REPORT NUMBER: CAL-90-N09

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

NISSAN MOTOR COMPANY, LTD
1990 INFINITI M30
2-DOOR SPORT COUPE

NHTSA NUMBER: ML5202

CALSPAN TEST NUMBER: 7776-9

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

February 13, 1990

FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
Office of Market Incentives
400 Seventh Street, S.W.
Room No. 5313 (NRM-20)
Washington, DC 20590

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15. Supplementary Notes

16. Abstract

A frontal load cell barrier test of a 1990 Infinity M30 2-Door Sport Coupe was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York on February 13, 1990.

The impact speed was 35.0 mph and the ambient temperature at the barrier face at the time of impact was 35°F. The maximum post-test vehicle crush was 24.5 inches. The test vehicle was equipped with a manual 3-point continuous belt system at each of the front outboard seating positions. The driver's position was equipped with an air bag as a supplemental restraint system.

With regard to FMVSS 208-"Occupant Crash Protection," injury criteria, both the driver and passenger dummies appear to comply with the head, chest and femur requirements.

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Section I

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 90 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-87-D-02012. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph requirements.

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

Section 2

SUMMARY OF TEST NUMBER ML5202

A load cell barrier consisting of 36 load cells was impacted by a 1990 Infiniti M30 Sport Coupe at a velocity of 35.0 mph. The test was performed at the Calspan Corporation Advanced Technology Center on February 13, 1990. 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 the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head and chest triaxial accelerometers and right/left femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 357) and the right-front passenger ATD (Serial No. 358) were calibrated previous to this test. 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 air bag and the HIC was 466.2. The maximum chest deceleration over 3 milliseconds was 42.9 g's and femur loads were 935.5 and 1131.6 pounds.

The right front passenger's HIC was 443.0 and maximum chest deceleration over 3 milliseconds was 44.5 g's. Femur loads were 844.2 and 715.7 pounds.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Year/Make/Model/Body Style: 1990 Infiniti M30 2-Door Sport Coupe

NHTSA No.: ML5202 VIN.: JNKHF14C2LT-000448

Body Color: White Date Of Manufacture: August 1989

Engine: 6 Cylinders; - C.I.D.; 3.0 Liters; - CC
X Gas; - Diesel; - Turbocharged
X Longitudinal; - Transverse

Transmission: 4 Speed; - Manual; X Automatic; X Overdrive

Final Drive: - Front Wheel; X Rear Wheel; - Four Wheel

Date Received: 12-04-89 Odometer Reading: 025.3 miles

X A/C; X P/S; X P/B; X P/wdo.; X Tilt Wheel
X P/seats; X Cruise Control

Type of Occupant Restraint: 3-Point Continuous Belt System with a Driver's Side Air Bag.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

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

Recommended Tire Size: P215/60R15 93H

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

Tires on Vehicle: P215/60R15 93H ; Manufacturer: Dunlop

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. Knob

Vehicle Capacity Weight (VCW) = 860 lbs. (A)

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

Rated Cargo and Luggage
Weight (RCLW) A-B = 110 lbs.

GVWR 4193 lbs. GAWR: Front 2249 lbs. Rear 2359 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 = 880 lbs. Right Rear = 780 lbs.

Left Front = 950 lbs. Left Rear = 760 lbs.

TOTAL FRONT WEIGHT = 1830 lbs. (54 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1540 lbs. (46 % of Total Vehicle Weight)

TOTAL DELIVERY WEIGHT = 3370 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (3370 lbs.)

VCW = Vehicle Capacity Weight (860 lbs.)

DSC = Designated Seating Capacity (5)

RCLW = VCW - 150 (DSC) = 110 lbs.

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

Target Test Weight = 3808 lbs.

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

Right Front = 990 lbs. Right Rear = 920 lbs.

Left Front = 1000 lbs. Left Rear = 930 lbs.

TOTAL FRONT WEIGHT = 1990 lbs. (52 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1850 lbs. (48 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 3840 lbs.

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

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 27.3 LF 27.0 RR 27.4 LR 27.2

Test Attitude: RF 26.5 LF 26.7 RR 25.4 LR 25.2

Wheel Base: 102.7 in.; C.G. = 49.3 in. rearward of front wheel C/L

Remarks: Trunk lid was removed to provide clearance for instrumentation. Trunk lid weight was approximately 10 lbs.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0°

Date of Test: February 13, 1990 Time of Test: 11:50

Ambient Temperature: 35 °F at impact area

Temperature in Occupant Compartment: 72 °F

Windshield Molding Temperature: 72 °F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: primary = 35.0 mph, secondary = 35.0 mph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 52 inches

Exiting Speed Trap: 12 inches

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length:	Pre-test	= R	185.0	C_L	188.3	L 185.4
	Post-test	= R	165.7	C_L	163.8	L 164.0
	Crush	= R	19.3	C_L	24.5	L 21.4

Distance from front of test vehicle to point of impact:

R 18.3" C_L 19.0" L 18.8"

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Air Bag	No Contact
Chest	No Contact	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	
	Left	Right
Door Opening	operable	operable

	Front	
Seat Movement	Left	Right
Seat Back Failure	none	none
Seat Shift (in.)	.25" forward	1 notch forward

Glazing Damage

Backlight/Windshield: Sustained stress fractures, but remained intact.

Section 3

OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

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

II. OVR DATA

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

Table 2

DUMMY INJURY CRITERIA VALUES

NHTSA No.: ML5202 Vehicle: 1990 Infiniti M30 2-Door Sport Coupe

	MAXIMUM HEAD ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	-49.4	17.7	42.3	64.6
Position #2 - Passenger	33.8	-26.0	47.4	49.5

	MAXIMUM CHEST ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	-43.4	-17.1	13.3	42.9
Position #2 - Passenger	-46.4	-38.8	17.9	44.5

The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Position #1 - Driver	935.5	1131.6
Position #2 - Passenger	844.2	715.7

	MAXIMUM FORCE - SEAT BELT LOADS (lbs.)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
Position #1 - Driver	1107.2	-	982.6
Position #2 - Passenger	1577.0	1165.9	-

	HEAD INJURY CRITERIA (HIC)			
	HIC	t_1 (SEC)	t_2 (SEC)	Average Acceleration t_1 TO t_2
Position #1 - Driver	466.2	.06765	.09532	49.0
Position #2 - Passenger	443.0	.08152	.11752	43.3

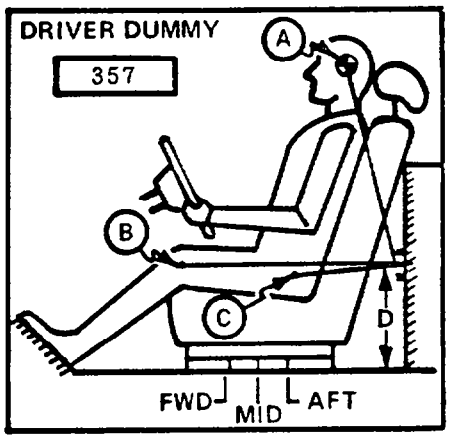
HIC is as defined in FMVSS 208. The maximum time interval from t_1 to t_2 is 36 milliseconds.

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION

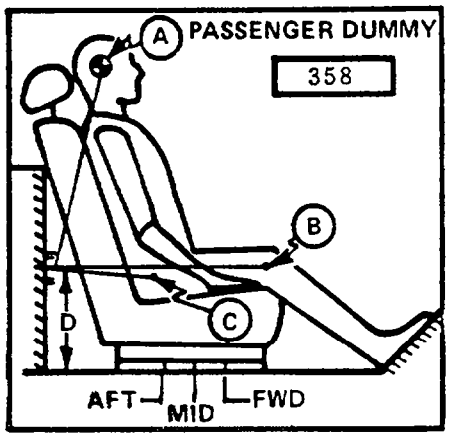
Test No.: ML5202 Vehicle: 1990 Infiniti M30 2-Door Sport Coupe

SEAT TYPE:	ADJUSTER TYPE:	BUCKET SEAT BACK TYPE:
- Bench	- Manual	- Fixed
X Bucket	X Power	X Adjustable Reclining
- Split Bench		

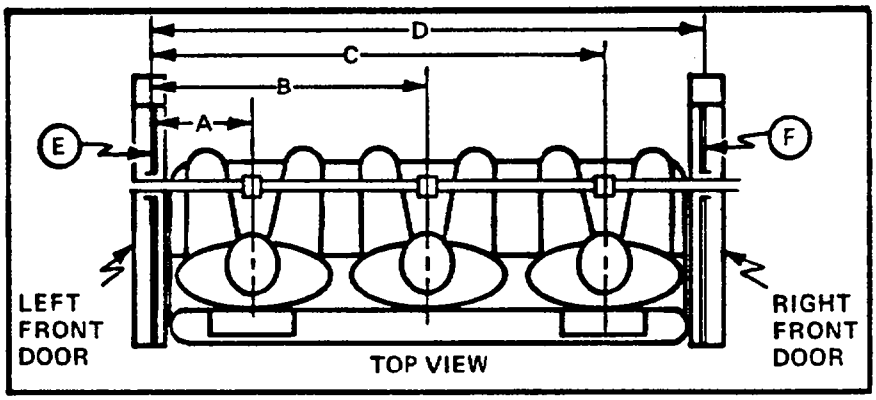


MEASUREMENT LOCATION

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



A =	22.9 in.	26 Degrees	A =	22.3 in.	24 Degrees
B =	33.0 in.	95 Degrees	B =	33.7 in.	98 Degrees
C =	19.1 in.	110 Degrees	C =	18.8 in.	110 Degrees
D =	13.6 in.		D =	13.6 in.	



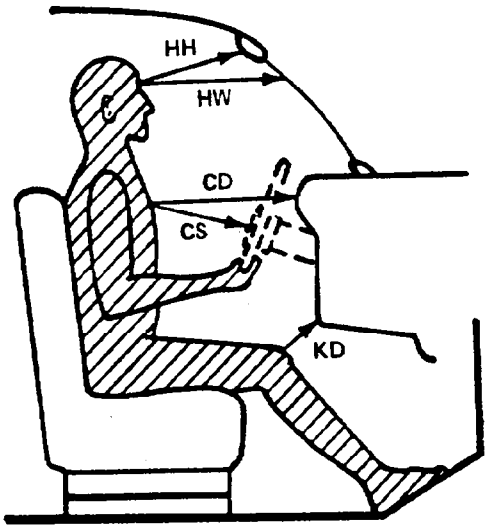
357 DUMMY ID 358

A =	Left Door to Driver Centerline	10.8 in.
B =	Left Door to Center Passenger Centerline	- in.
C =	Left Door to Right Passenger Centerline	38.0 in.
D =	Left Door to Right Door	49.3 in.
E,F =	Window Glass Height (Right and Left Must Be Equal)	10.8 in.

Figure 2

OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	15.6	16.5
HW	21.1	22.0
CD	22.5	23.3
CS	13.2	-
KDL	5.5	7.1
KDR	5.6	7.4
SA	See Note	See Note
TA	25°	25°



HH = Head to Windshield Header

HW = Head to Windshield

CD = Chest to Dash

CS = Chest to Steering Wheel

KD(L/R) = Knee to Dash (Left/Right)

SA = Seat Back Angle

TA = Torso Angle

HA = Head Target to "A" Pillar

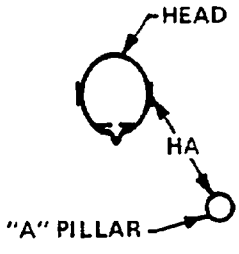
HR = Head to Side Roof

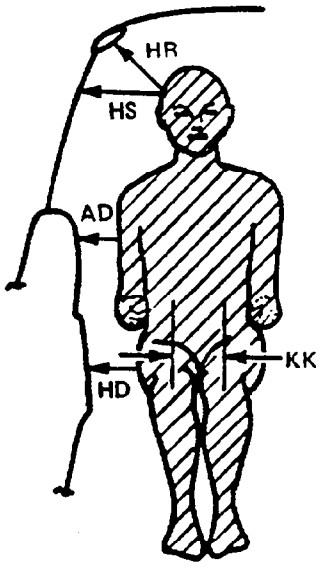
HS = Head to Side Window

AD = Arm to Door

HD = Hip to Door

KK = Knee to Knee



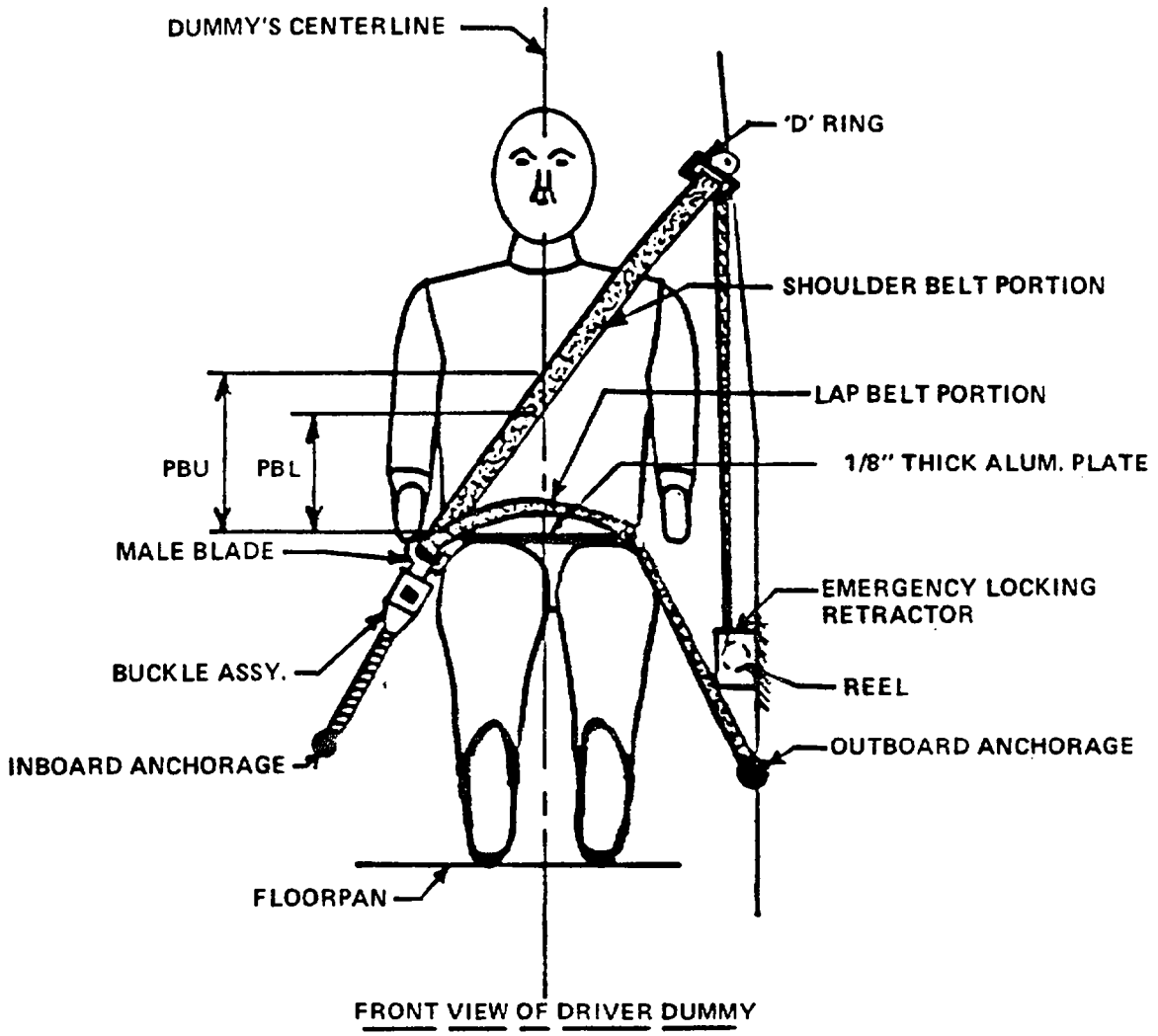


	DRIVER	PASSENGER
HR	5.3	5.3
HS	7.6	7.9
AD	2.7	3.4
HD	6.1	6.5
KK	10.8	8.2
HA	21.3	21.1

Note: Seat back was positioned as specified by manufacturer.

Figure 3

SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to upper edge	10.9	10.9
PBL -- Top surface of alum. plate to belt lower edge	13.8	13.8
LAP BELT TENSION	2 lbs.	2 lbs.
SHOULDER BELT TENSION	-	-

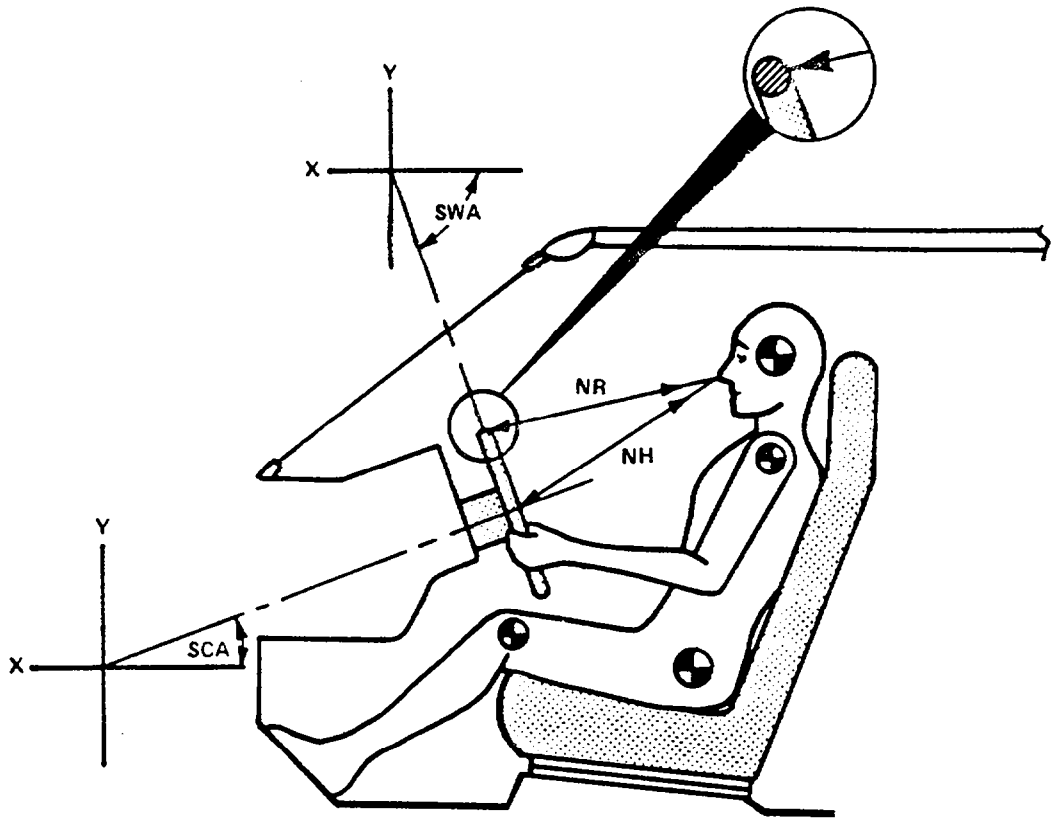
Table 3

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.	80.3"	82.8"
Shoulder belt length as measured on Part 572 Dummy.	36.0"	40.0"
Lap belt length as measured on Part 572 Dummy.	37.5"	36.0"
SHOULDER BELT SPOOL-OFF DATA:		
As determined by film analysis.	2.0"	2.0"
As determined mechanically.	1.7"	2.0"
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	0.4 in/ft	N/A in/ft
Measured mechanically	0.5 in/ft	0 in/ft

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	18.9	Inches
NH -- Distance from tip of dummy's nose to center of steering column hub	19.6	Inches
SCA -- Angle of steering column relative to the horizontal X axis	23	Degrees
SWA -- Angle of steering wheel relative to the horizontal X axis	-67	Degrees

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

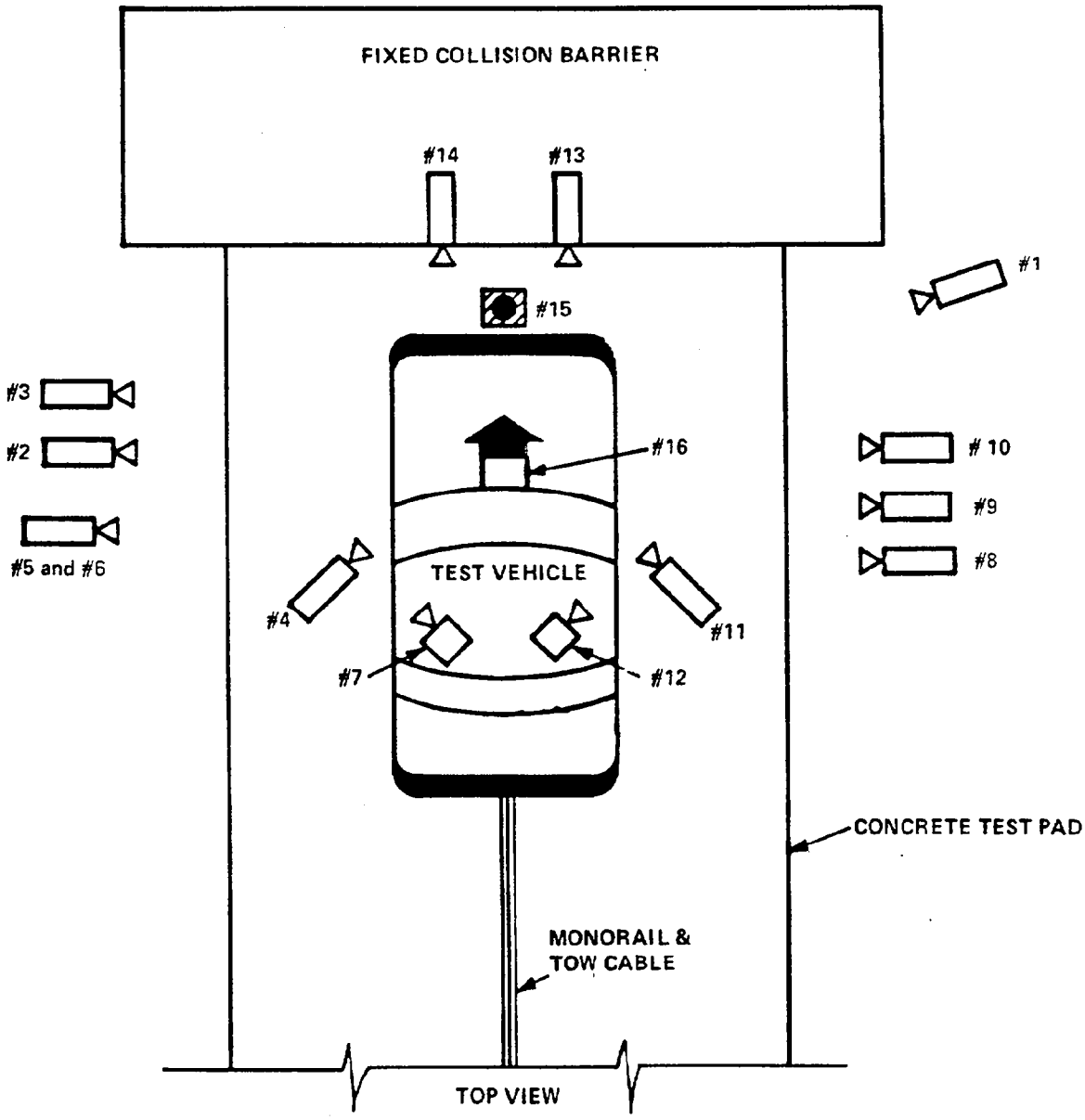


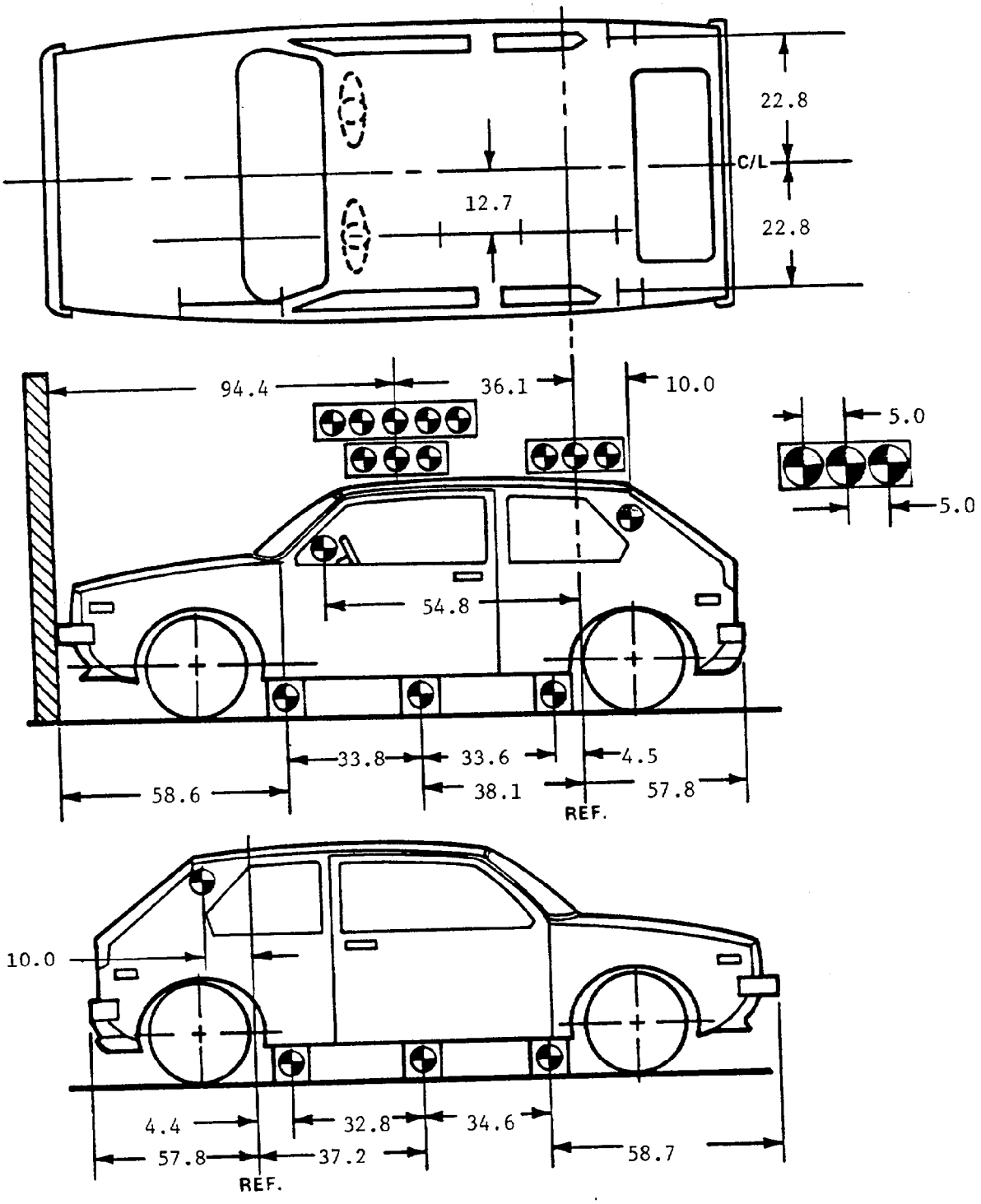
Table 4

HIGH-SPEED CAMERA LOCATIONS

Test No. ML5202 Vehicle: 1990 Infiniti M30 2-Door Sport Coupe

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	238	53	41	-4	221	13	540
3	Left Side View	339	17	41	-4	322	25	540
4	Driver and Interior View	119	111	72	-22	102	13	800
5	Steering Column (Bottom)	293	64	46	-4	286	25	560
6	Steering Column (Top)	293	64	71	-8	286	25	560
7	Left Belt	-	-	-	-	-	8	645
8	Overall Right Side	242	48	41	-6	225	13	790
9	Right Side View	334	62	56	-5	317	25	730
10	Right Passenger View	335	71	41	-5	318	35	660
11	Passenger and Interior View	109	122	70	-20	92	25	800
12	Right Belt	-	-	-	-	-	8	745
13	Passenger Front View	24	-5	73	-36	-	13	565
14	Driver Front View	24	-5	73	-35	-	13	530
15	Windshield View	0	0	126	-45	-	13	500
16	Pit View of Engine	0	32	-120	90	-	13	810

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

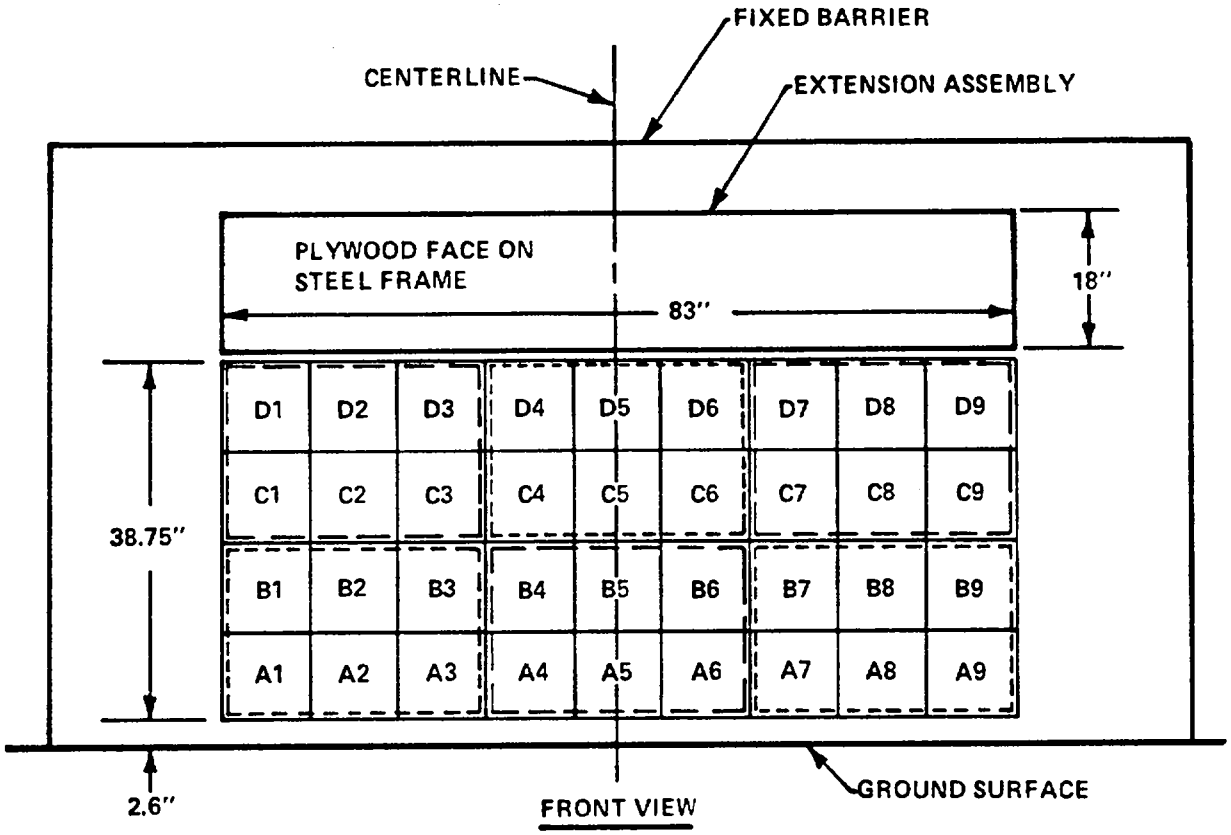


(DIMENSIONS IN INCHES)

Figure 7

LOAD CELL LOCATIONS ON FIXED BARRIER

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



6 GROUPS OF 6 LOAD CELLS EACH

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

The following data is presented in Appendix B:

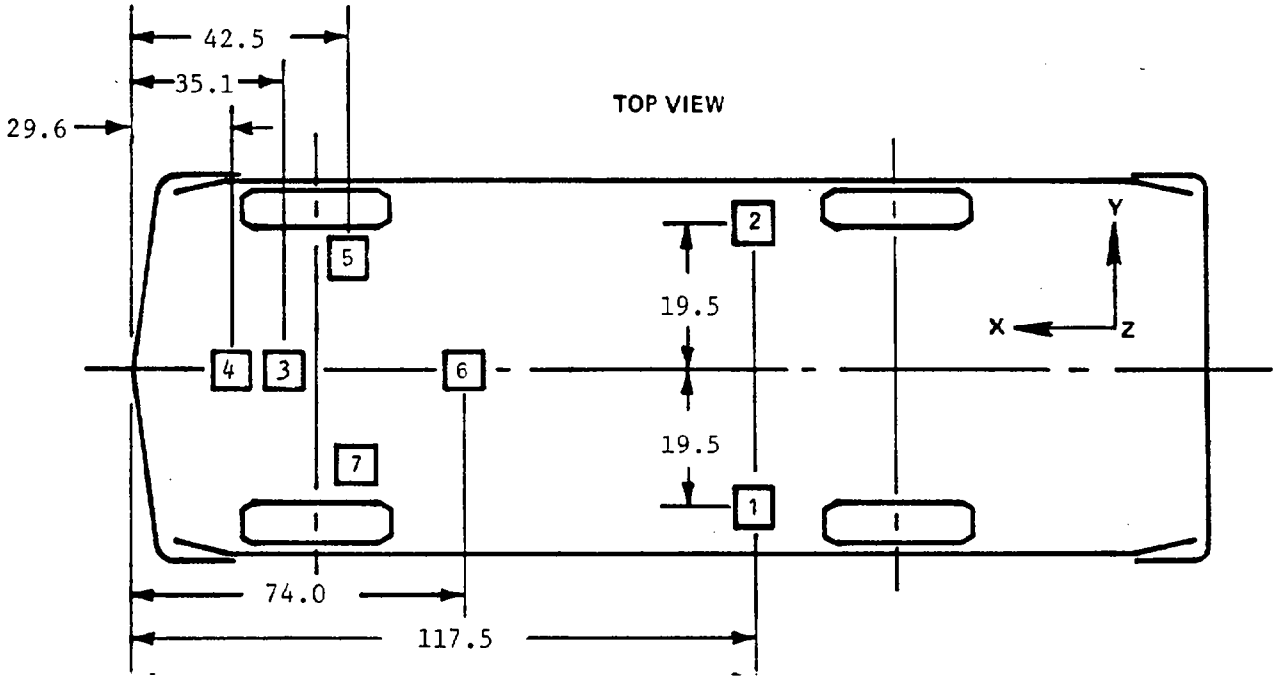
(1) Data from 36 individual load cells

(2) Total or Sum of 36 individual load cells

(3) Data from 6 Groupings shown above (6 cells/group)

Figure 8

VEHICLE ACCELEROMETER LOCATIONS



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

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

Figure 9

TEST VEHICLE MEASUREMENTS

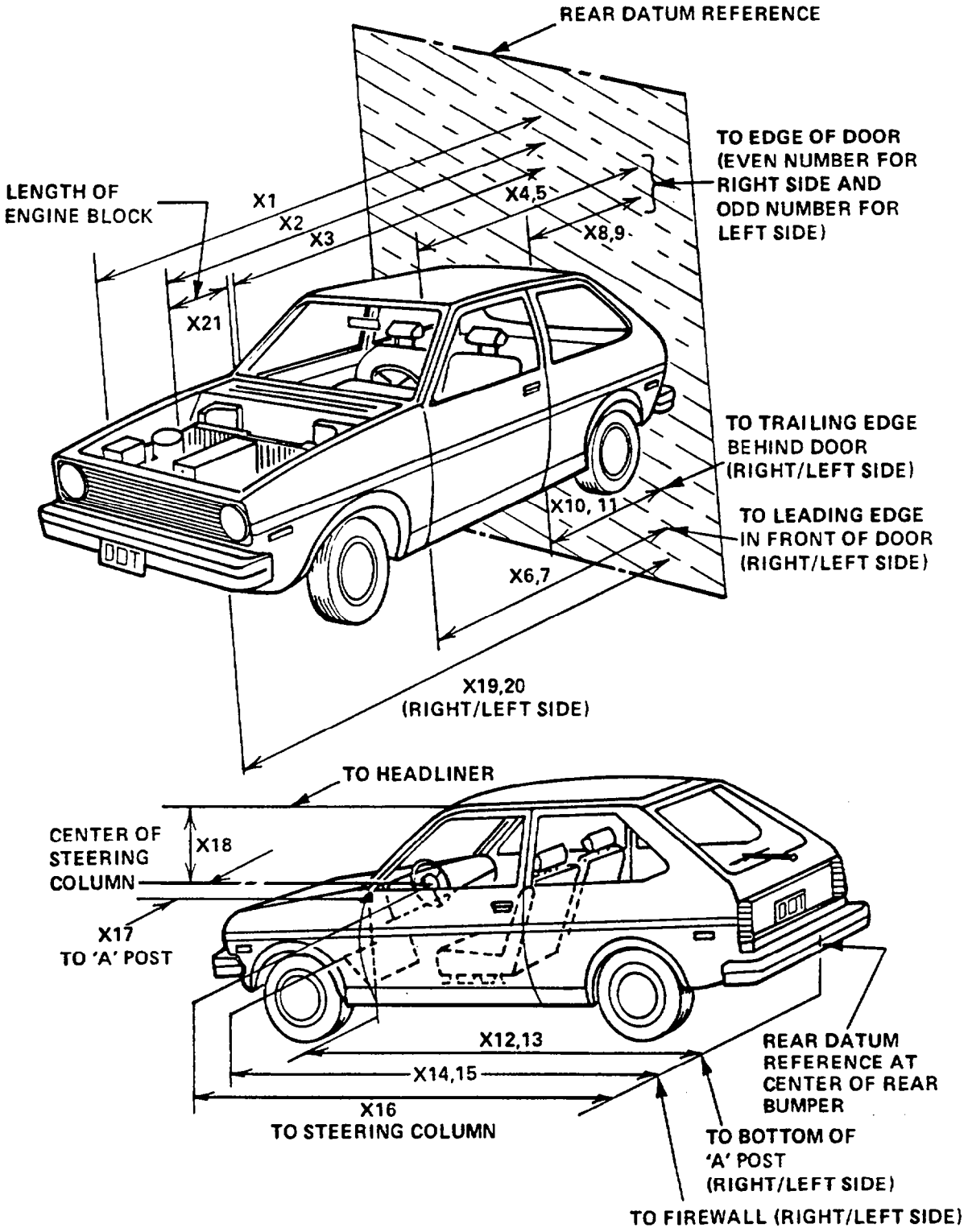


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	188.3	163.8	24.5
X2	Rear Surface of Vehicle to Front of Engine	160.5	153.5	7.0
X3	Rear Surface of Vehicle to Firewall	134.8	130.2	4.6
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	122.8	122.8	0.0
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	123.1	122.8	0.3
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	123.2	123.2	0.0
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	123.6	123.2	0.4
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	74.4	74.5	-0.1
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	74.5	74.3	0.2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	73.8	73.6	0.2
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	73.9	73.8	0.1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	125.3	125.2	0.1
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	125.5	125.4	0.1
X14	Rear Surface of Vehicle to Firewall, Right Side	134.5	132.3	2.2
X15	Rear Surface of Vehicle to Firewall, Left Side	135.1	132.9	2.2
X16	Rear Surface of Vehicle to Steering Column	106.4	105.6	0.8
X17	Center of Steering Column to "A" Post	14.3	13.5	0.8
X18	Center of Steering Column to Headliner	16.8	15.6	1.2
X19	Rear Surface of Vehicle to Right Side of Front Bumper	185.0	165.7	19.3
X20	Rear Surface of Vehicle to Left Side of Front Bumper	185.4	164.0	21.4
X21	Length of Engine Block	23.0	23.0	0.0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	115.4	114.7	0.7
CD	Rear Surface of Vehicle to Center of Dash Panel	115.1	113.8	1.3
LD	Rear Surface of Vehicle to Left Side of Dash Panel	115.4	114.9	0.5

Appendix A

PHOTOGRAPHS

Figure A-1 PRE-TEST FRONT VIEW

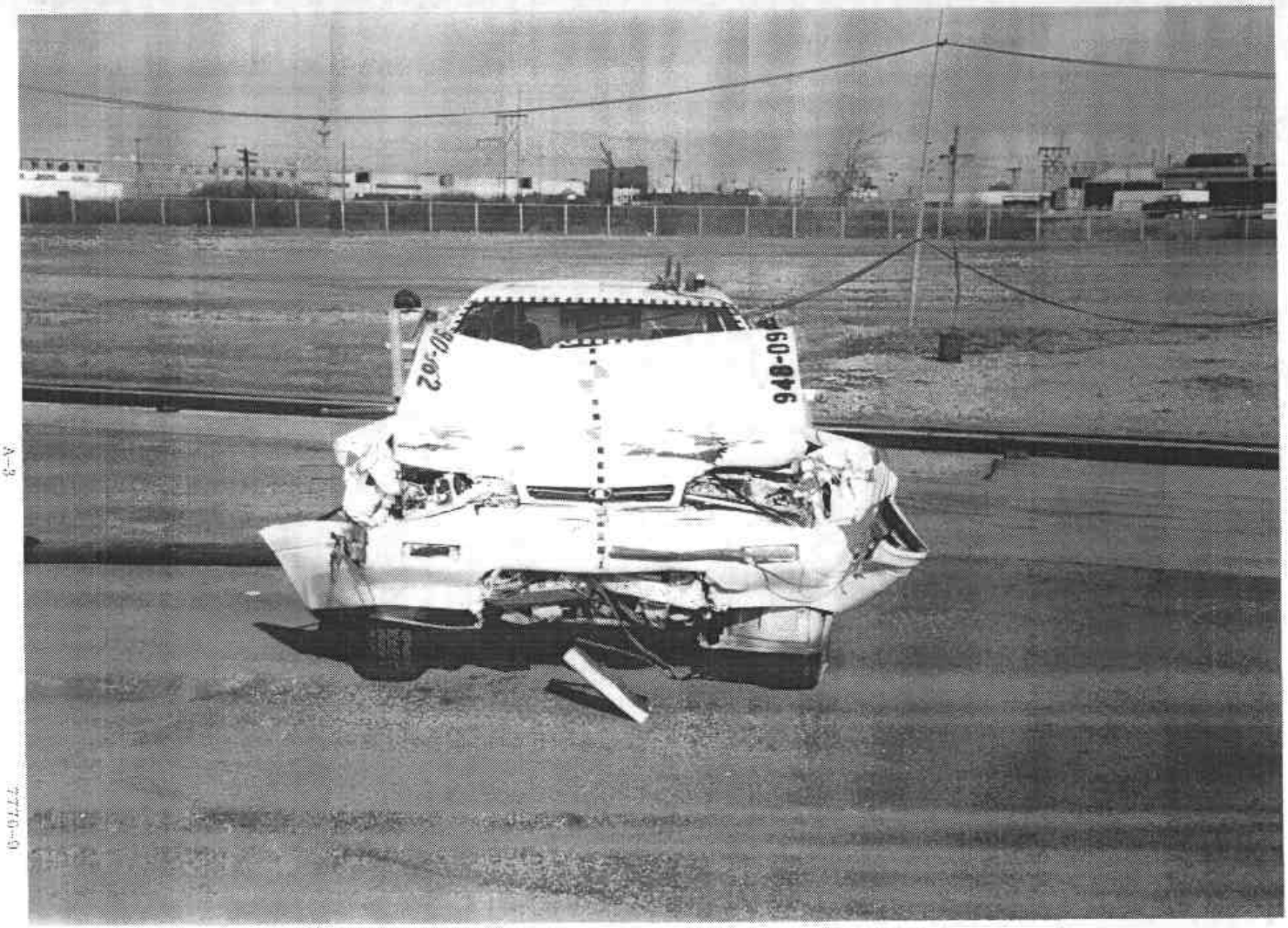


Figure A-2 POST TEST FRONT VIEW

Figure A-3 PRE-TEST LEFT SIDE VIEW

A-5

7774-5

Figure A-4 POST TEST LEFT SIDE VIEW

Figure A-5 PRE-TEST RIGHT SIDE VIEW

7776-9

Figure A-6 POST-TEST RIGHT SIDE VIEW

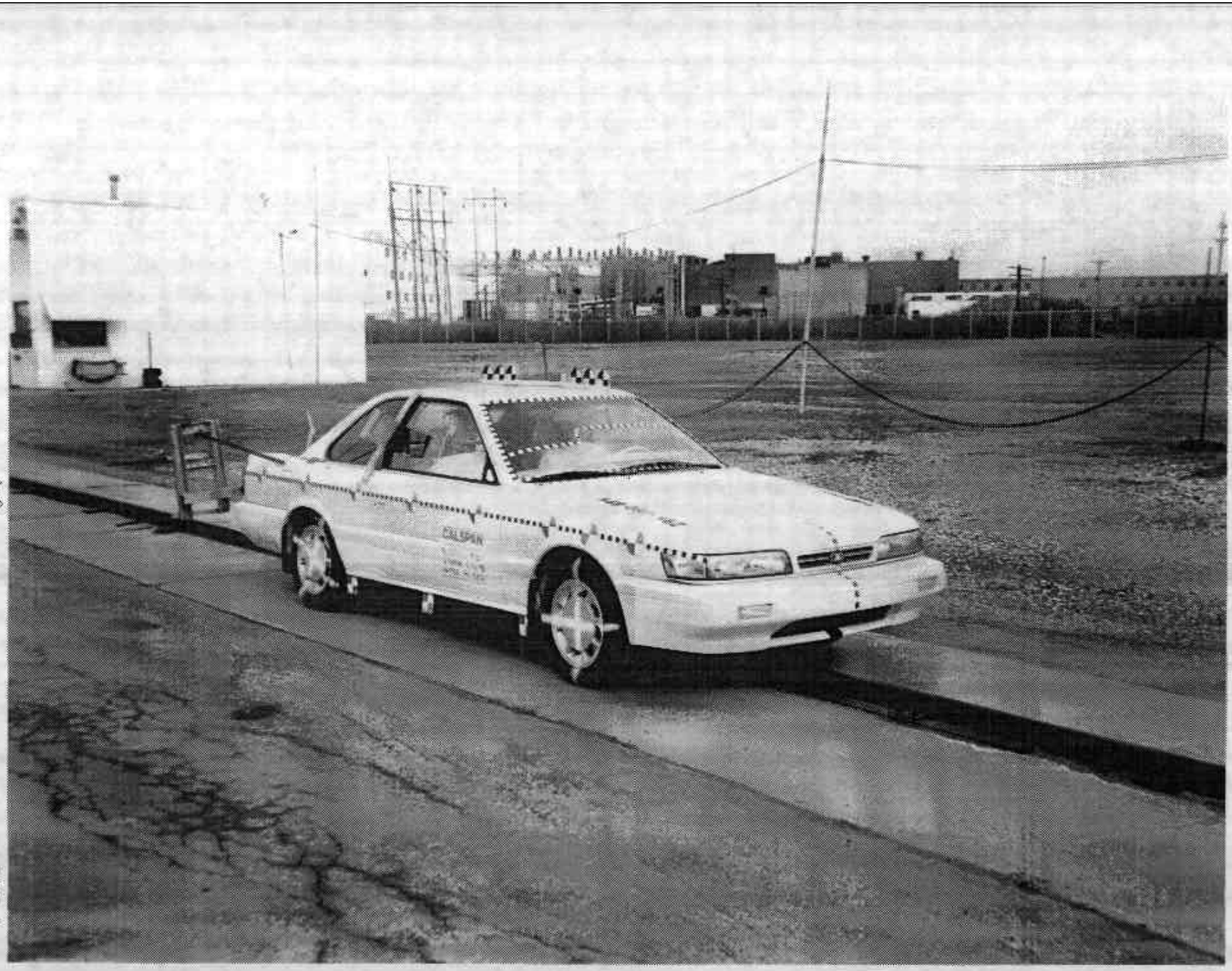


Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

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

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

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

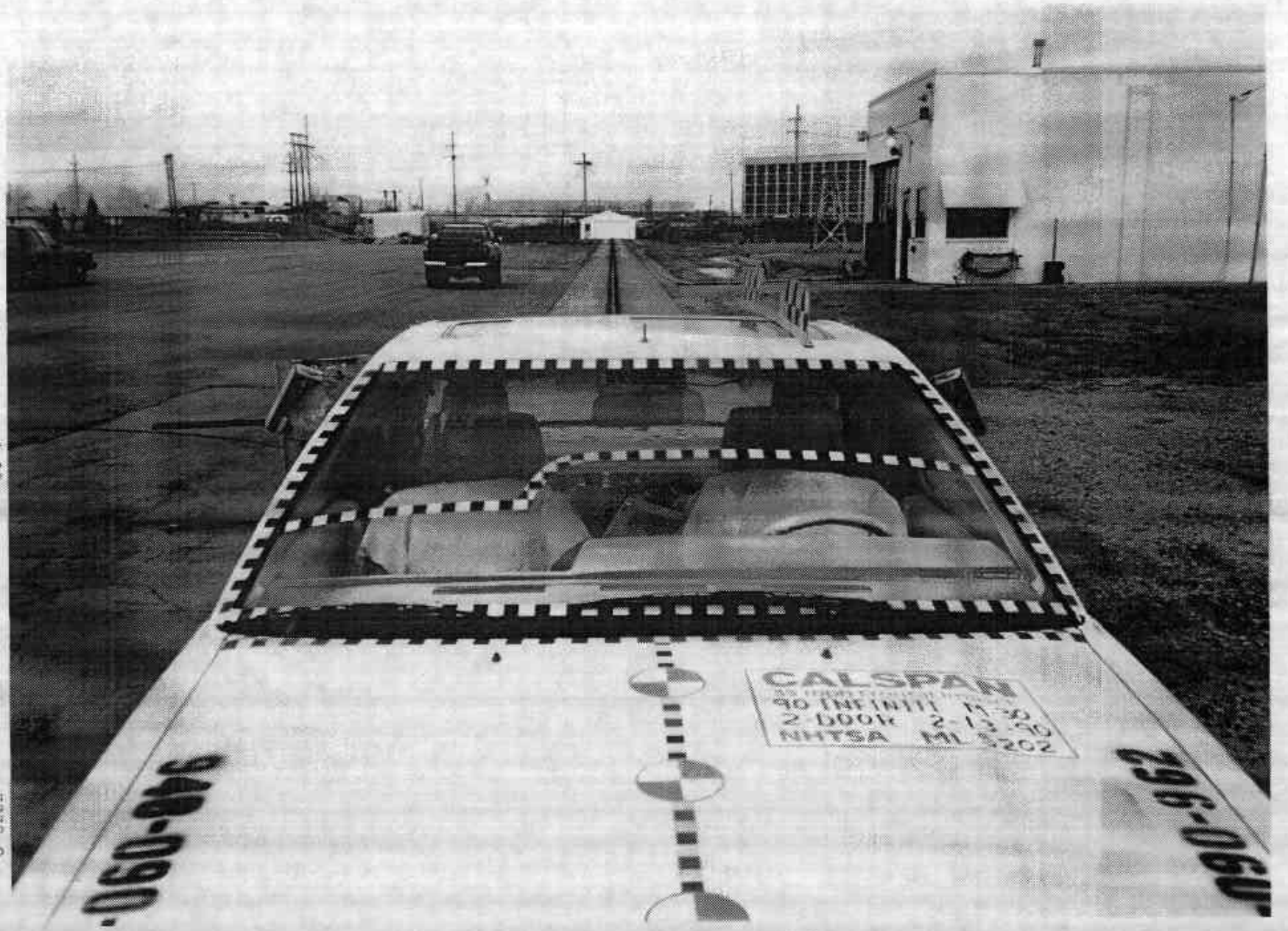


Figure A-11 PRE-TEST WINDSHIELD VIEW

Figure A-12 POST-TEST WINDSHIELD VIEW

A-14

7776-9

Figure A-13 PRE-TEST ENGINE COMPARTMENT VIEW

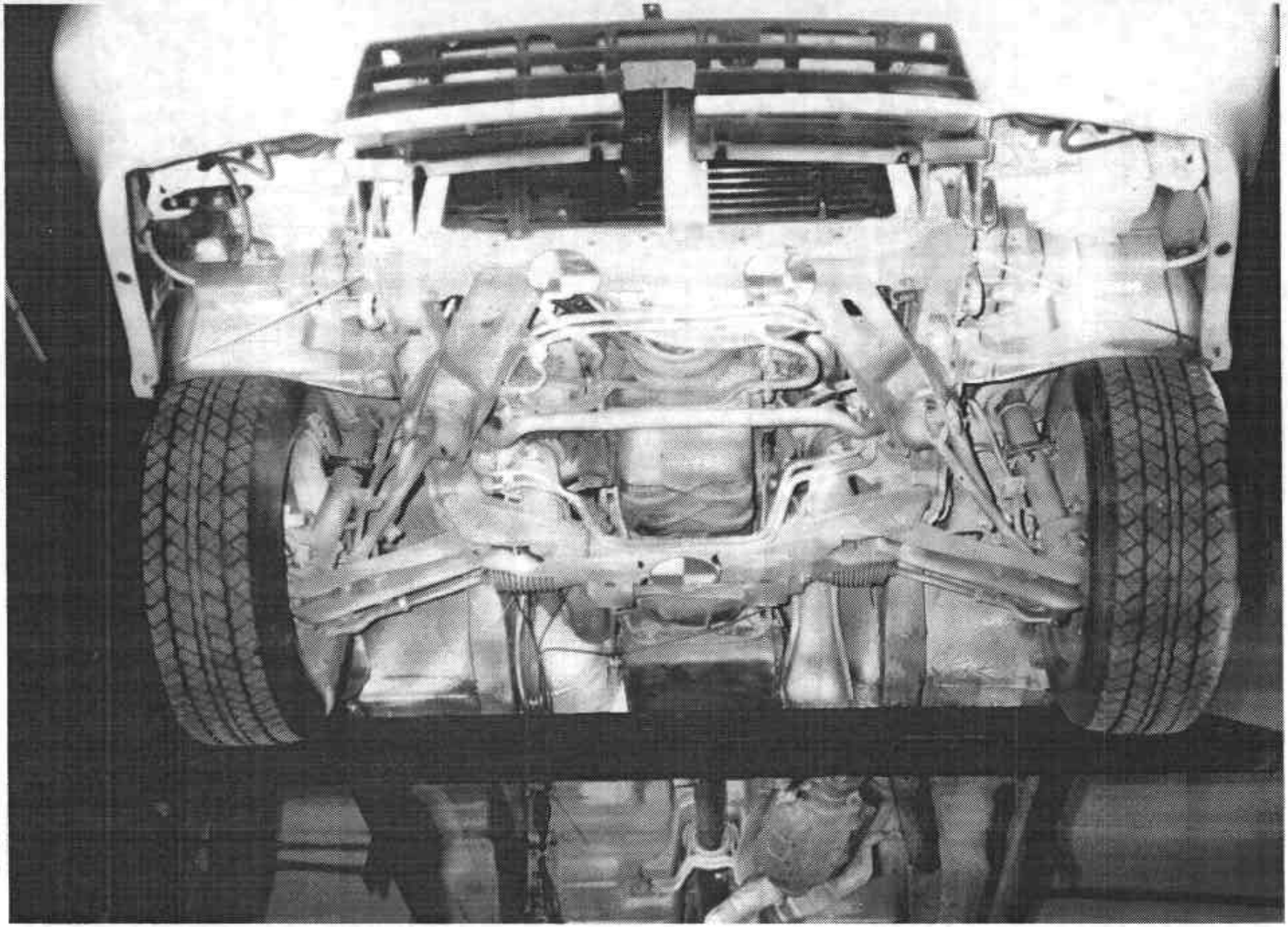


Figure A-14 PRE-TEST FRONT UNDERBODY VIEW

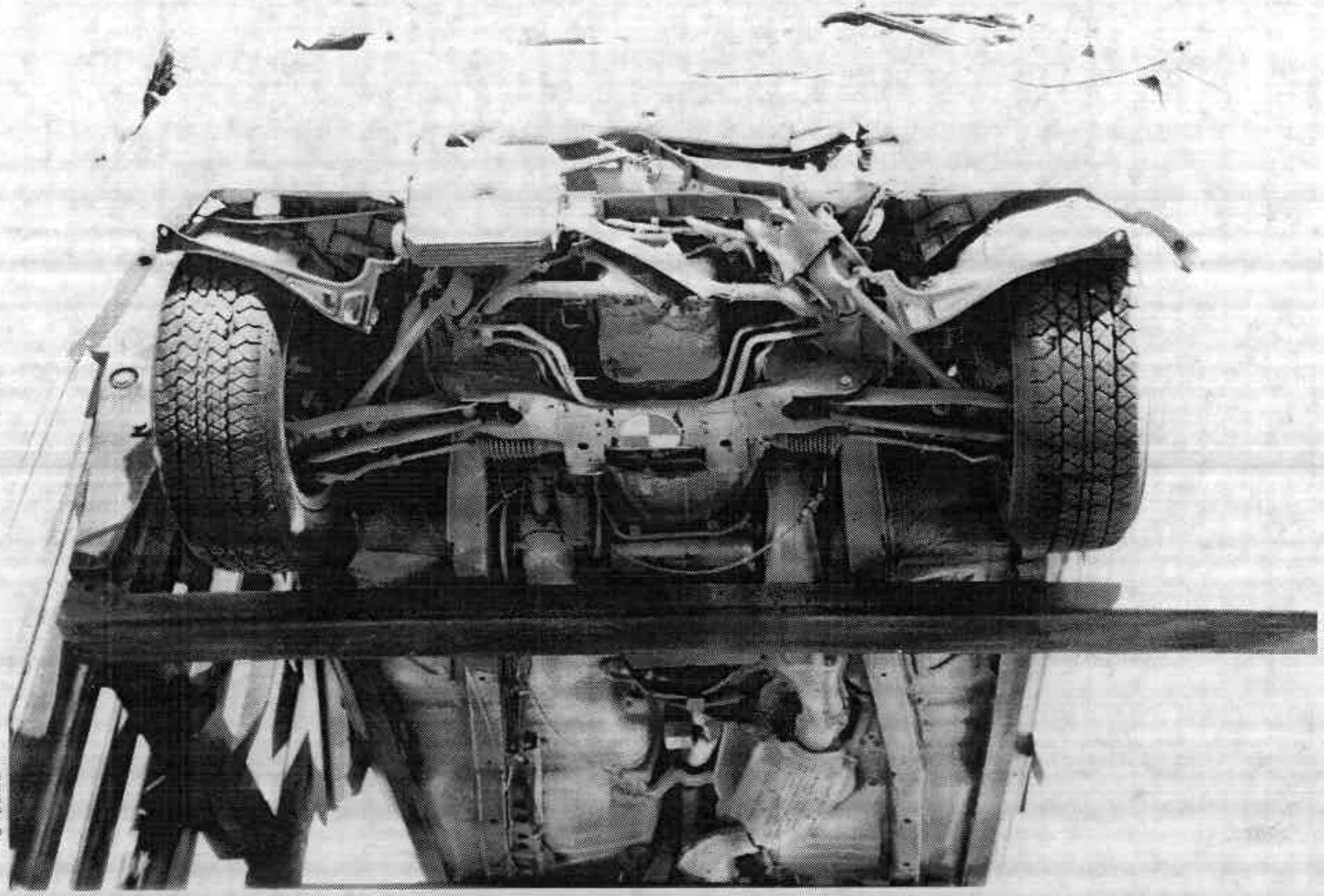


Figure A-15 POST-TEST FRONT UNDERBODY VIEW

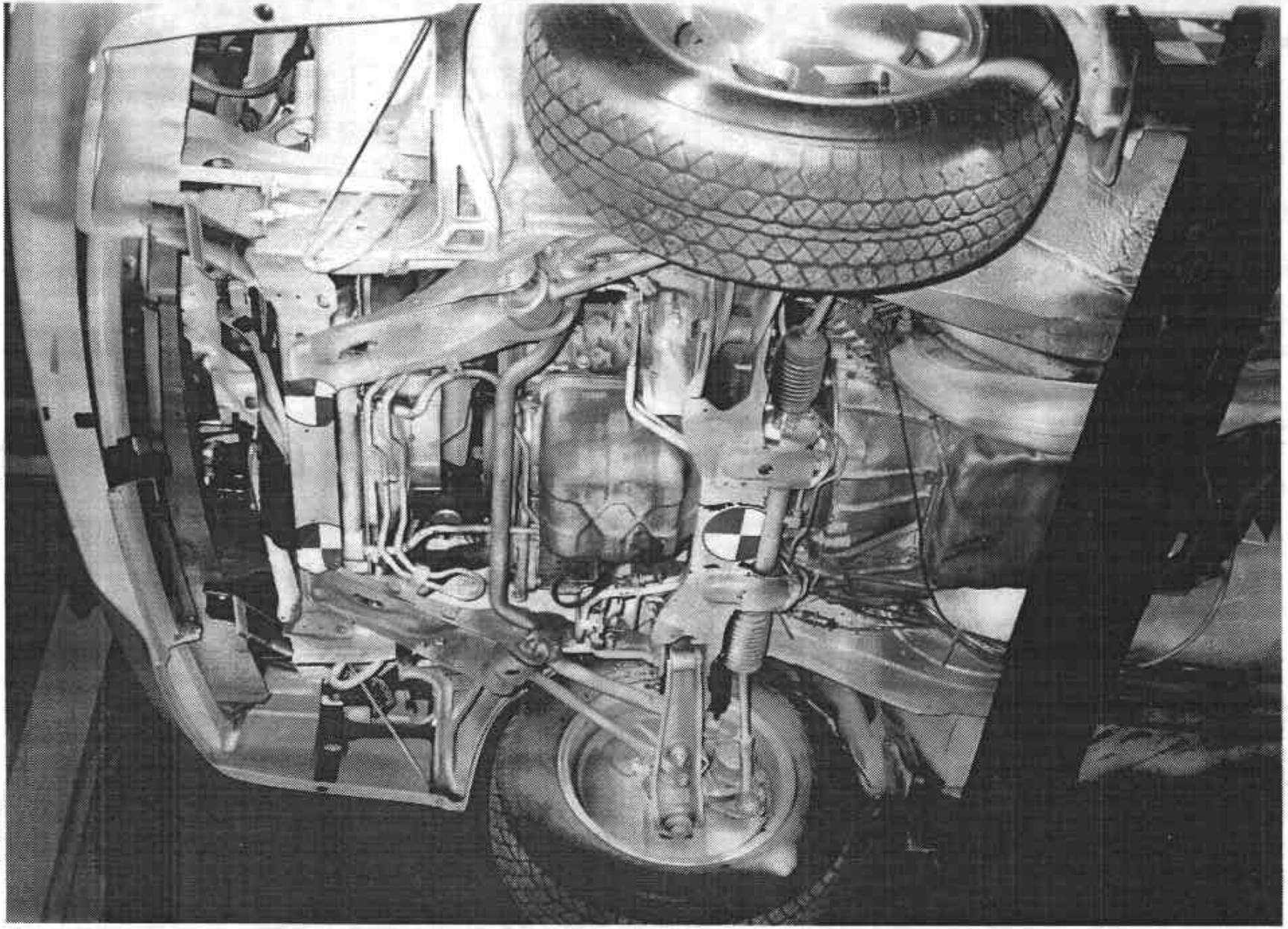


Figure A-16 PRE-TEST FRONT SIDE UNDERBODY VIEW

Figure A-17 POST-TEST FRONT SIDE UNDERBODY VIEW

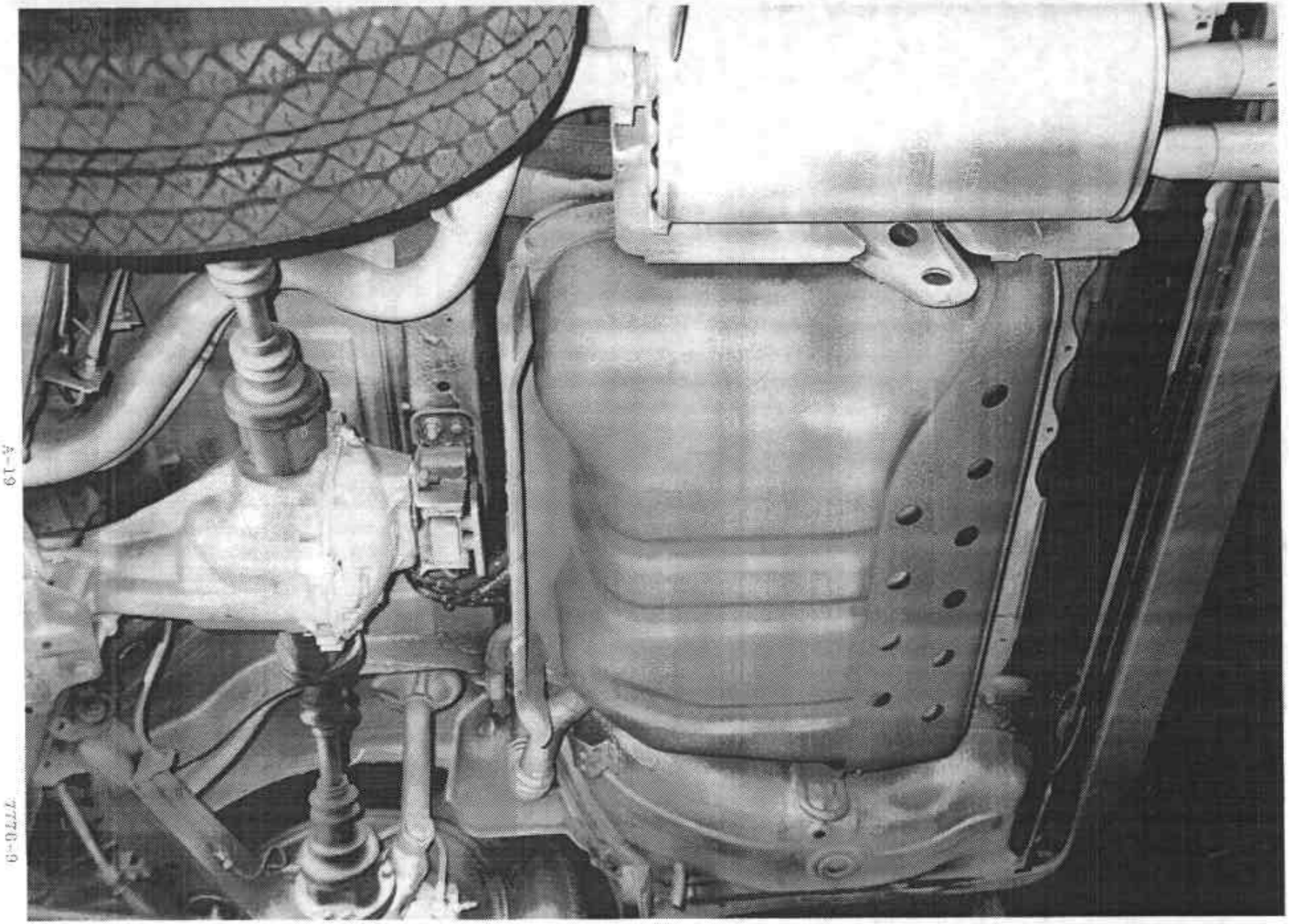


Figure A-18 PRE-TEST REAR UNDERBODY VIEW

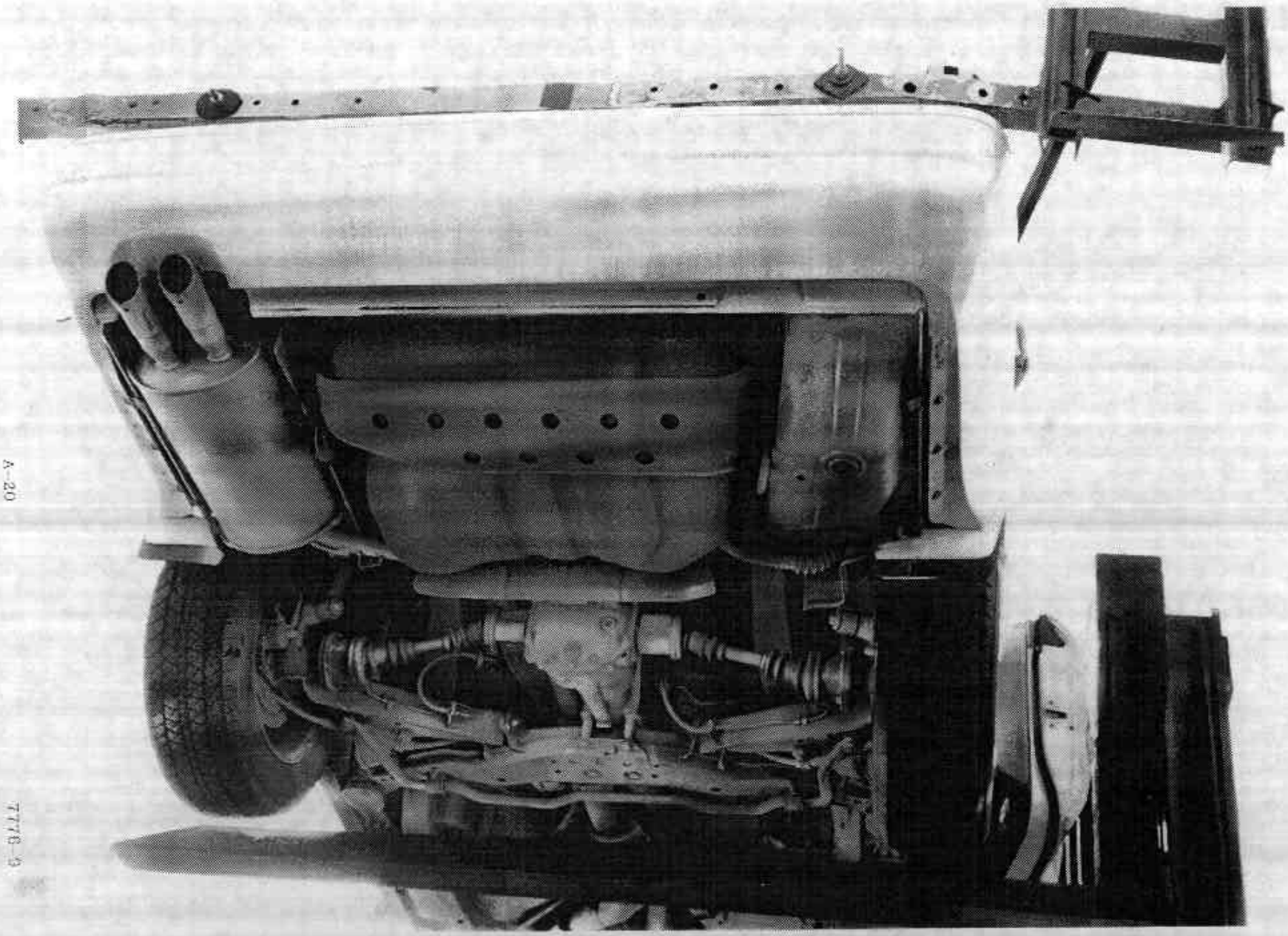


Figure A-19 POST-TEST REAR UNDERBODY VIEW

Figure A-20 PRE-TEST DRIVER POSITION VIEW

Figure A-21 POST-TEST DRIVER POSITION VIEW

Figure A-22 PRE-TEST PASSENGER POSITION VIEW

Figure A-23 POST-TEST PASSENGER POSITION VIEW

Figure A-24 PRE-TEST DRIVER AND INTERIOR VIEW

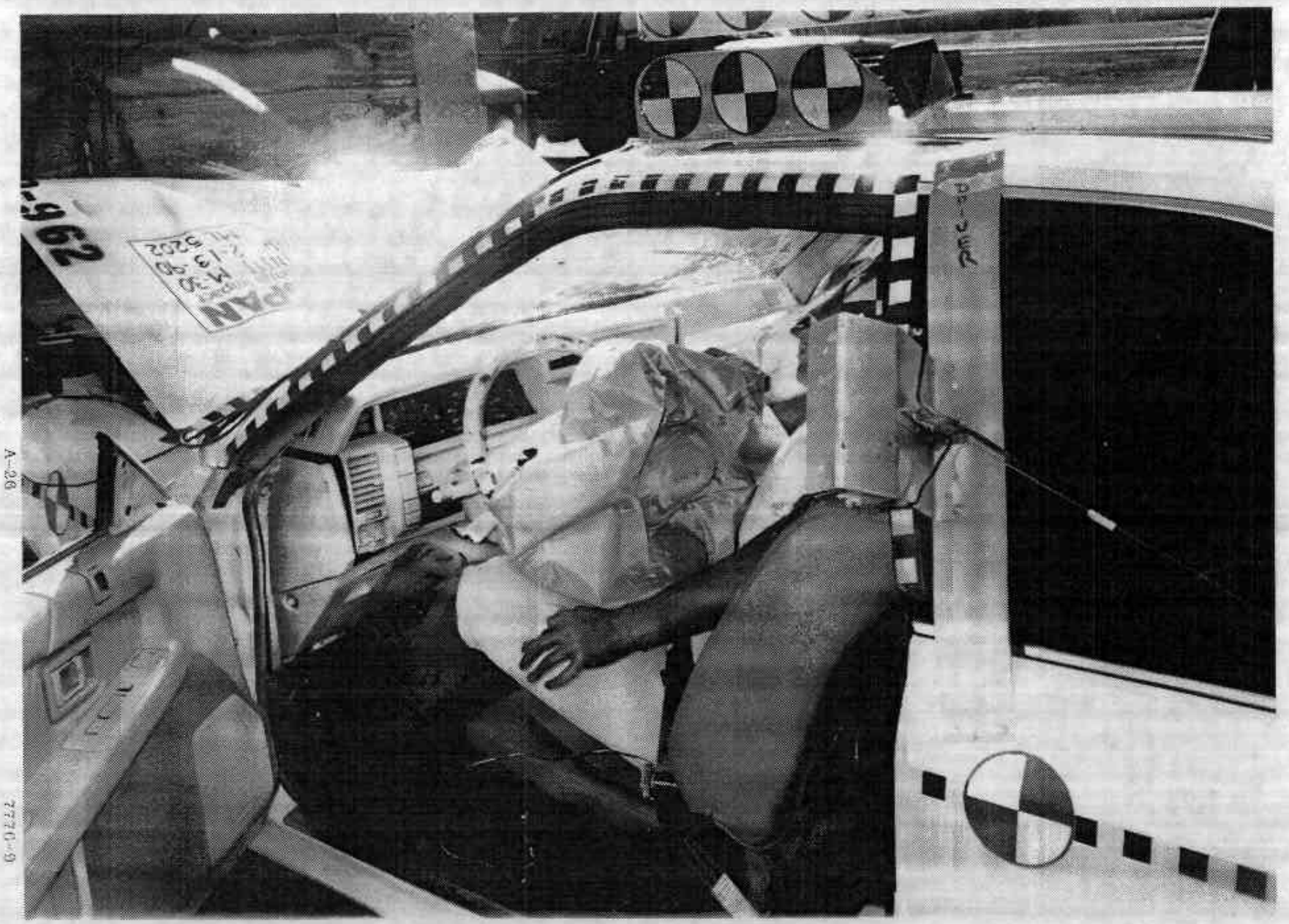


Figure A-25 POST-TEST DRIVER AND INTERIOR VIEW

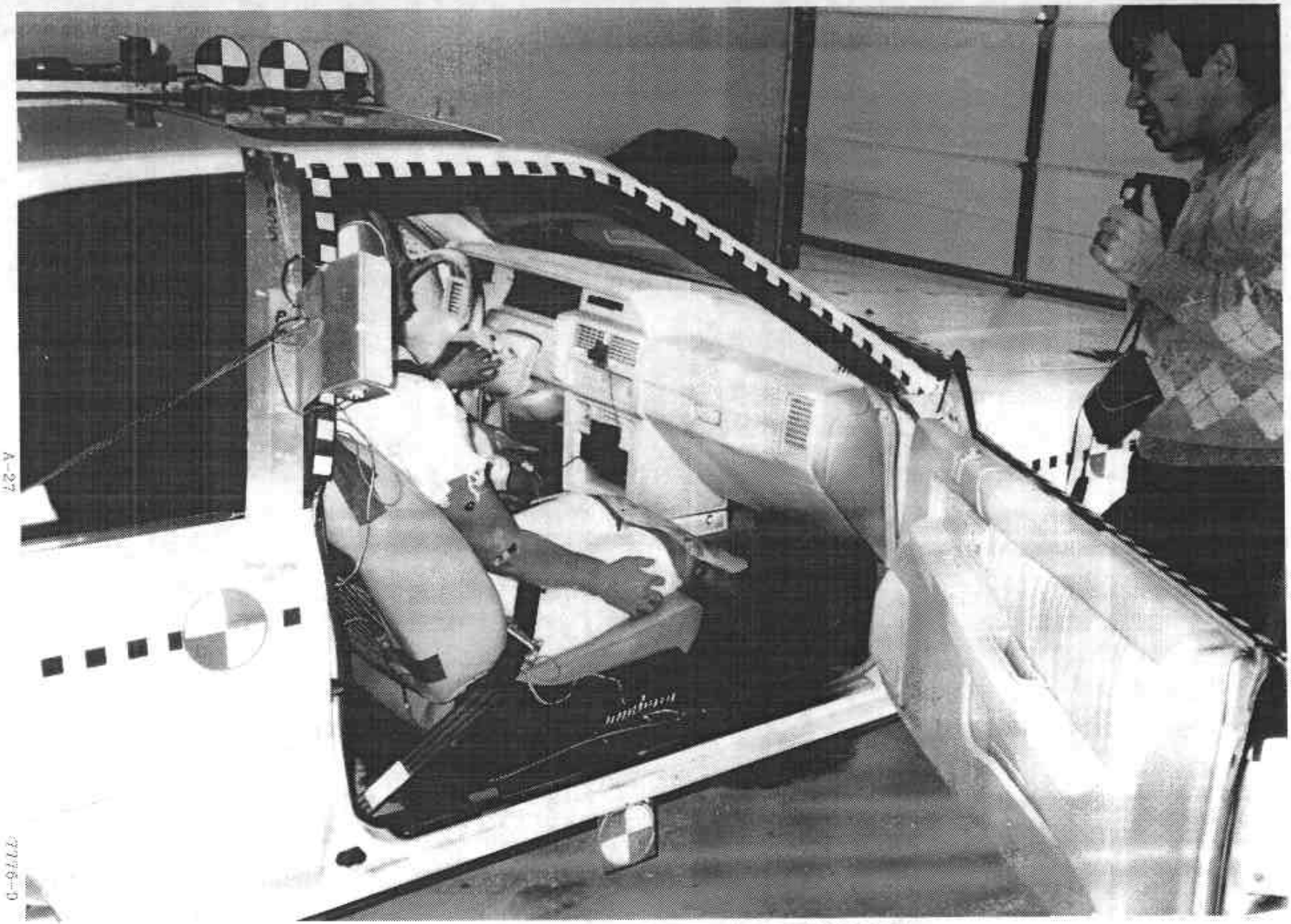


Figure A-26 PRE-TEST PASSENGER AND INTERIOR VIEW

Figure A-27 POST-TEST PASSENGER AND INTERIOR VIEW

Figure A-28 IMPACT VIEW

Appendix B

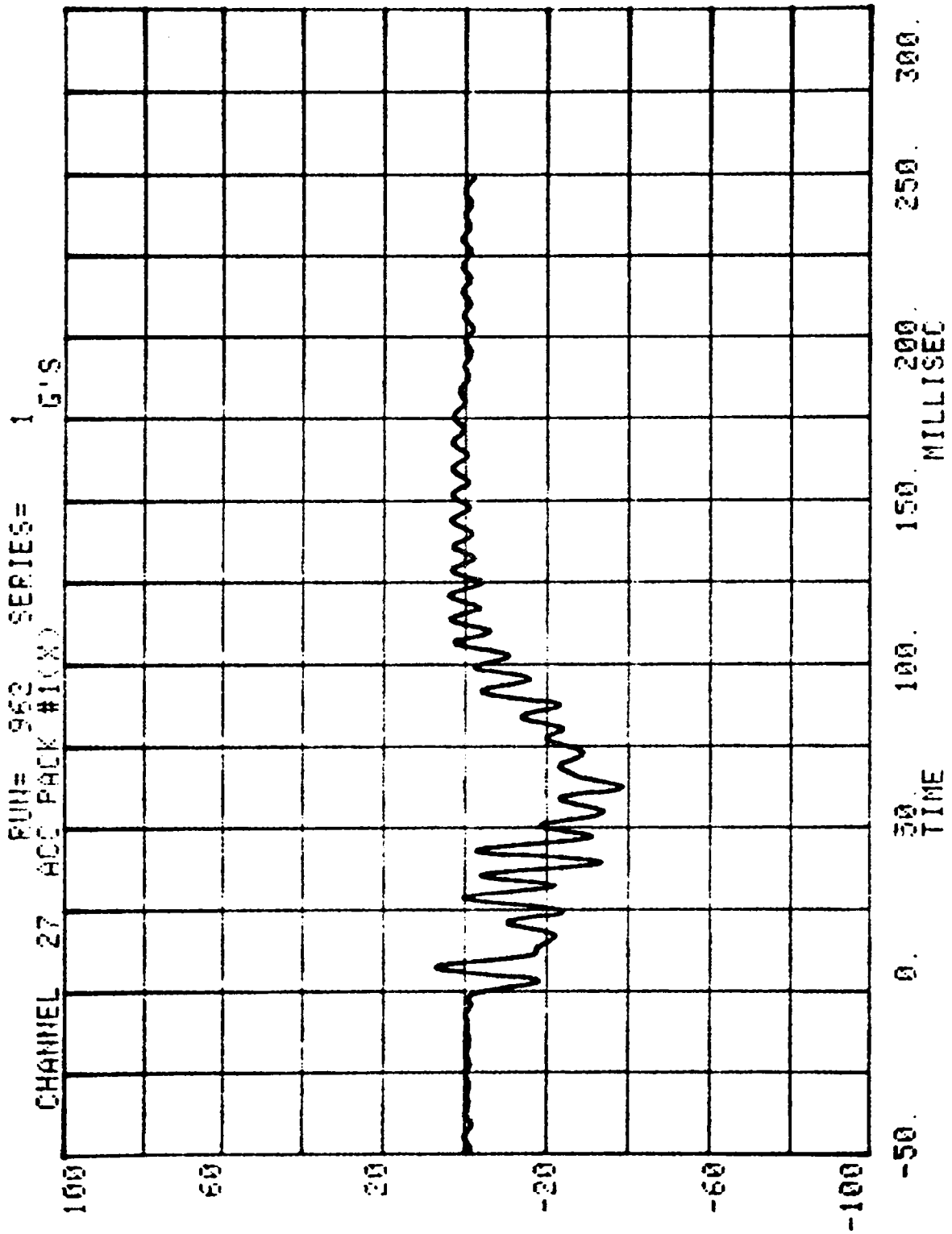
VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

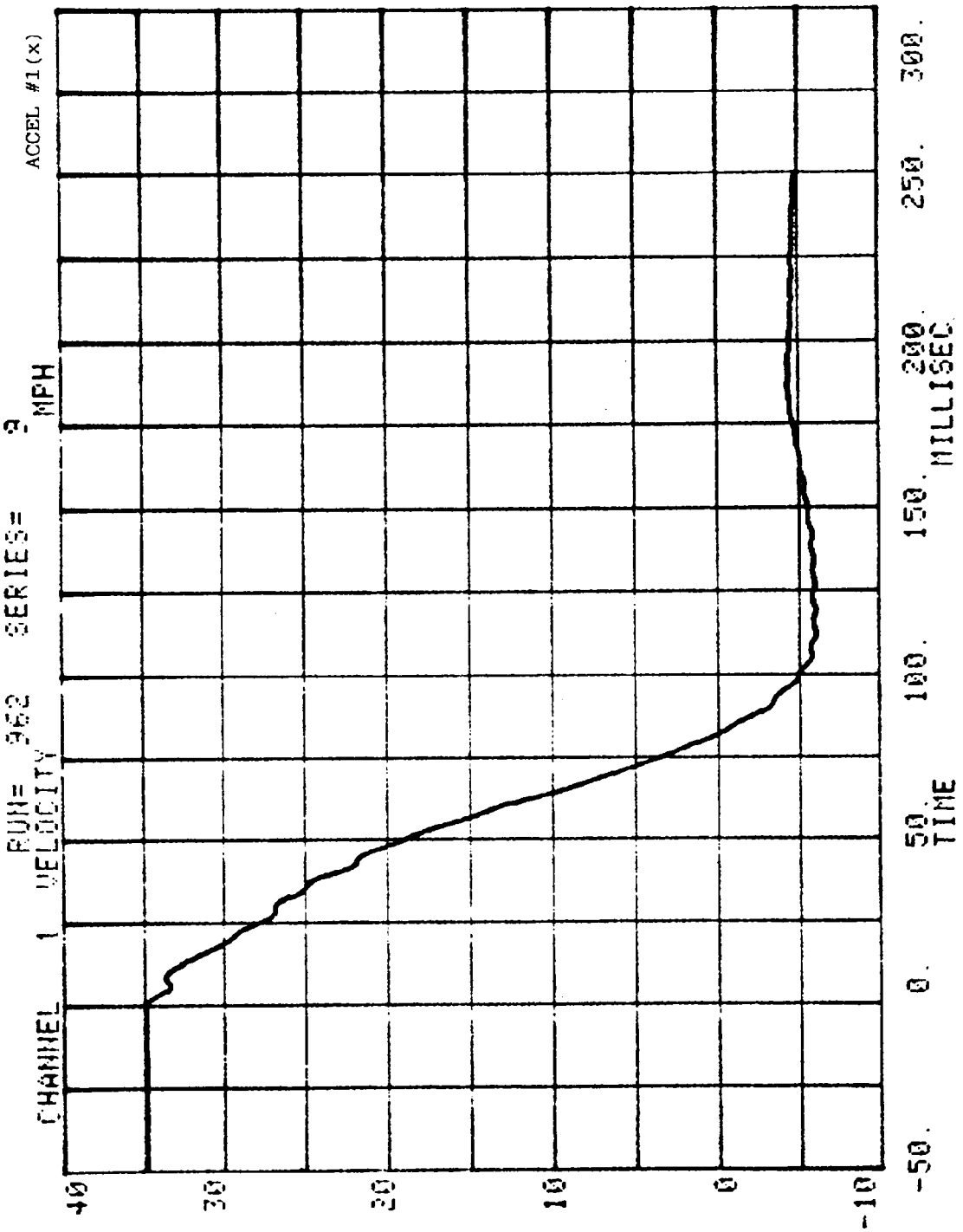
TEST NO. ML5202

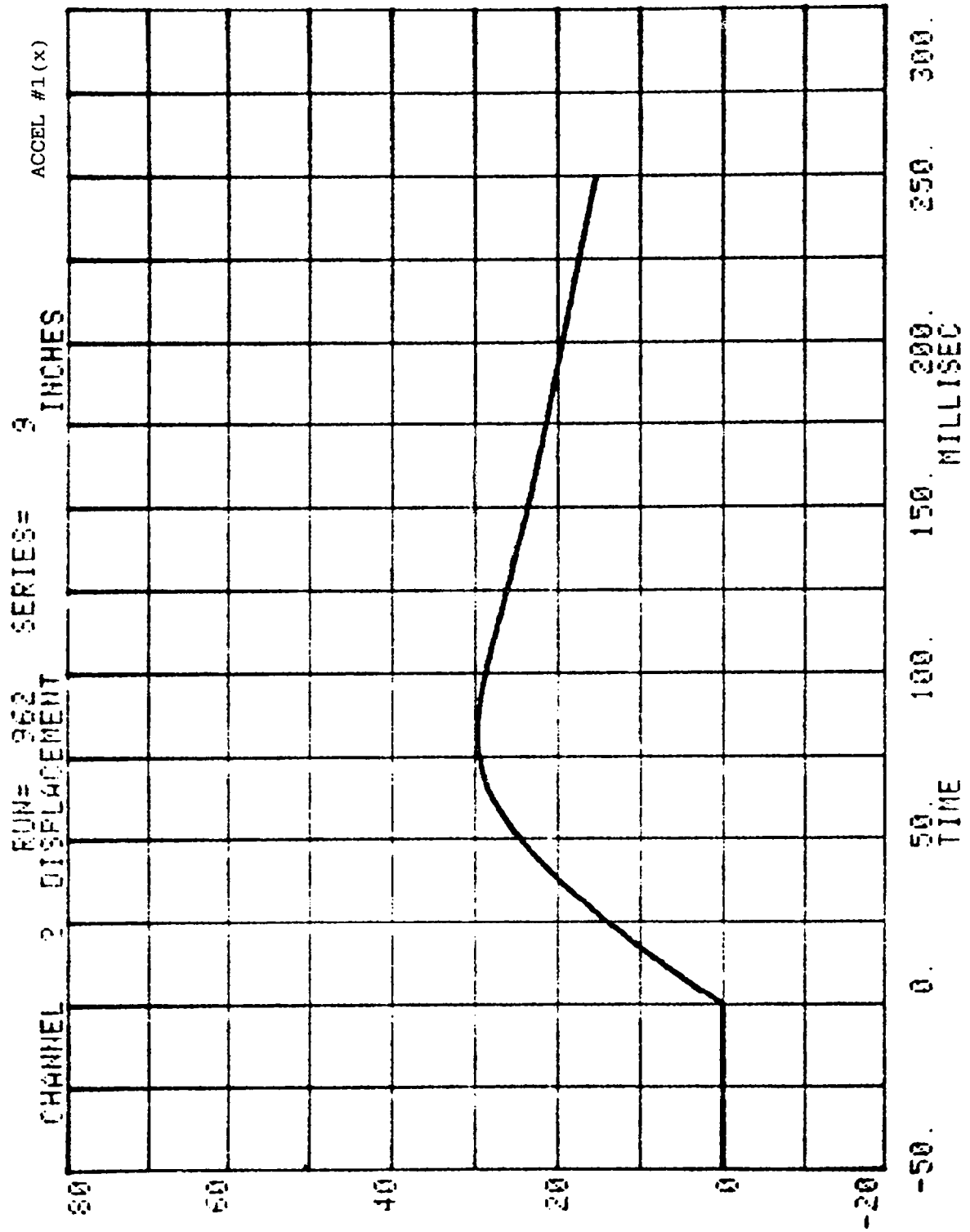
VEHICLE DATA

FILTER CHANNEL CLASS

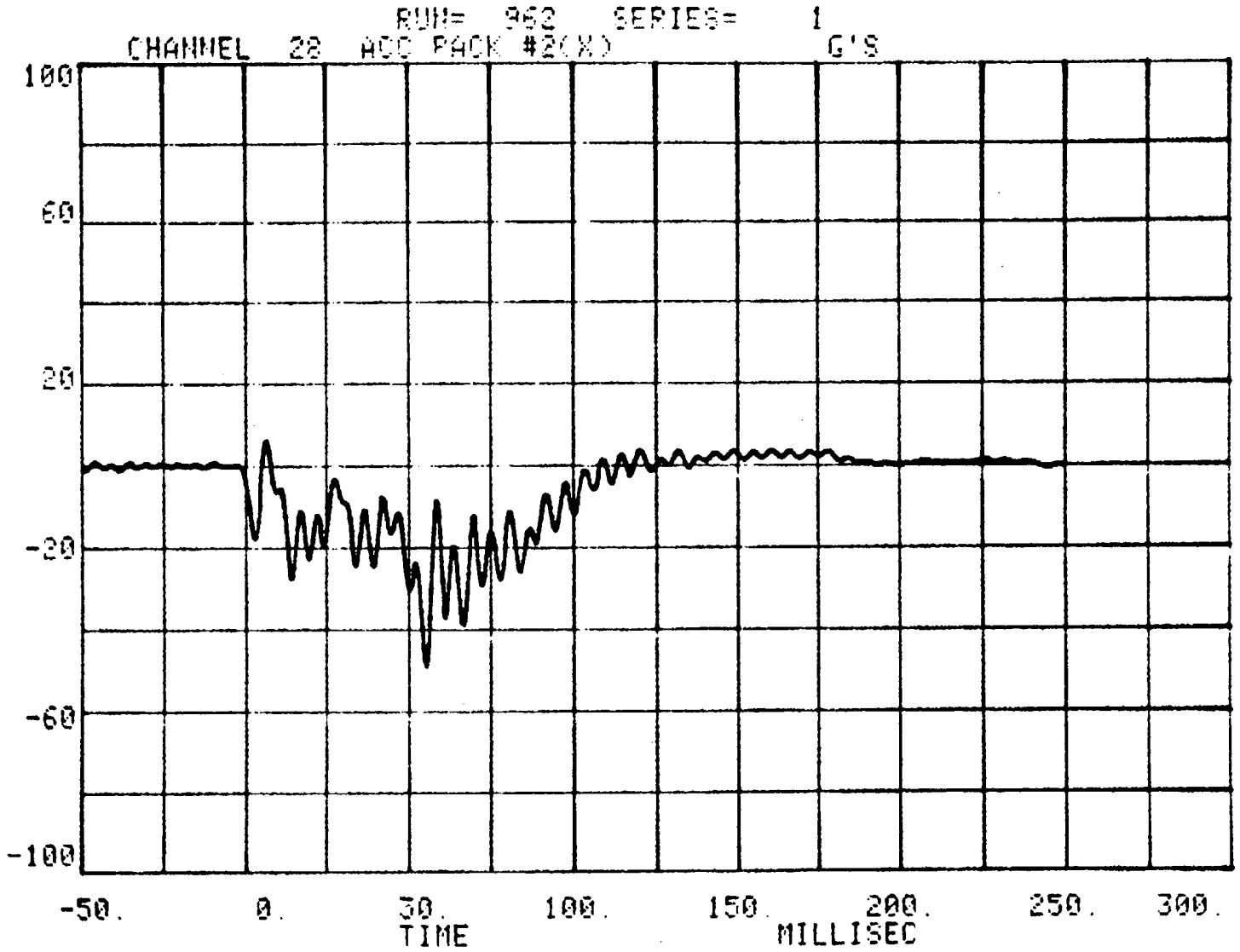
60


CHANNEL 27
RUN= 962
SERIES= 1
G'S
100
50
0
-50
-100
0.
50
100.
150.
200.
250.
300.
TIME
MILLISEC

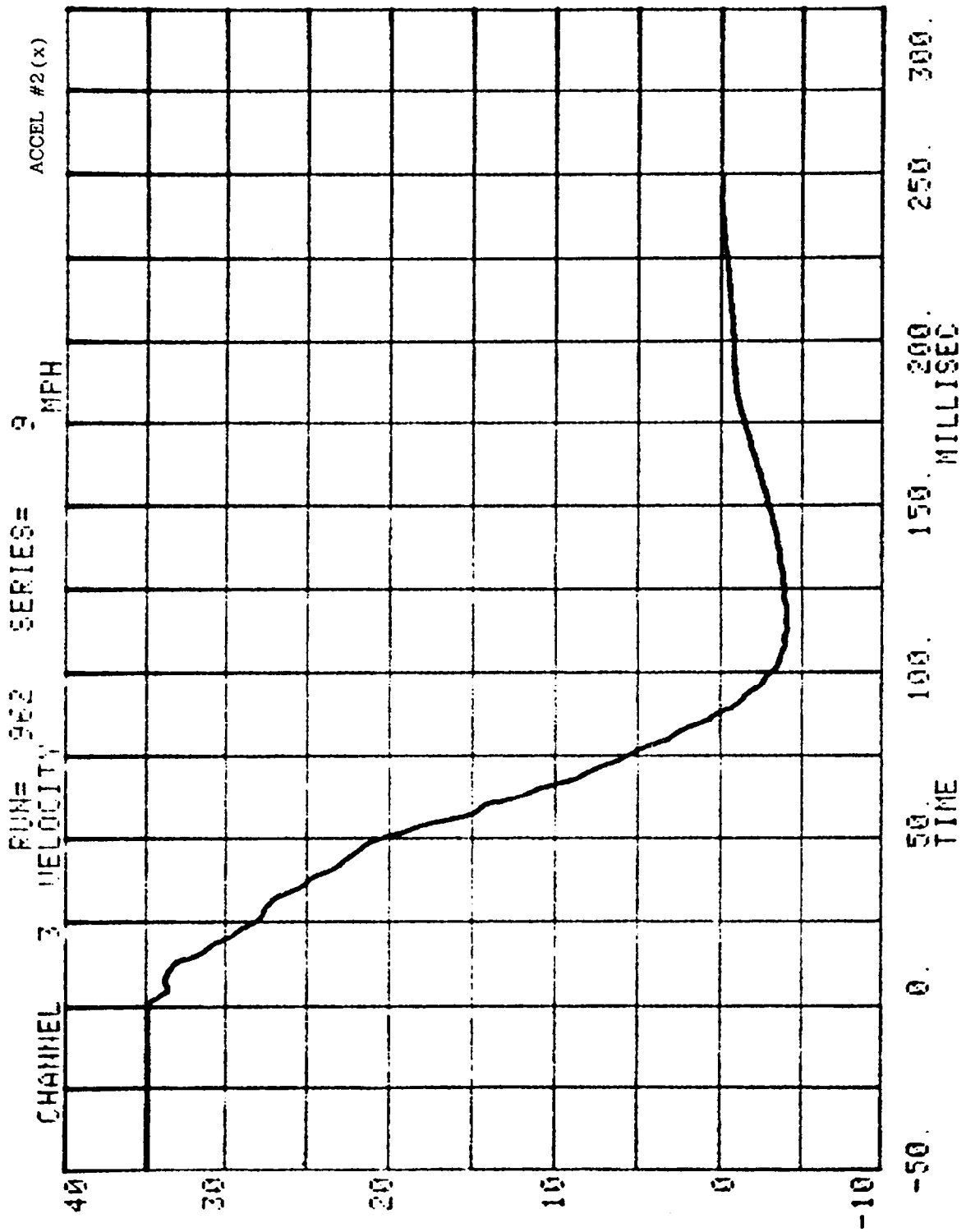

ACCEL #1(x)
CHANNEL 1 VELOCITY
RUN= 962 SERIES= 2
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

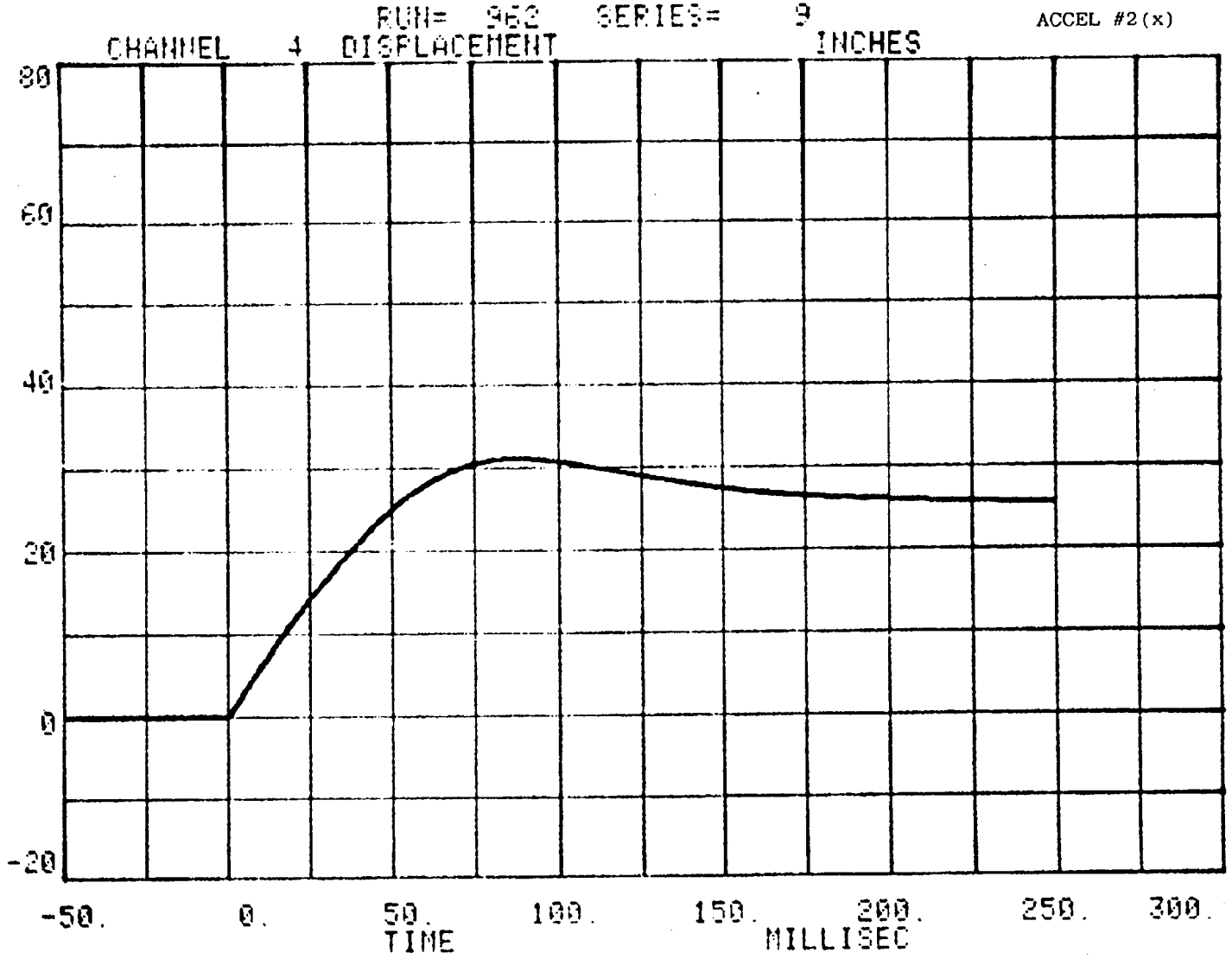

ACCEL #1(x)
CHANNEL 2 DISPLACEMENT
RUN= 362 SERIES= 3
INCHES
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

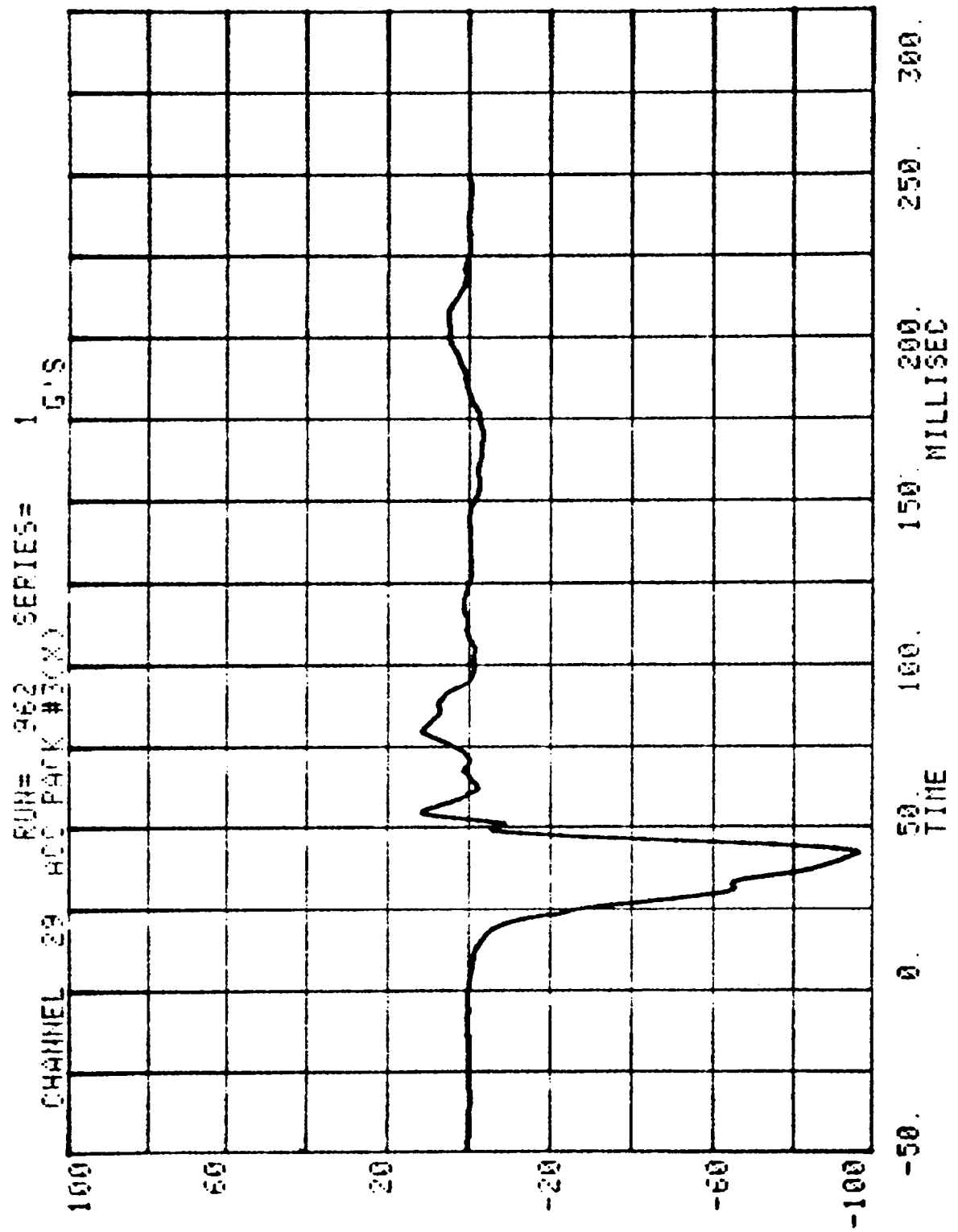
7776-9


RUN= 962 SERIES= 1
CHANNEL 28 ACC PACK #2(X) G'S
100
60
20
-20
-60
-100
-50.
0.
30.
100.
150.
200.
250.
300.
TIME
MILLISEC

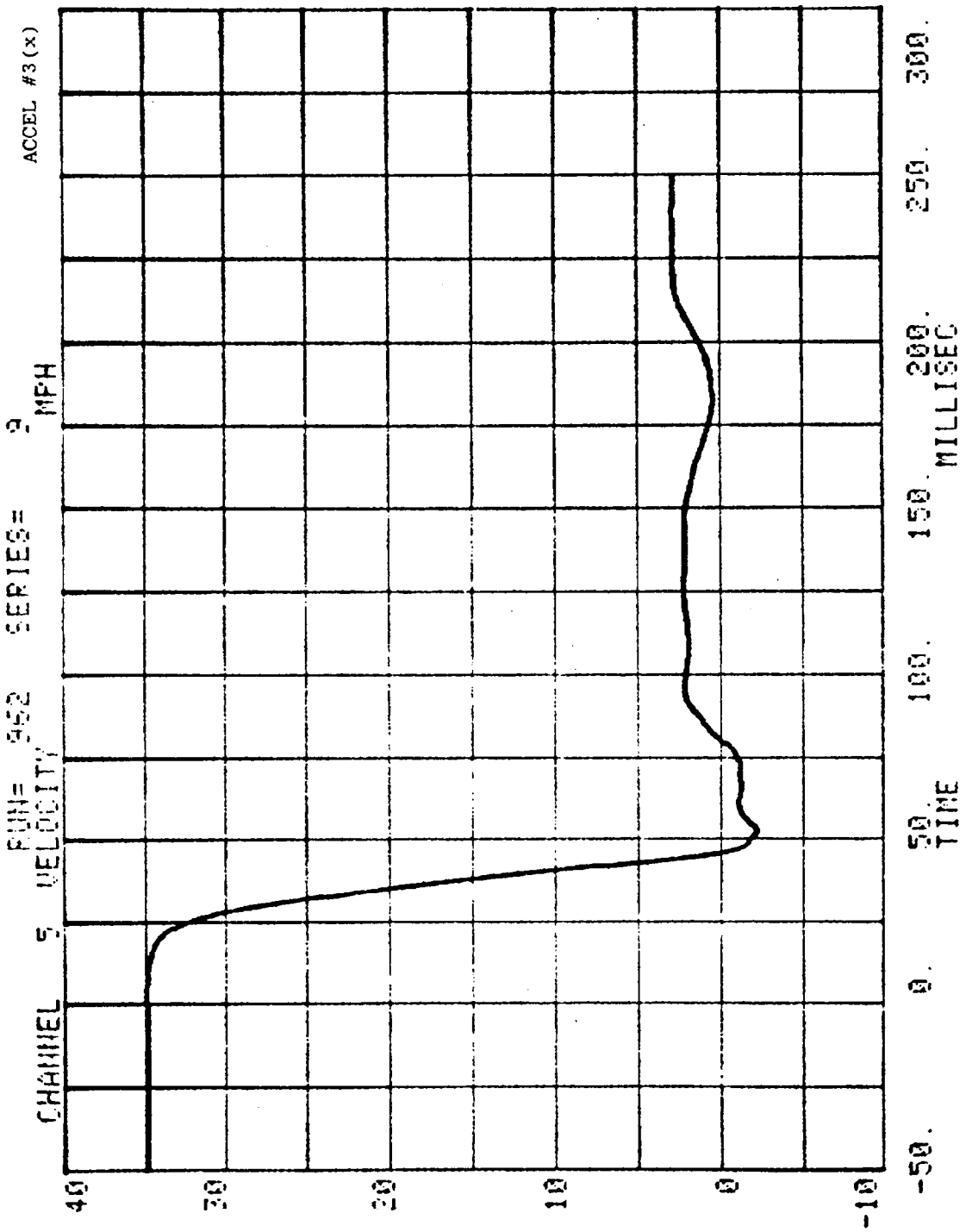
7776-9

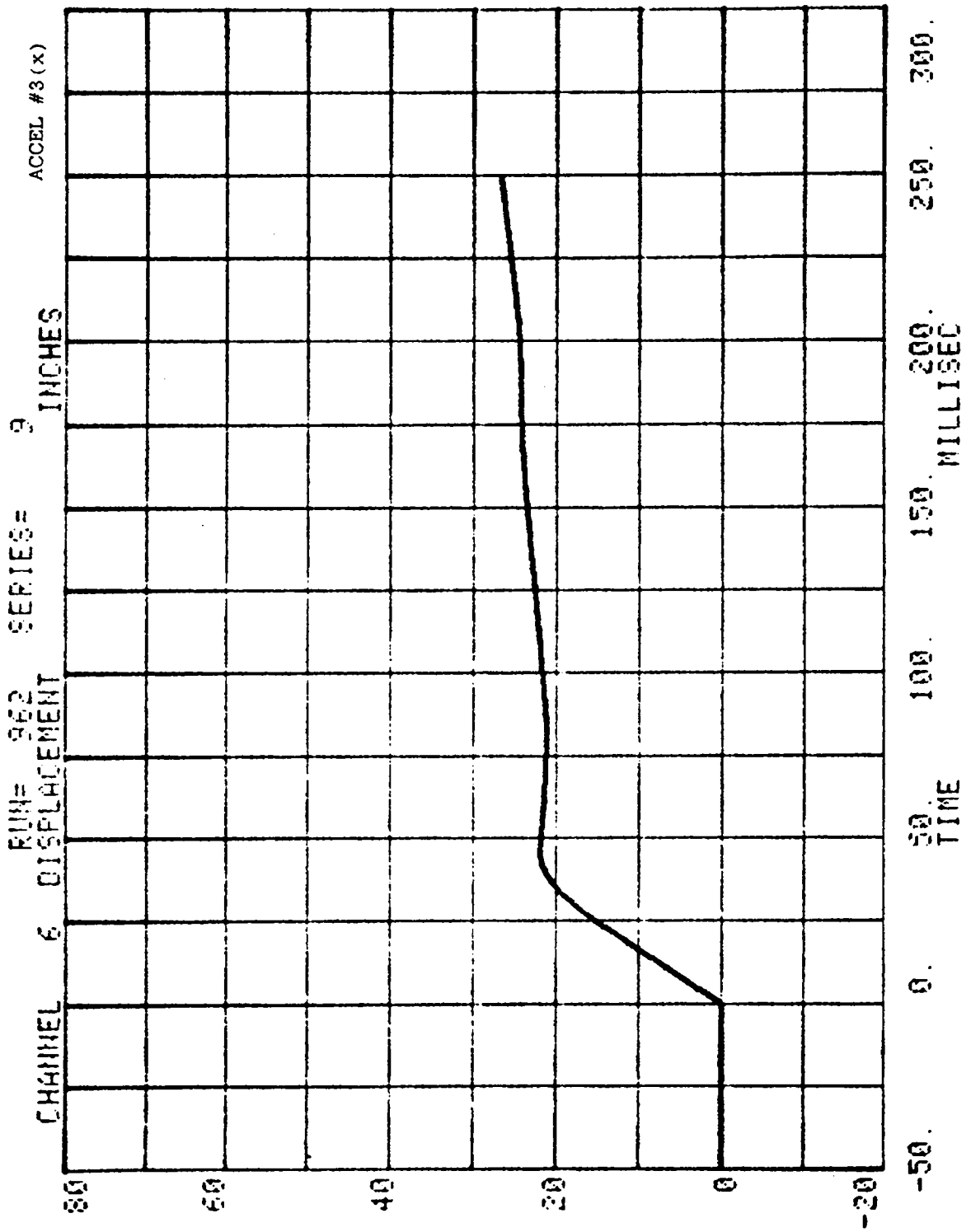

ACCEL #2(x)
CHANNEL 3 VELOCITY
RUN= 942 SERIES= 9
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

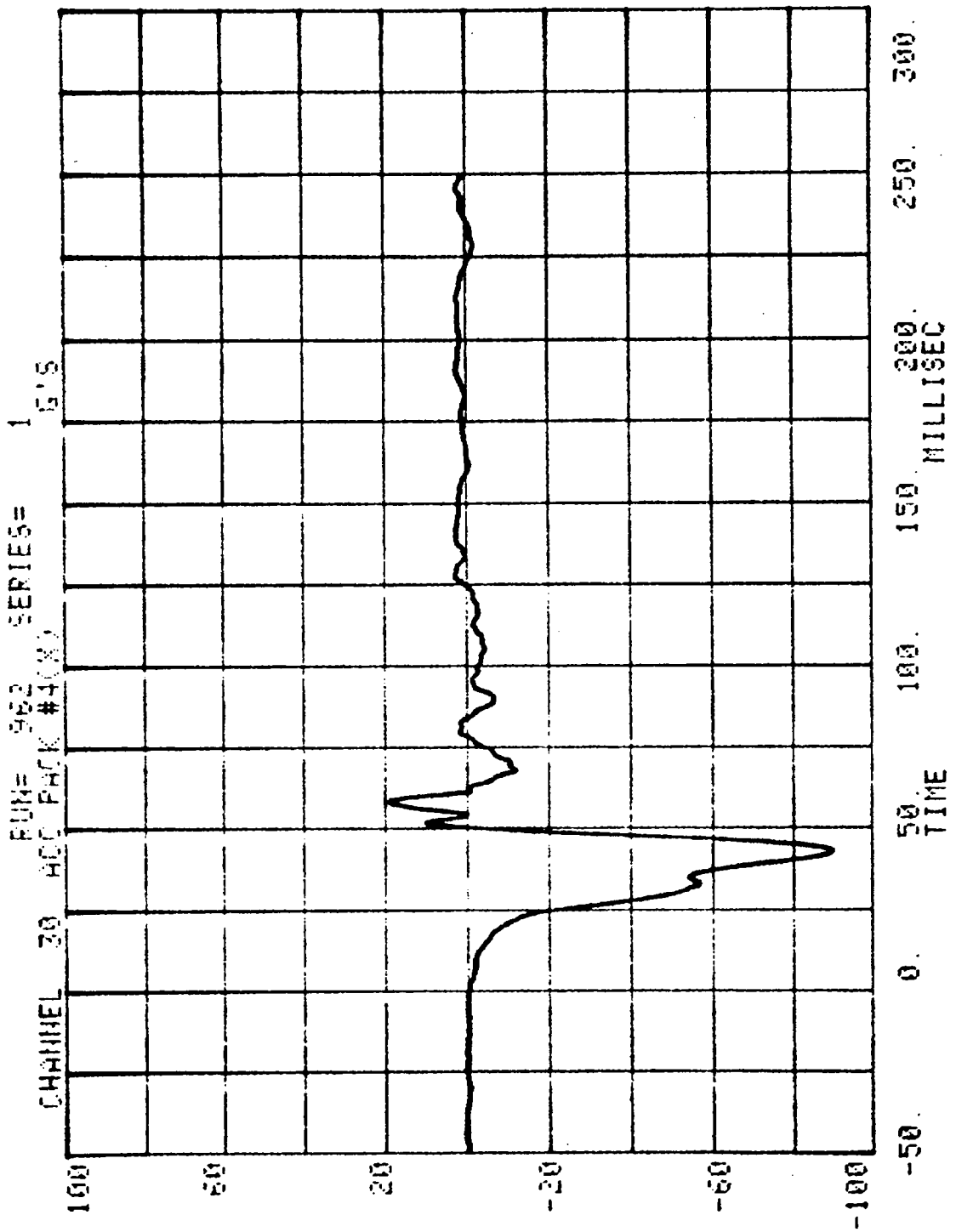

RUN= 962 SERIES= 9
ACCEL #2(x)
CHANNEL 4 DISPLACEMENT
INCHES
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 32 RUN= 962 SERIES= 1
HOG PARK #3(X)
G'S
100
50
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

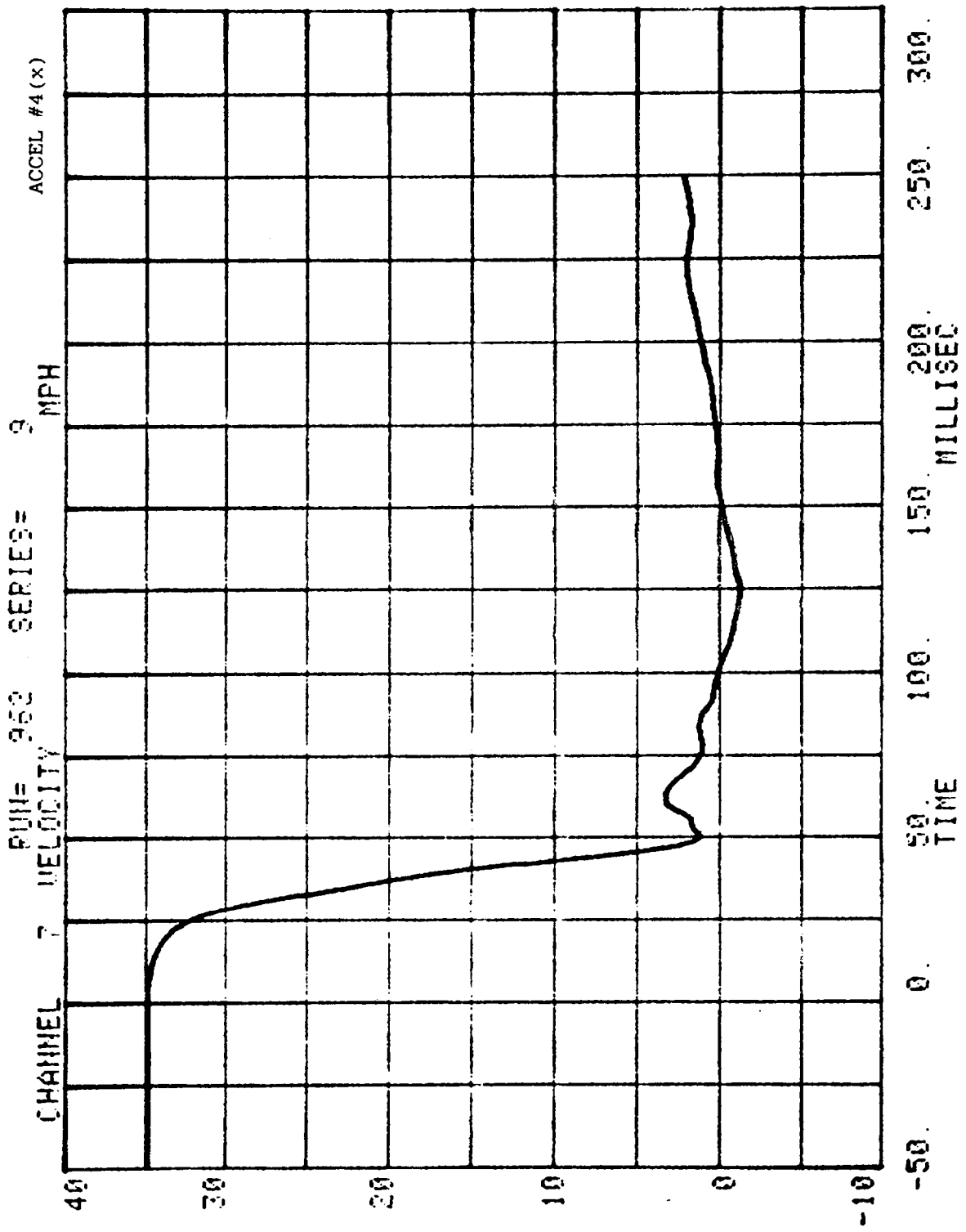
7776-9


ACCEL #3(x)
CHANNEL 5 VELOCITY
RUN= 452 SERIES= 9
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

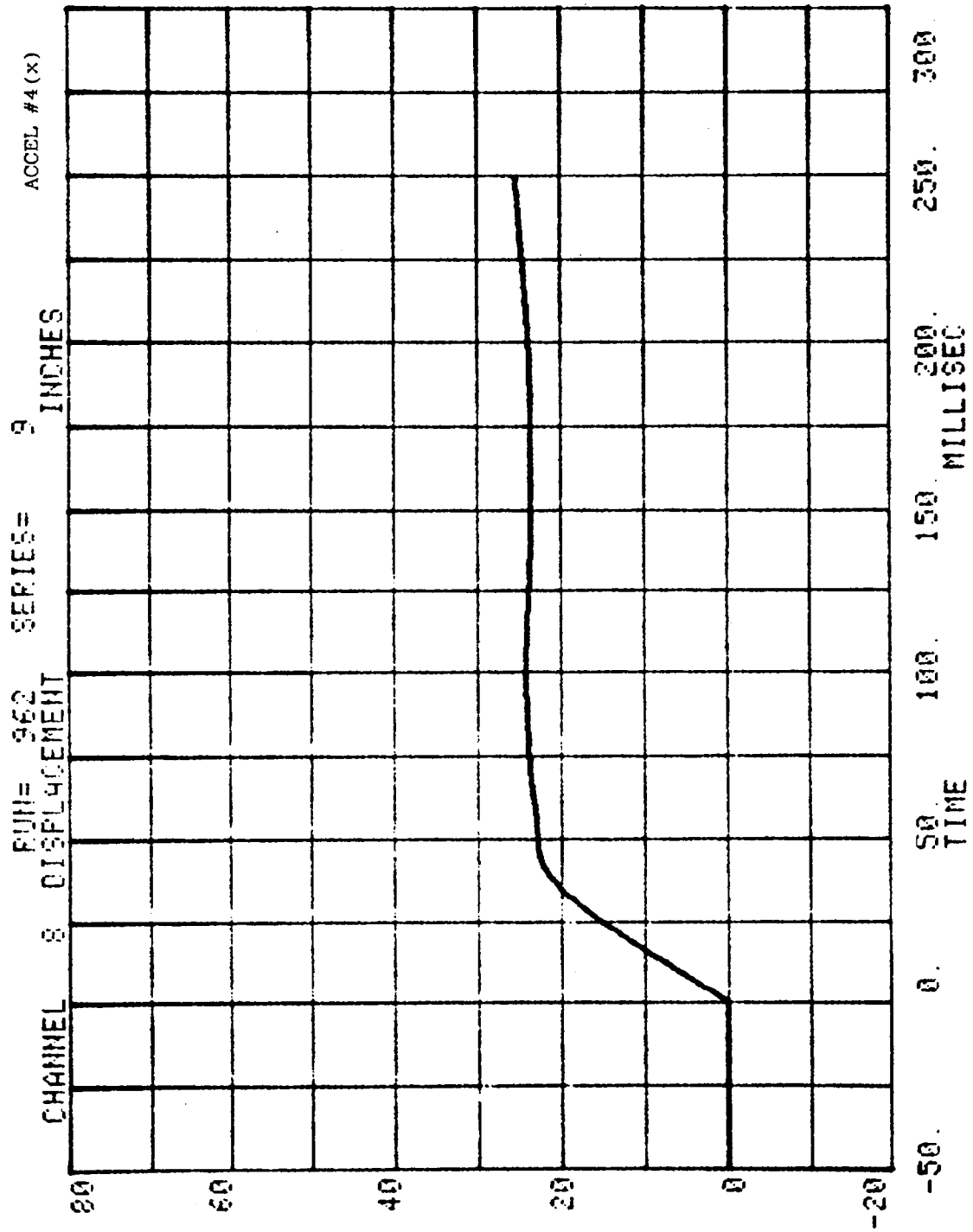

CHANNEL 6 DISPLACEMENT
RUN= 962 SERIES= 9 INCHES
ACCEL #3(x)
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 30
RUN= 962 SERIES= 1
100
50
20
-20
-50
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

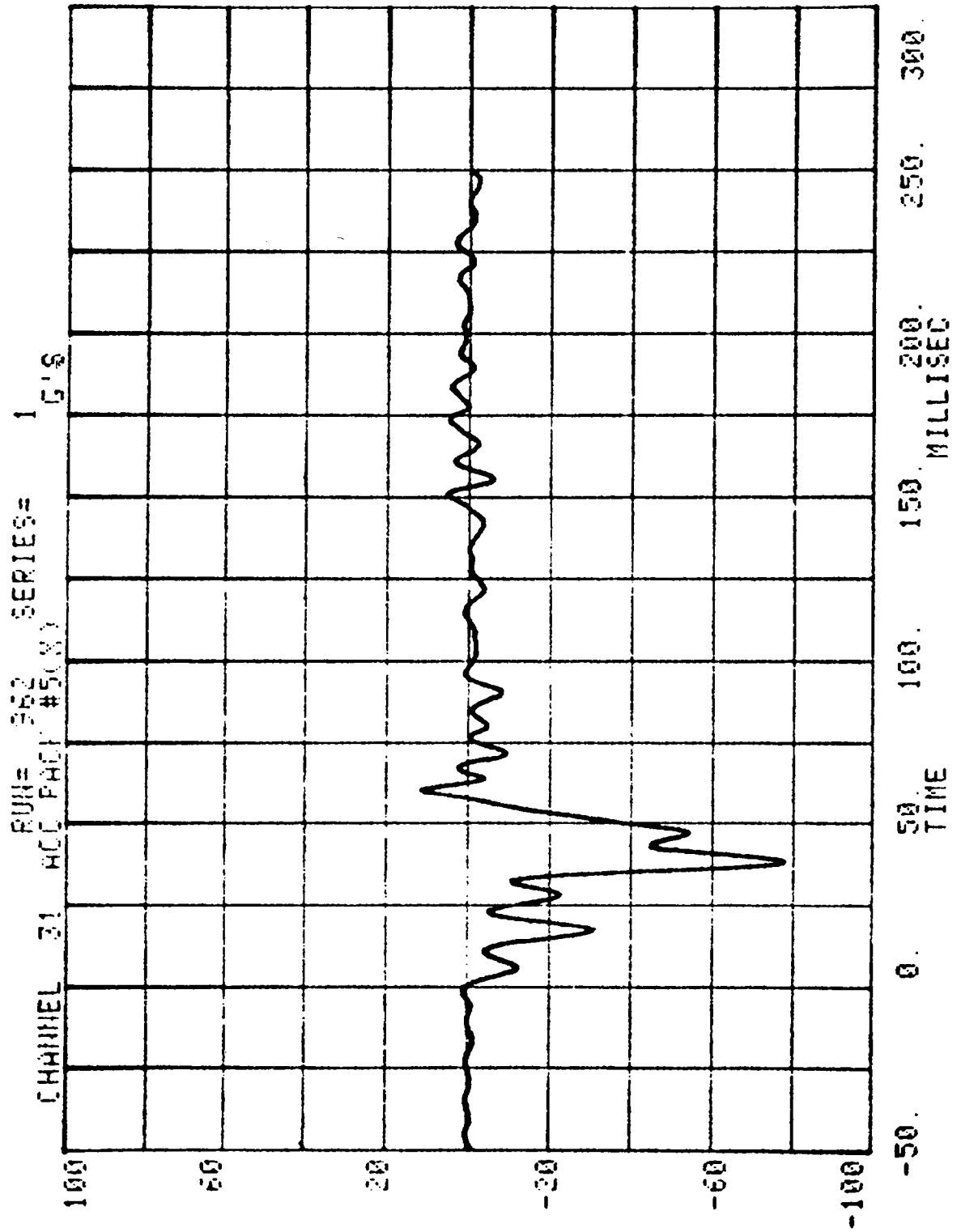
7776-9

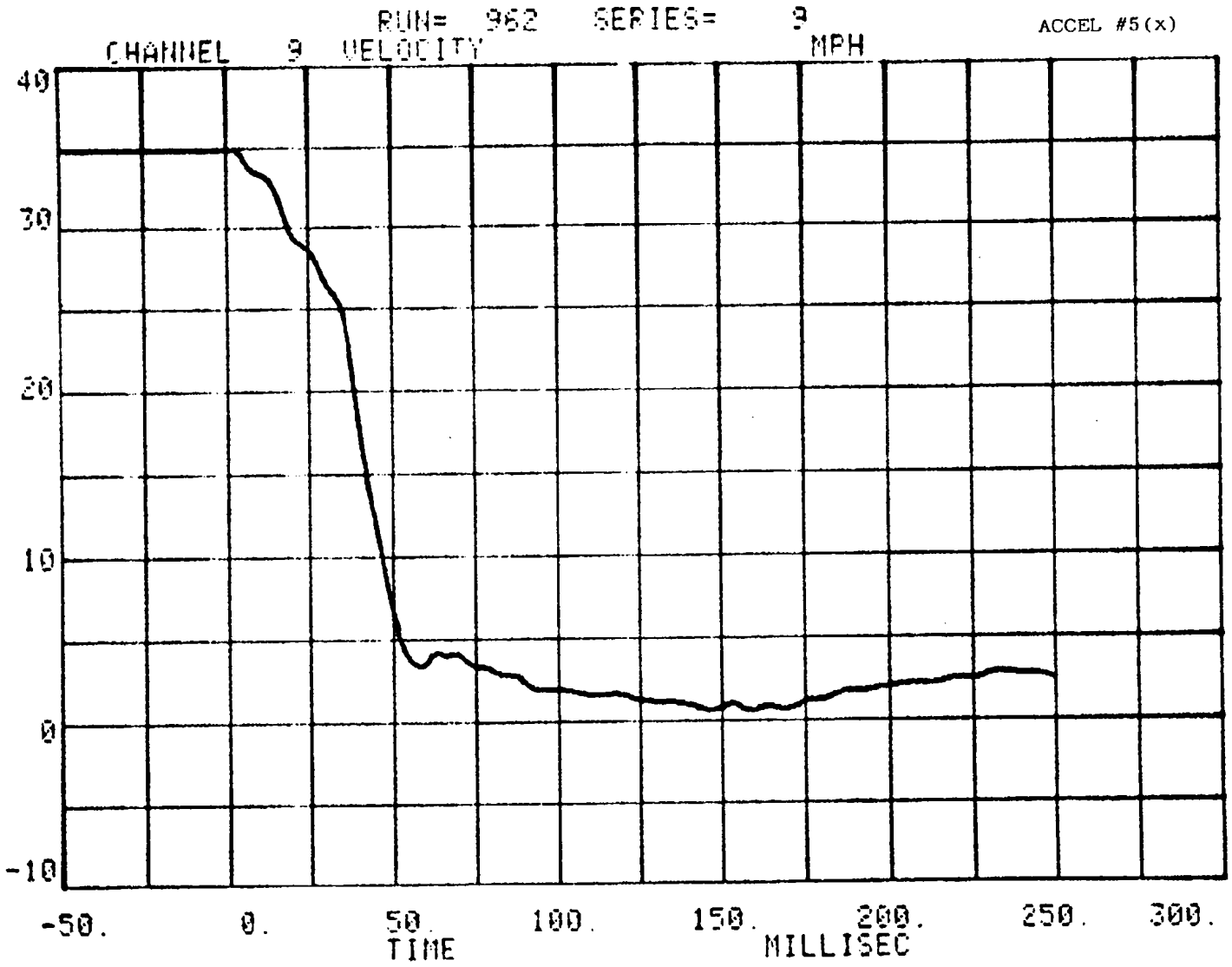

ACCEL #4(x)
CHANNEL 7 VELOCITY
RUN= 962 SERIES= 9 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

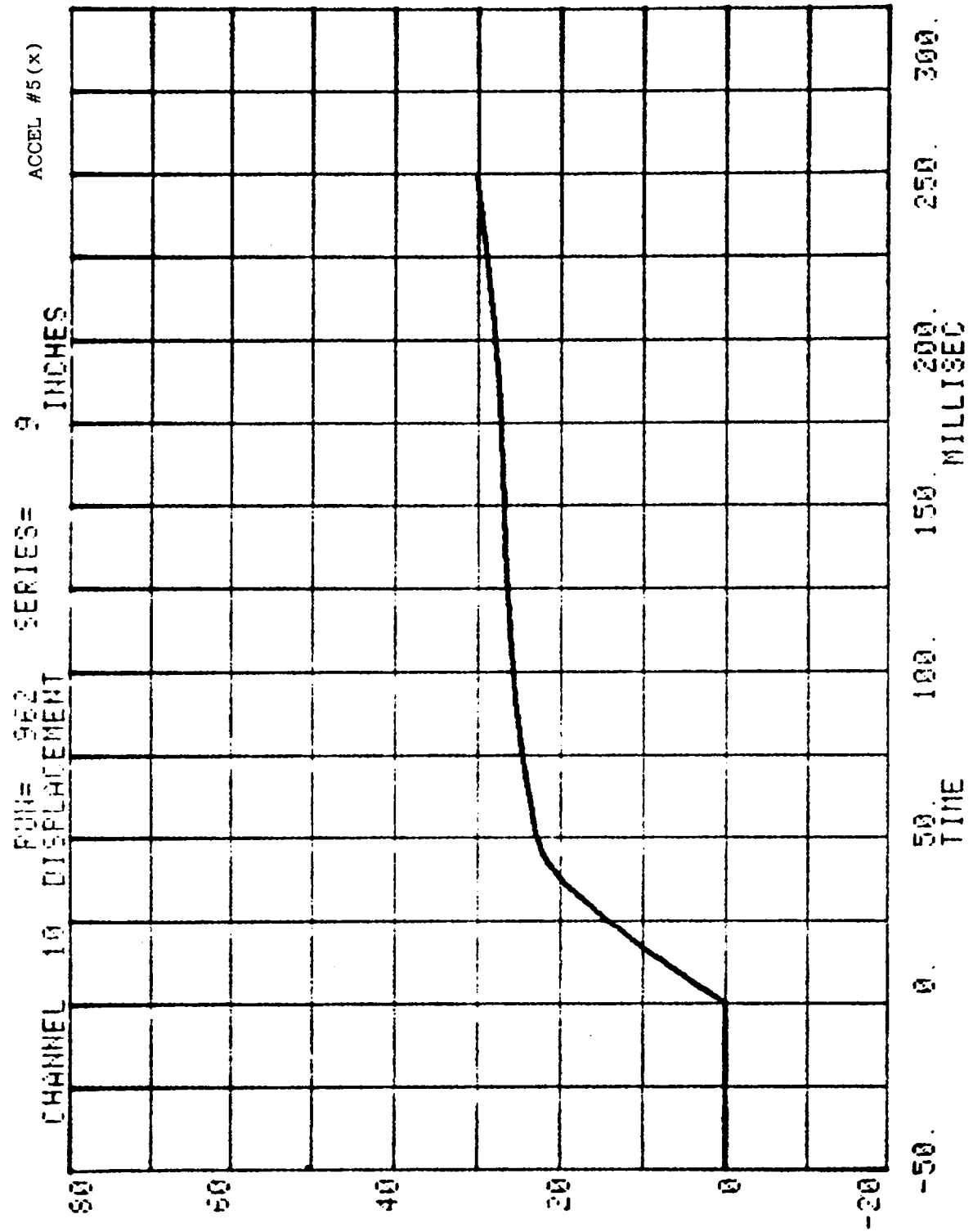
7776-9

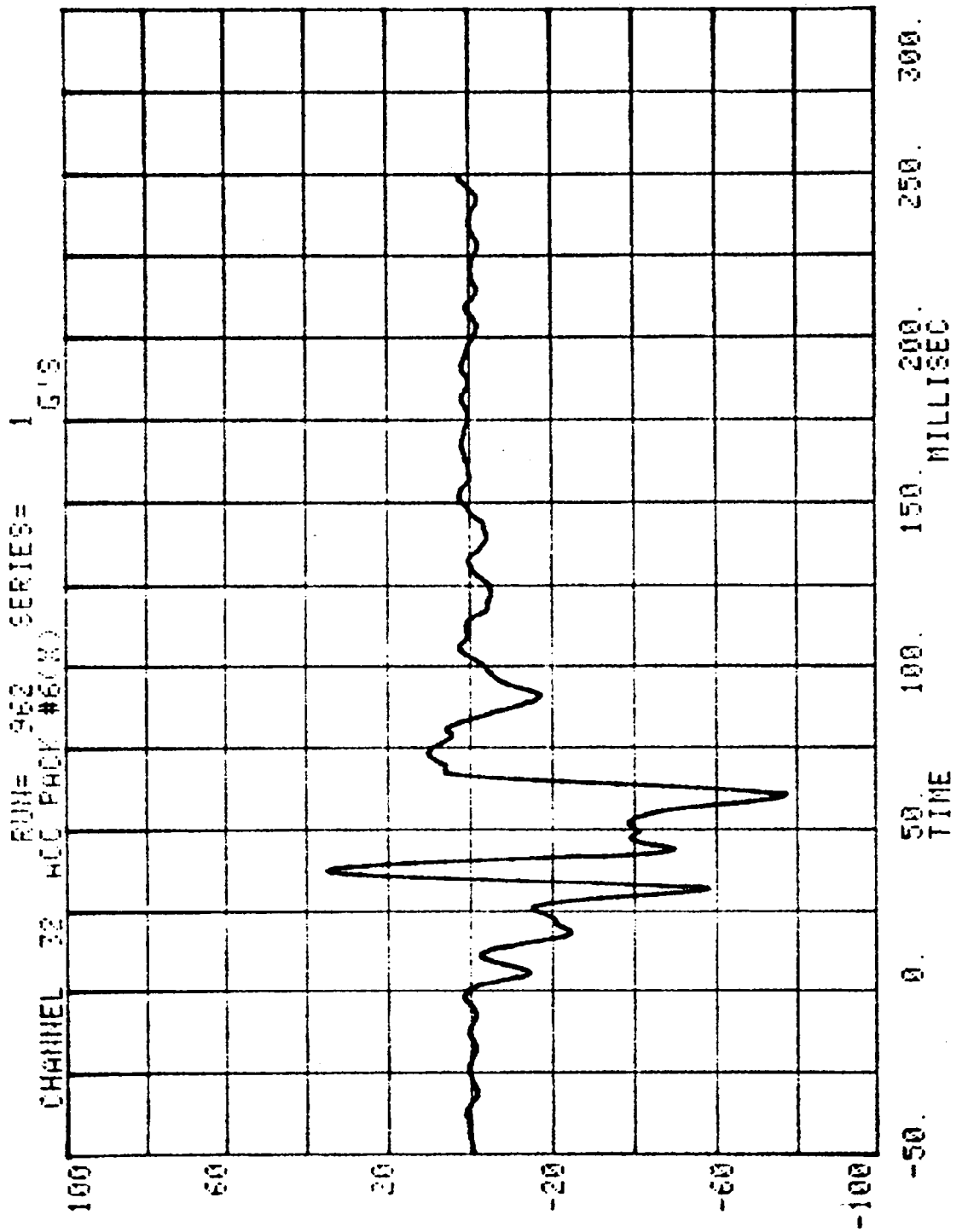

ACCEL #4(x)
CHANNEL 8 DISPLACEMENT
RUN= 962 SERIES= 9
INCHES
60
40
20
0
-20
-50.
0.
50.
100.
150
200.
250.
300
TIME
MILLISEC

7776-9

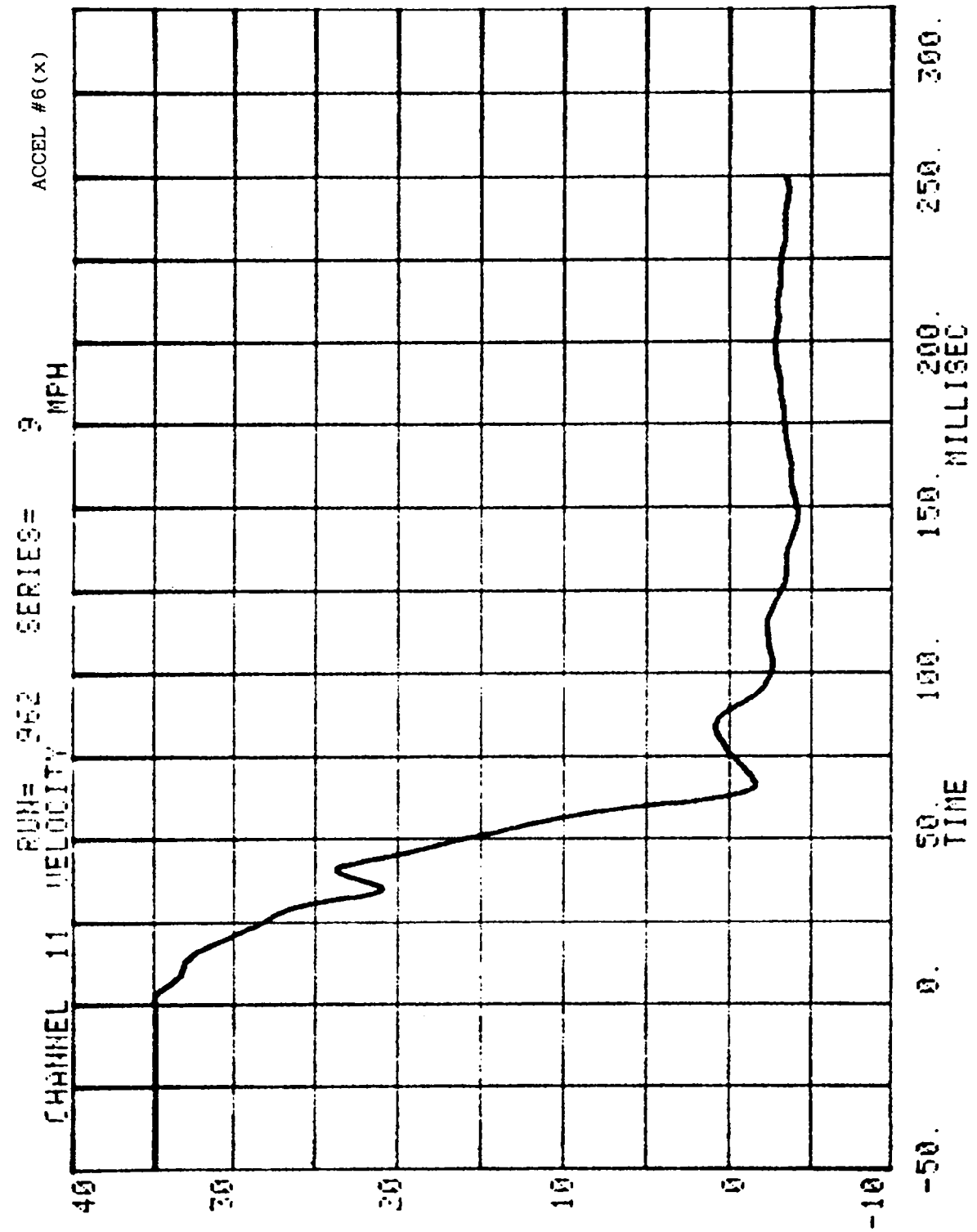

CHANNEL 31 HCC PACK #5(S)
RUN= 362 SERIES= 1
G'S
100
50
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 962 SERIES= 9
ACCEL #5(x)
CHANNEL 9 VELOCITY
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

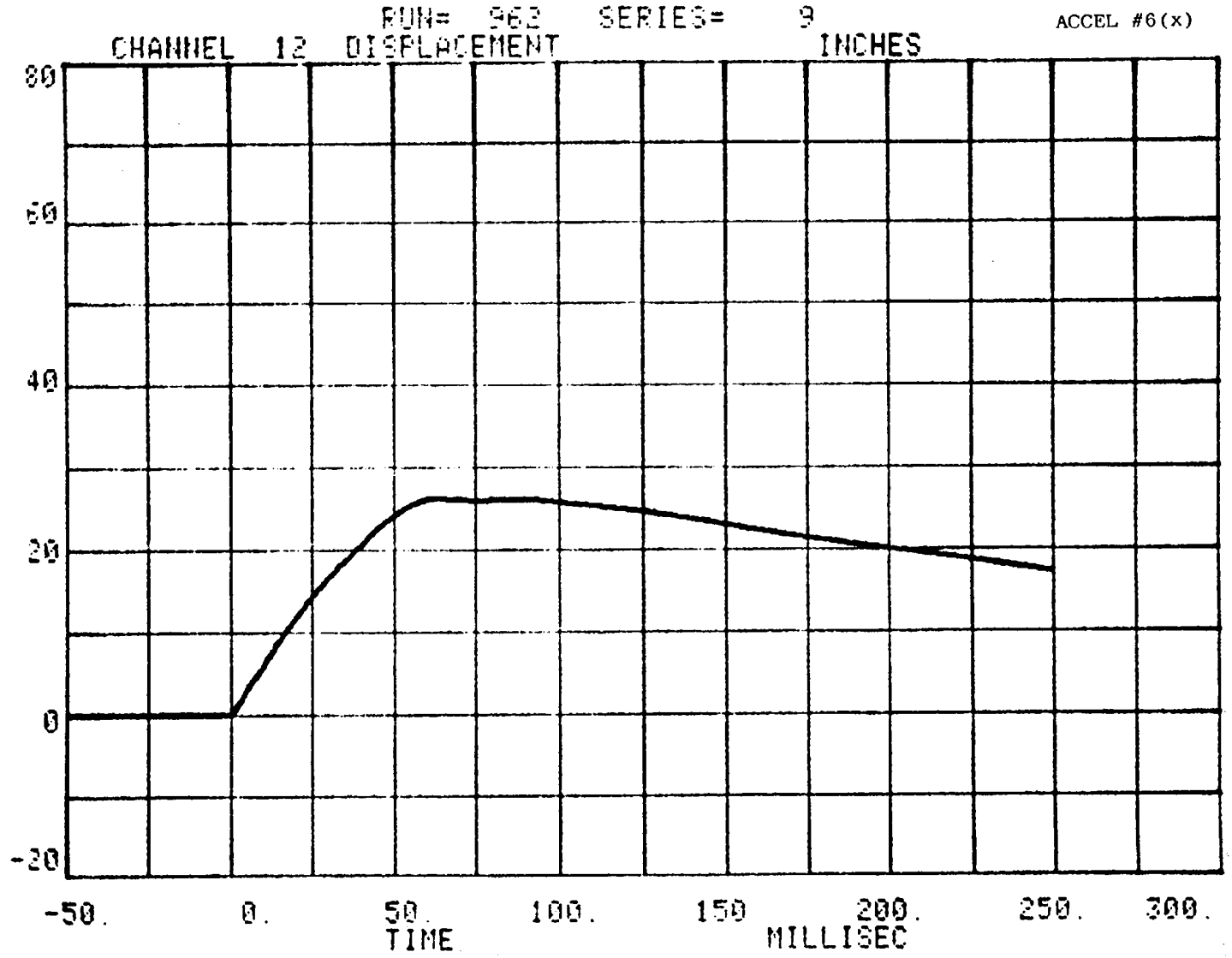

CHANNEL 10 DISPLACEMENT
RUN= 962 SERIES= 9
INCHES
ACCEL #5(x)
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

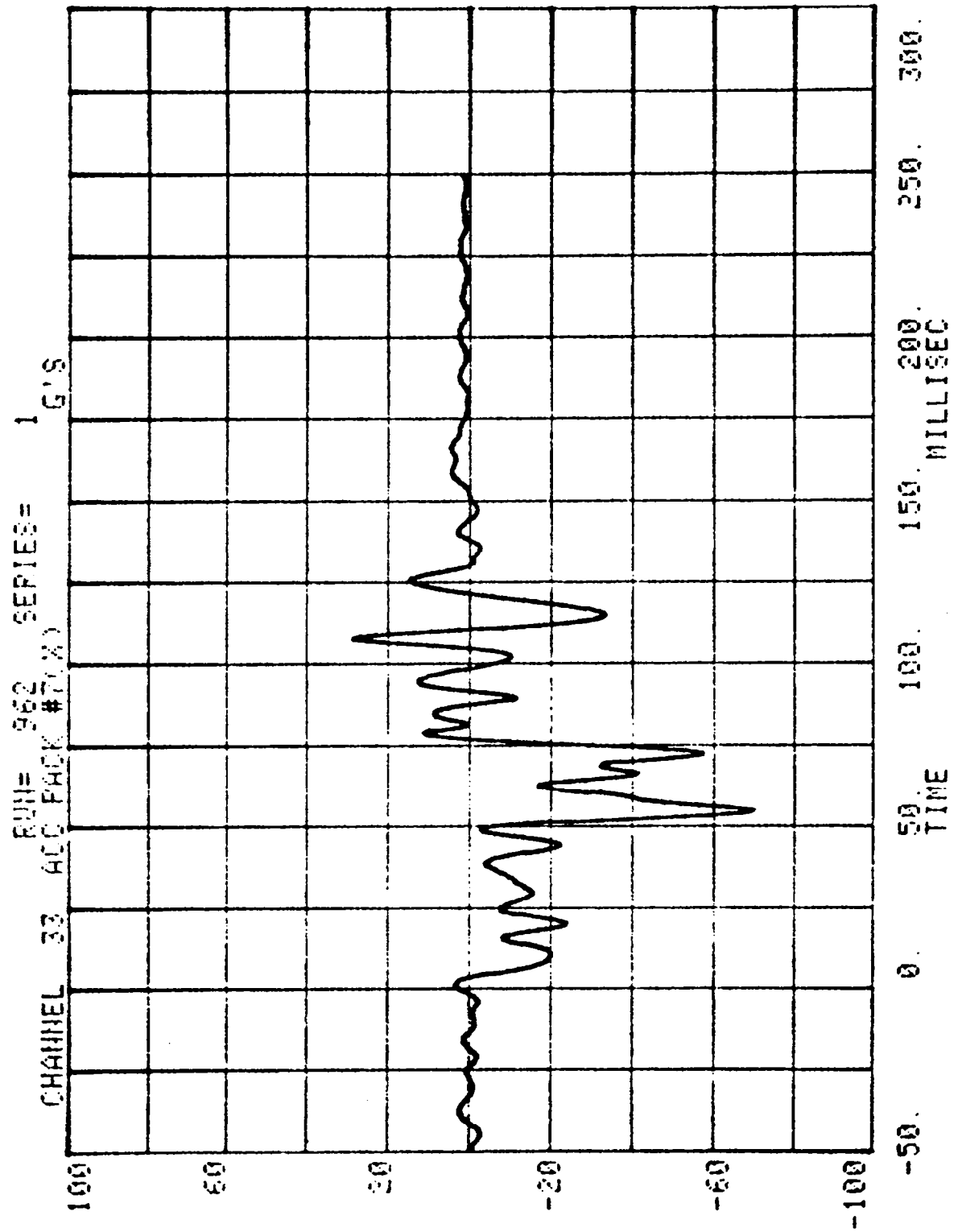

CHANNEL 32 HCC PACK #6/80 SERIES= 1
RUN= 962
G'S
100
60
30
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

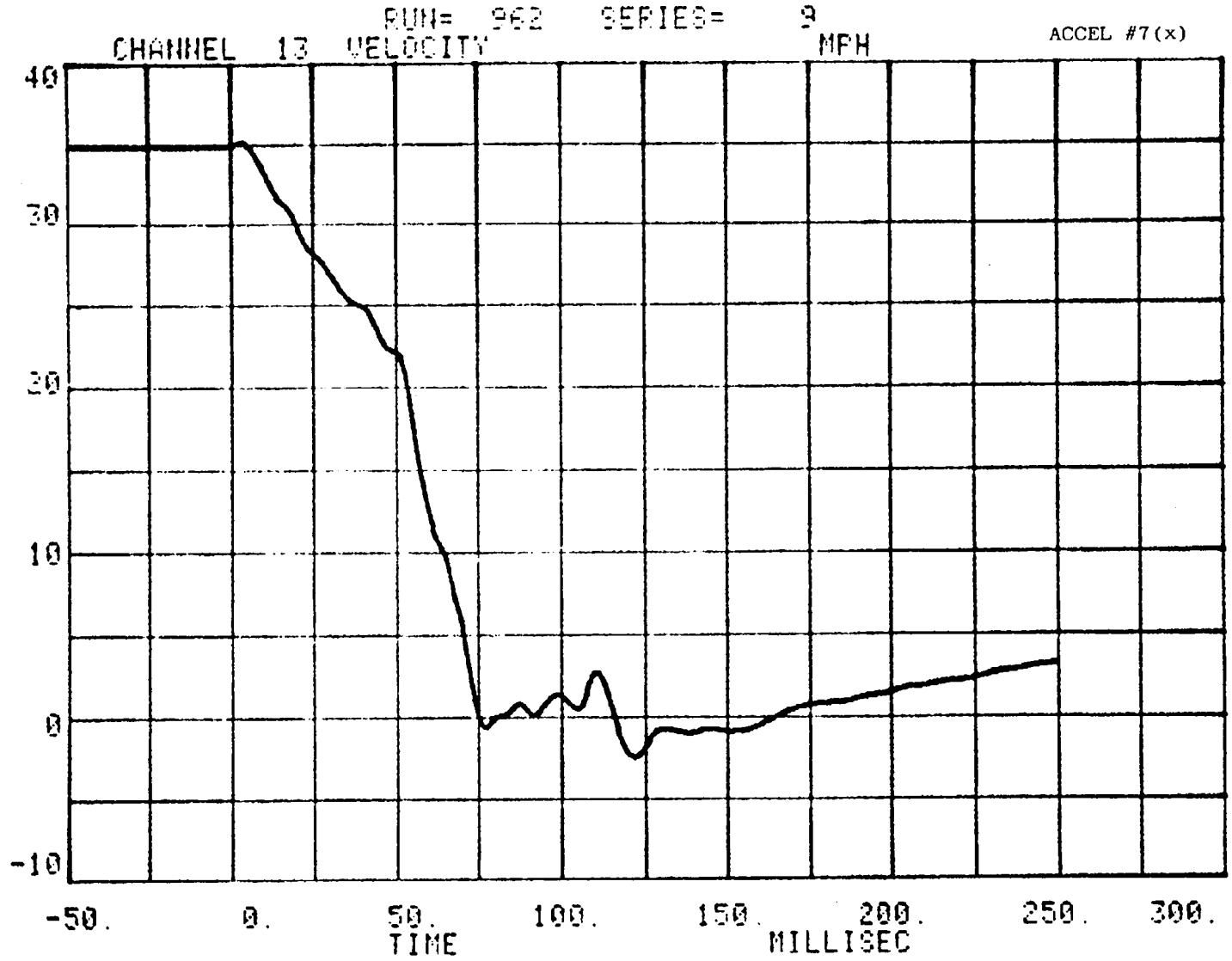
7776-9

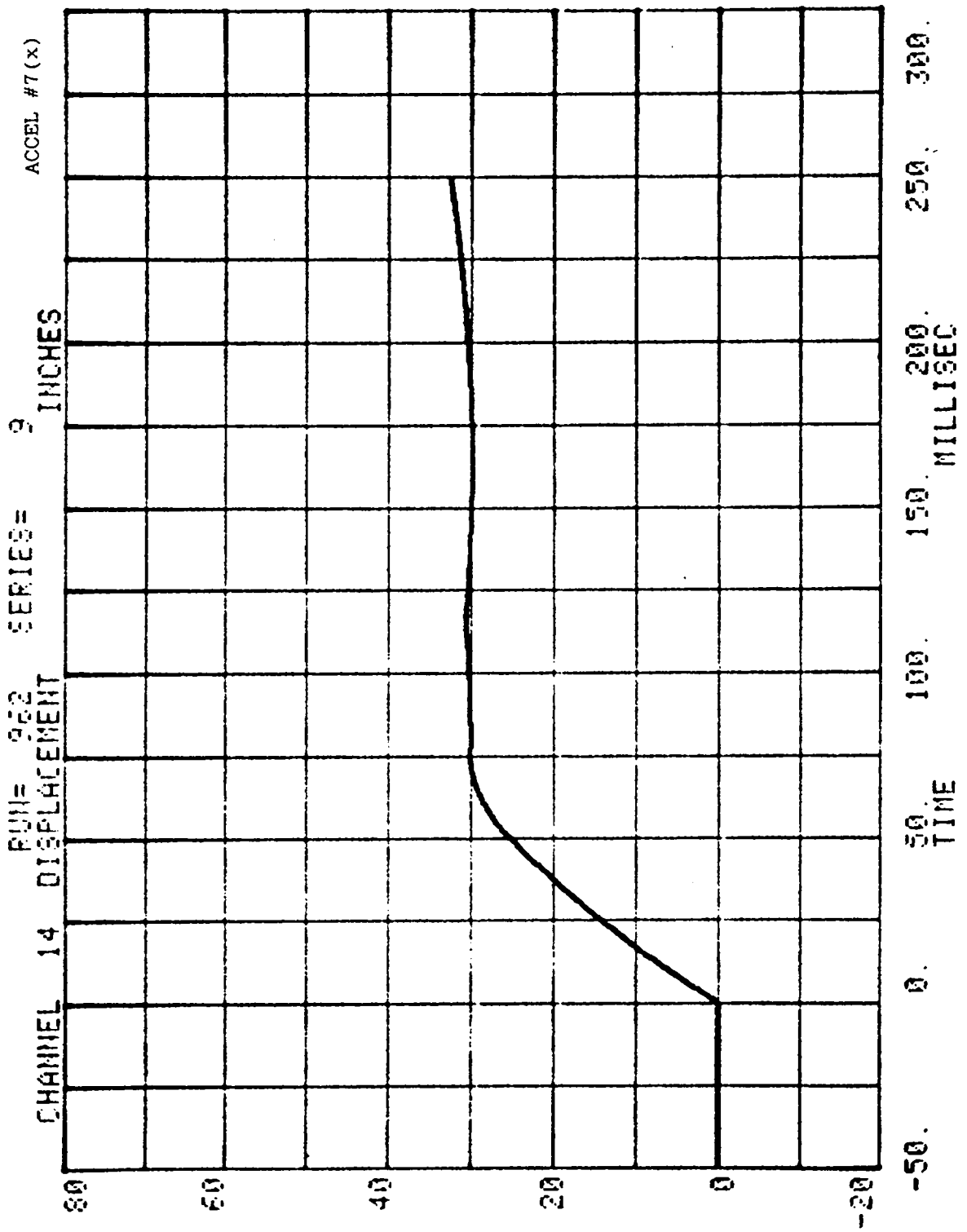

ACCEL #6(x)
CHANNEL 11 VELOCITY
RUN= 962 SERIES= 9 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7776-9


RUN= 962 SERIES= 9
ACCEL #6(x)
CHANNEL 12 DISPLACEMENT INCHES
80
60
40
20
0
-20
-50.
0.
50.
100.
150
200.
250.
300.
TIME MILLISEC


CHANNEL 33 ACC PACK #7(X)
RUN= 962 SERIES= 1
G'S
100
50
0
-50
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 962 SERIES= 9
CHANNEL 13 VELOCITY
MPH
ACCEL #7(x)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 14 DISPLACEMENT
RUN= 962 SERIES= 9
ACCEL #7(x)
INCHES
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

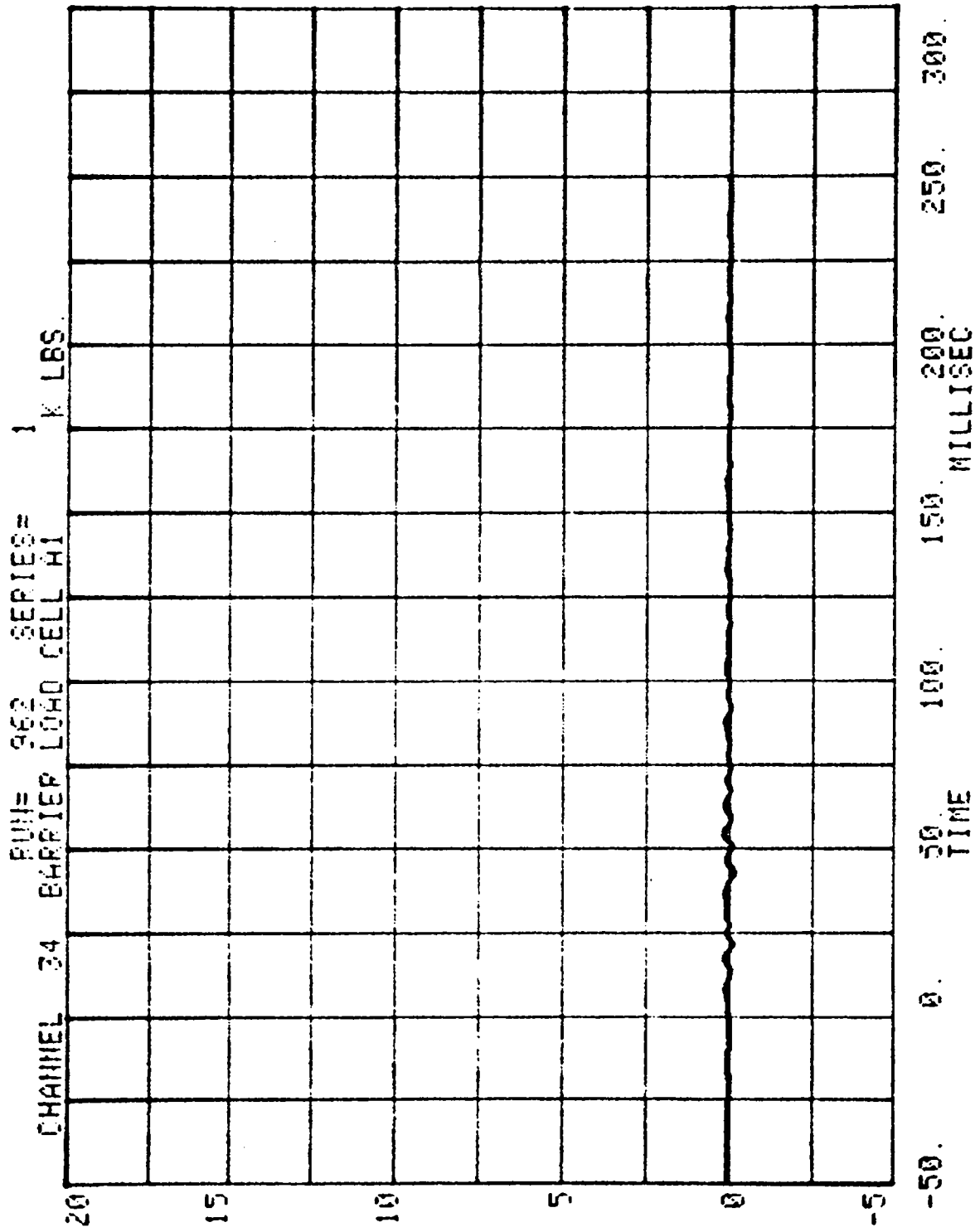
7776-9

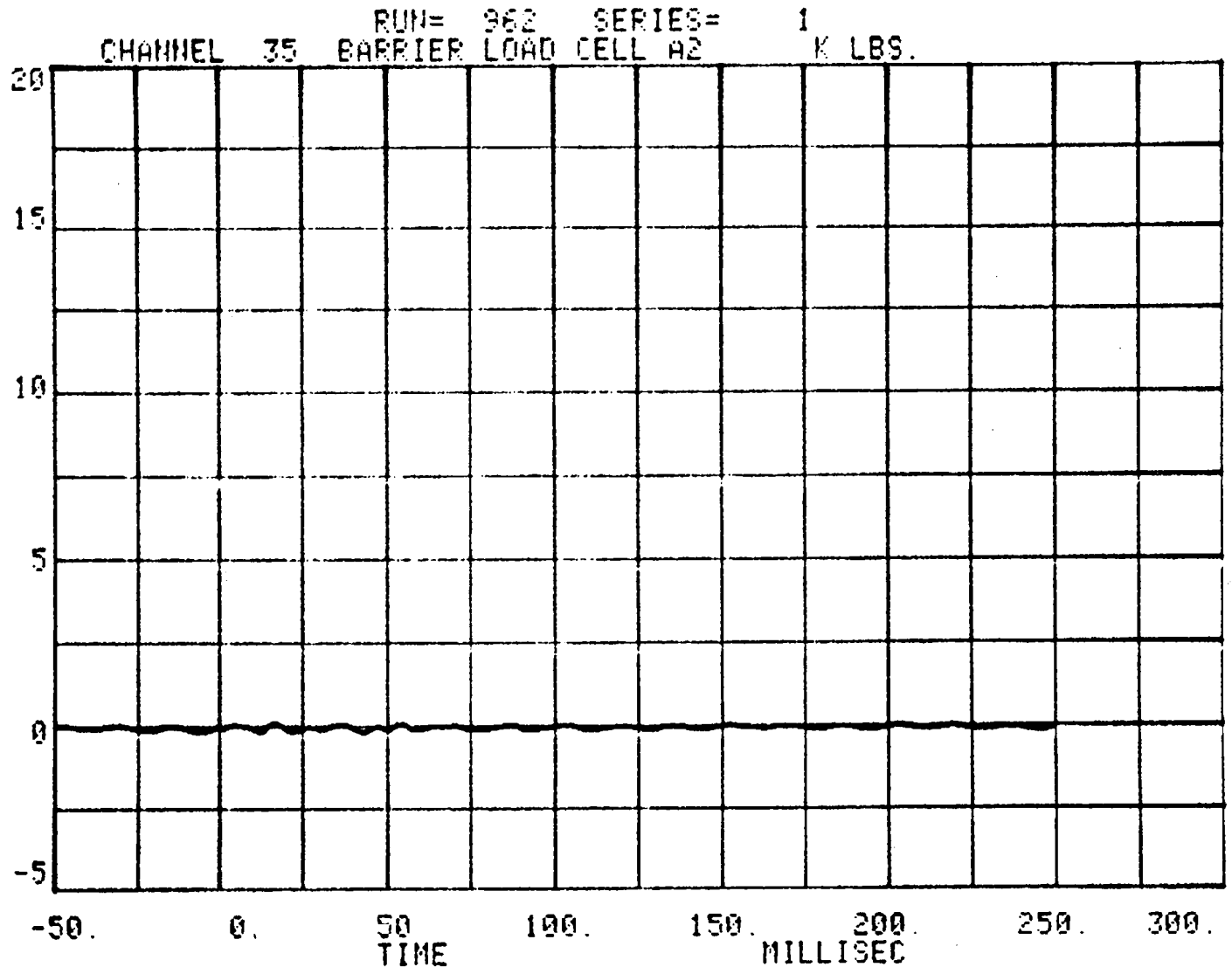
TEST NO. ML5202

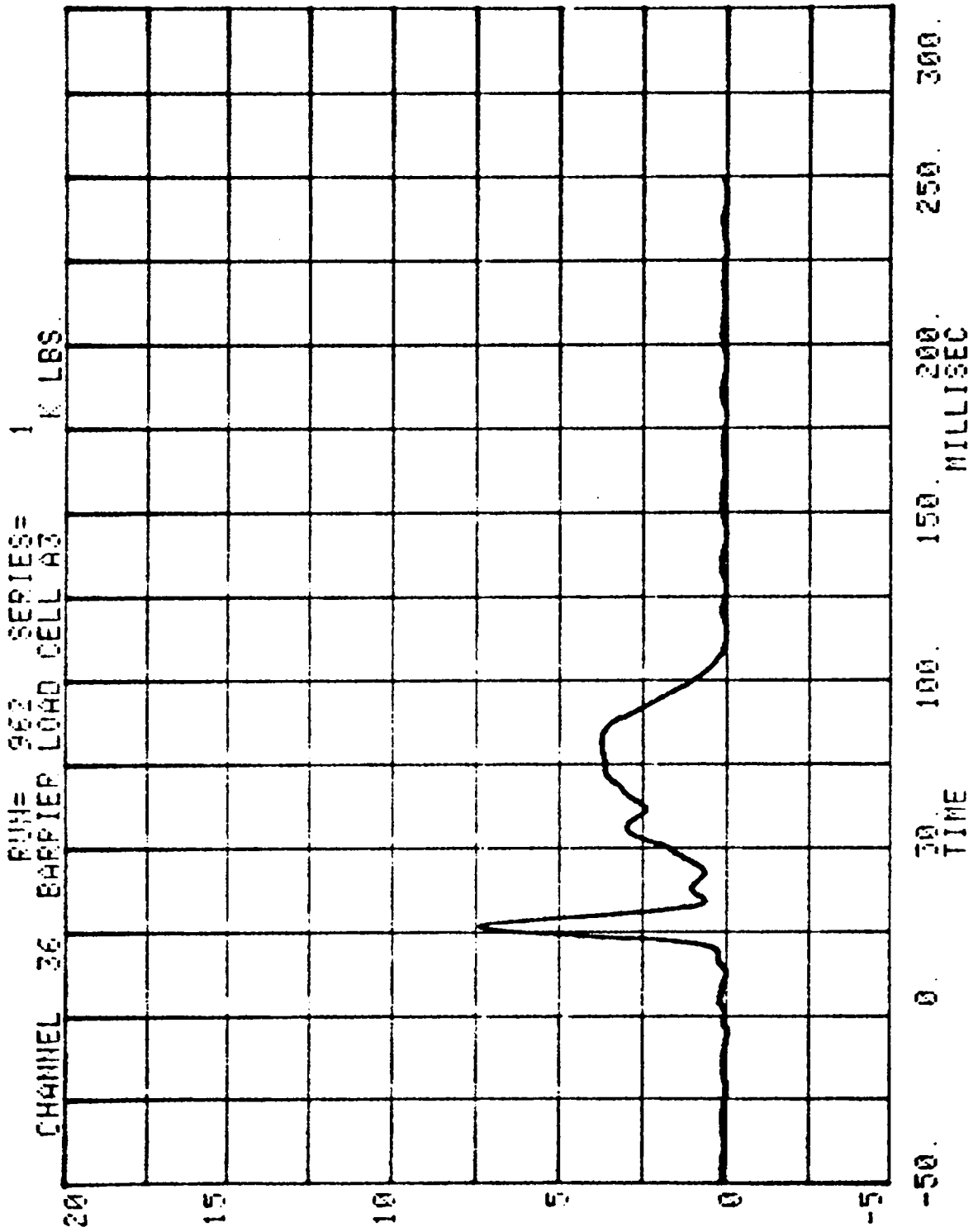
LOAD CELL BARRIER DATA

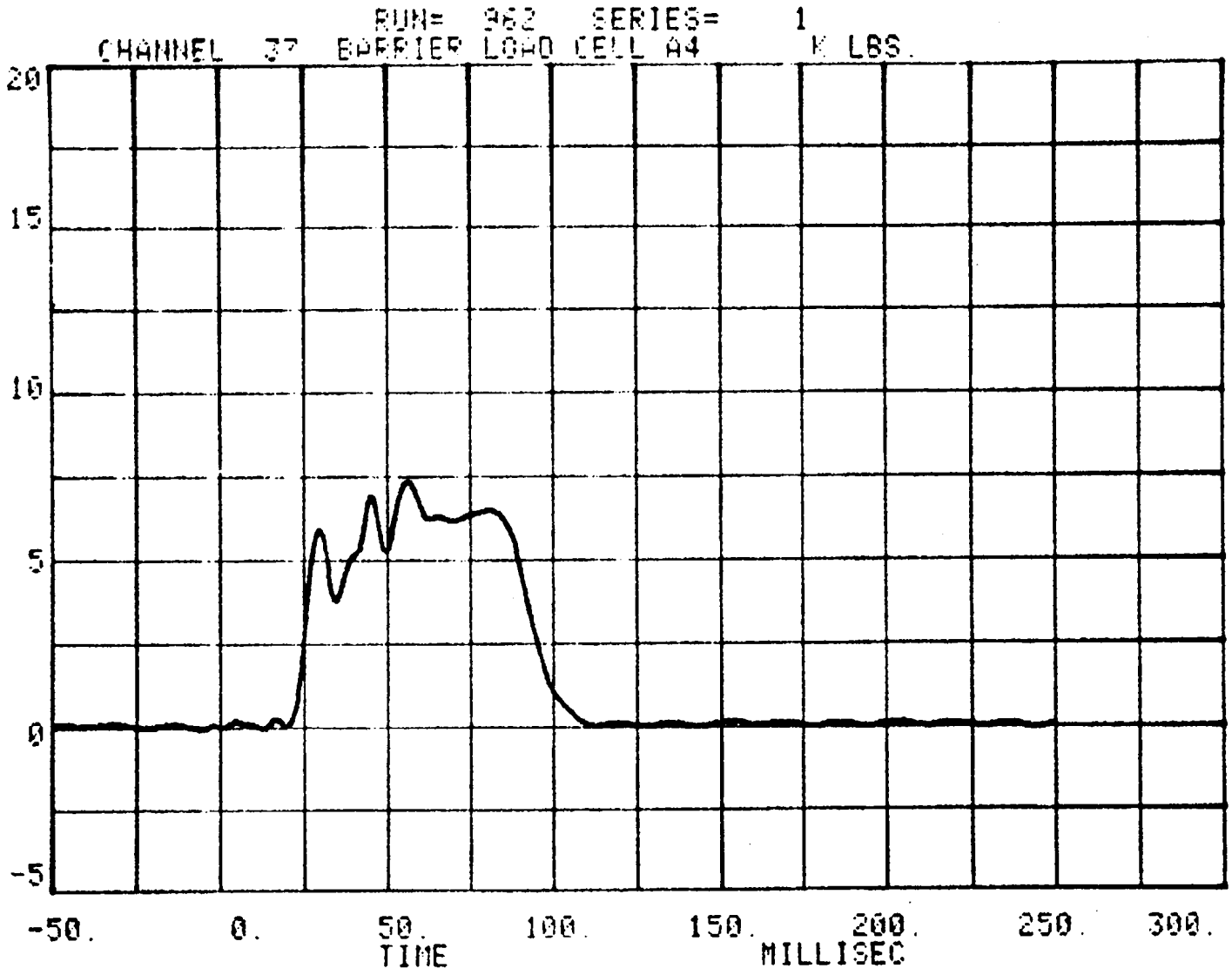
FILTER CHANNEL CLASS

60

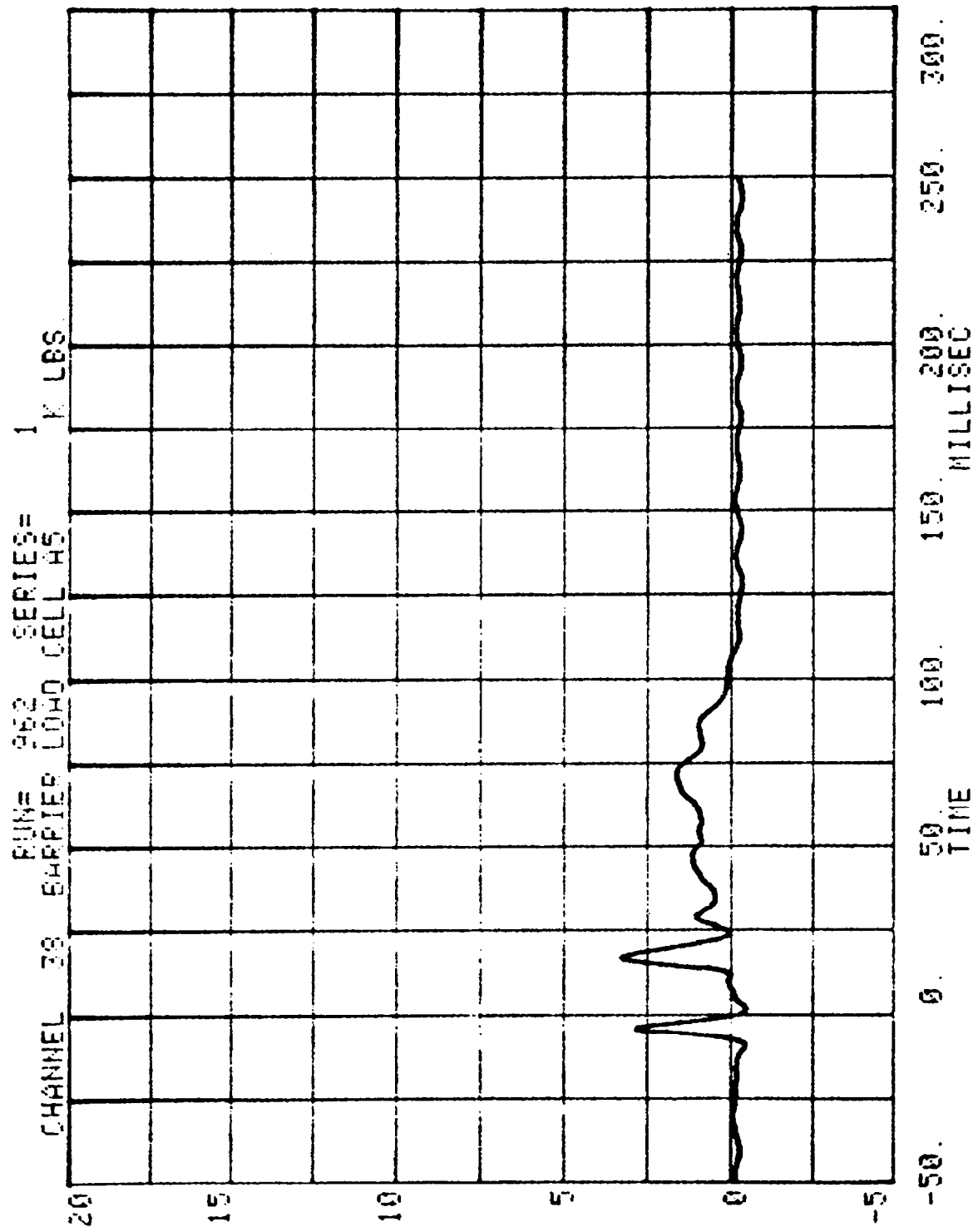

CHANNEL 34 BARRIER LOAD CELL H1
RUN= 962 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

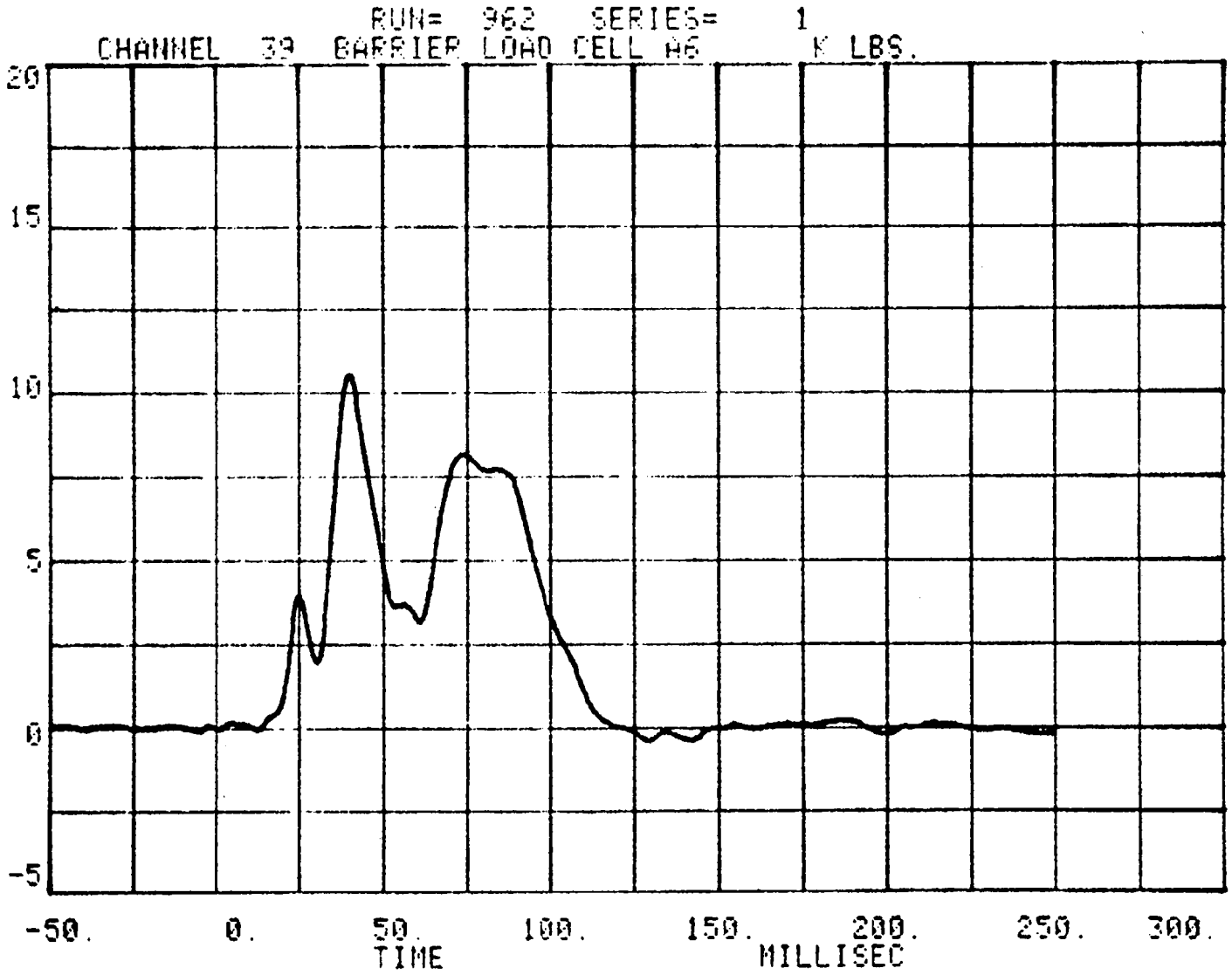

RUN= 362 SERIES= 1
CHANNEL 35 BARRIER LOAD CELL A2 K LBS.
20
15
10
5
0
-5
-50.
0.
50
100.
150.
200.
250.
300.
TIME
MILLISEC

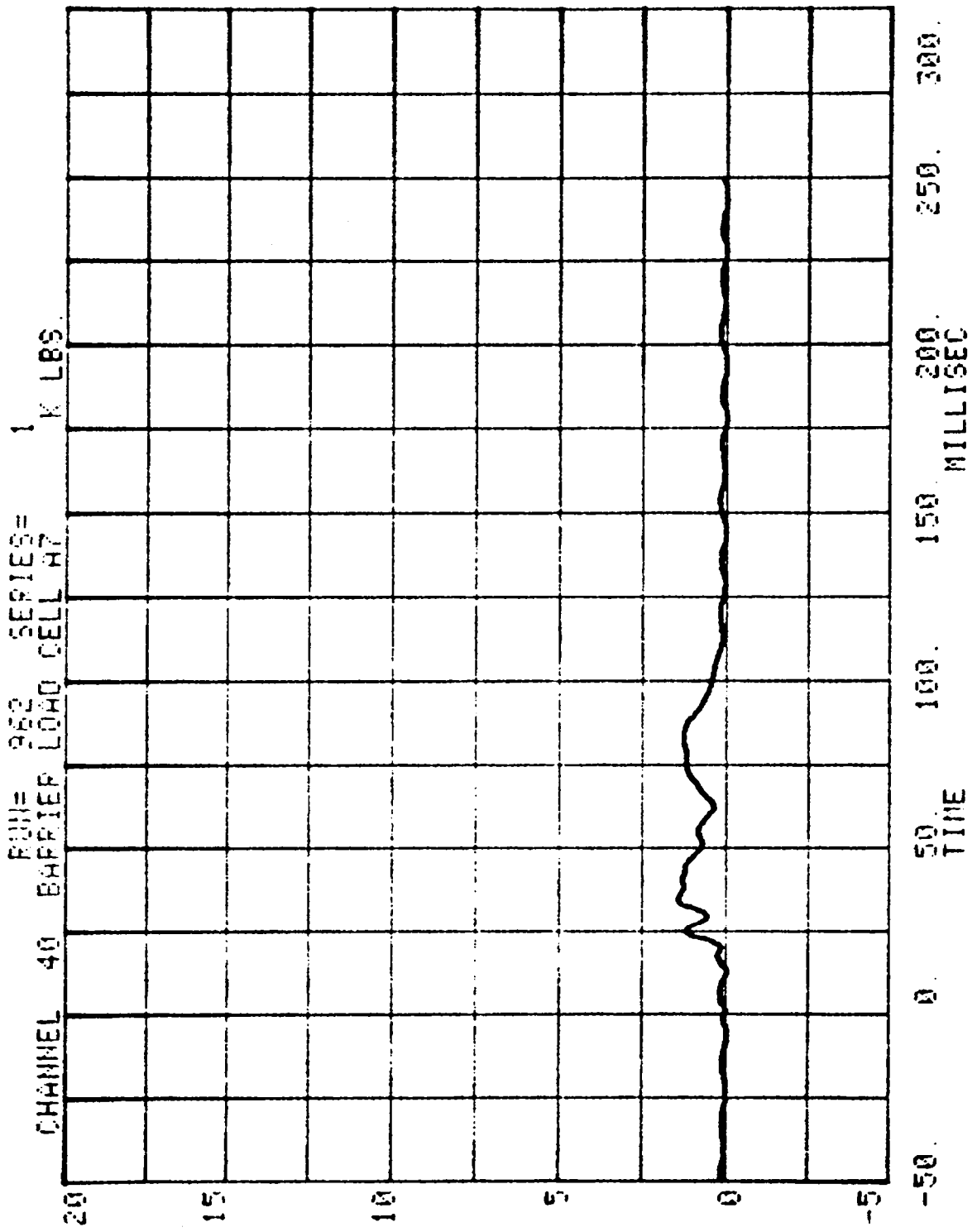

CHANNEL 36 BARRIER LOAD CELL A3
RUN= 962 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

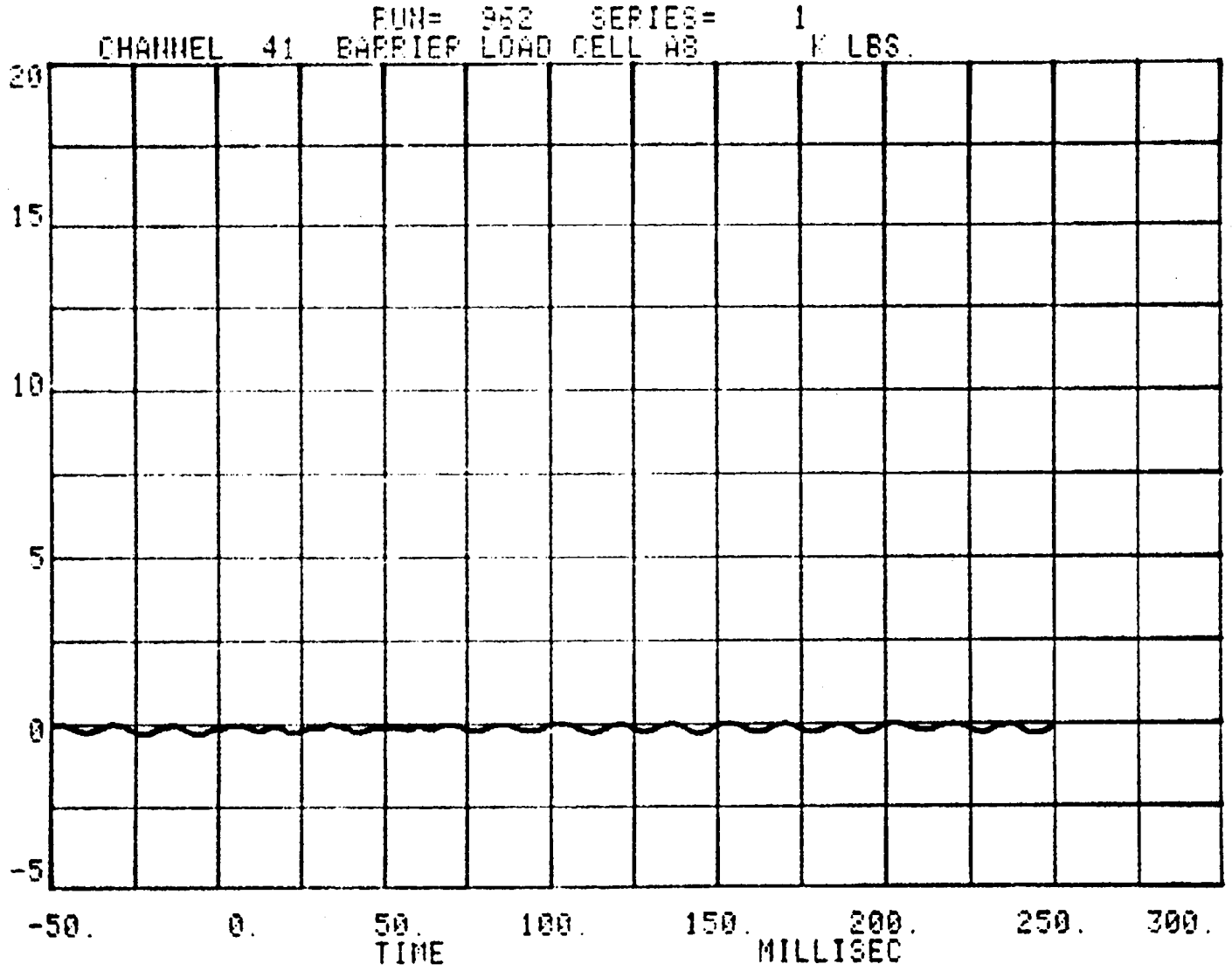

RUN= 962 SERIES= 1
CHANNEL 37 BARRIER LOAD CELL A4 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

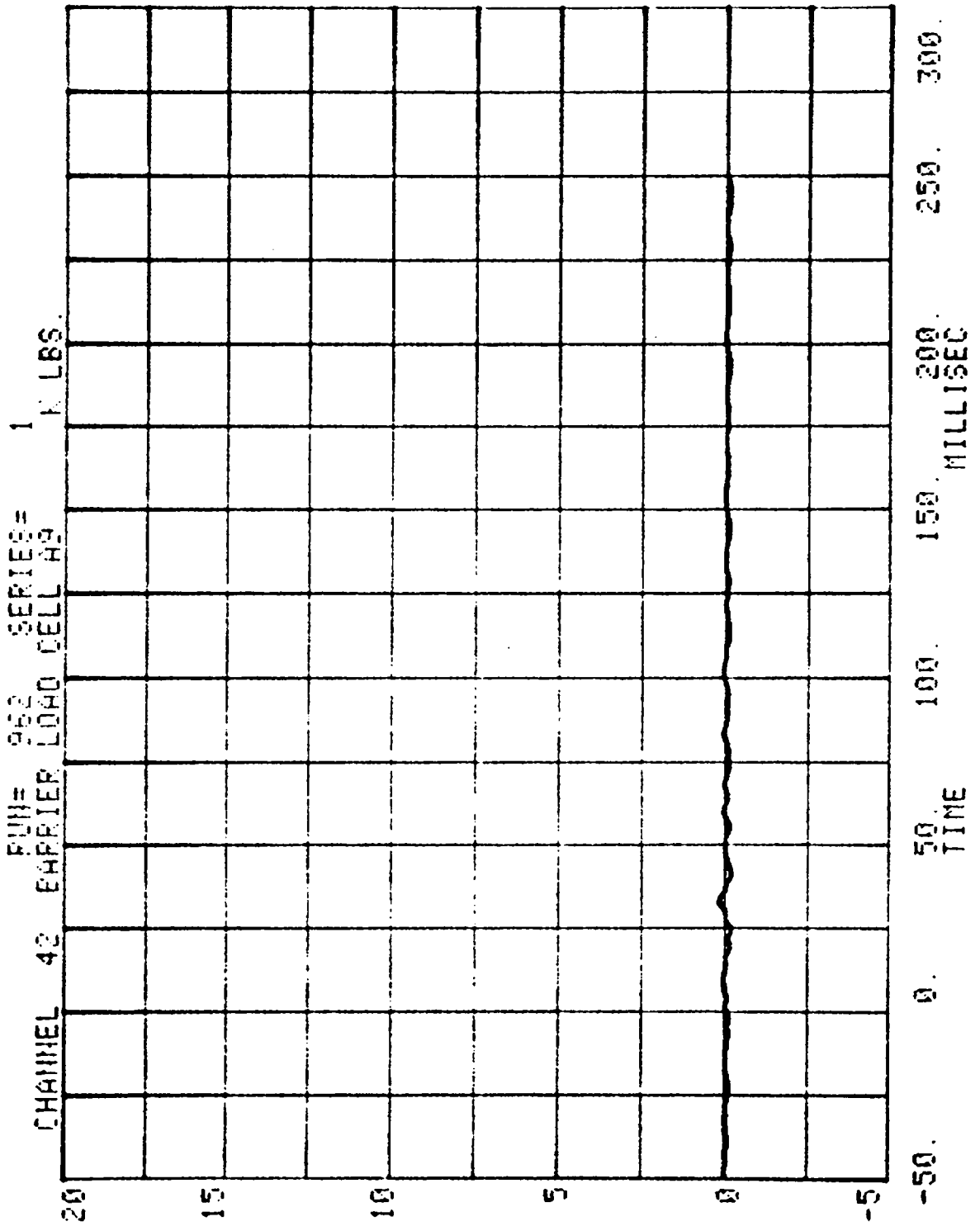
7776-9

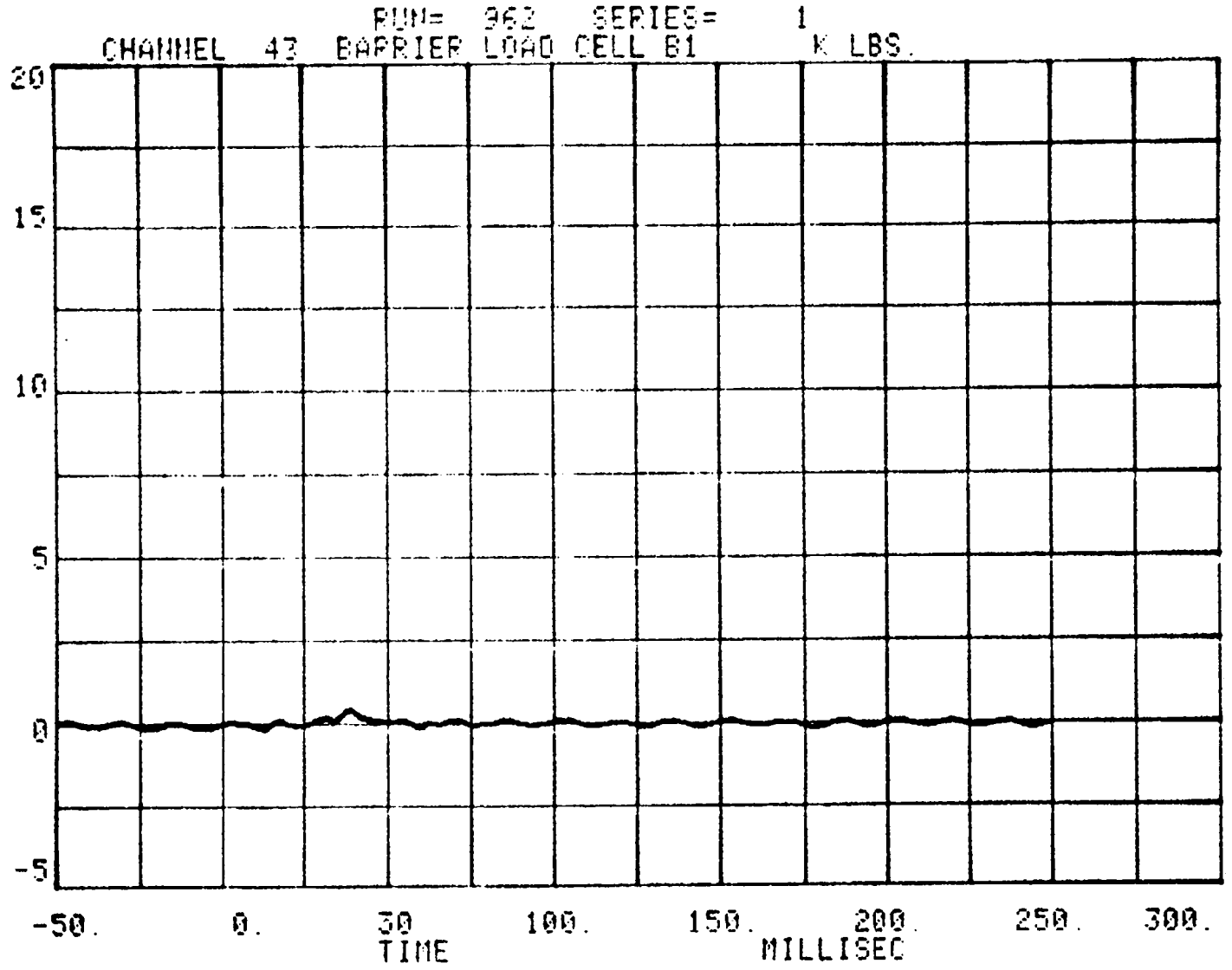

CHANNEL 38 SHAPIRO LOAD CELL HS
RUN= 352 SERIES= 1
K LBS
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

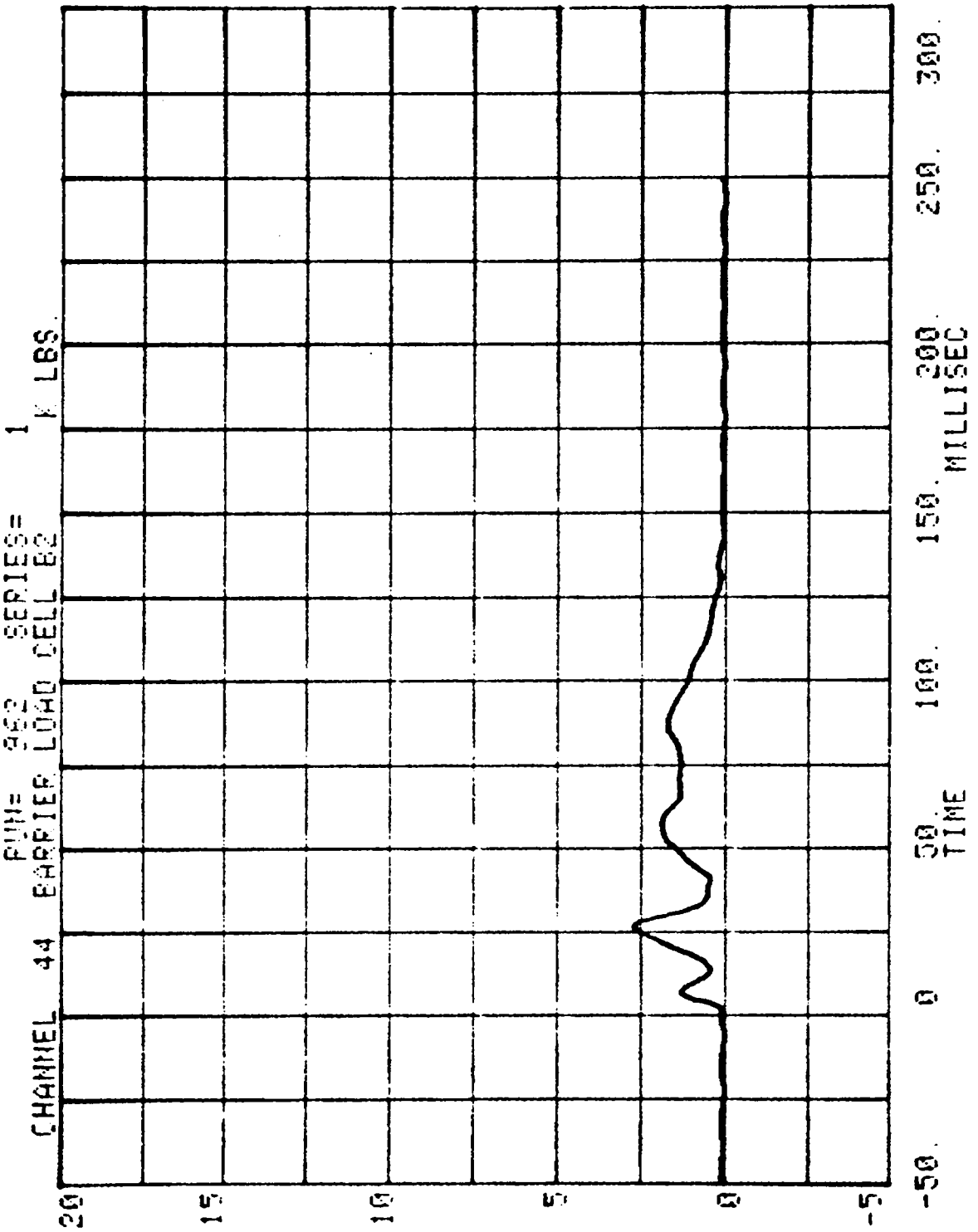

RUN= 962 SERIES= 1
CHANNEL 39 BARRIER LOAD CELL A6 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

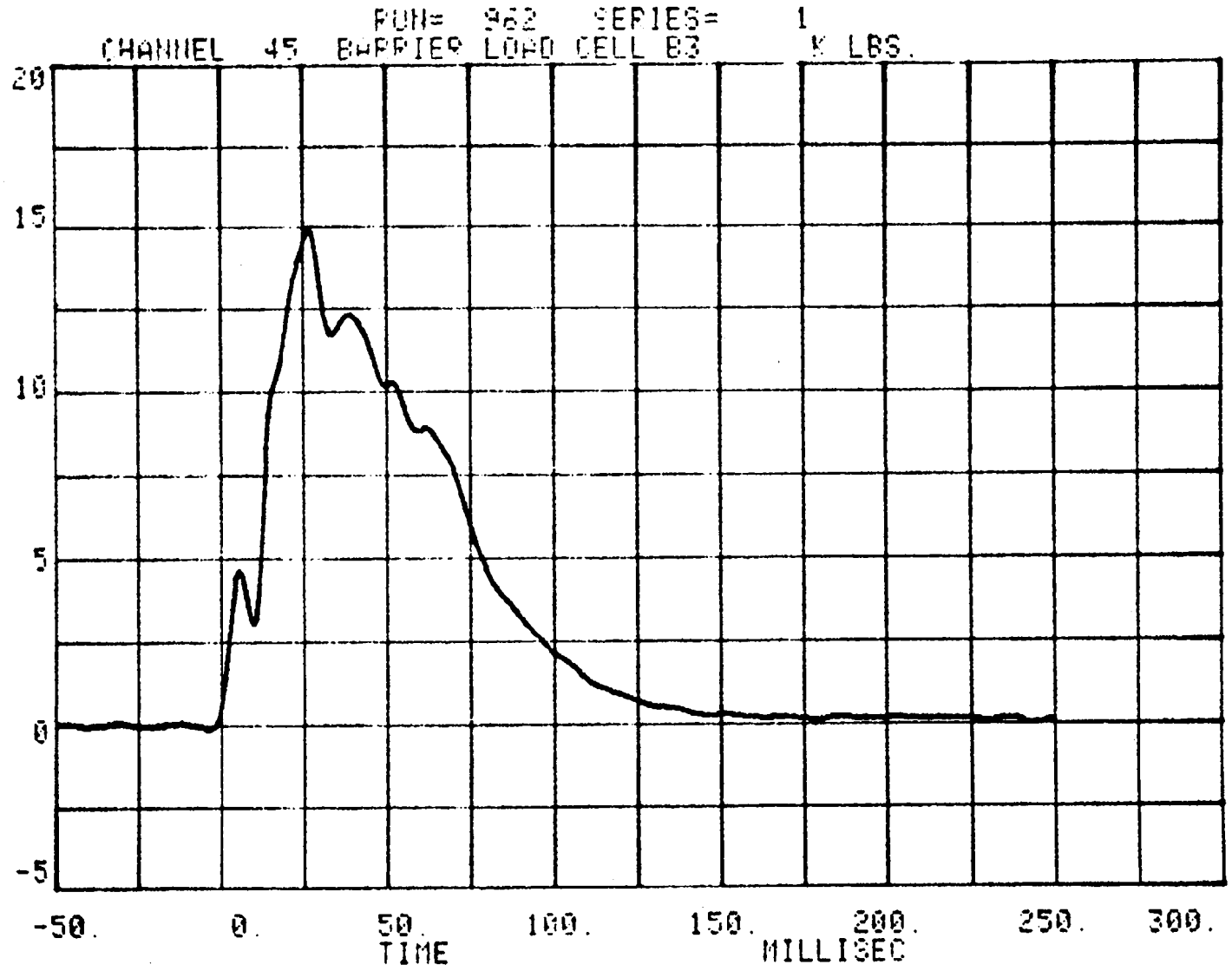

CHANNEL 40 RUN= 262 SERIES= 1
BARRIER LOAD CELL #2 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150
200.
250.
300.
TIME
MILLISEC

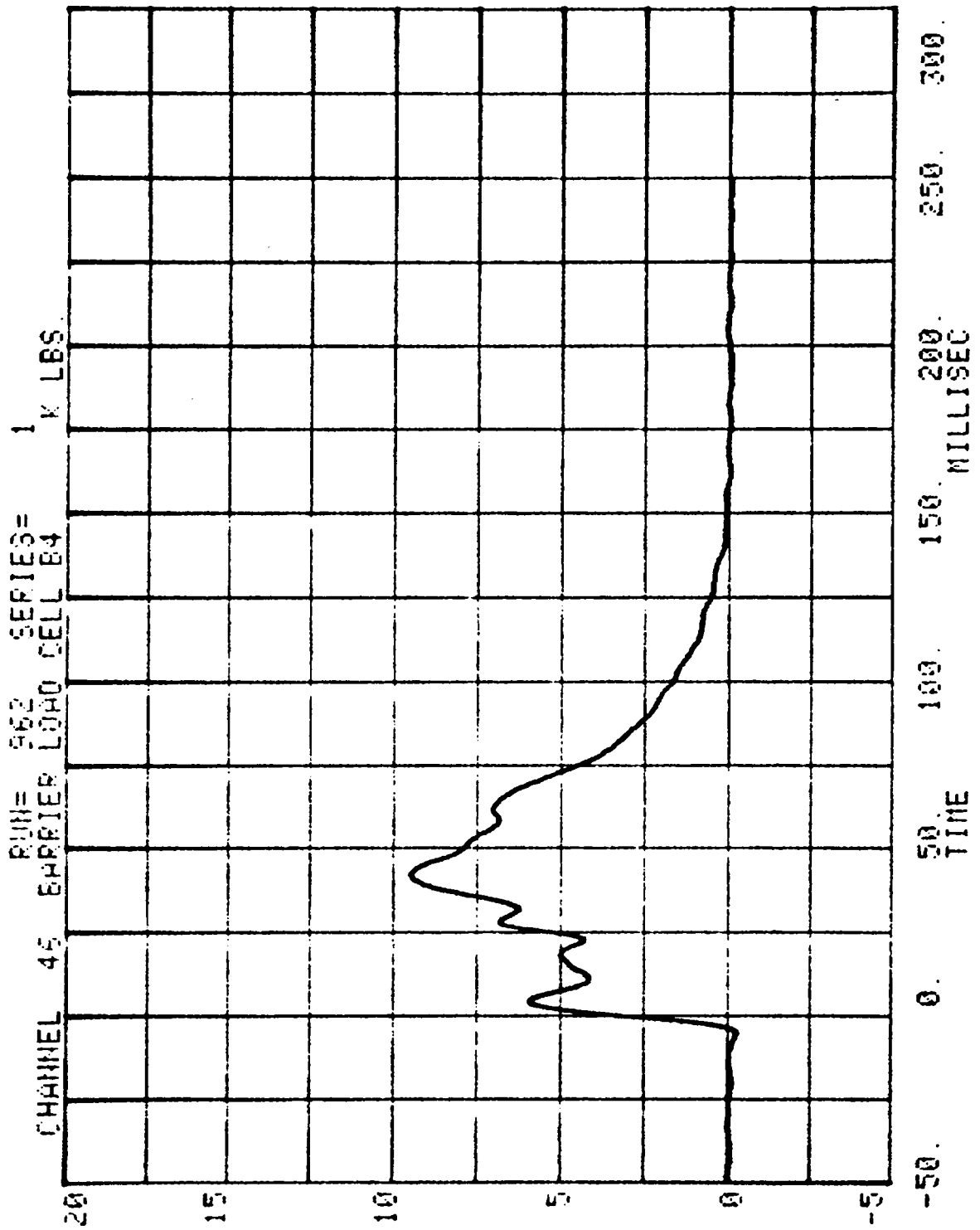

RUN= 952 SERIES= 1
CHANNEL 41 BARRIER LOAD CELL A8 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

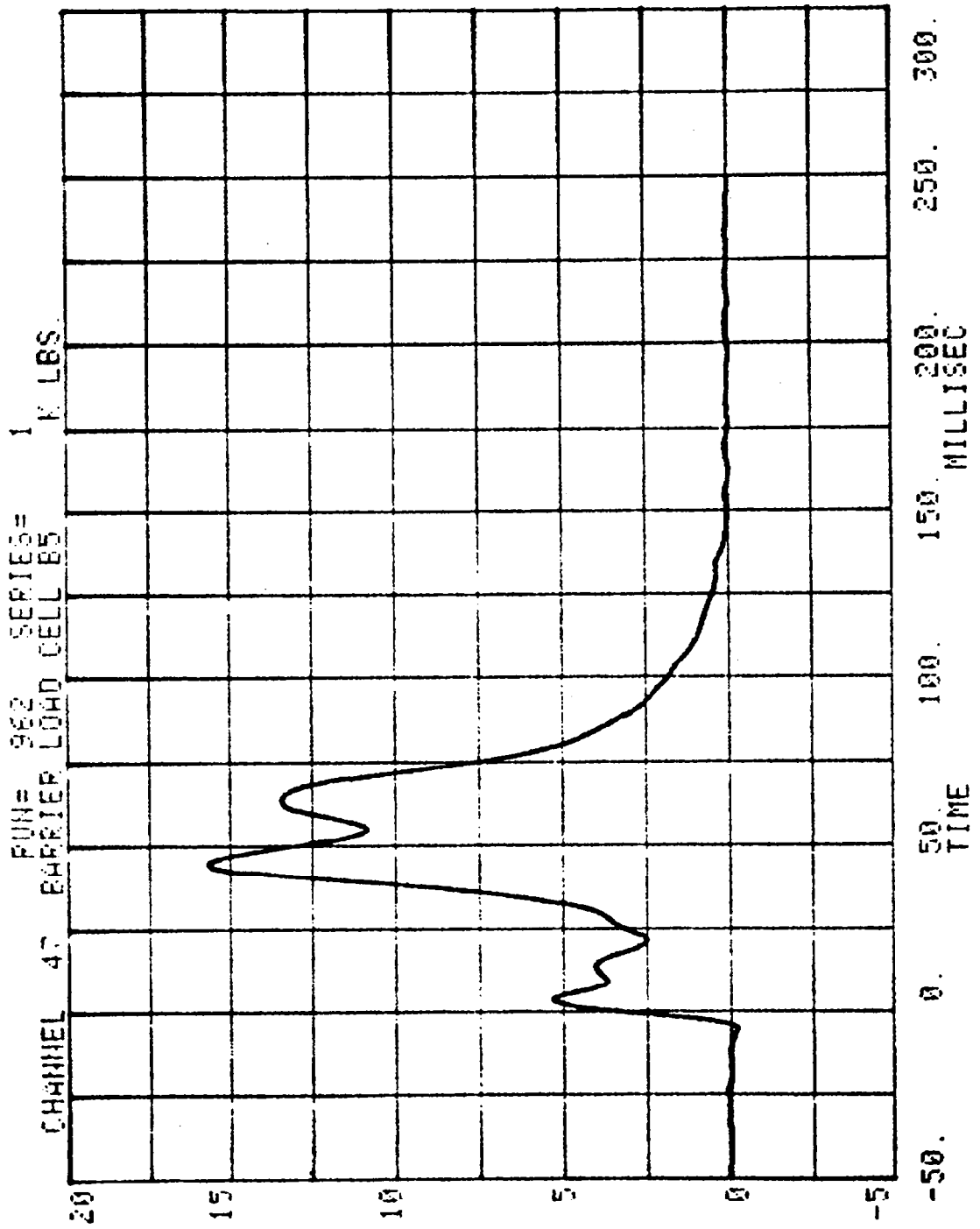

CHANNEL 42 BARRIER LOAD CELL #2
RUN= 962 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

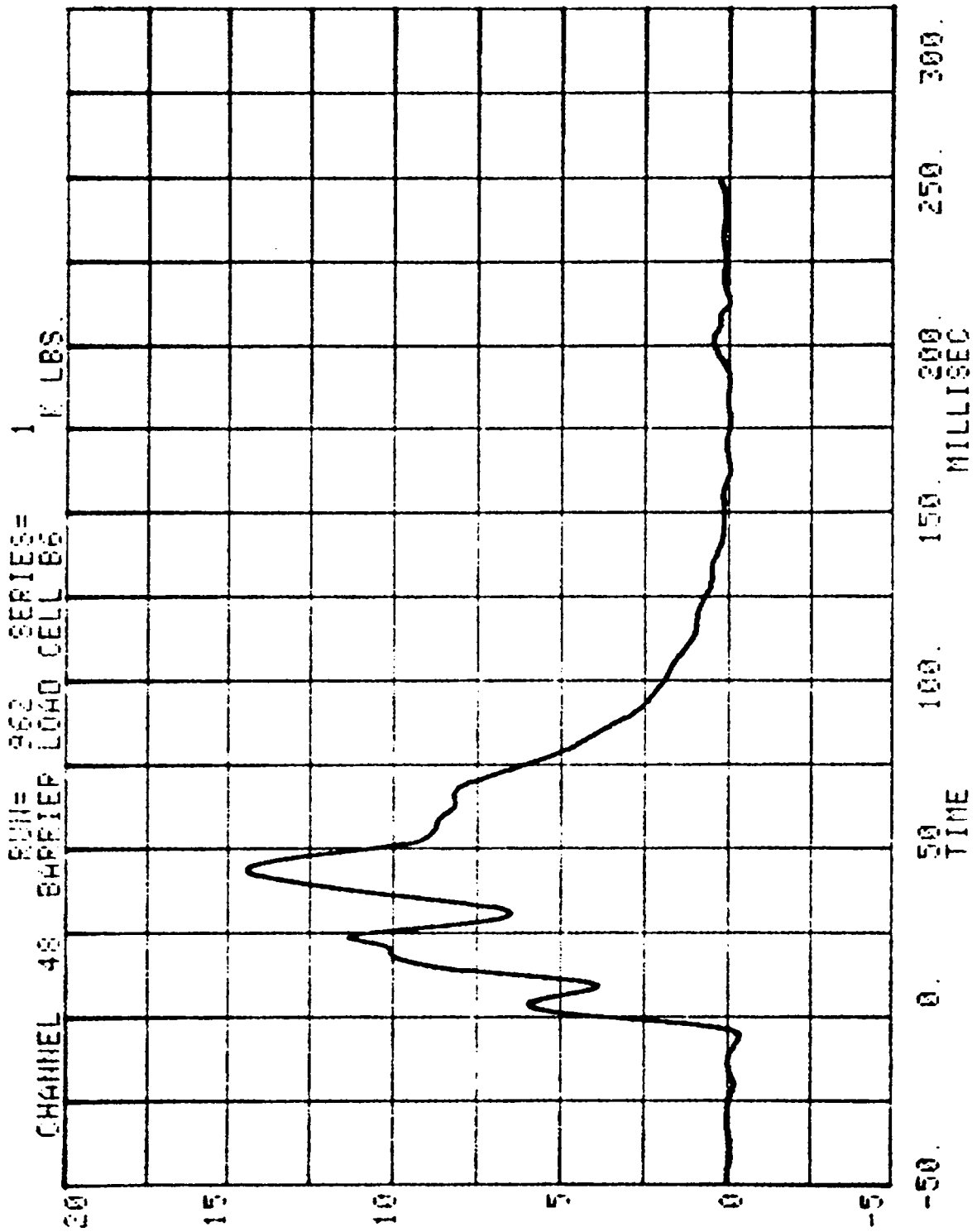

RUN= 962 SERIES= 1
CHANNEL 43 BARRIER LOAD CELL B1 K LBS.
20
15
10
5
0
-5
-50.
0.
50
100.
150.
200.
250.
300.
TIME
MILLISEC

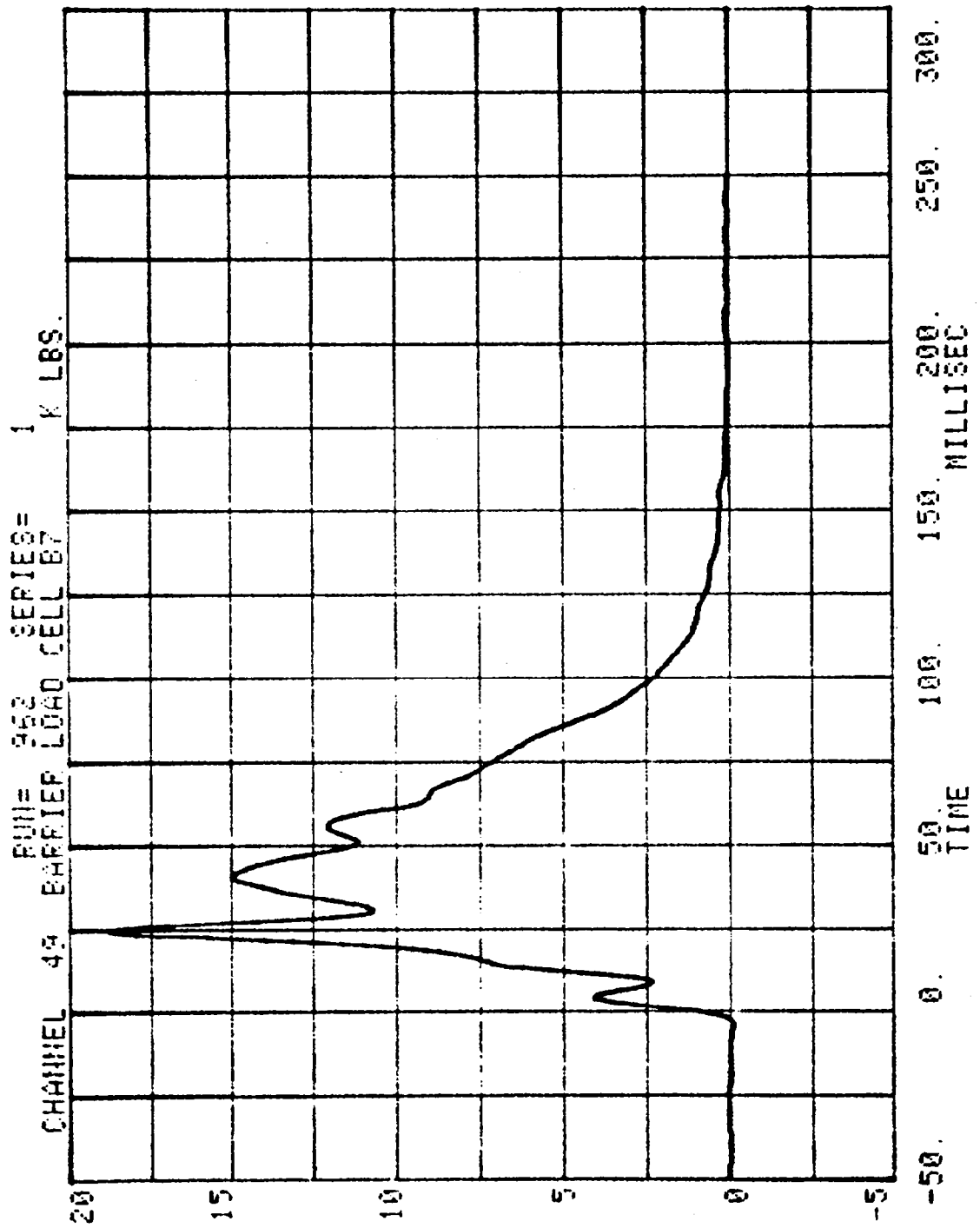

CHANNEL 44 EARFIEF LOAD CELL B2
RUN= 352 SERIES= 1
K LBS
20
15
10
5
0
-5
-50.
0
50.
TIME
100.
150.
200.
MILLISEC
250.
300.

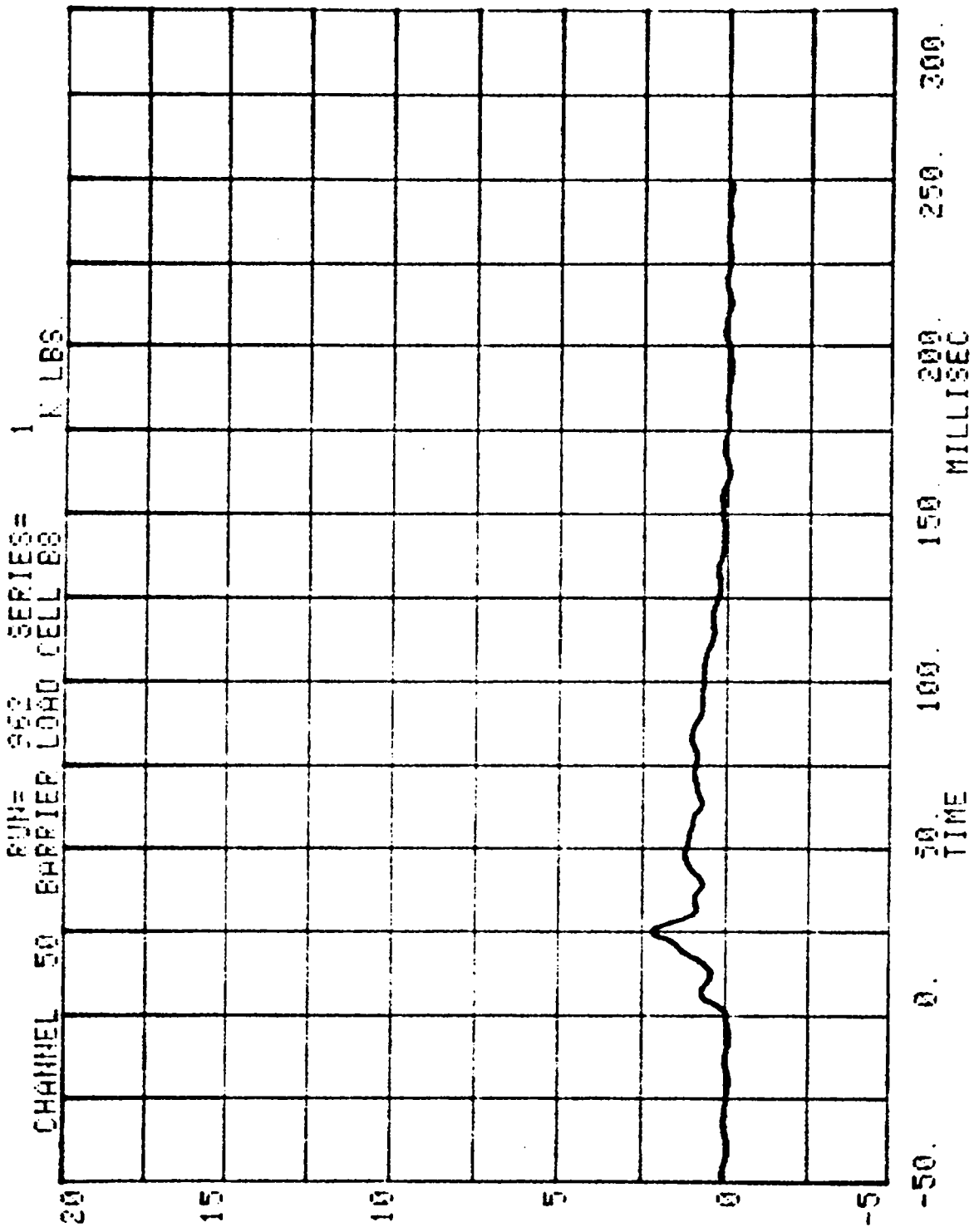

RUN= 962 SERIES= 1
CHANNEL 45 BARRIER LOAD CELL B3 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

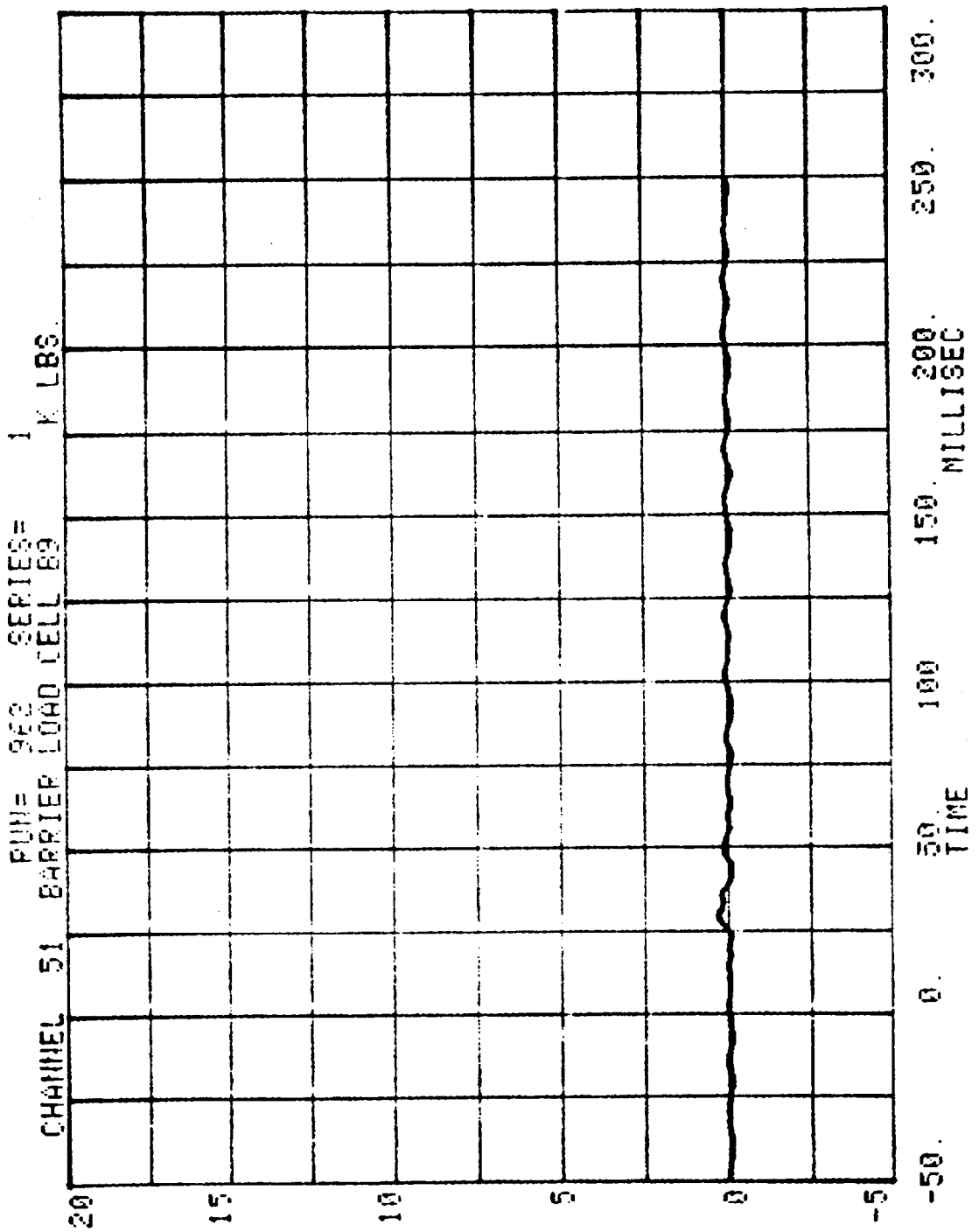

CHANNEL 45 BARRIER LOAD CELL B4
RUN= 962 SERIES= 1
K LBS
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 47 BARRIER LOAD CELL B5
RUN= 962 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

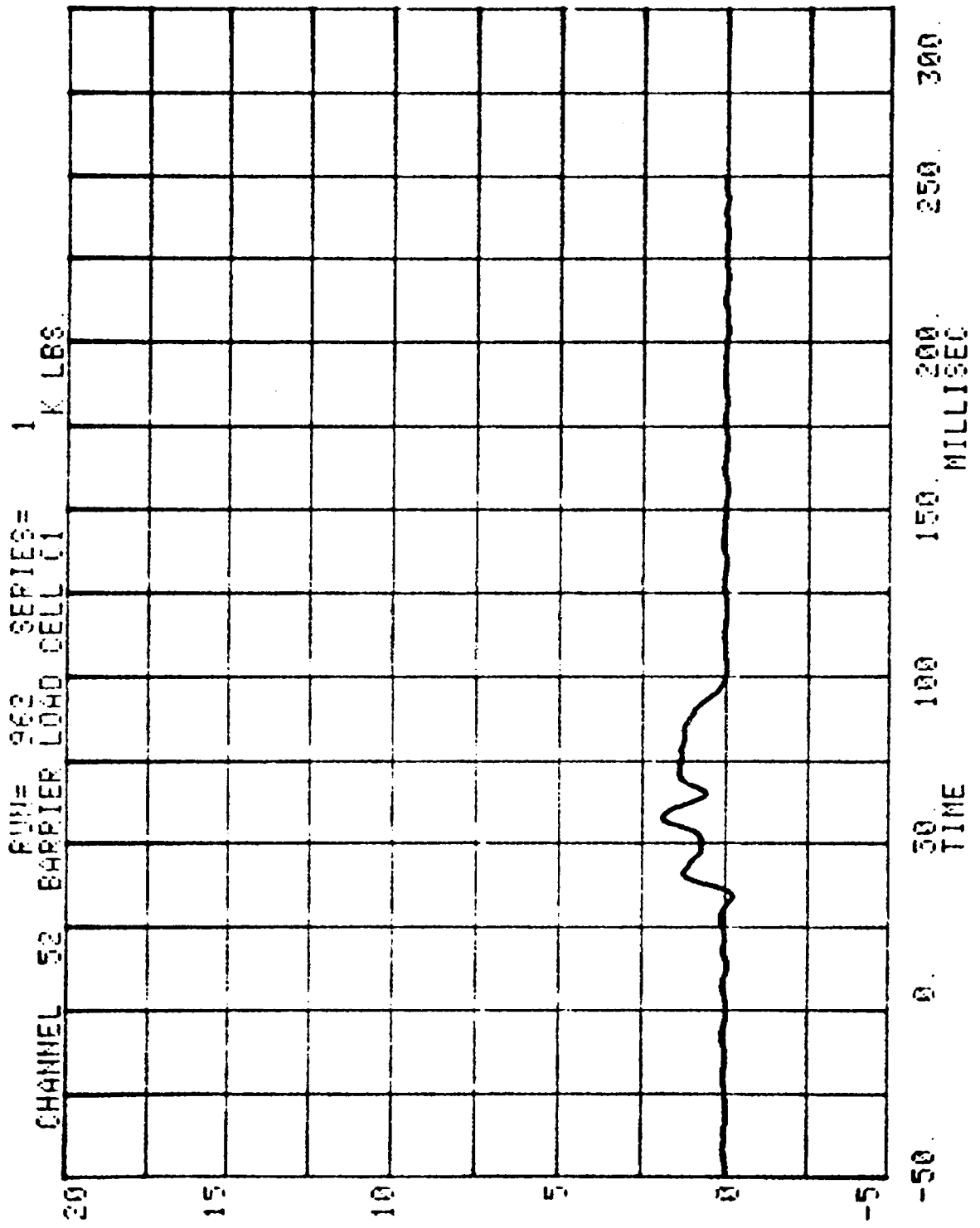

CHANNEL 48 BARRIER LOAD CELL B6
RUN= 262 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

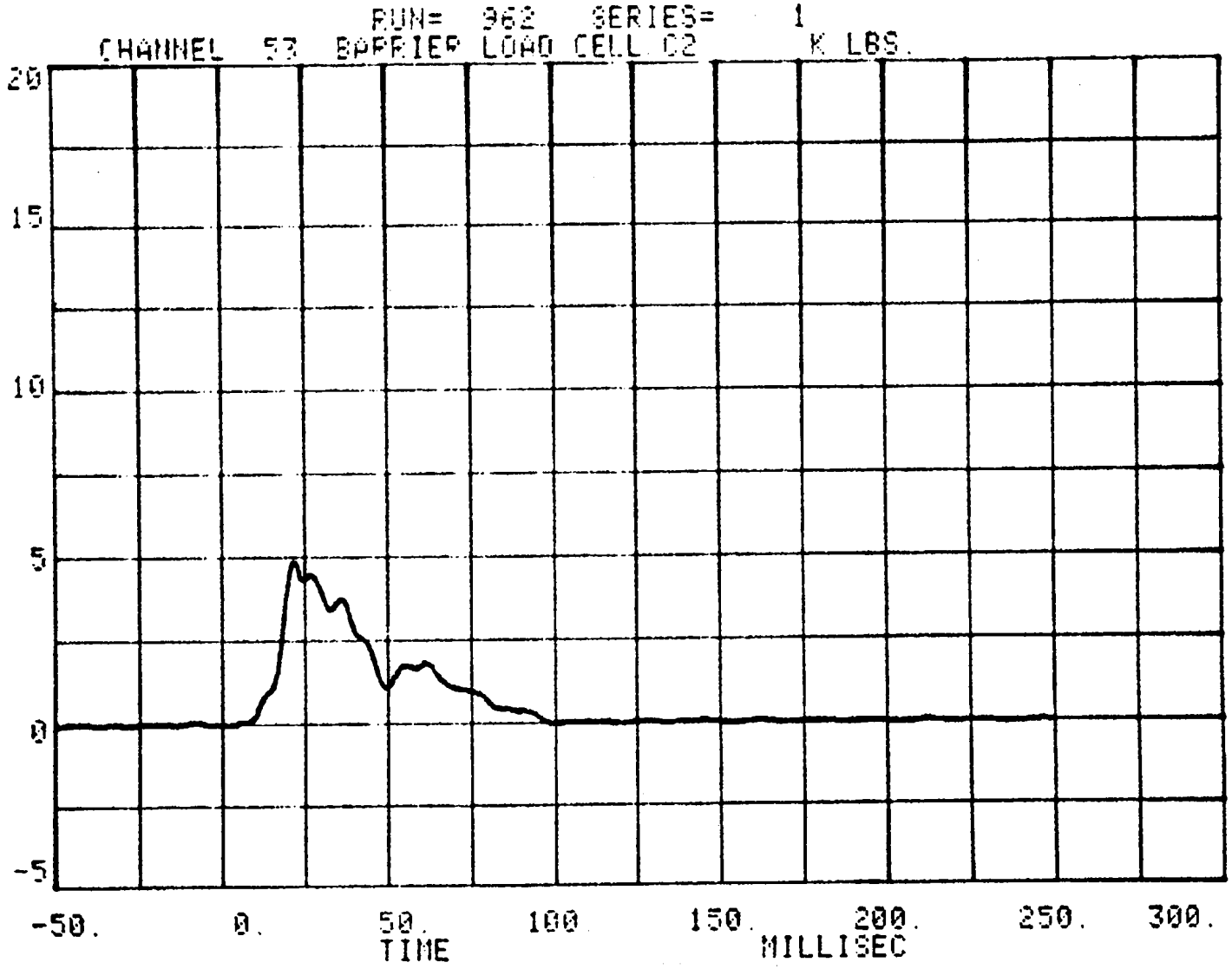

CHANNEL 42
RUN= 952
BARRIER LOAD CELL B7
SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 50 BARRIER LOAD CELL E8
RUN= 362 SERIES= 1
K LBS
20
15
10
5
0
-5
-50.
0.
50.
100.
150
200.
250.
300.
TIME
MILLISEC

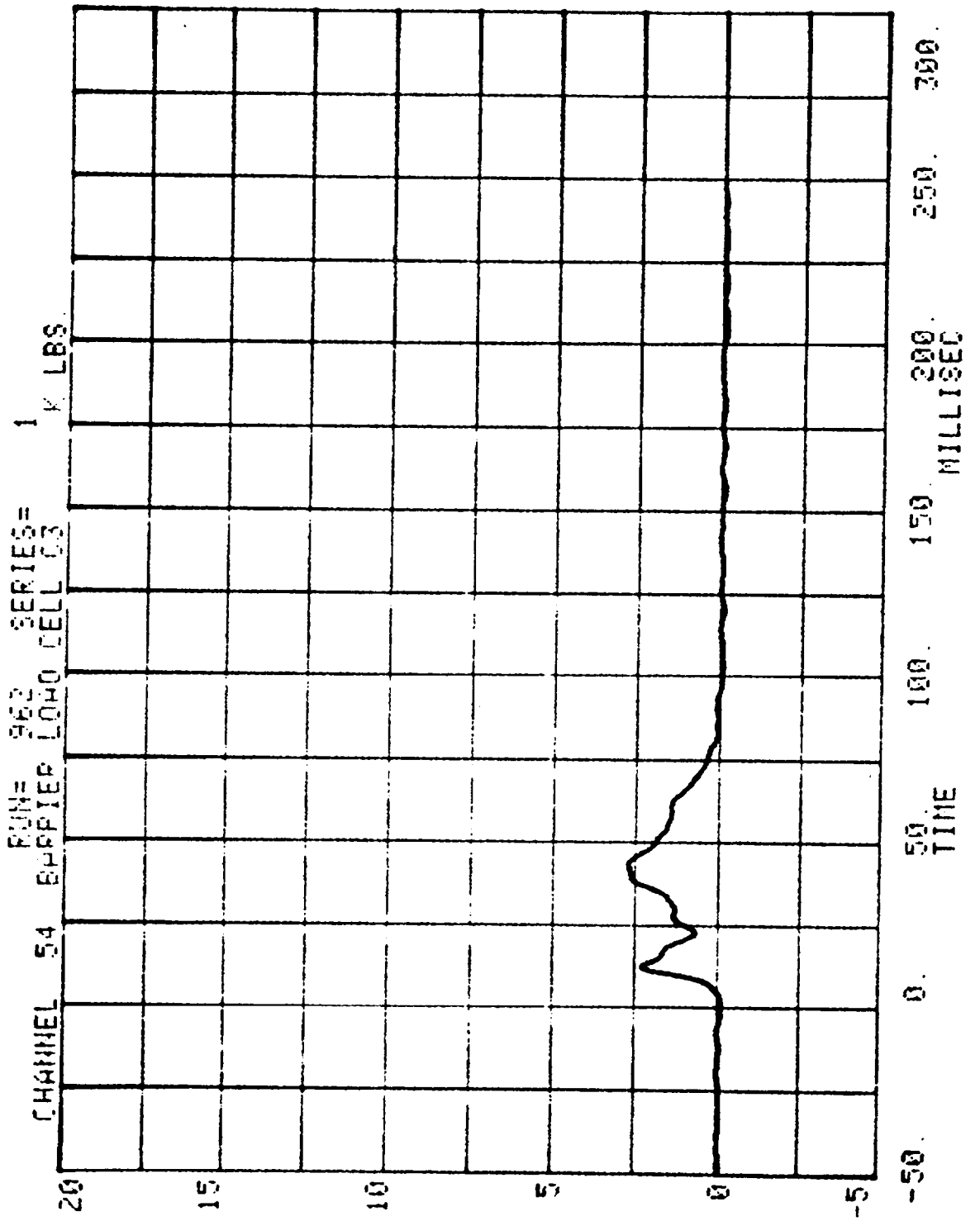

CHANNEL 51 BARRIER LOAD CELL 89
RUN= 923 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100
150.
200.
250.
300.
TIME
MILLISEC

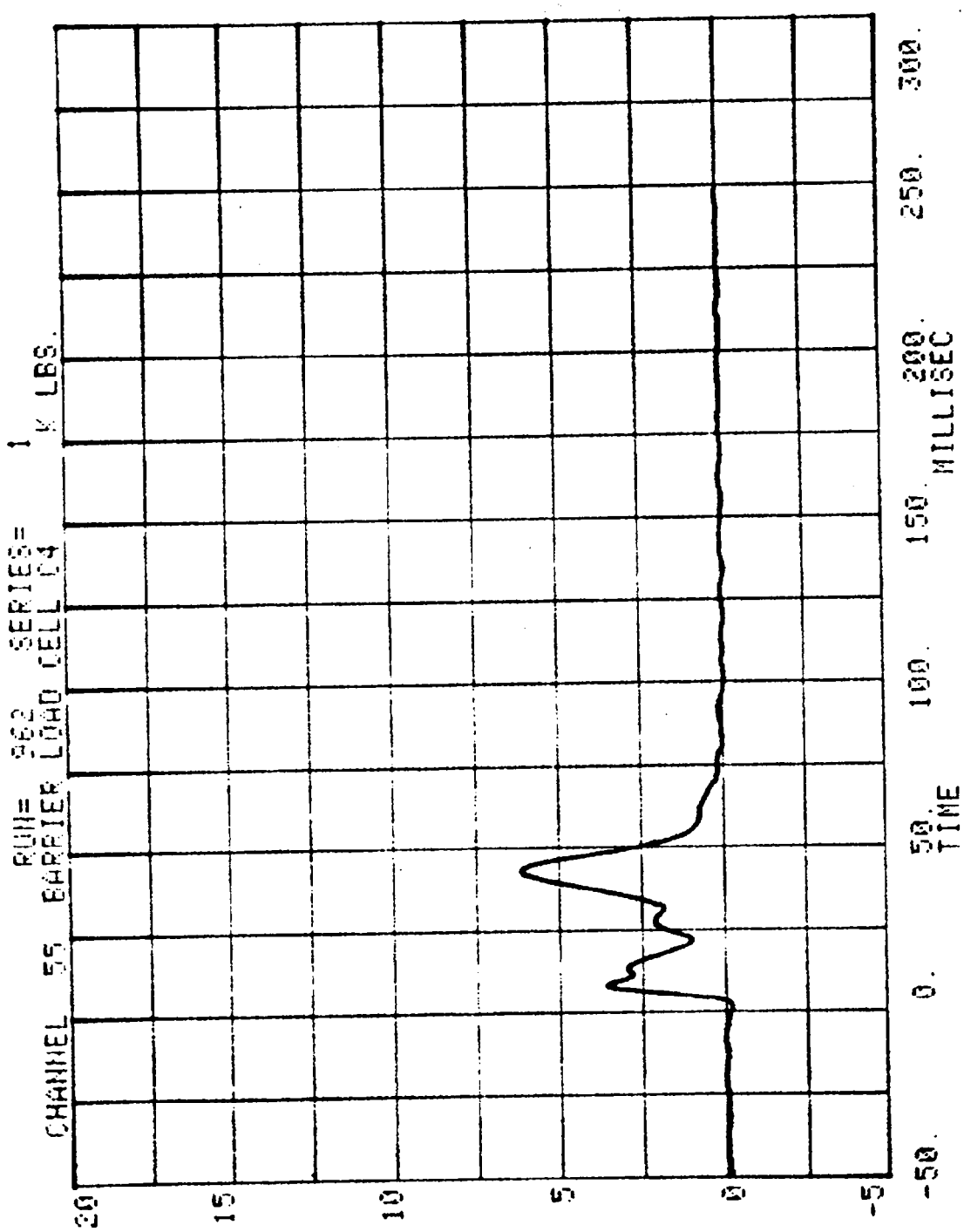
7776-9

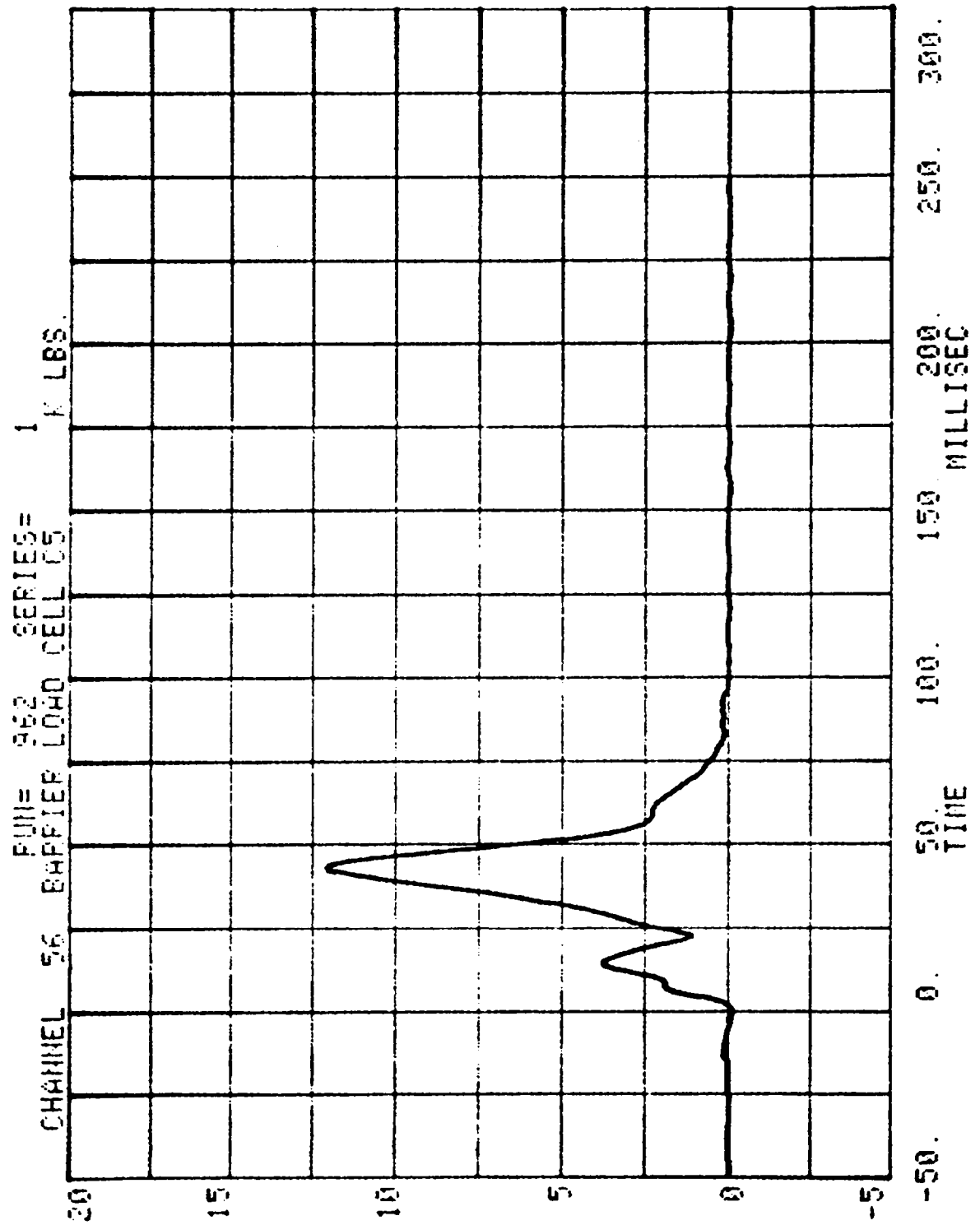

CHANNEL 60 BARRIER LOAD CELL C1
RUN= 962 SERIES= 1
K LBS
20
15
10
5
0
-5
-50
0.
50
100
150
200
250
300
TIME
MILLISEC


RUN= 962 SERIES= 1
CHANNEL 53 BARRIER LOAD CELL C2 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100
150.
200.
250.
300.
TIME
MILLISEC

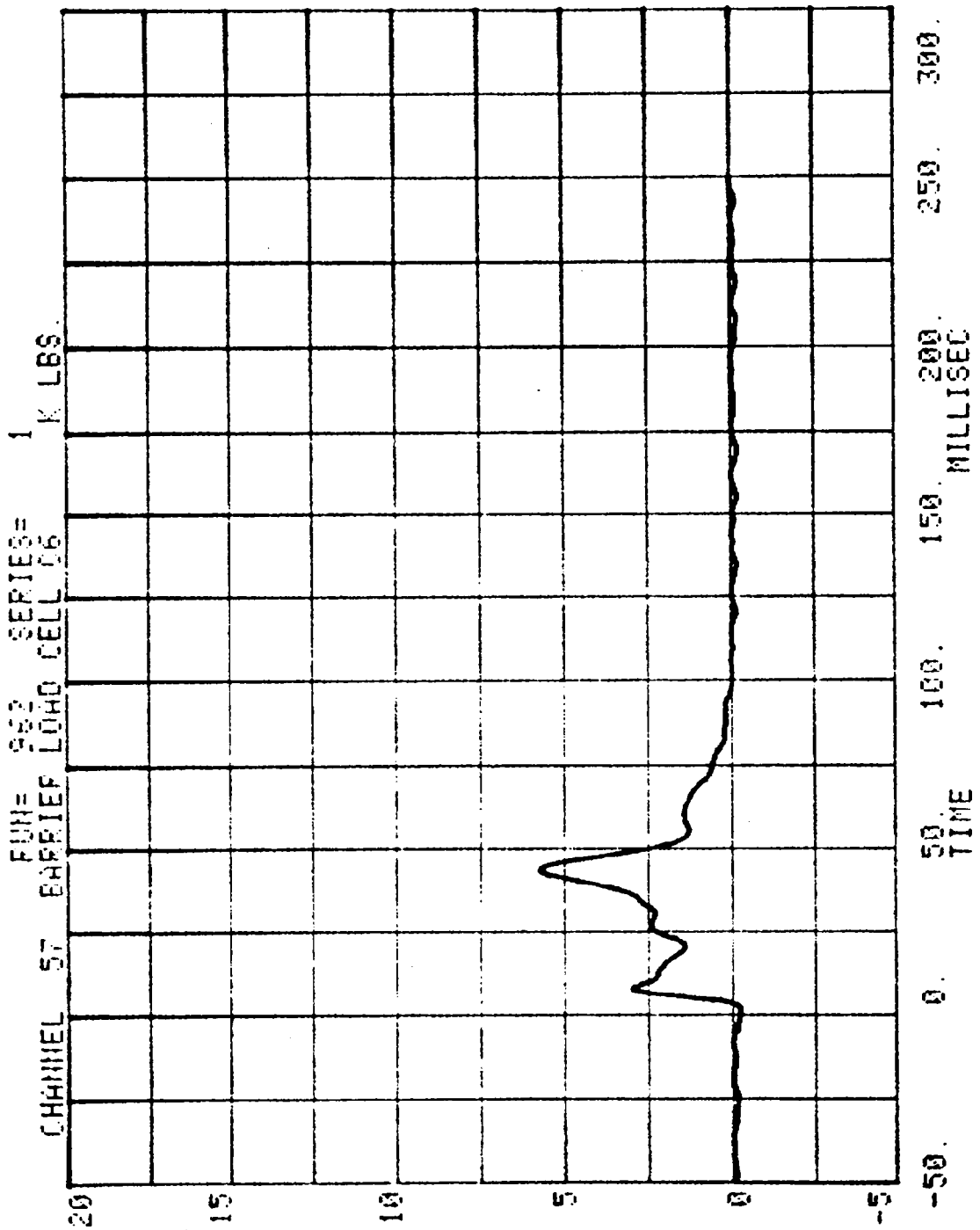
7776-9

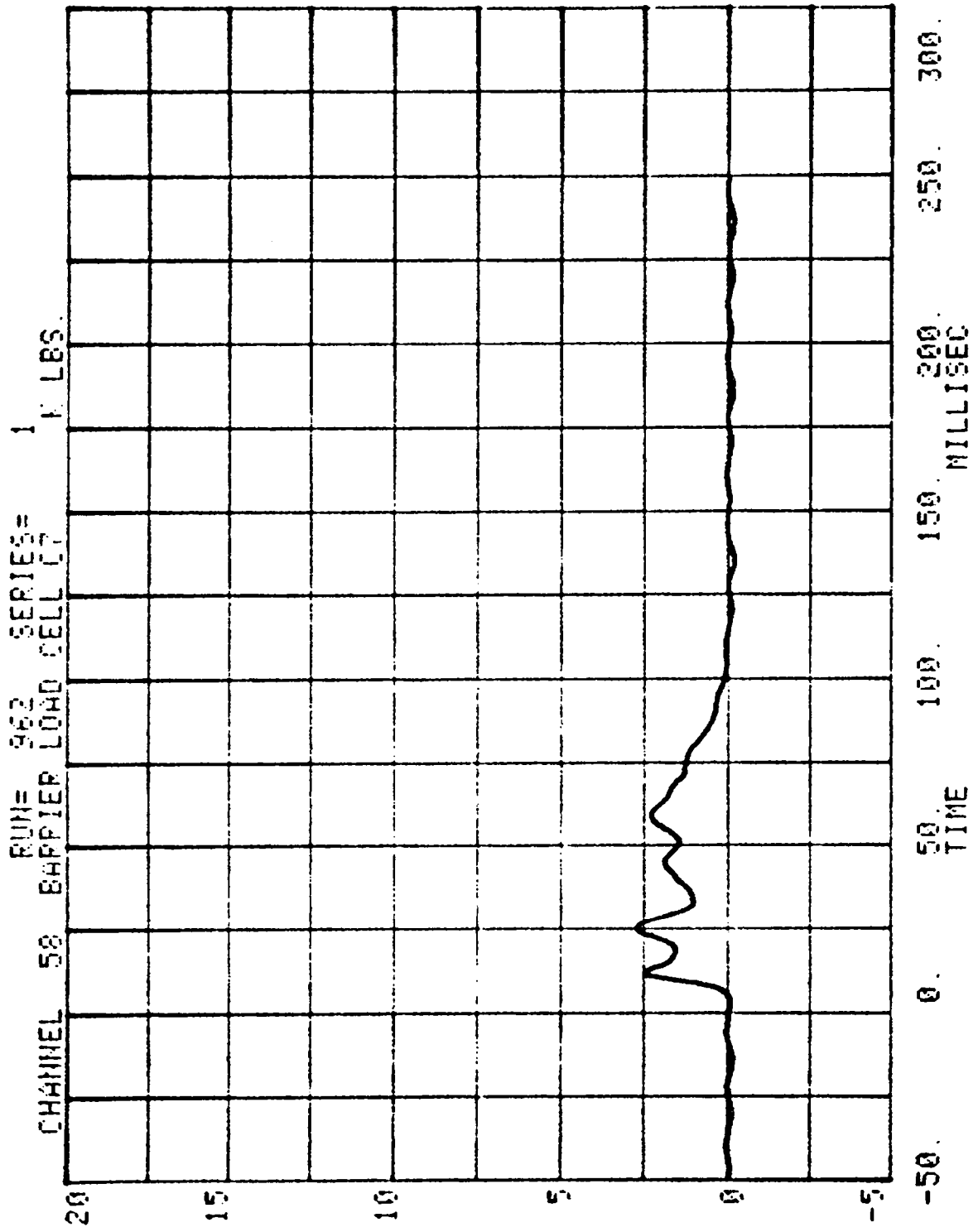

CHANNEL 54 EXPTER LOAD CELL C3
RUN= 962 SERIES= 1
K LBS
20
15
10
5
0
-5
-50.
0.
50.
100.
150
200.
250.
300.
TIME
MILLISEC

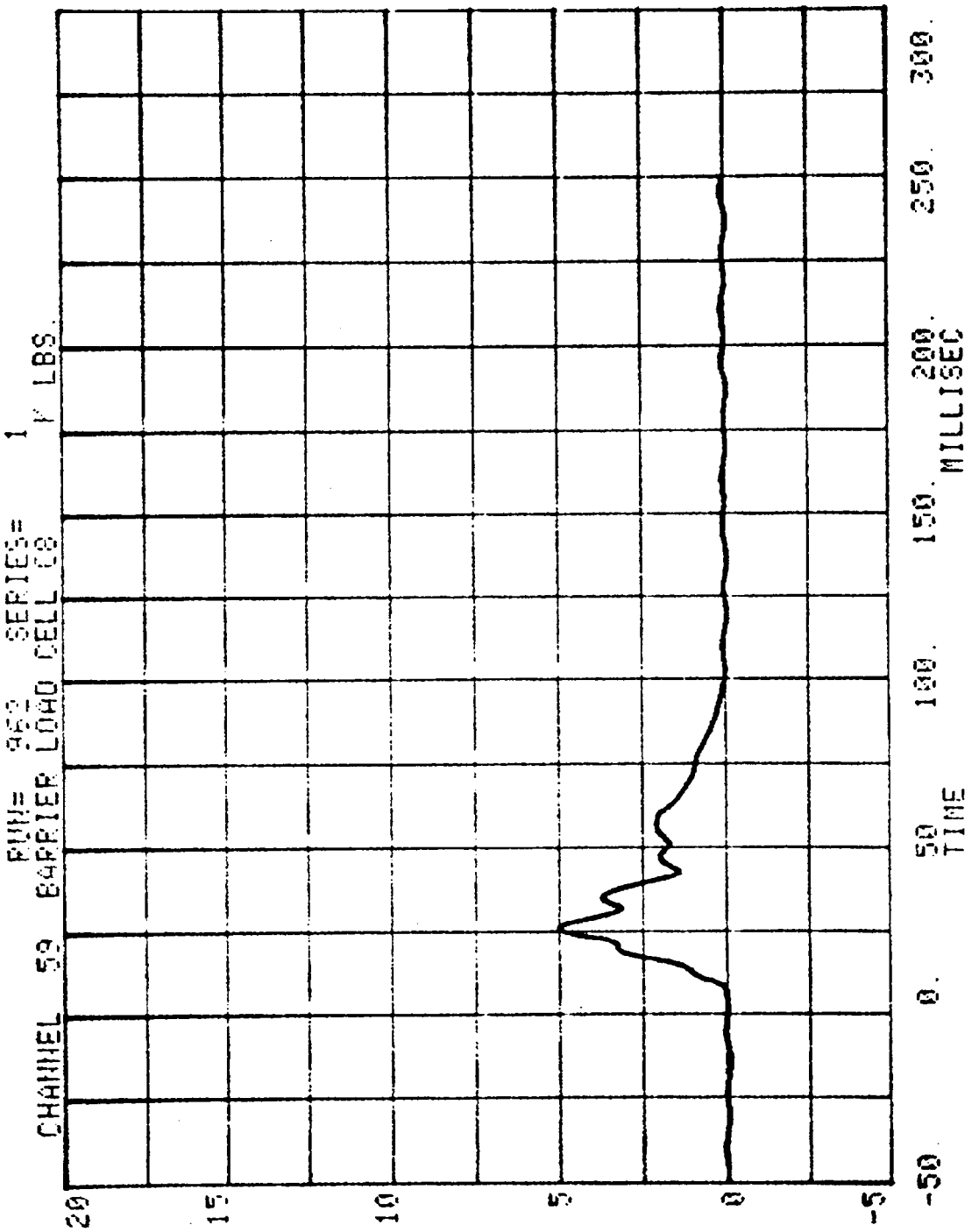

CHANNEL 55 BARRIER LOAD CELL 04
RUN= 862 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

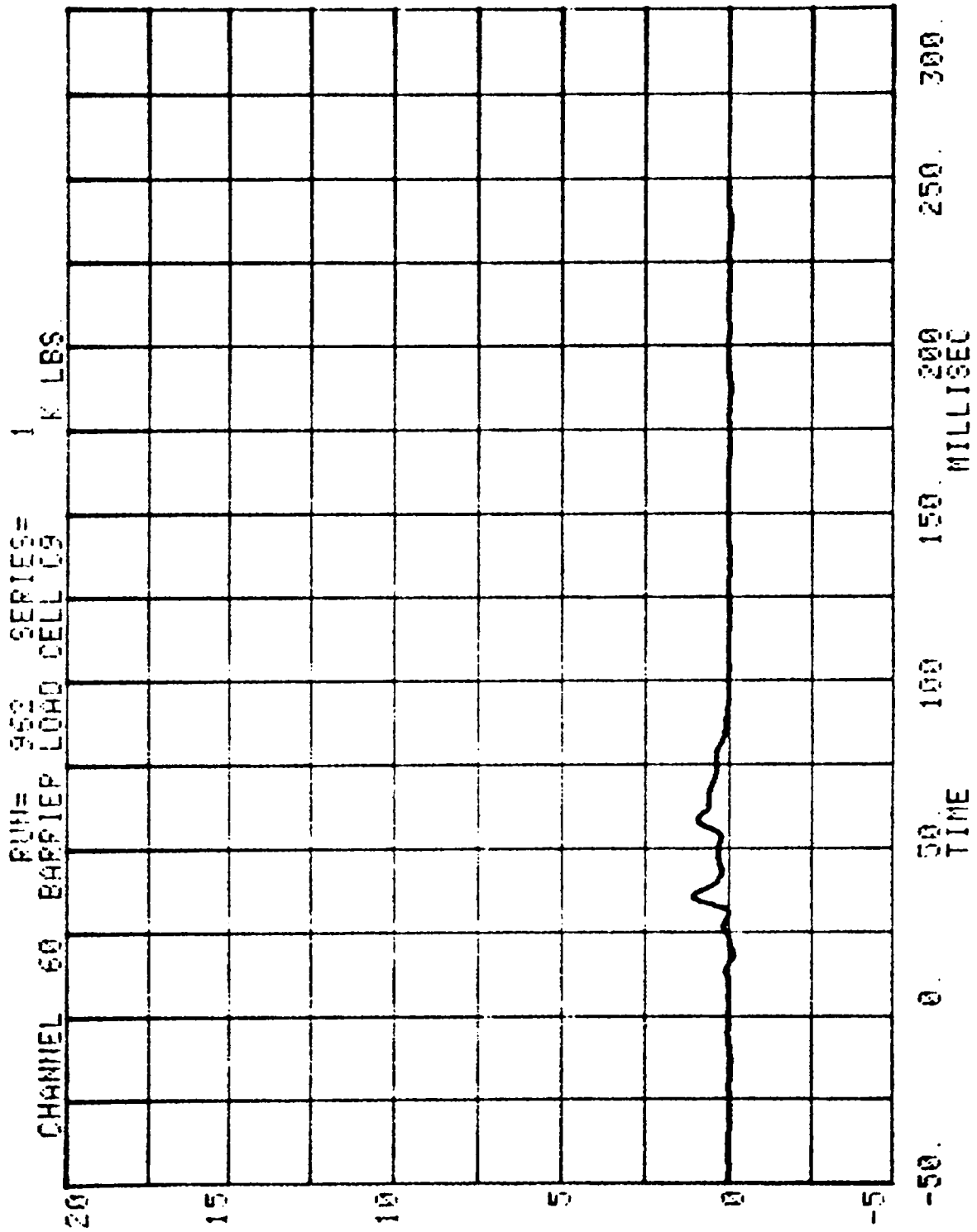

CHANNEL 56 BARRIER LOAD CELL C5
RUN= 362 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150
200.
250.
300.
TIME
MILLISEC

7776-9

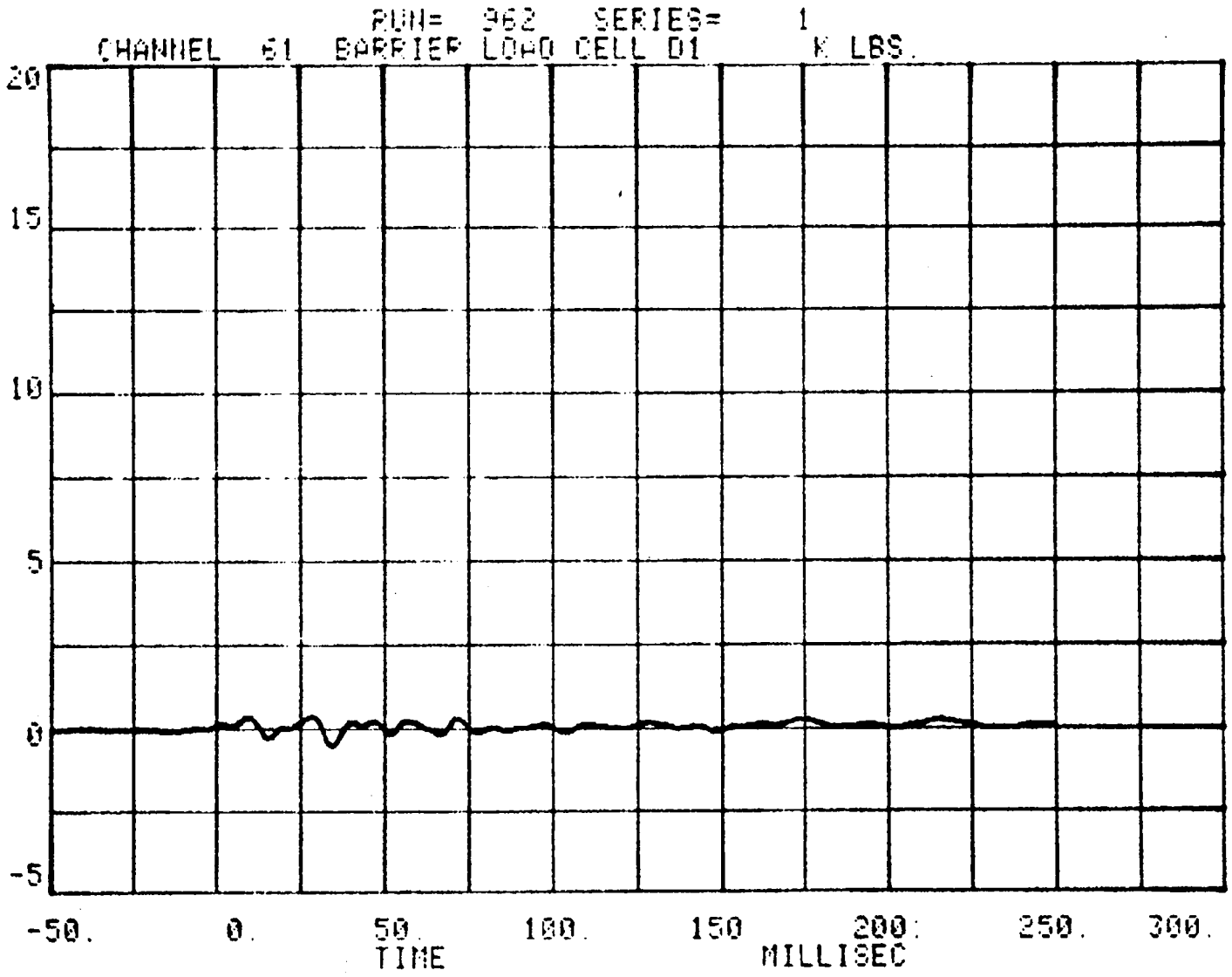

CHANNEL 57 BARRIER LOAD CELL 06
RUN= 823 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 58 BARRIER LOAD CELL CF
RUN= 962 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

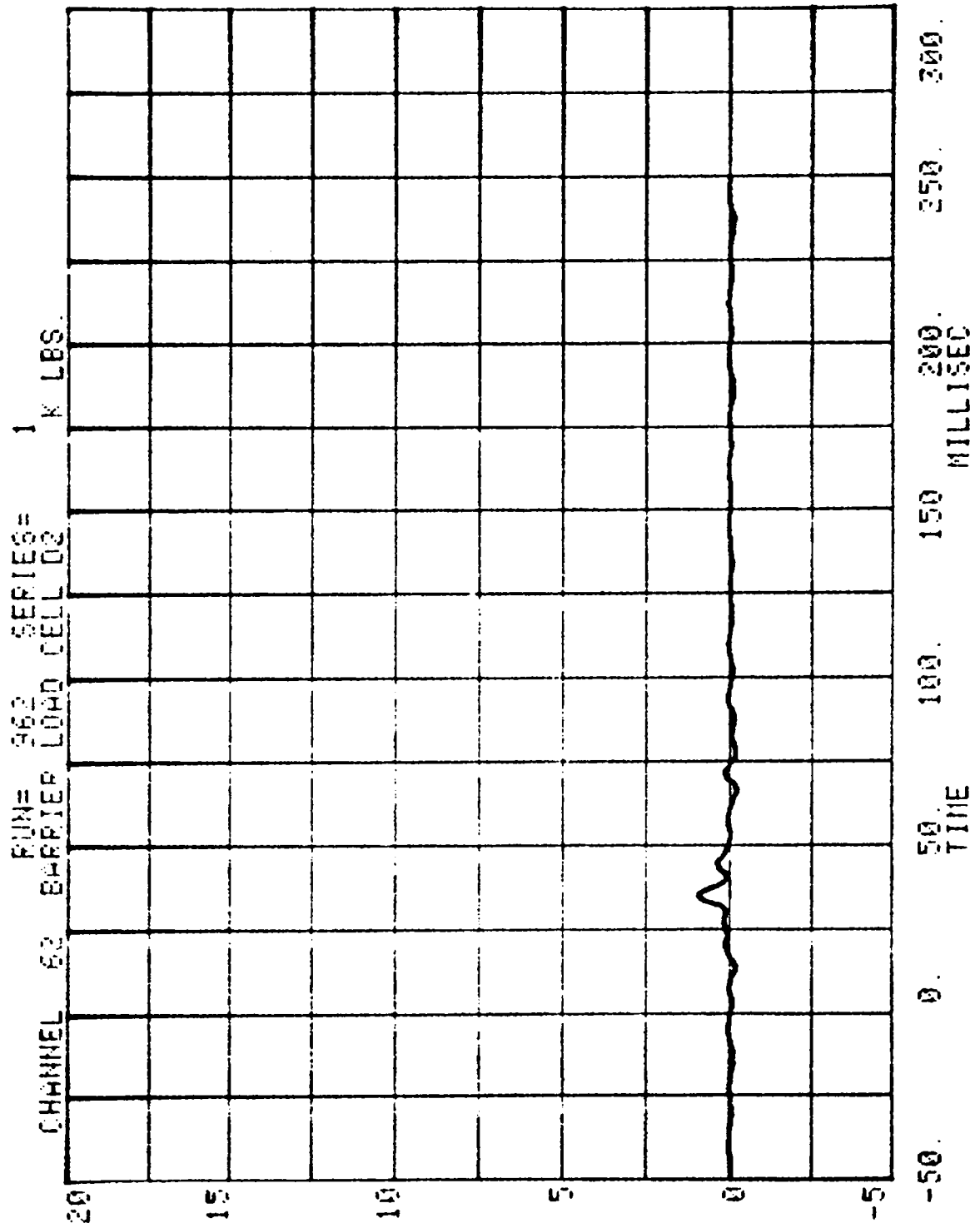

CHANNEL 52 BARRIER LOAD CELL 08
RUN= 2662 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50
0.
50
100.
150.
200.
250.
300.
TIME
MILLISEC

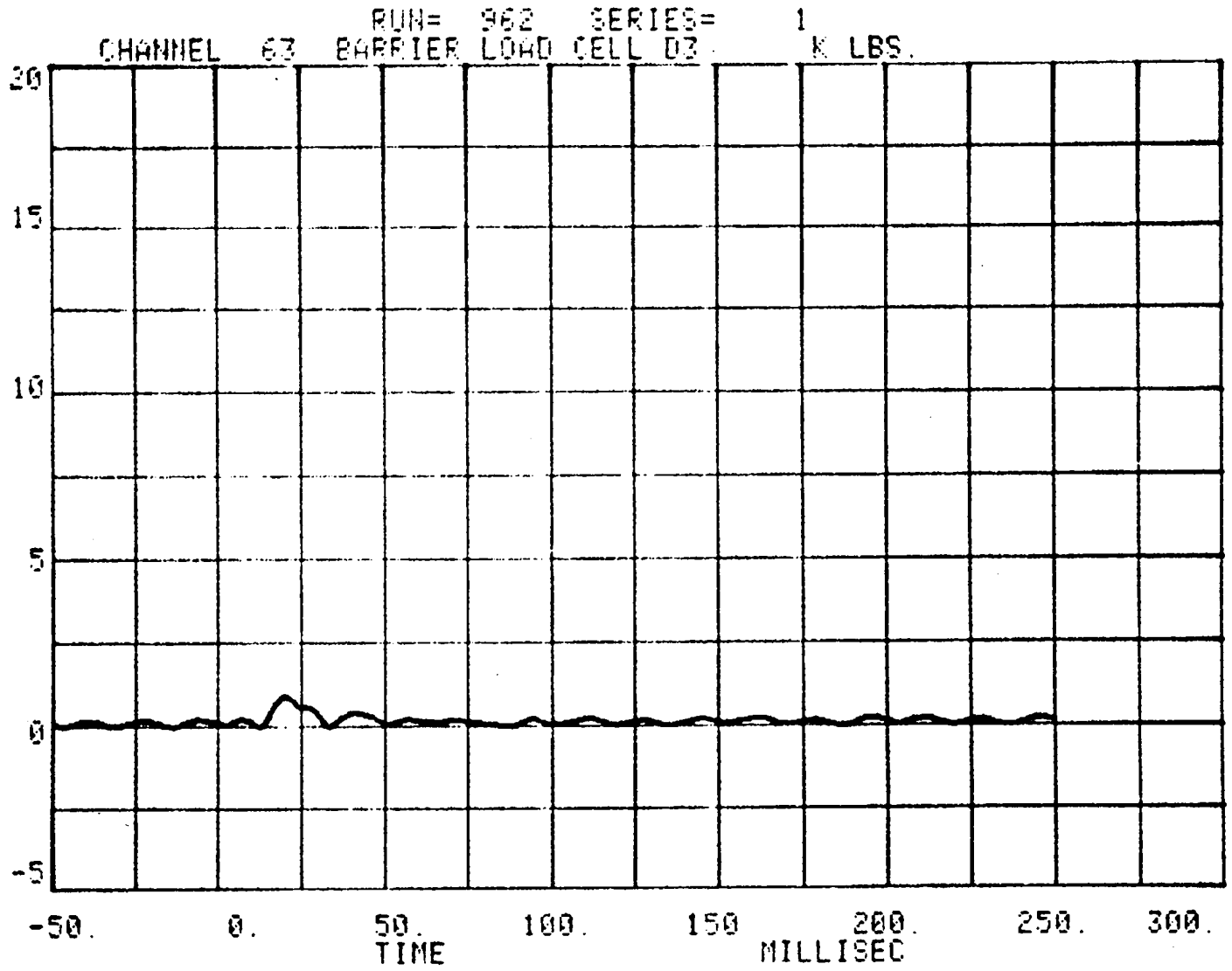

CHANNEL 60 BARRIER LOAD CELL 09
RUN= 253 SERIES= 1
K LBS
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

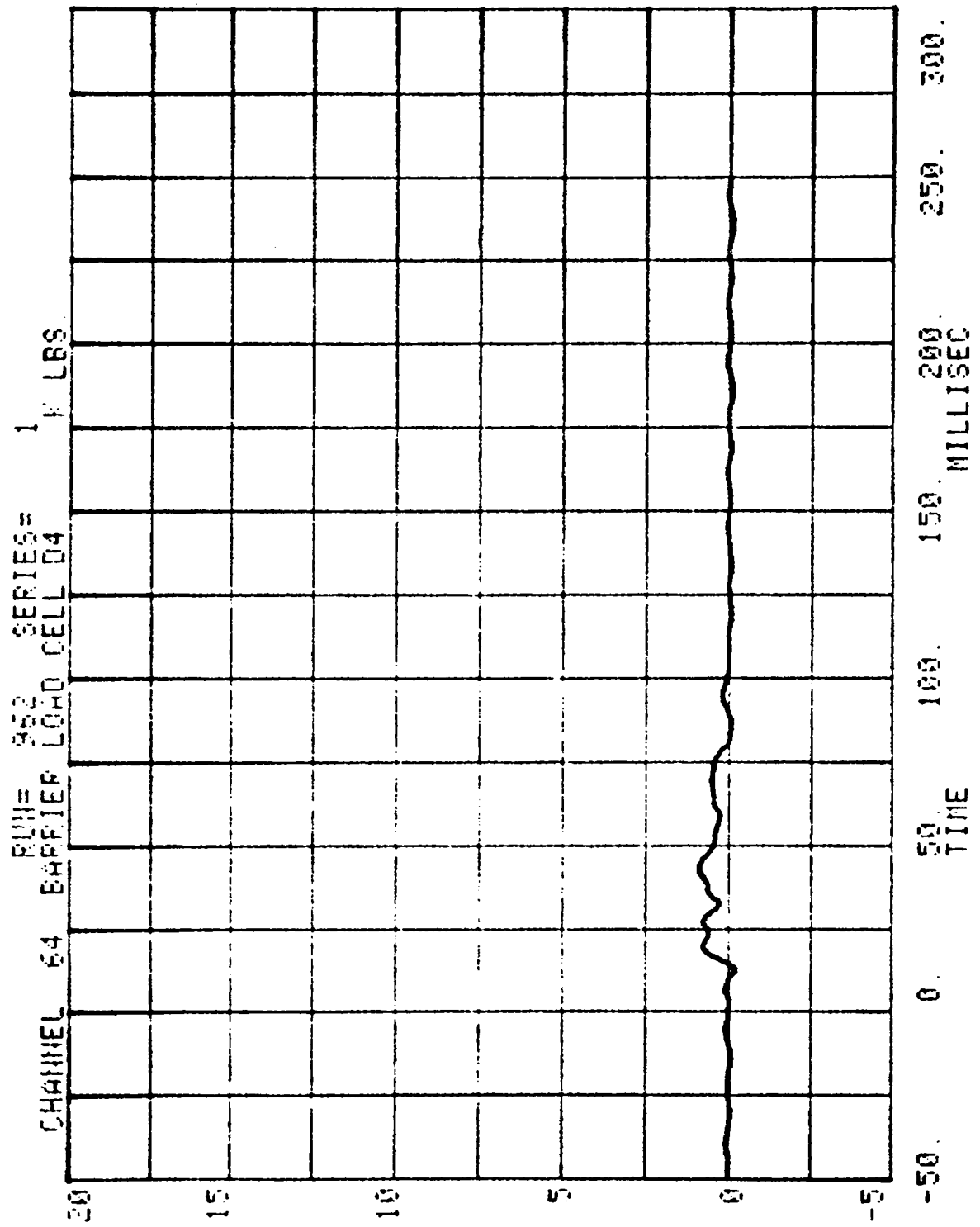
7776-9

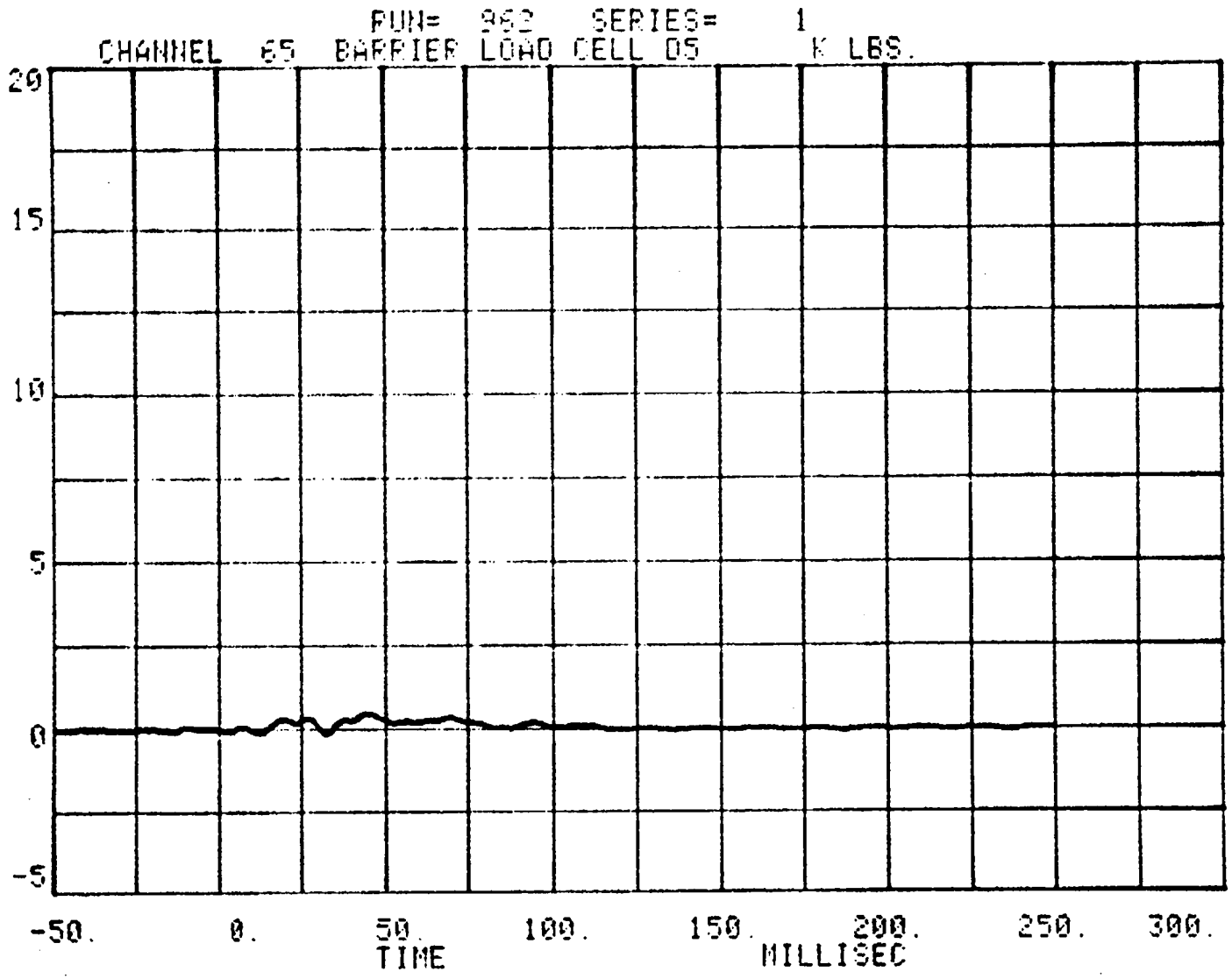

RUN= 962 SERIES= 1
CHANNEL 61 BARRIER LOAD CELL D1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150
200.
250.
300.
TIME
MILLISEC

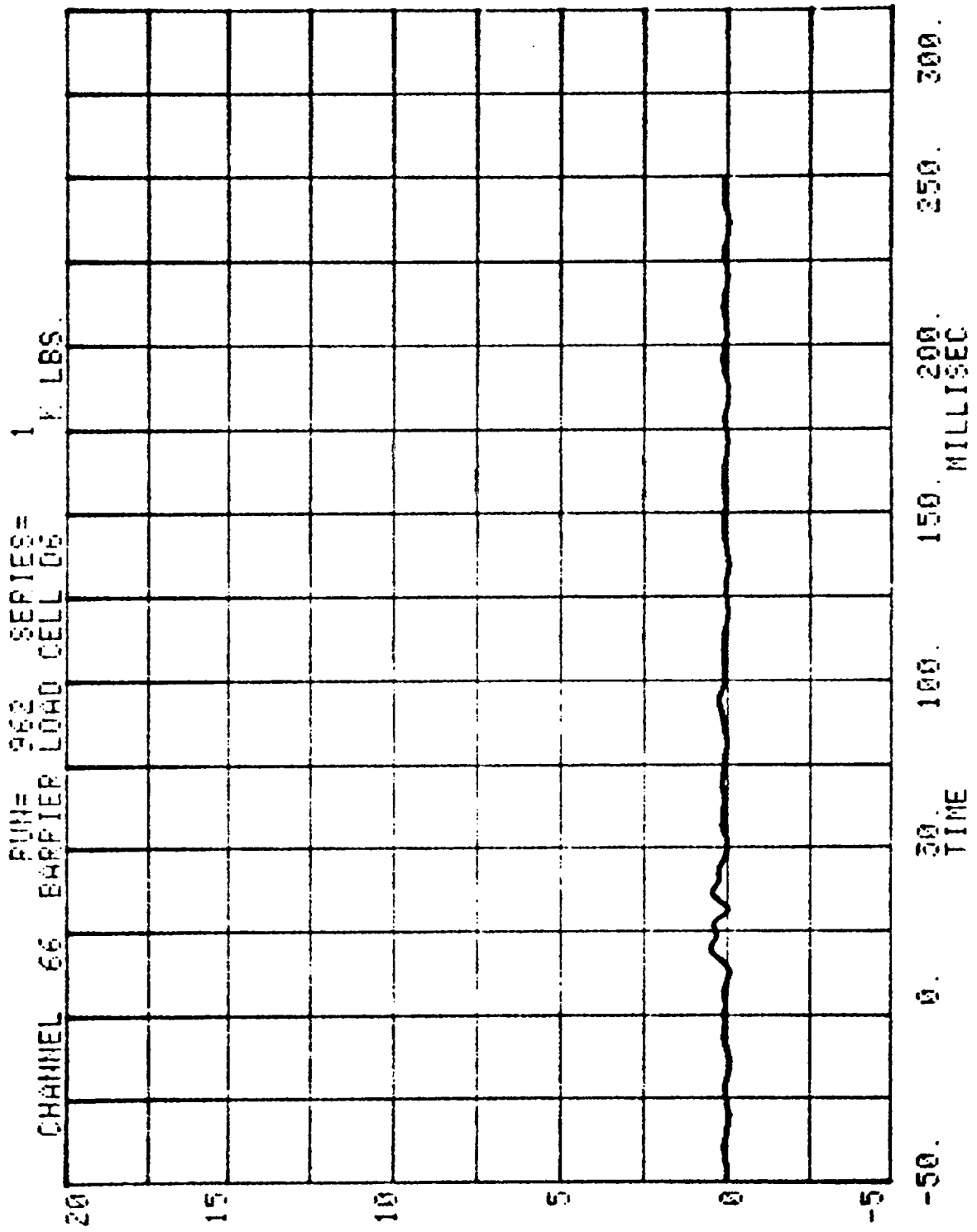
7776-9

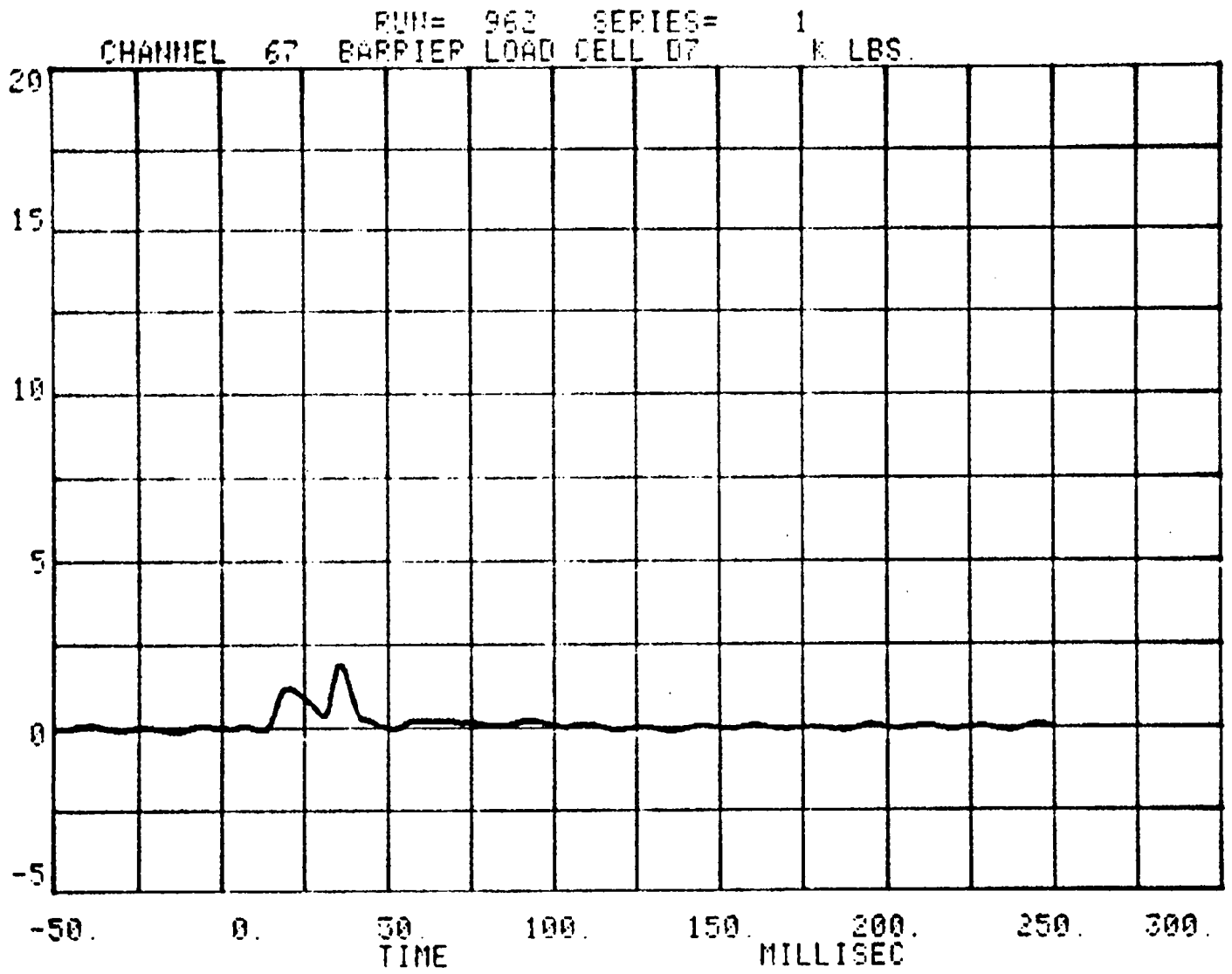

CHANNEL 62 BARRIER LOAD CELL 03
RUN= 362 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150
200.
250.
300.
TIME
MILLISEC


RUN= 962 SERIES= 1
CHANNEL 63 BARRIER LOAD CELL 03 K LBS.
30
15
10
5
0
-5
-50.
0.
50.
100.
150
200.
250.
300.
TIME
MILLISEC

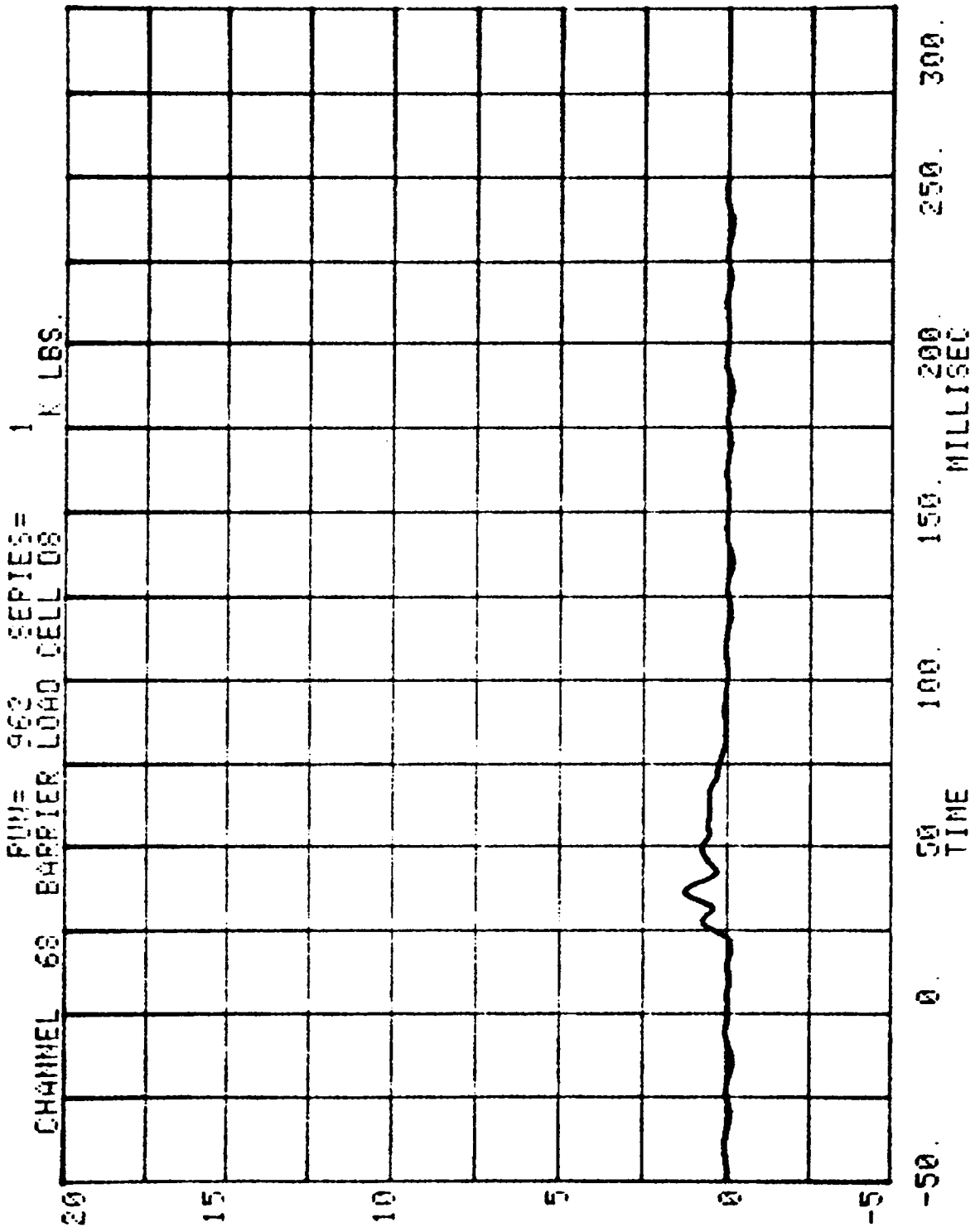

CHANNEL 64 BARRIER LOAD CELL 04
RUN= 252 SERIES= 1
K LBS
30
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 962 SERIES= 1
CHANNEL 65 BARRIER LOAD CELL 05 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

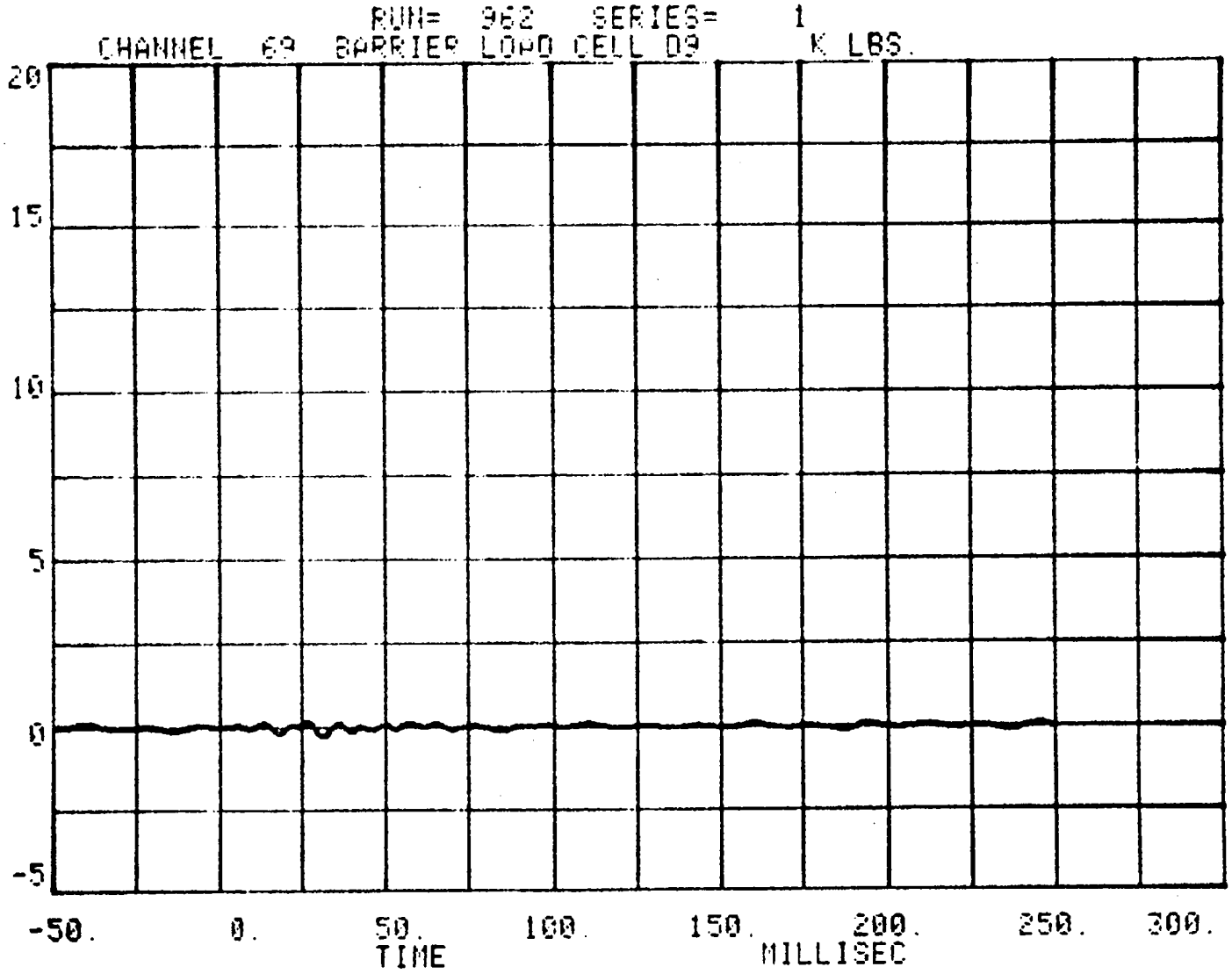

CHANNEL 66 BARRIER LOAD CELL 05
RUN= 262 SERIES= 1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 962 SERIES= 1
CHANNEL 67 BARRIER LOAD CELL 07 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7776-9


CHANNEL 60 BARRIER LOAD CELL 08
FUN= 962 SERIES= 1
20
15
10
5
0
-5
-50.
0.
50
TIME
100.
150.
200
MILLISEC
250.
300.
K LBS.

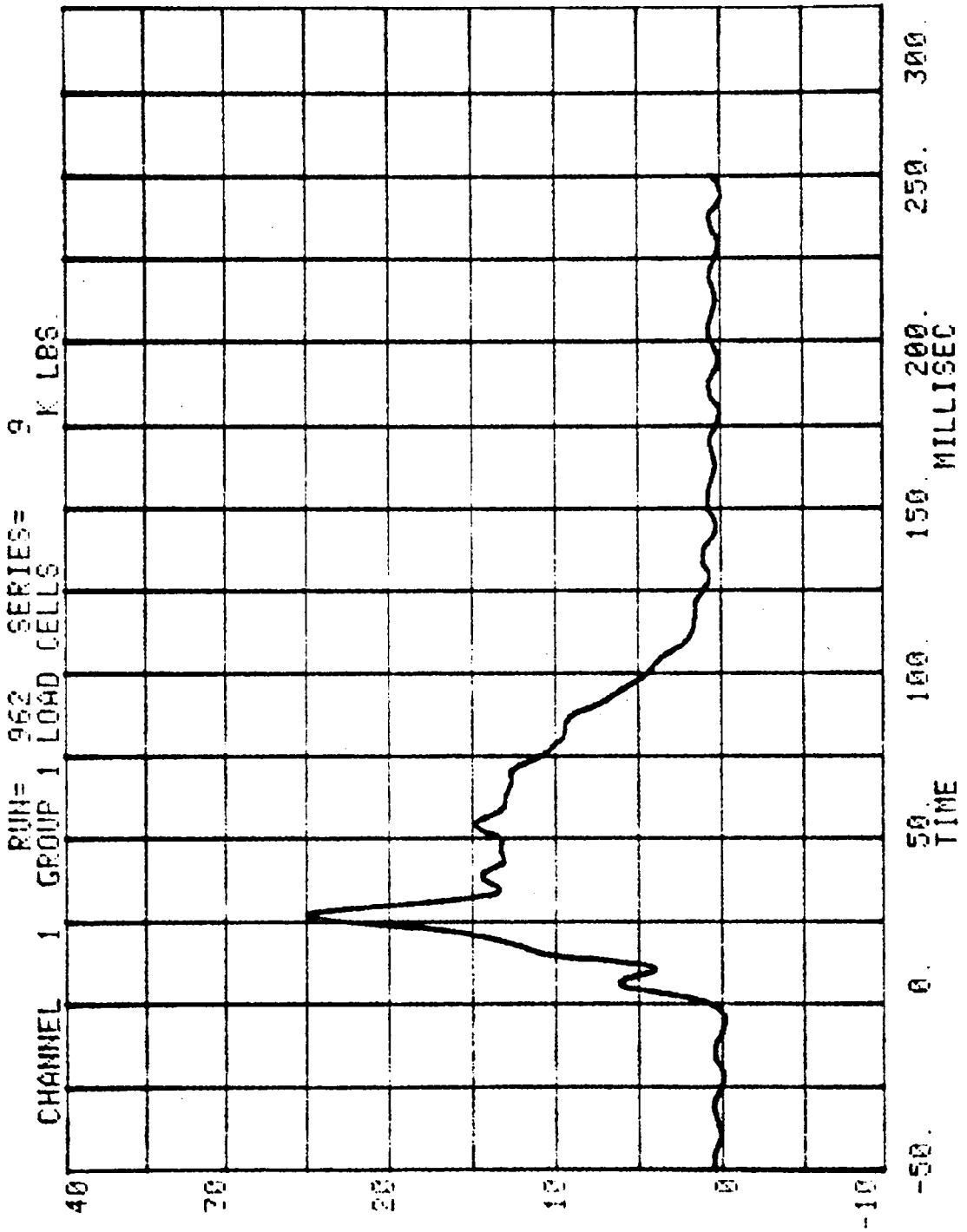
7776-9


RUN= 962 SERIES= 1
CHANNEL 69 BARRIER LOAD CELL 09 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

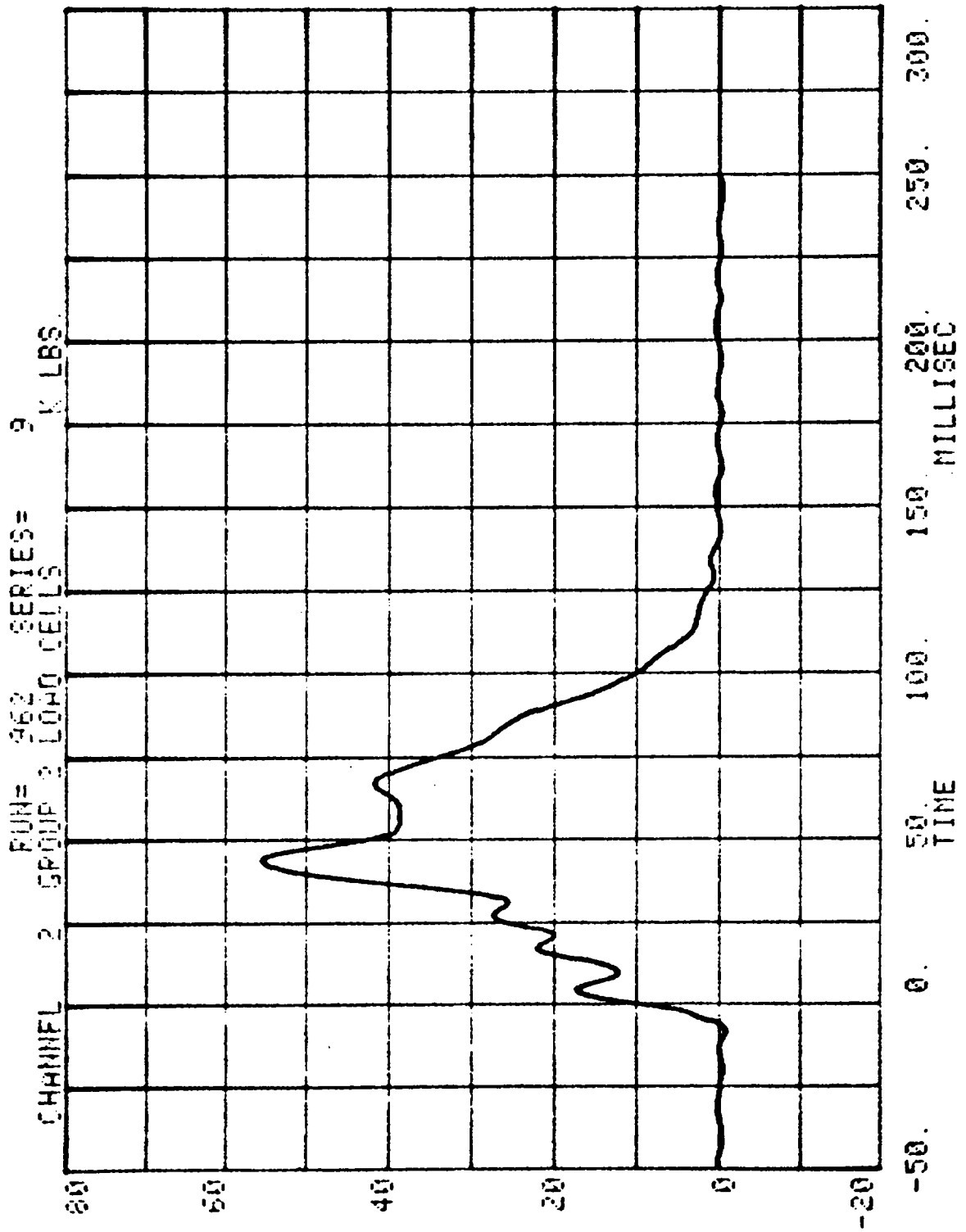
NEW CAR ASSESSMENT PROGRAM - 1990

RUN # 962 SERIES # 9

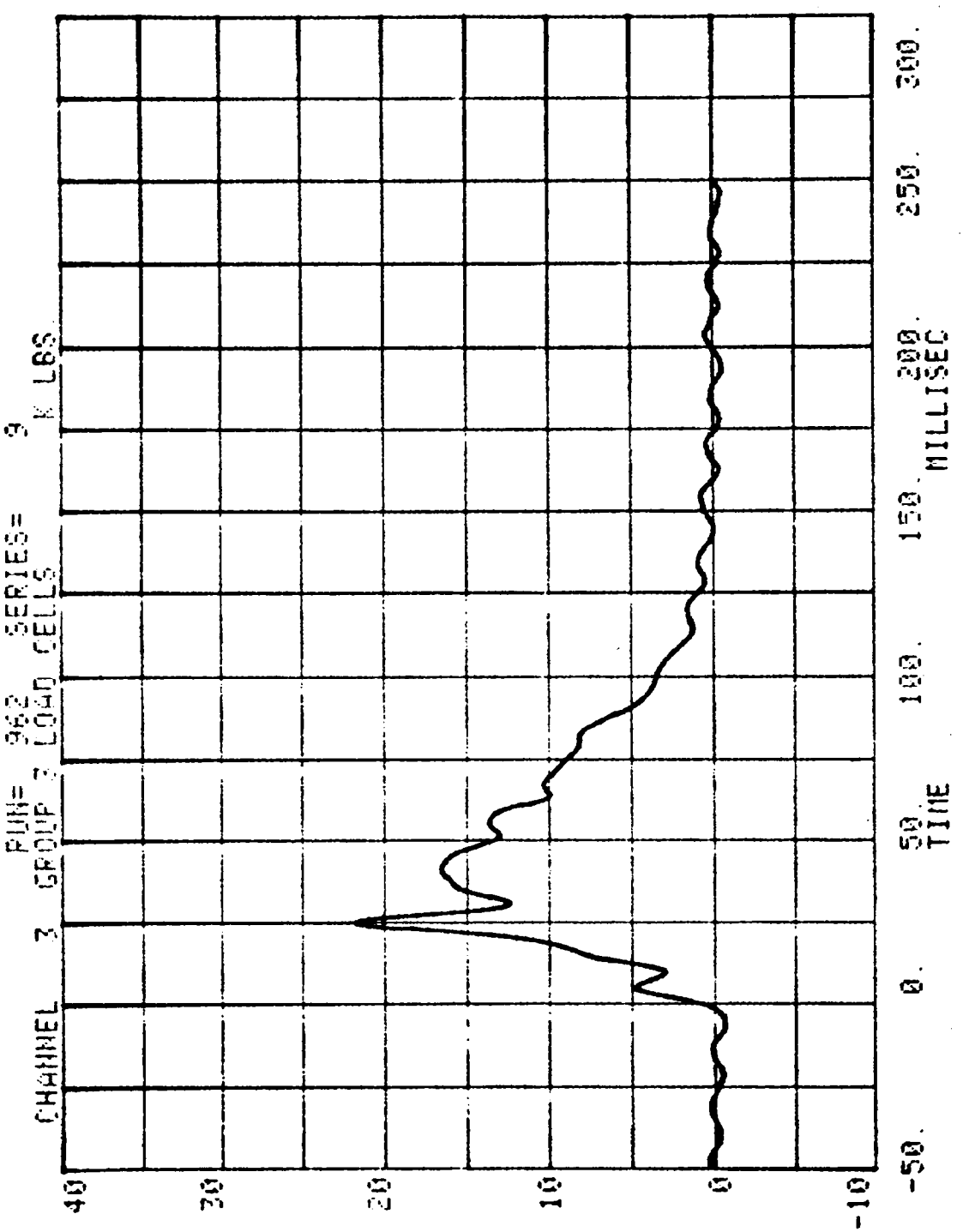
CHAN	TITLE	MINIMUM/MAXIMUM	AT TIME
1	GROUP 1 LOAD CELLS	-.289 K LBS. 25.045 K LBS.	-4.66 MS. 26.92 MS.
2	GROUP 2 LOAD CELLS	-.680 K LBS. 55.479 K LBS.	-8.26 MS. 44.02 MS.
3	GROUP 3 LOAD CELLS	-.539 K LBS. 21.811 K LBS.	-6.16 MS. 25.04 MS.
4	GROUP 4 LOAD CELLS	-.237 K LBS. 7.774 K LBS.	102.89 MS. 39.37 MS.
5	GROUP 5 LOAD CELLS	-.425 K LBS. 25.591 K LBS.	1.27 MS. 43.49 MS.
6	GROUP 6 LOAD CELLS	-.590 K LBS. 9.416 K LBS.	-13.73 MS. 26.17 MS.
7	TOTAL LOAD CELL SUM	-.669 K LBS. 121.551 K LBS.	-19.96 MS. 43.79 MS.

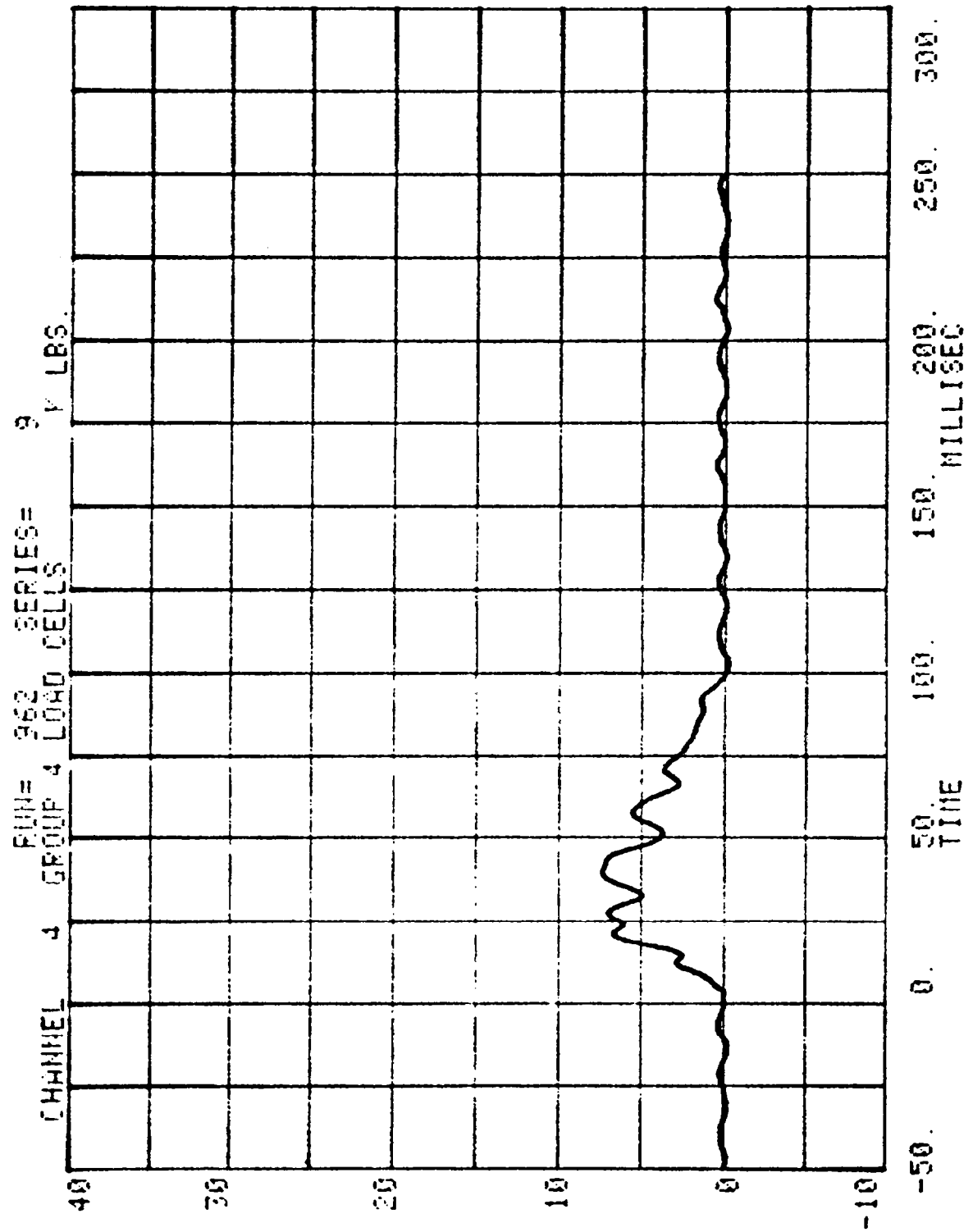

CHANNEL 1 GROUP 1 LOAD CELLS
RUN= 962 SERIES= 9
K LBS
40
20
0
-20
-40
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

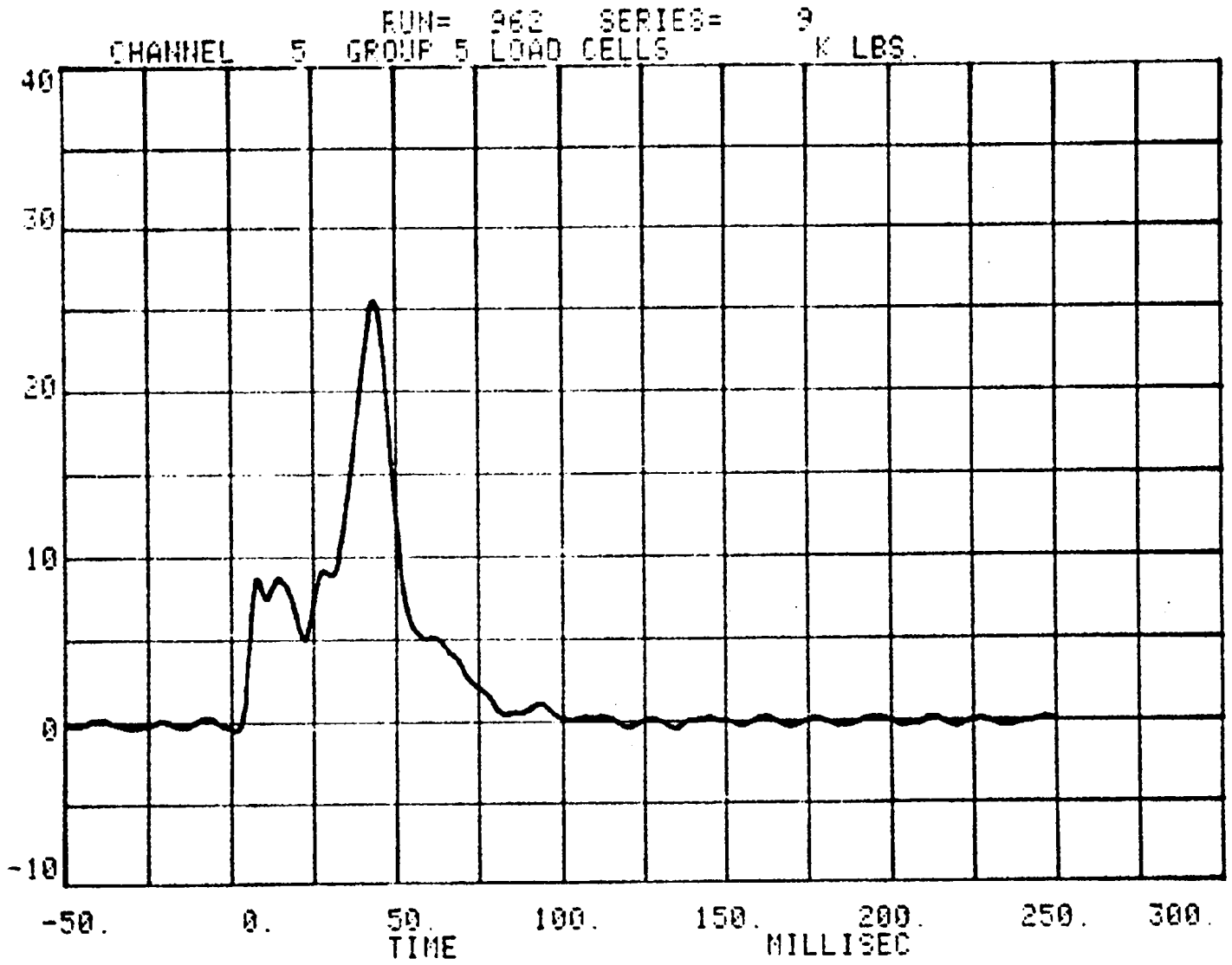
7776-9


CHANNEL 2 SPOOL 3 LOAD CELLS
RUN= 262 SERIES= 9
K LBS.
60
50
40
30
20
10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7776-9

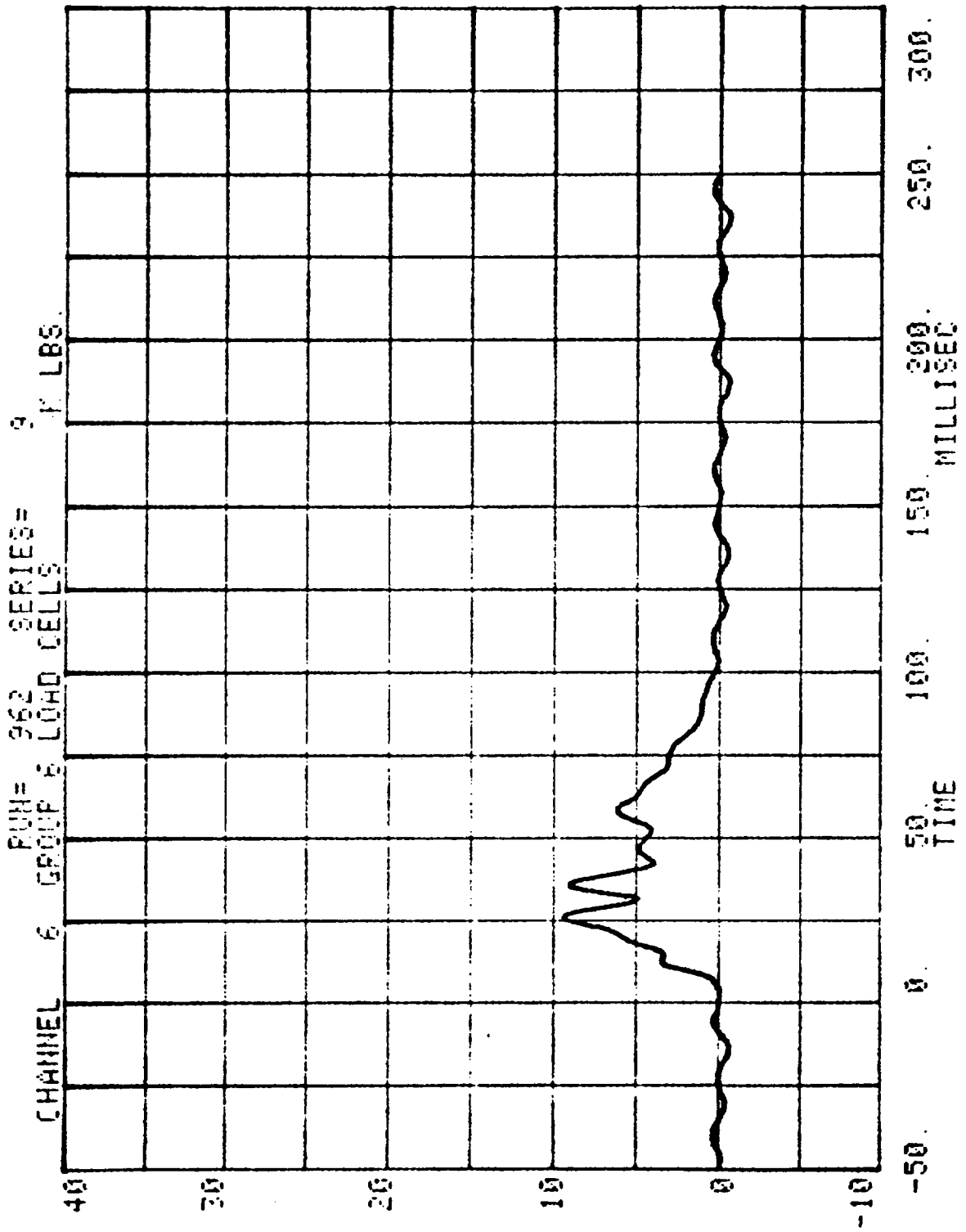

CHANNEL 3 GROUP 3 LOAD CELLS
RUN= 362 SERIES= 9
K LBS
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

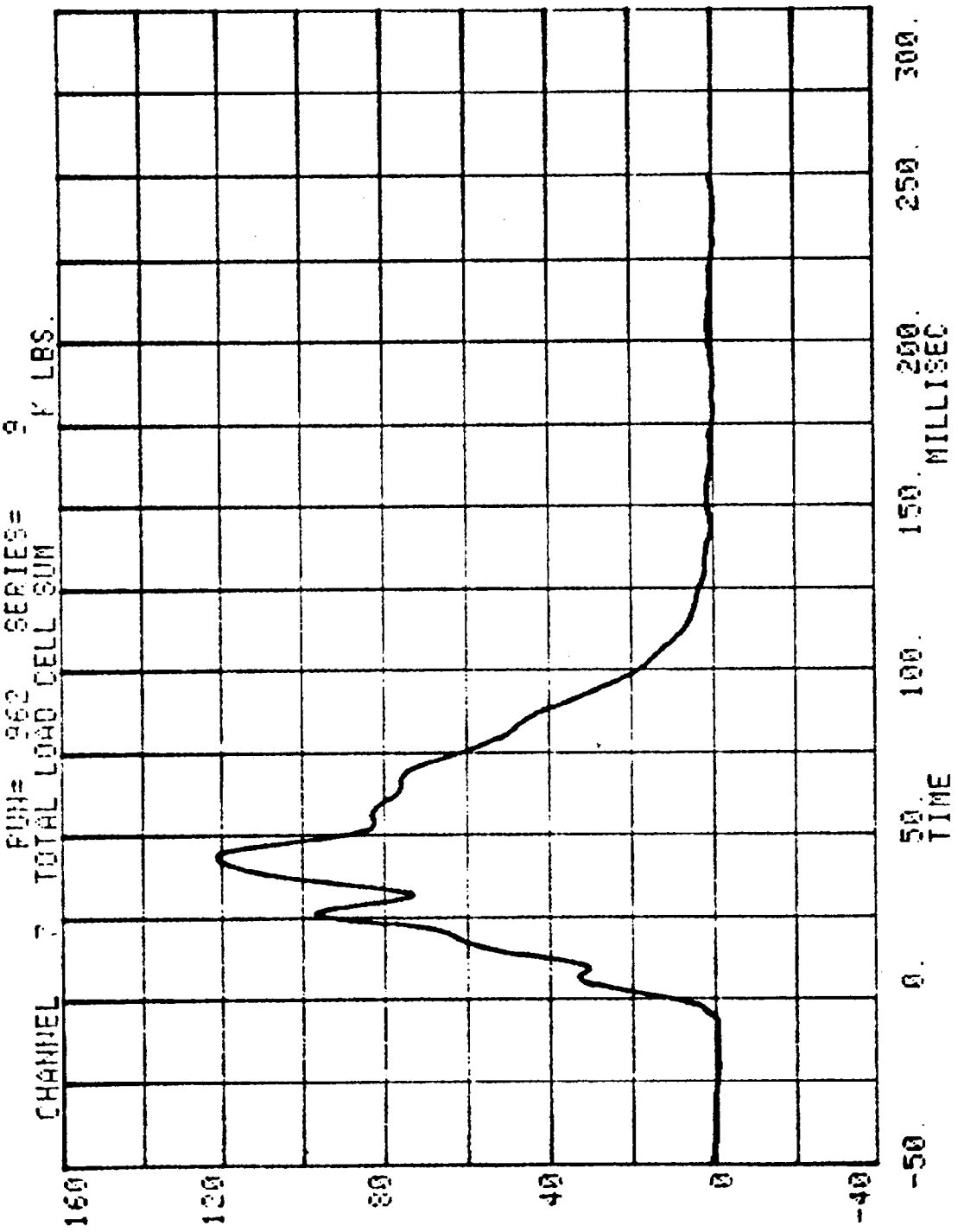

CHANNEL 4 GROUP 4 RUN= 962 SERIES= 9
4 LOAD CELLS
Y LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 962 SERIES= 9
CHANNEL 5 GROUP 5 LOAD CELLS K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

B-66

7776-9


CHANNEL 6 GROUP 6 LOAD CELLS
RUN= 962 SERIES= 9
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC.


CHANNEL 7 TOTAL LOAD CELL SUM
PUH= 962 SERIES= 9
F LBS.
160
120
80
40
0
-40
-50
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

TEST NO. ML5202

DUMMY DATA

CLASS	FILTER CHANNEL
Head Accelerations	1000
Chest Accelerations	180
Femur Forces	600
Belt Loads	60

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NEW CAR ASSESSMENT PROGRAM - 1990

RUN= 962

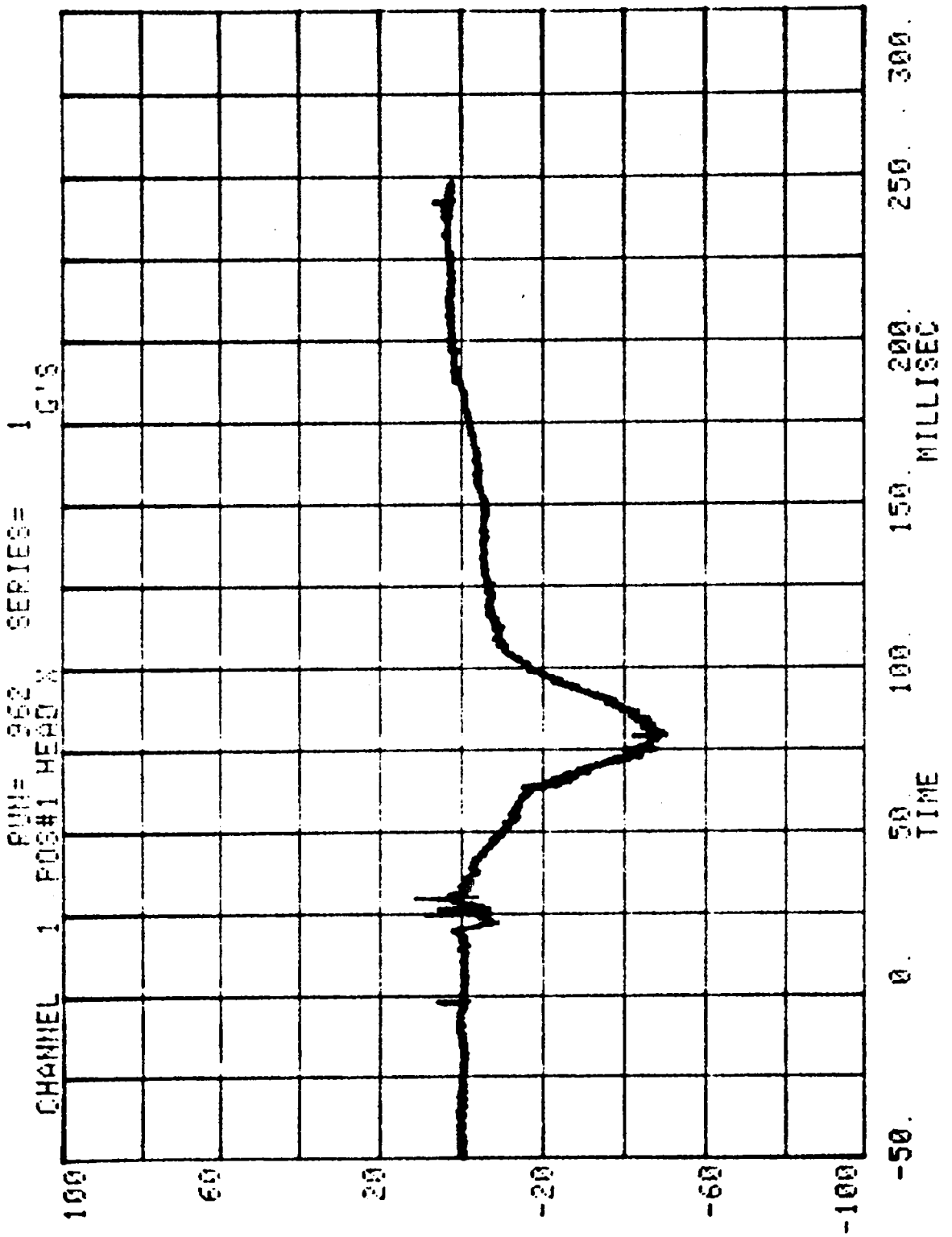
POS #1 HEAD RESULTANT

HIC= 466.3 FROM T1= .06765 TO T2= .09532

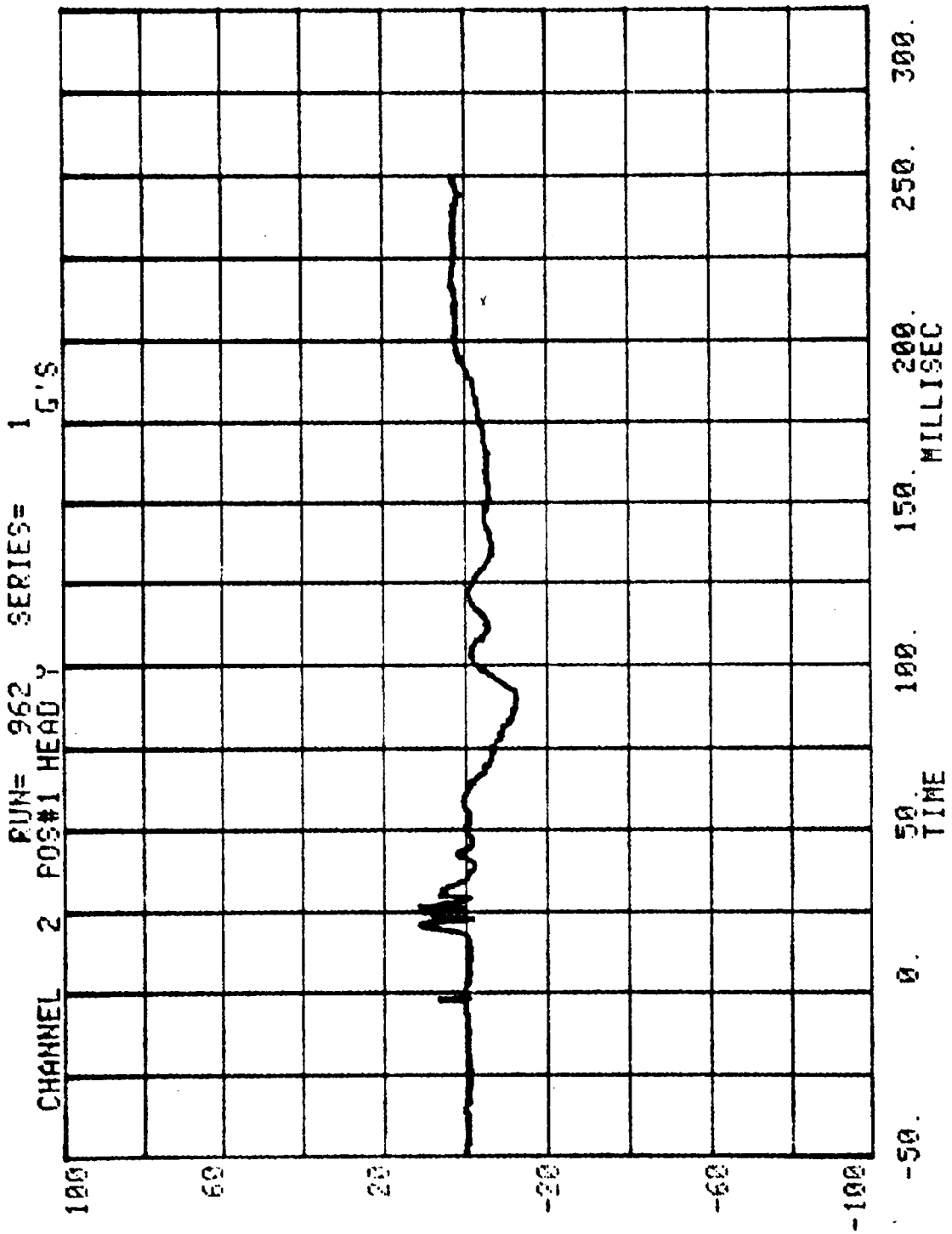
AVERAGE ACCELERATION BETWEEN T1 AND T2= 49.06'9

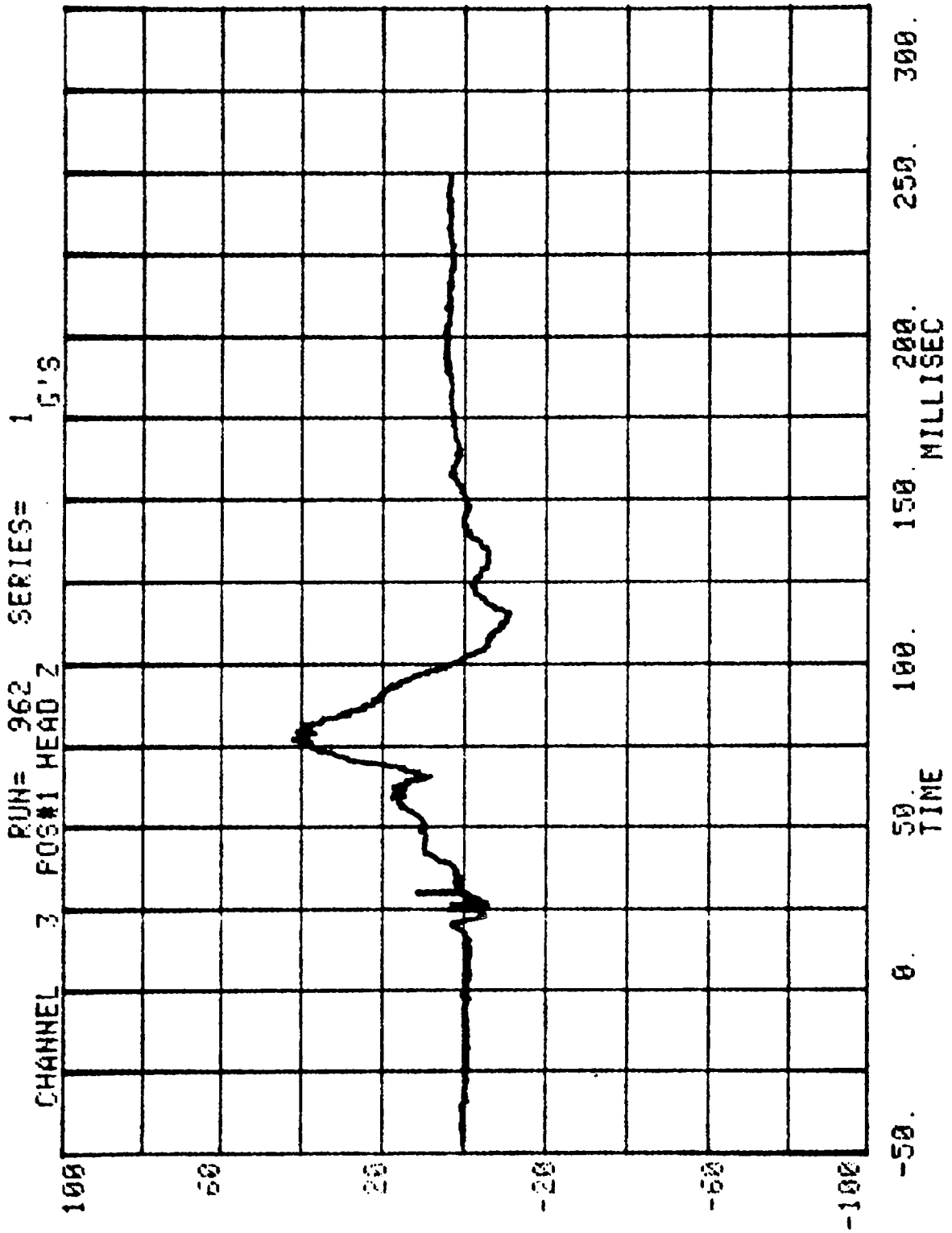
EVENT TIME= 267 2 MSEC

SEVERITY INDEX= 583.1

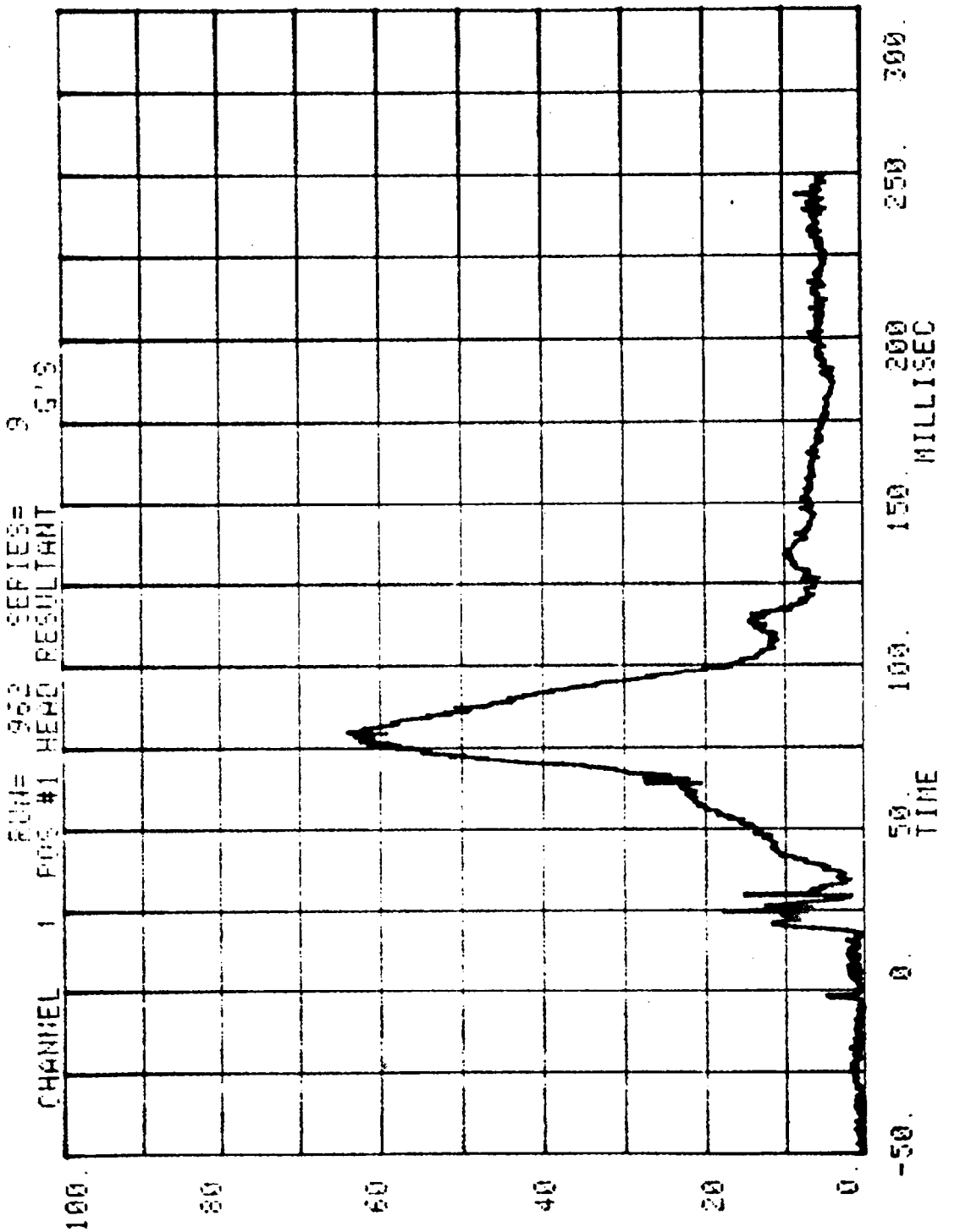

CHANNEL 1 POS#1 HEAD X
RUN= 962 SERIES= 1
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7776-9

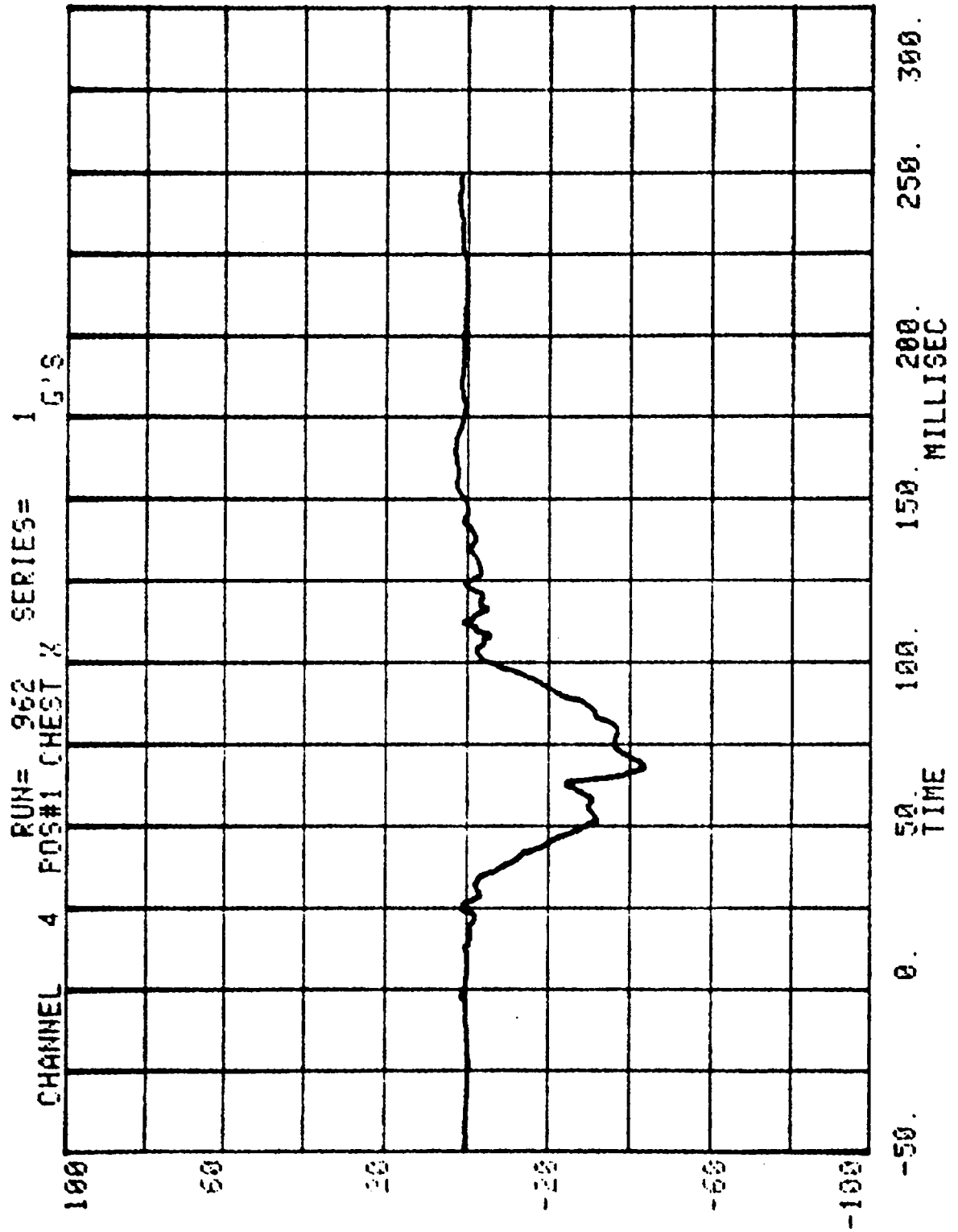

CHANNEL 2 POS#1 HEAD Y
RUN= 962 SERIES= 1
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 3 POS#1 HEAD Z
RUN= 962 SERIES= 1
G'S
100
50
0
-50
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

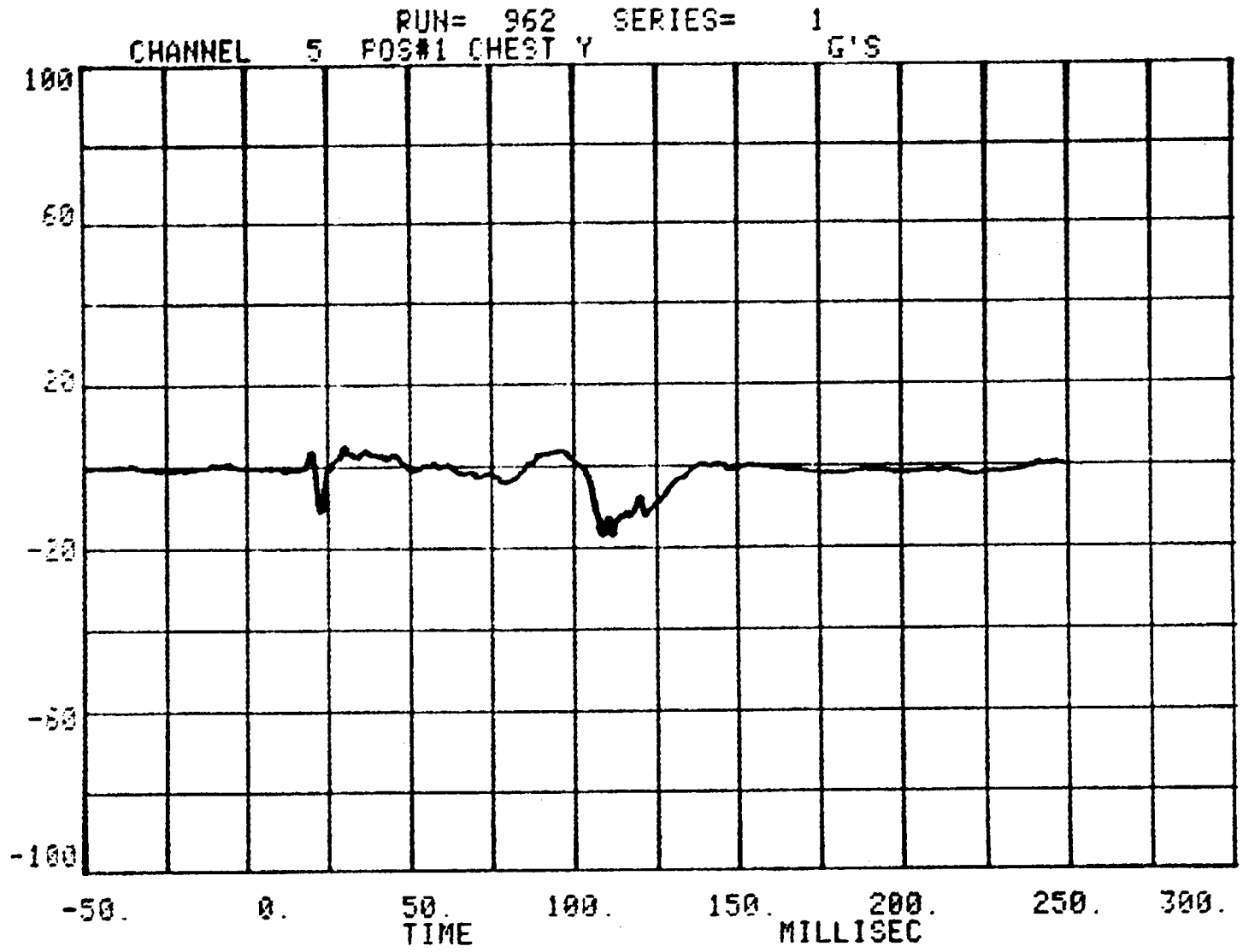
7776-9


CHANNEL 1 POS #1 HEAD RESULTANT
RUN= 962 SERIES= 3
5'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7776-9

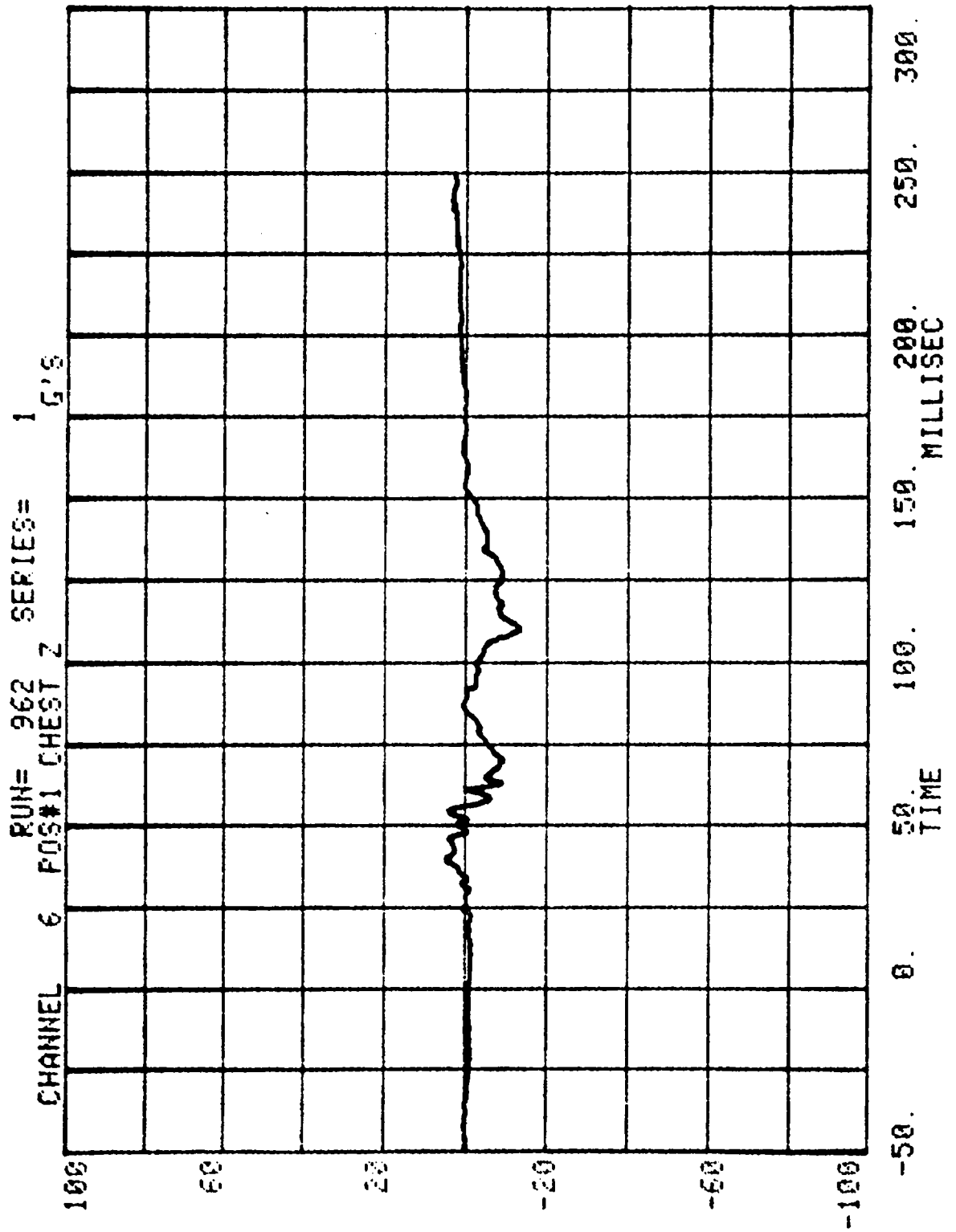

CHANNEL 4 POS#1 CHEST X
RUN= 962 SERIES= 1
G'S
100
50
0
-50
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

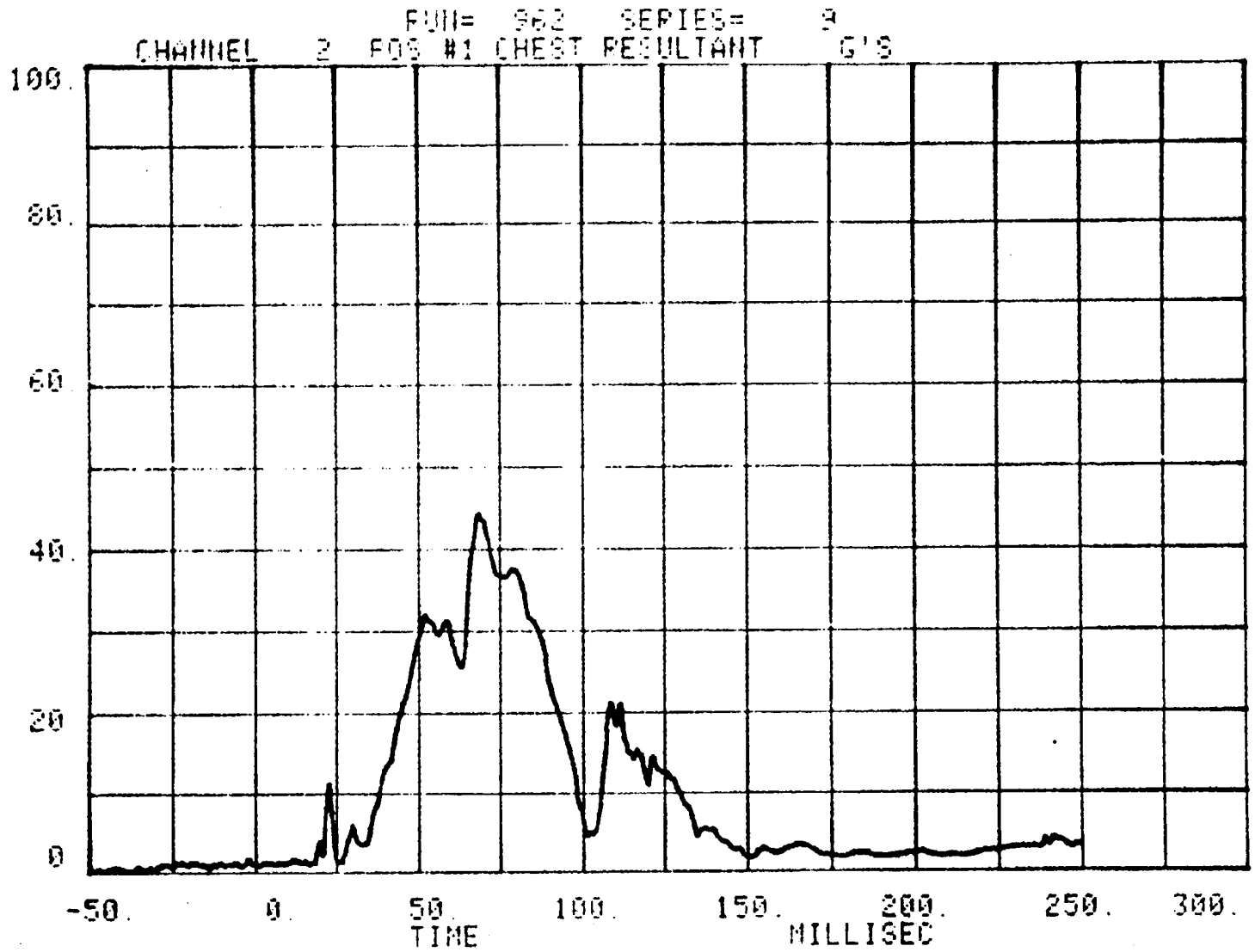
7776-9

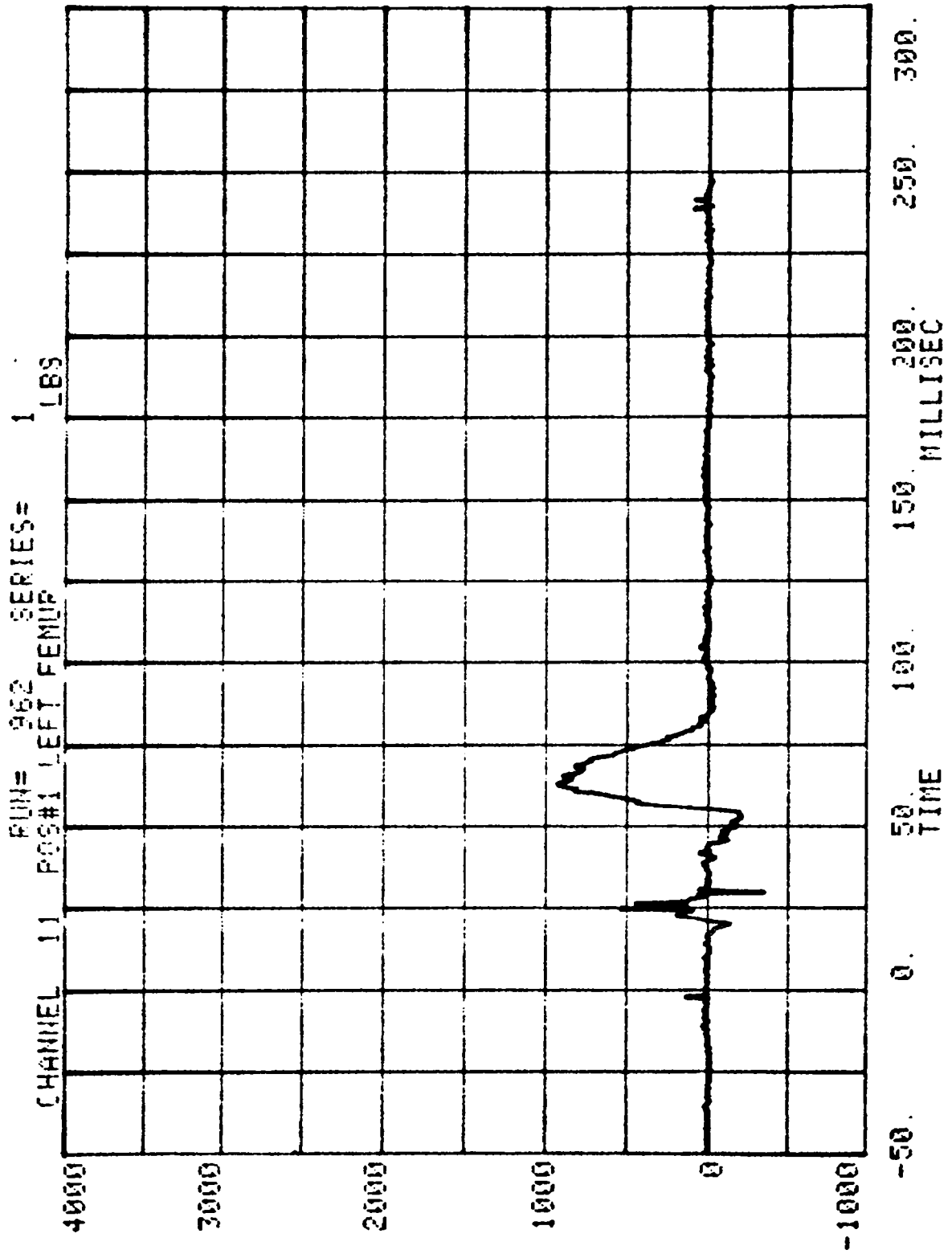

RUN= 962 SERIES= 1
CHANNEL 5 POS#1 CHEST Y G'S
100
50
20
-20
-50
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

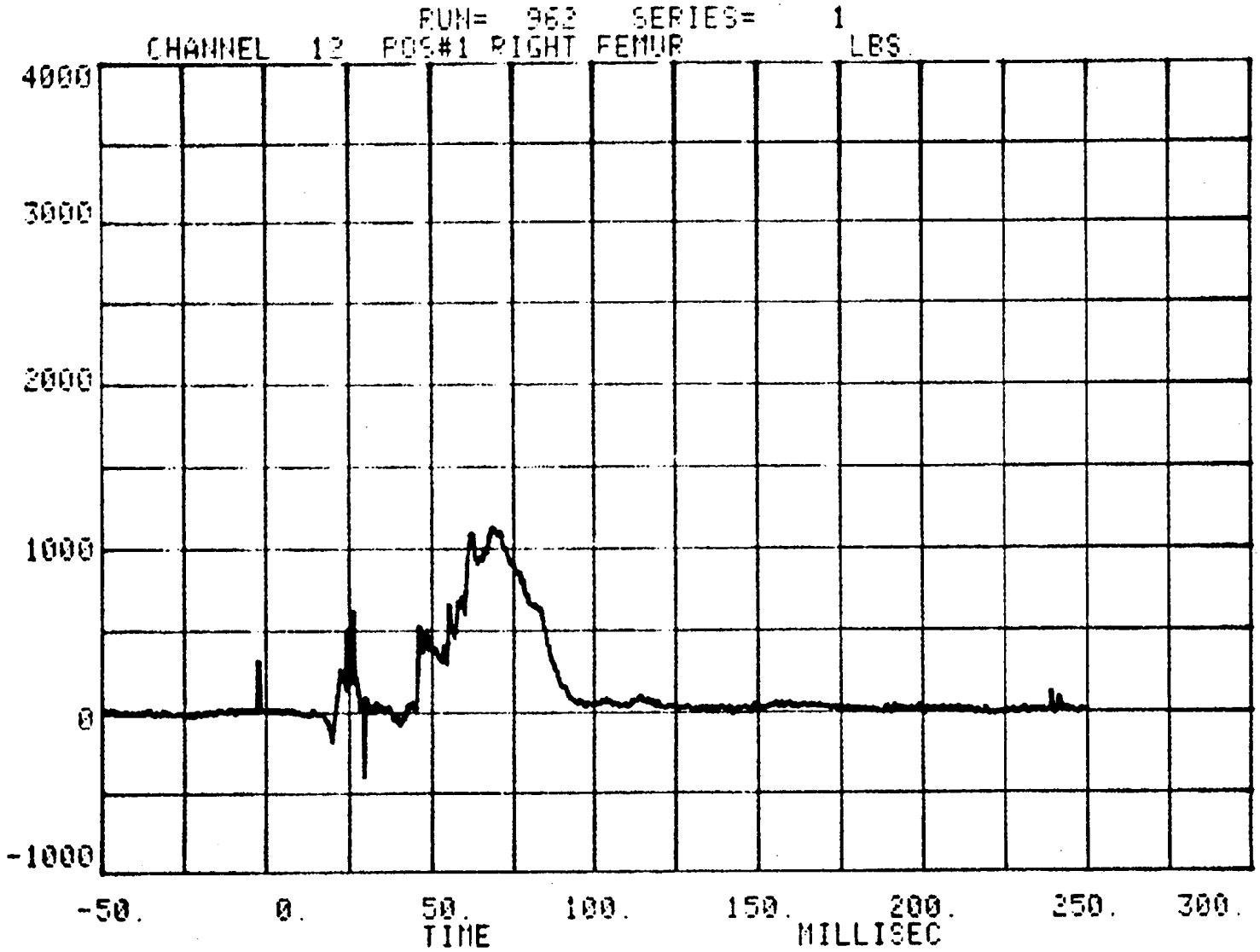
B-76

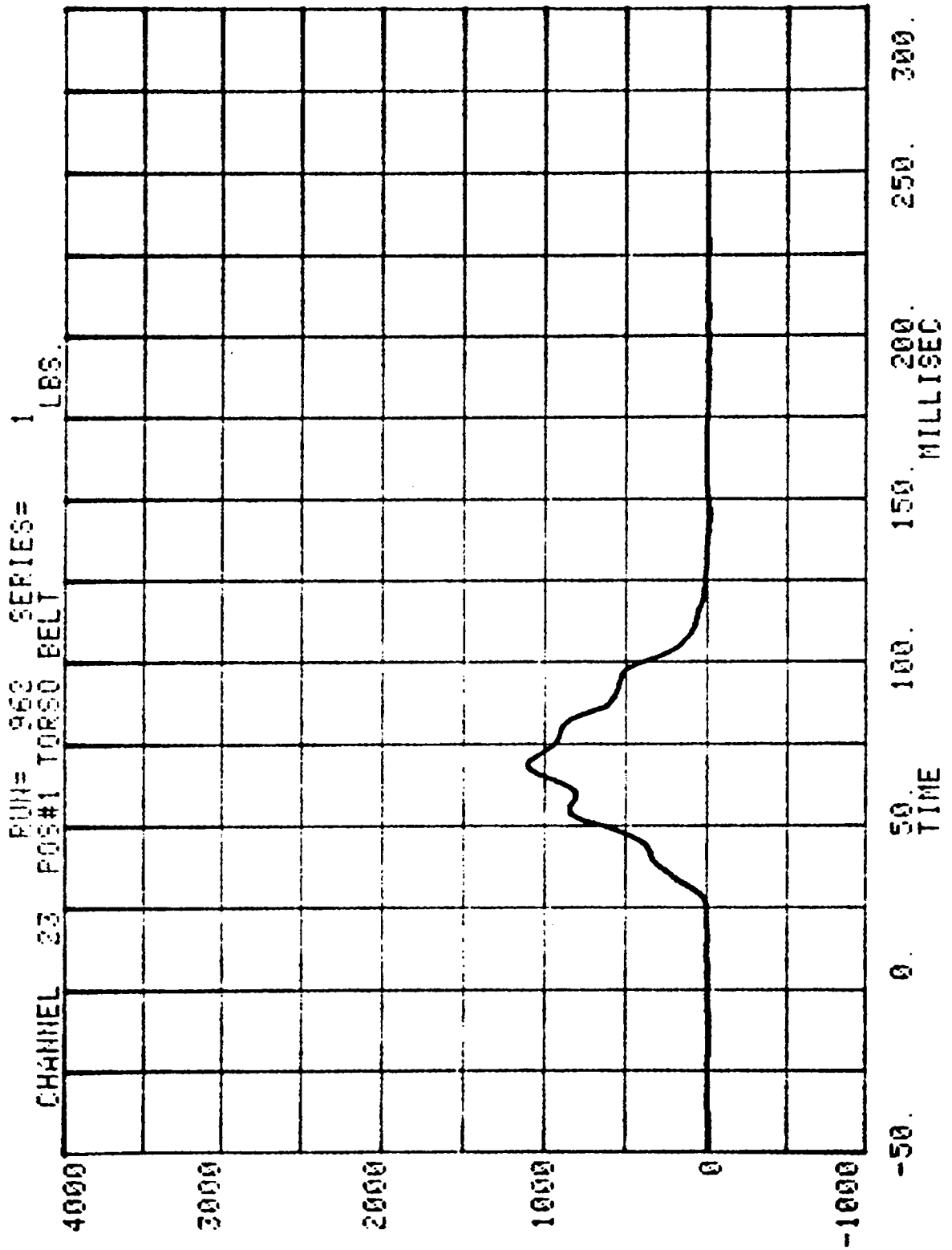
7776-9


CHANNEL 6 POS#1 CHEST Z
RUN= 962 SERIES= 1
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

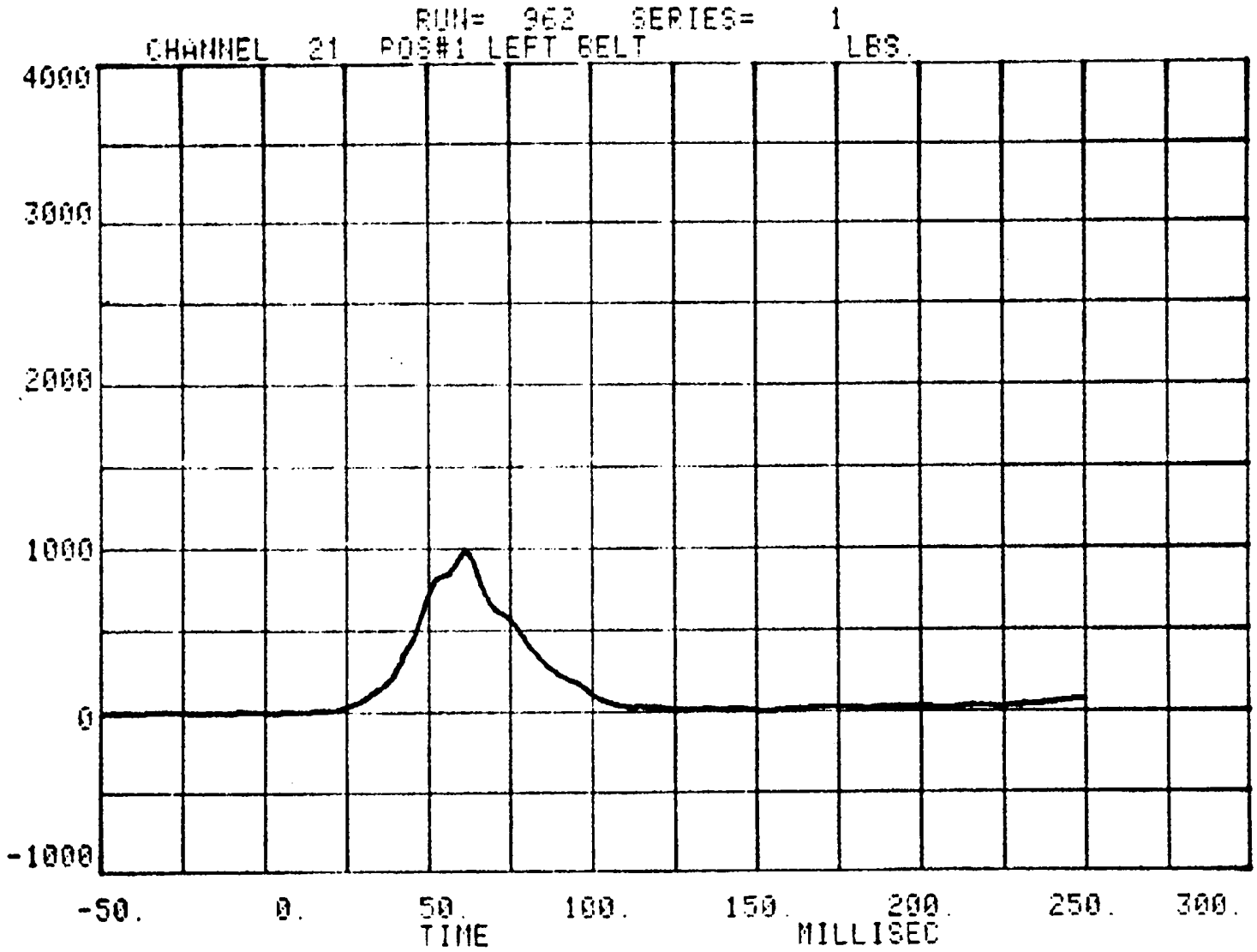

RUN= 962 SERIES= 9
CHANNEL 2 FDS #1 CHEST RESULTANT G'S
100.
80.
60.
40.
20.
0
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

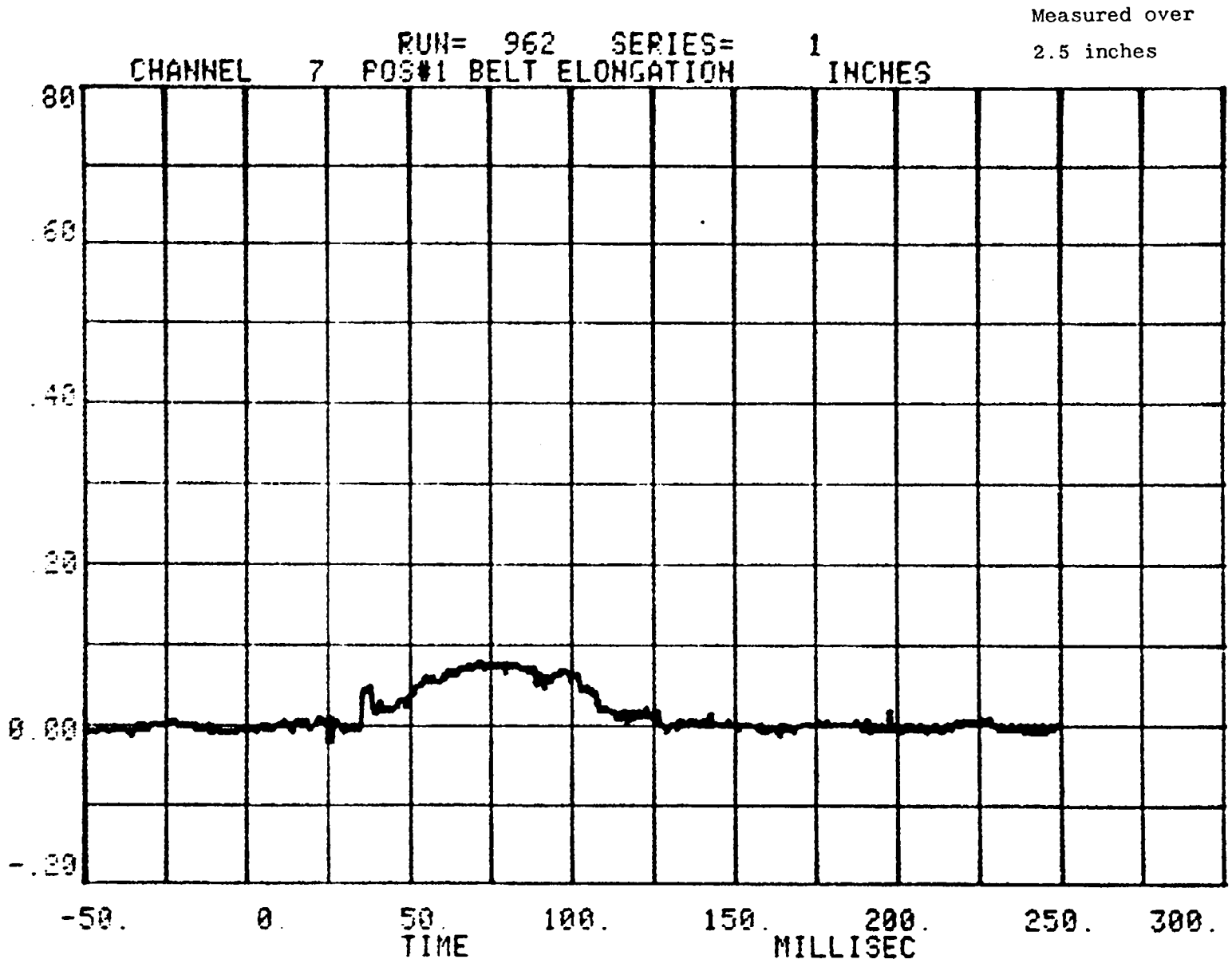

CHANNEL 11 POS#1 LEFT FEMUR
RUN= 962 SERIES= 1
LBS
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 962 SERIES= 1
CHANNEL 12 POS#1 RIGHT FEMUR LBS
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 23 POS#1 TORSO BELT
RUN= 962 SERIES= 1
LBS.
4000
3000
2000
1000
0
-1000
-50.
0
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7776-9


RUN= 962 SERIES= 1
CHANNEL 21 POS#1 LEFT BELT LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 962 SERIES= 1
CHANNEL 7 POS#1 BELT ELONGATION INCHES
Measured over
2.5 inches
.80
.60
.40
.20
0.00
-.20
-50.
0
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
3MS. MAXIMUM DURATION

NEW CAR ASSESSMENT PROGRAM - 1990

RUN= 962

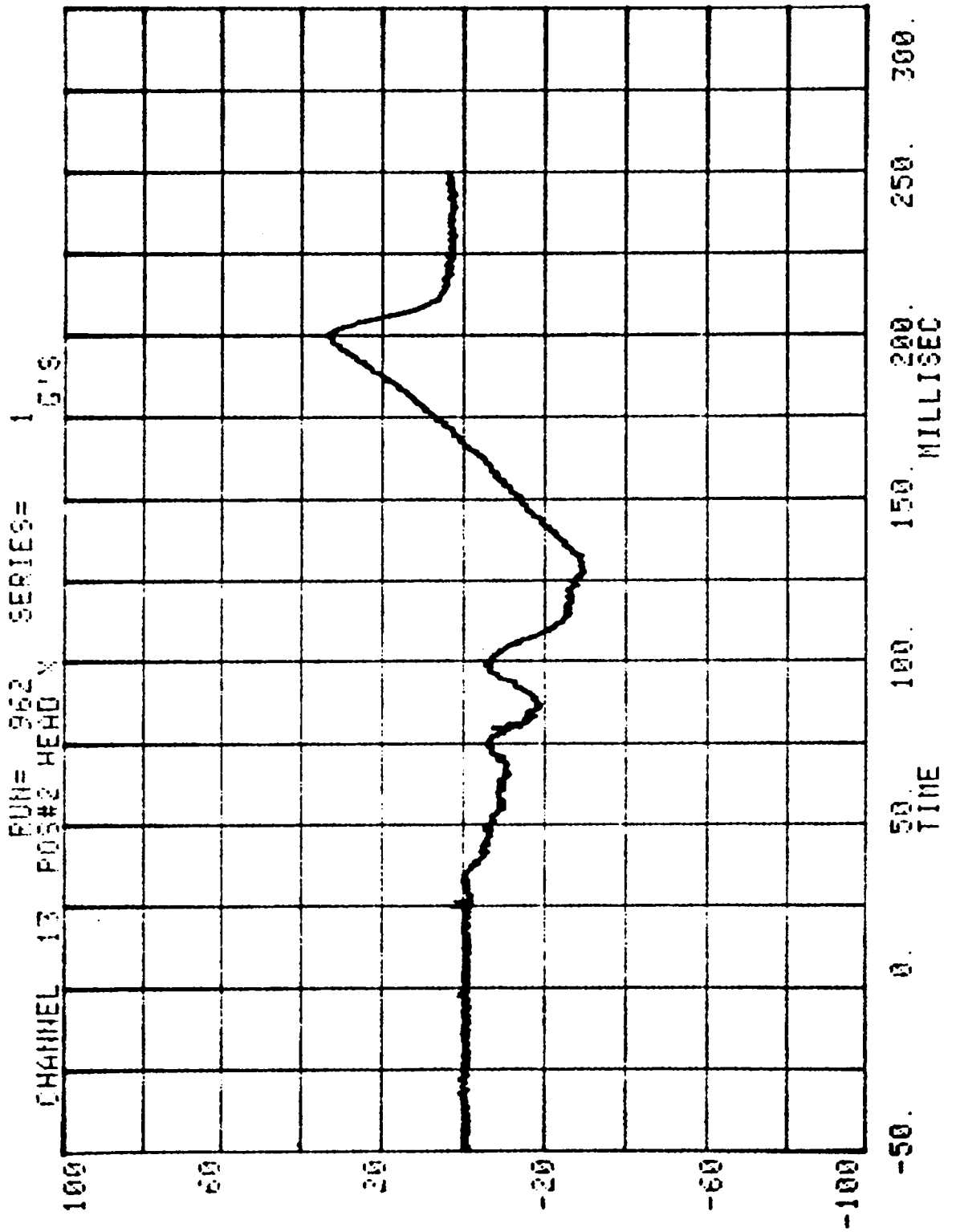
POS #2 HEAD RESULTANT

HIC= 443.0 FROM T1= .08152 TO T2= .11752

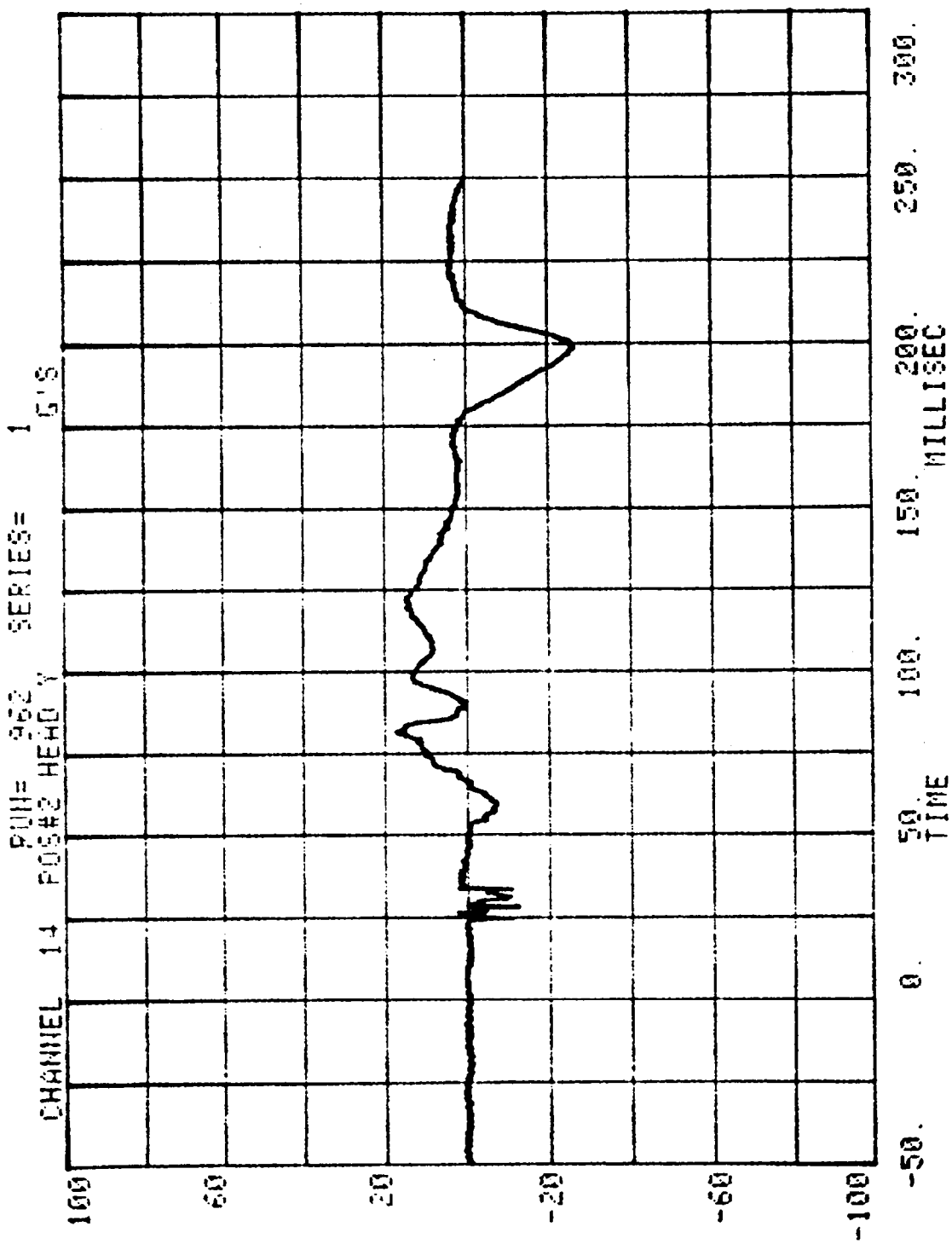
AVERAGE ACCELERATION BETWEEN T1 AND T2= 47 3G'S

EVENT TIME= 267.2 MSEC

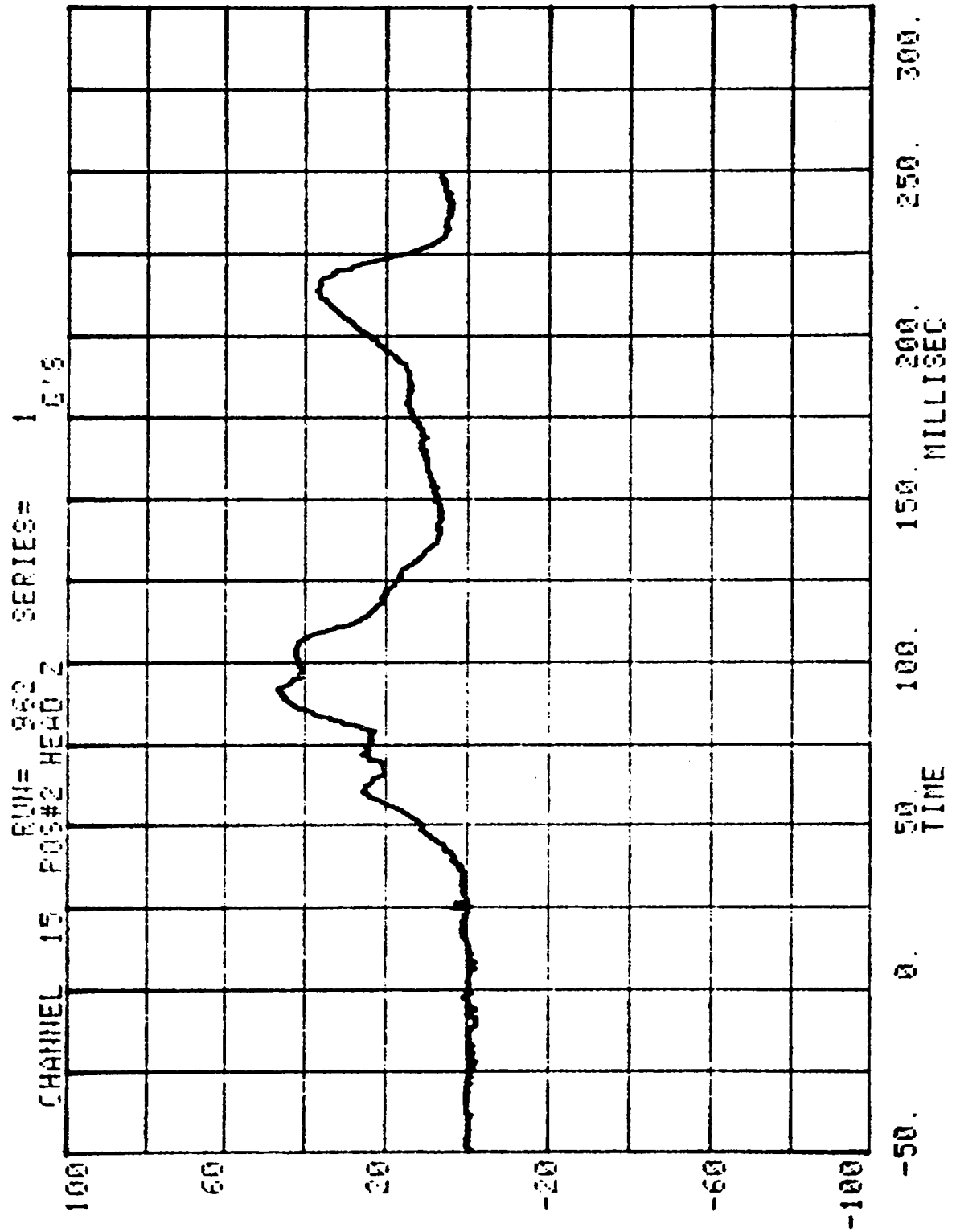
SEVERITY INDEX=1098.7


CHANNEL 13 POS#2 HEAD X RUN= 962 SERIES= 1 G'S
100
60
20
-20
-60
-100
-50.
0.
50.
TIME
100.
150.
200.
MILLISEC
250.
300.

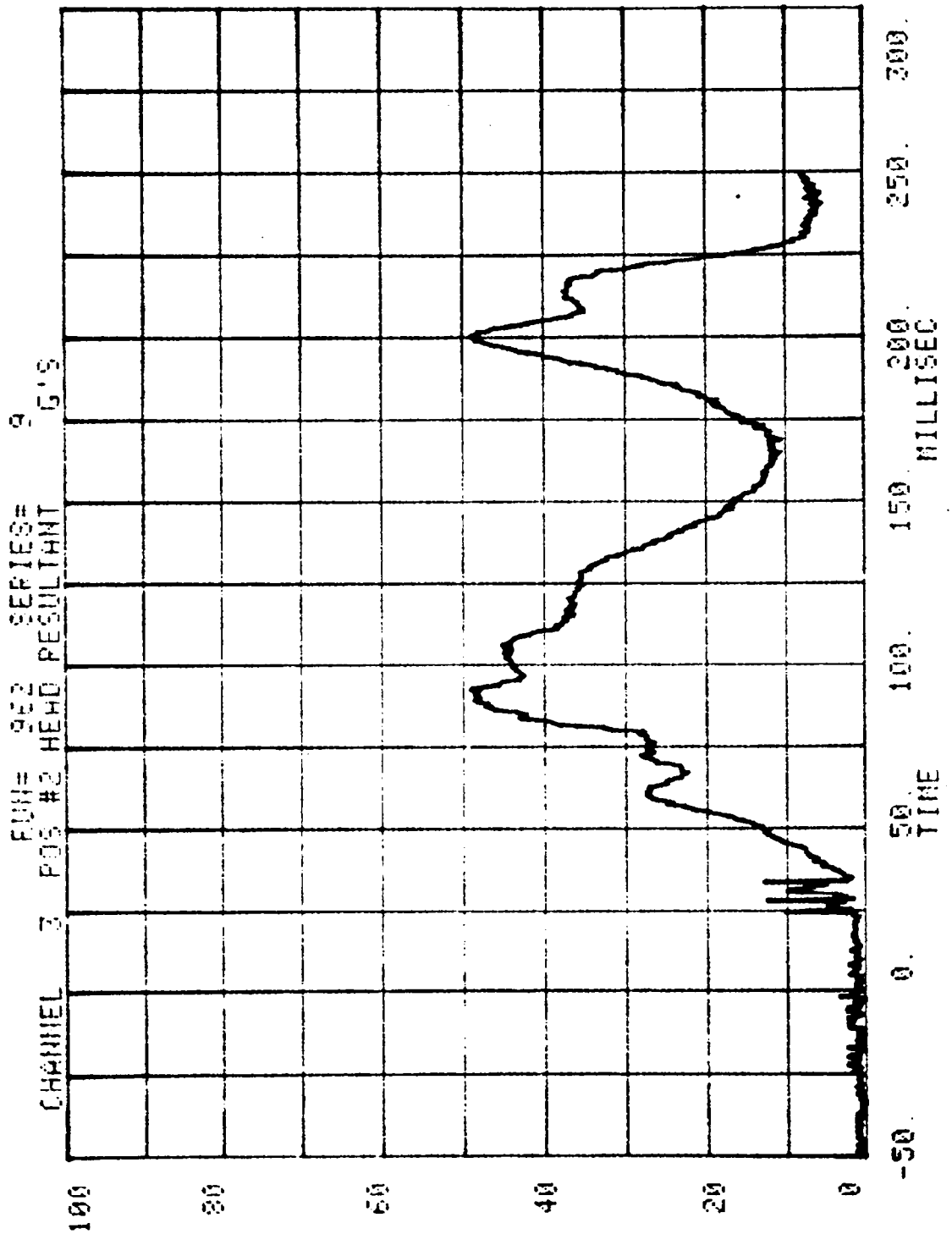
7776-9

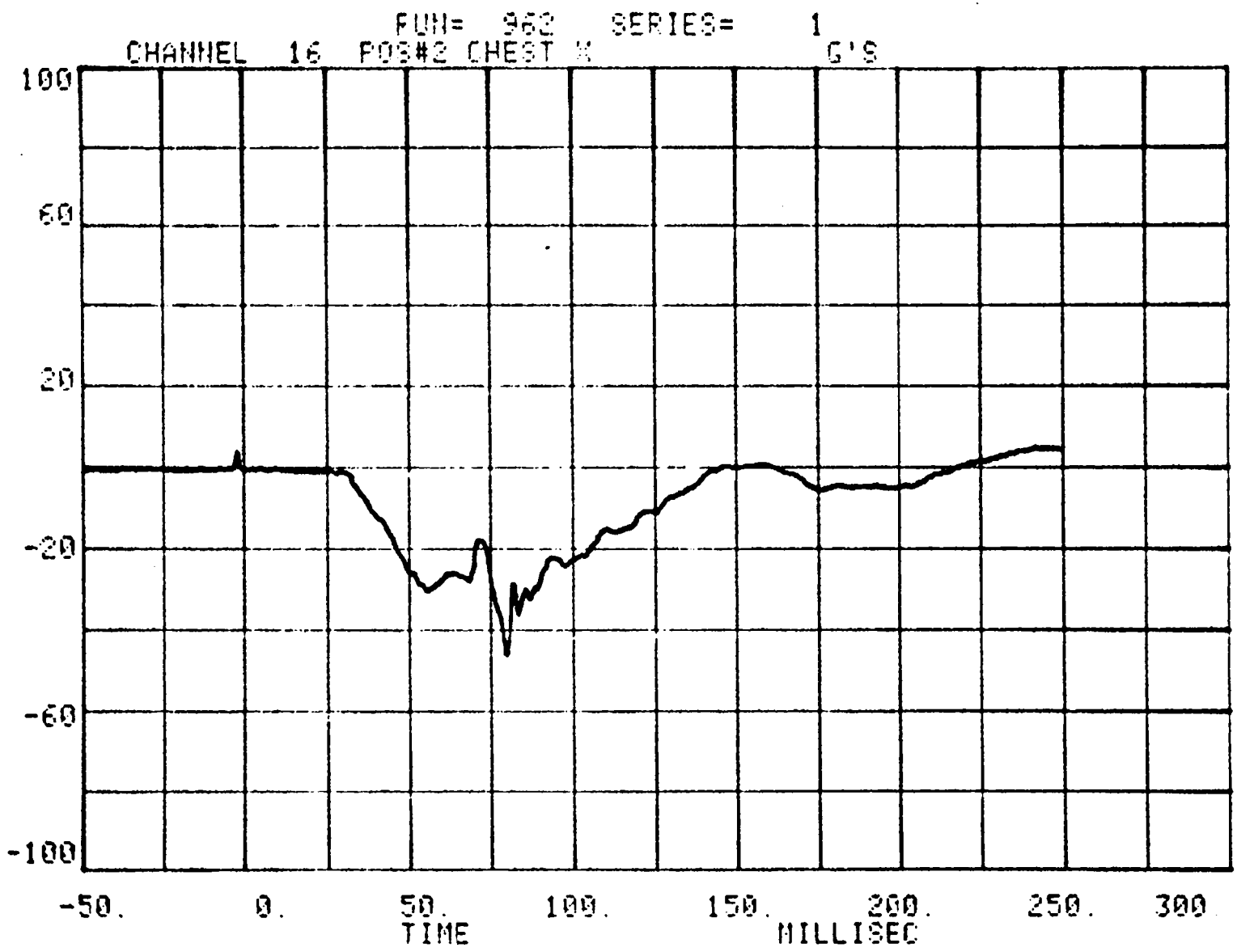

CHANNEL 14 POS#2 HEAD Y
RUN= 952 SERIES= 1
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

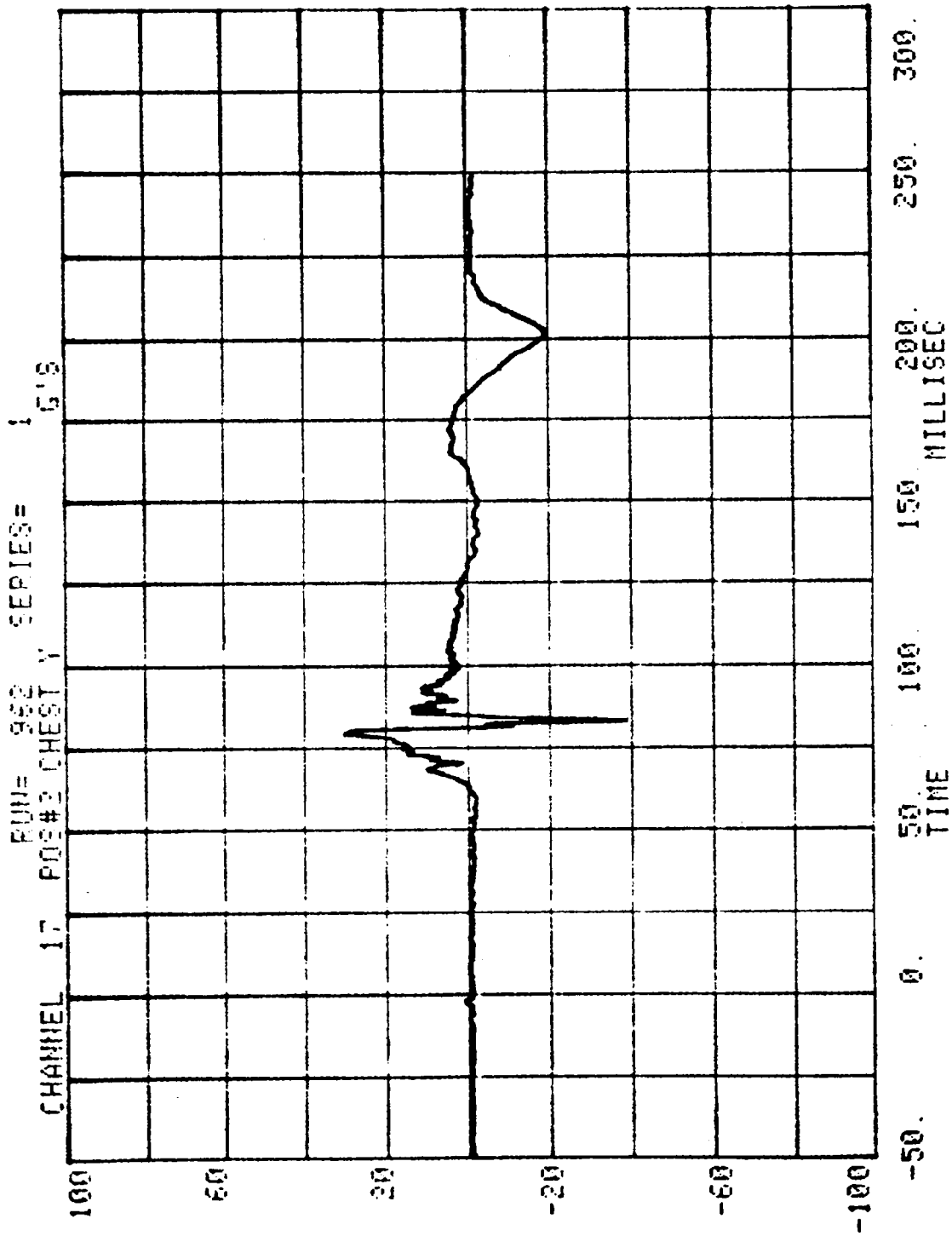
7776-9


CHANNEL 15 POS#2 HEAD 2
RUN= 962 SERIES= 1
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

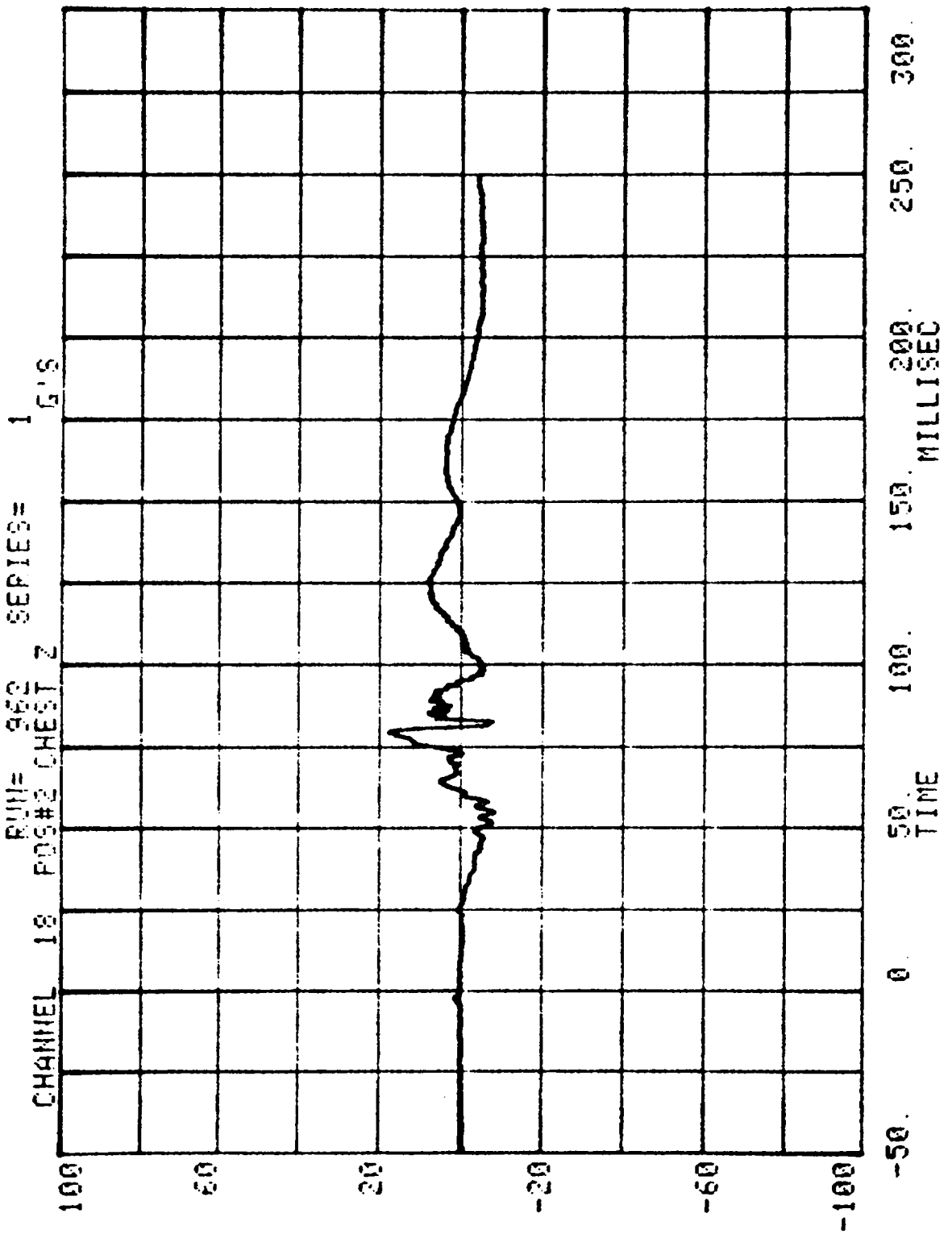
7776-9


CHANNEL 3 POS #2 HEAD RESULTANT
FILM= 962 SERIES= 9
G'S
100
80
60
40
20
0
-50.
0.
50.
100.
150
200.
250.
300.
TIME
MILLISEC

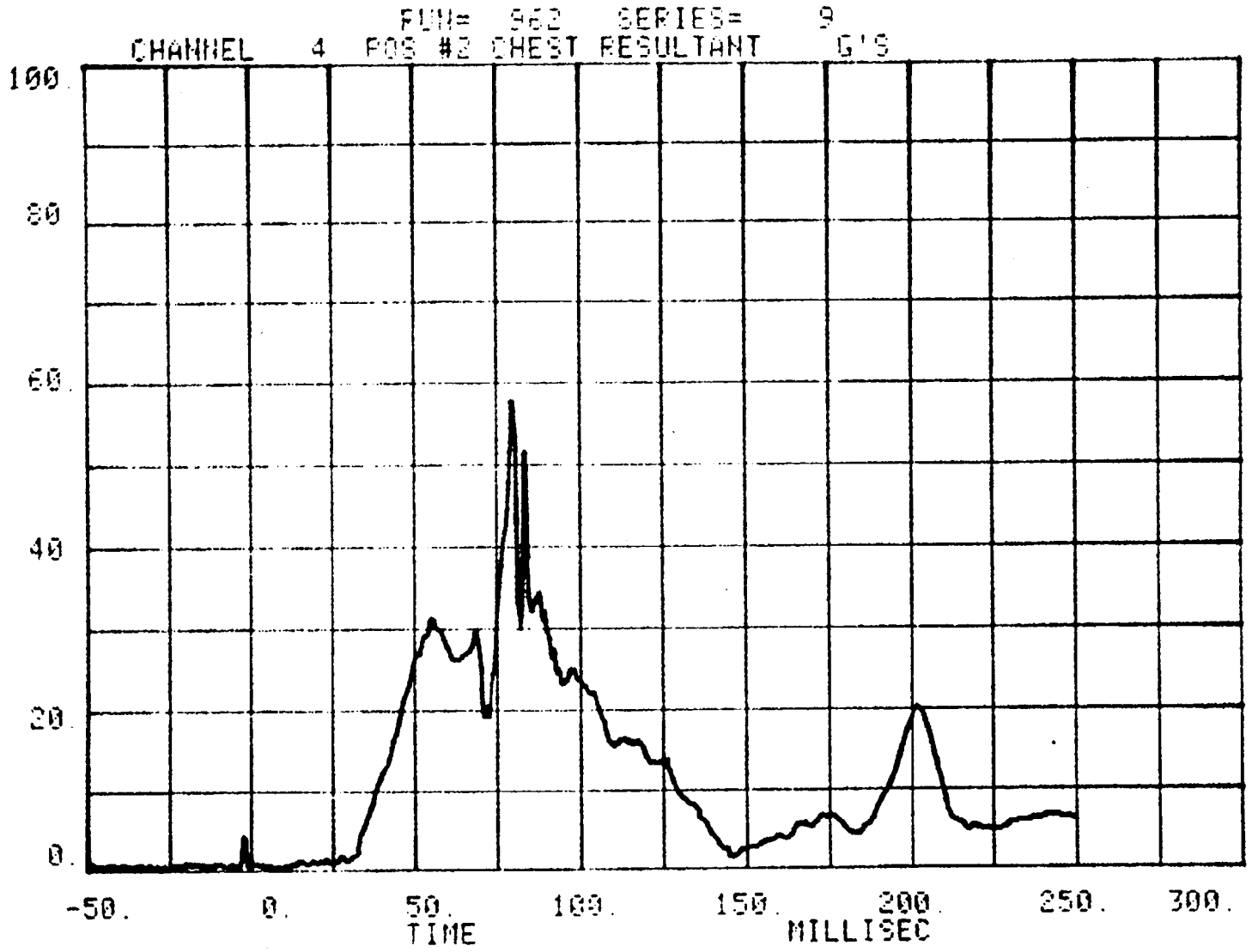

RUN= 963 SERIES= 1
CHANNEL 16 POS#2 CHEST X G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300
TIME MILLISEC

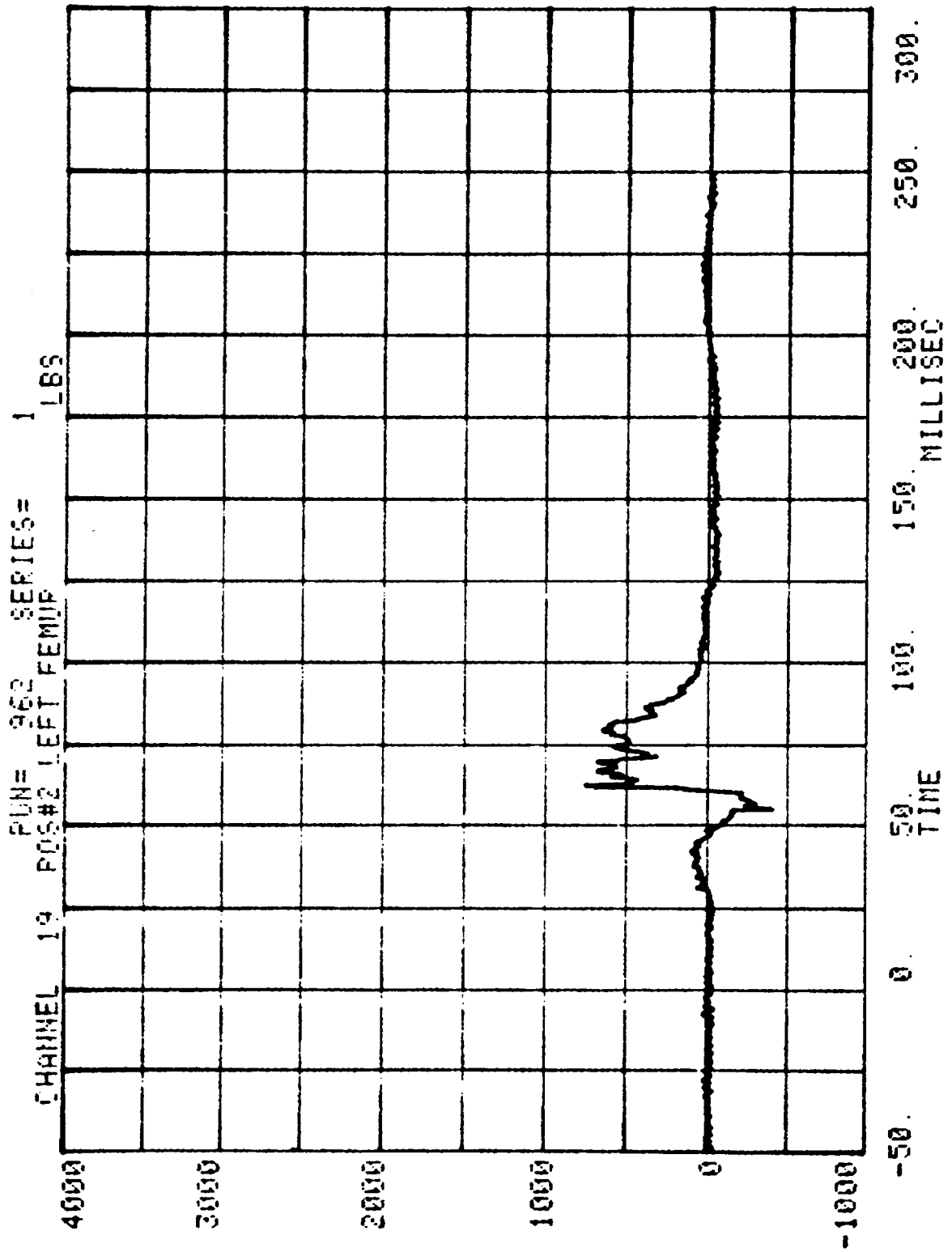

CHANNEL 17 POS#2 CHEST Y
RUN= 999 SERIES= 1
G'S
100
50
0
-20
-60
-100
-50.
0.
50.
100
150
200.
250.
300.
TIME
MILLISEC

7776-9

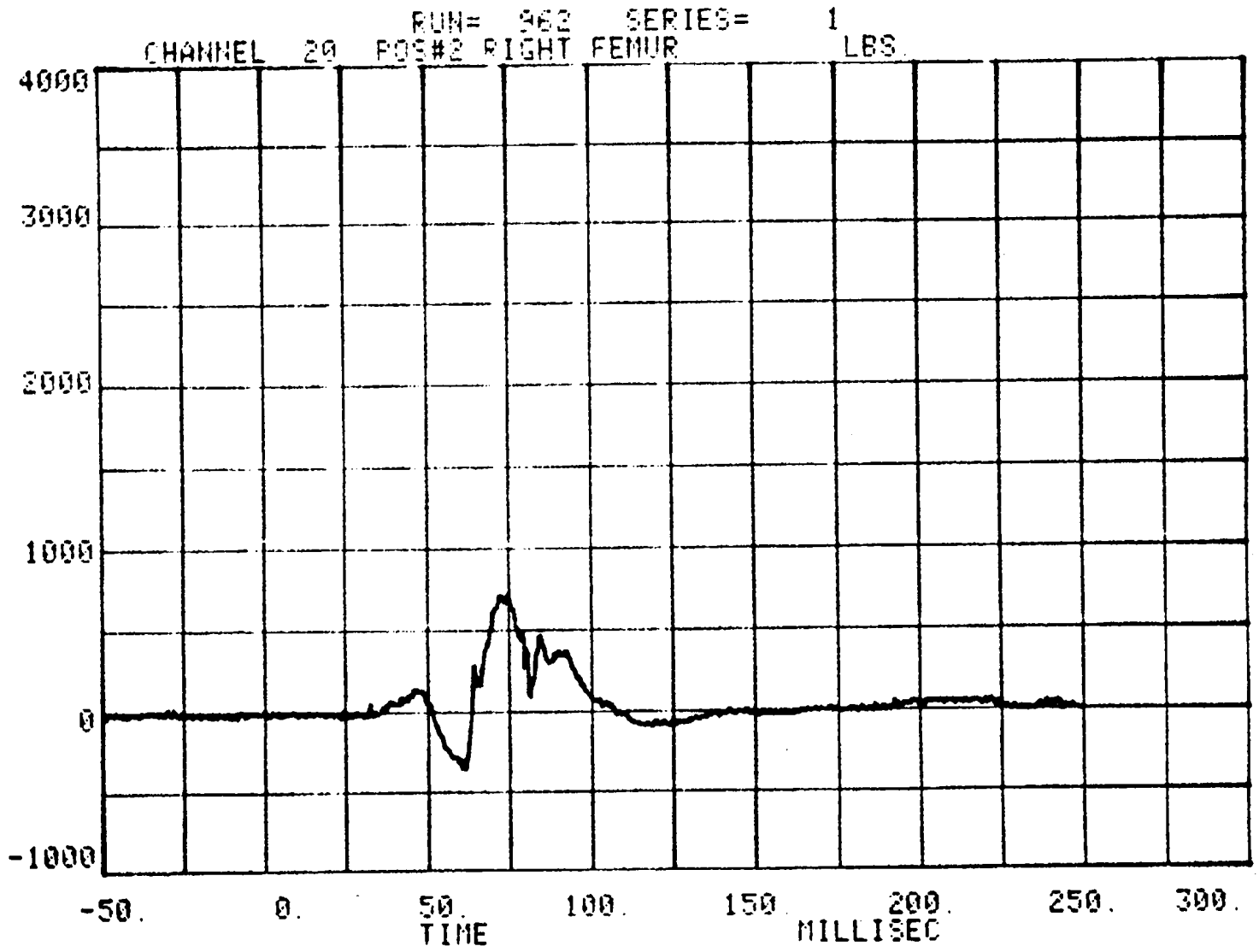

CHANNEL 18 POS#2 CHEST Z
RUN= 962 SERIES= 1
G'S
100
50
0
-50
-100
-50.
0
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

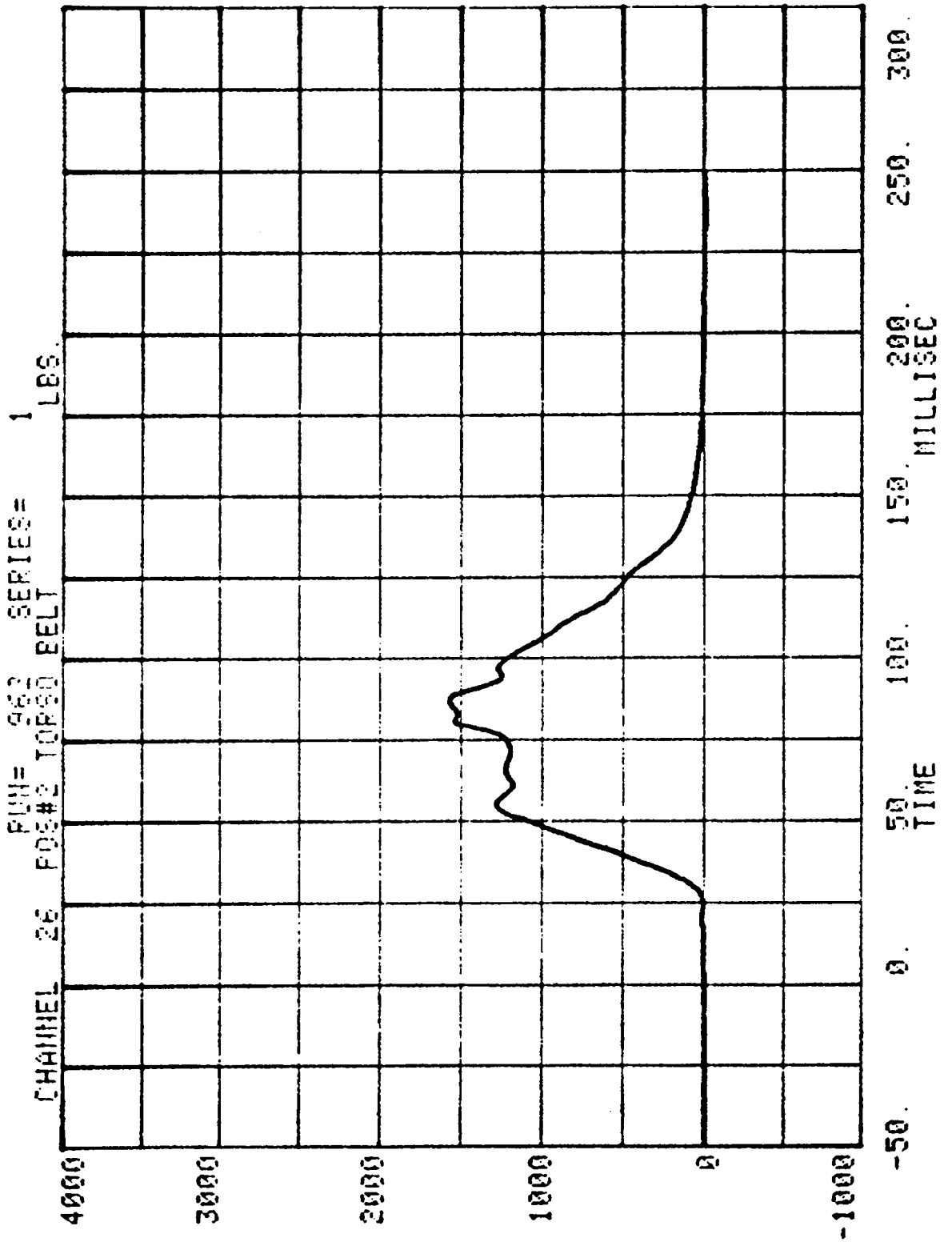
7776-9


RUN= 962 SERIES= 9
CHANNEL 4 POS #2 CHEST RESULTANT G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

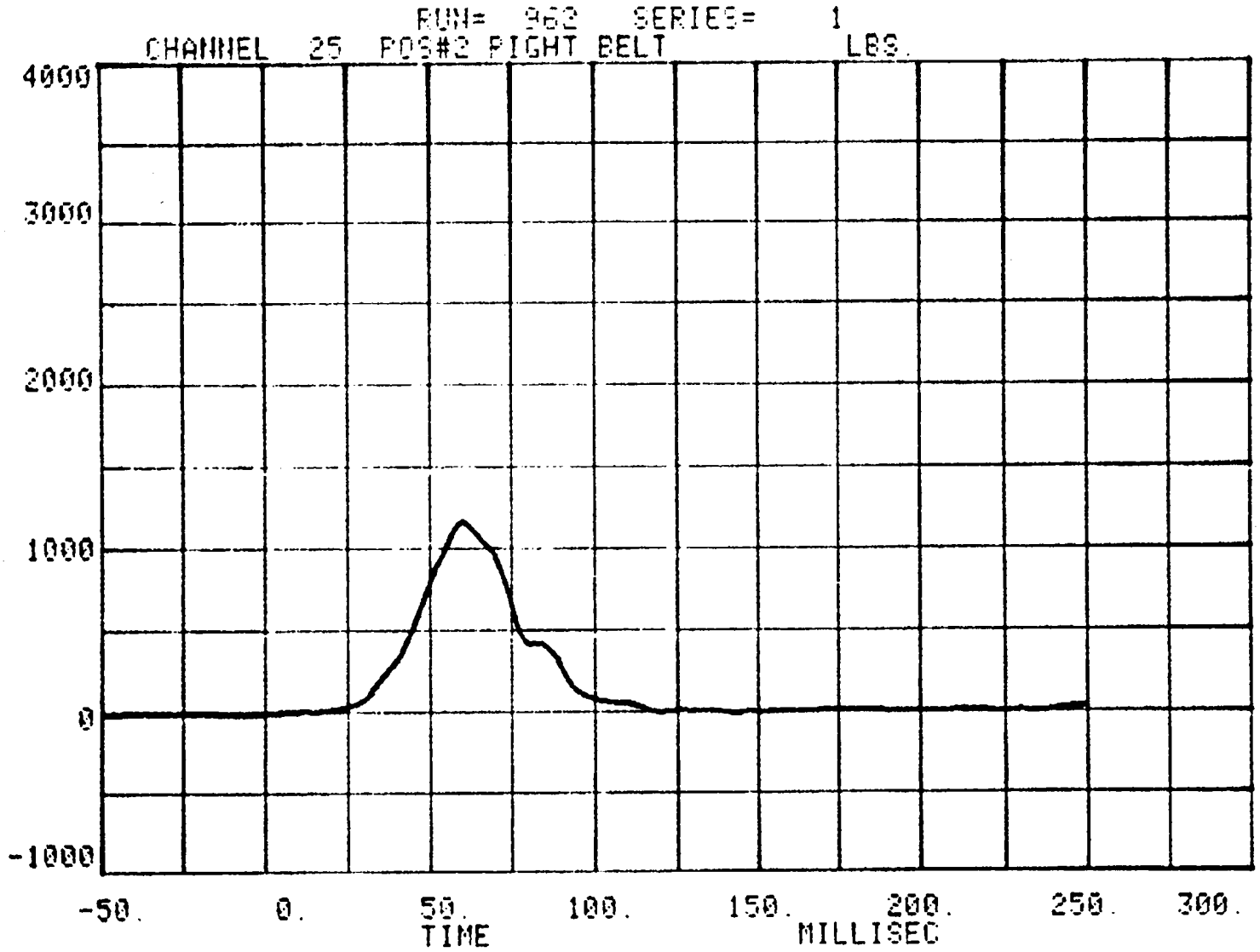

CHANNEL 19 POS#2 LEFT FEMUR
RUN= 962 SERIES= 1
LBS
4000
3000
2000
1000
0
-1000
-50.
0
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

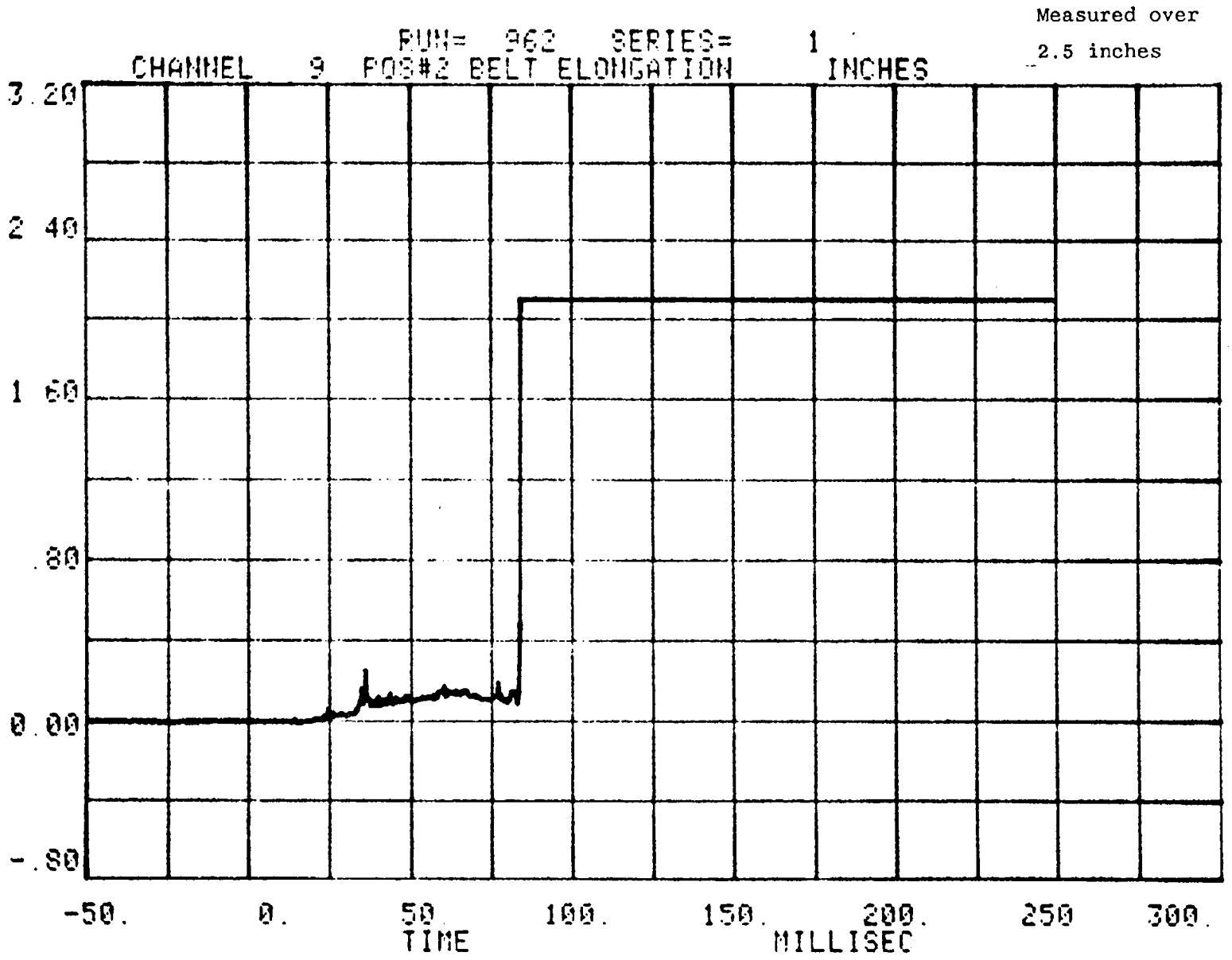
7776-9


RUN= 962 SERIES= 1
CHANNEL 20 POS#2 RIGHT FEMUR LBS
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150
200.
250.
300.
TIME
MILLISEC


CHANNEL 26 FD3#2 TORSO BELT
FILM= 982 SERIES= 1
LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7776-9


RUN= 962 SERIES= 1
CHANNEL 25 POS#2 RIGHT BELT LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 962 SERIES= 1
CHANNEL 9 POS#2 BELT ELONGATION INCHES
Measured over
2.5 inches
3.20
2.40
1.60
.80
0.00
-.80
-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 this Appendix.

Dummy serial numbers and certification dates are:

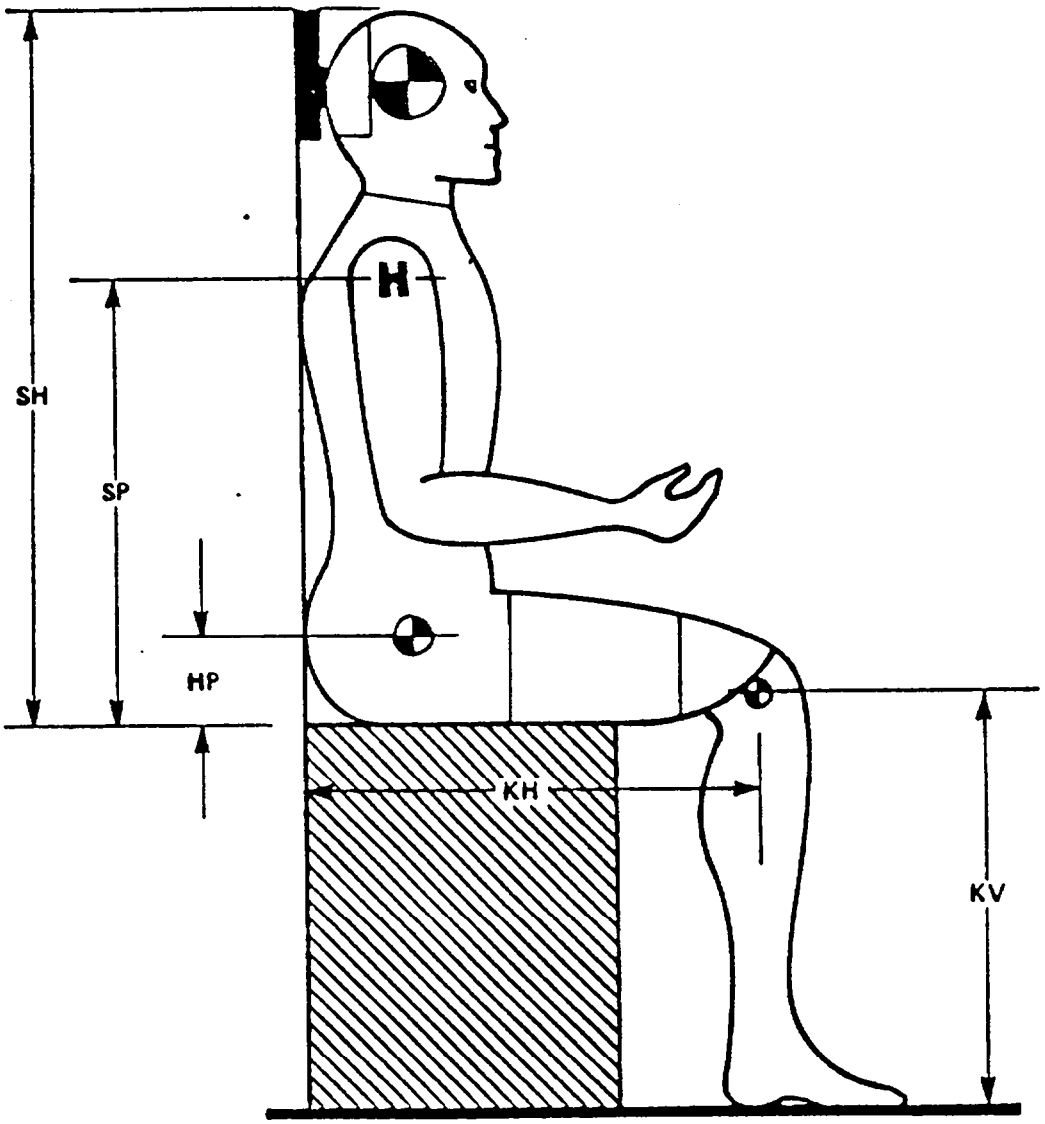
Serial No.	Completion Data
357	01-24-90
358	01-25-90

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 No. 6525-V-1.

Figure 10

DUMMY CONFIGURATION DIMENSIONS



PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 357

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXX	1-24-90	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXX	3	
SH - Seated Height	35.6 to 35.8"	35.6 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	21.9 "	"
HP - Hip Pivot Height	3.9" ref.	3.9 "	"
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.4 "	"
KV - Knee Pivot from floor	19.3 to 19.9"	19.5 "	"
SW - Shoulder Width	17.8 to 18.4"	18.0 "	"
HW - Hip Width	14.0 to 15.4"	14.3 "	"

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		1-24-90	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		3	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		69 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		29-33 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	211 G's	G's
b. peak lateral accel.	<= 10 G's	2.2 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.25 ms	ms

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

TECHNICIAN'S NAME: IVAN MINKEWICZ

7776-9

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 357

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	24.0 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	23.7 G's	
c. Peak Resultant Head Acceleration		26 G's max.	22.78 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.23 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	25.92 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	9.18 ms	
g. Max. Head Rotation		63 to 73 deg.	71.73 deg	
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	0.0 ms	
	Displ.	-.5 to .5"	0.0 "	
30 deg.	Time	25.6 to 34.4 ms.	27.16 ms	
	Displ.	2.1 to 3.1"	2.51 "	
60 deg.	Time	40.3 to 51.7 ms.	42.78 ms	
	Displ.	4.3 to 5.3"	4.96 "	
Maximum	Time	53.2 to 66.8 ms.	56.67 ms	
	Displ.	5.0 to 6.0"	5.72 "	
60 deg.	Time	67.0 to 83.0 ms.	73.41 ms	
	Displ.	4.3 to 5.3"	4.82 "	
30 deg.	Time	85.4 to 104.6 ms.	90.65 ms	
	Displ.	2.1 to 3.1"	2.11 "	
0 deg.	Time	101.0 - 123.0 ms.	104.29 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIANS NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 357

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	24 lbs	
b. Force @ 0.75"	36 to 50 lbs.	37 lbs	
c. Force @ 1.0"	50 to 63 lbs.	56 lbs	
d. Force @ 1.3"	73 to 88 lbs.	83.5 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	25.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	38 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	52 lbs	
d. Return Angle	12 deg. maximum	10 deg	
5. CHEST IMPACT TESTS:			
A.High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.8 fps	
(2) Peak Deflection	1.7" maximum	1.55 "	
(3) Peak Resistive Force	2250 lbs maximum	2009 lbs	
(4) Internal Hysteresis	50 to 70%	57 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	13.9 fps	
(2) Peak Deflection	1.1" maximum	.92 "	
(3) Peak Resistive Force	1450 lbs maximum	1208 lbs	
(4) Internal Hysteresis	50 to 70%	50.5 %	

TECHNICIAN'S NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 357

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2337 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.75 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2146 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.75 ms	

REMARKS:

TECHNICIAN'S NAME: IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER _____357_____

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CK54	1-90	7-90
HY LATERAL--	ENDEVCO	GD98	1-90	7-90
HZ VERTICAL--	ENDEVCO	CD75	1-90	7-90
2. CHEST ACCELEROMETER-				
CX LONGITUDINAL--	CEC	A115	1-90	7-90
CY LATERAL--	ENDEVCO	CS09	1-90	7-90
CZ VERTICAL--	CEC	A29	1-90	7-90
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	548	1-90	7-90
RIGHT SIDE	GSE	549	1-90	7-90
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A160	1-90	7-90
2. TEST PROBE ACCELEROMETER--	CEC	A161	1-90	7-90
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	2-90	8-90
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	2-90	8-90
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	2-90	8-90

NHTSA DUMMY I.D. NUMBER.: 358

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXX	1-25-90	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXX	3	
SH - Seated Height	35.6 to 35.8"	35.6 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	22.1 "	"
HP - Hip Pivot Height	3.9" ref.	3.9 "	"
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.5 "	"
KV - Knee Pivot from floor	19.3 to 19.9"	19.6 "	"
SW - Shoulder Width	17.8 to 18.4"	18.0 "	"
HW - Hip Width	14.0 to 15.4"	14.8 "	"

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		1-25-90	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		3	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		69 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		30-33 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	228.9 G's	G's
b. peak lateral accel.	<= 10 G's	6.1 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.25 ms	ms

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

TECHNICIAN'S NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 358

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	24.2 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	23.5 G's	
c. Peak Resultant Head Acceleration		26 G's max.	23.67 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.36 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	27.65 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	6.82 ms	
g. Max. Head Rotation		63 to 73 deg.	70.84 deg	
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	.87 ms	
	Displ.	-.5 to .5"	0.0 "	
30 deg.	Time	25.6 to 34.4 ms.	27.28 ms	
	Displ.	2.1 to 3.1"	2.35 "	
60 deg.	Time	40.3 to 51.7 ms.	42.66 ms	
	Displ.	4.3 to 5.3"	4.92 "	
Maximum	Time	53.2 to 66.8 ms.	56.67 ms	
	Displ.	5.0 to 6.0"	5.68 "	
60 deg.	Time	67.0 to 83.0 ms.	73.91 ms	
	Displ.	4.3 to 5.3"	4.72 "	
30 deg.	Time	85.4 to 104.6 ms.	90.53 ms	
	Displ.	2.1 to 3.1"	2.1 "	
0 deg.	Time	101.0 - 123.0 ms.	104.91 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIANS NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 358

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	26 lbs	
b. Force @ 0.75"	36 to 50 lbs.	41.5 lbs	
c. Force @ 1.0"	50 to 63 lbs.	58.5 lbs	
d. Force @ 1.3"	73 to 88 lbs.	87 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	26 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	38 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	50.5 lbs	
d. Return Angle	12 deg. maximum	10.5 deg	
5. CHEST IMPACT TESTS:			
A.High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.8 fps	
(2) Peak Deflection	1.7" maximum	1.53 "	
(3) Peak Resistive Force	2250 lbs maximum	2031 lbs	
(4) Internal Hysteresis	50 to 70%	56.4 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.0 fps	
(2) Peak Deflection	1.1" maximum	1.01 "	
(3) Peak Resistive Force	1450 lbs maximum	1267 lbs	
(4) Internal Hysteresis	50 to 70%	58.8 %	

TECHNICIAN'S NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 358

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2145 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.75 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	1875 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	2.0 ms	

REMARKS:

TECHNICIAN'S NAME: IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER _____358_____

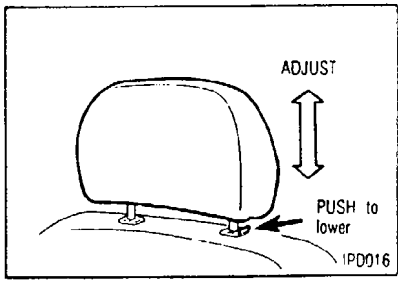
DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	EL86	10-89	4-90
HY LATERAL--	ENDEVCO	FR42	10-89	4-90
HZ VERTICAL--	ENDEVCO	GD35	10-89	4-90
2. CHEST ACCELEROMETER-				
CX LONGITUDINAL--	CEC	A150	1-90	7-90
CY LATERAL--	ENDEVCO	EL79	1-90	7-90
CZ VERTICAL--	CEC	A151	1-90	7-90
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	551	1-90	7-90
RIGHT SIDE	GSE	552	1-90	7-90
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A160	1-90	7-90
2. TEST PROBE ACCELEROMETER--	CEC	A161	1-90	7-90
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	2-90	8-90
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	2-90	8-90
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	2-90	8-90

Appendix D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

HEAD RESTRAINTS

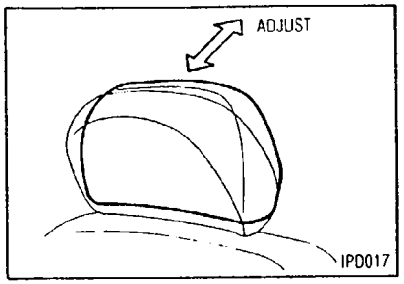
Adjust the top of the head restraints level with the top of your ears.



To raise the head restraint, just pull it up. To lower, push the lock knob and push the head restraint down.

WARNING:

Head restraints should be adjusted properly as they may provide significant protection against whiplash injury. Do not remove them.



To adjust the head restraint, push it forward or rearward as shown (if so equipped).

SEAT BELTS

PRECAUTIONS ON SEAT BELT USAGE

Your chances of being injured in an accident and/or the severity of injury may be greatly reduced if you are wearing your seat belt and it is properly adjusted. INFINITI strongly encourages you and all of your passengers to buckle up every time you drive.

Some states, provinces or territories require that seat belts be worn at all times when a vehicle is being driven.

WARNING:

- ***The belt should be adjusted to a snug fit. Slack in the lap-shoulder belt will reduce the effectiveness of the entire restraint system.***
- ***Never wear the belt inside out or twisted.***

- ***Do not allow more than one person to use the same belt.***
- ***All seat belt assemblies including retractors and attaching hardware should be inspected after any collision by your INFINITI dealer. INFINITI recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Seat belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted.***

Be sure to observe the following cautions when using seat belts. Failure to do so could increase the chance and/or severity of injury in an accident.

- ***Always route the shoulder belt over your shoulder and across your chest. Never position the belt under your arm.***
- ***Position the lap belt as low as possible AROUND THE HIPS, NOT THE WAIST.***

Infant or small child

INFINITI recommends that infants or small children be seated in a child restraint system. You should choose a child restraint system which fits your vehicle and always follow the manufacturer's instructions for installation and use.

INFINITI offers a genuine infant-child safety seat which meets all requirements of Federal Motor Vehicle Safety Standards (FMVSS 213). See your INFINITI dealer.

Children

Children who are too large for child restraint systems should be seated and restrained by the seat belts which are provided.

INFINITI recommends that children sit in the rear seat if available. According to accident statistics, children are safer when properly restrained in the rear seat than in the front seat.

If the child's seating position has a shoulder belt which is very close to the face or neck, move the child to a position without a shoulder belt if possible or move the child toward the center of the vehicle, away from the shoulder belt. Once a child has grown enough so the shoulder belt is no longer on or close to the neck or face, choose a position for the child with a shoulder belt whenever possible.

Never let a child stand or kneel on any seat and

do not allow a child in the cargo areas while the vehicle is moving.

Pregnant women

INFINITI recommends that pregnant women use seat belts. Contact your doctor for specific recommendations. The lap belt should be worn snug and positioned as low as possible around the hips, not the waist.

Injured persons

INFINITI recommends that injured persons use seat belts, depending on the injury. Check with your doctor for specific recommendations.

3-POINT TYPE WITH RETRACTOR

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

Fastening the belts

1. Adjust the seat.

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

2 Slowly pull the seat belt out of the retractor and insert the tongue into the buckle until it snaps

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

3 Position the lap belt portion **low on the hips** as shown

4 Pull the shoulder belt portion toward the retractor to take up extra slack

Unfastening the belts

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

Checking seat belt operation(3-point type with retractor)

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

1) When the belt is pulled quickly from the retractor

2) When the vehicle slows down rapidly.

To increase your confidence in the belts, check the operation as follows:

- Grasp the shoulder belt and pull quickly forward. The retractor should lock and restrict further belt movement.

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

Convenience clip

The convenience clip is provided to keep the

belt tongue in an accessible position when not being used.

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

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

2-POINT TYPE WITHOUT RETRACTOR

Fastening the belts

1. Insert the tongue into the buckle until it snaps

2. To lengthen, hold the tongue at a right angle to the belt and pull on the belt. To shorten, pull the free end of the belt away from the tongue, then pull the belt clip to take up the slack.

D-6

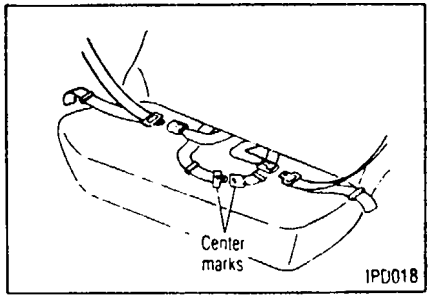
7776-9

3 Position the lap belt **low on the hips** as illustrated.

Unfastening the belts

To unfasten the belt, press the button on the buckle.

Fasten the seat belts when not in use to prevent them from being caught in the door.



Selecting correct set of belts

The center seat belt buckle and tongue are identified by the "CENTER" label. The center seat belt tongue can be fastened **only** into the center seat belt buckle.

SEAT BELT EXTENDERS

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

WARNING:

- ***Only INFINITI belt extenders, made by the same company which made the original equipment belts, should be used with the INFINITI belts already in the vehicle.***
- ***Persons who can use the standard seat belt should not use an extender. Such unnecessary use could***