

401-1280
REPORT NO. CAL-89-N18

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

NISSAN MOTOR COMPANY

NISSAN 240 SX

2-DOOR HATCHBACK

NHTSA NO. MK5200

CALSPAN TEST NO. 7731-18

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
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June 29, 1989



FINAL REPORT

Prepared for:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
400 SEVENTH STREET, S.W.
ROOM NO. 5313 (NRM-20)
WASHINGTON, DC 20590

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

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OCT 2 1989

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. CAL-89-N18		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NHTSA New Car Assessment Program (NCAP) Frontal Barrier Impact Test on a 1989 Nissan 240 SX 2-Door Hatchback				5. Report Date June 29, 1989	
				6. Performing Organization Code CAL	
7. Author(s) Michael J. Kilgallon, Project Engineer Walter E. Levan, Program Manager				8. Performing Organization Report No. 7731-18	
9. Performing Organization Name and Address Calspan Advanced Technology Center P.O. Box 400 Buffalo, NY 14225				10. Work Unit No. 911-18-909	
				11. Contract or Grant No. DTNH22-87-D-02012	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Market Incentives (NRM-20) 400 Seventh Street, S.W., Washington, DC 20590				13. Type of Report and Period Covered June-July 1989	
				14. Sponsoring Agency Code DOT/NHTSA/RM/OMI	
15. Supplementary Notes					
16. Abstract A frontal barrier impact test of a 1989 Nissan 240 SX 2-Door Hatchback was performed at the Calspan Advanced Technology Center crash test facility in Buffalo, New York on June 29, 1989. The impact speed was 34.8 mph and the ambient temperature was 72°F. The maximum vehicle crush was 25.0 inches. The test vehicle was equipped with an automatic torso belt and a manual lap belt at both of the front outboard positions. With regard to FMVSS 208 "Occupant Crash Protection", injury criteria, both the driver and the passenger appear to comply with head, chest and femur requirements.					
17. Key Words 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)				18. Distribution Statement Copies of this report are available from: Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 400 Seventh St., S.W. Washington, DC 20590	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 22. Price	

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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 FMVSS 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 MK5200

A load cell barrier consisting of 36 load cells was impacted by a 1989 Nissan 240 SX at a velocity of 34.8 mph. The test was performed at the Calspan Corporation Advanced Technology Center on June 29, 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 2 previous tests (MK0102 and MK5201) and the passenger ATD (Serial No. 320) was also used in Test MK5201. 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. Due to the location of the belts belt spool-off data is not available for this test.

The driver's head struck the steering wheel hub. The driver's HIC was 406.9. The maximum chest deceleration over 3 milliseconds was 40.6 g's and femur loads were 1234 and 656 pounds.

The right front passenger's HIC was 525.4. The maximum chest deceleration over 3 milliseconds was 44.1 g's and femur loads were 687 and 854 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1989 Nissan 240 SX SE Fastback 2-Door

NHTSA NO.: MK5200 VIN.: JN1HS36P7KW-008876

BODY COLOR: Blue DATE OF MANUFACTURE: October 1988

Engine: 4 cylinders; 146 C.I.D.; 2.4 Liters; - CC
X Gas; - Diesel; - Turbocharged
X Longitudinal; - Transverse

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

Date Received: 2/24/89 Odometer Reading: 144
- A/C; X P/S; X P/B; - P/wdo.; X Tilt Wheel
- P/seats; - Cruise Control

Type of Occupant Restraint: Automatic Torso Belt, Manual Lap Belt.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

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

Recommended Tire Size: 195/60R15 86H - or - 205/60R15 89H

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

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

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

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

Type of Front Seat Back: - Fixed; X Adj. With X Lever - Rot. Knob

Vehicle Capacity Weight (VCW) = 638 lbs. (A)

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

Rated Cargo and Luggage Weight (RCLW) A-B = 38 lbs.

GVWR 3476 lbs. GAWR: Front 1848 lbs. Rear 2200 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>720</u> lbs.	Right Rear = <u>620</u> lbs.
Left Front = <u>700</u> lbs.	Left Rear = <u>640</u> lbs.
TOTAL FRONT WEIGHT = <u>1420</u> lbs. (<u>53</u> % of Total Vehicle Weight)	
TOTAL REAR WEIGHT = <u>1260</u> lbs. (<u>47</u> % of Total Vehicle Weight)	
TOTAL DELIVERY WEIGHT = <u>2680</u> lbs.	

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (2680 lbs.)
VCW = Vehicle Capacity Weight (638 lbs.)
DSC = Designated Seating Capacity (4)
RCLW = VCW - 150 (DSC) = 38 lbs.
Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)
Target Test Weight = 3046 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 112 POUNDS CARGO:

Right Front = <u>790</u> lbs.	Right Rear = <u>780</u> lbs.
Left Front = <u>770</u> lbs.	Left Rear = <u>780</u> lbs.
TOTAL FRONT WEIGHT = <u>1560</u> lbs. (<u>50</u> % of Total Vehicle Weight)	
TOTAL REAR WEIGHT = <u>1560</u> lbs. (<u>50</u> % of Total Vehicle Weight)	
TOTAL TEST WEIGHT = <u>3120</u> lbs.	
Weight of ballast secured in vehicle trunk area = <u>0</u> lbs.	

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude:	RF	<u>27.9</u>	LF	<u>27.8</u>	RR	<u>26.9</u>	LR	<u>26.7</u>
Test Attitude:	RF	<u>27.6</u>	LF	<u>27.6</u>	RR	<u>25.7</u>	LR	<u>25.7</u>
Wheel Base: <u>97.5</u> in.; C.G. = <u>48.8</u> in. rearward of front wheel C/L								
Remarks: <u>Hatchback was removed to achieve test weight.</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: 6/29/89 Time of Test: 12:20
 Ambient Temperature: 72 °F at impact area
 Temperature in Occupant Compartment: 70 °F.
 Windshield Molding Temperature: 70 °F.
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 34.8 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>176.6</u>	C _L	<u>178.2</u>	L	<u>176.7</u>
	Post-test	= R	<u>154.1</u>	C _L	<u>153.2</u>	L	<u>153.1</u>
	Crush	= R	<u>22.5</u>	C _L	<u>25.0</u>	L	<u>23.6</u>

Distance from front of test vehicle to point of impact:

R 11.9 C/L 12.9 L 13.3

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Steering hub</u>	<u>No Contact</u>
Chest	<u>No Contact</u>	<u>No Contact</u>
Abdomen	<u>No Contact</u>	<u>No Contact</u>
Left Knee	<u>Dash panel</u>	<u>Dash panel</u>
Right Knee	<u>Dash panel</u>	<u>Dash panel</u>

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

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

Glazing Damage

Backlight/Windshield Sustained stress cracks but remained intact.

Section 3
OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

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

II. OVR DATA

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

Table 2
DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-43	-17	47	60.7	-40	-11	-11	40.6
DUMMY (2)	-22	18	68	74.1	-39	29	-59	44.1
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	LEFT FEMUR	RIGHT FEMUR
DUMMY (1)	1234	656
DUMMY (2)	687	854
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)	1851	-	972
DUMMY (2)	1958	884	-
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)	406.9	.07755	.11355	41.8
DUMMY (2)	525.4	.07110	.10710	46.3
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

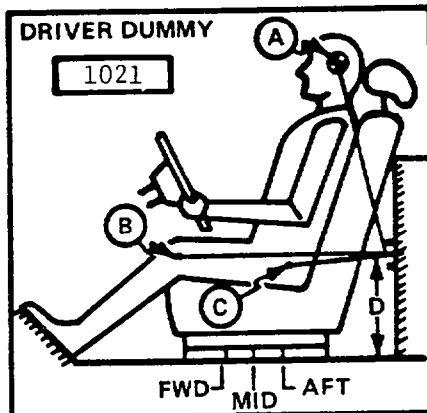
TEST NO.: MK5200

VEHICLE: 1989 Nissan 240 SX

SEAT TYPE:
☐ Bench
☒ Bucket
☐ Split Bench

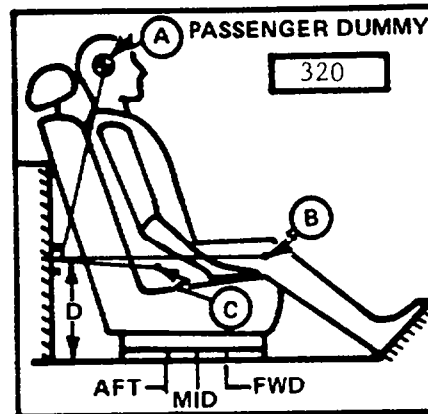
ADJUSTER TYPE:
☒ Manual
☐ Power

BUCKET SEAT BACK TYPE:
☐ Fixed
☒ Adjustable Reclining



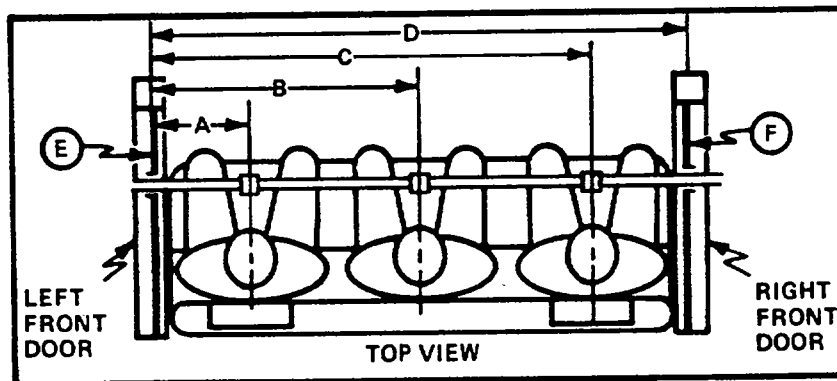
**MEASUREMENT
LOCATION**

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



A = 21.3 in. 14 Degrees
 B = 28.6 in. 94 Degrees
 C = 13.7 in. 116 Degrees
 D = 12.5 in.

A = 21.0 in. 15 Degrees
 B = 28.3 in. 96 Degrees
 C = 13.5 in. 114 Degrees
 D = 12.5 in.



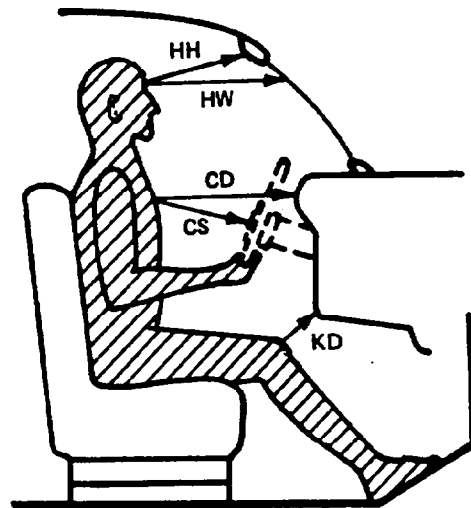
1021

320

A	=	Left Door to Driver Centerline	<u>11.0</u> in.
B	=	Left Door to Center Passenger Centerline	<u>-</u> in.
C	=	Left Door to Right Passenger Centerline	<u>37.7</u> in.
D	=	Left Door to Right Door	<u>48.7</u> in.
E, F	=	Window Glass Height (Right and Left Must Be Equal)	<u>11.0</u> in.

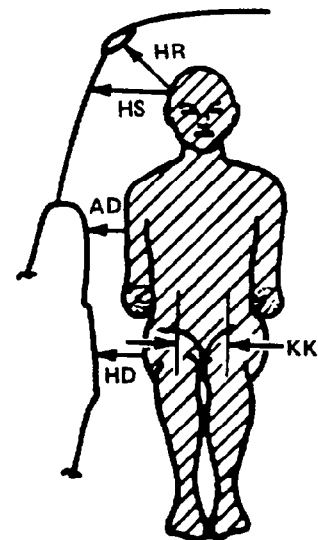
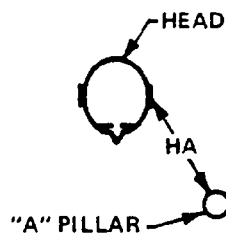
Figure 2
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	15.8	15.8
HW	19.8	20.0
CD	24.5	23.9
CS	16.0	-
KDL	5.3	6.2
KDR	5.5	6.3
SA	See Note	See Note
TA	25°	25°



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

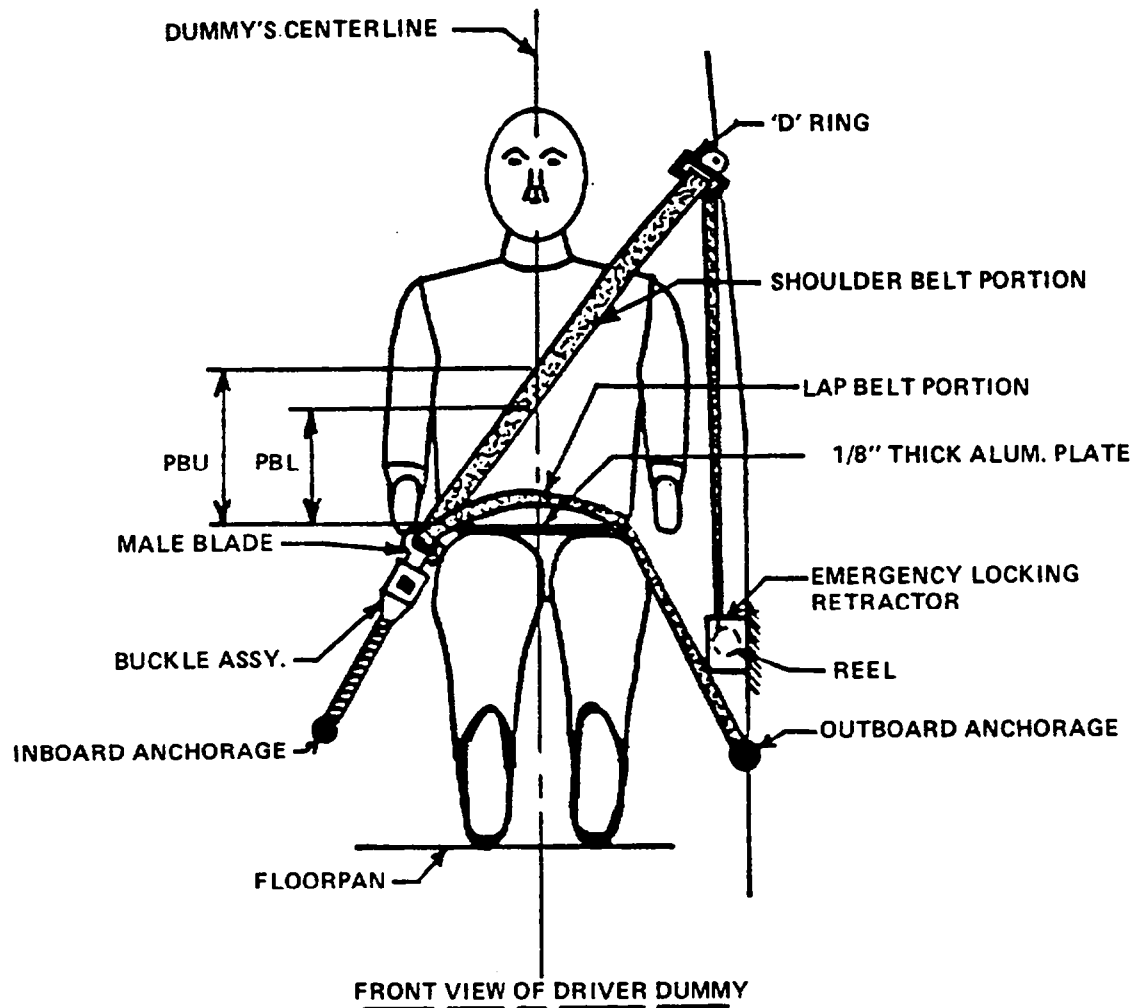
HA = Head Target to "A" Pillar
 HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door
 KK = Knee to Knee



	DRIVER	PASSENGER
HR	4.3	4.9
HS	7.8	8.3
AD	3.1	4.7
HD	6.8	7.2
KK	8.1	7.5
HA	19.2	18.8

Note: Seat angle is positioned as recommended by manufacturer.

Figure 3
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	12.5	12.0
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	9.5	9.0
<u>LAP BELT TENSION</u>	N/A	N/A
<u>SHOULDER BELT TENSION</u>	N/A	N/A

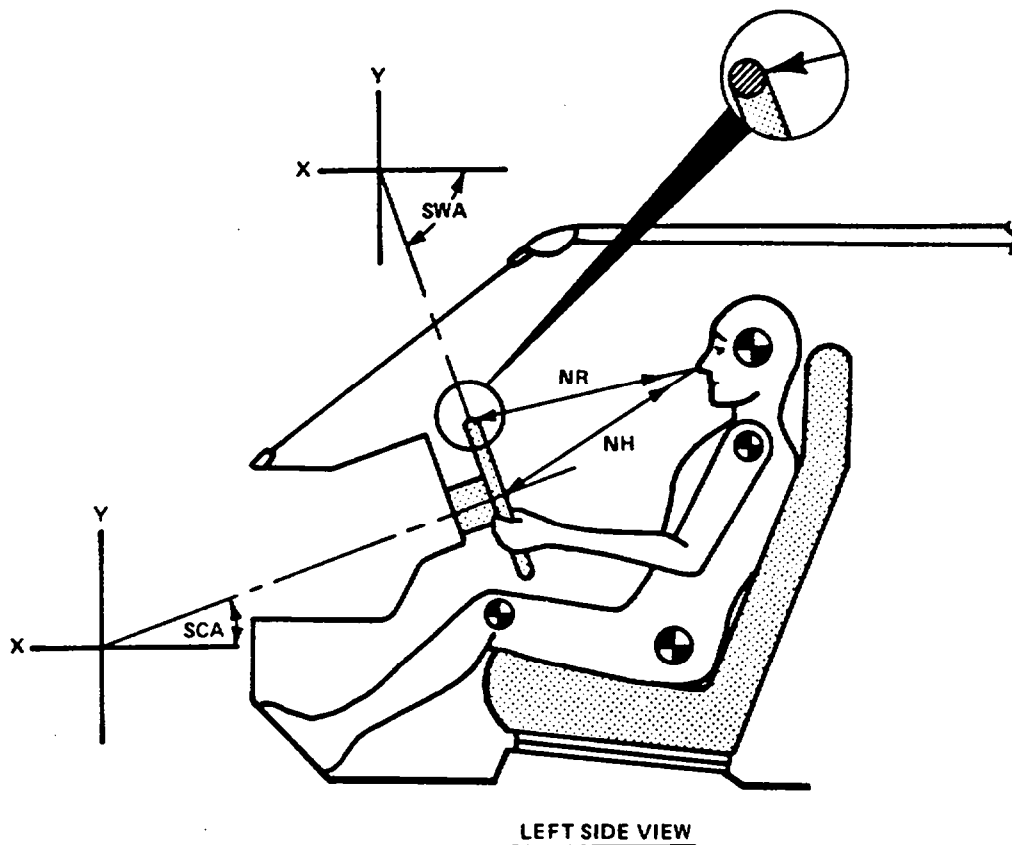
Table 3

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

<u>BELT LENGTH DATA:</u>	<u>Driver</u>	<u>Passenger</u>
Shoulder belt length as measured on Part 572 Dummy. Measured from seat back hinge to buckle release.	<u>38.0</u>	<u>38.0</u>
Lap belt length as measured on Part 572 Dummy.	<u>29.0</u>	<u>29.0</u>
<u>BELT STRETCH DATA:</u>		
Measured electronically between shoulder belt load cell and the "D" ring.	<u>0.6"/ft</u>	<u>1.2"/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	19.5	Inches
<u>NH</u> -- Distance from tip of dummy's nose to center of steering column hub	20.7	Inches
<u>SCA</u> -- Angle of steering column relative to the horizontal X axis	20.0	Degrees
<u>SWA</u> -- Angle of steering wheel relative to the horizontal X axis	-70.0	Degrees

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

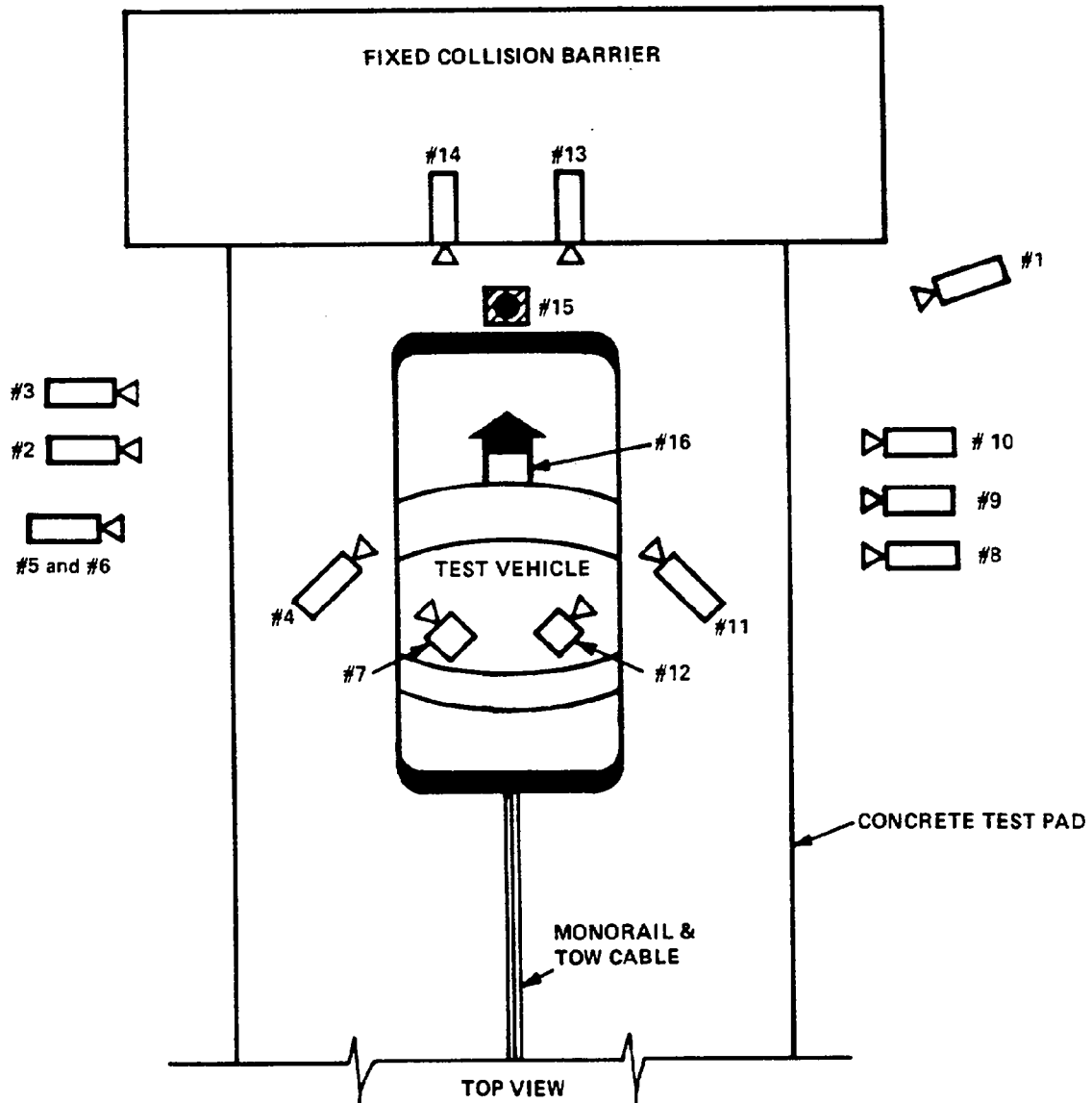


Table 4
HIGH-SPEED CAMERA LOCATIONS

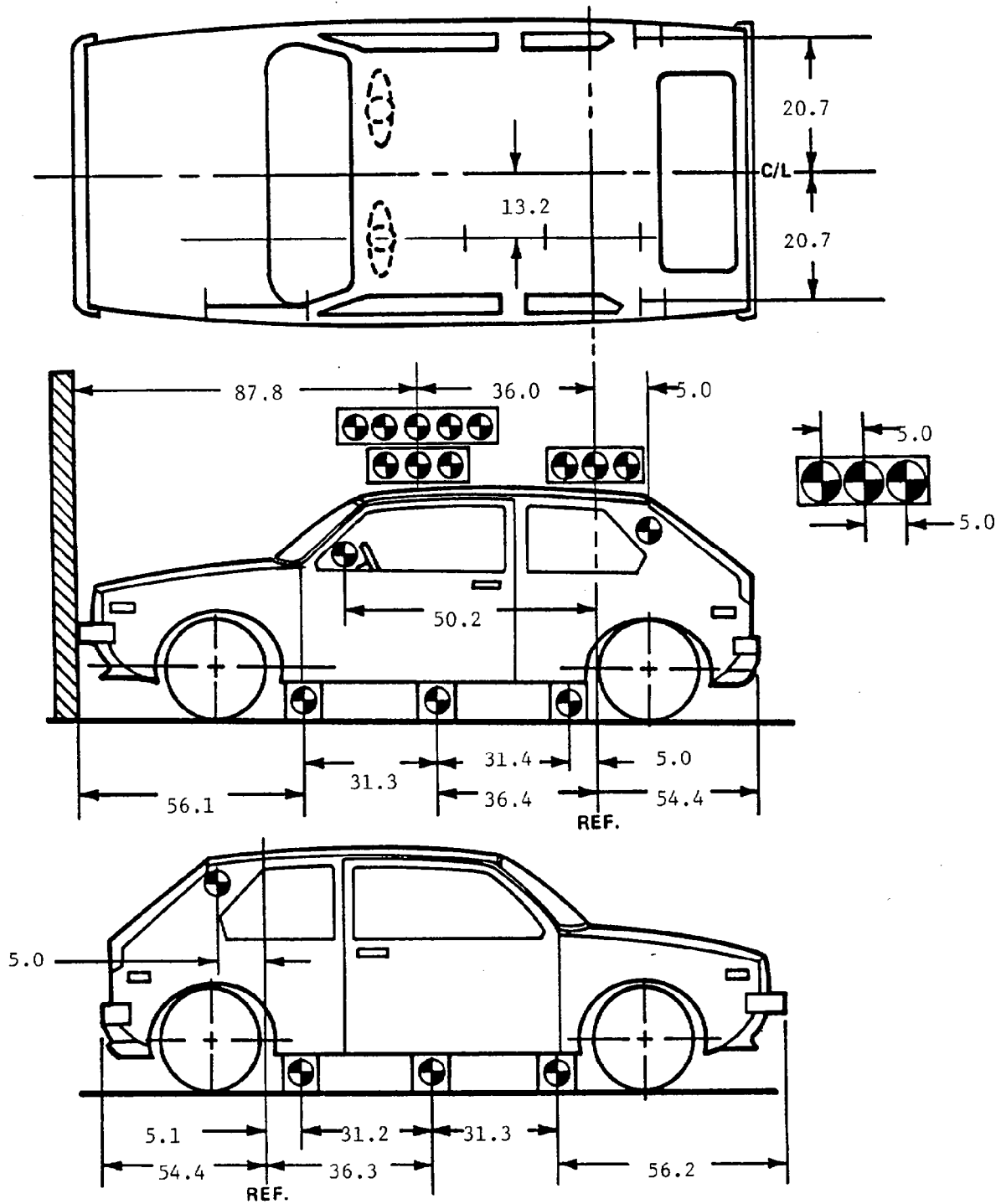
Test No. MK5200 Vehicle 1989 Nissan 240 SX

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	228	40	42	-4	212	13	530
3	Left Side View	316	15	41	-4	300	25	530
4	Driver and Interior View	102	110	67	-15	86	13	860
5	Steering Column (Bottom)	282	60	47	-5	266	25	540
6	Steering Column (Top)	282	60	71	-9	266	25	560
7	Left Belt	-	-	-	-	-	8	No Timing
8	Overall Right Side	240	75	42	-4	224	13	No Timing
9	Right Side View	324	56	41	-2	308	25	780
10	Right Passenger View	324	77	57	-2	308	35	770
11	Passenger and Interior View	100	115	68	-20	84	25	650
12	Right Belt	-	-	-	-	-	8	No Timing
13	Passenger Front View	24	-5	73	-40	-	13	590
14	Driver Front View	24	-5	73	-38	-	13	560
15	Windshield View	0	0	126	-45	-	13	570
16	Pit View of Engine	0	32	-120	90	-	13	880

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

Figure 6

VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

Figure 7

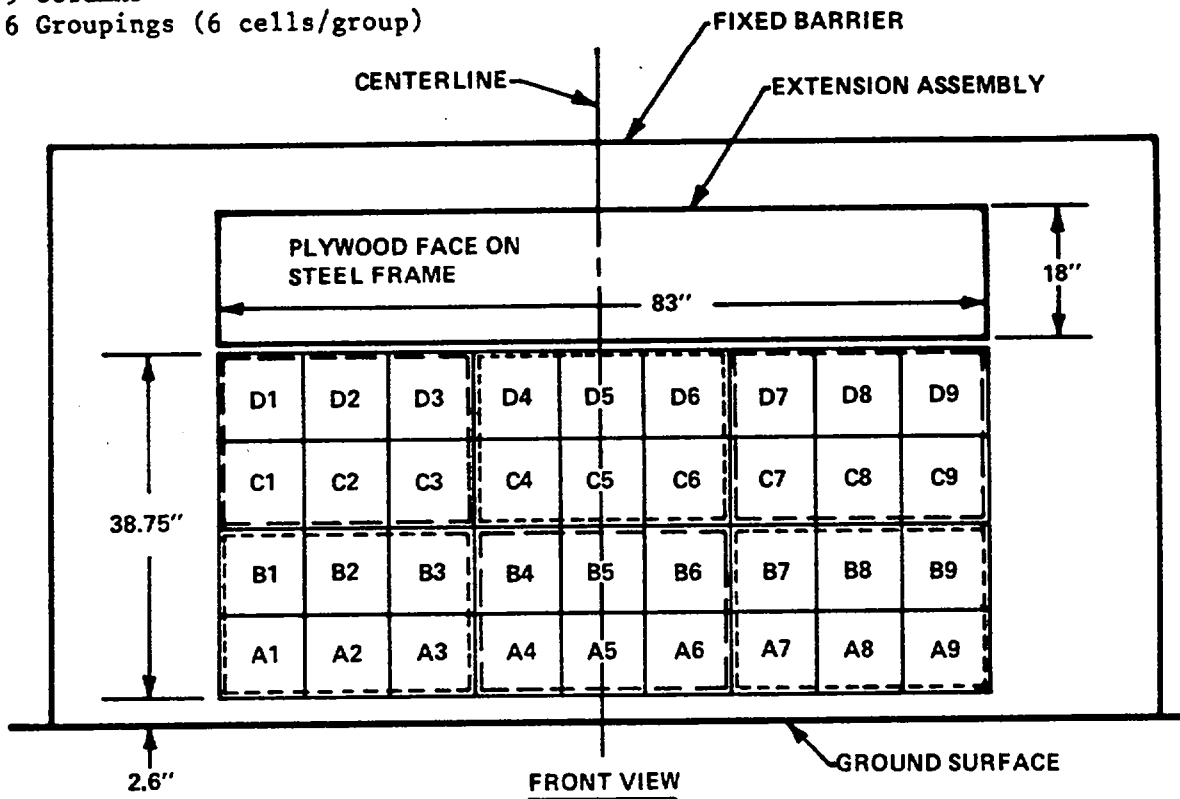
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells

4 Rows

9 Columns

6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

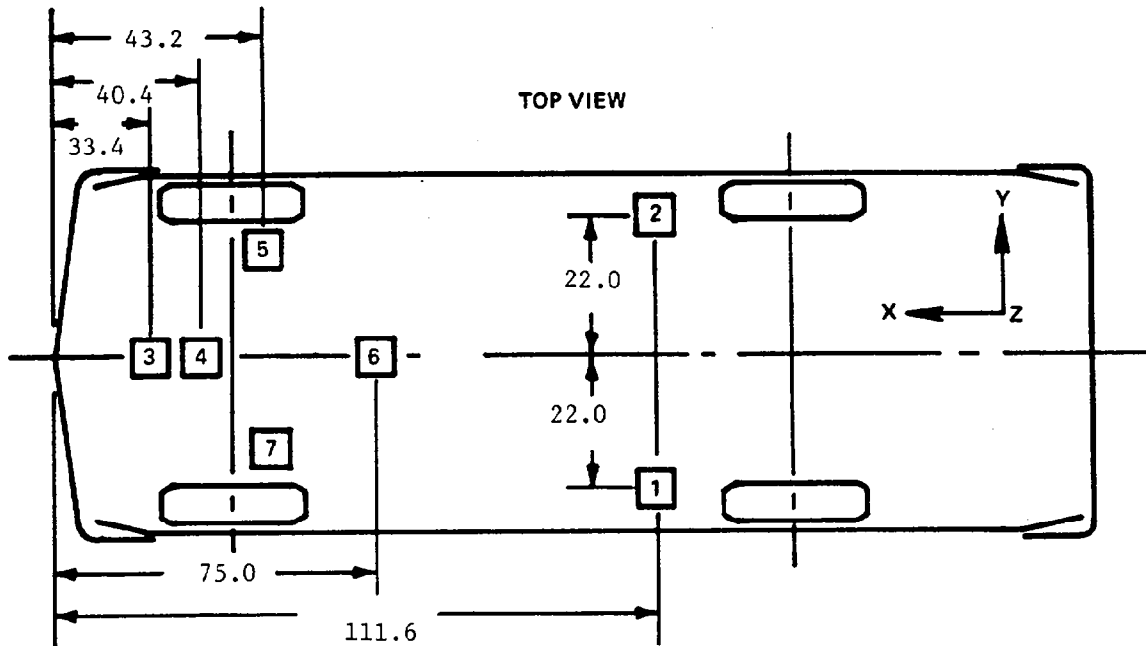
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

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

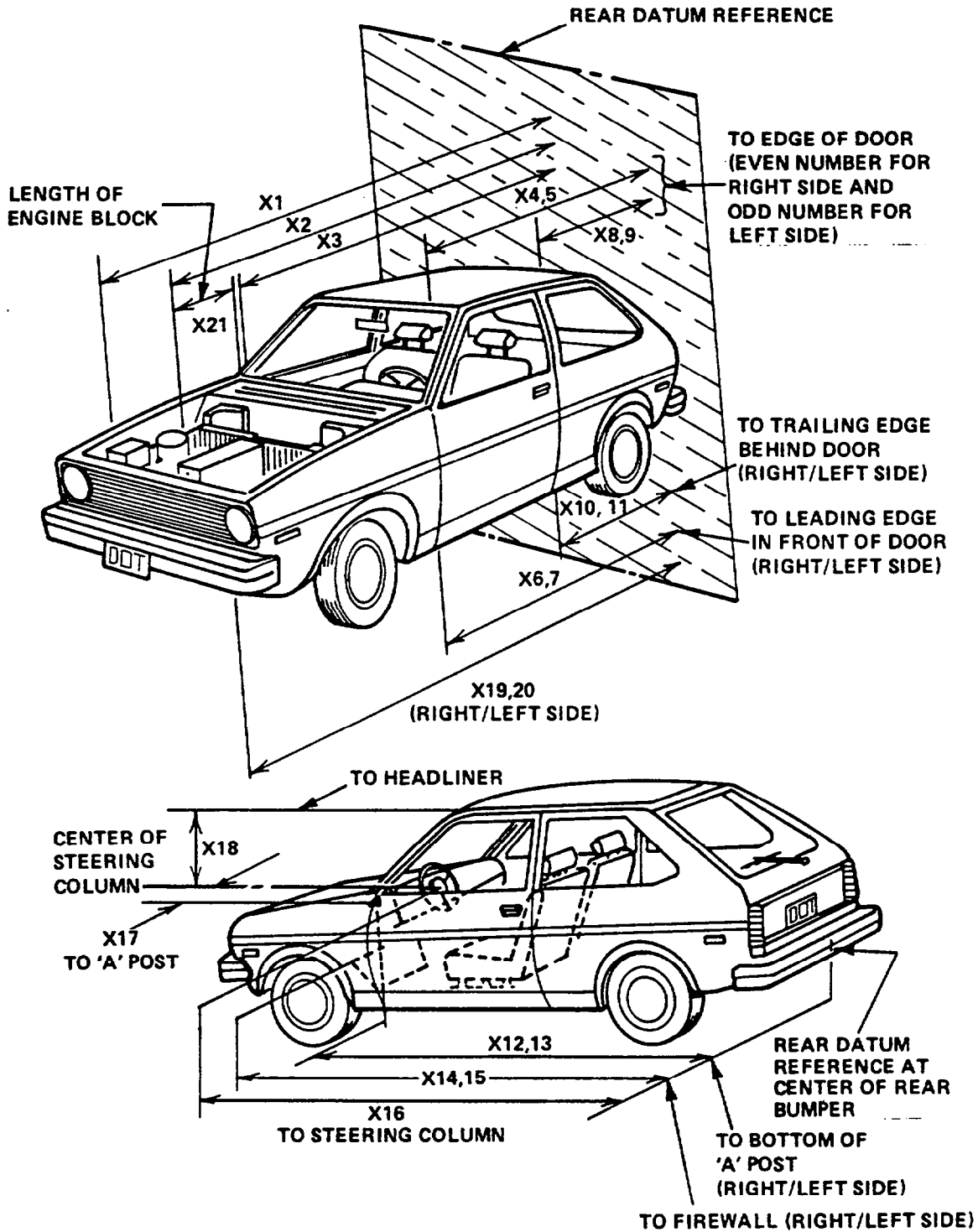


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	178.2	153.2	25.0
X2	Rear Surface of Vehicle to Front of Engine	148.2	140.8	7.4
X3	Rear Surface of Vehicle to Firewall	126.2	121.7	4.5
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	113.2	112.6	0.6
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	113.8	112.6	1.2
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	115.3	114.5	0.8
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	115.5	114.5	1.0
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	66.5	65.4	1.1
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	67.1	65.6	1.5
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	72.2	71.8	0.4
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	72.4	71.6	0.8
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	115.4	114.8	0.6
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	115.5	114.5	1.0
X14	Rear Surface of Vehicle to Firewall, Right Side	126.6	123.6	3.0
X15	Rear Surface of Vehicle to Firewall, Left Side	126.4	124.5	1.9
X16	Rear Surface of Vehicle to Steering Column	98.3	97.9	0.4
X17	Center of Steering Column to "A" Post	15.8	15.6	0.2
X18	Center of Steering Column to Headliner	15.7	16.9	-1.2
X19	Rear Surface of Vehicle to Right Side of Front Bumper	176.6	154.1	22.5
X20	Rear Surface of Vehicle to Left Side of Front Bumper	176.7	153.1	23.6
X21	Length of Engine Block	21.5	21.5	0.0

Appendix A
PHOTOGRAPHS

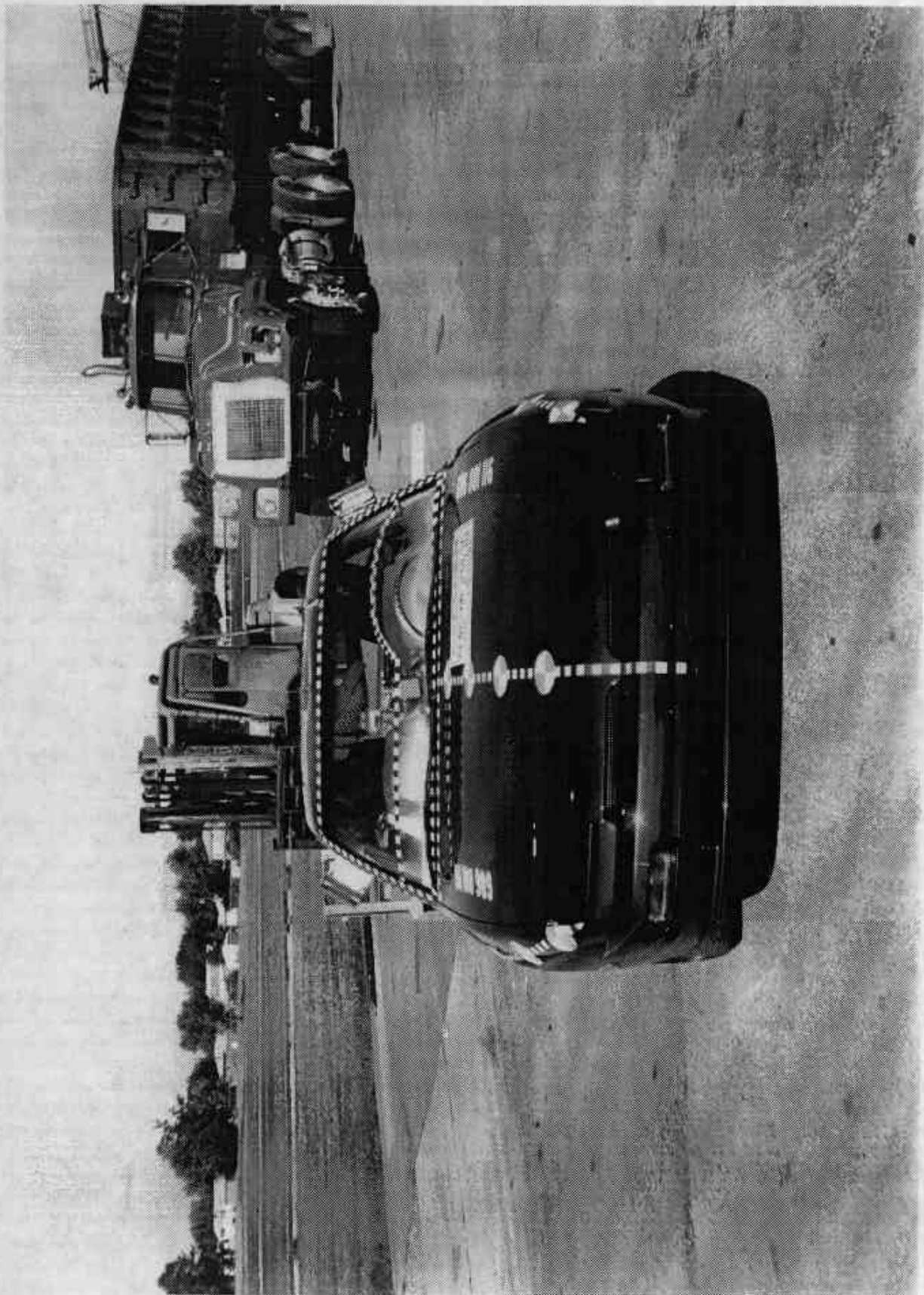


Figure A-1 PRE-TEST FRONT VIEW

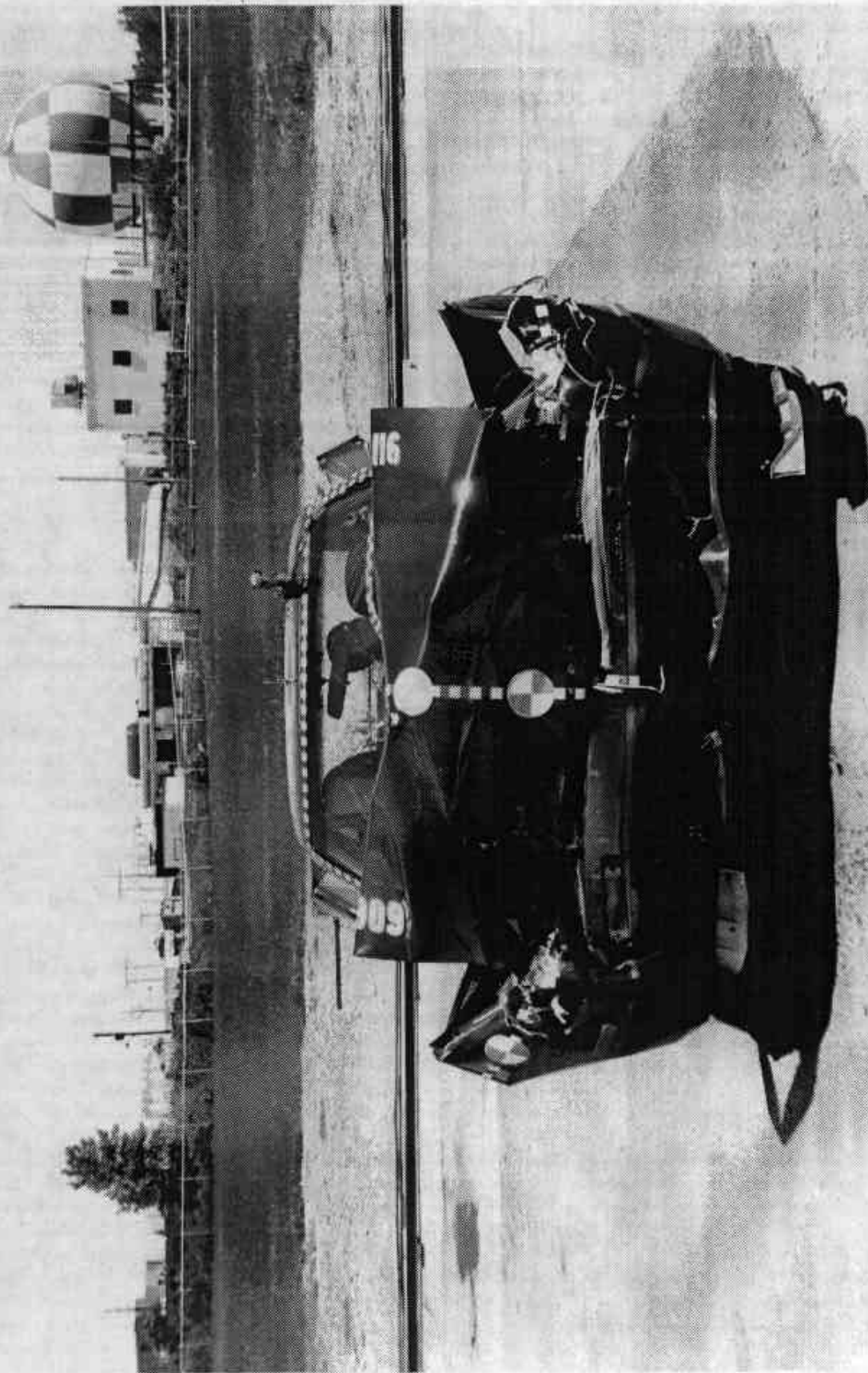


Figure A-2 POST-TEST FRONT VIEW

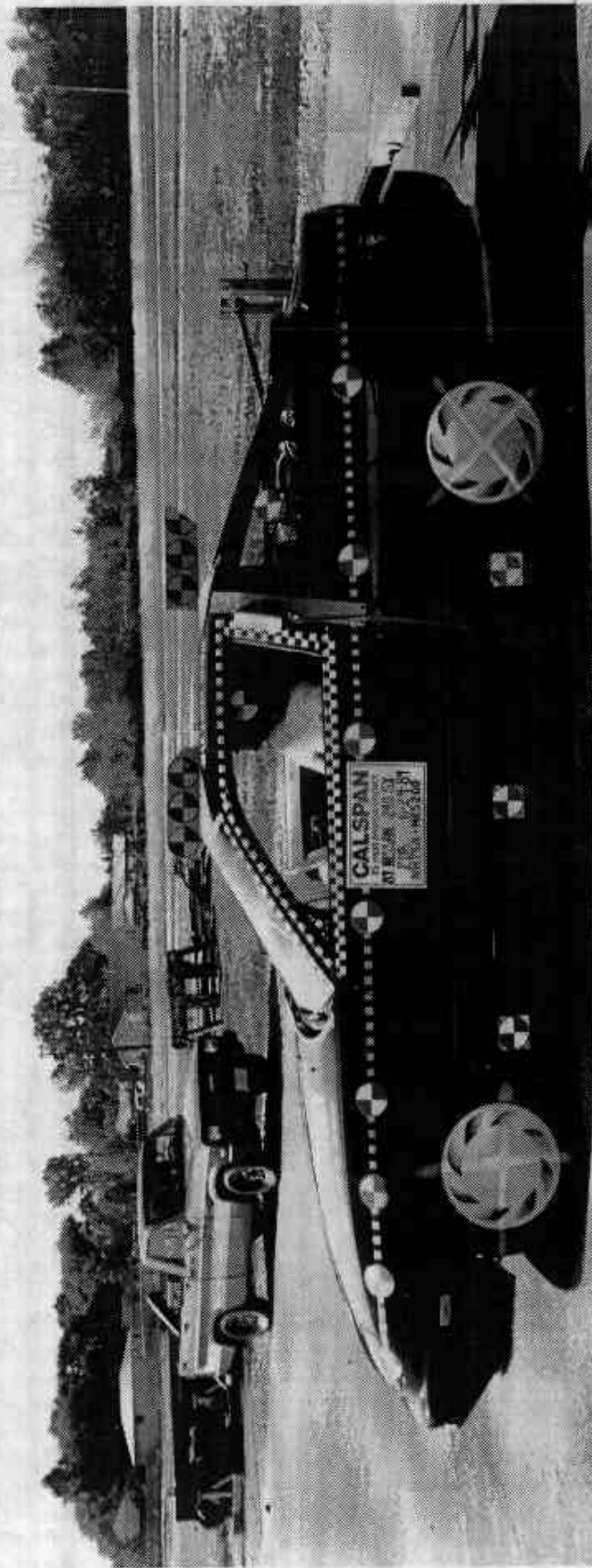


Figure A-3 PRE-TEST LEFT SIDE VIEW

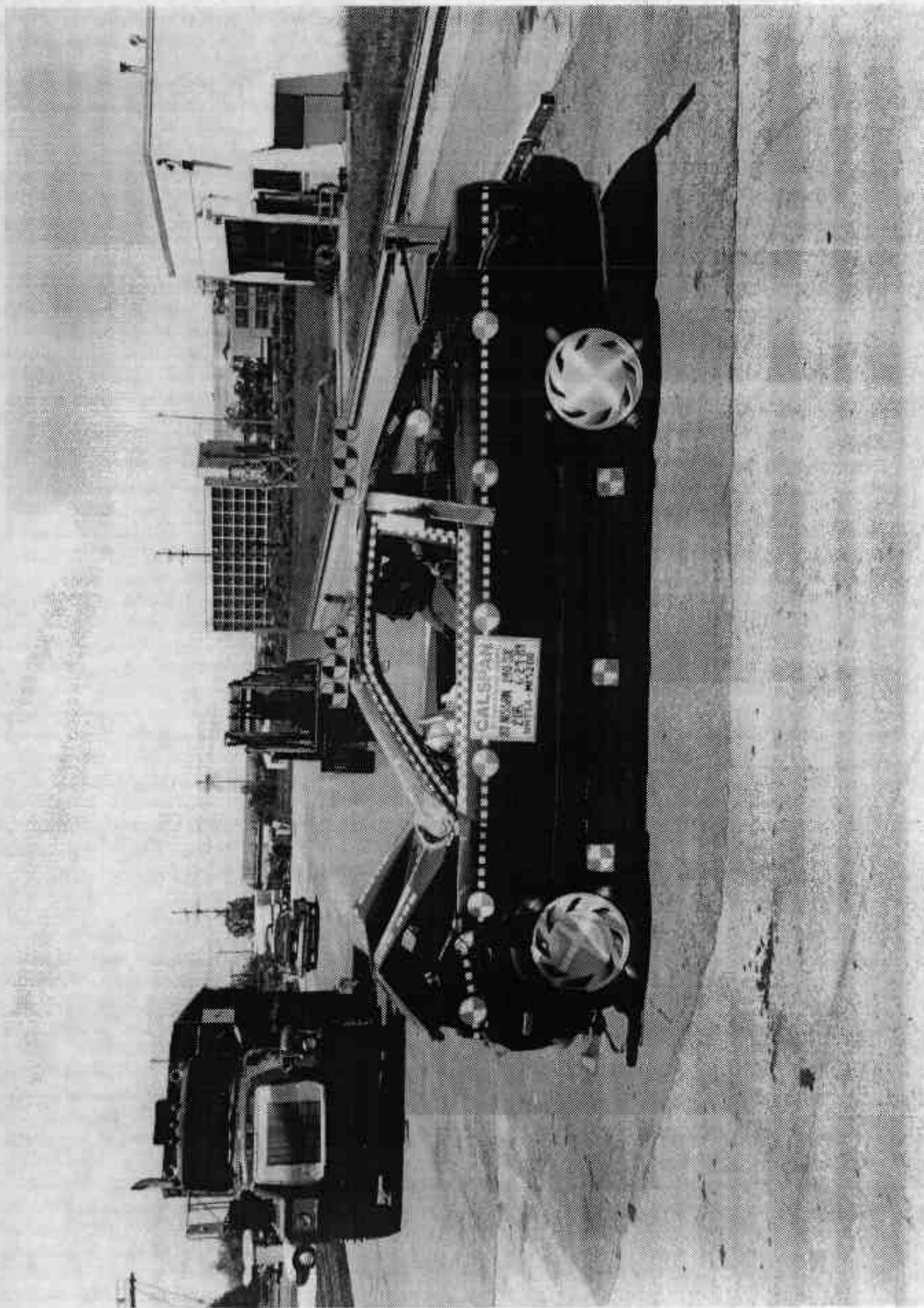


Figure A-4 POST-TEST LEFT SIDE VIEW

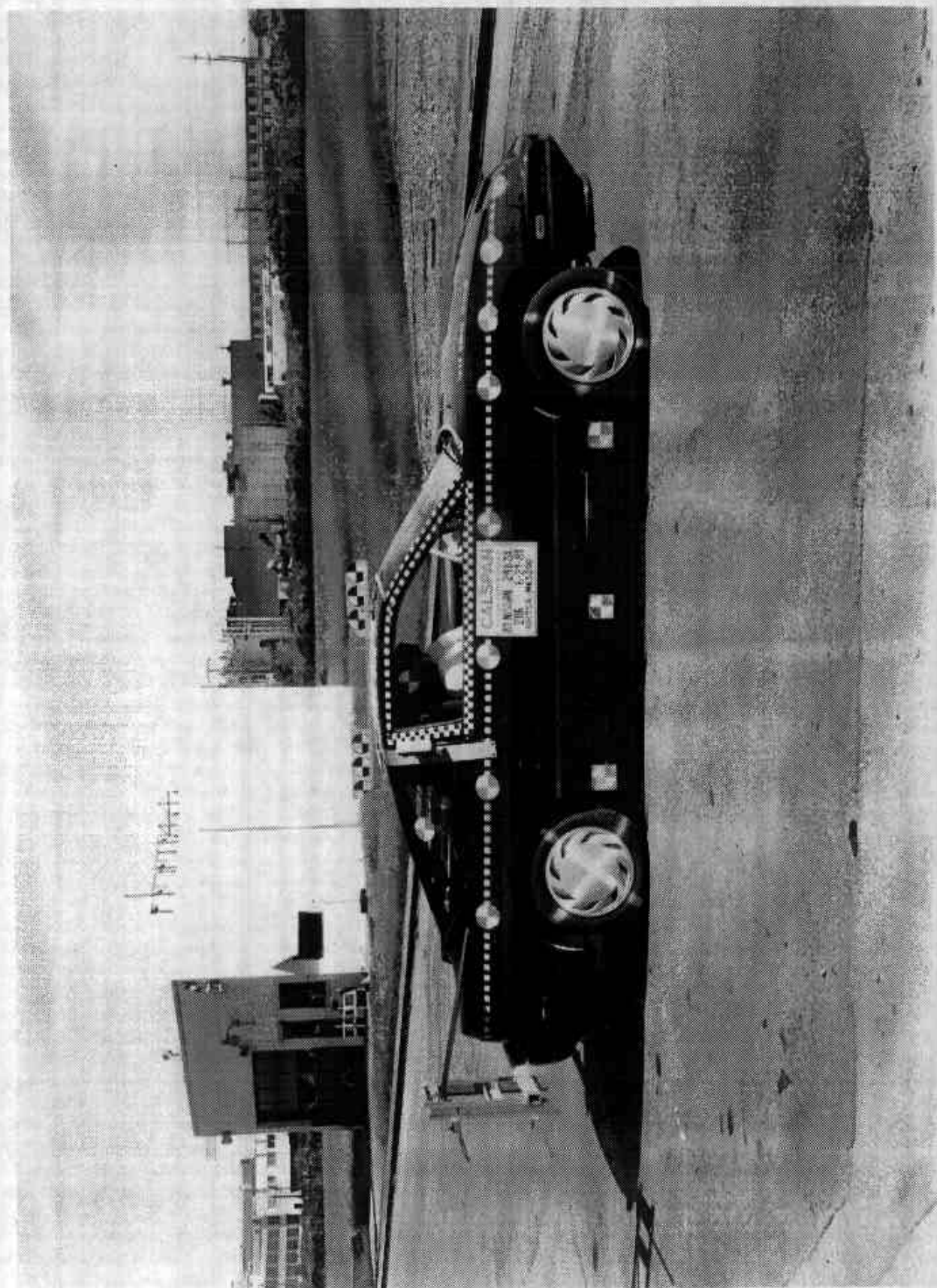


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-6

7731-18

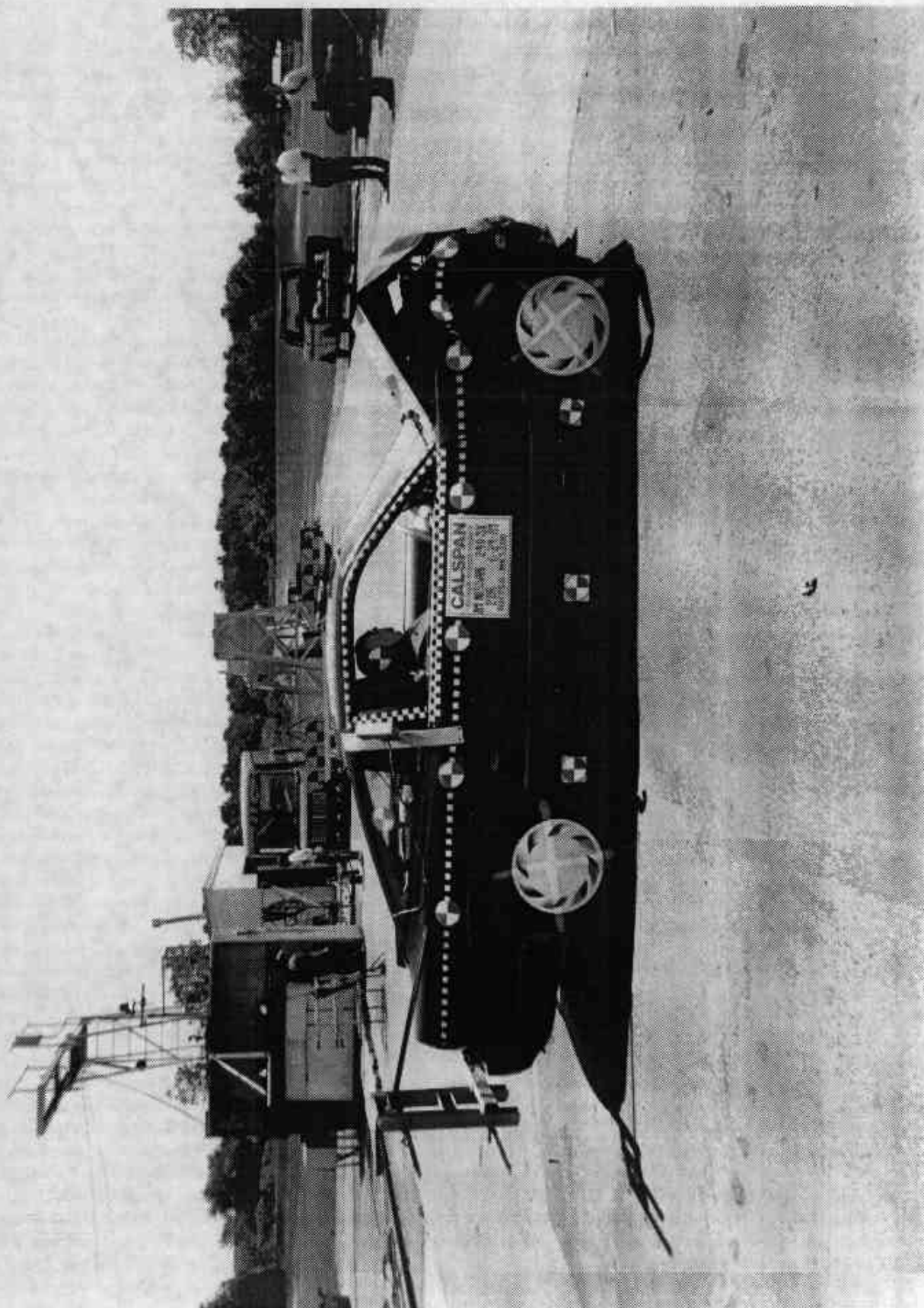


Figure A-6 POST-TEST RIGHT SIDE VIEW

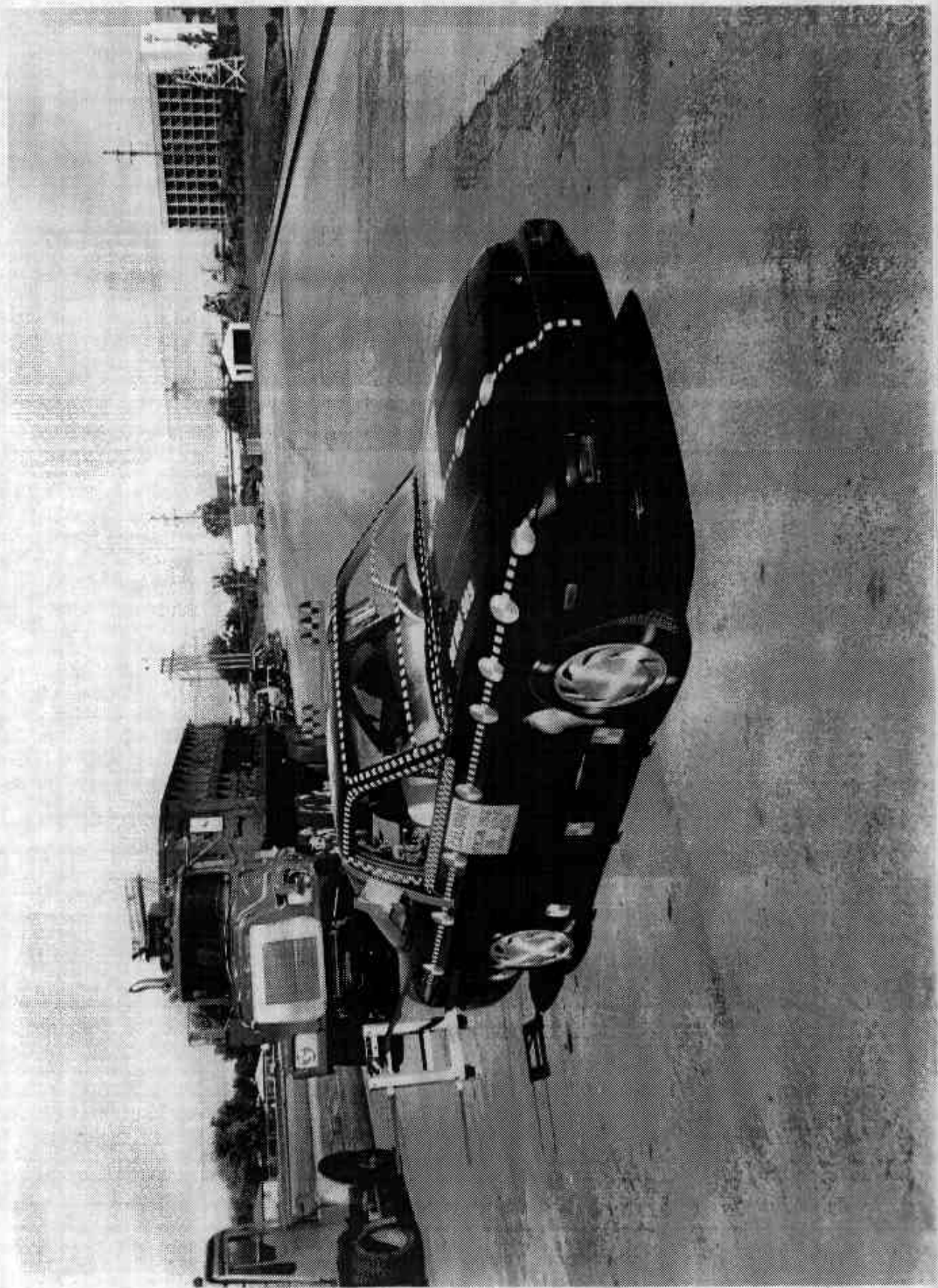


Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

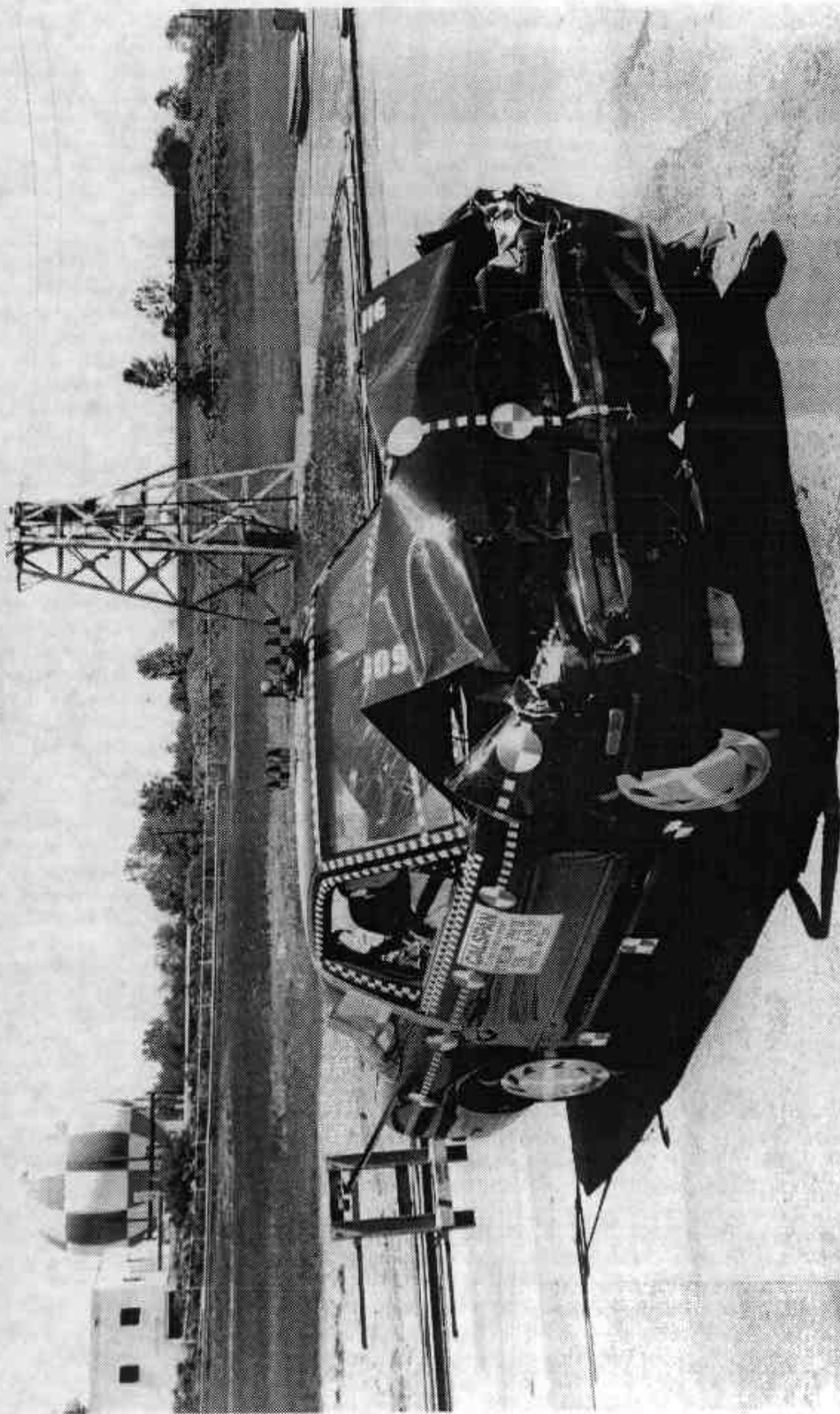


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW



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

A-10

7731-18

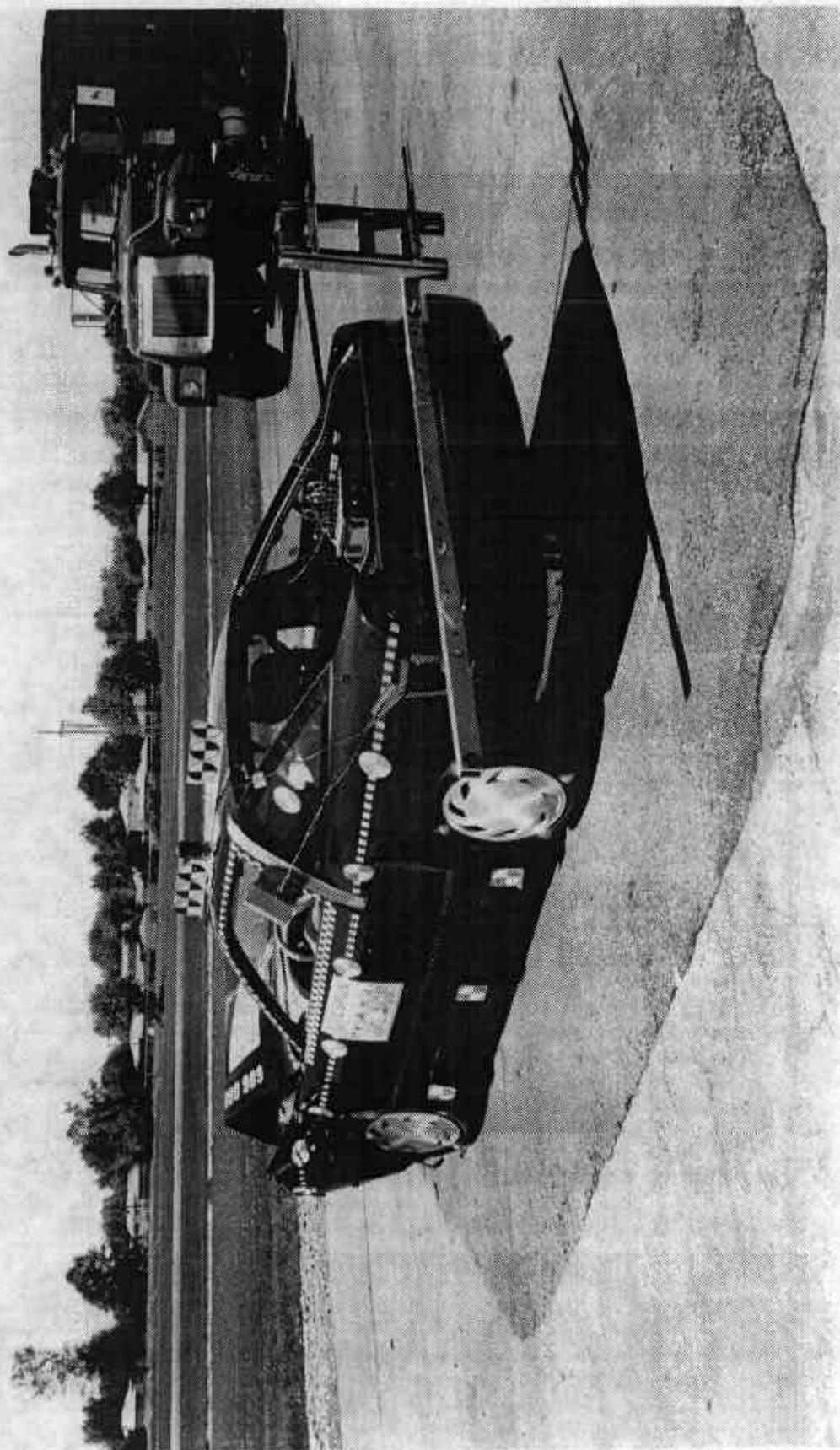


Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

A-11

7731-18

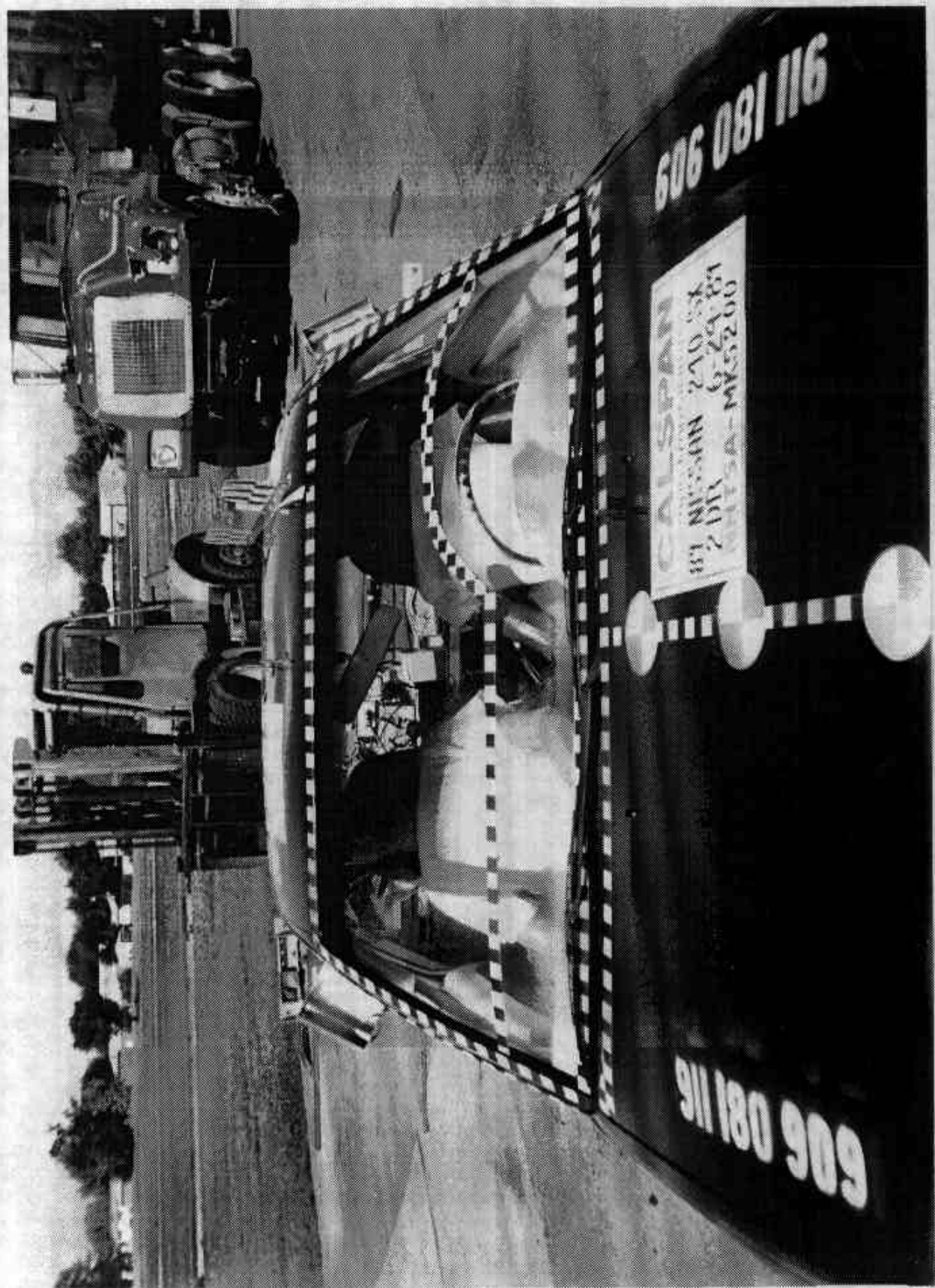


Figure A-11 PRE-TEST WINDSHIELD VIEW



Figure A-12 POST-TEST WINDSHIELD VIEW

A-13

7731-18

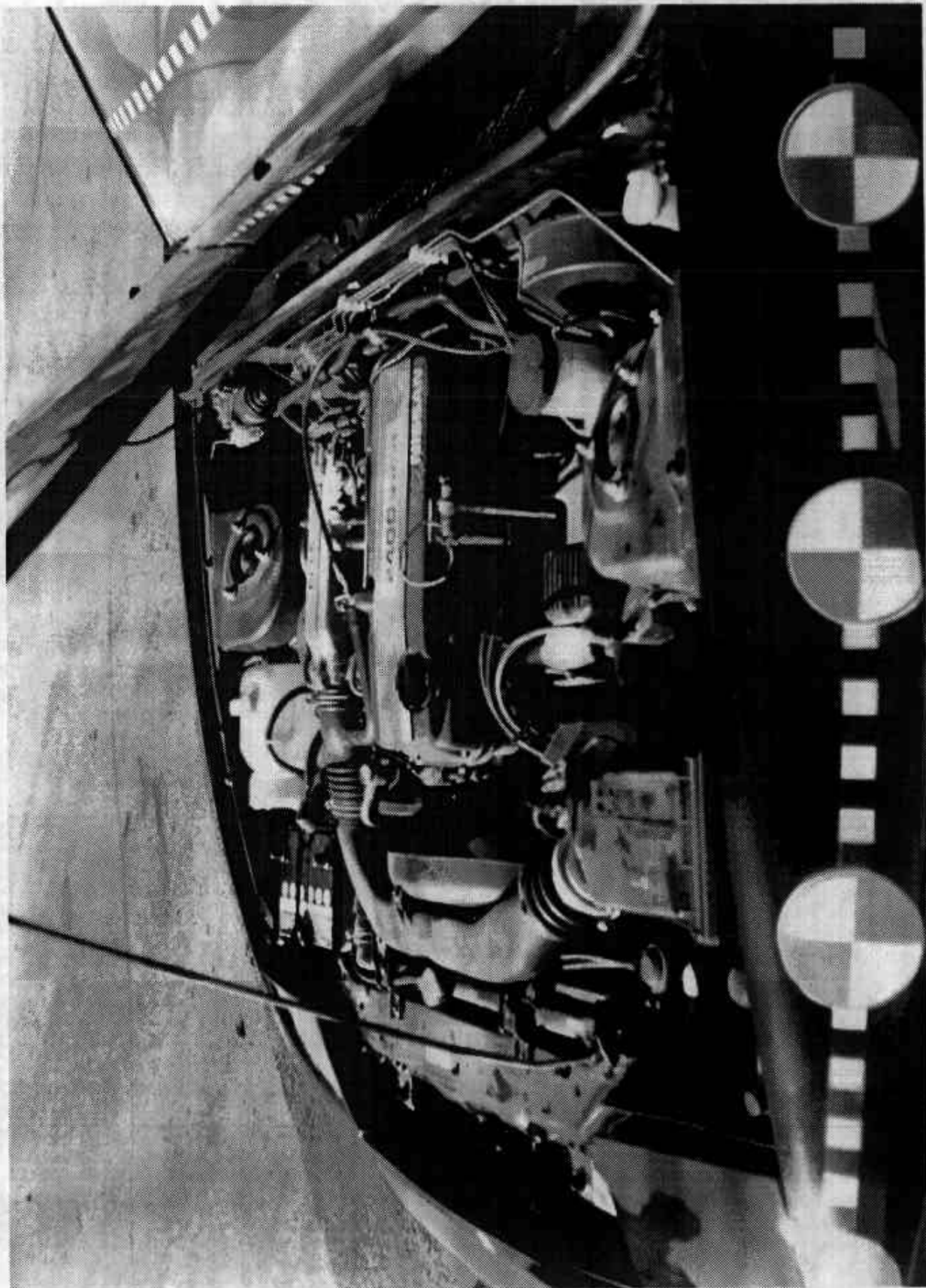


Figure A-13 PRE-TEST ENGINE COMPARTMENT VIEW

A-14

7731-18



Figure A-14 PRE-TEST FUEL CAP VIEW

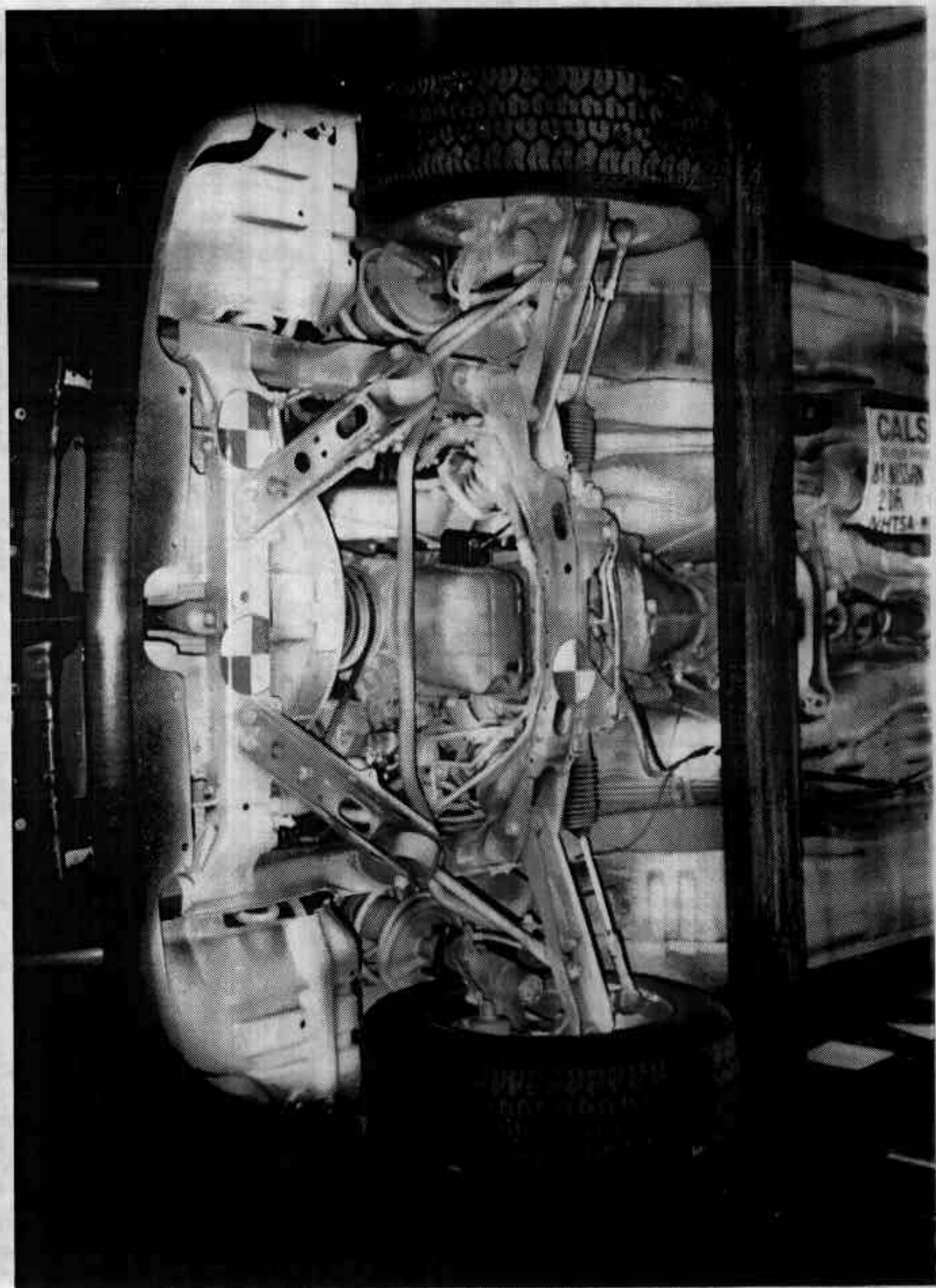


Figure A-15 PRE-TEST FRONT UNDERBODY VIEW

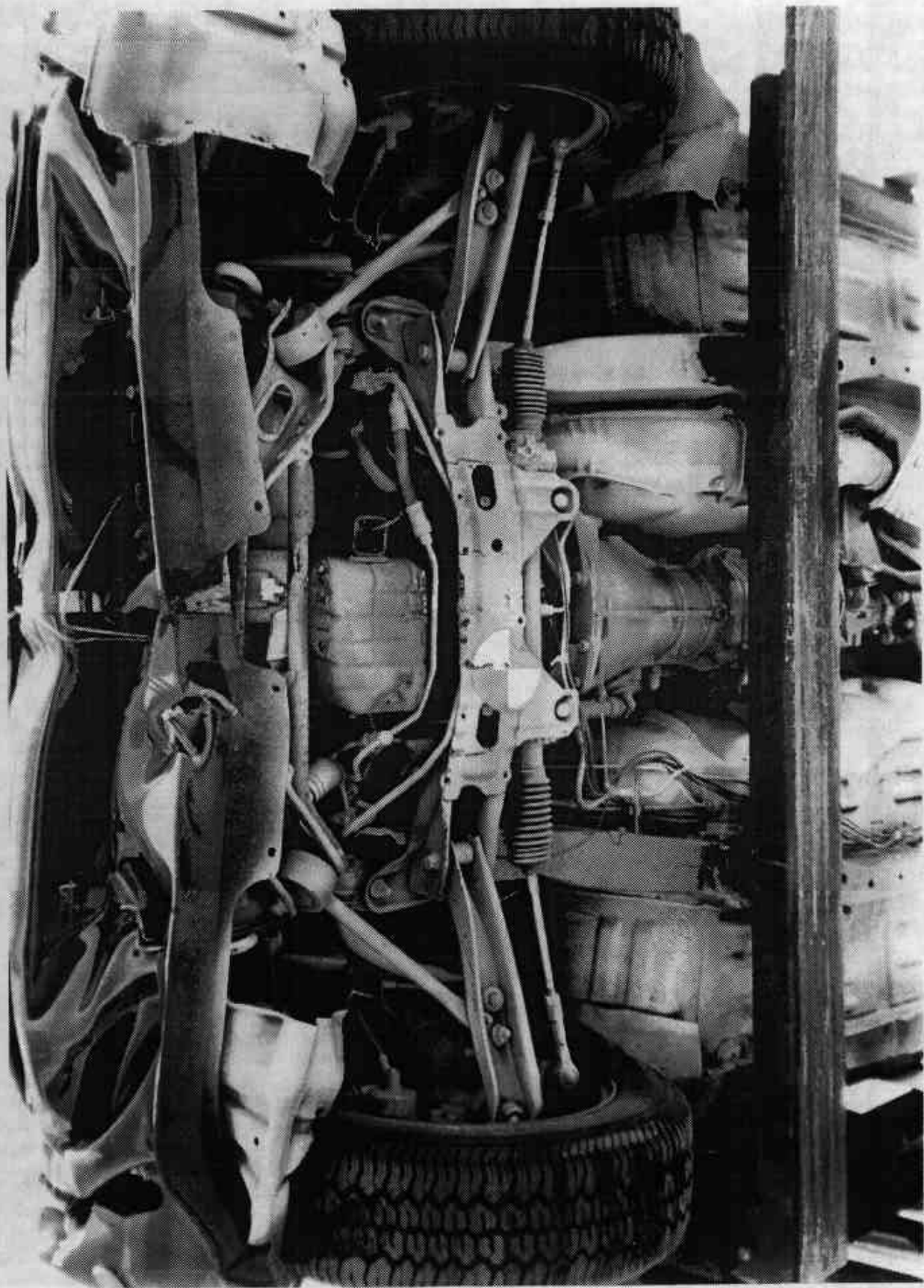


Figure A-16 POST-TEST FRONT UNDERBODY VIEW

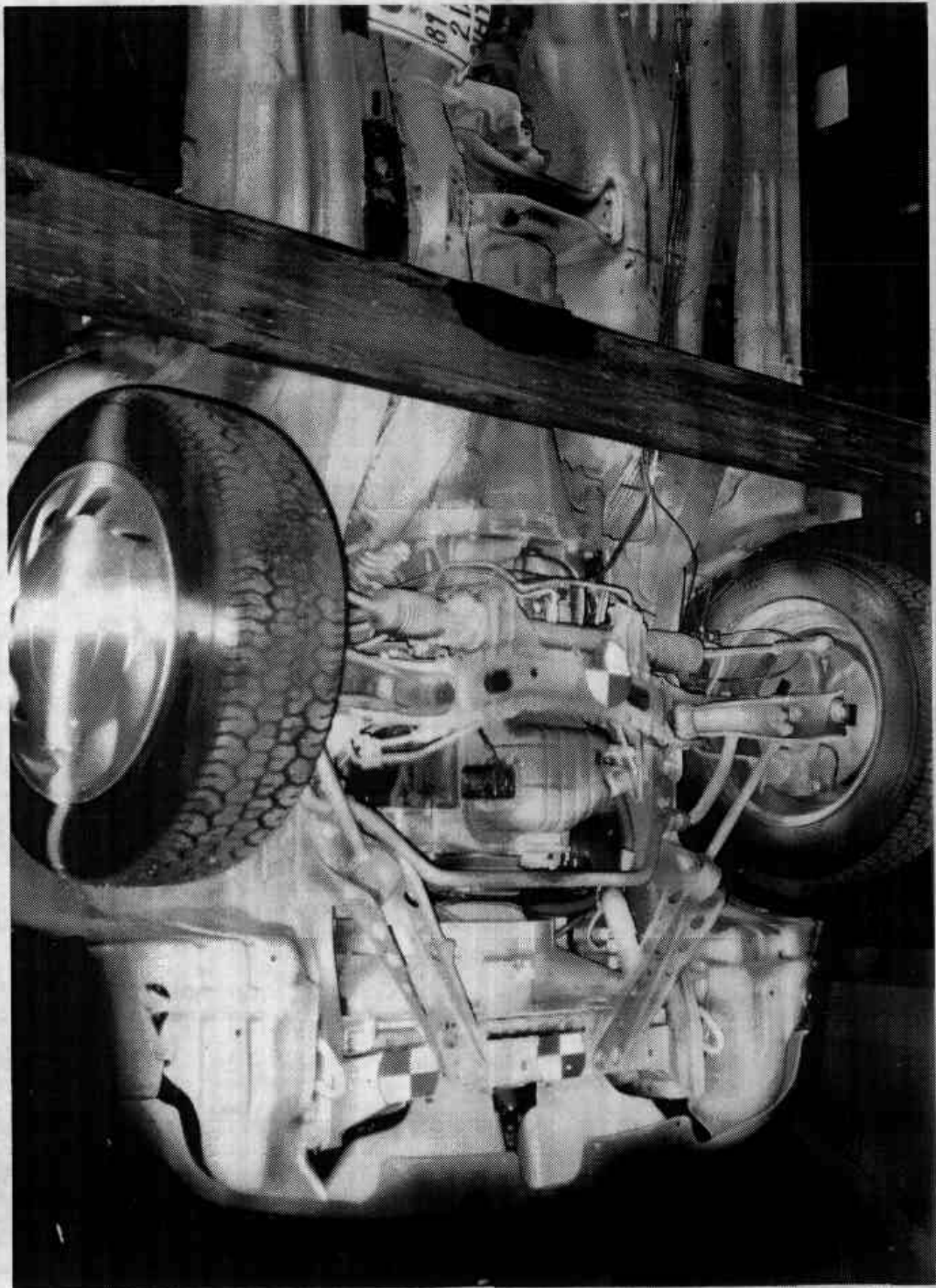


Figure A-17 PRE-TEST FRONT-SIDE UNDERBODY VIEW

A-18

7731-18

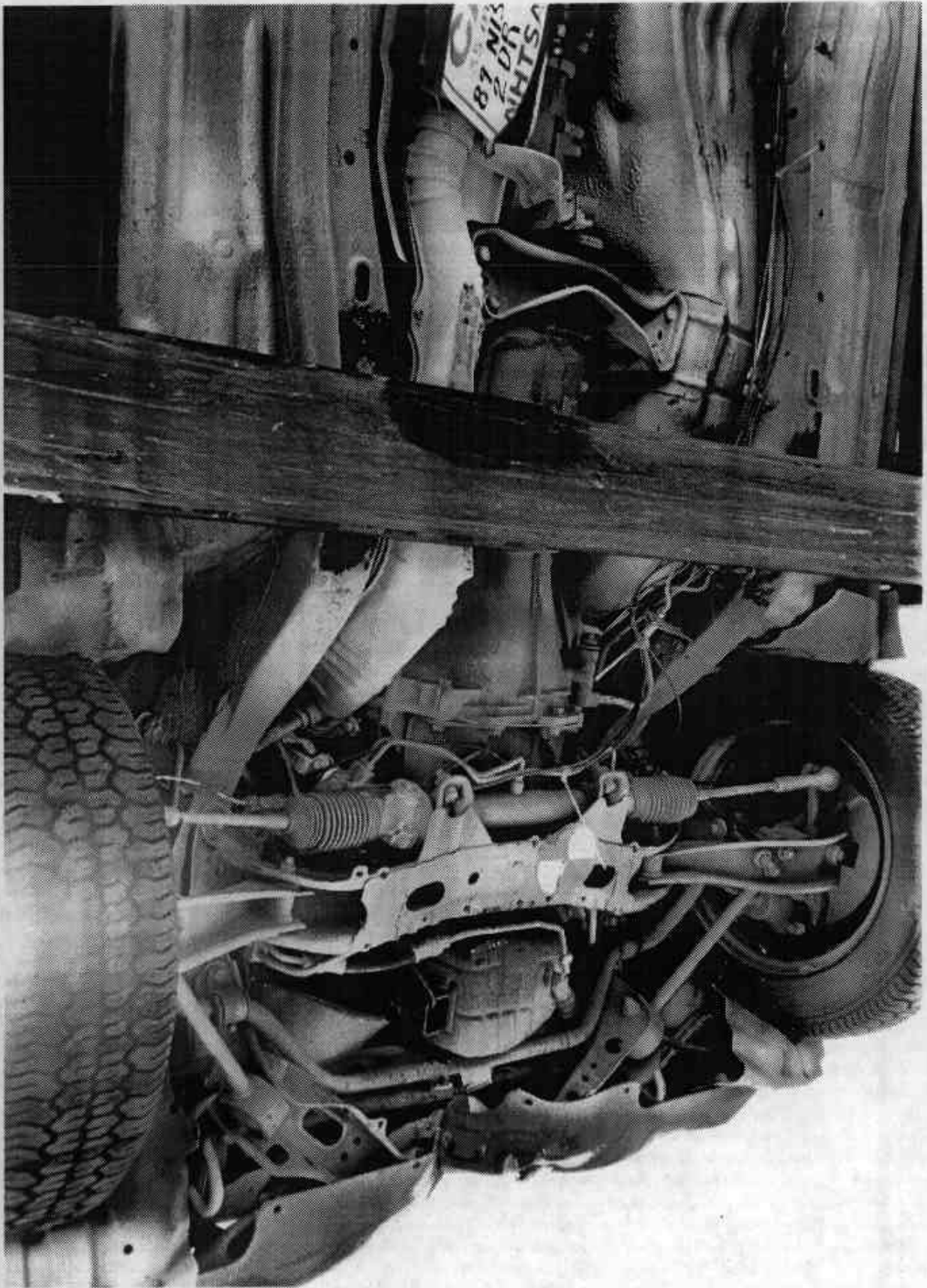


Figure A-18 POST-TEST FRONT-SIDE UNDERBODY VIEW

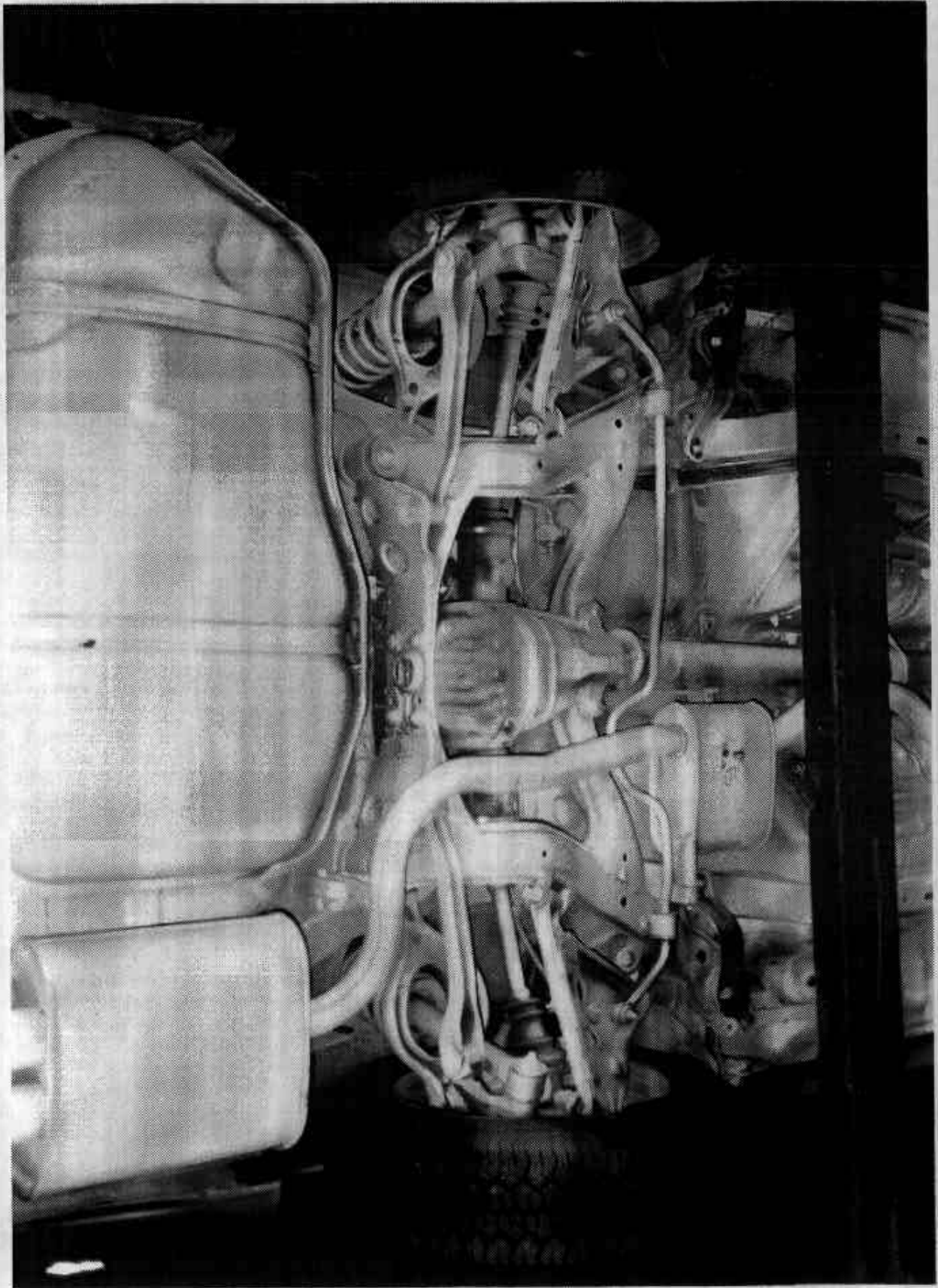


Figure A-19 PRE-TEST REAR UNDERBODY VIEW

A-20

7731-18

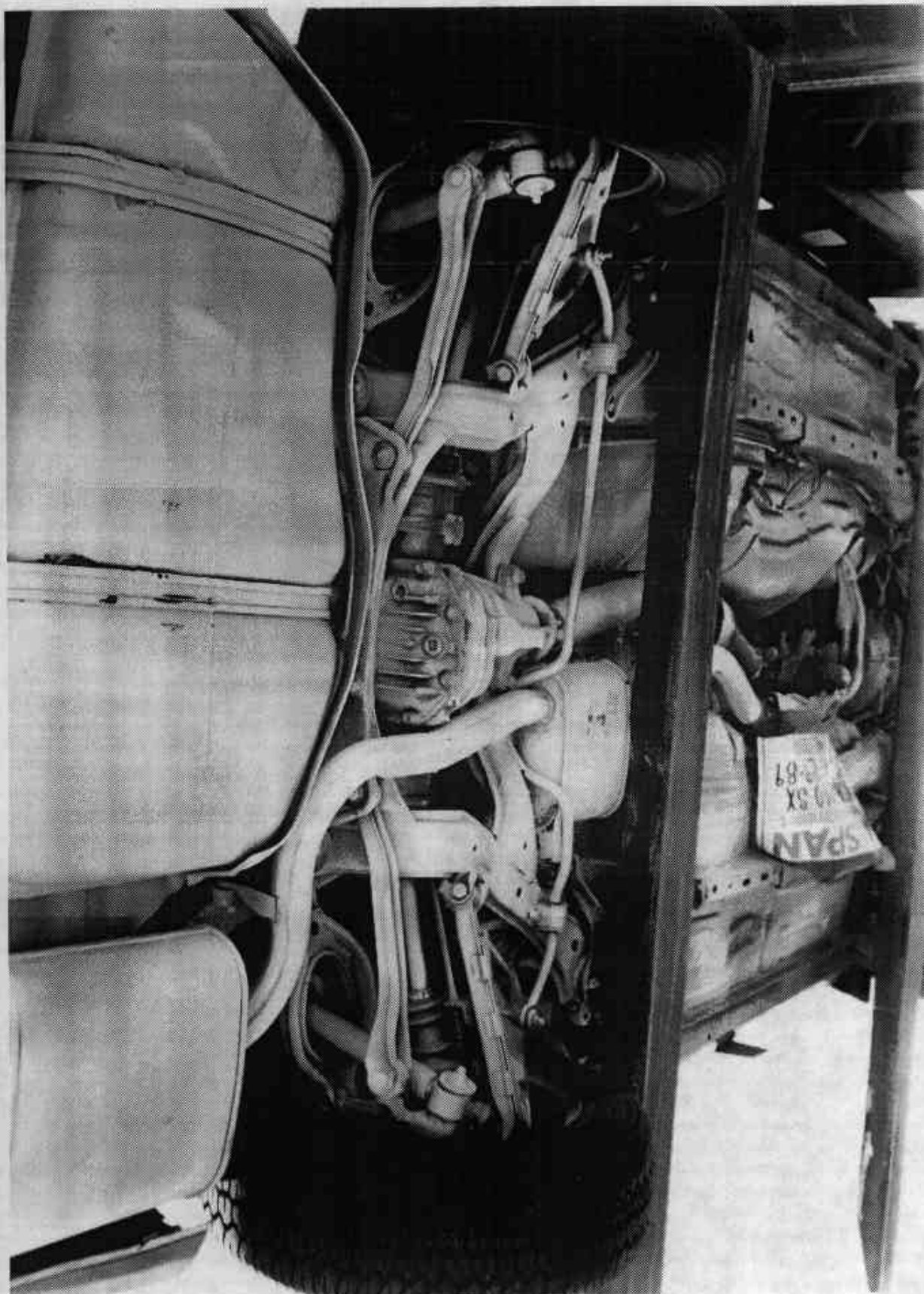


Figure A-20 POST-TEST REAR UNDERBODY VIEW

A-21

7731-18

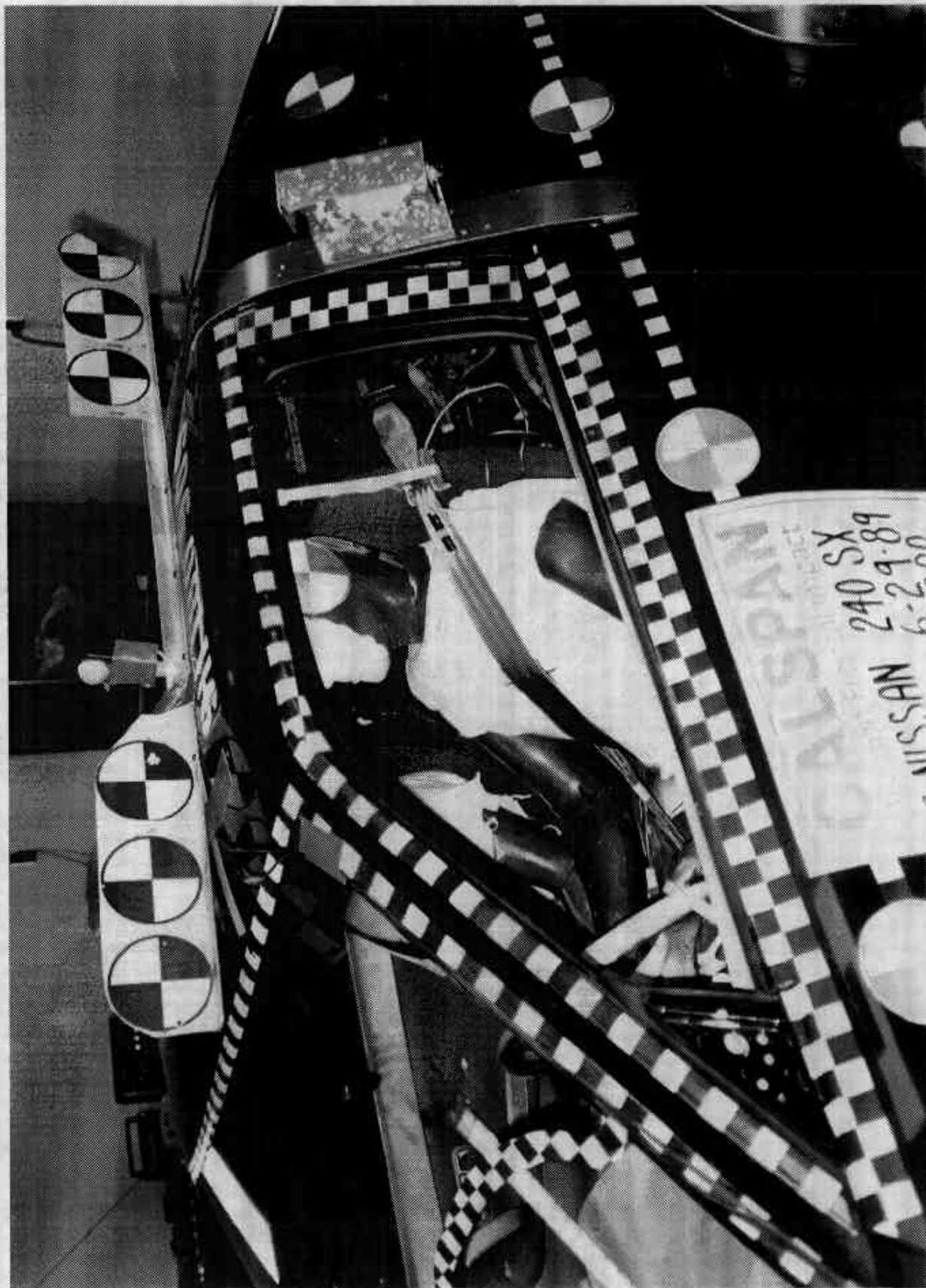


Figure A-21 PRE-TEST DRIVER POSITION VIEW



Figure A-22 POST-TEST DRIVER POSITION VIEW



Figure A-23 PRE-TEST PASSENGER POSITION VIEW



Figure A-24 POST-TEST PASSENGER POSITION VIEW

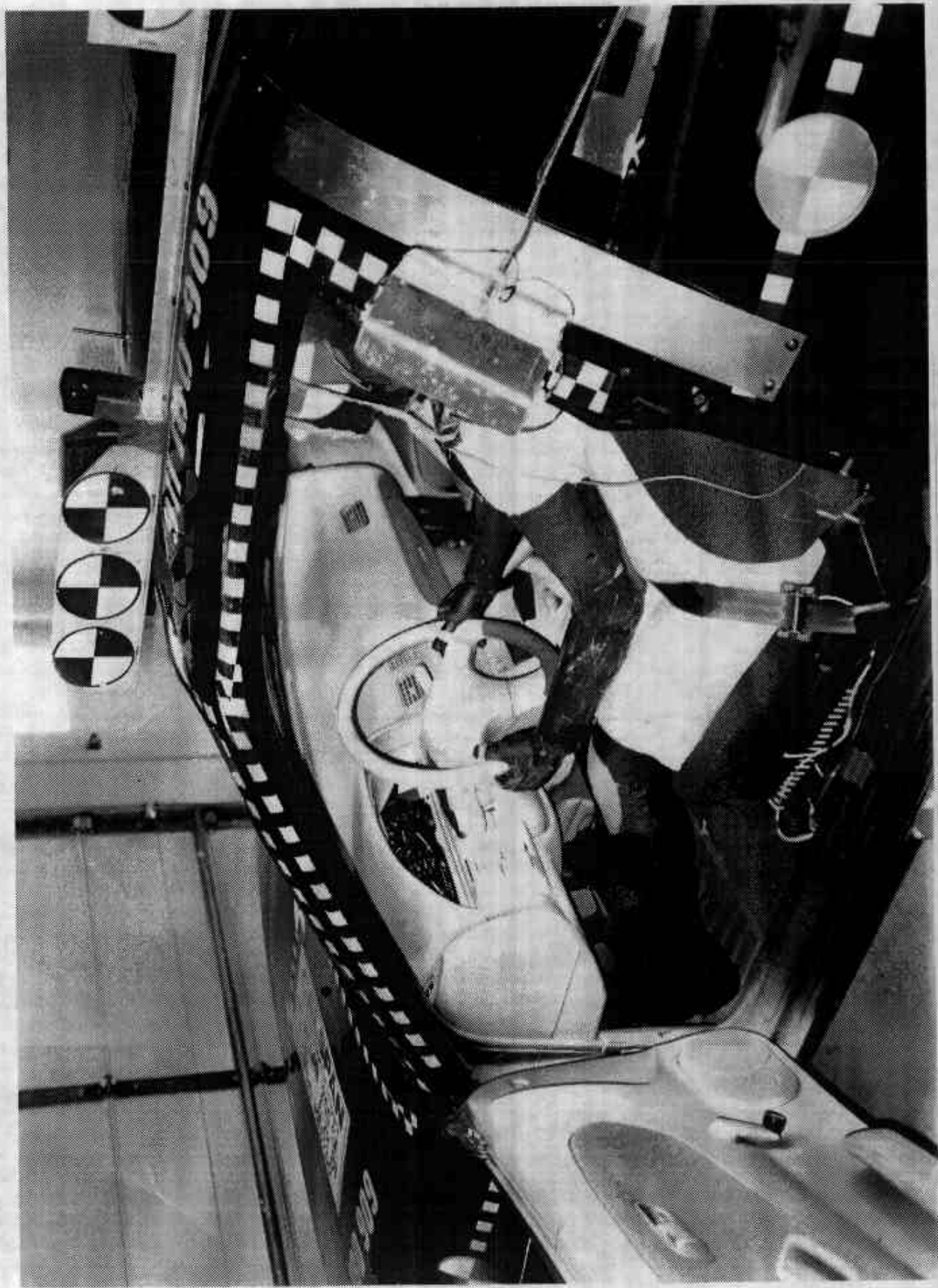


Figure A-25 PRE-TEST DRIVER AND INTERIOR VIEW

A-26

7731-18

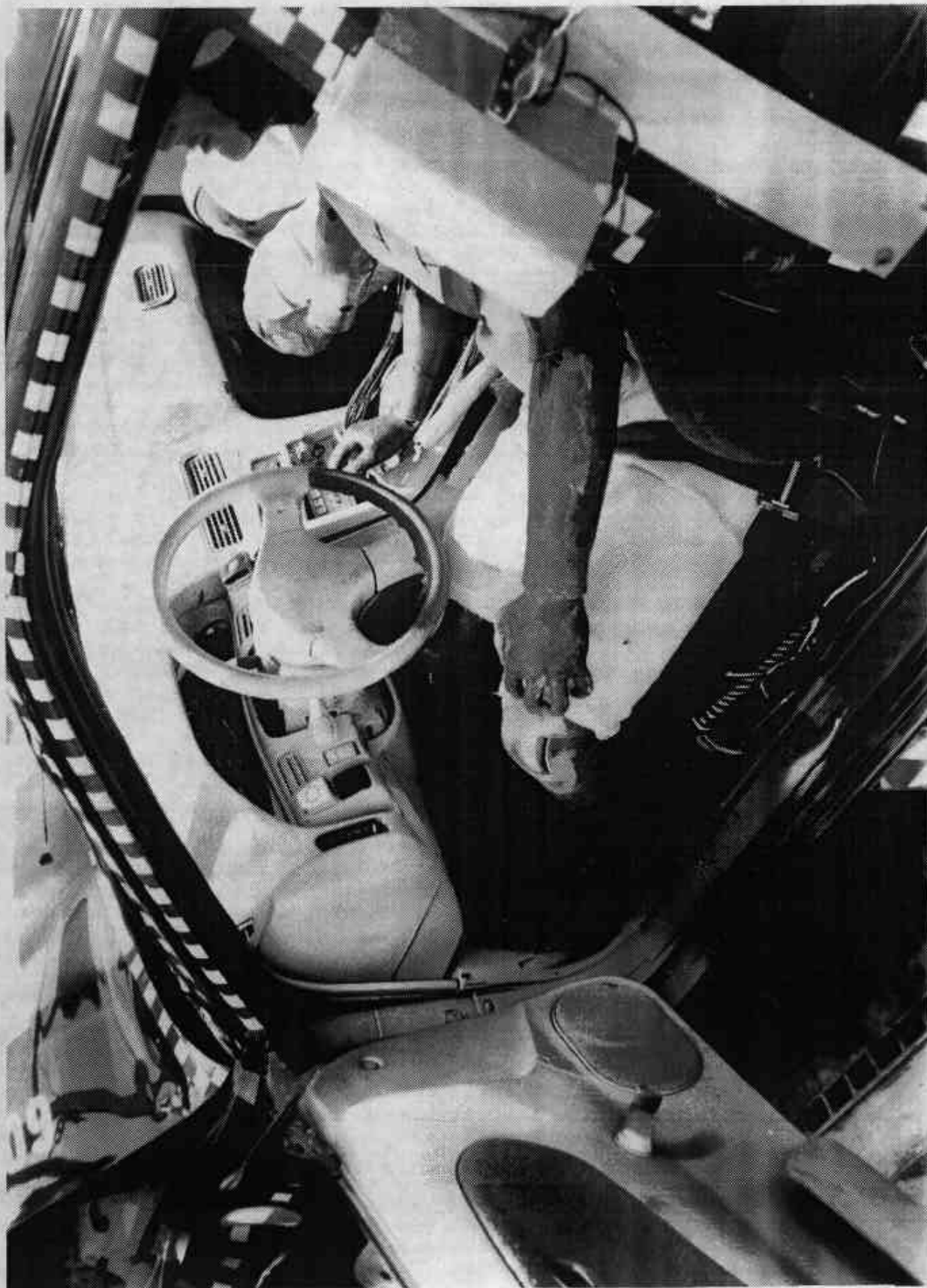


Figure A-26 POST-TEST DRIVER AND INTERIOR VIEW

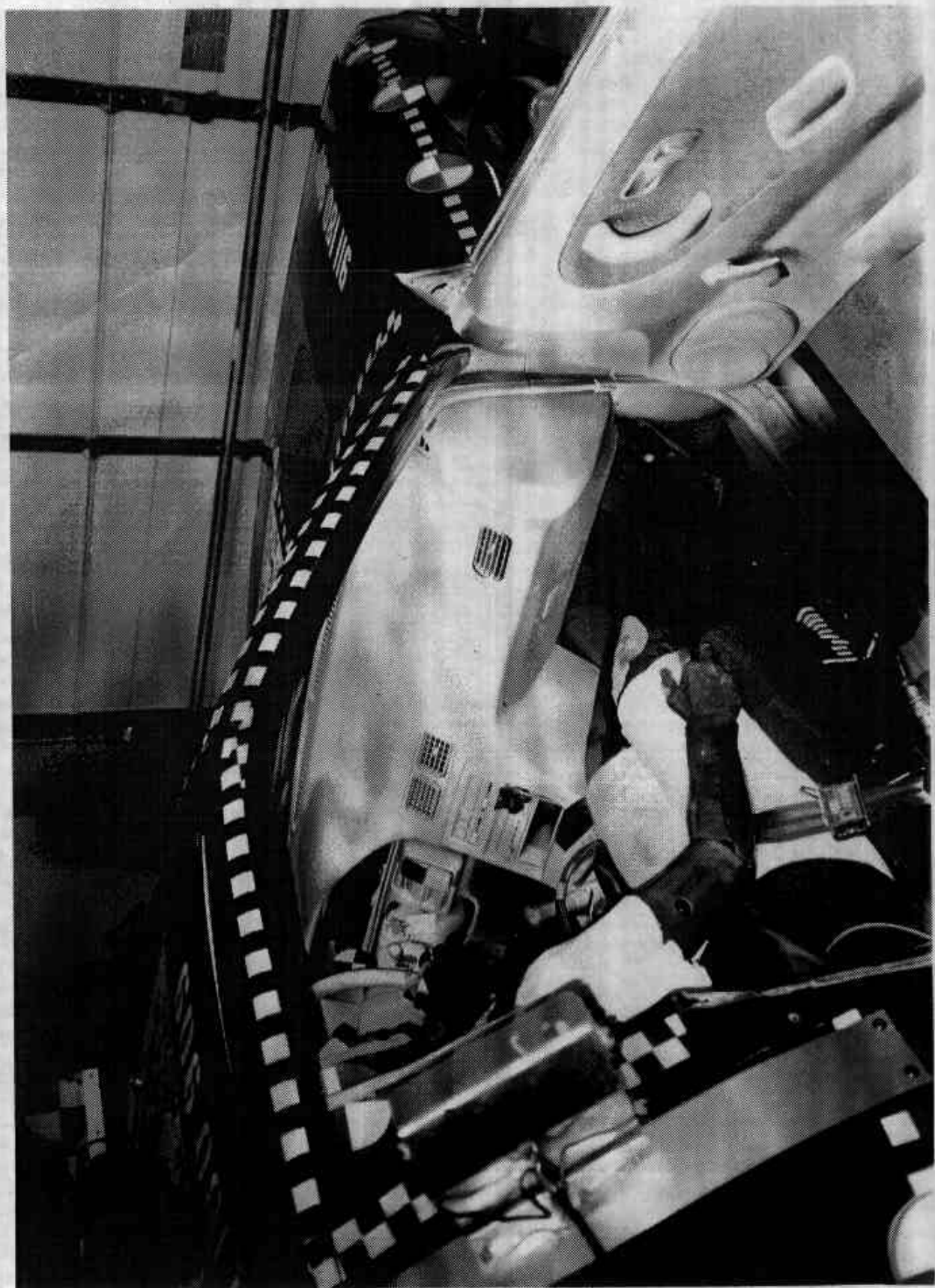


Figure A-27 PRE-TEST PASSENGER AND INTERIOR VIEW

A-28

7731-18



Figure A-28 POST-TEST PASSENGER AND INTERIOR VIEW

Appendix B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

TEST NO. MK5200

VEHICLE DATA

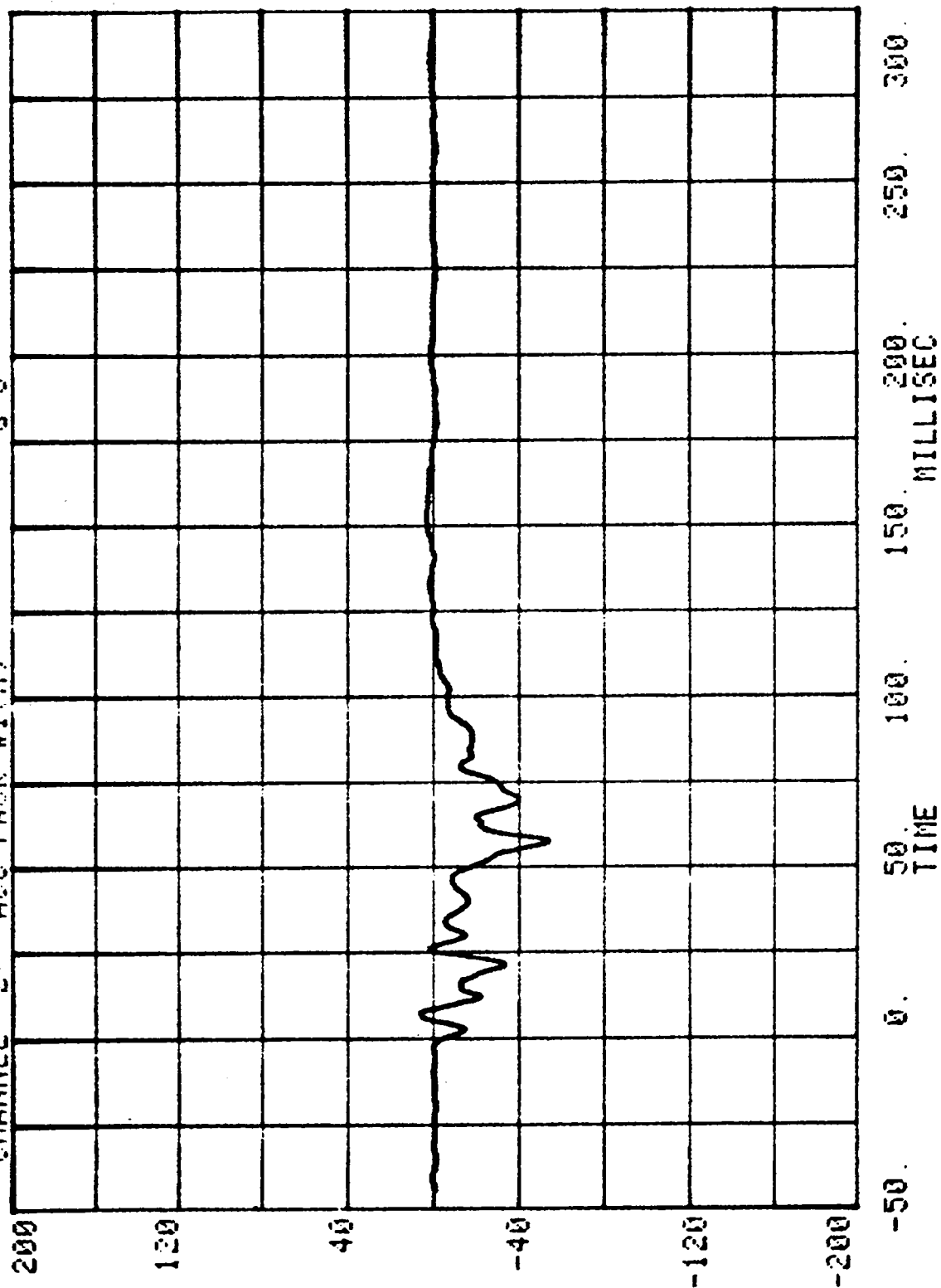
FILTER CHANNEL CLASS

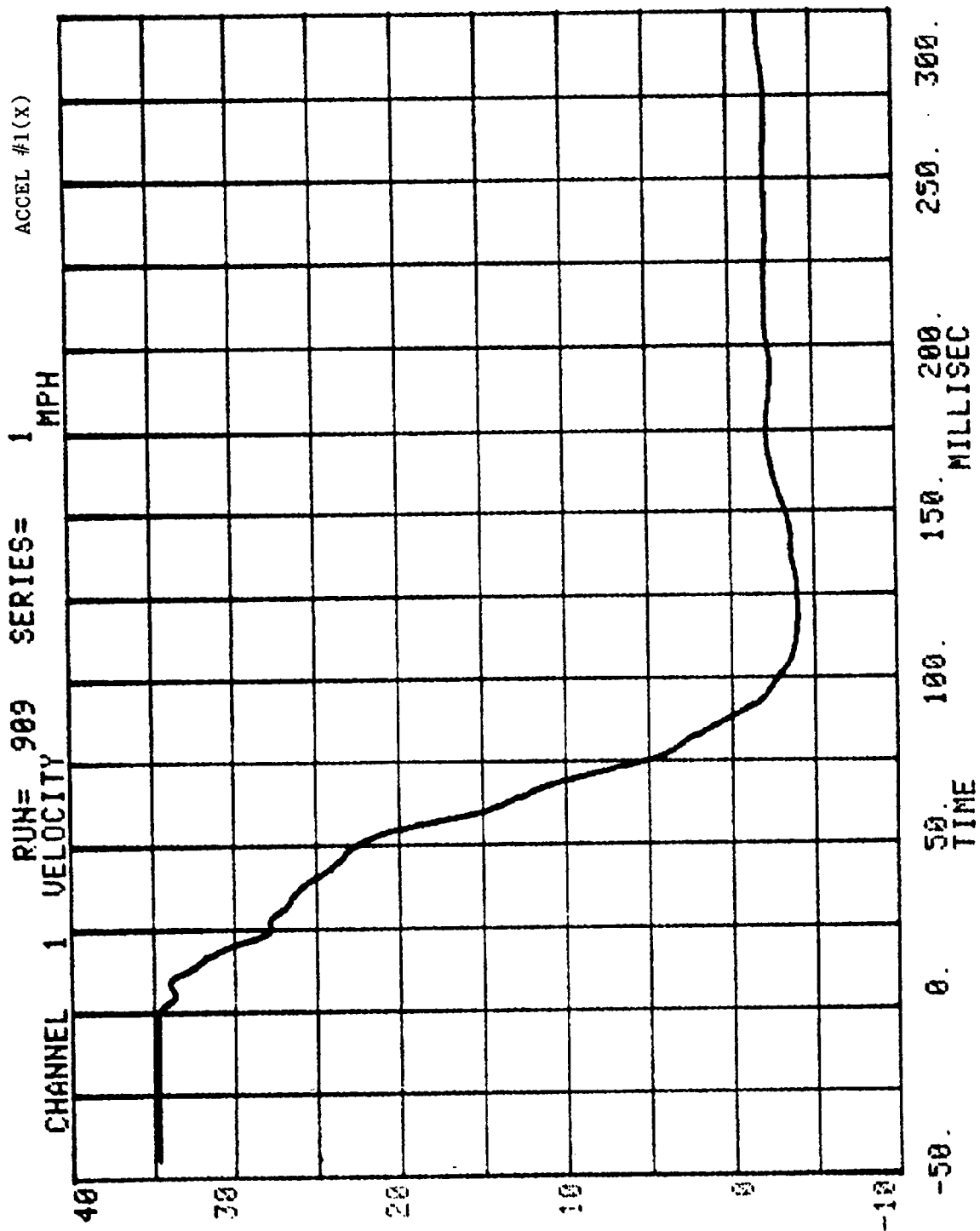
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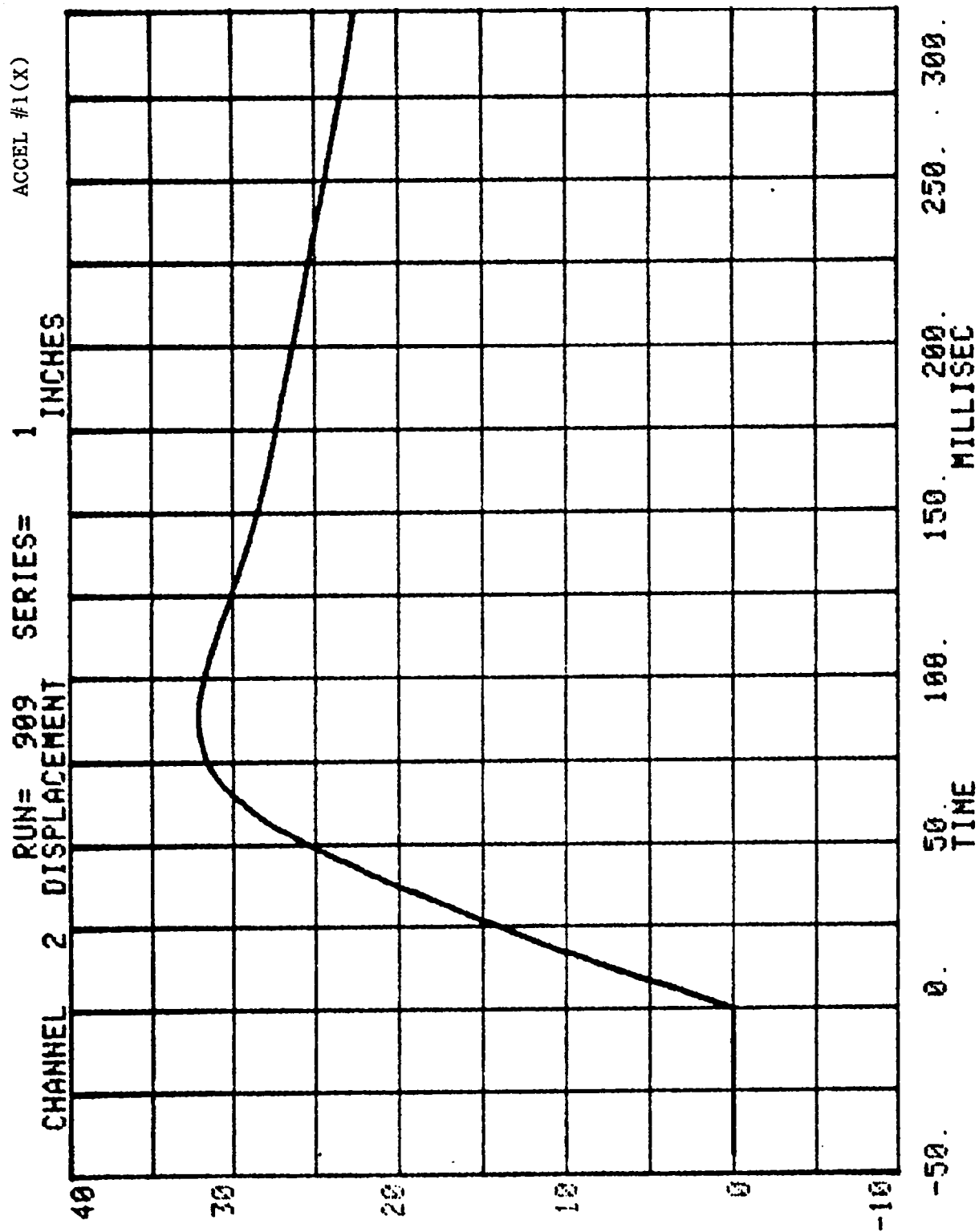
B-2

7731-18

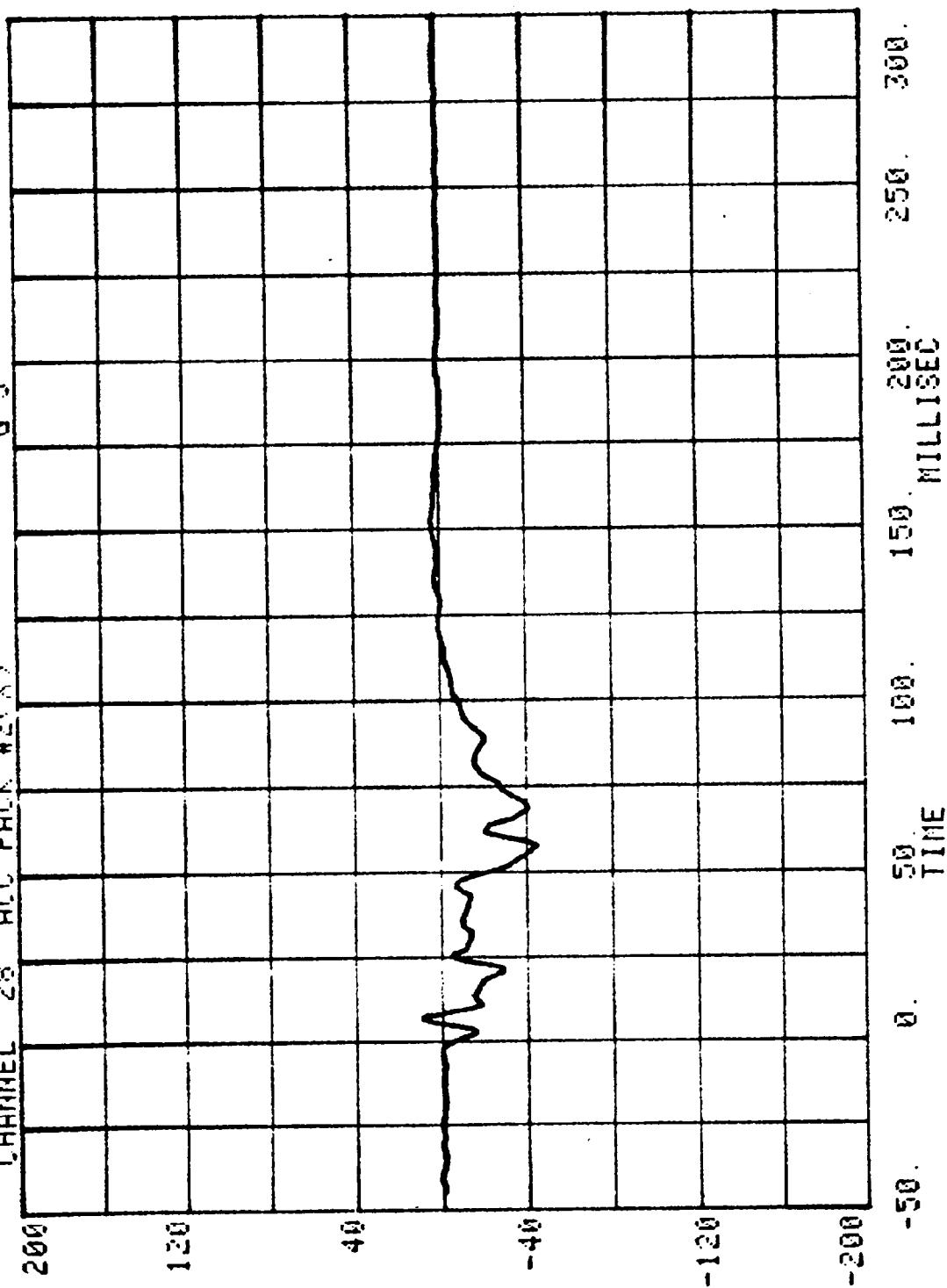
CHANNEL 27 ACC PACK #1(X) RUN= 909 SERIES= 1 G'S







CHANNEL 28 ACC PACK #2(X) RUN= 909 SERIES= 1 G'S



ACCEL #2(X)

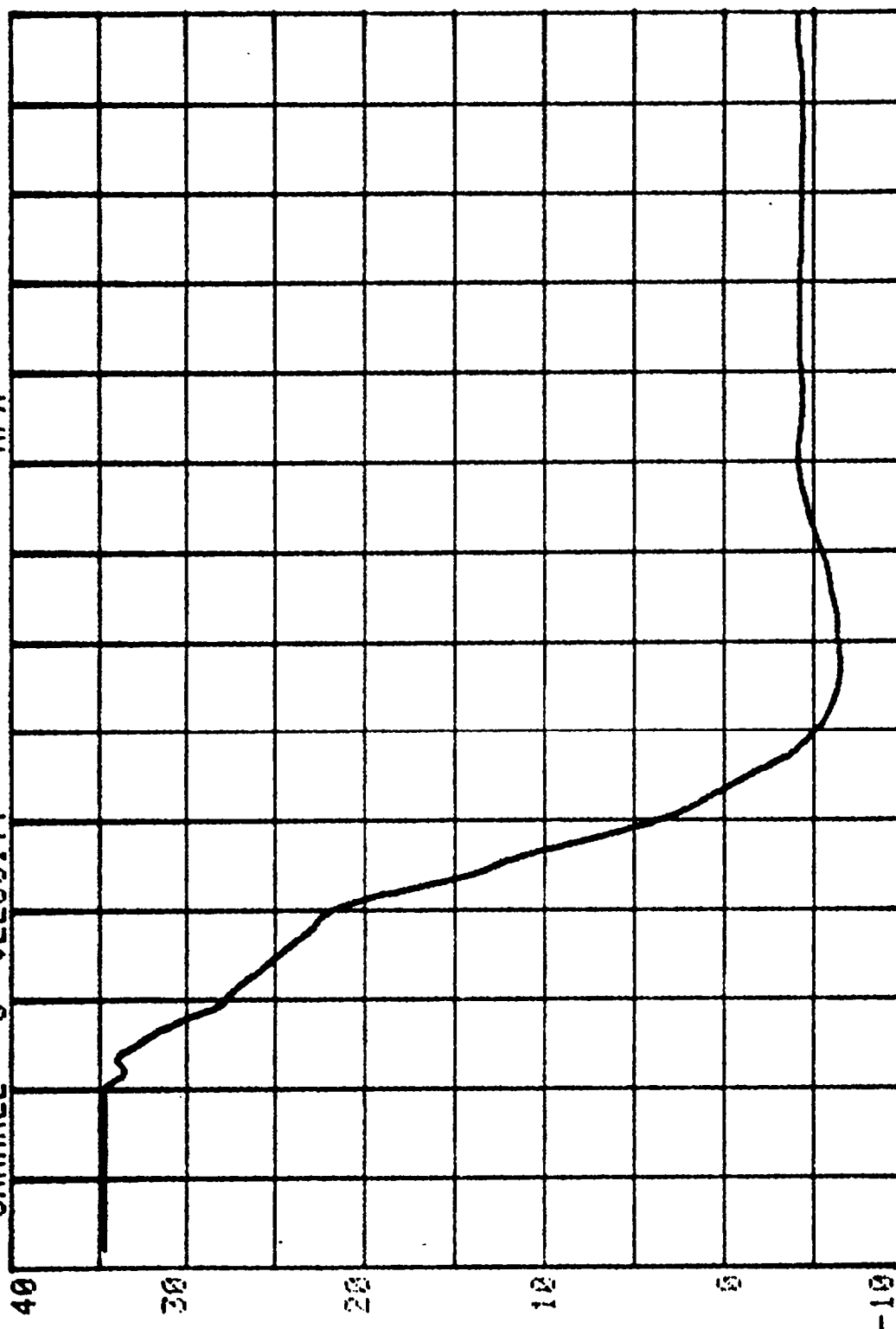
1 MPH

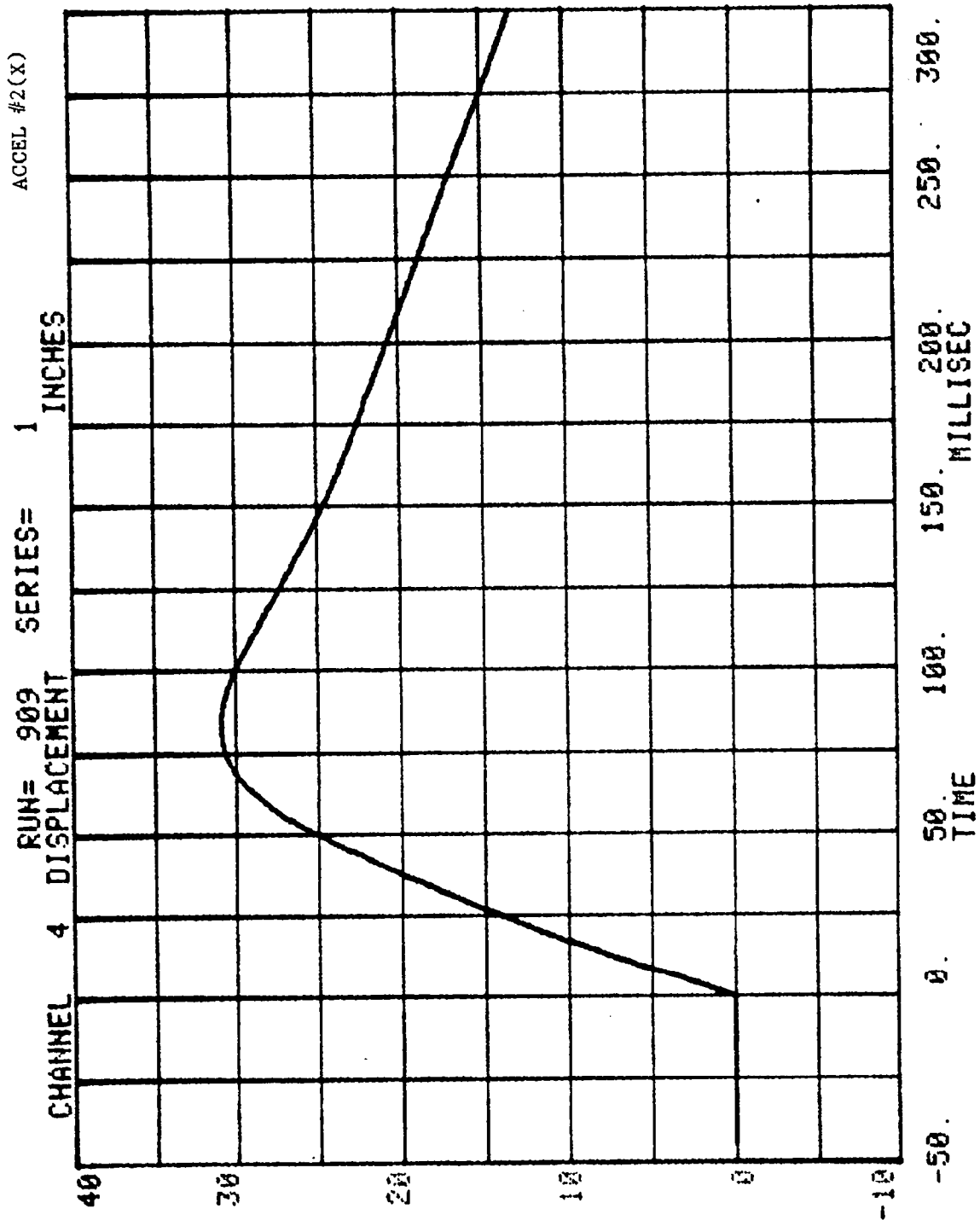
SERIES=

RUN= 909

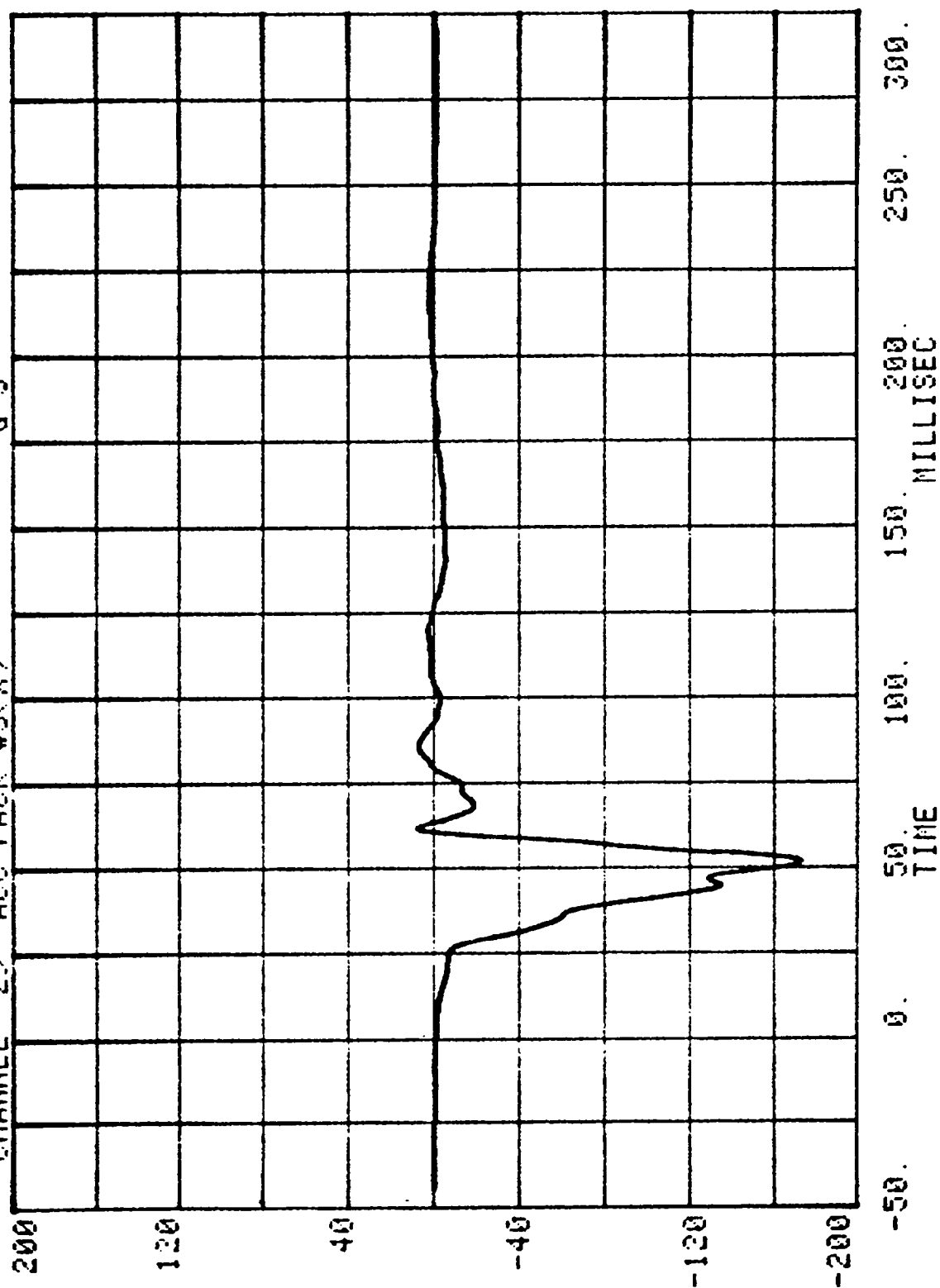
3 VELOCITY

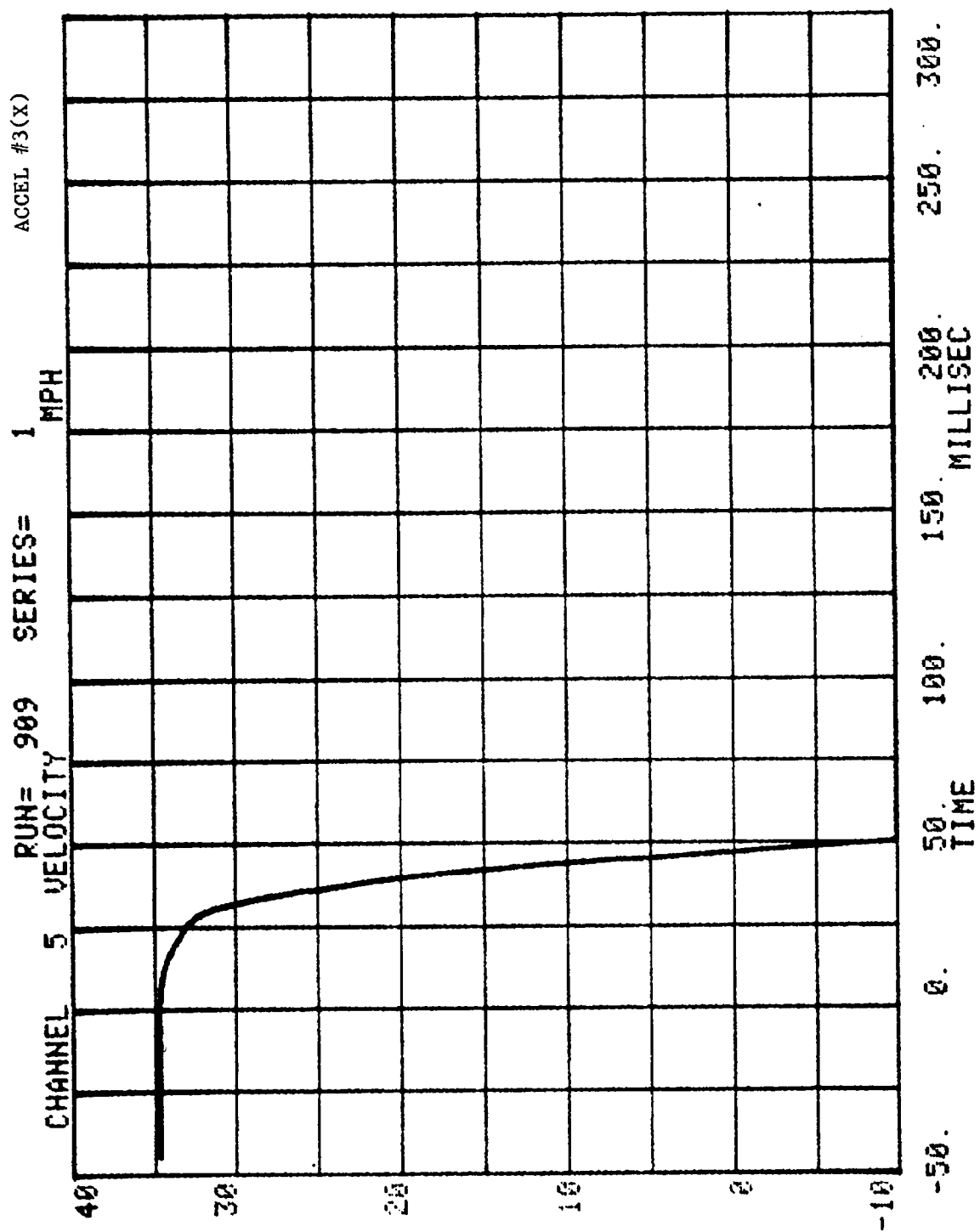
CHANNEL





RUN= 909 SERIES= 1 G'S
CHANNEL 29 ACC PACK #3(X)



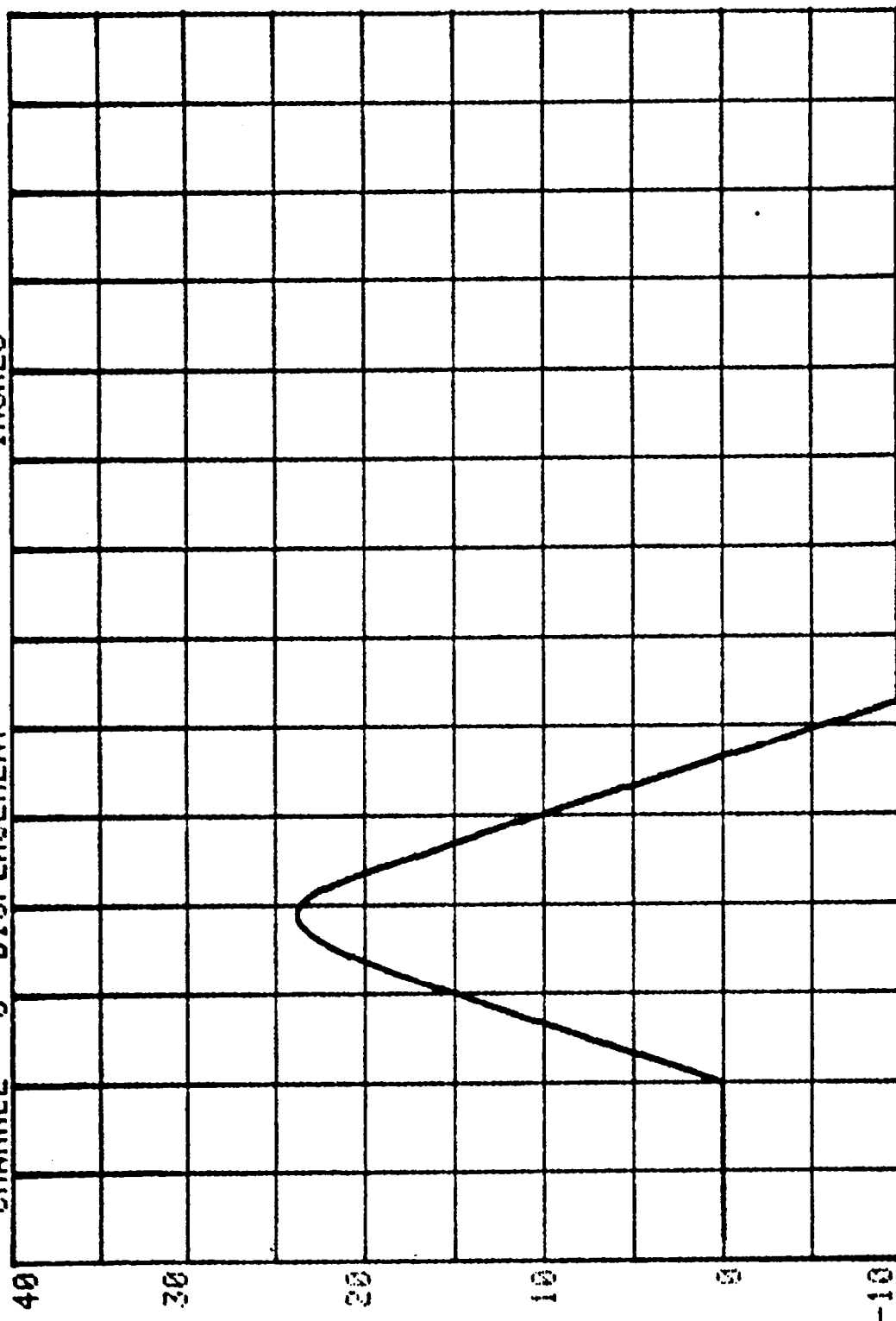


ACCEL #3(X)

SERIES= 1 INCHES

RUN= 989

CHANNEL 6 DISPLACEMENT



300.

250.

200.

150.

100.

50.

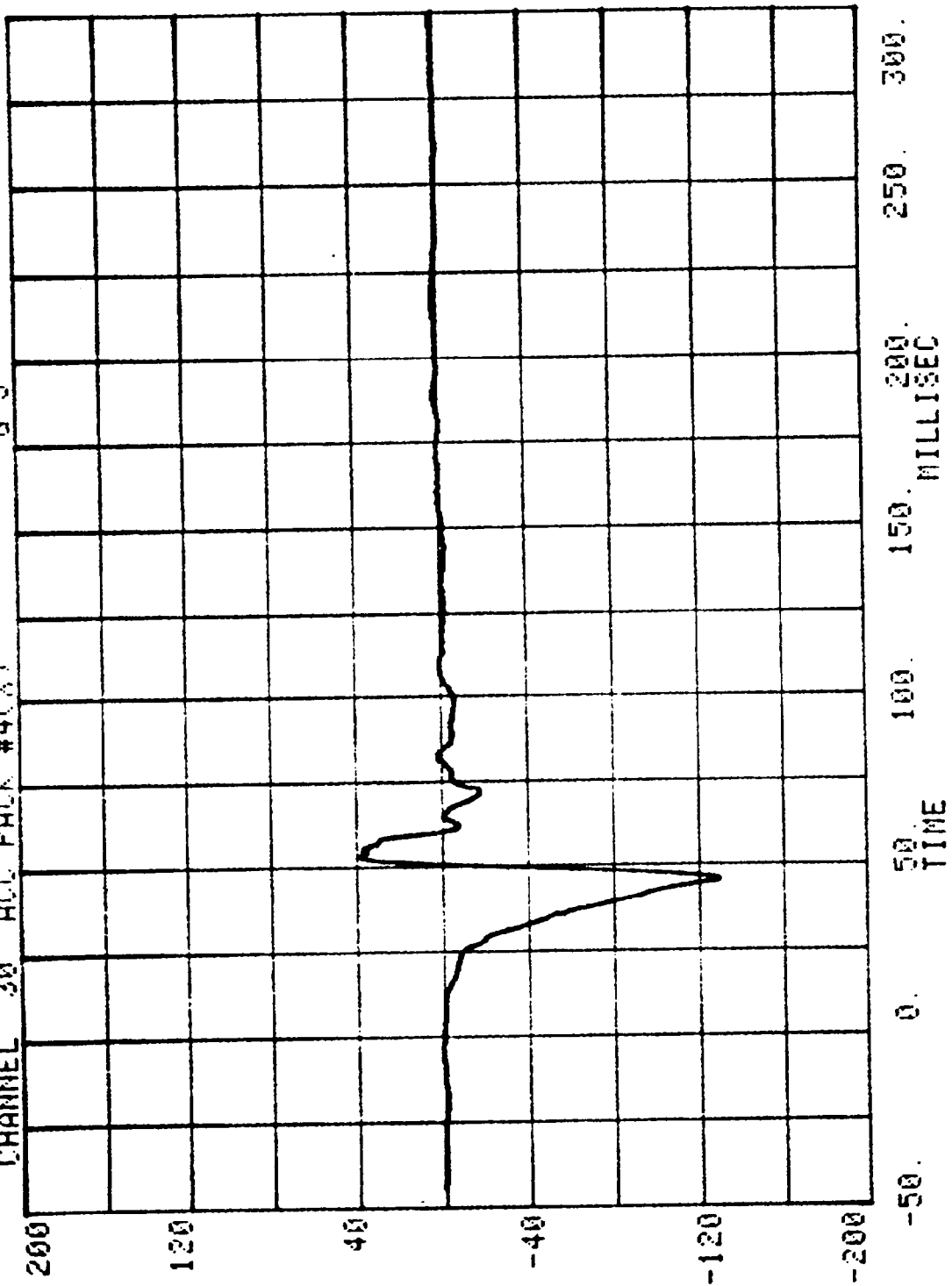
0.

-50.

MILLISEC

TIME

RUN= 909 SERIES= 1 G'S
CHANNEL 30 ACC PACK #4(X)



ACCEL #4 (X)

1 MPH

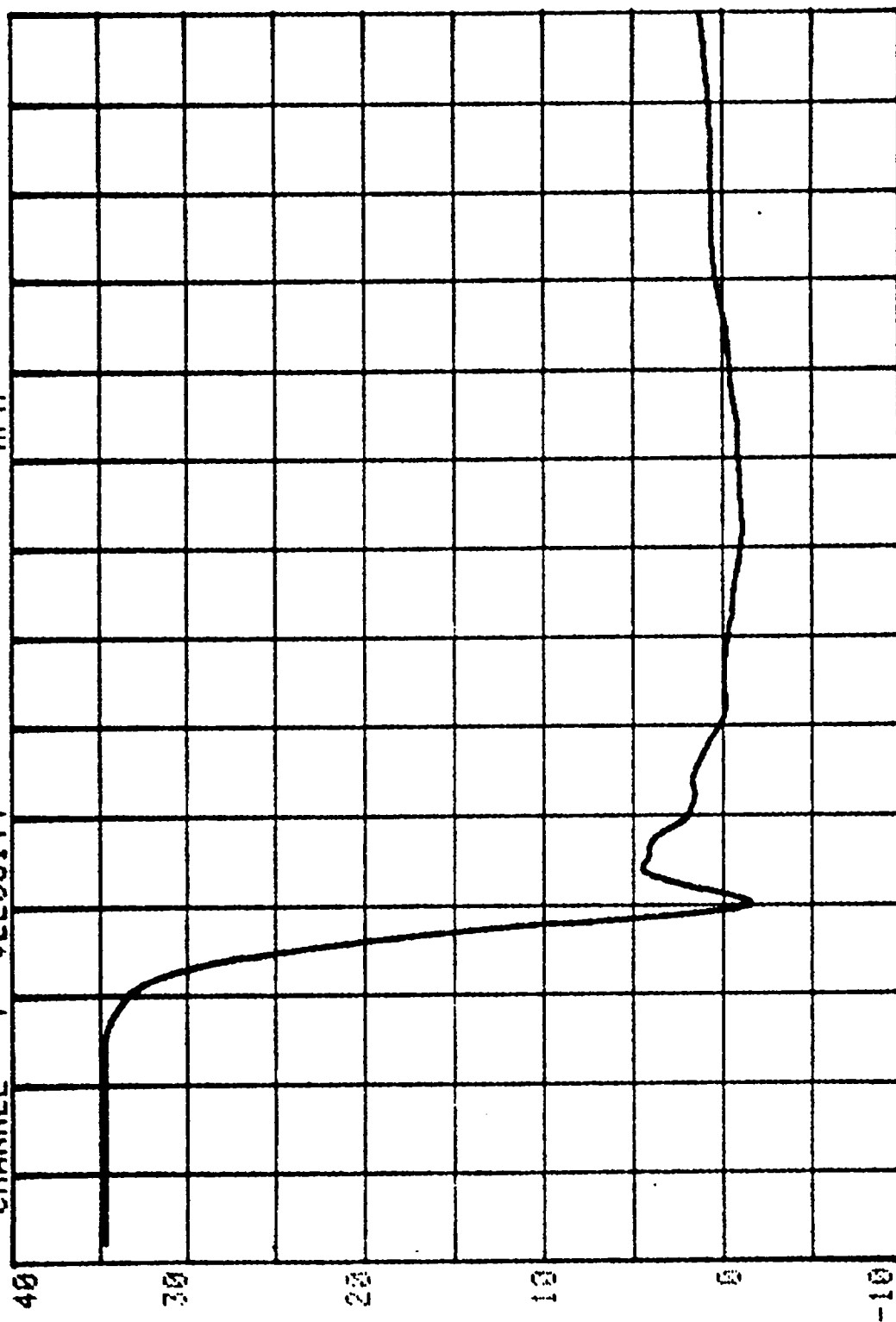
SERIES=

RUN= 909

VELOCITY

7

CHANNEL



300.

250.

200.

150.

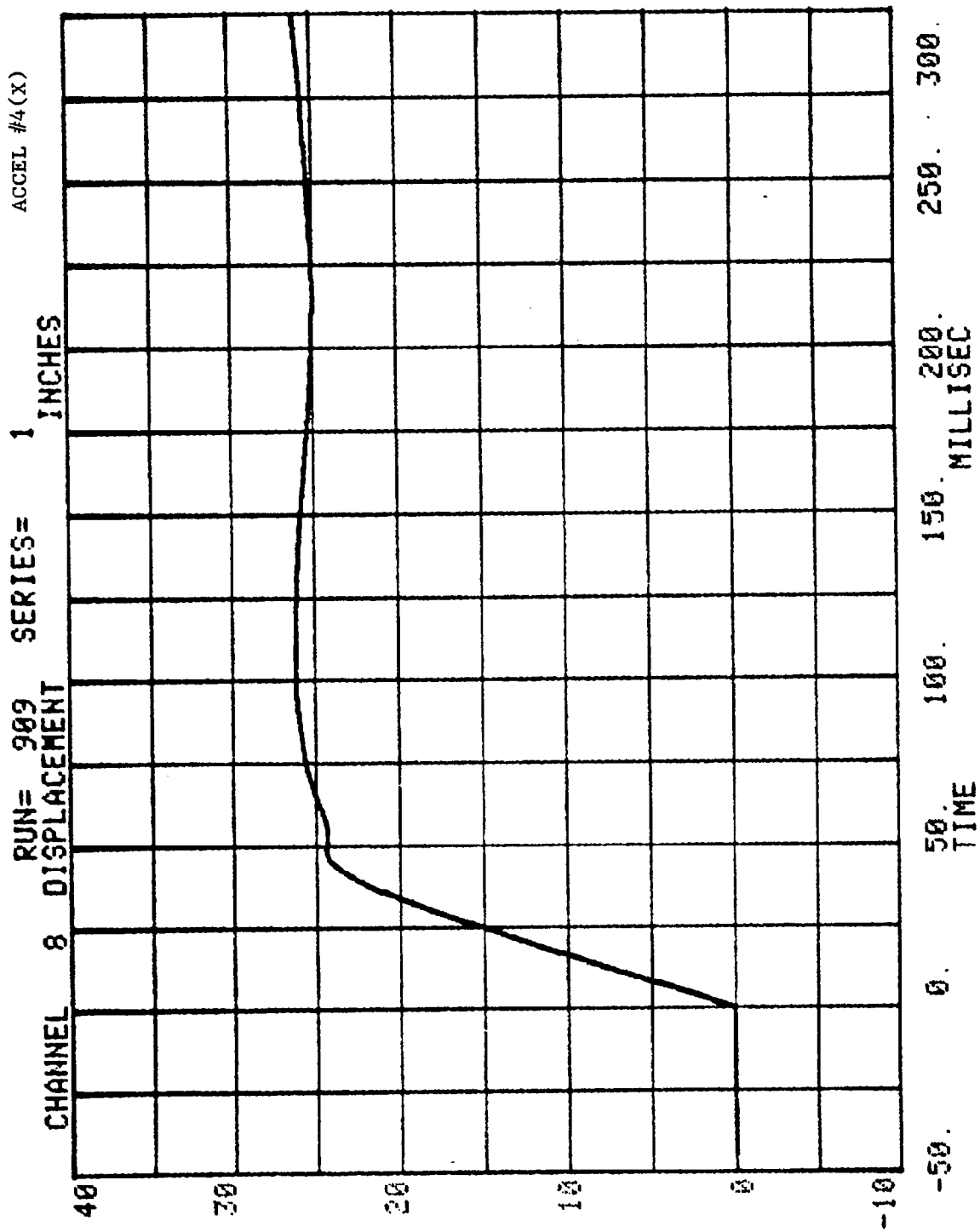
100.

50.

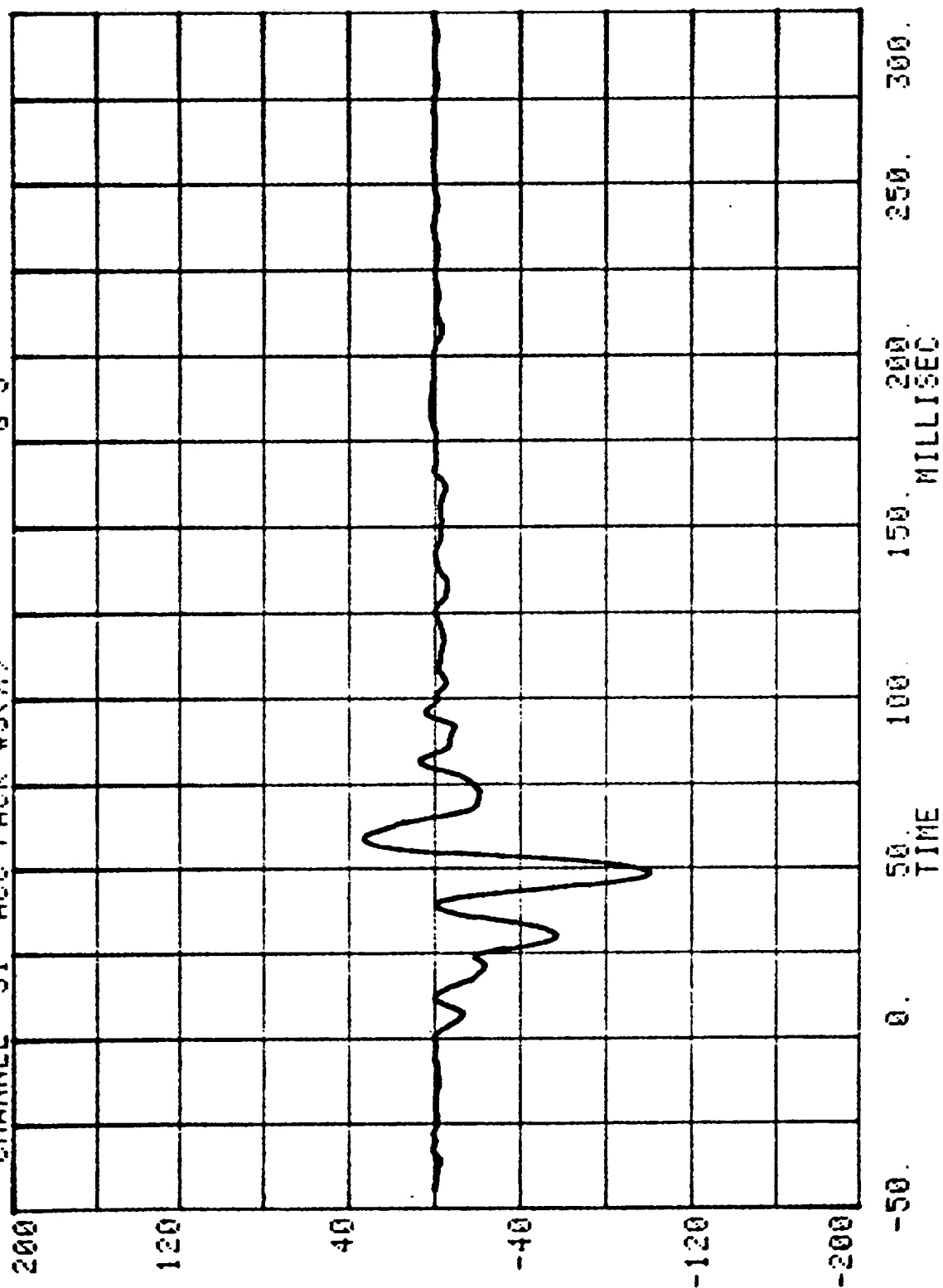
0.

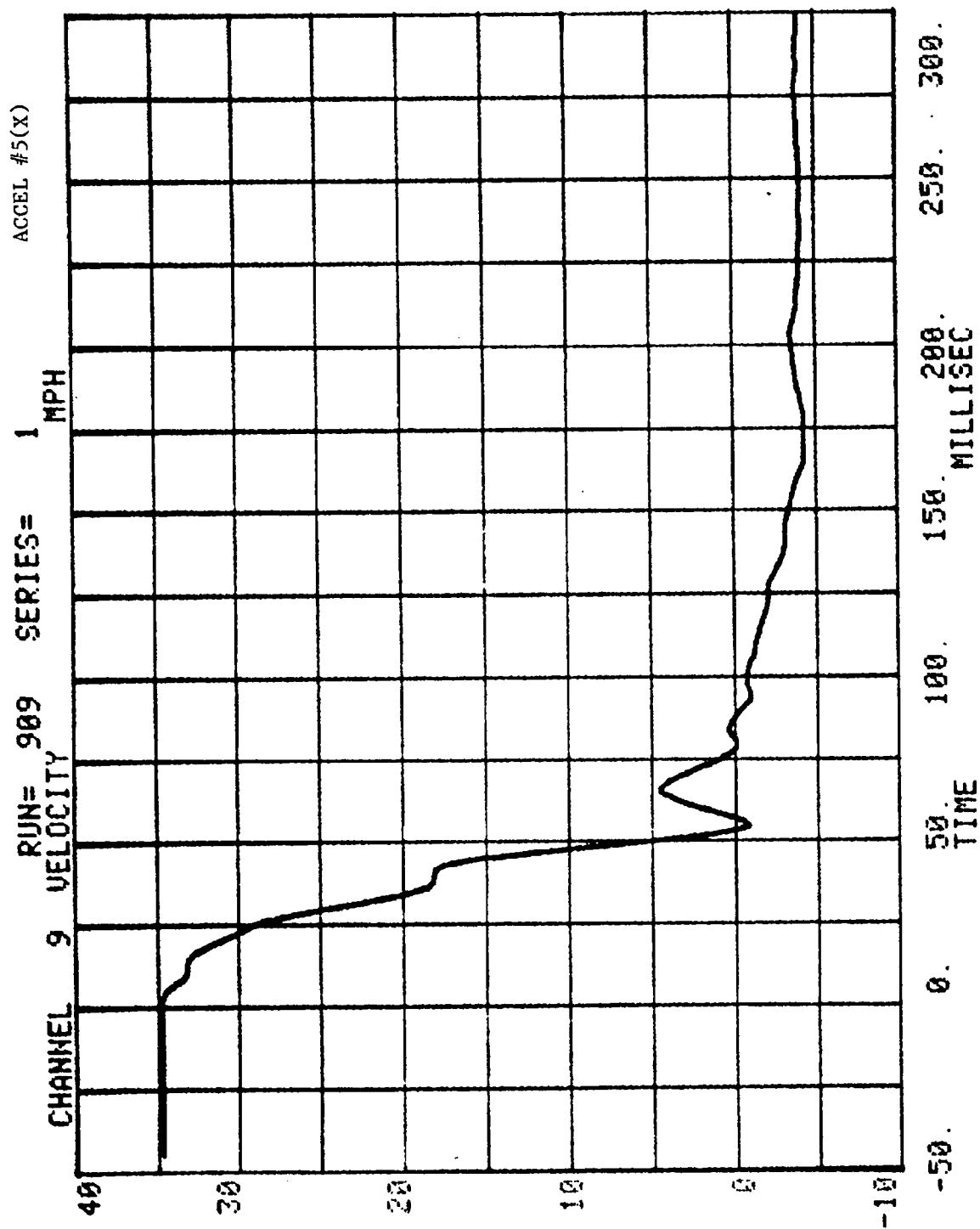
-50.

MILLISEC

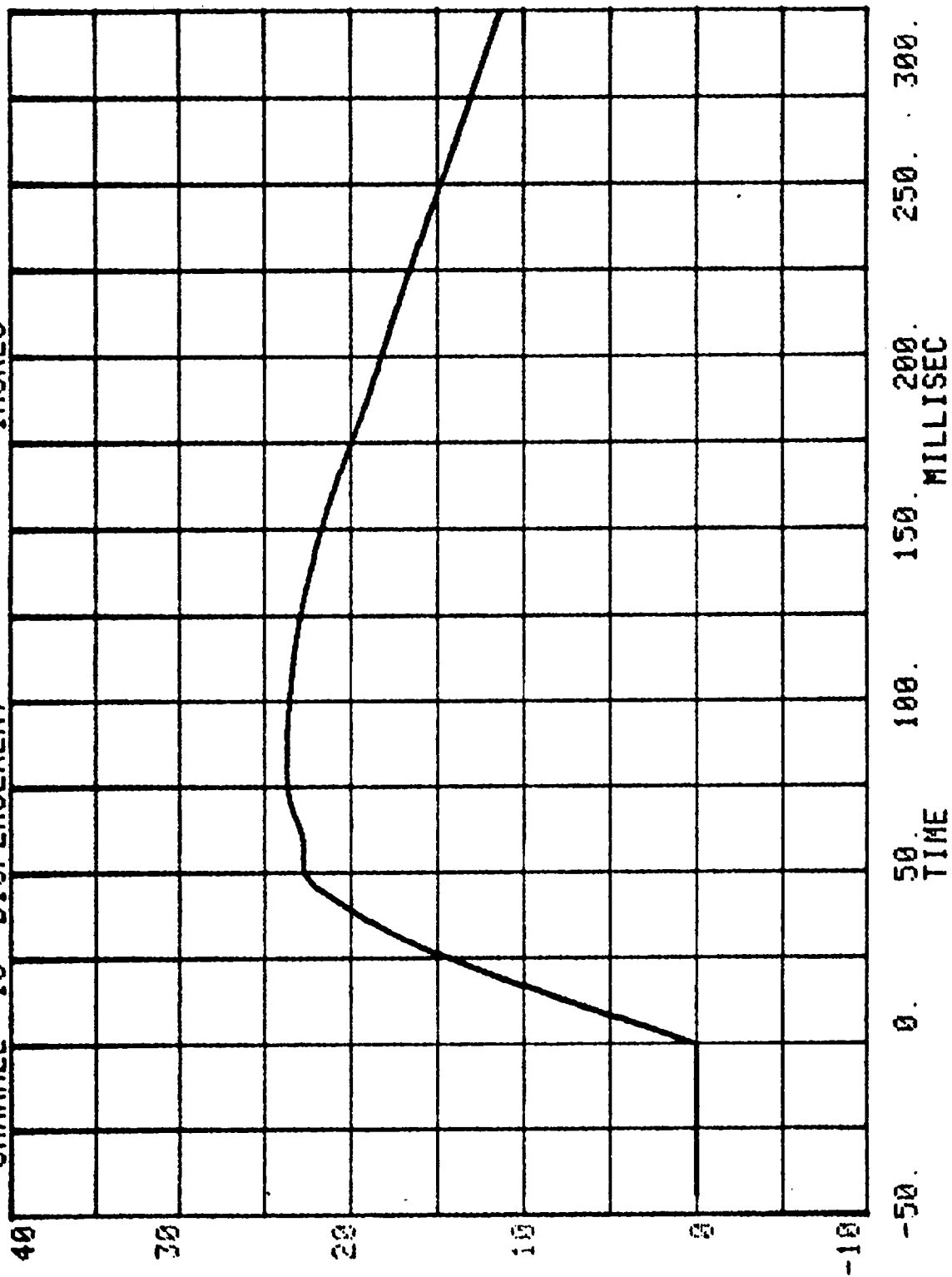


CHANNEL 31 ACC PACK #5(X) RUN= 909 SERIES= 1 5'S

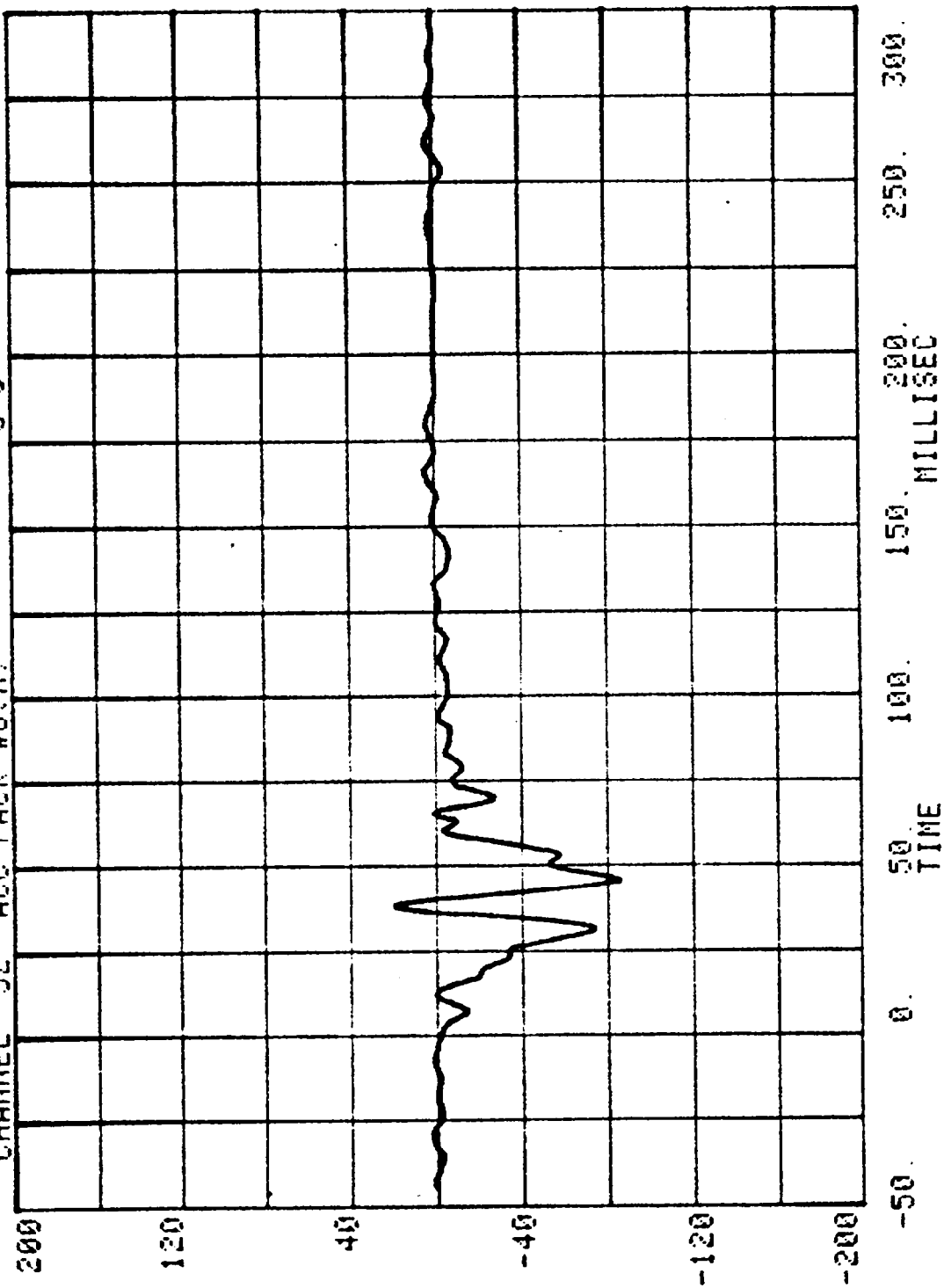




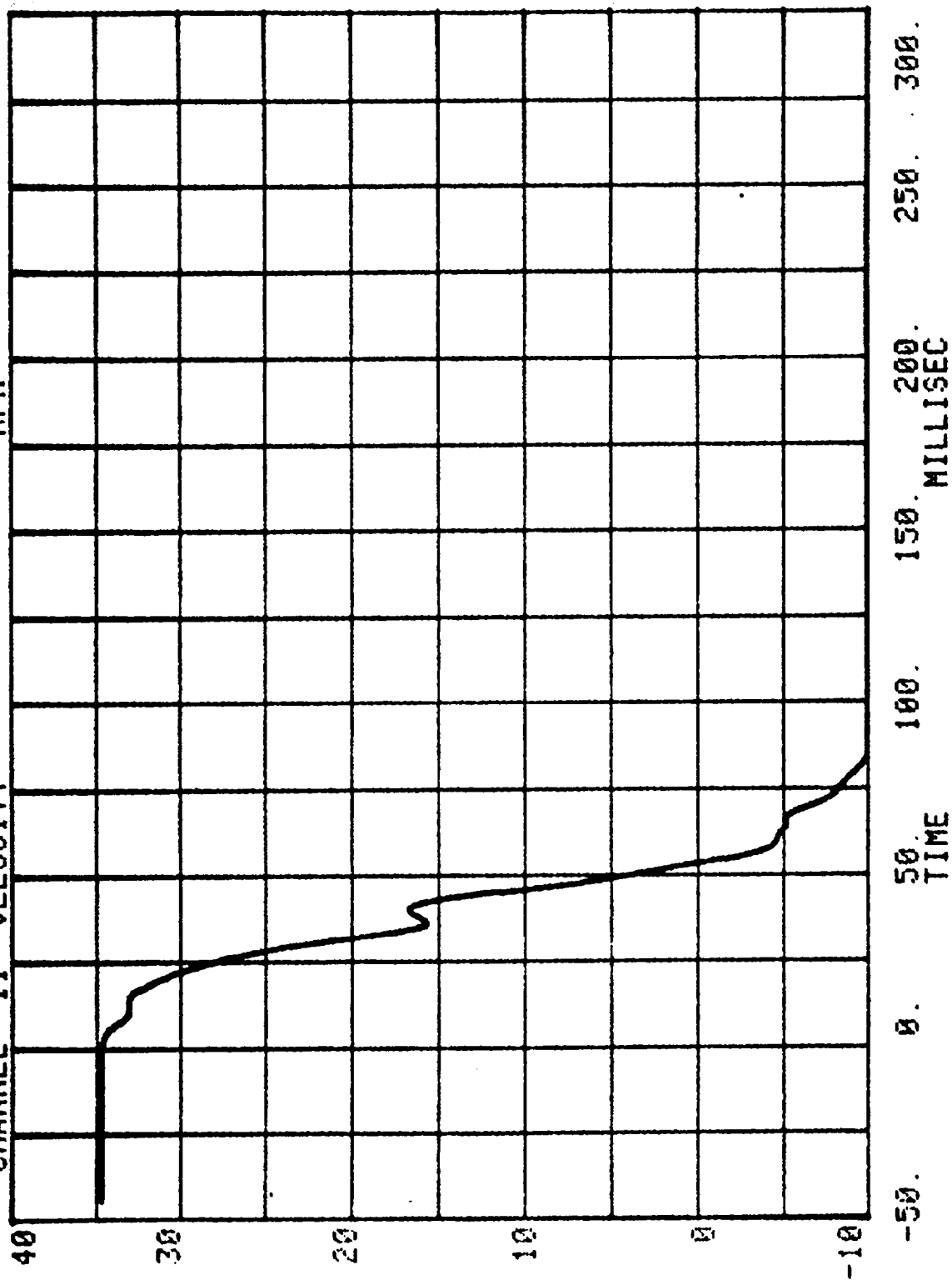
CHANNEL 10 DISPLACEMENT RUN= 909 SERIES= 1 ACCEL #5(X)



RUN= 909 SERIES= 1 G'S
CHANNEL 32 ACC PACK #6(X)



CHANNEL 11 VELOCITY
RUN= 909 SERIES= 1 MPH
ACCEL #6(X)

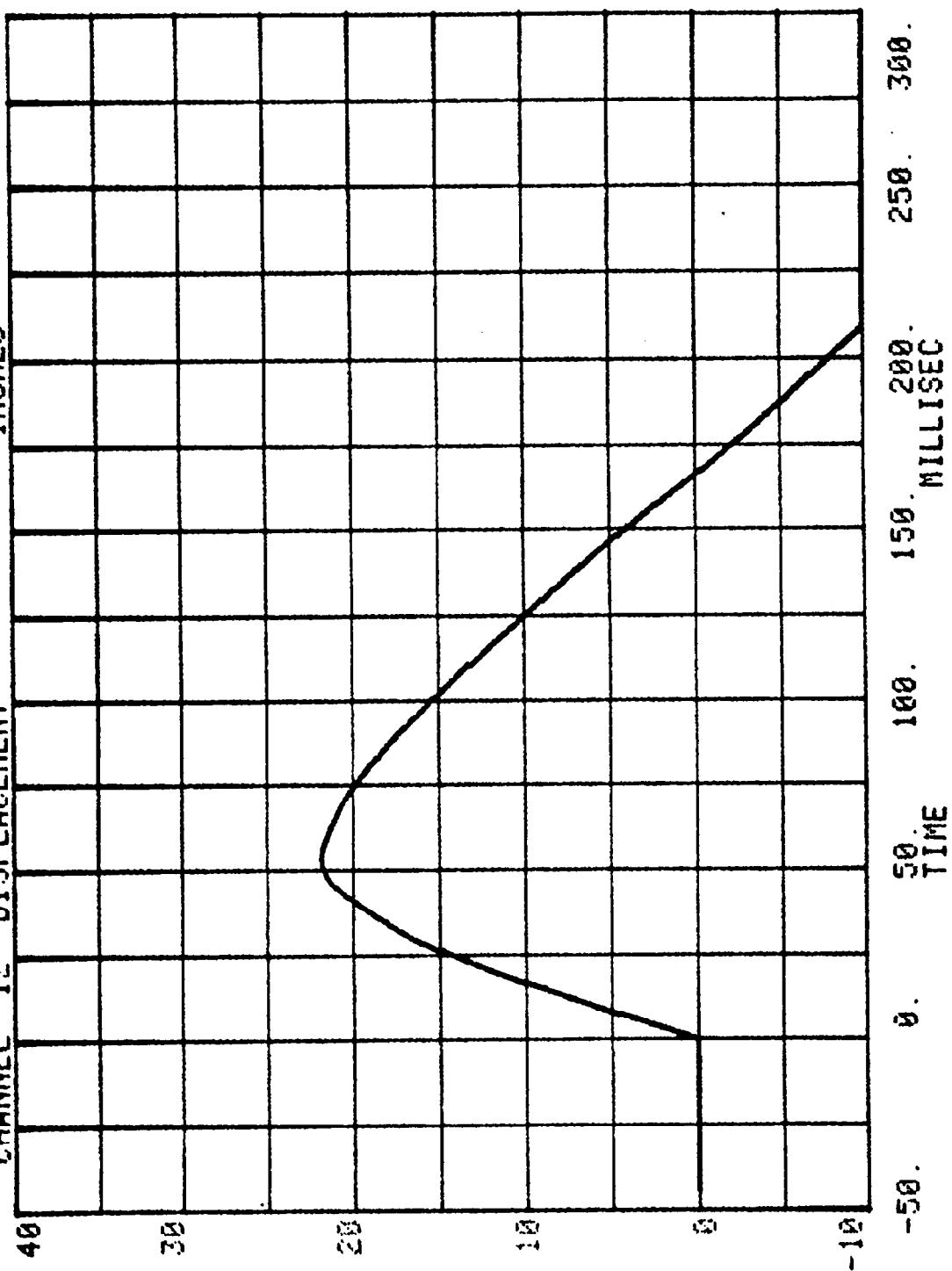


ACCEL #6(X)

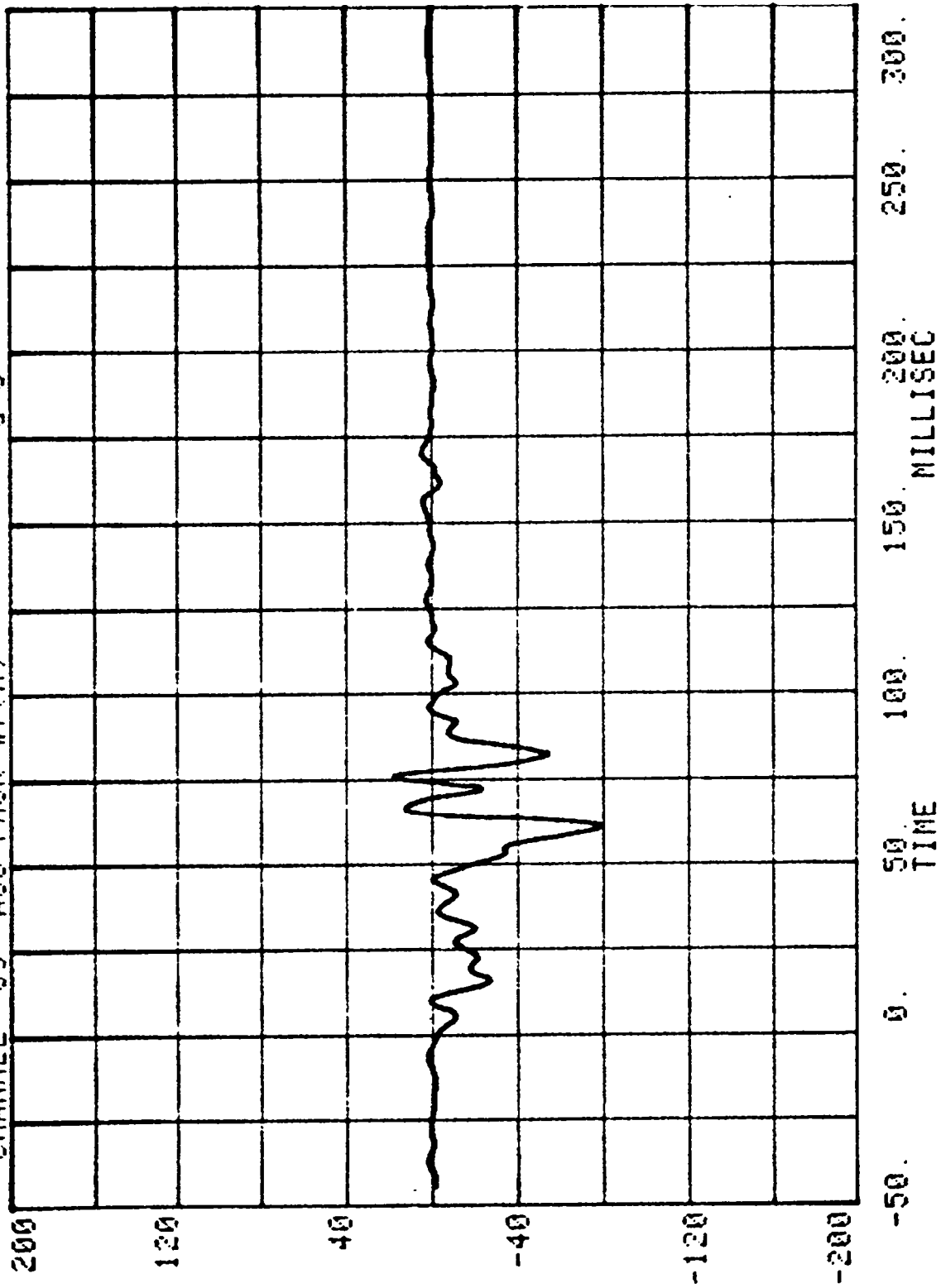
SERIES= 1 INCHES

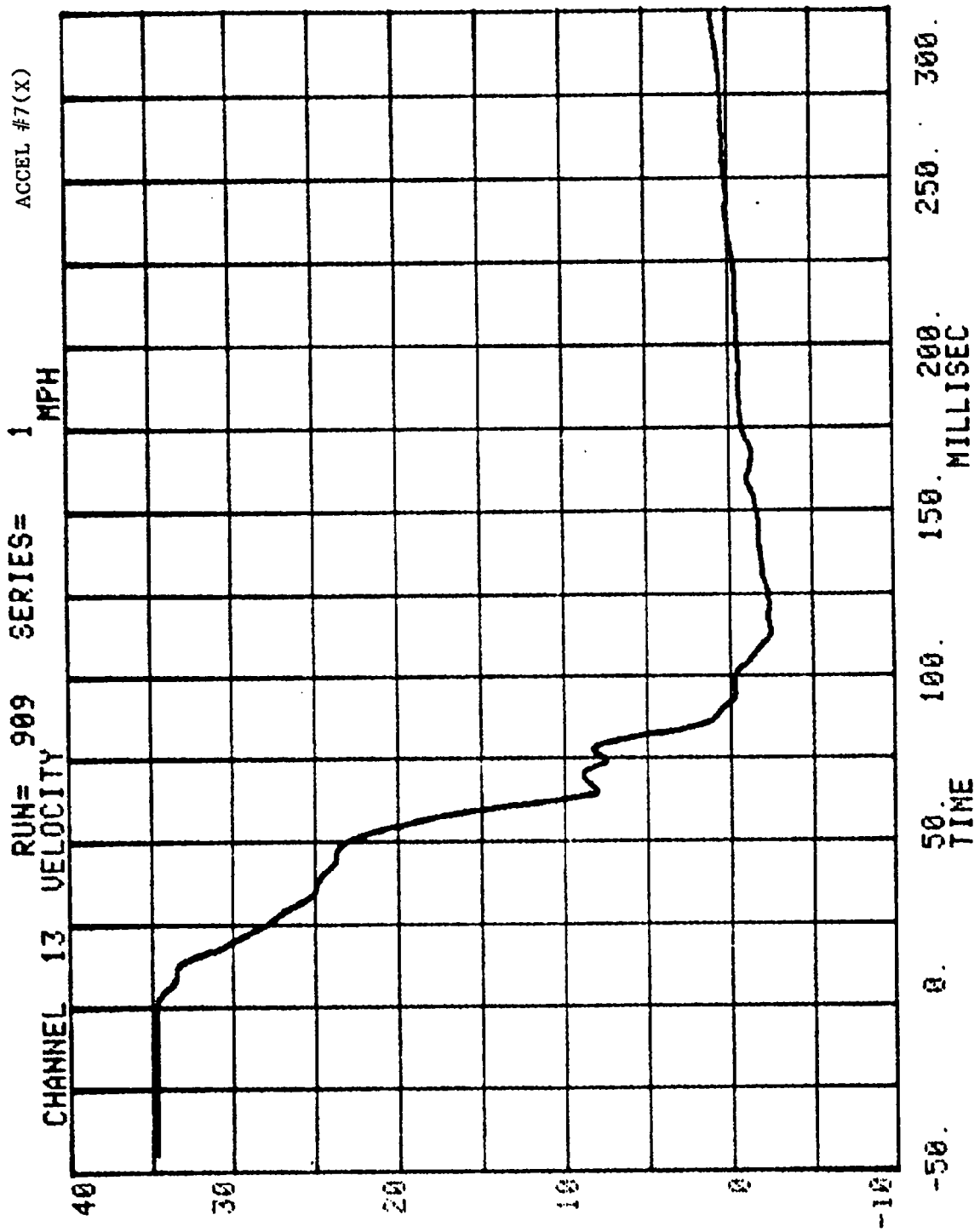
RUN= 909

CHANNEL 12 DISPLACEMENT



CHANNEL 33 ACC PACK #7(X) RUN= 909 SERIES= 1 G'S



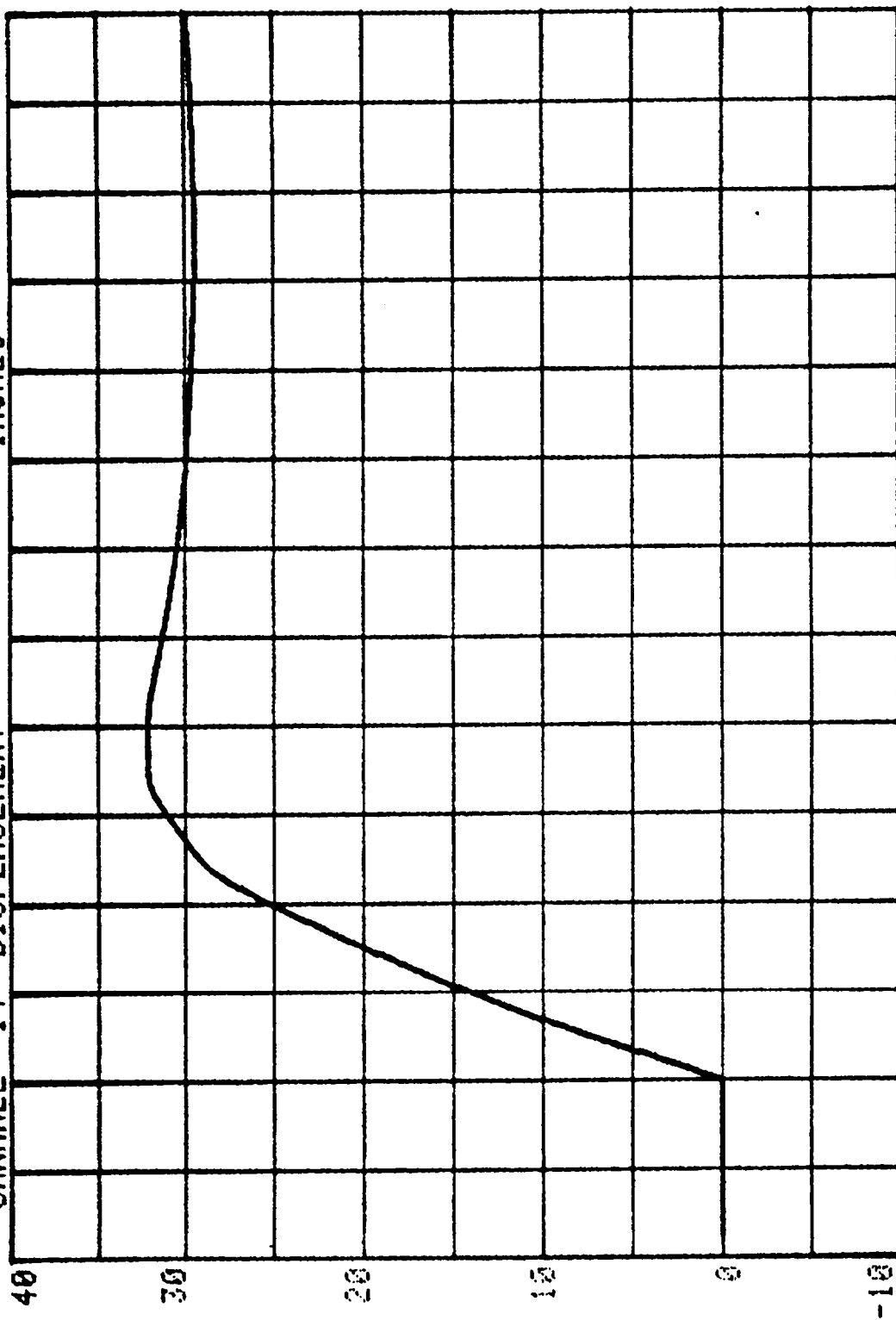


ACCEL #7(X)

SERIES= 1 INCHES

RUN= 909

CHANNEL 14 DISPLACEMENT



300.

250.

200.

150.

100.

50.

0.

-50.

MILLISEC

TIME

TEST NO. MK5200

LOAD CELL BARRIER DATA

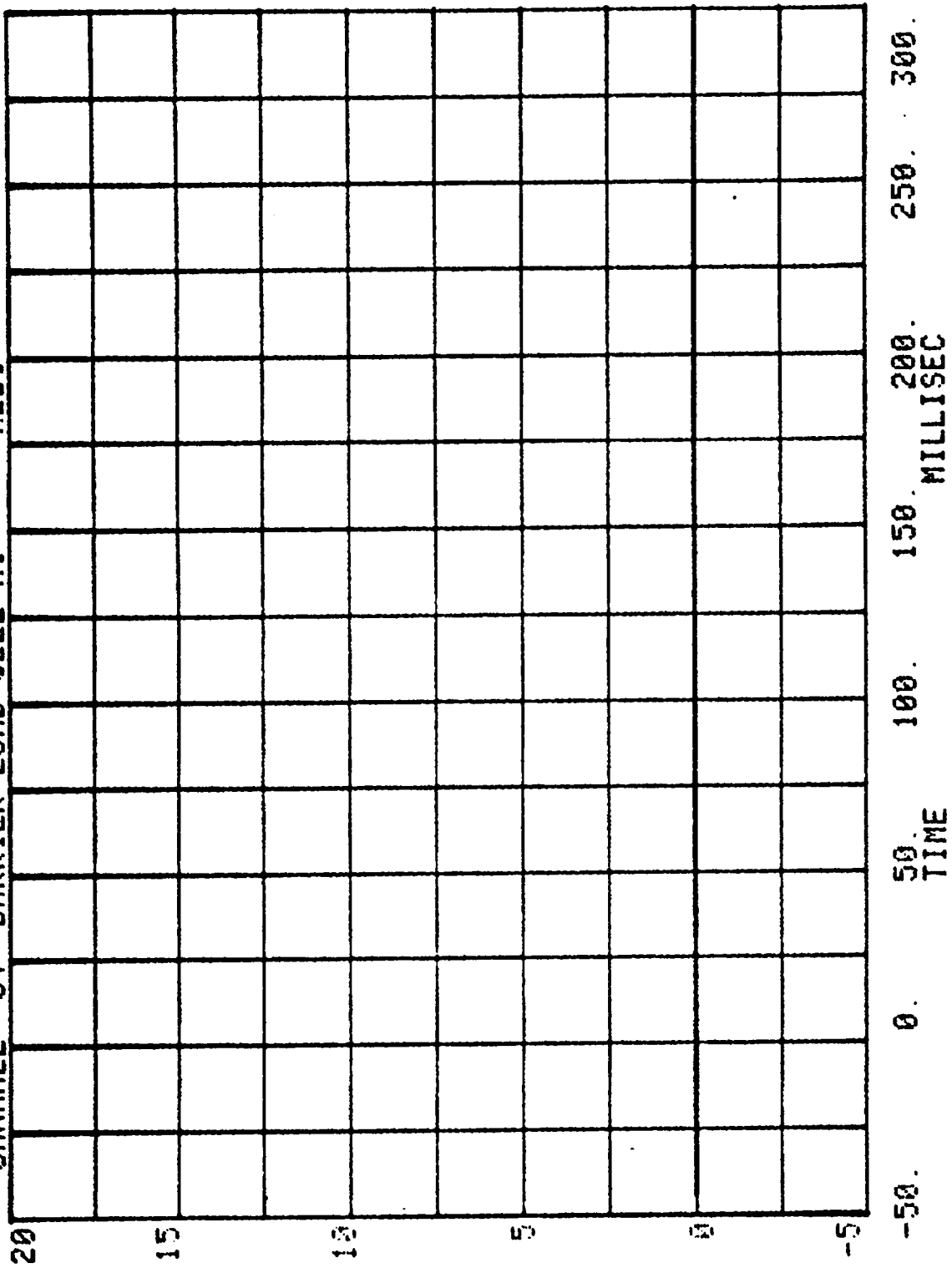
FILTER CHANNEL CLASS

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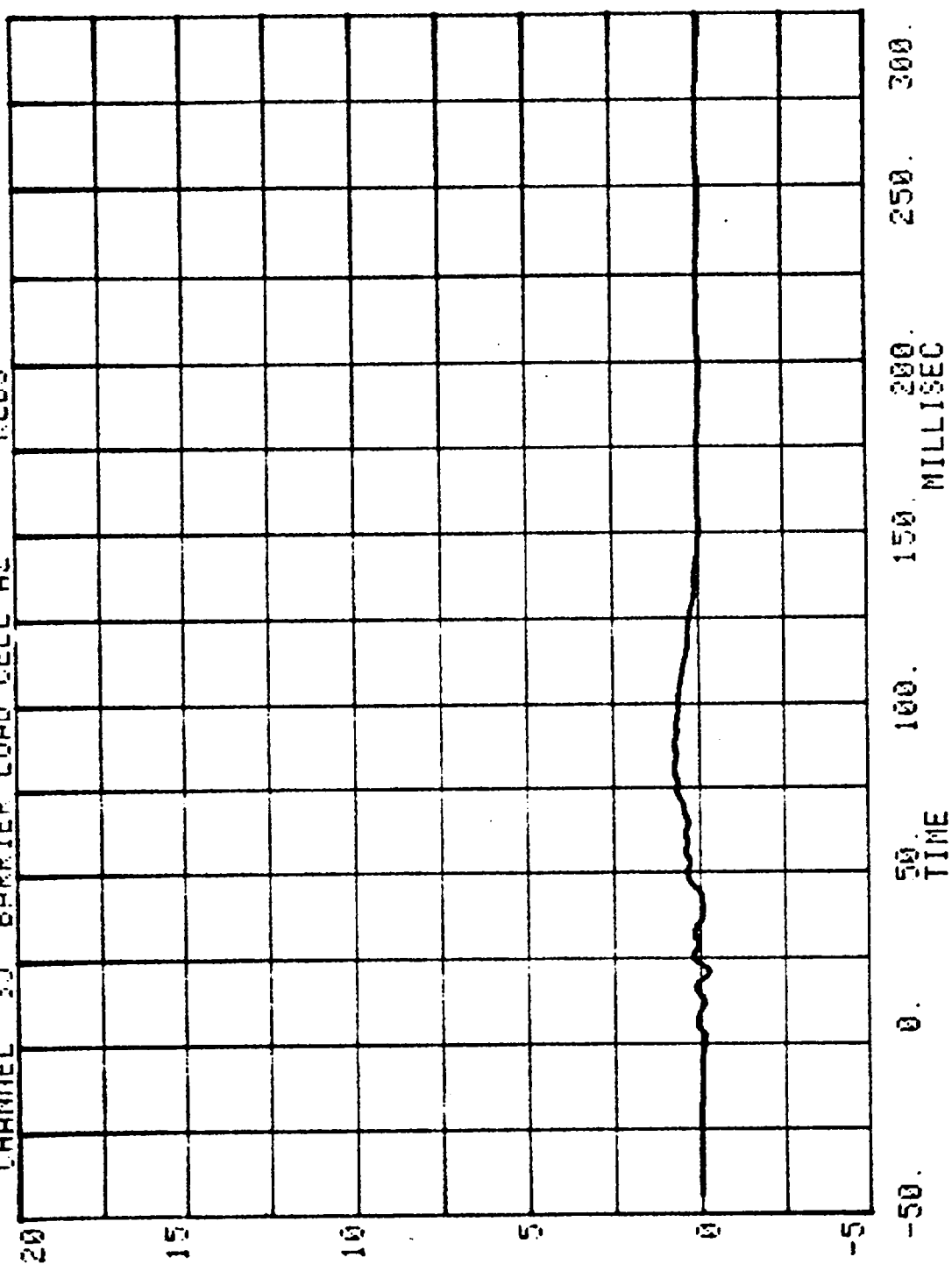
B-24

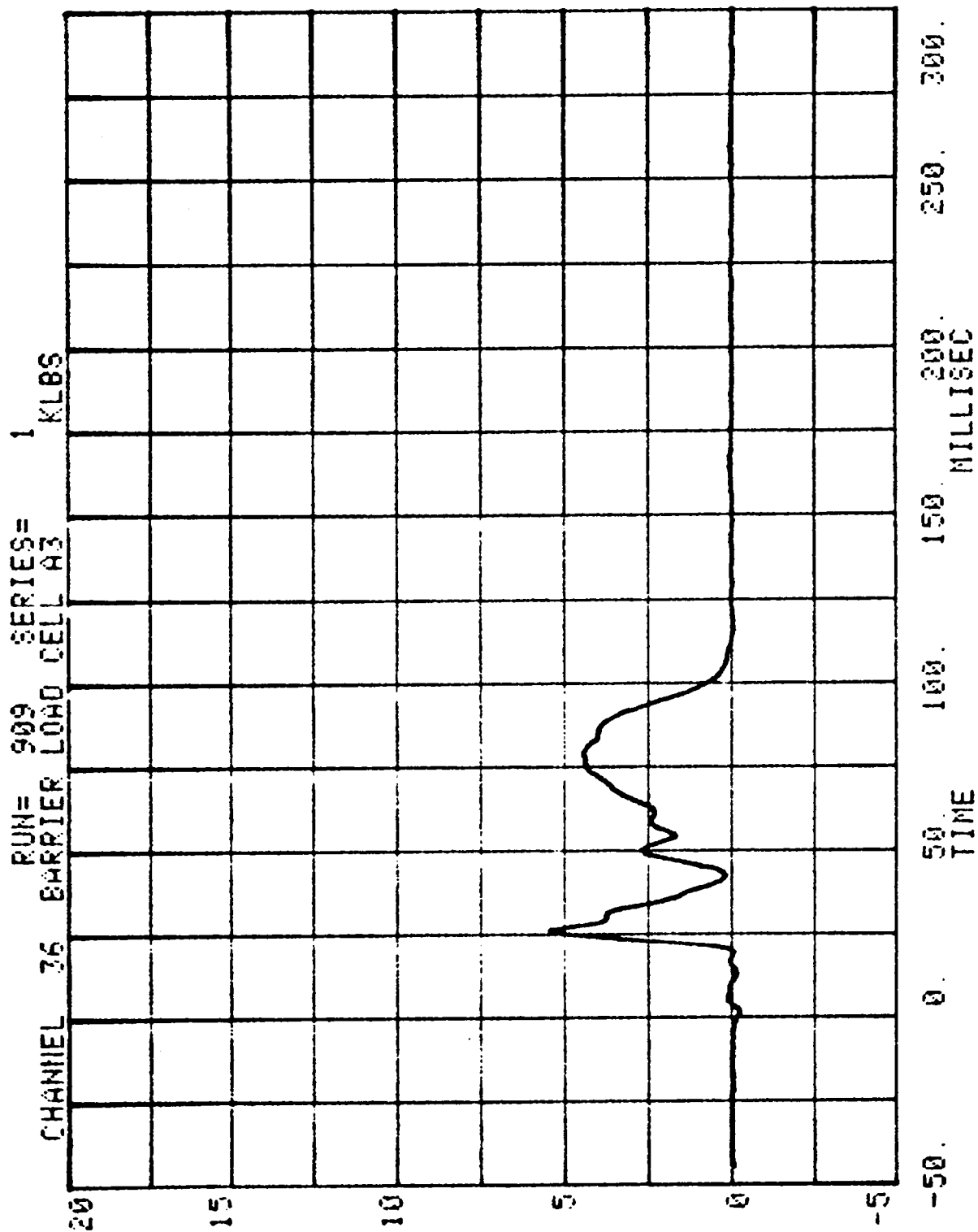
7731-18

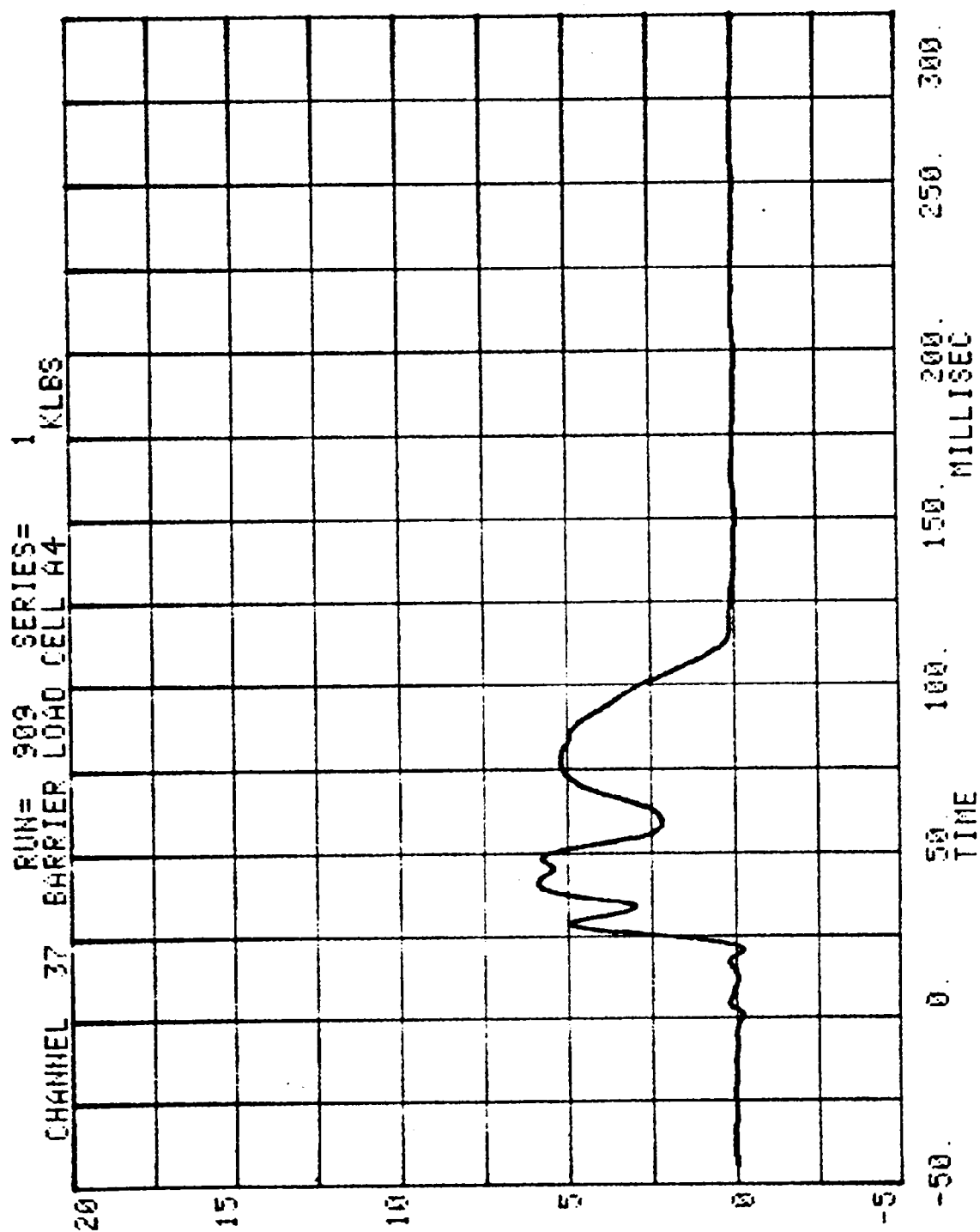
RUN= 989 SERIES= 1
CHANNEL 34 BARRIER LOAD CELL A1 KLBS



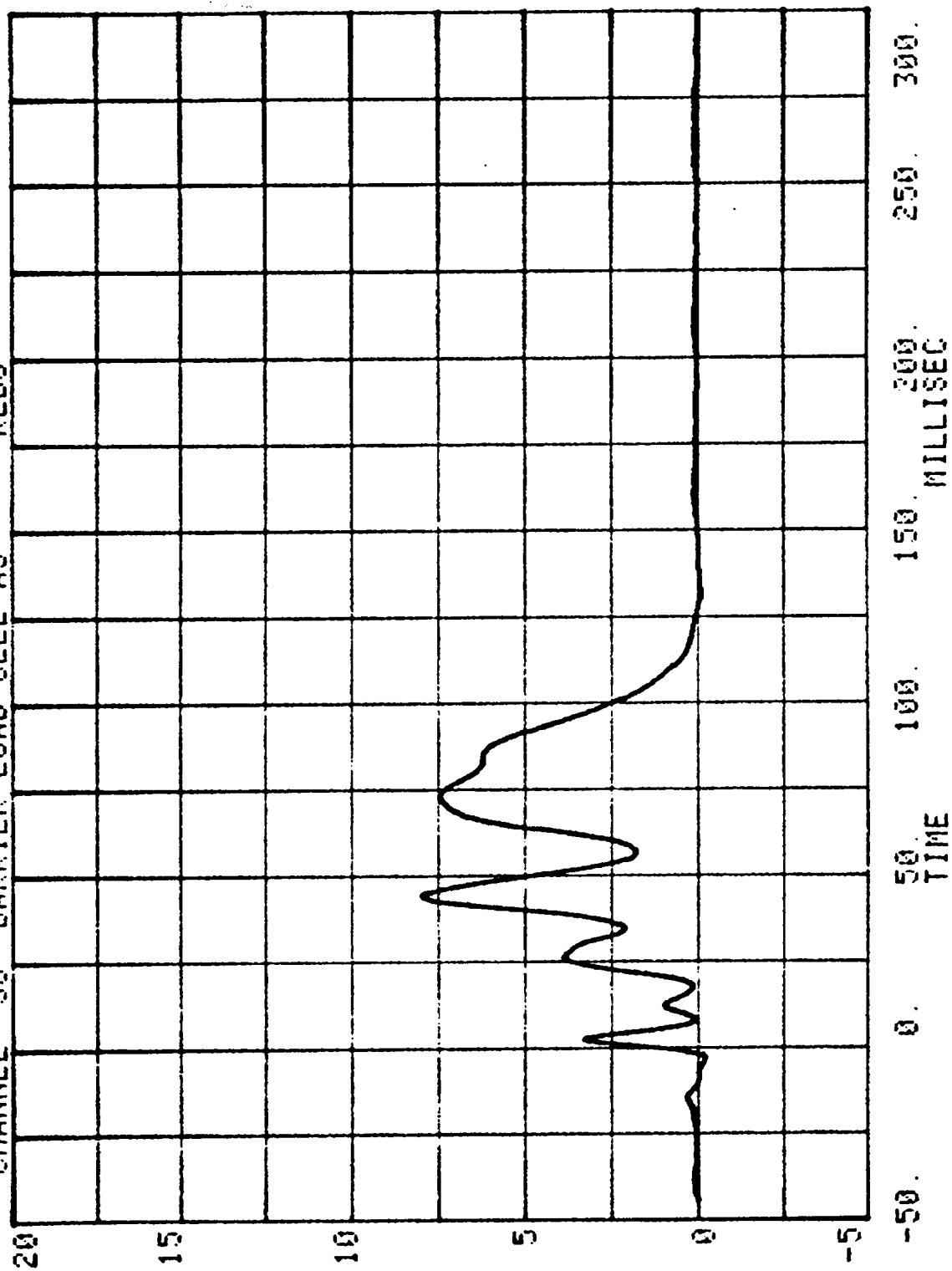
CHANNEL 35 BARRIER LOAD CELL A2 RUN= 909 SERIES= 1 KLBS



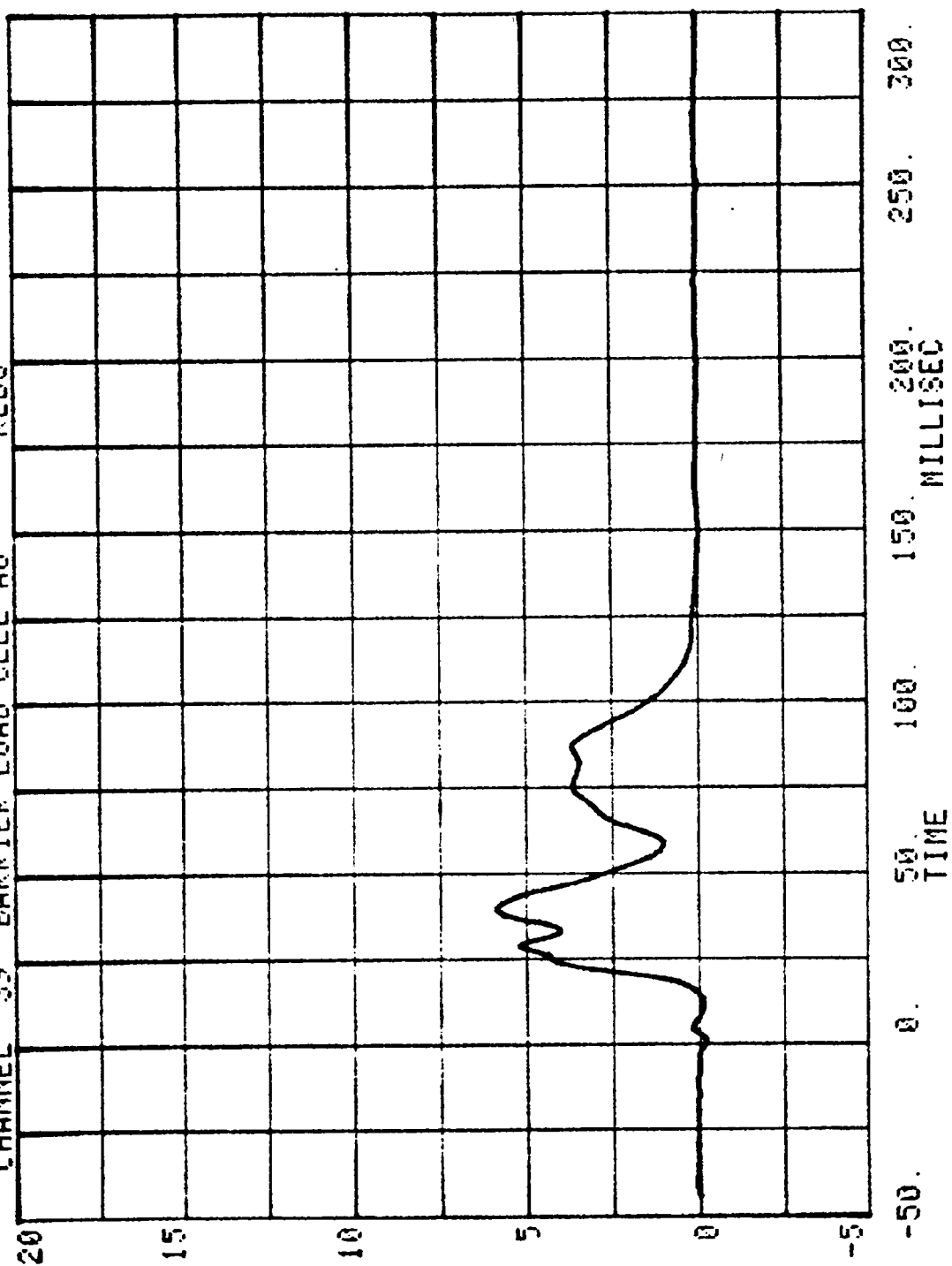




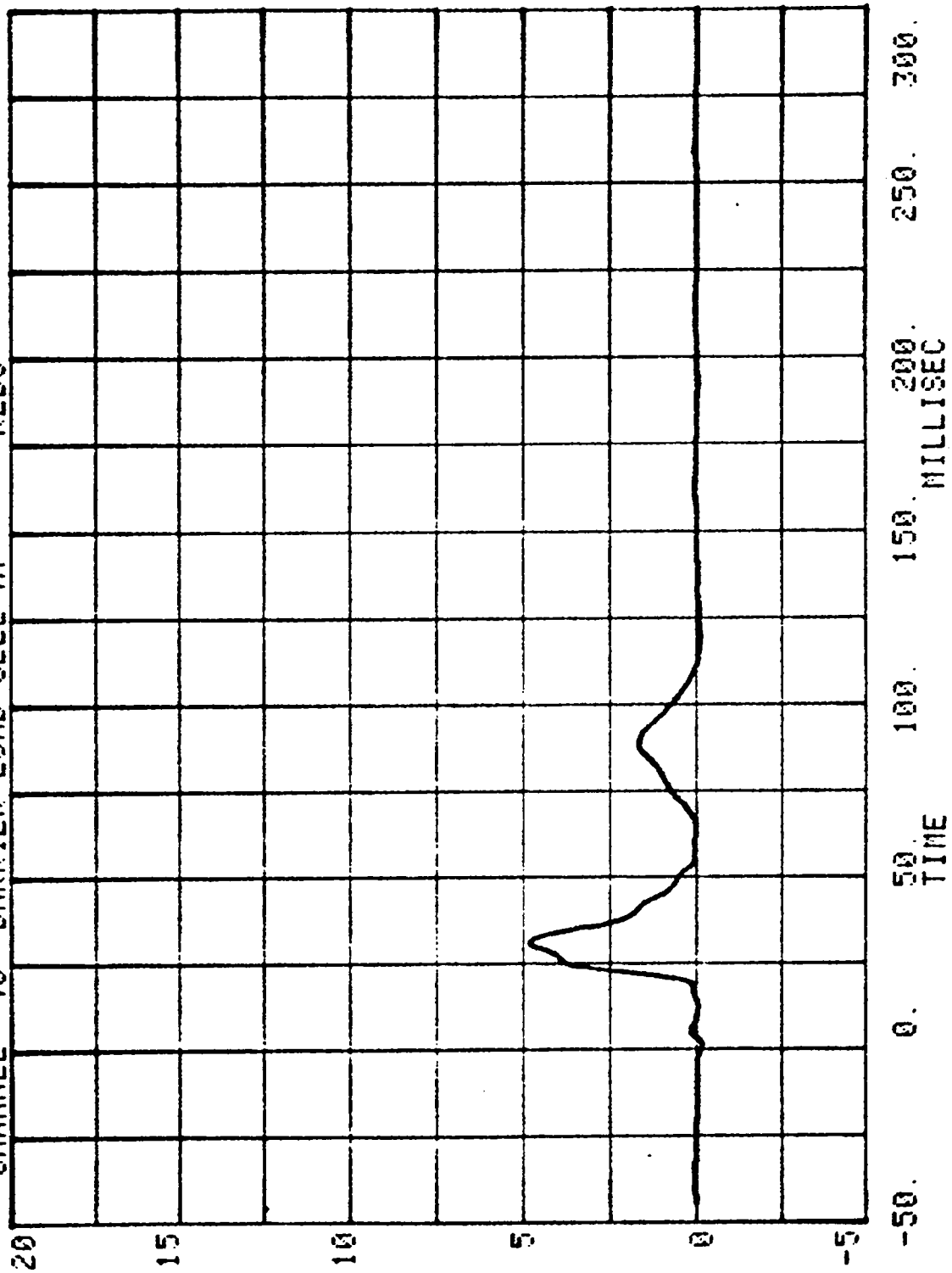
CHANNEL 38 BARRIER LOAD CELL H5 RUN= 909 SERIES= 1 KLBS



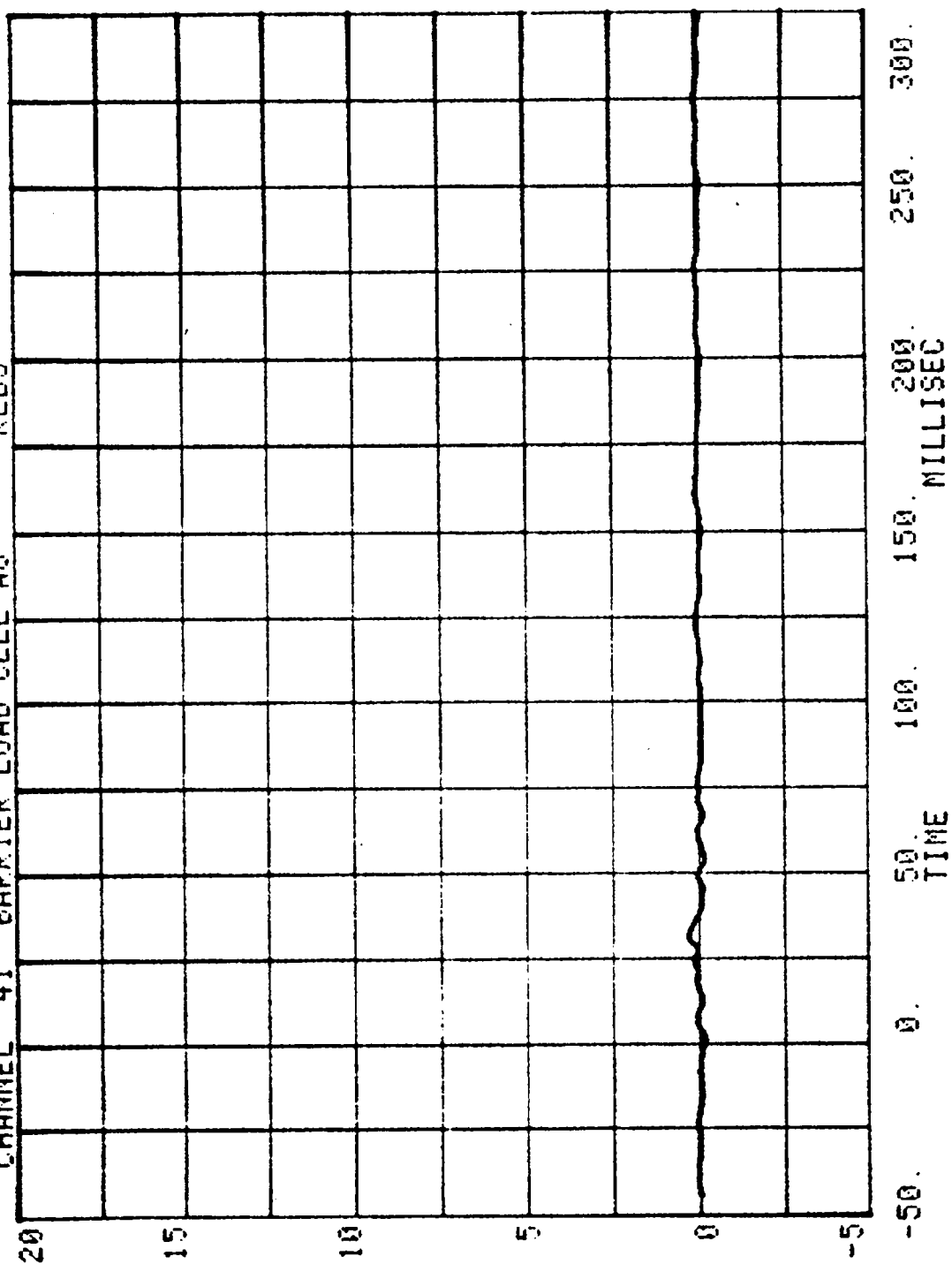
CHANNEL 39 BARRIER LOAD CELL A6 RUN= 909 SERIES= 1 KLBs



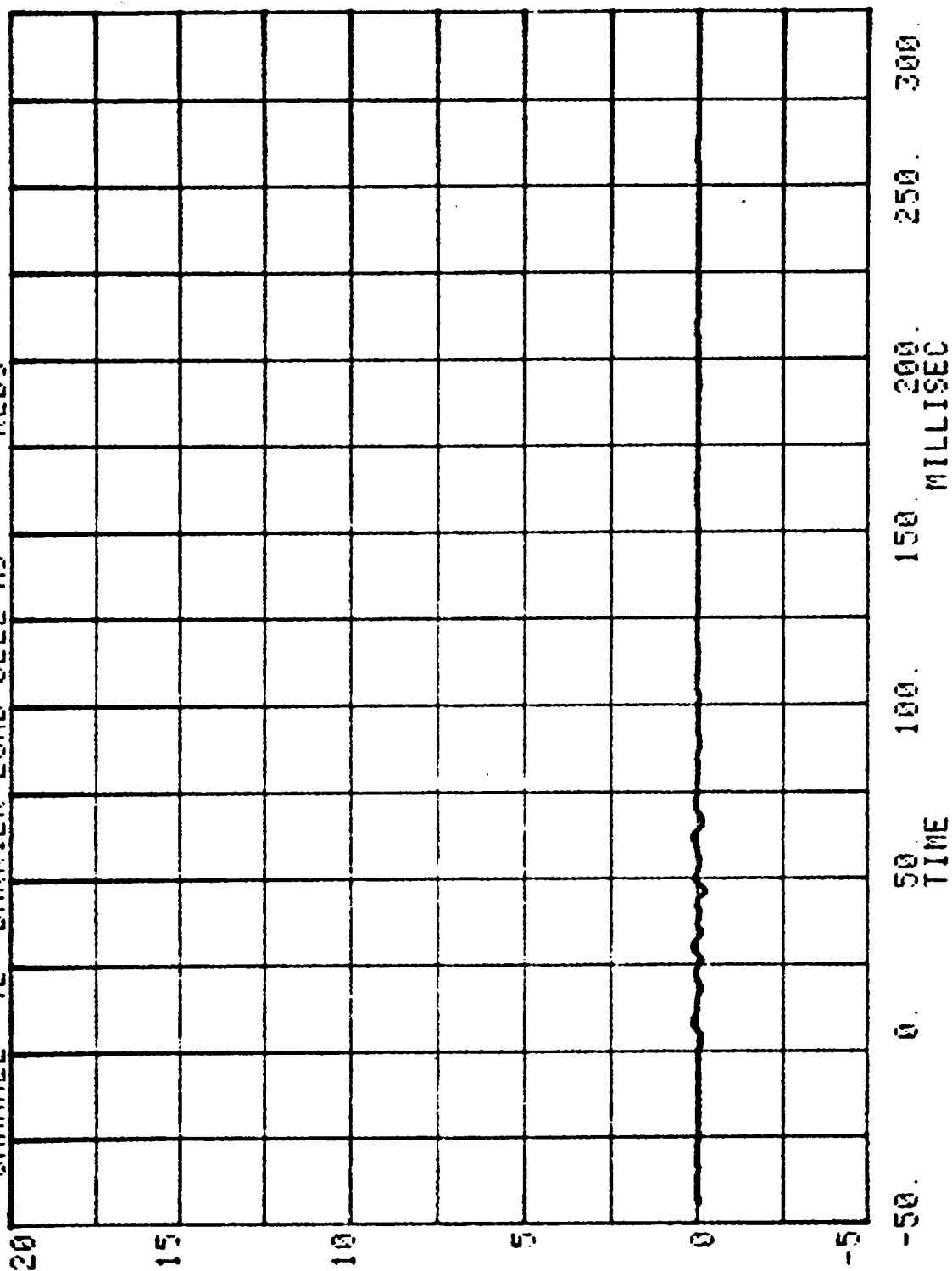
CHANNEL 40 BARRIER LOAD CELL A7 RUN= 303 SERIES= 1 KLBBS



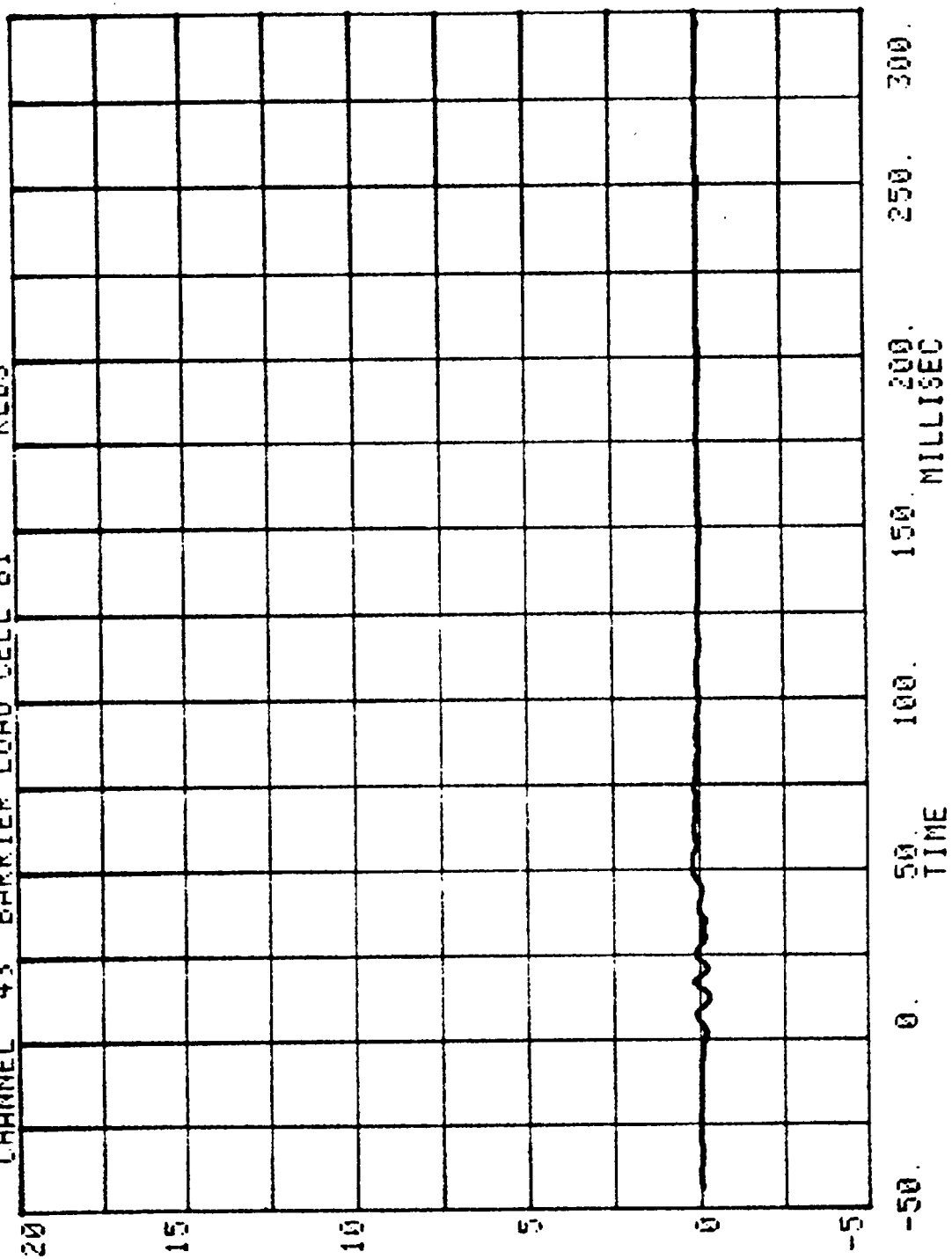
CHANNEL 41 BARRIER LOAD CELL A8 RUN= 909 SERIES= 1 KLBS



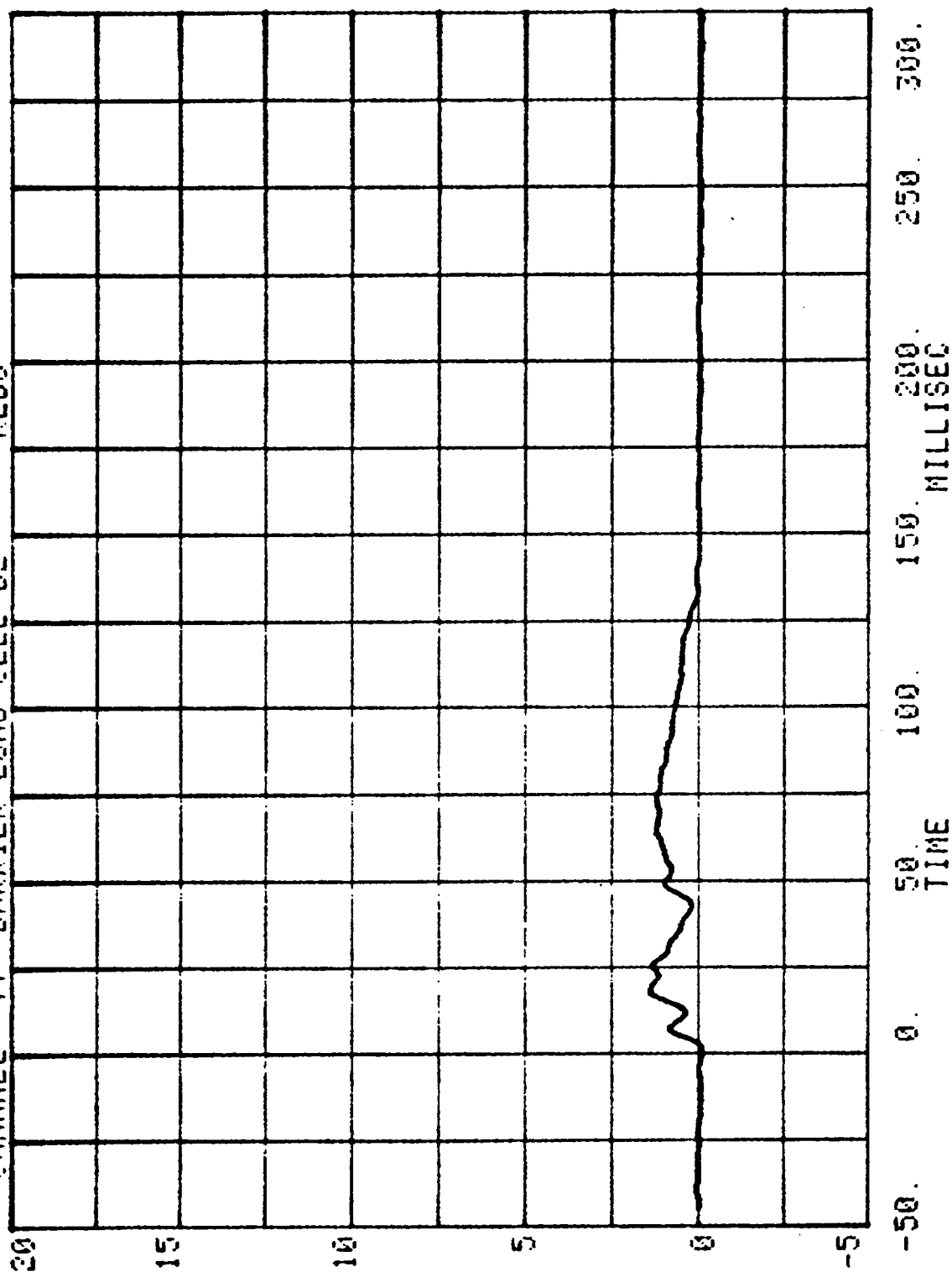
CHANNEL 42 RUH= 309 SERIES= 1
BARRIER LOAD CELL A9 KLBS



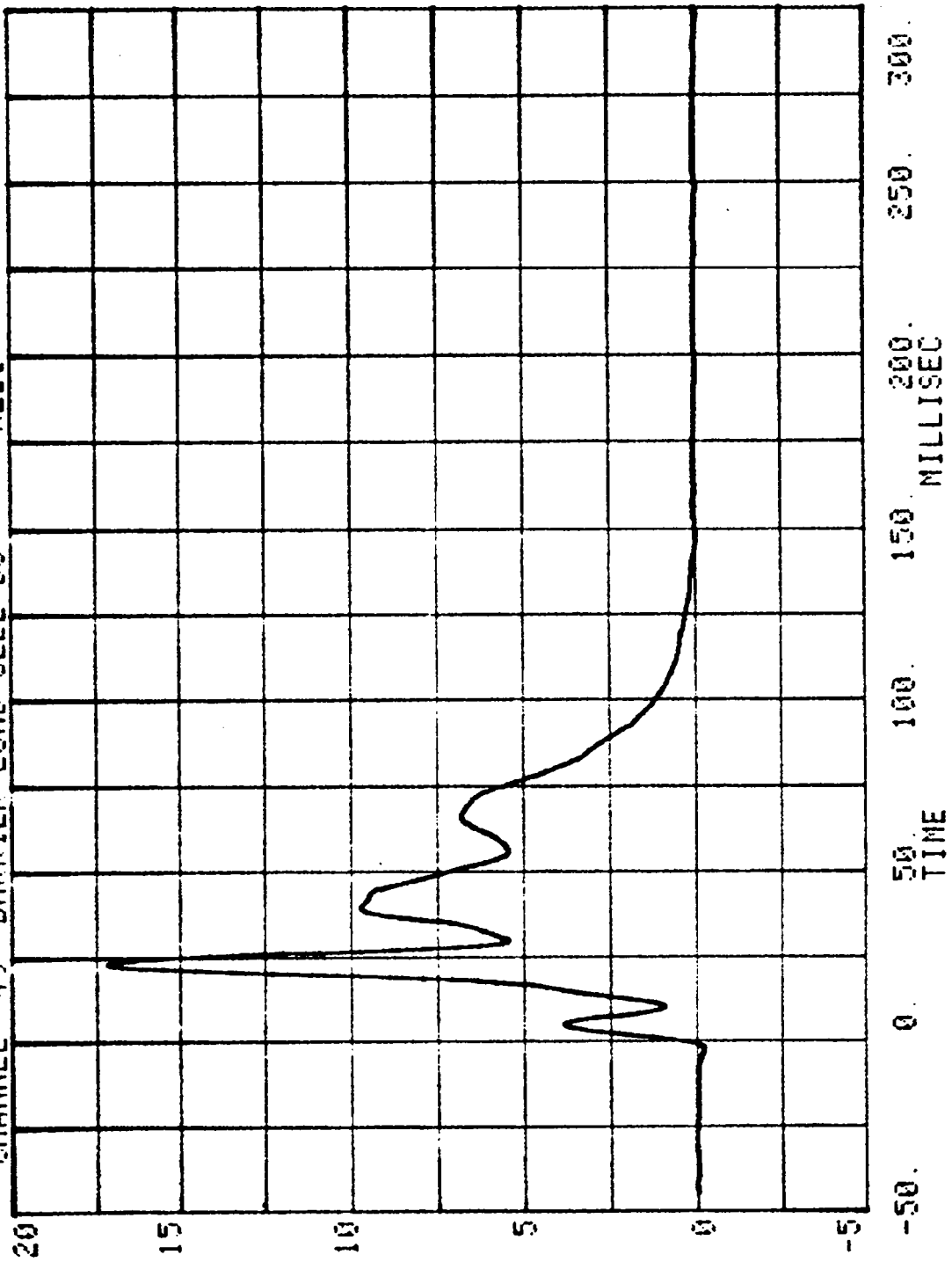
CHANNEL 43 BARRIER LOAD CELL B1 RUN= 909 SERIES= 1 KLBS



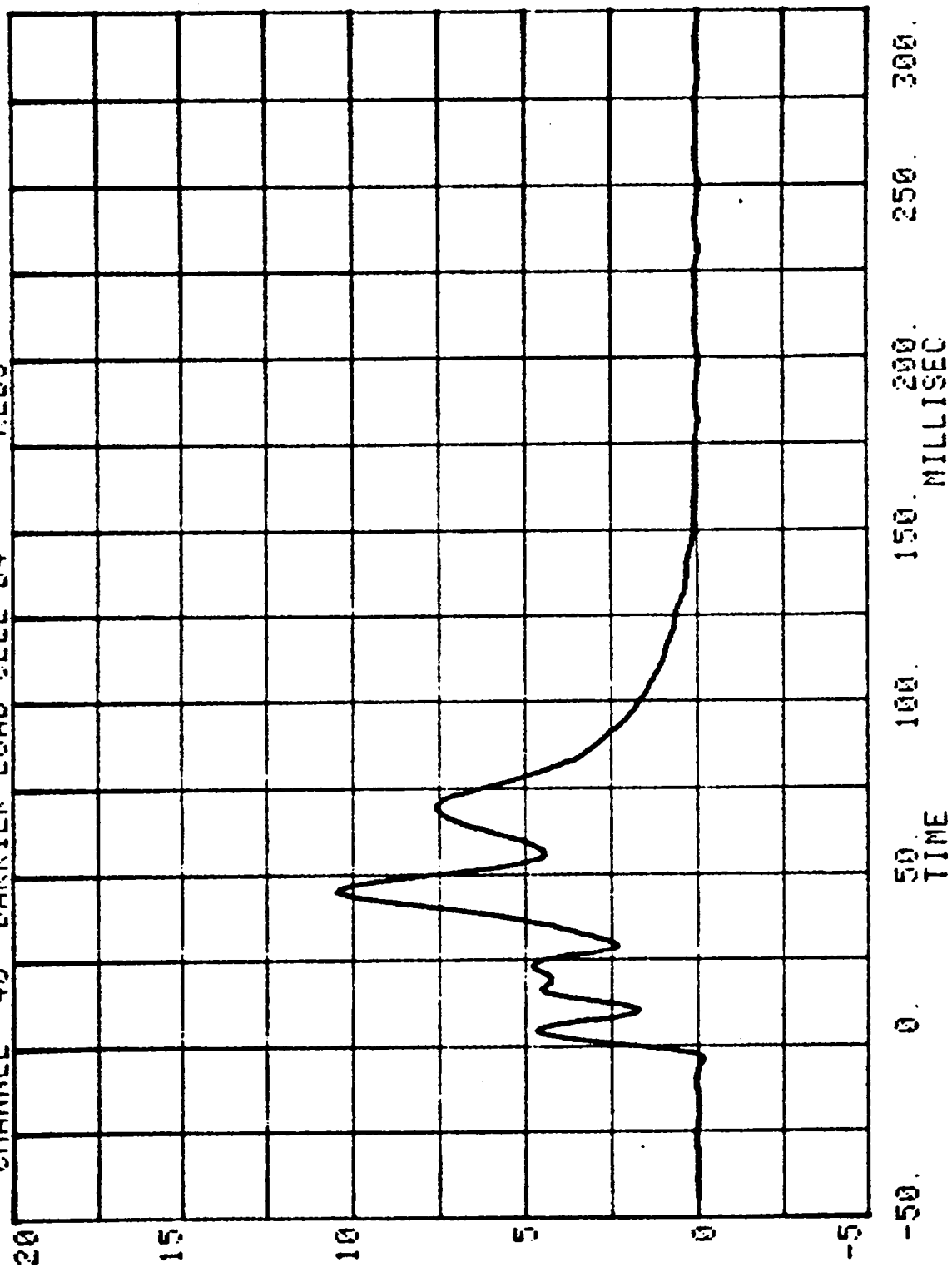
CHANNEL 44 BARRIER LOAD CELL B2 RUN= 989 SERIES= 1 KLBS



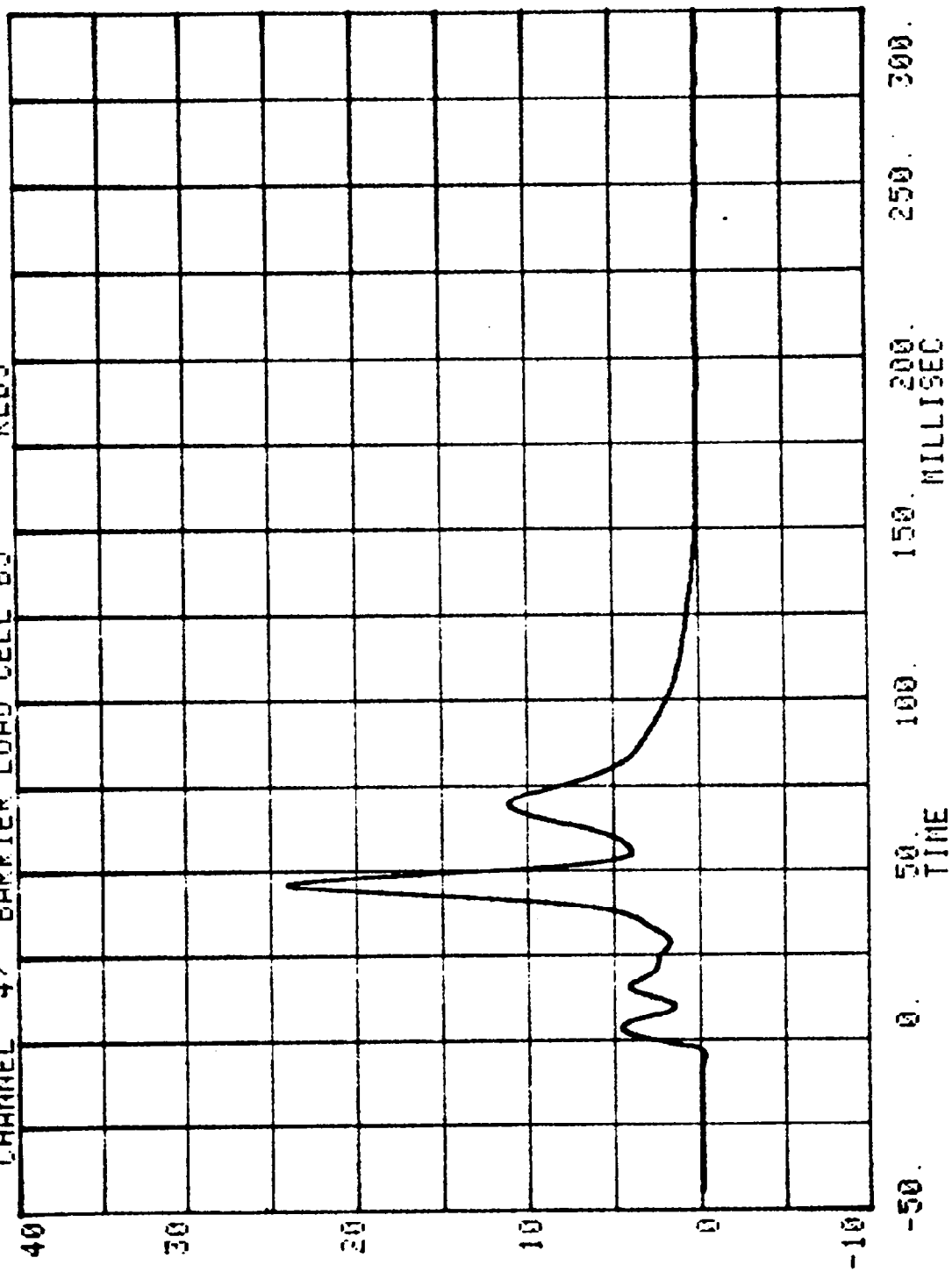
CHANNEL 45 BARRIER LOAD CELL B3
RUN= 909 SERIES= 1
KLBS



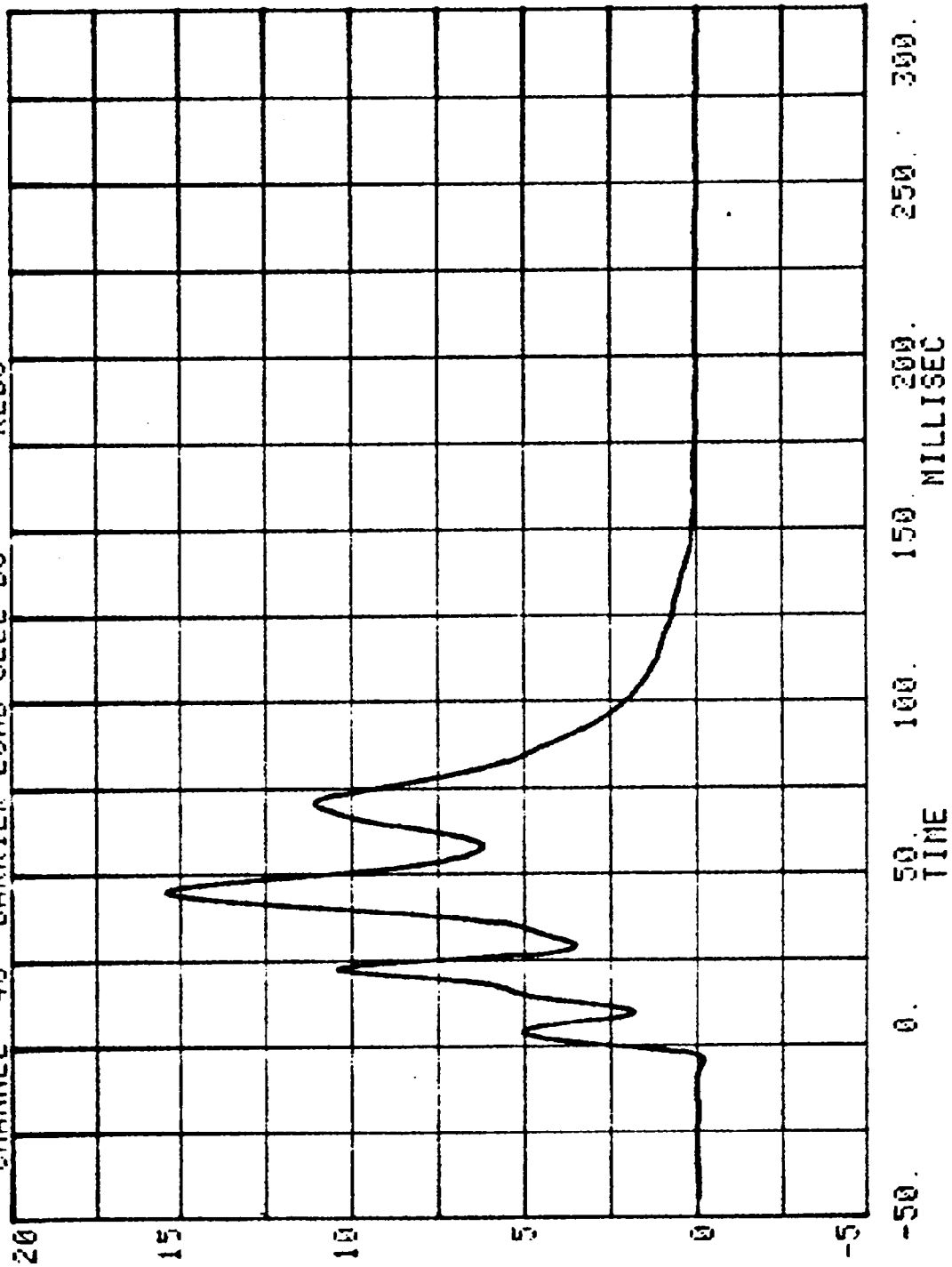
RUN= 909 SERIES= 1
CHANNEL 45 BARRIER LOAD CELL B4 KLB8



CHANNEL 47 BARRIER LOAD CELL B5
RUN= 909 SERIES= 1
KLBS



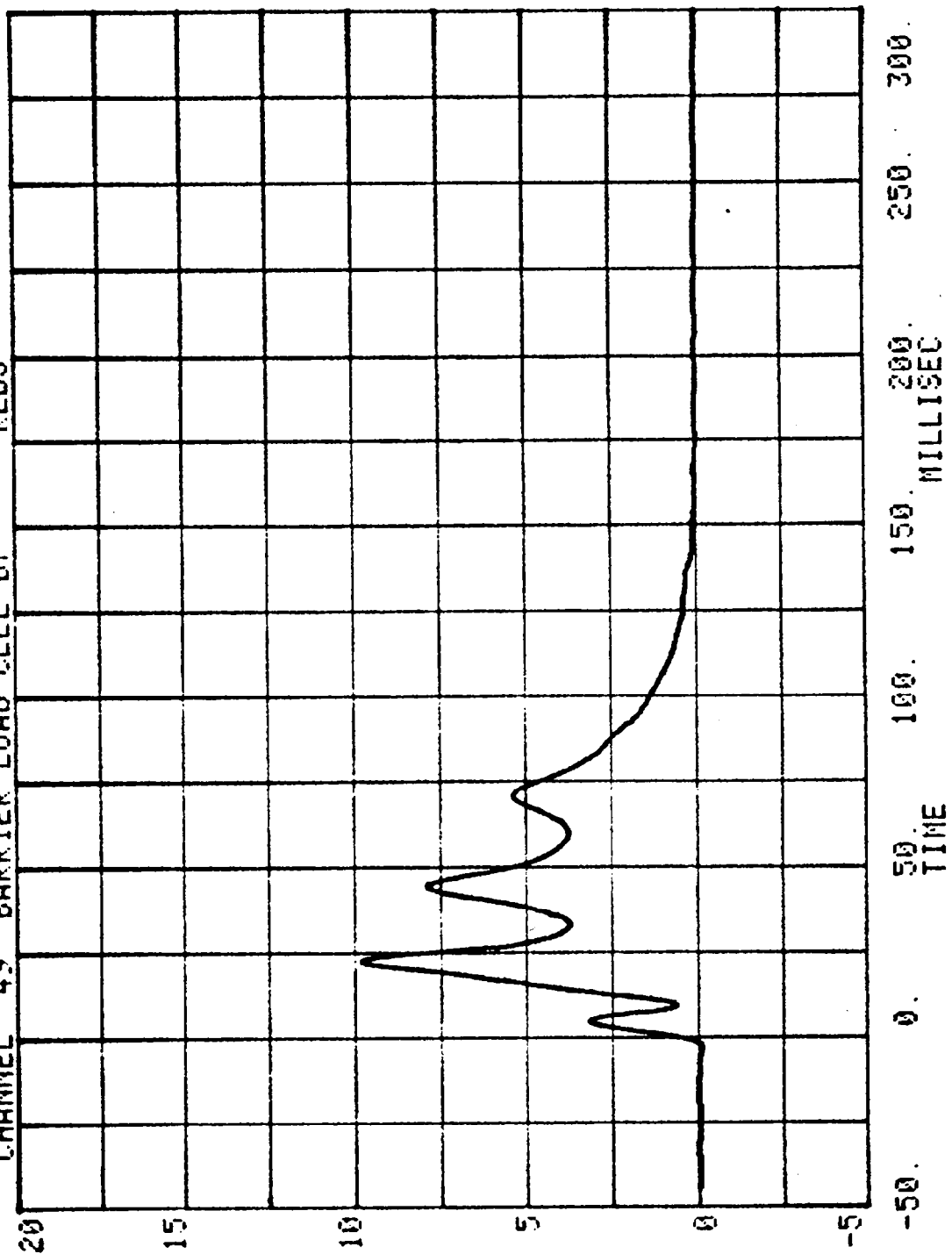
CHANNEL 48 BARRIER LOAD CELL B6 RUN= 909 SERIES= 1 KLBS



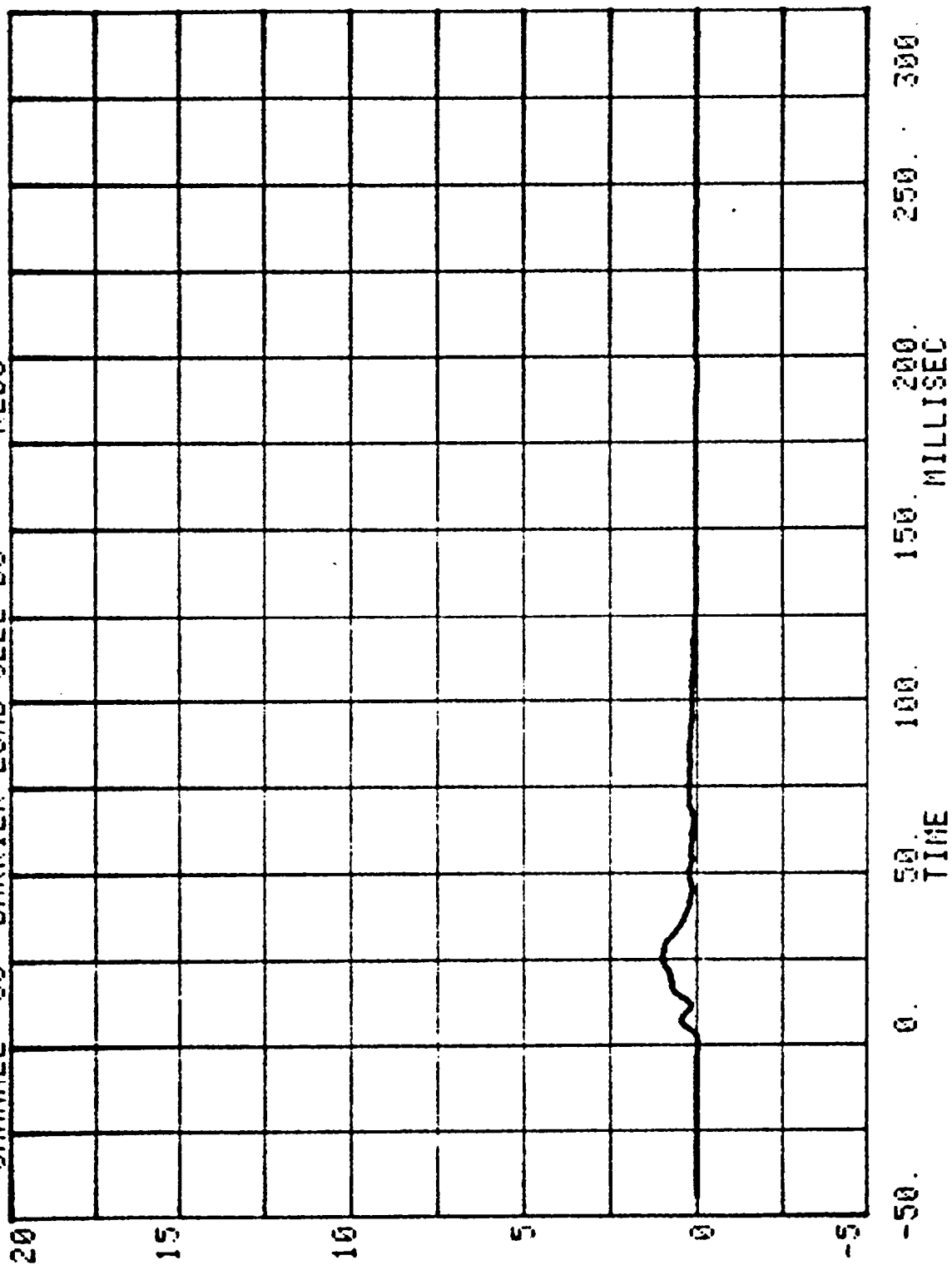
CHANNEL 49 BARRIER LOAD CELL B7

RUN= 909 SERIES= 1

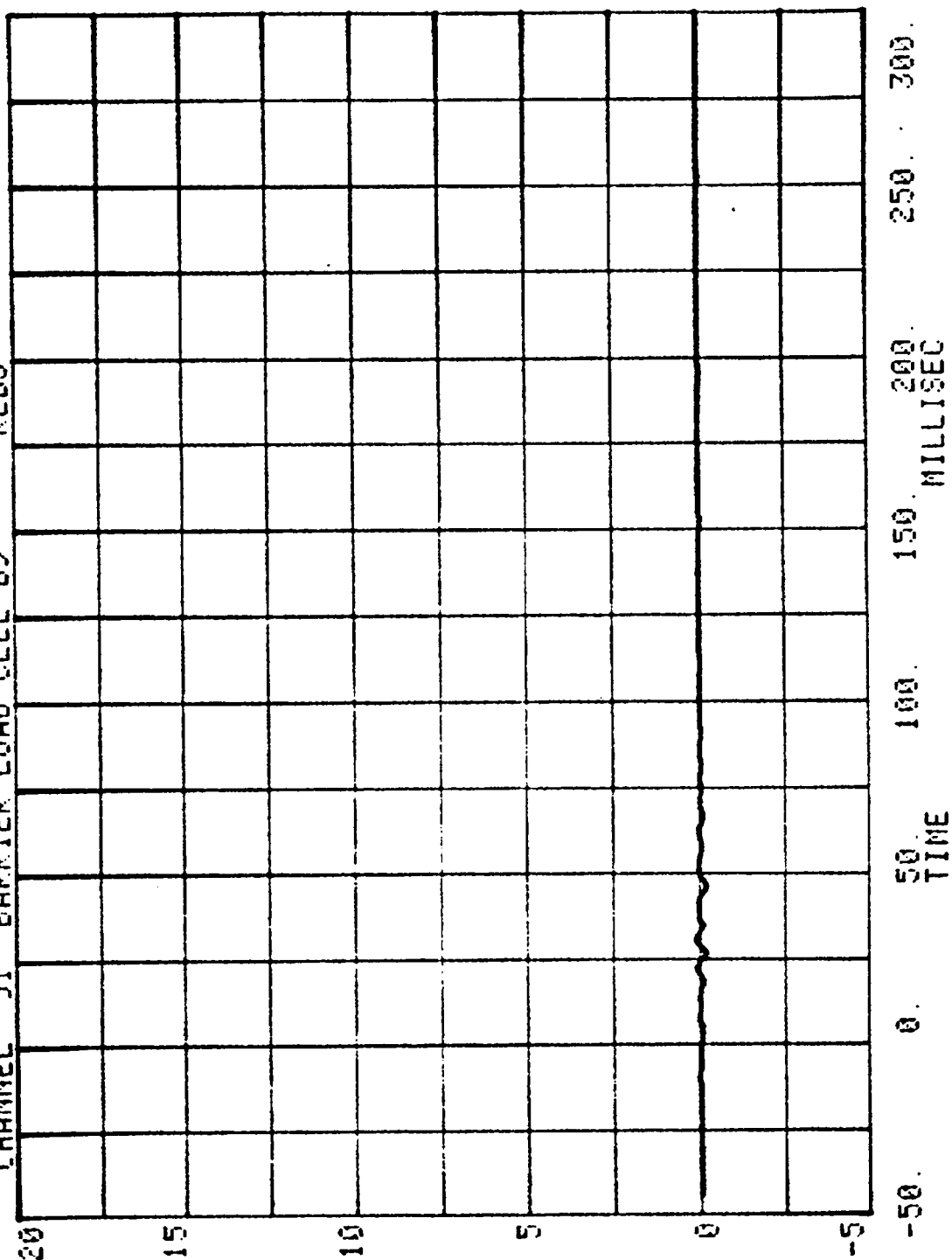
KLBS



CHANNEL 50 BARRIER LOAD CELL B8 RUN= 909 SERIES= 1 KLBS

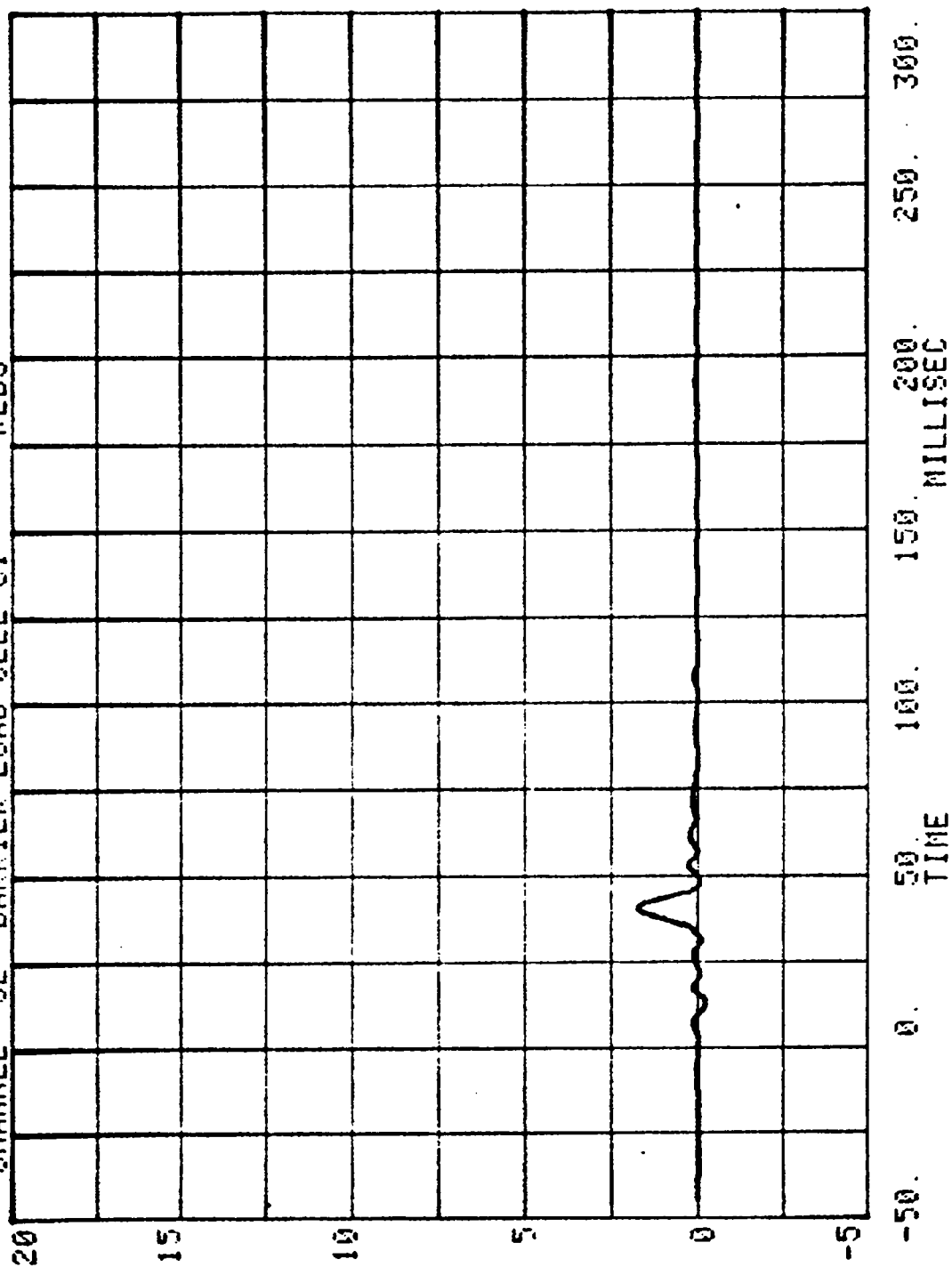


CHANNEL 51 BARRIER LOAD CELL B9 RUN= 909 SERIES= 1 KLBS

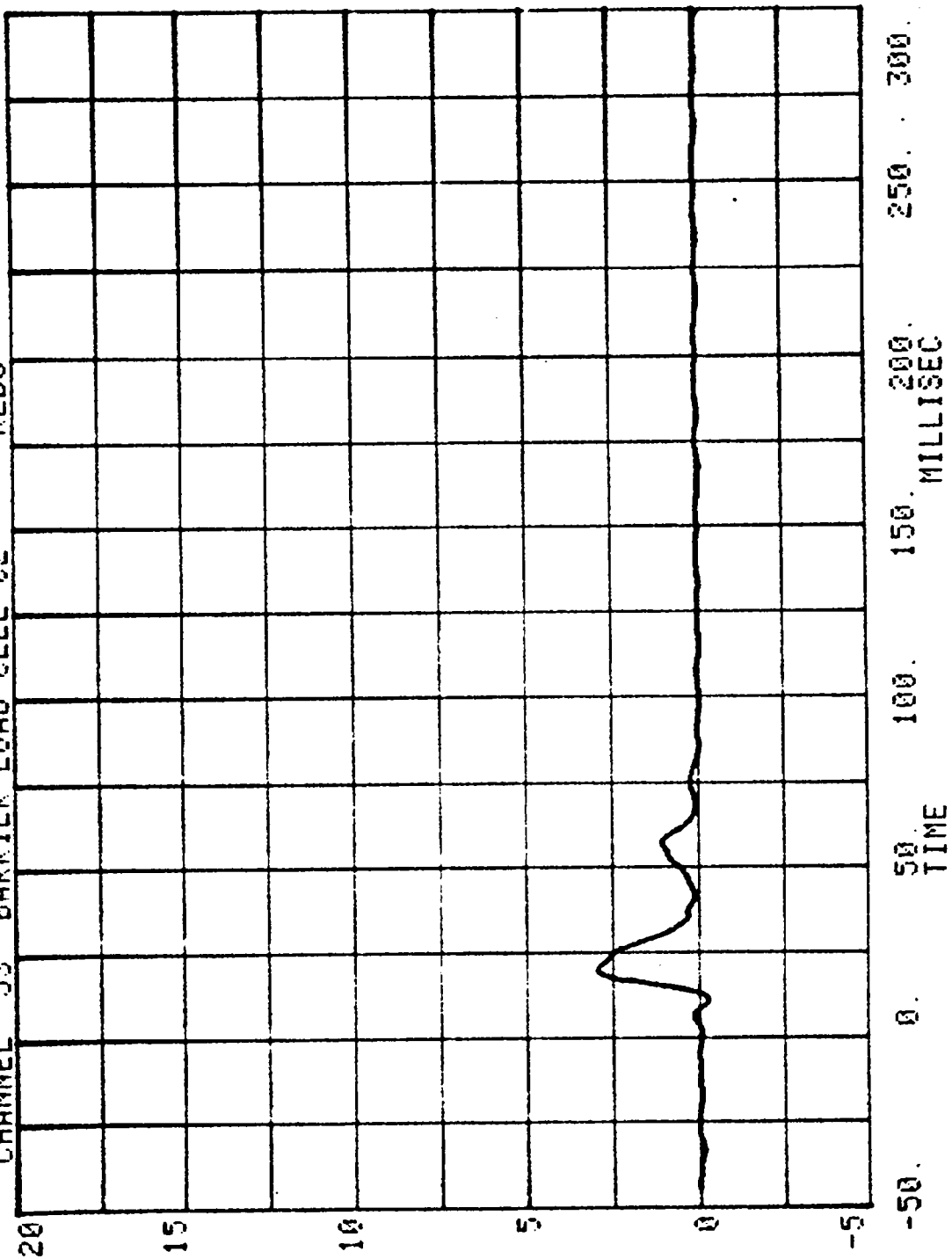


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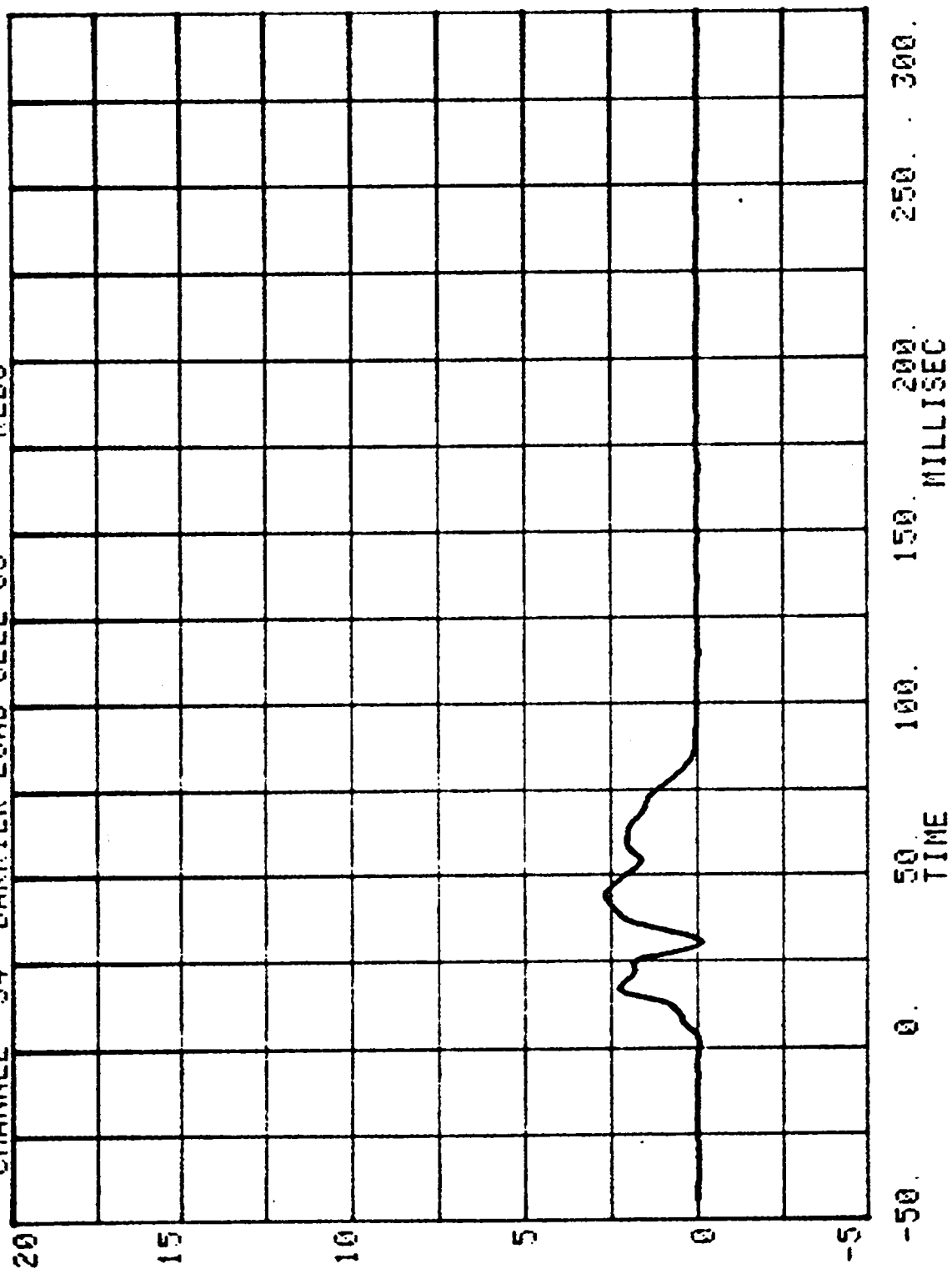
CHANNEL 52 RUN= 903 SERIES= 1 KLBS
BARRIER LOAD CELL C1



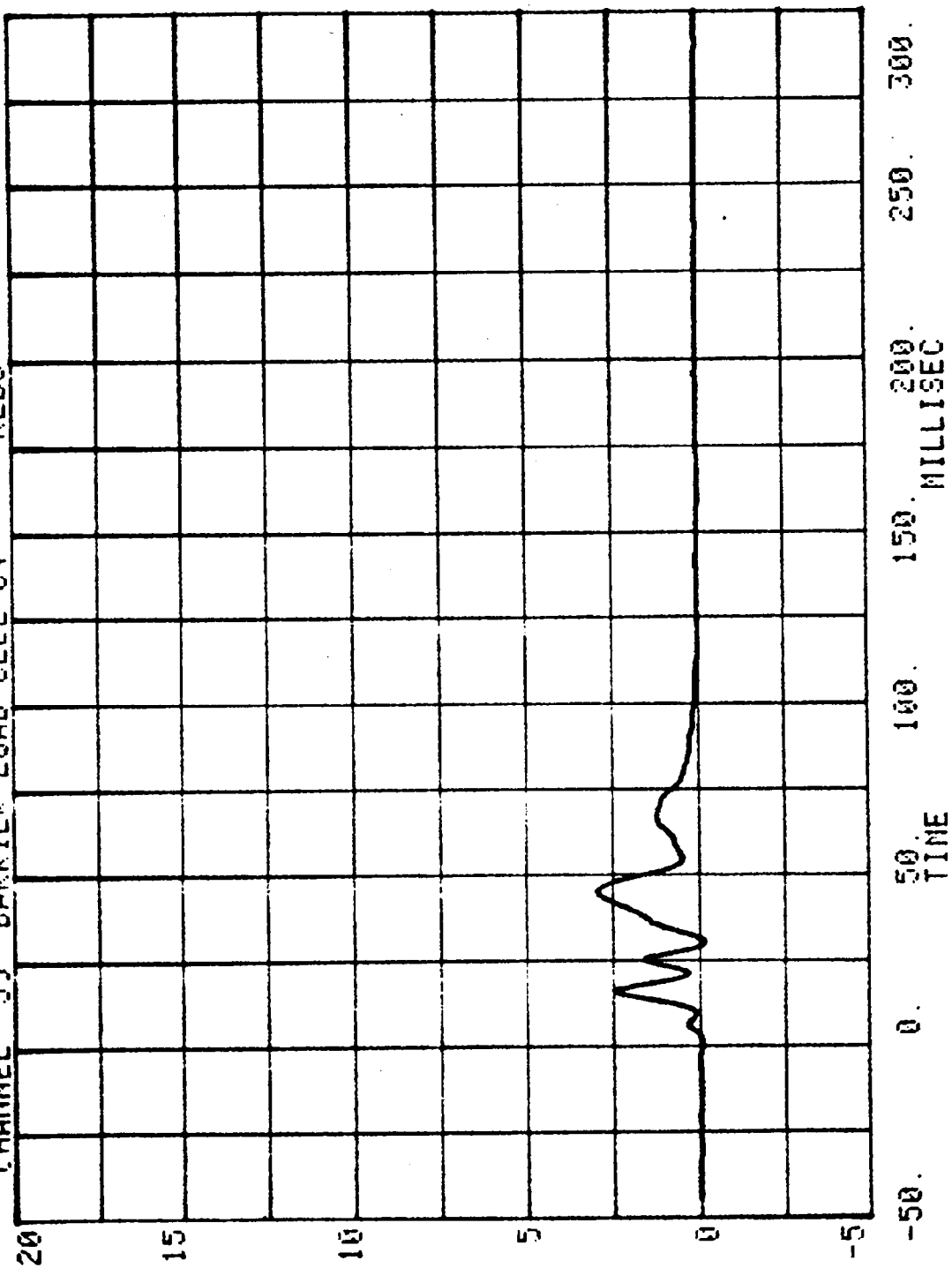
CHANNEL 53 BARRIER LOAD CELL 02 RUN= 909 SERIES= 1 KLBS

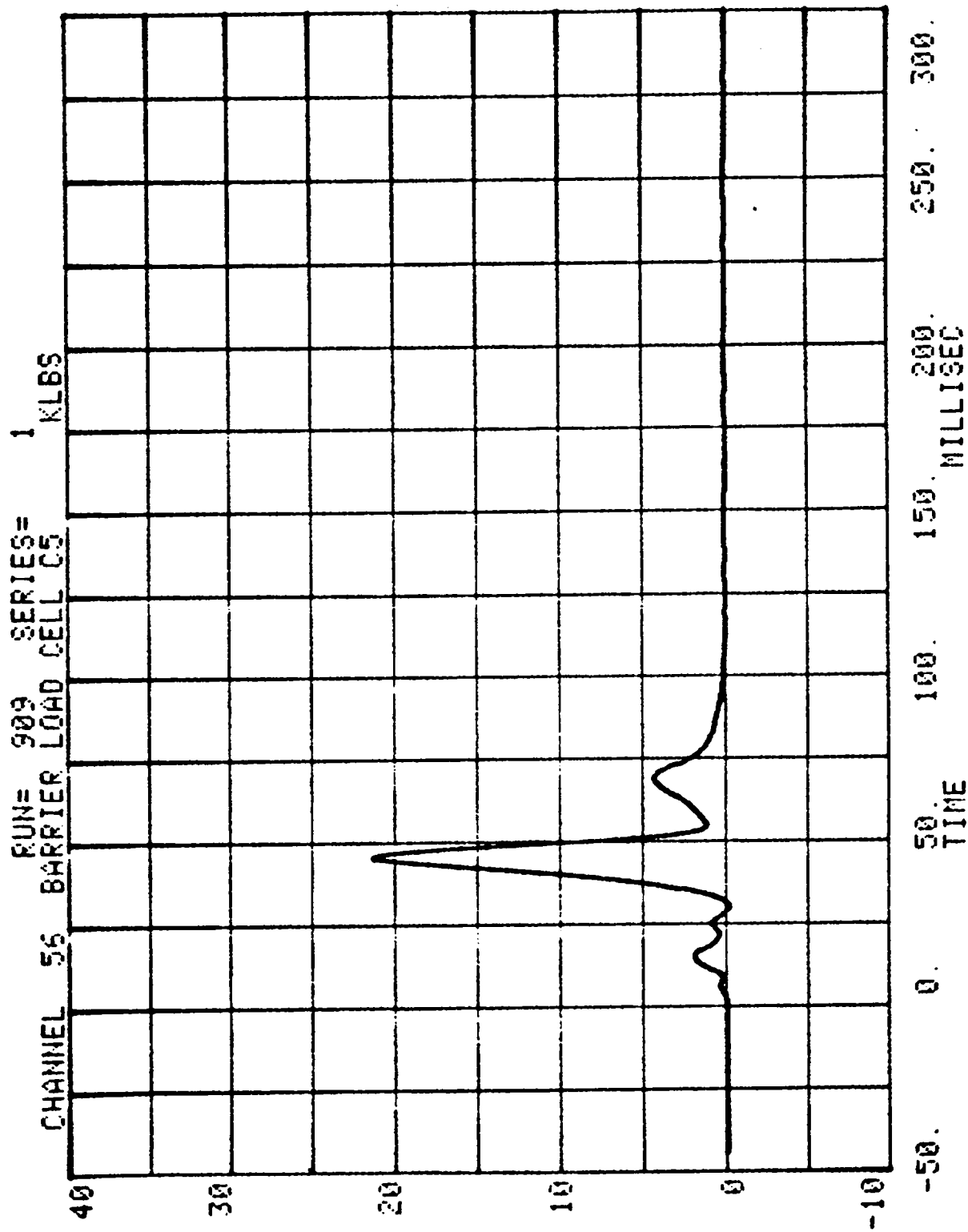


CHANNEL 54 RUN= 909 SERIES= 1
BARRIER LOAD CELL C3 KLBS

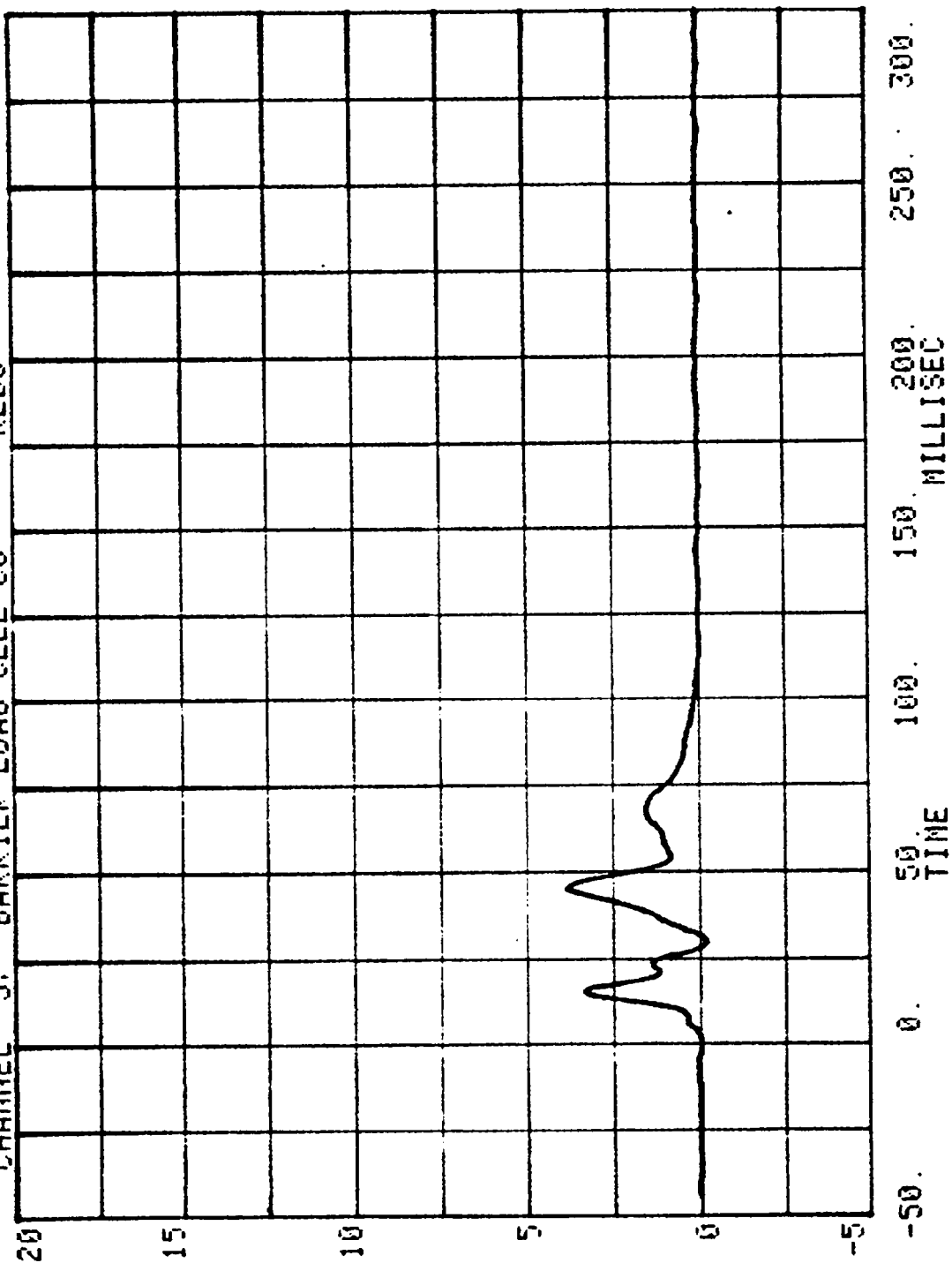


CHANNEL 55 BARRIER LOAD CELL C4 RUN= 909 SERIES= 1 KLBS

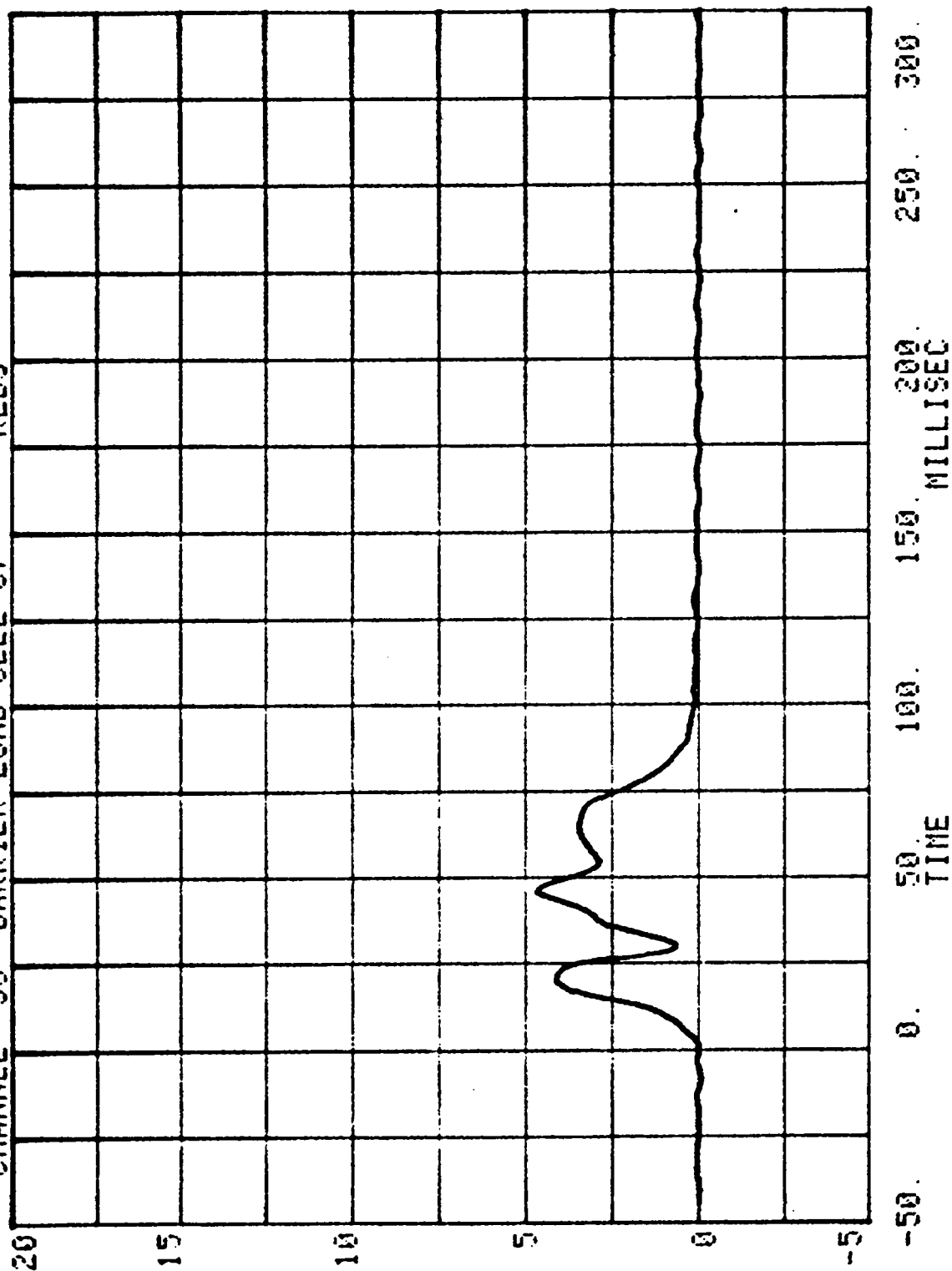




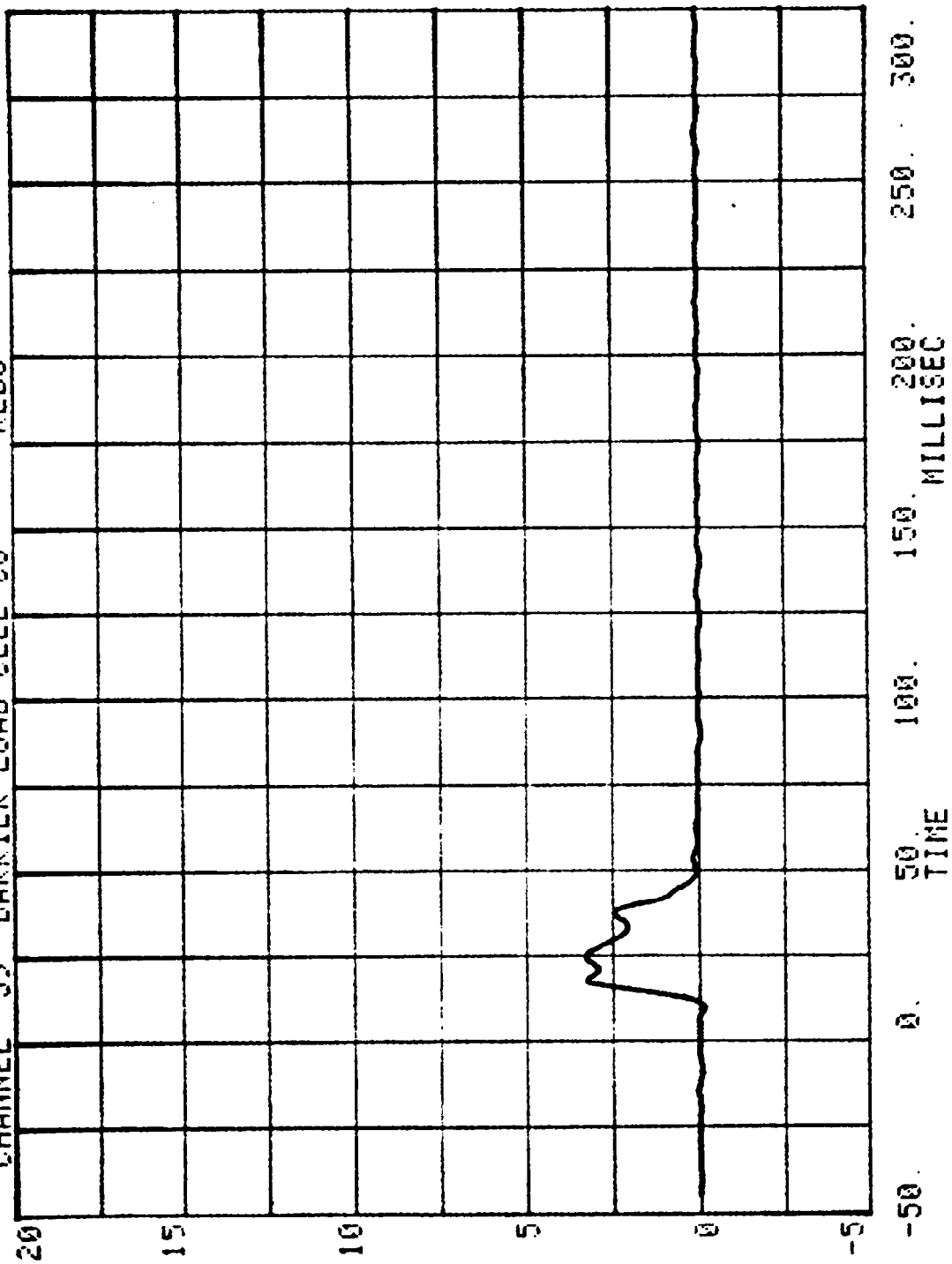
CHANNEL 57 RUN= 909 SERIES= 1 KLBS
BARRIER LOAD CELL C6



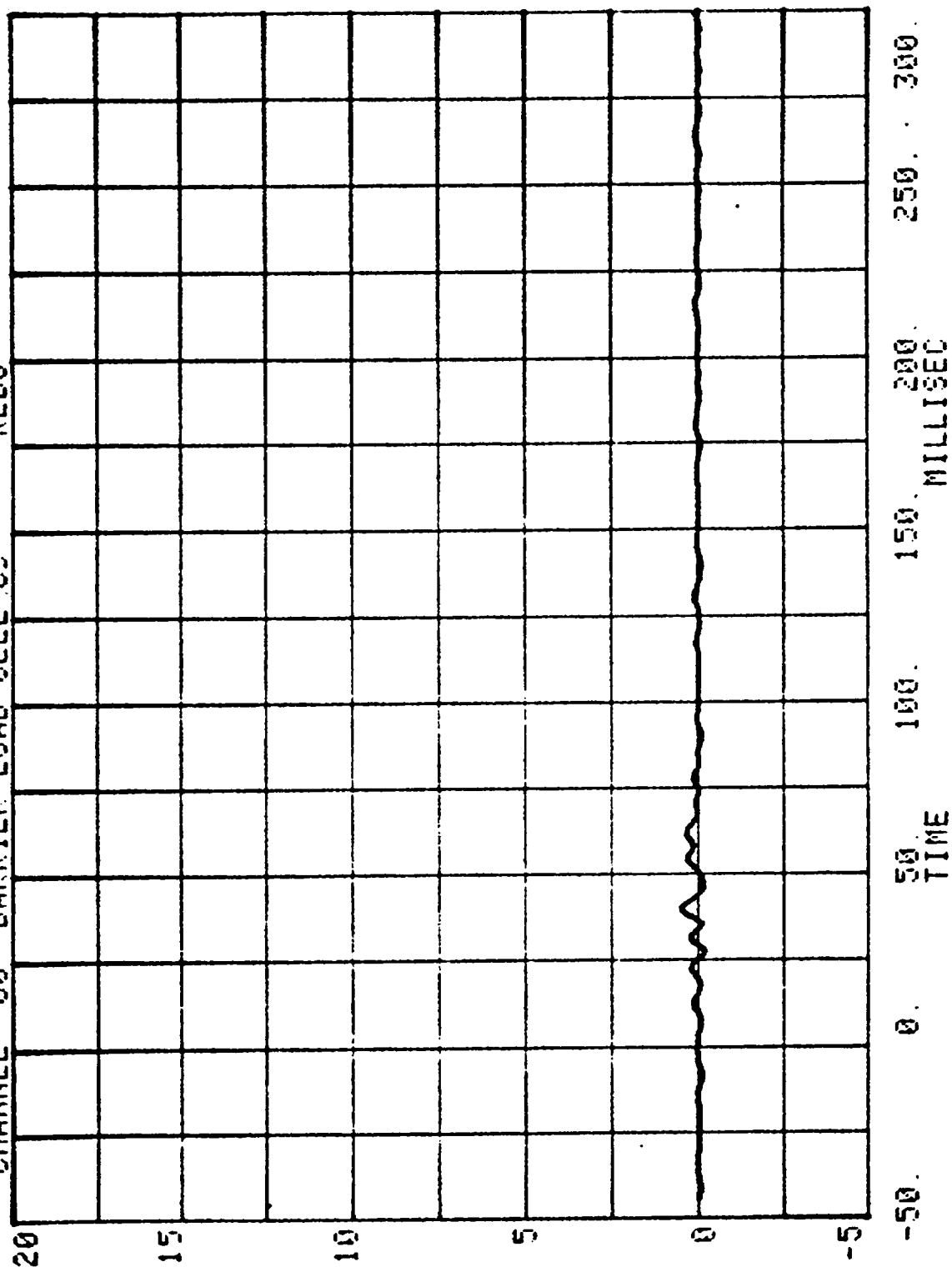
RUN= 903 SERIES= 1
CHANNEL 58 BARRIER LOAD CELL C7 KLBS



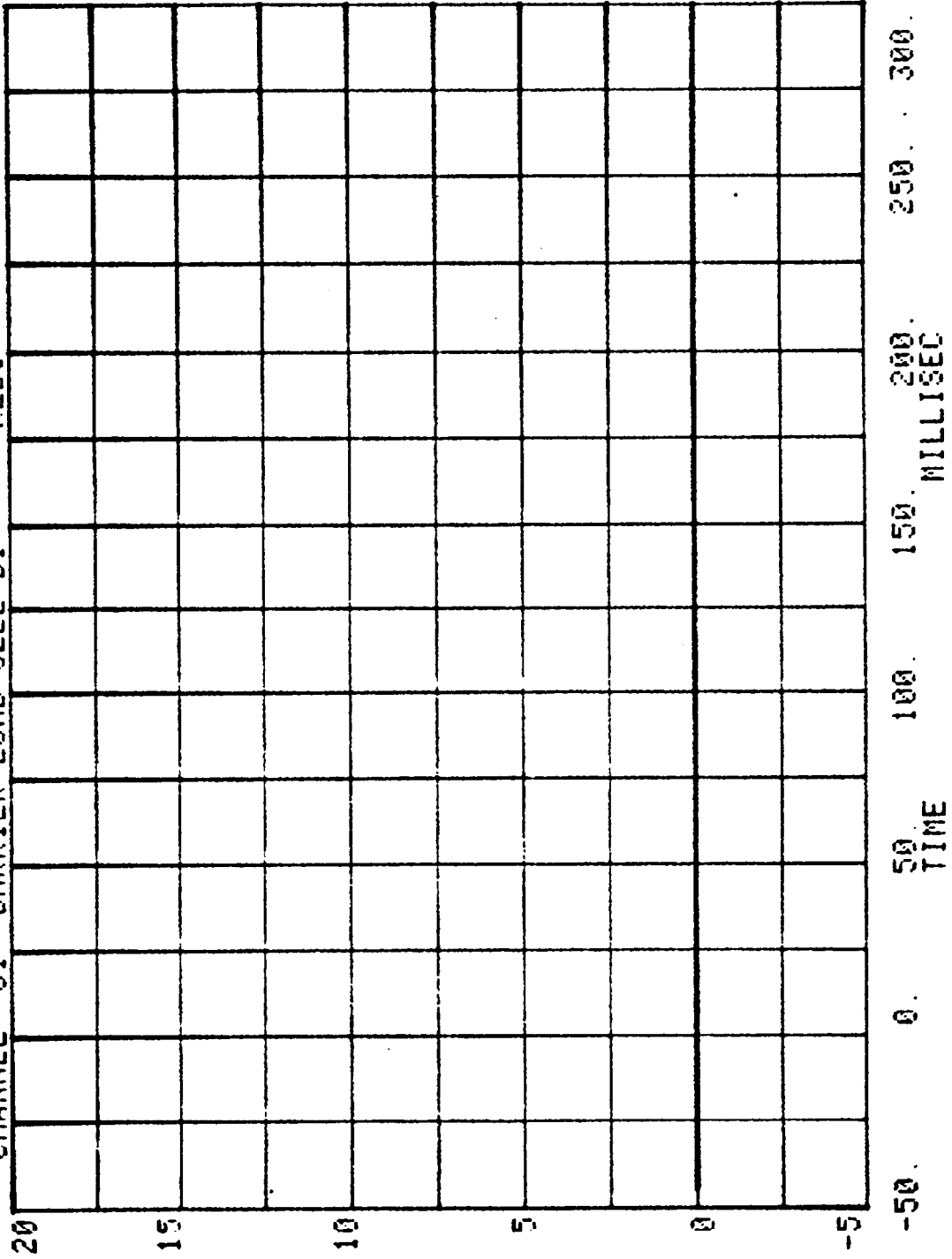
CHANNEL 59 BARRIER LOAD CELL C8
RUN= 309 SERIES= 1
KLBS



CHANNEL 60 RUN= 909 SERIES= 1
BARRIER LOAD CELL C9 KLBS

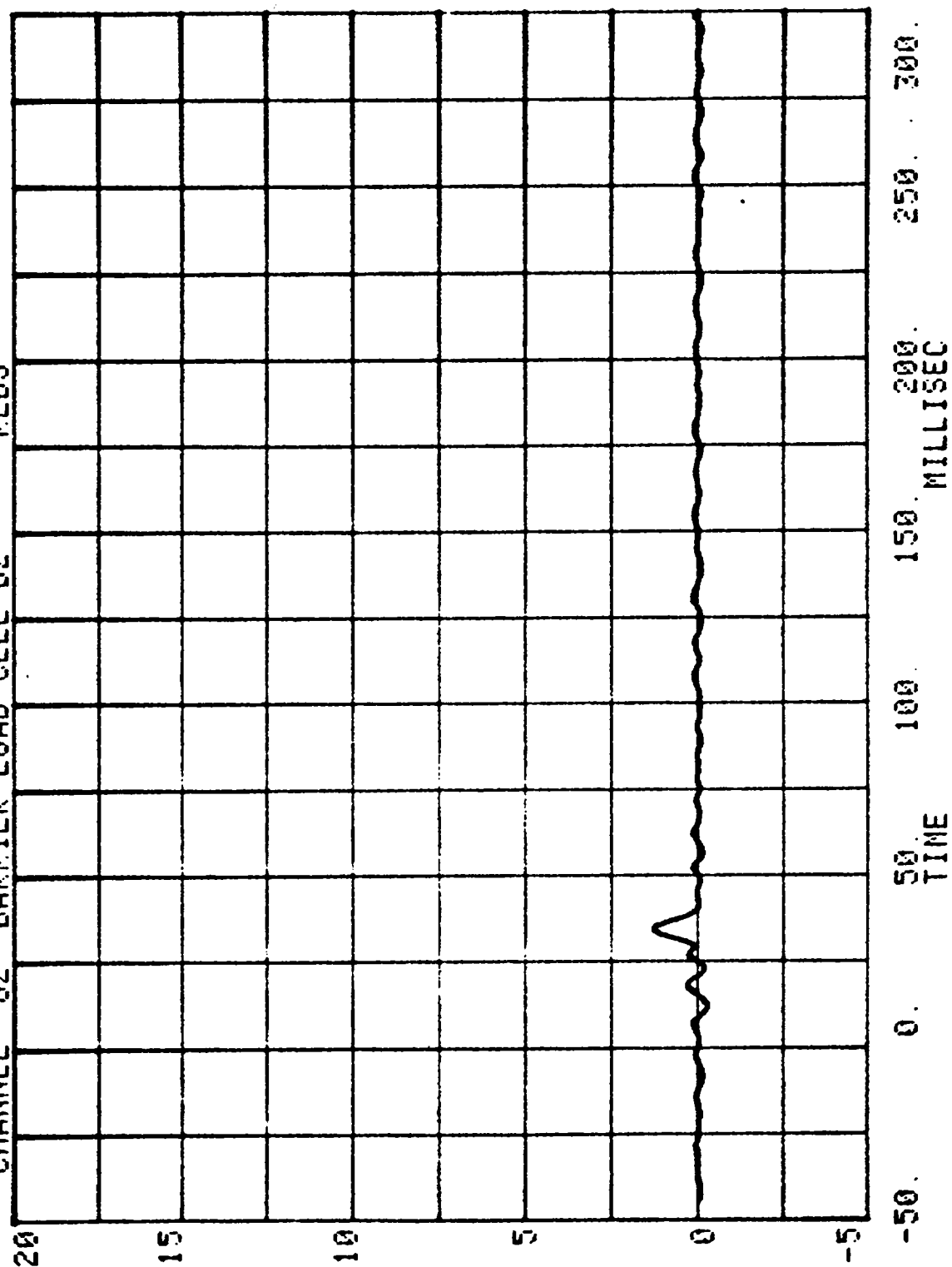


CHANNEL 61 BARRIER LOAD CELL D1 SERIES= 1 KLBS



CHANNEL 62 BARRIER LOAD CELL D2 1 KLBS

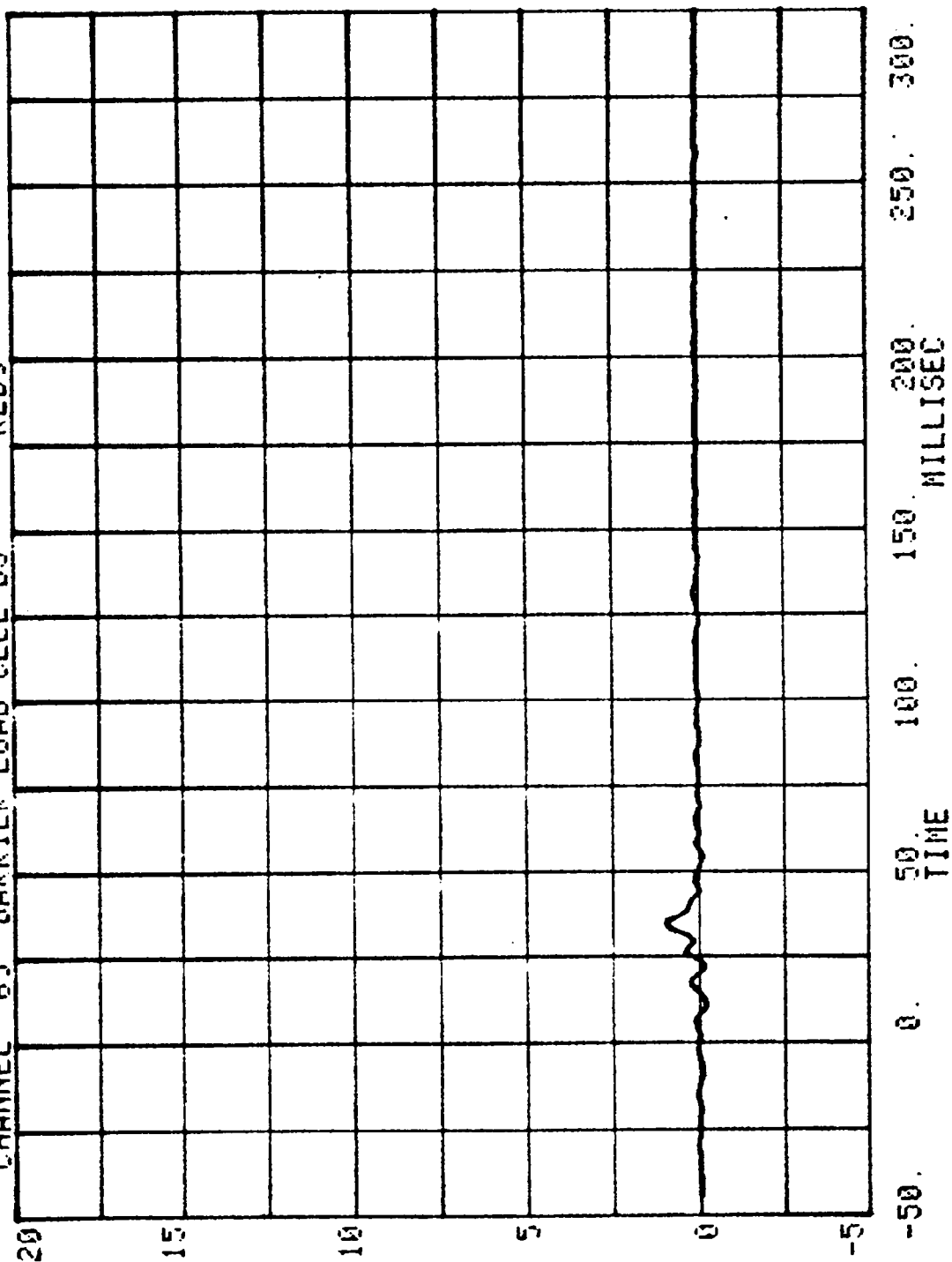
RUN= 909 SERIES=



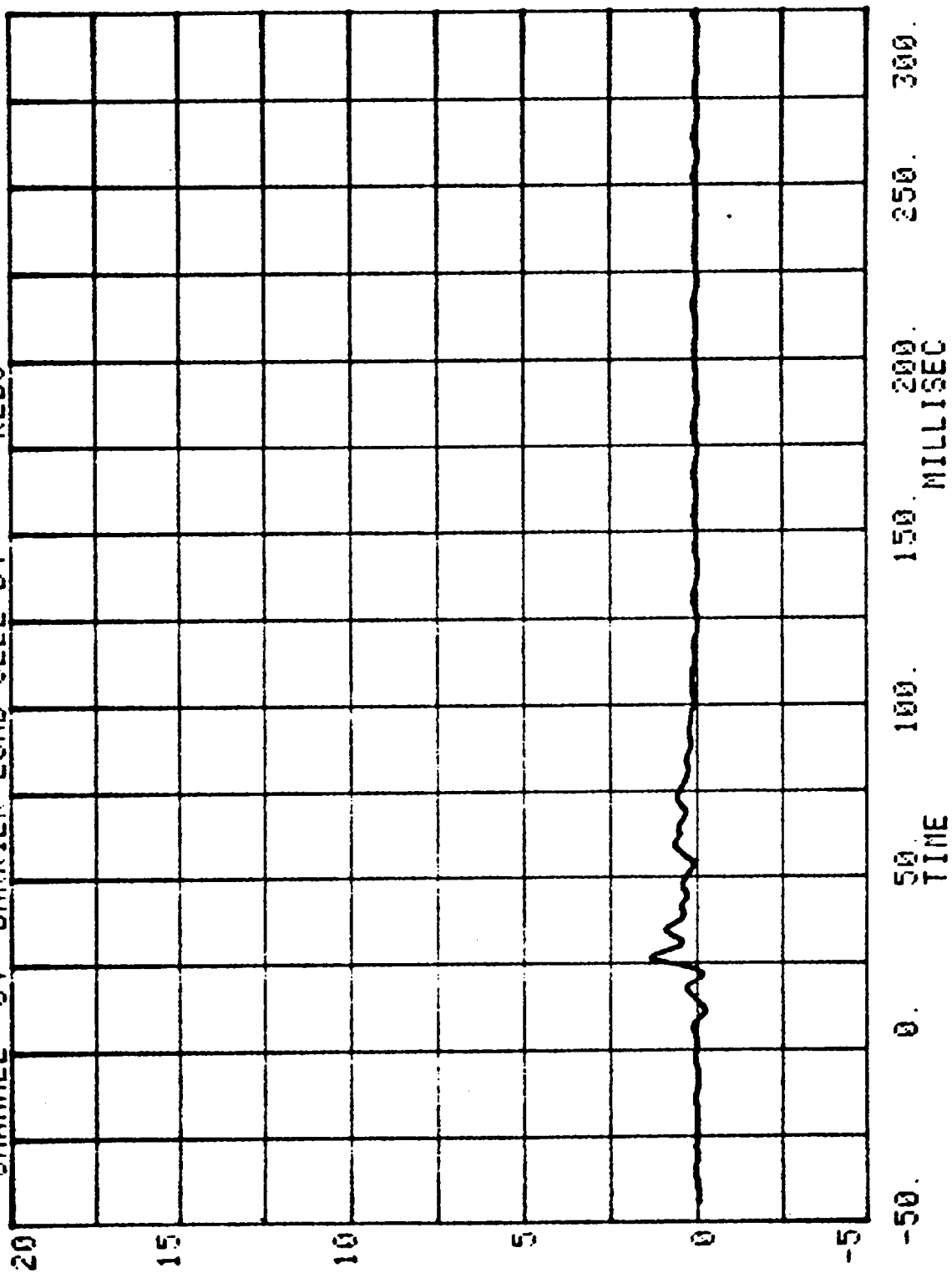
CHANNEL 63 BARRIER LOAD CELL D3

RUN= 909 SERIES= 1

KLBS



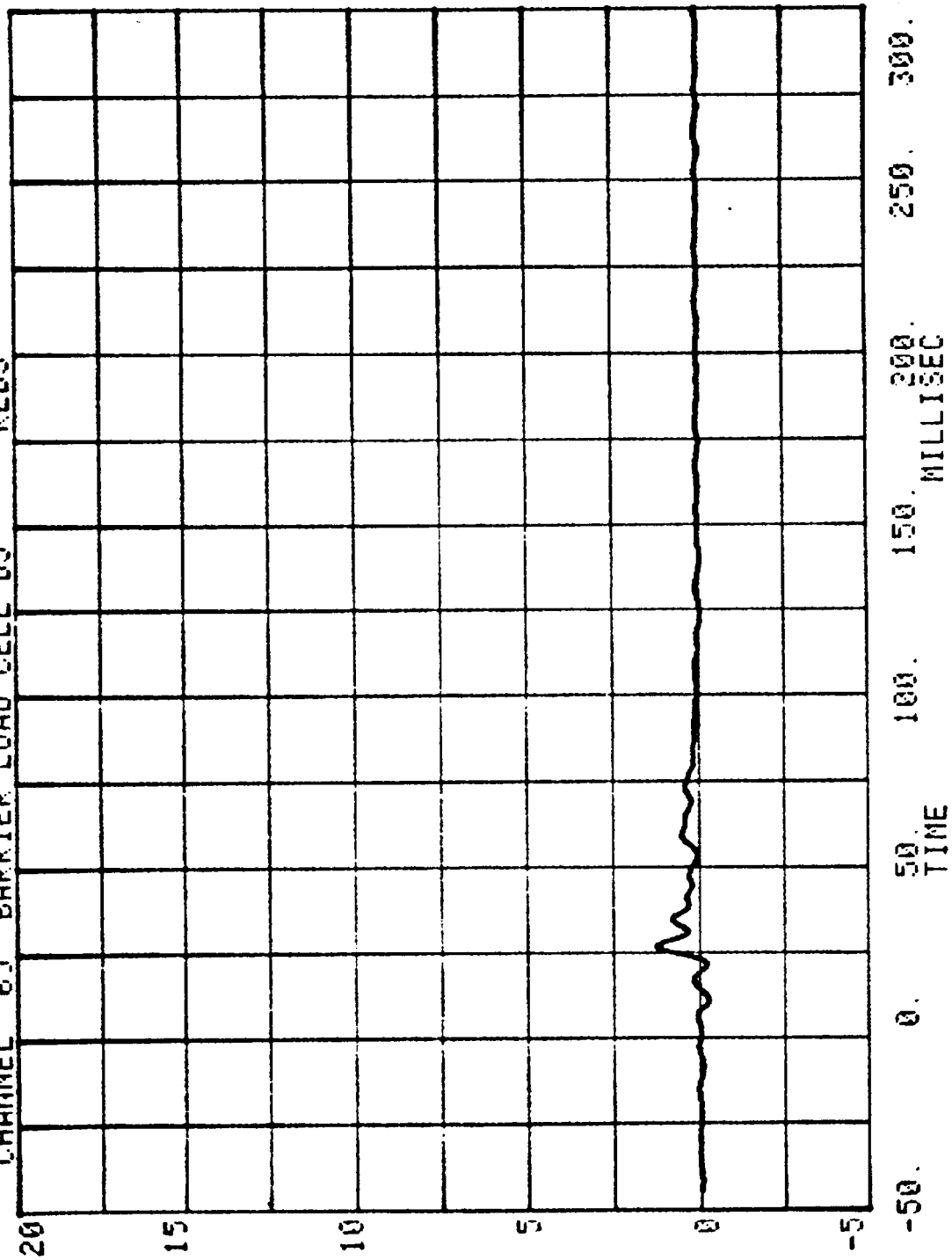
CHANNEL 64 BARRIER LOAD CELL 04 RUN= 909 SERIES= 1 KLBS



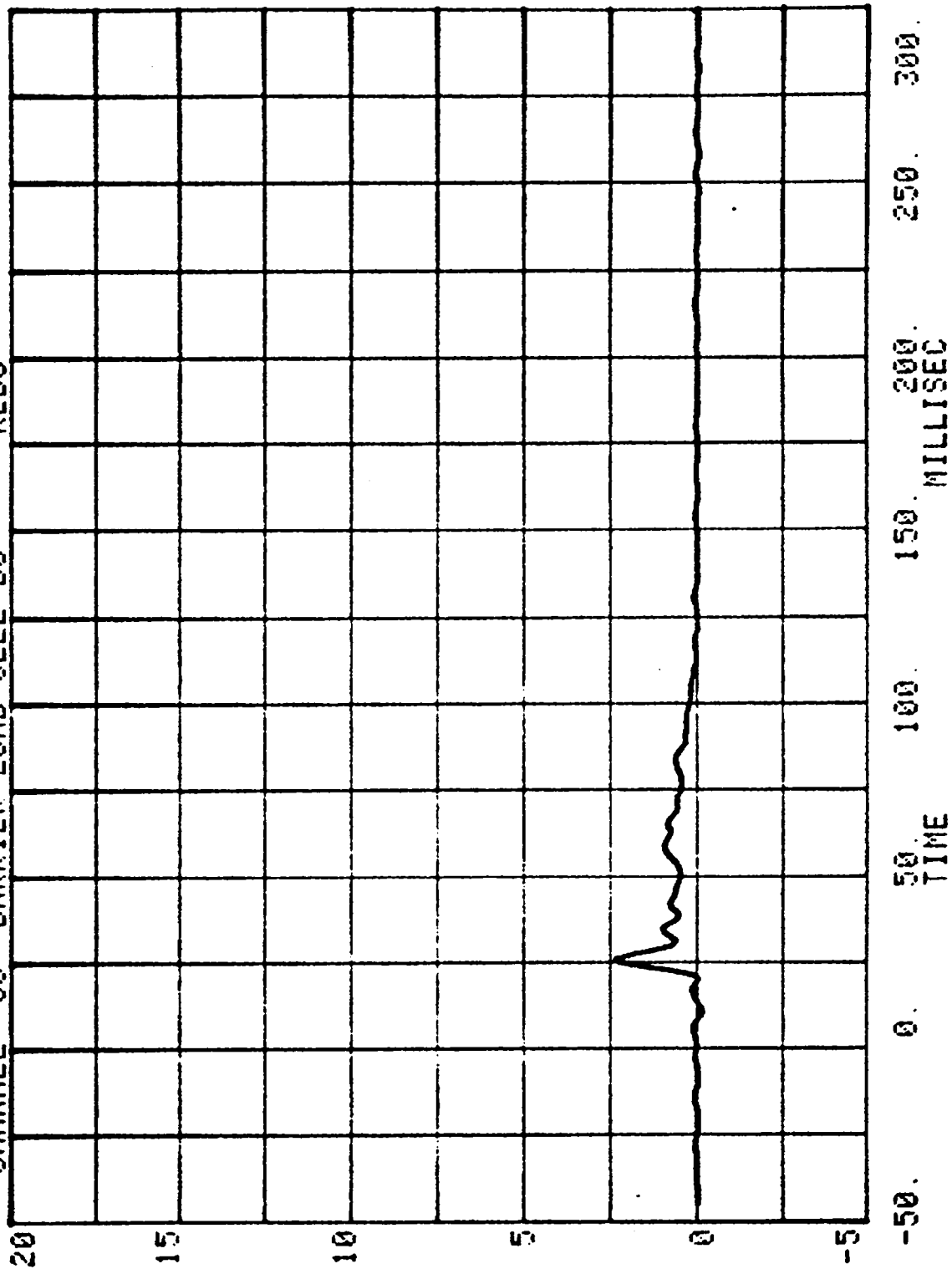
CHANNEL 65 BARRIER LOAD CELL 05

RUN= 909 SERIES= 1

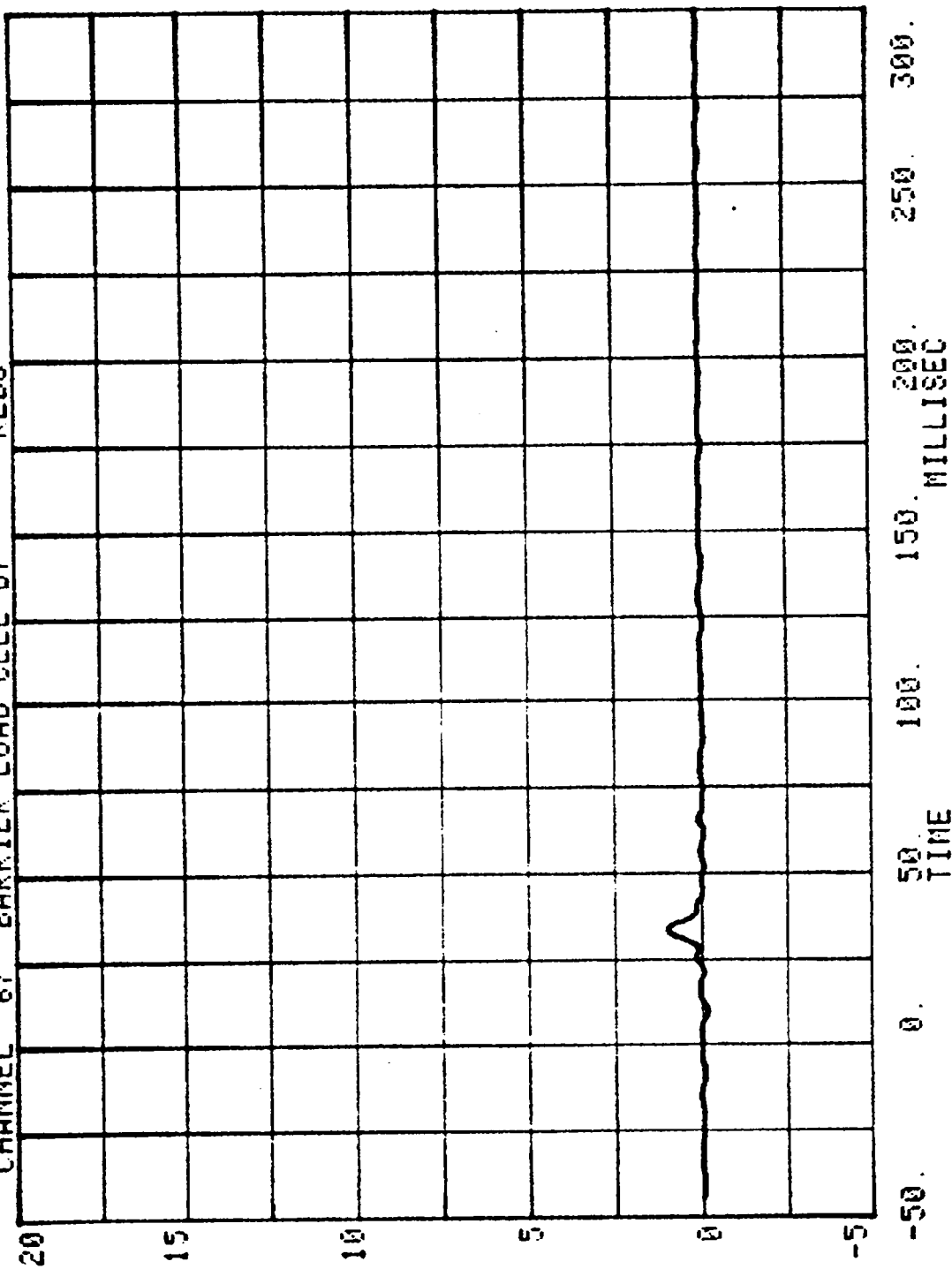
KLBS



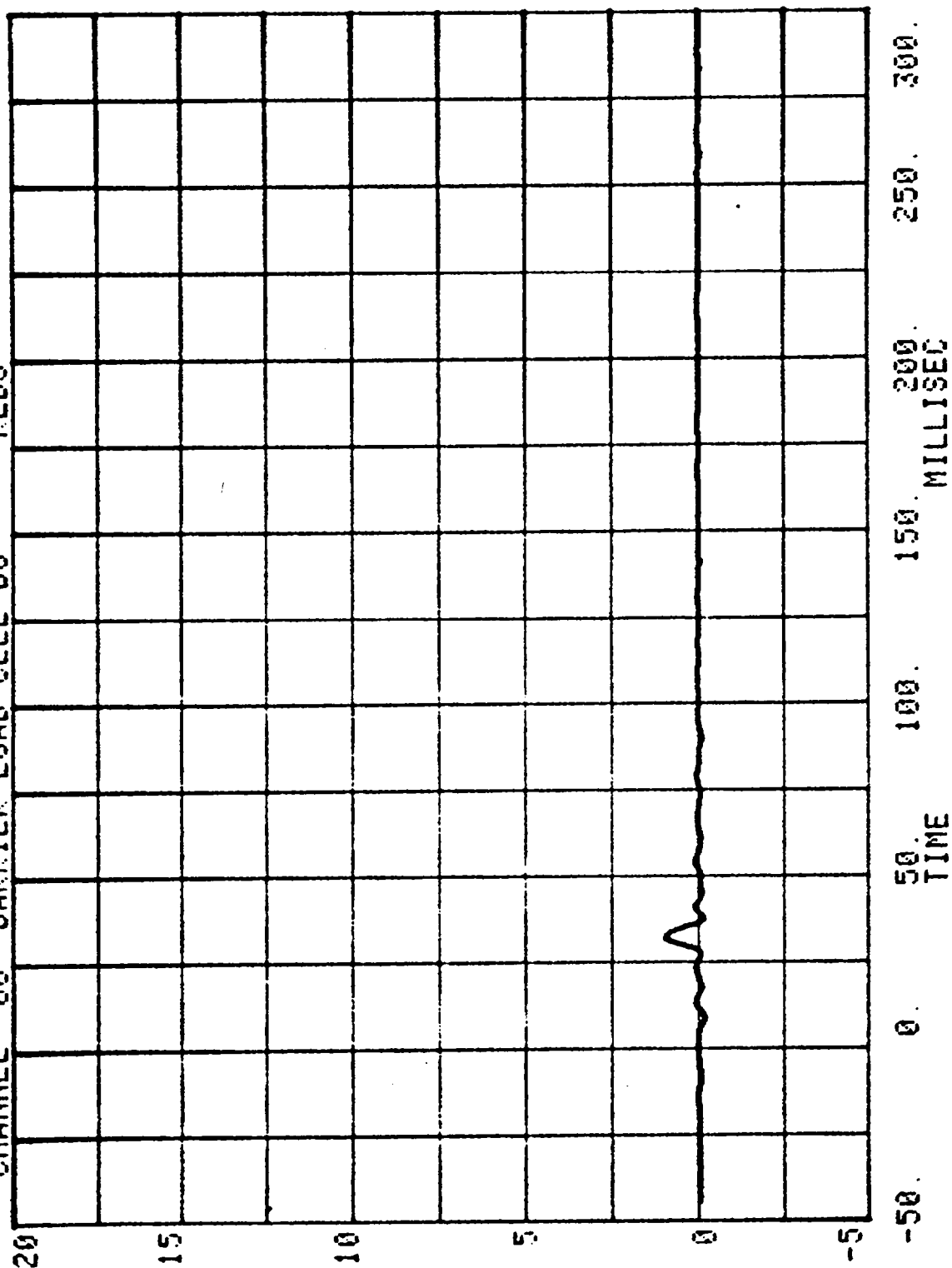
CHANNEL 66 BARRIER LOAD CELL D6
RUH= 909 SERIES= 1
KLBS



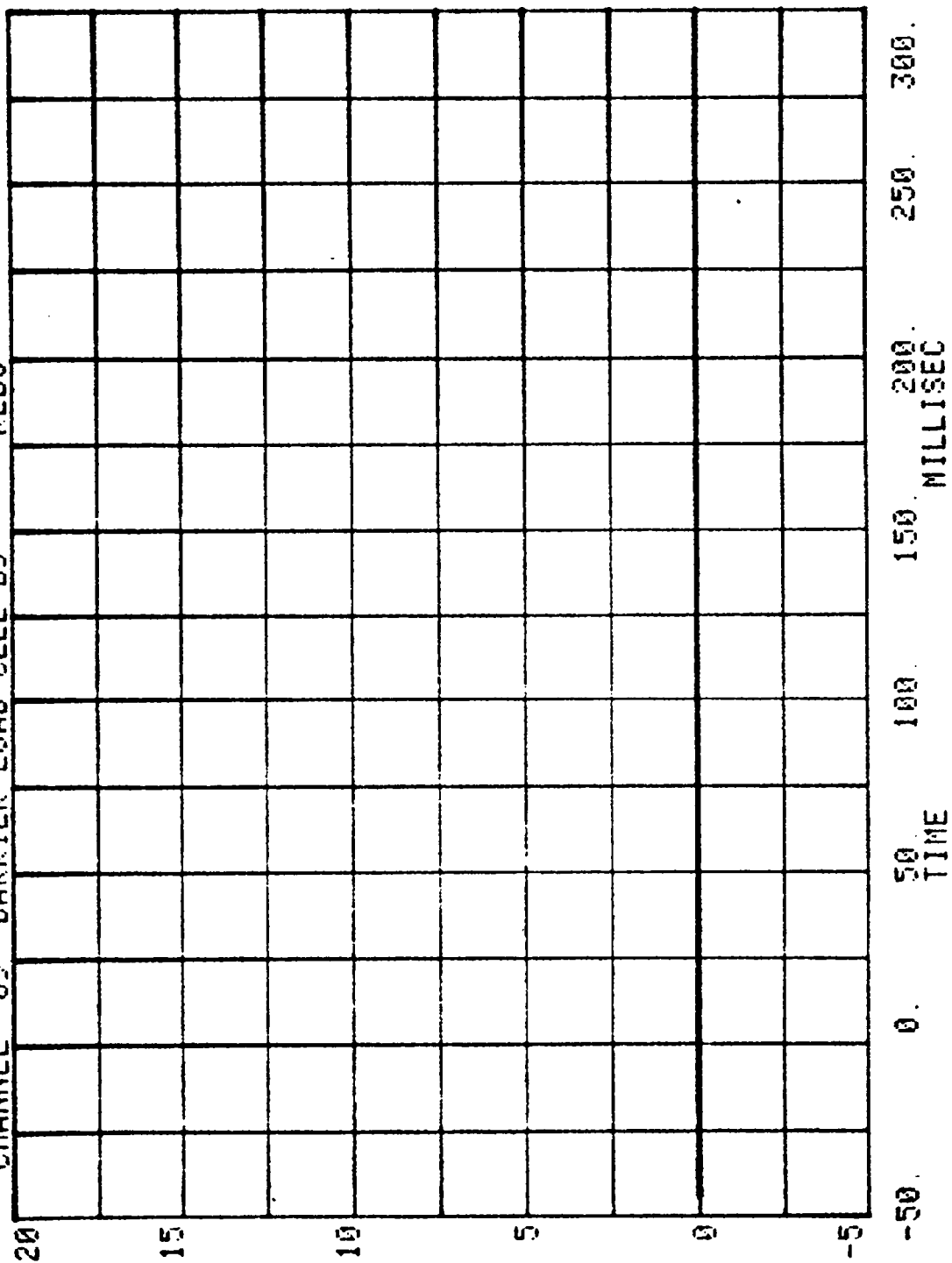
CHANNEL 67 BARRIER LOAD CELL D7 RUN= 909 SERIES= 1 KLBS



RUN= 909 SERIES= 1
CHANNEL 68 BARRIER LOAD CELL D8 KLBS



CHANNEL 69 RUN= 909 SERIES= 1 KLBS
BARRIER LOAD CELL D9



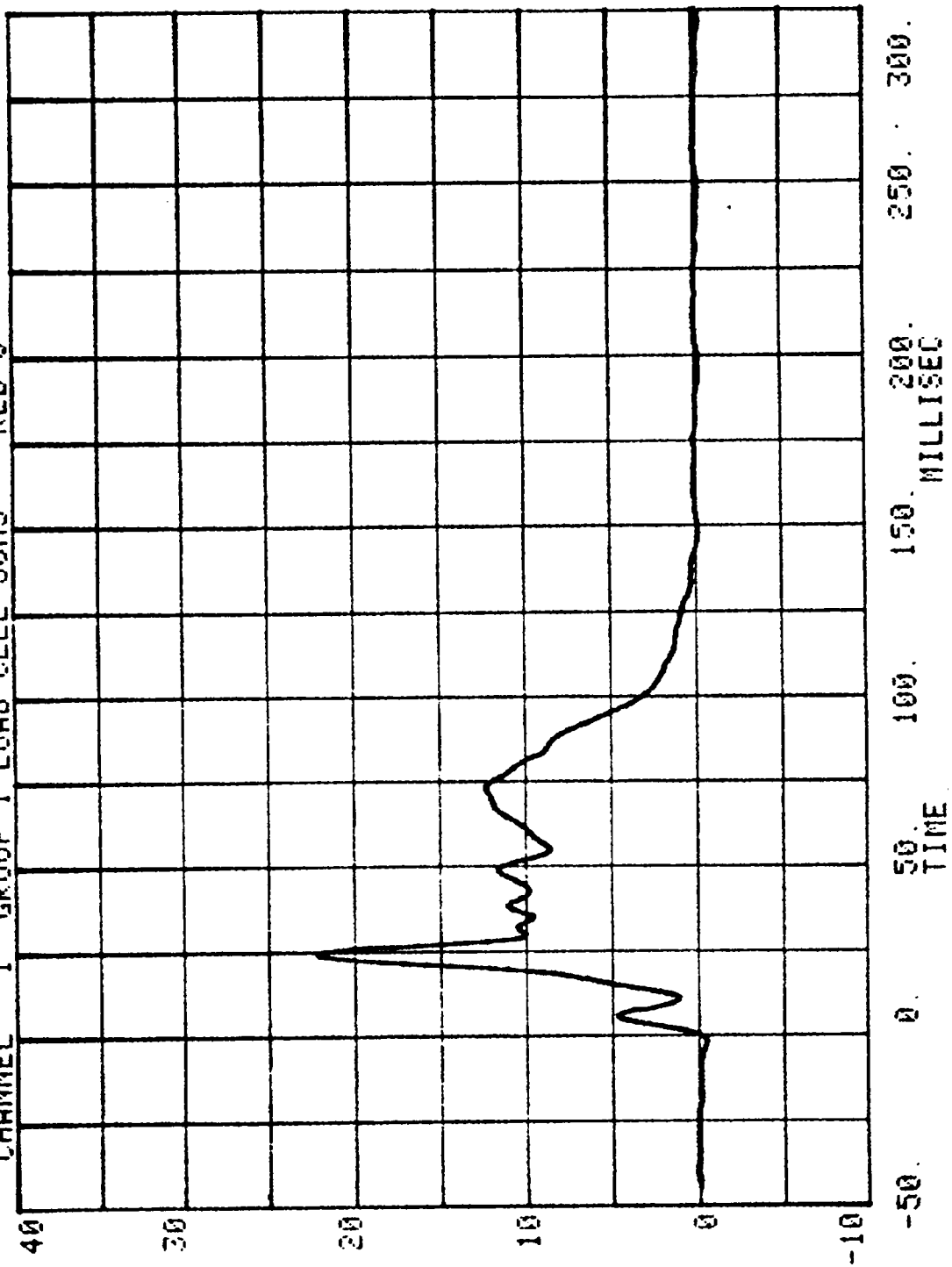
NEW CAR ASSESSMENT CRASH TEST - 1989

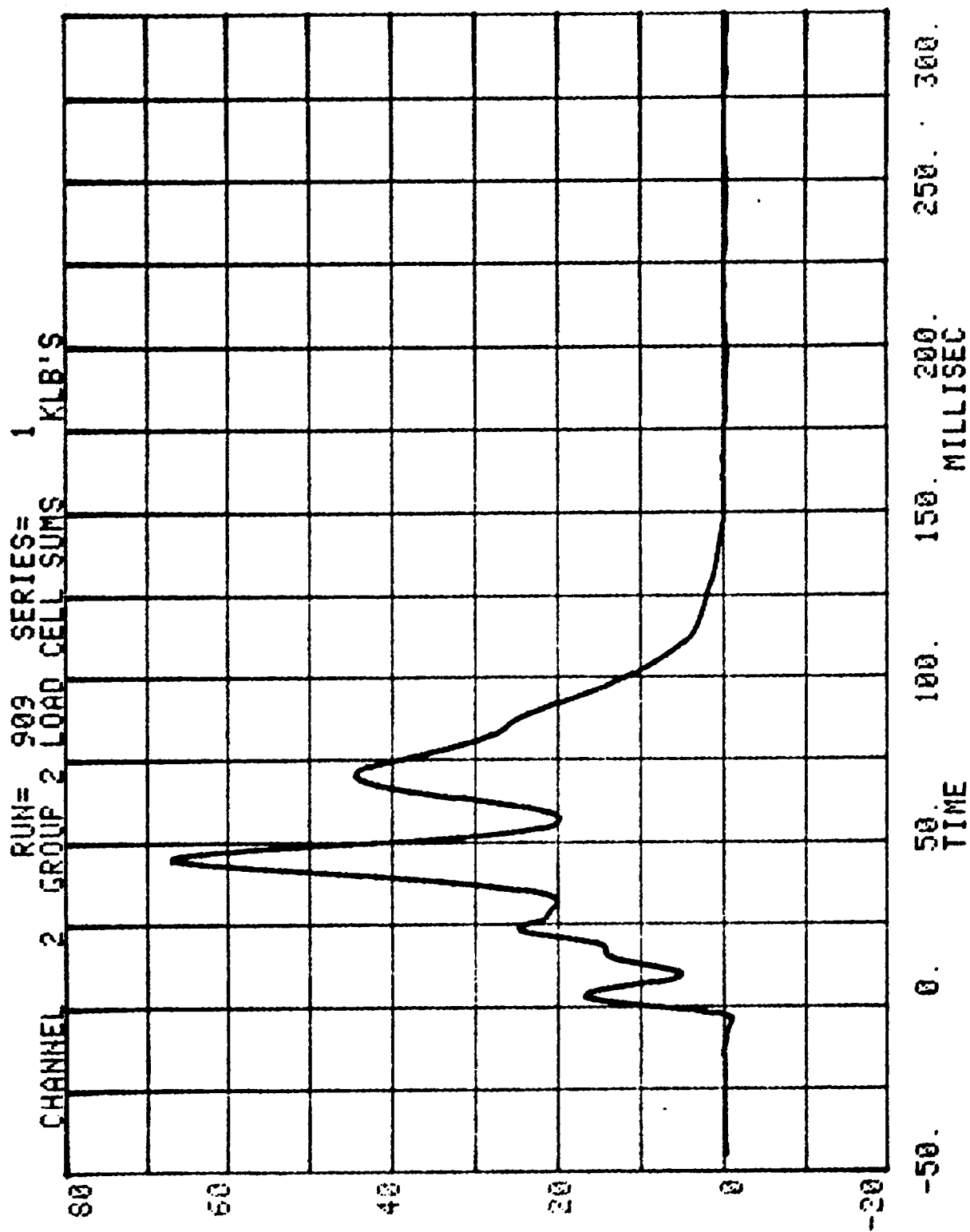
RUN # 909

SERIES # 1

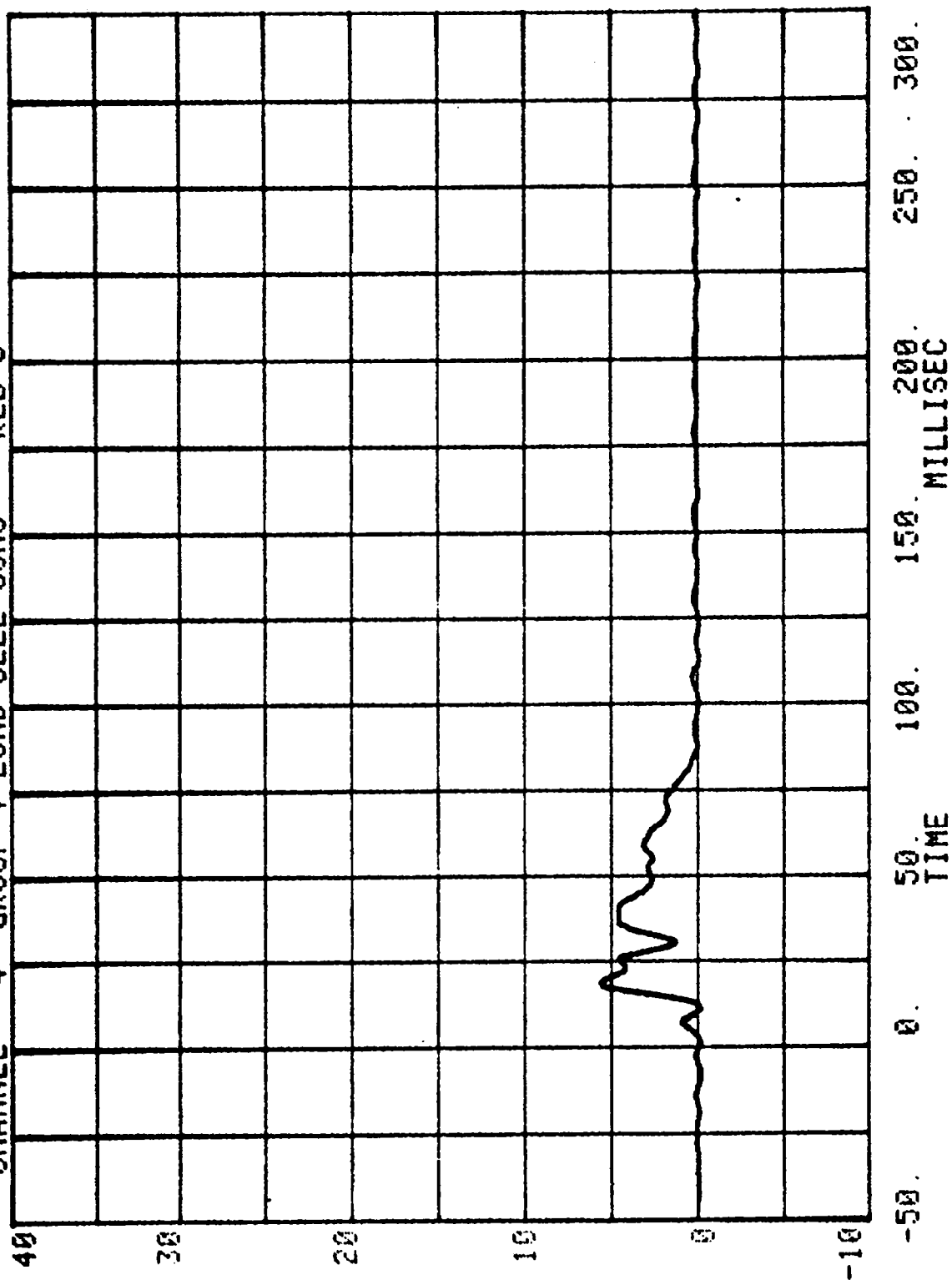
CHAN	TITLE	MINIMUM/MAXIMUM	AT	TIME
1	GROUP 1 LOAD CELL SUMS	-425 KLB'S 22.204 KLB'S		-1.73 MS. 24.22 MS.
2	GROUP 2 LOAD CELL SUMS	-563 KLB'S 67.503 KLB'S		-4.12 MS. 45.52 MS.
3	GROUP 3 LOAD CELL SUMS	-234 KLB'S 13.717 KLB'S		194.33 MS. 23.40 MS.
4	GROUP 4 LOAD CELL SUMS	-192 KLB'S 5.559 KLB'S		-7.95 MS. 18.45 MS.
5	GROUP 5 LOAD CELL SUMS	-149 KLB'S 29.348 KLB'S		-8.18 MS. 45.75 MS.
6	GROUP 6 LOAD CELL SUMS	-338 KLB'S 7.440 KLB'S		-8.18 MS. 23.25 MS.
7	TOTAL LOAD CELL SUMS	-883 KLB'S 123.776 KLB'S		-7.58 MS. 45.52 MS.

CHANNEL 1 GROUP 1 LOAD CELL SUMS SERIES= 1 KLB'S

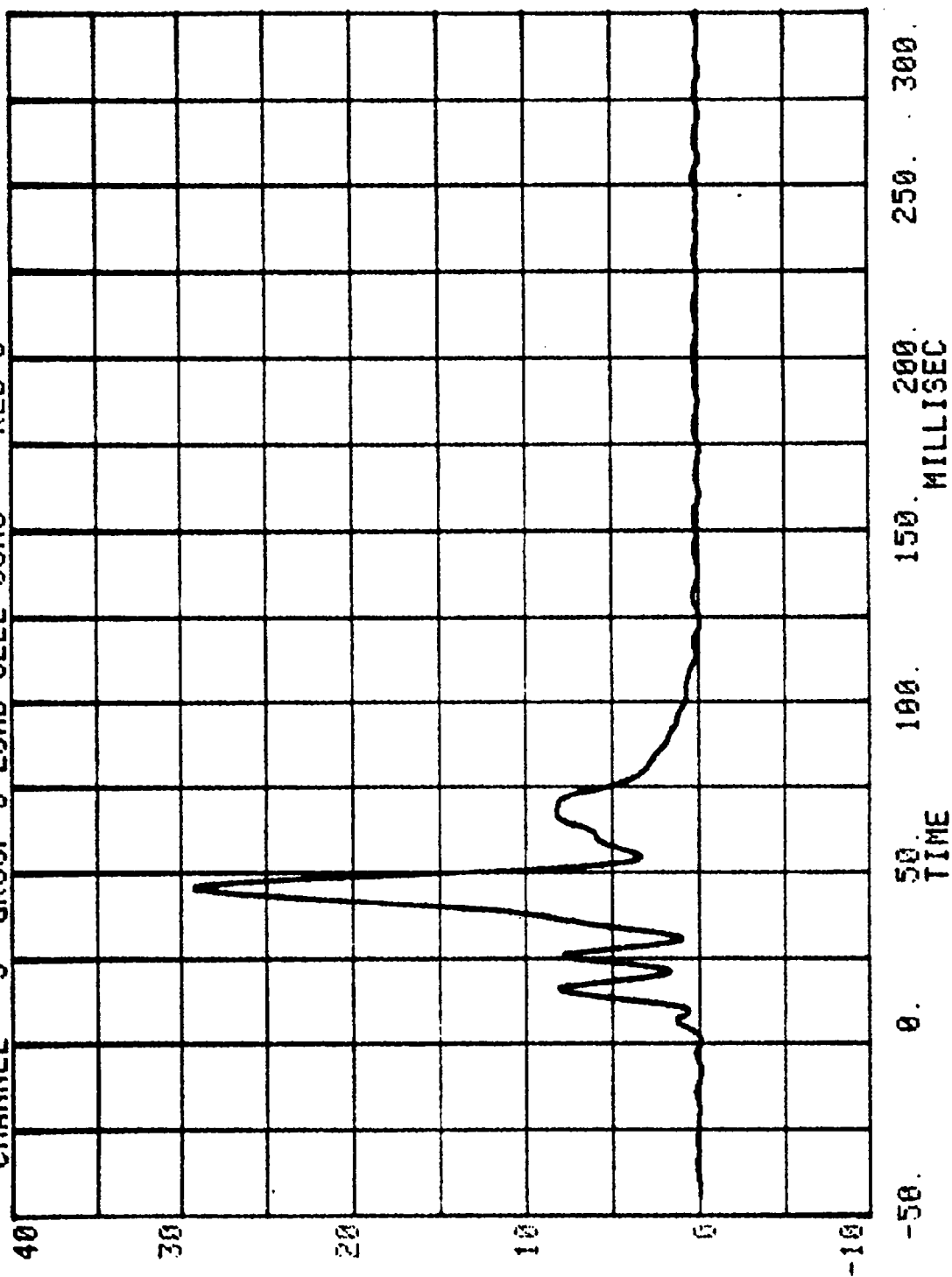




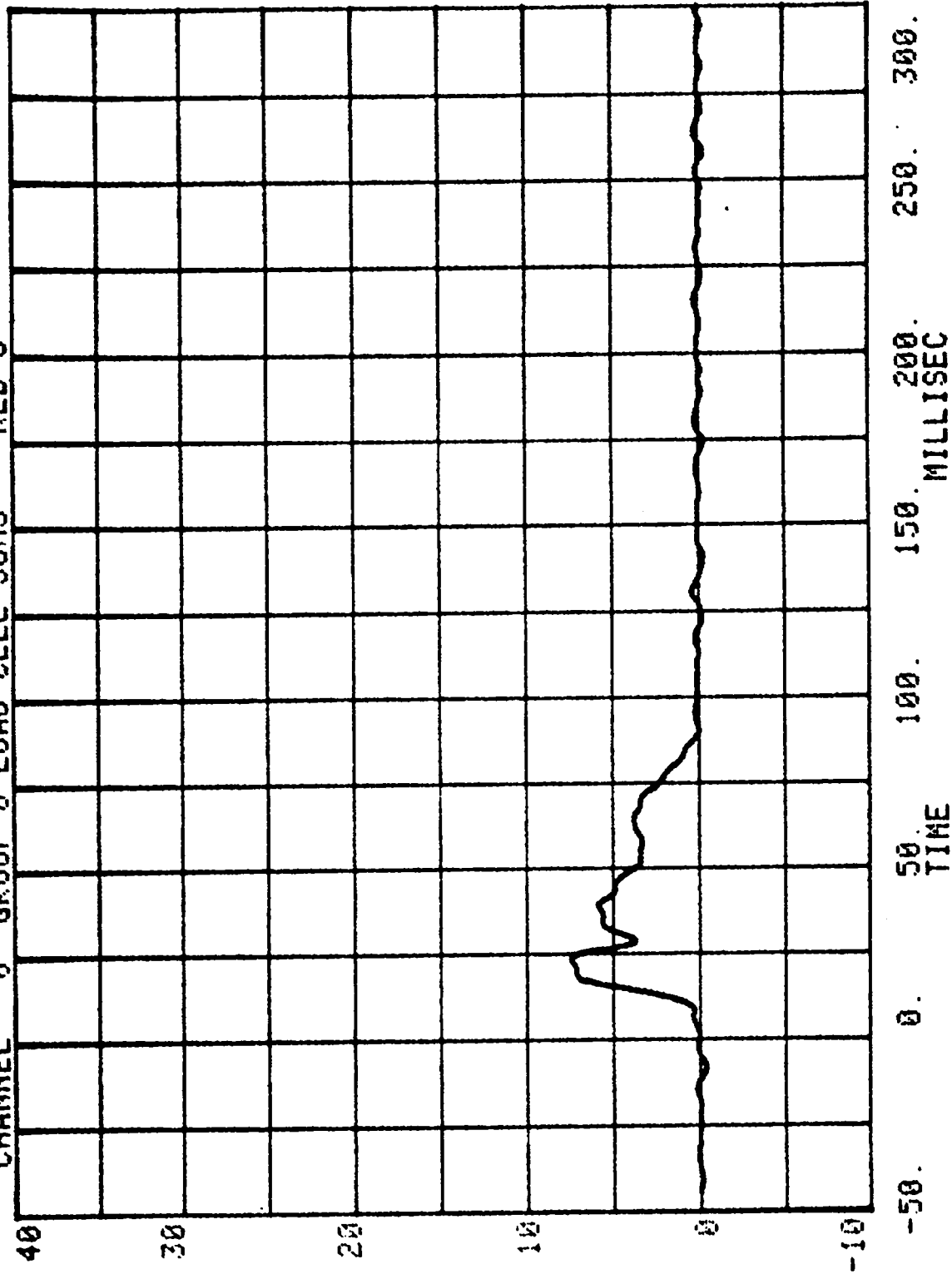
RUN= 989 SERIES= 1
CHANNEL 4 GROUP 4 LOAD CELL SUMS KLB'S

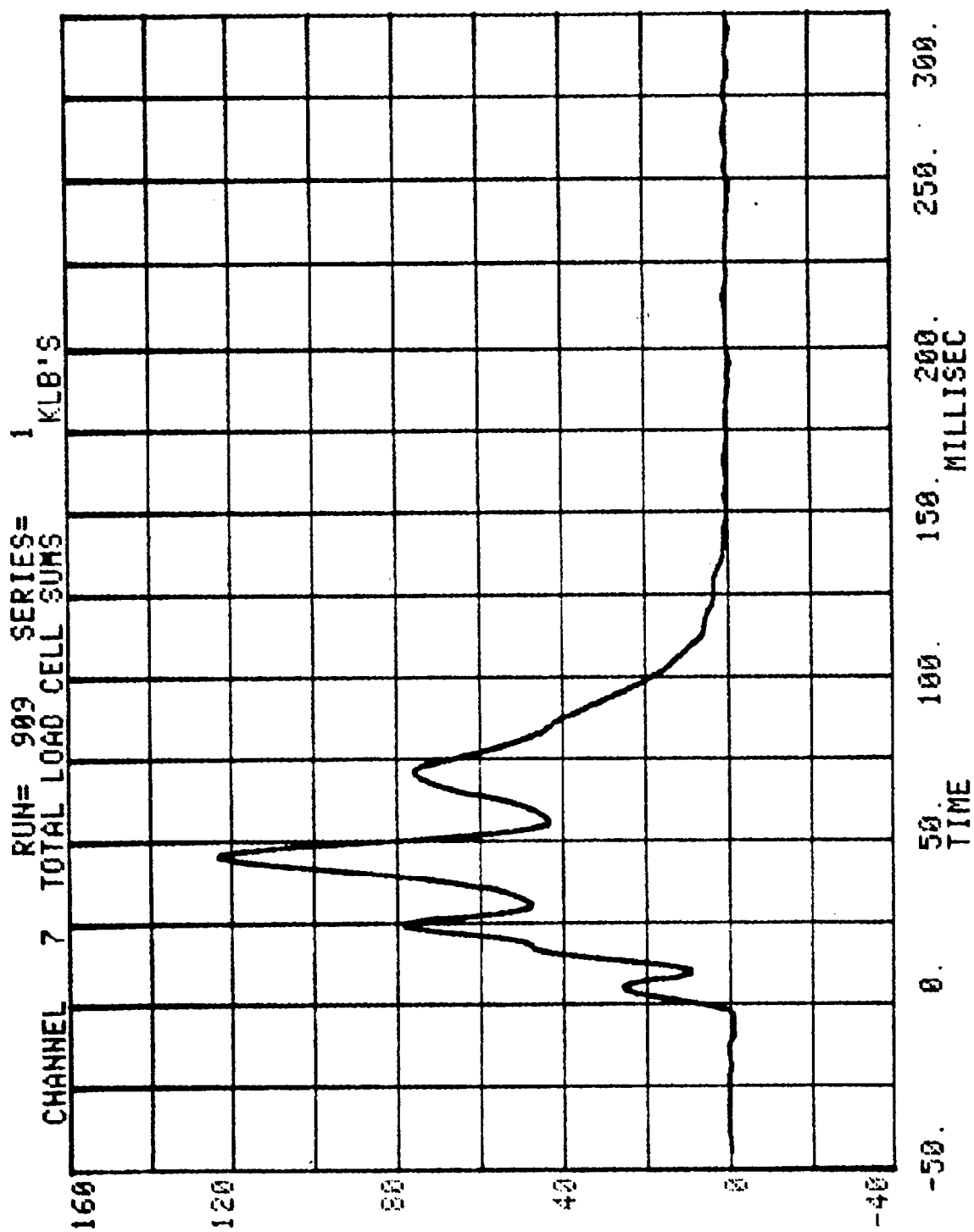


RUN= 999 SERIES= 1
CHANNEL 5 GROUP 5 LOAD CELL SUMS KLB'S



RUN= 909 SERIES= 1
CHANNEL 6 GROUP 6 LOAD CELL SUMS KLB'S





TEST NO. MK5200

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 CAR ASSESSMENT CRASH TEST - 1989

RUN= 909

POS #1 HEAD R

HIC= 406.9 FROM T1= .07755 TO T2= .11355

AVERAGE ACCELERATION BETWEEN T1 AND T2= 41.8G'S

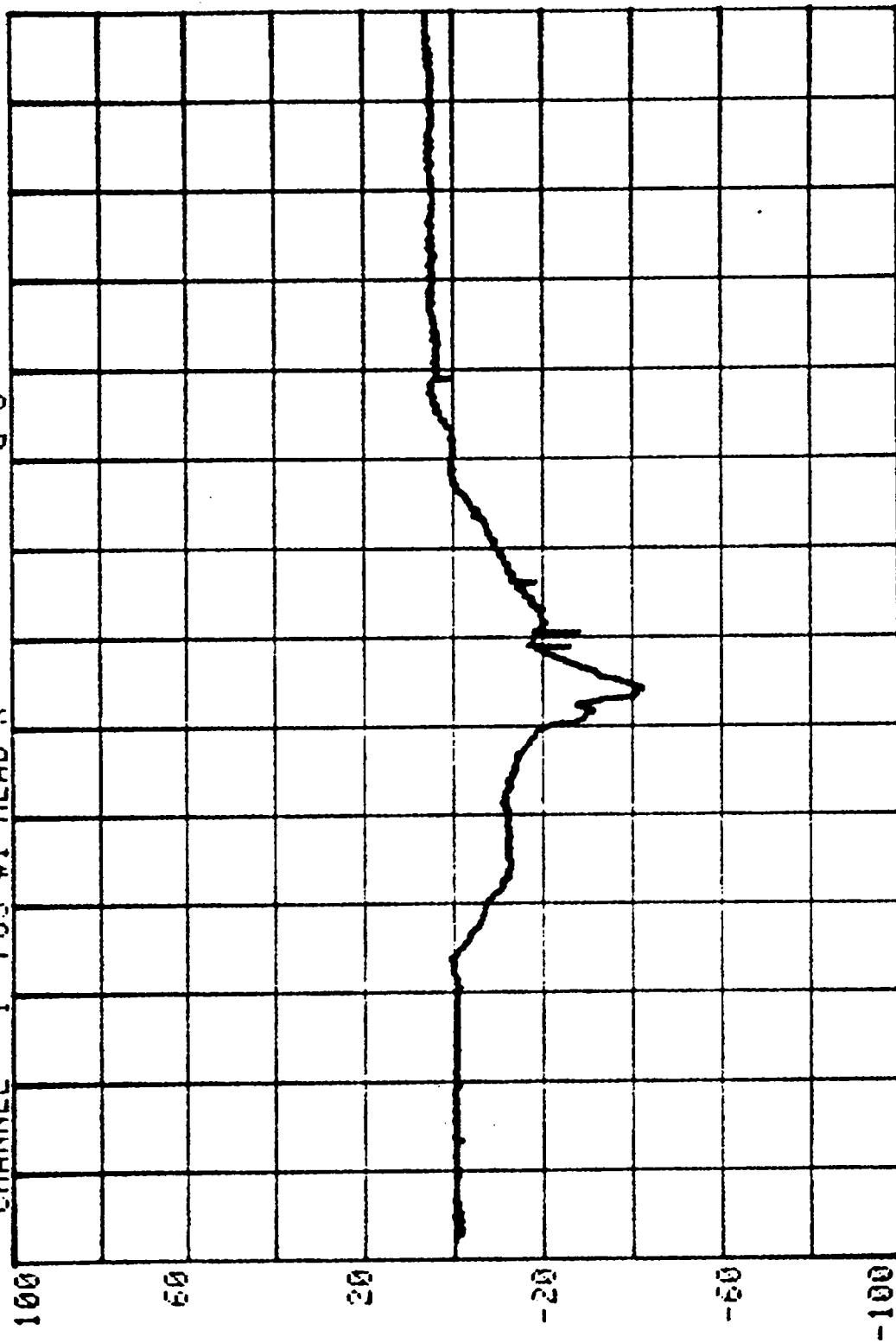
EVENT TIME= 300.0 MSEC

SEVERITY INDEX= 711.0

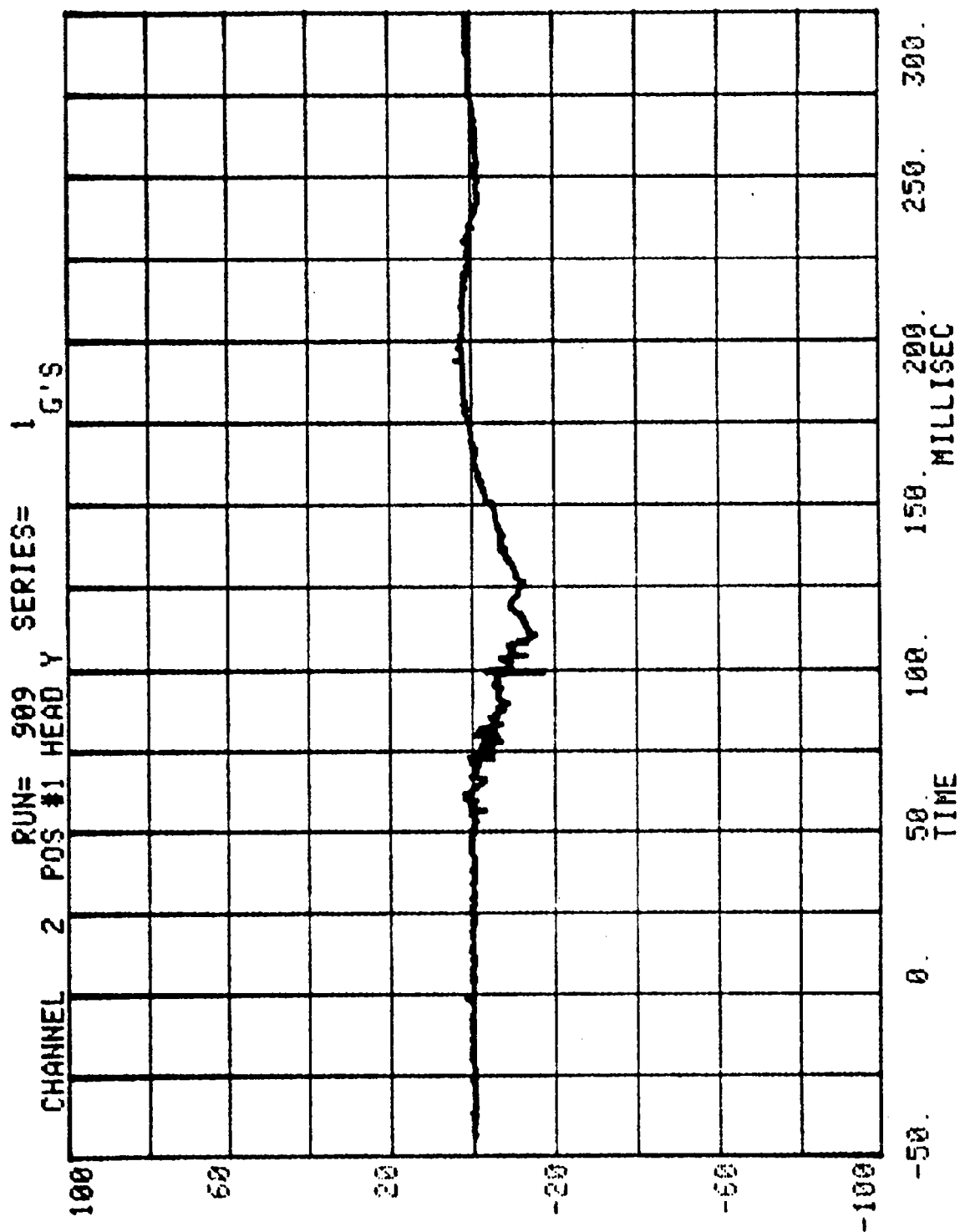
CHANNEL 1 POS #1 HEAD X

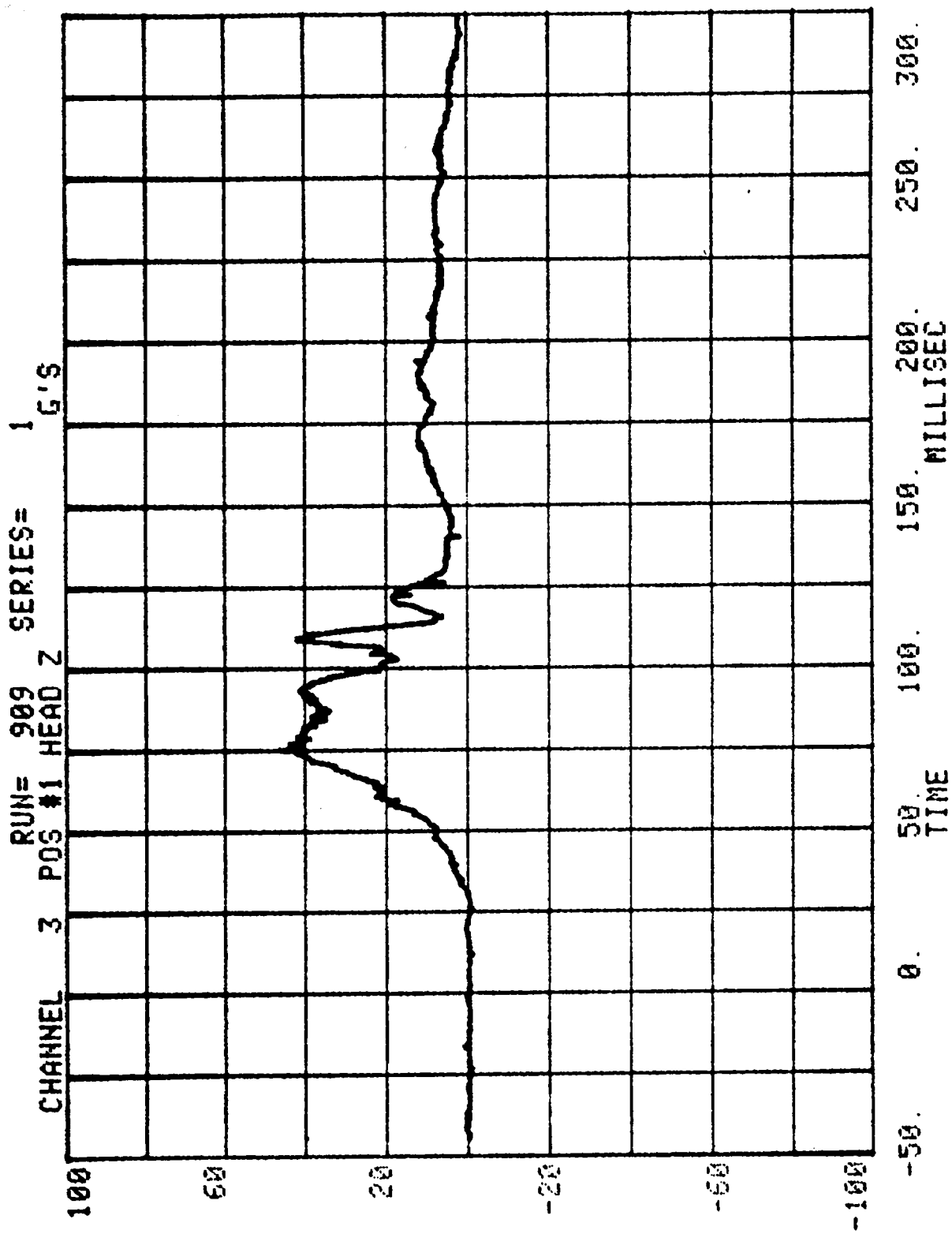
RUN= 309 SERIES= 1

G'S

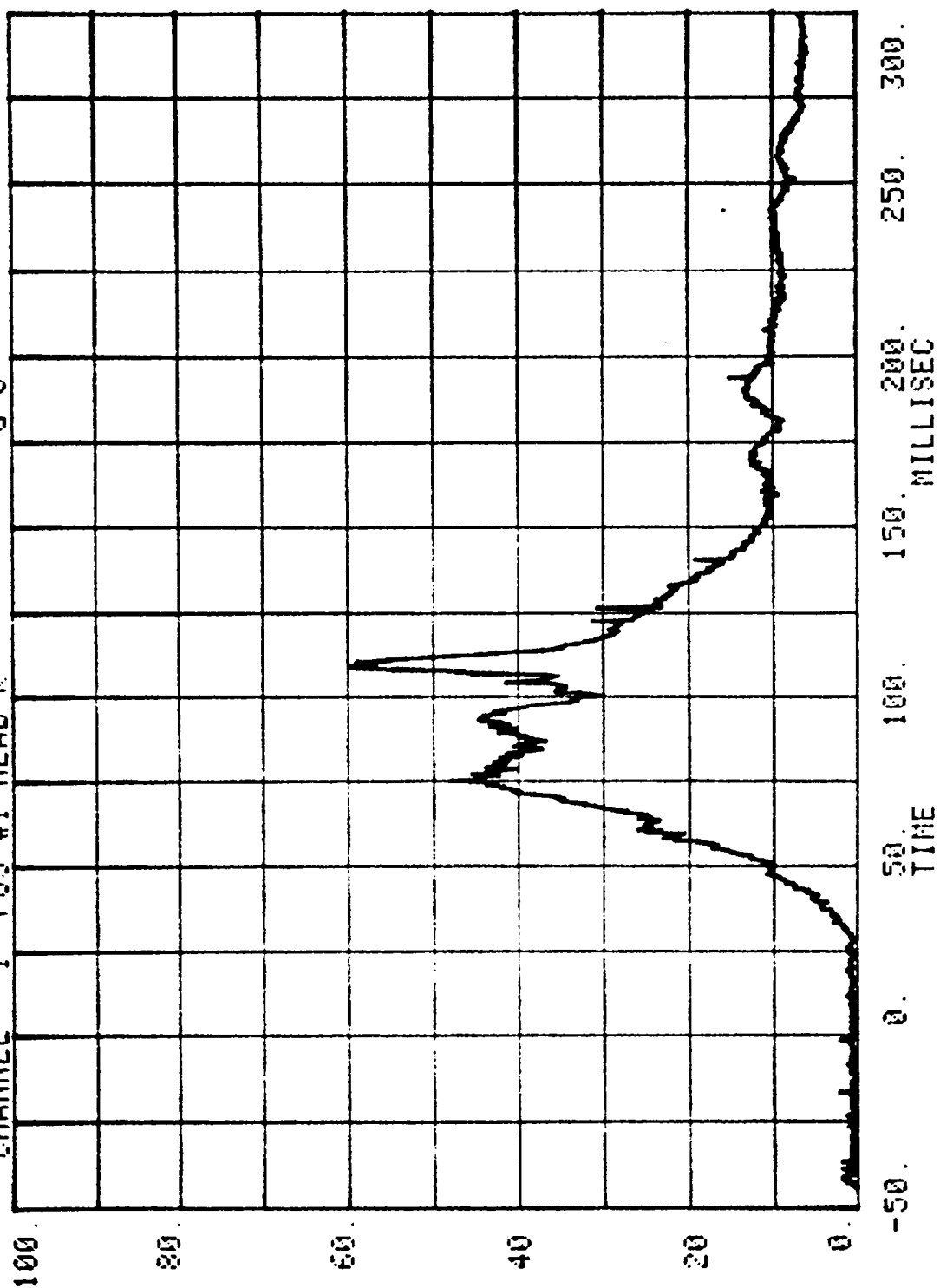


TIME
-50. 0. 50. 100. 150. 200. 250. 300.

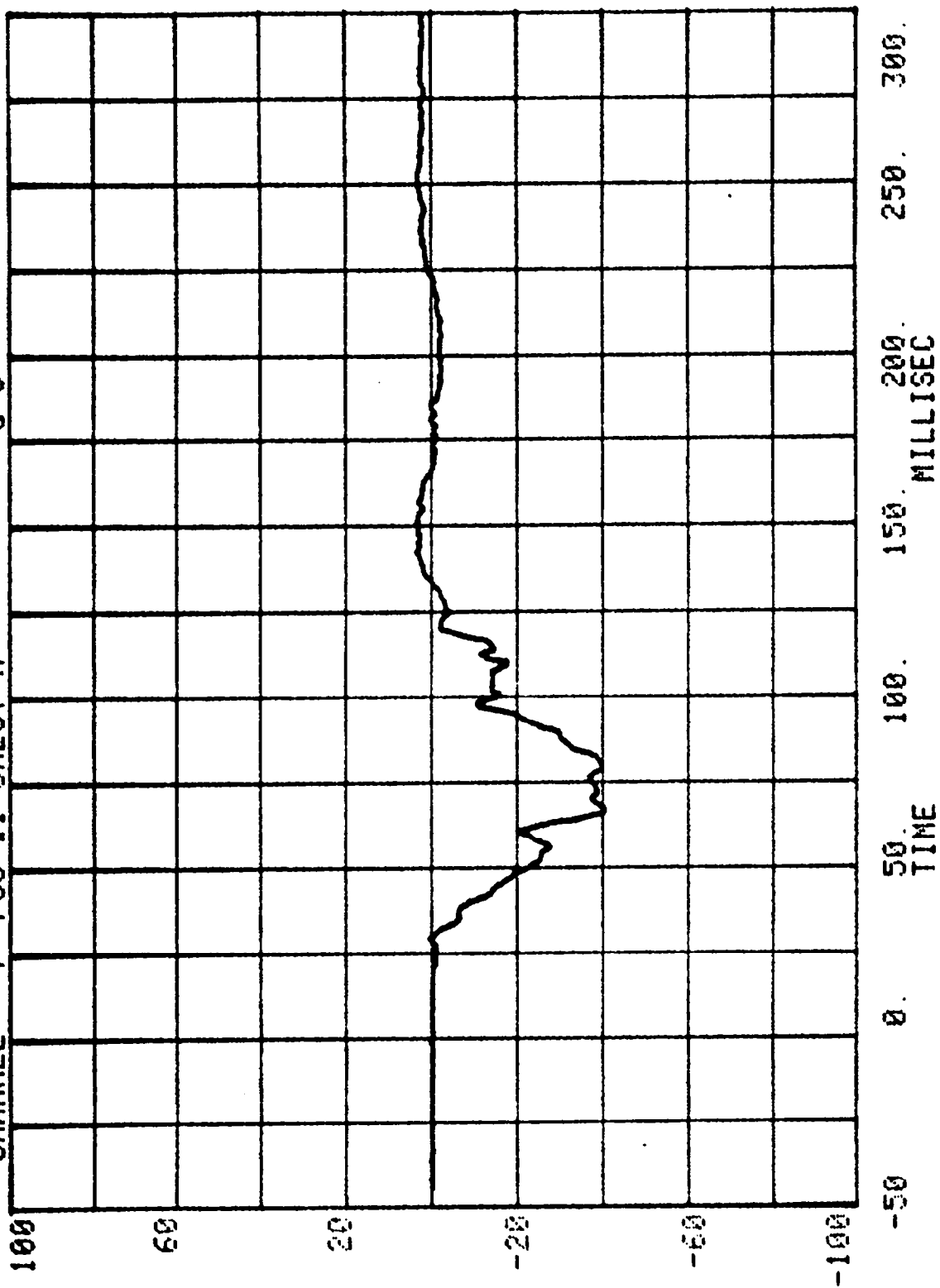


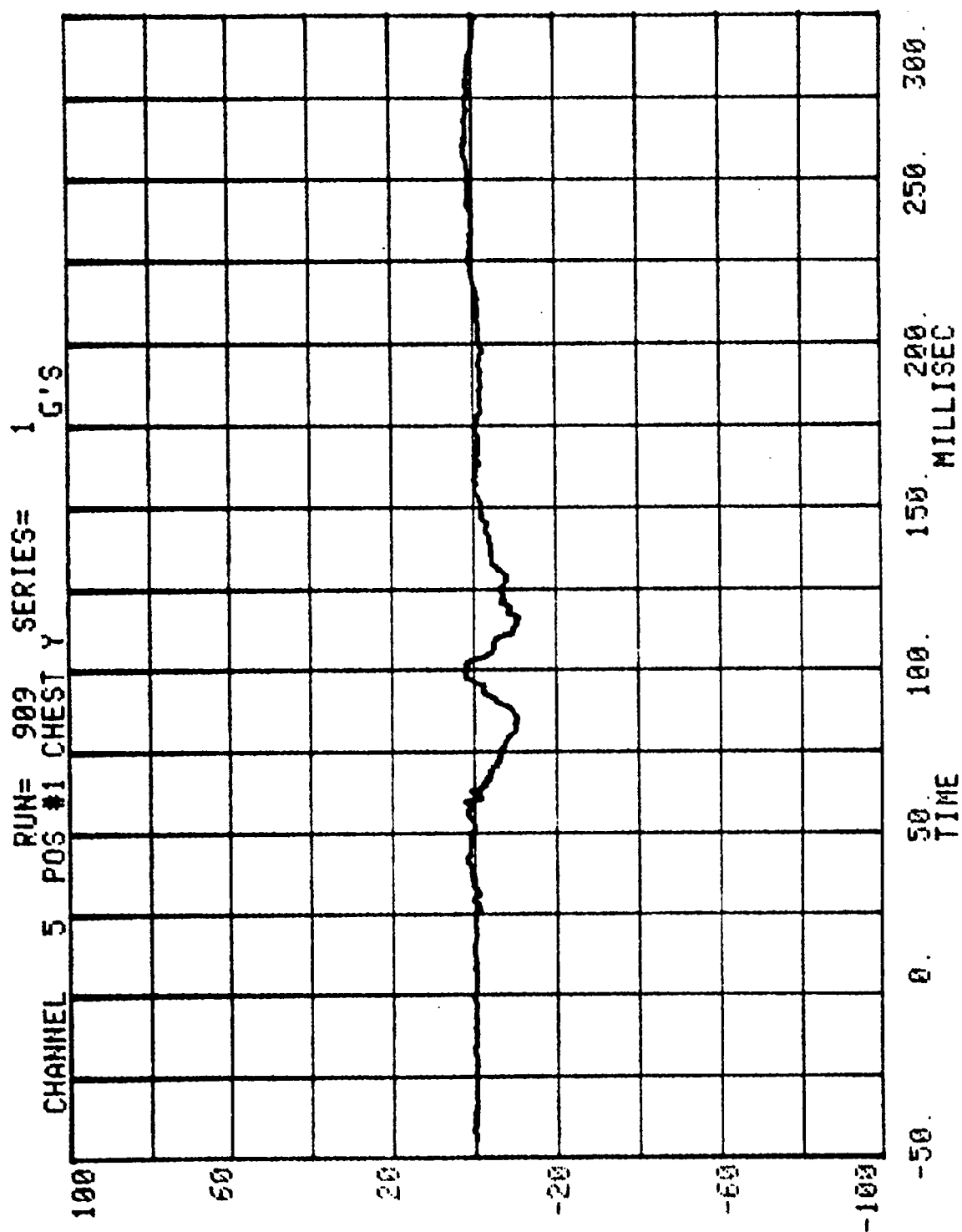


CHANNEL 1 POS #1 HEAD R RUN= 909 SERIES= 1 G'S

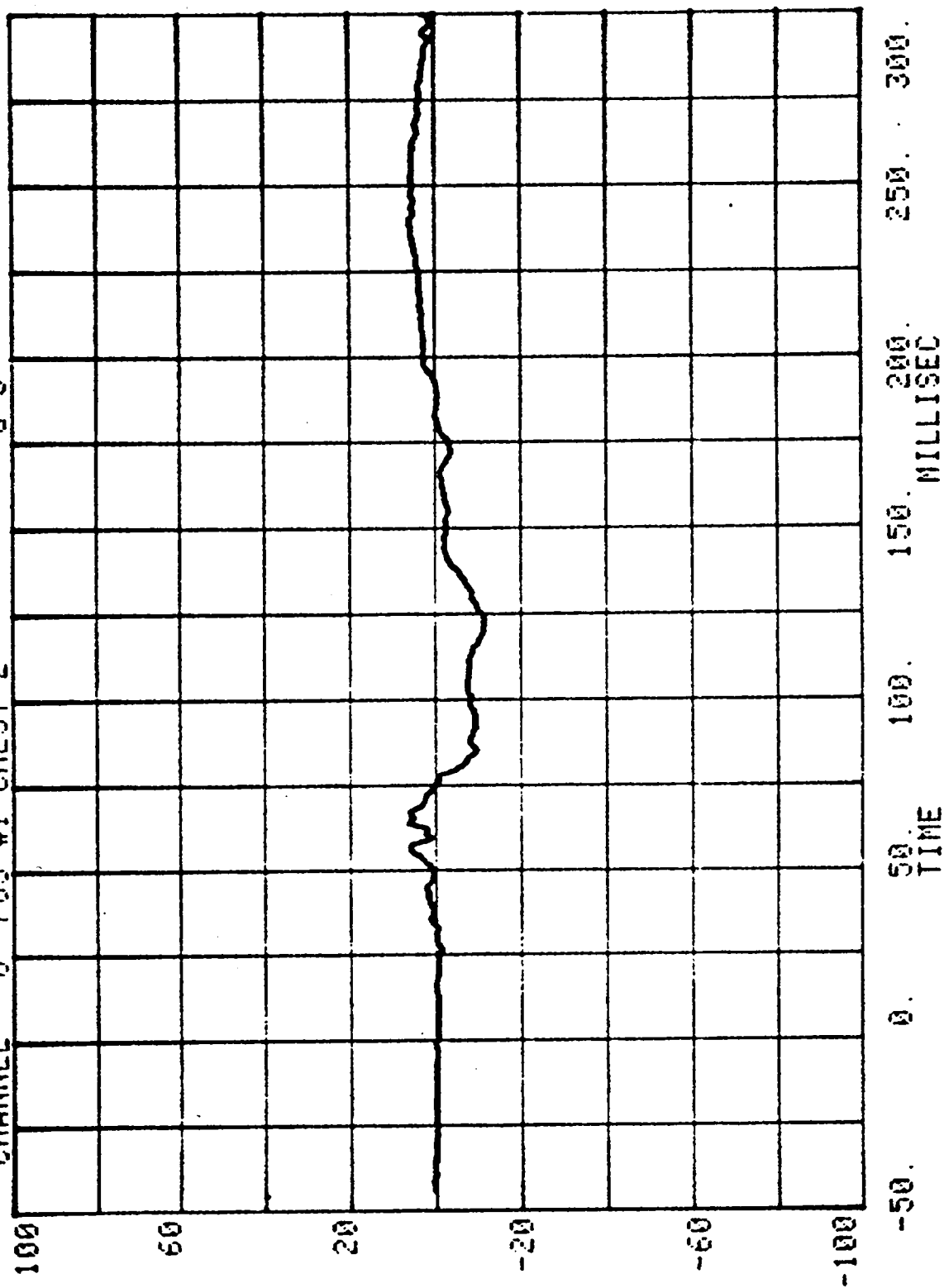


CHANNEL 4 POS #1 CHEST X
RUN= 909 SERIES= 1 G'S

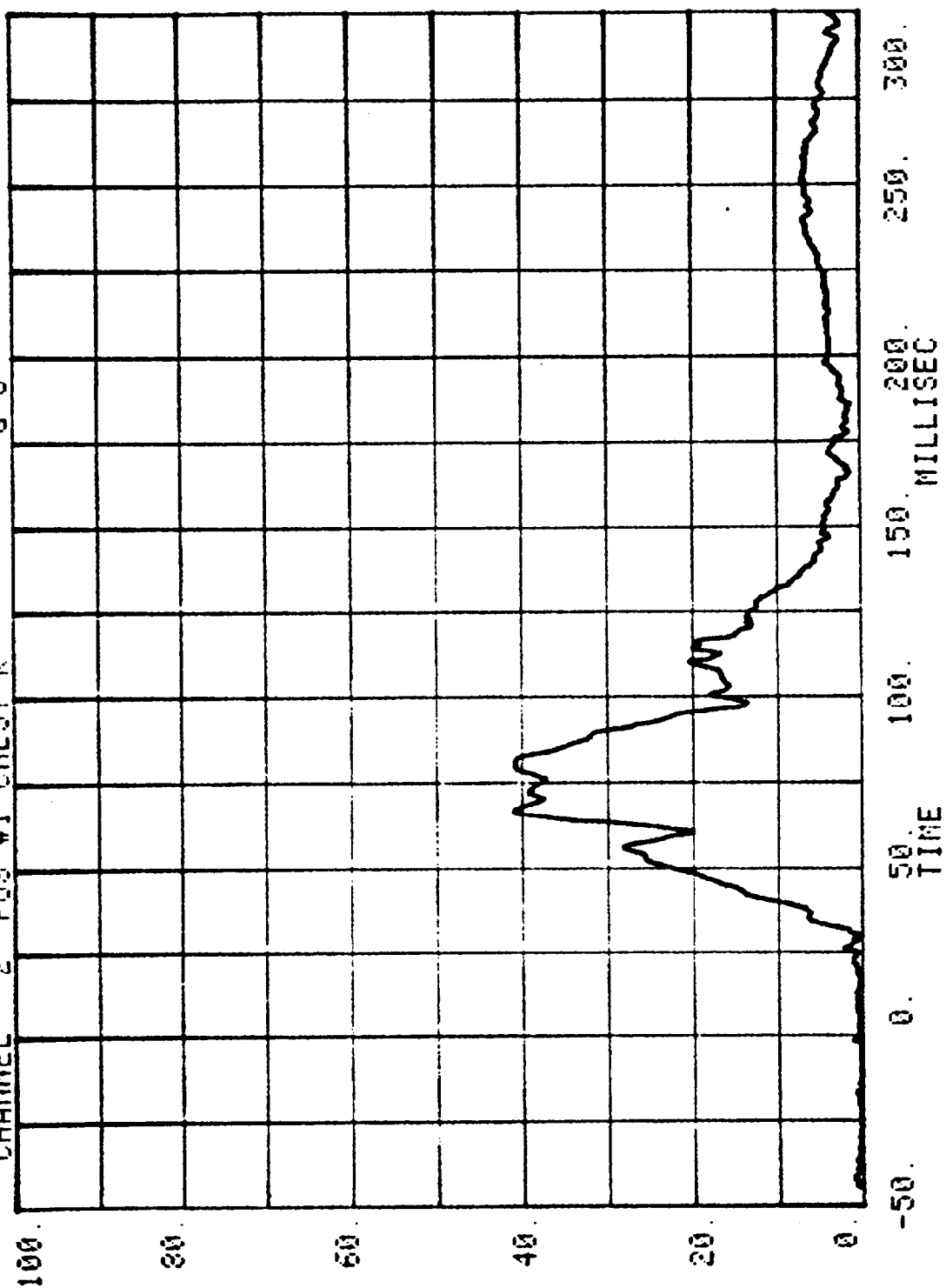




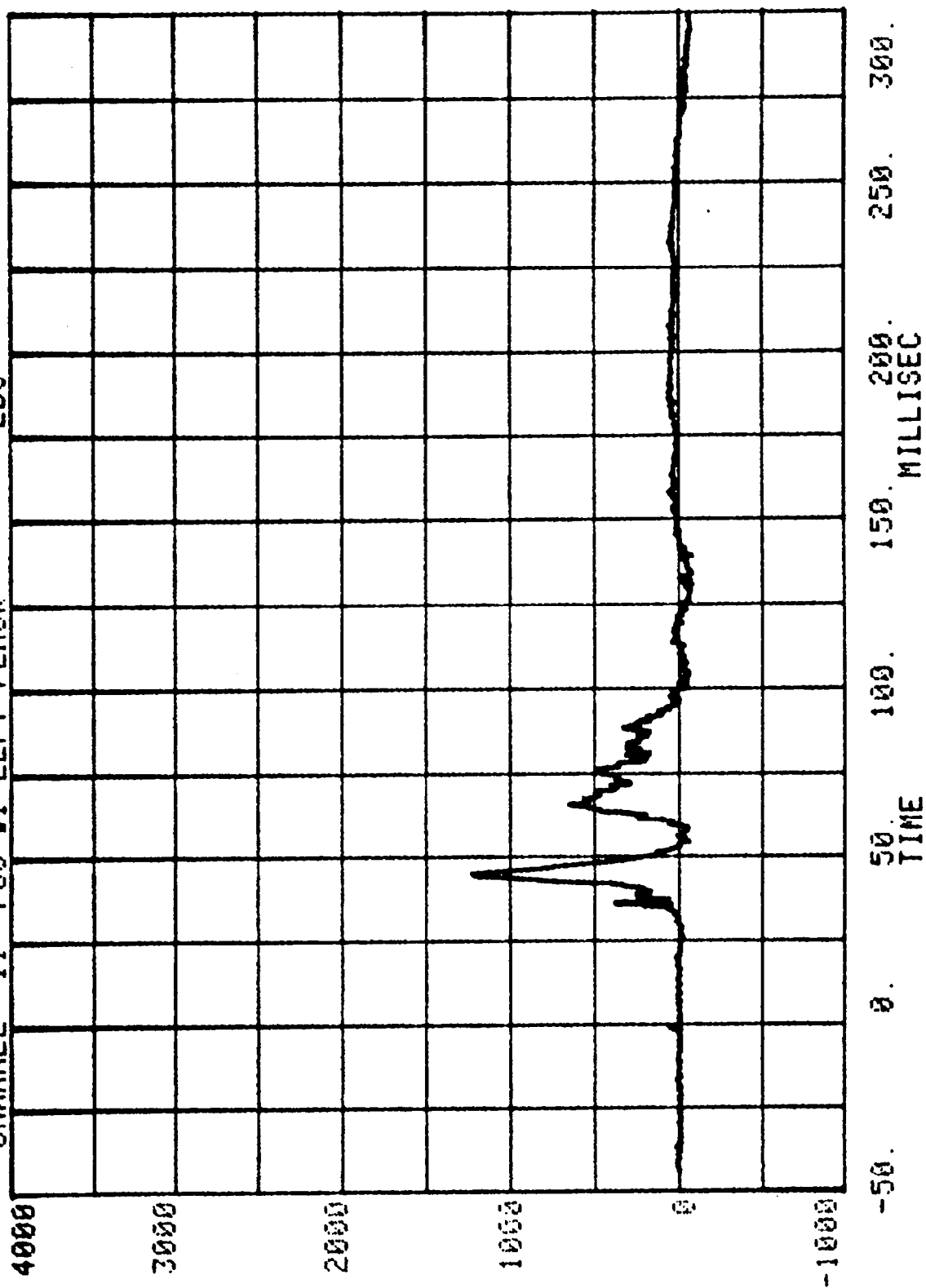
CHANNEL 6 POS #1 CHEST Z RUH= 909 SERIES= 1 G'S



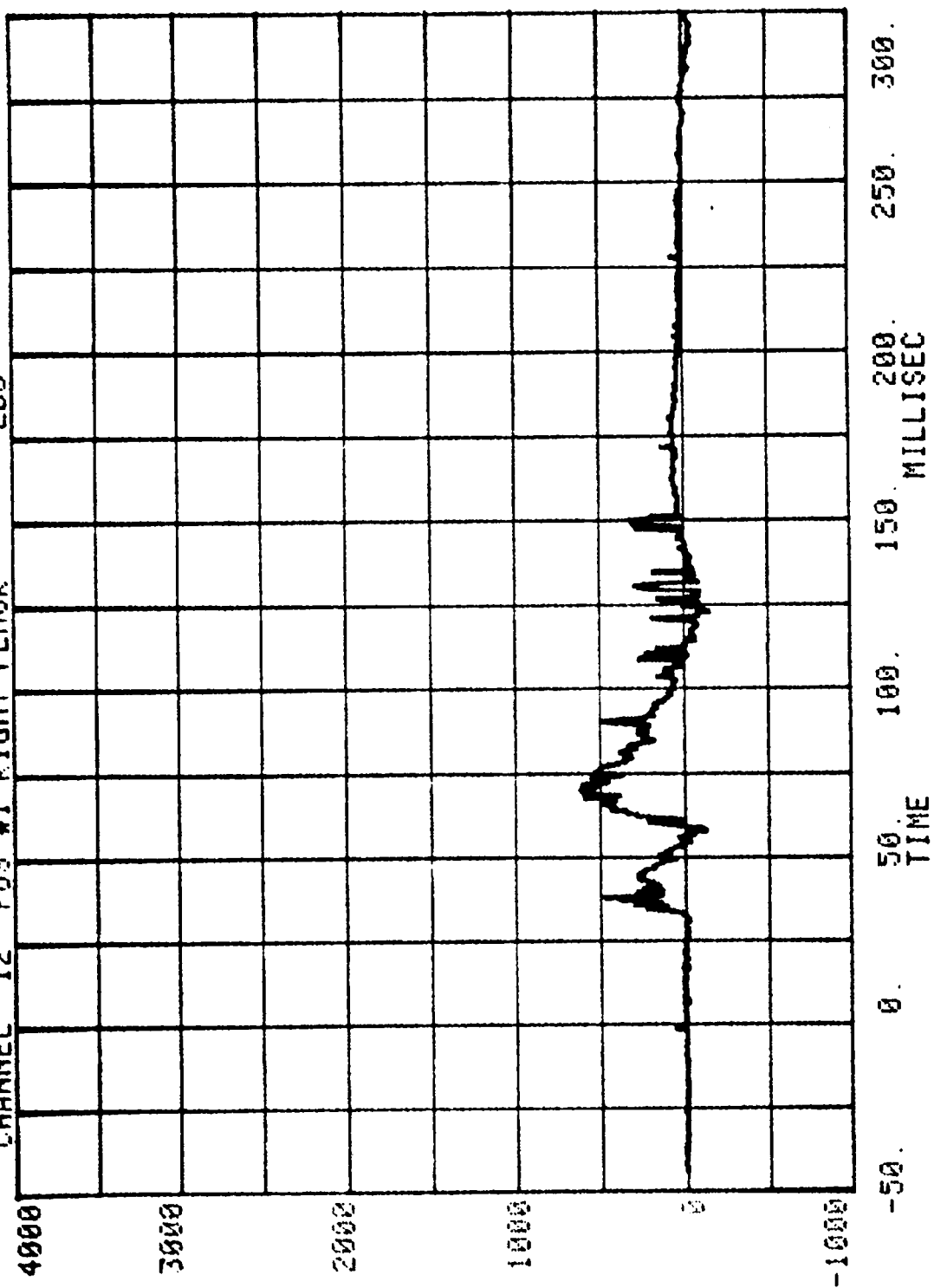
CHANNEL 2 POS #1 CHEST R RUN= 909 SERIES= 1 G'S



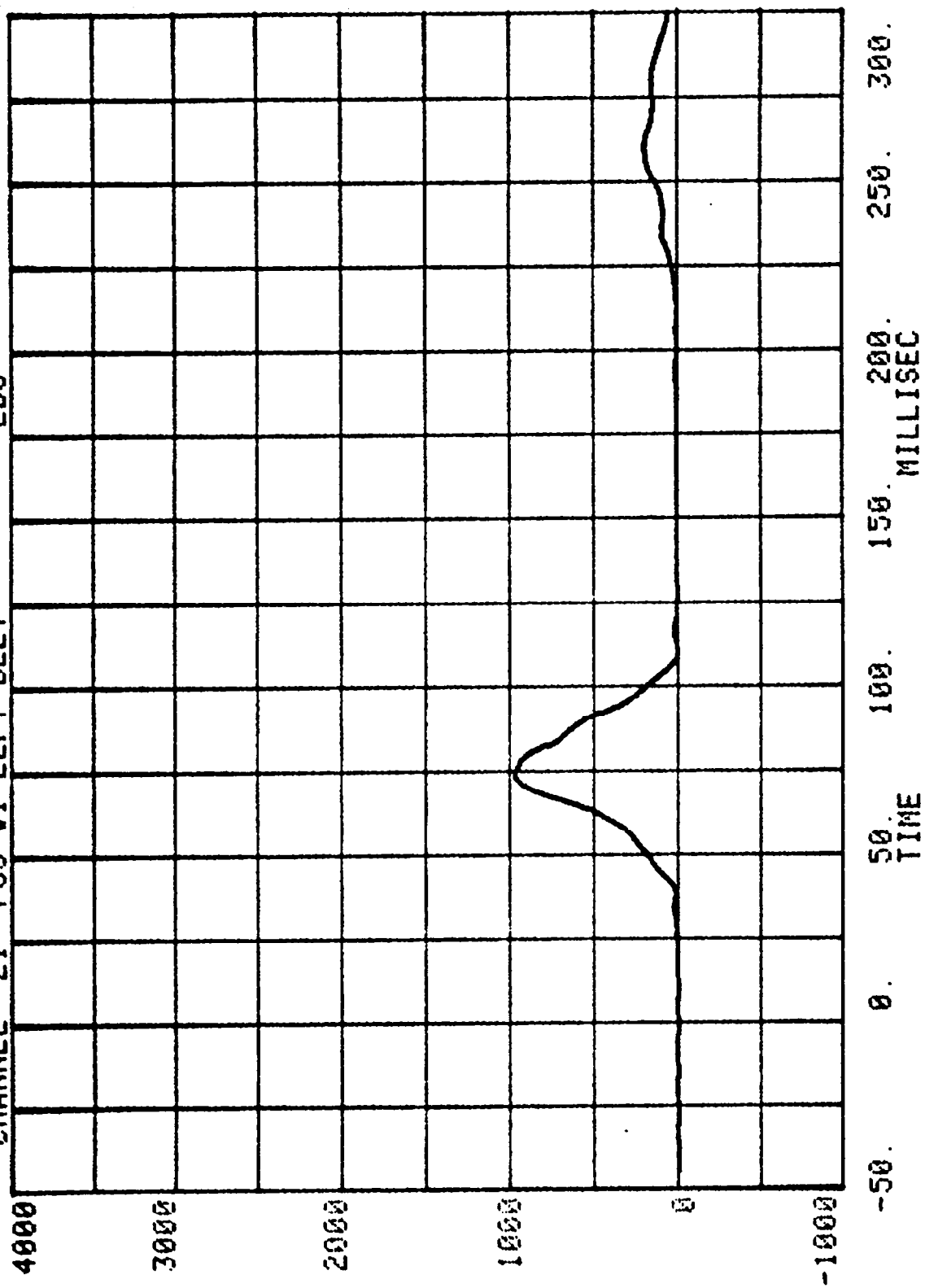
CHANNEL 11 POS #1 LEFT FEMUR RUN= 909 SERIES= 1 LBS



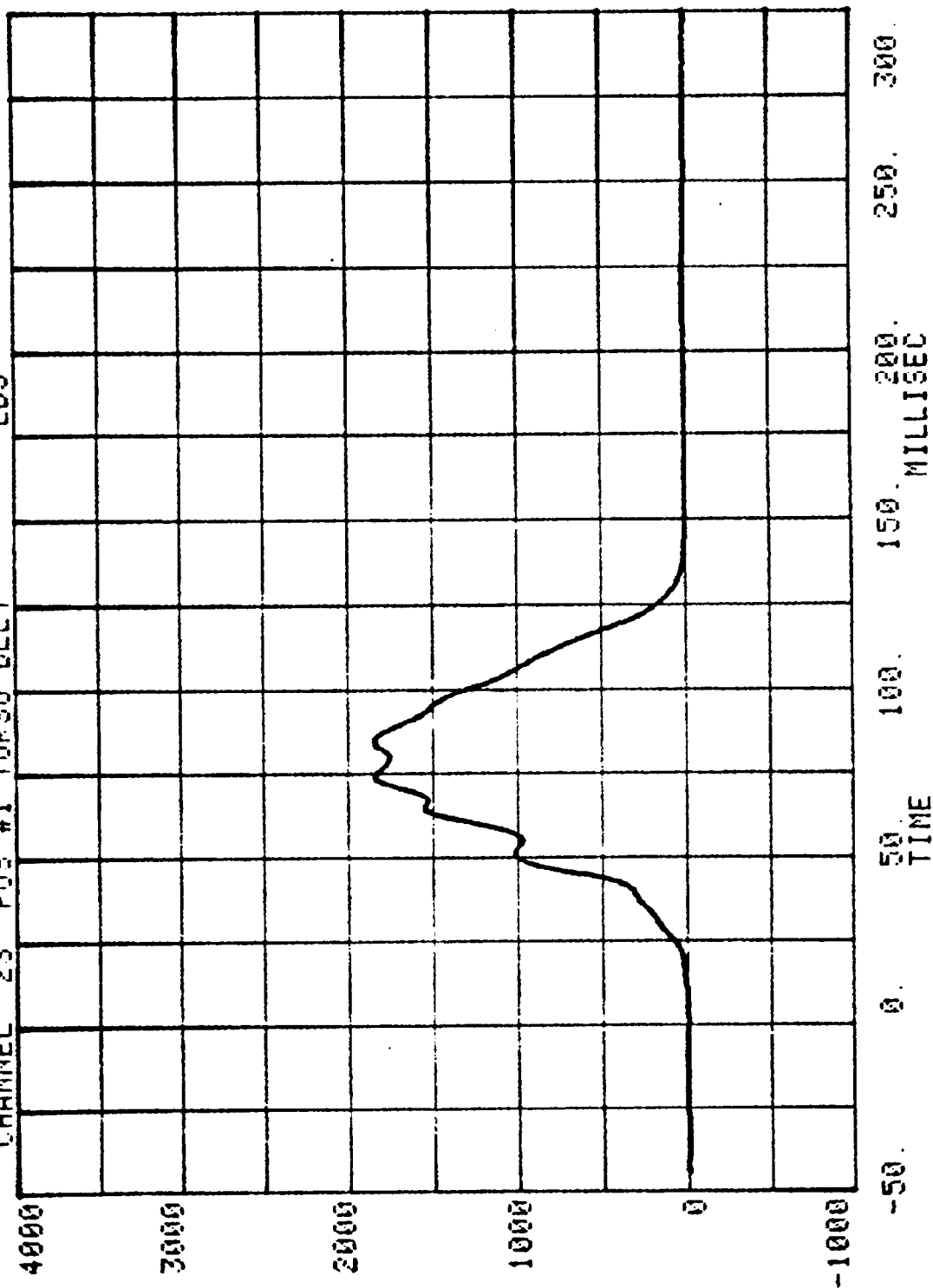
RUN= 909 SERIES= 1
CHANNEL 12 POS #1 RIGHT FEMUR LBS

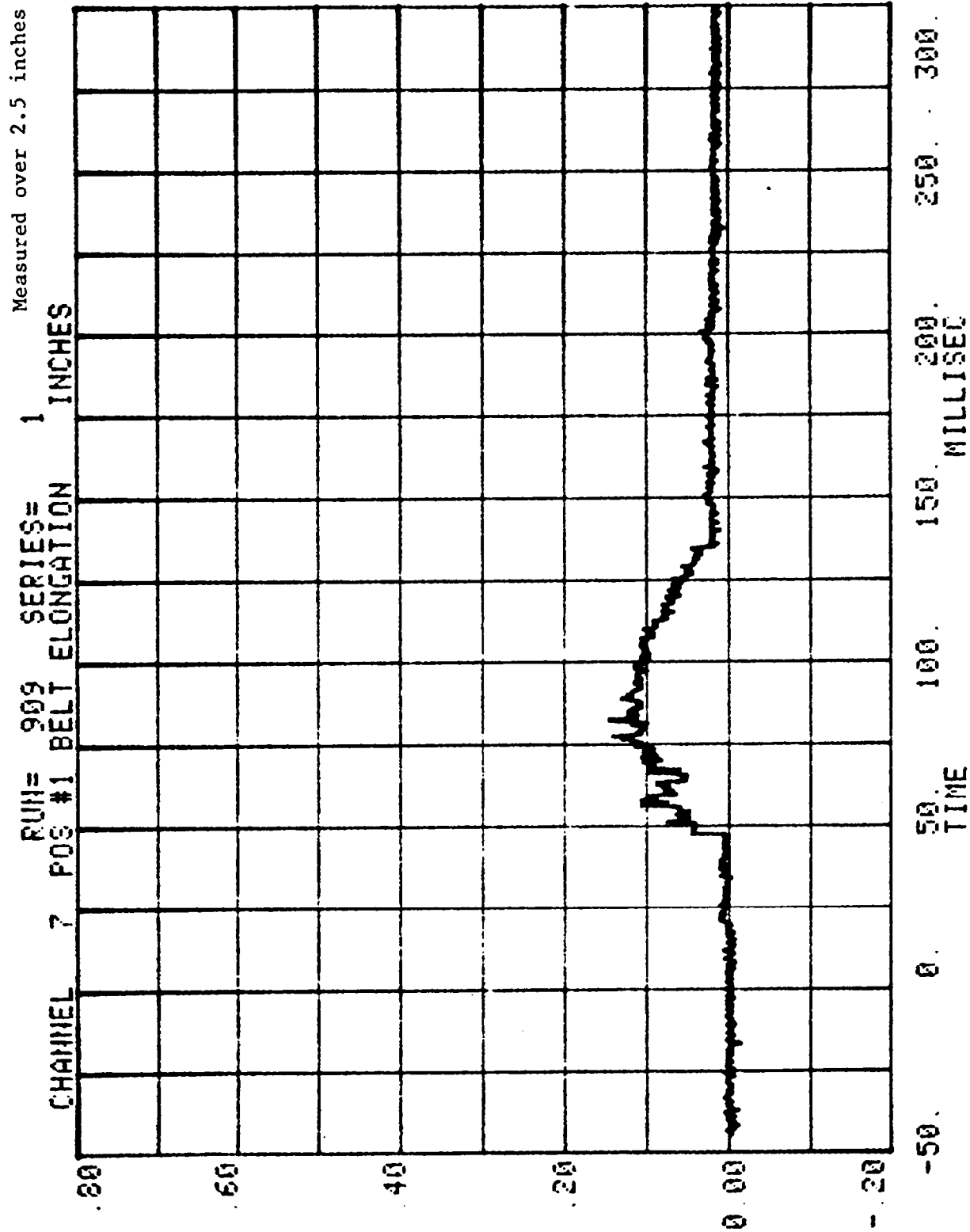


RUN= 989 SERIES= 1
CHANNEL 21 POS #1 LEFT BELT LBS



CHANNEL 23 POS #1 TORQO BELT
RUN= 909 SERIES= 1 LBS





HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

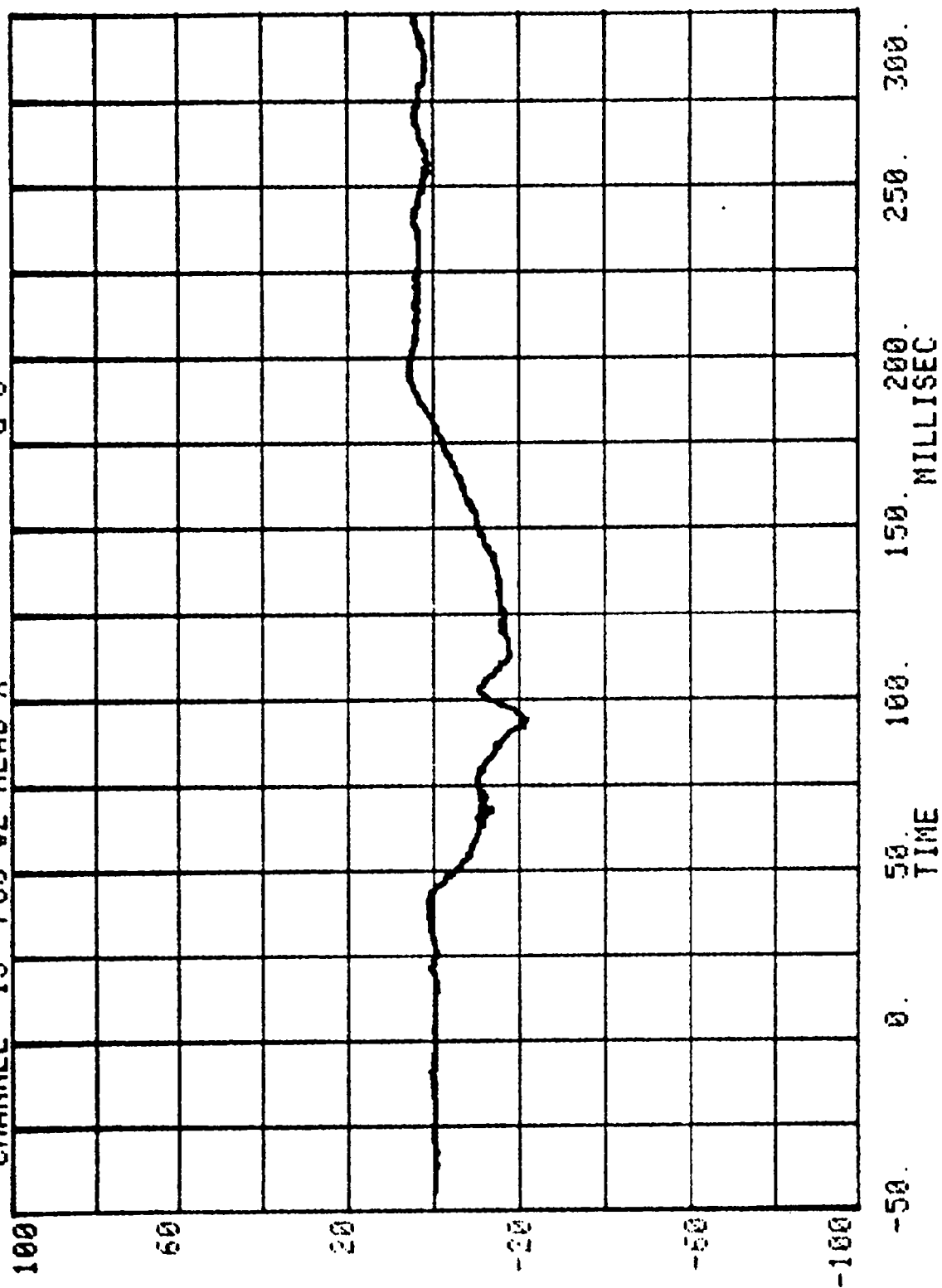
NEW CAR ASSESSMENT CRASH TEST - 1989

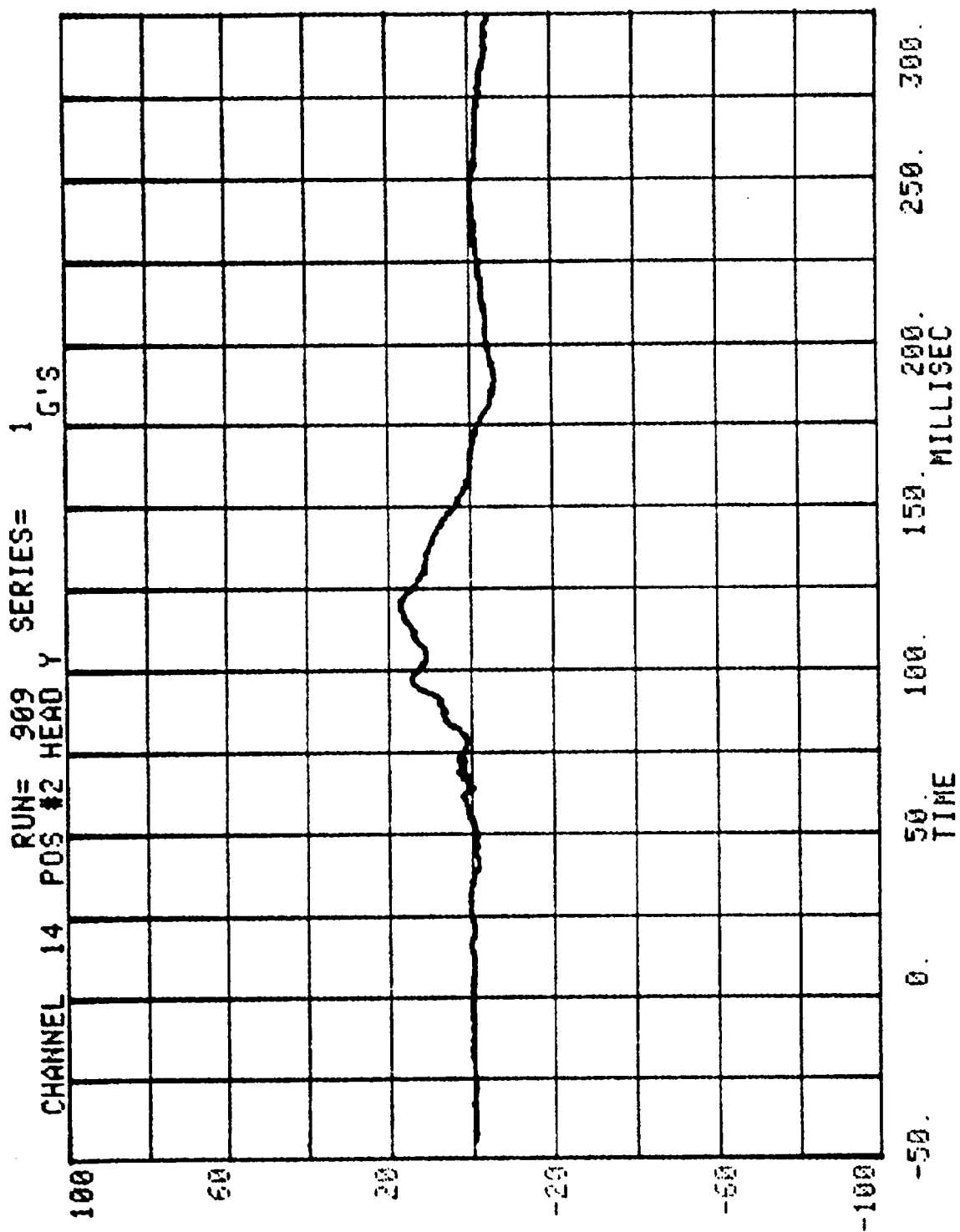
RUN= 909

POS #2 HEAD R

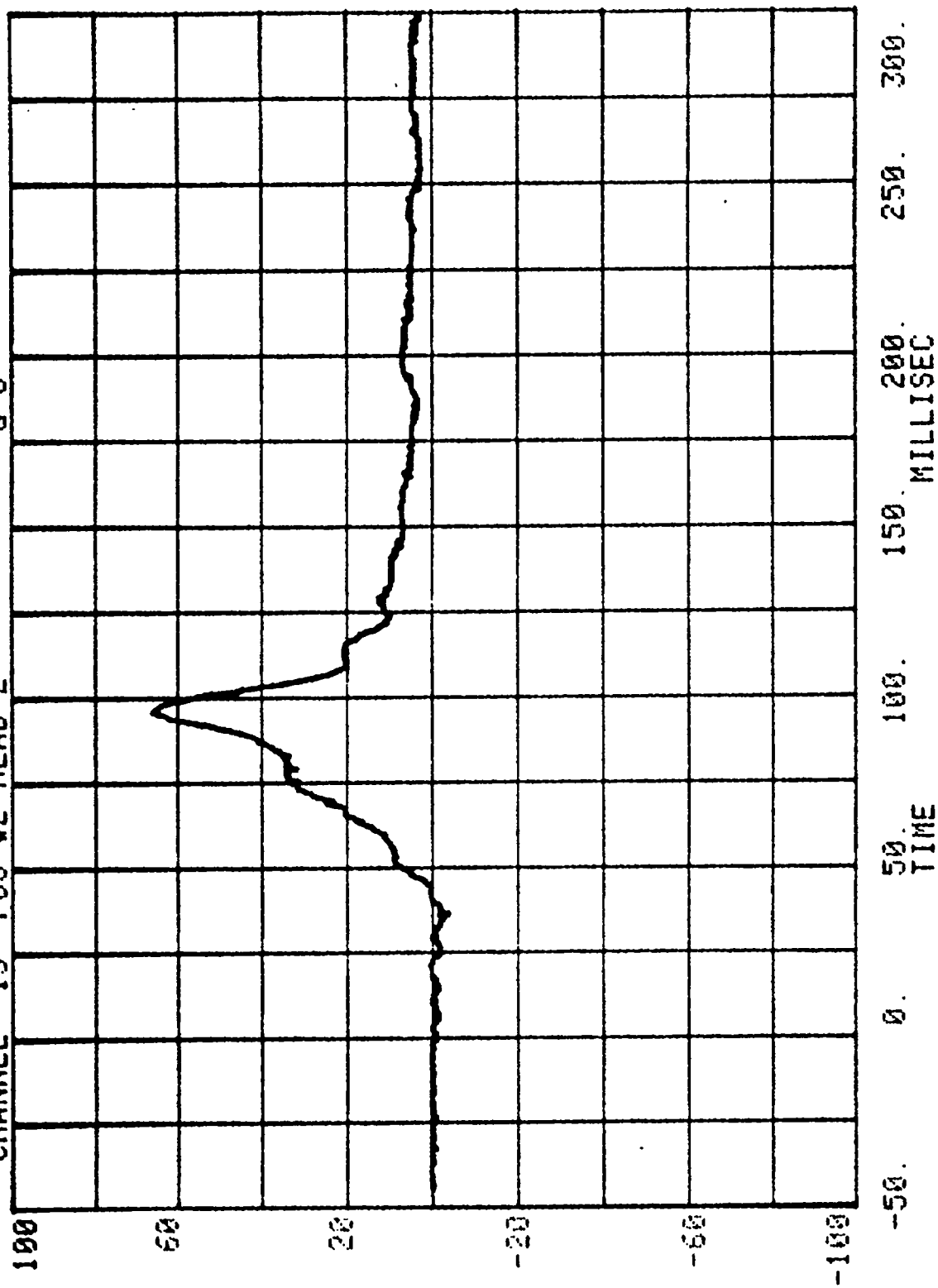
HIC= 525.4 FROM T1= .07110 TO T2= .10710
AVERAGE ACCELERATION BETWEEN T1 AND T2= 46 35'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 788.5

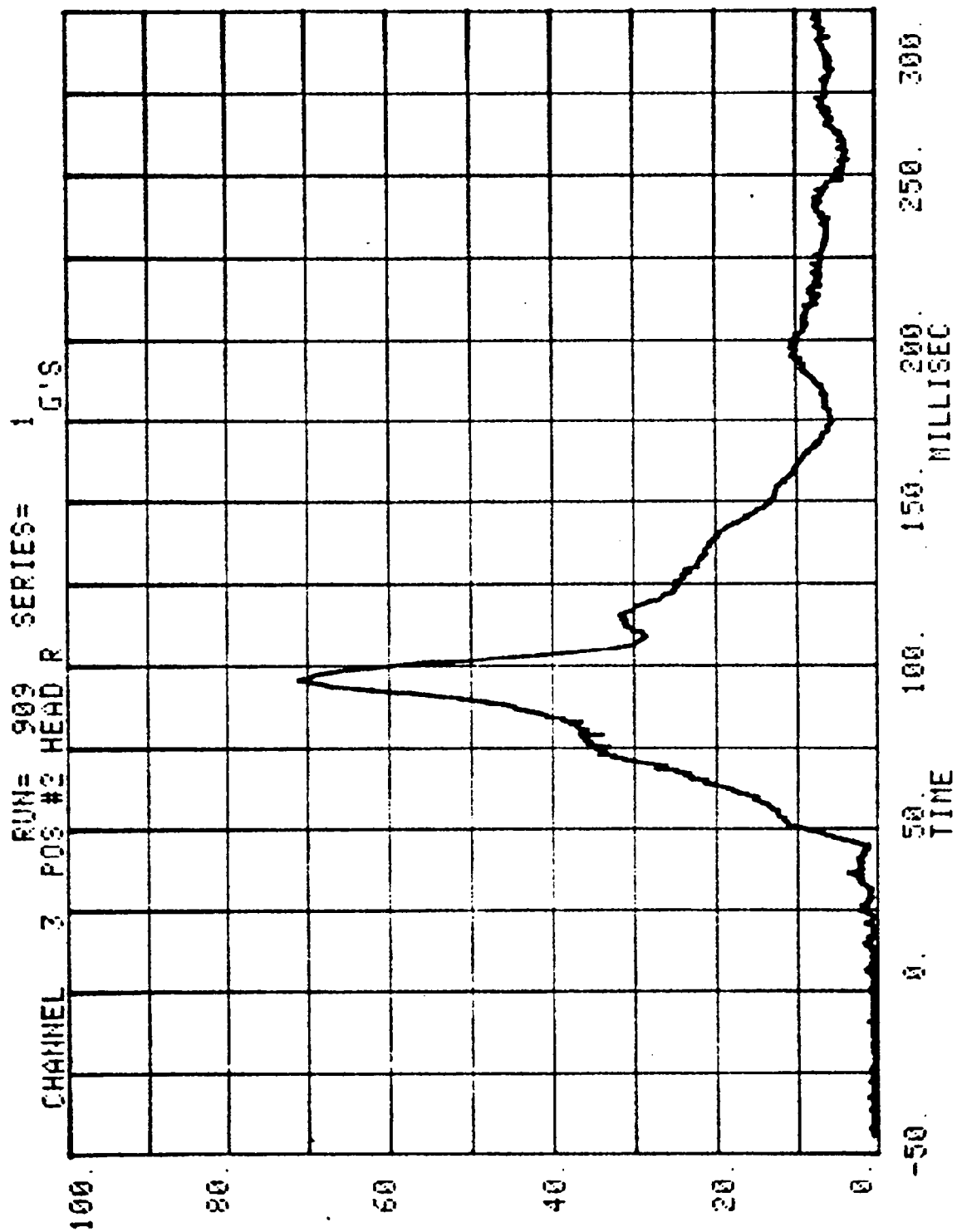
RUN= 909 SERIES= 1
CHANNEL 13 POS #2 HEAD X G'S



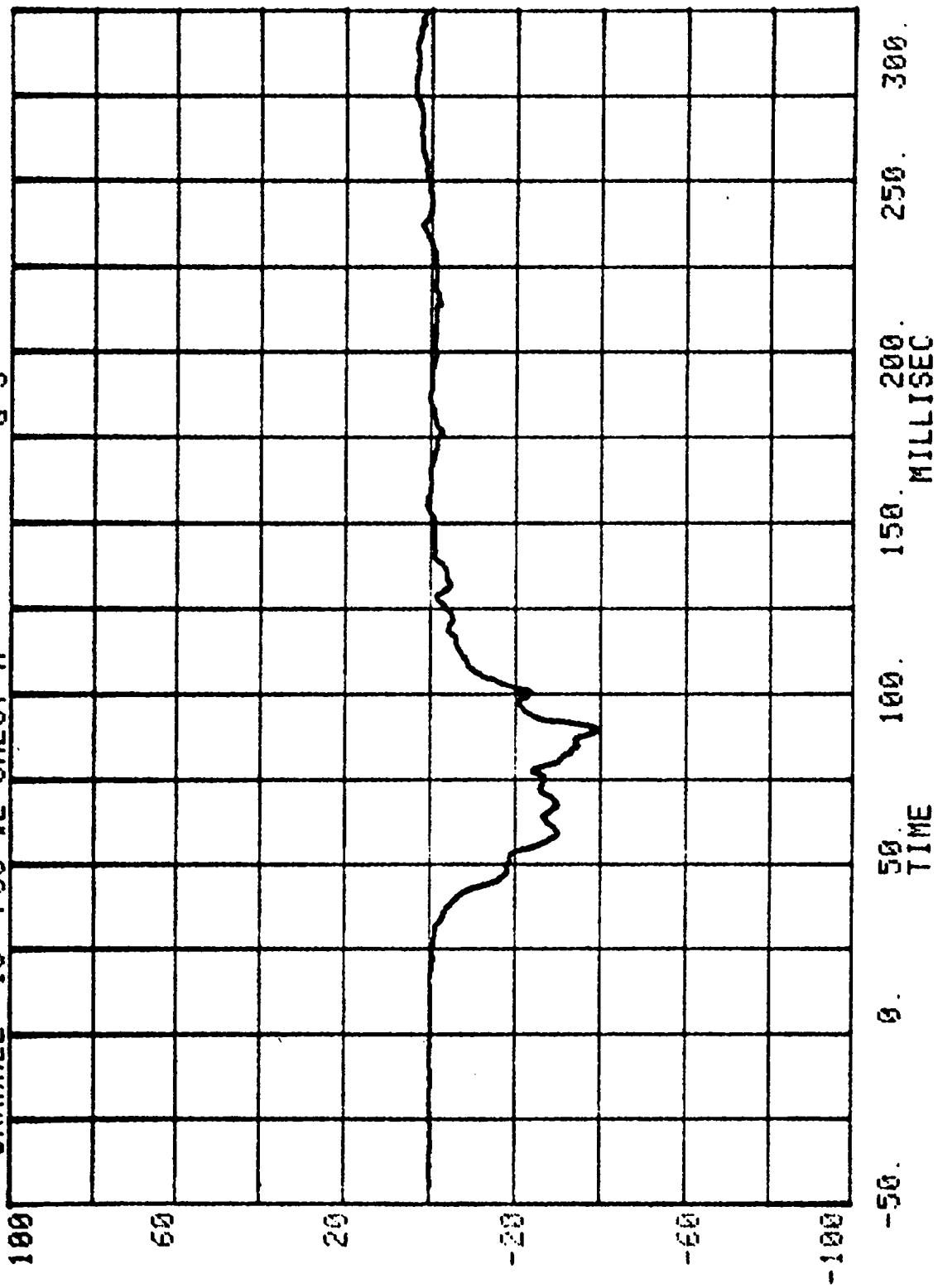


CHANNEL 15 POS #2 HEAD Z RUN= 909 SERIES= 1 G'S

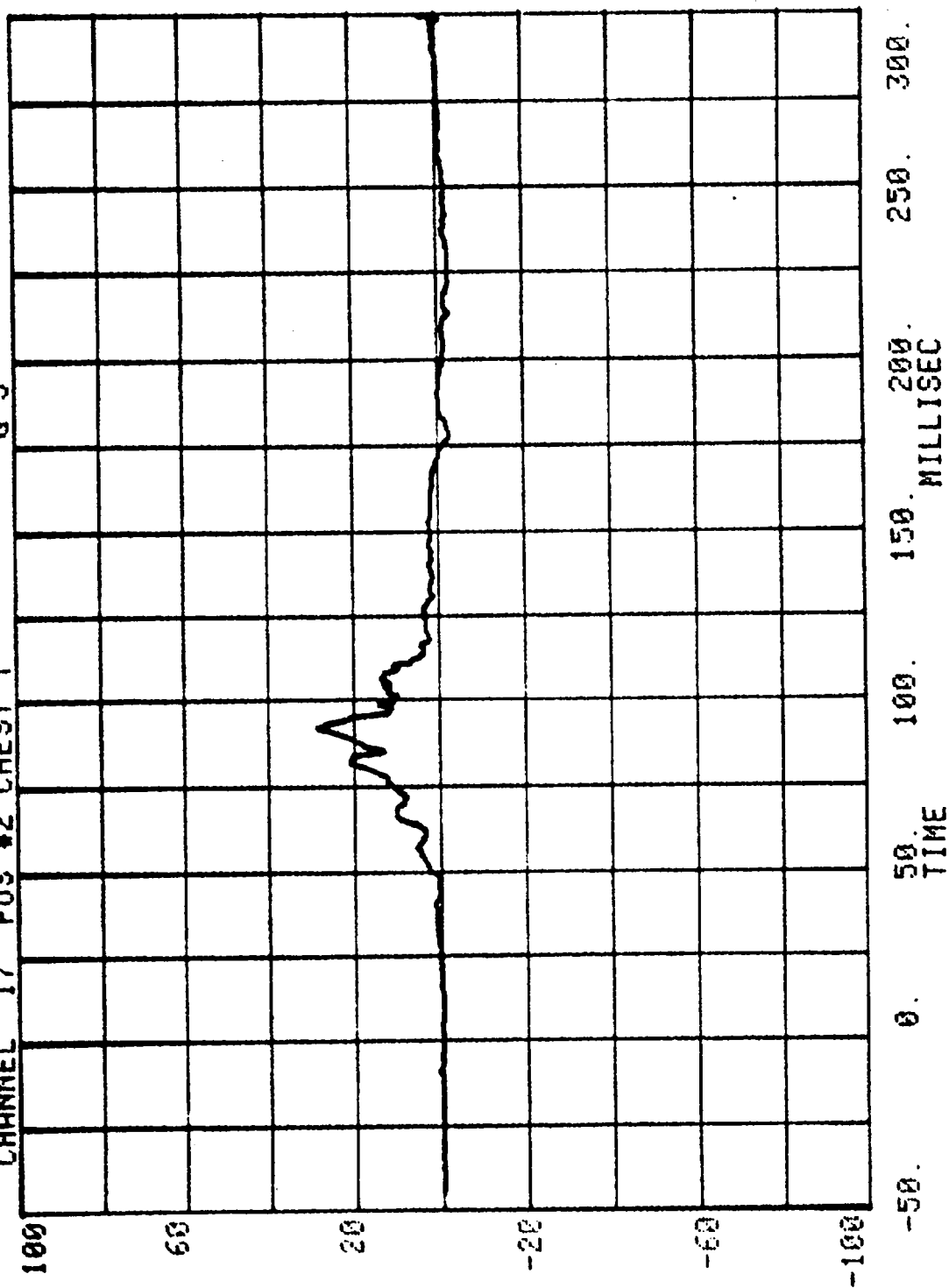




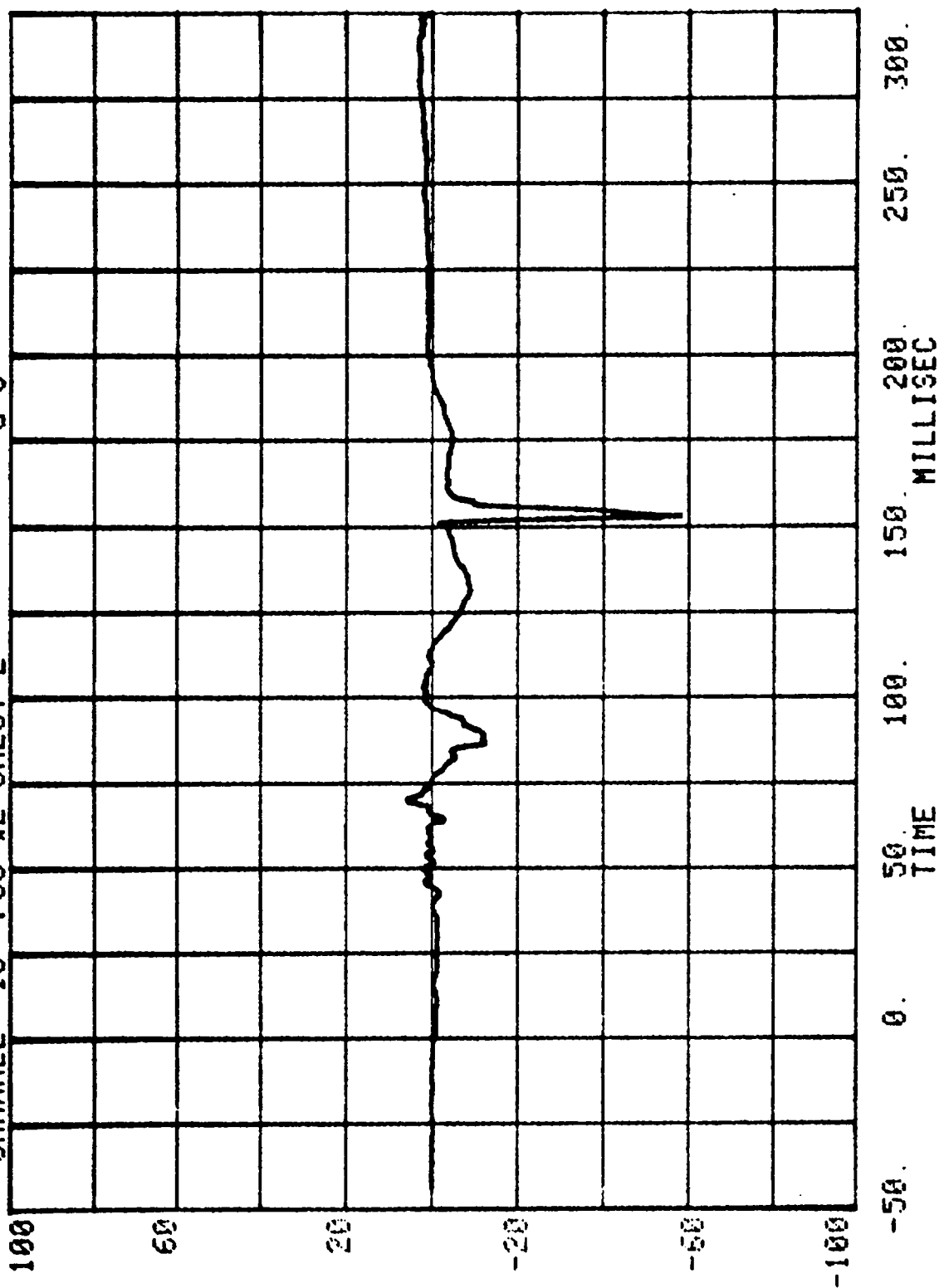
CHANNEL 16 POS #2 CHEST X SERIES= 1 G'S



RUN= 909 SERIES= 1
CHANNEL 17 POS #2 CHEST Y G'S



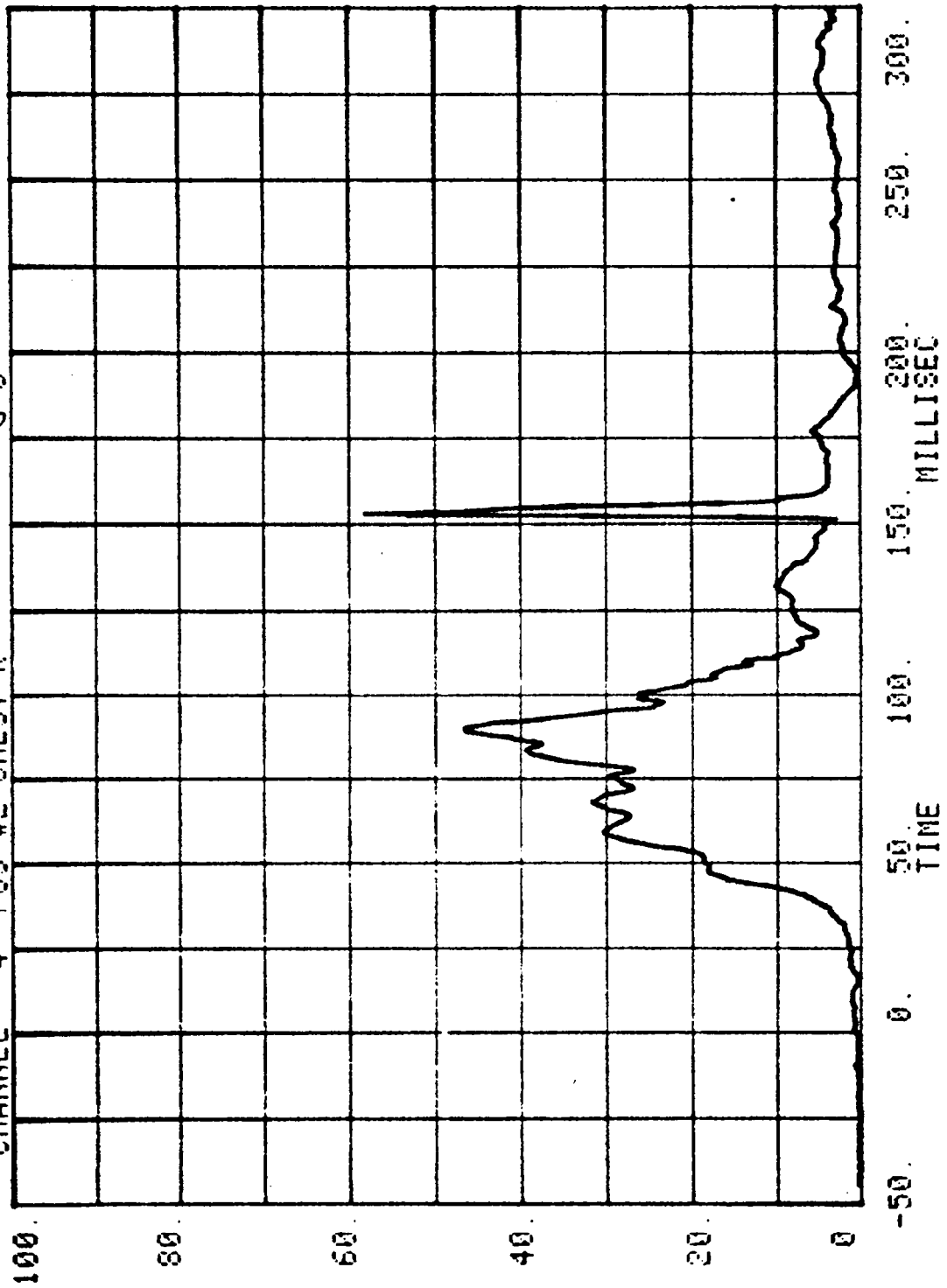
CHANNEL 18 POS #2 CHEST Z RUN= 909 SERIES= 1 G'S



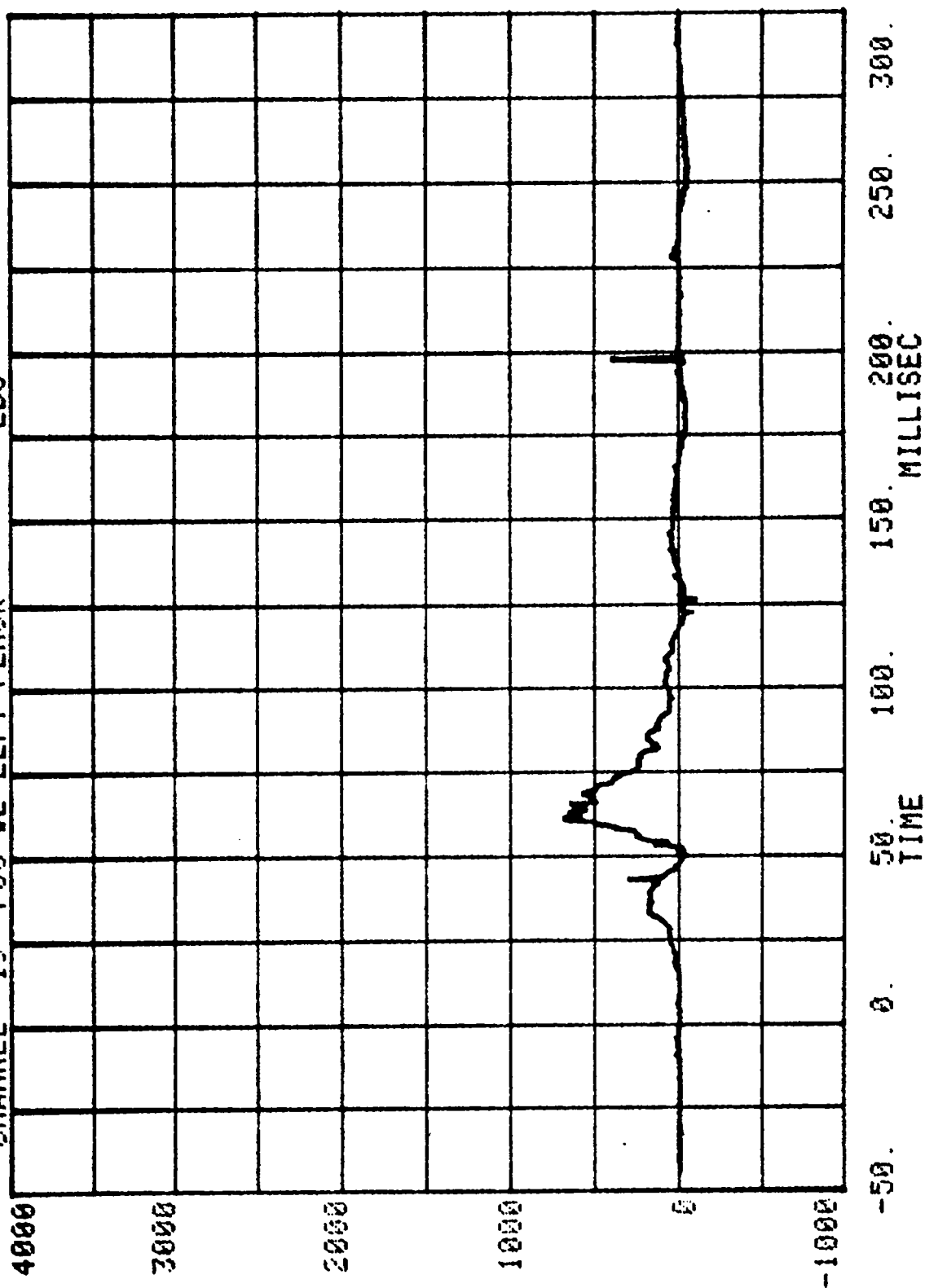
CHANNEL 4 POS #2 CHEST R

RUN= 909 SERIES= 1

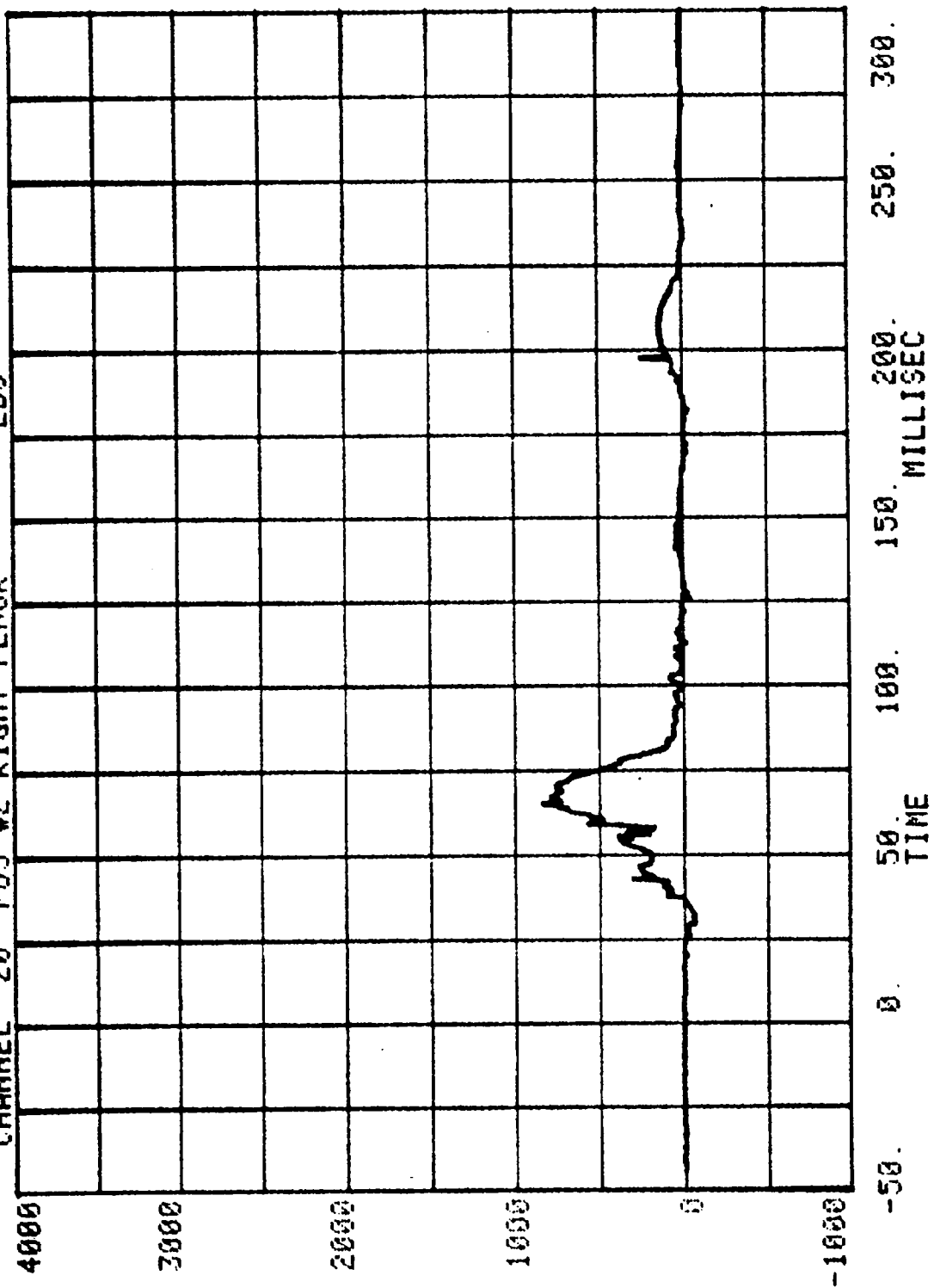
G'S



CHANNEL 19 POS #2 LEFT FEMUR RUN= 909 SERIES= 1 LBS



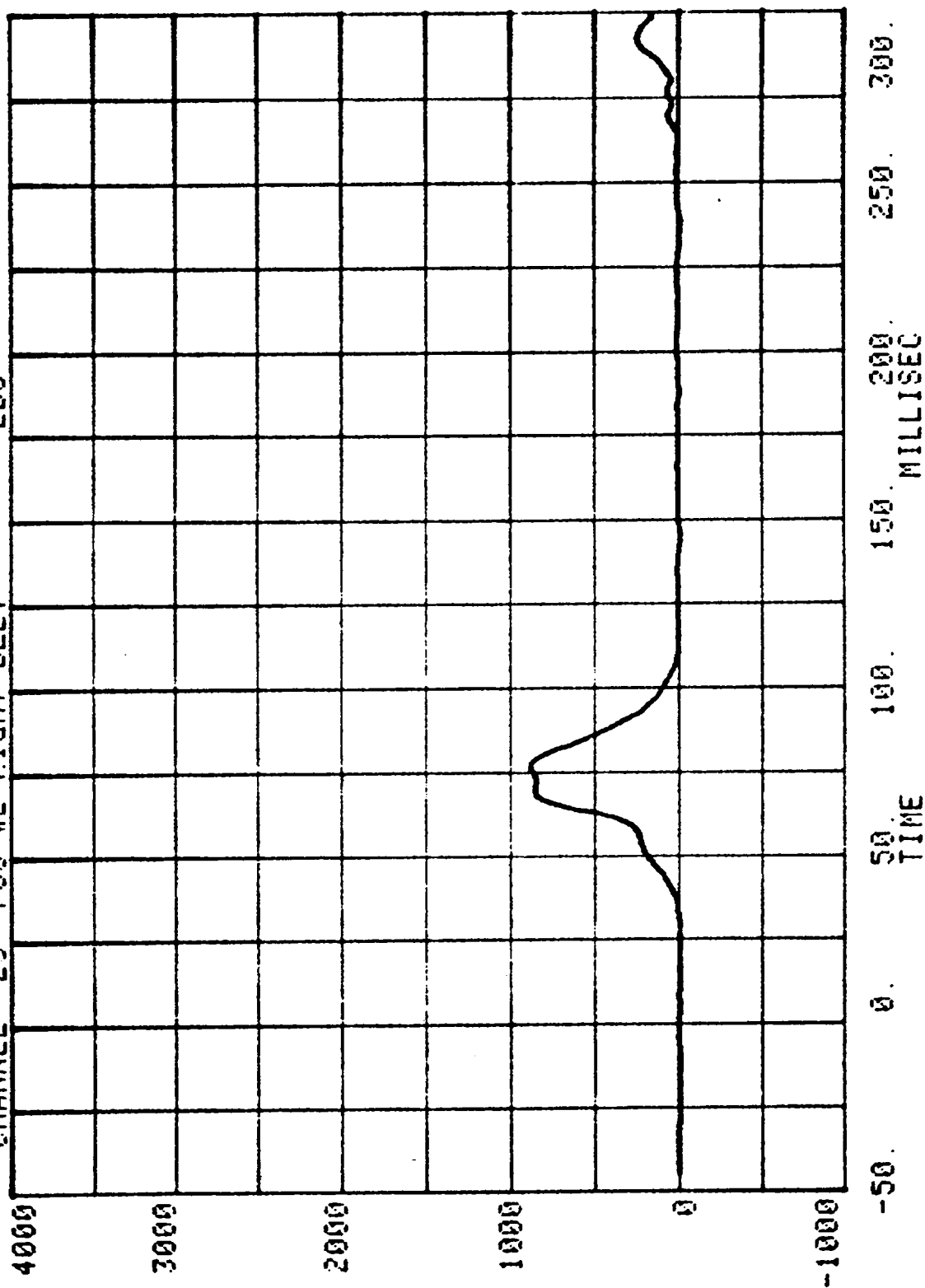
RUN= 989 SERIES= 1 LBS
CHANNEL 20 POS #2 RIGHT FEMUR



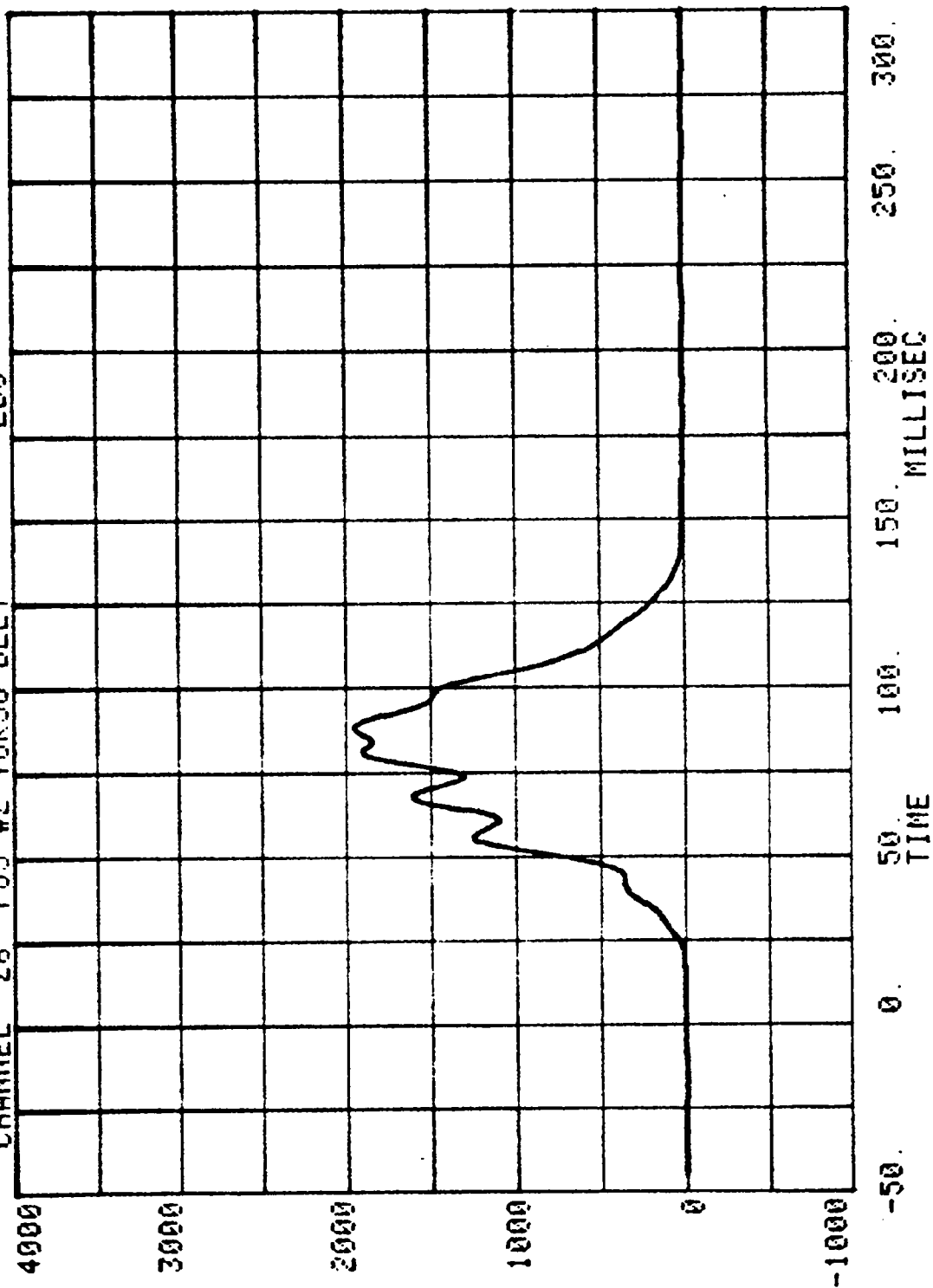
CHANNEL 25 POS #2 RIGHT BELT

RUN= 909 SERIES=

1 LBS

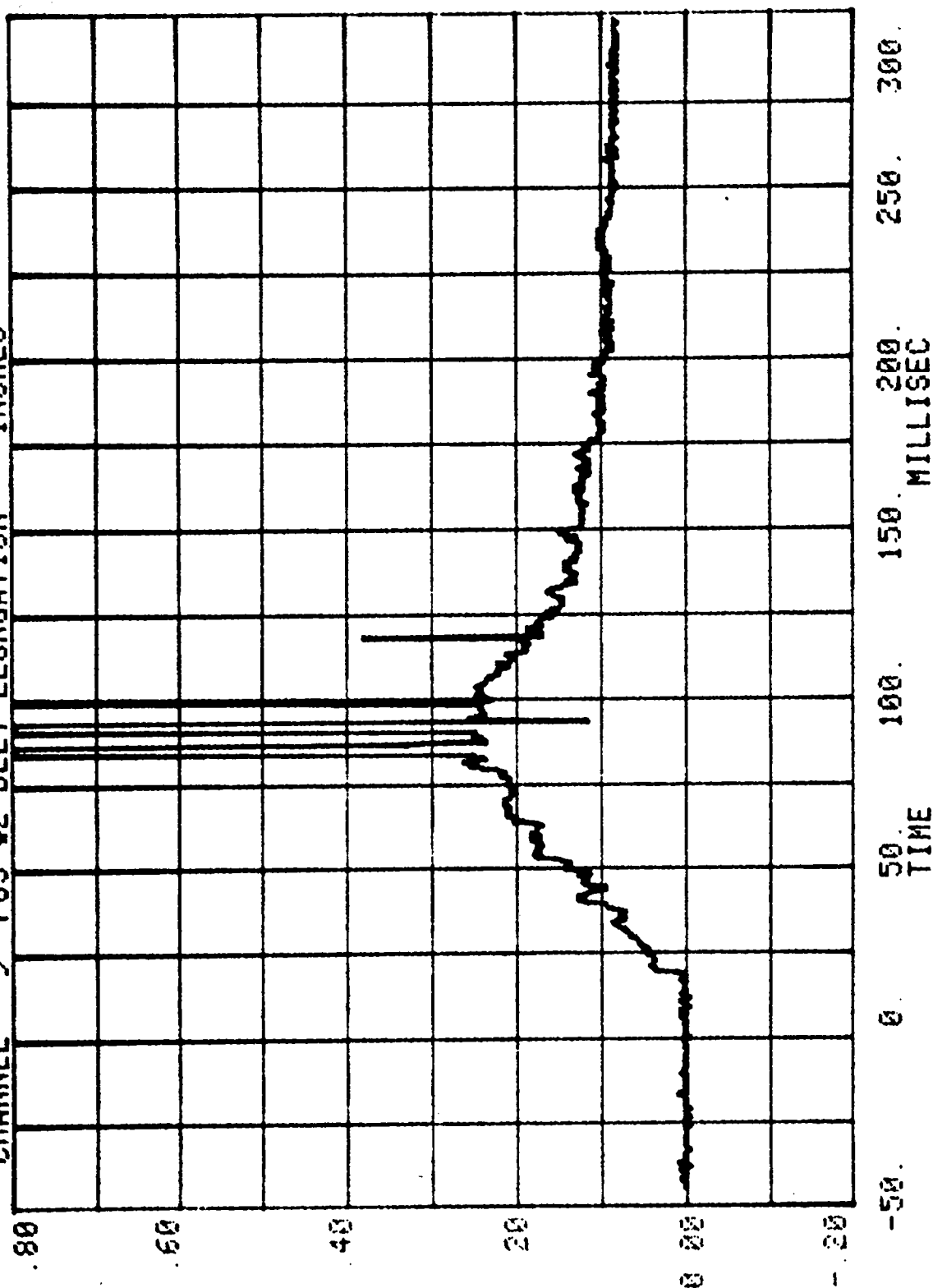


RUN= 909 SERIES= 1 LBS
CHANNEL 26 POS #2 TORSO BELT



Measured Over
2.5 Inches

CHANNEL 9 POS #2 BELT ELONGATION SERIES= 1 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.

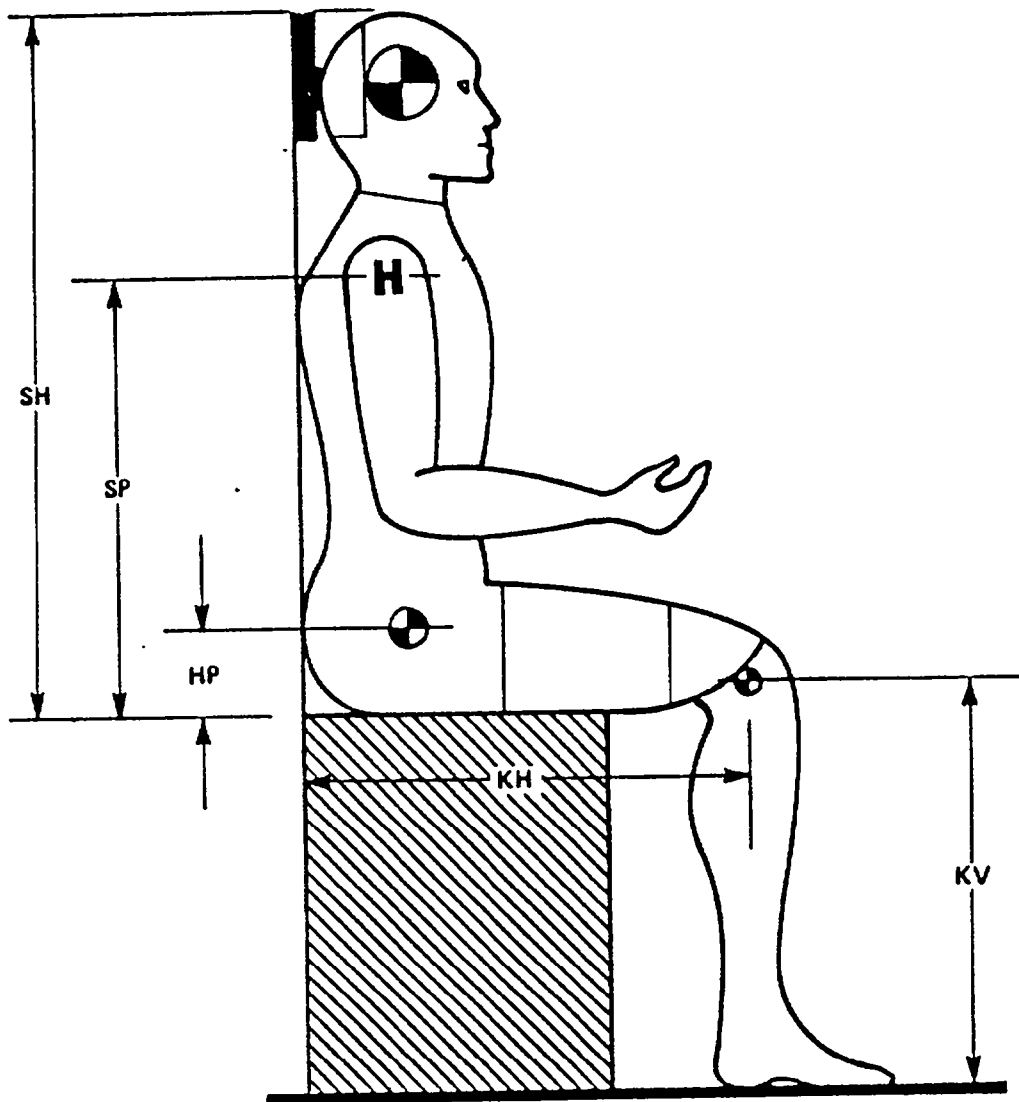
Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Date</u>
1021	6-7-89
320	6-26-89

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	6-7-89	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	3	
SH - Seated Height	35.6 to 35.8"	35.7 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	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		6-7-89	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		3	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-71 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		44-51 %	%
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.	1.1 ms	ms

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

TECHNICIAN'S NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	22.2 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	22 G's	
c. Peak Resultant Head Acceleration		26 G's max.	24.9 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.1 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	25.1 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	4 ms	
g. Max. Head Rotation		63 to 73 deg.	72 deg	
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	0.0 ms	
	Displ.	-.5 to .5"	0.0 "	
30 deg.	Time	25.6 to 34.4 ms.	27 ms	
	Displ.	2.1 to 3.1"	2.4 "	
60 deg.	Time	40.3 to 51.7 ms.	41.1 ms	
	Displ.	4.3 to 5.3"	4.8 "	
Maximum	Time	53.2 to 66.8 ms.	54 ms	
	Displ.	5.0 to 6.0"	5.7 "	
60 deg.	Time	67.0 to 83.0 ms.	74.2 ms	
	Displ.	4.3 to 5.3"	4.7 "	
30 deg.	Time	85.4 to 104.6 ms.	89.1 ms	
	Displ.	2.1 to 3.1"	2.3 "	
0 deg.	Time	101.0 - 123.0 ms.	103.7 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIANS NAME: IVAN MINKEWICZ

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	25 lbs	
b. Force @ 0.75"	36 to 50 lbs.	39 lbs	
c. Force @ 1.0"	50 to 63 lbs.	54.5 lbs	
d. Force @ 1.3"	73 to 88 lbs.	78 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	27 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	39 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	52.5 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.	21.8 fps	
(2) Peak Deflection	1.7" maximum	1.41 "	
(3) Peak Resistive Force	2250 lbs maximum	2106 lbs	
(4) Internal Hysteresis	50 to 70%	52.8 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	13.9 fps	
(2) Peak Deflection	1.1" maximum	1.08 "	
(3) Peak Resistive Force	1450 lbs maximum	1248 lbs	
(4) Internal Hysteresis	50 to 70%	54.9 %	

TECHNICIAN'S NAME: IVAN MINKEWICZ

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2305 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.8 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	6.9 fps	
(2) Maximum Force	1850 to 2500 lbs	2235 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.7 ms	

REMARKS:

TECHNICIAN'S NAME: IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 1021

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CX42	6-89	12-89
HY LATERAL--	ENDEVCO	CS41	5-89	11-89
HZ VERTICAL--	ENDEVCO	CH31	5-89	11-89
2. CHEST ACCELEROMETER--				
CX LONGITUDINAL--	CEC	A73	5-89	11-89
CY LATERAL--	ENDEVCO	CE06	5-89	11-89
CZ VERTICAL--	CEC	A44	5-89	11-89
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	551	6-89	12-89
RIGHT SIDE	GSE	552	6-89	12-89
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A144	3-89	9-89
2. TEST PROBE ACCELEROMETER--	CEC	A142	5-89	11-89
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS- DUCER INC	20051	5-89	11-89
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	5-89	11-89
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	5-89	11-89

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 320

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXXX	6-26-89	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	3	
SH - Seated Height	35.6 to 35.8"	35.7 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	22.0 "	"
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"	19.6 "	"
SW - Shoulder Width	17.8 to 18.4"	18.1 "	"
HW - Hip Width	14.0 to 15.4"	14.8 "	"

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		6-26-89	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		3	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		68-72 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		46-52 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	259 G's	G's
b. peak lateral accel.	<= 10 G's	6.6 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.2 ms	ms

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

TECHNICIAN'S NAME: IVAN MINKEWICZ

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

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 320

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	23.4 G's	
c. Peak Resultant Head Acceleration		26 G's max.	24.7 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.3 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	26.1 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 ms	
	Displ.	2.1 to 3.1"	2.4 "	
60 deg.	Time	40.3 to 51.7 ms.	42.9 ms	
	Displ.	4.3 to 5.3"	4.8 "	
Maximum	Time	53.2 to 66.8 ms.	55 ms	
	Displ.	5.0 to 6.0"	5.6 "	
60 deg.	Time	67.0 to 83.0 ms.	67 ms	
	Displ.	4.3 to 5.3"	5.2 "	
30 deg.	Time	85.4 to 104.6 ms.	87.3 ms	
	Displ.	2.1 to 3.1"	2.2 "	
0 deg.	Time	101.0 - 123.0 ms.	102.9 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIANS NAME: IVAN MINKEWICZ

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 320

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
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.	38.5 lbs	
c. Force @ 1.0"	50 to 63 lbs.	54 lbs	
d. Force @ 1.3"	73 to 88 lbs.	80 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	26.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	40 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	51.5 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	1.5 "	
(3) Peak Resistive Force	2250 lbs maximum	2173 lbs	
(4) Internal Hysteresis	50 to 70%	51.2 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.1 fps	
(2) Peak Deflection	1.1" maximum	1.04 "	
(3) Peak Resistive Force	1450 lbs maximum	1357 lbs	
(4) Internal Hysteresis	50 to 70%	56.4 %	

TECHNICIAN'S NAME: IVAN MINKEWICZ

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 320

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	6.9 fps	
(2) Maximum Force	1850 to 2500 lbs	1960 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	6.9 fps	
(2) Maximum Force	1850 to 2500 lbs	2010 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.75 ms	

REMARKS:

TECHNICIAN'S NAME: IVAN MINKEWICZ

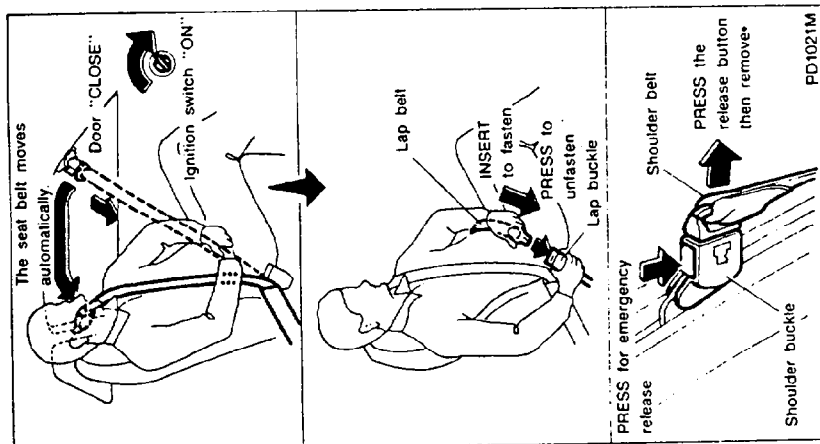
INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 320

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	FL12	4-89	10-89
HY LATERAL--	ENDEVCO	FL08	4-89	10-89
HZ VERTICAL--	ENDEVCO	FL06	4-89	10-89
2. CHEST ACCELEROMETER--				
CX LONGITUDINAL--	CEC	A74	3-89	9-89
CY LATERAL--	ENDEVCO	FL01	3-89	9-89
CZ VERTICAL--	CEC	A128	3-89	9-89
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	75	6-89	12-89
LEFT SIDE	GSE	76	6-89	12-89
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A144	3-89	9-89
2. TEST PROBE ACCELEROMETER--	CEC	A142	5-89	11-89
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS- DUCER INC	20051	5-89	11-89
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	5-89	11-89
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	5-89	11-89

Appendix D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS



Fastening the belts

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

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

2. Adjust the seat.

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

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

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

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

4. Slowly pull the lap belt out of the retractor and insert the tongue into the lap buckle until it snaps. Position the lap belt

low on the hips and pull the belt toward the retractor to take up extra slack.

- Do not wear the lap belt across the shoulder belt.
- The retractors are designed to lock during a sudden stop or on impact. A slow pulling motion will permit the belt to move, and allow you some freedom of movement in the seat.

Unfastening the belts

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

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

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

- Do not unfasten the shoulder belt tongue from the buckle except in emergency. See "Operation in Emergency" later in this Section.

How the automatic shoulder belt works

While the ignition switch is on;

the shoulder buckle will move to the forward position when the door is opened, and it will

move to the rear position when the door is closed.

While the ignition switch is off;

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

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

Seat belt warning light "  " and warning chime

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

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

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

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

If the shoulder belt tongue is disconnected from the buckle;

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

If the driver side lap belt is not fastened;

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

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.

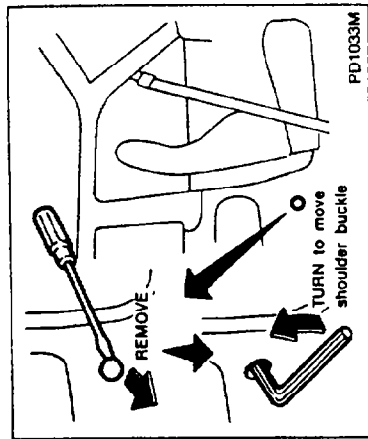
Operation in an accident

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.

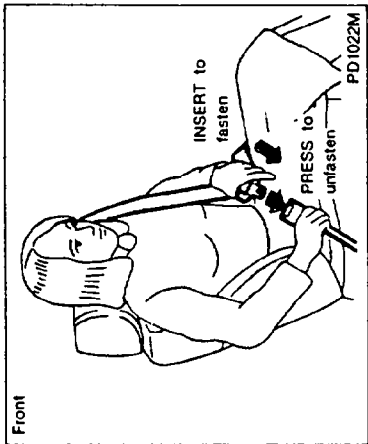
For normal use, the shoulder belt should always be connected to the buckle.



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 a 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.

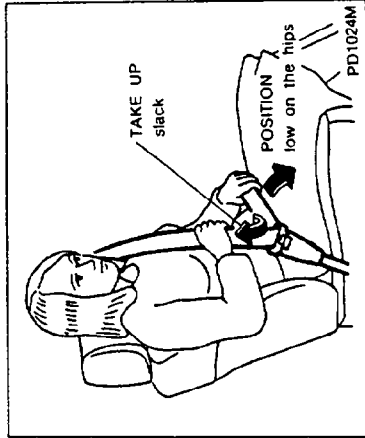


3-POINT TYPE WITH RETRACTOR

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

Fastening the belts (Front seat)

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. If the seat is reclined, the risk of sliding under the lap belt is increased and the risk of injury is increased.
2. Slowly pull the seat belt out of the retractor and insert the tongue into the buckle until it snaps.



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

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

Unfastening the belts

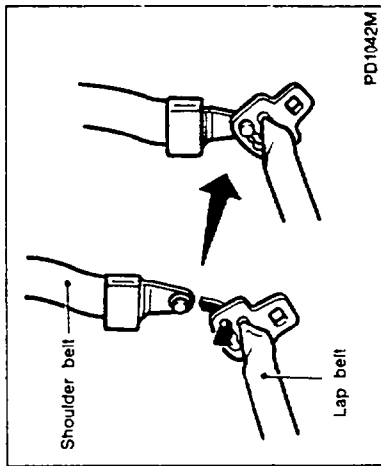
To unfasten the belt, press the button on the buckle. The seat belt will automatically retract.

Checking seat belt operation

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

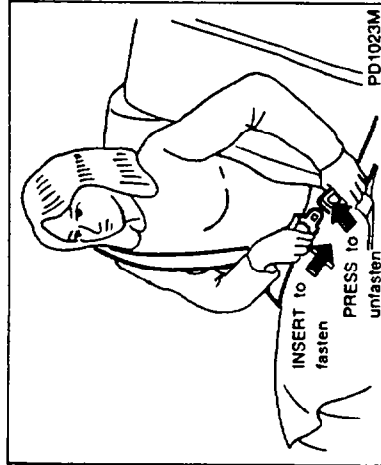
- 1) When the belt is pulled quickly from the retractor.
 - 2) When the vehicle slows down rapidly.
- To increase your confidence in the belts, check the operation as follows:
- Grasp the shoulder belt and pull quickly forward. The retractor should lock and restrict further belt movement.

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

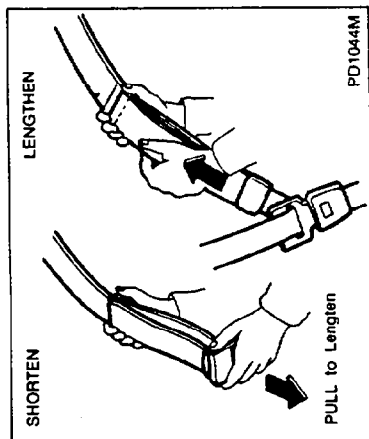


Fastening the belt (Rear seat)

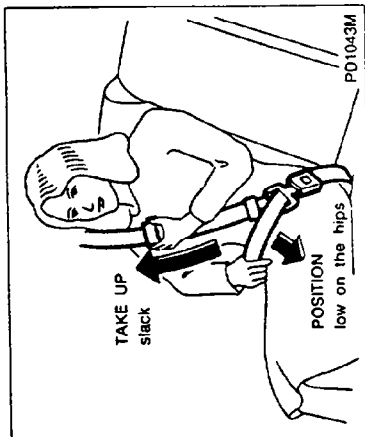
1. Slowly pull the lap belt.
2. Insert the projection on the plate of the shoulder belt into the hole in the tongue of the lap belt.



3. Insert the tongue into the buckle until it snaps. If the retractor locks and restricts further movement, let the lap belt rewind into the retractor, then slowly pull the lap belt out.



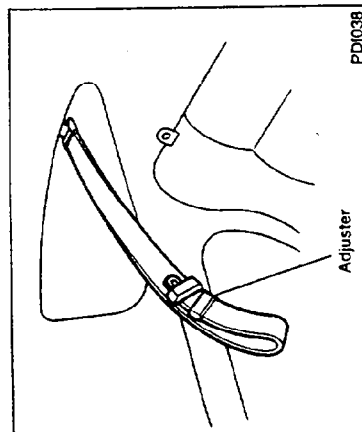
4. To lengthen the shoulder belt, hold the tongue at a right angle to the belt and pull on the belt. To shorten, pull the free end of the belt away from the tongue.



5. Pull the shoulder belt portion as shown to take up the slack.
6. Position the lap belt portion low on the hips as shown.

Unfastening the belts

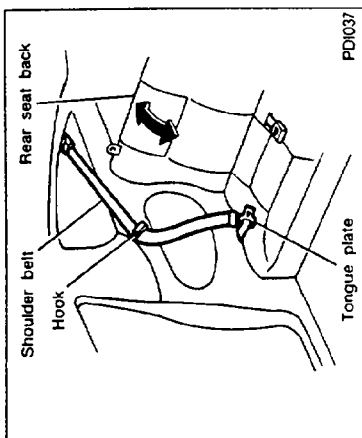
To unfasten the belt, press the button on the buckle. The lap belt will automatically retract.



When the shoulder belt is separated from the lap belt, the adjuster should be attached to the hook as shown.

CAUTION:

Make sure the rear shoulder belts are not caught in the seat back when it is lowered and raised.



When not using the rear seat belt (Fast Back model only)

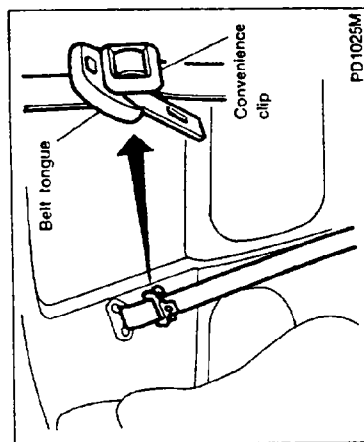
While the rear seat belts are not in use, the shoulder belt should always be held away from the seat by the hook, as shown in the illustration.

SEAT BELT EXTENDERS

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

• Only NISSAN belt extenders, made by the same company which made the original equipment belts, should be used with NISSAN belts.

• Persons who can use the standard seat belt should not use an extender. Such unnecessary use could result in serious personal injury in the event of an accident.



Convenience clip

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

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

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