

REPORT NO. CAL-88-N07

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

NISSAN MOTOR CO.
1988 NISSAN MAXIMA SE 4-DOOR SEDAN

NHTSA NO. MJ5200
CALSPAN TEST NO. 7626-7

CALSPAN CORPORATION
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February 10, 1988



FINAL REPORT

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OFFICE OF MARKET INCENTIVES
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16. Abstract <p>A frontal load cell barrier test of a 1988 Nissan Maxima SE 4-Door Sedan was performed at Calspan Corporation Advanced Technology Center Crash Test Facility in Buffalo, New York on February 10, 1988.</p> <p>The impact speed was 34.8 mph and the ambient temperature of the barrier face was 34^oF. The maximum post-test vehicle crush was 21.1 inches.</p> <p>The 1988 Nissan Maxima SE 4-Door Sedan was equipped with a passive shoulder belt and a manual lap belt. Both the shoulder belt and lap belt were used on each occupant in this test.</p> <p>With regard to FMVSS No. 208 "Occupant Crash Protection," injury criteria, the passenger dummy appeared to satisfy the head, chest and femur criteria, while the driver appeared to exceed the maximum chest deceleration over 3 milliseconds but did satisfy the head and femur requirements.</p>					
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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	OCCUPANT AND VEHICLE INFORMATION	3-1
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	Part 572 Dummy In-Vehicle Position	3-3
2	Occupant Clearance Dimensions	3-4
3	Seat Belt Positioning Data	3-5
4	Driver Dummy to Steering Column/Wheel Dimensions	3-7
5	Camera Positions for Frontal Impacts	3-8
6	Vehicle Target Locations	3-10
7	Load Cell Locations on Fixed Barrier	3-11
8	Vehicle Accelerometer Locations	3-12
9	Test Vehicle Measurements	3-13
10	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	3-2
3	Seat Belt Performance Assessment Test Data	3-6
4	High Speed Camera Locations	3-9
5	Vehicle Measurements	3-14

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.

Section 2
SUMMARY OF TEST NUMBER MJ5200

A load cell barrier consisting of 36 load cells was impacted by a 1988 Nissan Maxima SE 4-Door Sedan at a velocity of 34.8 mph. The test was performed at the Calspan Corporation Advanced Technology Center on February 10, 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.

The 1988 Nissan Maxima was equipped with a passive shoulder belt and a manual lap belt. The shoulder belt and the lap belt were both used on each occupant in the test.

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. Both ATDs had been used in previous NCAP tests. The driver ATD (Serial No. 749) had been used in tests MJ5100 and MJ0105. The right front passenger ATD (Serial No. 1021) had been used in test MJ0105. The Injury Criteria Values were not exceeded in any of these tests. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 60 channels of data were recorded in six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces. All channels checked out prior to the test. Questionable data loss experienced during impact were Barrier Load Cells A9, B1, C1, C2 and D7. Since these load cells are located on the far left and right of the barrier face (Figure 7) they probably experienced no force at impact. These load cells were not included in the summation of the groups or the total load cell barrier force. The vehicle accelerometer #4 experienced a cut wire approximately 30 milliseconds after impact.

The driver's head struck the steering wheel hub and rim; the HIC was 907. The maximum chest deceleration over 3 milliseconds was 64 g's and femur loads were 1500 and 1422 pounds.

The right-front passenger HIC was 861 and maximum chest deceleration over 3 milliseconds was 49 g's. Femur loads were 1049 and 885 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1988 Nissan Maxima SE 4-Door

NHTSA NO.: MJ5200 VIN.: JN1HU11P1JT604507

BODY COLOR: Red DATE OF MANUFACTURE: 8-87

Engine: 6 cylinders; - C.I.D.; 3.0 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: 22
X A/C; X P/S; X P/B; X P/wdo.; X Tilt Wheel
X P/seats; X Cruise Control

Type of Occupant Restraint: Passive Shoulder Belt/Manual Lap Belt

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 33 psi, Rear 29 psi

Recommended Tire Size: 195/60R15 86H

Recommended Cold Tire Pressure: Front 33 psi, Rear 29 psi

Tires on Vehicle: 195/60R15 86H; Manufacturer: Bridgestone

Number of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 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) = 900 lbs. (A)

No. of Occupants x 150 lbs. = 750 lbs. (B)

Rated Cargo and Luggage Weight (RCLW) A-B = 150 lbs.

GVWR 4065 lbs. GAWR: Front 2215 lbs. Rear 2050 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 = <u>1040</u> lbs.	Right Rear = <u>590</u> lbs.
Left Front = <u>1020</u> lbs.	Left Rear = <u>560</u> lbs.
TOTAL FRONT WEIGHT = <u>2060</u> lbs. (<u>64</u> % of Total Vehicle Weight)	
TOTAL REAR WEIGHT = <u>1150</u> lbs. (<u>36</u> % of Total Vehicle Weight)	
TOTAL DELIVERY WEIGHT = <u>3210</u> lbs.	

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (3210 lbs.)
 VCW = Vehicle Capacity Weight (900 lbs.)
 DSC = Designated Seating Capacity (5)
 RCLW = VCW - 150 (DSC) = 150 lbs.
 Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)
 Target Test Weight = 3688 lbs.

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

Right Front = <u>1120</u> lbs.	Right Rear = <u>800</u> lbs.
Left Front = <u>1070</u> lbs.	Left Rear = <u>700</u> lbs.
TOTAL FRONT WEIGHT = <u>2190</u> lbs. (<u>59</u> % of Total Vehicle Weight)	
TOTAL REAR WEIGHT = <u>1500</u> lbs. (<u>41</u> % of Total Vehicle Weight)	
TOTAL TEST WEIGHT = <u>3690</u> lbs.	
Weight of ballast secured in vehicle trunk area = <u>0</u> lbs.	

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude:	RF <u>26.5</u>	LF <u>26.8</u>	RR <u>26.7</u>	LR <u>27.0</u>
Test Attitude:	RF <u>26.1</u>	LF <u>27.1</u>	RR <u>24.8</u>	LR <u>25.8</u>
Wheel Base:	<u>105</u> in.; C.G. = <u>42.7</u> in. rearward of front wheel C/L			
Remarks:	<u>None</u>			

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

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0 °
 Date of Test: February 10, 1988 Time of Test: 12:15
 Ambient Temperature: 34 °F at impact area
 Temperature in Occupant Compartment: 72 °F.
 Windshield Molding Temperature: 70 °F.
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 34.8 mph, secondary = 34.8 mph
 Distance From Front Bumper to Barrier Face When Entering Speed Trap: 52
 inches; Exiting Speed Trap: 12 inches

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length:	Pre-test	= R	<u>176.3</u>	C _L	<u>181.4</u>	L	<u>176.6</u>
	Post-test	= R	<u>157.3</u>	C _L	<u>160.3</u>	L	<u>157.7</u>
	Crush	= R	<u>19.0</u>	C _L	<u>21.1</u>	L	<u>18.9</u>

Distance from front of test vehicle to point of impact:

R 25.5 C/L 25.1 L 25.5

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Steering Rim and Hub</u>	<u>Sun Visor</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>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Door Opening	<u>Operable</u>	<u>Operable</u>	<u>Operable</u>	<u>Operable</u>

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

Section 3
OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

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

II. OVR DATA

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

Table 2
DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-108	12	88	136	-68	-18	-17	64
DUMMY (2)	-21	22	68	68	-51	20	-8	49
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	1500	1422
DUMMY (2)	1049	885
DUMMY (3)		
DUMMY (4)		

	MAXIMUM FORCE - SEAT BELTS LOADS (LBS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	2572	-	411
DUMMY (2)	2826	995	-
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**			
	HIC	36 millisecond max.		AVE. ACC. (g) t ₁ TO t ₂
		t ₁ (SEC)	t ₂ (SEC)	
DUMMY (1)	907	.06630	.08820	70.3
DUMMY (2)	861	.06975	.10575	56.4
DUMMY (3)				
DUMMY (4)				

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION

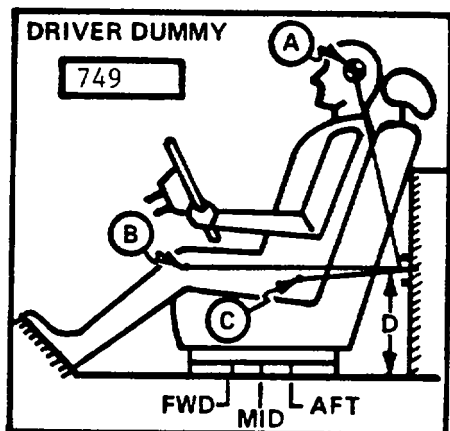
TEST NO.: MJ5200

VEHICLE: 1988 Nissan Maxima

SEAT TYPE:
 _____ Bench
 X Bucket
 _____ Split Bench

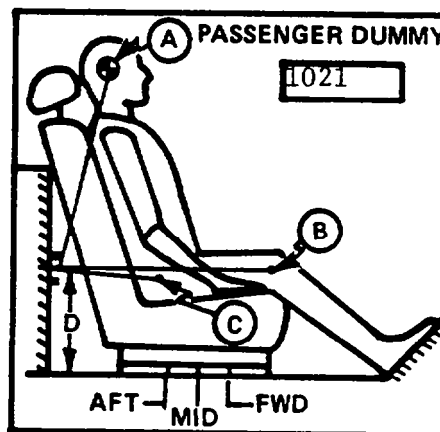
ADJUSTER TYPE:
 _____ Manual
 X Power

BUCKET SEAT BACK TYPE:
 _____ Fixed
 X Adjustable Reclining



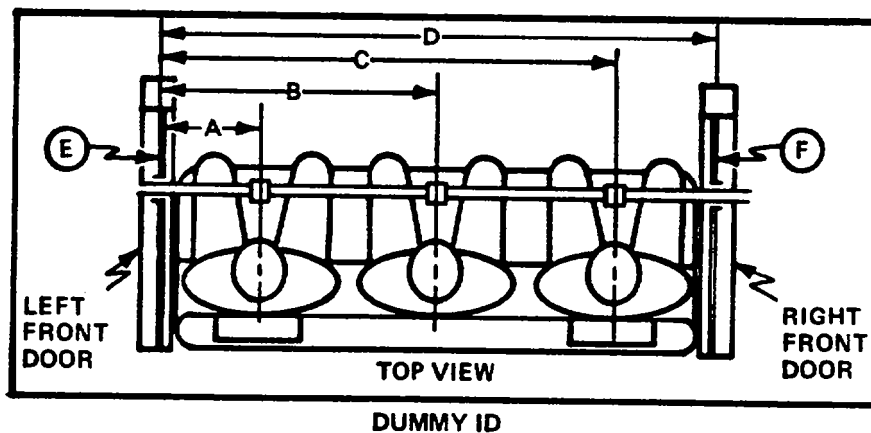
MEASUREMENT LOCATION

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



A = 21.5 in. -4 Degrees
 B = 23.5 in. 96 Degrees
 C = 8.6 in. 139 Degrees
 D = 13.4 in.

A = 22.3 in. -5 Degrees
 B = 21.3 in. 91 Degrees
 C = 7.2 in. 137 Degrees
 D = 13.4 in.



749

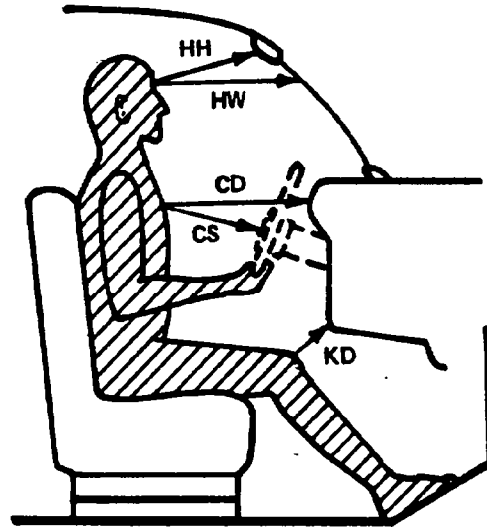
1021

A = Left Door to Driver Centerline 11.7in.
 B = Left Door to Center Passenger Centerline - in.
 C = Left Door to Right Passenger Centerline 38.6in.
 D = Left Door to Right Door 50.0in.
 E, F = Window Glass Height (Right and Left Must Be Equal) 11.5in.

Figure 2

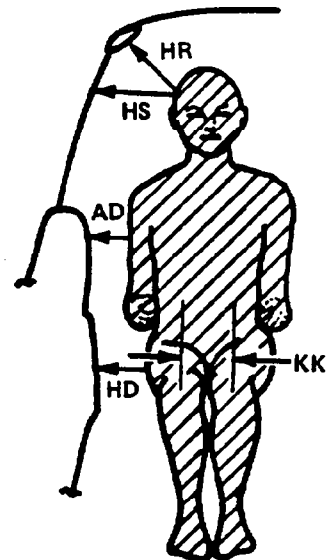
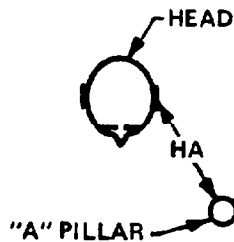
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	14.7	15.9
HW	20.2	20.3
CD	22.3	23.5
CS	14.2	-
KDL	5.3	5.9
KDR	5.1	6.4
SA	25°	25°
TA	24°	24°



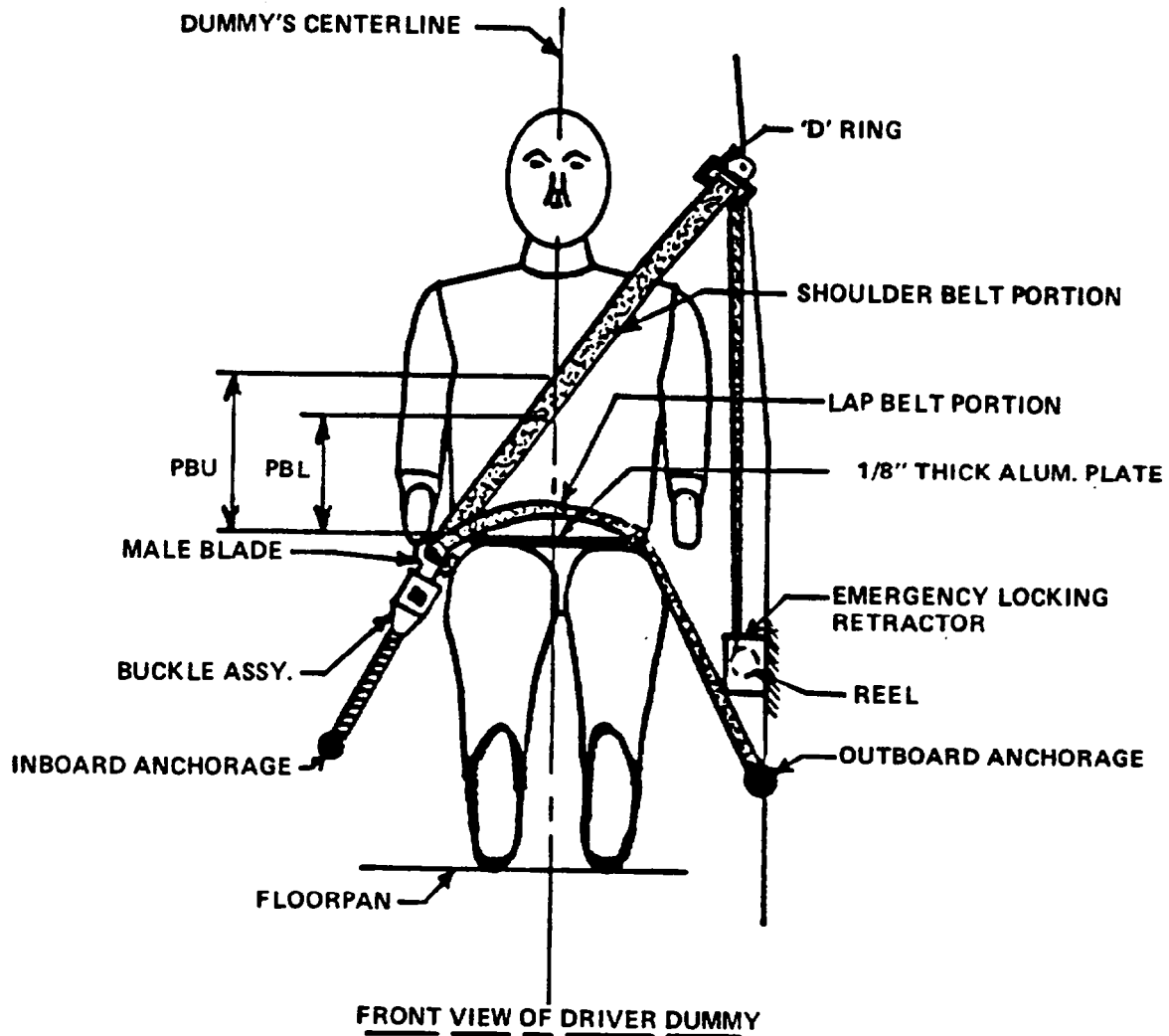
- HH = Head to Windshield Header
- HW = Head to Windshield
- CD = Chest to Dash
- CS = Chest to Steering Wheel
- KD(L/R) = Knee to Dash (Left/Right)
- SA = Seat Back Angle
- TA = Torso Angle

- 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	4.8	4.7
HS	8.7	8.5
AD	3.8	3.8
HD	6.2	6.0
KK	10.8	7.2
HA	20.0	19.1

Figure 3
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	13.5	13.5
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	10.5	10.5
<u>LAP BELT TENSION</u>	2 lbs	2 lbs
<u>SHOULDER BELT TENSION</u>	1.5 lbs	1.5 lbs

Table 3

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.

Driver

Passenger

Passive Belt system

Should belt length as measured on Part 572 Dummy.

35.0"

35.0"

Lap belt length as measured on Part 572 Dummy.

34.0"

34.0"

TORSO BELT SPOOL-OFF DATA:

As determined by film analysis.

See
Note 1

See
Note 1

As determined mechanically.

0.5"

0.5"

BELT STRETCH DATA:

Measured electronically between shoulder belt load cell and the "D" ring.

.82 inches/foot

1.6 inches/foot

Measured Mechanically

0.0

0.0

LAP BELT SPOOL-OFF:

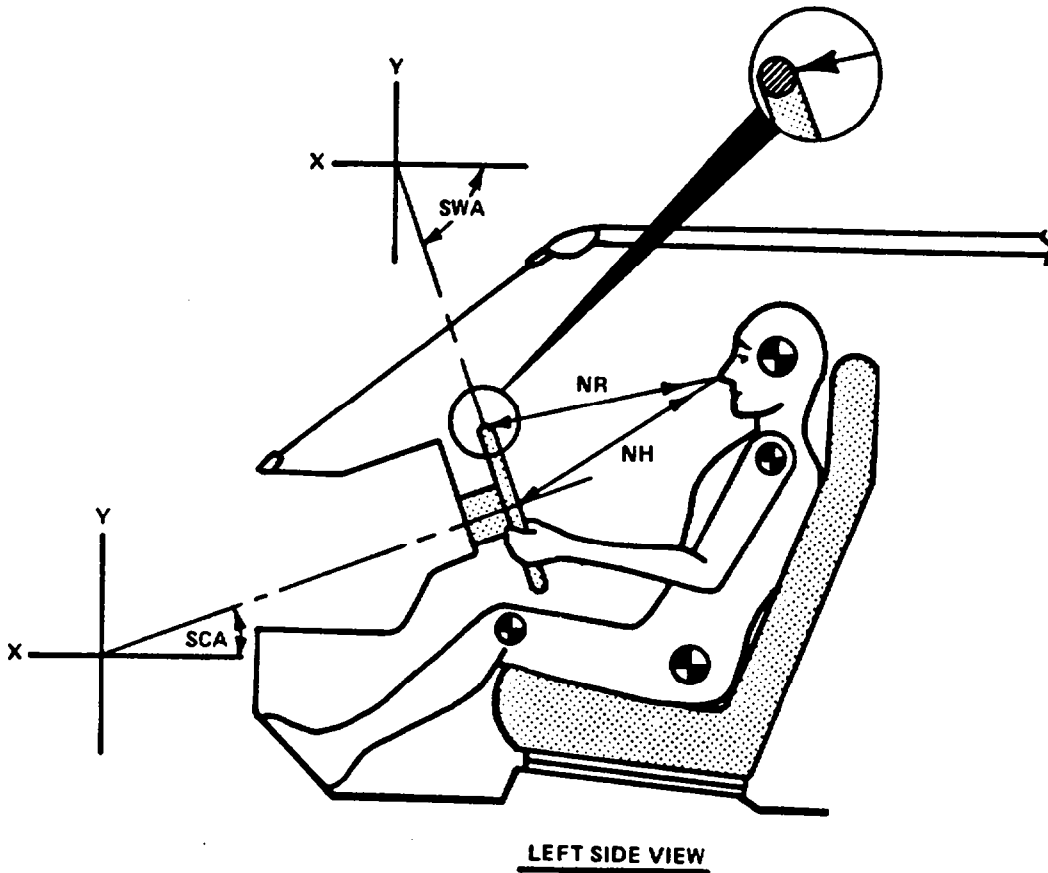
As measured mechanically

1.5"

2.0"

Note 1: Film coverage is not available for belt spool-off.

Figure 4
 DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



	MEASUREMENTS	
<u>NR</u> -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	19.2	Inches
<u>NH</u> -- Distance from tip of dummy's nose to center of steering column hub	20.5	Inches
<u>SCA</u> -- Angle of steering column relative to the horizontal X axis	24	Degrees
<u>SWA</u> -- Angle of steering wheel relative to the horizontal X axis	-66	Degrees

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

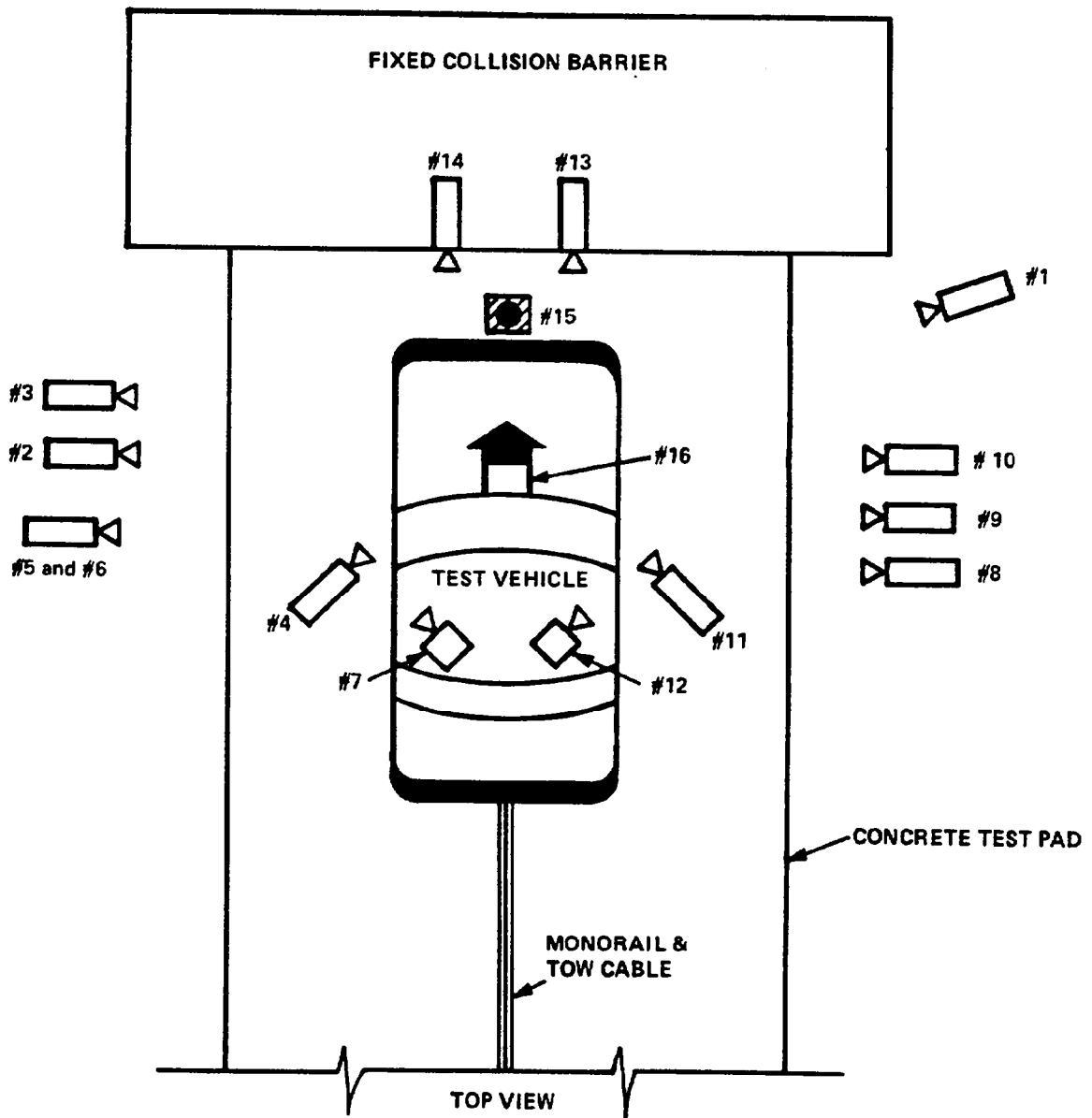


Table 4
HIGH-SPEED CAMERA LOCATIONS

Test No. MJ5200

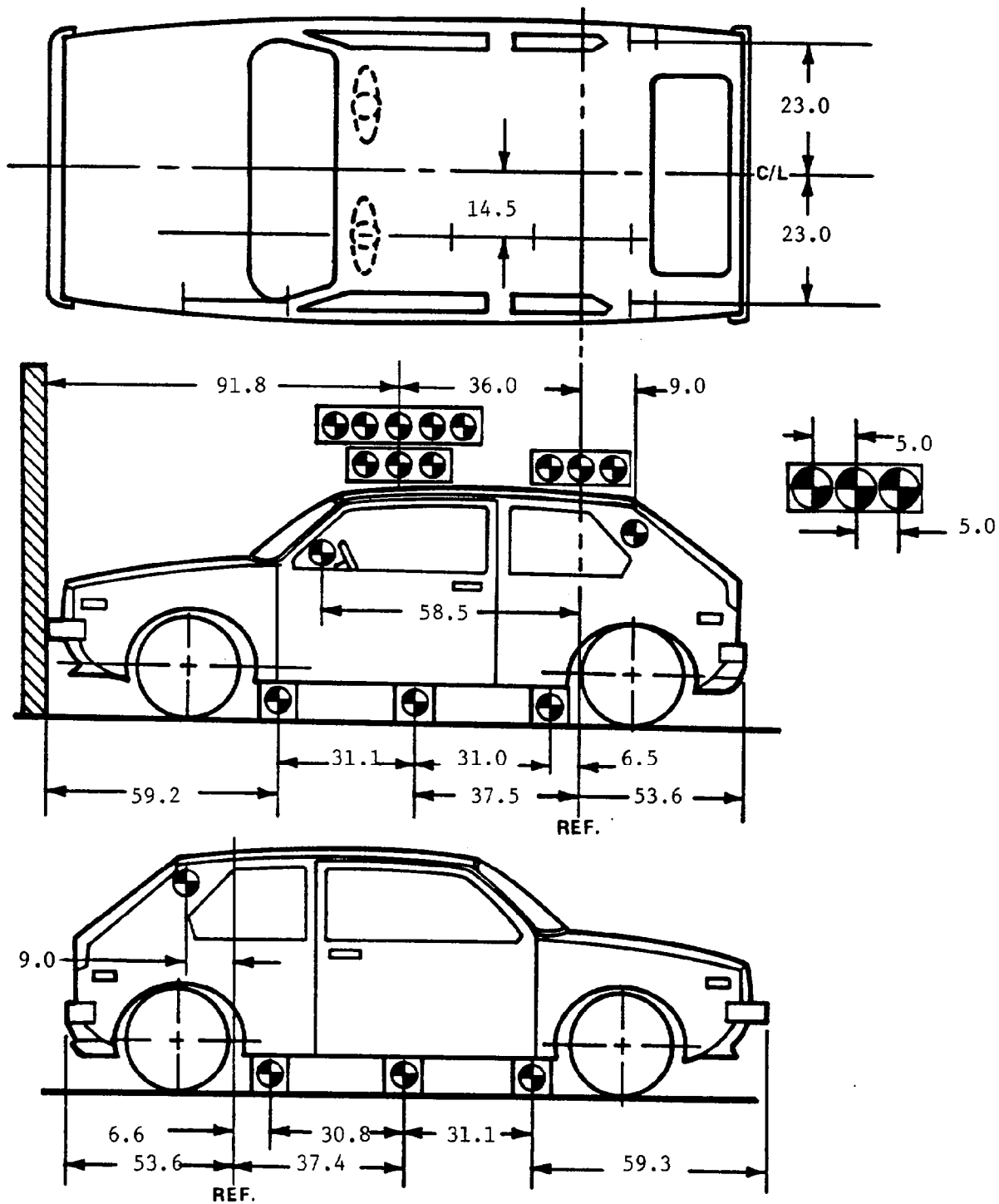
Vehicle 1988 Nissan Maxima SE

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	25	
2	Overall Left Side	275	46	42	-5	-	540	
3	Left Side View	232	40	41	-4	-	540	
4	Driver and Interior View	90	115	71	-19	-	810	
5	Steering Column (Bottom)	265	78	50	-4	248.5	550	
6	Steering Column (Top)	265	78	75	-10	248.5	550	
7	Left Belt	-	-	-	-	-	1110	
8	Overall Right Side	238	50	43	0	-	800	
9	Right Side View	250	52	44	-3	-	870	
10	Right Passenger View	255	70	48	-3	238.5	825	
11	Passenger and Interior View	82	110	60	-17	65.5	600	
12	Right Belt	-	-	-	-	-	1090	
13	Passenger Front View	24	5	72	-40	-	550	
14	Driver Front View	24	5	72	-39	-	540	
15	Windshield View	0	0	126	-55	-	530	
16	Pit View of Engine	0	30	-120	90	-	910	

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

Figure 6

VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

Figure 7

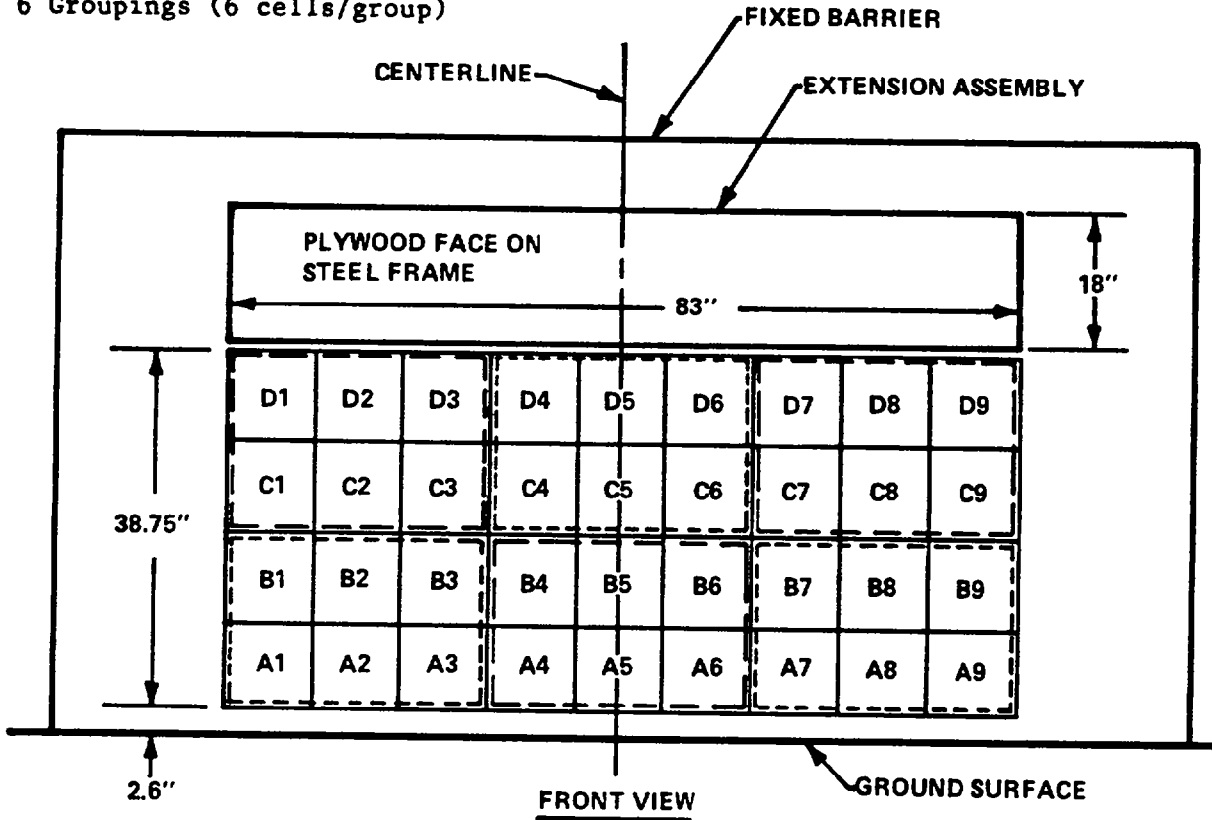
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells

4 Rows

9 Columns

6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

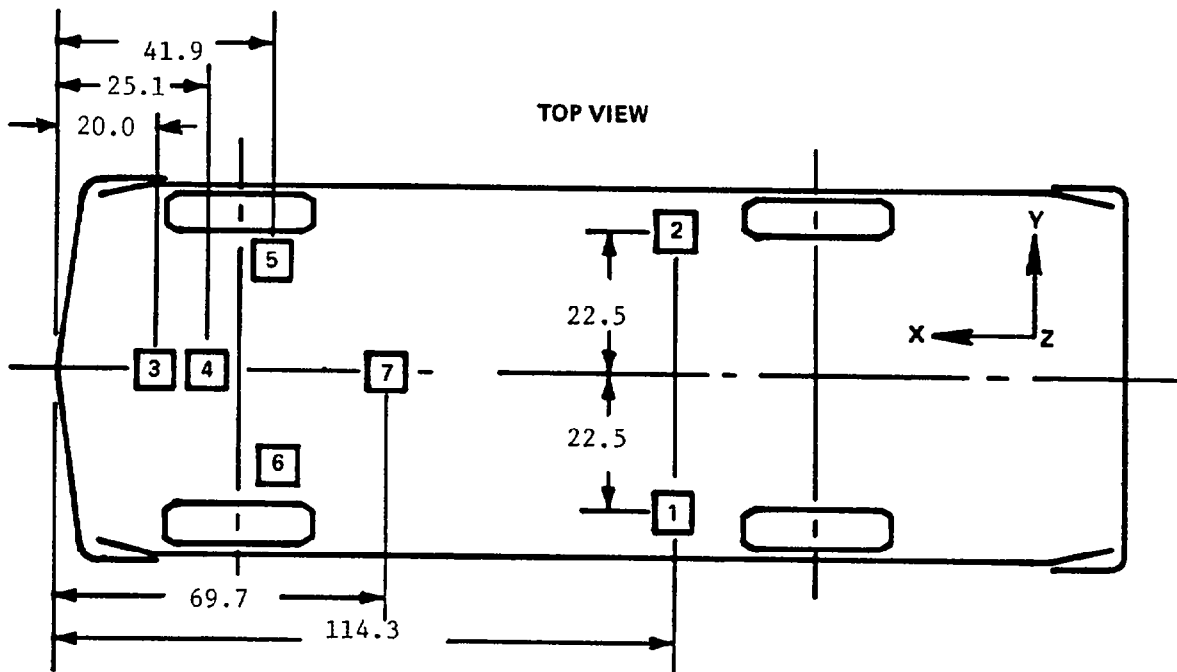
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

The following data is presented in Appendix B:

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

Figure 8

VEHICLE ACCELEROMETER LOCATIONS



ACCELEROMETER NUMBER*	ACCELEROMETER LOCATION	DIRECTION		
		X	Y	Z
1	Left Rear Seat Crossmember	X		
2	Right Rear Seat Crossmember	X		
3	Top of Engine	X		
4	Bottom of Engine	X		
5	Right Disc Brake Caliper	X		
6	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 9

TEST VEHICLE MEASUREMENTS

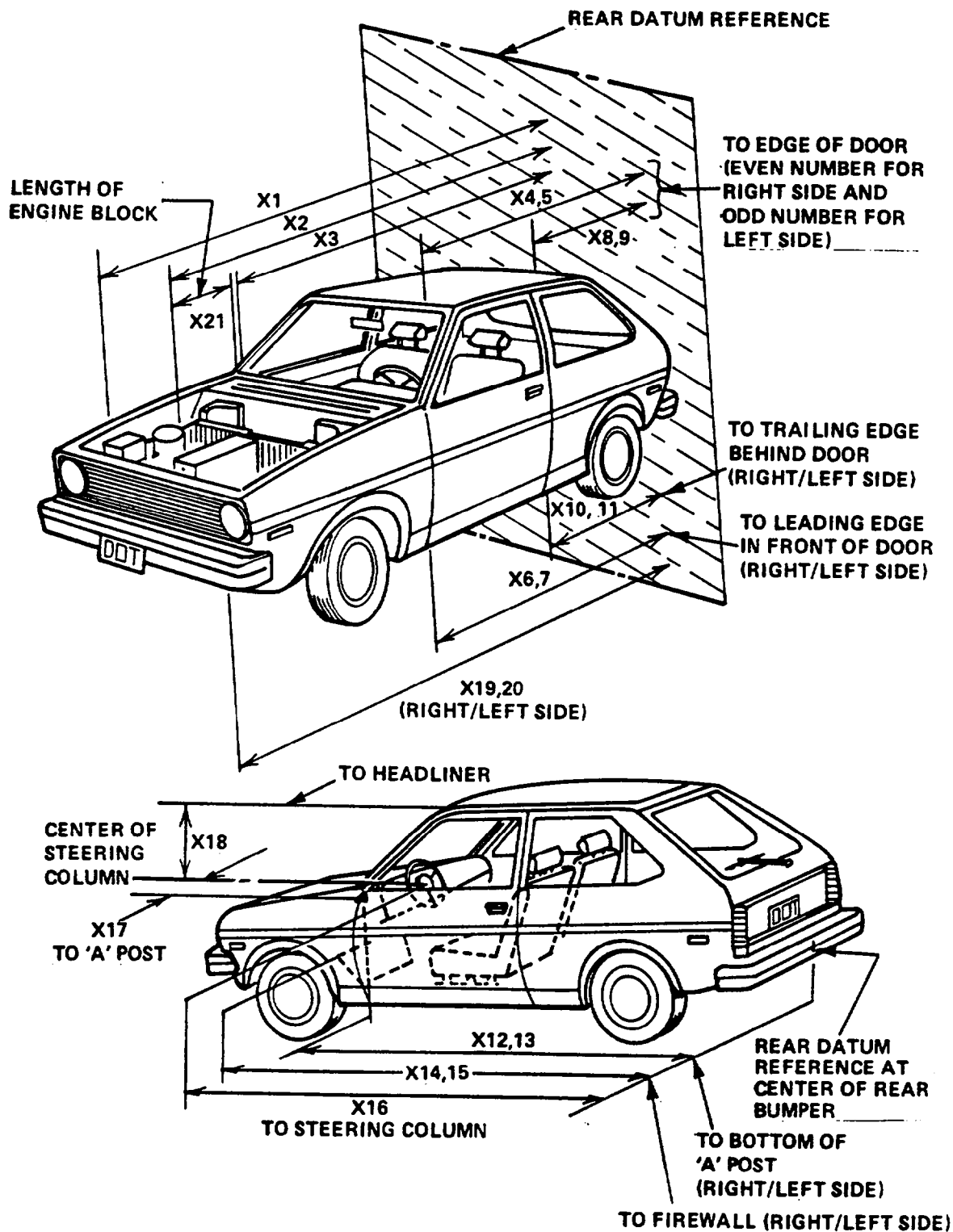
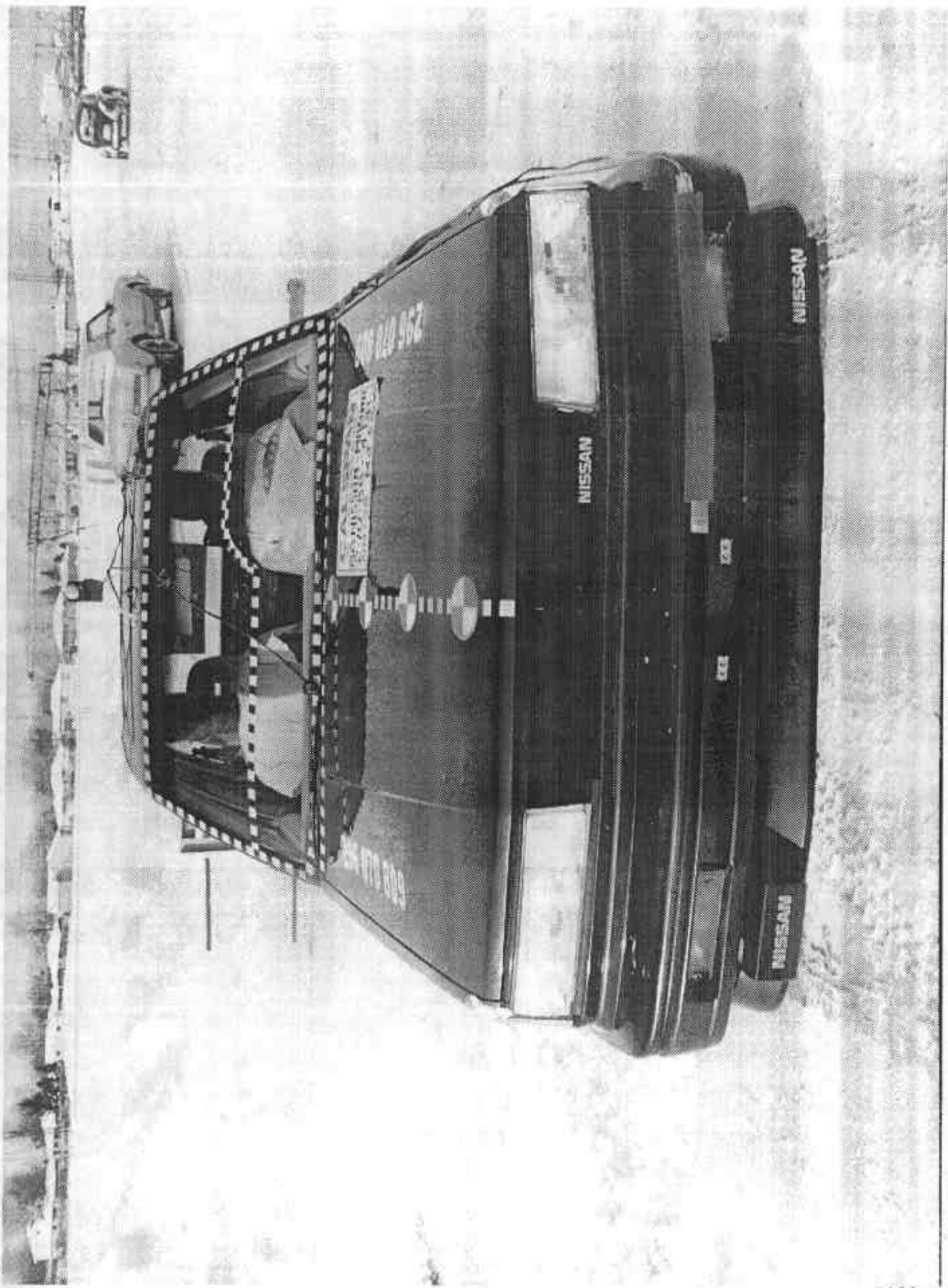


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	181.4	160.3	21.1
X2	Rear Surface of Vehicle to Front of Engine	160.9	144.0	16.9
X3	Rear Surface of Vehicle to Firewall	131.7	131.3	0.4
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	123.0	123.0	0.0
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	123.0	122.8	0.2
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	121.8	121.8	0.0
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	121.4	121.5	-0.1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	82.1	82.0	0.1
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	82.2	81.8	0.4
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	81.1	81.1	0.0
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	81.0	80.6	0.4
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	121.8	121.8	0.0
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	121.4	121.5	-0.1
X14	Rear Surface of Vehicle to Firewall, Right Side	130.1	123.8	6.3
X15	Rear Surface of Vehicle to Firewall, Left Side	130.7	124.7	6.0
X16	Rear Surface of Vehicle to Steering Column	104.7	102.0	2.7
X17	Center of Steering Column to "A" Post	15.2	14.9	0.3
X18	Center of Steering Column to Headliner	16.5	15.3	1.2
X19	Rear Surface of Vehicle to Right Side of Front Bumper	176.3	157.3	19.0
X20	Rear Surface of Vehicle to Left Side of Front Bumper	176.6	157.7	18.9
X21	Length of Engine Block	16.4	16.4	0.0

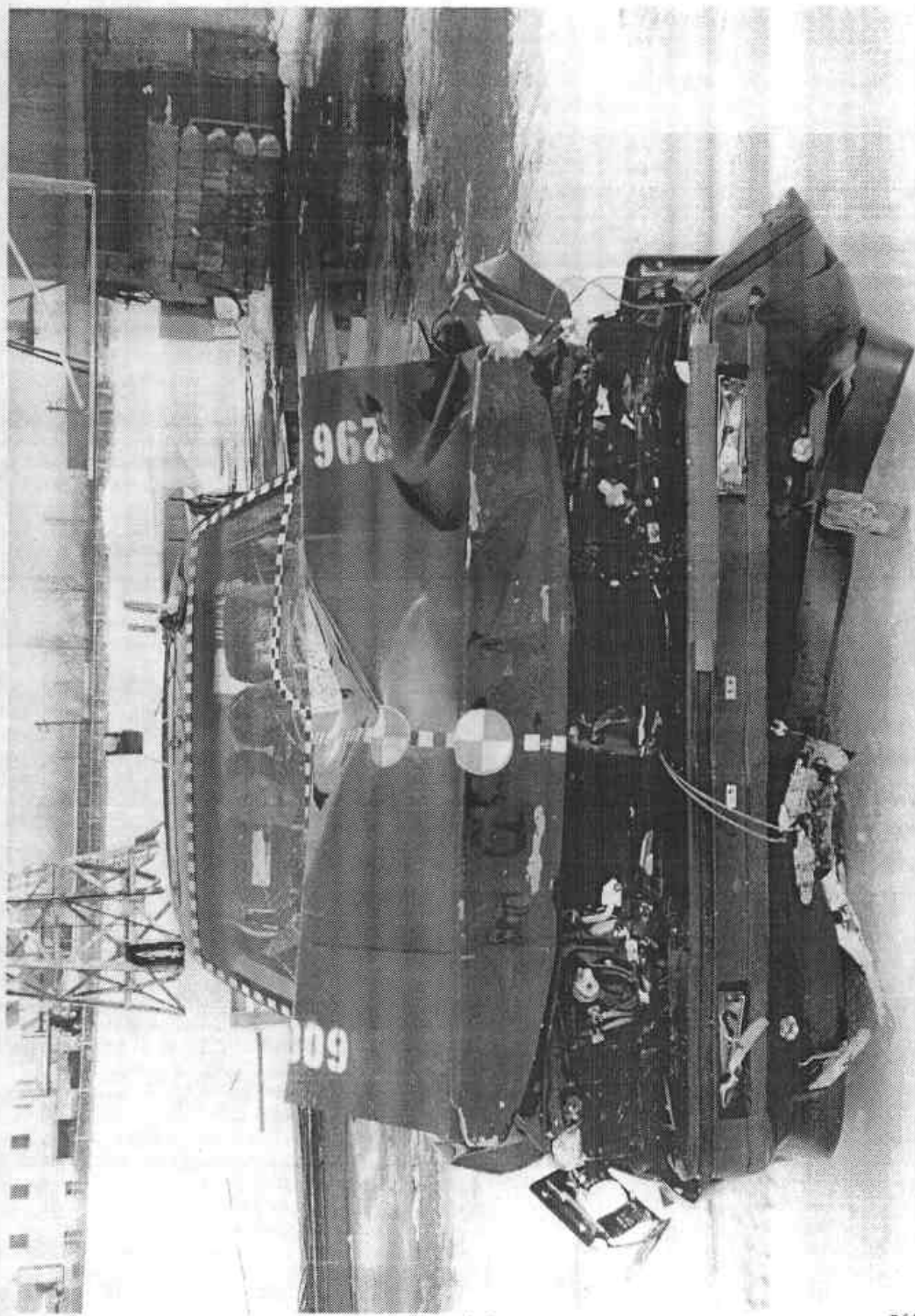
Appendix A
PHOTOGRAPHS



A-2

7626-7

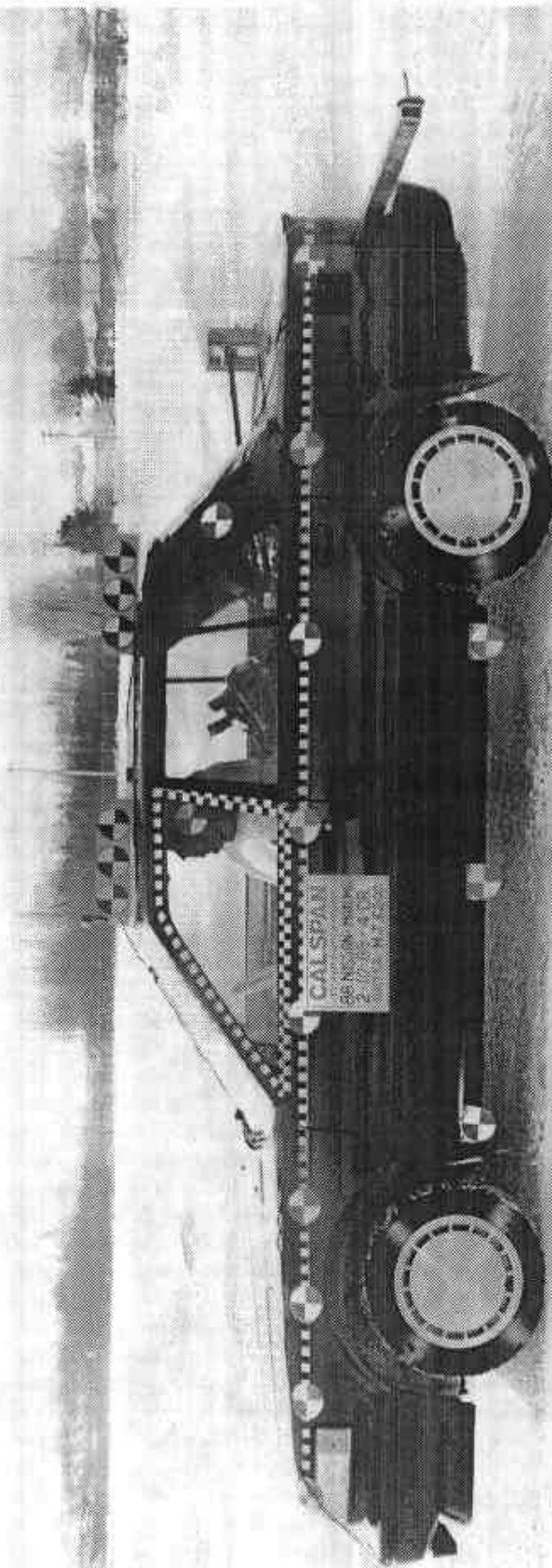
A-1 PRE-TEST FRONT VIEW



A-3

7626-7

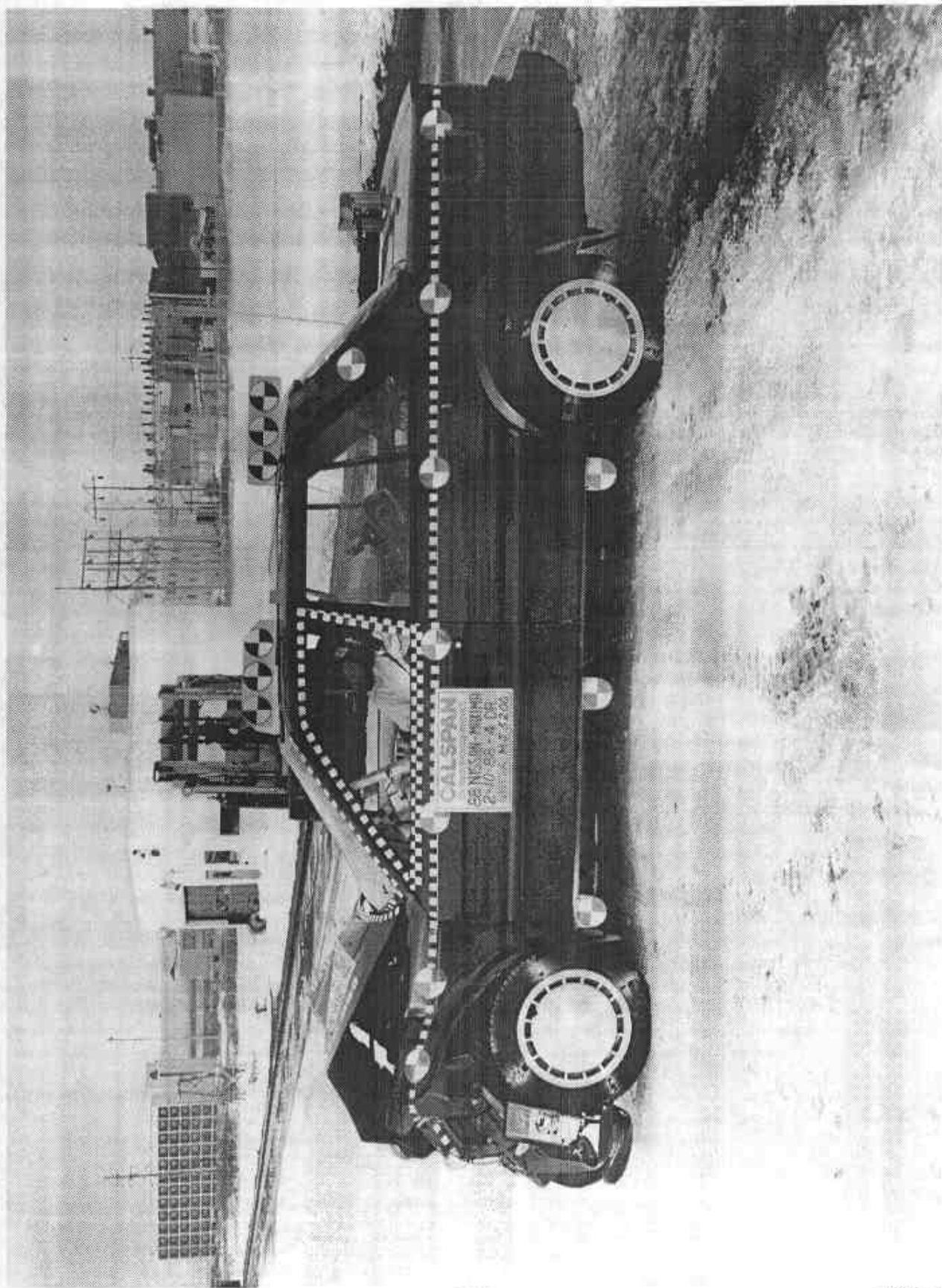
A-2 POST-TEST FRONT VIEW



A-4

7626-7

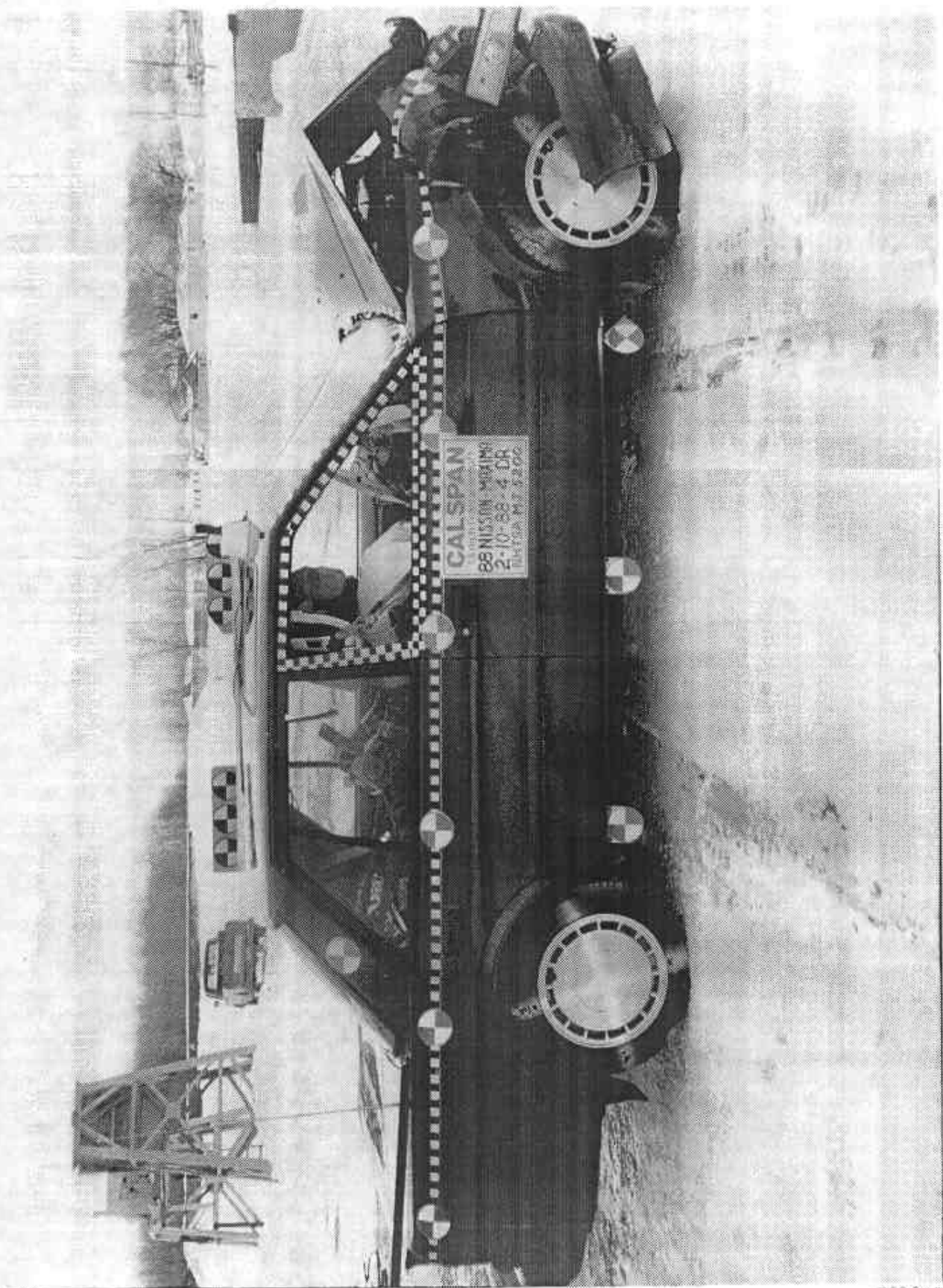
A-3 PRE-TEST LEFT SIDE VIEW



A-4 POST-TEST LEFT SIDE VIEW

A-5

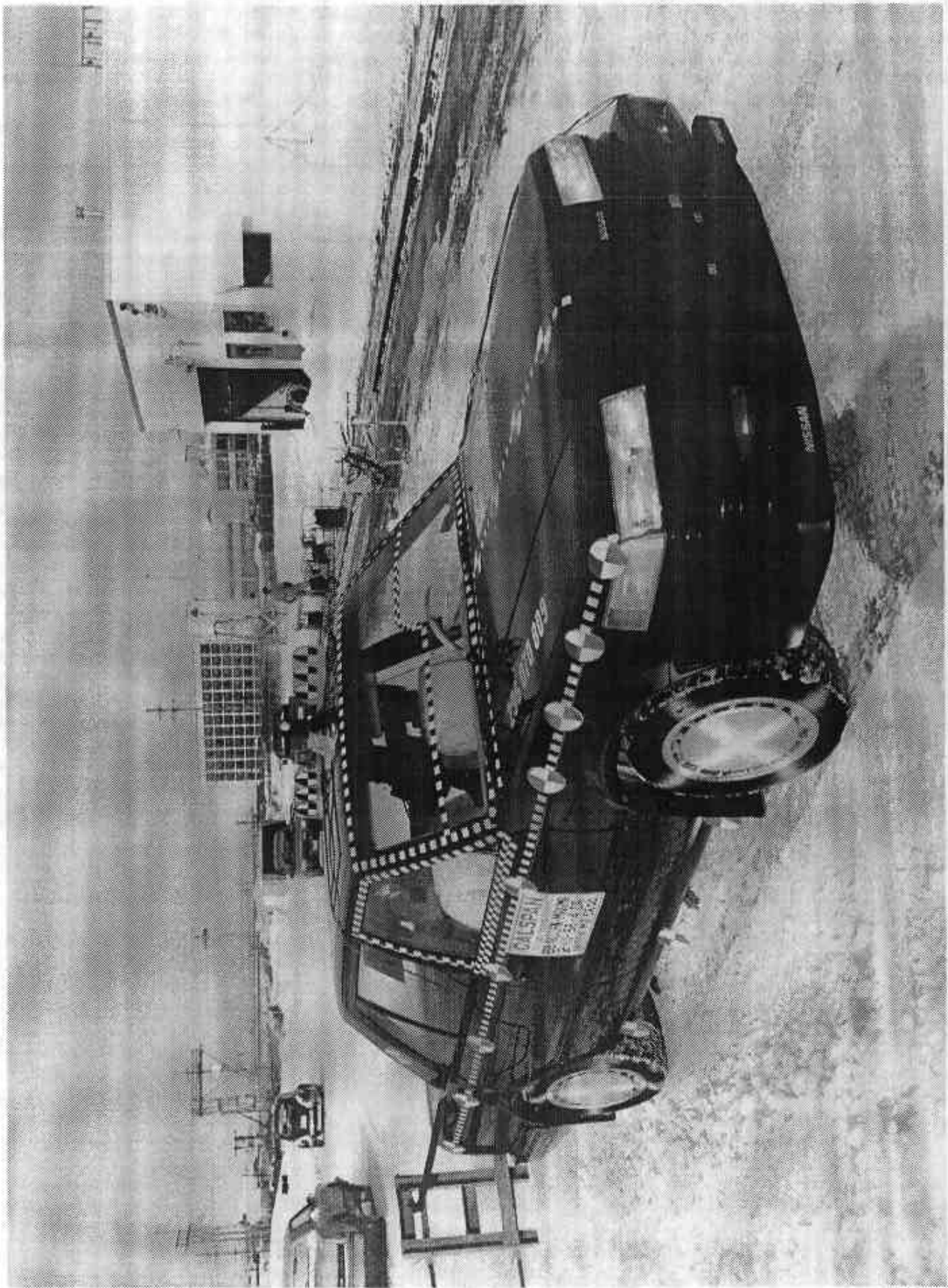
7626-7



A-6 POST-TEST RIGHT SIDE VIEW

A-7

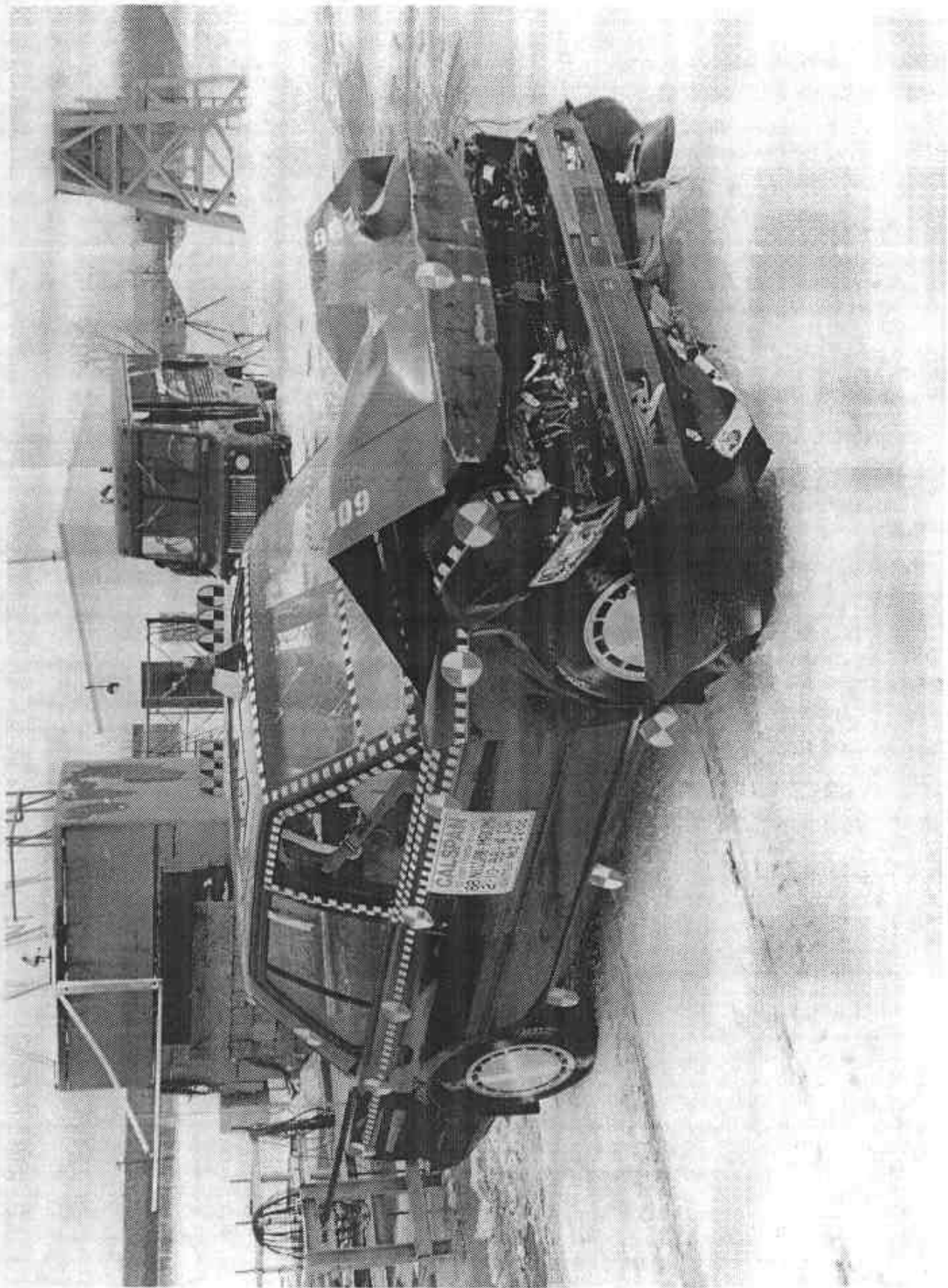
7626-7



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

A-8

7626-7



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

A-9

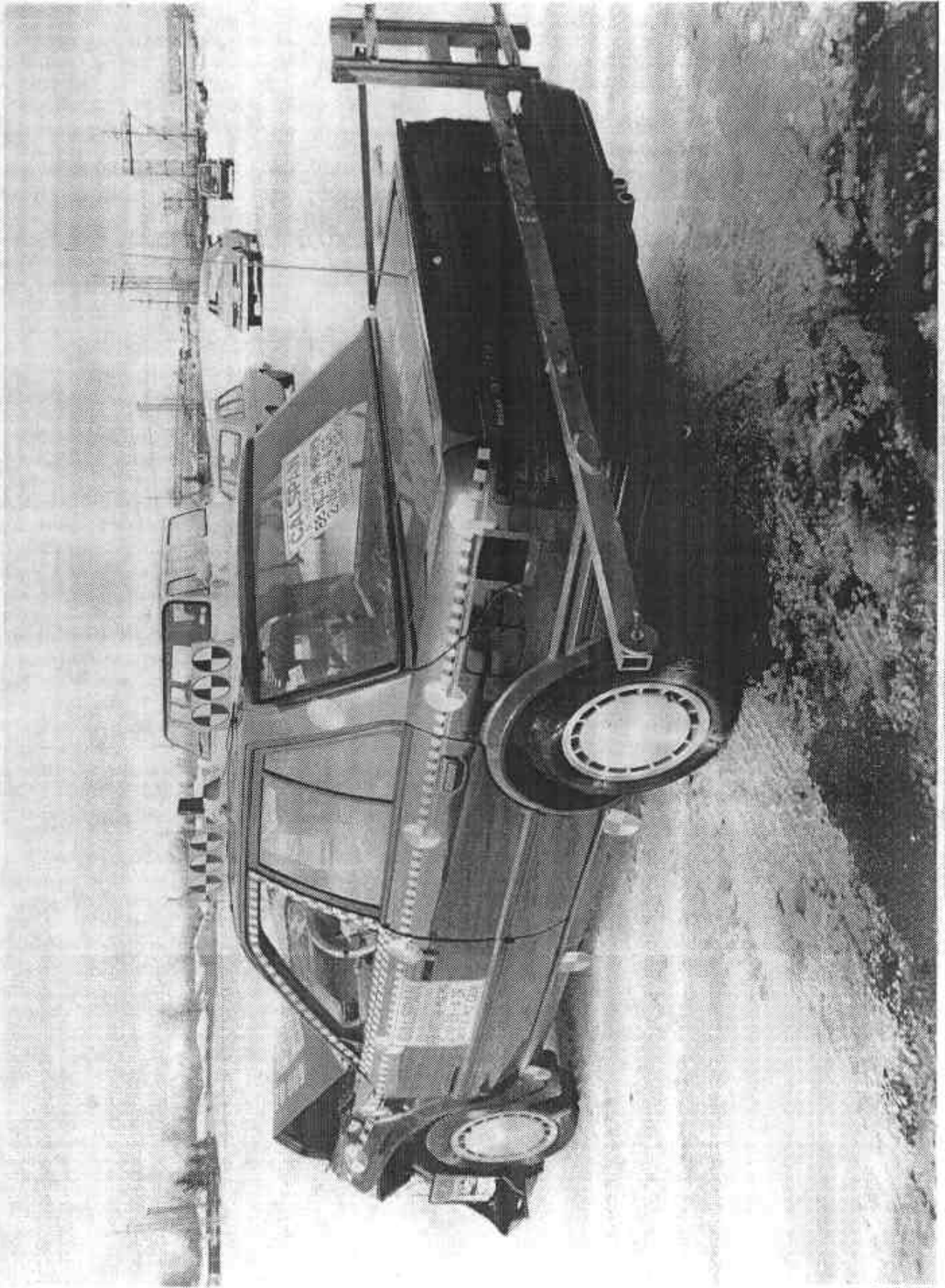
7626-7



A-10

7626-7

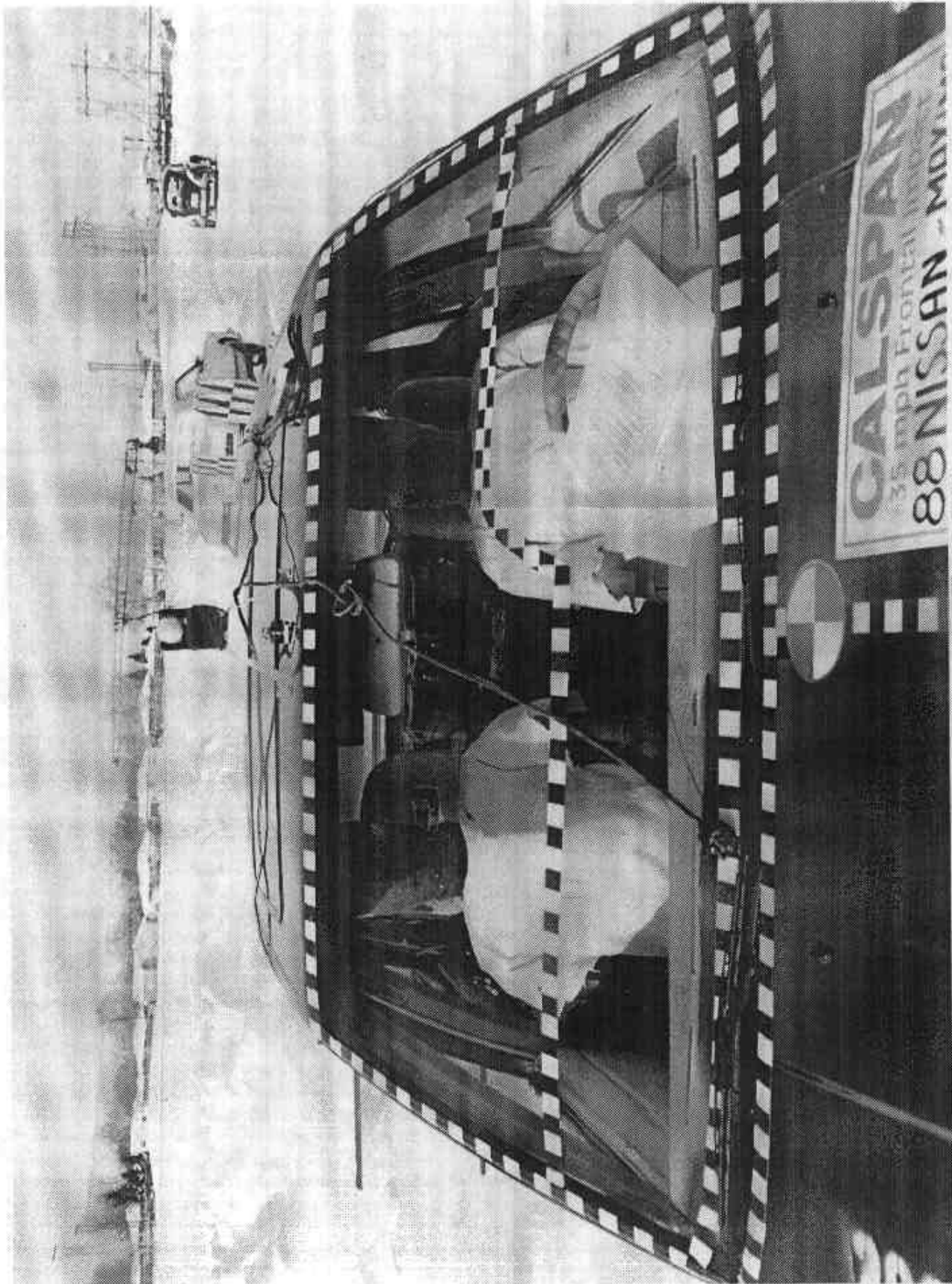
A-9 PRE-TEST LEFT REAR THREE QUARTER VIEW



A-10 POST-TEST LEFT REAR THREE QUARTER VIEW

A-11

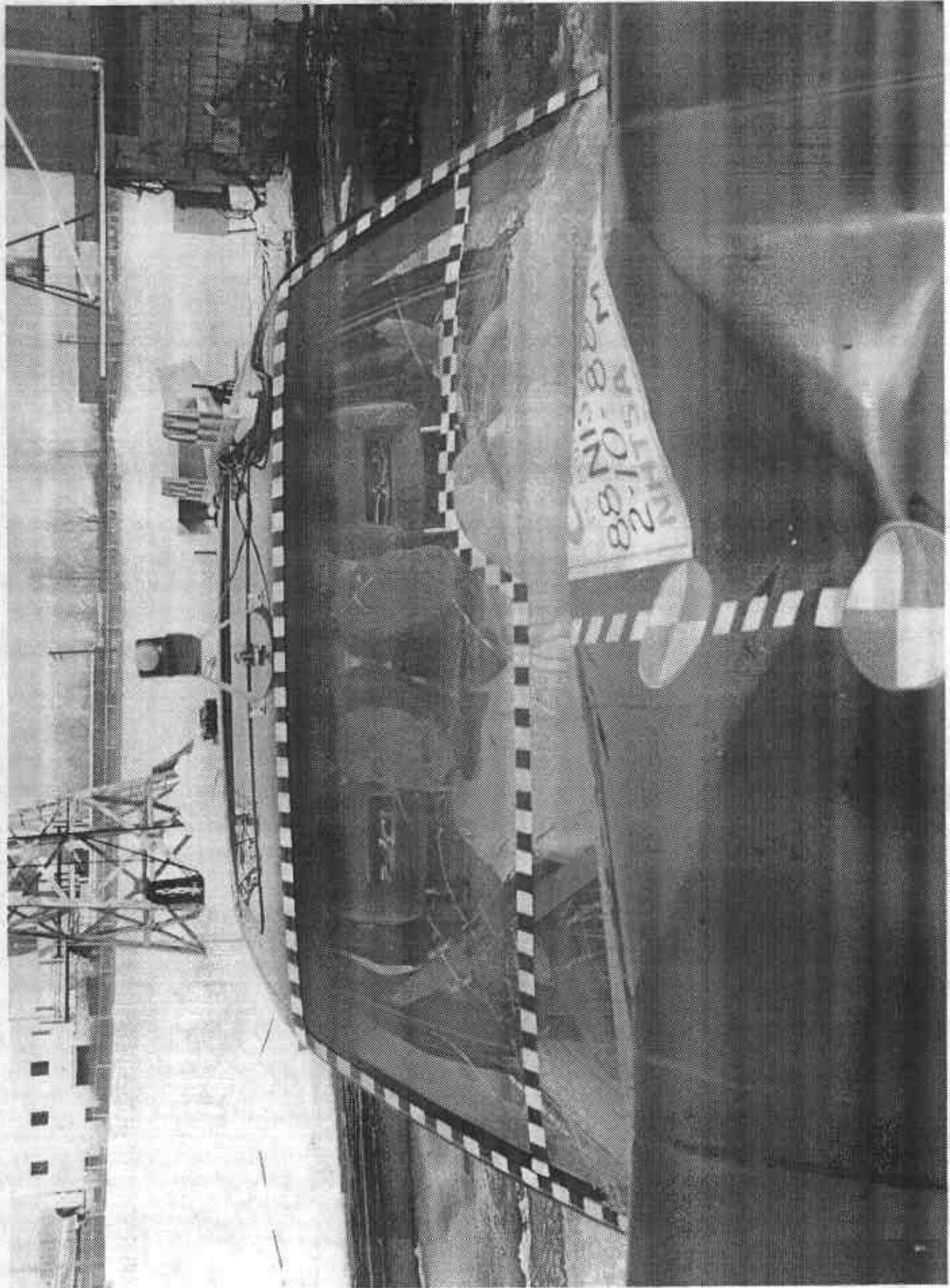
7626-7



A-11 PRE-TEST WINDSHIELD VIEW

A-12

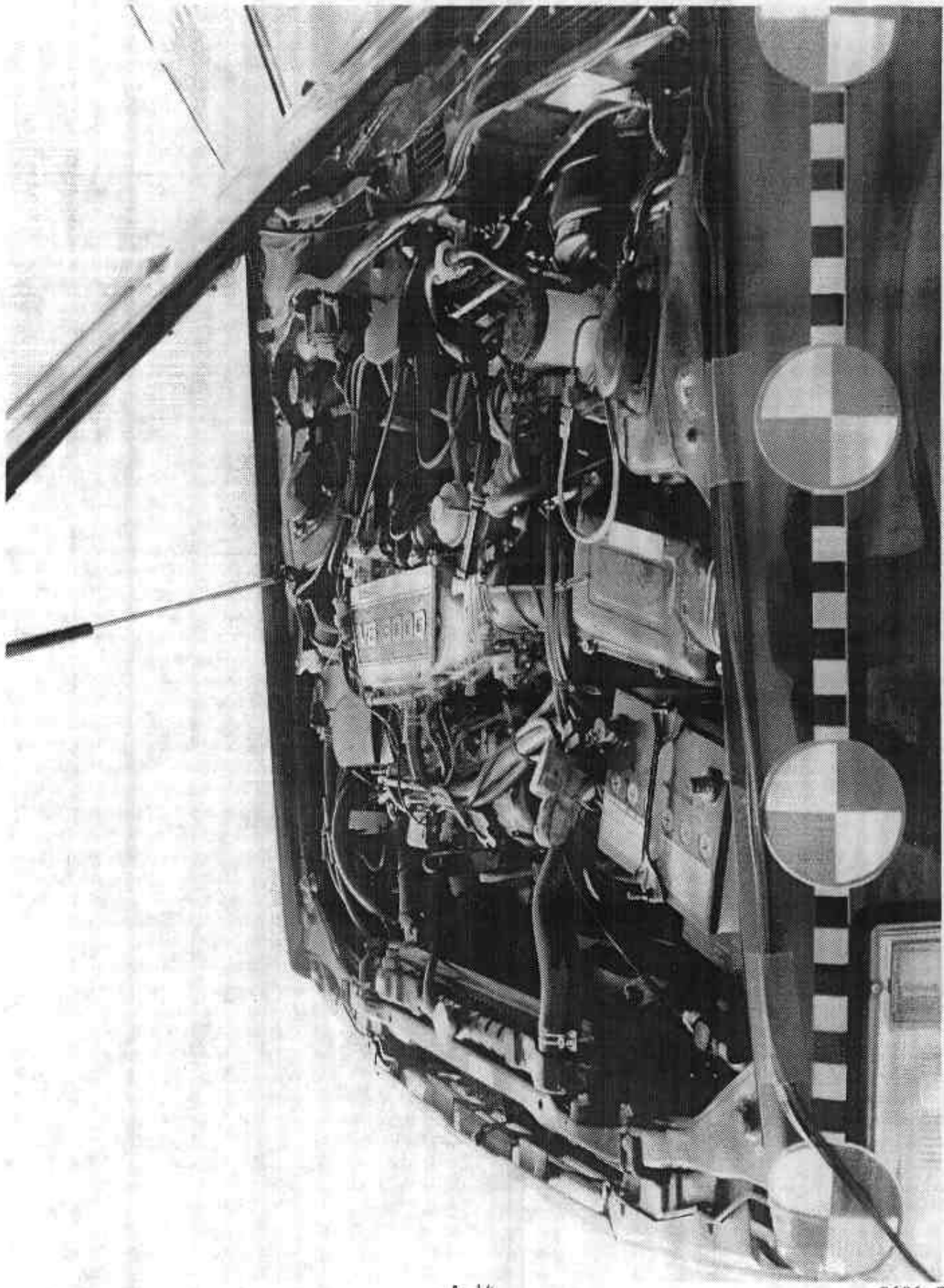
7626-7



A-12 POST-TEST WINDSHIELD VIEW

A-13

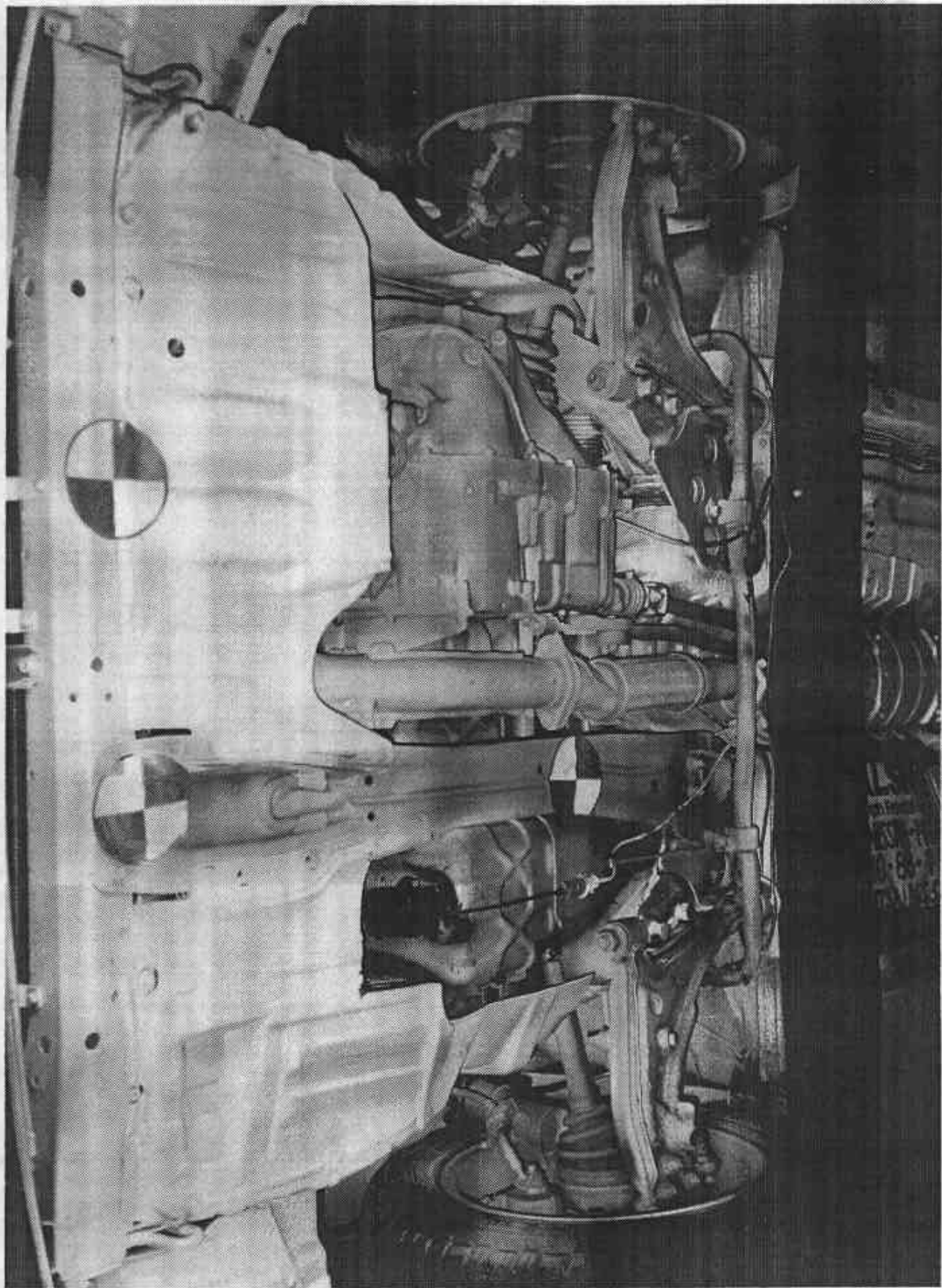
7626-7



A-13 PRE-TEST ENGINE COMPARTMENT VIEW

A-14

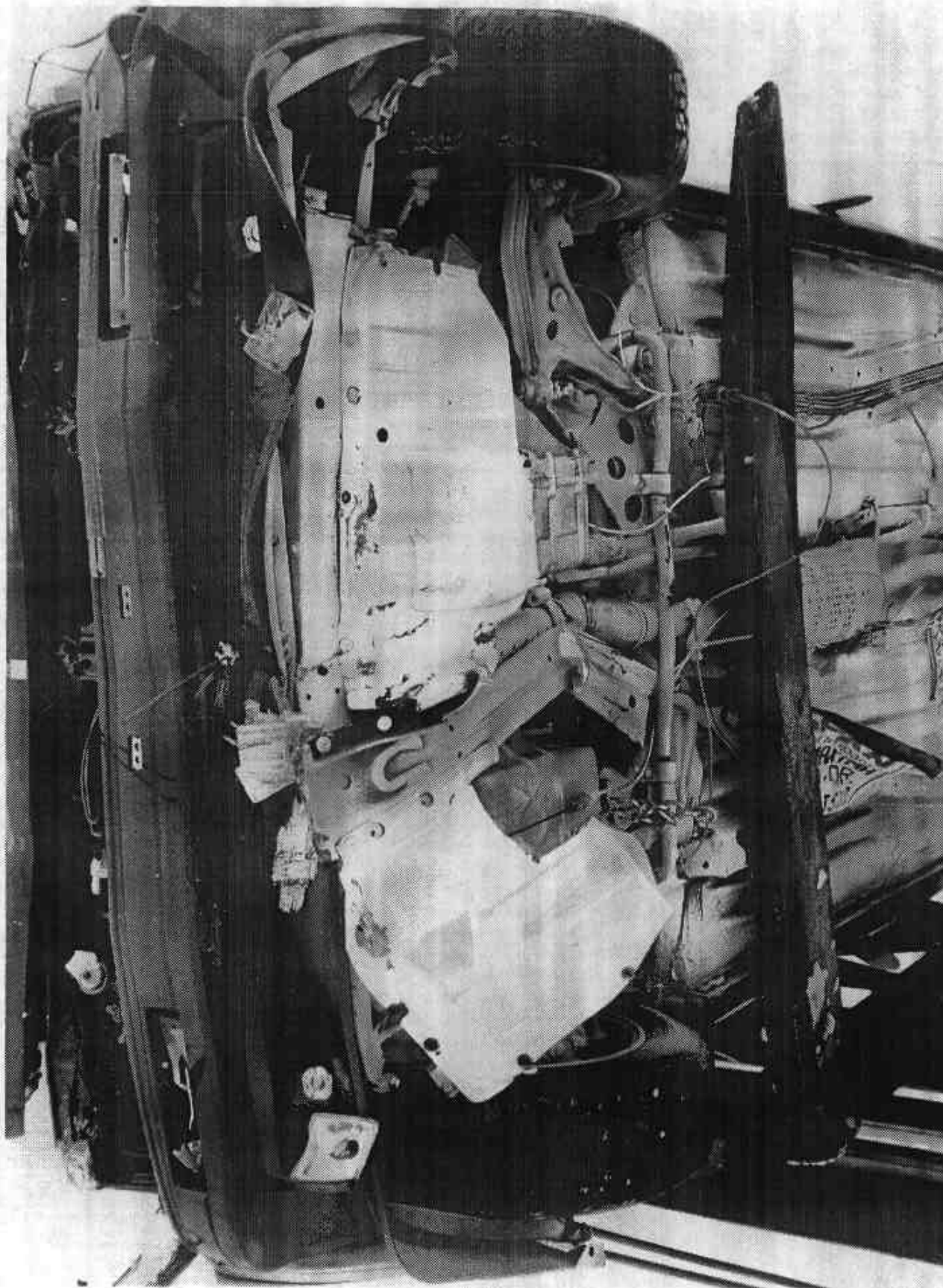
7626-7



A-14 PRE-TEST FRONT UNDERBODY VIEW

A-15

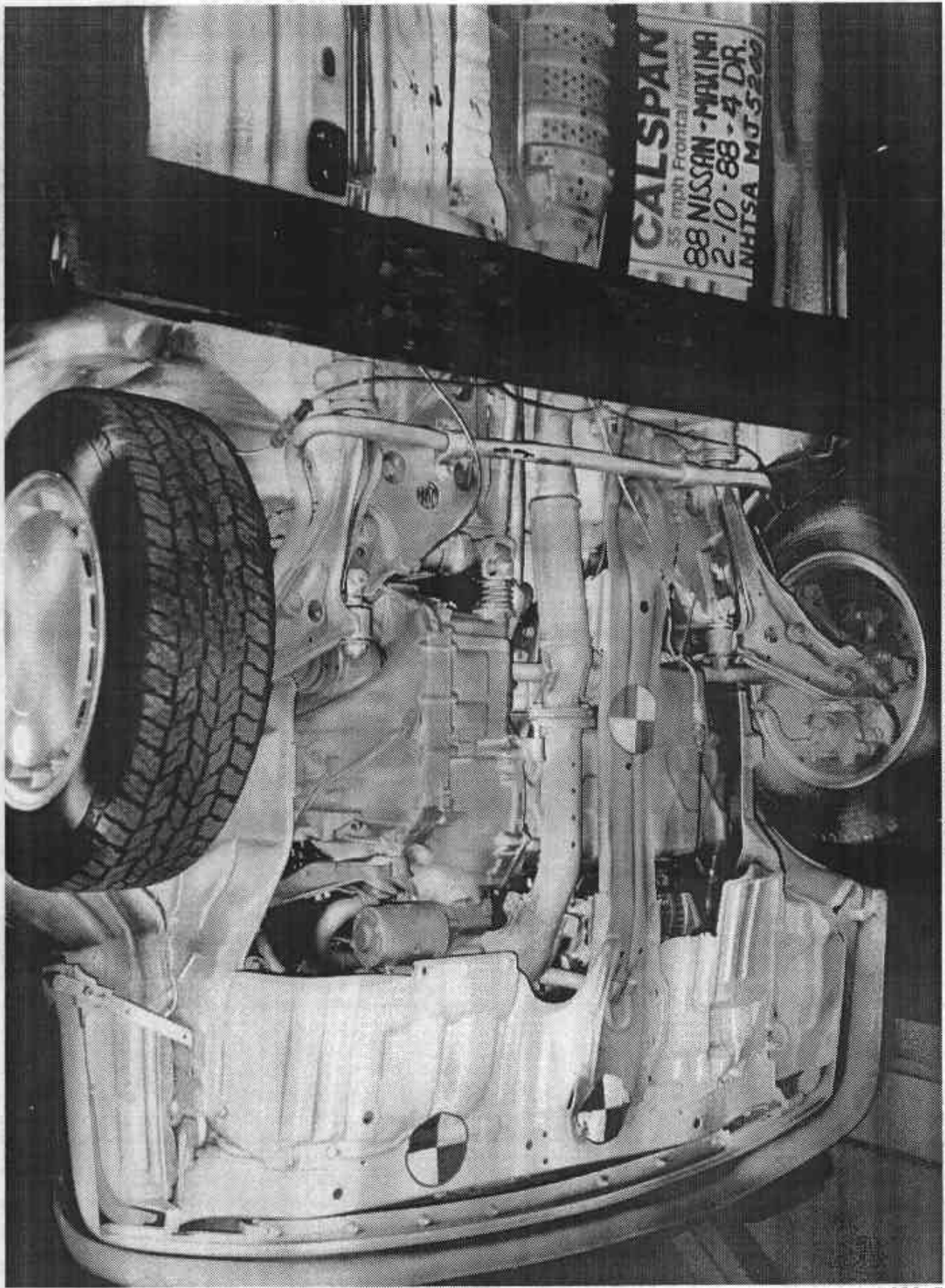
7626-7



A-15 POST-TEST FRONT UNDERBODY VIEW

A-16

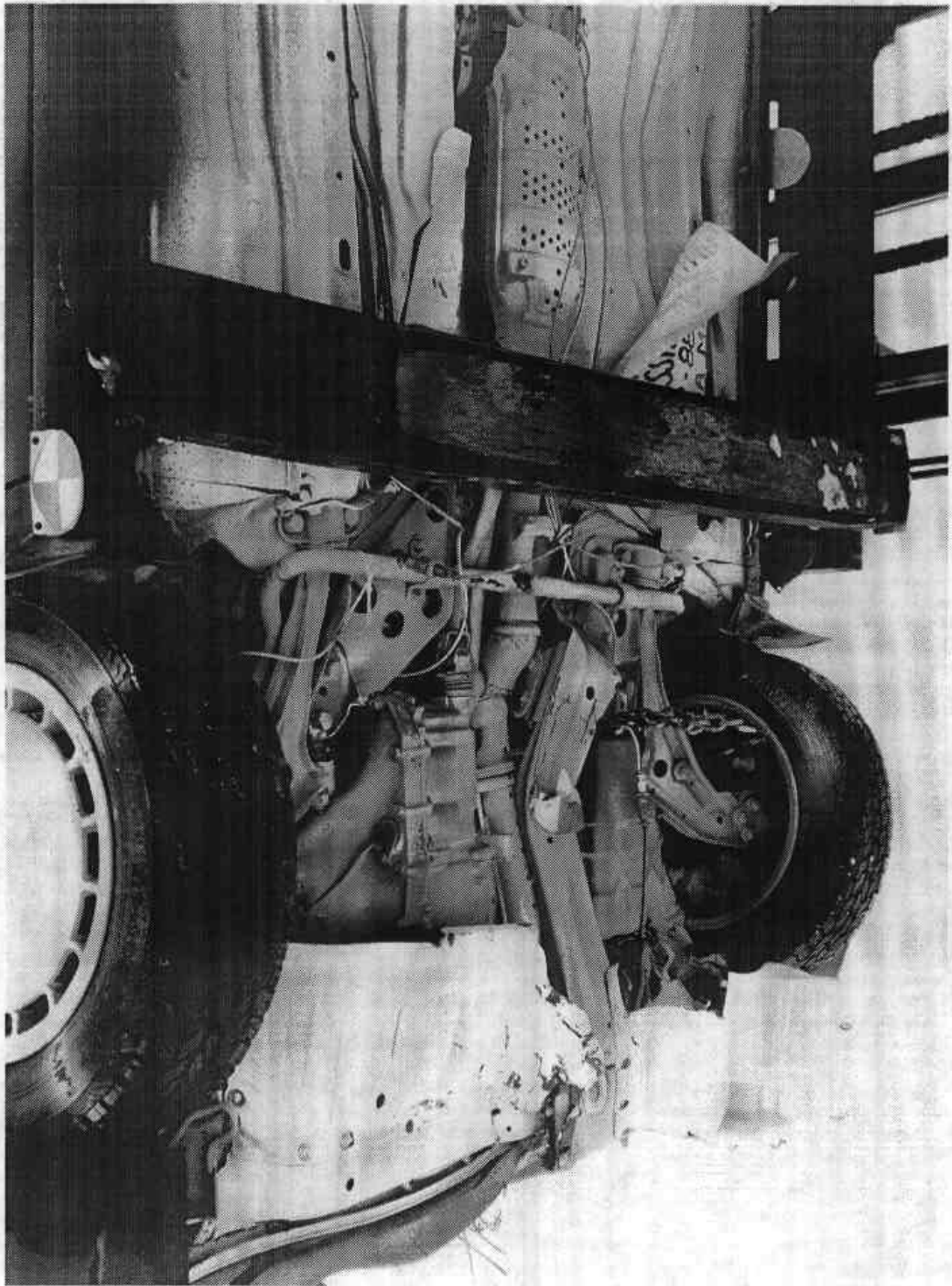
7626-7



A-16 PRE-TEST FRONT SIDE UNDERBODY VIEW

A-17

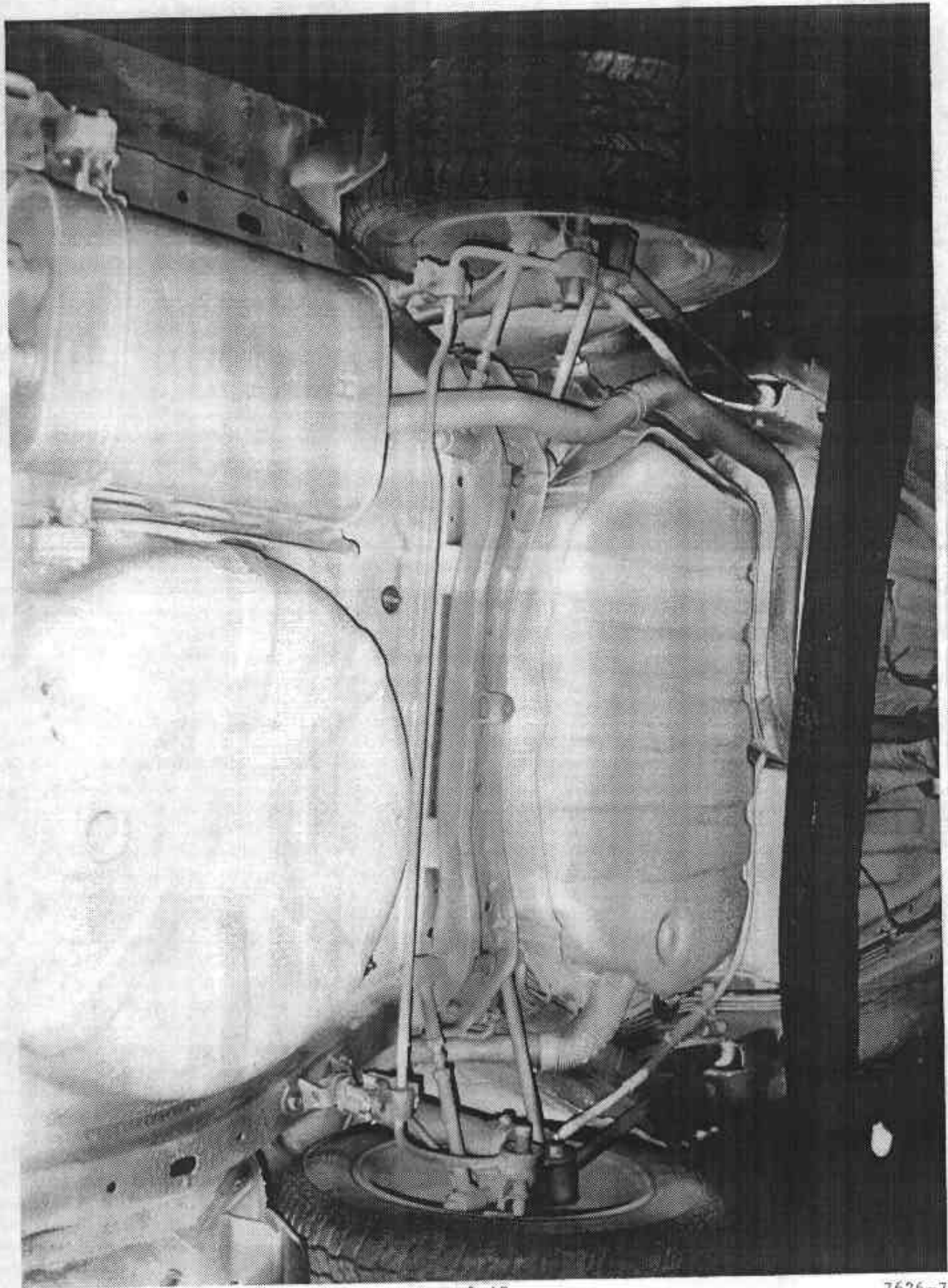
7626-7



A-17 POST-TEST FRONT SIDE UNDERBODY VIEW

A-18

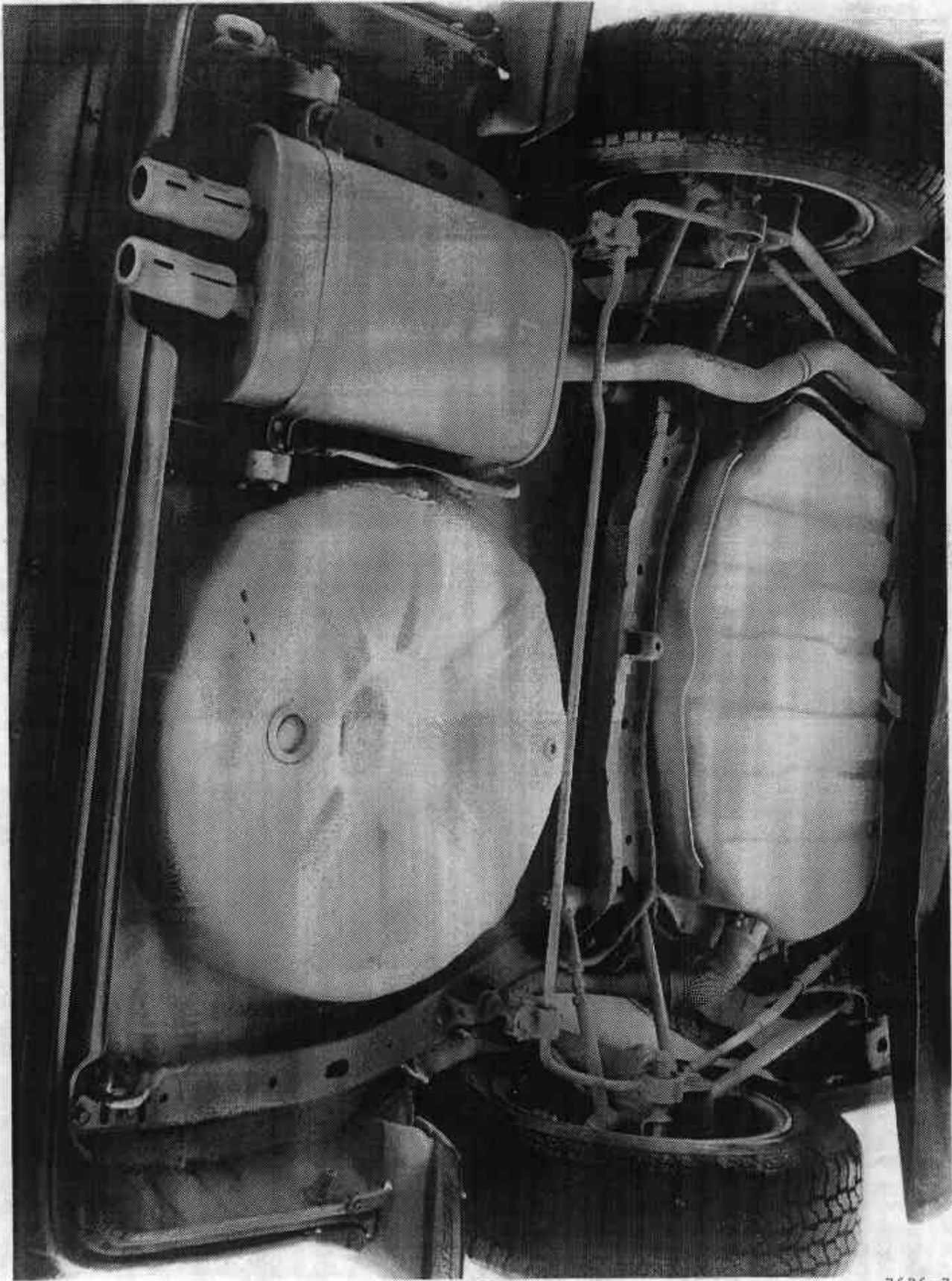
7626-7



A-18 PRE-TEST REAR UNDERBODY VIEW

A-19

7626-7



A-19 POST-TEST REAR UNDERBODY VIEW

A-20

7626-7



A-20 PRE-TEST DRIVER POSITION VIEW

A-21

7626-7



A-21 POST-TEST DRIVER POSITION VIEW

A-22

7626-7



A-22 PRE-TEST PASSENGER POSITION VIEW

A-23

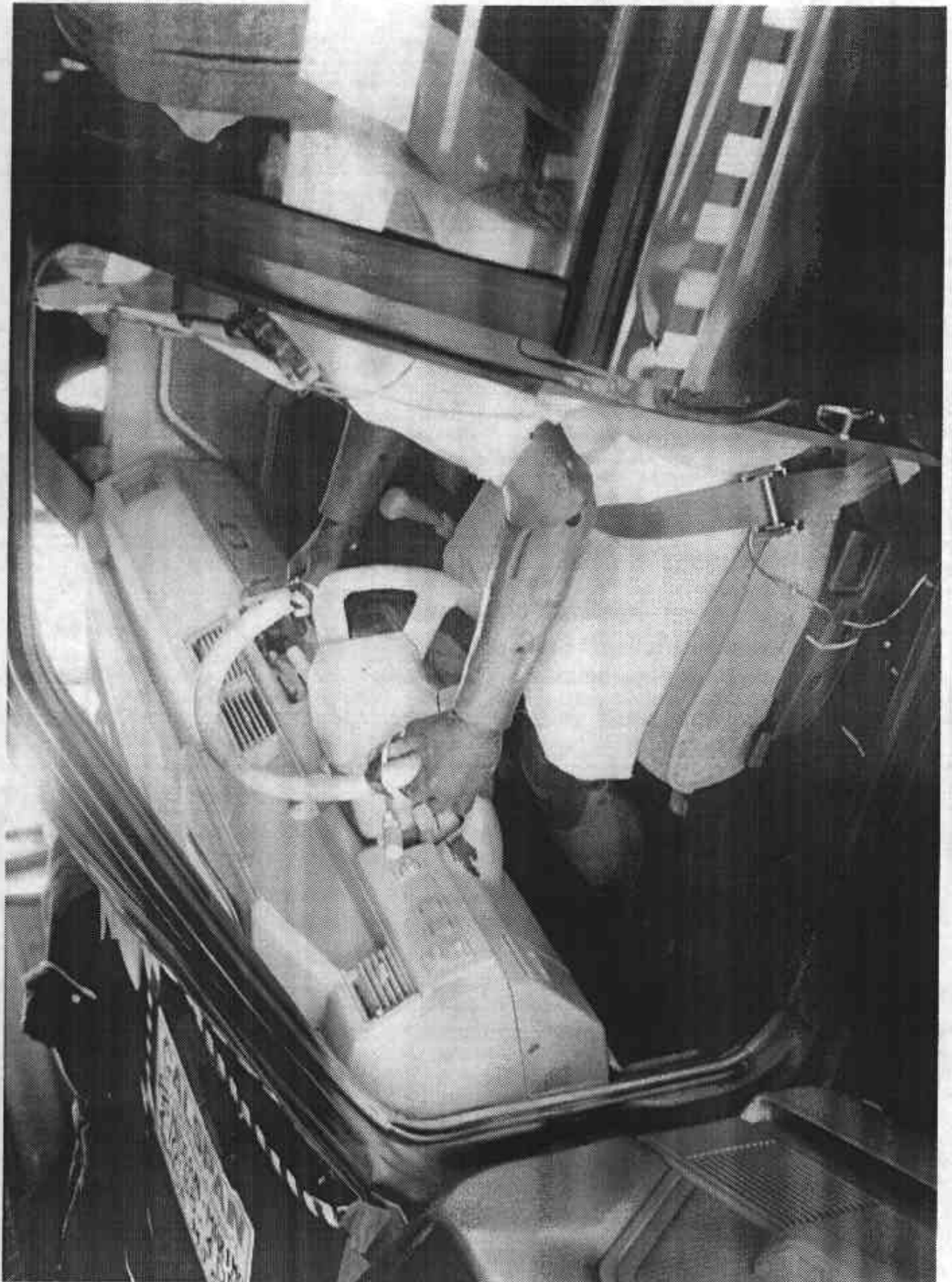
7626-7



A-23 POST-TEST PASSENGER POSITION VIEW

A-24

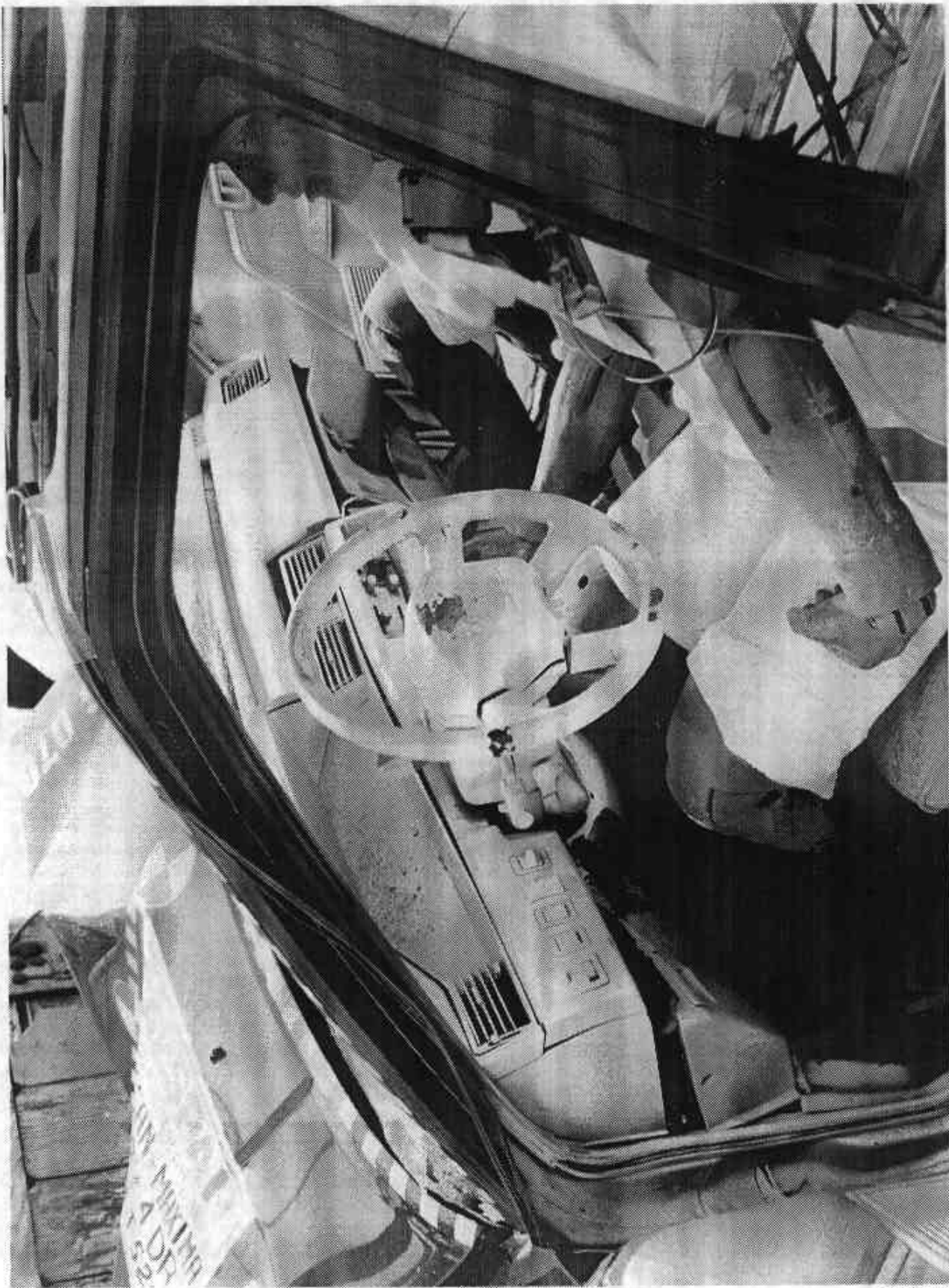
7626-7



A-24 PRE-TEST DRIVER AND INTERIOR VIEW

A-25.

7626-7



A-25 POST-TEST DRIVER AND INTERIOR VIEW

A-26

7626-7



A-26 PRE-TEST PASSENGER AND INTERIOR VIEW

A-27

7626-7



A-27 POST-TEST PASSENGER AND INTERIOR VIEW

A-28

7626-7

Appendix B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

TEST NO. MJ5200

VEHICLE DATA

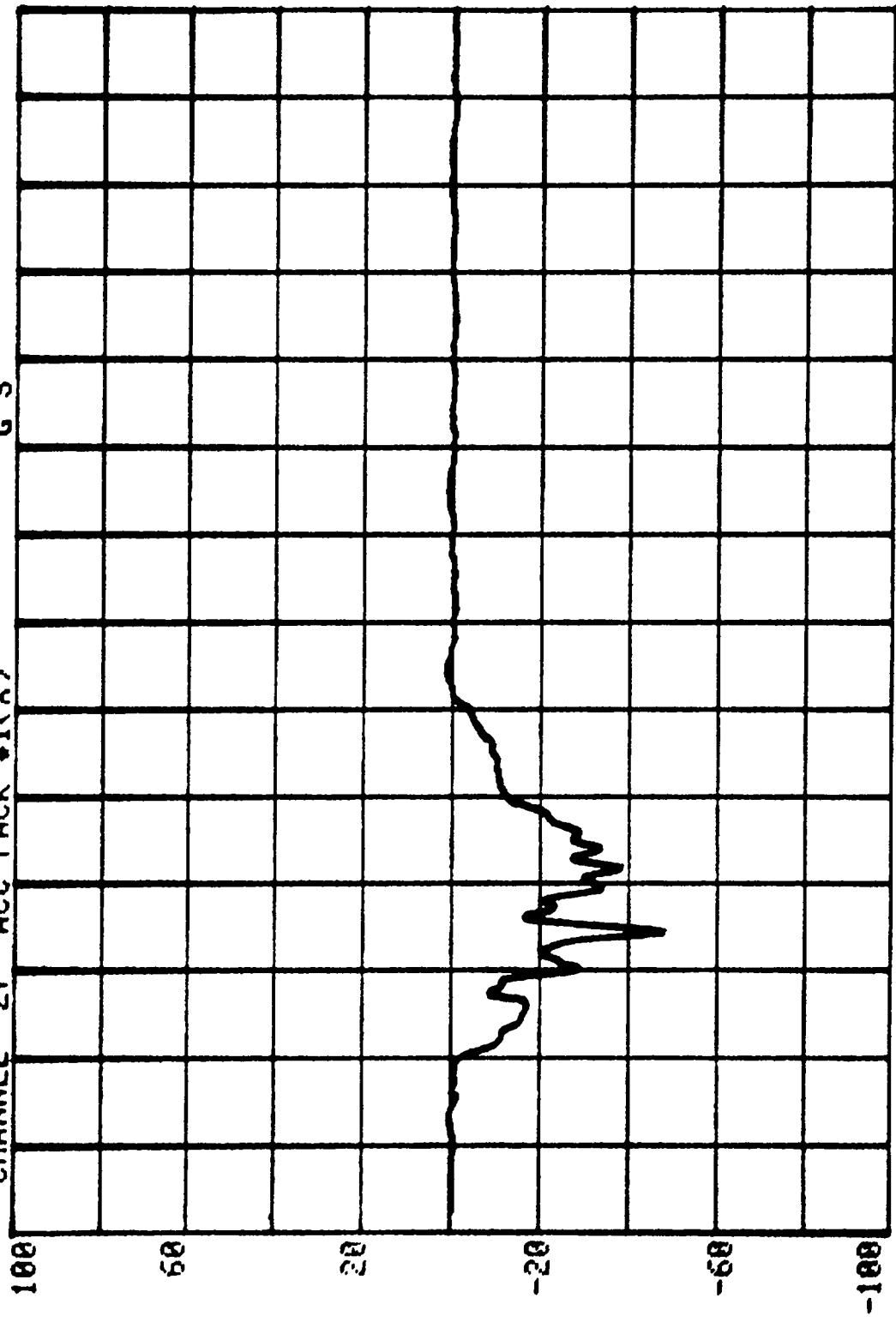
FILTER CHANNEL CLASS

60

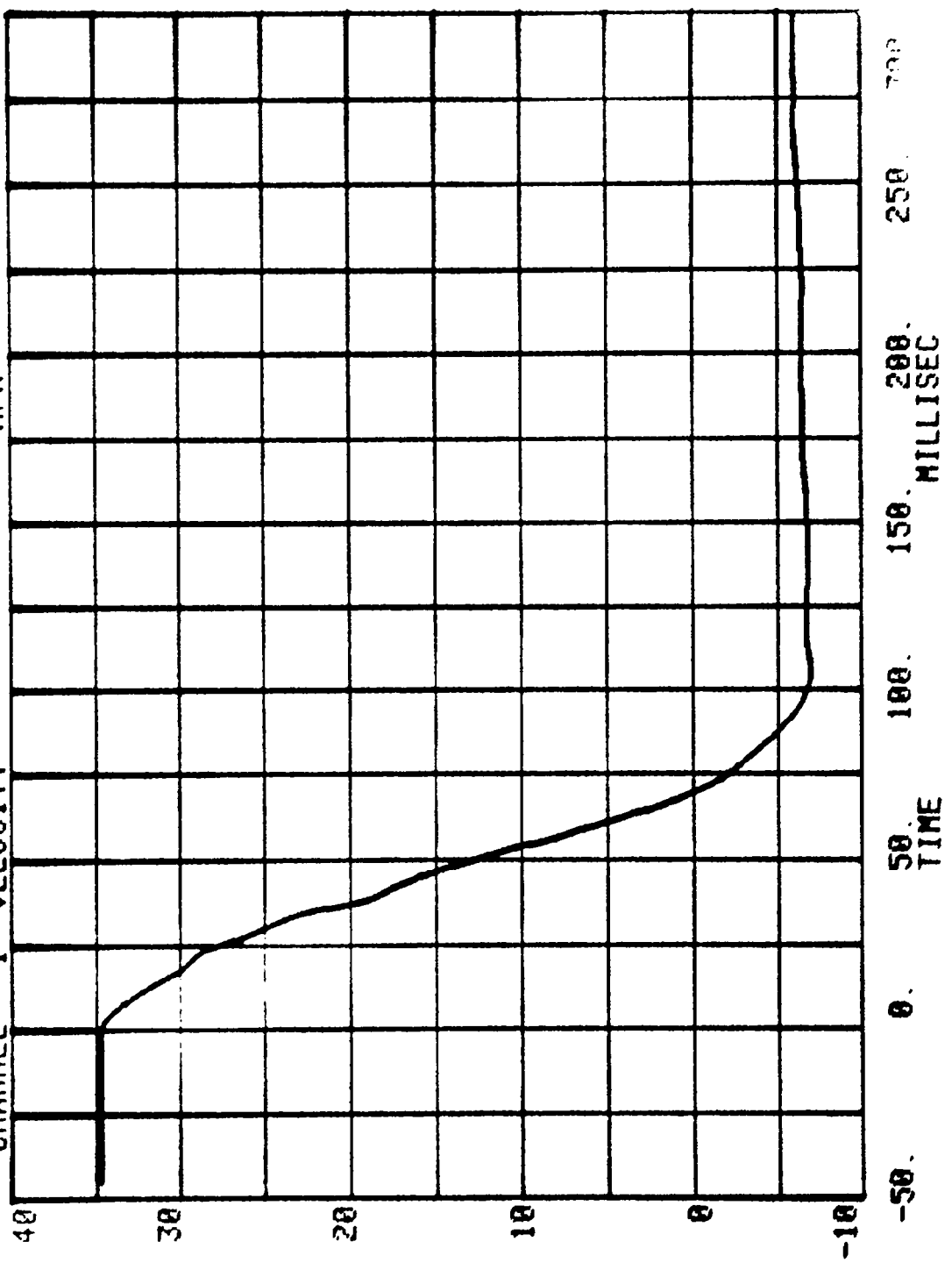
CHANNEL 27 ACC PACK #1(X) G'S

RUN= 809

SERIES= 5200



ACC #1
RUN= 809 SERIES= 5200 MPH
CHANNEL 1 VELOCITY

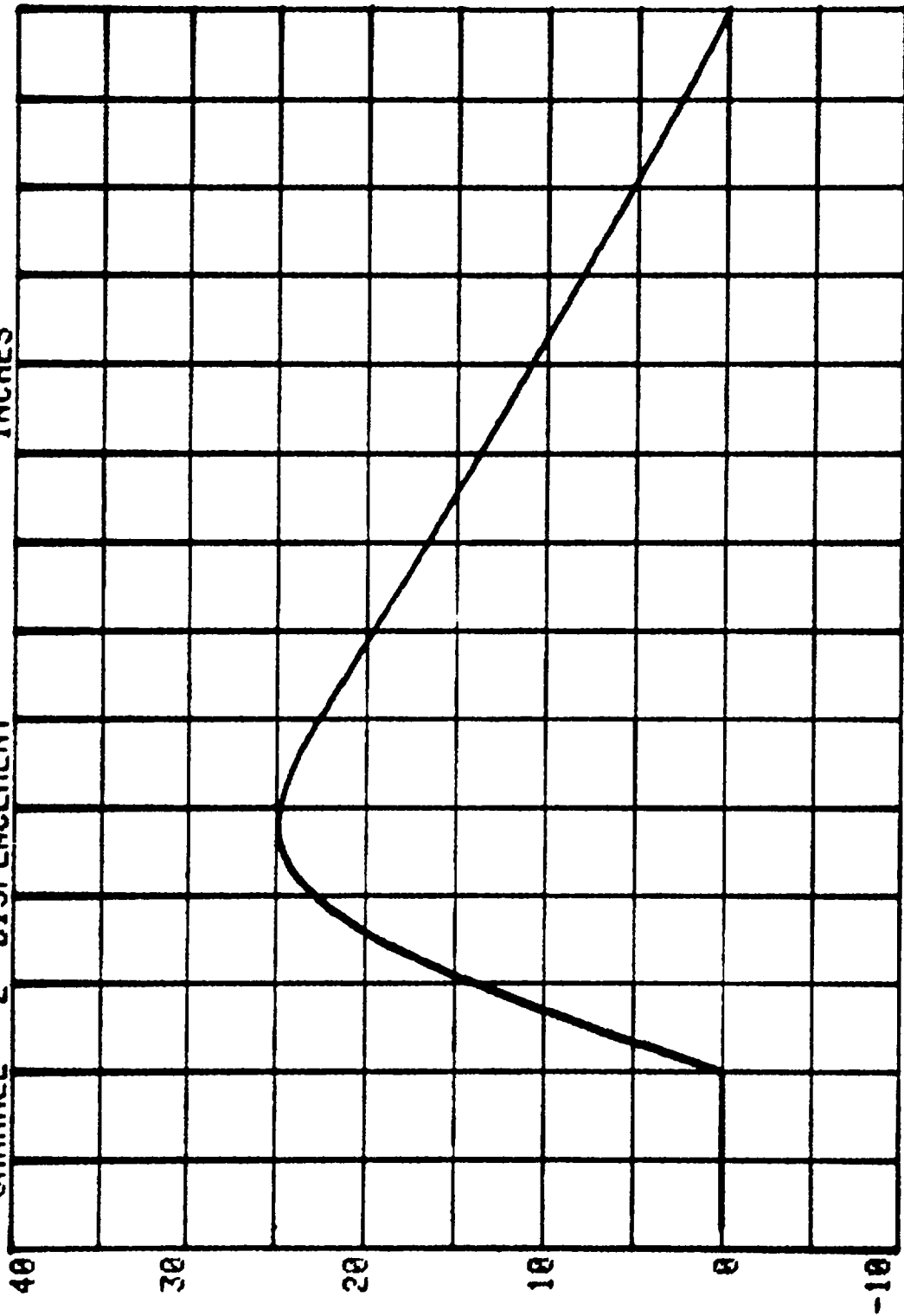


ACC #1

RUN# 809 SERIES= 5200

CHANNEL 2 DISPLACEMENT

INCHES



300.

250.

200.

150.

100.

50.

0.

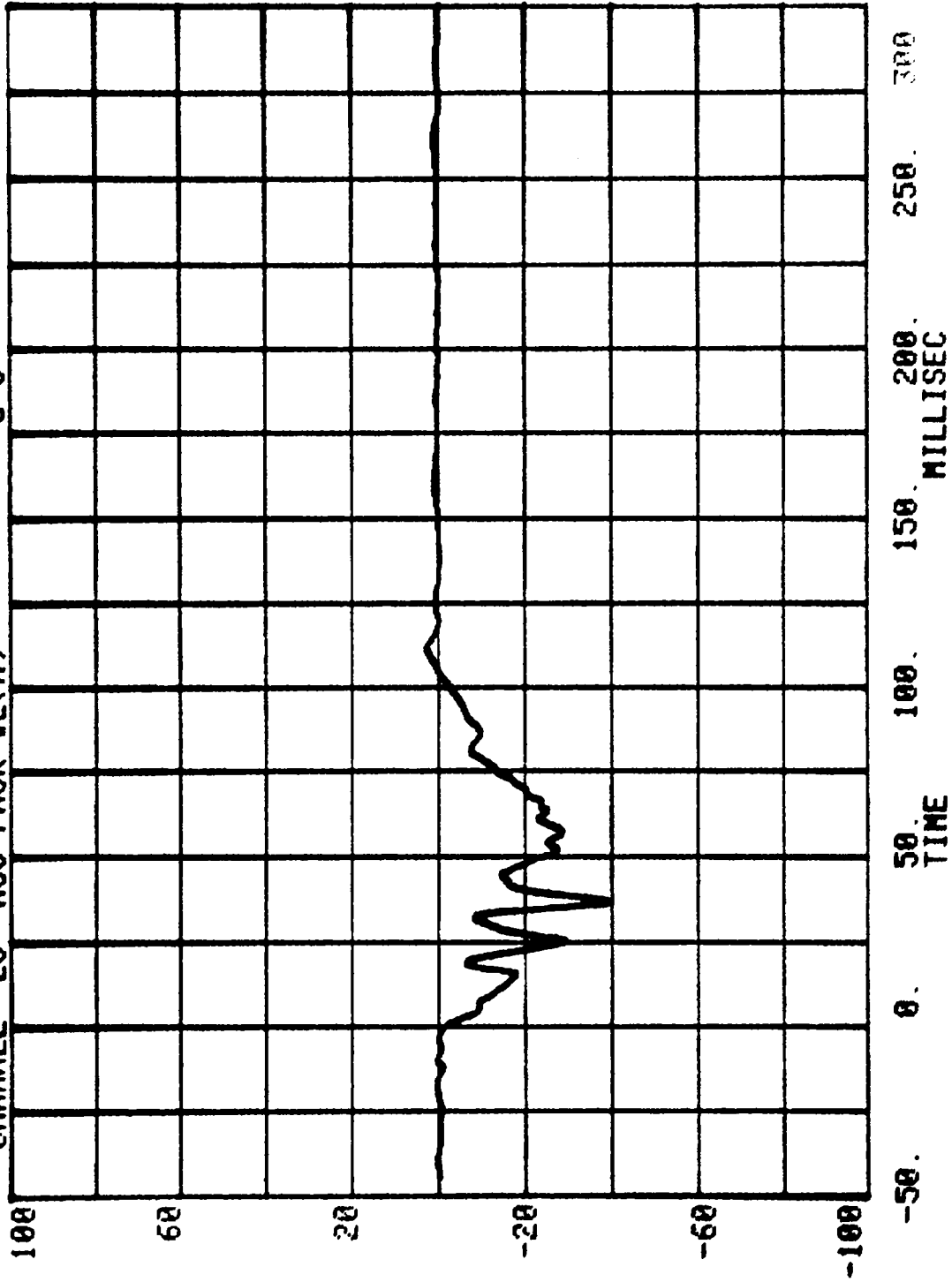
-50.

MILLISEC

TIME

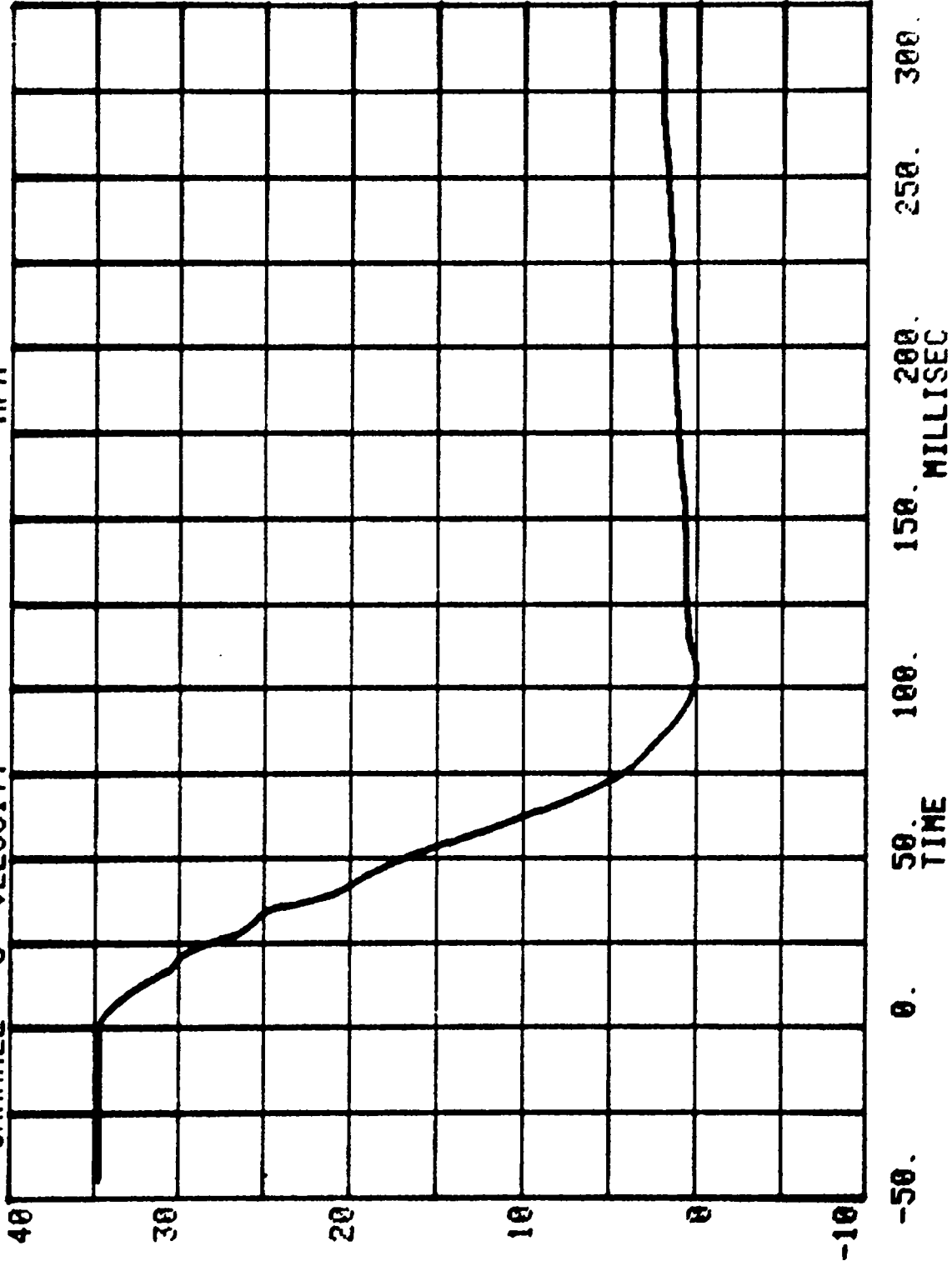
CHANNEL 28 ACC PACK #2(X) G'S

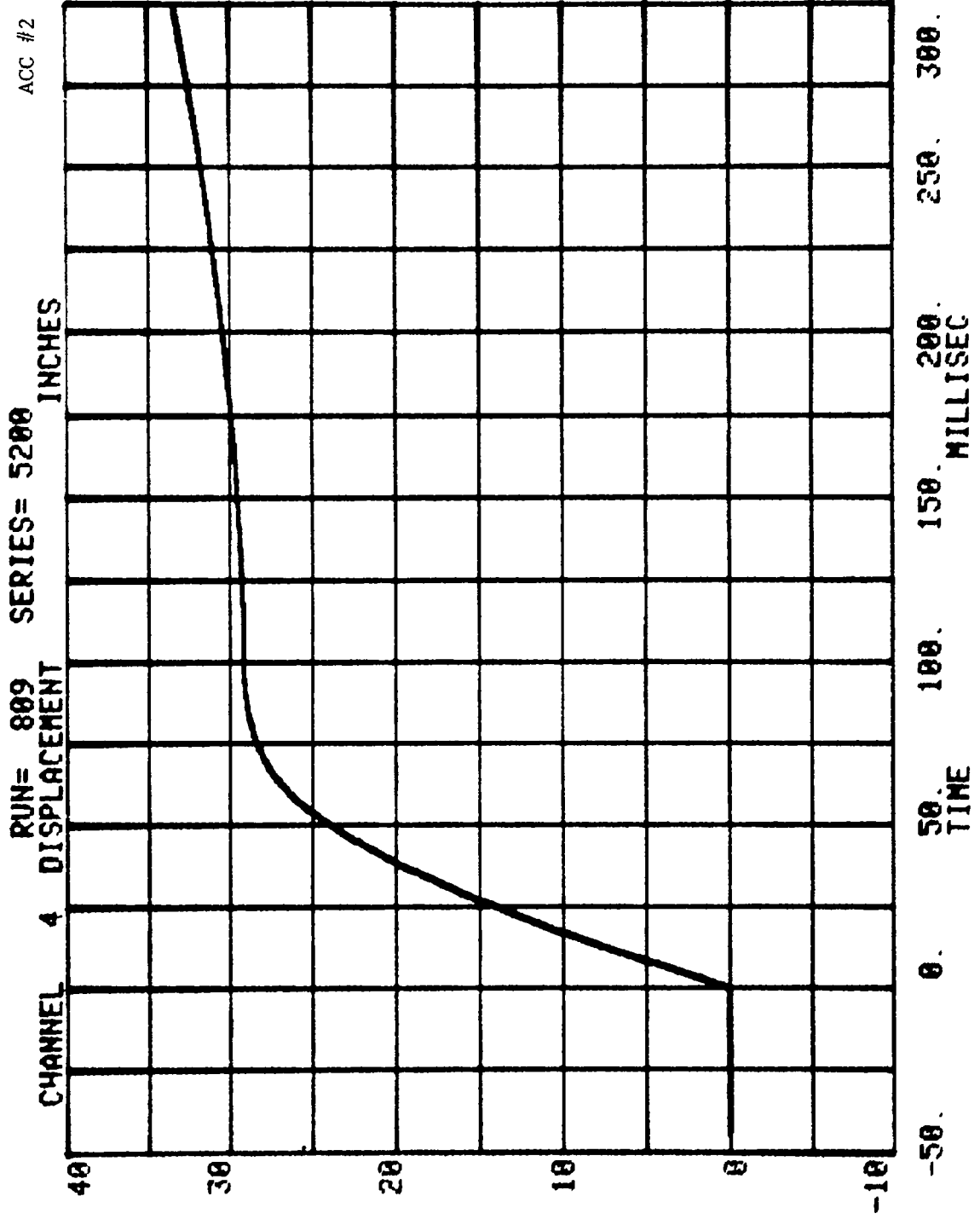
RUN= 809 SERIES= 5200



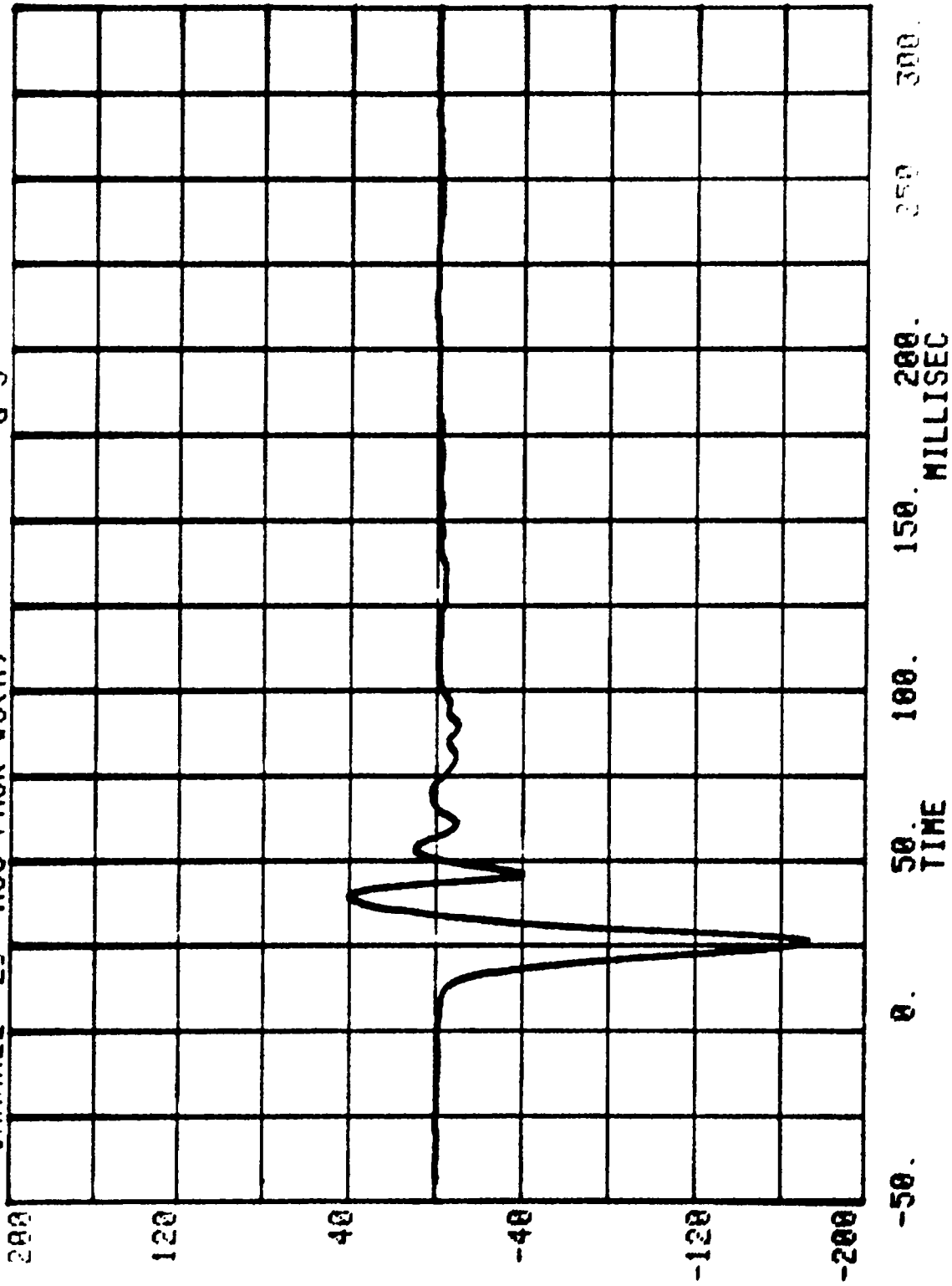
ACC #2

CHANNEL 3 VELOCITY
RUN= 809 SERIES= 5200 MPH





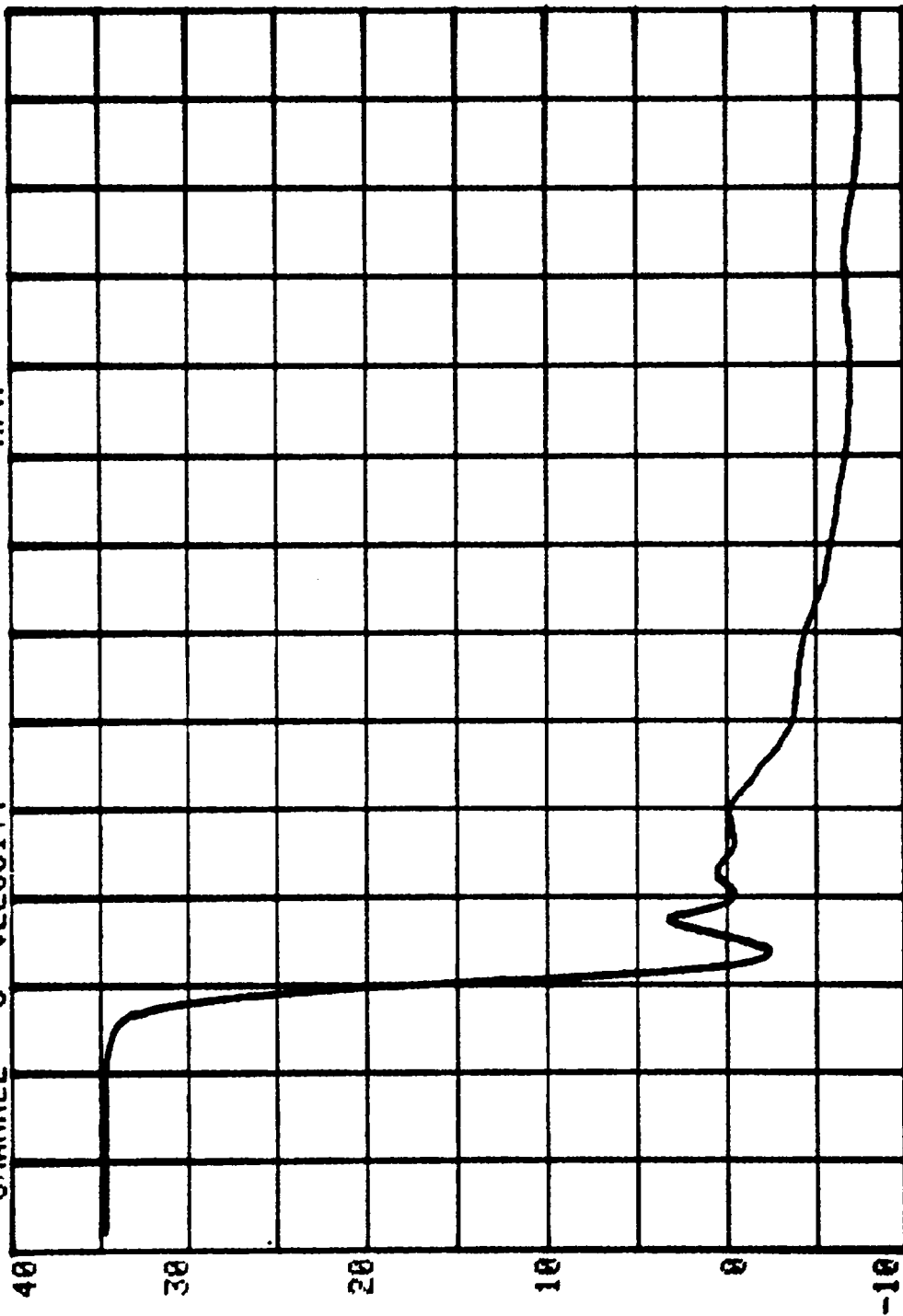
RUN= 809 SERIES= 5200 G'S
CHANNEL 29 ACC PACK #3(X)



ACC #3

CHANNEL 5 VELOCITY SERIES= 5200 MPH

RUN= 809

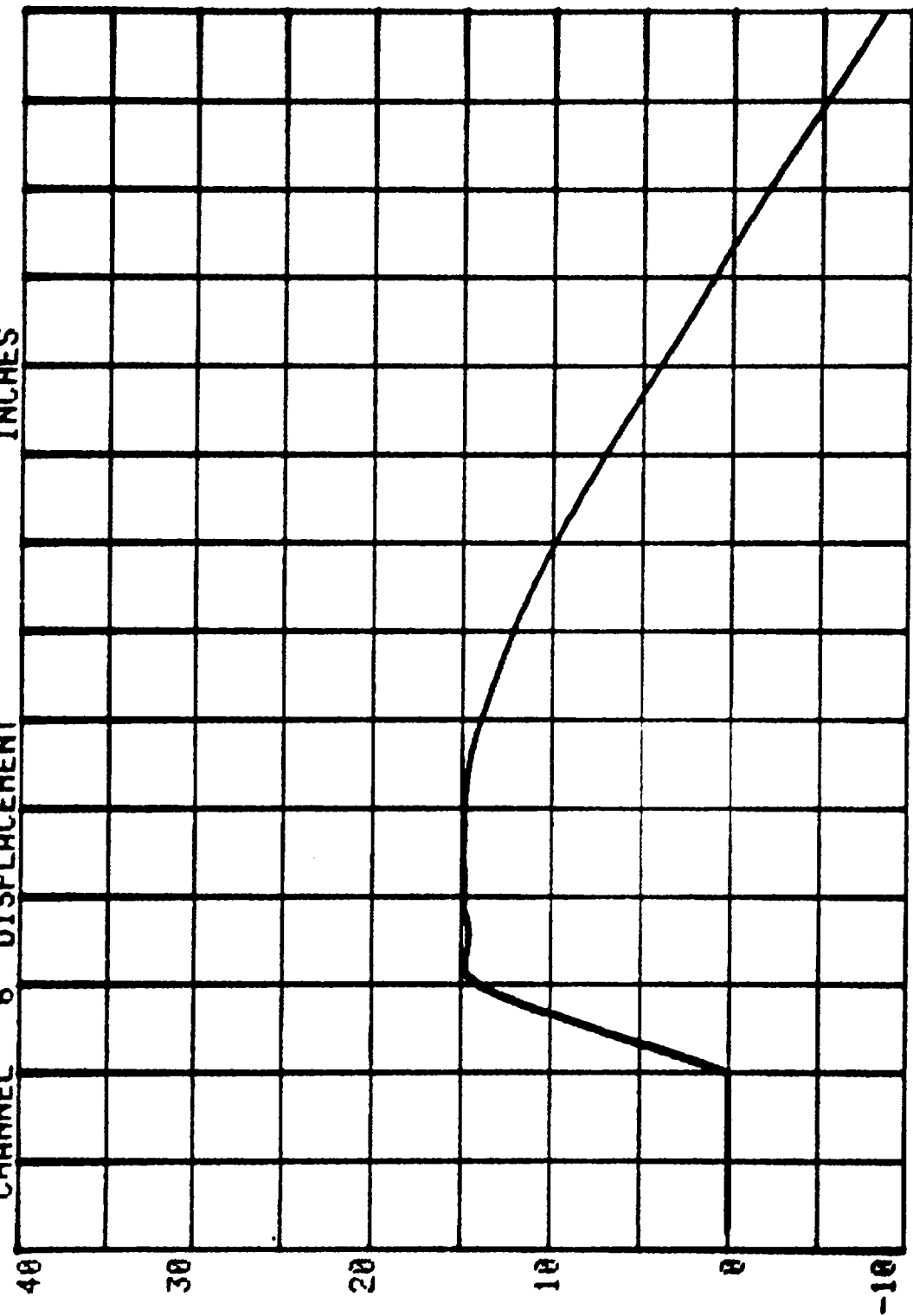


ACC #3

RUN= 809 SERIES= 5200

CHANNEL 6 DISPLACEMENT

INCHES



300.

250.

200.

150.

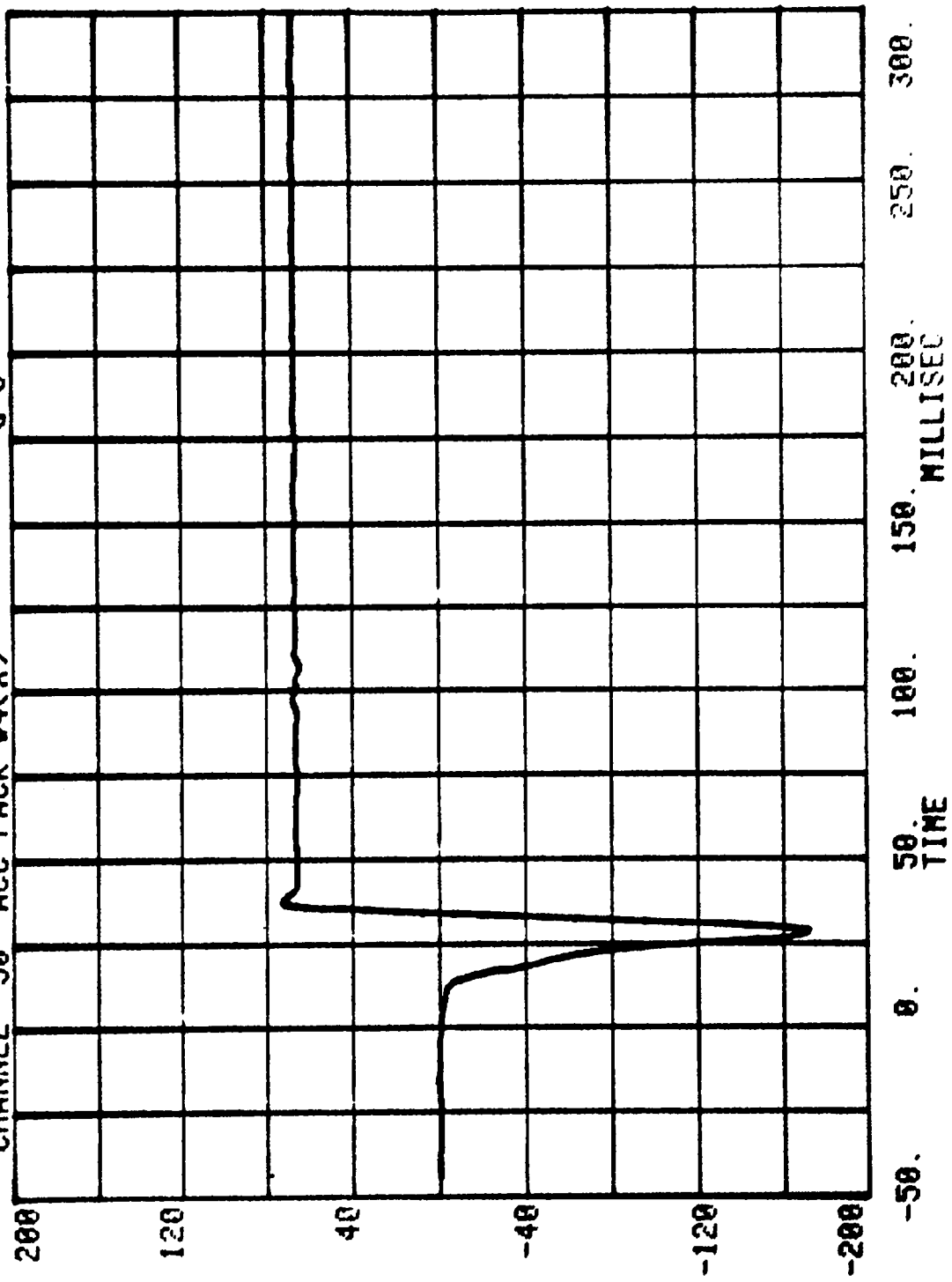
100.

50.

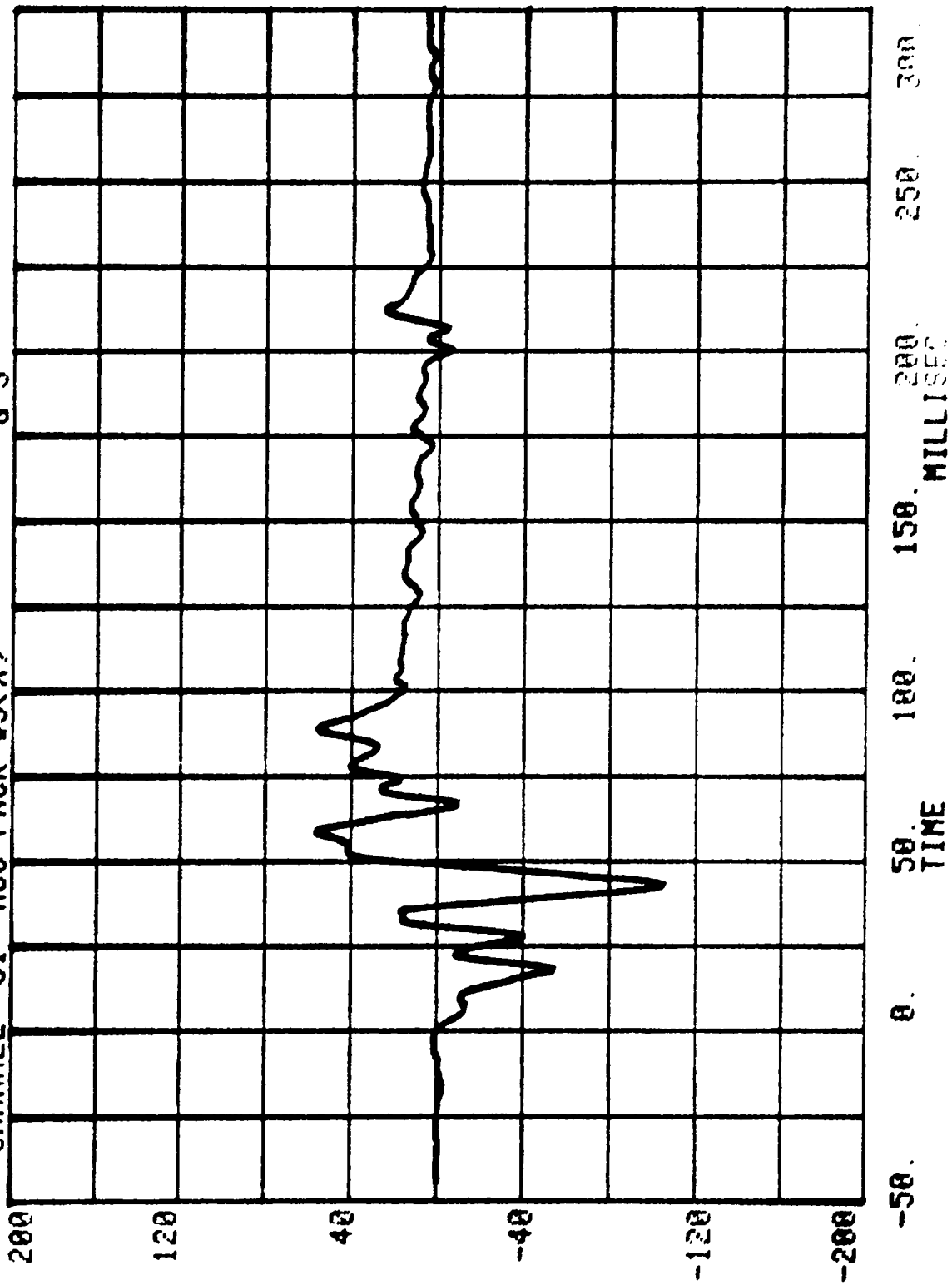
0.

-50.

RUN= 809 SERIES= 5200 G'S
CHANNEL 30 ACC PACK #4(X)

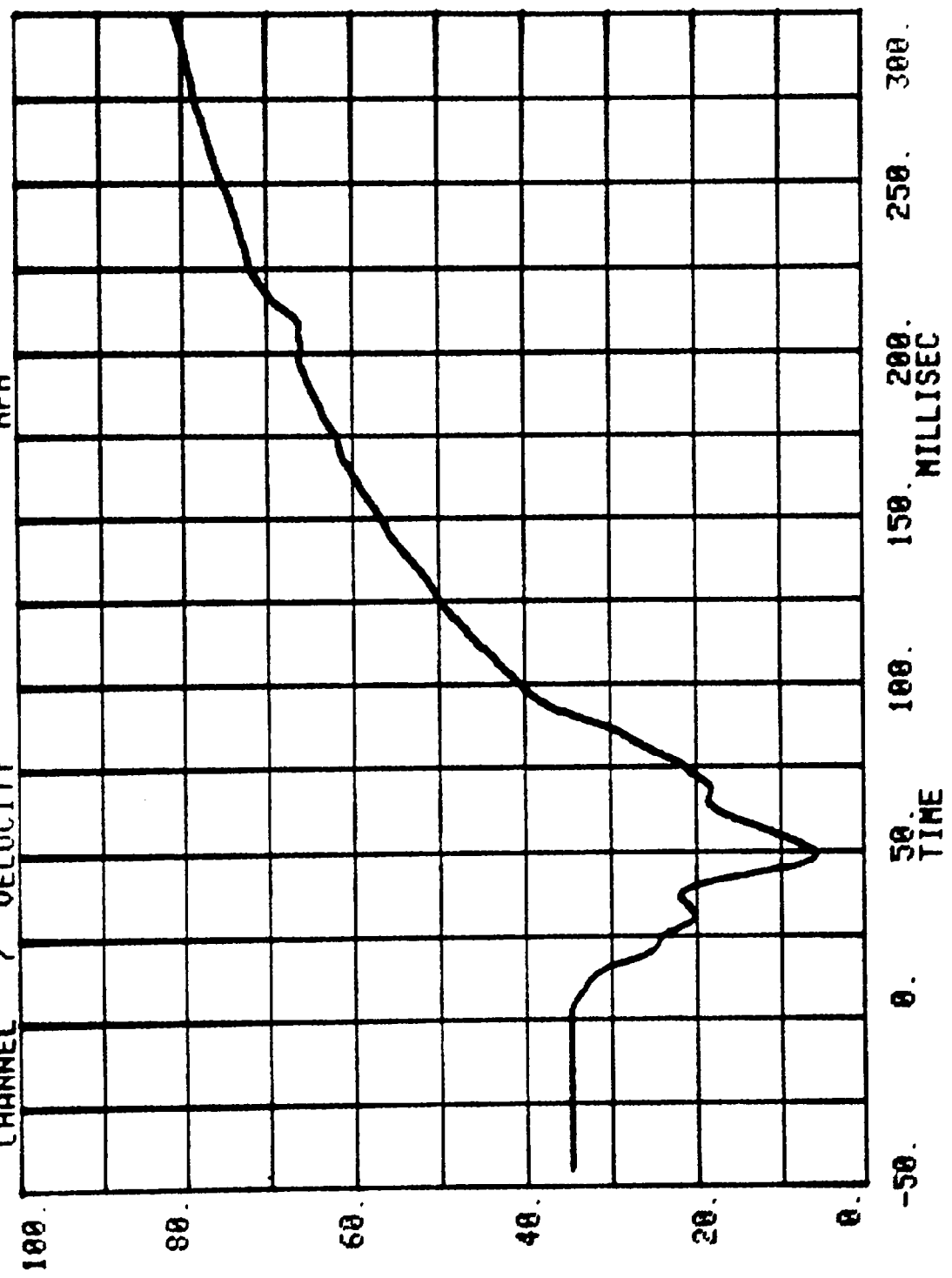


RUN= 809 SERIES= 5200 G'S
CHANNEL 31 ACC PACK #5(X)



ACC #5

CHANNEL 7 VELOCITY
RUN= 889 SERIES= 5200 MPH

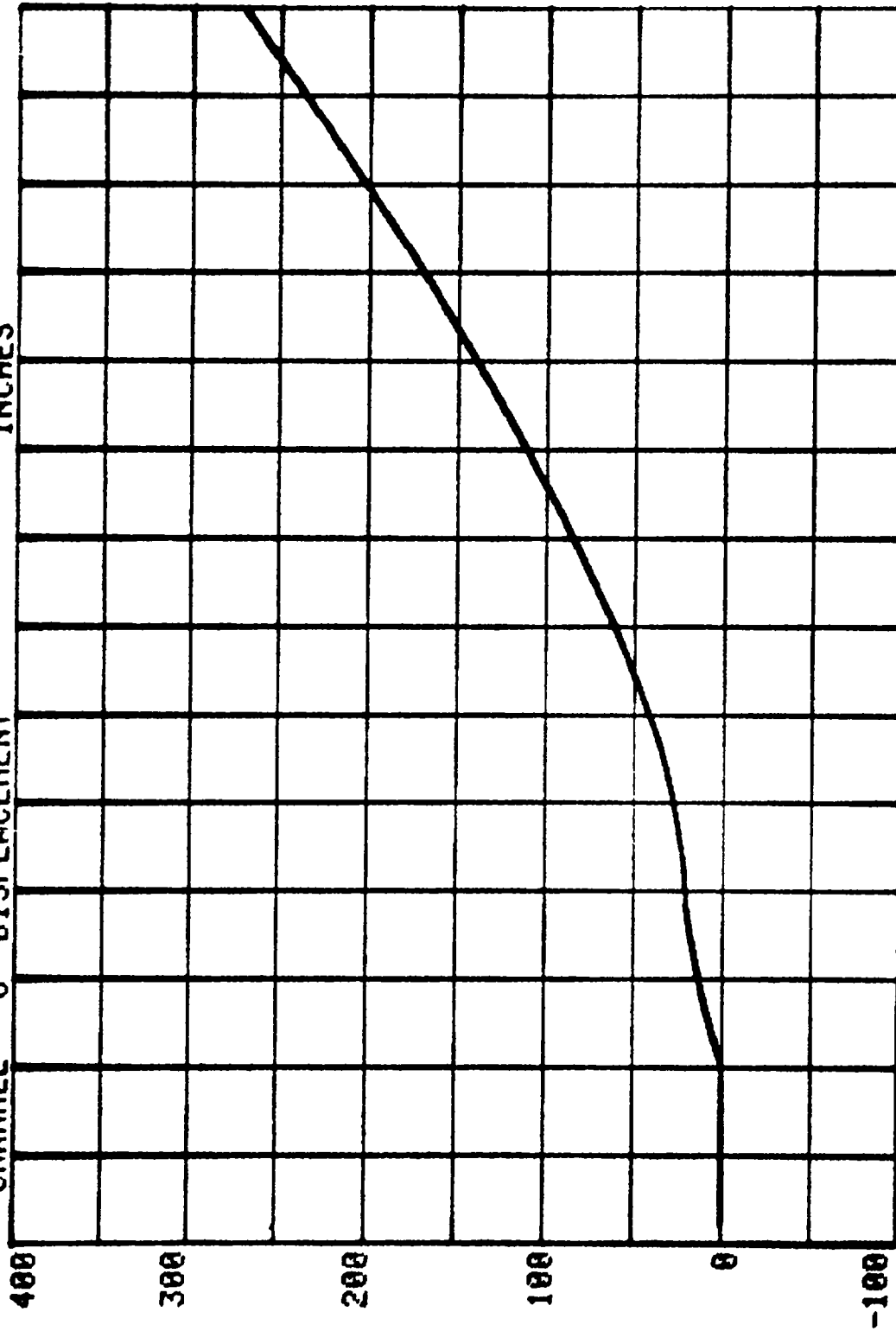


ACC #5

RUN= 809 SERIES= 5200

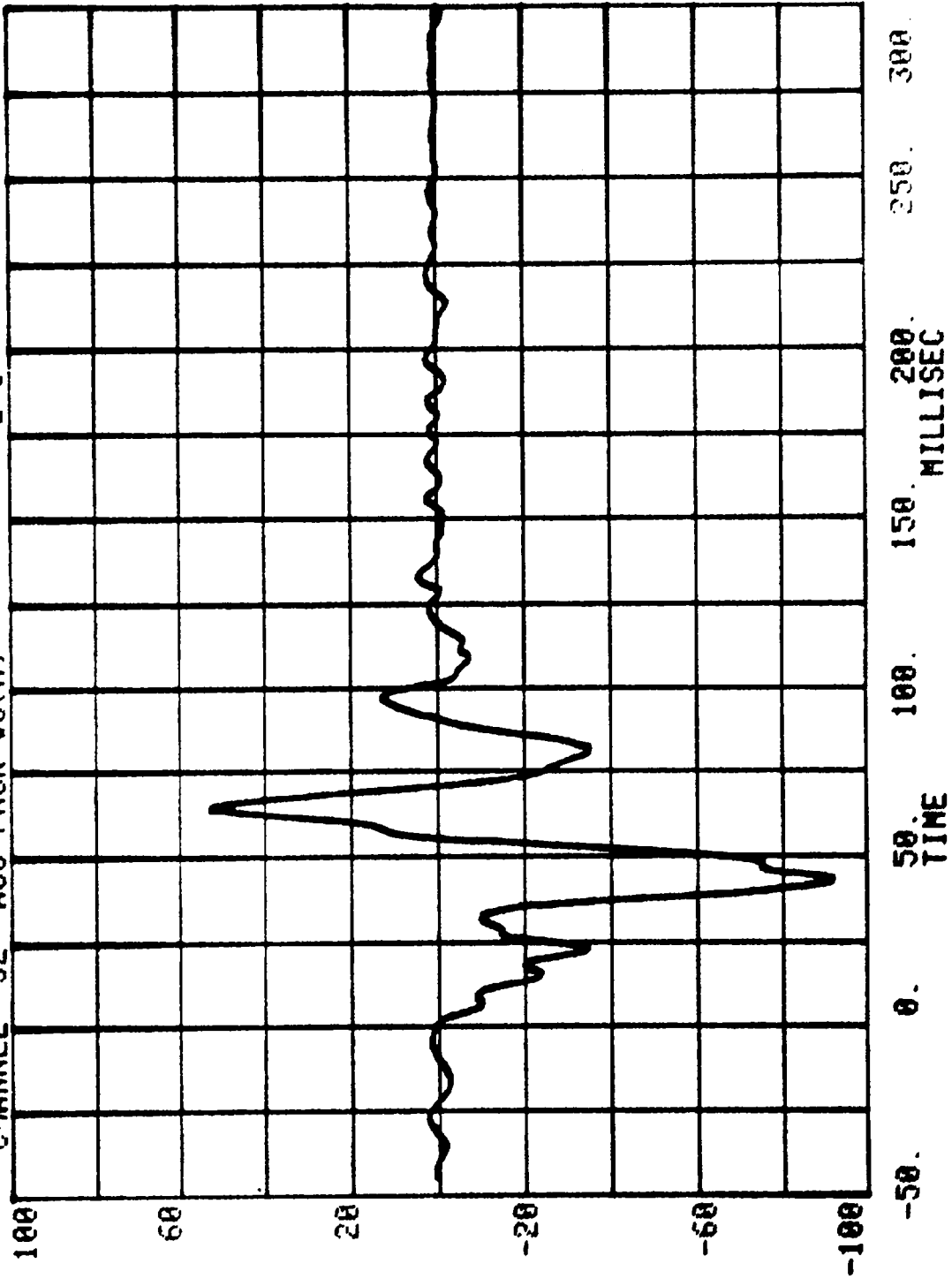
CHANNEL 8 DISPLACEMENT

INCHES

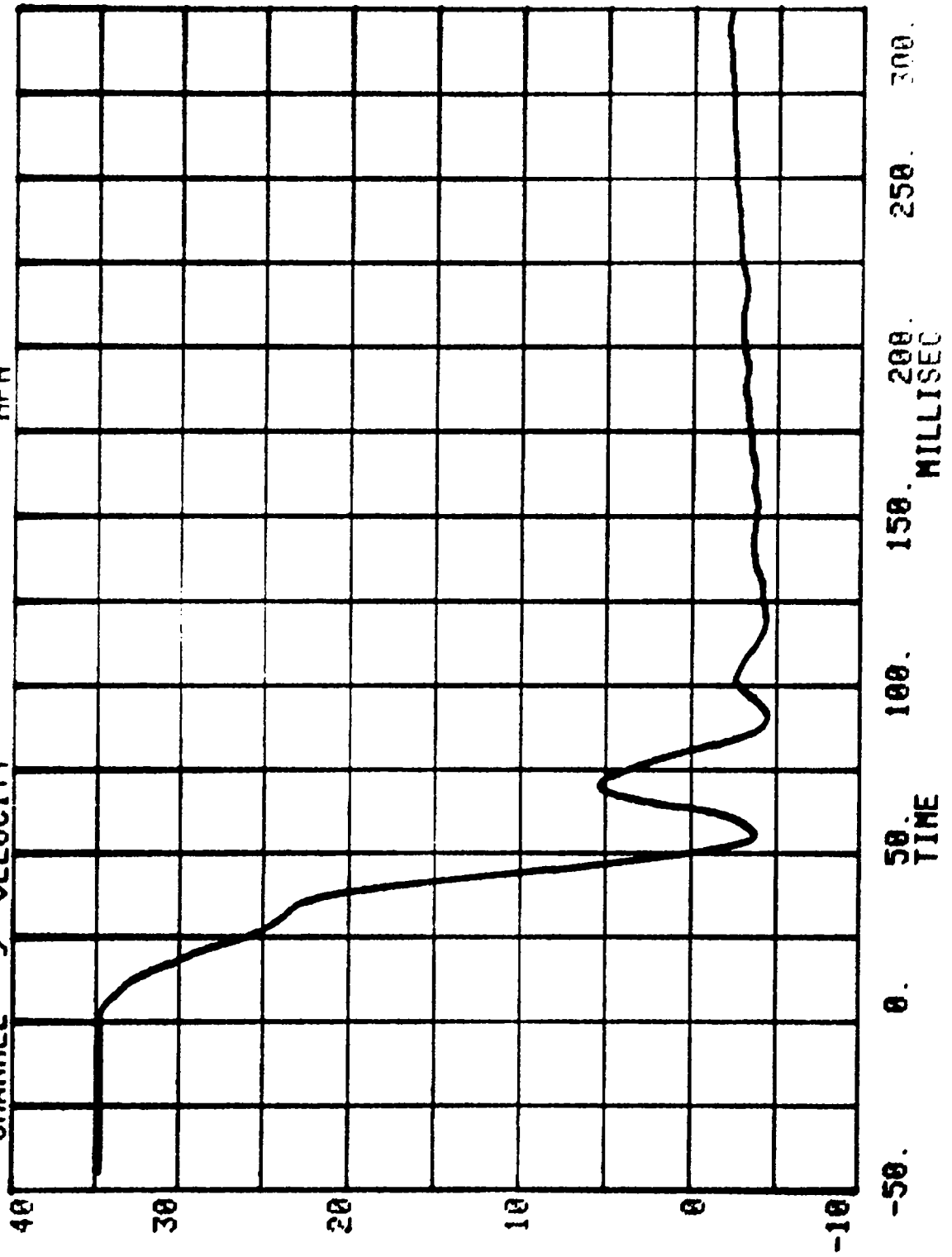


-50. 0. 50. 100. 150. 200. 250. 300

RUN= 809 SERIES= 5200 G'S
CHANNEL 32 ACC PACK #6(X)



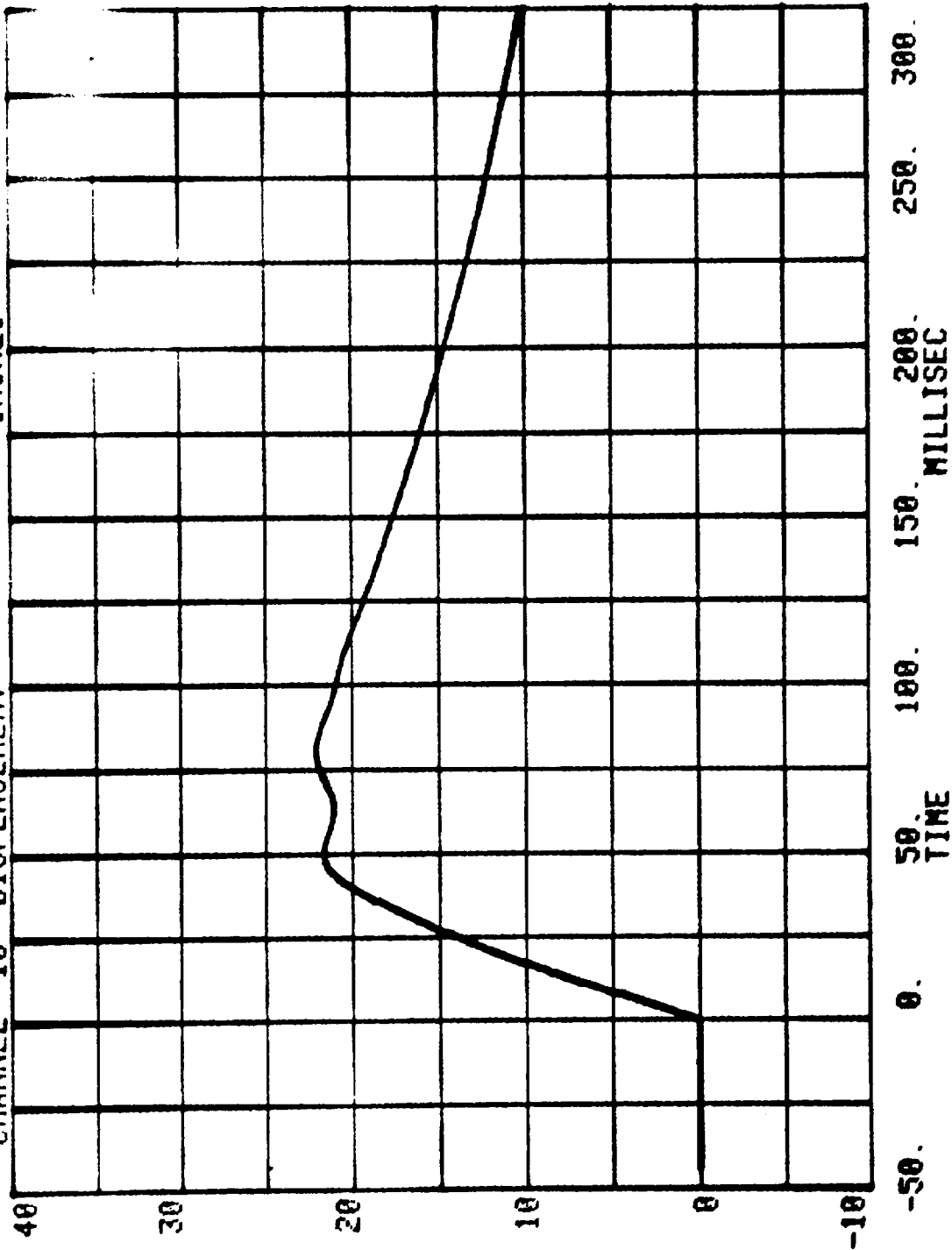
CHANNEL 9 VELOCITY
RUN= 809 SERIES= 5200 MPH
ACC #6



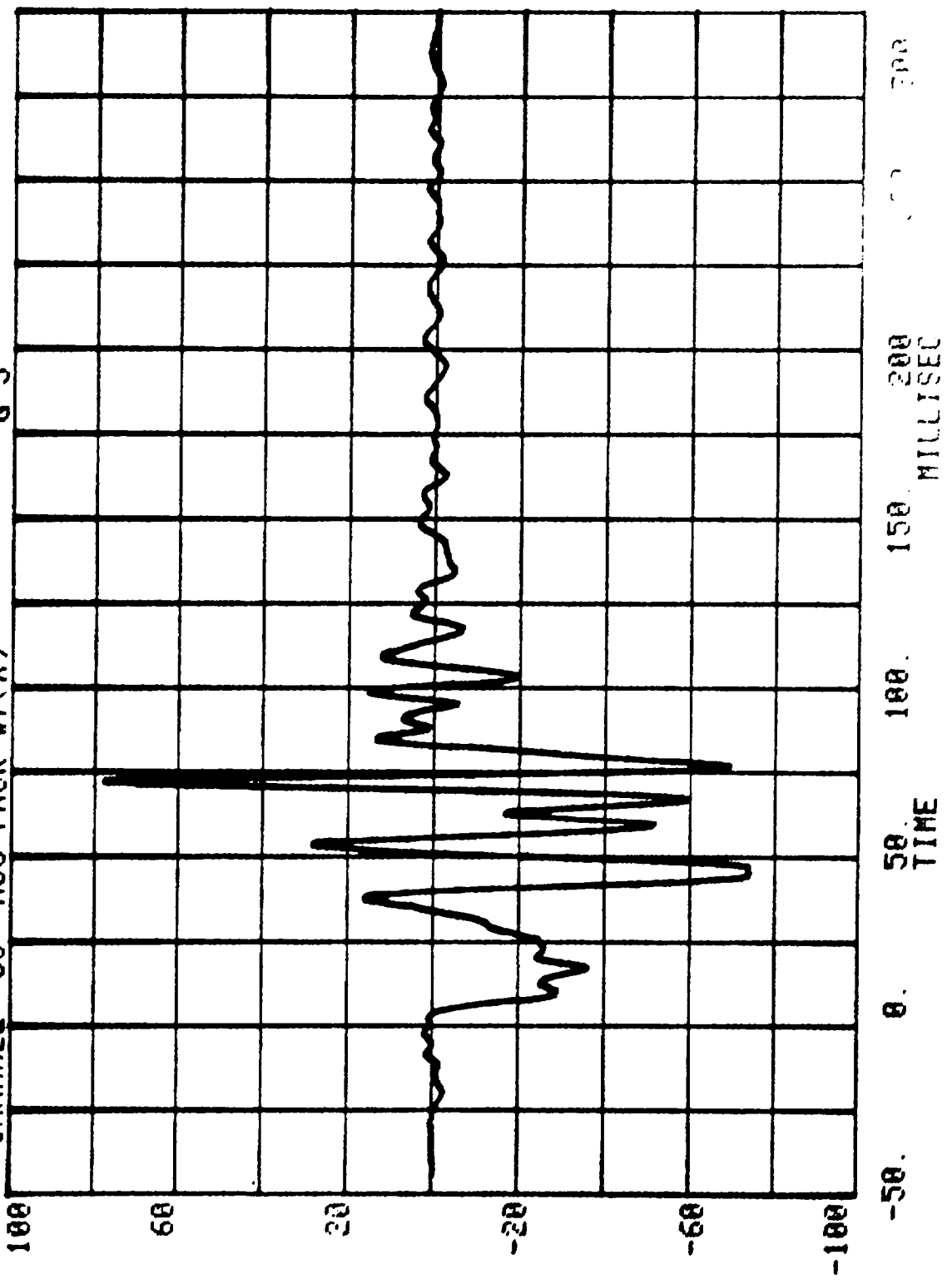
ACC #6

CHANNEL 10 DISPLACEMENT SERIES= 5200 INCHES

RUN= 809



RUN= 809 SERIES= 5200 G'S
CHANNEL 33 ACC PACK #7(X)

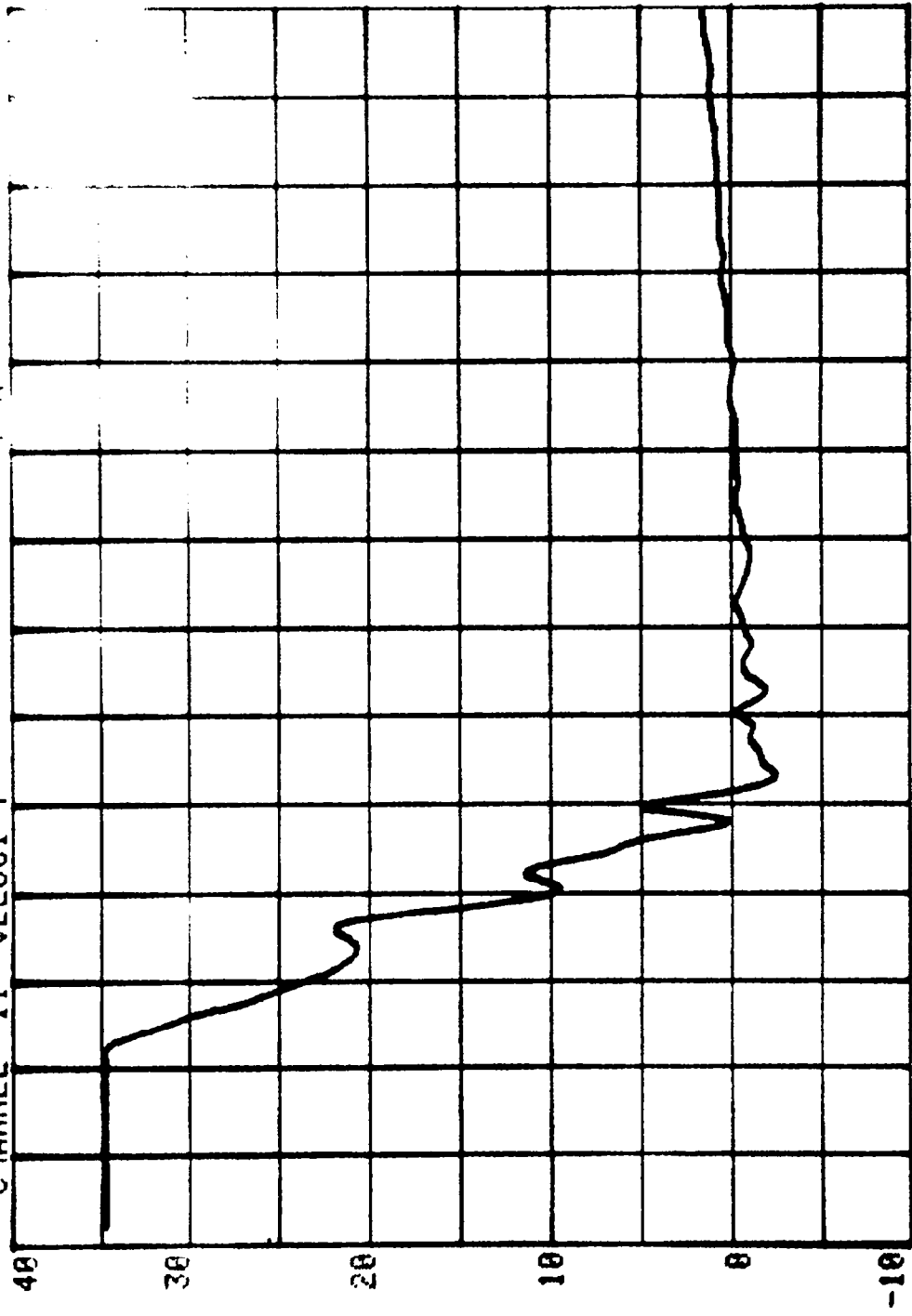


ACC #7

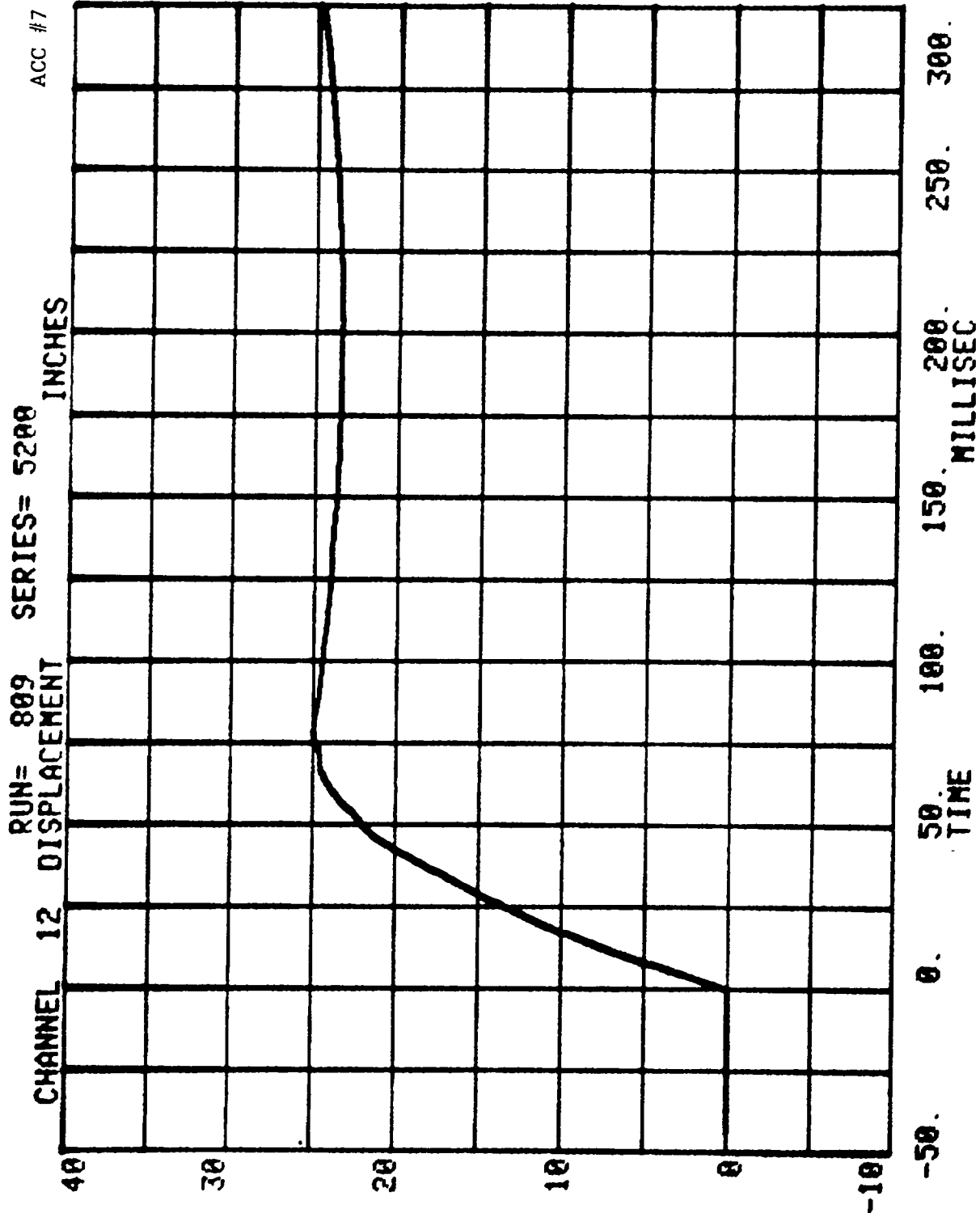
RUN= 809 SERIES= 5200

MPH

CHANNEL 11 VELOCITY



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



TEST NO. MJ5200

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

PUN= 909

POS#1 HEAD R

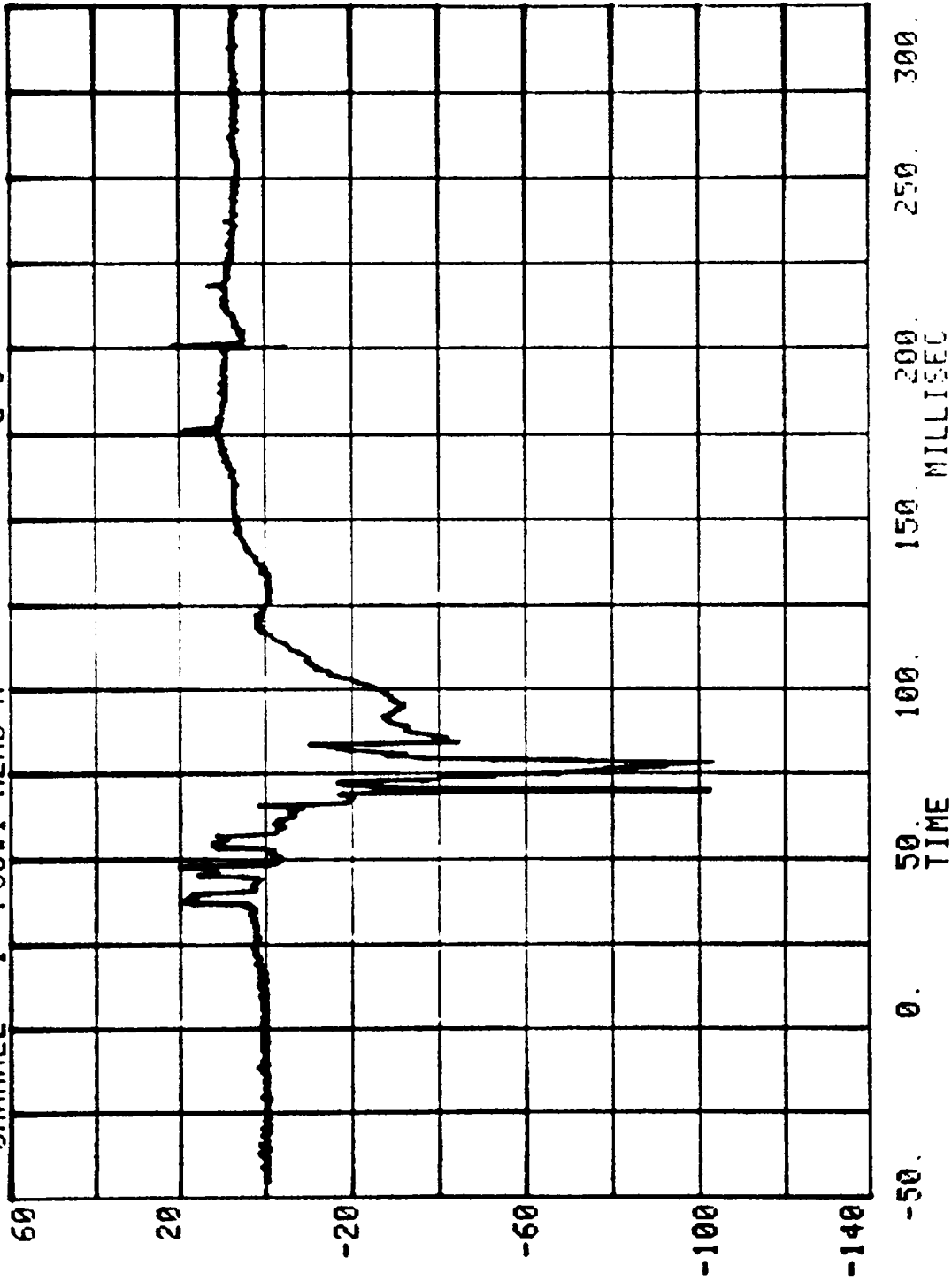
HIC= 907.4 FROM T1= .06630 TO T2= .08820

AVERAGE ACCELERATION BETWEEN T1 AND T2= 70.3G'S

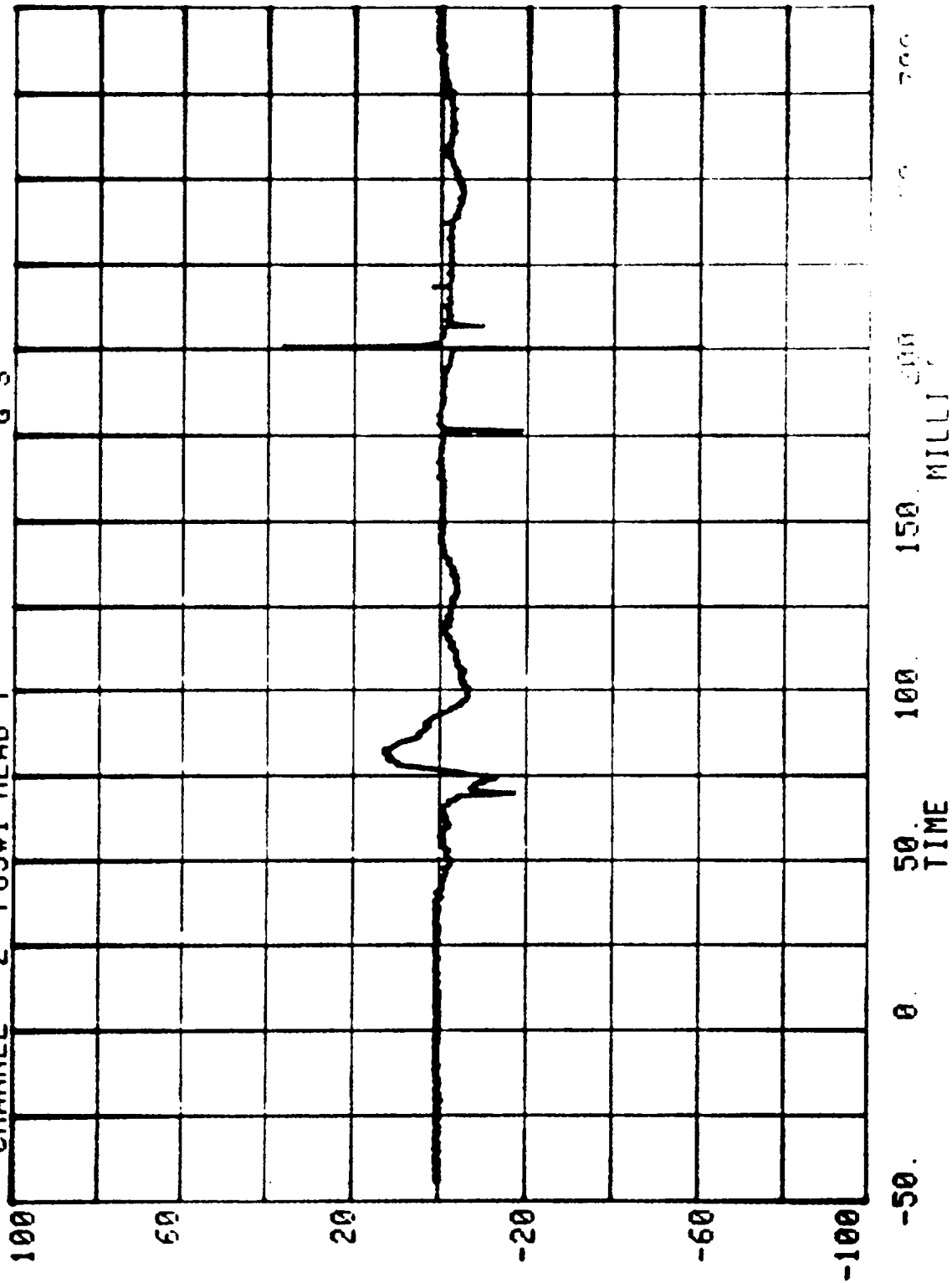
EVENT TIME= 300.0 MSEC

SEVERITY INDEX=1328.5

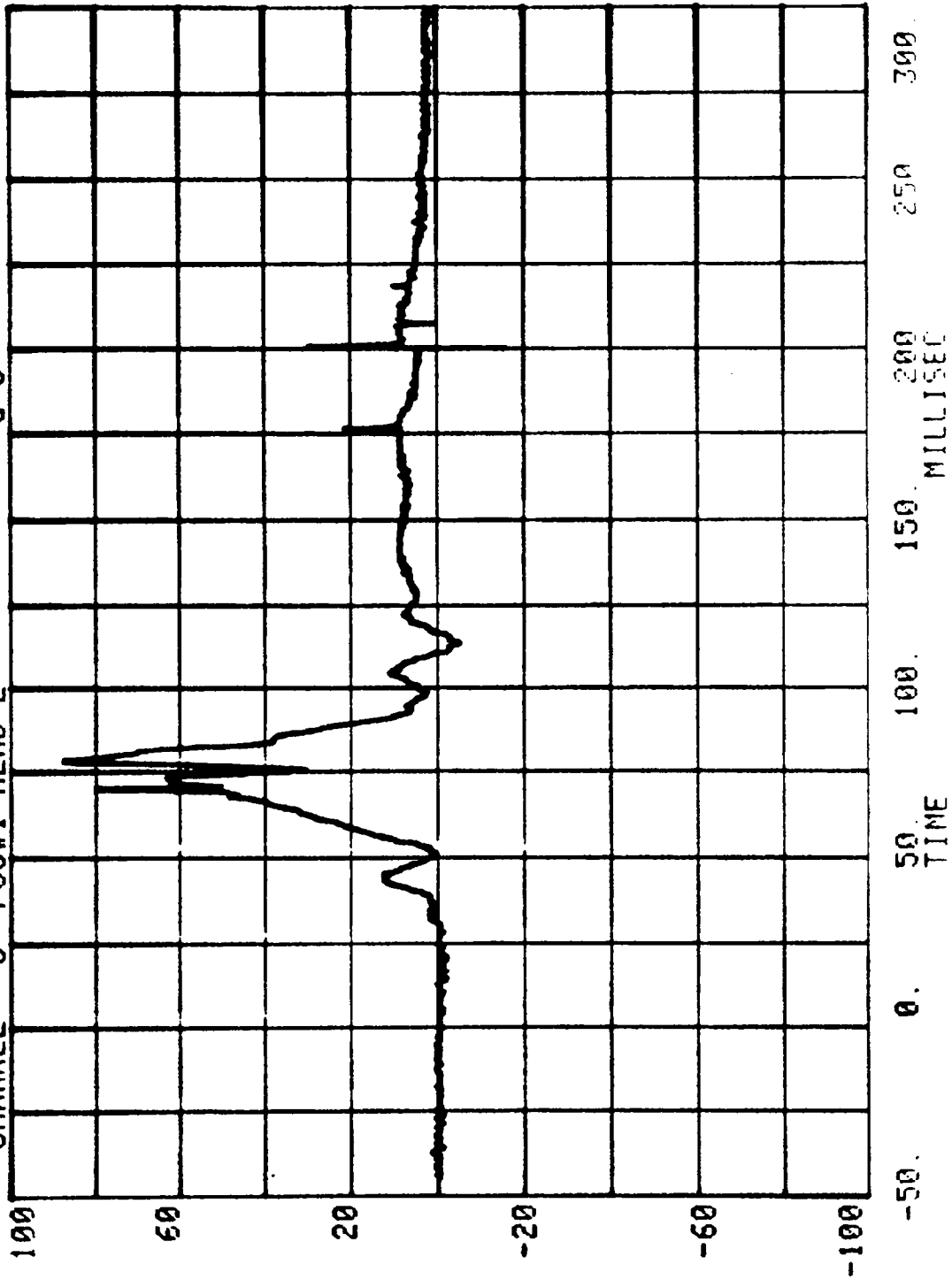
CHANNEL 1 POS#1 HEAD X
RUN= 809 SERIES= 5200 G'S



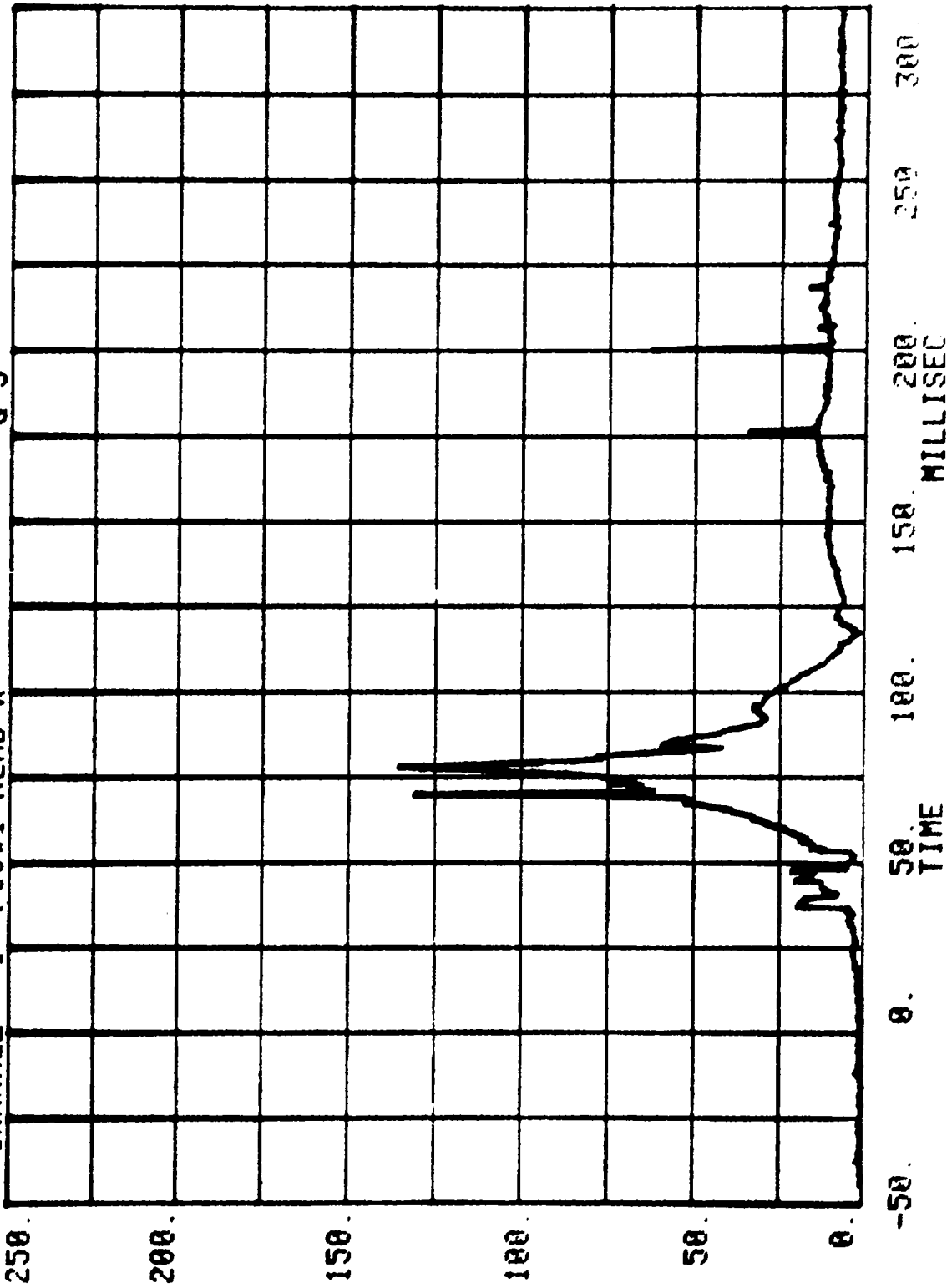
CHANNEL 2 POS#1 HEAD Y
RUN= 809 SERIES= 5200 G'S



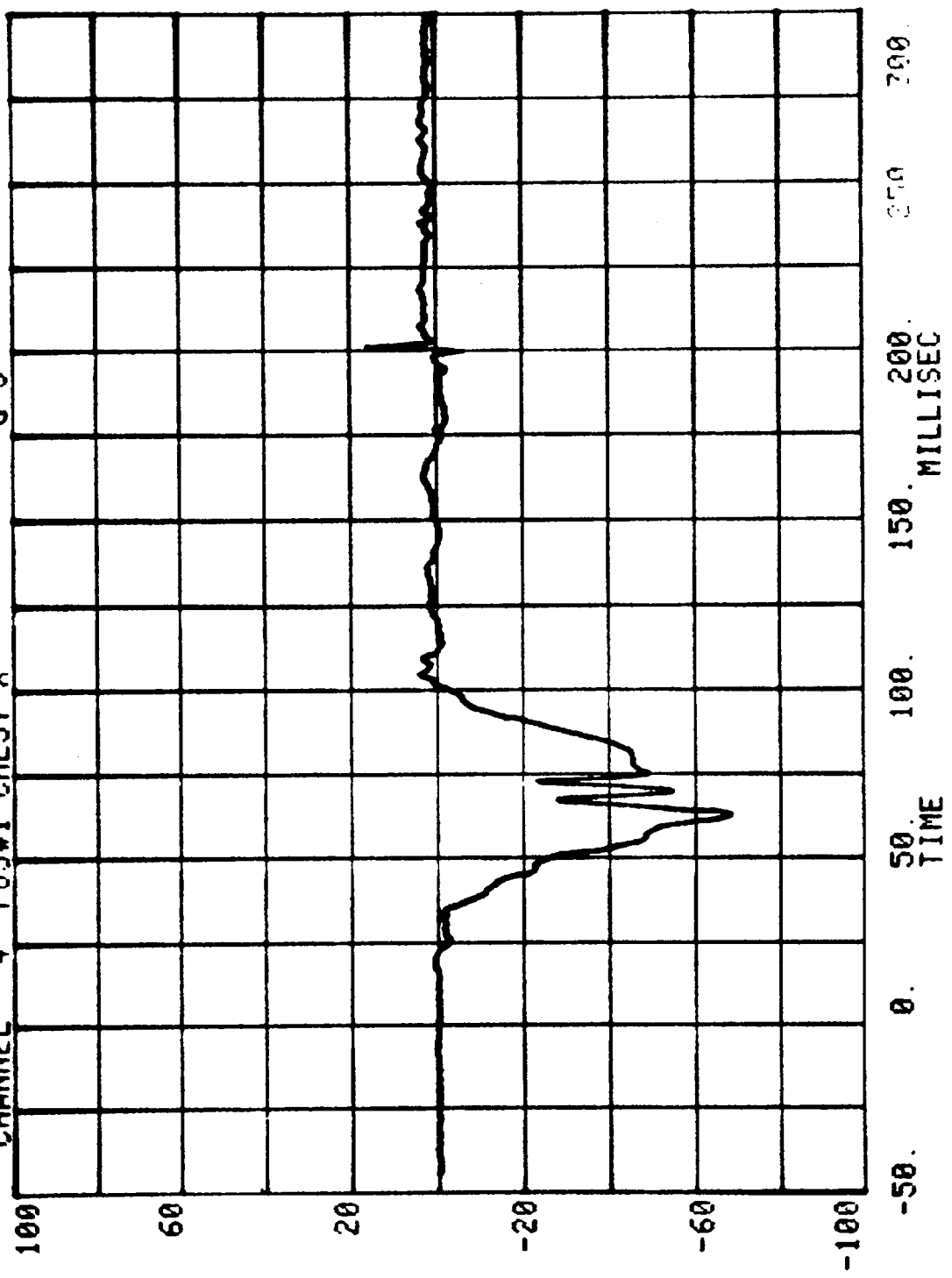
CHANNEL 3 POS#1 HEAD Z
RUN= 809 SERIES= 5200 G'S



CHANNEL 1 POS#1 HEAD R
RUN= 809 SERIES= 5200 G'S



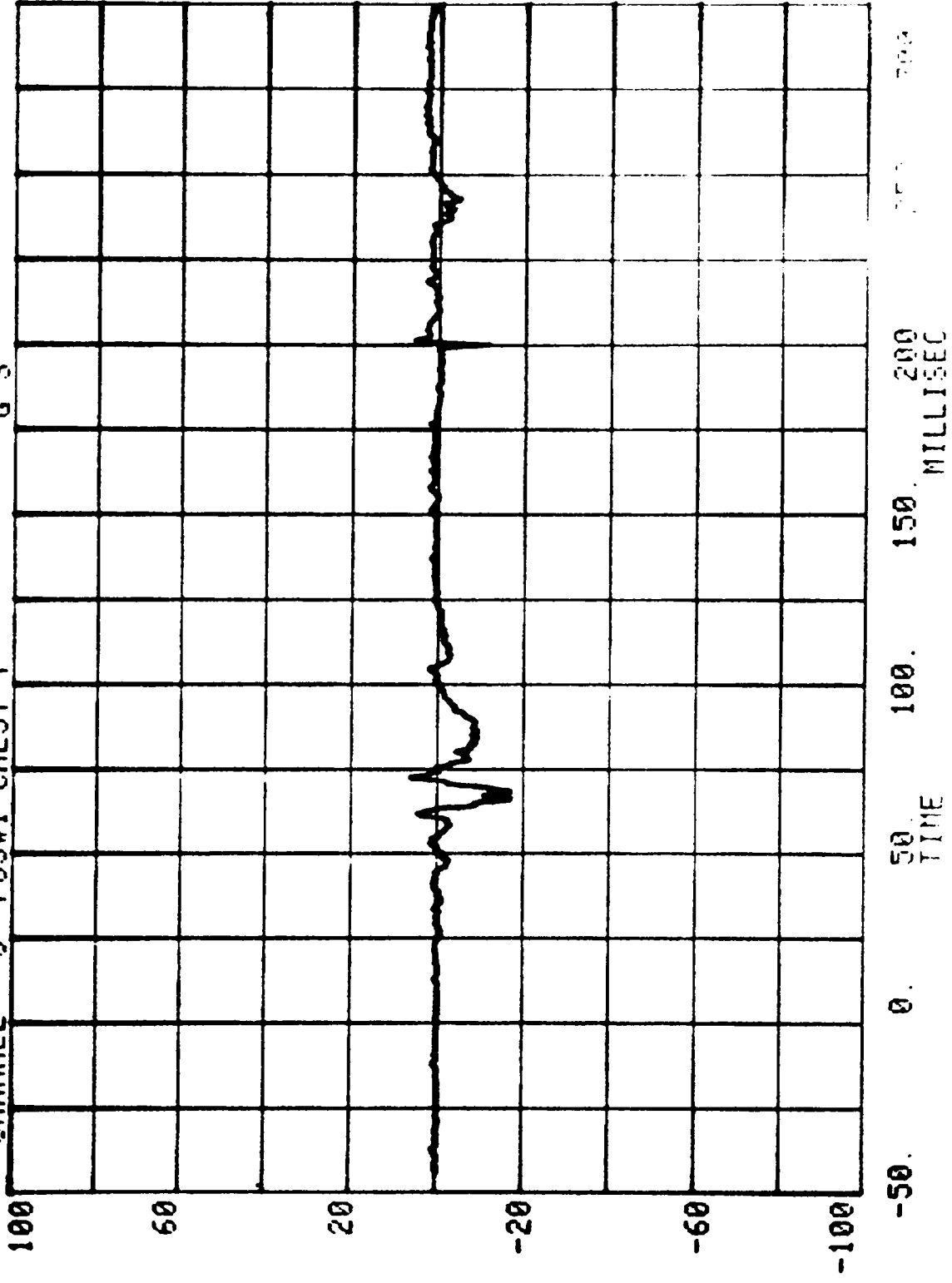
CHANNEL 4 POS#1 CHEST X
RUN= 809 SERIES= 5200 G'S



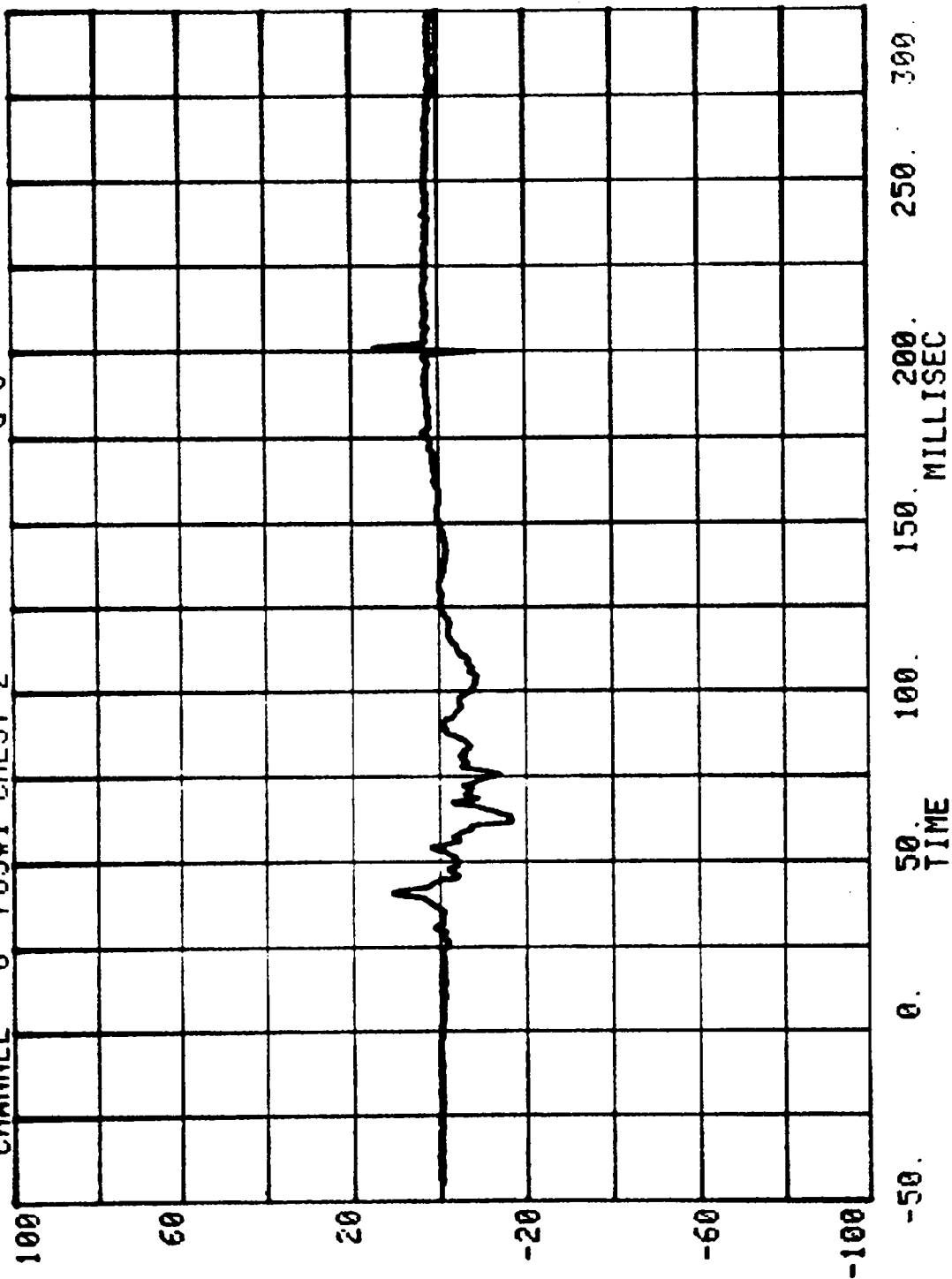
CHANNEL 5 POS#1 CHEST Y G'S

RUN= 809

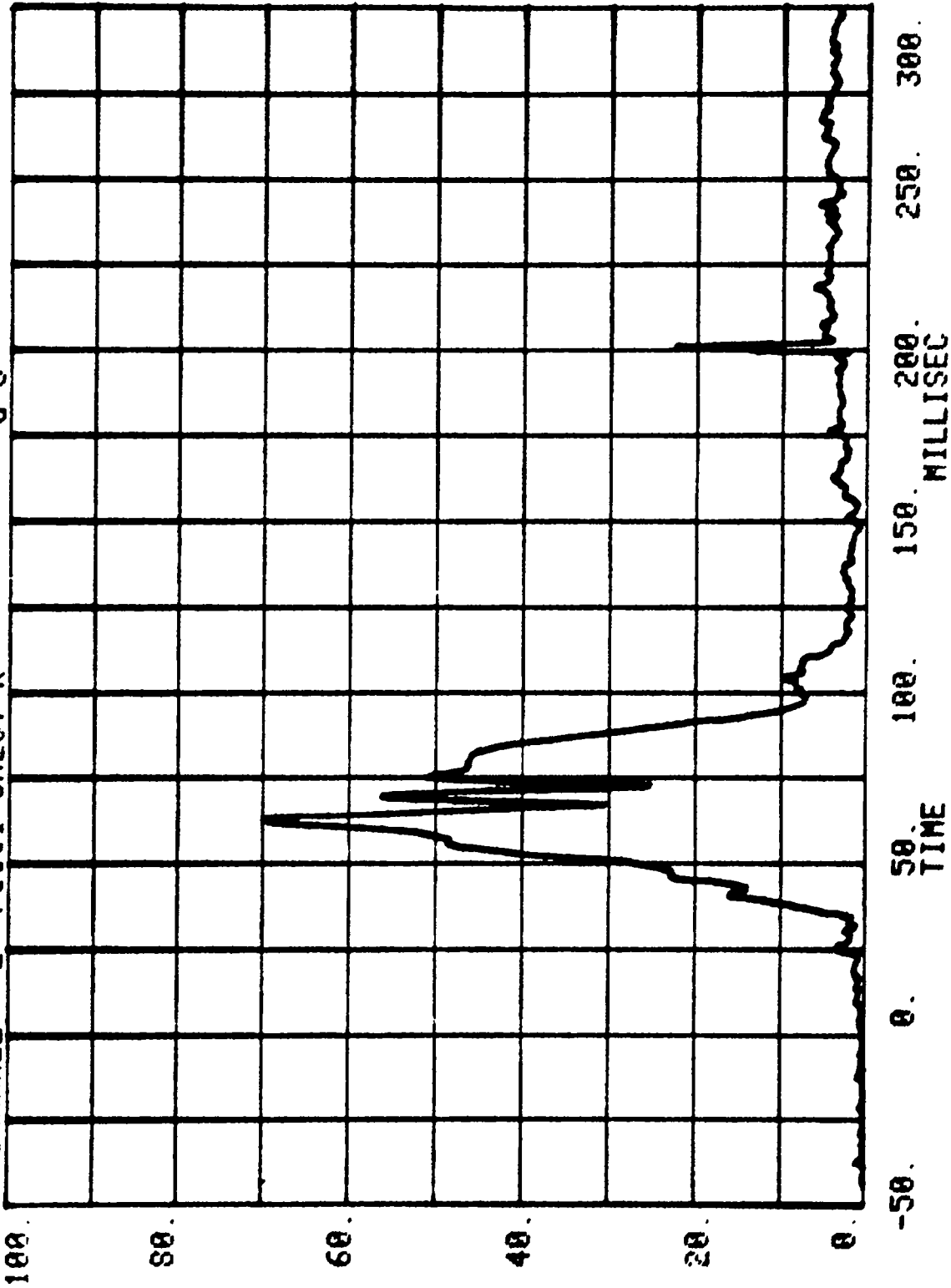
SERIES= 5200



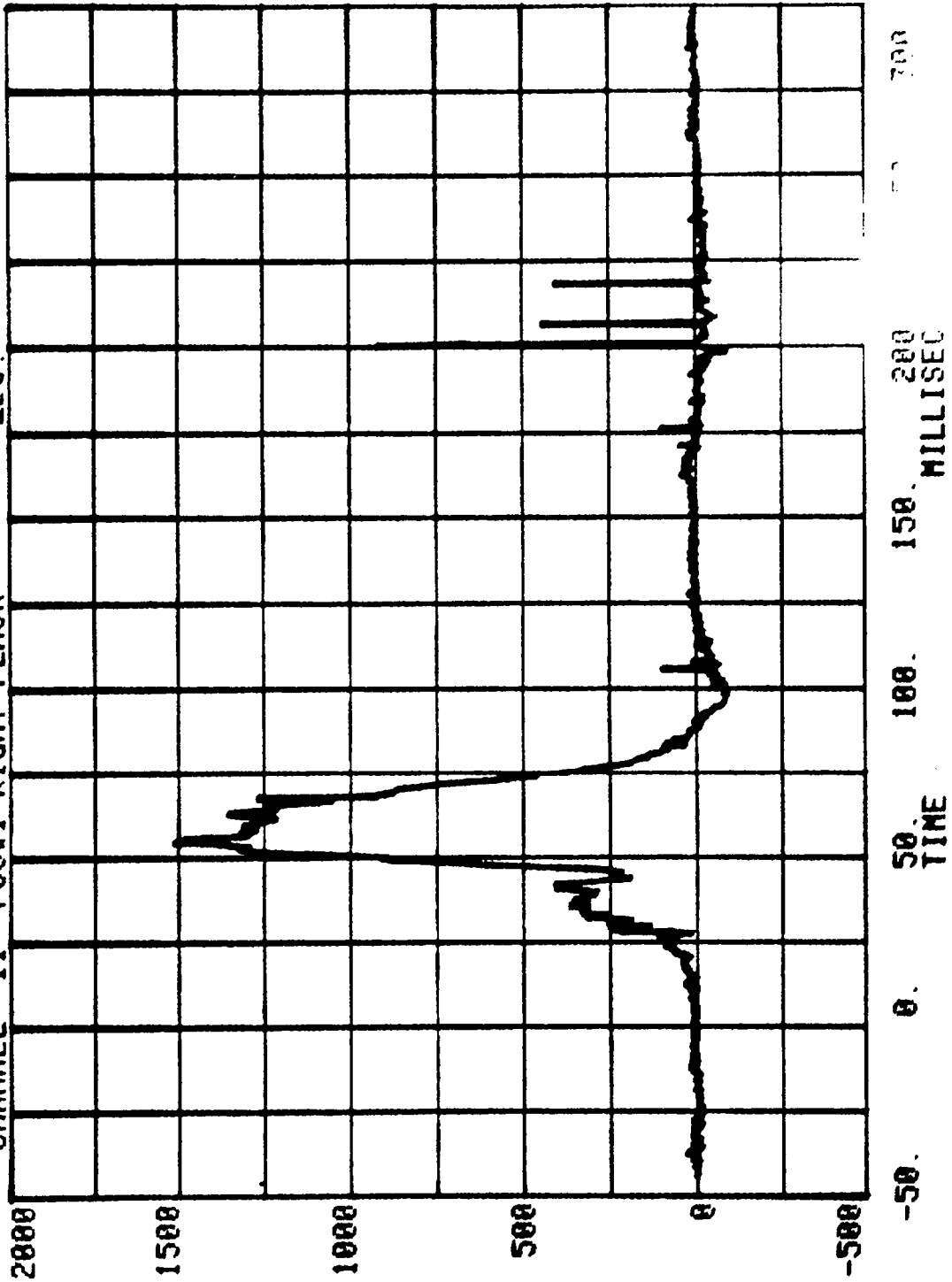
CHANNEL 6 POS#1 CHEST Z
RUN= 809 SERIES= 5200 G'S



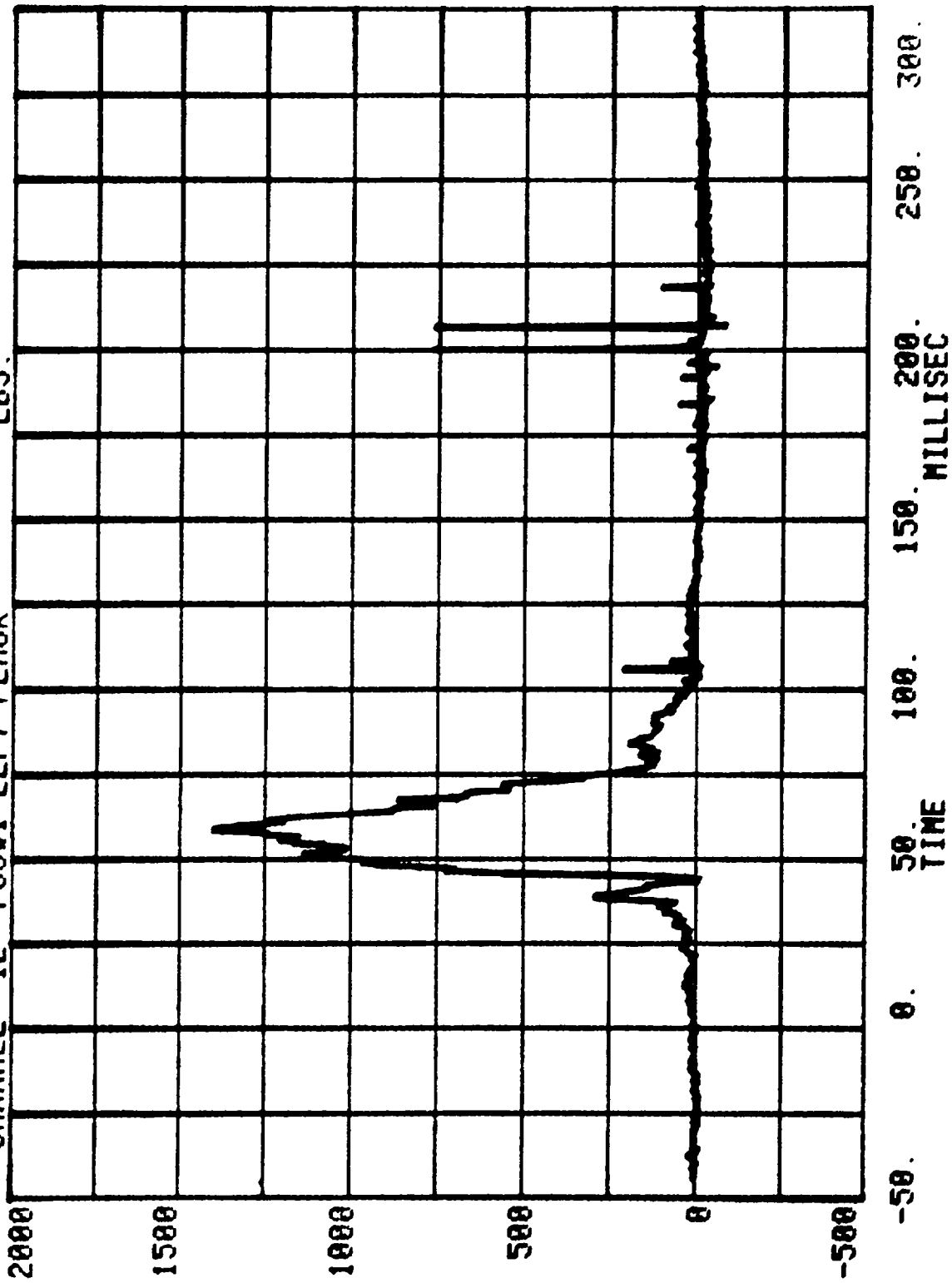
CHANNEL 2 POS#1 CHEST R
RUN= 809 SERIES= 5200 G'S



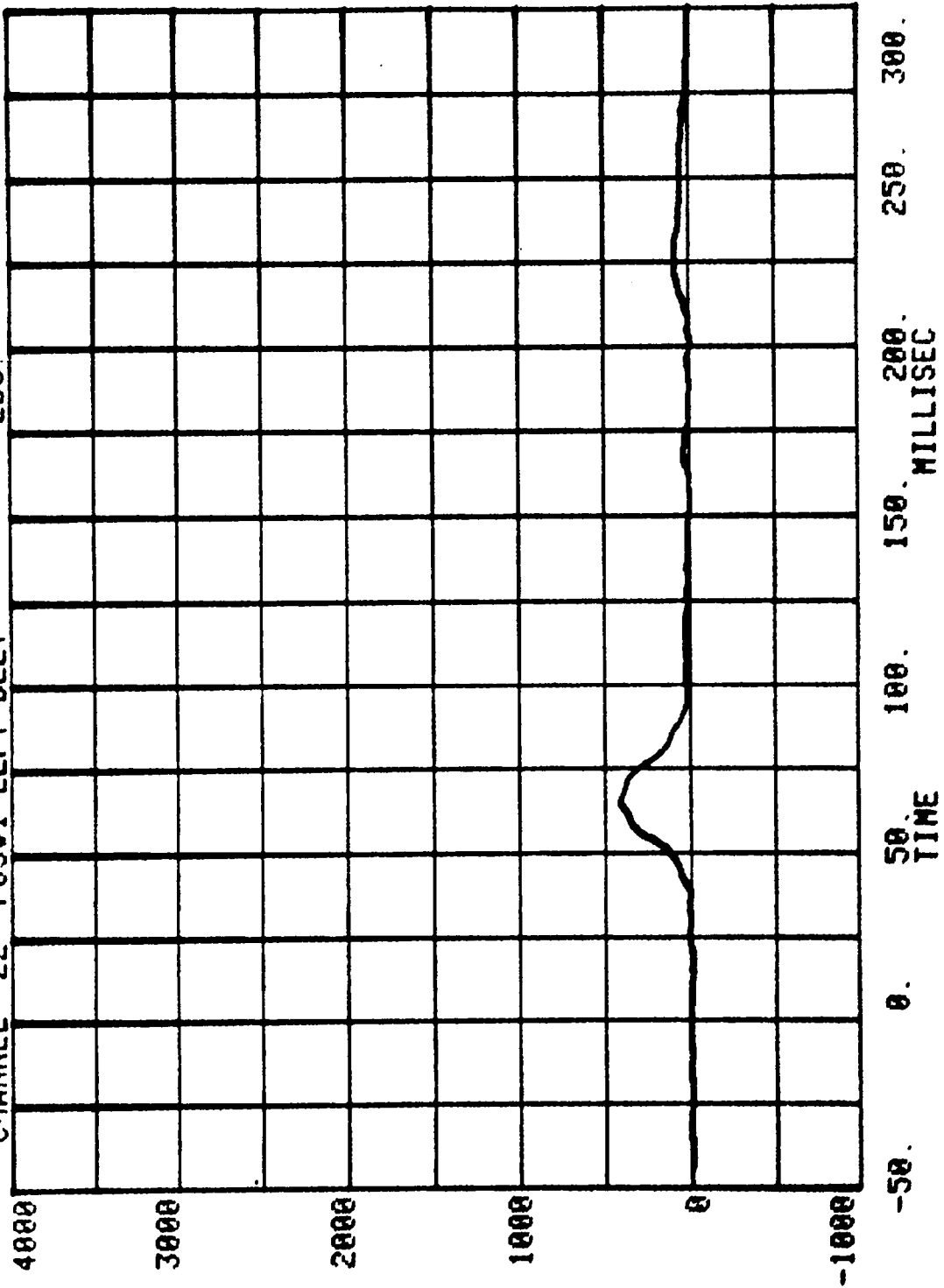
CHANNEL 11 POS#1 RIGHT FEMUR
RUN= 809 SERIES= 5200 LBS.



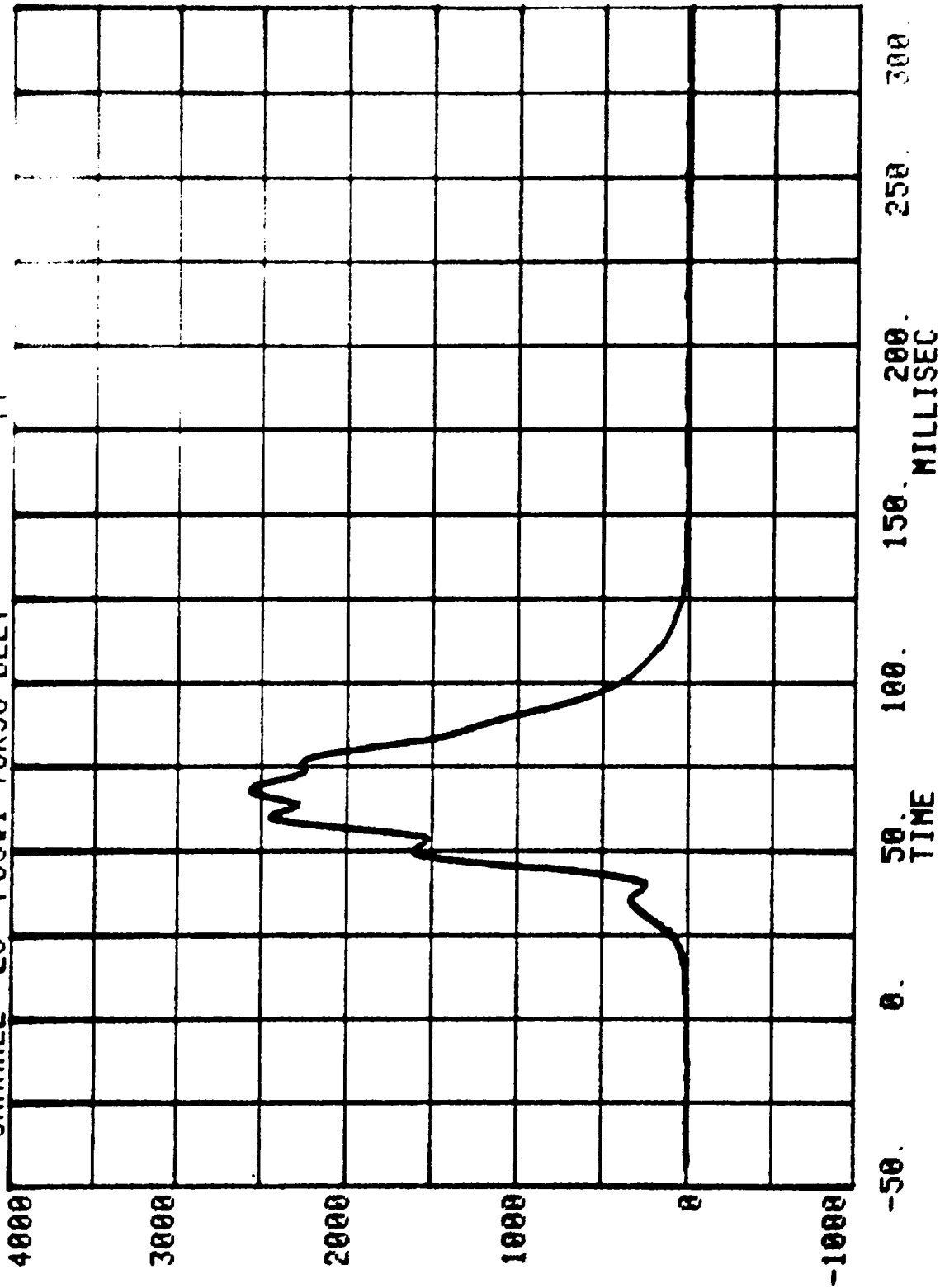
RUN= 809 SERIES= 5200 LBS.
CHANNEL 12 POS#1 LEFT FEMUR



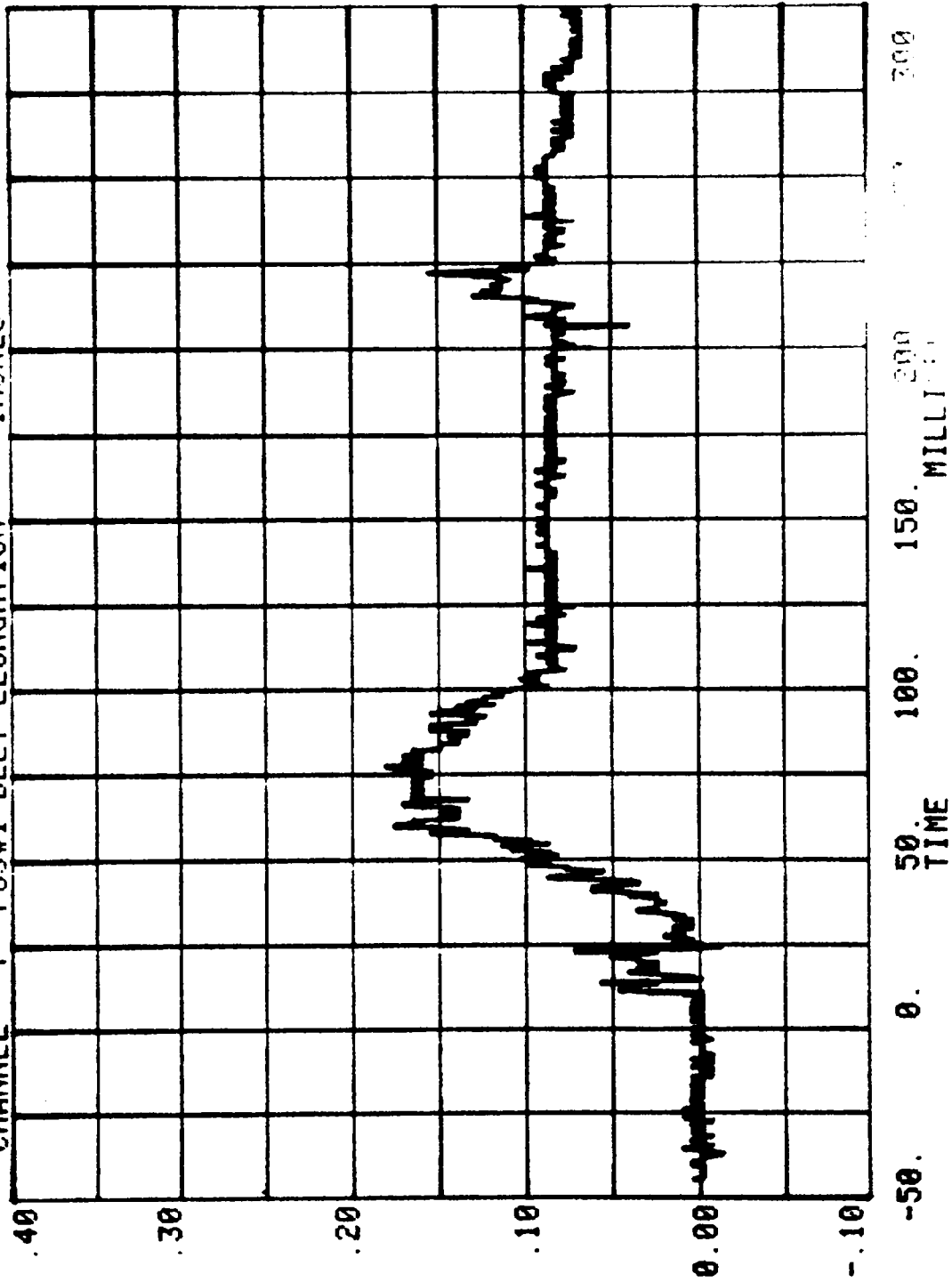
CHANNEL 22 POS#1 LEFT BELT
RUN= 809 SERIES= 5200 LBS



RUN= 809 SERIES= 5200
CHANNEL 23 POS#1 TORSO BELT



CHANNEL 7 POS#1 BELT ELONGATION SERIES= 5200 MEASURED OVER 2.5 INCHES



HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

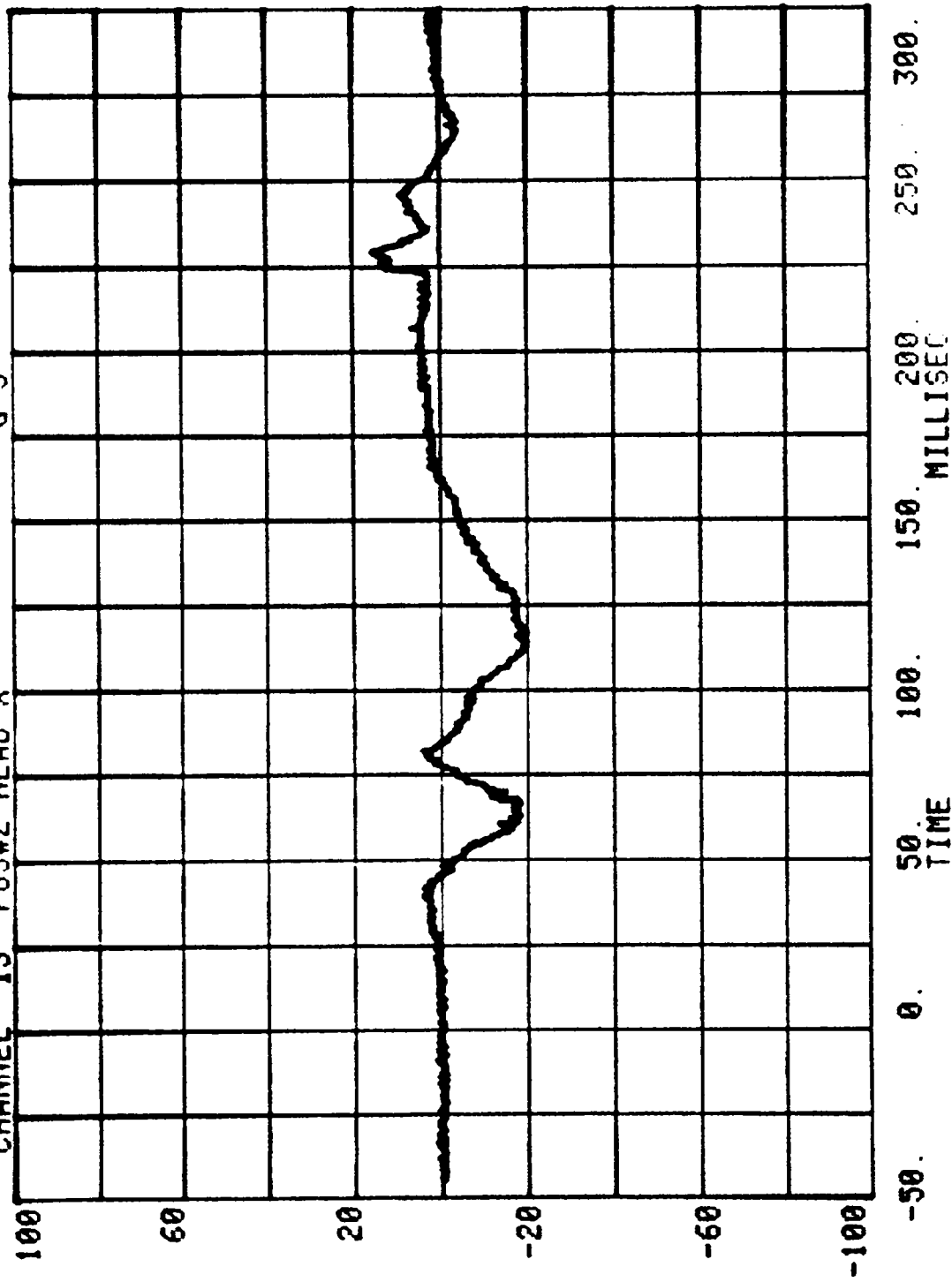
NEW CAR ASSESSMENT BARRIER TEST - 1988

RUN= 809

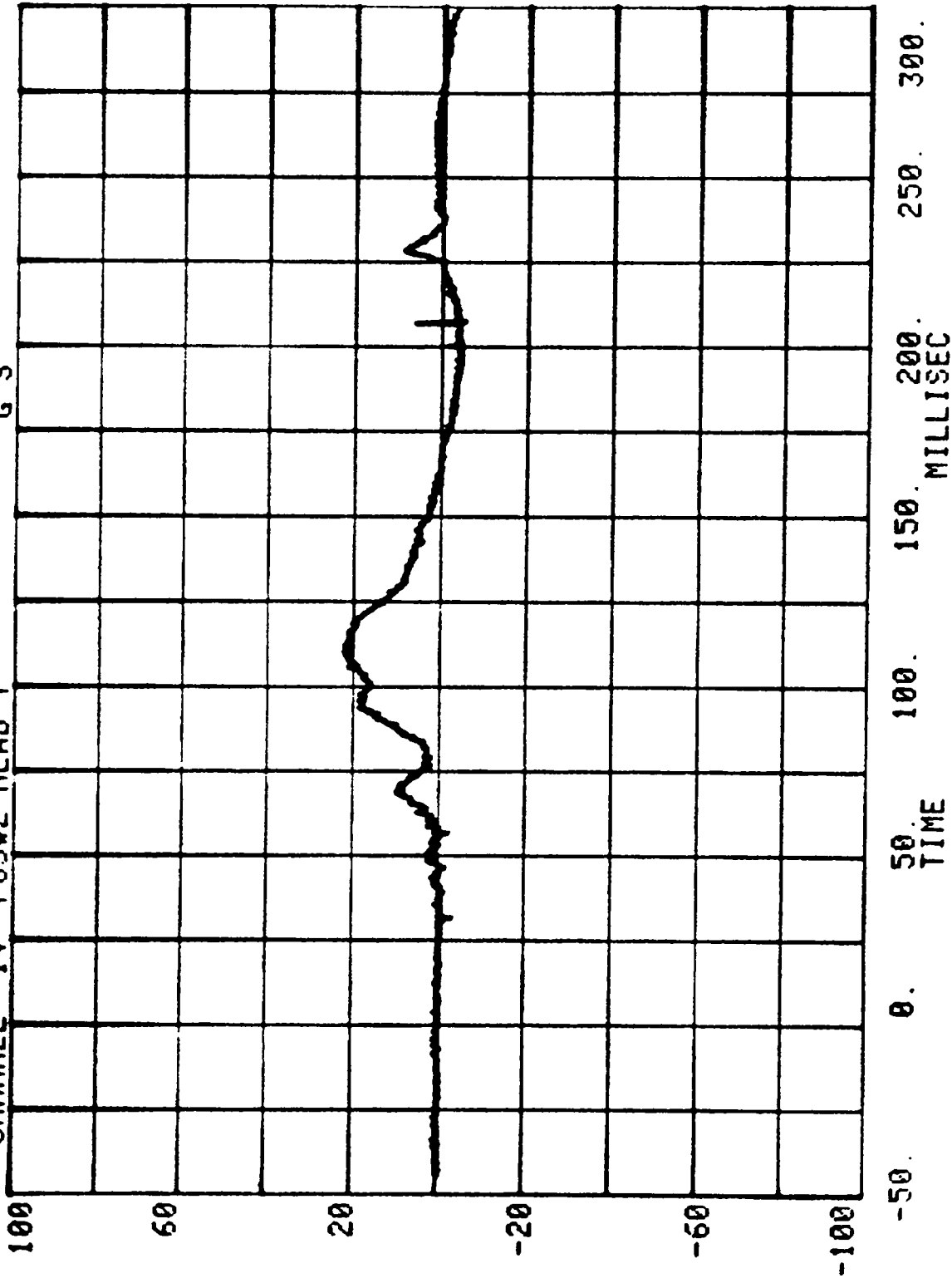
POS#2 HEAD R

HIC= 861.2 FROM T1= .06975 TO T2= .10575
AVERAGE ACCELERATION BETWEEN T1 AND T2= 56.4G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=1224.0

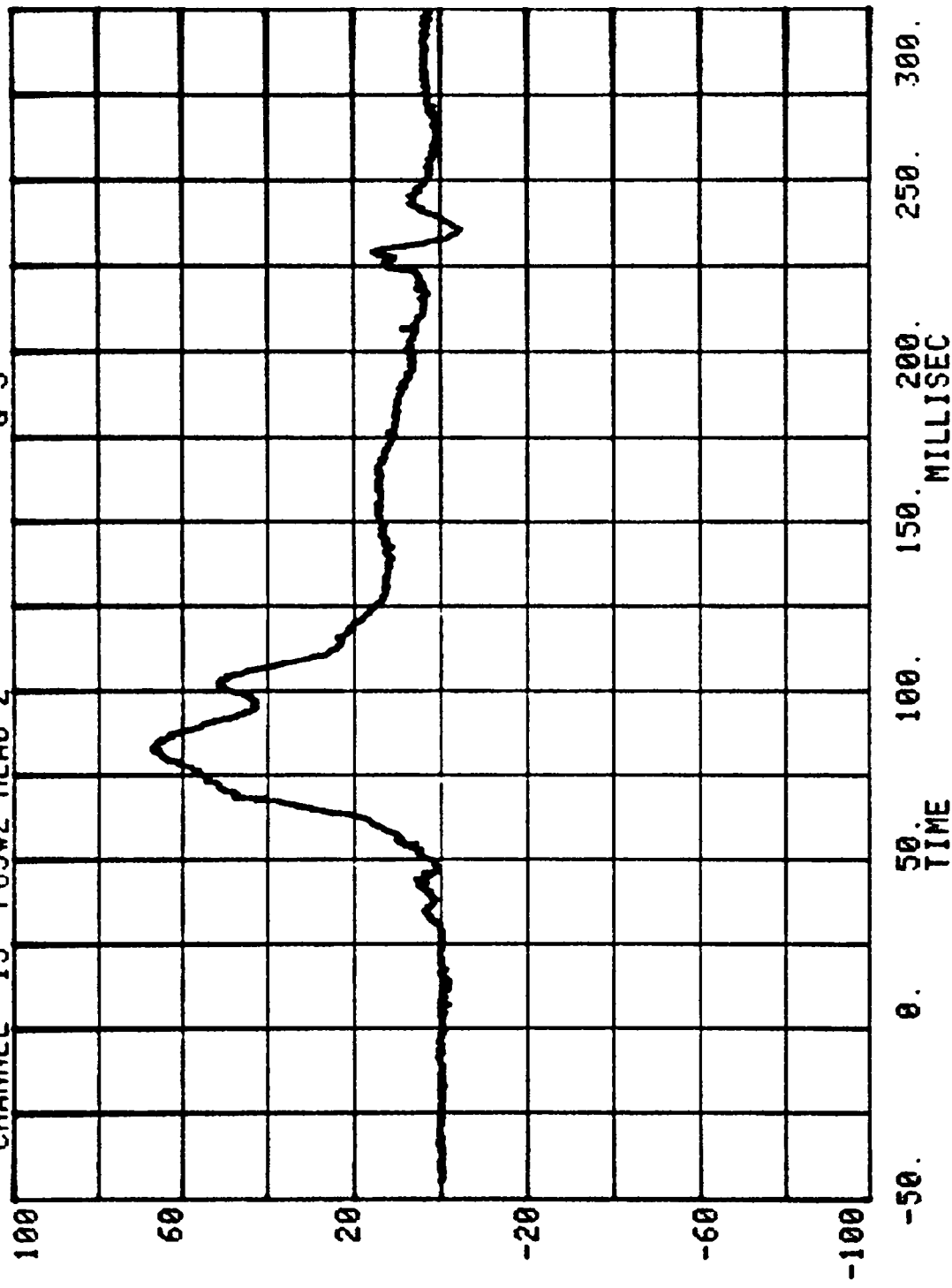
CHANNEL 13 POS#2 HEAD X
RUN= 809 SERIES= 5200 G'S



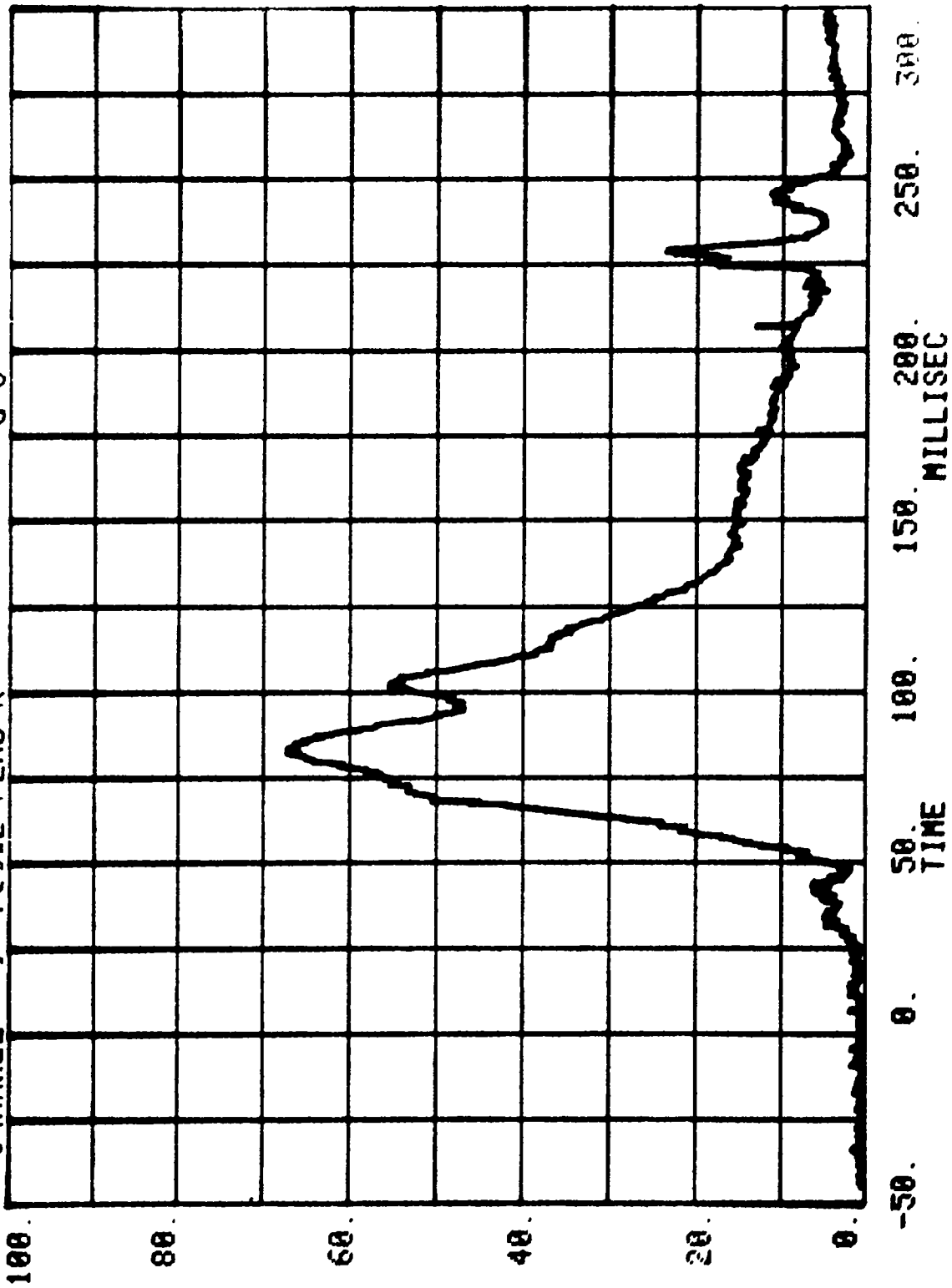
CHANNEL 14 POS#2 HEAD Y
RUN= 809 SERIES= 5200 G'S



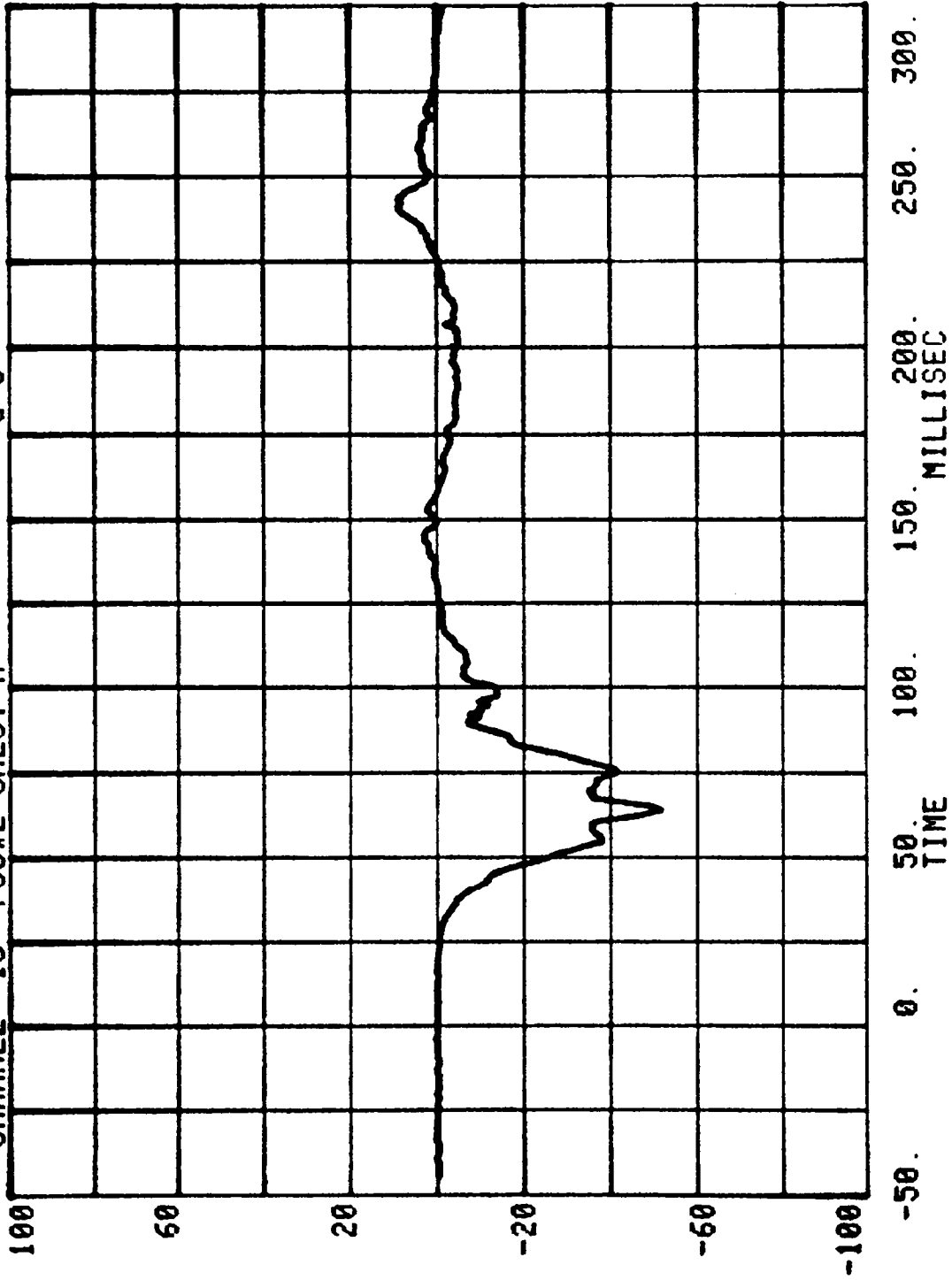
CHANNEL 15 POS#2 HEAD Z
RUN= 809 SERIES= 5200 G'S



CHANNEL 3 POS#2 HEAD R
RUN= 809 SERIES= 5200 G'S



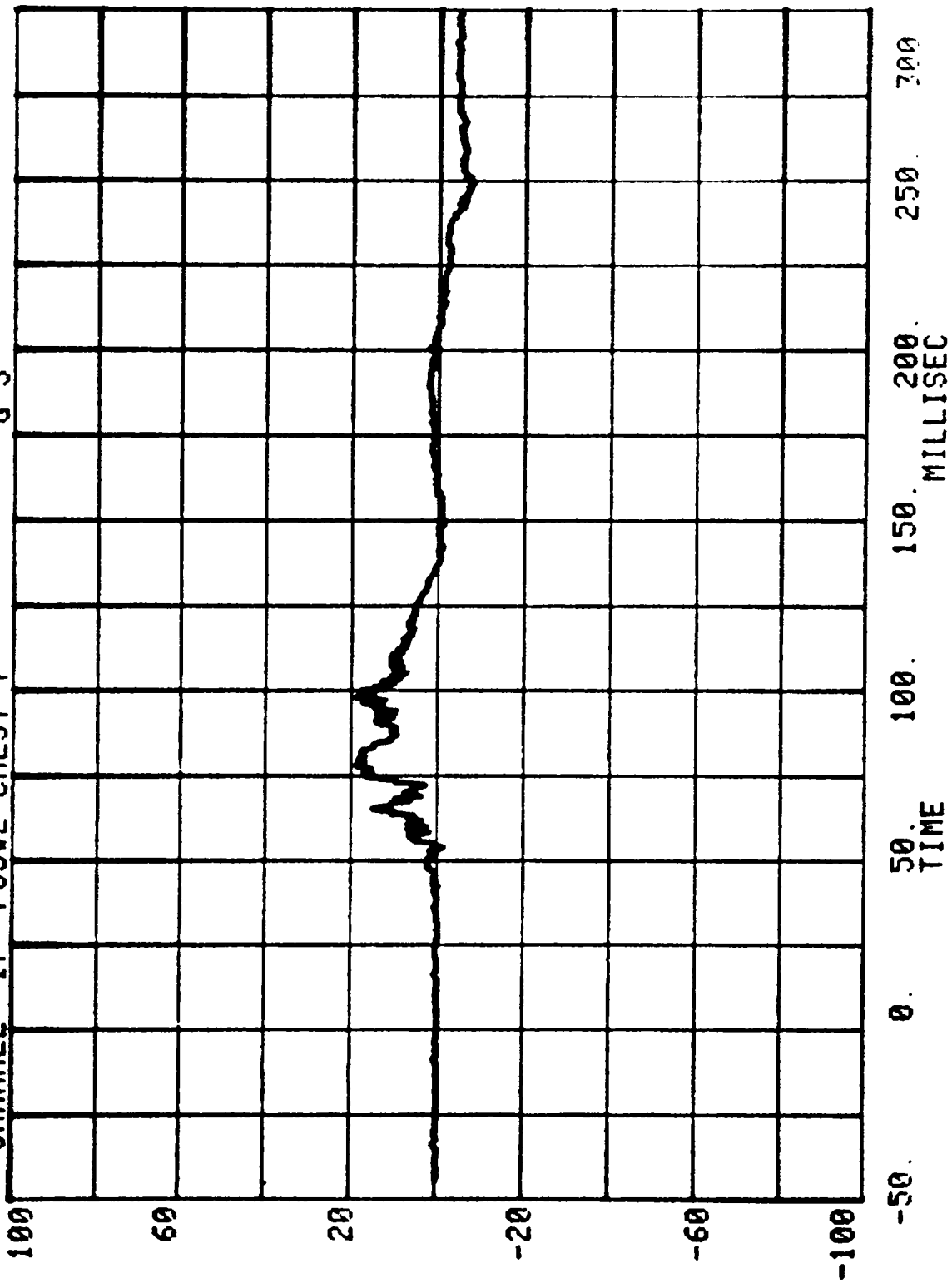
CHANNEL 16 POS#2 CHEST X
RUN= 809 SERIES= 5200 G'S



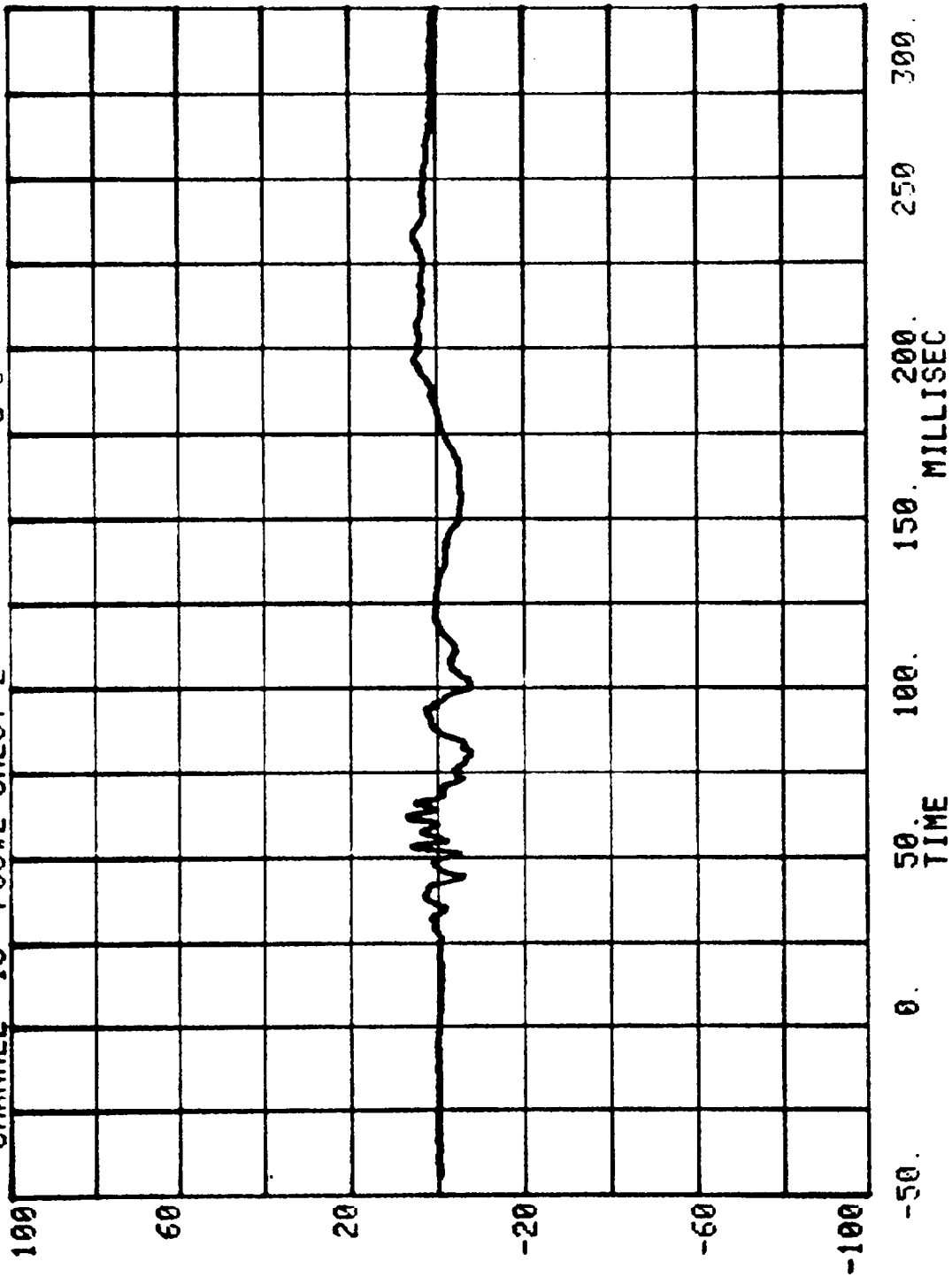
CHANNEL 17 POS#2 CHEST Y G'S

RUN= 809

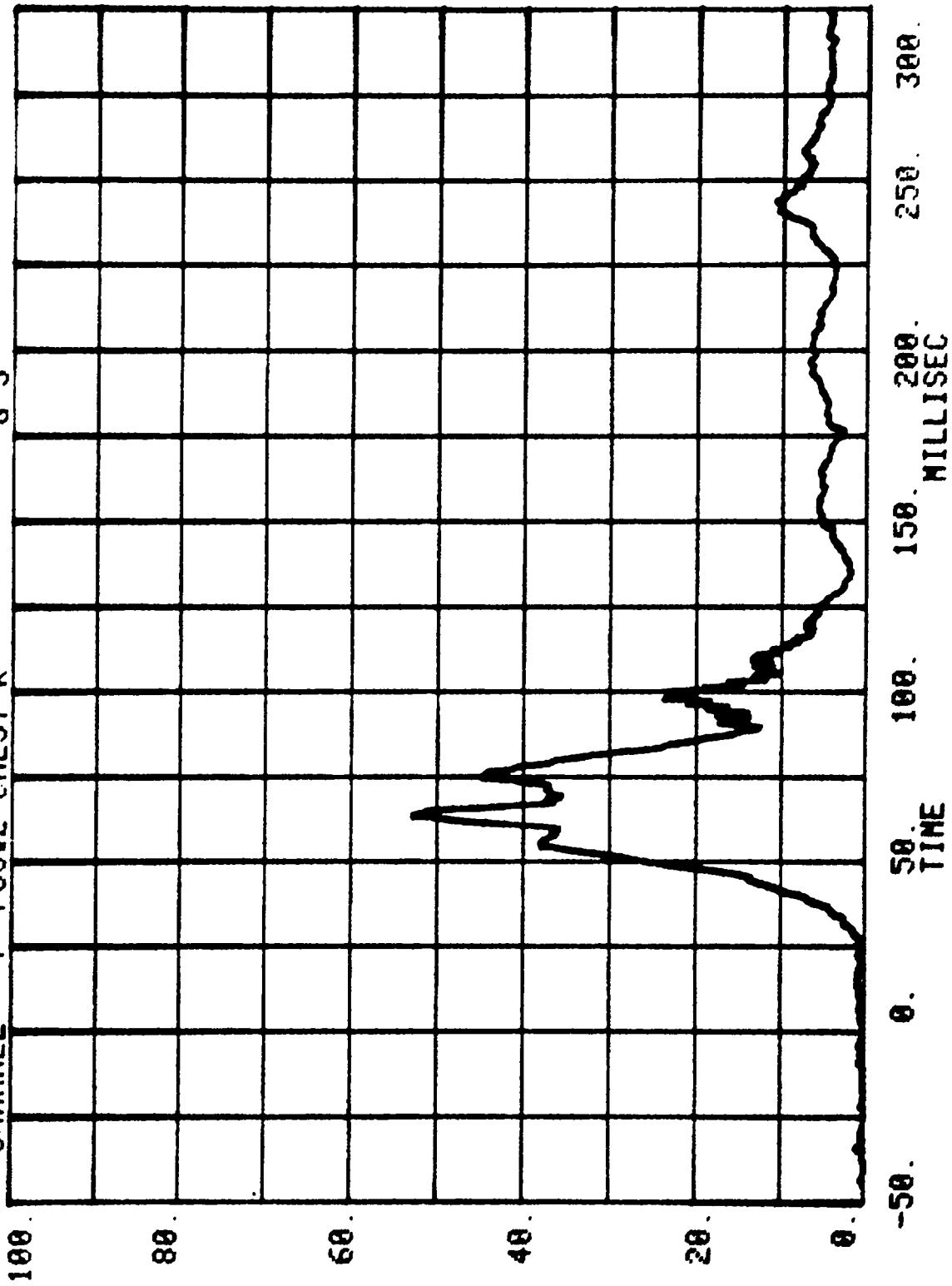
SERIES= 5200



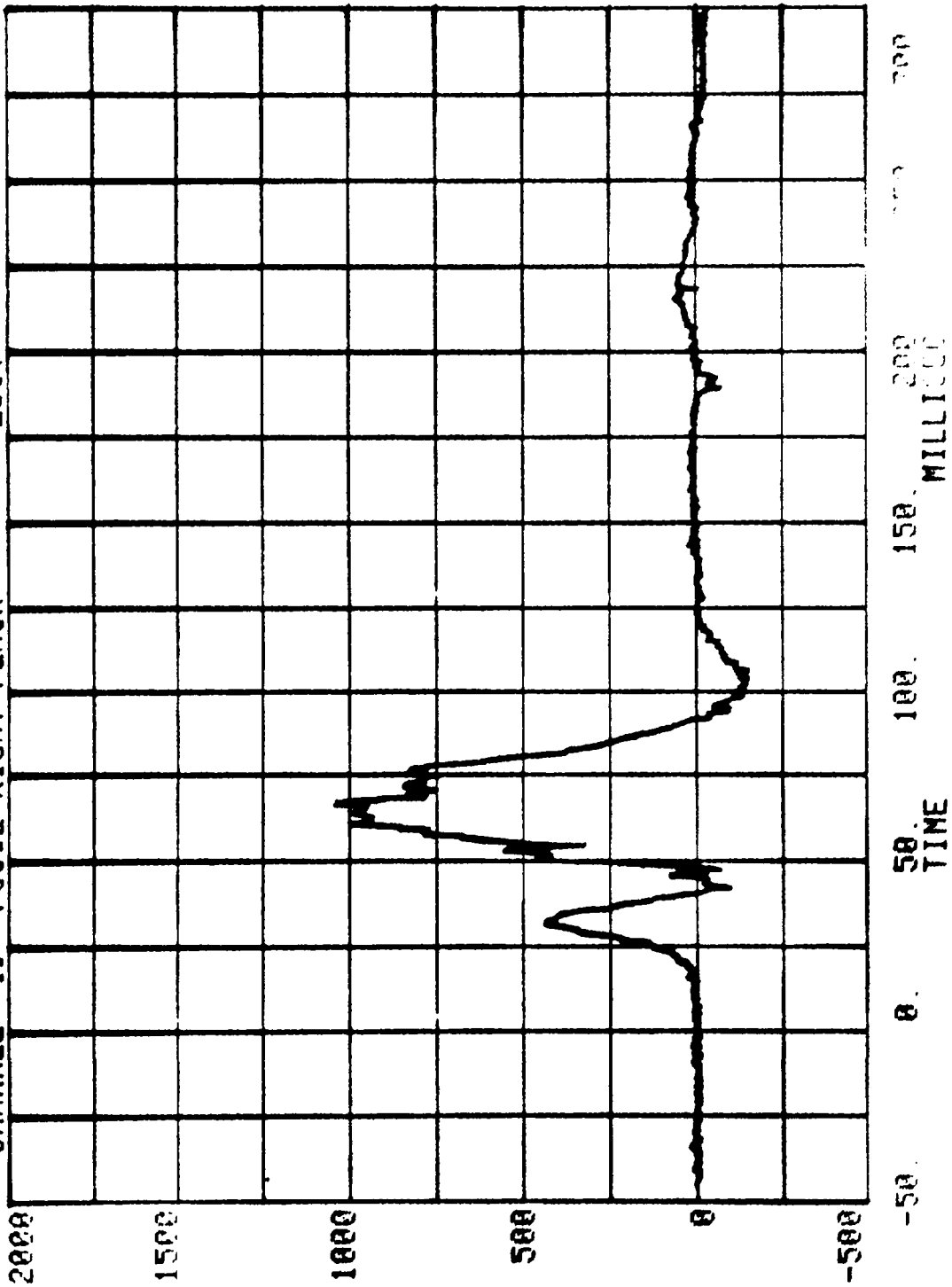
CHANNEL 18 POS#2 CHEST Z
RUN= 809 SERIES= 5200 G'S



CHANNEL 4 POS#2 CHEST R
RUN= 809 SERIES= 5200 G'S

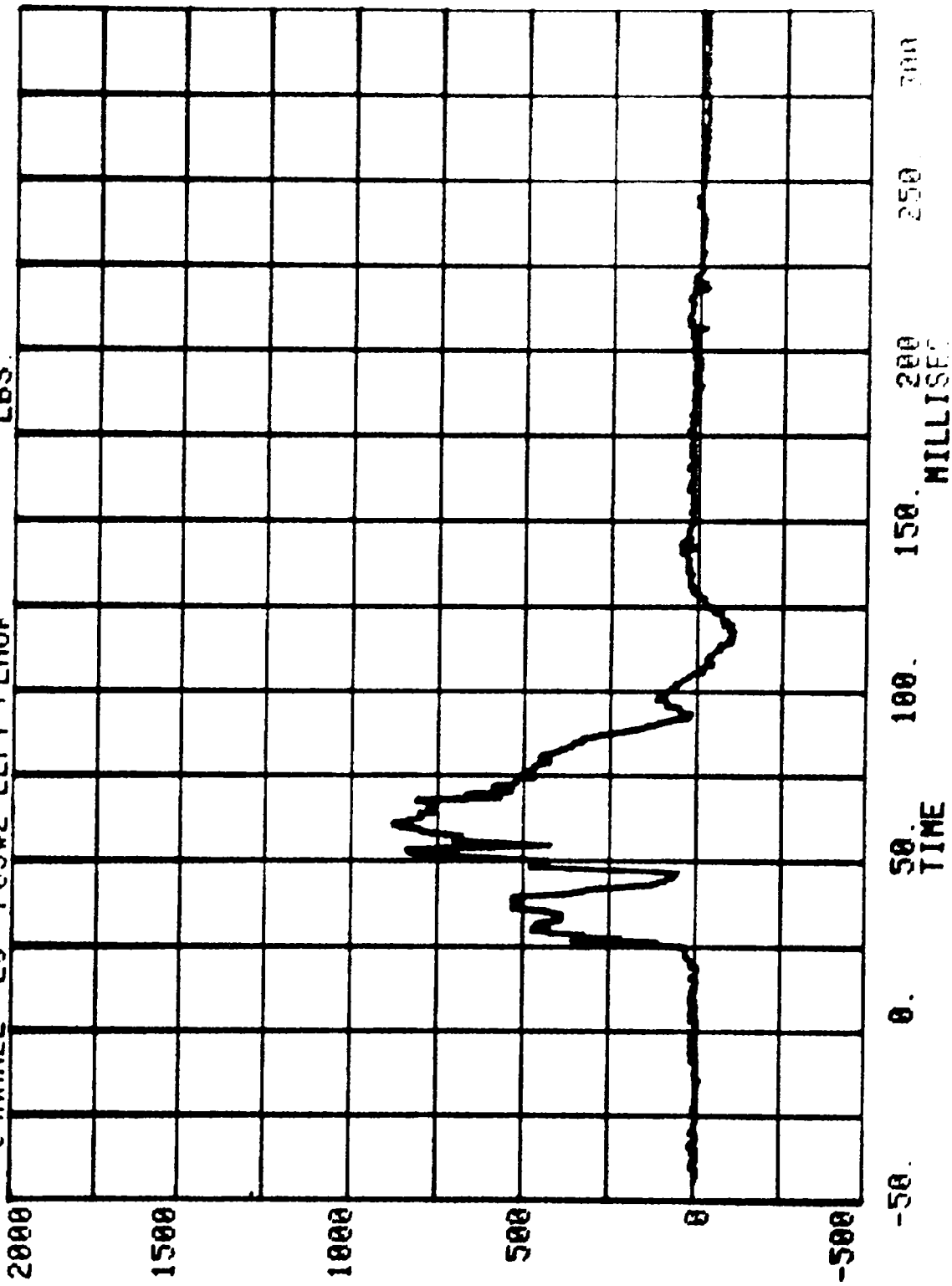


CHANNEL 19 POS#2 RIGHT FEMUR
RUN= 809 SERIES= 5200 LBS.

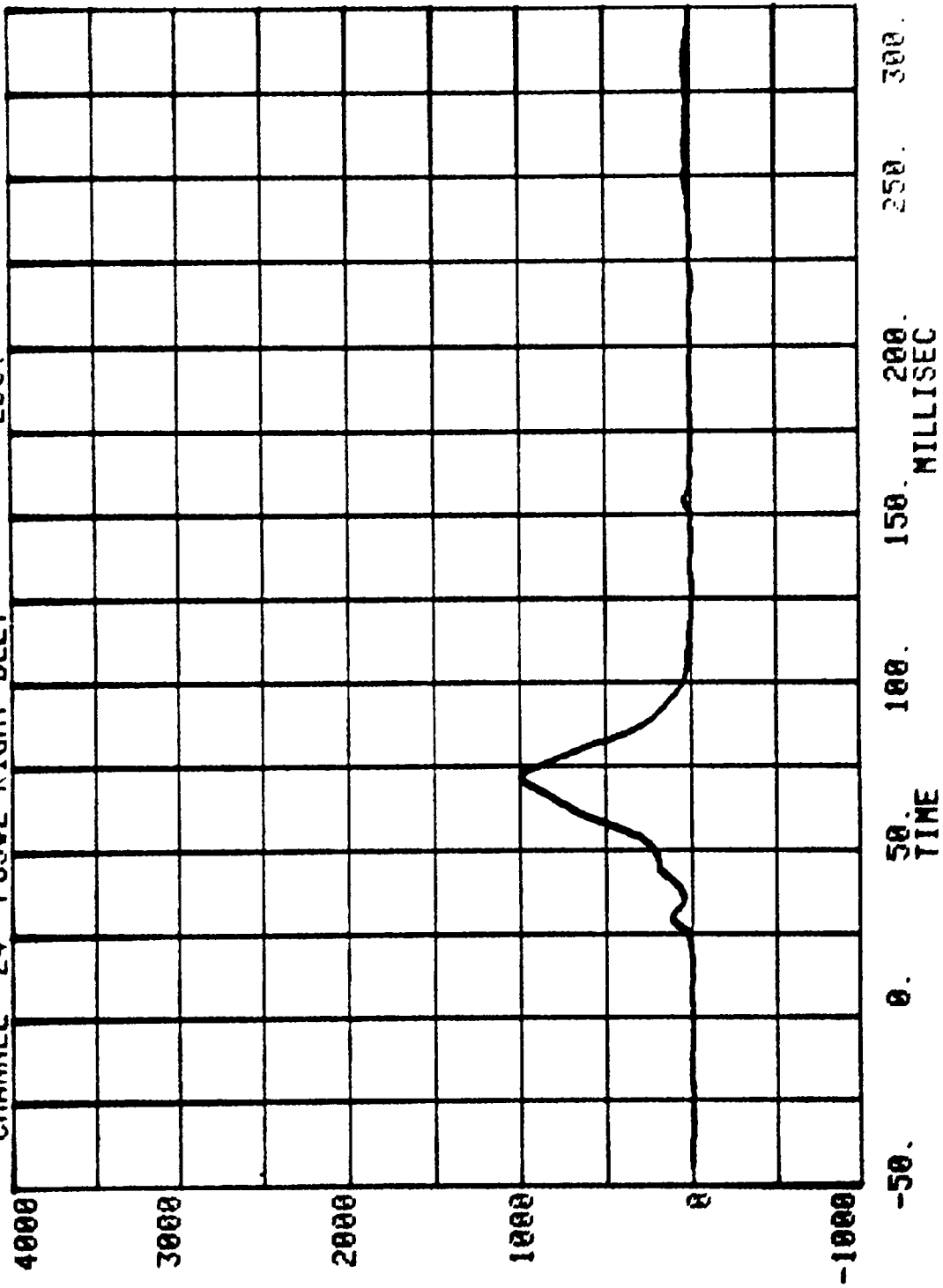


CHANNEL 29 POS#2 LEFT FEMUR LBS.

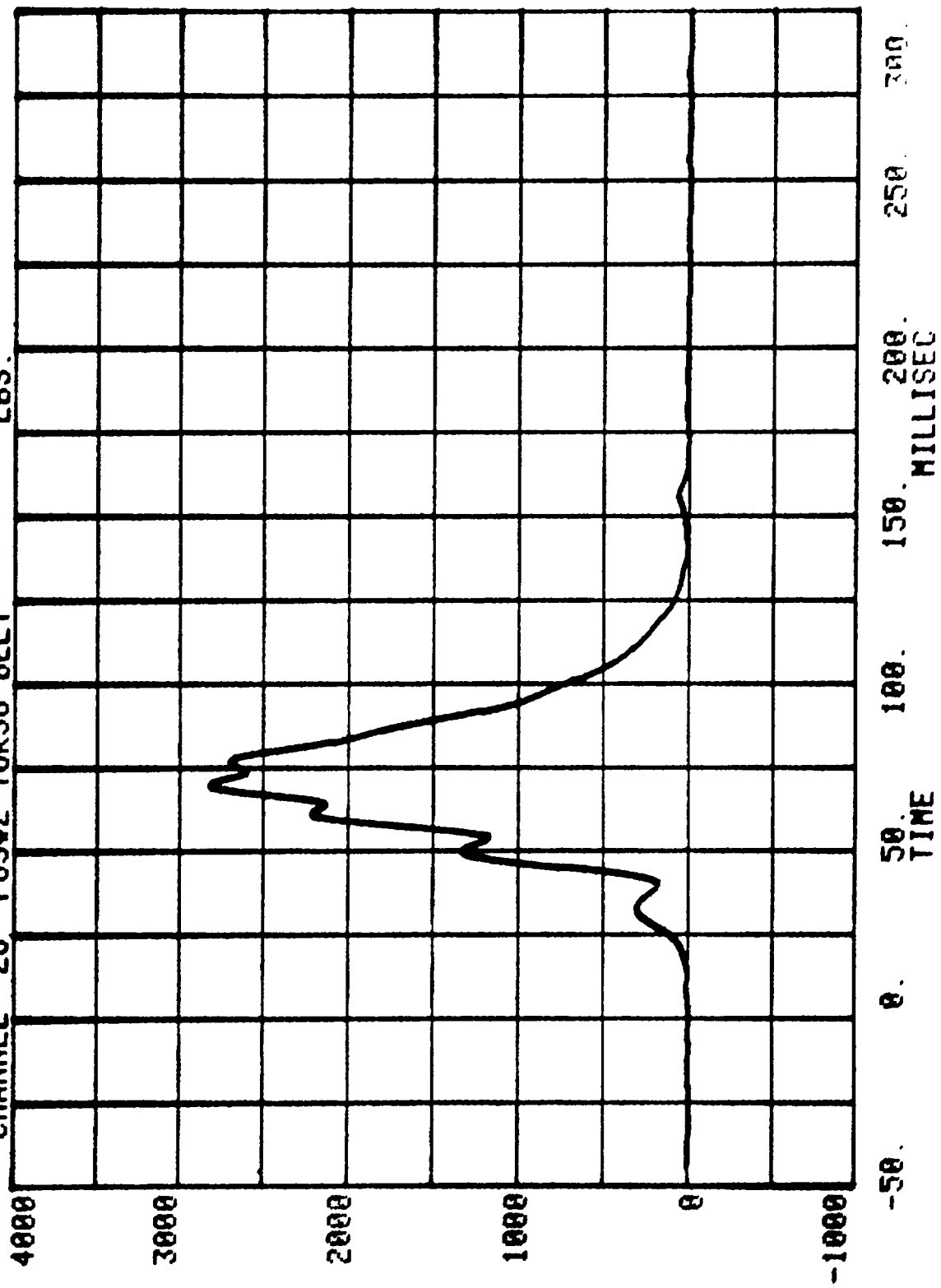
RUN= 809 SERIES= 5200



RUN= 809 SERIES= 5200 LBS.
CHANNEL 24 POS#2 RIGHT BELT



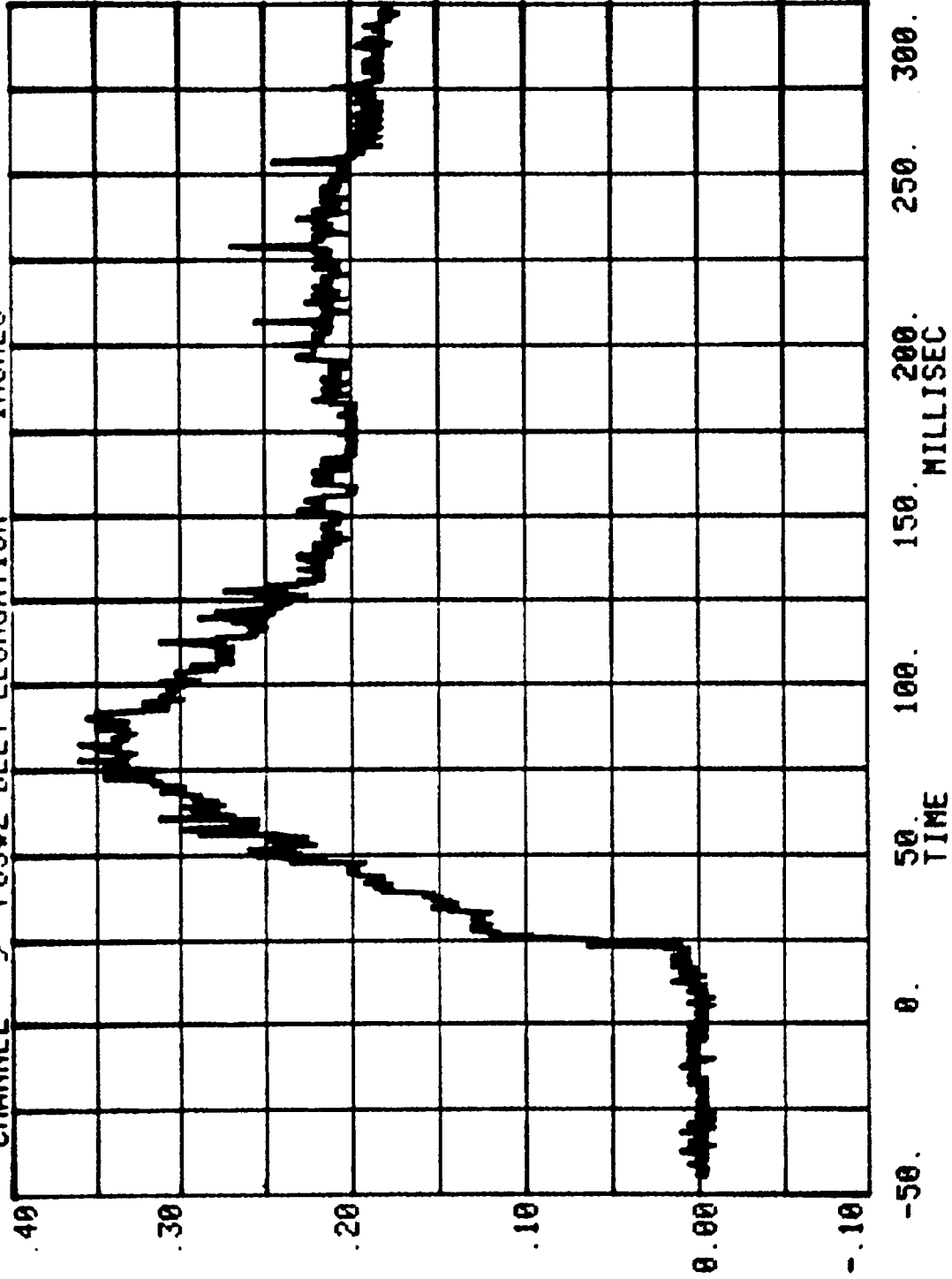
CHANNEL 26 POS#2 TORSO BELT
RUN= 809 SERIES= 5200 LBS.



MEASURED OVER 2.5 INCHES

RUN= 809 SERIES= 5200

CHANNEL 9 POS#2 BELT ELONGATION INCHES

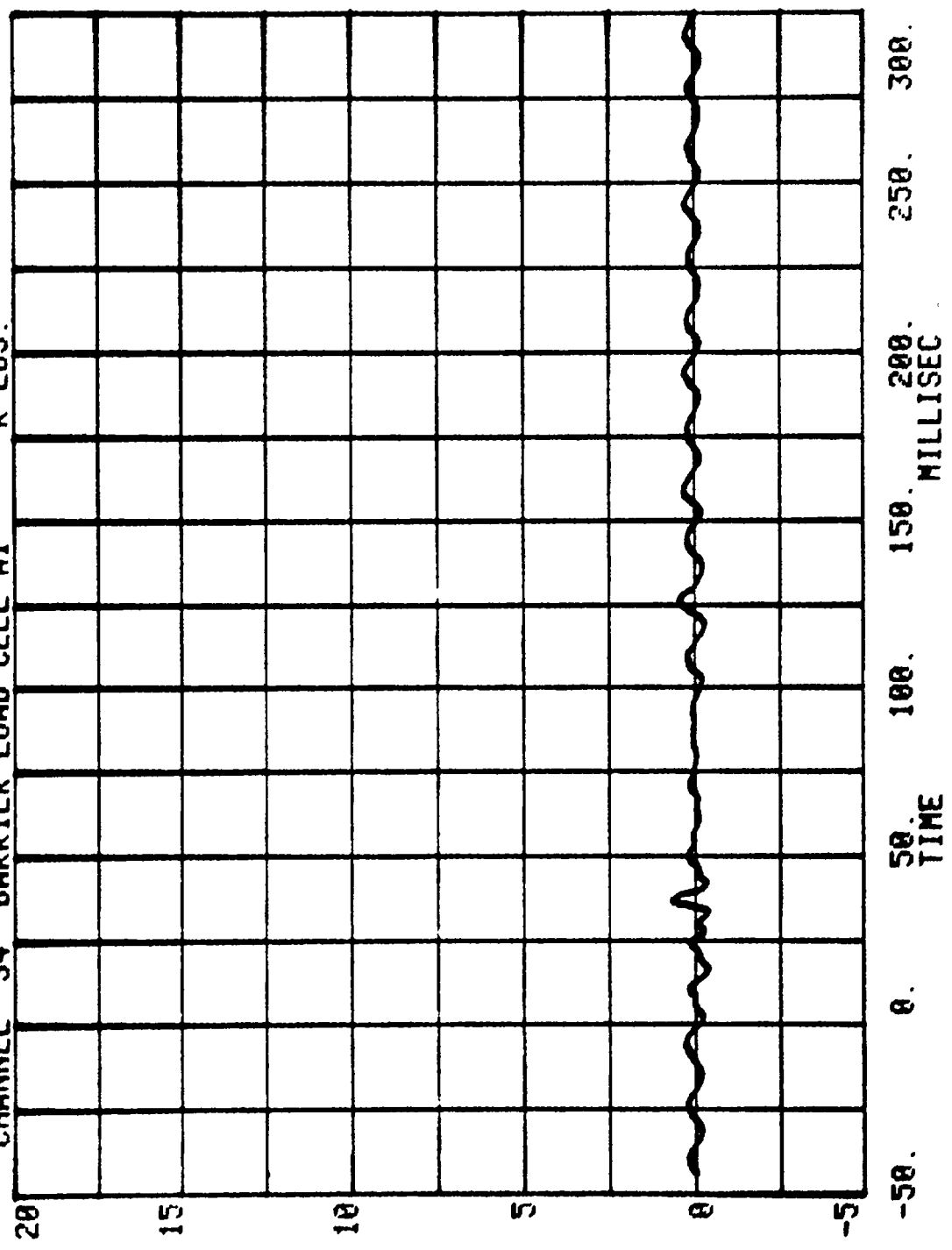


TEST NO. MJ5200

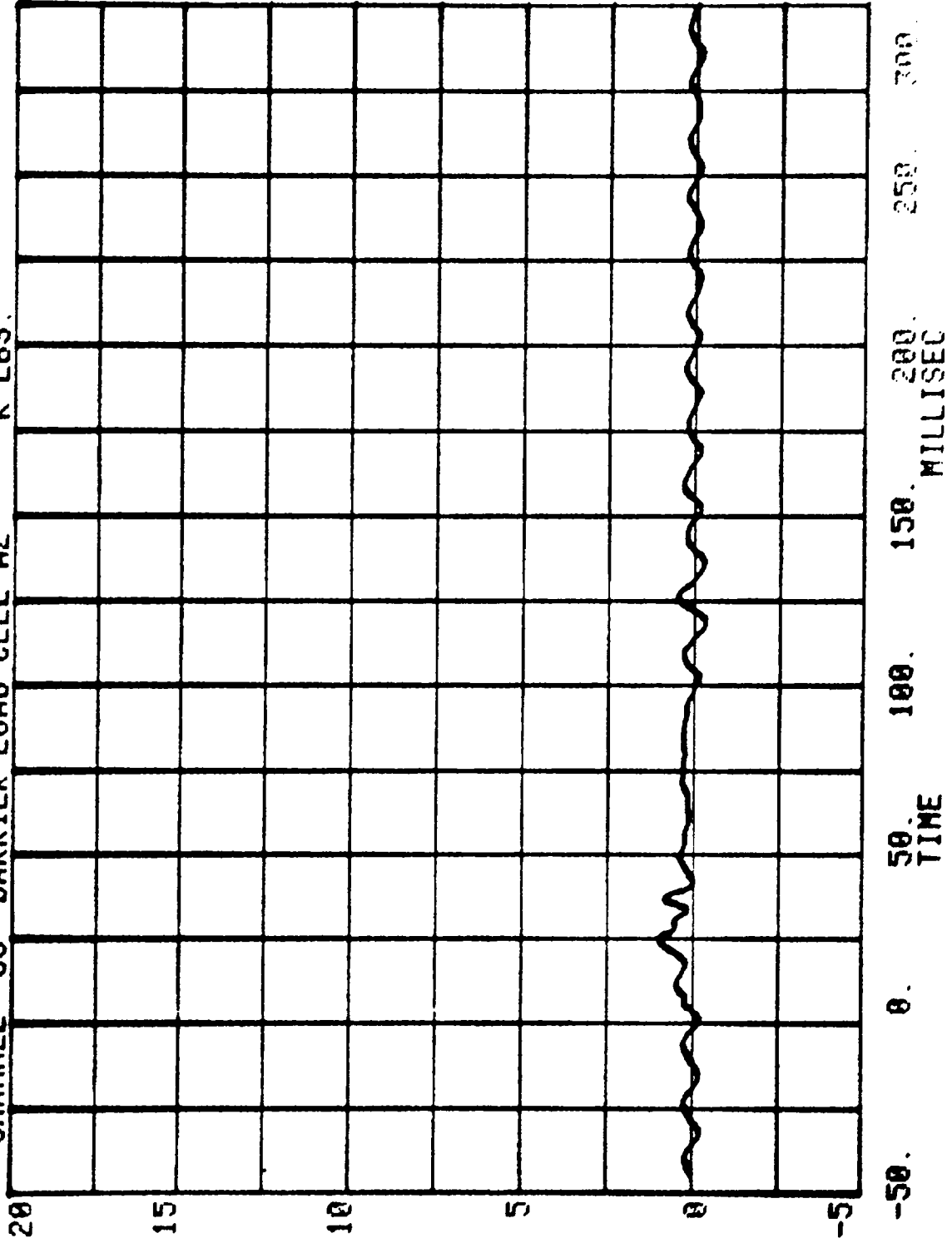
LOAD CELL BARRIER DATA
FILTER CHANNEL CLASS

60

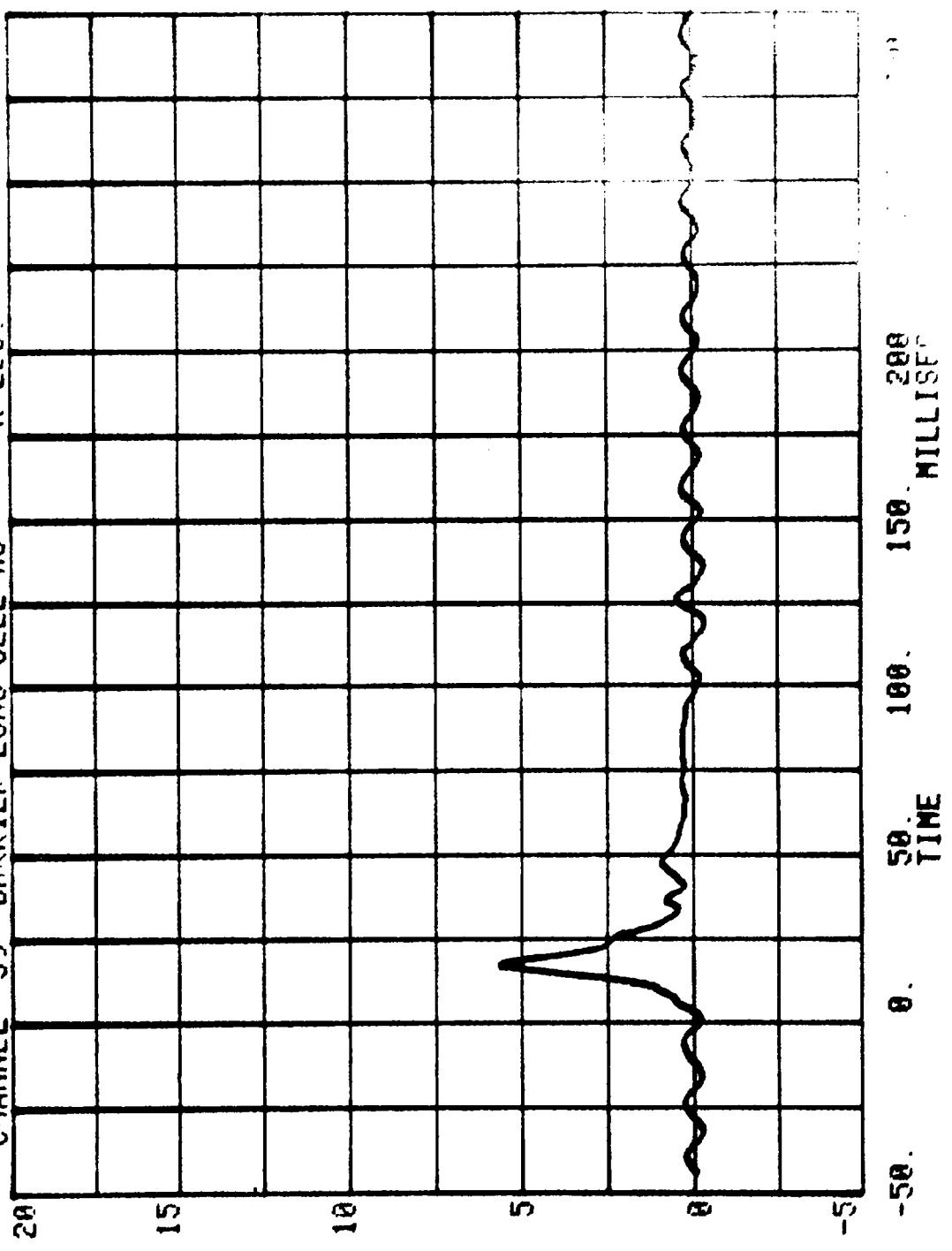
RUN= 809 SERIES= 5200 K LBS.
CHANNEL 34 BARRIER LOAD CELL A1



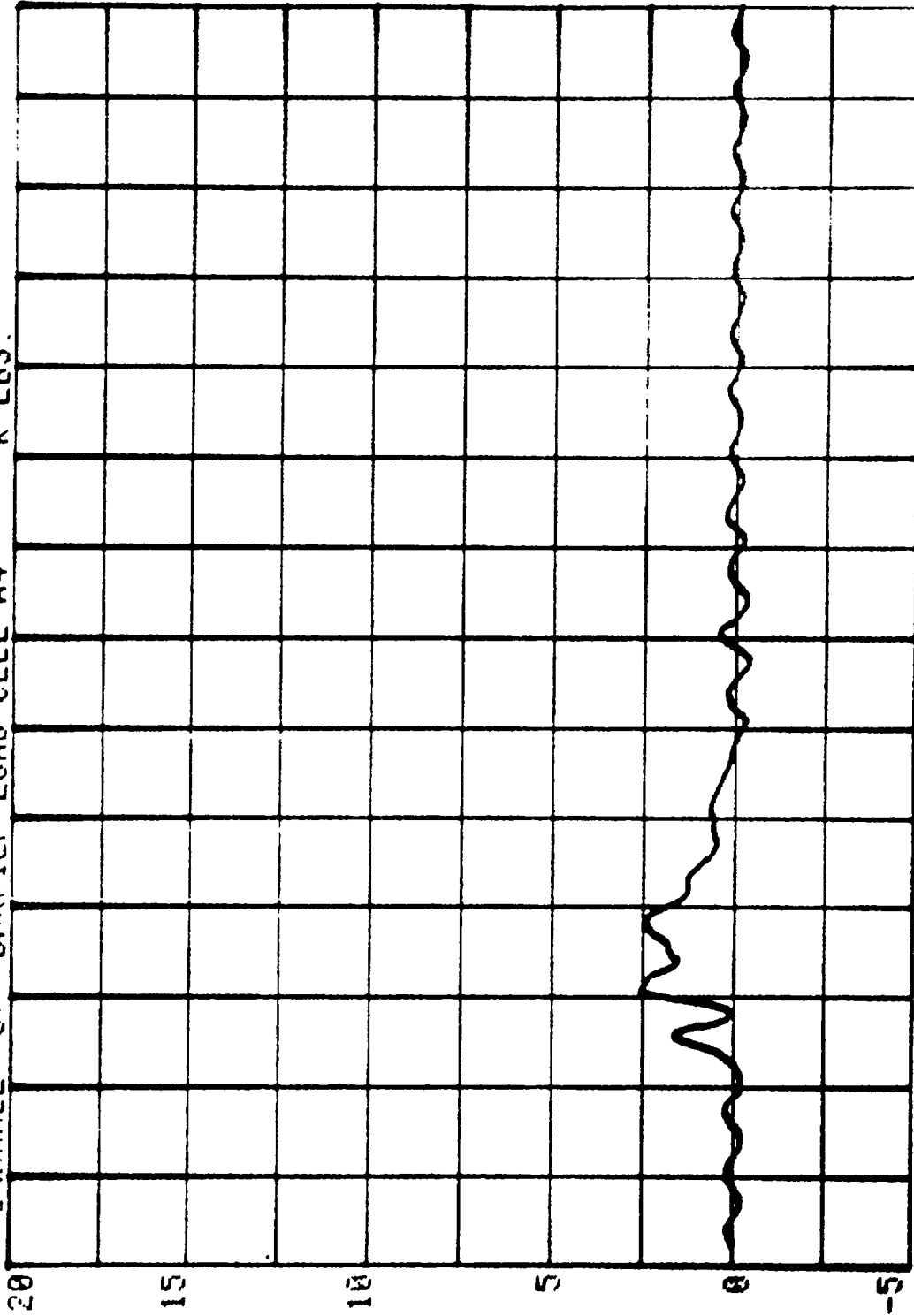
CHANNEL 35 BARRIER LOAD CELL A2 SERIES= 5200 K LBS.



CHANNEL 35 BARRIER LOAD CELL A3
RUN= 809 SERIES= 5200 K LBS.

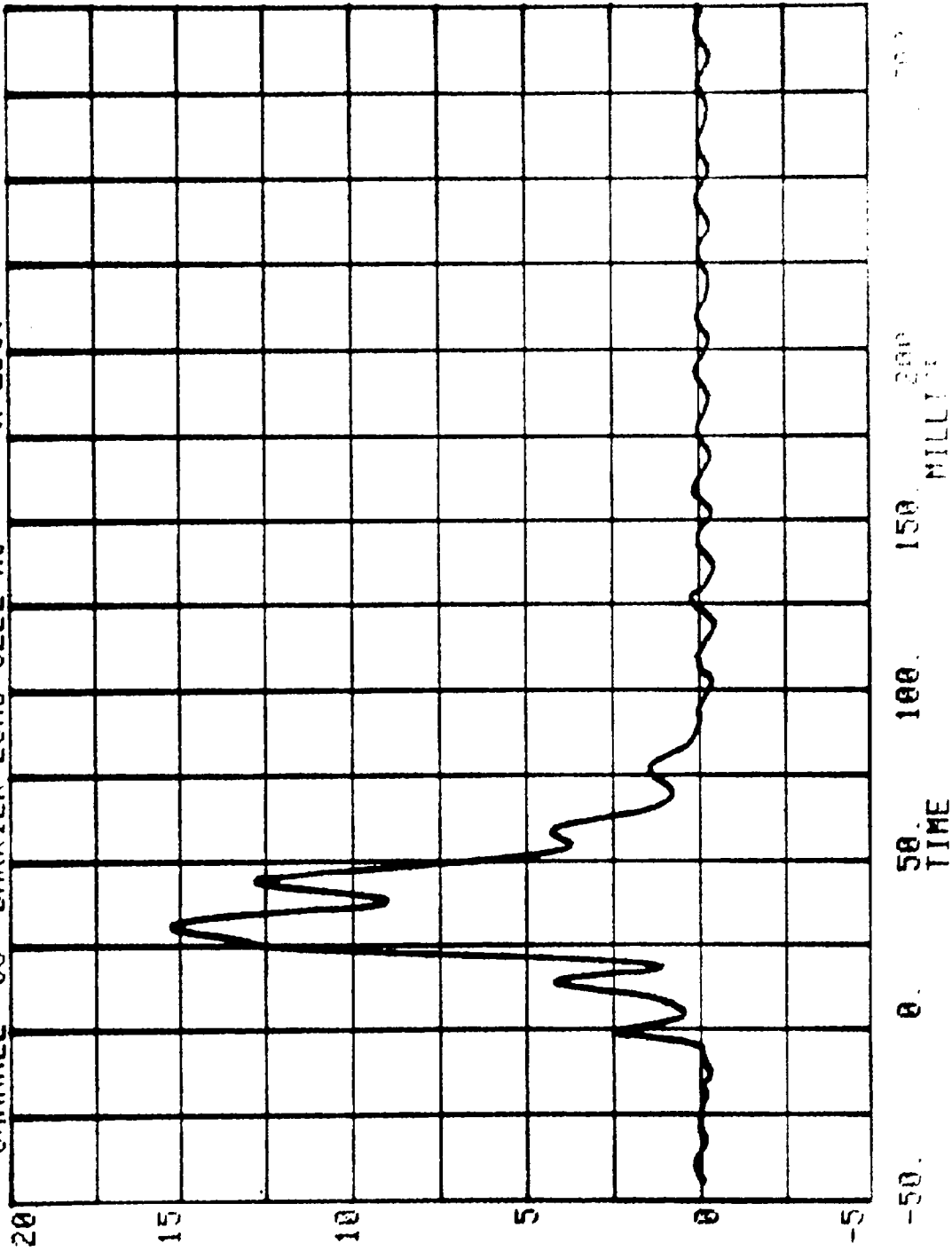


CHANNEL 37 BARRIER LOAD CELL A4
RUN= 809 SERIES= 5200 K LBS.

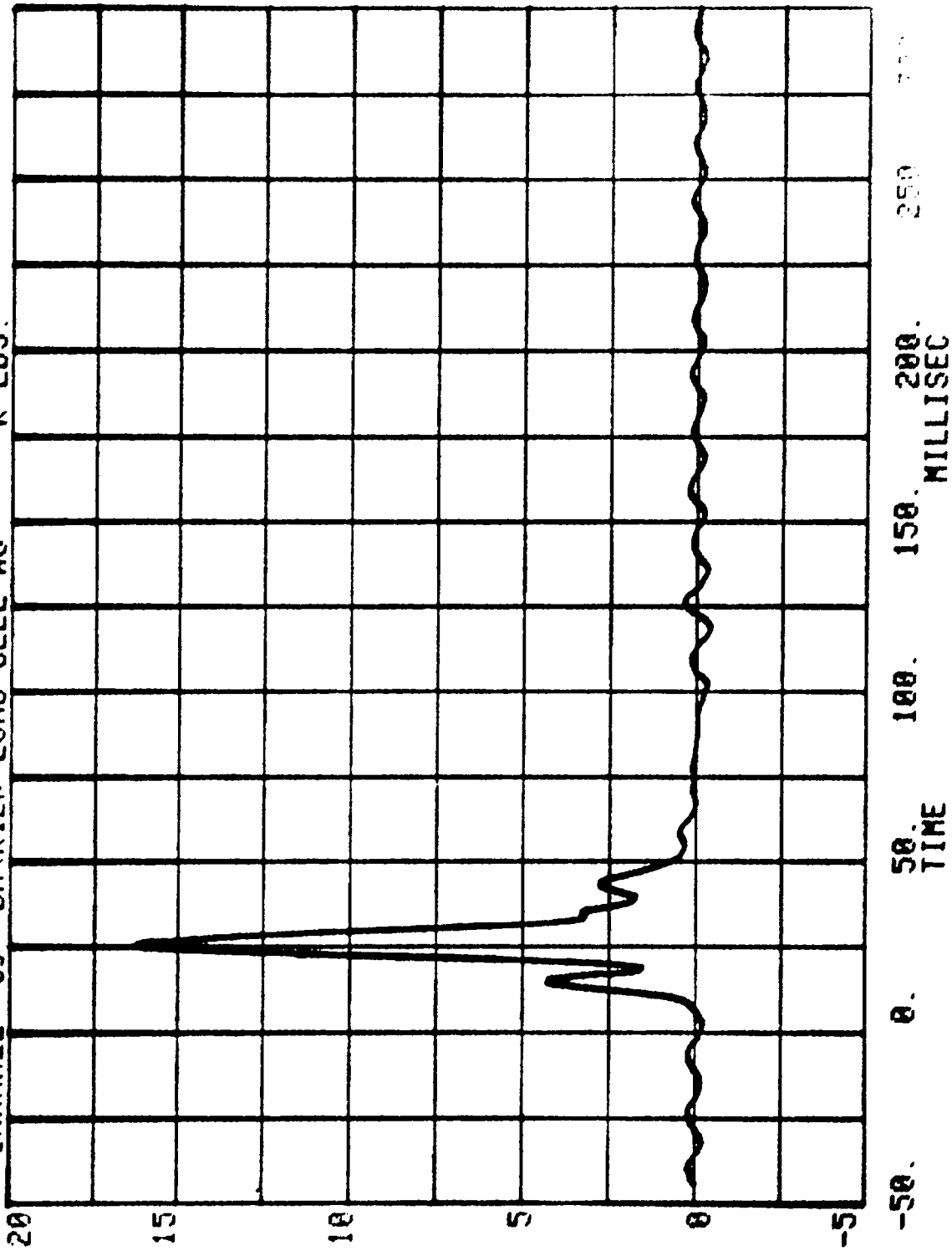


-50. 0. 50. 100. 150. 200.
TIME MILLISEC.

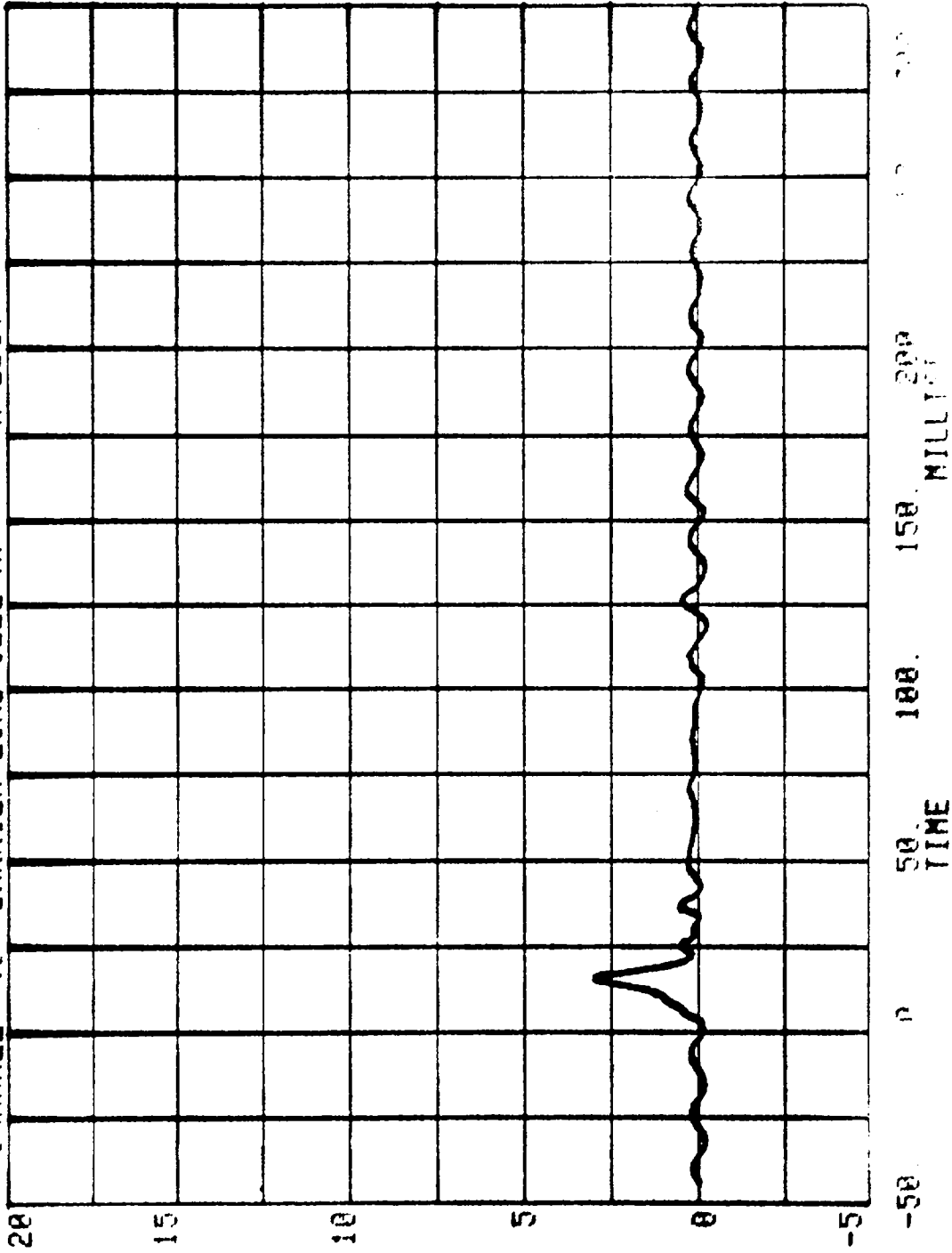
CHANNEL 38 BARRIER LOAD CELL A5
RUN= 809 SERIES= 5200 K LBS.



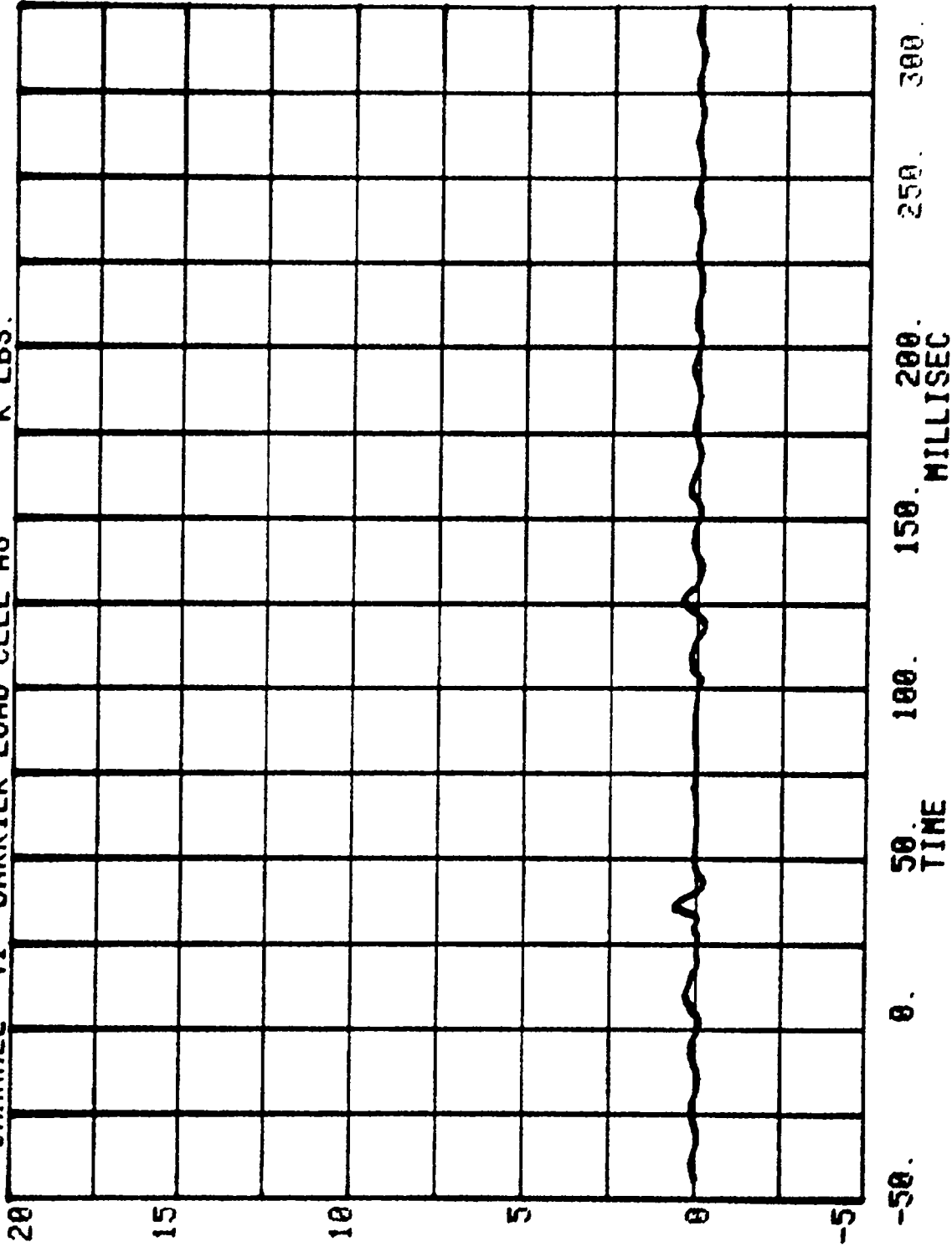
CHANNEL 39 BARRIER LOAD CELL #6
RUN= 809 SERIES= 5200 K LBS.



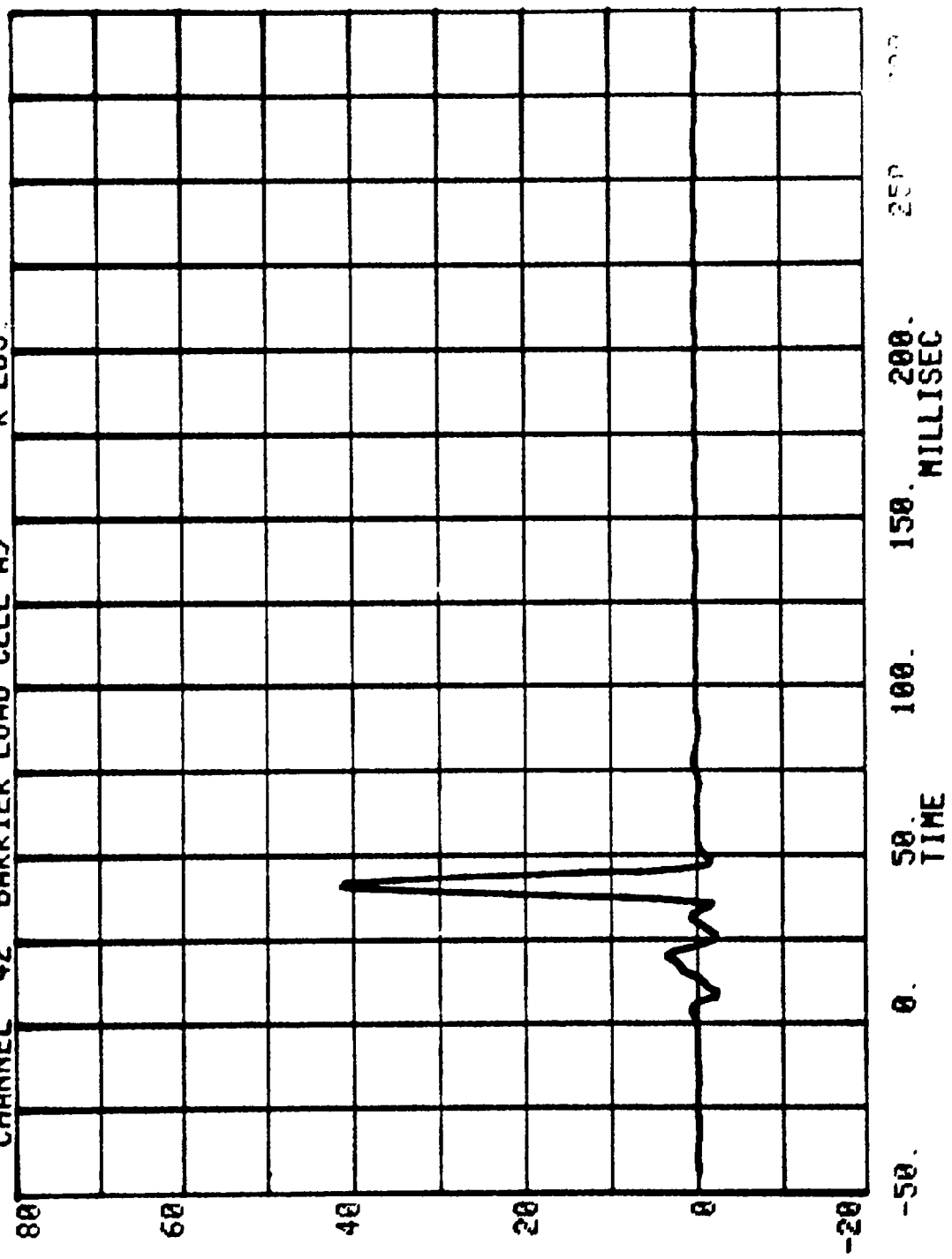
CHANNEL 40 BARRIER LOAD CELL A7
RUN= 809 SERIES= 5200 K LBS.



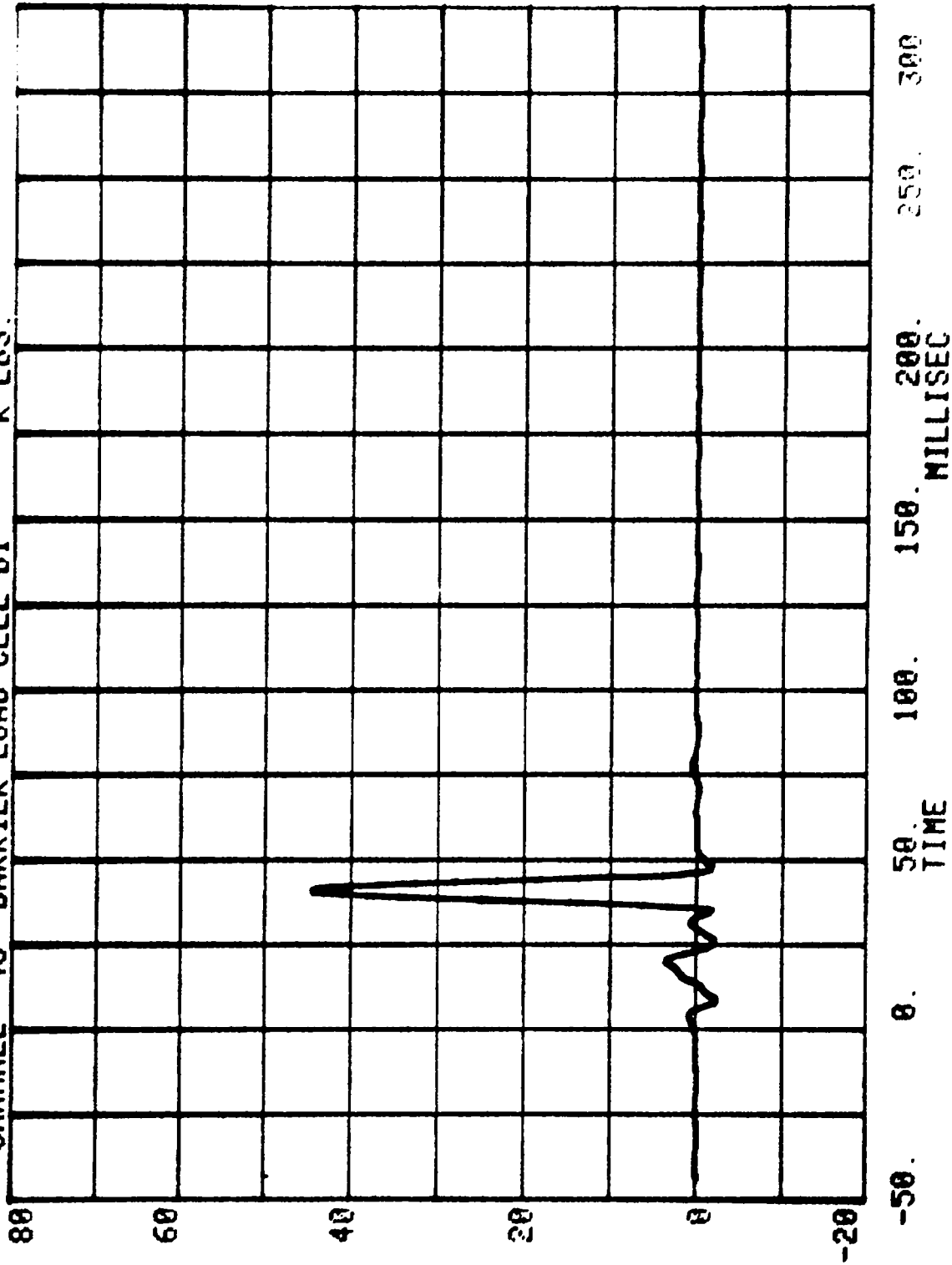
CHANNEL 41 BARRIER LOAD CELL A8 K LBS.
RUN= 889 SERIES= 5200



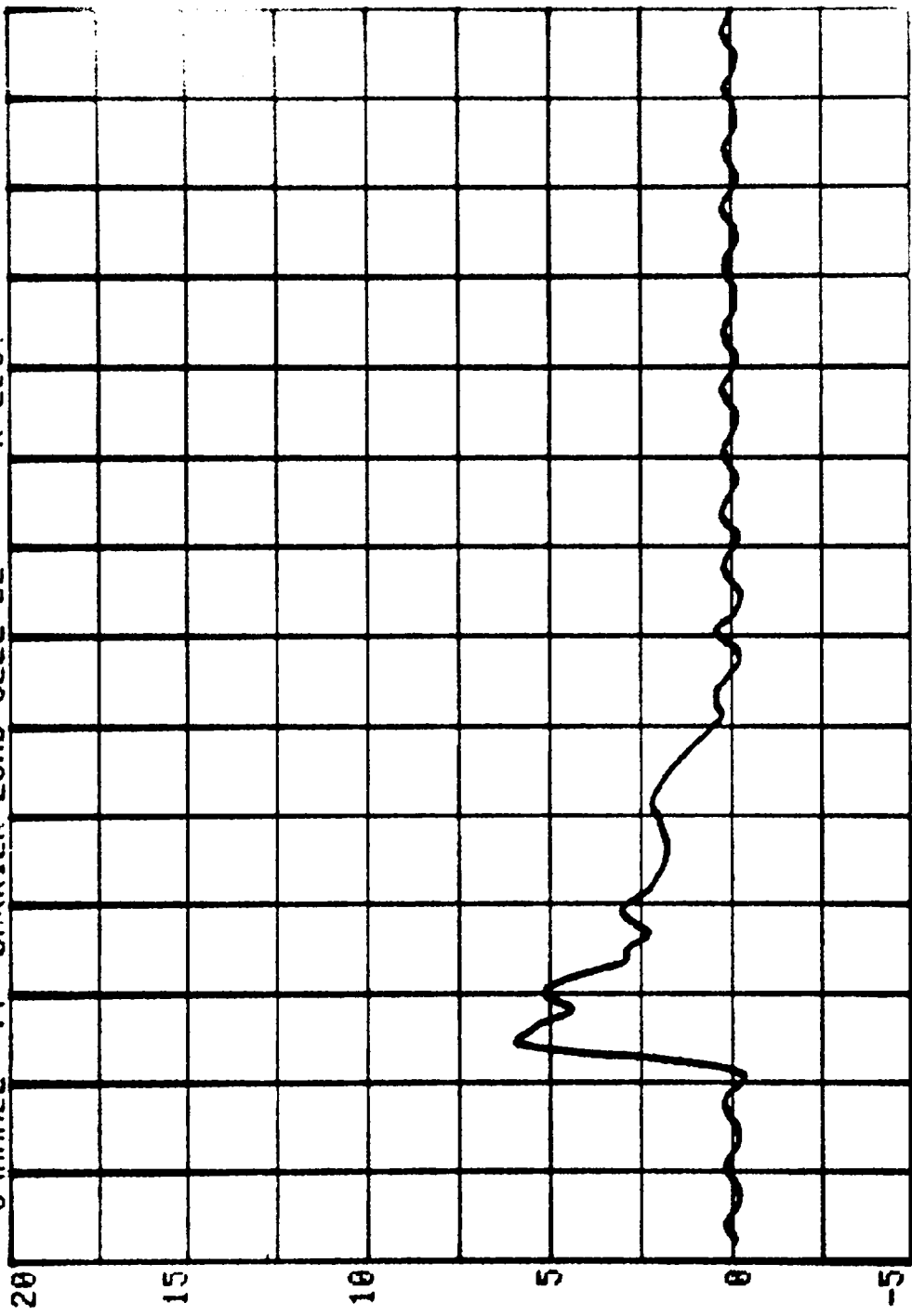
CHANNEL 42 BARRIER LOAD CELL A9
RUN= 809 SERIES= 5200 K LBS



CHANNEL 43 BARRIER LOAD CELL B1
RUN= 809 SERIES= 5200 K LBS.

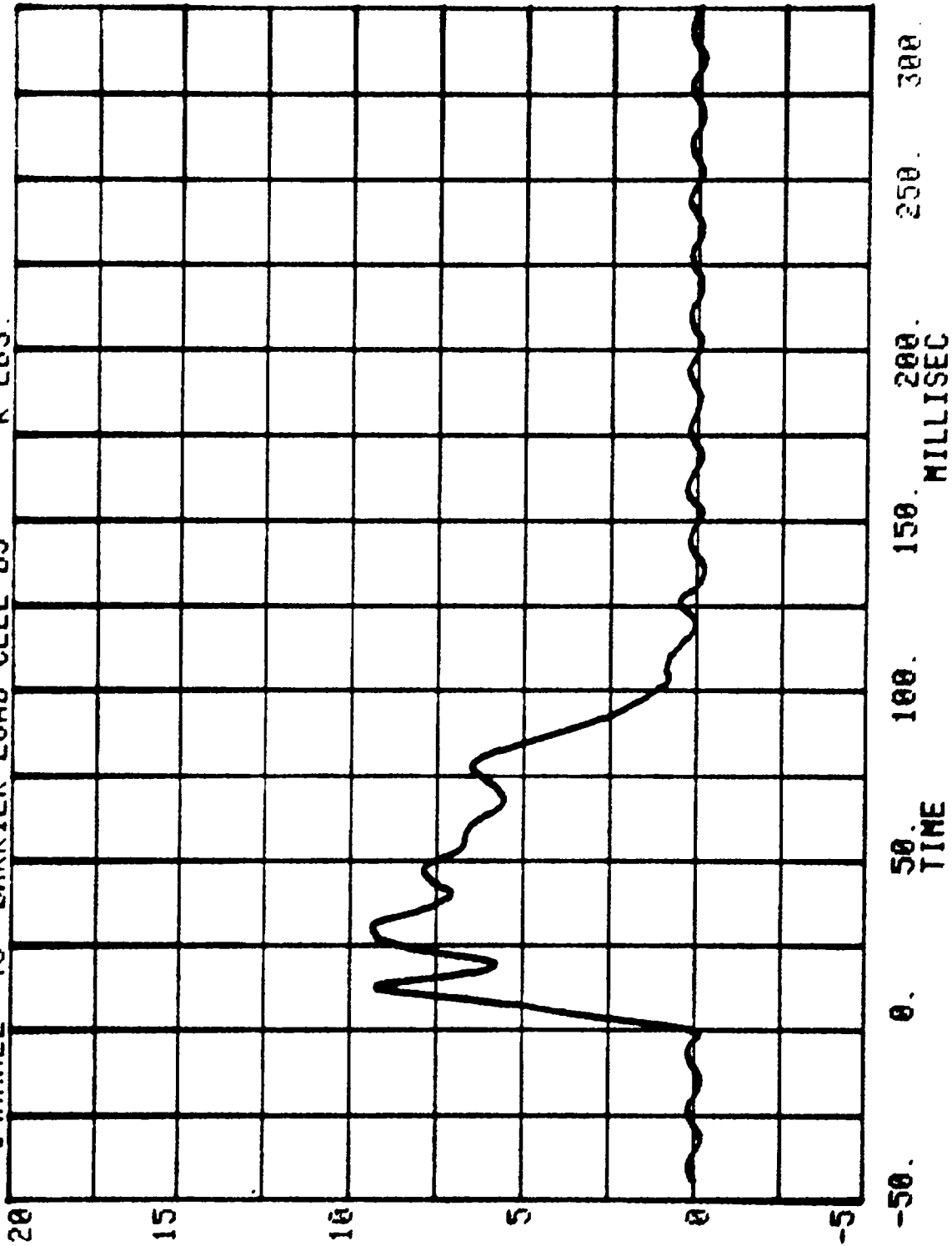


CHANNEL 44 BARRIER LOAD CELL B2
RUN= 809 SERIES= 5200 K LBS.

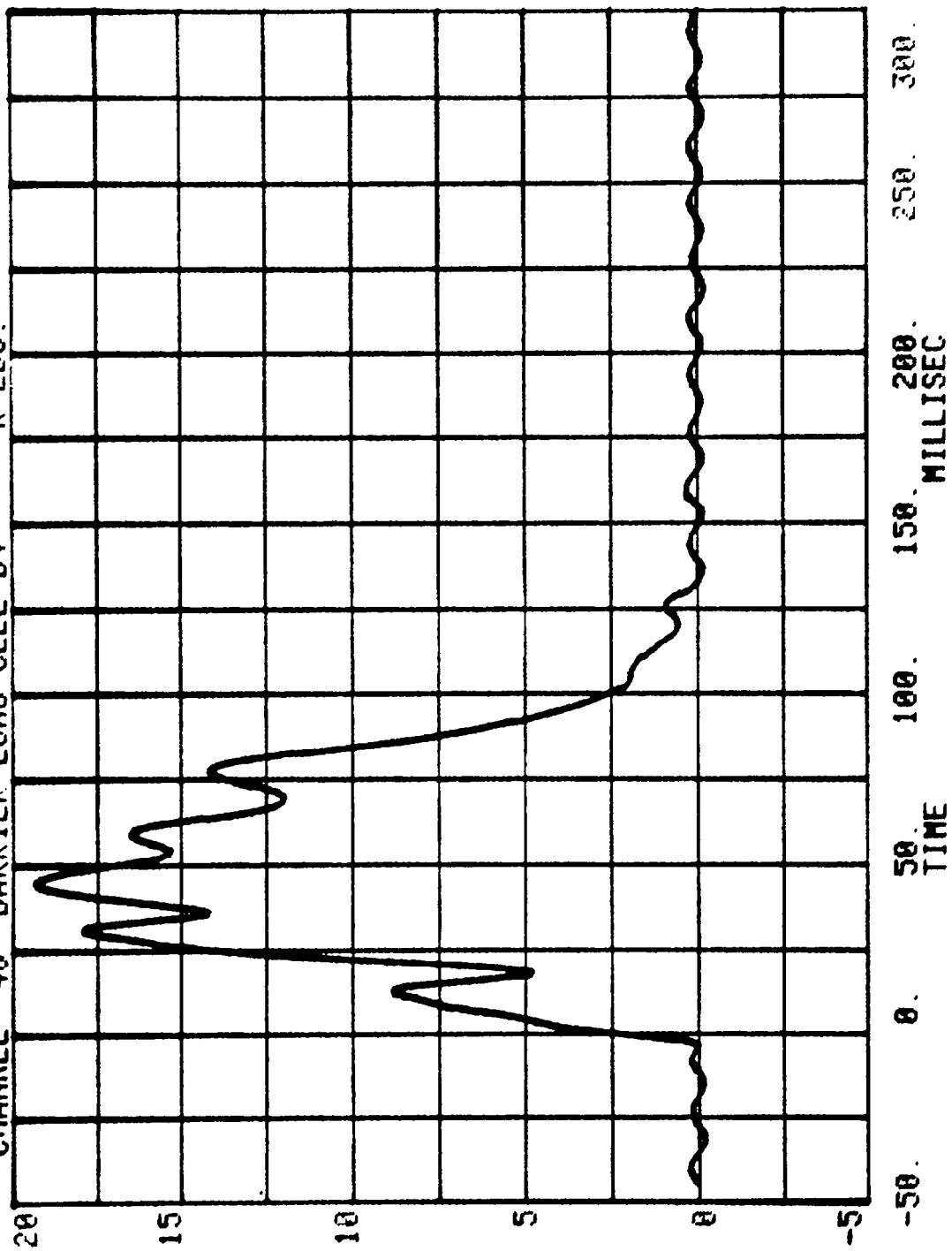


-50. 0. 50. 100. 150. 200.
TIME MILLISEC

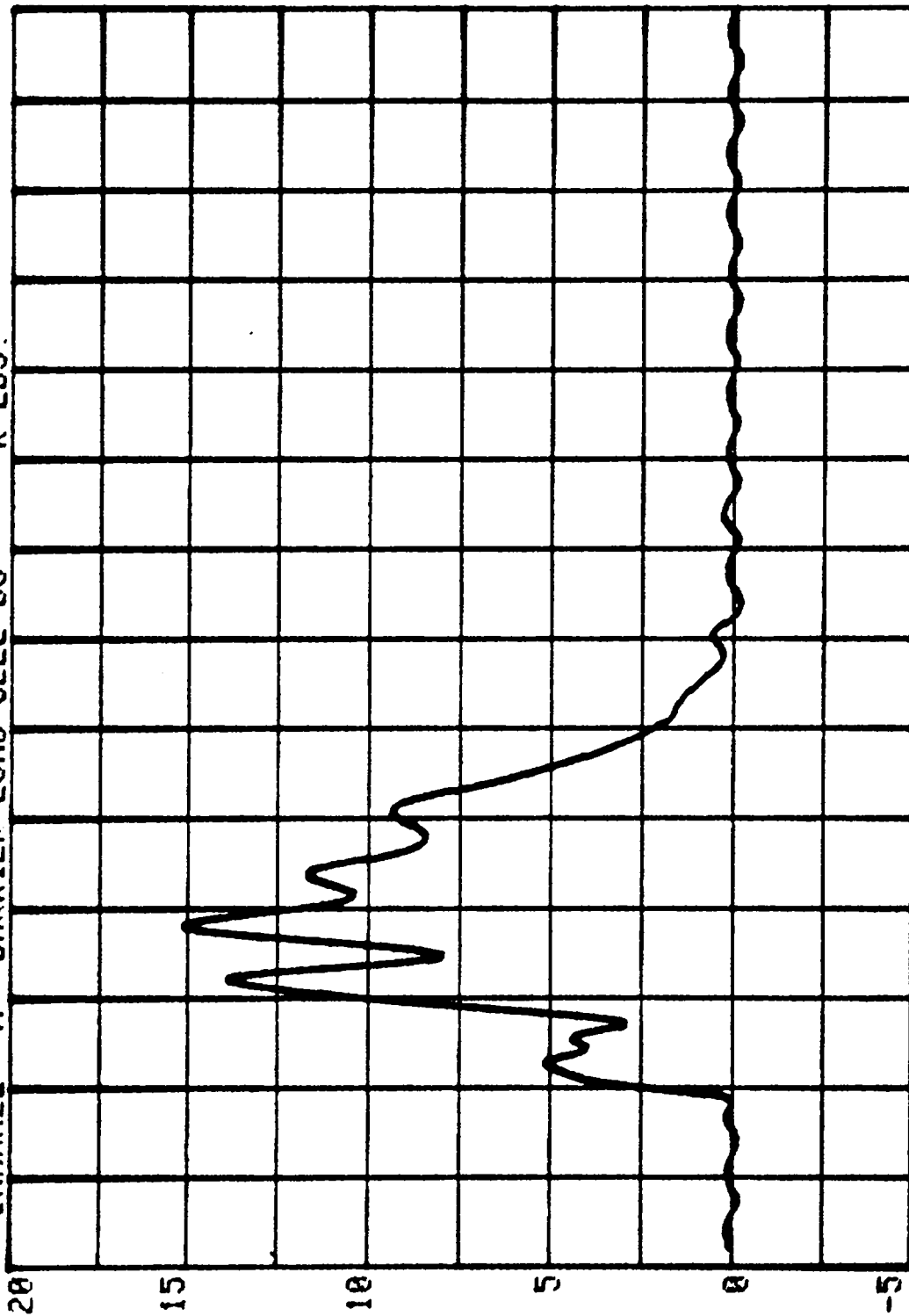
CHANNEL 45 BARRIER LOAD CELL B3
RUN= 809 SERIES= 5200 K LBS.



CHANNEL 46 BARRIER LOAD CELL B4
RUN= 809 SERIES= 5200 K LBS.

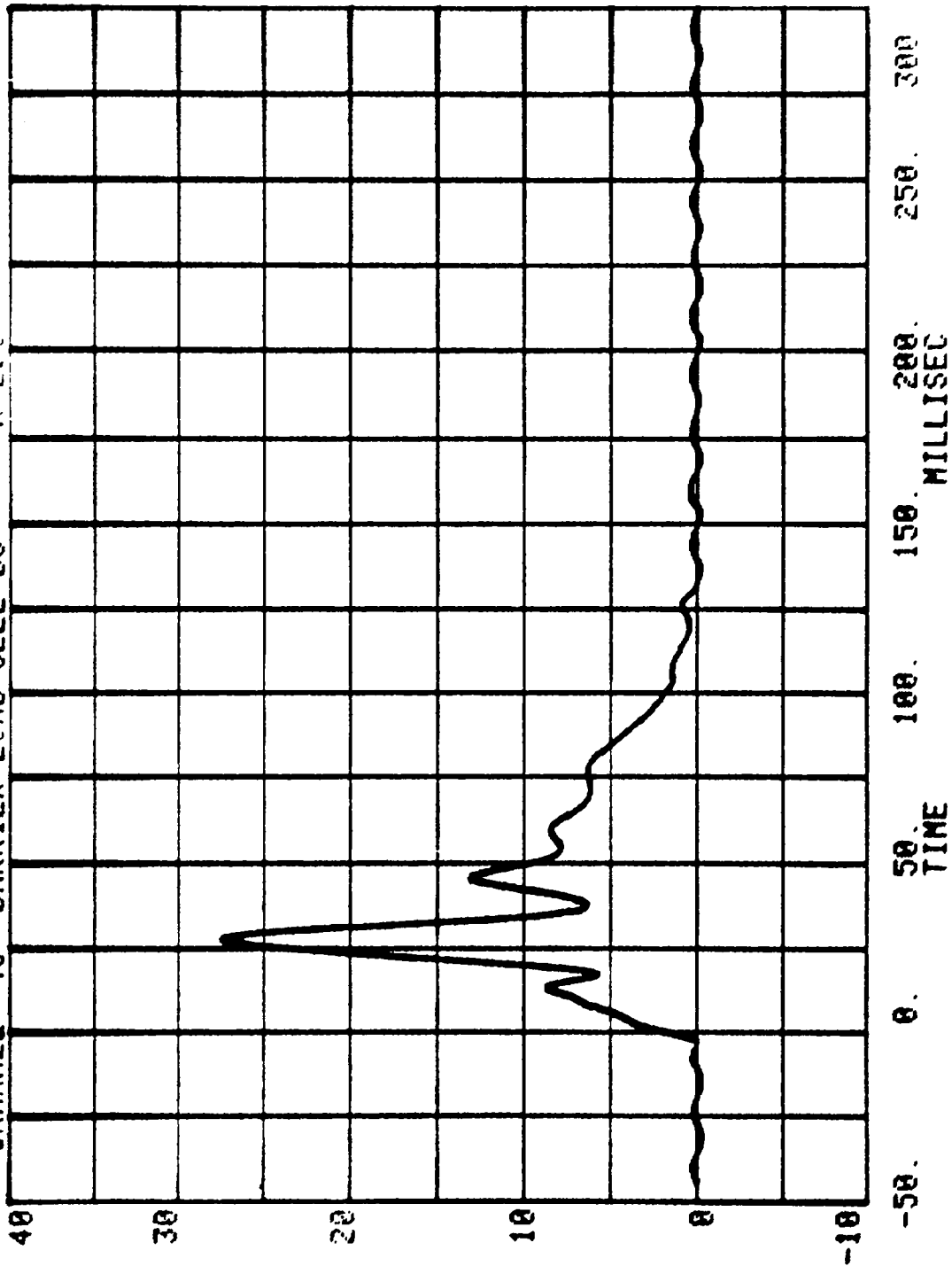


CHANNEL 47 BARRIER LOAD CELL B5
RUN= 809 SERIES= 5200 K LBS.



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

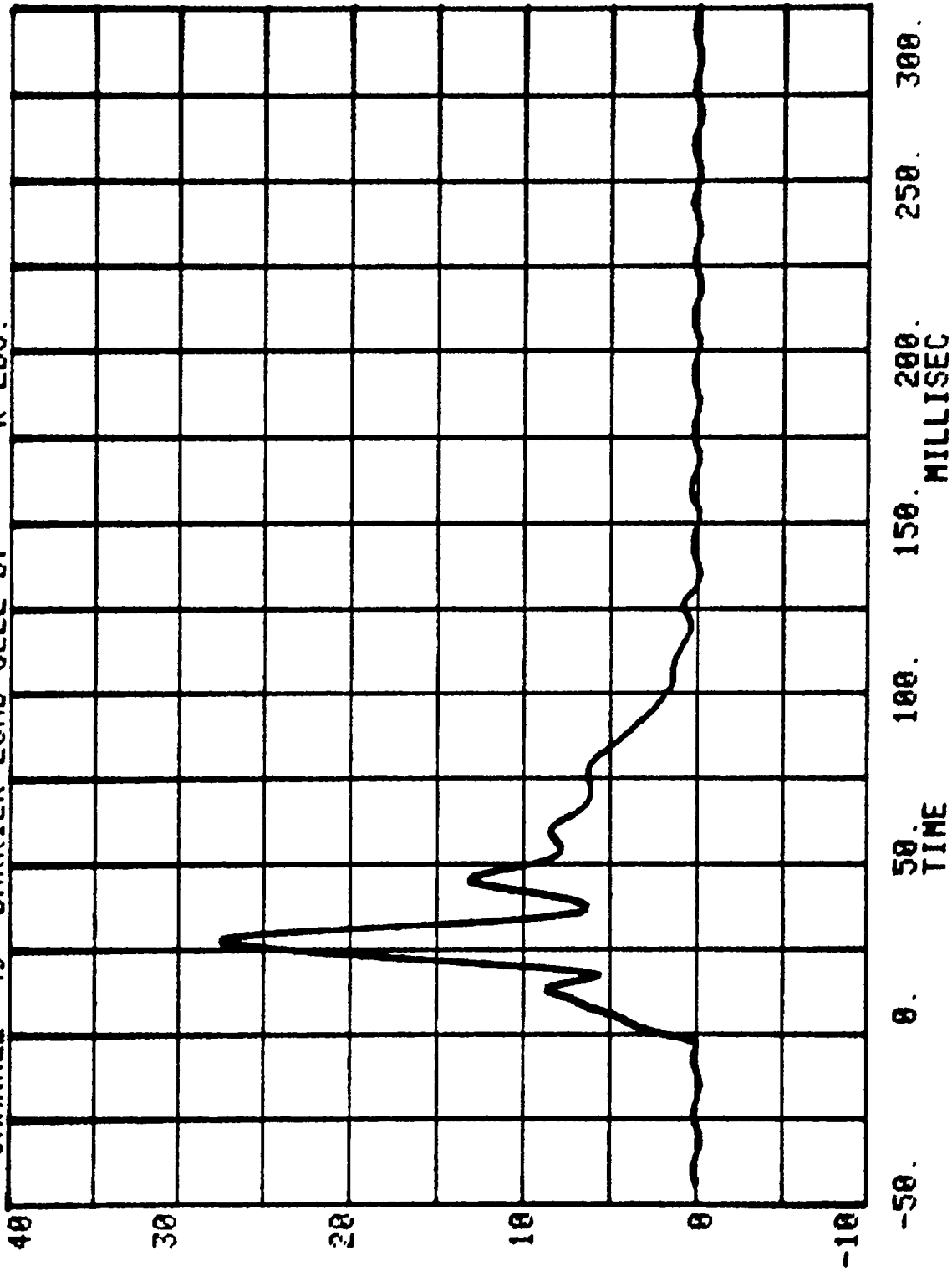
CHANNEL 48 BARRIER LOAD CELL B6
RUN= 809 SERIES= 5200 K LBS



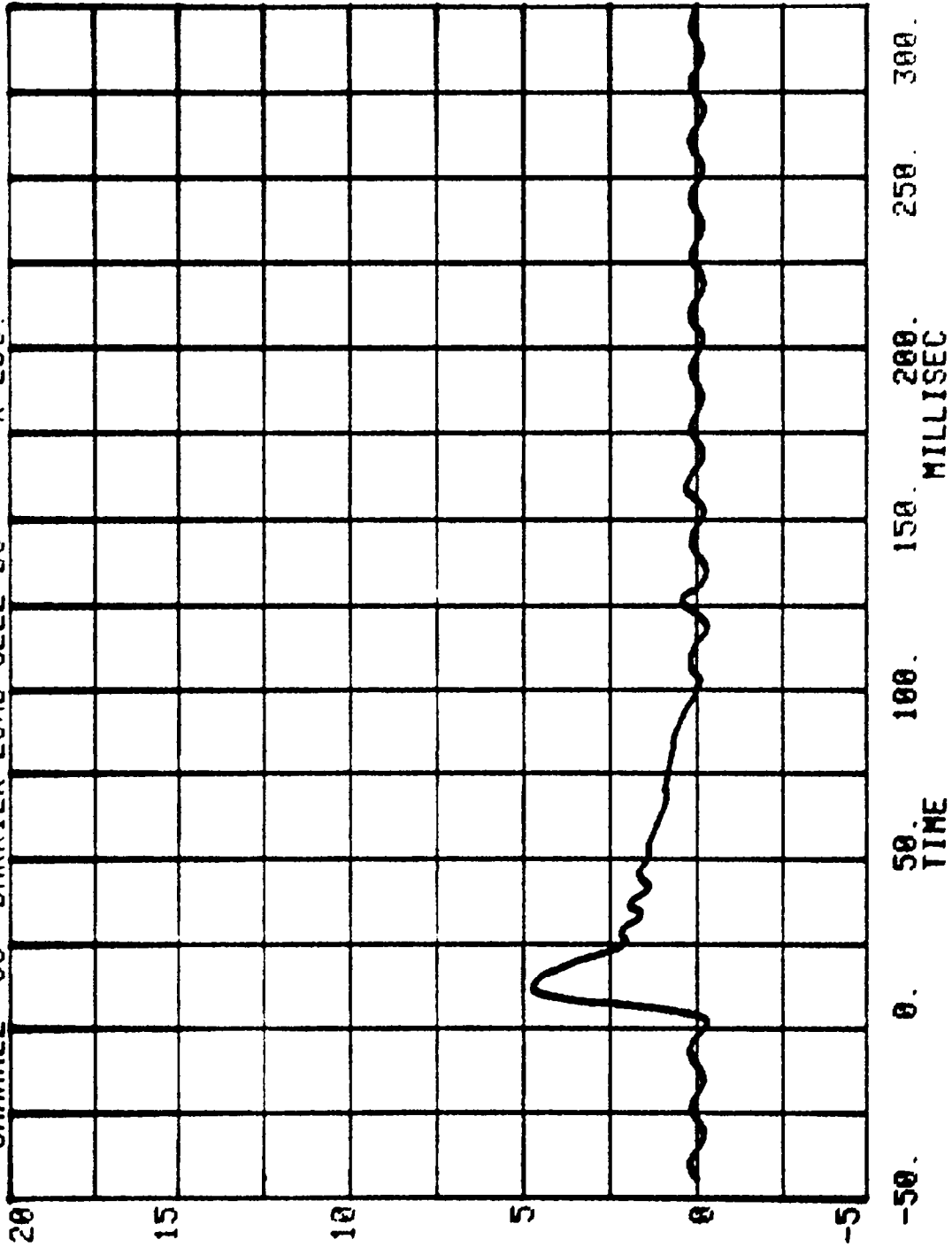
CHANNEL 49 BARRIER LOAD CELL B7

RUN= 809 SERIES= 5200

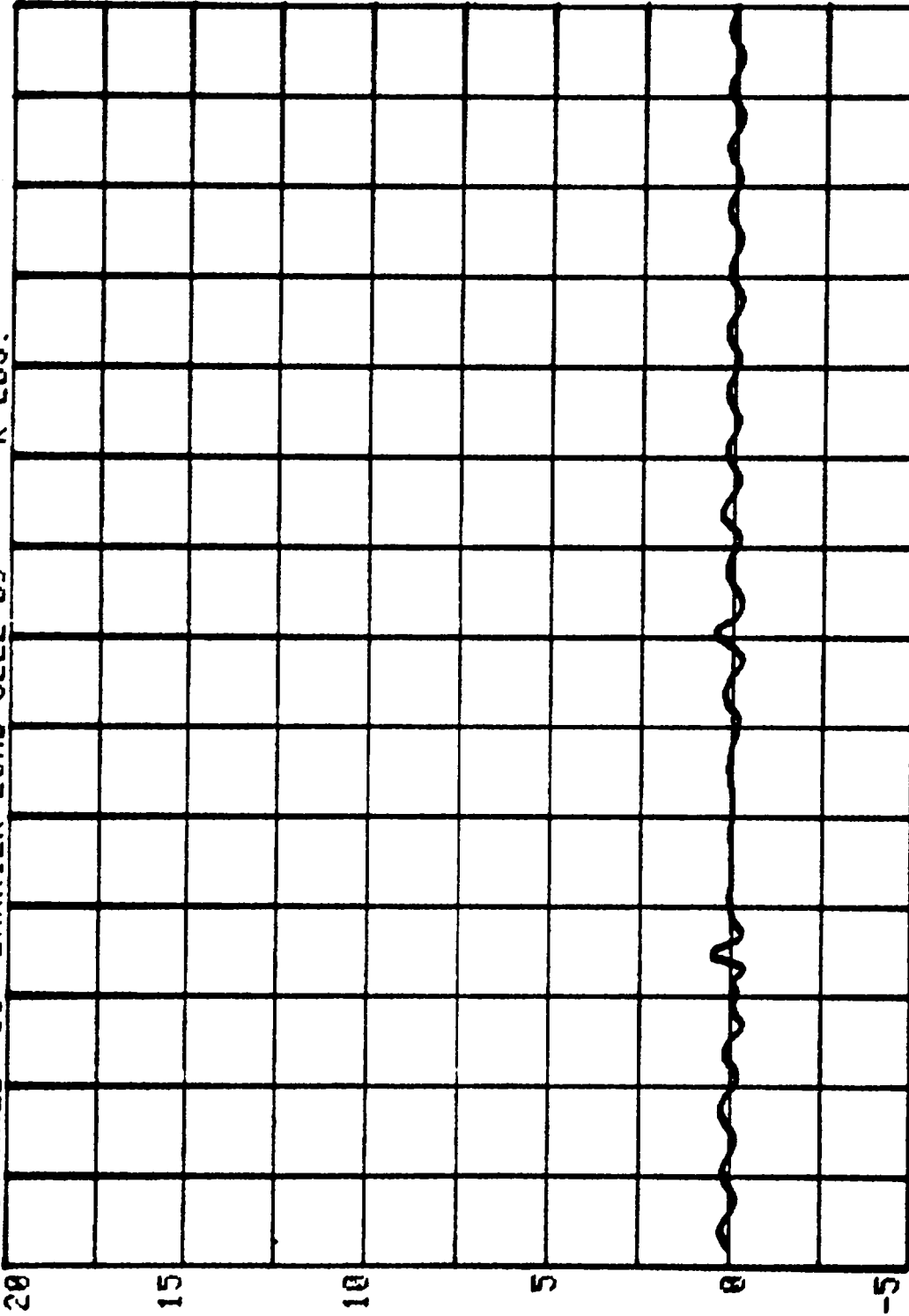
K LBS.



CHANNEL 50 BARRIER LOAD CELL B8
RUN= 809 SERIES= 5200 K LBS.

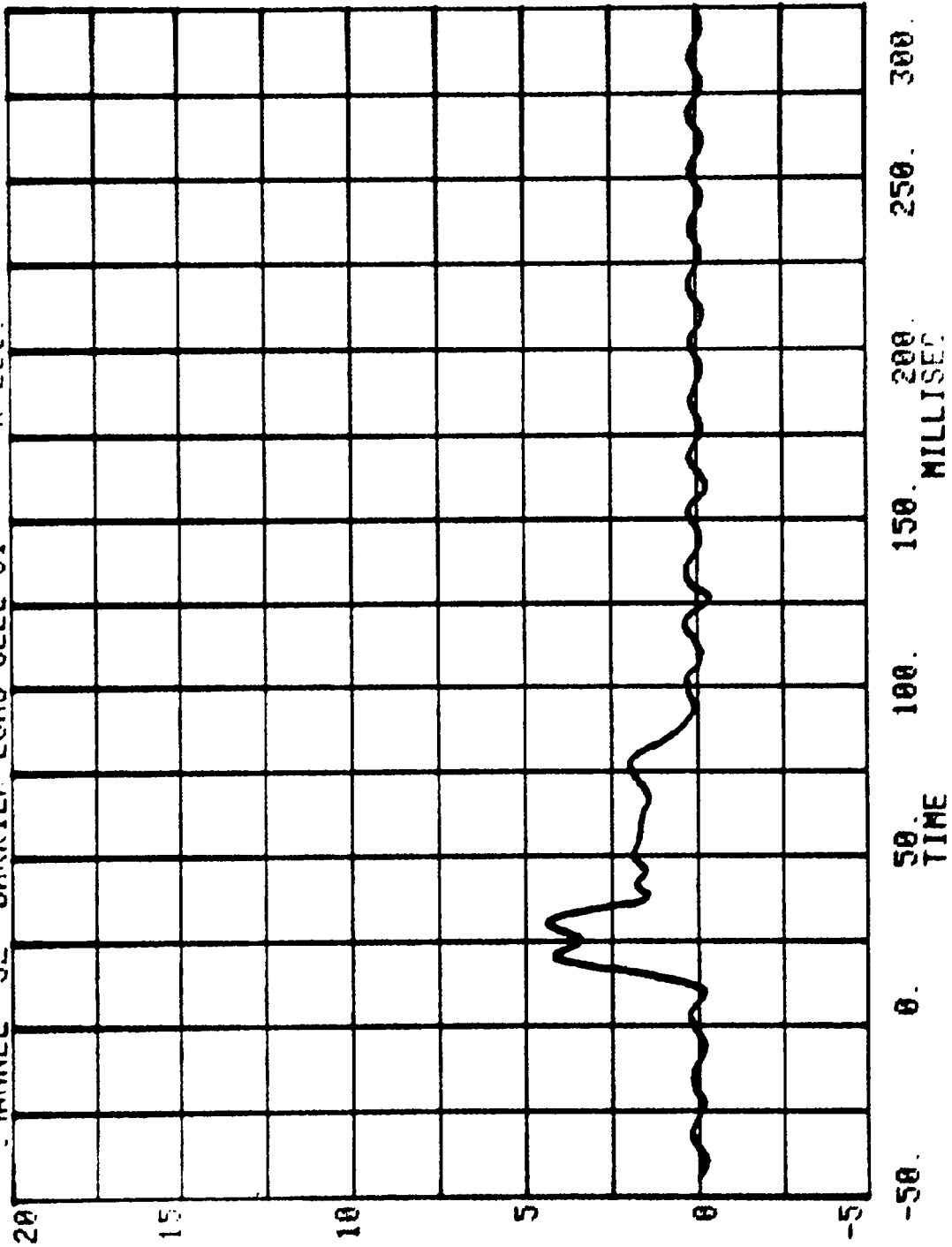


CHANNEL 51 BARRIER LOAD CELL B9 SERIES= 5200 K LBS.

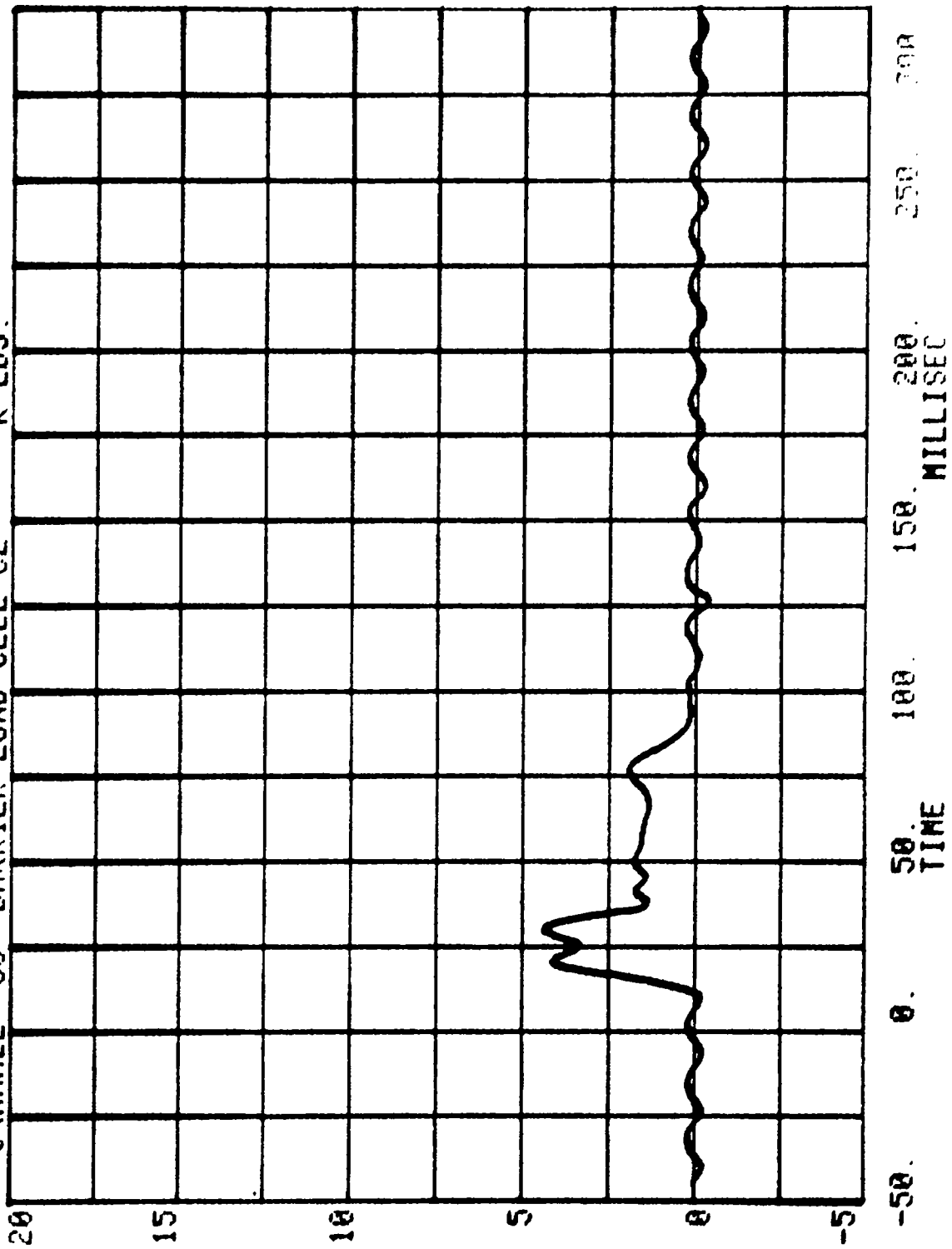


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

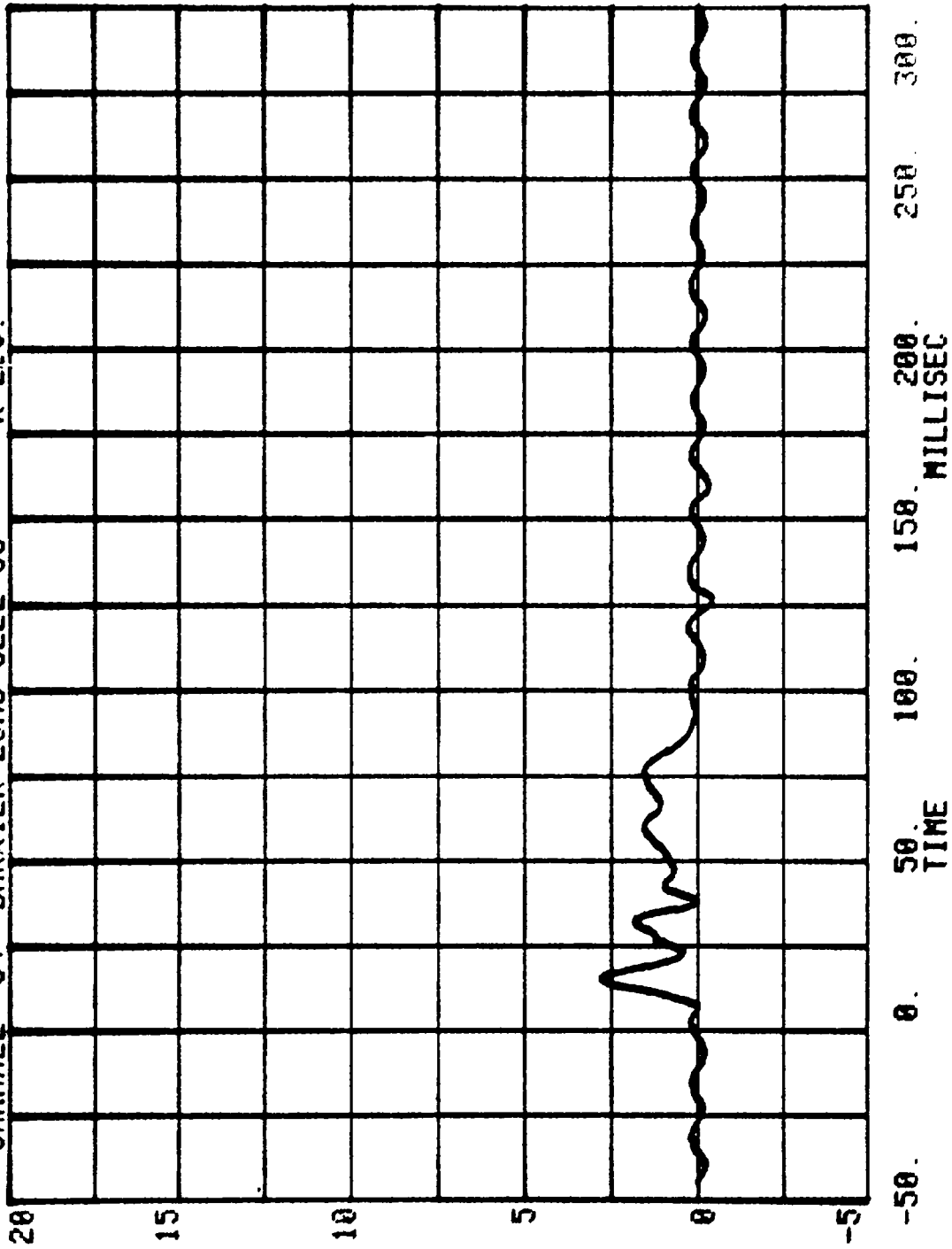
CHANNEL 52 BARRIER LOAD CELL C1
RUN= 809 SERIES= 5200 K LBS.



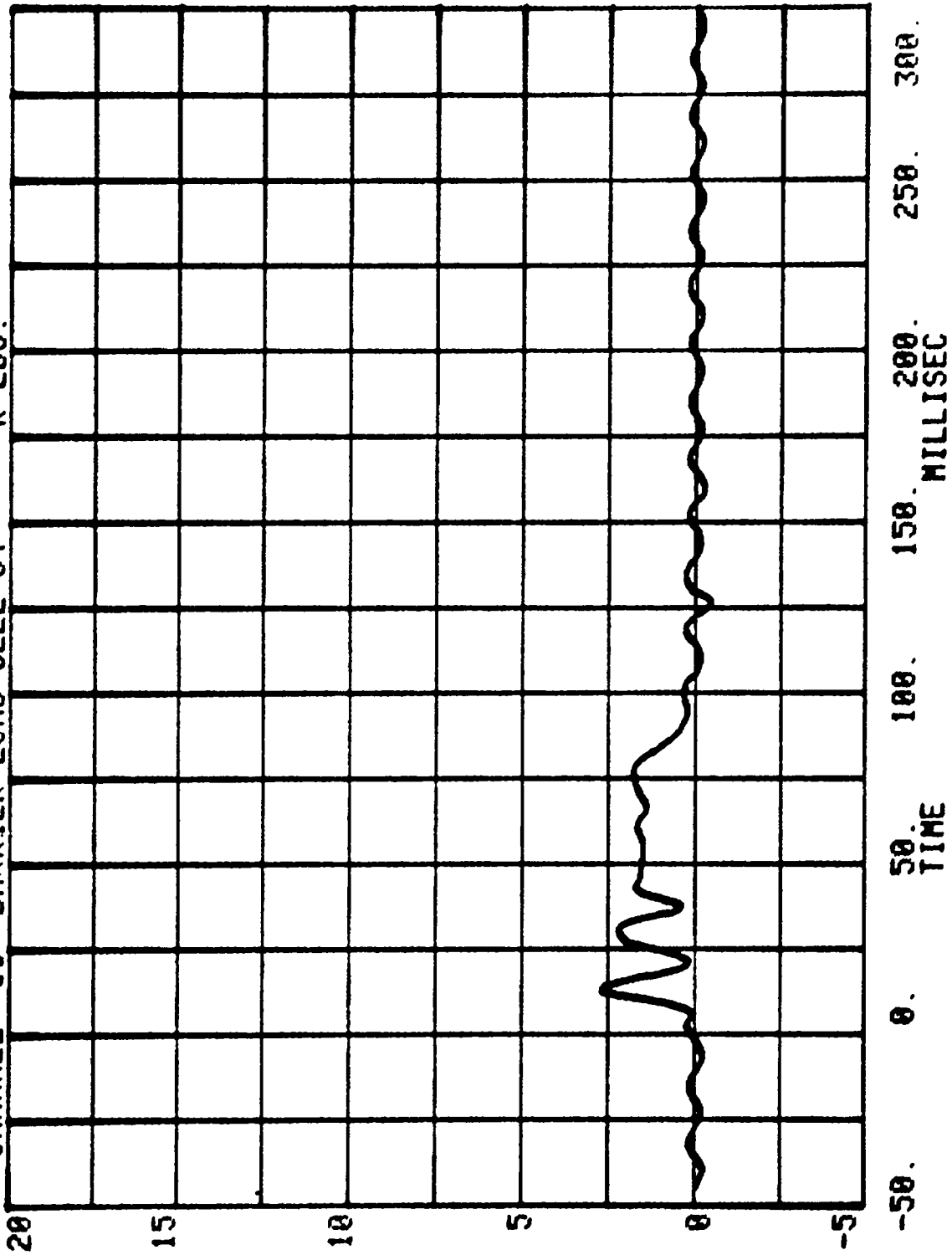
CHANNEL 53 BARRIER LOAD CELL C2
RUN= 809 SERIES= 5200 K LBS.



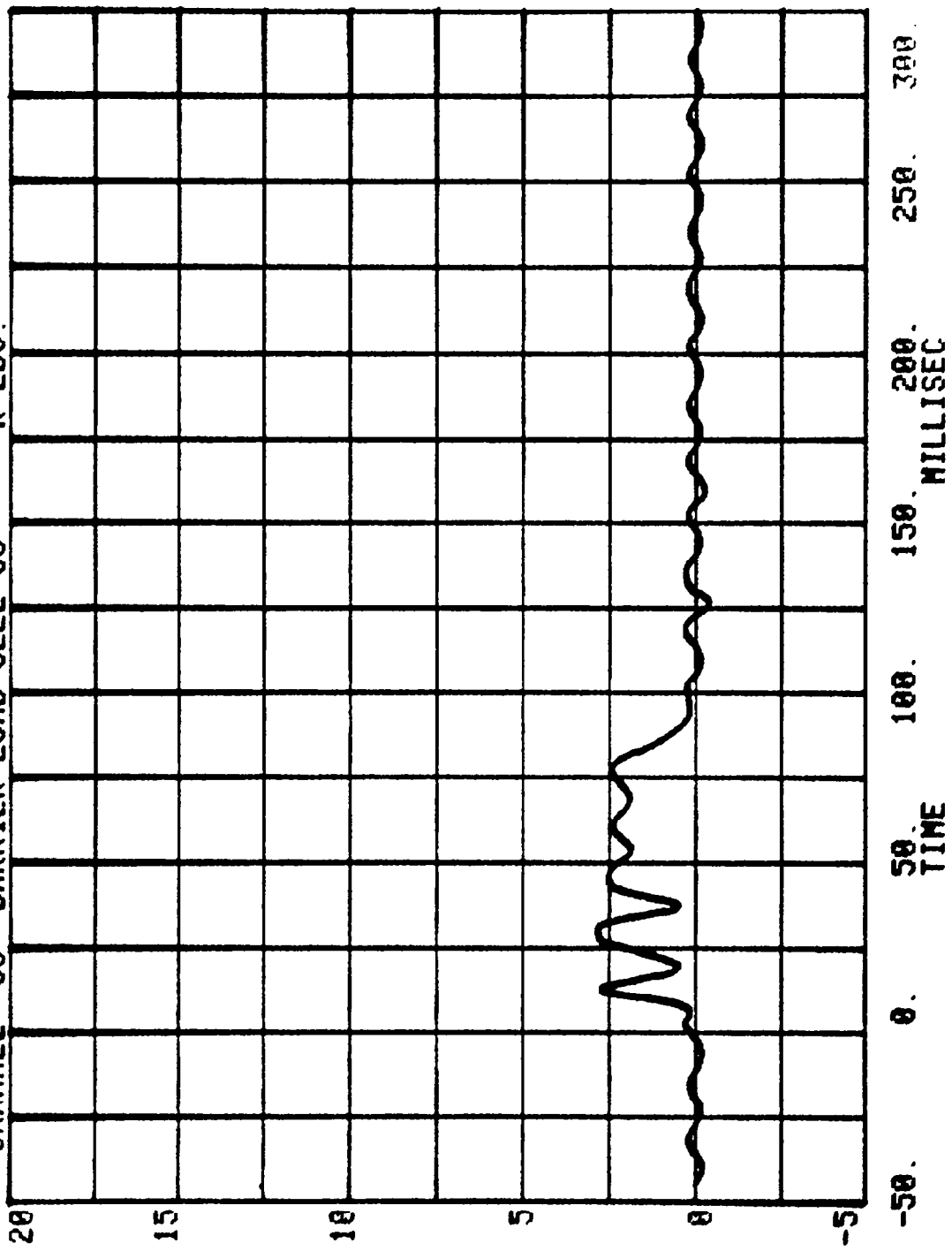
CHANNEL 54 BARRIER LOAD CELL C3
RUN= 809 SERIES= 5200 K LIBS.



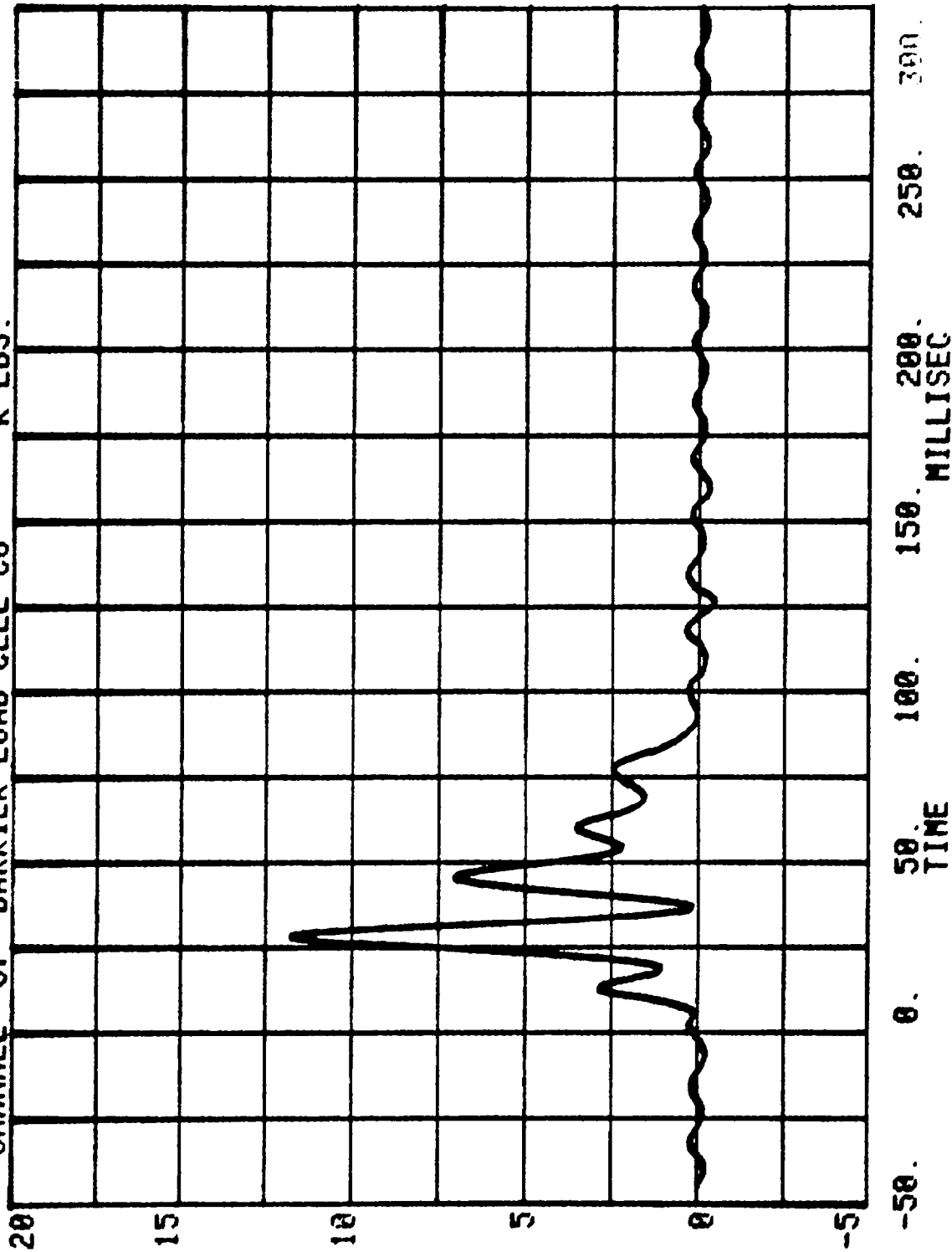
CHANNEL 55 BARRIER LOAD CELL C4
RUI= 809 SERIES= 5200 K LBS.



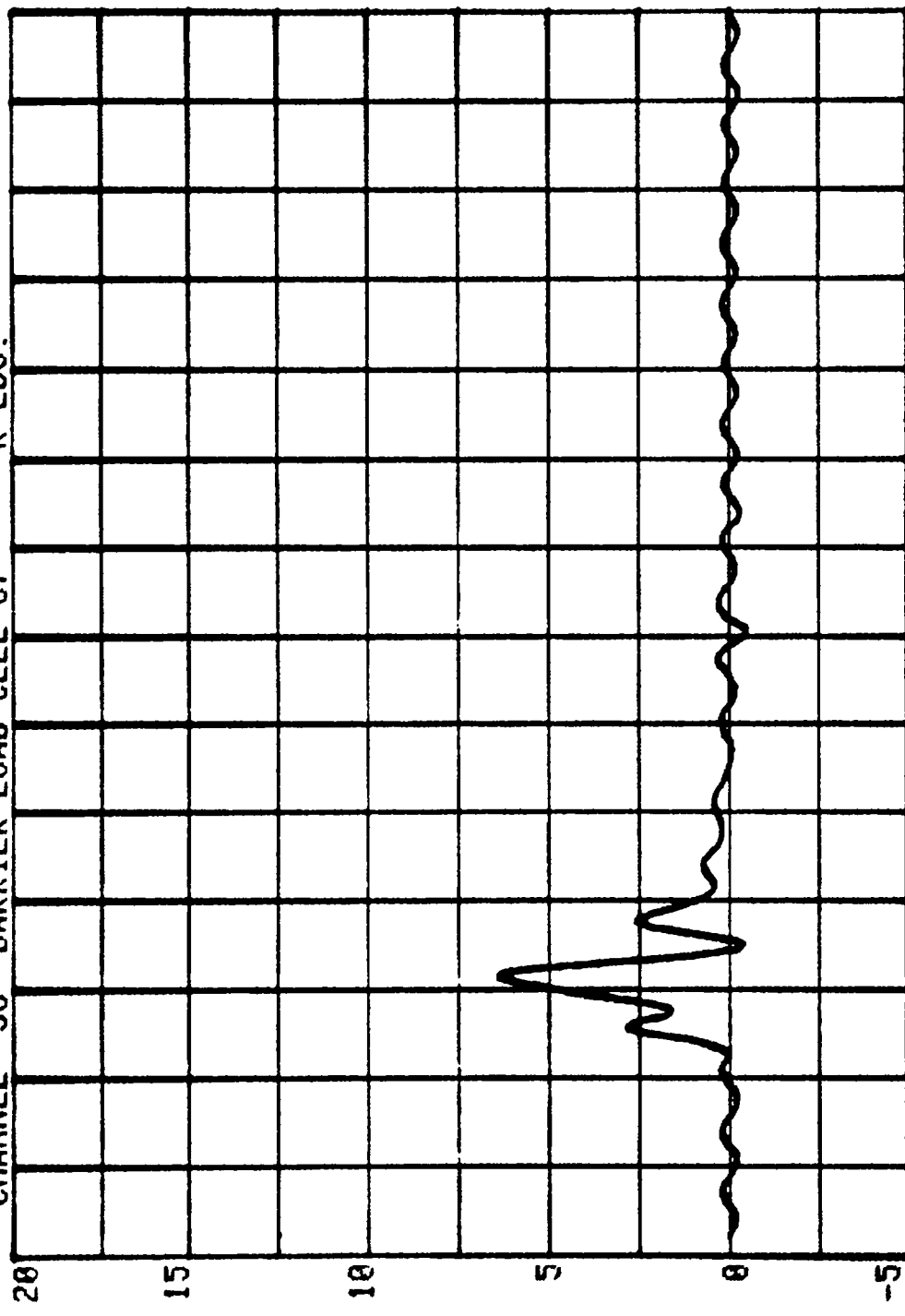
RUN: 809 SERIES= 5200 K LBS.
CHANNEL 56 BARRIER LOAD CELL C5



RUN= 809 SERIES= 5200 K LBS.
CHANNEL 57 BARRIER LOAD CELL C6

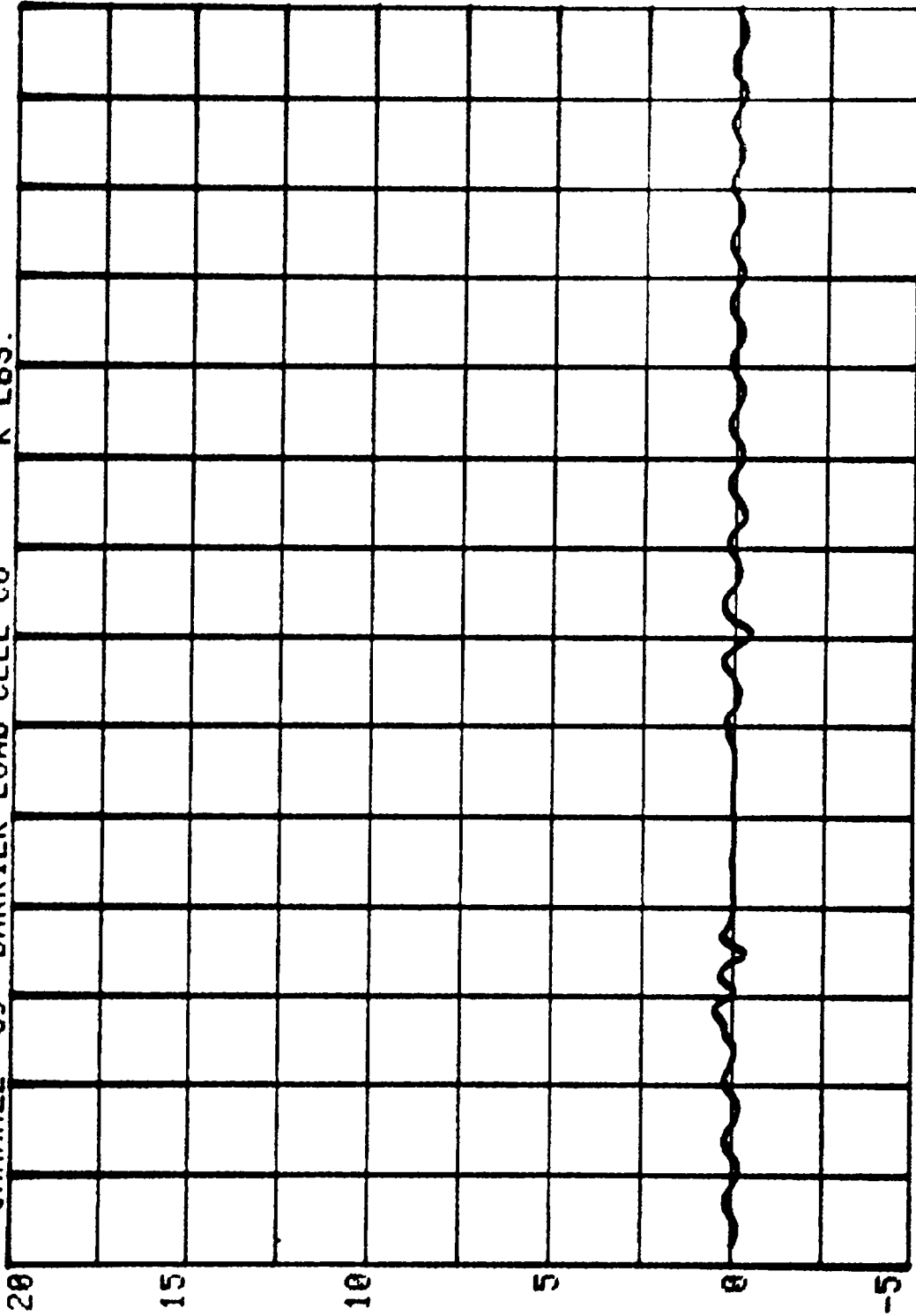


CHANNEL 58 BARRIER LOAD CELL C7 K LBS.
RUN= 809 SERIES= 5200



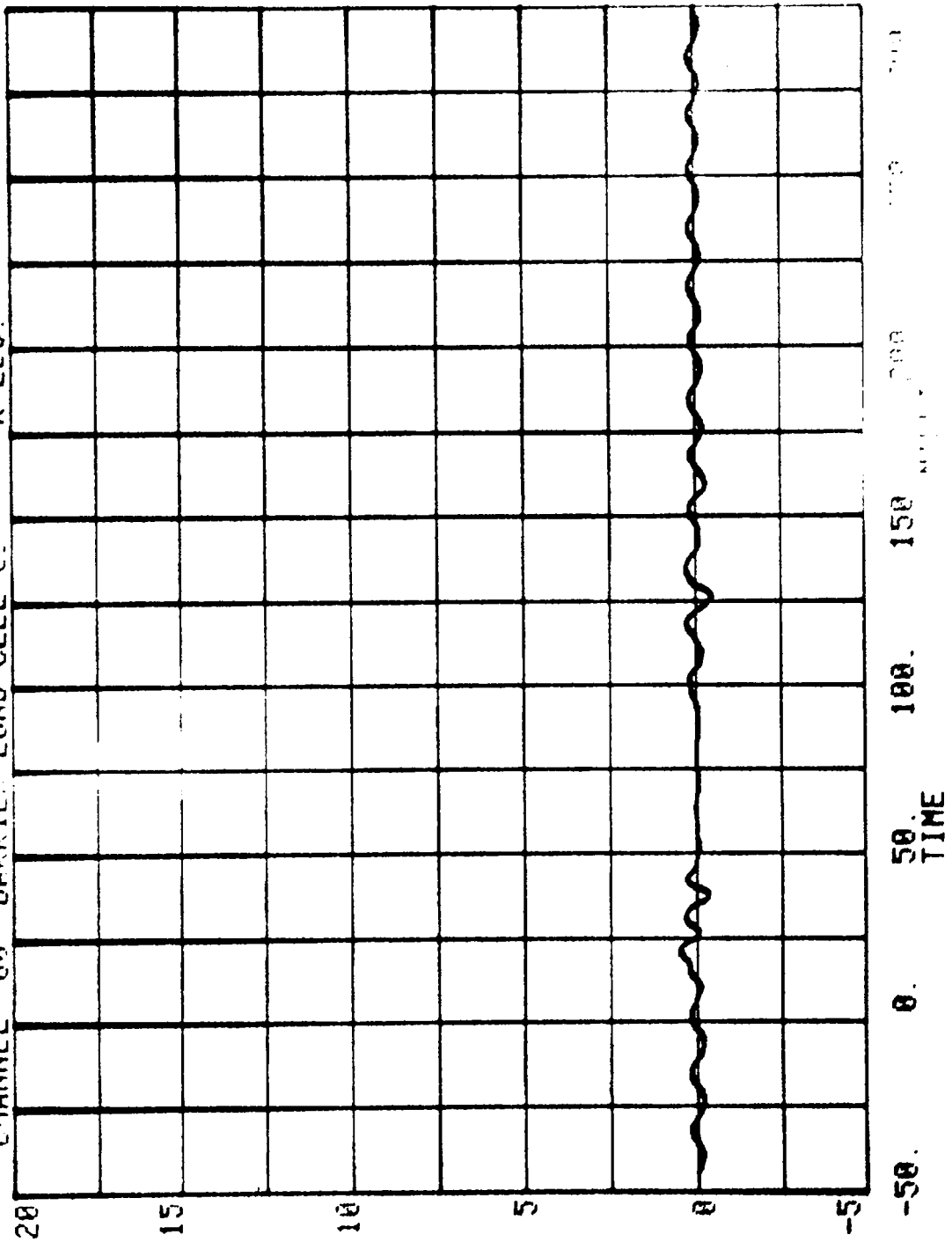
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 59 BARRIER LOAD CELL C8 K LBS.
RUN= 809 SERIES= 5200

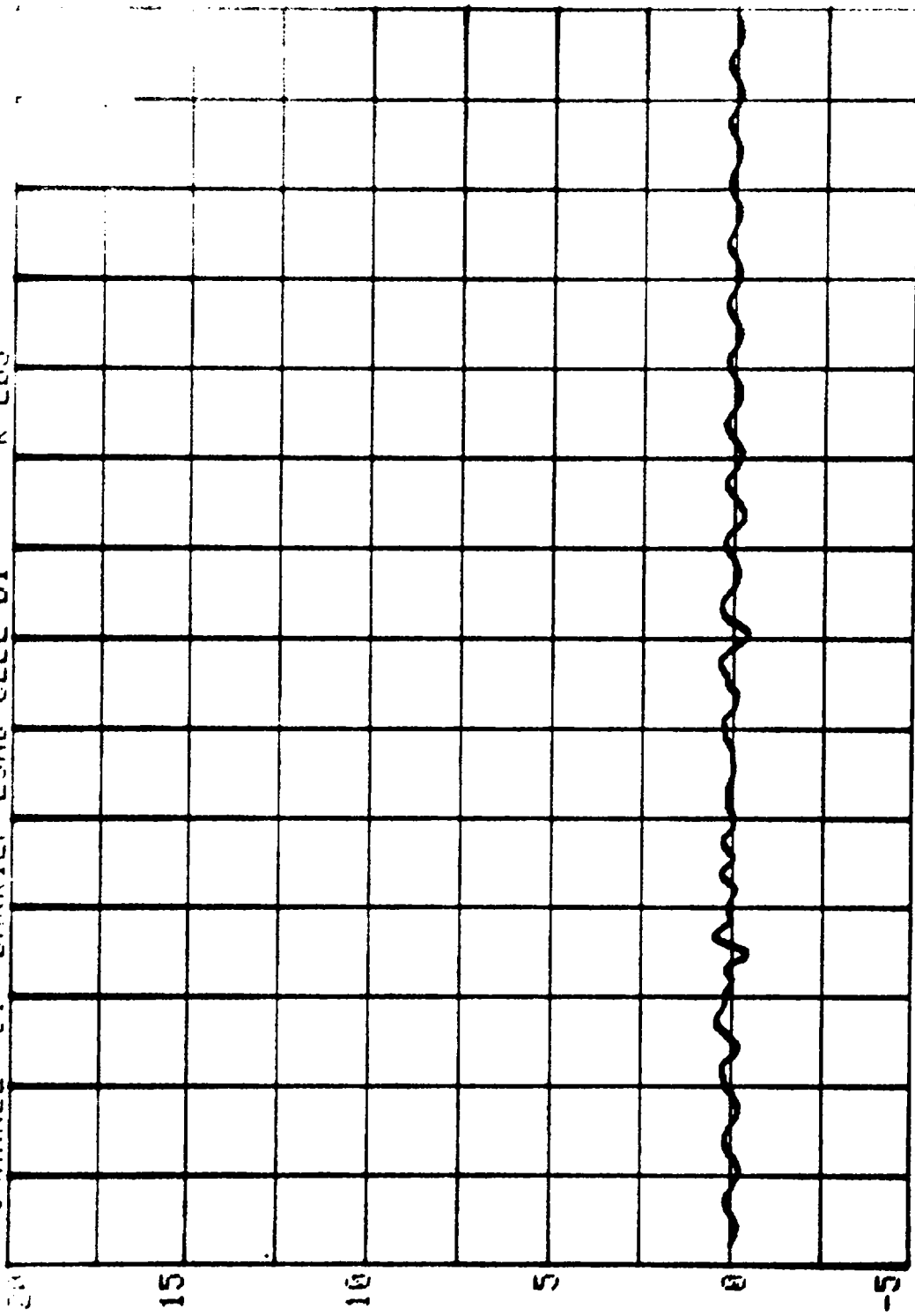


TIME
-50. 0. 50. 100. 150. 200. 250. 300.

CHANNEL 60 BARRIER LOAD CELL C9 SERIES= 5200 K LBS.

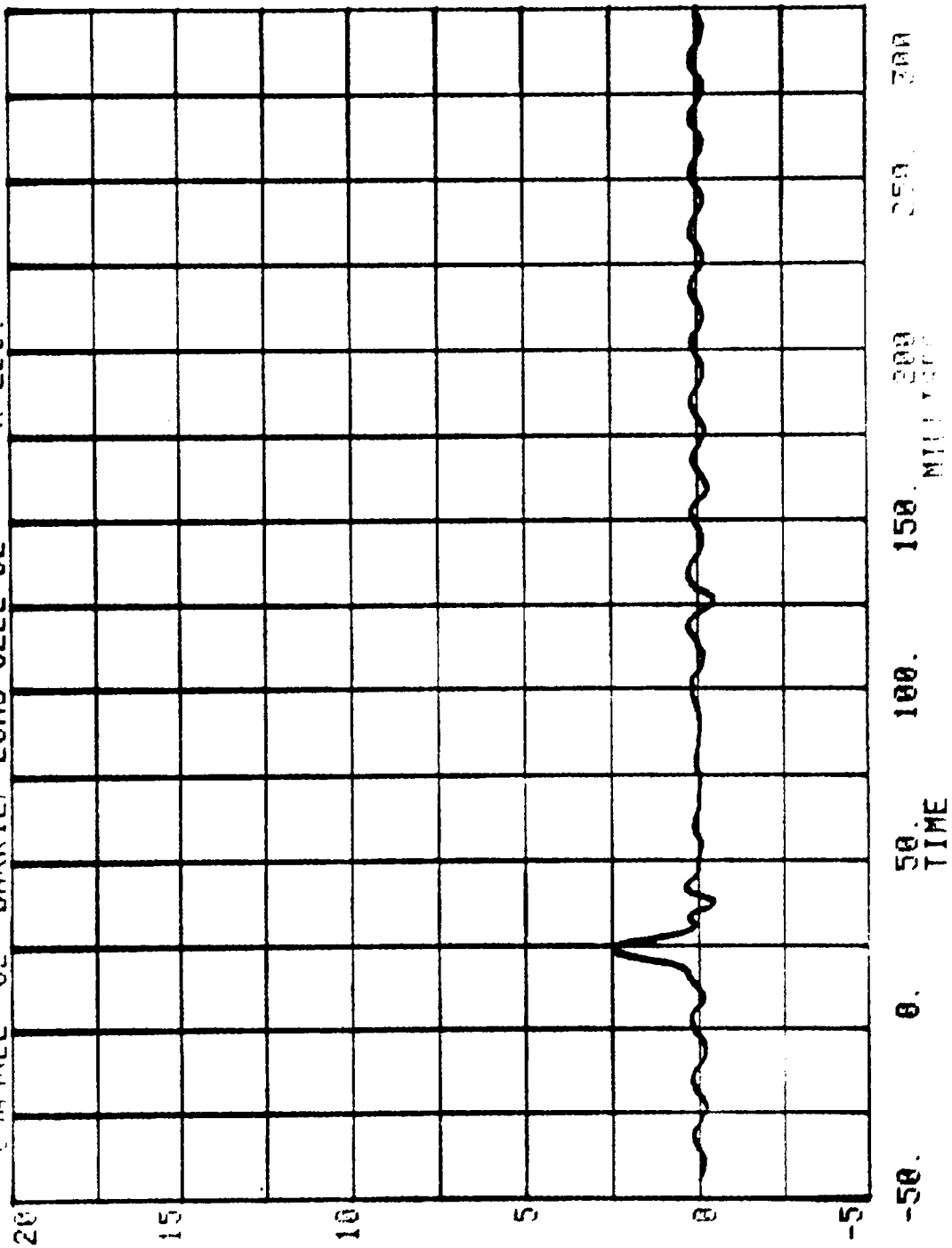


CHANNEL 61 BARRIEP LOAD CELL D1
RUN= 809 SERIES= 5200 K LBS

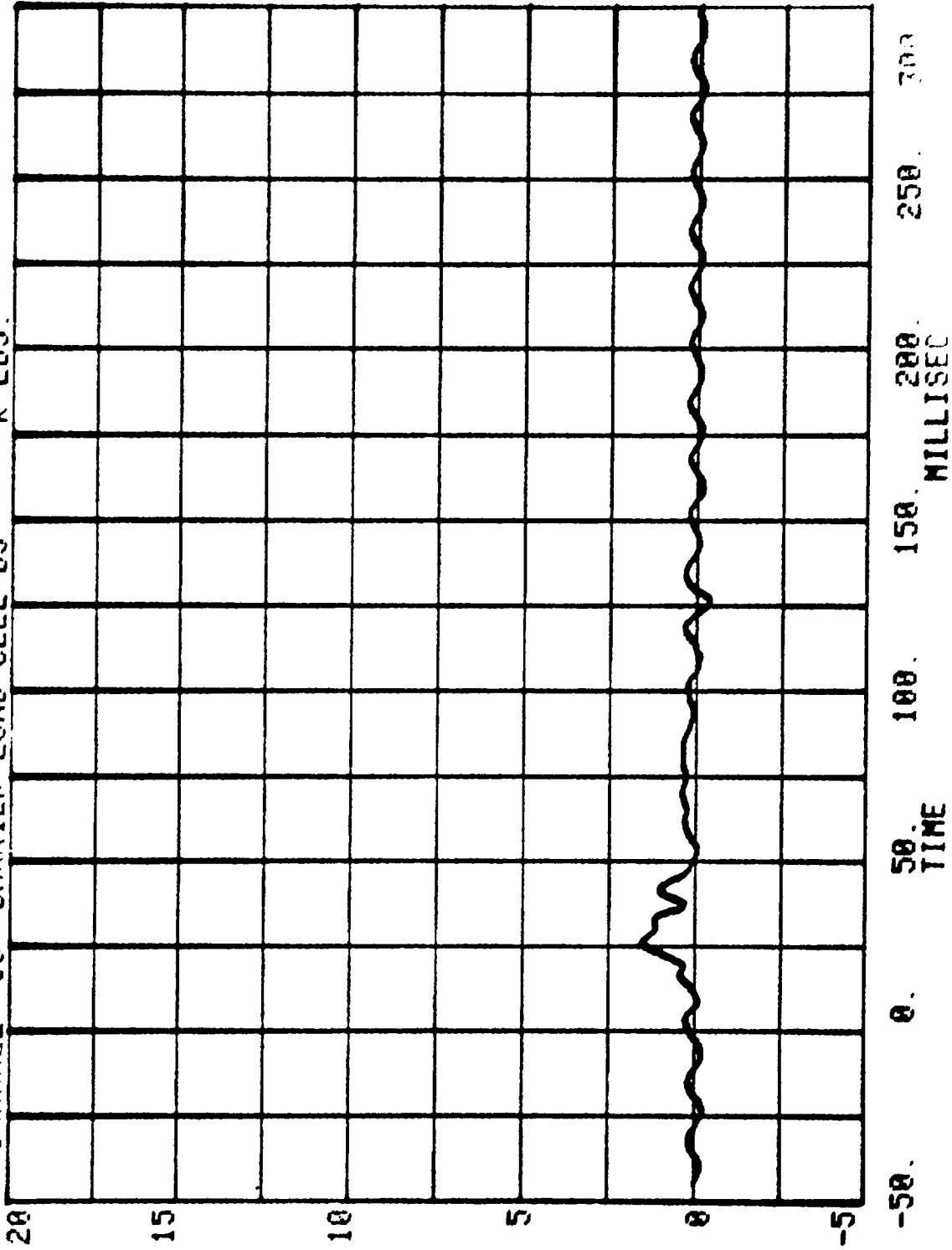


-50. 0. 50. 100. 150. 200.
TIME MILLISEC

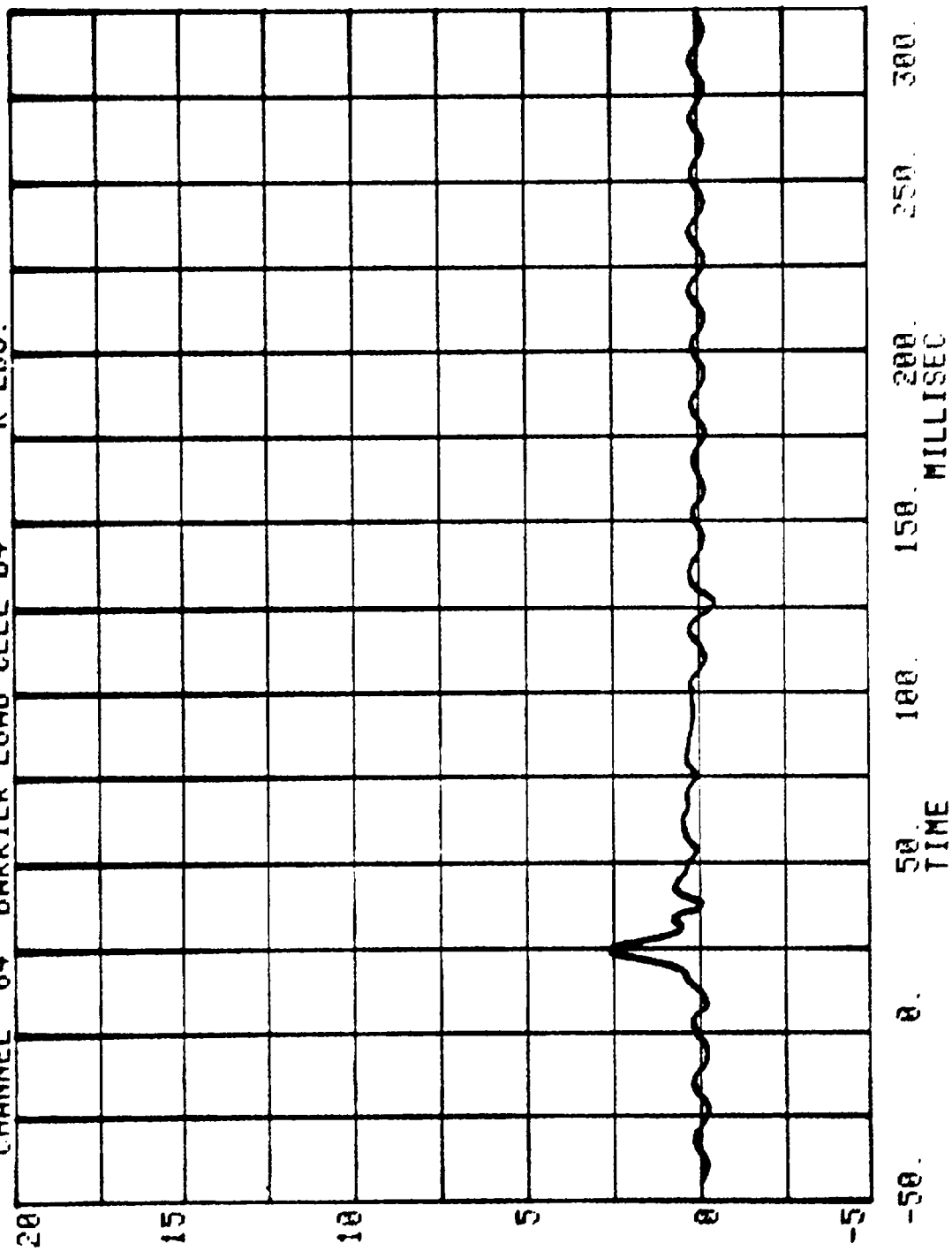
CHANNEL 62 BARRIER LOAD CELL 02
RUN= 809 SERIES= 5200 K LBS.



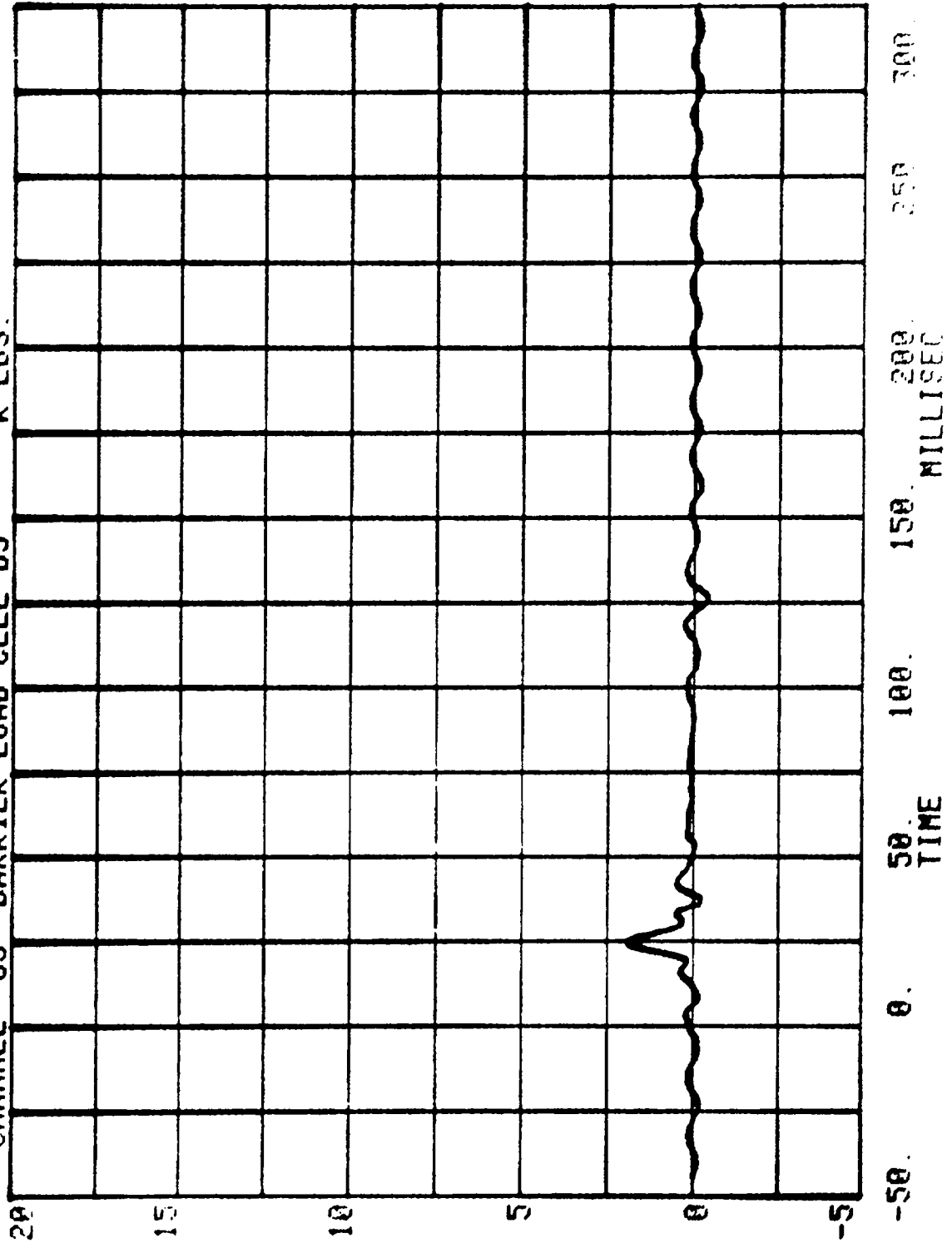
CHANNEL 63 BARRIER LOAD CELL 03 SERIES= 5200 K LBS.



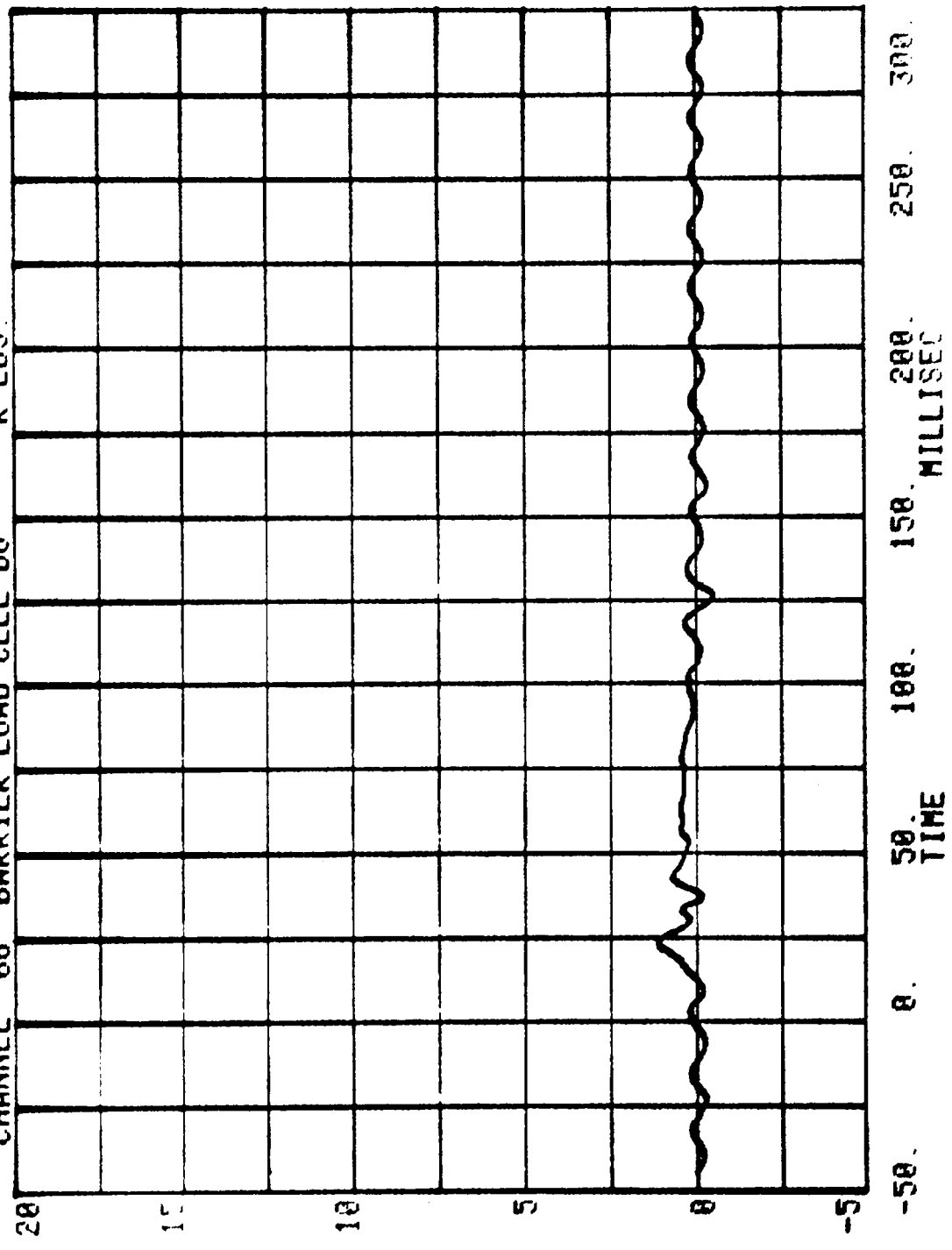
CHANNEL 64 BARRIER LOAD CELL D4 K LBS.
RUN= 809 SERIES= 5200



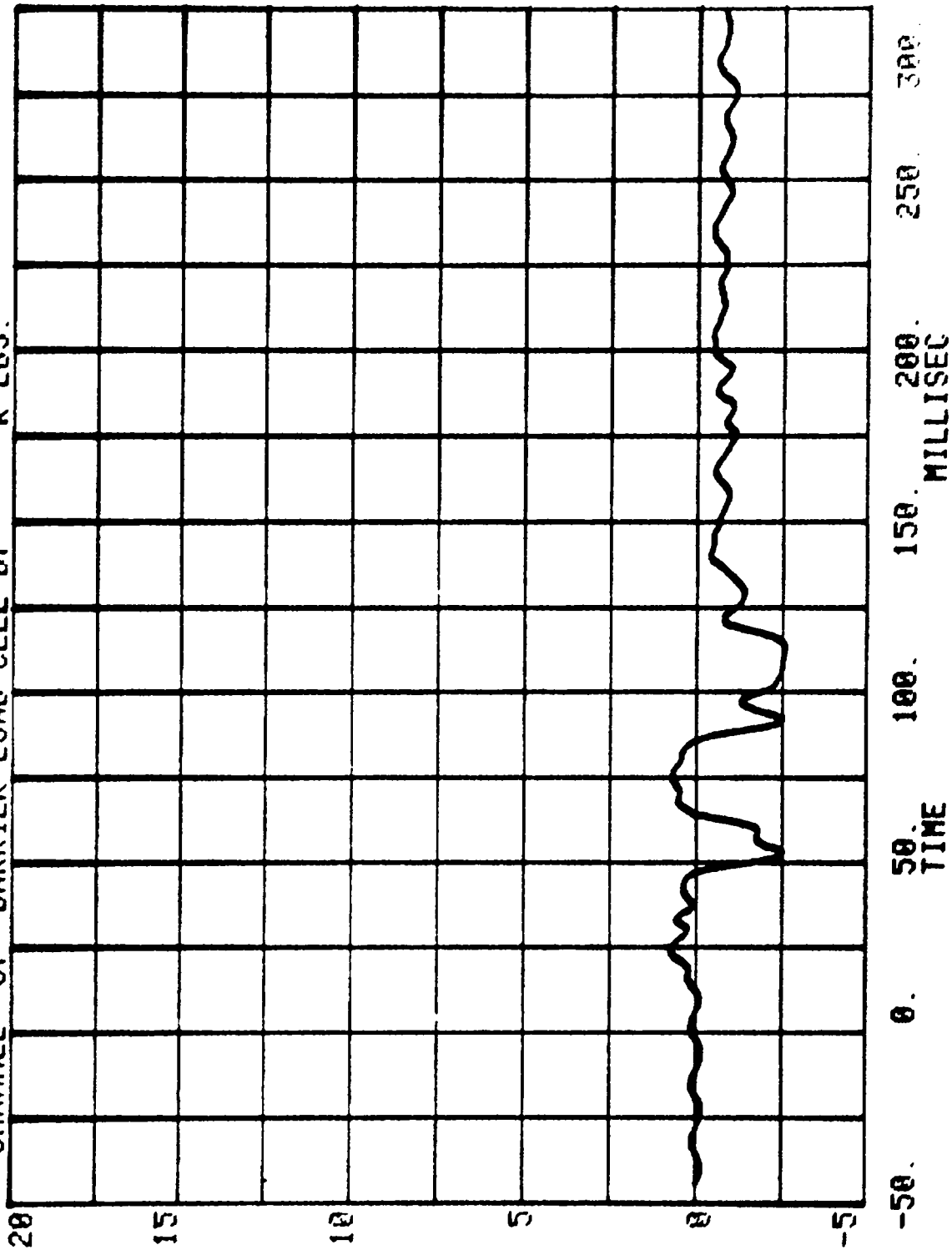
RUN= 809 SERIES= 5200
CHANNEL 65 BARRIER LOAD CELL 05 K LBS.



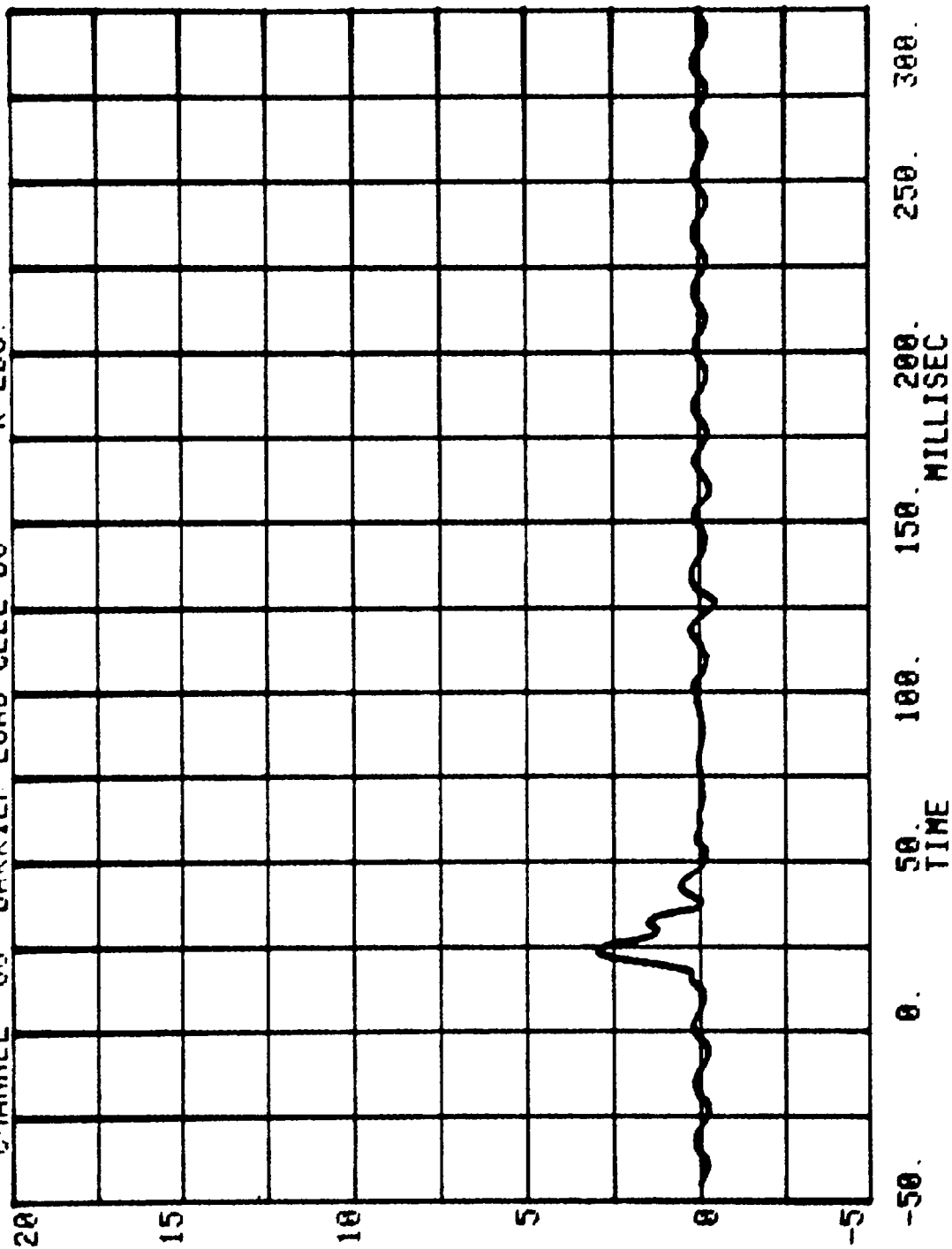
RUN= 809 SERIES= 5200 K LBS.
CHANNEL 66 BARRIER LOAD CELL D6



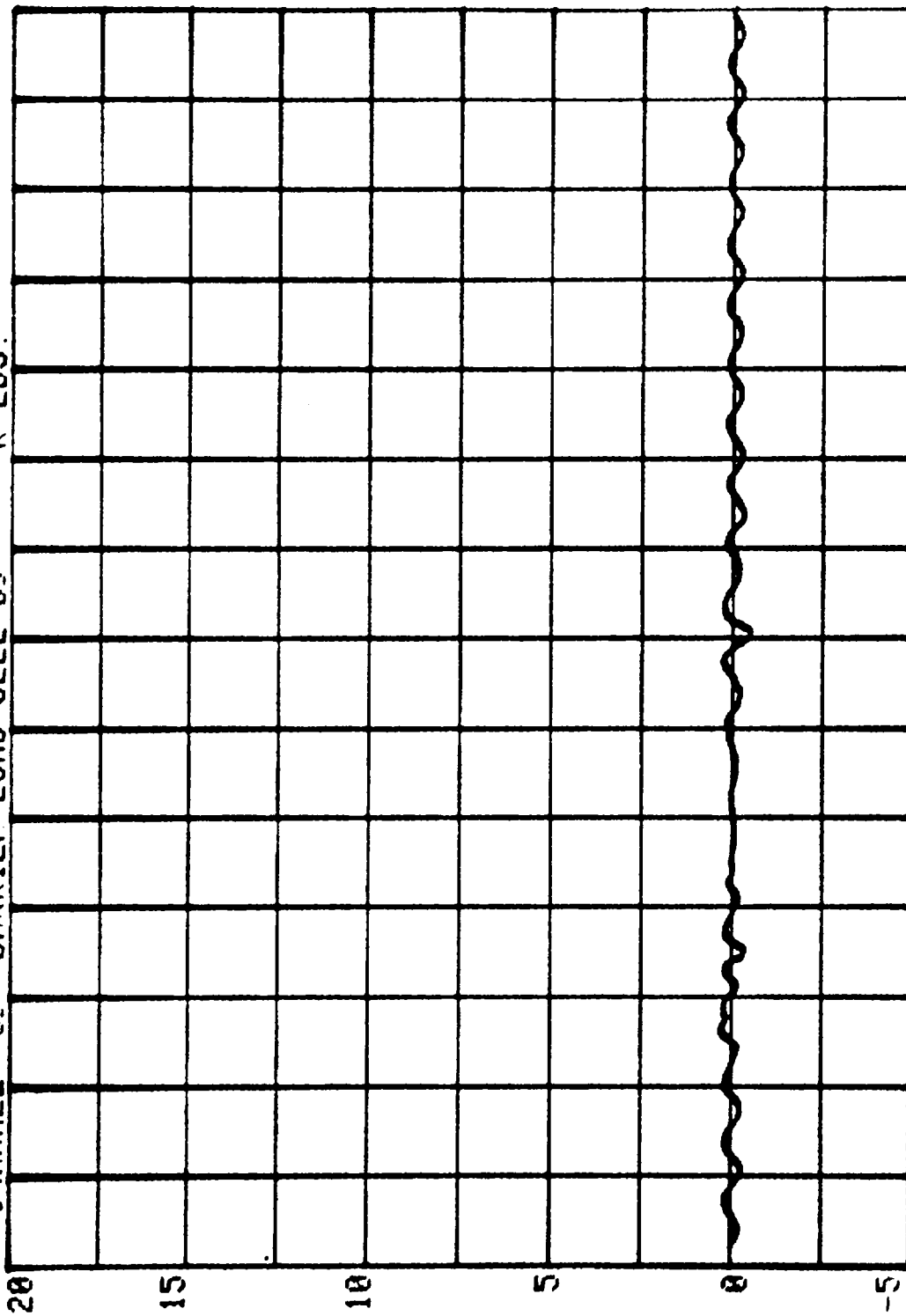
RUN= 809 SERIES= 5200
CHANNEL 67 BARRIER LOAD CELL D7 K LBS.



CHANNEL 68 BARRIEP LOAD CELL D8
RUN= 809 SERIES= 5200 K LBS.



CHANNEL 69 BARRIER LOAD CELL D9
RUN= 809 SERIES= 5200 K LBS.



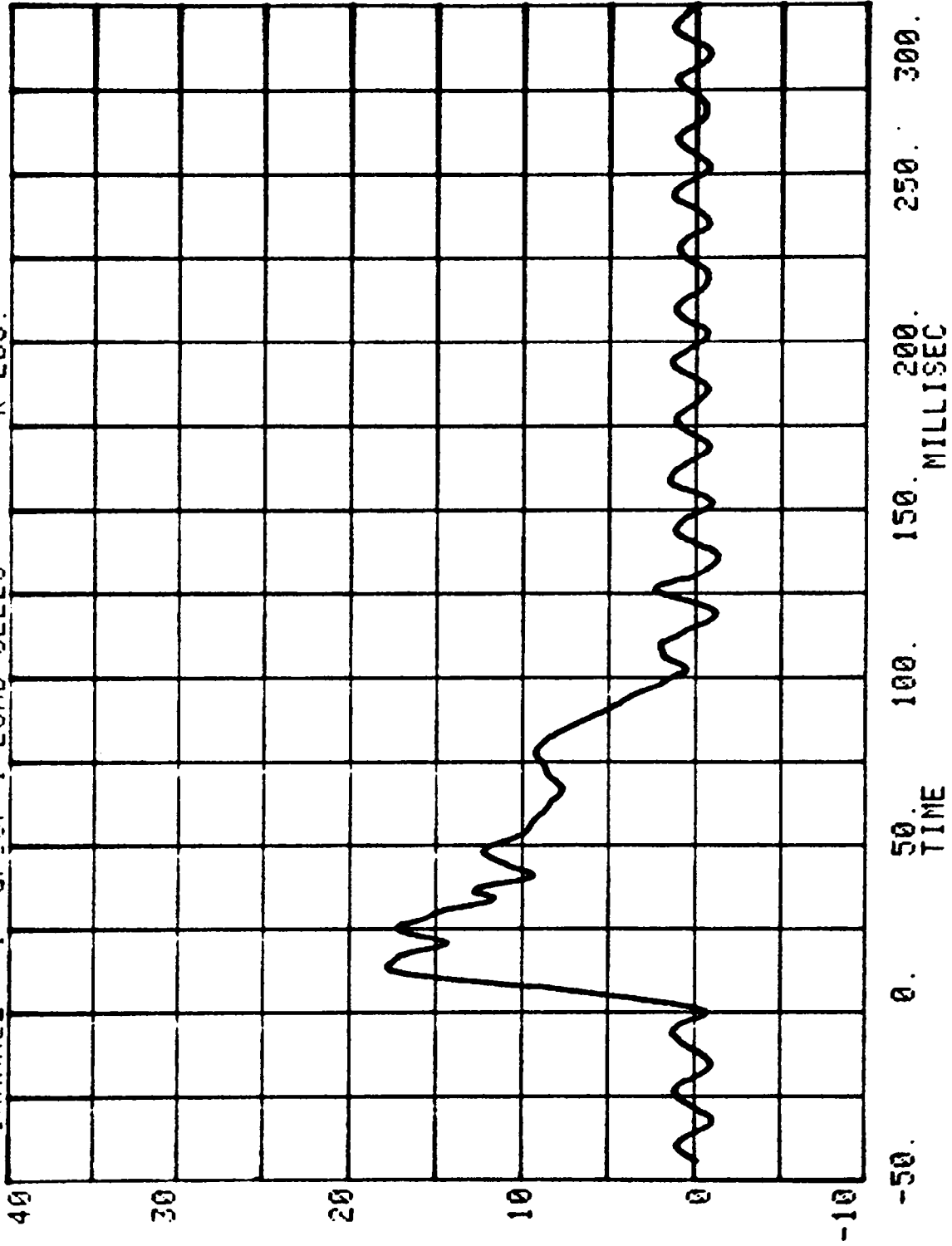
-50. 0. 50. 100. 150. 200. 250. 300.
MILLISEC
TIME

NEW CAR ASSESSMENT BARRIER TEST - 1988

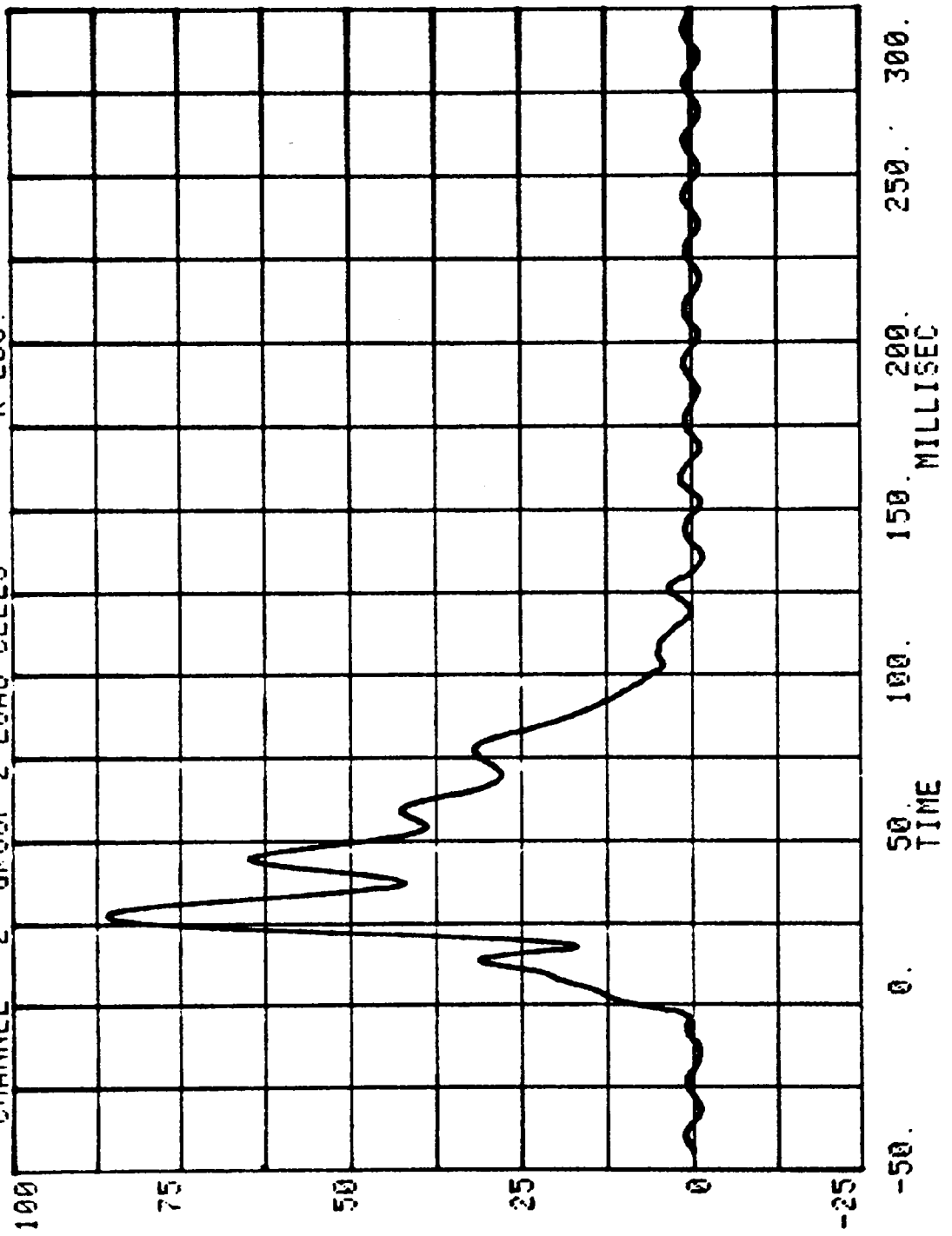
FUN # 809 SERIES # 5200

CHAN	TITLE	MINIMUM	MAXIMUM
1	GROUP 1 LOAD CELLS	-1.317	17.867 K LBS.
2	GROUP 2 LOAD CELLS	-1.620	86.113 K LBS.
3	GROUP 3 LOAD CELLS	-1.036	29.687 K LBS.
4	GROUP 4 LOAD CELLS	-1.655	4.734 K LBS.
5	GROUP 5 LOAD CELLS	-2.632	19.374 K LBS.
6	GROUP 6 LOAD CELLS	-2.320	7.989 K LBS.
7	TOTAL LOAD CELL SUM	-1.101	162.755 K LBS.

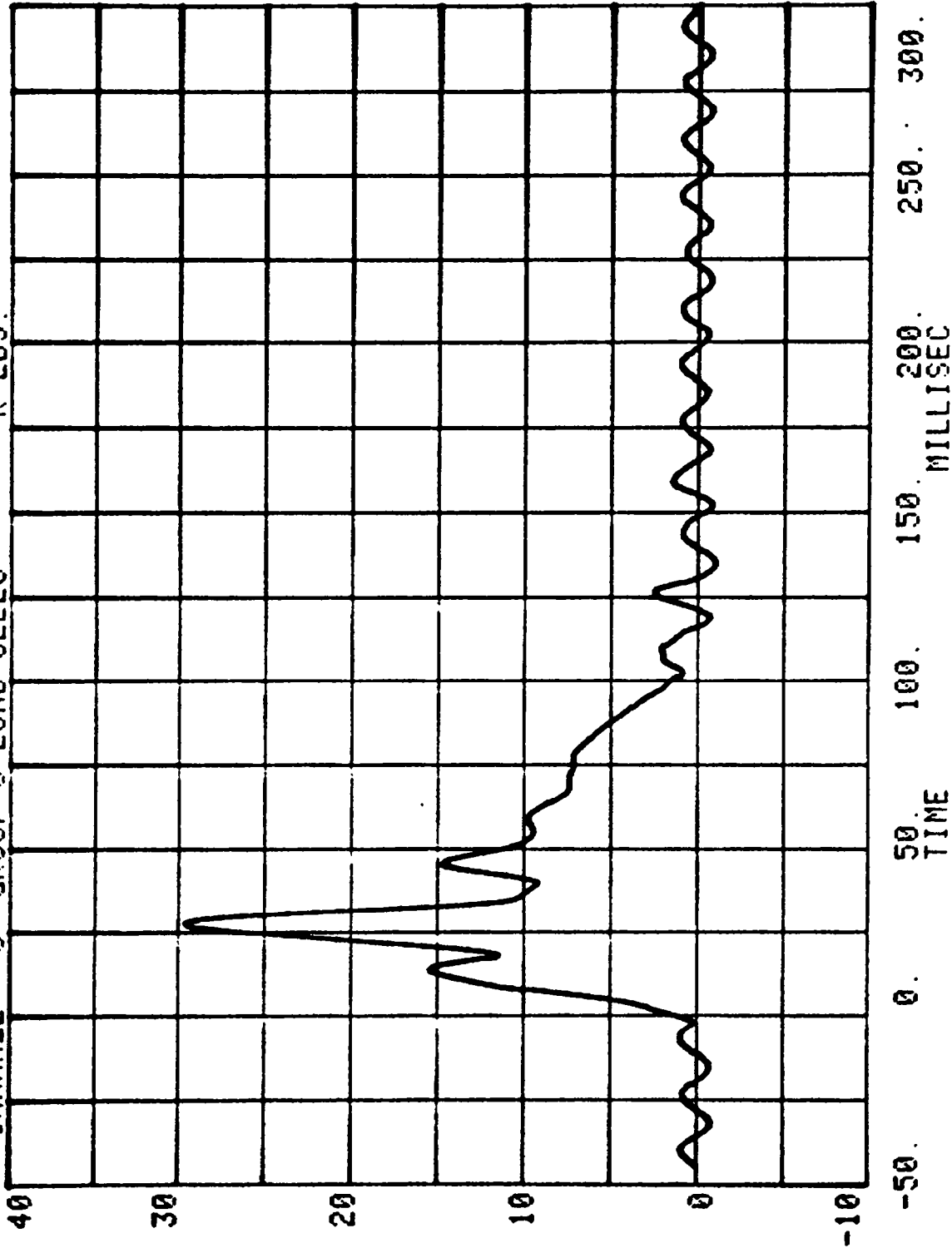
CHANNEL 1 GROUP 1 LOAD CELLS
RUN= 802 SERIES= 5200 K LBS.



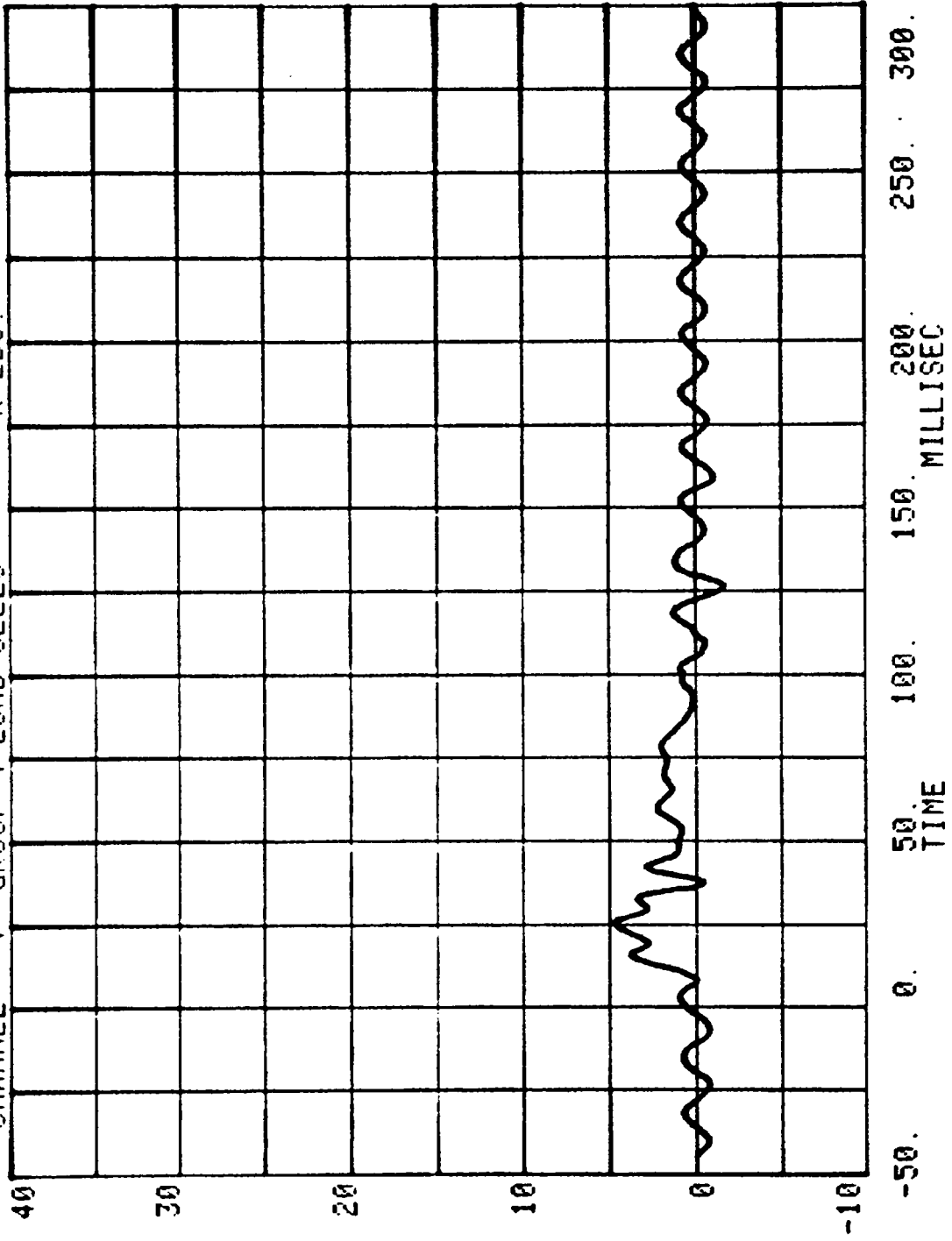
CHANNEL 2 GROUP 2 LOAD CELLS
RUN= 809 SERIES= 5200 K LBS.



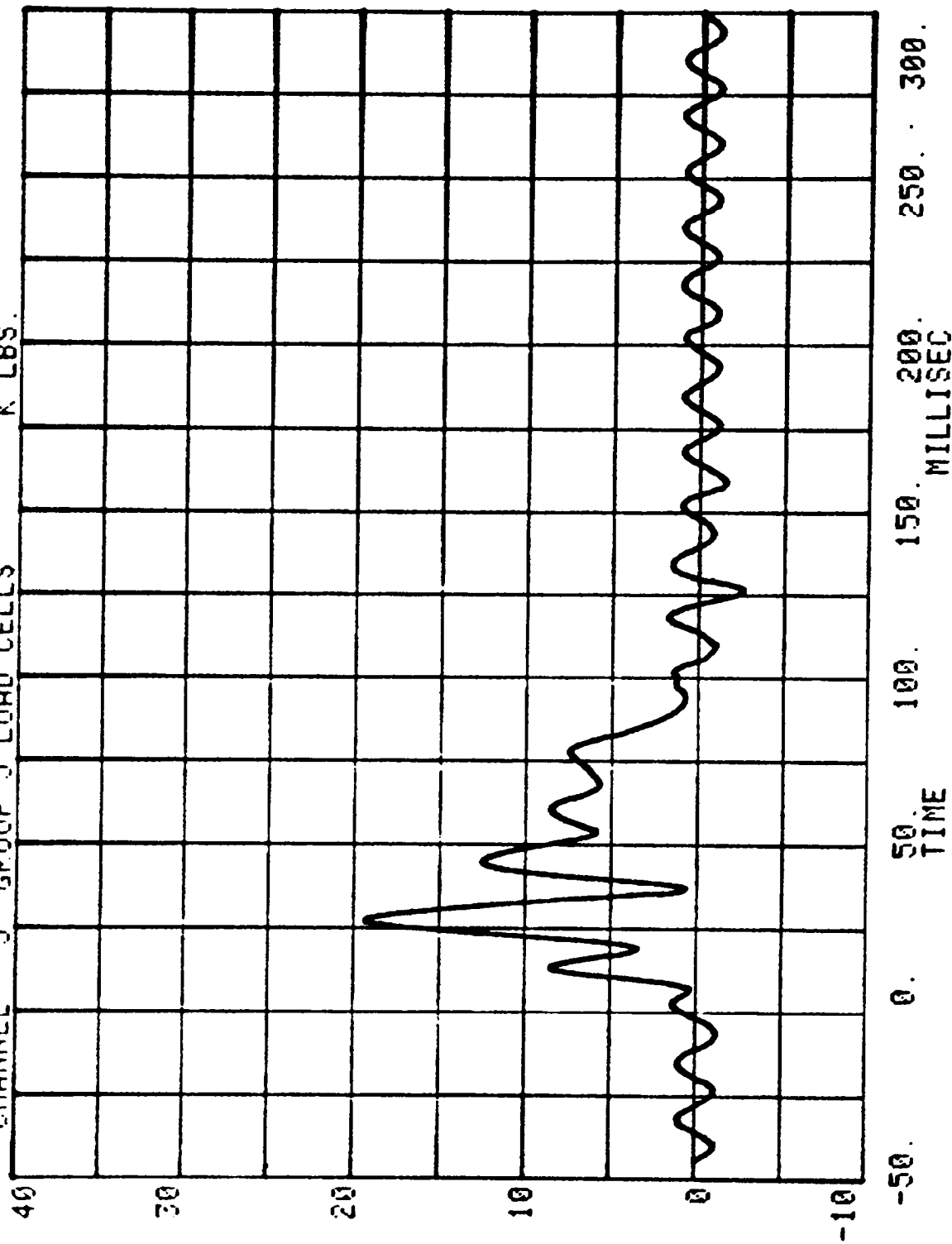
CHANNEL 3 GROUP 3 LOAD CELLS
RUN= 909 SERIES= 5200 K LBS.



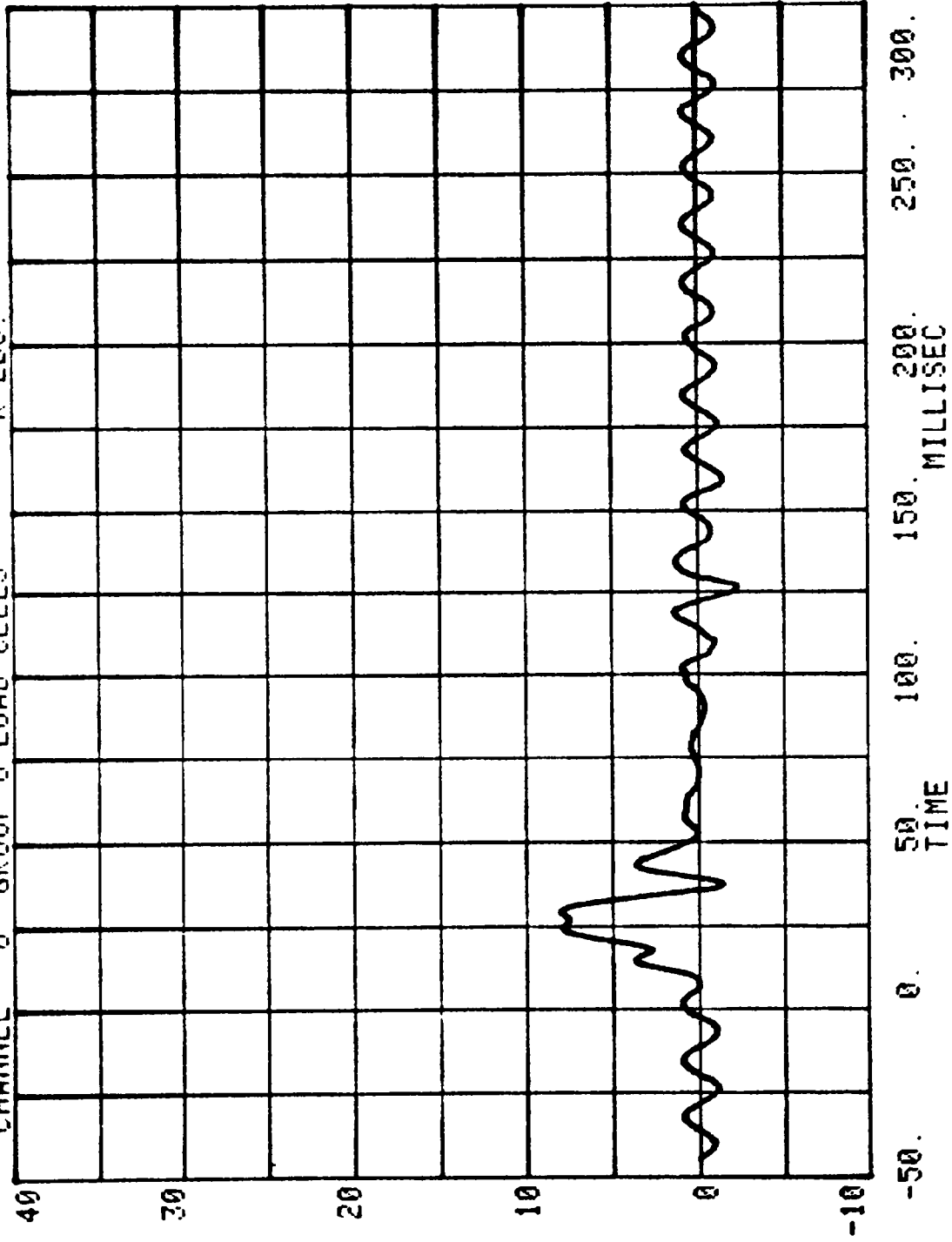
CHANNEL 4 GROUP 4 LOAD CELLS
RUH= 809 SERIES= 5200 K LBS.



CHANNEL 5 GROUP 5 LOAD CELLS
RUH= 809 SERIES= 5200 K LBS.

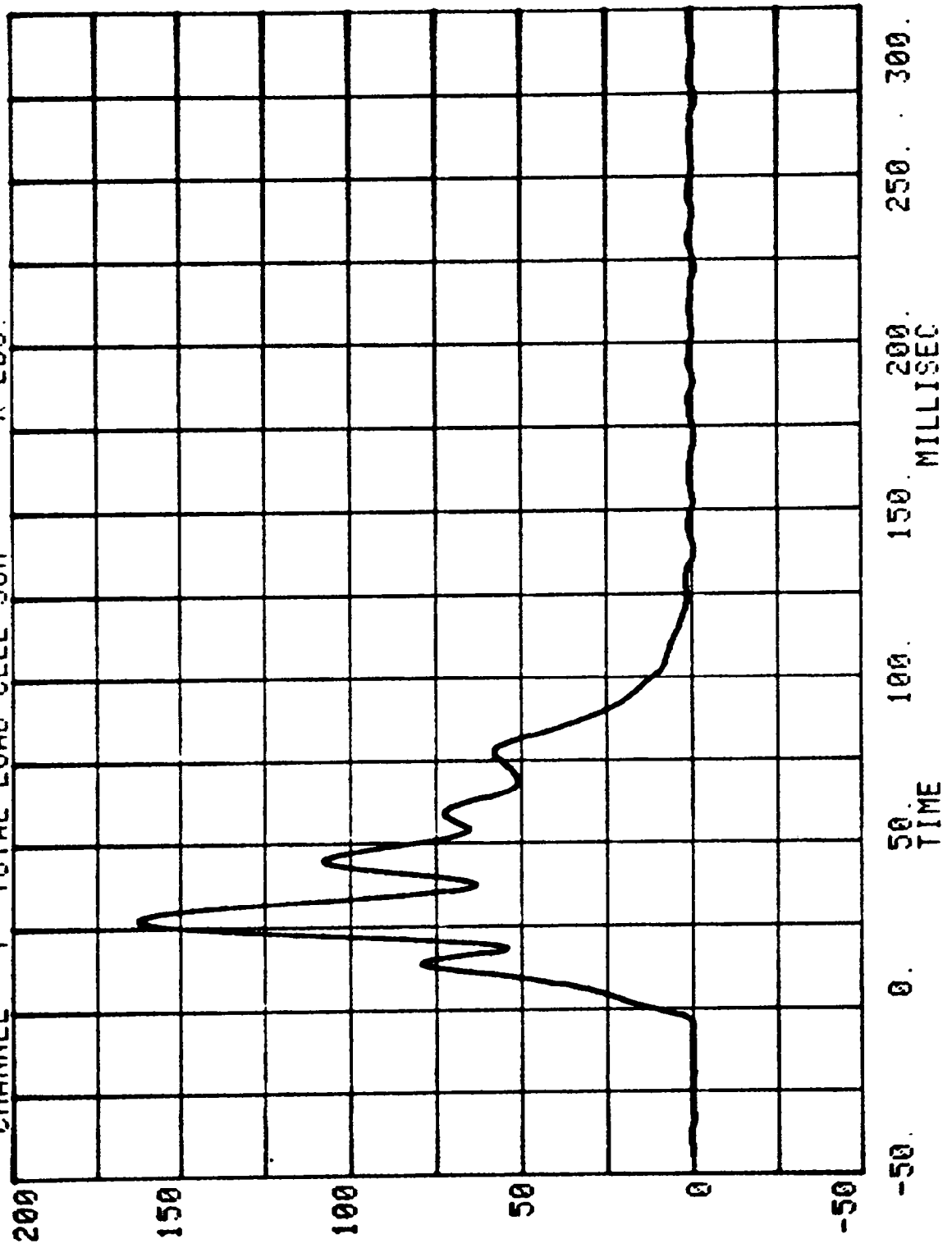


CHANNEL 6 GROUP 6 LOAD CELLS
RUN= 809 SERIES= 5200 K LBS.



CHANNEL 7 TOTAL LOAD CELL SUM K LBS.

RUN= 809 SERIES= 5200



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.

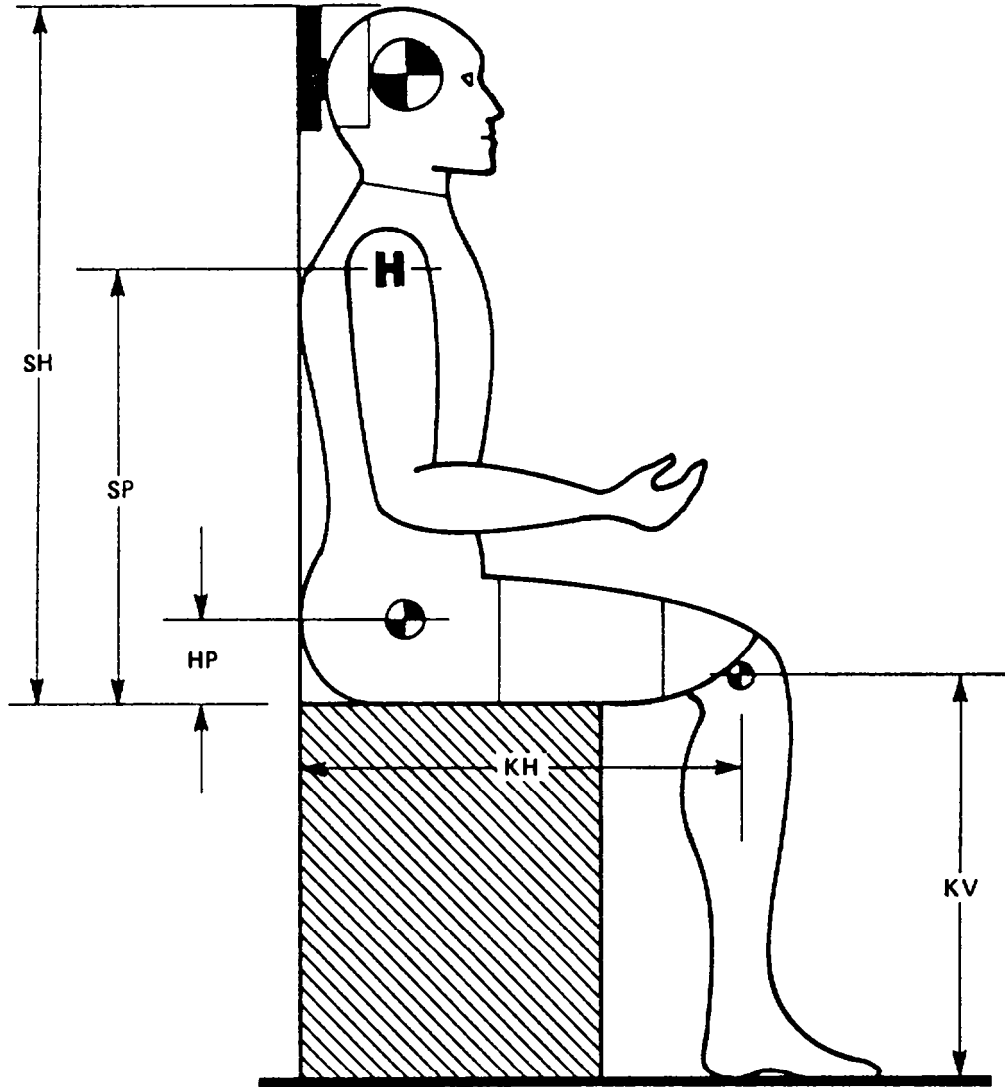
Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Date</u>
749	12-15-87
1021	2- 2-88

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 10 DUMMY CONFIGURATION DIMENSIONS



PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NETSA DUMMY I.D. NUMBER.: 749

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXXX	12-15-87	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	1	
SH - Seated Height	35.6 to 35.8"	35.7"	
SP - Shoulder Pivot Height	21.8 to 22.4"	22.2"	
HP - Hip Pivot Height	3.9" ref.	3.9"	
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.6"	
KV - Knee Pivot from floor	19.3 to 19.9"	19.6"	
SW - Shoulder Width	17.8 to 18.4"	18.2"	
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		12-15-87	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-71 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		29-32%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	230 G's	
b. peak lateral accel.	<= 10 G's	10 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' crash test program.

TECHNICIAN'S NAME: D. W. Hess

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	21.5 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	23 G's	
c. Peak Resultant Head Acceleration		26 G's max.	22 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.1 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	28 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	5.1 ms	
g. Max. Head Rotation		63 to 73 deg.	68 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.	28.9 ms	
	Displ.	2.1 to 3.1"	3.1"	
60 deg.	Time	40.3 to 51.7 ms.	45.5 ms	
	Displ.	4.3 to 5.3"	5.3"	
Maximum (68 deg)	Time	53.2 to 66.8 ms.	57.5 ms	
	Displ.	5.0 to 6.0"	6.0"	
60 deg.	Time	67.0 to 83.0 ms.	72 ms	
	Displ.	4.3 to 5.3"	5.2"	
30 deg.	Time	85.4 to 104.6 ms.	90.1 ms	
	Displ.	2.1 to 3.1"	2.8"	
0 deg.	Time	101.0 - 123.0 ms.	107 ms	
	Displ.	-.5 to 0.5"	0.0"	

TECHNICIANS NAME: *D.W. Hess*

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 749

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	24 lbs	
b. Force @ 0.75"	36 to 50 lbs.	36 lbs	
c. Force @ 1.0"	50 to 63 lbs.	56 lbs	
d. Force @ 1.3"	73 to 88 lbs.	85 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	31 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	44.5 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	52 lbs	
d. Return Angle	12 deg. maximum	8.5 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.85 fps	
(2) Peak Deflection	1.7" maximum	1.62"	
(3) Peak Resistive Force	2250 lbs maximum	2132 lbs	
(4) Internal Hysteresis	50 to 70%	55.3%	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.06 fps	
(2) Peak Deflection	1.1" maximum	1.1"	
(3) Peak Resistive Force	1450 lbs maximum	1352 lbs	
(4) Internal Hysteresis	50 to 70%	61.7%	

TECHNICIAN'S NAME: D. W. Hess

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 749

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Right Side			
(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	1.75 ms	
B. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	6.9 fps	
(2) Maximum Force	1850 to 2500 lbs	2075 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.8 ms	

REMARKS:

TECHNICIAN'S NAME:

D. W. H. Less

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 749

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CL60	9-87	3-88
HY LATERAL--	ENDEVCO	CG34	9-87	3-88
HZ VERTICAL--	ENDEVCO	CN24	9-87	3-88
2. CHEST ACCELEROMETER--				
CX LONGITUDINAL--	CEC	A129	9-87	3-88
CY LATERAL--	ENDEVCO	CN64	9-87	3-88
CZ VERTICAL--	CEC	A56	9-87	3-88
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	306	10-87	4-88
LEFT SIDE	GSE	310	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.: 1021

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXXX	2-2-88	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	3	
H - Seated Height	35.6 to 35.8"	35.7"	
P - Shoulder Pivot Height	21.8 to 22.4"	22.1"	
P - Hip Pivot Height	3.9" ref.	3.9"	
H - Knee Pivot from Back Line	20.1 to 20.7"	20.4"	
V - Knee Pivot from floor	19.3 to 19.9"	19.5"	
W - Shoulder Width	17.8 to 18.4"	18.1"	
W - 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		2-2-88	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		3	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-72 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		20-39%	
TEST PARAMETER	SPECIFICATION		
. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	225 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' crash test program.

TECHNICIAN'S NAME: D. L. Head

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	21.8 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	26 G's	
c. Peak Resultant Head Acceleration		26 G's max.	24 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.5 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	26 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	3.7 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.	27.3 ms	
	Displ.	2.1 to 3.1"	2.8"	
60 deg.	Time	40.3 to 51.7 ms.	42.2 ms	
	Displ.	4.3 to 5.3"	5.0"	
Maximum (72 deg)	Time	53.2 to 66.8 ms.	56.1 ms	
	Displ.	5.0 to 6.0"	5.8"	
60 deg.	Time	67.0 to 83.0 ms.	74 ms	
	Displ.	4.3 to 5.3"	4.8"	
30 deg.	Time	85.4 to 104.6 ms.	92 ms	
	Displ.	2.1 to 3.1"	2.3"	
0 deg.	Time	101.0 - 123.0 ms.	106 ms	
	Displ.	-.5 to 0.5"	0.0"	

TECHNICIANS NAME: *D. J. Hess*

I. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	27 lbs	
b. Force @ 0.75"	36 to 50 lbs.	41 lbs	
c. Force @ 1.0"	50 to 63 lbs.	56 lbs	
d. Force @ 1.3"	73 to 88 lbs.	85 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	31.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	41.5 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	56 lbs	
d. Return Angle	12 deg. maximum	8 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.8 fps	
(2) Peak Deflection	1.7" maximum	1.48"	
(3) Peak Resistive Force	2250 lbs maximum	2210 lbs	
(4) Internal Hysteresis	50 to 70%	57%	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.1 fps	
(2) Peak Deflection	1.1" maximum	1.0"	
(3) Peak Resistive Force	1450 lbs maximum	1352 lbs	
(4) Internal Hysteresis	50 to 70%	61.8%	

TECHNICIAN'S NAME: D. J. H. S. O.

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Right Side			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2150 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.96 ms	
B. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2300 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.82 ms	

REMARKS:

TECHNICIAN'S NAME: D. W. Hess

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 1021

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CJ22	2-88	8-88
HY LATERAL--	ENDEVCO	CS41	2-88	8-88
HZ VERTICAL--	ENDEVCO	CH31	2-88	8-88
2. CHEST ACCELEROMETER--				
CX LONGITUDINAL--	CEC	A73	2-88	8-88
CY LATERAL--	ENDEVCO	CE06	2-88	8-88
CZ VERTICAL--	CEC	A44	2-88	8-88
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	552	10-87	4-88
LEFT SIDE	GSE	551	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

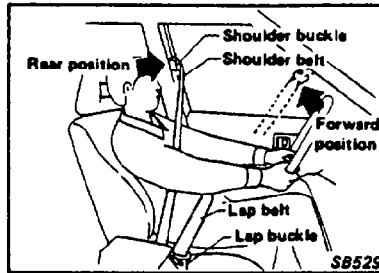
VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

SEAT BELTS

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

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

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



Fastening the belts

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

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

2. Adjust the seat.

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

3. Turn the ignition switch on. The shoulder buckle will move to the rear position and will fit across your chest.

2-7

and the shoulder belt will move away from your chest.

- Never touch the door guide rail while the shoulder buckle is moving.
- Do not unfasten the shoulder belt tongue from the buckle except in emergency. See "Operation in Emergency" later in this Section.

How the automatic shoulder belt works

While the ignition switch is on; the shoulder buckle will move to the forward position when the door is opened, and it will move to the rear position when the door is closed.

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

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

Seat belt warning light "  " and warning chime

When the ignition switch is turned on with the door open (the shoulder buckle is at

the front position);

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

When the ignition switch is turned on with the door closed;

the chime will sound and the warning light will flicker until the shoulder buckle reaches the rear position. The warning light will come on for several seconds after the shoulder buckle reaches the rear position.

If the shoulder belt tongue is disconnected from the buckle;

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

If the driver side lap belt is not fastened;

when the ignition switch is turned on and the shoulder buckle reaches the rear position, the warning light will come on for

Pull the shoulder belt toward the retractor to take up extra slack.

- Never touch the door guide rail while the shoulder buckle is moving.
 - Do not wear the shoulder belt across the neck or under your outer arm. The shoulder belt should be positioned midway over the shoulder for the most effective protection.
4. Slowly pull the lap belt out of the retractor and insert the tongue into the lap buckle until it snaps. Position the lap belt low on the hips and pull the belt toward the retractor to take up extra slack.
- Never wear the lap belt across the shoulder belt.
 - The retractors are designed to lock during a sudden stop or on impact. A slow pulling motion will permit the belt to move, and allow you some freedom of movement in the seat.

Unfastening the belts

1. To unfasten the lap belt, press the button on the lap buckle. The seat belt will automatically retract.
2. Open the door. The shoulder belt buckle will move to the front position

about 6 seconds and the chime will sound for about 6 seconds until the lap belt is fastened. Fasten the lap belt before driving.

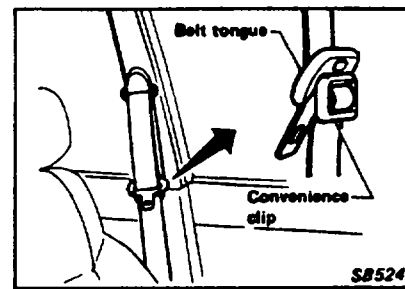
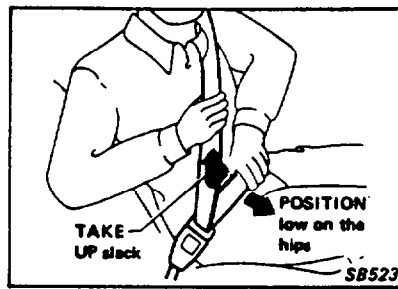
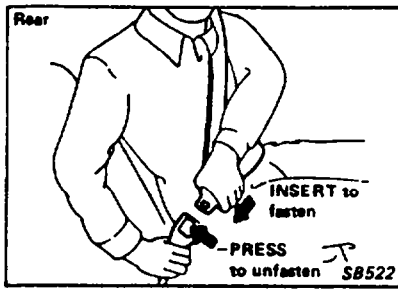
System malfunction

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

2-8

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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

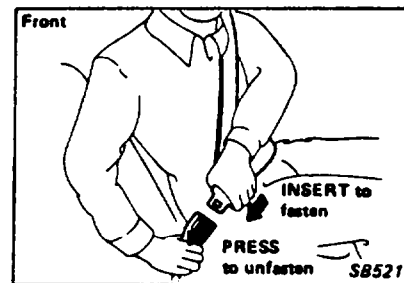
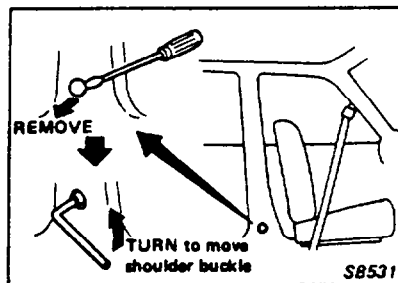
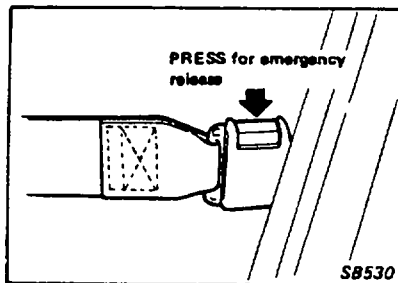
To unfasten the belt, press the button on the buckle. The seat belt will automatically retract.

Convenience clip (For Canada)

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.



Operation in an accident

Emergency release

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

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

If either shoulder belt buckle does not operate

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

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

3-POINT TYPE WITH RETRACTOR

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

Fastening the belts

1. Adjust the seat.

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