

1092

CAL REPORT NO. 7581-2

CRASHWORTHINESS TESTING AND ANALYSIS
25 MPH FRONTAL BARRIER IMPACT

1987 Hyundai Excel GSL
4-Door Hatchback

CALSPAN TEST NO. Y23-1-793

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
P.O. BOX 400
BUFFALO, NY 14225

OCTOBER 20, 1987



FINAL REPORT

Prepared for:

U. S. DEPARTMENT OF TRANSPORTATION
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION
TRANSPORTATION SYSTEMS CENTER
KENDALL SQUARE
CAMBRIDGE, MA 02142

Rec'd
2/22/88
Bak

This Test Report was prepared for the U.S. Department of Transportation, Research and Special Programs Administration, under Contract No. DTRS57-87-C-00047. 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.

Prepared by:

David J. Travale
David J. Travale, Project Engineer

Approved by:

Walter E. Levan
Walter E. Levan, Program Manager

FINAL REPORT ACCEPTED BY:

Contract Technical Manager

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1 Report No 7581- 2		2 Government Accession No		3 Recipient's Catalog No	
4 Title and Subtitle Crashworthiness Testing & Analysis, 25 mph Frontal Barrier Impact, 1987 Hyundai Excel GLS 4-Door Hatchback				5 Report Date October 20, 1987	
				6 Performing Organization Code CAL	
7. Author(s) David J. Travale, Project Engineer Walter E. Levan, Program Manager				8 Performing Organization Report No 7581-2	
9 Performing Organization Name and Address Calspan Advanced Technology Center P.O. Box 400 Buffalo, NY 14225				10 Work Unit No Y23-010-793	
				11 Contract or Grant No DTRS57-87-C-00047	
				13 Type of Report and Period Covered Final Report October 1987	
12 Sponsoring Agency Name and Address U. S. Department of Transportation Research and Special Programs Administration Transportation Systems Center Kendall Square, Cambridge, MA 02142				14 Sponsoring Agency Code DOT/NHTSA/NRD	
15 Supplementary Notes					
16 Abstract A frontal load cell barrier test of a 1987 Hyundai Excel GLS 4-Door Hatchback was performed at the Calspan Corporation, Advanced Technology Center Crash Test Facility in Buffalo, New York, on October 20, 1987. Impact speed was 24.7 mph and the ambient temperature at the barrier face at the time of impact was 59°F. Un unrestrained Hybrid III dummy was used for the test.					
17 Key Words 25 mph Frontal Barrier Impact Test Crashworthiness			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	

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	PURPOSE AND TEST PROCEDURE	1-1
2	SUMMARY OF FRONTAL BARRIER IMPACT TEST	2-1
3	OCCUPANT AND VEHICLE INFORMATION	3-1
Appendix A	PHOTOGRAPHS	A-1
Appendix B	VEHICLE, LOAD CELL BARRIER DATA, AND DUMMY RESPONSE DATA	B-1

LIST OF FIGURES

<u>Figure No.</u>		<u>Page No.</u>
1	Occupant Clearance Dimensions	3-5
2	Summary of Vehicle Accelerometer Data . . .	3-8
3	Pre- and Post-Test Accelerometer Locations .	3-9
4	Camera Positions for Frontal Impacts	3-10
5	Vehicle Target Locations	3-12
6	Load Cell Locations on Fixed Barrier	3-13
7	Pre- and Post-Test Measurement Points . . .	3-15

LIST OF TABLES

<u>Table No.</u>		<u>Page No.</u>
1	General Test and Vehicle Data	3-1
2	Dummy Injury Criteria Values	3-6
3	Laceration Index Values	3-7
4	High-Speed Camera Locations	3-11
5	Test Vehicle Frontal Profile Data	3-14
6	Occupant Compartment Geometric Measurements Recording Form	3-19

Section 1
PURPOSE AND TEST PROCEDURE

This 25 mph frontal barrier impact test is part of the Crashworthiness Testing and Analysis Program sponsored by the Research and Special Programs Administration under Contract No. DTRS57-87-C-00047. The purpose of this test is to obtain and analyze responses from vehicles and unrestrained Hybrid III dummies during a frontal car-to-barrier crash.

Section 2
SUMMARY OF TEST

A load cell barrier was impacted by a 1987 Hyundai Excel GLS 4-Door Hatchback at a velocity of 24.7 mph. The test was performed at the Calspan Corporation Advanced Technology Center on October 20, 1987. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact was documented by one real-time camera and 11 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

The load cell barrier consisted of 36 load cells. The outermost column of load cells (see Figure 6) on either side of the barrier was not used leaving a total of 28 cells from which readings were obtained.

One Hybrid III 50th percentile unrestrained male anthropomorphic test device (ATDs) was placed in the driver seating position, according to dummy placement instructions specified in Laboratory Indicant Test Procedure.

The ATD was fully instrumented with head and chest triaxial accelerometers, upper and lower 6-axis force transducers in the neck, chest potentiometer, abdominal pressure transducer, right/left femur load cells, right/left tibia load cells, and right/left knee shear transducers.

The 92 channels of data were recorded on eight 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier, and dummy response data traces. The data from vehicle accelerometer packs 5 (X), 5 (Z), and 9 (X) is questionable after 70 msec., 70 msec. and 35 msec. respectively. The suspected cause is data transmission wires being cut or pinched during vehicle impact.

The driver's head struck the steering wheel rim and dashboard. The driver's HIC was 1451. The maximum chest deceleration over 3 milliseconds was 54.5 g's and femur loads were 1671 and 1208 pounds. The Laceration Index (TLI) equaled 1.0.

Table 1

GENERAL TEST AND VEHICLE DATA

Vehicle Year/Make/Model/Body Style 1987 Hyundai Excel GSL 4-Door HatchbackNHTSA No. Y23-010-793 VIN. KMHLA31J3HU146878Body Color Brown Date of Manufacture 12-86Engine: 4 cylinders; - C.I.D.; 1.5 Liters; - CC
X Gas; - Diesel; - Turbocharged
- Longitudinal; X TransverseTransmission 5 Speed X Manual - Automatic - Overdrive
Final Drive; X Front Wheel; - Rear Wheel; - Four WheelX A/C; X P/S; X P/B; - P/wdo.; - Tilt Wheel
- P/seats; - Cruise ControlType of Occupant Restraint 3-point continuous beltDATA RECORDED FROM VEHICLE'S TIRE PLACARD:Tire Pressure (at capacity): Front 30 psi, Rear 30 psiRecommended Tire Size: P155/80R13Recommended Cold Tire Pressure: Front 30 psi, Rear 30 psiTires on Vehicle: P155/80R13; Manufacture: GoodyearNumber of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 TOTALType of Front Seats: X Bucket; - Bench; - Split BenchType of Front Seat Back: - Fixed; X Adj. With X Lever - Rot. KnobVehicle Capacity Weight (VCW) = 816 lbs. (A)No. of Occupants x 150 lbs. = 750 lbs. (B)Rated Cargo and Luggage
Weight (RCLW) A-B = 66 lbs.GVWR 3185 lbs. GAWR: Front 1653 lbs. Rear 1587 lbs.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS) = UDW

Right Front = 750 lbs. Right Rear = 470 lbs.
Left Front = 720 lbs. Left Rear = 450 lbs.
TOTAL FRONT WEIGHT = 1470 lbs. (62 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 920 lbs. (38 % of Total Vehicle Weight)
TOTAL DELIVERY WEIGHT = 2390 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES

Right Front = 680 lbs. Right Rear = 570 lbs.
Left Front = 760 lbs. Left Rear = 650 lbs.
TOTAL FRONT WEIGHT = 1440 lbs. (54 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1220 lbs. (46 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 2660 lbs.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (ont'd)

POST-IMPACT DATA

Type of Test Frontal Barrier Impact Angle 0

Date of Test 10/8/87 Time of Test 11:10

Ambient Temperature 59 °F. at impact area

Temperature in Occupant Compartment 70 °F.

Windshield Molding Temperature -- °F.

Required Impact Velocity Range: 24.5 to 25.5 mph

Impact Velocity: primary = 24.7 mph, secondary 24.7 mph

Distance From Front Bumper to Barrier Face When Entering Speed Trap 52 inches; Exiting Speed Trap 12 inches

VISIBLE DUMMY CONTACT POINTS

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Steering Rim/Dash</u>	<u>N/A</u>
Chest	<u>None</u>	<u></u>
Abdomen	<u>Lower Rim</u>	<u></u>
Left Knee	<u>Dash</u>	<u></u>
Right Knee	<u>Dash</u>	<u></u>

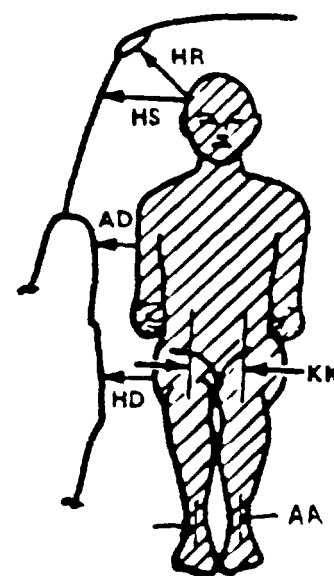
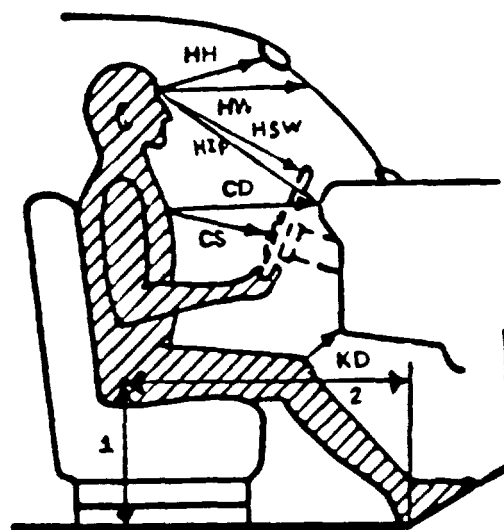
Table 1
GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Door Opening	<u>operable</u>	<u>operable</u>	<u>operable</u>	<u>operable</u>
	<u>Front</u>		<u>Rear</u>	
<u>Seat Movement</u>	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Seat Back Failure	<u>None</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Seat Shift (in.)	<u>None</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

Figure 1 OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	11.0	--
HW	17.8	--
CD	18.8	--
CS	11.7	--
KDL	5.1	--
KDR	6.0	--
SA	21.0	--
TA	23.0	--
HIP	21.2	--
HSW	16.7	--
1	11.0	--
2	36.6	--
ULA	108°	--
LLA	225°	--

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
 HIP = Head to Instrument Panel
 HSW = Head to Steering Wheel
 1 = H-Point to toeboard/floorboard intersection vertical
 2 = H-Point to toeboard/floorboard intersection horizontal
 ULA = Upper leg angle
 LLA = Lower leg angle



All angles are taken relative to the vertical

HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door
 KK = Knee to Knee
 AA = Ankle to Ankle
 DT = Dummy Temperature °F

	DRIVER	PASSENGER
HR	5.5	--
HS	8.3	--
AD	4.1	--
HD	7.0	--
KK	9.3	--
AA	12.2	--
DT	72.2	--

Table 2
DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R *
DUMMY (1)	-174	-17	-30	174	60	11	-21	54.5
DUMMY (2)								
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	1208	1671
DUMMY (2)		
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)	N/A	N/A	N/A
DUMMY (2)			
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**			
	HIC	t ₁ (SEC)	t ₂ (SEC)	AVE. ACC. (g) t ₁ TO t ₂
DUMMY (1)	1451	0.08535	.09585	114
DUMMY (2)				
DUMMY (3)				
DUMMY (4)				

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO 208

Table 3 LACERATION INDEX VALUES

Record of cuts through leathers and in PVC skull cap.

Cuts Through Leathers				Cuts in PVC		
Outer Leather		Inner Leather		No. of Cuts (N)	Length (S) (mm)	Depth (d) (mm)
No. of Cuts (N)	Length (S) (mm)	NS ²	No. of Cuts (N)	Length (S) (mm)		NS ² d ³
0			0			
A = 0		B = 0		C = 0		

$$TLI = 1 + \log_{10} \left[1 + 1.16 (A) + 50.8 (B) + 16500 (C) \right] = 1$$

$$A = \sum N_1 S^2$$

$$B = \sum N_2 S^2$$

$$C = \sum N_3 S^2 d^3$$

Note: If there are no lacerations through the outer layer

Length of cut(s) completely through leather to nearest mm.

Length of cut(s) in PVC to nearest mm.

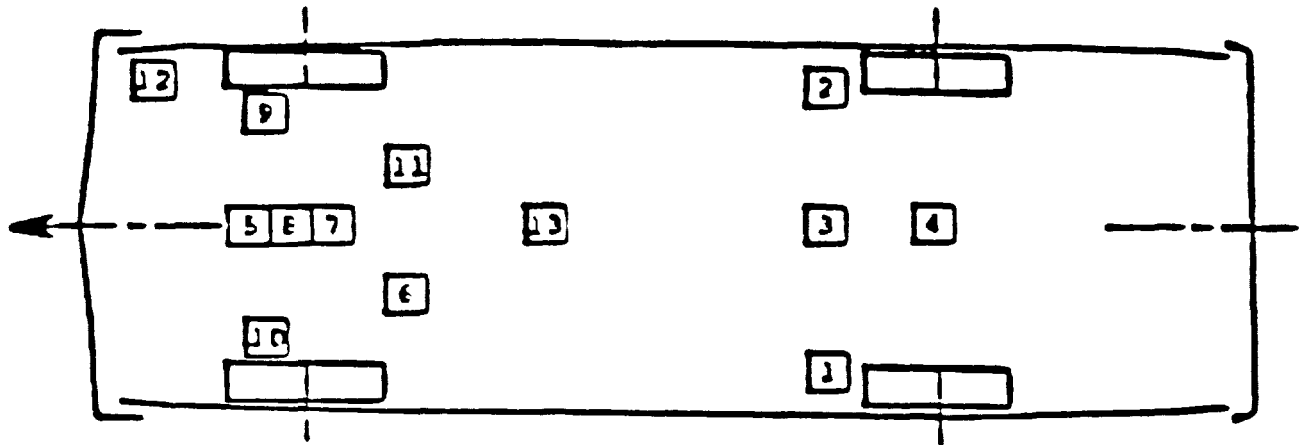
Depth of cut(s) in PVC to nearest mm.

TLI = 0 If there is no damage to outer leather

TLI = 1 If there are abrasions but no penetrating

laceration to outer leather

Figure 2 SUMMARY OF VEHICLE ACCELEROMETER DATA



Vehicle: 1987 Hyundai Excel GLS 4-Door Hatchback

Loc. No.	Description	Direction	Maximum Value (g's)	
			X-Y	X-Z
1	Rear seat X-member - left side primary	X	-30	3
1*	Rear seat X-member - left side redundant	X	-104	5
2	Rear seat X-member - right side primary	X	-29	2
2*	Rear seat X-member - right side redundant	X	-29	2
3	Rear seat X-member - centerline	X	-31	4
3	Rear seat X-member - centerline	Y	-1	2
3	Rear seat X-member - centerline	Z	-18	13
4	Rear axle centerline	X	-28	6
4	Rear axle centerline	Z	-8	10
5	Top of engine block	X	-57	17
5	Top of engine block	Z	-40	43
6	Steering wheel hub	X	-183	10
6	Steering wheel hub	Z	-36	120
7	Front suspension X-member	X	-33	3
7	Front suspension X-member	Z	-6	34
8	Bottom of engine	X	-70	8
9	Right front brake caliper	X	-48	293
10	Left front brake caliper	X	-37	4
11	Instrument panel	X	-67	52
11	Instrument panel	Z	-62	49

*Mounted on rubber isolation pad.

Figure 3

**PRE- AND POST-TEST POSITION OF TEST VEHICLE
ACCELEROMETER MOUNTING LOCATIONS**

Test Description: 25 mph Frontal Barrier Impact

Test Vehicle: 1987 Hyundai Excel GLS 4-Door Hatchback

Reference Plane: Vertical plane at rear bumper

Accelerometer Description	Longitudinal Location		
	Pre-Test	Post-Test	Change
Rear seat A-member - left side primary	107	107	0.0
Rear seat X-member - left side redundant	107	107	0.0
Rear seat X-member - right side primary	107	107	0.0
Rear seat X-member - right side redundant	107	107	0.0
Rear seat X-member - centerline	107	107	0.0
Rear axle centerline	52.2	52.2	0.0
Top of engine block	137.2	133.8	3.4
Steering wheel hub	91.9	93.2	1.3
Front suspension X-member	119.2	117.0	2.2
Bottom of engine	134.1	130.2	3.9
Right front brake caliper	124.5	121.3	3.2
Left front brake caliper	124.5	121.3	3.2
Instrument panel	102.5	102.1	0.4

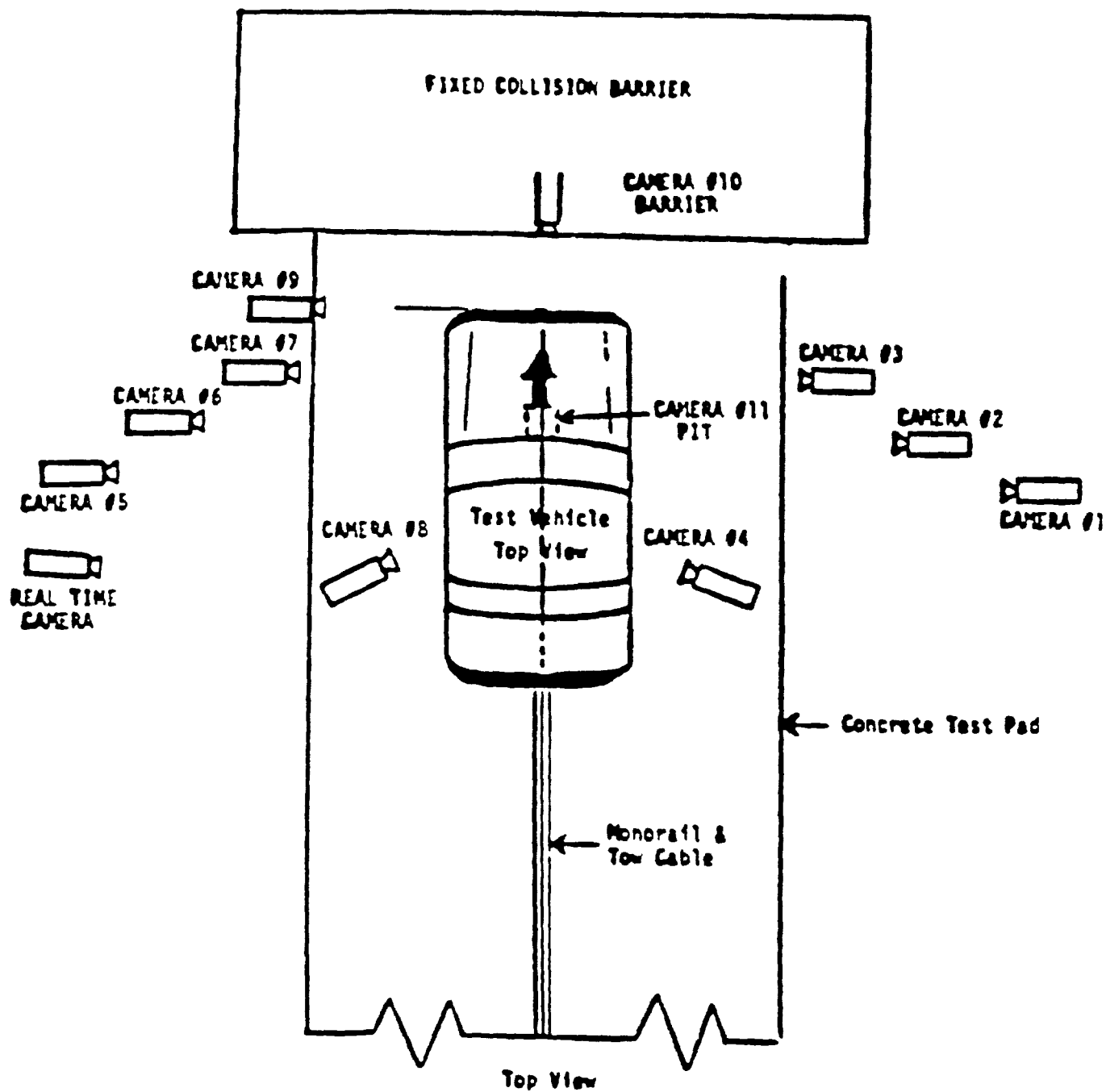


Figure 4 CAMERA POSITIONS FOR FRONTAL IMPACTS

Table 4 HIGH-SPEED CAMERA LOCATIONS

Vehicle 1987 Hyundai Excel GLS 4-Door Hatchback

Test No. Y23-010-793

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)
		X	Y	Z	
1	Vehicle and Barrier Right	226.0	62.0	47.5	2
2	Vehicle Front Half Right	269.5	49.0	48.0	2
3	Right Front Passenger	244.0	38.0	41.0	2
4	Right Front Passenger	96.0	93.0	69.0	16
5	Vehicle and Barrier Left	392.0	60.0	51.0	5
6	Vehicle Front Half Left	281.0	35.5	43.5	5
7	Driver	199.5	13.0	41.0	6
8	Driver	103.0	97.0	71.5	17
9	Vehicle Bumper and Pole	27.0	-5.0	72.0	32
10	Front View (Barrier)	0	28.0	223.0	-90
11	Front Underbody (Pit)	0	25.0	-85.0	90

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

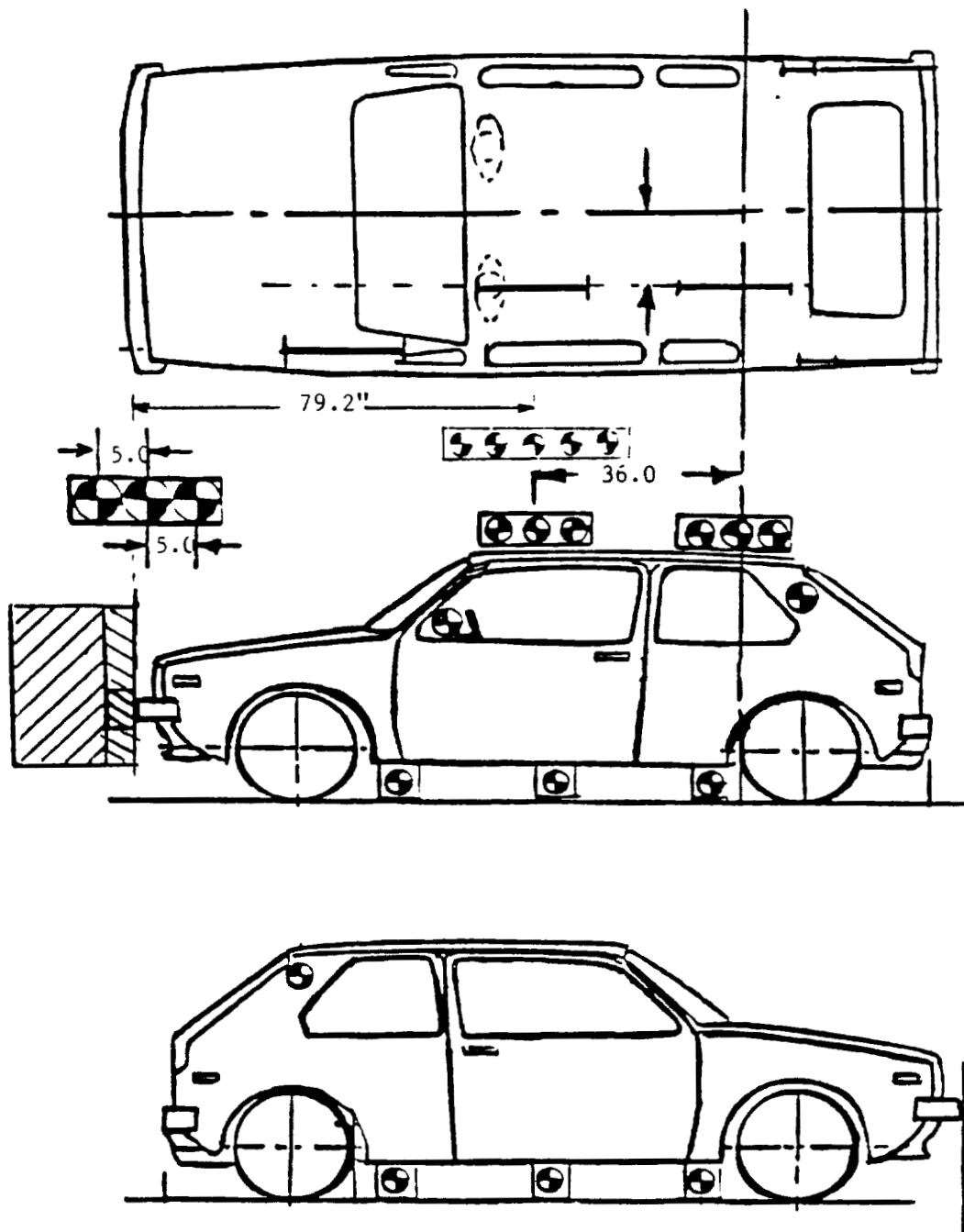
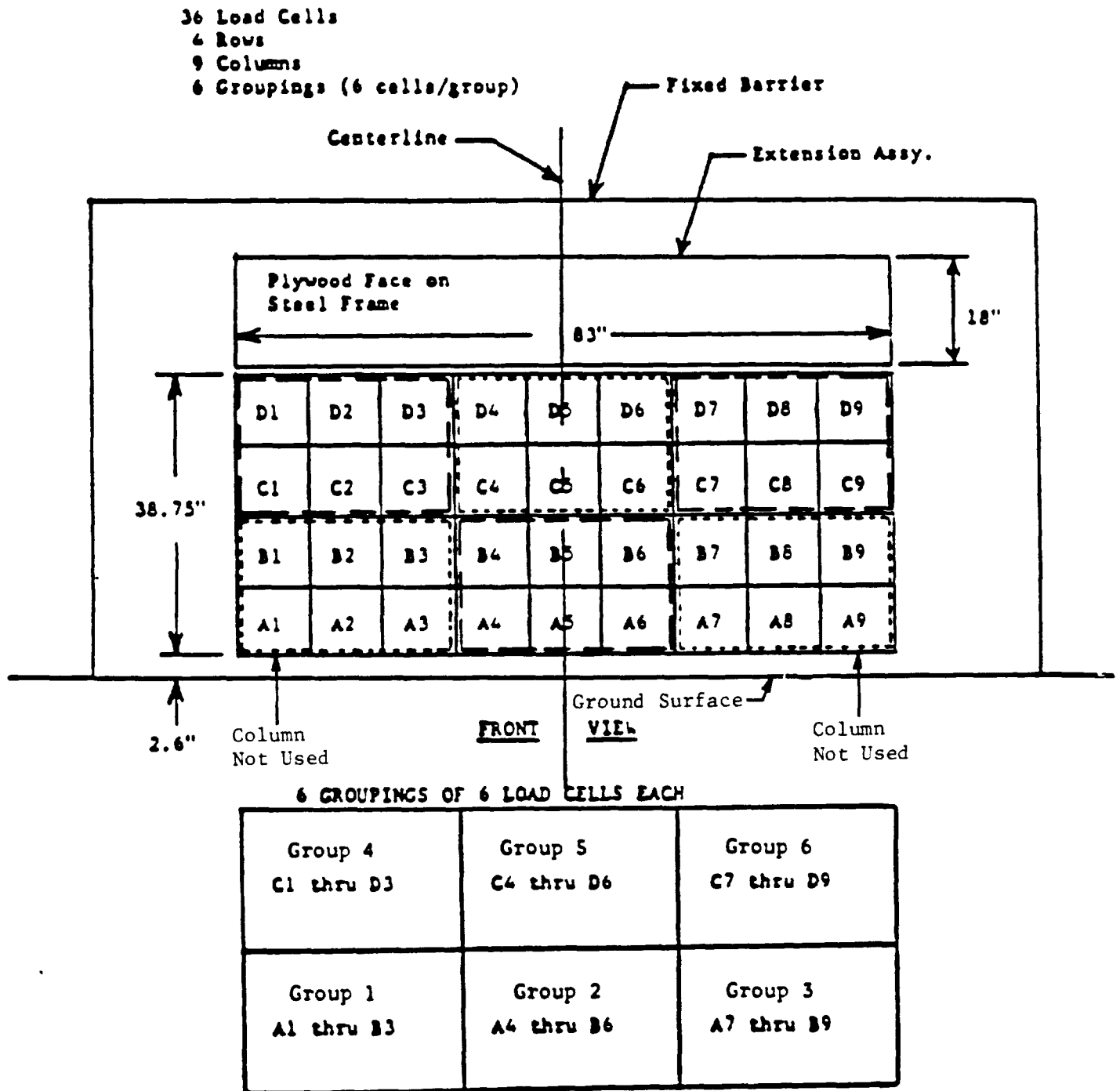


Figure 5 VEHICLE TARGET LOCATIONS

Figure 6 LOAD CELL LOCATIONS ON FIXED BARRIER



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)

Table 5 TEST VEHICLE FRONTAL PROFILE DATA

X-axis measurements referenced to the front bumper
centerline Y-axis measurements are in inches left and right of the vehicle
centerline Z-axis (height) measurements are from the ground

MAKE/MODEL Hyundai Excel GLS
4-Door Hatchback

YEAR 1987 VIN

TEST# Y23-010-
793

Vehicle Width = 56.5

PRE-TEST

Y-axis Position---		Vehicle Left				Vehicle Right		
Profile Level		27.65	16.65	5.65		5.65	16.65	27.65
Top of front bumper	X Z 19	3.3	.9	.1	0	.1	.9	3.3
Center of grille	X Z 25	7.9	5.3	5.0	4.9	5.0	5.3	7.9
Front of hood	X Z 28	9.1	6.4	5.7	5.6	5.7	6.4	9.1

POST-TEST

Y-axis Position---		Vehicle Left				Vehicle Right		
Profile Level		27.65	16.65	5.65		5.65	16.65	27.65
Top of front bumper	X Z 19.5	14.4	12.9	12.6	12.5	12.6	12.9	14.4
Center of grille	X Z 24.6	15.1	15.0	14.7	14.6	15.1	15.0	16.5
Front of hood	X Z 27.8	15.2	14.9	14.7	14.6	16.2	15.5	16.6

CHANGE

Y-axis Position---		Vehicle Left				Vehicle Right		
Profile Level		0	0	0		0	0	0
Top of front bumper	X Z -0.5	-11.1	-12.0	-12.5	-12.5	-12.5	-12.0	-11.1
Center of grille	X Z 0.4	-7.2	-9.7	-9.7	-9.7	-10.1	-9.7	-8.6
Front of hood	X Z 0.2	-6.1	-8.5	-9.0	-9.0	-10.5	-9.1	-7.5

Figure 7 PRE-TEST AND POST-TEST MEASUREMENT POINTS

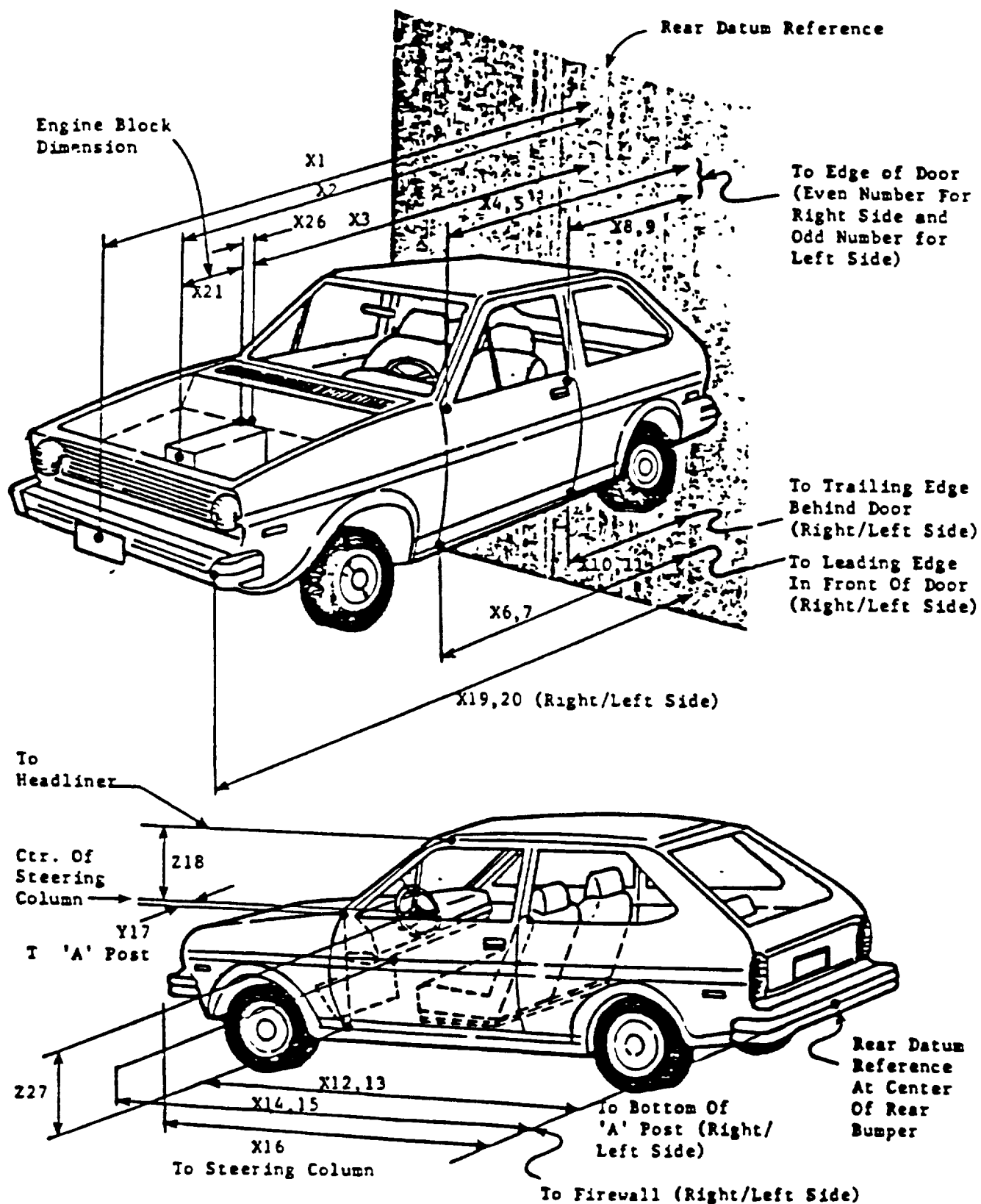


Figure 7 (cont'd)

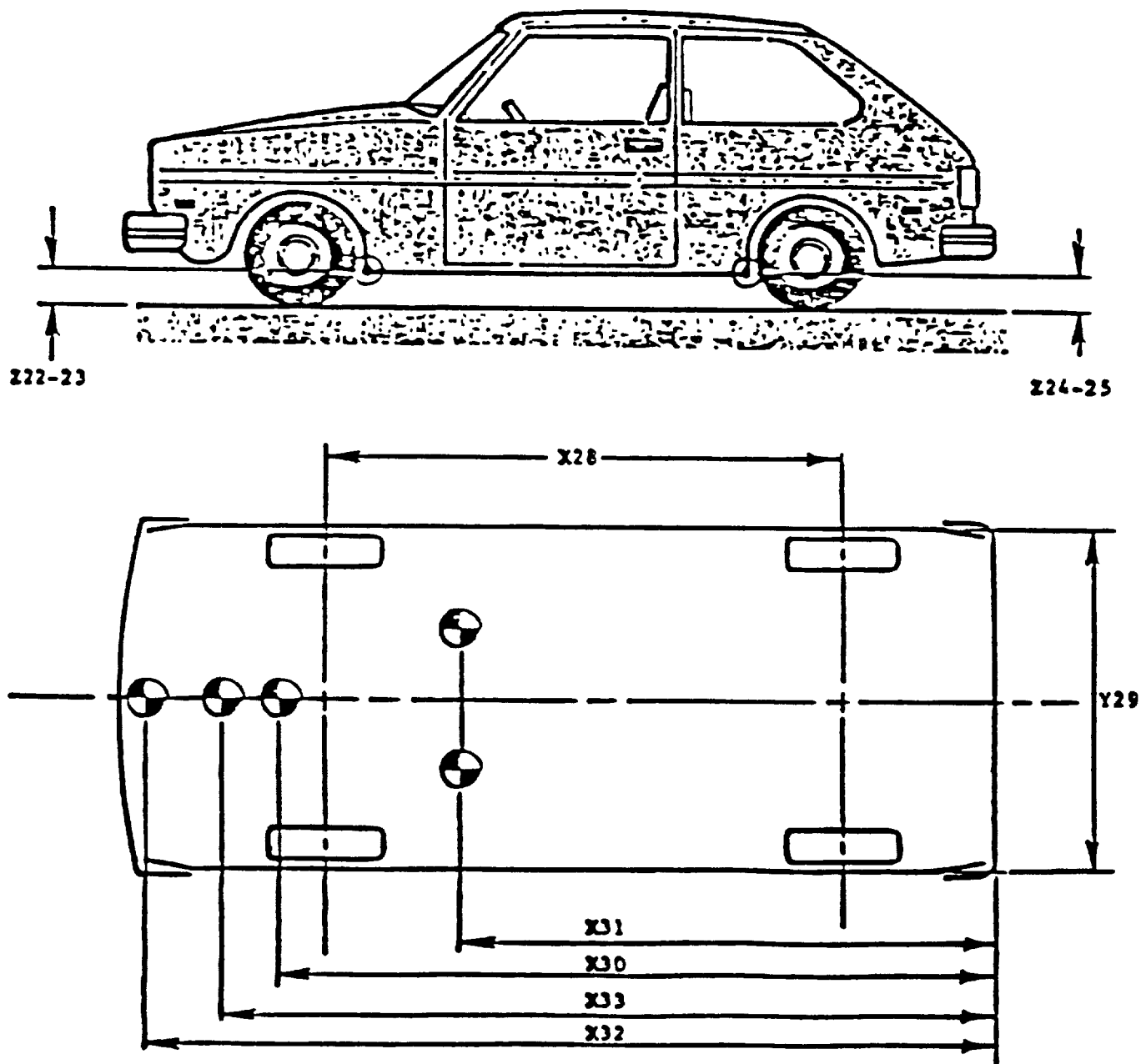


Figure 7 (cont'd)

PARTNER VEHICLE
IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL		TEST NUMBER	DIMENSIONS IN INCHES	
Hyundai Excel GLS 4-Door Hatchback		Y23-010-793		
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	
X 1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	160.2	147.5	
X 2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	137.6	147.5	
X 3	REAR SURFACE OF VEHICLE TO FIREWALL	119.1	118.7	
X 4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	109.2	109.2	
X 5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	109.5	109.2	
X 6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	107.9	107.9	
X 7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	107.5	108.0	
X 8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	70.6	70.5	
X 9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	71.0	70.5	
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	71.3	71.3	
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	71.4	72.1	
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF RIGHT SIDE	107.9	107.9	
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF LEFT SIDE	107.5	108.6	
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	118.7	114.1	
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	119.2	115.9	
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	91.9	93.2	
Y17	STEERING COLUMN TO "A" POST	15.5	15.5	

Figure 7 (cont'd)

PARTNER VEHICLE
IMPACTED VEHICLE MEASUREMENTS CONTD

VEHICLE MAKE/MODEL		TEST NUMBER	DIMENSIONS IN INCHES	
Hyundai Excel GLS 4-Door Hatchback		Y23-010-793		
NO	TYPE OF MEASUREMENT	PRE TEST	POST TEST	
Z18	REAR OF WINDSHIELD HEADER TO STEERING WHEEL CENTER	17.7	18.5	
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	158.6	145.6	
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	158.7	147.8	
X21	WIDTH OF ENGINE BLOCK	15.5	15.5	
Z22	RIGHT FRONT SILL TO GROUND PLANE	11.7	11.7	
Z23	LEFT FRONT SILL TO GROUND PLANE	11.7	11.7	
Z24	RIGHT REAR SILL TO GROUND PLANE	11.7	11.7	
Z25	LEFT REAR SILL TO GROUND PLANE	11.7	11.7	
X26	FIREWALL TO ENGINE OR TRANSAXLE	12.2	8.8	
Z27	VERTICAL DIMENSION FROM DOOR SILL TO CENTERLINE OF STEERING COLUMN	21.8	20.2	
X28	WHEELBASE OF VEHICLE	93.7	90.5	
Y29	WIDTH OF VEHICLE AT MAXIMUM WIDTH POINT	62.8	62.8	
X30	REAR SURFACE OF VEHICLE TO ENGINE TARGET	134.1	130.2	
X31	REAR SURFACE OF VEHICLE TO COMPARTMENT TARGET	82.0	82.0	
X32	REAR SURFACE OF VEHICLE TO BUMPER TARGER	153.8	144.5	
X33	REAR SURFACE OF VEHICLE TO FRAME CROSSMEMBER	119.2	117.0	

3-18

7581-2

Table 6 OCCUPANT COMPARTMENT GEOMETRIC MEASUREMENTS RECORDING FORM

Test #: Y23-010-793

VIN: KMHLA31J3HU146878

Model Year: 1987

Make: Hyundai Model: Excel GLS Body Style: 4-Door Hatchback

All Dimensions in Inches

No.		Pre-Test	Post-Test	Diff.
1A	C.L. of Front Wheel to Reference Plane (X) Driver	126.9	123.5	3.4
1B	Passenger	126.9	123.5	3.4
2	Ref. Plane to Toeboard/Floorpan Intersection	114.4	113.7	0.7
3A	Length of Seat Back W/O Headrest	21.5	-	-
3B	Length of Seat Back W/ Headrest	31.3	-	-
4	Angle of Seat Back W.R.T. Horizontal	112°	-	-
5	Top of Seat Back to Floor	28.5	-	-
6	Top of Seat Back to Reference Plane	68.0	-	-
7	Length of Seat Cushion	18.9	-	-
8	Angle of Seat Cushion W.R.T. Horizontal	14°	-	-
8A	Top of the Seat Cushion to the Floor	11.5	-	-
8B	Length of Seat Base	22.1	-	-
9	Rearmost Point of Upper Surface of Seat Cushion to Floor	7.5	-	-
10	Rearmost Point of Upper Surface of Seat Cushion to Ref. Plane	72.6	-	-
11	Angle of Steering Column W.R.T. Horizontal	150°	145°	5°
12	Length of Windshield	27	-	-
13	Angle of Windshield W.R.T. Horizontal	149°	149°	0
14	Length of Header	0.8	0.8	0
15	Angle of Header W.R.T. Horizontal	225°	225°	0
16A	Deleted			
16B	Deleted			

- indicates measurement not required

Table 6 OCCUPANT COMPARTMENT GEOMETRIC MEASUREMENTS RECORDING FORM (cont.)

		All Dimensions in Inches		
No.		Pre-Test	Post-Test	Diff.
17	Steering Wheel Pivot Point to Floor	23.5	23.6	0.1
18	Steering Wheel Pivot Point to Reference Plane	94.5	95.75	1.25
19A	Deleted			
19B	Deleted			
20A	Deleted			
20B	Deleted			
21	Foremost Point of Header to Floor	41.9	42.3	0.4
22	Foremost Point of Header to Reference Plane	90.6	90.5	0.1
23	Foremost Point of Windshield to Floor	28.7	29.6	0.9
24	Foremost Point of Windshield to Reference Plane	111.3	110.3	1.0
25	Steering Wheel Angle (indicate tilt standard)	63°	73.5°	10.5°
26	Steering Wheel Pivot Point to C.L. of Rim	2.8	-1.0	3.8
27	Steering Wheel Pivot Point to Rearmost Face of Hub	2.6	2.6	0.0
28	Radius of Steering Wheel	7.5	7.5	0.0
29	Fire Wall to Shear Capsule	10.0	6.0	4.0
30	Steering Wheel Pivot Point to Shear Capsule	17.8	16.7	1.1
31	Deleted			
32A	Distance (X) from Top Edge of Inst. Panel to Ref. Plane (Driver)	99.2	99.1	0.1
32B	Distance (X) from Midpoint of Inst. Panel to Ref. Plane (Driver)	102.3	101.3	1.0
32C	Distance (X) from Lower Edge of Inst. Panel to Ref. Plane (Driver)	105.4	105.7	0.3
32D	Distance (Y) from Top Edge of Instrument Panel to Floor (Driver)	111.3	112.9	1.6

Table 6 OCCUPANT COMPARTMENT GEOMETRIC MEASUREMENTS RECORDING FORM (cont.)

All Dimensions in Inches

No.		Pre-Test	Post-Test	Diff.
32E	Distance (Y) from Midpoint of Instrument Panel to Floor (Driver)	20.5	22.1	1.6
32F	Distance (Y) from Lower Edge of Inst. Panel to Floor (Driver)	12.1	12.5	0.4
32G	Angle of Instrument Panel Top Surface (Driver)	350°	346°	4.0°
32H	Angle of Instrument Panel Mid Surface (Driver)	95°	85°	10°
32I	Angle of Instrument Panel Lower Surface (Driver)	127°	128°	1°
32J	Distance (X) from Top Edge of Inst. Panel to Ref. Plane (Pass.)	103.4	103.0	0.4
32K	Distance (X) from Midpoint of Inst. Panel to Ref. Plane (Pass.)	102.2	102.0	0.2
32L	Distance (X) from Lower Edge of Inst. Panel to Ref. Plane (Pass.)	105.6	104.7	0.9
32M	Distance (Y) from Top Edge of Inst. Panel to Floor (Pass.)	26.5	27.5	1.0
32N	Distance (Y) from Midpoint of Inst. Panel to Floor (Pass.)	17.2	18.2	1.0
32O	Distance (Y) from Lower Edge of Inst. Panel to Floor (Pass.)	12.0	12.5	0.5
32P	Angle of Instrument Panel Top Surface (Pass.)	358°	0°	2°
32Q	Angle of Instrument Panel Mid Surface (Pass.)	94°	84°	10°
32R	Angle of Instrument Panel Lower Surface (Pass.)	123°	118°	5°
33	D - Ring Anchor to C.L. of Occupant	10.4	-	-
34	Torso Spool to C.L. of Occupant	13.8	-	-
35	Outboard Lap Belt Anchor to C.L. of Occupant	11.1	-	-
36	Inboard Lap Belt Anchor to C.L. of Occupant	10.0	-	-
37	D - Ring Anchor to Floor	34.9	-	-
38	Torso Spool to Floor	12.1	-	-
39	Outboard Lap Belt Anchor to Floor	3.0	-	-

Table 6 OCCUPANT COMPARTMENT GEOMETRIC MEASUREMENTS RECORDING FORM

(cont.)

All Dimensions In Inches

No.		Pre-Test	Post-Test	Diff.
40	Inboard Lap Belt Anchor to Floor	3.0	-	-
41	Reference Plane to D - Ring Anchor	69.0	-	-
42	Reference Plane to Torso Spool	71.4	-	-
43	Reference Plane to Inboard Lap Belt Anchor	73.3	-	-
44	Reference Plane to Outboard Lap Belt Anchor	70.6	-	-
45A	Length of Belt - Torso	34.5	-	-
45B	Length of Belt - Lap	36.8	-	-
45C	Length of Belt - Total	71.3	-	-
46	Measurement #10 with Seat in Rearmost Position	69.3	-	-
47	Measurement #10 with Seat in Foremost Position	76.6	-	-
48	Increment in Measurement #10 between Single Seat Stops	0.73	-	-
49	Number of Retractors in Restraint System (Driver)	1.0	-	-
50	Type of Buckle Tongue: Fixed or Slip (Driver)	Slip	-	-
51A	Extension on Inboard Lap Belt Buckle (Yes) or (No)	Yes	-	-
51B	If Yes, Give Length and Material of Construction	Cable 6.5	-	-
52A	Extension of D - Ring? (Yes) or (No)	No	-	-
52B	If Yes, Give Length and Material of Construction	N/A	-	-
53	Weight of Steering Column (lbs.)	-	7.14	-
54	Weight of Steering Wheel (lbs.)	-	4.06	-
55A	H - Point Position X Seat in Rearmost Position	74.4	-	-
55B	H - Point Position Y	11.0	-	-

Table 6 OCCUPANT COMPARTMENT GEOMETRIC MEASUREMENTS RECORDING FORM (cont.)

All Dimensions In Inches

No.		Pre-Test Post - Test Diff.		
55C	H - Point Position Z	6.6	-	-
56A	Toeboard Angle W.R.T. to Horizontal (Driver)	55°	73°	18°
56B	Toeboard Angle W.R.T. to Horizontal (Pass.)	65°	64°	1°
57	Distance Between Toe of Accelerator Pedal and Toeboard	4.5	-	-
58	Distance Between Heel of Accelerator Pedal and Toeboard	5.1	-	-
59	Ground to Floorboards	9.1	9.1	0.0
	Left Knee Penetration	0.0	2.0	2.0
	Right Knee Penetration	0.0	1.8	1.8
	Shear Module Movement - Upper	0.0	2.2	2.2
	Shear Module Movement - Lower	0.0	2.3	2.3
	Available Steering Column Stroke	2.7	0.0	2.7

APPENDIX A
PHOTOGRAPHS

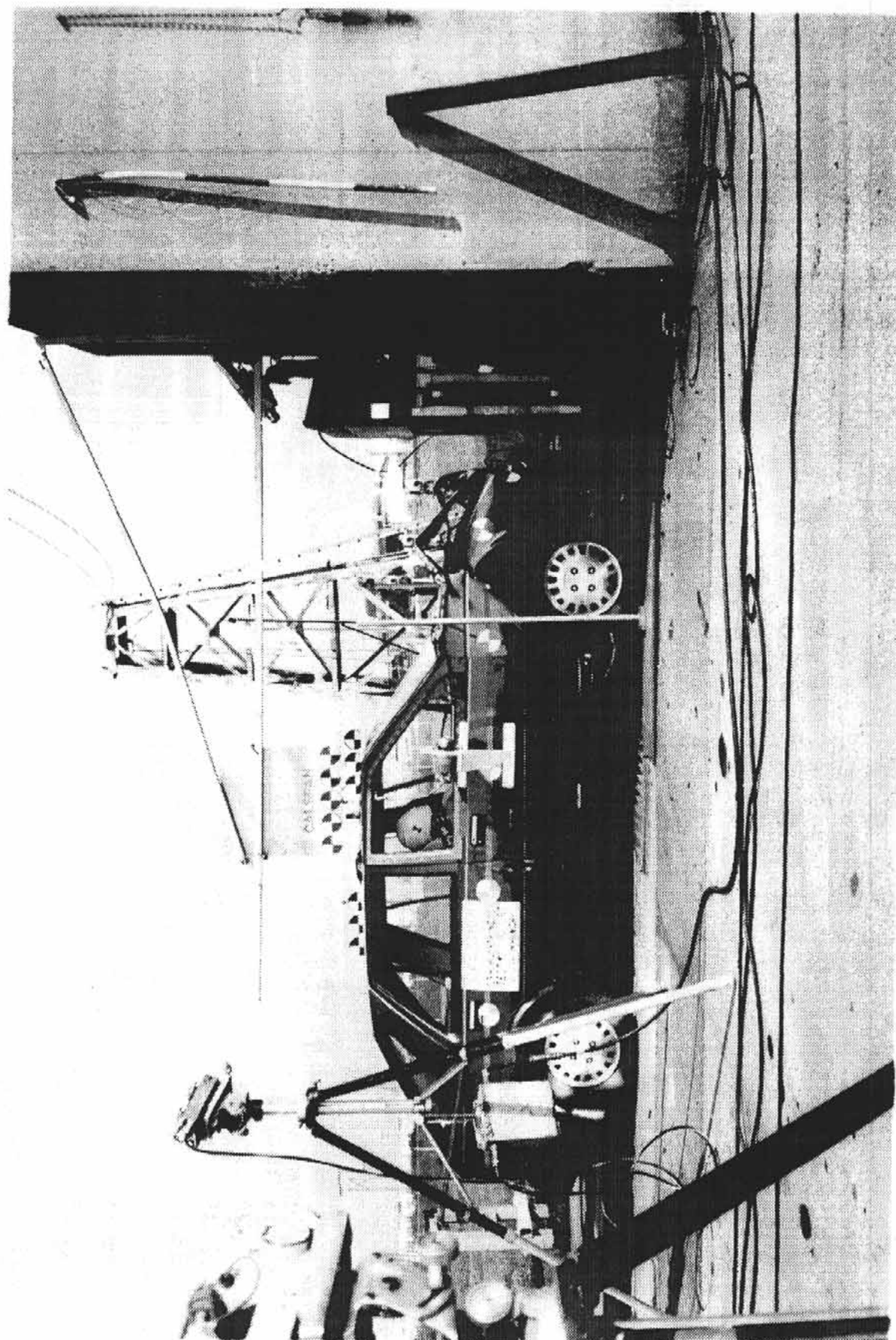


Figure A-25 VEHICLE IMPACT

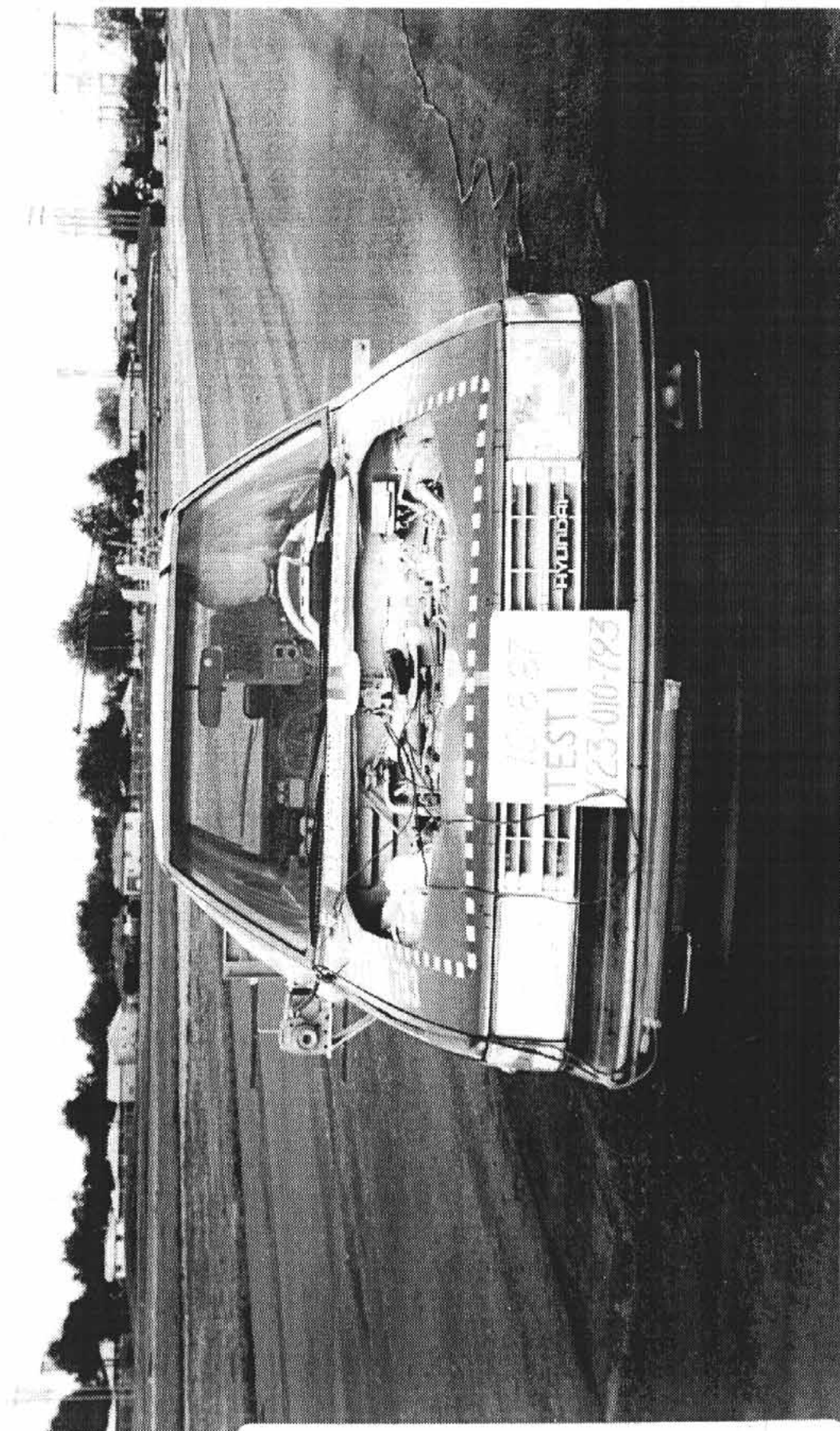


Figure A-1 PRE-TEST FRONT VIEW

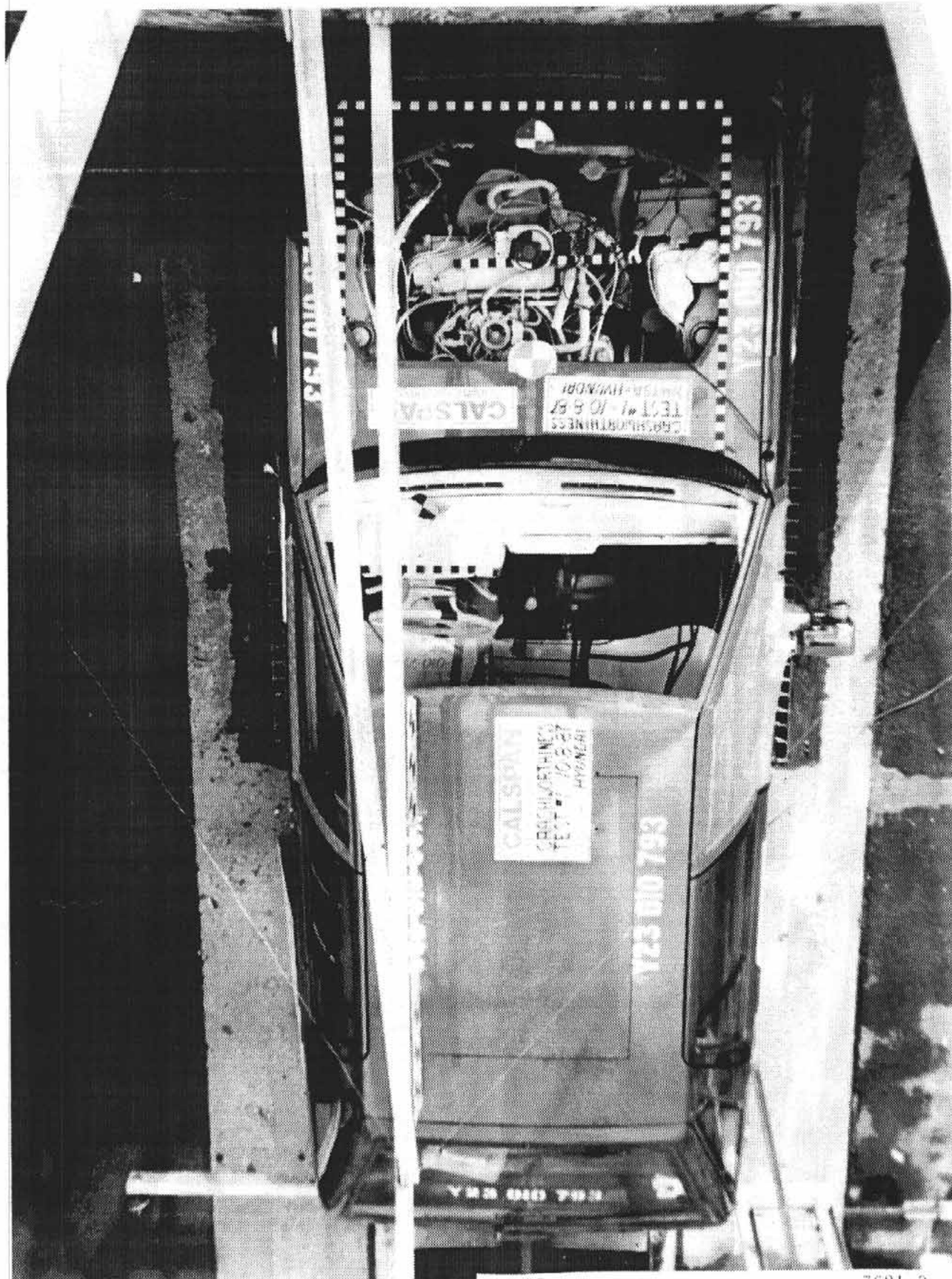


Figure A-24 PRE-TEST TOP VIEW COMPLETE VEHICLE



Figure A-2 POST-TEST FRONT VIEW

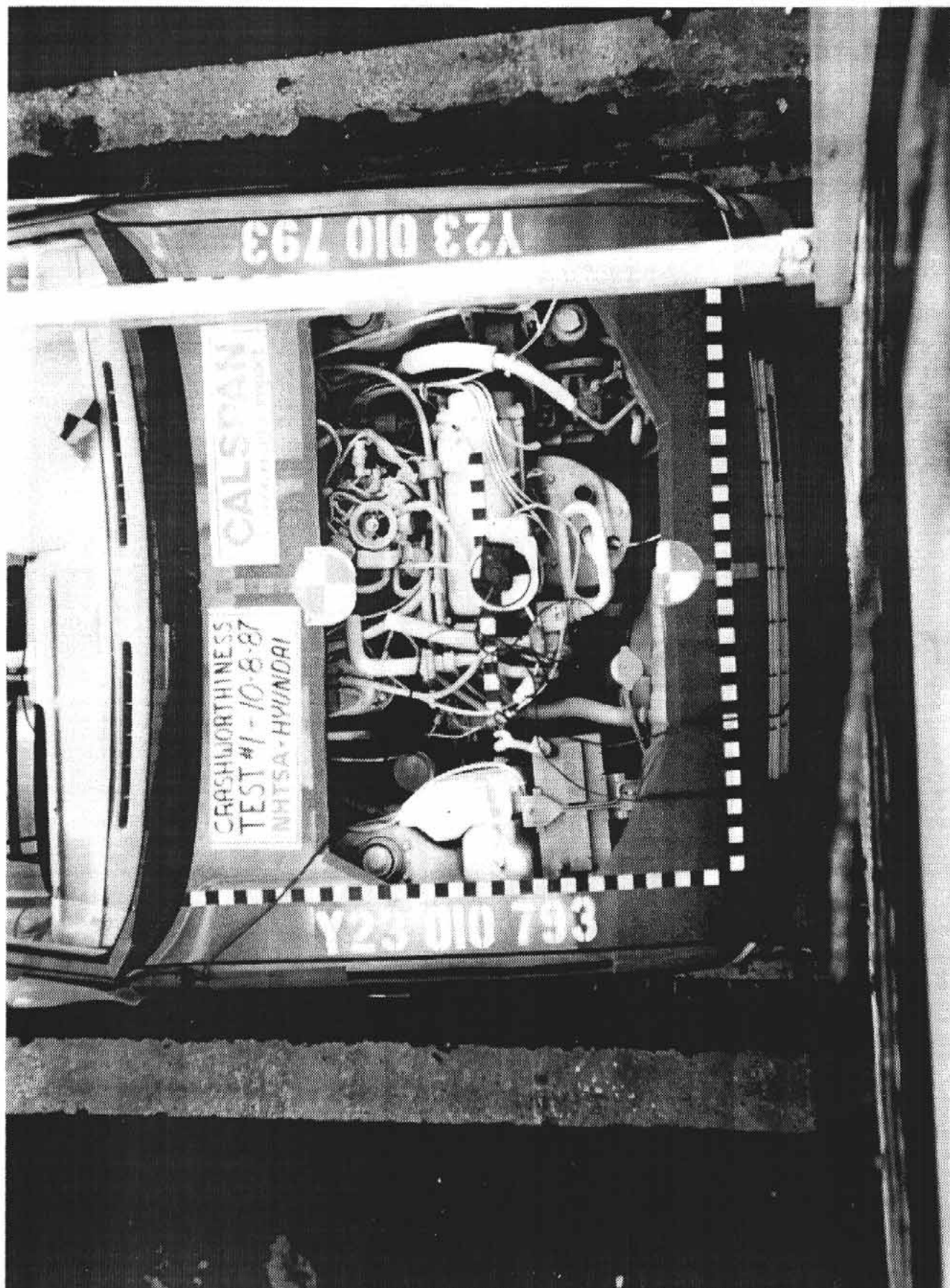


Figure A-23 PRE-TEST TOP VIEW ENGINE COMPARTMENT



Figure A-3 PRE-TEST FRONT THREE-QUARTER VIEW

A-4

7581-2



Figure A-22 POST-TEST RIGHT SIDE VIEW OCCUPANT POSITION



Figure A-4 POST-TEST FRONT THREE-QUARTER VIEW

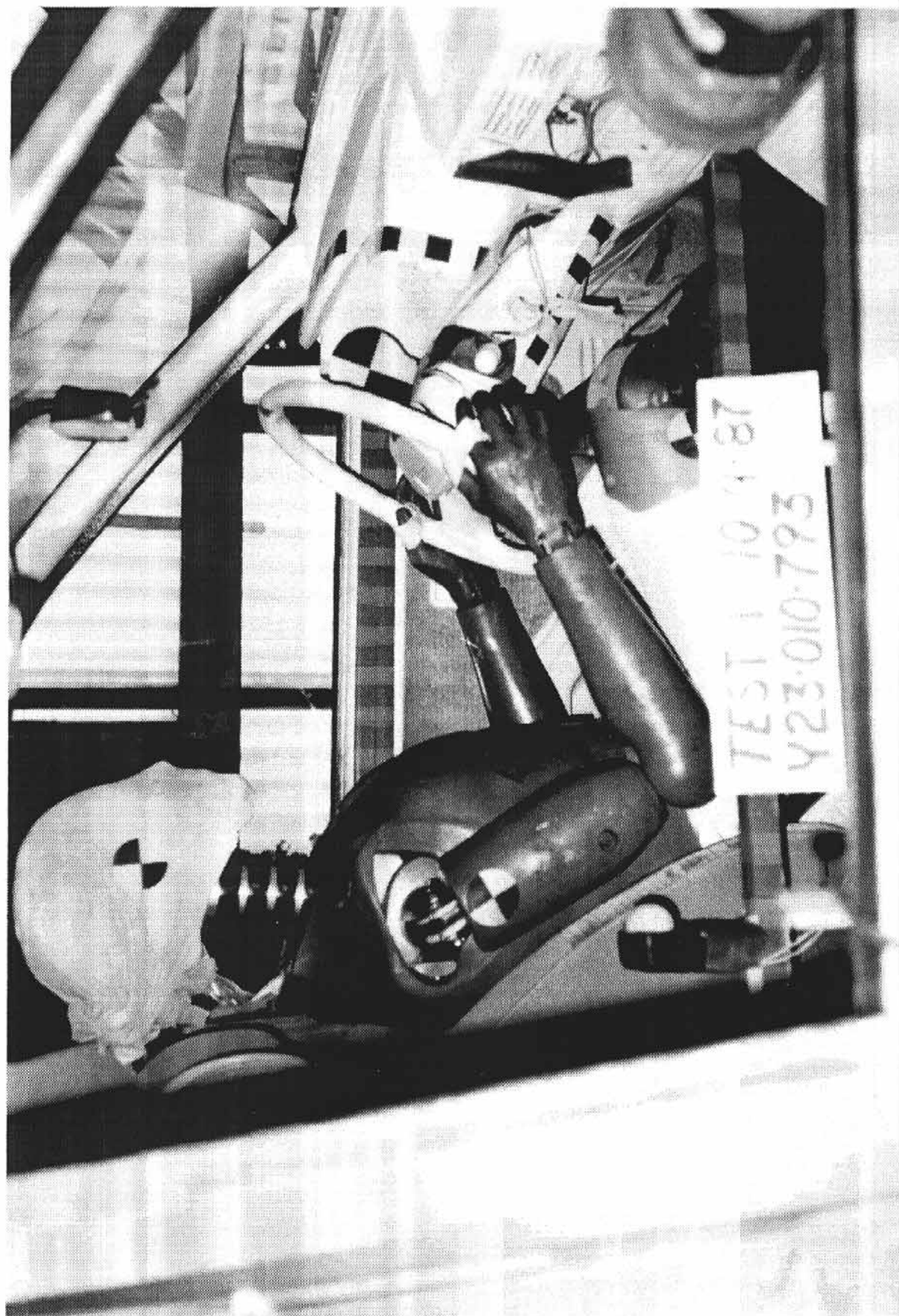


Figure A-21. PRE-TEST RIGHT SIDE VIEW OCCUPANT POSITION

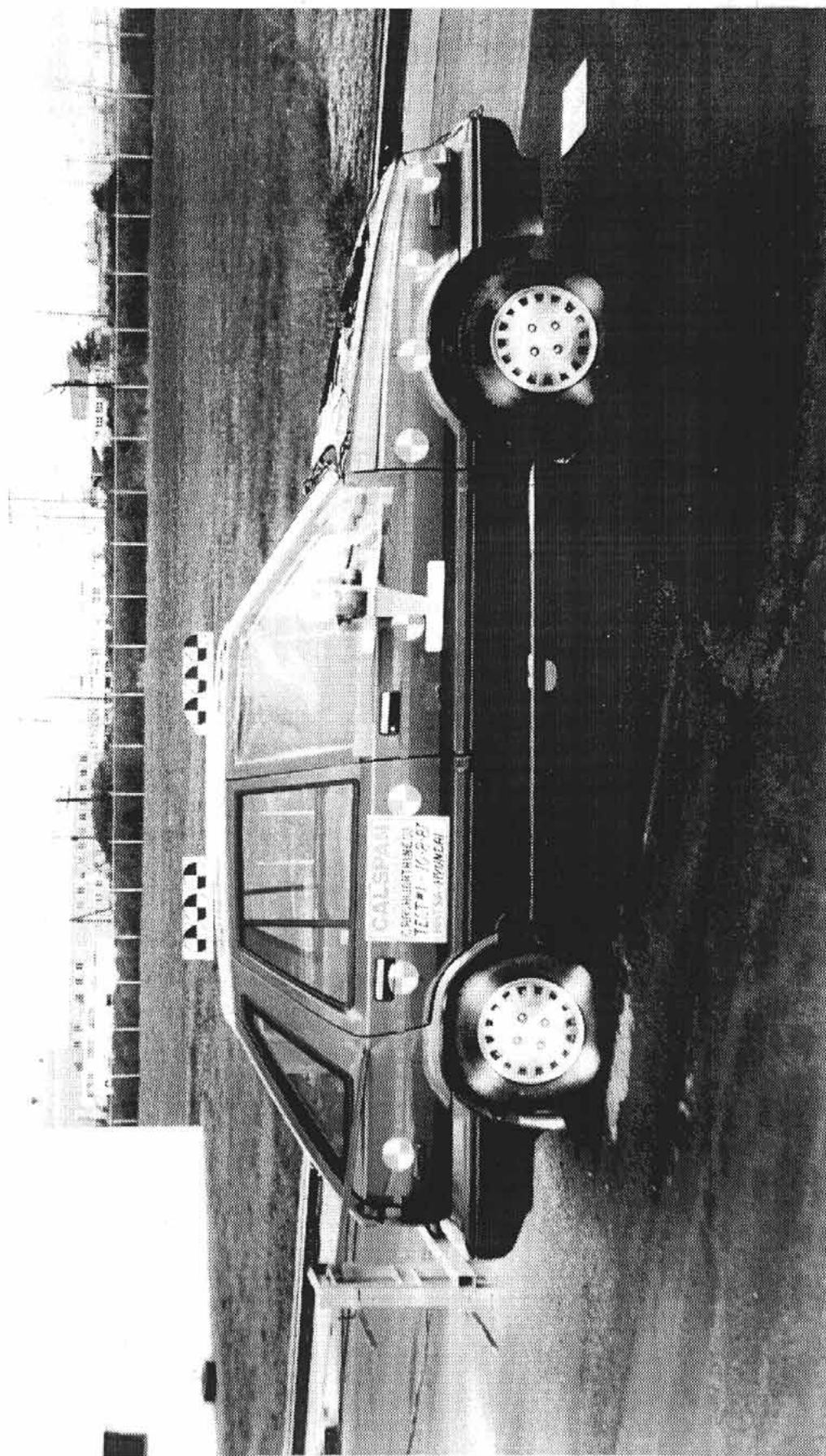


Figure A-5 PRE-TEST RIGHT SIDE VIEW

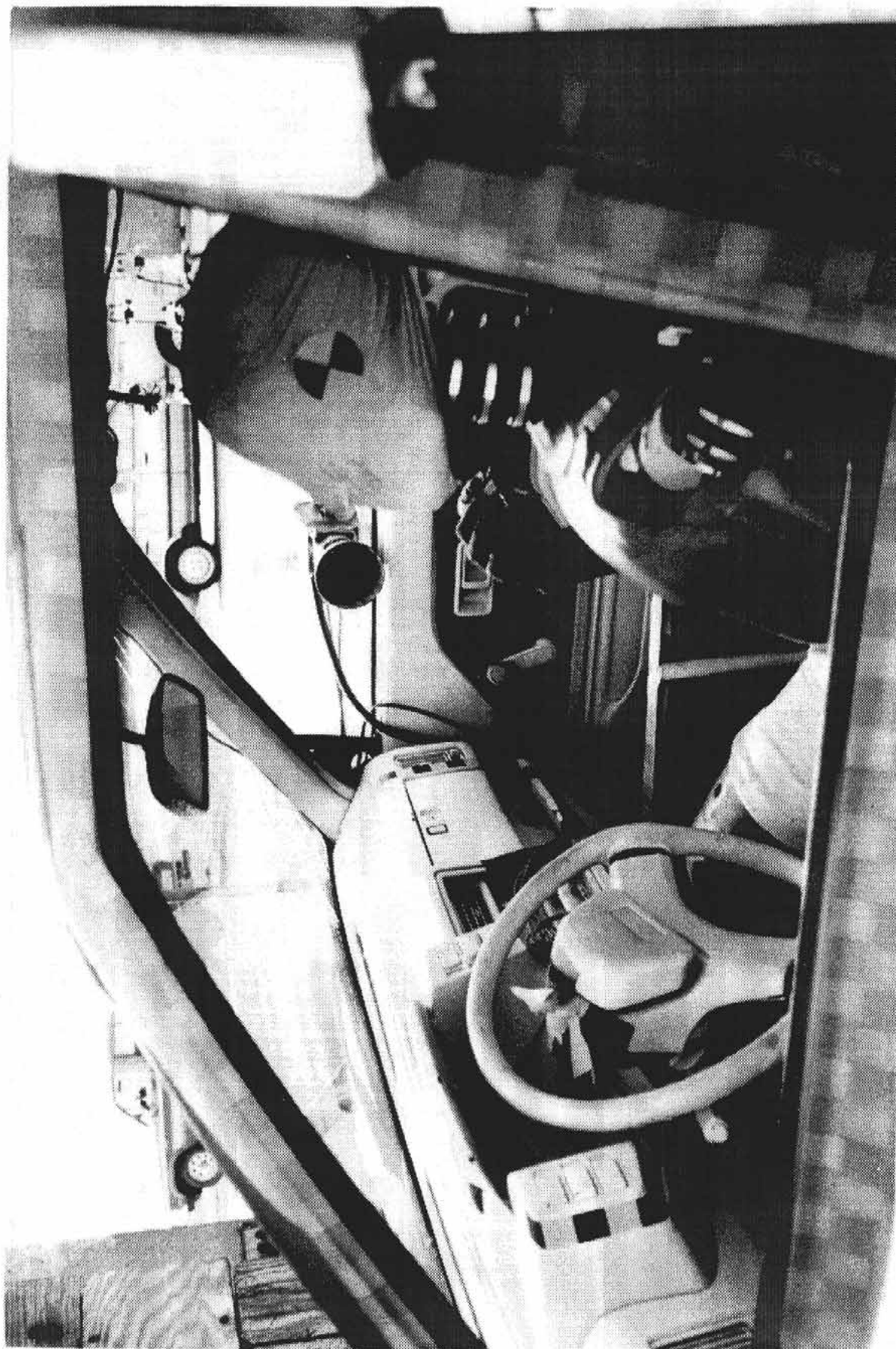


Figure A-20 POST-TEST LEFT SIDE VIEW OCCUPANT POSITION



Figure A-6 POST-TEST RIGHT SIDE VIEW

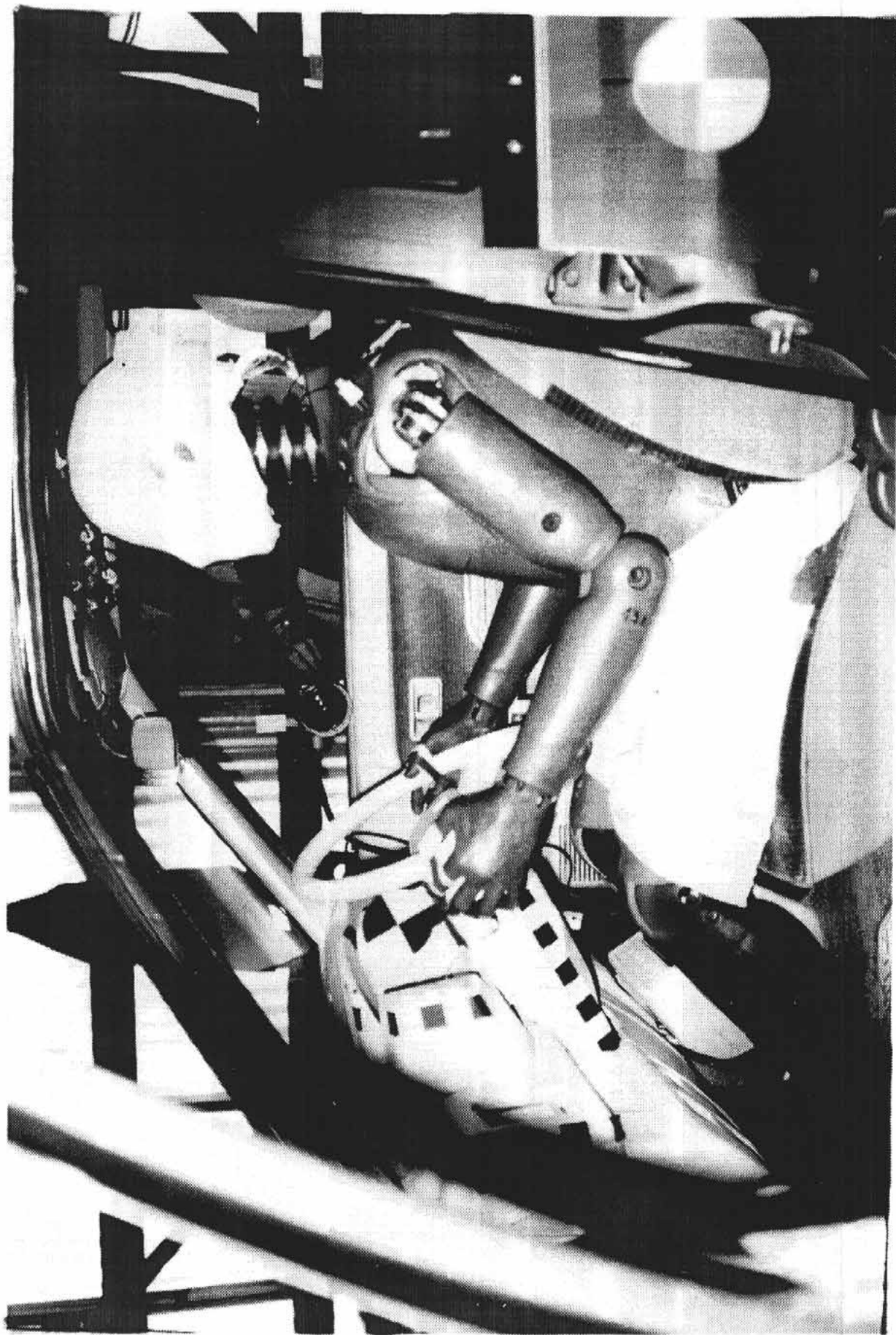


FIGURE A-19 PRE-TEST LEFT SIDE VIEW OCCUPANT POSITION

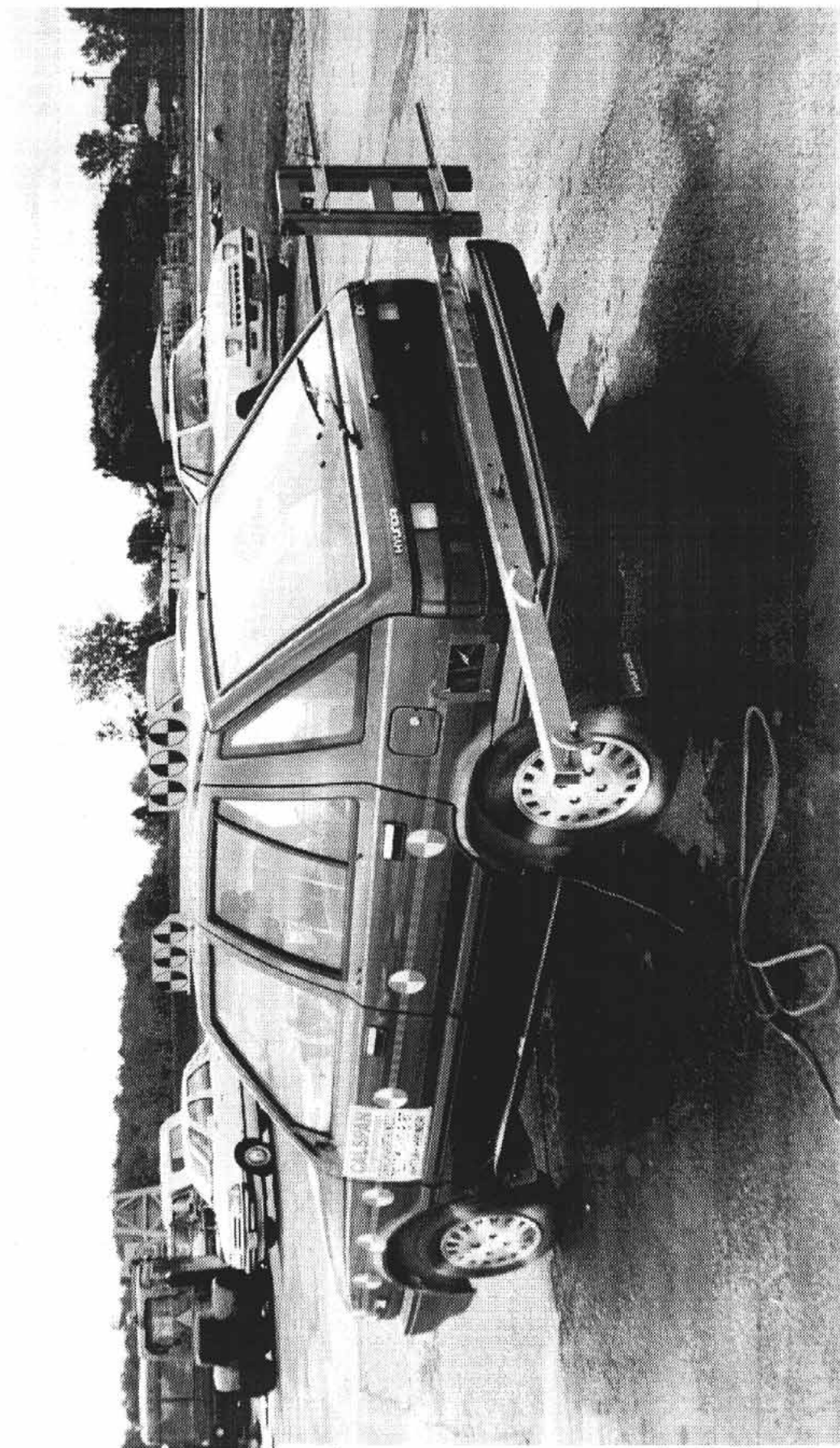


Figure A-7 PRE-TEST REAR THREE-QUARTER VIEW

A-8

7581-2

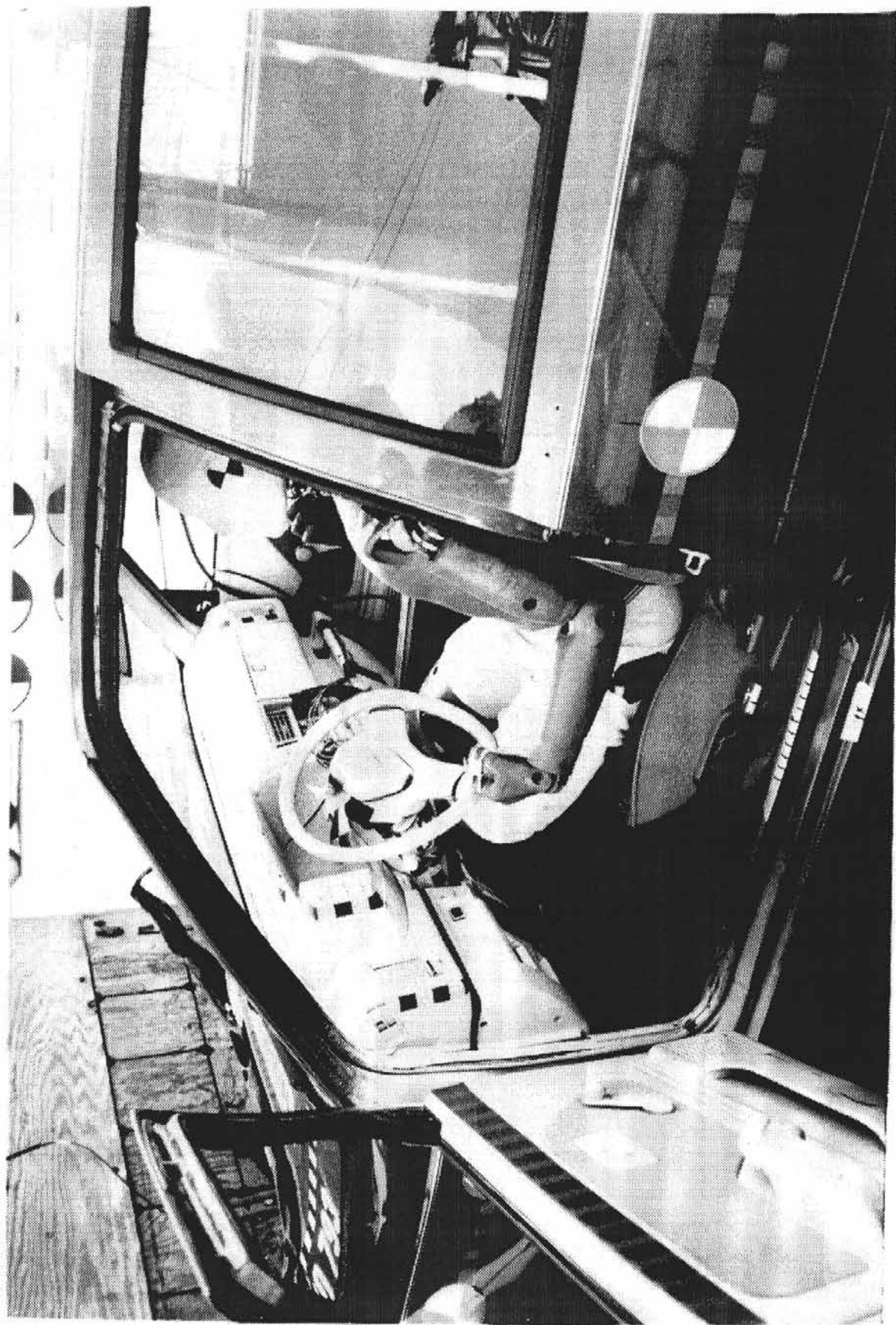


Figure A-18 POST-TEST INTERIOR COMPARTMENT AND OCCUPANT POSITION



Figure A-8 POST-TEST REAR THREE-QUARTER VIEW

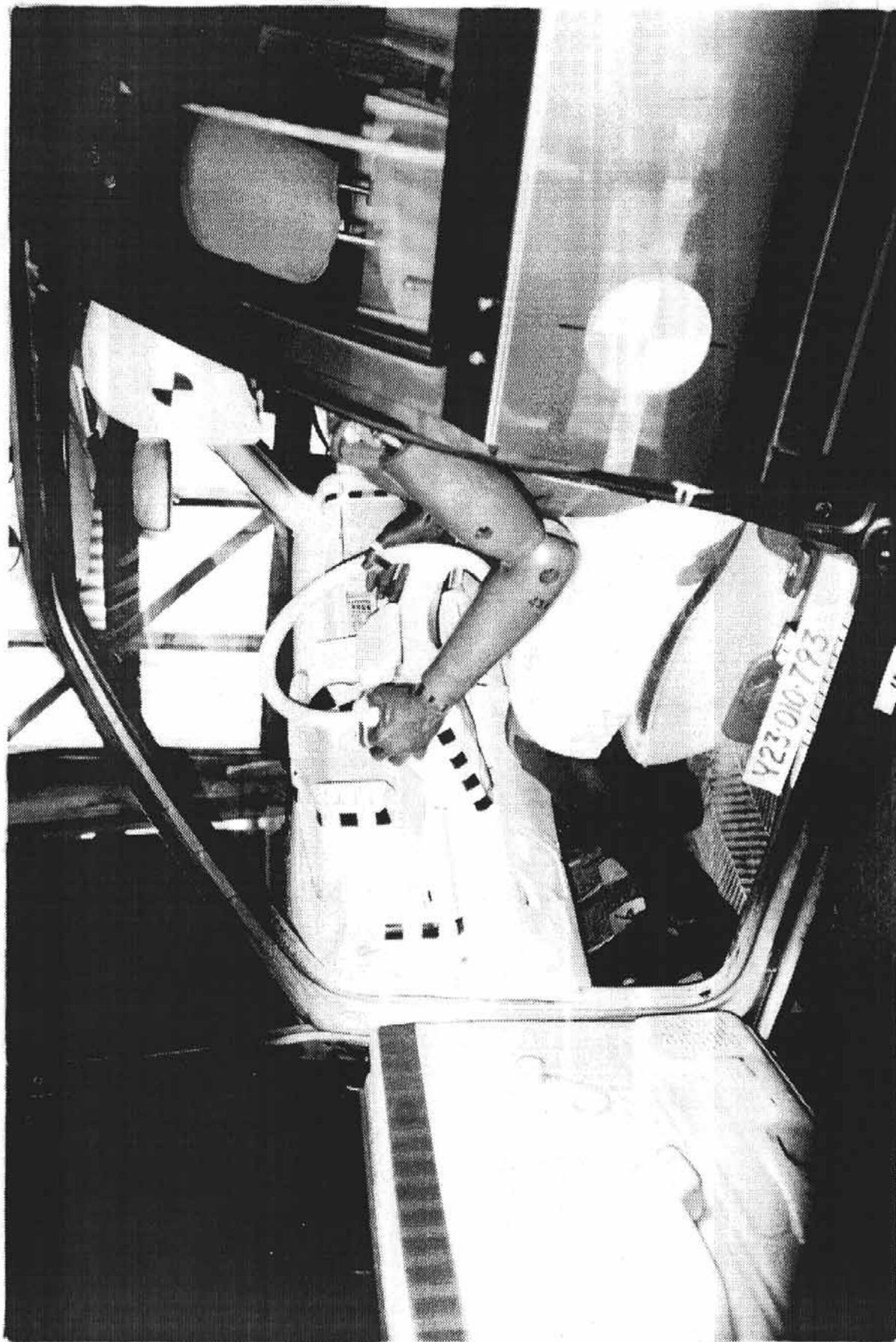


Figure A-17 PRE-TEST INTERIOR COMPARTMENT AND OCCUPANT POSITION

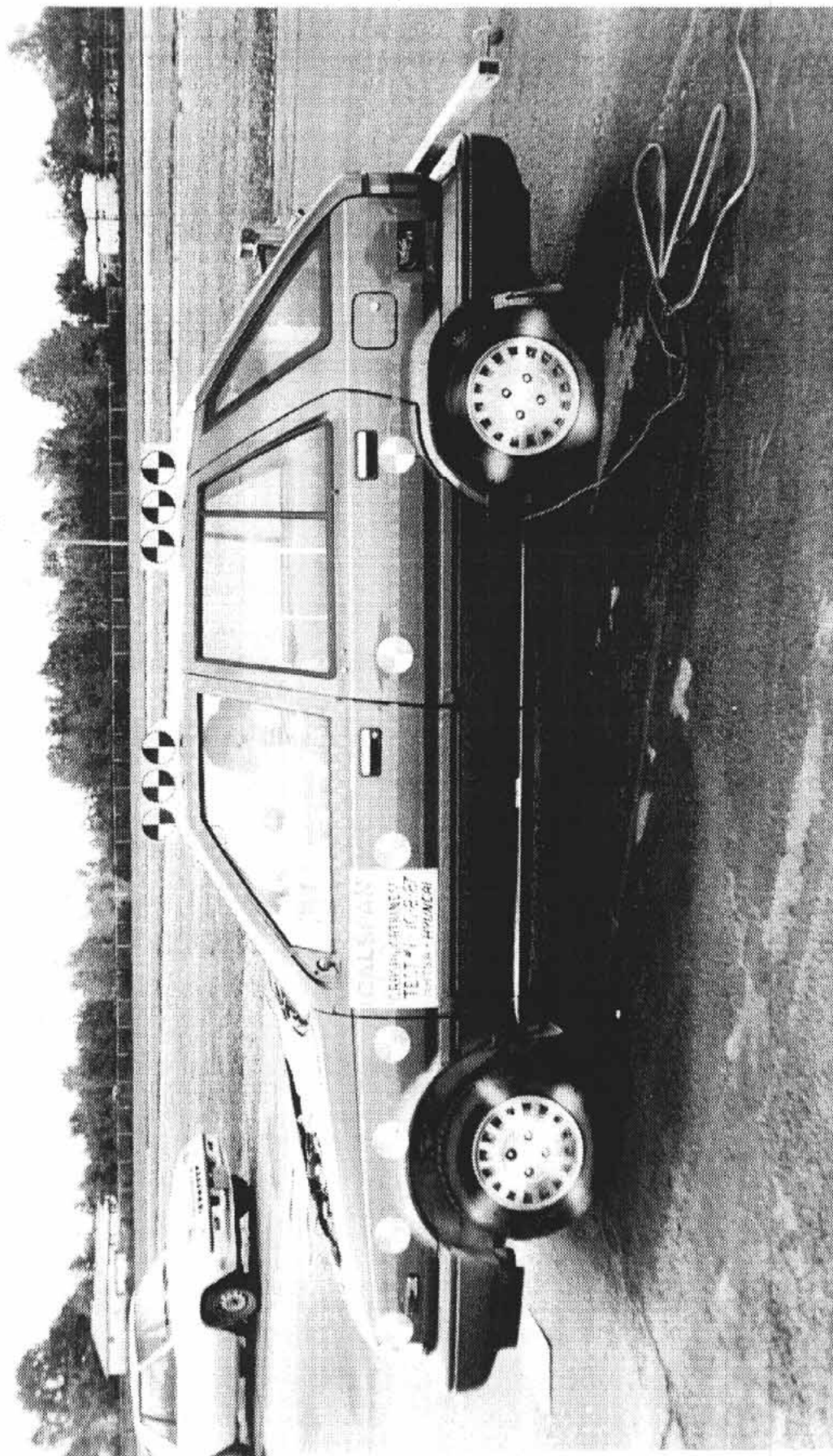


Figure A-9 PRE-TEST LEFT SIDE VIEW

A-10

7581-2

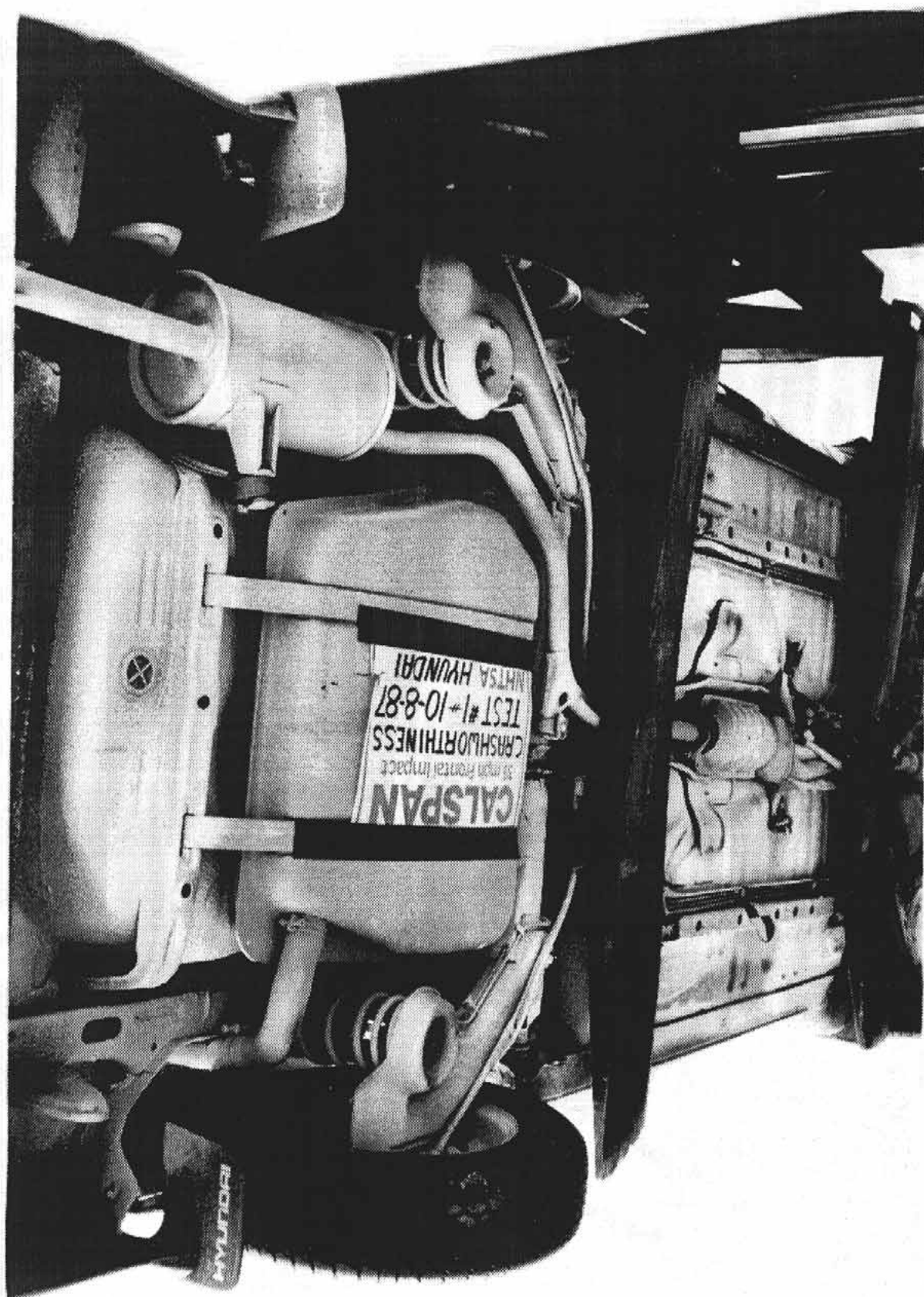


Figure A-16 POST-TEST REAR VIEW UNDERBODY



Figure A-10 POST-TEST LEFT SIDE VIEW



Figure A-15 PRE-TEST REAR VIEW UNDERBODY

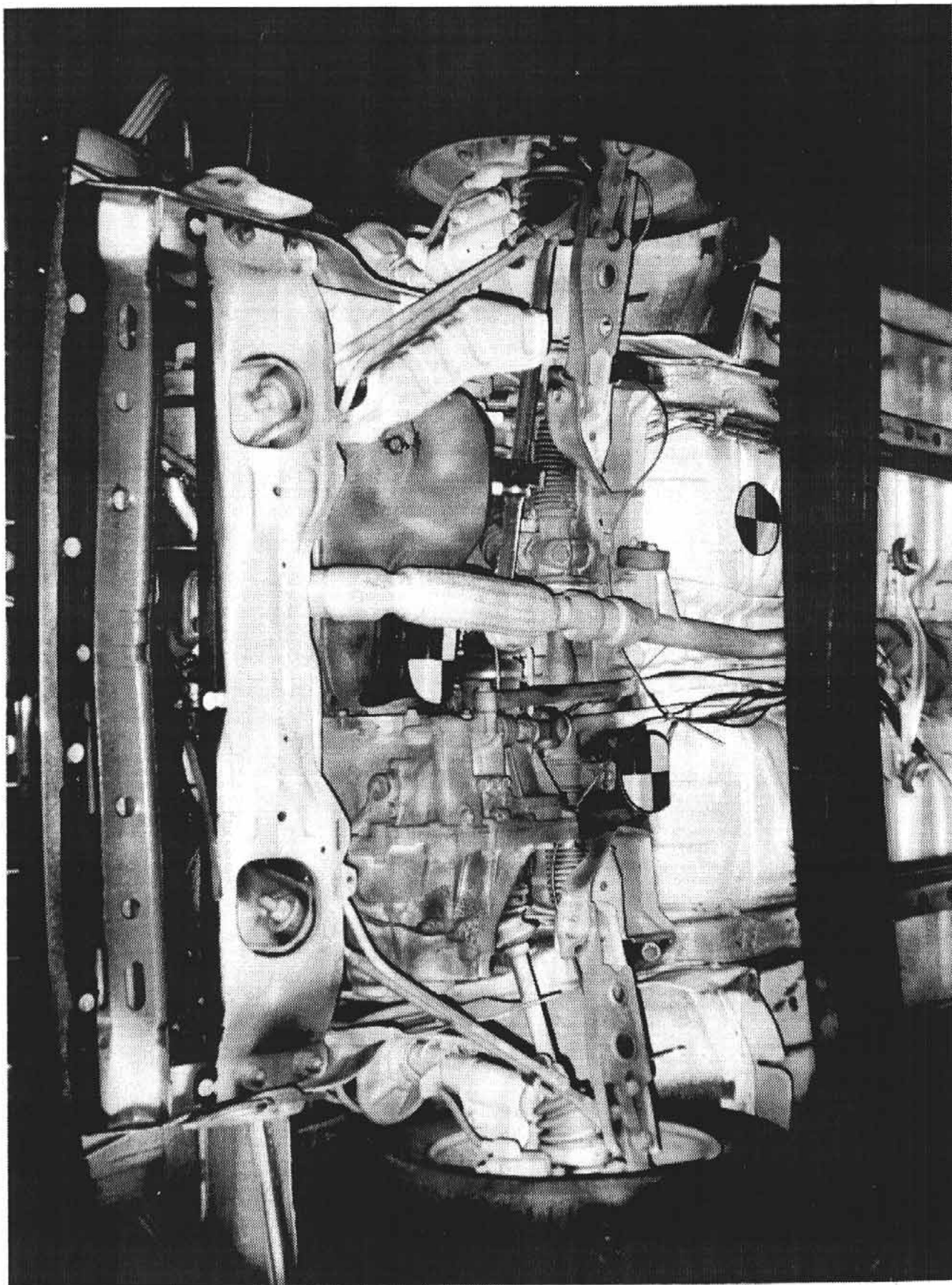


Figure A-11 PRE-TEST FRONT VIEW ENGINE UNDERBODY

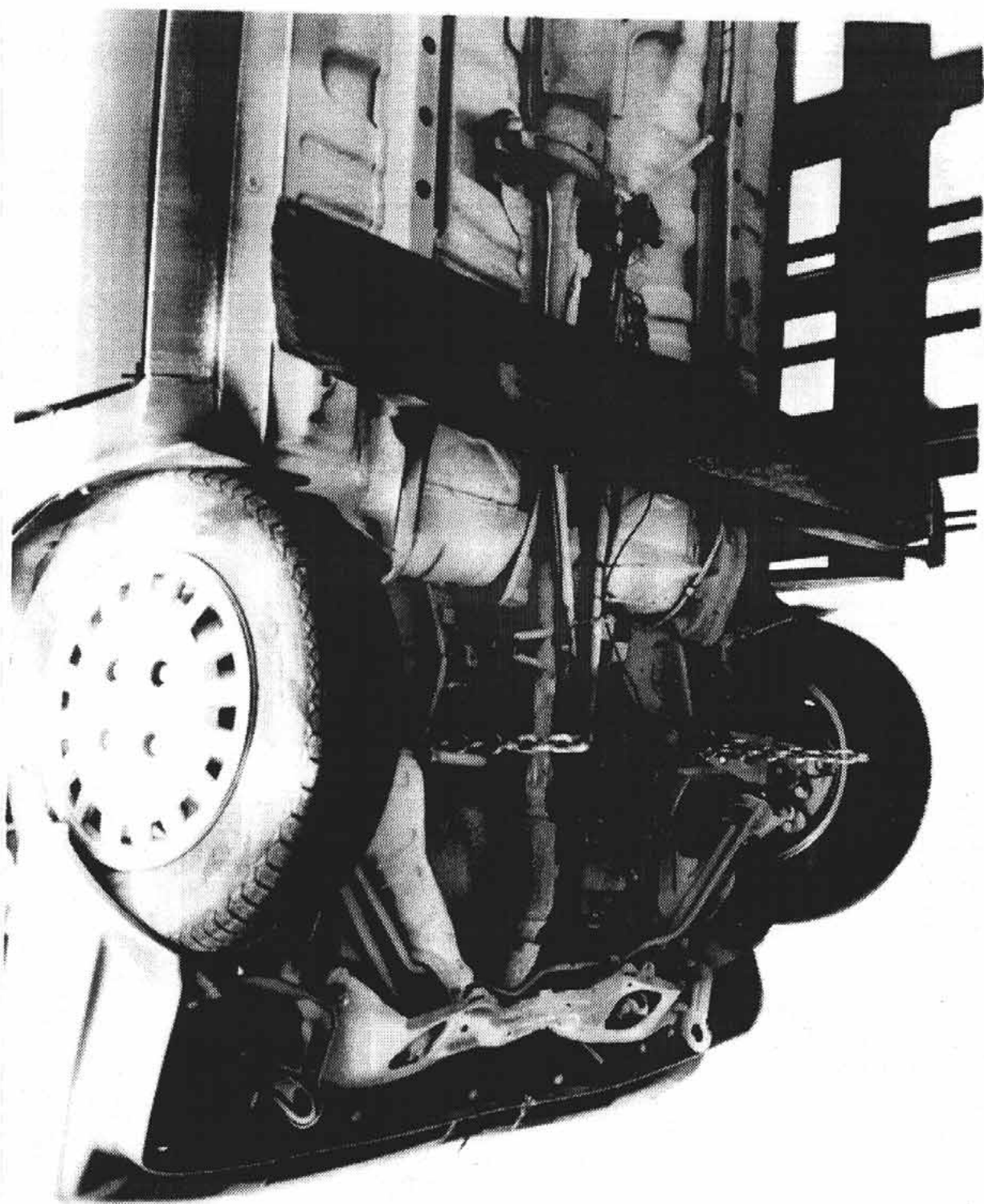


Figure A-14 POST-TEST SIDE VIEW ENGINE UNDERBODY

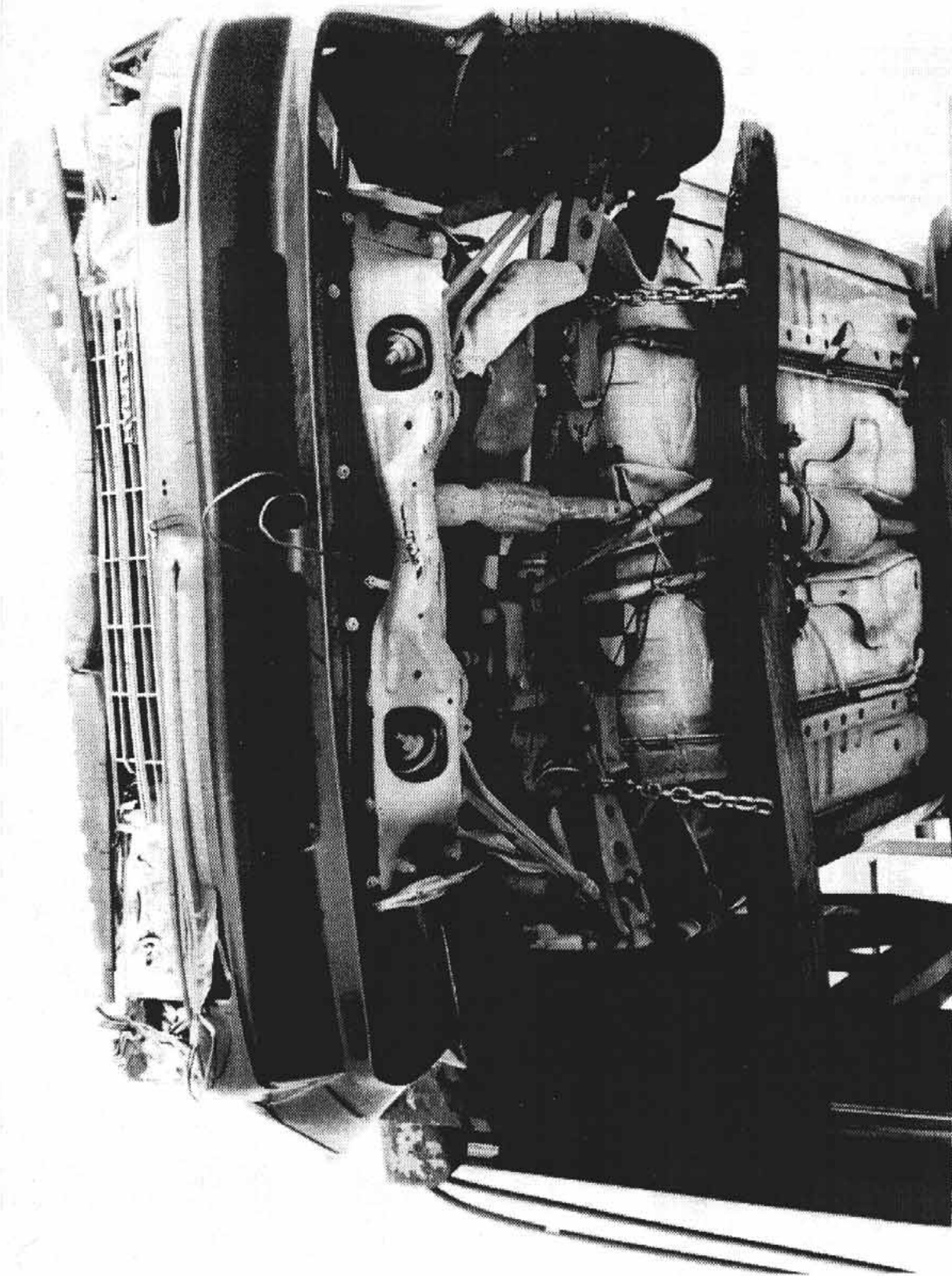


Figure A-12 POST-TEST FRONT VIEW ENGINE UNDERBODY

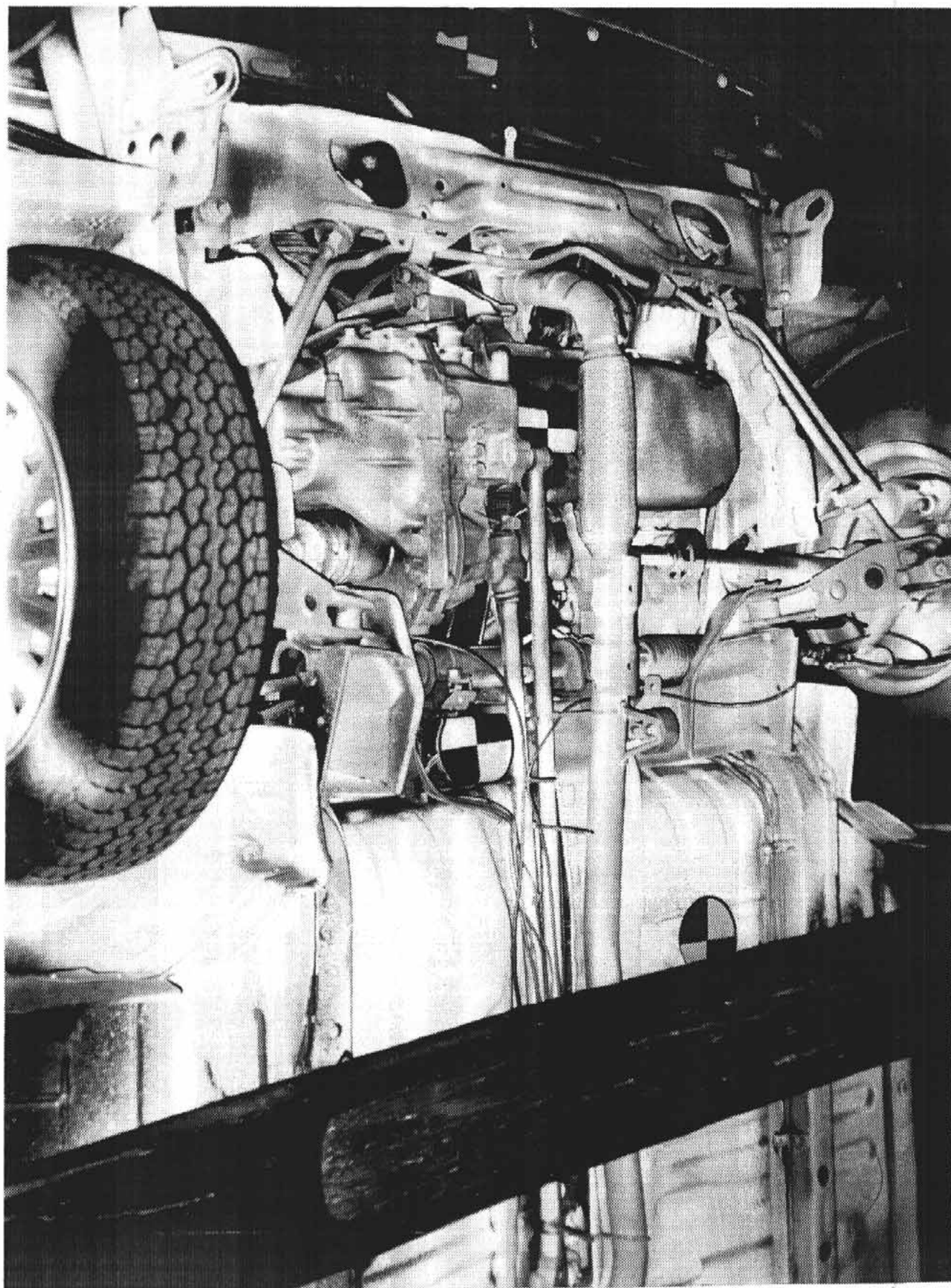


Figure A-13 PRE-TEST SIDE VIEW ENGINE UNDERBODY

APPENDIX B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

HYUNDAI INTO BARPIEP CPASH TEST

RUN # 793

SERIES # 1

CHAN	TITLE	MINIMUM	MAXIMUM
1	POS#1 HEAD 1	-174.030	13.197 G'S
2	POS#1 HEAD 1	-16.796	5.745 G'S
3	POS#1 HEAD 2	-30.384	9.053 G'S
4	POS#1 HD1XG	-16.805	3.579 G'S
5	POS#1 HD1ZG	-30.259	23.851 G'S
6	POS#1 HD2YG	-27.174	20.391 G'S
7	POS#1 HD2ZG	-105.766	26.720 G'S
8	POS#1 HD3XG	-166.416	63.644 G'S
9	POS#1 HD3YG	-15.117	15.659 G'S
10	POS#1 CHEST X	-4.351	59.876 G'S
11	POS#1 CHEST Y	-1.896	10.502 G'S
12	POS#1 CHEST Z	-20.583	4.898 G'S

B-2

7581-2

HYUNDAI INTO BAPPIER CRASH TEST

RUN # 793

SERIES # 1

CHAN	TITLE	MINIMUM	MAXIMUM
13 POS#1	UPPER STERNUM X	-117.551	224.398 G'S
14 POS#1	LOWER STERNUM X	-122.918	243.934 G'S
15 POS#1	CHEST POT	-1.714	.033 INCHES
16 POS#1	ABDOMINAL PRESS	- 177	3.602 PSI (2.28 inches of deflection)
17 POS#1	RIGHT FEMUR LOAD	-67.072	1208.262 LBS.
18 POS#1	LEFT FEMUR LOAD	-150.518	1671.120 LBS.
19 POS#1	UPPER NECK F(X)	-486.199	140.145 LBS.
20 POS#1	UPPER NECK F(Y)	-58.827	72.530 LBS.
21 POS#1	UPPER NECK F(Z)	-51.712	537.213 LBS.
22 POS#1	UPPER NECK M(X)	-227.727	194.309 IN-LBS.
23 POS#1	UPPER NECK M(Y)	-380.376	274.066 IN-LBS.
24 POS#1	UPPER NECK M(Z)	-8543.980	667.963 IN-LBS.

HYUNDAI INTO BARRIER CRASH TEST

FJN # 793

SERIES # 1

CHAN	TITLE	MINIMUM	MAXIMUM
25 POS#1	LOWER NECK F(X)	-149.266	277.592 LBS
26 POS#1	LOWER NECK F(Y)	-108.217	62.930 LBS
27 POS#1	LOWER NECK F(Z)	-365.206	241.137 LBS
28 POS#1	LOWER NECK M(X)	-385.106	356.810 IN-LBS
29 POS#1	LOWER NECK M(Y)	-20.166	47.508 IN-LBS.
30 POS#1	LOWER NECK M(Z)	-247.541	80.132 IN-LBS
31 POS#1	R.LOWER TIBIA M(X)	-87.145	1244.382 IN-LBS
32 POS#1	R.LOWER TIBIA F(Y)	-13.354	169.846 LBS.
33 POS#1	R.LOWER TIBIA F(Z)	-1047.778	175.339 LBS.
34 POS#1	R.UPPER TIBIA M(X)	-302.139	258.060 IN-LBS.
35 POS#1	R.UPPER TIBIA M(Y)	-980.494	872.425 IN-LBS.
36 POS#1	R.KNEE SHEAR RIGHT	-588.778	124.541 LBS.

HYUNDAI INTO BAPPIER CRASH TEST

RUN # 793		SERIES # 1	
CHAN	TITLE	MINIMUM	MAXIMUM
37 POS#1 P KNEE SHEAR LEFT		-504 158	86 377 LBS
38 POS#1 L LOWER TIBIA M X		-740 711	1284 729 IN-LBS
39 POS#1 L LOWER TIBIA F Y		-22 670	97 683 LBS
40 POS#1 L LOWER TIBIA F Z		-17 301	511.289 LBS
41 POS#1 L UPPER TIBIA M X		-411 402	416.243 IN-LBS.
42 POS#1 L UPPER TIBIA M Y		-645 198	499 558 IN-LBS
43 POS#1 L KNEE SHEAR RIGHT		-315.521	58.524 LBS.
44 POS#1 L KNEE SHEAR LEFT		-287 067	7.977 LBS.
*45 ACC PACK #11(X)		-66 597	51.960 G'S
*46 ACC PACK #11(Z)		-62.076	48.699 G'S
*47 ACC PACK #1(X)		-30.048	2.626 G'S
*48 ACC PACK #1(X)R		-104.017	5.014 G'S

*Accelerometer location may be found in Figure 2, Page 3-8.

HYUNDAI INTO BARRIER CRASH TEST

RUN # 797

SERIES # 1

CHAN	TITLE	MINIMUM	MAXIMUM
* 49	ACC PACK #2(X)	-28.665	2.006 G'S
* 50	ACC PACK #2(X)R	-28.789	2.318 G'S
* 51	ACC PACK #3(X)	-31.302	3.861 G'S
* 52	ACC PACK #3(Y)	-1.138	2.257 G'S
* 53	ACC PACK #3(Z)	-17.617	12.671 G'S
* 54	ACC PACK #4(X)	-28.354	5.716 G'S
* 55	ACC PACK #4(Z)	-7.907	9.682 G'S
* 56	ACC PACK #5(X)	-56.733	16.655 G'S
* 57	ACC PACK #5(Z)	-33.994	42.769 G'S
* 58	ACC PACK #6(X)	-183.159	10.201 G'S
* 59	ACC PACK #6(Z)	-36.177	119.703 G'S
* 60	ACC PACK #7(X)	-32.822	2.997 G'S

*Accelerometer location may be found
in Figure 2, Page 3-8.

H7UHD41 INTO BARRIER CRASH TEST

CHAN	TITLE	MINIMUM	MAXIMUM	SERIES #
*61 ACC PACK #7(Z)		-5 913	33 969 G'S	1
*62 ACC PACK #8(X)		-70 298	8.476 G'S	
*63 ACC PACK #9(X)		-49 181	292 937 G'S	
*64 ACC PACK #10(X)		-36 827	4.092 G'S	
65 BARRIER LOAD CELL A2		- .754	.866 K LBS.	
66 BARRIER LOAD CELL A3		- .166	240 K LBS.	
67 BARRIER LOAD CELL A4		- 400	.696 K LBS.	
68 BARRIER LOAD CELL A5		- .409	20.689 K LBS.	
69 BARRIER LOAD CELL A6		- .277	.701 K LBS.	
70 BARRIER LOAD CELL A7		- .288	.579 K LBS.	
71 BARRIER LOAD CELL A8		- .173	.288 K LBS.	
72 BARRIER LOAD CELL B2		.008	.070 K LBS.	

*Accelerometer location may be found in Figure 2, Page 3-8.

HYUNDAI INTO BARRIER CRASH TEST

RUN # 793

SERIES # 1

CHAN	TITLE	MINIMUM	MAXIMUM
73	BARRIER LOAD CELL B3	- 159	11 419 K LBS
74	BARRIER LOAD CELL B4	- 146	4 668 K LBS
75	BARRIER LOAD CELL B5	- 115	4 354 K LBS
76	BARRIER LOAD CELL B6	- 151	7 577 K LBS
77	BARRIER LOAD CELL B7	- 116	10 047 K LBS
78	BARRIER LOAD CELL B8	- 117	3.759 K LBS
79	BARRIER LOAD CELL C2	- 172	2 048 K LBS.
80	BARRIER LOAD CELL C3	- 207	2 360 K LBS.
81	BARRIER LOAD CELL C4	-.174	1.754 K LBS.
82	BARRIER LOAD CELL C5	-.160	2.423 K LBS.
83	BARRIER LOAD CELL C6	-.132	2.390 K LBS.
84	BARRIER LOAD CELL C7	-.187	2.743 K LBS.

HYUNDAI INTO BARRIER CRASH TEST

RUN # 797

SERIES # 1

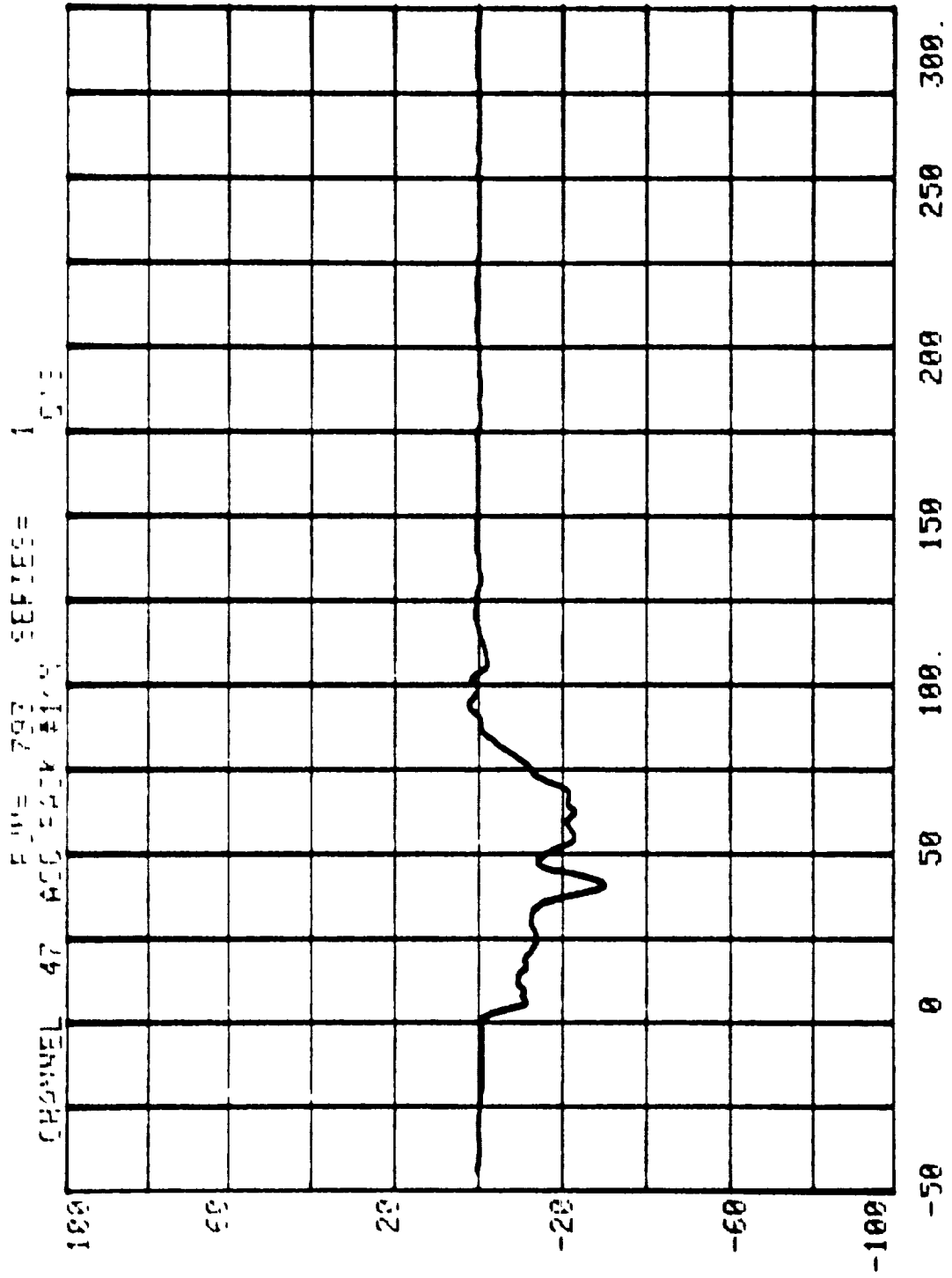
CHAN	TITLE	MINIMUM	MAXIMUM
85	BARRIER LOAD CELL C8	- 192	2 691 K LBS
86	BARRIER LOAD CELL D2	- 150	276 K LBS.
87	BARRIER LOAD CELL D3	- 111	232 K LBS
88	BARRIER LOAD CELL D4	- 204	202 K LBS.
89	BARRIER LOAD CELL D5	- 215	163 K LBS
90	BARRIER LOAD CELL D6	- 195	.185 K LBS.
91	BARRIER LOAD CELL D7	- 166	.219 K LBS
92	BARRIER LOAD CELL D8	-.185	.184 K LBS.

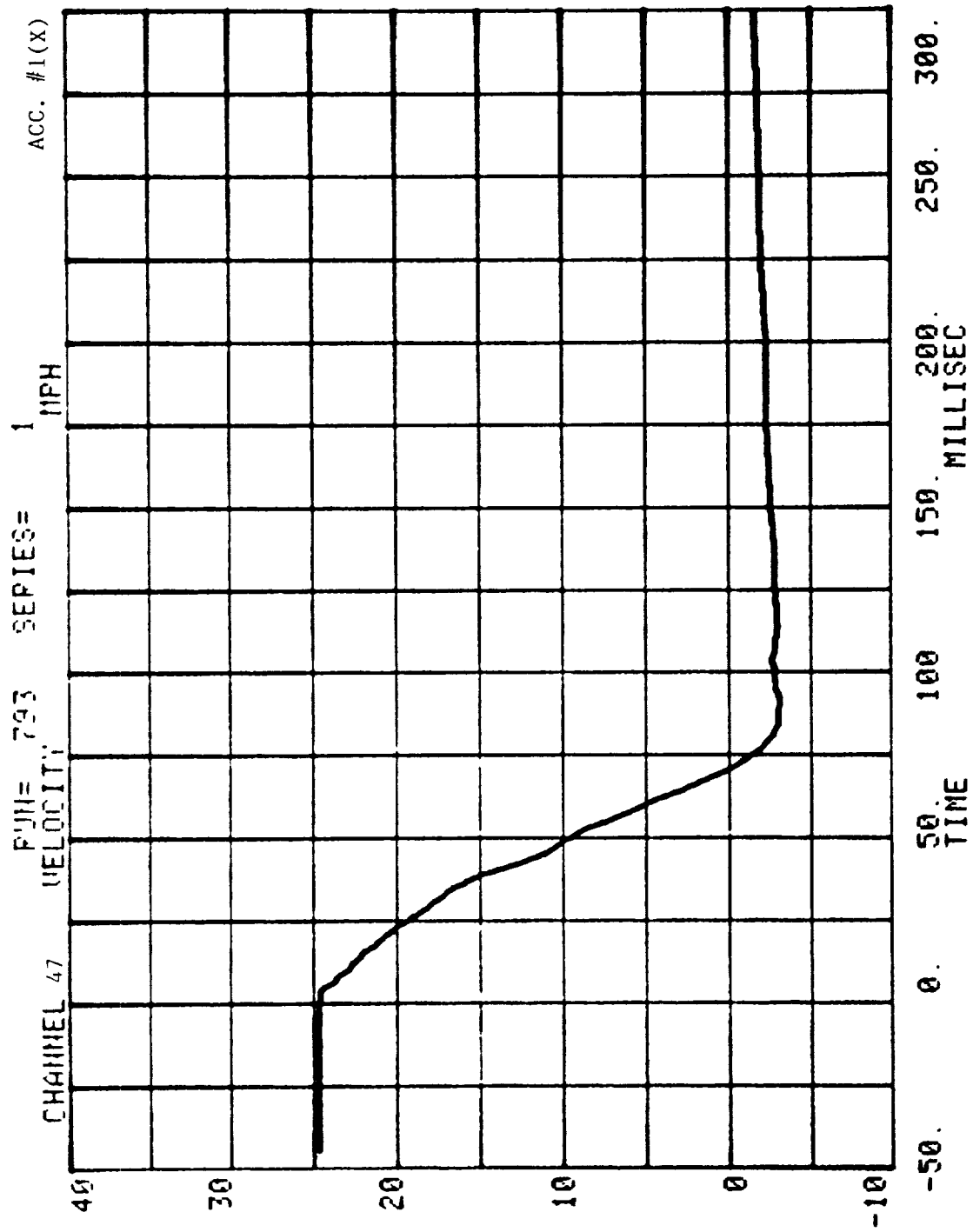
TEST NO. Y23-010-793

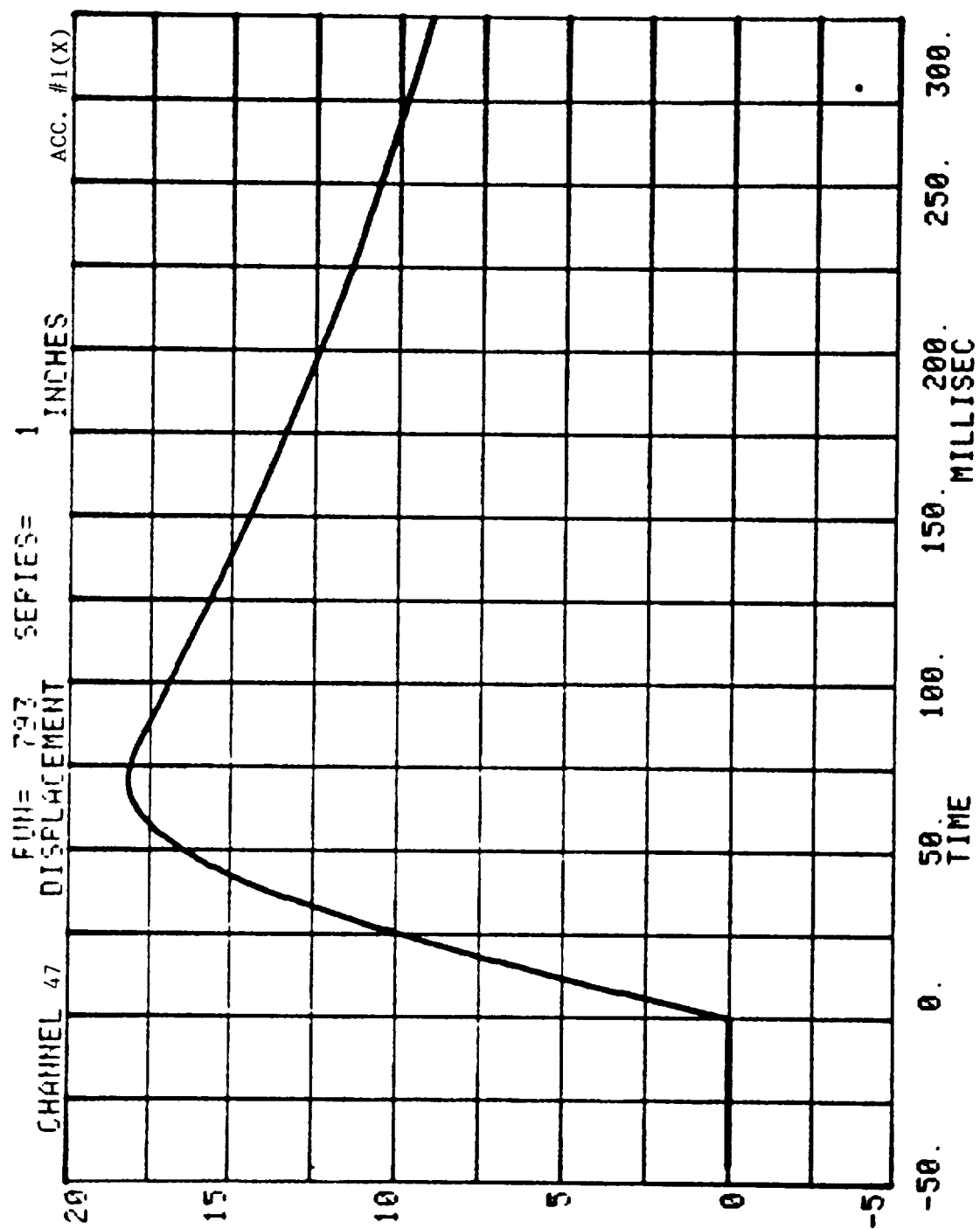
VEHICLE DATA

FILER CHANNEL CLASS

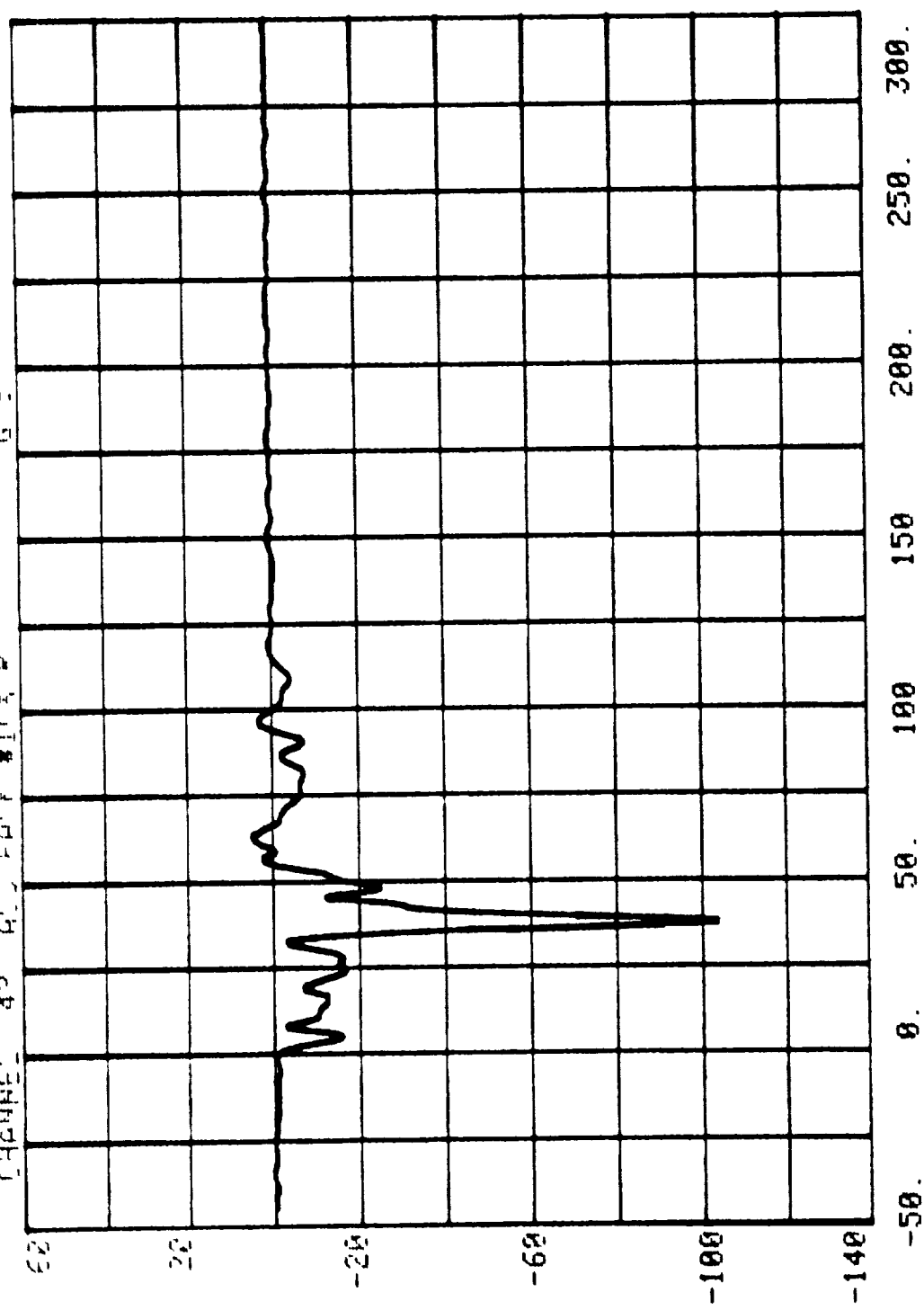
60

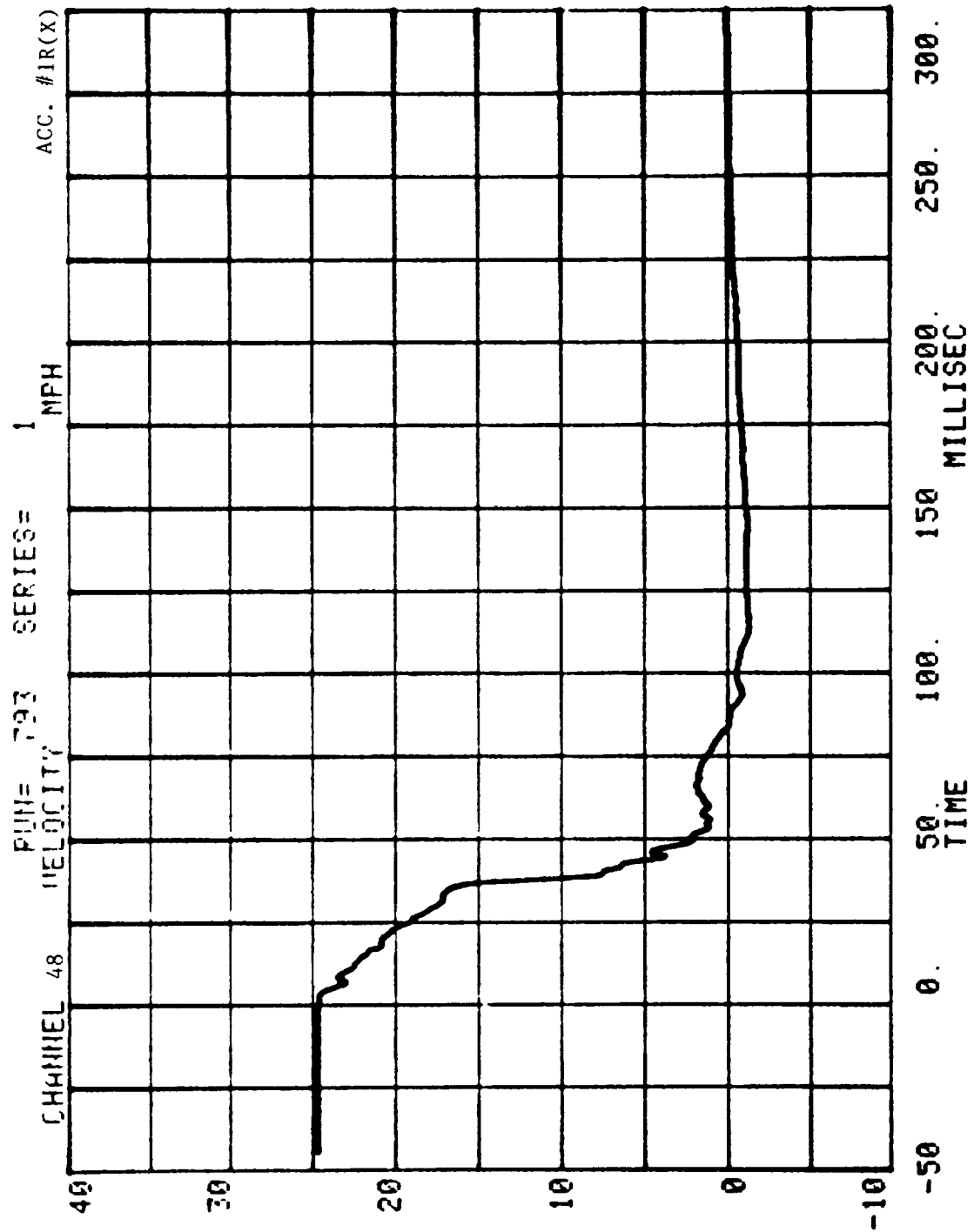


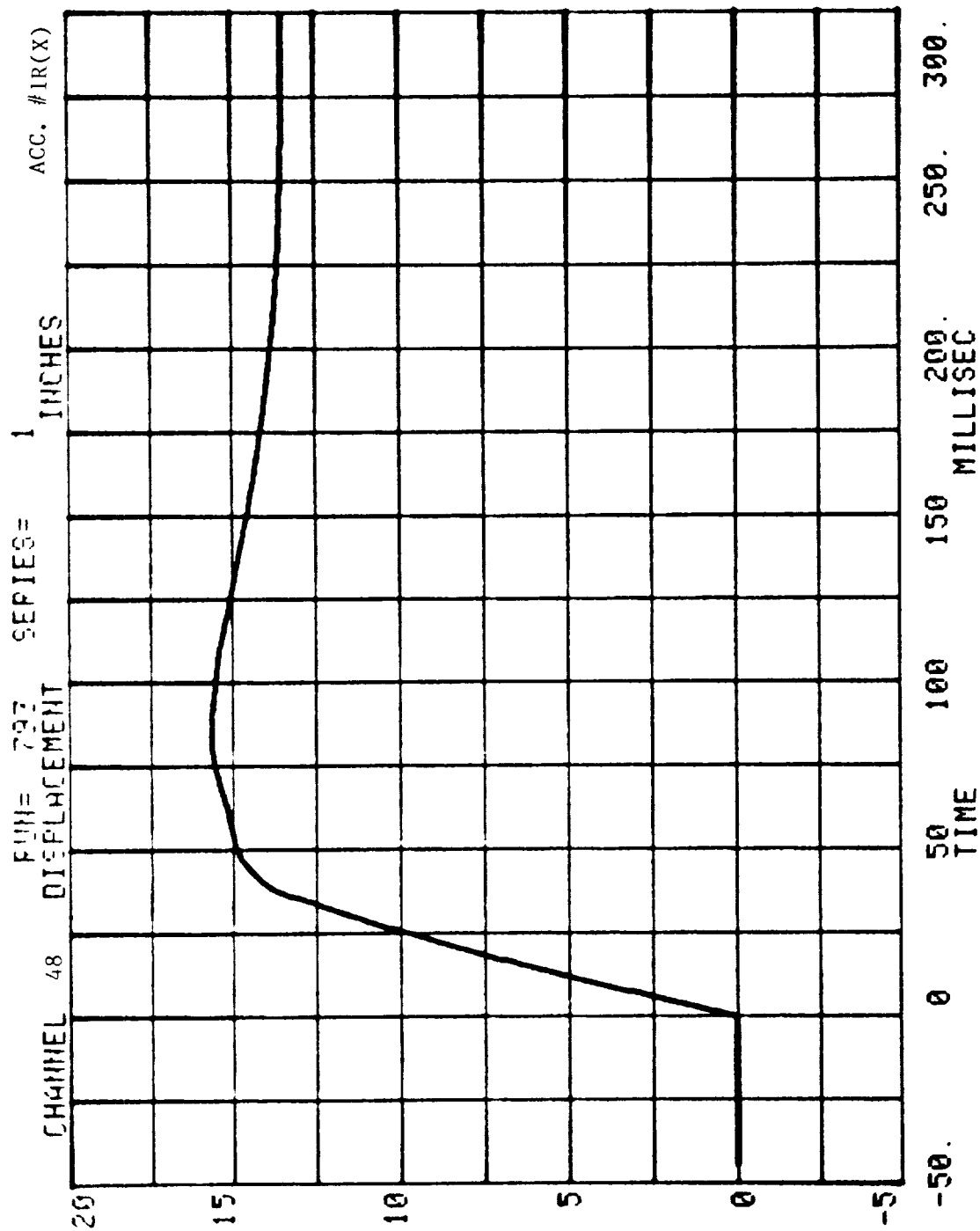




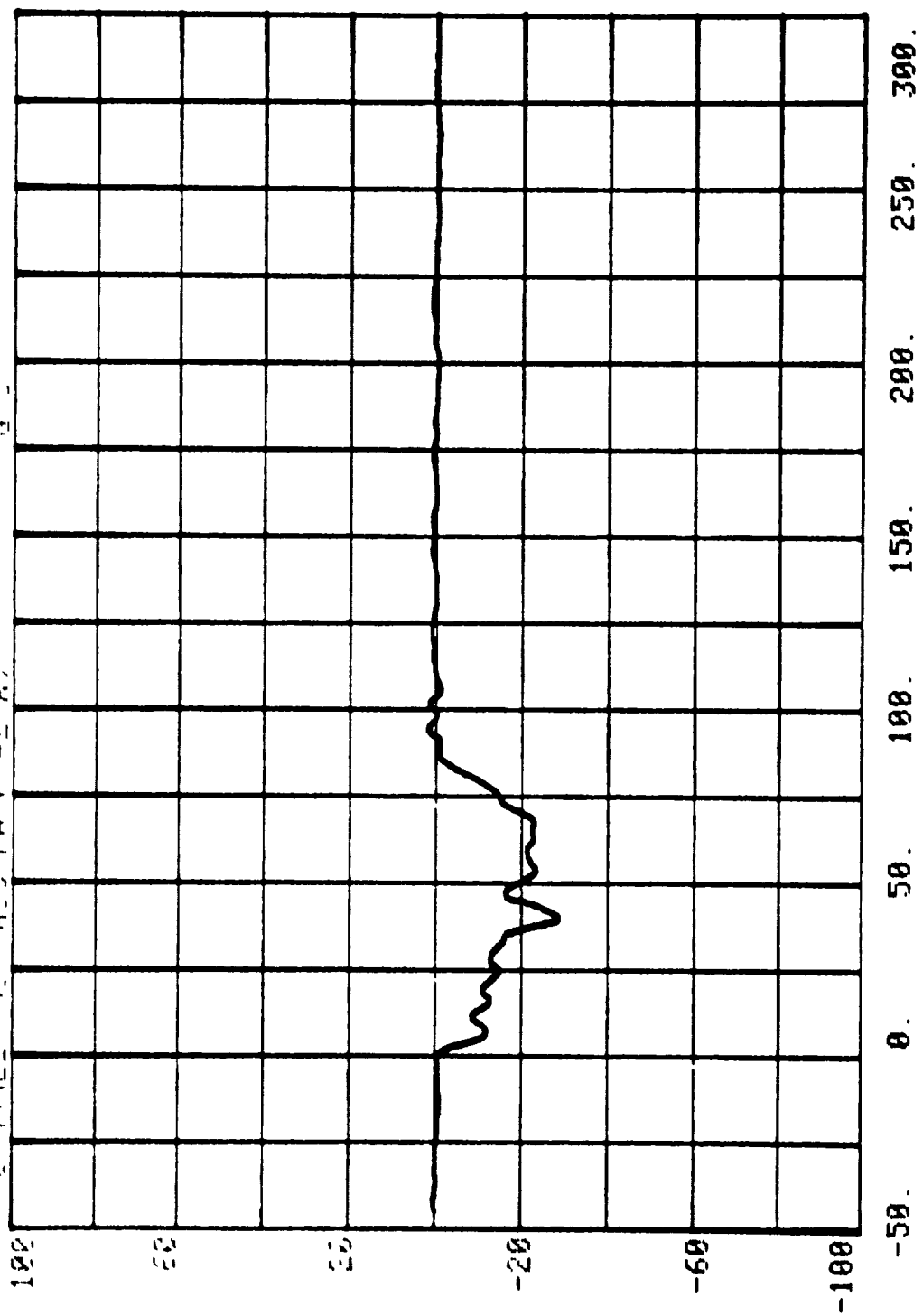
CHANNEL 40 PULSE 793 SERIES= 1

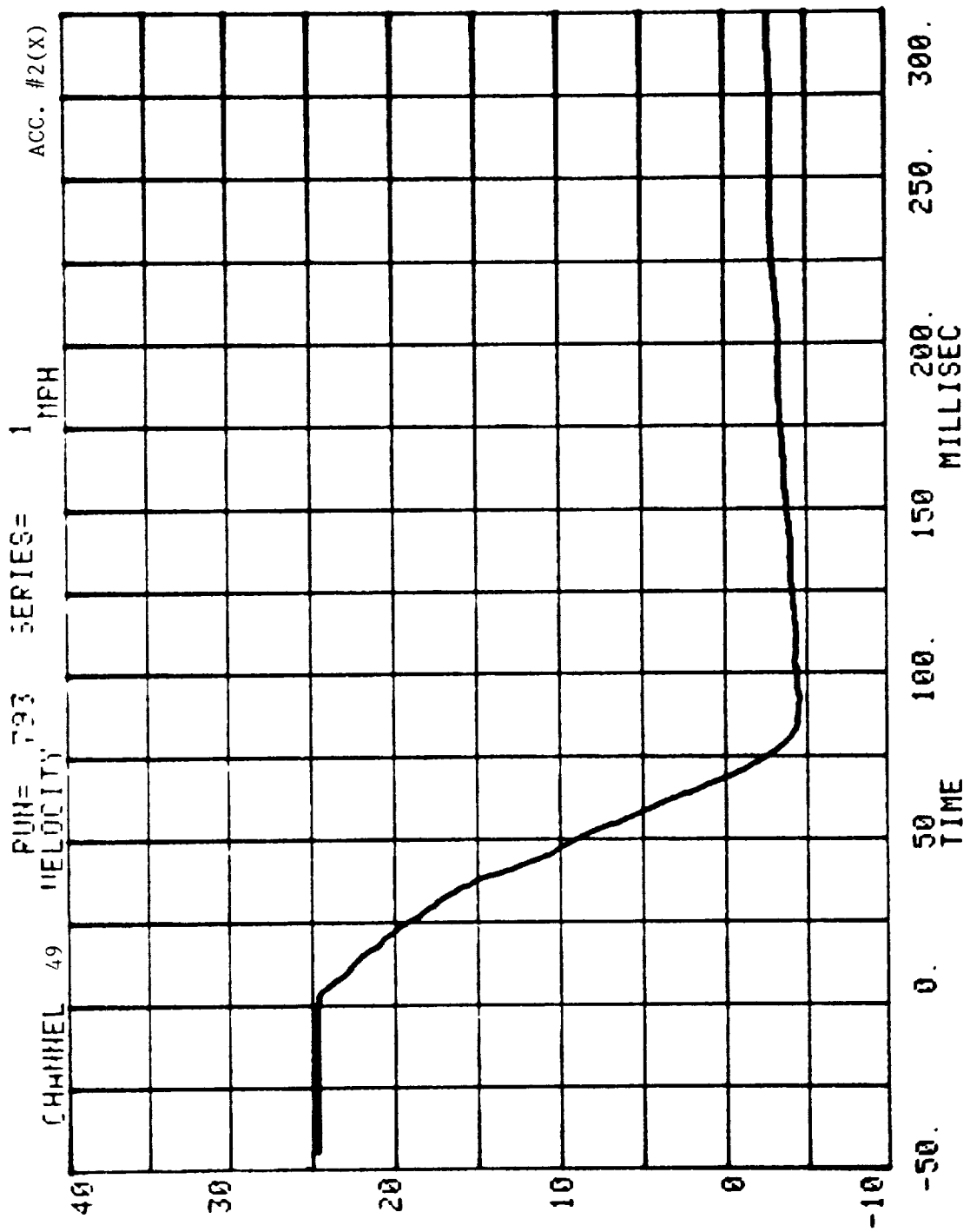


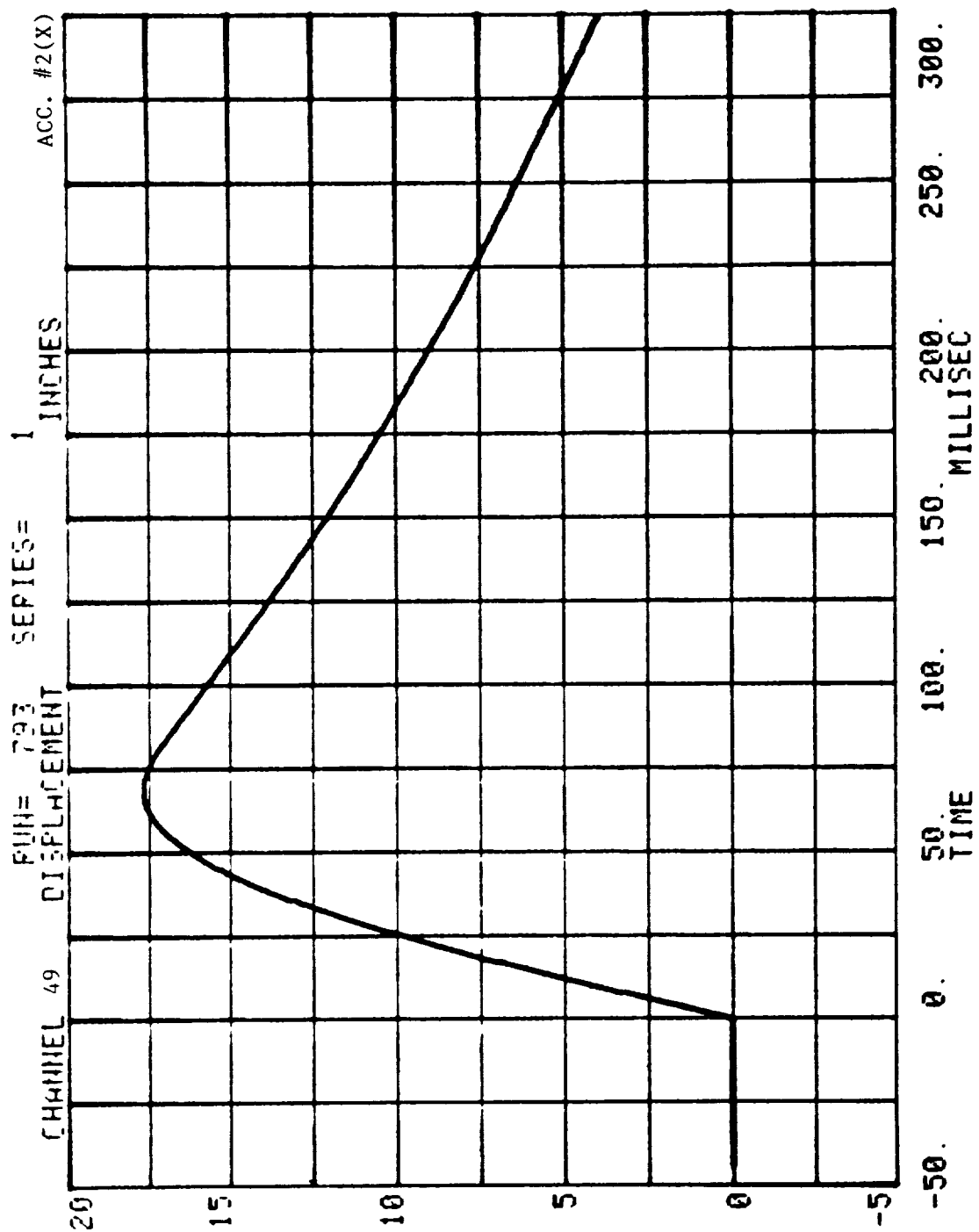


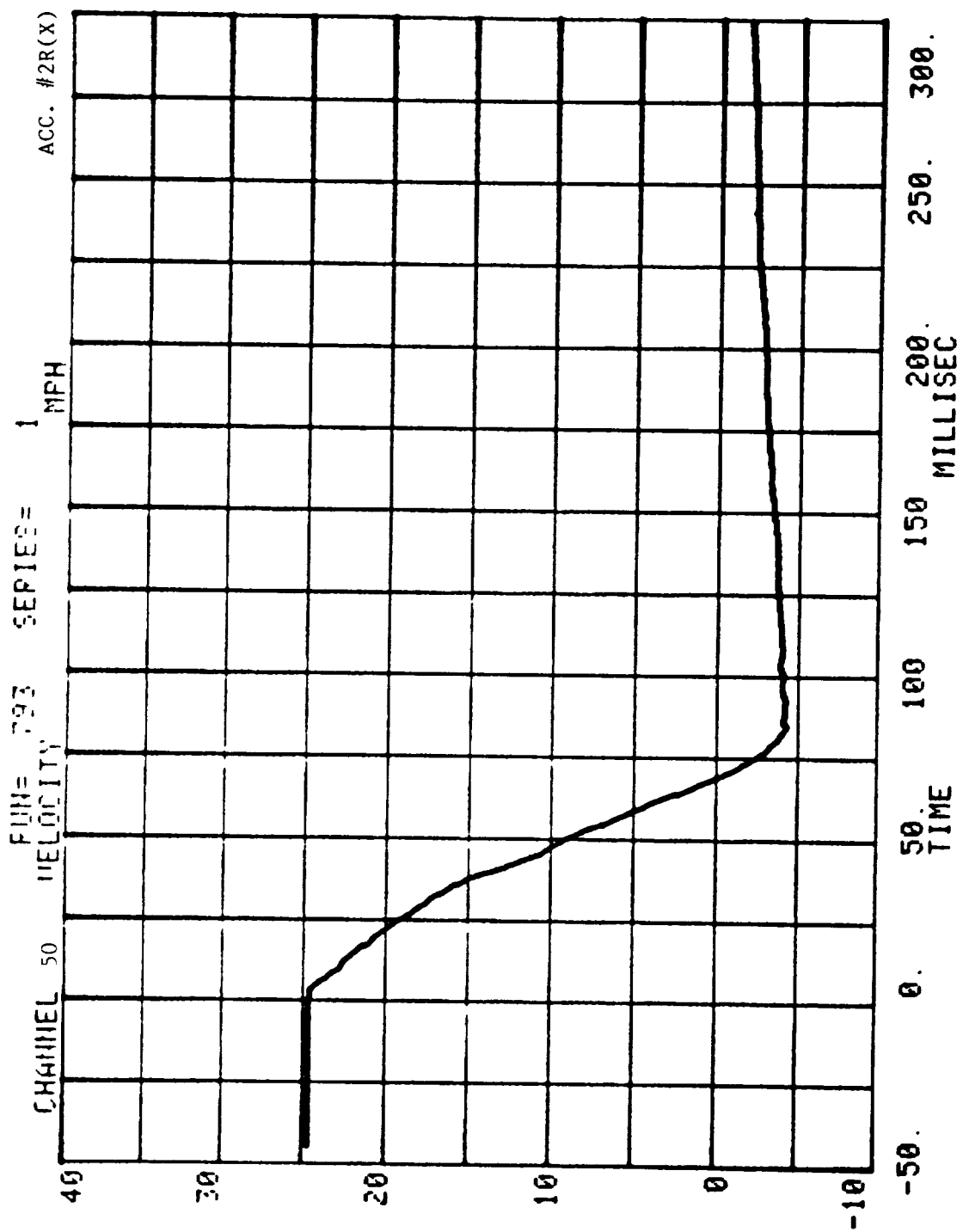


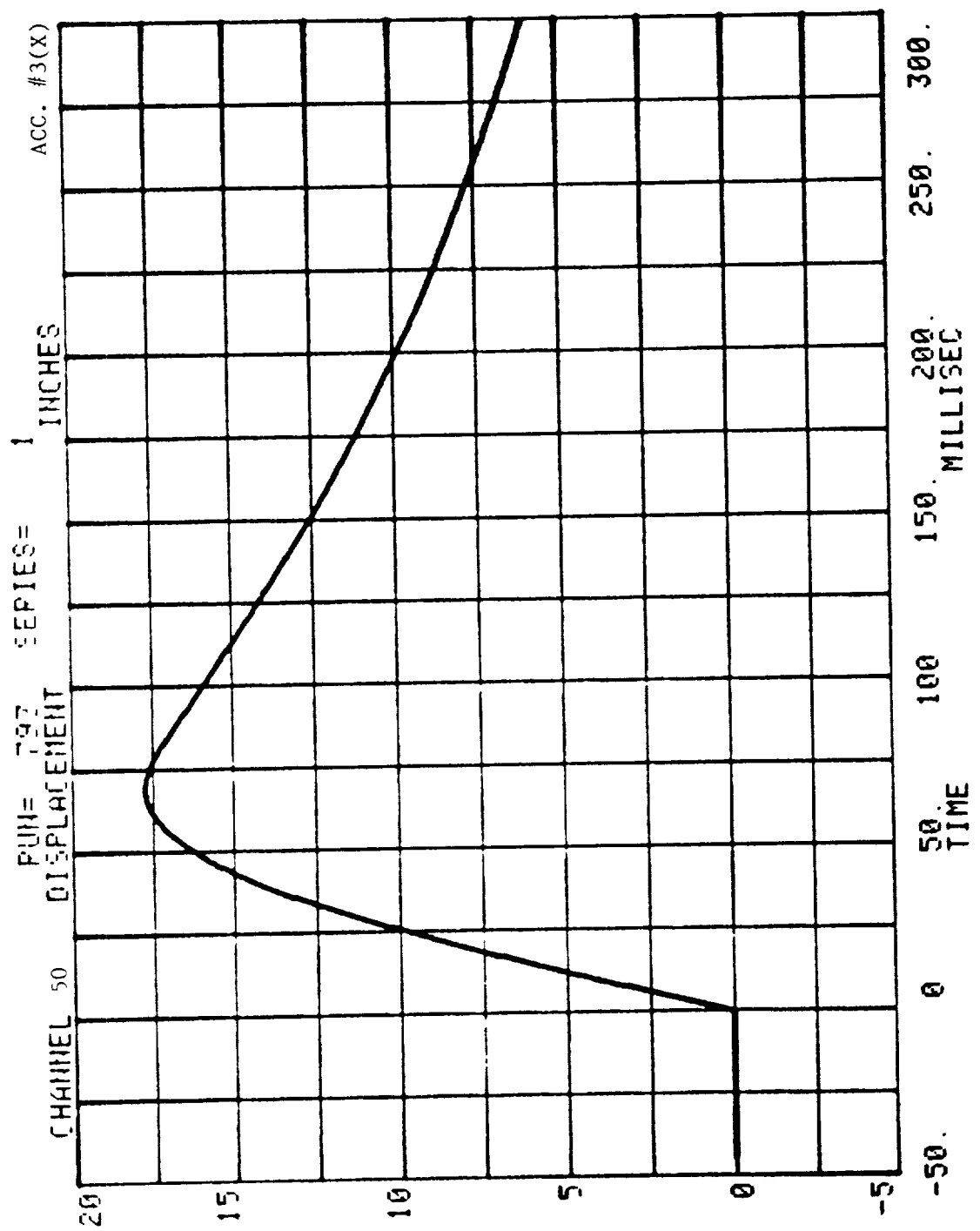
CHANEL 49 ACC FACT #20%
PUH= 797 SERIES= 163

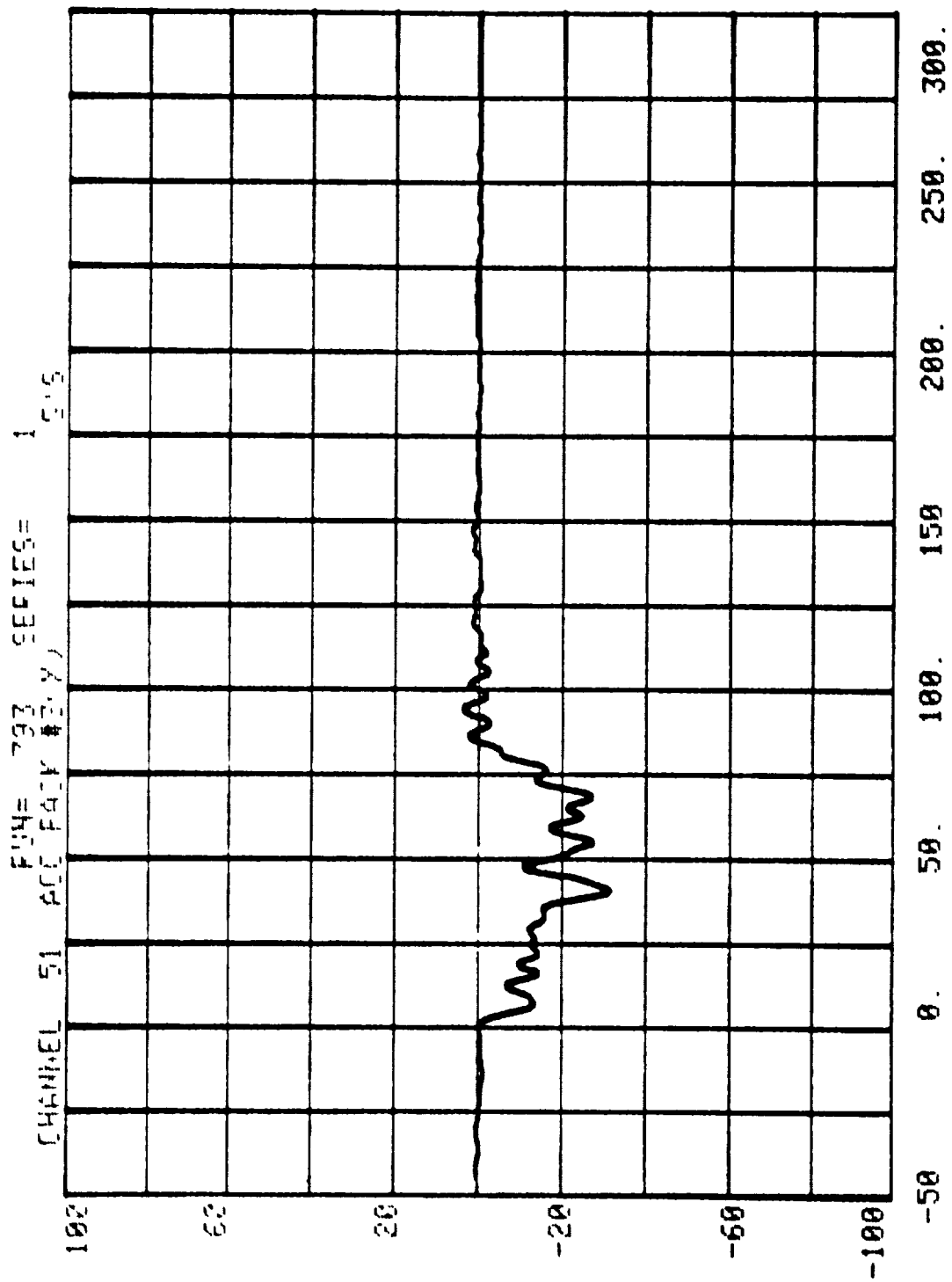


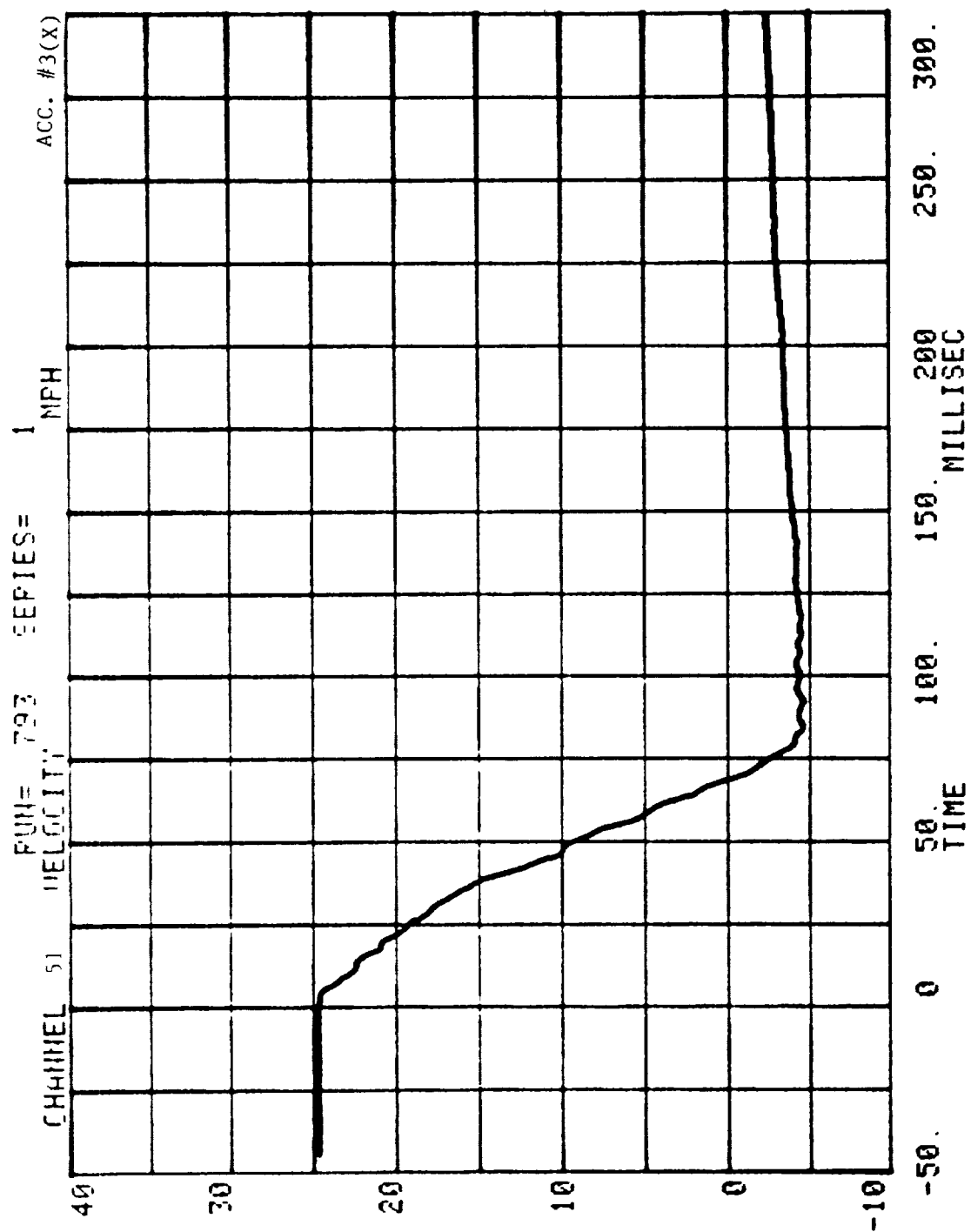


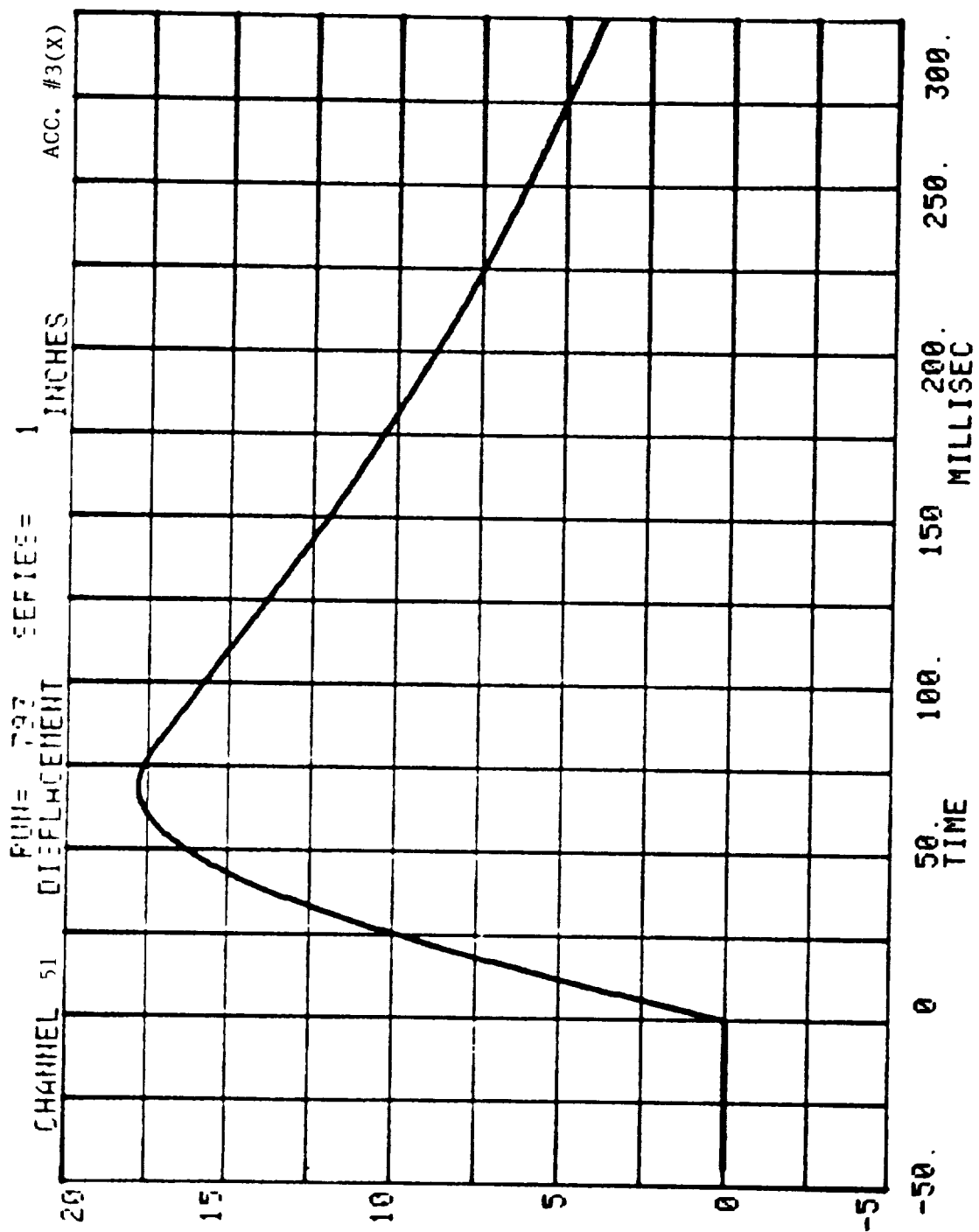


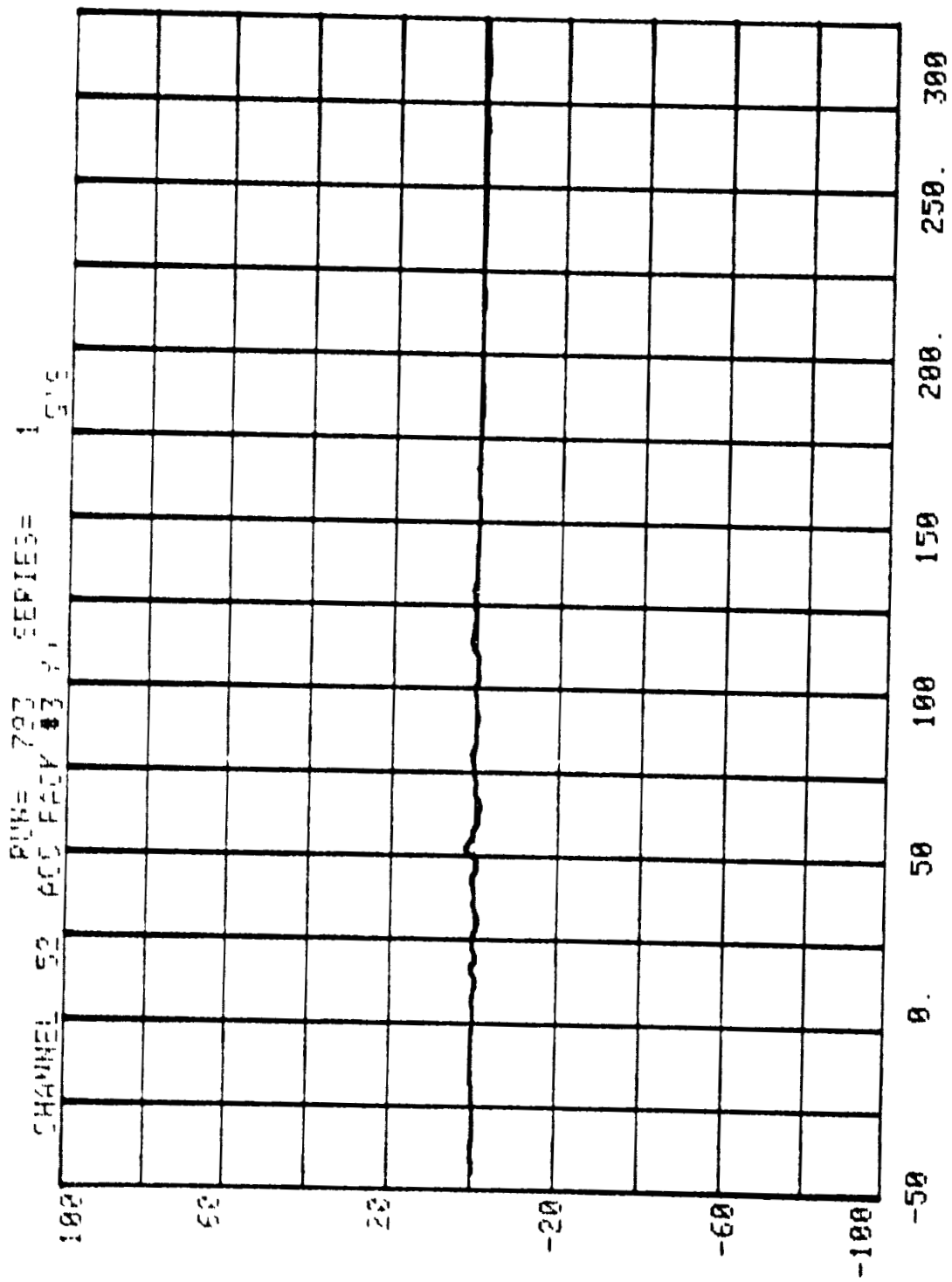


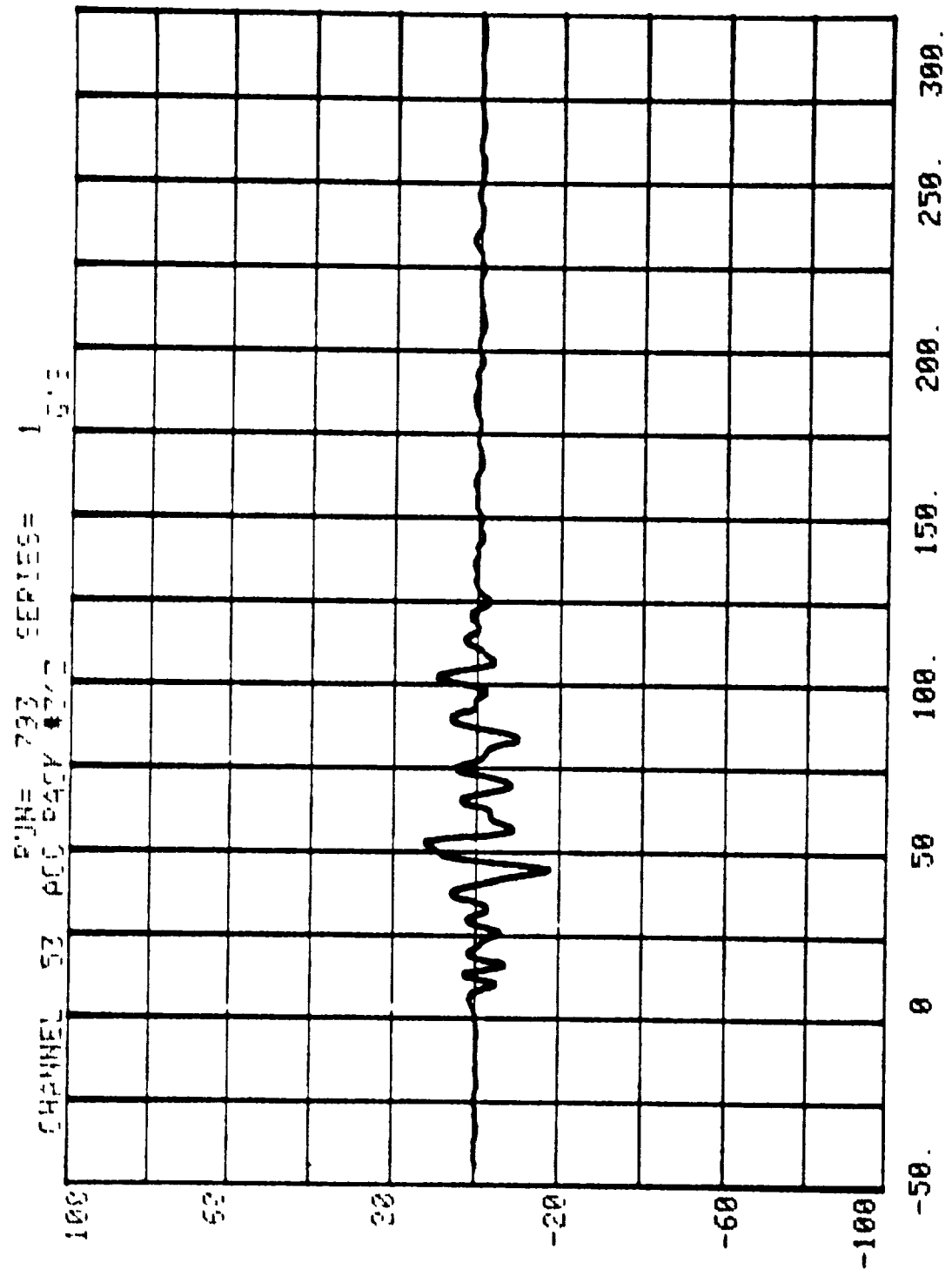




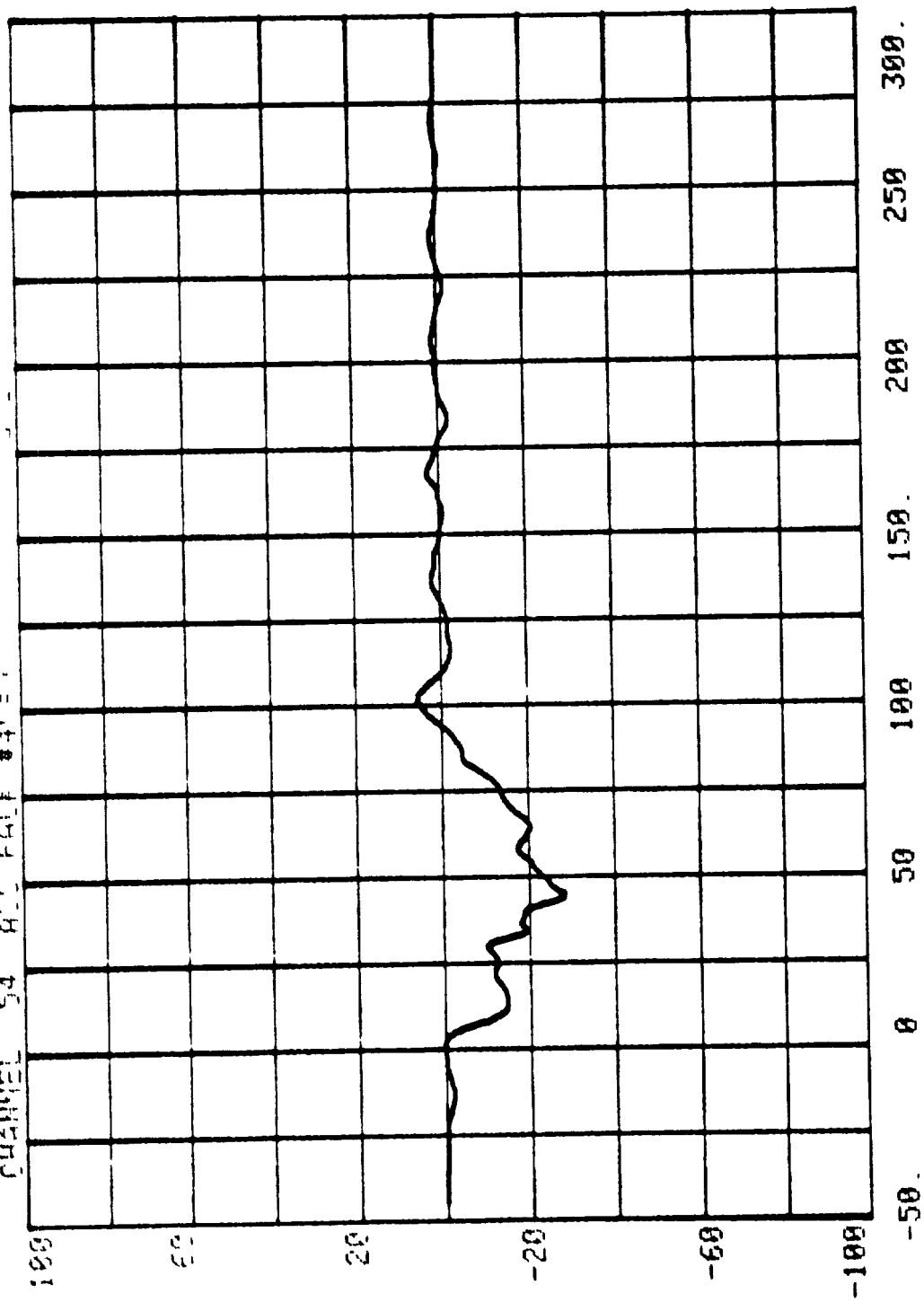


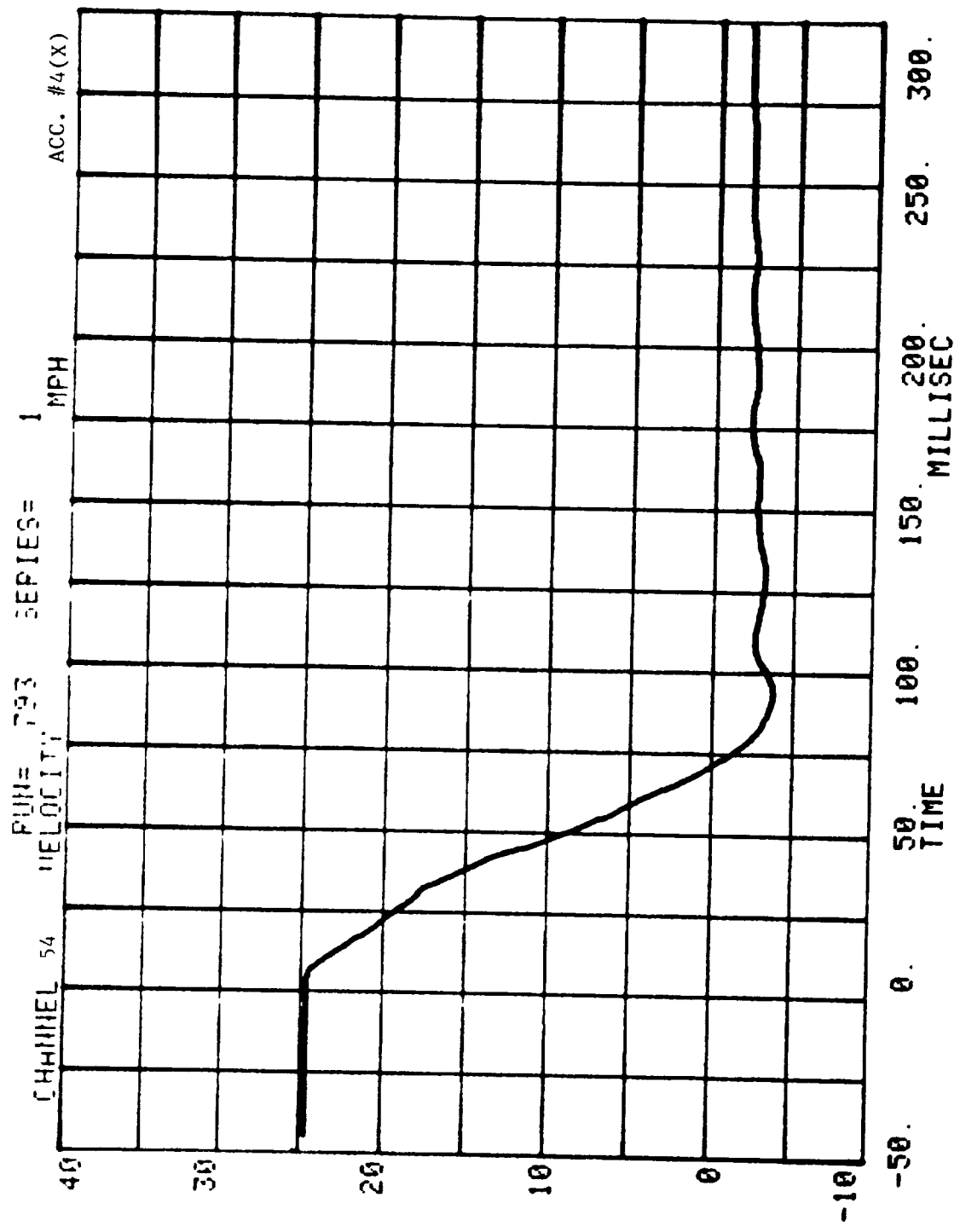


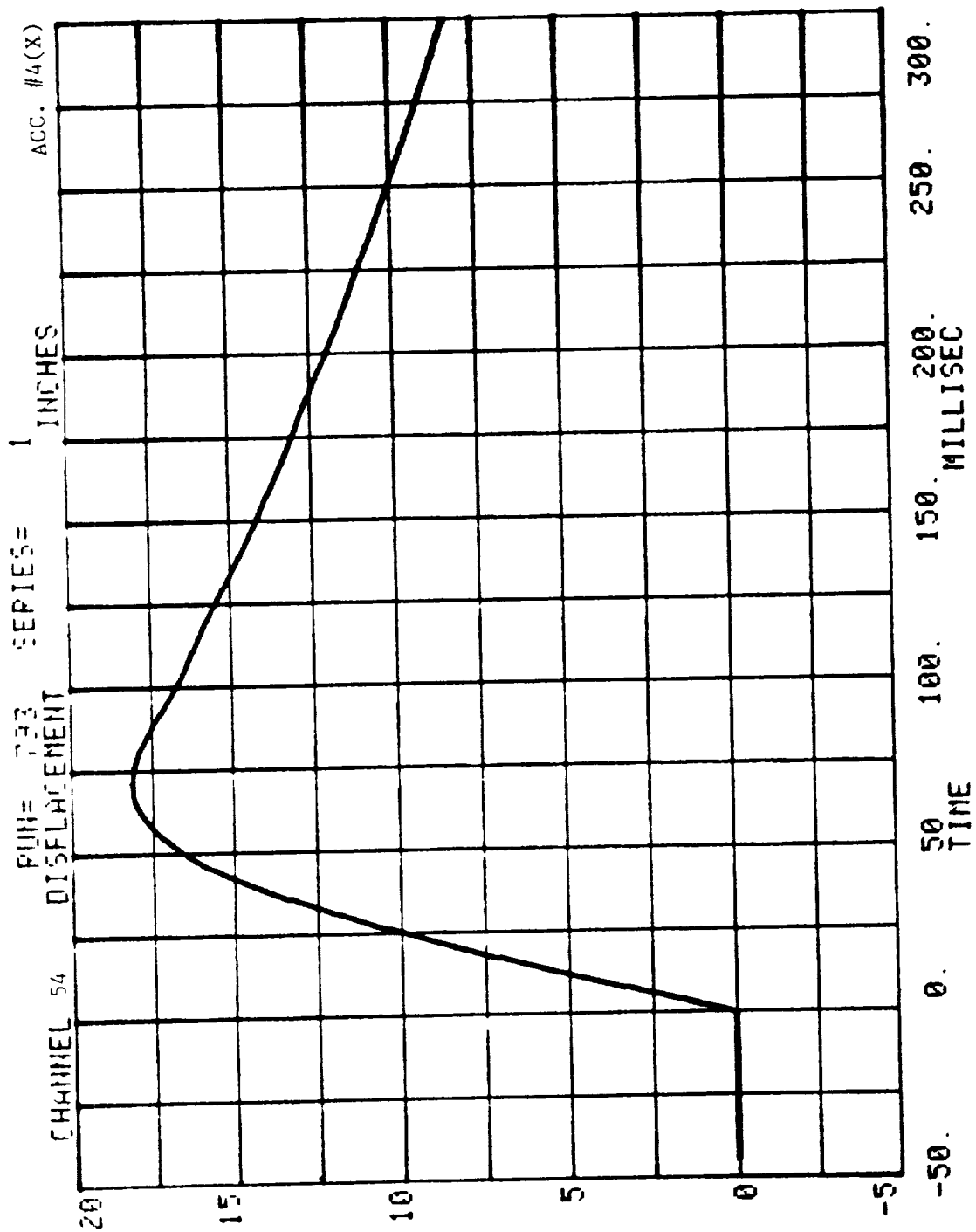




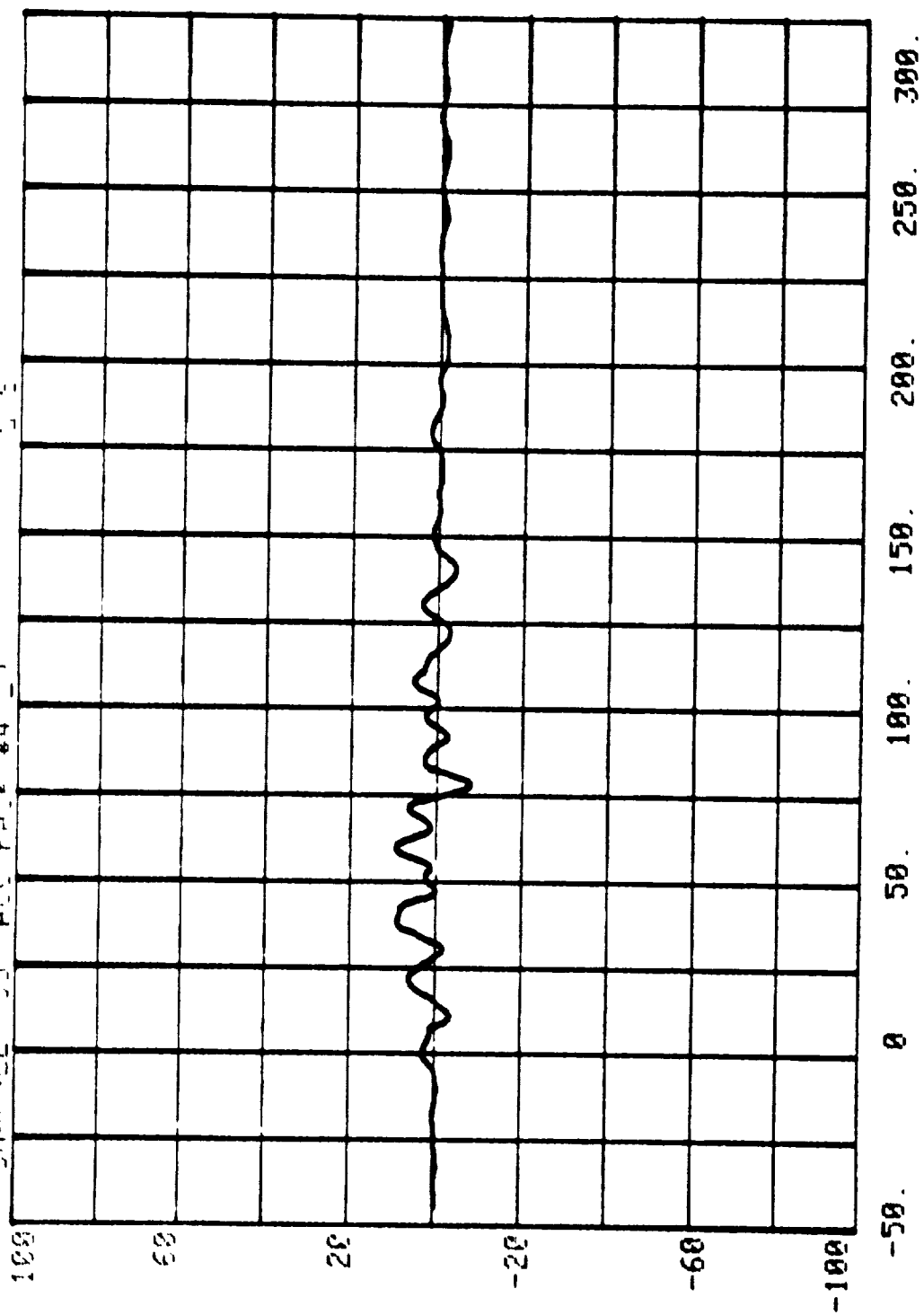
CHANNEL 54 ACC FACT 442. PUN= 797 SERIES= 1



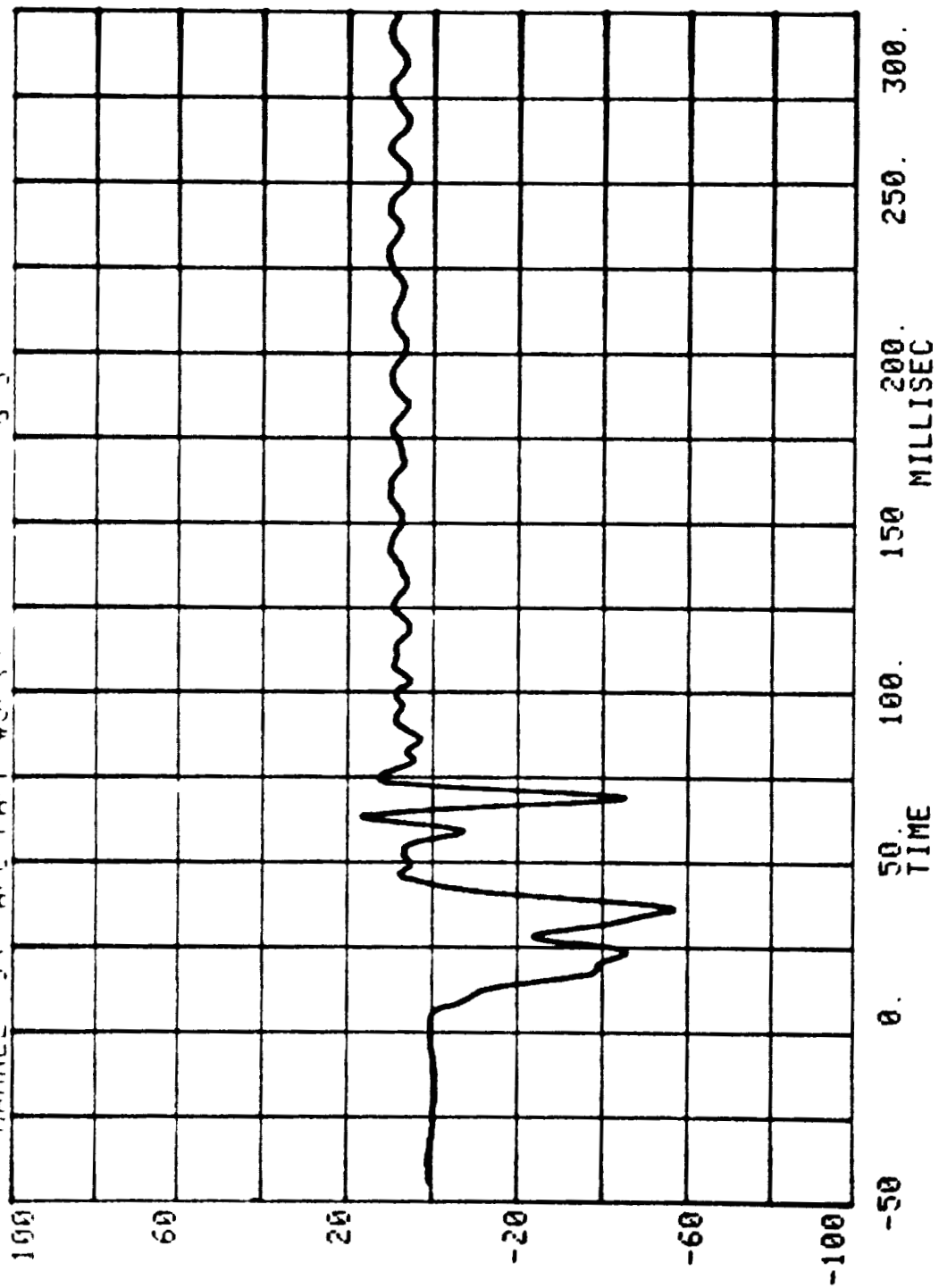




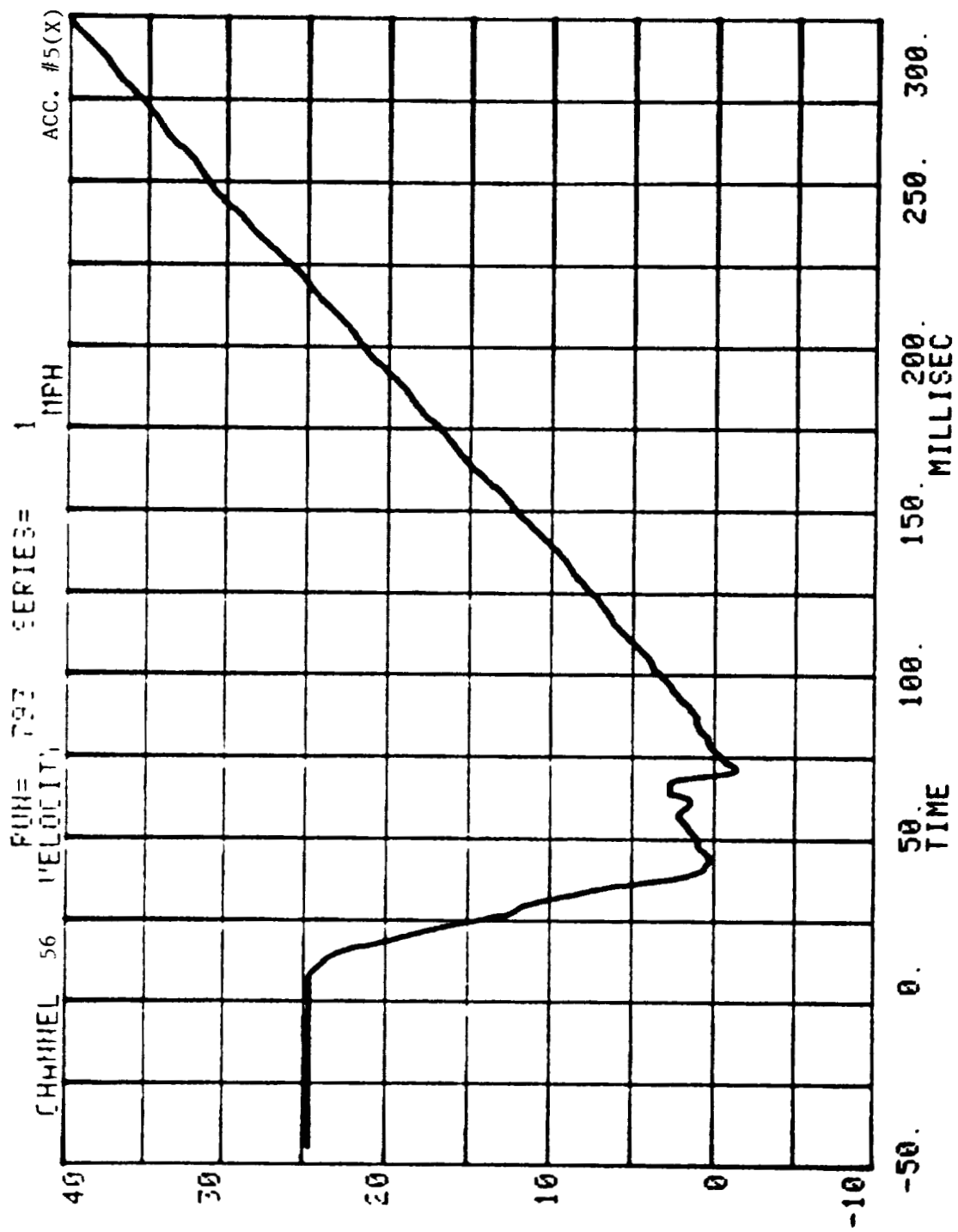
CHANNEL 55 PUN= 797 SERIES= 1
ACC P20V #471



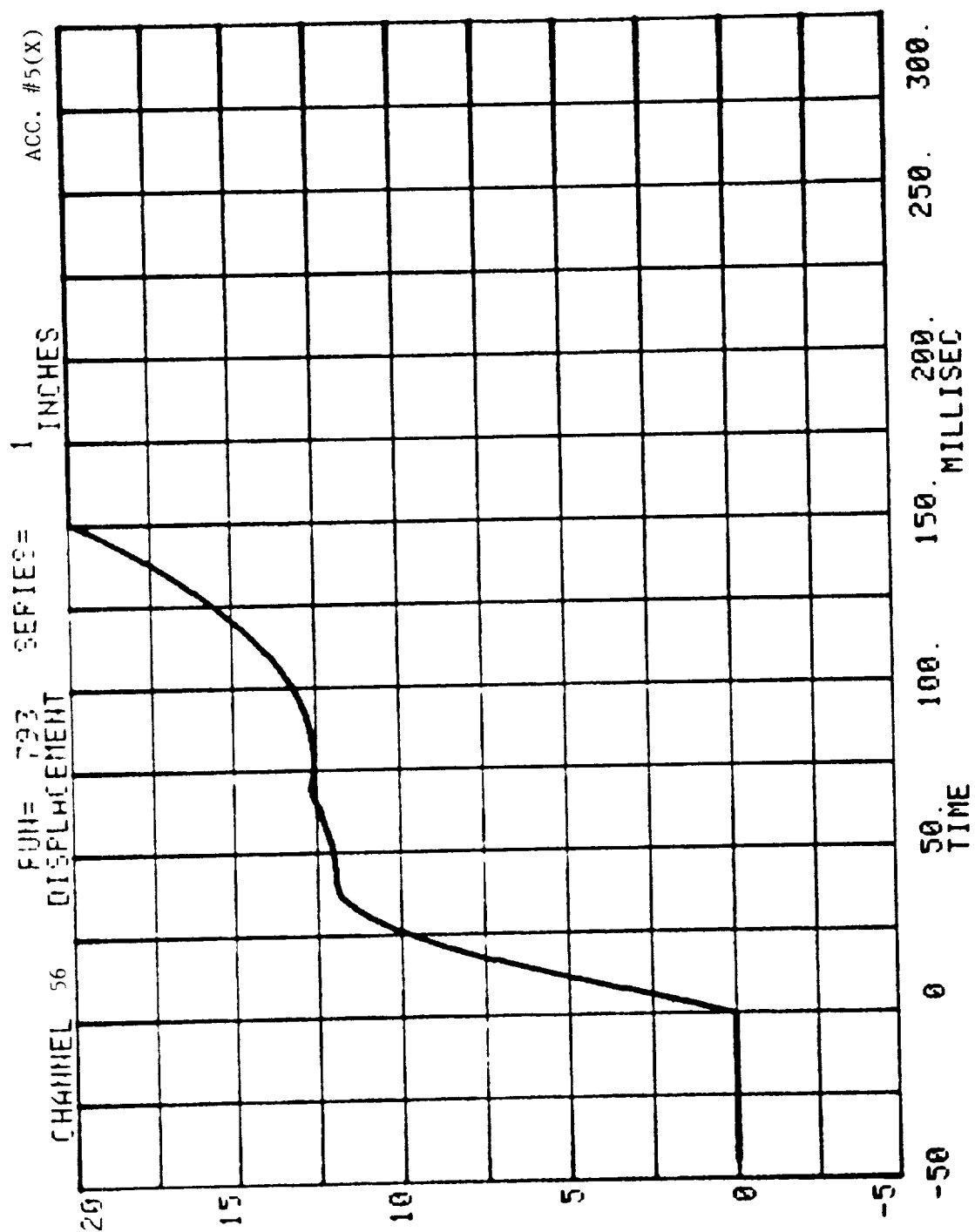
CHANNEL 55 ACQ FACT #50 N
RUN= 733 REPIE= 1 5'S



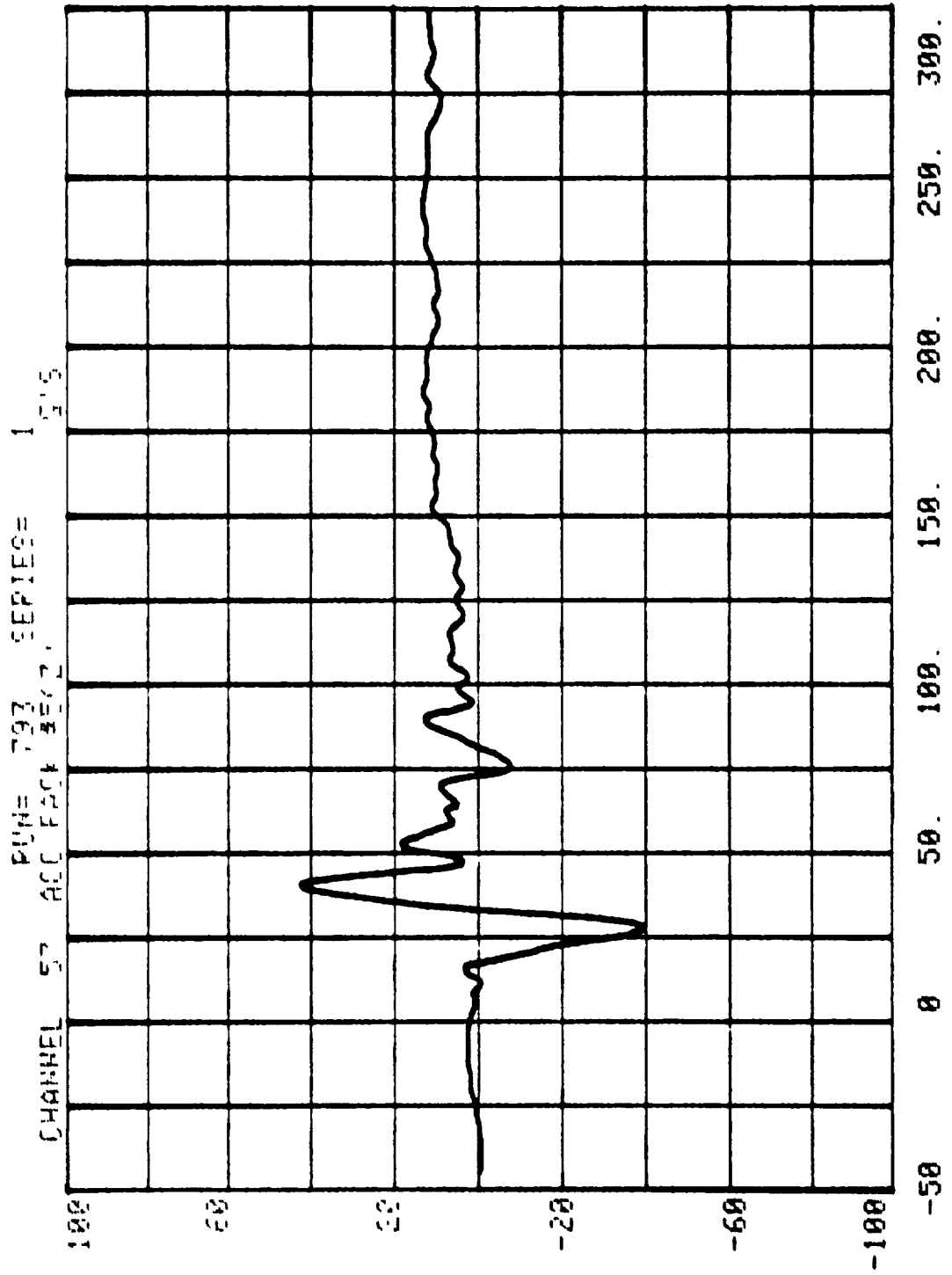
Note: Data questionable after
70 msec.



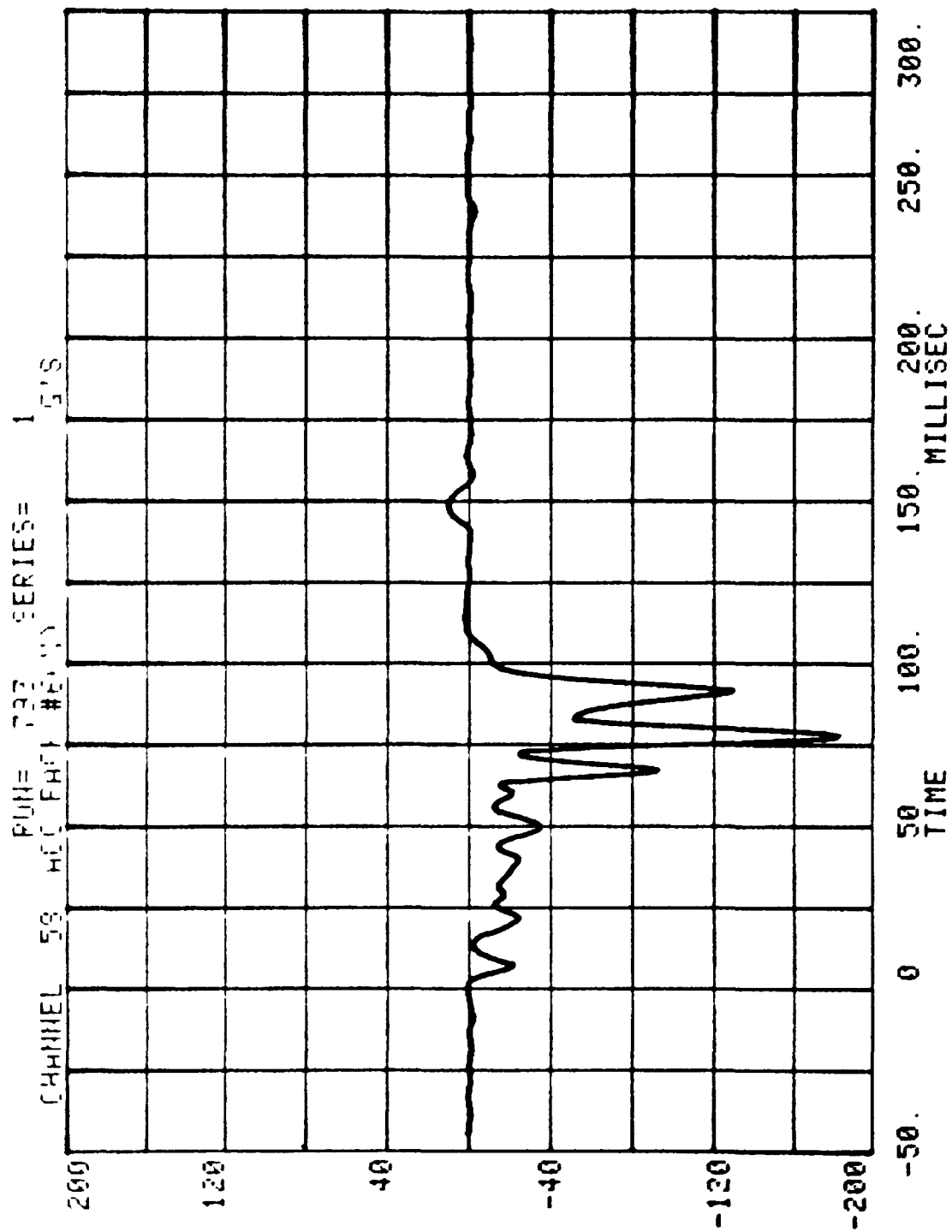
Note: Data questionable after 70 msec.

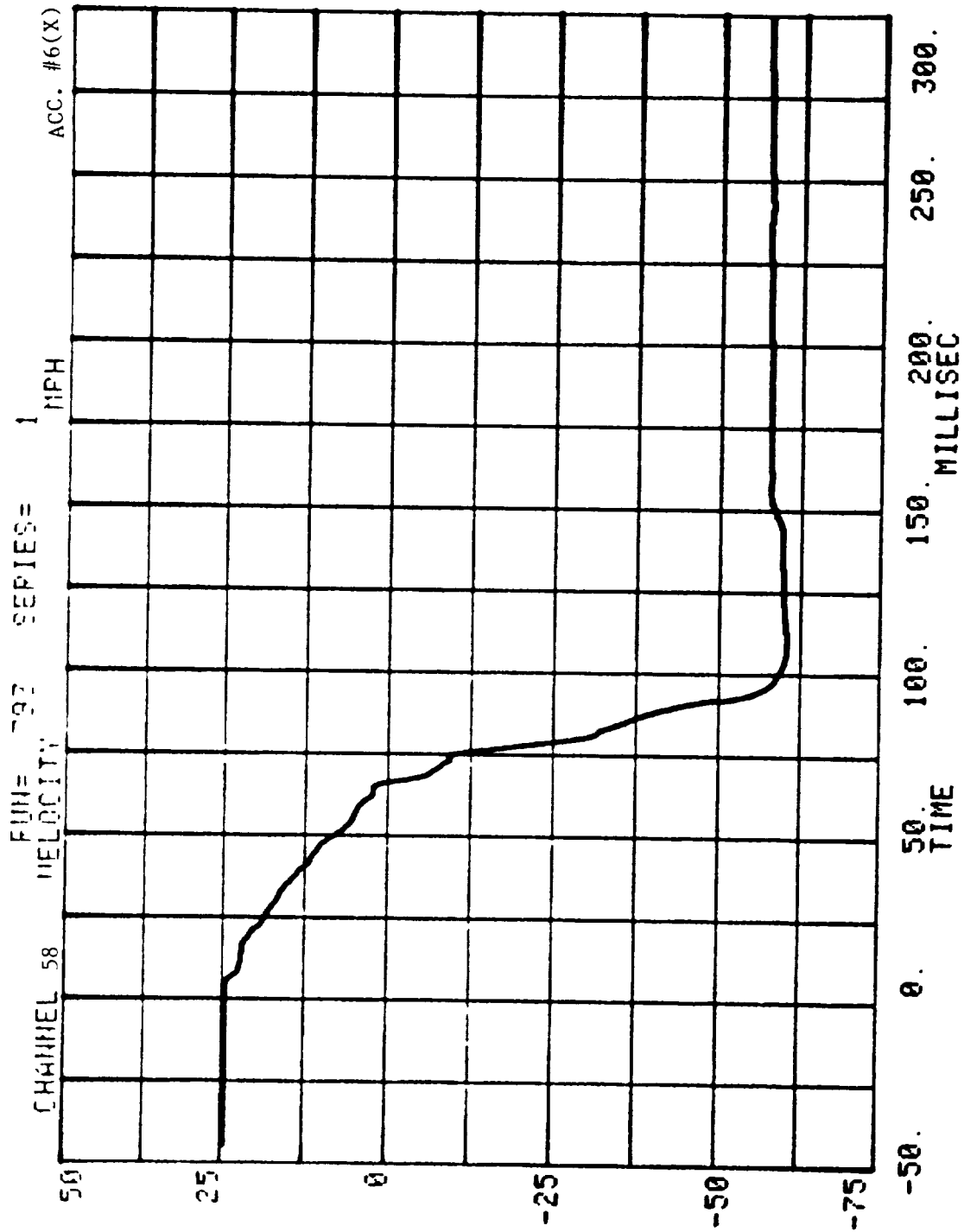


Note: Data questionable after 70 msec.



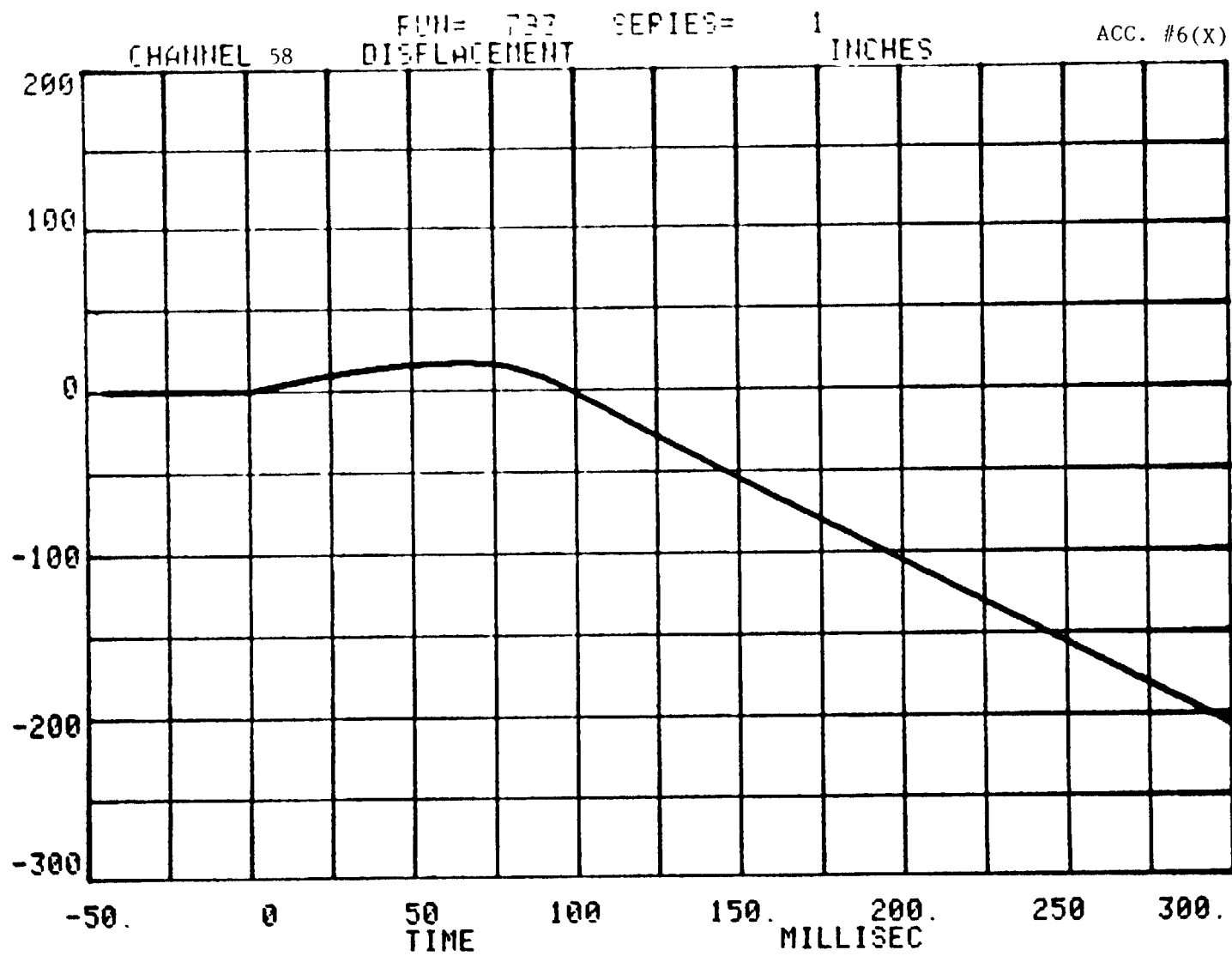
Note: Data questionable after
70 msec.

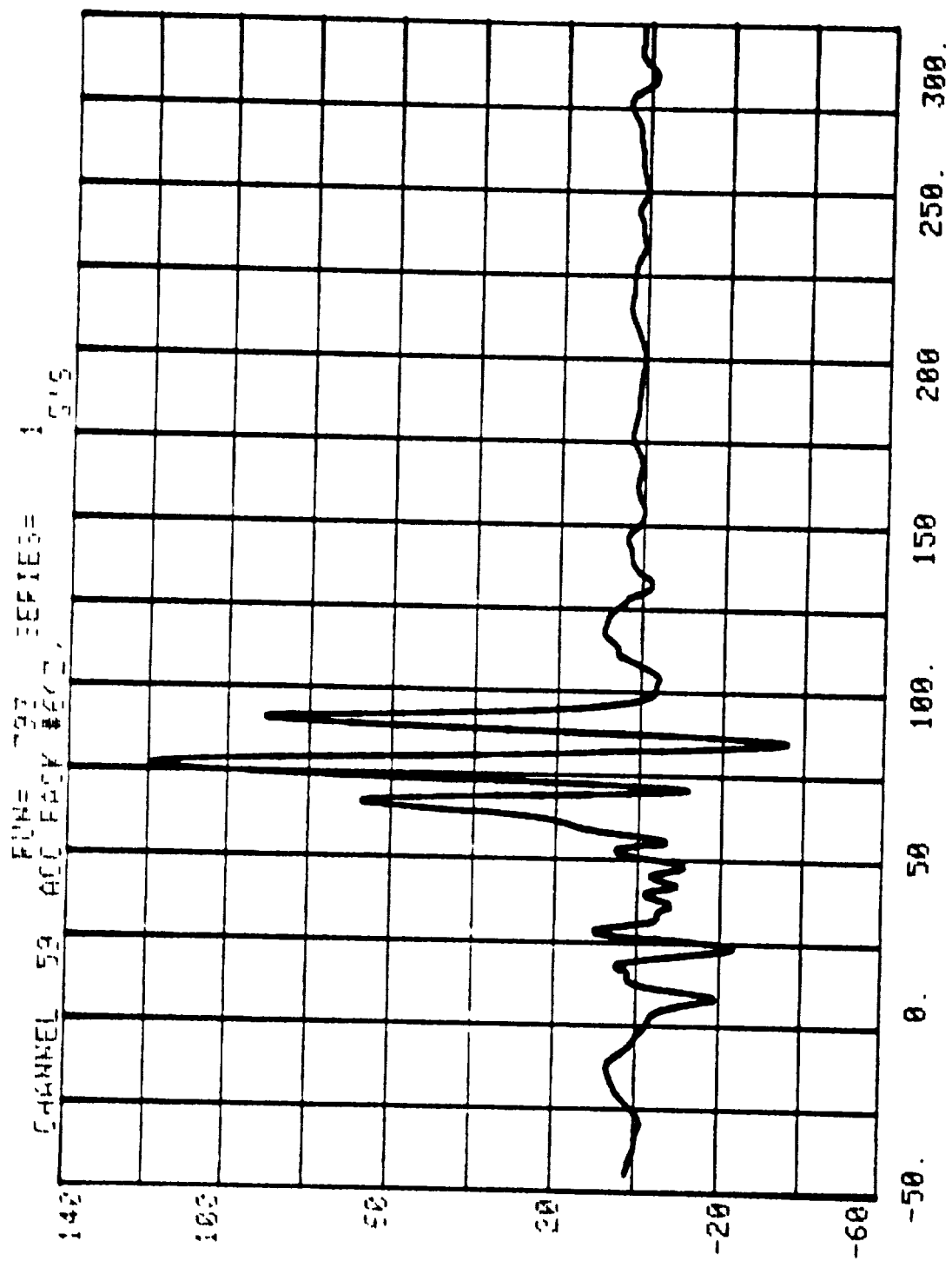


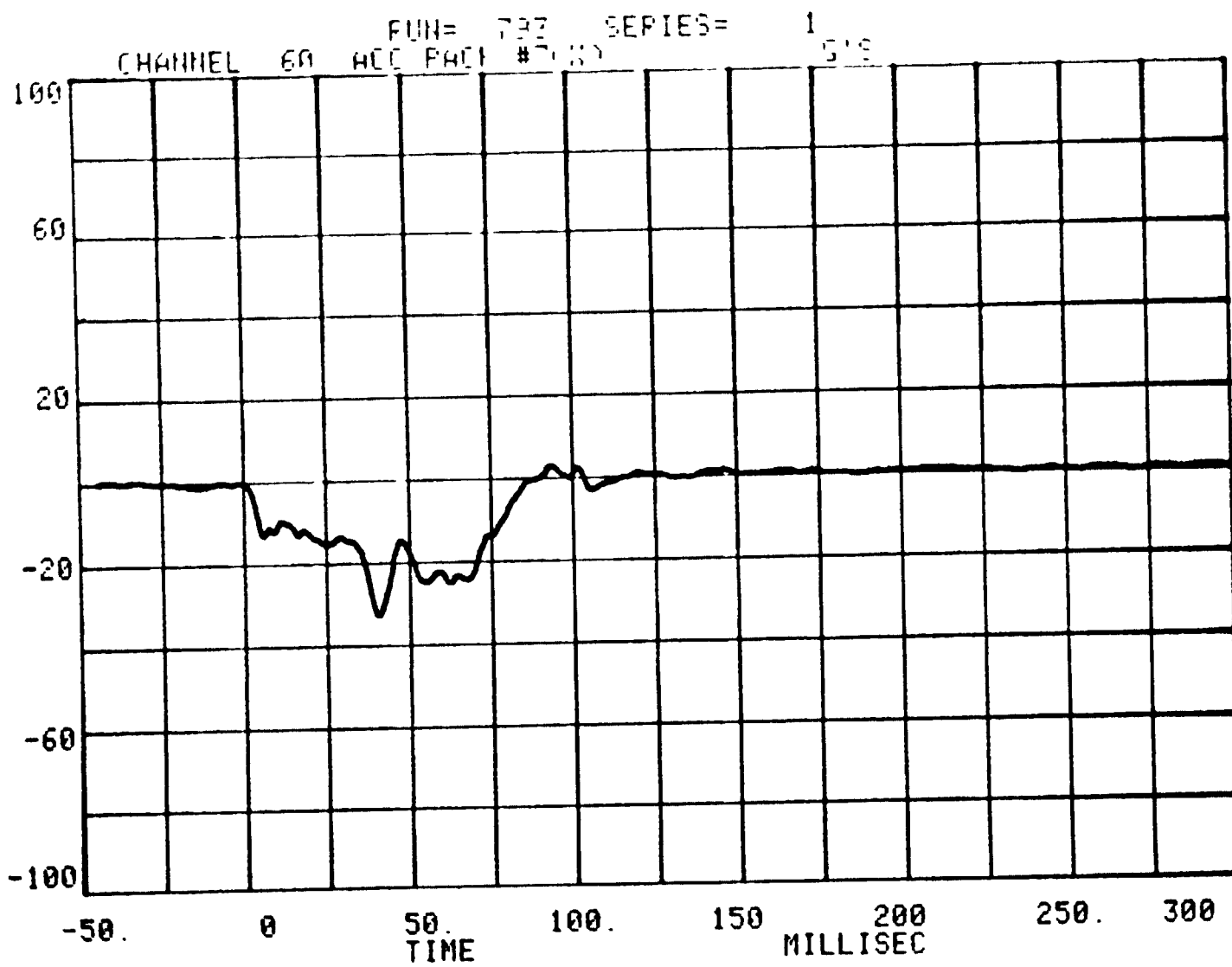


B-38

7581-2

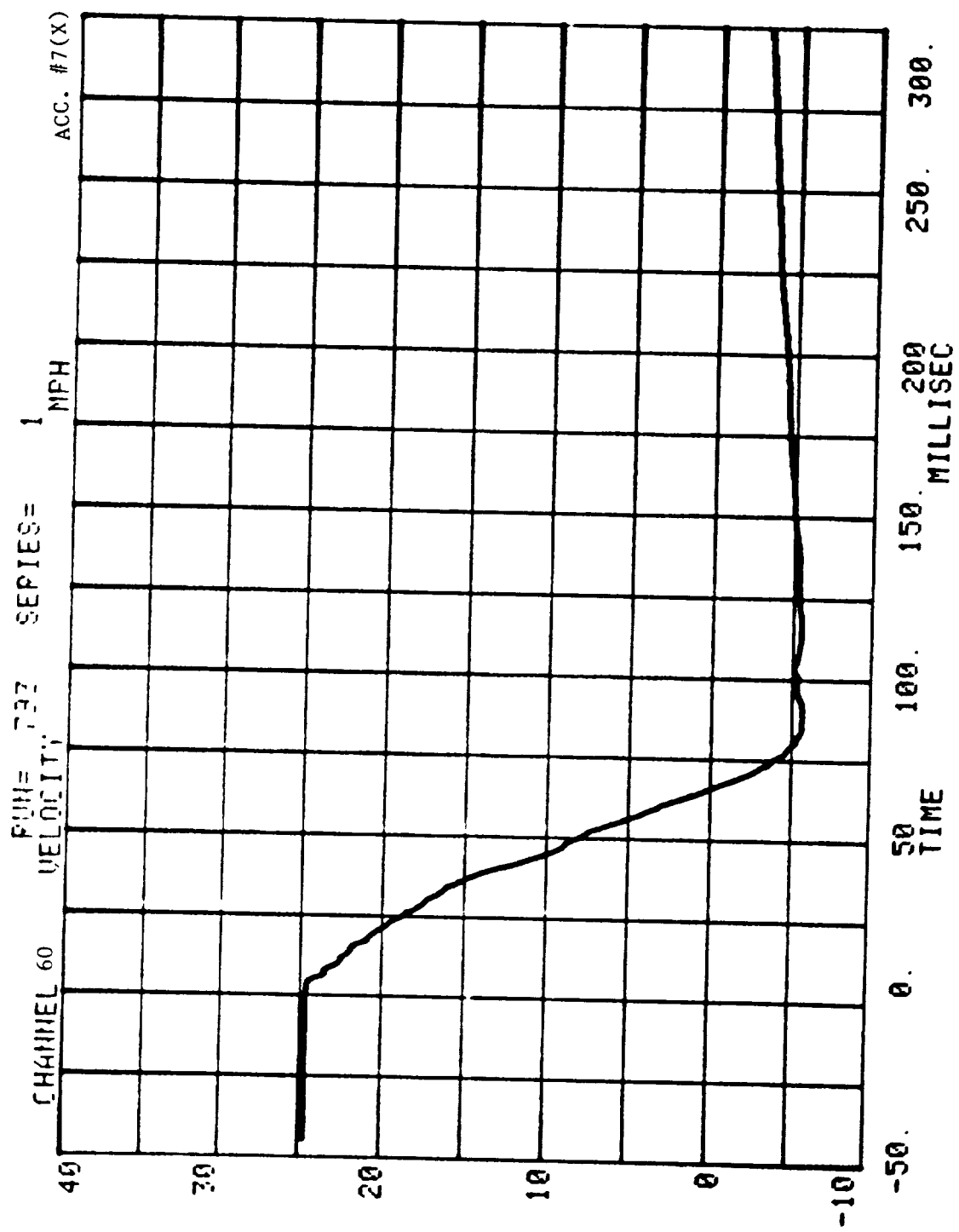


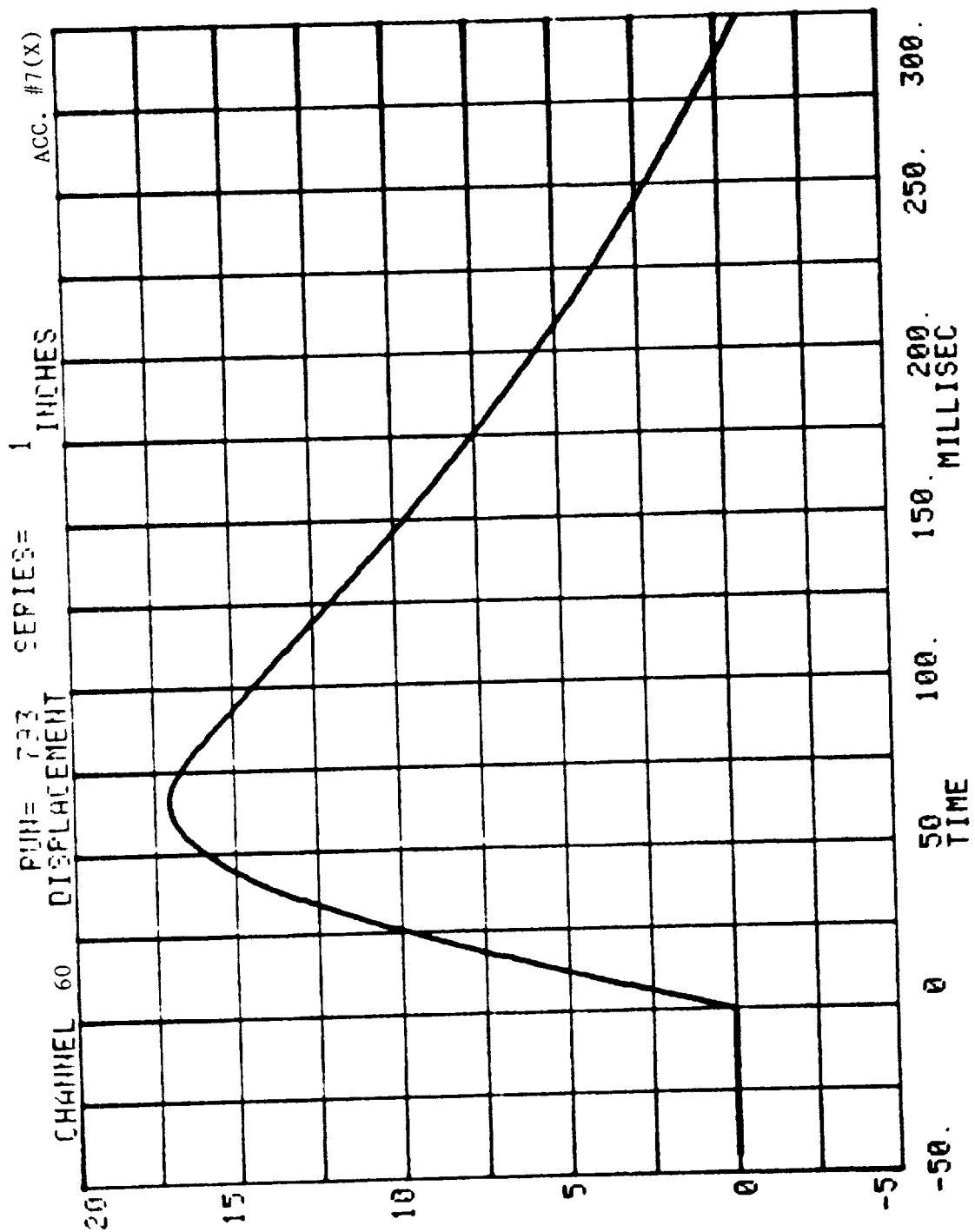




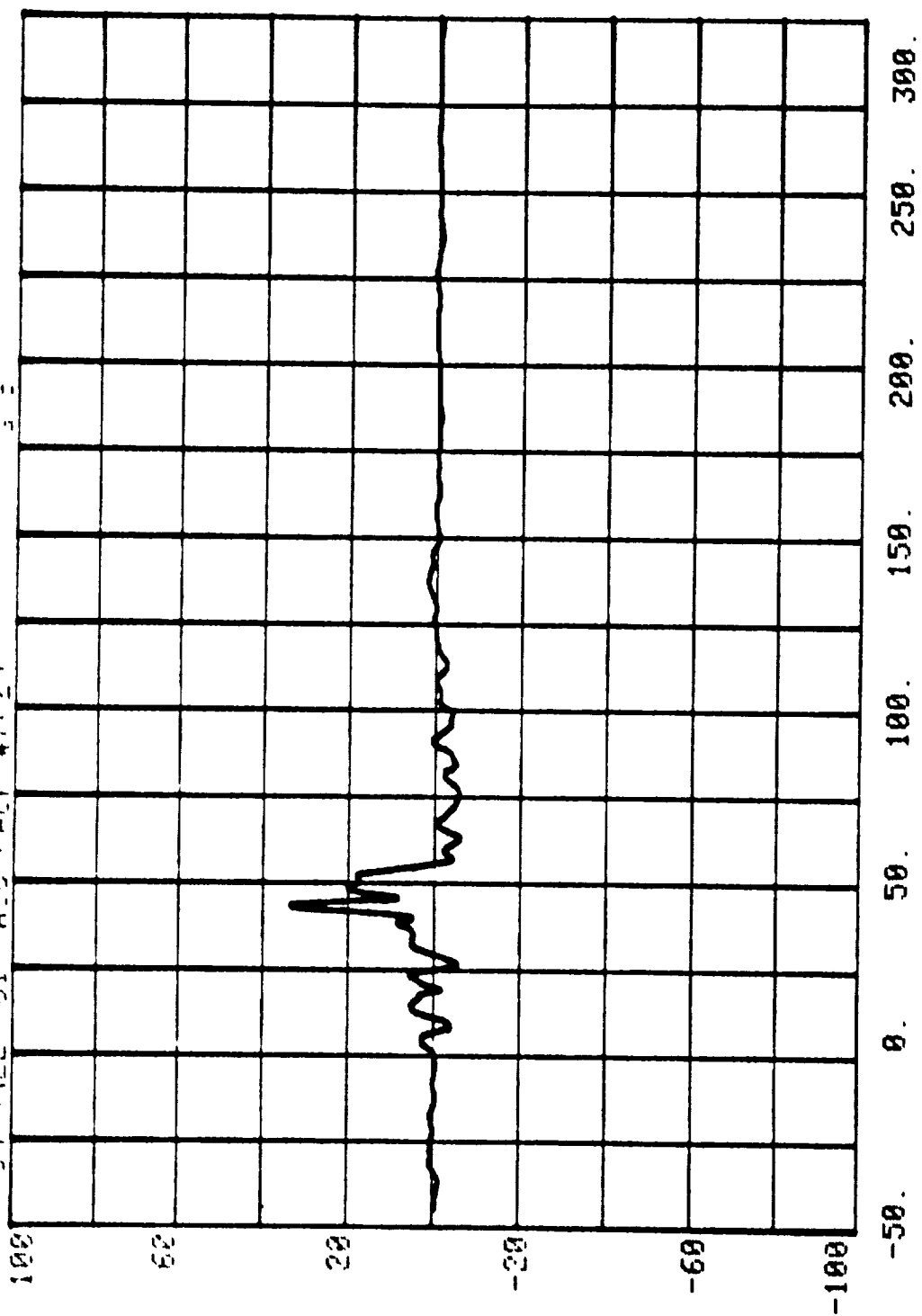
B-40

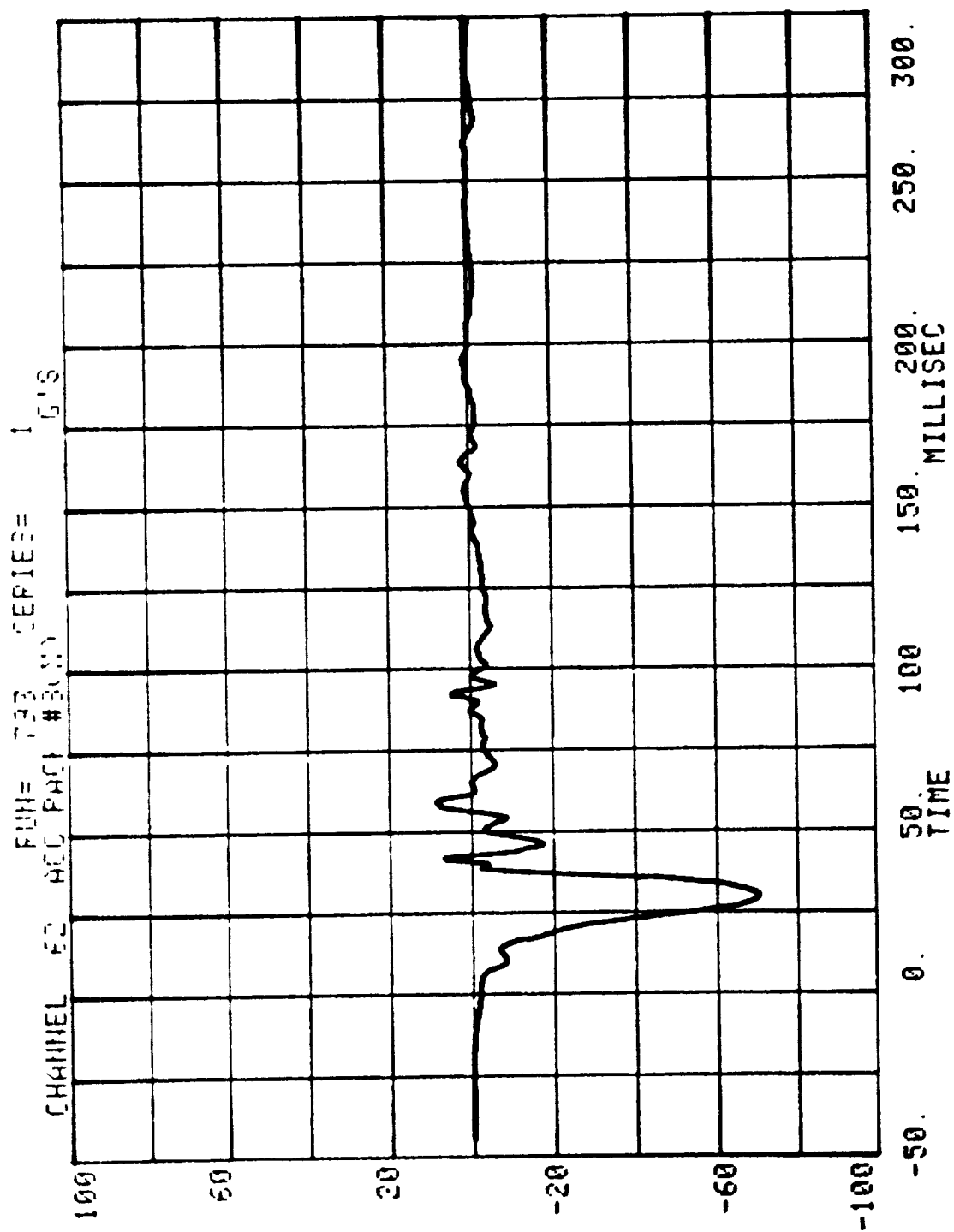
7581-2

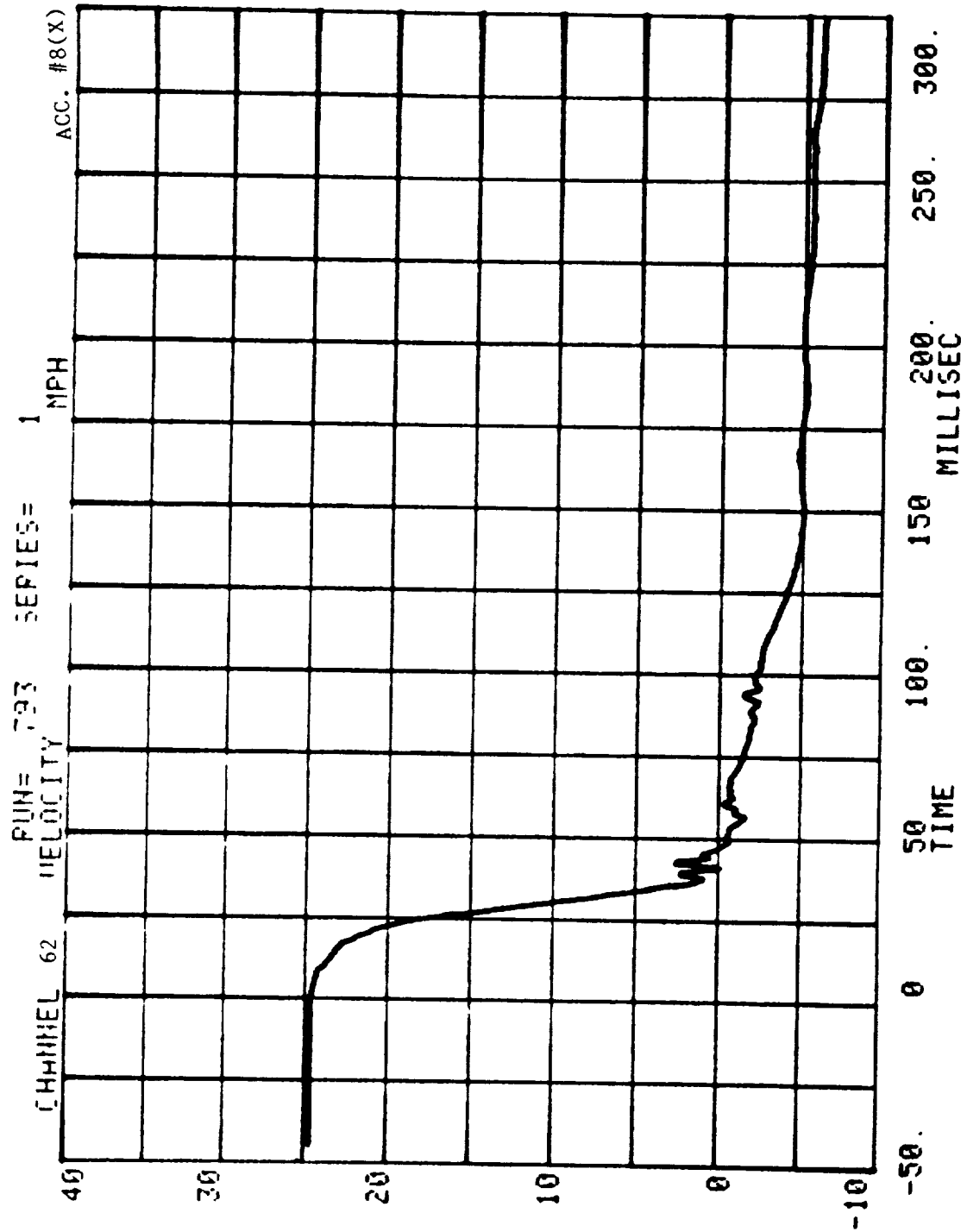


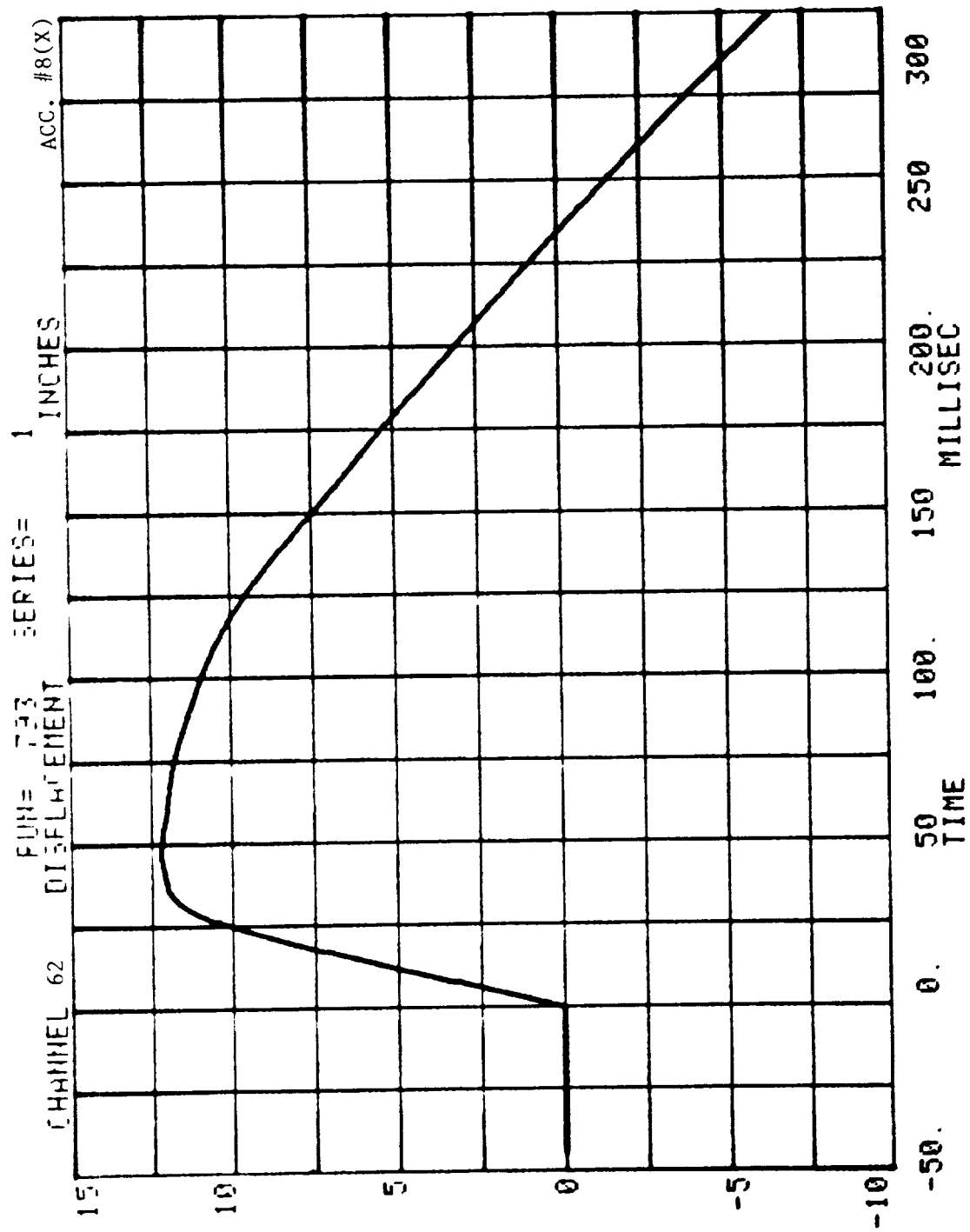


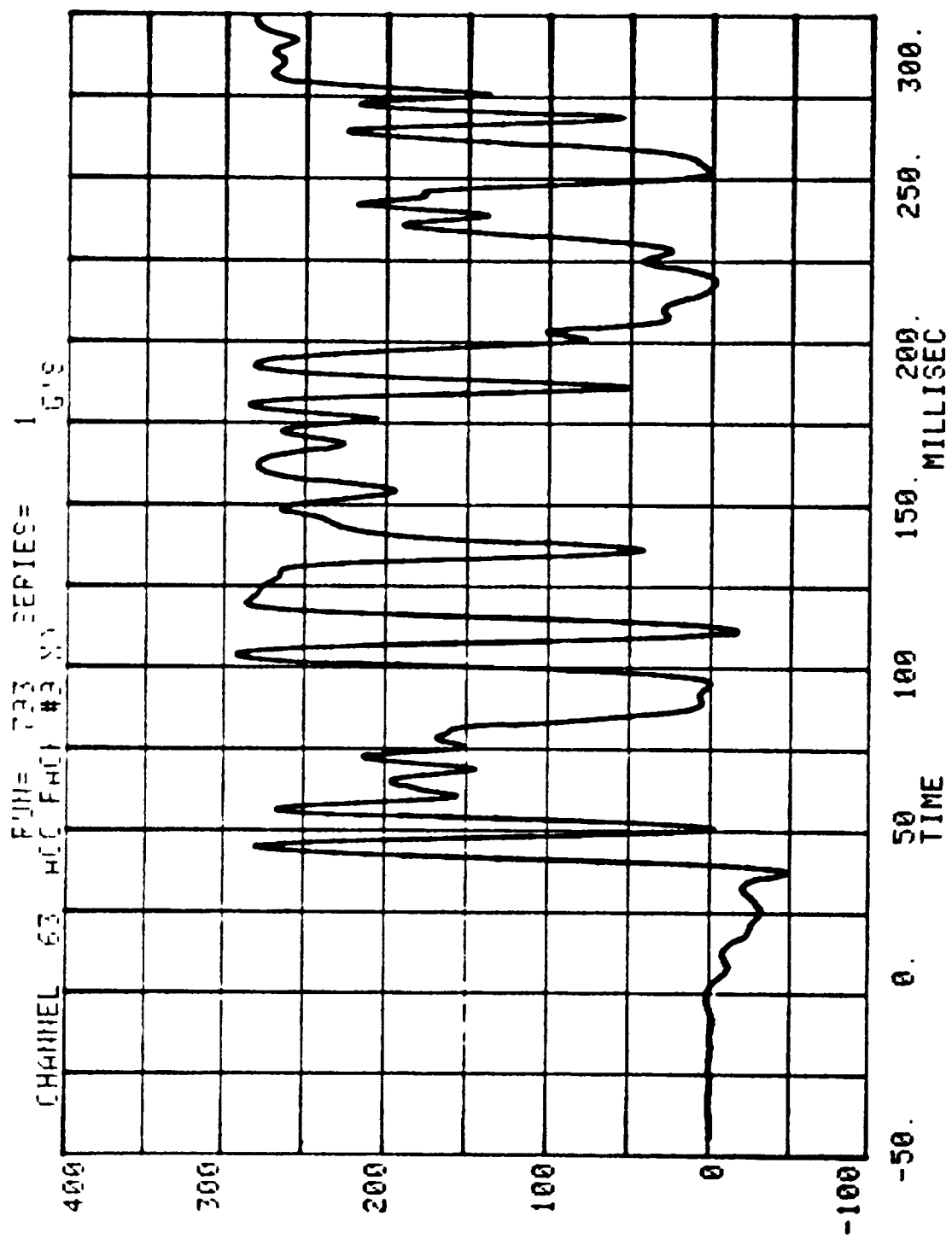
CHANNEL 51 ACC PLOT #772, PUN= 723, SERIES= 1



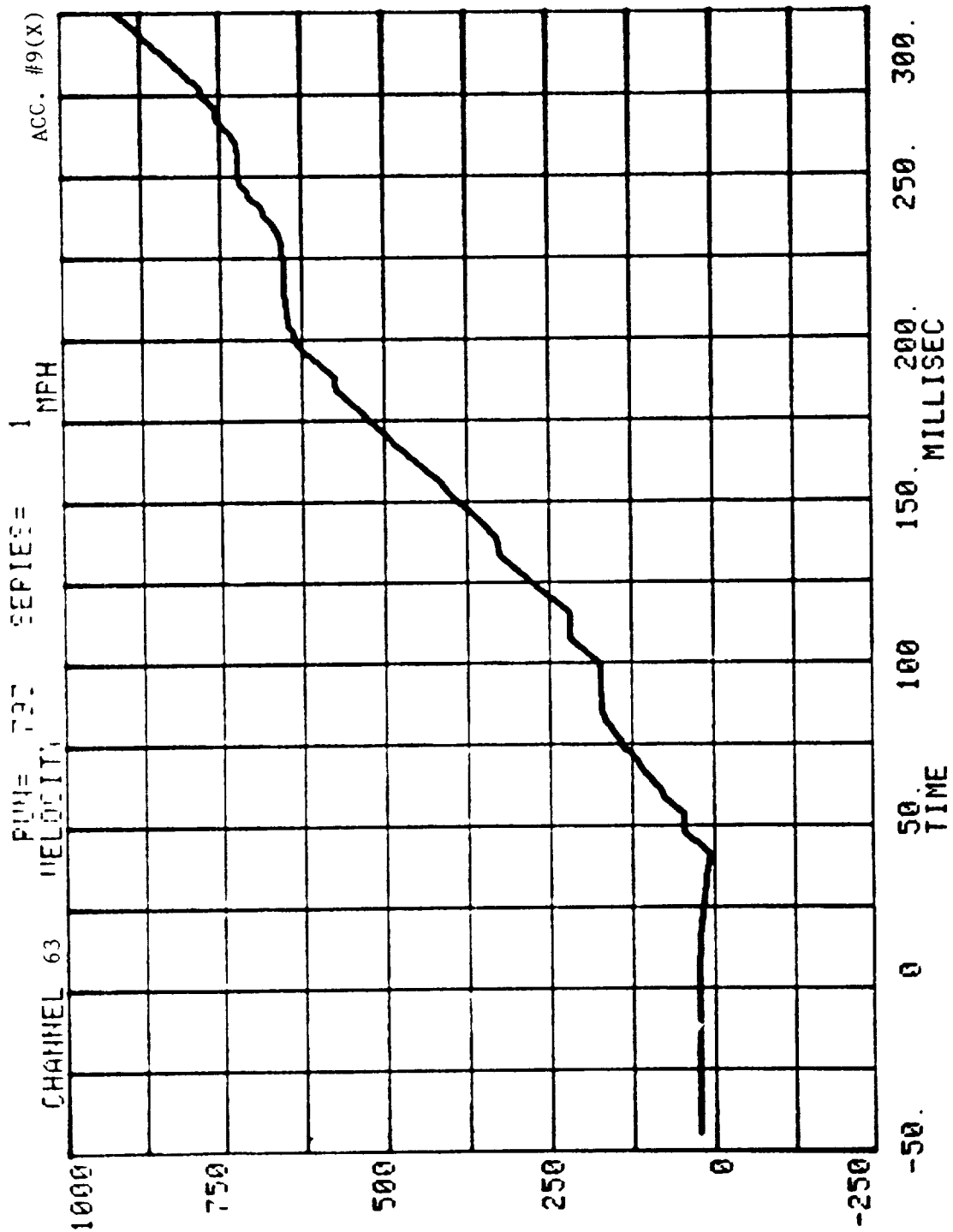




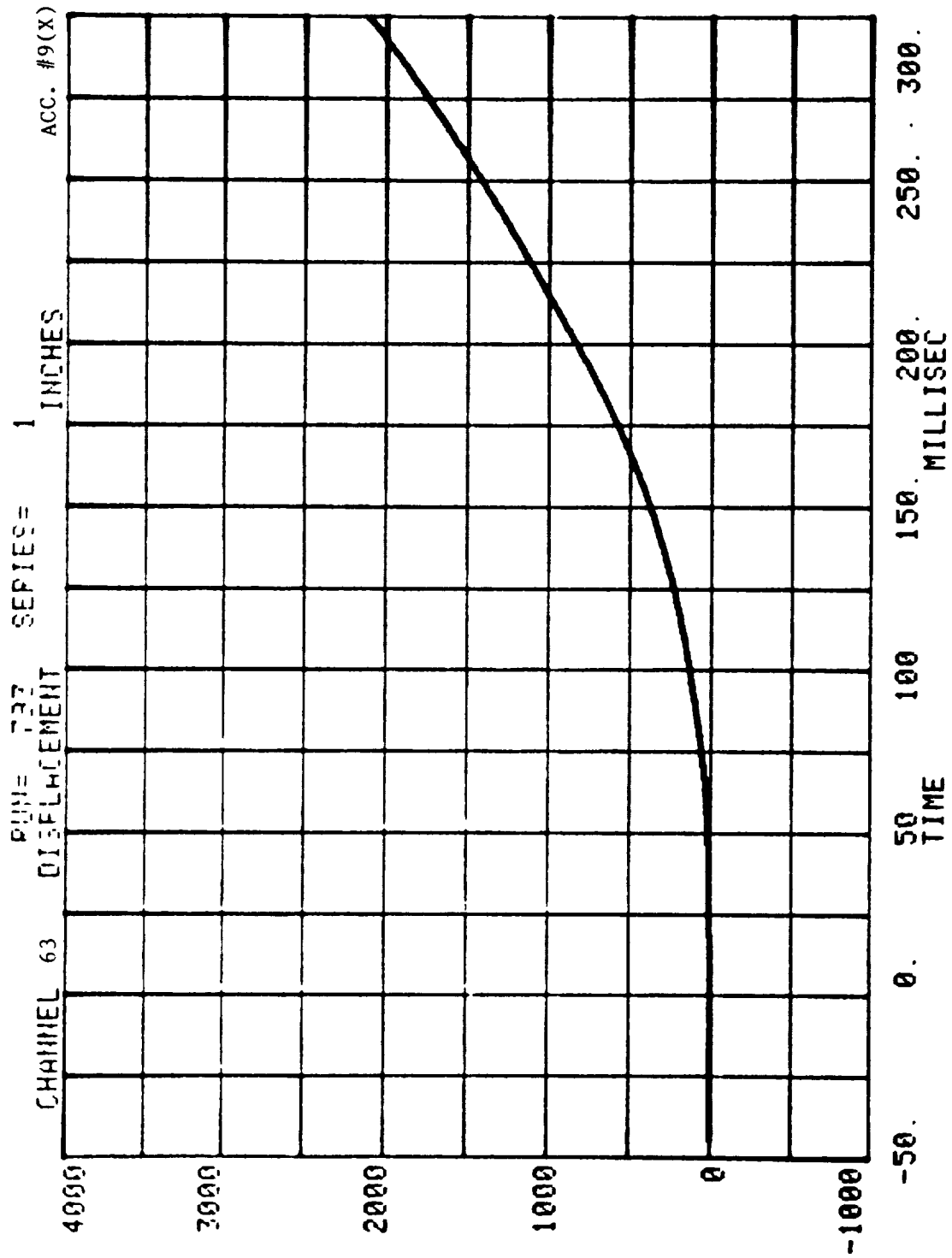




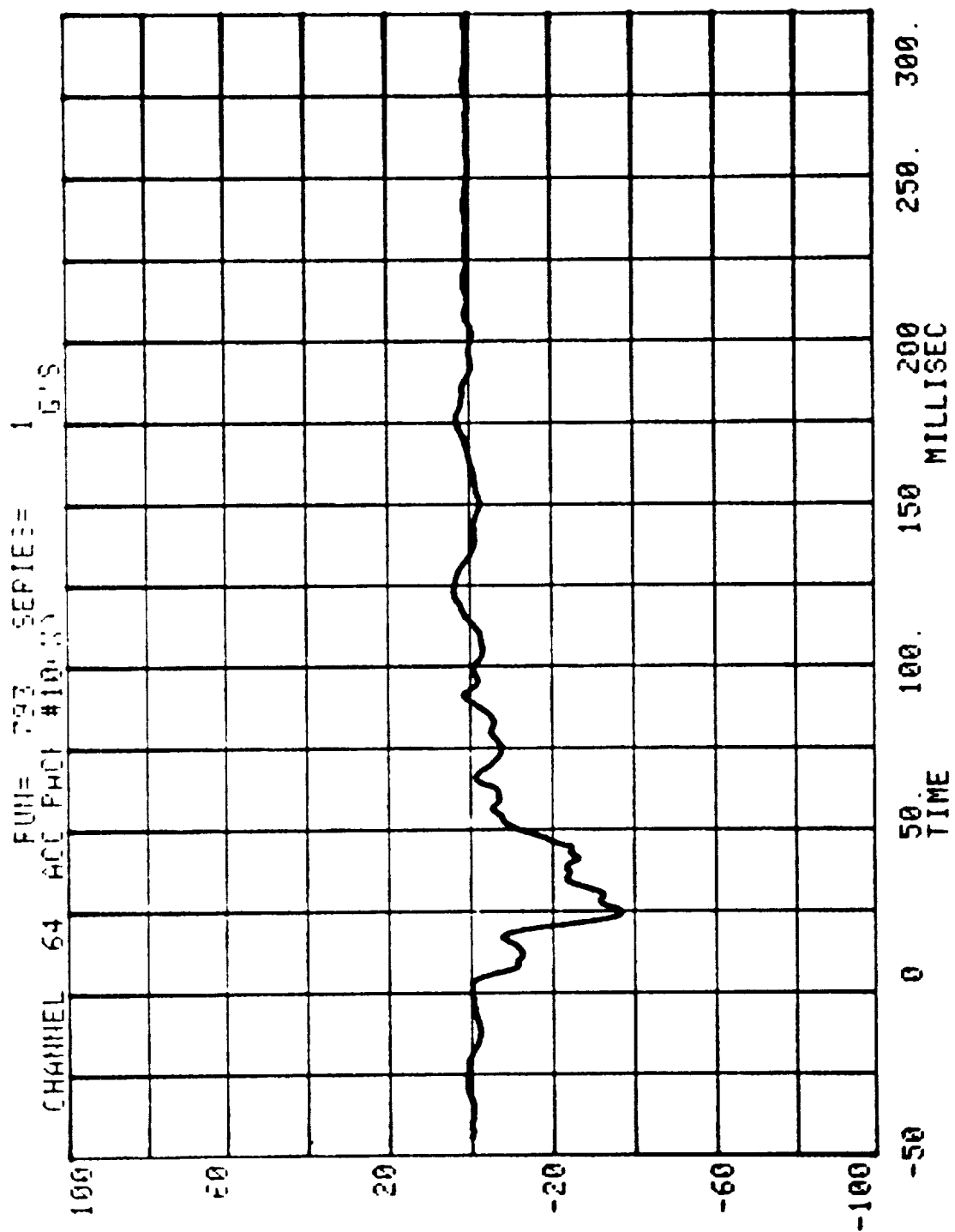
Note: Data questionable after 35 msec

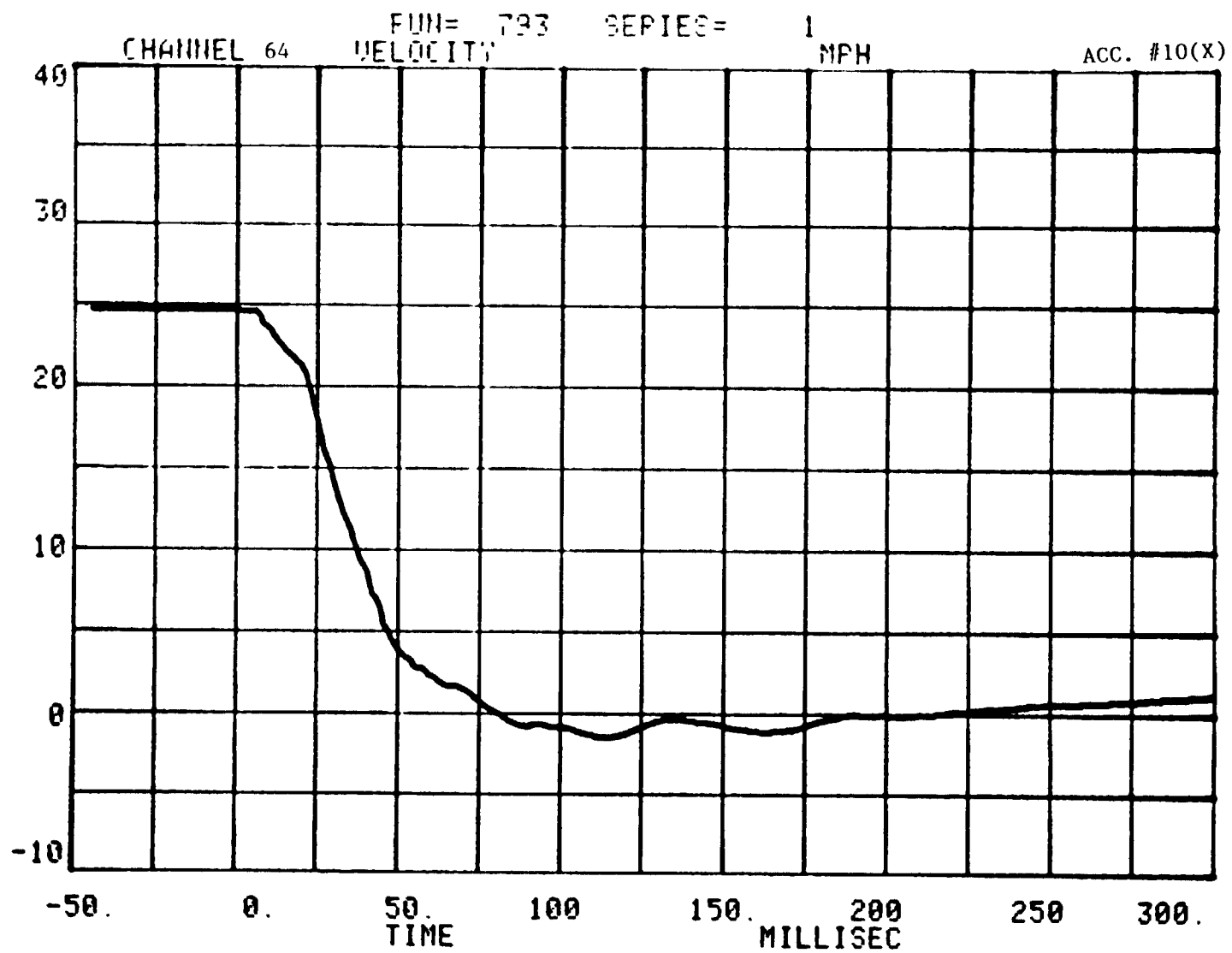


Note: Data questionable after
35 msec.



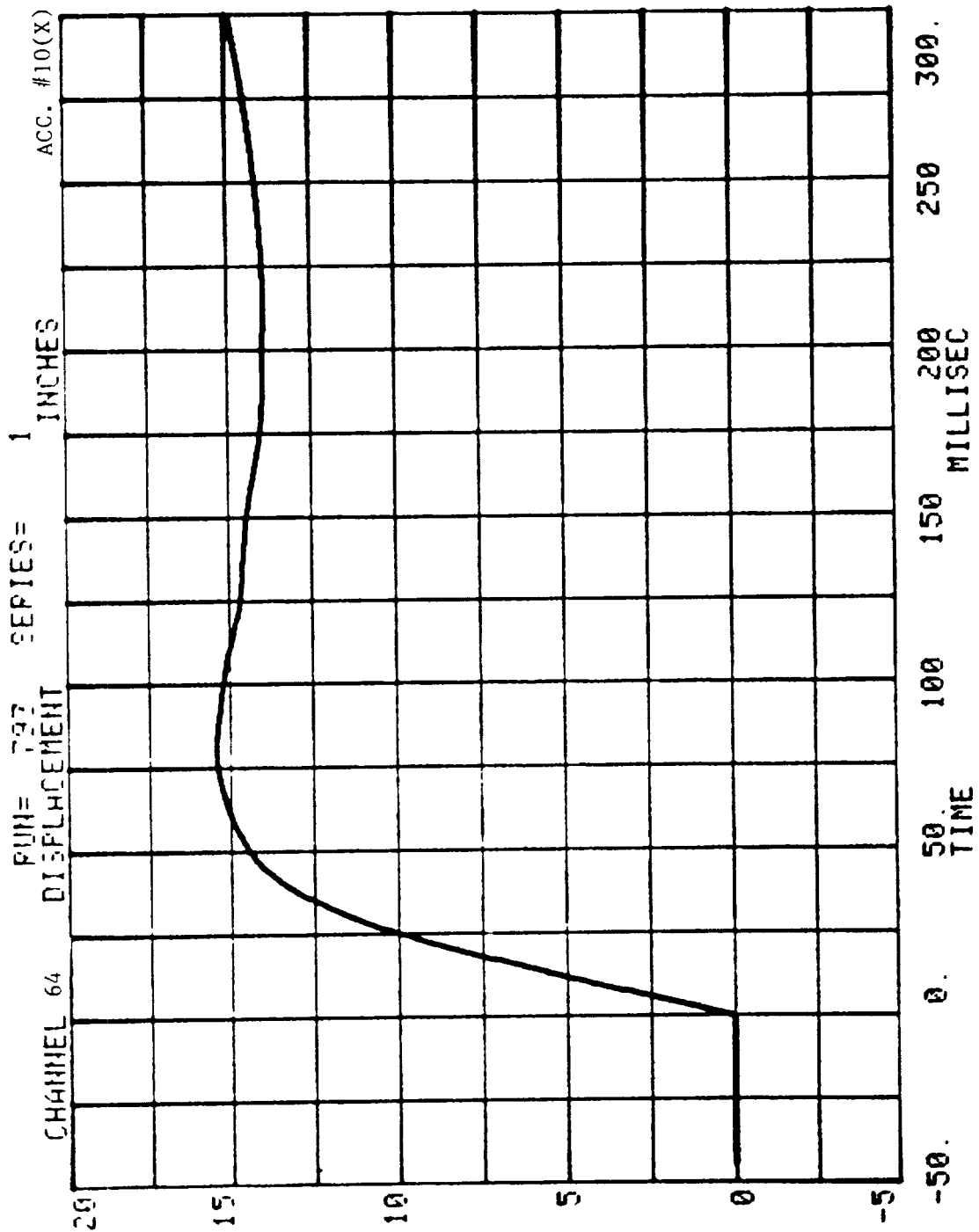
Note: Data questionable after
35 msec.

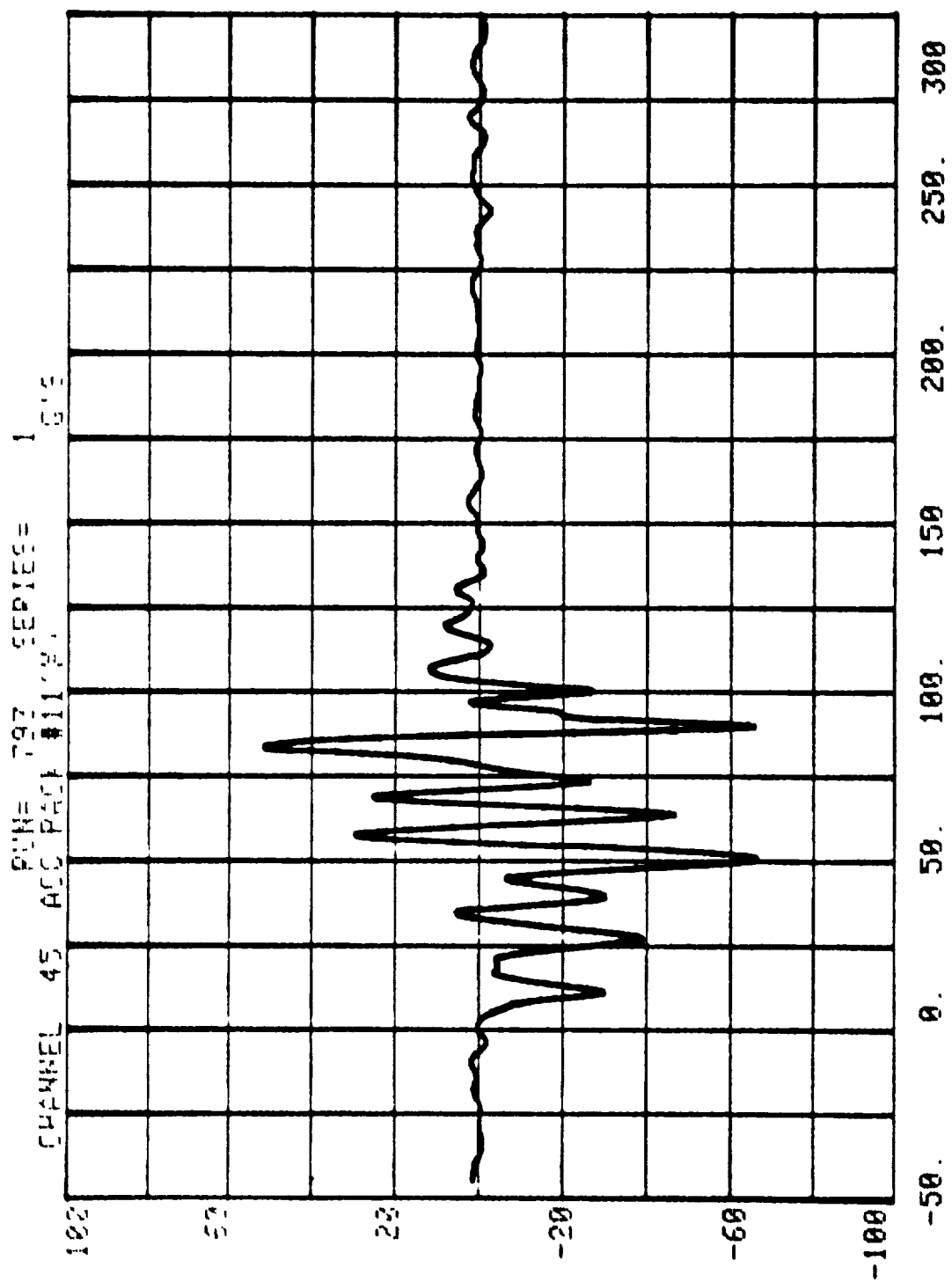


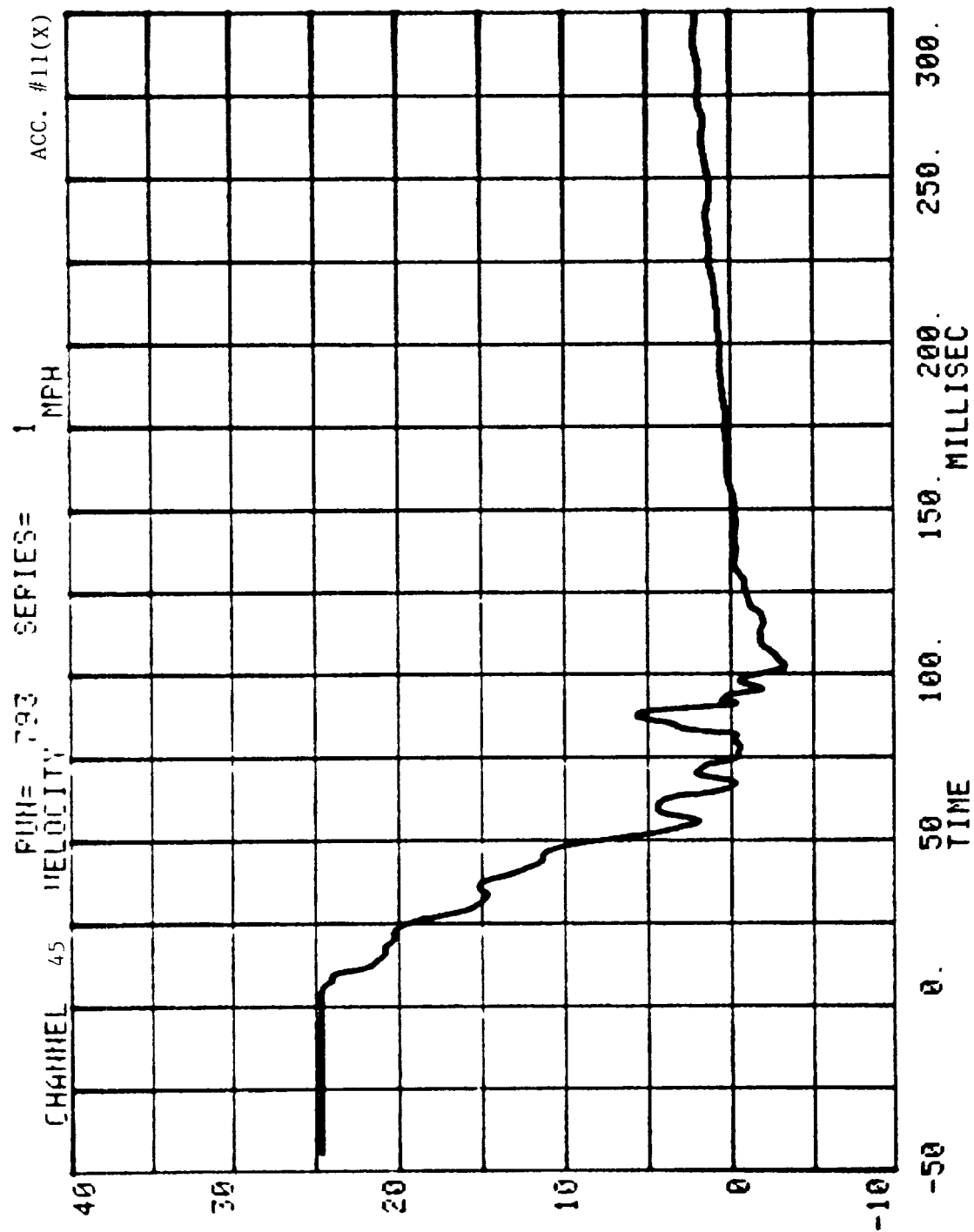


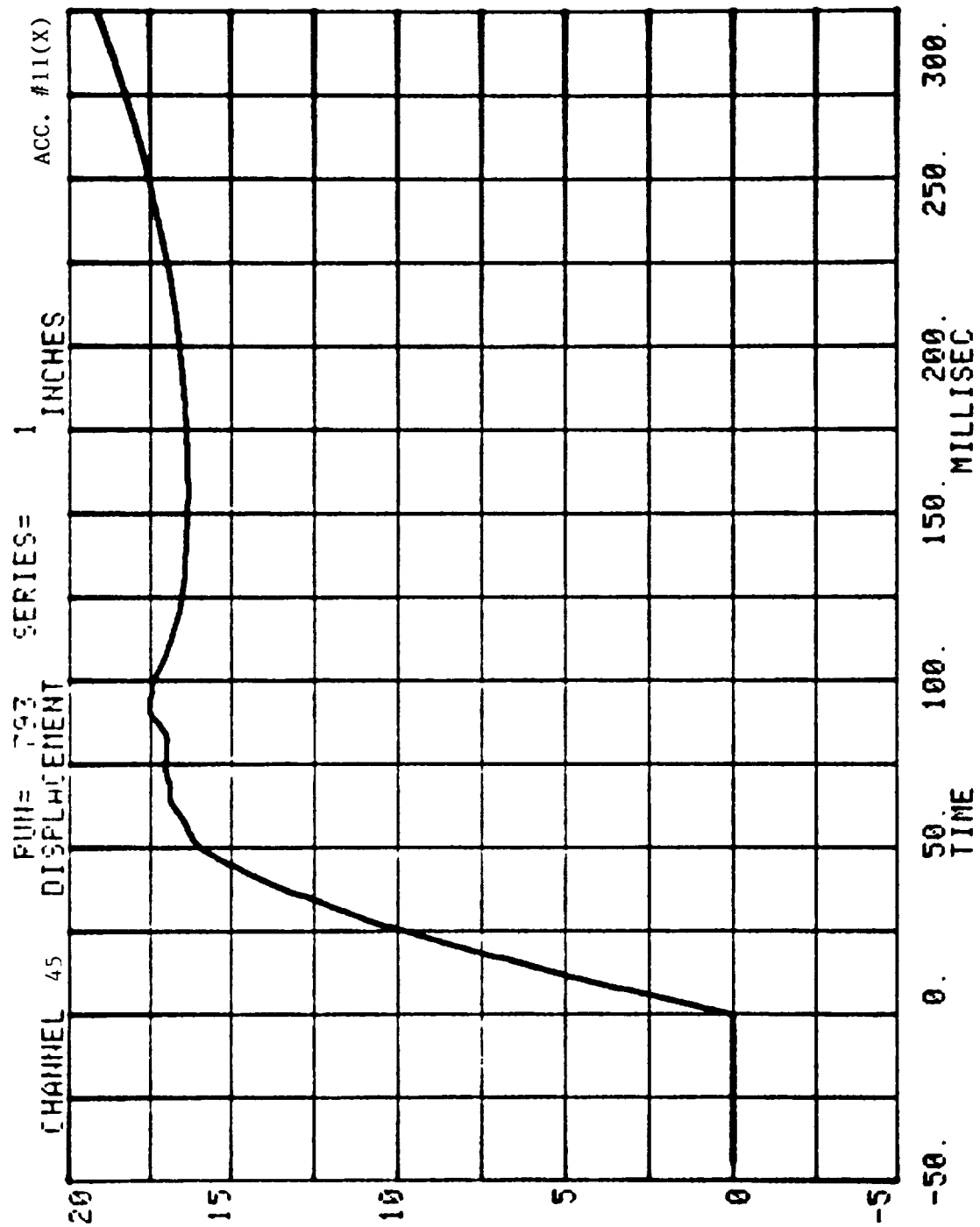
B-51

7581-2

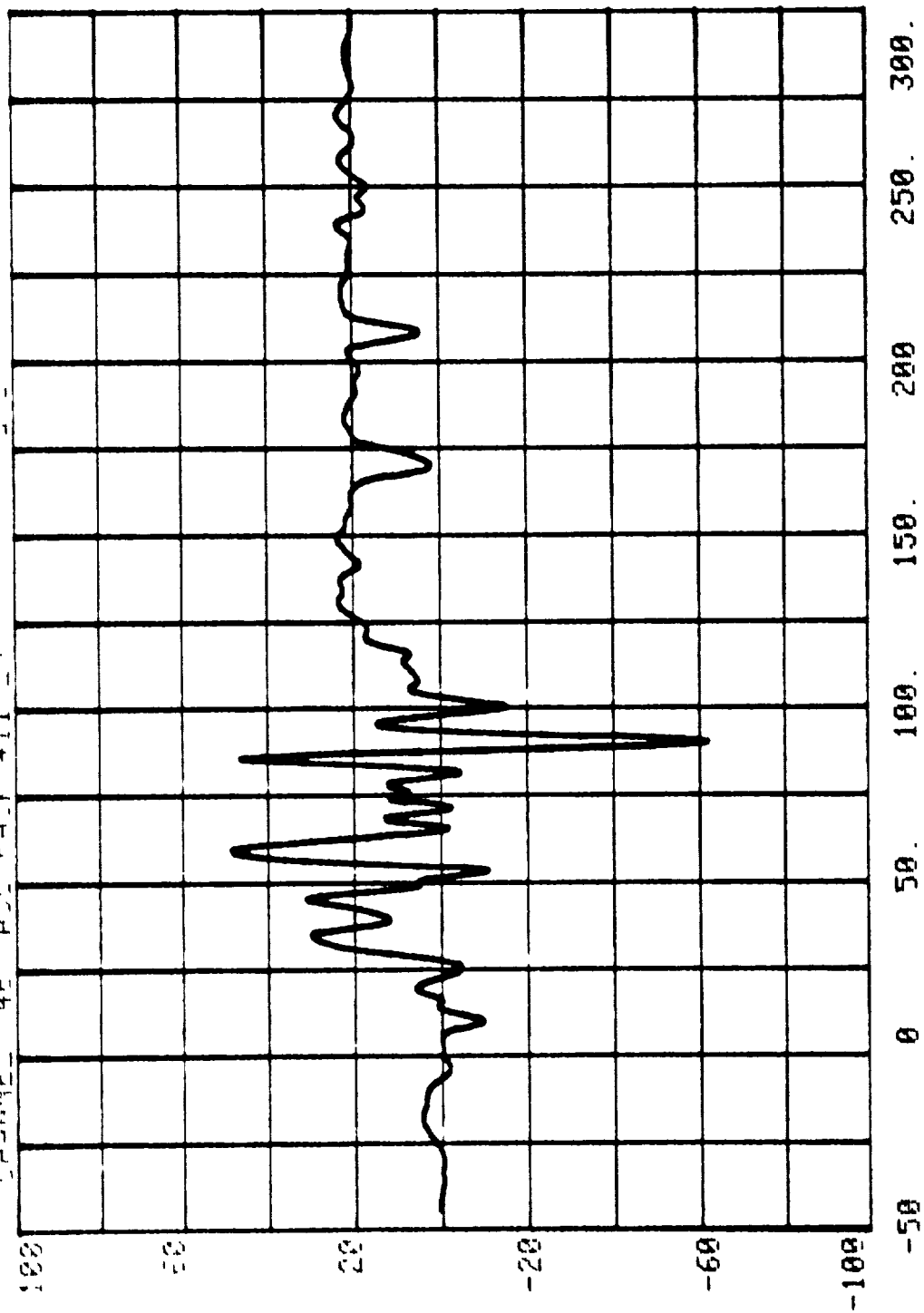








CHANNEL 46 ACCE FAC Y 41102
RUN# 737 SERIES# 1



TEST NO. Y23-010-793

LOAD CELL BARRIER DATA

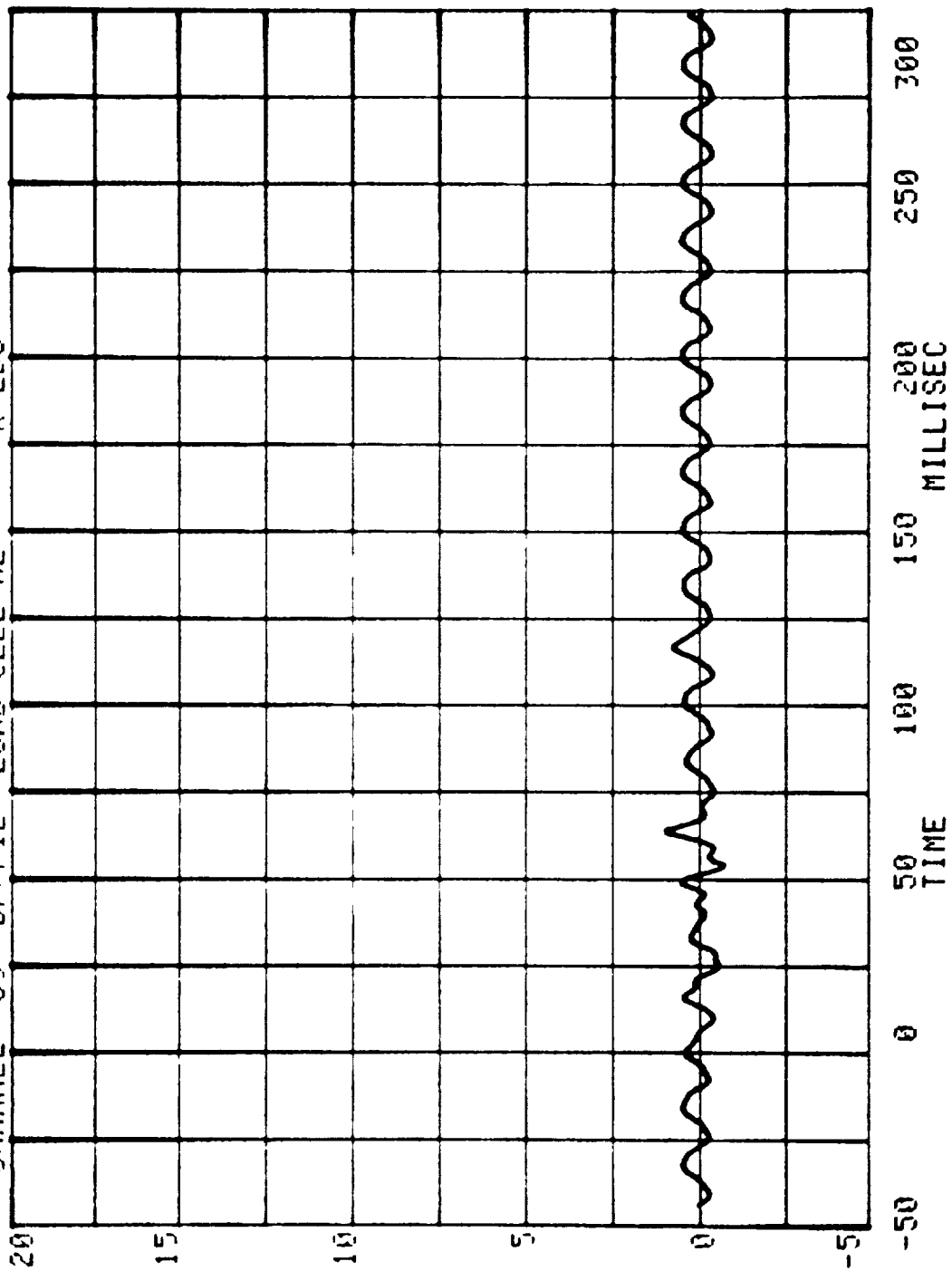
FILTER CHANNEL CLASS

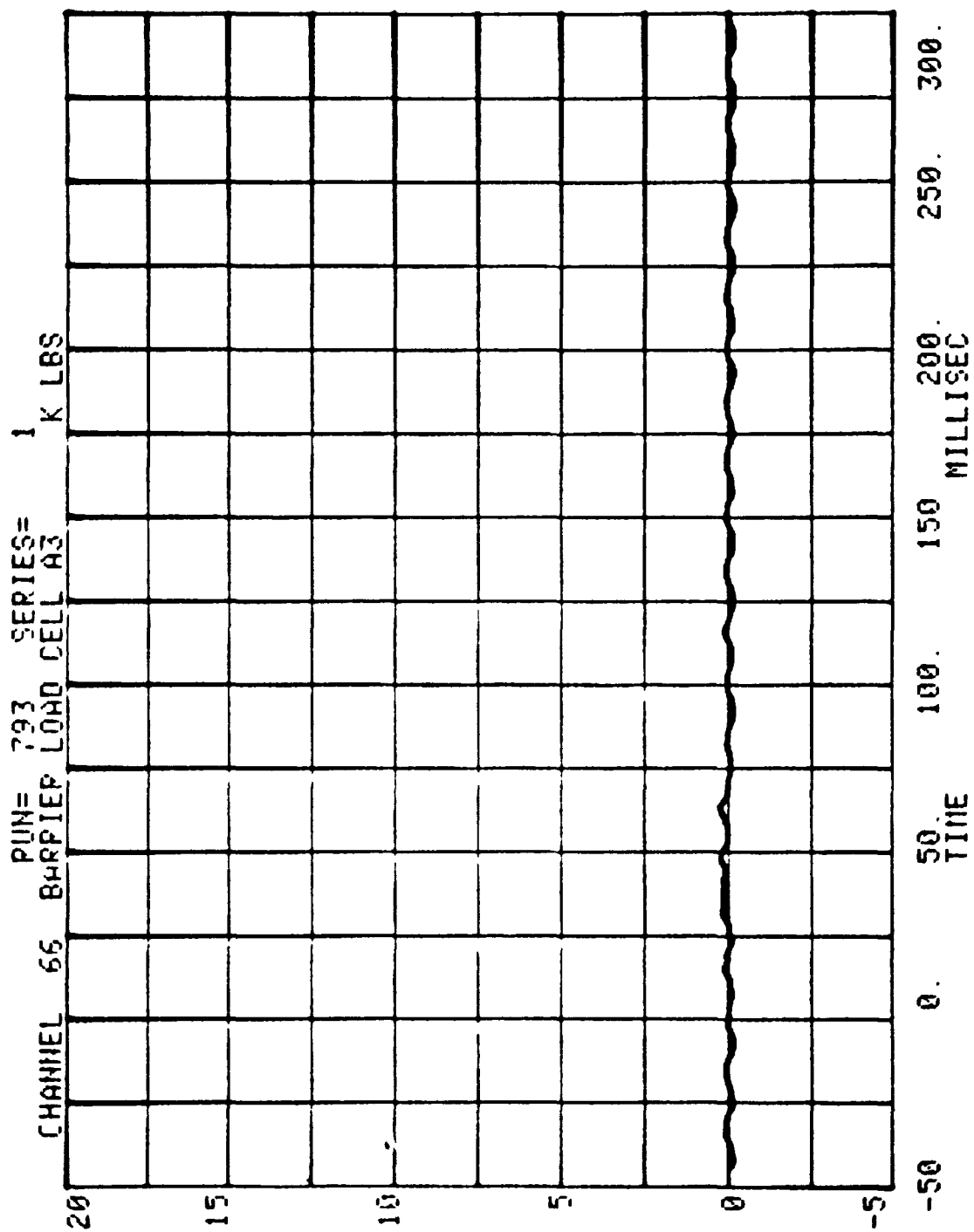
60

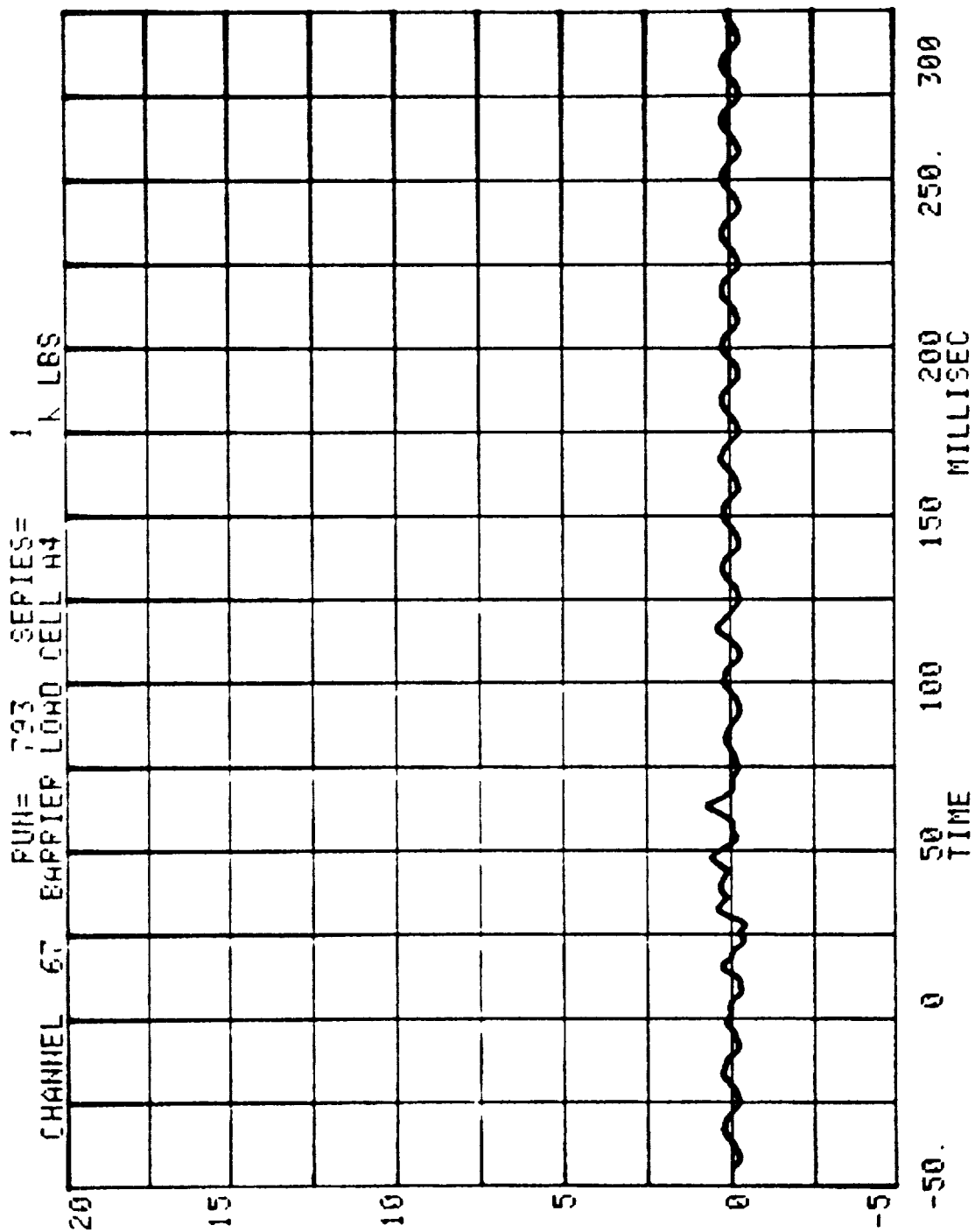
CHANNEL 65 BURRIER LOAD CELL A2

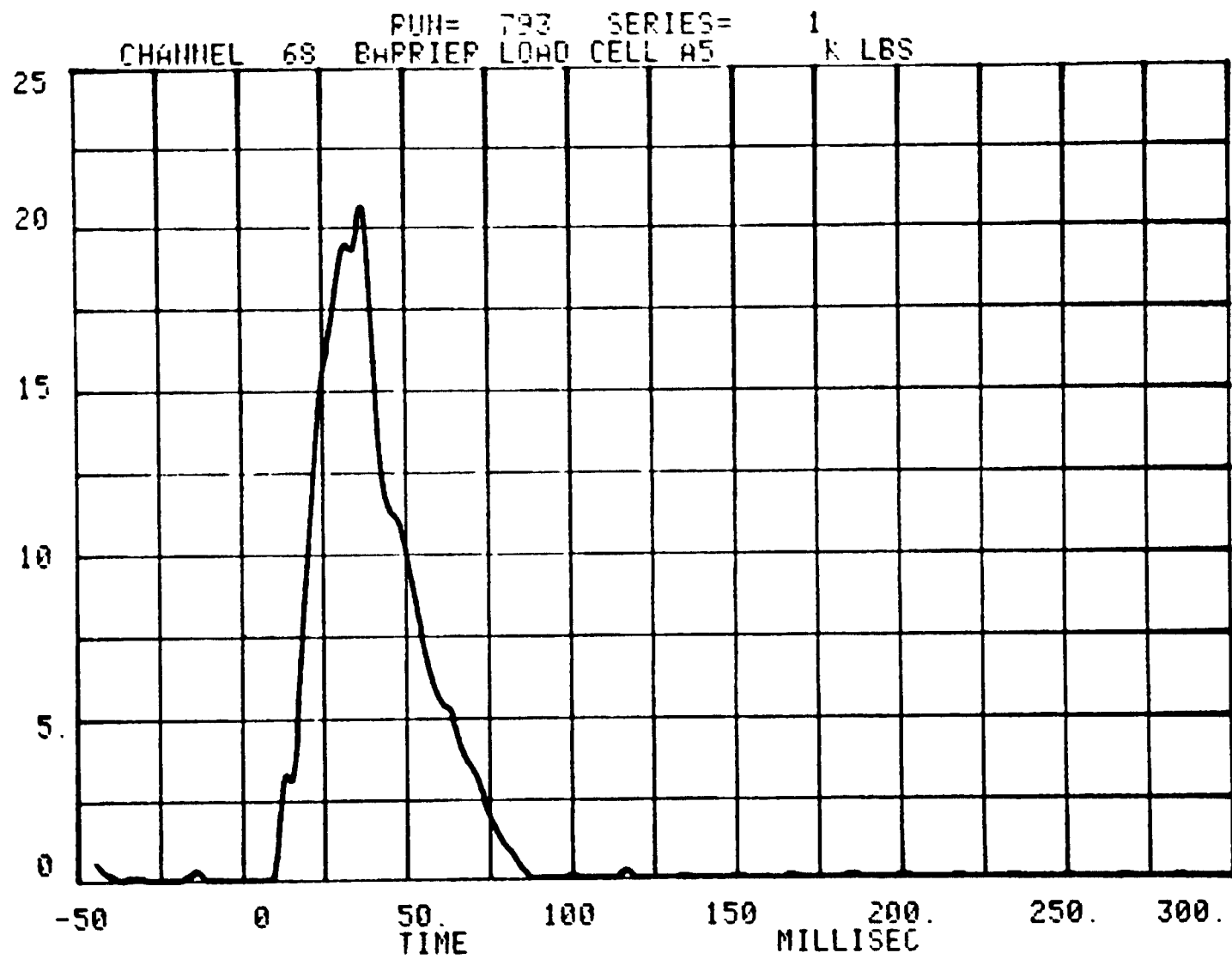
RUN= 793 SERIES= 1

K LBS



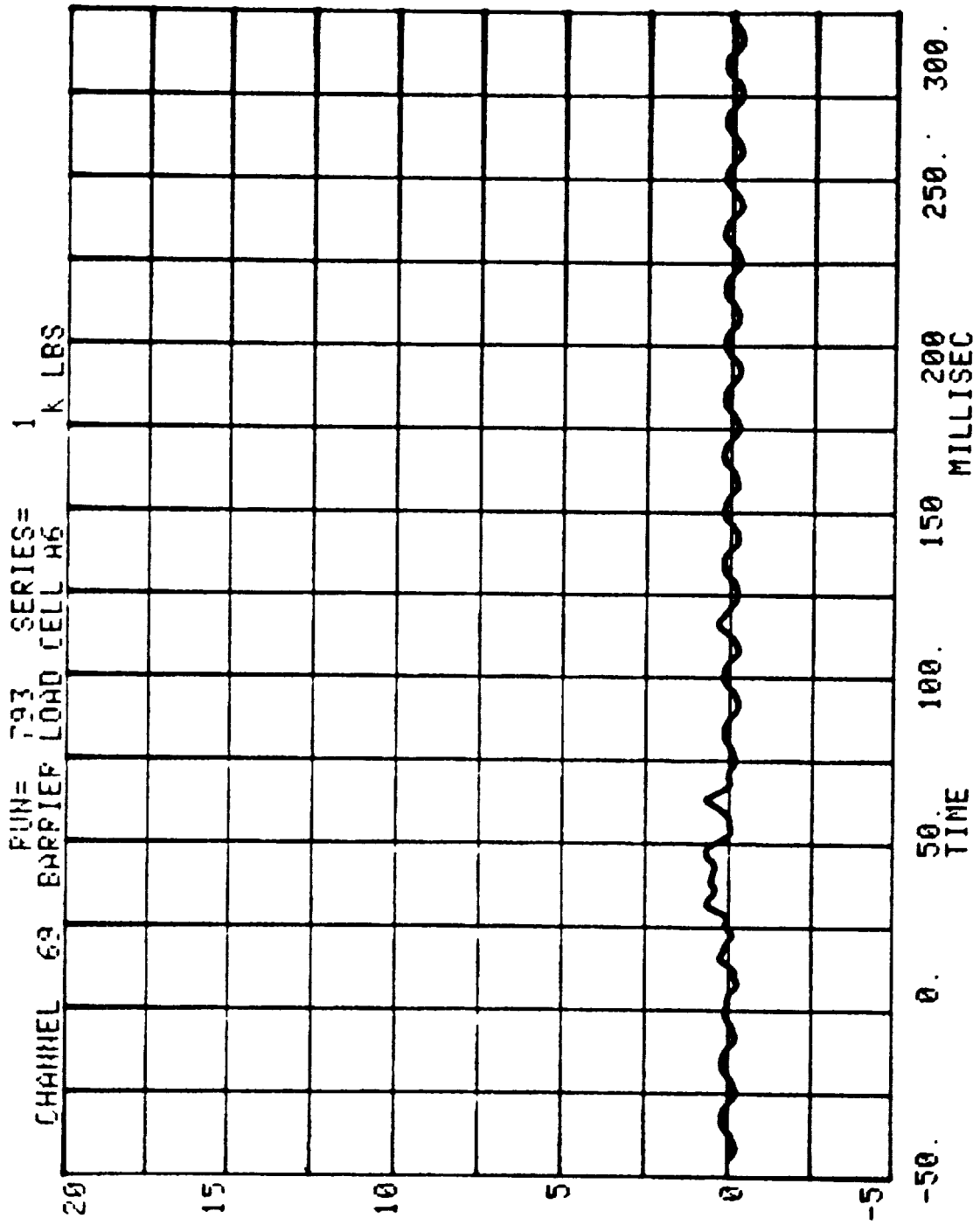


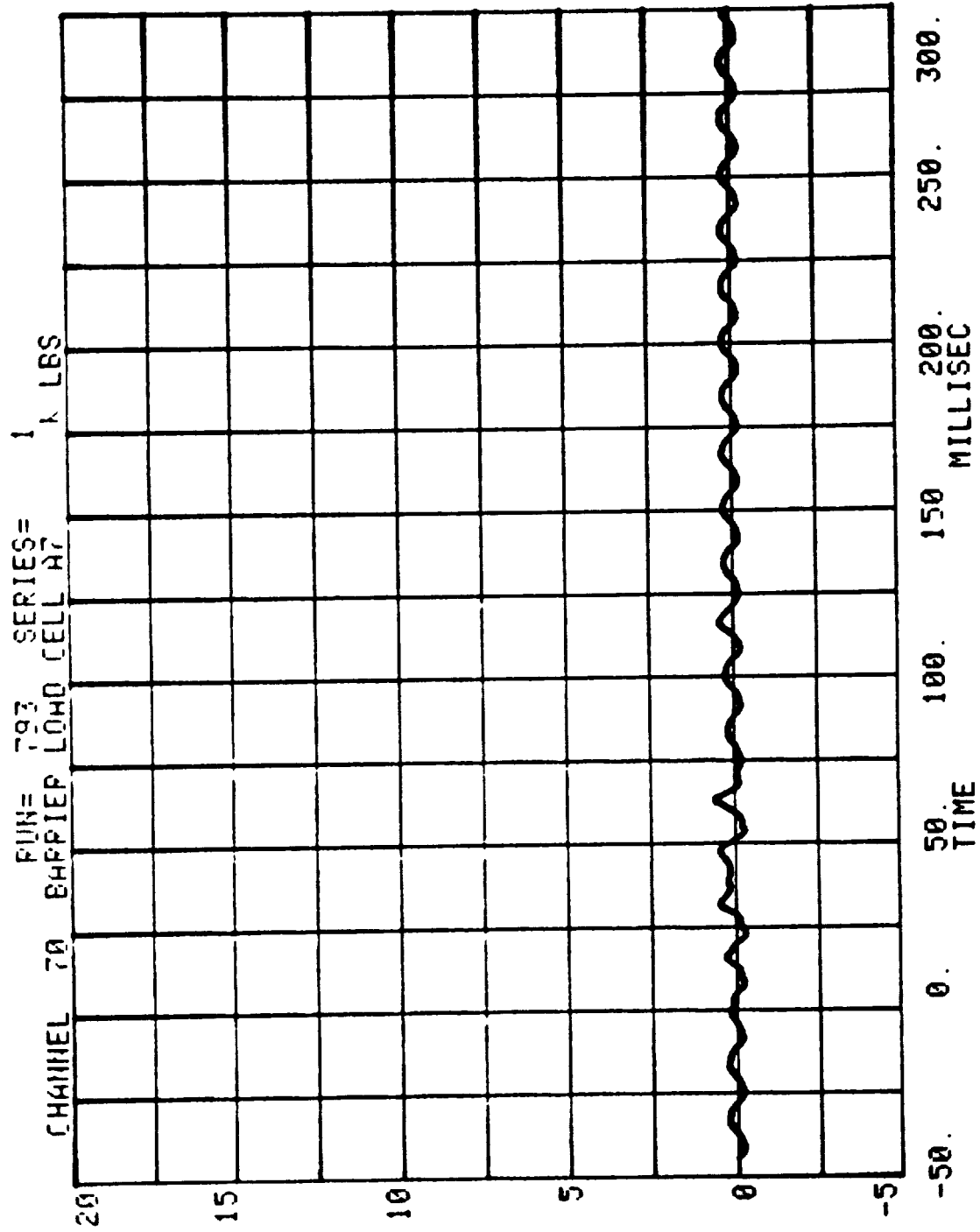




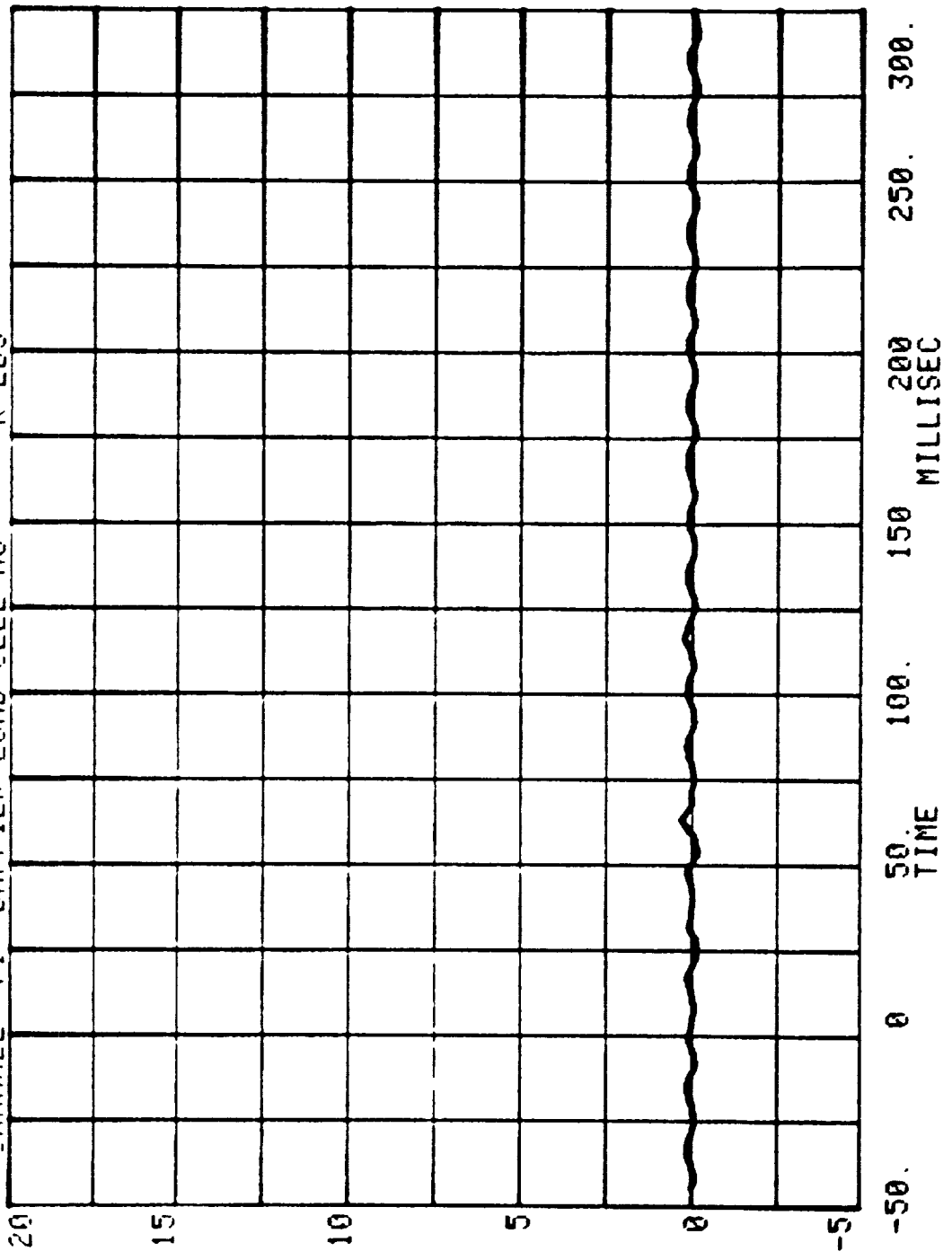
B-61

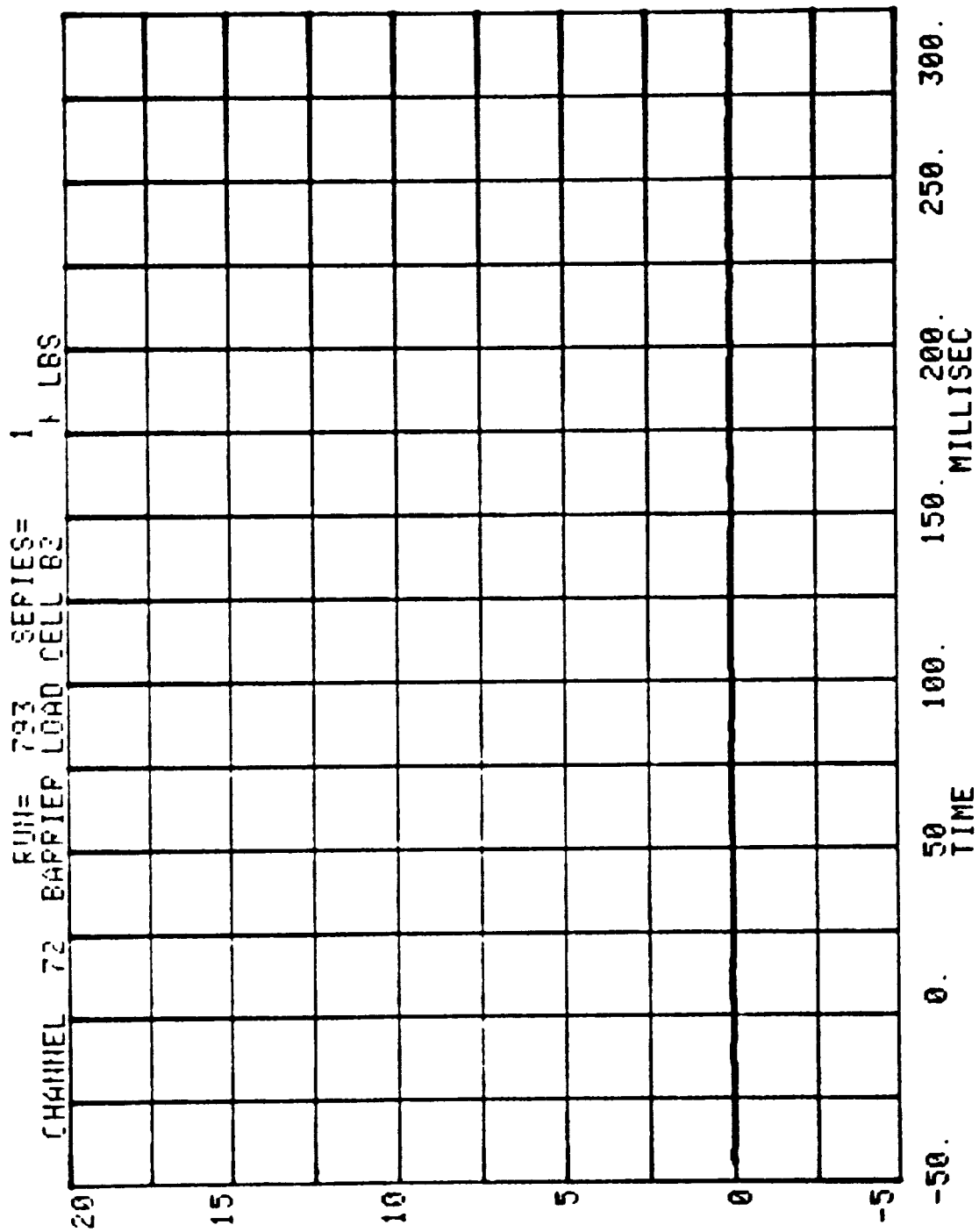
7581-2





CHANNEL 71 BARRIER LOAD CELL AS PUN= 793 SERIES= 1 1 LBS

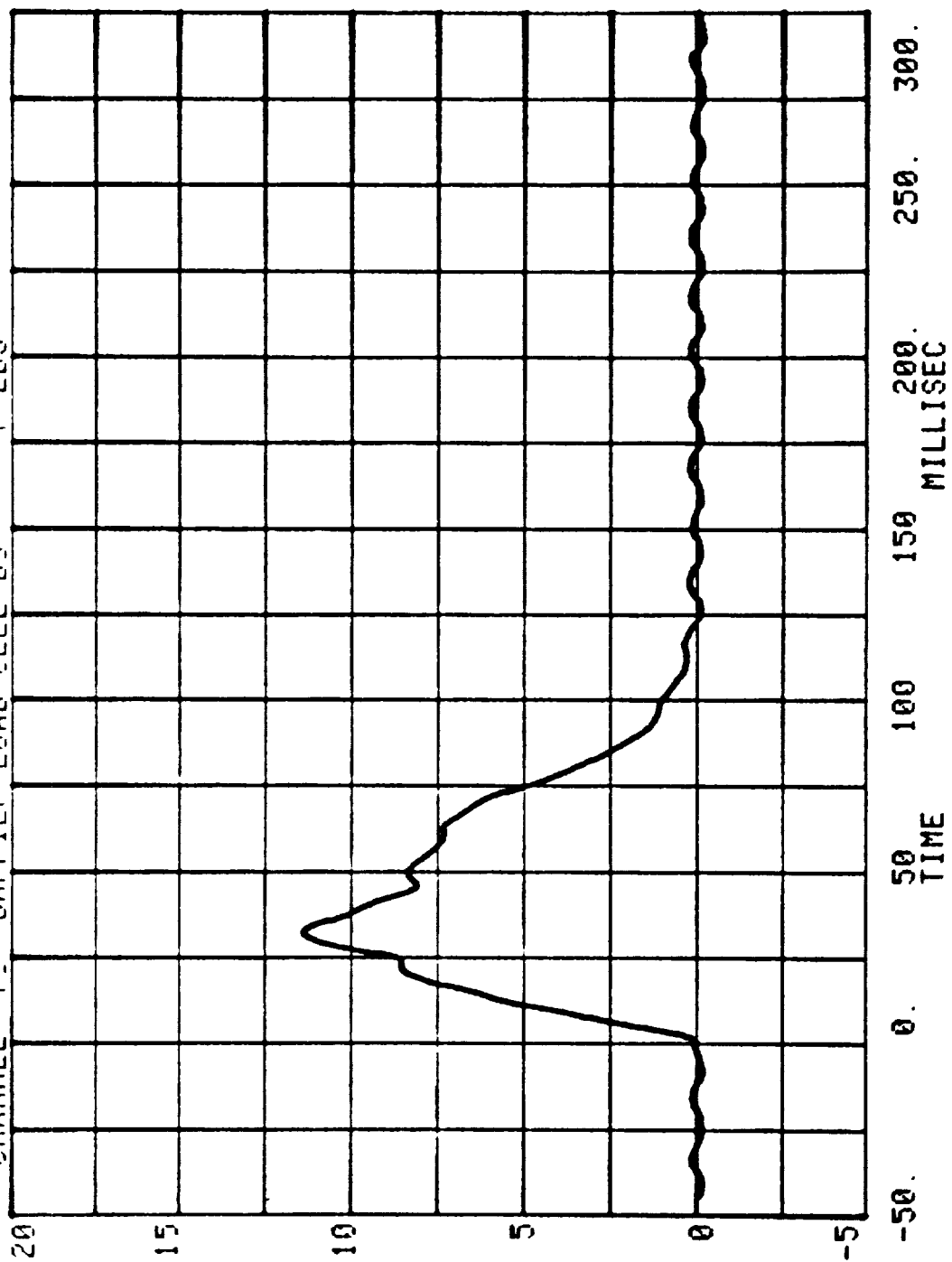


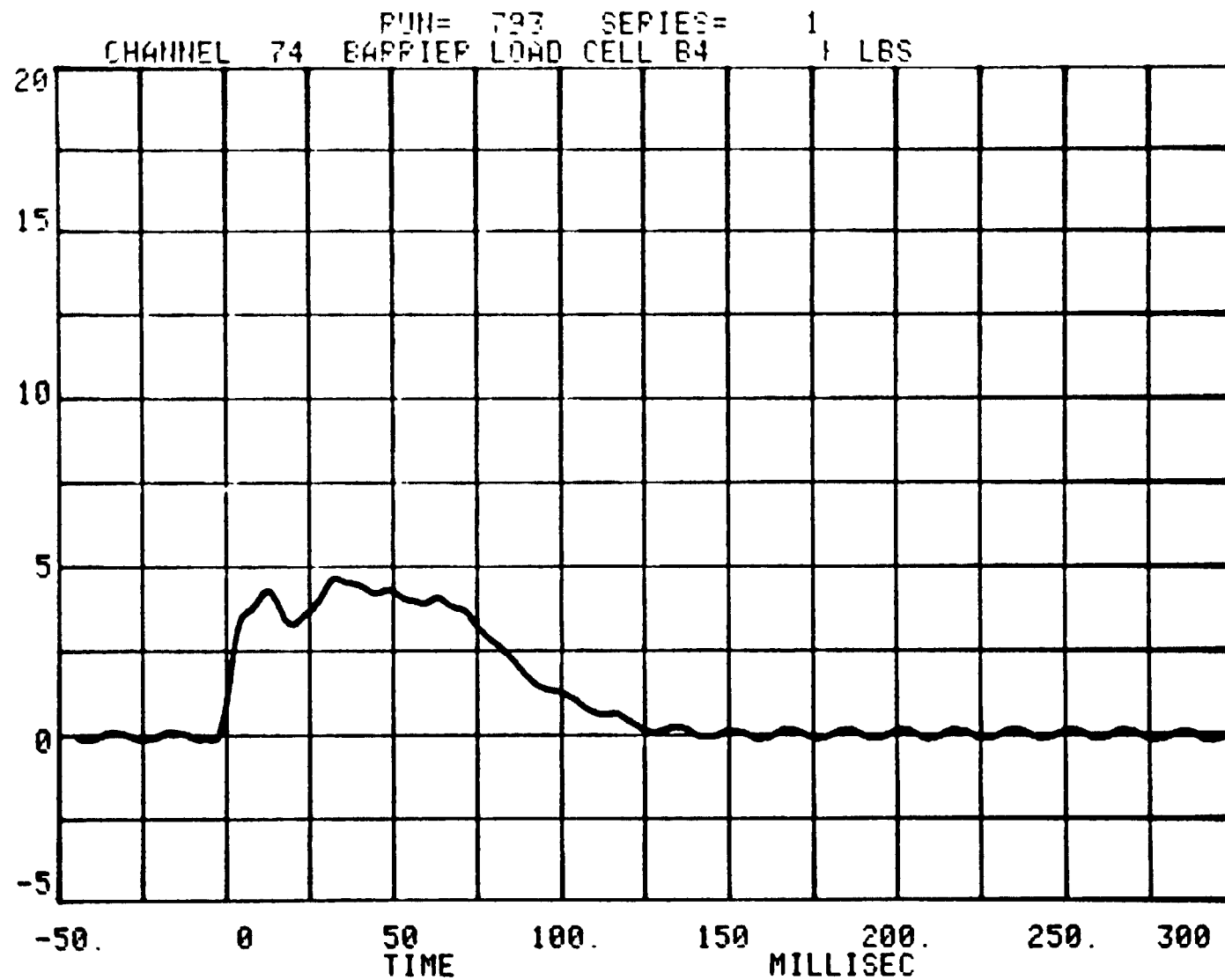


CHANNEL 73 BARRIER LOAD CELL B3

PIN= 733 SERIES= 1

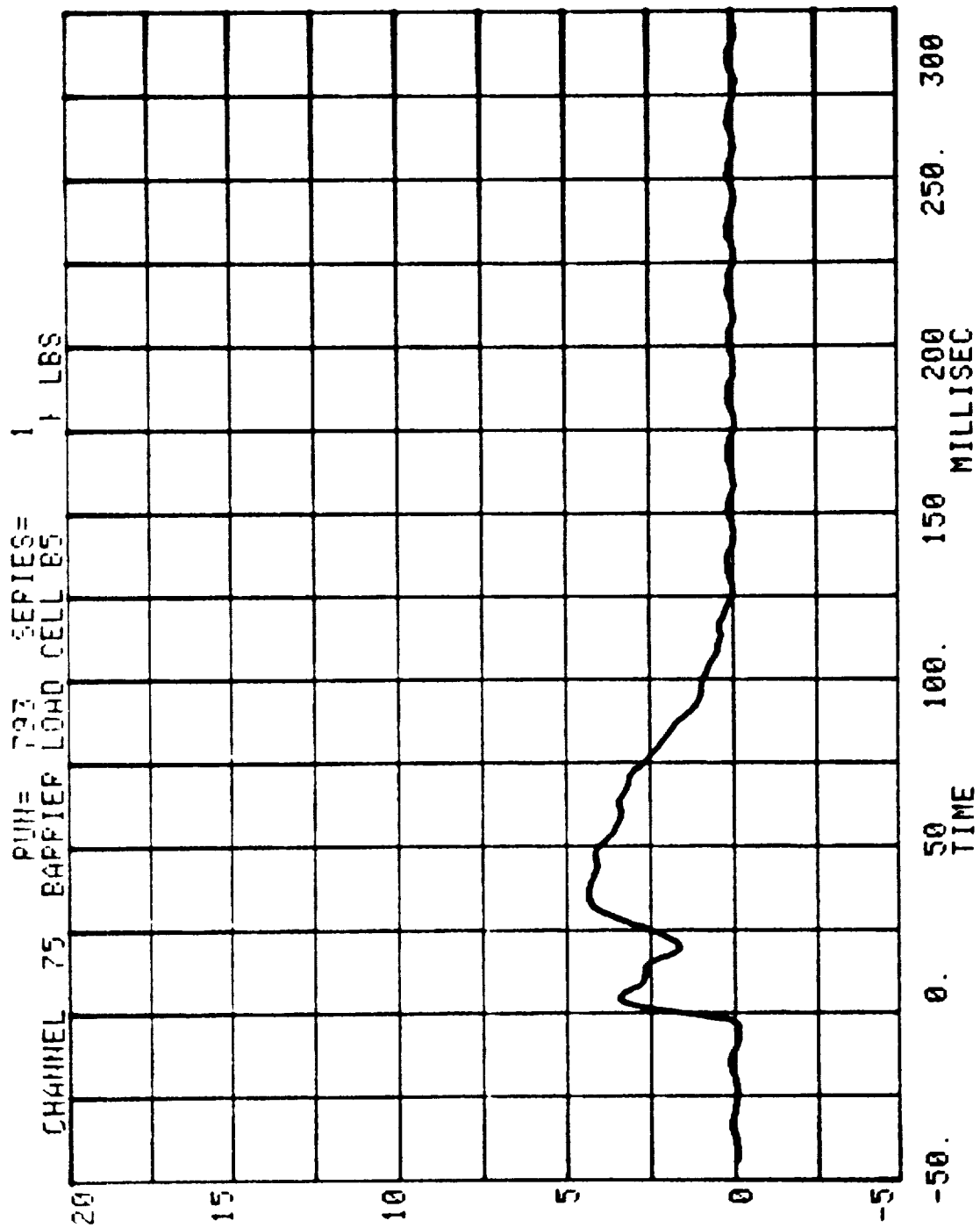
1 LBS

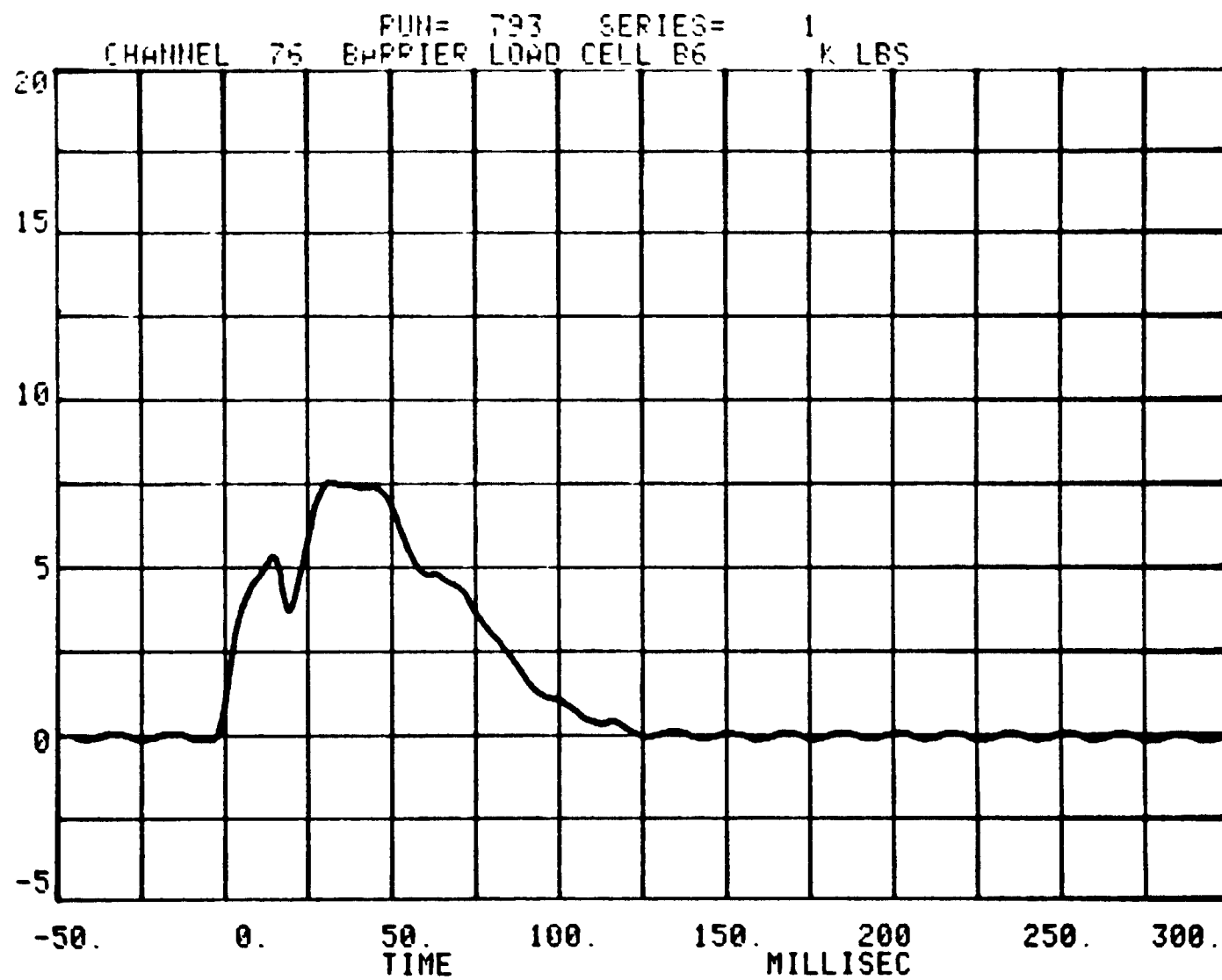




B-67

7581-2

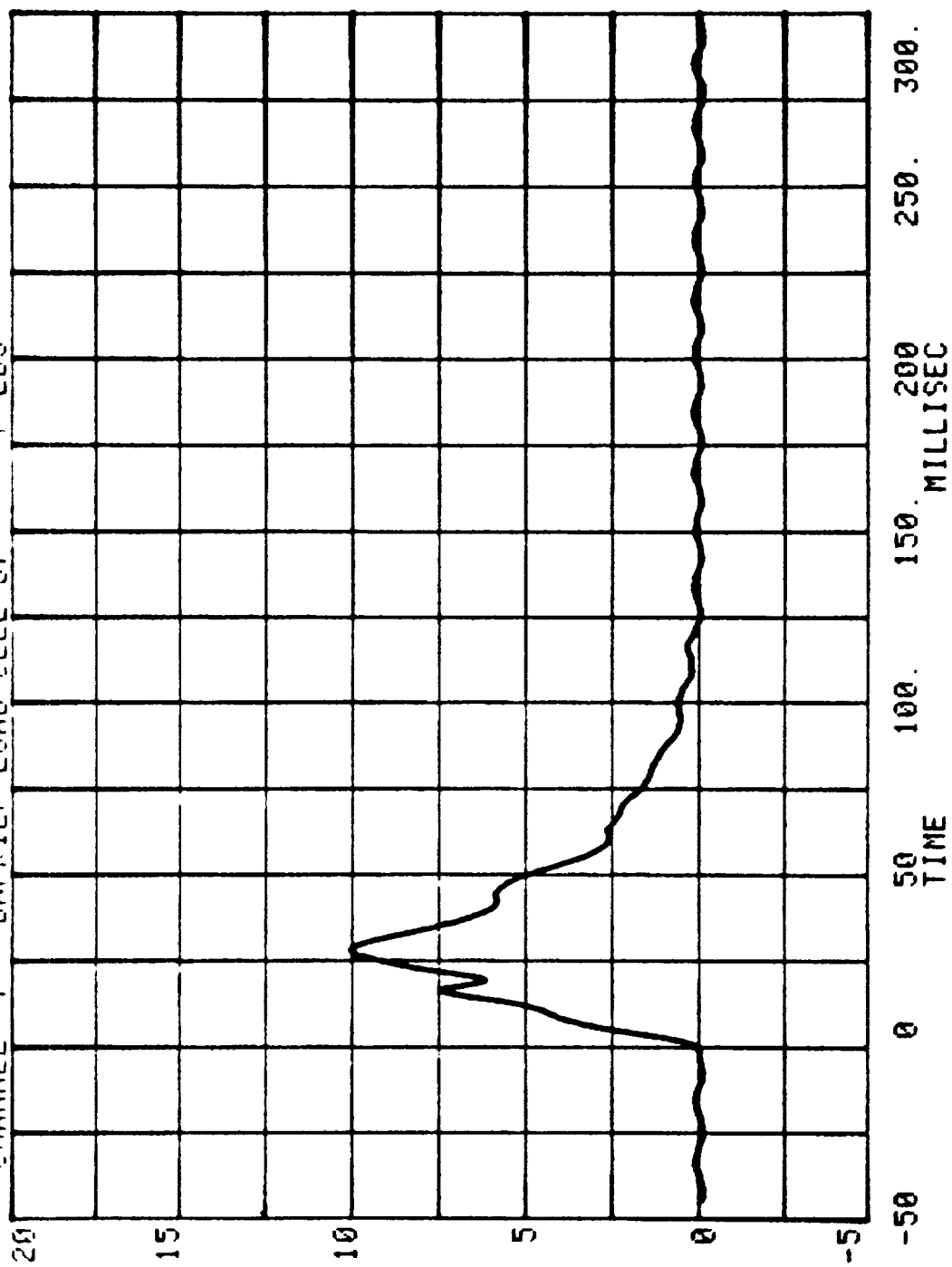




B-69

7581-2

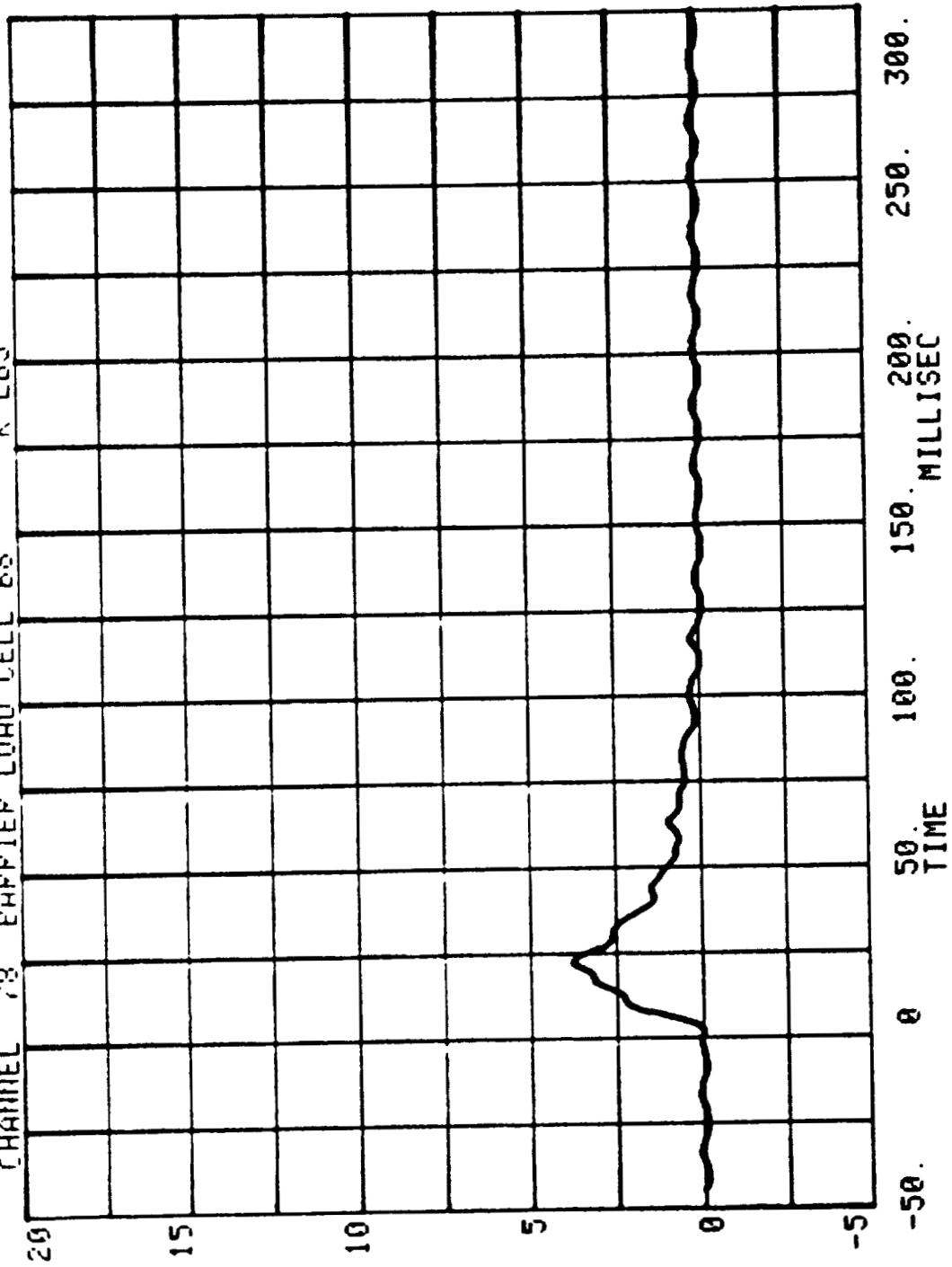
CHANNEL 77 BARRIER LOAD CELL B7
FUH= 723 SERIES= 1 LBS

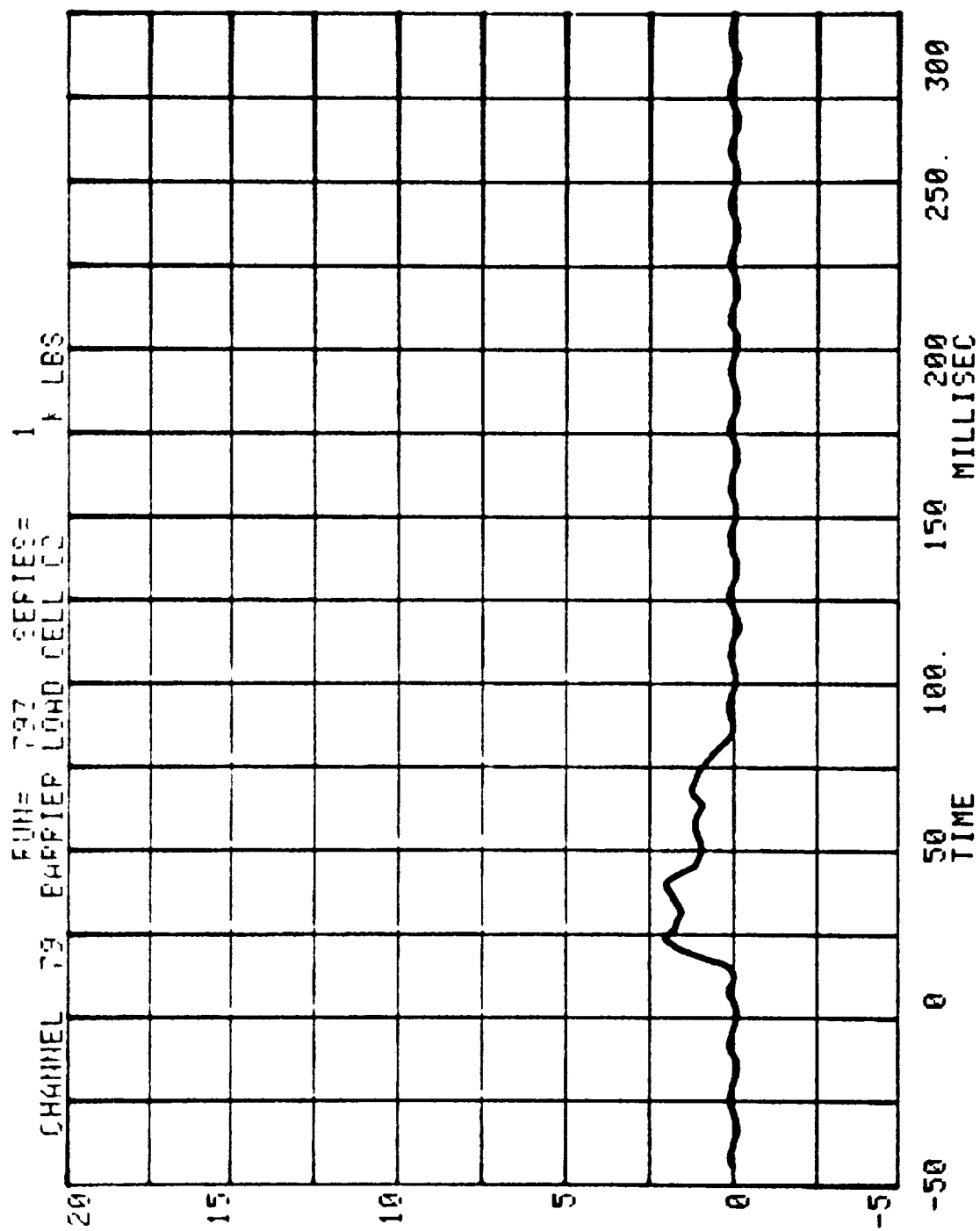


CHANNEL 78 EXPIER LOAD CELL B8

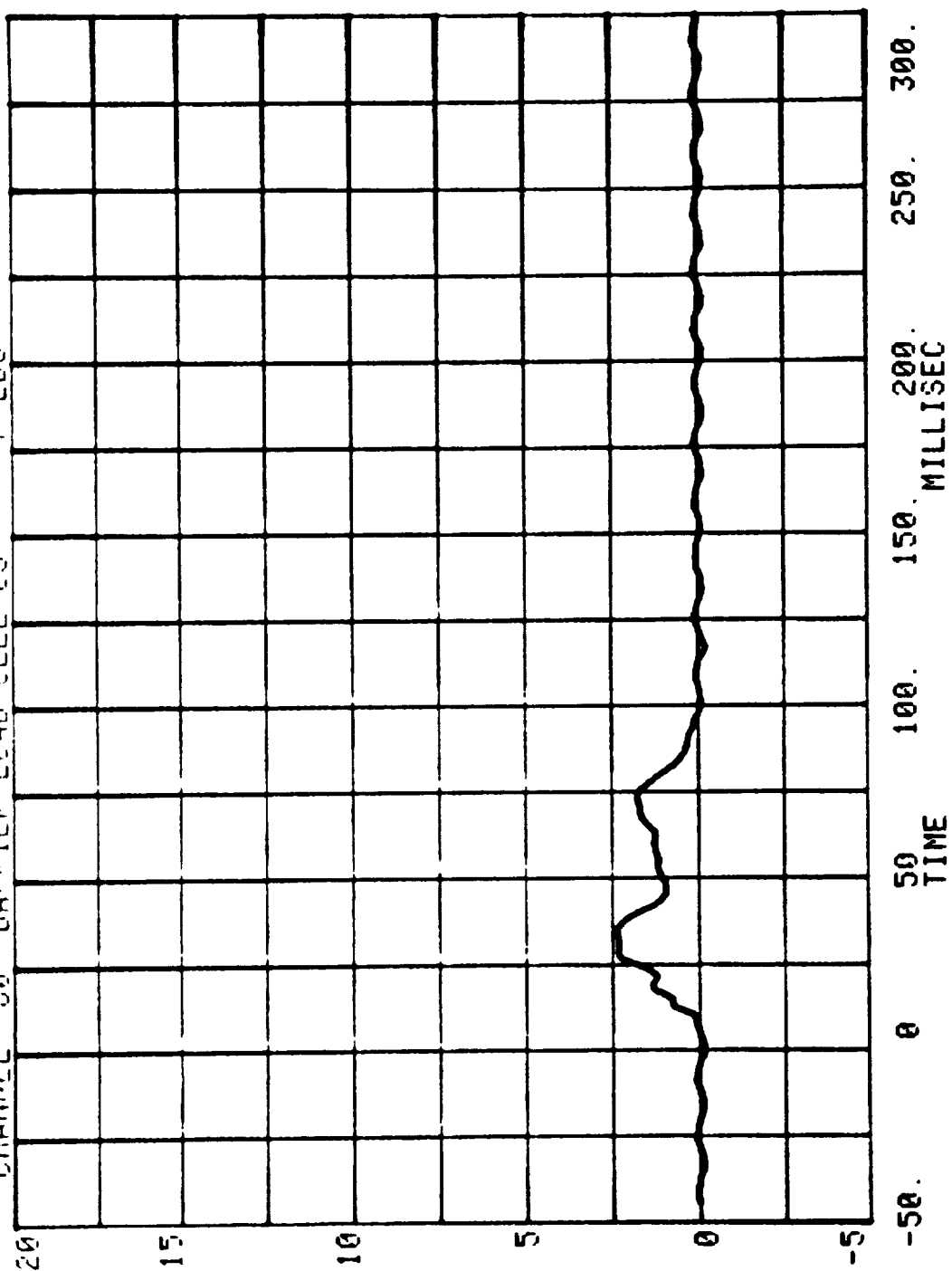
PUN= 793 SERIES= 1

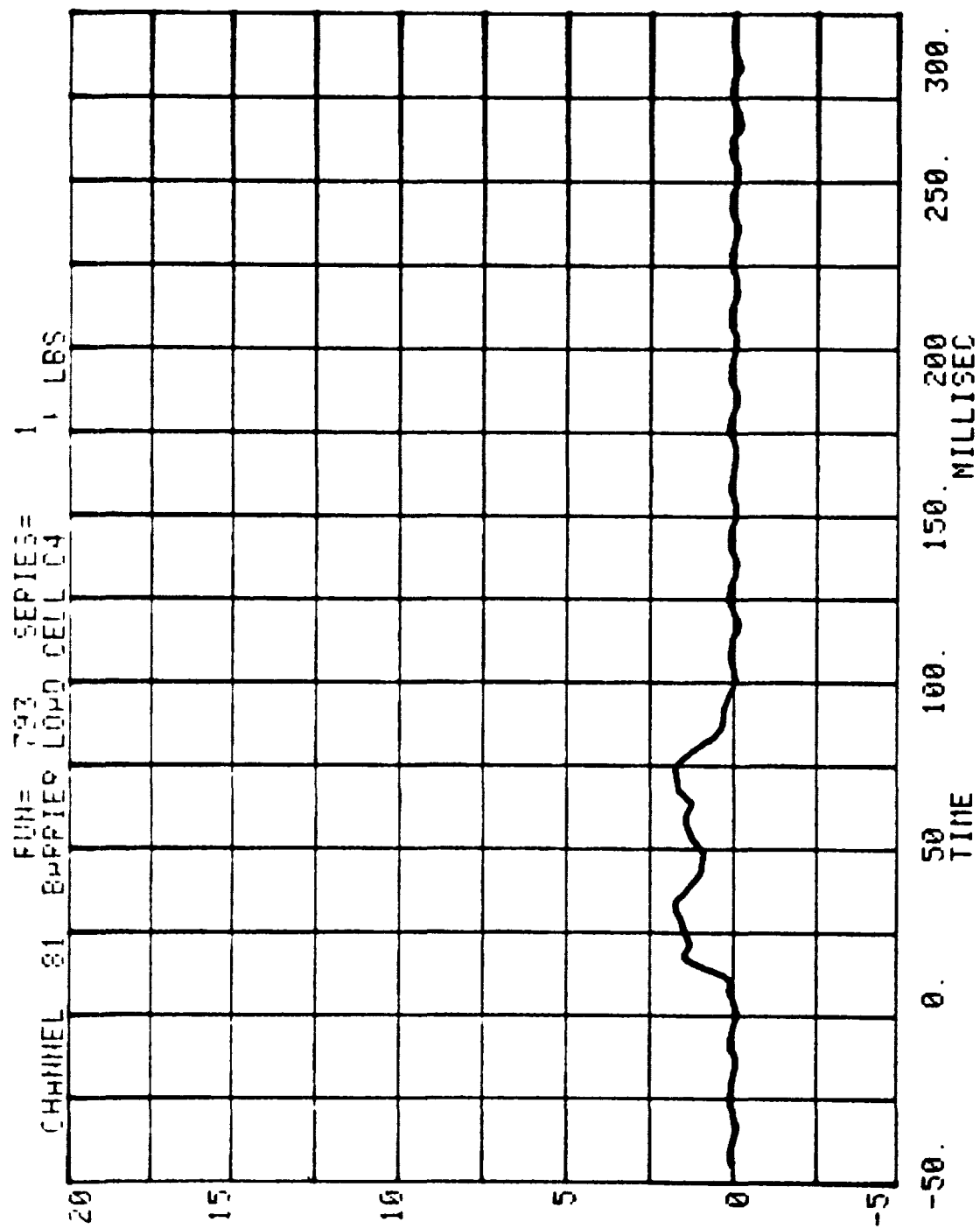
1 LBS



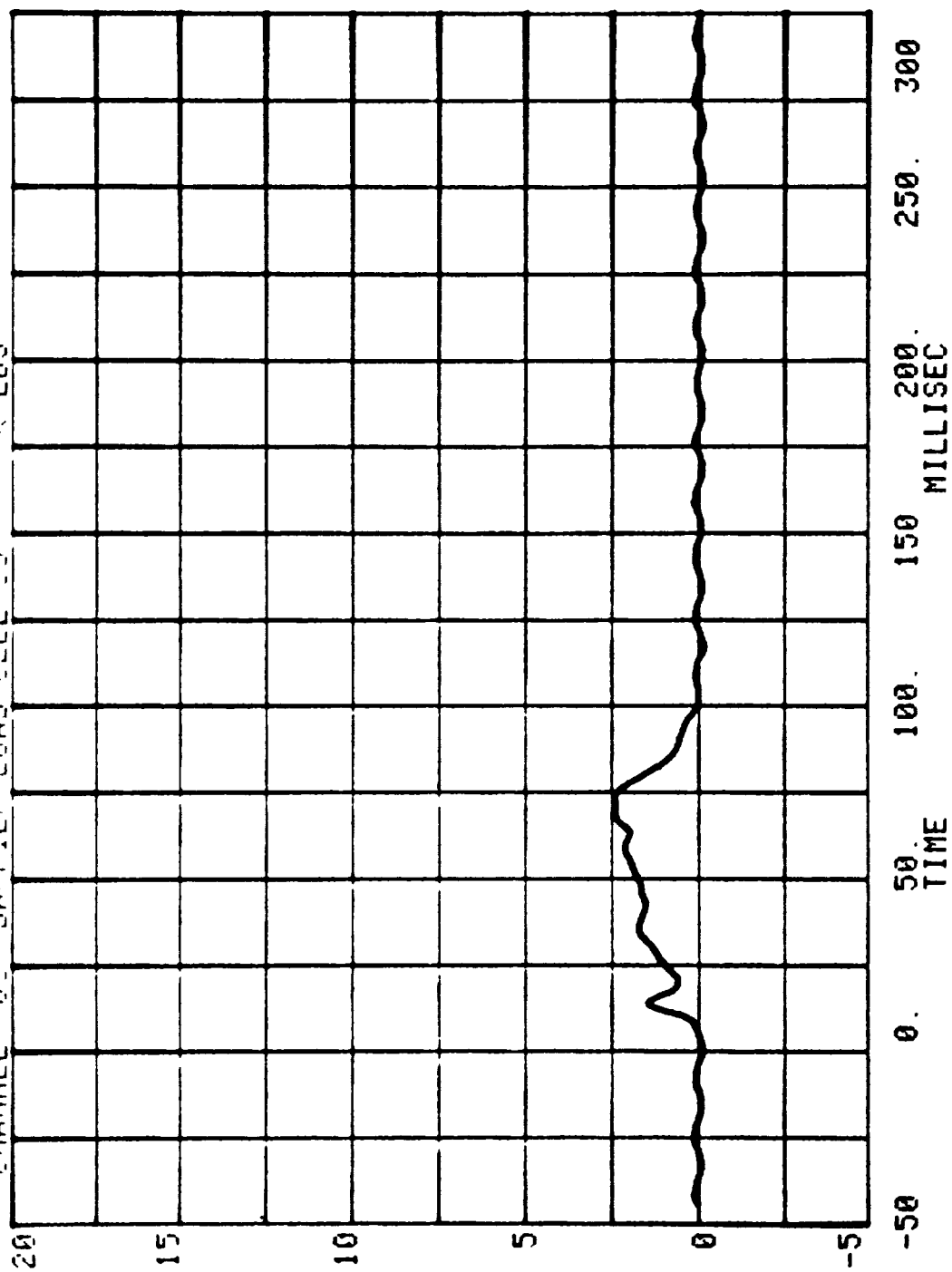


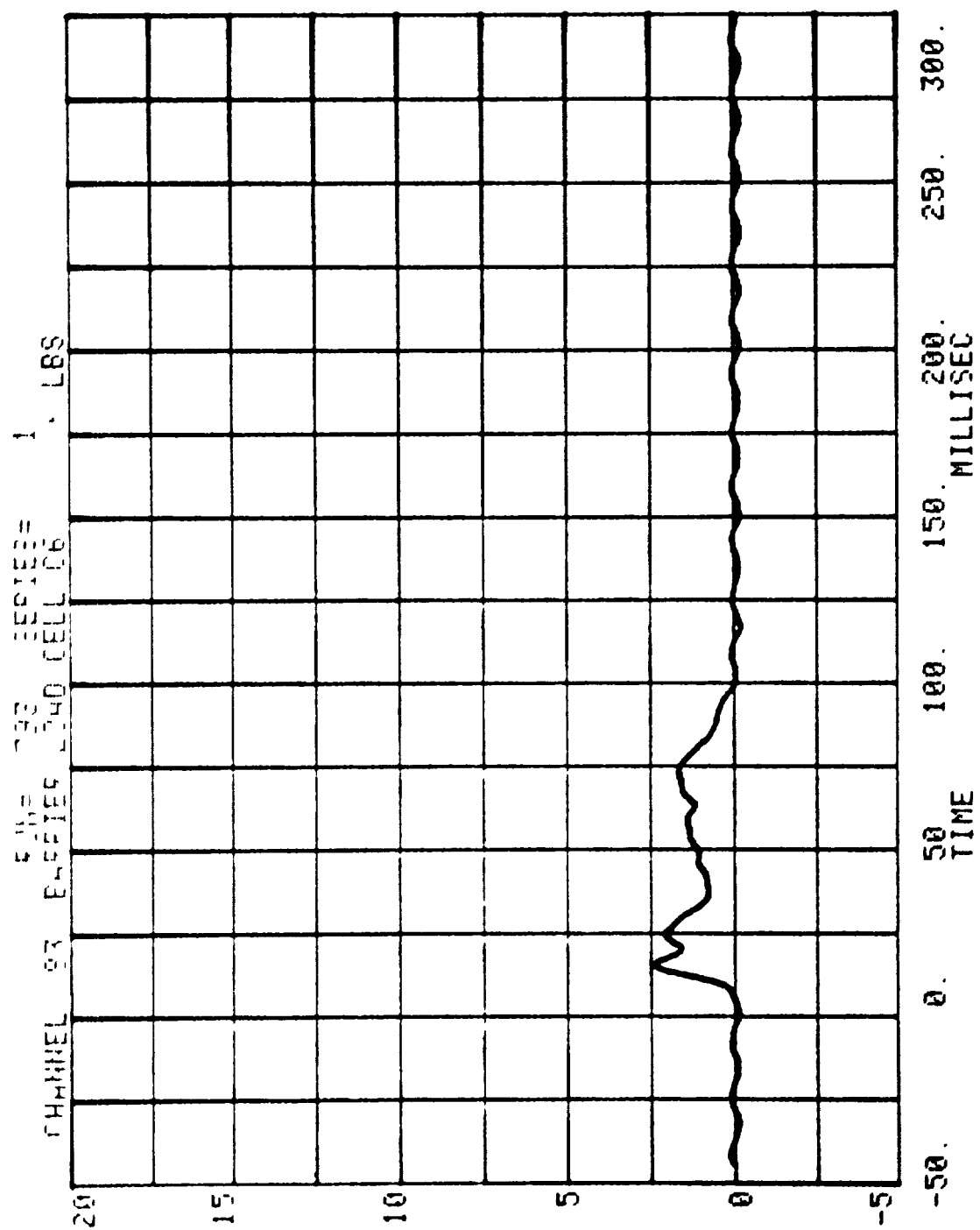
CHANNEL 20 BARRIER LOAD CELL C3
PULSE 727 SERIES= 1 LBS



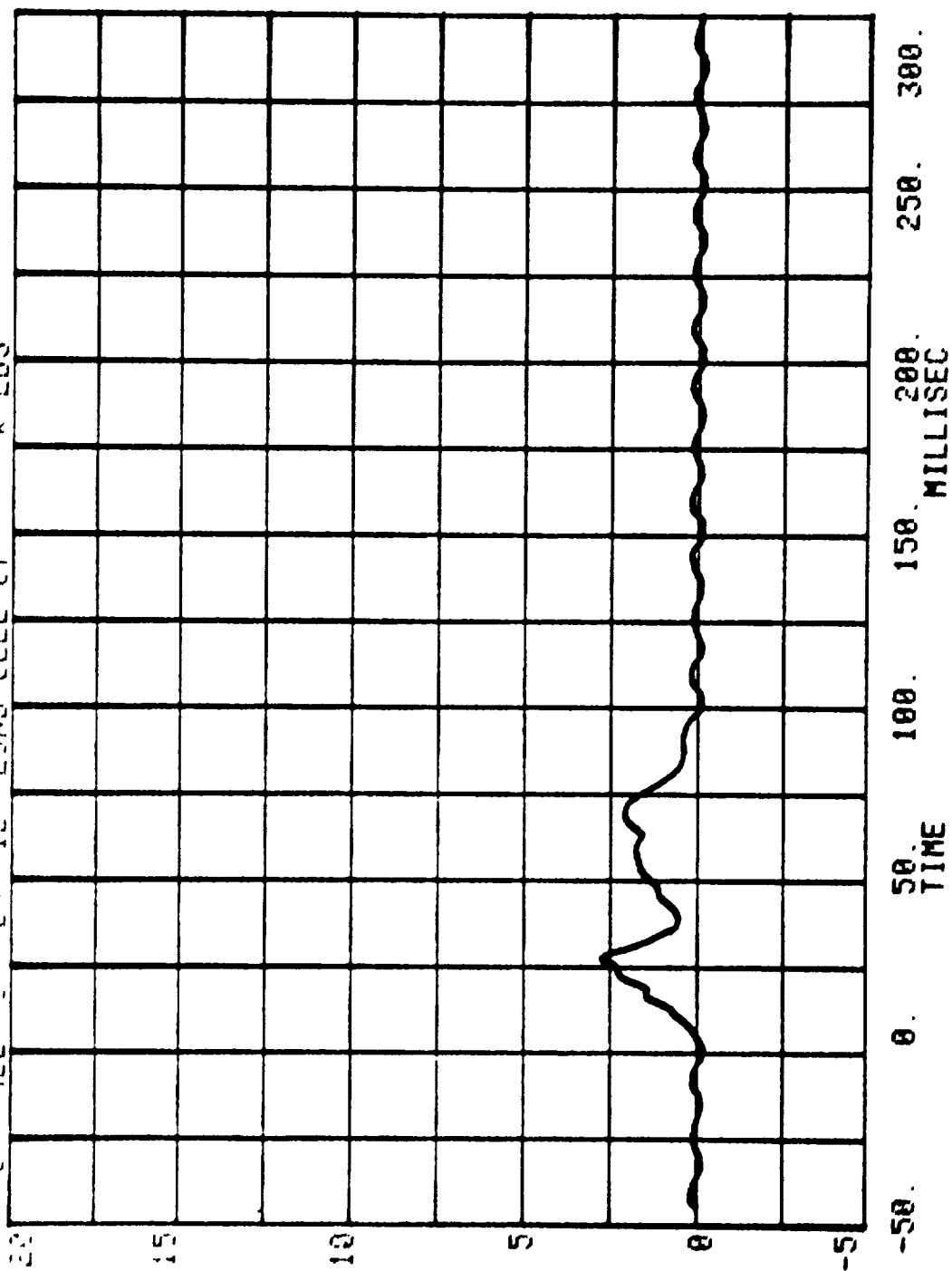


CHANNEL 82 SUPPLIER COND CELL C5 RUN= 797 SERIES= 1 K LBS





C-CHANNEL 51 EXERCISE LOAD CELL C1 SERIES= 1 K LBS

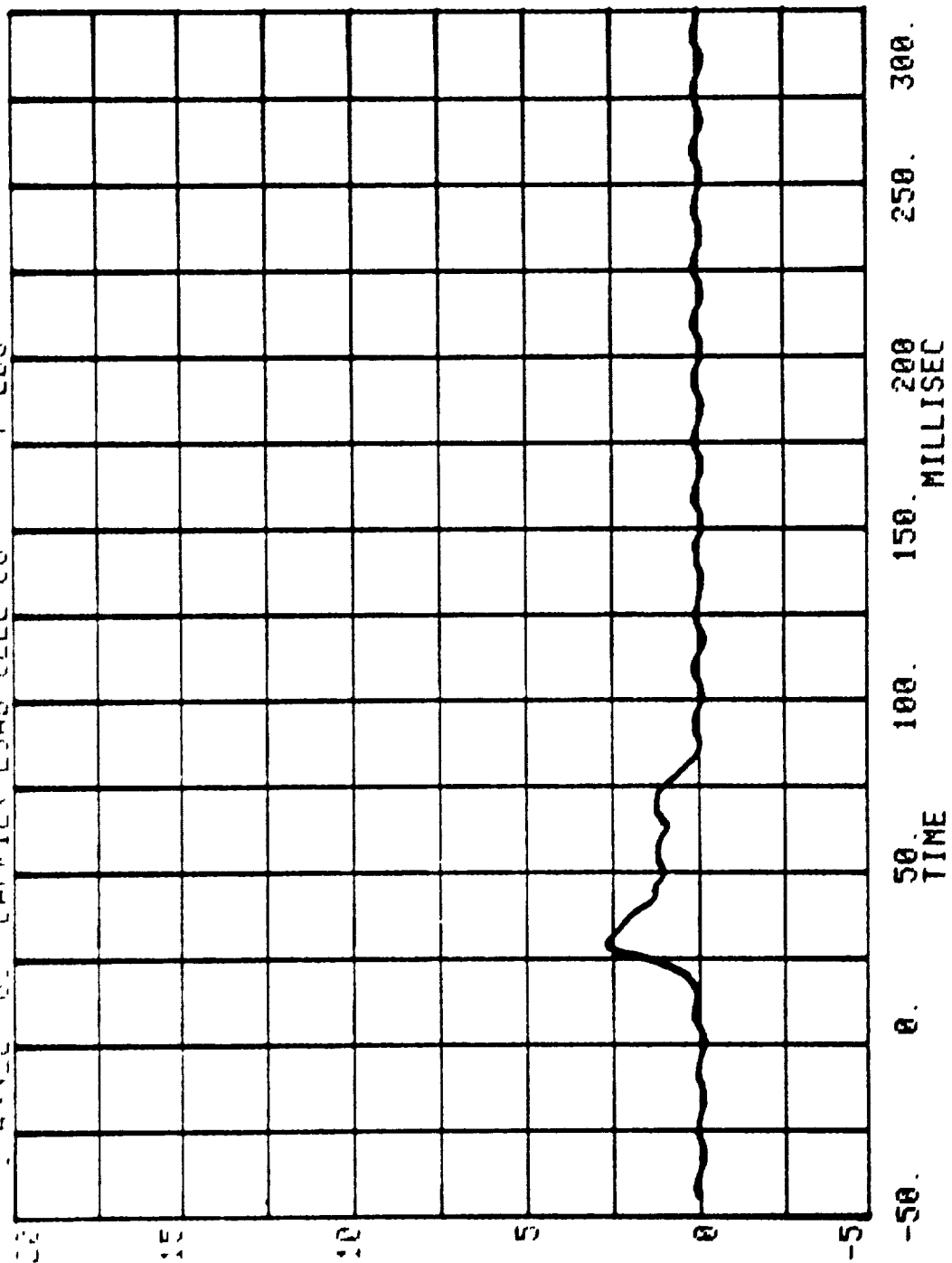


CHANNEL 05 ENERGY LOAD CELL 08

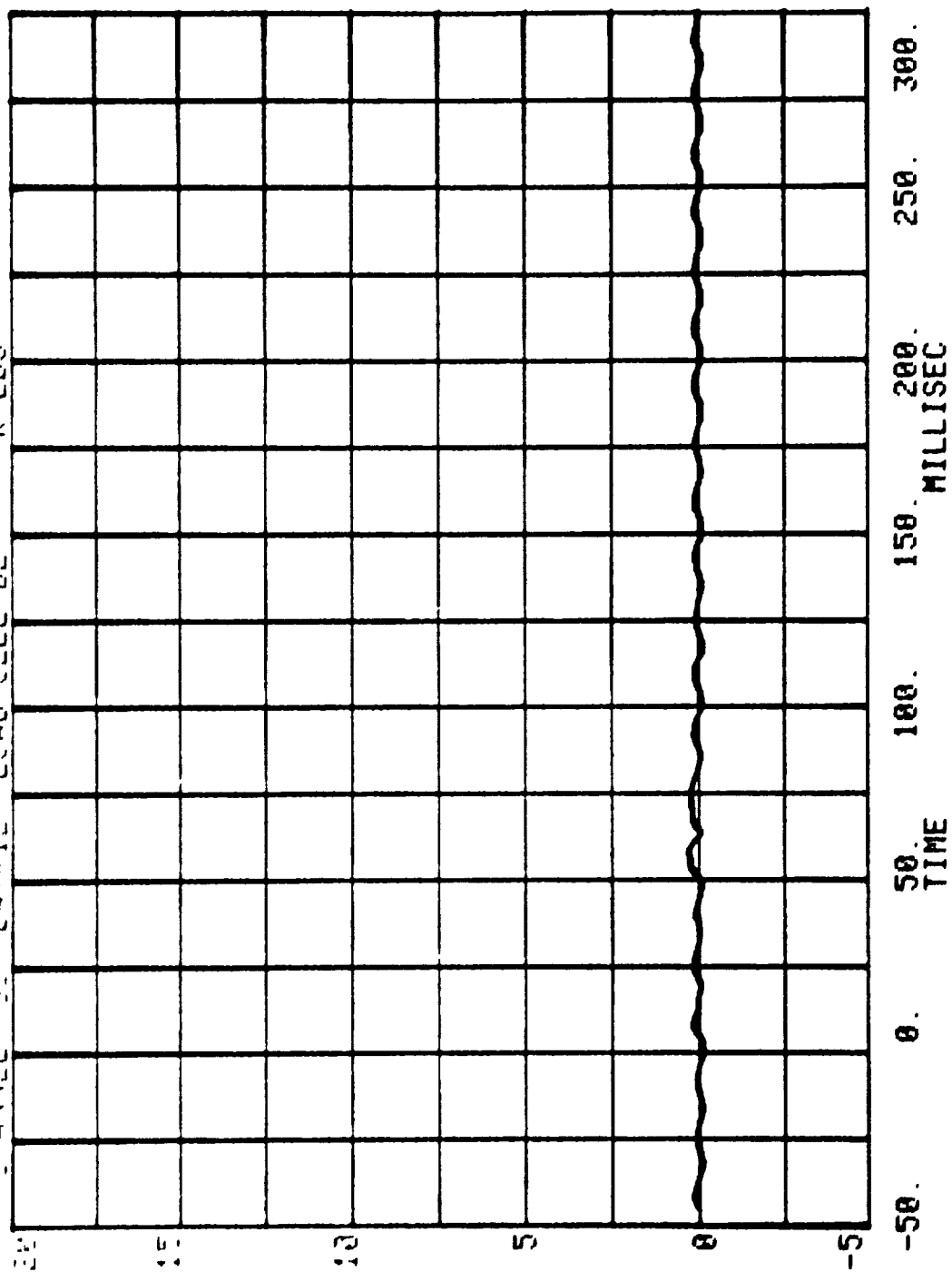
TIME= 735

SERIES=

1 LBS



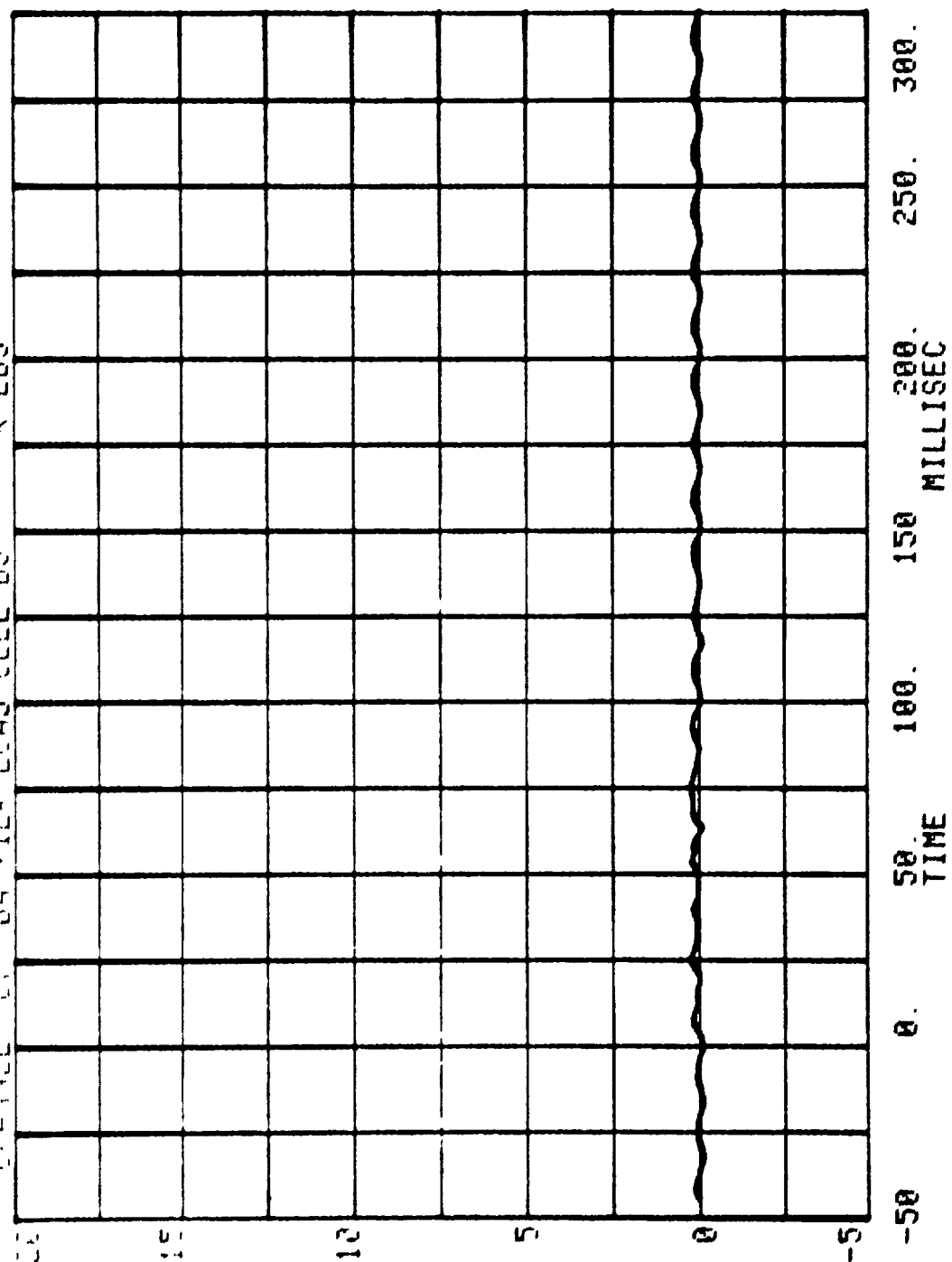
C-CHANNEL 33 SUPPLY LOAD CELL D2 RYU= 733 SERIES= 1 K LBS



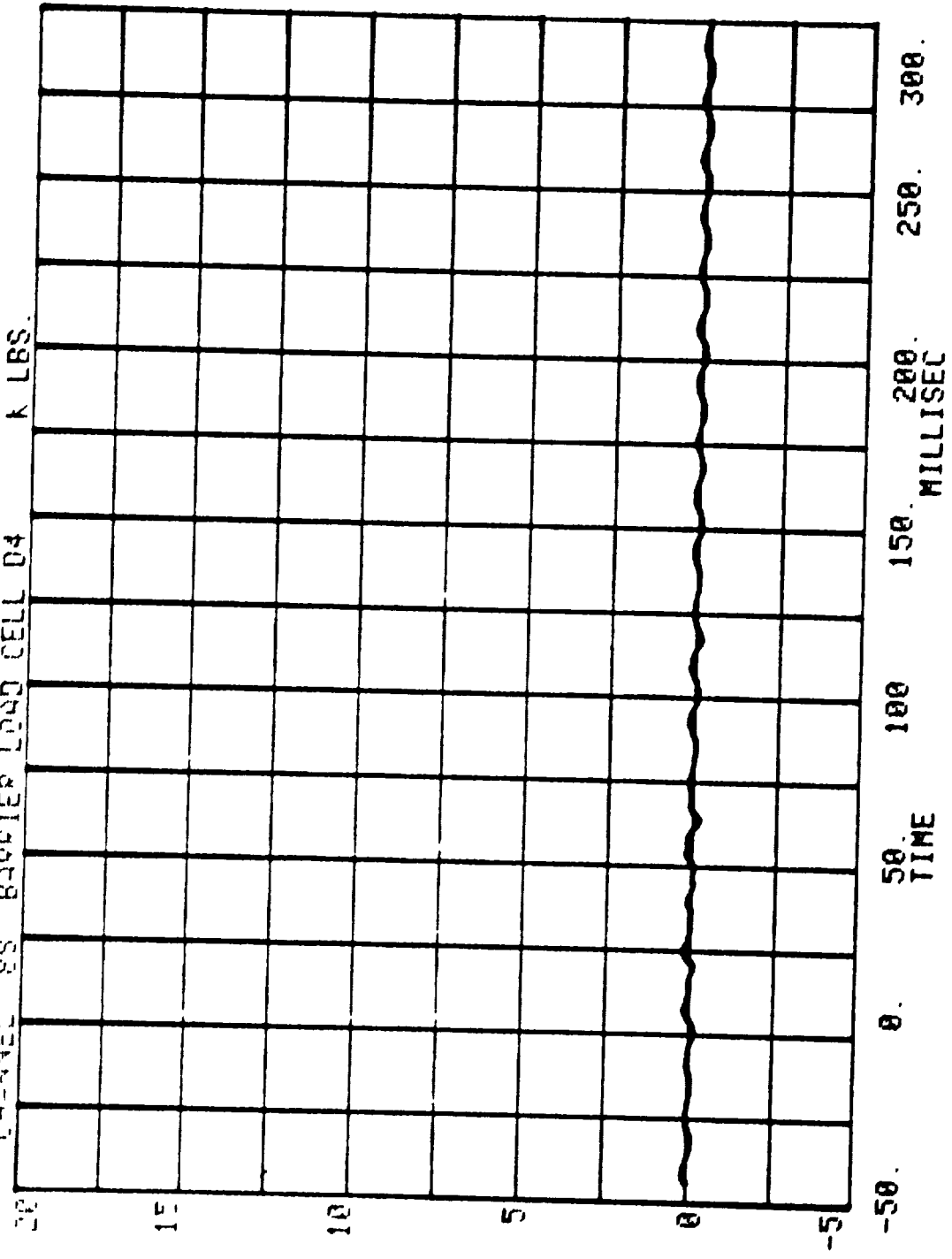
CHANNEL 37 BARRIER LOAD CELL 03

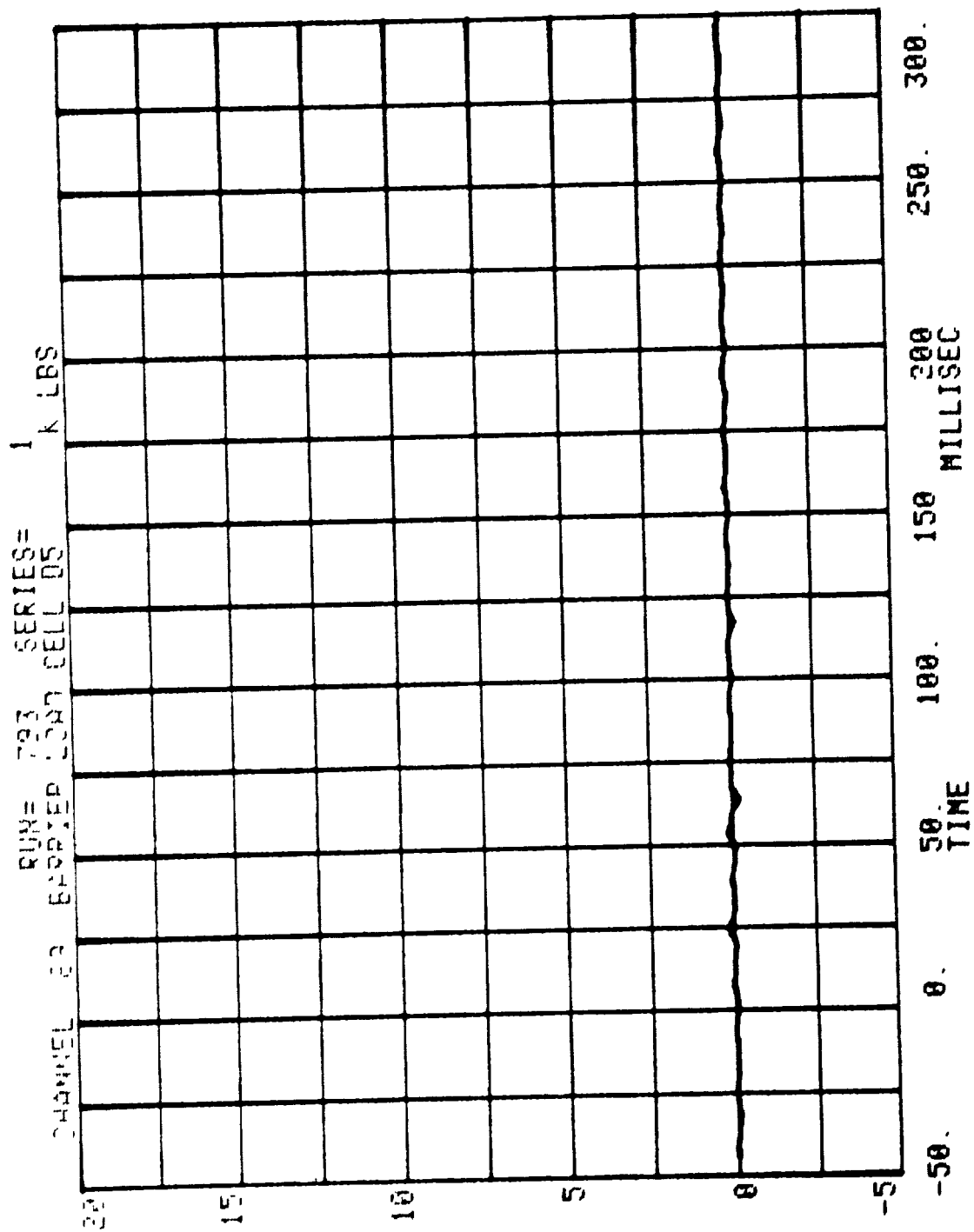
TYPE 733 SERIES=

1 K LBS

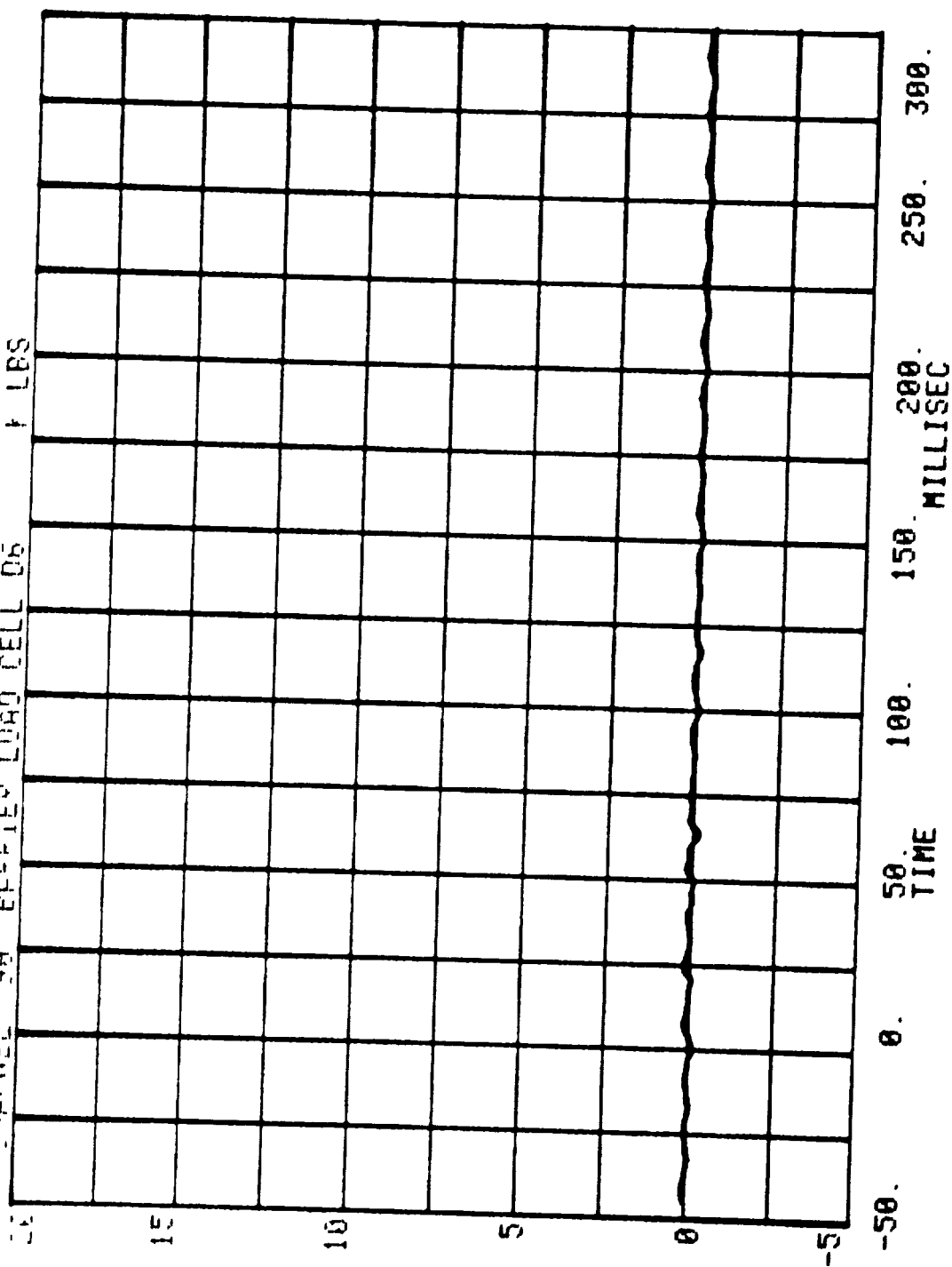


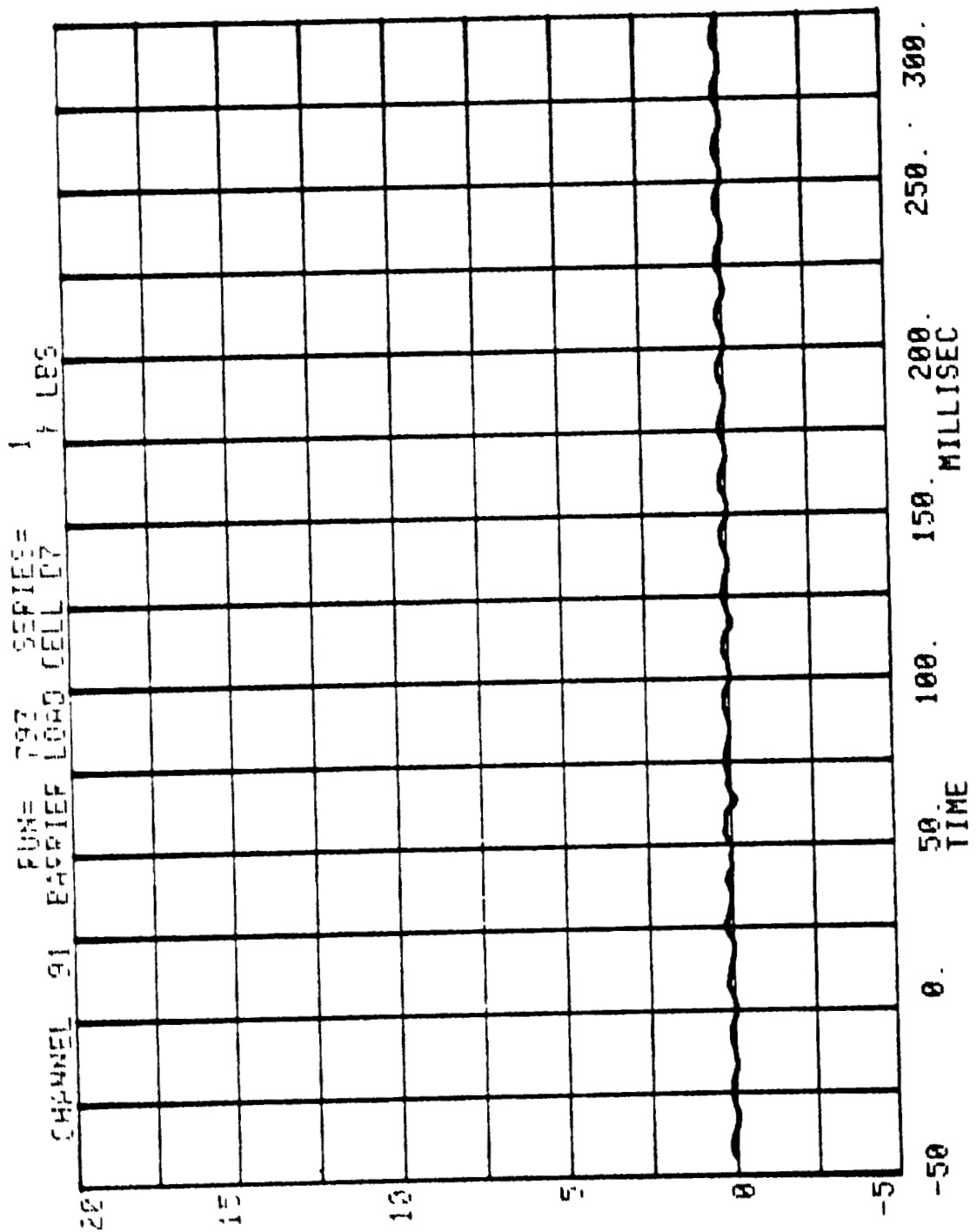
CH-ANAL 08 BARRIER LOAD CELL 04 P/N= 735 SERIES= 1 K LBS.



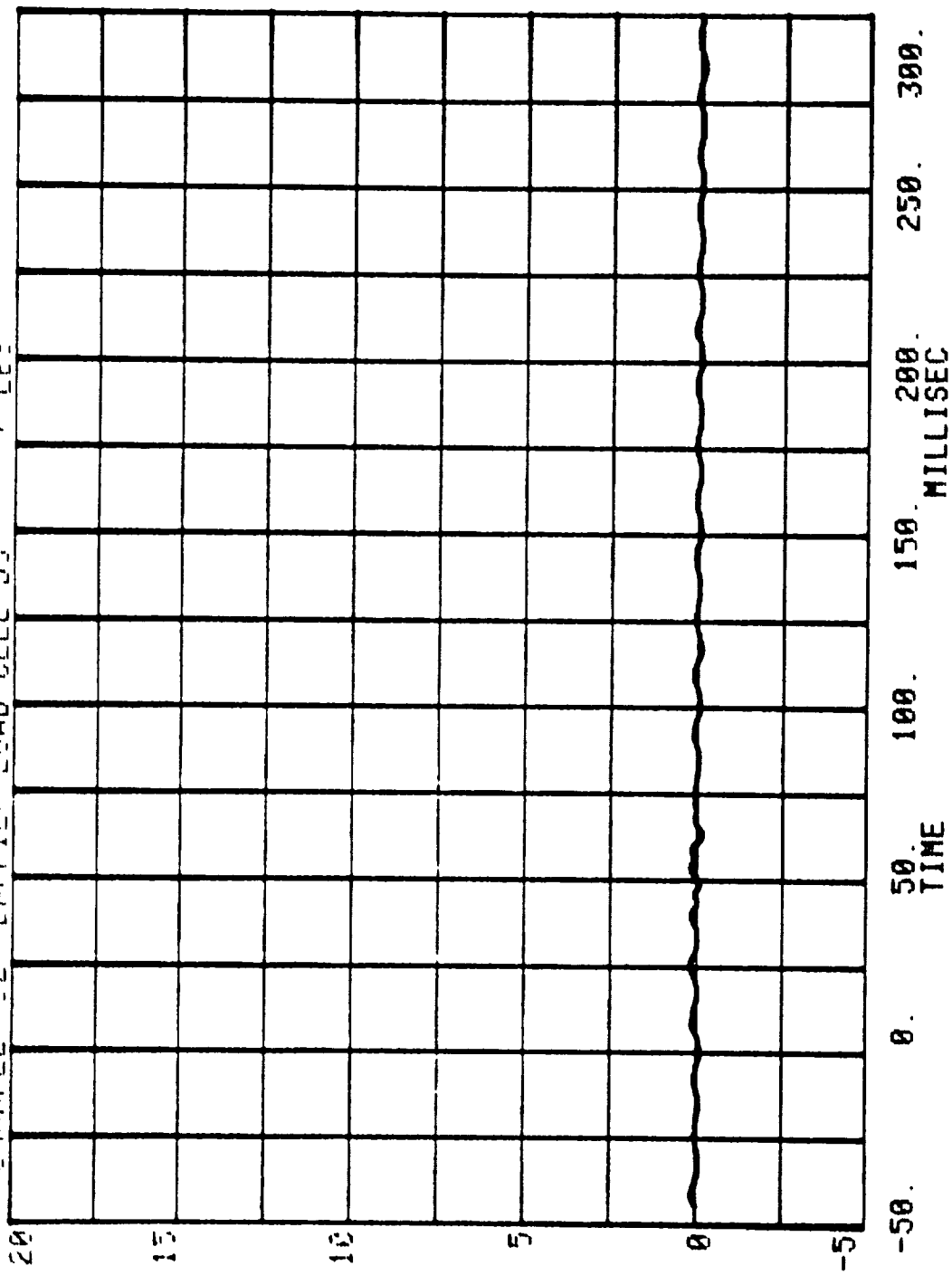


CHANNEL 99 SERIES 1 1 LBS
PUN= 793
ELAPSED LOAD CELL DS





CHANNEL 92 EFFIEC LOAD CELL 03 RUN= 793 SERIES= 1 V LBS



TEST NO. Y23-010-793

DUMMY DATA

	FILTER CHANNEL CLASS
HEAD ACCELERATIONS	1000
CHEST ACCELERATIONS	180
FEMUR FORCES	600

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS MAXIMUM DURATION

HYUNDAI INTO BARRIER CRASH TEST

RUN= 793

POS#1 HEAD R

HIC=1451.0 FROM T1= .08535 TO T2= .09585

AVERAGE ACCELERATION BETWEEN T1 AND T2= 113.8G'S

EVENT TIME= 300.0 MSEC

SEVERITY INDEX=1853.3

B-87

7581-2

HYUNDAI INTO BARRIER CRASH TEST

RUN # 793

SERIES # 1

CHANNEL

TITLE

3 MS CLIPPED PEAK

2 POS#1 CHEST R

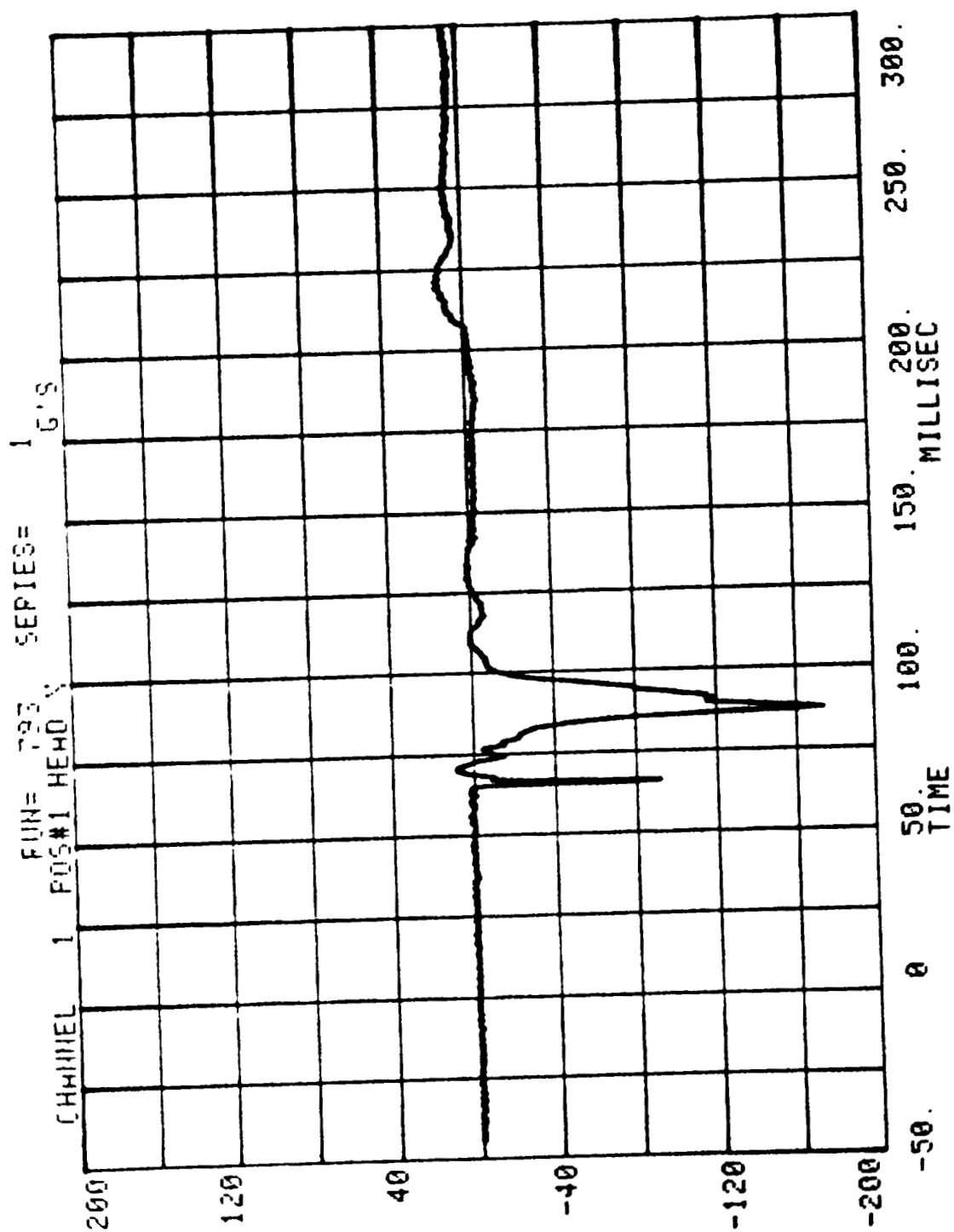
54 466 G'S

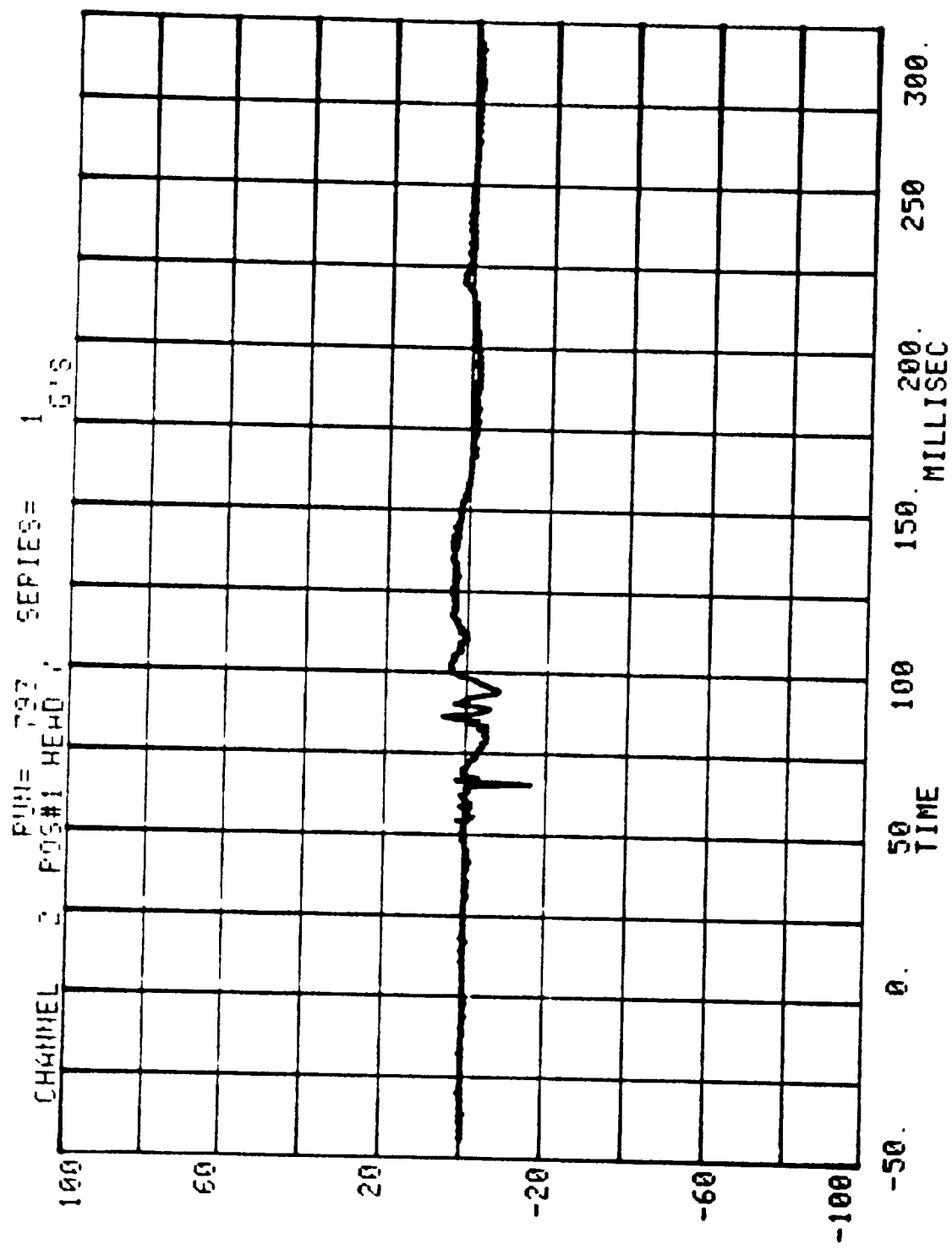
B-88

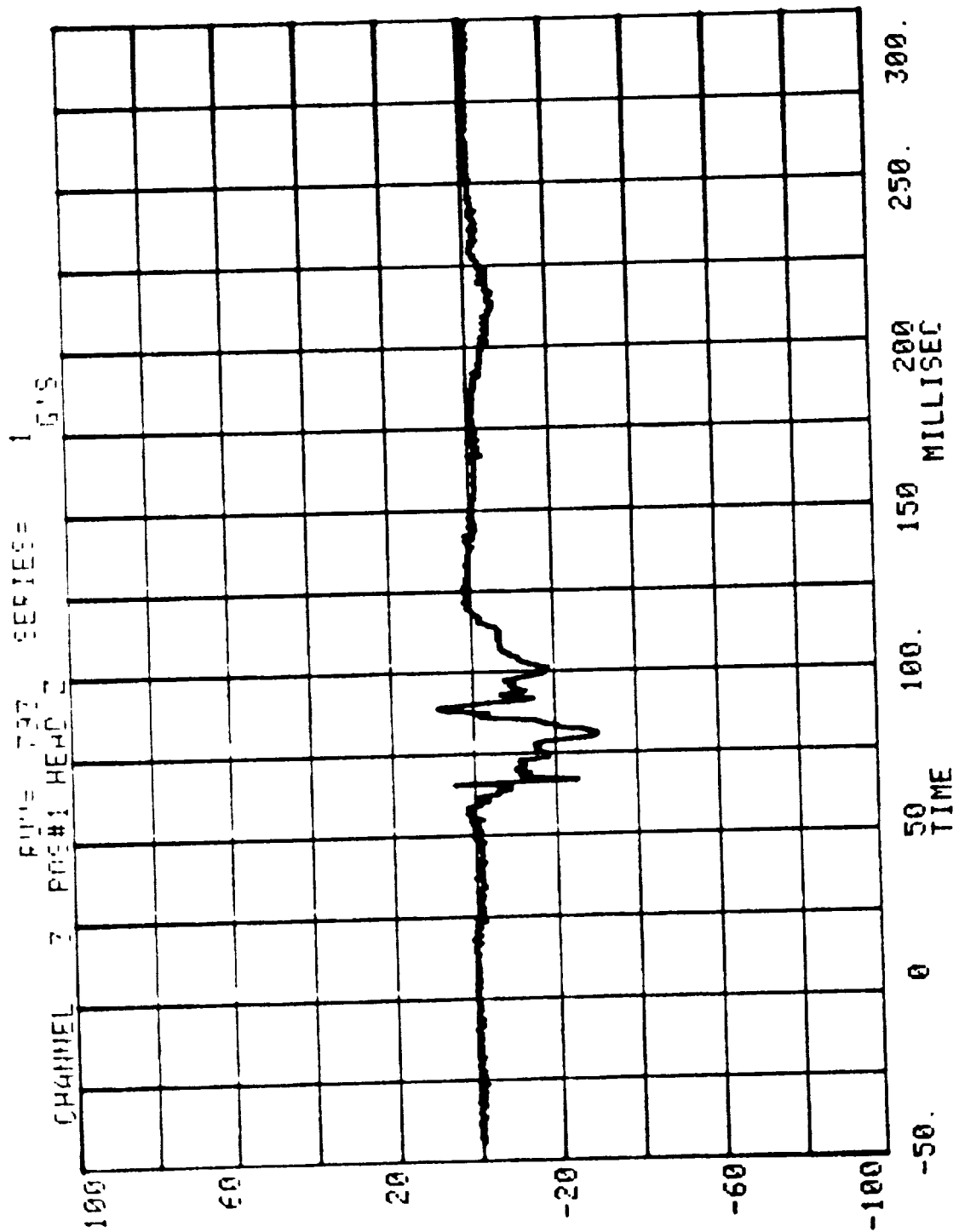
7581-2

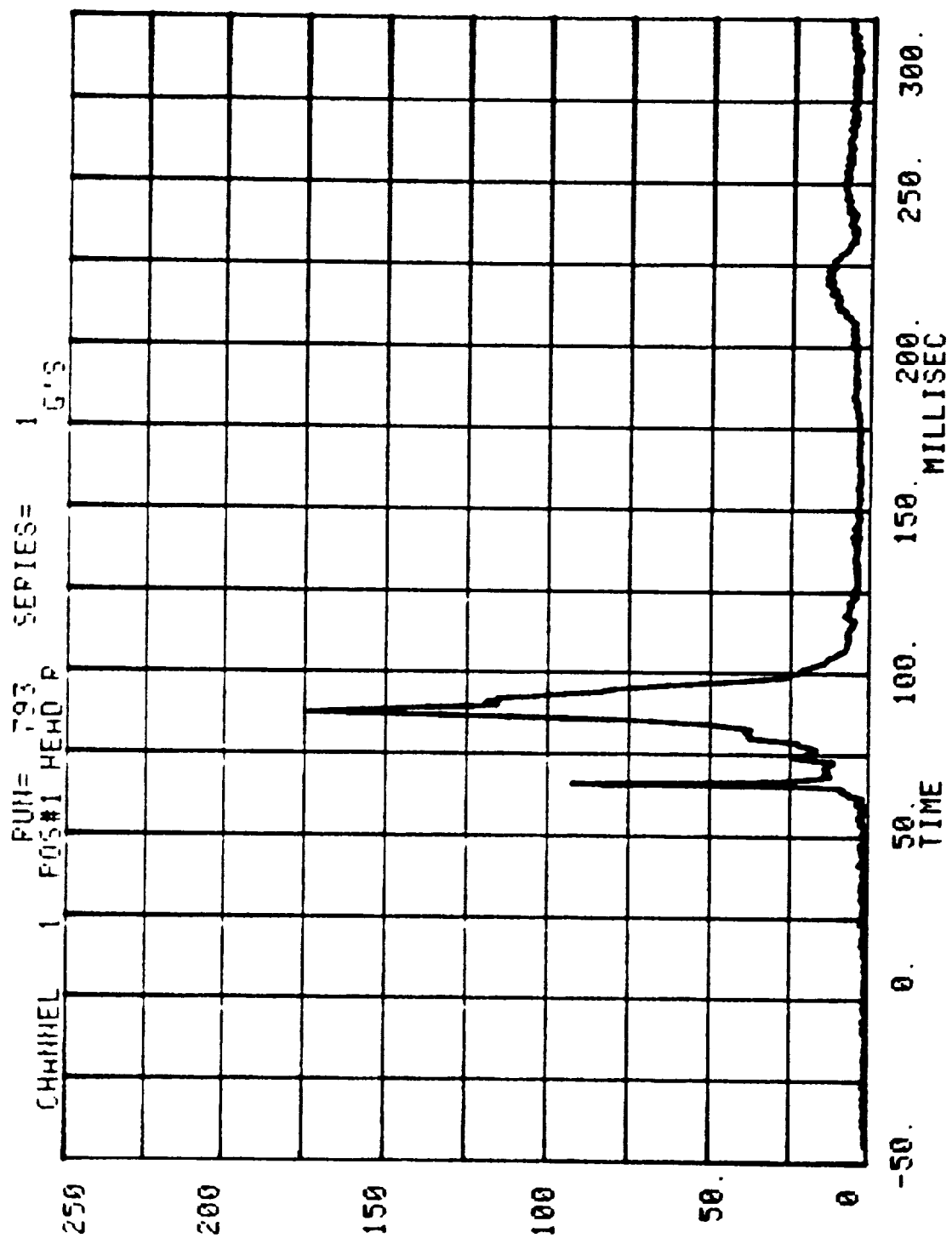
HYUNDAI INTO BAPPIER CFHEH TEST

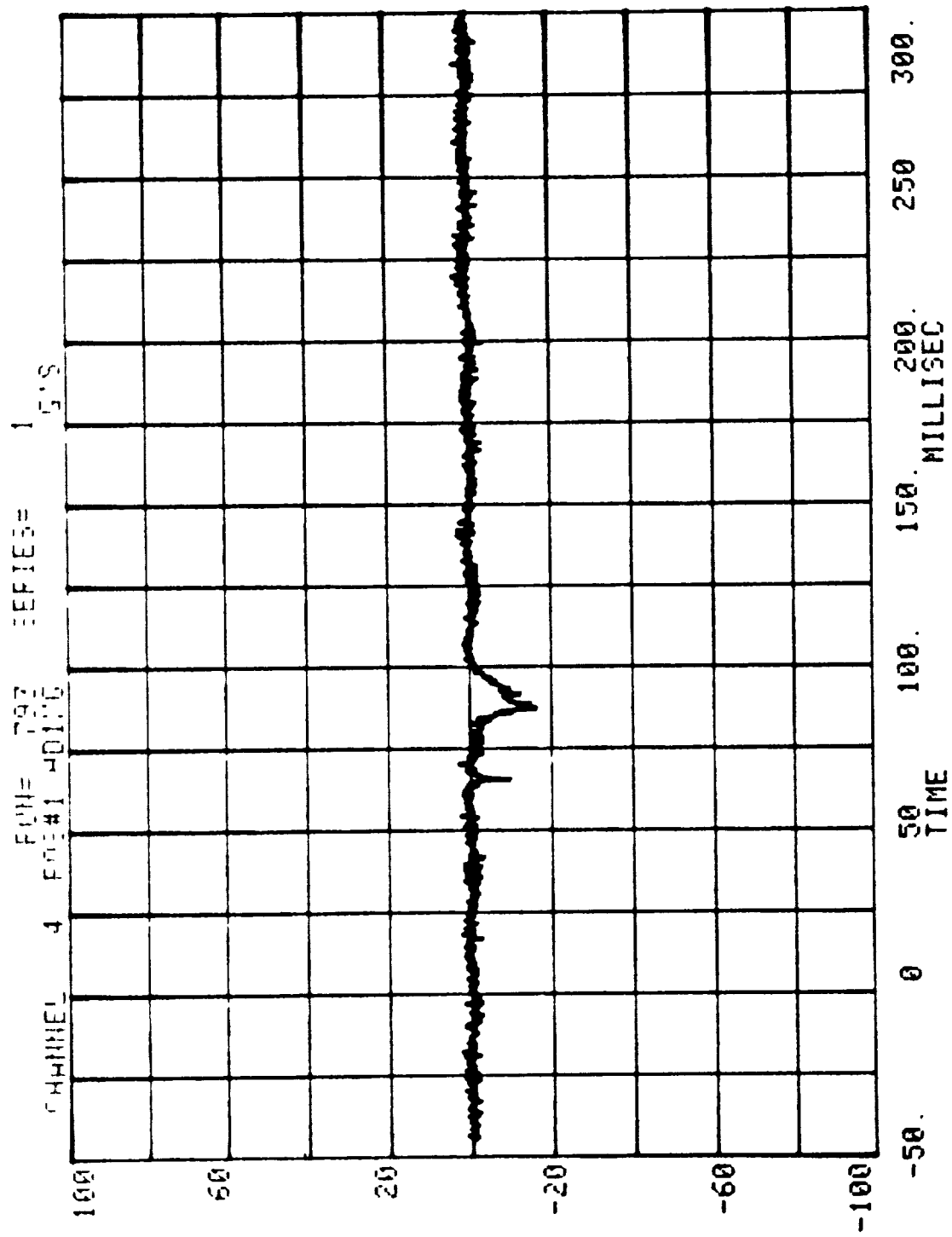
CHAN	PUN # 793	TITLE	MINIMUM	MAXIMUM	SERIES # 1
1	POS#1	HEAD R	379	174 096	G'S
2	POS#1	CHEST R	033	60 082	G'S

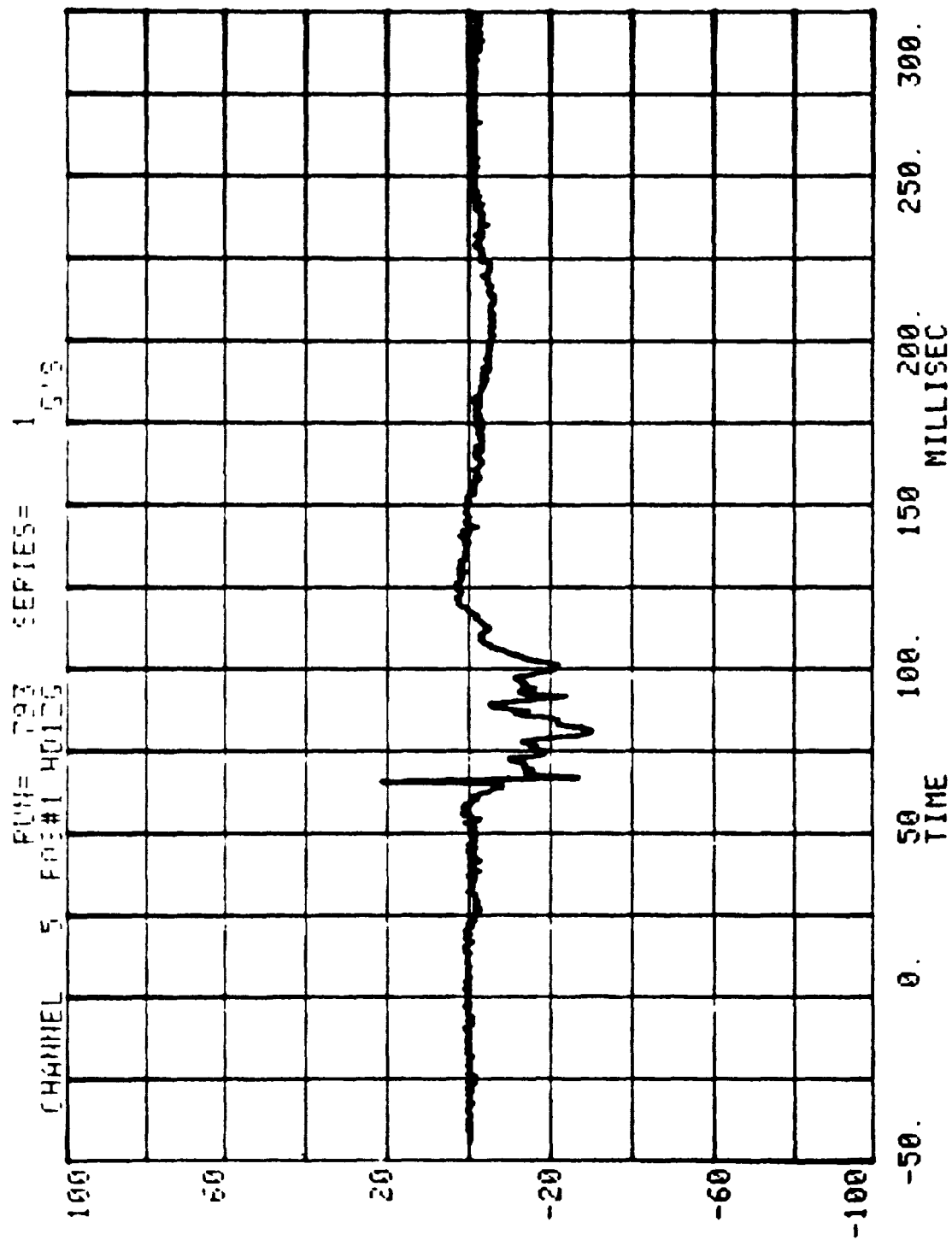


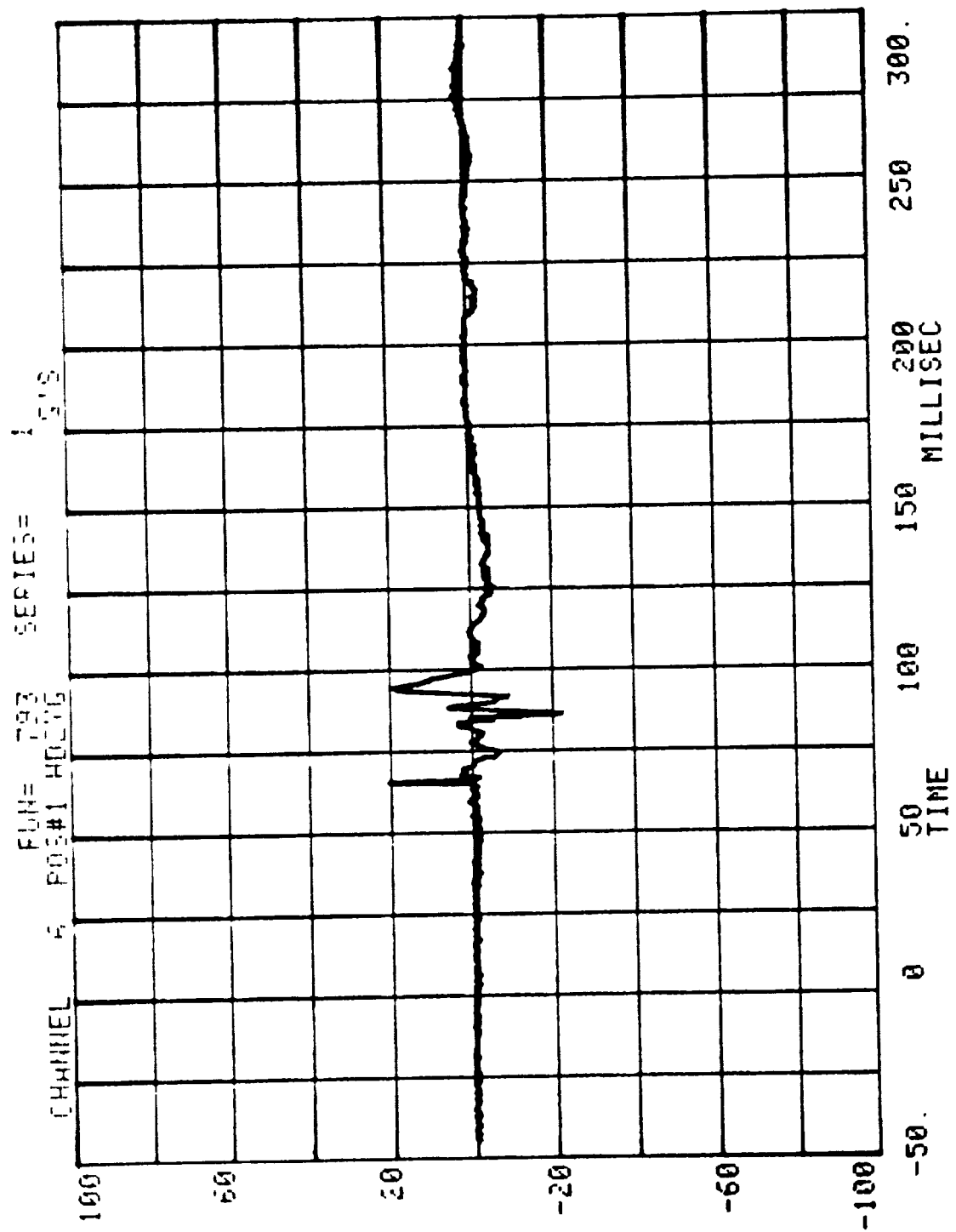


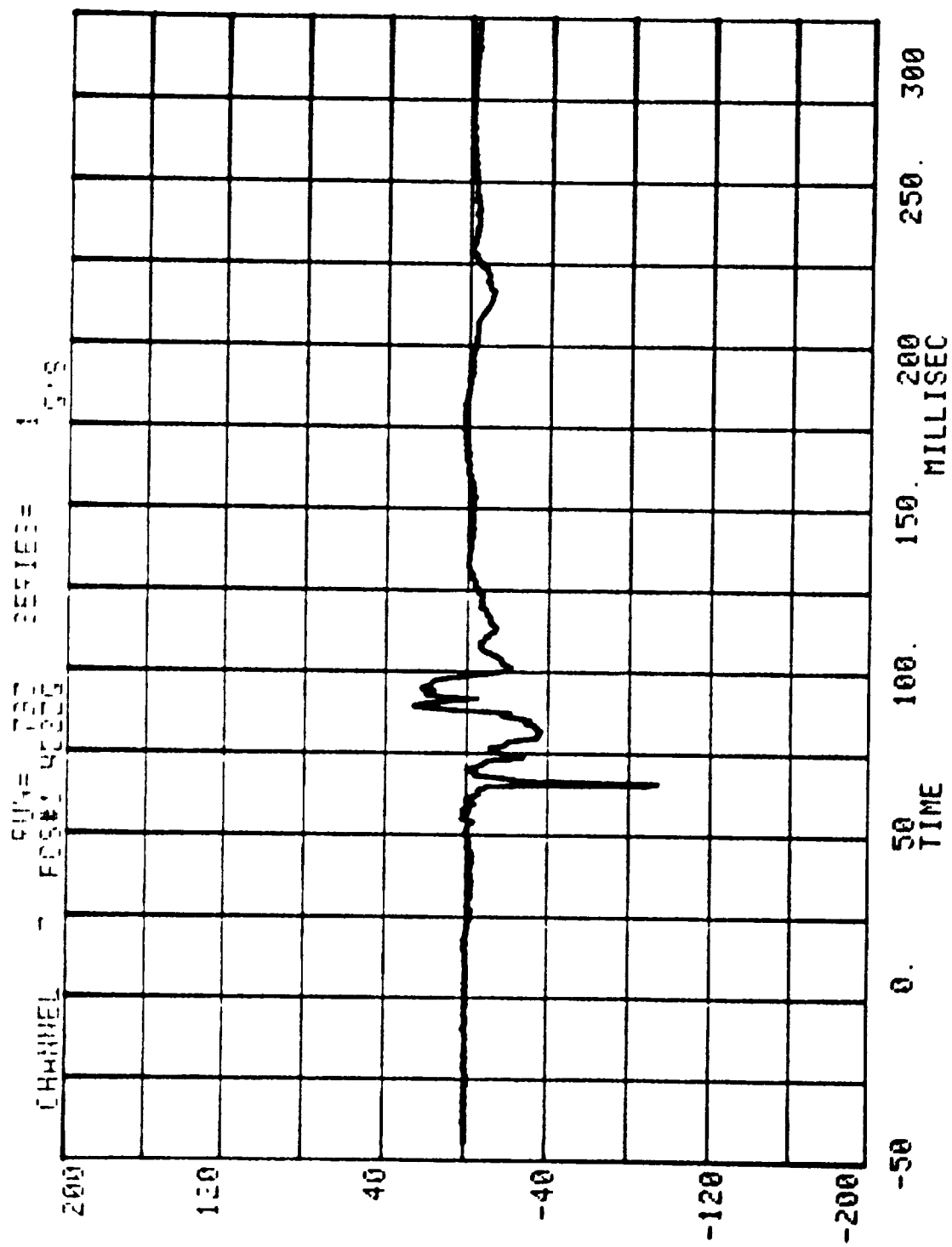


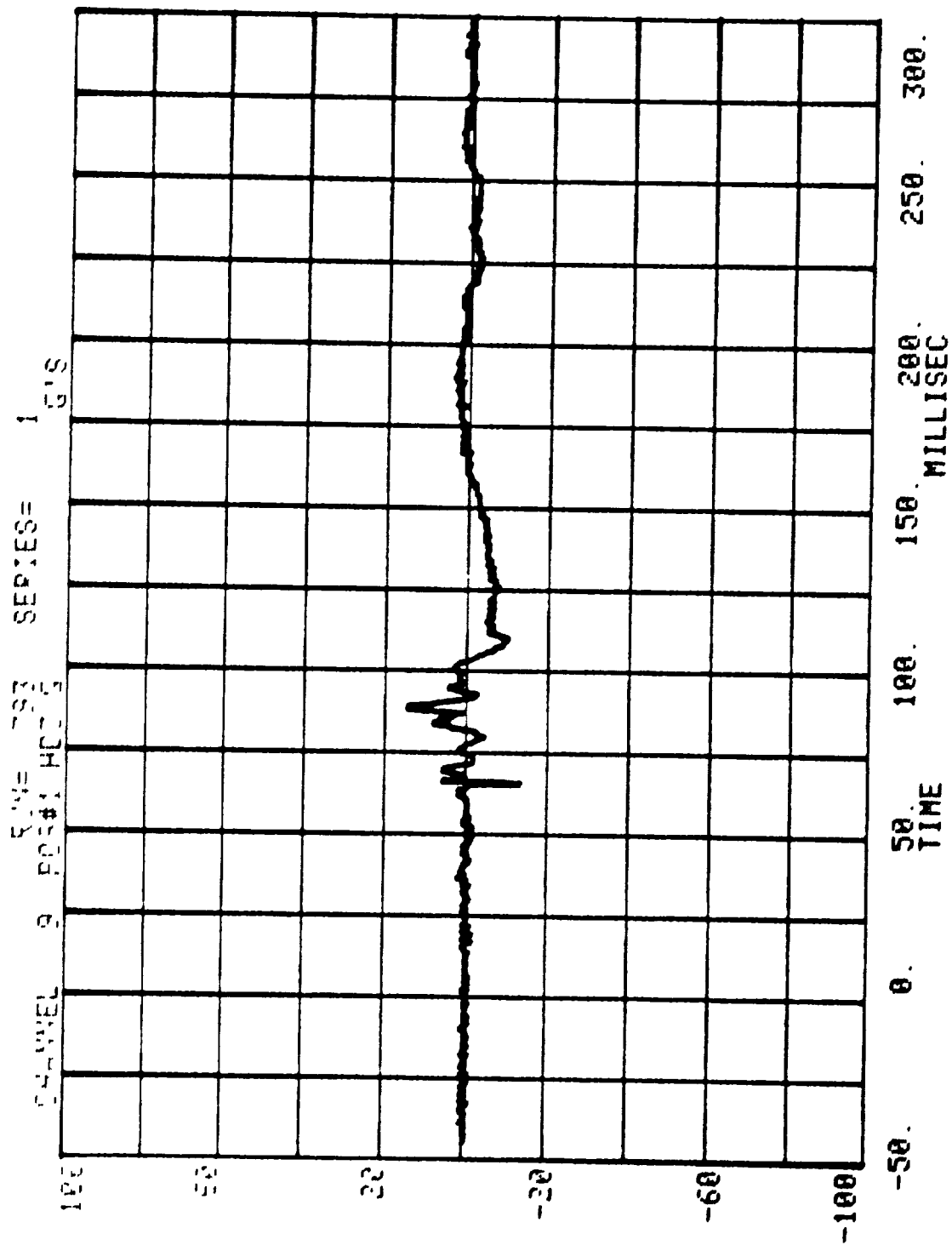


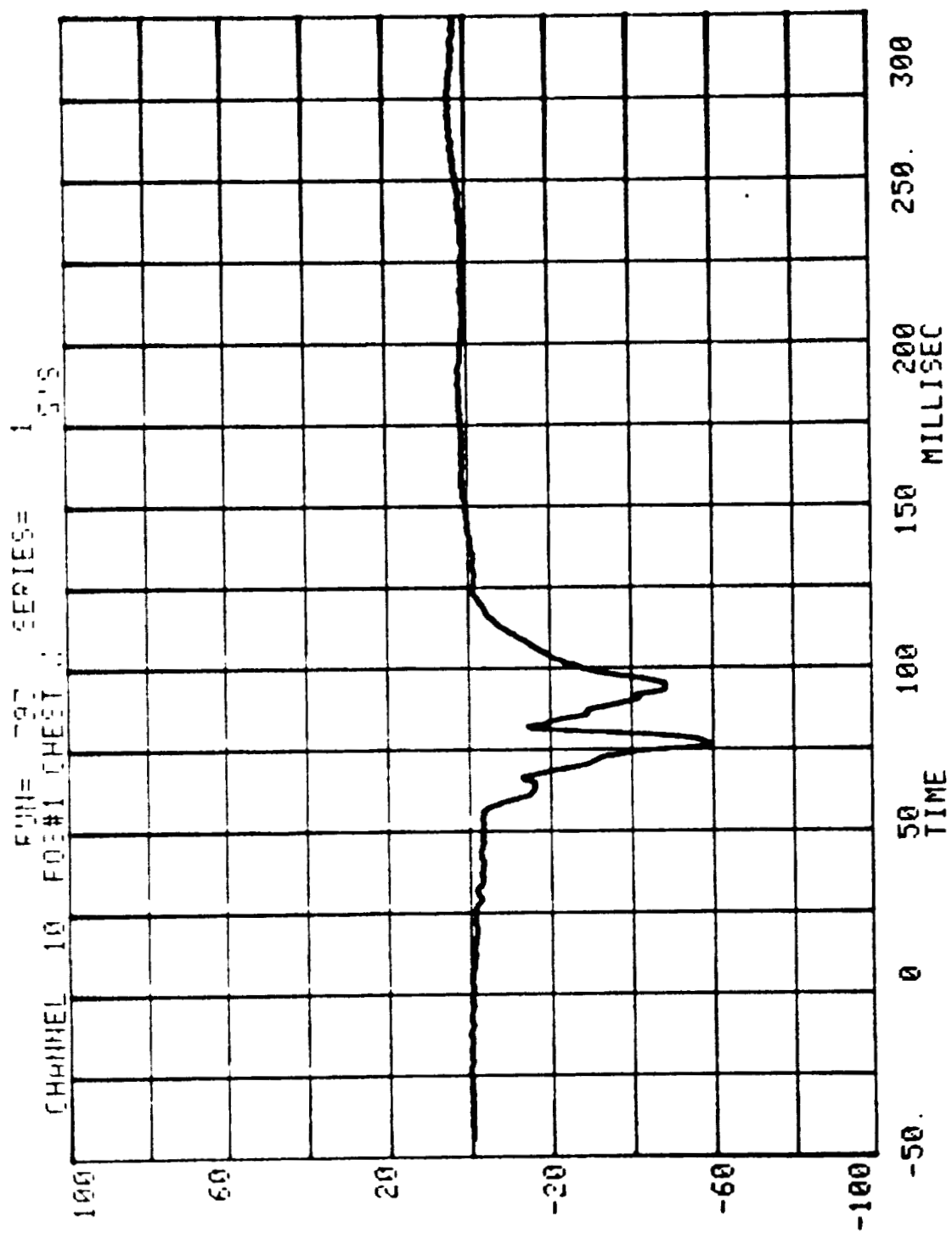


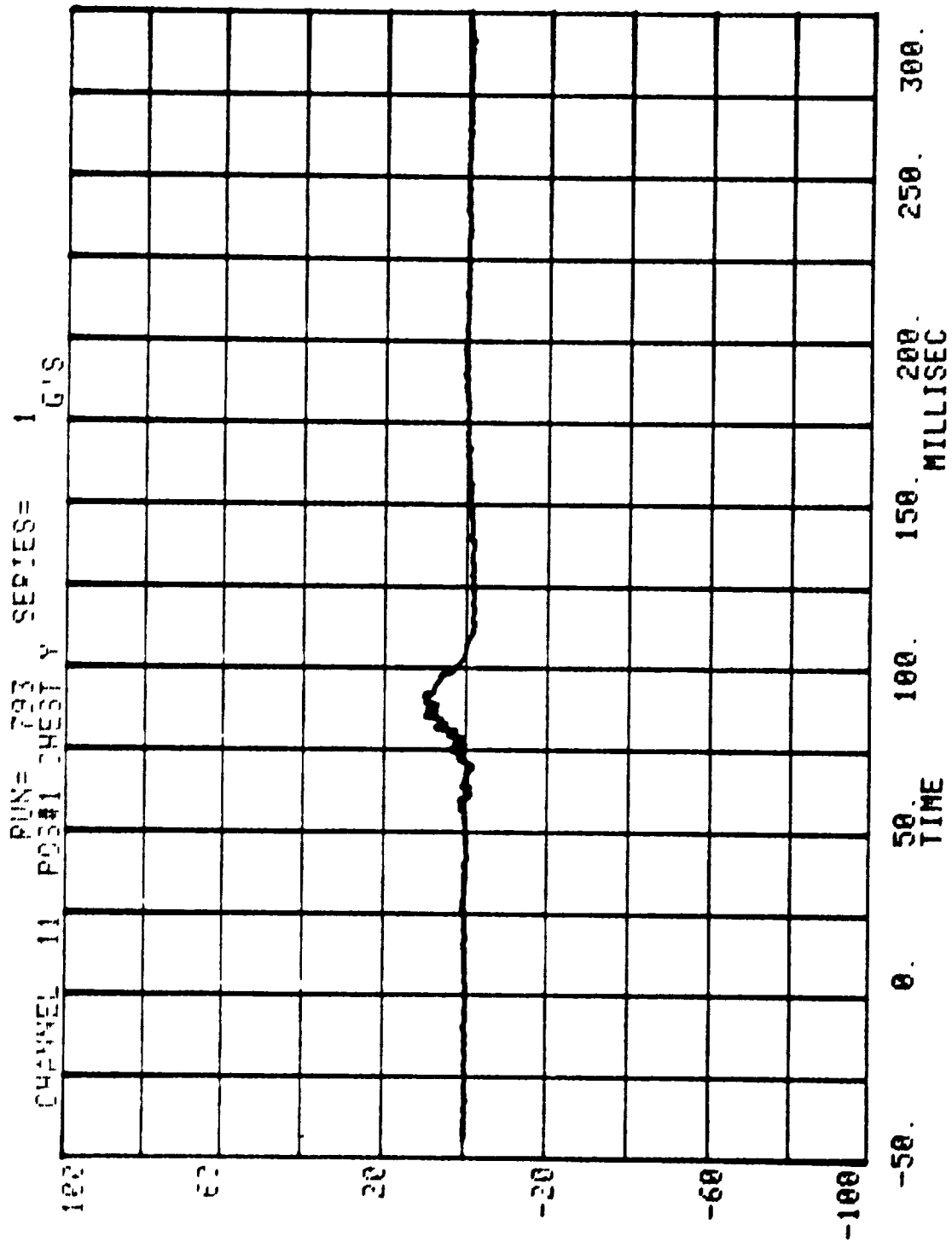


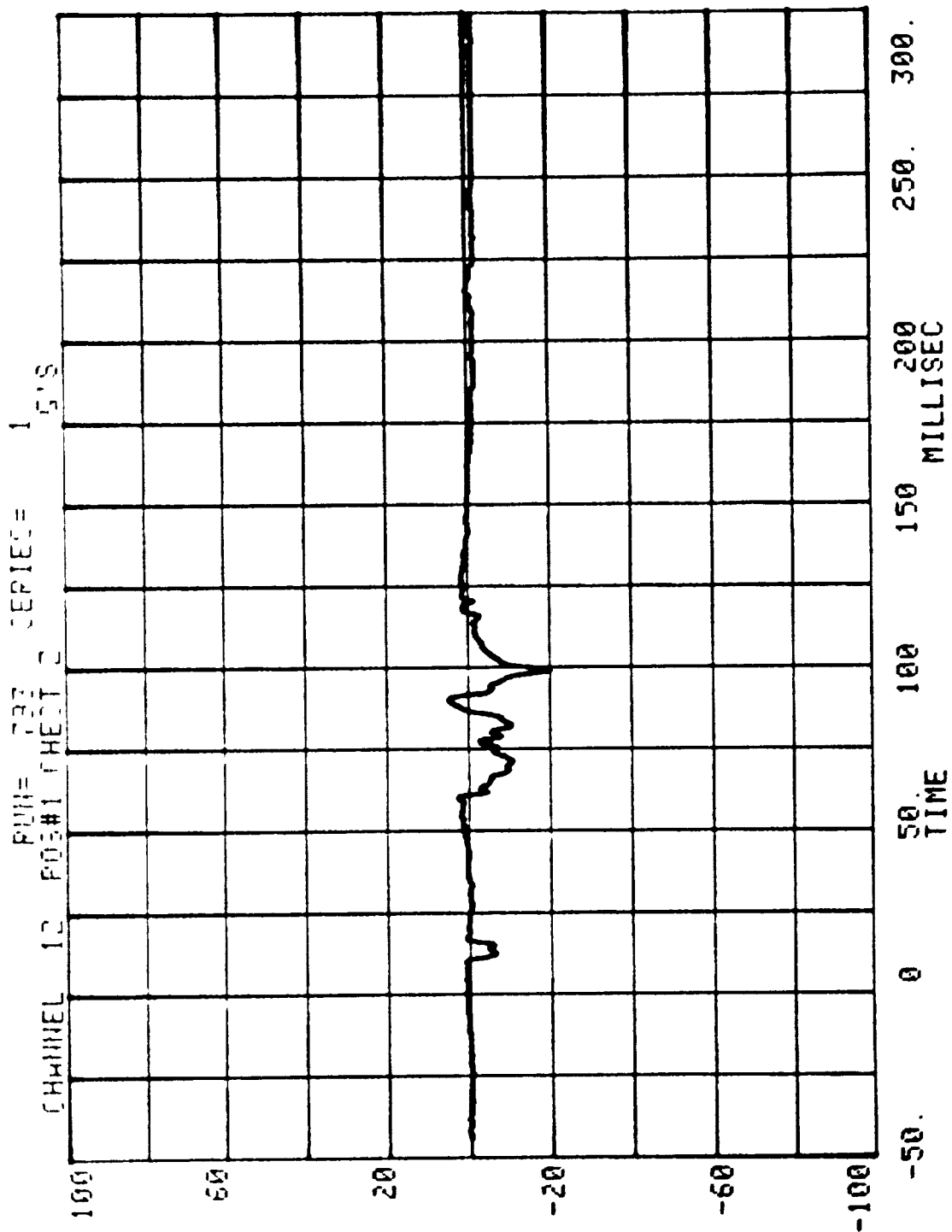


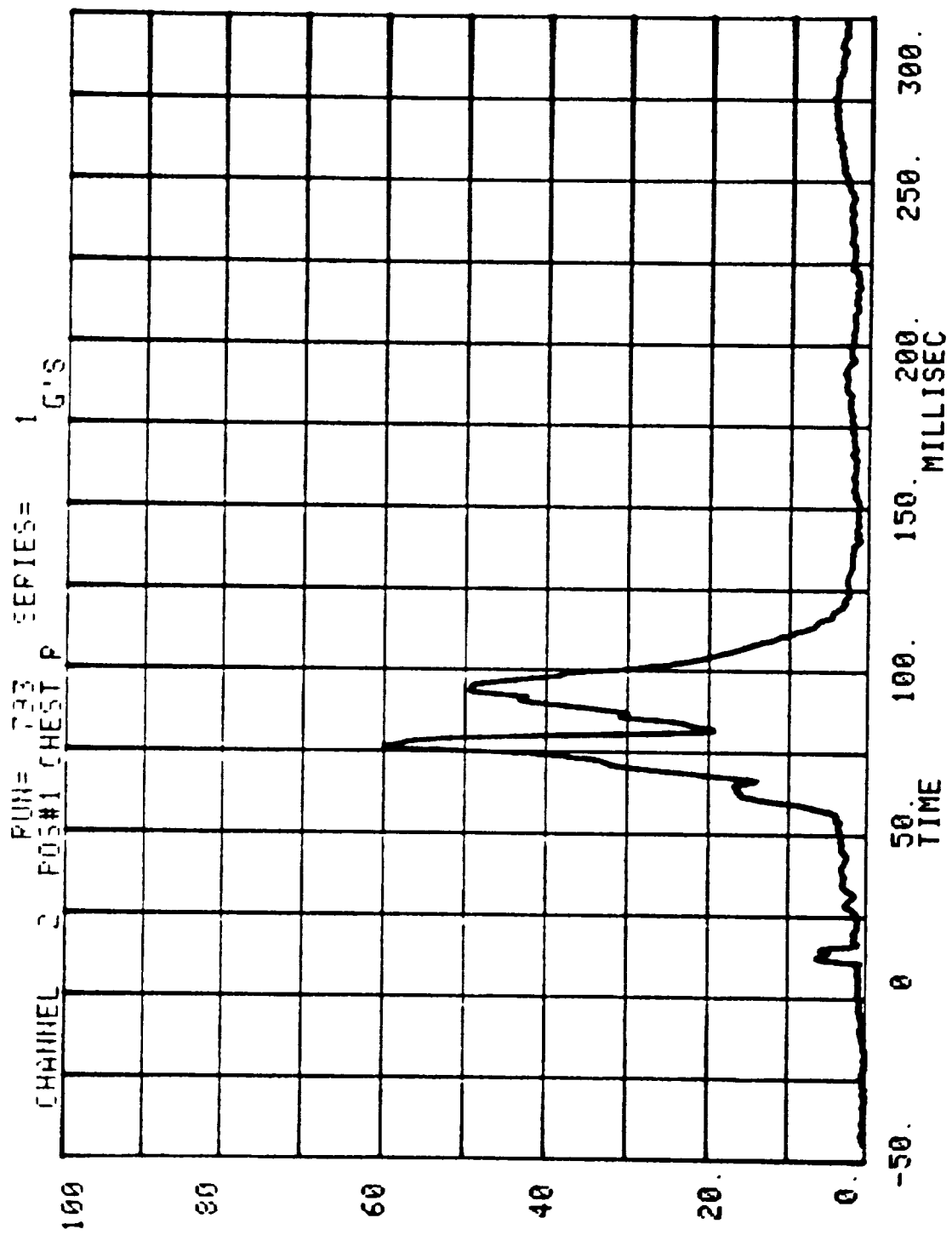


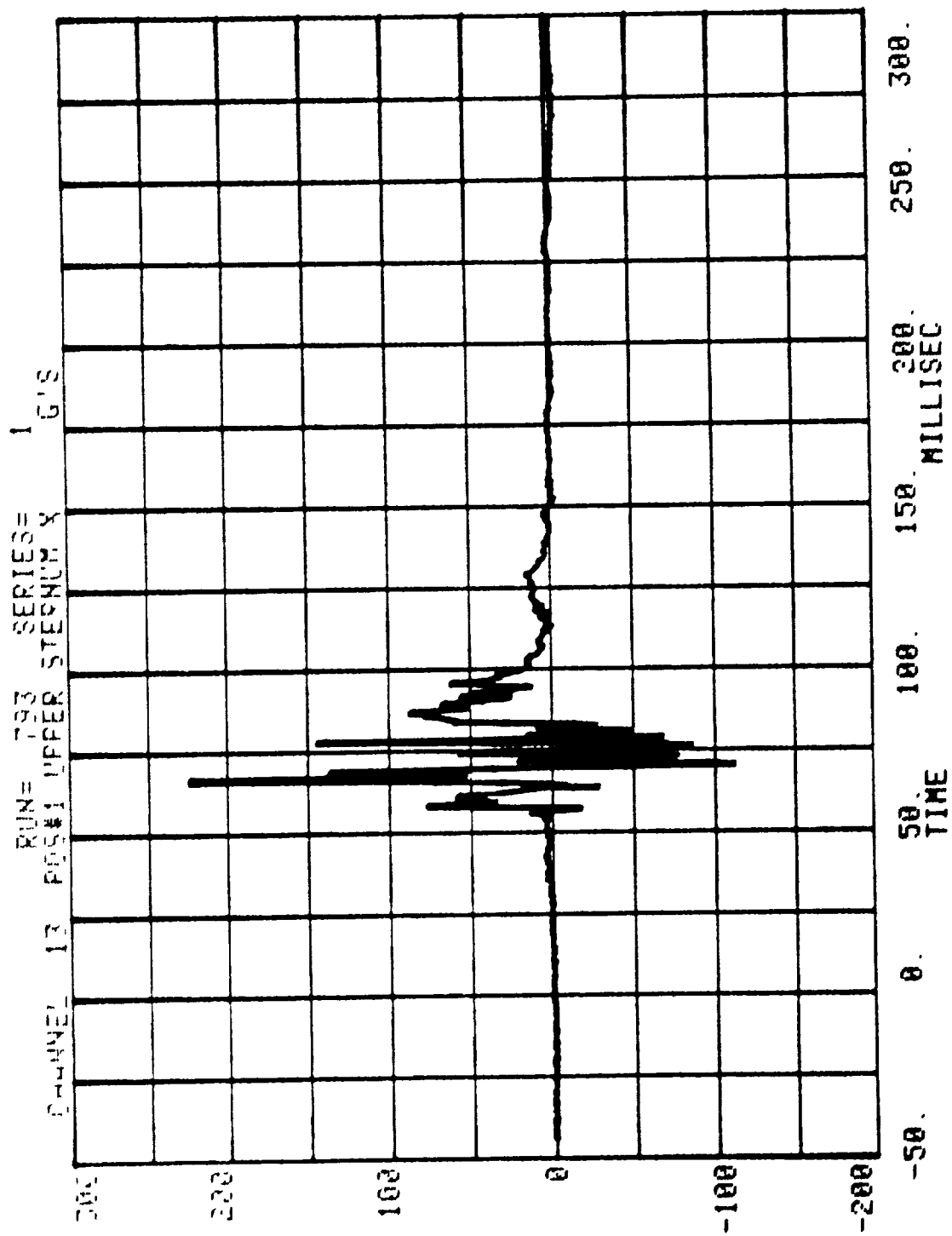


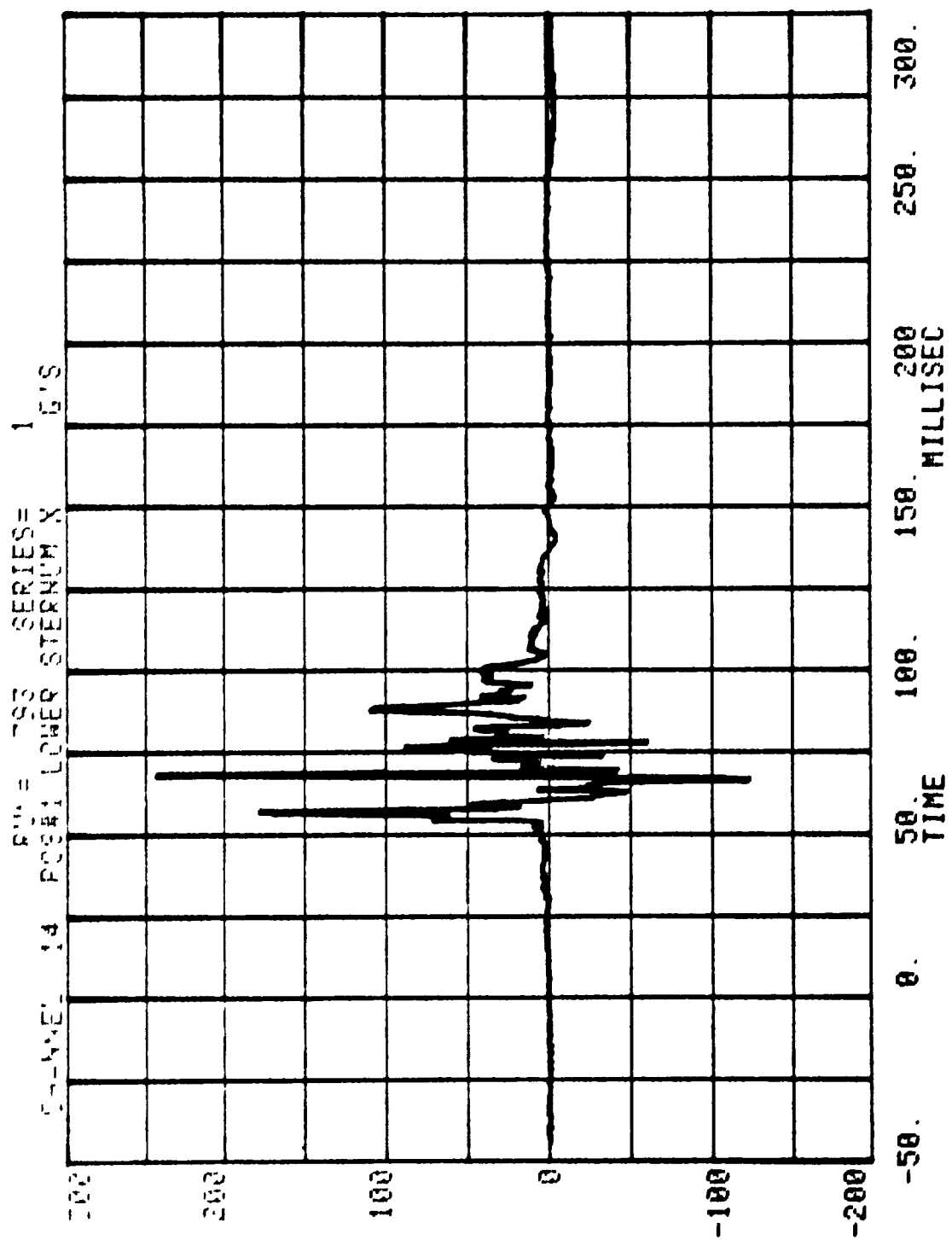


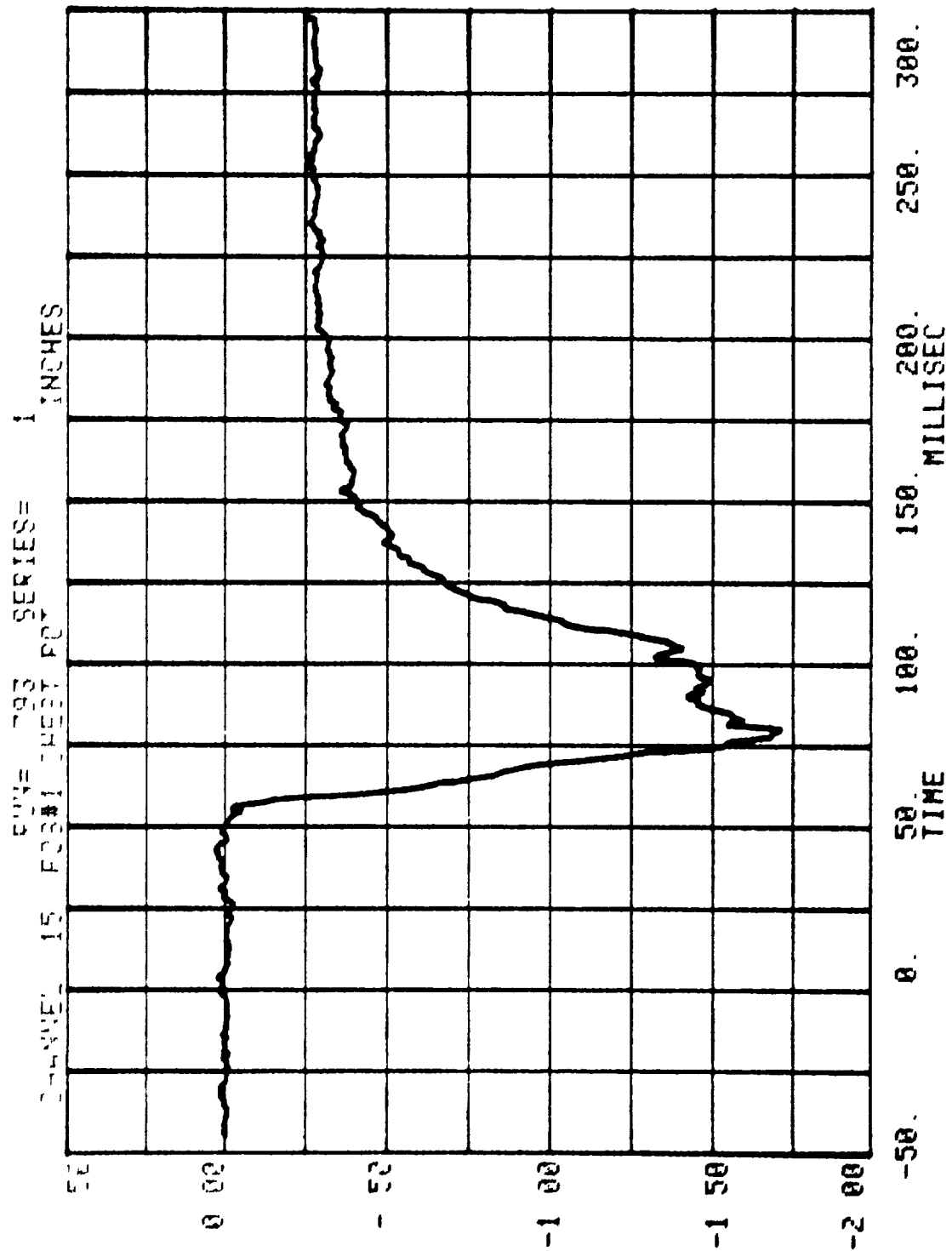


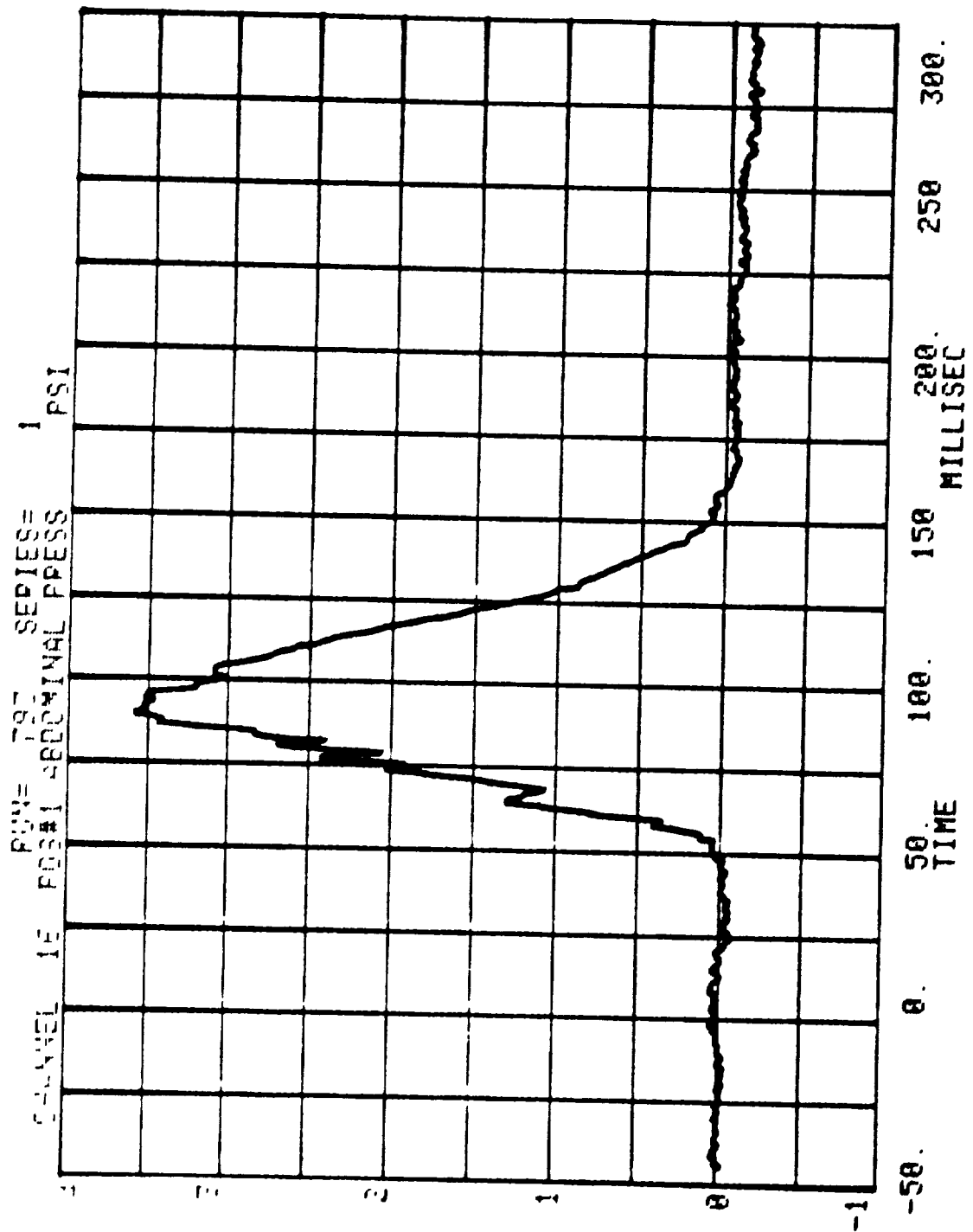


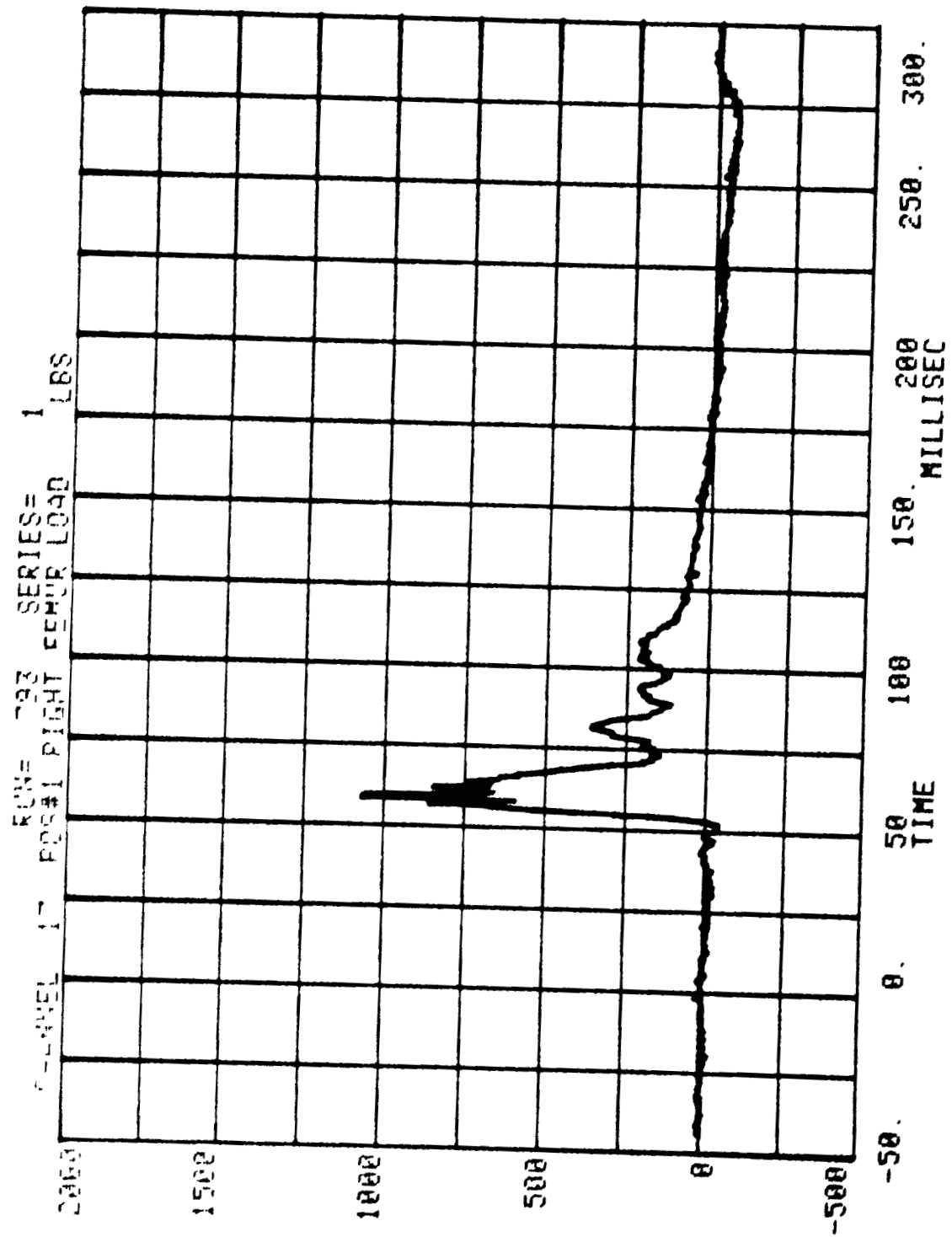


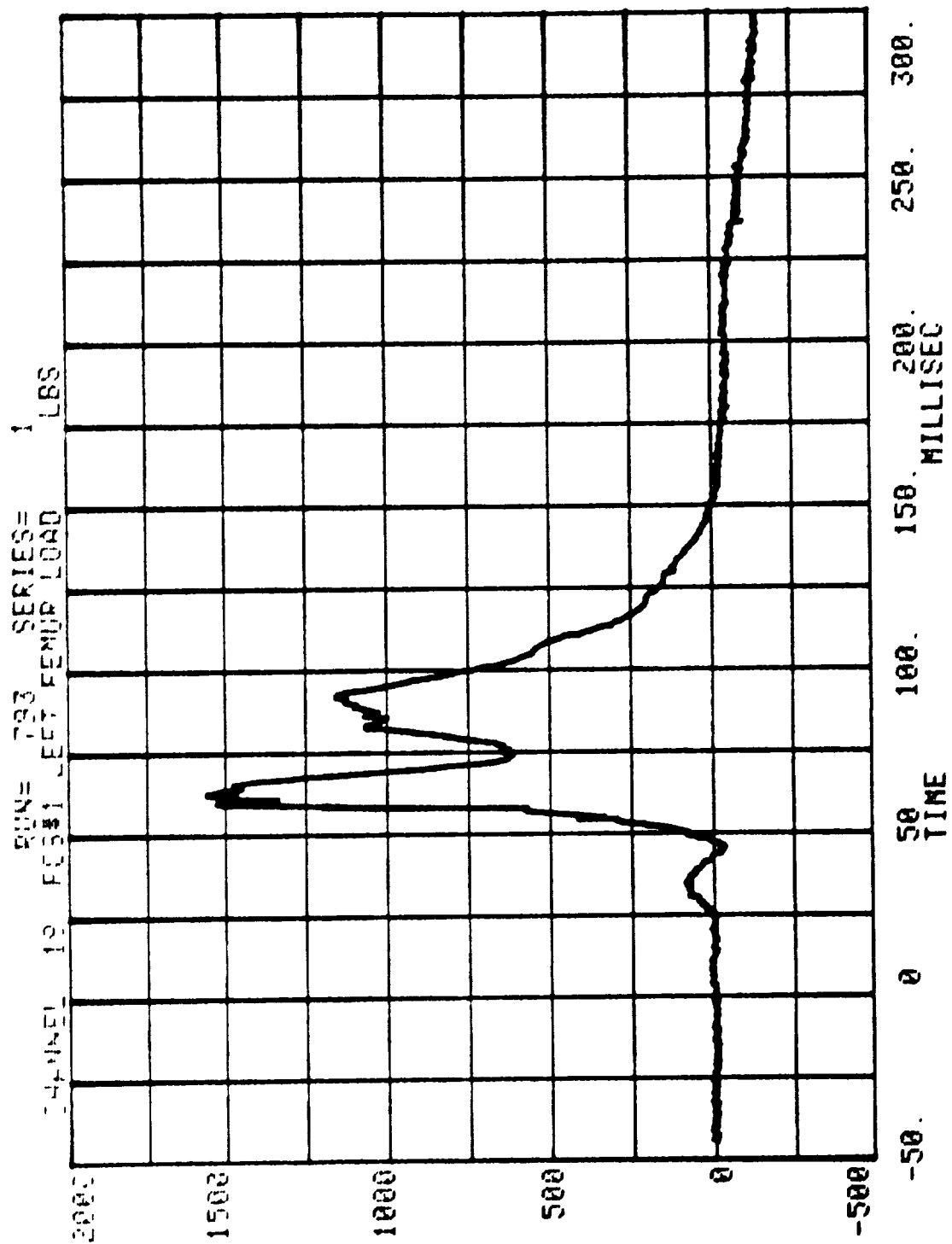


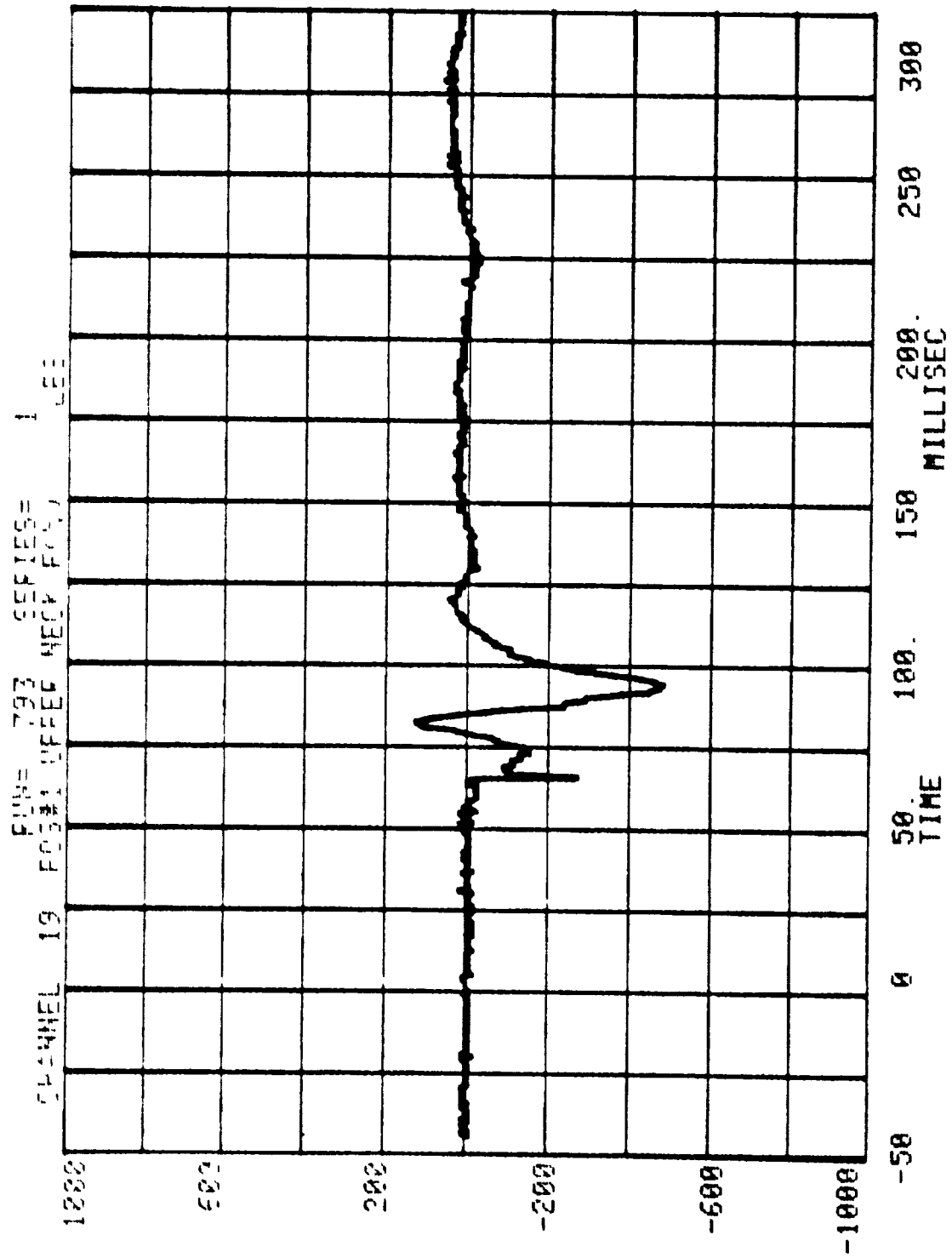


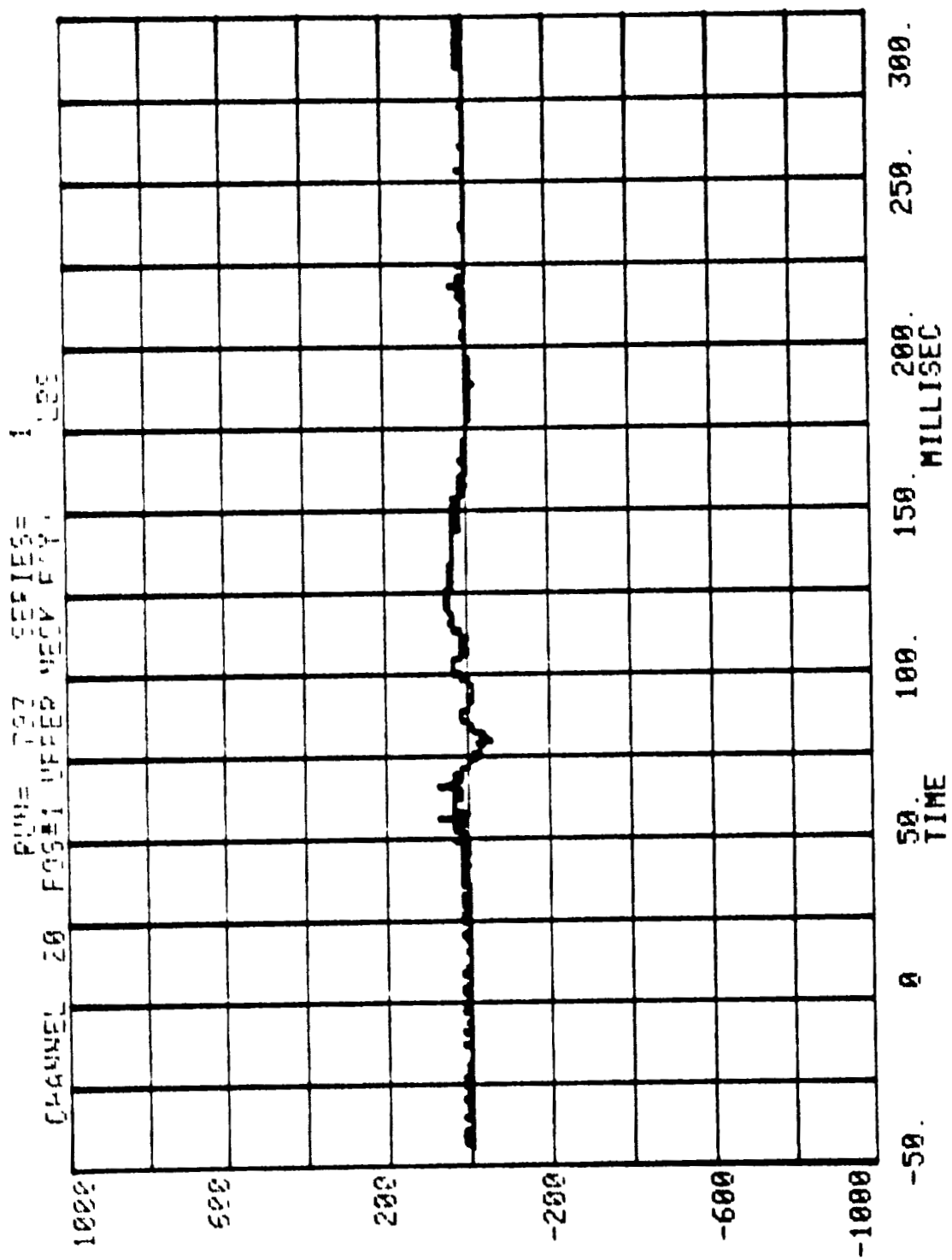


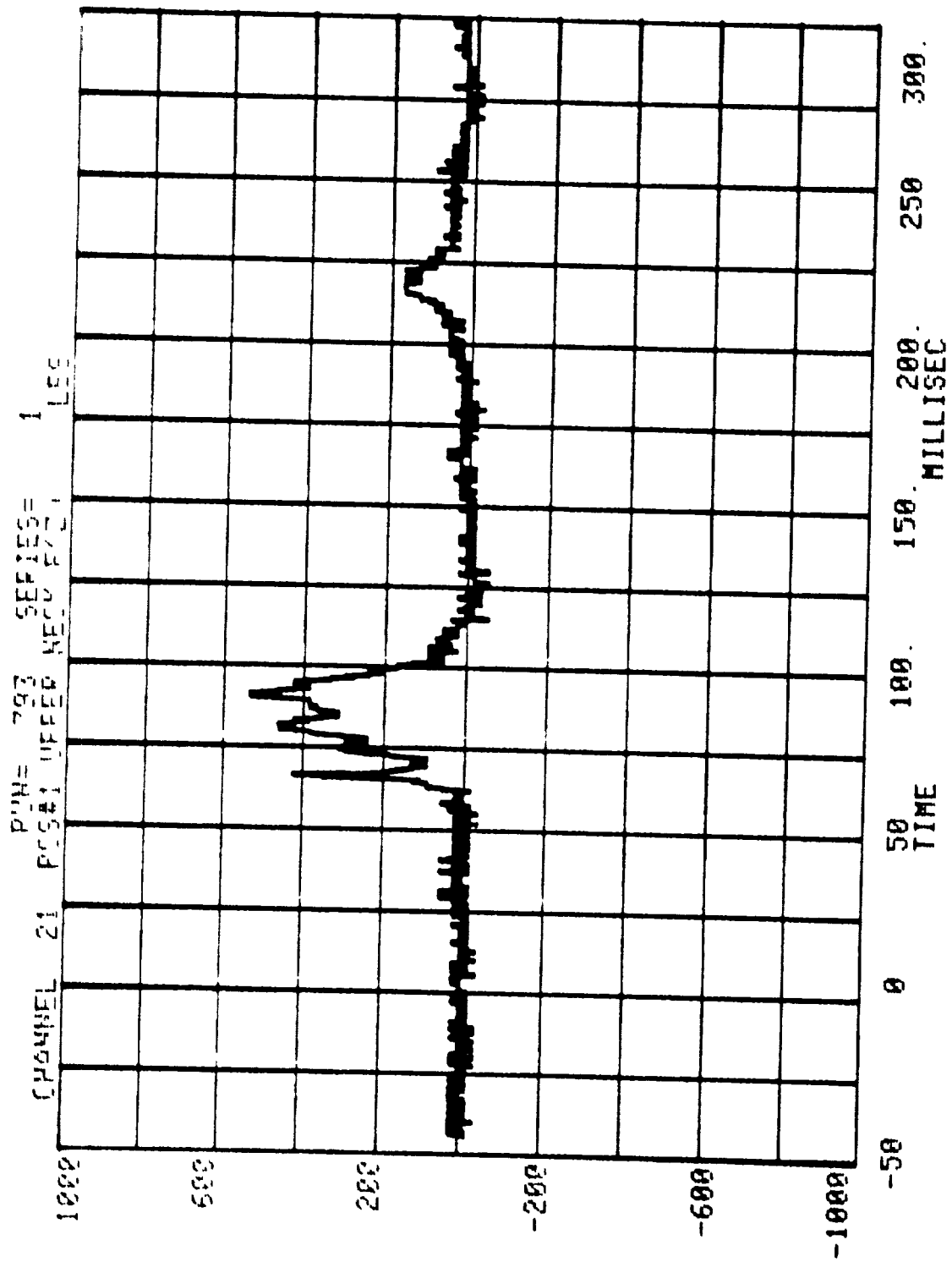




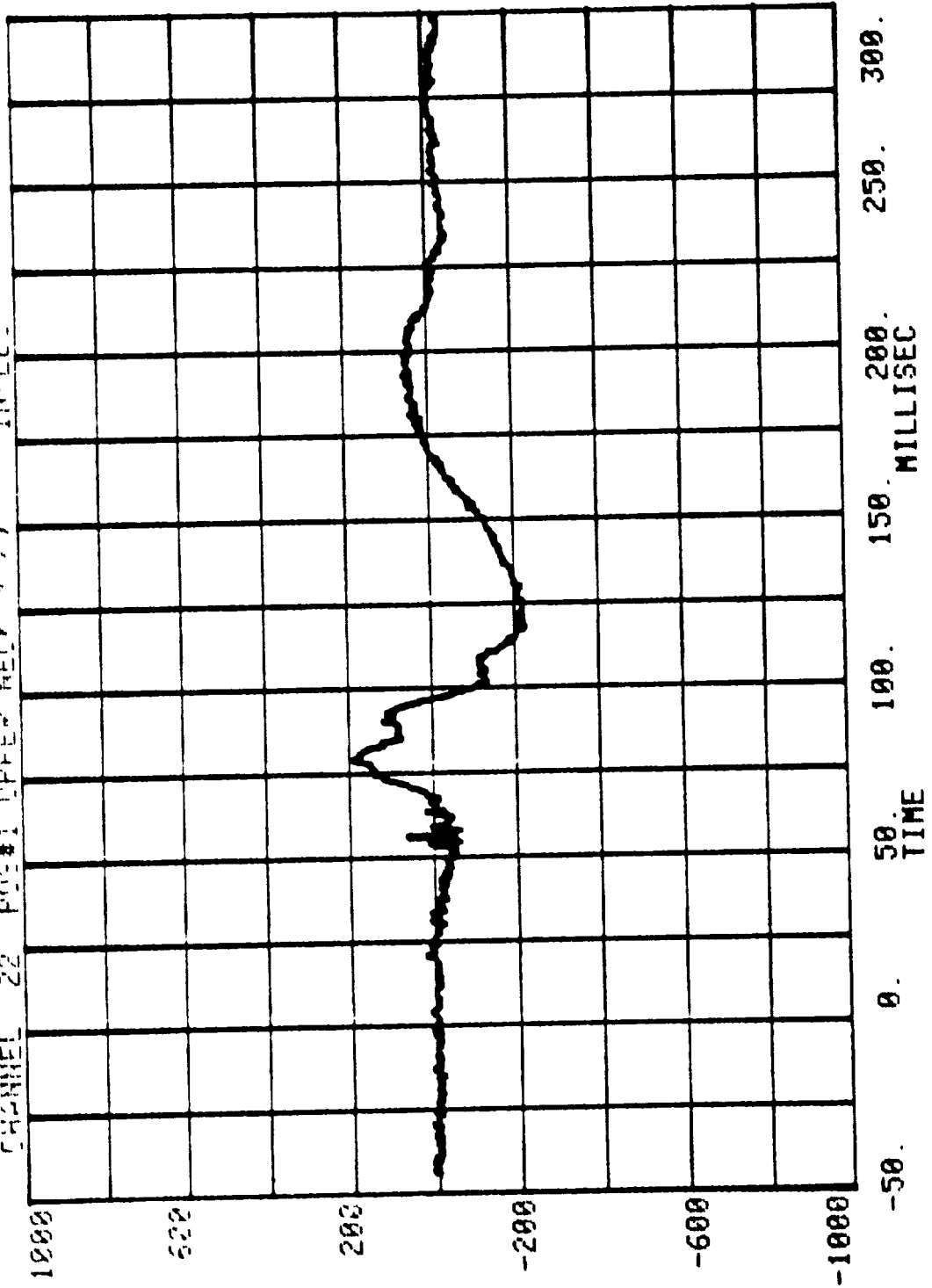


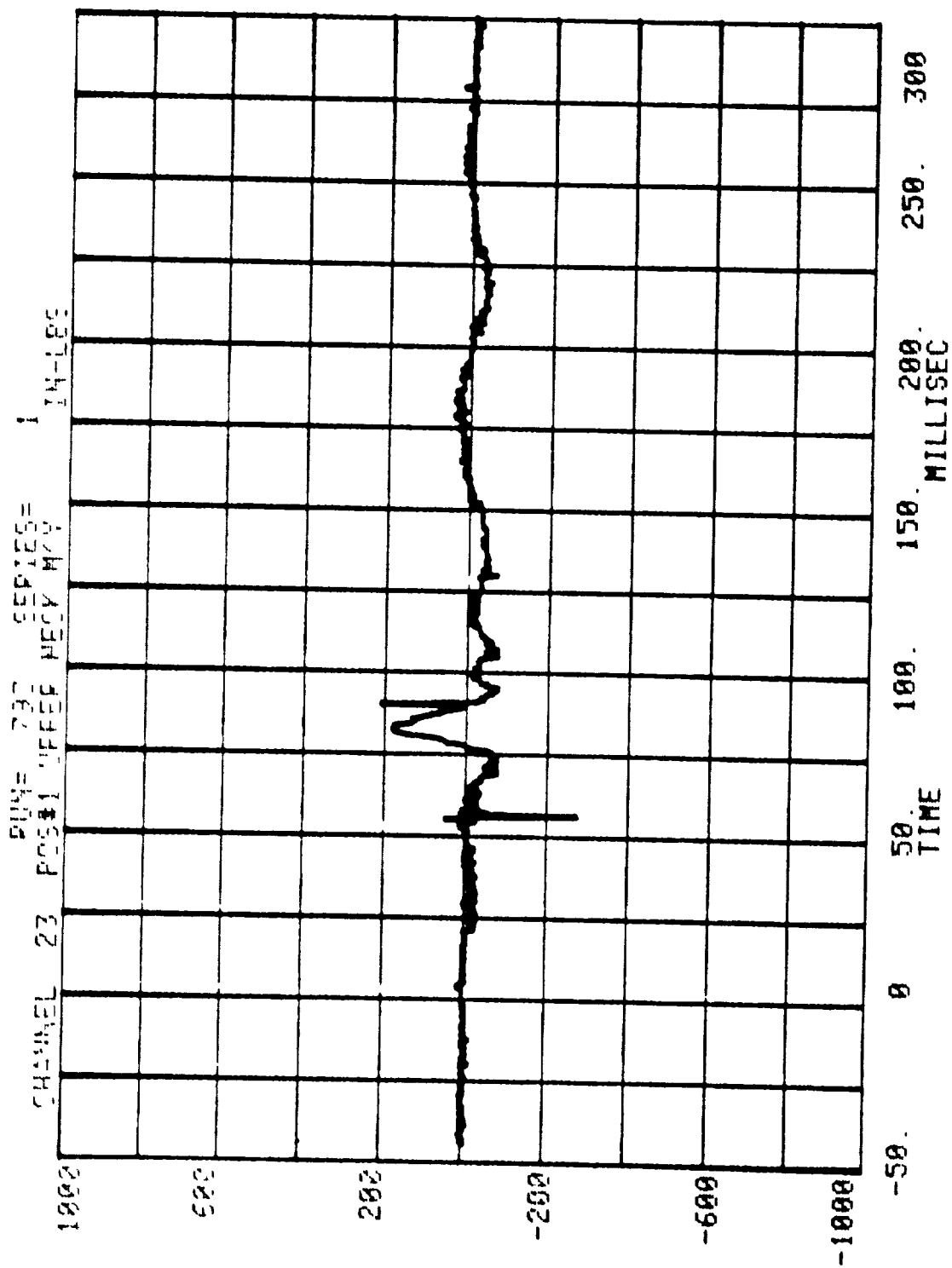


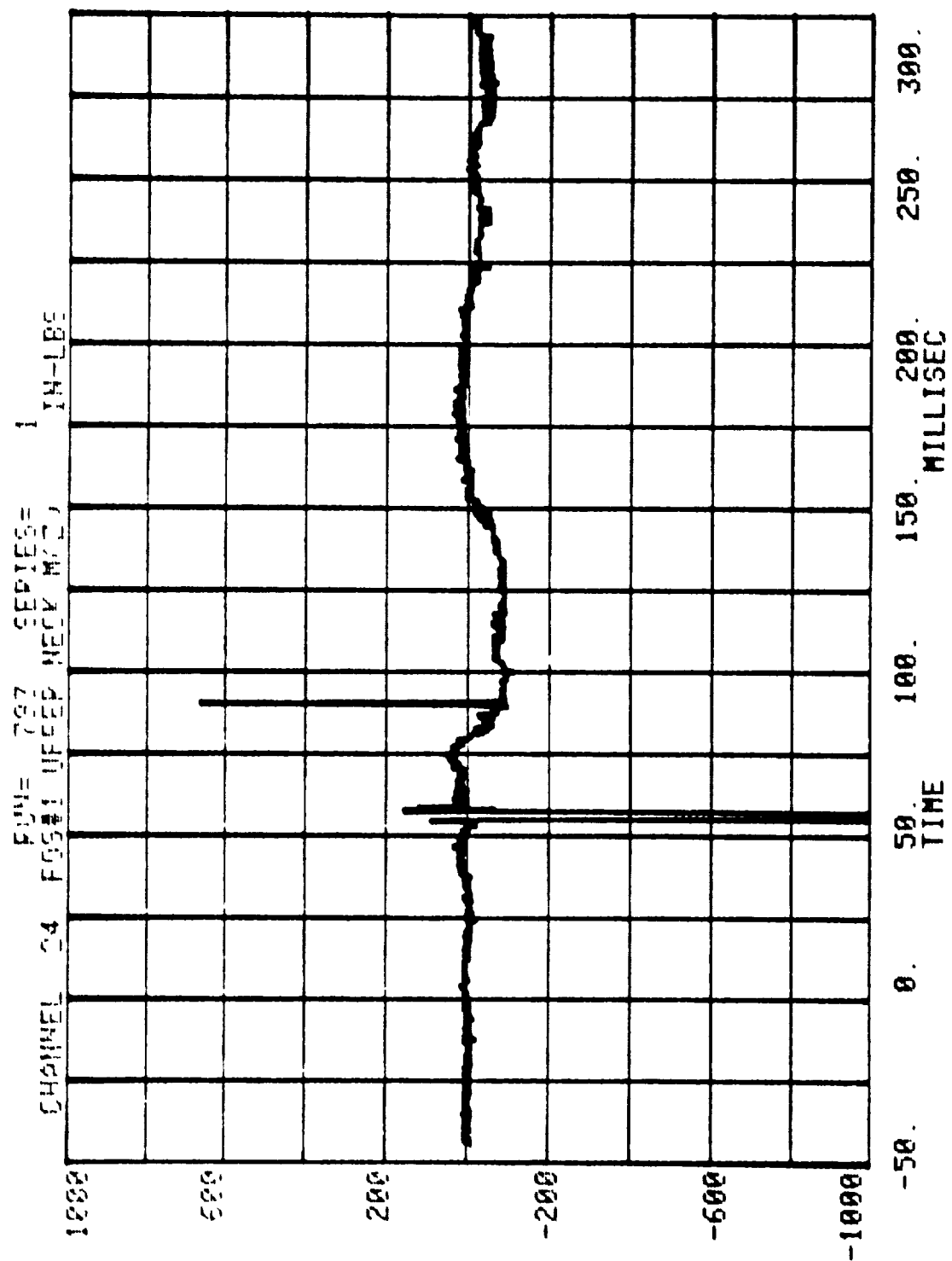




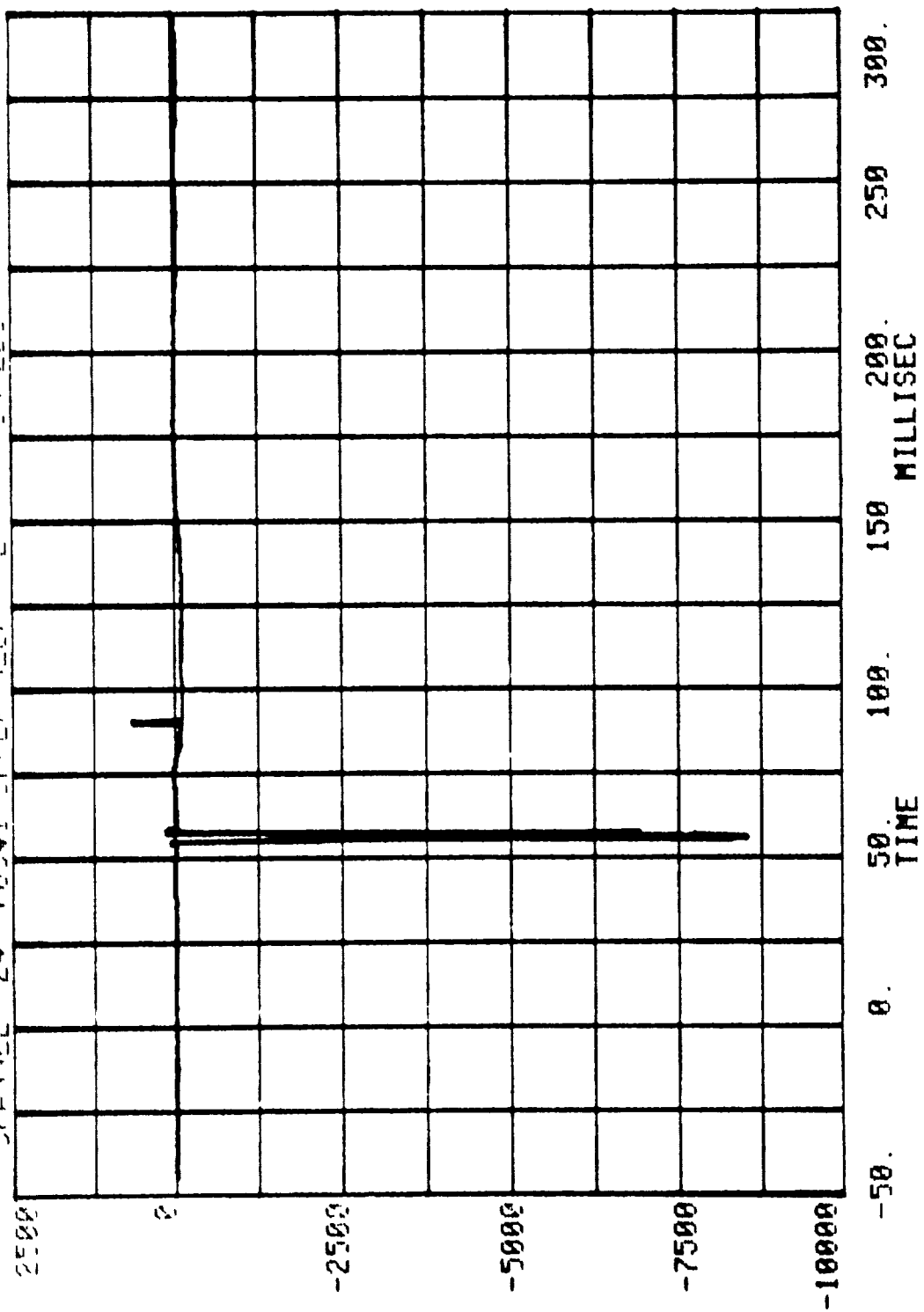
CHANNEL 22 RUN= 753 SERIES= 1 IN-LPS
P03#1 UPPER HELIX W'97

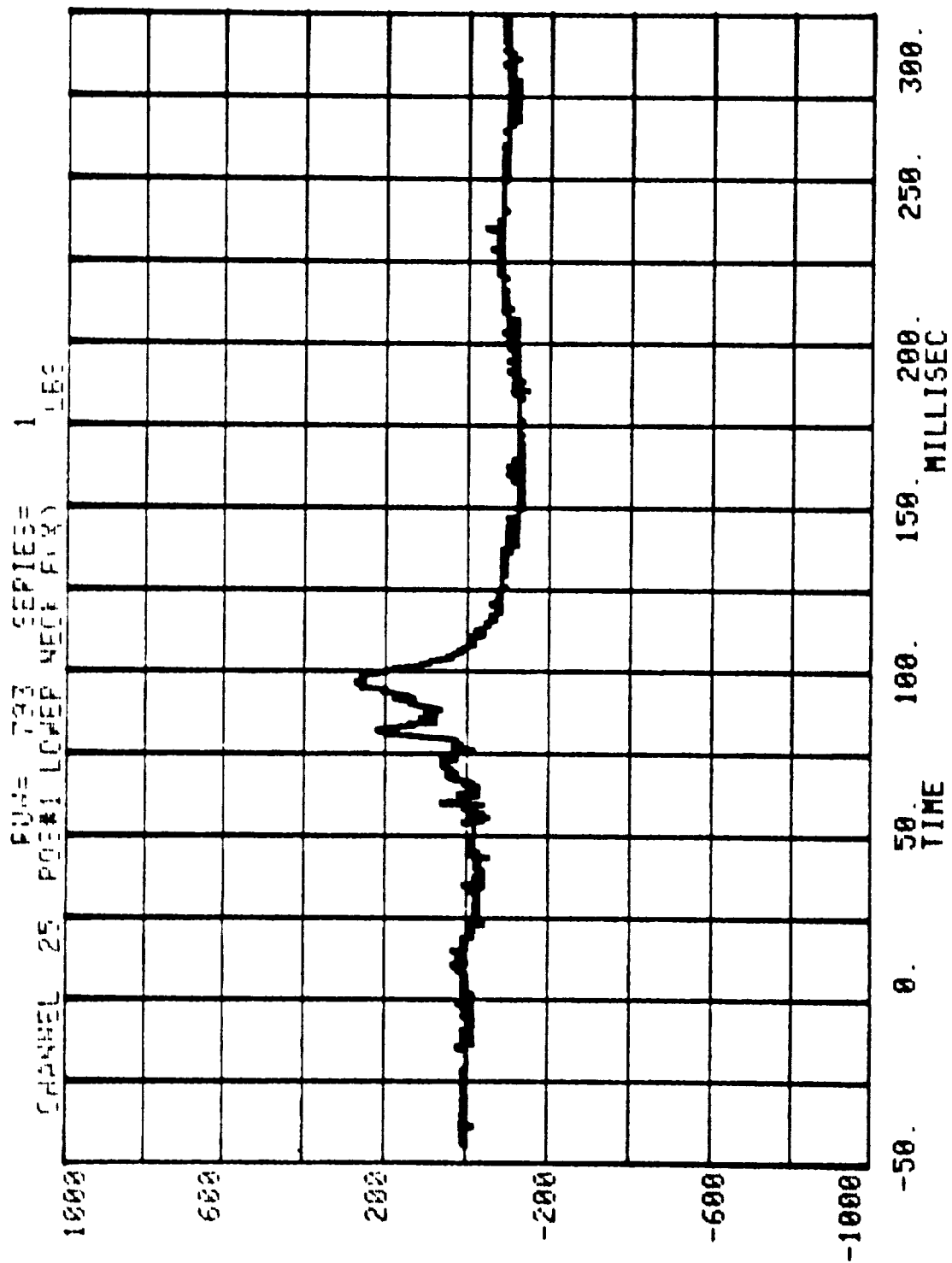


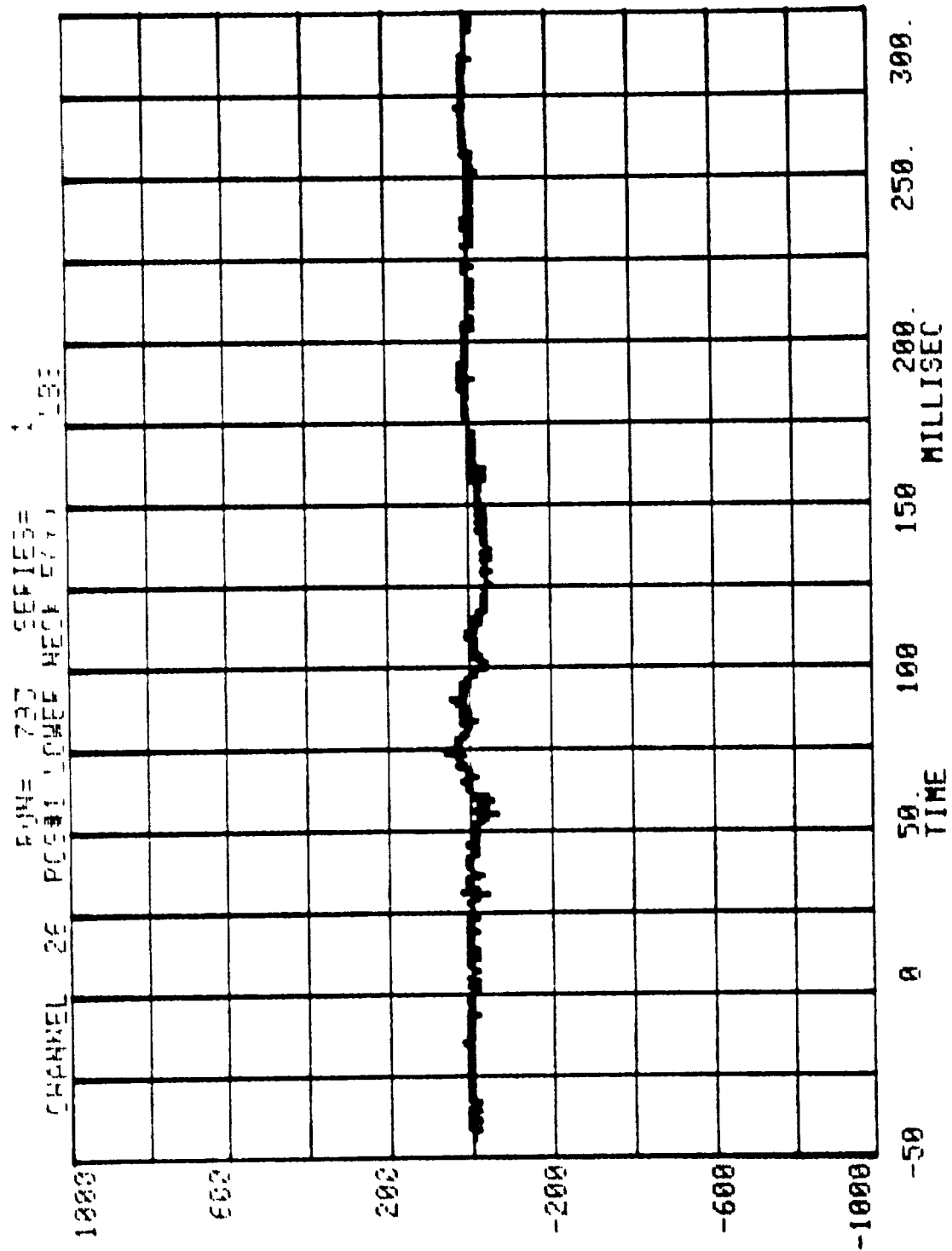


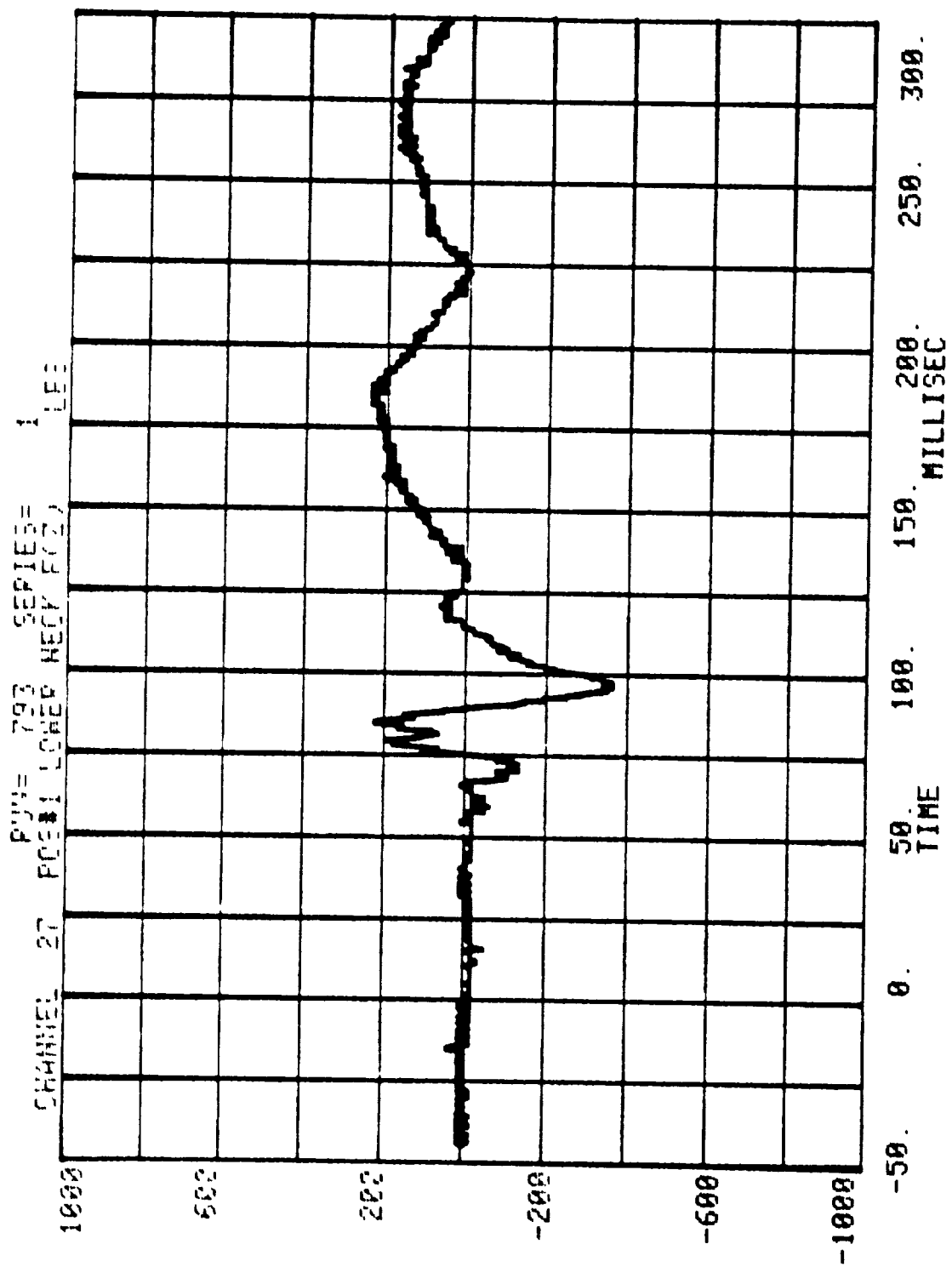


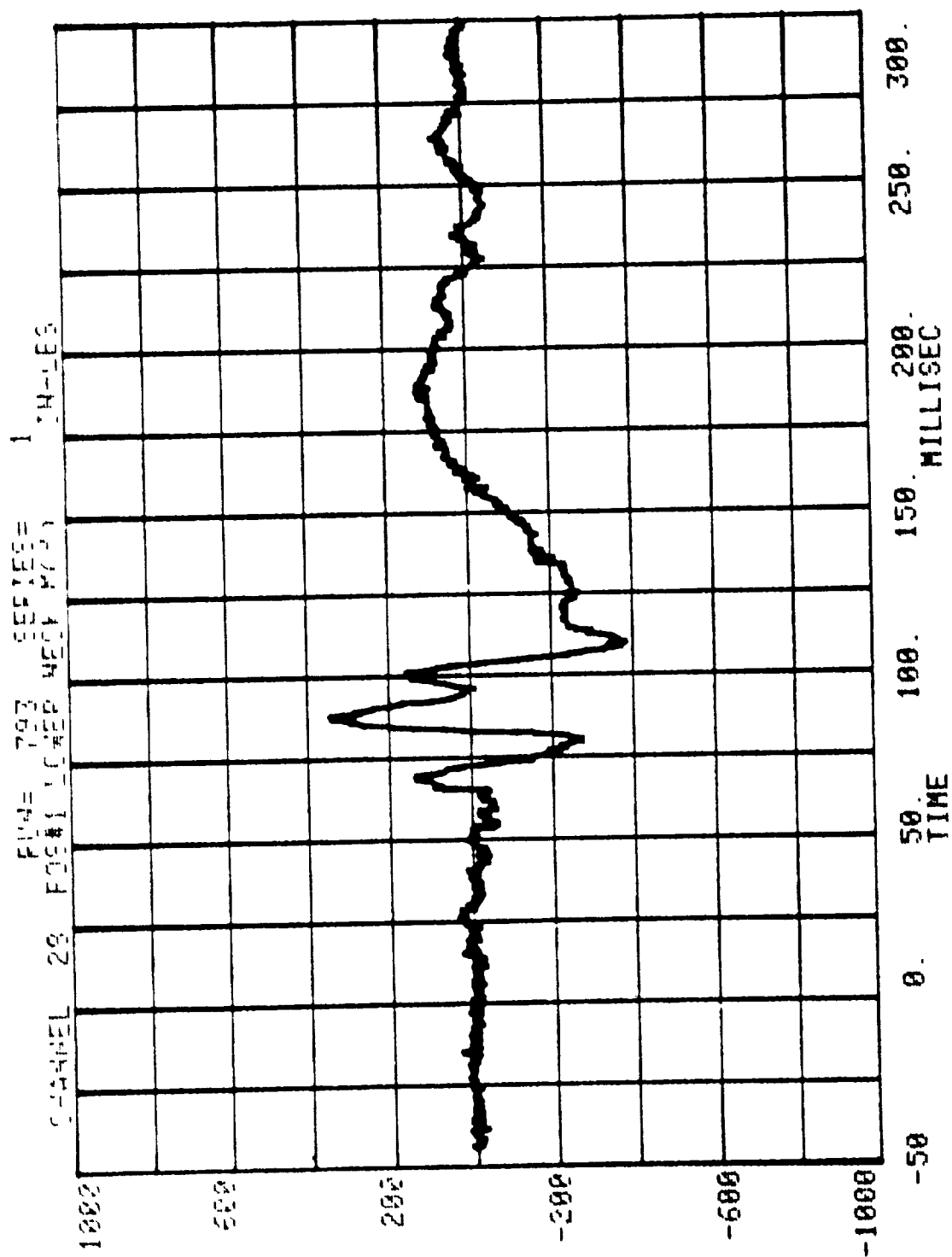
CHANNEL 24 POS#1 UPPER WEGY M.2. 14-LBS



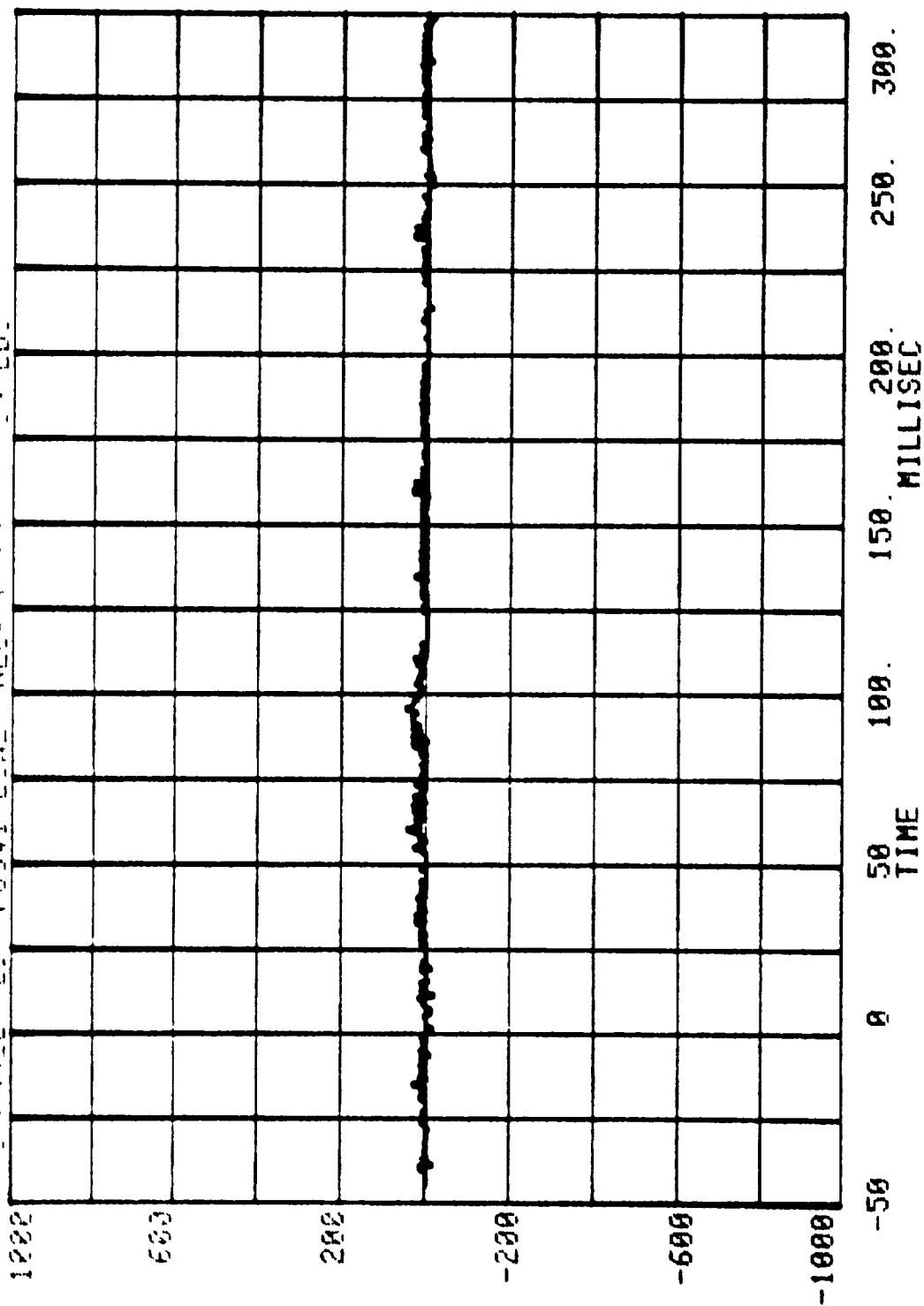


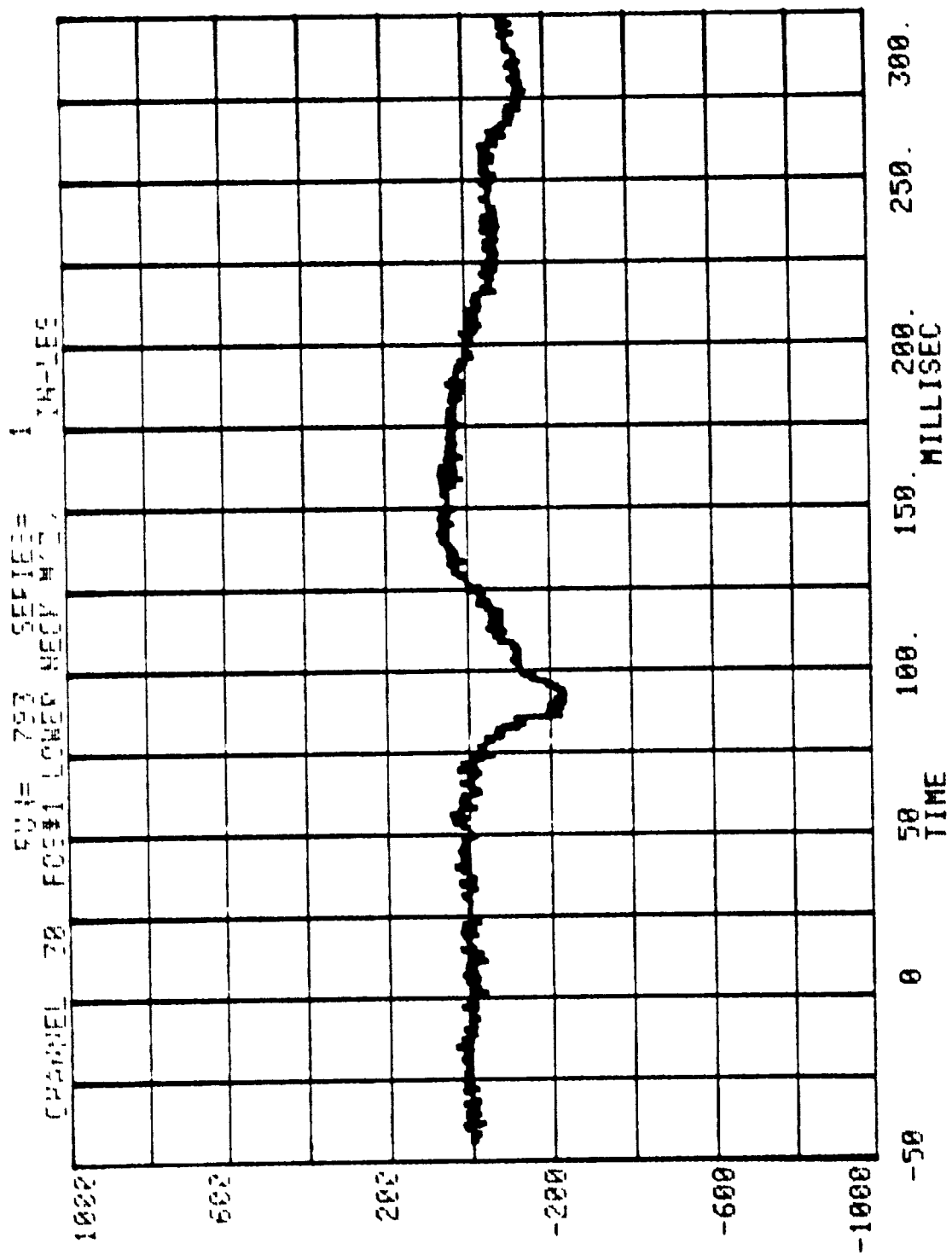




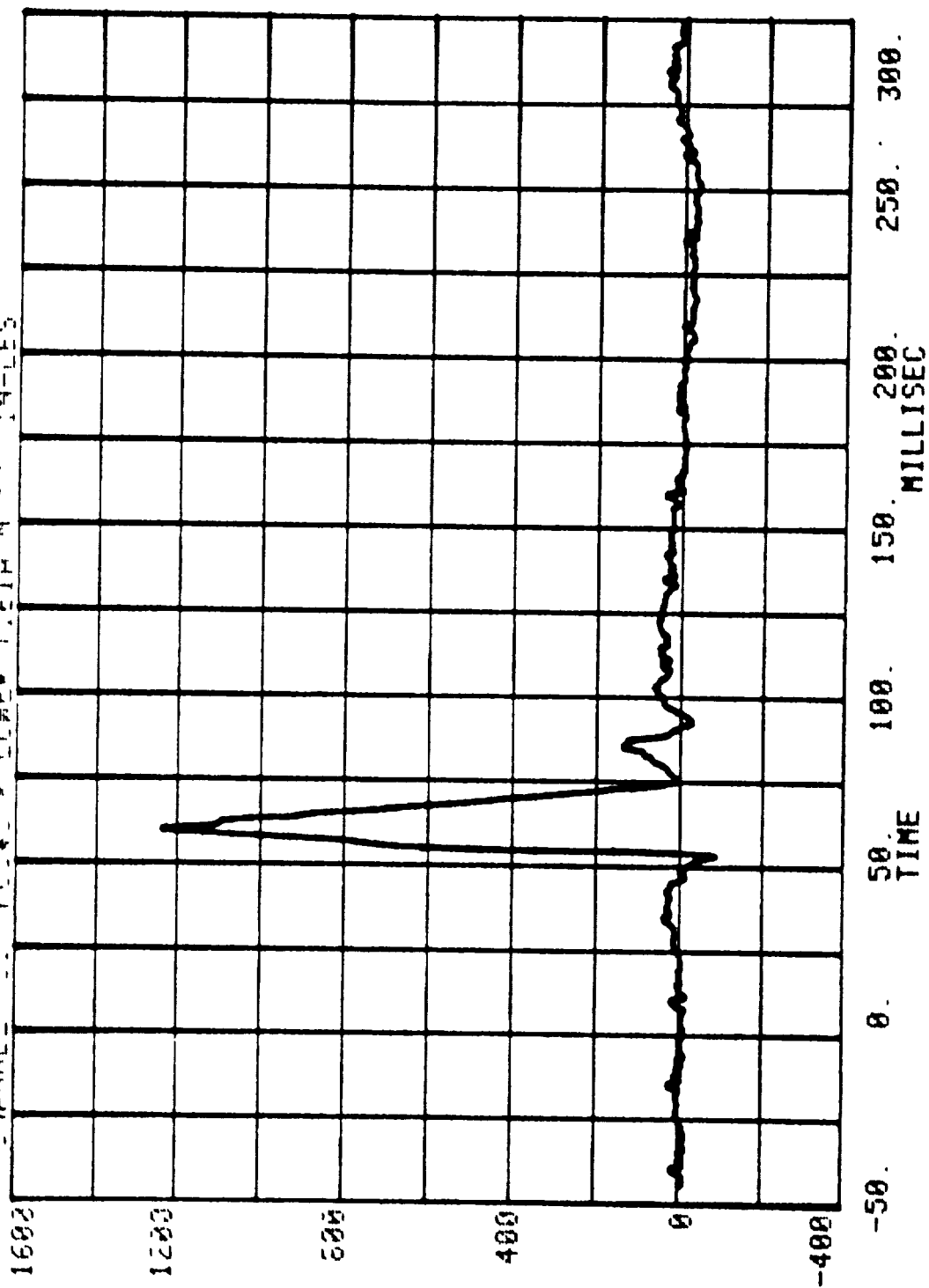


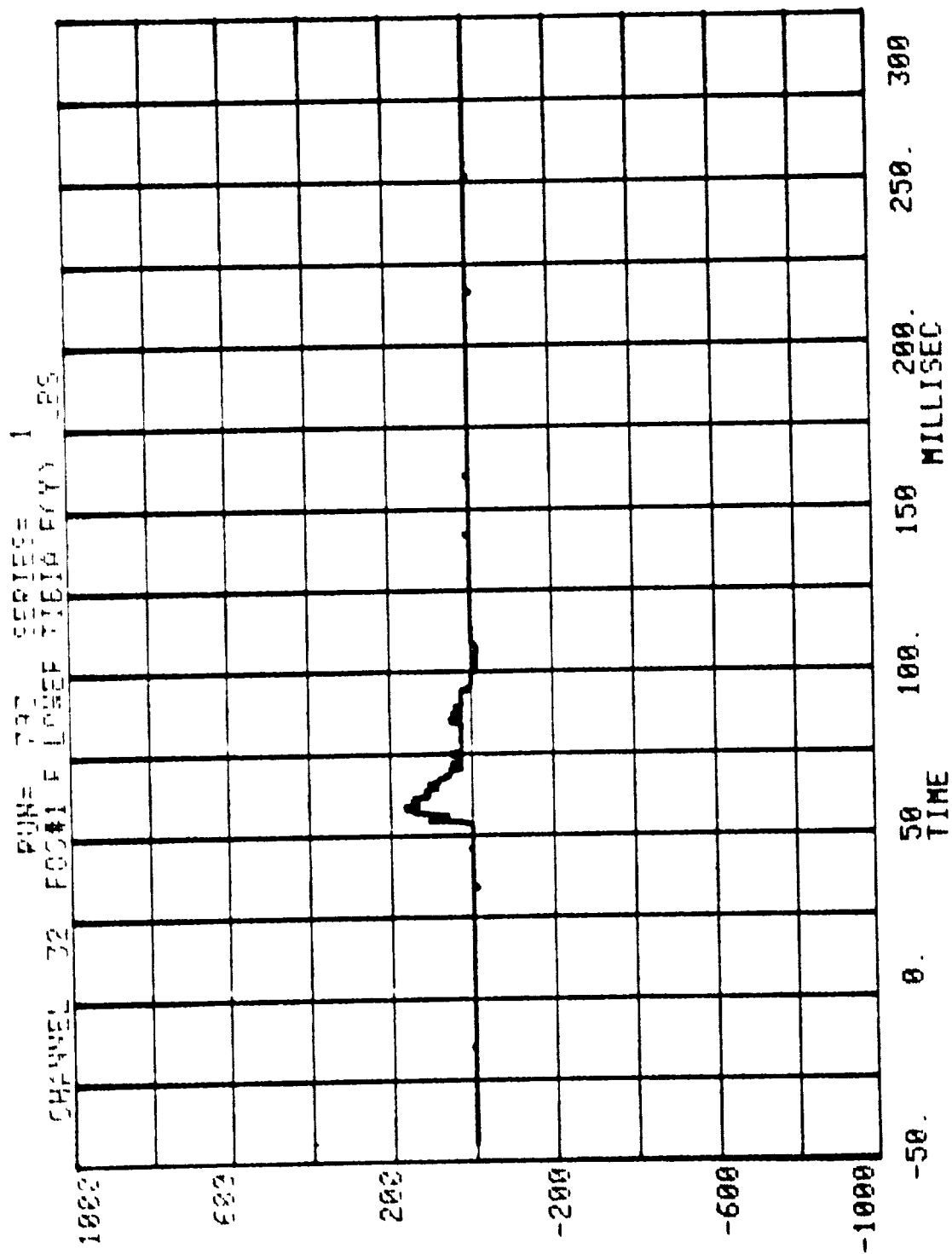
CHANNEL 23 F0341 LOGGED NEGATIVE
 PUN= 737 SERIES= 1 IN-LBE



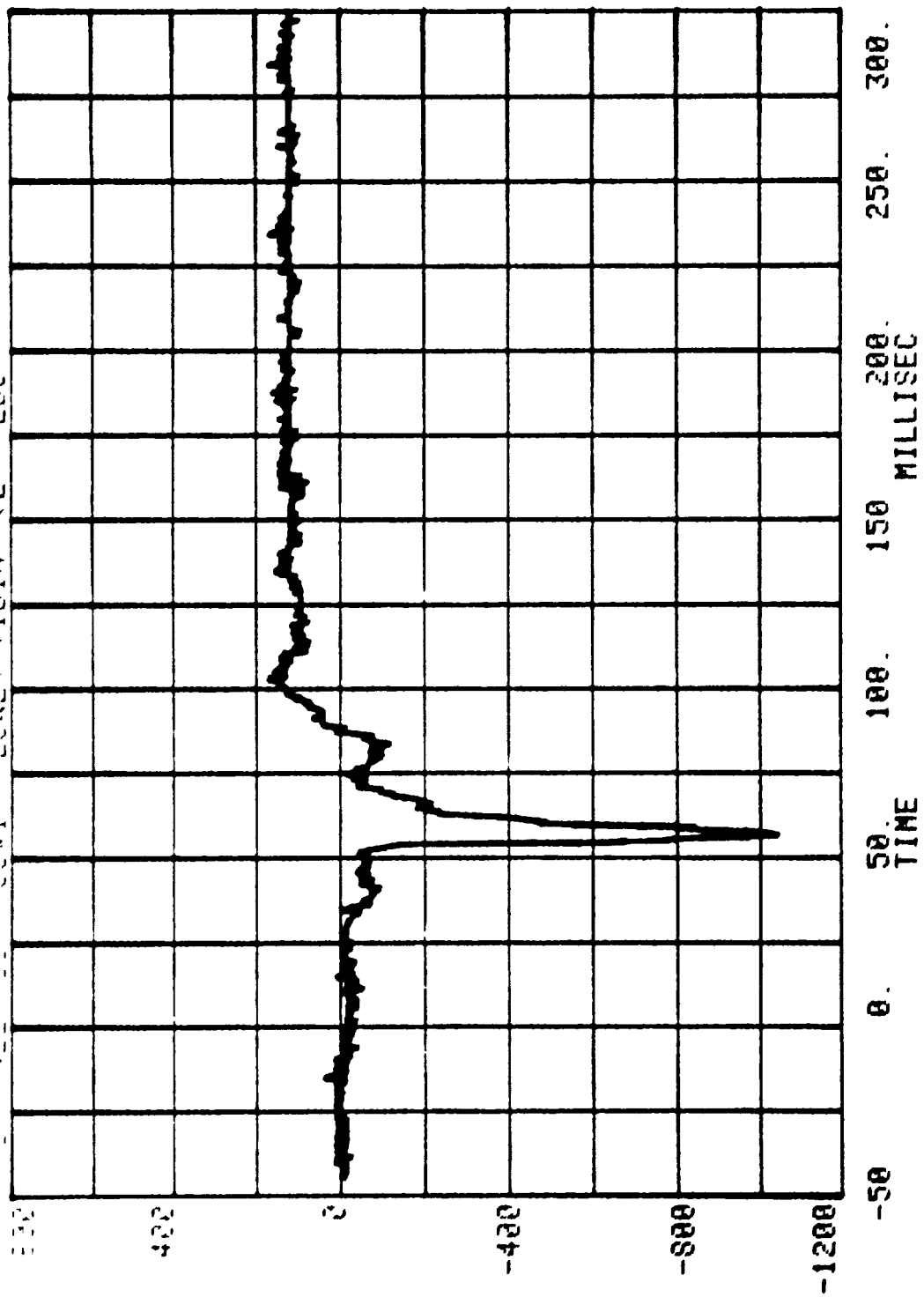


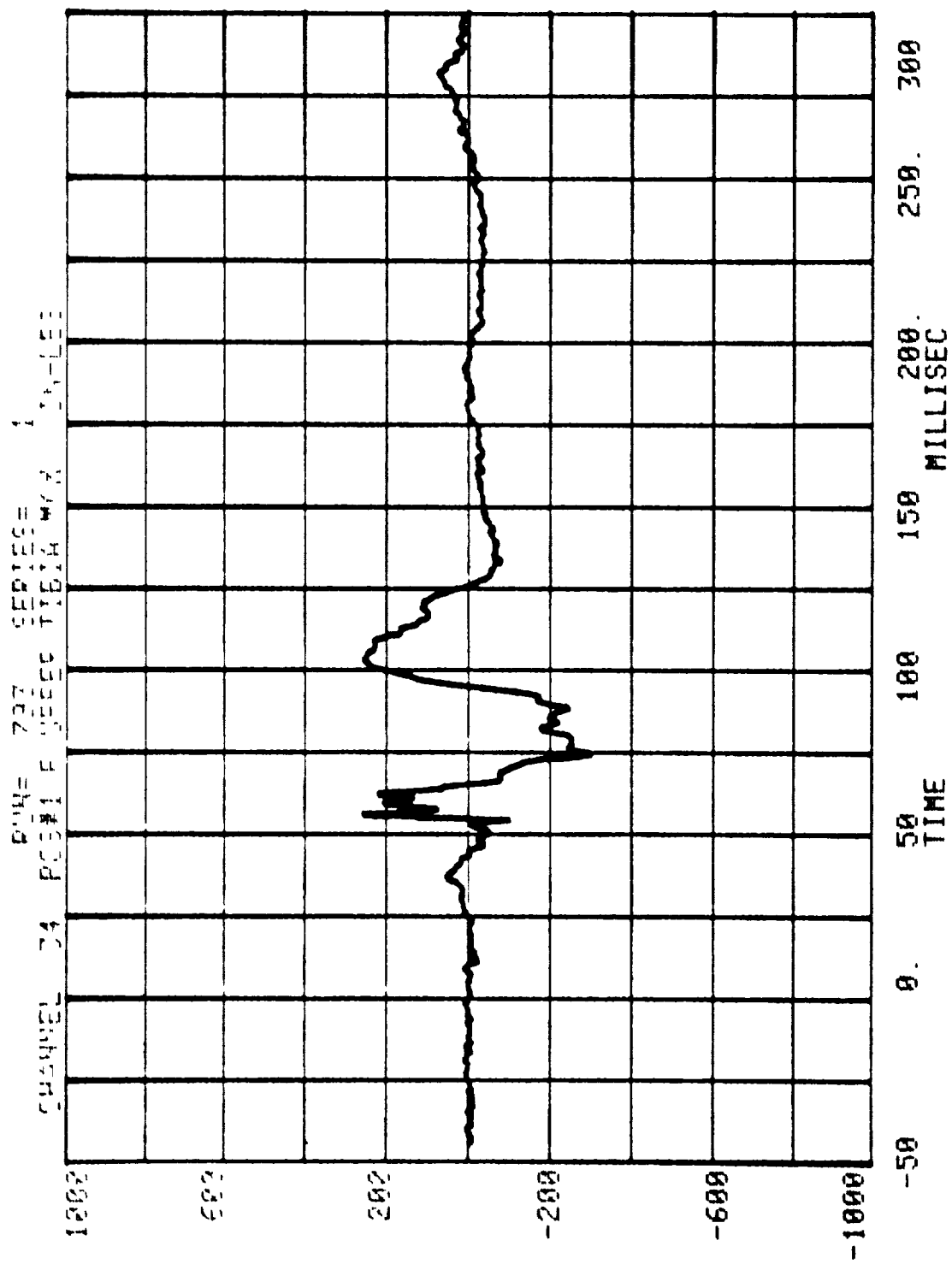
CHANNEL 71 P04= 737 SERIES= 1
P05= 8 LOWER TIME M= 14-LES

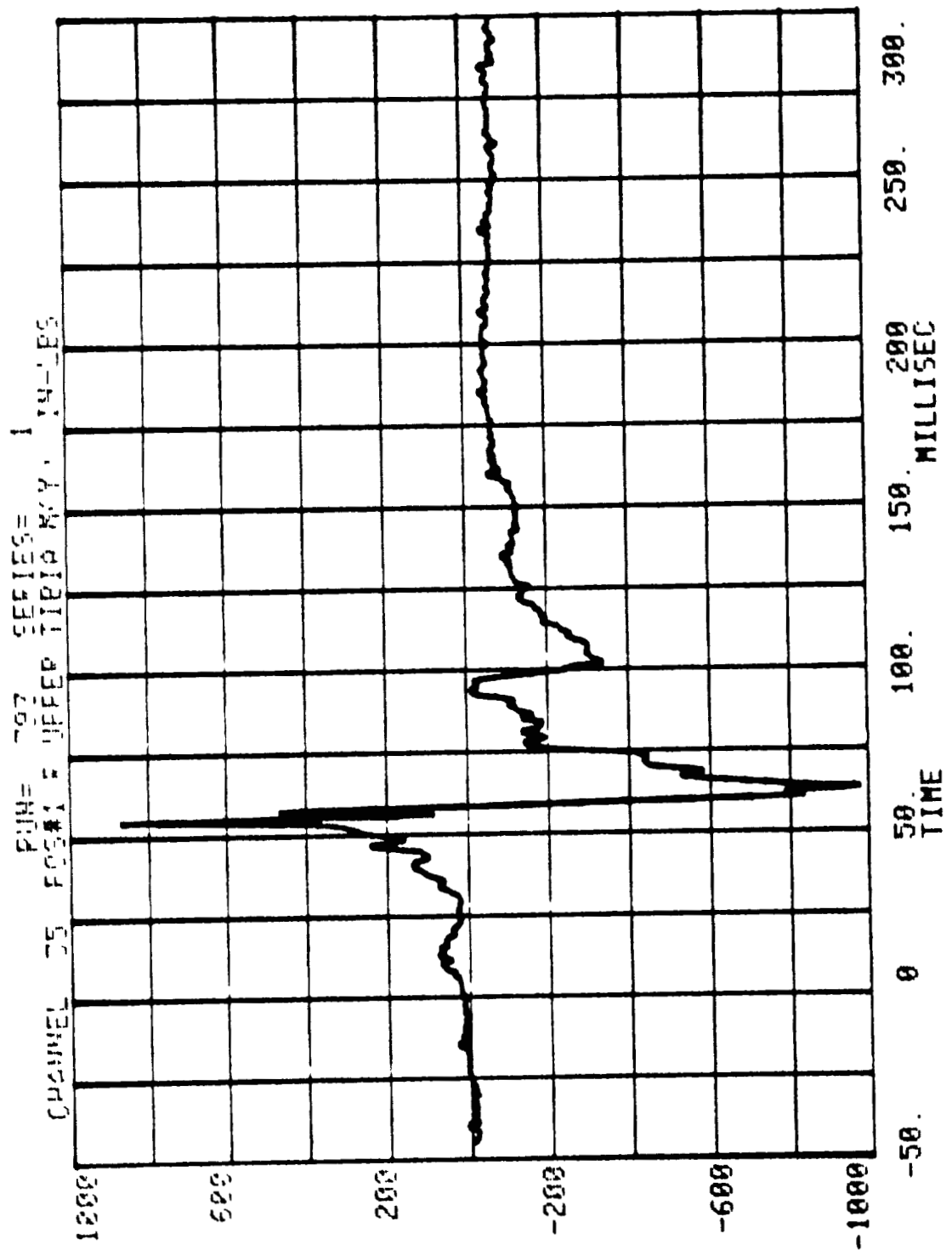


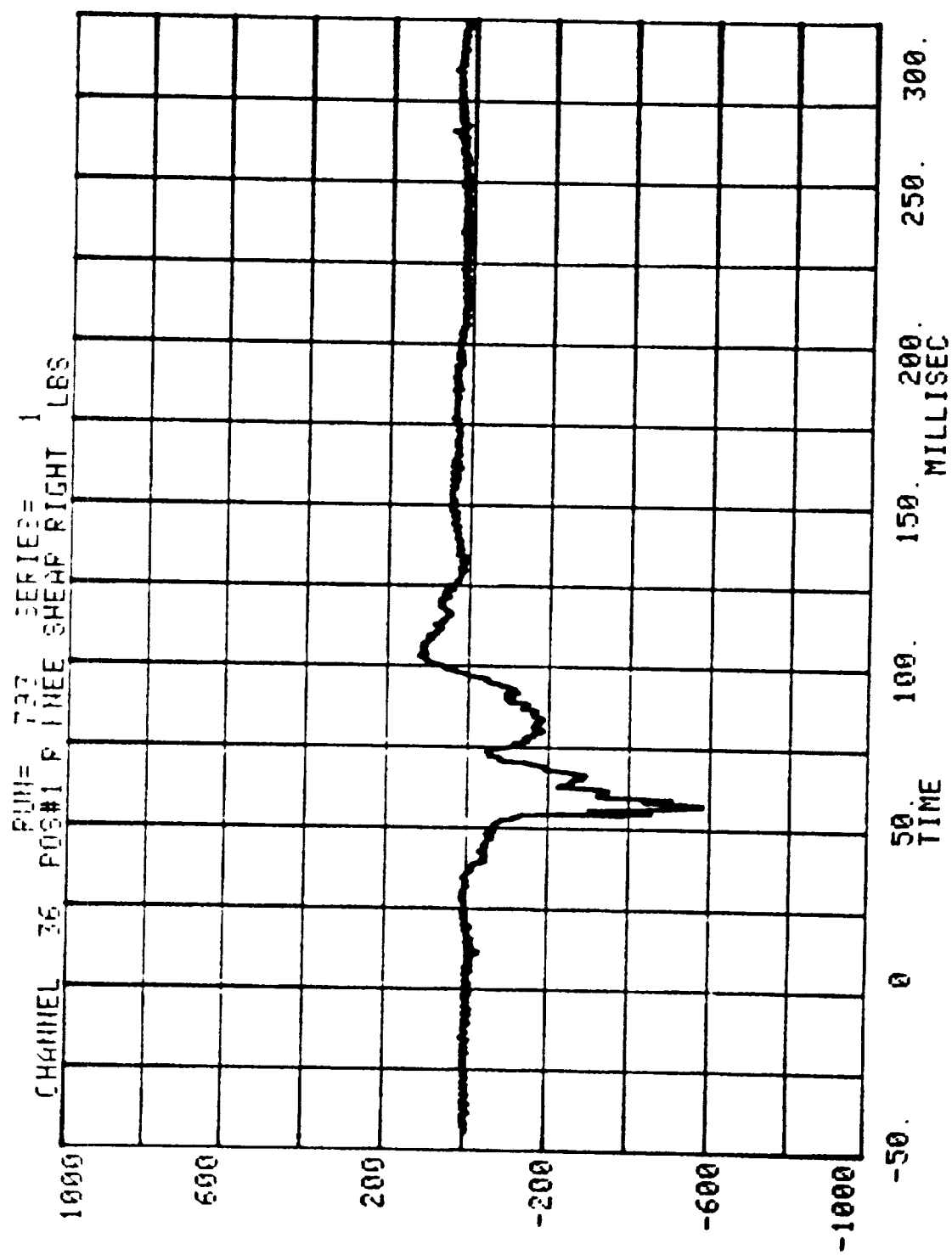


CHANNEL 37 P03#1 F LOWER TIBIA FCD 1 LBS









CHANNEL 37 POS#1 FREE SHEAR LEFT LBS

RUN= 737 SERIES= 1

