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REPORT NO. CAL-87-N20

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

GENERAL MOTORS CORPORATION

1987 OLDSMOBILE CALAIS

4-DOOR SEDAN

NHTSA NO. MH0101

CALSPAN TEST NO. 7556-20

CALSPAN CORPORATION

ADVANCED TECHNOLOGY CENTER

P.O. BOX 400

BUFFALO, NEW YORK 14225

JUNE 18, 1987

FINAL REPORT

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF MARKET INCENTIVES

400 SEVENTH STREET, S.W.

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WASHINGTON, DC 20590

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This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-87-C-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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SEP 15 1987

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
CAL-87-N20		

4. Title and Subtitle	5. Report Date
NHTSA New Car Assessment Program (NCAP) Frontal Barrier Impact on 1987 Oldsmobile Calais 4-Door Sedan	June 18, 1987
	6. Performing Organization Code CAL
7. Author(s) Walter E. Levan, Project Engineer Donald A. Alianello, Program Manager	8. Performing Organization Report No. 7556-20
9. Performing Organization Name and Address **Calspan Advanced Technology Center** **P.O. Box 400** **Buffalo, NY 14225**	10. Work Unit No. 229-20-782
	11. Contract or Grant No. DTNH22-87-C-02012
	13. Type of Report and Period Covered Final Report June - July
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	14. Sponsoring Agency Code DOT/NHTSA/RM/OMI

15. Supplementary Notes

16. Abstract

A Frontal Load Cell Barrier Test of a 1987 Oldsmobile Calais 4 Door Sedan was performed at the Calspan Corporation, Advanced Technology Center Crash Test Facility in Buffalo, New York, on June 18, 1987.

Impact speed was 34.6 mph and the ambient temperature at the barrier face at the time of impact was 76°F. The maximum post-test vehicle crush was 25.8 inches.

The 1987 Oldsmobile Calais, 4 Door Sedan was equipped with a passive seat belt system for the lap and shoulder belts.

With regard to FMVSS No. 208 "Occupant Crash Protection," injury criteria, the right front passenger appeared to satisfy the head, chest, and femur criteria while the driver appeared to exceed the maximum chest deceleration over 3 milliseconds. The driver did satisfy the head and femur requirements.

17. Key Words	18. Distribution Statement
35 mph Frontal Barrier Impact Test **New Car Assessment Program (NCAP)** **FMVSS 212 Indicant Testing** **FMVSS 219 (Partial) Indicant Testing** **FMVSS 301-75 Indicant Testing**	**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)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	**Unclassified**		

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Section 1
PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 87 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.

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 MH0101

A load cell barrier consisting of 36 load cells was impacted by a 1987 Oldsmobile Calais 4-Door Sedan at a velocity of 34.6 mph. The test was performed at the Calspan Corporation Advanced Technology Center on June 18, 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 15 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

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

The 1987 Oldsmobile Calais 4-Door Sedan was equipped with a passive seat belt system for the lap and shoulder belts. The belt retractors for the lap and shoulder belts are located in each of the front doors.

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. These ATDs had been certified prior to the test, and certification details along with instrumentation calibration data, are found in Appendix C.

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

The driver's head struck the steering wheel rim and hub and the HIC was 405. The maximum chest deceleration over 3 milliseconds was 70 g's and femur loads were 1737 and 1085 pounds.

The right front passenger's HIC was 328 and maximum chest deceleration over 3 milliseconds was 40 g's. Femur loads were 555 and 1435 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1987 Oldsmobile Calais, 4 door Sedan

NHTSA NO.: MH0101 VIN.: 1G3NF54V5HM286317

BODY COLOR: Silver DATE OF MANUFACTURE: 5/87

Engine: 4 cylinders; - C.I.D.; 2.5 Liters; - CC
x Gas; - Diesel; - Turbocharged
- Longitudinal; x Transverse

Transmission: 3 Speed ___ Manual; x Automatic; - Overdrive
Final Drive: x Front Wheel; - Rear Wheel; - Four Wheel

Date Received: _____ Odometer Reading: 17
x A/C; x P/S; x P/B; - P/wdo.; - Tilt Wheel
_____ P/seats; _____ Cruise Control

Type of Occupant Restraint: Passive Lap and Shoulder Belt

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 35 psi, Rear 35 psi

Recommended Tire Size: P185/80R13

Recommended Cold Tire Pressure: Front 35 psi, Rear 35 psi

Tires on Vehicle: P185/80R13; Manufacturer: Firestone

Number of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 TOTAL

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

Type of Front Seat Back: - Fixed; x Adj. With x Lever - Rot. Knot

Vehicle Capacity Weight (VCW) = 882 lbs. (A)

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

Rated Cargo and Luggage Weight (RCLW) A-B = 132 lbs.

GVWR 3548 lbs. GAWR: Front 1977 lbs. Rear 1571 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 = 850 lbs. Right Rear = 470 lbs.

Left Front = 890 lbs. Left Rear = 440 lbs.

TOTAL FRONT WEIGHT = 1740 lbs. (65.7 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 910 lbs. (34.3 % of Total Vehicle Weight)

TOTAL DELIVERY WEIGHT = 2650 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (2650 lbs.)

VCW = Vehicle Capacity Weight (882 lbs.)

DSC = Designated Seating Capacity (5)

RCLW = VCW - 150 (DSC) = 132 lbs.

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

Target Test Weight = 3110 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 142 POUNDS CARGO:

Right Front = 920 lbs. Right Rear = 630 lbs.

Left Front = 950 lbs. Left Rear = 620 lbs.

TOTAL FRONT WEIGHT = 1870 lbs. (59.9 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1250 lbs. (40.1 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 3120 lbs.

Weight of ballast secured in vehicle trunk area = 0 lbs.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 26.5 LF 26.2 RR 26.7 LR 26.8

Test Attitude: RF 26.1 LF 26.2 RR 24.5 LR 24.8

Wheel Base: 103.4 in.; C.G. = 41.4 in. rearward of front wheel C/L

Remarks: 12.6 gallons of solvent in fuel tank

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0 °

Date of Test: 6/18/87 Time of Test: 11:15

Ambient Temperature: 76 °F at impact area

Temperature in Occupant Compartment: 76 °F.

Windshield Molding Temperature: 76 °F.

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: primary = 34.6 mph, secondary = 34.5 mph

Distance From Front Bumper to Barrier Face When Entering Speed Trap: 52.0 inches; Exiting Speed Trap: 12.0 inches

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length:	Pre-test	= R	175.6	C_L	178.8	L	174.8
	Post-test	= R	151.4	C_L	153.0	L	153.6
	Crush	= R	24.2	C_L	25.8	L	21.2

Distance from front of test vehicle to point of impact:

R 9.9 C/L 10.1 L 9.9

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Steering wheel rim	No Contact
Chest	Steering wheel hub	No contact
Abdomen	No contact	No contact
Left Knee	Dash panel	Dash panel
Right Knee	Dash panel	Dash panel

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	Front		Rear	
	Left	Right	Left	Right
Door Opening	Operable	Operable	Operable	Operable

	Front	
Seat Movement	Left	Right
Seat Back Failure	None	None
Seat Shift (in.)	None	None

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	-22	38	74	74	11	13	70
DUMMY (2)	-85	-20	61	105	-40	17	17	40
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	1737	1085
DUMMY (2)	555	1435
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)	2488	-	518
DUMMY (2)	1769	944	-
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**			
		36 MILLISEC MAX.		AVE. ACC. (g)
	HIC	t_1 (SEC)	t_2 (SEC)	t_1 TO t_2
DUMMY (1)	405	.05782	.08317	48.0
DUMMY (2)	328	.05647	.07402	51.1
DUMMY (3)				
DUMMY (4)				

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION

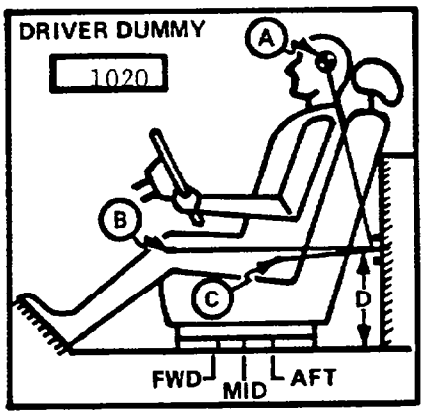
TEST NO.: MH0101

VEHICLE: 1987 Oldsmobile Calais 4-dr Sedan

SEAT TYPE:
- ____ Bench
- x Bucket
- ____ Split Bench

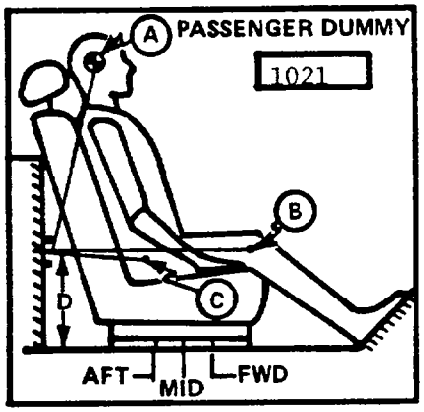
ADJUSTER TYPE:
- x Manual
- ____ Power

BUCKET SEAT BACK TYPE:
- ____ Fixed
- x Adjustable Reclining

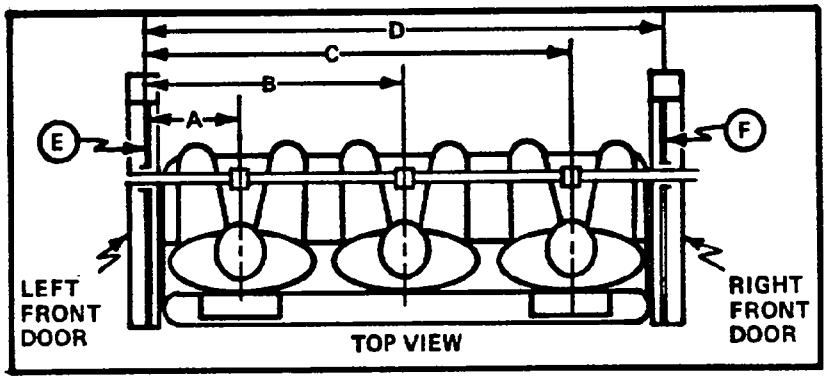


MEASUREMENT LOCATION

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



A =	23.2	in.	3	Degrees	A =	22.8	in.	3	Degrees
B =	22.4	in.	93	Degrees	B =	23.0	in.	96	Degrees
C =	5.5	in.	128	Degrees	C =	7.5	in.	125	Degrees
D =	10.5	in.			D =	10.5	in.		

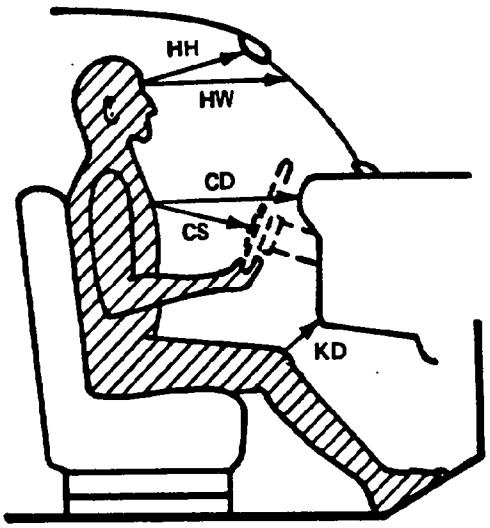


		DUMMY ID	
		1020	1021
A	=	Left Door to Driver Centerline	12.7 in.
B	=	Left Door to Center Passenger Centerline	- in.
C	=	Left Door to Right Passenger Centerline	40 in.
D	=	Left Door to Right Door	51.3 in.
E, F	=	Window Glass Height (Right and Left Must Be Equal)	12 in.

Figure 2

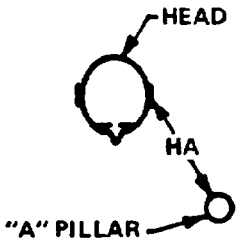
OCCUPANT CLEARANCE DIMENSIONS

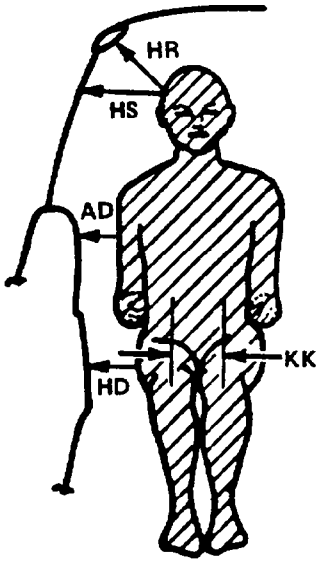
	DRIVER	PASSENGER
HH	12.0	11.9
HW	16.1	15.9
CD	20.3	21.9
CS	12.5	-
KDL	5.3	5.7
KDR	4.8	6.2
SA	24°	24°
TA	24°	24°



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

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





	DRIVER	PASSENGER
HR	5.1	4.8
HS	8.7	8.0
AD	3.9	3.7
HD	5.8	4.9
KK	9.8	8.1
HA	15.3	15.3

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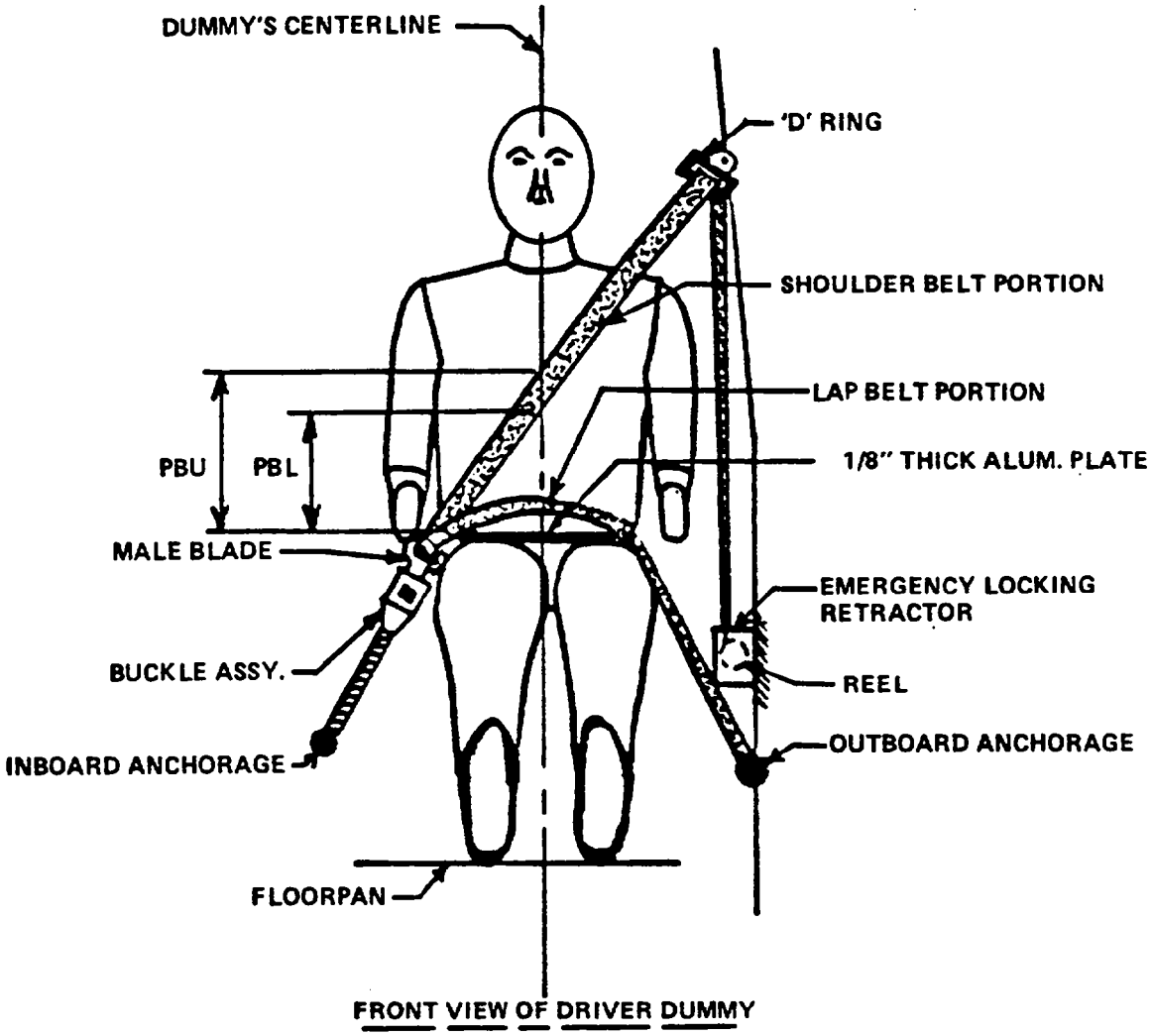
Figure 3

SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to upper edge	14.4	14.2
PBL -- Top surface of alum. plate to belt lower edge	11.0	11.3
LAP BELT TENSION	1.0 lb	1.0 lb
SHOULDER BELT TENSION	1.0 lb	1.0 lb

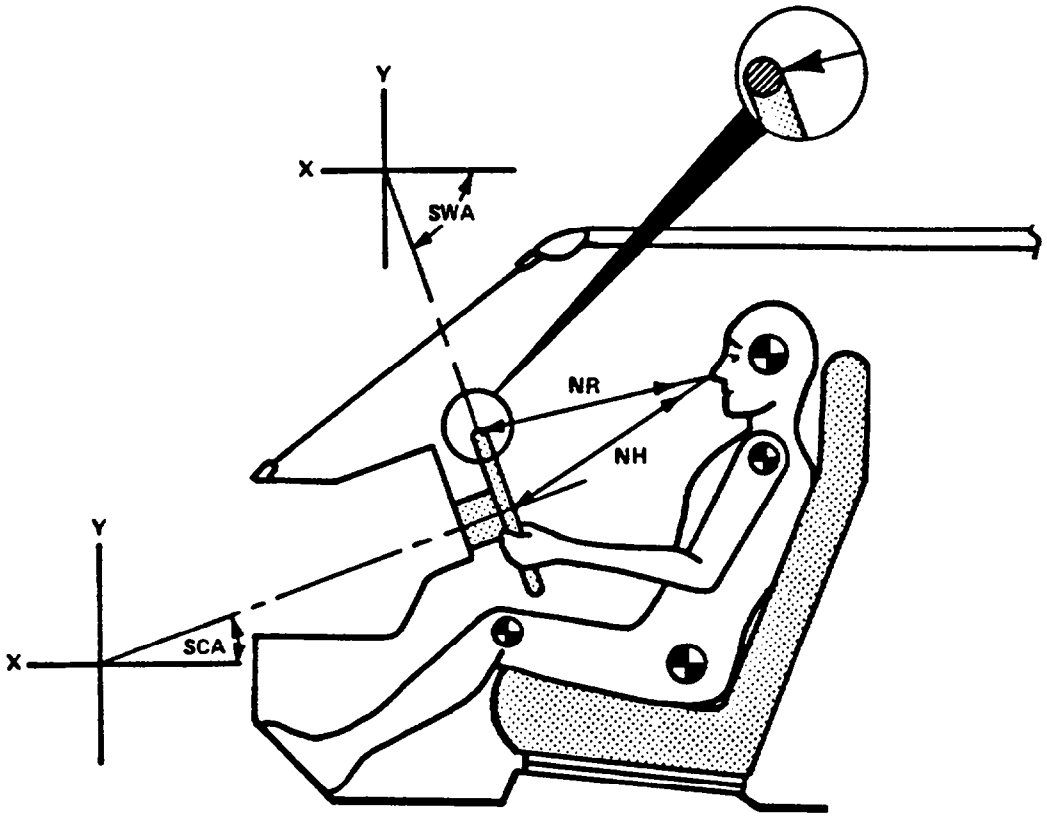
Table 3

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	68.5	68.5
Should belt length as measured on Part 572 Dummy.	33.0	33.0
Lap belt length as measured on Part 572 Dummy.	21.5	21.5
BELT SPOOL-OFF DATA:		
As determined by film analysis.	2.0	2.5
As determined mechanically.	2.0	-
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	.6 in per ft	.6 in per ft.
Measured Mechanically	.4 in per ft	None

Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



LEFT SIDE VIEW

	MEASUREMENTS	
NR -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	14.7	Inches
NH -- Distance from tip of dummy's nose to center of steering column hub	17.2	Inches
SCA -- Angle of steering column relative to the horizontal X axis	18	Degrees
SWA -- Angle of steering wheel relative to the horizontal X axis	-72	Degrees

NOTE: Camera Information Shown on Table

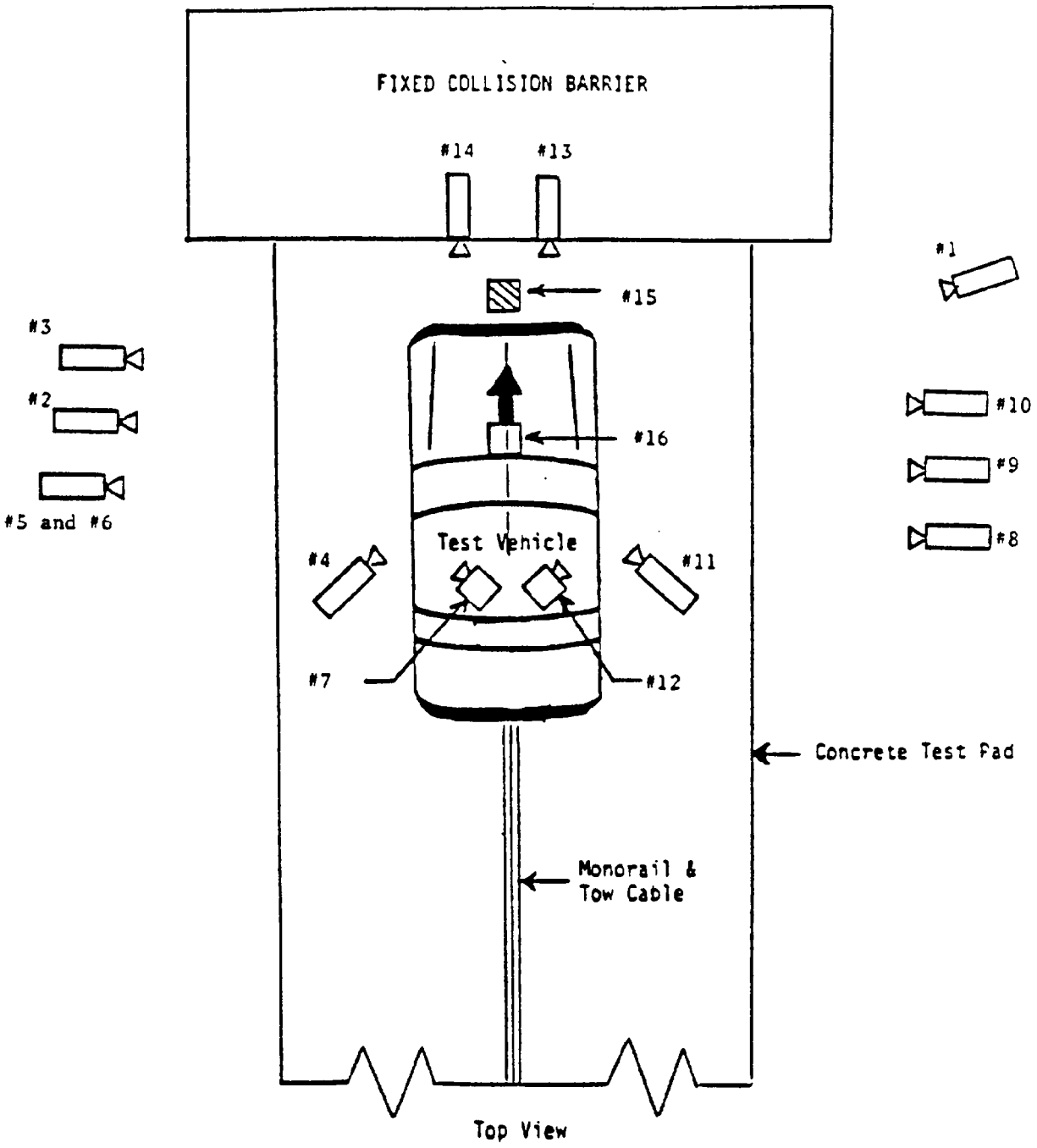


Figure 5 CAMERA POSITION FOR FRONTAL IMPACTS

Table 4
HIGH-SPEED CAMERA LOCATIONS

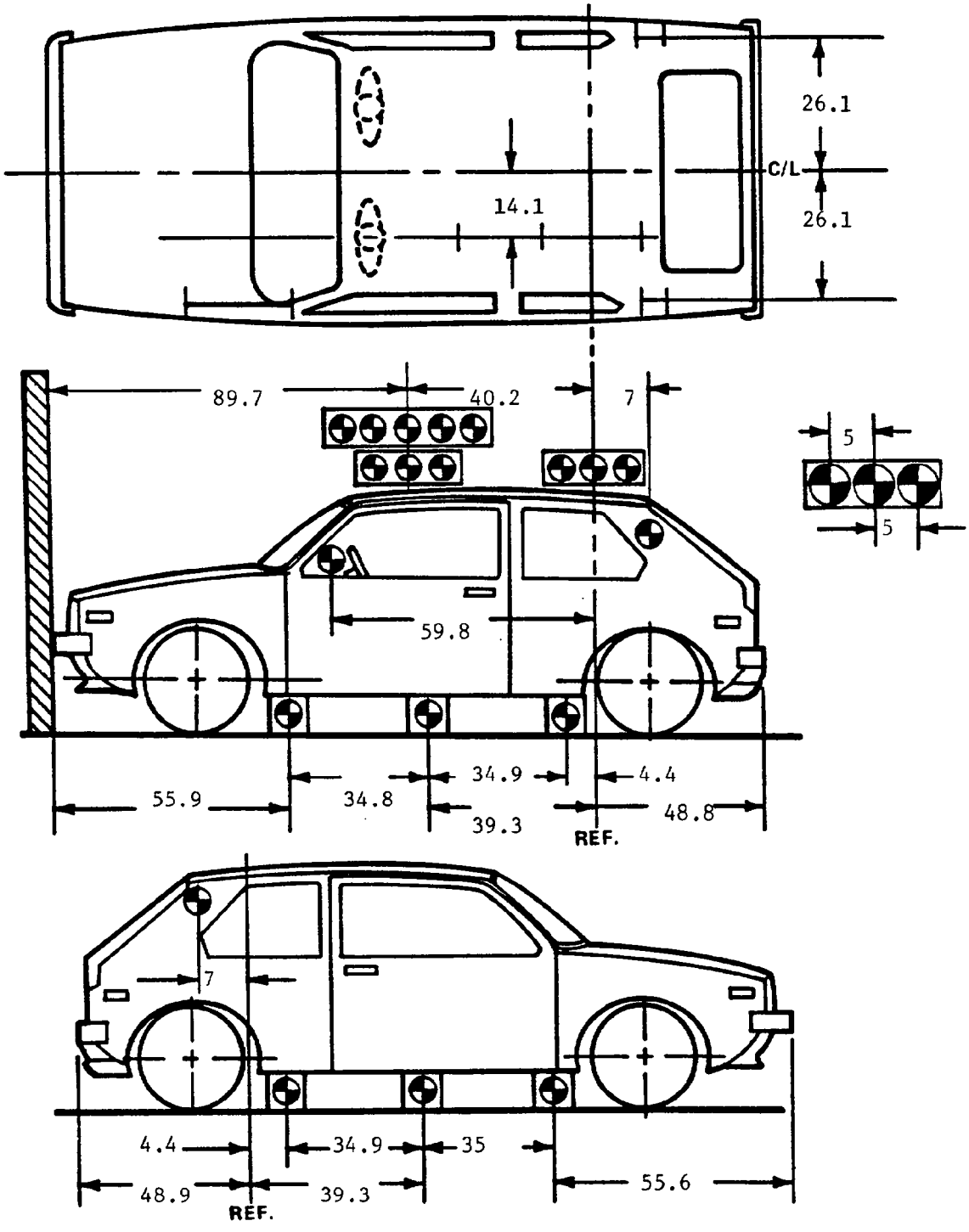
Test No. MH1010 **Vehicle** 1987 Oldsmobile Calais 4-door sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (in)* X	Y	Z	ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	262	45	42	-2	-	13	525
3	Left Side View	251	40	43	-5	-	25	525
4	Driver & Interior View	105	114	70	-16	-	13	675
5	Steering Column (Bottom)	240	78	52	-6	223	25	540
6	Steering Column (Top)	240	78	77	-13	223	25	560
7	Left Belt	-	-	-	-	-	8	800
8	Overall Right Side	246	47	43	-1	-	13	790
9	Right Side View	260	70	44	-4	-	25	810
10	Right Passenger View	276	86	42	-3	260	35	800
11	Passenger & Interior View	87	101	66	-15	-	25	580
12	Right Belt	-	-	-	-	-	8	710
13	Passenger Front View	24	0	72	-40	-	13	540
14	Driver Front View	24	0	72	-40	-	13	560
15	Windshield View	0	0	126	-55	-	13	525
16	Pit View of Engine	0	32	-120	90	-	13	790
17								

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

Figure 6

VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

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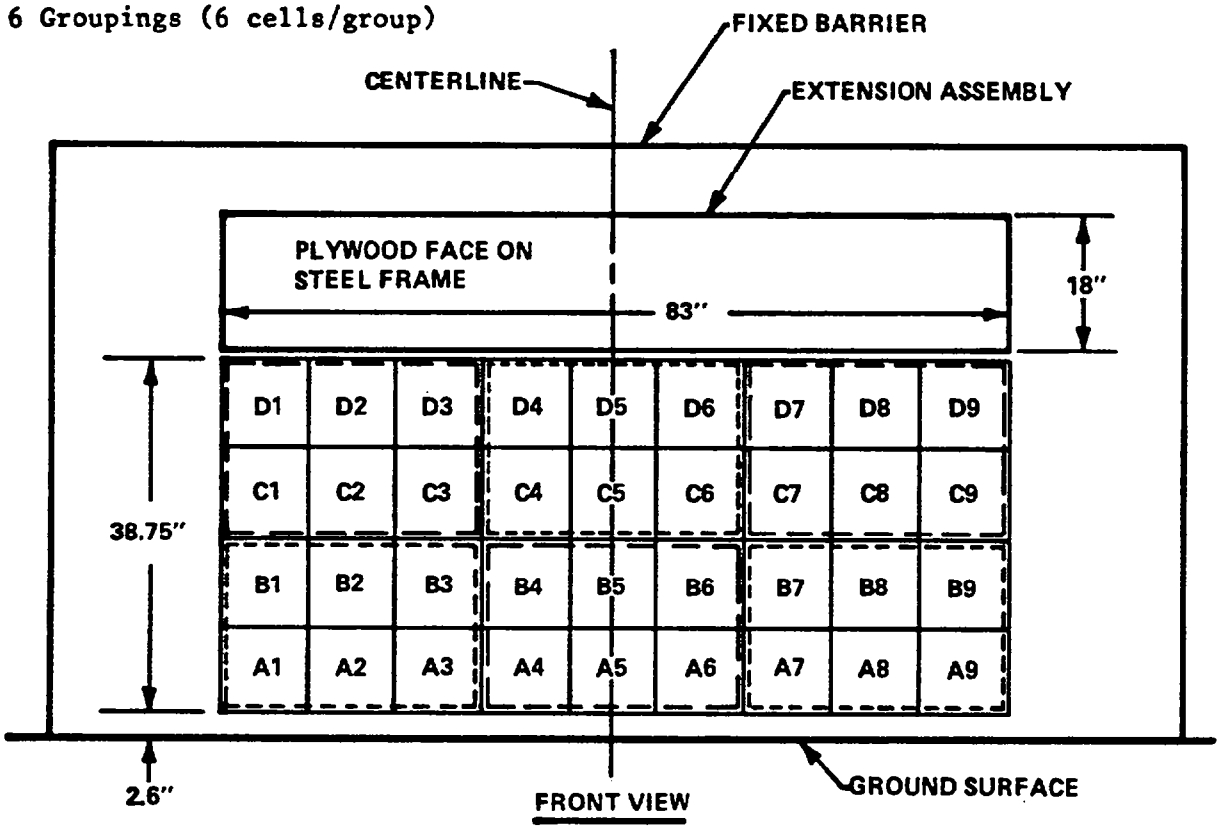
Figure 7

LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells
4 Rows
9 Columns
6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

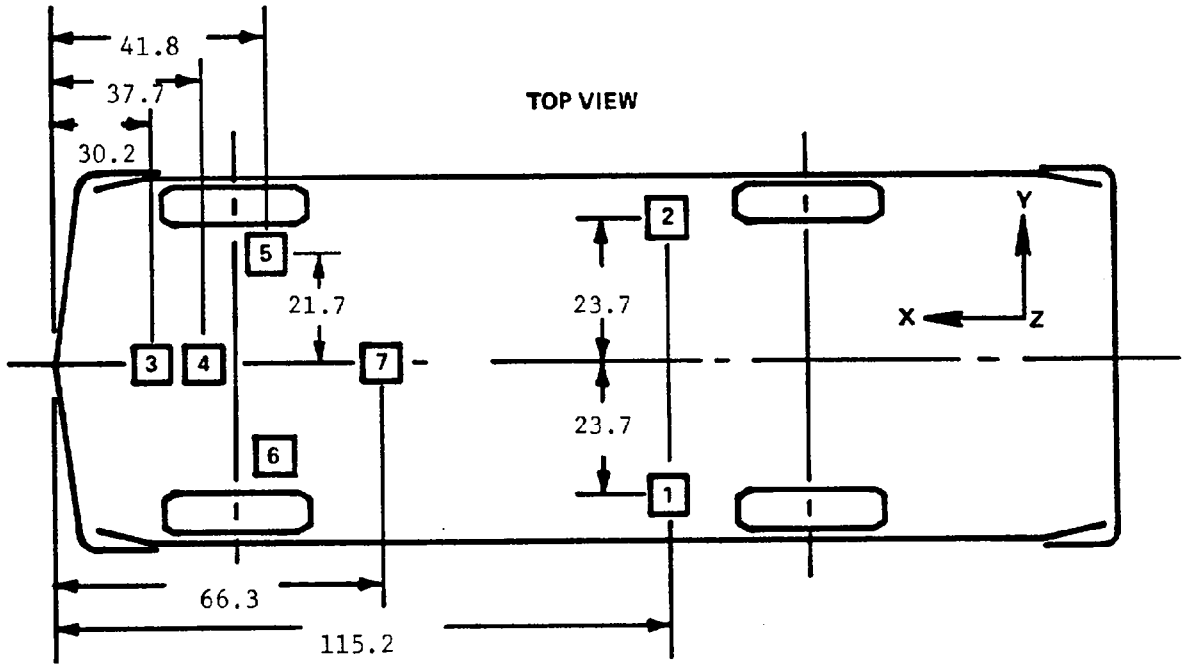
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

The following data is presented in Appendix B:

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

Figure 8

VEHICLE ACCELEROMETER LOCATIONS



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

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

Figure 9

TEST VEHICLE MEASUREMENTS

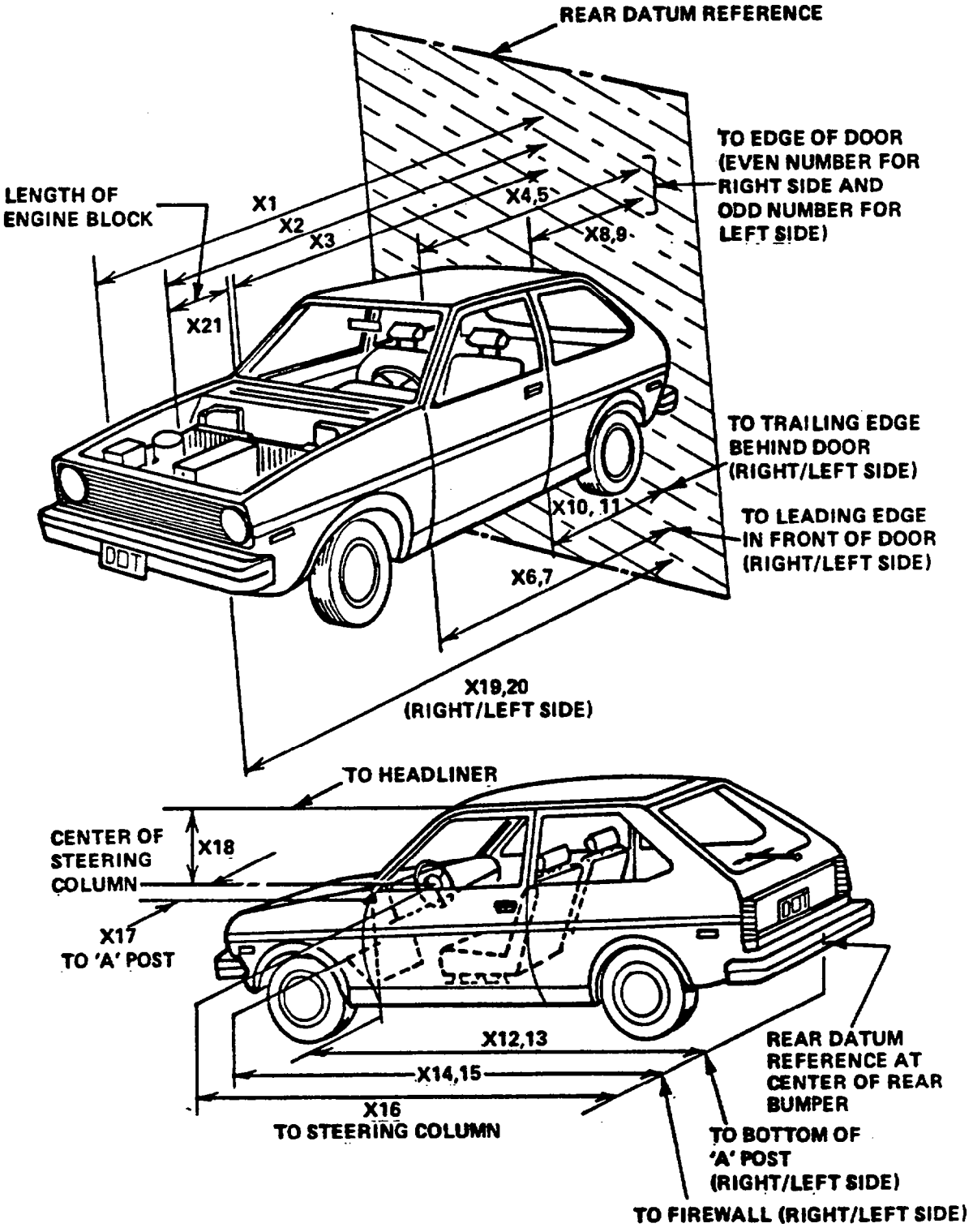


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	178.8	153.0	25.8
X2	Rear Surface of Vehicle to Front of Engine	150.3	140.1	10.2
X3	Rear Surface of Vehicle to Firewall	129.4	124.2	5.2
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	119.5	119.4	.1
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	119.5	119.6	-.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	118.5	118.0	.5
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	118.4	117.9	.5
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	78.9	79.2	- .3
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	78.6	79.0	- .4
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	80.2	79.7	.5
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	78.9	79.6	- .7
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	118.5	118.0	.5
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	118.4	117.8	.6
X14	Rear Surface of Vehicle to Firewall, Right Side	129.7	121.1	8.6
X15	Rear Surface of Vehicle to Firewall, Left Side	129.4	121.3	8.1
X16	Rear Surface of Vehicle to Steering Column	100.0	99.2	.8
X17	Center of Steering Column to "A" Post	16.6	16.2	.4
X18	Center of Steering Column to Headliner	15.5	14.5	1.0
X19	Rear Surface of Vehicle to Right Side of Front Bumper	175.6	151.4	24.2
X20	Rear Surface of Vehicle to Left Side of Front Bumper	174.8	153.6	21.2
X21	Length of Engine Block	17.7	17.7	0.0

Appendix A

PHOTOGRAPHS

Figure A-1 PRE-TEST FRONT VIEW

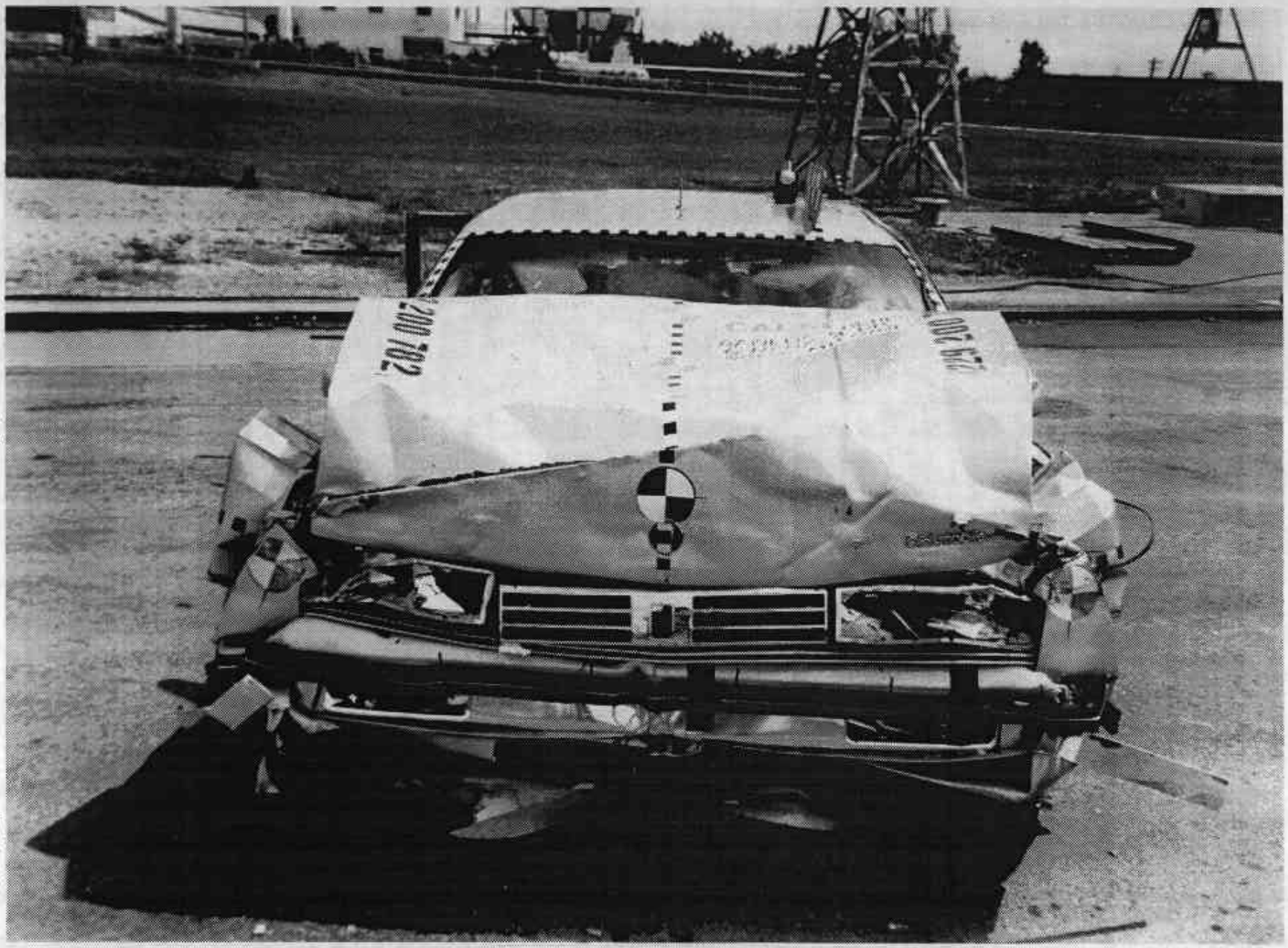


Figure A-2 POST-TEST FRONT VIEW

Figure A-3 PRE-TEST LEFT SIDE VIEW

Figure A-4 POST-TEST LEFT SIDE VIEW

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Figure A-5 PRE-TEST RIGHT SIDE VIEW

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Figure A-6 POST-TEST RIGHT SIDE VIEW

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

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

Figure A-9 PRE-TEST WINDSHIELD VIEW

Figure A-10 POST-TEST WINDSHIELD VIEW

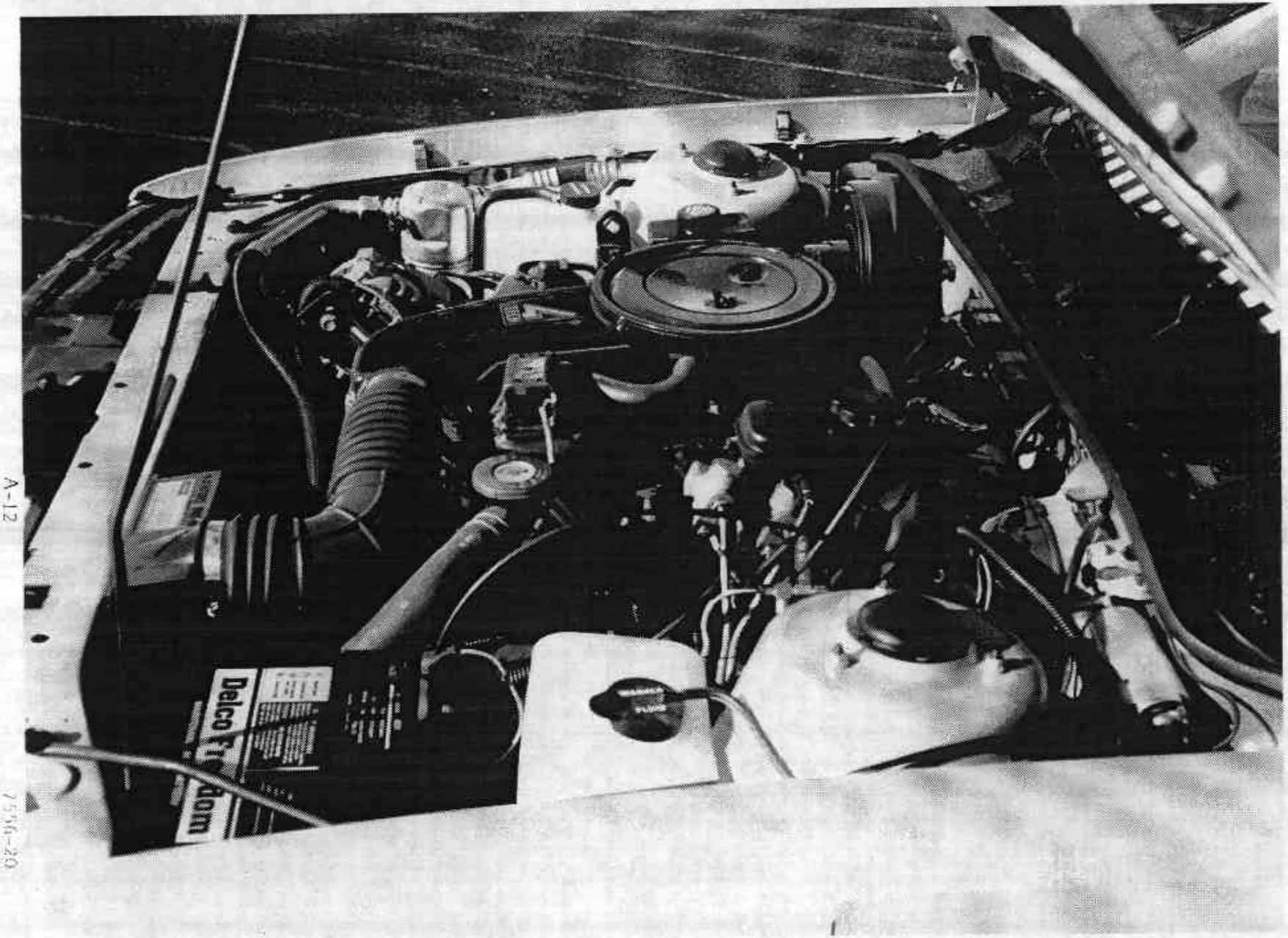

Figure A-11 PRE-TEST ENGINE COMPARTMENT VIEW

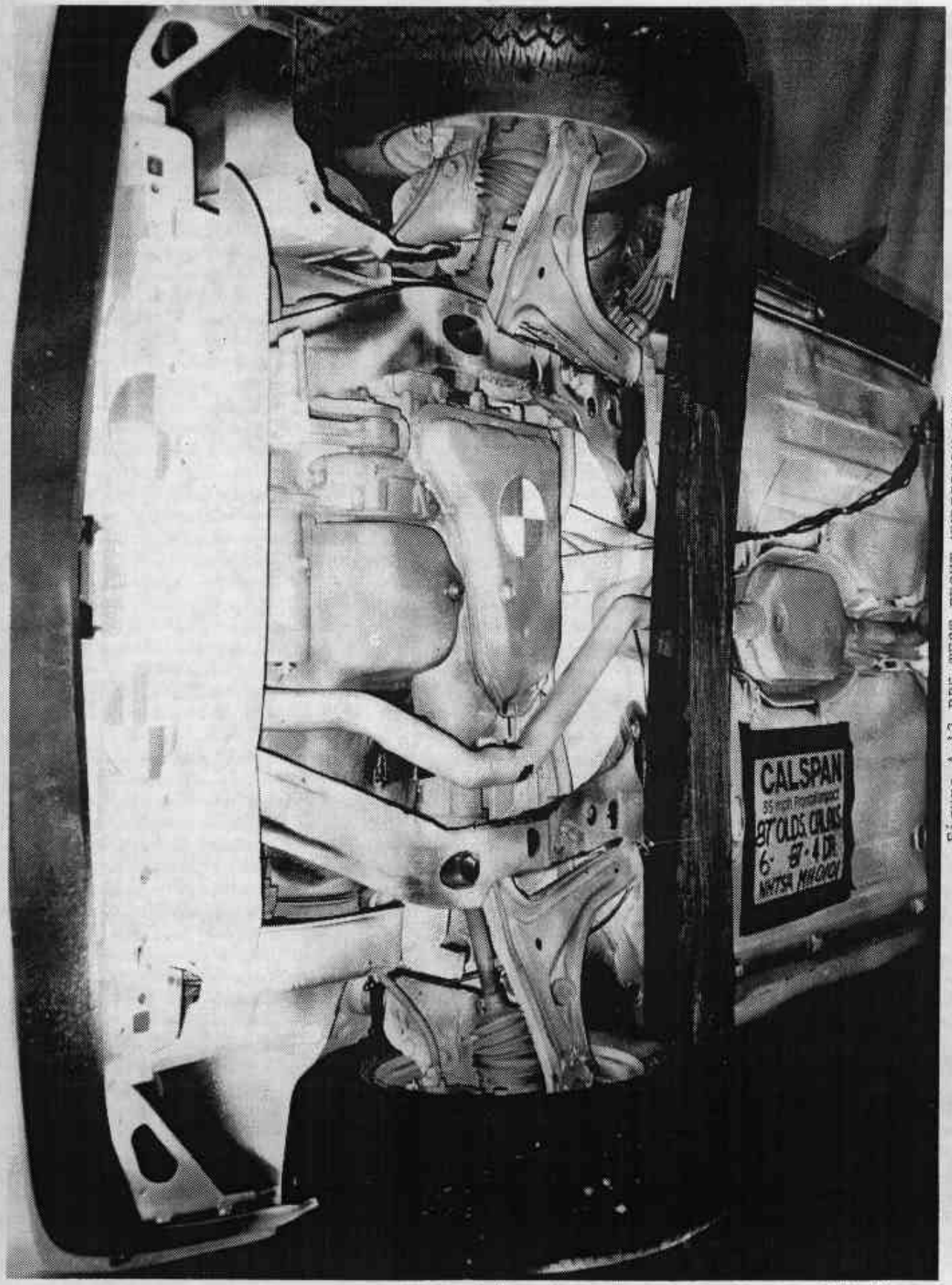

Figure A-12 PRE-TEST FRONT UNDERBODY VIEW

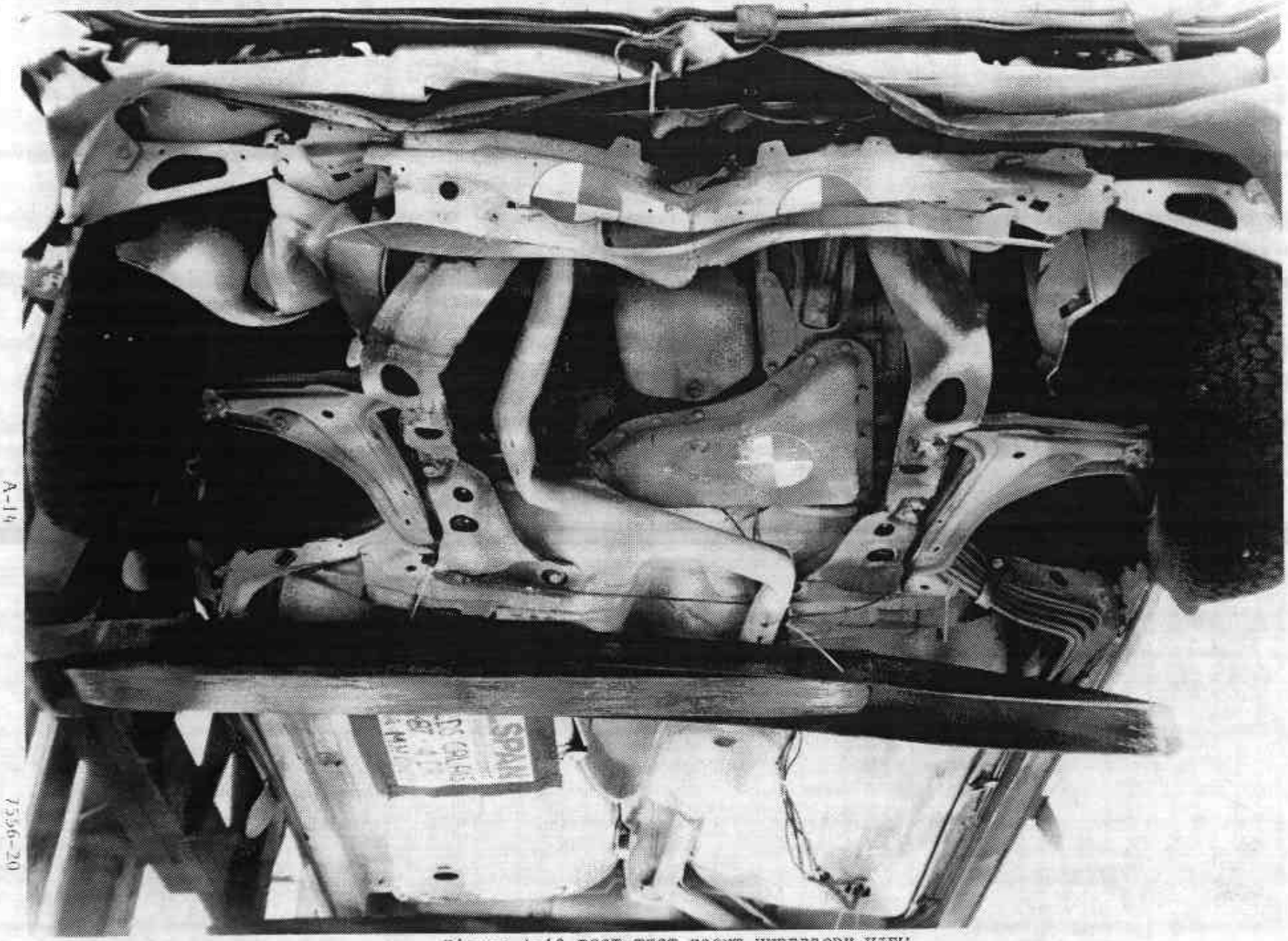

Figure A-13 POST-TEST FRONT UNDERBODY VIEW

Figure A-14 PRE-TEST FRONT-SIDE UNDERBODY VIEW

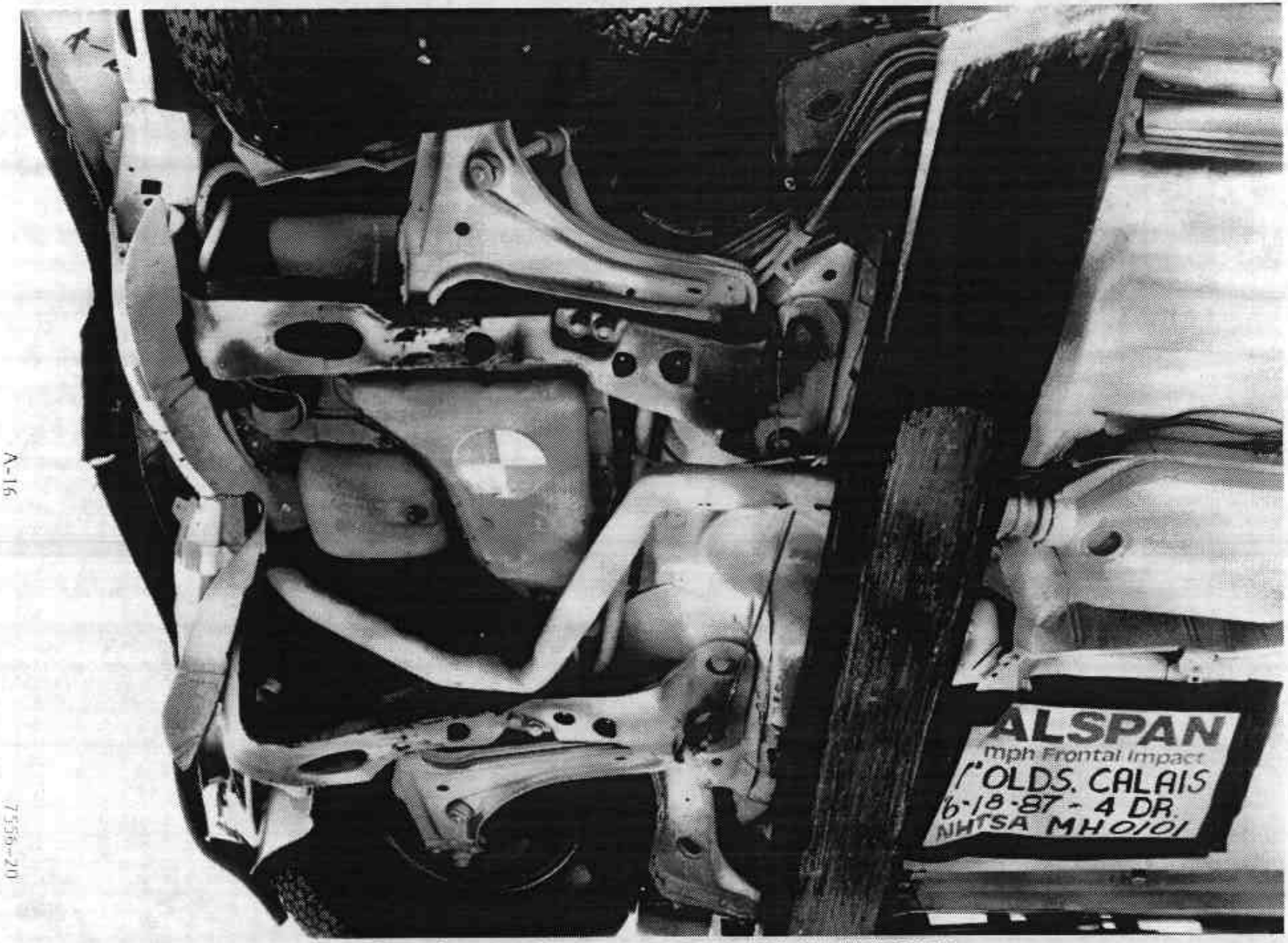

Figure A-15 POST-TEST FRONT-SIDE UNDERBODY VIEW

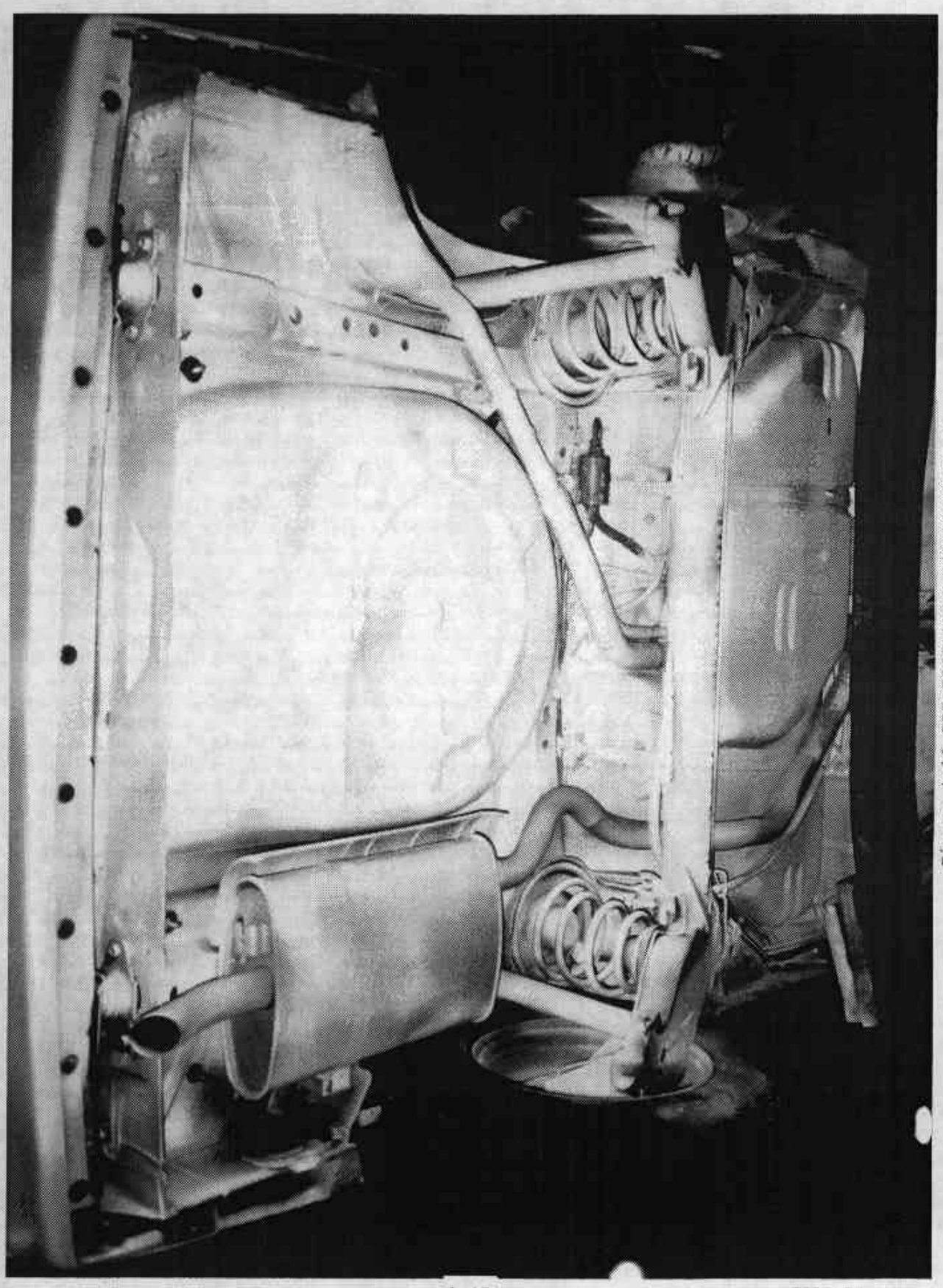

Figure A-16 PRE-TEST REAR UNDERBODY VIEW

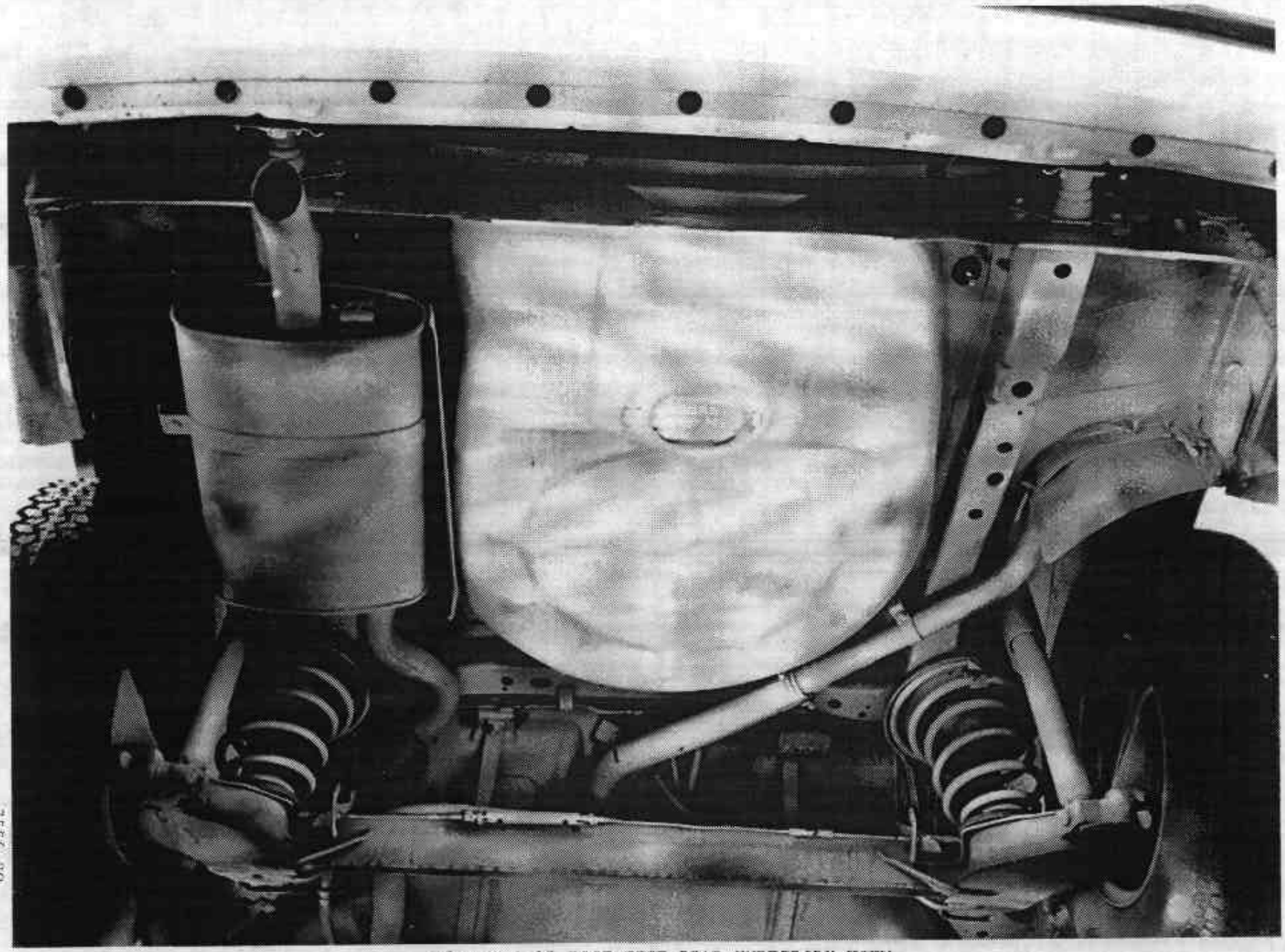

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Figure A-17 POST-TEST REAR UNDERBODY VIEW

Figure A-18 PRE-TEST DRIVER VIEW

Figure A-19 POST-TEST DRIVER VEIW

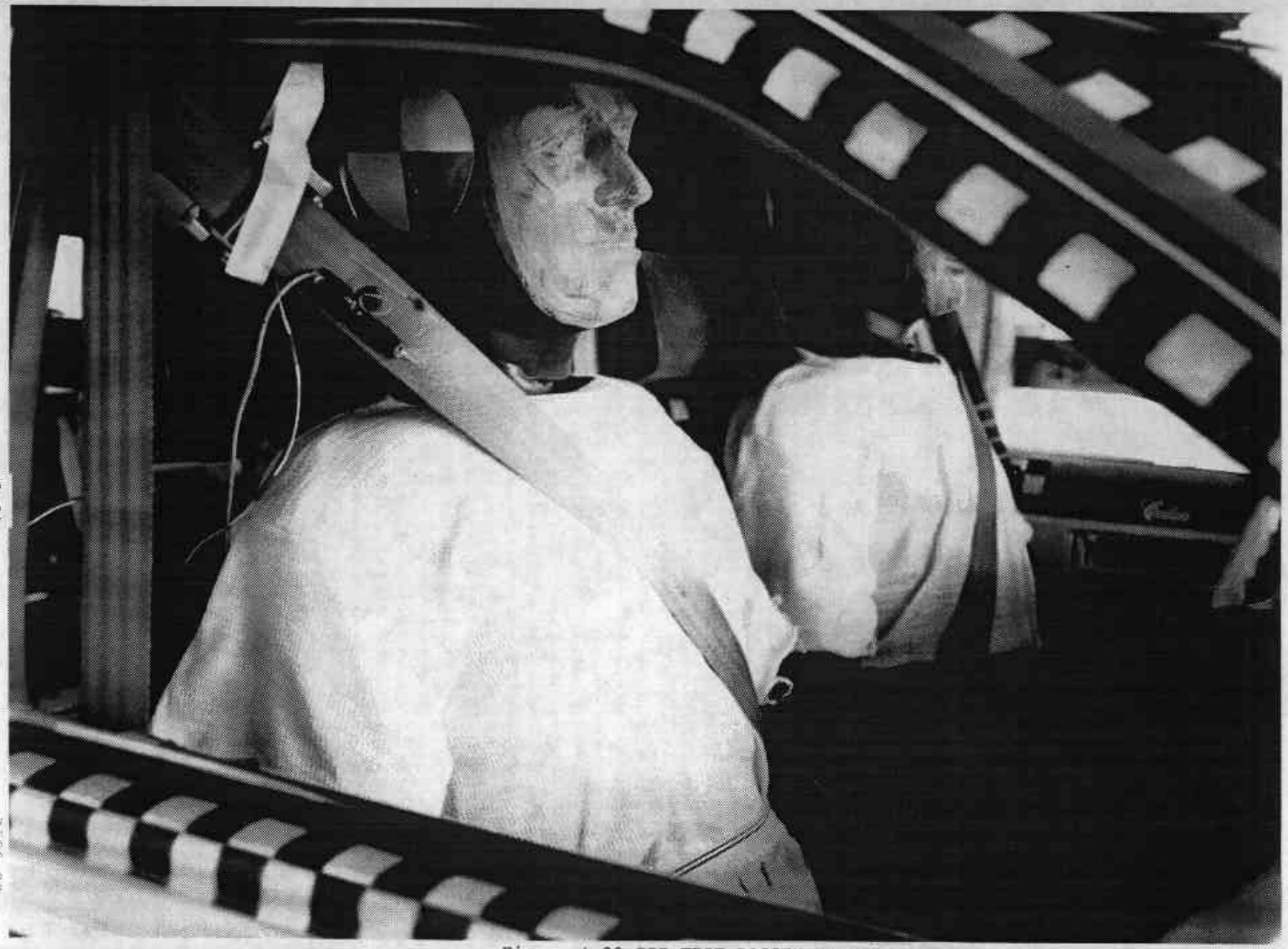


Figure A-20 PRE-TEST PASSENGER VIEW

Figure A-21 POST-TEST PASSENGER VIEW

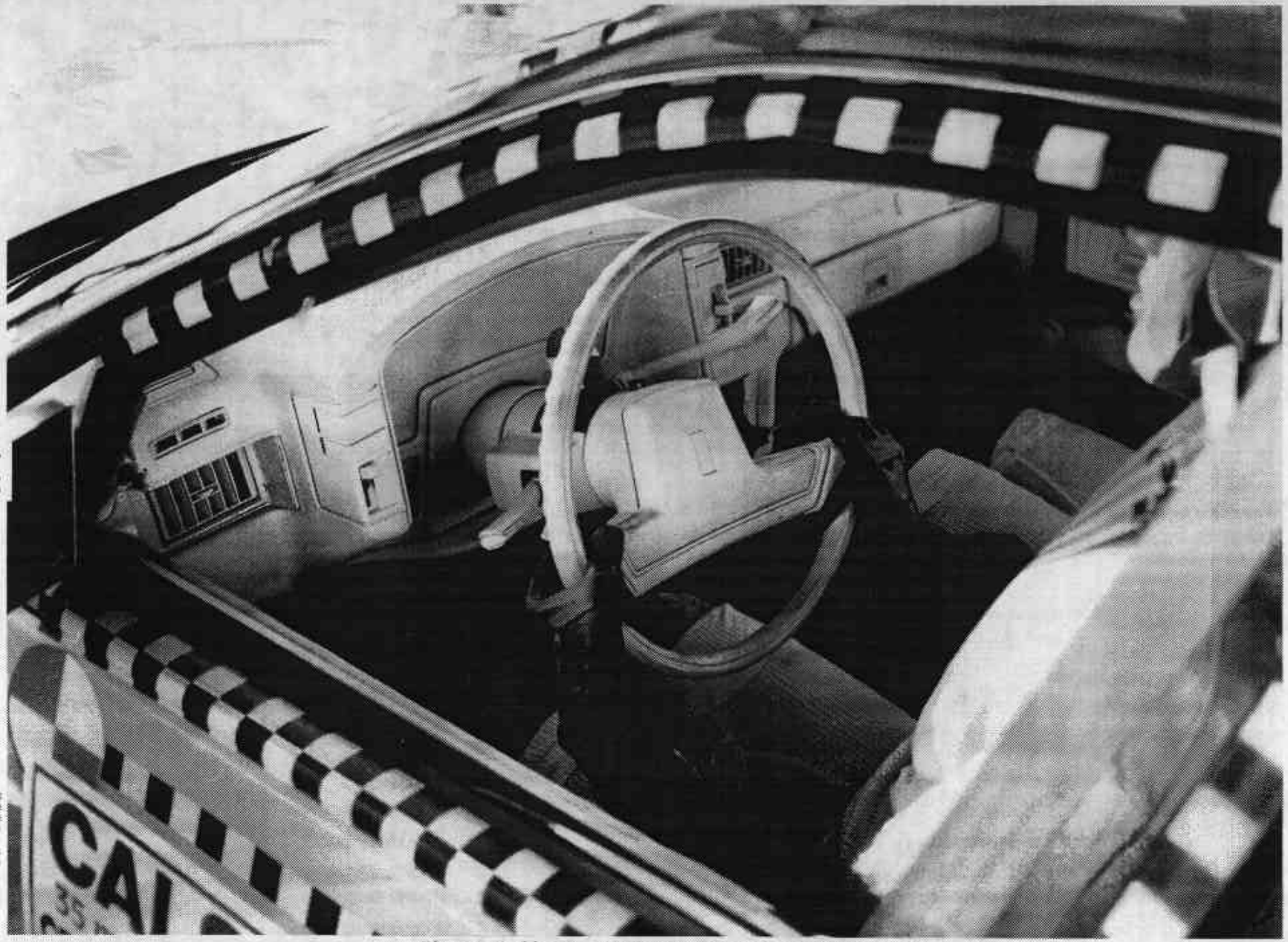


Figure A-22 PRE-TEST DRIVER AND INTERIOR VIEW

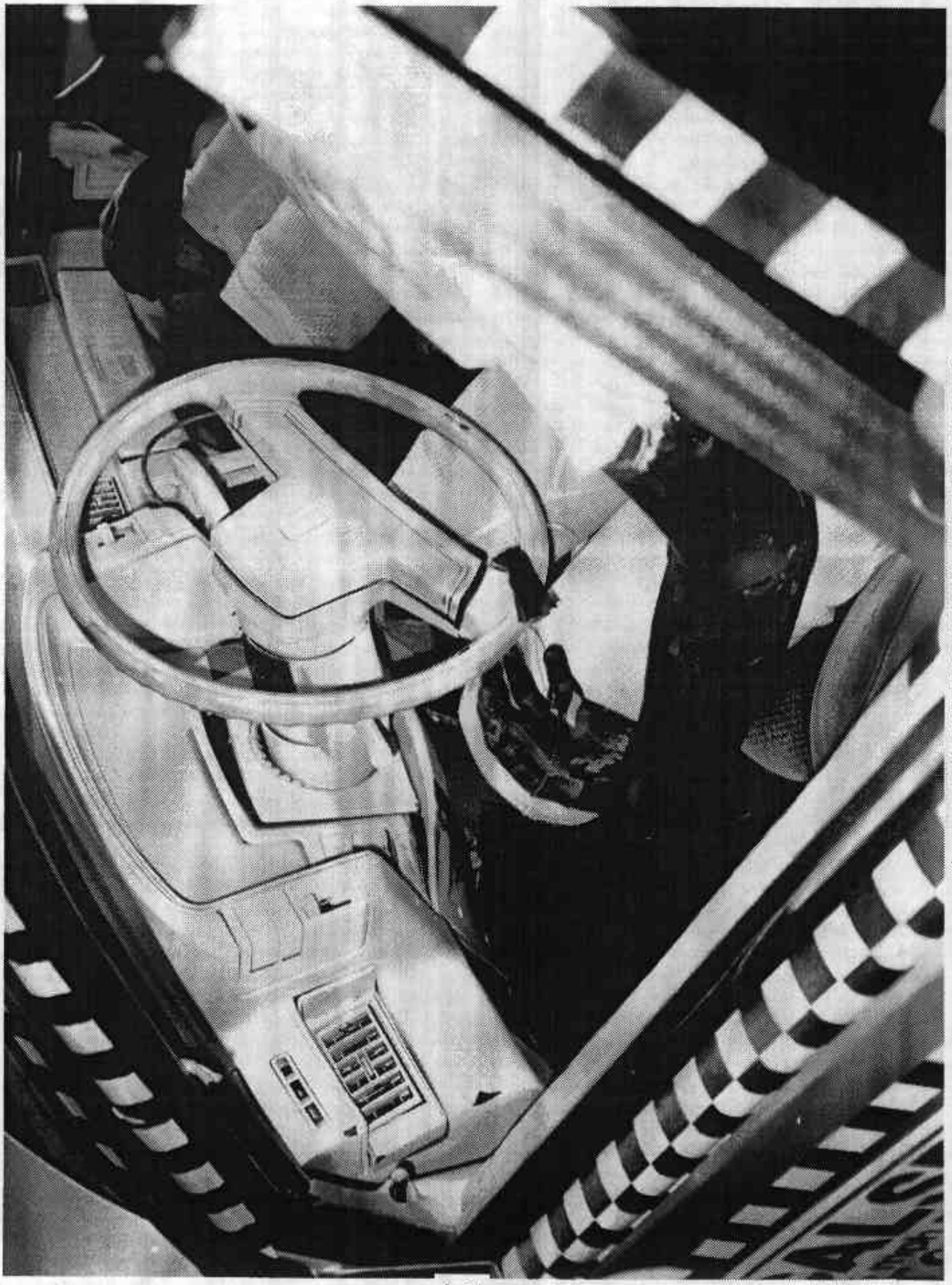


Figure A-23 POST-TEST DRIVER AND INTERIOR VIEW

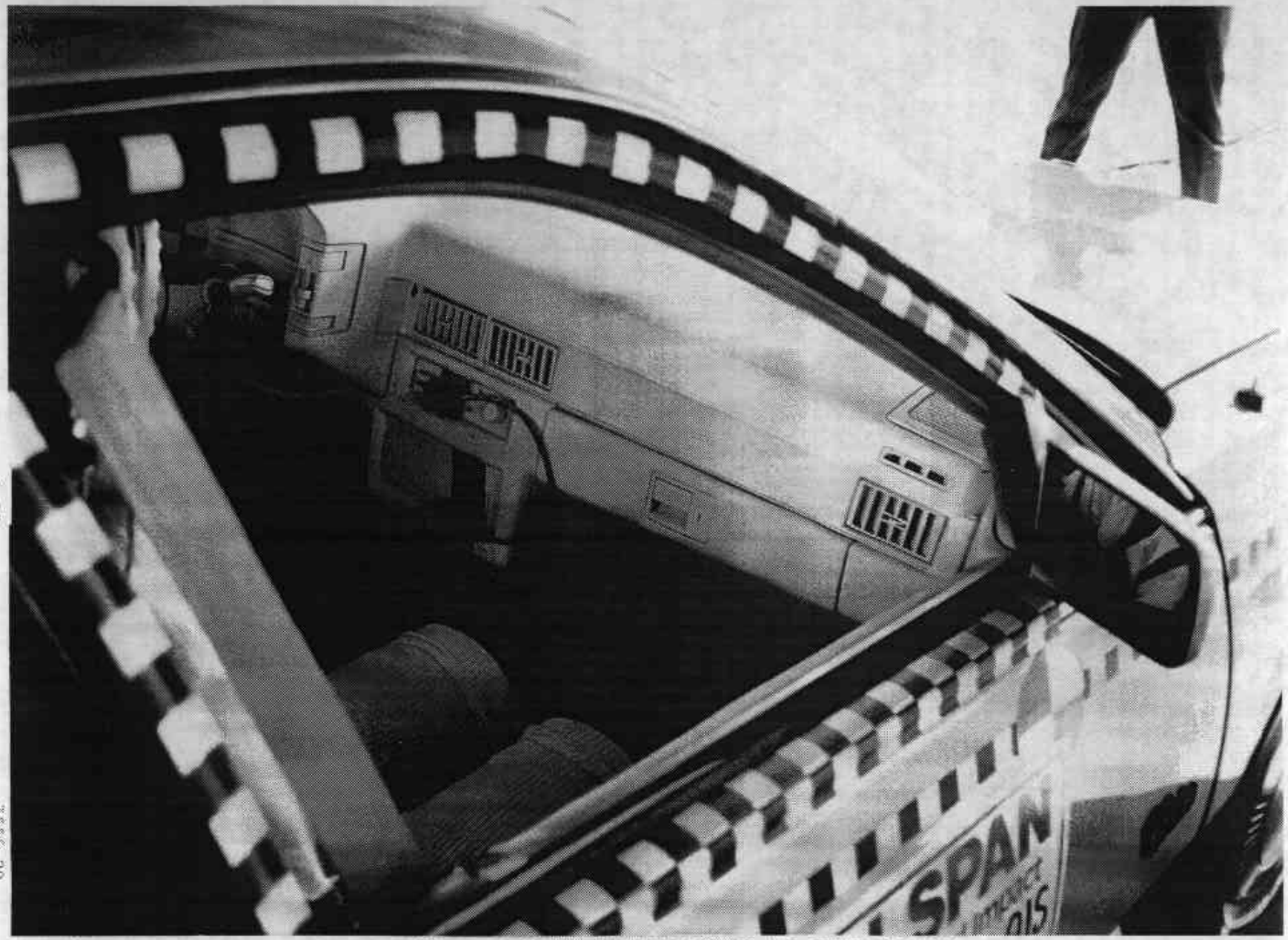


Figure A-24 PRE-TEST PASSENGER AND INTERIOR VIEW

7356-20

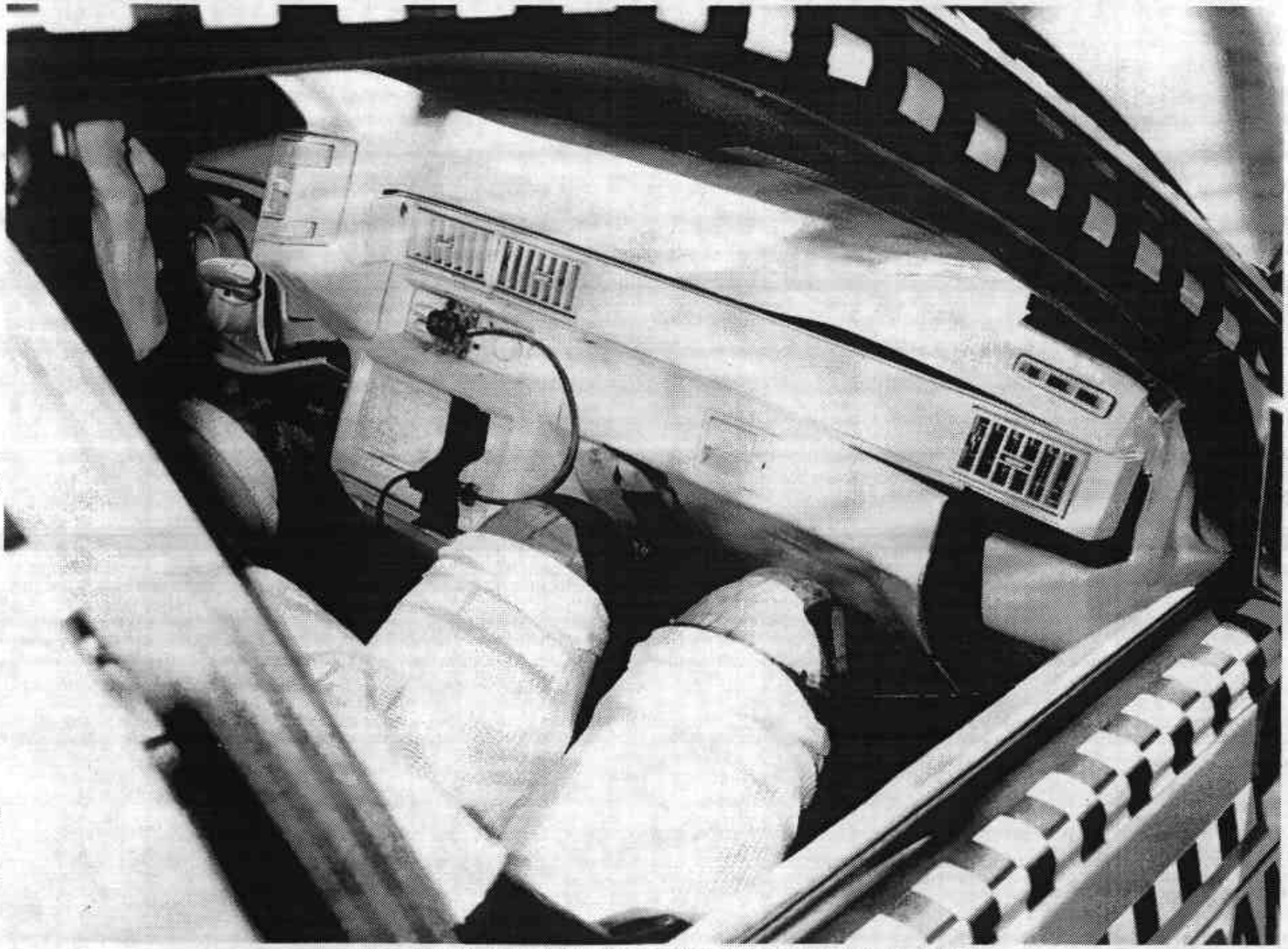


Figure A-25 POST-TEST PASSENGER AND INTERIOR VIEW

Appendix B

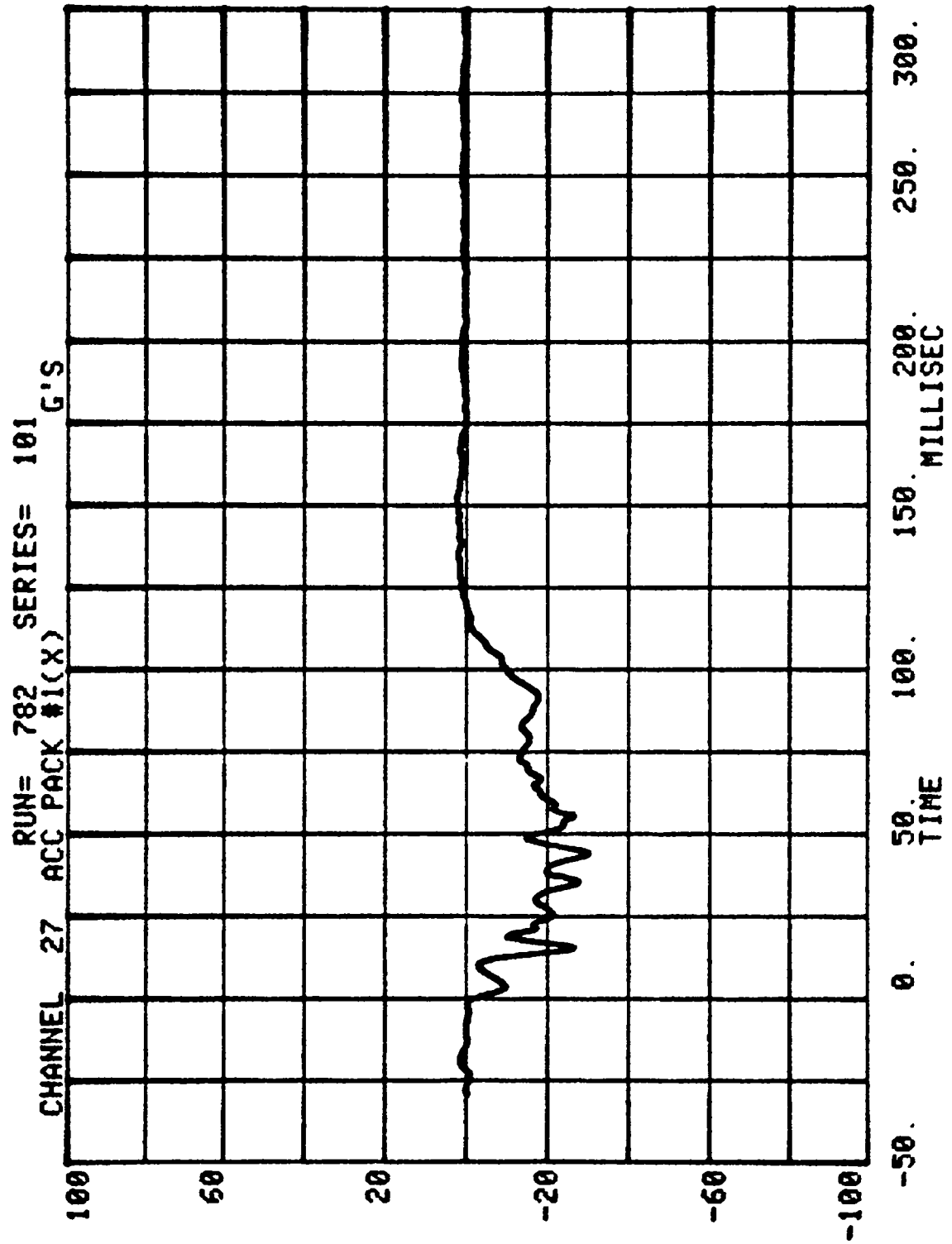
VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

TEST NO. MH0101

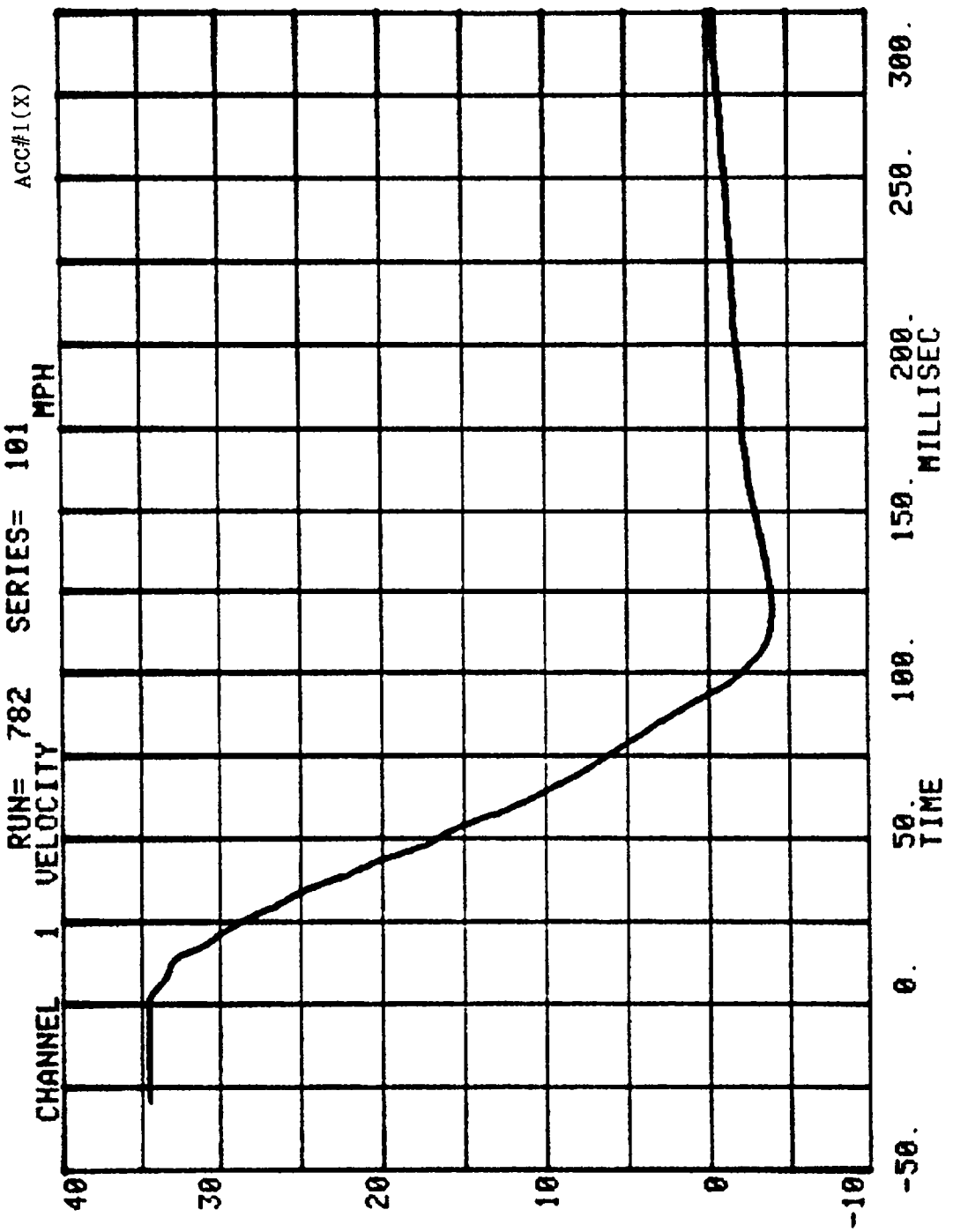
VEHICLE DATA

FILTER CHANNEL CLASS

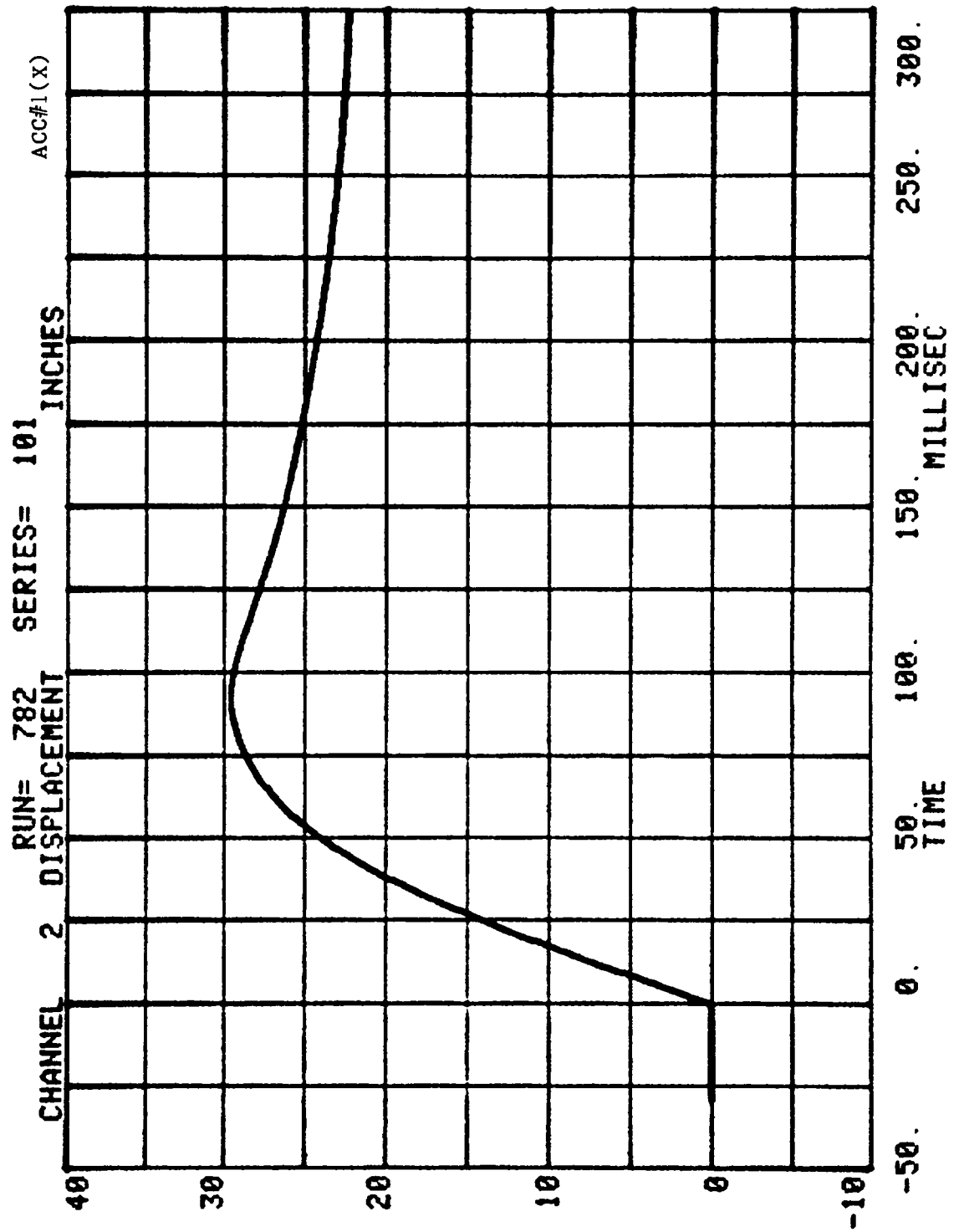
60

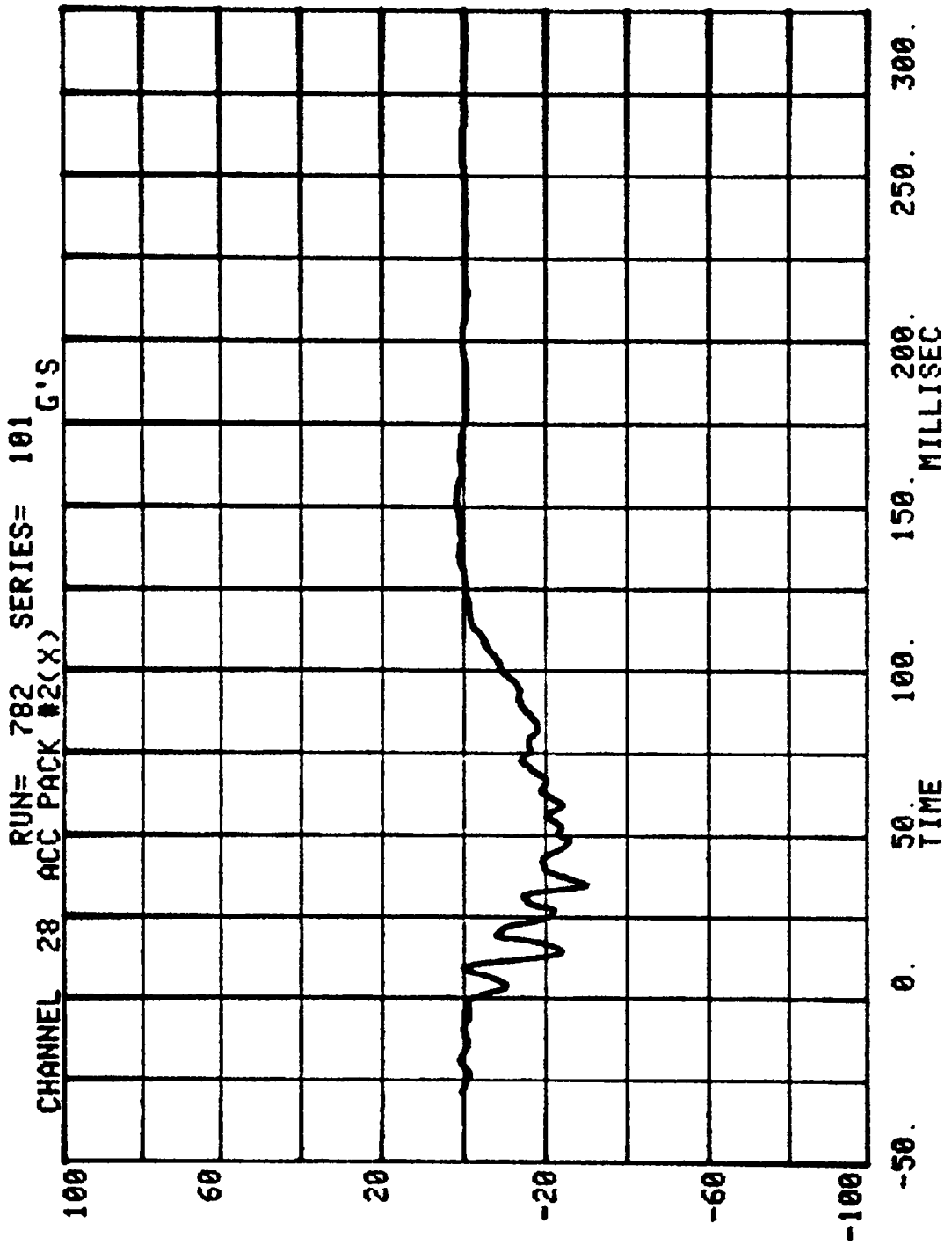

CHANNEL 27 ACC PACK #1(X)
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

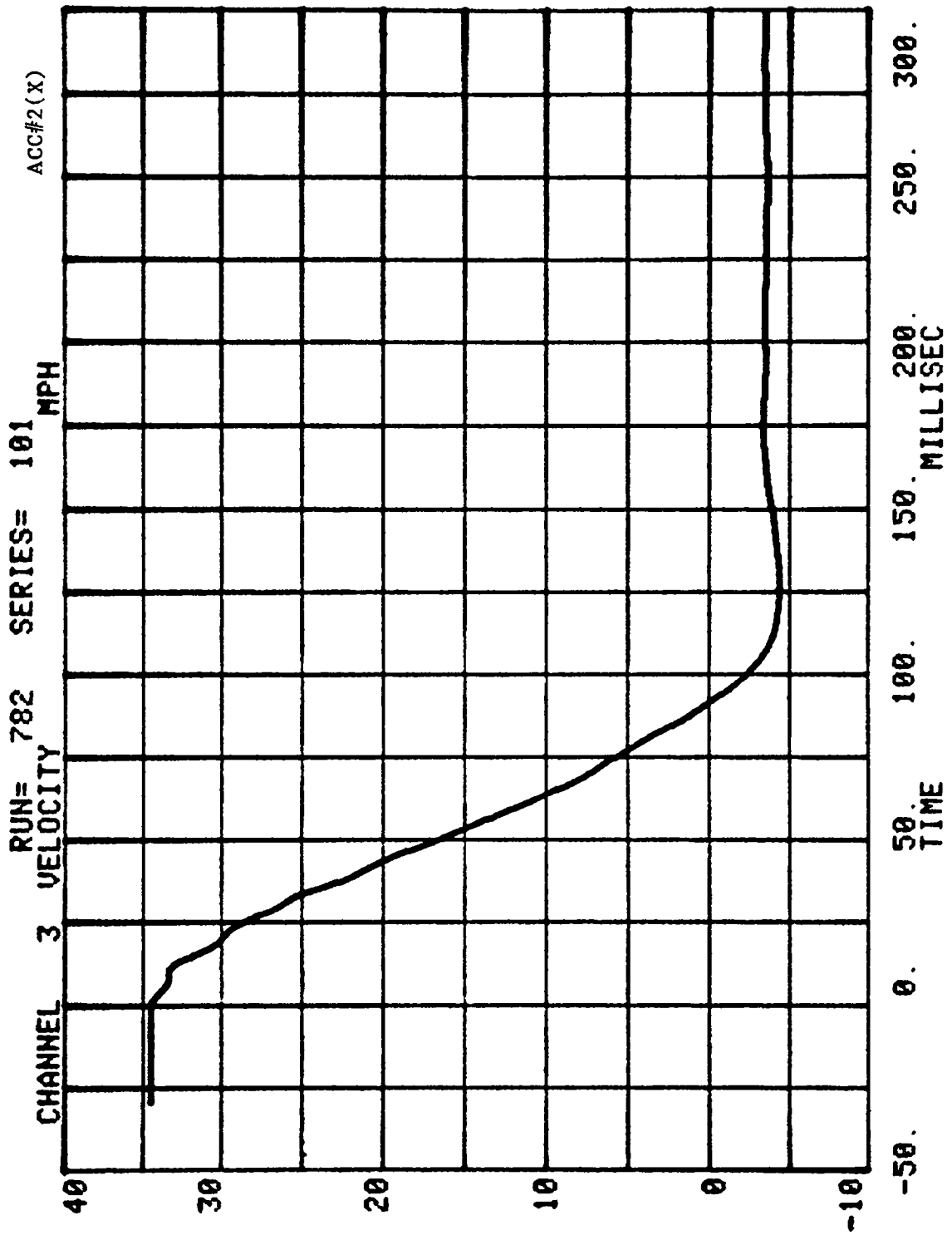
7556-20


ACC#1(X)
CHANNEL 1 VELOCITY
RUN= 782 SERIES= 101 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

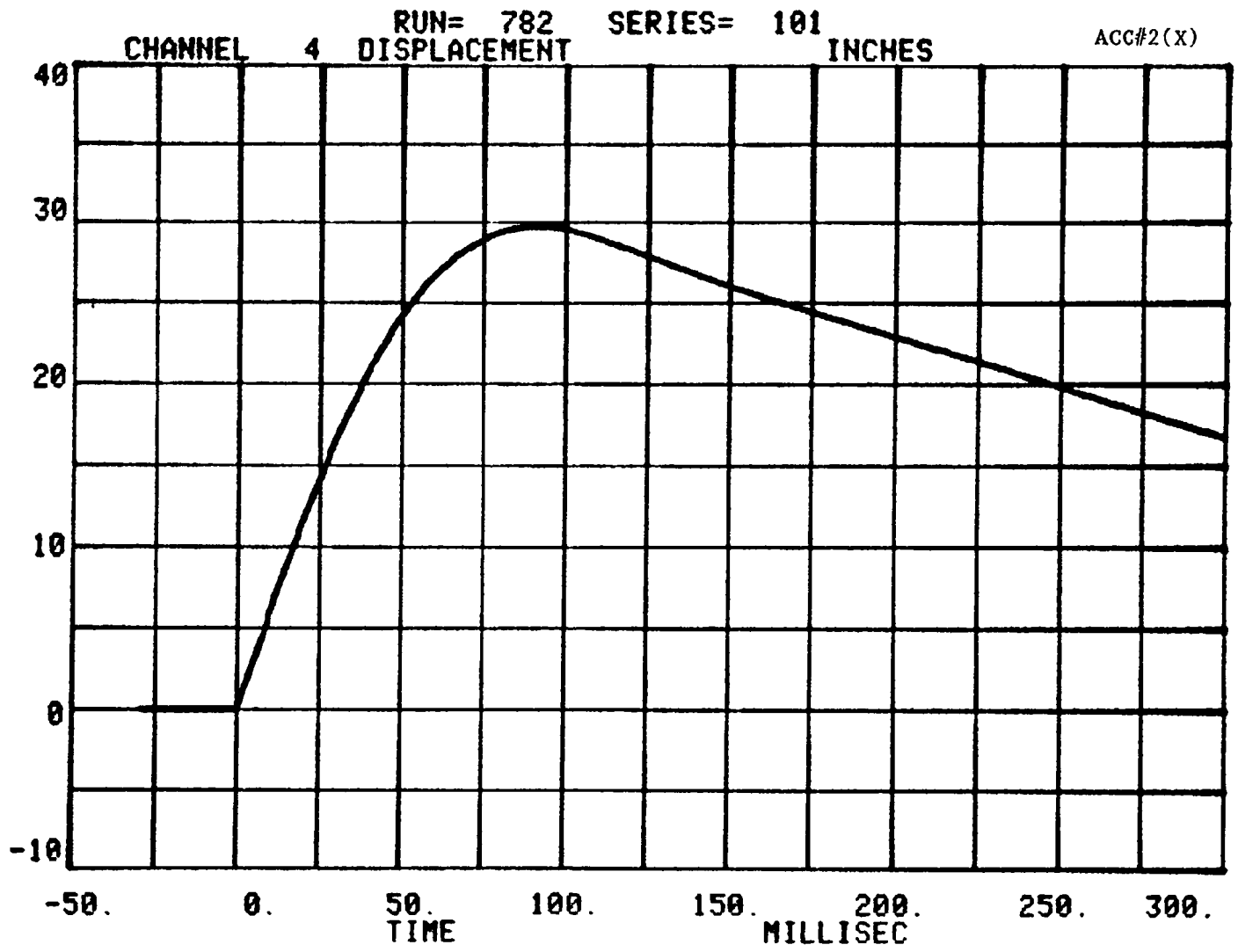
7556-20

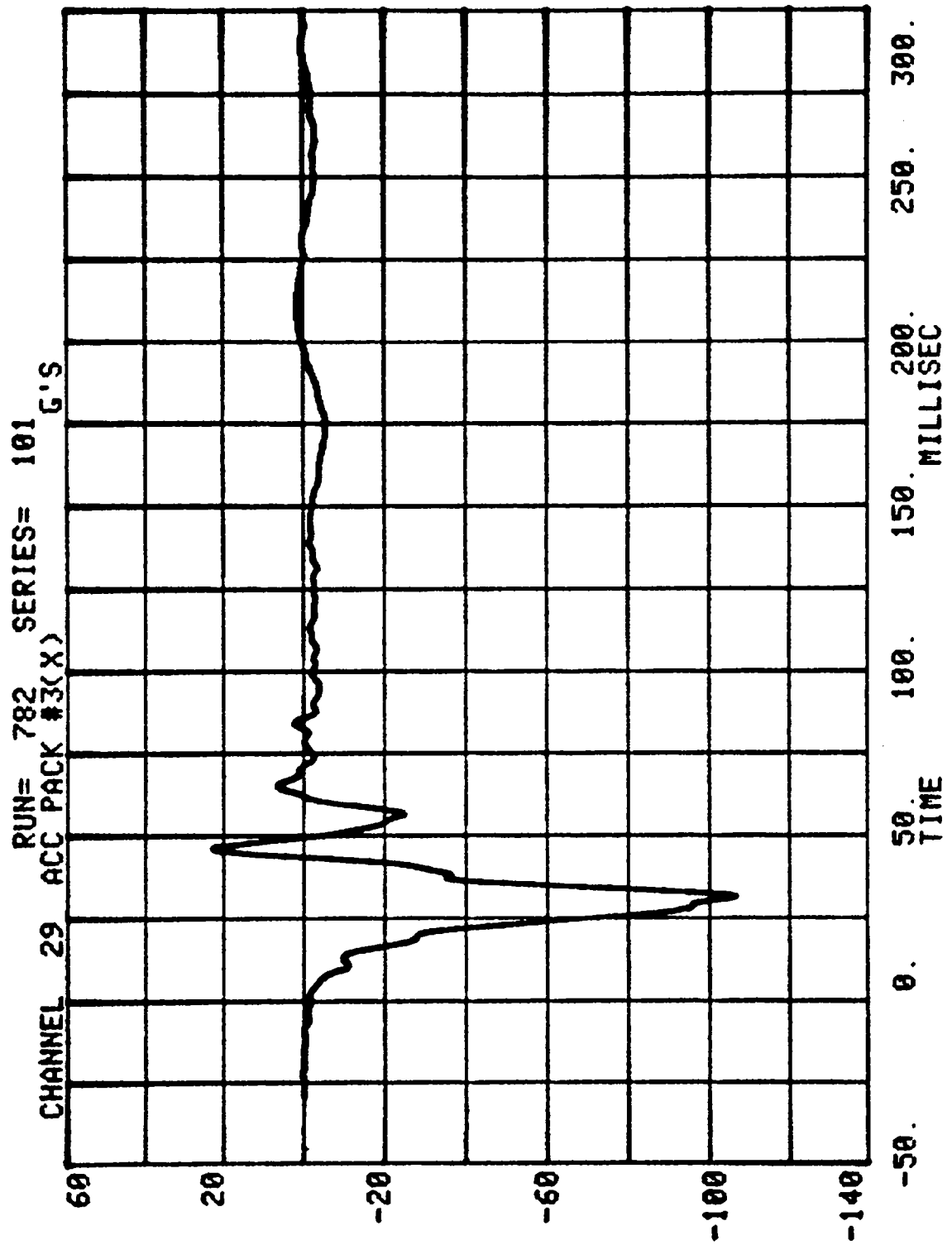

ACC#1(X)
CHANNEL 2 DISPLACEMENT
RUN= 782 SERIES= 101
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

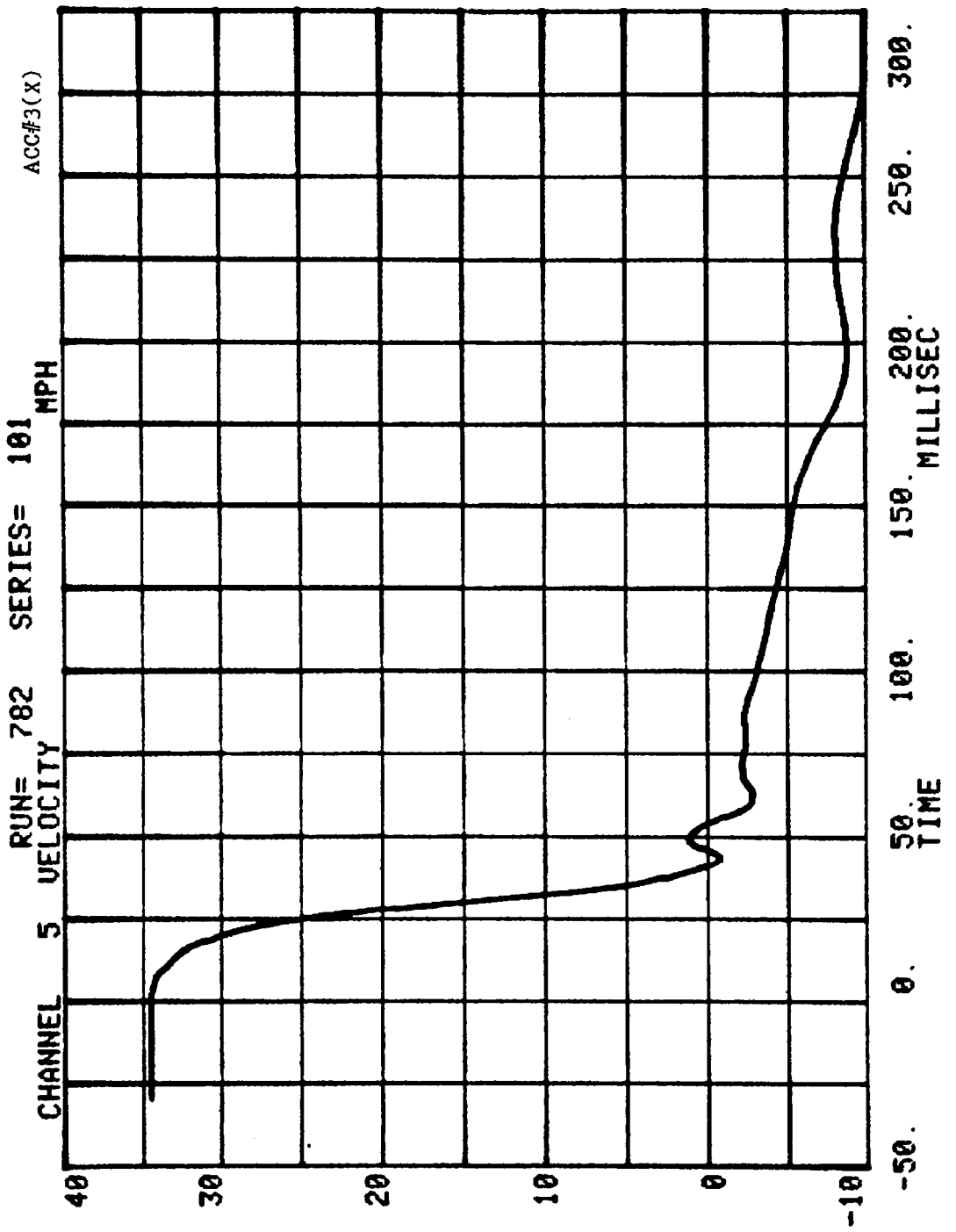

CHANNEL 28 ACC PACK #2(X)
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC#2(X)
CHANNEL 3 VELOCITY
RUN= 782 SERIES= 101
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

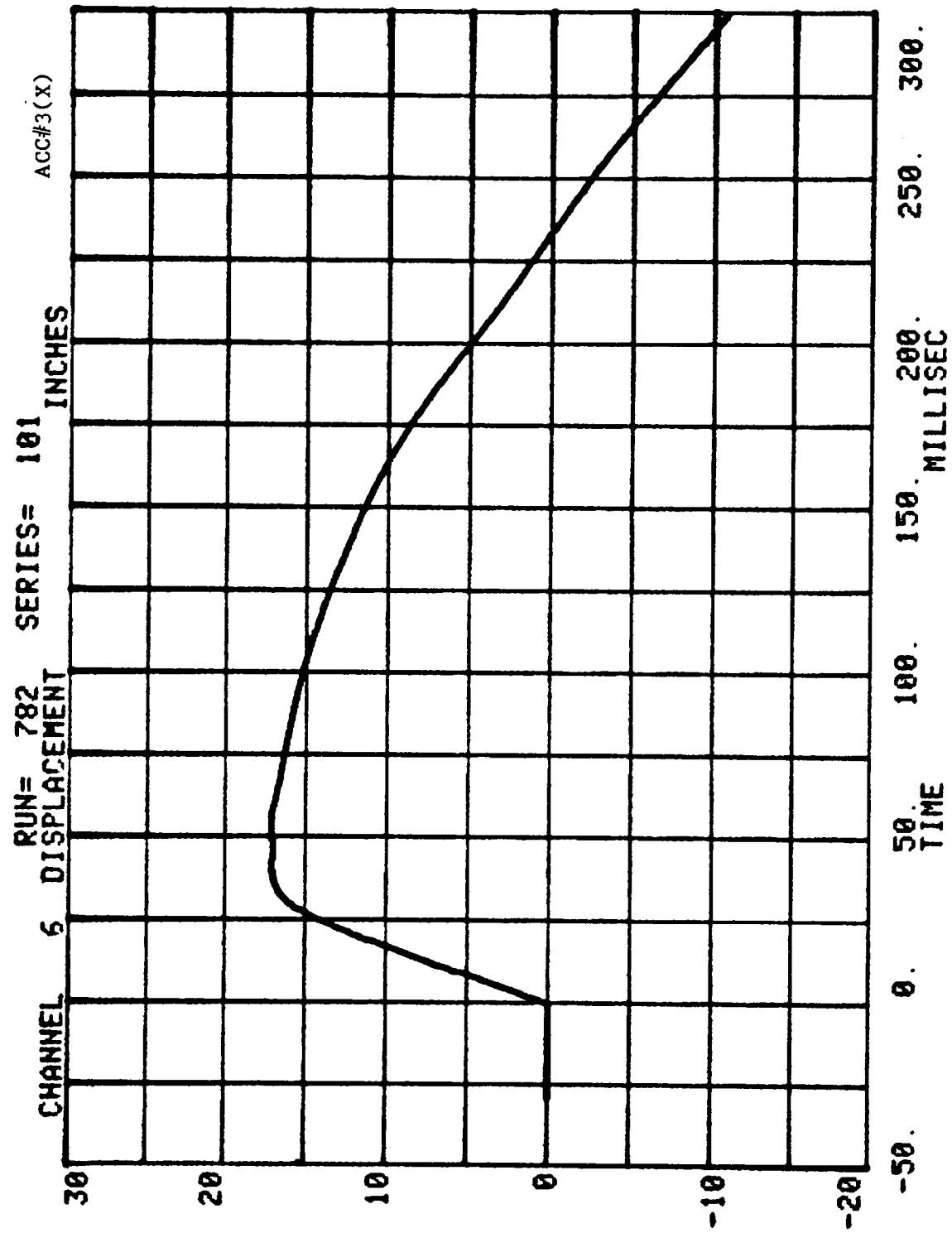
7556-20

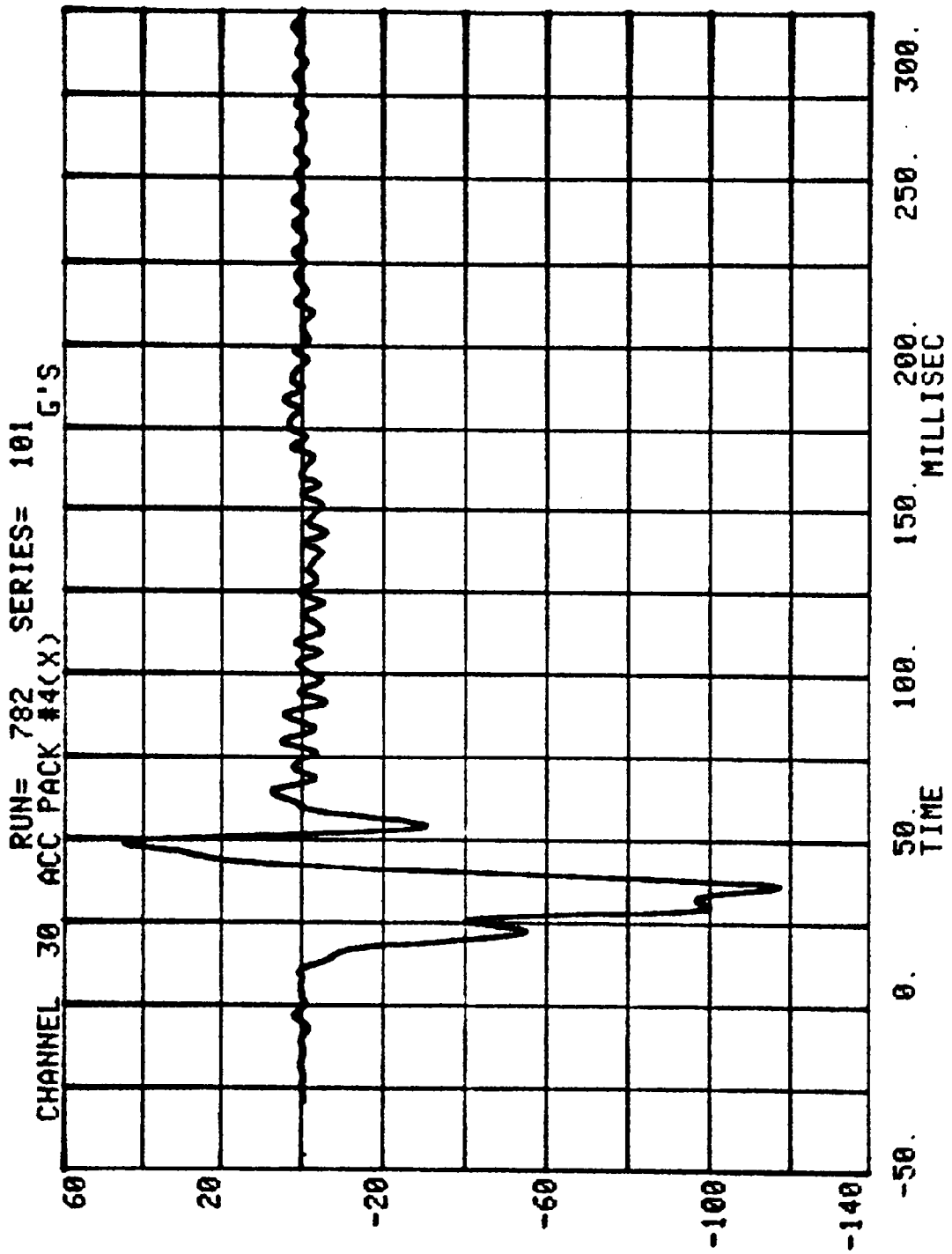

RUN= 782 SERIES= 101
CHANNEL 4 DISPLACEMENT INCHES
ACC#2(X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

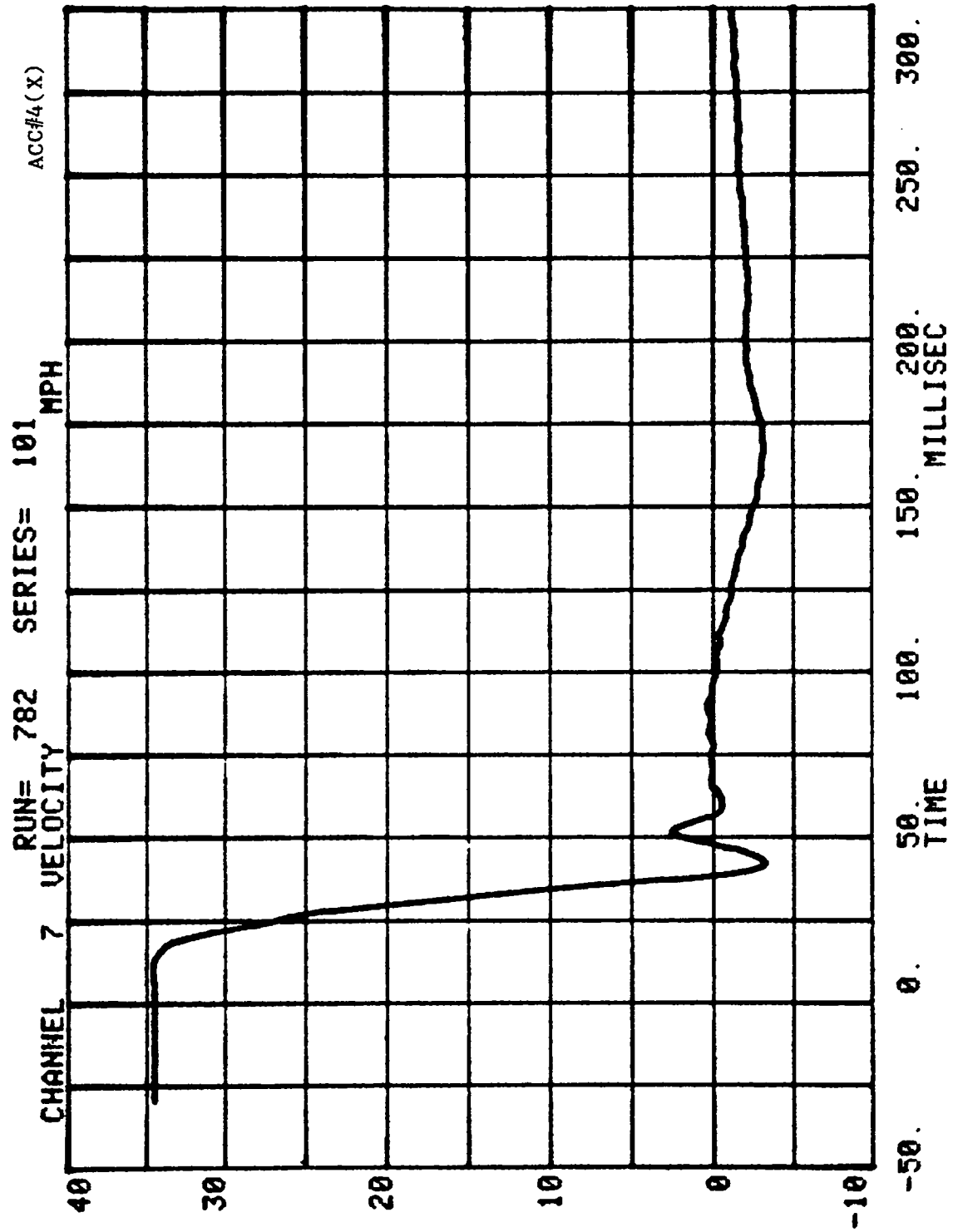

CHANNEL 29 ACC PACK #3(X)
RUN= 782 SERIES= 101
G'S
60
20
-20
-60
-100
-140
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

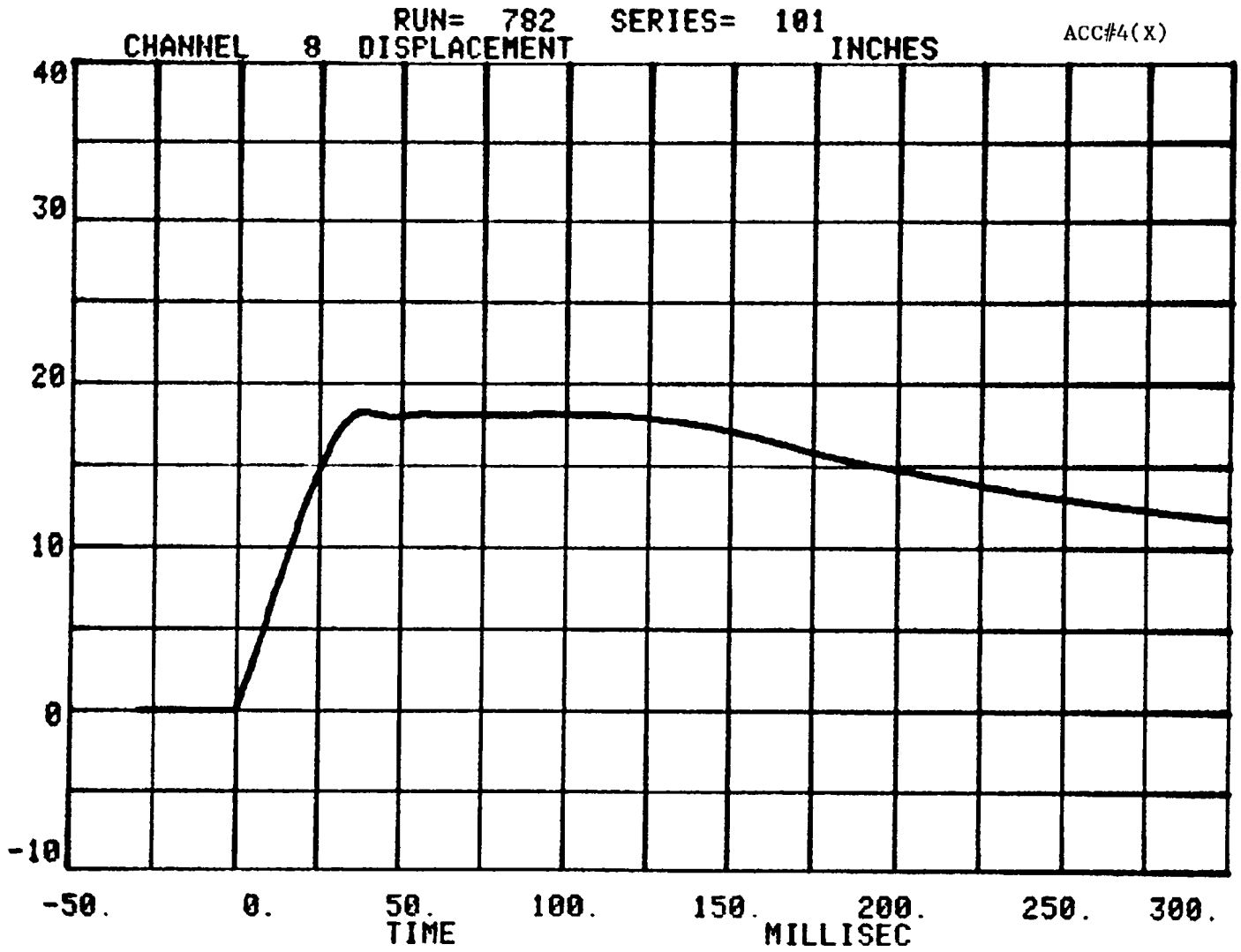

CHANNEL 5 VELOCITY
RUN= 782 SERIES= 101 MPH
ACC#3(X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

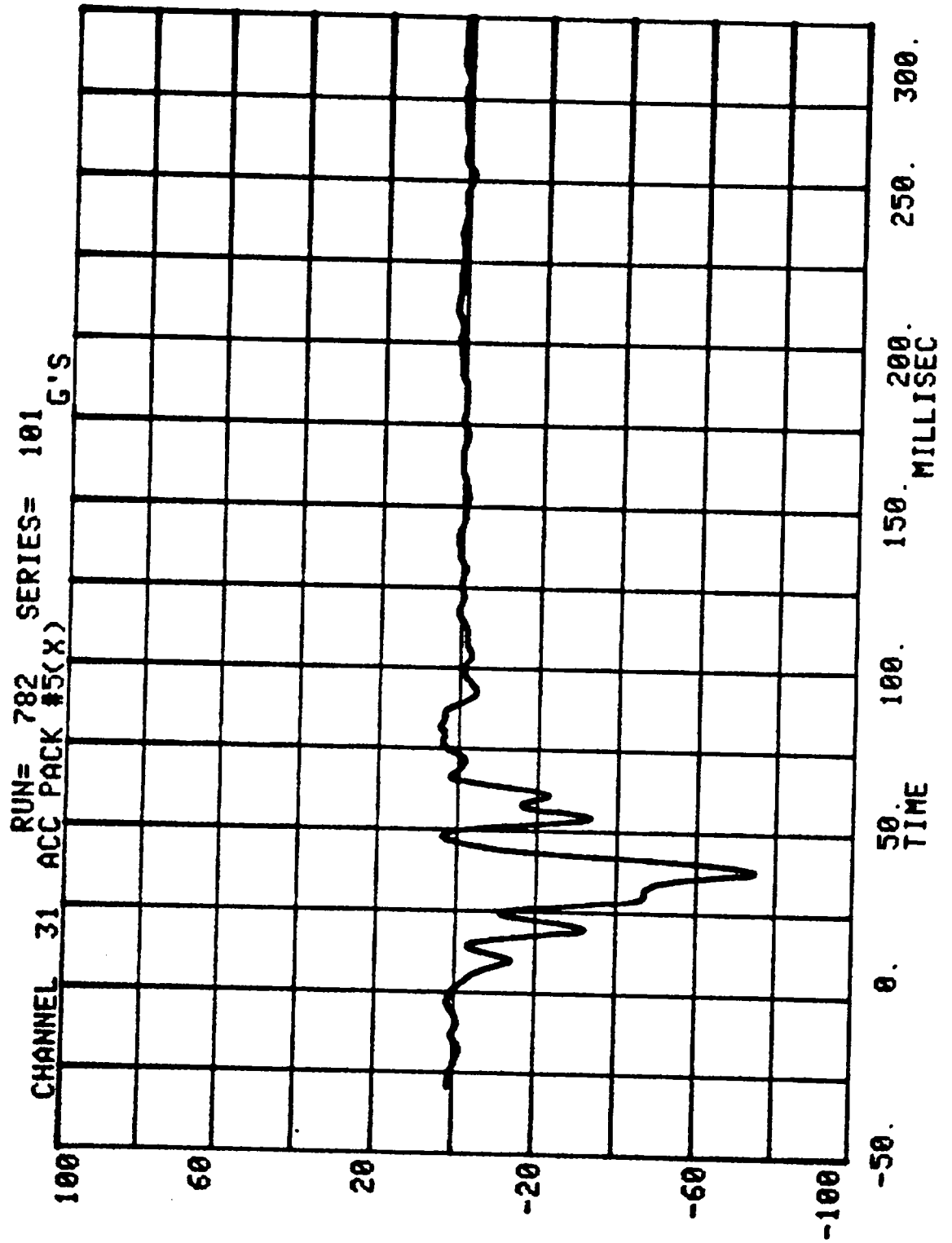
7556-20

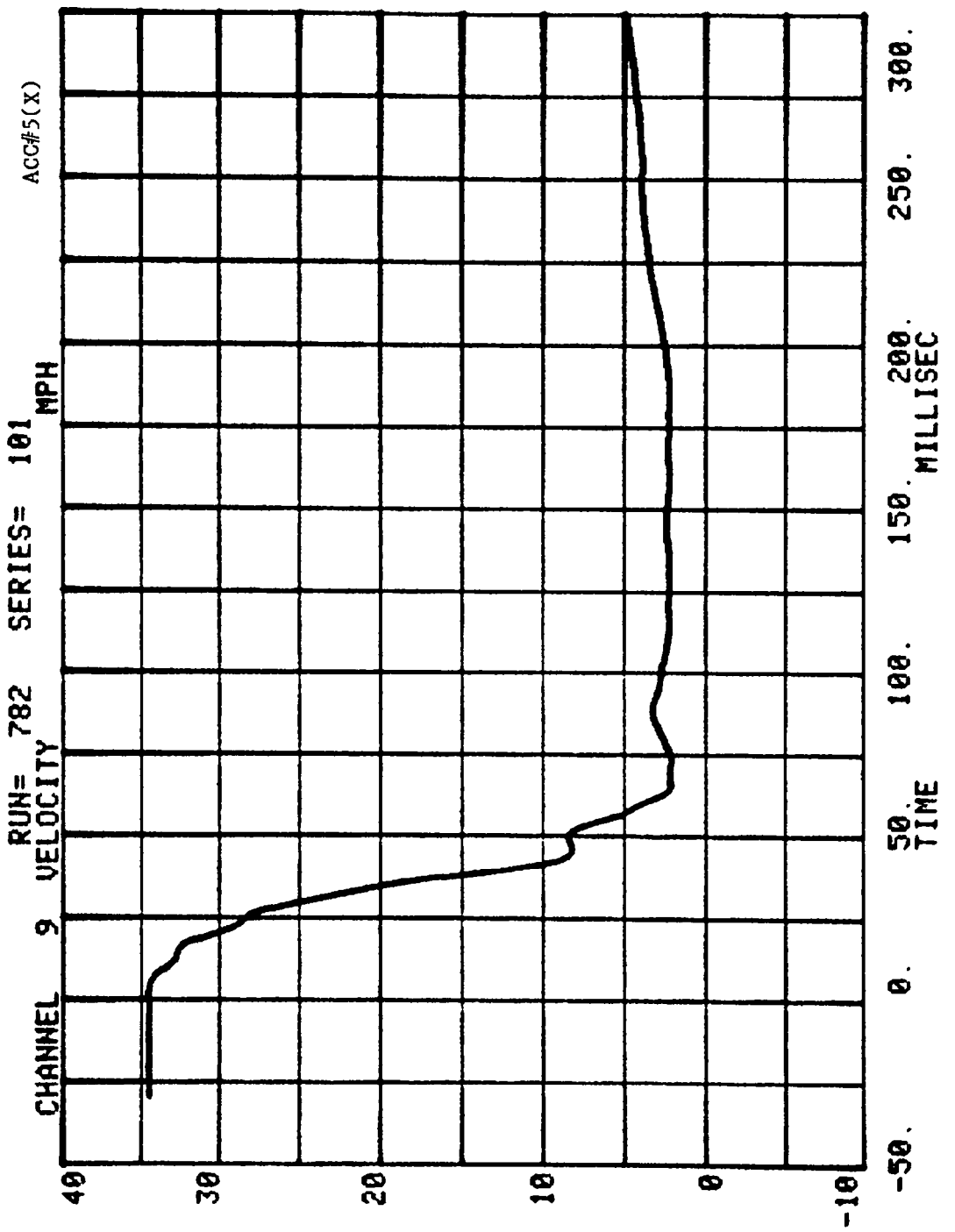

ACC#3(X)
CHANNEL 6 DISPLACEMENT
RUN= 782 SERIES= 101 INCHES
30
20
10
0
-10
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 30 ACC PACK #4(X)
RUN= 782 SERIES= 101
G'S
60
20
-20
-60
-100
-140
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

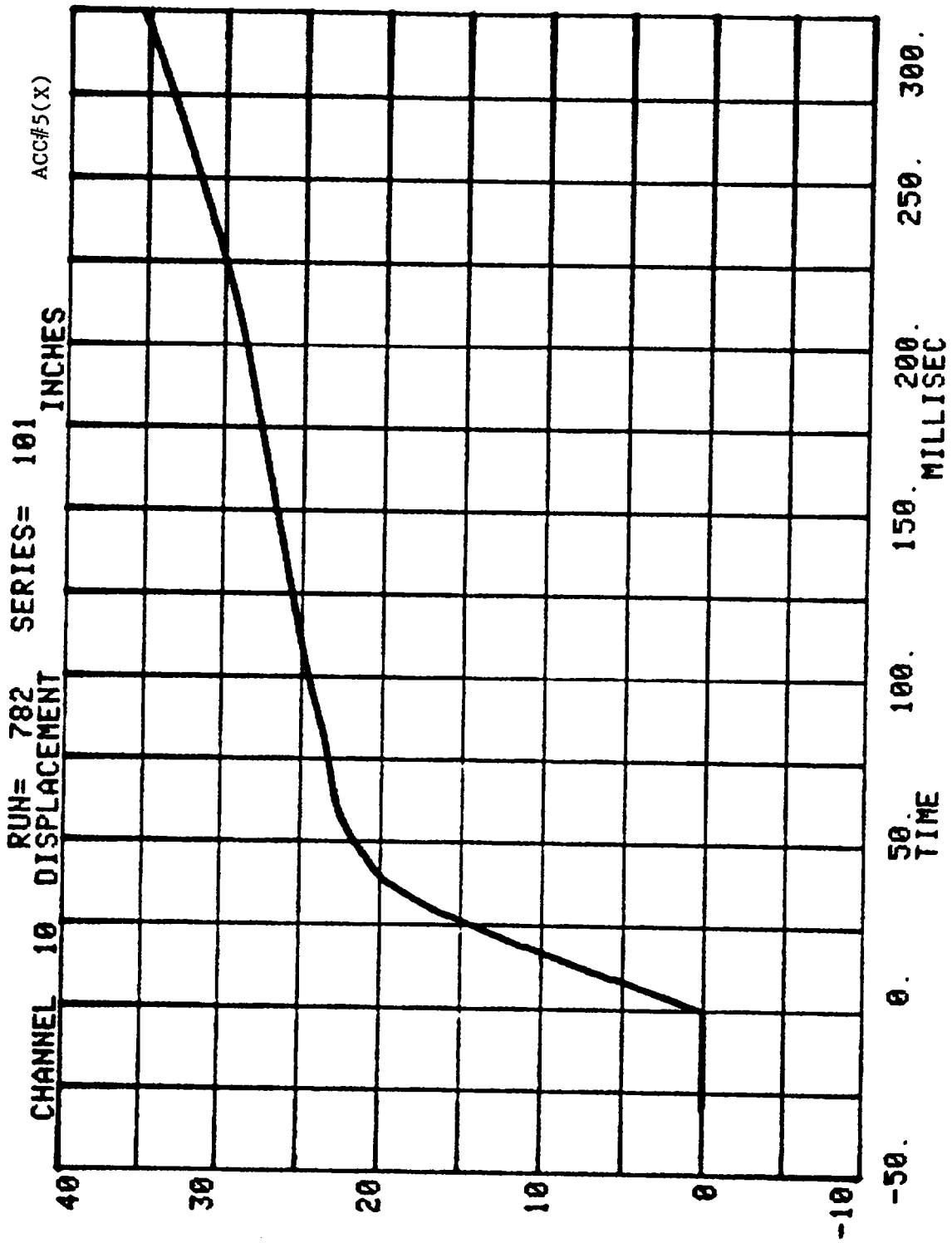

CHANNEL 7 VELOCITY
RUN= 782 SERIES= 101 MPH
ACC#4(X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

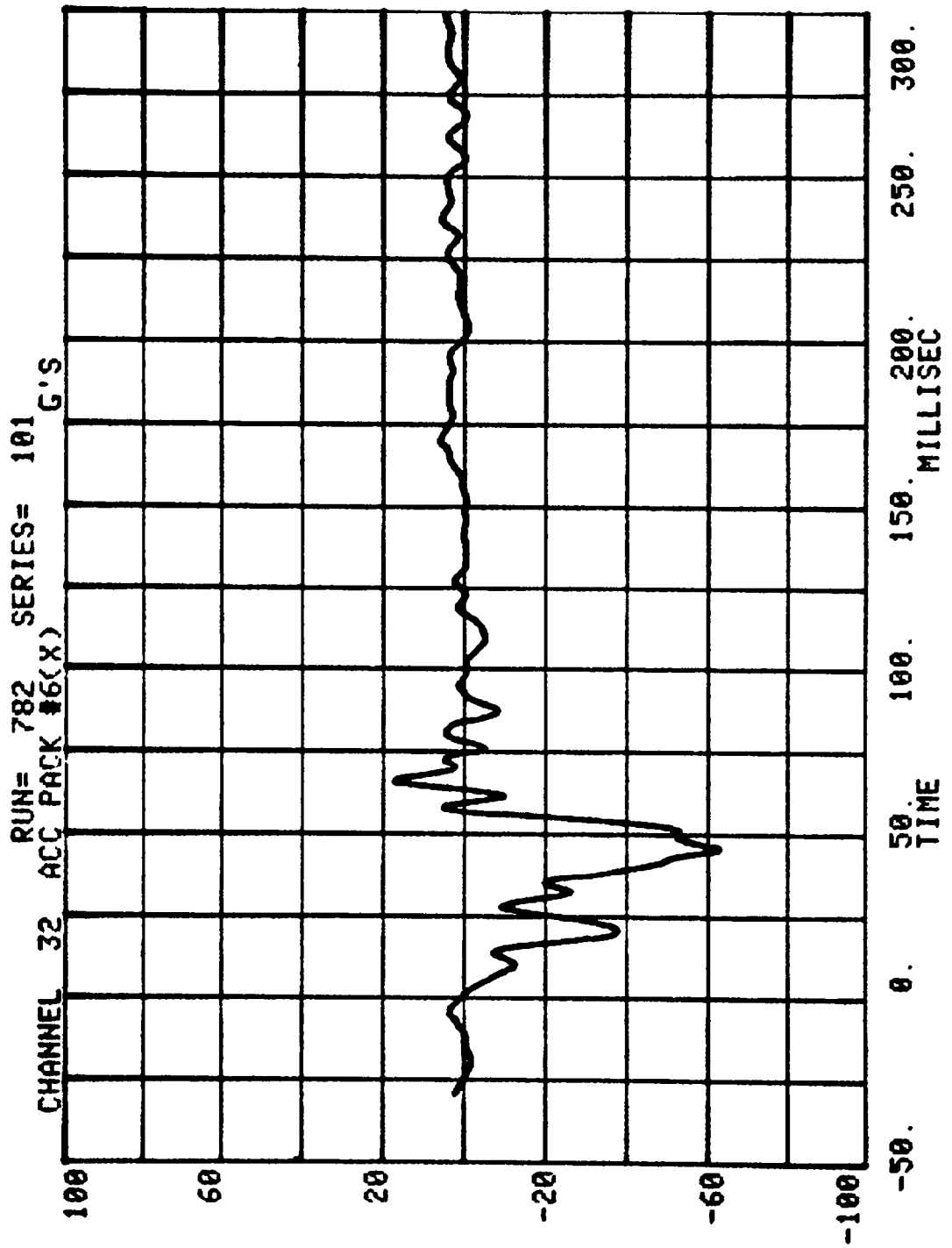

RUN= 782 SERIES= 101
CHANNEL 8 DISPLACEMENT INCHES
ACC#4(X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC


CHANNEL 31 ACC PACK #5(X)
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

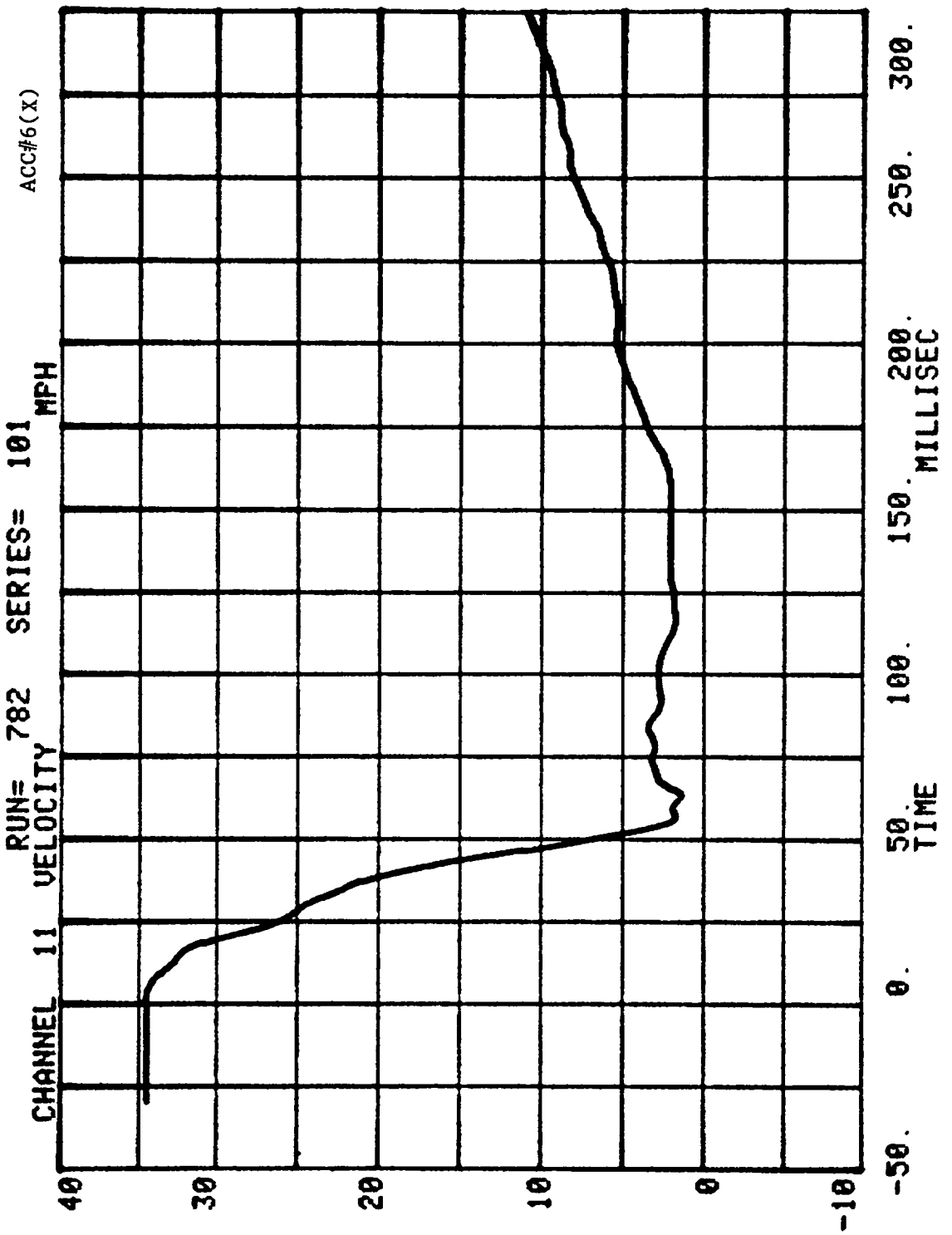

ACC#5(X)
CHANNEL 9 VELOCITY
RUN= 782 SERIES= 101 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20

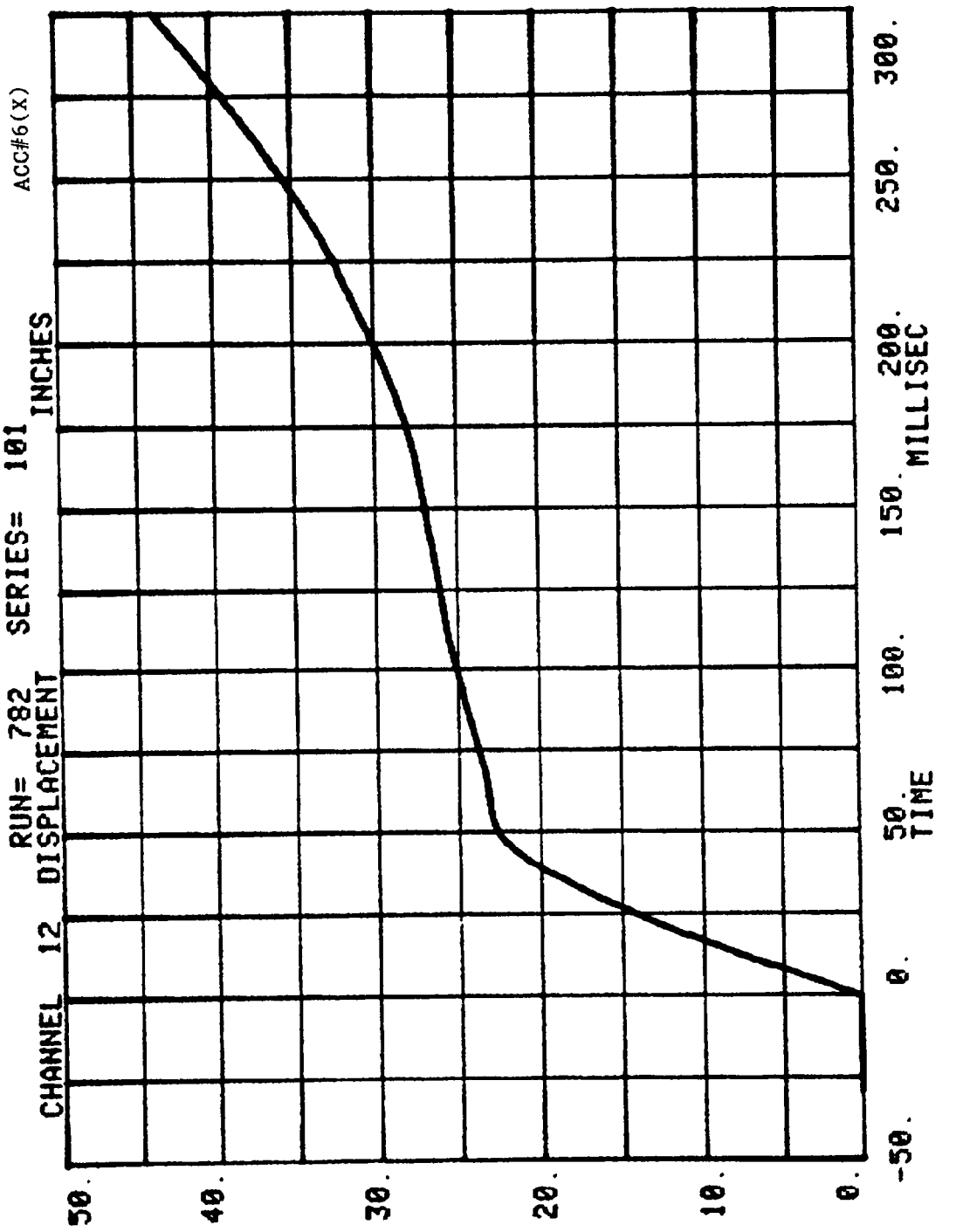

ACC#5(X)
CHANNEL 10 DISPLACEMENT
RUN= 782 SERIES= 101 INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 32 ACC PACK #6(X)
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

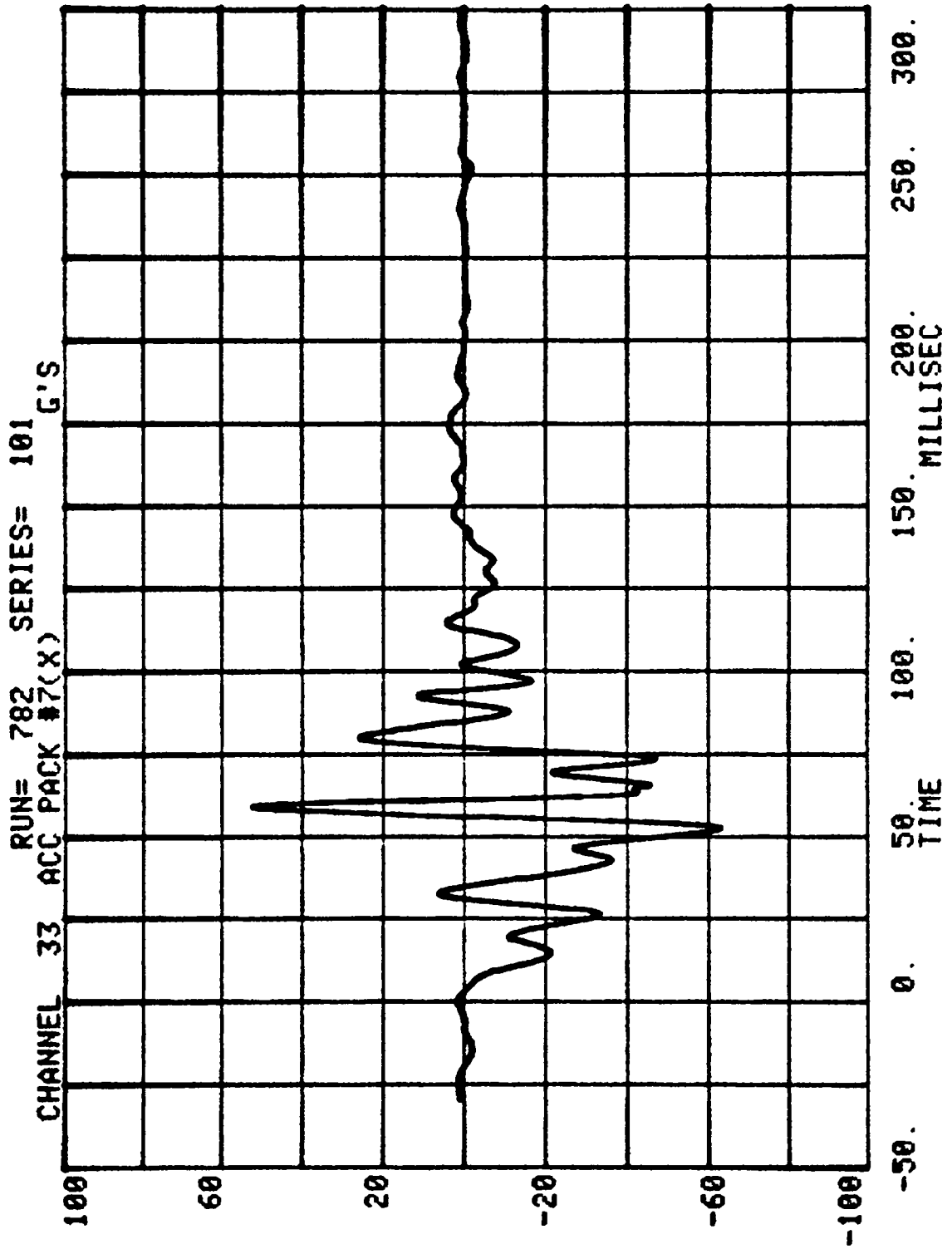
7556-20


ACC#6(X)
CHANNEL 11 VELOCITY
RUN= 782 SERIES= 101
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

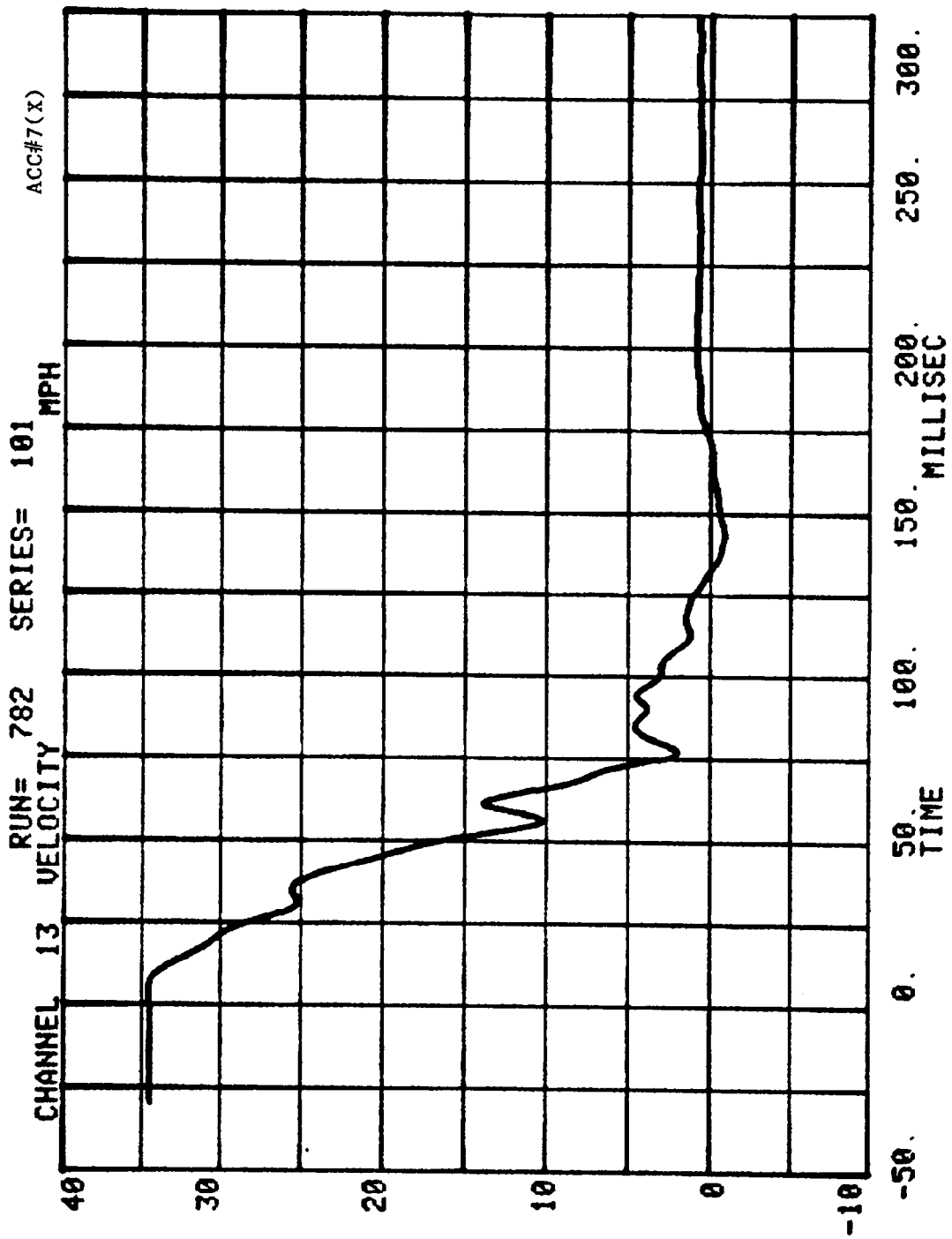
7556-20

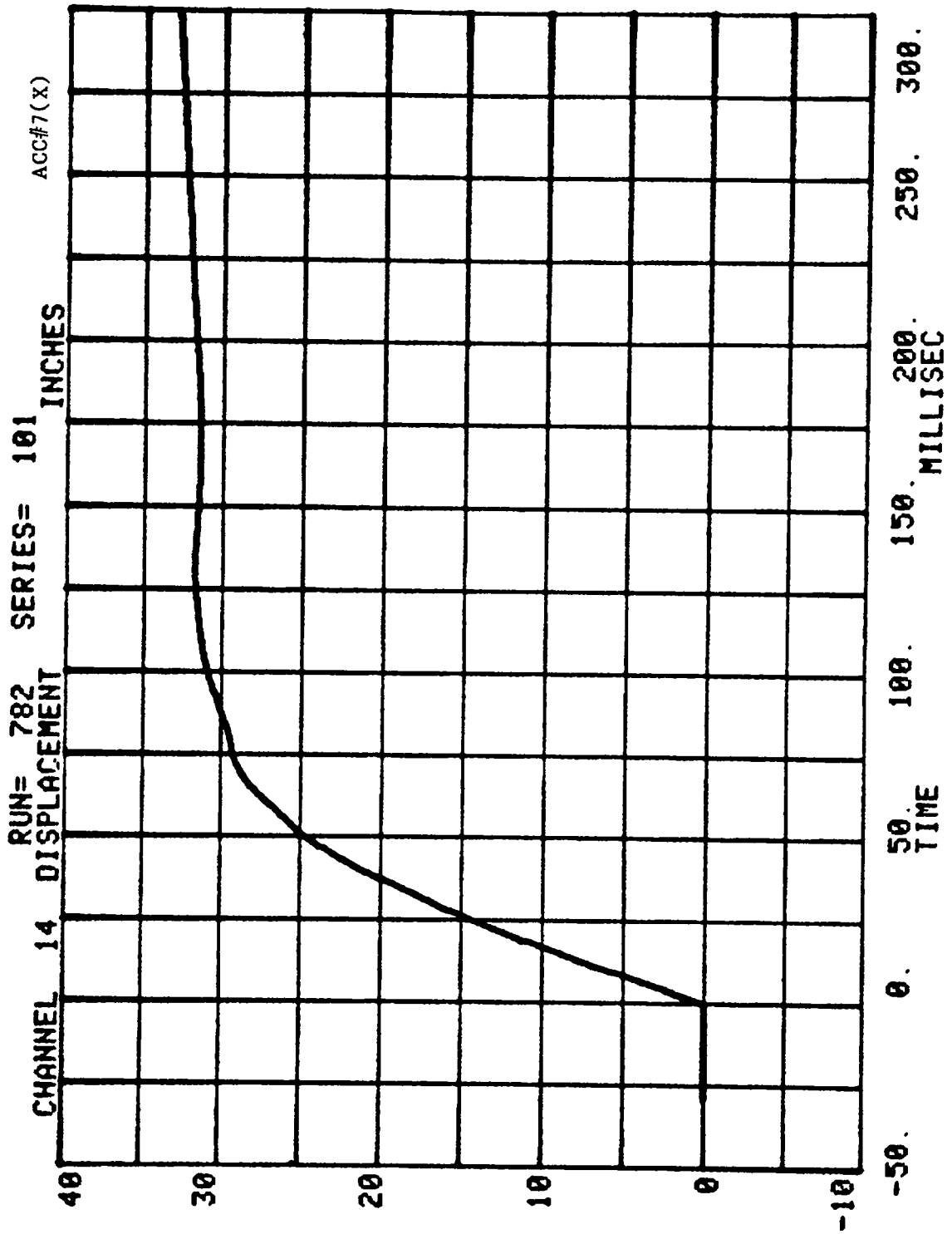

CHANNEL 12 DISPLACEMENT
RUN= 782 SERIES= 101
INCHES
ACC#6(X)
50.
40.
30.
20.
10.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20


CHANNEL 33 ACC PACK #7(X)
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20


CHANNEL 13 VELOCITY
RUN= 782 SERIES= 101
MPH
ACC#7(X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

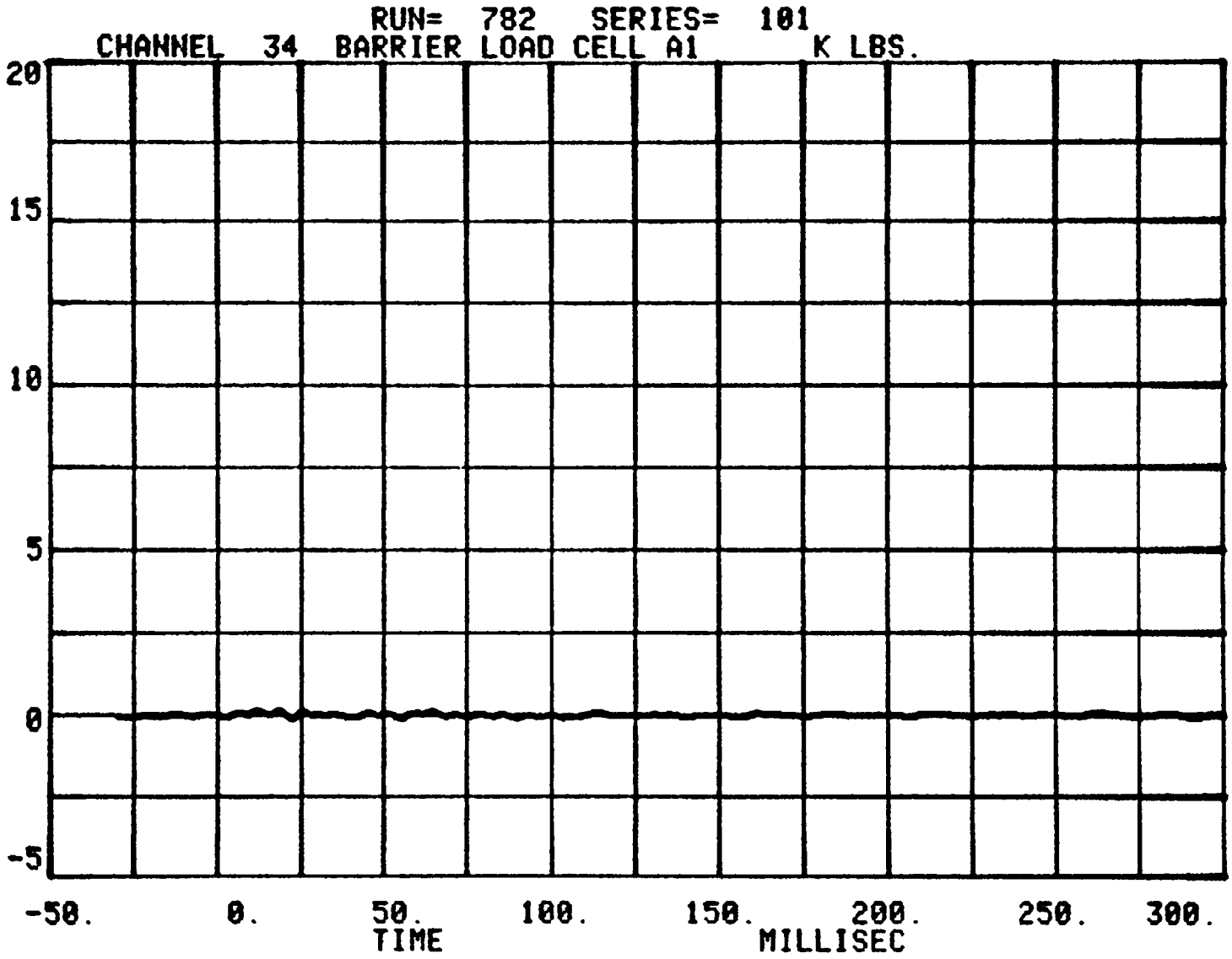

ACC#7(X)
CHANNEL 14 DISPLACEMENT
RUN= 782 SERIES= 101
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

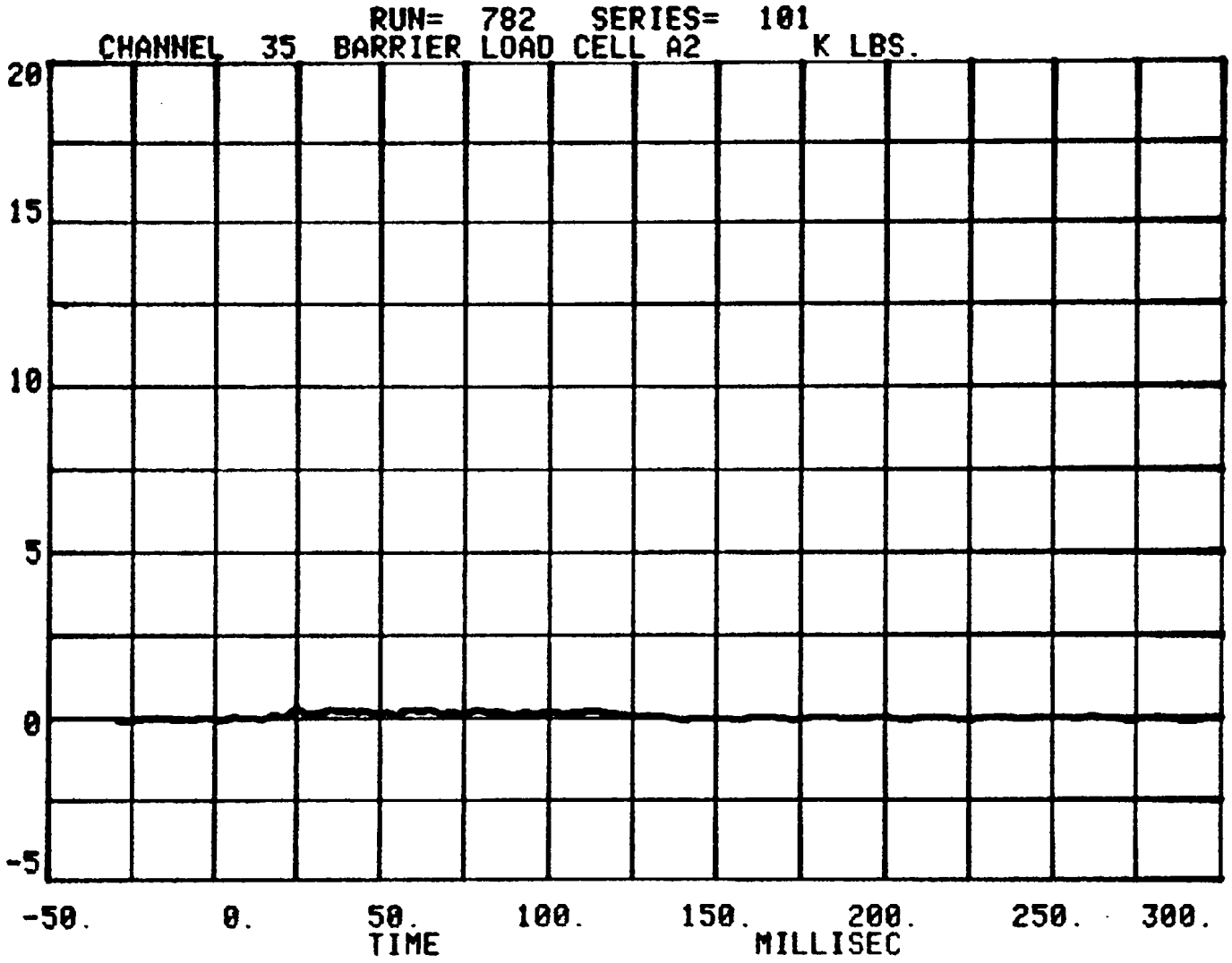
TEST NO. MH0101

LOAD CELL BARRIER DATA

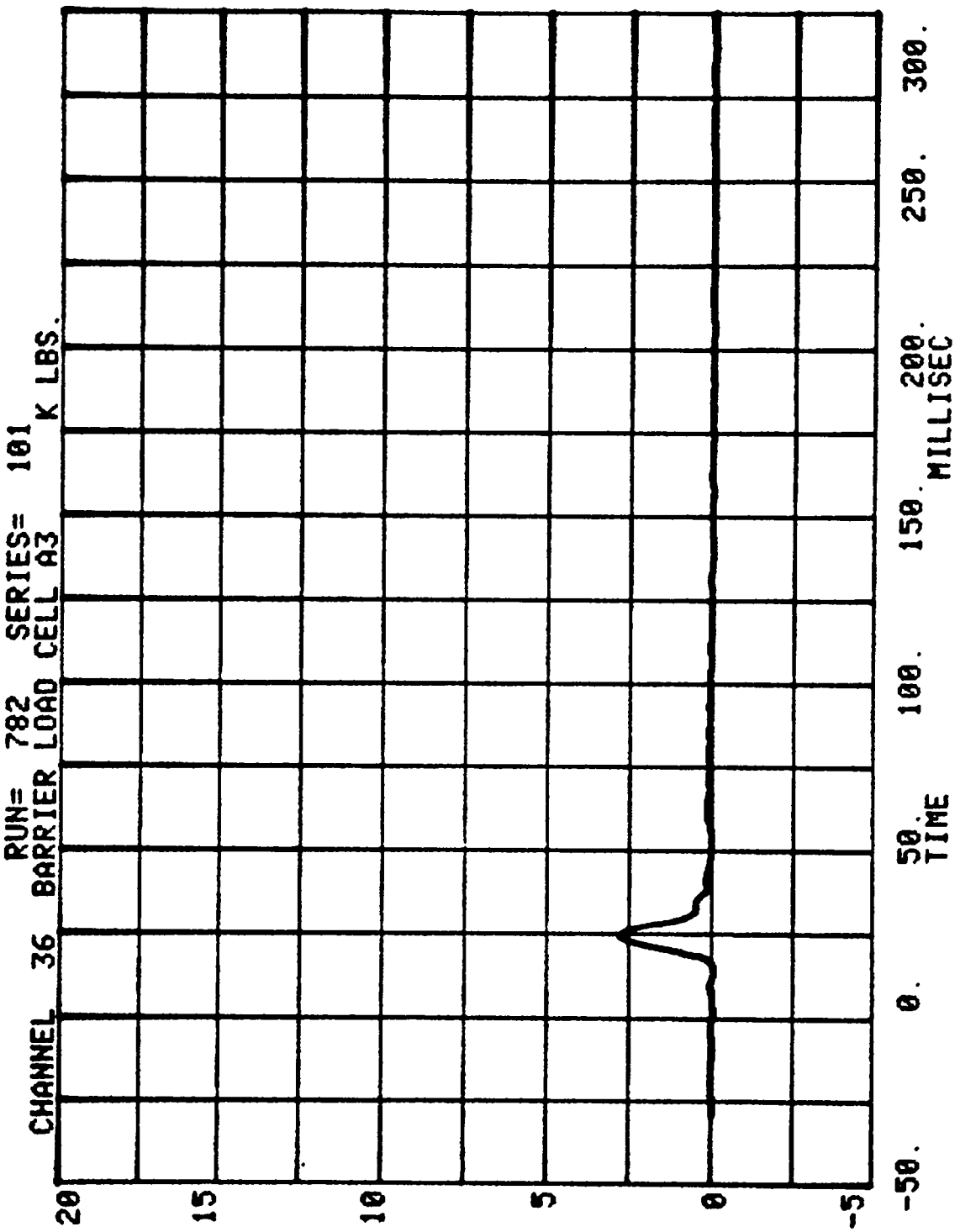
FILTER CHANNEL CLASS

60

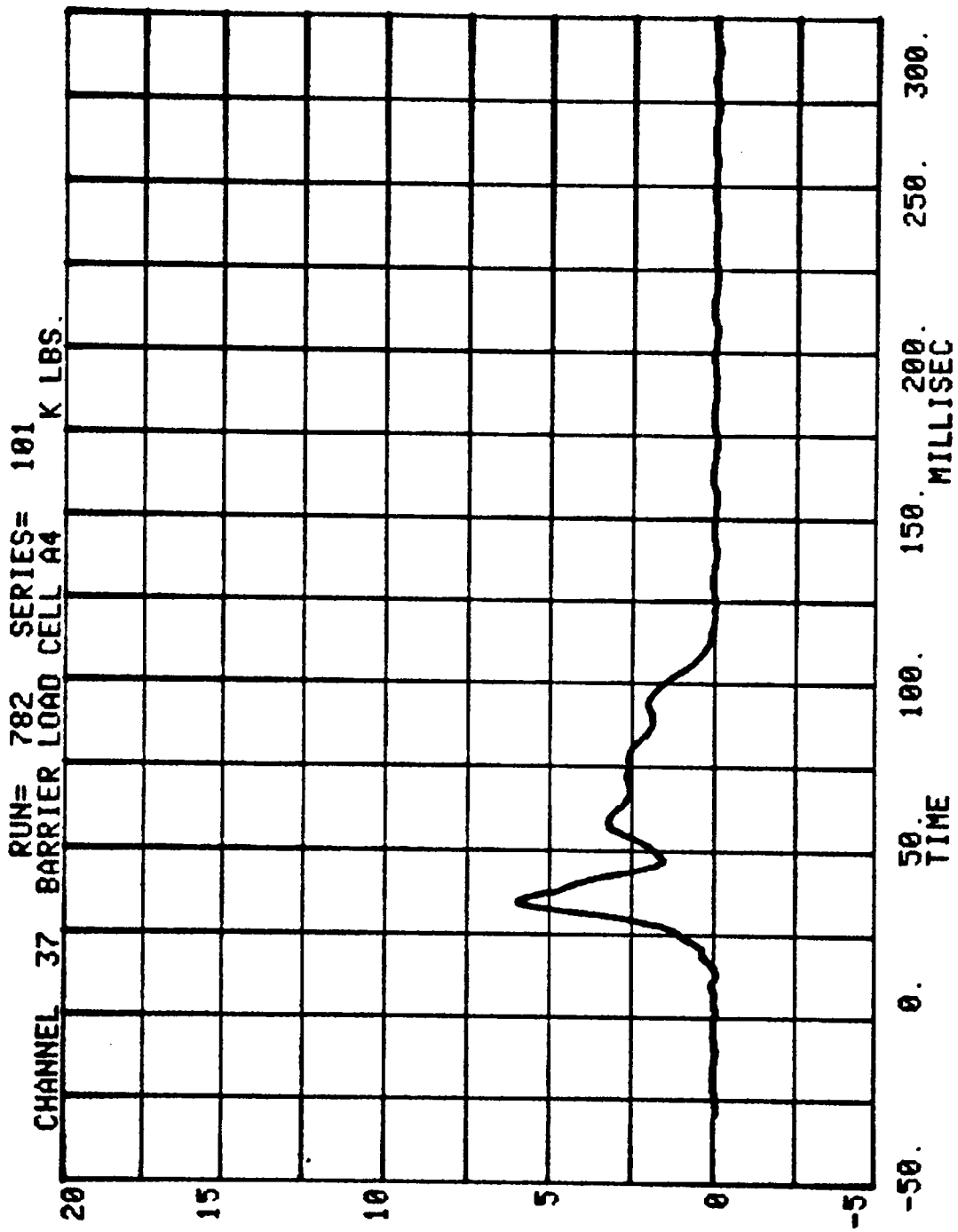

RUN= 782 SERIES= 101
CHANNEL 34 BARRIER LOAD CELL A1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

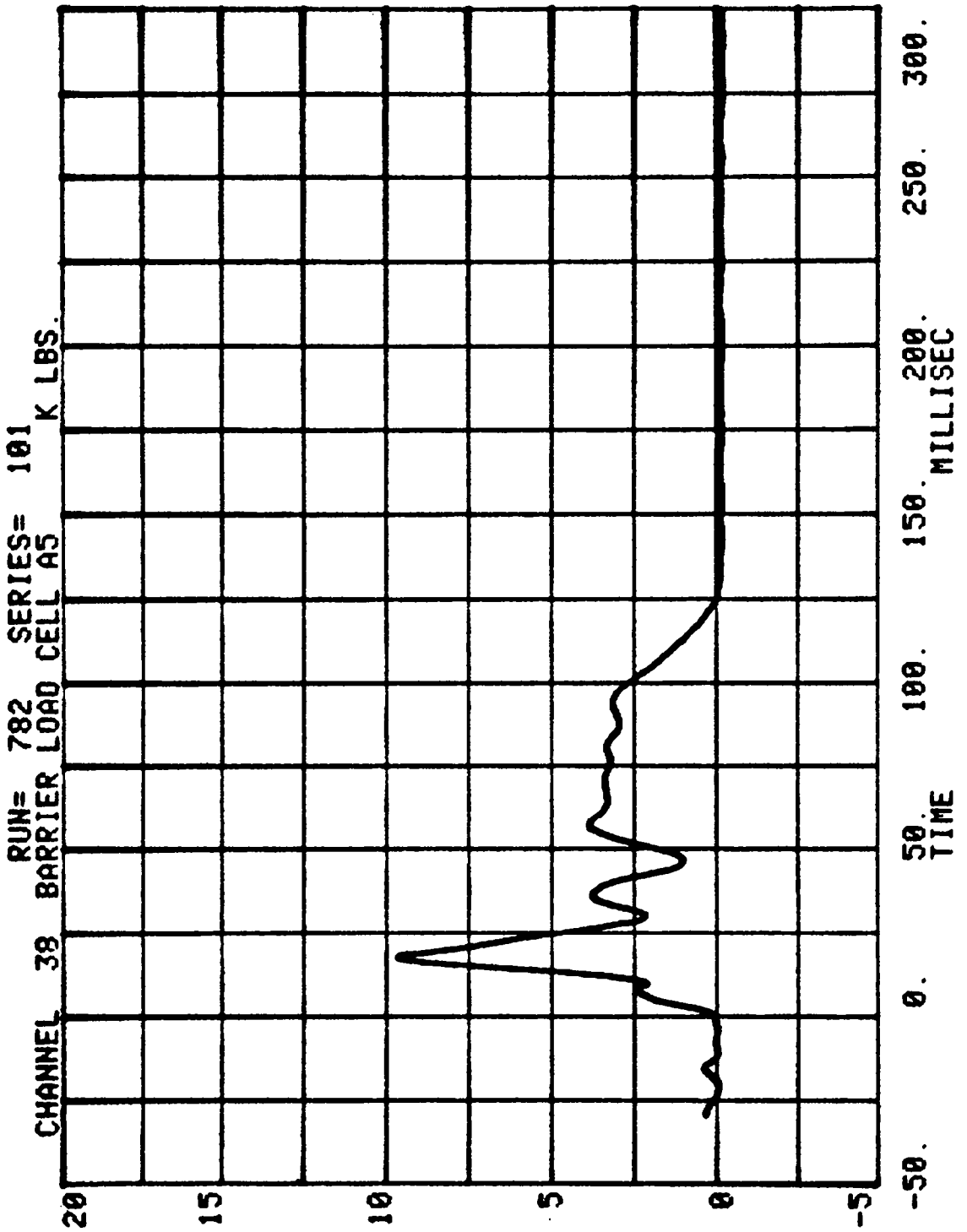

RUN= 782 SERIES= 101
CHANNEL 35 BARRIER LOAD CELL A2
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

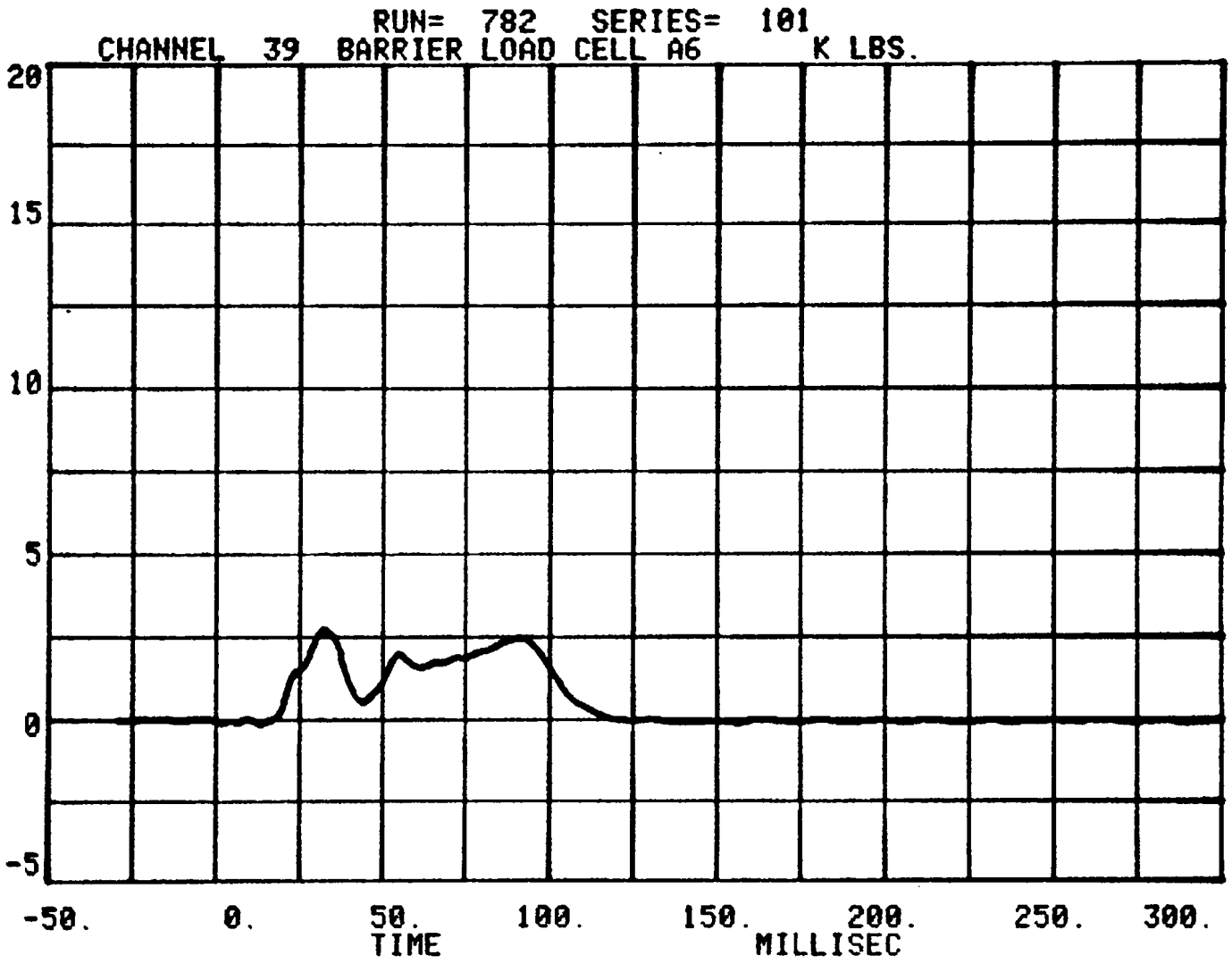
7556-20


CHANNEL 36 BARRIER LOAD CELL A3
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

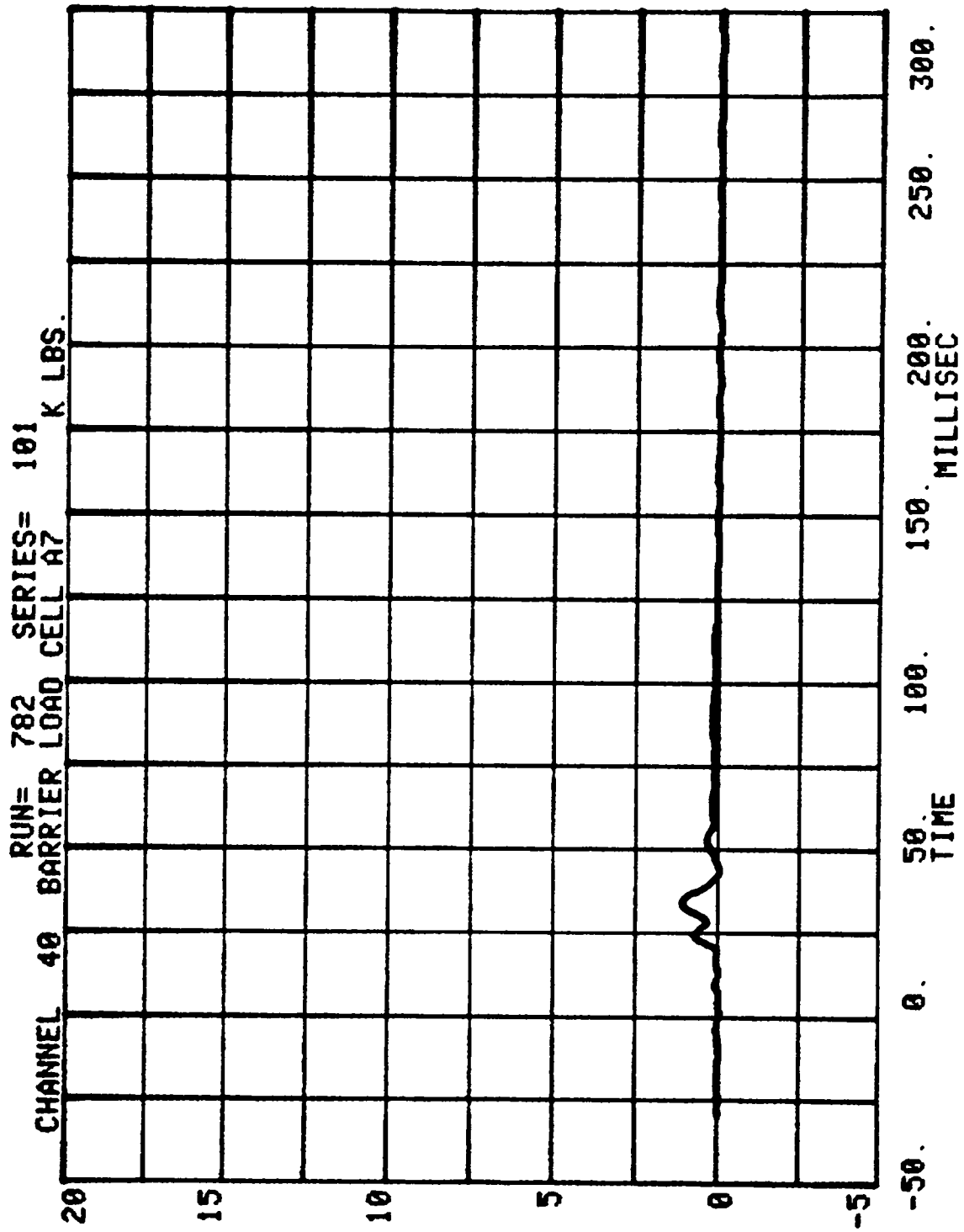
7556-20


CHANNEL 37 RUN= 782 SERIES= 101
BARRIER LOAD CELL A4
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

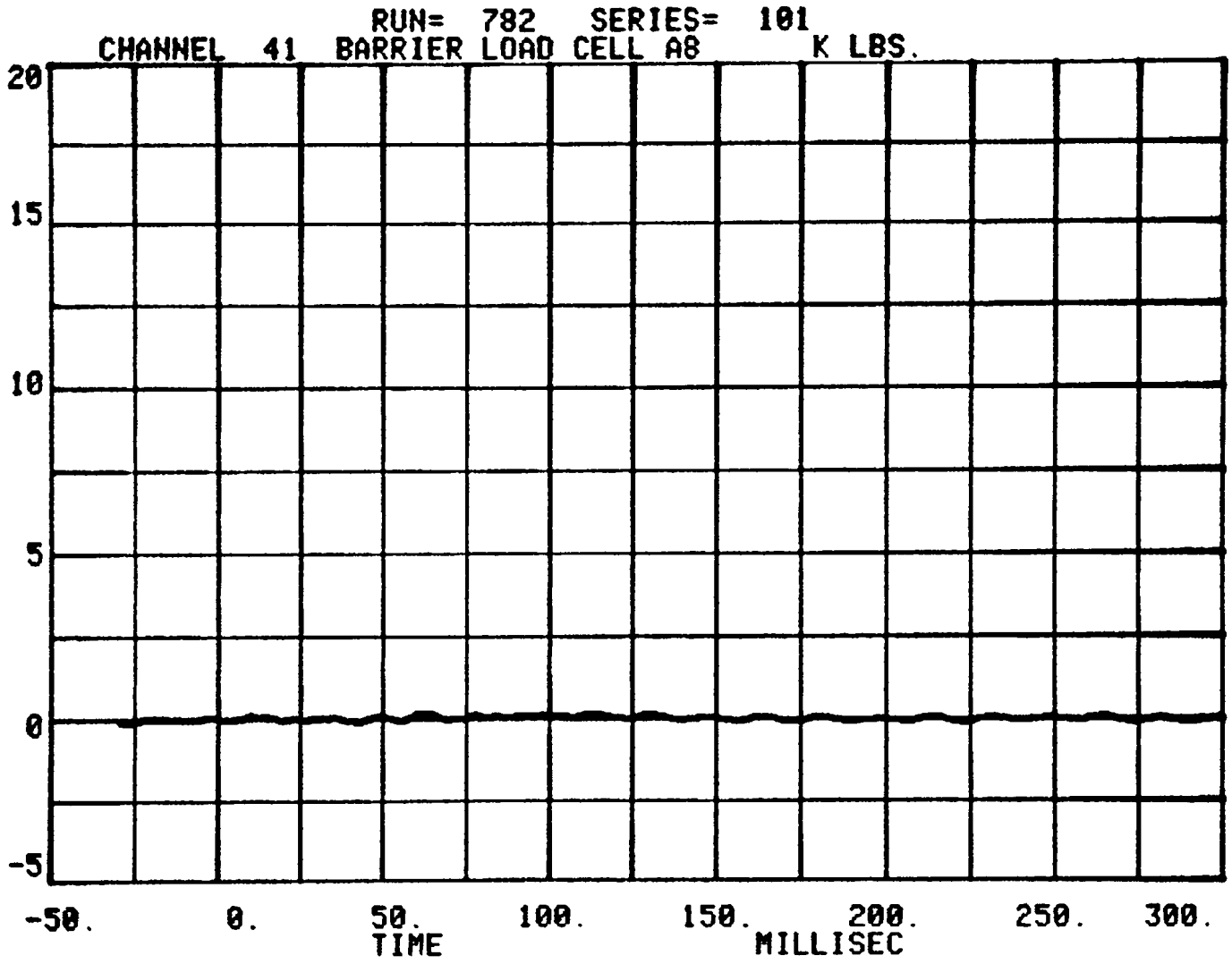

CHANNEL 39 BARRIER LOAD CELL A5
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

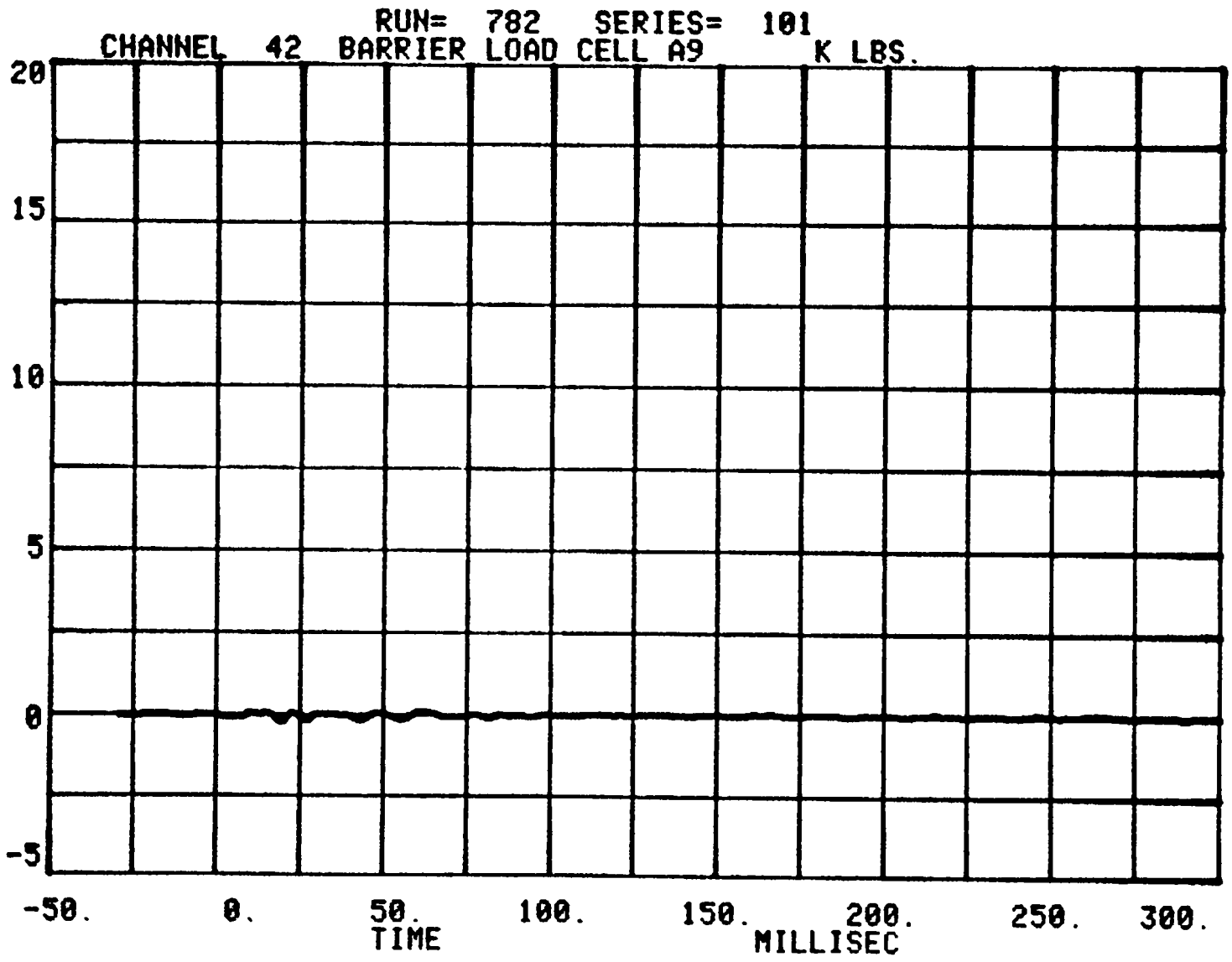

RUN= 782 SERIES= 101
CHANNEL 39 BARRIER LOAD CELL A6 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

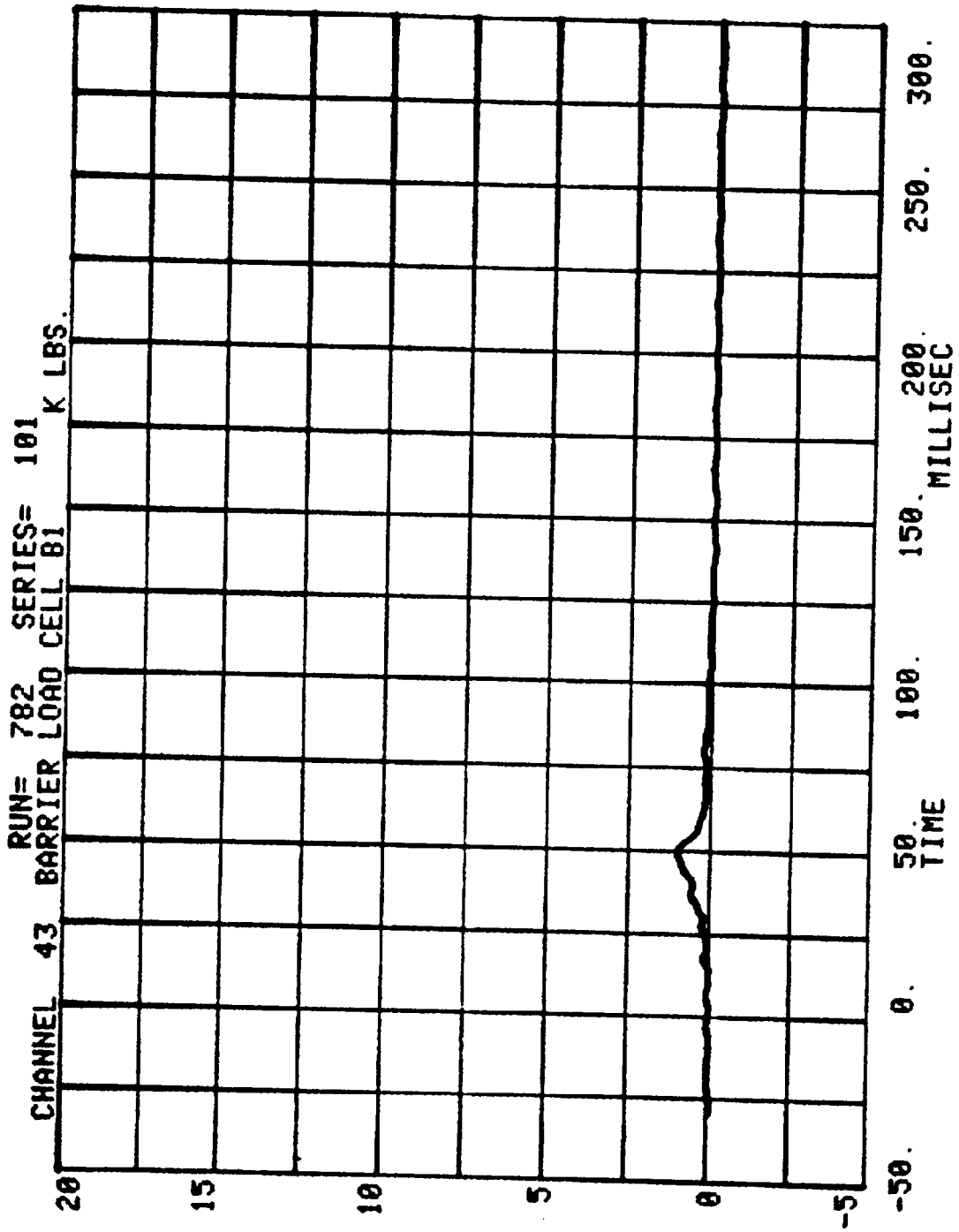
7556-20

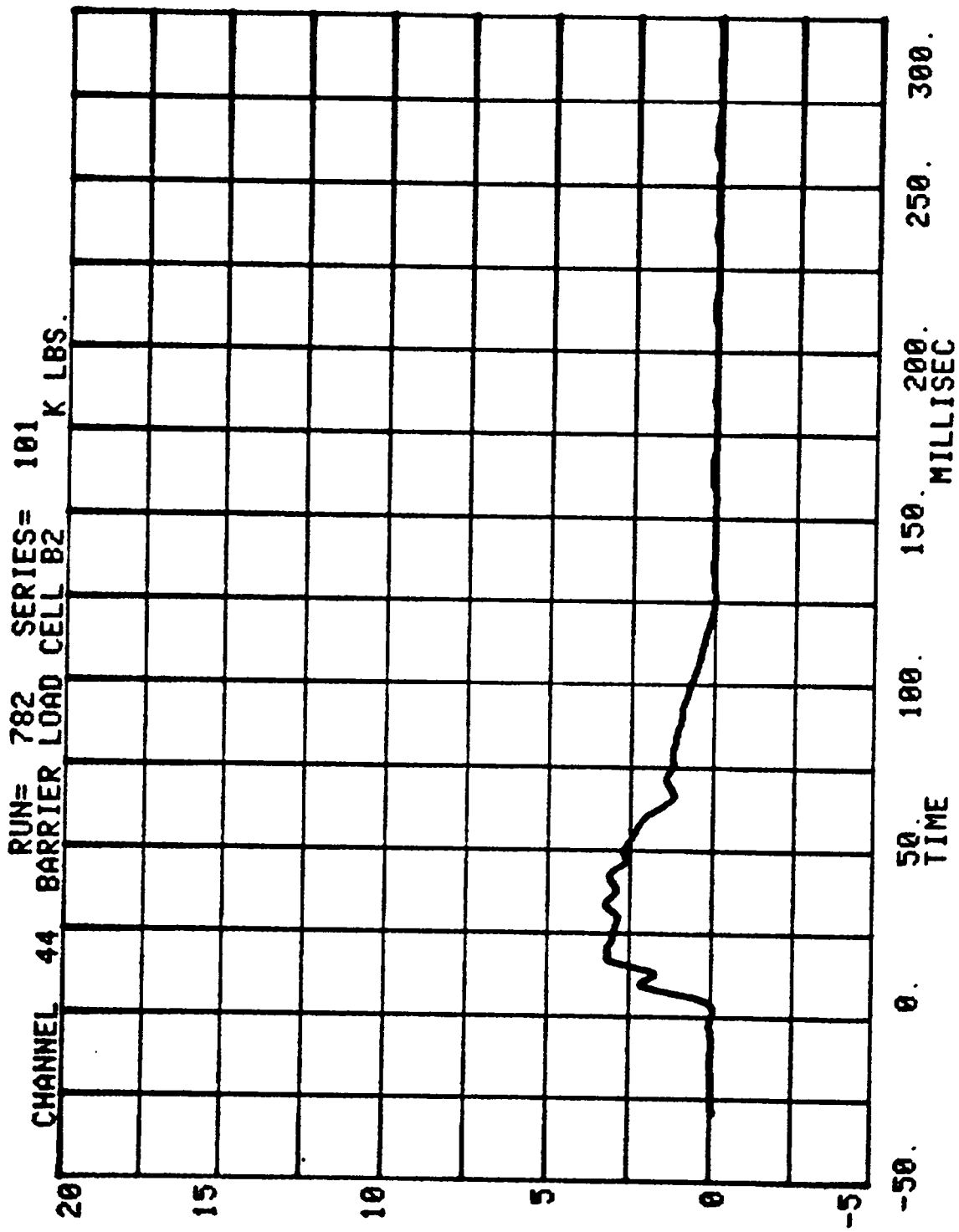

CHANNEL 40 BARRIER LOAD CELL A7
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

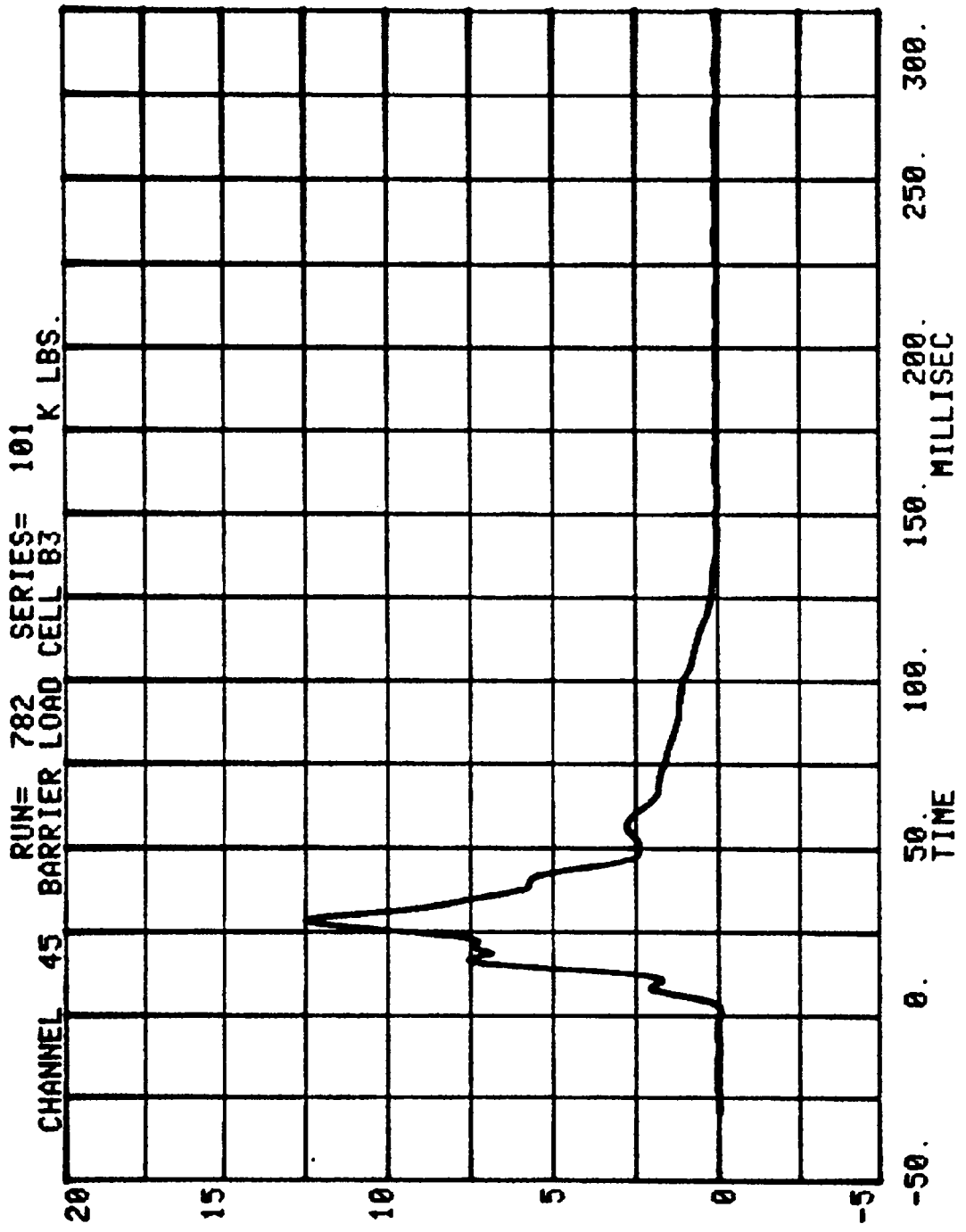
7556-20


RUN= 782 SERIES= 101
CHANNEL 41 BARRIER LOAD CELL A8 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

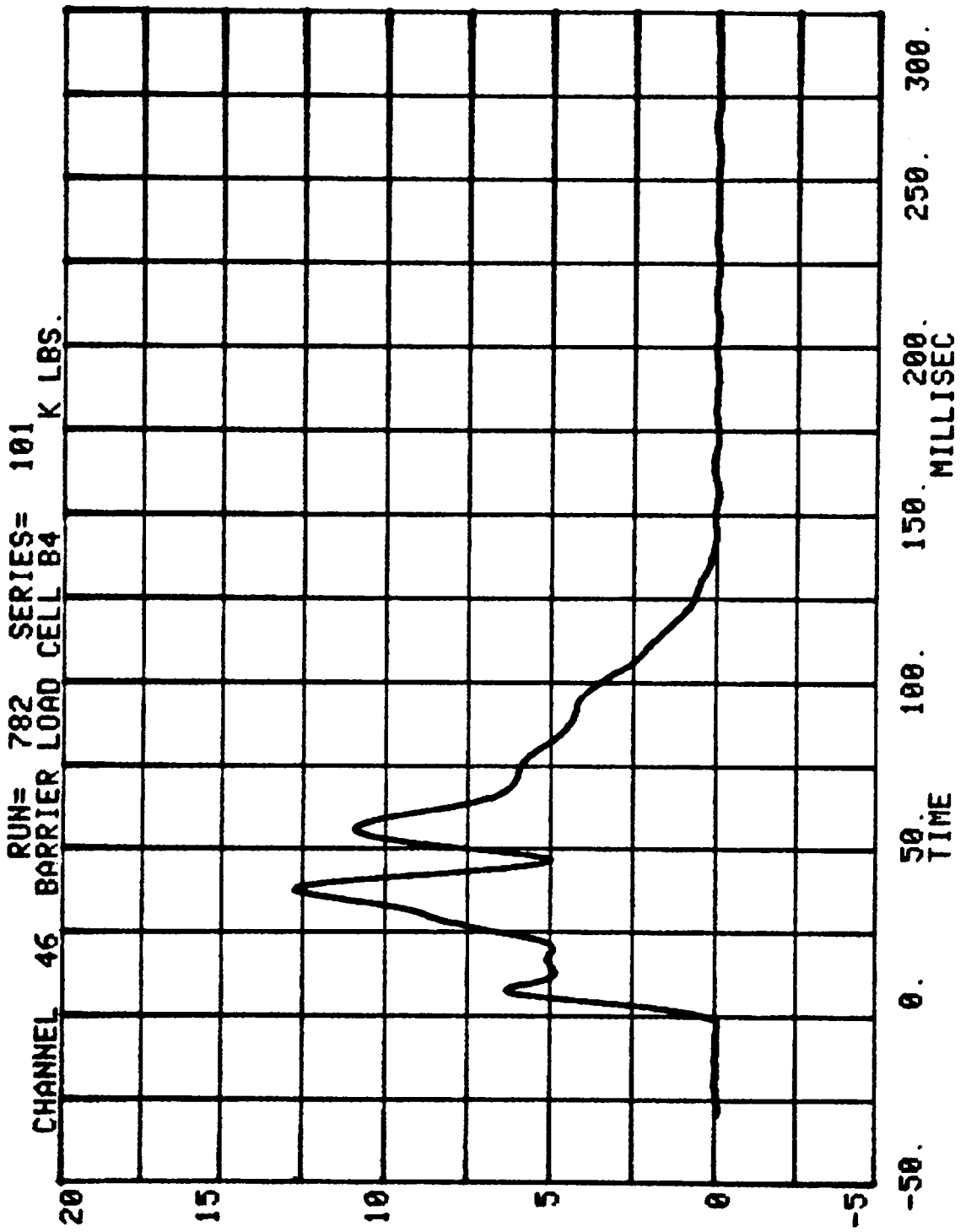

RUN= 782 SERIES= 101
CHANNEL 42 BARRIER LOAD CELL A9
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 43 BARRIER LOAD CELL B1
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

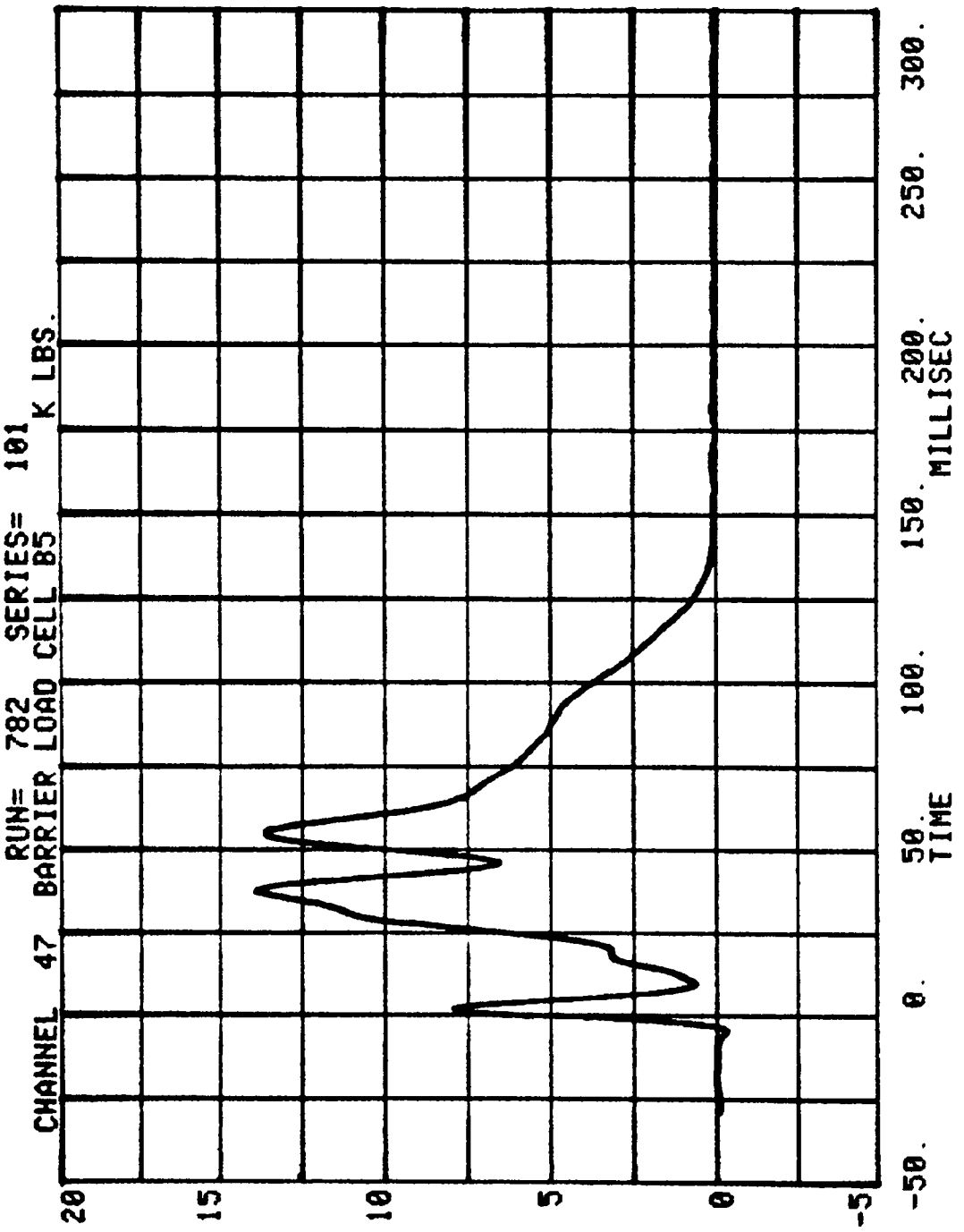

CHANNEL 44 BARRIER LOAD CELL B2
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 45 BARRIER LOAD CELL B3
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

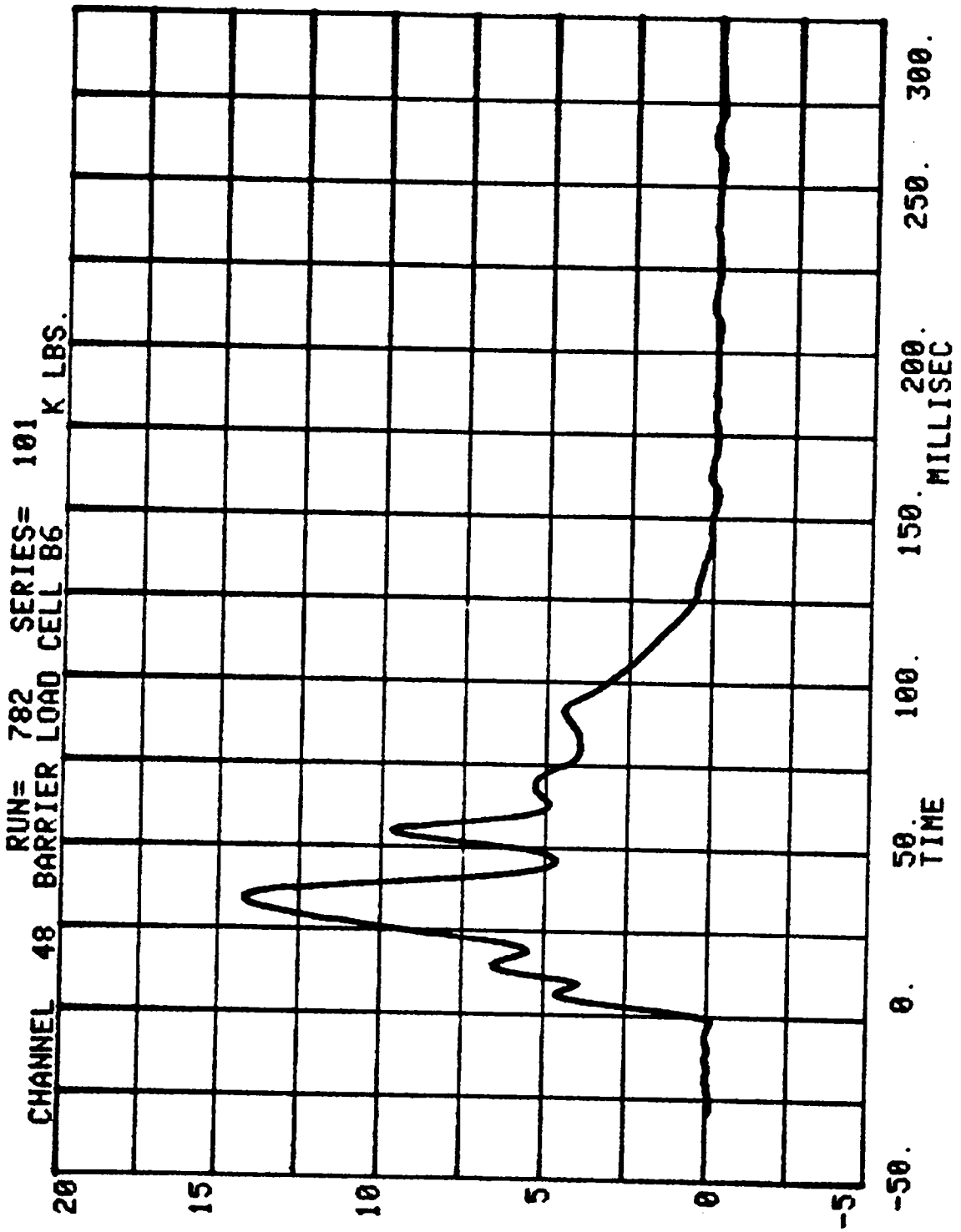
7556-20

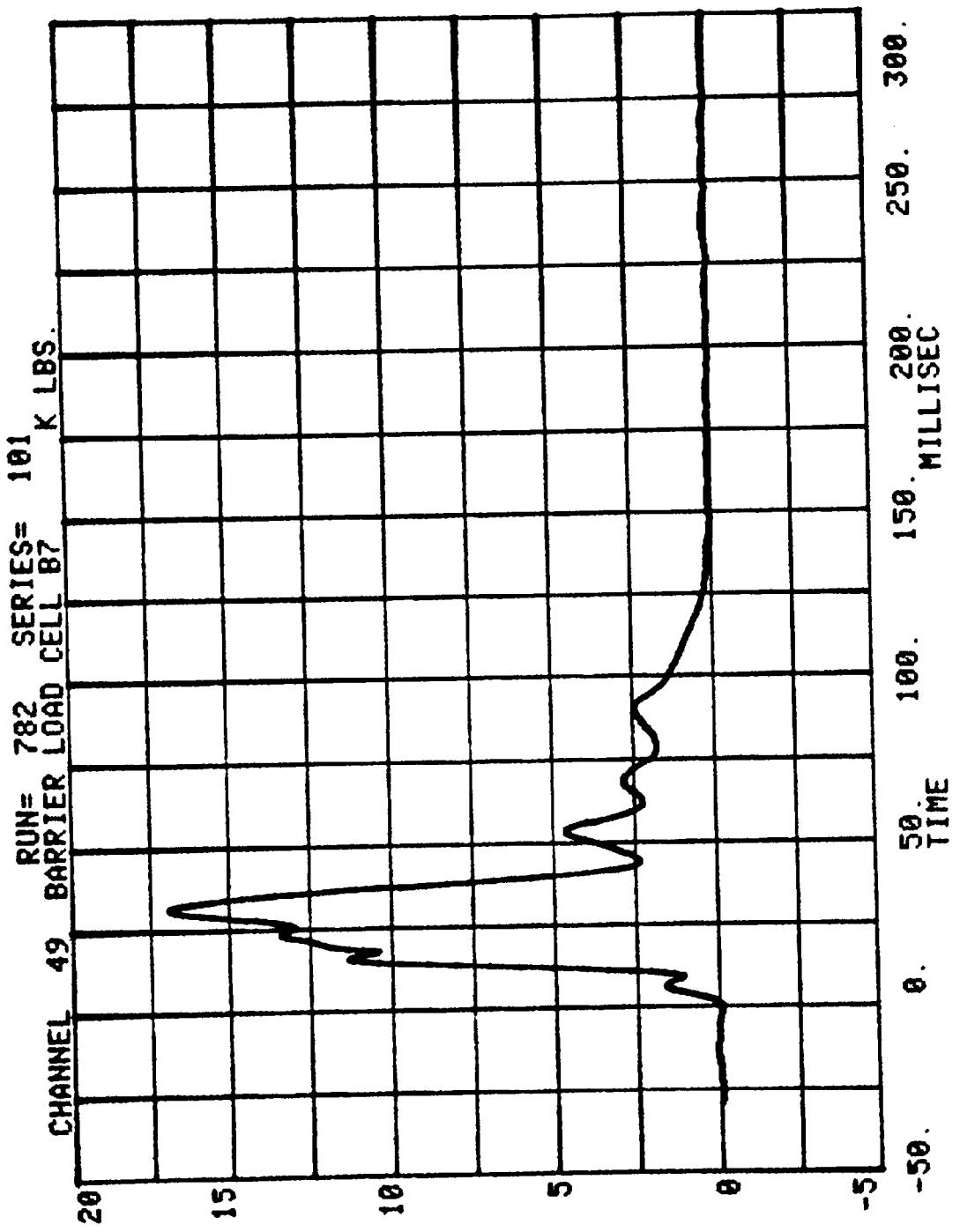

CHANNEL 46 BARRIER LOAD CELL B4
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20

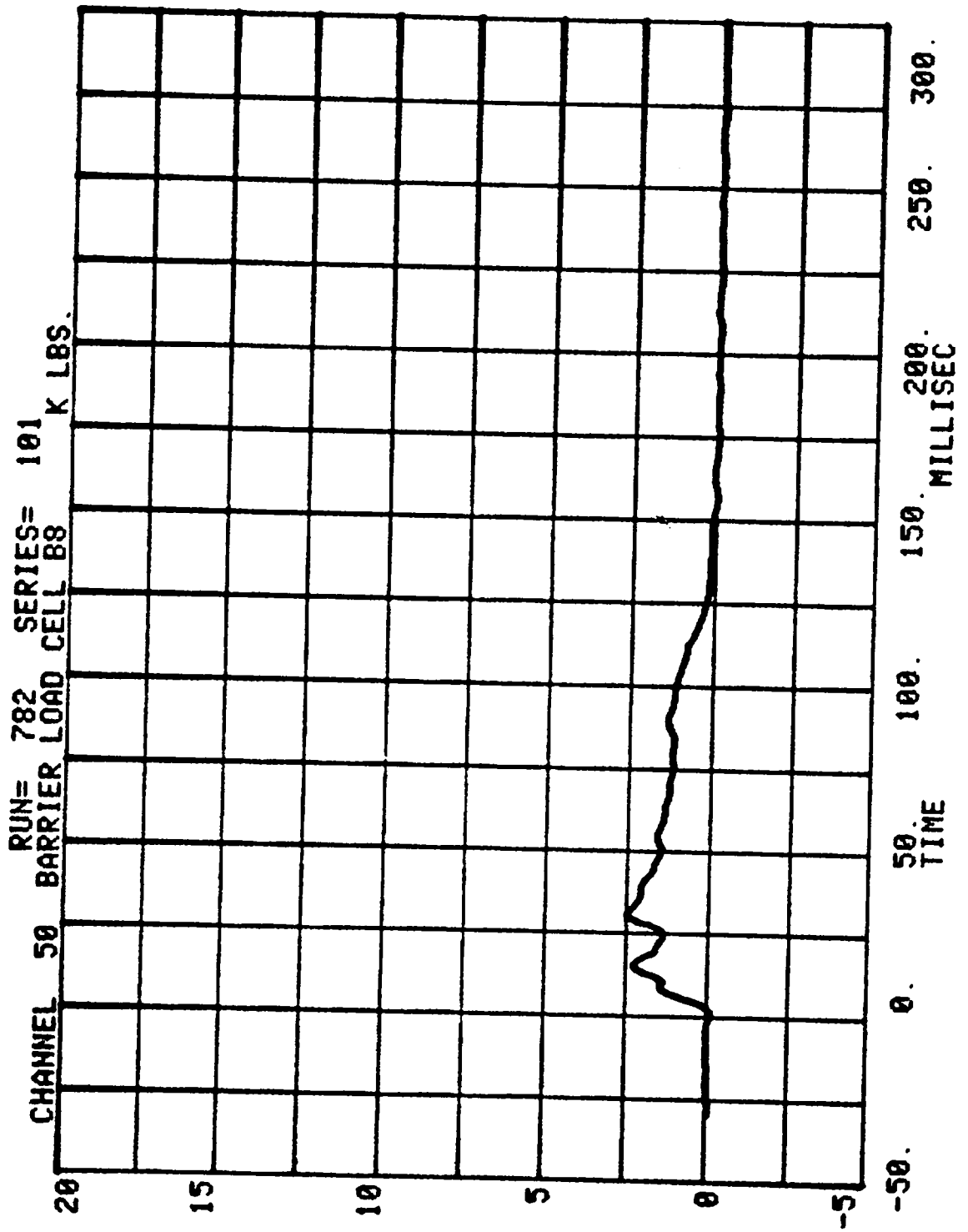

CHANNEL 47
RUN= 782 SERIES= 101
BARRIER LOAD CELL B5
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20

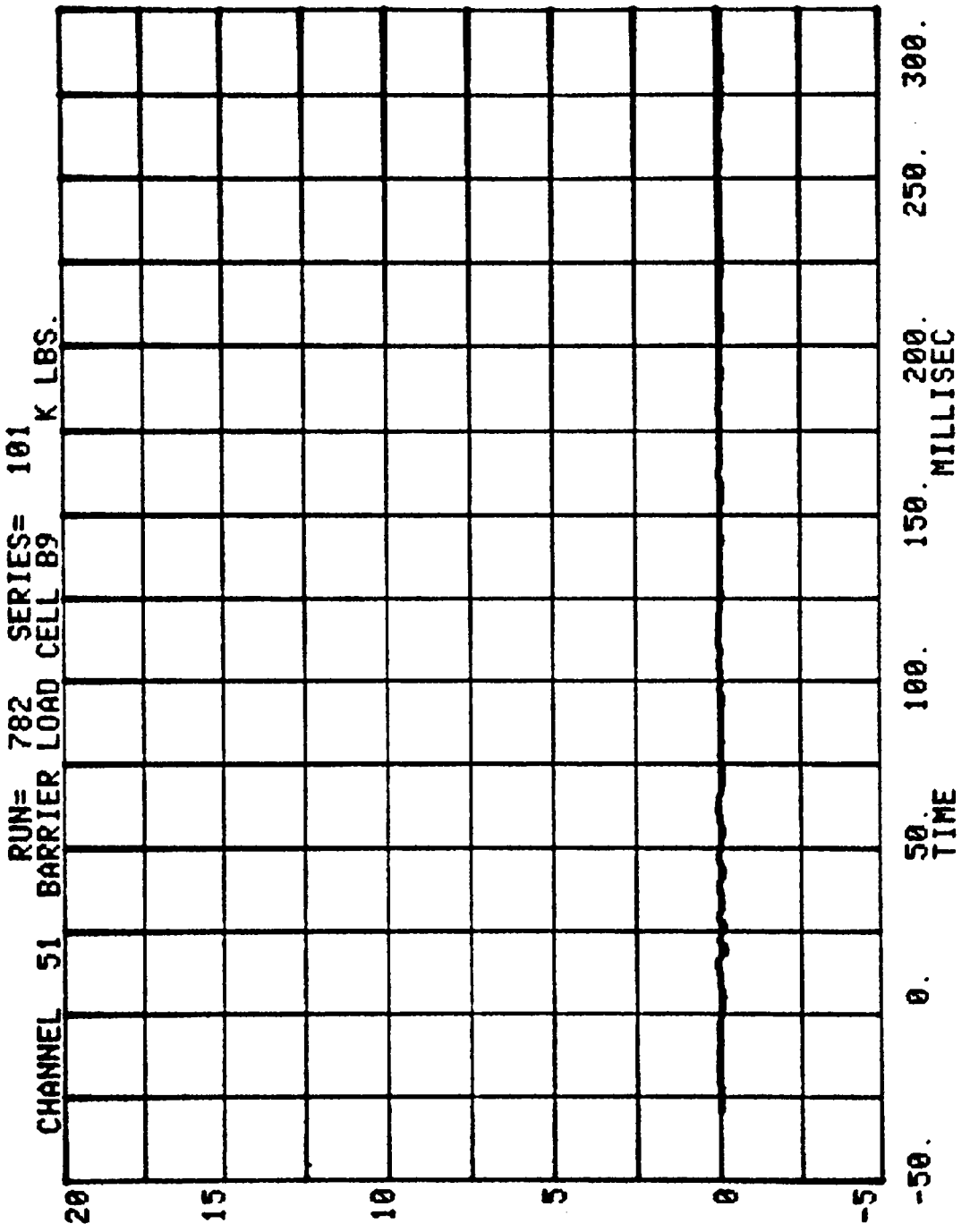

CHANNEL 48 BARRIER LOAD CELL B6
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 49
RUN= 782 SERIES= 101
BARRIER LOAD CELL B7
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

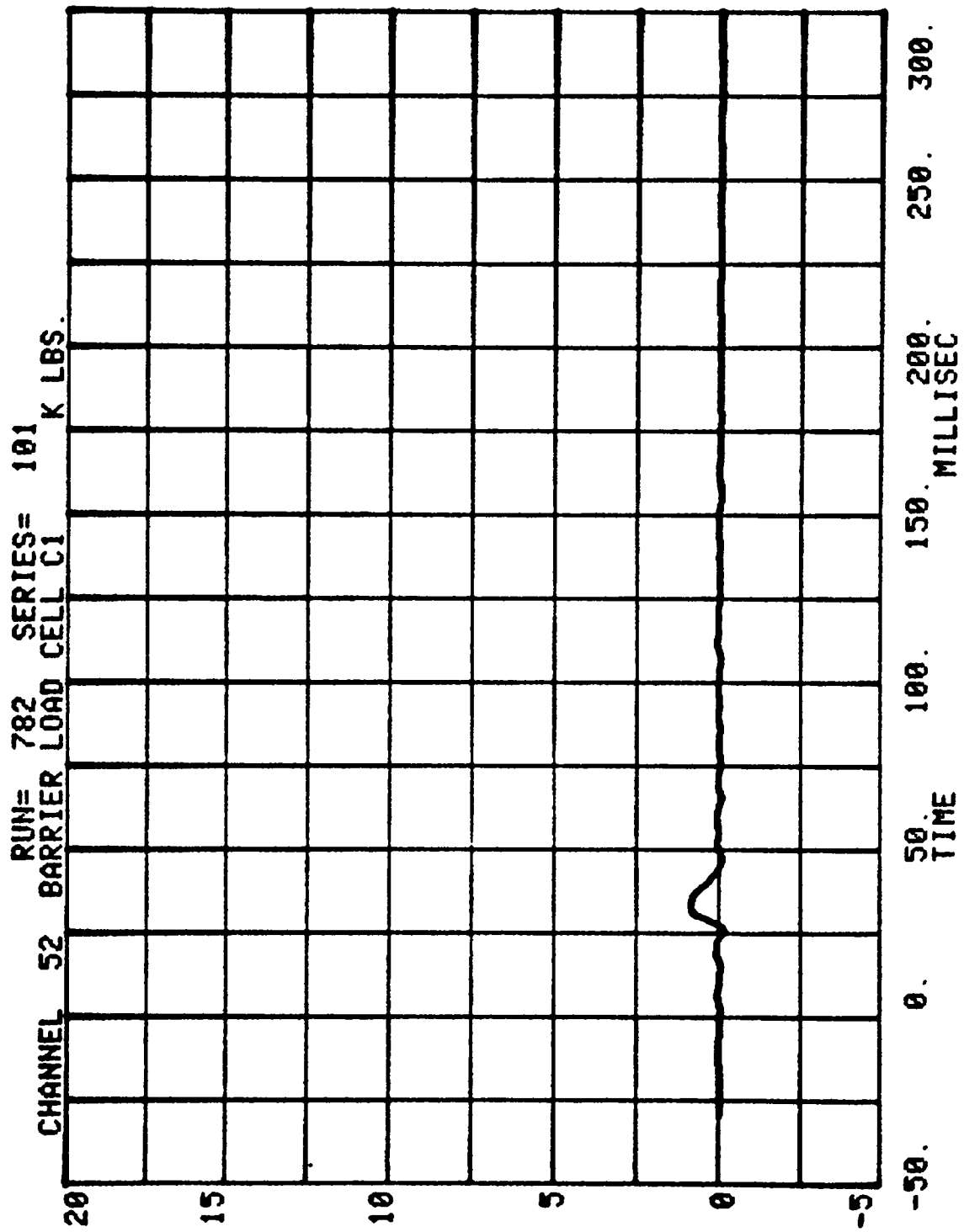
7556-20


CHANNEL 50 BARRIER LOAD CELL B8
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

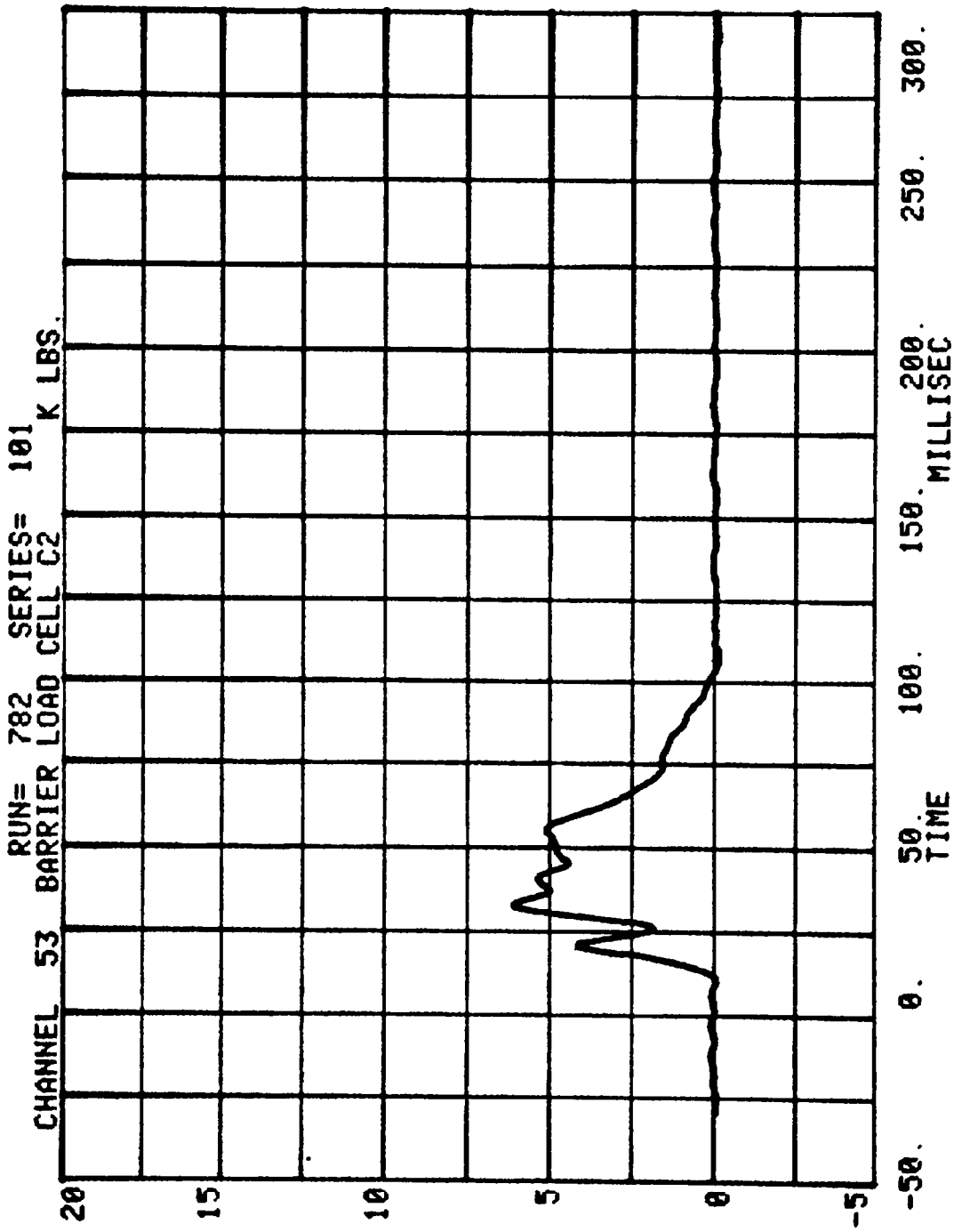
7556-20

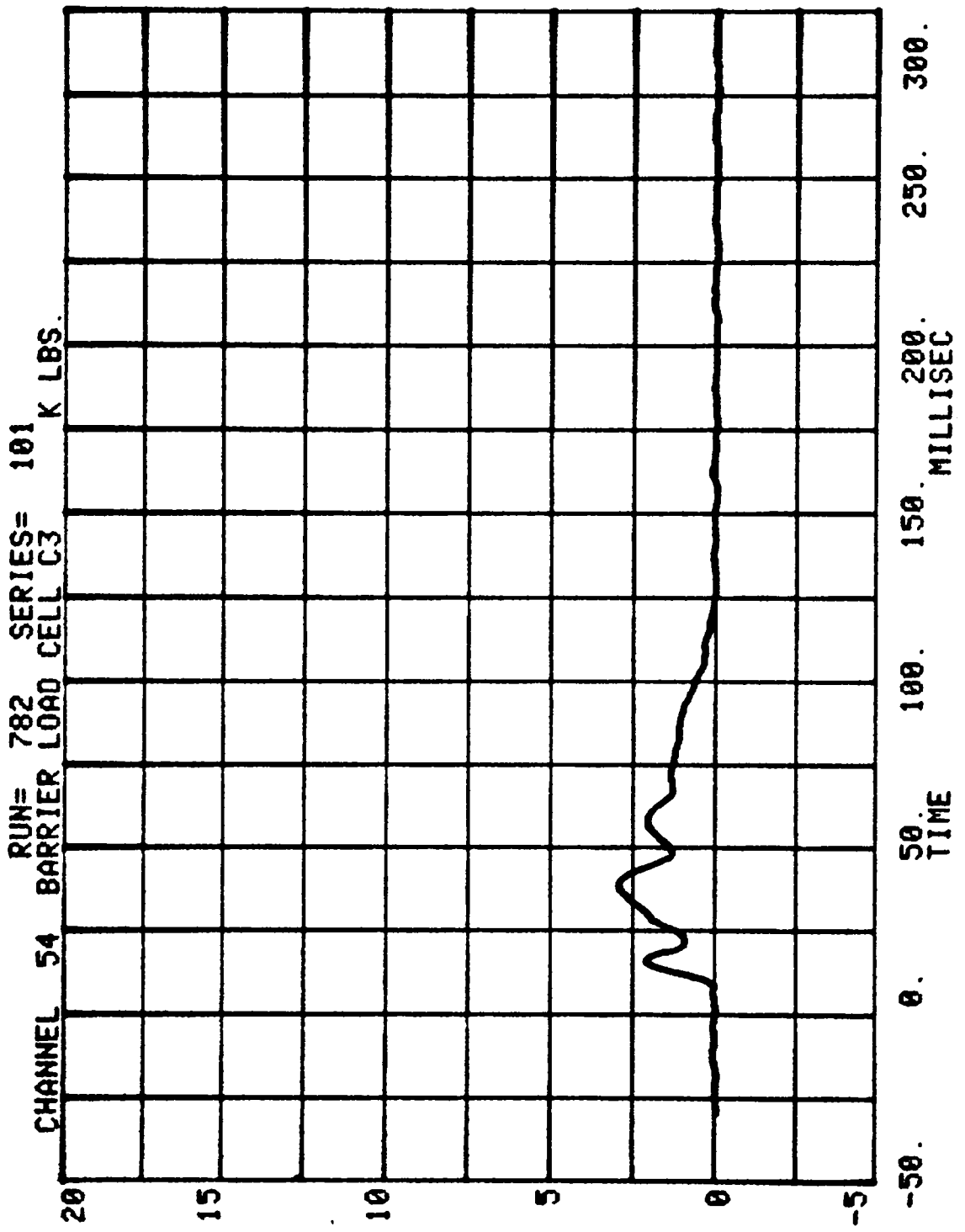

CHANNEL 51 BARRIER LOAD CELL B9
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

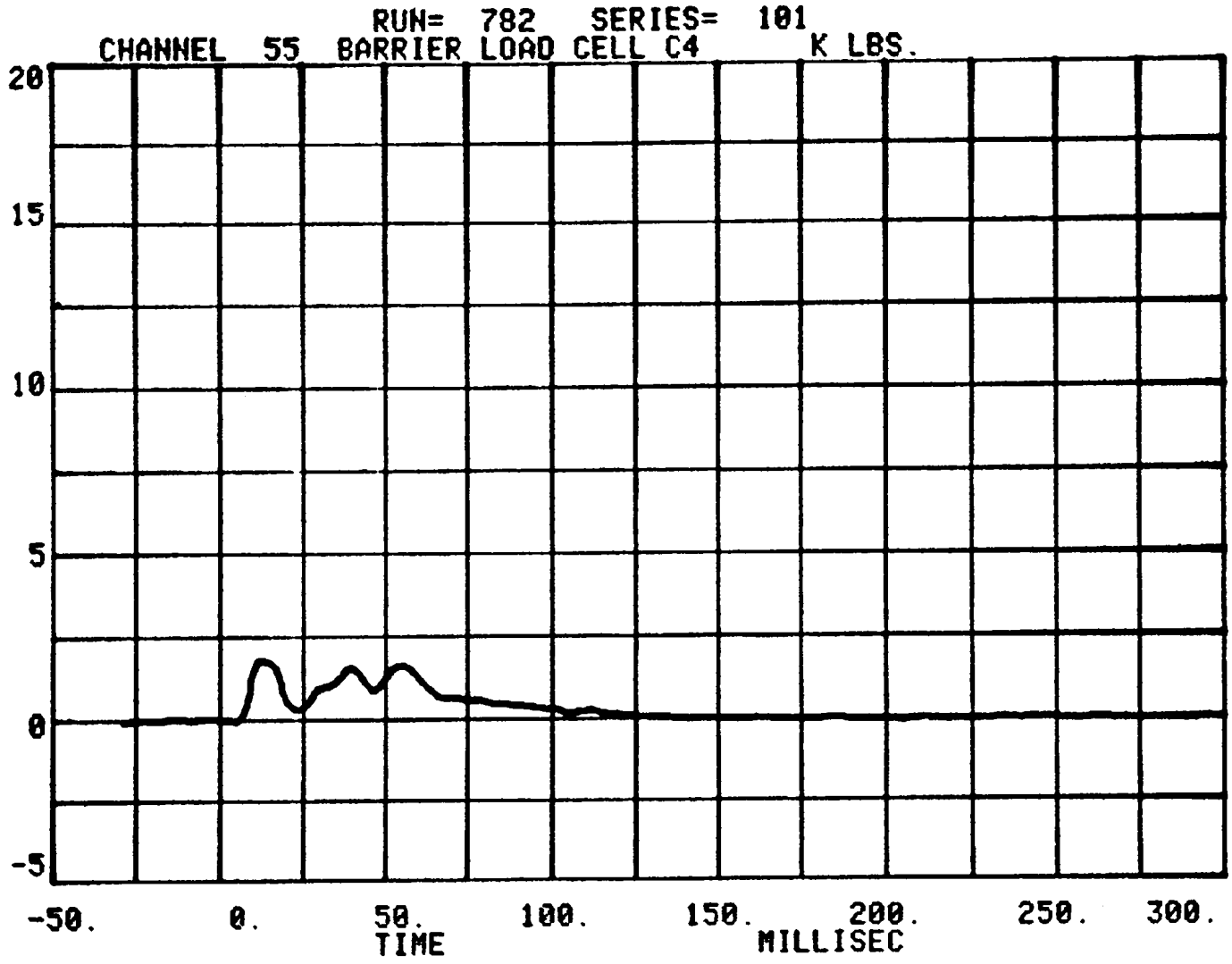
7556-20


CHANNEL 52 BARRIER LOAD CELL C1
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

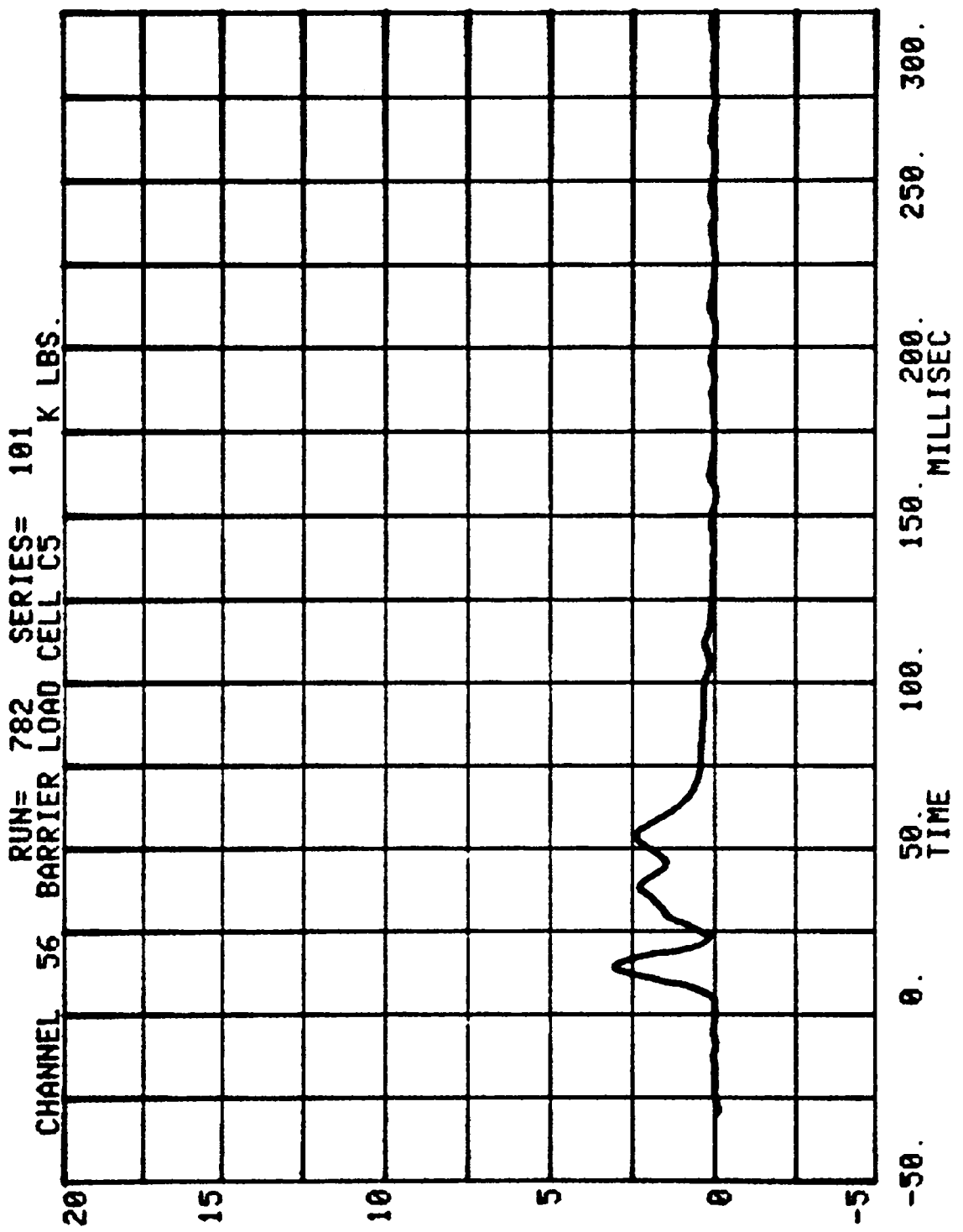
7556-20


CHANNEL 53
RUN= 782 SERIES= 101
BARRIER LOAD CELL C2
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

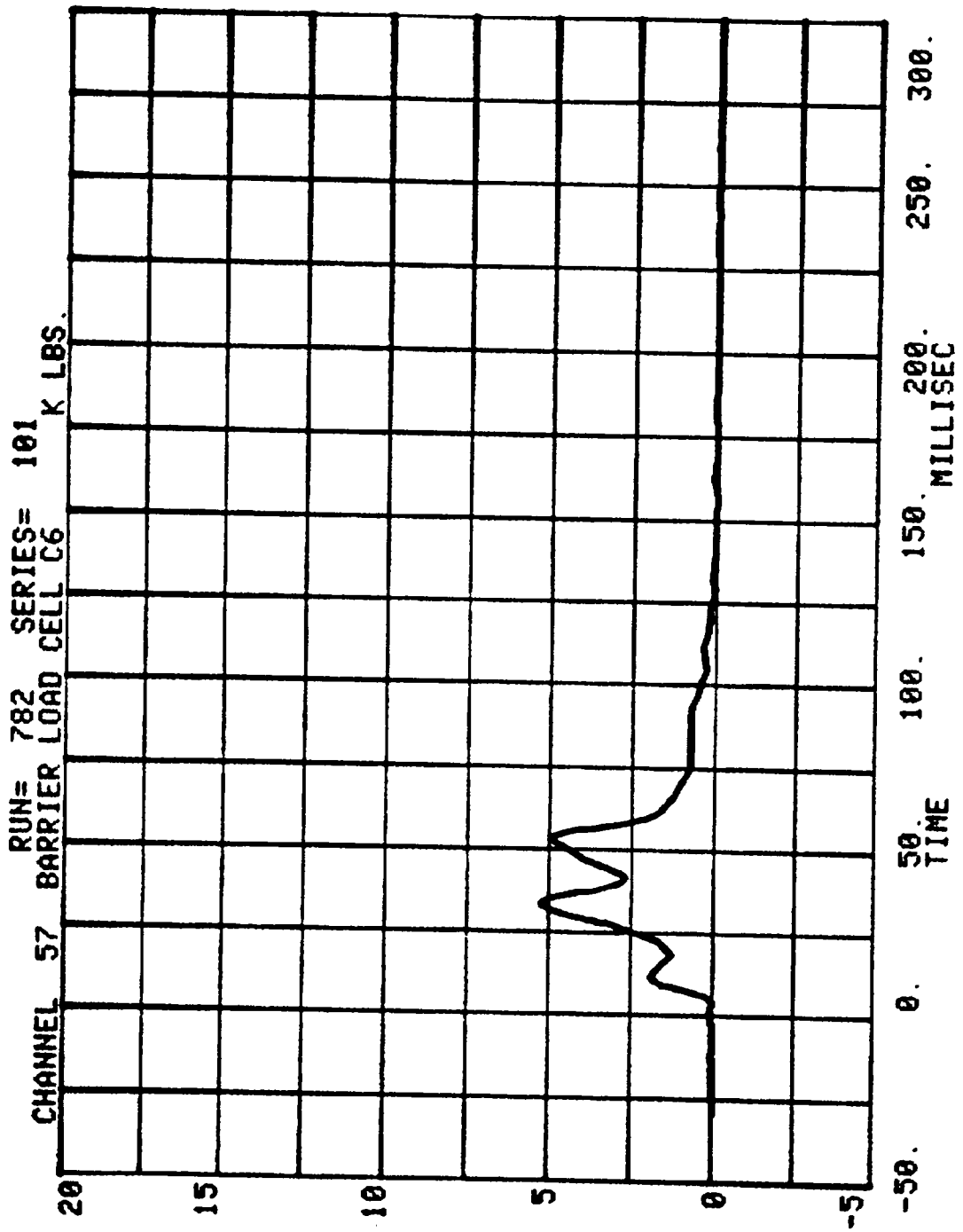

CHANNEL 54 BARRIER LOAD CELL C3
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

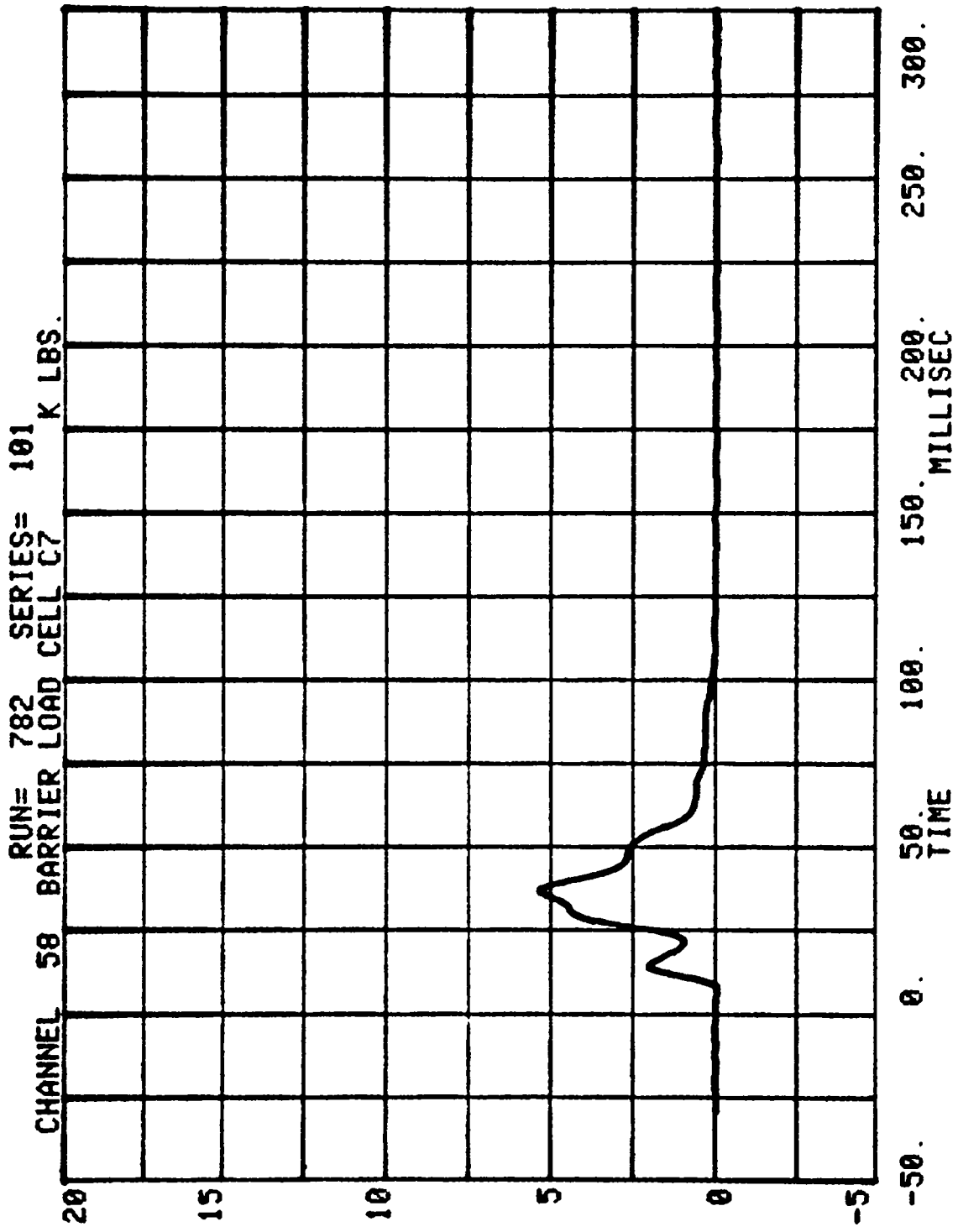

RUN= 782 SERIES= 101
CHANNEL 55 BARRIER LOAD CELL C4 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20

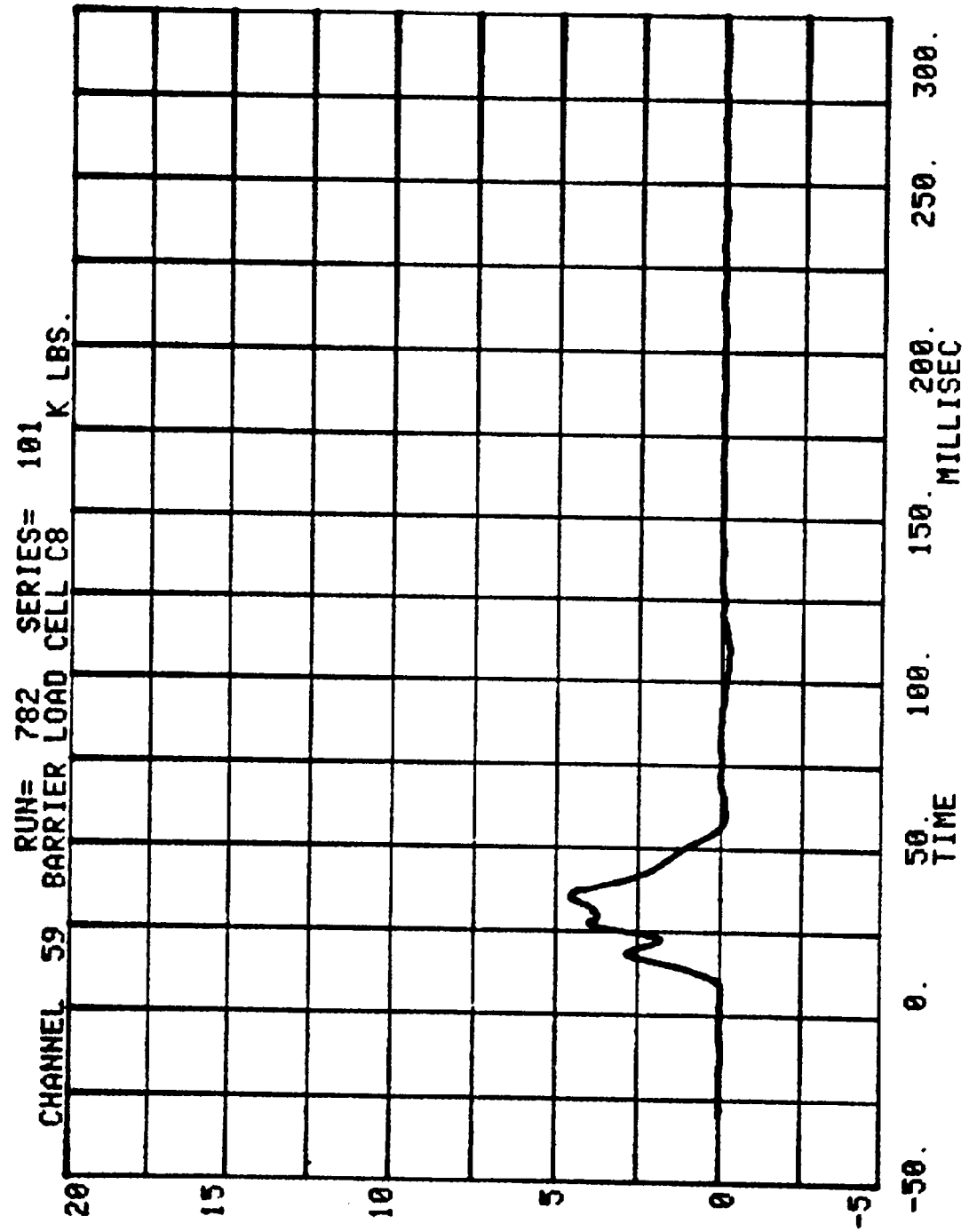

CHANNEL 56 BARRIER LOAD CELL C5
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

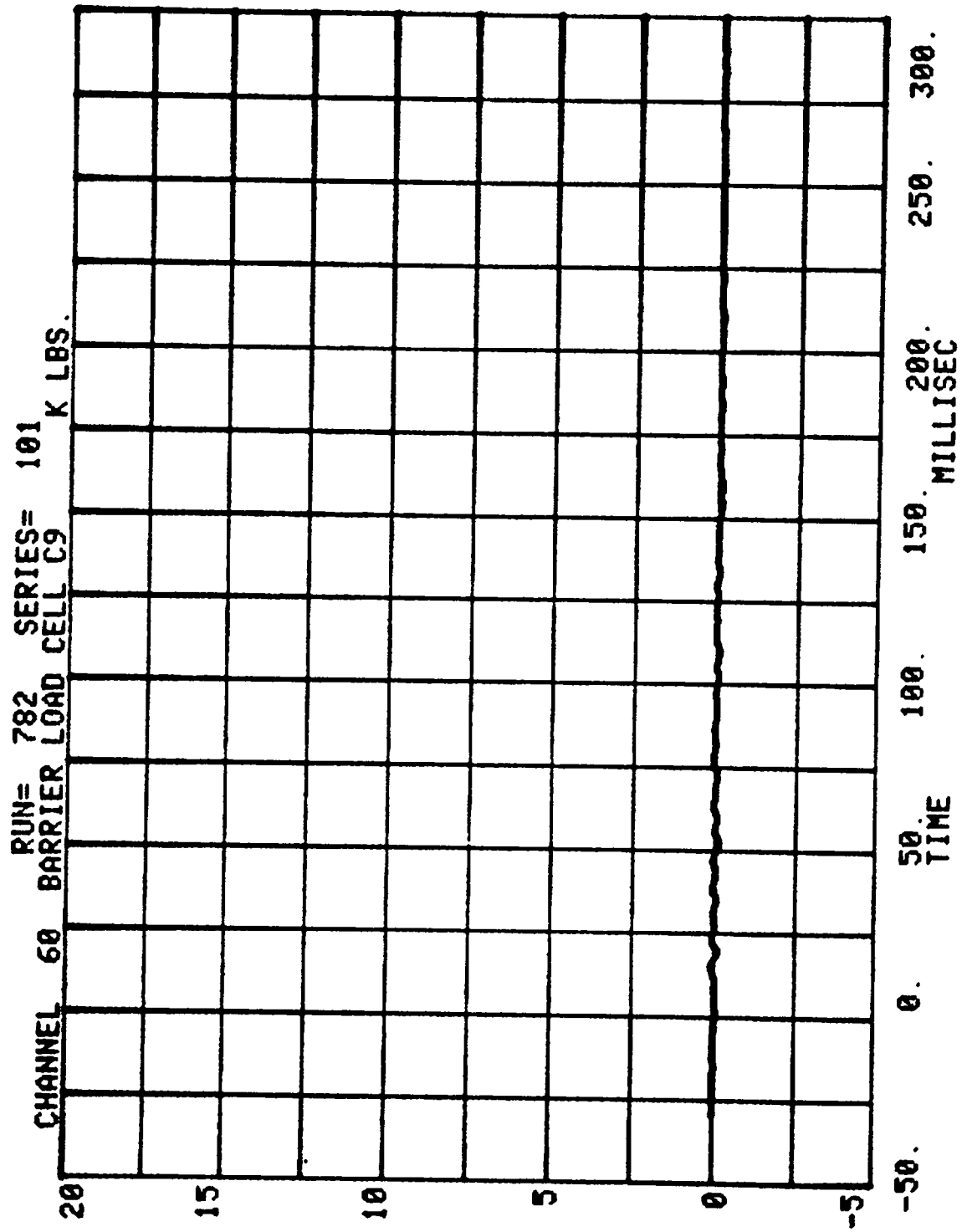
7556-20

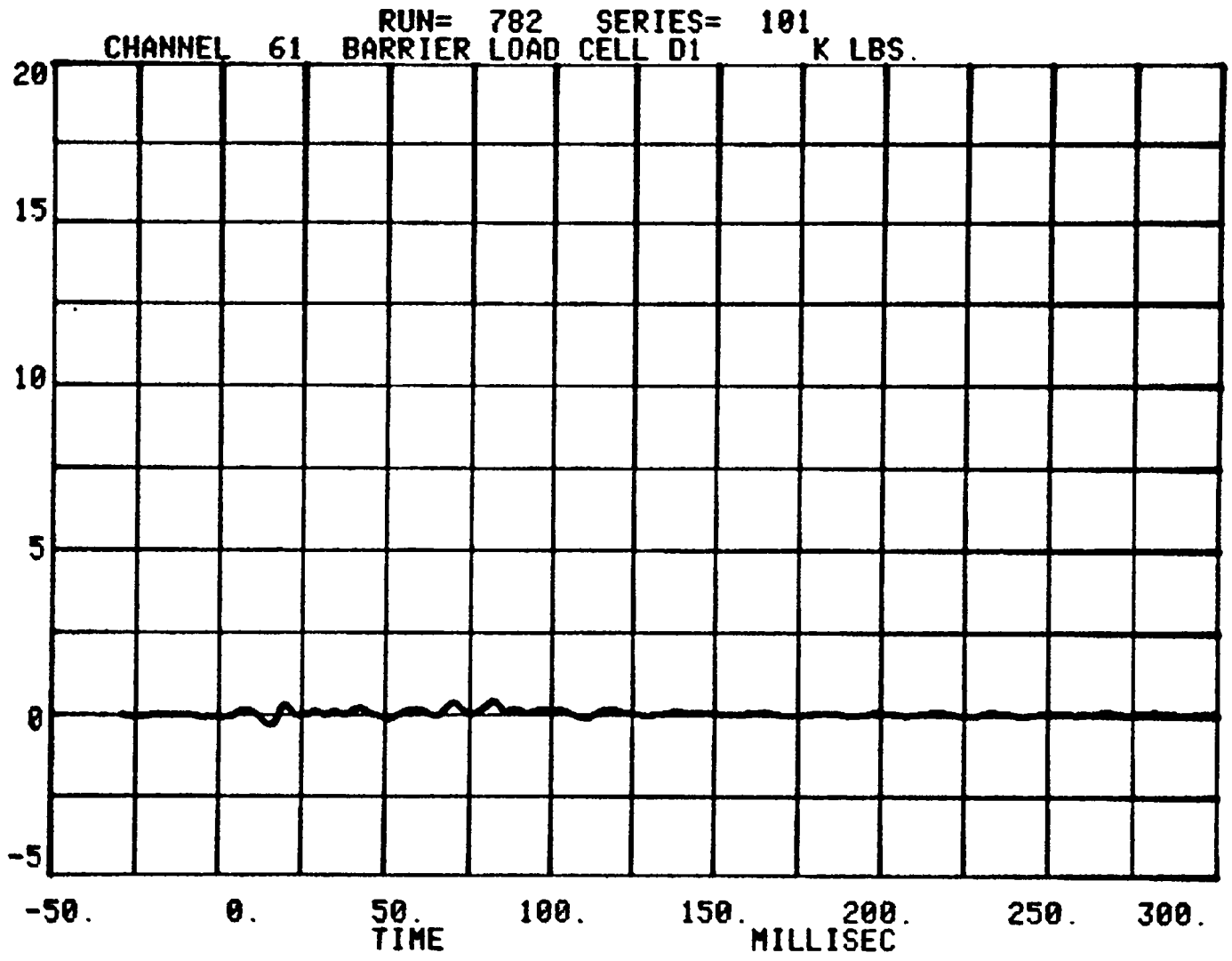

CHANNEL 57
RUN= 782
BARRIER LOAD CELL C6
SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

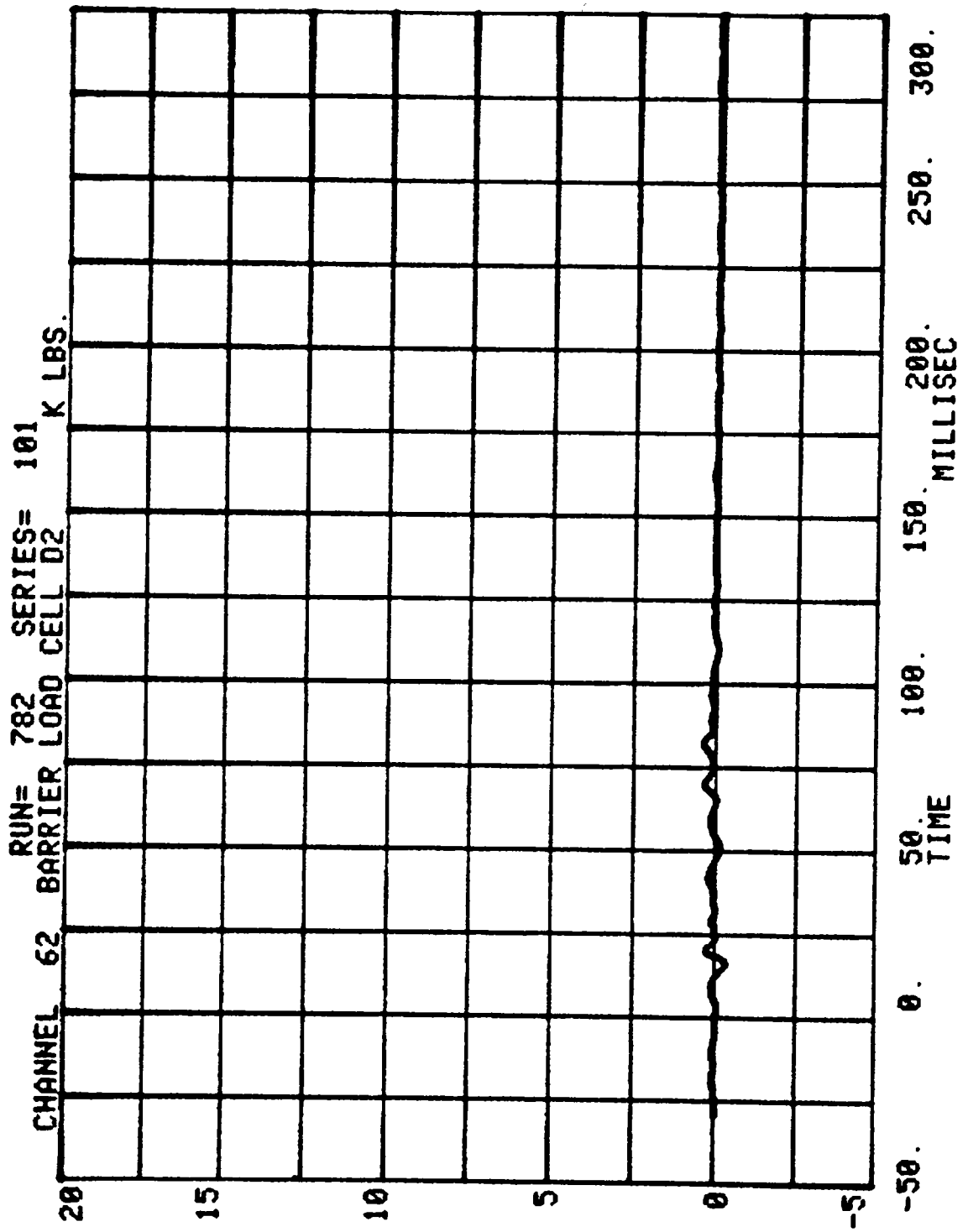

CHANNEL 58 BARRIER LOAD CELL C7
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

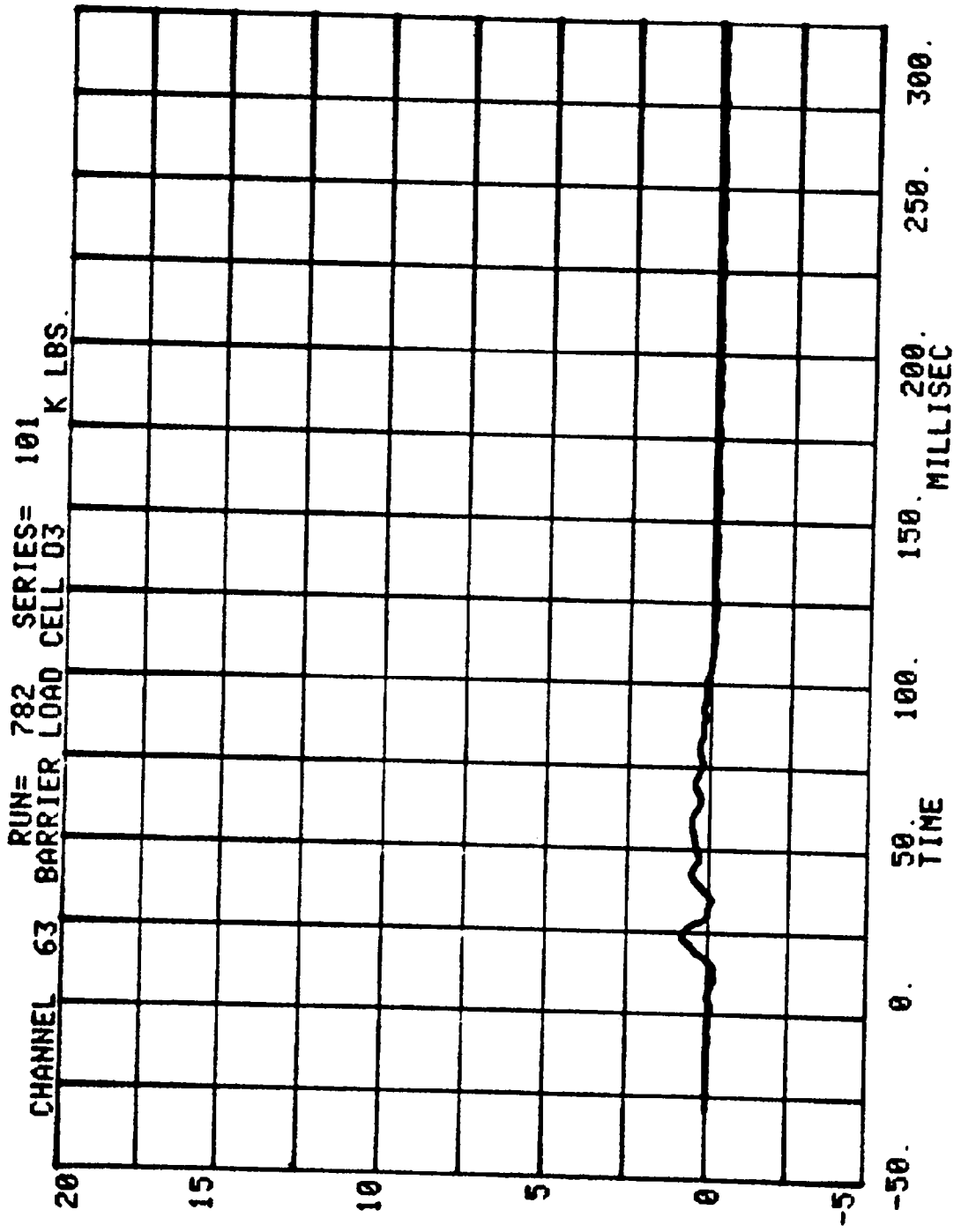
7556-20

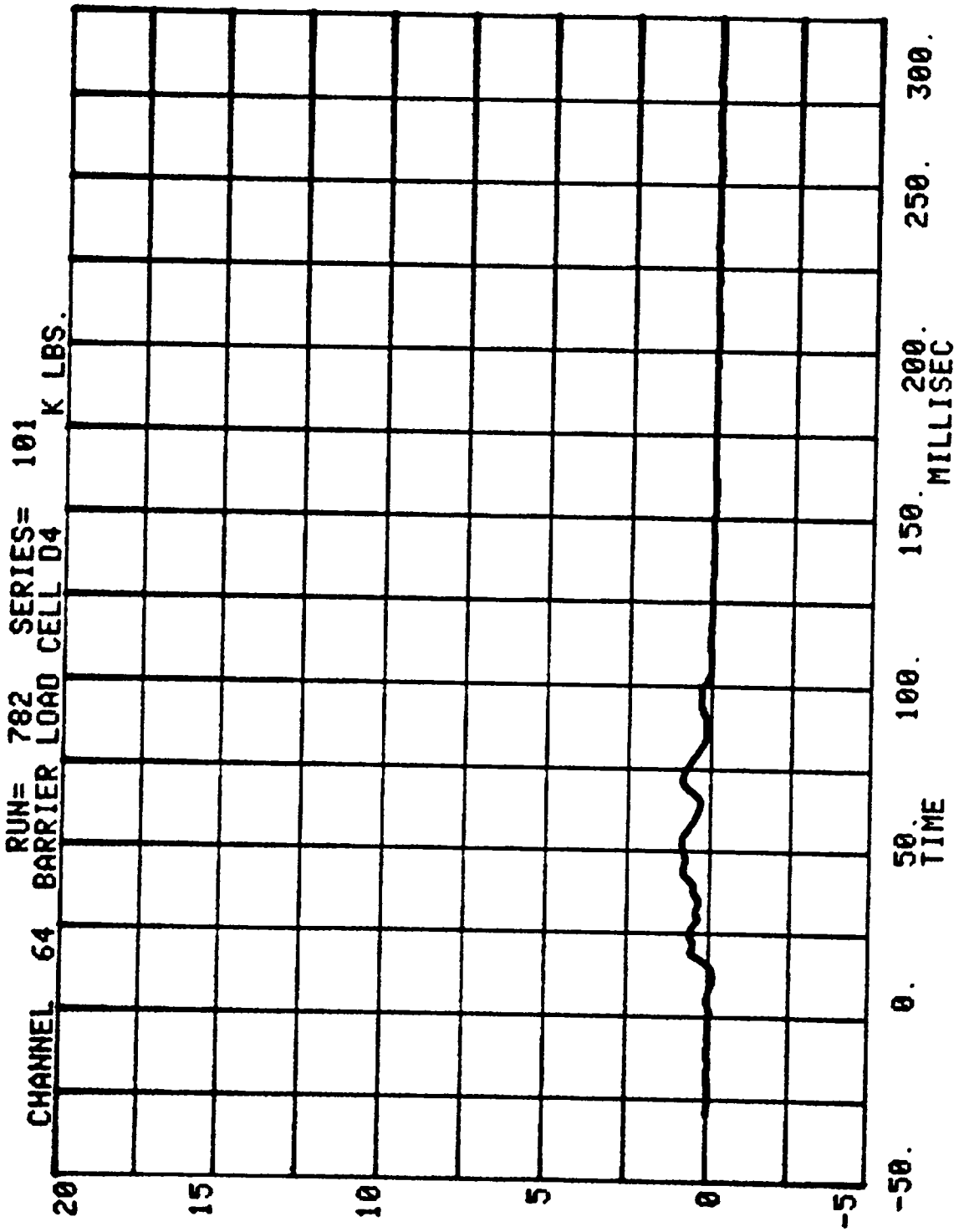

CHANNEL 59 BARRIER LOAD CELL C8
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

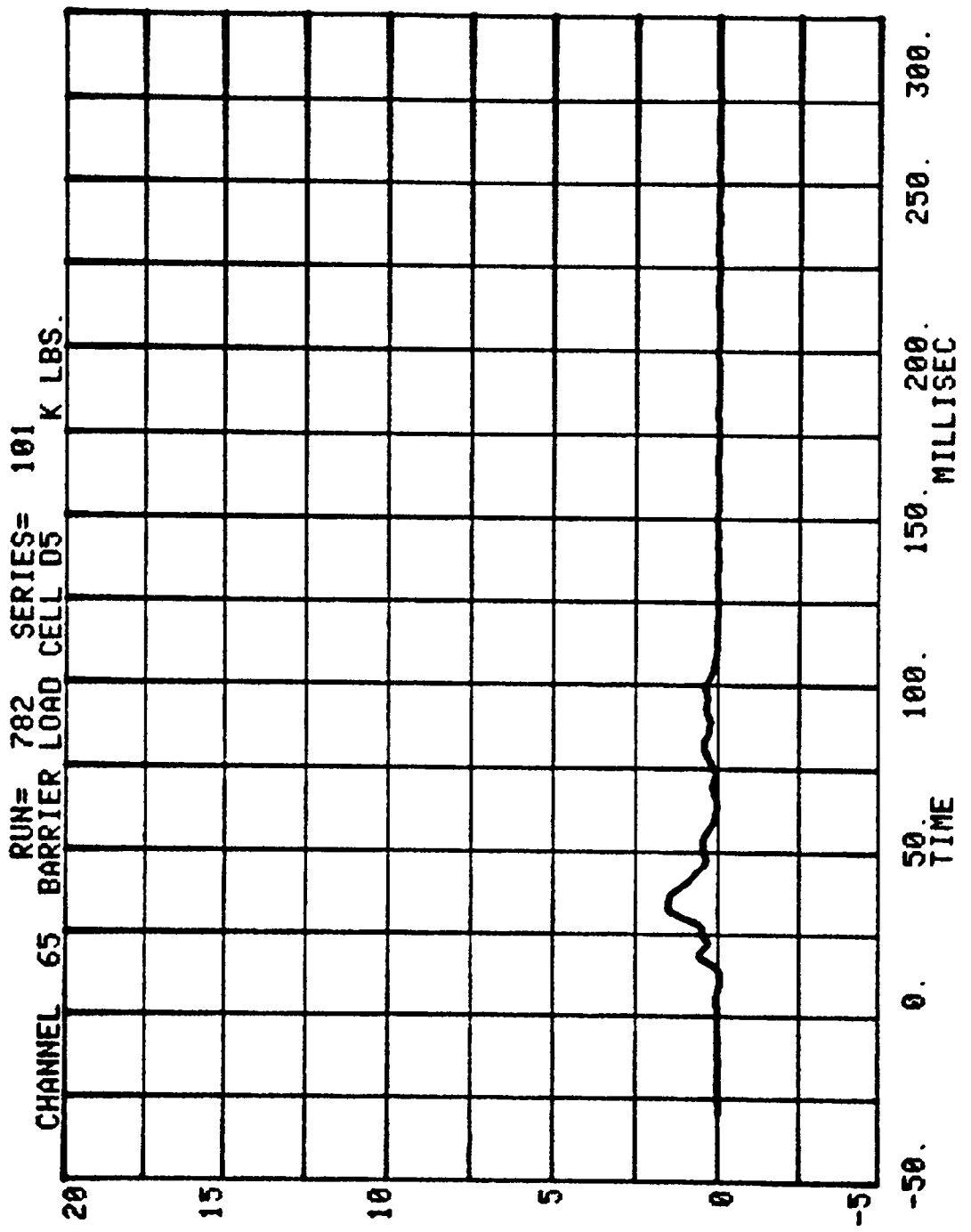

CHANNEL 60 BARRIER LOAD CELL C9
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

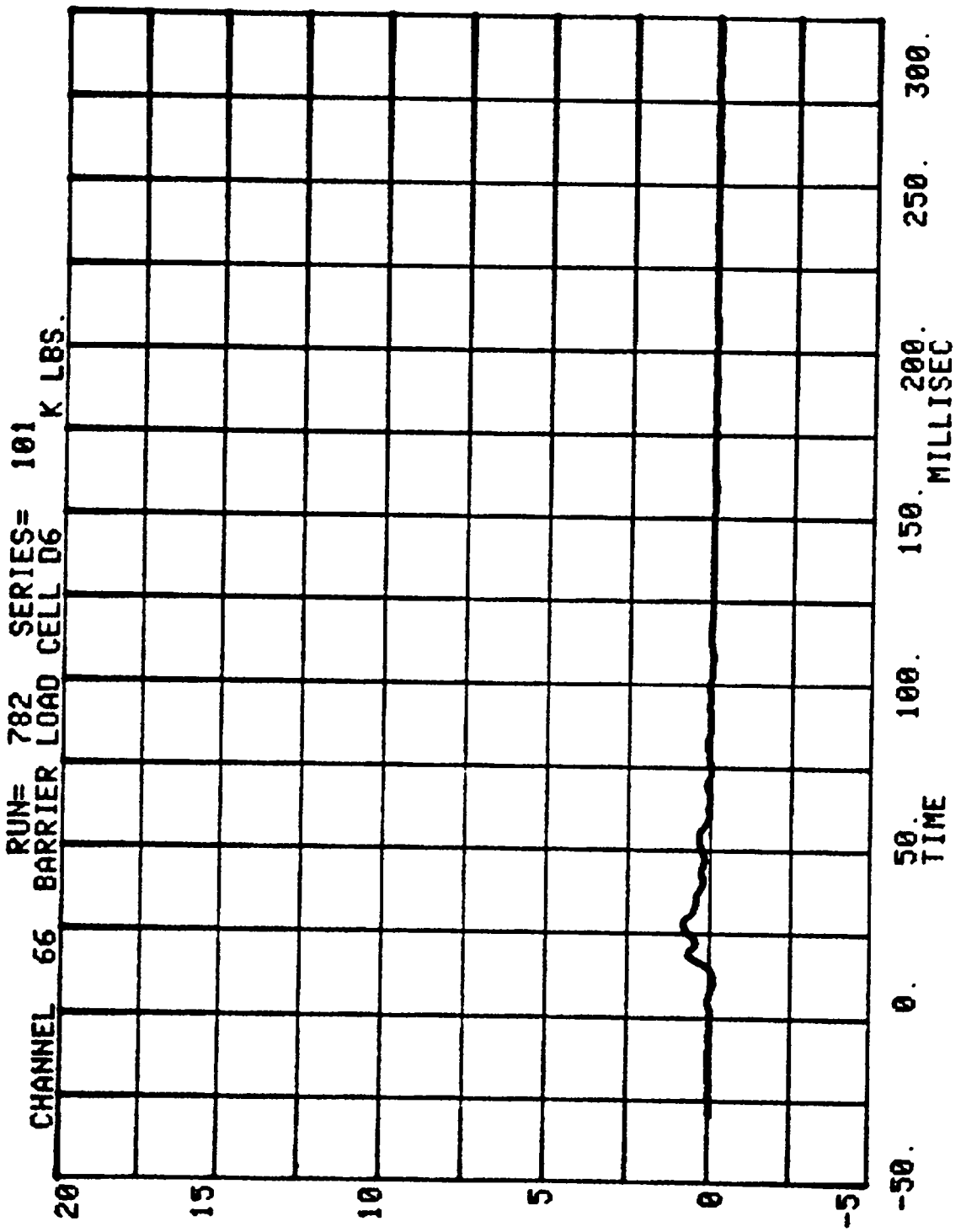

RUN= 782 SERIES= 101
CHANNEL 61 BARRIER LOAD CELL D1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

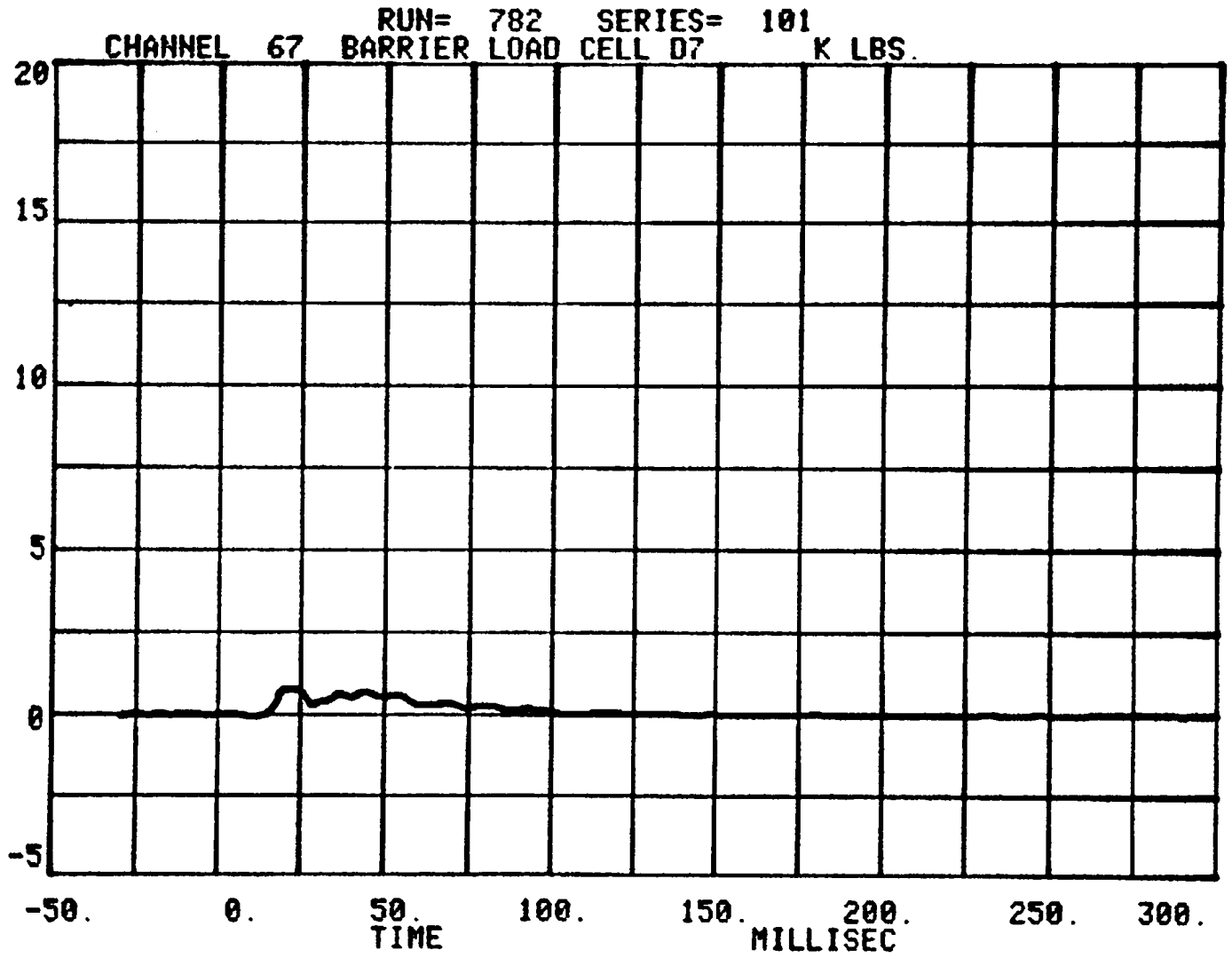

CHANNEL 62
RUN= 782 SERIES= 101
BARRIER LOAD CELL D2
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

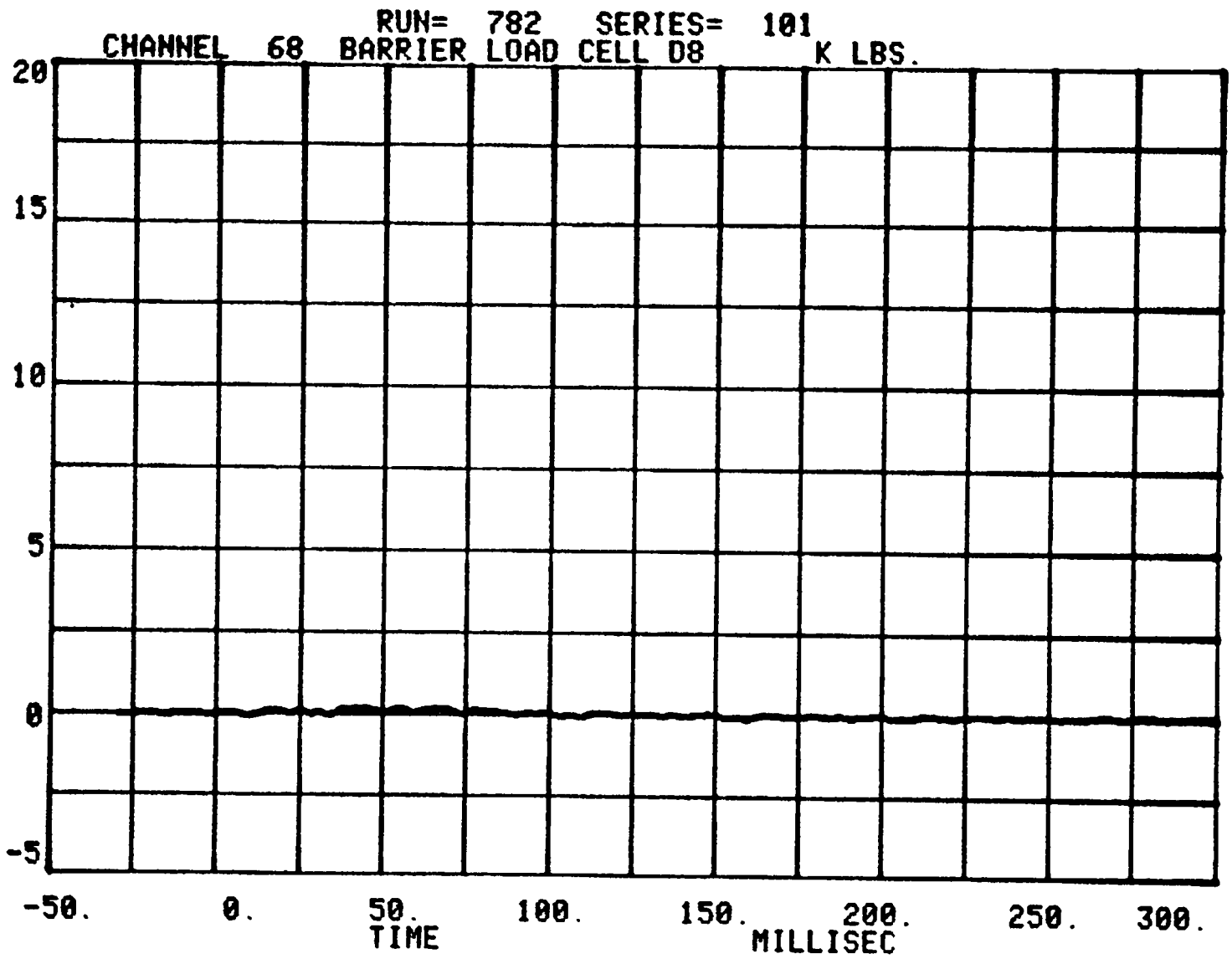

CHANNEL 63 BARRIER LOAD CELL 03
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

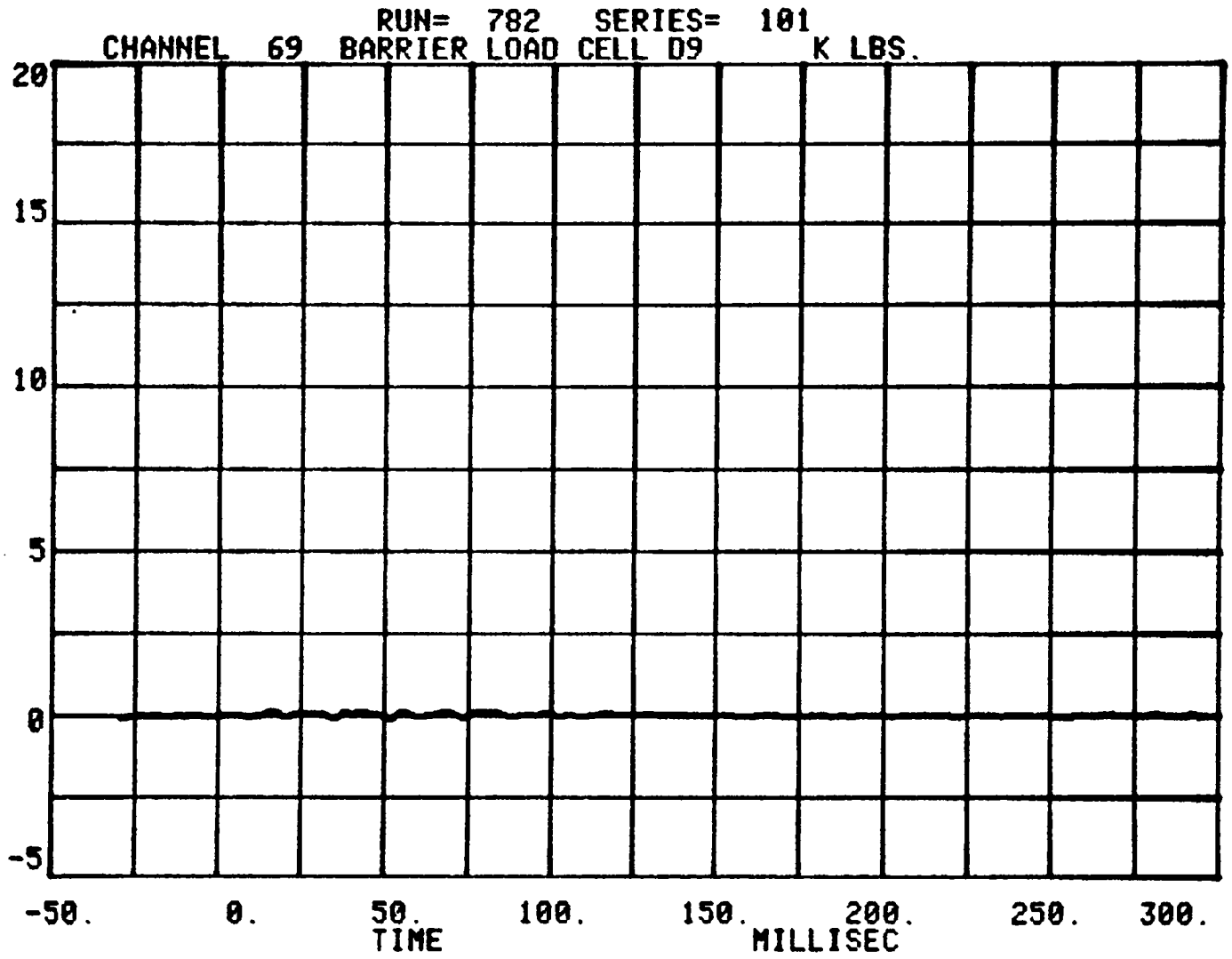

CHANNEL 64 BARRIER LOAD CELL D4
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 65 BARRIER LOAD CELL D5
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 66 BARRIER LOAD CELL 06
RUN= 782 SERIES= 101
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 782 SERIES= 101
CHANNEL 67 BARRIER LOAD CELL D7 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

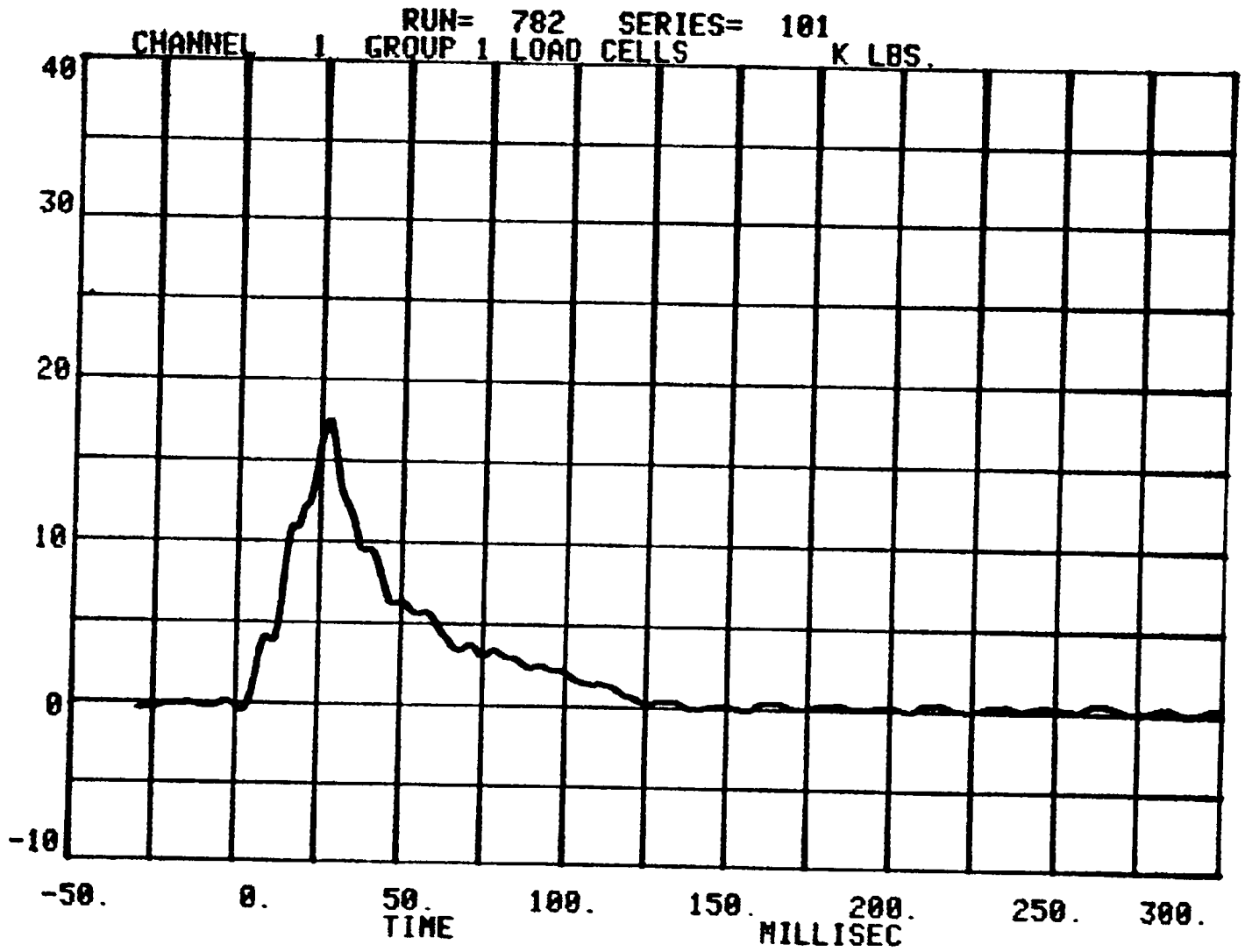

RUN= 782 SERIES= 101
CHANNEL 68 BARRIER LOAD CELL D8
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

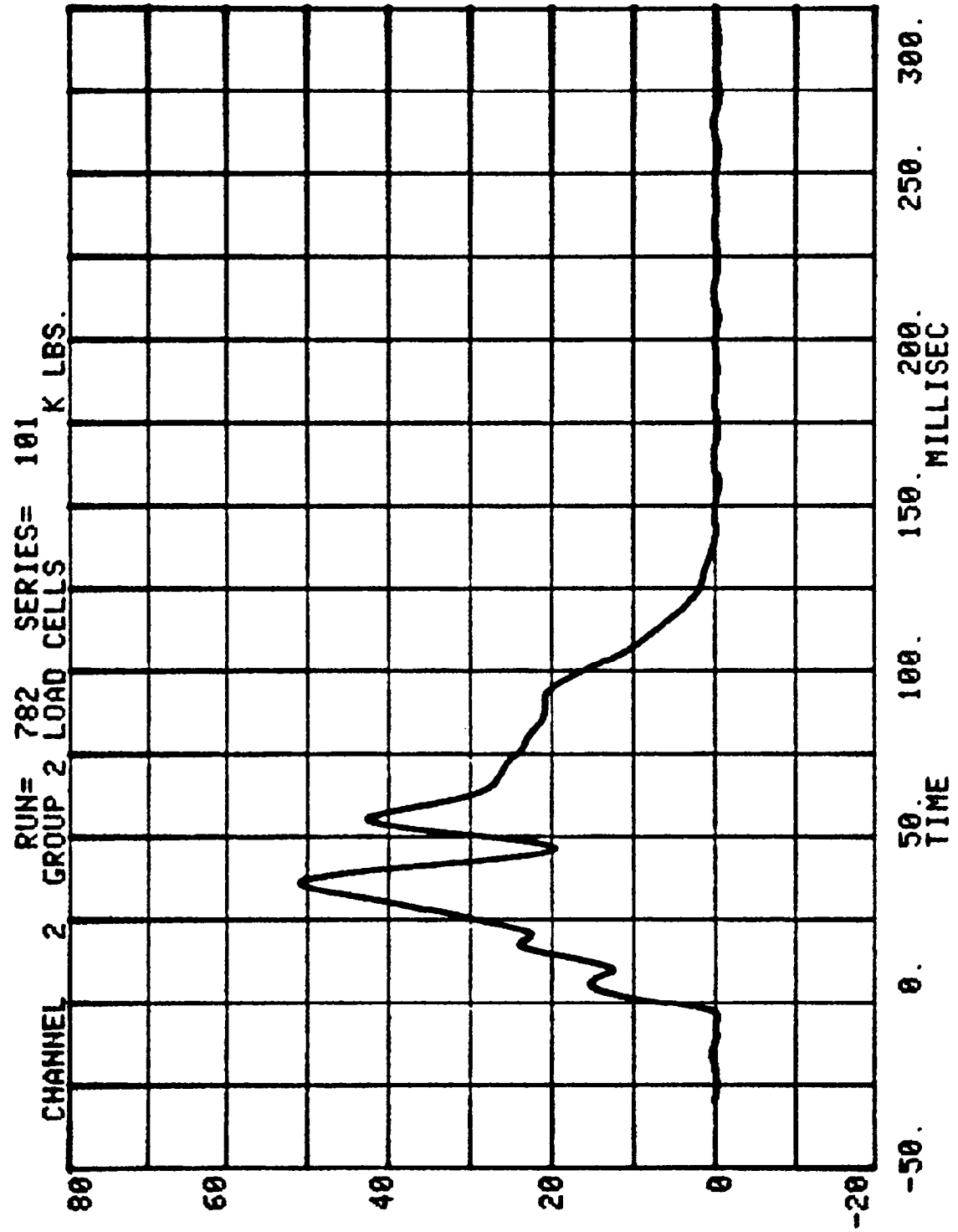

RUN= 782 SERIES= 101
CHANNEL 69 BARRIER LOAD CELL D9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

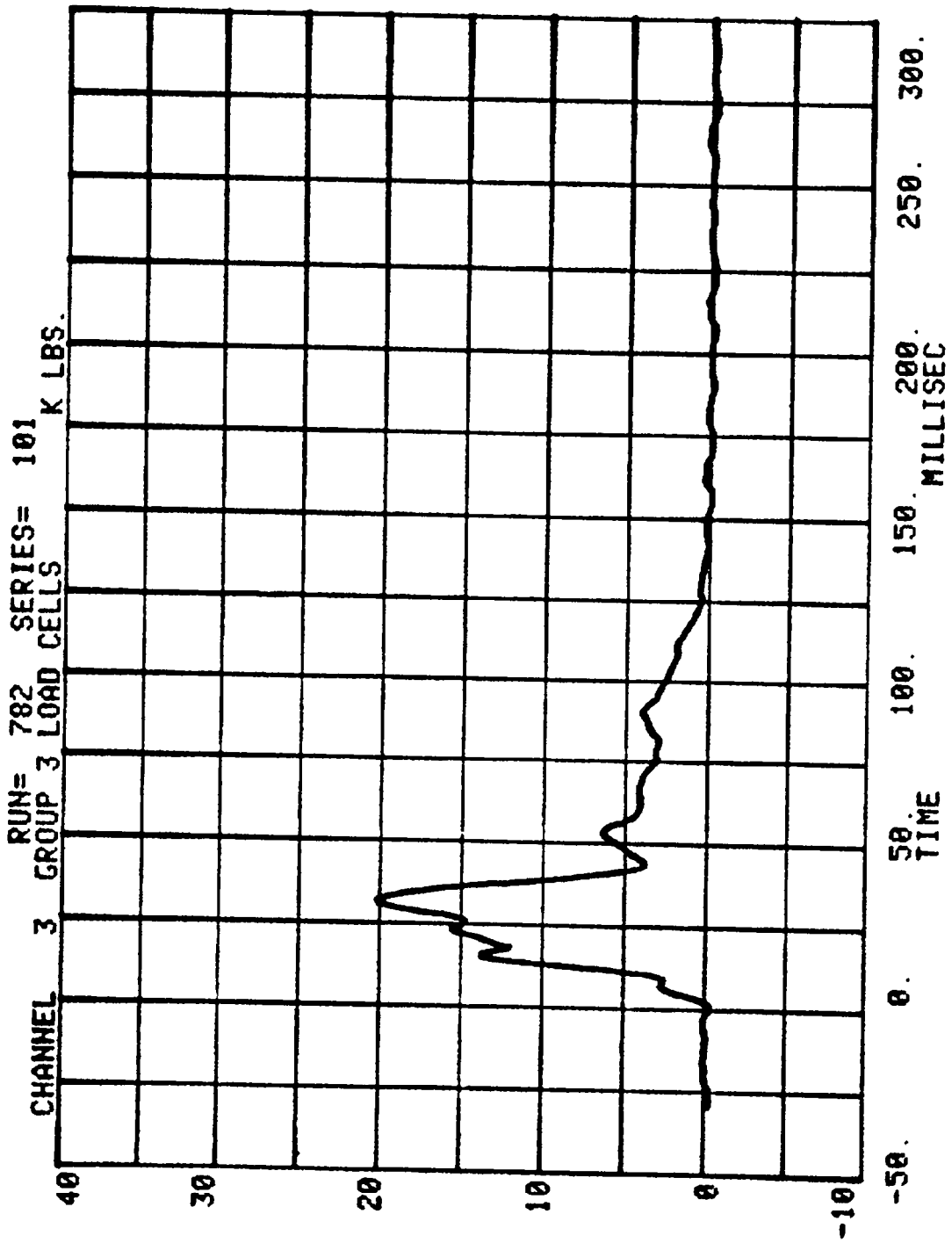
NEW CAR ASSESSMENT BARRIER TESTS - 1987

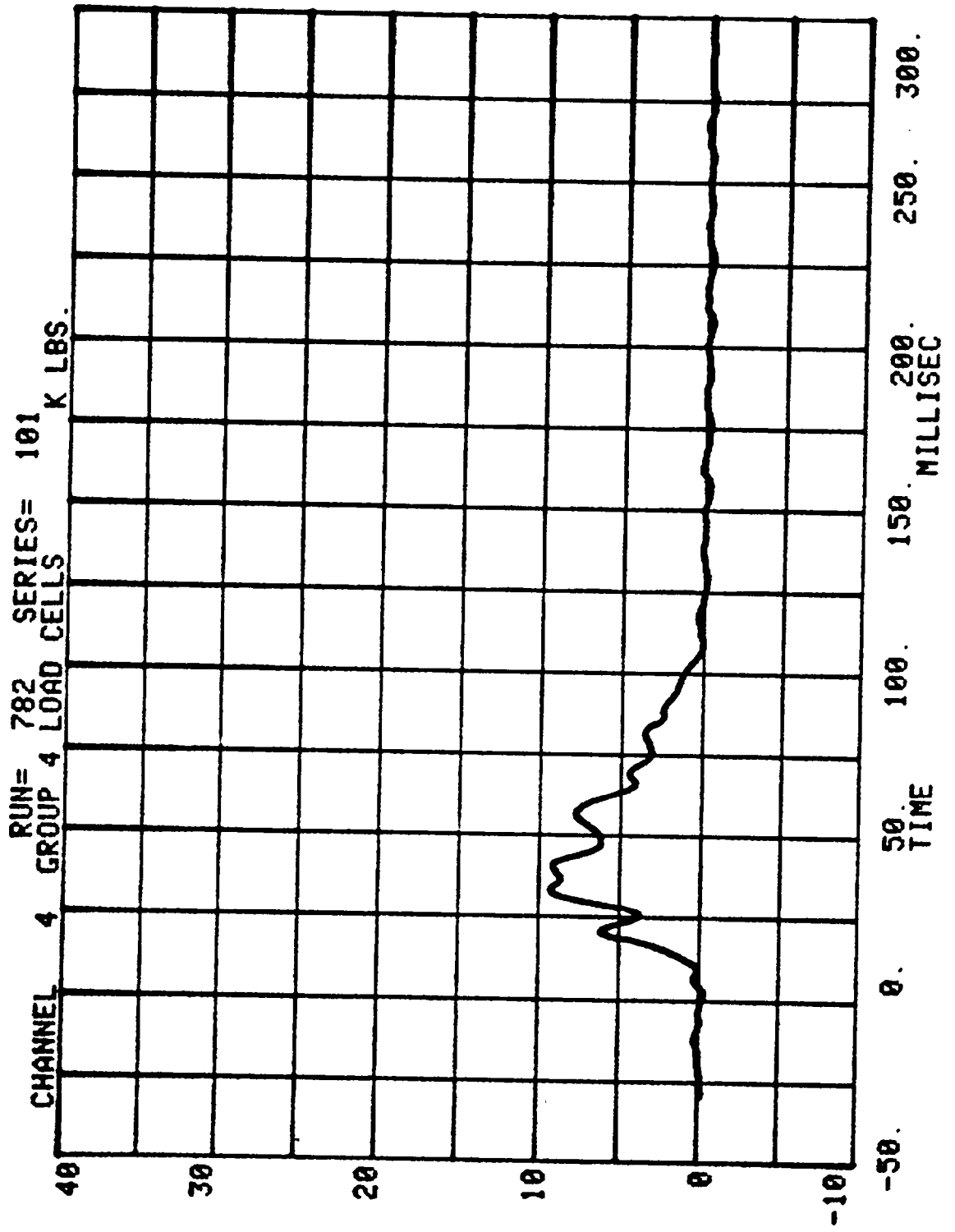
RUN # 782 SERIES # 101

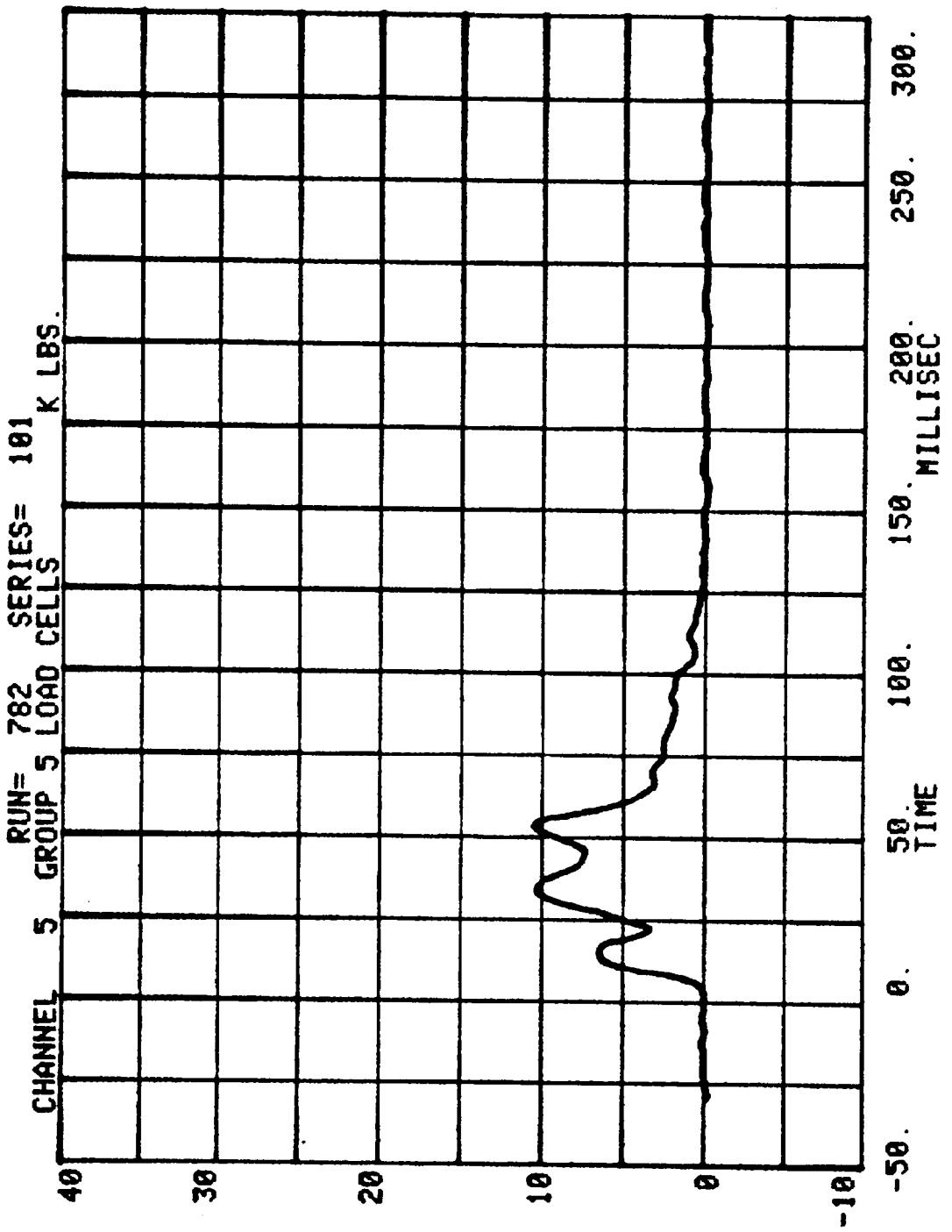
CHAN	TITLE	MINIMUM	MAXIMUM
1	GROUP 1 LOAD CELLS	-.333	17.482 K LBS.
2	GROUP 2 LOAD CELLS	-.571	50.884 K LBS.
3	GROUP 3 LOAD CELLS	-.285	20.200 K LBS.
4	GROUP 4 LOAD CELLS	-.284	9.313 K LBS.
5	GROUP 5 LOAD CELLS	-.197	10.526 K LBS.
6	GROUP 6 LOAD CELLS	-.381	10.439 K LBS.
7	TOTAL LOAD CELL SUM	-1.606	108.831 K LBS.

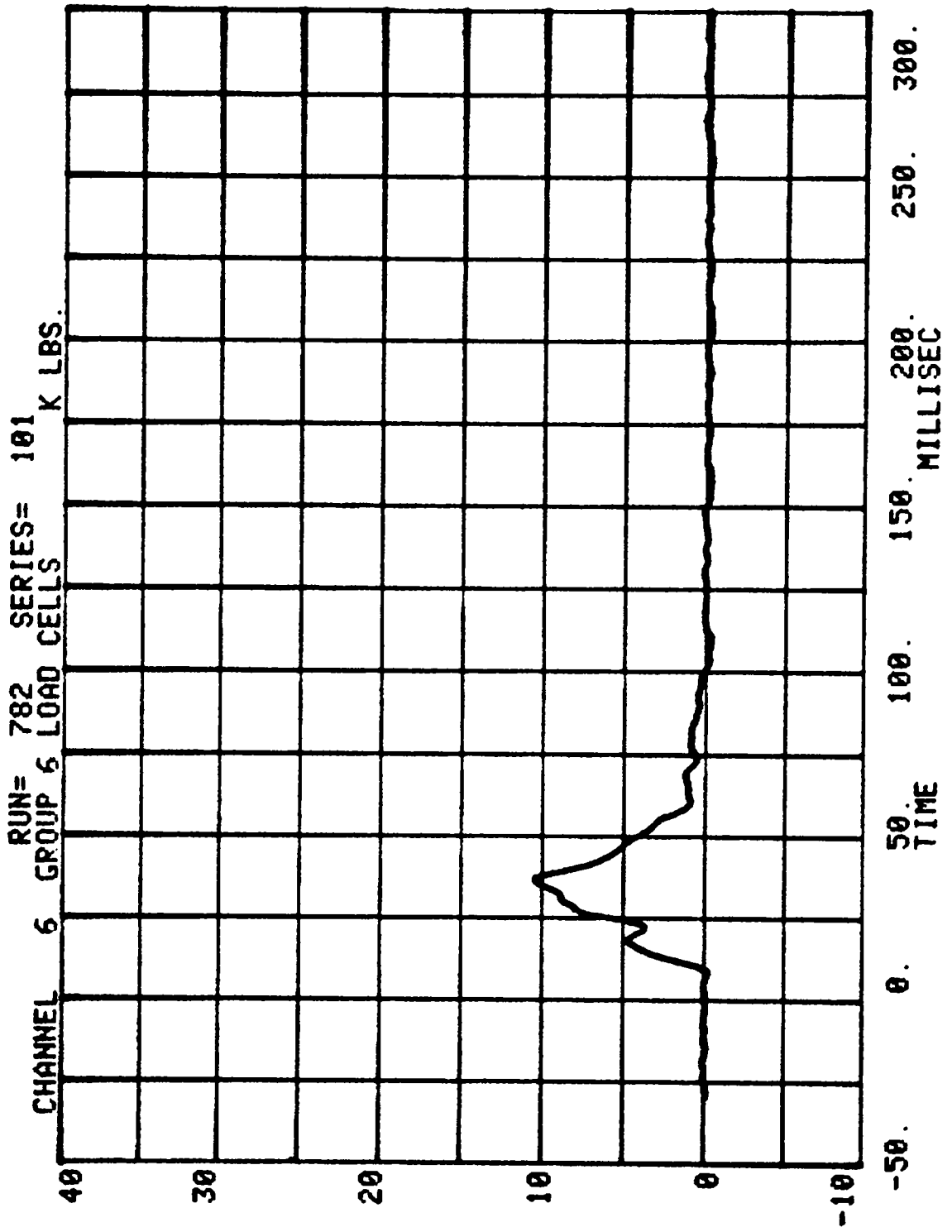

RUN= 782 SERIES= 101
CHANNEL 1 GROUP 1 LOAD CELLS K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

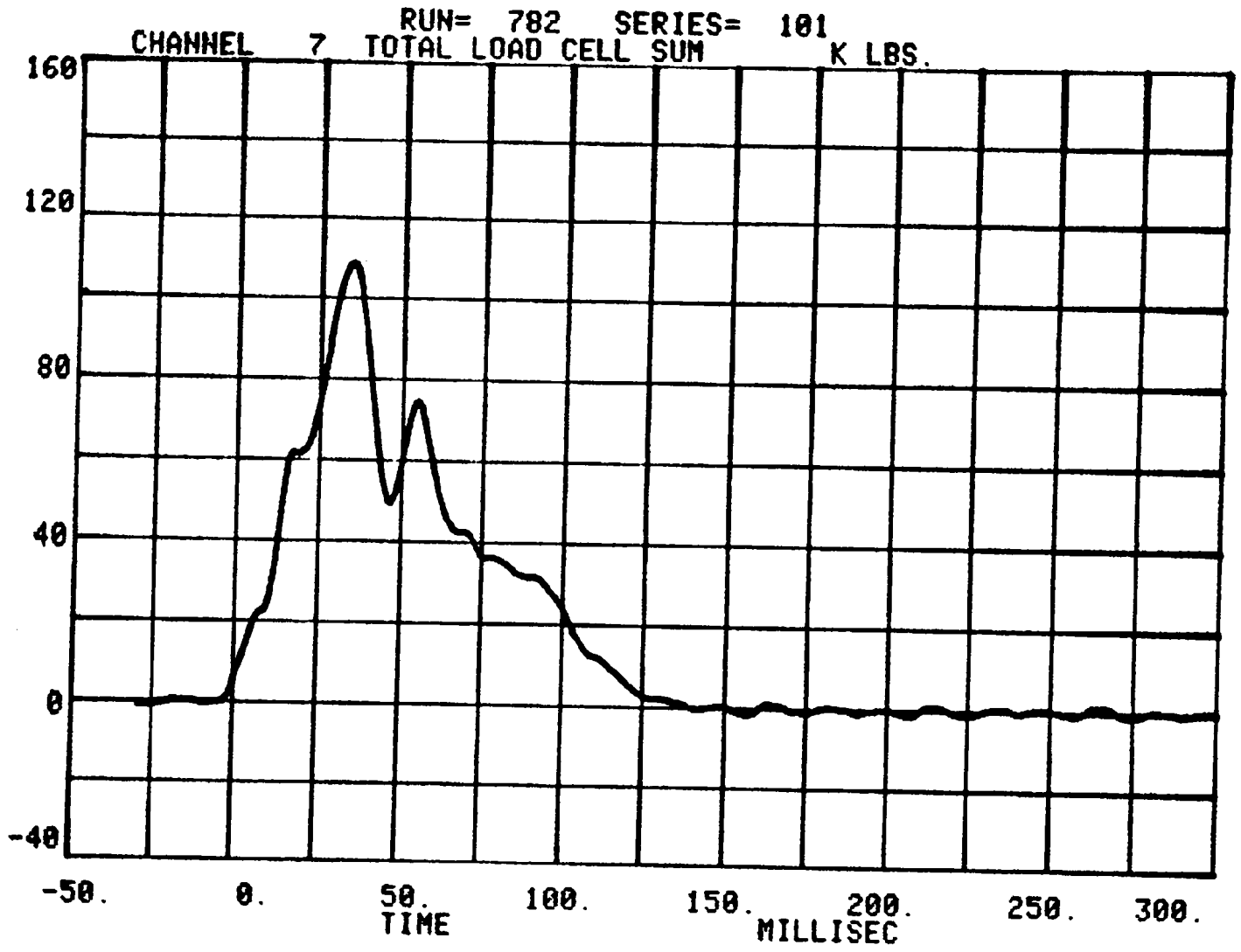

CHANNEL 2 GROUP 2 LOAD CELLS
RUN= 782 SERIES= 101
K LBS.
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 3 GROUP 3 LOAD CELLS
RUN= 782 SERIES= 101
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 4
RUN= 782
GROUP 4 LOAD CELLS
SERIES= 101
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 5 GROUP 5 LOAD CELLS
RUN= 782 SERIES= 101
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 6 GROUP 6 LOAD CELLS
RUN= 782 SERIES= 101
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 782 SERIES= 101
CHANNEL 7 TOTAL LOAD CELL SUM K LBS.
160
120
80
40
0
-40
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

TEST NO. MH0101

DUMMY DATA

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

HEAD INJURY CRITERION
HEAD SEVERITY INDEX

NEW CAR ASSESSMENT BARRIER TESTS - 1987

RUN= 782

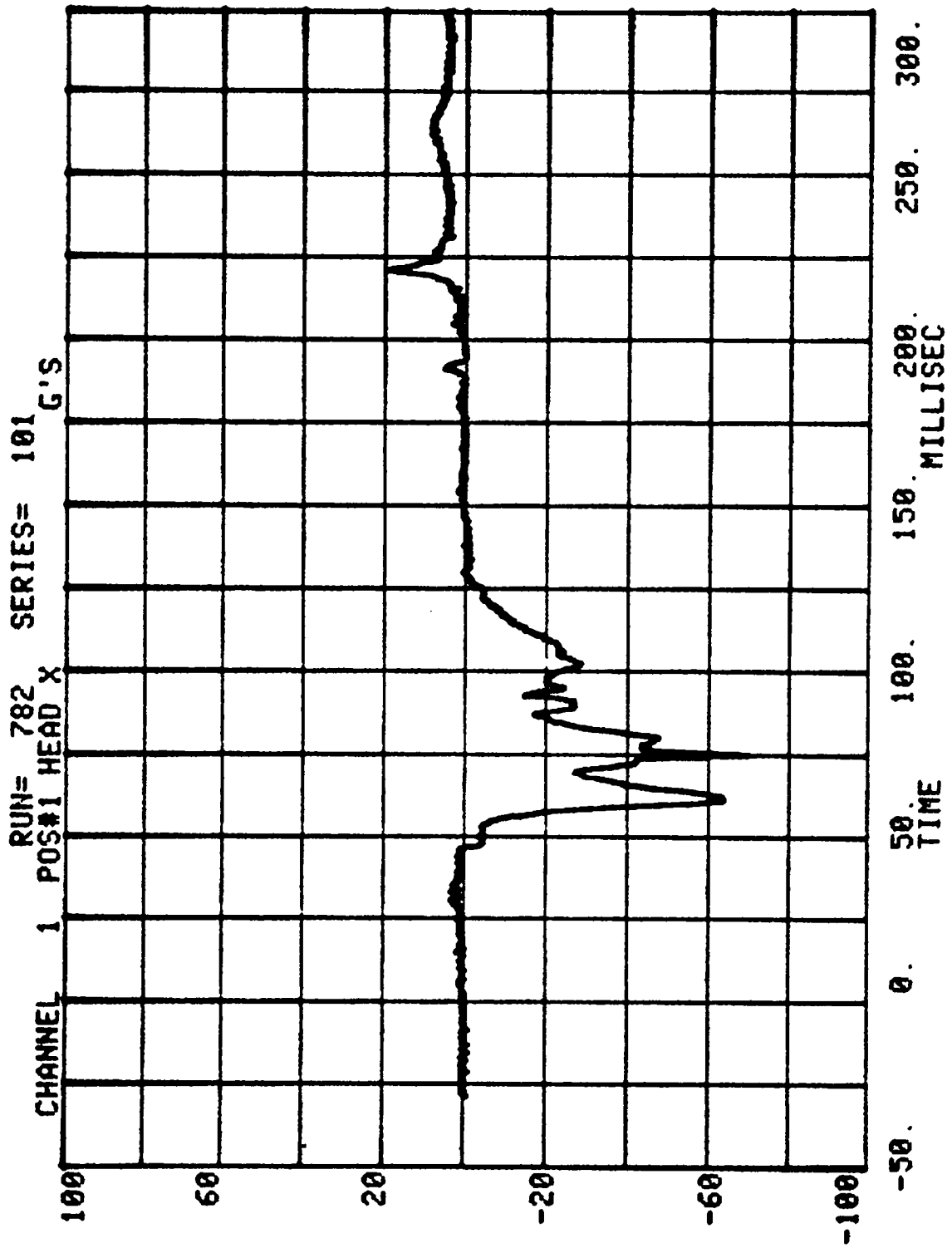
POS#1 HEAD R

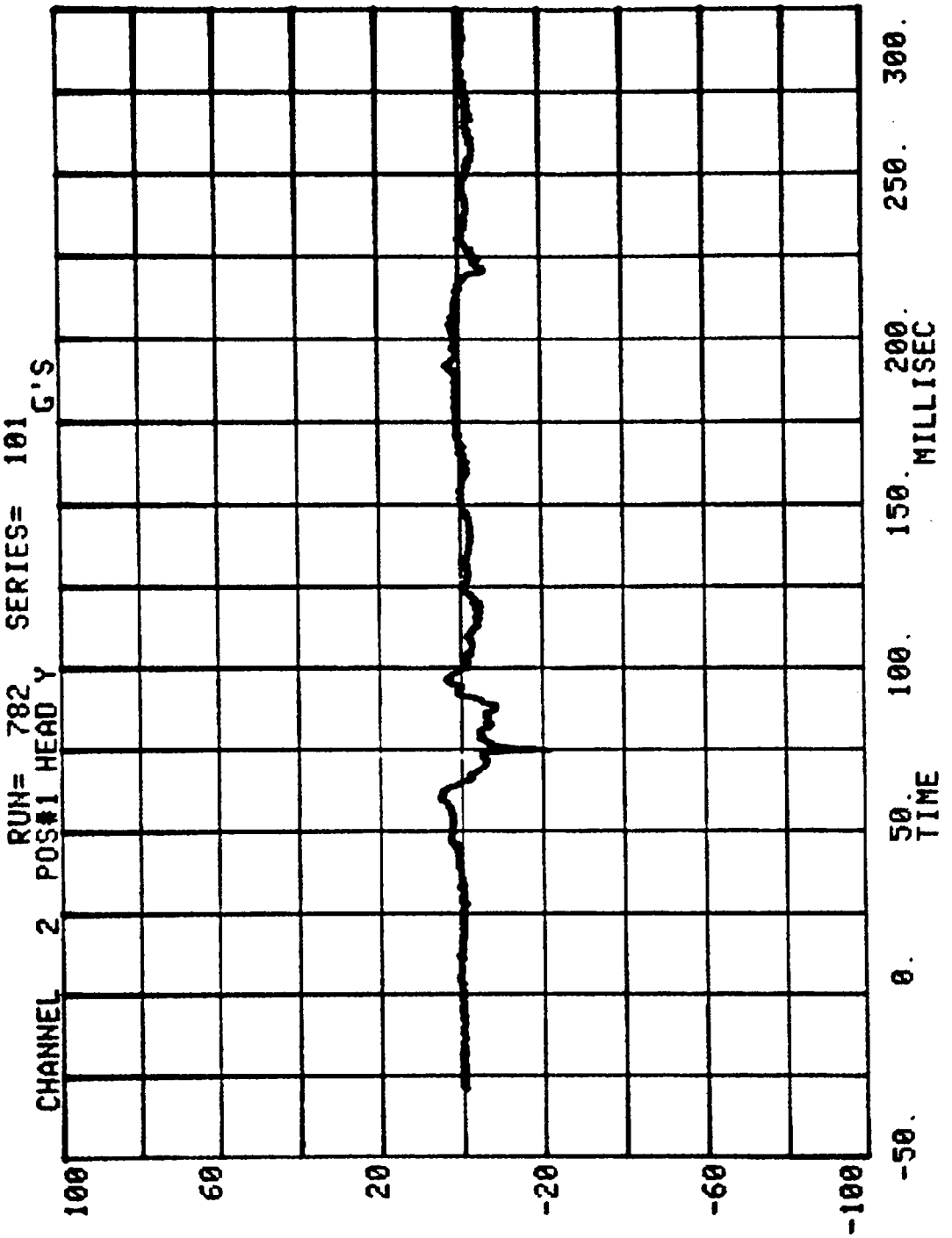
HIC= 404.9 FROM T1= .05782 TO T2= .08317

AVERAGE ACCELERATION BETWEEN T1 AND T2= 48.0G'S

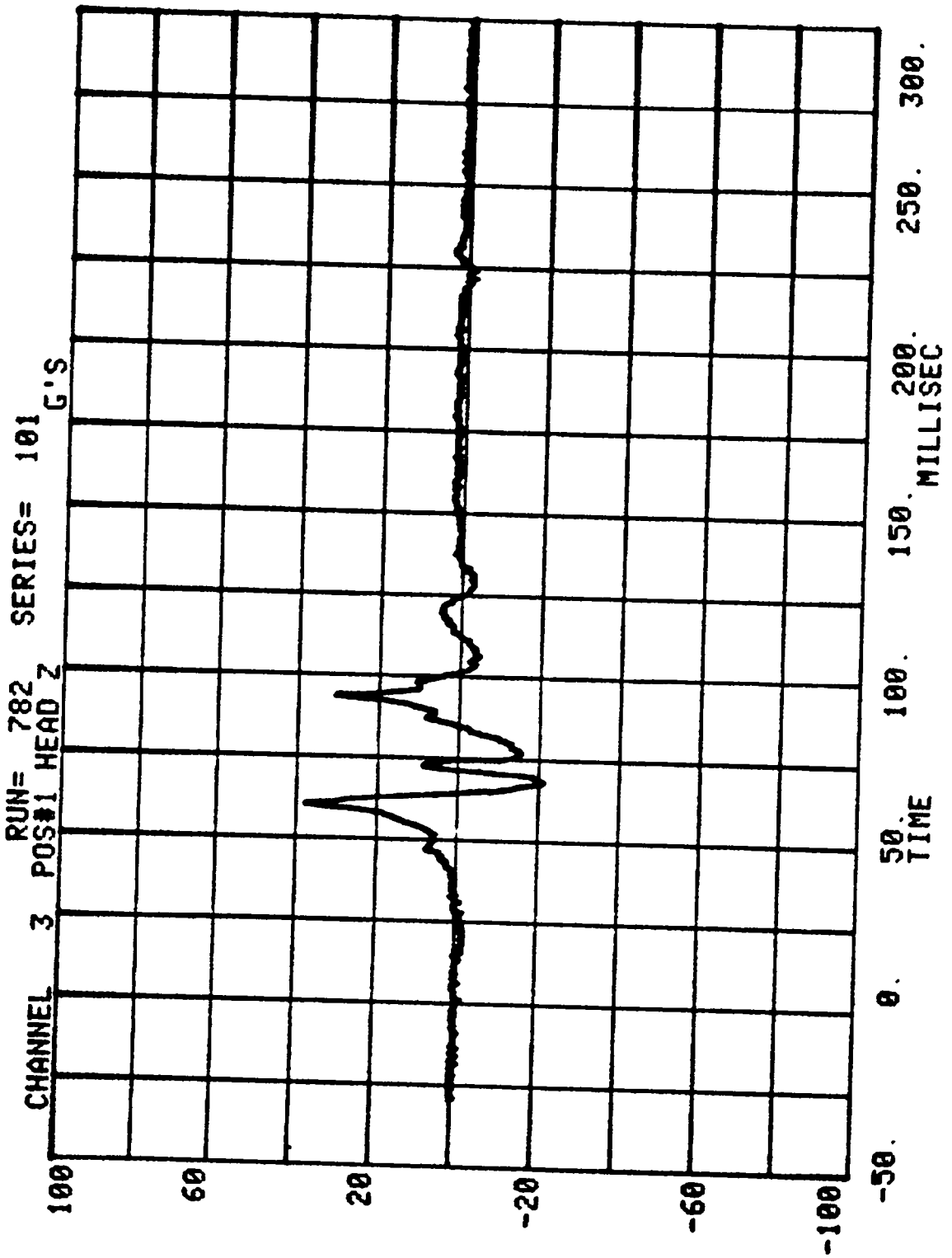
EVENT TIME= 300.0 MSEC

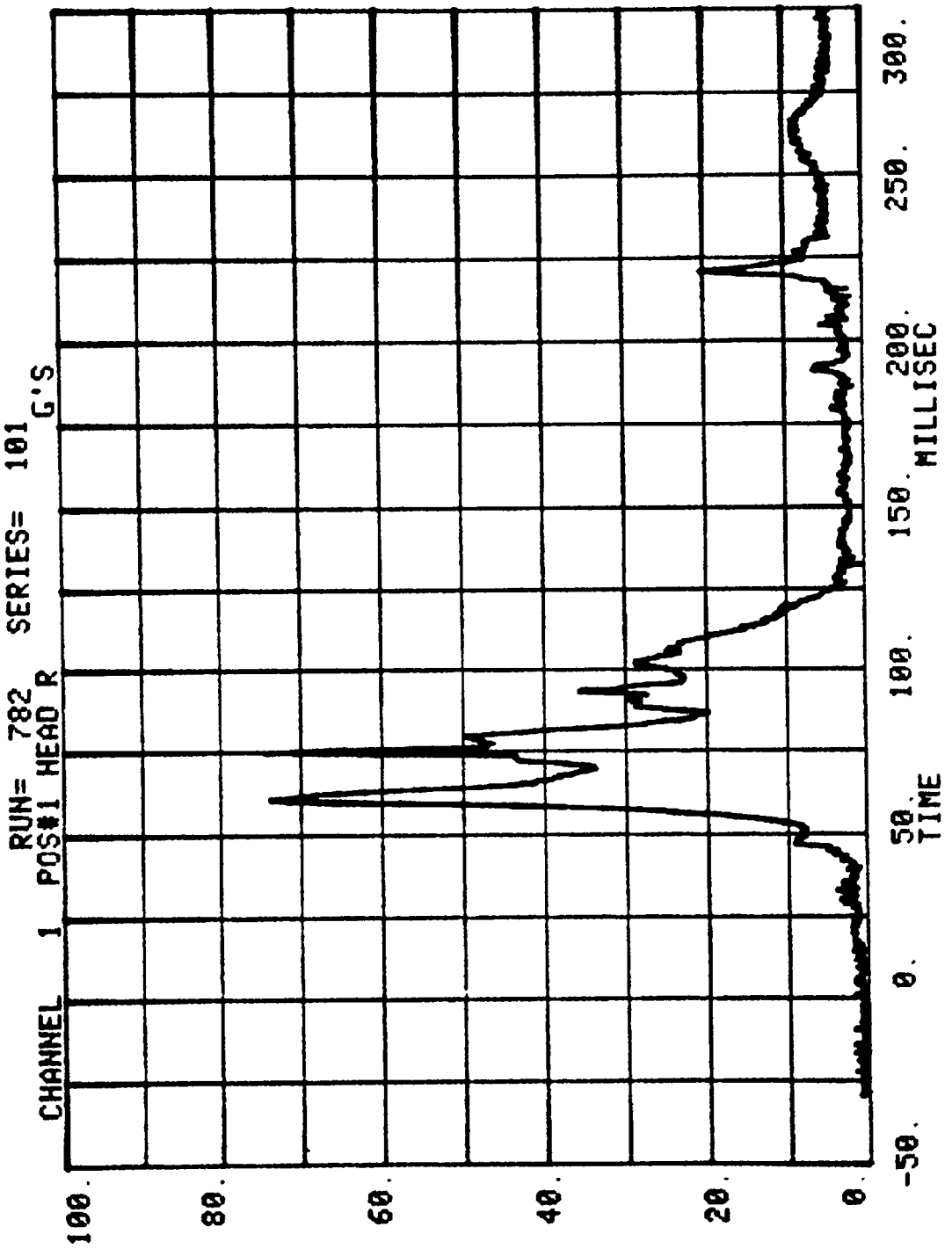
SEVERITY INDEX= 577.6


CHANNEL 1 POS#1 HEAD X
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

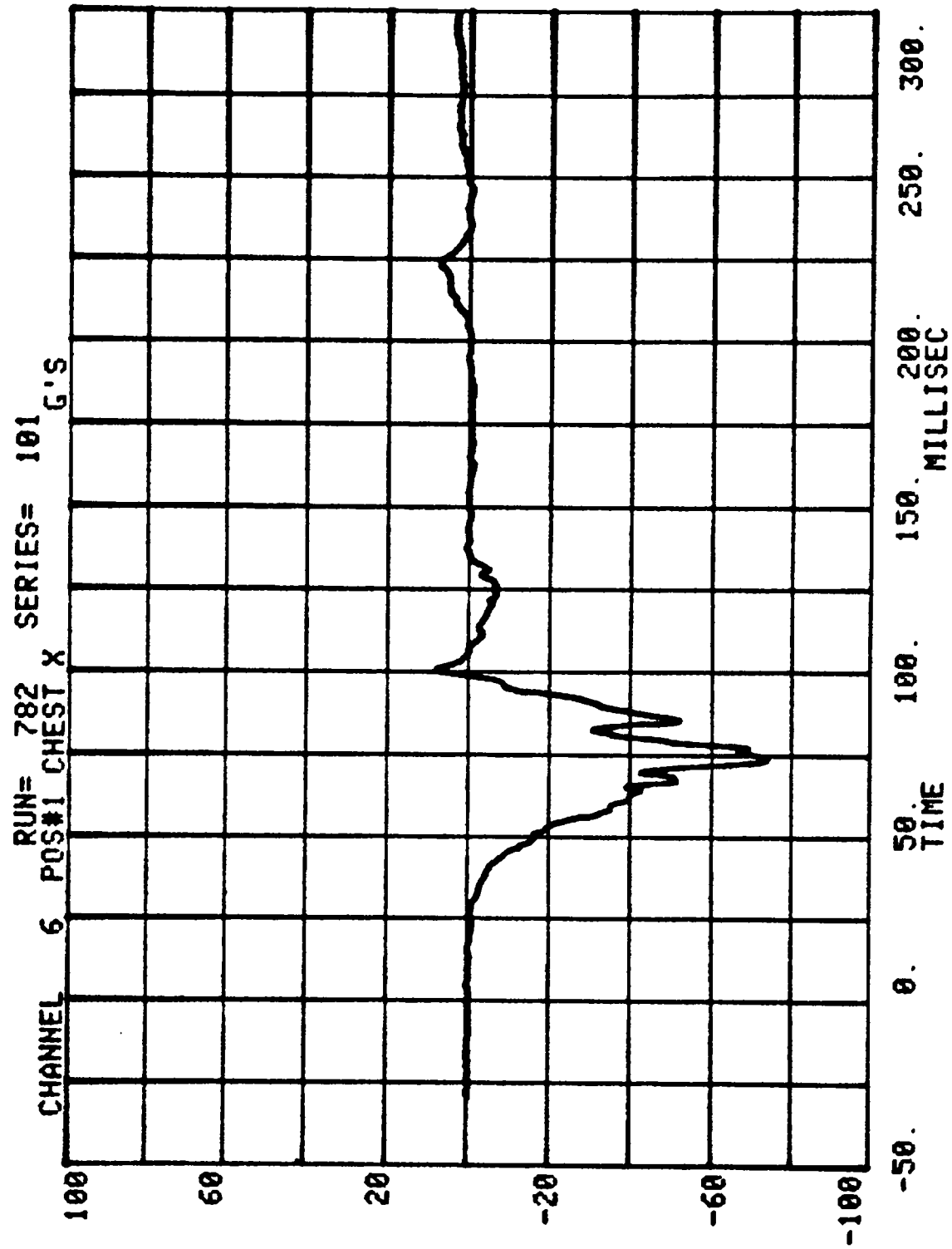

CHANNEL 2 POS#1 HEAD Y
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20

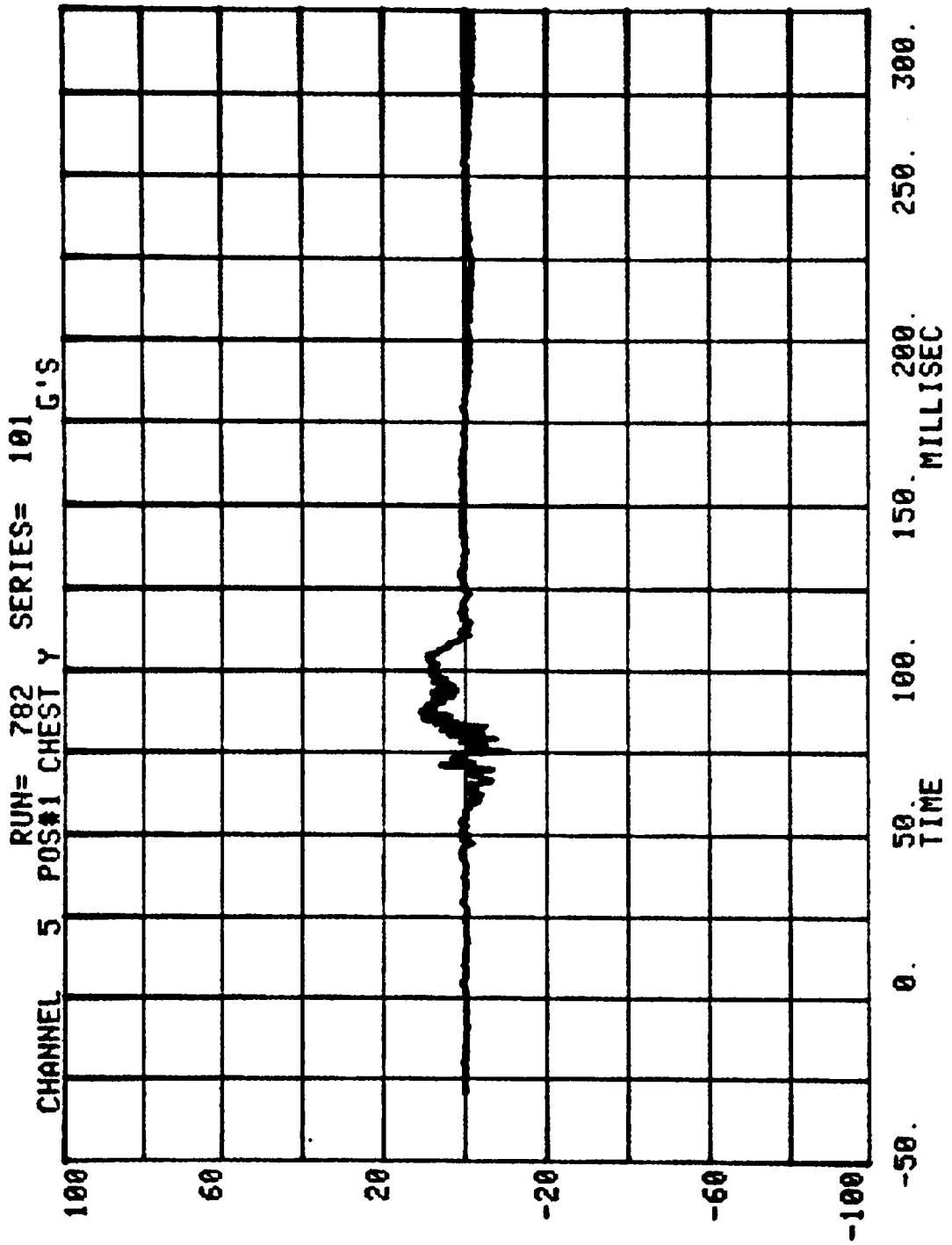

CHANNEL 3 POS#1 HEAD 2
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

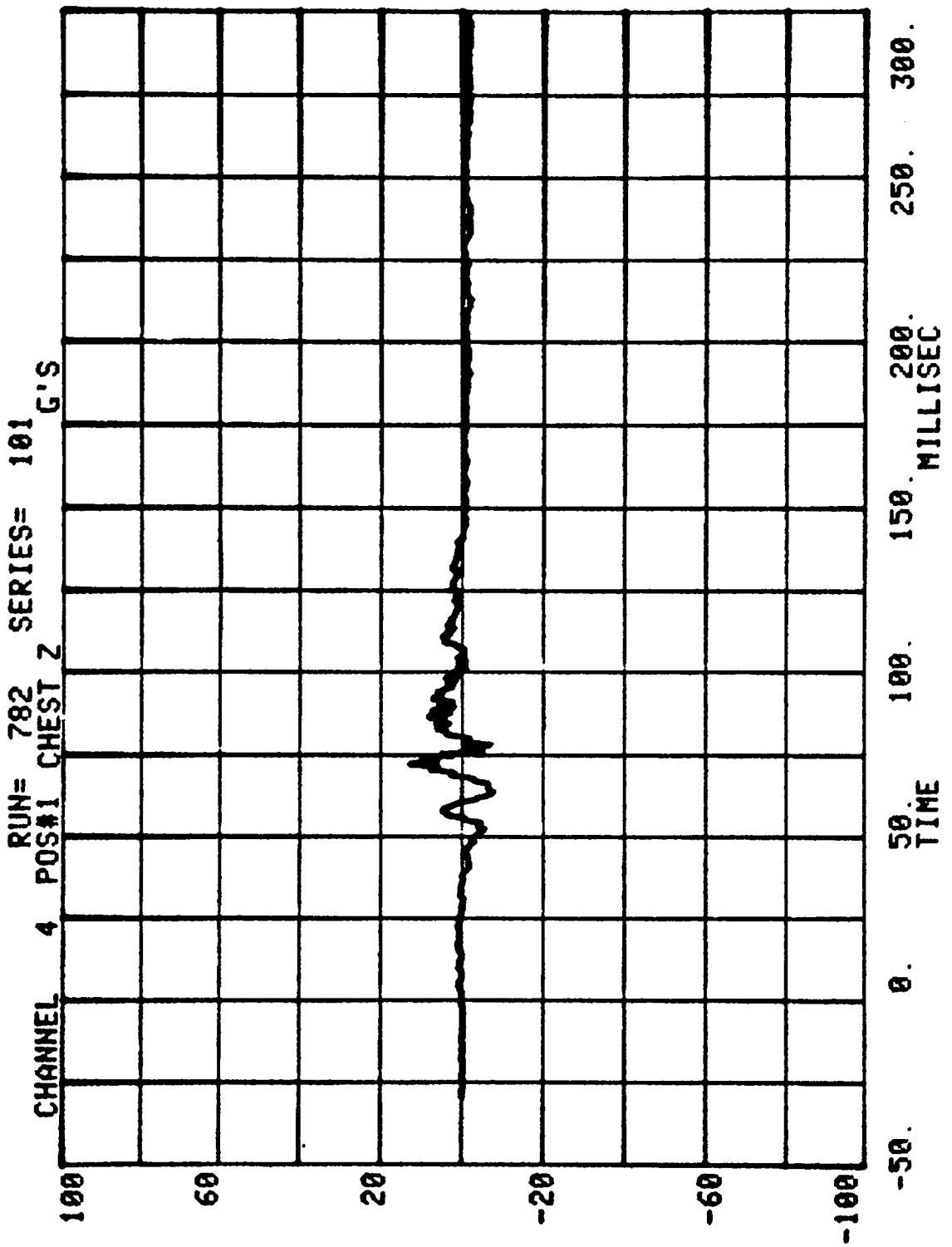

CHANNEL 1 POS#1 HEAD R
RUN= 782 SERIES= 101
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

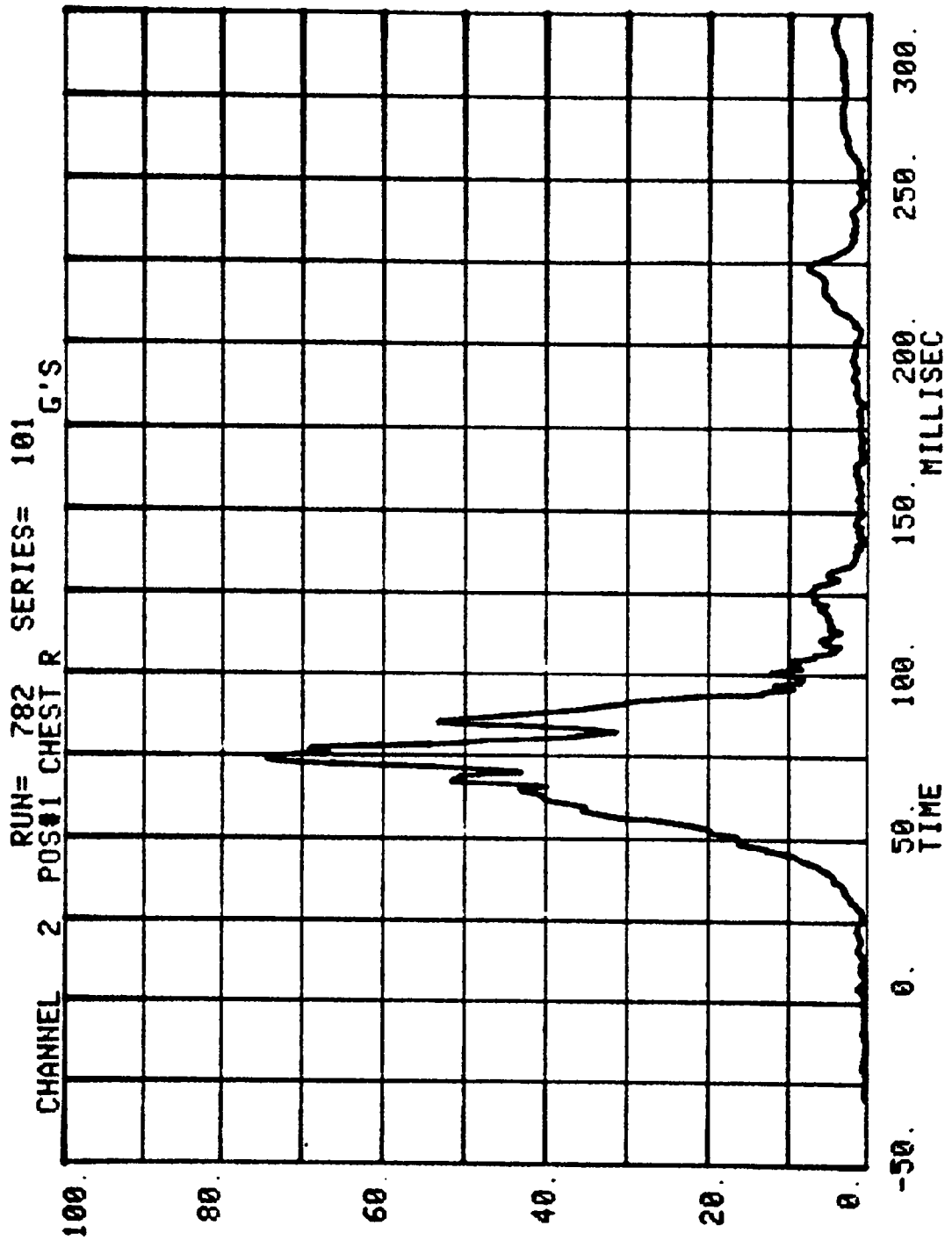
7556-20


CHANNEL 6 POS#1 CHEST X
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

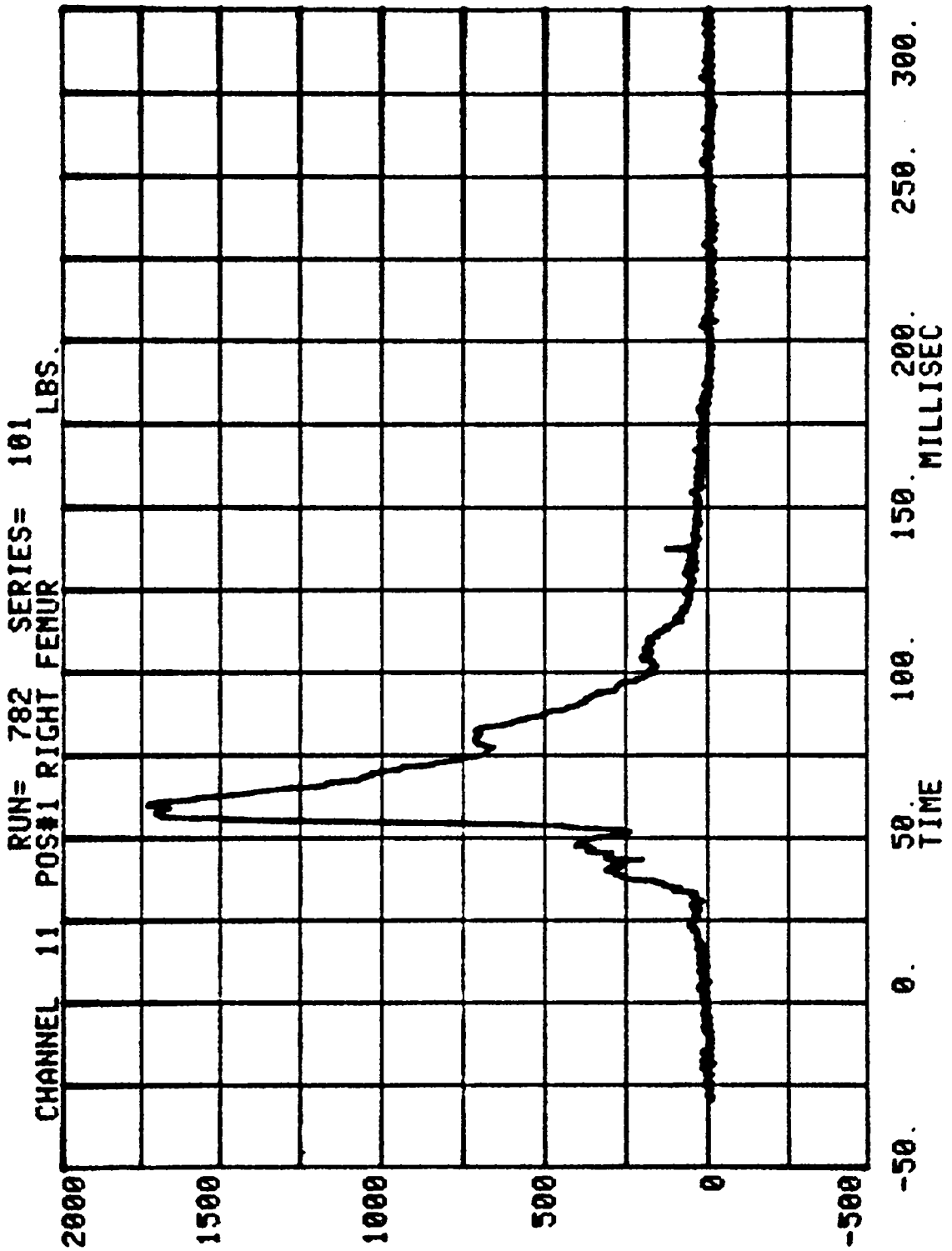
7556-20


CHANNEL 5 POS#1 CHEST Y
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

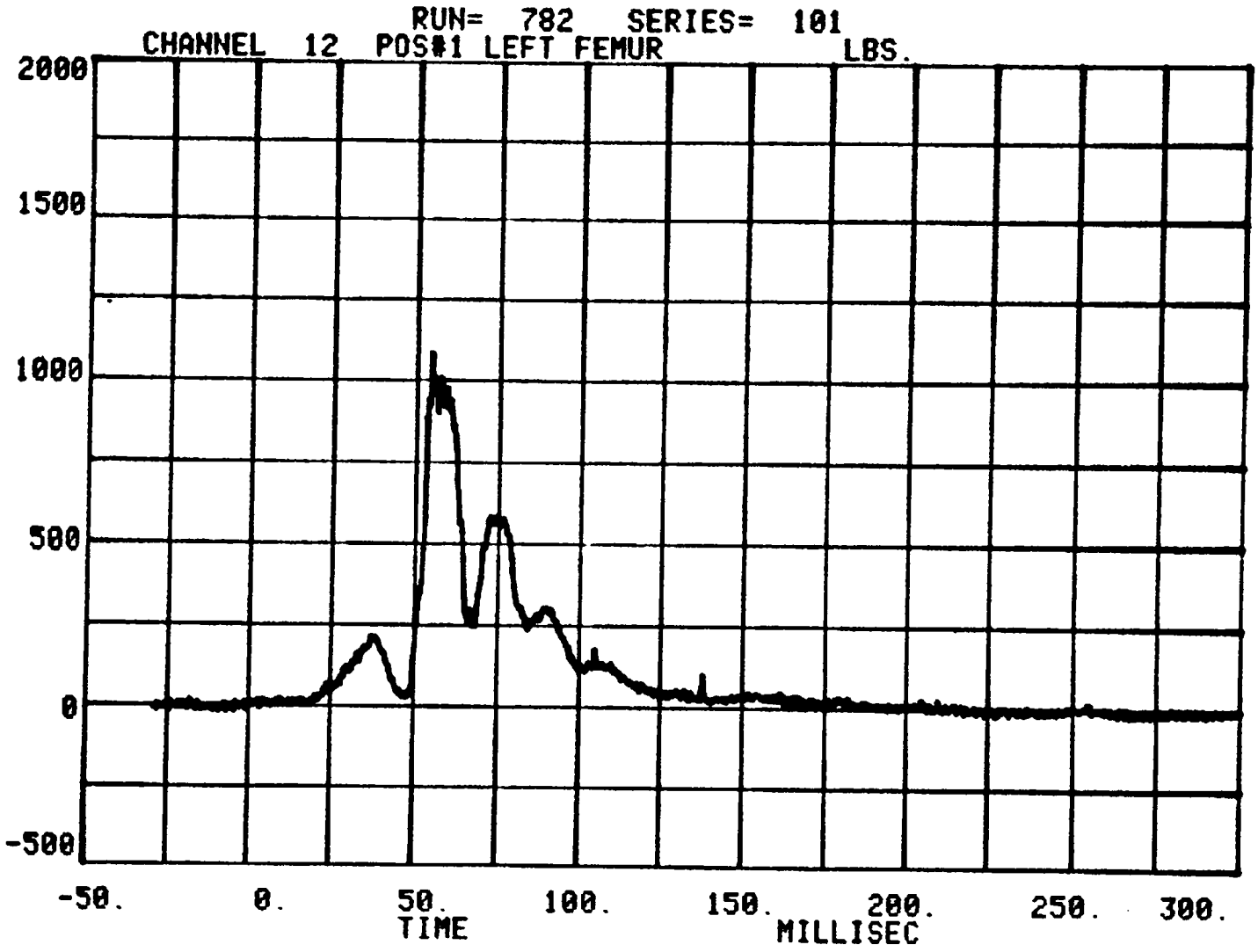

CHANNEL 4 POS#1 CHEST Z
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

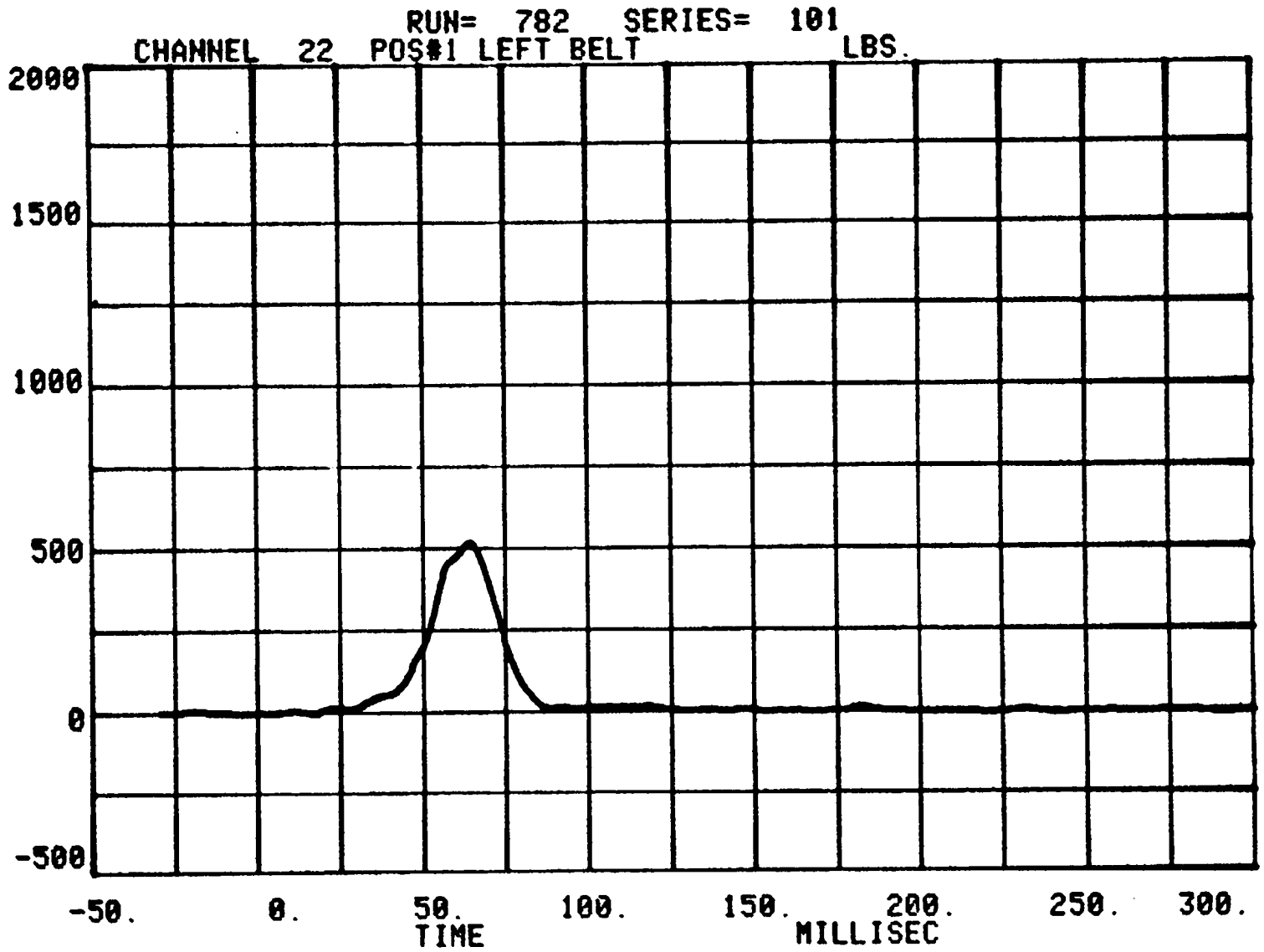

CHANNEL 2 POS#1 CHEST R
RUN= 782 SERIES= 101
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

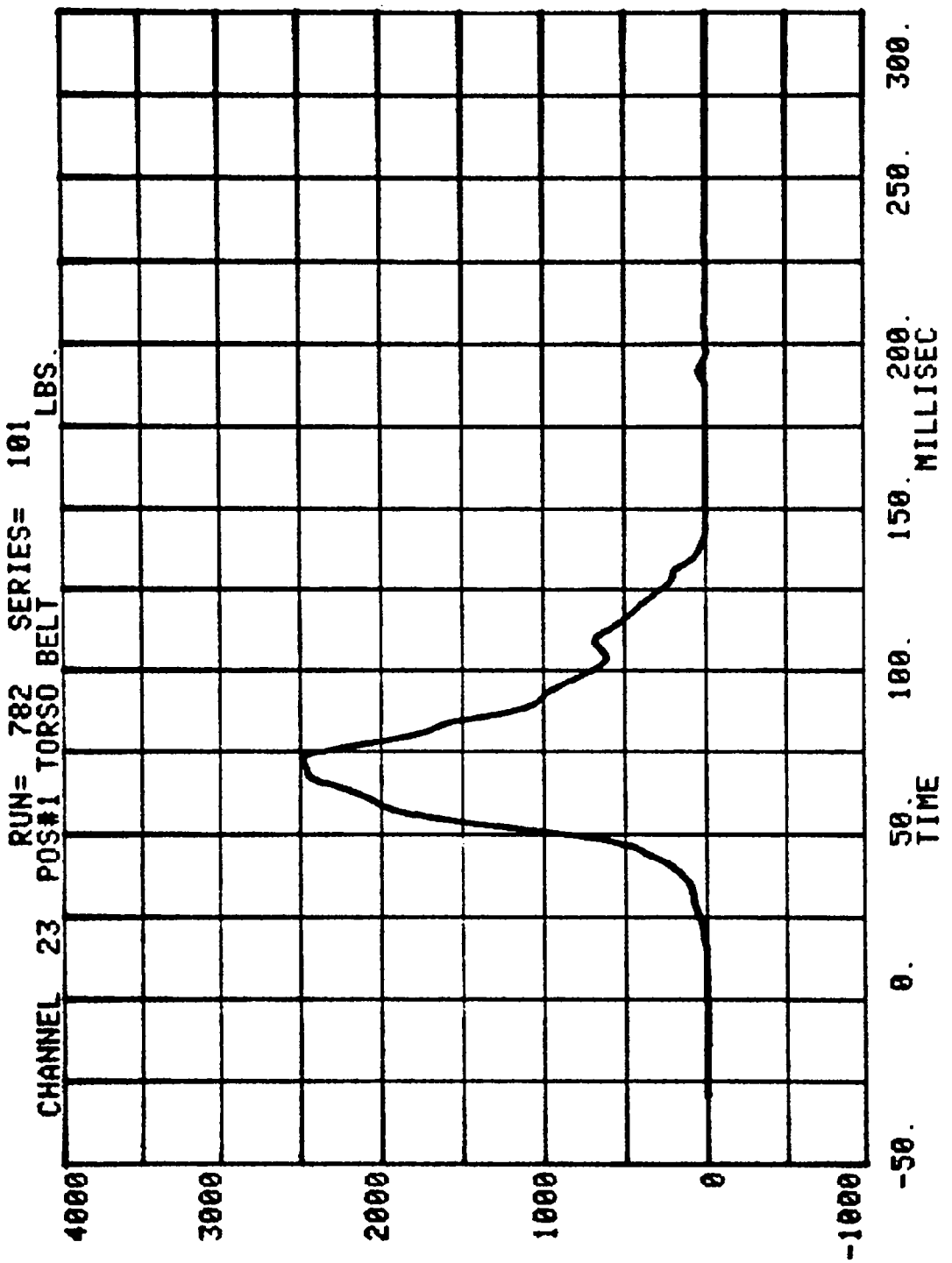
7556-20


CHANNEL 11 POS#1 RIGHT FEMUR
RUN= 782 SERIES= 101
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20

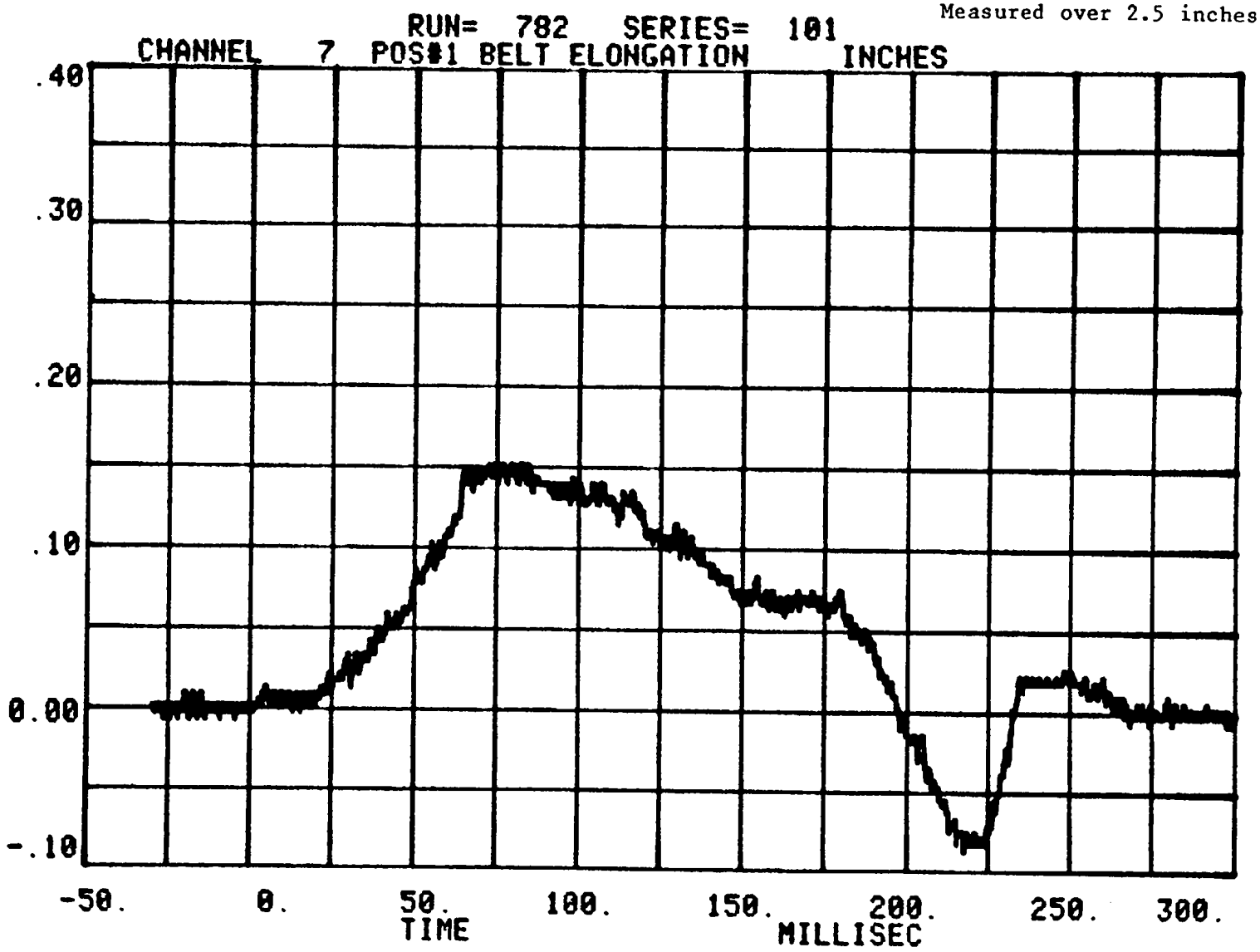

RUN= 782 SERIES= 101
CHANNEL 12 POS#1 LEFT FEMUR LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 782 SERIES= 101
CHANNEL 22 POS#1 LEFT BELT LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 23 POS#1 TORSO BELT
RUN= 782 SERIES= 101
LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20

Measured over 2.5 inches



HEAD INJURY CRITERION
HEAD SEVERITY INDEX

NEW CAR ASSESSMENT BARRIER TESTS - 1987

RUN= 782

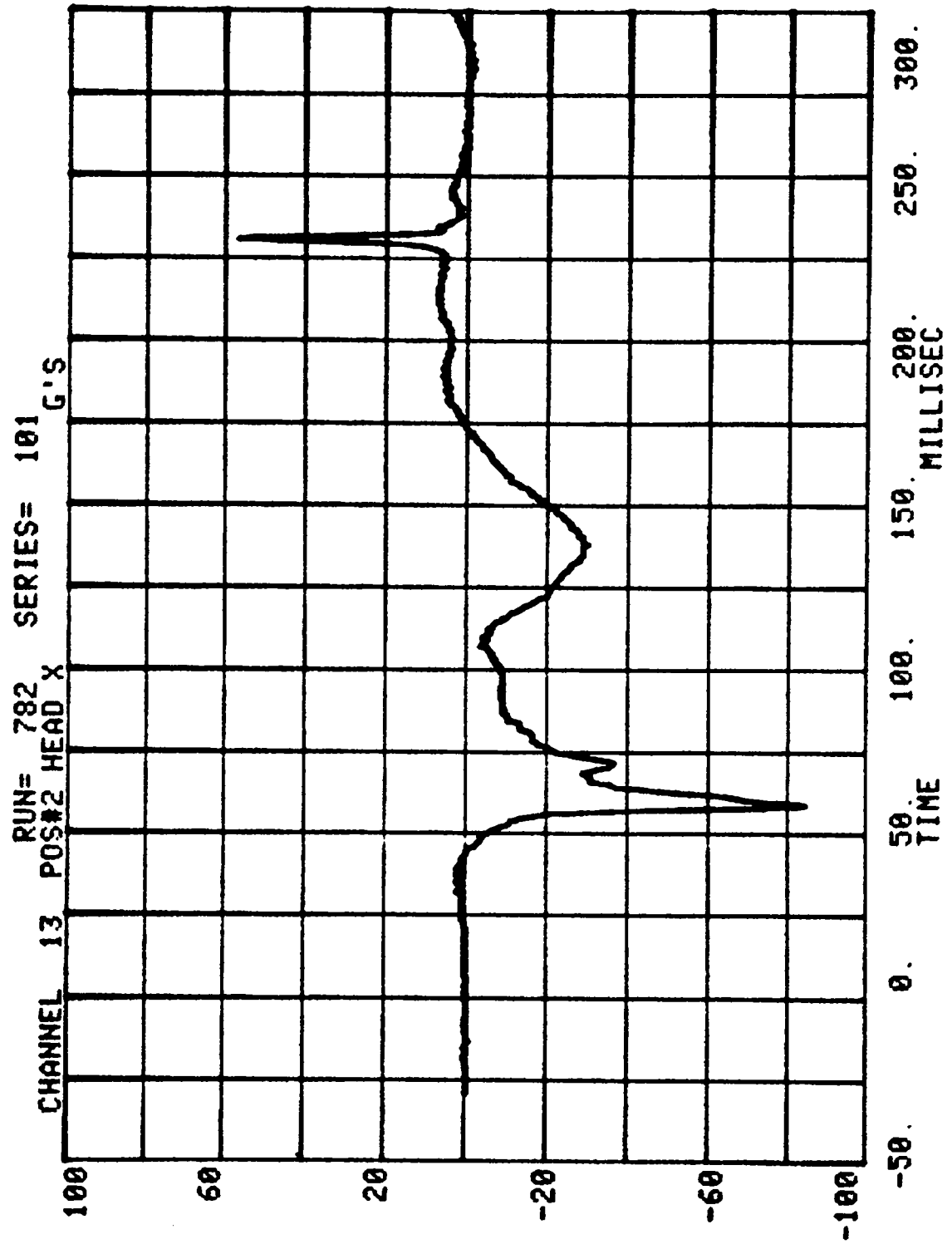
POS#2 HEAD R

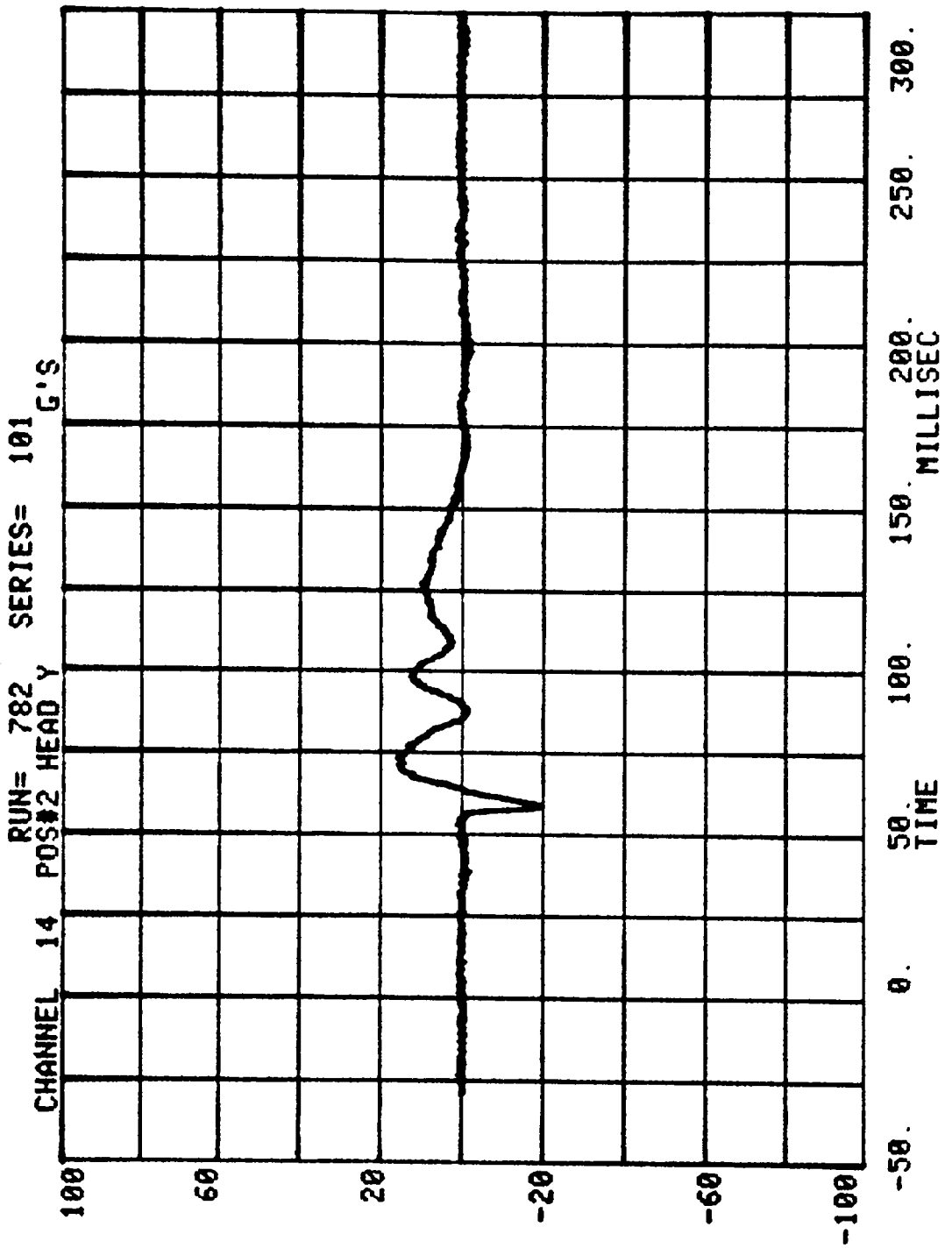
HIC= 327.8 FROM T1= .05647 TO T2= .07402

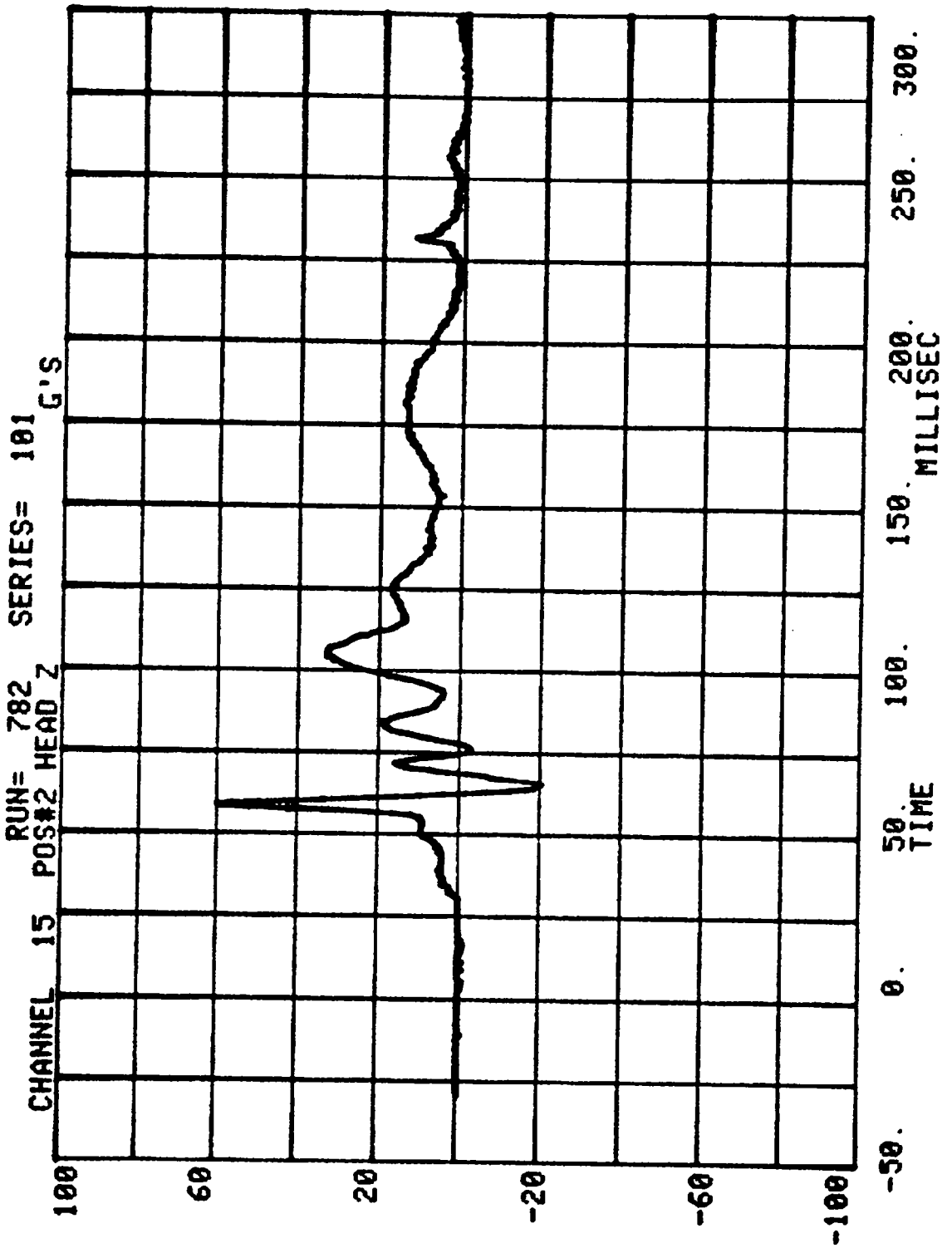
AVERAGE ACCELERATION BETWEEN T1 AND T2= 51.1G'S

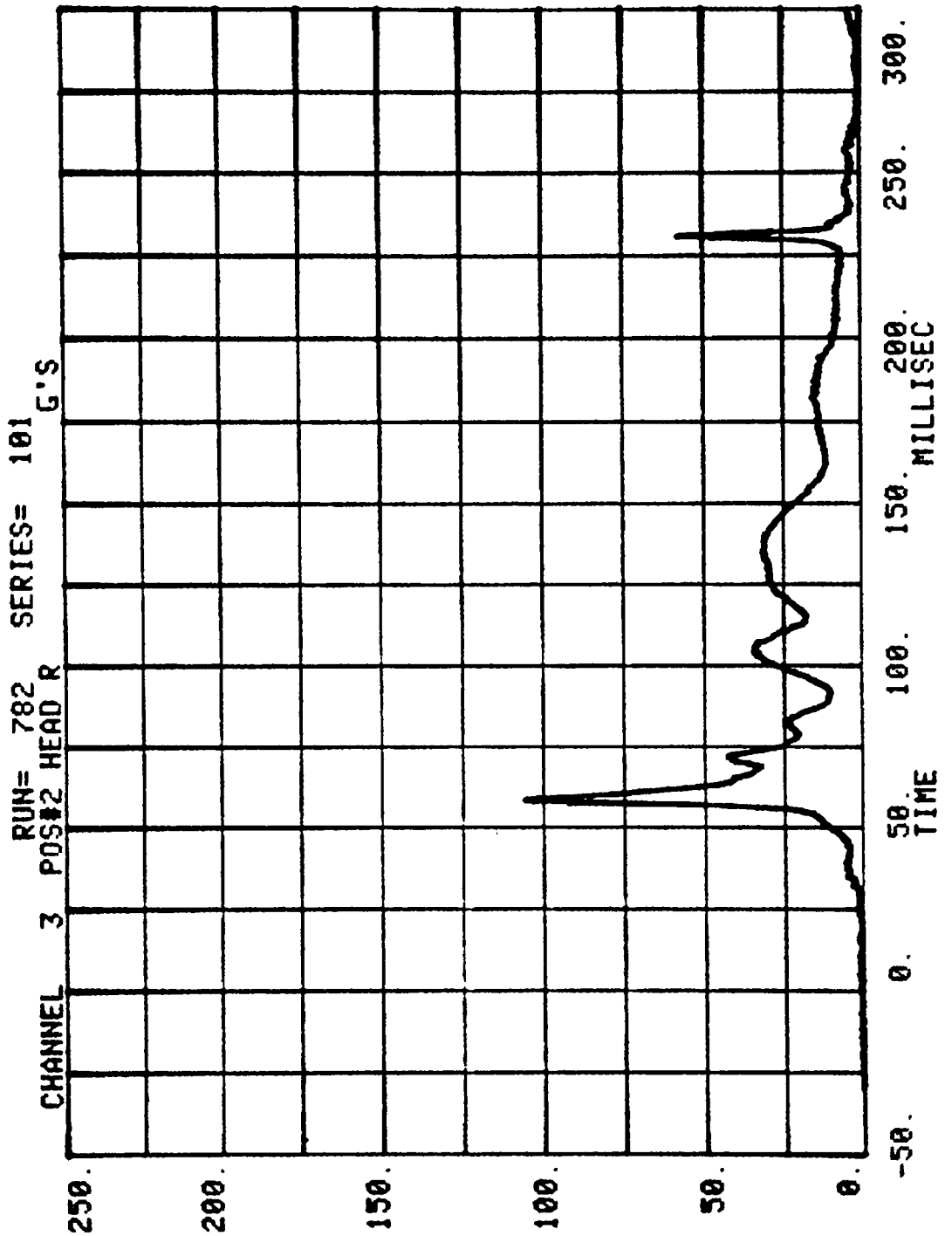
EVENT TIME= 300.0 MSEC

SEVERITY INDEX= 779.8

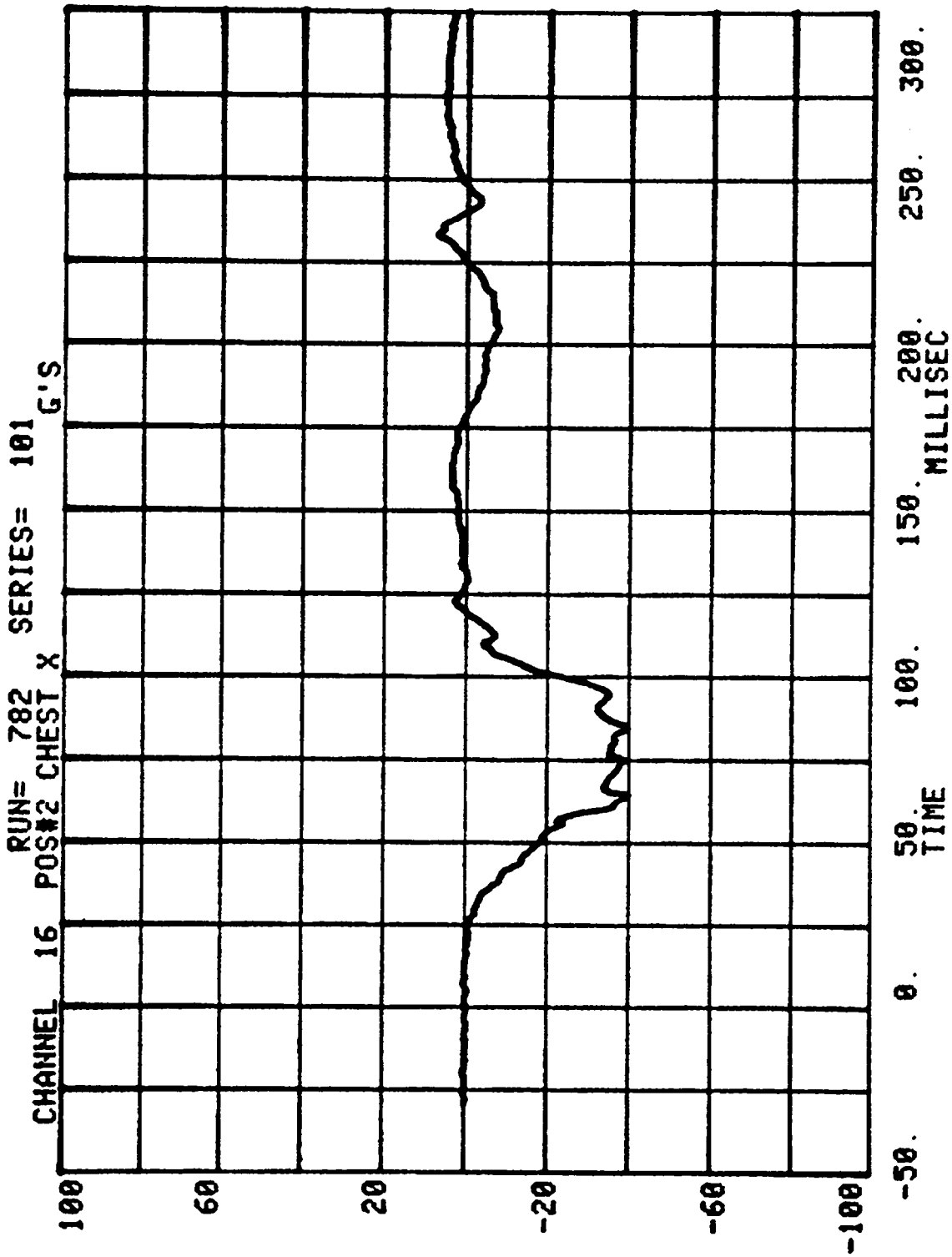

CHANNEL 13 POS#2 HEAD X
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 14 POS#2 HEAD Y
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

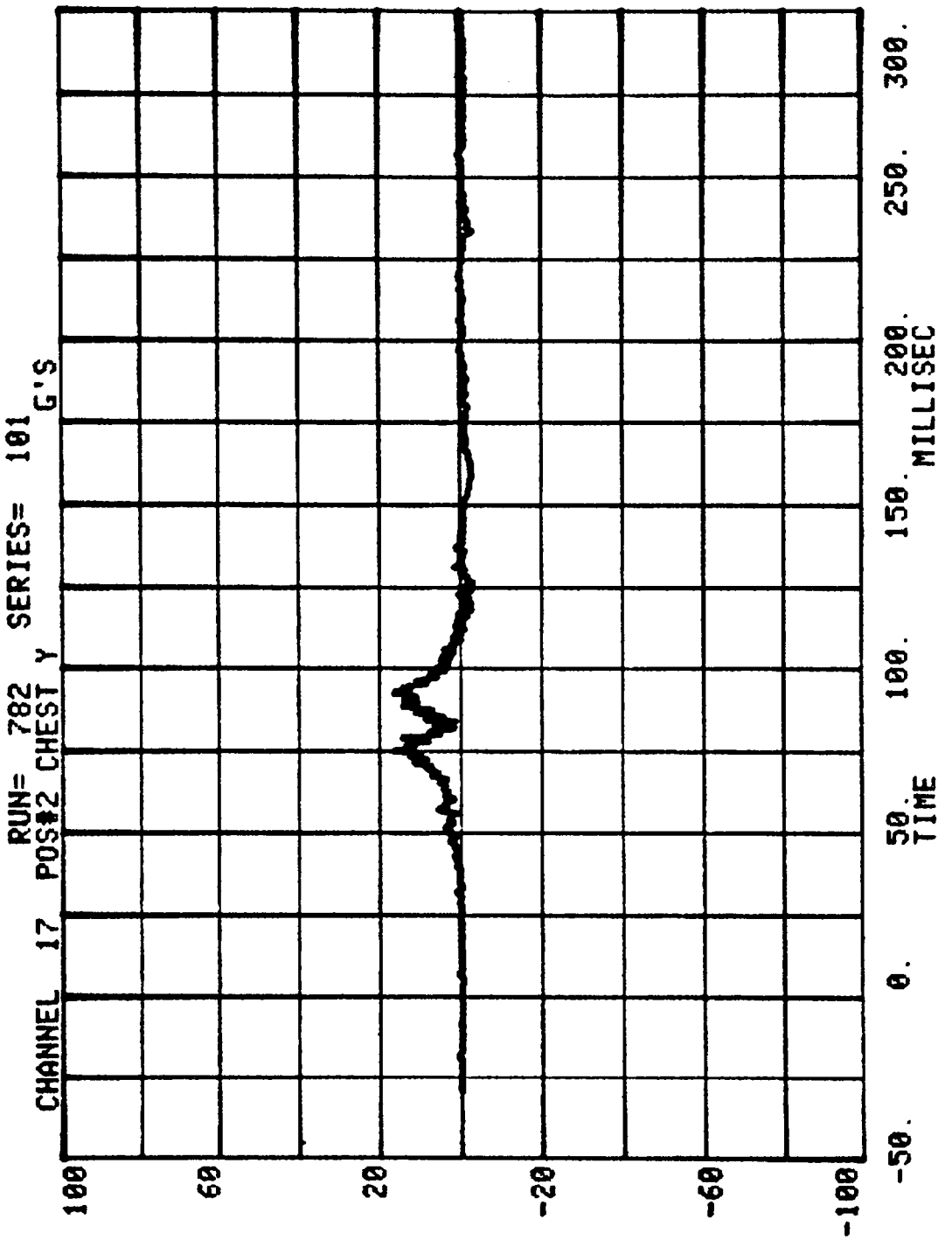

CHANNEL 15 POS#2 HEAD Z
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 3 POS#2 HEAD R
RUN= 782 SERIES= 101
G'S
250.
200.
150.
100.
50.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

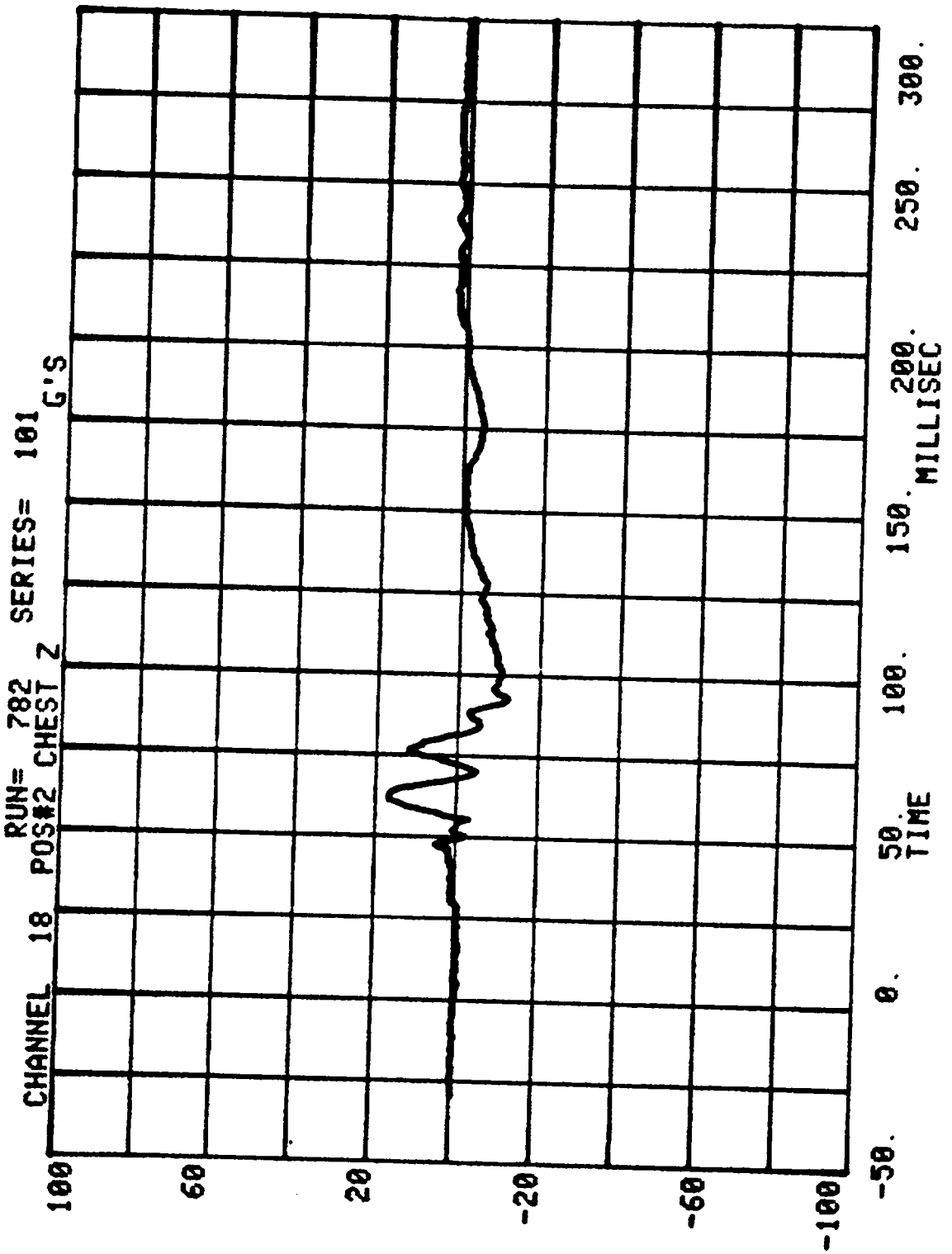
7556-20

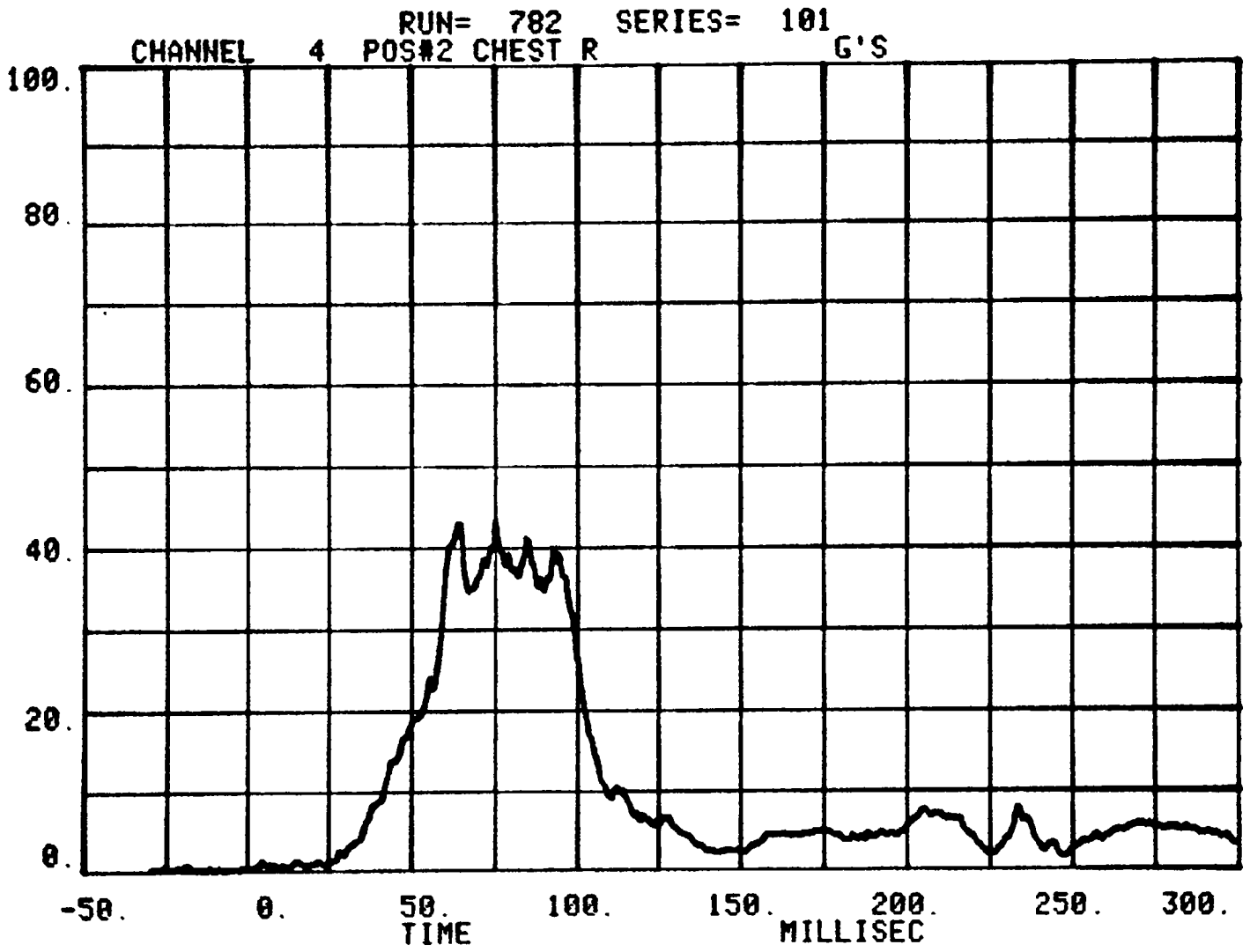

CHANNEL 16 POS#2 CHEST X
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20

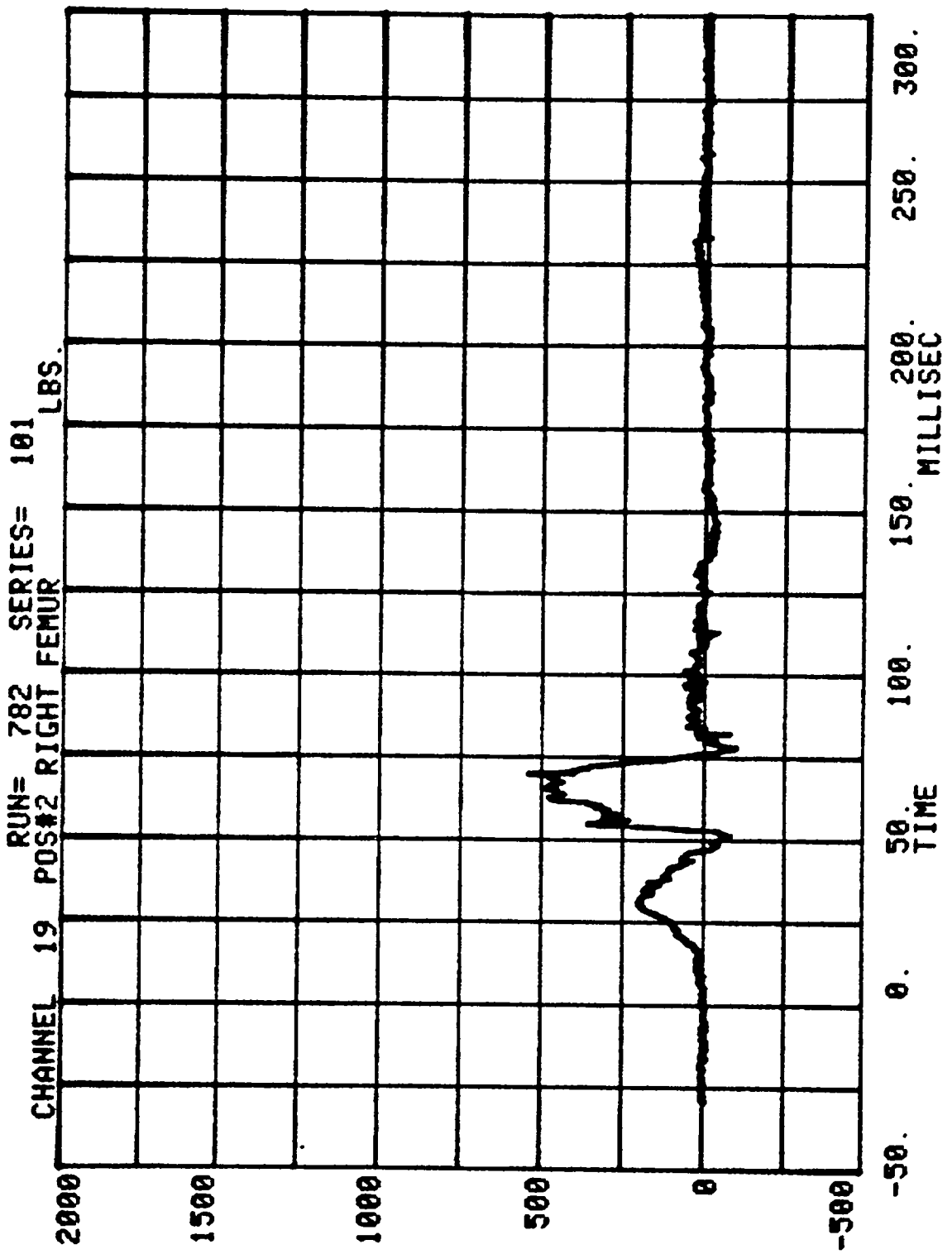

CHANNEL 17 POS#2 CHEST Y
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20

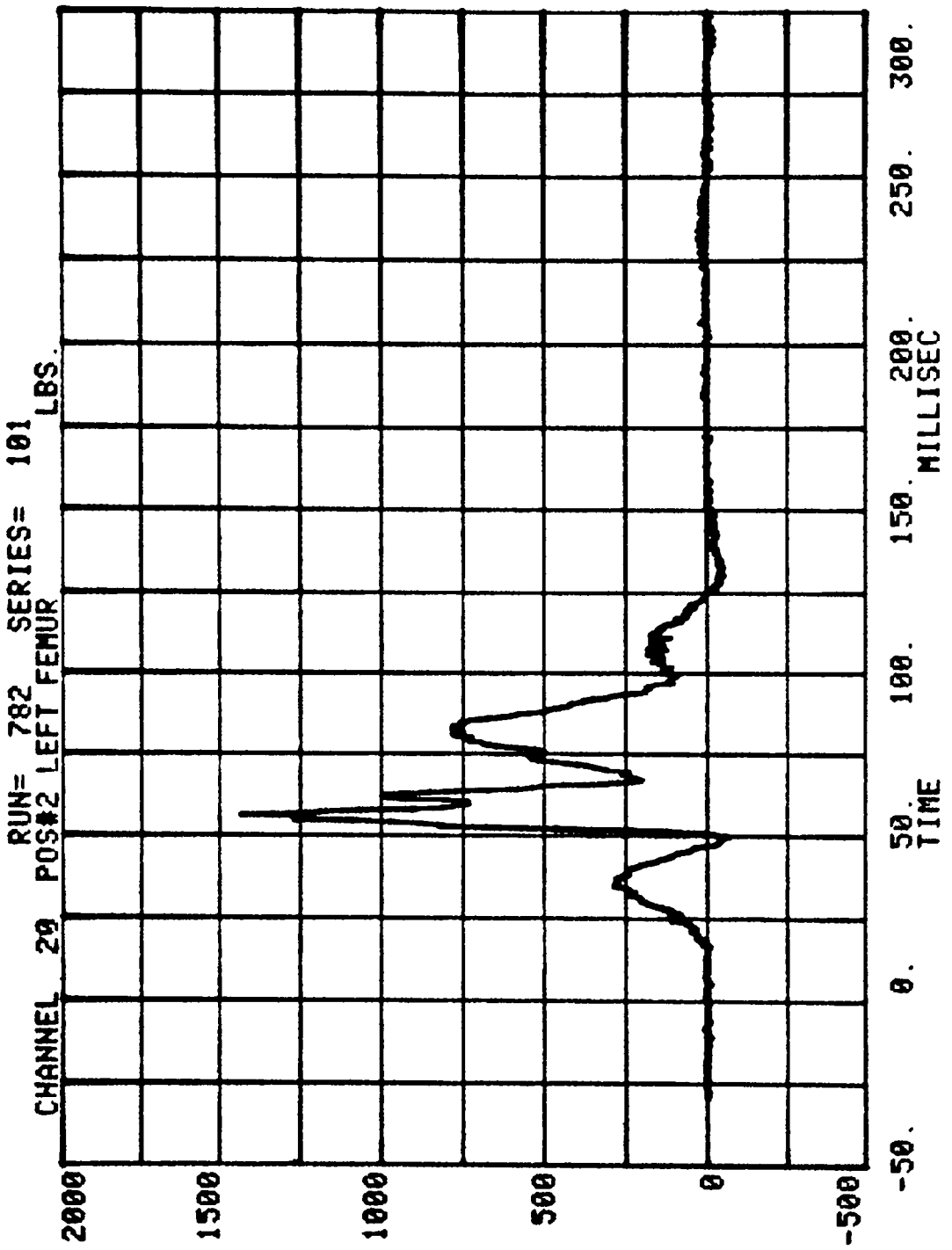

CHANNEL 18 POS#2 CHEST Z
RUN= 782 SERIES= 101
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 782 SERIES= 101
CHANNEL 4 POS#2 CHEST R
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

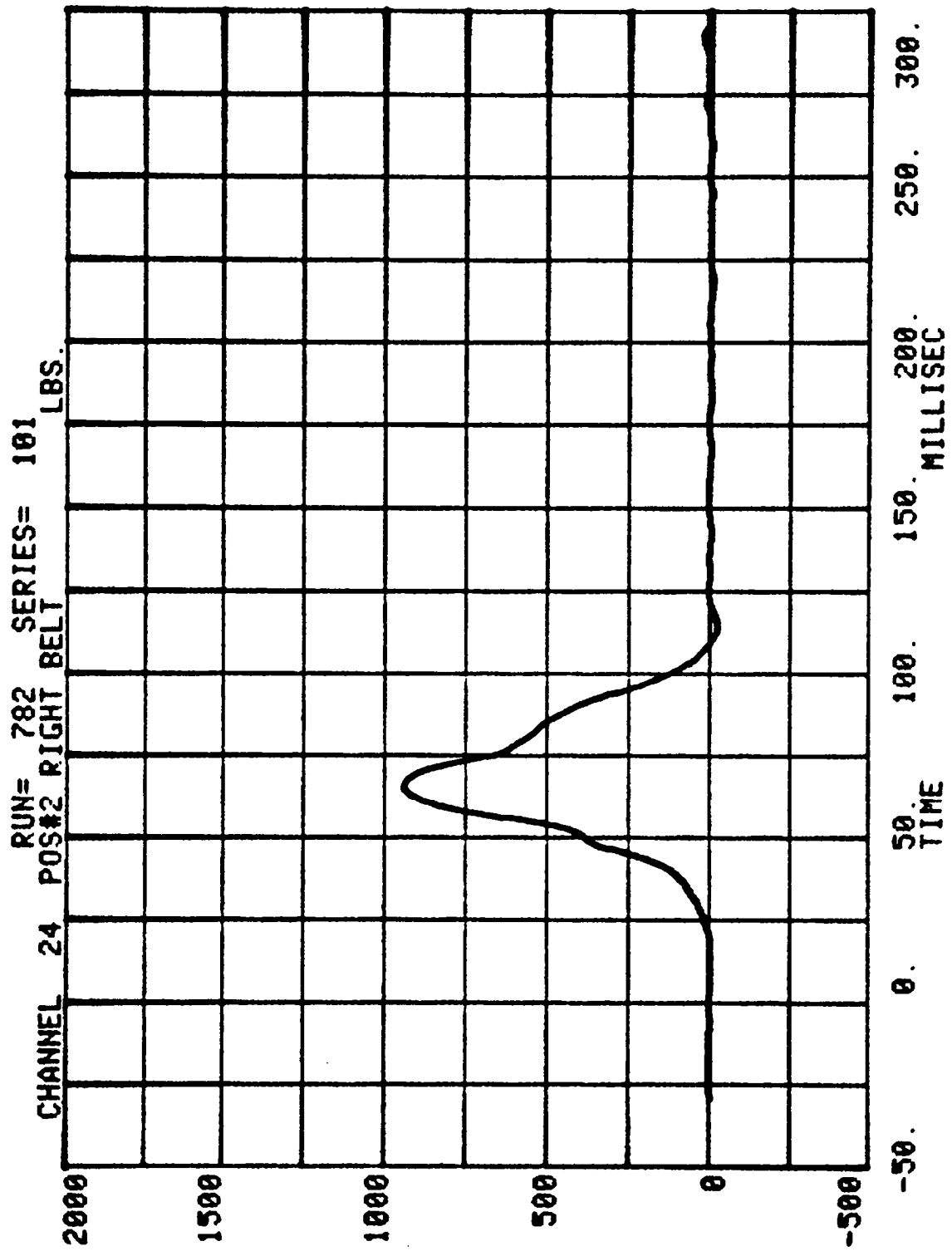
7556-20


CHANNEL 19 POS#2 RIGHT FEMUR
RUN= 782 SERIES= 101
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

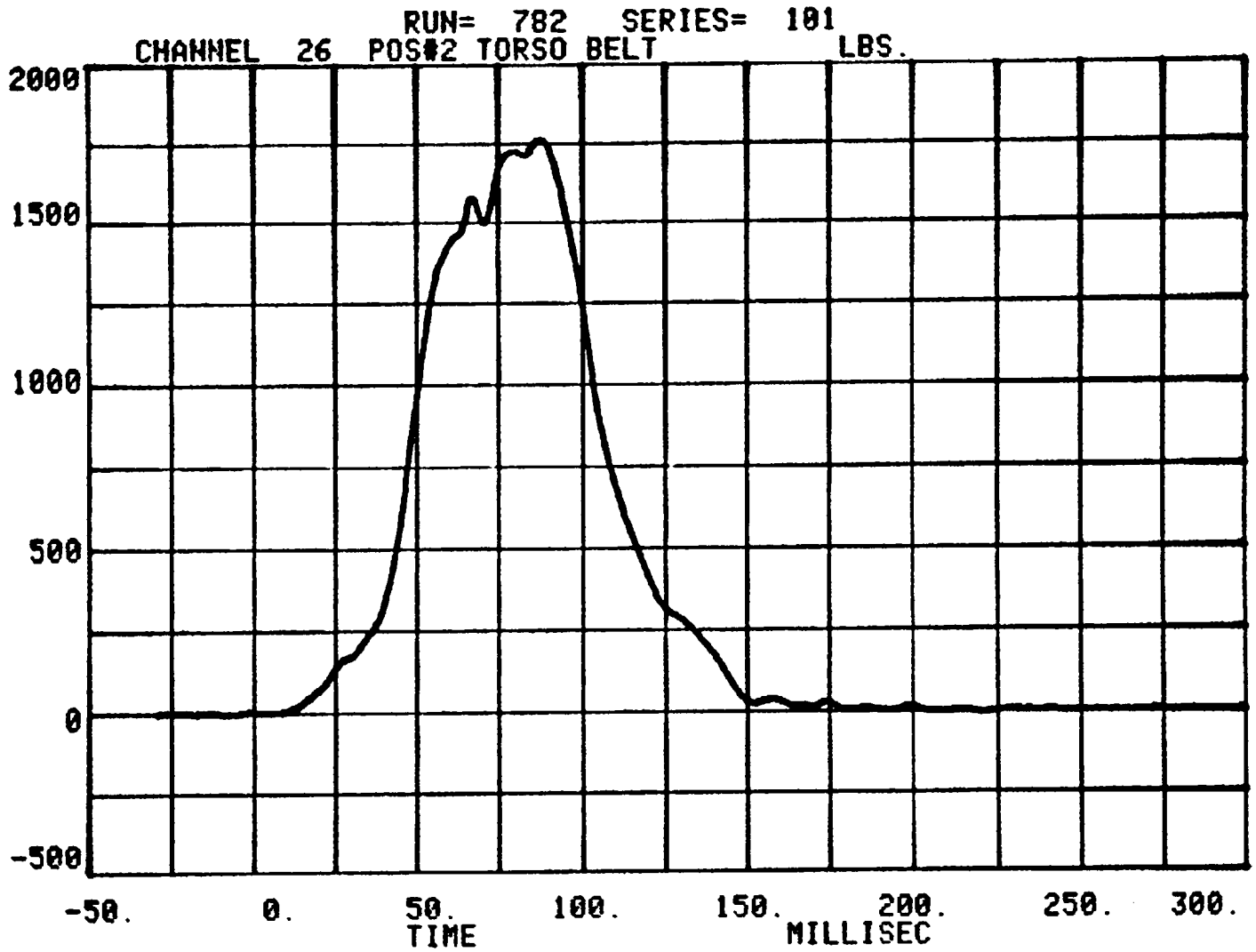
7556-20


CHANNEL 29
RUN= 782 SERIES= 101
POS#2 LEFT FEMUR
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

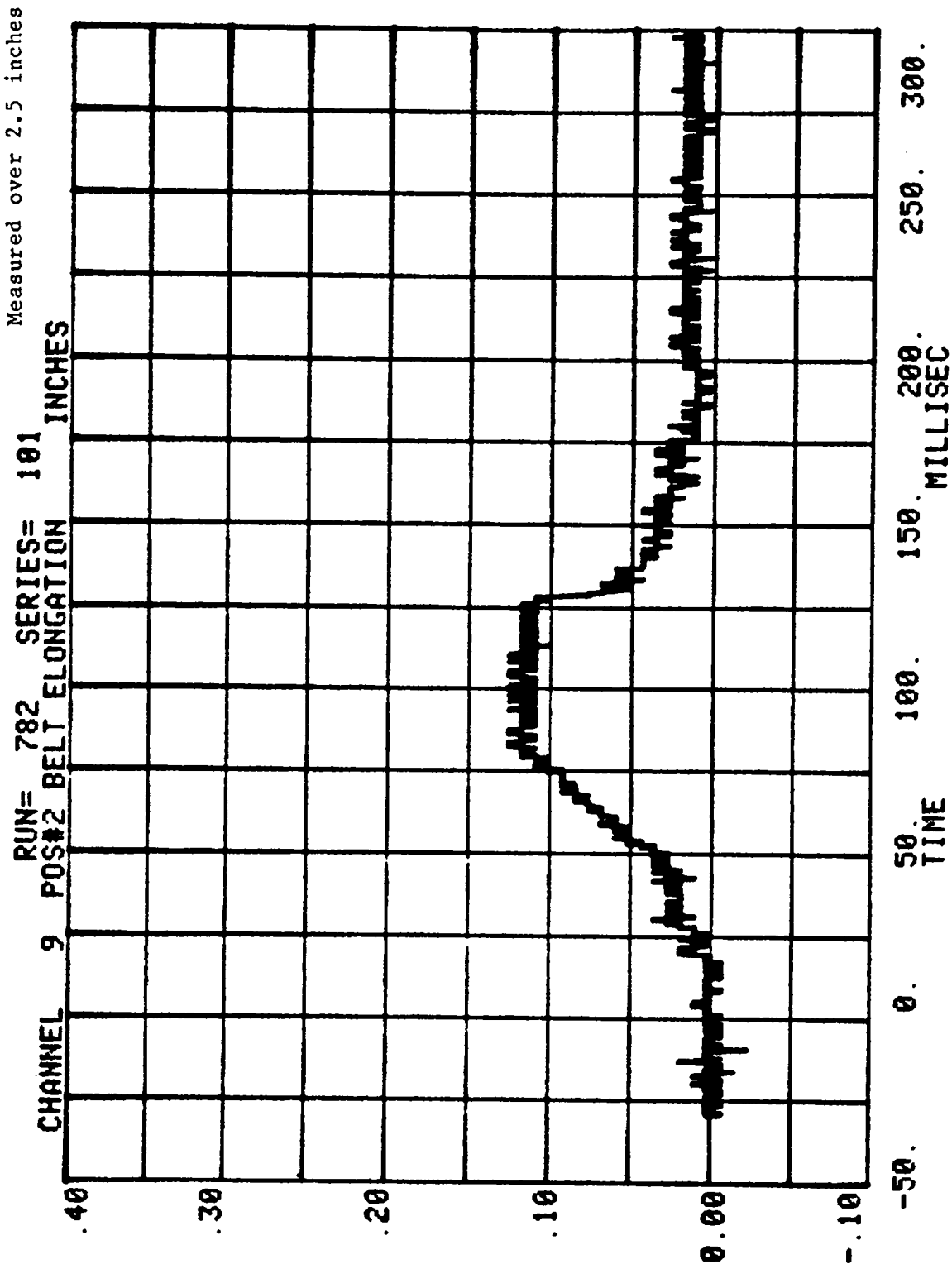
7556-20


CHANNEL 24 RUN= 782 SERIES= 101
POS#2 RIGHT BELT LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20


RUN= 782 SERIES= 101
CHANNEL 26 POS#2 TORSO BELT LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7556-20


Measured over 2.5 inches
CHANNEL 9 RUN= 782 SERIES= 101
POS#2 BELT ELONGATION INCHES
.40
.30
.20
.10
0.00
-.10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC

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 the Appendix.

Dummy serial numbers and certification dates are:

Serial No.	Completion Date
1020	5/29/87
1021	5/29/87

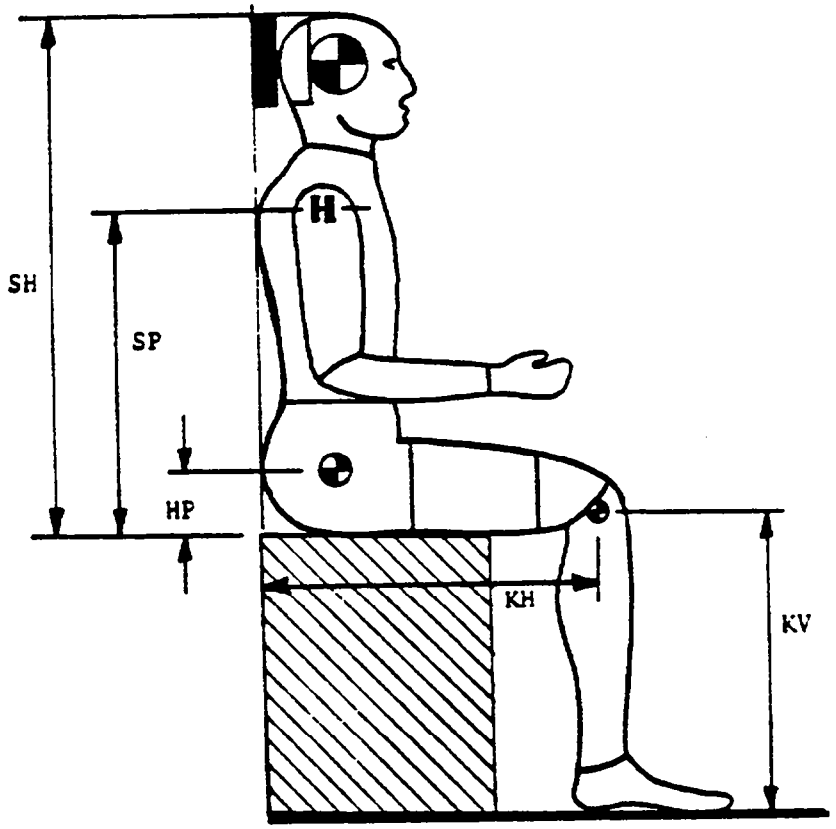
Electronic Test Equipment

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.

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NO.: 1020

I. CONFIGURATION VERIFICATION DATA:



	P.572 SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
DATE OF CONFIGURATION VERIFICATION		5/29/87	
VERIFICATION NUMBER FOR DUMMY*		4	
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"	19.6"	
SW - Shoulder Width - - - - - - -	17.8 to 18.4"	18.1"	
HW - Hip Width- - - - - - - - - -	14.0 to 15.4"	14.7"	

TECHNICIAN'S NAME: D. W. Hess

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

DUMMY CONFIG. & PERF. VERIF. DATA....Continued:

II. PERFORMANCE VERIFICATION DATA: NHTSA DUMMY I.D. NO.: 1020

TECHNICIAN'S NAME: D. W. Hess

			PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION----------			5/29/87	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY*------			4	
VERIF. LAB. TEMPERATURE (66 to 78°F Range)-----			76 °F.	°F.
VERIF. LAB. HUMIDITY (10 to 70% Range)			52-54 %	%
TEST PARAMETER		SPECIFICATION		
1. HEAD DROP TEST--				
a. Peak Resultant Accel.-		210 to 260G	242 g	
b. Peak Lateral Accel.- -		≤ - 10G	8 g	
c. Time above 100G- - - -		0.9 to 1.5ms	1.16 ms	
2. NECK BENDING TEST--				
a. Pendulum Speed - - - -		21.5 to 25.5 fps	24.77 fps	
b. Pend. Avg. Decel. over $t_3 - t_2$		20 to 24G	23.5 g	
c. Peak Resultant Head Acceleration - - - - -		26G max.	24 g	
d. Pendulum Decel.(t_2-t_1)		≤ - 3ms	3 ms	
e. Pendulum Decel.(t_3-t_2)		25 to 30 ms	27 ms	
f. Pendulum Decel.(t_4-t_3)		≤ - 10ms	5.3 ms	
g. Max. Head Rotation - -		63 to 73°	72°	
h. Chordal Displacement-- Head Rotation Angle-				
0°	Time- -	-2 to 2 ms	0 ms	
	Displ.-	-.5 to .5"	0.0"	
30°	Time- -	25.6 to 34.4ms	28.5 ms	
	Displ.-	2.1 to 3.1"	2.7"	
60°	Time- -	40.3 to 51.7ms	43 ms	
	Displ.-	4.3 to 5.3"	4.7"	
Maximum (72 °)	Time- -	53.2 to 66.8ms	58 ms	
	Displ.-	5.0 to 6.0"	5.6"	

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

II. PERFORMANCE VERIFICATION DATA (Continued) NHTSA DUMMY I.D. NO.: 1020

TECHNICIAN'S NAME: D. W. Hess

TEST PARAMETER		SPECIFICATION	Pre-Test (if required)	Post-Test (if required)
2. NECK BENDING TEST.... Continued:				
h. Chordal Displacement:				
Head Rotation Angle--				
60°	Time	67.0 to 83.0 ms	76.5 ms	
	Displ.	4.3 to 5.3 in.	4.5"	
30°	Time	85.4 to 104.6 ms	92.5 ms	
	Displ.	2.1 to 3.1 in.	2.2"	
0°	Time	101.0 to 123.0 ms	107 ms	
	Displ.	-.5 to 0.5 in.	0"	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ .5" - - - - -		23 to 36 lbs.	28 lbs.	
b. Force @ .75" - - - - -		36 to 50 lbs.	42 lbs.	
c. Force @ 1.0" - - - - -		50 to 63 lbs.	59.6 lbs.	
d. Force @ 1.3" - - - - -		73 to 88 lbs.	85 lbs.	
4. LUMBAR FLEXION TEST:				
a. Force @ 20° - - - - -		22 to 34 lbs.	26.5 lbs.	
b. Force @ 30° - - - - -		34 to 46 lbs.	39 lbs.	
c. Force @ 40° - - - - -		46 to 58 lbs.	48 lbs.	
d. Return Angle - - - - -		12° maximum	8°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed- - -		21.78-22.22 fps	22.16 fps	
(2) Peak Deflection-		1.7" maximum	1.43"	
(3) Peak Resistive Force- - - - - -		2250 lbs. maximum	2236 lbs.	
(4) Internal Hysteresis - - -		50 to 70%	62.6%	
b. Low Speed				
(1) Probe Speed- - -		13.86-14.14 fps	14.02 fps	
(2) Peak Deflection-		1.1" maximum	.86"	
(3) Peak Resistive Force- - - - - -		1450 lbs. maximum	1248 lbs.	
(4) Internal Hyster.		50 to 70%	68.9%	

DUMMY CONFIG. & PERF. VERIF. DATA....Continued:

II. PERFORMANCE VERIFICATION DATA (Continued) NHTSA DUMMY I.D. NO.: 1020

TECHNICIAN'S NAME: D. W. Hess

TEST PARAMETER	SPECIFICATION	Pre-Test (if required)	Post-Test (if required)
6. KNEE IMPACT TESTS:			
a. Right Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.00 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2250 lbs.	
(3) Time Above 1000#-	1.7 ms minimum	1.72 ms	
b. Left Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.01 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	1950 lbs.	
(3) Time Above 1000#-	1.7 ms minimum	1.92 ms	

REMARKS:

INSTRUMENT CALIBRATION INFORMATION

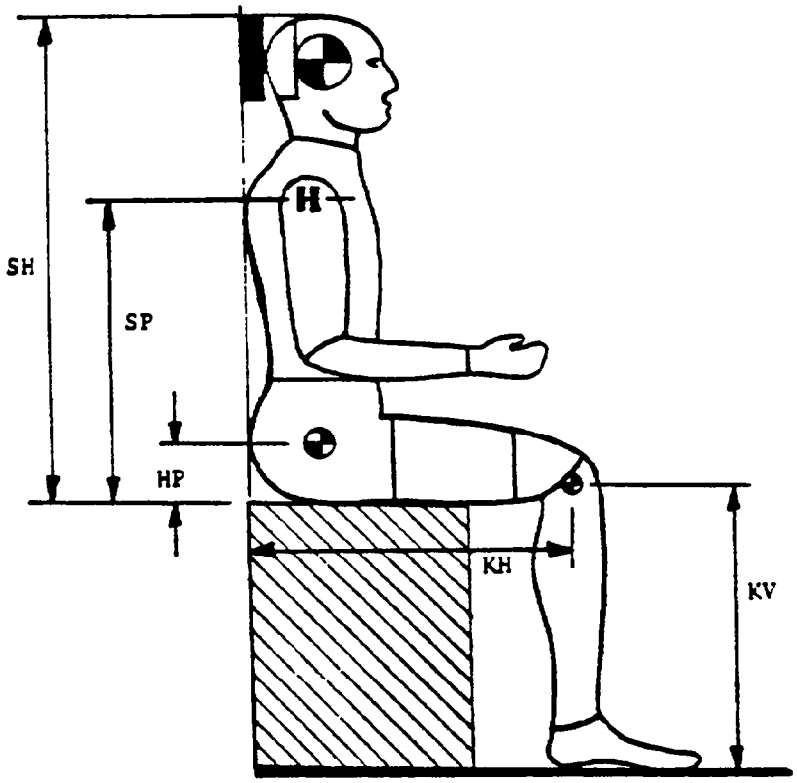
NHTSA DUMMY ID NO. 1020 CALIB. SEQ. NOS. FOR DUMMY: 4

	MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
A. DUMMY INSTRUMENTS:				
1. Head Accelerometers --				
a. Triaxial unit - - - - -	NA	------	------	------
b. Uniaxial units				
(1) Longitudinal (A_x) -	Endevco	CS70	2-87	8-87
(2) Lateral (A_y) - - -	"	CH35	2-87	8-87
(3) Vertical (A_z) - - -	"	CU88	2-87	8-87
2. Chest Accelerometers -- (Vehicle Crash Test Usage)				
a. Triaxial unit - - - - -	NA	------	------	------
b. Uniaxial units				
(1) Longitudinal (A_x) -	CEC	A84	2-87	8-87
(2) Lateral (A_y) - - -	Endevco	CY71	2-87	8-87
(3) Vertical (A_z) - - -	CEC	A86	2-87	8-87
3. Chest Potentiometer - - -	NA	------	------	------
4. Femur Load Cells --				
a. Right Side - - - - - -	GSE	551	2-87	8-87
b. Left Side - - - - - -	GSE	552	2-87	8-87
B. CALIB. LAB. INSTRUMENTS:				
1. Pendulum Accelerometer - - -	CED	18259	2-87	8-87
2. Test Probe Accelerometer - - -	CED	17815	2-87	8-87
3. Lumbar Flexion Test Push Force Gauge - - - - - - - - -	Transducer Inc.	20051	2-87	8-87
4. Abdominal Compression Test Force Gauge - - - - - - - - -	BLH	72952	2-87	8-87
5. Abdominal Compression Test Displacement Gauge - - - - -	CIC	567-11	2-87	8-87

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NO.: 1021

I. CONFIGURATION VERIFICATION DATA:



	P.572 SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
DATE OF CONFIGURATION VERIFICATION		5/29/87	
VERIFICATION NUMBER FOR DUMMY*		4	
SH - Seated Height- - - - - - - -	35.6 to 35.8"	35.7"	
SP - Shoulder Pivot Height- - - -	21.8 to 22.4"	22.2"	
HP - Hip Pivot Height - - - - - -	3.9" ref.	3.9"	
KH - Knee Pivot from back line- -	20.1 to 20.7"	20.4"	
KV - Knee Pivot from floor- - - -	19.3 to 19.9"	19.5"	
SW - Shoulder Width - - - - - - -	17.8 to 18.4"	18.2"	
HW - Hip Width- - - - - - - - - -	14.0 to 15.4"	15.0"	

TECHNICIAN'S NAME: D. W. Hess

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

DUMMY CONFIG. & PERF. VERIF. DATA....Continued:

II. PERFORMANCE VERIFICATION DATA: NHTSA DUMMY I.D. NO.: 1021

TECHNICIAN'S NAME: D. W. Hess

			PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION----------			5/29/87	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY*------			4	
VERIF. LAB. TEMPERATURE (66 to 78°F Range)-----			75-76 °F.	°F.
VERIF. LAB. HUMIDITY (10 to 70% Range)			50-56 %	%
TEST PARAMETER		SPECIFICATION		
1. HEAD DROP TEST--				
a. Peak Resultant Accel.-		210 to 260G	252 g	
b. Peak Lateral Accel.- -		≤ - 10G	5 g	
c. Time above 100G- - - -		0.9 to 1.5ms	1.12 ms	
2. NECK BENDING TEST--				
a. Pendulum Speed - - - -		21.5 to 25.5 fps	22.78 fps	
b. Pend. Avg. Decel. over $t_3 - t_2$		20 to 24G	23.5 g	
c. Peak Resultant Head Acceleration - - - - -		26G max.	23 g	
d. Pendulum Decel.(t_2-t_1)		≤ - 3ms	2.5 ms	
e. Pendulum Decel.(t_3-t_2)		25 to 30 ms	27 ms	
f. Pendulum Decel.(t_4-t_3)		≤ - 10ms	5 ms	
g. Max. Head Rotation - -		63 to 73°	69°	
h. Chordal Displacement-- Head Rotation Angle-				
0°	Time- -	-2 to 2 ms	0 ms	
	Displ.-	-.5 to .5"	0.0"	
30°	Time- -	25.6 to 34.4ms	28.6 ms	
	Displ.-	2.1 to 3.1"	2.7"	
60°	Time- -	40.3 to 51.7ms	43 ms	
	Displ.-	4.3 to 5.3"	4.7"	
Maximum (69 °)	Time- -	53.2 to 66.8ms	56.5 ms	
	Displ.-	5.0 to 6.0"	5.4"	

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

DUMMY CONFIG. & PERF. VERIF. DATA....Continued:

II. PERFORMANCE VERIFICATION DATA (Continued) NHTSA DUMMY I.D. NO.: 1021

TECHNICIAN'S NAME: D. W. Hess

TEST PARAMETER		SPECIFICATION	Pre-Test (if required)	Post-Test (if required)
2. NECK BENDING TEST.... Continued:				
h. Chordal Displacement:				
Head Rotation Angle--				
60°	Time	67.0 to 83.0 ms	74 ms	
	Displ.	4.3 to 5.3 in.	4.5"	
30°	Time	85.4 to 104.6 ms	92 ms	
	Displ.	2.1 to 3.1 in.	2.2"	
0°	Time	101.0 to 123.0 ms	108 ms	
	Displ.	-.5 to 0.5 in.	0.0"	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ .5" - - - - -		23 to 36 lbs.	26.5 lbs.	
b. Force @ .75" - - - - -		36 to 50 lbs.	38 lbs.	
c. Force @ 1.0" - - - - -		50 to 63 lbs.	55 lbs.	
d. Force @ 1.3" - - - - -		73 to 88 lbs.	87 lbs.	
4. LUMBAR FLEXION TEST:				
a. Force @ 20° - - - - -		22 to 34 lbs.	31 lbs.	
b. Force @ 30° - - - - -		34 to 46 lbs.	41 lbs.	
c. Force @ 40° - - - - -		46 to 58 lbs.	51 lbs.	
d. Return Angle - - - - -		12° maximum	6.5°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed- - -		21.78-22.22 fps	21.79 fps	
(2) Peak Deflection-		1.7" maximum	1.45"	
(3) Peak Resistive Force- - - - - -		2250 lbs. maximum	2240 lbs.	
(4) Internal Hysteresis - - -		50 to 70%	69.4%	
b. Low Speed				
(1) Probe Speed- - -		13.86-14.14 fps	13.94 fps	
(2) Peak Deflection-		1.1" maximum	1.0"	
(3) Peak Resistive Force- - - - - -		1450 lbs. maximum	1248 lbs.	
(4) Internal Hyster.		50 to 70%	65.9%	

II. PERFORMANCE VERIFICATION DATA (Continued) NHTSA DUMMY I.D. NO.: 1021

TECHNICIAN'S NAME: D. W. Hess

TEST PARAMETER	SPECIFICATION	Pre-Test (if required)	Post-Test (if required)
6. KNEE IMPACT TESTS:			
a. Right Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.83 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	1870 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.84 ms	
b. Left Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.99 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	1900 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.88 ms	

REMARKS:

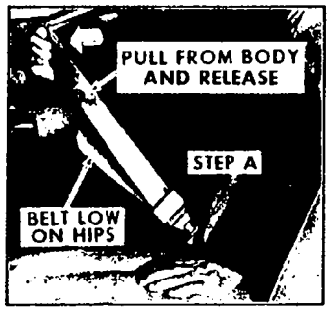
INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1021 CALIB. SEQ. NOS. FOR DUMMY: 4

A. DUMMY INSTRUMENTS:	MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. Head Accelerometers --				
a. Triaxial unit - - - - -	NA	------	------	------
b. Uniaxial units				
(1) Longitudinal (A_x) -	Endevco	CH83	2-87	8-87
(2) Lateral (A_y) - - -	"	CU62	2-87	8-87
(3) Vertical (A_z) - - -	"	CM86	2-87	8-87
2. Chest Accelerometers -- (Vehicle Crash Test Usage)				
a. Triaxial unit - - - - -	NA	------	------	------
b. Uniaxial units				
(1) Longitudinal (A_x) -	CEC	A74	2-87	8-87
(2) Lateral (A_y) - - -	Endevco	CE76	2-87	8-87
(3) Vertical (A_z) - - -	CEC	A72	2-87	8-87
3. Chest Potentiometer - - -				
4. Femur Load Cells --				
a. Right Side - - - - - -	GSE	306	2-87	8-87
b. Left Side - - - - - -	GSE	310	2-87	8-87
B. CALIB. LAB. INSTRUMENTS:				
1. Pendulum Accelerometer - - -	CED	18259	2-87	8-87
2. Test Probe Accelerometer - - -	CED	17815	2-87	8-87
3. Lumbar Flexion Test Push Force Gauge - - - - - - - - -	Transducer Inc.	20051	2-87	8-87
4. Abdominal Compression Test Force Gauge - - - - - - - - -	BLH	72952	2-87	8-87
5. Abdominal Compression Test Displacement Gauge - - - - -	CIC	567-11	2-87	8-87

APPENDIX D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS



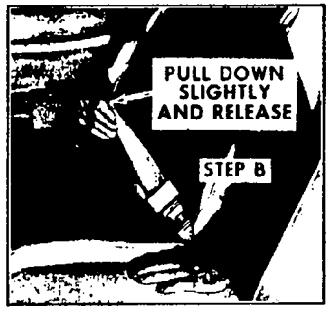
Shoulder Belt Slack – Step A

amount of protection in an accident because the belt is too loose to restrain you as intended.

- Pull the shoulder belt out at least 130 millimeters (five inches), so it returns to your chest when you let go.
- Then, pull down on the shoulder belt the least amount needed to ease pressure (but no more than 25 millimeters or one inch) and let go.
- To get rid of belt slack, pull the belt out at least 130 millimeters (five inches) and let go.

Keep any shoulder belt slack to a minimum– no more than 25 millimeters (one inch). Belt slack beyond the specified amount could significantly reduce the

Shoulder Belt Slack – Step B



To unfasten the belt, push in the button in the center of the buckle. When the buckle is unlatched and the door is opened, or the shoulder belt is pulled out about 180 millimeters (seven inches), the retractor should rewind the belt. Hold the belt as it retracts. If the belt does not retract fully, slide the latch plate down the webbing.

To help prevent damage to the seat belt and interior trim, be sure the belt is fully retracted and the latch plate is out of the way before closing the door.

Automatic Seat Belt System

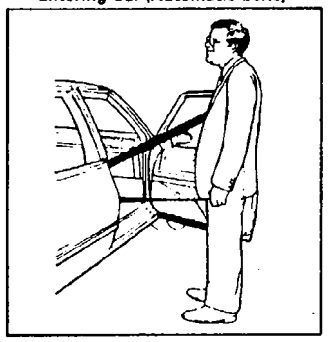
(Front Seats, Certain Models)

On late production models, the front seats have an Automatic Seat Belt system for the lap-shoulder belt. It is called "automatic" because it is designed to fit itself across you when you enter the car and close the door. Each time you leave the car, the belt is designed to let you exit without unbuckling it.

1. Get in the car, close the door fully and lock it. The Automatic Seat Belt is designed to fit itself across you.

   If the belts prevent you from opening a door, the door may have been

Entering Car (Automatic Belts)



slammed too hard; if so, close the door fully and open it slowly. If it happens repeatedly, a seat belt retractor is not working correctly. Promptly take any problems to your Oldsmobile dealer for service advice. Have any necessary repairs completed at once.

2. Adjust the seat as needed. Sit up straight and well back in the seat. Make sure the lap belt portion of the Automatic Seat Belt is located as low on the hips as possible and is free of twists and slack– reposition it if necessary. This reduces the risk of sliding under the belt during a collision.

Positioning Automatic Seat Belt

3. Make sure the shoulder belt portion of the Automatic Seat Belt is routed directly across the chest and over the shoulder, and is free of twists and slack– reposition it if necessary. This helps assure that the belt will properly restrain you in an accident.

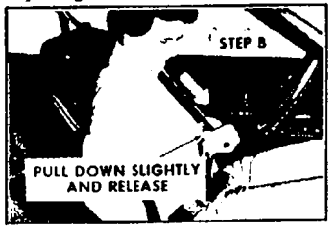
   The Automatic Seat Belt system is designed to lock only during a sudden stop or impact. At other times, the belt should move freely with the person.

Adjusting Shoulder Belt Slack – Step A

4. On two-door models, if the shoulder belt portion is too snug:
   A. Pull the shoulder belt out at least 130 milimeters (five inches) so it returns to your chest when you let go.
   B. Then, pull down on the shoulder belt the least amount needed to ease pressure (but no more than 25 millimeters or one inch) and let go.
5. To get rid of the slack in the belt, pull the belt out at least 130 millimeters (five inches) and let go.

This feature is designed into the shoulder belt retractor so that it ratchets like a window shade. Step A cycles or "zeroes" the device so you can add a small amount of slack in Step B.

Adjusting Shoulder Belt Slack – Step B



Keep any shoulder belt slack to a minimum (whether or not it has the feature in Steps 4 and 5)– no more than 25 millimeters (one inch). Belt slack beyond the amount specified could significantly reduce the amount of protection in an accident because the belt is too loose to restrain you as intended.

There is no need to detach the Automatic Seat Belt when leaving the car. With the belt still attached to its buckle, it will swing out of your way as the door is opened.

In an emergency, or if a child in a child restraint is to ride where the Automatic Seat Belt is located, detach the belt by pushing the release button in the center of the buckle and pulling on the belt at the same time.

A special Infant/Child Seat Restraint Belt should be used in place of the Automatic Seat Belt when using a child restraint in the front seat. (See **"Child Restraint"** in this section.)

General Motors urges that you keep the Automatic Seat Belts attached at all times, except when a child is riding in the front seat in a child restraint held by the Infant/Child Seat Restraint Belt.

A properly used Automatic Seat Belt system can reduce the risk and severity of injury in an accident.

To reattach the Automatic Seat Belt so it can function properly, first close and lock the door. Then:

- Grasp the latch plate where it has been retracted against the door and pull the webbing across your lap.
- Keep the webbing straight so it does not twist, and push the latch plate into the buckle until it clicks.

"FASTEN BELTS" Light

Cars Without Automatic Seat Belts

When you turn the ignition key to "Run" or "Start," a red **"FASTEN BELTS"** reminder light will come on for four to eight seconds to remind people to fasten their seat belts. Unless the driver's seat belt is buckled, a chime will sound at the same time.

If the seat belt or reminder system does not work as described, see your dealer for service.

Cars With Automatic Seat Belts

On cars with the Automatic Seat Belt system, the **"FASTEN BELTS"** light serves two purposes: it both reminds people to wear their seat belts, and is designed to warn that a retractor may have malfunctioned.

If for some reason the driver's Automatic Seat Belt has been detached, when the ignition key is turned to "Run," a tone (or chime) is designed to sound for four to eight seconds to remind people to fasten their seat belts. Unless the driver's belt is reattached, the **"FASTEN BELTS"** warning light is also designed to come on and then go off about two minutes later. With the ignition on, the light is designed to come on when a door handle is operated or a door is open.

CAUTION: If the *"FASTEN BELTS"* light comes on and stays on at any time other than when you start the car (whether or not the Automatic Seat Belts are attached), it means the Automatic Seat Belt system may have malfunctioned and may not be able to provide the intended protection in the event of an accident.

If the light does not come on, or if it stays on, or if the system does not work as described, see your dealer to have the Automatic Seat Belt system inspected and repaired at once, to help reduce the risk of personal injury in collisions or sudden maneuvers.

Seat Belt Extender

If a seat belt cannot be fastened because it is not long enough, General Motors will be pleased to furnish a seat belt extender without charge. (On cars with Automatic Seat Belts, extenders are not expected to be needed in seating positions with this belt system, due to the extra webbing which allows the Automatic Seat Belts to be attached to the door.)

To get an extender, contact your dealer; remember to bring the heaviest coat you expect to wear, to obtain the proper length extender. Be prepared to choose a front or rear seat position where the extender will be used– an extender measured for a front seat may not be safe for use in a rear seat, and one measured for the rear may not be safe in the front.

Remember also that the extender intended for this car may not be safe for use in another vehicle, and that the extender from another vehicle may not be safe for use in this car. For example, an improper extender might come apart during an accident, causing the user to be injured. The seat belt extender is to be used only by the person for whom it was measured; use by others, or use in another vehicle, could reduce seat belt restraint effectiveness in an accident and result in personal injury. Do not use the extender if the seat belt can be fastened without it.

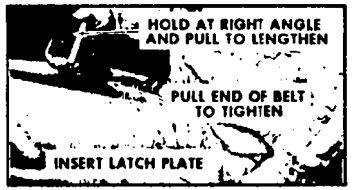
To use the extender, sit in the seat measured for the extender (as indicated on the extender's label), push the car's seat belt latch plate into the extender's buckle, and the extender's latch plate into the seat belt buckle. To unfasten the belt, push in the button in the center of the extender buckle so that it remains attached on the inboard side. This helps avoid damaging the extender or interior trim. Keep the extender in the vehicle for which it was intended.

Rear Seat Lap Belts

On 2-door cars without Automatic Seat Belts, push back the front seat belt "sleeve" out of the door opening when getting into the rear seat. Push it forward again once you are inside, so the person in the front seat can easily reach the belt. (Upon leaving, remember to pull the sleeve rearward out of the door opening.)

Rear seat lap belts next to side windows have retractors which are designed to take up extra webbing.

In a single motion, pull the rear seat outboard lap belt across your lap far enough to push the latch plate into the buckle, until it clicks. (If the belt is not long enough, an extension is available from your dealer. See **"Seat Belt Extender"** in this section.) If the webbing locks before the latch plate reaches the buckle, let it rewind fully into its retractor. This will unlock it so the belt can be pulled out to the proper length.



Rear Seat Lap Belts

These belts should be positioned, worn, and released as described under **"Front Seat Lap-Shoulder Belt"** for cars without Automatic Seat Belts. Adjust the belt to a snug fit by pulling it firmly across your lap toward the retractor, so the retractor can take up slack.

The lap belt at the center seat also should be positioned, worn and released as described above; however, it does not have a retractor. Adjust it to a snug fit by pulling on the end of the belt coming from the latch plate.

To lengthen a center seat lap belt, place the latch plate at an angle to the belt webbing and pull on the latch plate; the belt should then slide easily. (If the belt is not long enough, an extension is available from your dealer. See **"Seat Belt Extender"** in this section.)