

DOT 1117

REPORT NO. CAL-88-N01

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

VOLKSWAGEN DO BRASIL S.A.
1988 VOLKSWAGEN FOX
2-Door Sedan

NHTSA NO. MJ5800
CALSPAN TEST NO. 7626-1

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December 17, 1987



FINAL REPORT

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

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

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Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. CAL-88-N01		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NHTSA New Car Assessment Program (NCAP) Frontal Barrier Impact Test on 1988 Volkswagen Fox 2-Door Sedan				5. Report Date December 17, 1987	
				6. Performing Organization Code CAL	
7. Author(s) Michael J. Kilgallon, Project Engineer Walter E. Levan, Program Manager				8. Performing Organization Report No. 7626-1	
9. Performing Organization Name and Address Calspan Advanced Technology Center P.O. Box 400 Buffalo, NY 14225				10. Work Unit No. 296-01-803	
				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 Final Report December - January	
				14. Sponsoring Agency Code DOT/NHTSA/RM/OMI	
15. Supplementary Notes					
16. Abstract A frontal load cell barrier test of a 1988 Volkswagen Fox 2-Door Sedan was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York on December 17, 1987. Impact speed was 35.1 mph and the ambient temperature at the barrier face at the time of impact was 26°F. The maximum post-test vehicle crush was 19.8 inches. The test vehicle was equipped with a manual 3-point continuous belt system at each of the front outboard seating positions.					
17. Key Words 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)			18. Distribution Statement <u>Copies of this report are available from:</u> 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 88 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-87-D-02012. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph FMVSS 212/219/301-75 requirements.

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

Section 2
SUMMARY OF TEST NUMBER MJ5800

A load cell barrier consisting of 36 load cells was impacted by a 1988 Volkswagen Fox 2-Door Sedan at a velocity of 35.1 mph. The test was performed at the Calspan Corporation Advanced Technology Center on December 17, 1987. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 16 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

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

Both ATDs were fully instrumented with head and chest triaxial accelerometers and right/left femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 1021) and the passenger ATD (Serial No. 1022) were certified prior to the test. Certification details and instrumentation calibration data are found in Appendix C.

The 67 channels of data were recorded on six 14-channel FM tape recorders. Right femur data for position #1 became intermittent after 55 msec. Torso belt data for position #1 was not available after 75 msec. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the steering wheel rim and hub and the HIC was 1114. The maximum chest deceleration over 3 milliseconds was 55 g's. The driver's left femur load was 344 pounds.

The right front passenger's HIC was 1424. The maximum chest deceleration over 3 milliseconds was 44 g's. Femur loads were 478 and 663 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1988 Volkswagen Fox 2-Door Sedan
 NHTSA NO.: MJ5800 VIN.: 9BWBA0309JP021395
 BODY COLOR: Red DATE OF MANUFACTURE: 9/87
 Engine: 4 cylinders; - C.I.D.; 1.8 Liters; - CC
x Gas; - Diesel; - Turbocharged
x Longitudinal; - Transverse
 Transmission: 4 Speed x Manual; - Automatic; - Overdrive
 Final Drive: x Front Wheel; - Rear Wheel; - Four Wheel
 Date Received: 11-30-87 Odometer Reading: 43
- A/C; - 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 24 psi, Rear 32 psi
 Recommended Tire Size: 155 SR13 175/70 SR13
 Recommended Cold Tire Pressure: Front 24 psi, Rear 32 psi
 Tires on Vehicle: 155SR13; Manufacturer: Pirelli
 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 - Lever x Rot. Knot
 Vehicle Capacity Weight (VCW) = 760 lbs. (A)
 No. of Occupants x 150 lbs. = 600 lbs. (B)
 Rated Cargo and Luggage Weight (RCLW) A-B = 160 lbs.
 GVWR 2886 lbs. GAWR: Front 1520 lbs. Rear 1432 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>670</u> lbs.	Right Rear = <u>440</u> lbs.
Left Front = <u>640</u> lbs.	Left Rear = <u>450</u> lbs.
TOTAL FRONT WEIGHT = <u>1310</u> lbs. (<u>60</u> % of Total Vehicle Weight)	
TOTAL REAR WEIGHT = <u>890</u> lbs. (<u>40</u> % of Total Vehicle Weight)	
TOTAL DELIVERY WEIGHT = <u>2200</u> lbs.	

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (2200 lbs.)

VCW = Vehicle Capacity Weight (760 lbs.)

DSC = Designated Seating Capacity (4)

RCLW = VCW - 150 (DSC) = 160 lbs.

Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)

Target Test Weight = 2688 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 172 POUNDS CARGO:

Right Front = <u>770</u> lbs.	Right Rear = <u>630</u> lbs.
Left Front = <u>710</u> lbs.	Left Rear = <u>590</u> lbs.
TOTAL FRONT WEIGHT = <u>1480</u> lbs. (<u>55</u> % of Total Vehicle Weight)	
TOTAL REAR WEIGHT = <u>1220</u> lbs. (<u>45</u> % of Total Vehicle Weight)	
TOTAL TEST WEIGHT = <u>2700</u> lbs.	
Weight of ballast secured in vehicle trunk area = <u>0</u> lbs.	

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude:	RF <u>25.3"</u>	LF <u>25.3"</u>	RR <u>24.9"</u>	LR <u>25.1"</u>
Test Attitude:	RF <u>23.3"</u>	LF <u>23.6"</u>	RR <u>23.3"</u>	LR <u>23.8"</u>
Wheel Base: <u>93</u> in.; C.G. = <u>42</u> 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: 12/17/87 Time of Test: 14:00
 Ambient Temperature: 26 °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 = 35.1 mph, secondary = 35.2 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>159.9</u>	C _L	<u>163.1</u>	L	<u>160.3</u>
	Post-test	= R	<u>140.3</u>	C _L	<u>143.3</u>	L	<u>142.3</u>
	Crush	= R	<u>19.6</u>	C _L	<u>19.8</u>	L	<u>18.0</u>

Distance from front of test vehicle to point of impact:

R 19.9 C/L 19.7 L 20.8

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Steering Hub</u>	<u>Dash</u>
Chest	<u>No contact</u>	<u>No contact</u>
Abdomen	<u>No contact</u>	<u>No contact</u>
Left Knee	<u>Dash</u>	<u>Dash</u>
Right Knee	<u>Dash</u>	<u>Dash</u>

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

	<u>Front</u>	
	<u>Left</u>	<u>Right</u>
Door Opening	Not operable <u> </u>	Operable <u> </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>

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)	-70	27	120	136	-58	-14	-18	55
DUMMY (2)	-134	54	94	170	-42	25	15	44
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	See Note 1	344
DUMMY (2)	478	663
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)	See Note 1	-	1778
DUMMY (2)	1738	1356	-
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**			
	HIC	t ₁ (SEC)	t ₂ (SEC)	AVE. ACC. (g) t ₁ TO t ₂
DUMMY (1)	1114	.06510	.08850	74.3
DUMMY (2)	1424	.08407	.09195	126.7
DUMMY (3)				
DUMMY (4)				

Note 1: Data is not available for position #1 right femur and position #1 torso belt.

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION

TEST NO.: MJ5800

VEHICLE: 1988 Volkswagen Fox

SEAT TYPE:

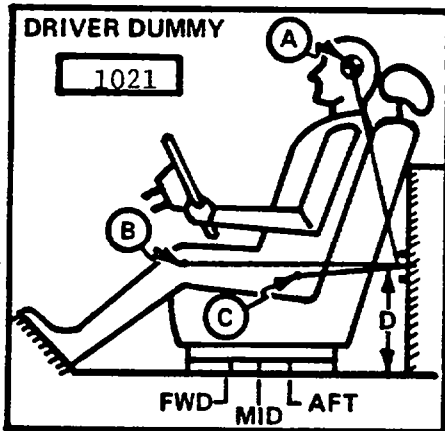
 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

 X Manual
 Power

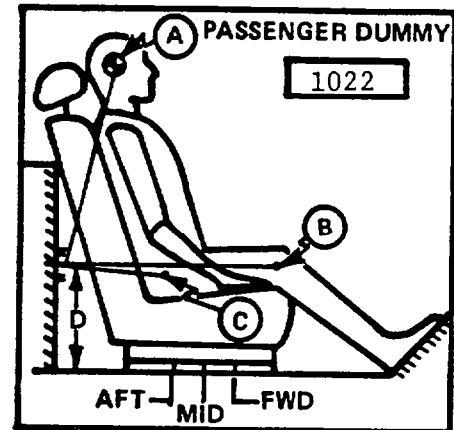
BUCKET SEAT BACK TYPE:

 Fixed
 X Adjustable Reclining



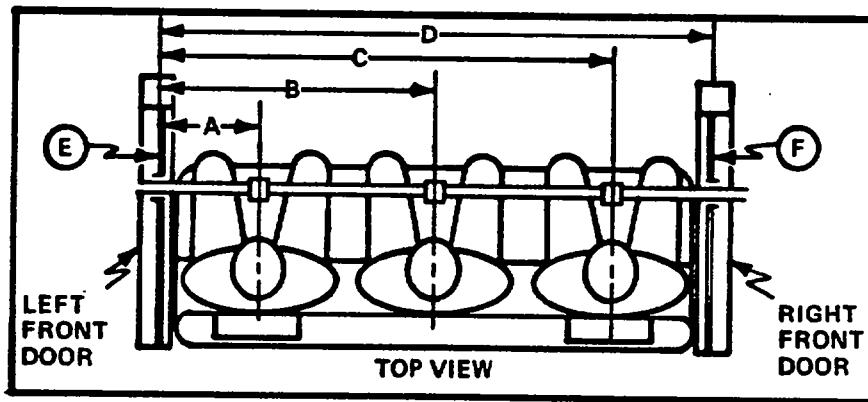
MEASUREMENT LOCATION

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



A = 20.2 in. 50° Degrees
 B = 33.1 in. 105° Degrees
 C = 20.4 in. 126° Degrees
 D = 18.7 in.

A = 20.4 in. 50° Degrees
 B = 34 in. 102° Degrees
 C = 21 in. 124° Degrees
 D = 18.7 in.



DUMMY ID

1021

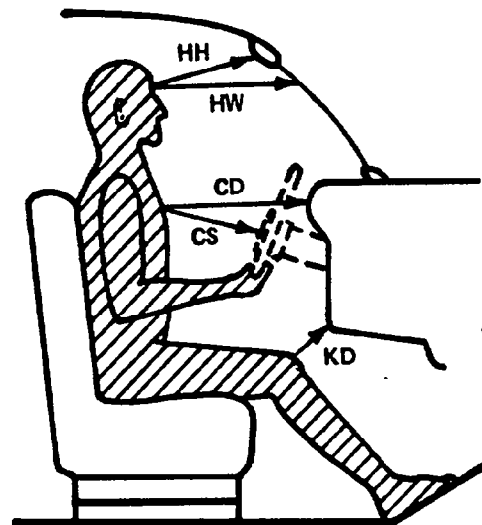
1022

A	=	Left Door to Driver Centerline	<u>11.8</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>9.5</u> in.

Seat back angle was set by rotating seat back positioning dial 225° from full upright.

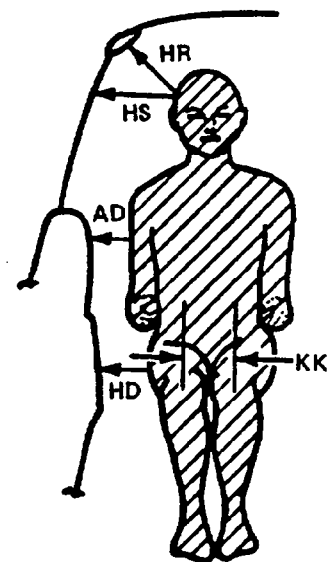
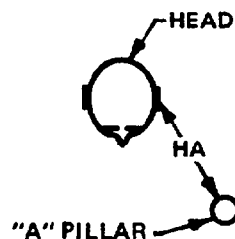
Figure 2
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	11.5	10.7
HW	16.0	15.7
CD	19.1	18.8
CS	15.3	--
KDL	4.1	4.7
KDR	4.6	4.1
SA	See Note 1	See Note 1
TA	18°	18°



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

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

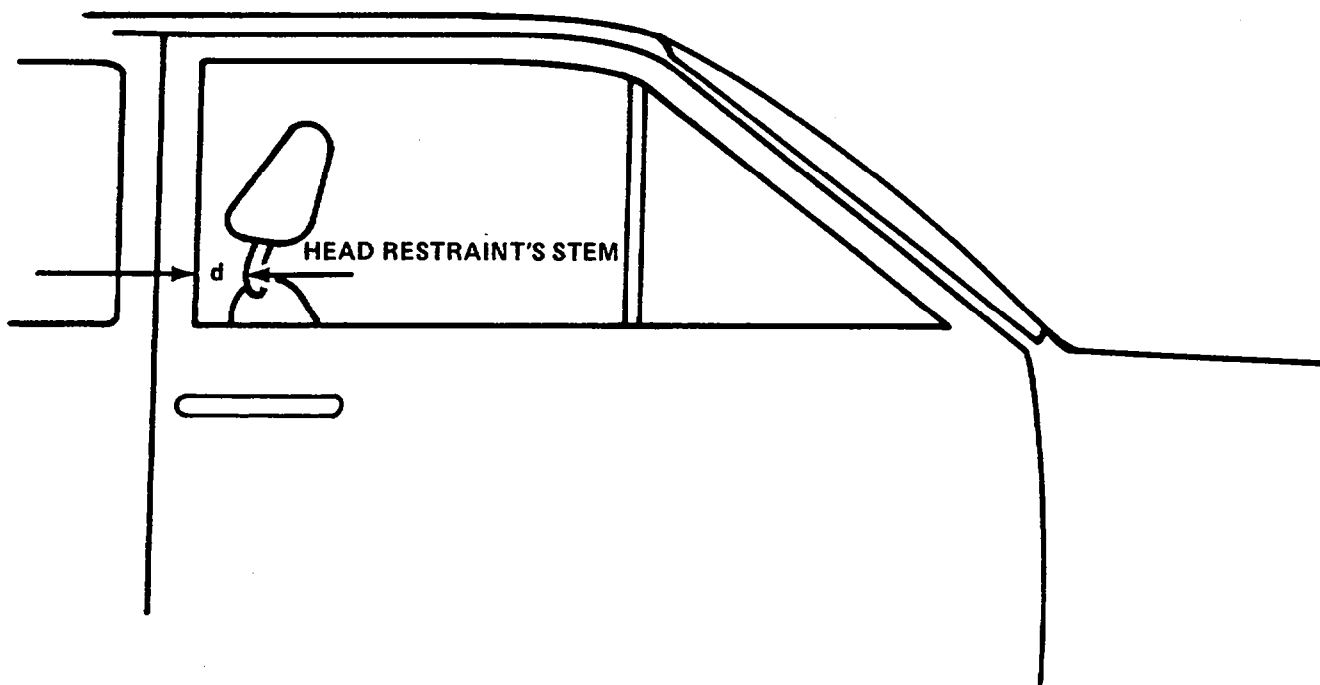


	DRIVER	PASSENGER
HR	4.8	4.3
HS	7.9	7.3
AD	3.4	3.5
HD	6.6	5.6
KK	9.5	8
HA	15.8	14.8

Note 1: Seat adjustment dial was set 225° rotation from full upright (5/8 of a turn). Additional adjustment was accomplished by measuring 2.25" from head restraint to window frame (see Figure 3).

Figure 3 VOLKSWAGEN DO BRASIL S.A.

2-DOOR FOX SEAT BACK PLACEMENT

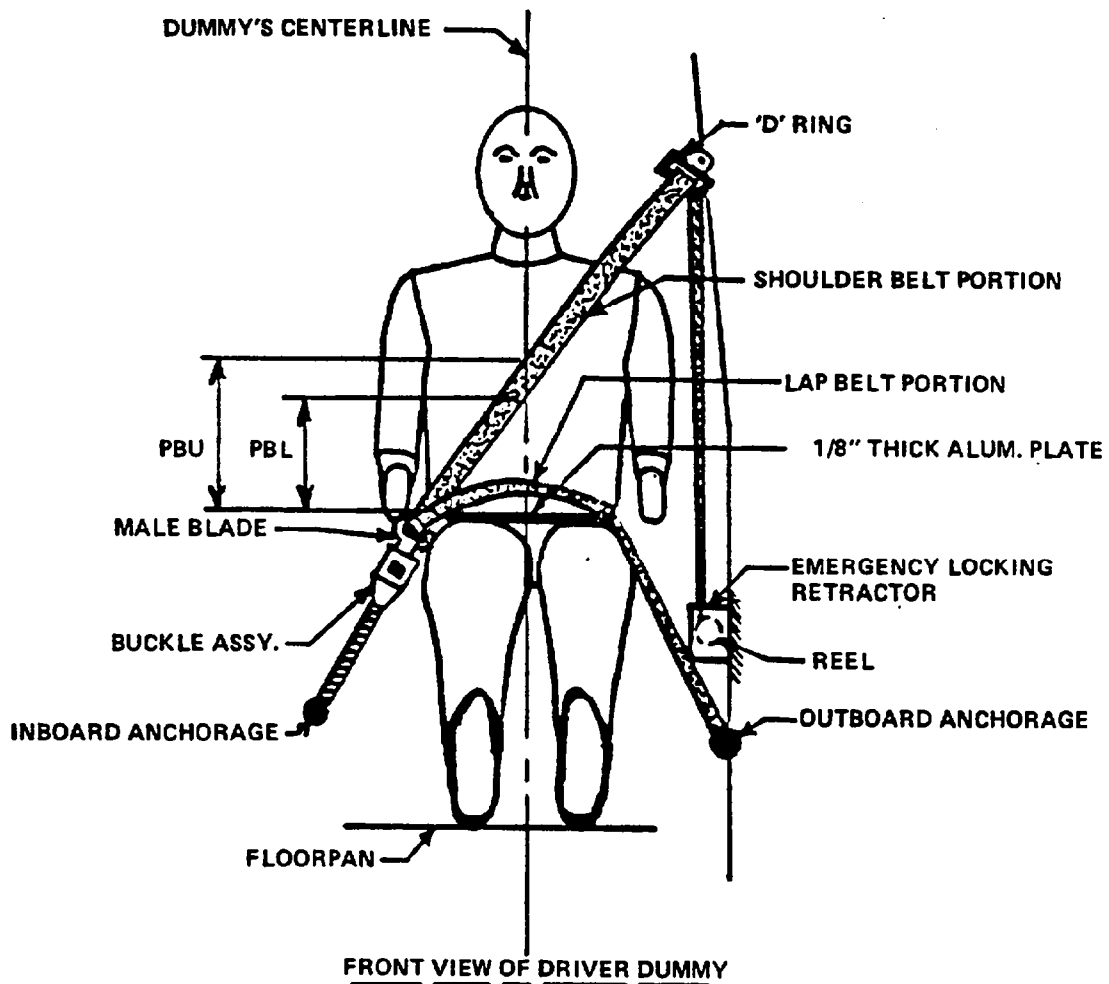


d DISTANCE FROM THE REAR OF THE DRIVER/PASSENGER WINDOW FRAME TO THE HEAD RESTRAINT STEM. MEASUREMENT TAKEN ON THE STEM AT THE CLOSEST POINT OF THE SEAT BACK WITH THE SEAT BACK ADJUSTED IN ORDER TO HAVE AN 18° TORSO ANGLE.

d = 57 mm (2¼")

Note: Seat Back positioning data as received from Volkswagen of America.

Figure 4
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	13.5	14.0
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	10.5	10.8
<u>LAP BELT TENSION</u>	--	--
<u>SHOULDER BELT TENSION</u>	2.5	2.5

Table 3

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA**BELT LENGTH DATA:**

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

Driver**Passenger**95.0"95.0"

Shoulder belt length as measured
on Part 572 Dummy.

41.0"41.0"

Lap belt length as measured on
Part 572 Dummy.

35.5"35.5"**BELT SPOOL-OFF DATA:**

As determined by film analysis.

2.0"1.5"

As determined mechanically.

2.0"1.5"

As determined electronically.

2.0"1.8"**BELT STRETCH DATA:**

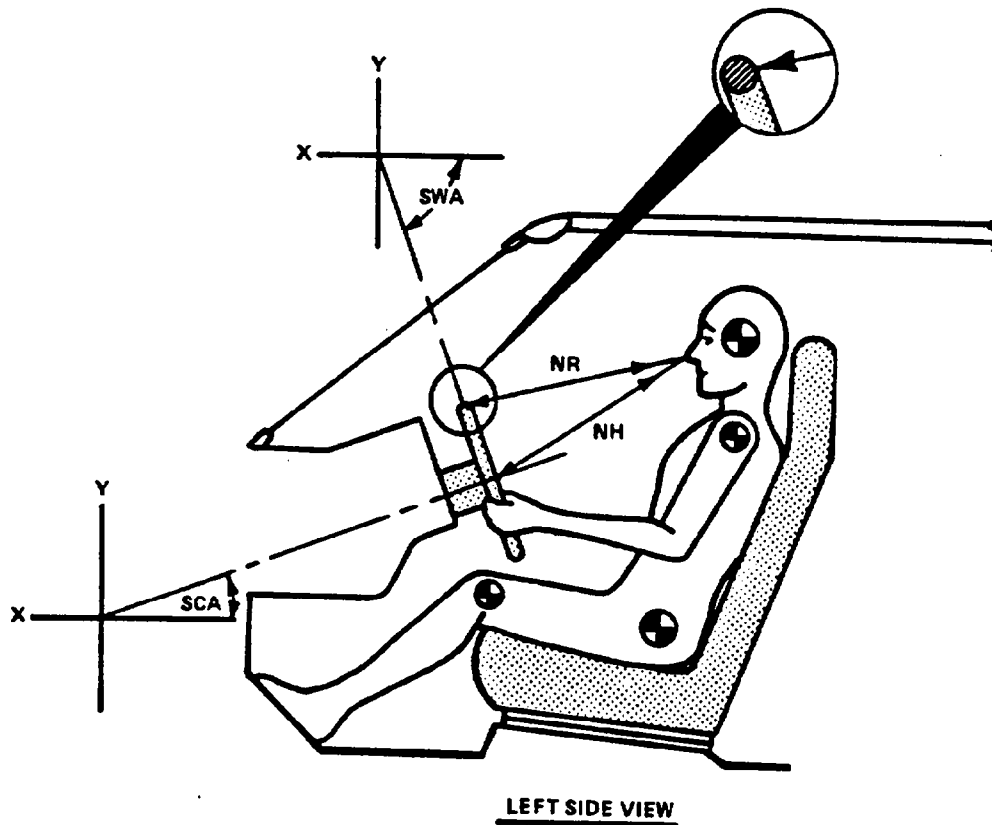
Measured electronically between
shoulder belt load cell and the "D" ring.

0.8 in/ft1.1 in/ft

Measured Mechanically

0.00.0

Figure 5
 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	15.6	Inches
<u>NH</u> -- Distance from tip of dummy's nose to center of steering column hub	17	Inches
<u>SCA</u> -- Angle of steering column relative to the horizontal X axis	23	Degrees
<u>SWA</u> -- Angle of steering wheel relative to the horizontal X axis	-67	Degrees

<u>HS</u> -- Distance from Dummy's Head C.G. Target to Striker Plate	31.8	Inches
--	------	--------

Figure 6
CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

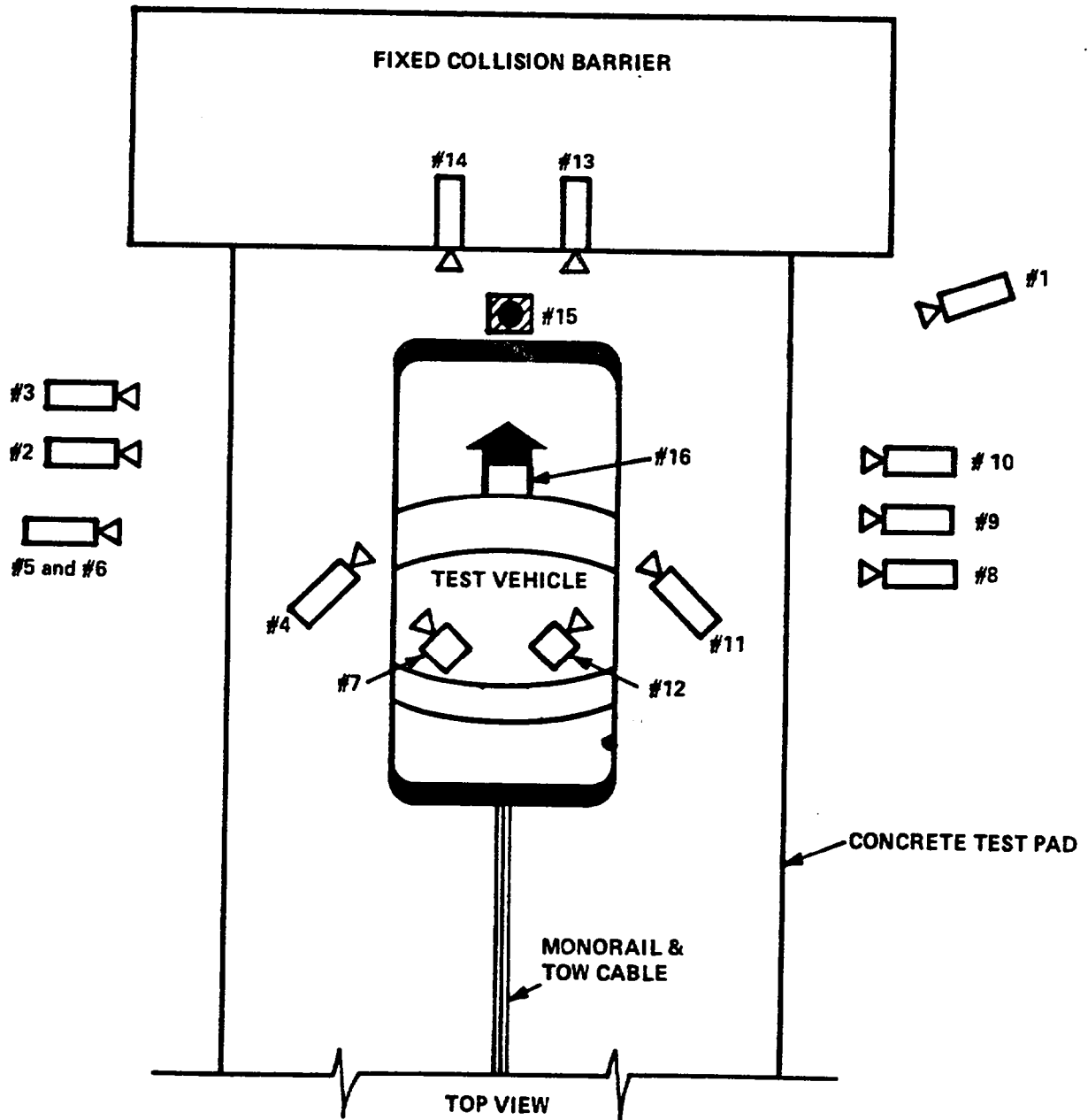


Table 4
HIGH-SPEED CAMERA LOCATIONS

Test No. MJ5800 1988 Volkswagen Fox

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	279	57	42	5	-	13	540
3	Left Side View	224	38	41	5	-	25	540
4	Driver and Interior View	81	82	71	19	-	13	780
5	Steering Column (Bottom)	291	82	49	4	275	25	550
6	Steering Column (Top)	291	94	73	10	275	25	550
7	Left Belt	-	-	-	-	-	8	750
8	Overall Right Side	232	64	43	1	-	13	800
9	Right Side View	248	42	44.5	3	-	25	850
10	Right Passenger View	276	65	54.5	5	260	35	680
11	Passenger and Interior View	72	95	71	21	-	25	600
12	Right Belt	-	-	-	-	-	8	820
13	Passenger Front View	24	-5	73	42	-	13	550
14	Driver Front View	24	-5	73	38	-	13	540
15	Windshield View	0	0	126	-55	-	13	550
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

VEHICLE TARGET LOCATIONS

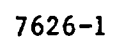


Figure 8

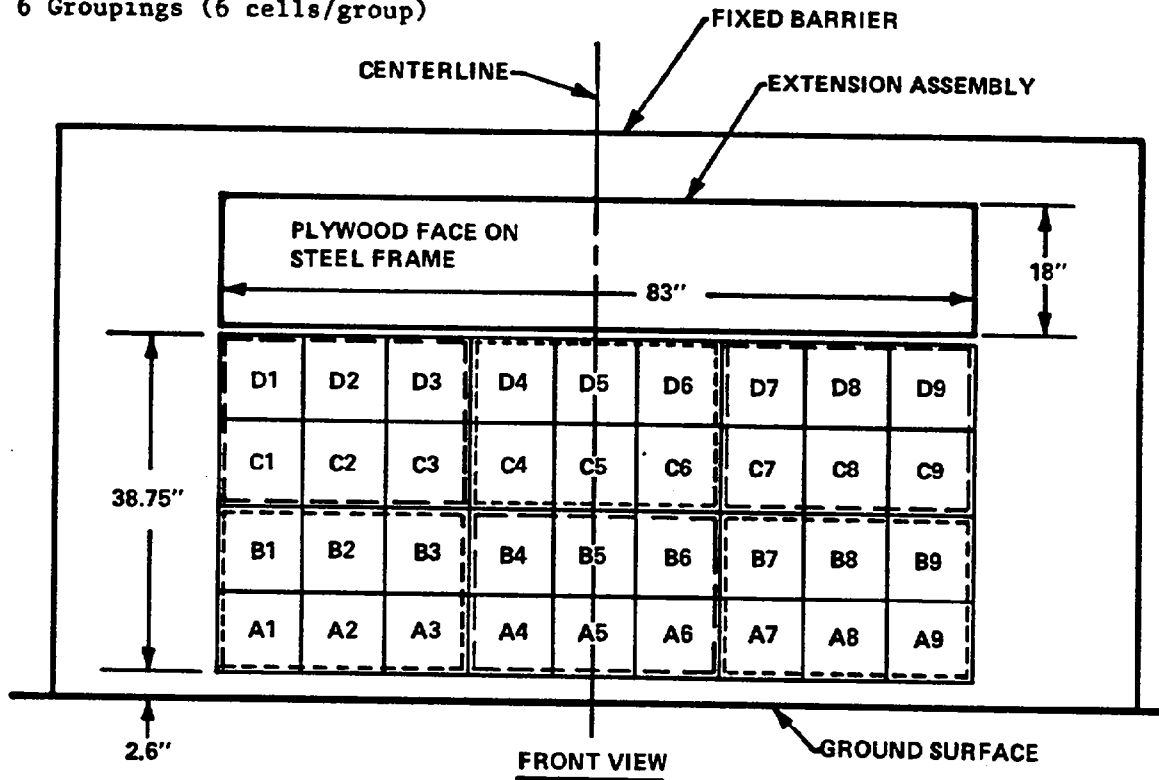
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells

4 Rows

9 Columns

6 Groupings (6 cells/group)



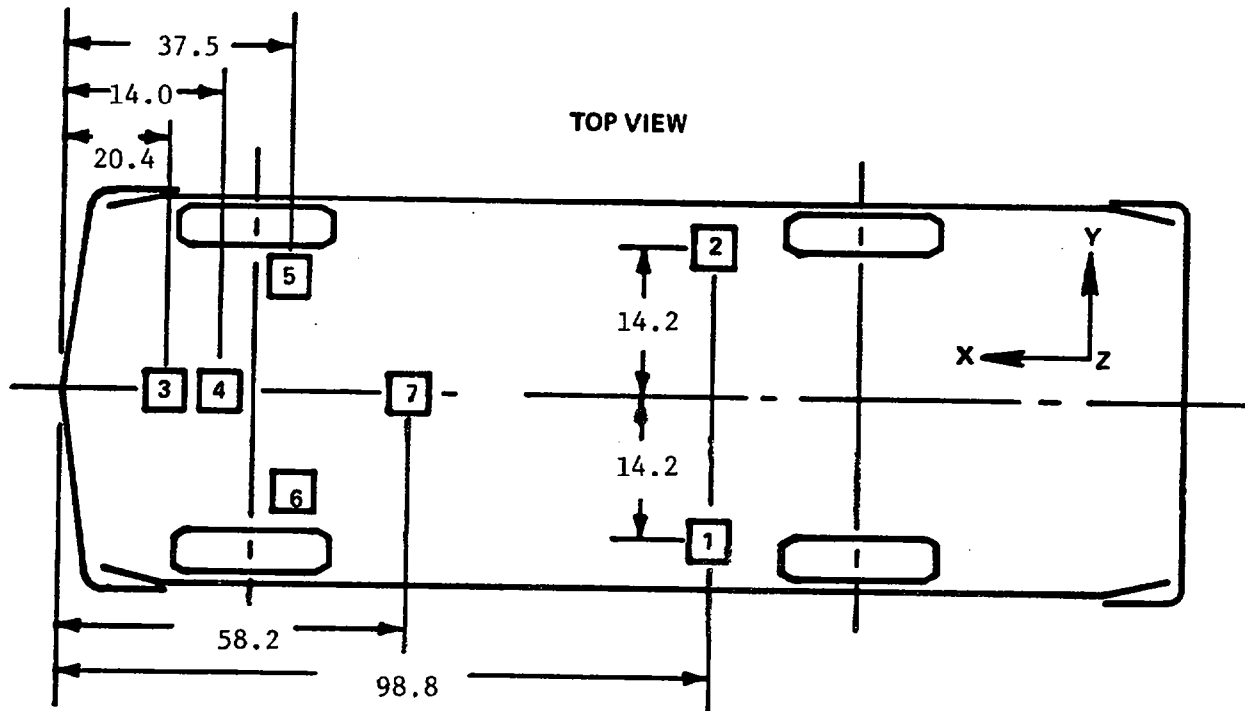
6 GROUPS OF 6 LOAD CELLS EACH

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 9
VEHICLE ACCELEROMETER LOCATIONS



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

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

Figure 10

TEST VEHICLE MEASUREMENTS

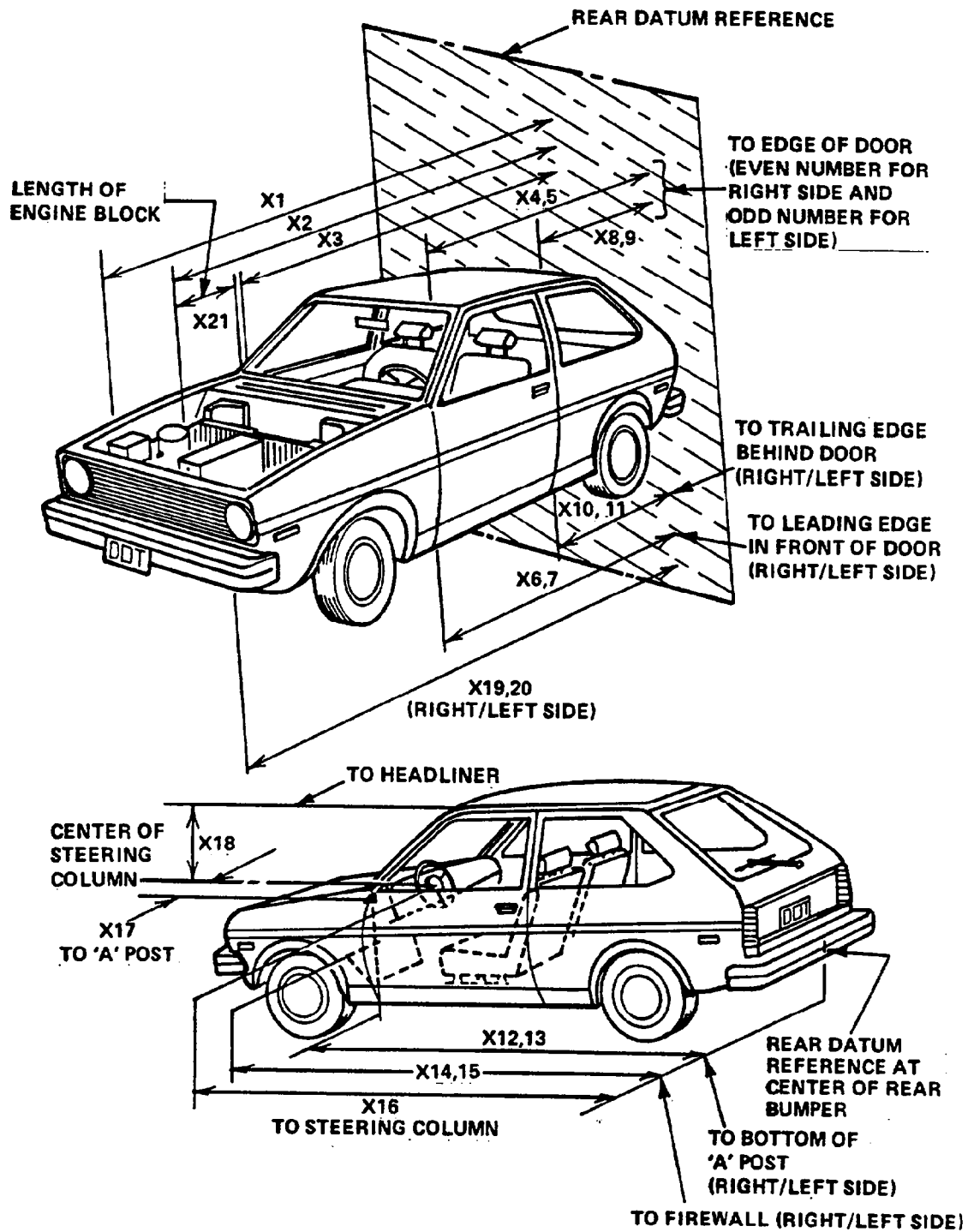


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	163.1	143.3	19.8
X2	Rear Surface of Vehicle to Front of Engine	150.3	139.0	11.3
X3	Rear Surface of Vehicle to Firewall	127.1	122.1	5.0
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	112.0	112.8	-0.8
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	112.9	113.0	-0.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	111.5	111.0	0.5
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	112.1	111.1	1.0
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	65.9	66.5	-0.6
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	66.8	66.9	-0.1
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	66.5	66.4	0.1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	67.3	66.2	1.1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	111.5	111.0	0.5
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	112.1	111.1	1.0
X14	Rear Surface of Vehicle to Firewall, Right Side	123.2	118.1	5.1
X15	Rear Surface of Vehicle to Firewall, Left Side	124.1	120.7	3.4
X16	Rear Surface of Vehicle to Steering Column	92.9	96.7	-3.8
X17	Center of Steering Column to "A" Post	15.6	14.0	1.6
X18	Center of Steering Column to Headliner	15.5	13.5	2.0
X19	Rear Surface of Vehicle to Right Side of Front Bumper	159.9	140.3	19.6
X20	Rear Surface of Vehicle to Left Side of Front Bumper	160.3	142.3	18.0
X21	Length of Engine Block	14.5	14.5	0.0

Appendix A
PHOTOGRAPHS

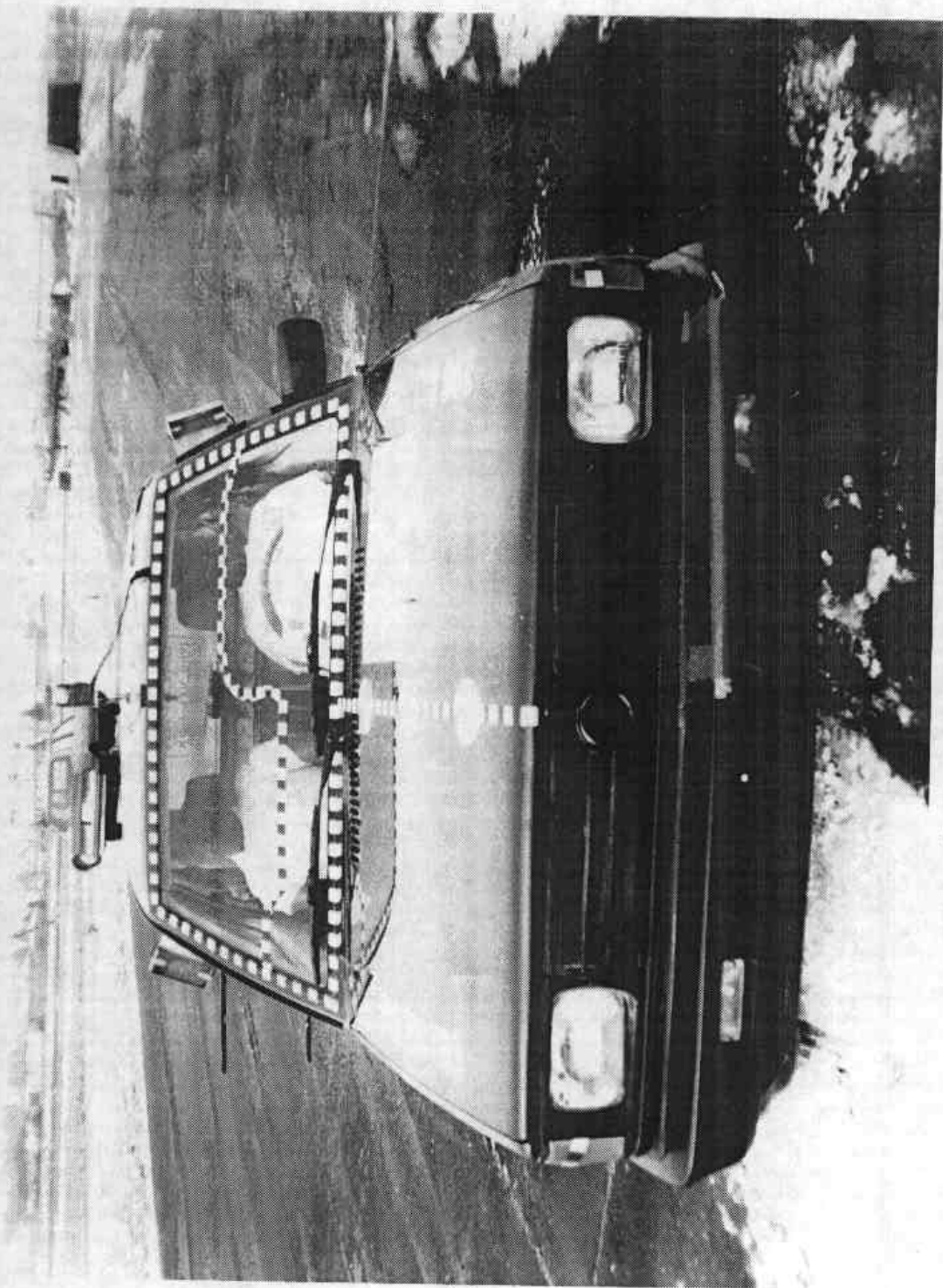


Figure A-1 PRE-TEST FRONT VIEW

A-2

7625-1

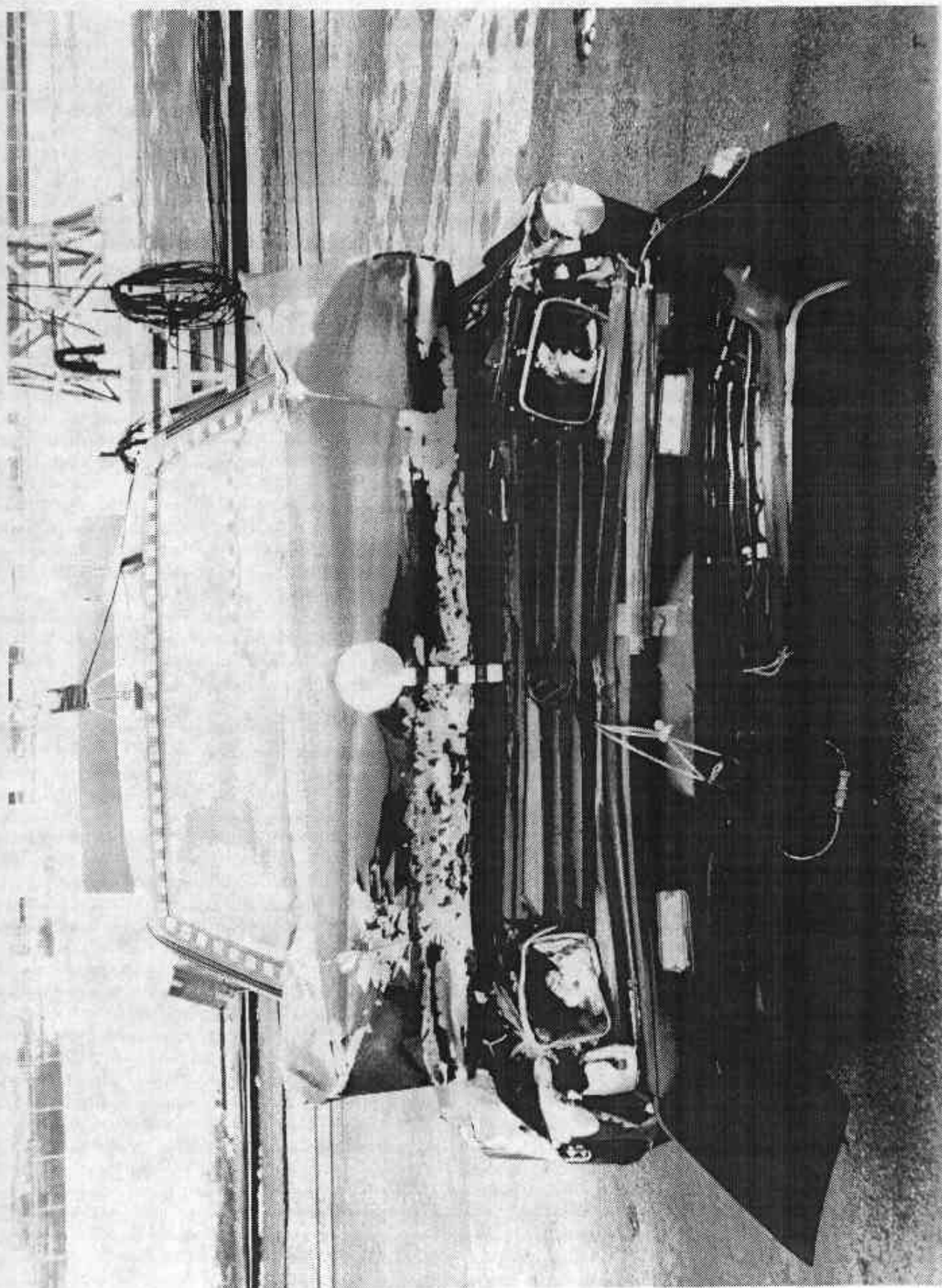


Figure A-2 POST-TEST FRONT VIEW

A-3

7626-1

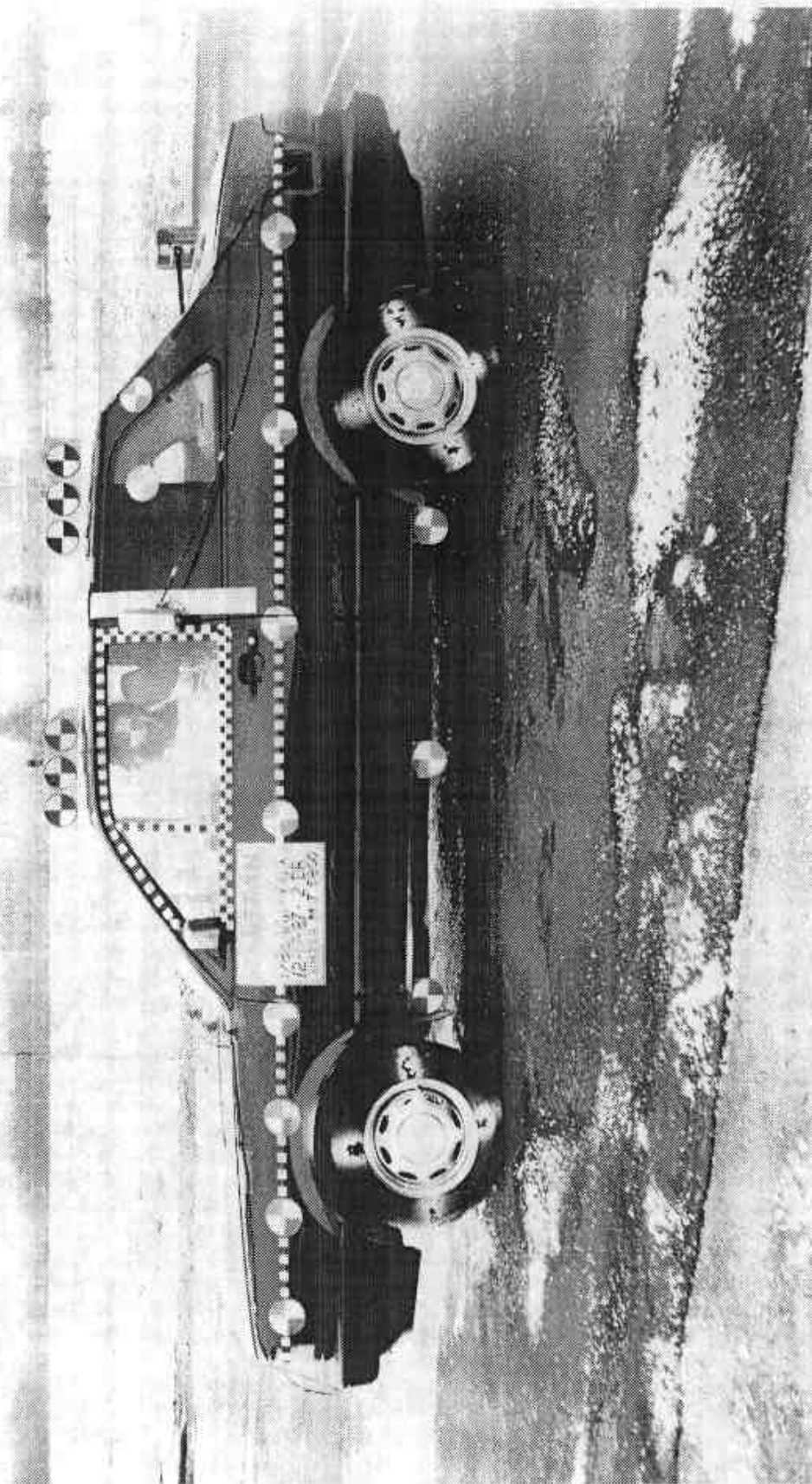


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-4

7626-1

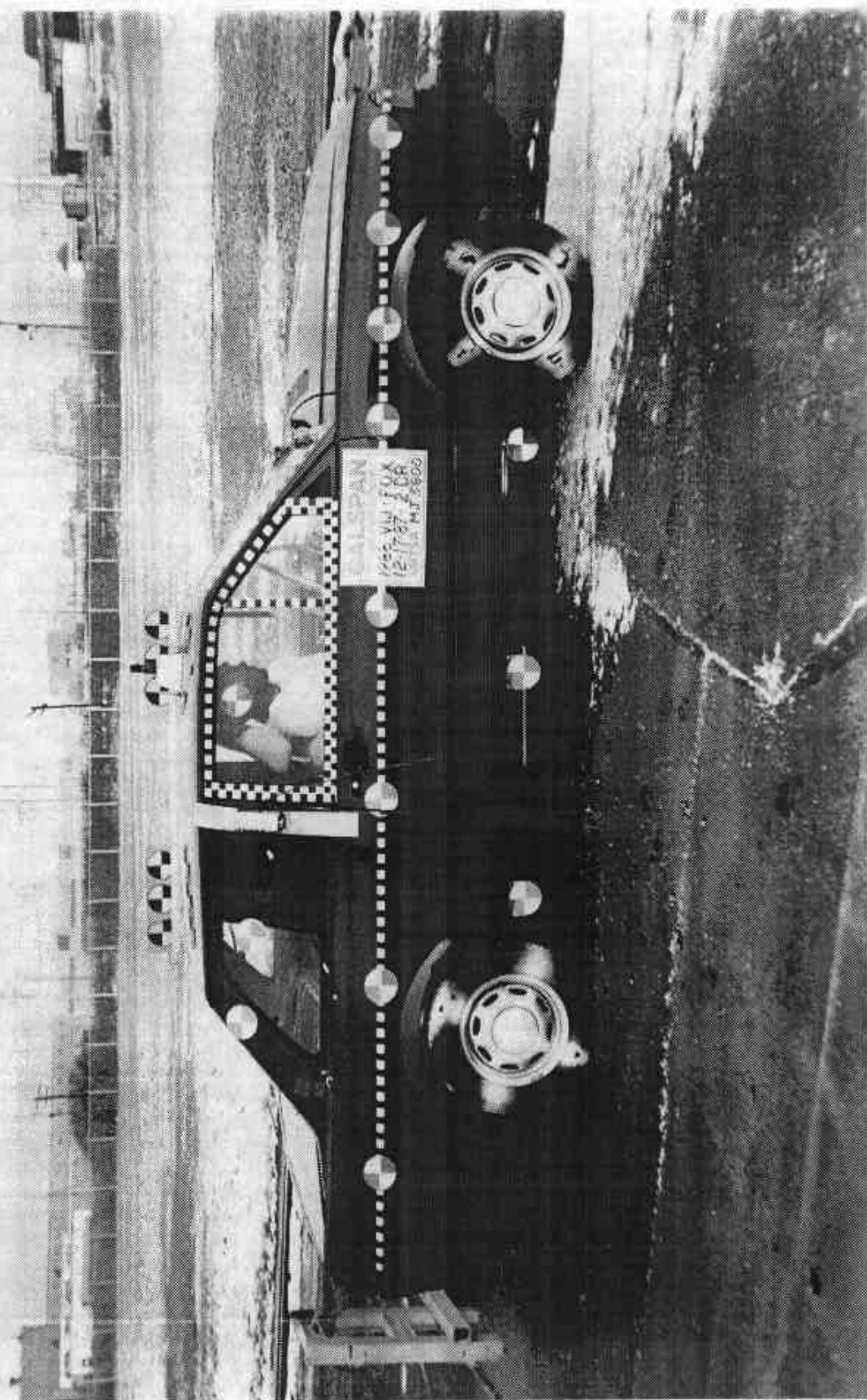


Figure A-4 PRE-TEST RIGHT SIDE VIEW

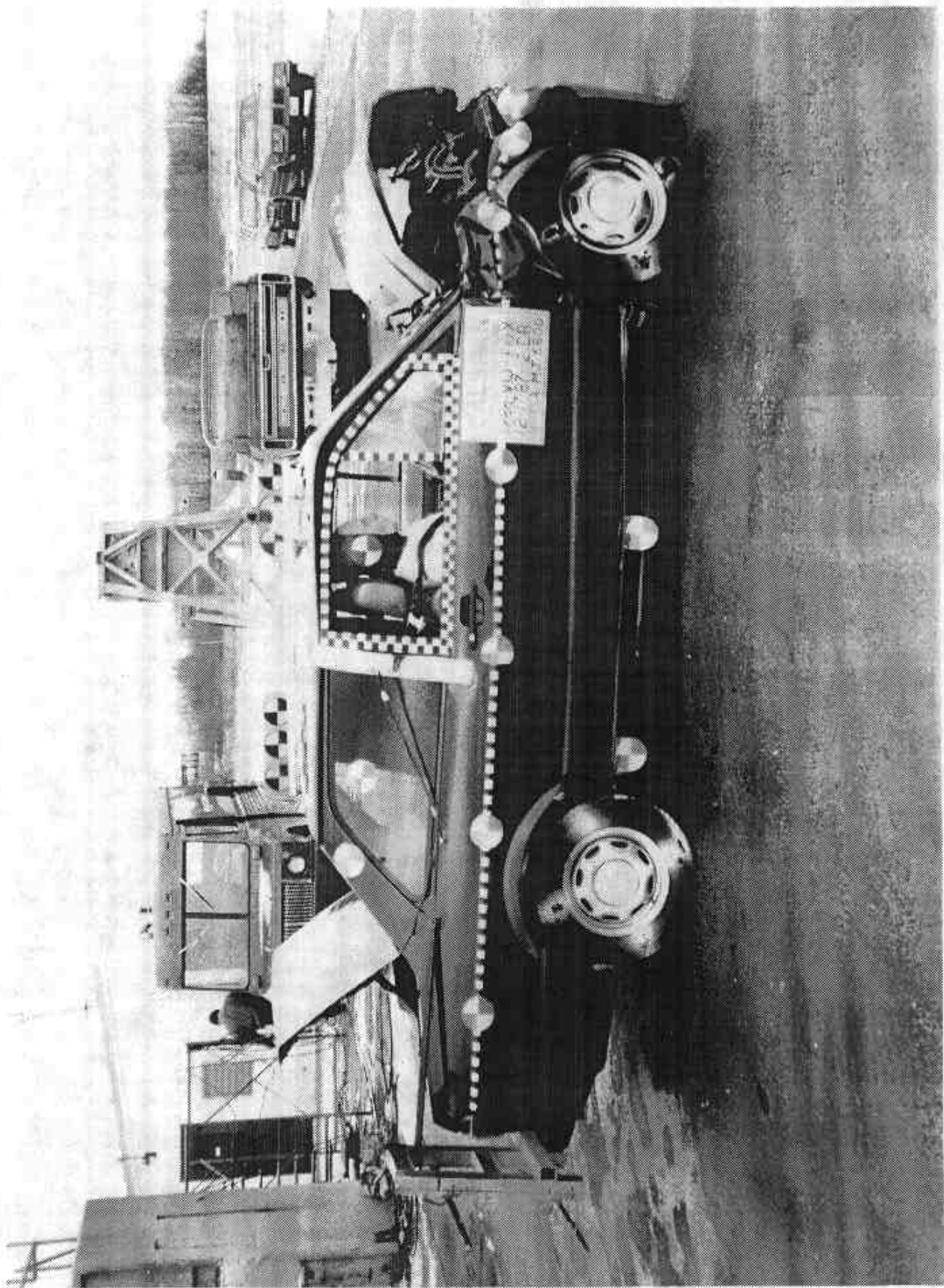


Figure A-5 POST-TEST RIGHT SIDE VIEW

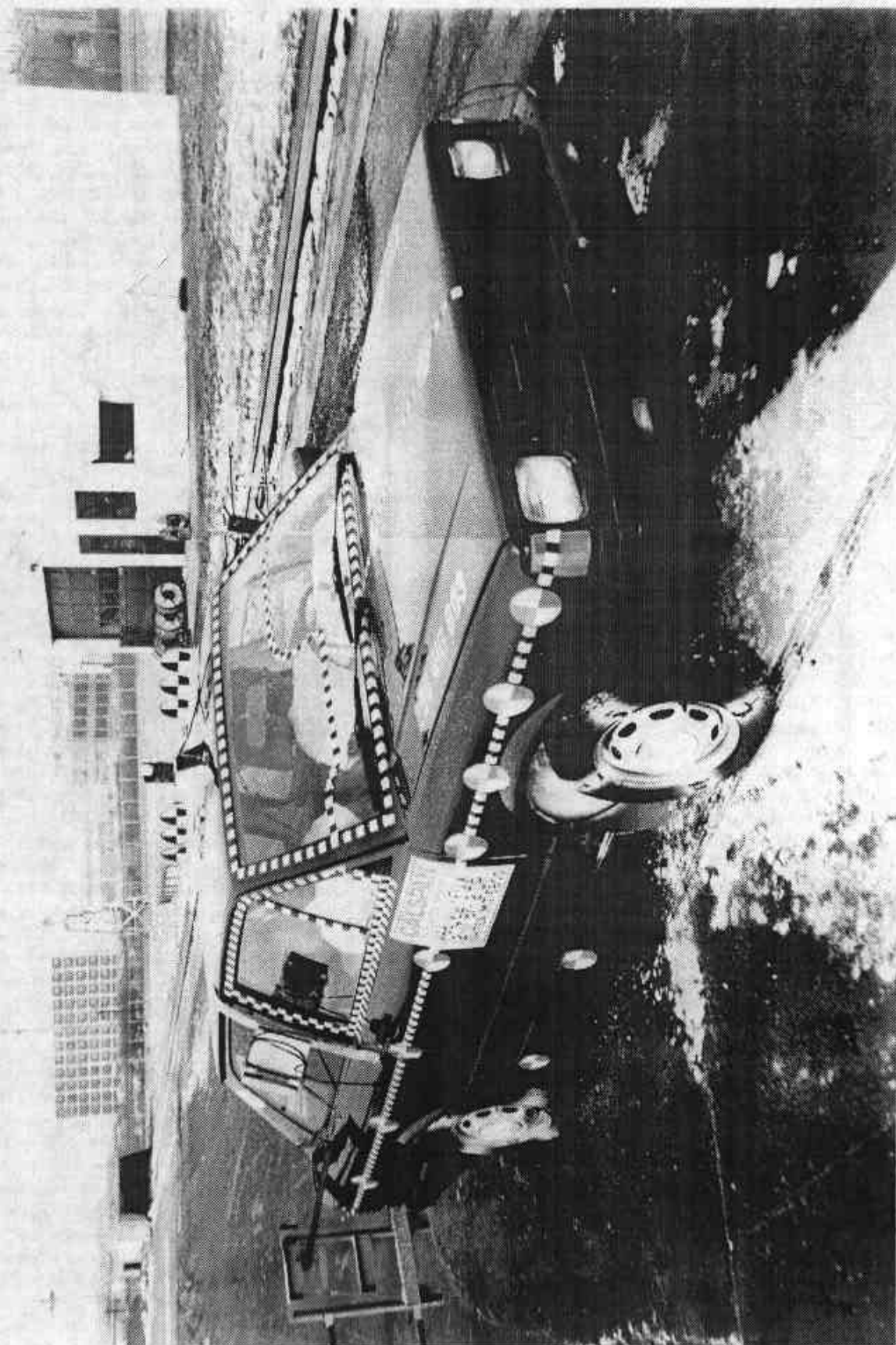


Figure A-6 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-7

7626-1

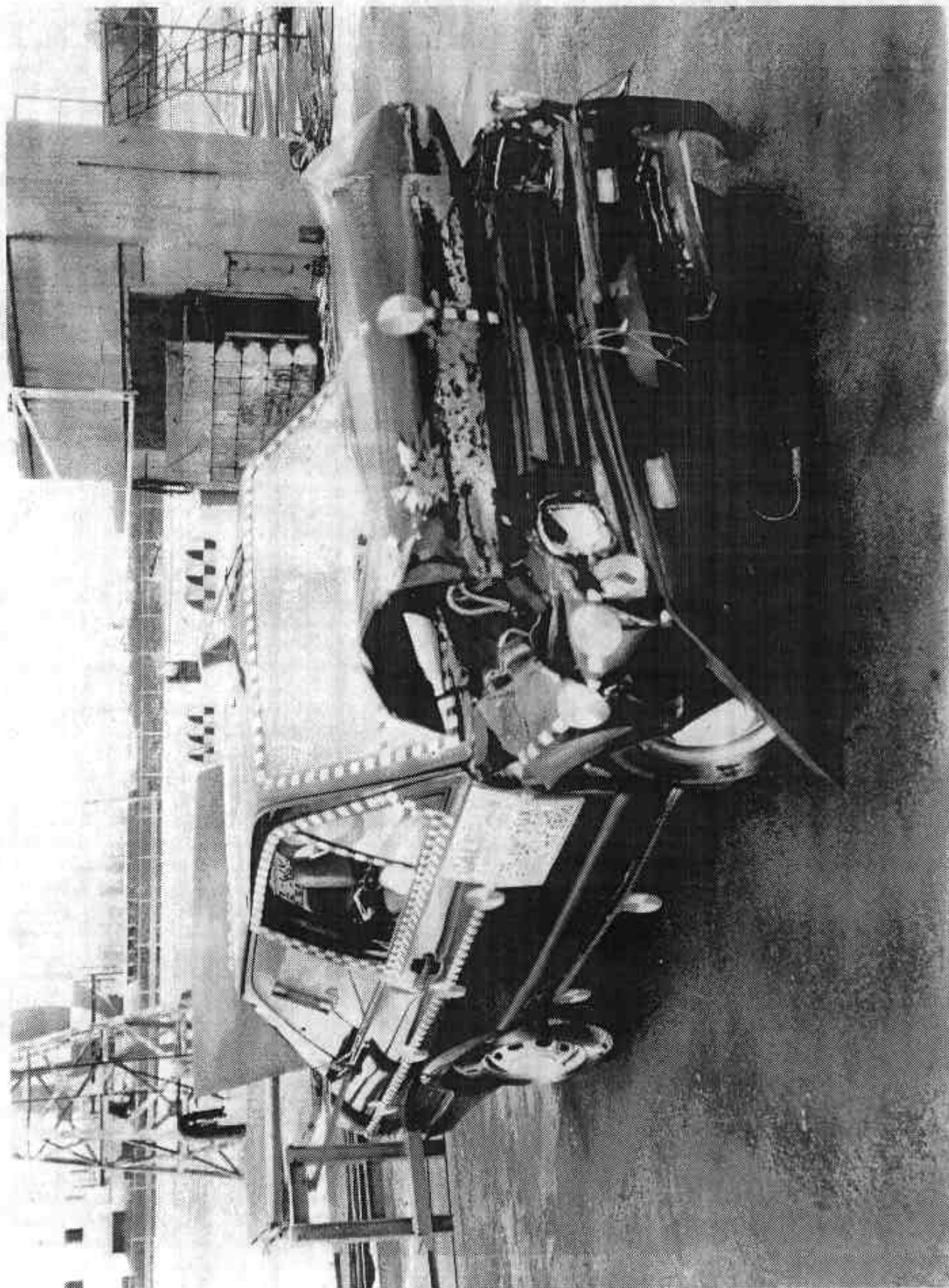


Figure A-7 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-8

7626-1



Figure A-8 PRE-TEST LEFT REAR THREE-QUARTER VIEW

A-9

7626-1



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

A-10

7626-1

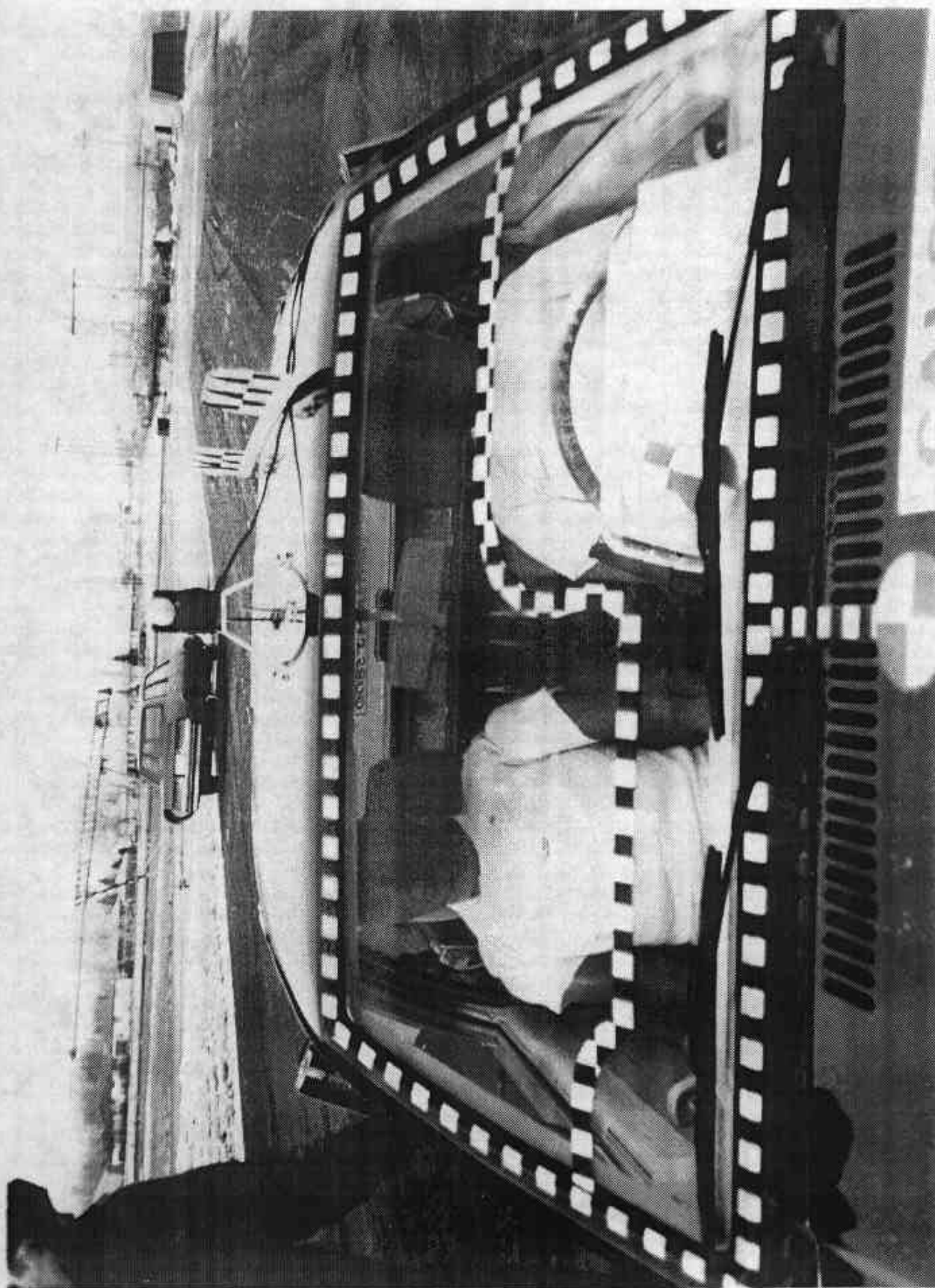


Figure A-10 PRE-TEST WINDSHIELD VIEW

A-11

7626-1

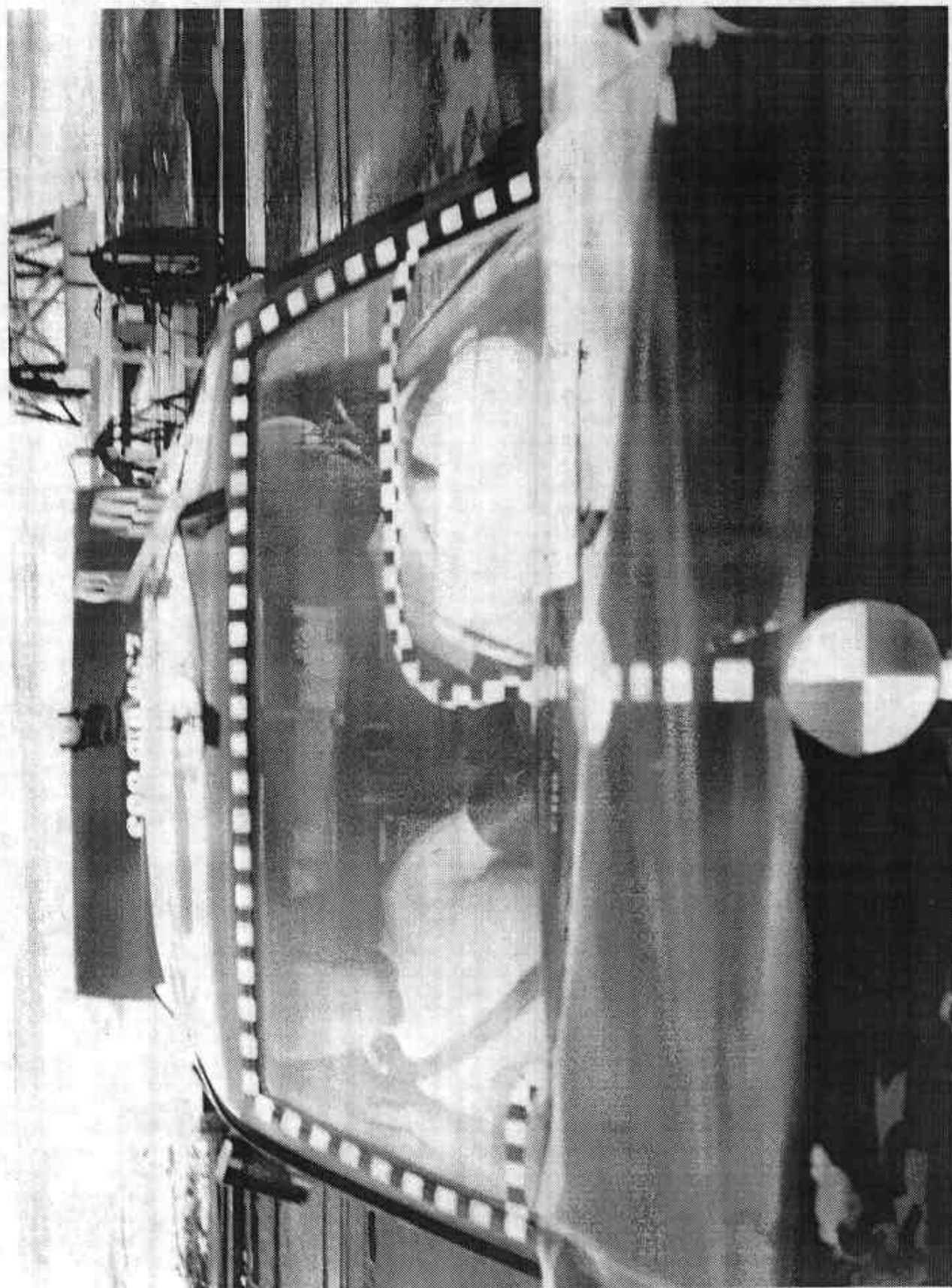


Figure A-11 POST-TEST WINDSHIELD VIEW

A-12

7626-1

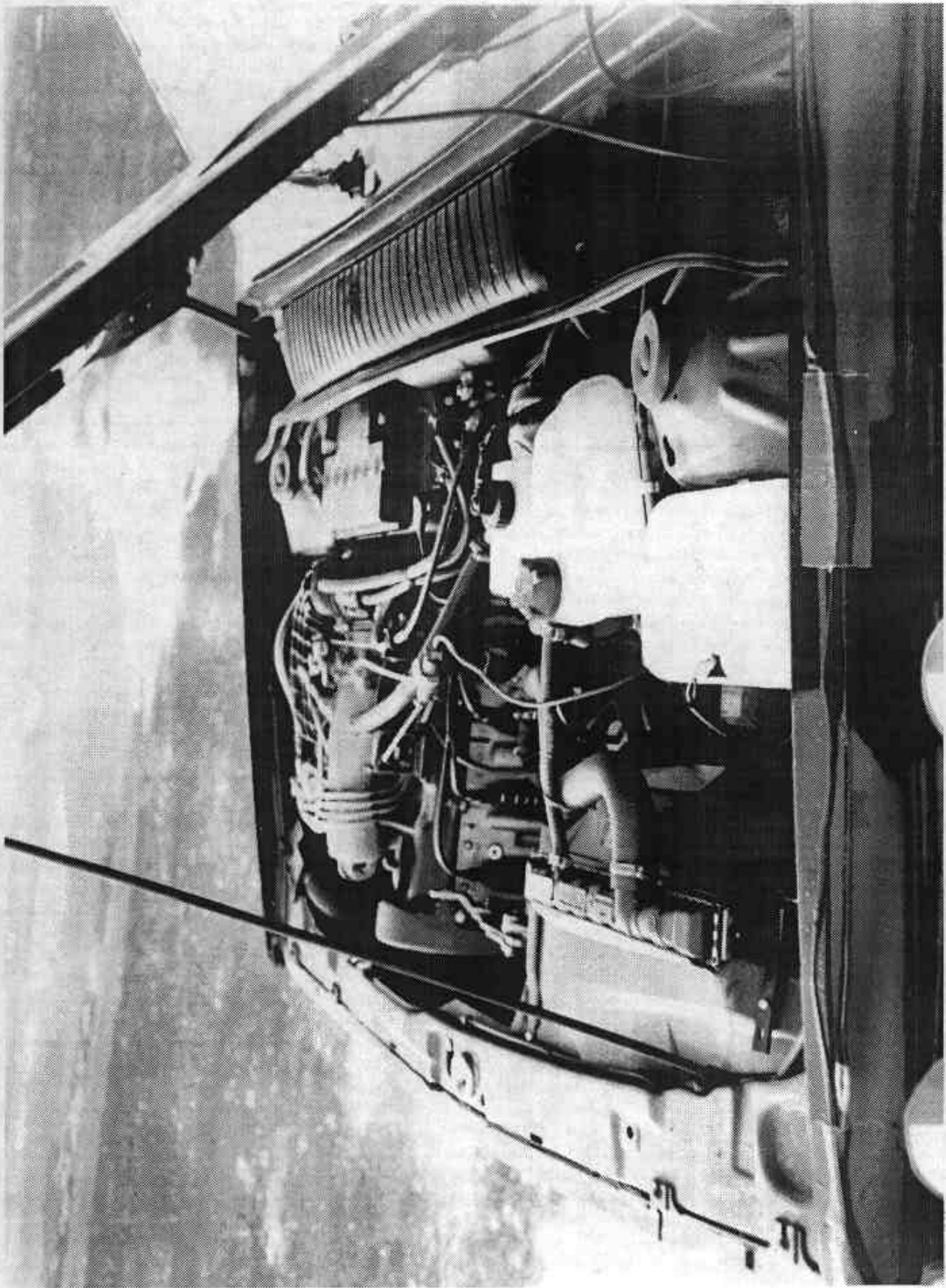


Figure A-12 PRE-TEST ENGINE COMPARTMENT VIEW

A-13

7626-1

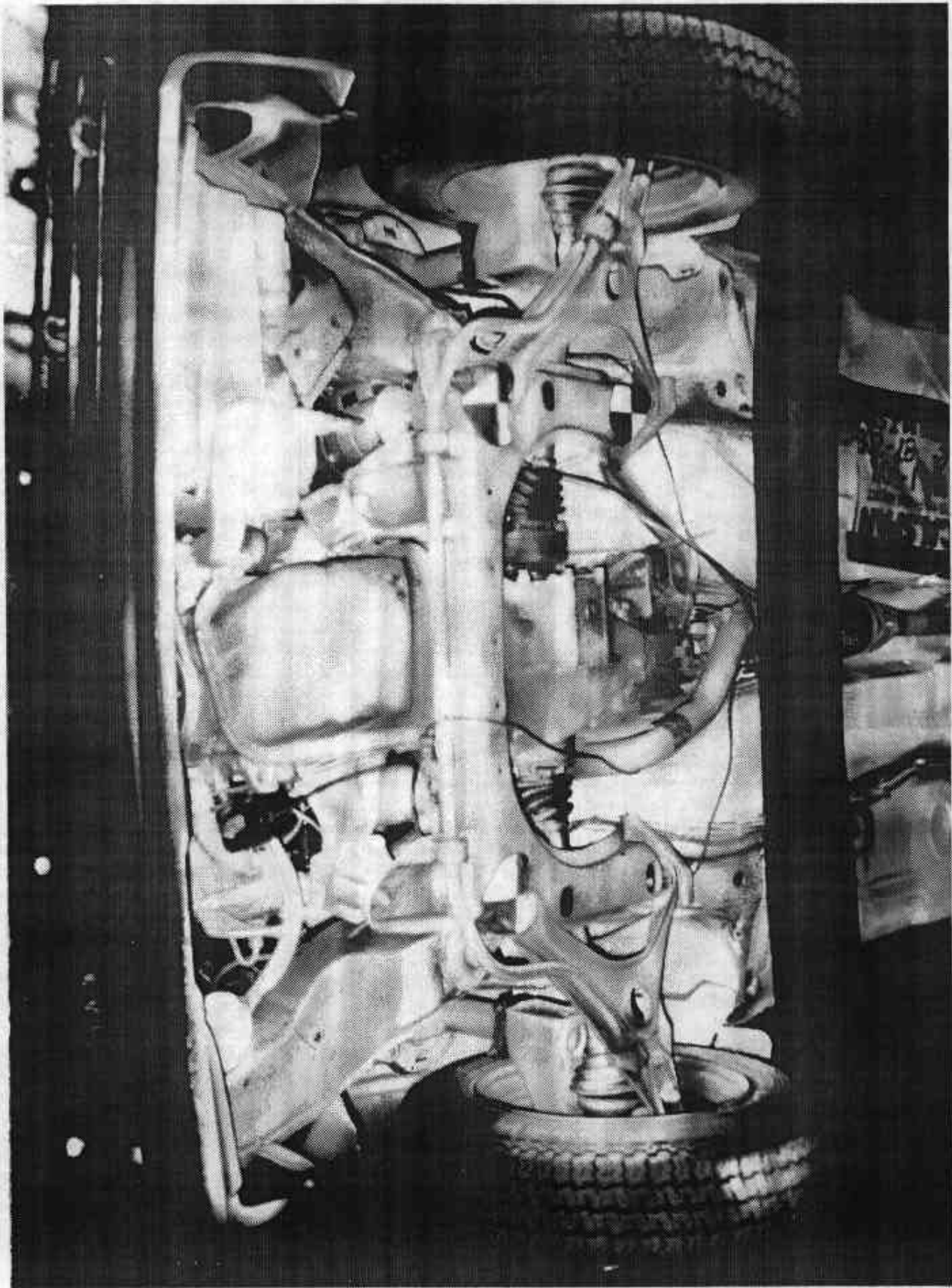


Figure A-13 PRE-TEST FRONT UNDERBODY VIEW

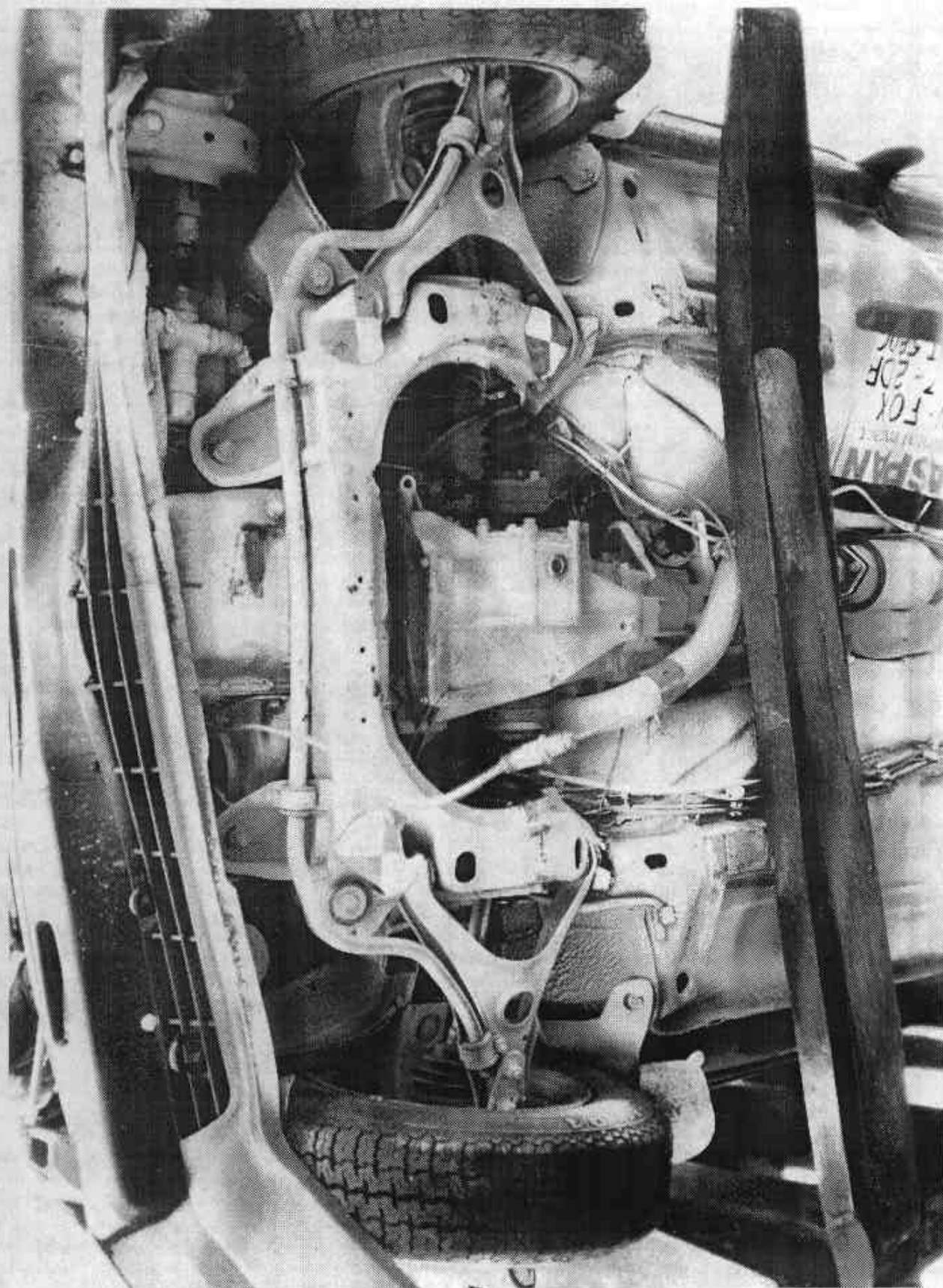


Figure A-14 POST-TEST FRONT UNDERBODY VIEW

A-15

7626-1

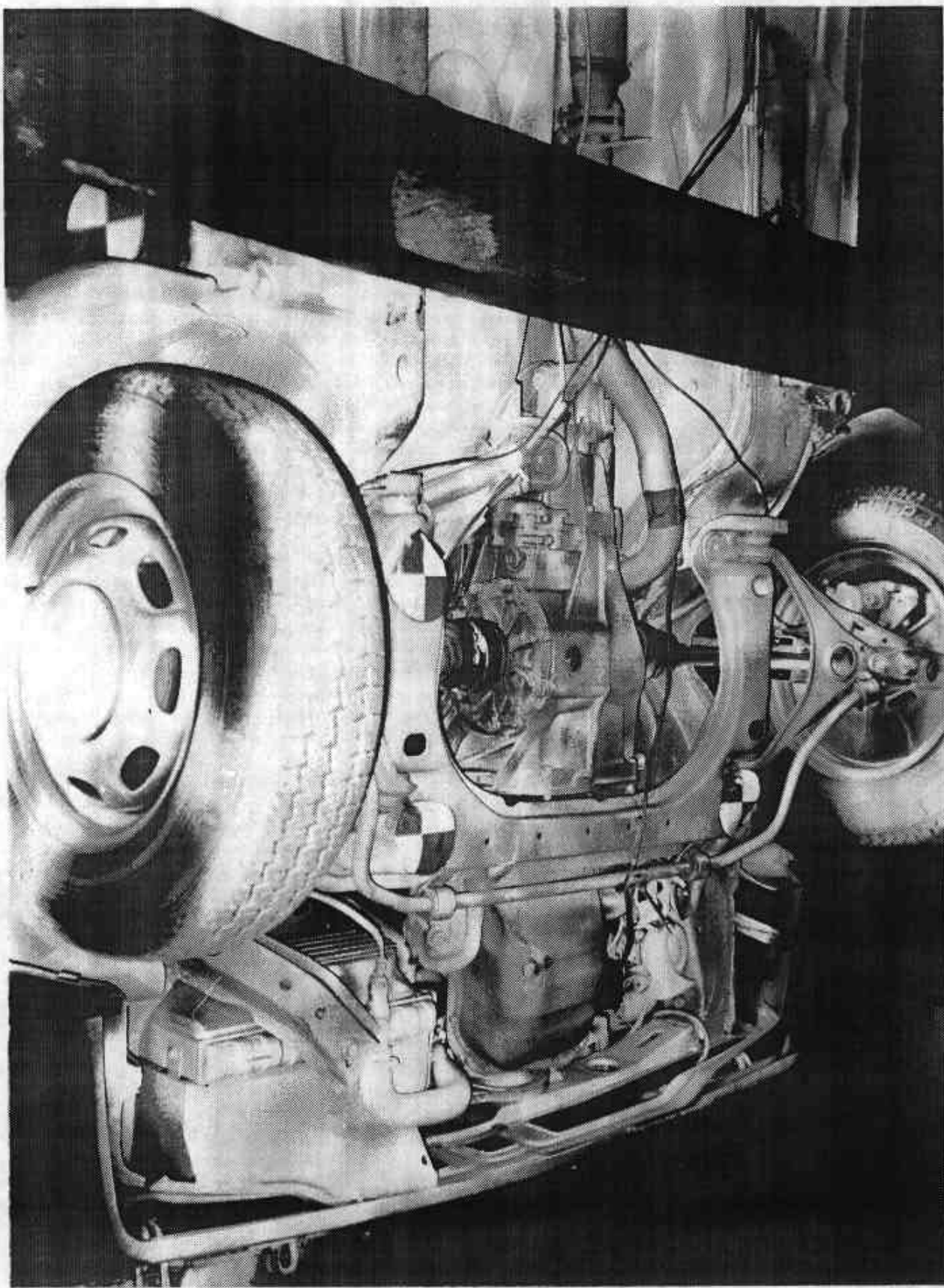


Figure A-15 PRE-TEST FRONT-SIDE UNDERBODY VIEW

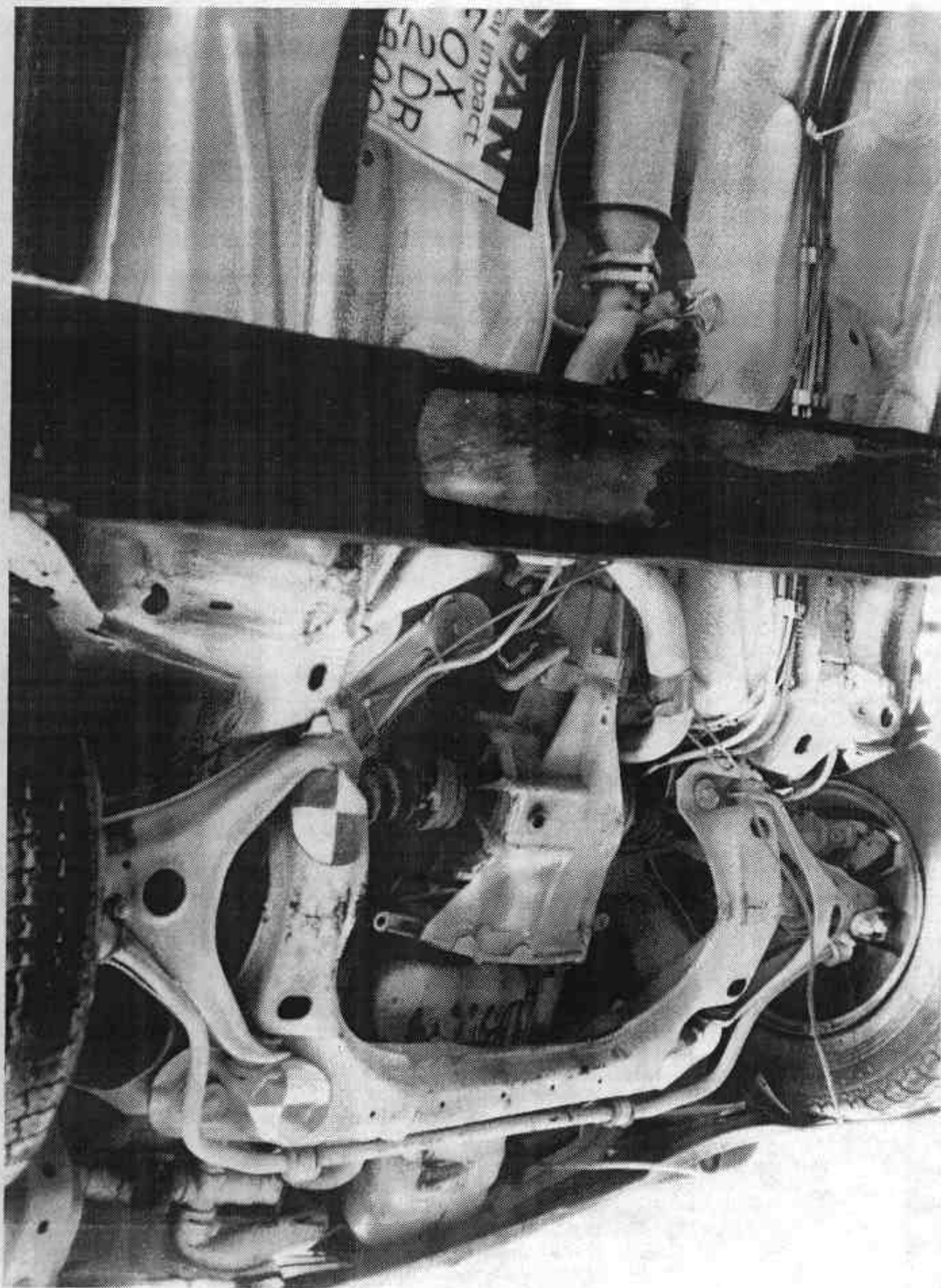


Figure A-16 POST-TEST FRONT-SIDE UNDERBODY VIEW



Figure A-17 PRE-TEST REAR UNDERBODY VIEW

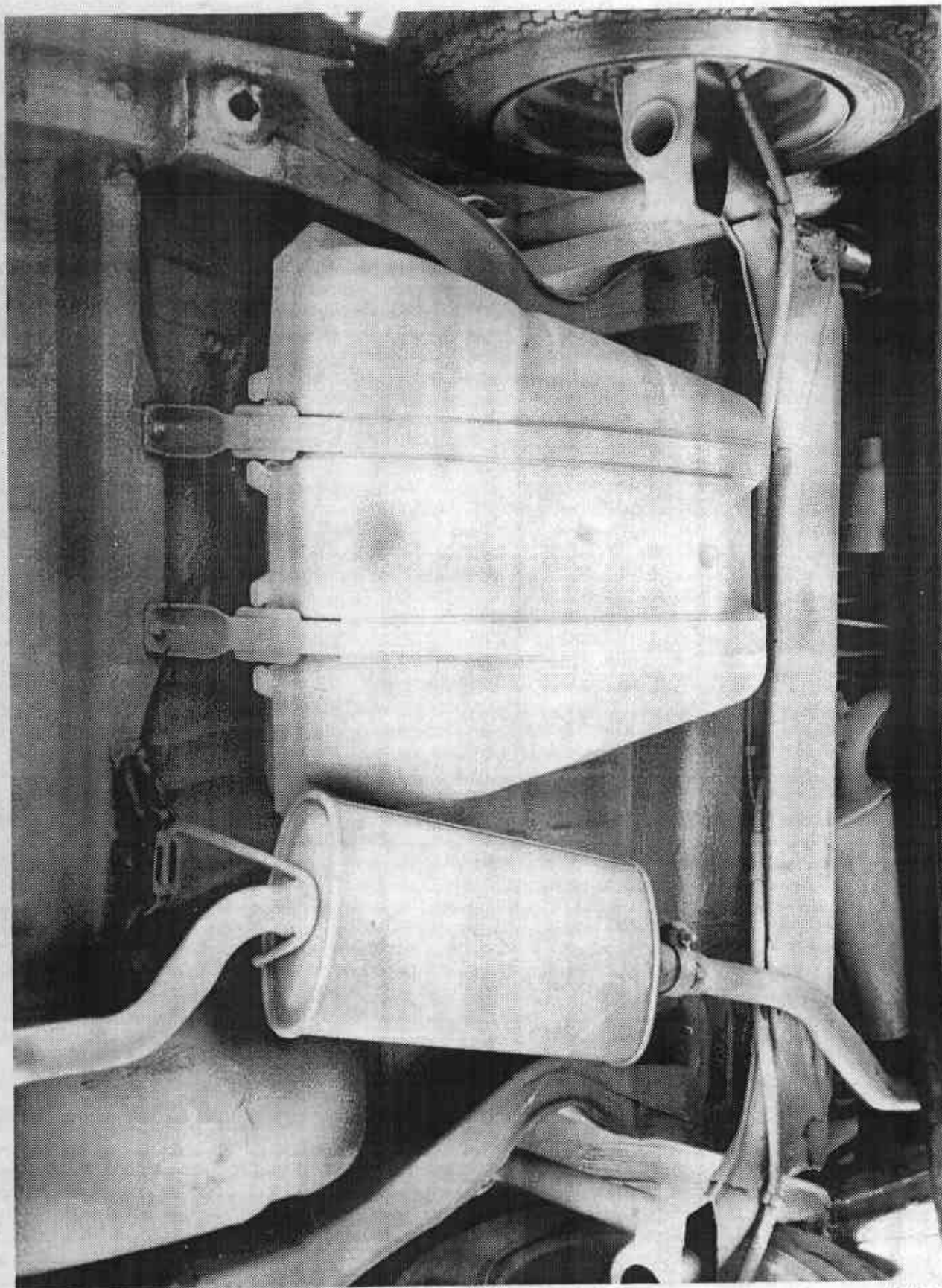


Figure A-18 POST-TEST REAR UNDERBODY VIEW

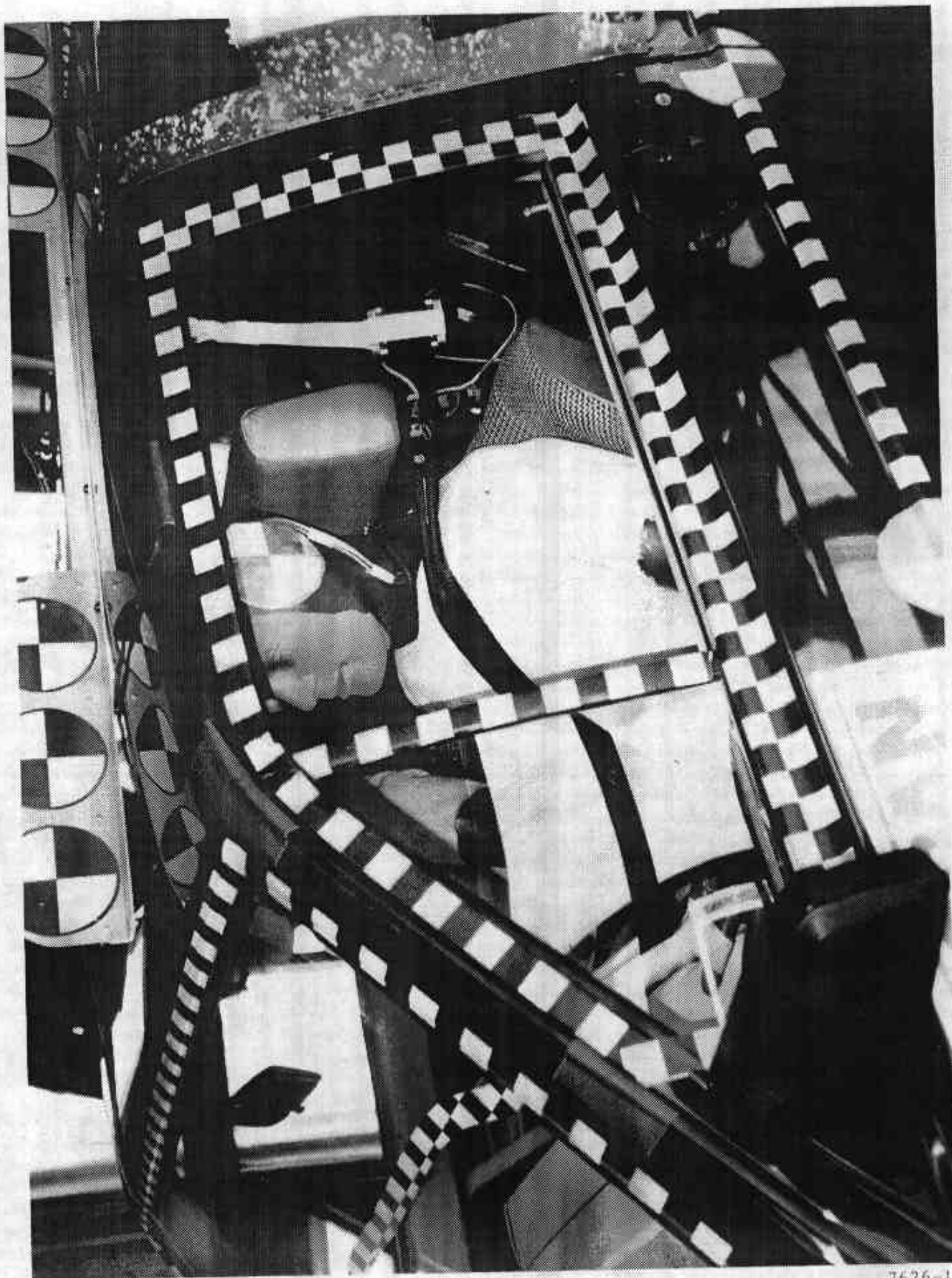


Figure A-19 PRE-TEST DRIVER POSITION VIEW

A-20

7626-1

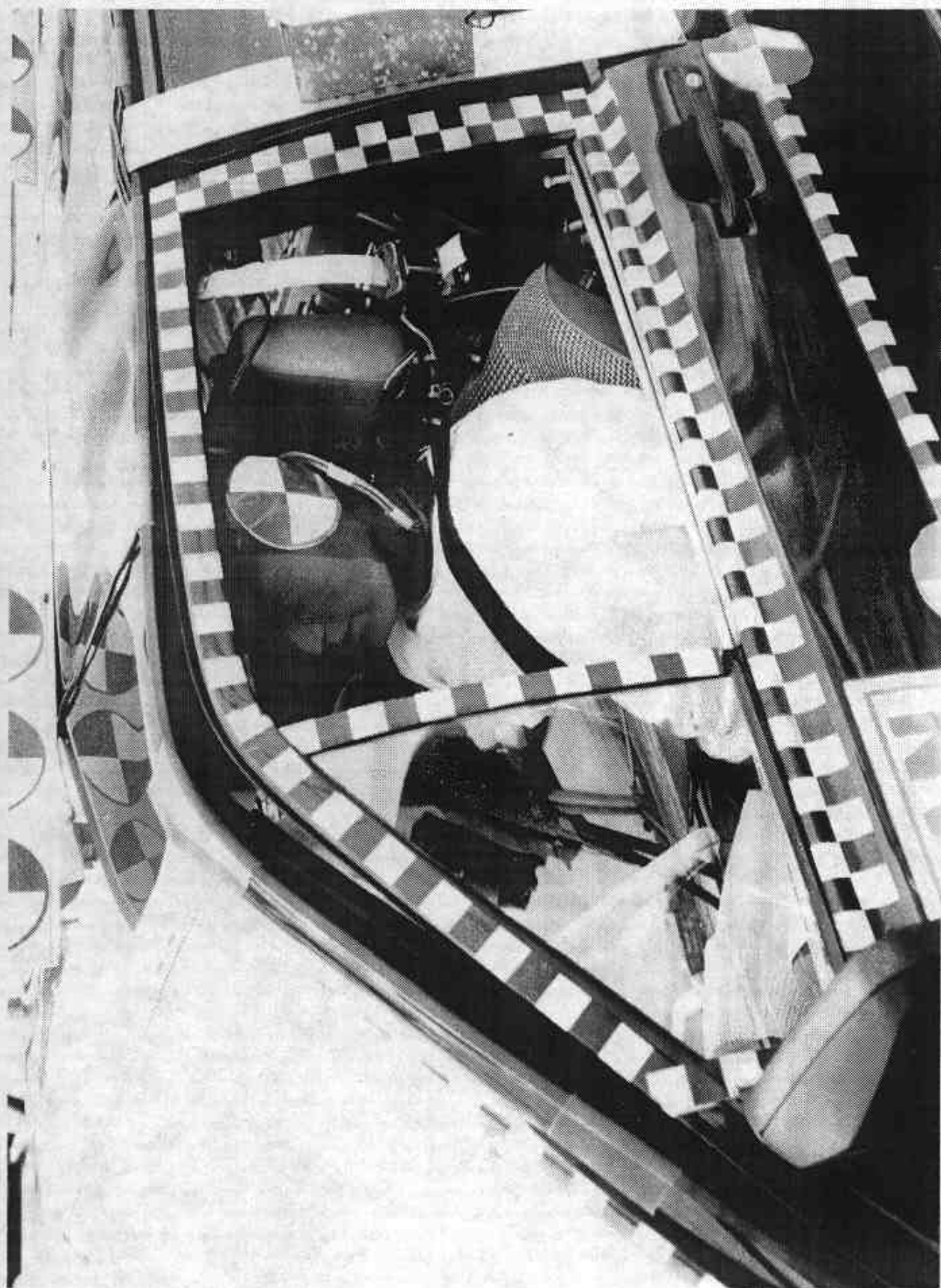


Figure A-20 POST-TEST DRIVER POSITION VIEW

A-21

7626-1



Figure A-21. PRE-TEST PASSENGER POSITION VIEW

A-22

7626-1



Figure A-22 POST-TEST PASSENGER POSITION VIEW

A-23

7626-1

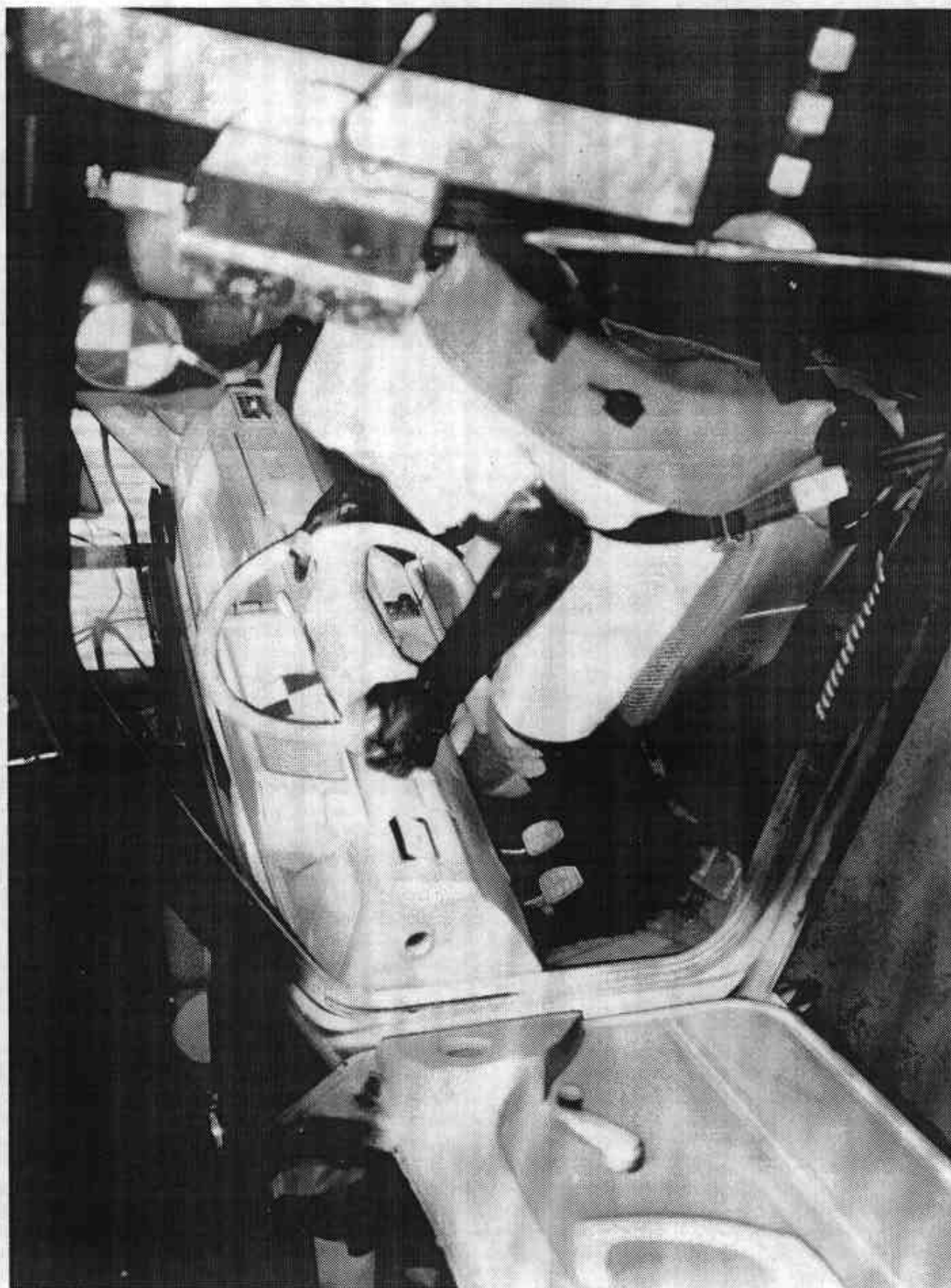


Figure A-23 PRE-TEST DRIVER AND INTERIOR VIEW

A-24

7626-1



Figure A-24 POST-TEST DRIVER AND INTERIOR VIEW

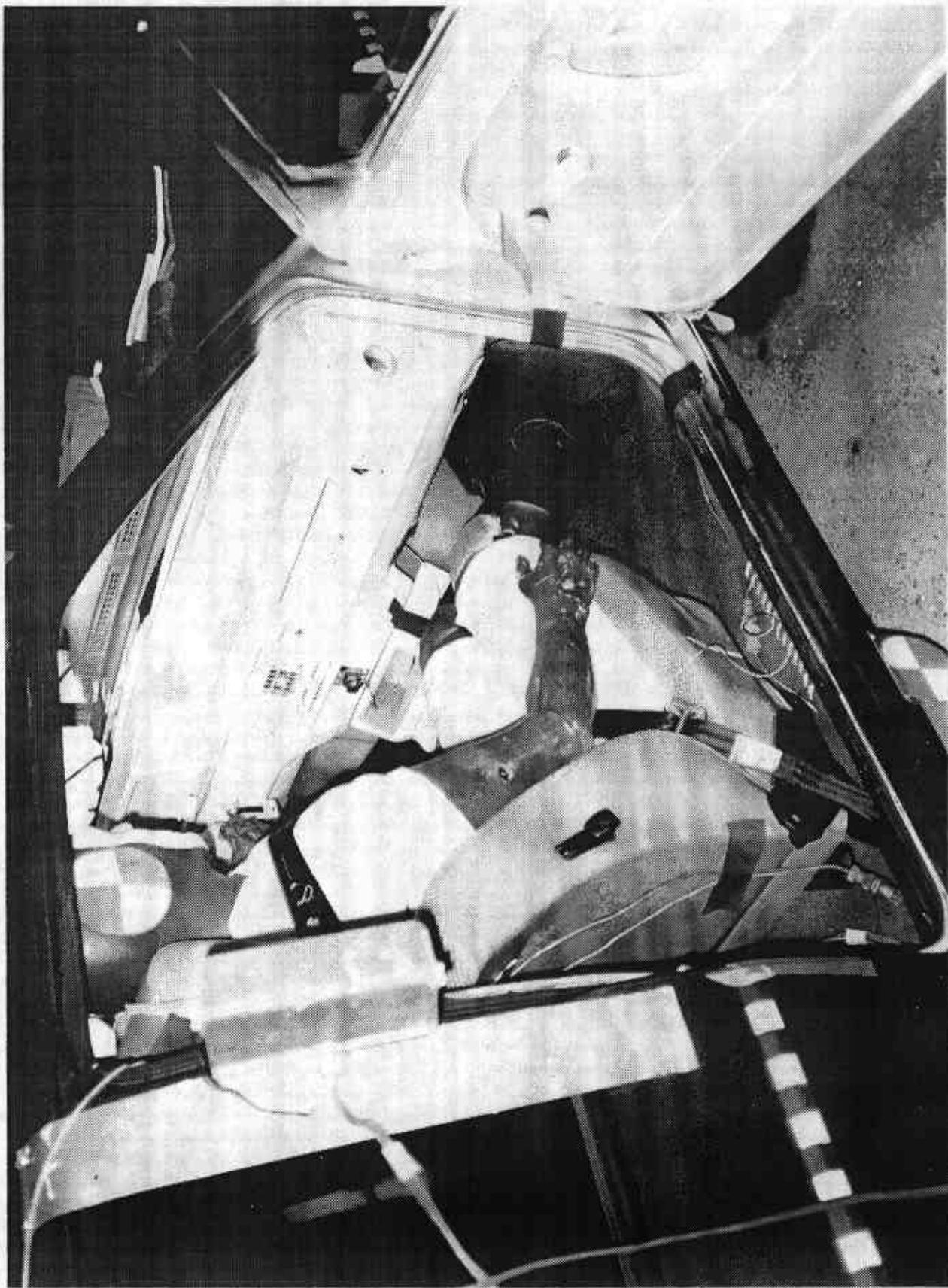


Figure A-25 PRE-TEST PASSENGER AND INTERIOR VIEW

A-26

7626-1



Figure A-26 POST-TEST PASSENGER AND INTERIOR VIEW

A-27

7626-1

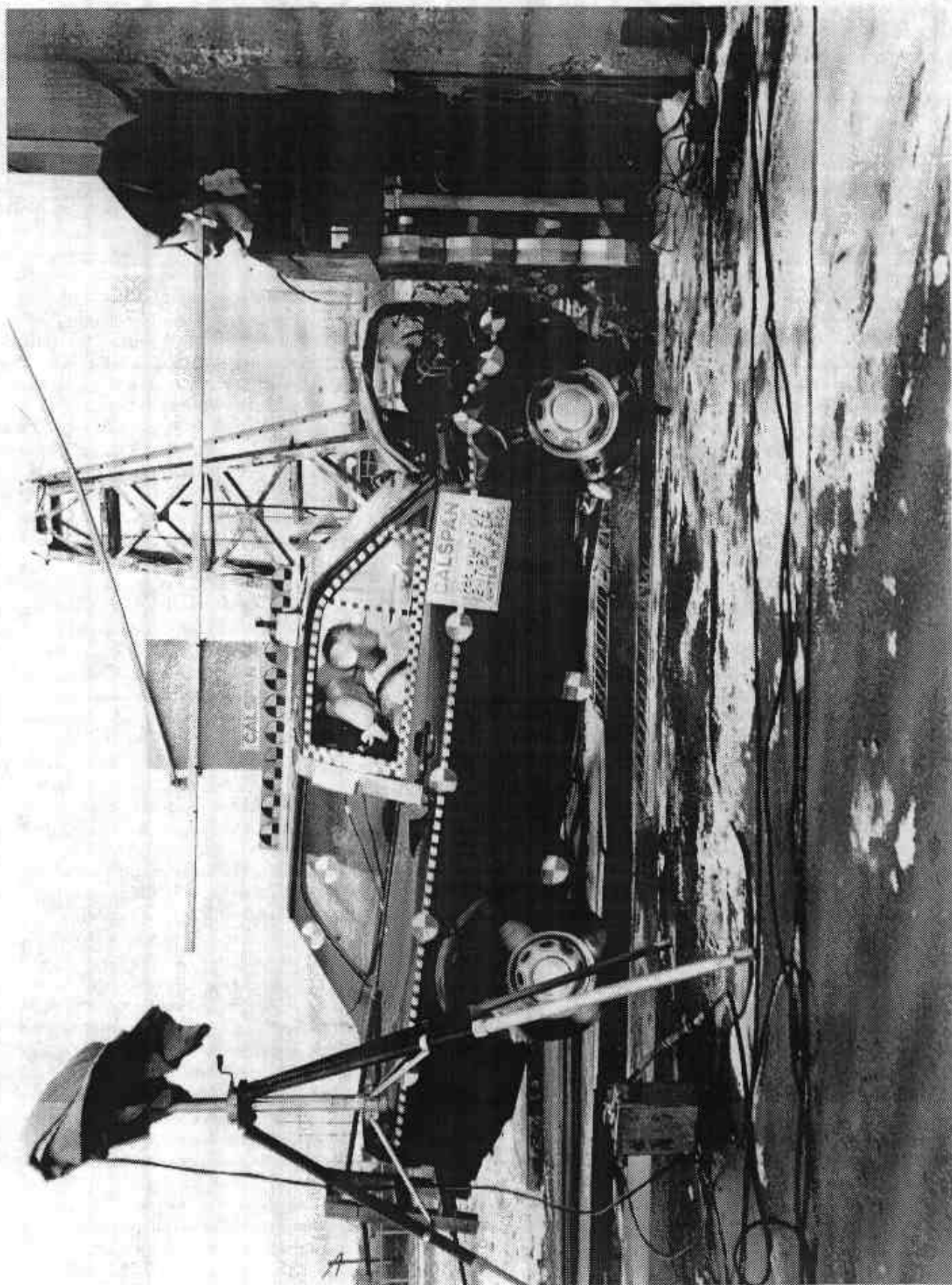


Figure A-27 IMPACT VIEW

A-28

7626-1

Appendix B

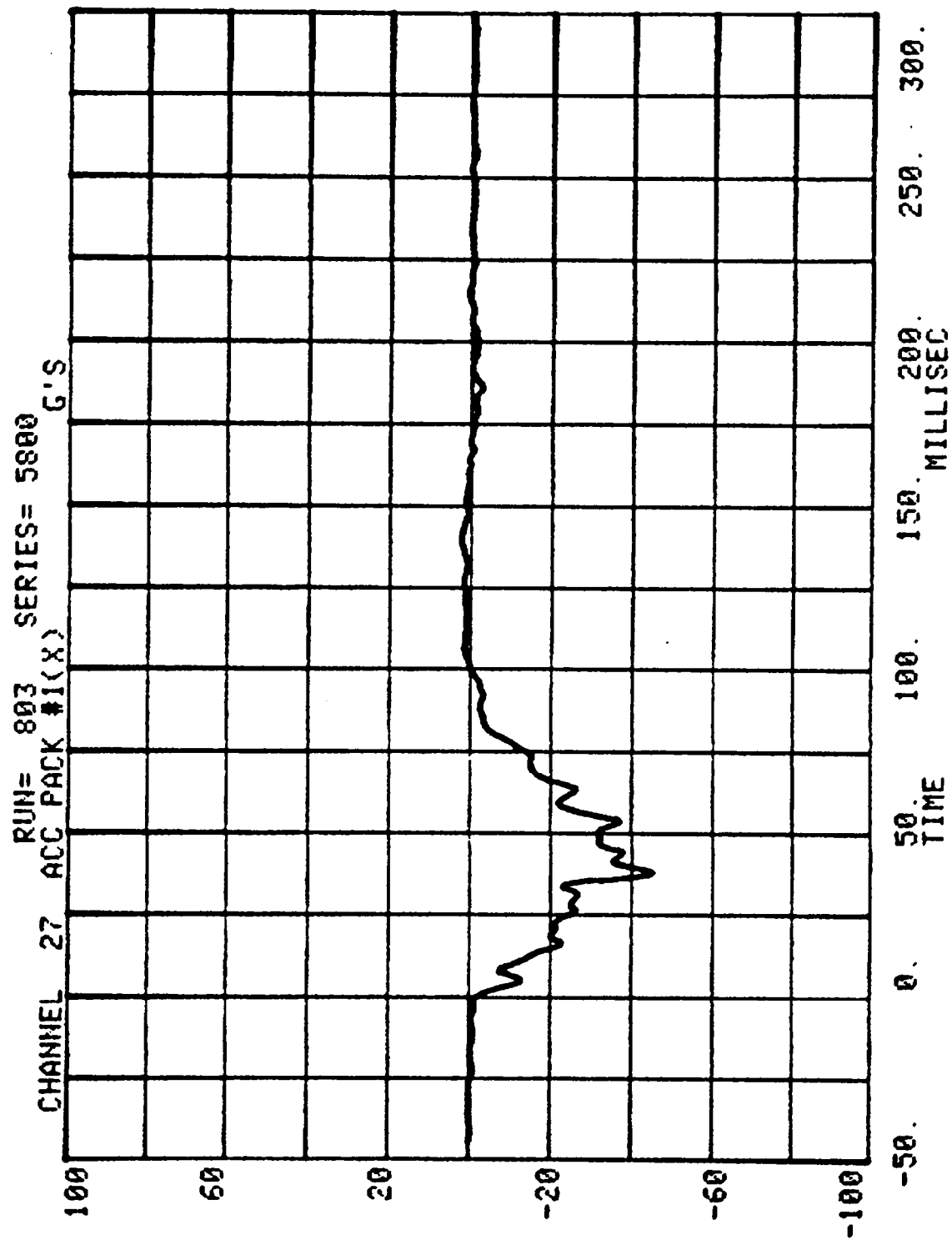
VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

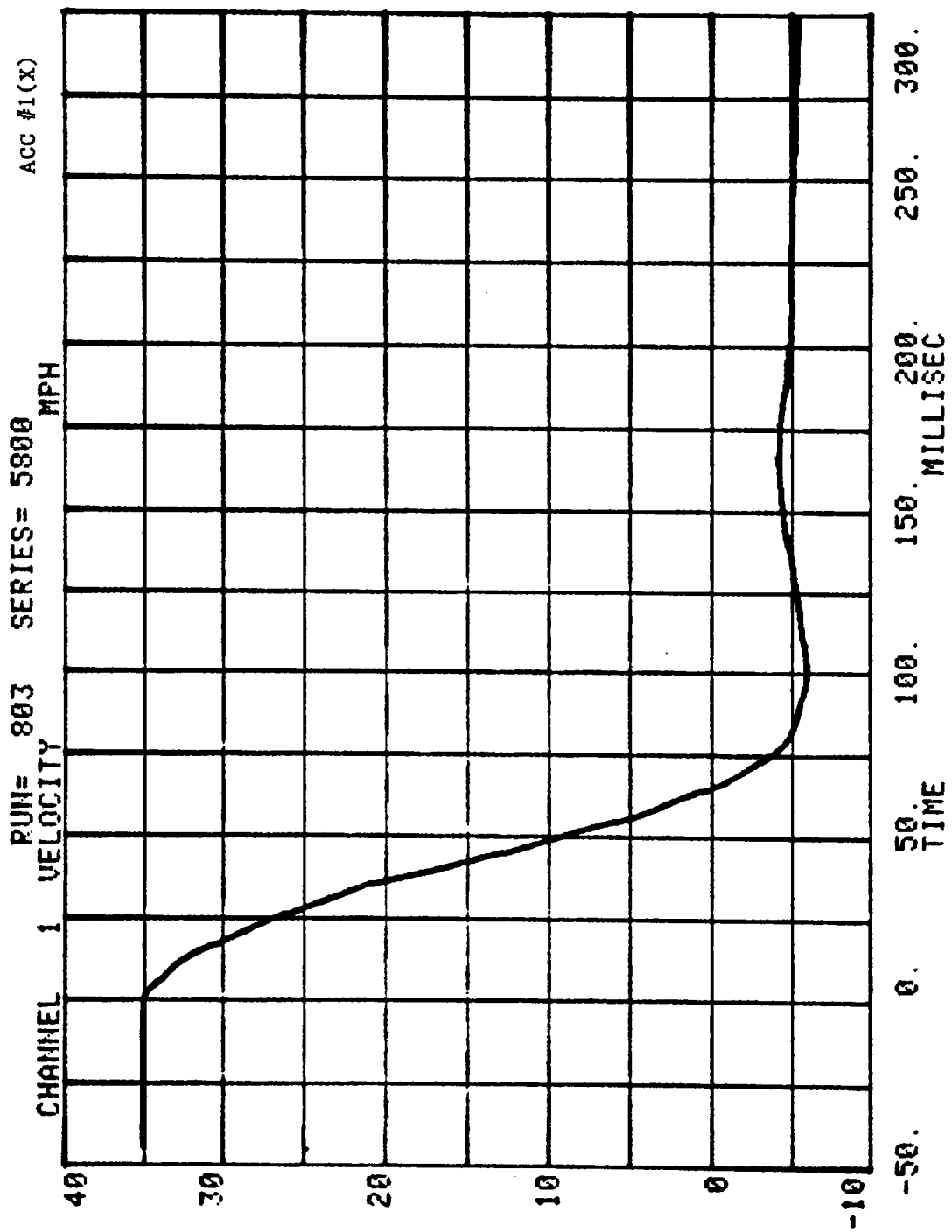
TEST NO. MJ5800

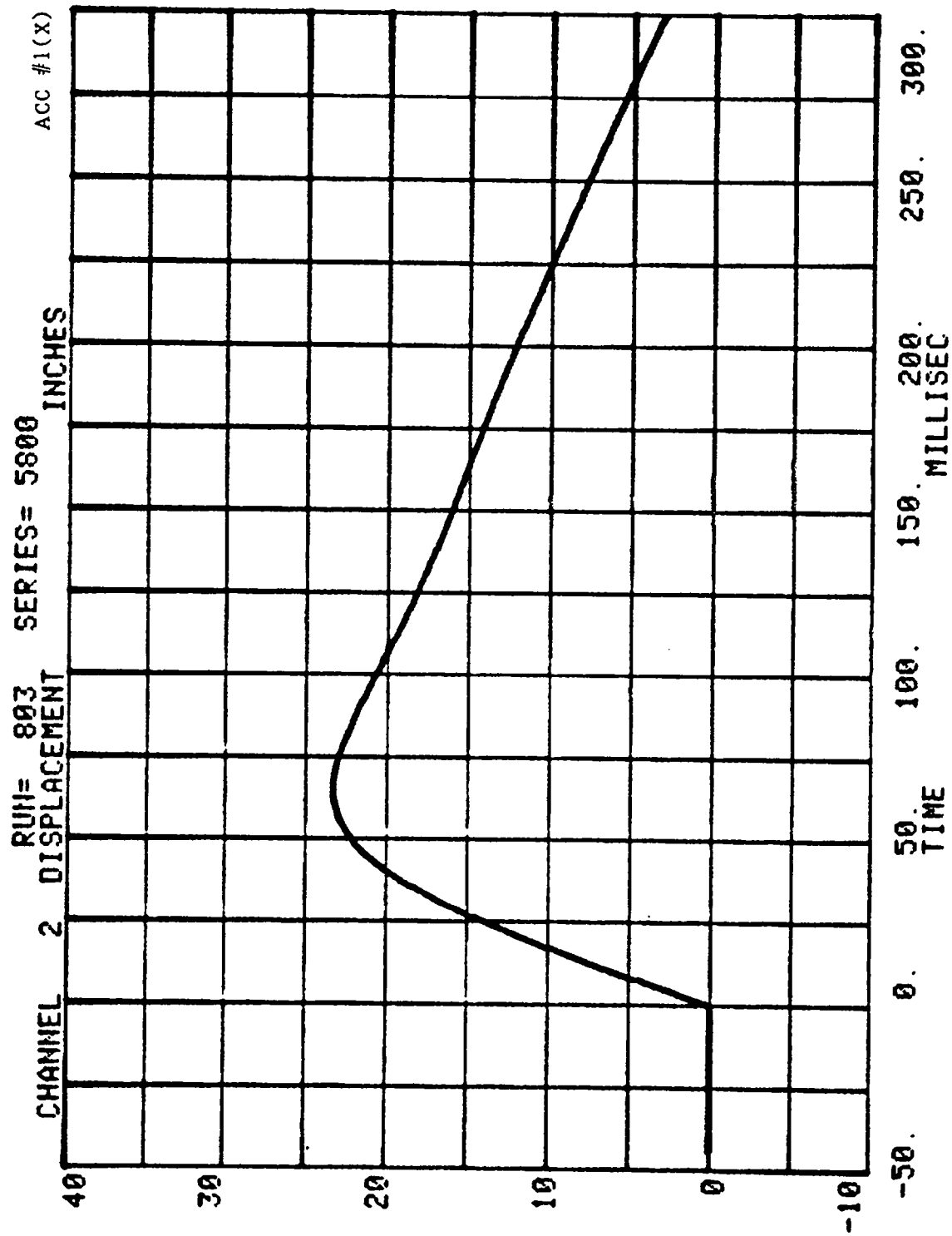
VEHICLE DATA

FILTER CHANNEL CLASS

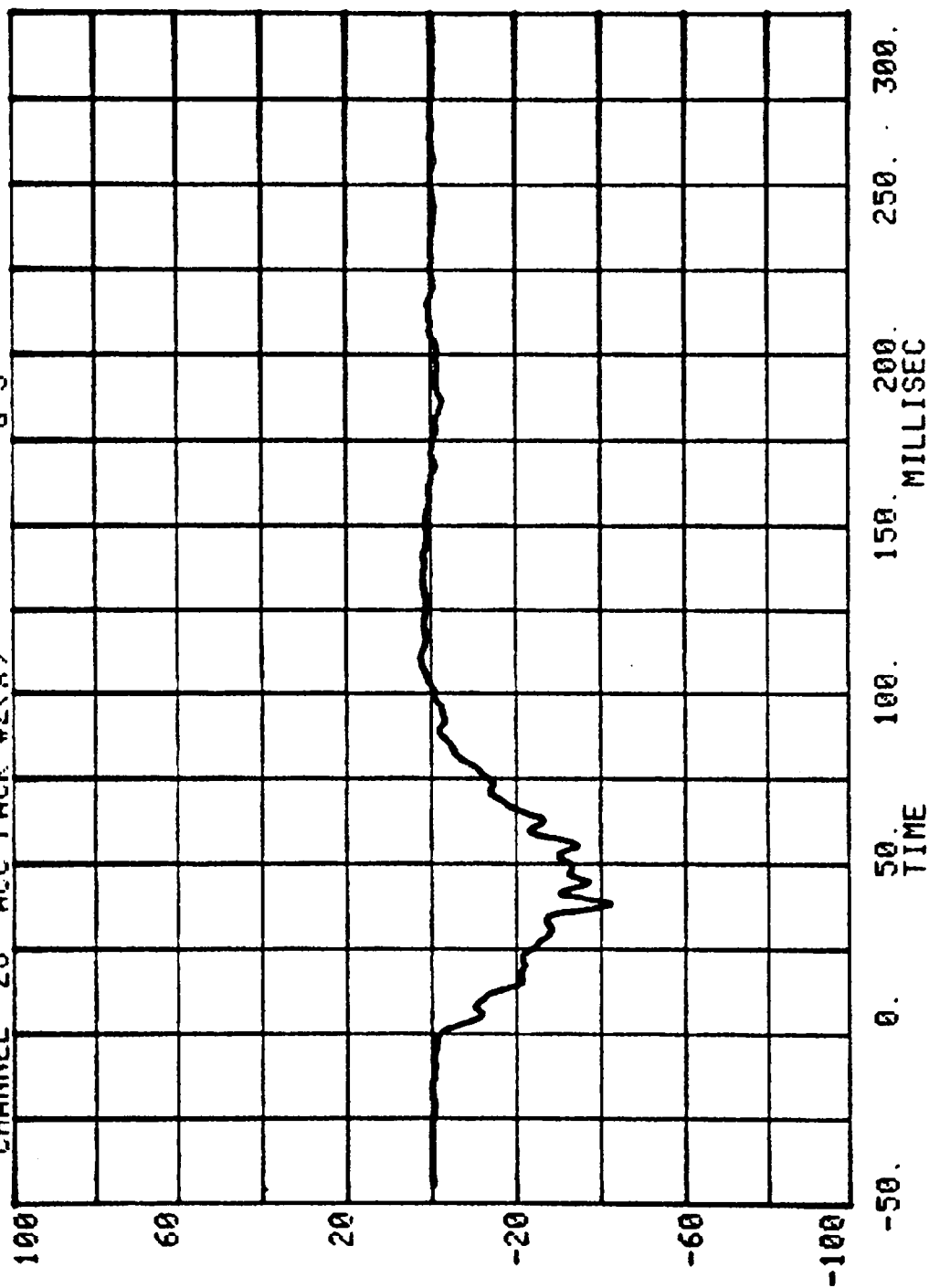
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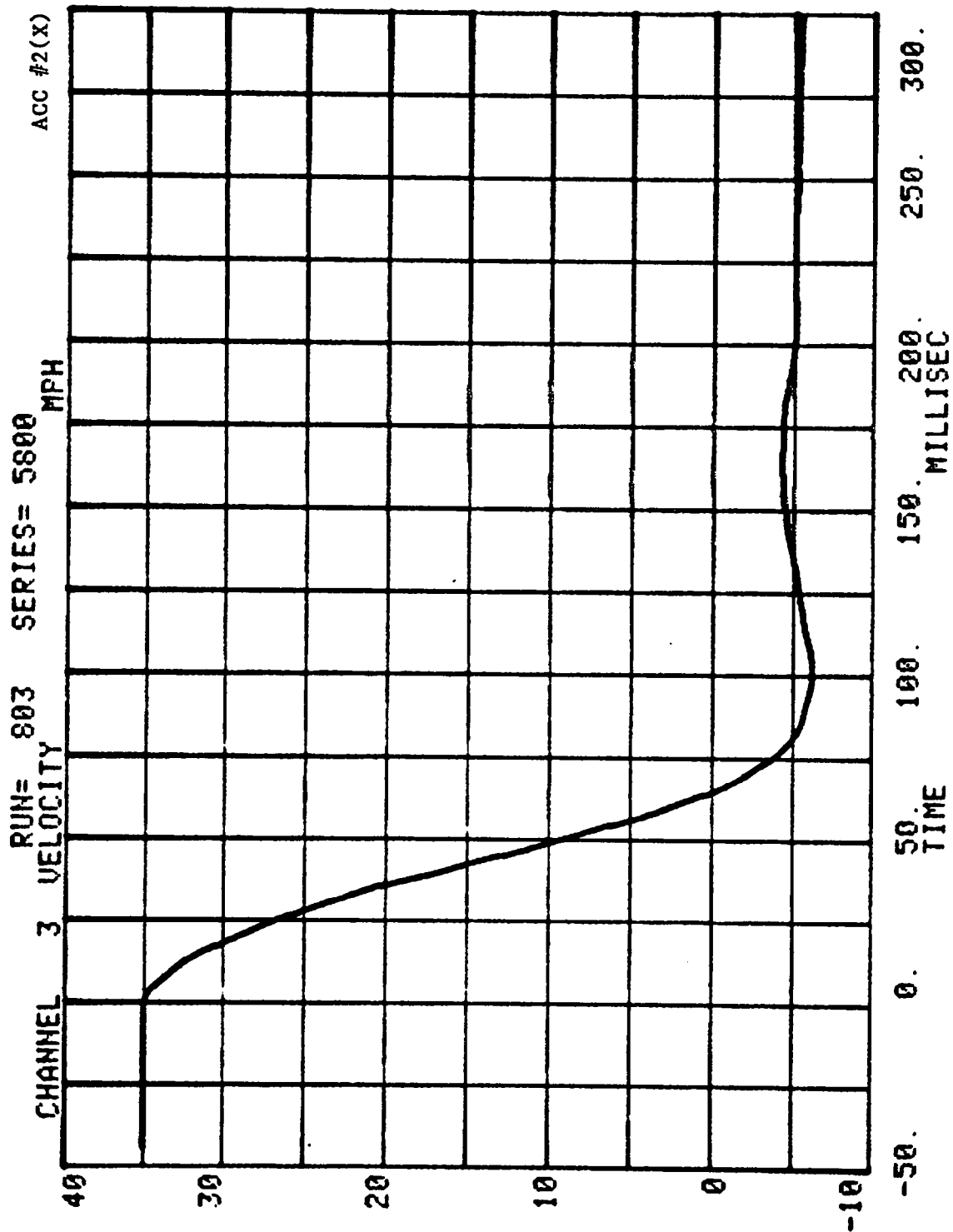


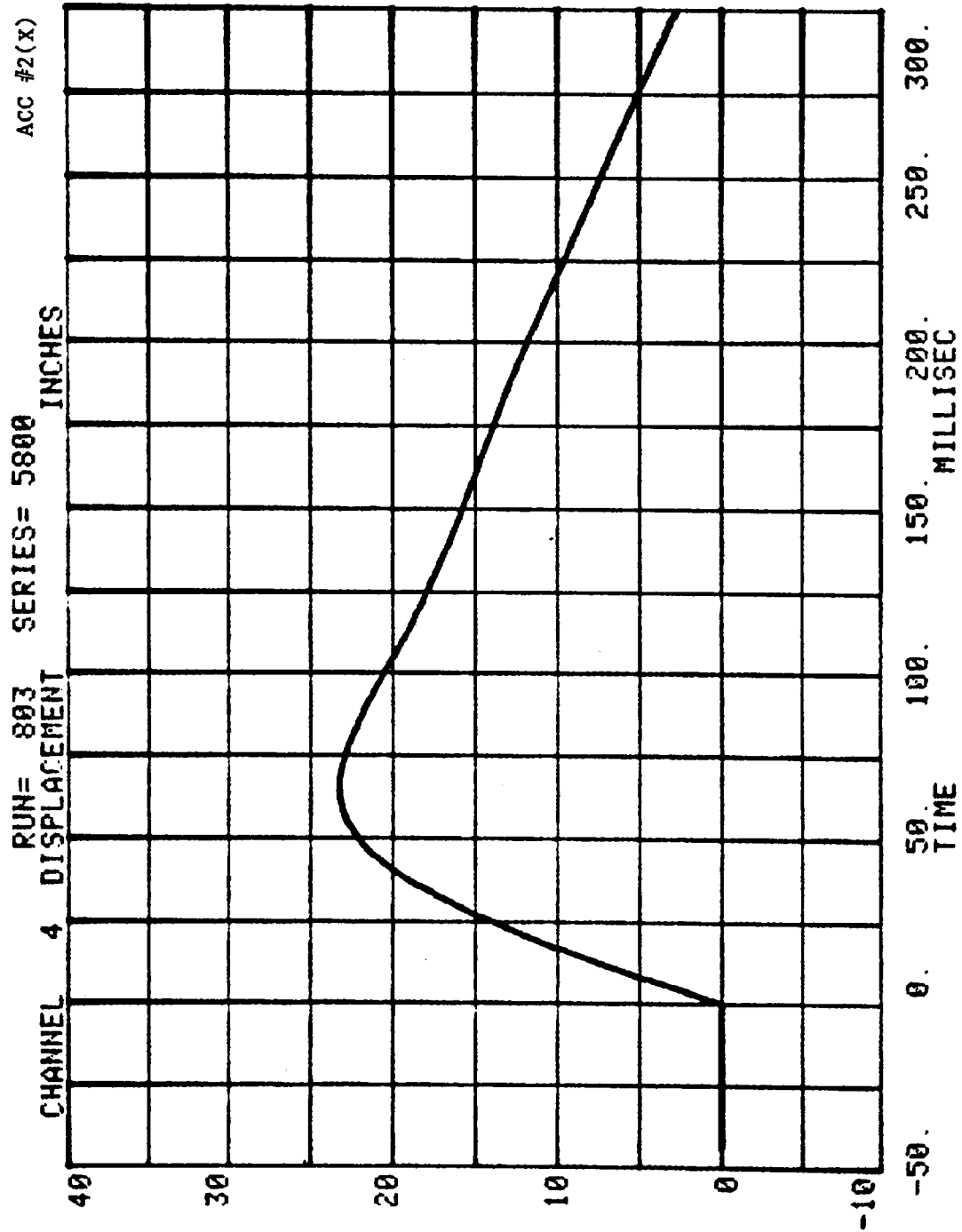


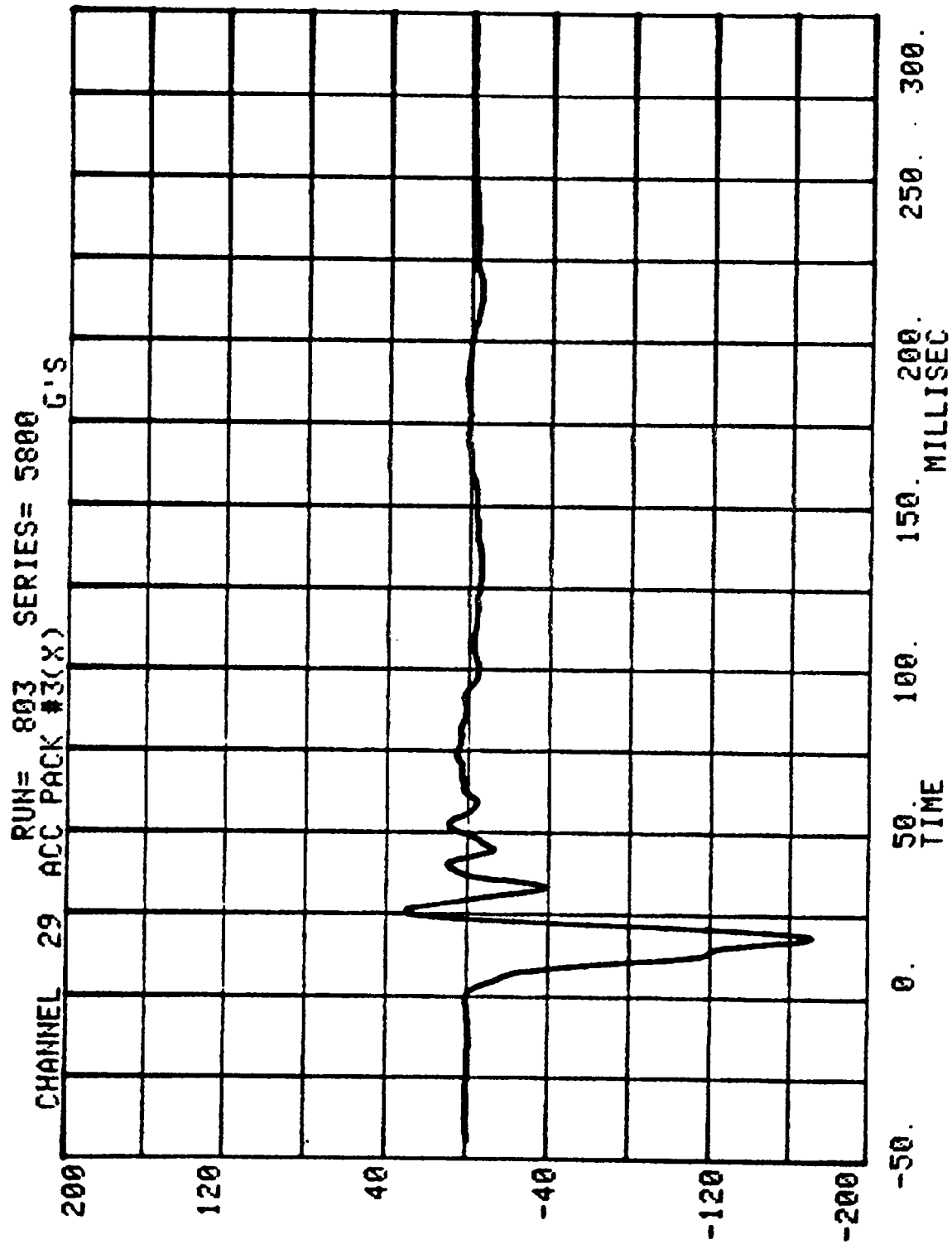


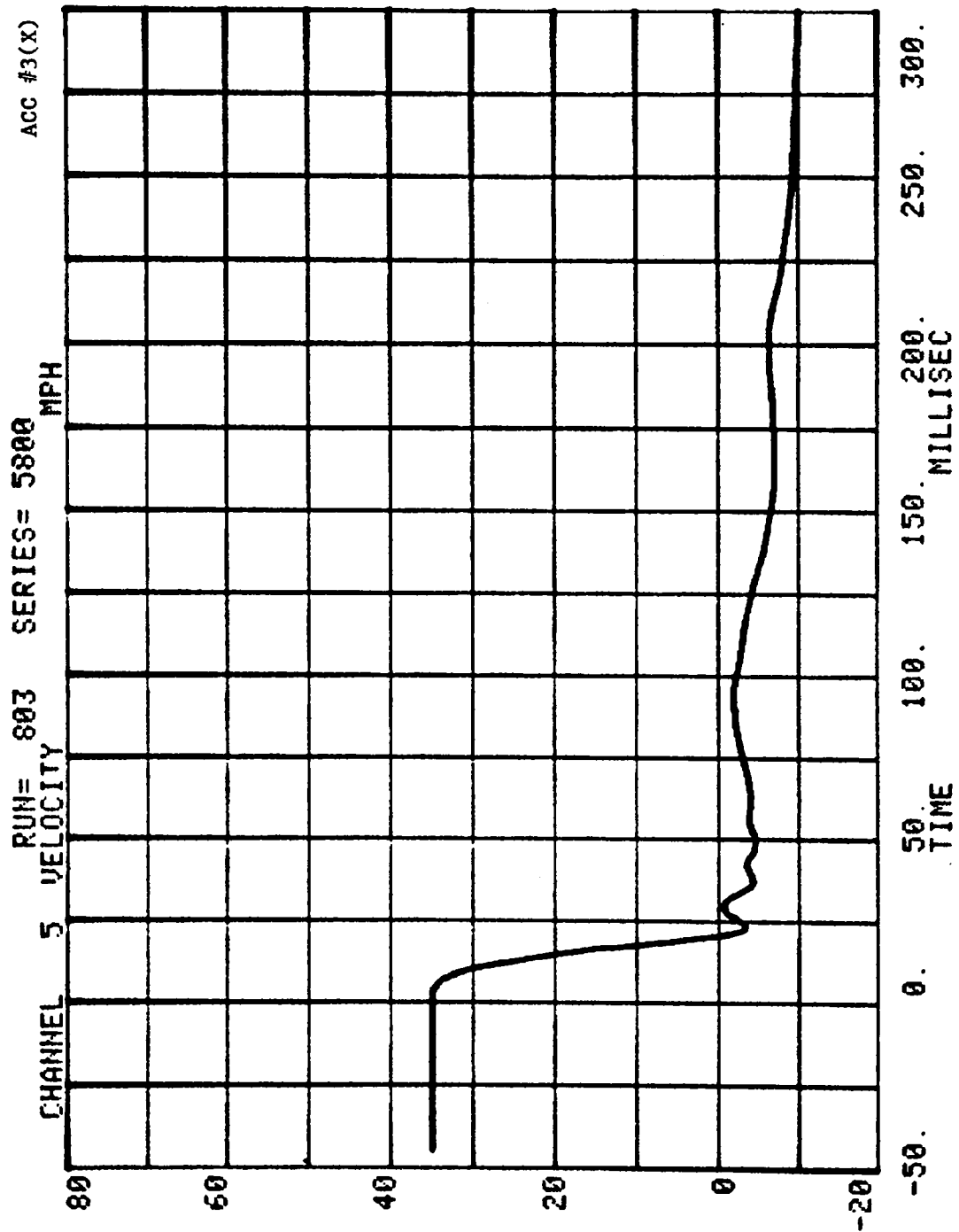
CHANNEL 28 ACC PACK #2(X) RUN= 803 SERIES= 5800 G'S

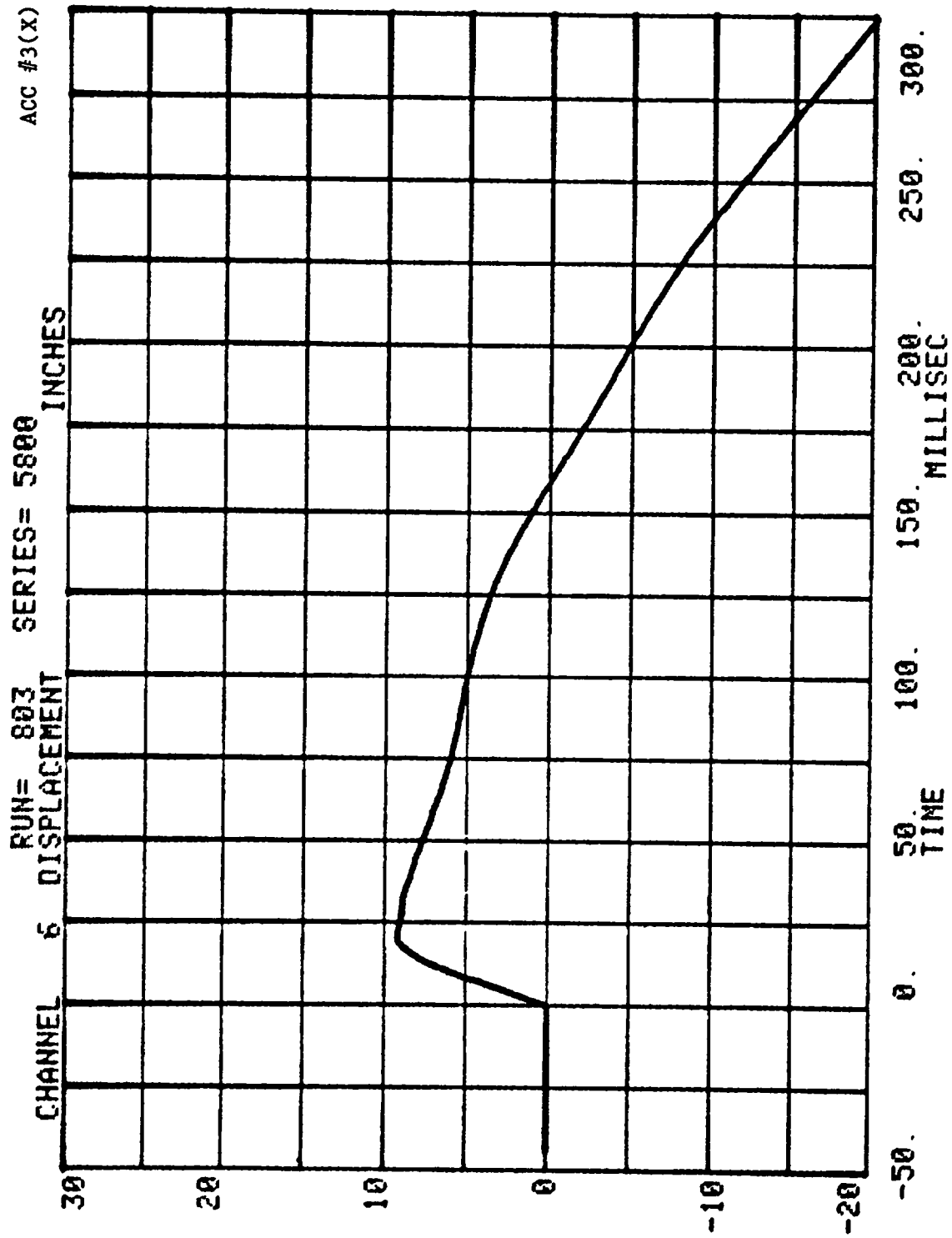


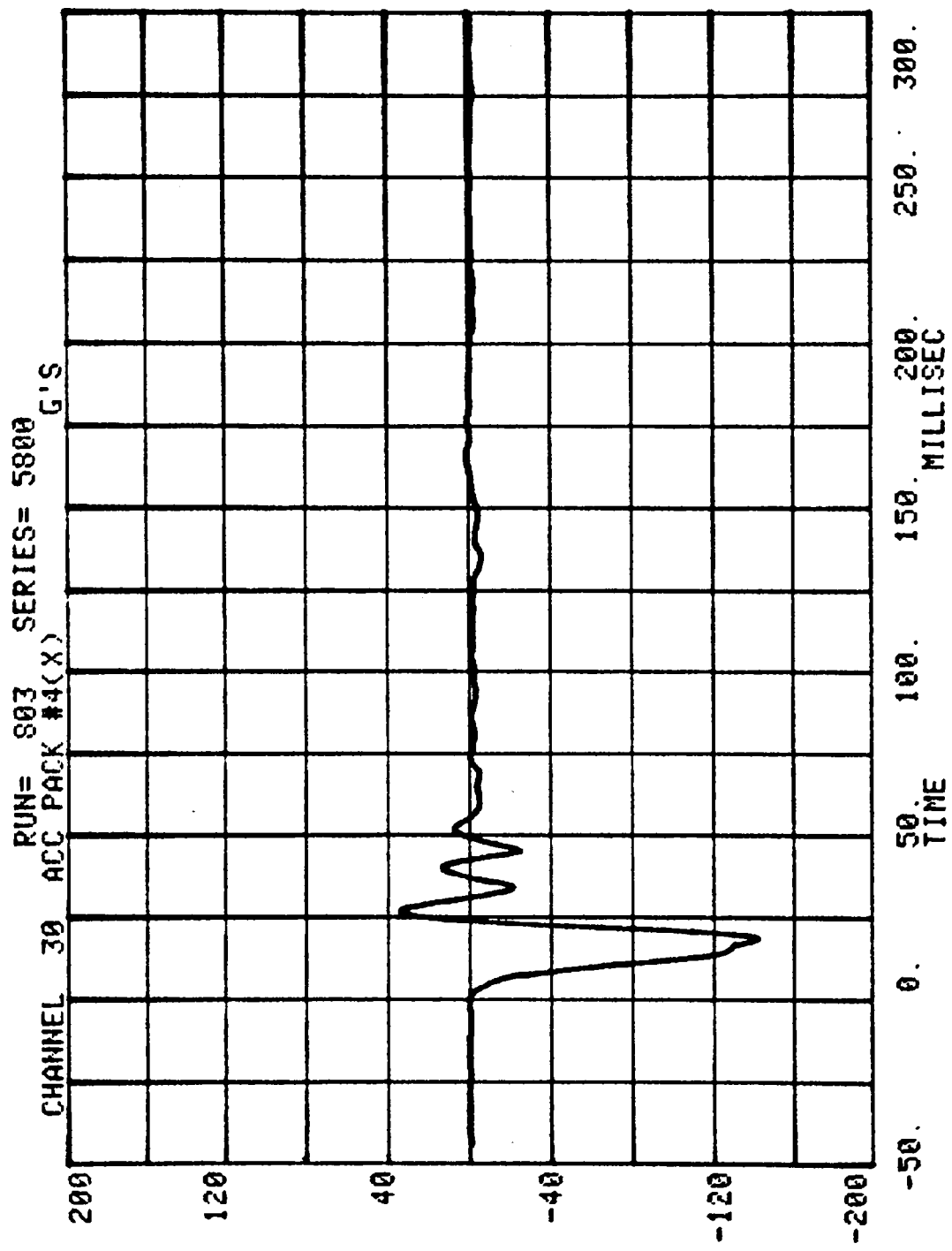


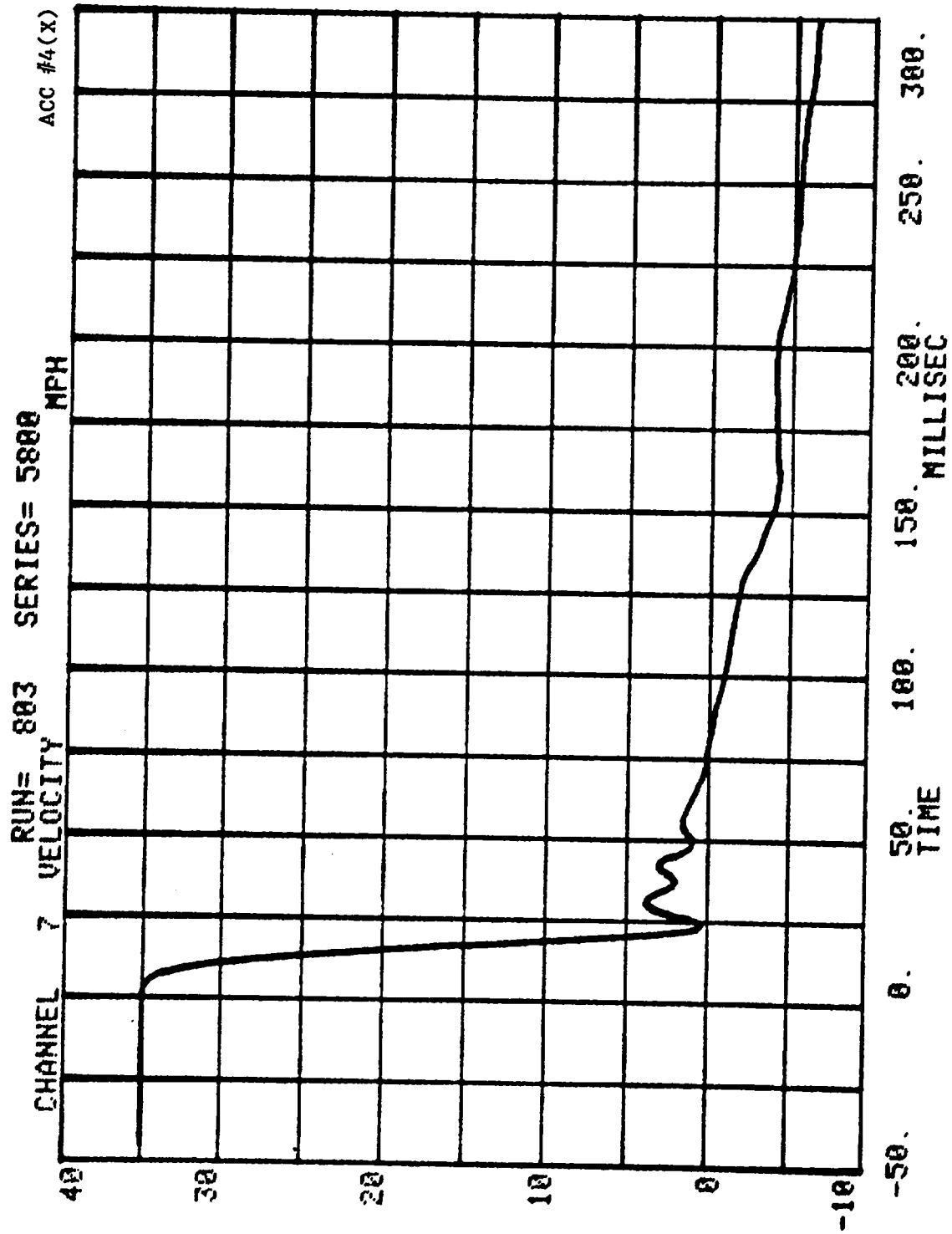


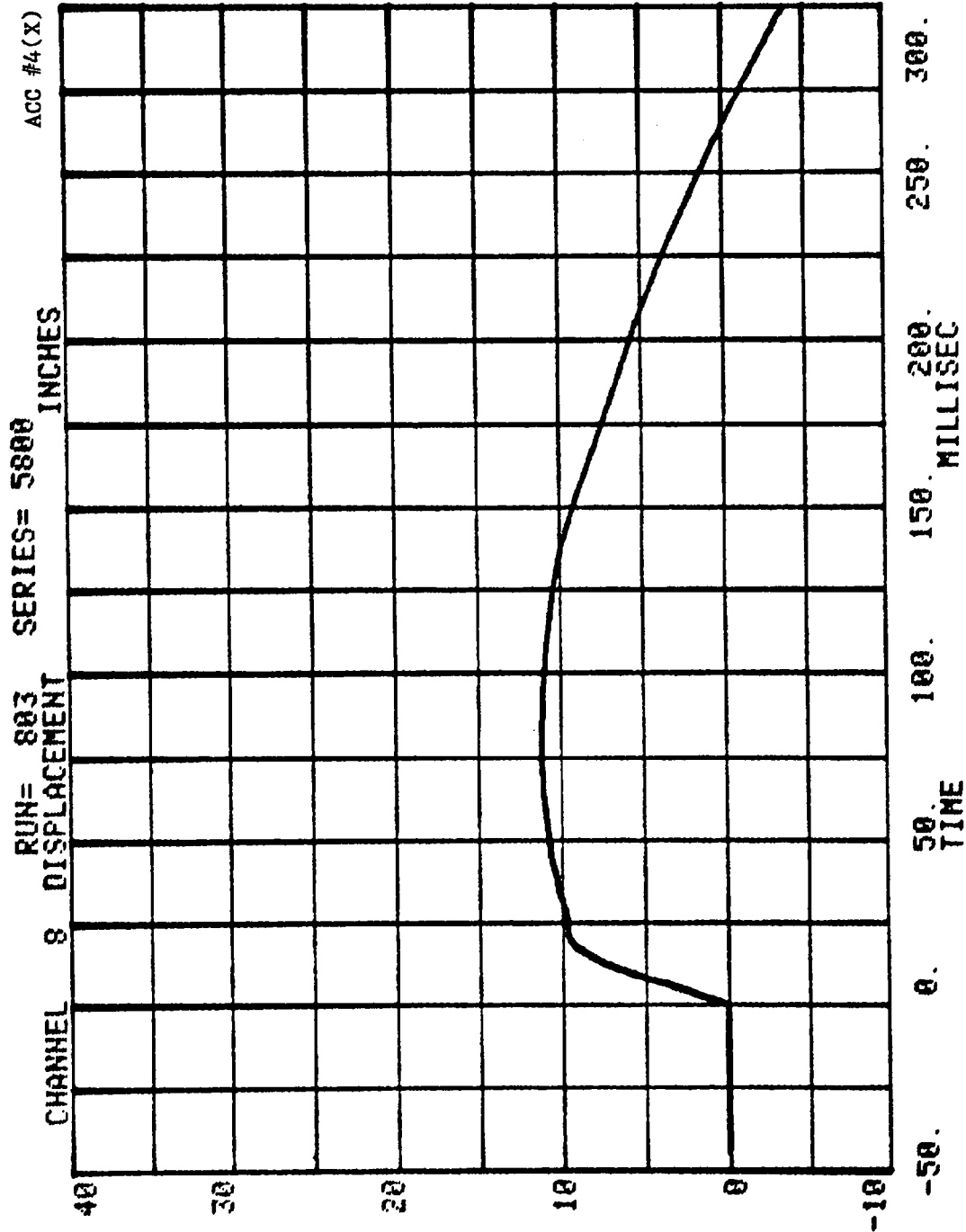




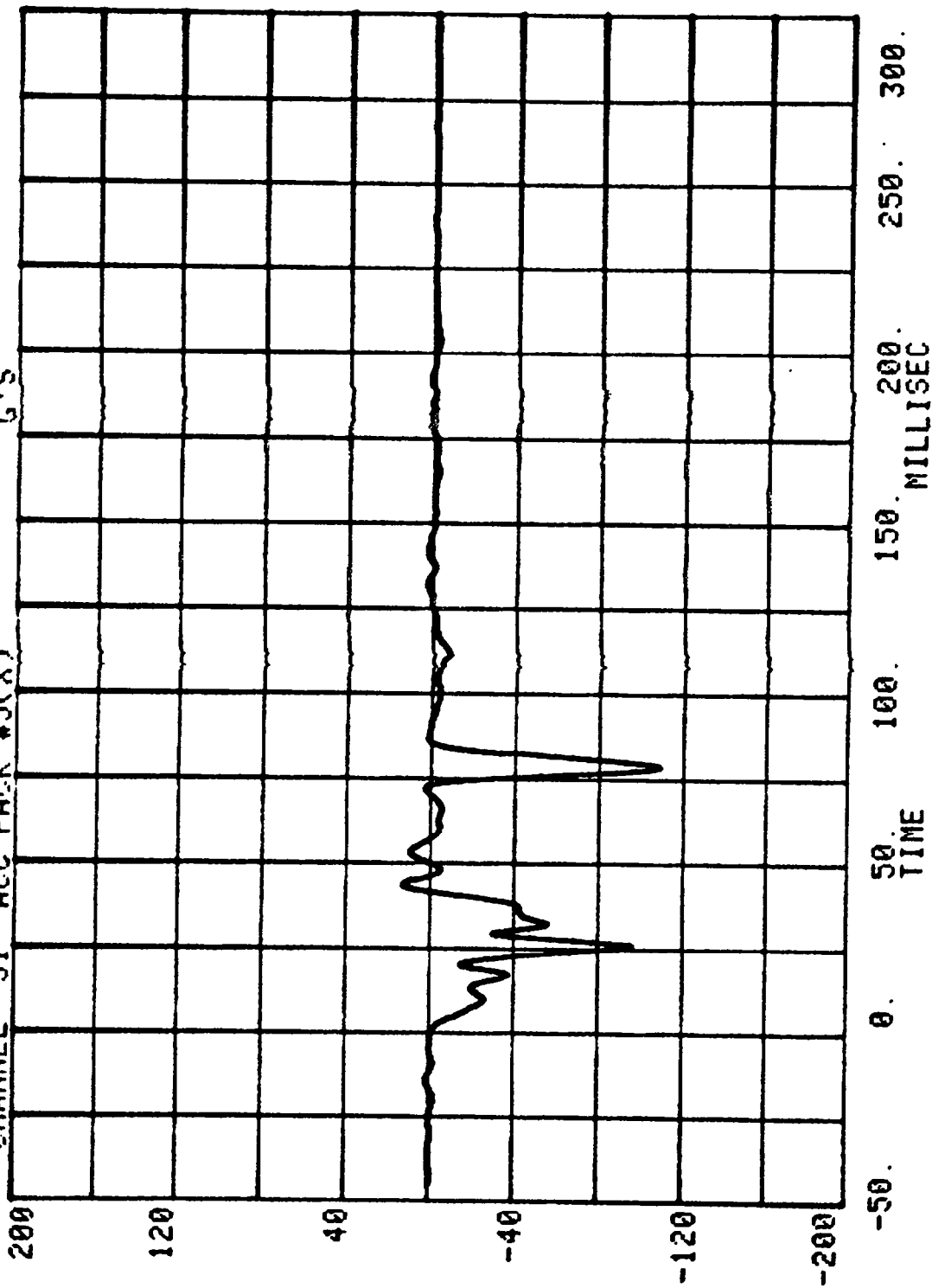


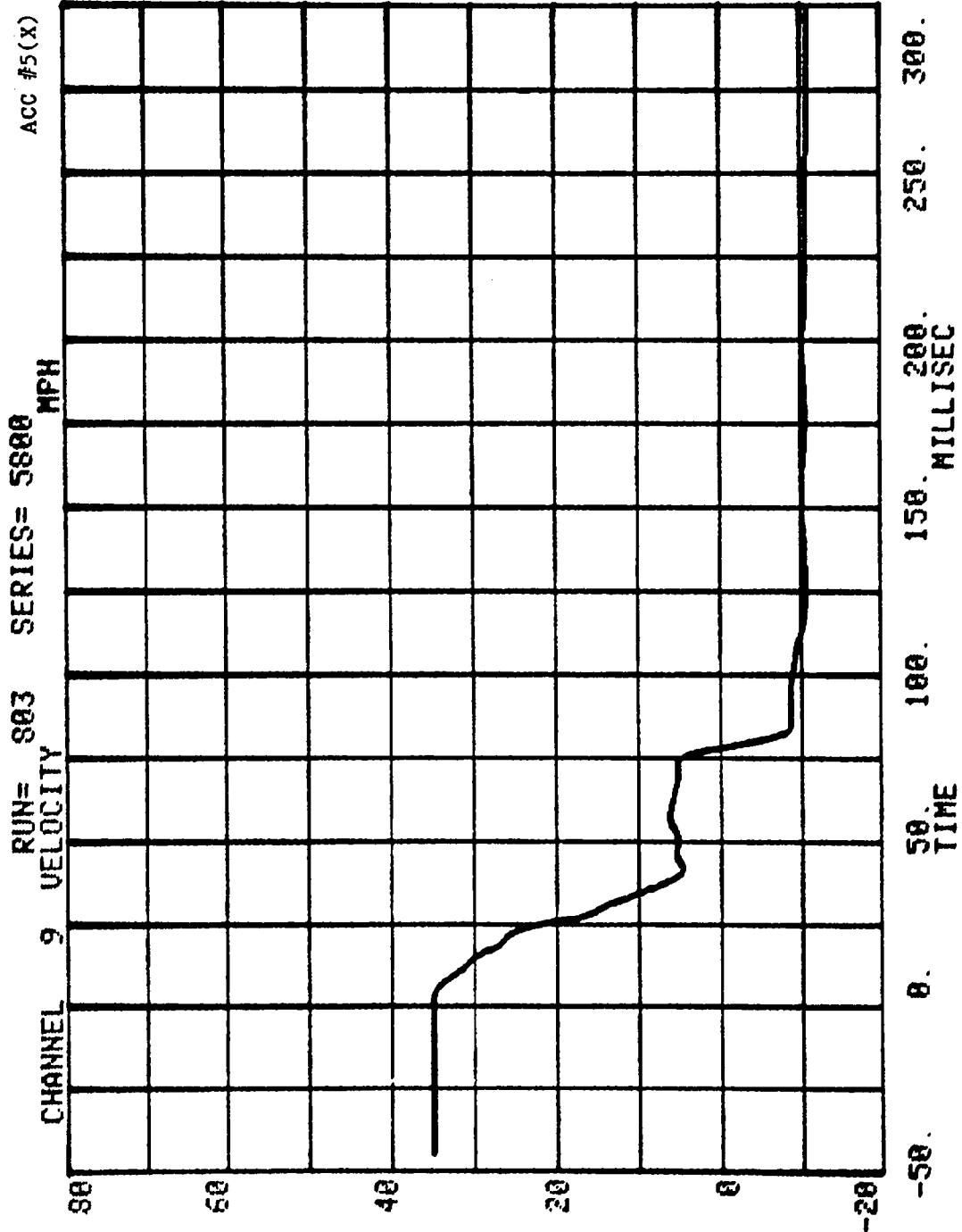


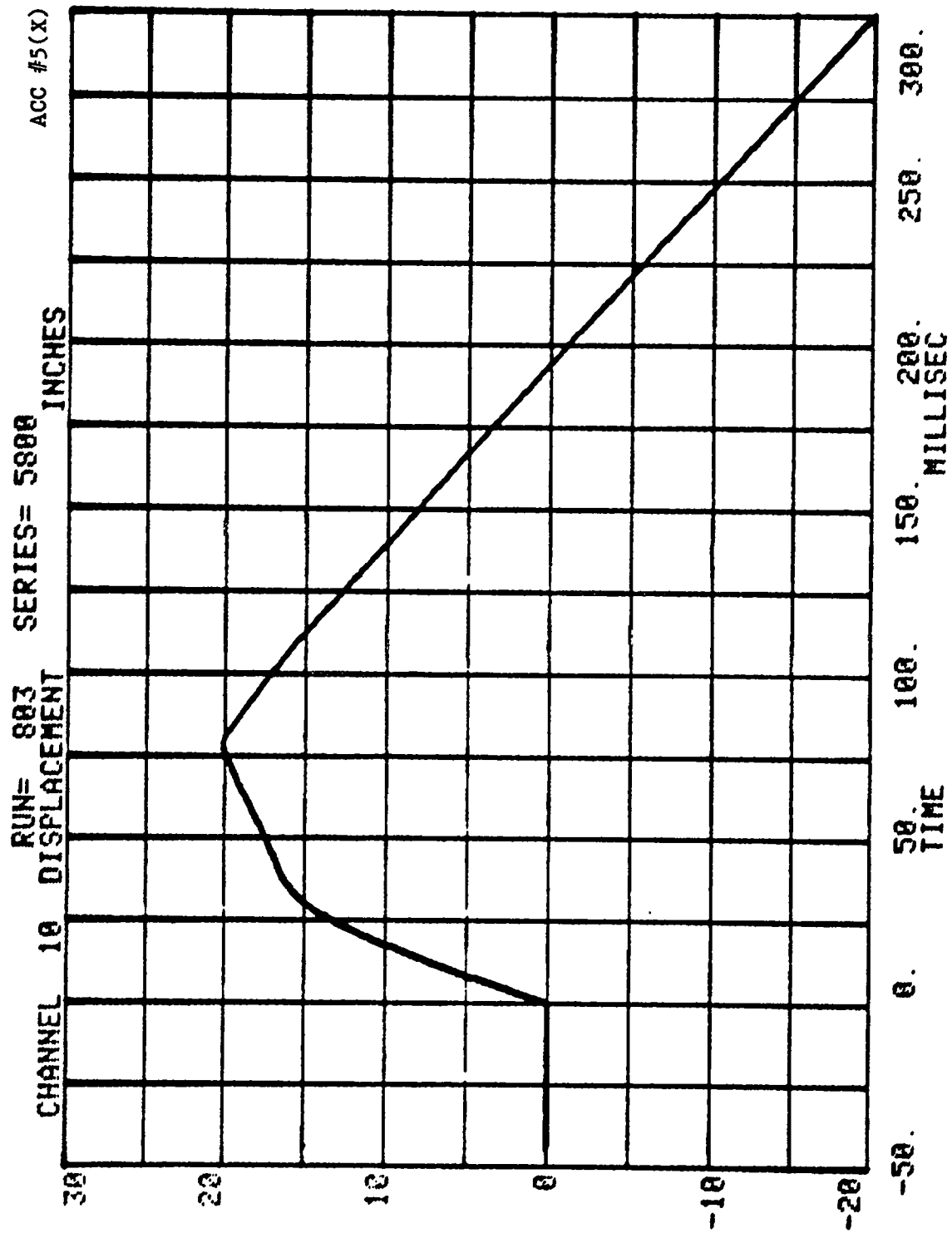




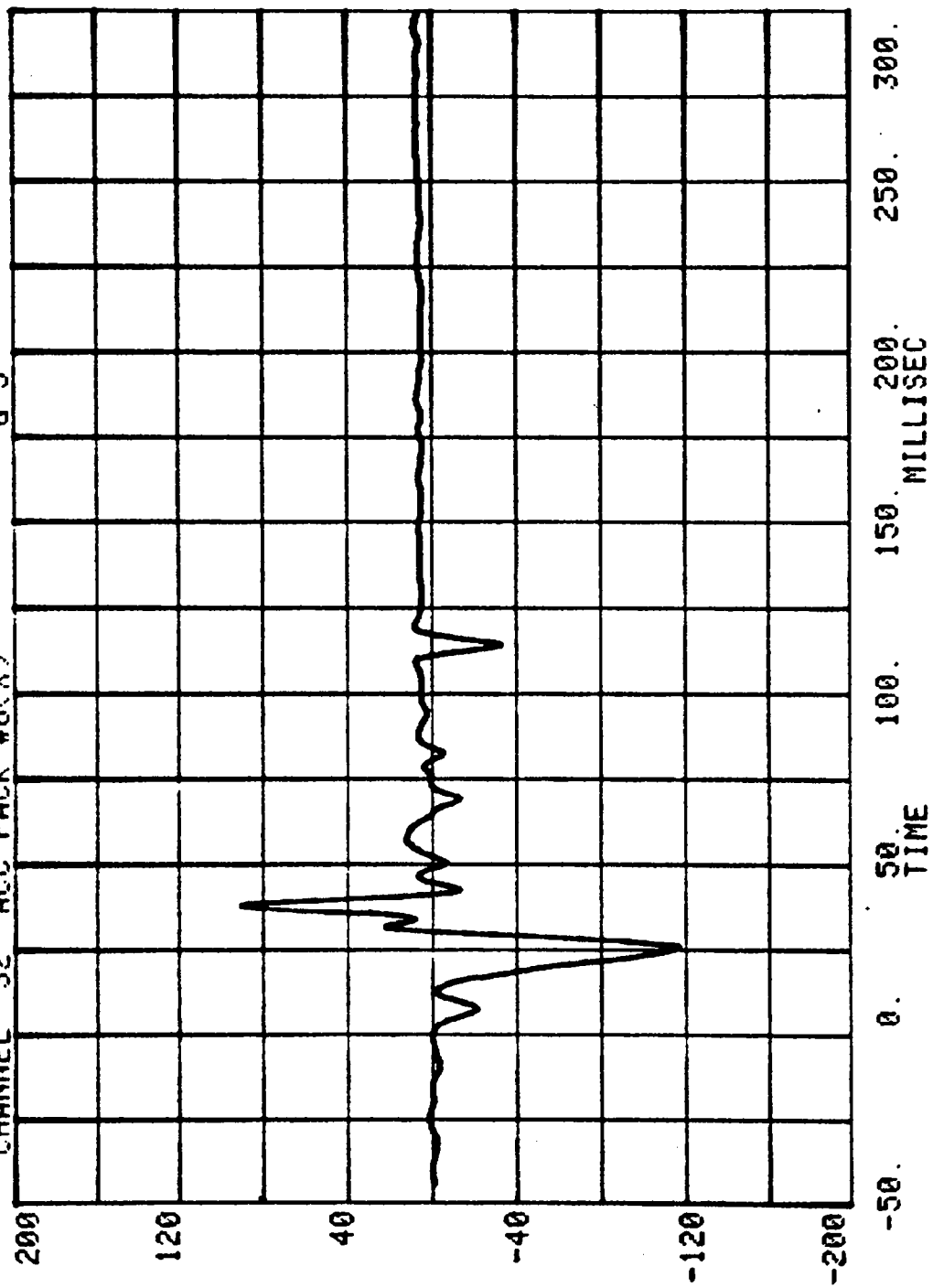
CHANNEL 31 ACC PACK #5(X) RUN= 803 SERIES= 5800 G'S

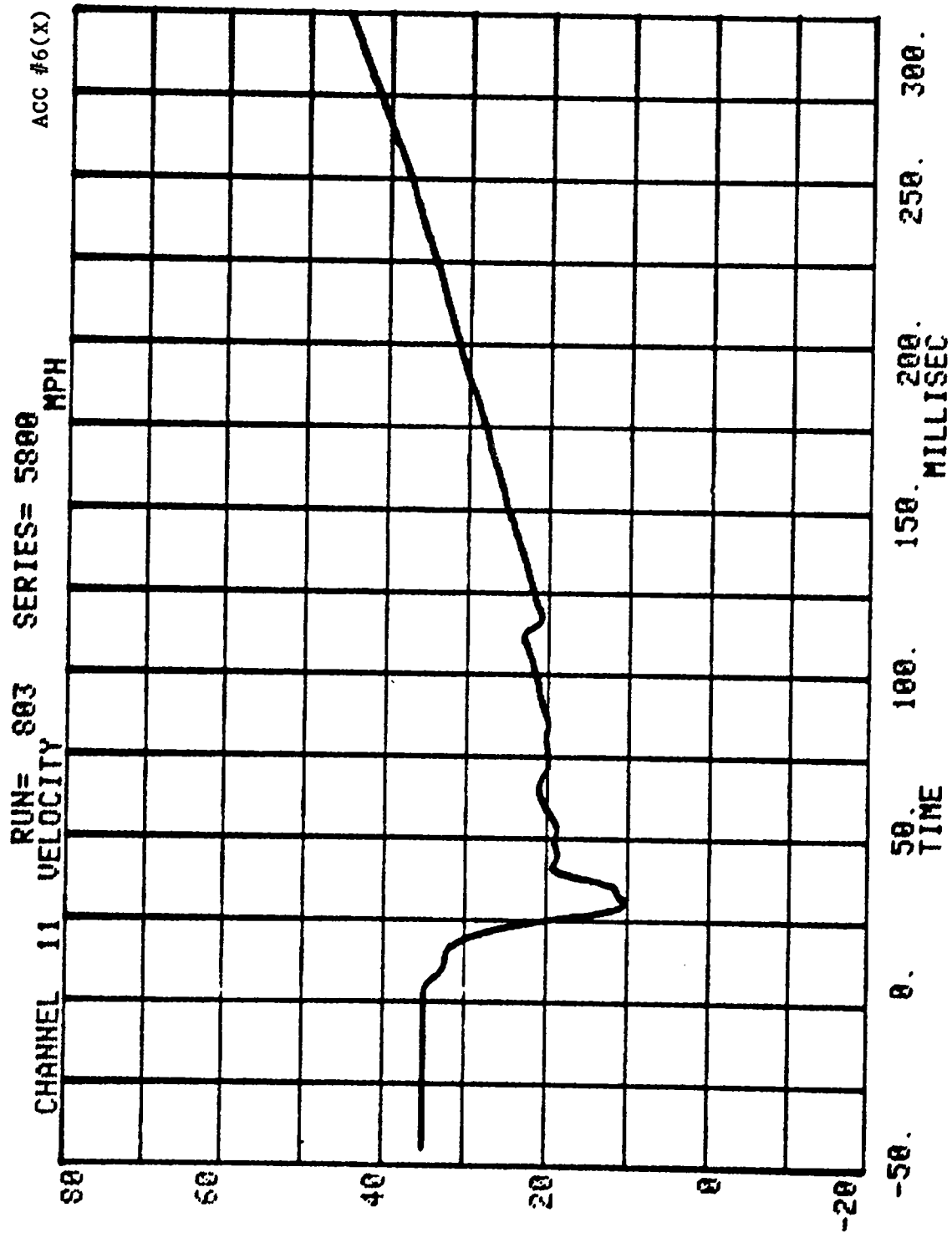


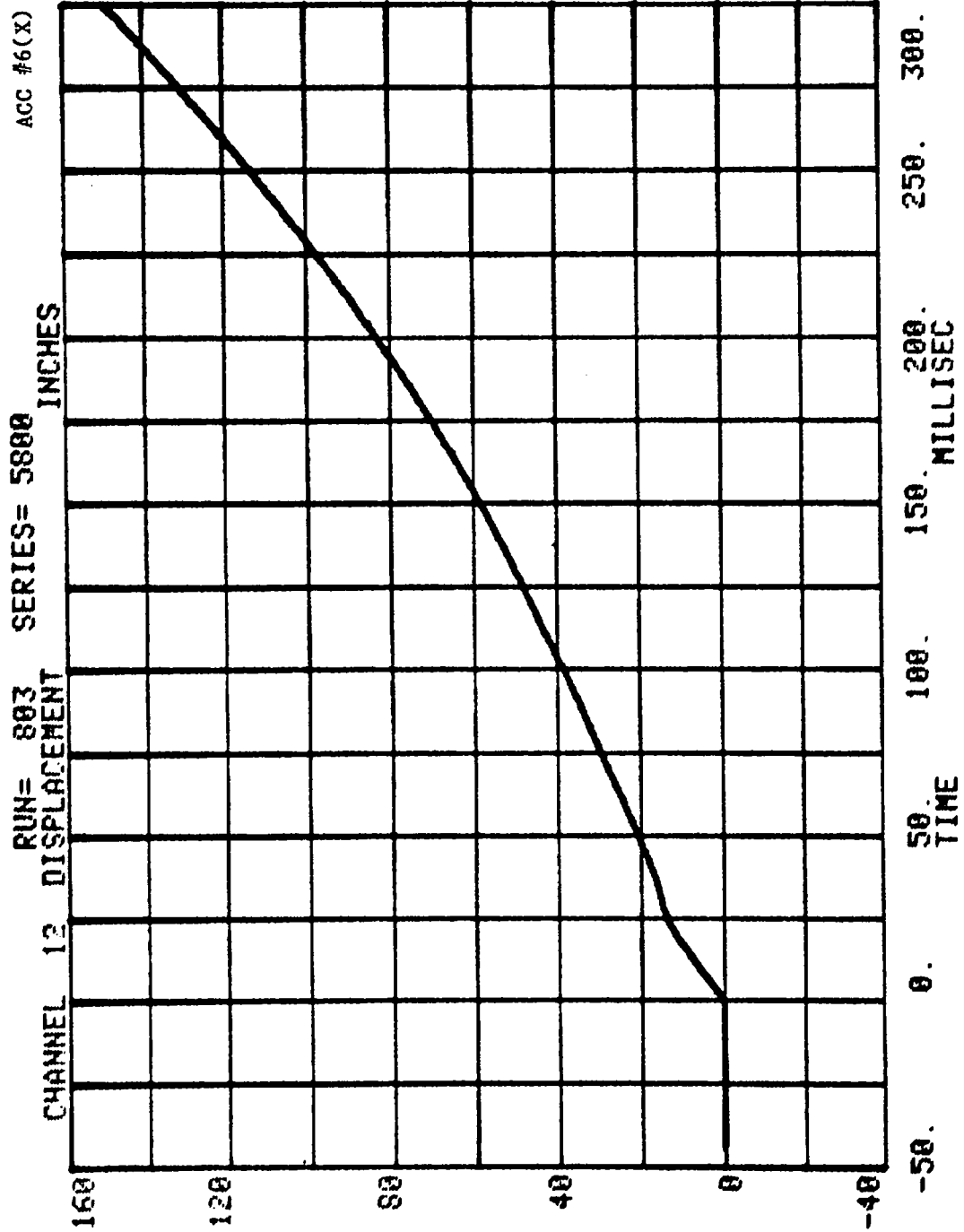




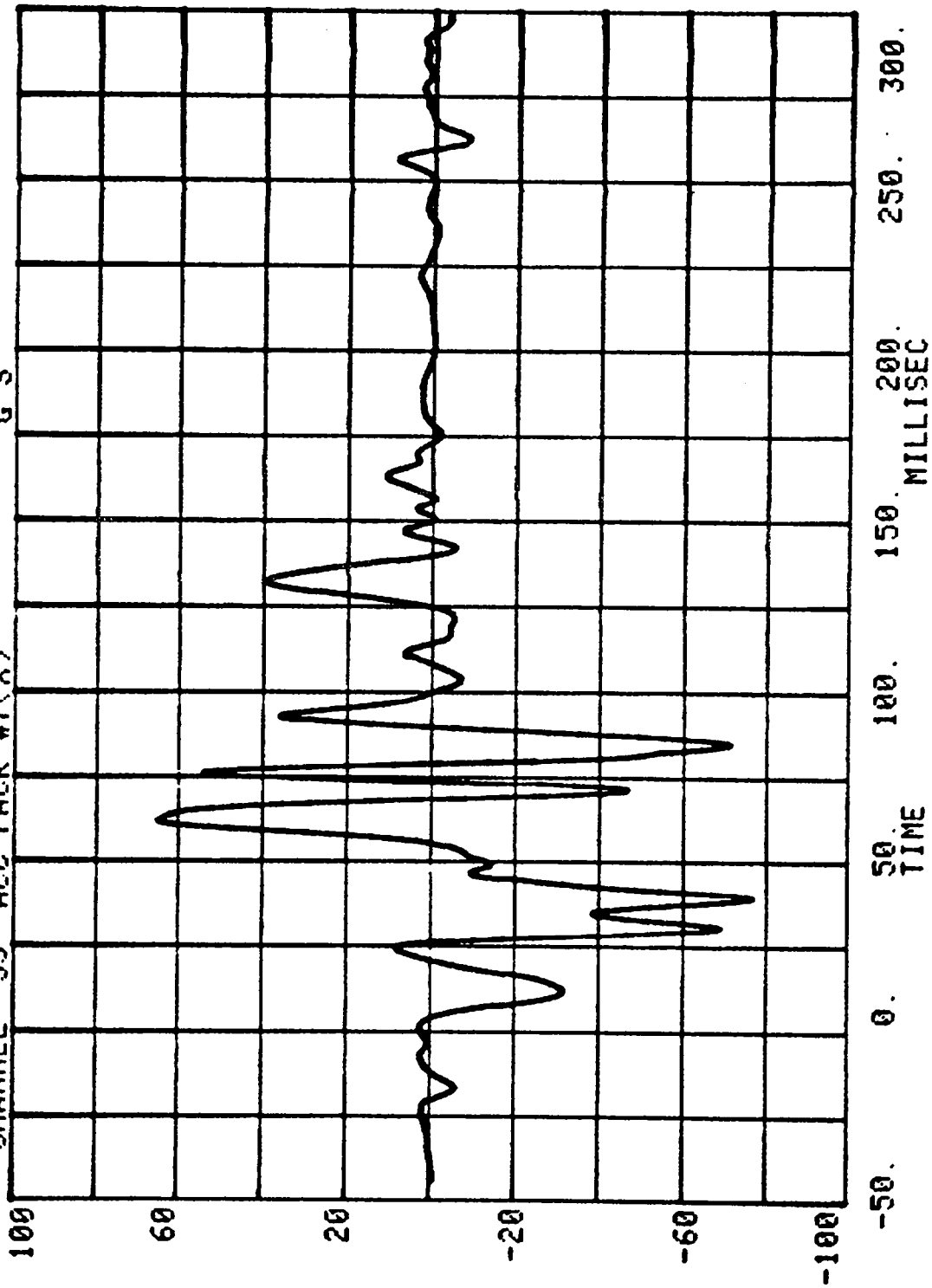
RUN= 803 SERIES= 5800
CHANNEL 32 ACC PACK #6(X) G'S

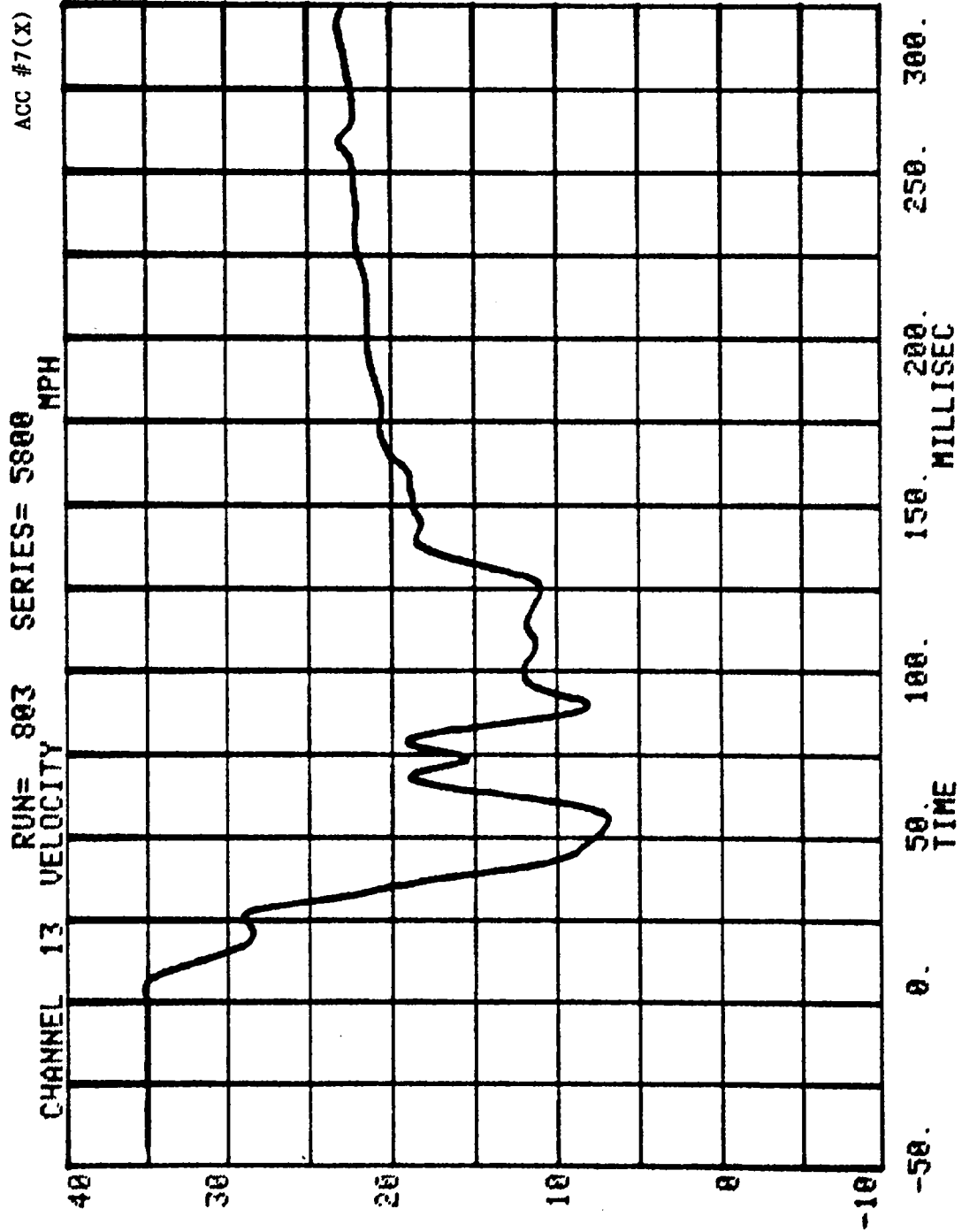


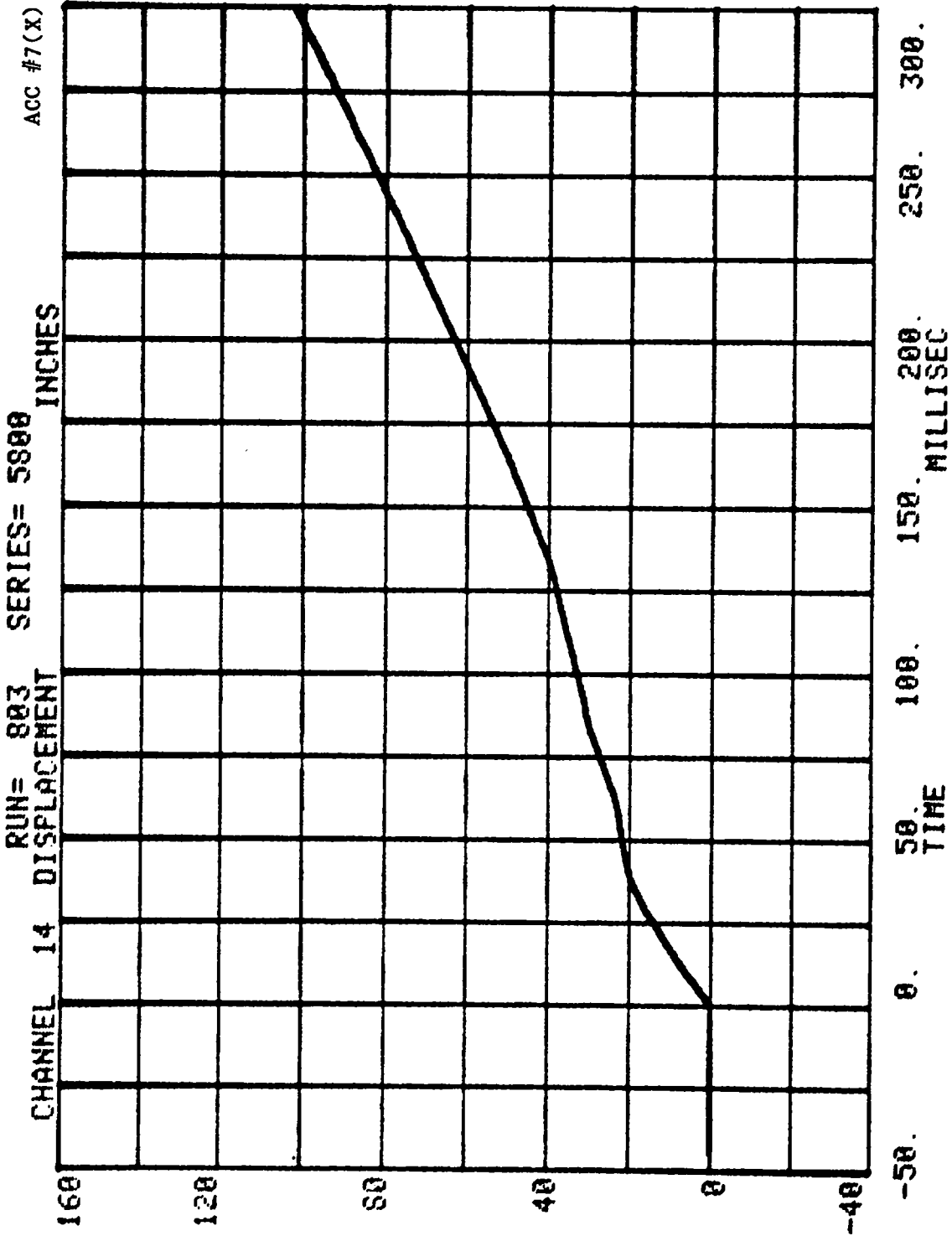




CHANNEL 33 ACC PACK #7(X) RUN= 303 SERIES= 5800 G'S







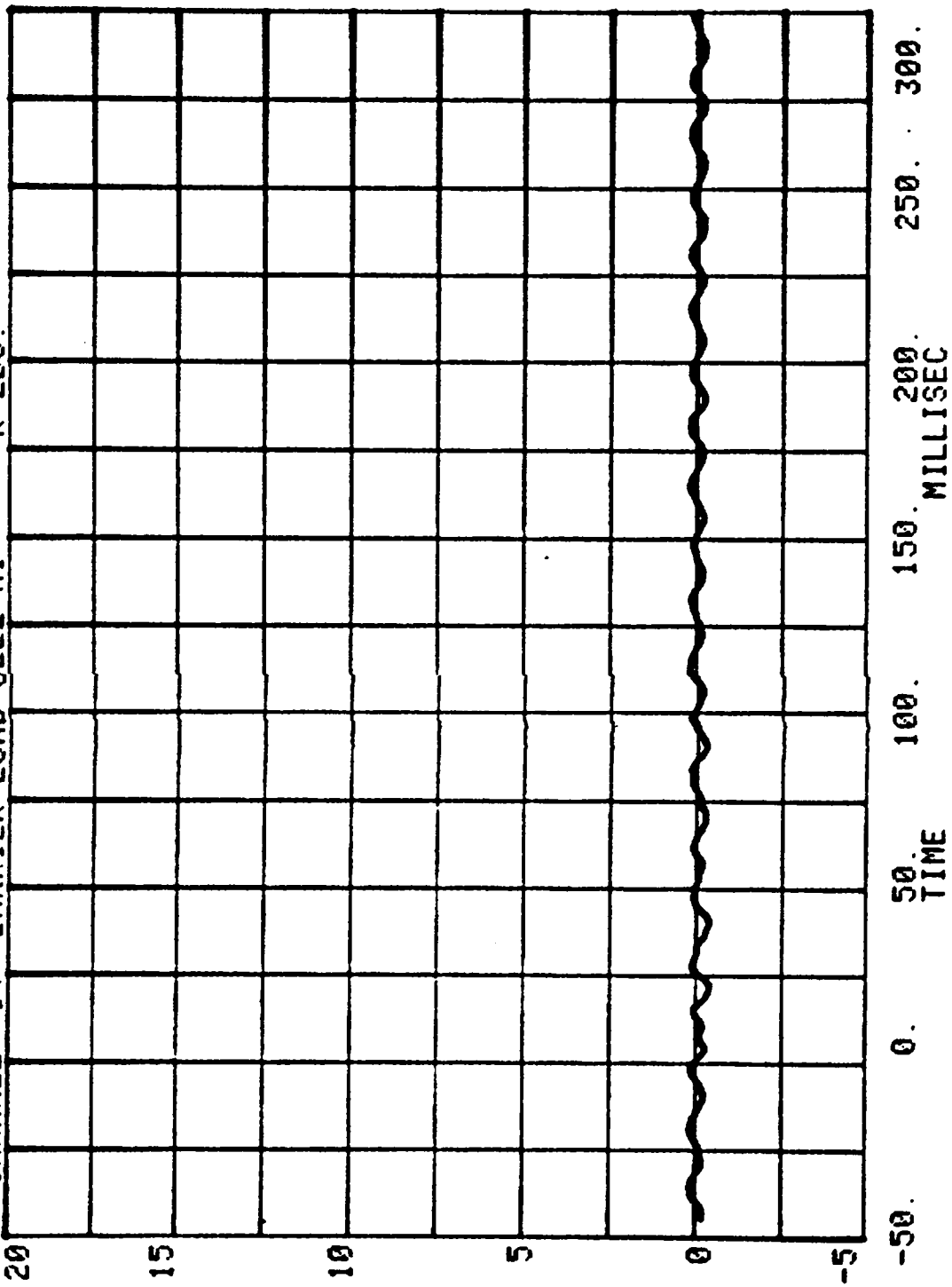
TEST NO. MJ5800

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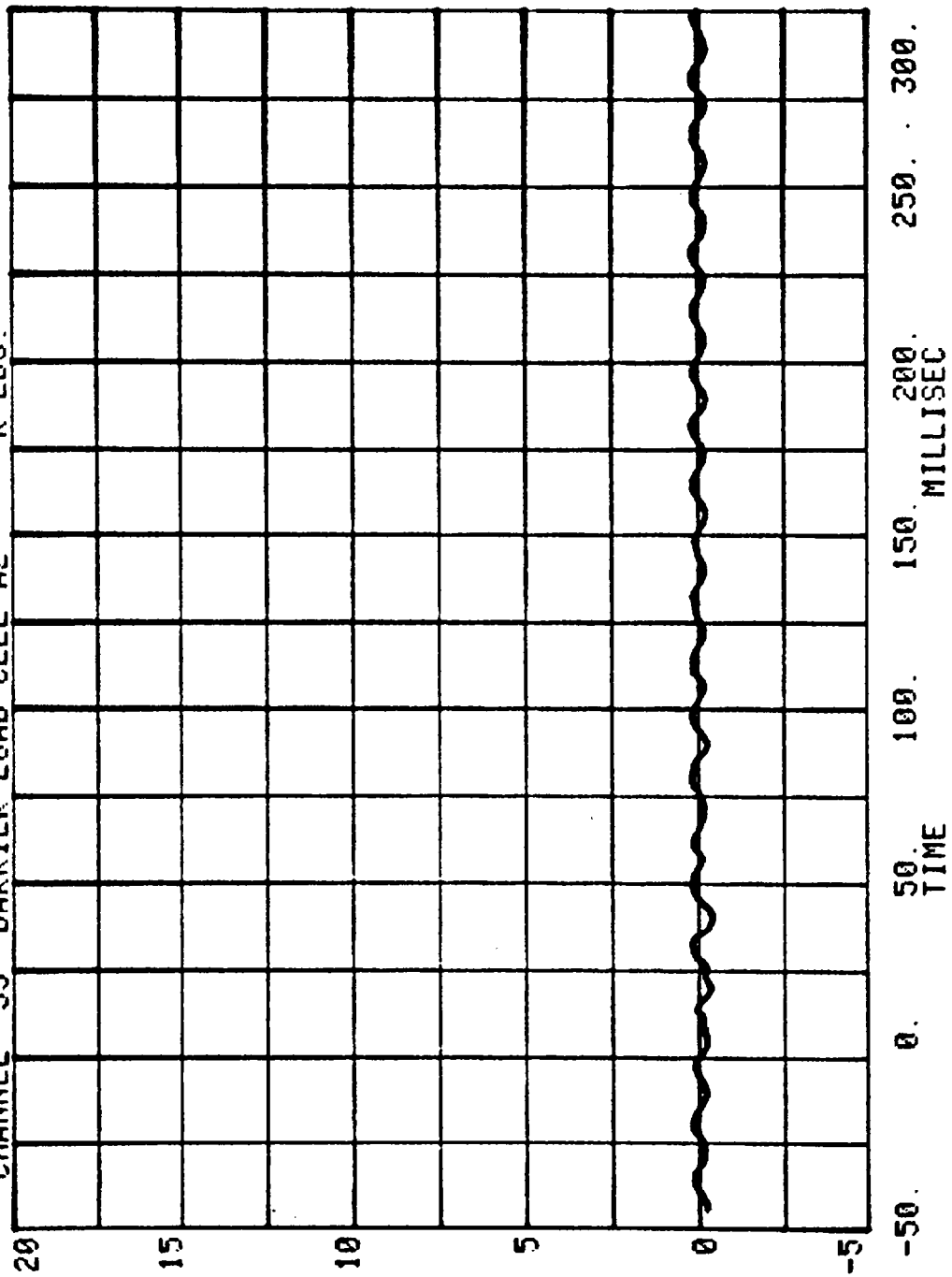
FILTER CHANNEL CLASS

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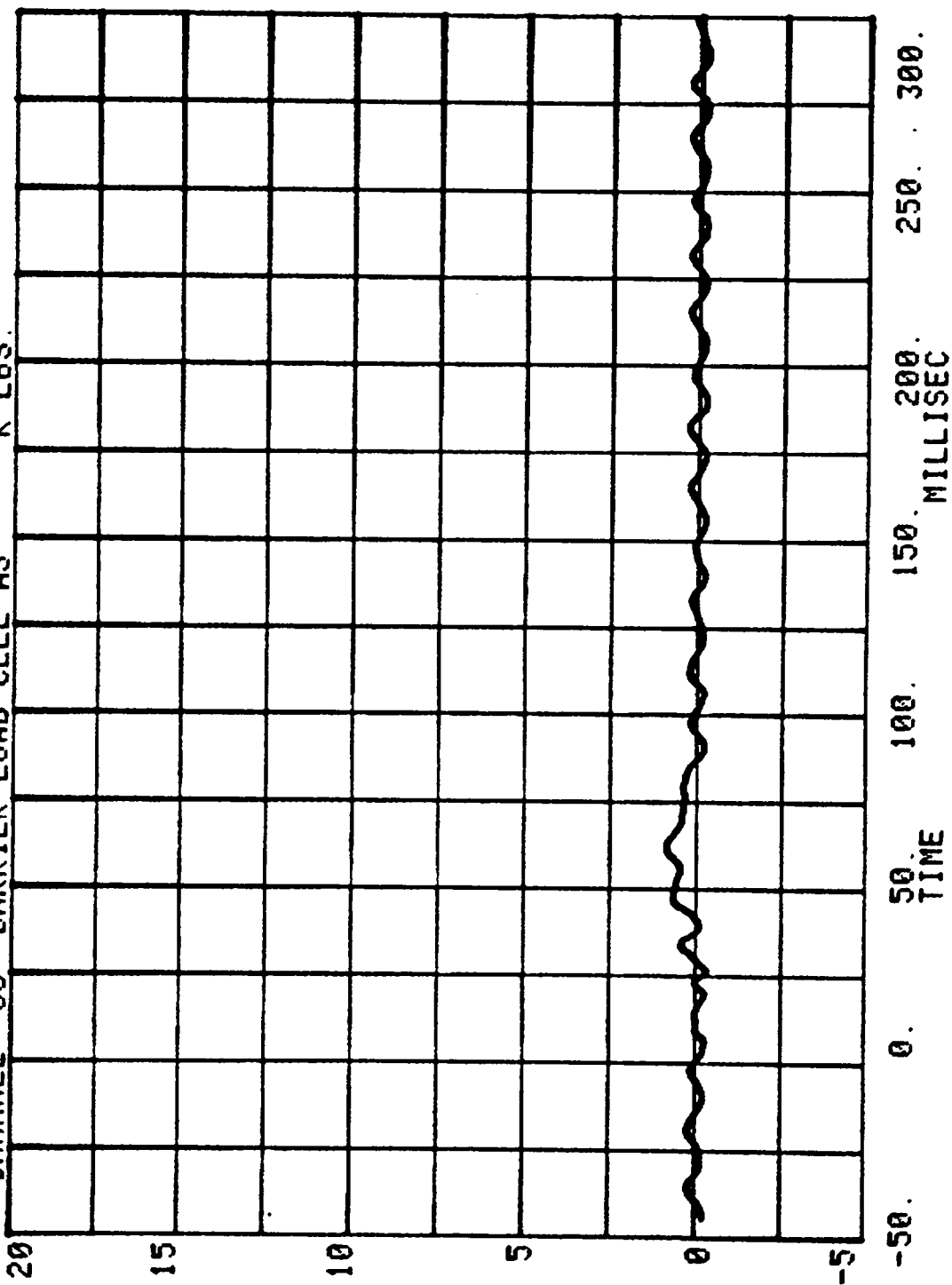
CHANNEL 34 BARRIER LOAD CELL A1
RUH= 803 SERIES= 5800 K LBS.

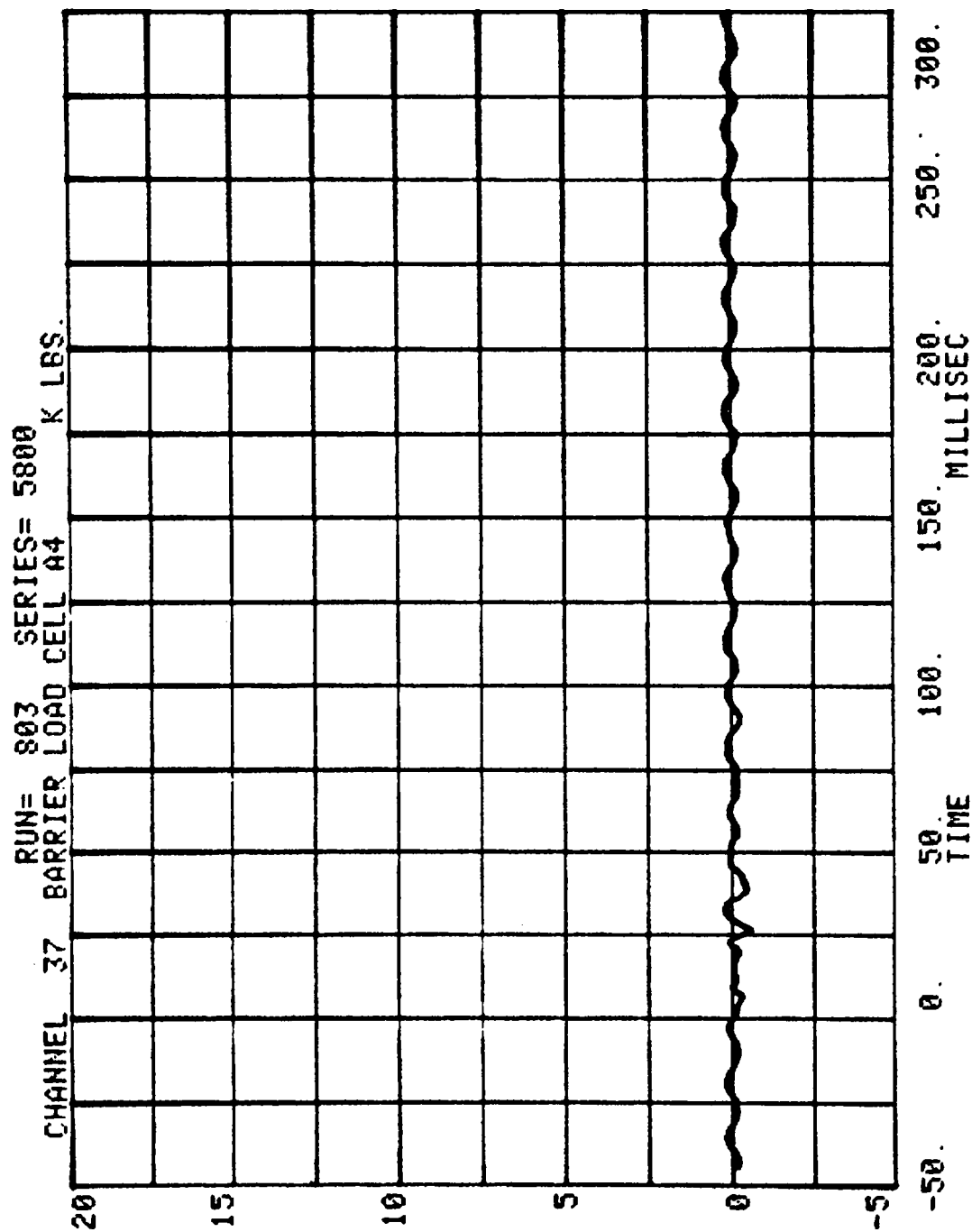


CHANNEL 35 BARRIER LOAD CELL A2 RUN= 803 SERIES= 5800 K LBS.

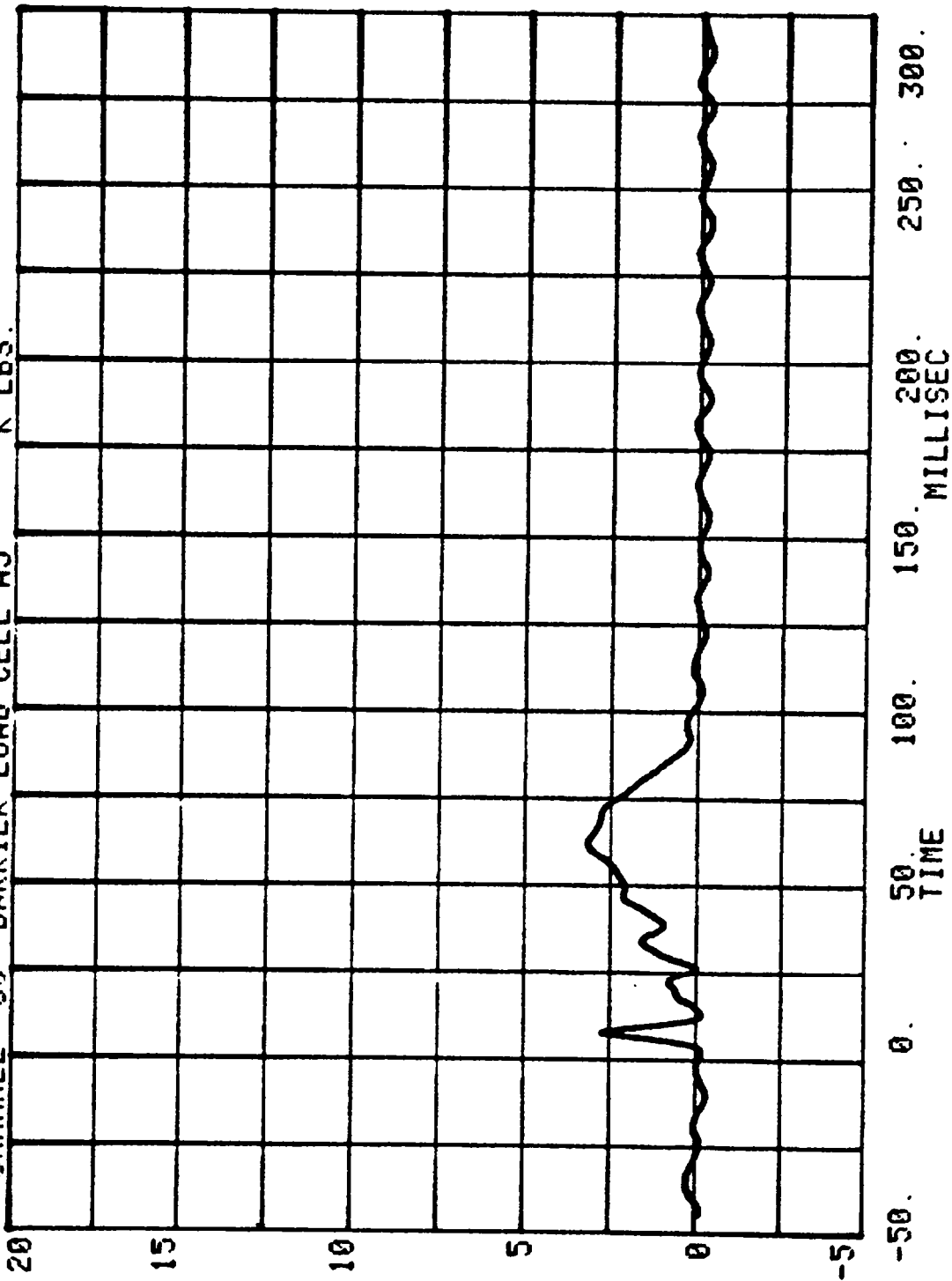


CHANNEL 36 BARRIER LOAD CELL A3 RUN= 803 SERIES= 5800 K LBS.

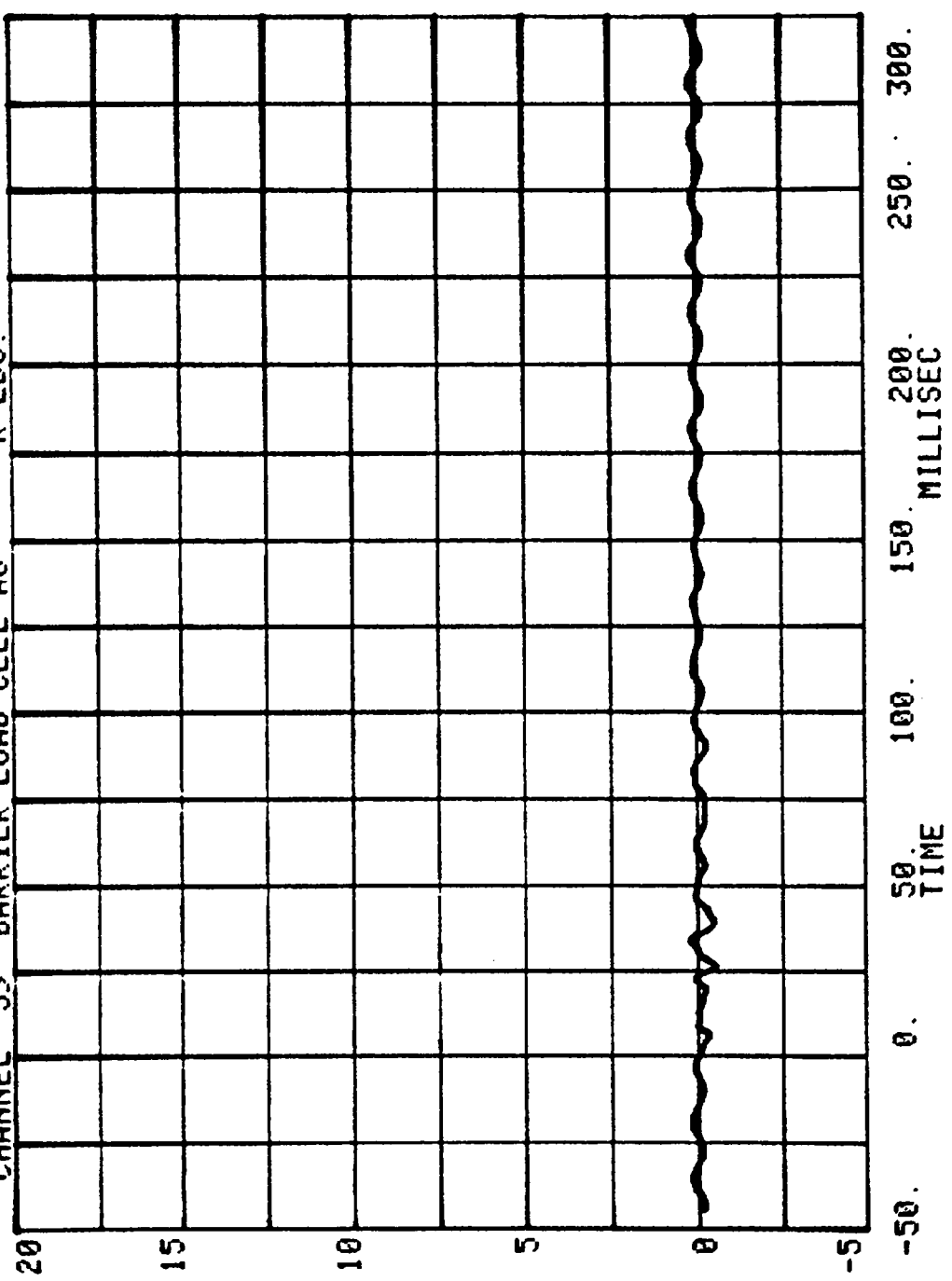




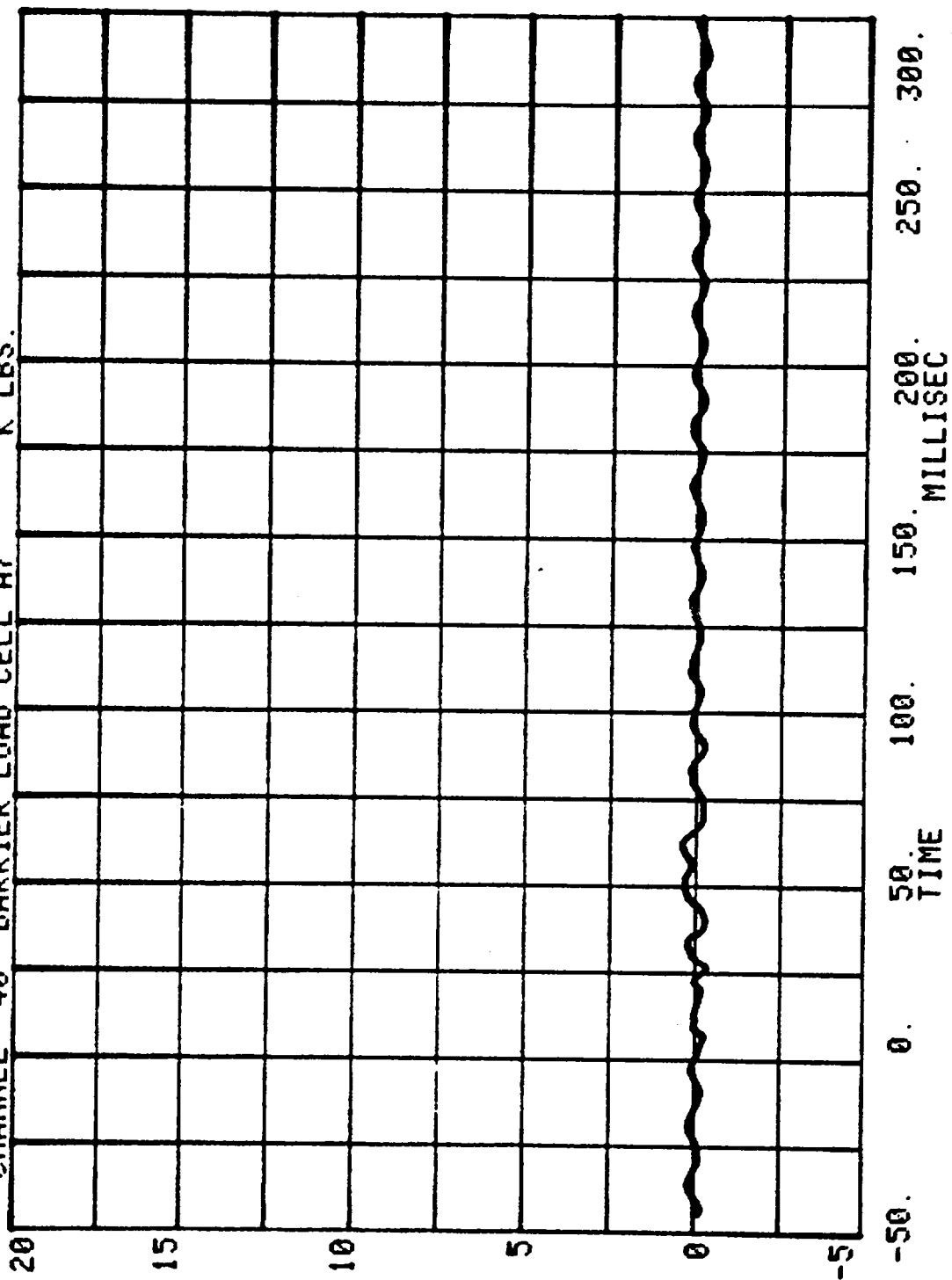
CHANNEL 38 RUN= 903 SERIES= 5800 K LBS.
BARRIER LOAD CELL A5



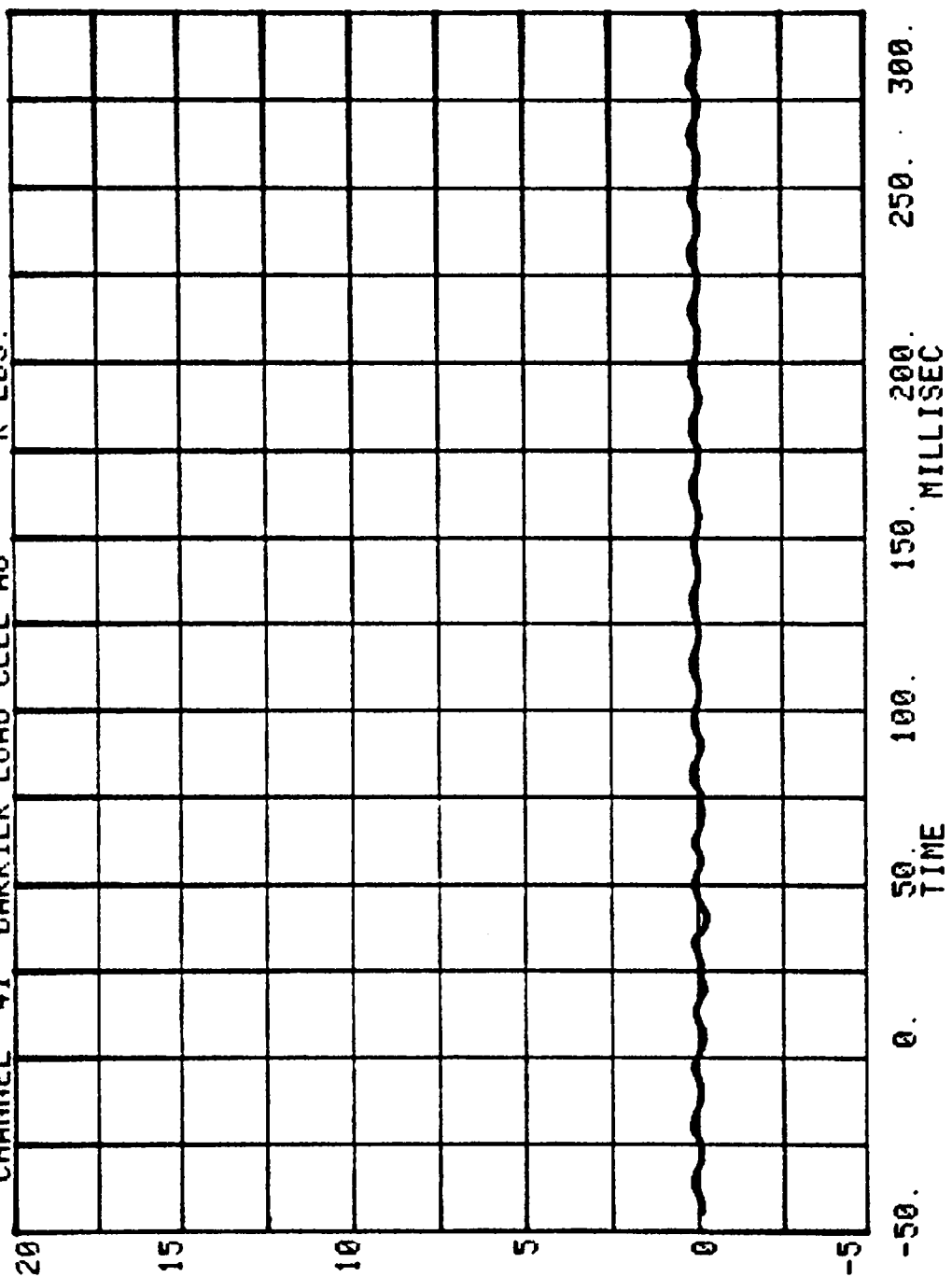
CHANNEL 39 BARRIER LOAD CELL A6 RUN= 803 SERIES= 5800 K LBS.



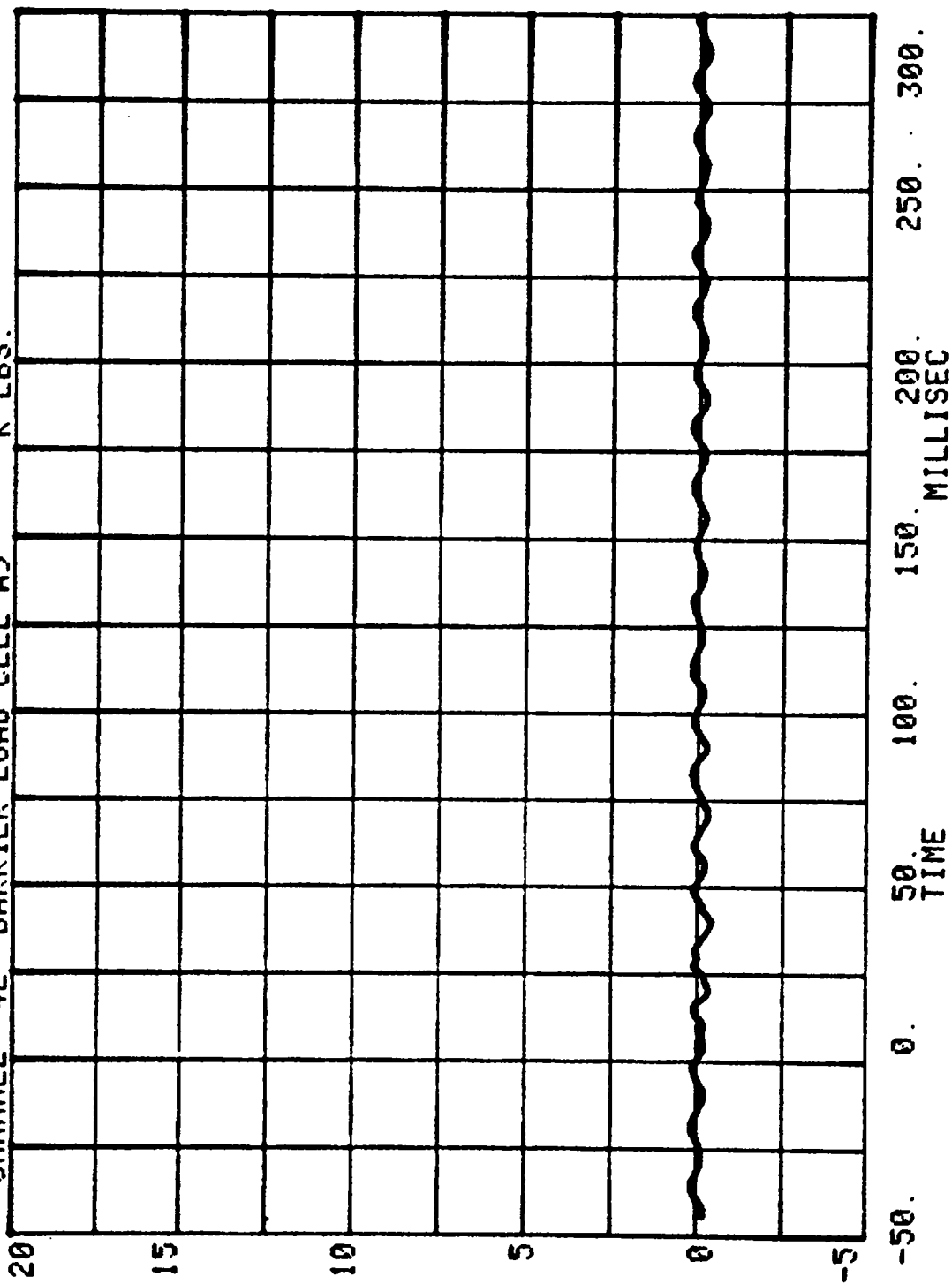
CHANNEL 40 BARRIER LOAD CELL A7 RUN= 803 SERIES= 5300 K LBS.



CHANNEL 41 BARRIER LOAD CELL A8 RUN= 883 SERIES= 5800 K LBS.

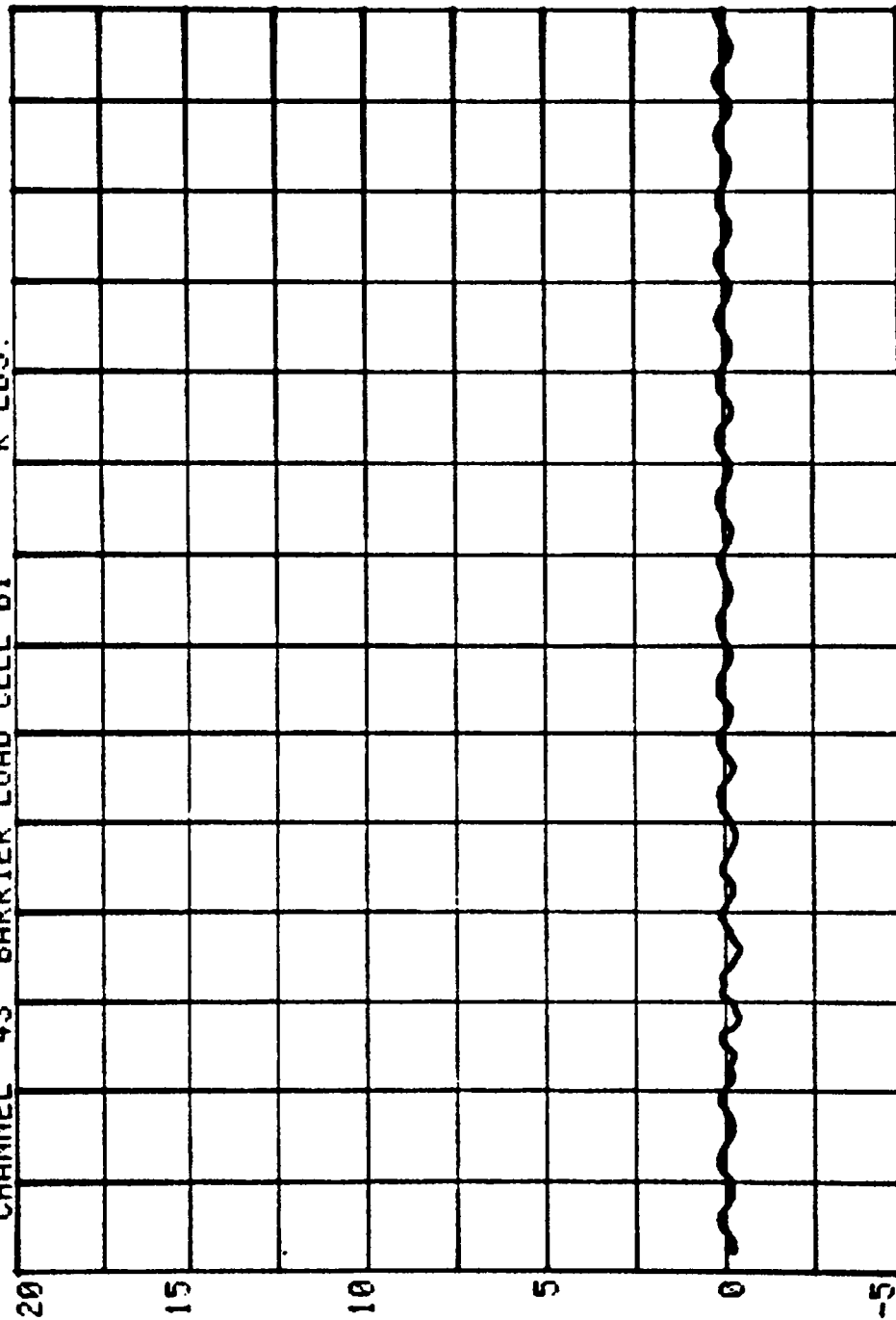


CHANNEL 42 BARRIER LOAD CELL A9 RUN= 803 SERIES= 5800 K LBS.



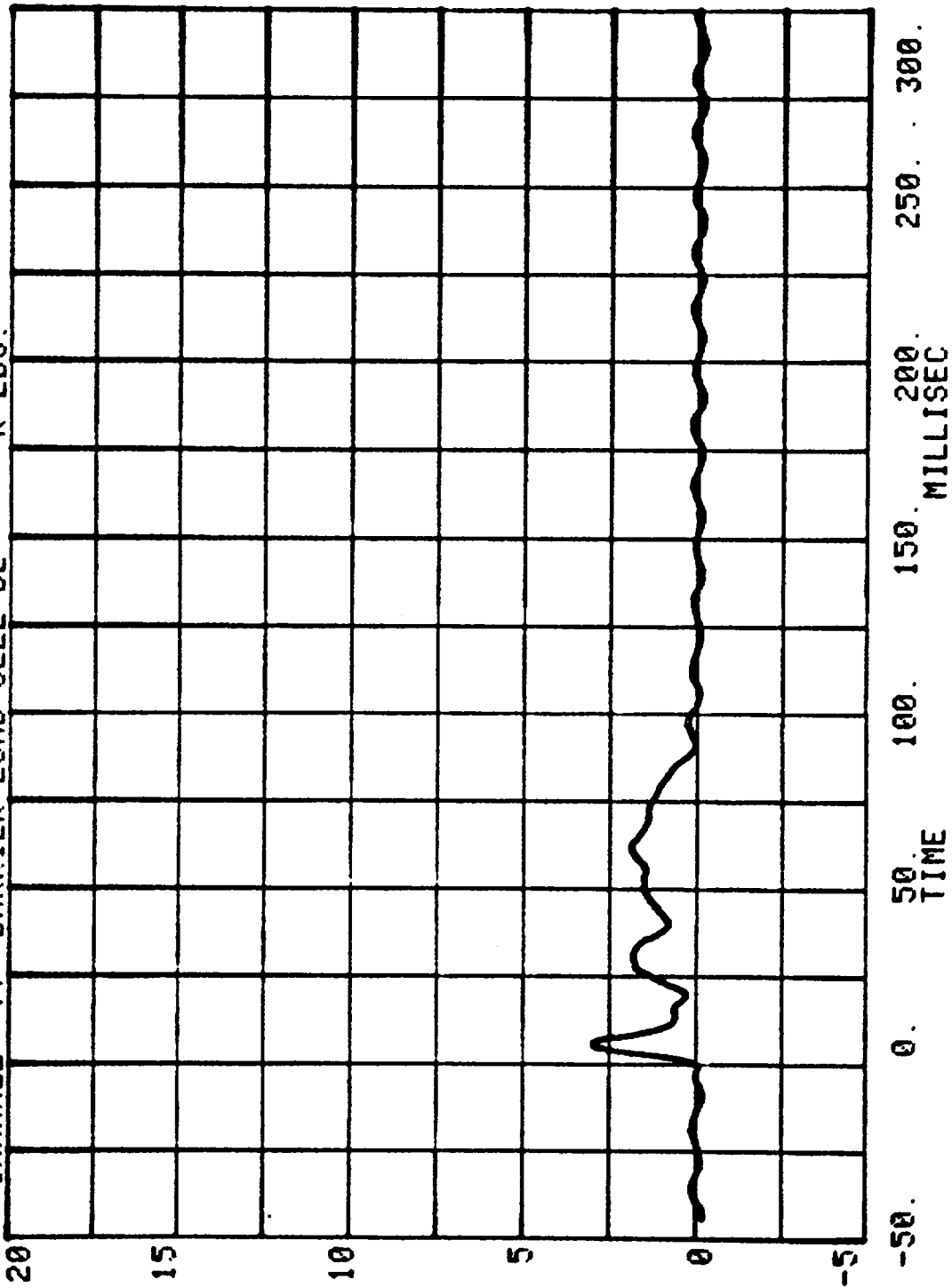
CHANNEL 43 BARRIER LOAD CELL B1 K LBS.

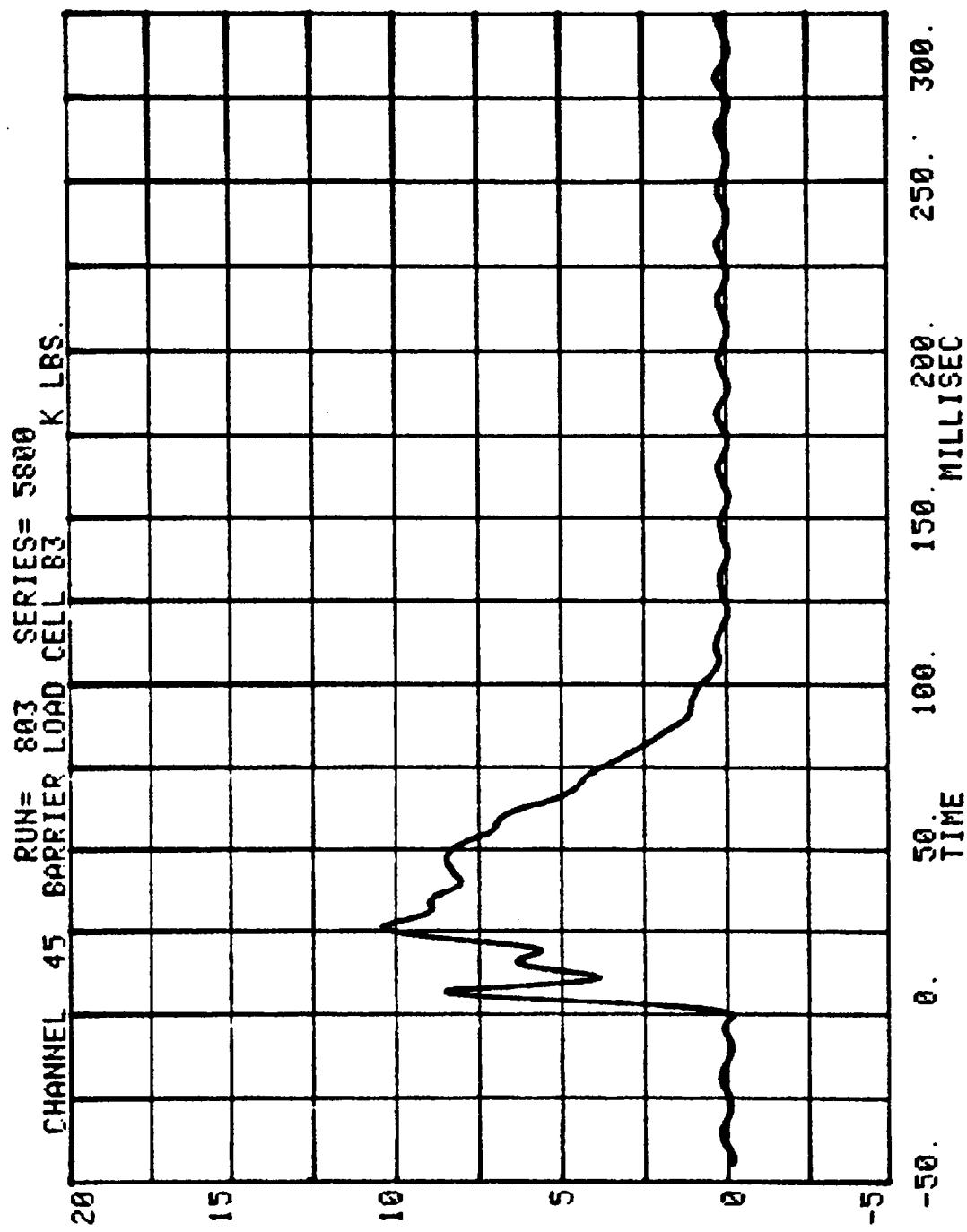
RUN= 803 SERIES= 5800

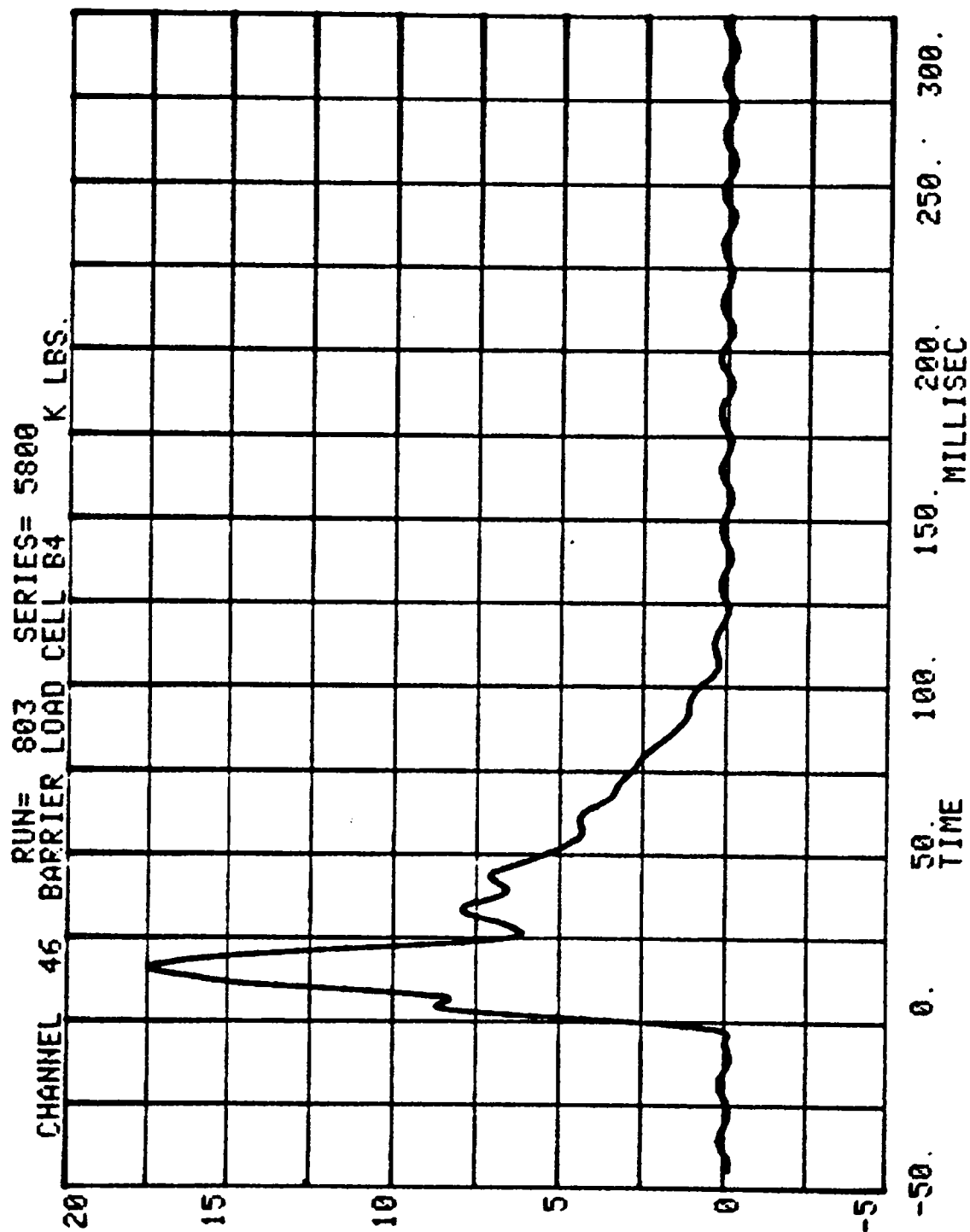


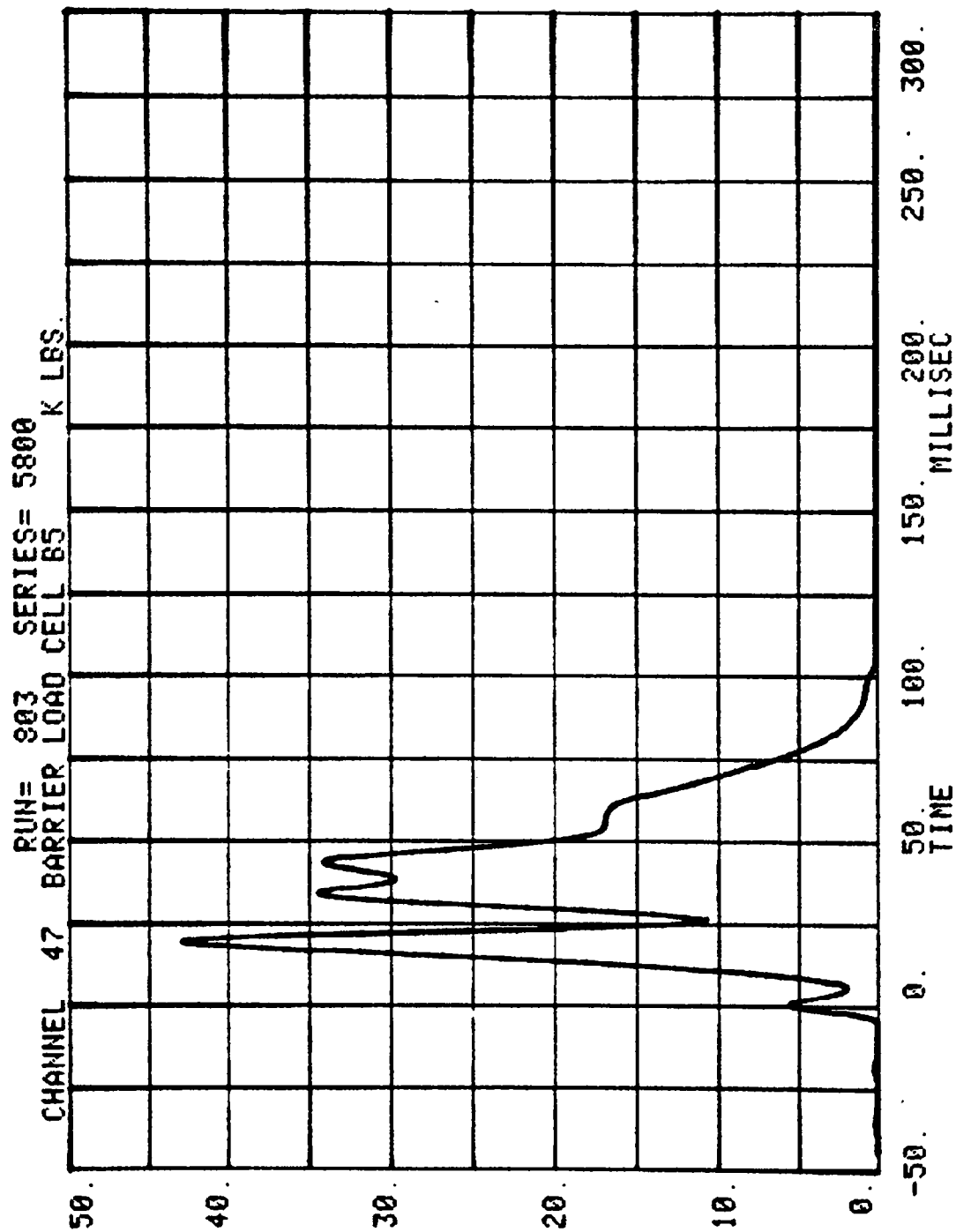
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 44 RUN= 803 SERIES= 5800
BARRIER LOAD CELL B2 K LBS.

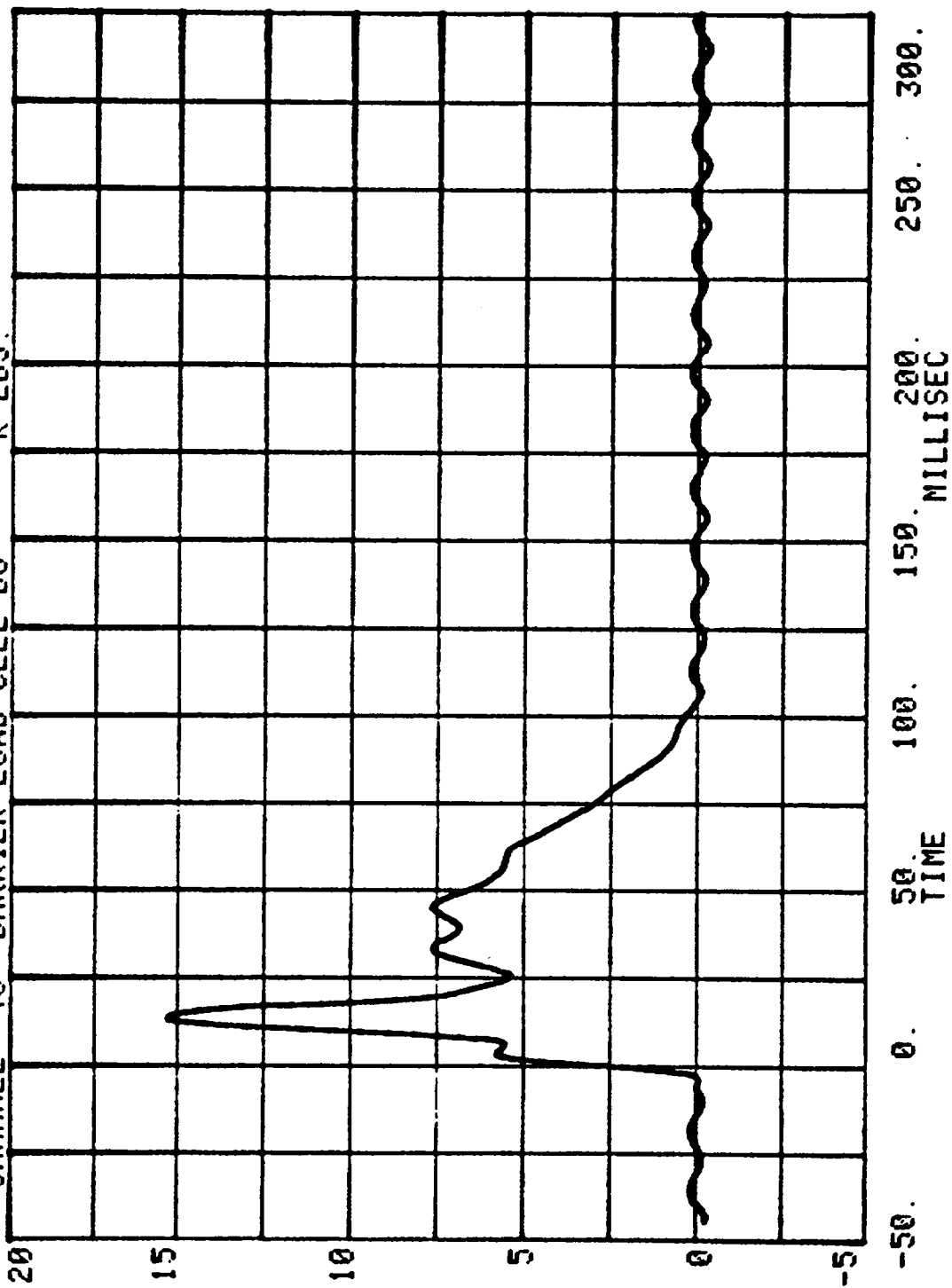


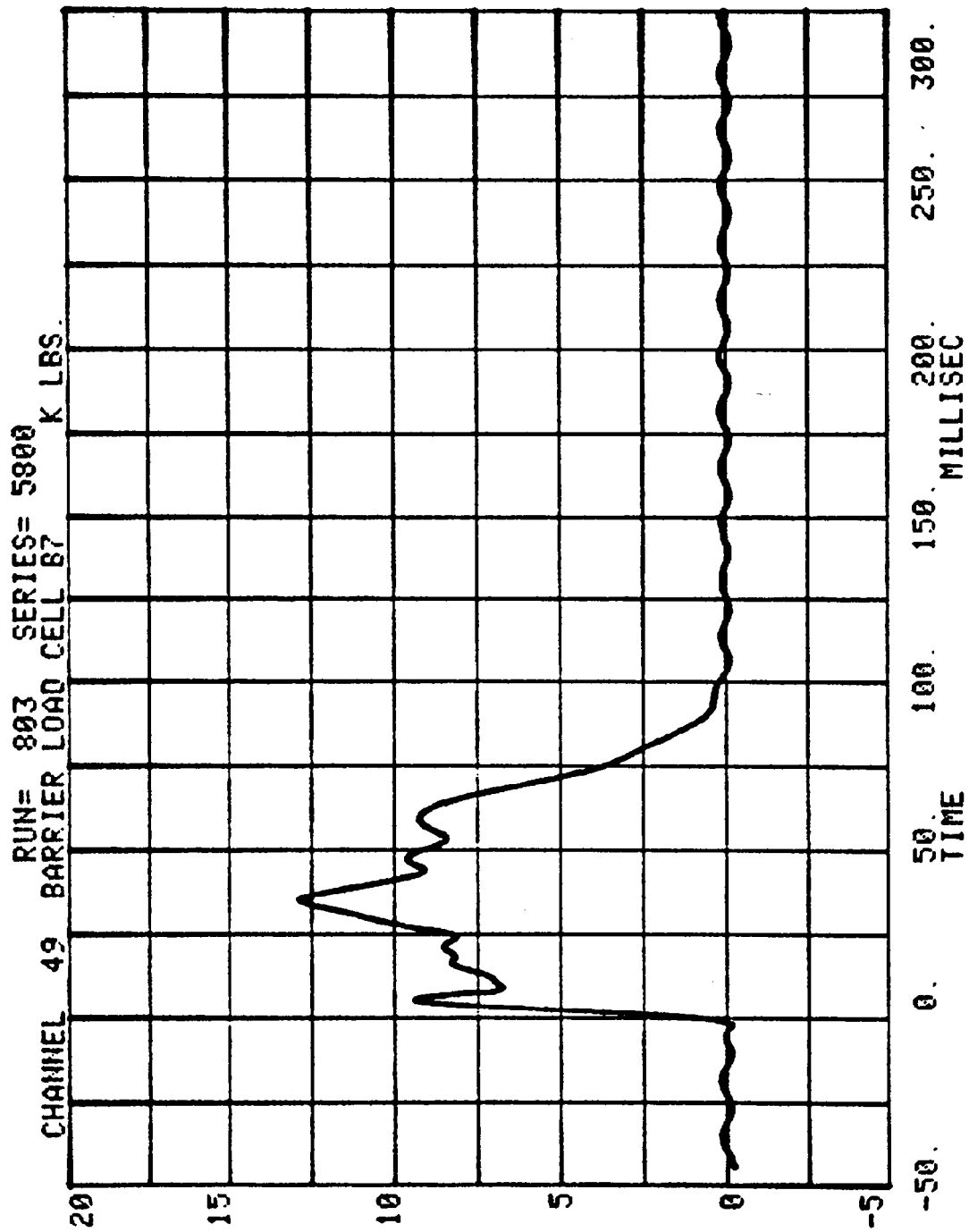




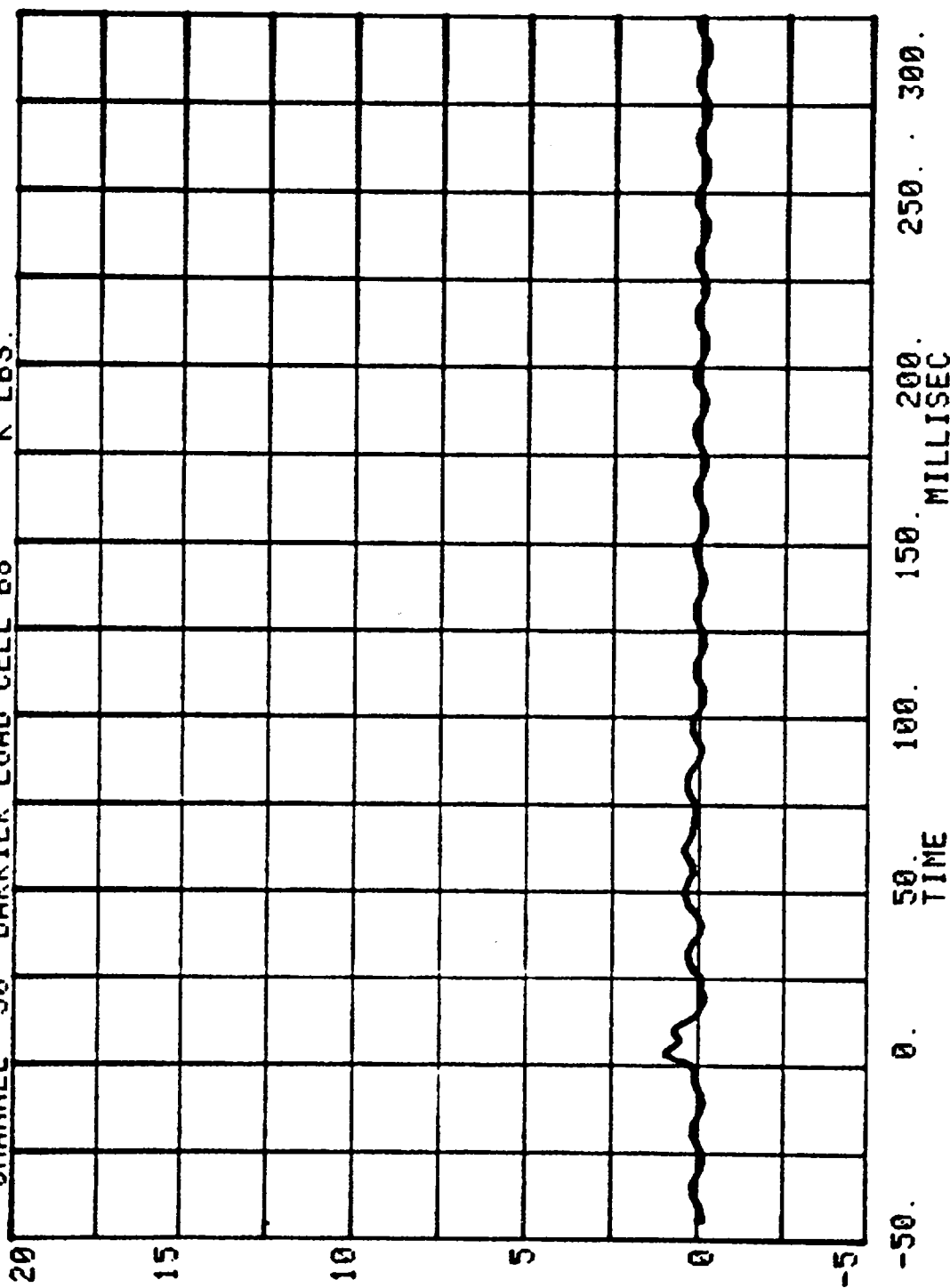


CHANNEL 48 RUN= 803 SERIES= 5800
BARRIER LOAD CELL B6 K LBS.

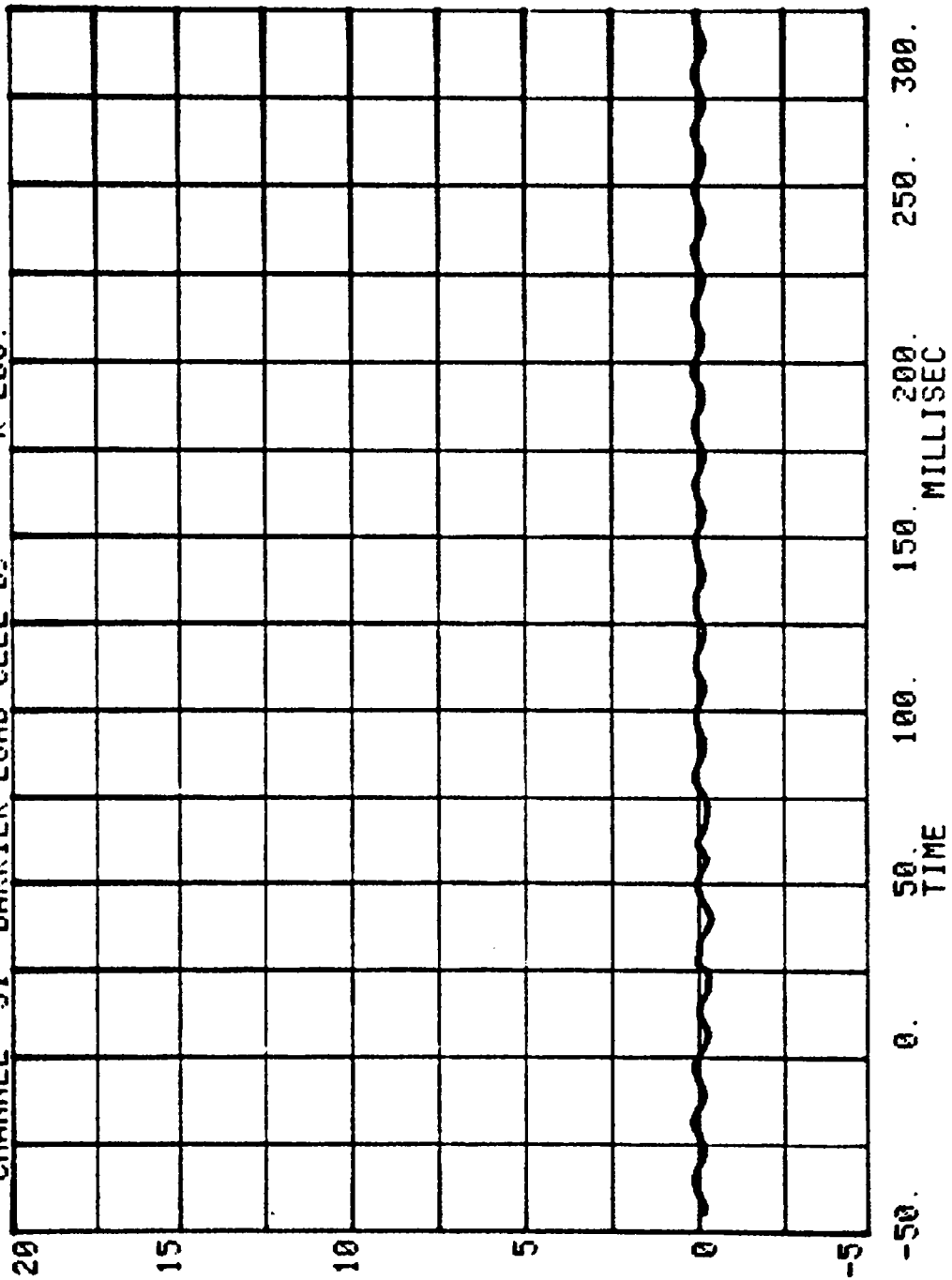




CHANNEL 50 BARRIER LOAD CELL B8 RUH= 803 SERIES= 5800 K LBS.



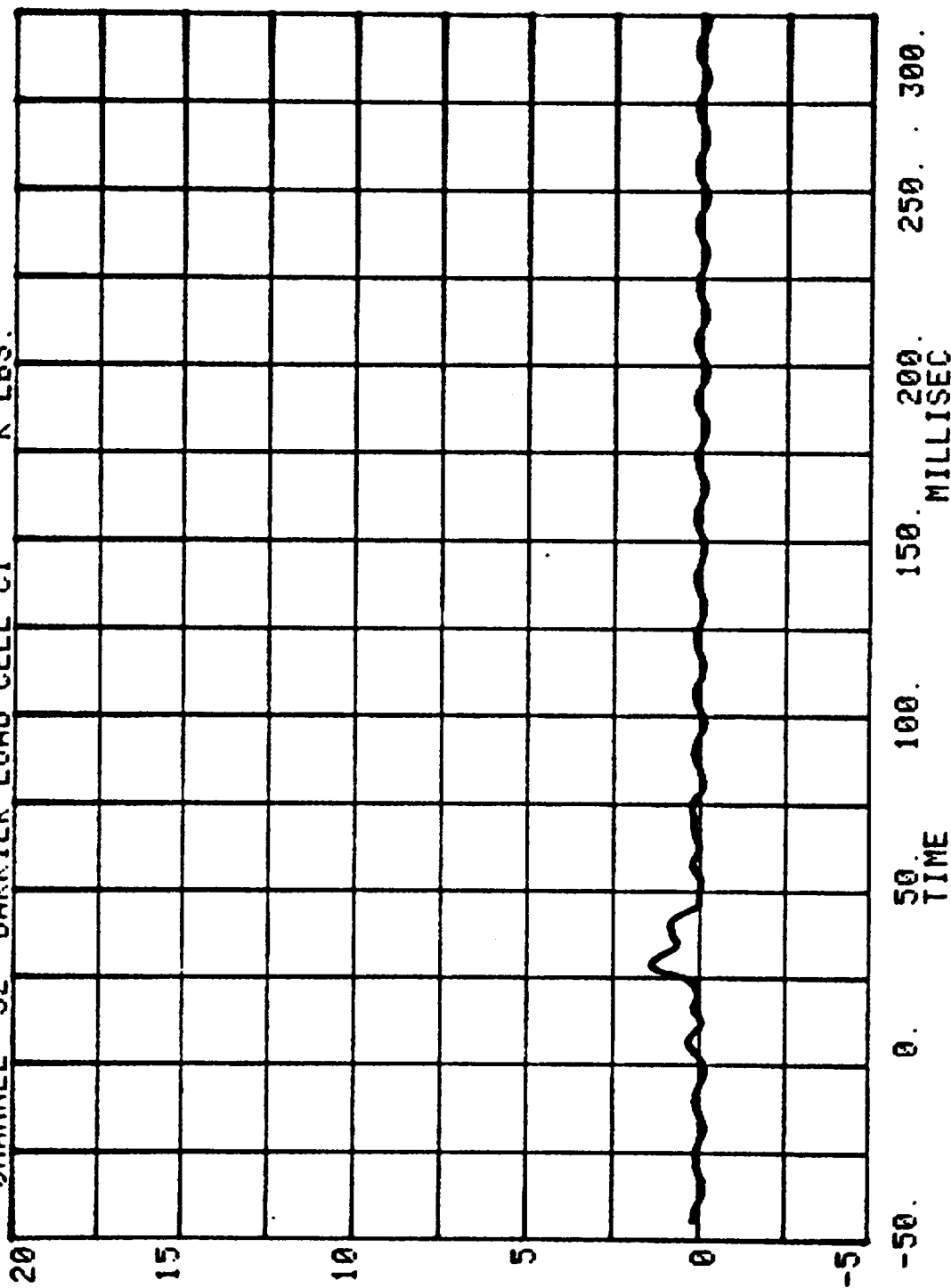
CHANNEL 51 BARRIER LOAD CELL B9 RUN= 803 SERIES= 5800 K LBS.

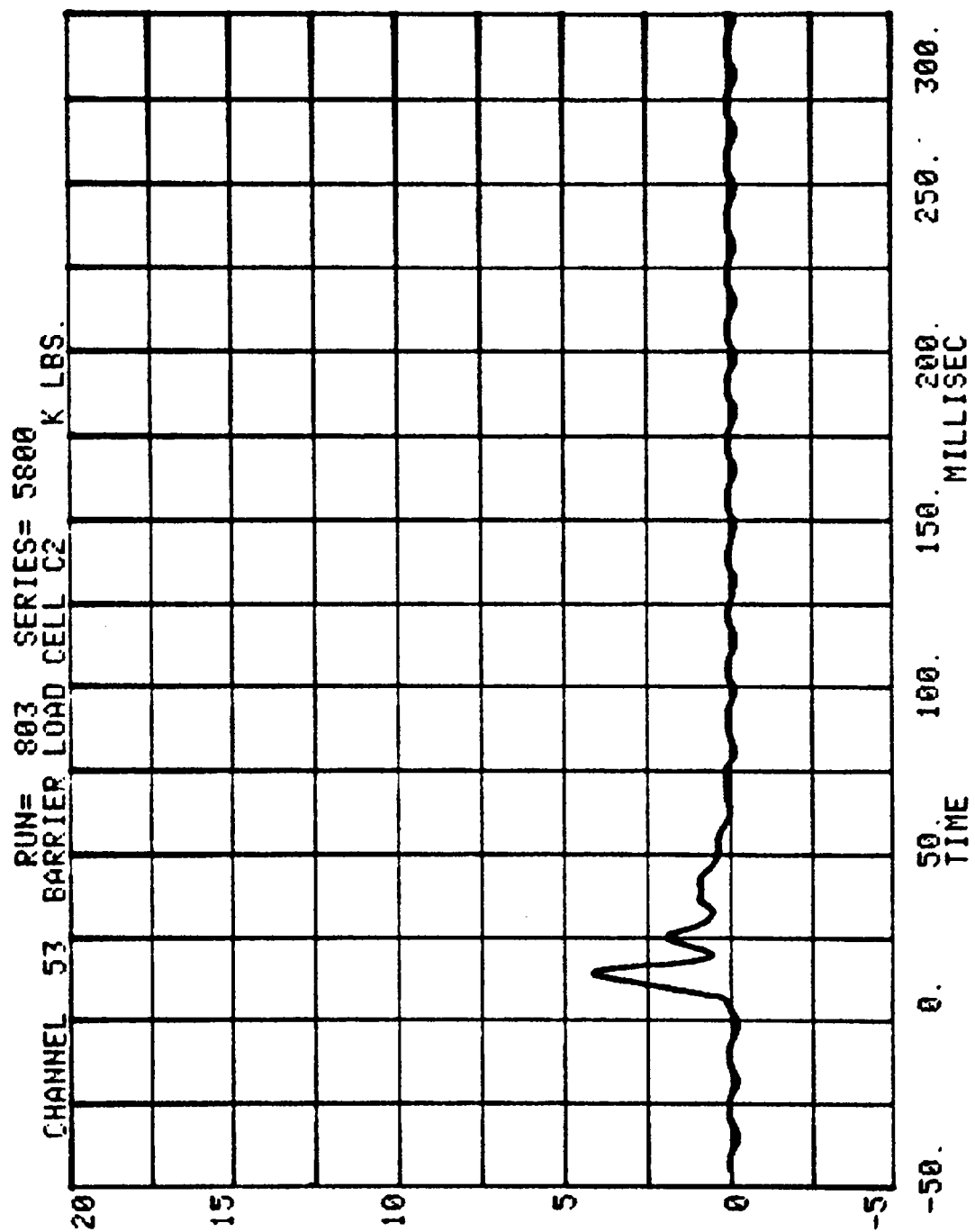


CHANNEL 52 BARRIER LOAD CELL C1

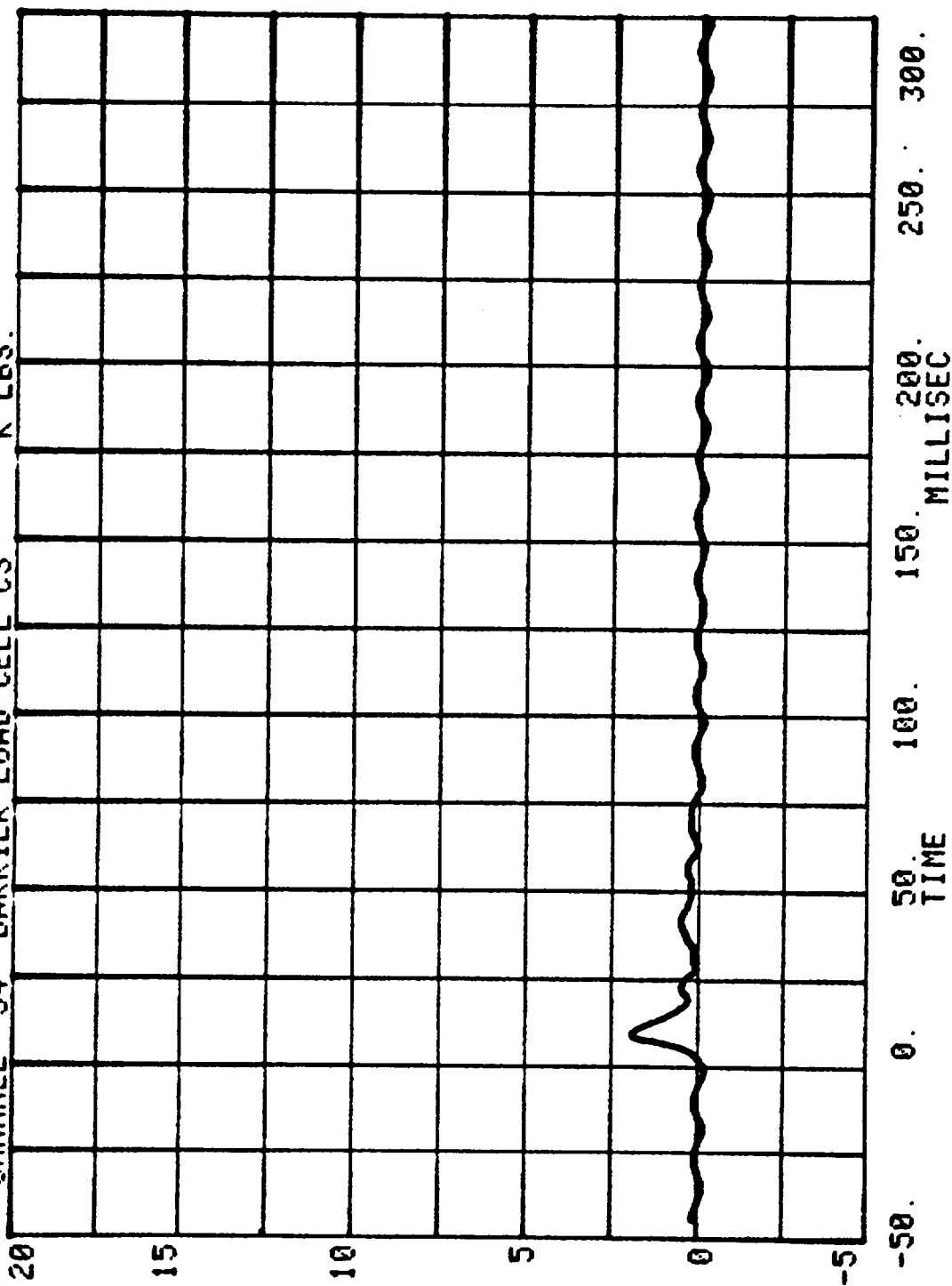
RUN= 803 SERIES= 5800

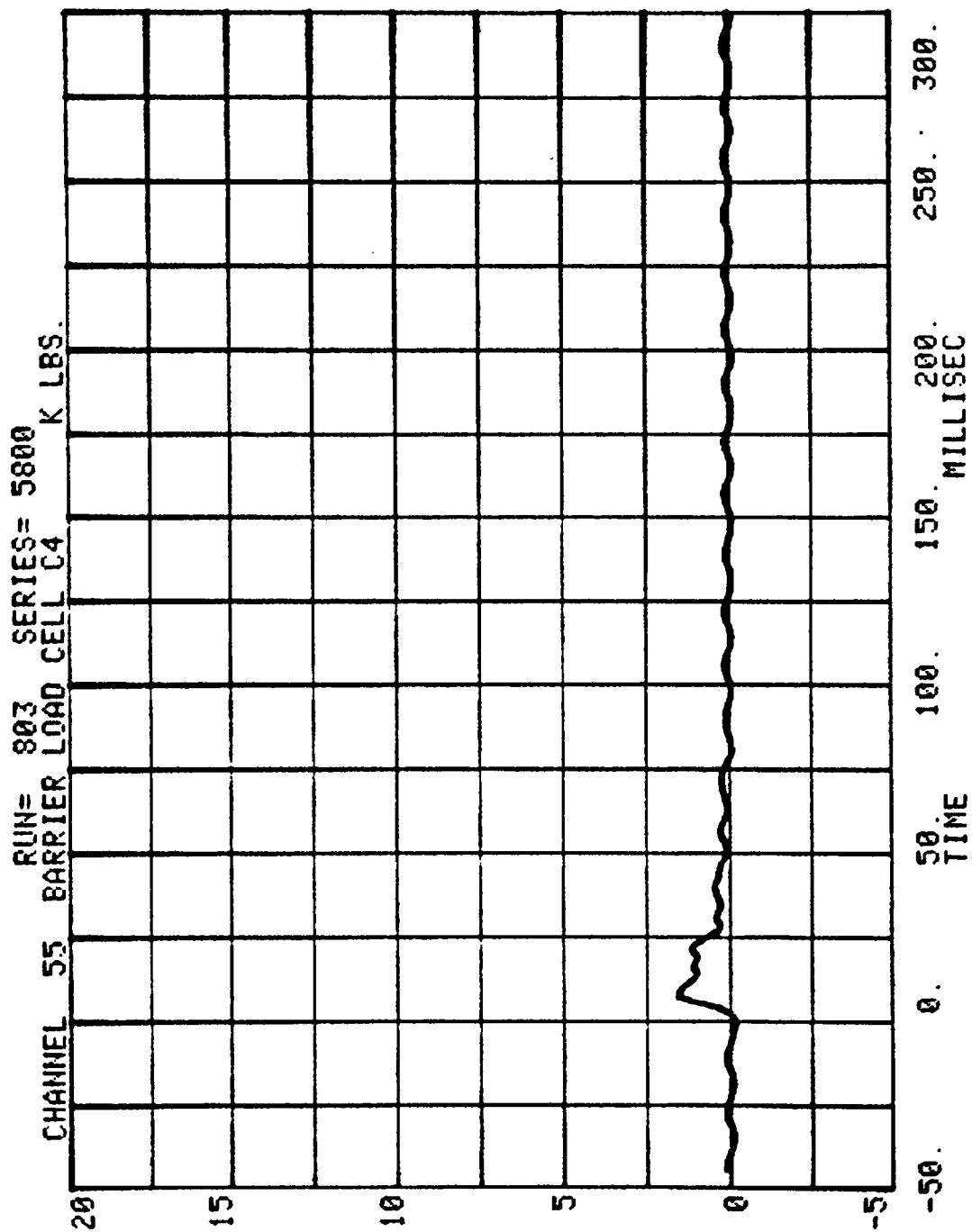
K LBS.





CHANNEL 54 BARRIER LOAD CELL C3 RUN= 803 SERIES= 5800 K LBS.

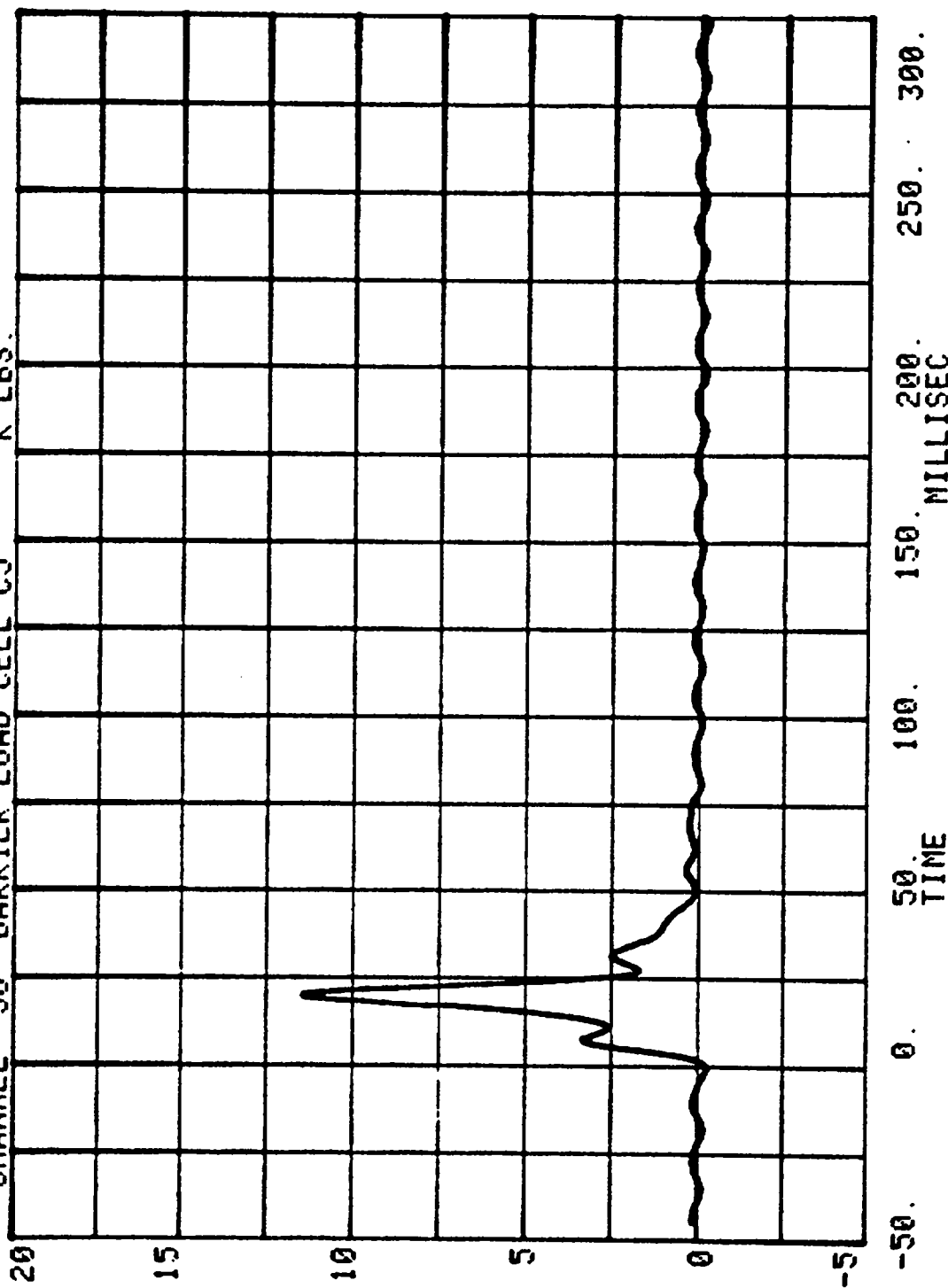


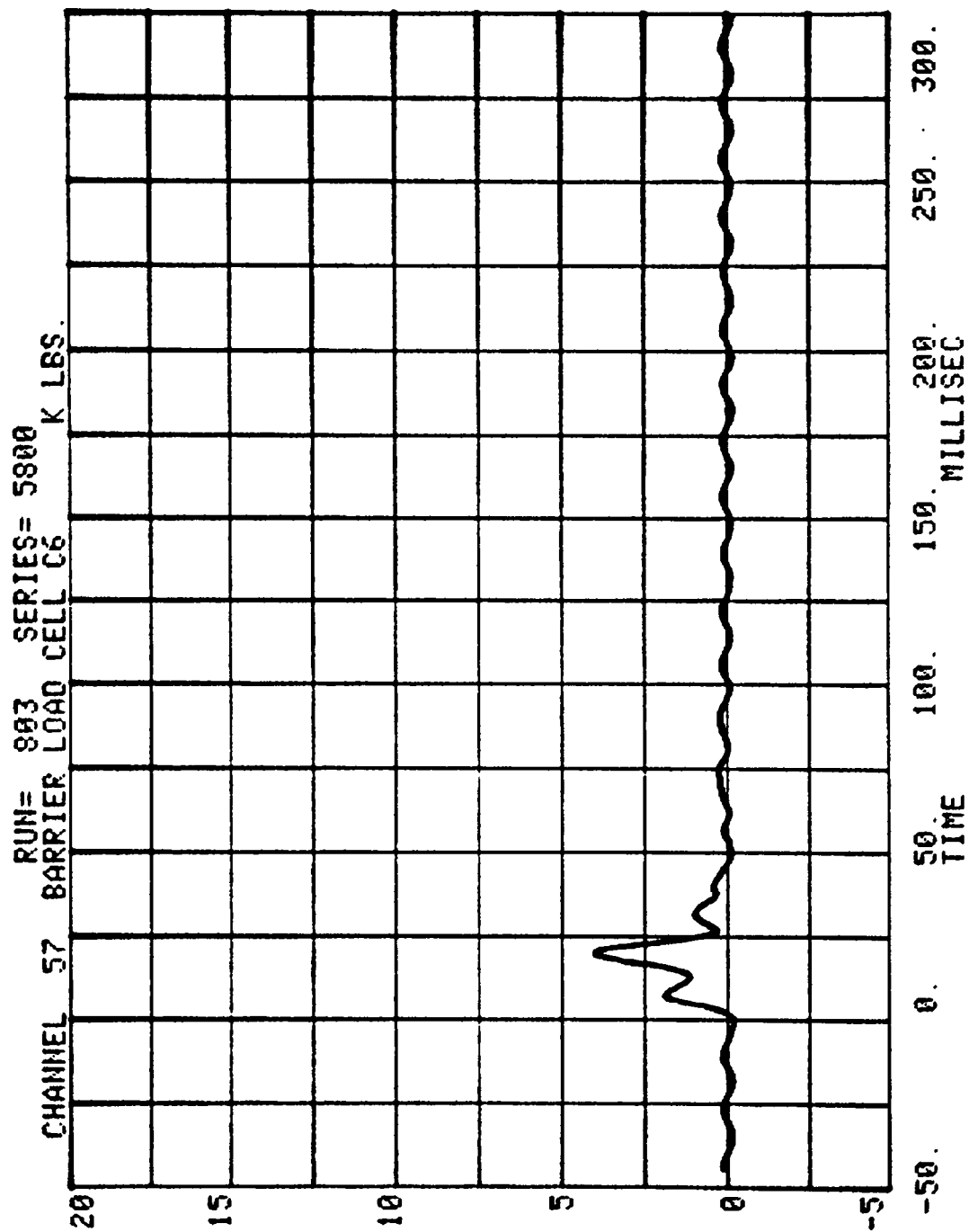


CHANNEL 56 BARRIER LOAD CELL C5

RUN= 803 SERIES= 5800

K LBS.

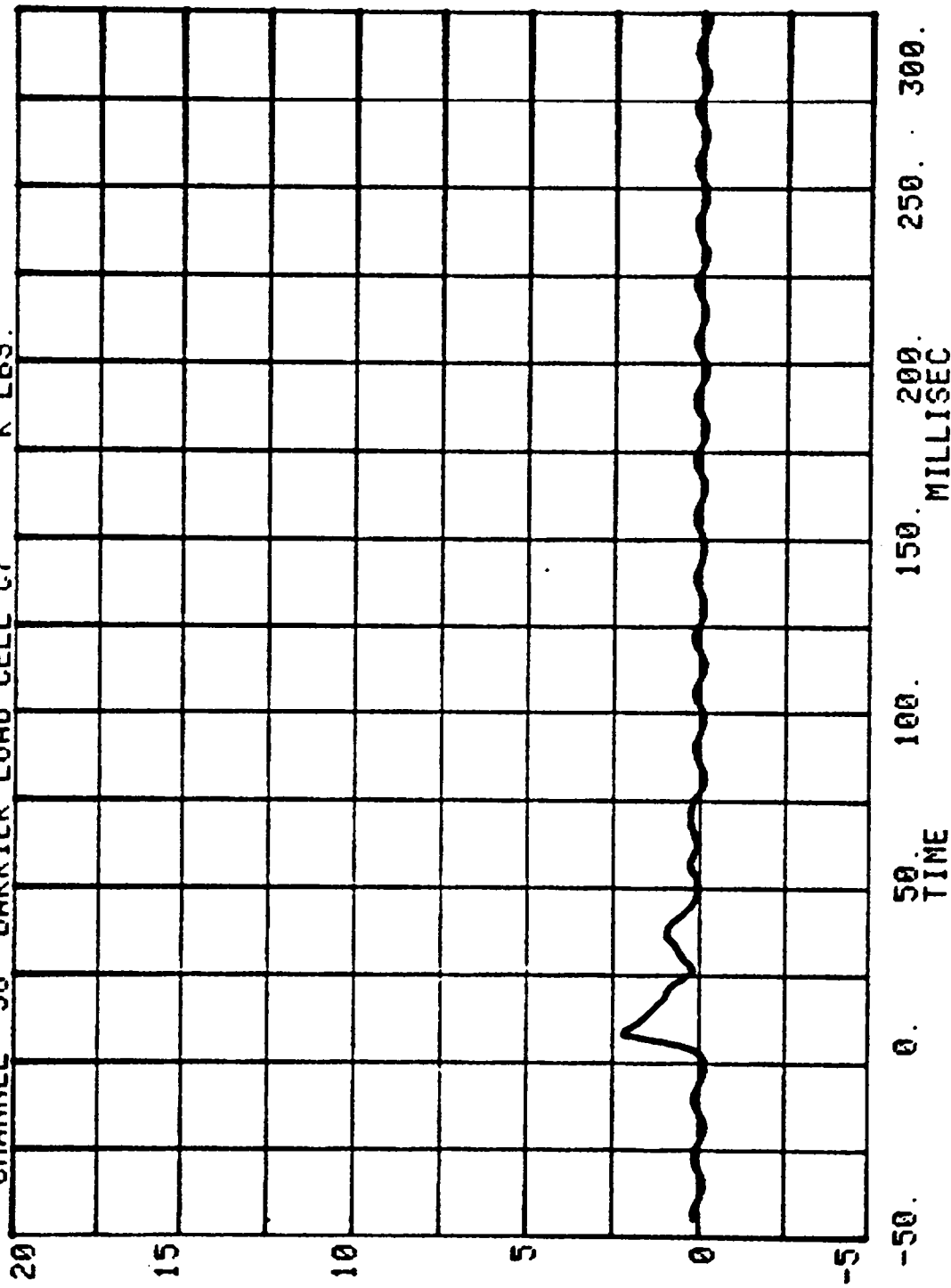




CHANNEL 58 BARRIER LOAD CELL C7

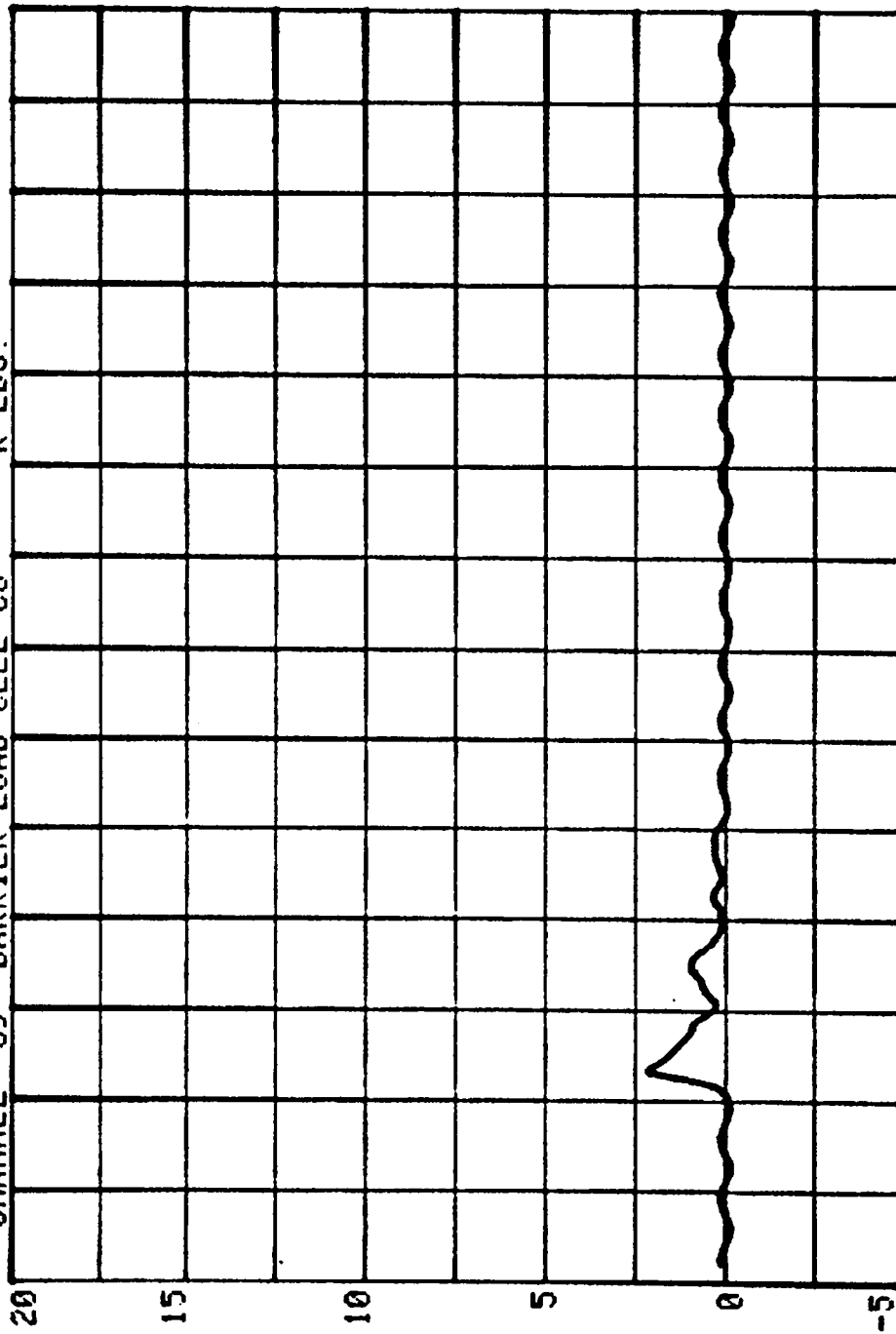
RUN= 803 SERIES= 5800

K LBS.

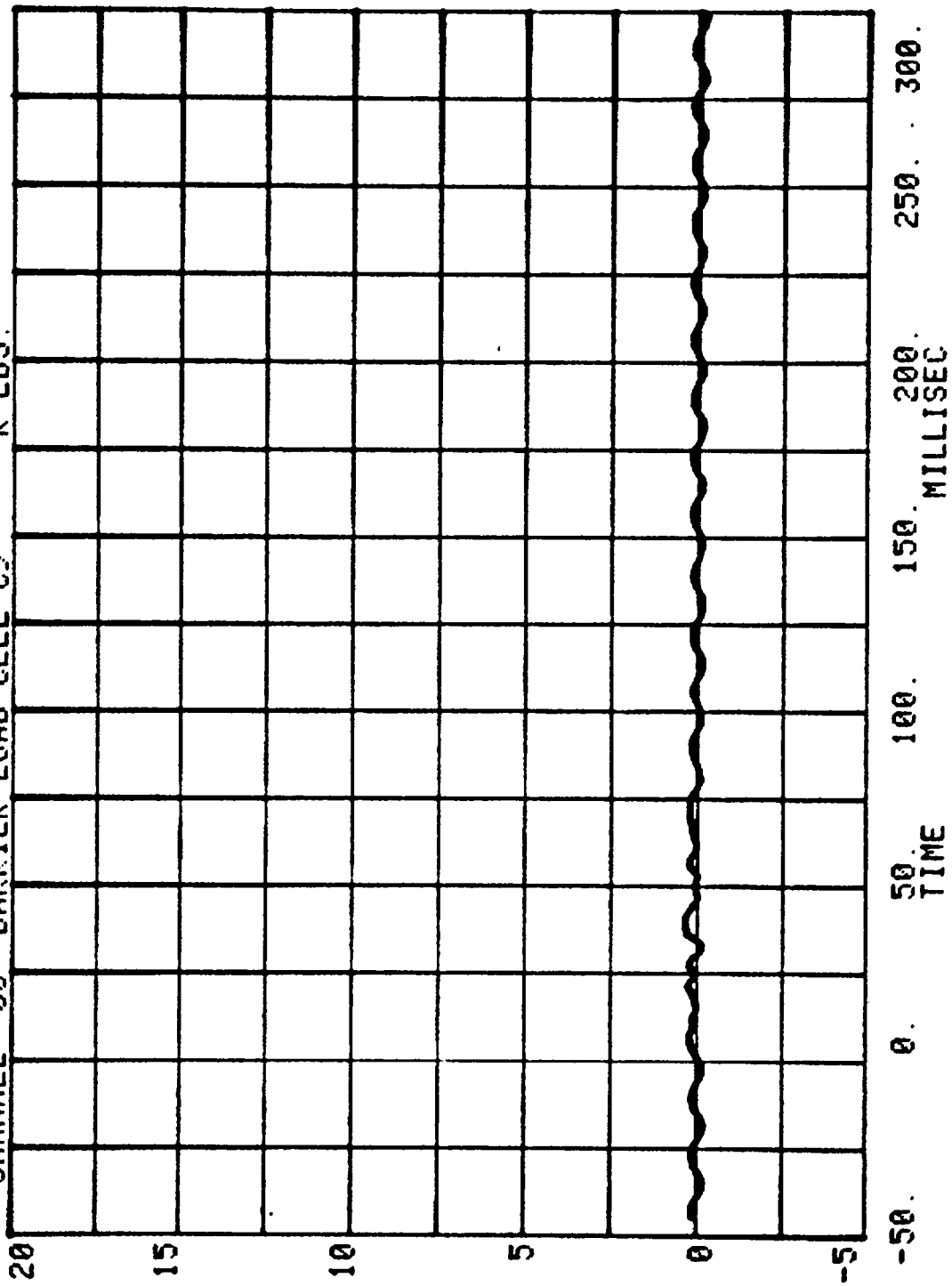


CHANNEL 59 BARRIER LOAD CELL C8 K LBS.

RUN= 803 SERIES= 5800



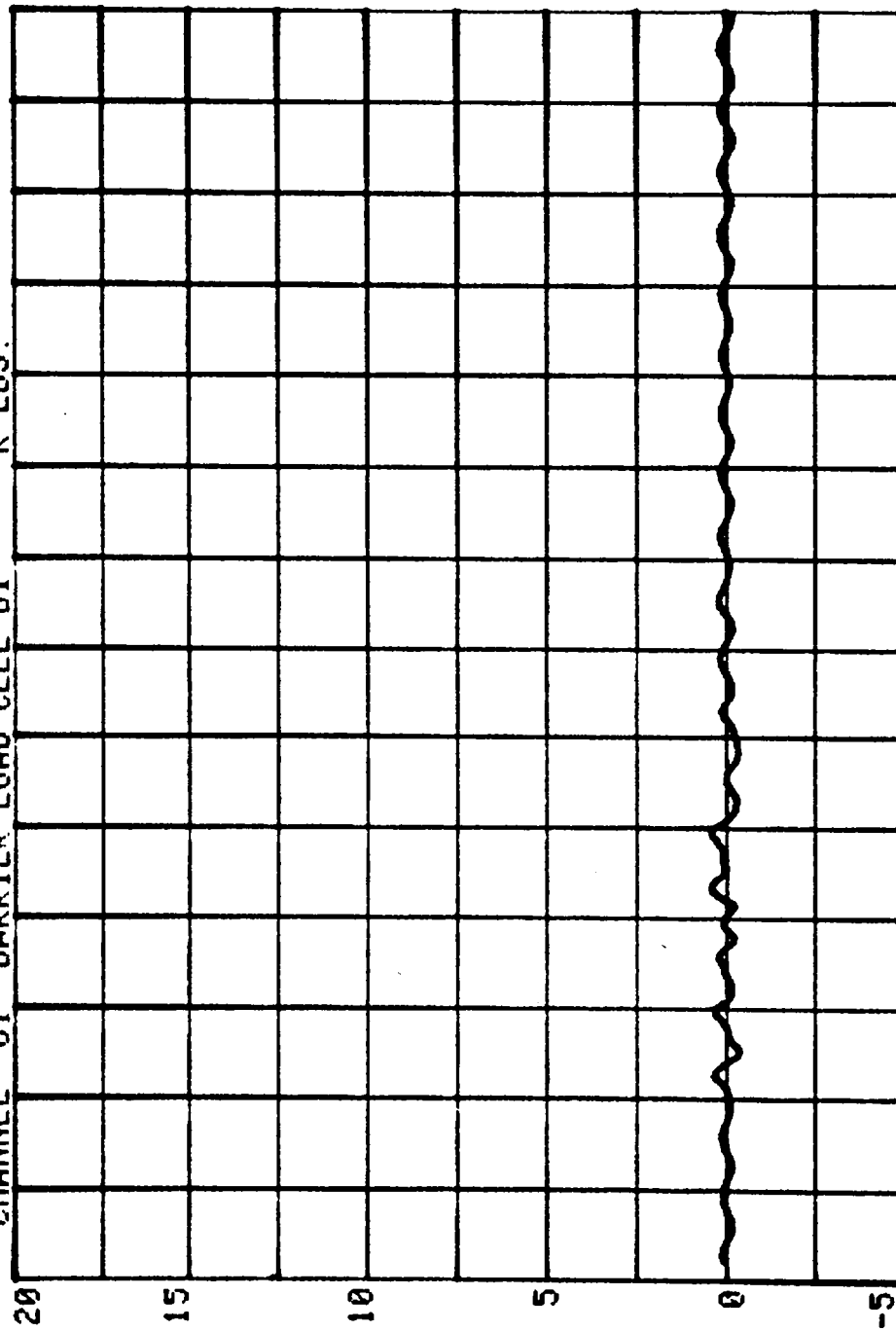
RUN= 803 SERIES= 5800
CHANNEL 60 BARRIER LOAD CELL C9 K LBS.



CHANNEL 61 BARRIER LOAD CELL D1

RUN= 803 SERIES= 5800

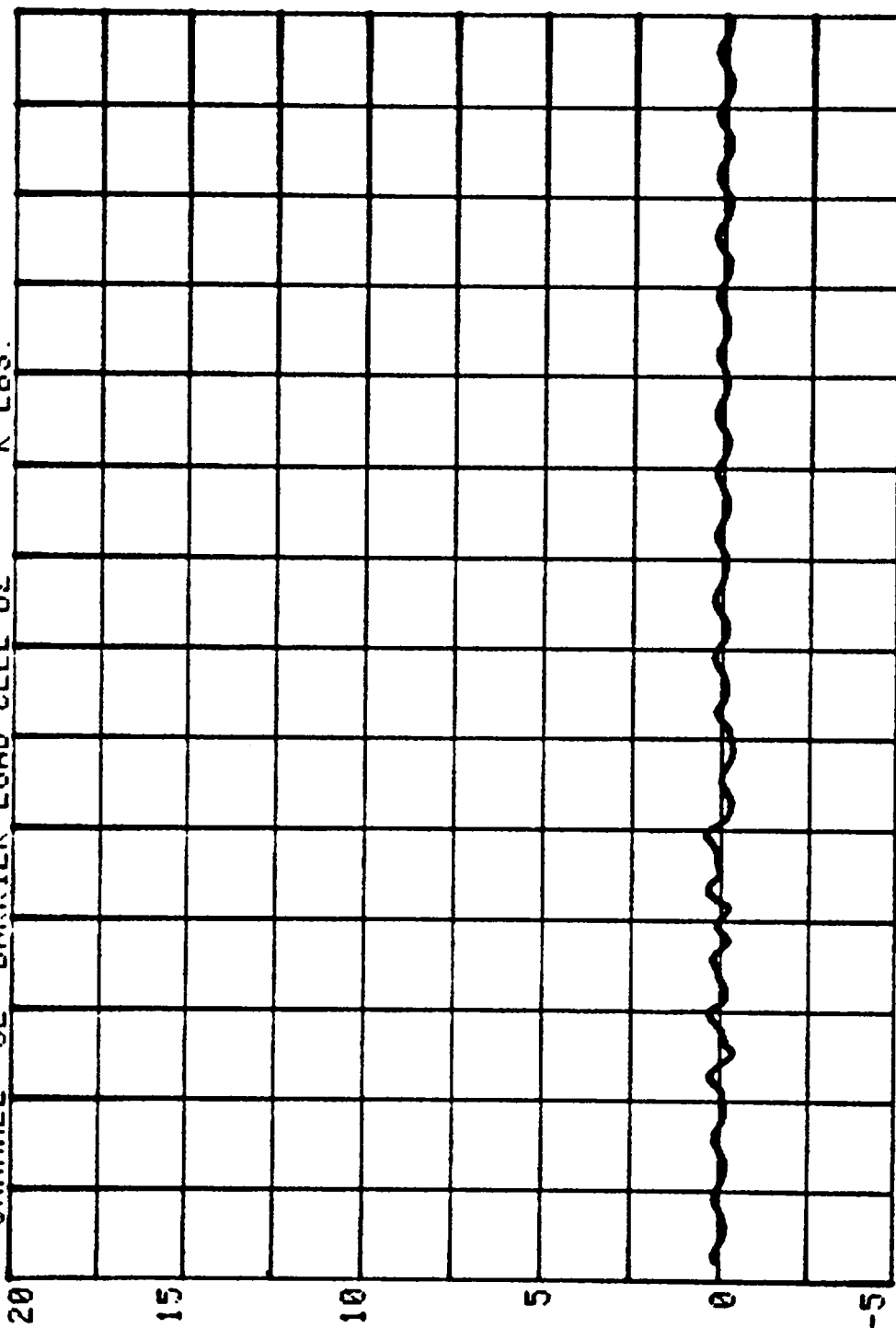
K LBS.

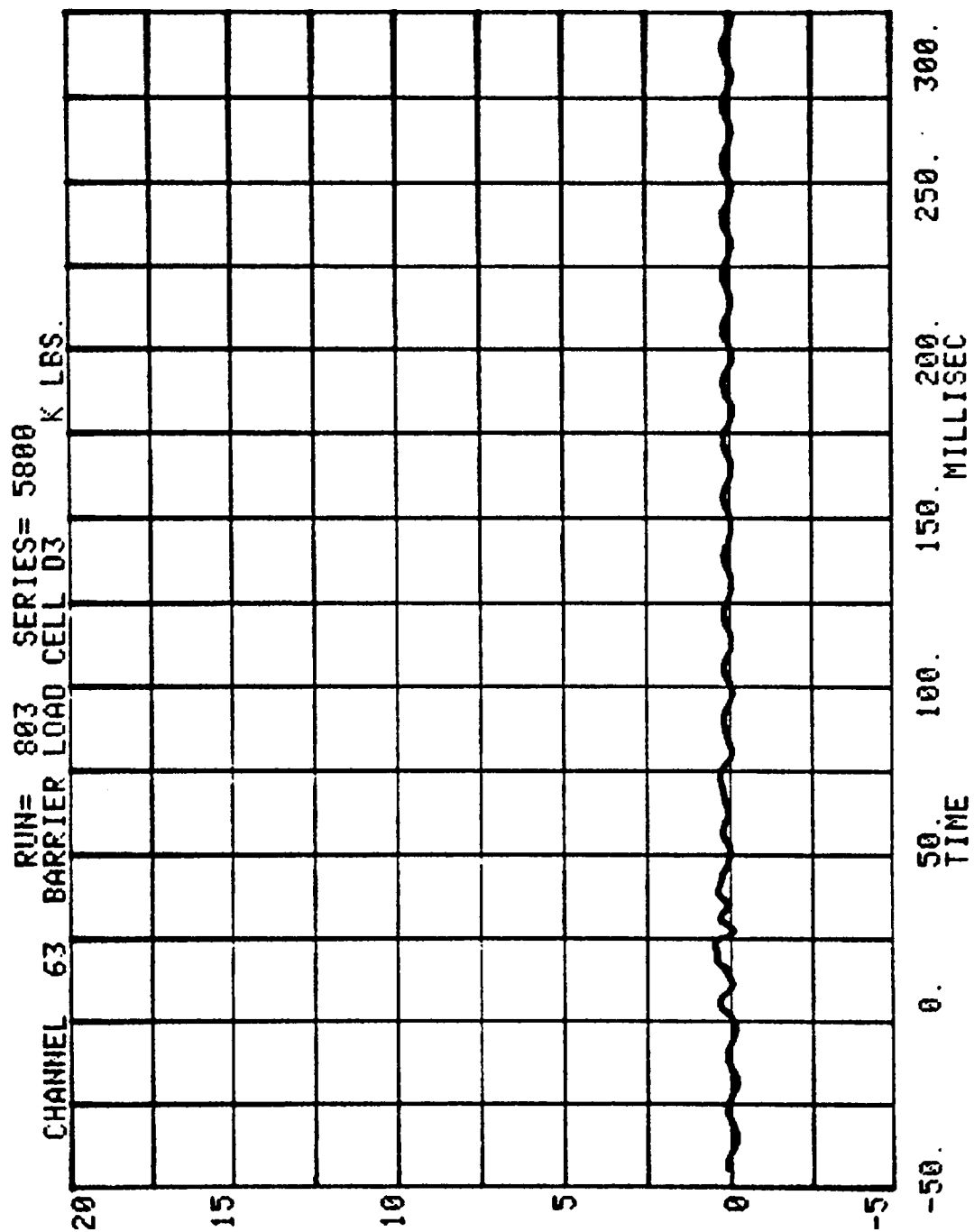


TIME
-50. 0. 50. 100. 150. 200. 250. 300.
MILLISEC

CHANNEL 62 BARRIER LOAD CELL D2 K LBS.

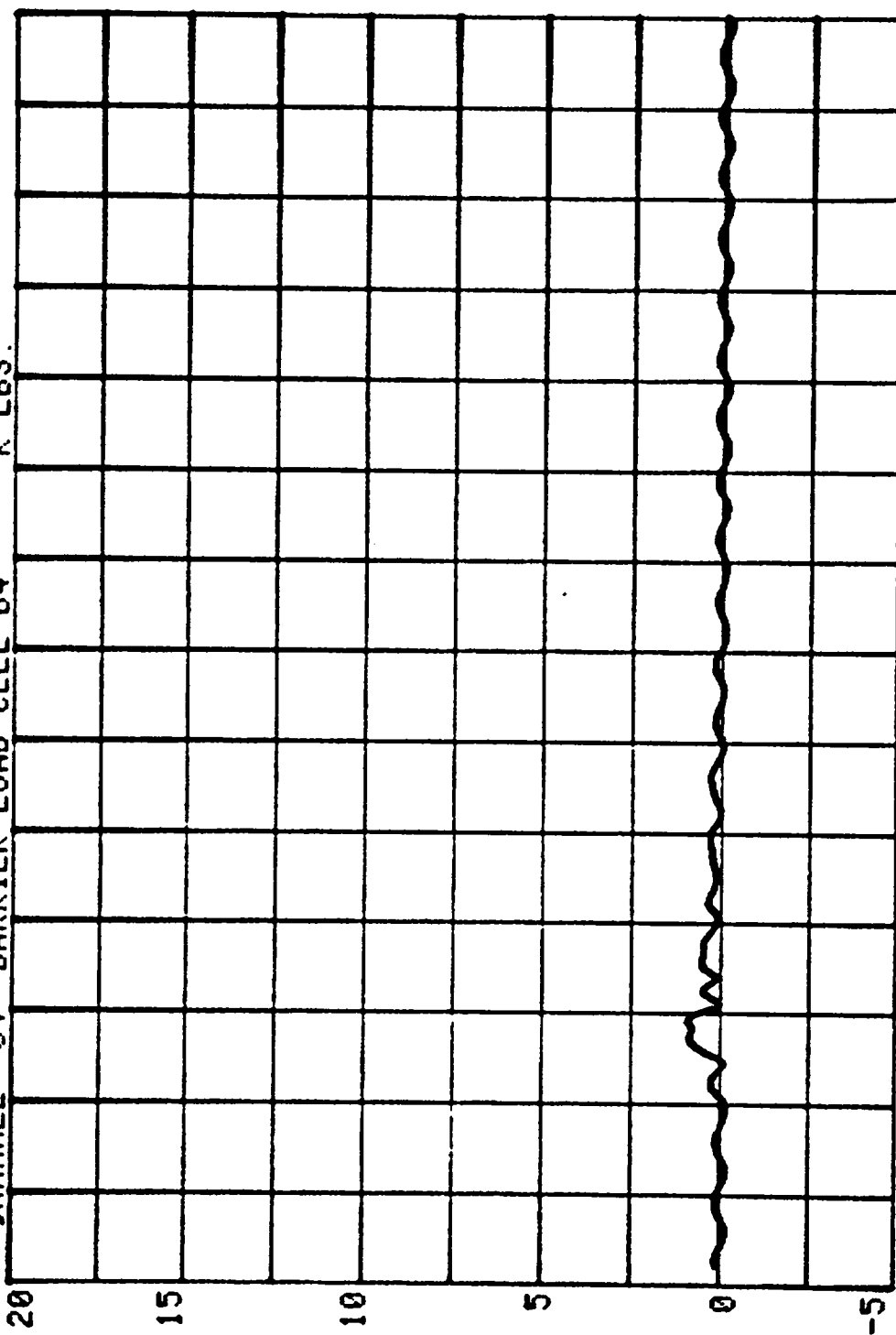
RUN= 803 SERIES= 5800

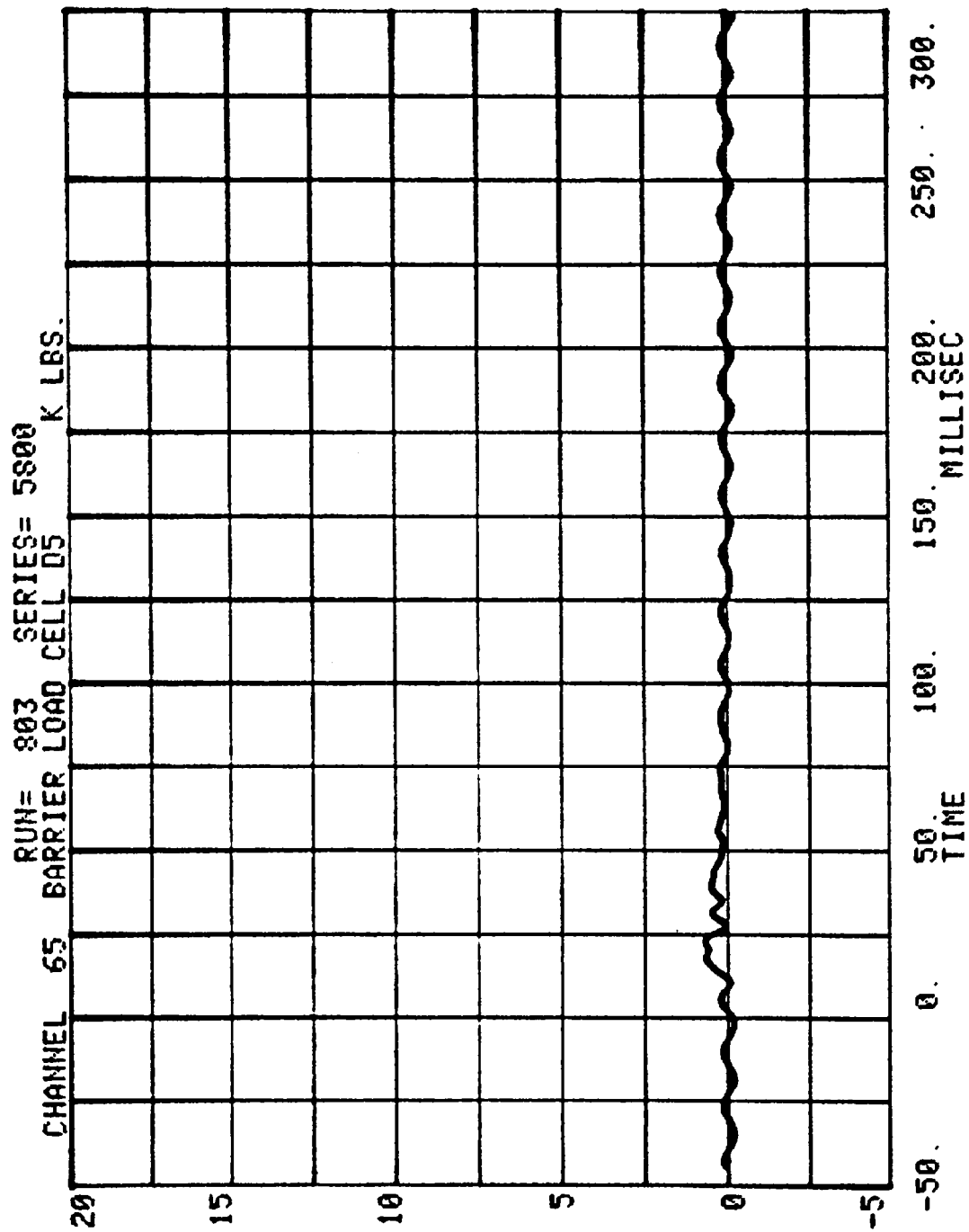




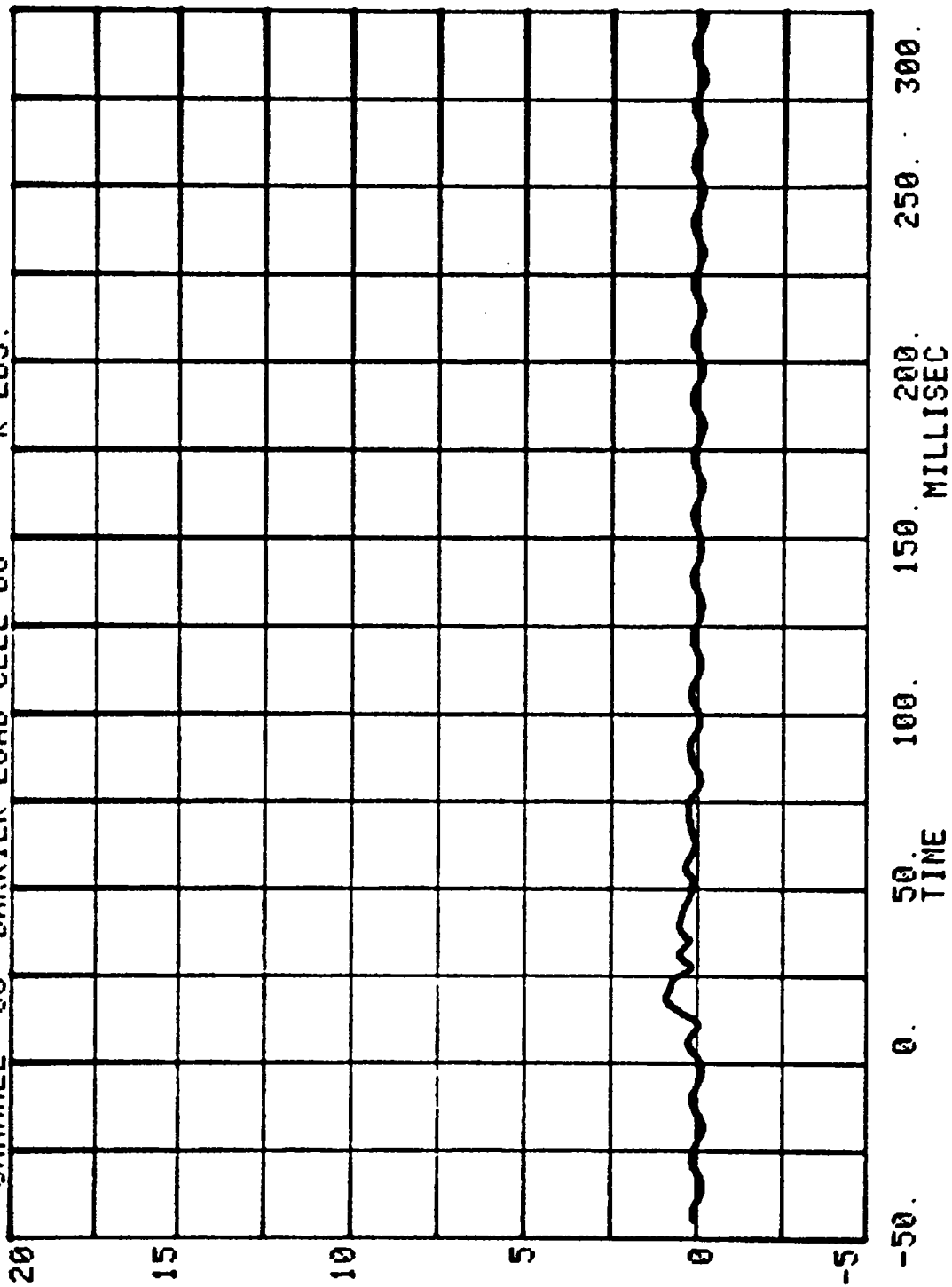
CHANNEL 64 BARRIER LOAD CELL D4 K LBS.

RUN= 803 SERIES= 5800



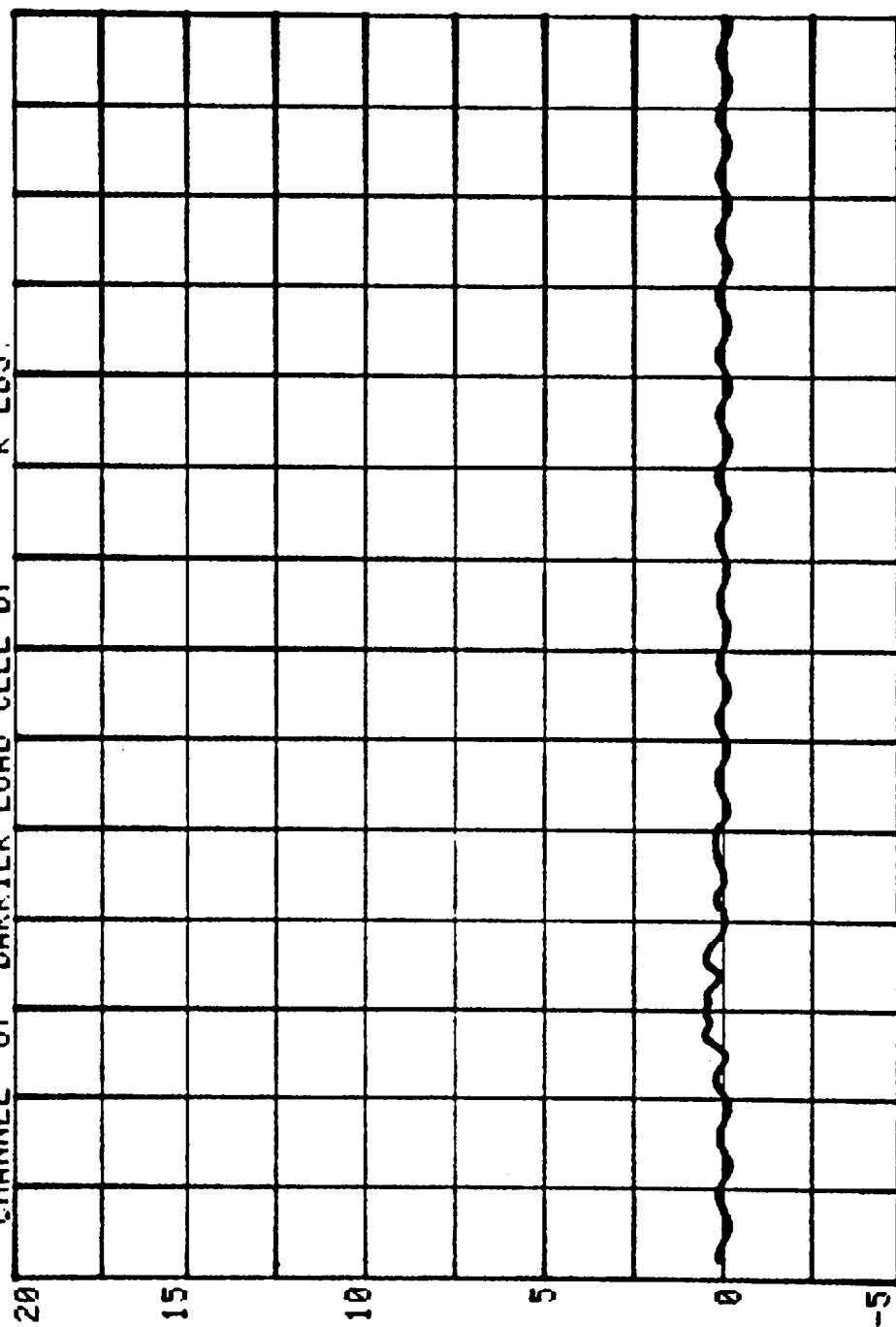


CHANNEL 66 BARRIER LOAD CELL 06 K LBS.
RUN= 803 SERIES= 5800



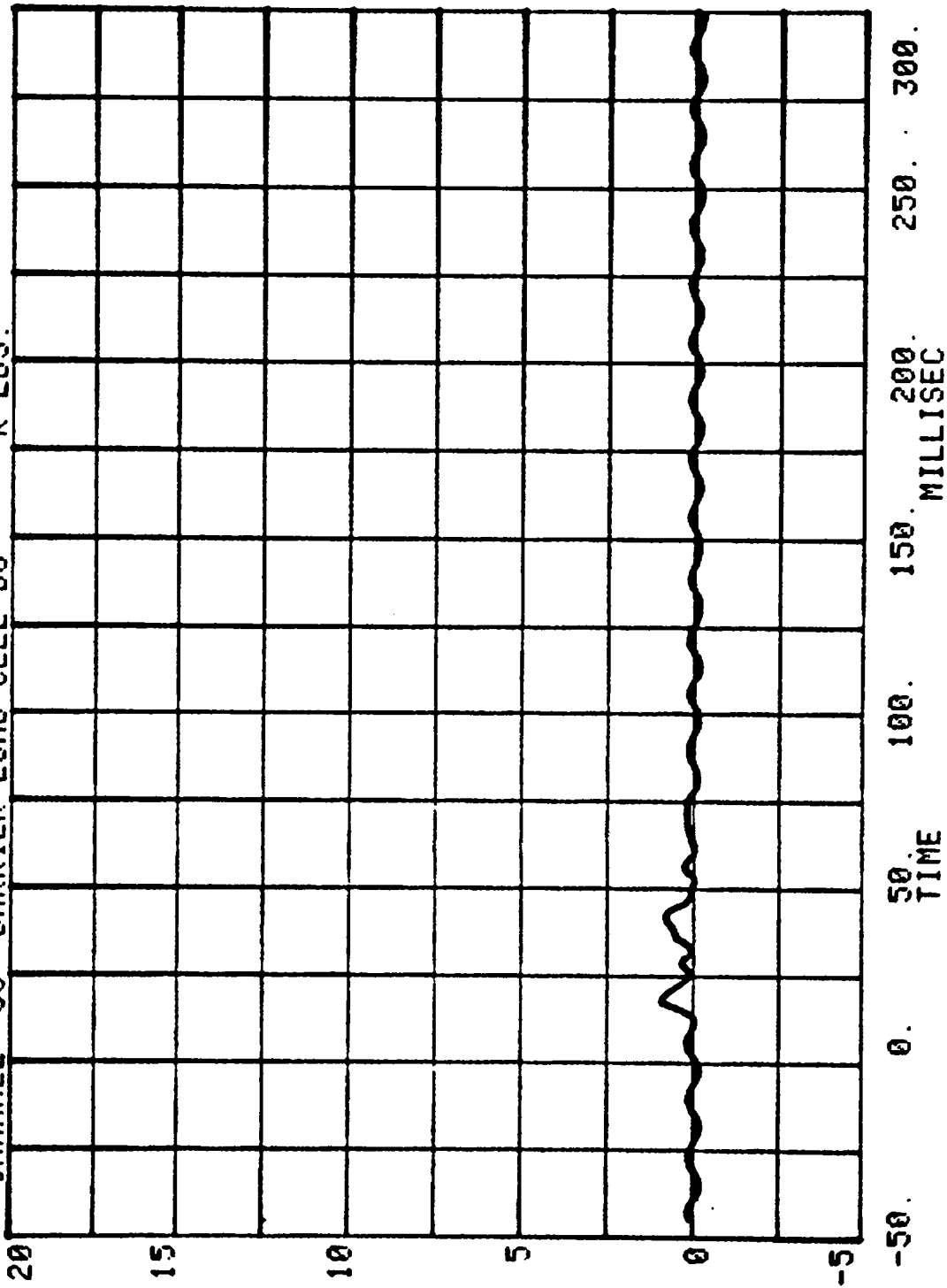
CHANNEL 67 BARRIER LOAD CELL D7 K LBS.

RUN= 803 SERIES= 5800

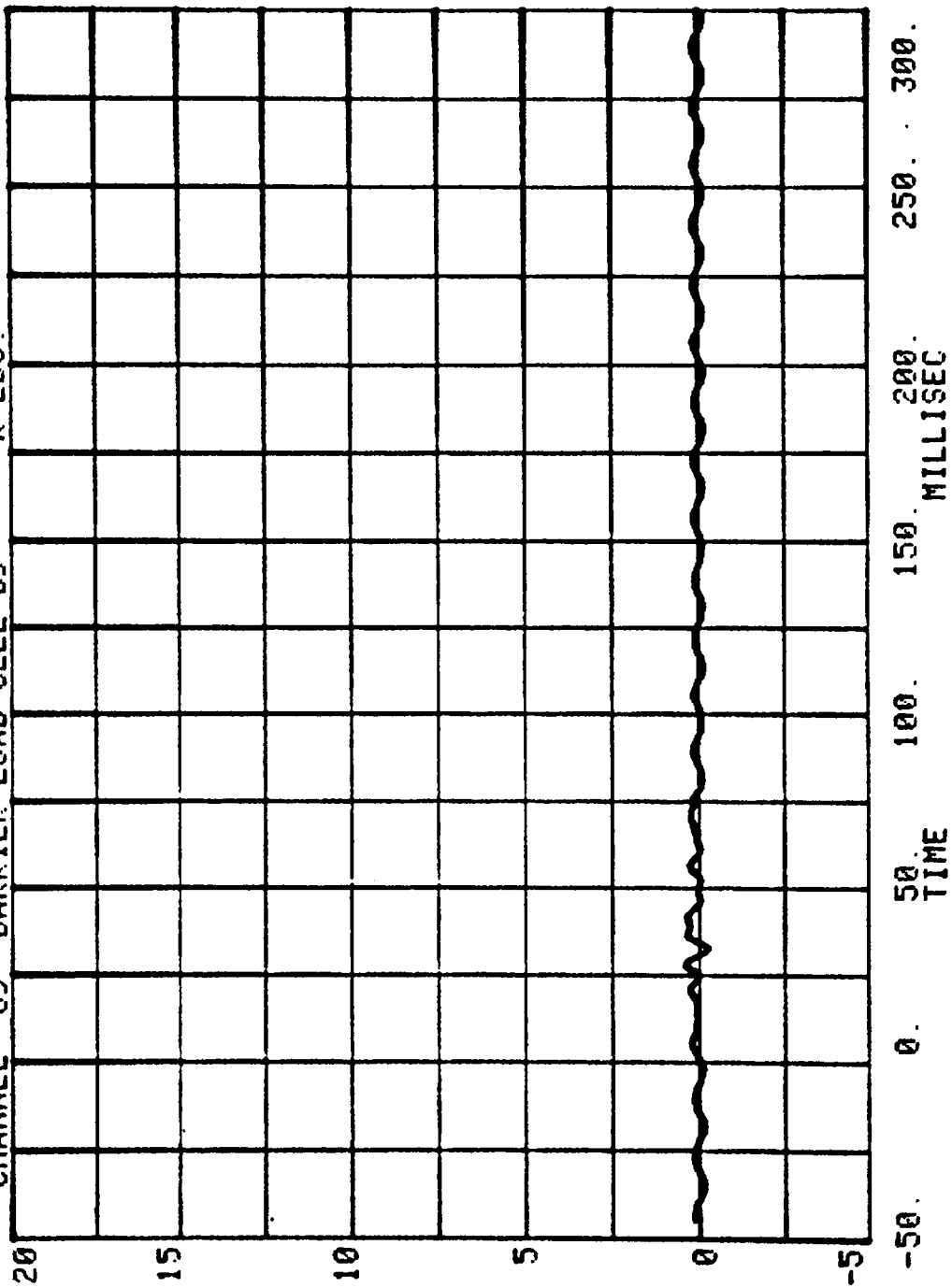


-50. 0. 50. 100. 150. 200. 250. 300.
TIME
MILLISEC

RUN= 803 SERIES= 5800
CHANNEL 68 BARRIER LOAD CELL DS K LBS.



CHANNEL 69 BARRIER LOAD CELL D9 RUN= 803 SERIES= 5800 K LBS.

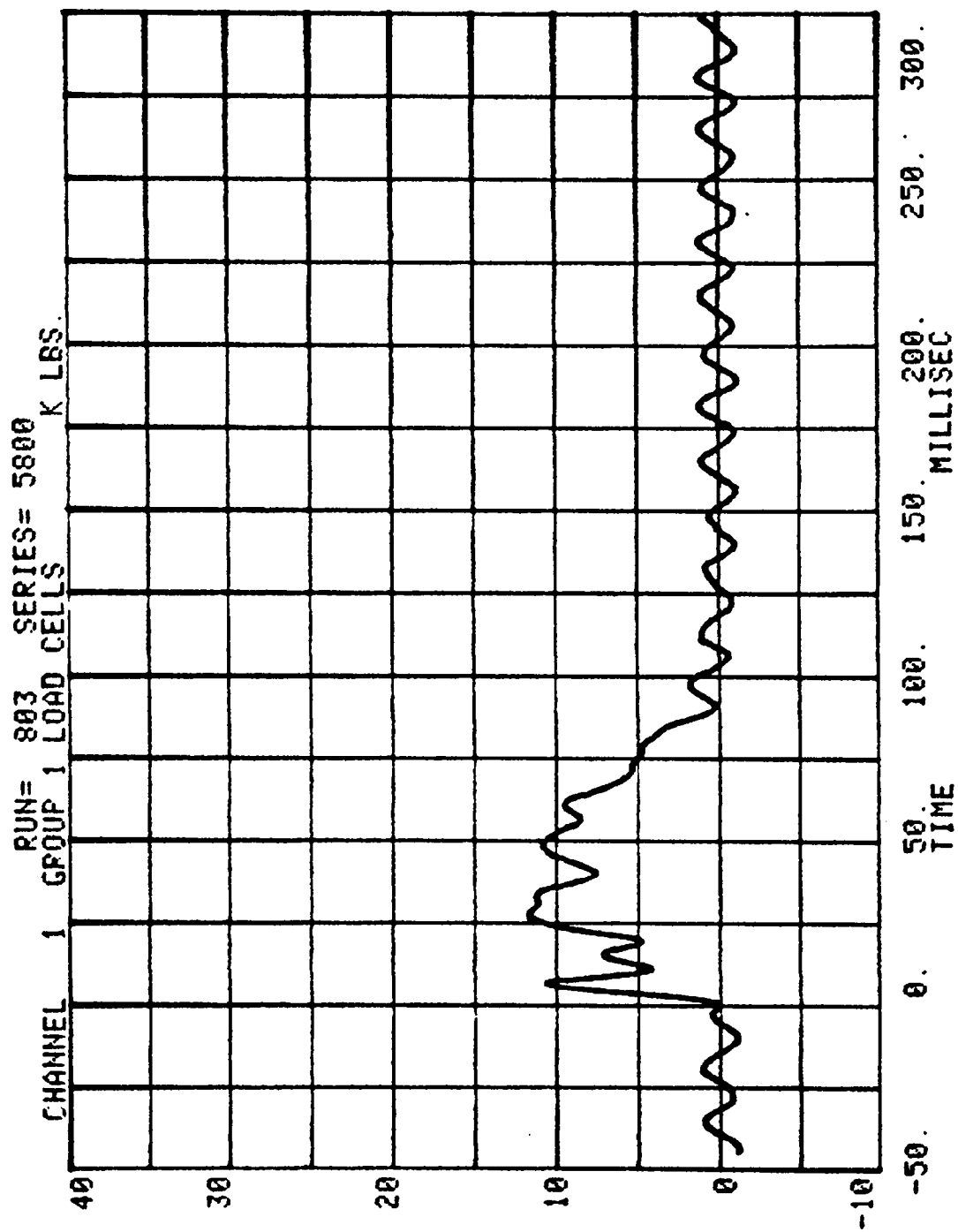


NEW CAR ASSESSMENT BARRIER TEST - 1988

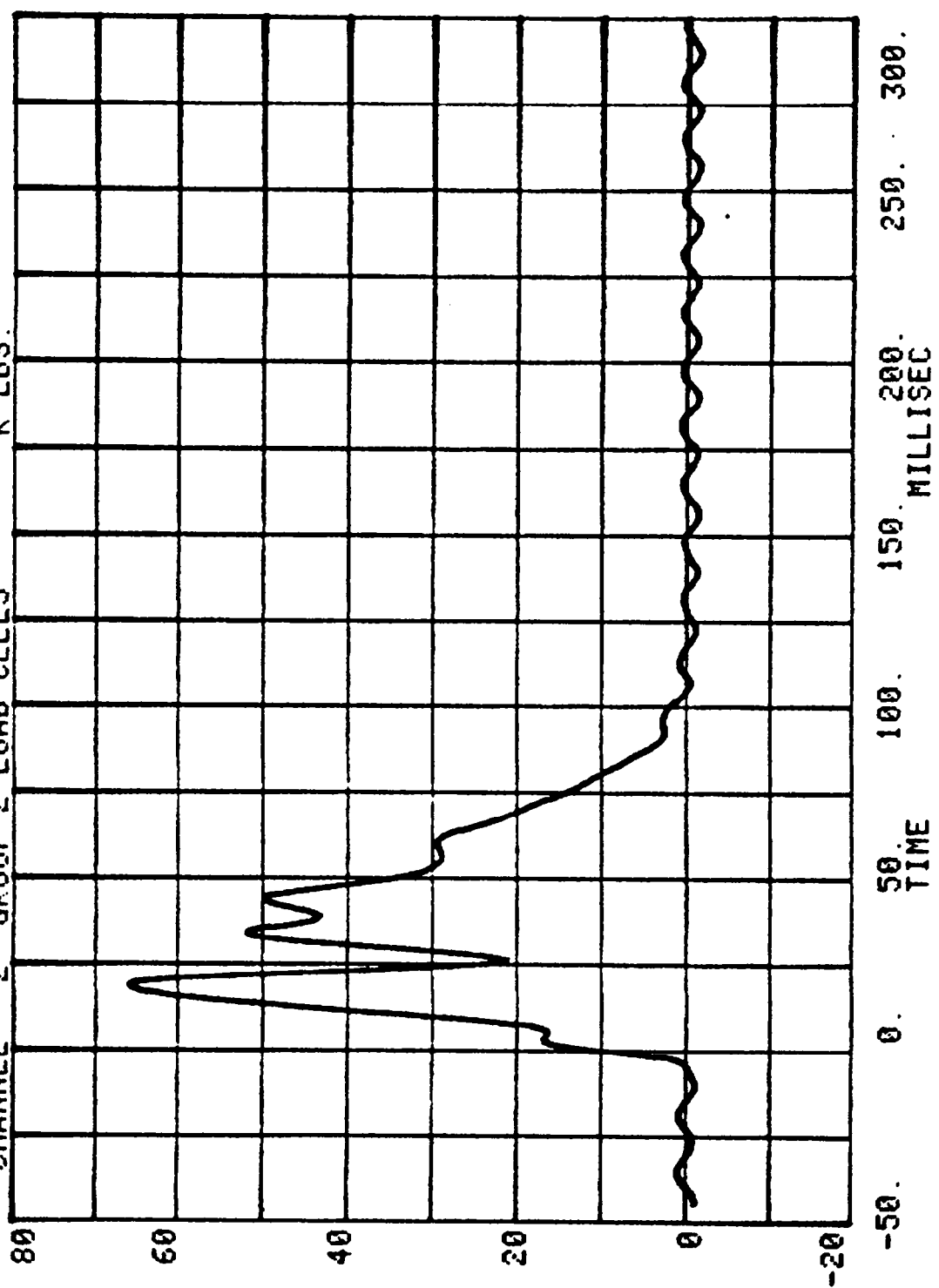
RUN # 803

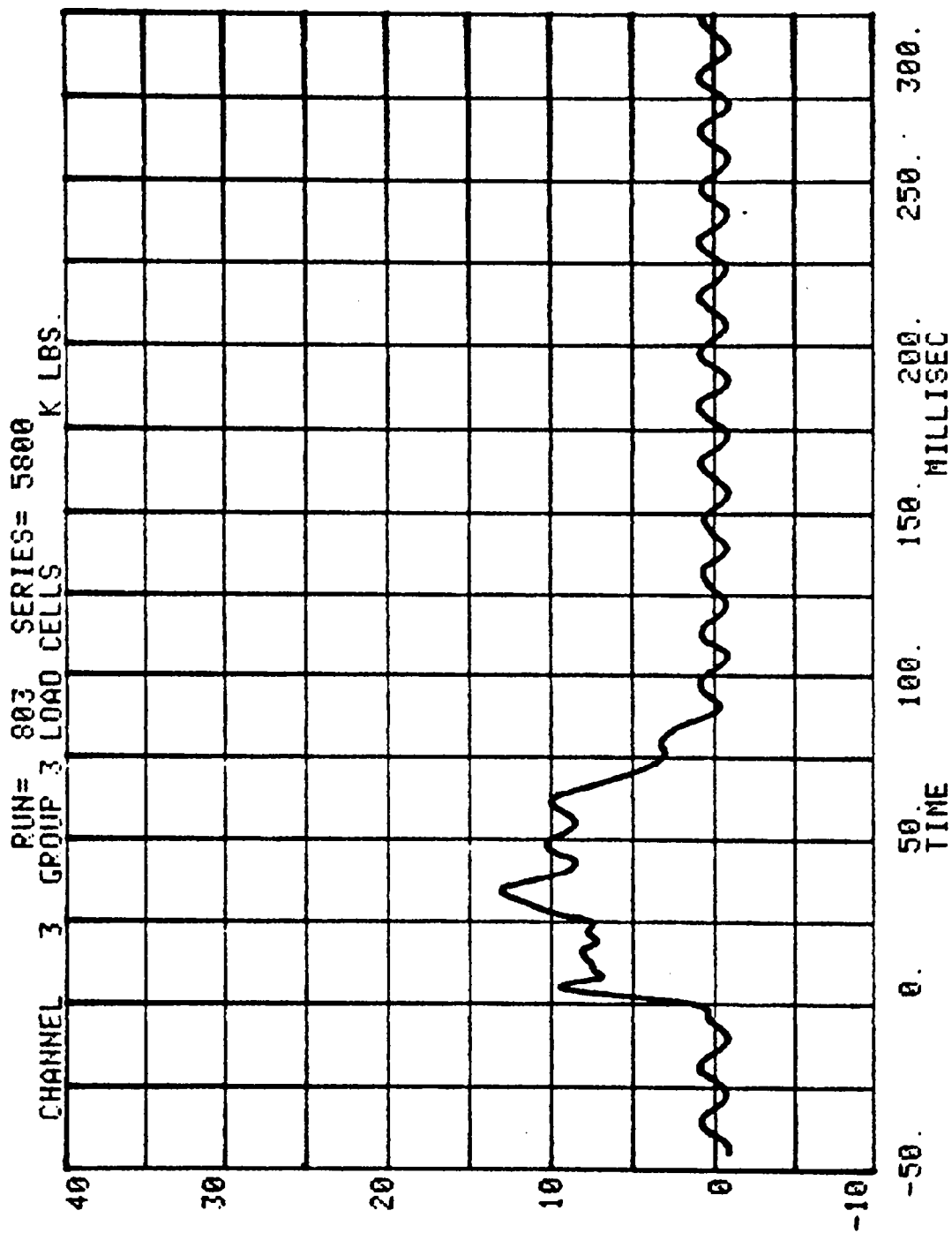
SERIES # 5800

CHAN	TITLE	MINIMUM/MAXIMUM	AT	TIME
1	GROUP 1 LOAD CELLS	-1.143 K LBS. 11.720 K LBS.		189.90 MS. 27.52 MS.
2	GROUP 2 LOAD CELLS	-1.477 K LBS. 65.936 K LBS.		290.25 MS. 19.05 MS.
3	GROUP 3 LOAD CELLS	- .912 K LBS. 13.101 K LBS.		290.32 MS. 34.20 MS.
4	GROUP 4 LOAD CELLS	-1.095 K LBS. 4.551 K LBS.		97.95 MS. 14.40 MS.
5	GROUP 5 LOAD CELLS	- .937 K LBS. 18.758 K LBS.		0.00 MS. 20.10 MS.
6	GROUP 6 LOAD CELLS	- .957 K LBS. 4.864 K LBS.		182.03 MS. 8.25 MS.
7	TOTAL LOAD CELL SUM	-1.137 K LBS. 101.096 K LBS.		153.53 MS. 19.27 MS.



CHANNEL 2 GROUP 2 LOAD CELLS RUN= 803 SERIES= 5800 K LBS.

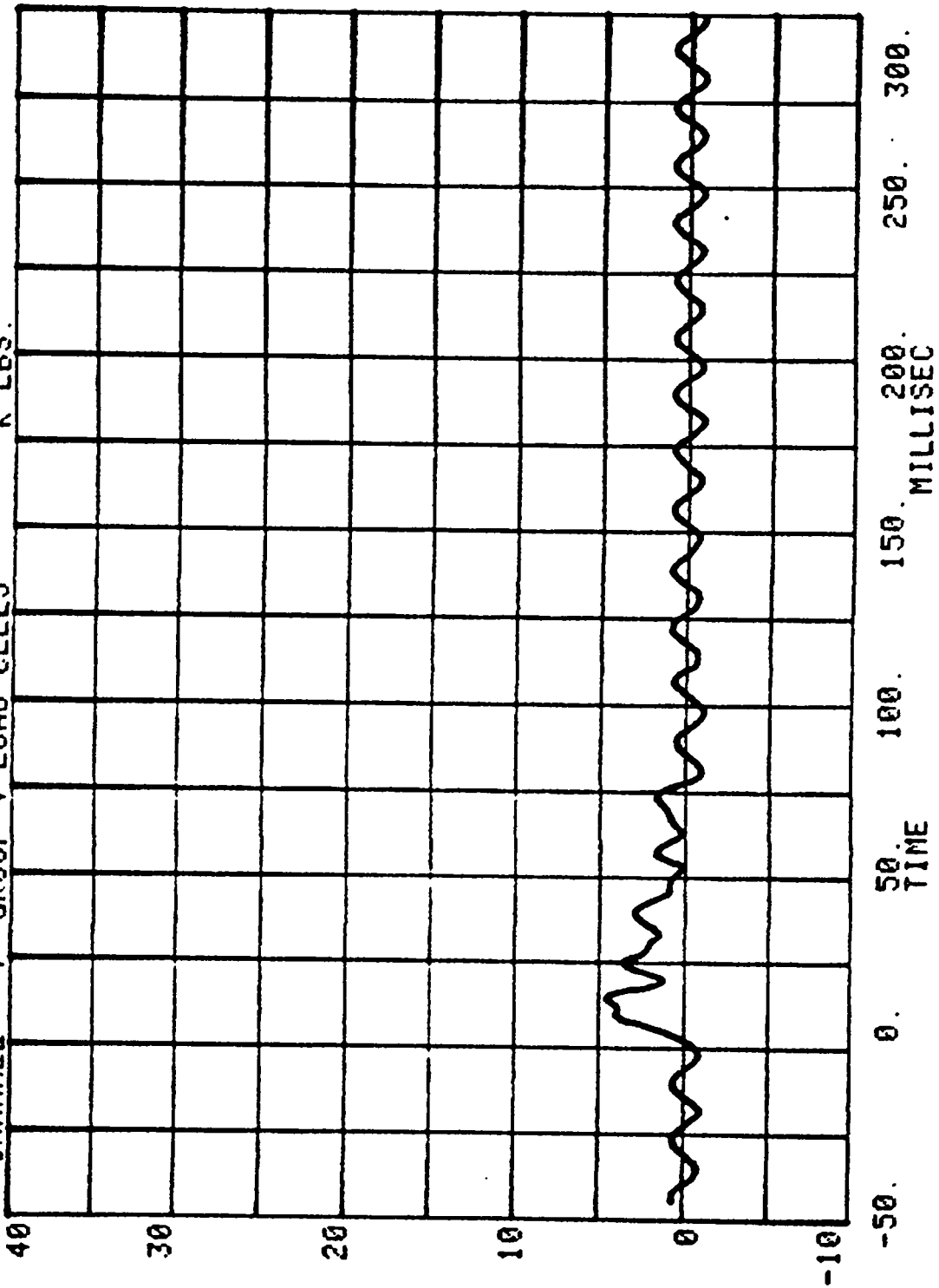


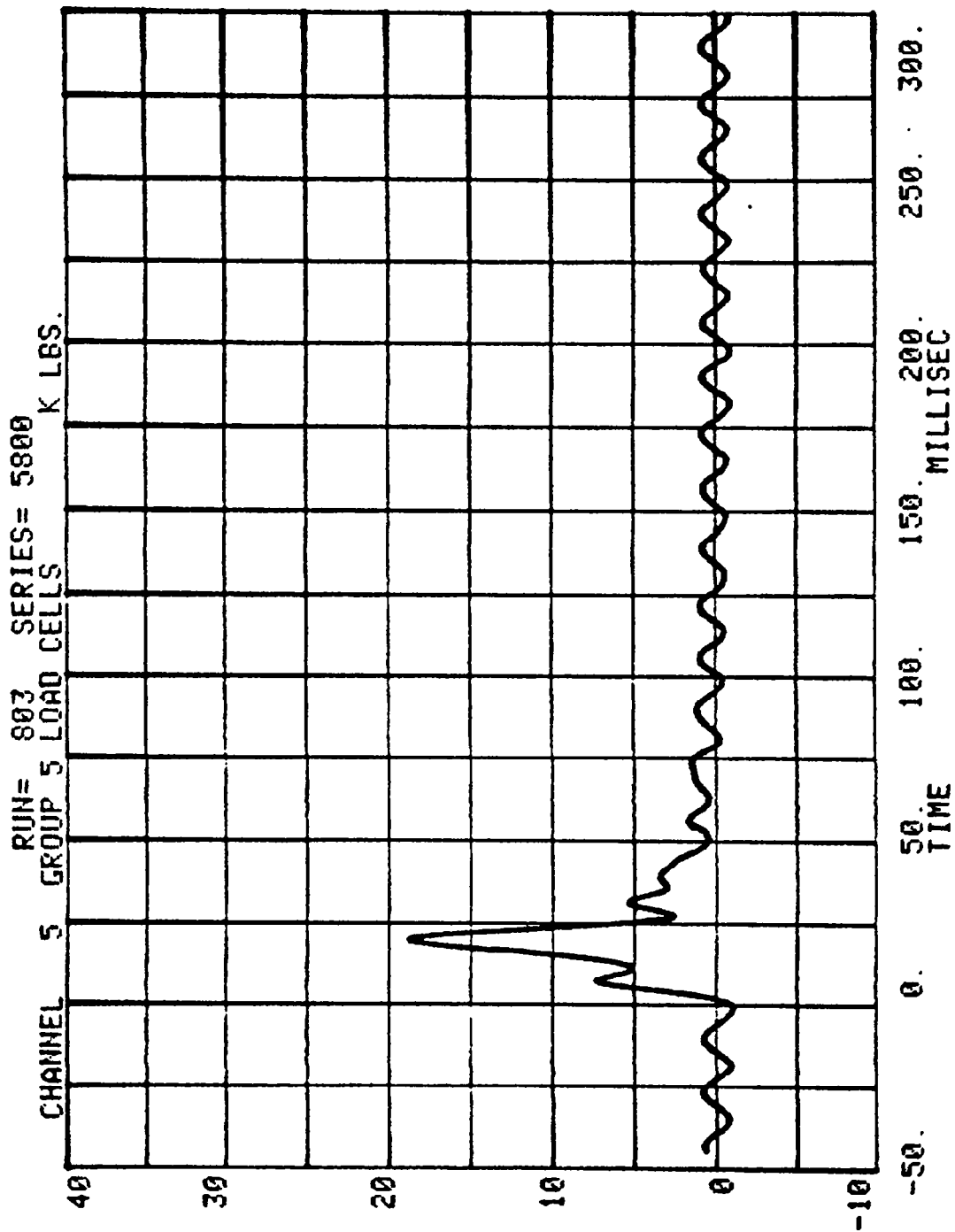


CHANNEL 4 GROUP 4 LOAD CELLS

RUN= 803 SERIES= 5800

K LBS.

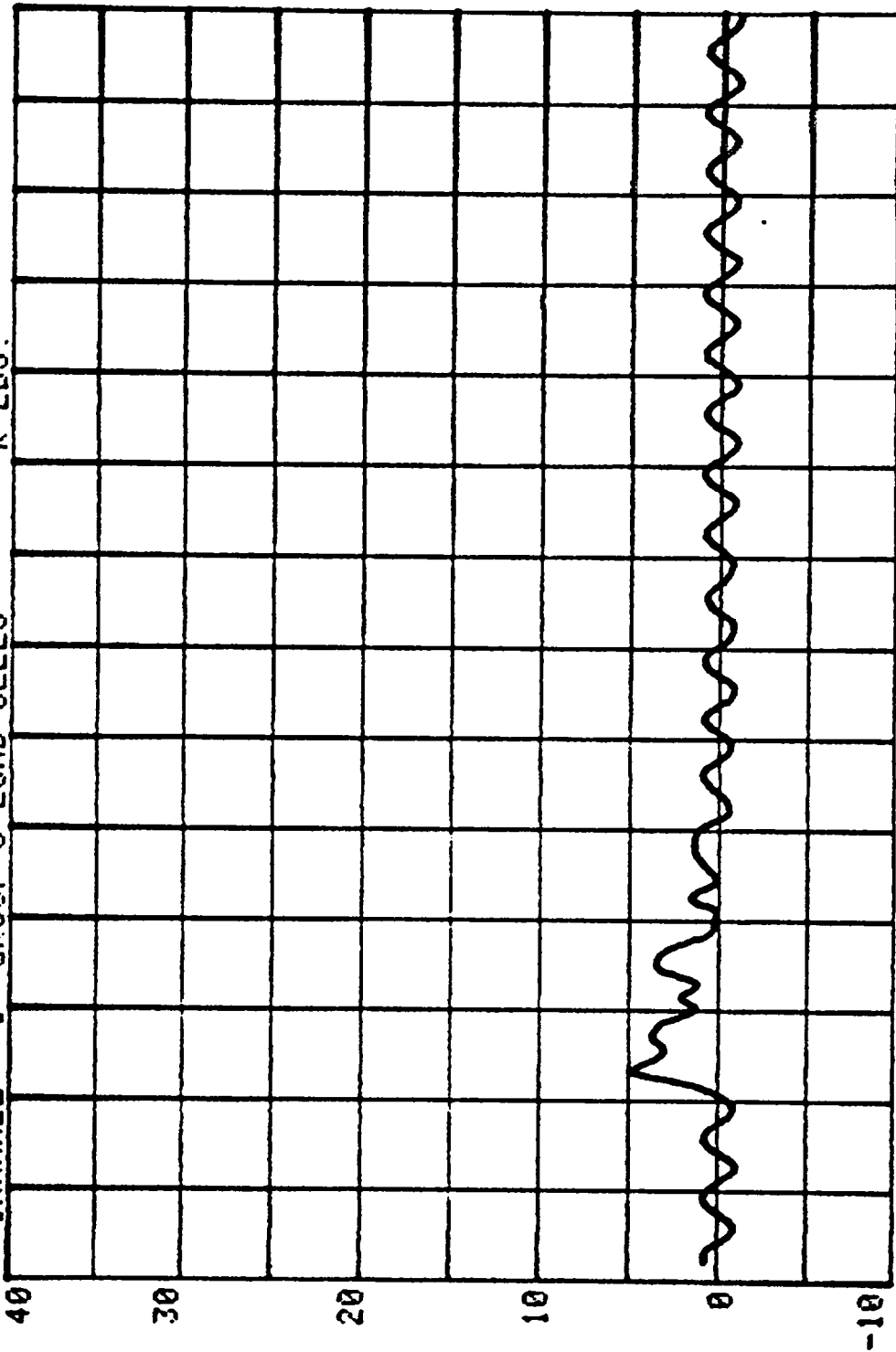




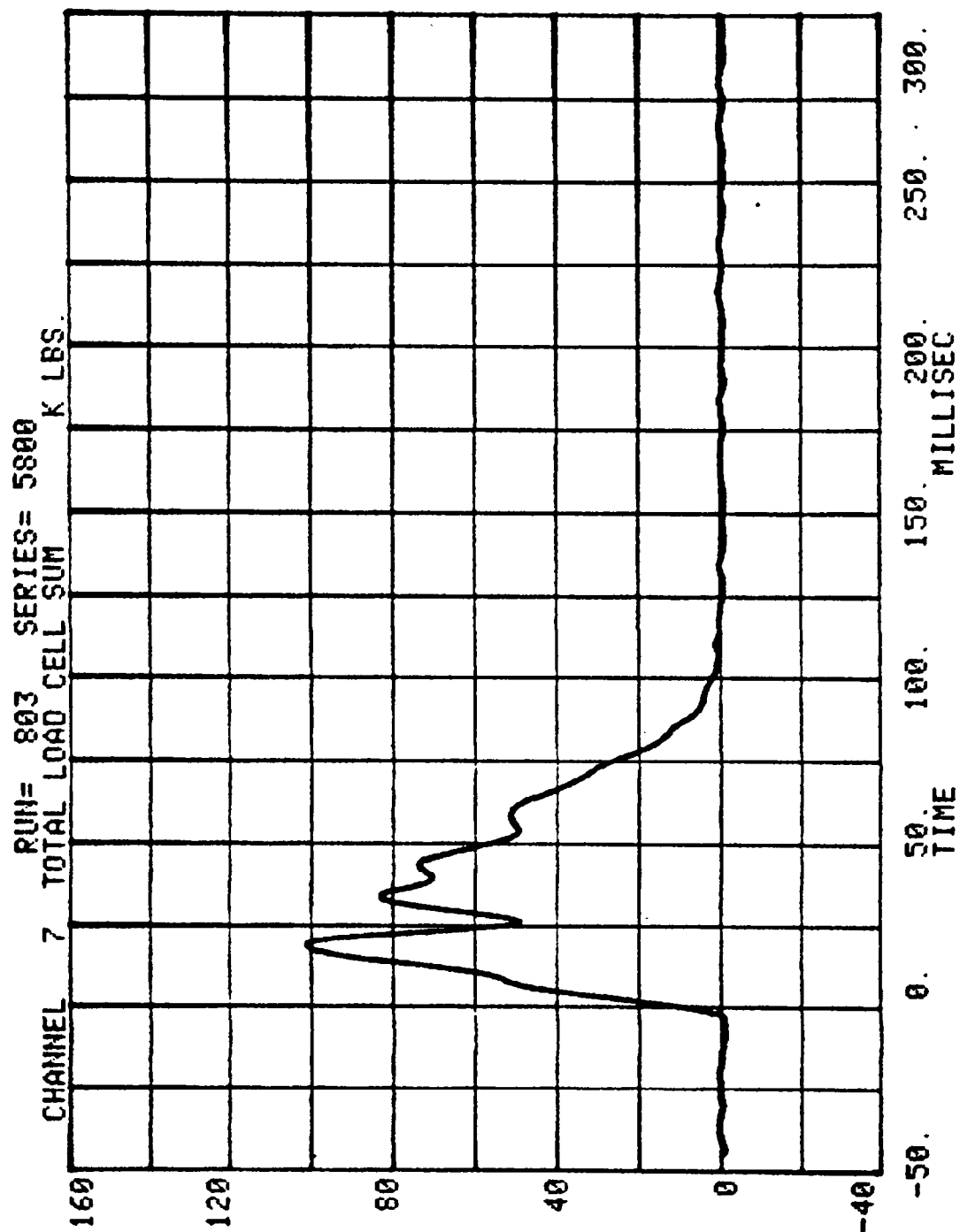
CHANNEL 6 GROUP 6 LOAD CELLS

RUN= 803 SERIES= 5800

K LBS.



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



TEST NO. MJ5800

DUMMY DATA

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

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NEW CAR ASSESSMENT BARRIER TEST - 1988

RUN= 803

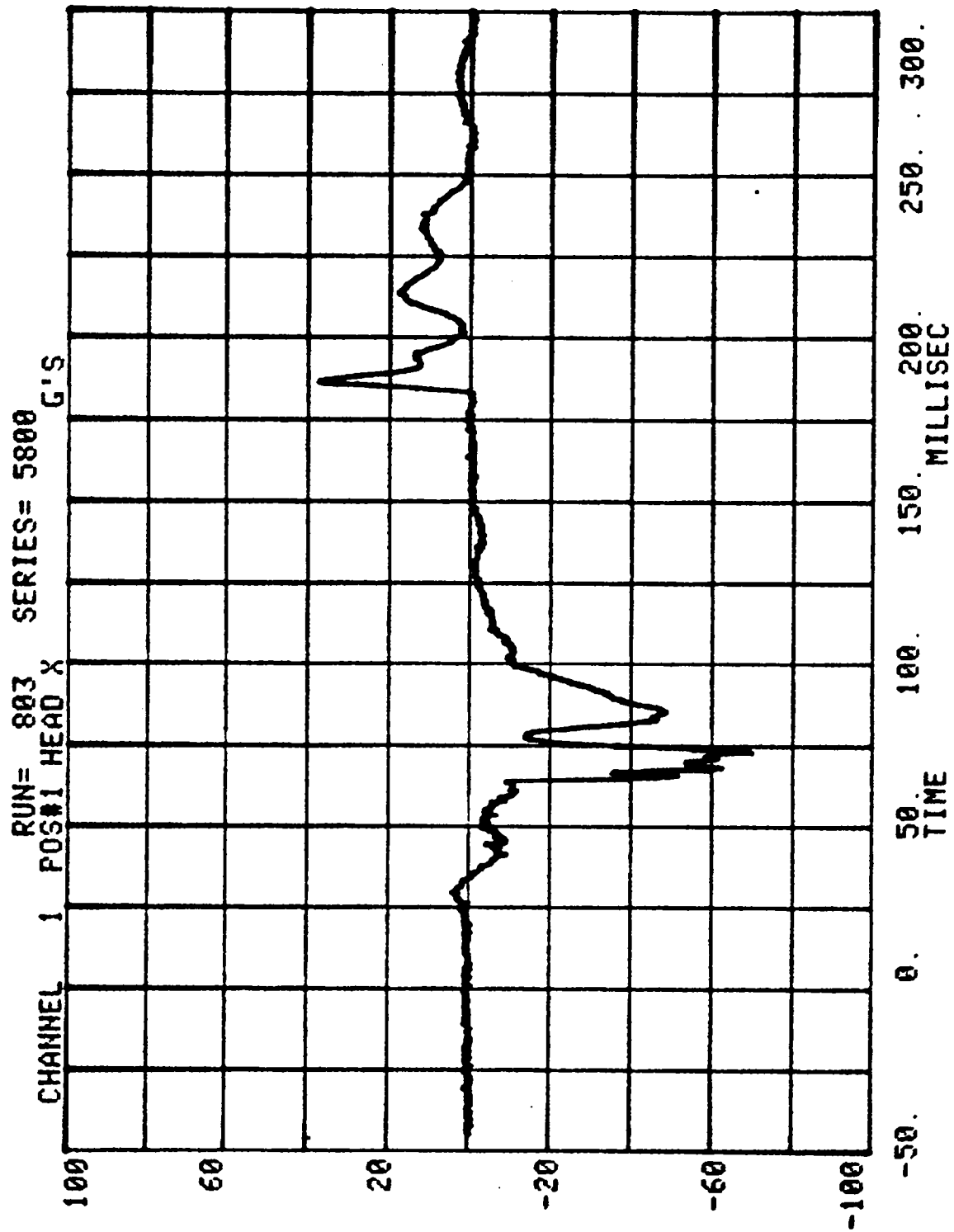
POS#1 HEAD R

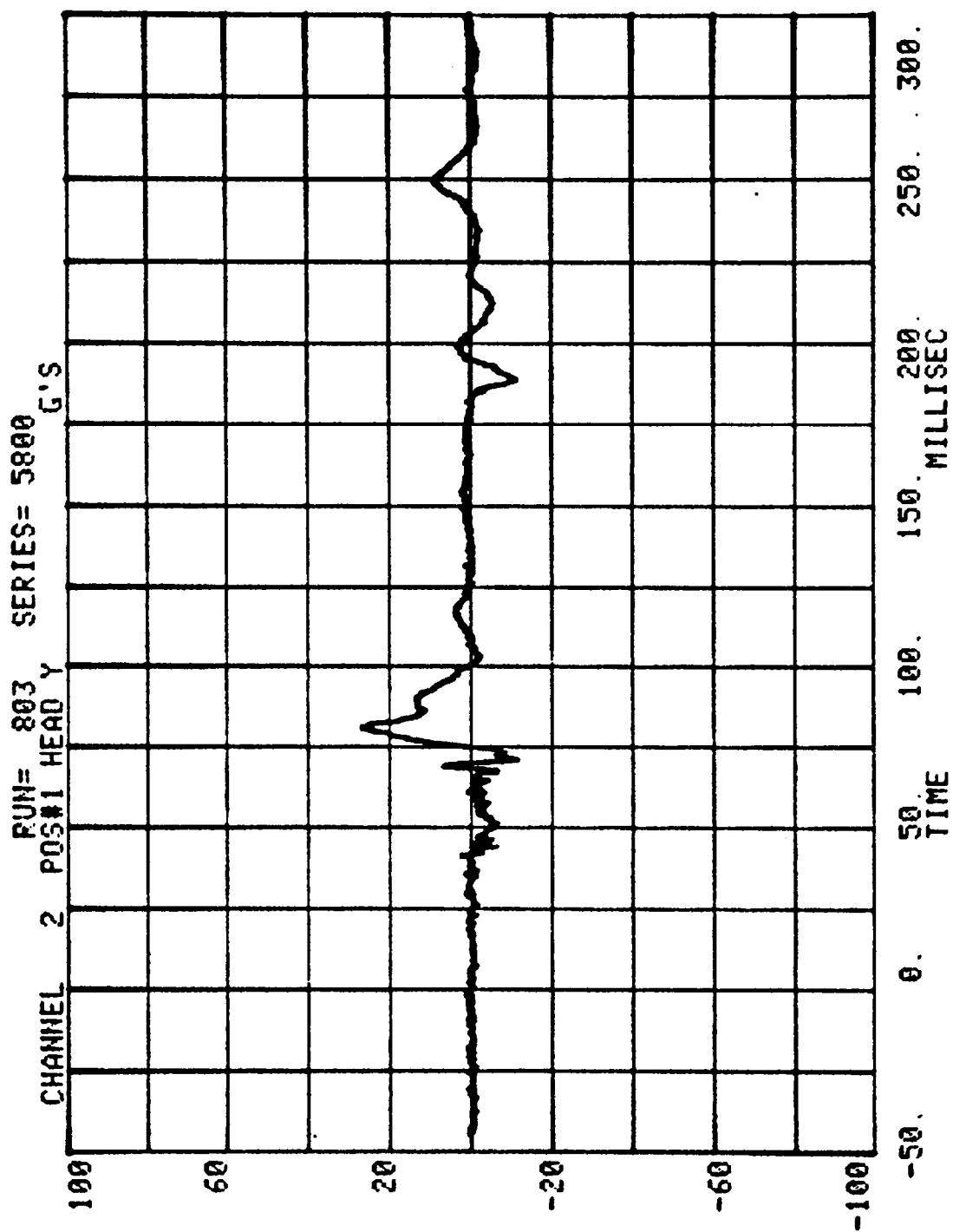
HIC=1113.9 FROM T1= .06510 TO T2= .08850

AVERAGE ACCELERATION BETWEEN T1 AND T2= 74.3G'S

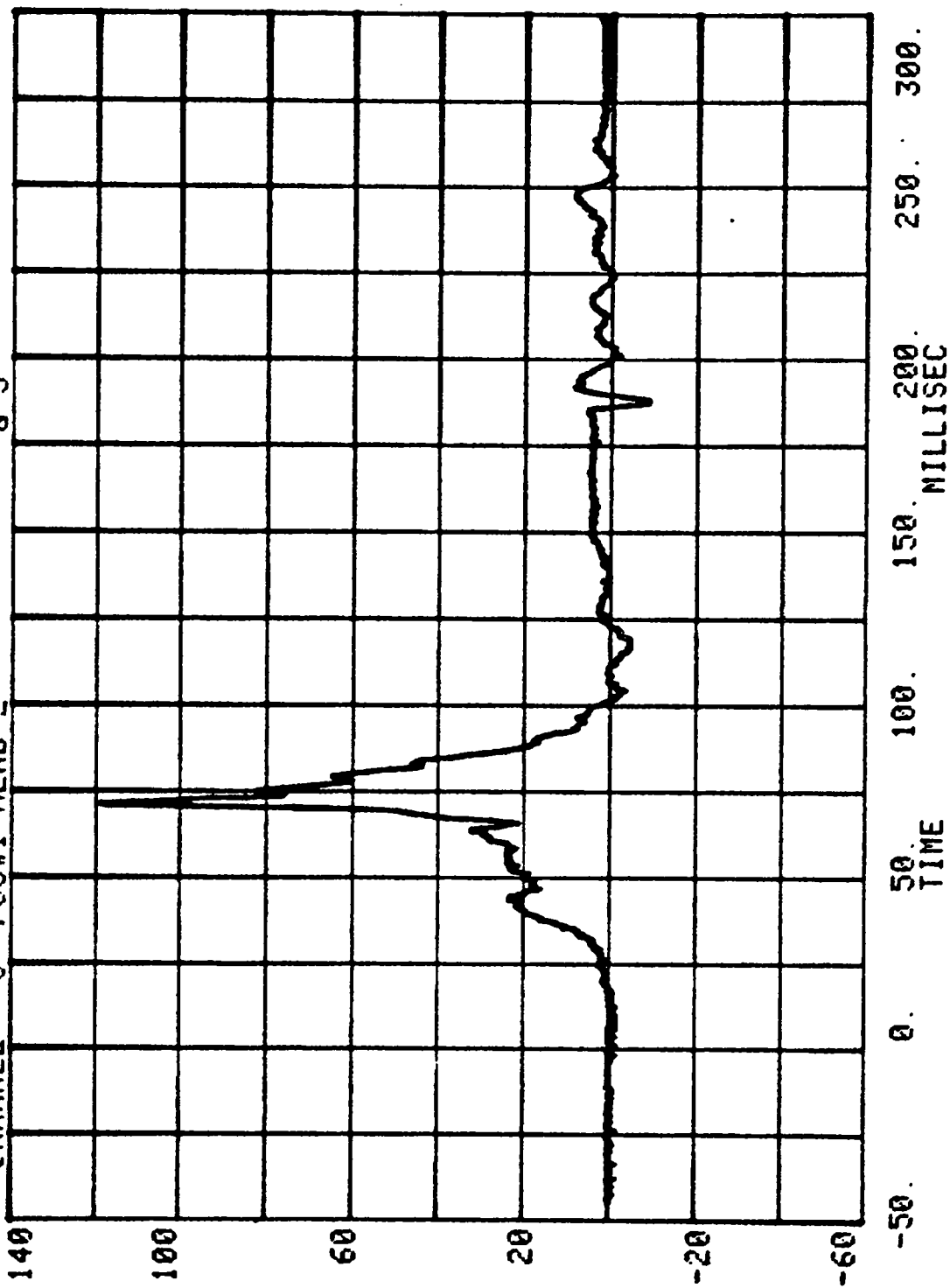
EVENT TIME= 300.0 MSEC

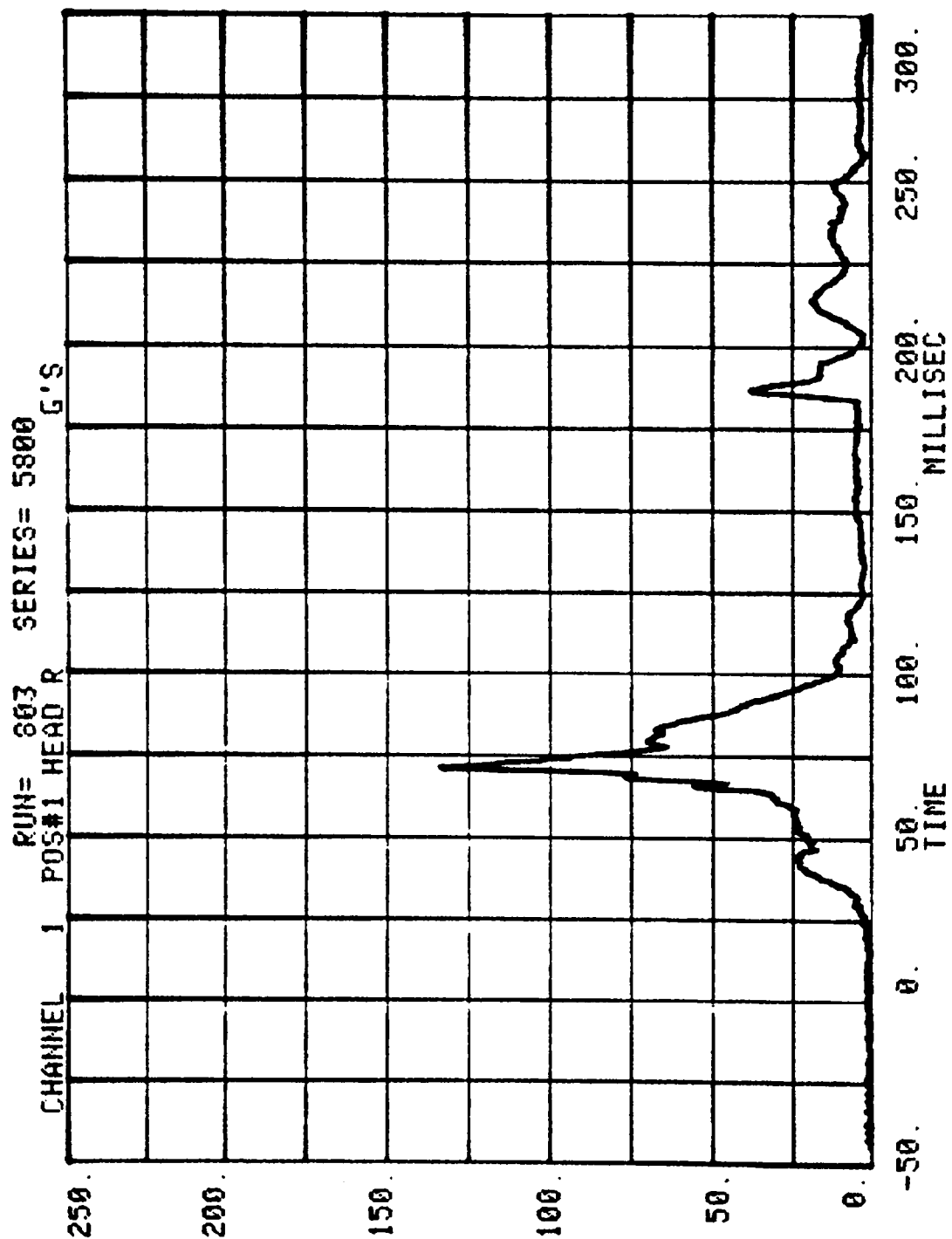
SEVERITY INDEX=1513.8

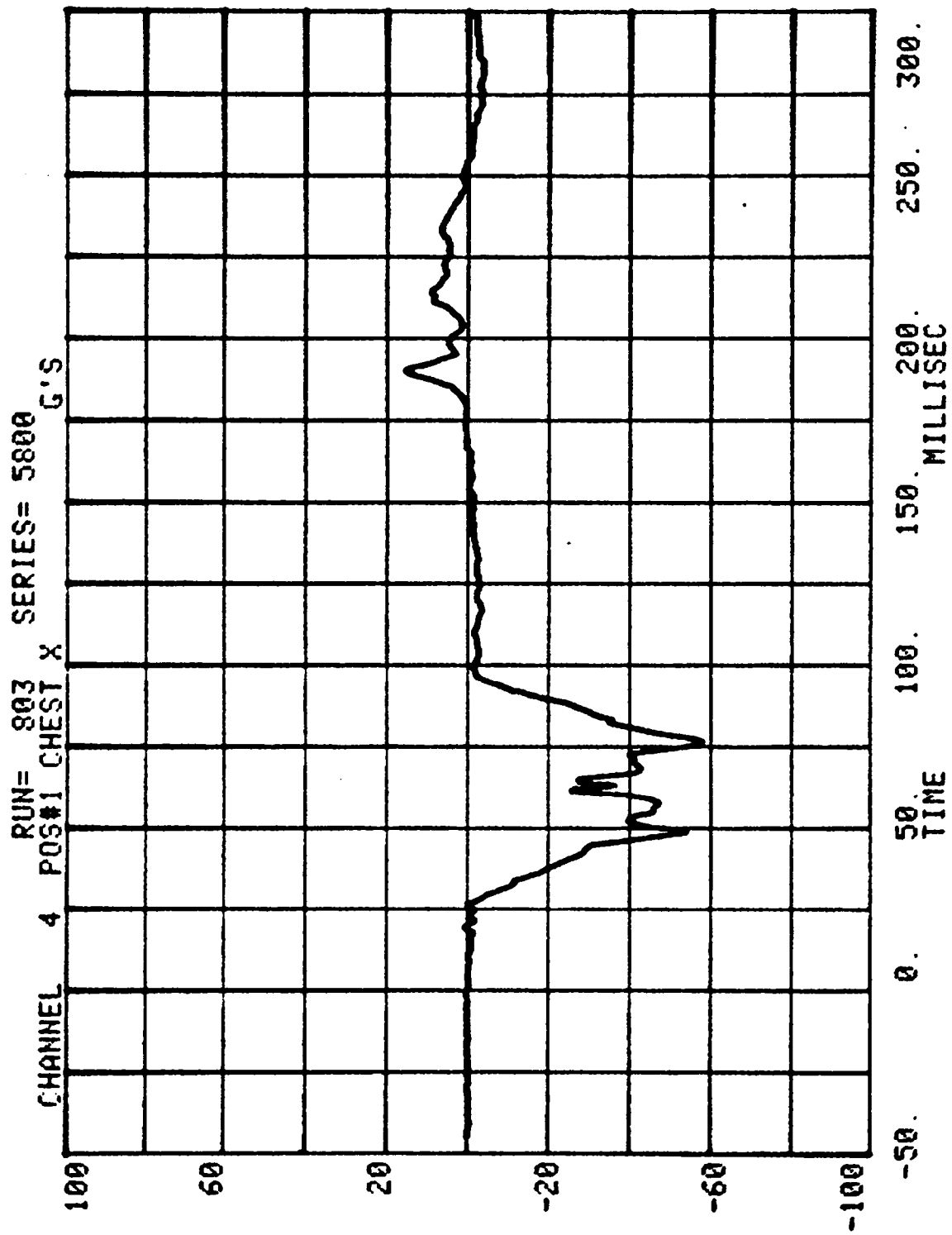


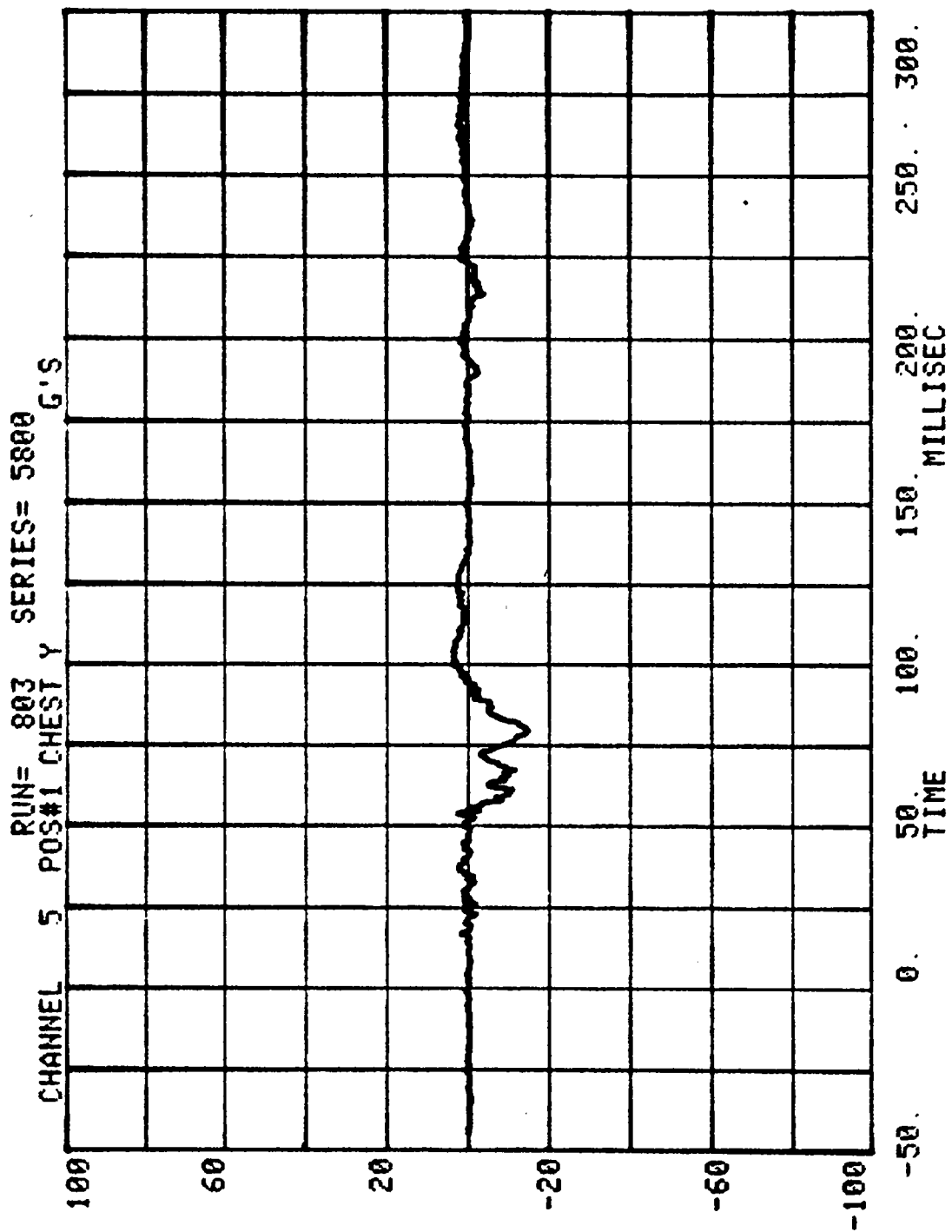


CHANNEL 3 POS#1 HEAD Z RUN= 803 SERIES= 5800 G'S

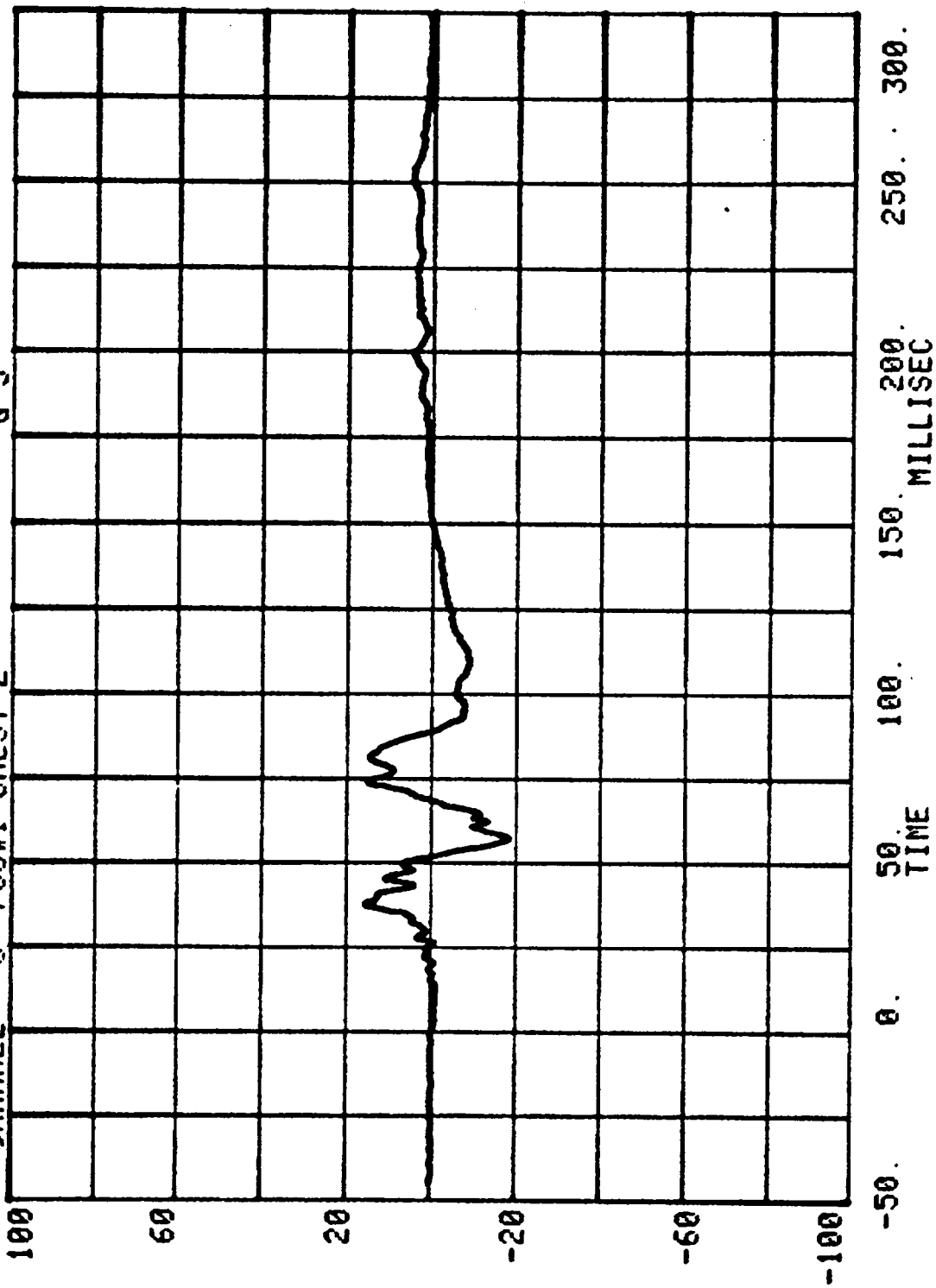


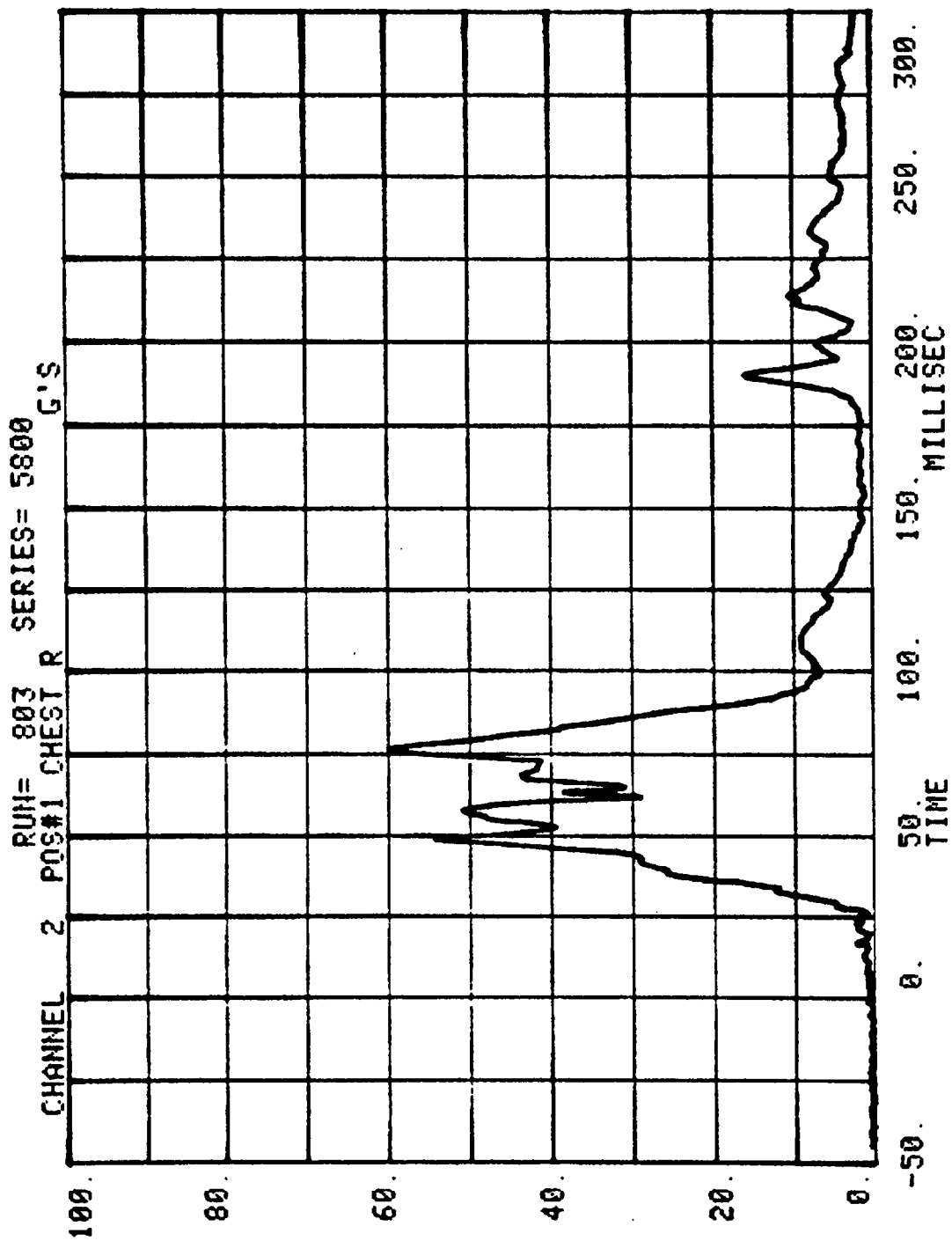






CHANNEL 6 POS#1 CHEST Z RUN= 803 SERIES= 5800 G'S

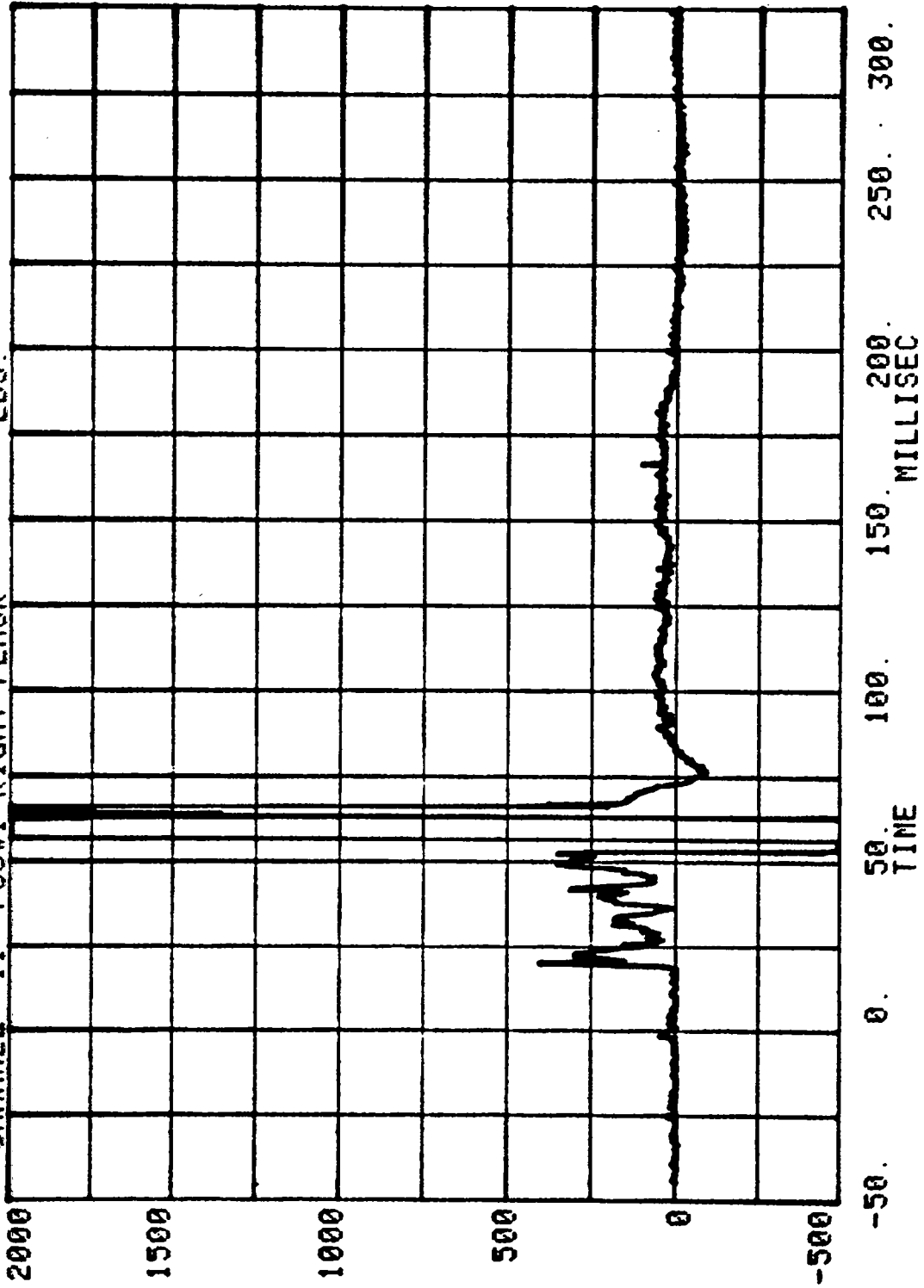




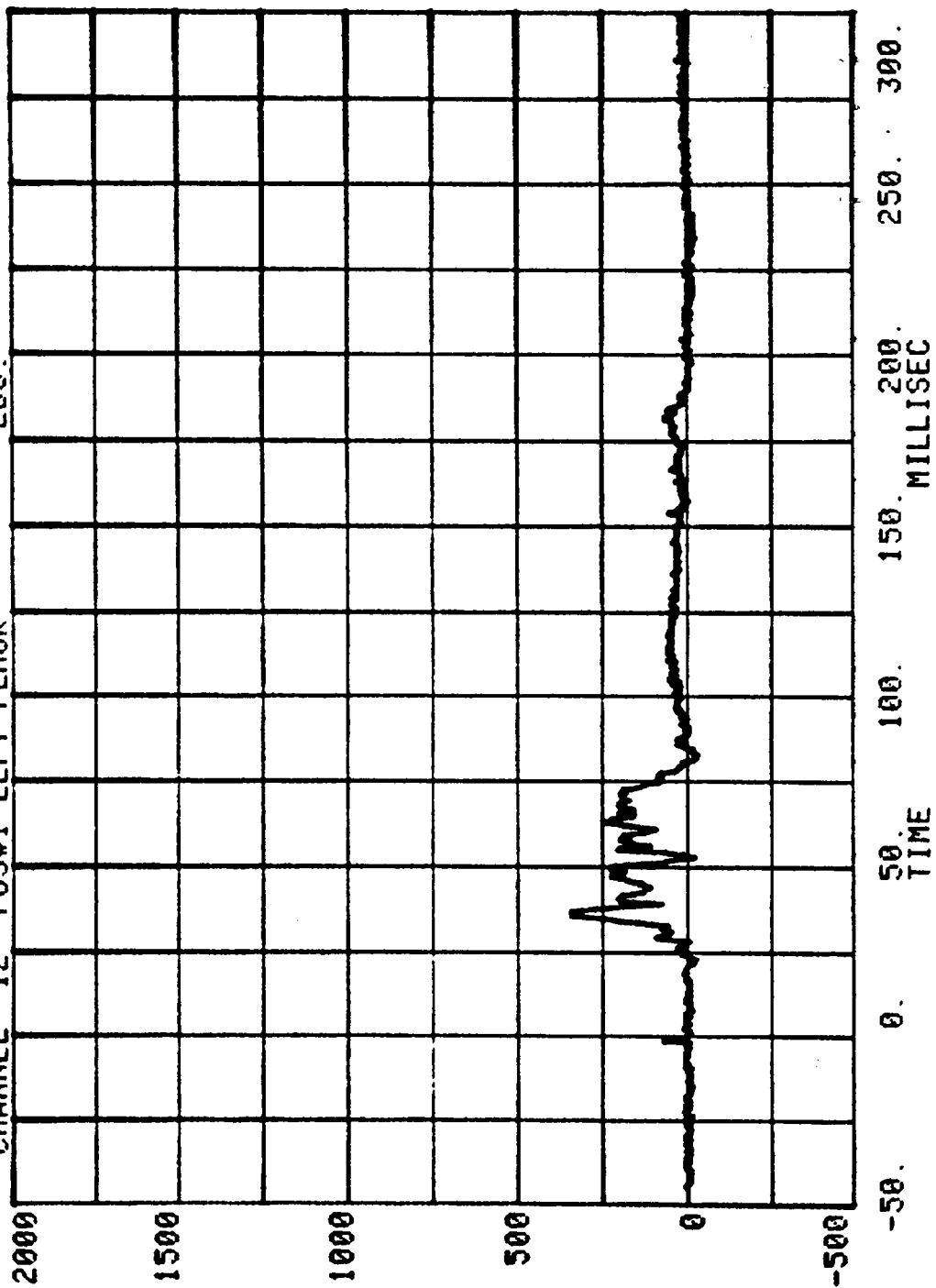
CHANNEL 11 POS#1 RIGHT FEMUR

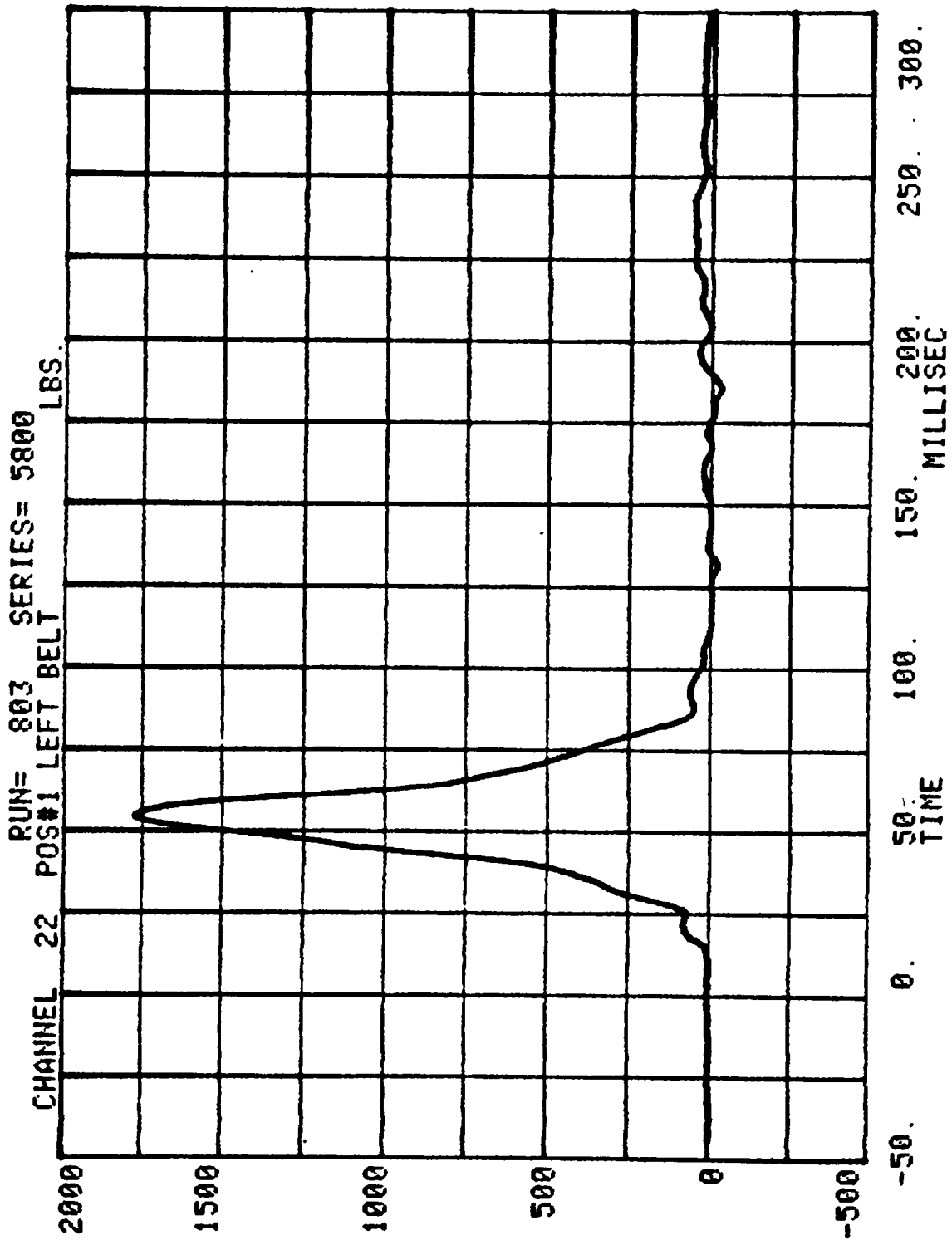
RUN= 803 SERIES= 5800

LBS.

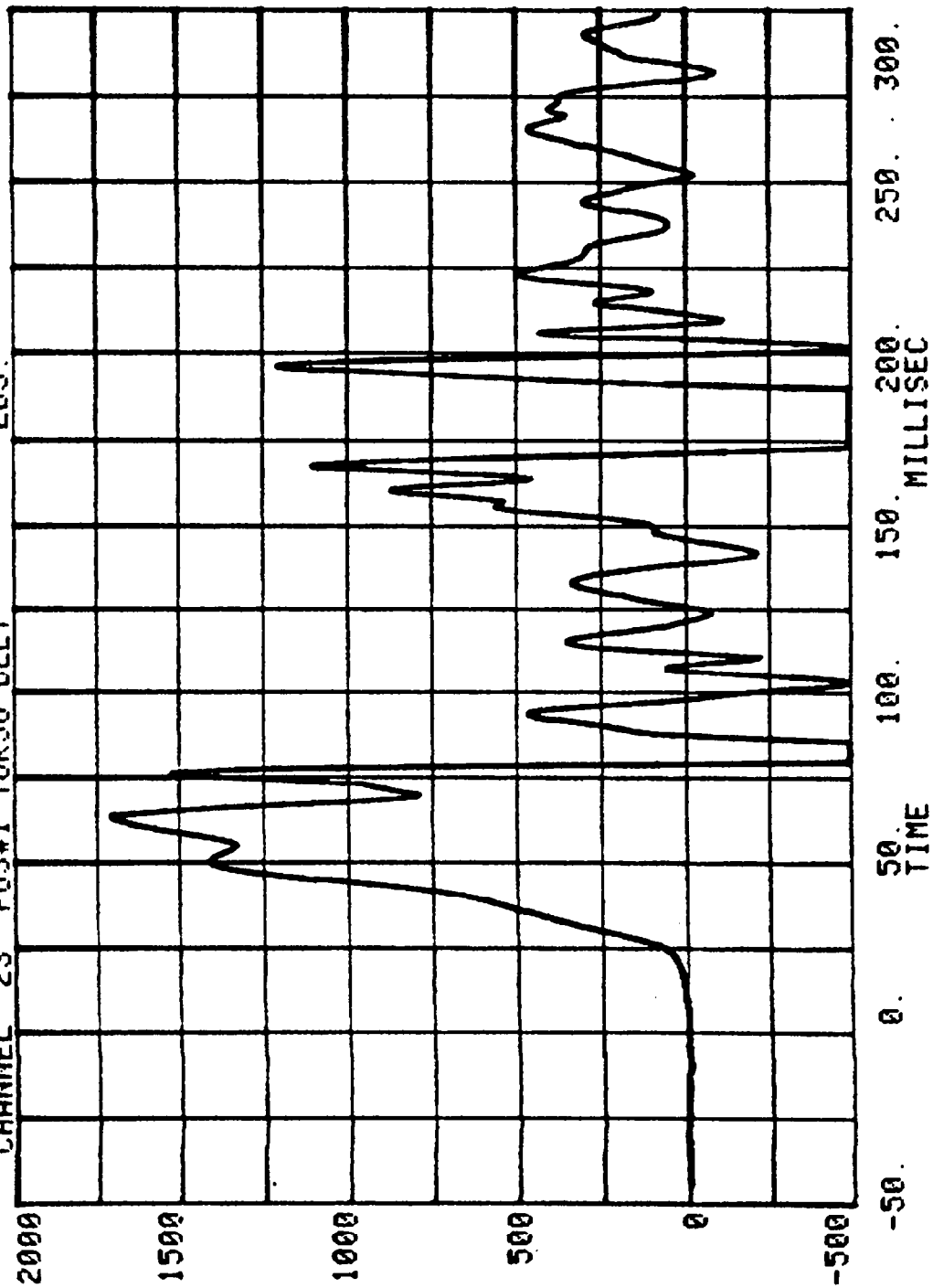


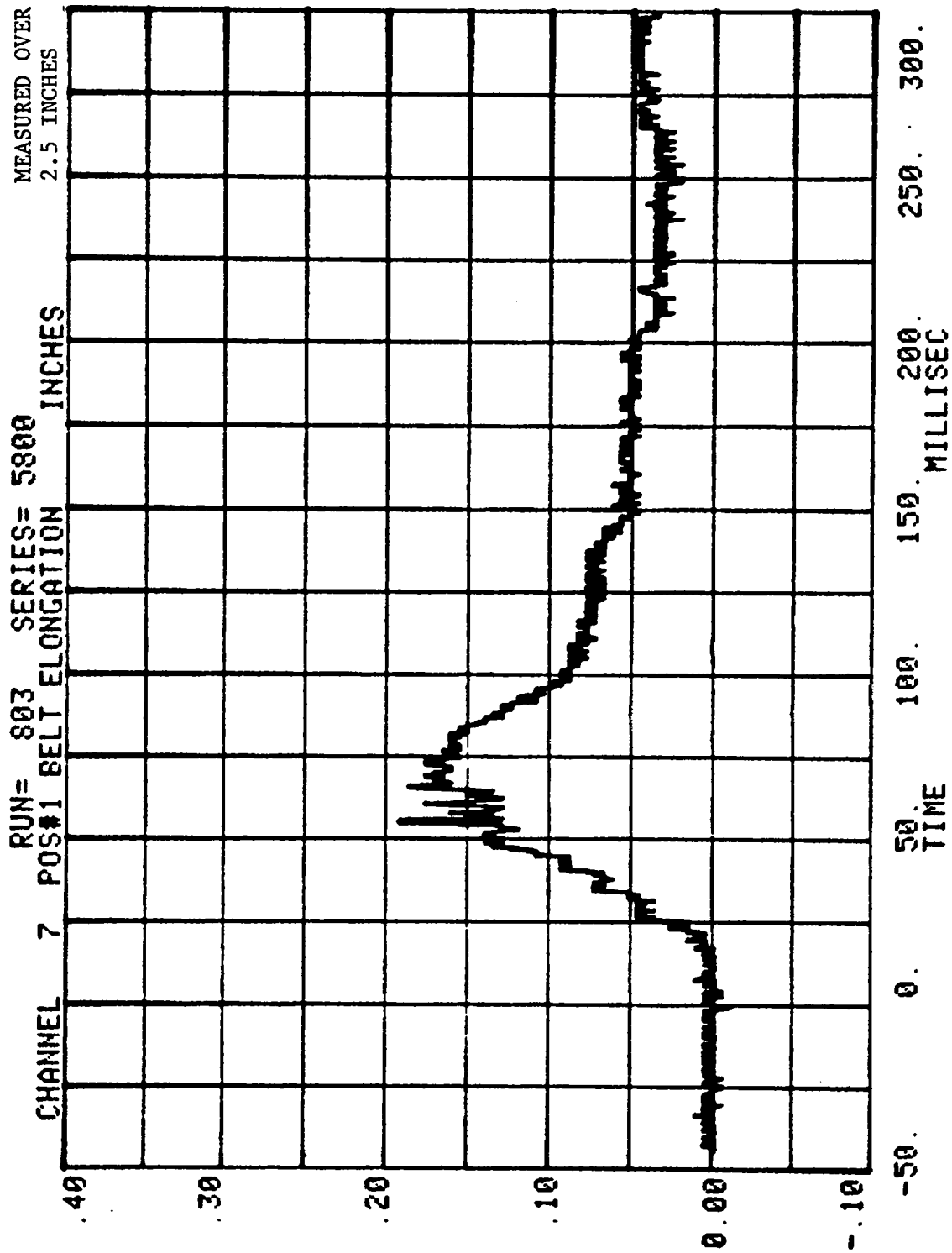
CHANNEL 12 POS#1 LEFT FEMUR
RUN= 803 SERIES= 5900 LBS.

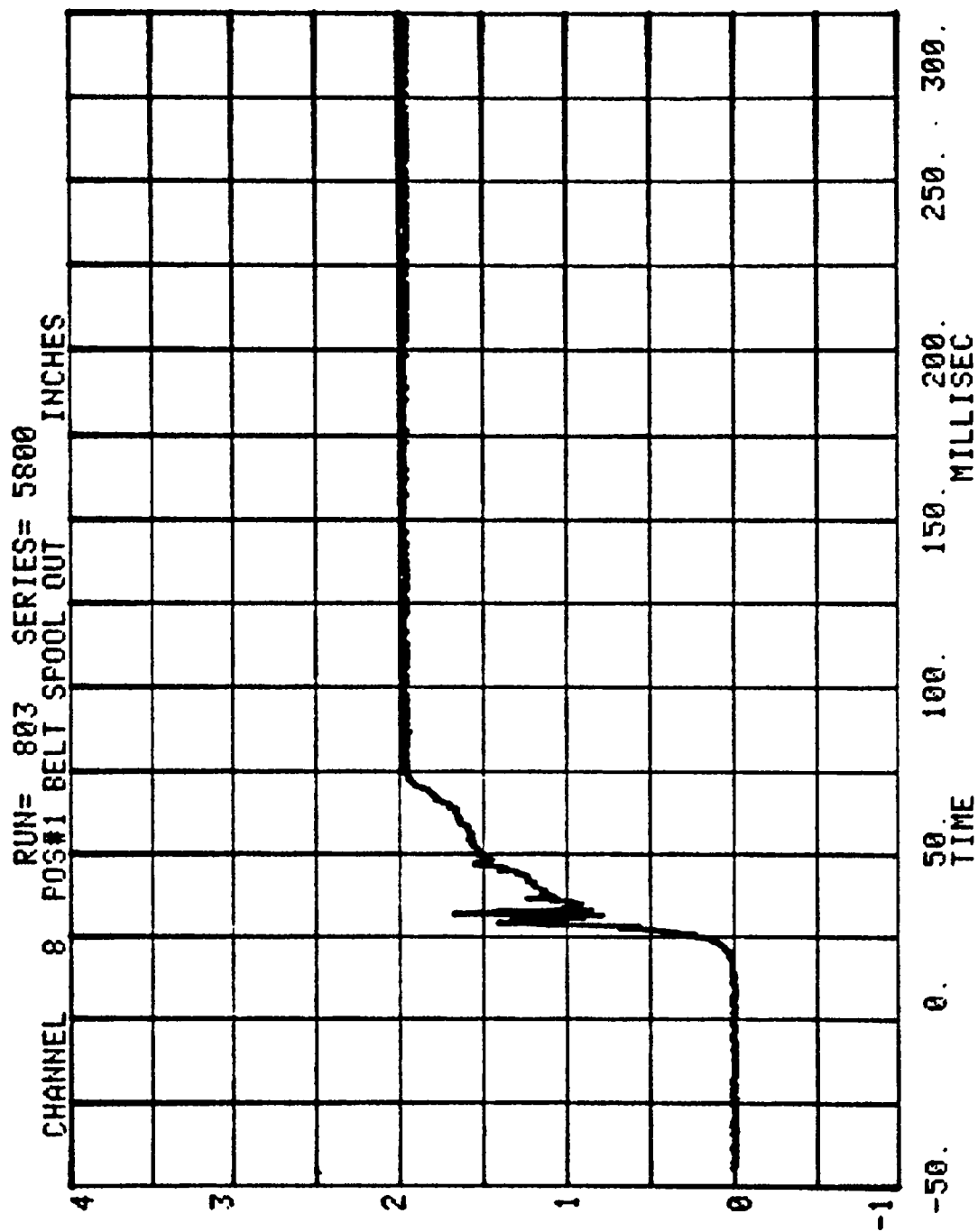




CHANNEL 23 RUN= 803 SERIES= 5800 LBS.
POS#1 TORSO BELT







HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NEW CAR ASSESSMENT BARRIER TEST - 1988

RUN= 803

POS#2 HEAD R

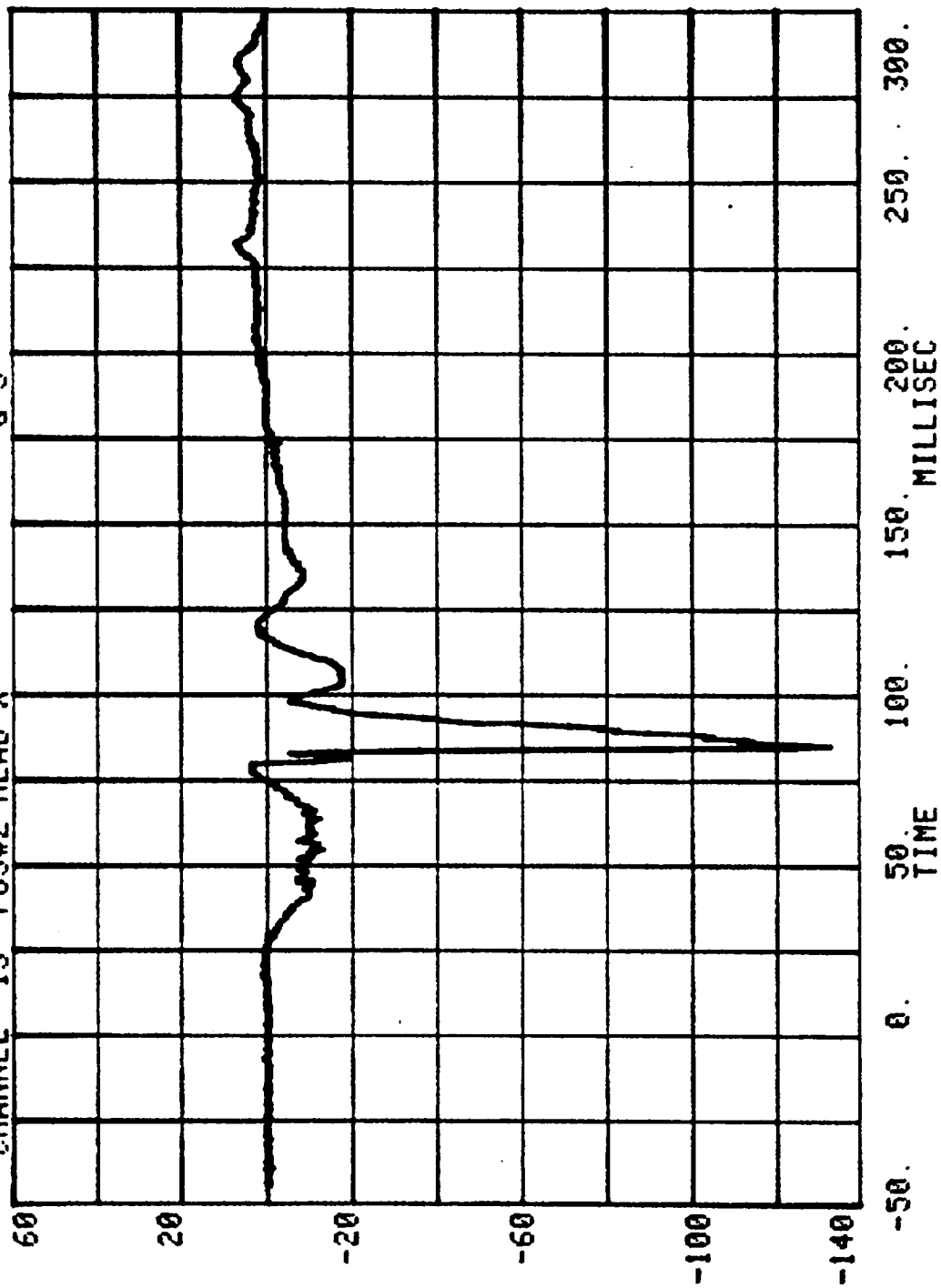
HIC=1423.5 FROM T1= .08407 TO T2= .09195
AVERAGE ACCELERATION BETWEEN T1 AND T2= 126.7G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=1937.6

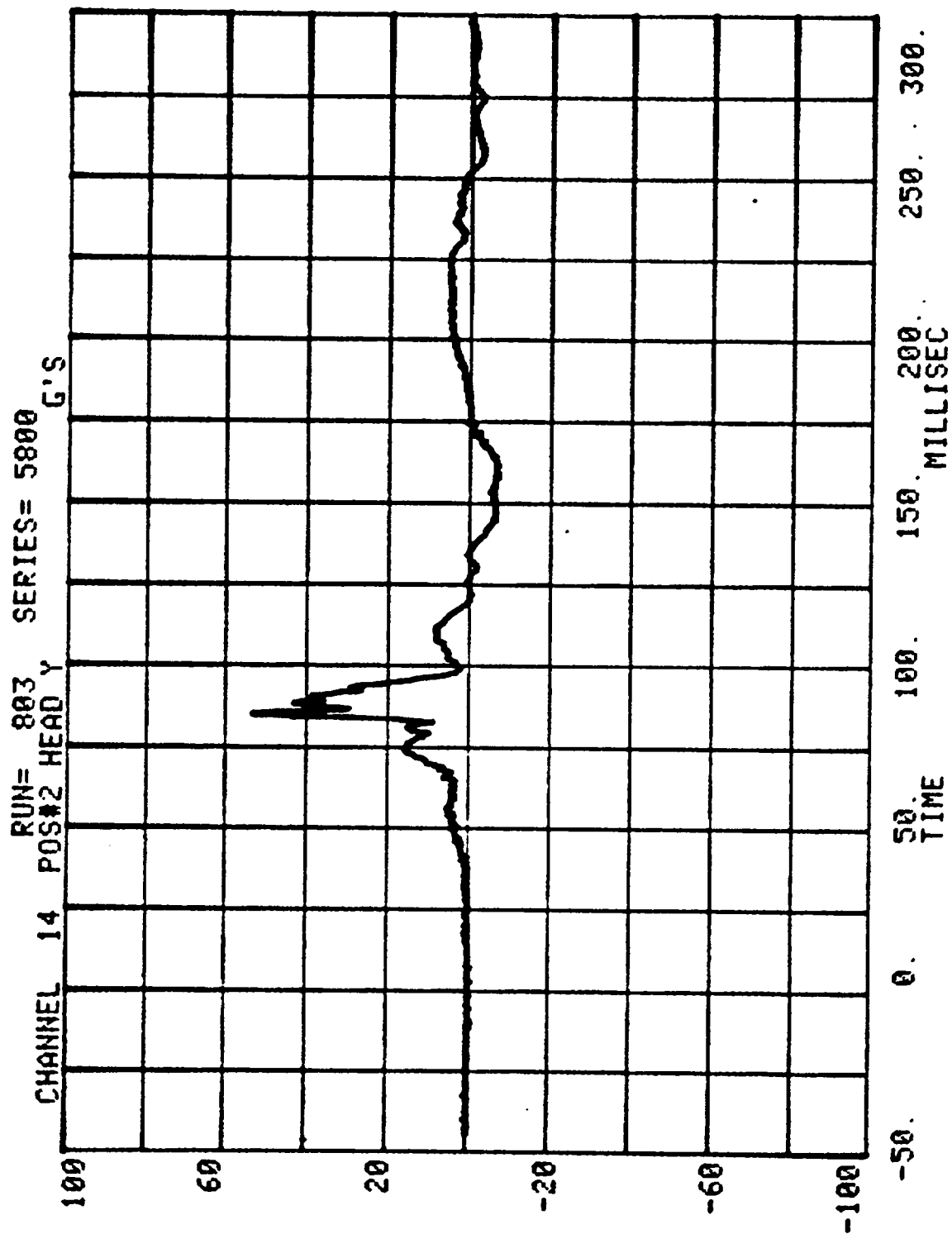
CHANNEL 13 POS#2 HEAD X

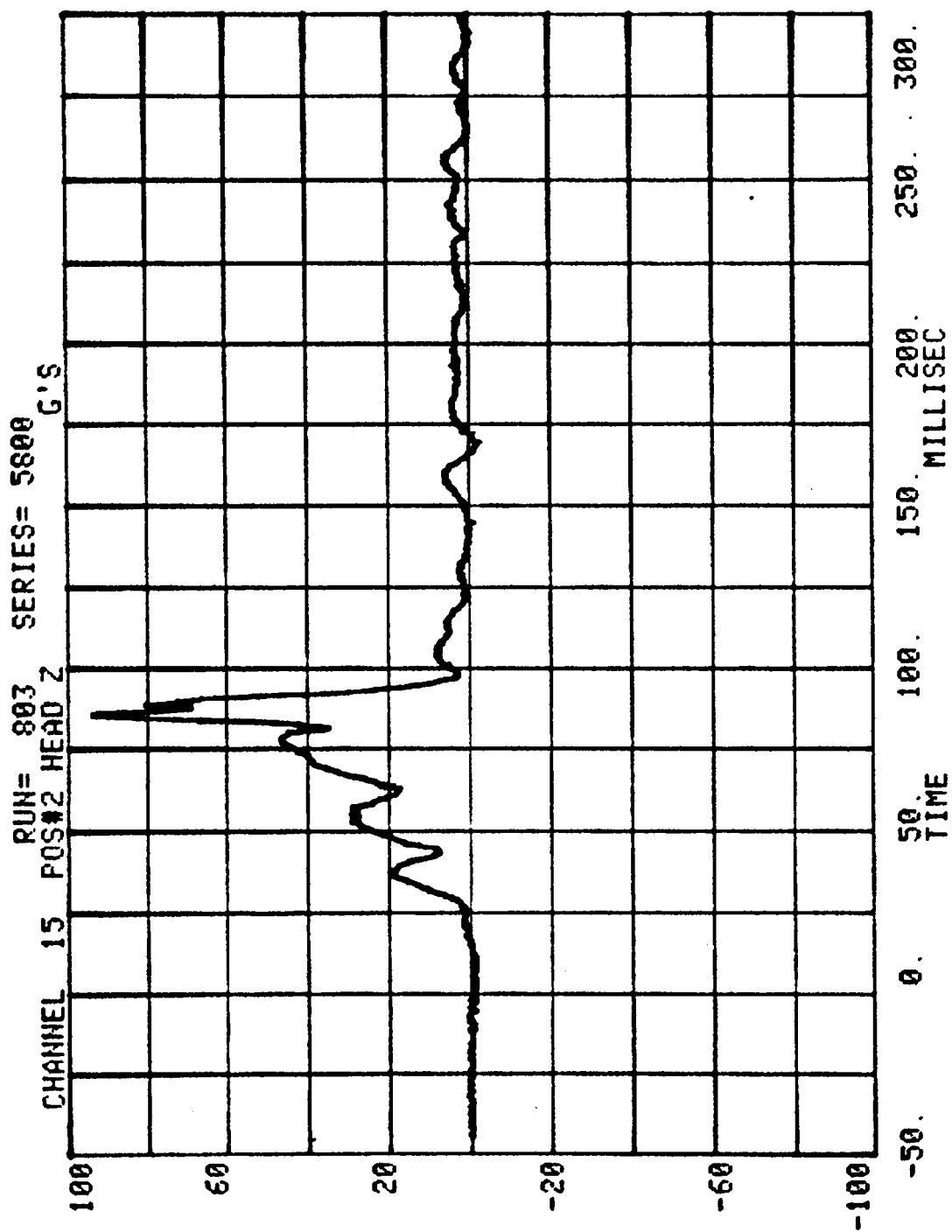
RUN= 803

SERIES= 5800

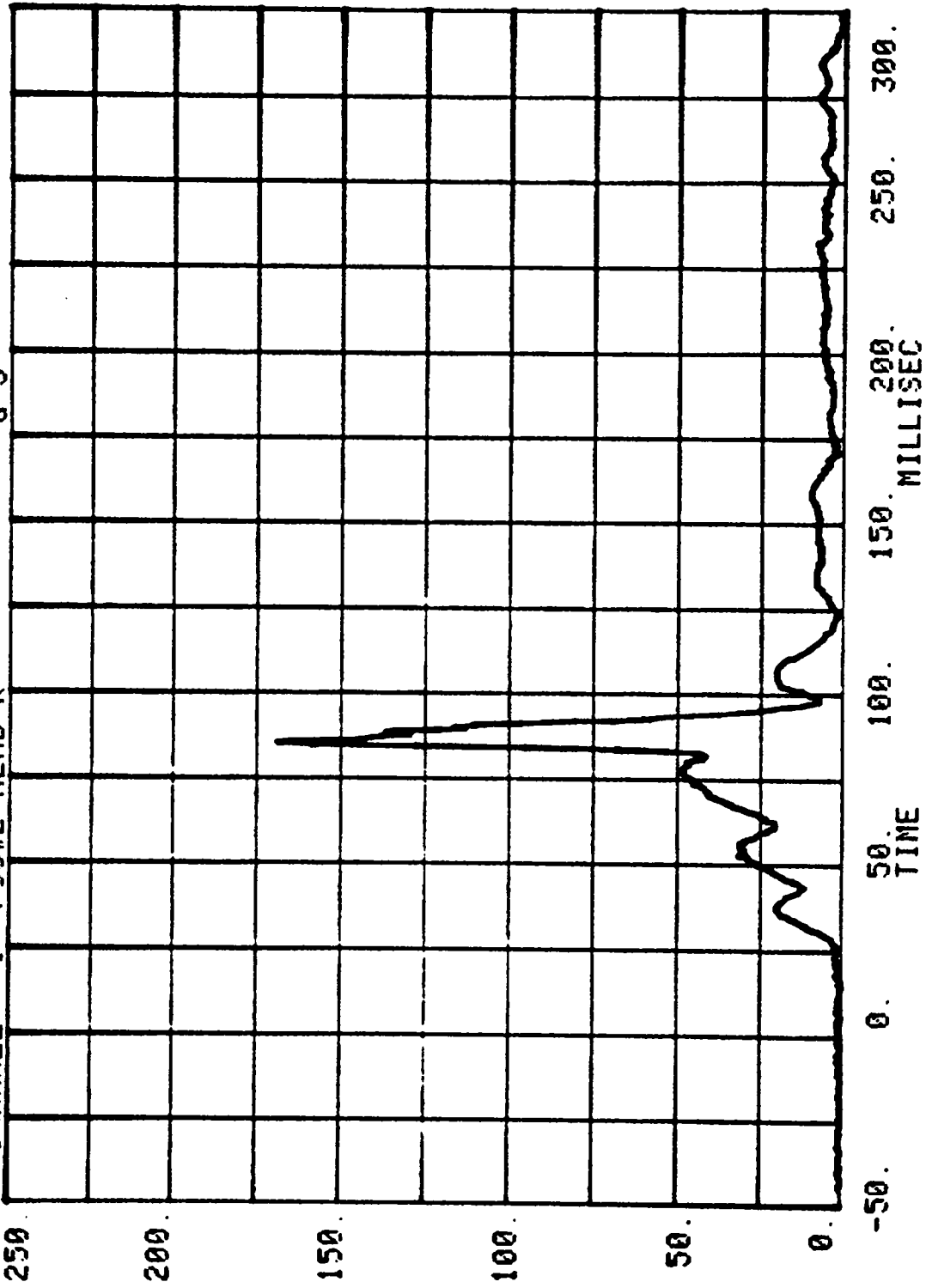
G'S



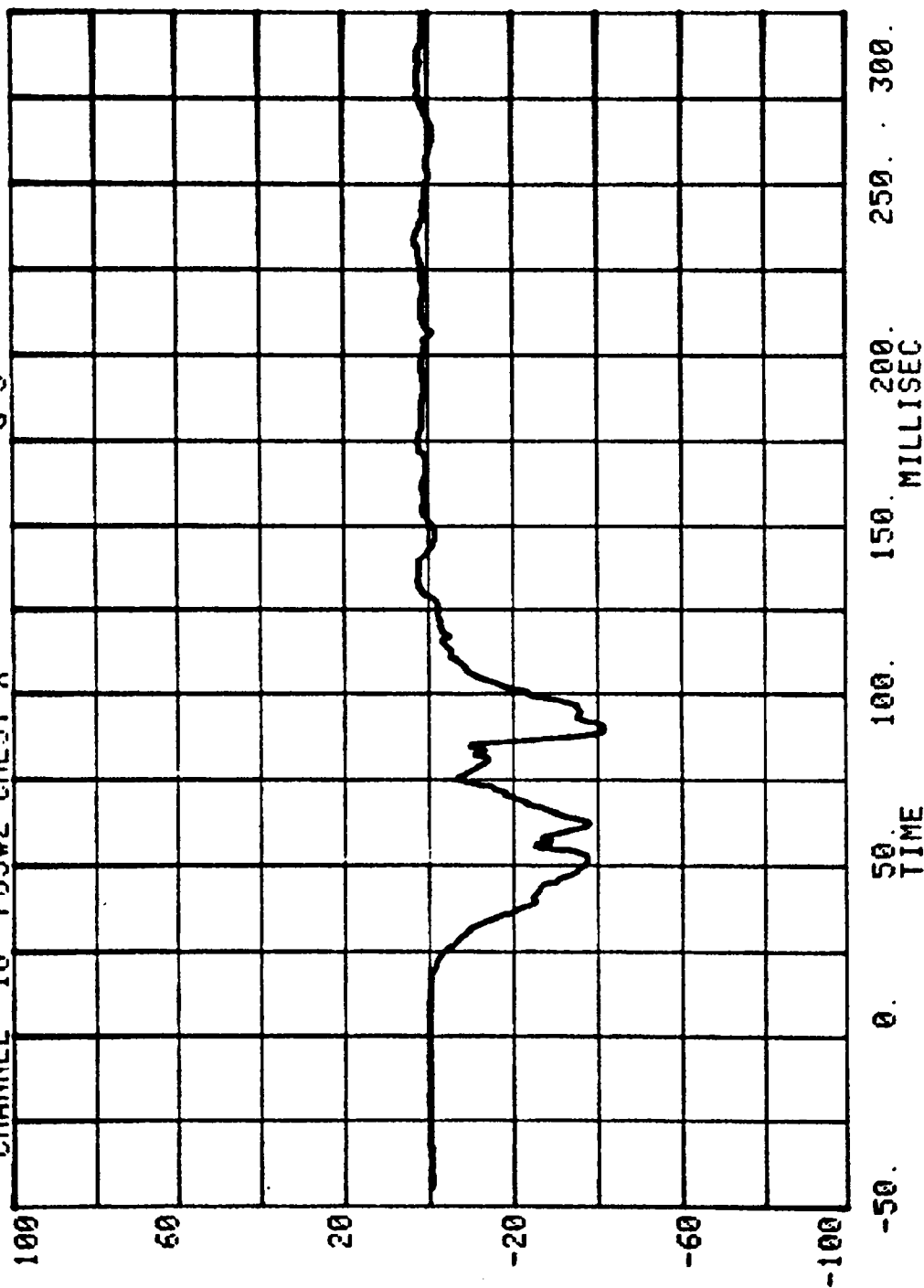




CHANNEL 3 RUN= 203 SERIES= 5800 G'S

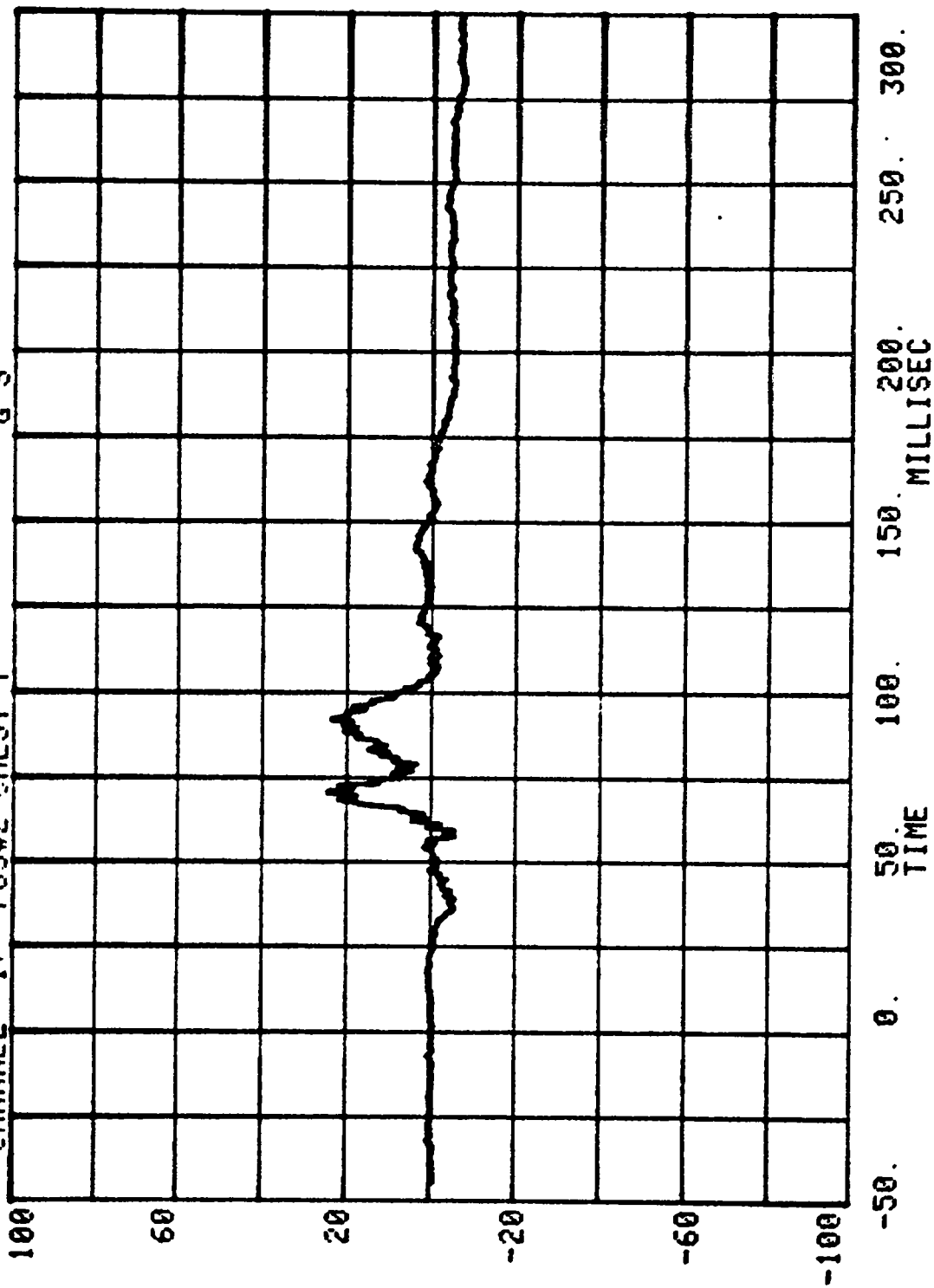


CHANNEL 16 POS#2 CHEST X
RUN= 803 SERIES= 5800 G'S

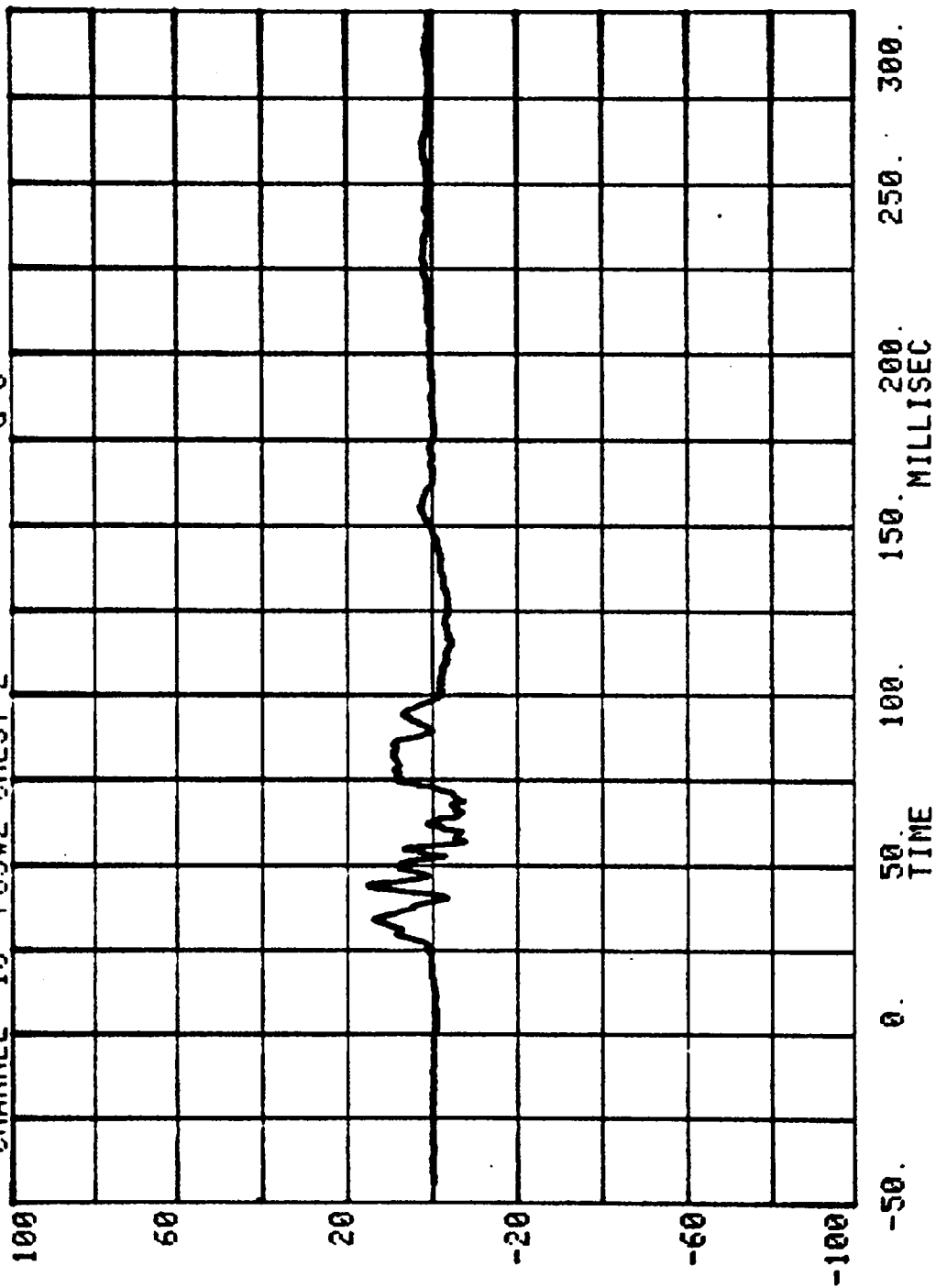


CHANNEL 17 POS#2 CHEST Y G'S

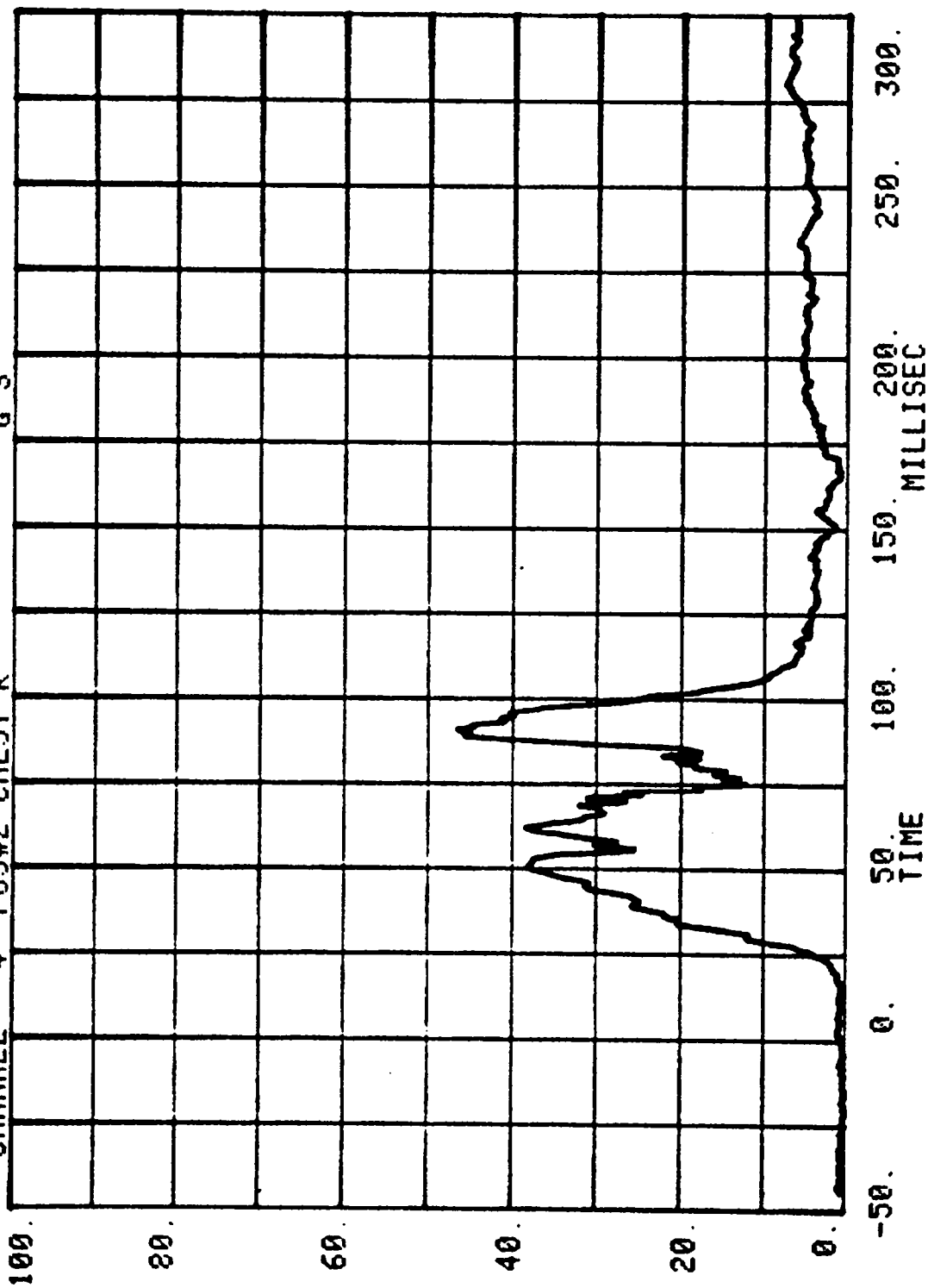
RUN= 803 SERIES= 5800

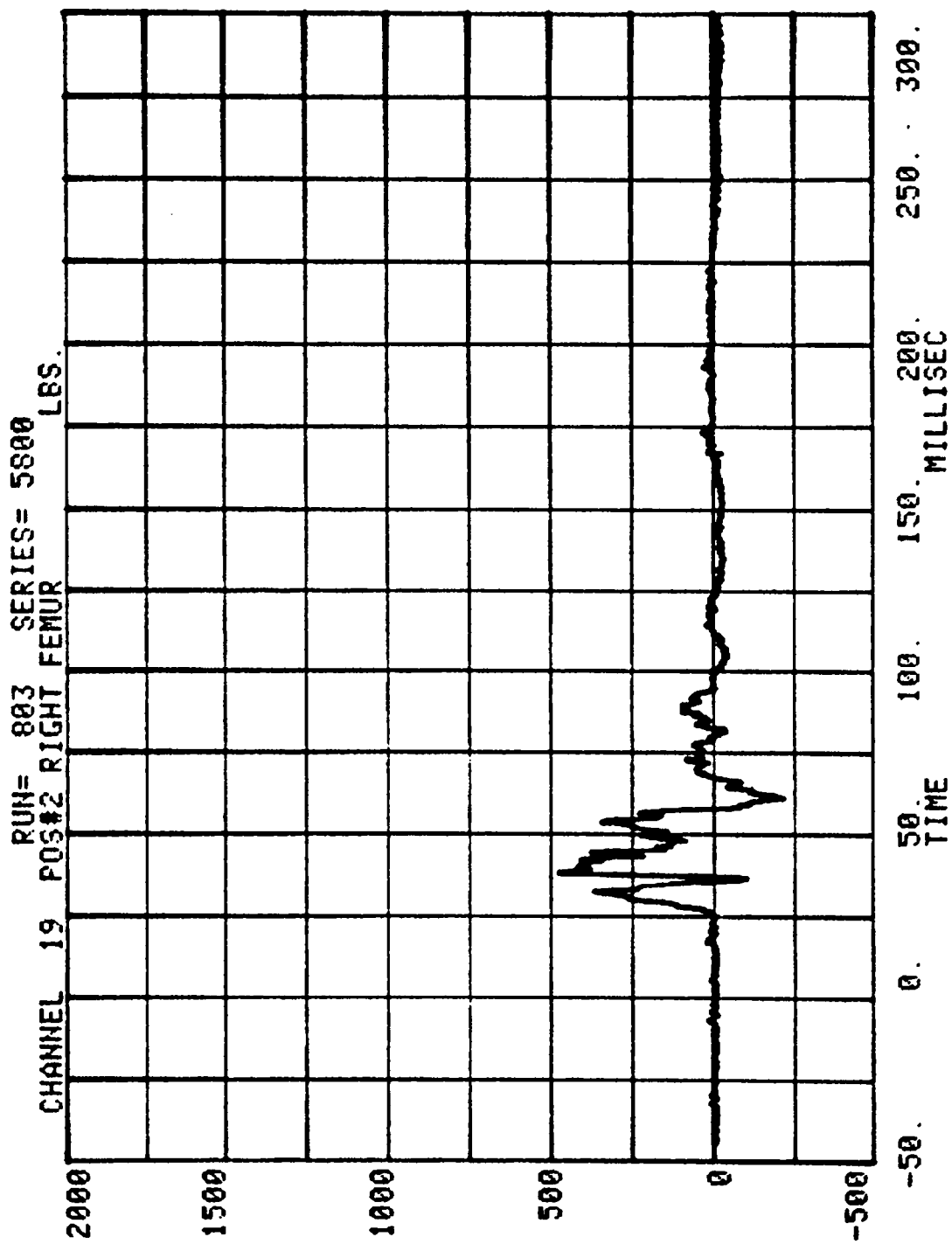


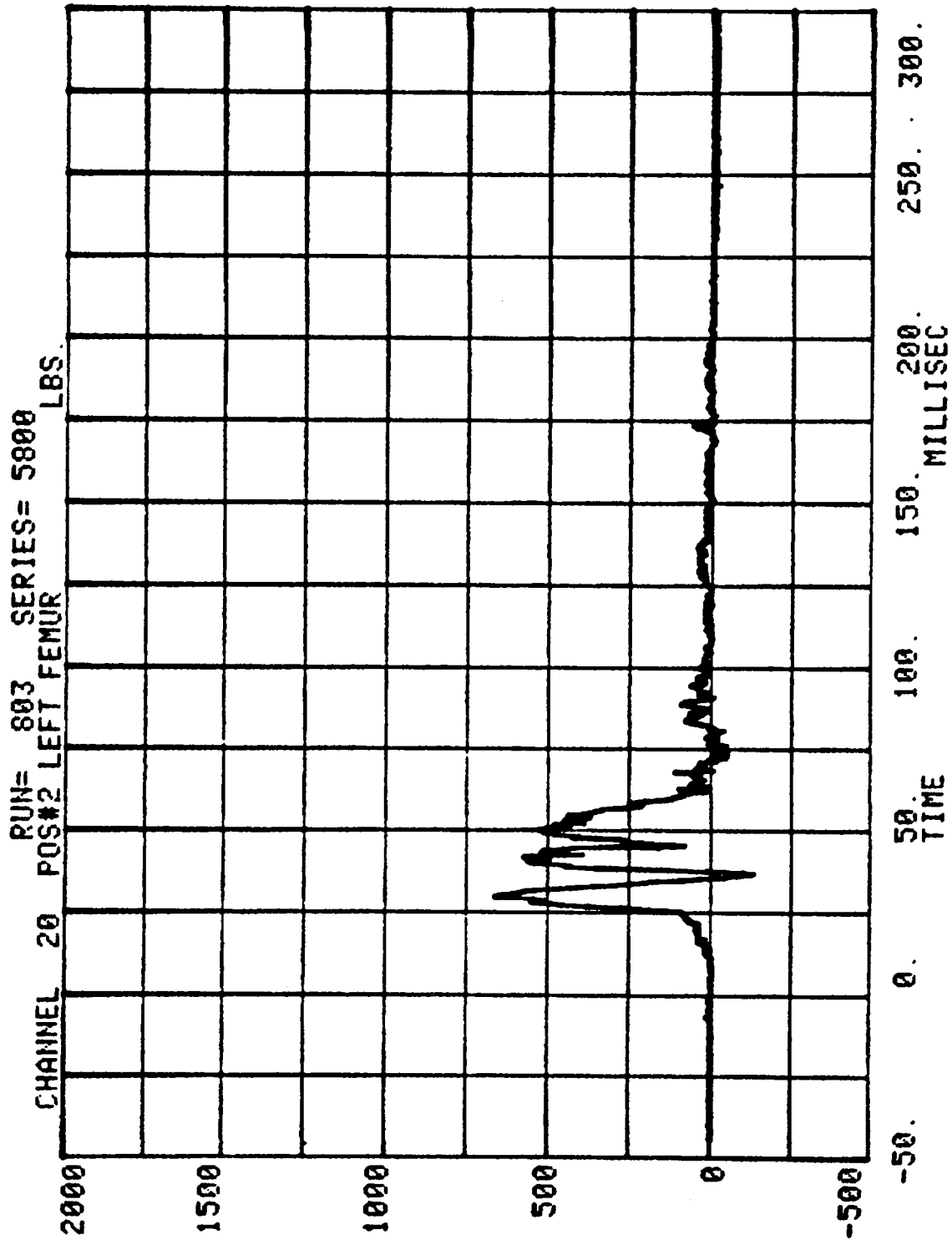
CHANNEL 18 POS#2 CHEST Z RUN= 803 SERIES= 5800 G'S

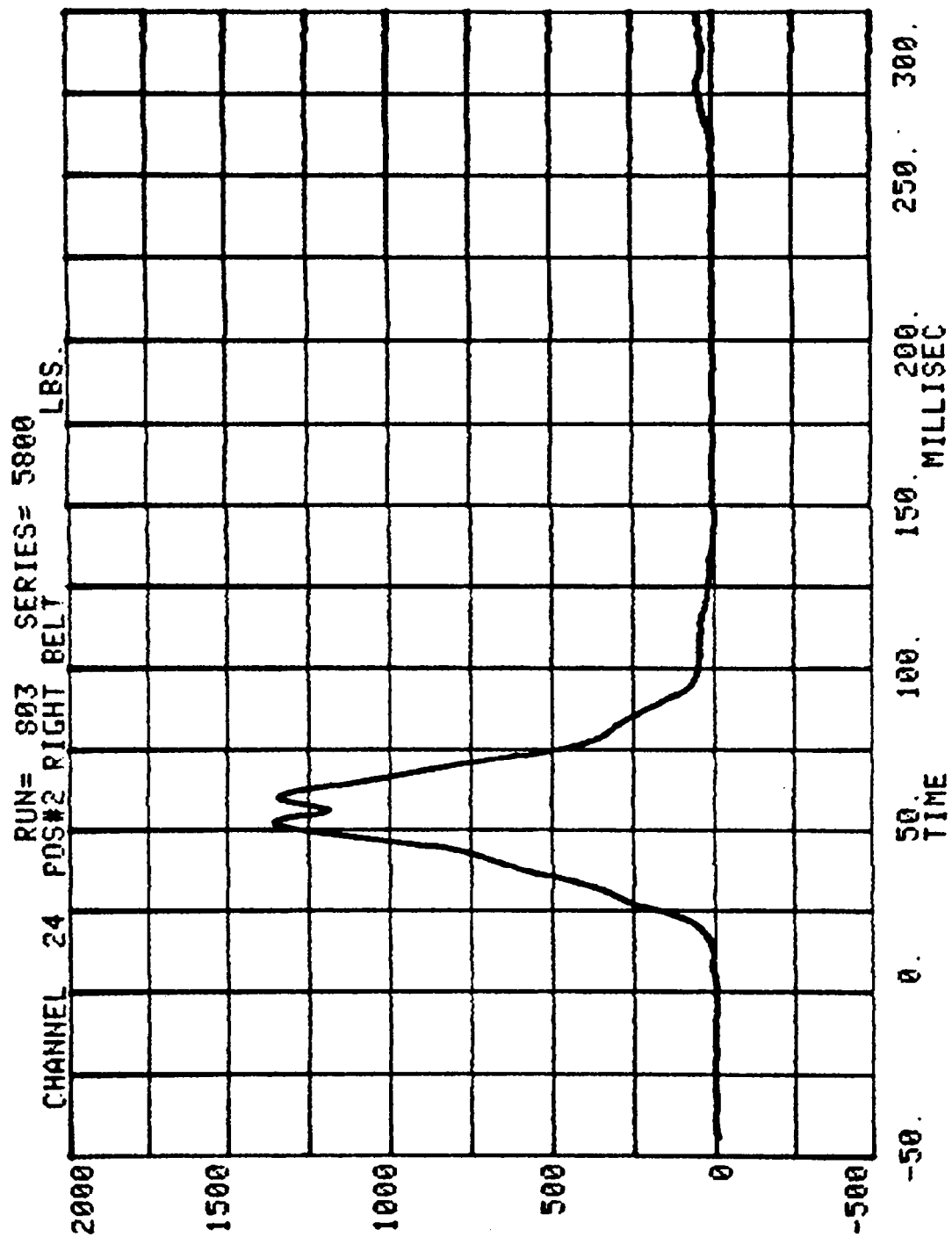


CHANNEL 4 POS#2 CHEST R RUN= 803 SERIES= 5800 G'S

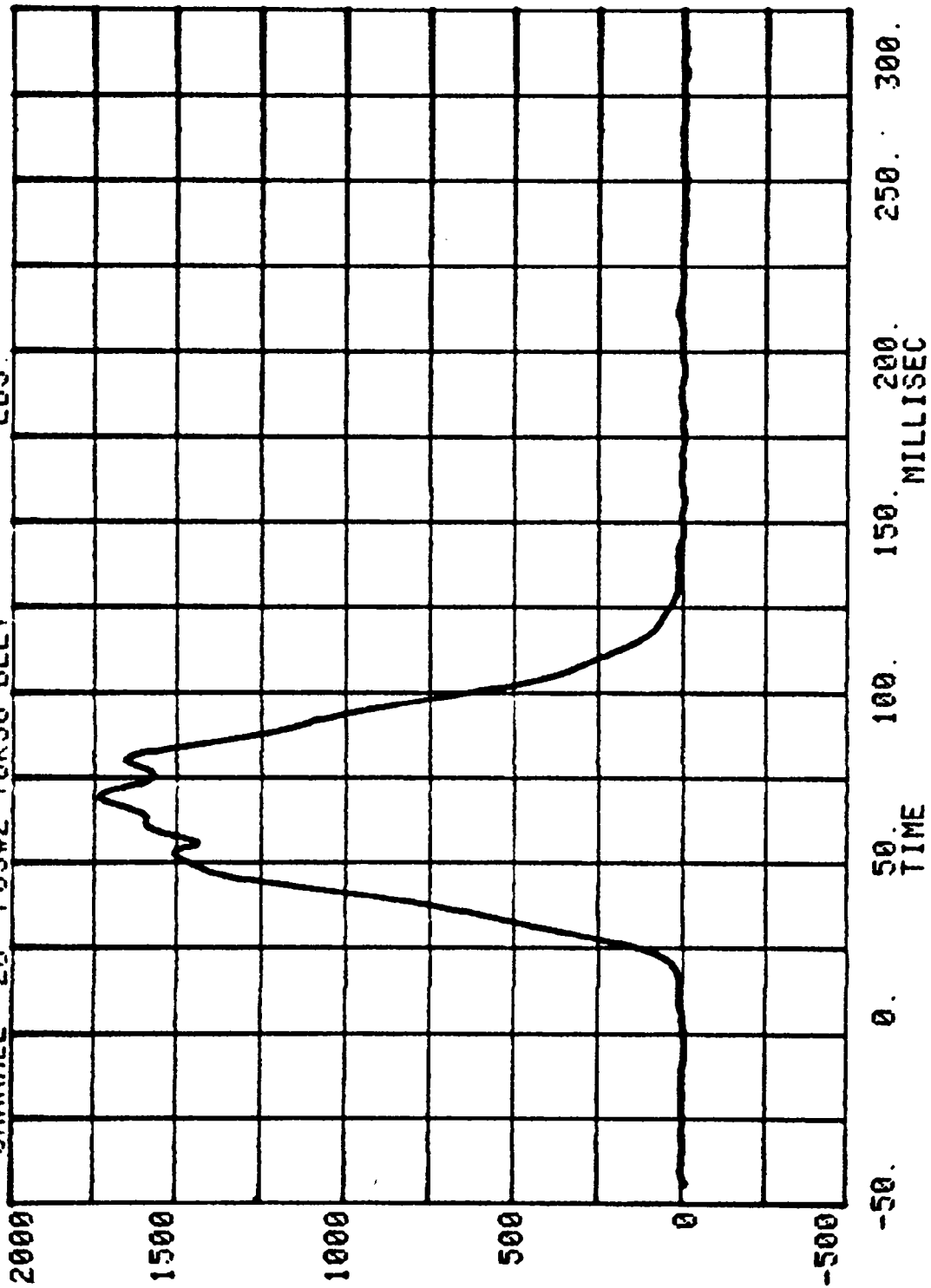


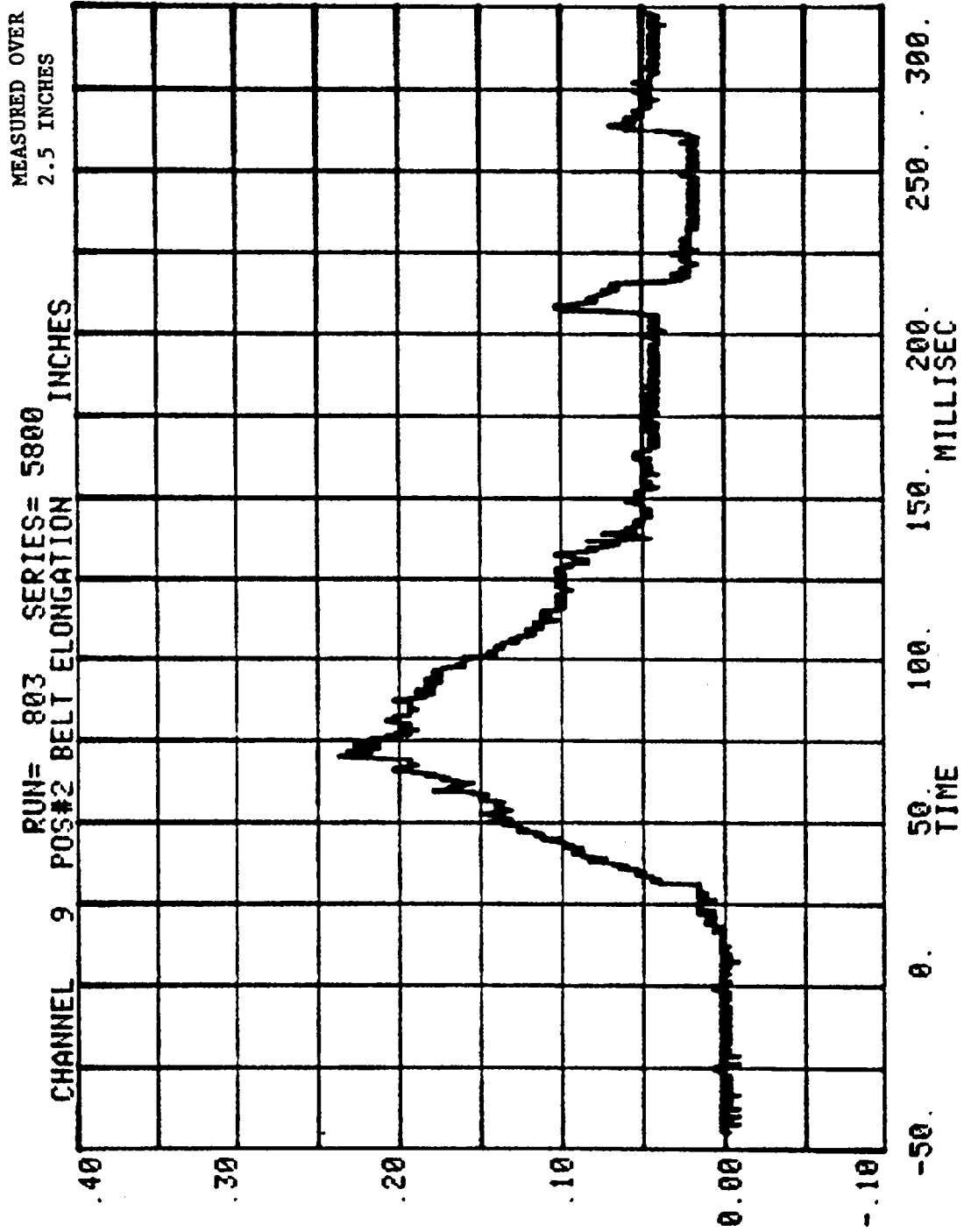




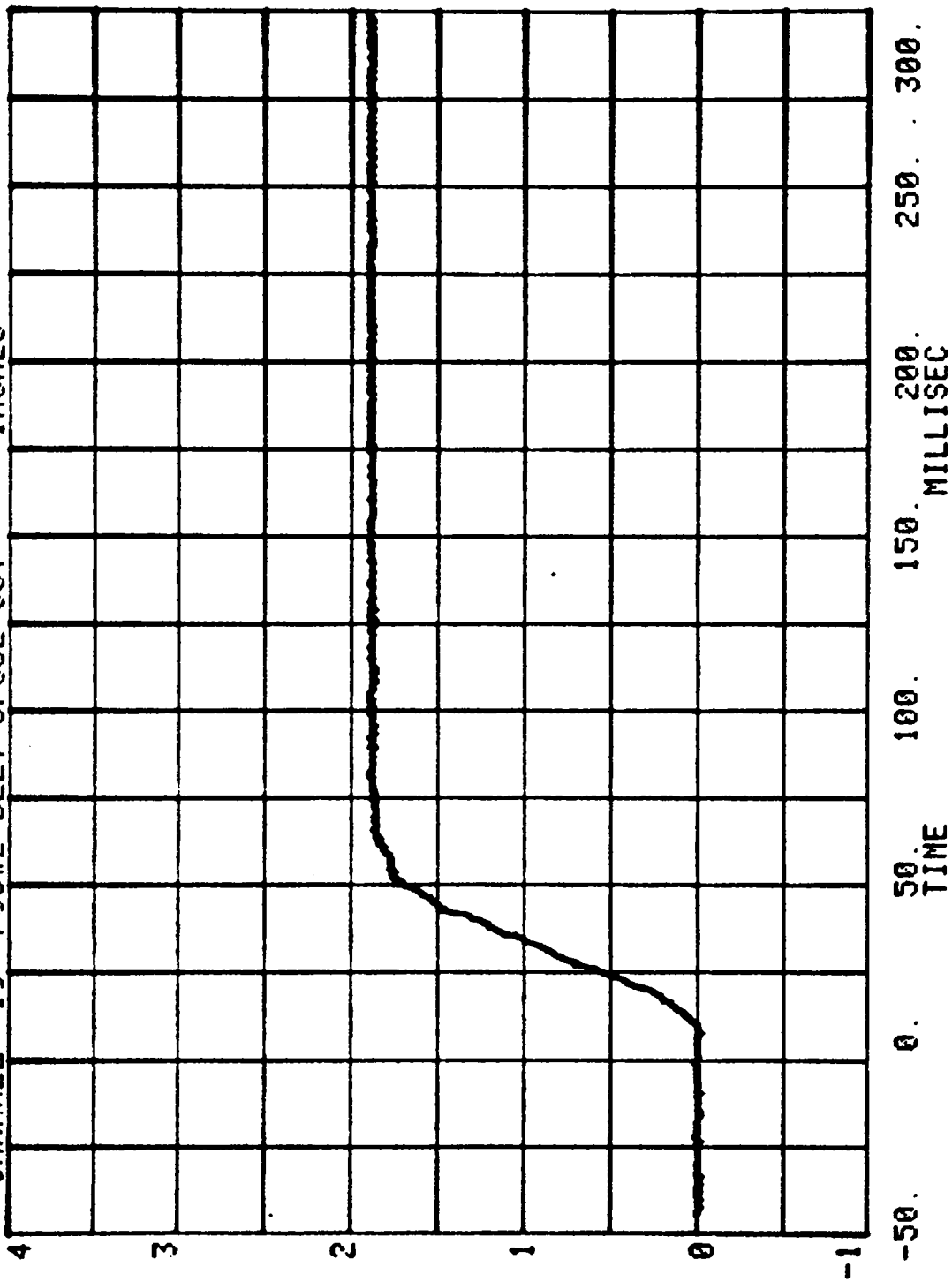


CHANNEL 26 RUN= 803 POS#2 TORSO BELT SERIES= 5800 LBS.





RUN= 803 SERIES= 5800
CHANNEL 10 POS#2 BELT SPOOL OUT 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.

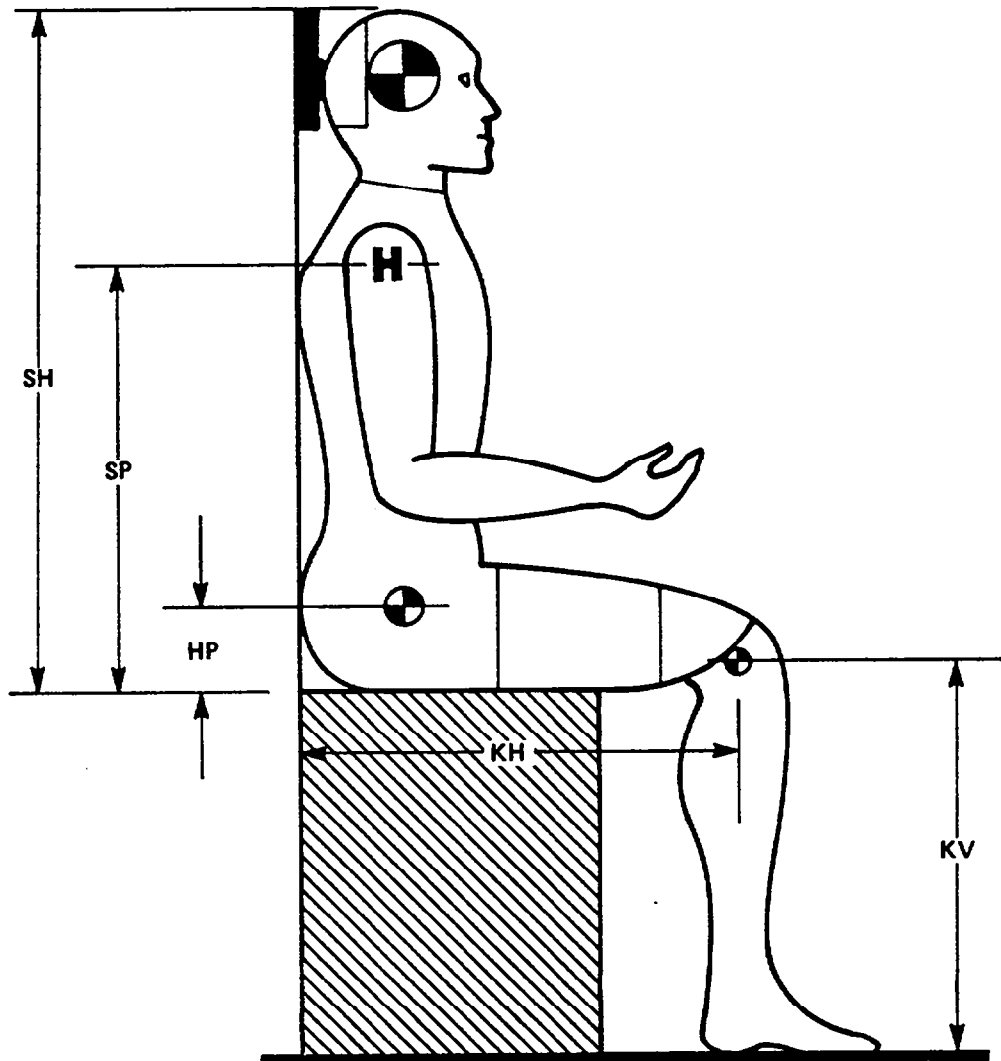
Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Date</u>
1021	12-11-87
1022	12-11-87

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 11 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	XXXXXXXXXXXXX	12-11-87	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXX	1	
SH - Seated Height	35.6 to 35.8"	35.7"	
SP - Shoulder Pivot Height	21.8 to 22.4"	22.1"	
HP - Hip Pivot Height	3.9" ref.	3.9"	
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.4"	
KV - Knee Pivot from floor	19.3 to 19.9"	19.5"	
SW - Shoulder Width	17.8 to 18.4"	18.1"	
HW - Hip Width	14.0 to 15.4"	14.8"	

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		12-11-87	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		68-71deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		29-36%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	249g	
b. peak lateral accel.	<= 10 G's	3g	
c. Time above 100 G's	0.9 to 1.5 ms.	1.2ms	

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

TECHNICIAN'S NAME:

D.W. Hess

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	21.9fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	23.5g	
c. Peak Resultant Head Acceleration		26 G's max.	24g	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.1ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	27ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	3.5ms	
g. Max. Head Rotation		63 to 73 deg.	70deg	
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	0ms	
	Displ.	-.5 to .5"	0"	
30 deg.	Time	25.6 to 34.4 ms.	27.5ms	
	Displ.	2.1 to 3.1"	2.6"	
60 deg.	Time	40.3 to 51.7 ms.	42ms	
	Displ.	4.3 to 5.3"	5.1"	
Maximum (70 deg)	Time	53.2 to 66.8 ms.	53.5ms	
	Displ.	5.0 to 6.0"	5.8"	
60 deg.	Time	67.0 to 83.0 ms.	71ms	
	Displ.	4.3 to 5.3"	4.9"	
30 deg.	Time	85.4 to 104.6 ms.	89.1ms	
	Displ.	2.1 to 3.1"	2.1"	
0 deg.	Time	101.0 - 123.0 ms.	104.9ms	
	Displ.	-.5 to 0.5"	0.0"	

TECHNICIANS NAME: *DW Hees*

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.	24.5 lbs	
b. Force @ 0.75"	36 to 50 lbs.	37.5 lbs	
c. Force @ 1.0"	50 to 63 lbs.	51.5 lbs	
d. Force @ 1.3"	73 to 88 lbs.	78.0 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	26.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	36.5 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	47.0 lbs	
d. Return Angle	12 deg. maximum	8 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.8 fps	
(2) Peak Deflection	1.7" maximum	1.45"	
(3) Peak Resistive Force	2250 lbs maximum	2236 lbs	
(4) Internal Hysteresis	50 to 70%	50.0%	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	13.9 fps	
(2) Peak Deflection	1.1" maximum	1.03"	
(3) Peak Resistive Force	1450 lbs maximum	1352 lbs	
(4) Internal Hysteresis	50 to 70%	58.8%	

TECHNICIAN'S NAME: DW Hess

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. Right Side			
(1) Probe Speed	6.76 to 7.04 fps	6.8 fps	
(2) Maximum Force	1850 to 2500 lbs	1900 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.9 ms	
B. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.04 fps	
(2) Maximum Force	1850 to 2500 lbs	2125 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.9 ms	

REMARKS:

TECHNICIAN'S NAME: D.W. Hess

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1021

CALIB. SEQ. NOS. FOR DUMMY: _____

A. DUMMY INSTRUMENTS

1. Head Accelerometers

a. Triaxial unit

b. Uniaxial units

(1) Longitudinal (A_x)

(2) Lateral (A_y)

(3) Vertical (A_z)

2. Chest Accelerometers (Vehicle Crash Test Usage)

a. Triaxial unit

b. Uniaxial units

(1) Longitudinal (A_x)

(2) Lateral (A_y)

(3) Vertical (A_z)

3. Chest Potentiometer

4. Femur Load Cells

a. Right Side

b. Left Side

B. CALIB. LAB. INSTRUMENTS:

1. Pendulum Accelerometer

2. Test Probe Accelerometer

3. Lumbar Flexion Test Push Force Gauge

4. Abdominal Compression Test Force Gauge

5. Abdominal Compression Test Displacement Gauge

MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
NA	---	---	---
Endevco	CJ22	9-87	3-88
Endevco	CS41	9-87	3-88
Endevco	CH31	9-87	3-88
NA	---	---	---
CEC	A73	9-87	3-88
Endevco	CE06	9-87	3-88
CEC	A44	9-87	3-88
NA	---	---	---
GSE	77	10-87	4-88
GSE	76	10-87	4-88
CED	18259	11-87	5-88
CED	17815	11-87	5-88
Transducer Inc.	20051	11-87	5-88
BLH	72952	11-87	5-88
CIC	567-11	11-87	5-88

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXXX	12-11-87	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	1	
SH - Seated Height	35.6 to 35.8"	35.8"	
SP - Shoulder Pivot Height	21.8 to 22.4"	22.1"	
HP - Hip Pivot Height	3.9" ref.	3.9"	
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.5"	
KV - Knee Pivot from floor	19.3 to 19.9"	19.5"	
SW - Shoulder Width	17.8 to 18.4"	18.1"	
HW - Hip Width	14.0 to 15.4"	15.0"	

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		12-11-87	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-71 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		29-36%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	250 G's	
b. peak lateral accel.	<= 10 G's	9 G's	
c. Time above 100 G's	0.9 to 1.5 ms.	1.2 ms	

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

TECHNICIAN'S NAME: D.W. Hess

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

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	21.87 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.	26 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 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.	27.5 ms	
	Displ.	2.1 to 3.1"	2.6"	
60 deg.	Time	40.3 to 51.7 ms.	41.5 ms	
	Displ.	4.3 to 5.3"	5.0"	
Maximum (72 deg)	Time	53.2 to 66.8 ms.	53.2 ms	
	Displ.	5.0 to 6.0"	5.8"	
60 deg.	Time	67.0 to 83.0 ms.	68 ms	
	Displ.	4.3 to 5.3"	4.7"	
30 deg.	Time	85.4 to 104.6 ms.	89 ms	
	Displ.	2.1 to 3.1"	2.2"	
0 deg.	Time	101.0 - 123.0 ms.	104 ms	
	Displ.	-.5 to 0.5"	0.0"	

TECHNICIANS NAME:

D.W. Hess

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

		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.	29 lbs	
b. Force @ 0.75"	36 to 50 lbs.	42.5 lbs	
c. Force @ 1.0"	50 to 63 lbs.	56.5 lbs	
d. Force @ 1.3"	73 to 88 lbs.	79 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	30 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	41 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	52.5 lbs	
d. Return Angle	12 deg. maximum	9 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	22.20 fps	
(2) Peak Deflection	1.7" maximum	1.5"	
(3) Peak Resistive Force	2250 lbs maximum	2184 lbs	
(4) Internal Hysteresis	50 to 70%	56.2%	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	13.9 fps	
(2) Peak Deflection	1.1" maximum	.93"	
(3) Peak Resistive Force	1450 lbs maximum	1352 lbs	
(4) Internal Hysteresis	50 to 70%	63.1%	

TECHNICIAN'S NAME:

D.W. Hess

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
6. KNEE IMPACT TEST			
A. Right Side			
(1) Probe Speed	6.76 to 7.04 fps	7.03 fps	
(2) Maximum Force	1850 to 2500 lbs	2300 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.7 ms	
B. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.00 fps	
(2) Maximum Force	1850 to 2500 lbs	2050 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.85 ms	

REMARKS:

TECHNICIAN'S NAME: D. Walters

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1022

CALIB. SEQ. NOS. FOR DUMMY: _____

A. DUMMY INSTRUMENTS

1. Head Accelerometers

a. Triaxial unit

b. Uniaxial units

(1) Longitudinal (A_x)

(2) Lateral (A_y)

(3) Vertical (A_z)

2. Chest Accelerometers (Vehicle Crash Test Usage)

a. Triaxial unit

b. Uniaxial units

(1) Longitudinal (A_x)

(2) Lateral (A_y)

(3) Vertical (A_z)

3. Chest Potentiometer

4. Femur Load Cells

a. Right Side

b. Left Side

B. CALIB. LAB. INSTRUMENTS:

1. Pendulum Accelerometer

2. Test Probe Accelerometer

3. Lumbar Flexion Test Push Force Gauge

4. Abdominal Compression Test Force Gauge

5. Abdominal Compression Test Displacement Gauge

MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
NA	---	---	---
Endevco	CK54	9-87	3-88
Endevco	CK78	9-87	3-88
Endevco	CD75	9-87	3-88
NA	---	---	---
CEC	A115	9-87	3-88
Endevco	CS09	9-87	3-88
CEC	A29	9-87	3-88
GSE	077	10-87	4-88
GSE	076	10-87	4-88
CED	18259	11-87	5-88
CED	17815	11-87	5-88
Transducer Inc.	20051	11-87	5-88
BLH	72952	11-87	5-88
CIC	567-11	11-87	5-88

APPENDIX D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

CONTROLS AND EQUIPMENT

SAFETY BELTS

WARNING

Safety belts have been shown to be the single most effective means available for reducing the potential for serious injury and death in automobile accidents. Therefore for your own protection as well as that of your passengers always properly wear safety belts when the vehicle is in motion. Pregnant women should always use a seating position with lap/shoulder belts.

In order to provide the maximum level of protection safety belts must be properly positioned on the body. Improperly positioned safety belts can cause serious personal injury in case of an accident. Therefore read and always observe all of the following instructions and warnings pertaining to the use of safety belts installed in your vehicle.

- When fastening the lap/shoulder belt, the shoulder belt should be positioned midway over the shoulder — it must never rest against the neck. See illustration on page 14.

- The combination lap/shoulder belt on the front seats can be adjusted to fit comfortably — see page 14.

- Do not use comfort clips or devices which create slack in the shoulder belt portion and can increase the risk of injury in an accident. However such clips may be required in the proper use of some child restraint systems.
- Do not strap in more than one person with each belt.

- For maximum effectiveness, the lap belt must be worn low and tight across the pelvis. Make sure any slack is wound on the retractor.

- Do not wear shoulder part of belt under your arm or otherwise out of position. This would increase the risk of serious injury in case of an accident.

- Belts should not be worn twisted.

- Do not wear belts over rigid or breakable objects in or on your clothing, such as eye glasses, pens, keys, etc. as these may cause injury.

- Several layers of heavy clothing may interfere with proper positioning of belts and reduce the overall effectiveness of the system.

- Keep belt buckles free of any obstruction that may prevent secure locking.

- Make sure the belt of the unoccupied passenger seat is fully wound up on its retractor, so that the belt tongue is in its stowed position. This reduces the possibility of the tongue becoming a striking object in case of a sudden stop.

- Belts that have been subjected to excessive stretch forces in an accident must be replaced.

- Belts must not rub against sharp objects.

- Do not allow safety belts to become damaged by becoming caught in door or seat hardware.

- If belts show damage to webbing, bindings, buckles or retractors, they must be replaced.

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CONTROLS AND EQUIPMENT

WARNING continued

- If belts do not work properly, see your VW dealer.

- Do not modify or disassemble the safety belts in your vehicle.

- The belts must be kept clean as otherwise the retractors may not work properly (also see "Vehicle care," page 51).

- Never bleach or dye safety belts.

- Do not allow safety belts to retract until they are completely dry.

Child Safety

WARNING

All vehicle occupants and especially children should be restrained whenever riding in cars. Holding a child in your arms is not a substitute for a child restraint system. In an accident, a child held in a person's arms can be struck or crushed by any unrestrained rider. An unrestrained child could also be injured by striking the interior, or by being ejected from the vehicle during a sudden maneuver or impact.

A child restraint system can help protect a child in a car.

Accident statistics have shown that children are generally safer in the rear seat area than in the front seating positions.

A suitable child restraint properly installed and used in one of the rear seating positions provides the highest degree of protection for infants and small children in most accident situations.

Commercially available child seats complying with U.S. Federal Standard FMVSS 213 (or in Canada CMVSS 213) are required to be capable of being installed with a lap belt or with the lap belt portion of a combination lap-shoulder belt.

Because improperly or inadequately installed child restraint systems can increase the risk of injury to children in accidents, always carefully read and follow all instructions on installation and use that come with the system.

Children must be positioned so that

the shoulder belt does not contact or remain in front of the face, chin, neck or throat. Failure to follow this precaution can increase the risk or severity of injury in the event of a collision.

In summary:

Children who are less than 12 years old should sit in the rear.

For reasons of safety, a child should only occupy the front seat if all of the rear seating positions are already occupied by other children.

The children should wear, depending on age, either a child restraint system or the existing safety belts.

- Infants or toddlers should be secured with a child restraint system designed for their size.

- Children at about six years old and older may wear lap belts.

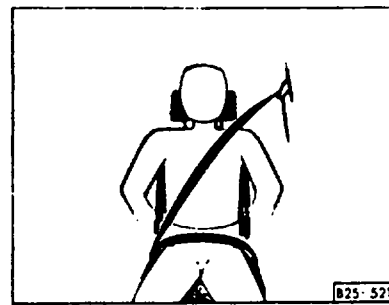
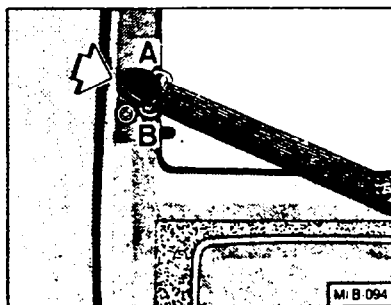
- If the child is big enough to wear a combination lap/shoulder belt, make sure that the shoulder belt is positioned midway over the shoulder — never across the neck of the child. See illustration on next page.

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Belt Warning System

An audio-visual warning system is interconnected with the driver's safety belt.

Every time the ignition is turned on, the safety belt warning light will come on for about six seconds as a reminder to buckle up. If the driver does not fasten the safety belt, the chime will also come on for six seconds. With the driver's door closed, the chime will go off as soon as the driver has buckled up.



Adjusting the Shoulder Seatbelt

There are two fastening points on the center pillar for the front safety belts to accommodate the height of the driver and the front passenger. On your vehicle, the belts are attached at the upper point (A).

- To lower the belt, remove cap at belt anchor (arrow) and remove hexagon bolt.
- Remove plug and washer at point (B).
- Place belt at lower point and fasten with hexagon bolt.
- Tighten bolt and replace cap.
- Install plug and washer at point (A).

Lap-Shoulder Belt

The combination lap-shoulder belt is equipped with a locking retractor. The system adjusts automatically to your size and movements as long as the pull on the belt is slow.

Hard braking or a collision locks the belt. The belt will also lock when you drive up or down a steep hill or in a sharp curve.

- To fasten, grasp belt tongue and pull belt in continuous slow motion across your chest and lap.

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- Insert belt tongue into buckle on inboard side of seat. Push down until it is securely locked with an audible click. Pull belt to check.
- Pull shoulder section to make sure belt fits snugly across the pelvis.
- The shoulder belt must be positioned midway over the shoulder — **it must never rest against the neck.** See illustration.
- Belts should fit snugly across the pelvis and chest. **Make sure any slack is wound up on the retractor.**
- Adjust height of belt anchorage is necessary. Do not wear shoulder part of belt under your arm or otherwise out of position. This would increase the possibility of serious injury in case of an accident.

Always heed WARNINGS on page 12-13.

- To unfasten belt, push in release button on buckle. Belt will spring out of buckle.
- To release a locked belt, lean back to take the body pressure off the belt.
- To store lap-shoulder belt, allow belt to wind up on retractor as you guide belt tongue to its stowed position.

WARNING

To reduce the risk of injury in an accident, position the lap belt as low as possible on the pelvis.

Lap Belts*

The automatic retractor will lock the lap belt when your passenger has buckled up, and the remaining slack has been retracted. Make sure any slack is wound on the retractor.

The belt can only be pulled out after it is fully retracted.

*where applicable

- To fasten lap belt, grasp belt tongue on outboard side of seat and slowly and evenly pull across the pelvis. Insert belt tongue into the respective buckle and push down until it is securely locked with an audible click. Pull belt to check.
- To unfasten belt, push release button on buckle.

During Pregnancy

Pregnant women should always wear combination lap/shoulder belts. The lap belt portion must be worn snugly and as low as possible across the pelvis. To avoid pressure on the abdomen the belt must never pass over the waist.

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