

REPORT NO. CAL-89-N07

1308

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

MAZDA MOTORS MANUFACTURING COMPANY
1989 FORD PROBE GL
2-DOOR HATCHBACK

NHTSA NO. MK0200
CALSPAN TEST NO. 7731-7

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
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April 11, 1989



FINAL REPORT

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OFFICE OF MARKET INCENTIVES
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16. Abstract <p>A frontal barrier impact test of a 1989 Ford Probe, 2-Door Hatchback, was performed at the Calspan Advanced Technology Center crash test facility in Buffalo, New York, on April 11, 1989.</p> <p>The impact speed was 34.5 mph and the ambient temperature was 33°F. The maximum vehicle crush was 21.5 inches. The test vehicle was equipped with a 3-point continuous belt system at both the driver and passenger positions.</p> <p>With regard to FMVSS 208, "Occupant Crash Protection" injury criteria, both the driver and passenger dummy appear to satisfy the head, chest, and femur requirements.</p>					
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Section 1
PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 89 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-87-D-02012. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph requirements.

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

Section 2
SUMMARY OF TEST NUMBER MK0200

A load cell barrier consisting of 36 load cells was impacted by a 1989 Ford Probe GL 2-Door Hatchback at a velocity of 34.5 mph. The test was performed at the Calspan Corporation Advanced Technology Center on April 11, 1989. Pre-test 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 15 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

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

Both ATDs were fully instrumented with head and chest triaxial accelerometers and left/right femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 1021) had been used in two previous tests (MK0203 and MK0301) and the passenger ATD (Serial No. 749) was also used in Test MK0301. The Injury Criteria Values were not exceeded in these tests. Certification details, along with the instrumentation calibration data, are found in Appendix C.

The 65 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the steering wheel rim and hub. The driver's HIC was 969.8. The maximum chest deceleration over 3 milliseconds was 46.3 g's and femur loads were 690.6 and 870.2 pounds.

The right front passenger's HIC was 496.1. The maximum chest deceleration over 3 milliseconds was 34.9 g's and femur loads were 579.3 and 187.3 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1989 Ford Probe GL 2-Door Hatchback

NHTSA NO.: MK0200 VIN.: 1ZVBT20CXX5238639

BODY COLOR: Silver DATE OF MANUFACTURE: February 3, 1989

Engine: 4 cylinders; - C.I.D.; 2.2 Liters; - CC
X Gas; - Diesel; - Turbocharged
- Longitudinal; X Transverse

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

Date Received: 3/30/89 Odometer Reading: 062.5
- A/C; X P/S; X P/B; - P/wdo.; - Tilt Wheel
- P/seats; - Cruise Control

Type of Occupant Restraint: 3-point continuous belt system

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 32 psi, Rear 26 psi

Recommended Tire Size: P185/70R14

Recommended Cold Tire Pressure: Front 32 psi, Rear 26 psi

Tires on Vehicle: P185/70R14
Invicta GL; Manufacturer: Goodyear

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. Knob

Vehicle Capacity Weight (VCW) = 680 lbs. (A)

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

Rated Cargo and Luggage Weight (RCLW) A-B = 80 lbs.

GVWR 3580 lbs. GAWR: Front 2095 lbs. Rear 1740 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 = 840 lbs. Right Rear = 480 lbs.
 Left Front = 810 lbs. Left Rear = 520 lbs.
 TOTAL FRONT WEIGHT = 1650 lbs. (62 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1000 lbs. (38 % of Total Vehicle Weight)
 TOTAL DELIVERY WEIGHT = 2650 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (2650 lbs.)
 VCW = Vehicle Capacity Weight (680 lbs.)
 DSC = Designated Seating Capacity (4)
 RCLW = VCW - 150 (DSC) = 80 lbs.
 Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)
 Target Test Weight = 3058 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 82 POUNDS CARGO:

Right Front = 890 lbs. Right Rear = 630 lbs.
 Left Front = 910 lbs. Left Rear = 630 lbs.
 TOTAL FRONT WEIGHT = 1800 lbs. (59 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1260 lbs. (41 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 3060 lbs.
 Weight of ballast secured in vehicle trunk area = 0 lbs.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 26.7" LF 26.7" RR 26.1" LR 26.1"
 Test Attitude: RF 26.0" LF 26.2" RR 24.3" LR 24.3"
 Wheel Base: 99.5 in.; C.G. = 40.9 in. rearward of front wheel C/L
 Remarks: _____

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

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0 °
 Date of Test: 4/11/89 Time of Test: 12:30
 Ambient Temperature: 33 °F at impact area
 Temperature in Occupant Compartment: 68 °F.
 Windshield Molding Temperature: 68 °F.
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 34.5 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:	Pre-test	= R	<u>173.7</u>	C _L	<u>177.0</u>	L	<u>174.5</u>
	Post-test	= R	<u>155.2</u>	C _L	<u>155.5</u>	L	<u>156.3</u>
	Crush	= R	<u>18.5</u>	C _L	<u>21.5</u>	L	<u>18.2</u>

Distance from front of test vehicle to point of impact:

R 16.2 in. C/L 16.7 in. L 16.7 in.

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Steering rim and hub</u>	<u>No Contact</u>
Chest	<u>Lower steering rim</u>	<u>No Contact</u>
Abdomen	<u>No Contact</u>	<u>No Contact</u>
Left Knee	<u>Dash Panel</u>	<u>Dash Panel</u>
Right Knee	<u>Dash Panel</u>	<u>Dash Panel</u>

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

	<u>Front</u>	
	<u>Left</u>	<u>Right</u>
Door Opening	<u>Operable</u>	<u>Operable</u>
	<u>Front</u>	
	<u>Left</u>	<u>Right</u>
<u>Seat Movement</u>	<u>None</u>	<u>None</u>
Seat Back Failure	<u>None</u>	<u>None</u>
Seat Shift (in.)	<u>None</u>	<u>None</u>
<u>Glazing Damage</u>		
Backlight/Windshield	<u>Windshield remained intact.</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)	-103	-41	62	121.9	-50	-13	-8	46.3
DUMMY (2)	-22	12	58	59.9	-36	14	-12	34.9
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	LEFT FEMUR	RIGHT FEMUR
DUMMY (1)	690.6	870.2
DUMMY (2)	579.3	187.3
DUMMY (3)		
DUMMY (4)		

	MAXIMUM FORCE - SEAT BELT LOADS (LBS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	1792.3	-	801.1
DUMMY (2)	1962.8	945.6	-
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)	969.8	.07177	.09292	73.2
DUMMY (2)	496.1	.06855	.10455	45.3
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

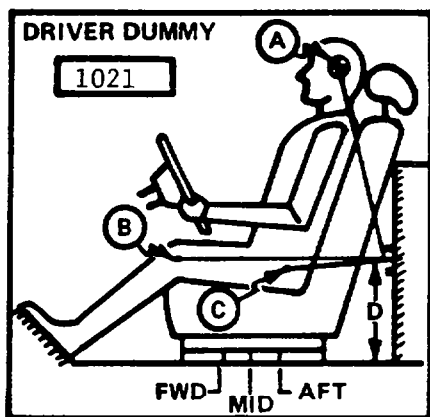
TEST NO.: MK0200

VEHICLE: 1989 Ford Probe 2-Door Hatchback

SEAT TYPE:
 Bench
 X Bucket
 Split Bench

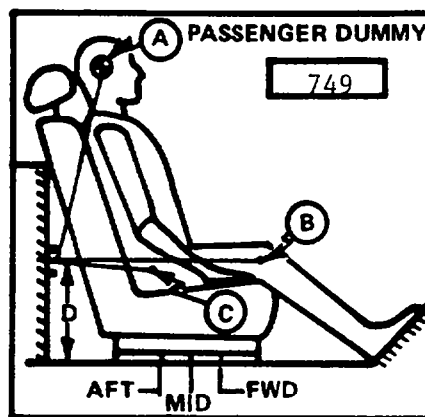
ADJUSTER TYPE:
 Manual
 X Power
 Power

BUCKET SEAT BACK TYPE:
 Fixed
 X Adjustable Reclining



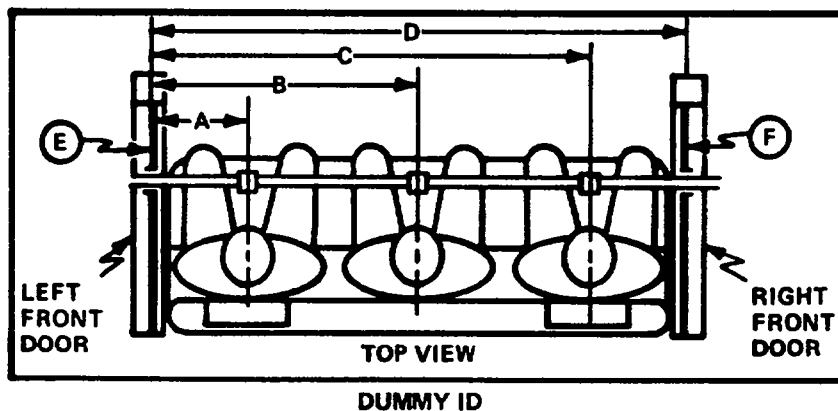
MEASUREMENT LOCATION

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



A = 22.0 in. 36 Degrees
 B = 33.5 in. 98 Degrees
 C = 19.8 in. 120 Degrees
 D = 15.7 in.

A = 22.6 in. 35 Degrees
 B = 33.6 in. 97 Degrees
 C = 20.3 in. 116 Degrees
 D = 15.7 in.



 1021

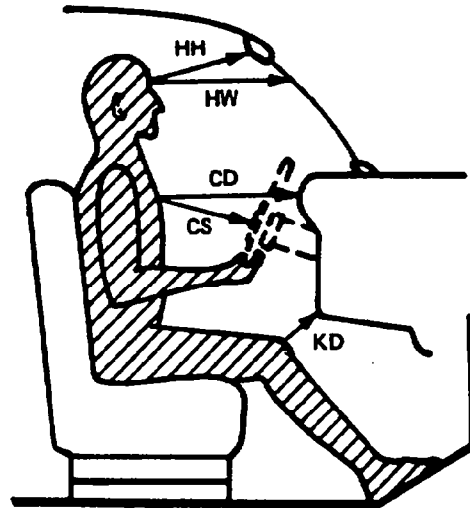
 749

A = Left Door to Driver Centerline 12.3 in.
 B = Left Door to Center Passenger Centerline - in.
 C = Left Door to Right Passenger Centerline 39.4 in.
 D = Left Door to Right Door 51.8 in.
 E, F = Window Glass Height (Right and Left Must Be Equal) 10.0 in.

Figure 2

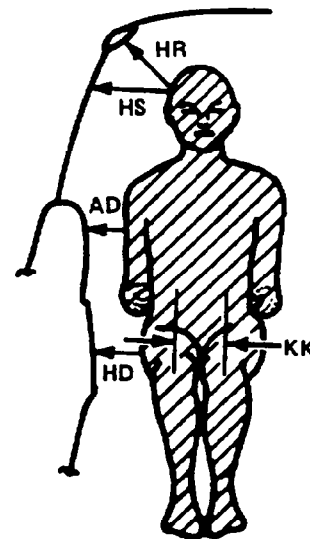
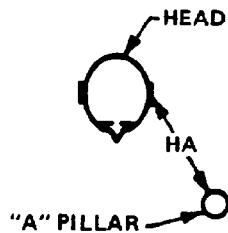
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	12.1	12.1
HW	17.0	17.1
CD	20.9	22.6
CS	14.4	-
KDL	5.7	6.2
KDR	6.1	5.8
SA	21.0°	21.0°
TA	22.0°	23.0°



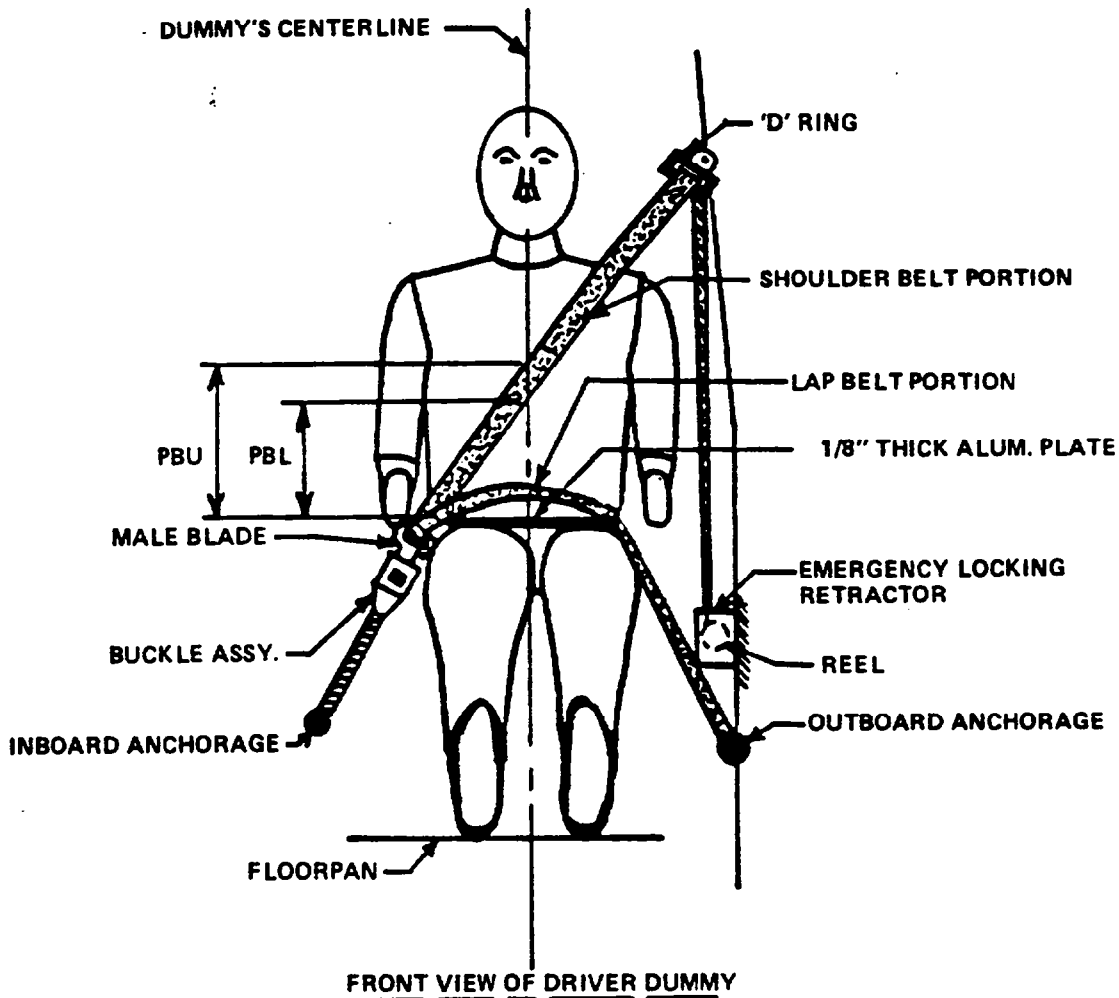
- HH = Head to Windshield Header
- HW = Head to Windshield
- CD = Chest to Dash
- CS = Chest to Steering Wheel
- KD(L/R)= Knee to Dash (Left/Right)
- SA = Seat Back Angle
- TA = Torso Angle

- 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	5.5	5.4
HS	9.1	9.2
AD	4.9	4.4
HD	7.3	7.3
KK	9.2	7.2
HA	16.4	16.0

Figure 3
SEAT BELT POSITIONING DATA



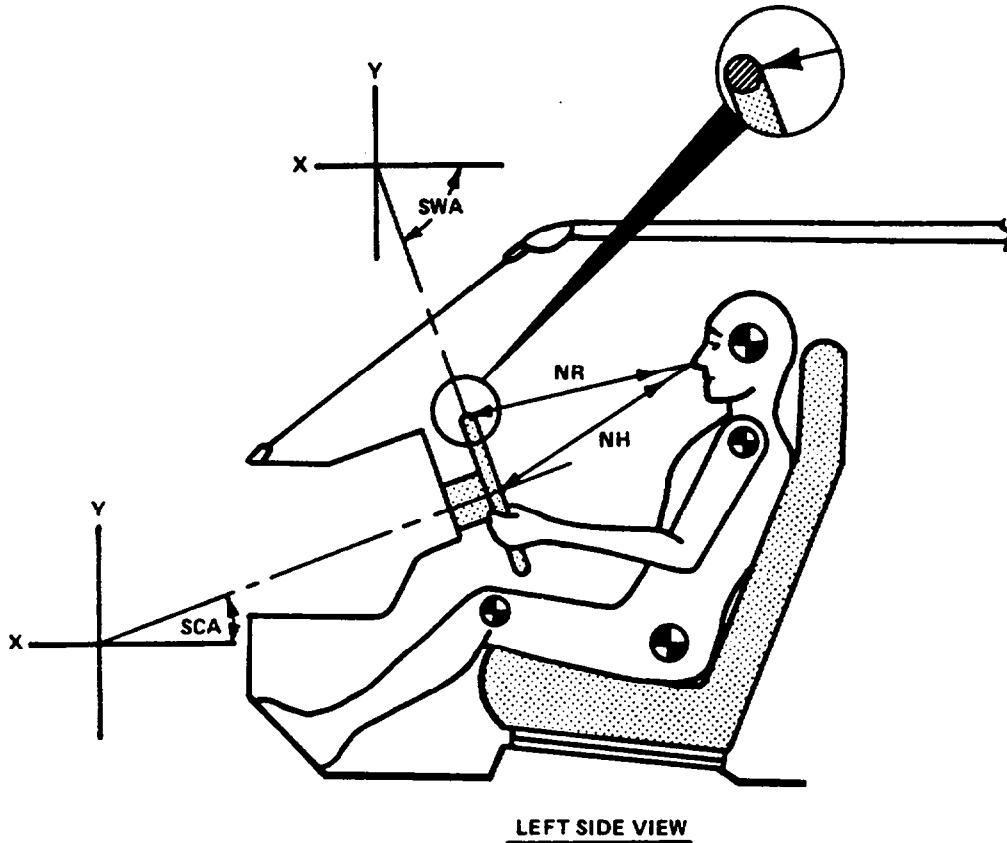
	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to belt upper edge	14.0	13.8
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	10.7	10.5
<u>LAP BELT TENSION</u>	2.0 lb	2.0 lbs
<u>SHOULDER BELT TENSION</u>	-	-

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>77.3"</u>	<u>77.5"</u>
Shoulder belt length as measured on part 572 Dummy	<u>37.3"</u>	<u>37.5"</u>
Lap belt length as measured on Part 572 Dummy.	<u>34.0"</u>	<u>34.0"</u>
<u>BELT SPOOL-OFF DATA:</u>		
As determined by film analysis.	<u>1.5"</u>	<u>1.5"</u>
As determined mechanically.	<u>1.0"</u>	<u>1.5"</u>
<u>BELT STRETCH DATA:</u>		
Measured electronically between shoulder belt load cell and the "D" ring.	<u>0.9 in/ft</u>	<u>0.3 in/ft</u>
Measured mechanically	<u>0.0"</u>	<u>0.0"</u>

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



	MEASUREMENTS	
<u>NR</u> -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	17.4	Inches
<u>NH</u> -- Distance from tip of dummy's nose to center of steering column hub	18.2	Inches
<u>SCA</u> -- Angle of steering column relative to the horizontal X axis	20	Degrees
<u>SWA</u> -- Angle of steering wheel relative to the horizontal X axis	-70	Degrees

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

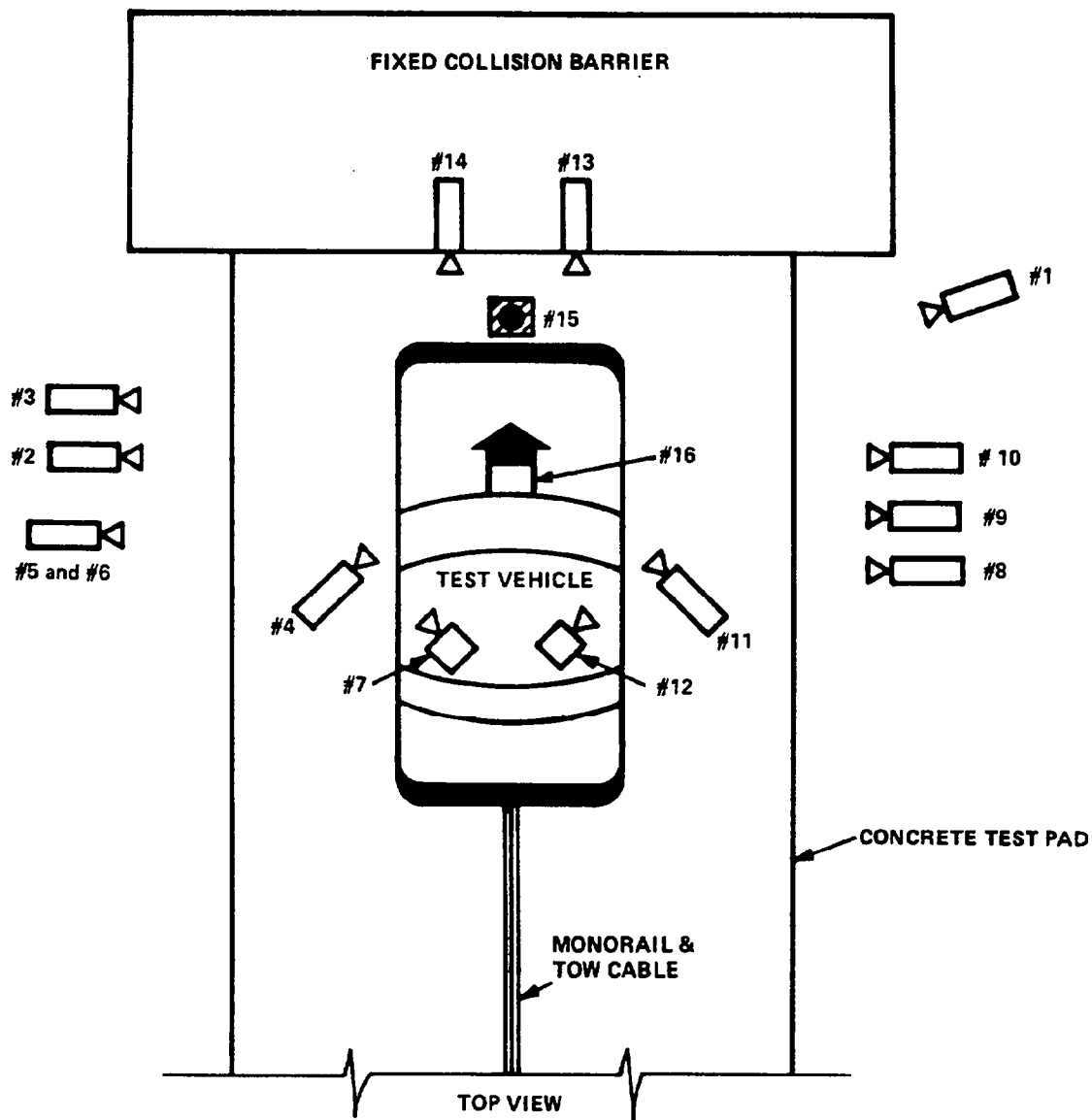


Table 4
HIGH-SPEED CAMERA LOCATIONS

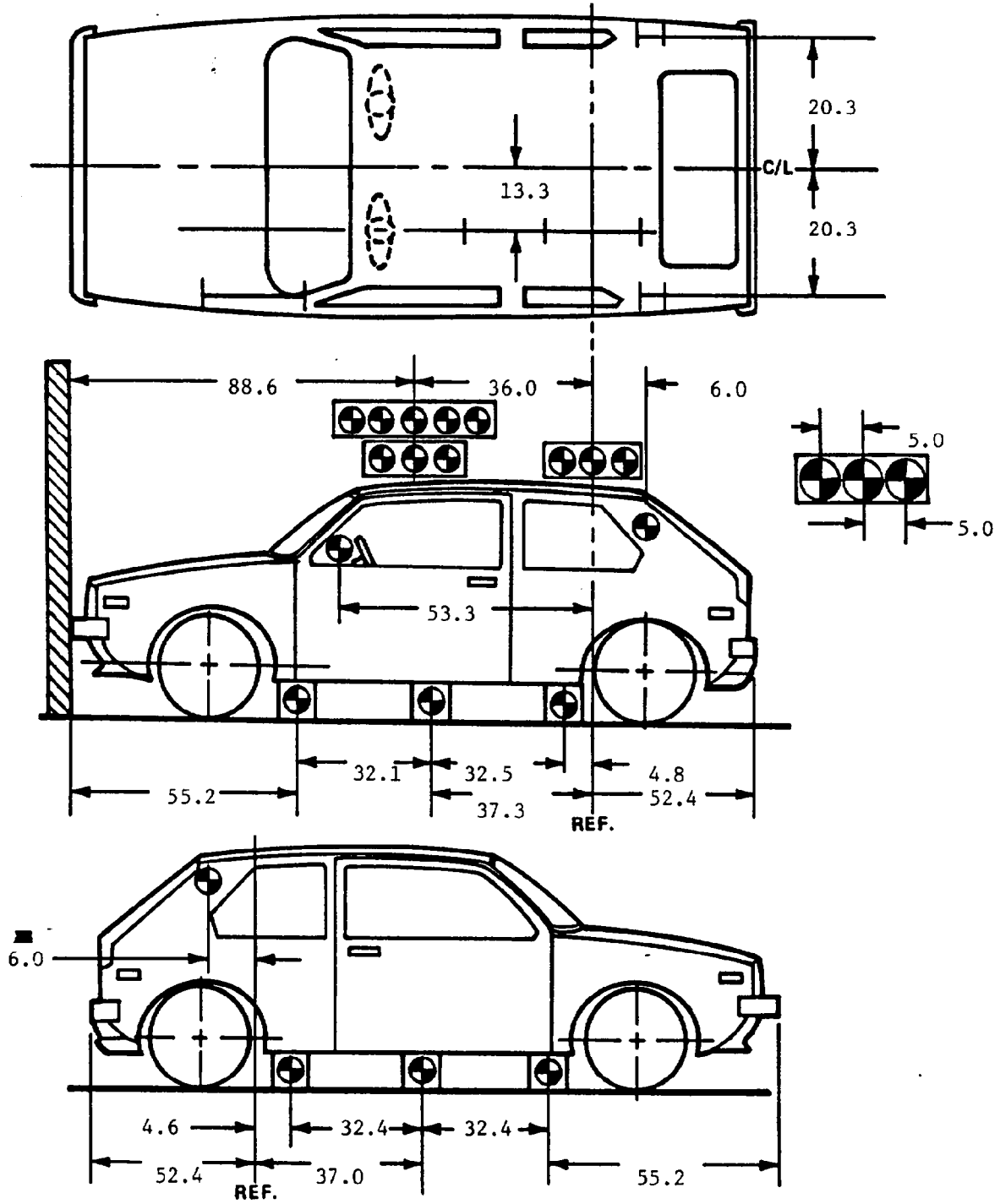
Test No. MK0200 Vehicle 1989 Ford Probe GL 2-Door Hatchback

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	237	53	41	-5°	220.5	490	
3	Left Side View	314	27	41	-3°	297.5	540	
4	Driver and Interior View	103	106	68	-19°	86.5	800	
5	Steering Column (Bottom)	311	69	46	-4°	294.5	550	
6	Steering Column (Top)	311	69	70	-10°	294.5	560	
7	Left Belt	-	-	-	-	-	550	
8	Overall Right Side	242.0	65	41.5	-4°	225.5	560	
9	Right Side View	307.0	43	41	-2°	290.5	700	
10	Right Passenger View	318.0	66	57	-3°	301.5	740	
11	Passenger and Interior View	95.0	112	68	-20°	78.5	610	
12	Right Belt	-	-	-	-	-	720	
13	Passenger Front View	24	-5	73	-39°	-	540	
14	Driver Front View	24	-5	73	-38°	-	490	
15	Windshield View	0	0	126	-45°	-	540	
16	Pit View of Engine	0	32	-120	90°	-	920	

* 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

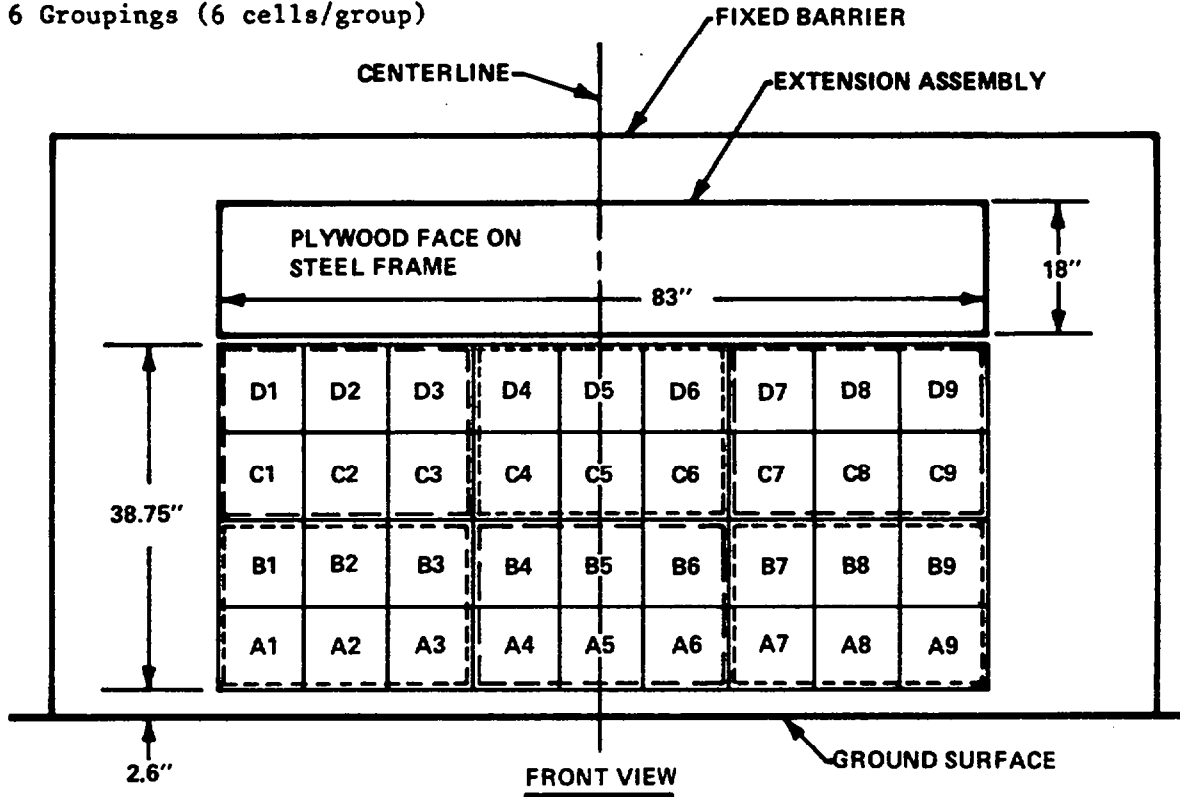
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells

4 Rows

9 Columns

6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

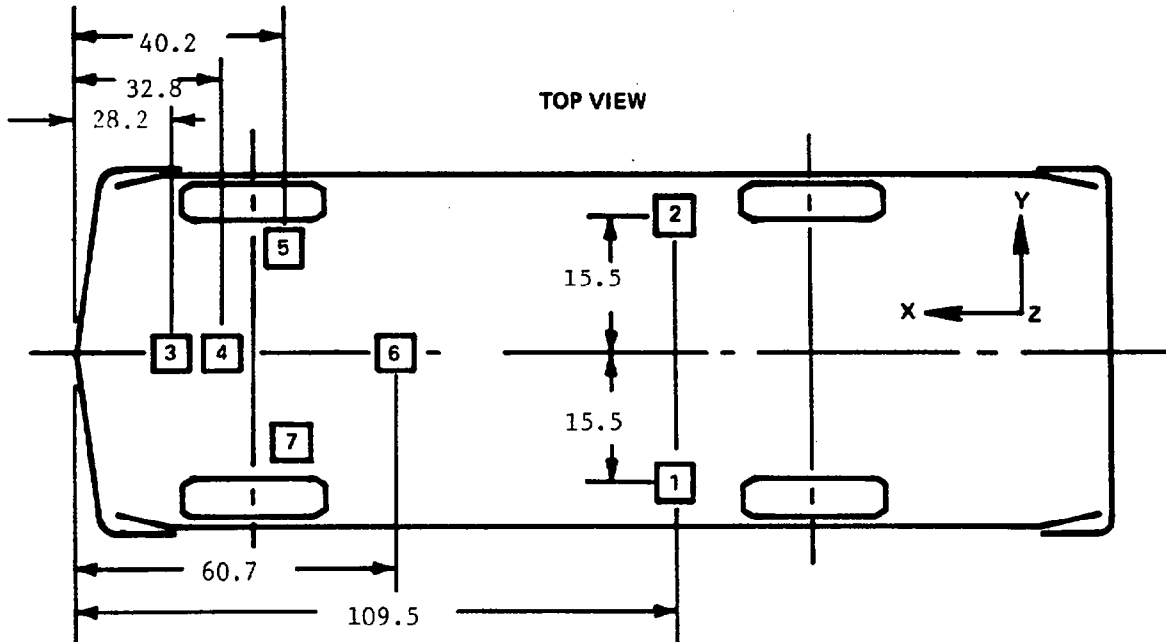
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

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	Instrument Panel	X		
7	Left Disc Brake Caliper	X		

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

Figure 9

TEST VEHICLE MEASUREMENTS

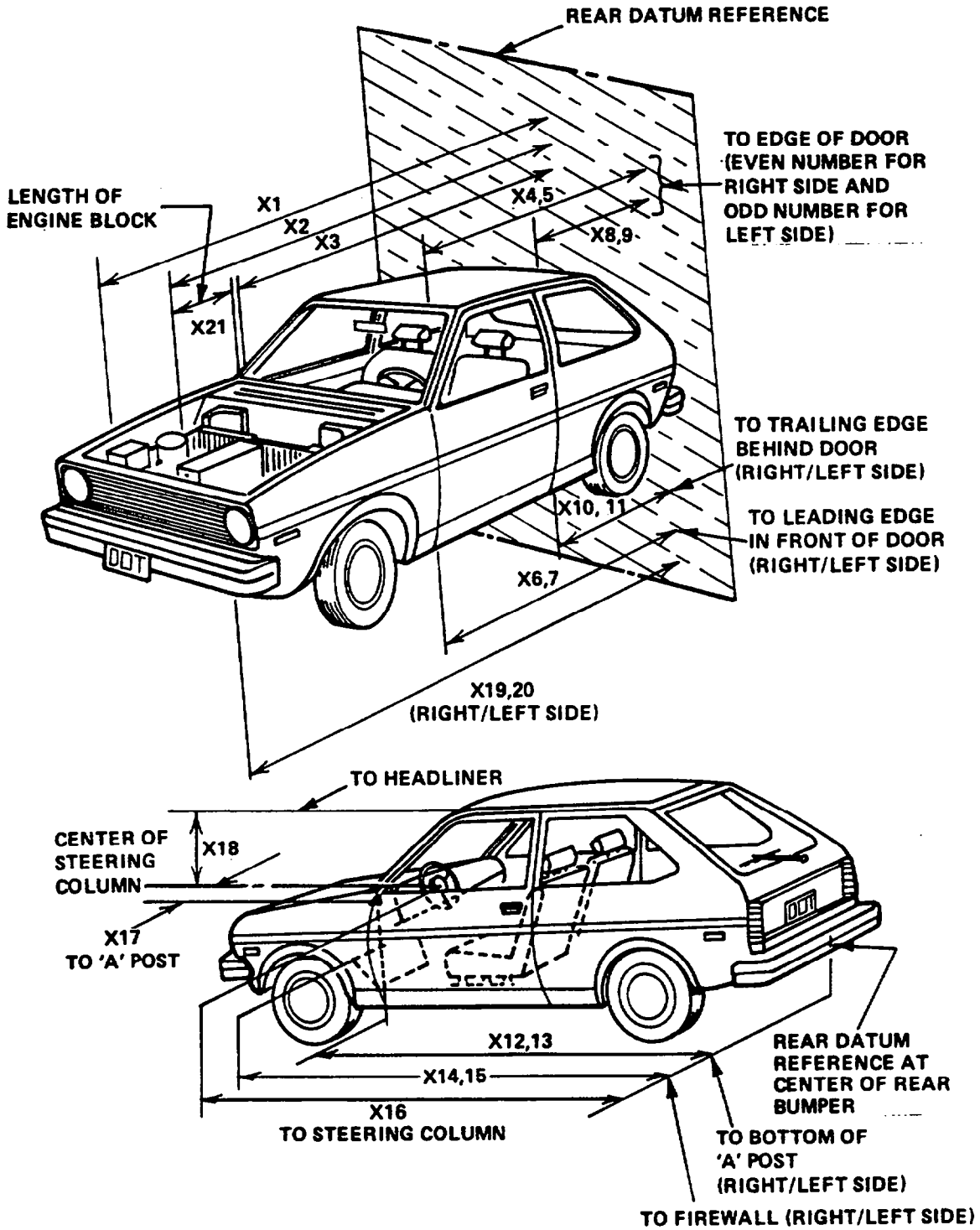


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	177.0	155.5	21.5
X2	Rear Surface of Vehicle to Front of Engine	150.8	143.1	7.7
X3	Rear Surface of Vehicle to Firewall	129.9	128.0	1.9
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	118.3	116.9	1.4
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	118.3	117.8	0.5
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	117.8	117.8	0.0
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	117.5	118.0	-0.5
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	67.5	66.0	1.5
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	67.4	66.8	0.6
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	71.2	71.3	-0.1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	71.1	71.5	-0.4
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	117.6	117.9	-0.3
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	117.5	118.2	-0.7
X14	Rear Surface of Vehicle to Firewall, Right Side	130.1	127.6	2.5
X15	Rear Surface of Vehicle to Firewall, Left Side	130.6	129.2	1.4
X16	Rear Surface of Vehicle to Steering Column	102.4	100.8	1.6
X17	Center of Steering Column to "A" Post	17.0	16.4	0.6
X18	Center of Steering Column to Headliner	15.8	15.3	0.5
X19	Rear Surface of Vehicle to Right Side of Front Bumper	173.7	155.2	18.5
X20	Rear Surface of Vehicle to Left Side of Front Bumper	174.5	156.3	18.2
X21	Length of Engine Block	13.0	13.0	0.0

Appendix A
PHOTOGRAPHS



Figure A-1 PRE-TEST FRONT VIEW

A-2

7731-7

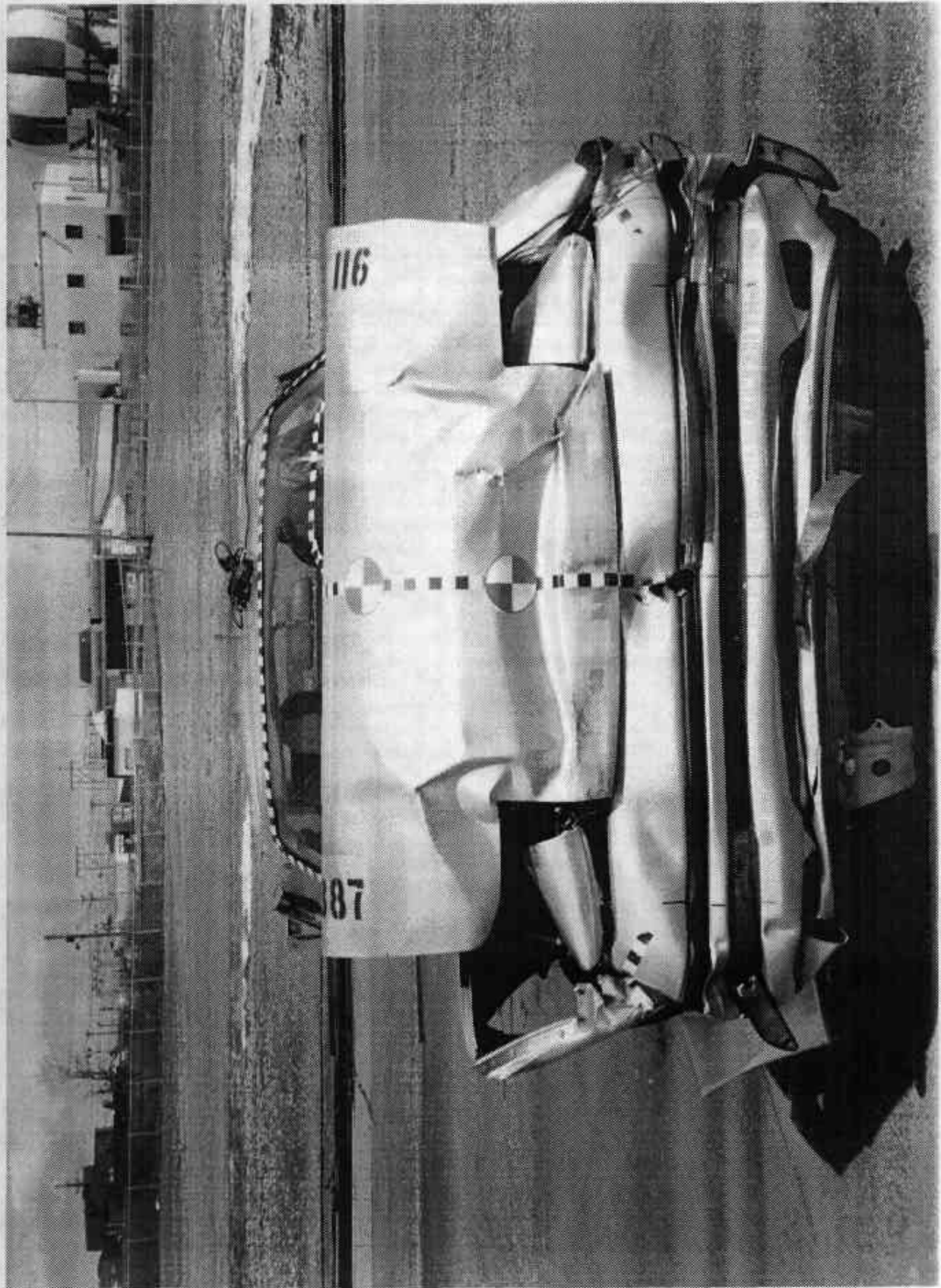


Figure A-2 POST-TEST FRONT VIEW

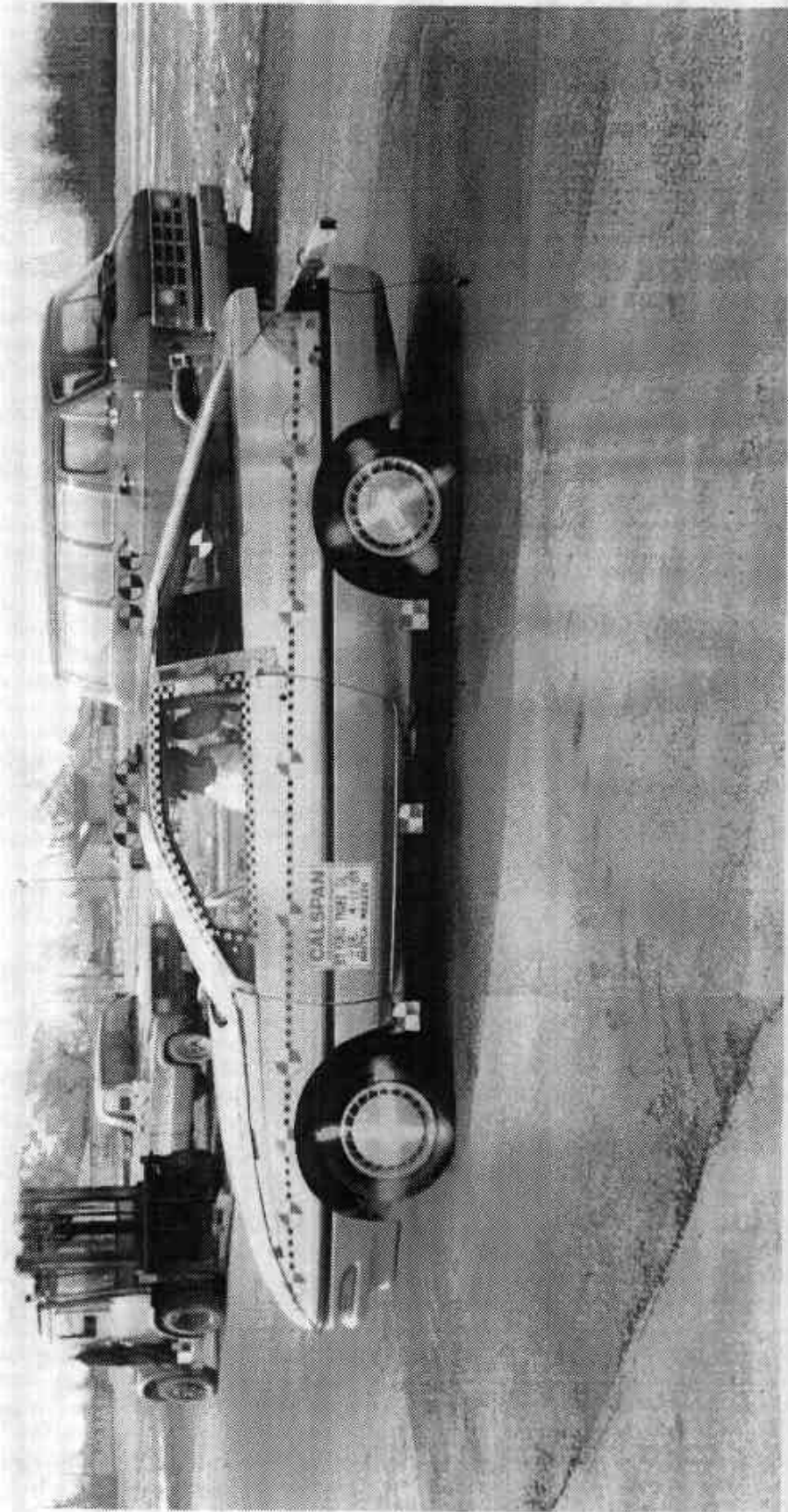


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-4

7731-7



Figure A-4 POST-TEST LEFT SIDE VIEW

A-5

7731-7

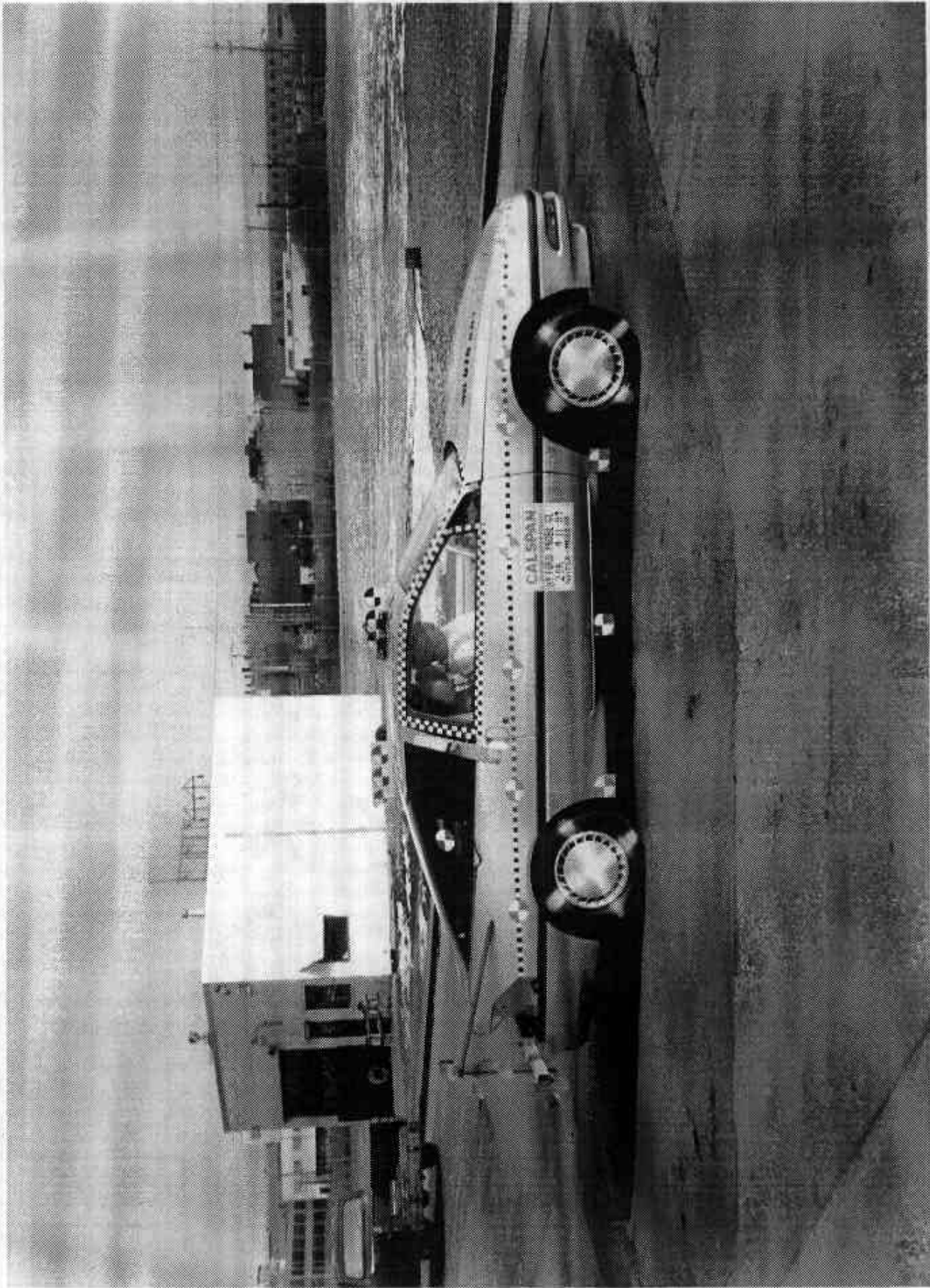


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-6

7731-7

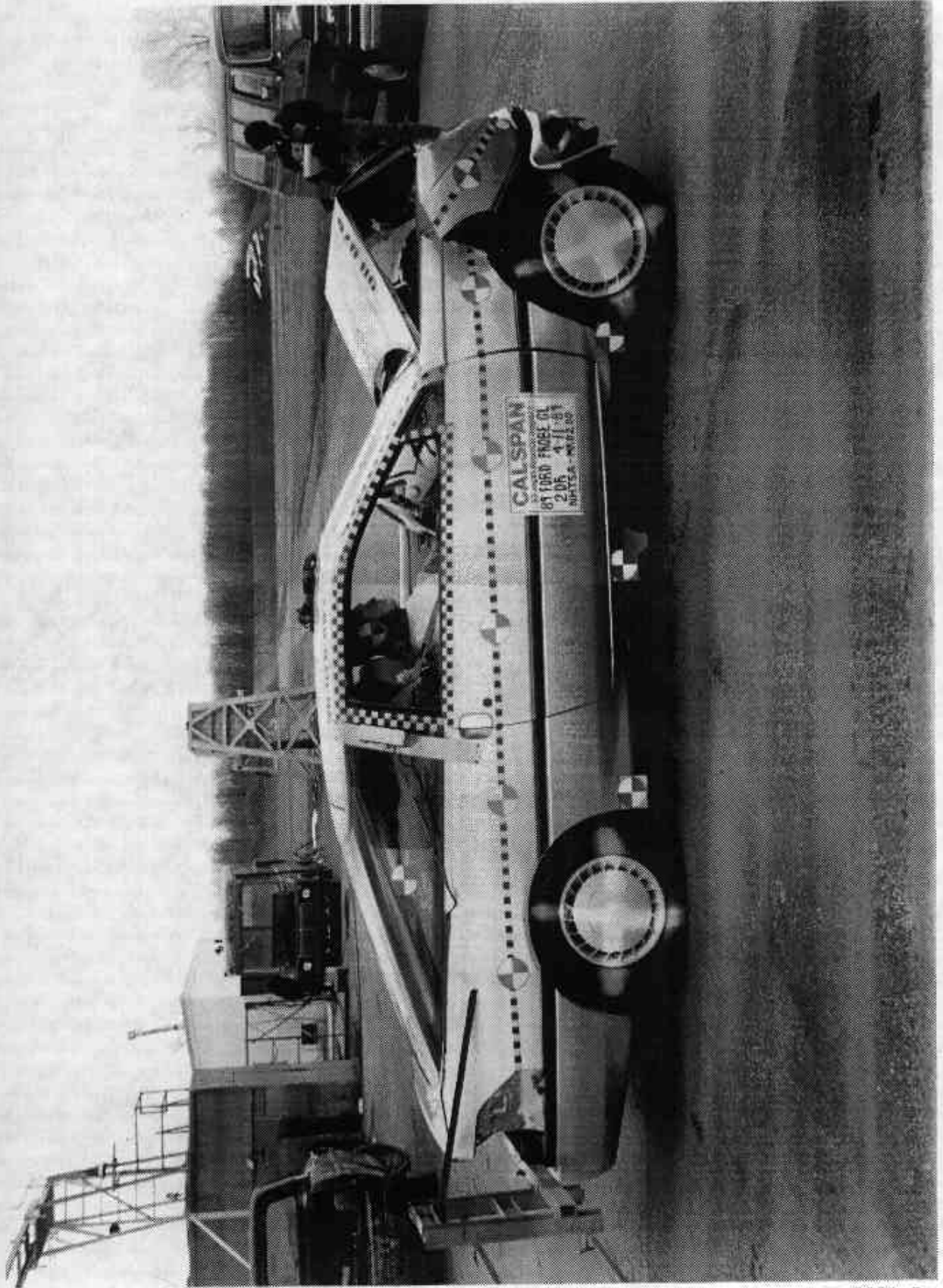


Figure A-6 POST-TEST RIGHT SIDE VIEW

A-7

7731-7



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

A-8

7731-7

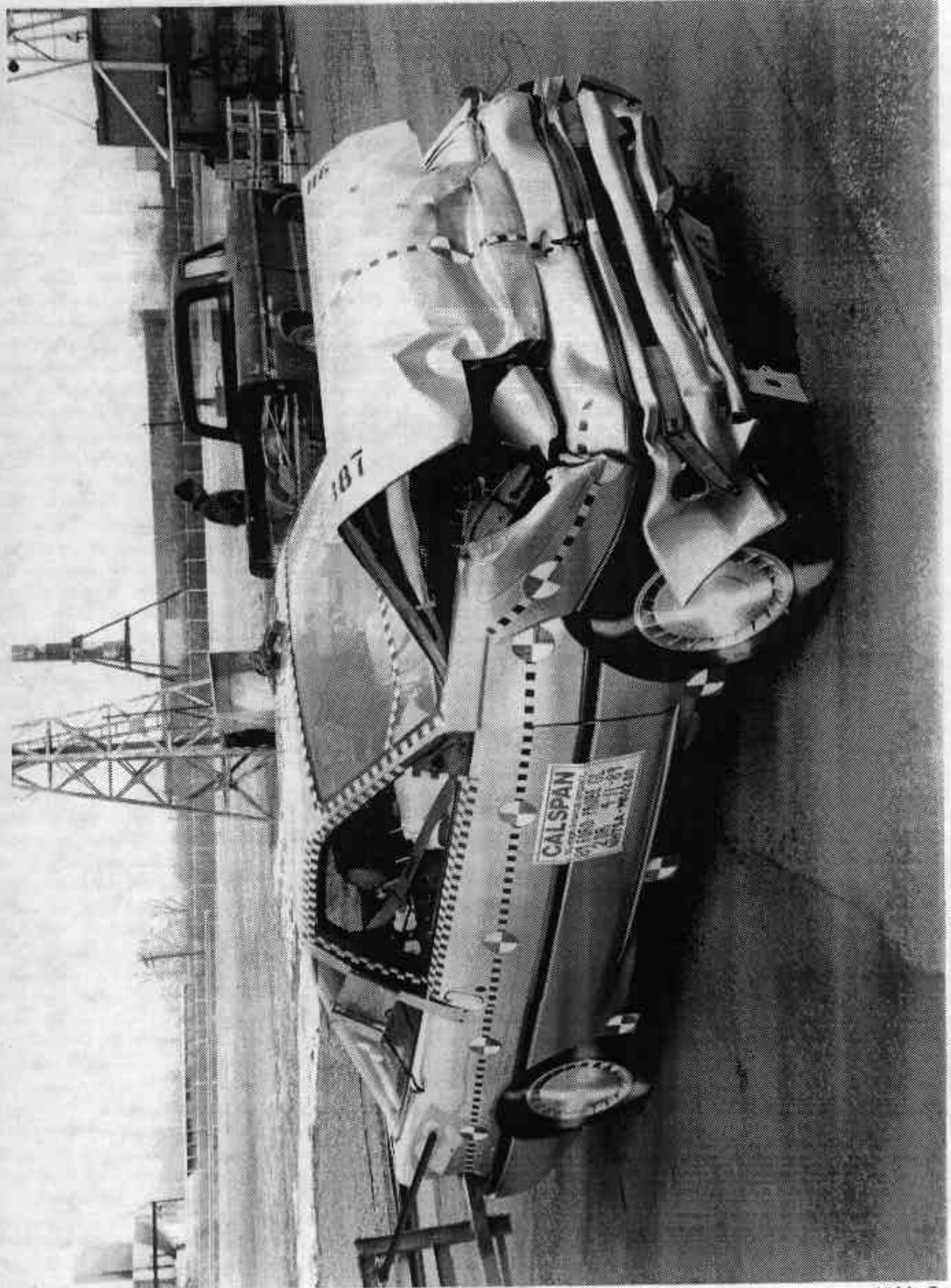


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-9

7731-7



A-10

7731-7

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

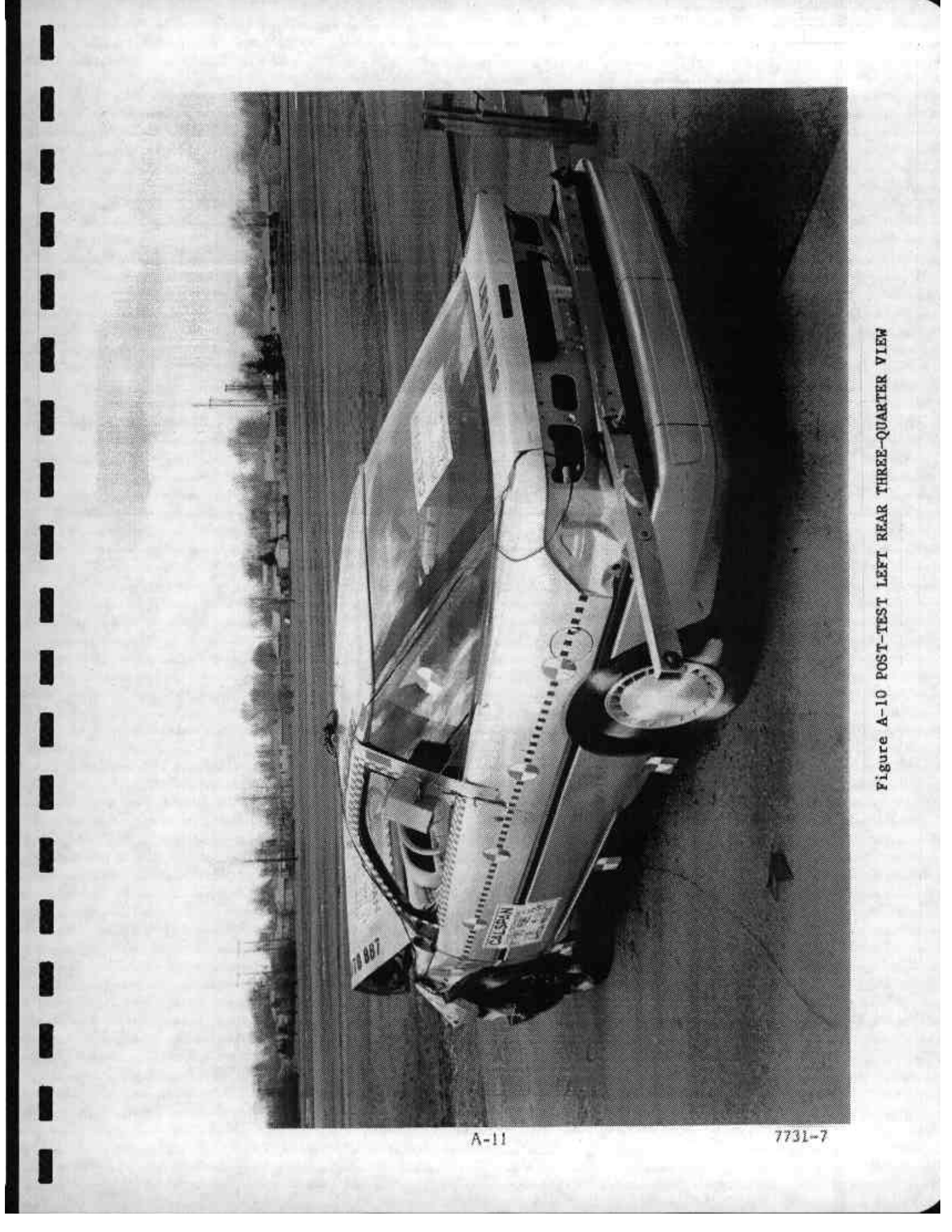


Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

A-11

773L-7

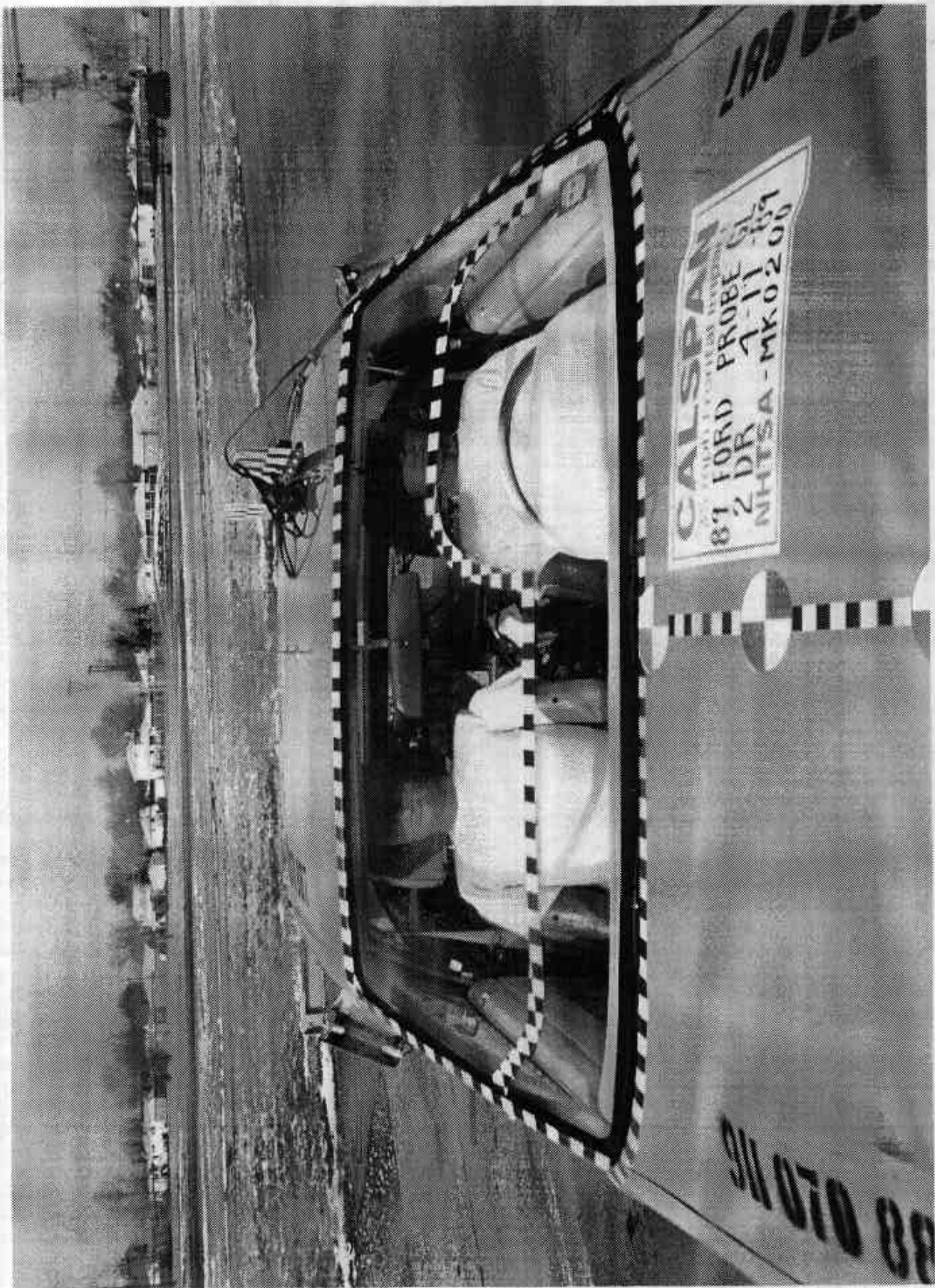


Figure A-11 PRE-TEST WINDSHIELD VIEW

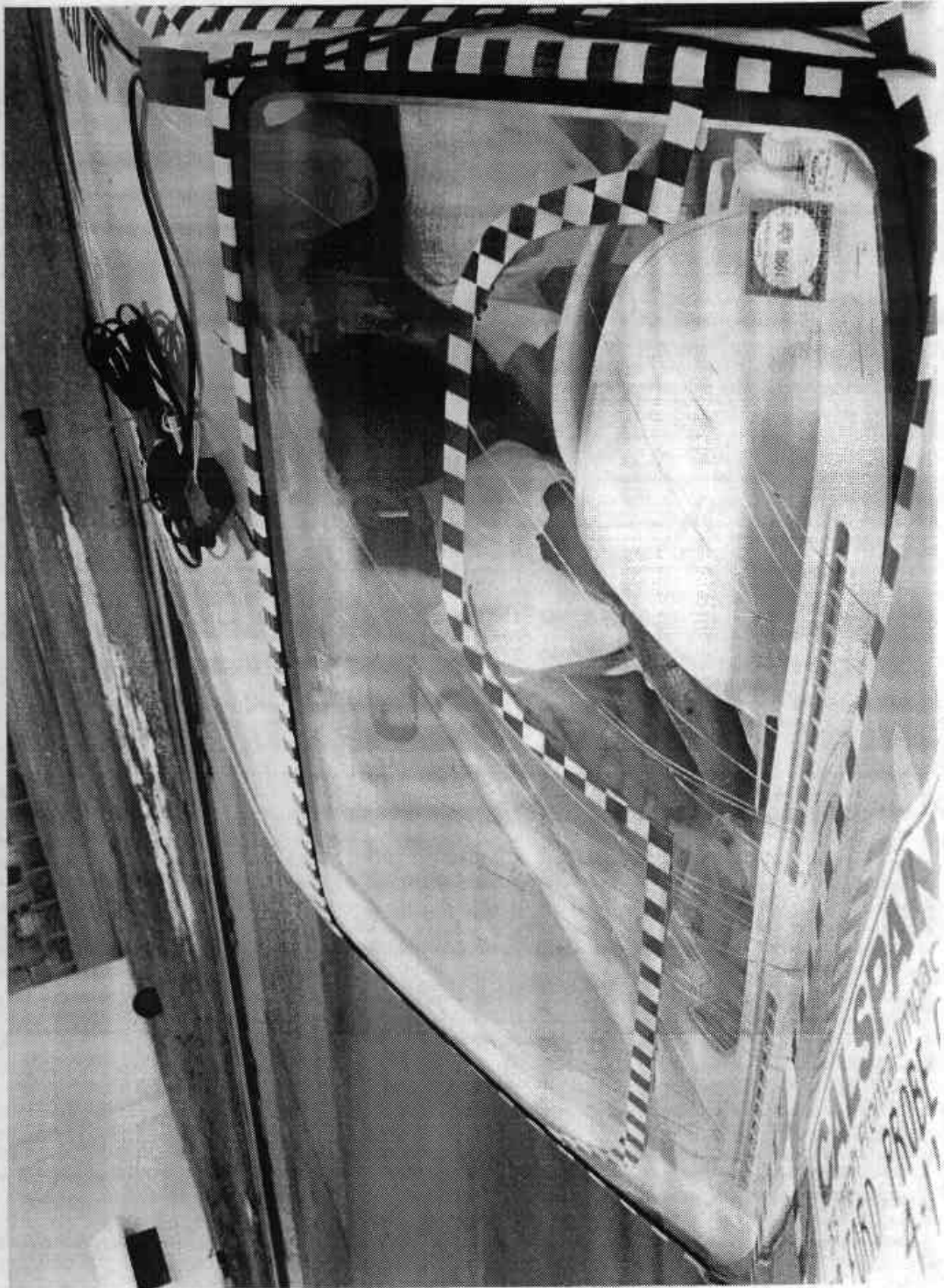
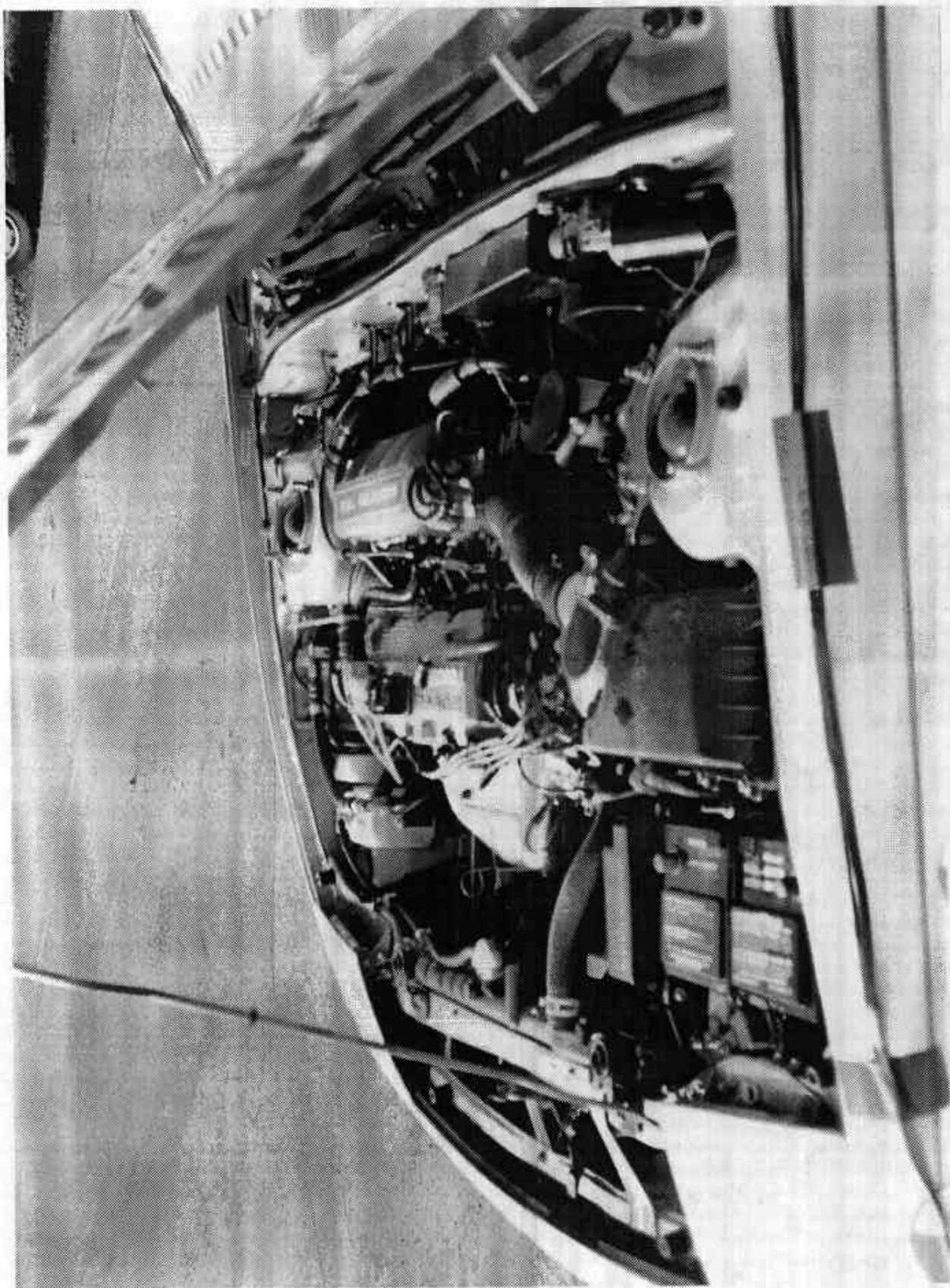


Figure A-12 POST-TEST WINDSHIELD VIEW

A-13

7731-7



A-14

7731-7

Figure A-13 PRE-TEST ENGINE COMPARTMENT VIEW

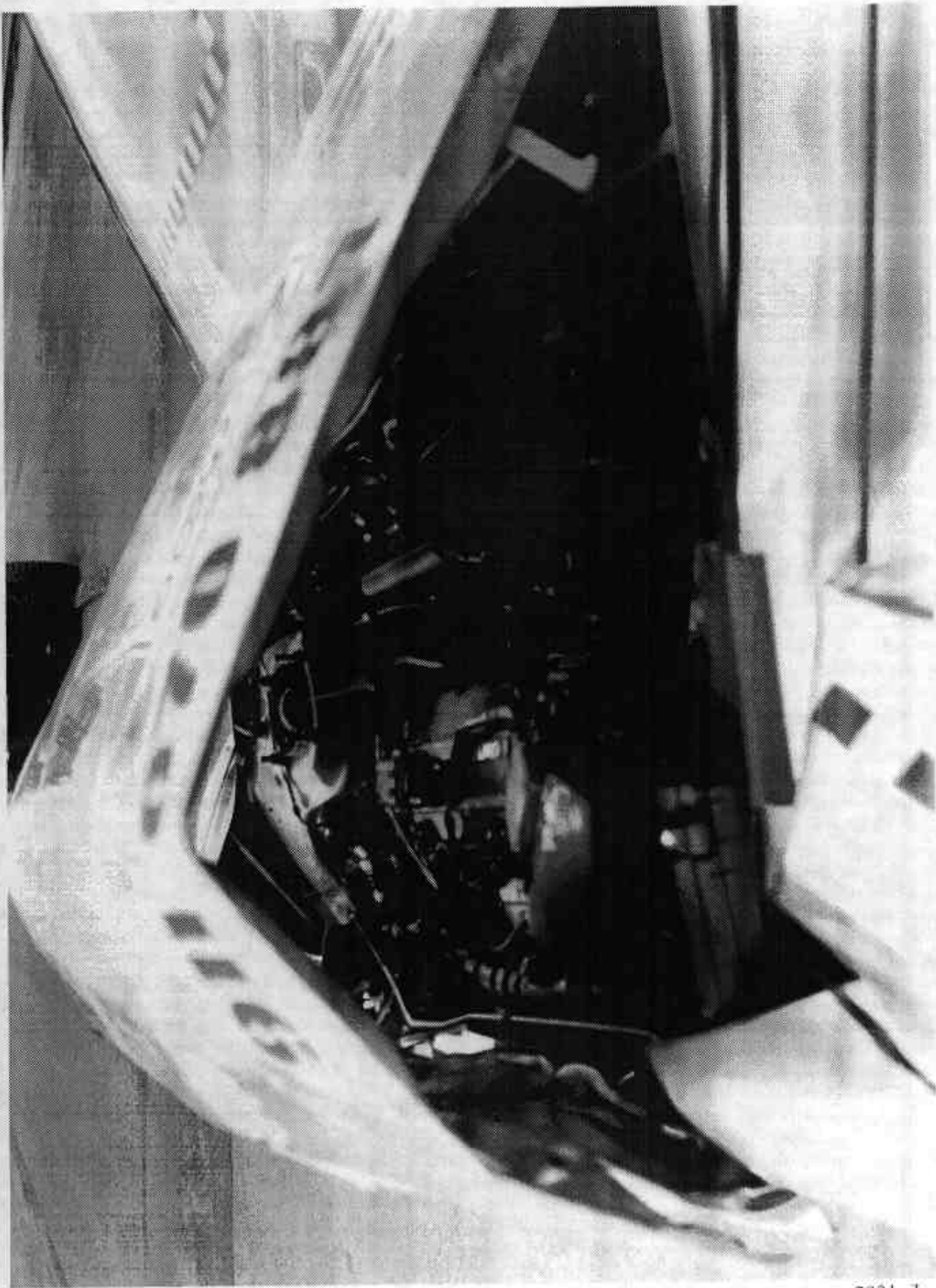


Figure A-14 POST-TEST ENGINE COMPARTMENT VIEW

A-15

7731-7



Figure A-15 PRE-TEST FUEL CAP VIEW

A-16

7731-7

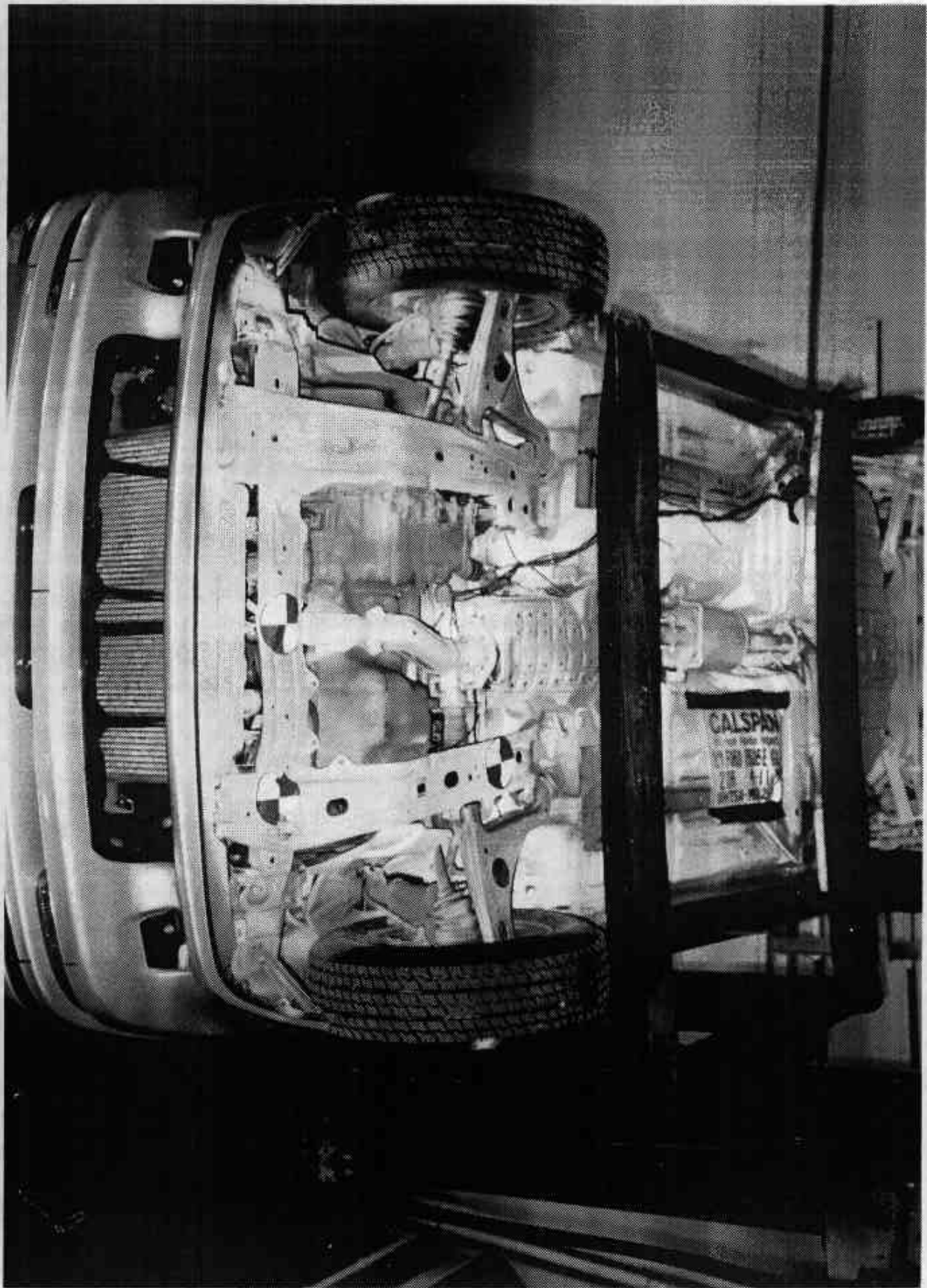


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

A-17

7731-7

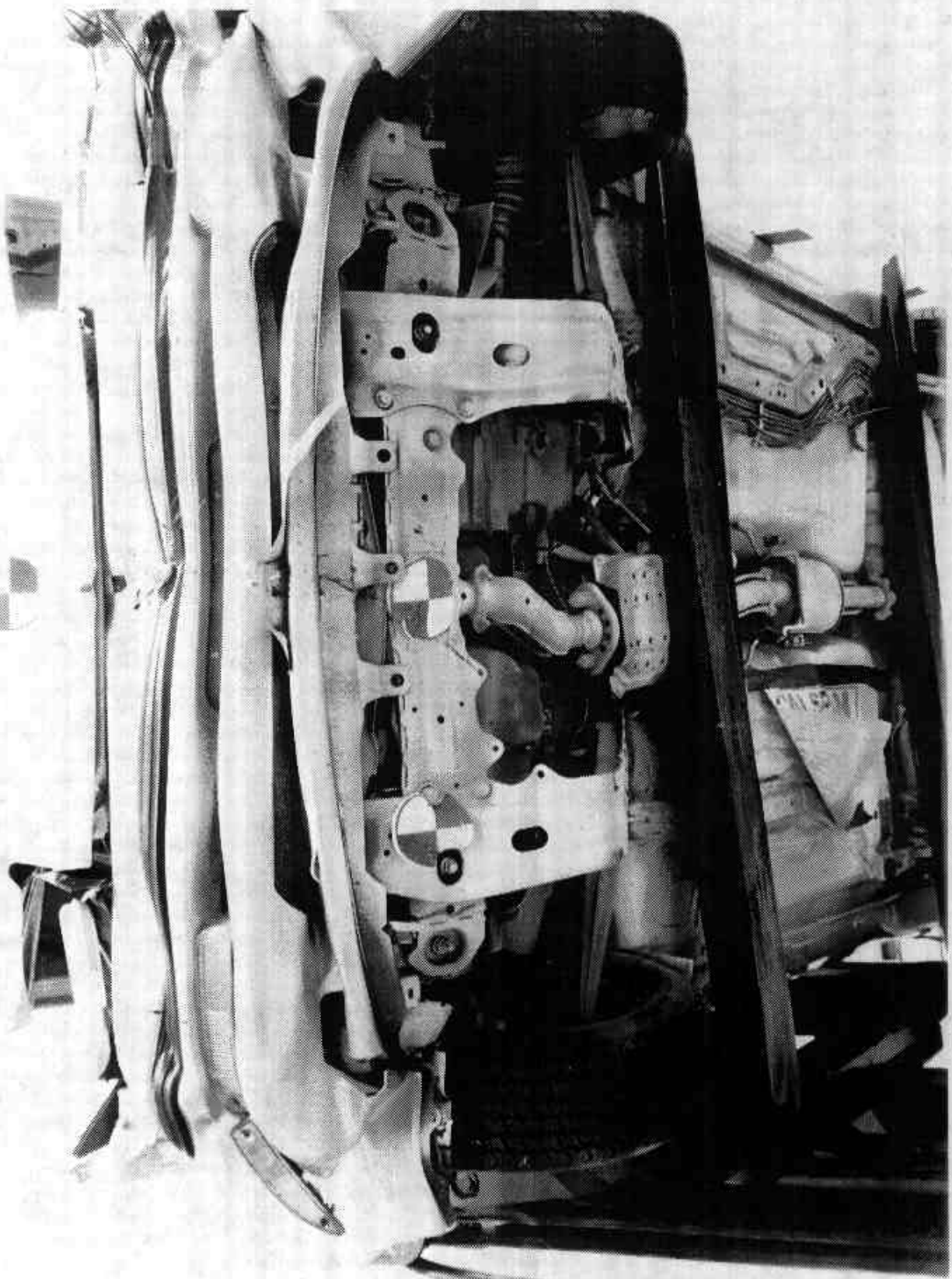


Figure A-17 POST-TEST FRONT UNDERBODY VIEW

A-18

7731-7

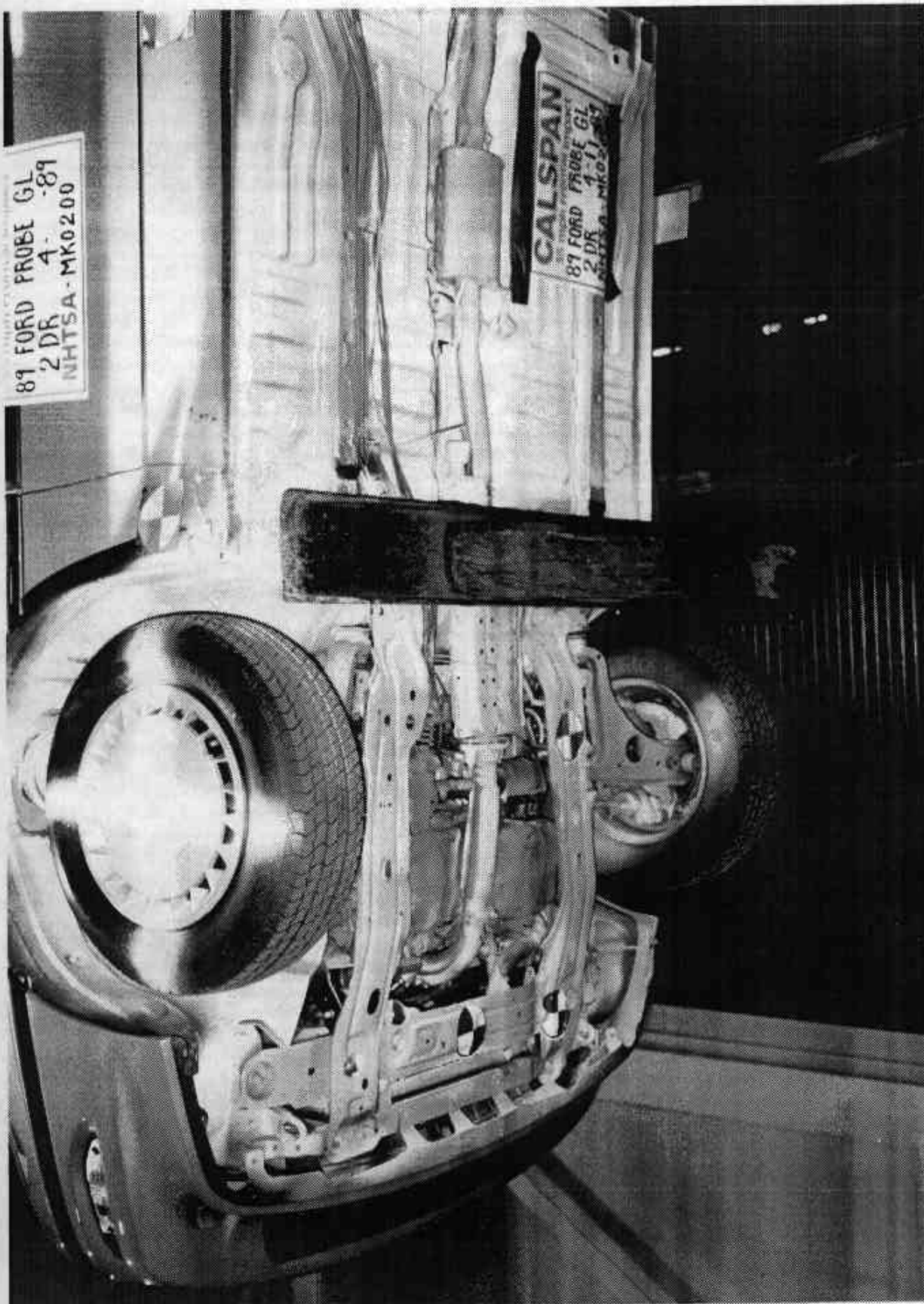


Figure A-18 PRE-TEST FRONT-SIDE UNDERBODY VIEW

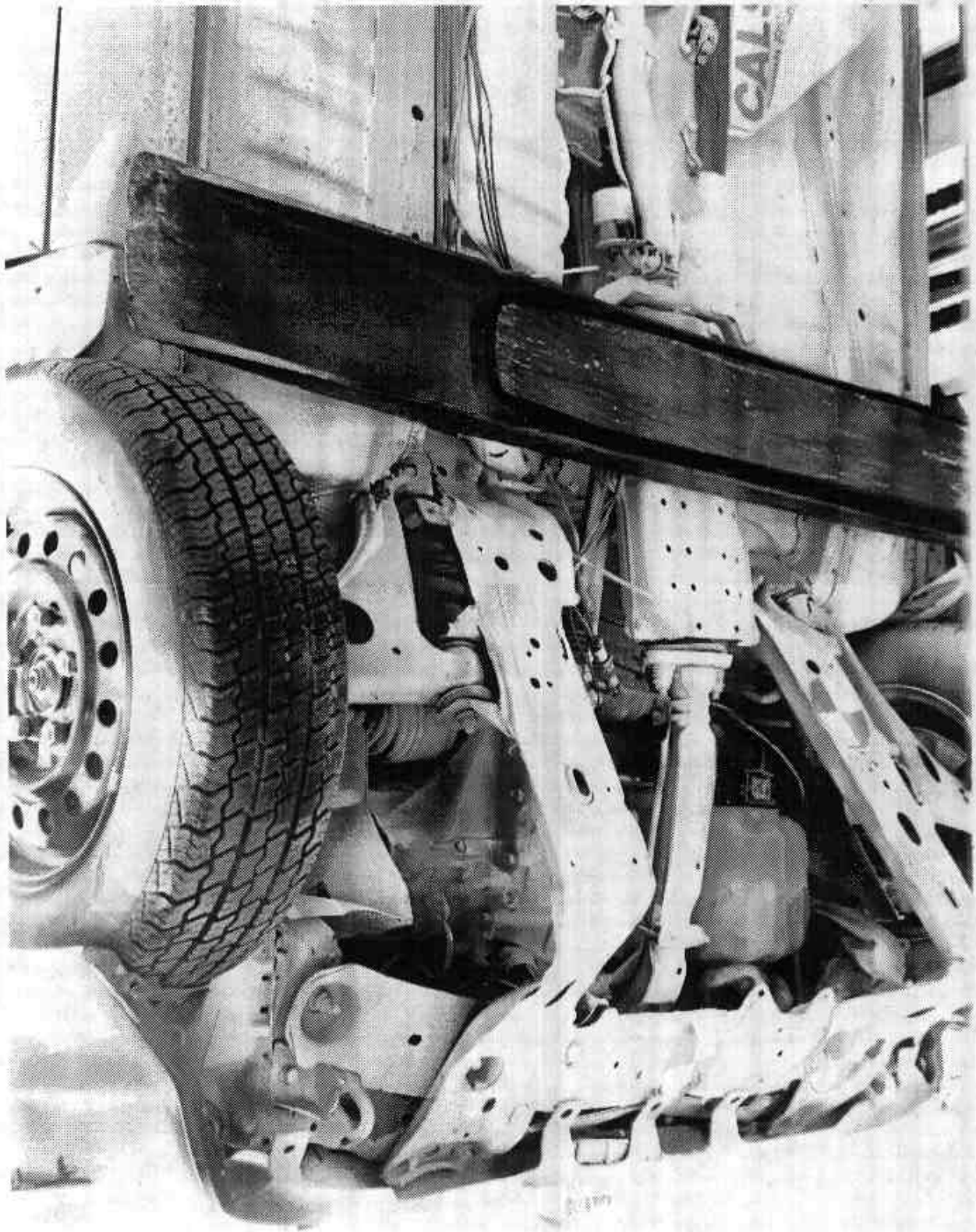


Figure A-19 POST-TEST FRONT-SIDE UNDERBODY VIEW

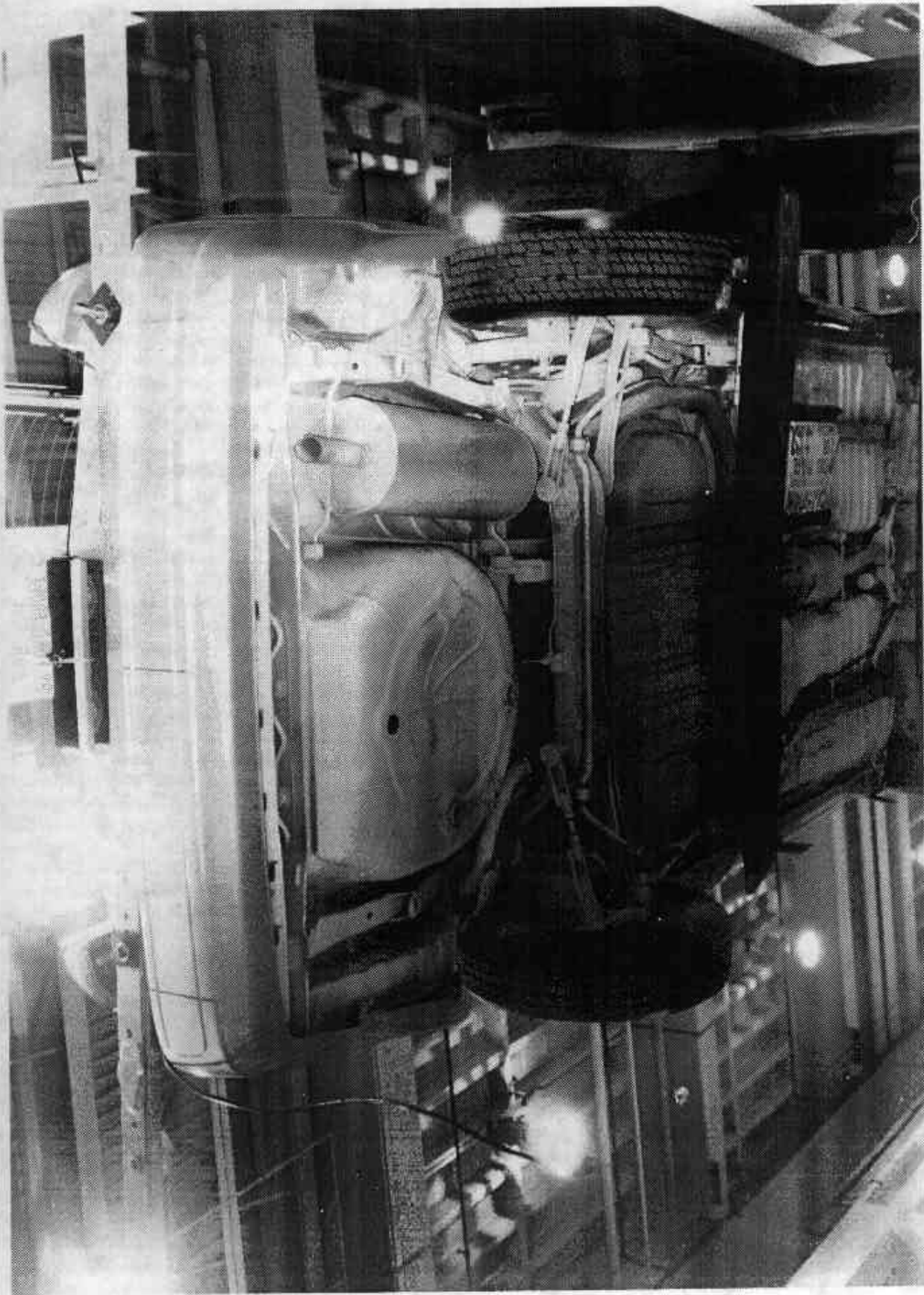


Figure A-20 PRE-TEST REAR UNDERBODY VIEW

A-21

7731-7

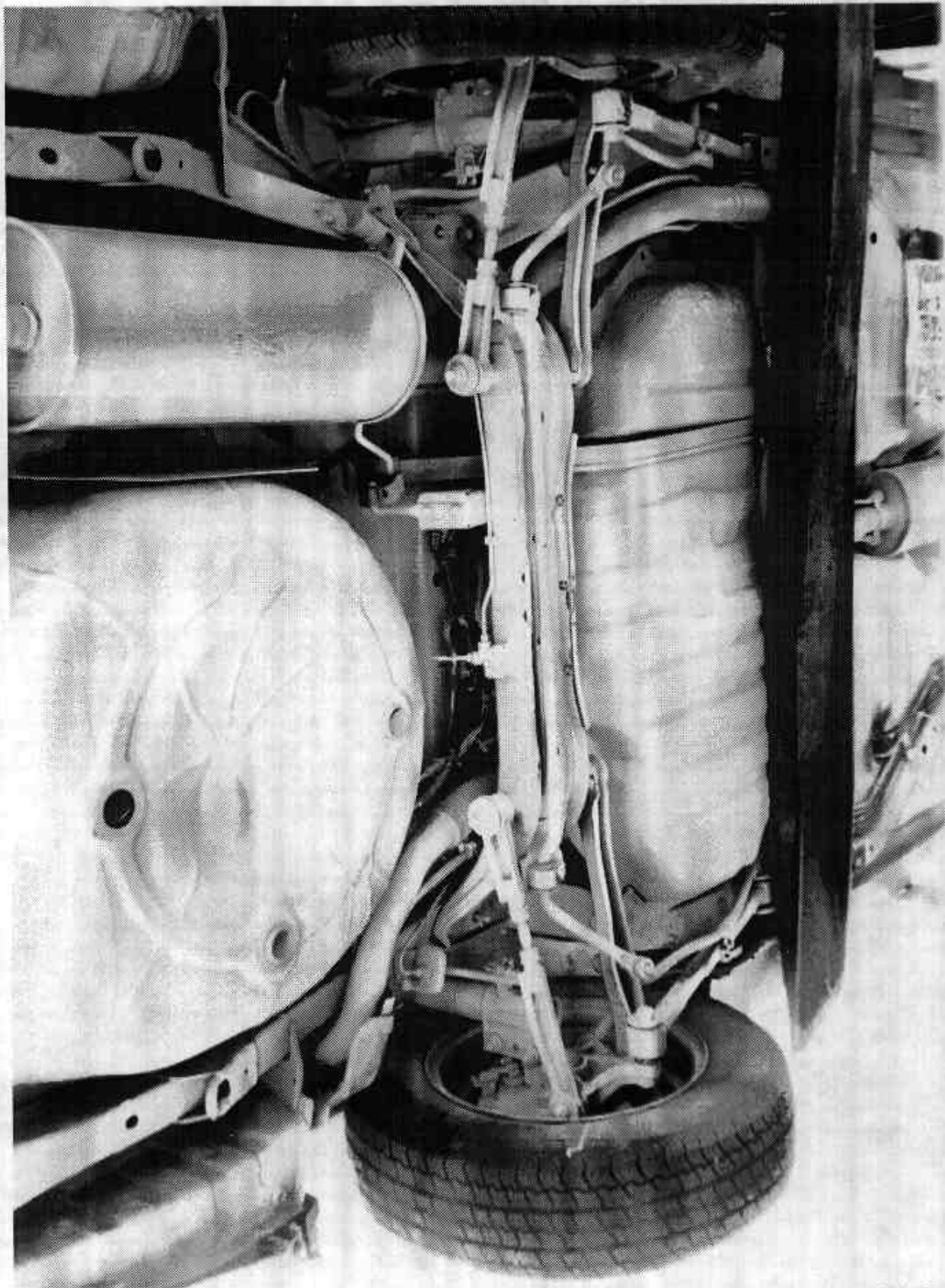


Figure A-21 POST-TEST REAR UNDERBODY VIEW

A-27

7731-7

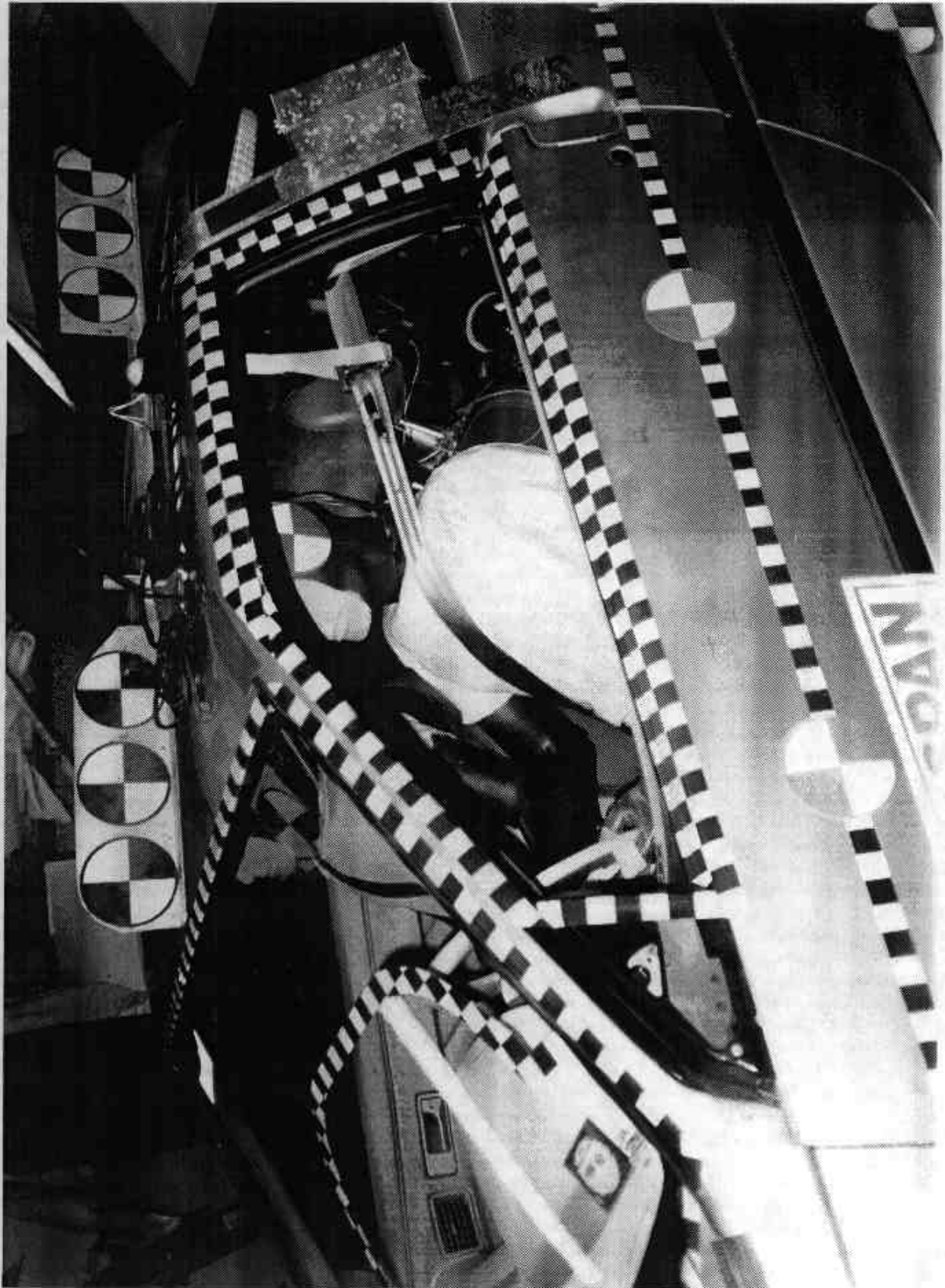


Figure A-22 PRE-TEST DRIVER POSITION VIEW

A-23

7731-7

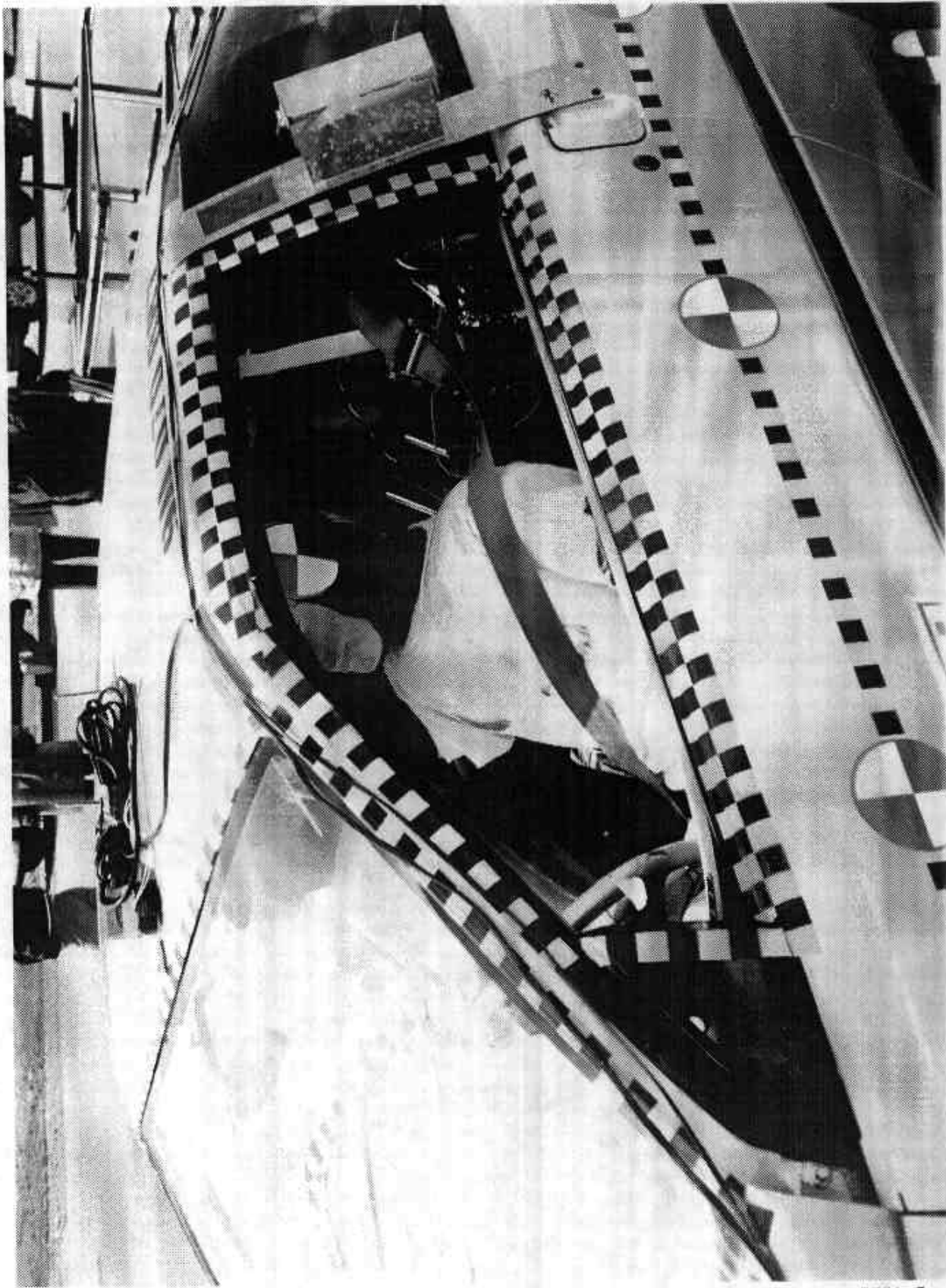


Figure A-23 POST-TEST DRIVER POSITION VIEW

A-24

7731-7



Figure A-24 PRE-TEST PASSENGER POSITION VIEW

A-25

7731-1



Figure A-25 POST-TEST PASSENGER POSITION VIEW

A-26

7731-7

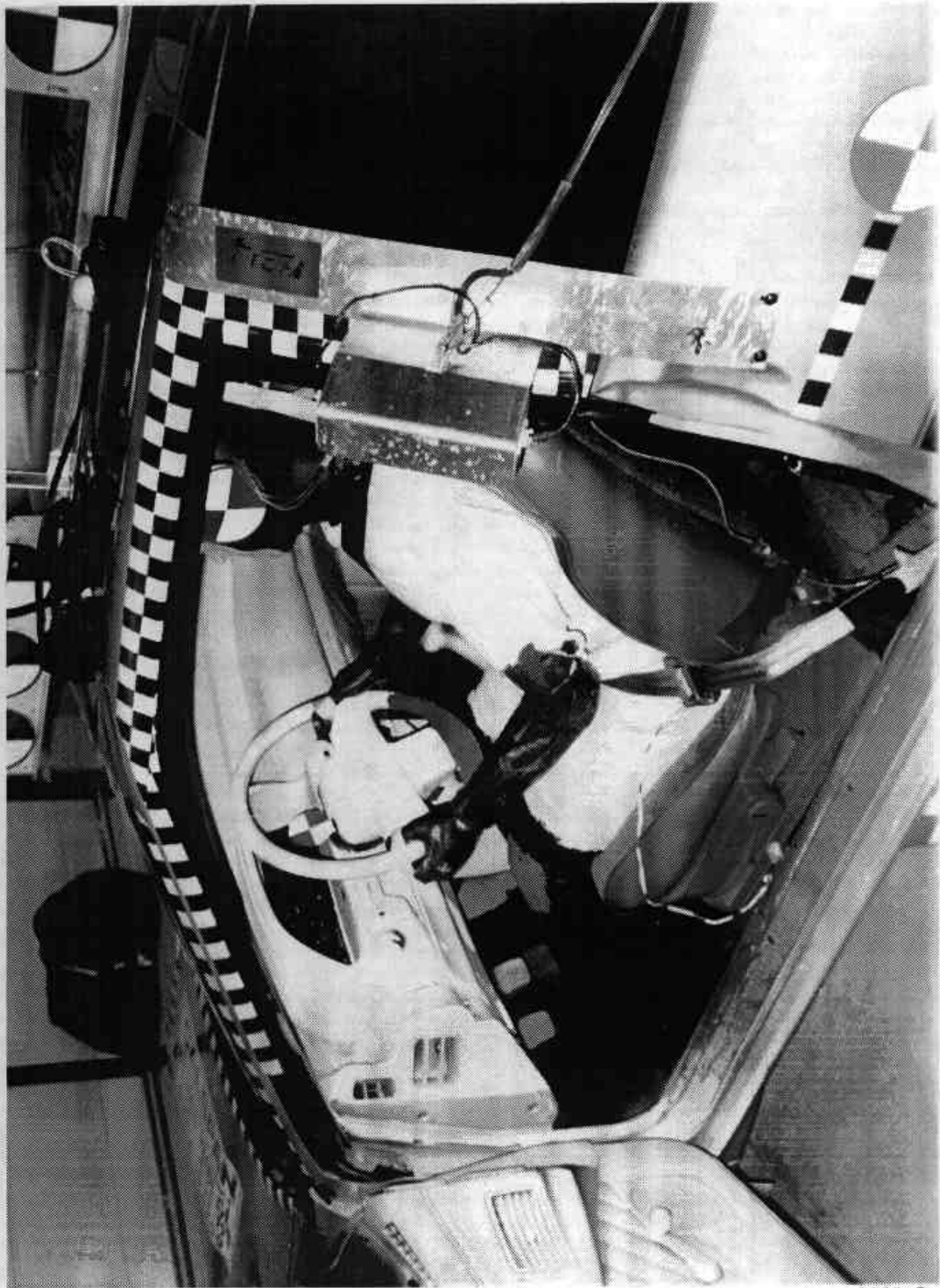


Figure A-26 PRE-TEST DRIVER AND INTERIOR VIEW

A-27

7731-7



Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW

A-28

7731-7



Figure A-28 PRE-TEST PASSENGER AND INTERIOR VIEW

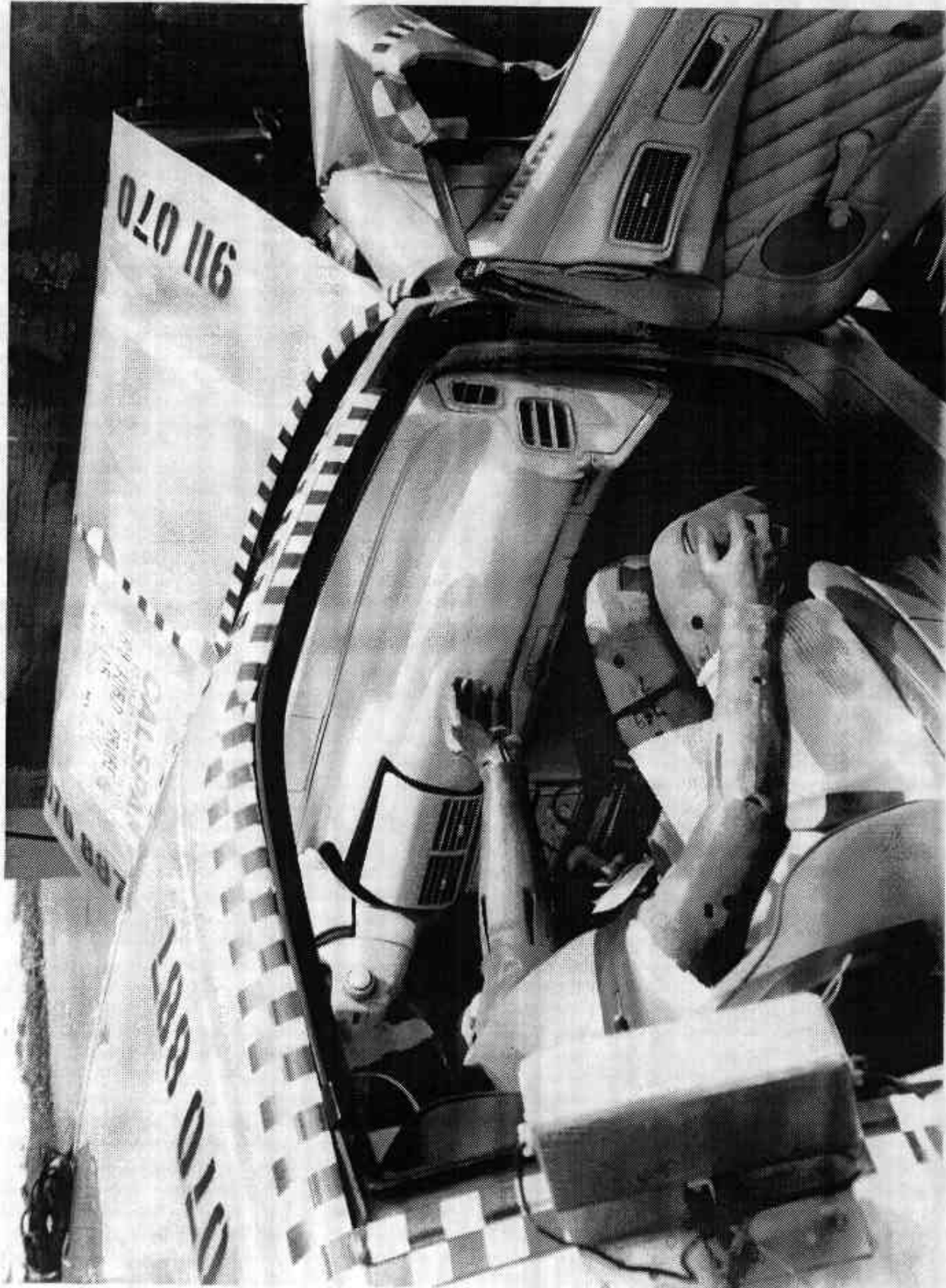


Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW

Appendix B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

TEST NO. MK0200

VEHICLE DATA

FILTER CHANNEL CLASS

60

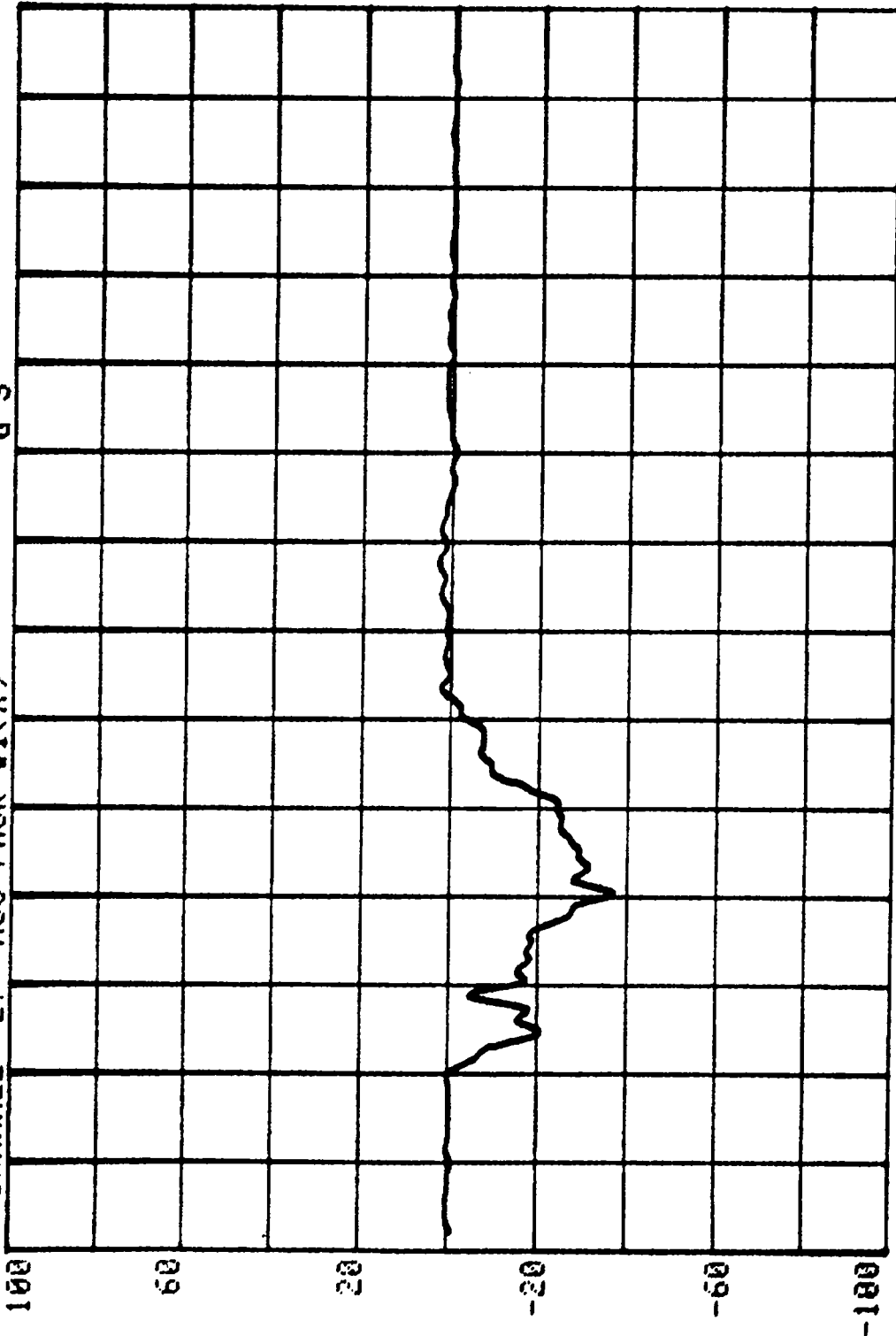
B-2

7731-7

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

RUN= 887

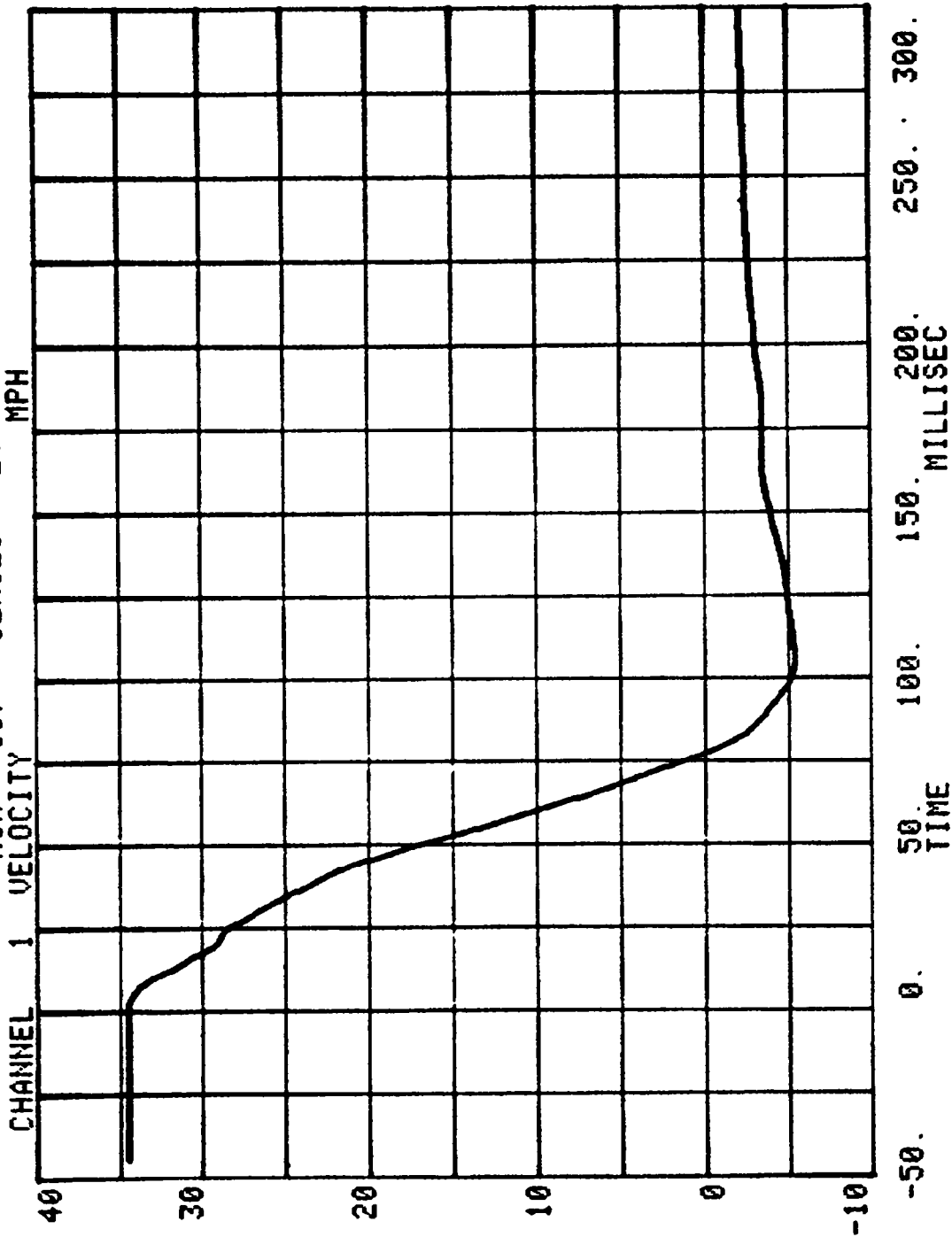
SERIES= 200



ACCEL #1(X)

CHANNEL 1 VELOCITY SERIES= 200 MPH

RUN= 887

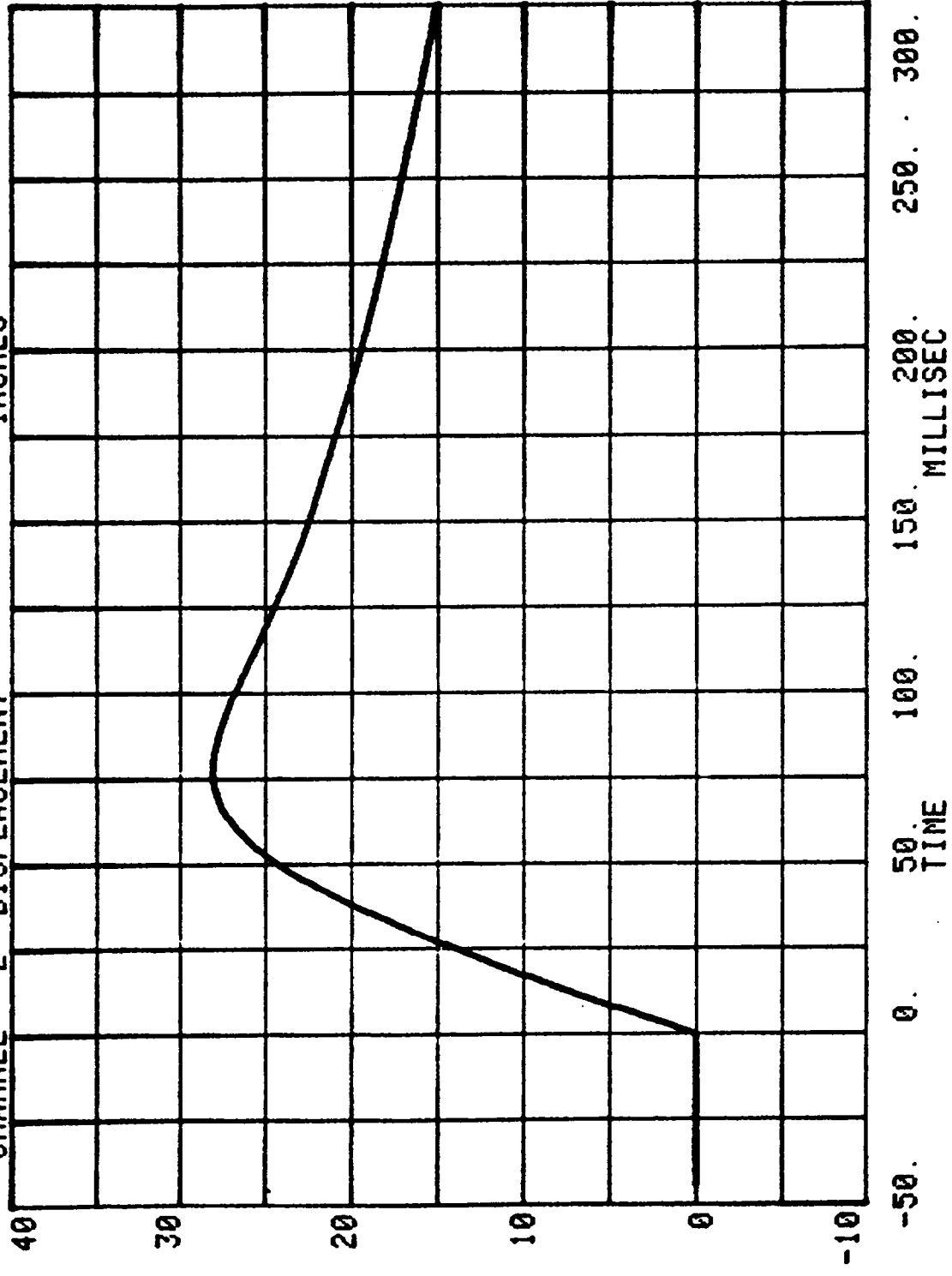


ACCEL #1(X)

SERIES= 200 INCHES

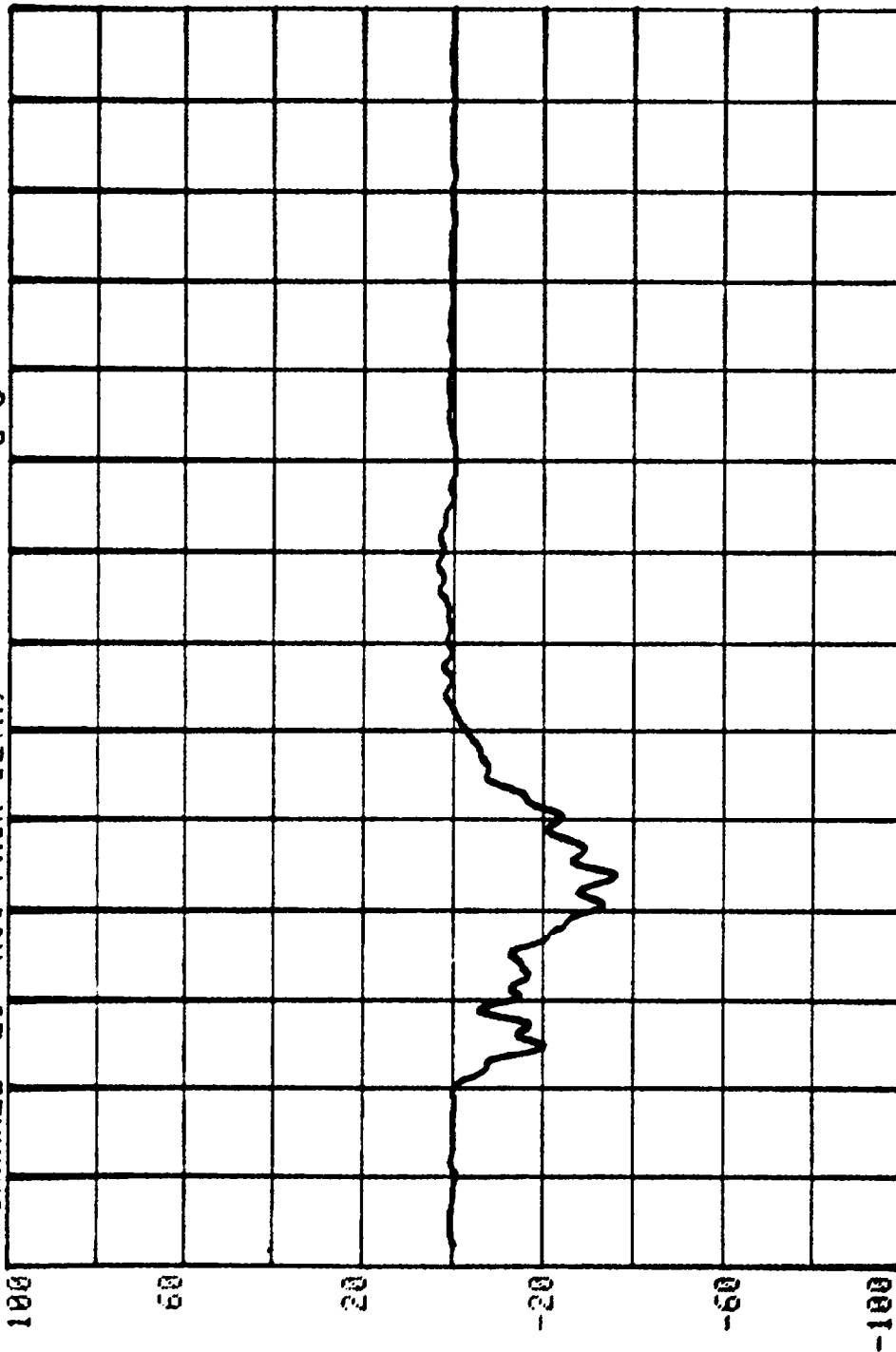
RUN= 887

CHANNEL 2 DISPLACEMENT



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

RUN= 887 SERIES= 200

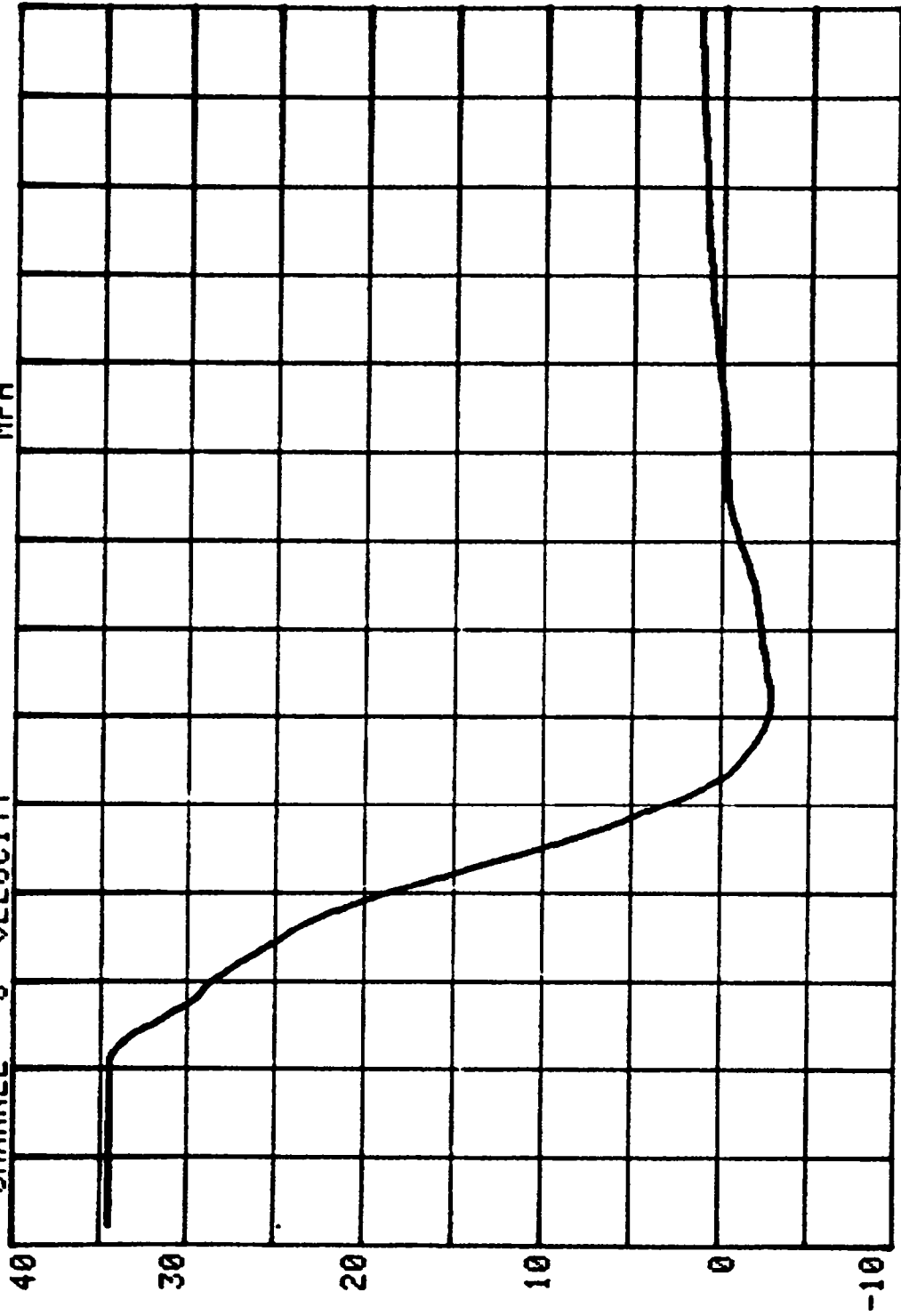


ACCEL #2 (X)

SERIES= 200 MPH

RUN= 887

CHANNEL 3 VELOCITY



250. 300.

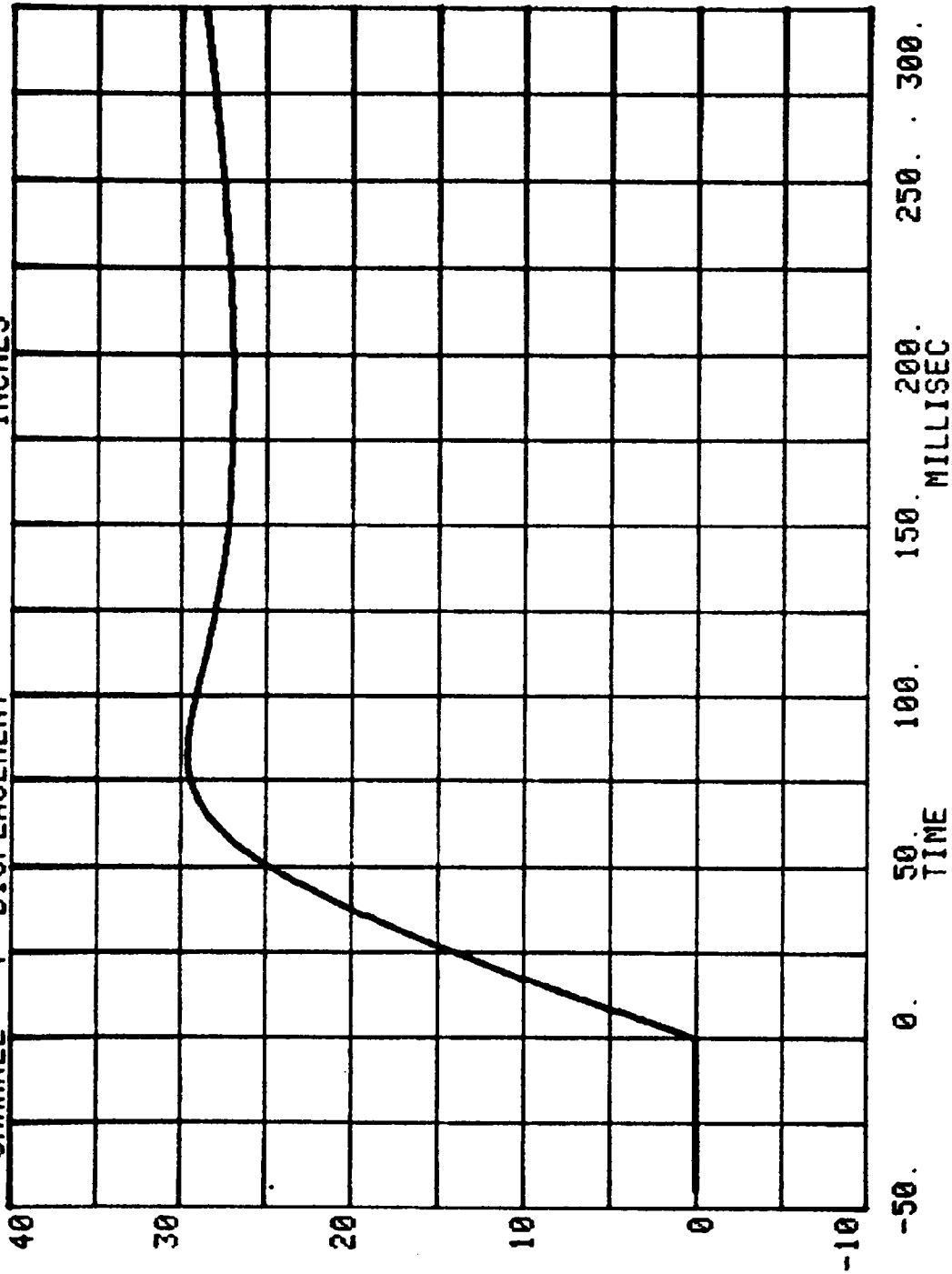
150. 200. MILLISEC

50. TIME

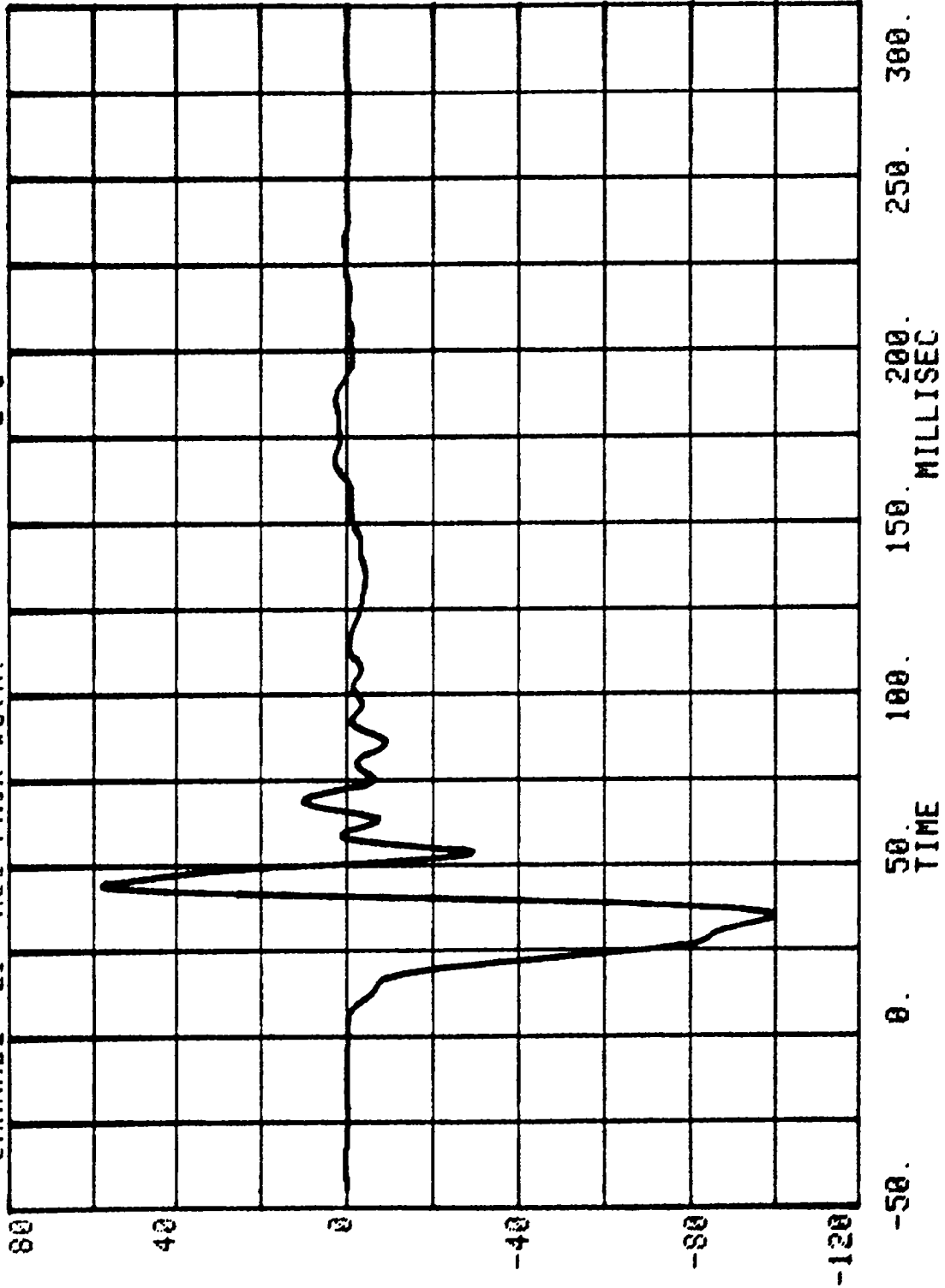
0.

-50.

CHANNEL 4 DISPLACEMENT
RUN= 887 SERIES= 200 INCHES
ACCEL #2(X)



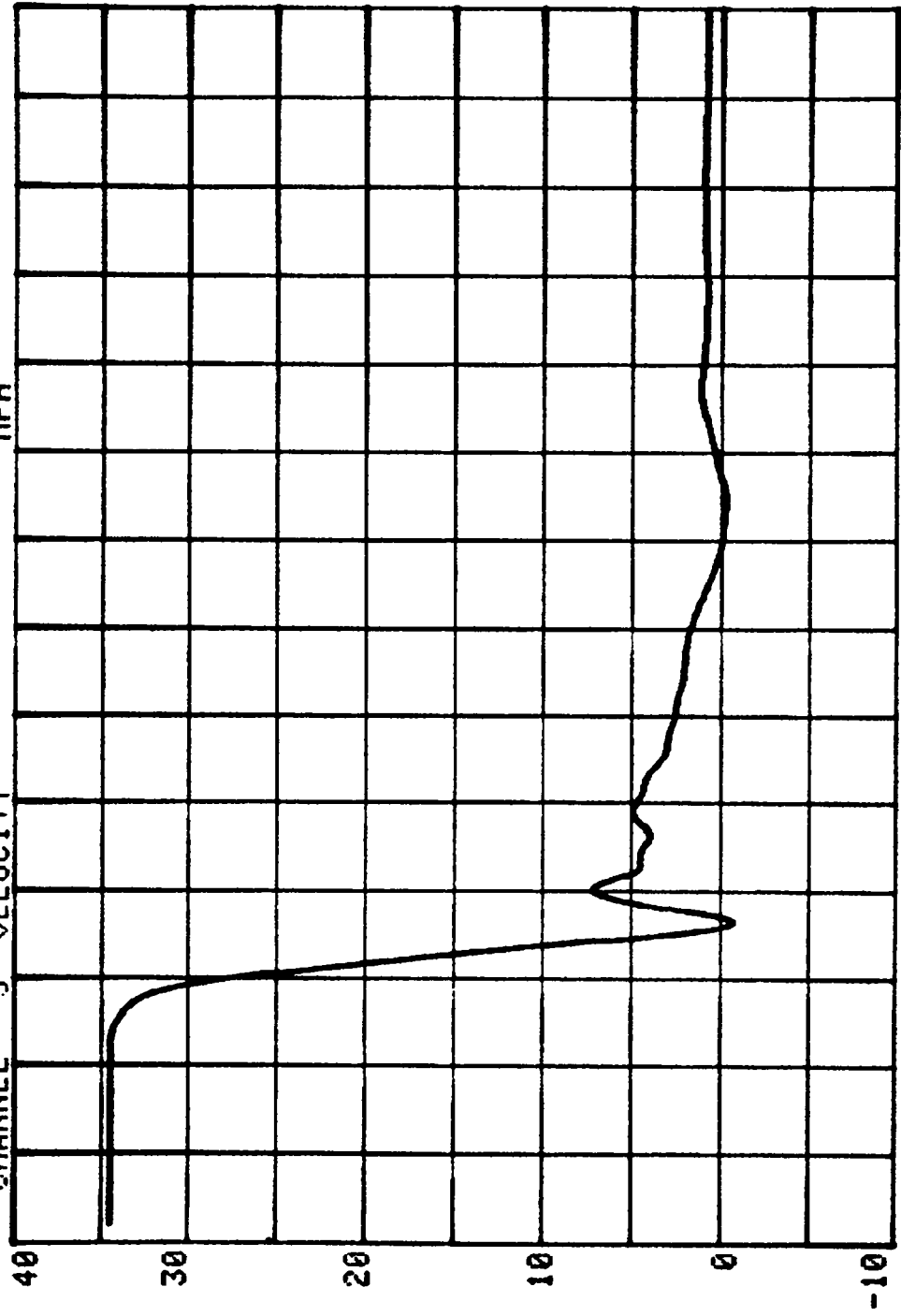
RUN= 887 SERIES= 200
CHANNEL 29 ACC PACK #3(X) G'S



ACCEL #3(X)

CHANNEL 5 VELOCITY SERIES= 200 MPH

RUN= 887



250. 300.

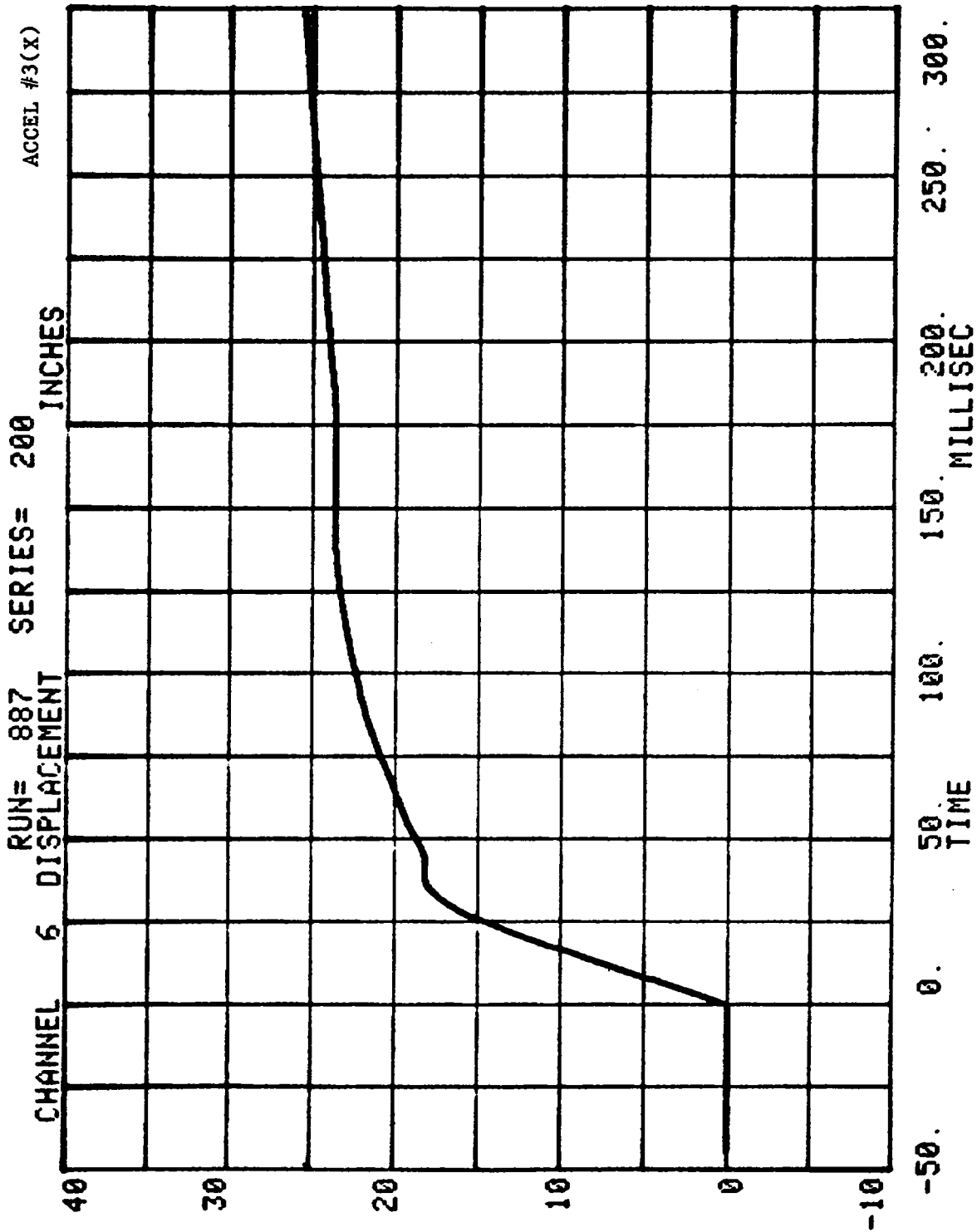
150. MILLISEC

100.

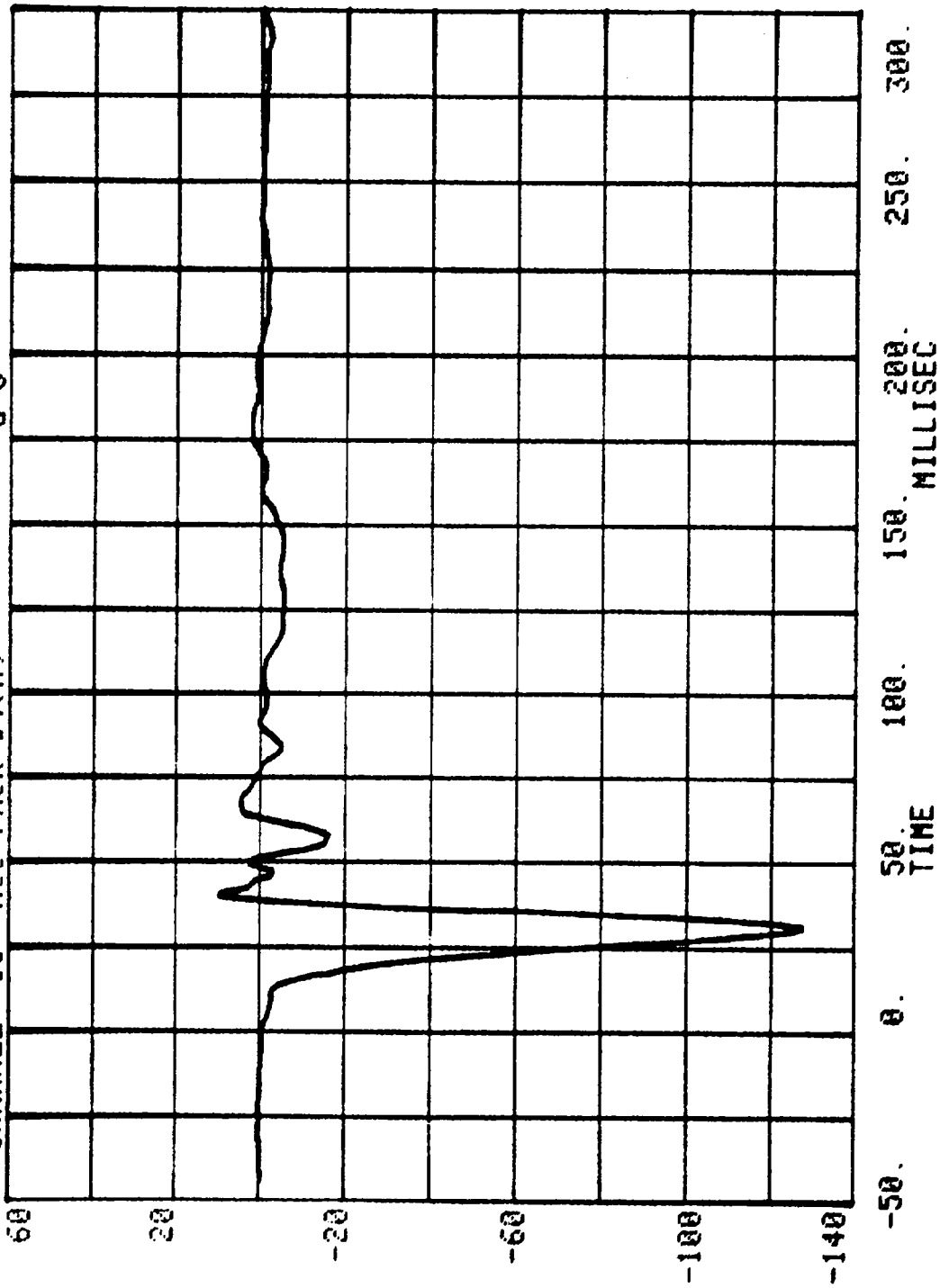
50. TIME

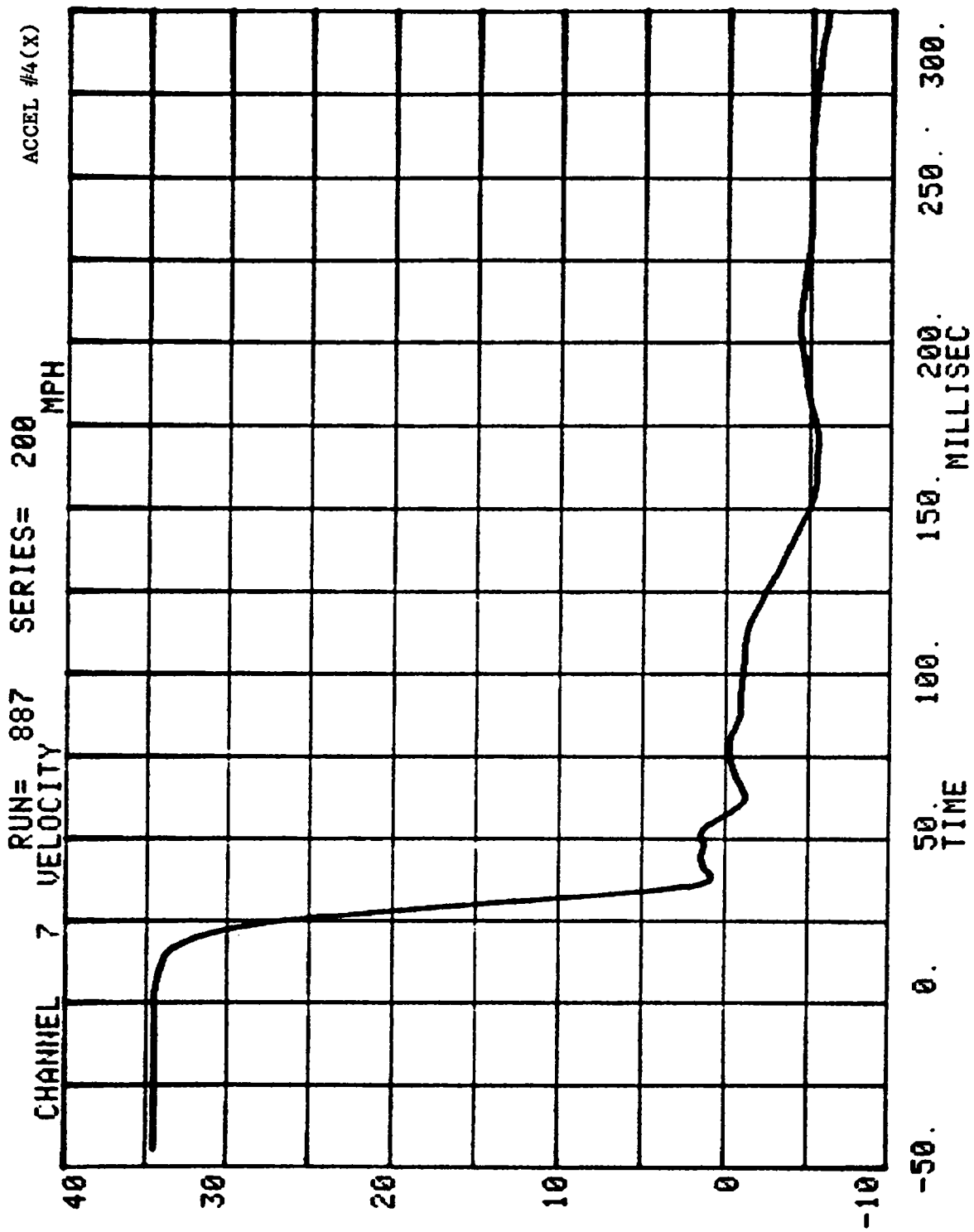
0.

-50.



RUN= 887 SERIES= 200 G'S
CHANNEL 30 ACC PACK #4(X)



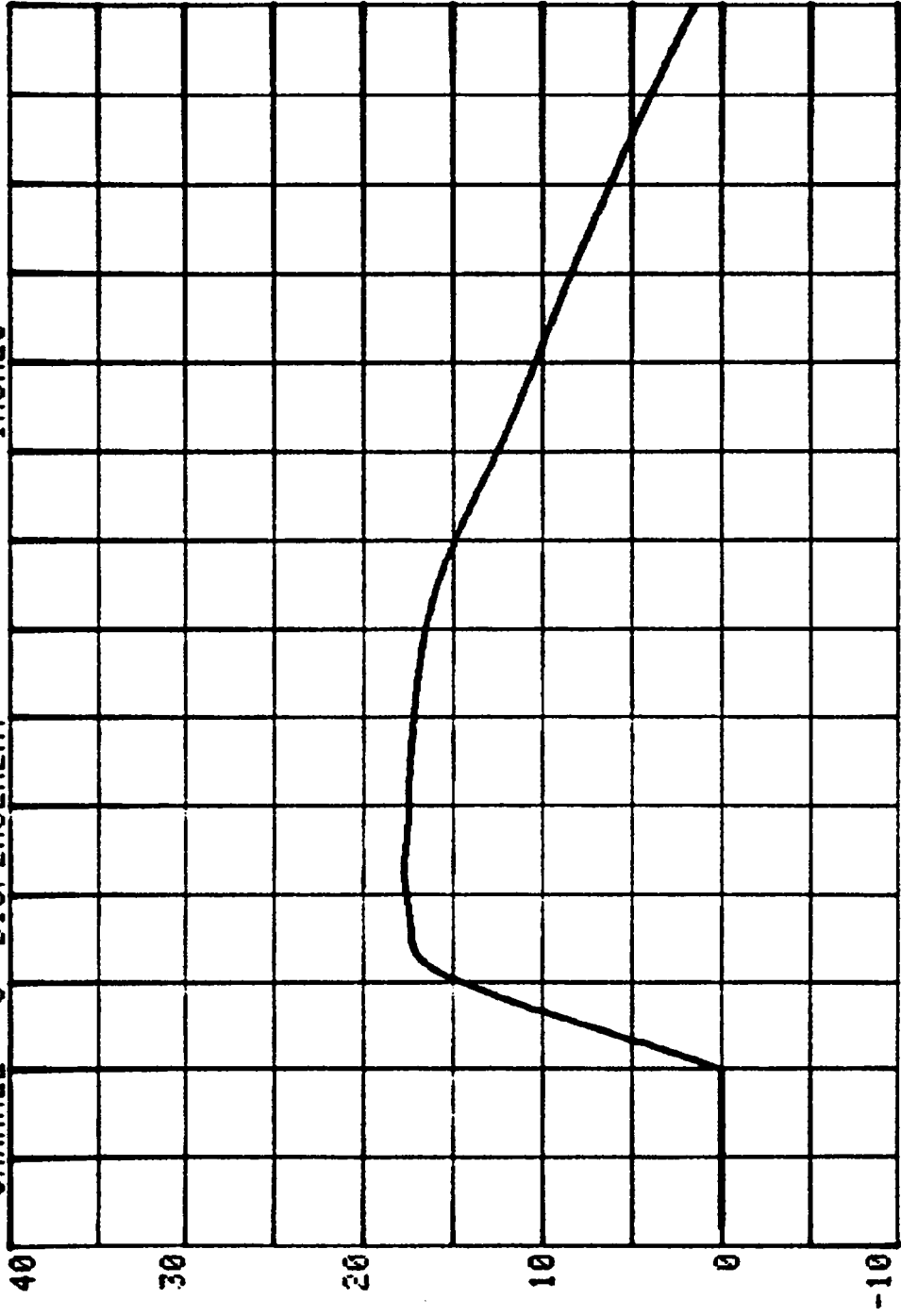


ACCEL #4(X)

SERIES= 200 INCHES

RUN= 887

CHANNEL 8 DISPLACEMENT

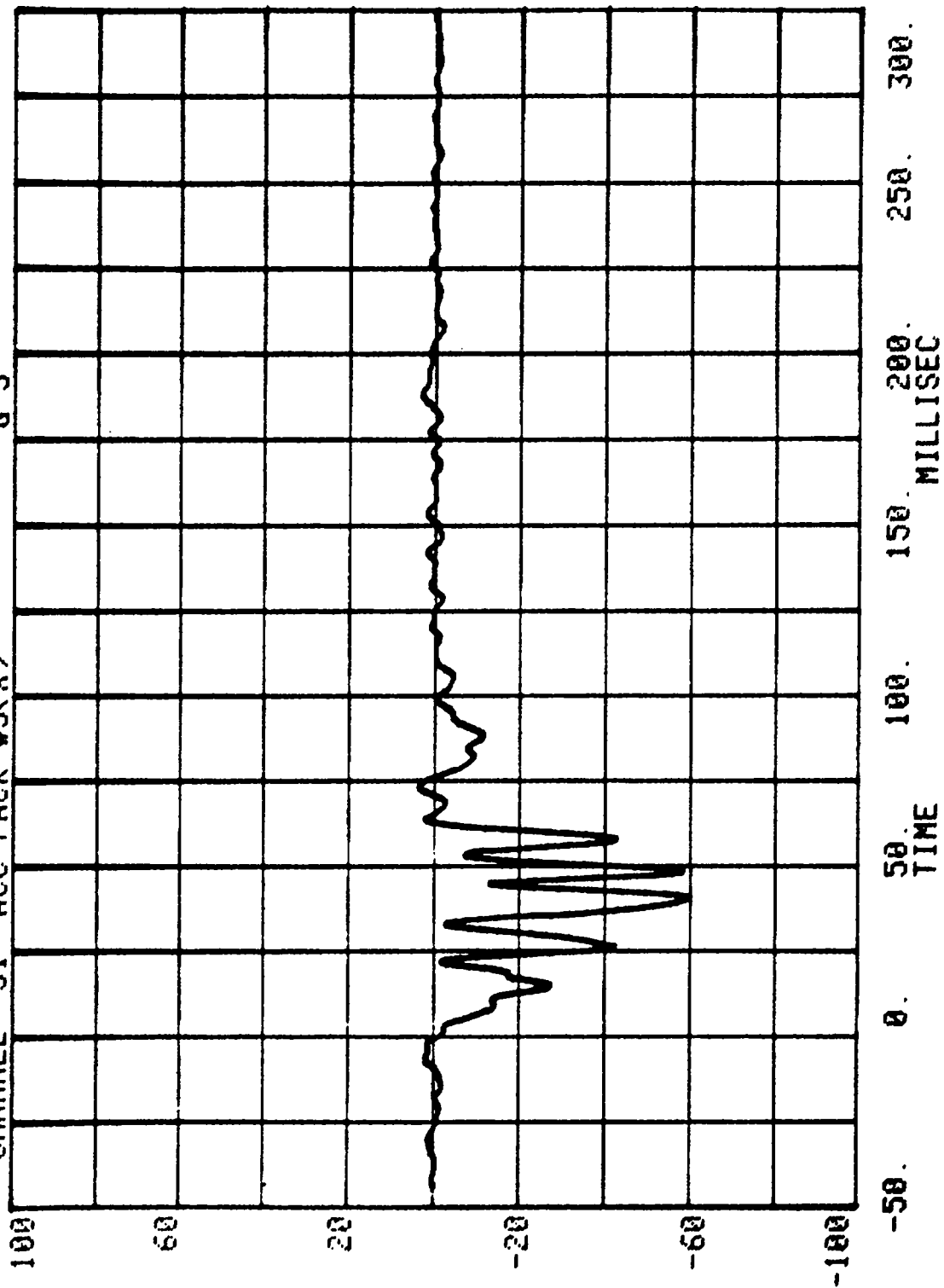


40
30
20
10
0
-10

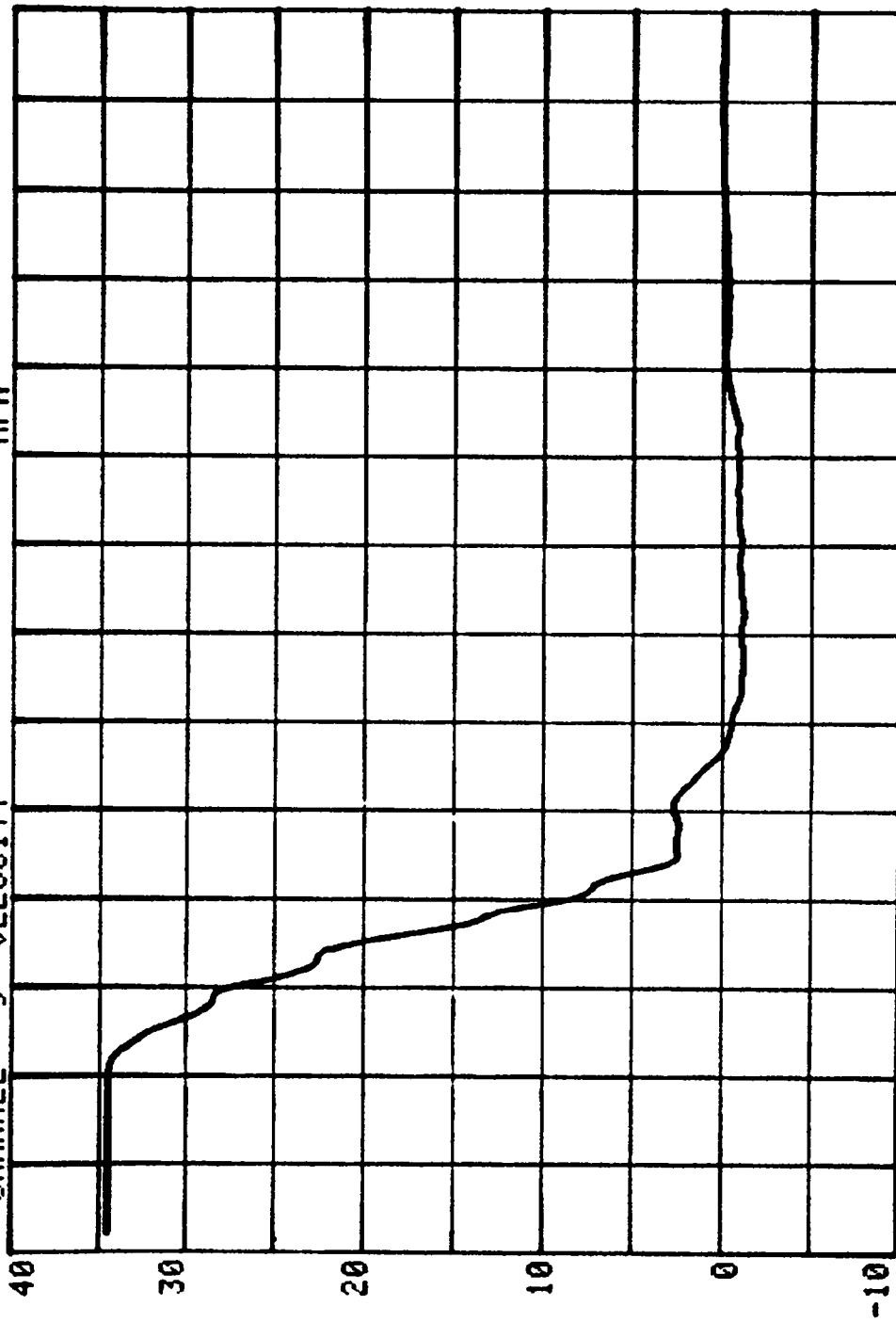
0. 50. 100. 150. 200. 250. 300.

TIME MILLISEC

RUN= 887 SERIES= 200 G'S
CHANNEL 31 ACC PACK #5(X)



CHANNEL 9 VELOCITY SERIES= 200 MPH ACCEL #5(X)



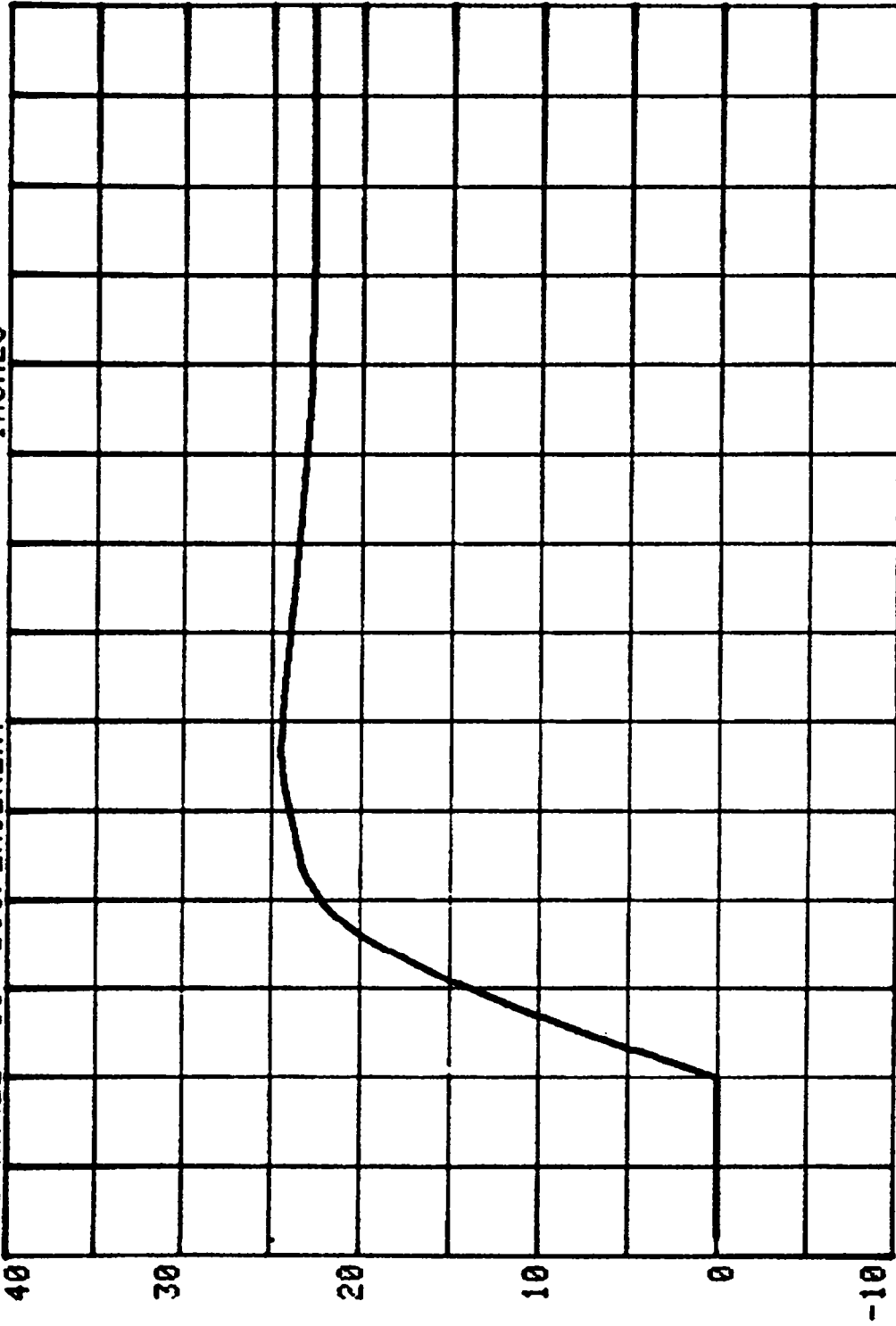
TIME 0. 50. 100. 150. 200. 250. 300. MILLISEC

ACCEL #5(X)

SERIES= 200 INCHES

RUN= 887

CHANNEL 10 DISPLACEMENT



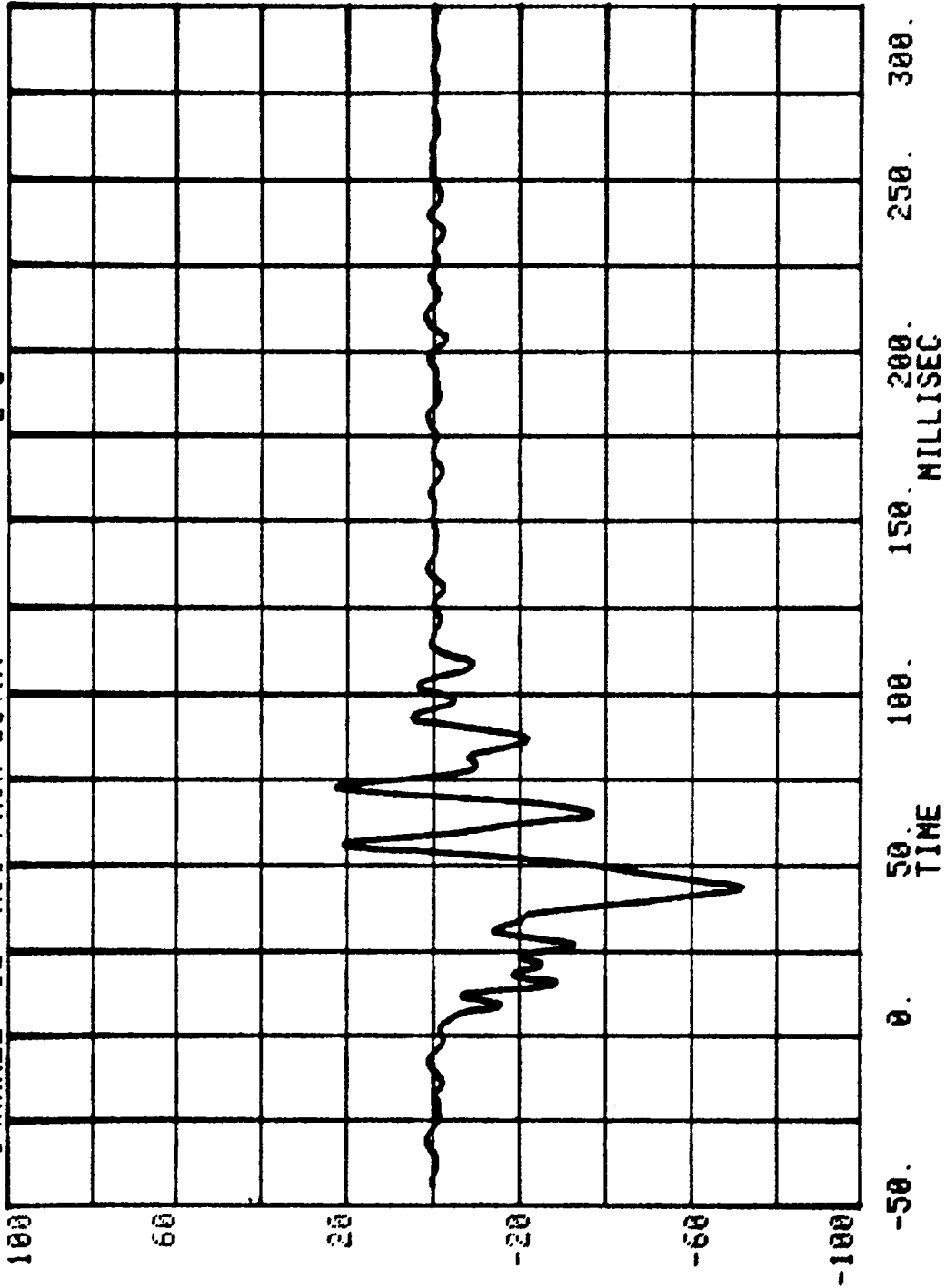
250. 300.

150. 200. MILLISEC

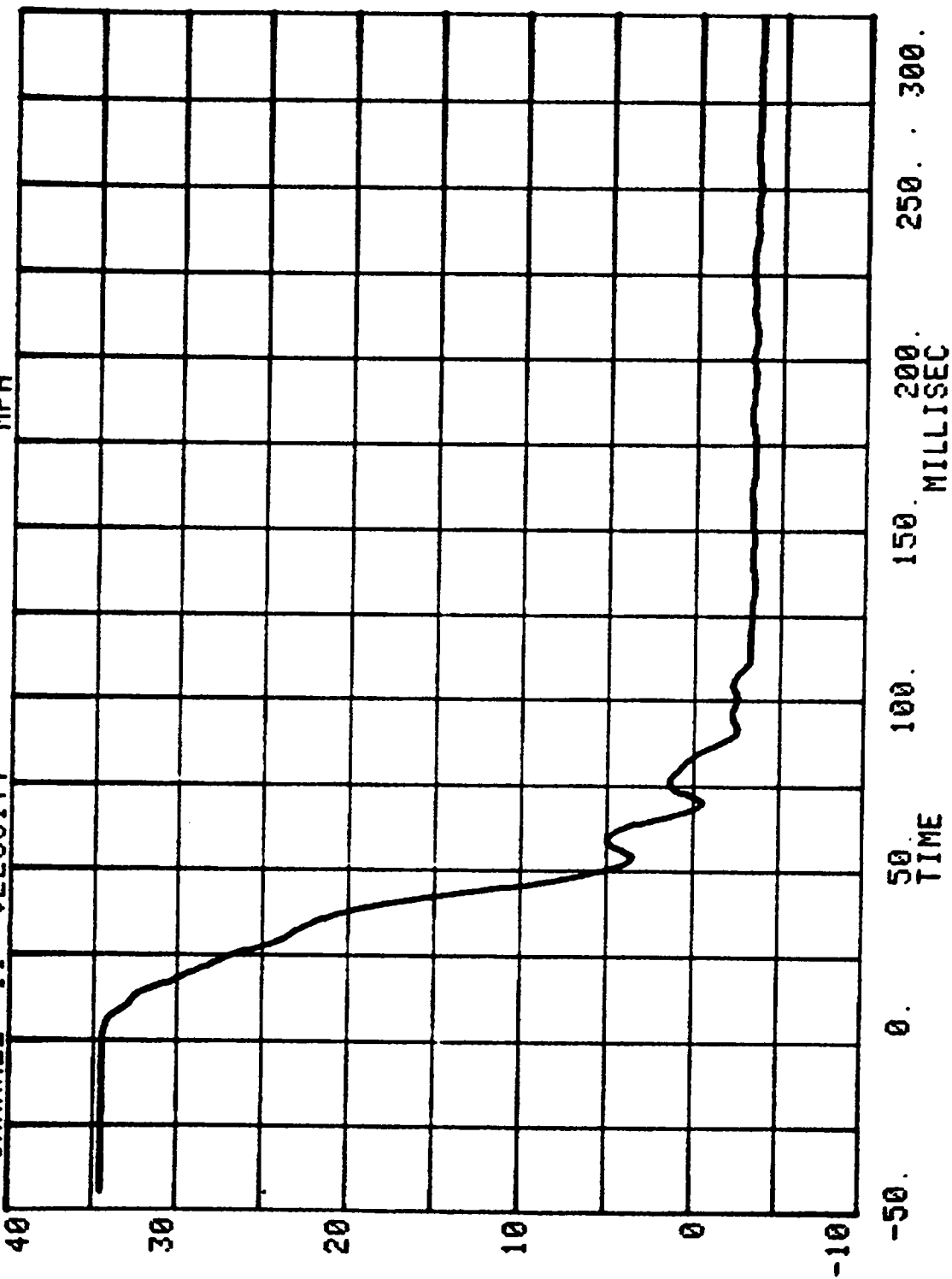
100. 50. TIME

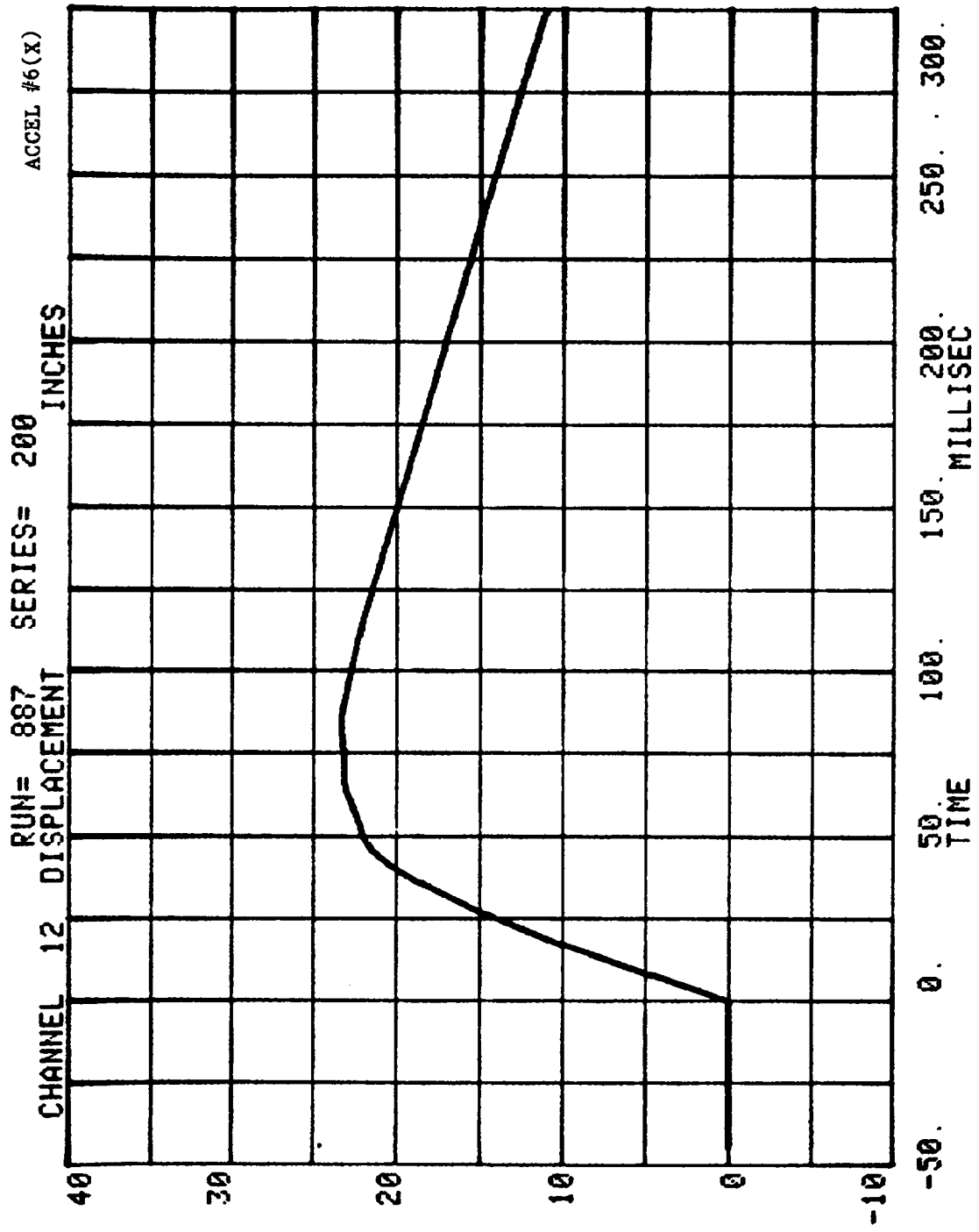
0. -50.

CHANNEL 32 ACC PACK #6(X) RUN= 887 SERIES= 200 G'S



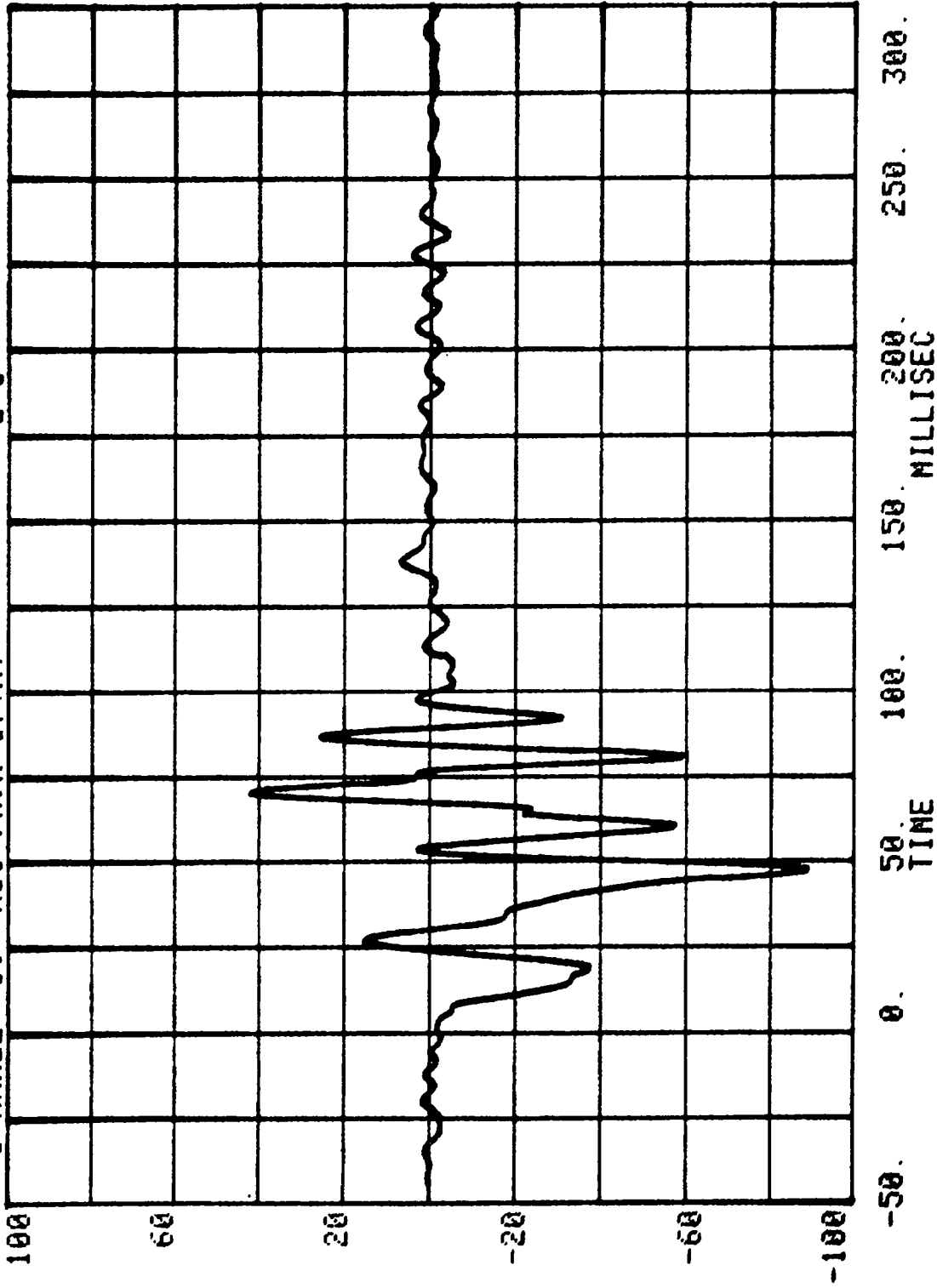
CHANNEL 11 VELOCITY
RUN= 887 SERIES= 200 MPH
ACCEL #6(X)





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

RUN= 887 SERIES= 200



ACCEL #7(X)

SERIES= 200 MPH

RUN= 887

CHANNEL 13 VELOCITY



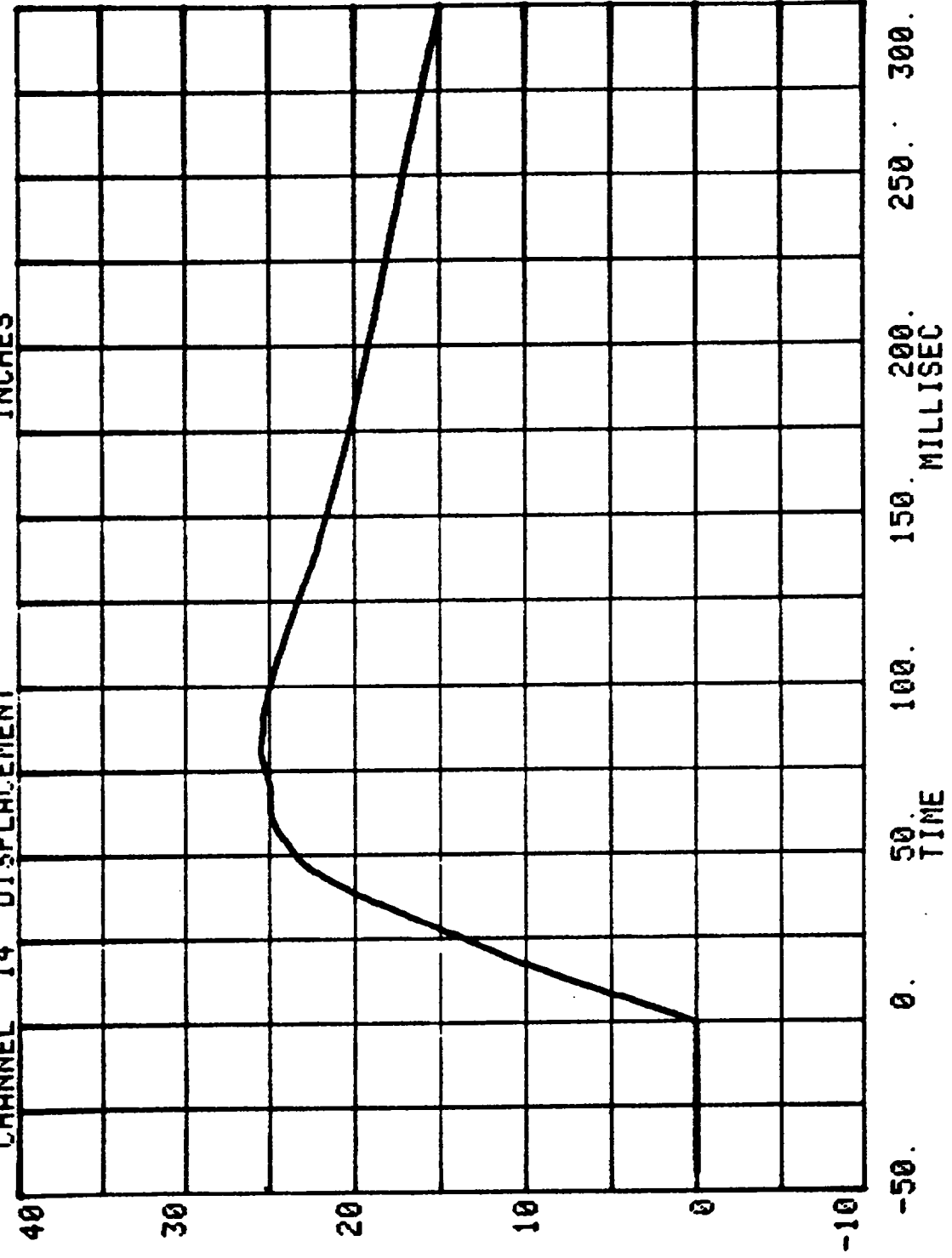
250. 300.

200. MILLISEC

100. TIME

0. -50.

CHANNEL 14 DISPLACEMENT RUN= 887 SERIES= 200 INCHES ACCEL #7(X)



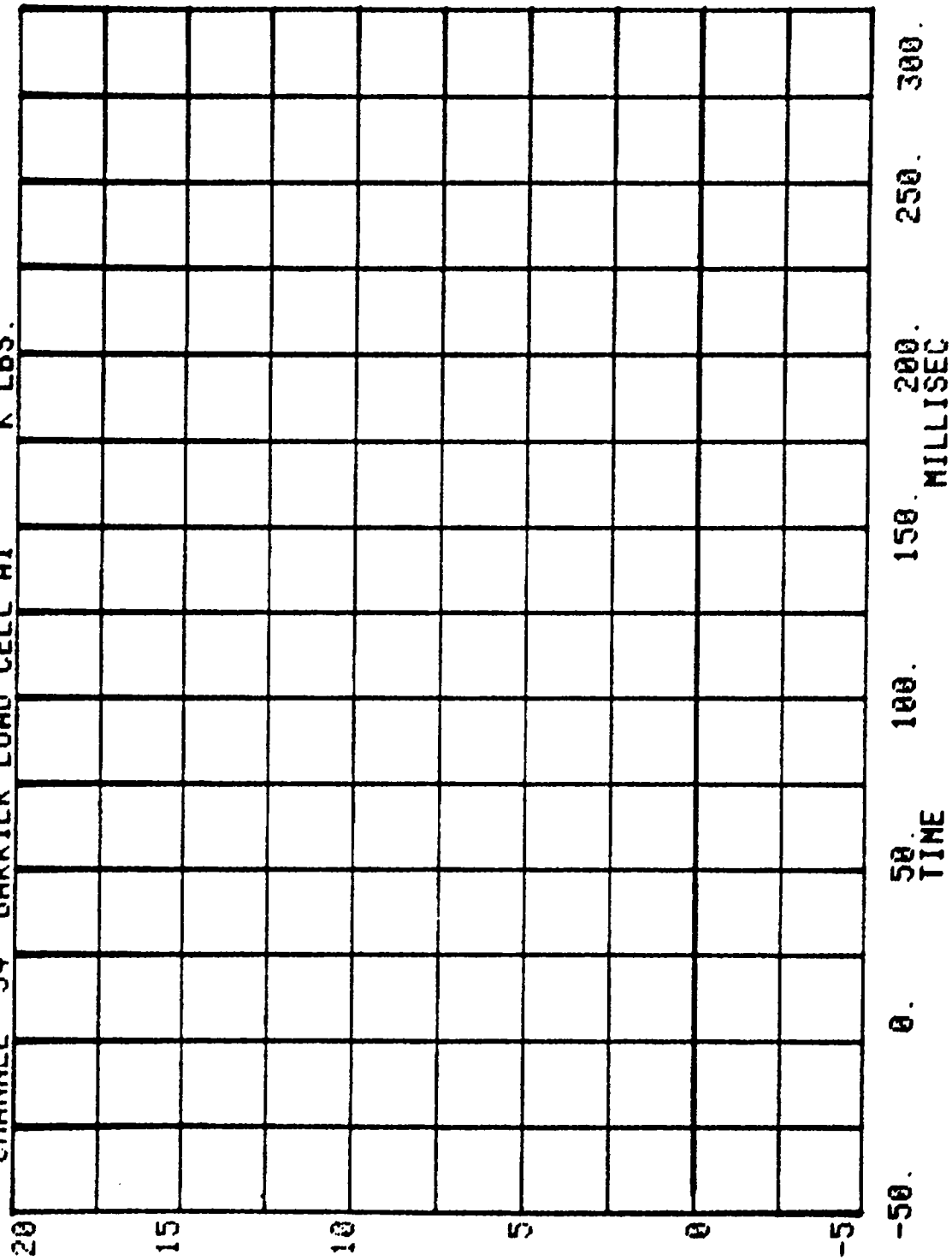
TEST NO. MK0200

LOAD CELL BARRIER DATA

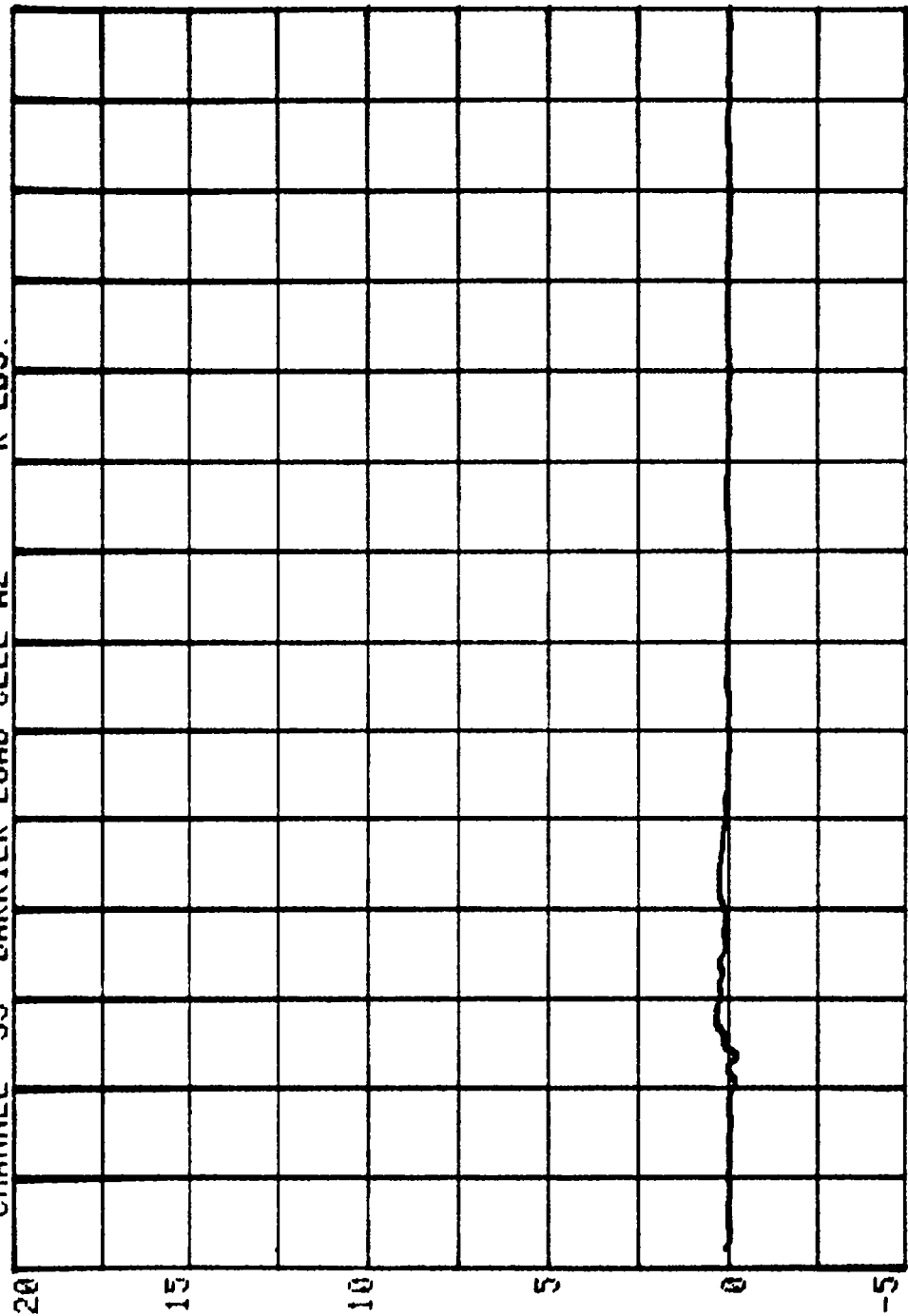
FILTER CHANNEL CLASS

60

CHANNEL 34 BARRIER LOAD CELL A1
RUN= 887 SERIES= 200 K LBS.

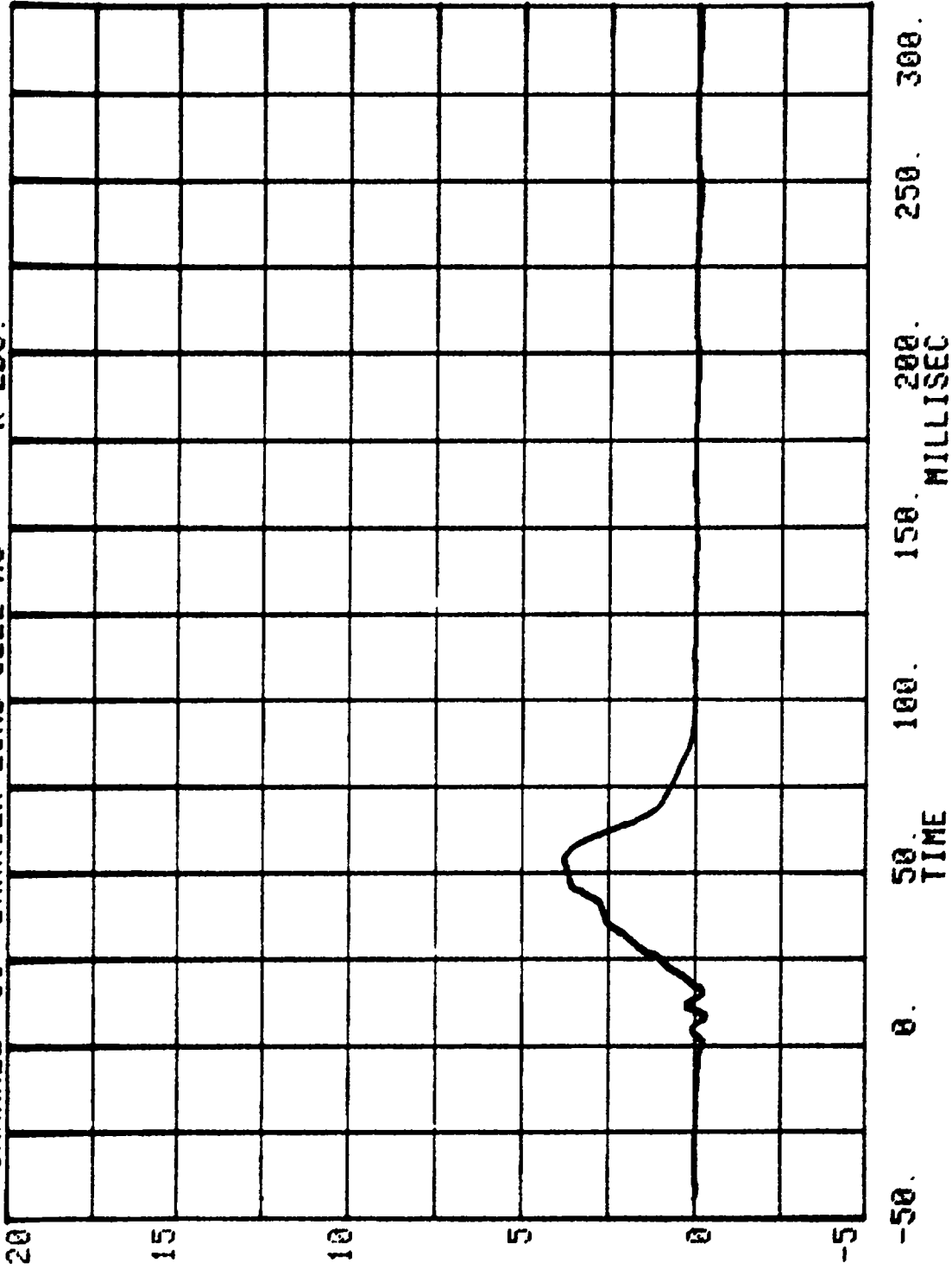


CHANNEL 35 BARRIER LOAD CELL A2 SERIES= 200 K LBS.

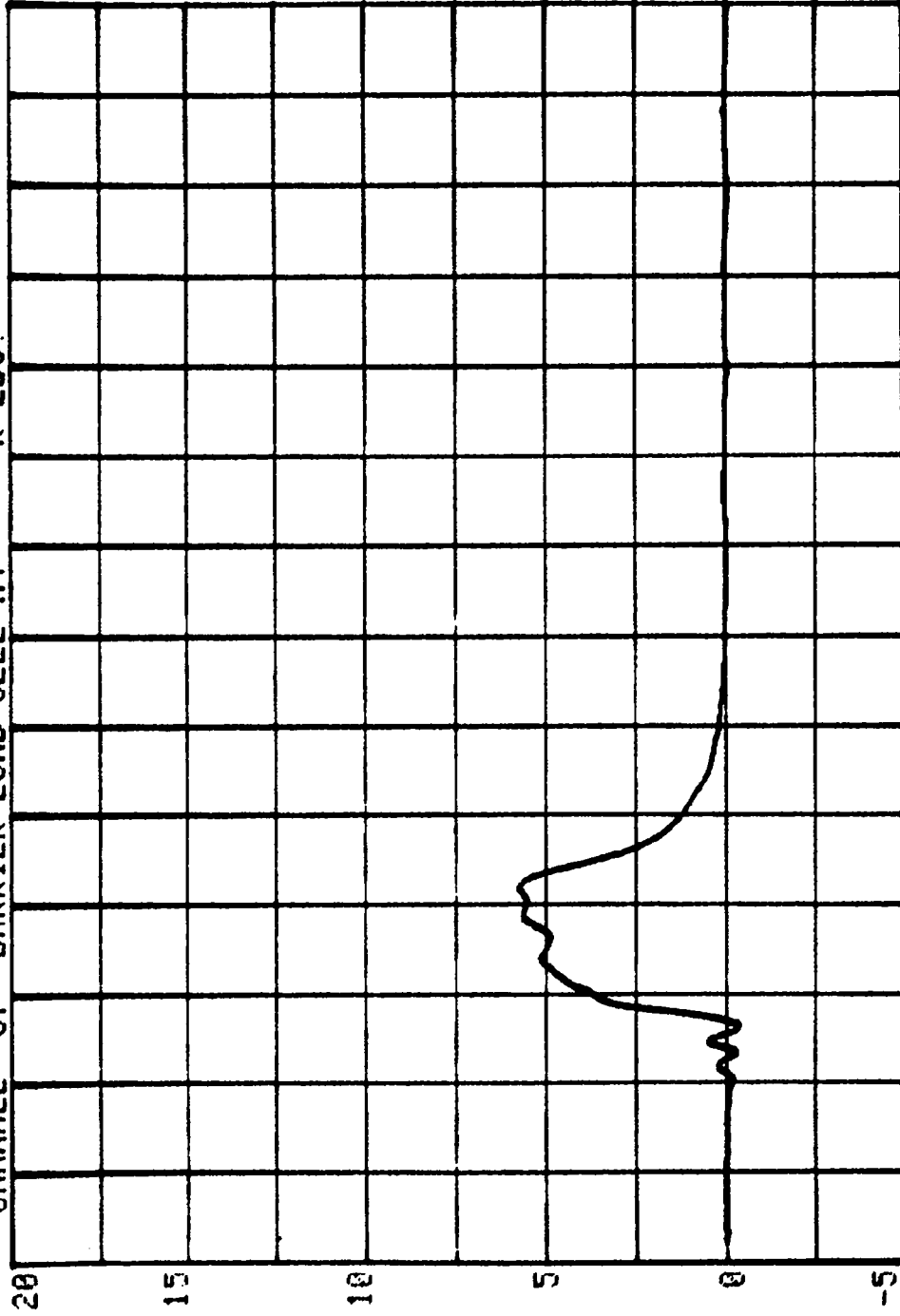


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 36 BARRIER LOAD CELL A3
RUN= 887 SERIES= 200 K LBS.

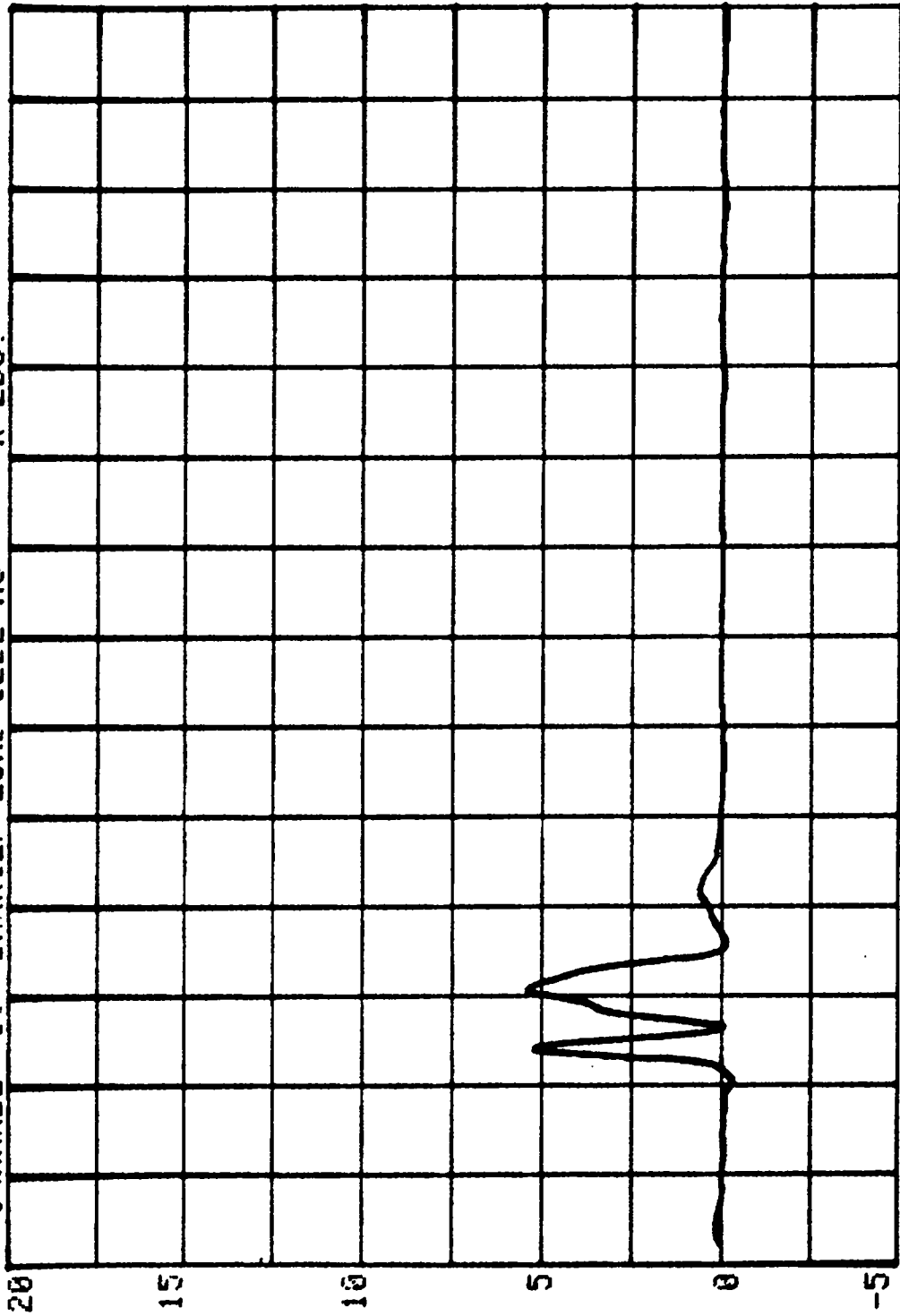


CHANNEL 37 BARRIER LOAD CELL #4
RUN= 887 SERIES= 200 K LBS.



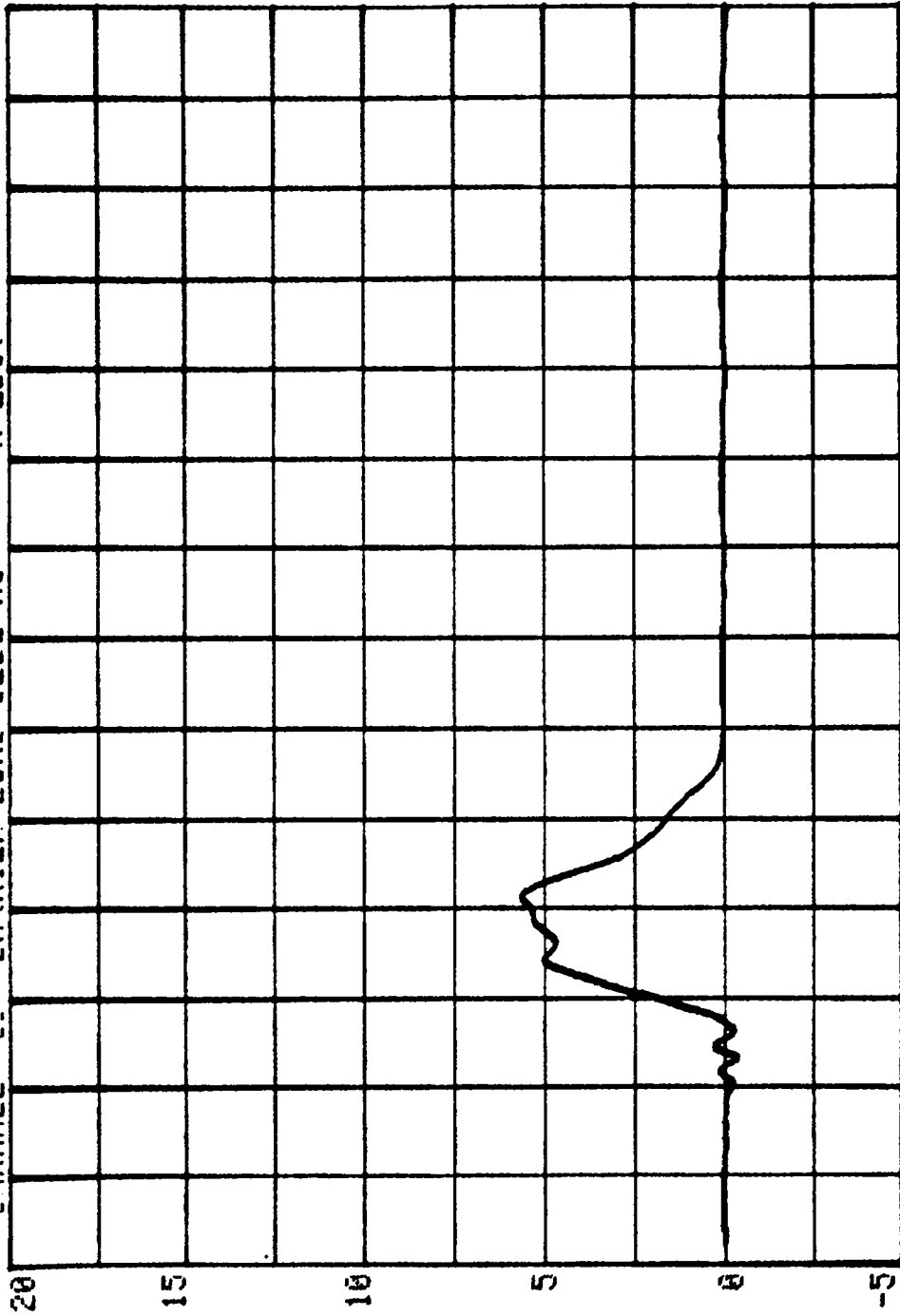
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 39 BARRIER LOAD CELL A5
RUN= 887 SERIES= 200 K LBS.



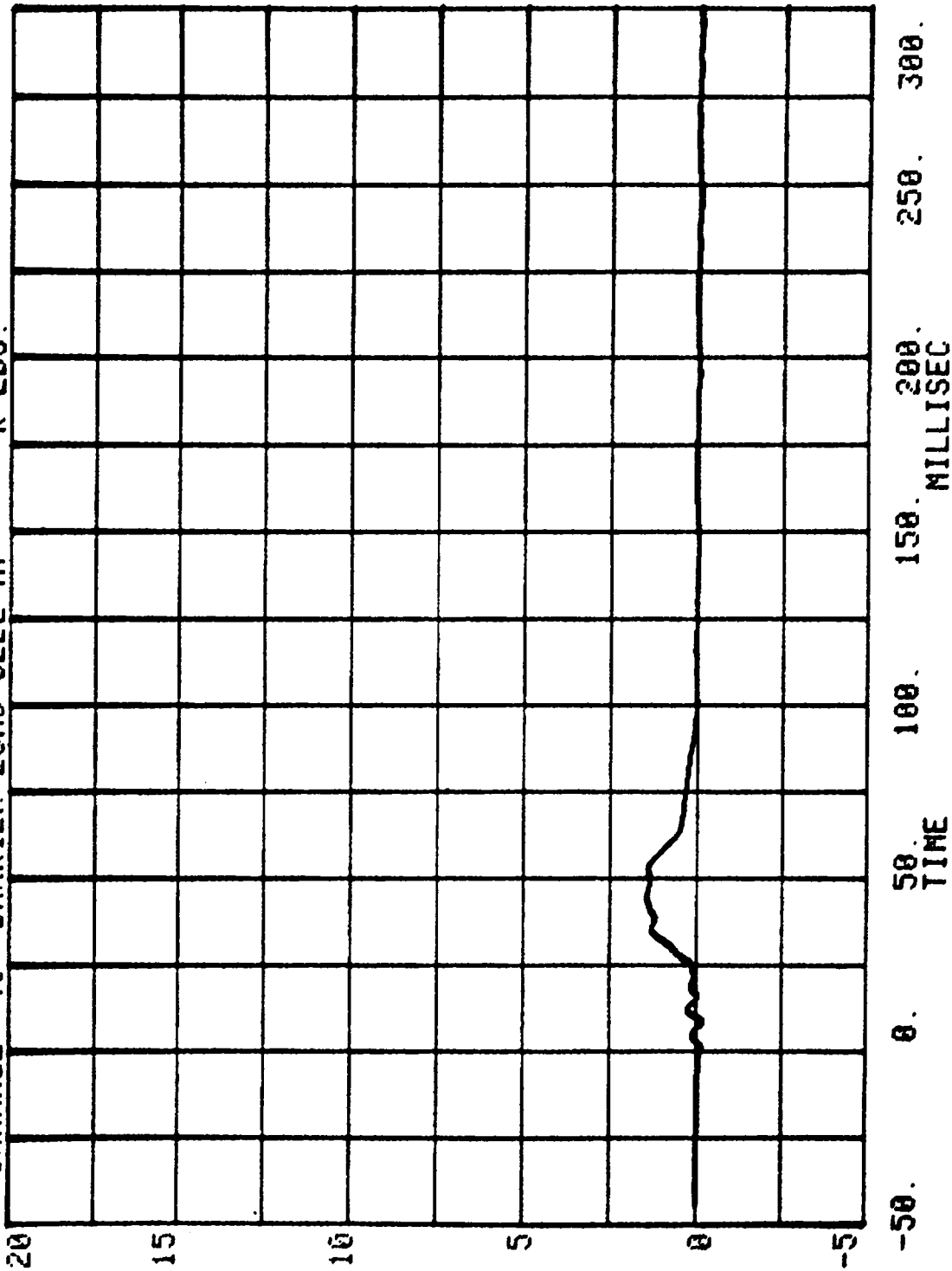
-50. 0. 50. 100. 150. 200. 250. 300.
MILLISEC
TIME

CHANNEL 39 BARRIER LOAD CELL A6
RUN= 887 SERIES= 200 K LBS.

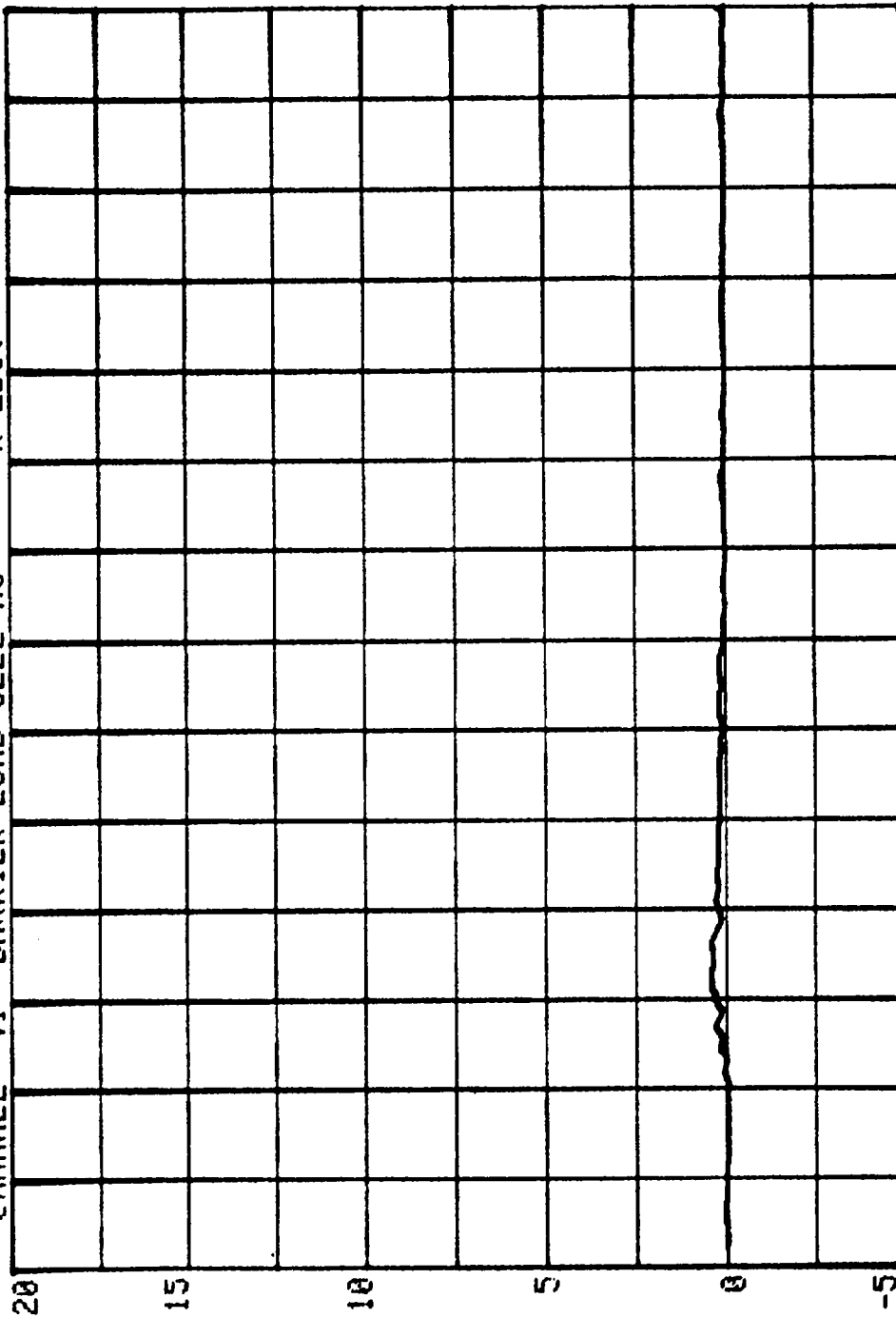


-50. 0. 50. 100. 150. 200. 250. 300.
TIME

CHANNEL 40 BARRIER LOAD CELL A7
RUN= 887 SERIES= 200 K LBS.

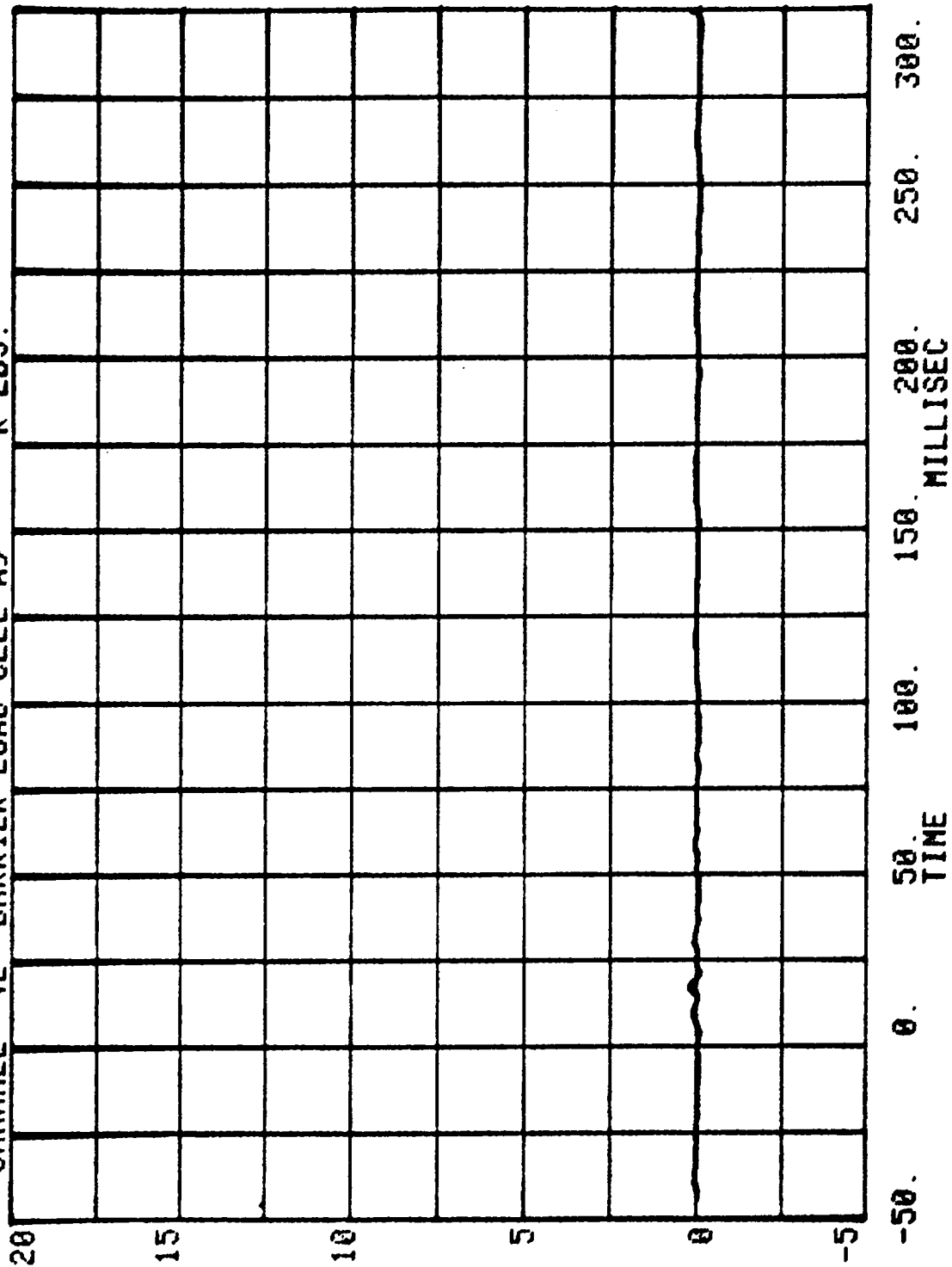


CHANNEL 41 BARRIER LOAD CELL AS
RUN= 887 SERIES= 200 K LBS.

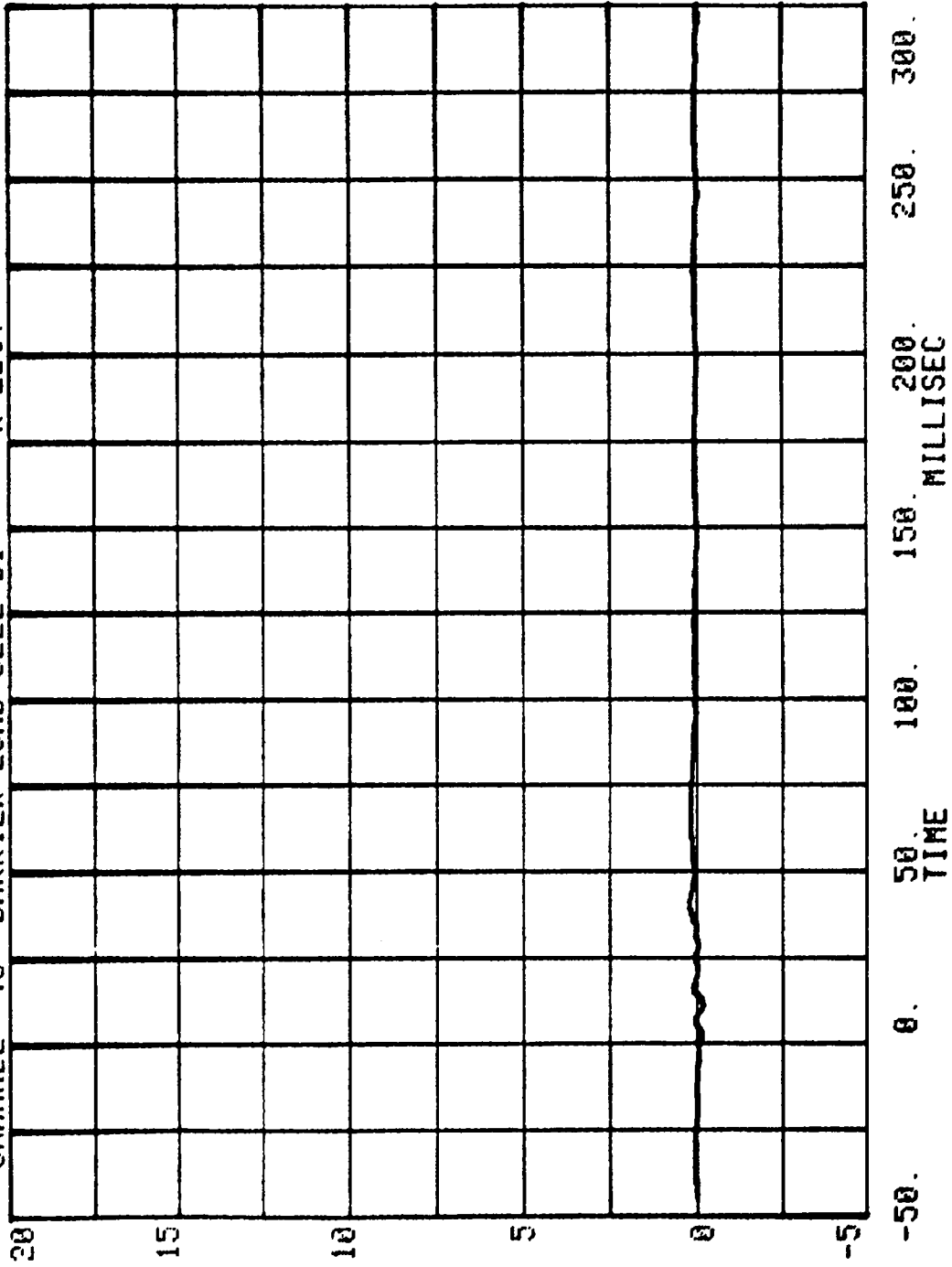


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

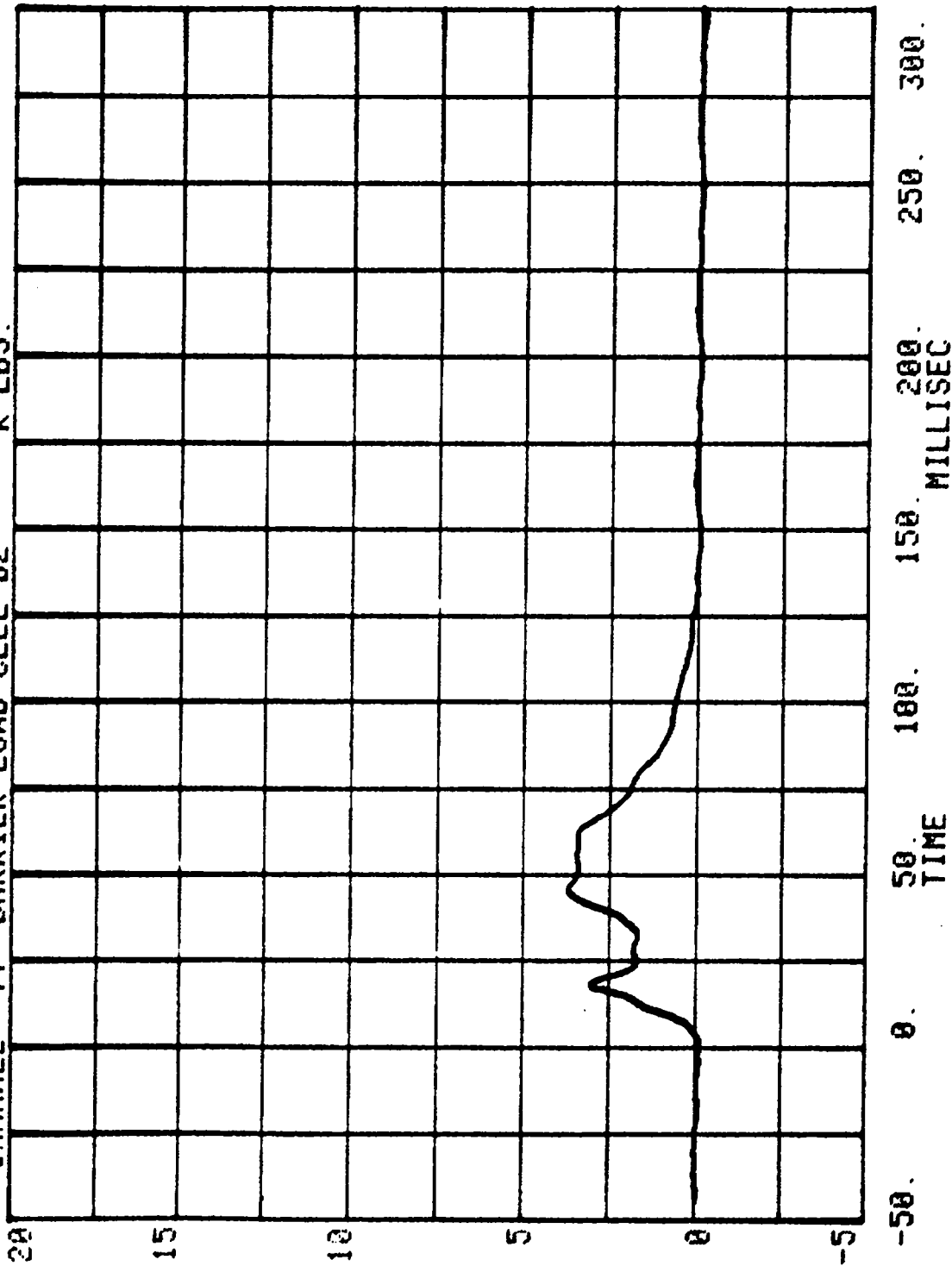
CHANNEL 42 BARRIER LOAD CELL A9
RUN= 887 SERIES= 200 K LBS.



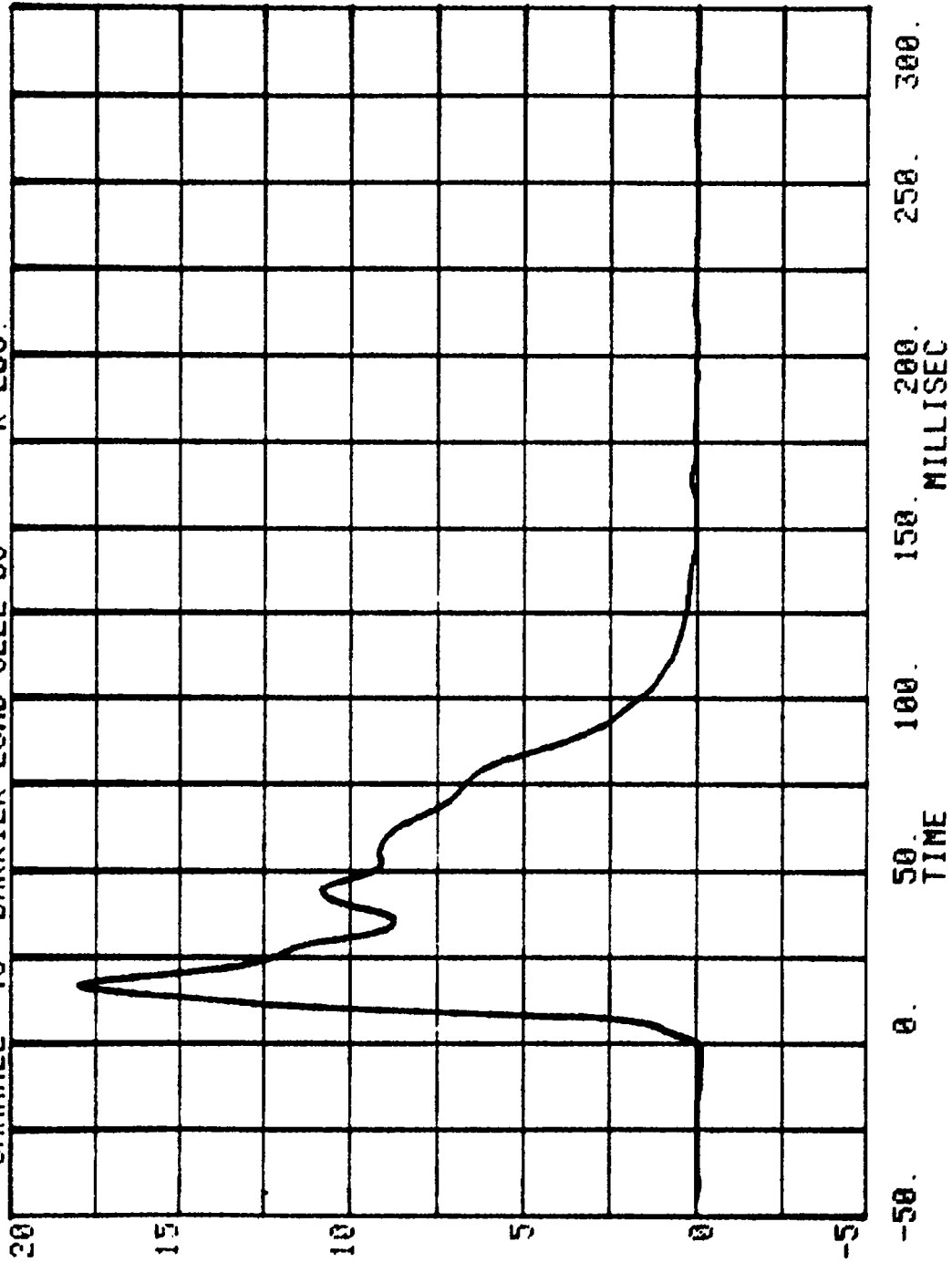
RUN= 887 SERIES= 200
CHANNEL 43 BARRIER LOAD CELL B1 K LBS.



CHANNEL 44 BARRIER LOAD CELL 82
RUN= 987 SERIES= 200 K LBS.



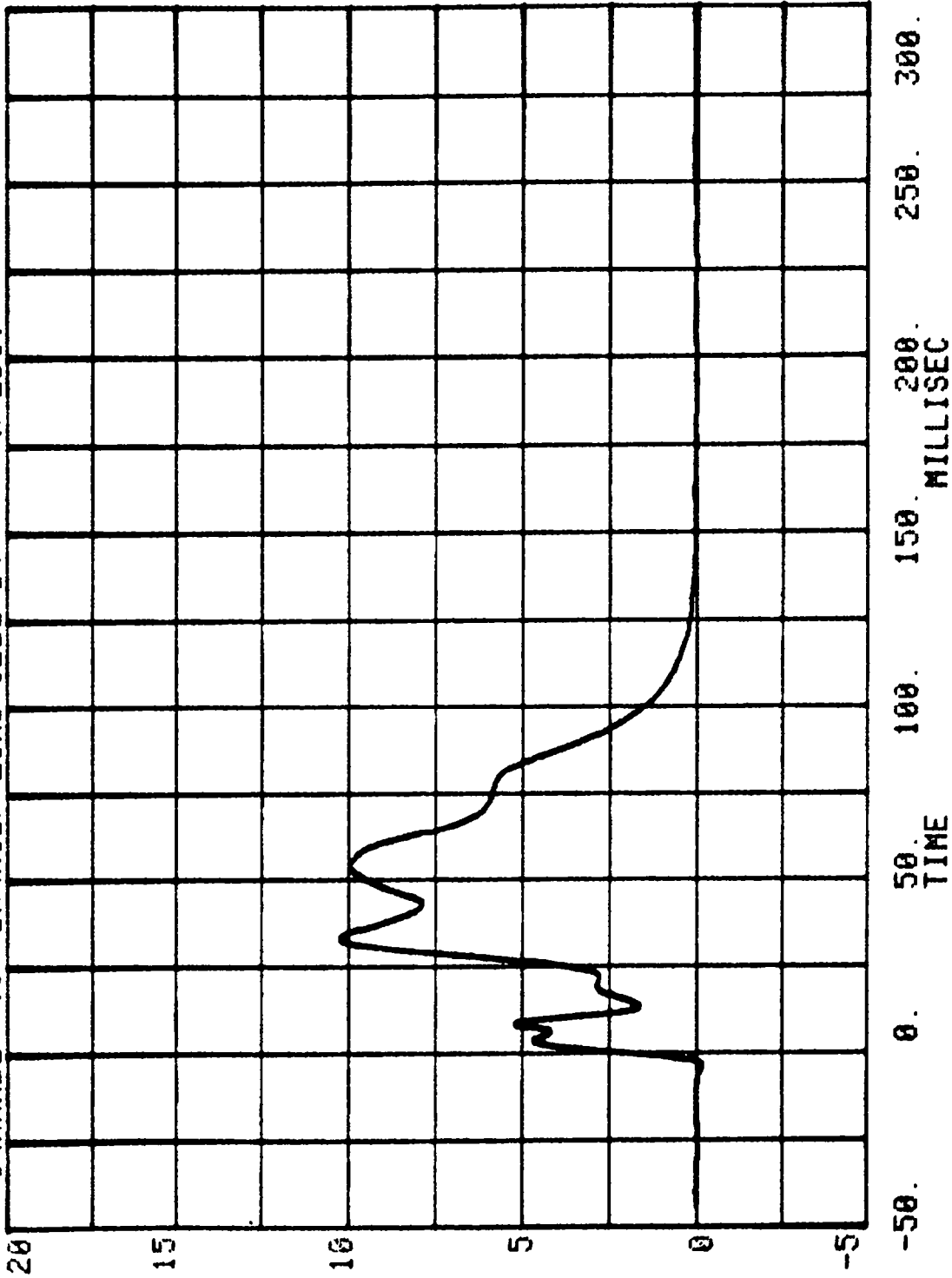
CHANNEL 45 BARRIER LOAD CELL B3
RUN= 887 SERIES= 200 K LBS.



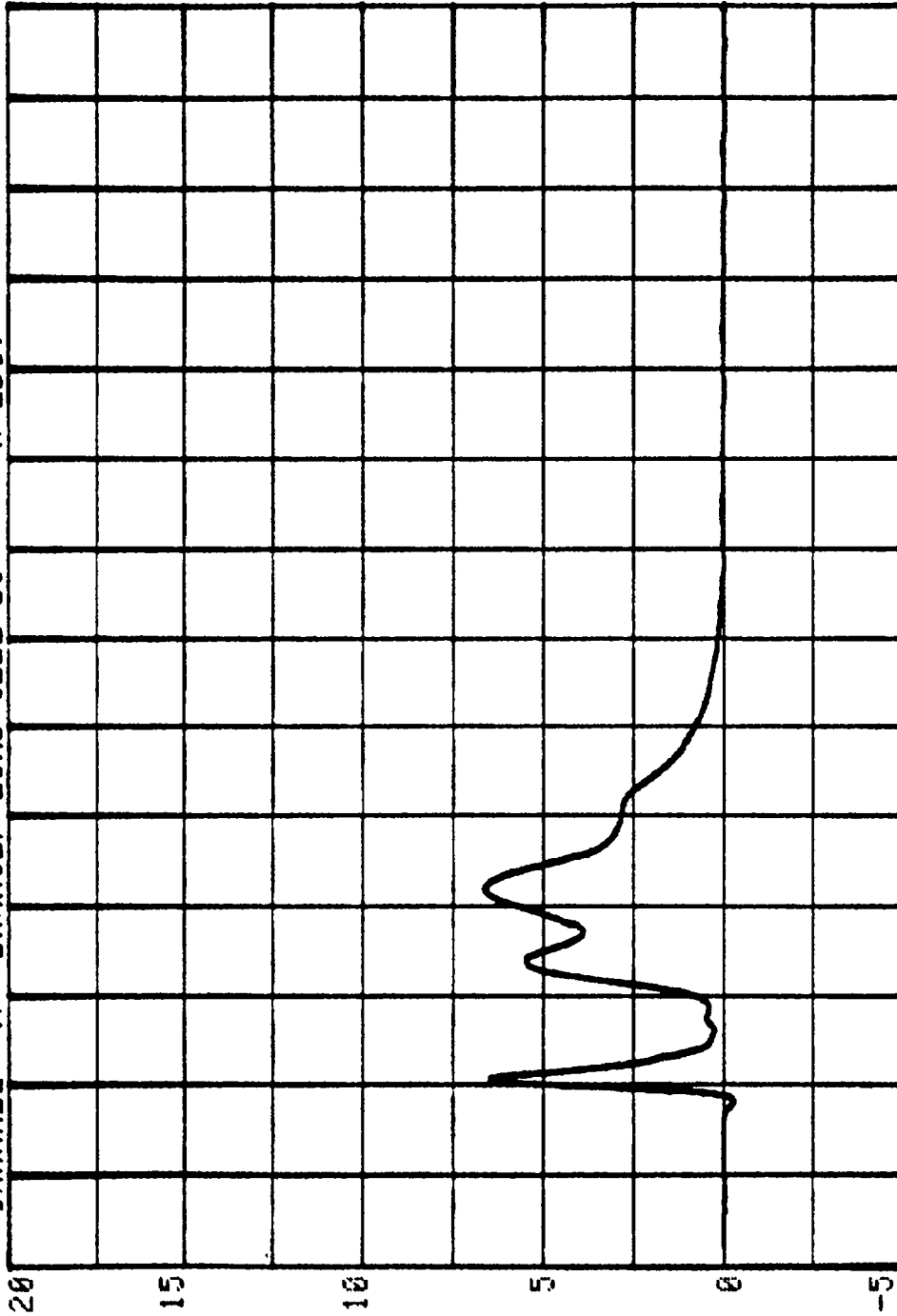
CHANNEL 46 BARRIER LOAD CELL B4

RUN= 887 SERIES= 200

K LBS.



CHANNEL 47 BARRIER LOAD CELL B5
RUN= 887 SERIES= 200 K LBS.

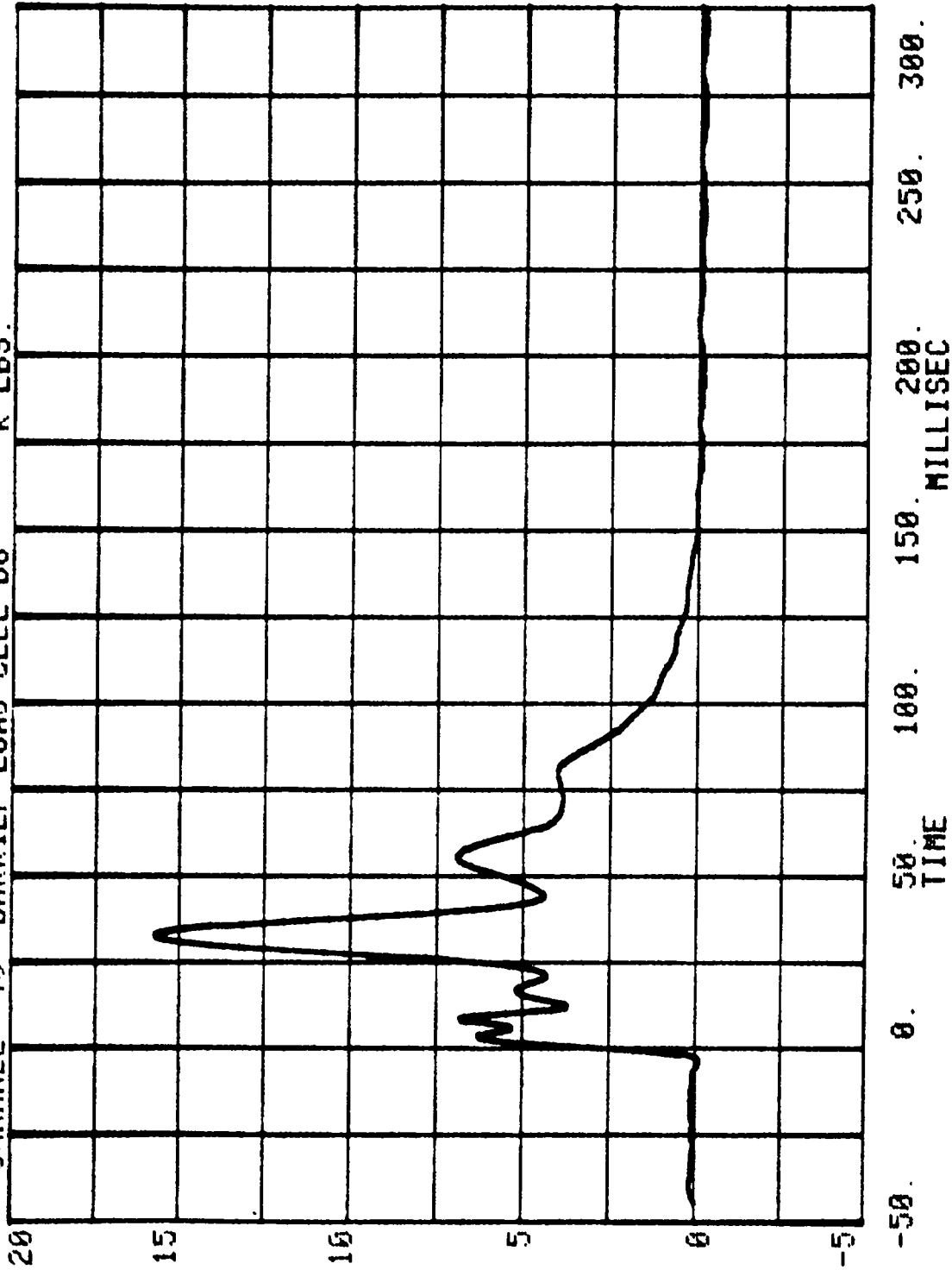


-50. 0. 50. 100. 150. 200. 250. 300.
TIME
MILLISEC

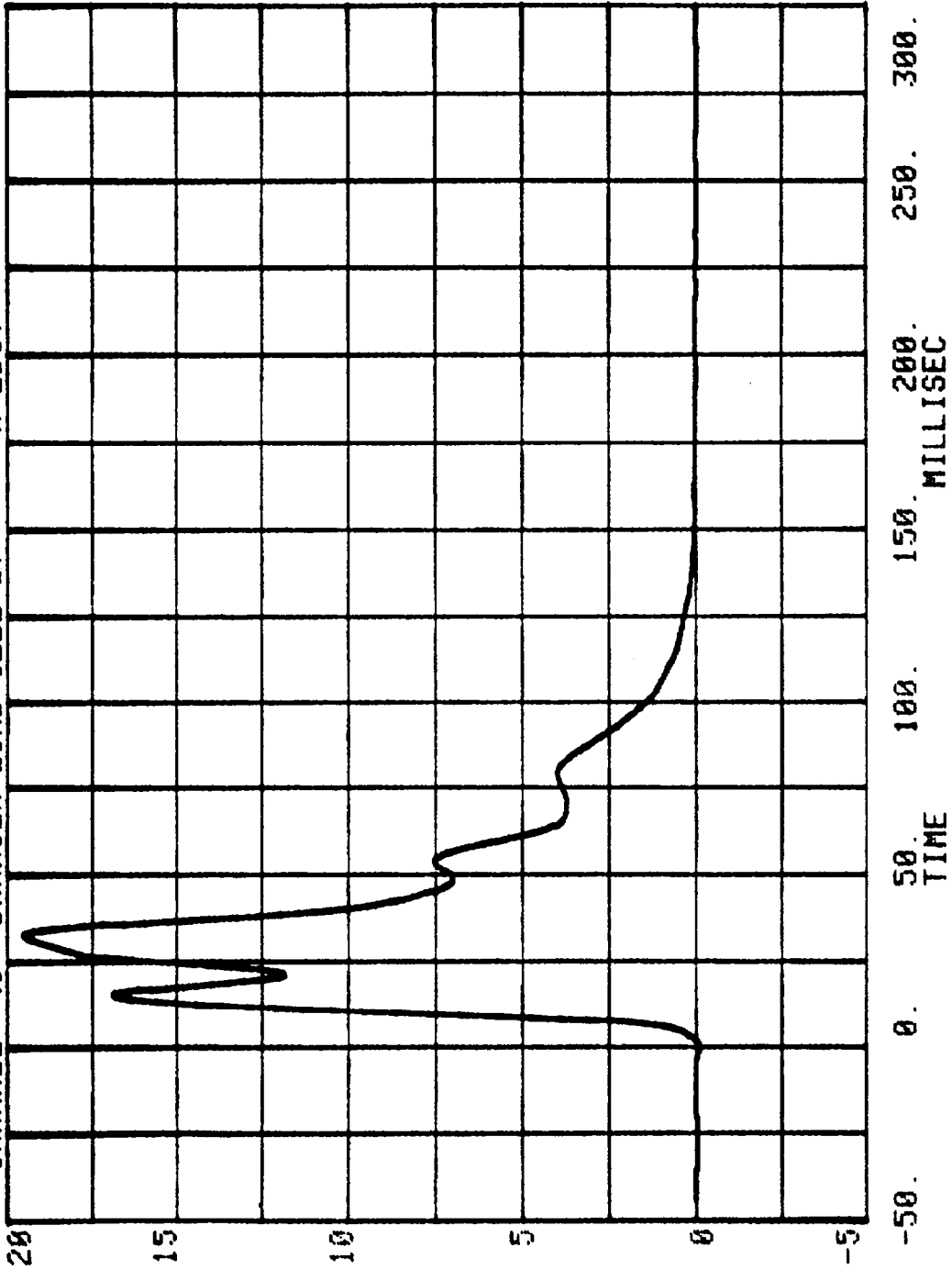
CHANNEL 48 BARRIEP LOAD CELL B6

RUN= 887 SERIES= 200

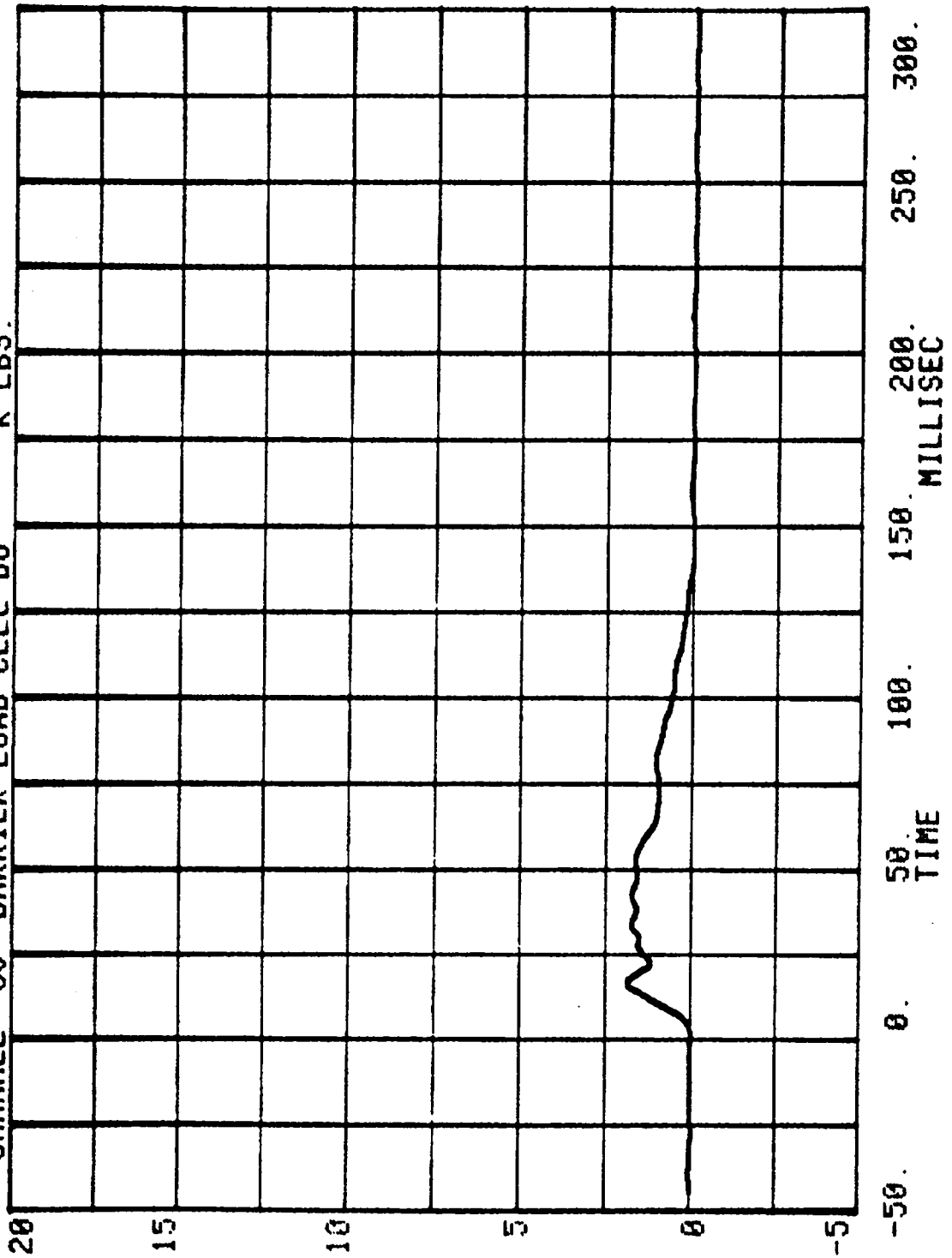
K LBS.



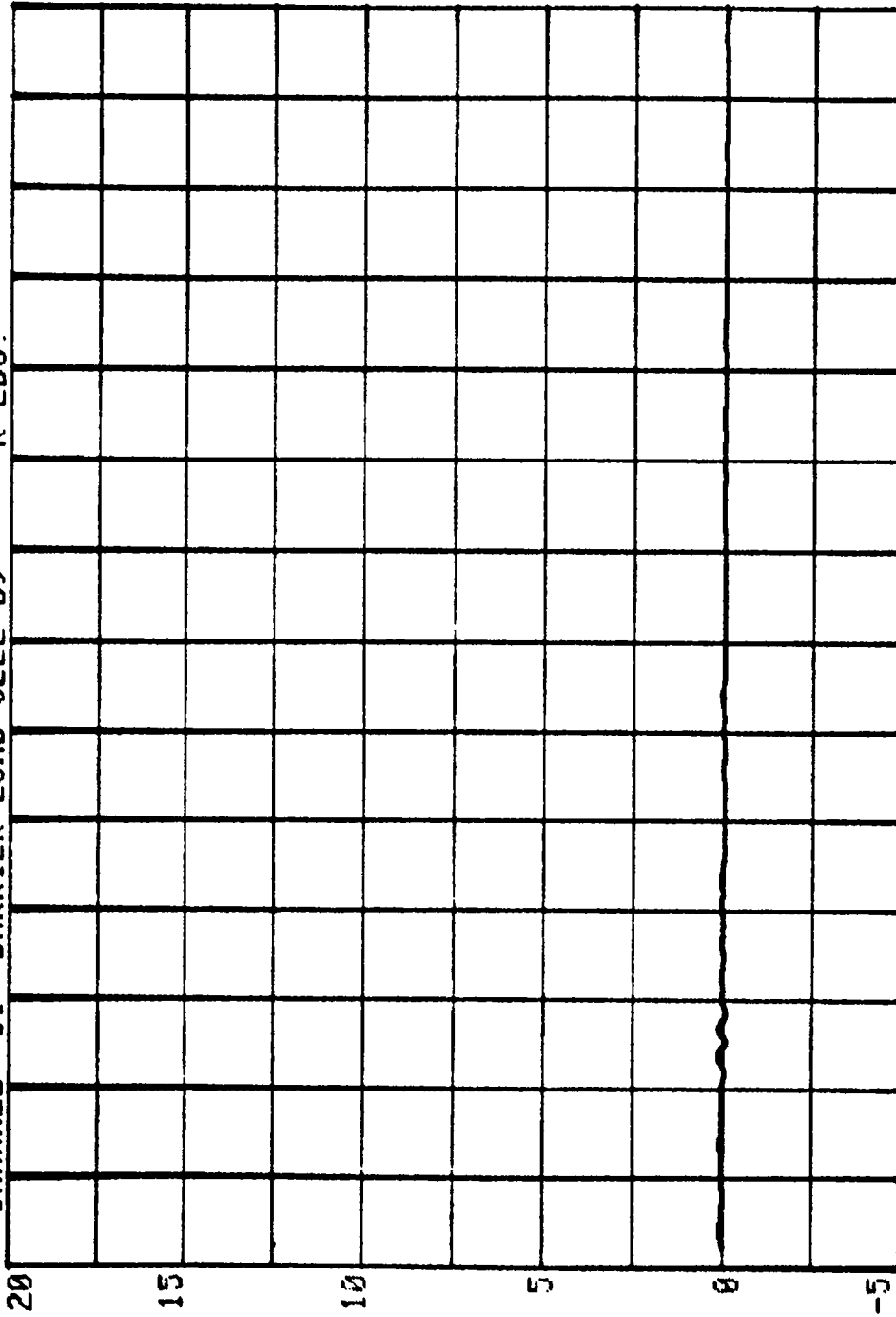
CHANNEL 49 BARRIER LOAD CELL B7
RUN= 887 SERIES= 200 K LBS.



RUN= 887 SERIES= 200
CHANNEL 50 BARRIER LOAD CELL B8 K LBS.

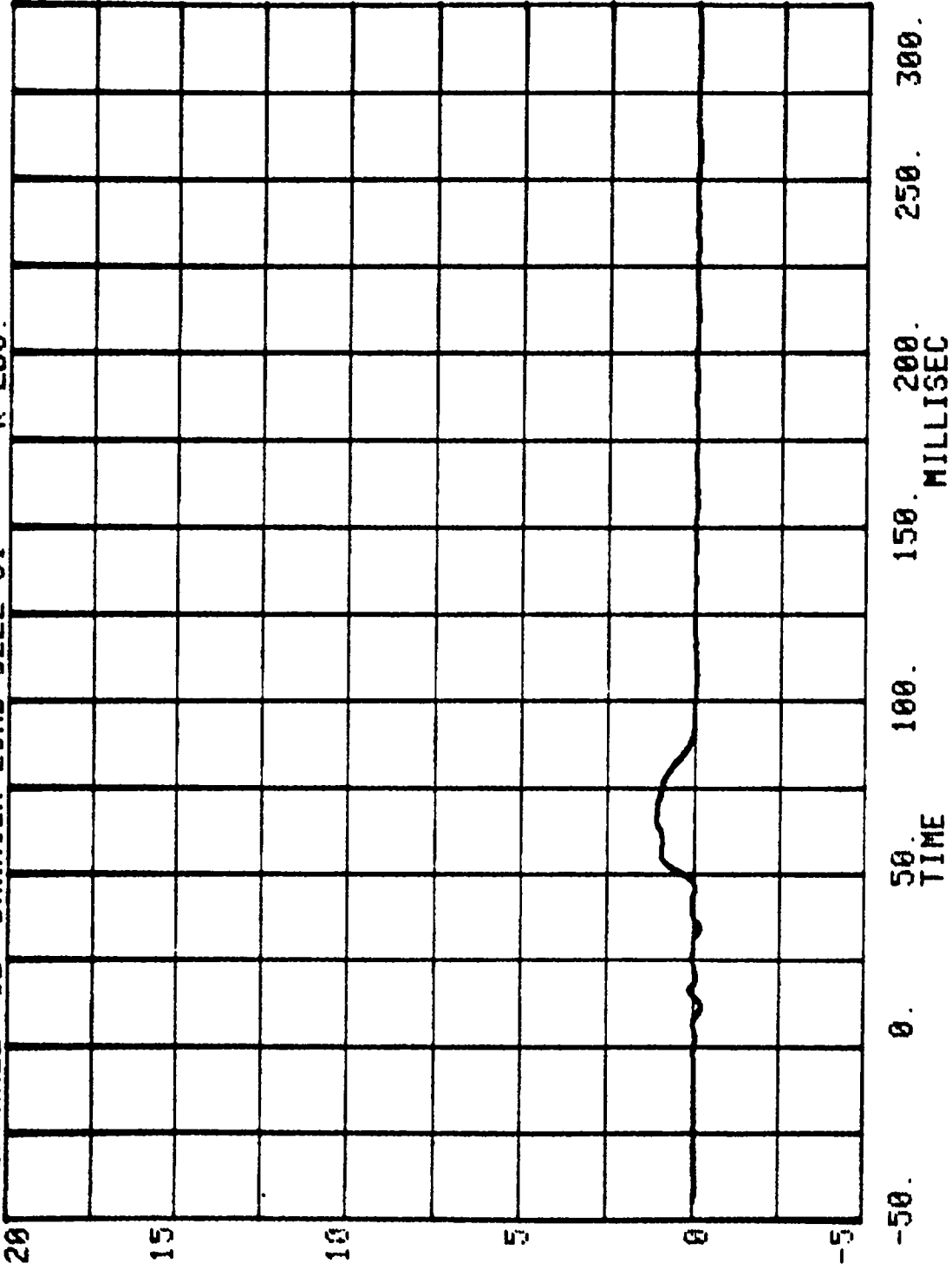


CHANNEL 51 BARRIER LOAD CELL B9
RUN= 887 SERIES= 200 K LBS.

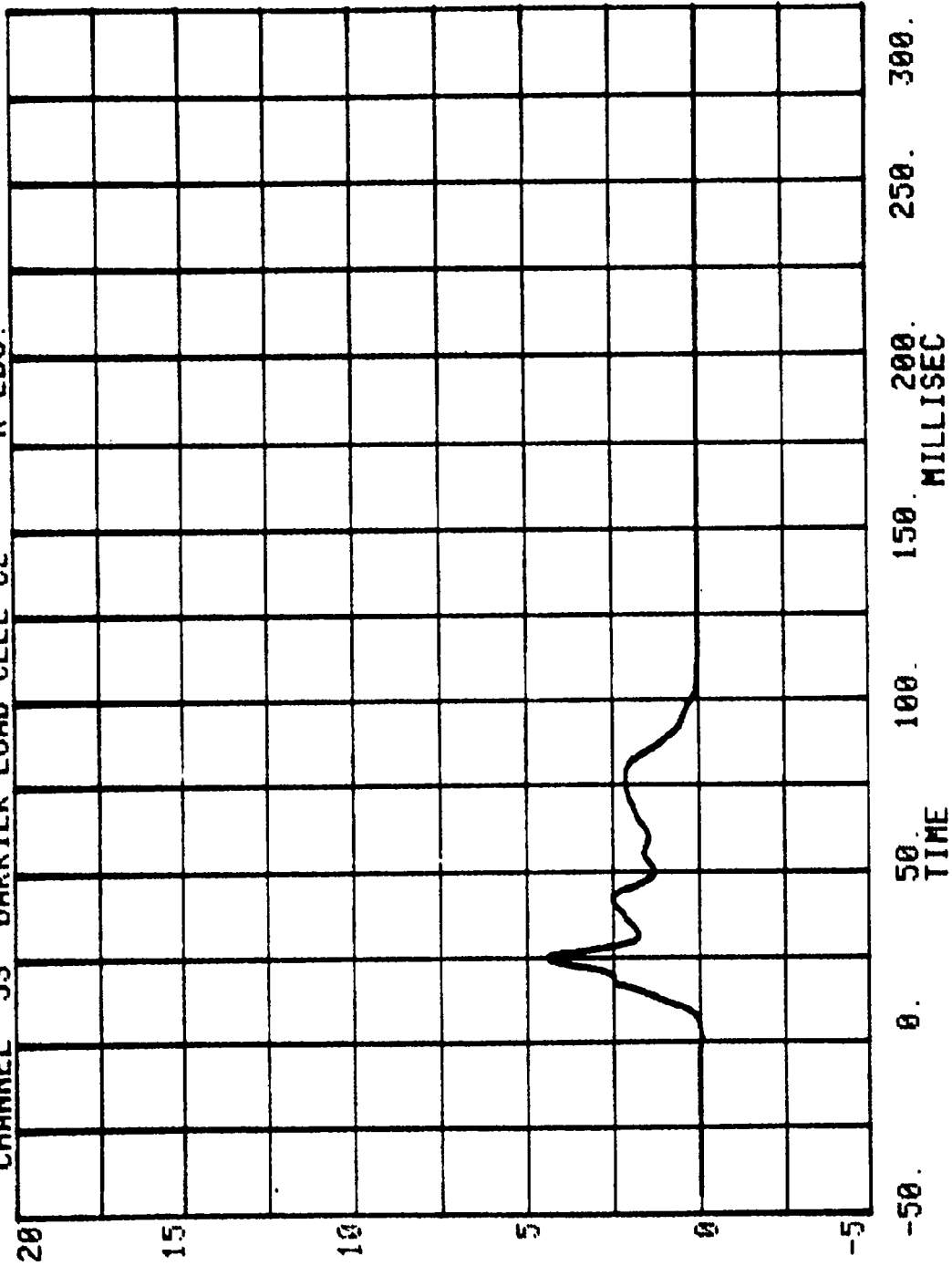


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

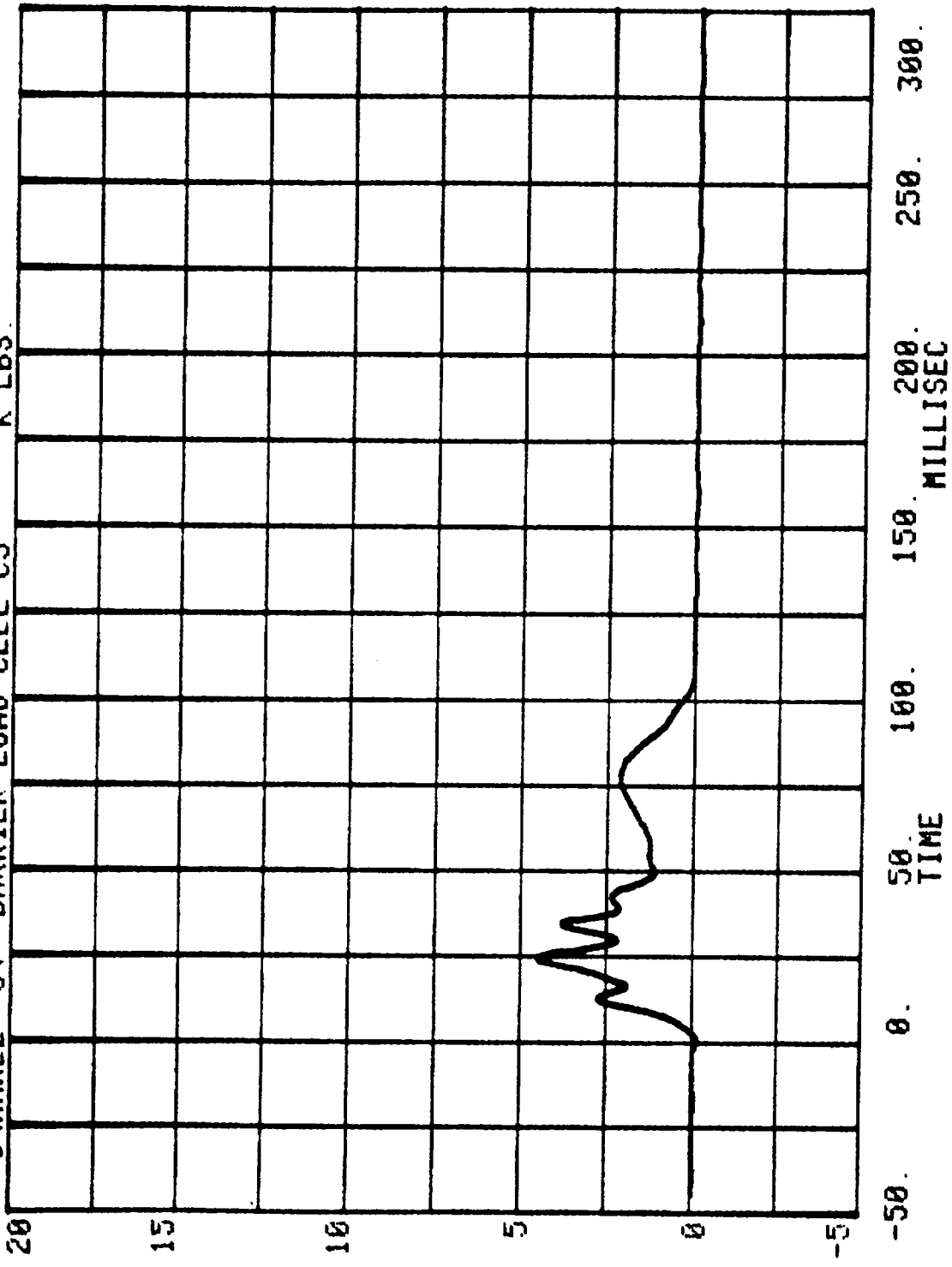
RUN= 887 SERIES= 200 K LBS.
CHANNEL 52 BARRIER LOAD CELL C1



CHANNEL 53 BARRIER LOAD CELL C2
RUN= 887 SERIES= 200 K LBS.

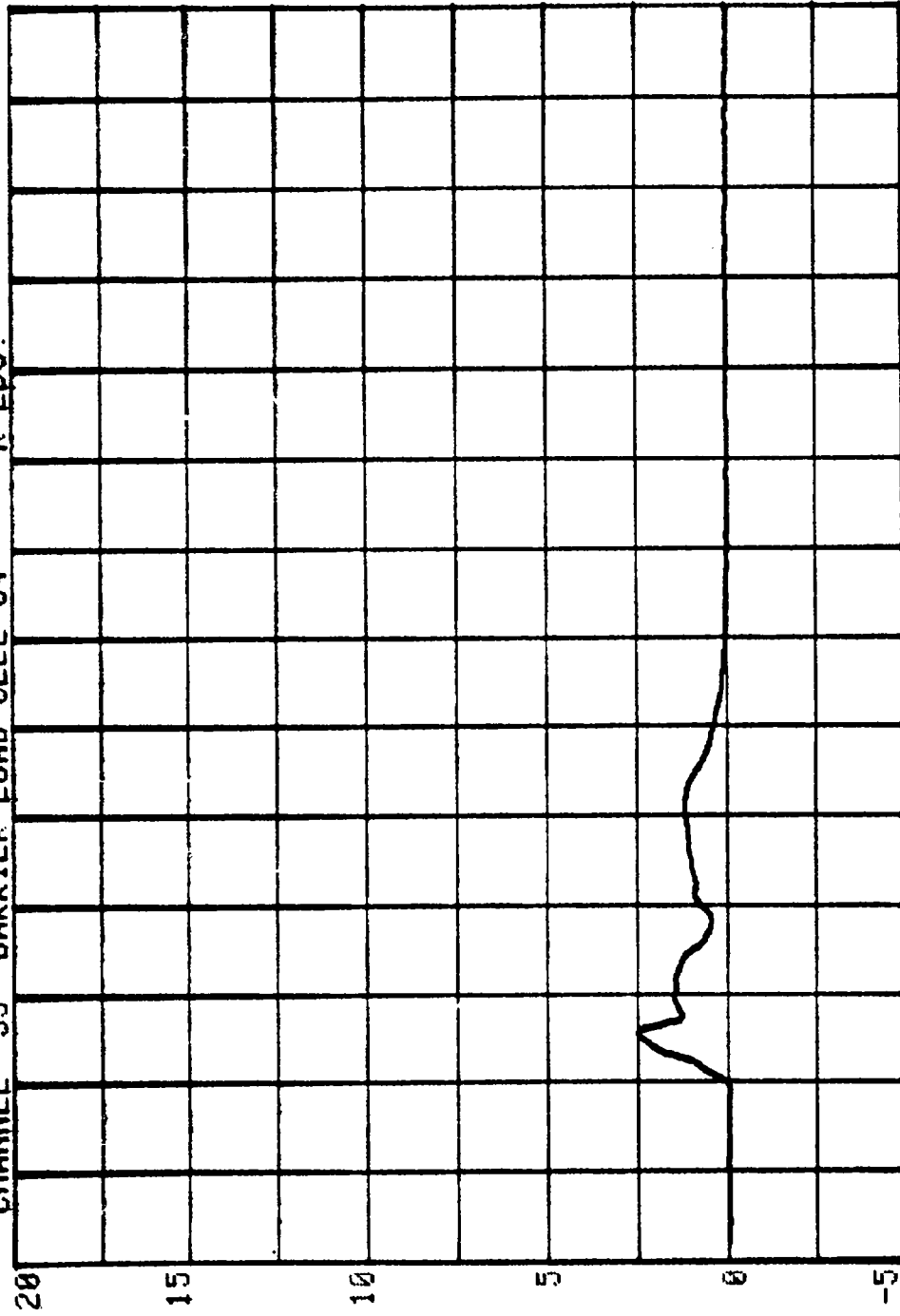


CHANNEL 54 BARRIER LOAD CELL C3
RUN= 887 SERIES= 200 K LBS.



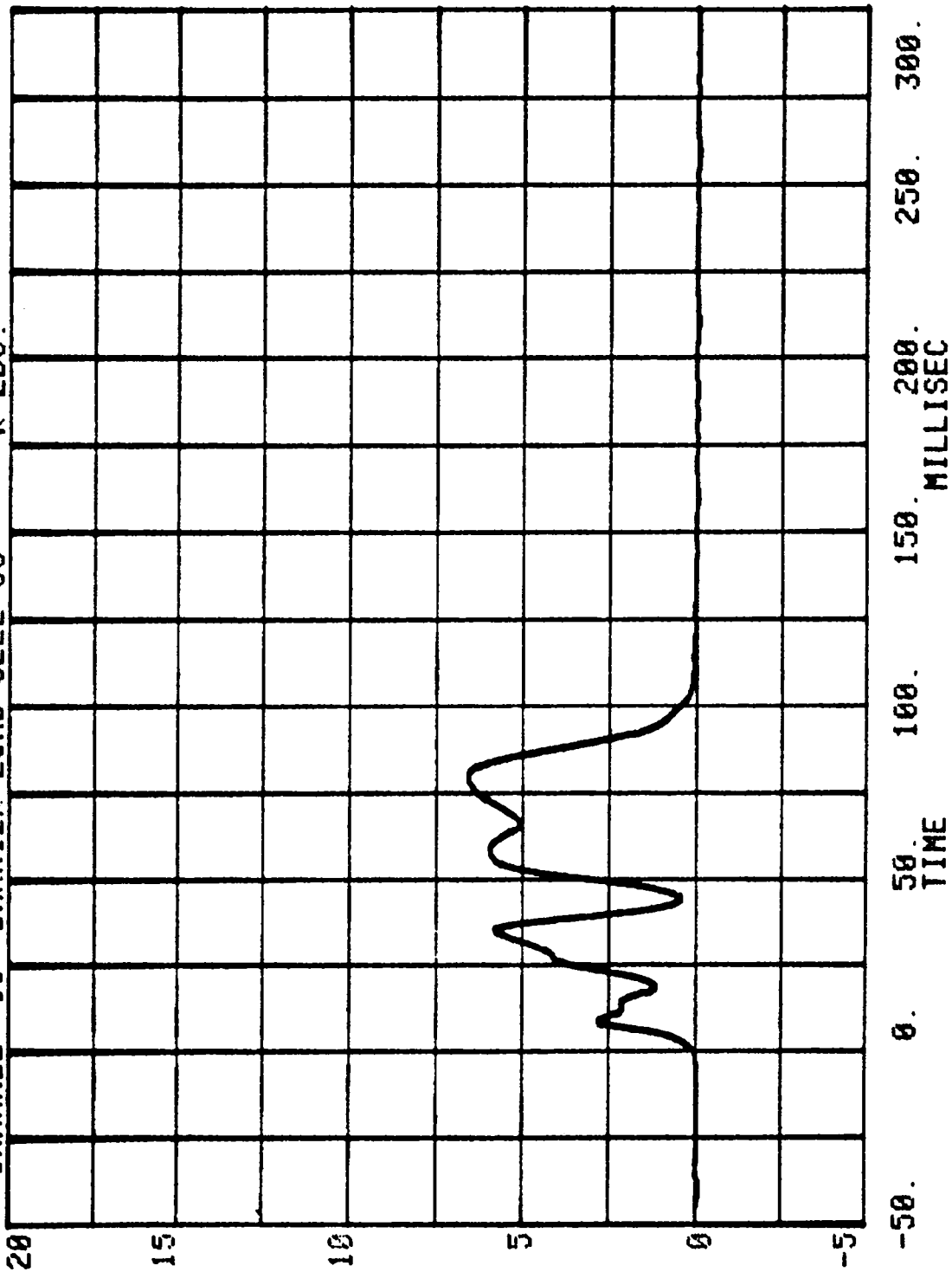
CHANNEL 55 BARRIER LOAD CELL C4 K LBS.

RUN= 887 SERIES= 200

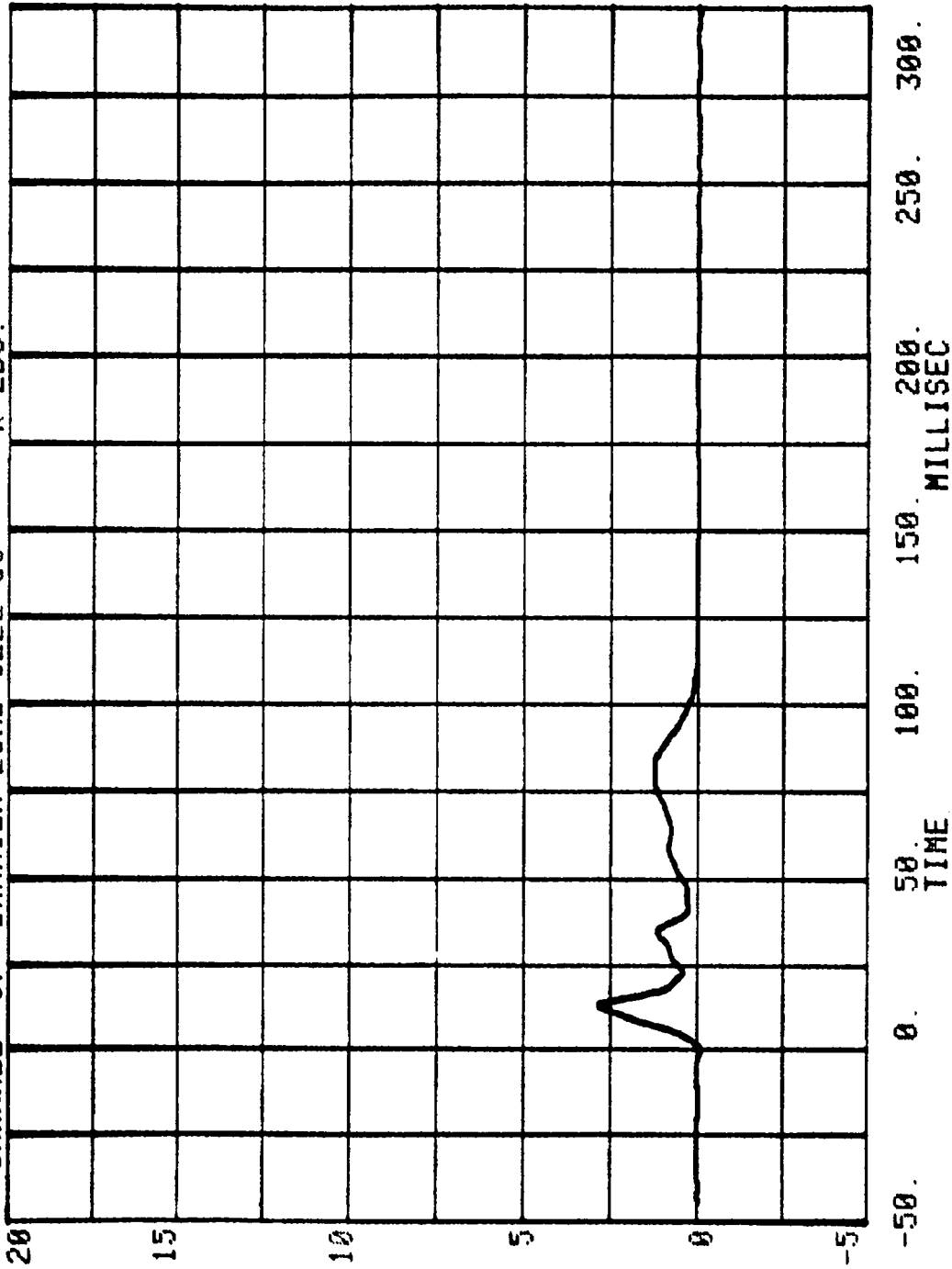


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

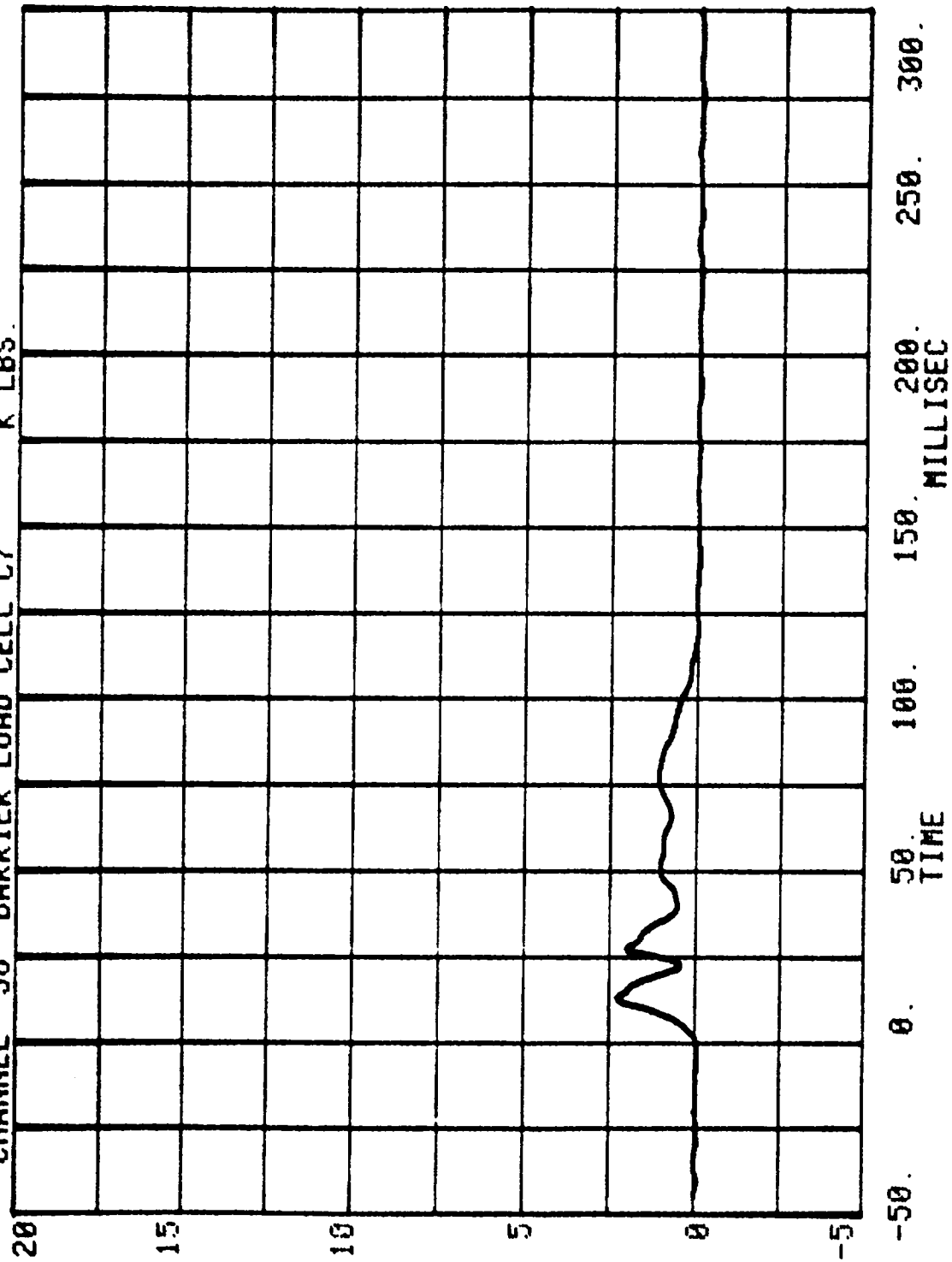
RUN= 887 SERIES= 200 K LBS.
CHANNEL 56 BARRIER LOAD CELL C5



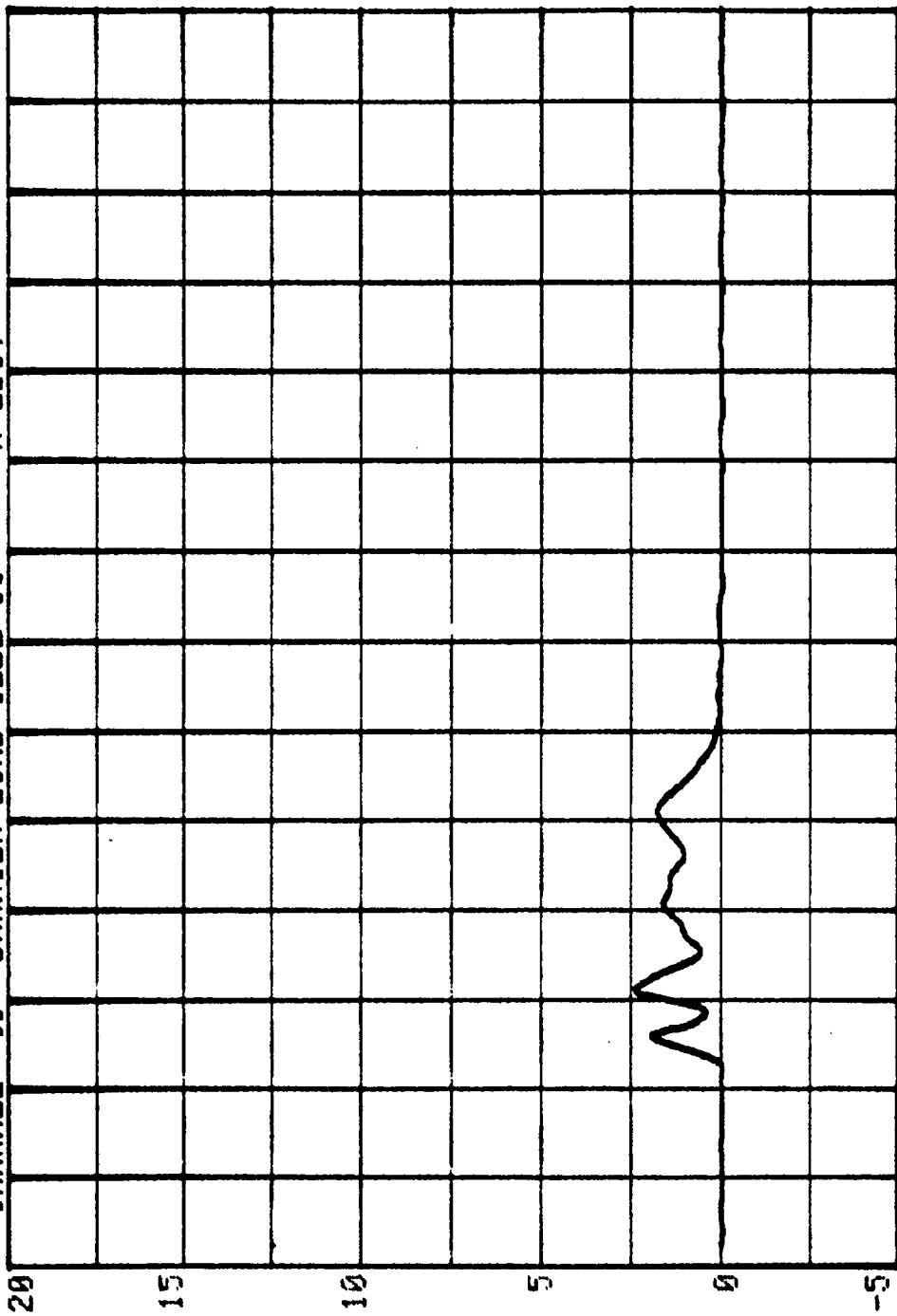
CHANNEL 57 BARRIER LOAD CELL C6
RUN= 887 SERIES= 200 K LBS.



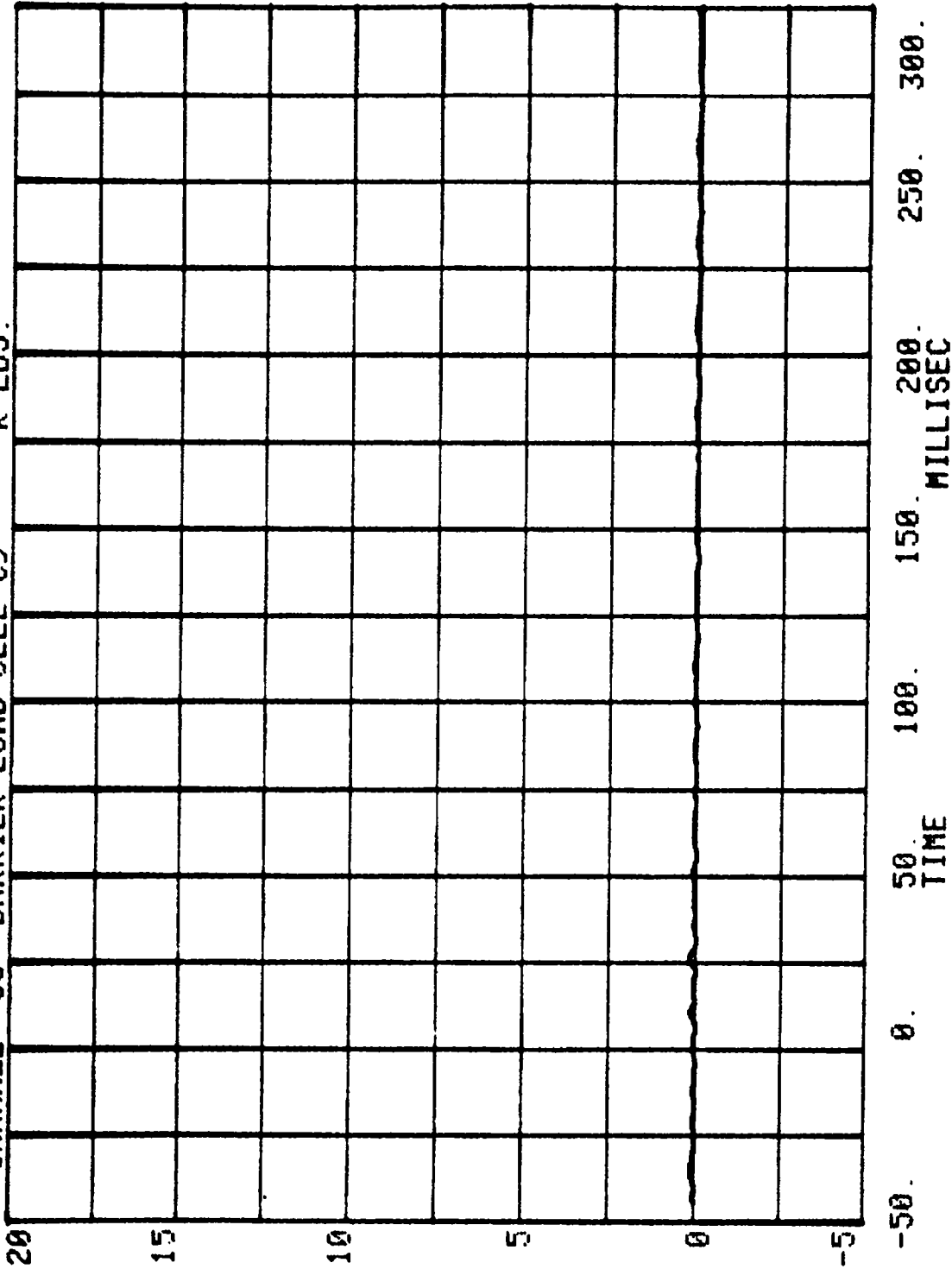
CHANNEL 58 BARRIER LOAD CELL C7
RUN= 887 SERIES= 200 K LBS.



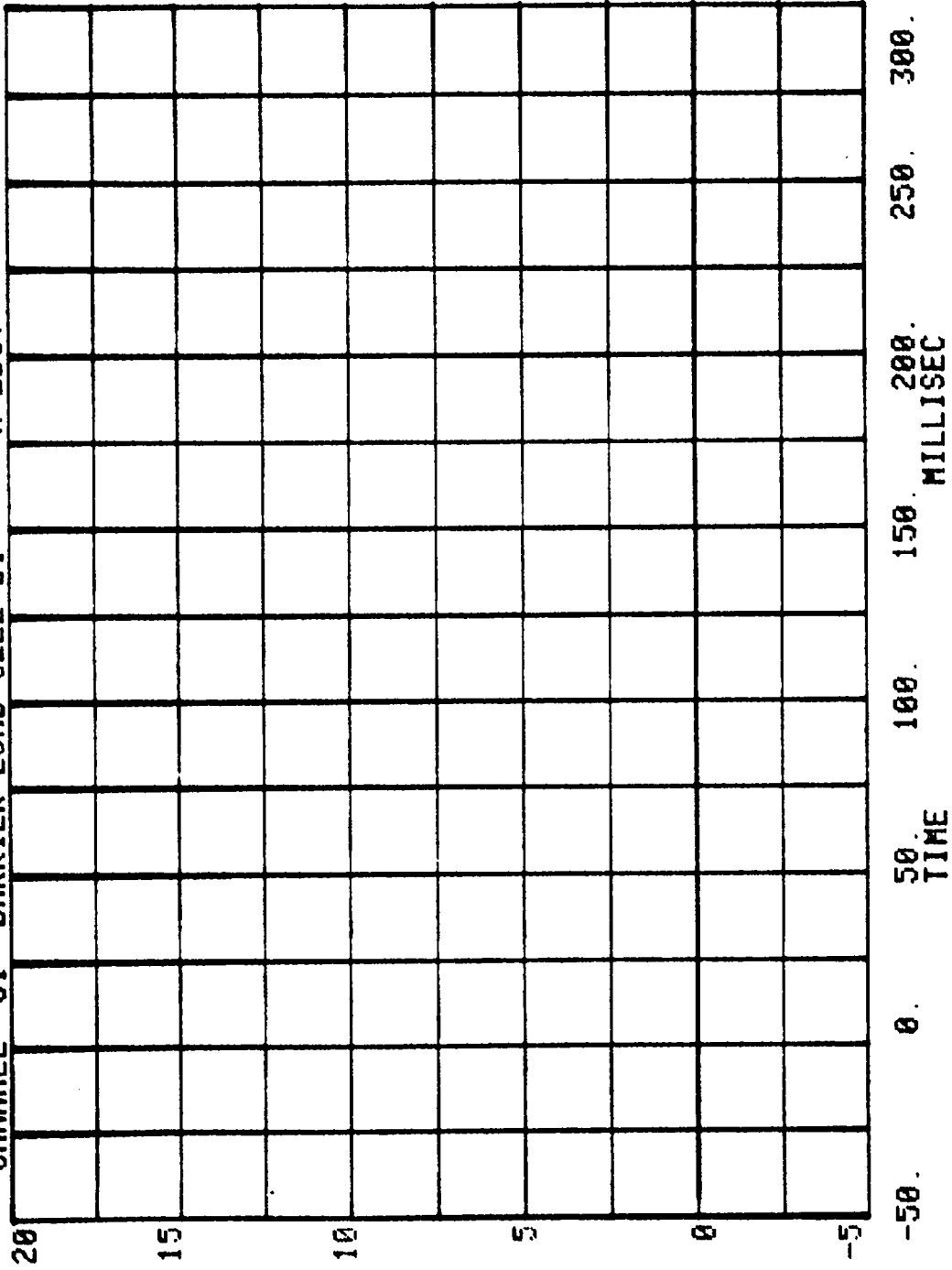
CHANNEL 59 BARRIER LOAD CELL C8
RUN= 887 SERIES= 200 K LBS.



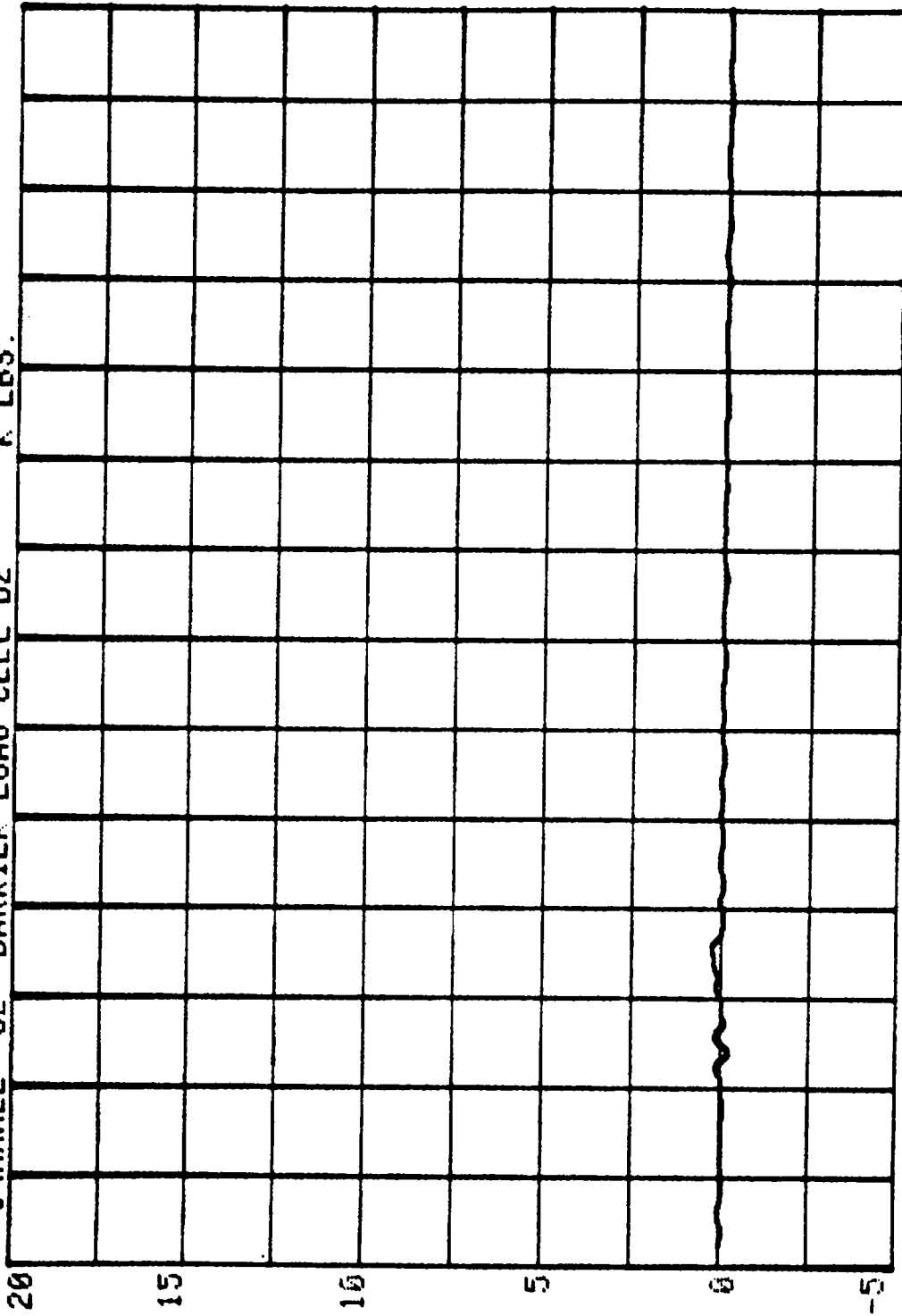
CHANNEL 60 BARRIER LOAD CELL C9
RUN= 887 SERIES= 200 K LBS.



CHANNEL 61 BARRIER LOAD CELL D1
RUN= 887 SERIES= 200 K LBS.

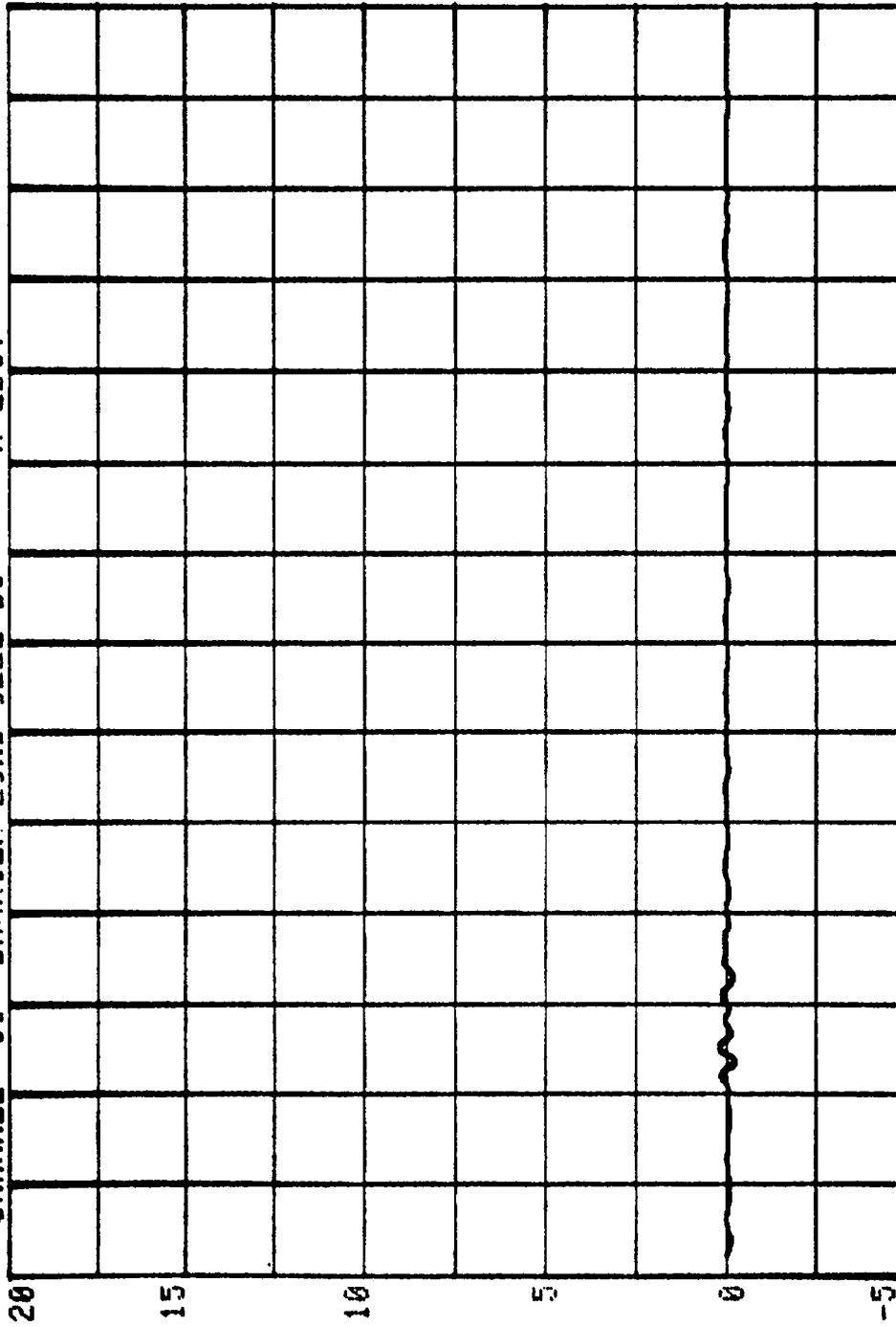


CHANNEL 62 BARRIER LOAD CELL D2
RUN= 887 SERIES= 200 K LBS.



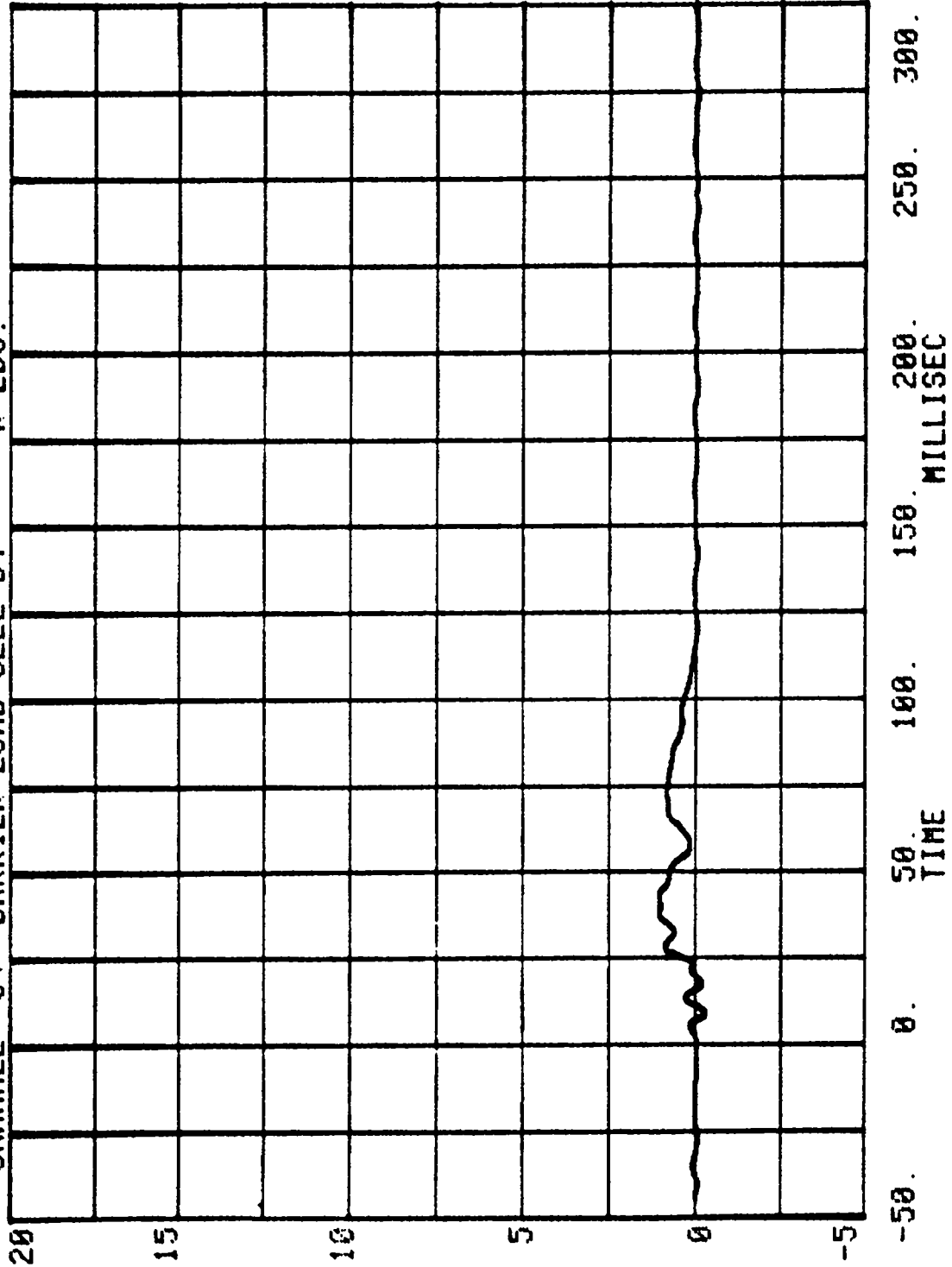
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 63 BARRIER LOAD CELL 03
RUH= 887 SERIES= 200 K LBS.

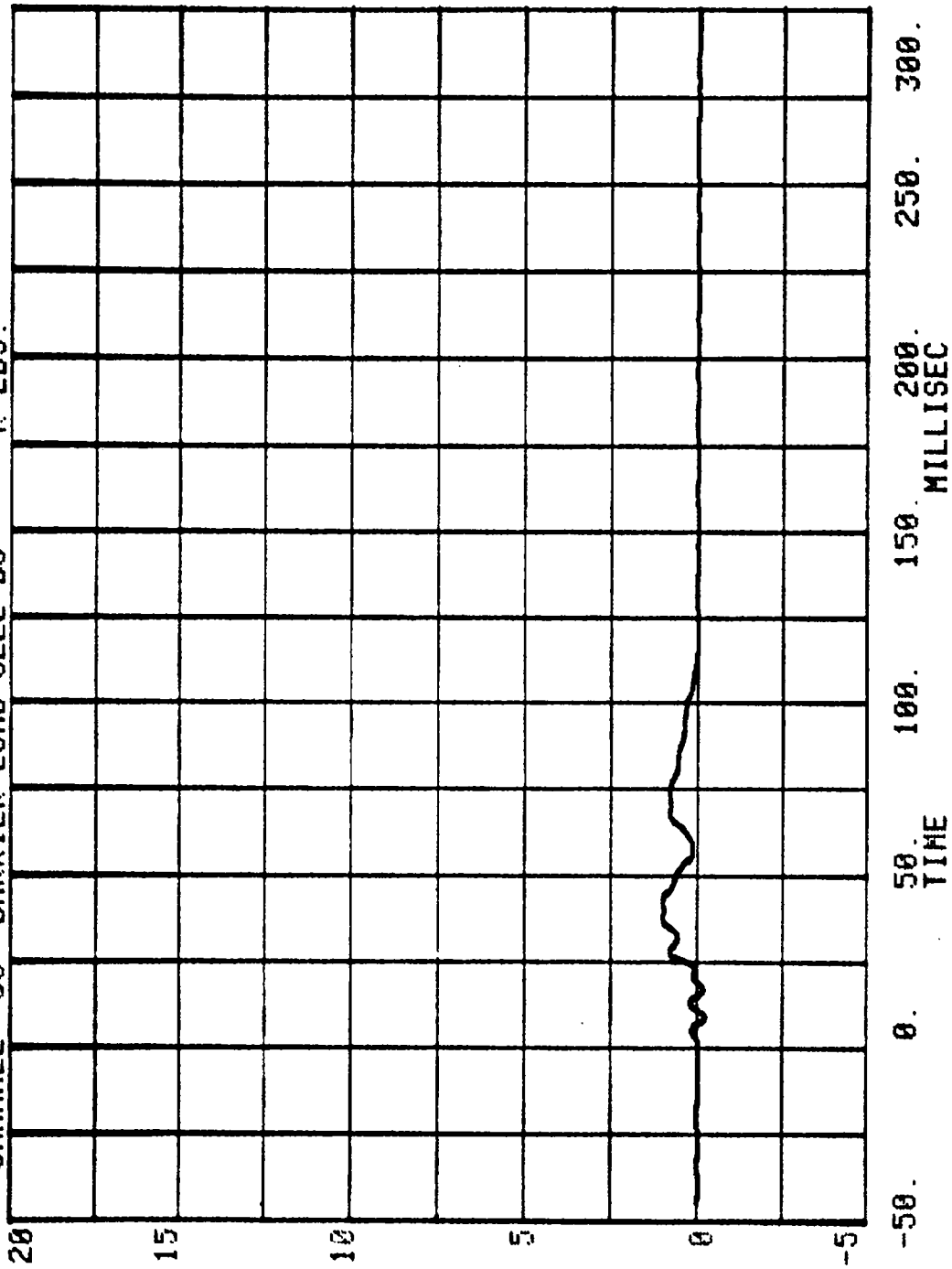


-50. 0. 50. 100. 150. 200. 250. 300.
TIME
MILLISEC

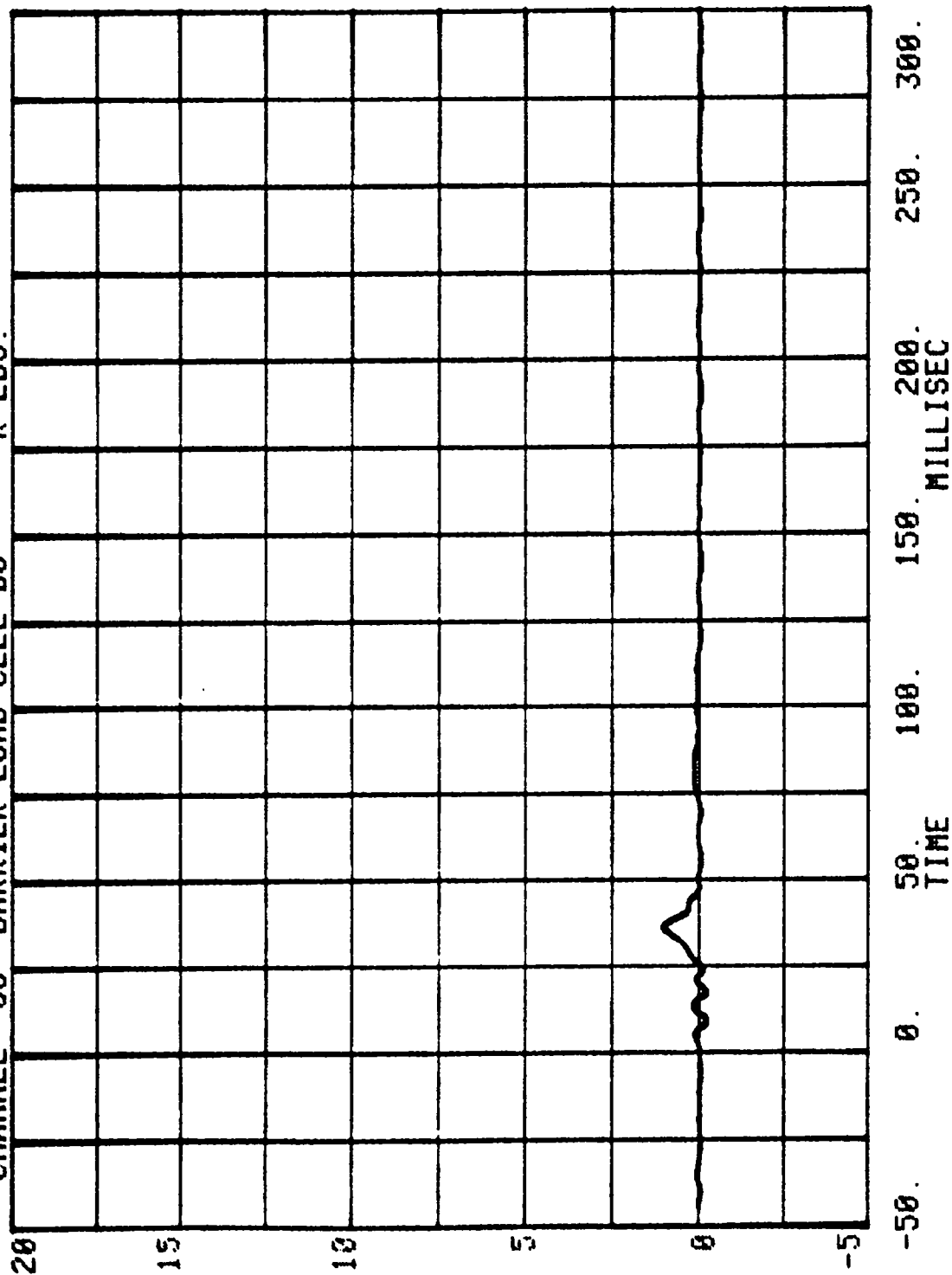
CHANNEL 64 BARRIER LOAD CELL D4
RUN= 887 SERIES= 200 K LBS.



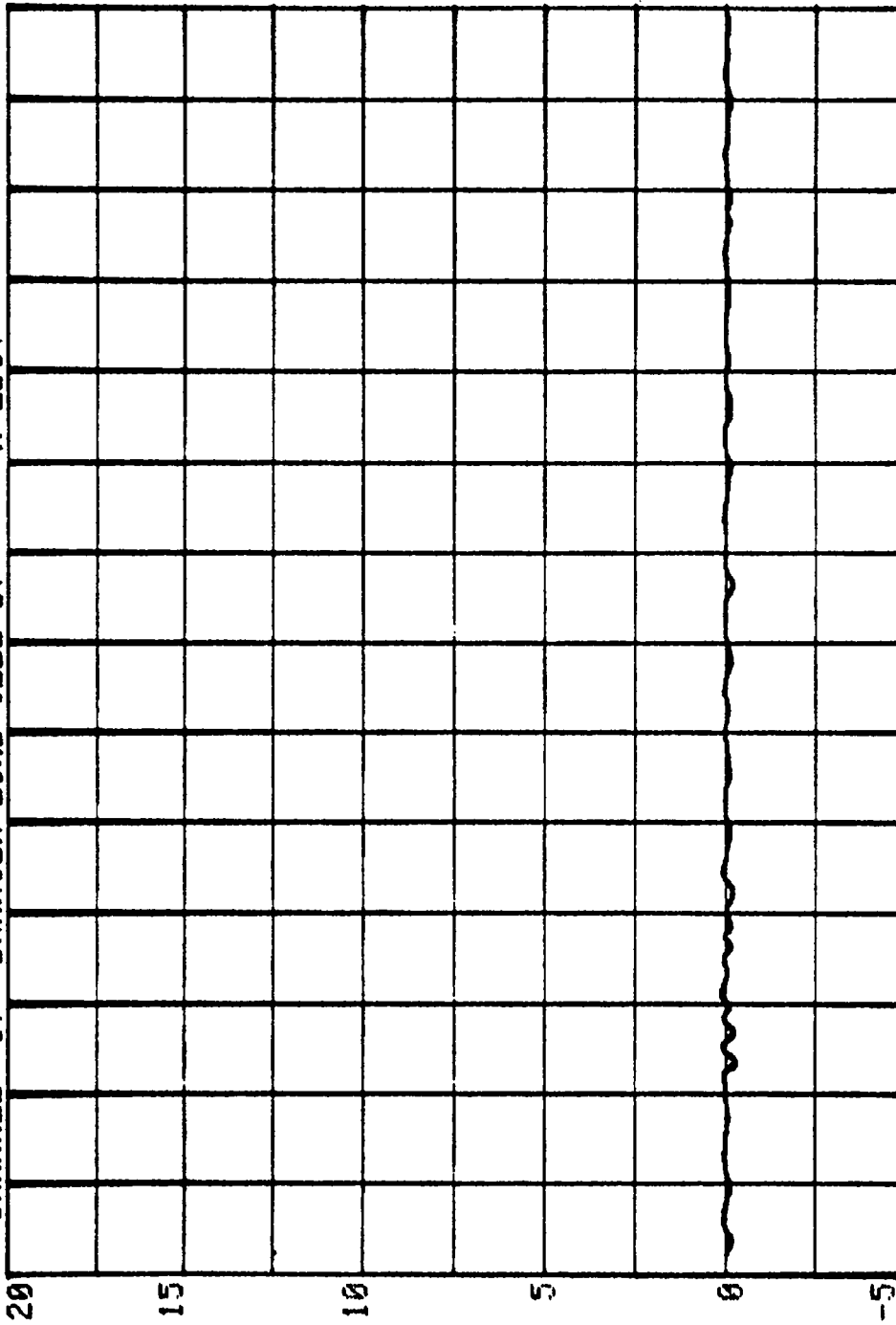
CHANNEL 65 BARRIER LOAD CELL D5
RUM= 887 SERIES= 200 K LBS.



CHANNEL 66 BARRIER LOAD CELL D6
RUN= 887 SERIES= 200 K LBS.

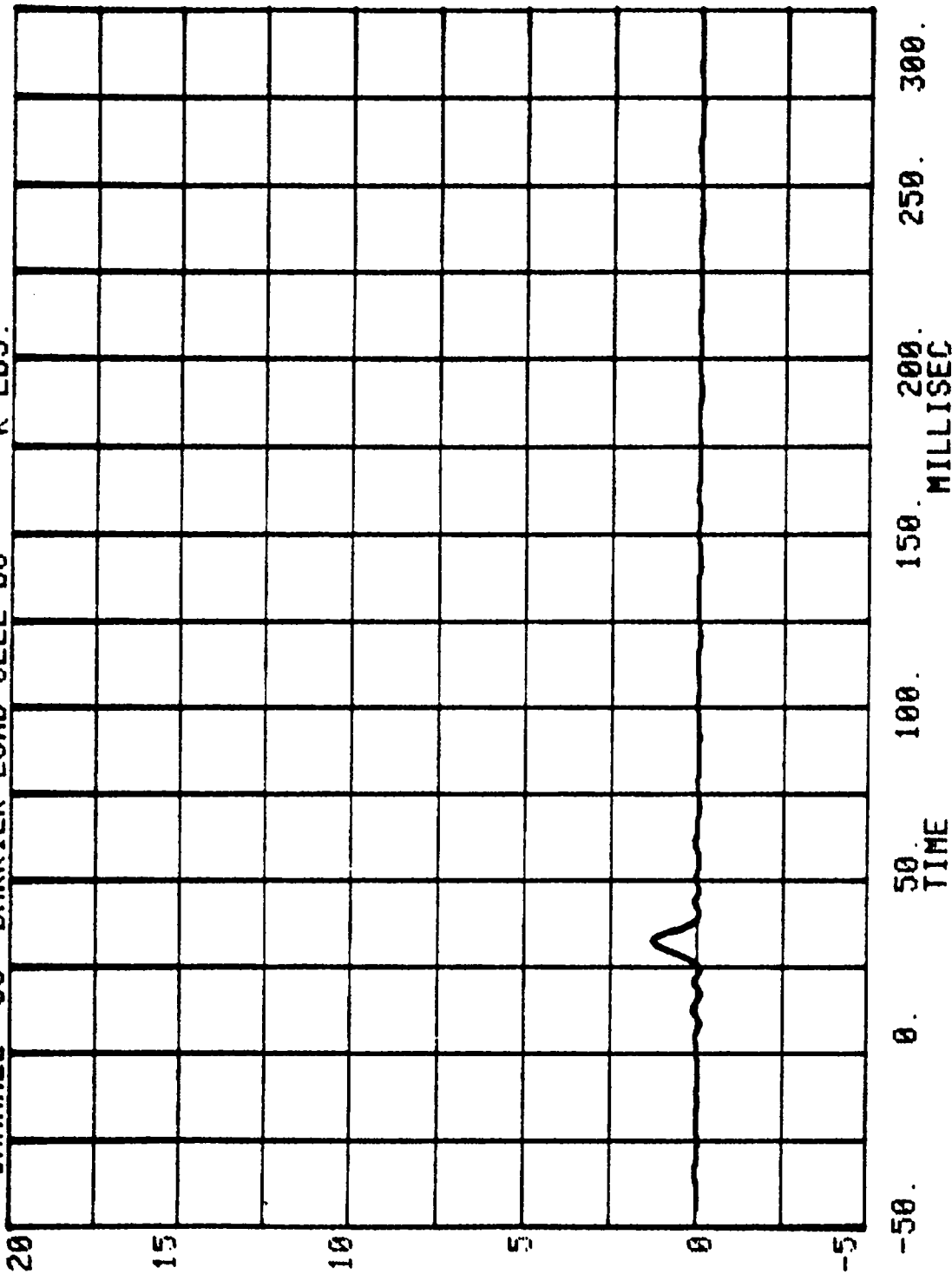


CHANNEL 67 BARRIER LOAD CELL D7
RUN= 887 SERIES= 200 K LBS.

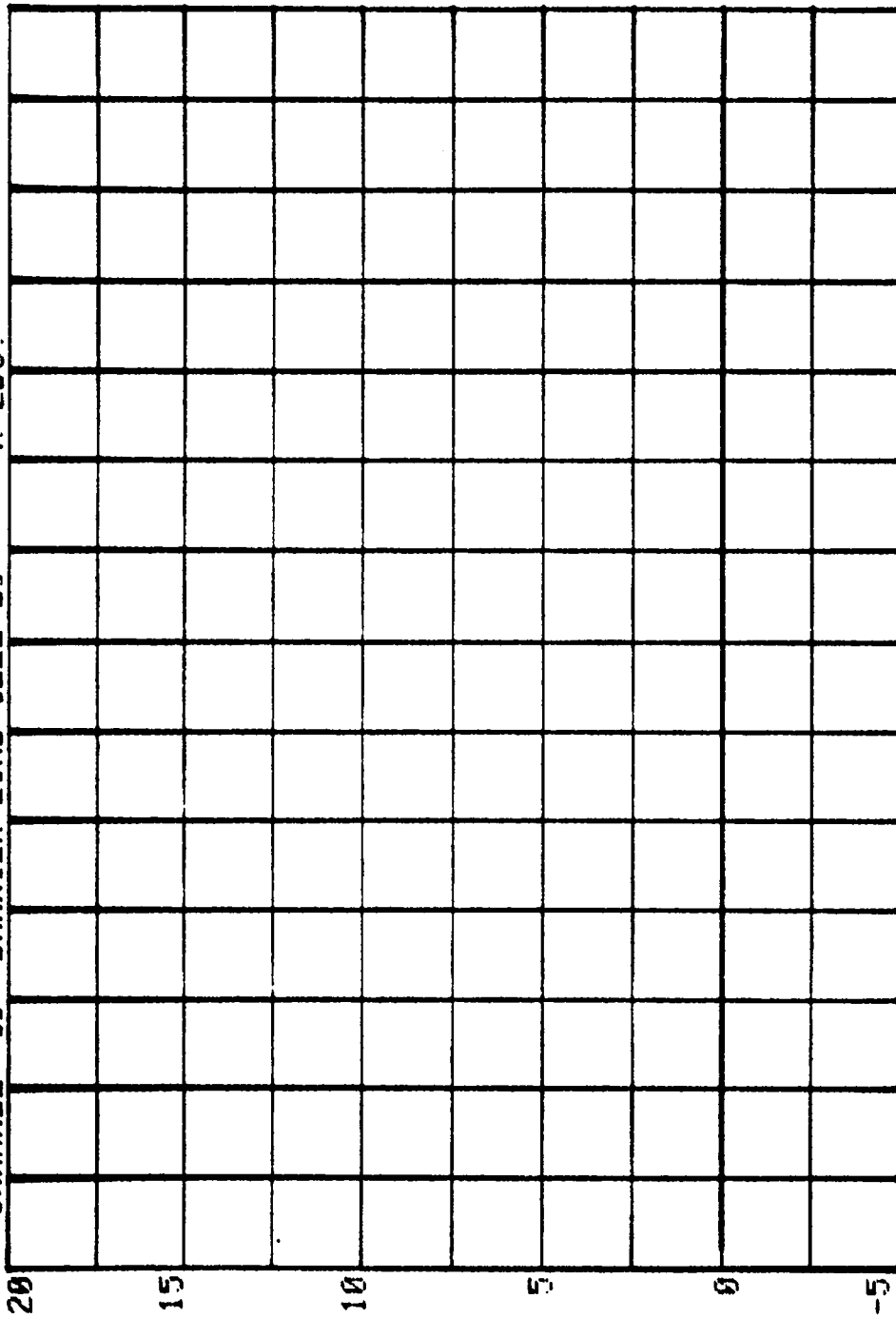


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 68 BARRIER LOAD CELL D8
RUN= 887 SERIES= 200 K LBS.



CHANNEL 69 BARRIER LOAD CELL D9
RUN= 887 SERIES= 200 K LBS.

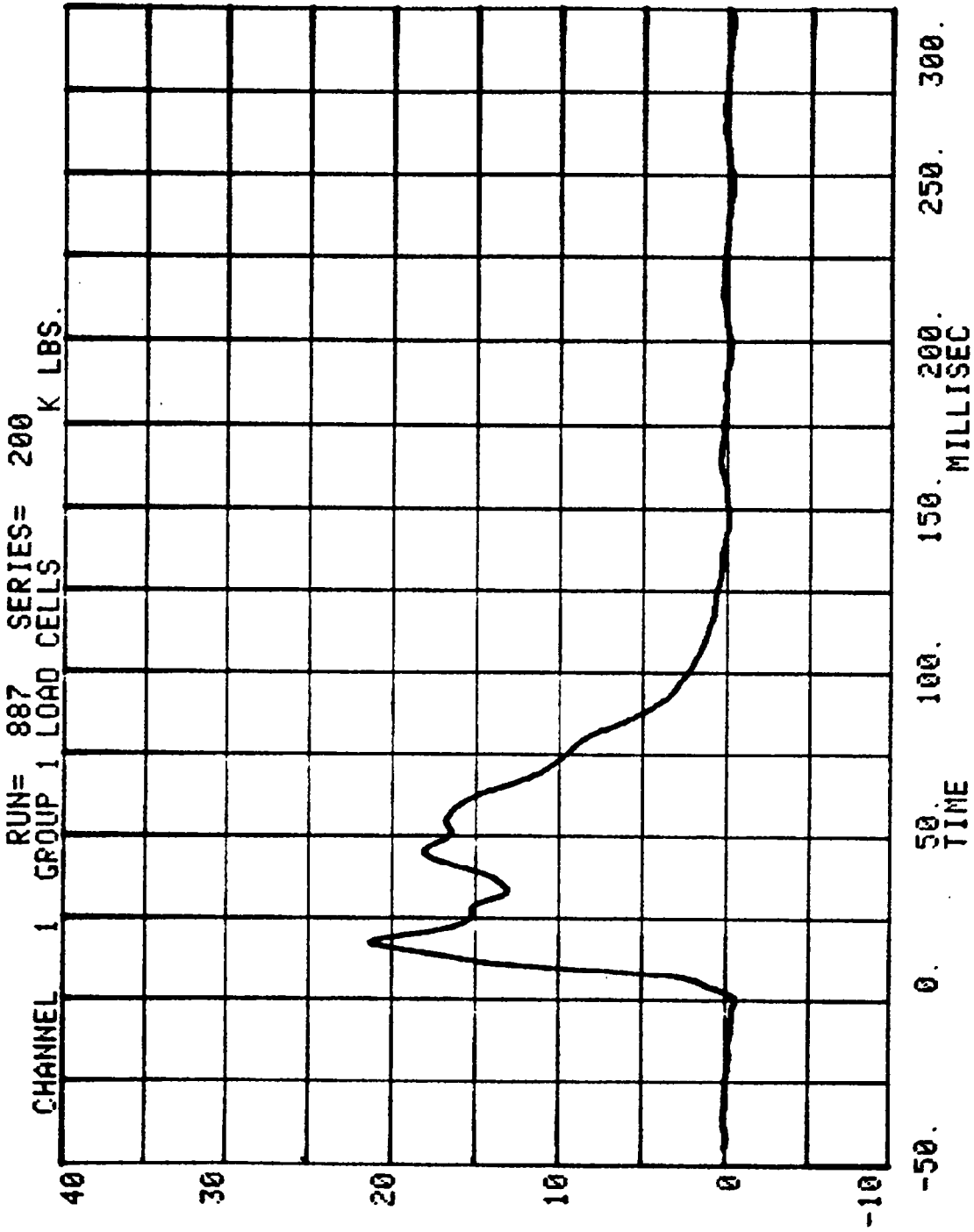


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

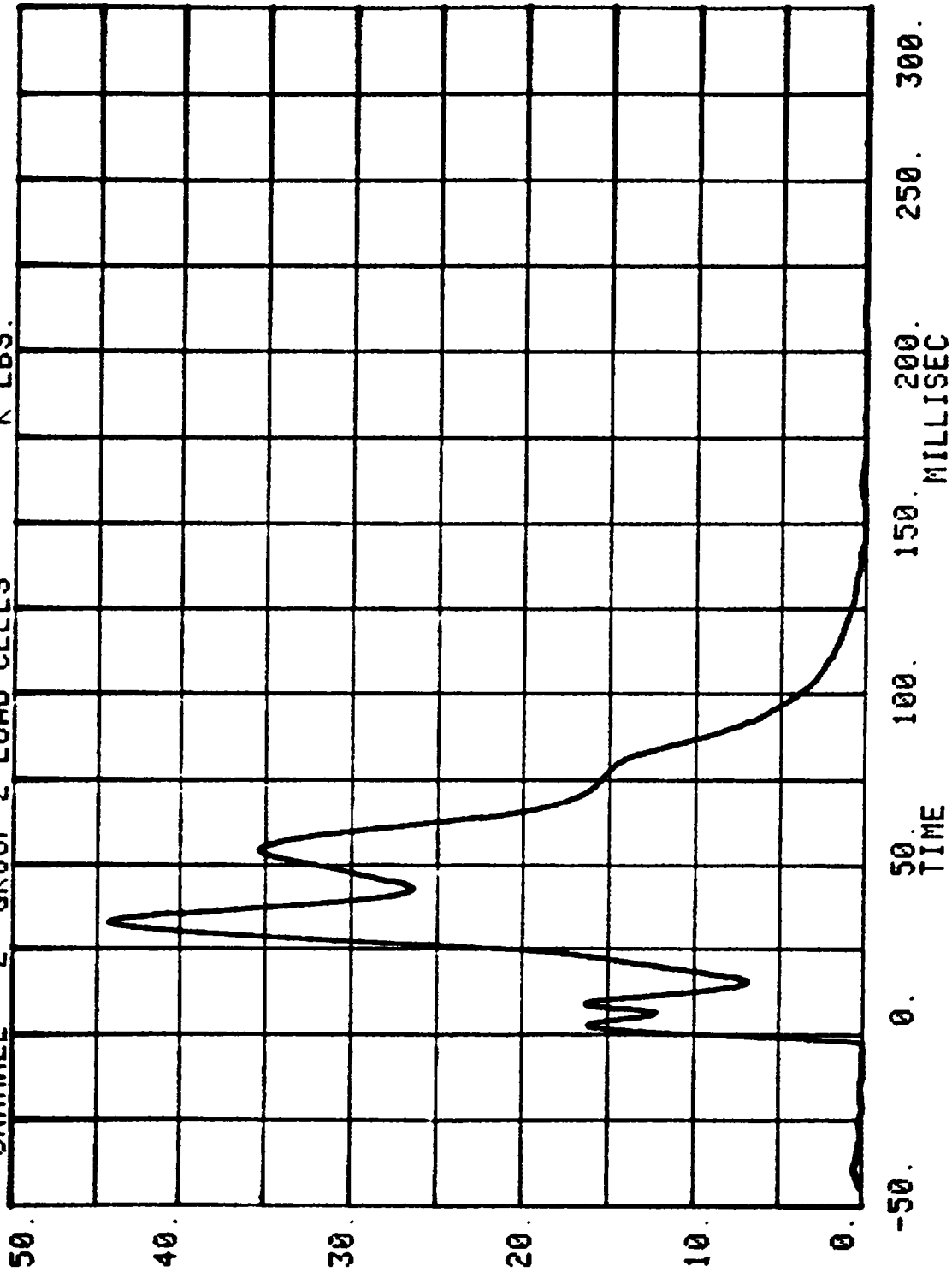
NEW CAR ASSESSMENT CRASH TEST - 1989

RUN # 887 SERIES # 200

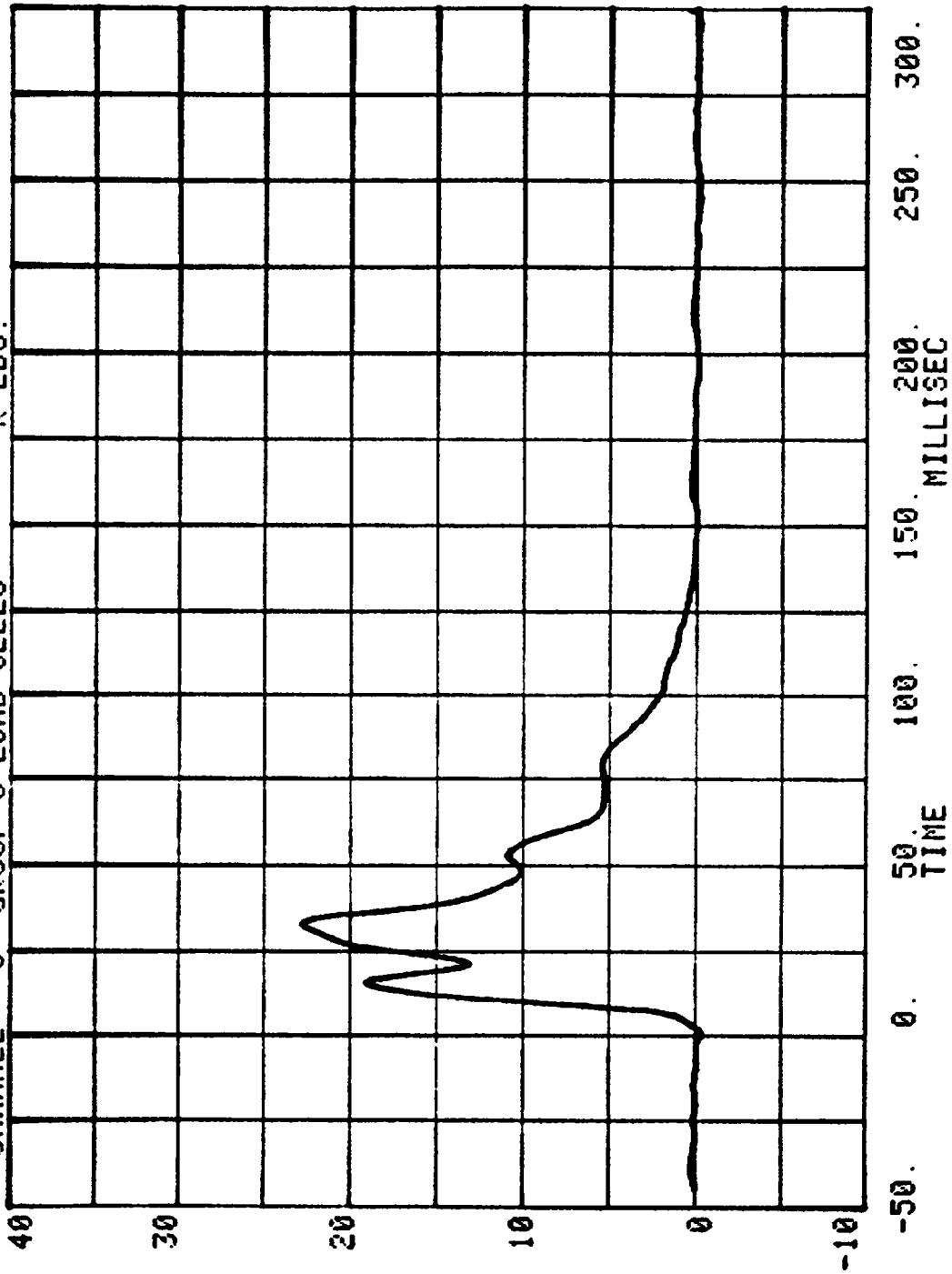
CHAN	TITLE	MINIMUM	MAXIMUM	AT	TIME
1	GROUP 1 LOAD CELLS	- 543 K LBS.	21.268 K LBS.		- .08 MS. 17.55 MS.
2	GROUP 2 LOAD CELLS	- 672 K LBS.	44.369 K LBS.		-4.20 MS. 32.92 MS.
3	GROUP 3 LOAD CELLS	- 284 K LBS.	22.829 K LBS.		.67 MS. 32.92 MS.
4	GROUP 4 LOAD CELLS	- 265 K LBS.	8.906 K LBS.		1.12 MS. 24.67 MS.
5	GROUP 5 LOAD CELLS	- 204 K LBS.	10.394 K LBS.		-40.05 MS. 35.85 MS.
6	GROUP 6 LOAD CELLS	- 386 K LBS.	4.970 K LBS.		141.30 MS. 27.97 MS.
7	TOTAL LOAD CELL SUM	-1.446 K LBS.	99.266 K LBS.		-4.35 MS. 33.30 MS.



CHANNEL 2 GROUP 2 LOAD CELLS
RUN= 887 SERIES= 200 K LBS.



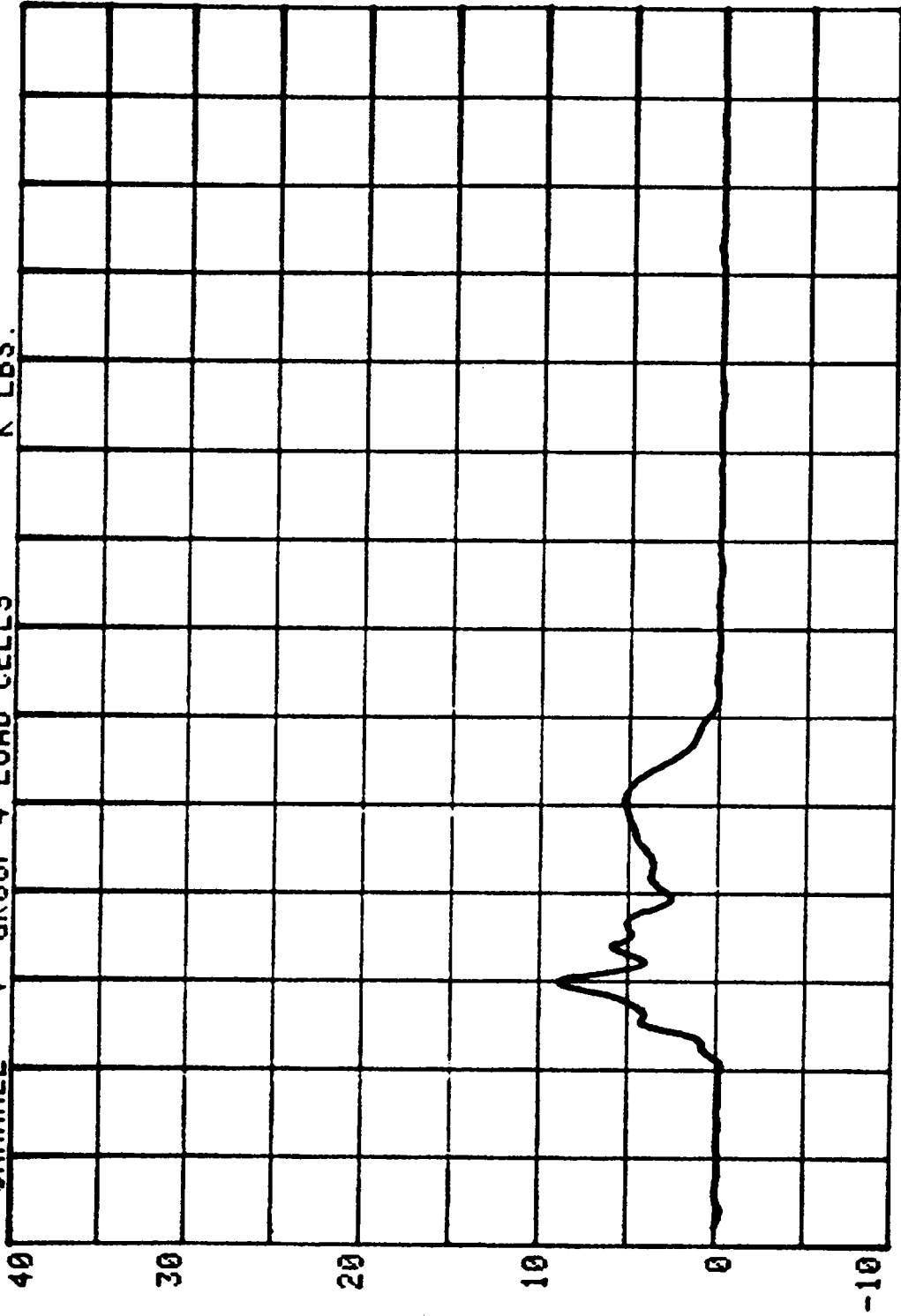
CHANNEL 3 GROUP 3 LOAD CELLS
RUN= 887 SERIES= 200 K LBS.



CHANNEL 4 GROUP 4 LOAD CELLS

RUN= 887 SERIES= 200

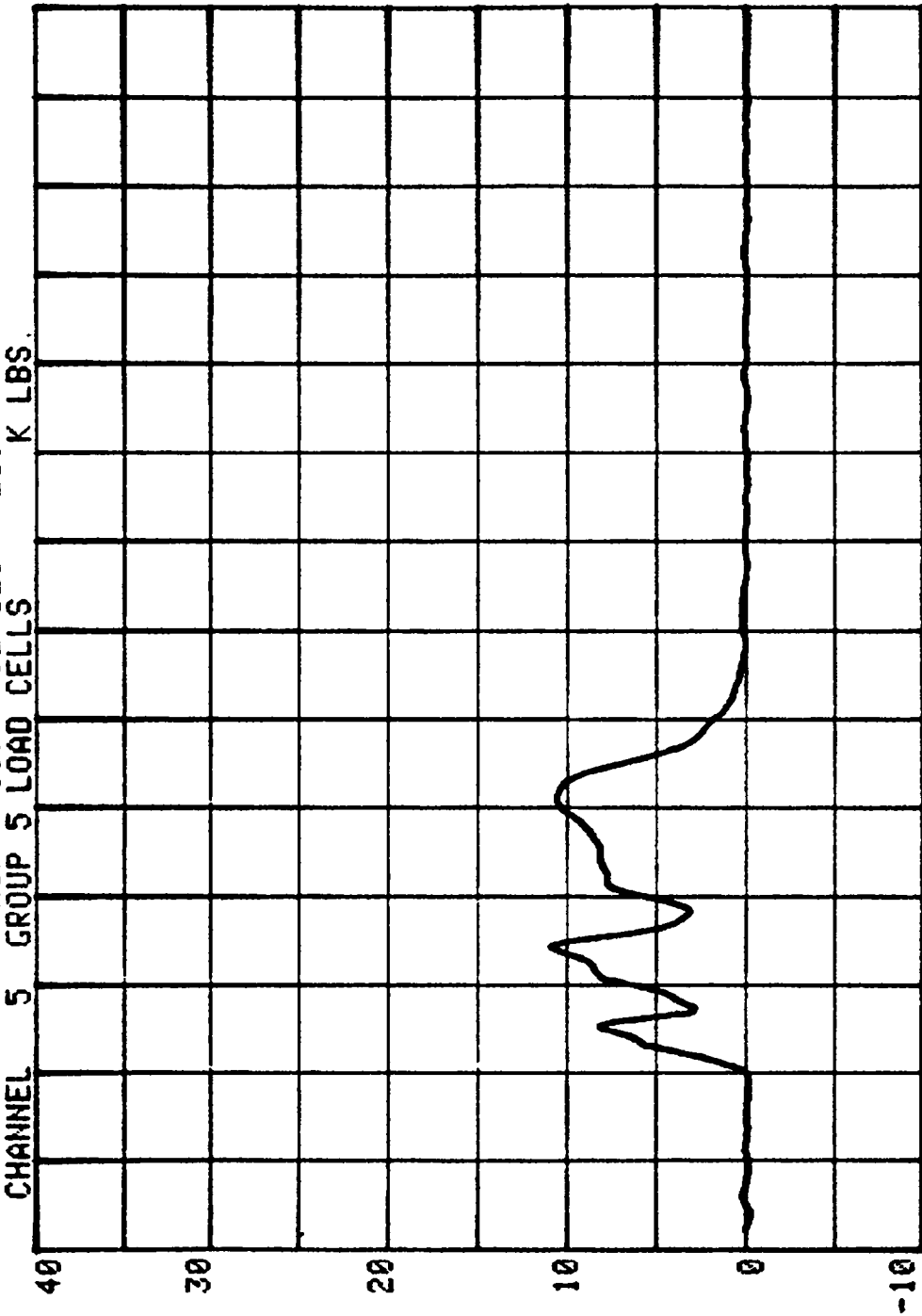
K LBS.



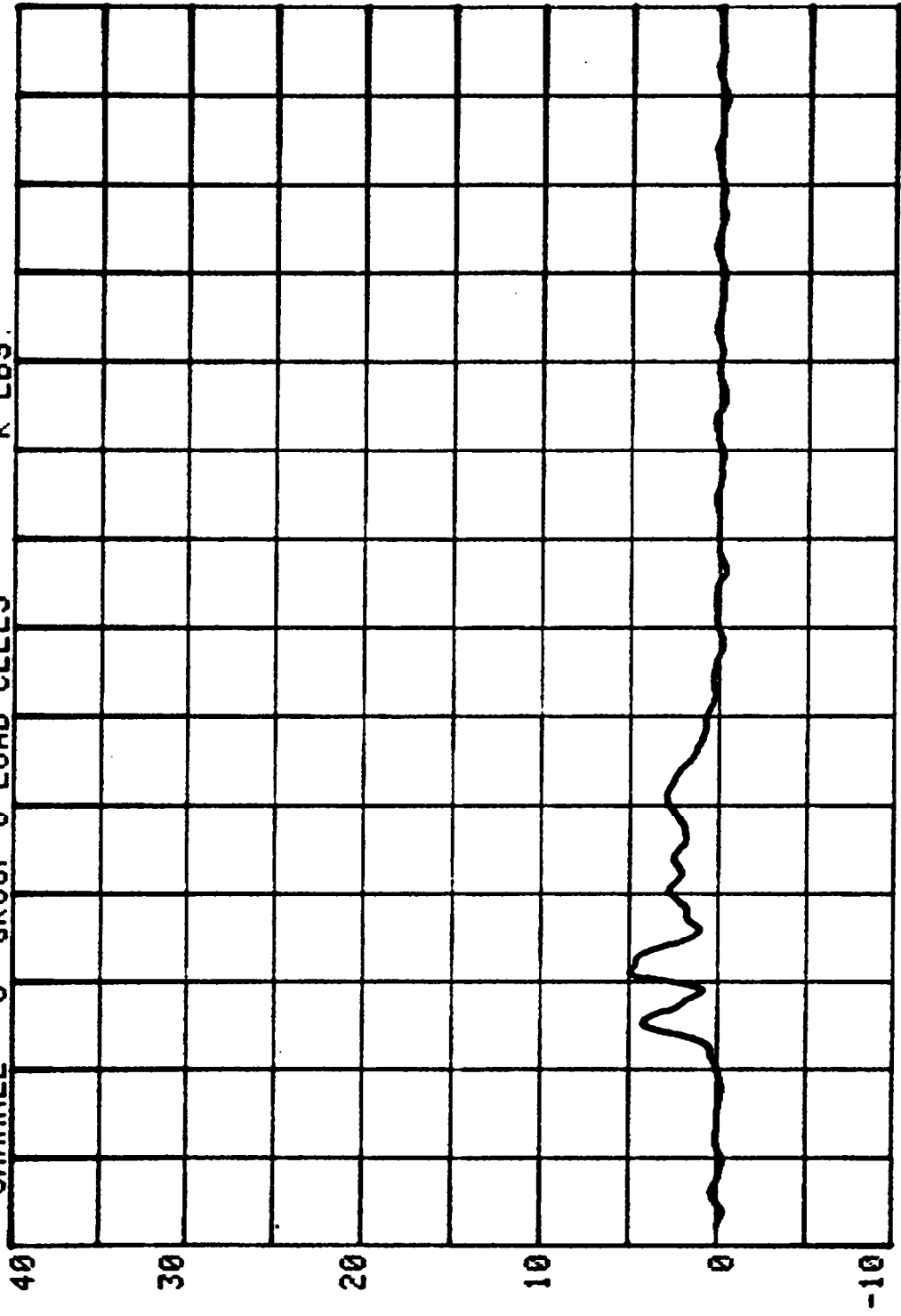
-50. 0. 50. 100. 150. 200. 250. 300.
MILLISEC

CHANNEL 5 GROUP 5 LOAD CELLS

RUN= 887 SERIES= 200



RUN= 887 SERIES= 200
CHANNEL 6 GROUP 6 LOAD CELLS K LBS.



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

CHANNEL 7 TOTAL LOAD CELL SUM K LBS.

RUN= 887 SERIES= 200



TEST NO. MK0200

DUMMY DATA

FILTER CHANNEL CLASS

HEAD ACCELERATION	1000
CHEST ACCELERATION	180
FEMUR FORCES	600
BELT LOADS	60

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NEW CHR ASSESSMENT CRASH TEST - 1989

RUN= 887

POS#1 HEAD R

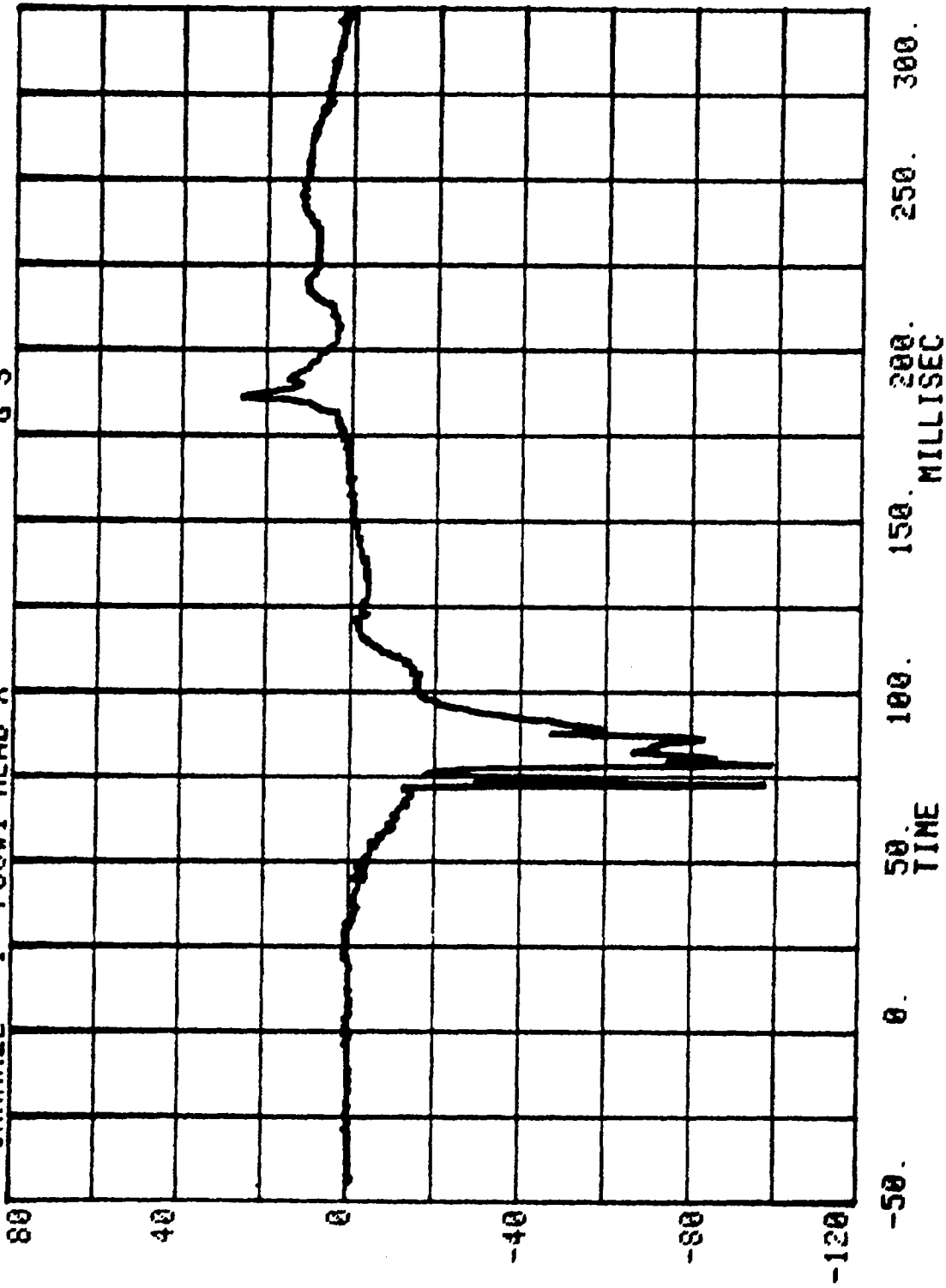
HIC= 969.8 FROM T1= .07177 TO T2= .09292

AVERAGE ACCELERATION BETWEEN T1 AND T2= 73.2G'S

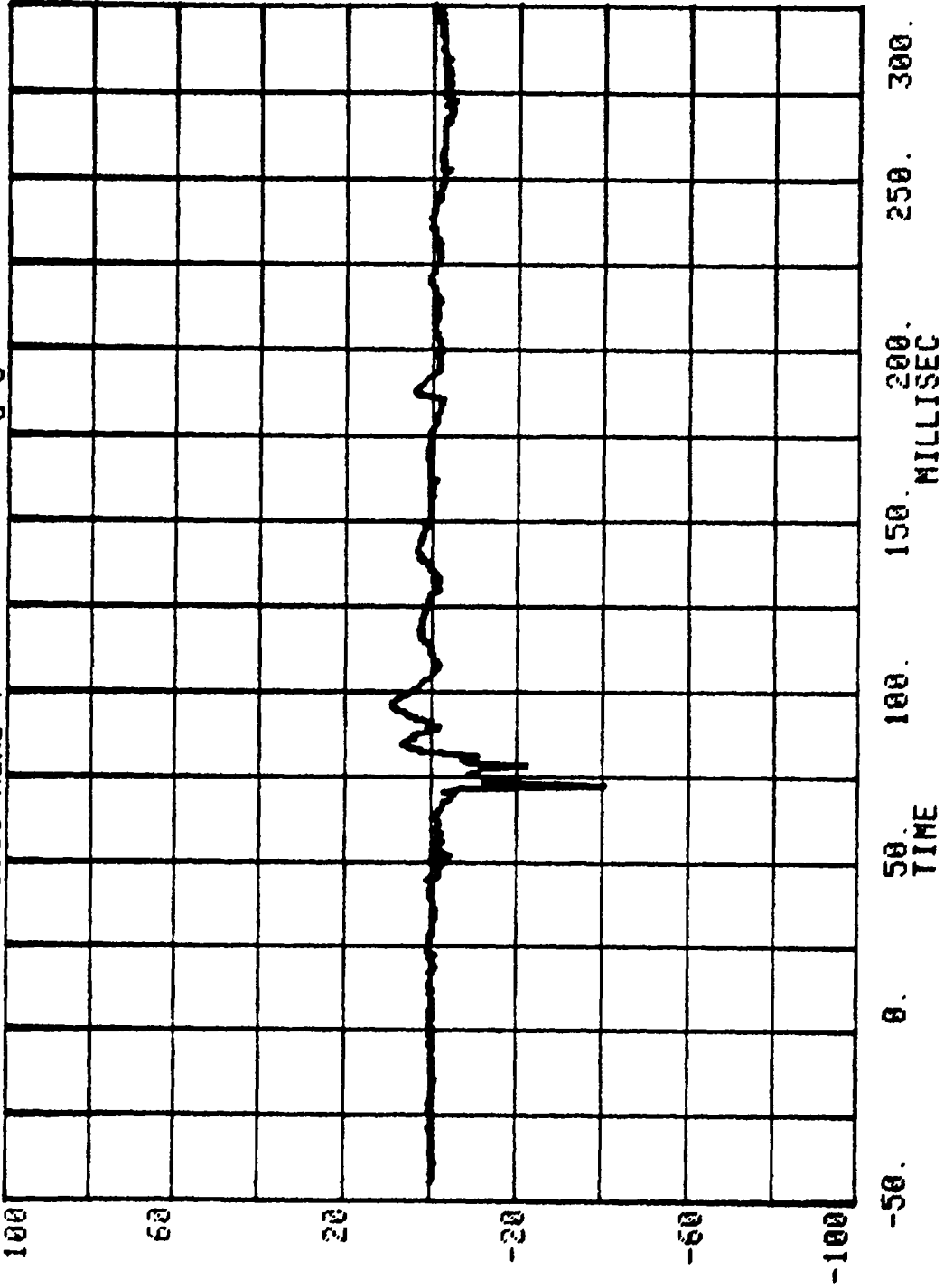
EVENT TIME= 300.0 MSEC

SEVERITY INDEX=1271.6

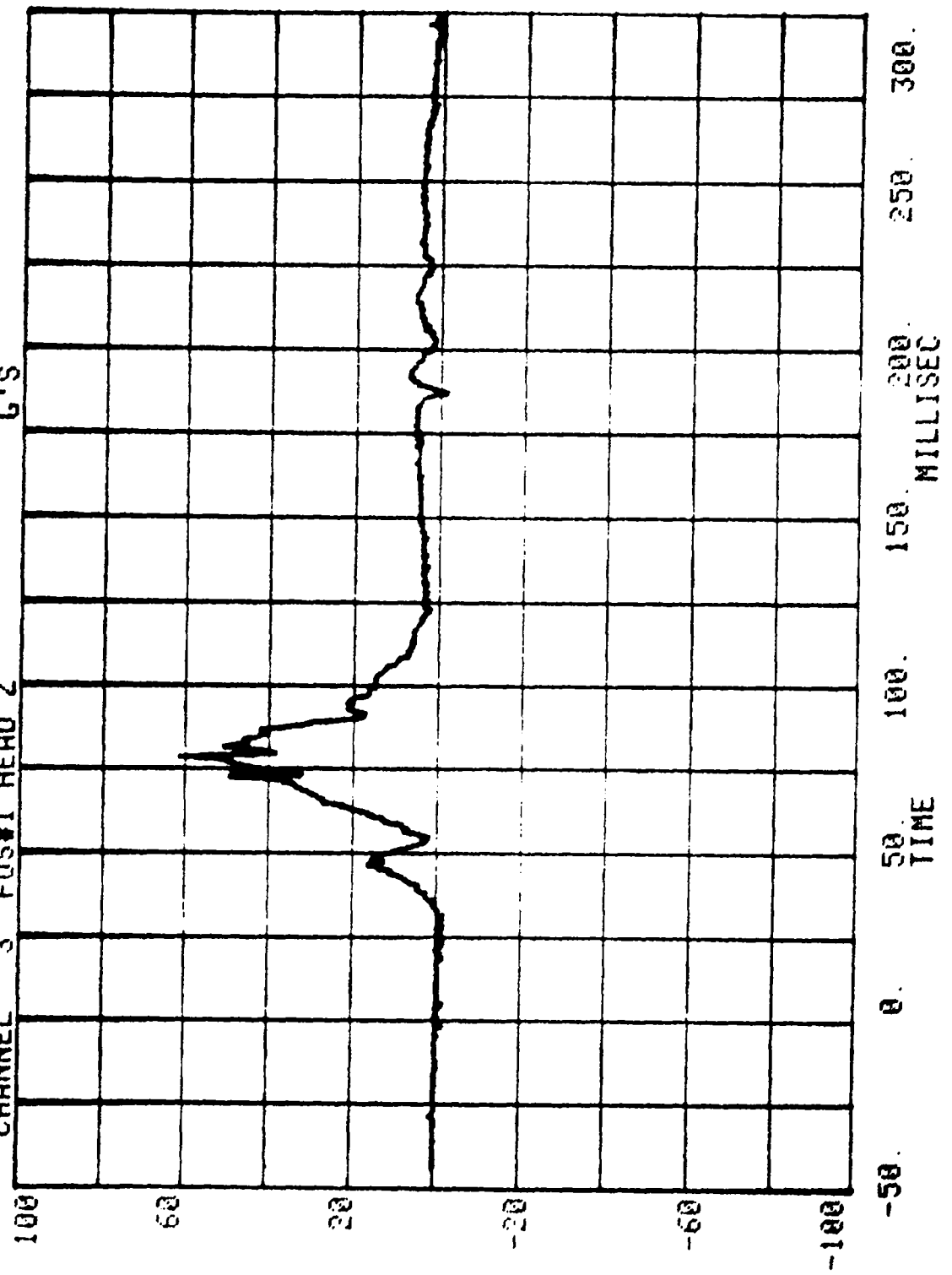
CHANNEL 1 POS#1 HEAD X
RUN= 987 SERIES= 200 G'S



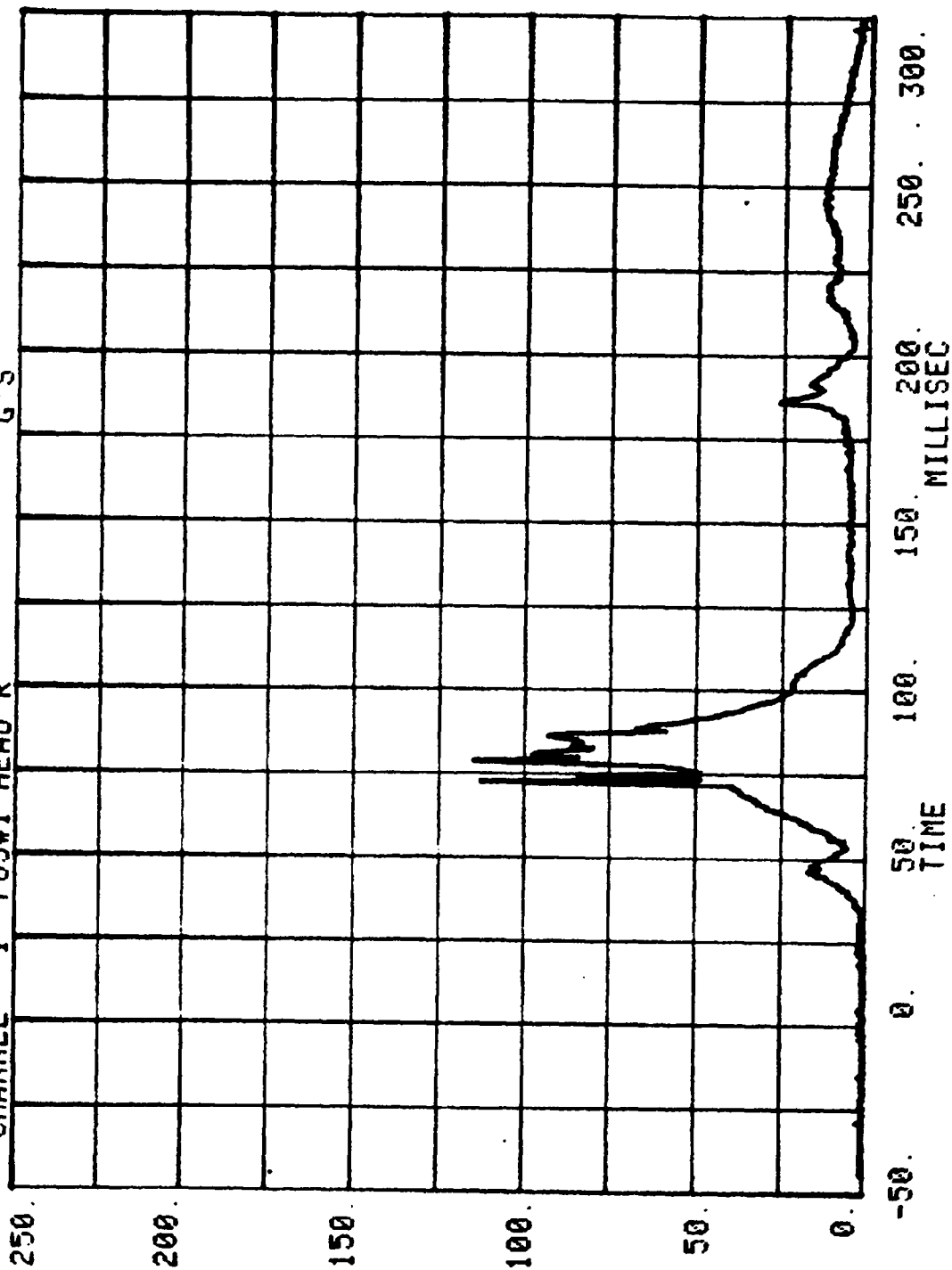
CHANNEL 2 POS#1 HEAD Y
RUN= 887 SERIES= 200 G'S



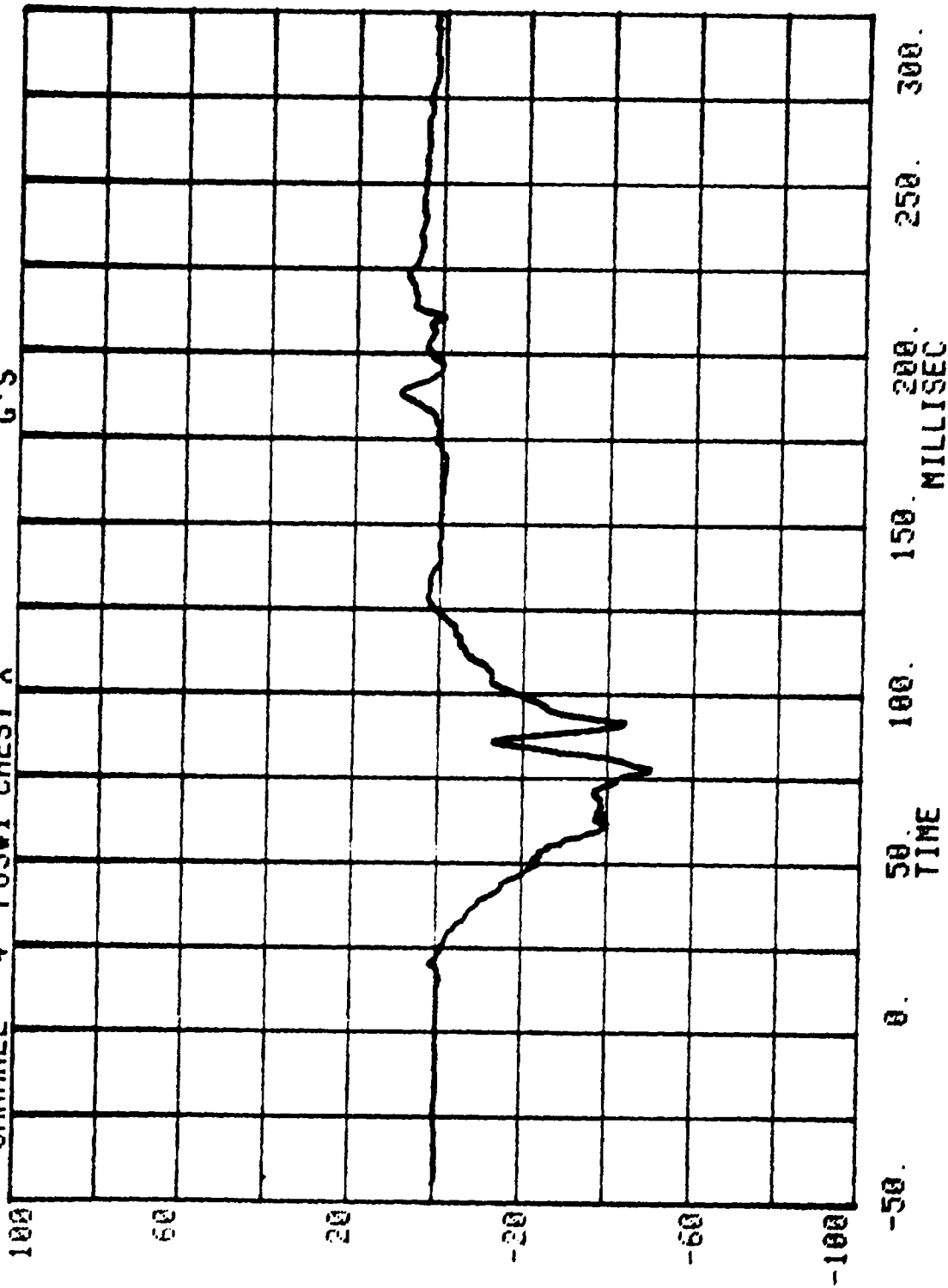
CHANNEL 3 POS#1 HEAD Z
RUN= 887 SERIES= 200 G'S



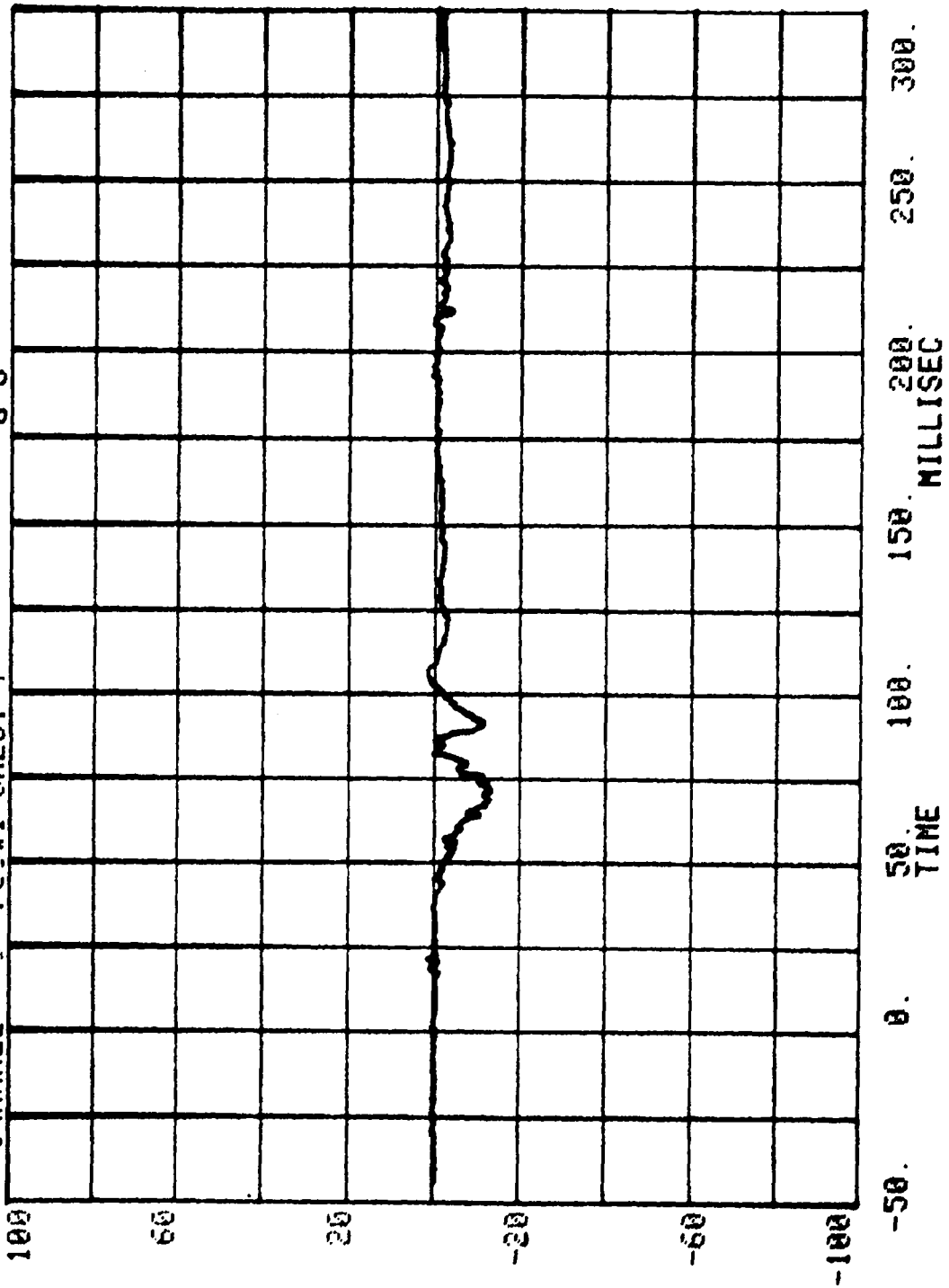
CHANNEL 1 POS#1 HEAD R
RUH= 887 SERIES= 200 G'S



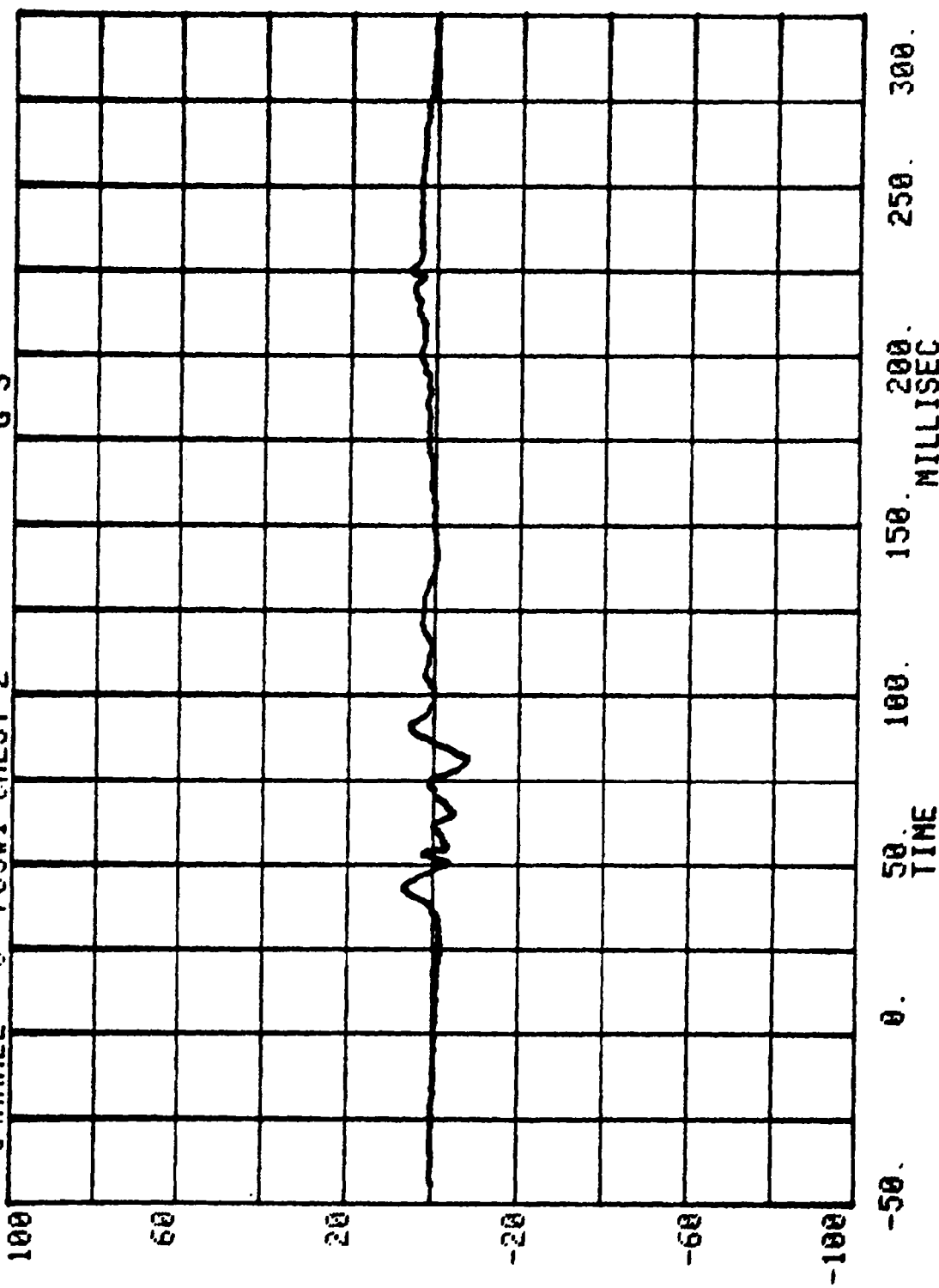
CHANNEL 4 POS#1 CHEST X
RUN= 887 SERIES= 200 G'S



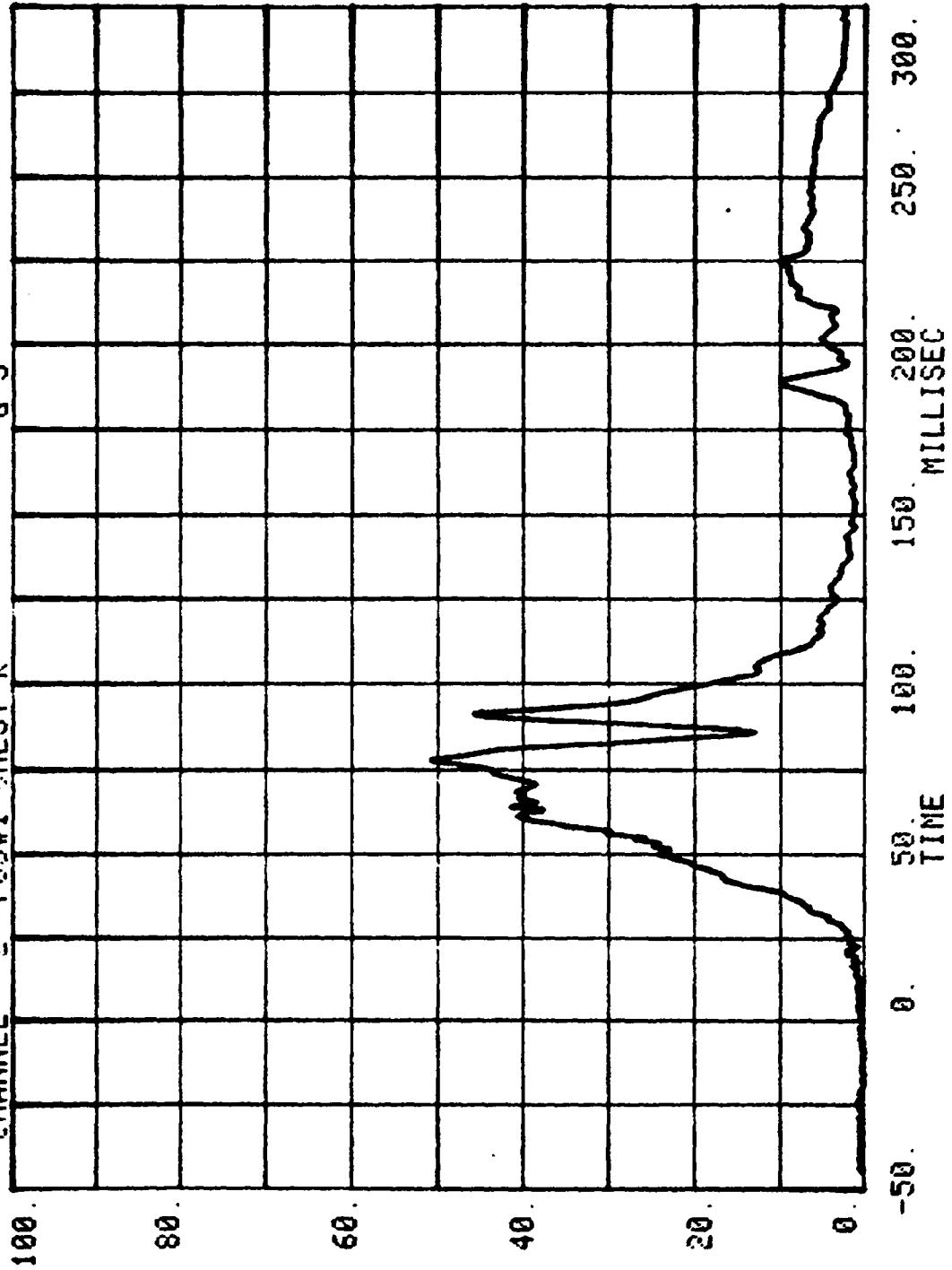
CHANNEL 5 POS#1 CHEST Y
RUN= 887 SERIES= 200 G'S



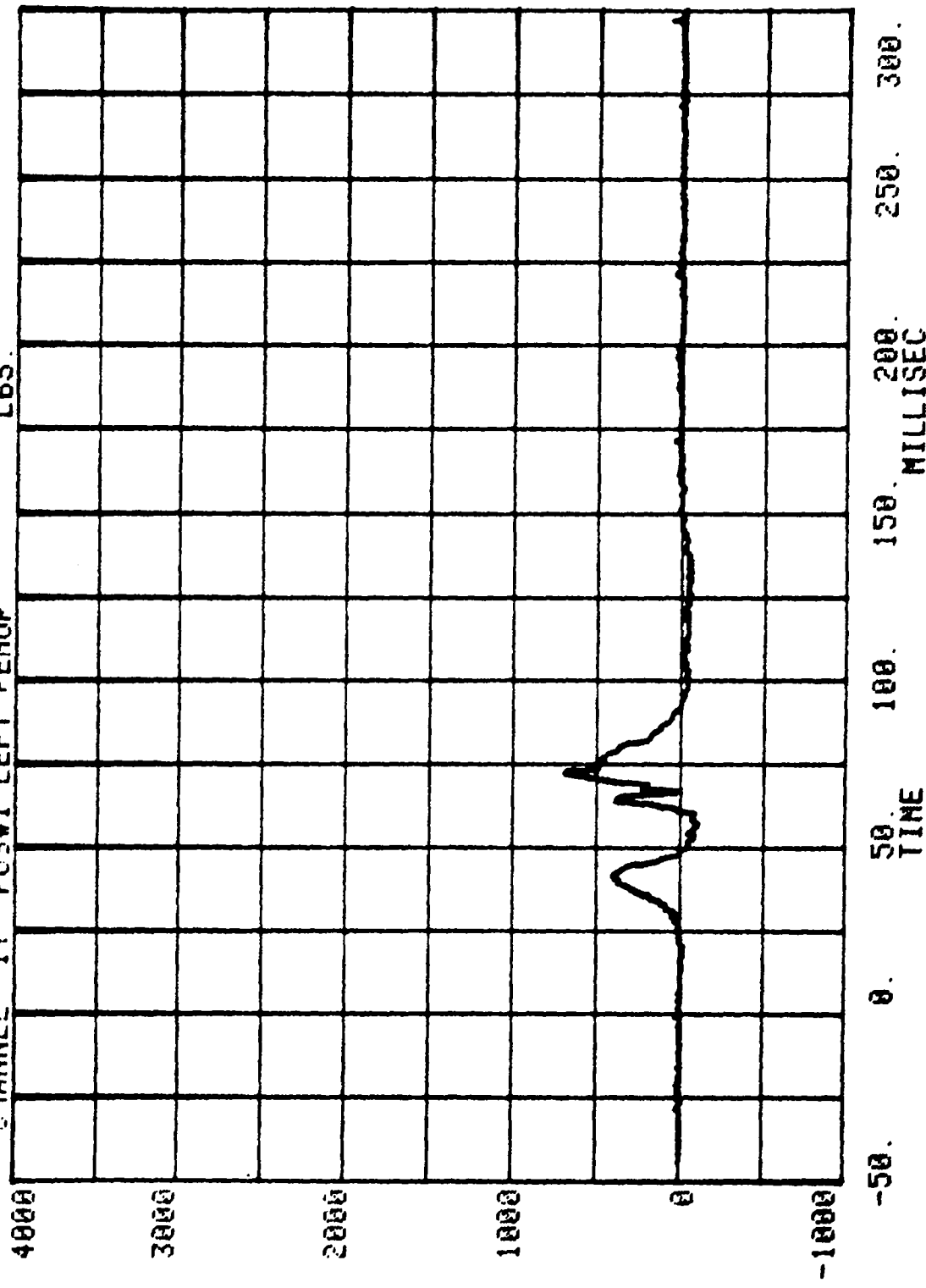
CHANNEL 6 POS#1 CHEST Z
RUN= 887 SERIES= 200 G'S



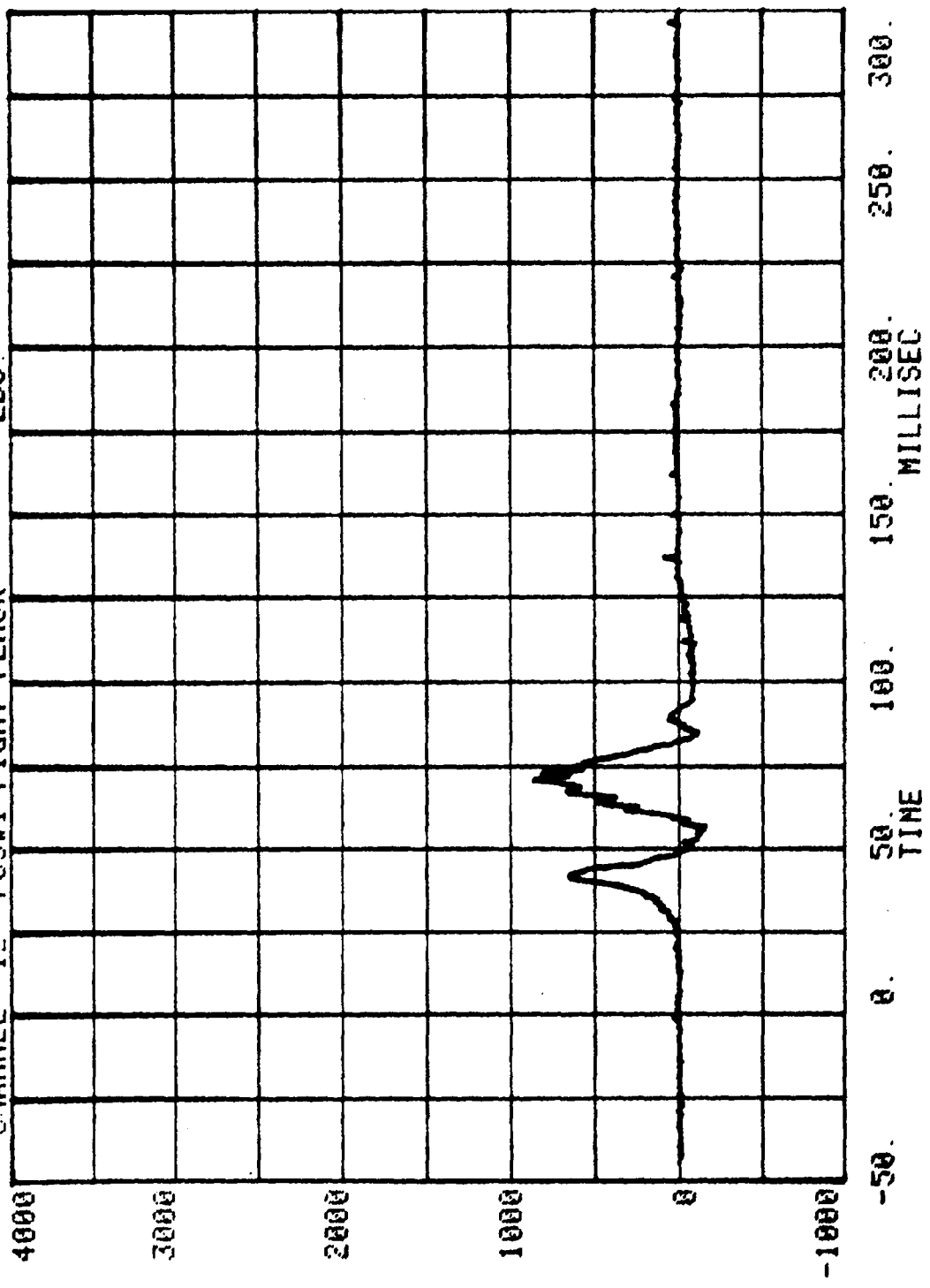
CHANNEL 2 POS#1 CHEST R
RUN= 887 SERIES= 200 G'S



CHANNEL 11 POS#1 LEFT FEMUR
RUN= 887 SERIES= 200 LBS.

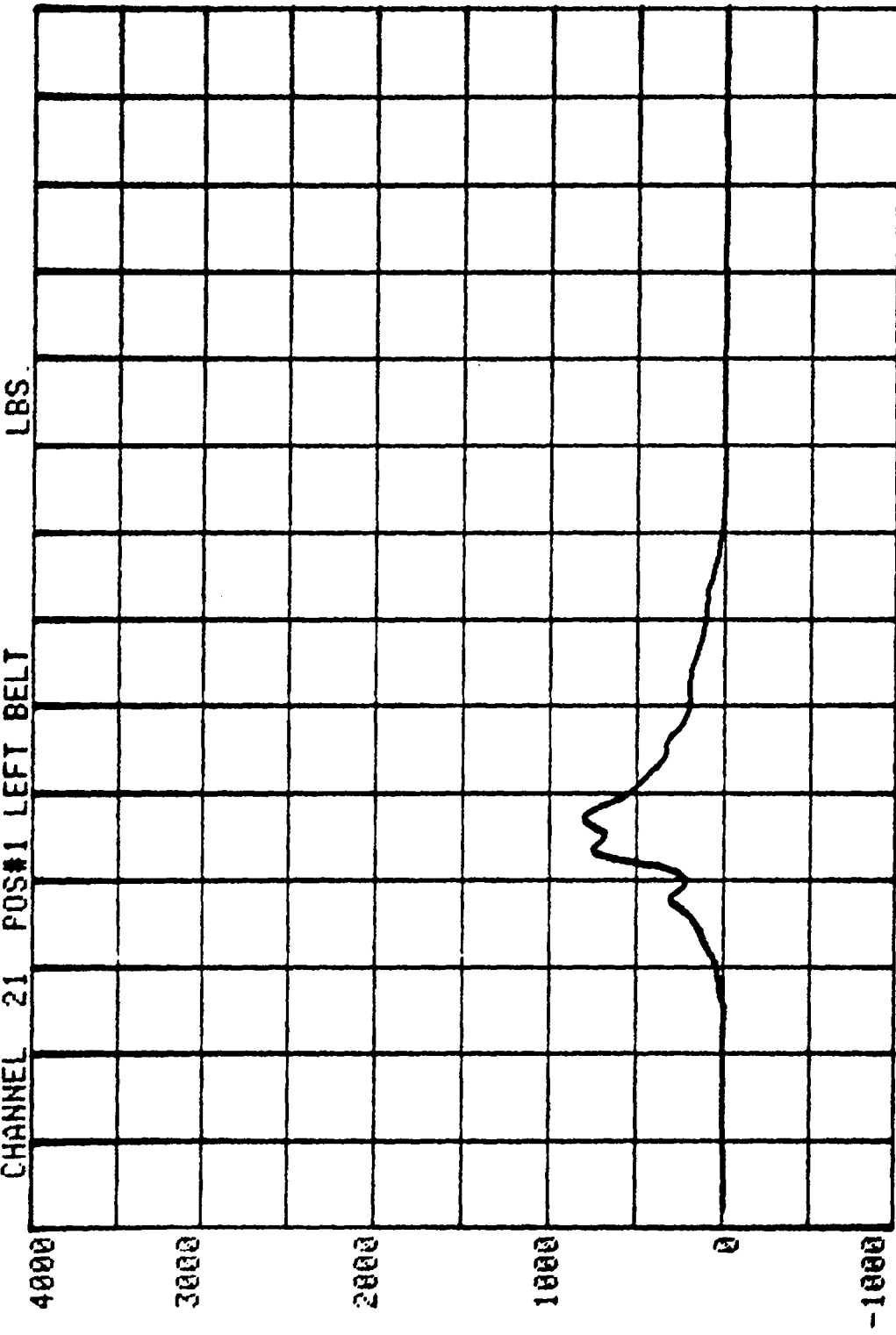


CHANNEL 12 POS#1 PIGHT FEMUR
RUN= 887 SERIES= 200 LBS.

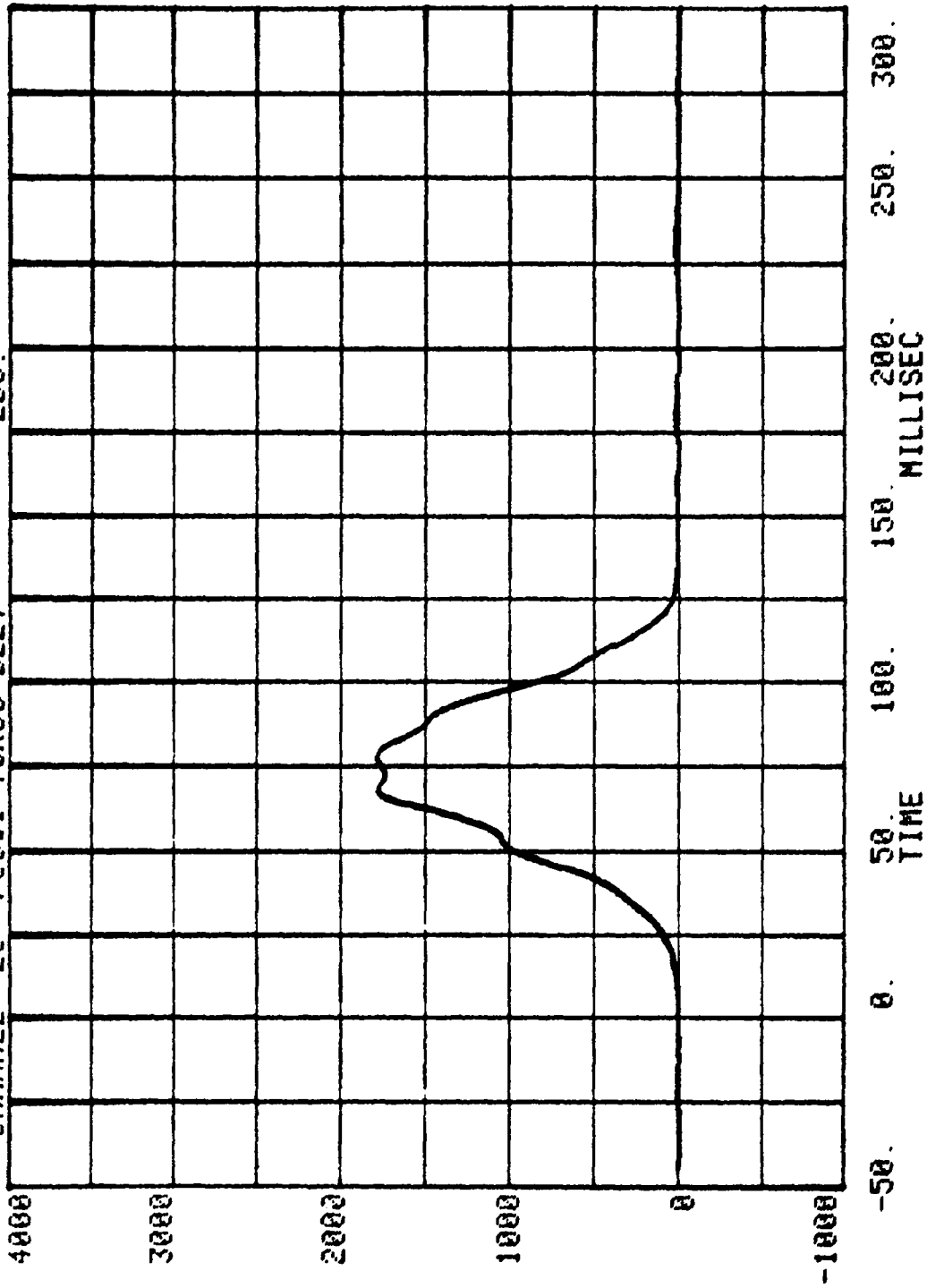


CHANNEL 21 POS#1 LEFT BELT

RUN= 887 SERIES= 200



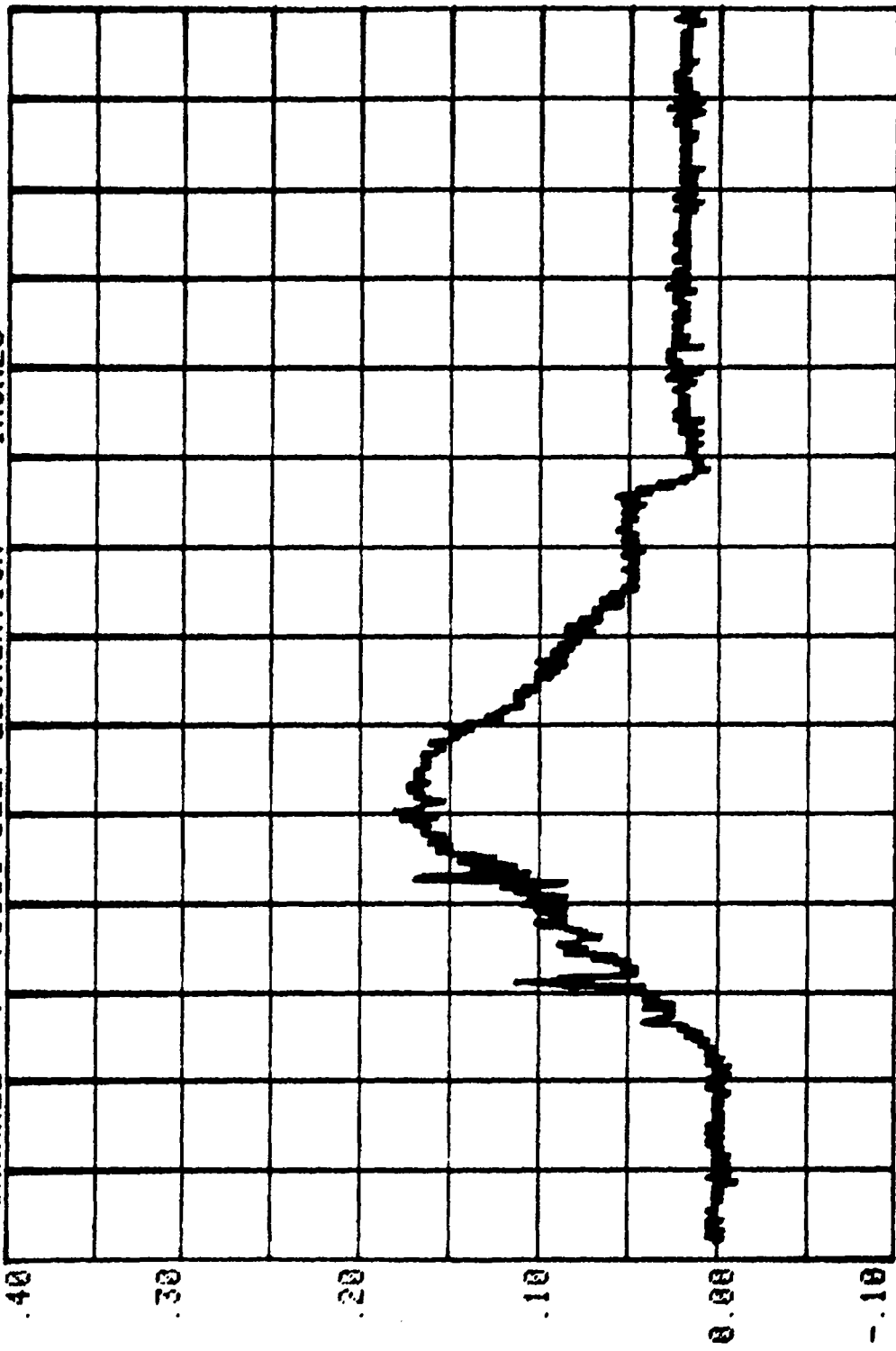
CHANNEL 23 POS#1 TORSO BELT
RUN= 887 SERIES= 200 LBS.



Measured over 2.5 inches

RUN= 987 SERIES= 200

CHANNEL 7 POS#1 BELT ELONGATION



INCHES
-0.10
0.00
.10
.20
.30
.40
-50. 0. 50. 100. 150. 200. 250. 300.
TIME
MILLISEC

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NEW CAR ASSESSMENT CRASH TEST - 1989

RUN= 887

POS#2 HEAD R

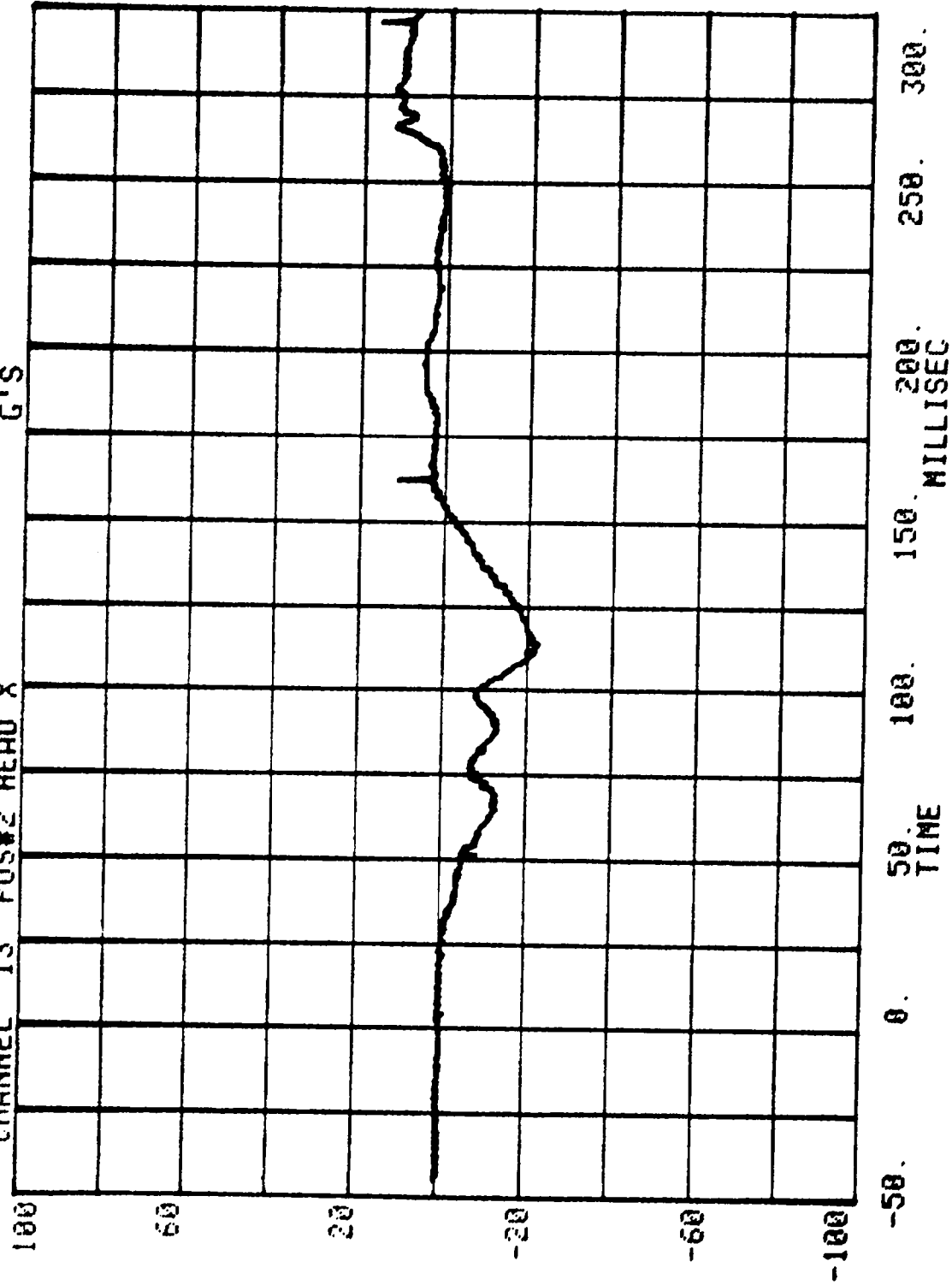
HIC= 496.1 FROM T1= .06855 TO T2= .10455

AVERAGE ACCELERATION BETWEEN T1 AND T2= 45.3G'S

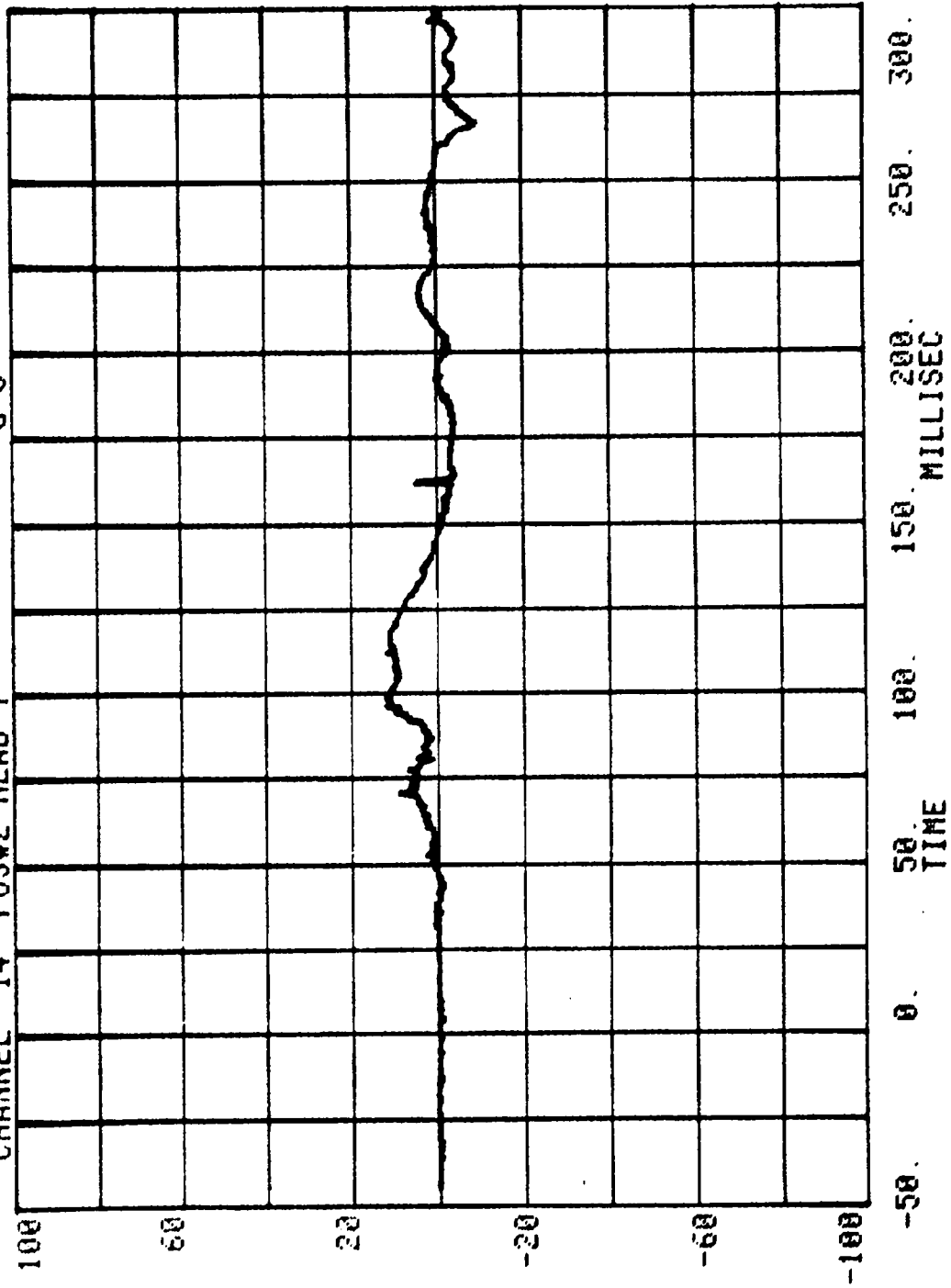
EVENT TIME= 300.0 MSEC

SEVERITY INDEX= 761.6

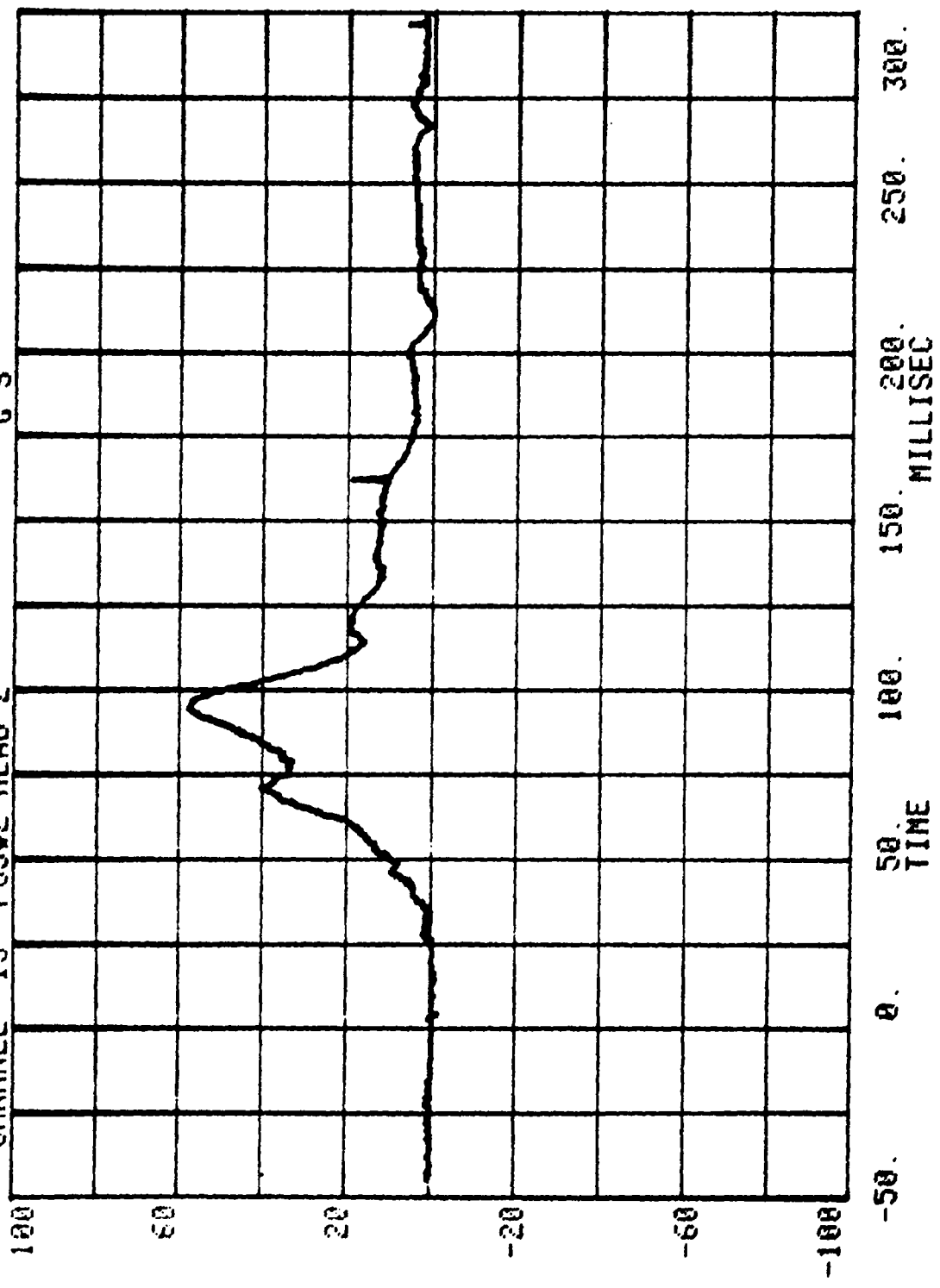
CHANNEL 13 POS#2 HEAD X
RUN= 887 SERIES= 200 G'S



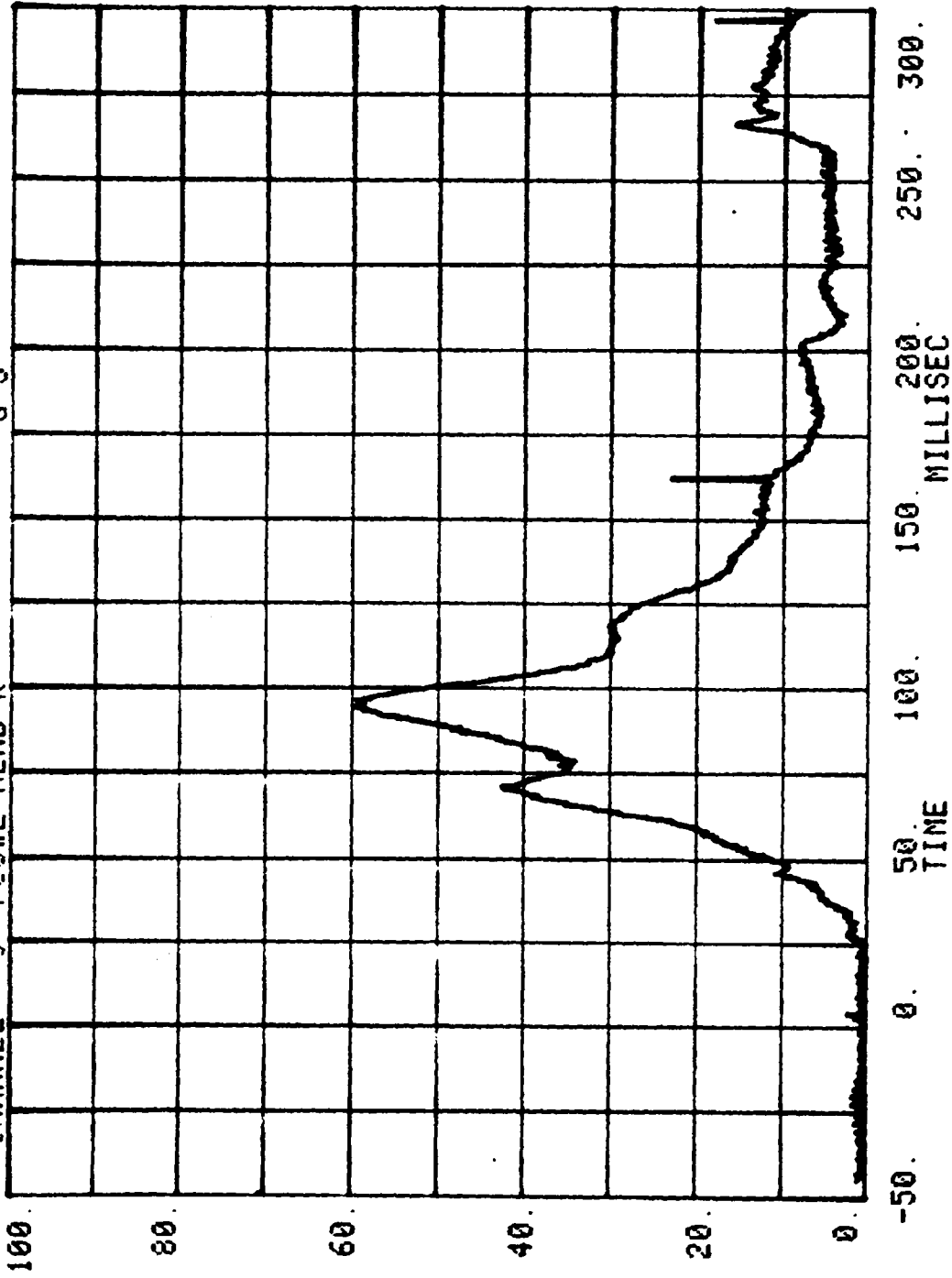
CHANNEL 14 POS#2 HEAD Y
RUN= 887 SERIES= 200 G'S



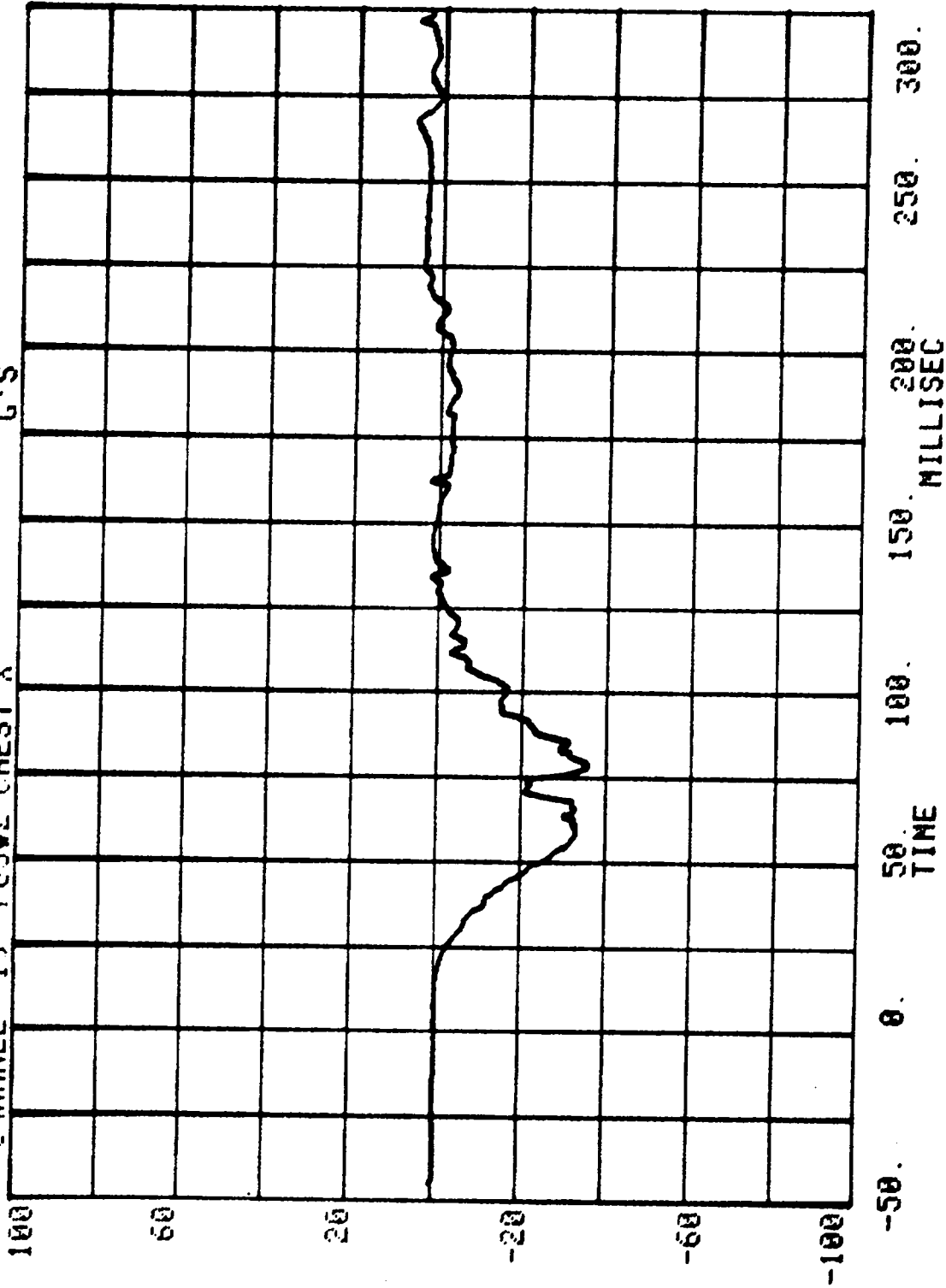
CHANNEL 15 POS#2 HEAD Z
RUN= 887 SERIES= 200 G'S



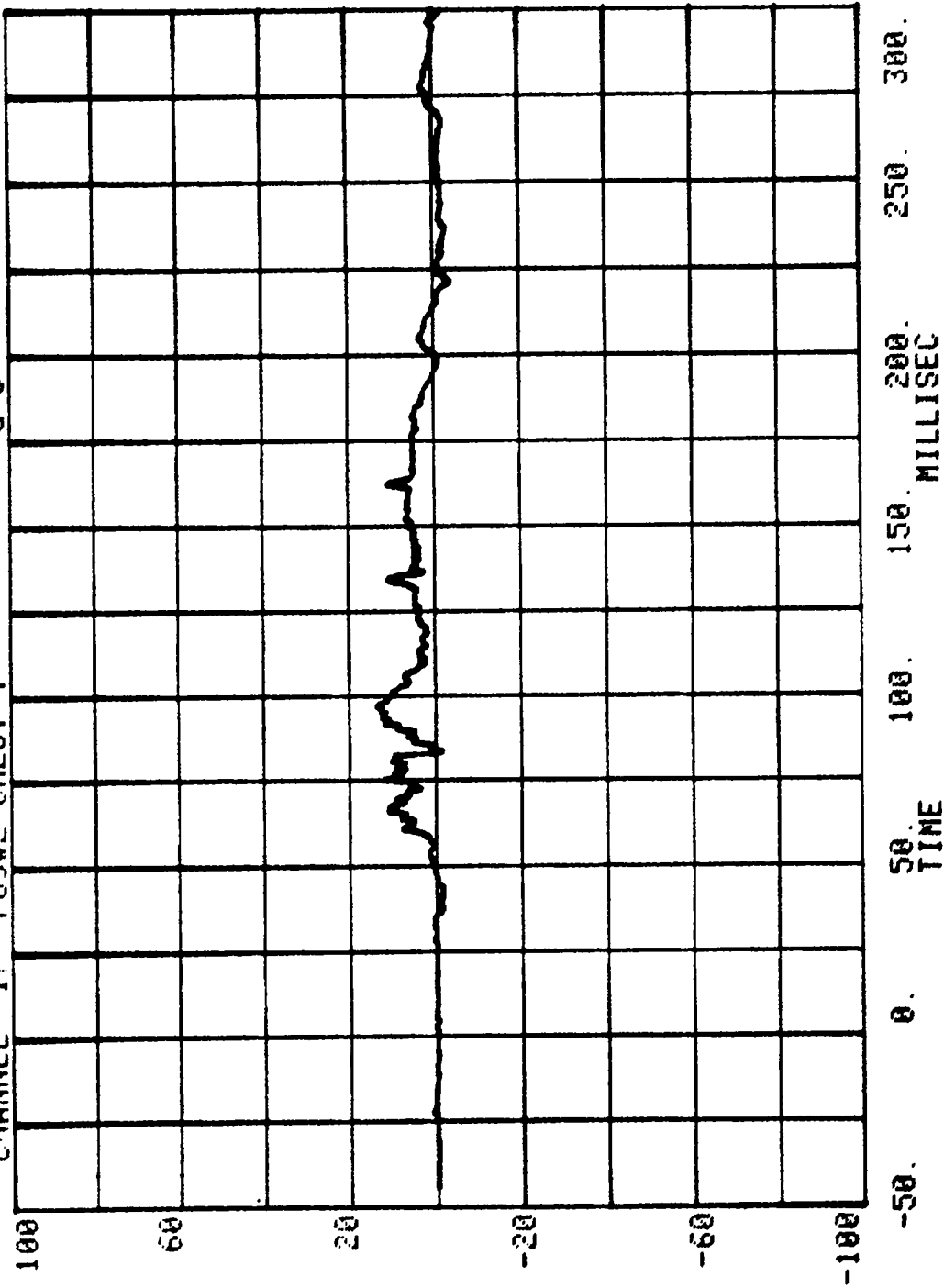
CHANNEL 3 POS#2 HEAD R
RUN= 887 SERIES= 200 G'S



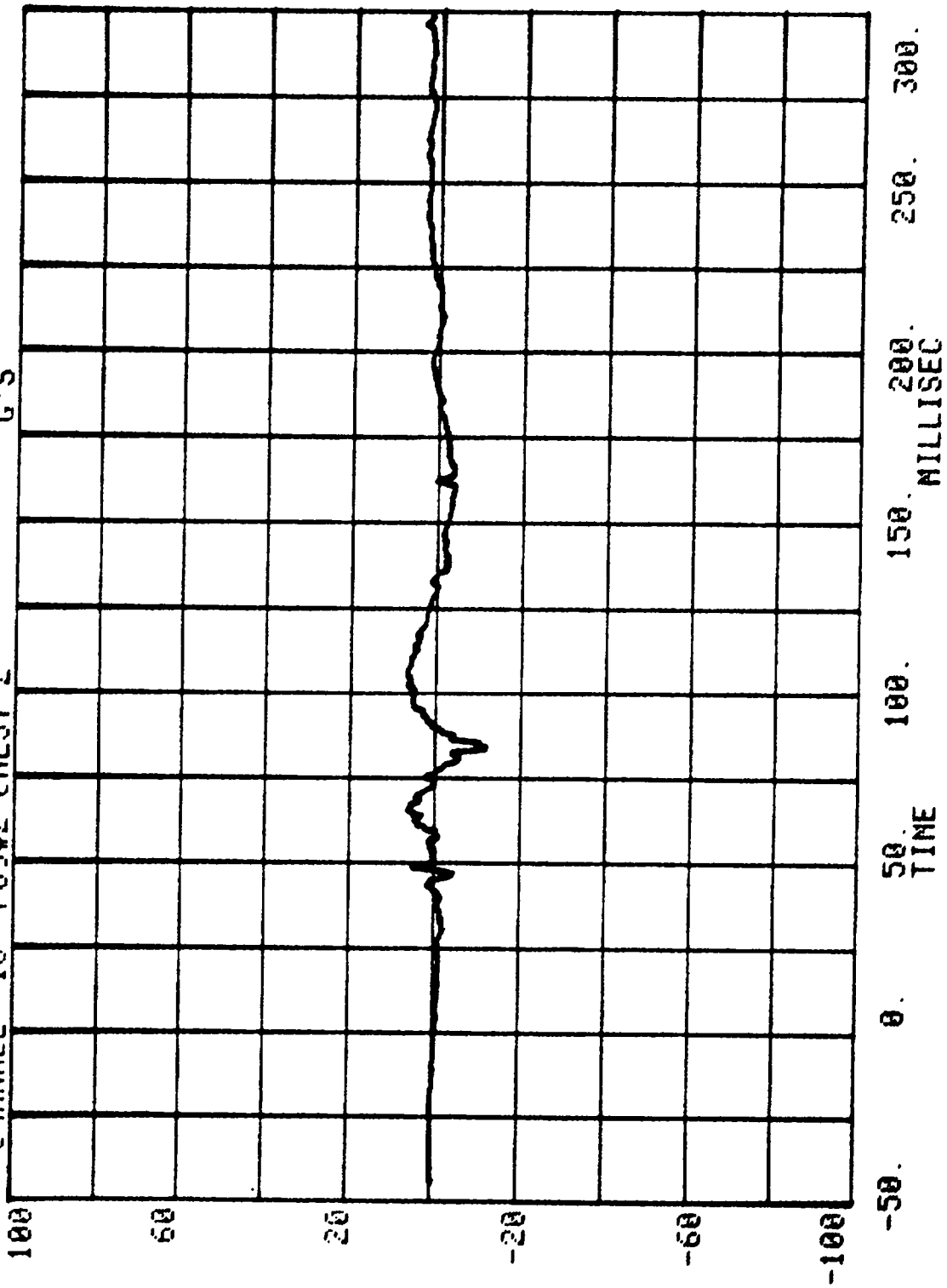
CHANNEL 15 POS#2 CHEST X
RUN= 887 SERIES= 200 G'S



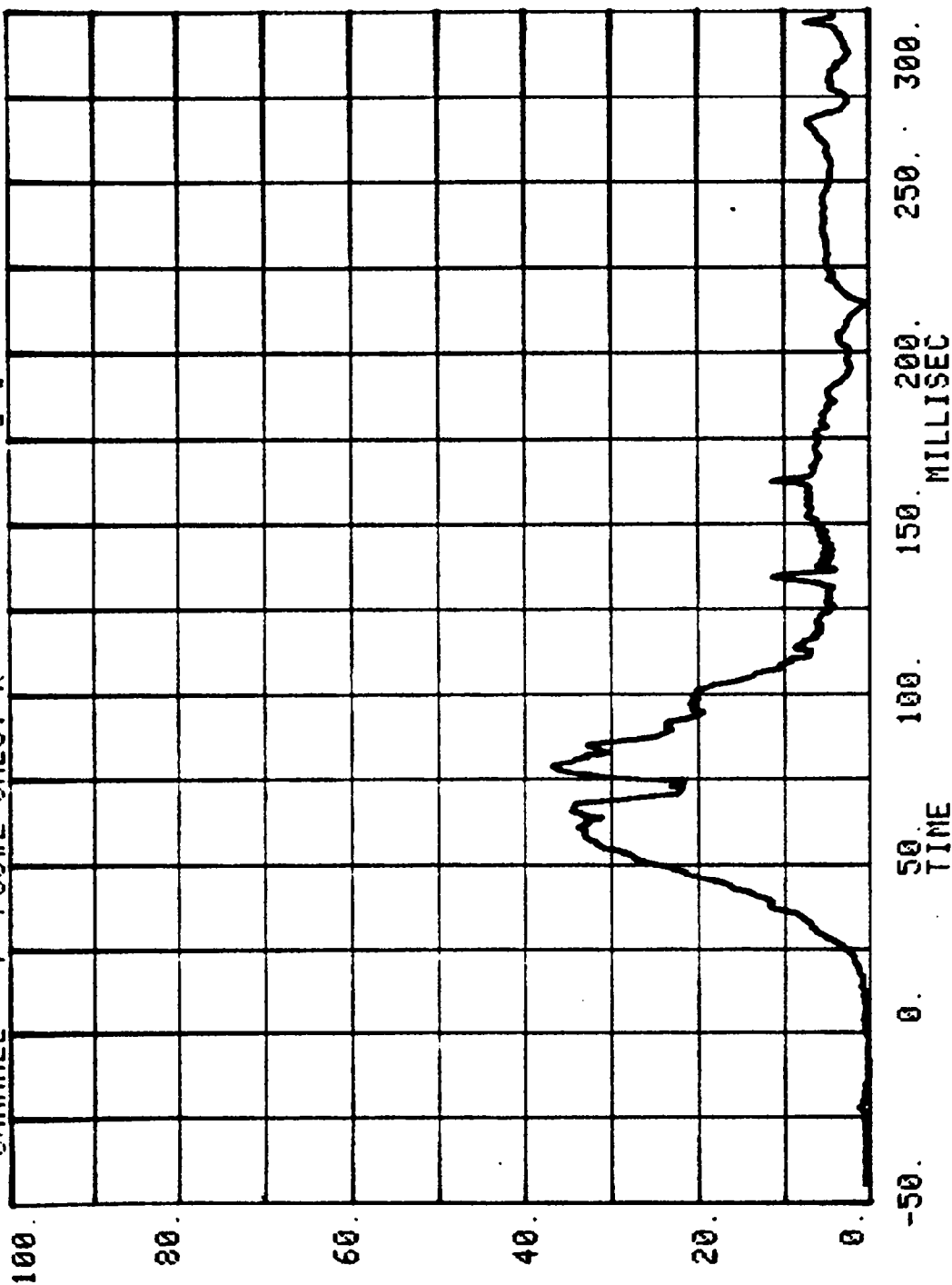
CHANNEL 17 POS#2 CHEST Y
RUN= 887 SERIES= 200 G'S



RUN= 887 SERIES= 200 G'S
CHANNEL 18 POS#2 CHEST Z

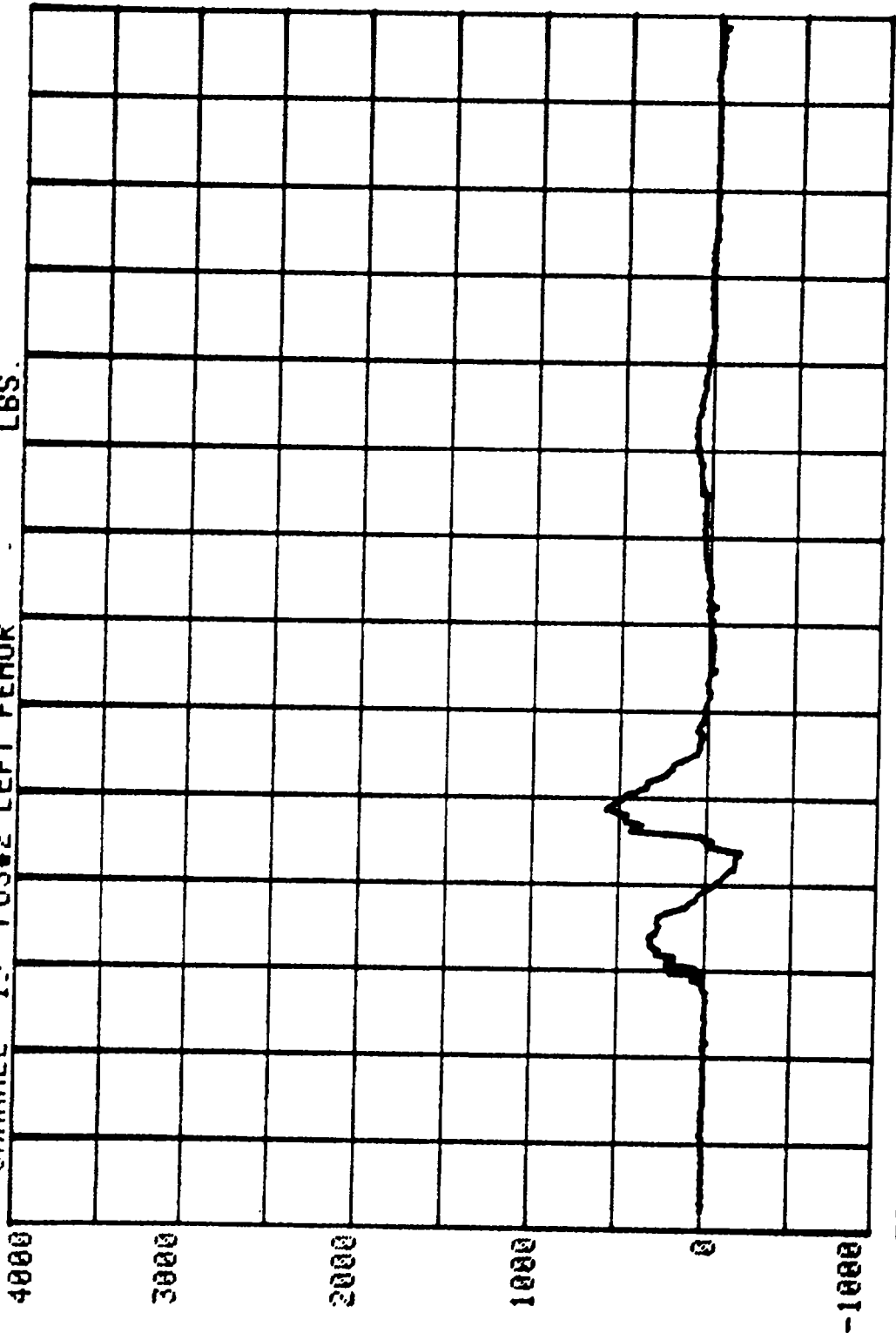


CHANNEL 4 POS#2 CHEST R
RUN= 887 SERIES= 200 G'S

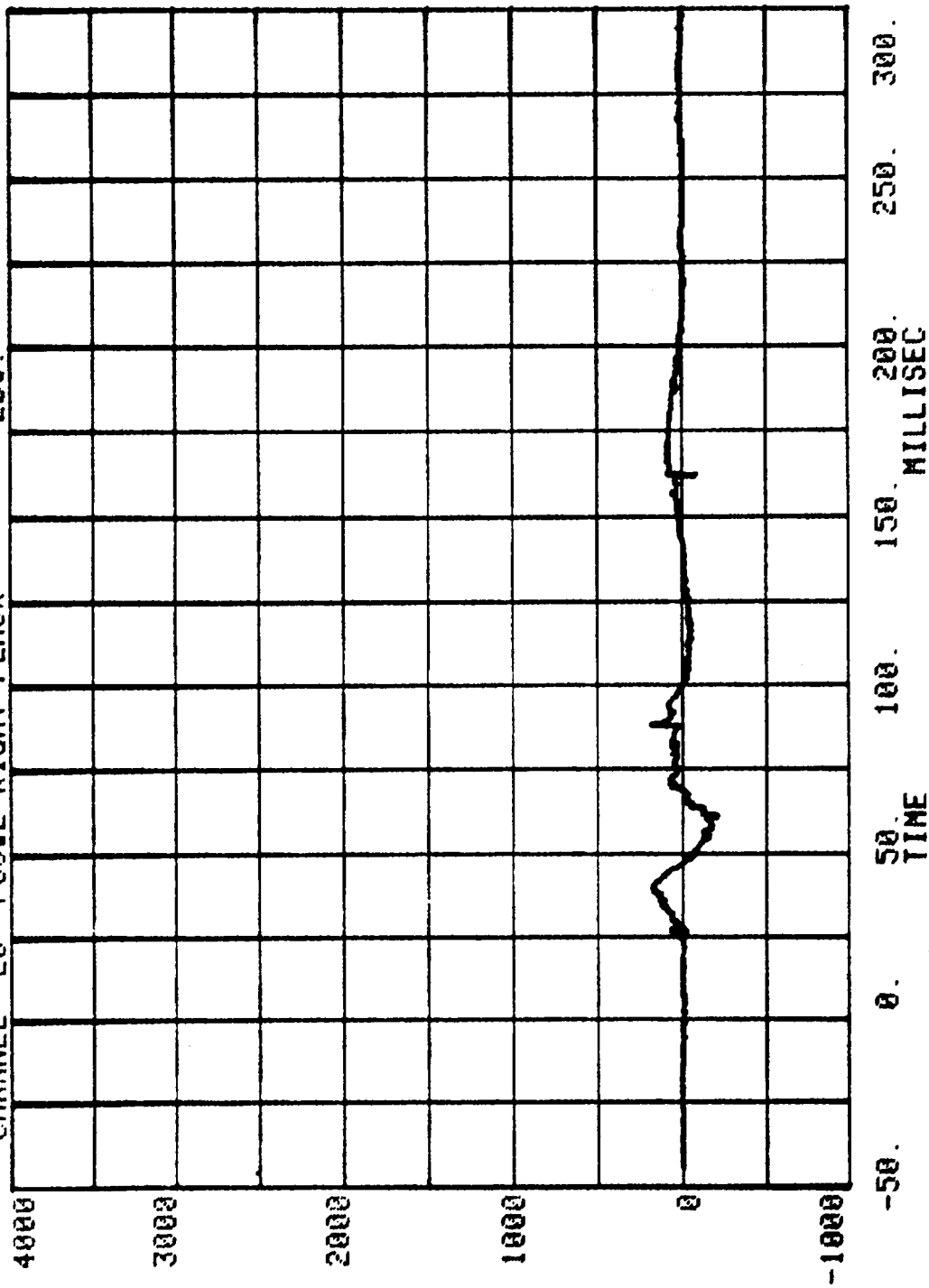


CHANNEL 19 POS#2 LEFT FEMUR LBS.

RUN= 887 SERIES= 200



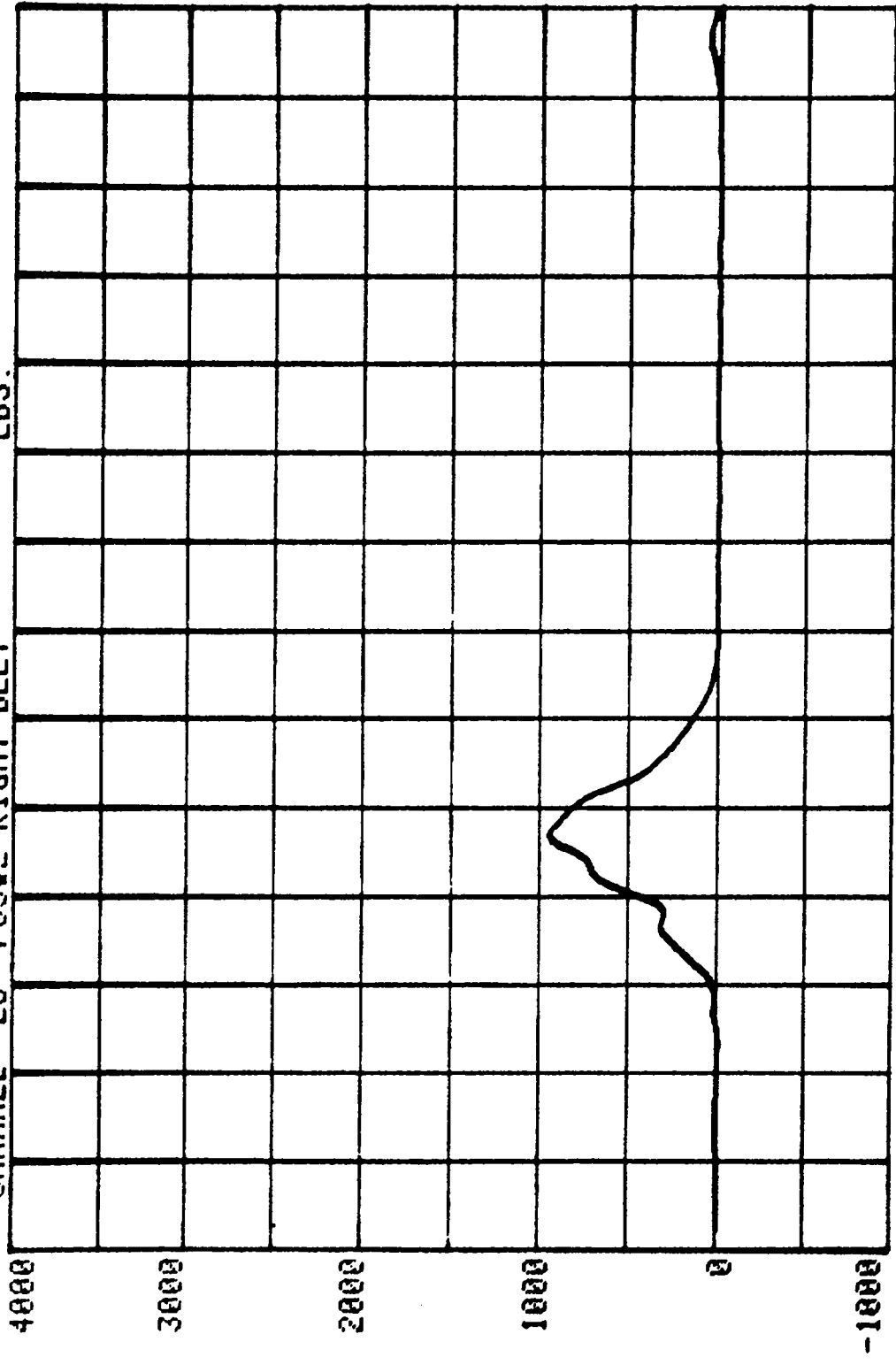
CHANNEL 20 POS#2 RIGHT FEMUR
RUN= 887 SERIES= 200 LBS.



CHANNEL 25 POS#2 RIGHT BELT

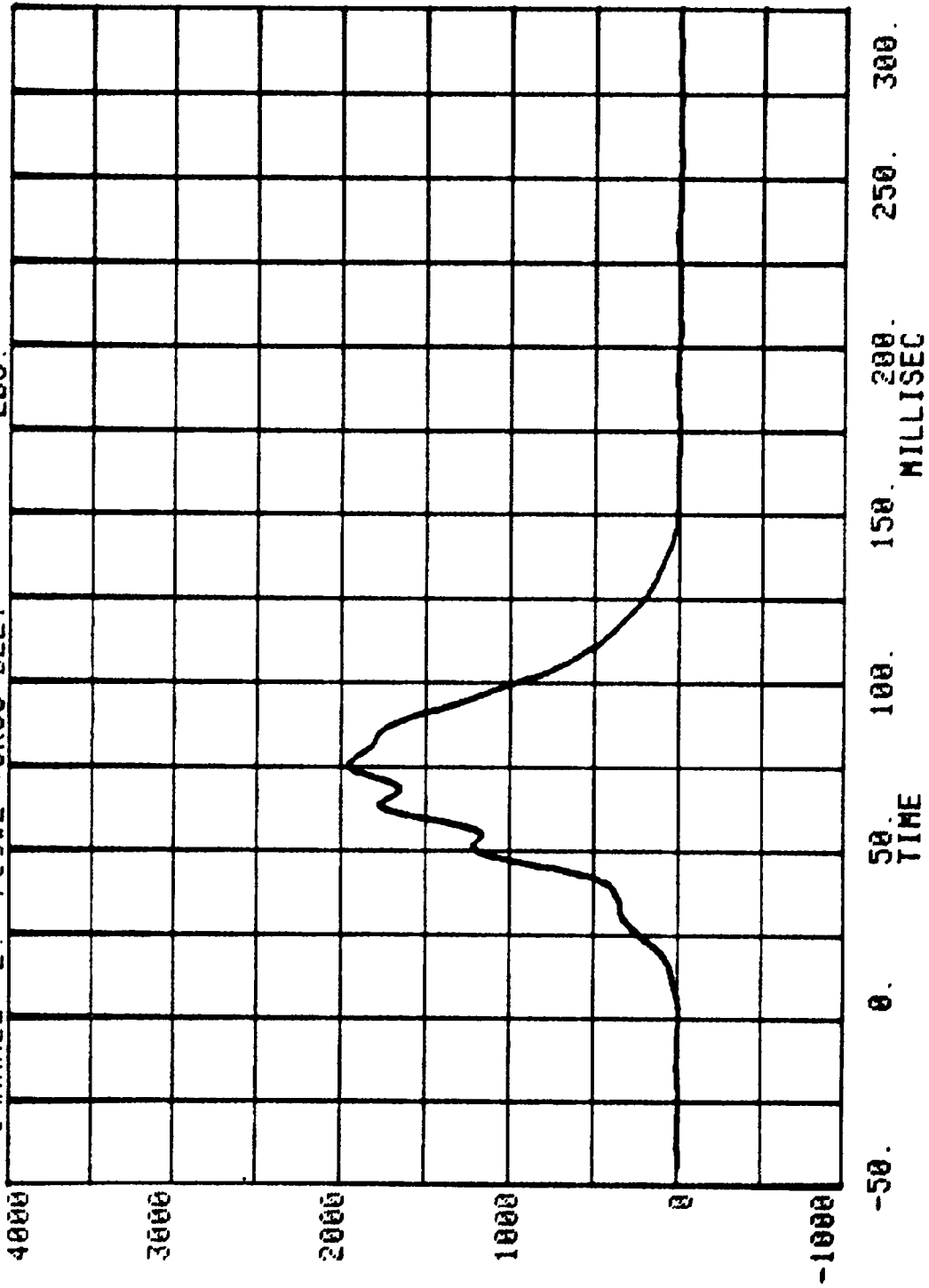
RUN= 887 SERIES= 200

LBS.



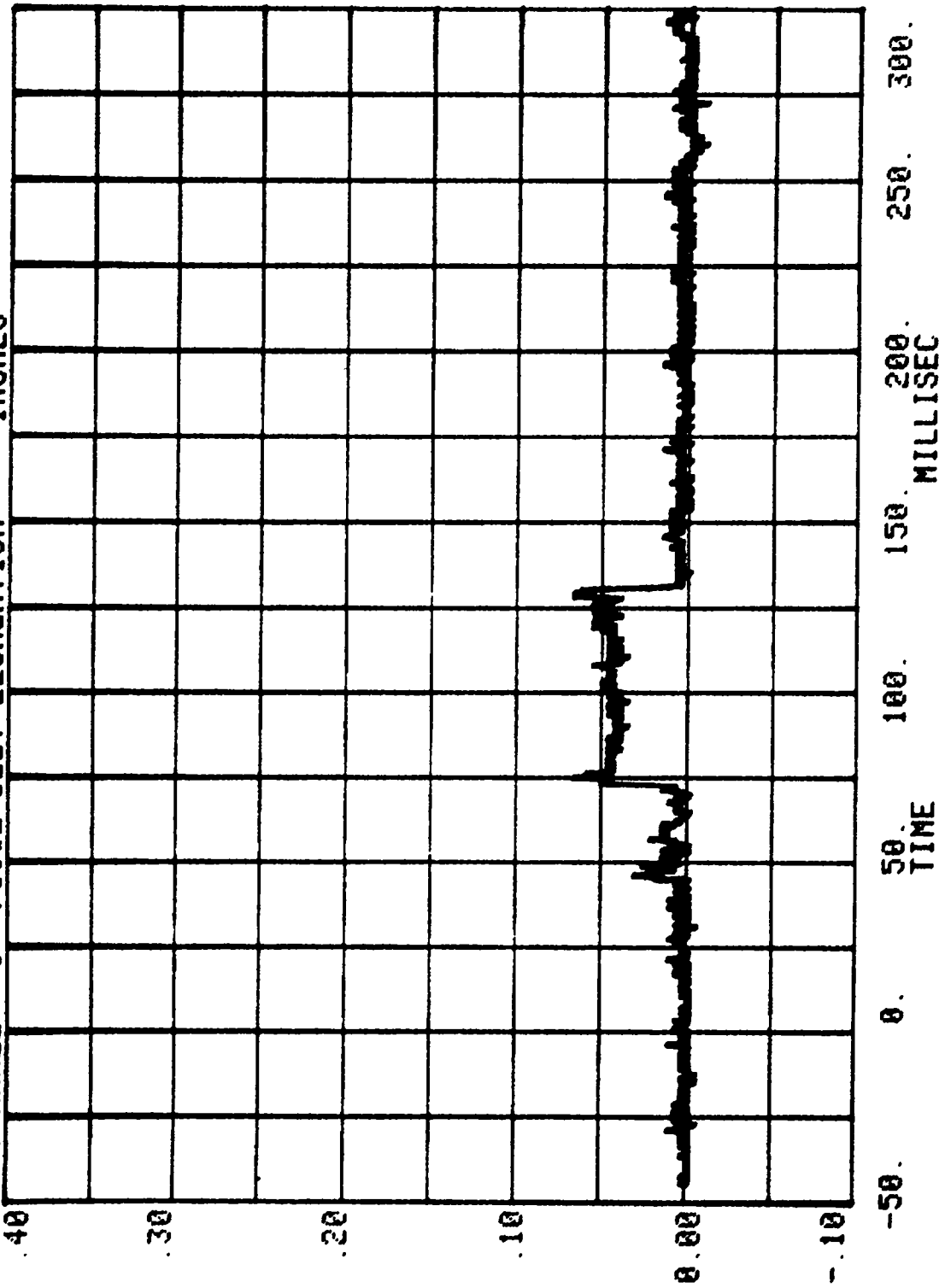
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 25 POS#2 TORSO BELT
RUN= 887 SERIES= 200 LBS.



Measured over
2.5 inches

CHANNEL 9 POS#2 BELT ELONGATION SERIES= 200 INCHES



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.

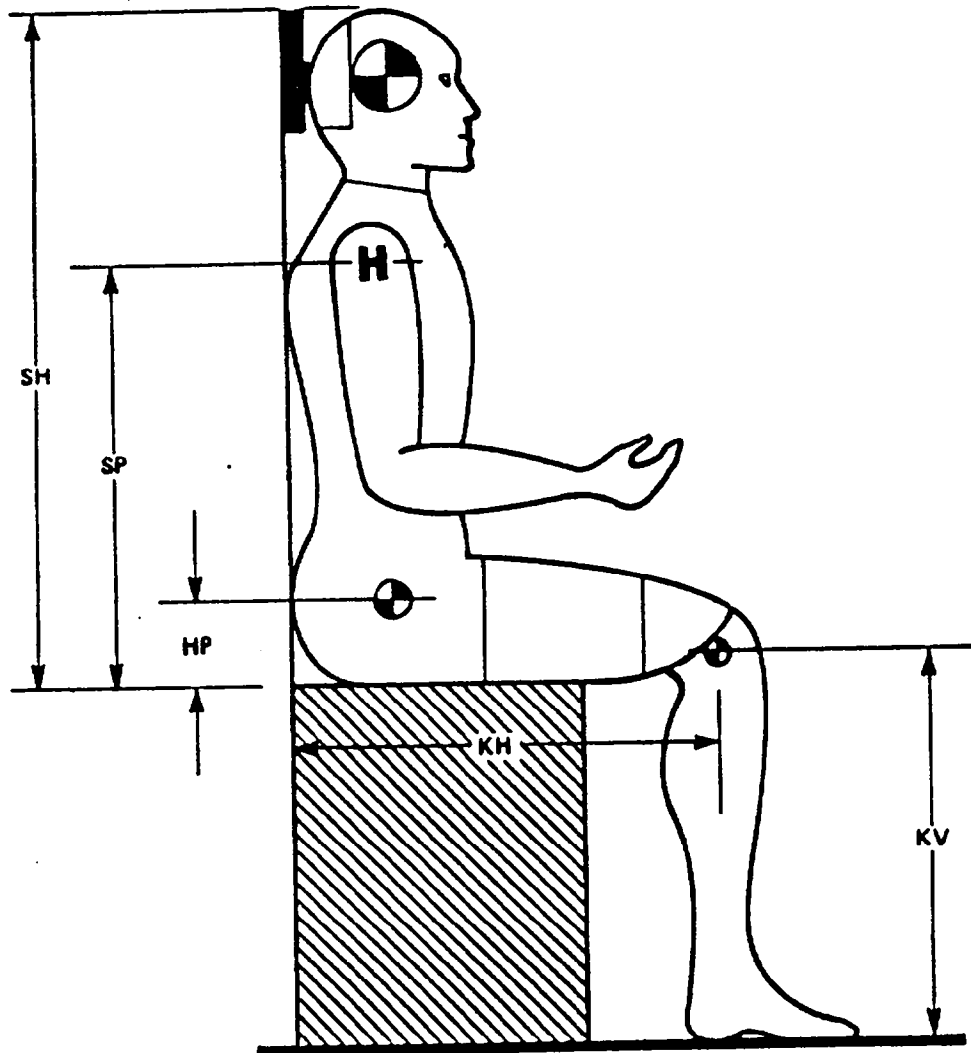
Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Date</u>
1021	3-10-89
749	3-9-89

Electronic Test Equipment

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

Figure 10 DUMMY CONFIGURATION DIMENSIONS



PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 1021

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXXX	3-10-89	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	2	
SH - Seated Height	35.6 to 35.8"	35.7 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	21.9 "	"
HP - Hip Pivot Height	3.9" ref.	3.9 "	"
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.4 "	"
KV - Knee Pivot from floor	19.3 to 19.9"	19.8 "	"
SW - Shoulder Width	17.8 to 18.4"	18.3 "	"
HW - Hip Width	14.0 to 15.4"	14.9 "	"

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		3-10-89	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		2	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-72 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		22-25 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	250 G's	G's
b. peak lateral accel.	<= 10 G's	2 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.15 ms	ms

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

TECHNICIAN'S NAME:

[Signature]

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PART 572 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)
2. NECK BENDING TEST			
a. Pendulum Speed	21.5 to 25.5 fps.	22.4 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.	25.7 G's	
d. Pendulum Decel. (t2-t1)	<= 3 ms.	2 ms	
e. Pendulum Decel. (t3-t2)	25 to 30 ms.	27 ms	
f. Pendulum Decel. (t4-t3)	<= 10 ms.	3.1 ms	
g. Max. Head Rotation	63 to 73 deg.	65 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"	2.35 "
60 deg.	Time	40.3 to 51.7 ms.	44 ms
	Displ.	4.3 to 5.3"	4.7 "
Maximum	Time	53.2 to 66.8 ms.	53.4 ms
	Displ.	5.0 to 6.0"	5.2 "
60 deg.	Time	67.0 to 83.0 ms.	71.1 ms
	Displ.	4.3 to 5.3"	4.8 "
30 deg.	Time	85.4 to 104.6 ms.	88 ms
	Displ.	2.1 to 3.1"	2.4 "
0 deg.	Time	101.0 - 123.0 ms.	102.8 ms
	Displ.	-.5 to 0.5"	0.0 "

TECHNICIAN'S NAME:

[Handwritten Signature]

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	24 lbs	
b. Force @ 0.75"	36 to 50 lbs.	37.5 lbs	
c. Force @ 1.0"	50 to 63 lbs.	53 lbs	
d. Force @ 1.3"	73 to 88 lbs.	78 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	25.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	37.7 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	51 lbs	
d. Return Angle	12 deg. maximum	11 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	1.52 "	
(3) Peak Resistive Force	2250 lbs maximum	2236 lbs	
(4) Internal Hysteresis	50 to 70%	68.4 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.1 fps	
(2) Peak Deflection	1.1" maximum	1.08 "	
(3) Peak Resistive Force	1450 lbs maximum	1393 lbs	
(4) Internal Hysteresis	50 to 70%	65.2 %	

TECHNICIAN'S NAME: *[Signature]*

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. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2210 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.7 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2155 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.75 ms	

REMARKS:

TECHNICIAN'S NAME:

[Handwritten Signature]

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INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 1021

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCERLROMETER--				
HX LONGITUDINAL--	ENDEVCO	CJ22	11-88	5-89
HY LATERAL--	ENDEVCO	CS41	11-88	5-89
HZ VERTICAL--	ENDEVCO	CH31	11-88	5-89
2. CHEST ACCELEROMETER--				
CX LONGITUDINAL--	CEC	A73	11-88	5-89
CY LATERAL--	ENDEVCO	CE06	11-88	5-89
CZ VERTICAL--	CEC	A44	11-88	5-89
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	552	12-88	5-89
LEFT SIDE	GSE	551	12-88	5-89
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A144	3-89	9-89
2. TEST PROBE ACCELEROMETER--	CEC	A142	11-88	5-89
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	11-88	5-89
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	11-88	5-89
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	11-88	5-89

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA 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	3-9-89	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	1	
SH - Seated Height	35.6 to 35.8"	35.6 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	22.0 "	"
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"	19.5 "	"
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		3-9-89	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-72 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		22-26 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	226 G's	G's
b. peak lateral accel.	<= 10 G's	7 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.15 ms	ms

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

TECHNICIAN'S NAME:

[Handwritten Signature]

PART 572 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)
2. NECK BENDING TEST				
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	23.5 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.	26.9 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	4.1 ms	
g. Max. Head Rotation		63 to 73 deg.	66 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.	28.3 ms	
	Displ.	2.1 to 3.1"	2.6 "	
60 deg.	Time	40.3 to 51.7 ms.	44 ms	
	Displ.	4.3 to 5.3"	4.6 "	
Maximum	Time	53.2 to 66.8 ms.	53.9 ms	
	Displ.	5.0 to 6.0"	5.1 "	
60 deg.	Time	67.0 to 83.0 ms.	74.4 ms	
	Displ.	4.3 to 5.3"	4.6 "	
30 deg.	Time	85.4 to 104.6 ms.	90.1 ms	
	Displ.	2.1 to 3.1"	2.2 "	
0 deg.	Time	101.0 - 123.0 ms.	105 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIAN'S NAME:

Am. T. ...

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.	26 lbs	
b. Force @ 0.75"	36 to 50 lbs.	39 lbs	
c. Force @ 1.0"	50 to 63 lbs.	54 lbs	
d. Force @ 1.3"	73 to 88 lbs.	77 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	28 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	41 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	51 lbs	
d. Return Angle	12 deg. maximum	9 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	1.42 "	
(3) Peak Resistive Force	2250 lbs maximum	2184 lbs	
(4) Internal Hysteresis	50 to 70%	50.1 %	
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	1362 lbs	
(4) Internal Hysteresis	50 to 70%	57.3 %	

TECHNICIAN'S NAME:

[Handwritten Signature]

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)
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2125 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.75 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2295 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.8 ms	

REMARKS:

TECHNICIAN'S NAME:

[Handwritten Signature]

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	CK54	12-88	6-89
HY LATERAL--	ENDEVCO	CK78	12-88	6-89
HZ VERTICAL--	ENDEVCO	CD75	12-88	6-89
2. CHEST ACCELEROMETER--				
CX LONGITUDINAL--	CEC	A115	12-88	6-89
CY LATERAL--	ENDEVCO	CS09	12-88	6-89
CZ VERTICAL--	CEC	A29	12-88	6-89
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	548	12-88	6-89
LEFT SIDE	GSE	549	12-88	6-89
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A144	3-89	9-89
2. TEST PROBE ACCELEROMETER--	CEC	A142	11-88	5-89
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	11-88	5-89
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	11-88	5-89
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	11-88	5-89

Appendix D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

BEFORE DRIVING YOUR VEHICLE

OCCUPANT RESTRAINT SYSTEMS

WARNING — Be sure to LOCK ALL DOORS before driving away. Locking the doors, along with using the safety belts provided, will minimize the risk of injury or ejection in an accident.

Ford Motor Company recommends that you always "buckle up." In some areas restraint system use is required by law.

WARNING — All vehicle occupants, including pregnant women, should wear their safety belts for maximum protection in the event of a collision. All vehicle occupants, including pregnant women, should be sure the lap belt, or lap belt portion of the lap-shoulder belt, is fitted snugly and as low as possible around the hips, not on the waist. Shoulder belts should also be properly adjusted for minimum slack. Failure to properly utilize the safety belts may increase the chance and/or severity of injury in the event of a collision.

According to accident statistics, properly restrained children are safer in the rear seat than the front seat.

For maximum protection in the event of a collision or sudden stop, always protect the infant and child occupants of your vehicle with an infant or child safety seat or restraint designed especially for them which conforms to applicable motor vehicle safety standards. Do not permit children to sit where they cannot be properly restrained.

Manual Front Lap-Shoulder Belts

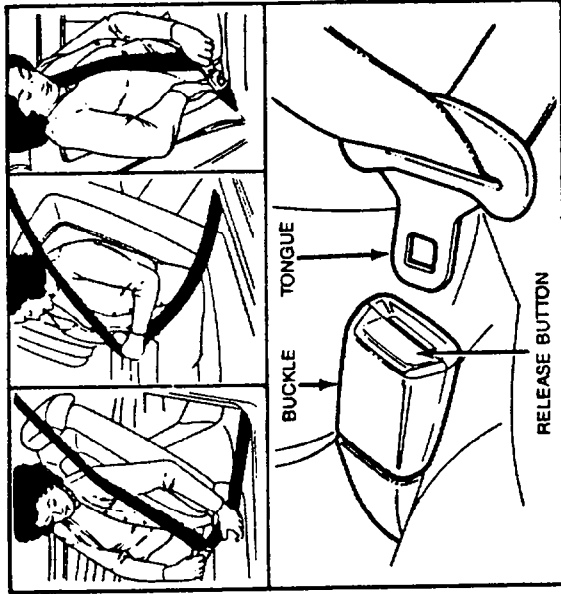
The belt system allows freedom of movement, locking tight only on hard braking or impacts of approximately 5 mph (8 km/h) or more. The system cannot be made to lock by jerking the belt.

After entering your vehicle, close the door and adjust the front seat to obtain the best position for your driving

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BEFORE DRIVING YOUR VEHICLE

comfort, access to controls, and visibility. Then pull the lap-shoulder belt from the retractor so that the shoulder portion of the belt crosses your shoulder and chest, and insert the belt tongue into the buckle until you hear a snap and feel it latch.



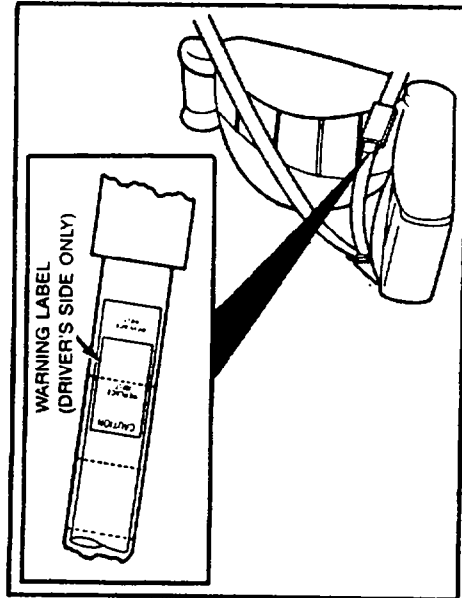
Pull up on the shoulder portion of the belt through the tongue to tighten the lap portion to a snug fit. Be sure the belt is as low on your hips as possible. The belt retractor is designed to take up the excess webbing and maintain tension on the belt.

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BEFORE DRIVING YOUR VEHICLE

SAFETY BELT WARNING LABEL (DRIVER'S SAFETY BELT ONLY)

A warning label has been placed inside the sleeve of the driver's belt. In the event the safety belt has experienced heavy stress, the warning label will be pulled out of the sleeve. This indicates that the safety belt must be replaced.



It is recommended that the safety belt be replaced in the event of a collision even if the warning label is not visible.

WARNING - Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Be sure the lap portion of the belt is fitted snugly and as low as possible around the hips, not the waist. Failure to follow these precautions could increase the chance and/or severity of an injury in an accident.

BEFORE DRIVING YOUR VEHICLE

NOTE — The safety belt warning light located in the instrument cluster will glow for about four to eight seconds after the ignition switch is turned to the ON position. The safety belt chime will also sound for four to eight seconds if the driver's belt is not used.

UNFASTENING BELTS

Push the release button in the buckle and allow the belts to unlatch. Guide the tongue to its original position while the belt retracts to minimize the possibility of it striking you or part of the vehicle.

Rear Lap Belts with Retractors

Pull the rear lap belt from the retractor. Position the lap belt as low as possible on the hips — not the waist. Insert the tongue into the buckle until an audible "click" is heard.

NOTE — If the rear lap belt locks when being pulled out, retract belt completely, and then pull the belt out to the desired length.

WARNING — Be sure the lap belt is fitted snugly and as low as possible around the hips, not around the waist. Failure to do so may increase the chance of injury in the event of a collision.

Untangling Belts

If you should jam the lap belt retractor by allowing the belt to retract when it is twisted, you can free the webbing with this procedure:

- Pull on the belt with both hands to tighten it on the retractor spool.
- Feed the belt back into the retractor until it is completely retracted. Repeat previous step if necessary.

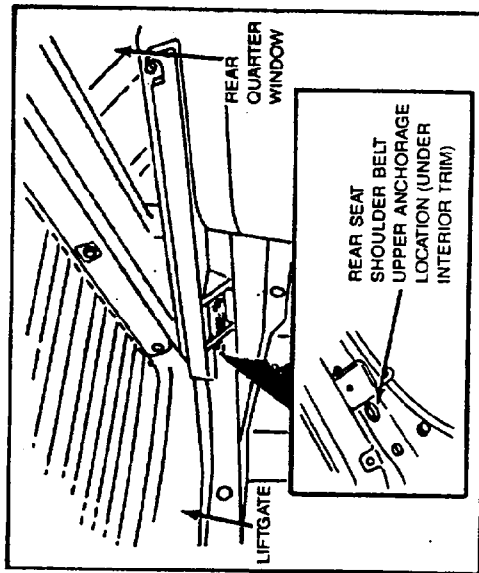
BEFORE DRIVING YOUR VEHICLE

- Pull the belt out of the retractor as far as it will go. Remove any foreign matter or untwist the belt as necessary and let the belt retract.
- Extend and retract the belt about five times to make sure the belt retractor operates properly.

Rear Seat Lap-Shoulder Belt Upper Anchorage Location

Your vehicle is equipped with two upper anchorages for rear lap-shoulder belts, one for each outboard seating position. Rear seat lap-shoulder belt assembly kits can be obtained and installed by your local Ford or Lincoln-Mercury dealer.

WARNING — In order to reduce the risk of personal injury in an accident, install only a lap-shoulder belt assembly kit especially designed for your vehicle, in accordance with the instructions provided with the kit.



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BEFORE DRIVING YOUR VEHICLE

Safety Belt Maintenance

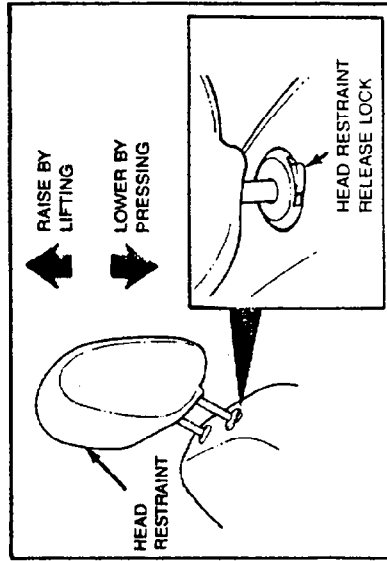
Safety belt assemblies should be periodically inspected to assure that they have not become damaged and that they remain in proper operating condition, particularly if they have been subjected to severe stress.

WARNING — All safety belt assemblies including retractors and attaching hardware should be inspected after any collision. Ford recommends that all safety belt assemblies in use during a collision be replaced unless the collision was minor, and a qualified technician finds that the belts show no damage and continue to operate properly. Safety belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted.

Head Restraints

To raise and lower the head restraints, squeeze the head restraint release lock while adjusting the head restraint.

WARNING — Adjust the head restraint so that it is just behind your head and never behind your neck to reduce the chance of injury in the event of a collision.



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