DOT1149

REPORT NO. CAL-88-N09

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

NISSAN MOTOR CO. LTD

1988 NISSAN VAN XE

NHTSA NO. MJ5202

CALSPAN TEST NO. 7626-9

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

FEBRUARY 16, 1988

FINAL REPORT

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
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Prepared: Michael J. Kilgallon

Michael J. Kilgallon, Project Engineer

Approved: Walter E. Levan

Walter E. Levan, Program Manager
Transportation Research/
Physical Sciences Department

FINAL REPORT ACCEPTED BY:

R. Smalen

Manager, New Car Assessment Program (NCAP)

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15. Supplementary Notes

16. Abstract

A frontal load cell barrier of a 1988 Nissan Van XE was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York, on February 16, 1988.

Impact speed was 34.9 mph and the ambient temperature at the barrier face at the time of impact was 25°F. The maximum vehicle crush was 19.2 inches. The test vehicle was equipped with a manual 3-point continuous belt system at each of the front outboard seating positions.

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Section 1
PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 88 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-87-D-02012. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph 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 MJ5202

A load cell barrier consisting of 36 load cells was impacted by a 1988 Nissan Van XE at a velocity of 34.9 mph. The test was performed at the Calspan Corporation Advanced Technology Center on February 16, 1988. 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. The camera which films the driver and interior view did not operate properly. Film of this view is unavailable. 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.

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 shoulder belts to measure dummy torso section loading. Seat belt load cells were not used on the driver's or passenger's lap belts because the belt stalk was too short. The Driver ATD (Serial No. 1021) had been used in two previous tests (MJ0105, MJ5200). The Passenger ATD (Serial No. 1022) was used in one previous test (MJ5201). The Injury Criteria Values were not exceeded in these tests. 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 only data anomalies that occurred during impact were load cells A9, B1, C1 and C2. These load cells should not have experienced any forces due to their location. Load cells A9, B1, C1 and C2 were not used in the calculation of load cell sums or the total load cell barrier sum.

The driver's head struck the steering wheel hub and the HIC was 949. The maximum chest deceleration over 3 milliseconds was 54 g's and femur loads were 1708 and 1326 pounds.

The right front passenger's HIC was 597. The maximum chest deceleration over 3 milliseconds was 36 g's and femur loads were 1331 and 661 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1988 Nissan Van XE 4 Door

NHTSA NO.: MJ5202 VIN.: JN8SC26S9J4024123

BODY COLOR: Silver DATE OF MANUFACTURE: 9/87

Engine: 4 cylinders; 145.8 C.I.D.; 2.4 Liters; - CC
X Gas; - Diesel; - Turbocharged
X Longitudinal; - Transverse

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

Date Received: 12/14/87 Odometer Reading: 16
X A/C; X P/S; X P/B; - P/wdo.; X Tilt Wheel
- P/seats; - Cruise Control

Type of Occupant Restraint: 3-point continuous belt system

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

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

Recommended Tire Size: P195/75R14 P205/70R14

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

Tires on Vehicle: P195/75R14; Manufacturer: Yokohama

Number of Occupants: 2 Front; 2 Rear; 3 3rd Seat; 7 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) = - lbs. (A)

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

Rated Cargo and Luggage Weight (RCLW) A-B = 300 lbs.

GVWR 4800 lbs. GAWR: Front 2545 lbs. Rear 2470 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 = 1050 lbs. Right Rear = 690 lbs.

Left Front = 1110 lbs. Left Rear = 710 lbs.

TOTAL FRONT WEIGHT = 2160 lbs. (61 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1400 lbs. (39 % of Total Vehicle Weight)

TOTAL DELIVERY WEIGHT = 3560 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (3560 lbs.)

VCW = Vehicle Capacity Weight (- lbs.)

DSC = Designated Seating Capacity (-)

RCLW = VCW - 150 (DSC) = 300 lbs.

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

Target Test Weight = 4188 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 152 POUNDS CARGO:

Right Front = 1250 lbs. Right Rear = 880 lbs.

Left Front = 1270 lbs. Left Rear = 790 lbs.

TOTAL FRONT WEIGHT = 2520 lbs. (60 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1670 lbs. (40 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 4190 lbs.

Weight of ballast secured in vehicle trunk area = 150 lbs.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 27.3 LF 27.1 RR 27.8 LR 27.4

Test Attitude: RF 27.2 LF 26.9 RR 27.0 LR 26.7

Wheel Base: 92.2 in.; C.G. = 36.8 in. rearward of front wheel C/L

Remarks: 14.4 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: 2/16/88 Time of Test: 12:25

Ambient Temperature: 25 °F at impact area

Temperature in Occupant Compartment: 72 °F.

Windshield Molding Temperature: 68 °F.

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: primary = 34.9 mph, secondary = 34.9 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	173.7	C_L	178.3	L	172.5
	Post-test	= R	158.2	C_L	159.1	L	158.3
	Crush	= R	15.5	C_L	19.2	L	14.2

Distance from front of test vehicle to point of impact:

R 21.0 C/L 21.1 L 20.8

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Steering Hub	Dash
Chest	None	None
Abdomen	None	None
Left Knee	Dash	Dash
Right Knee	Dash	Dash

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	Front	
	Left	Right
Door Opening	Not operable	Not 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)	-87	-23	69	109	-64	-8	-17	54
DUMMY (2)	-34	66	62	94	-37	17	21	36
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	1708	1326
DUMMY (2)	1331	661
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)	1502	-	***
DUMMY (2)	2381	***	-
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**			
		36 millisecond max.		AVE. ACC. (g)
	HIC	t_1 (SEC)	t_2 (SEC)	t_1 TO t_2
DUMMY (1)	949	.06405	.08010	81.0
DUMMY (2)	597	.06832	.10432	48.7
DUMMY (3)				
DUMMY (4)				

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

***UNABLE TO ATTACH LAP BELT LOAD CELL DUE TO SHORTNESS OF BELT STALK.

Figure 1

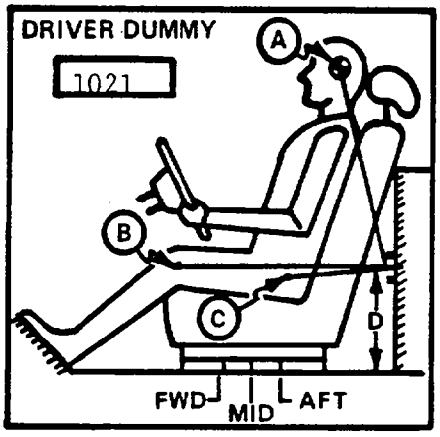
PART 572 DUMMY IN-VEHICLE POSITION

TEST NO.: MJ5202 VEHICLE: 1988 Nissan Van XE

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

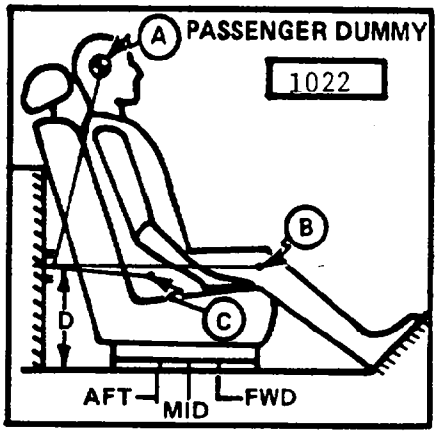
ADJUSTER TYPE:
- X Manual
- ____ Power

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

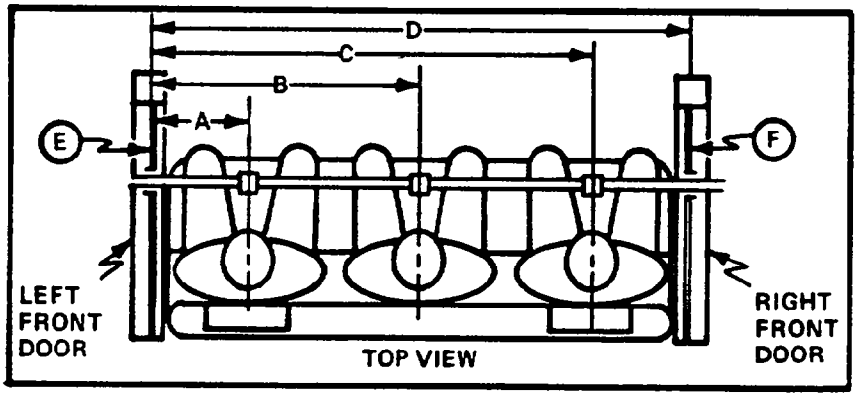


MEASUREMENT LOCATION

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



A =	24.8	in.	7	Degrees	A =	24.7	in.	-1	Degrees
B =	23.2	in.	96	Degrees	B =	20.4	in.	99	Degrees
C =	5.3	in.	106	Degrees	C =	4.6	in.	132	Degrees
D =	11.5	in.			D =	11.6	in.		



DUMMY ID

1021 1022

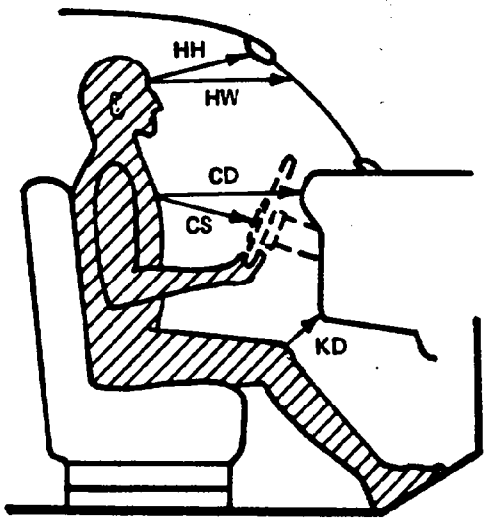
A	=	Left Door to Driver Centerline	10.3	in.
B	=	Left Door to Center Passenger Centerline	--	in.
C	=	Left Door to Right Passenger Centerline	43.5	in.
D	=	Left Door to Right Door	52.9	in.
E, F	=	Window Glass Height (Right and Left Must Be Equal)	14.0	in.

Note: Sill to Reference Point Was Measured From Door Closure Switch to Hinge Pin.

Figure 2

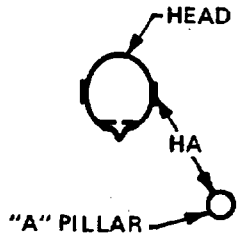
OCCUPANT CLEARANCE DIMENSIONS

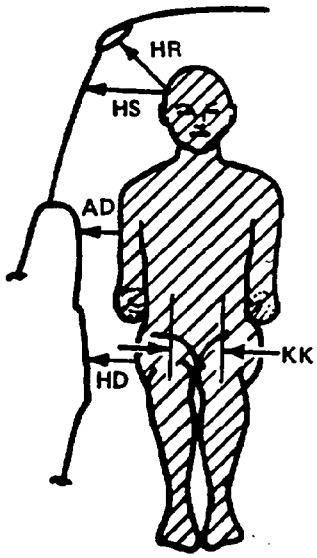
	DRIVER	PASSENGER
HH	16.6	19.1
HW	19.6	21.9
CD	24.3	28.3
CS	15.6	---
KDL	7.4	10.0
KDR	7.5	10.5
SA	22°	22°
TA	22°	22°



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

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





	DRIVER	PASSENGER
HR	4.3	4.8
HS	7.0	7.3
AD	2.3	3.2
HD	4.7	5.2
KK	10.5	8.4
HA	20.1	23.0

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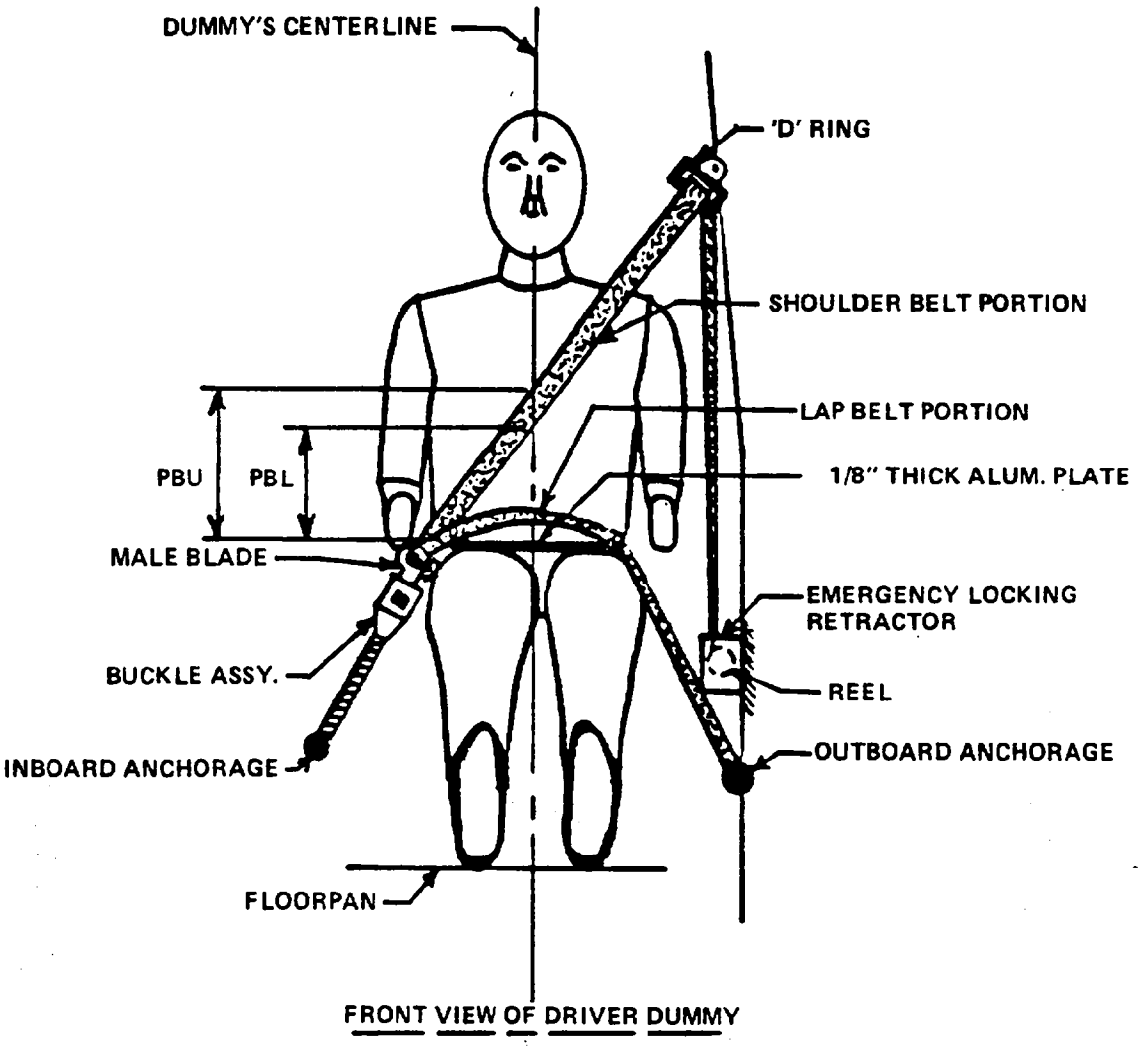
Figure 3

SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to upper edge	13.6	13.5
PBL -- Top surface of alum. plate to belt lower edge	10.5	10.3
LAP BELT TENSION	-	-
SHOULDER BELT TENSION	2.5	2.5

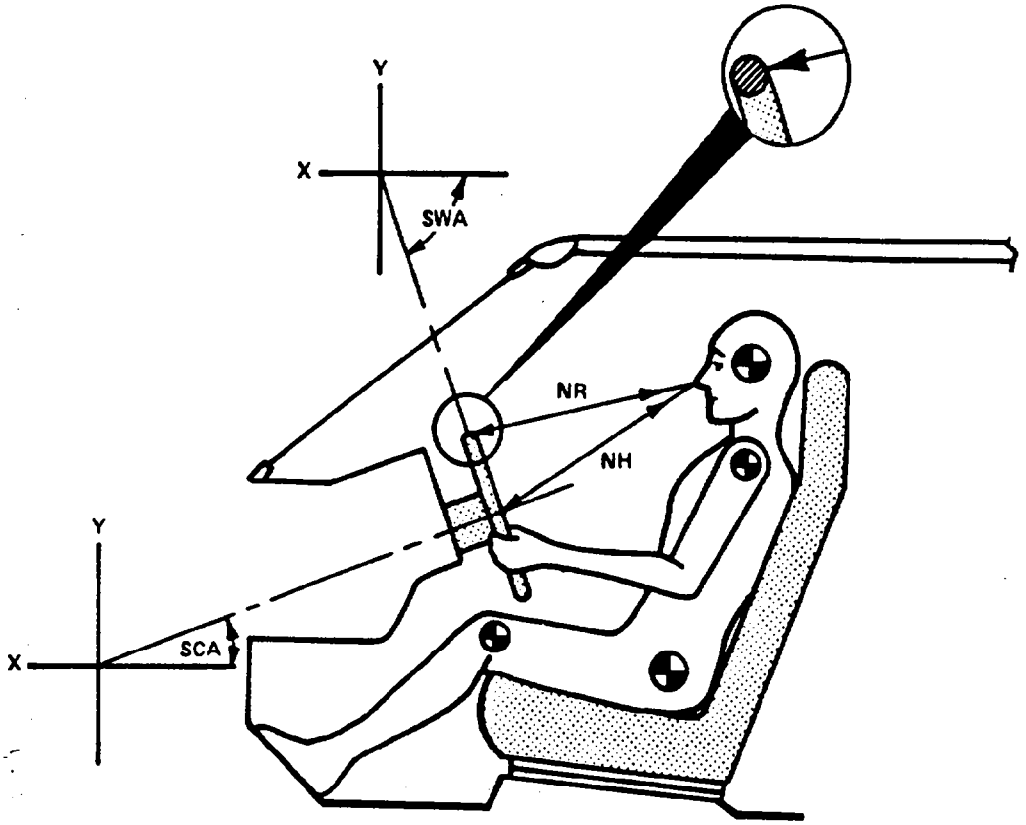
Table 3

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

	Driver	Passenger
BELT LENGTH DATA:		
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	77.5"	75.0"
Should belt length as measured on Part 572 Dummy.	33.0"	31.5"
Lap belt length as measured on Part 572 Dummy.	28.0"	27.0"
BELT SPOOL-OFF DATA:		
As determined by film analysis.	2.5"	2.0"
As determined mechanically.	1.5"	2.2"
As determined electronically.	1.7"	2.6"
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	1.1 in/ft	0.7 in/ft
Measured Mechanically	0.0"	0.1"

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	22.0	Inches
NH -- Distance from tip of dummy's nose to center of steering column hub	20.9	Inches
SCA -- Angle of steering column relative to the horizontal X axis	44	Degrees
SWA -- Angle of steering wheel relative to the horizontal X axis	-46	Degrees

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

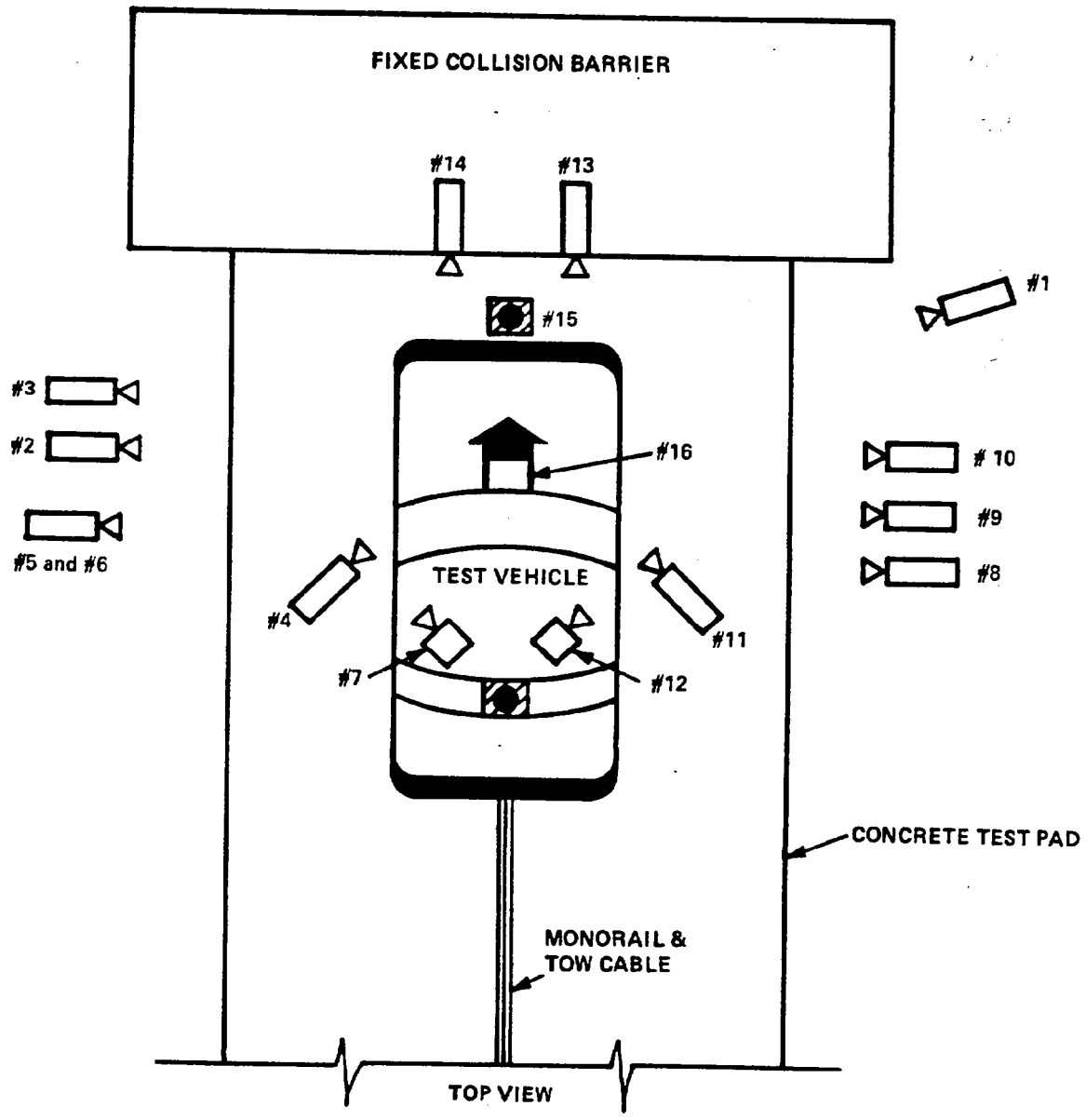


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Table 4
HIGH-SPEED CAMERA LOCATIONS

Test No. MJ5202 Vehicle 1988 Nissan Van XE

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	233	37	45	-2	-	13	540
3	Left Side View	297	18	42	-3	-	25	540
4	Driver and Interior View	81	68	75	-15	-	13	see note 1
5	Steering Column (Bottom)	379	61	49	-4	359.4	25	550
6	Steering Column (Top)	379	61	73	-8	359.4	25	560
7	Left Belt	-	-	-	-	-	8	960
8	Overall Right Side	213	74.5	42	-2	-	13	810
9	Right Side View	241	54	45	-2	221.4	25	850
10	Right Passenger View	264	30	55	-2	244.4	35	720
11	Passenger and Interior View	66	72	74	-16	-	13	600
12	Right Belt	-	-	-	-	-	8	775
13	Passenger Front View	20	0	56	-35	-	13	545
14	Driver Front View	20	0	56	-33	-	13	545
15	Windshield View	0	0	125	-45	-	13	535
16	Pit View of Engine	0	35	-120	90	-	13	900
17	Pit View of Fuel Tank							

Note 1: Film is not available.
* 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

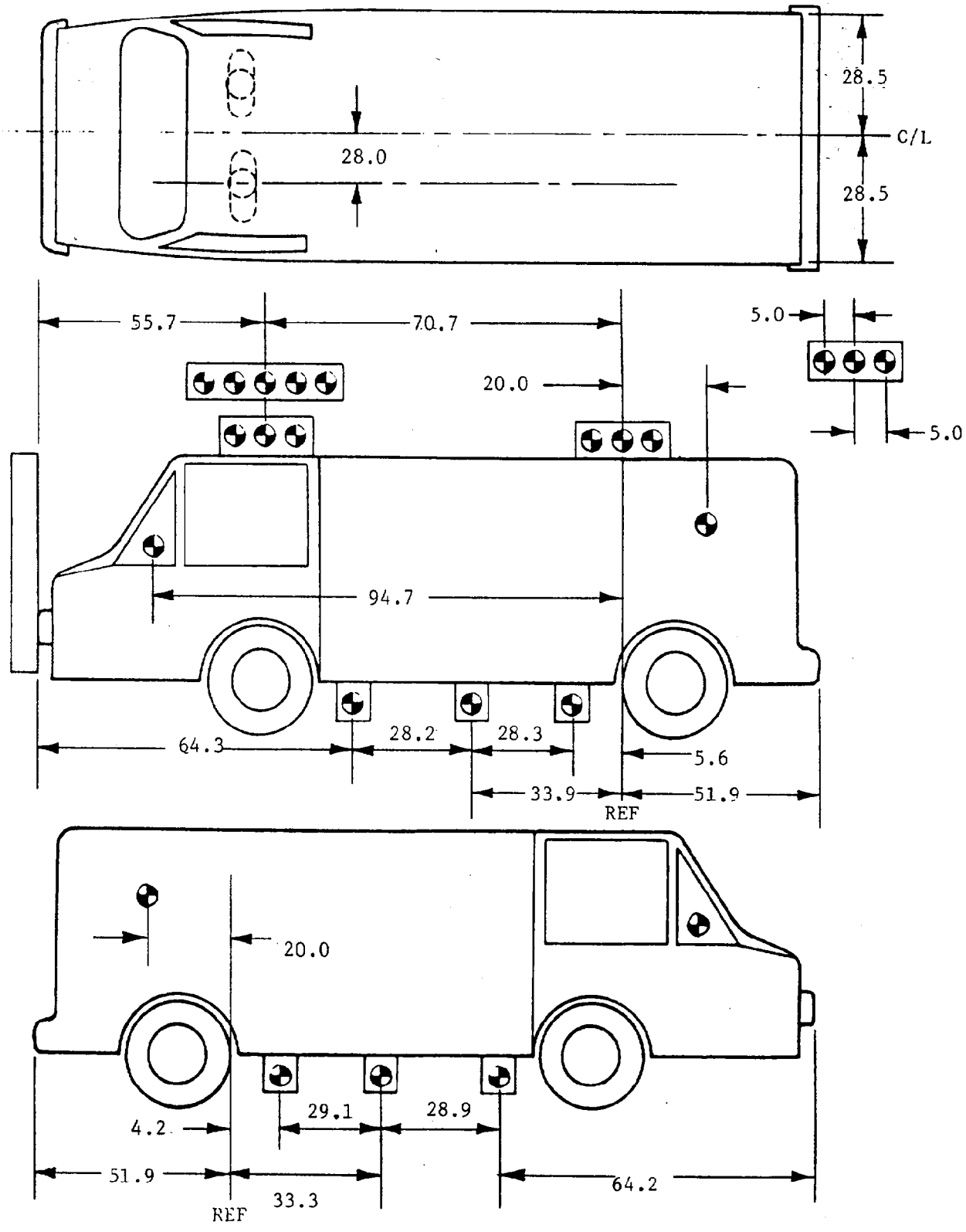

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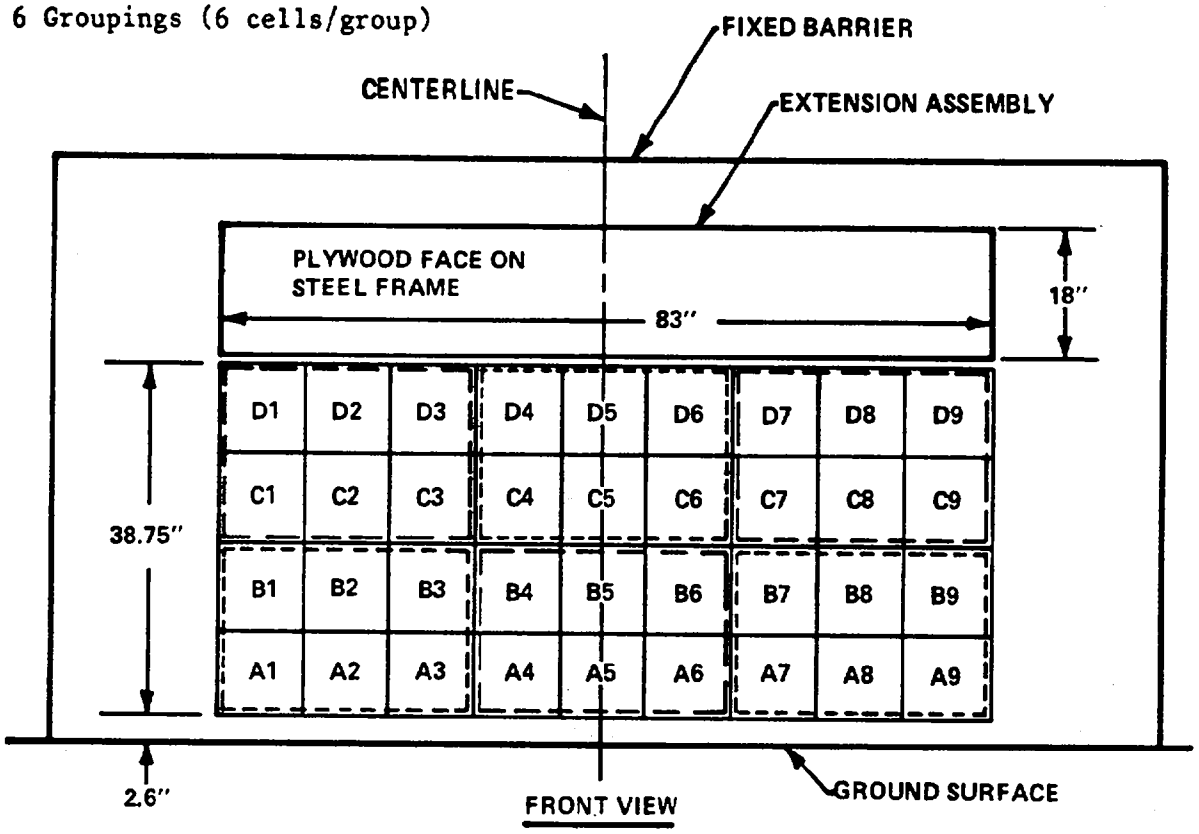
Figure 7

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

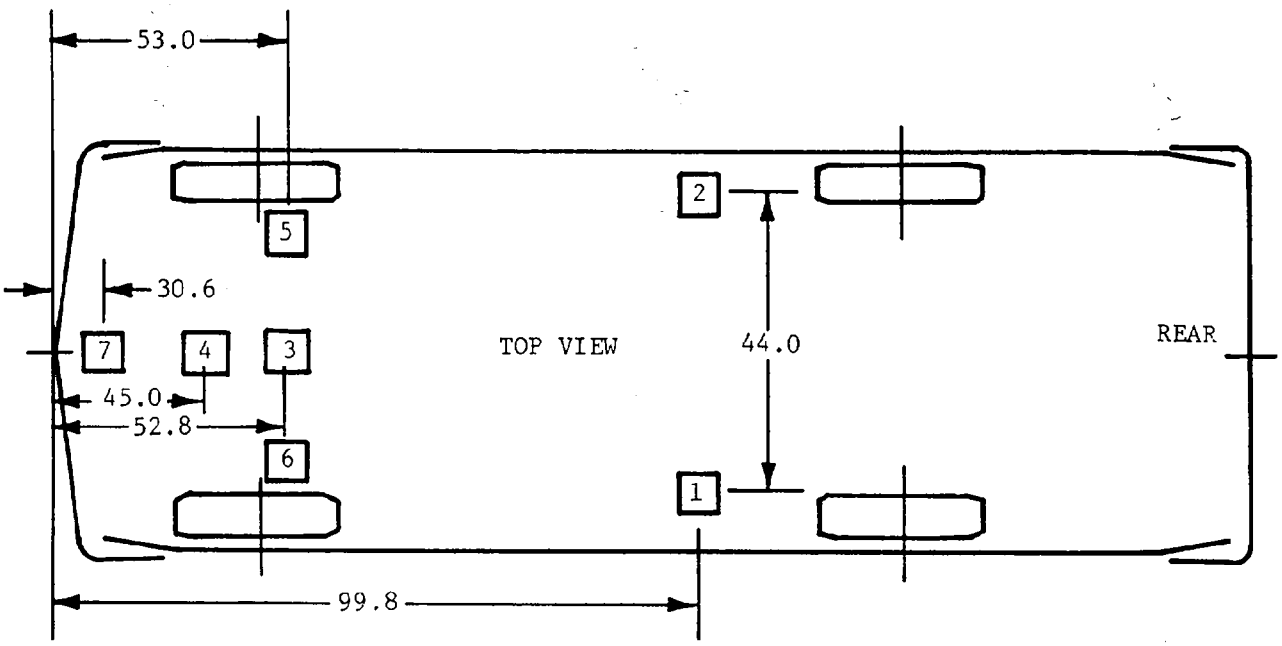
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

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



DIMENSIONS IN INCHES

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

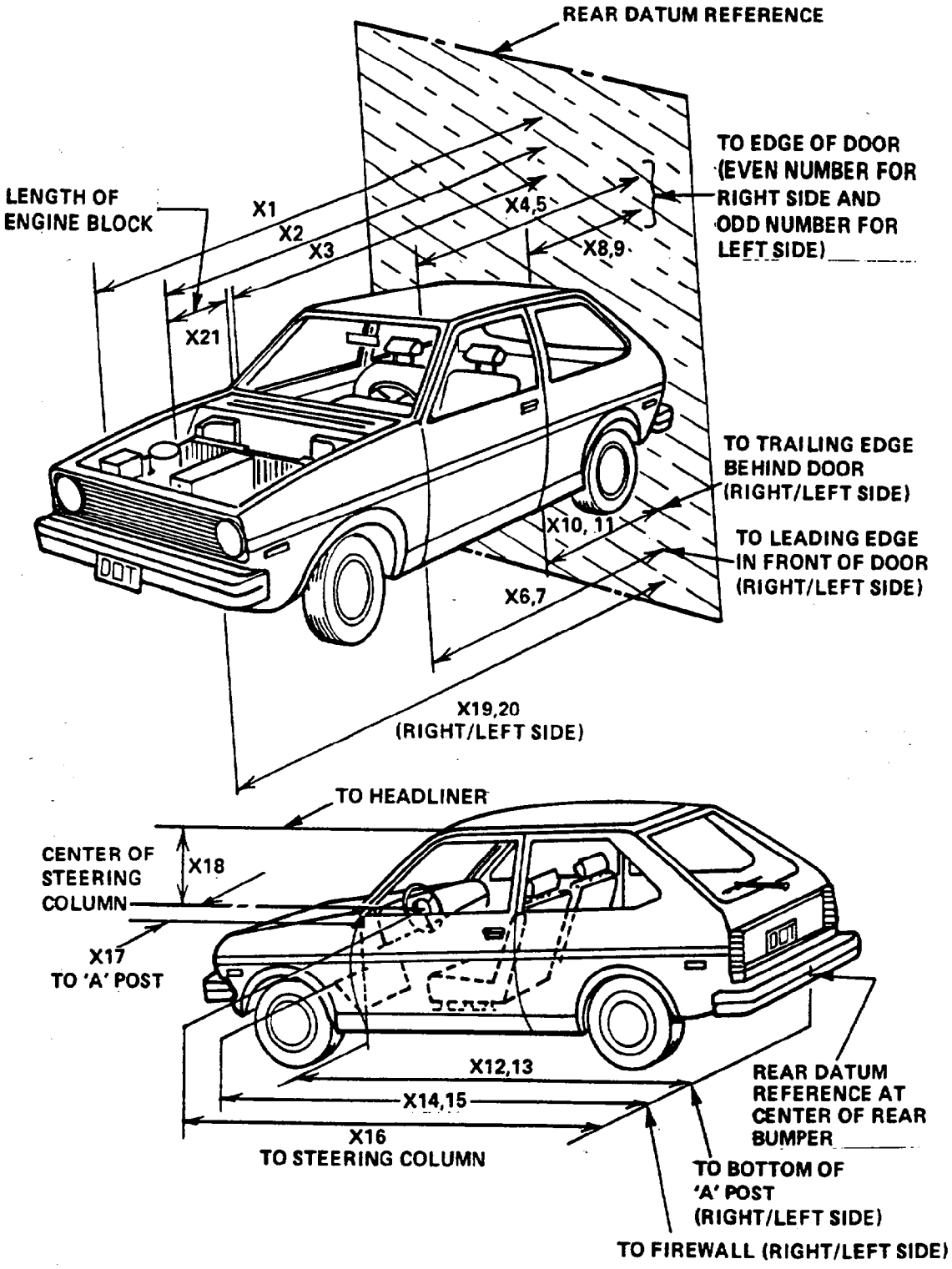


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	178.3	159.1	19.2
X2	Rear Surface of Vehicle to Front of Engine	125.1	126.2	-1.1
X3	Rear Surface of Vehicle to Firewall	103.9	103.9	0.0
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	158.8	154.0	4.8
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	158.5	154.7	3.8
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	158.6	153.5	5.1
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	158.1	154.0	4.1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	112.2	109.9	2.3
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	111.7	108.4	3.3
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	121.9	118.5	3.4
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	121.5	118.4	3.1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	158.7	153.5	5.2
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	158.0	154.0	4.0
X14	Rear Surface of Vehicle to Firewall, Right Side	162.2	152.2	10.0
X15	Rear Surface of Vehicle to Firewall, Left Side	160.9	150.9	10.0
X16	Rear Surface of Vehicle to Steering Column	138.6	136.4	2.2
X17	Center of Steering Column to "A" Post	14.0	10.9	3.1
X18	Center of Steering Column to Headliner	17.5	14.8	2.7
X19	Rear Surface of Vehicle to Right Side of Front Bumper	173.7	158.2	15.5
X20	Rear Surface of Vehicle to Left Side of Front Bumper	172.5	158.3	14.2
X21	Length of Engine Block	18.5	18.5	0.0

Appendix A

PHOTOGRAPHS

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Figure A-1 PRE-TEST FRONT VIEW

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Figure A-2 POST-TEST FRONT VIEW

Figure A-3 PRE-TEST LEFT SIDE VIEW

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Figure A-4 POST-TEST LEFT SIDE VIEW

Figure A-5 PRE-TEST RIGHT SIDE VIEW

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Figure A-6 POST-TEST RIGHT SIDE VIEW

A-8

7628-9

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

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

A-10

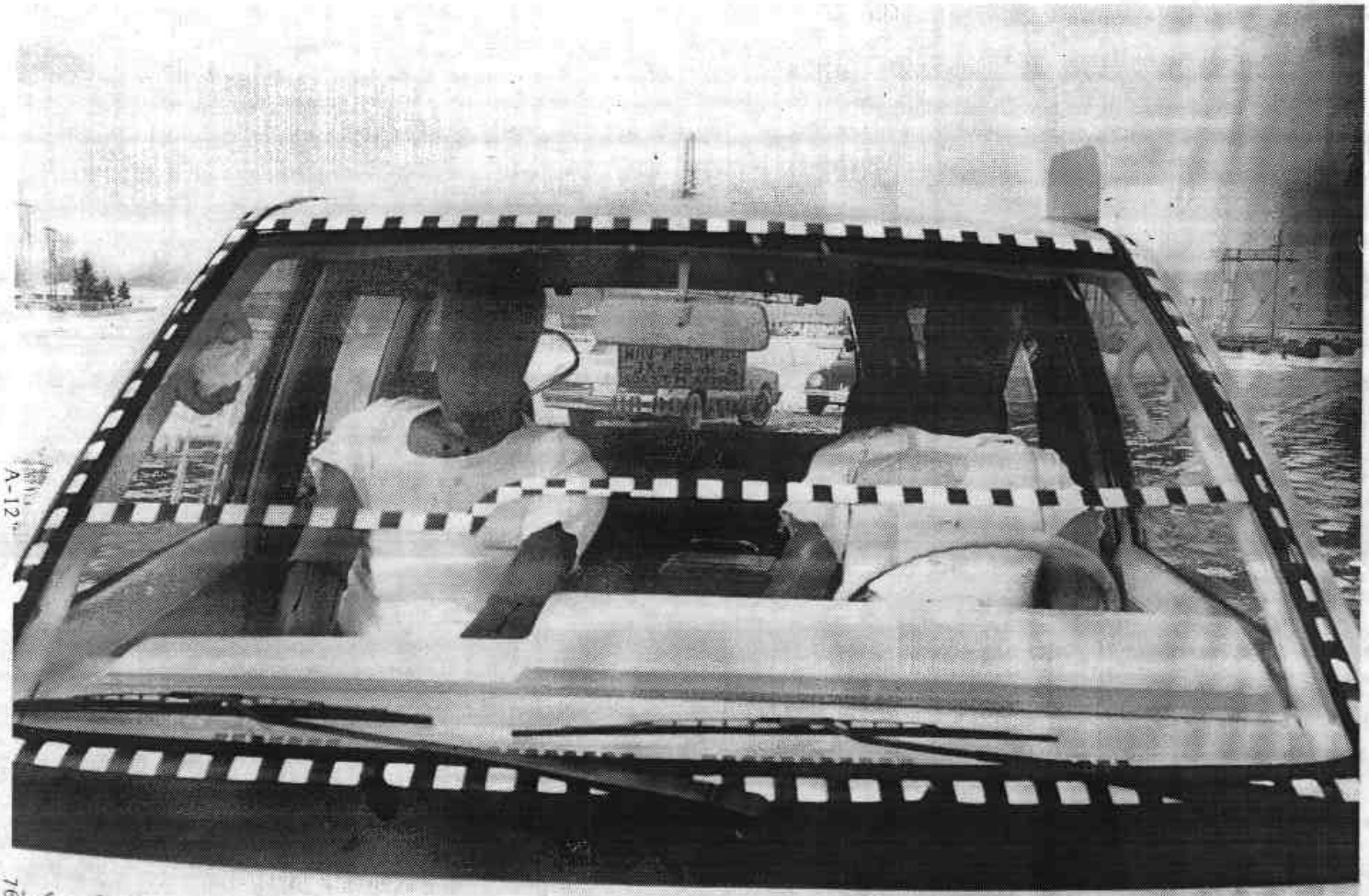
7626-9

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

A-11

7926-9

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



A-12

7626-9

6-88 -XE-
MJ5200

CALSPAN

Figure A-11 PRE-TEST WINDSHIELD VIEW

Figure A-12 POST-TEST WINDSHIELD VIEW

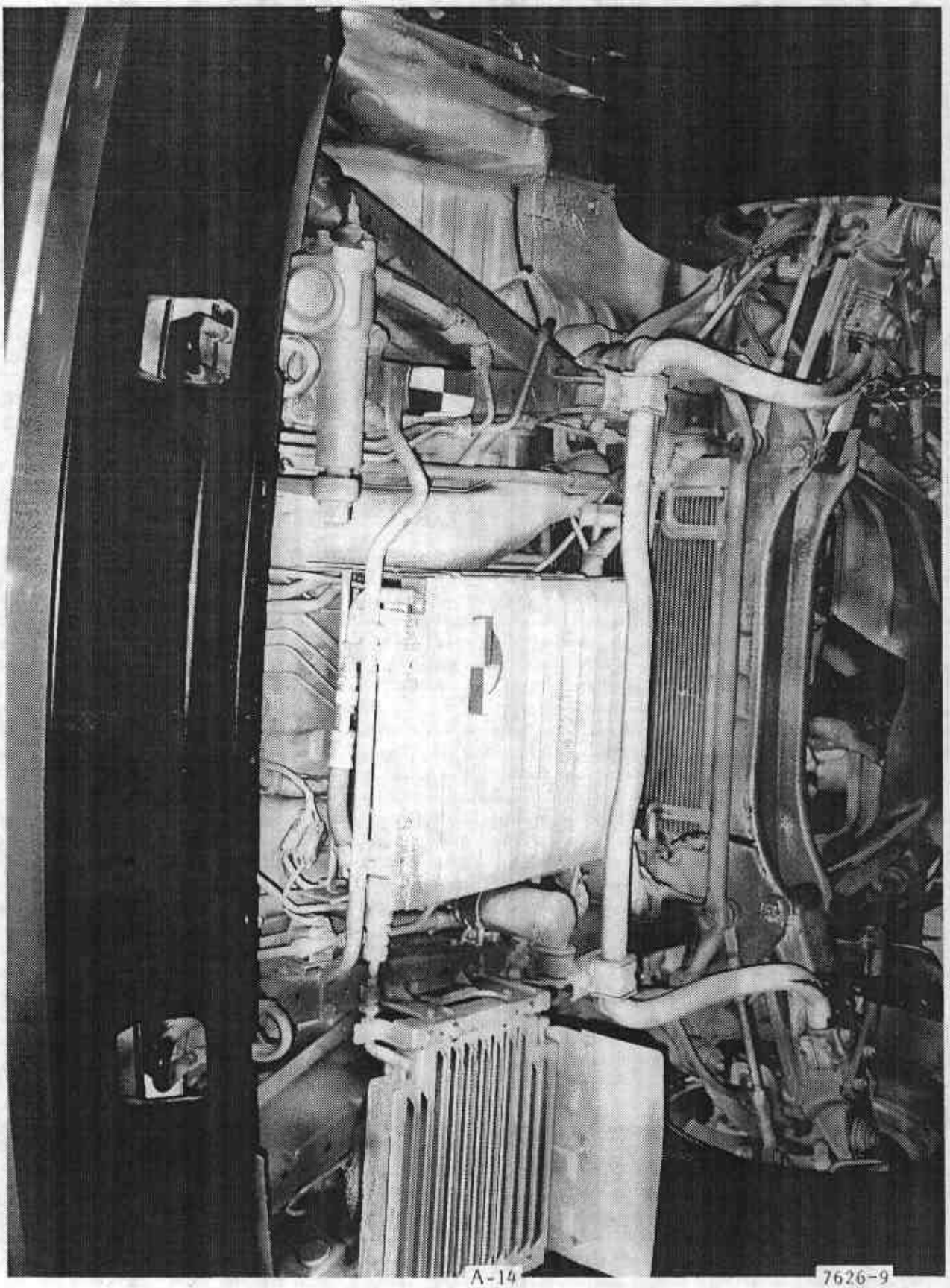
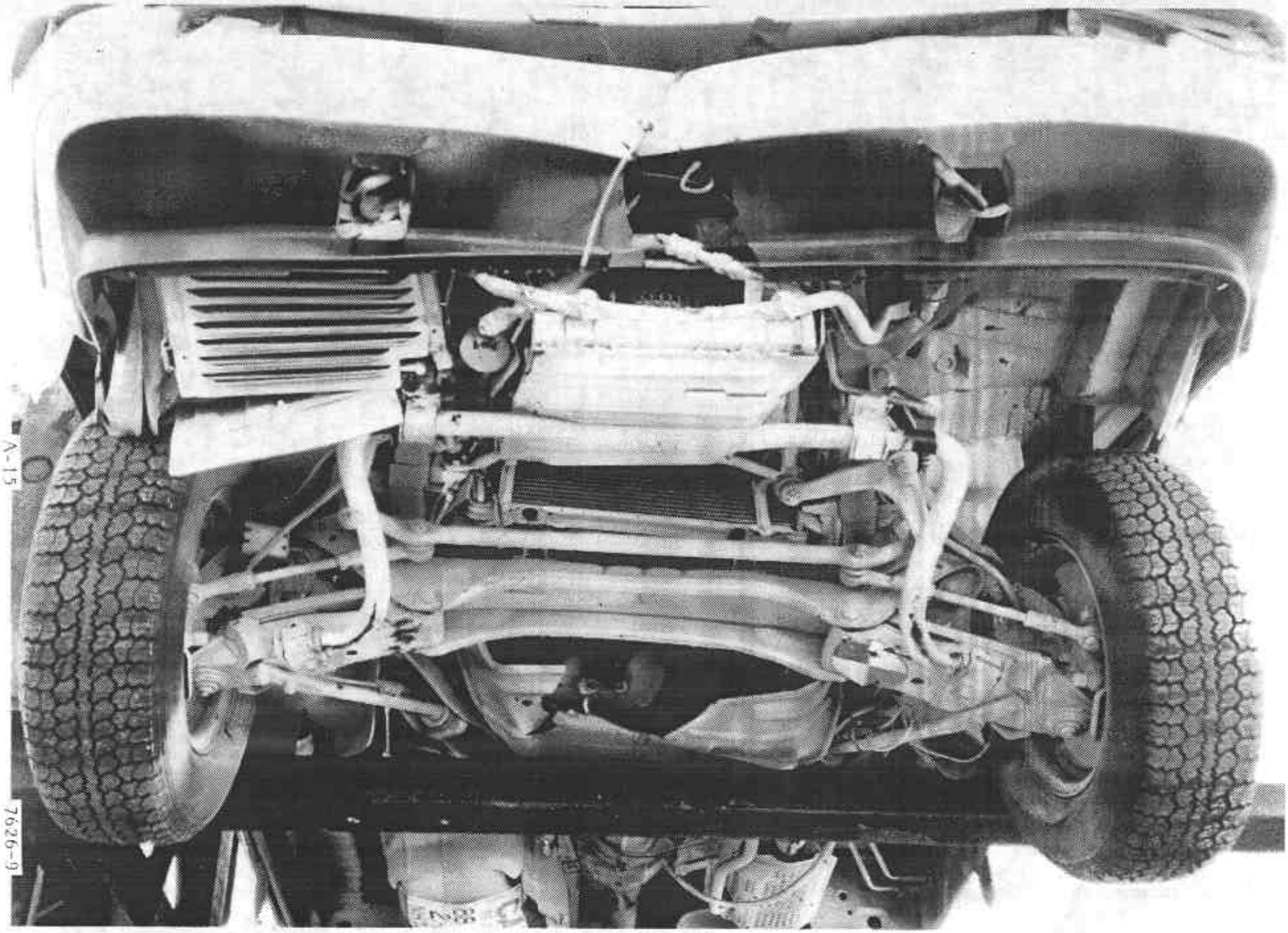


Figure A-13 PRE-TEST FRONT UNDERBODY VIEW

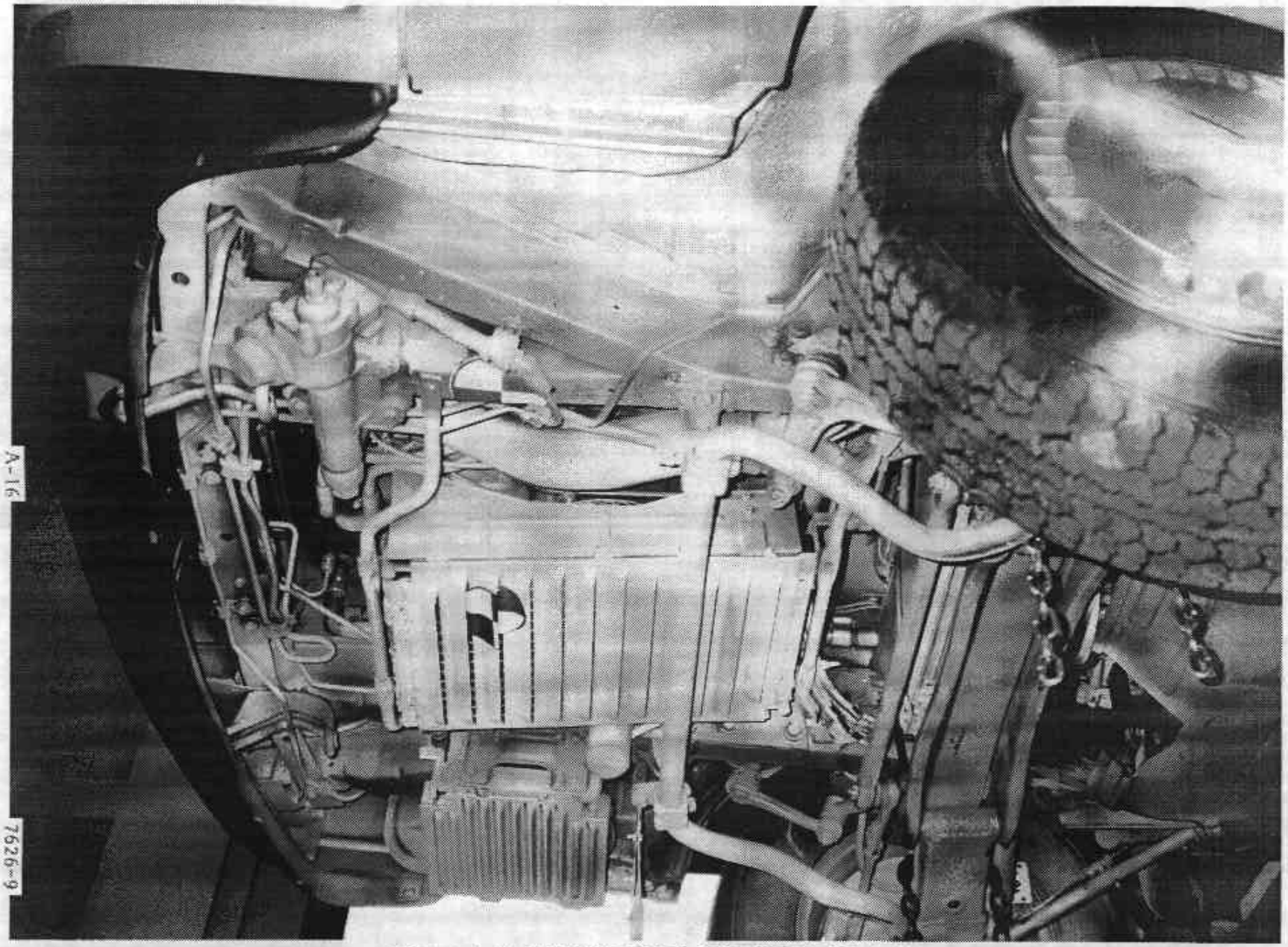
7626-9



A-15

7626-9

Figure A-14 POST-TEST FRONT UNDERBODY VIEW



A-16

7626-9

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

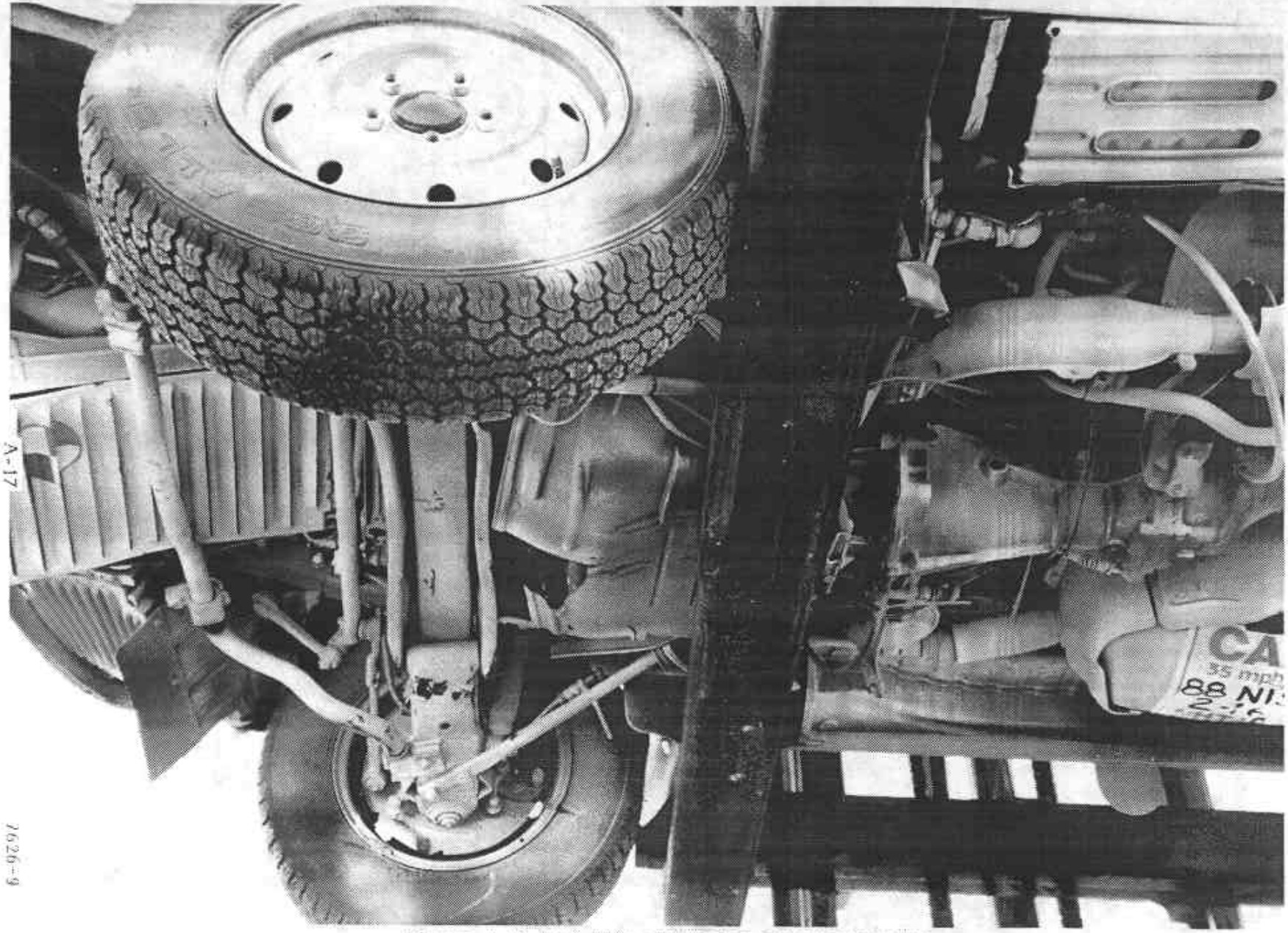
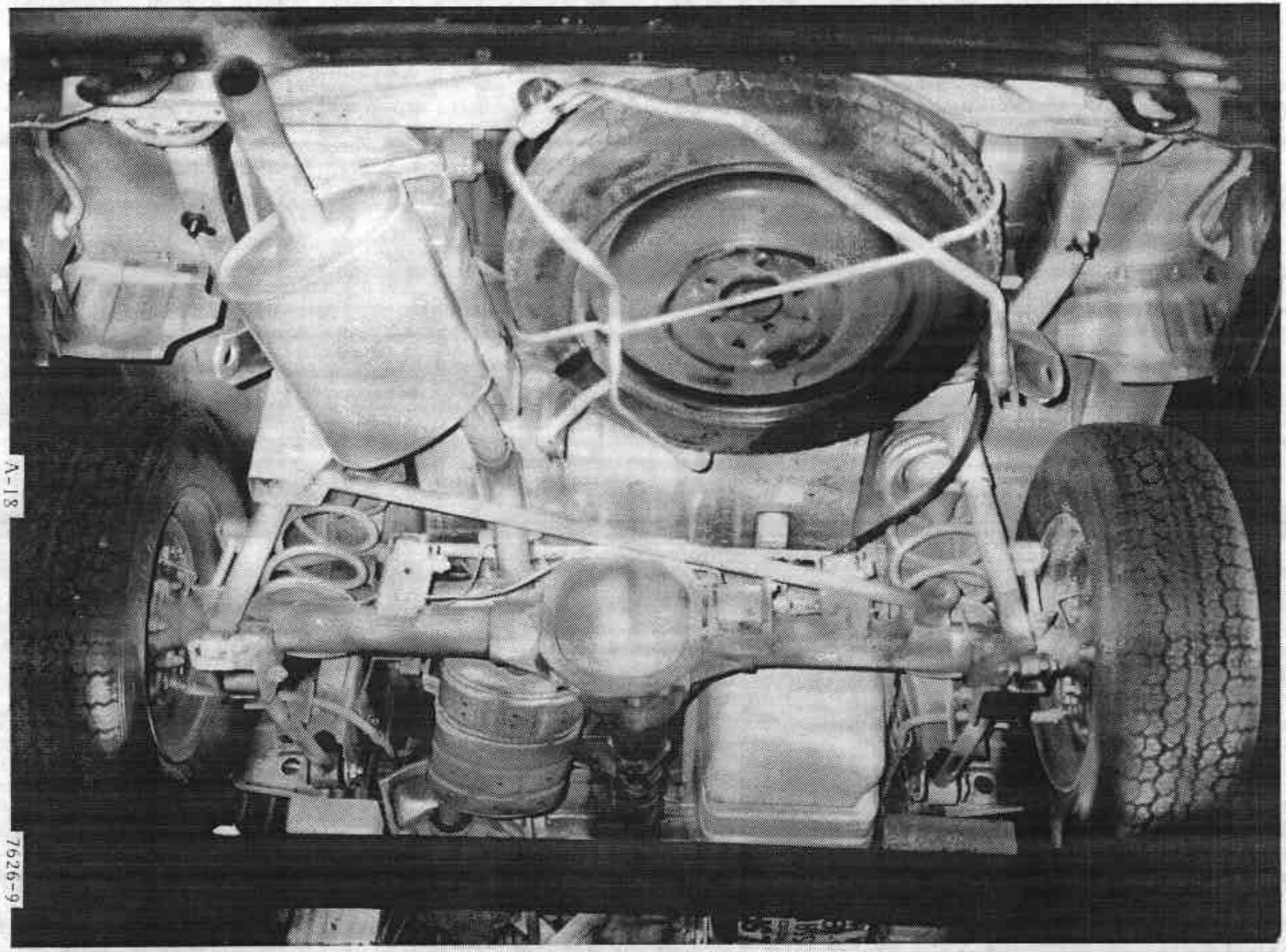


Figure A-16 POST-TEST FRONT-SIDE UNDERBODY VIEW



A-18

7626-9

Figure A-17 PRE-TEST REAR UNDERBODY VIEW

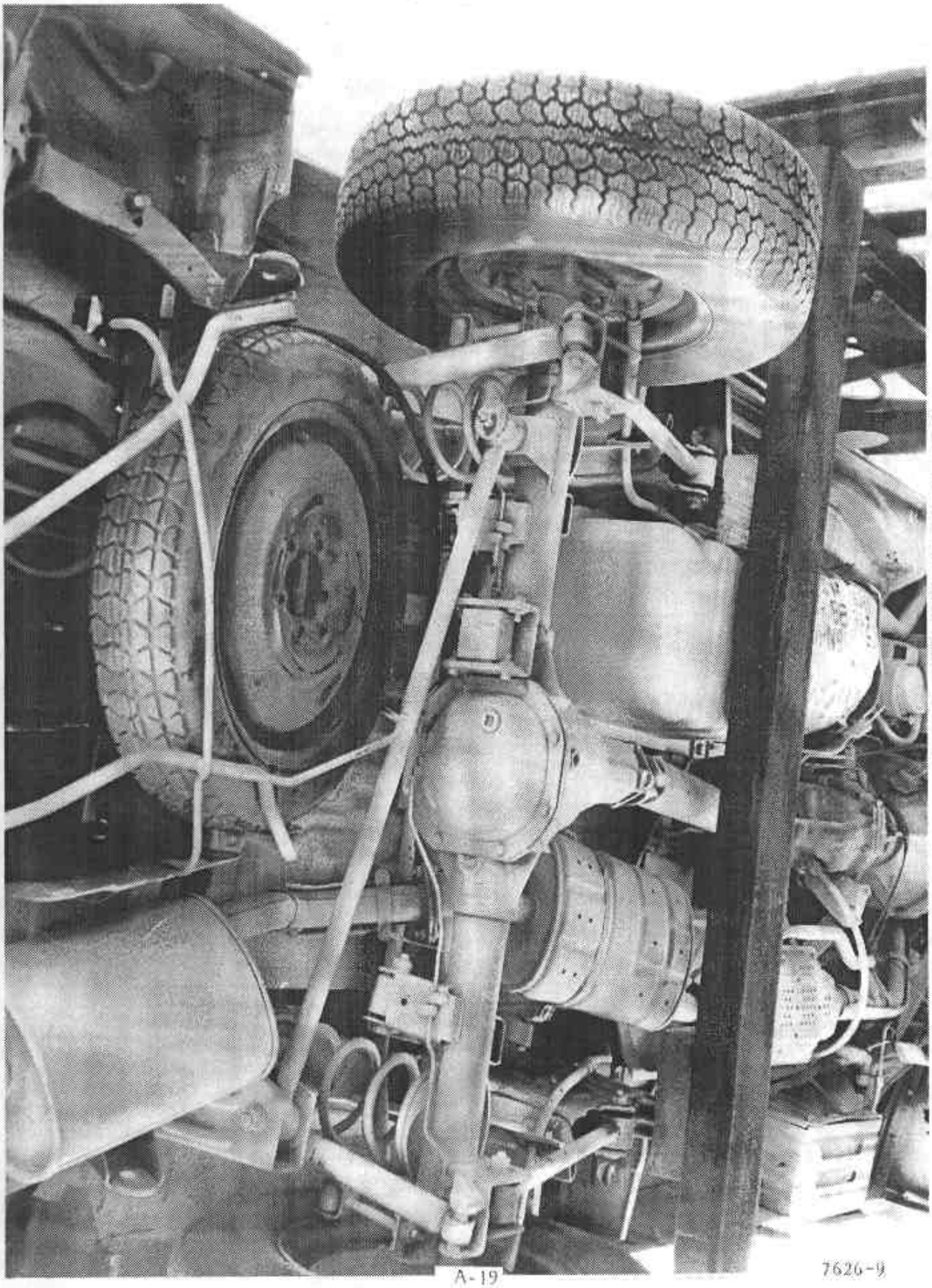


Figure A-18 POST-TEST REAR UNDERBODY VIEW

7626-9

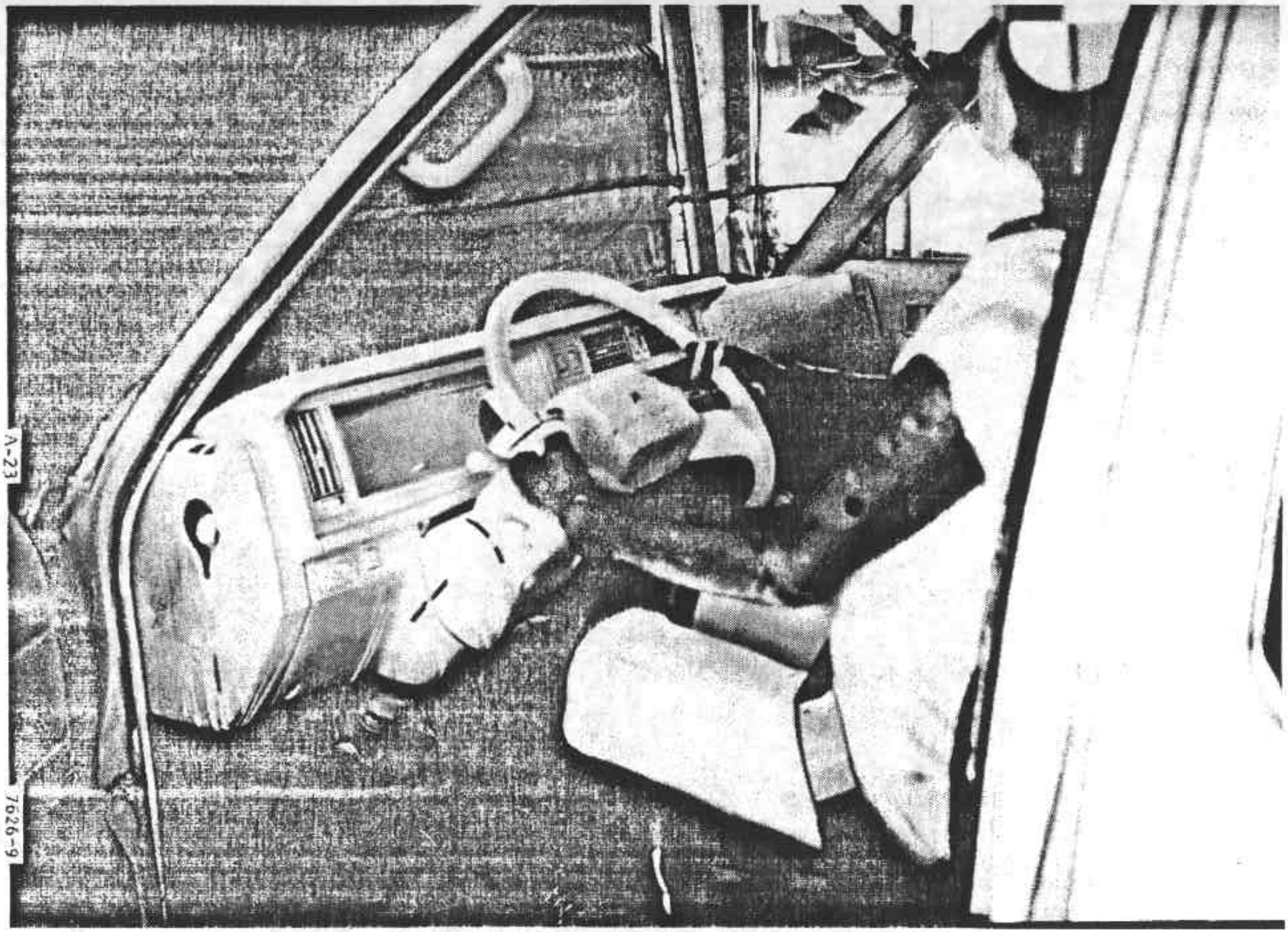
A-20

7636-9

Figure A-19 PRE-TEST DRIVER POSITION VIEW

Figure A-20 POST-TEST DRIVER POSITION VIEW

Figure A-21 POST-TEST PASSENGER POSITION VIEW



A-23

7626-9

Figure A-22 PRE-TEST DRIVER AND INTERIOR VIEW

R

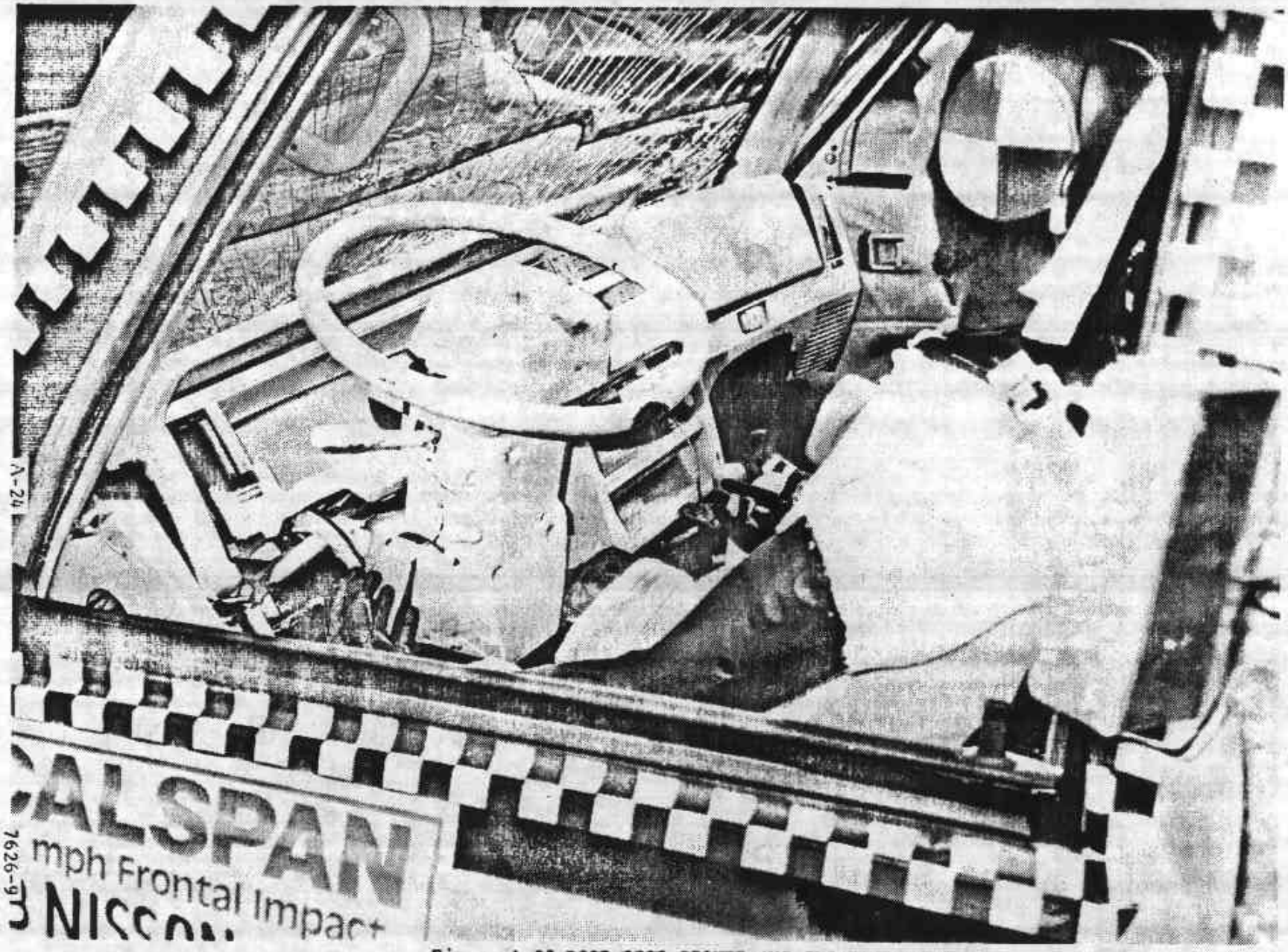


Figure A-23 POST-TEST DRIVER AND INTERIOR VIEW

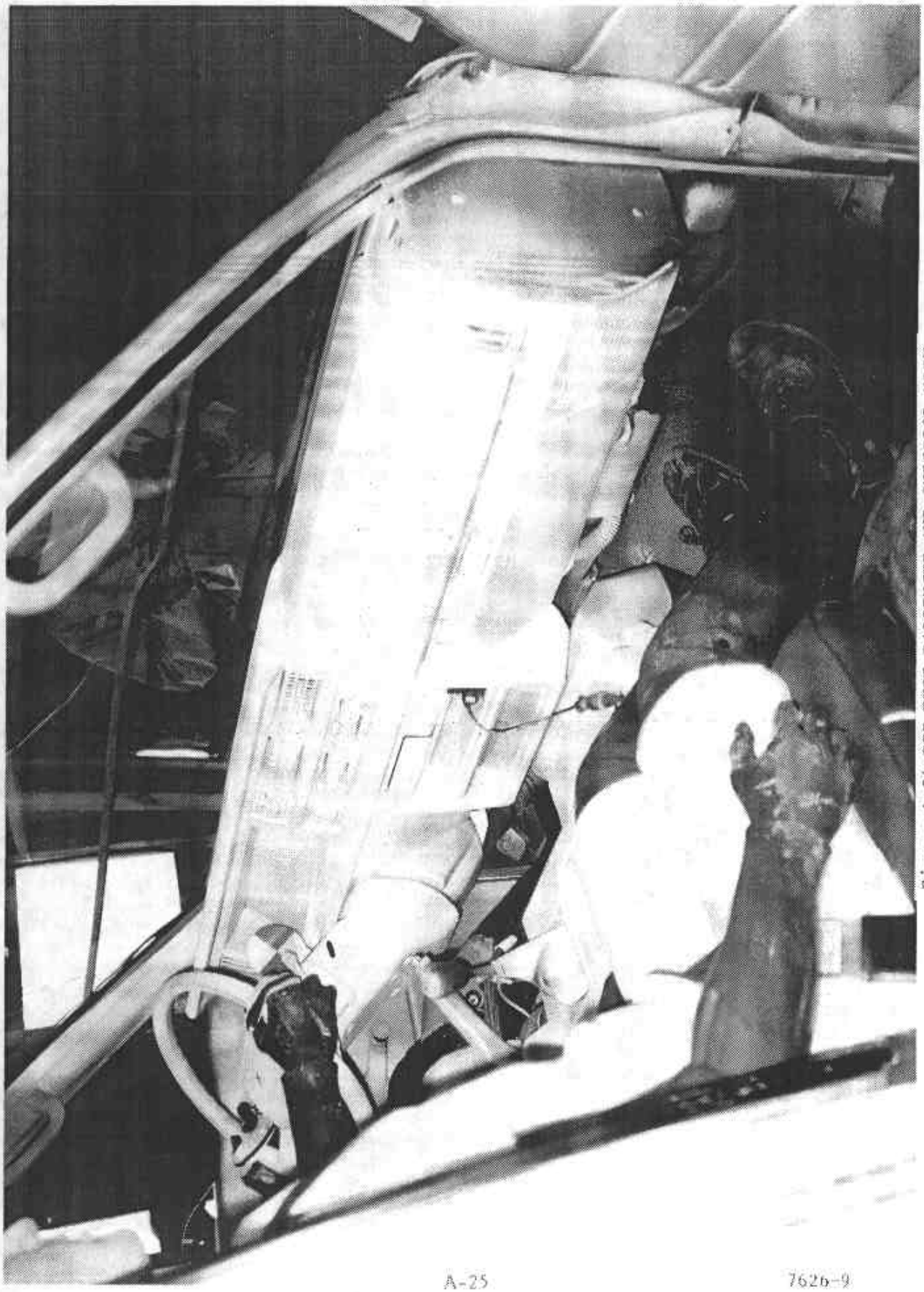


Figure A-24 PRE-TEST PASSENGER AND INTERIOR VIEW

Figure A-25 POST-TEST PASSENGER AND INTERIOR VIEW

Appendix B

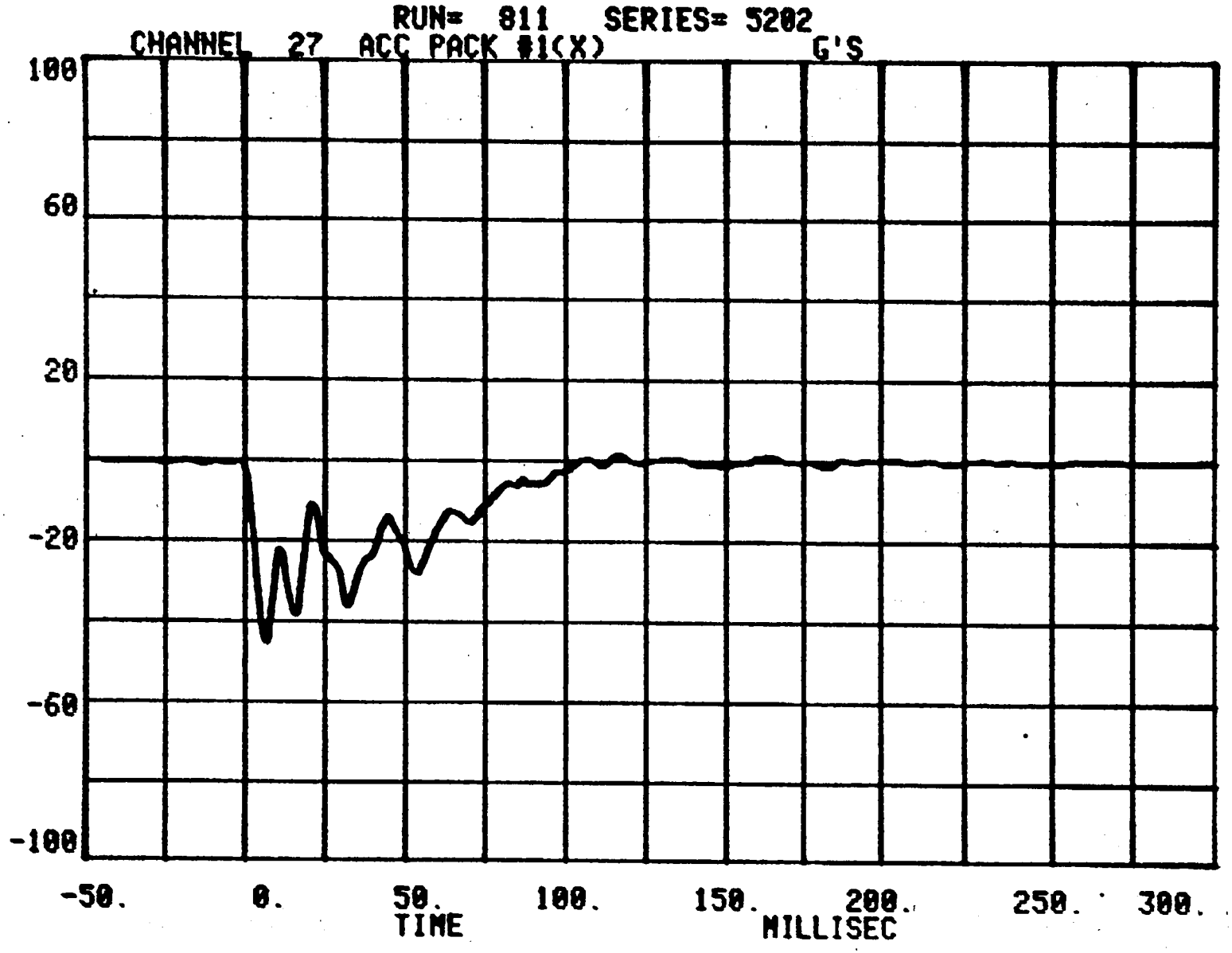
VEHICLE, DEFORMABLE MOVING BARRIER AND DUMMY RESPONSE DATA

TEST NO. MJ5202

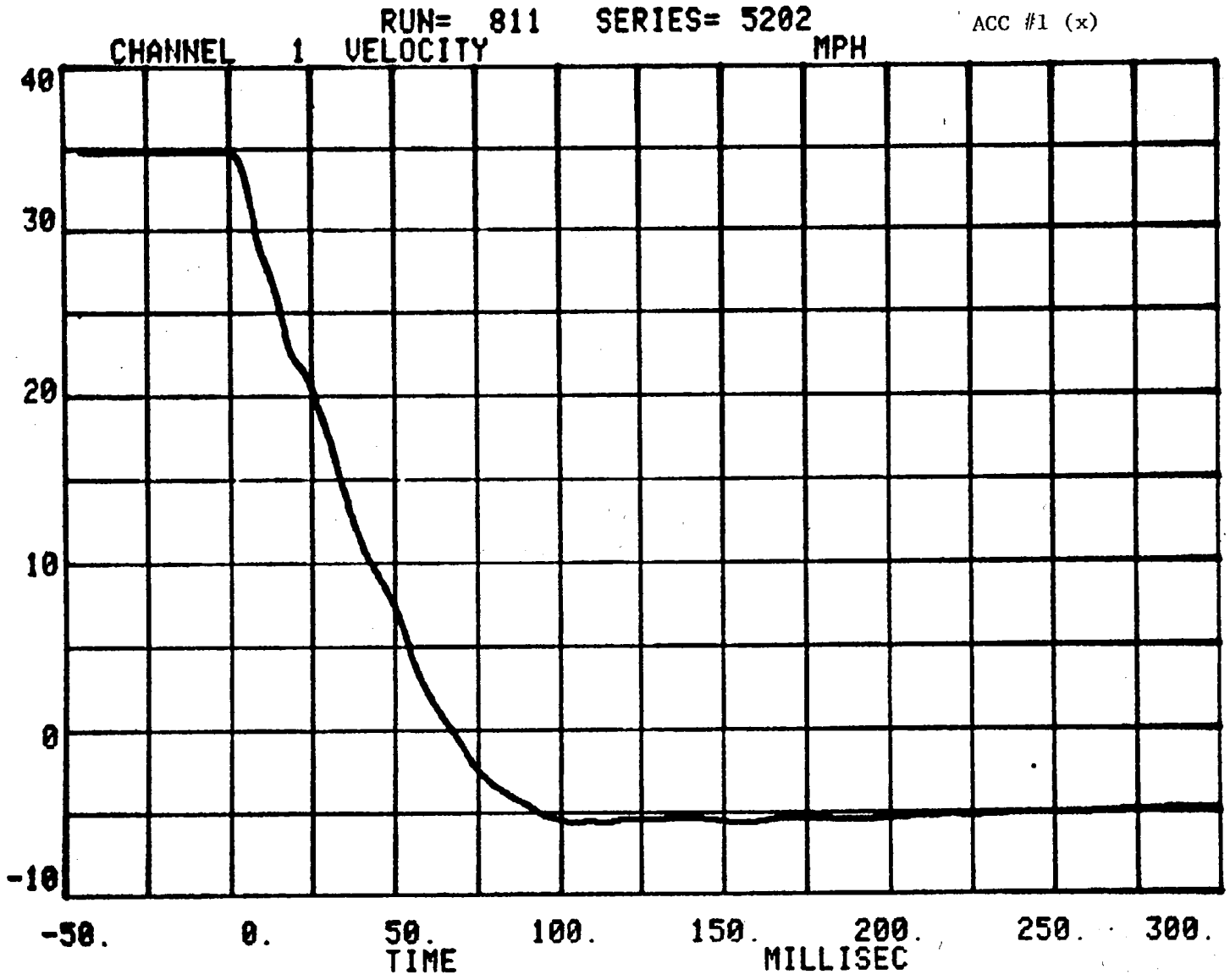
VEHICLE DATA

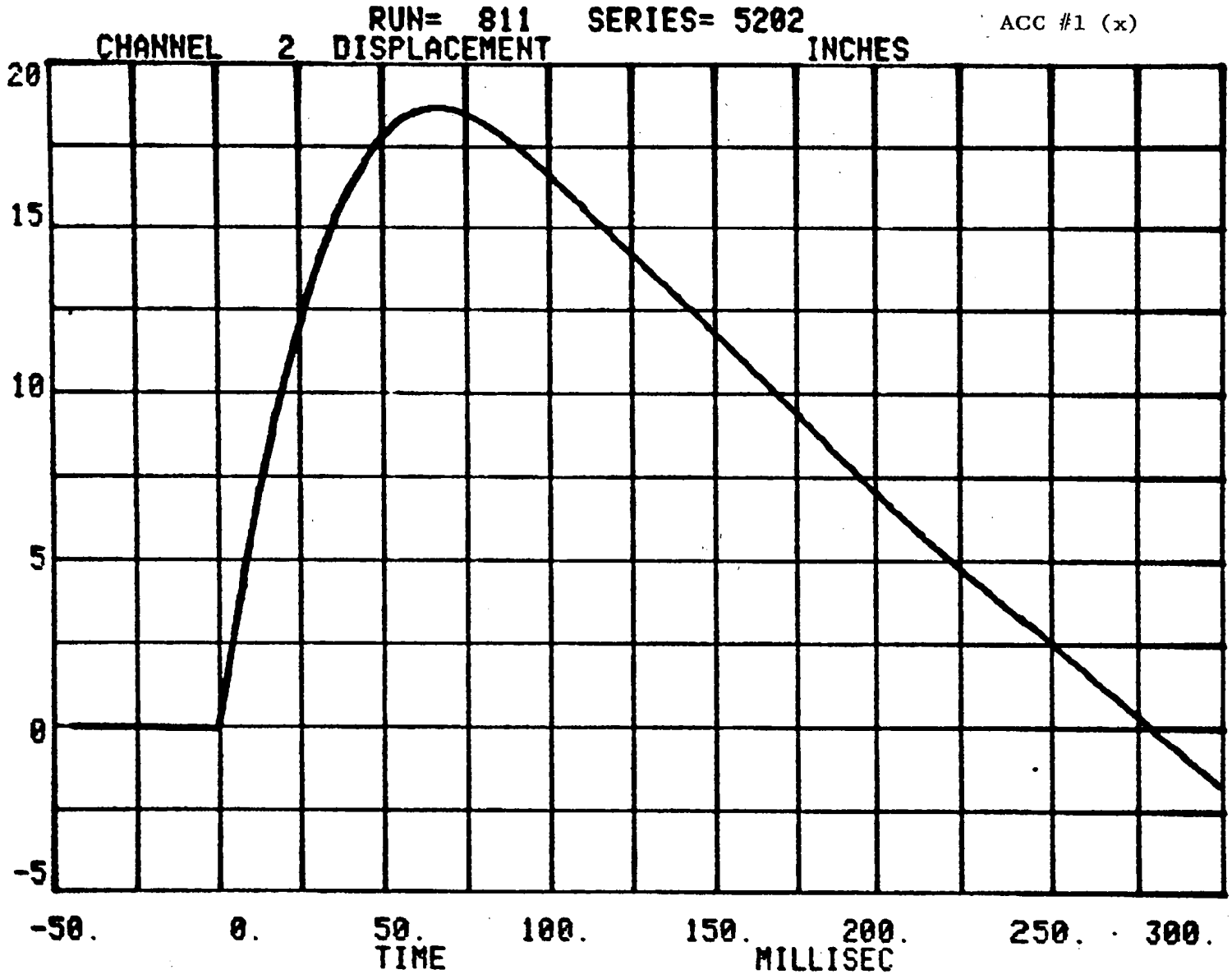
FILTER CHANNEL CLASS

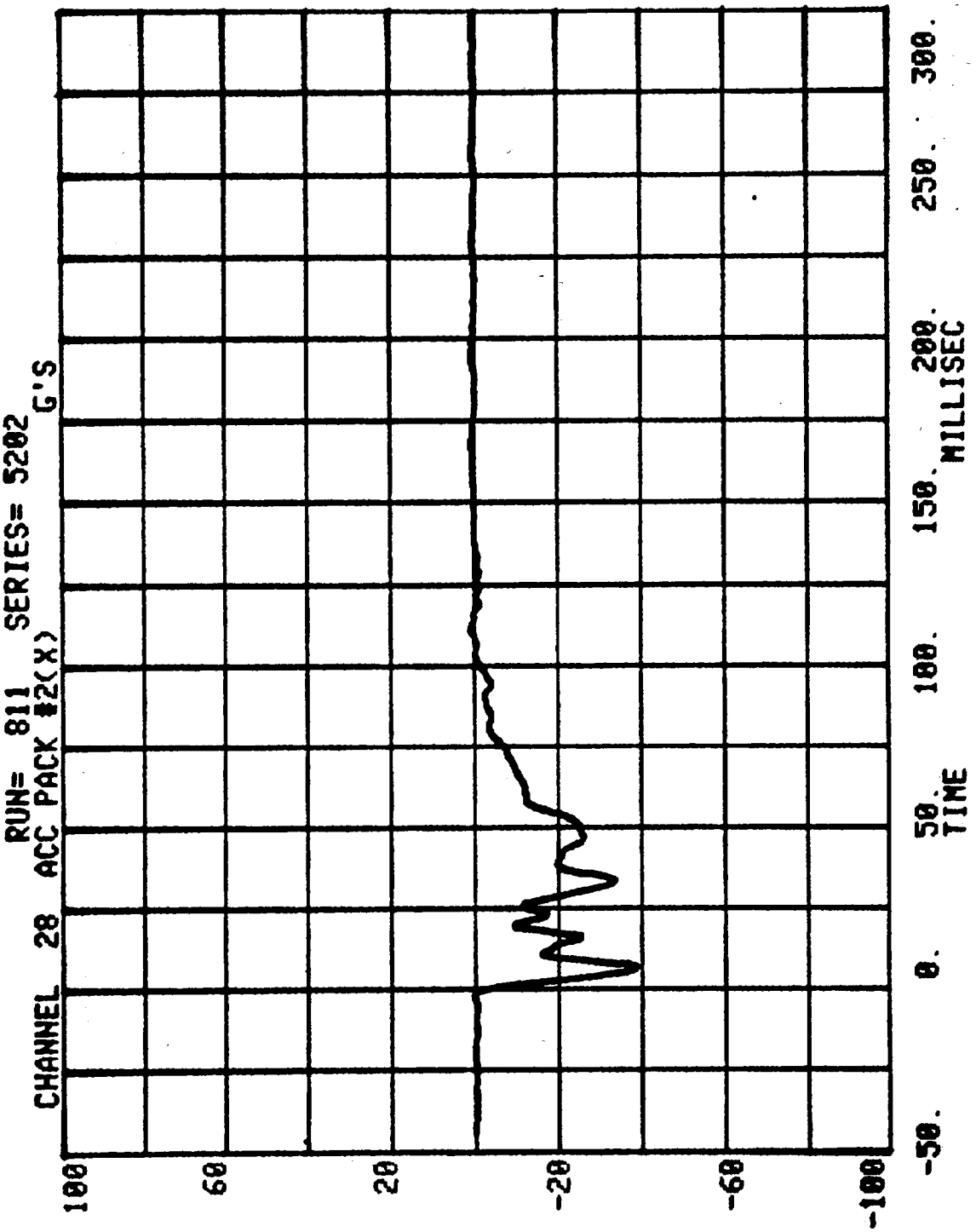
60

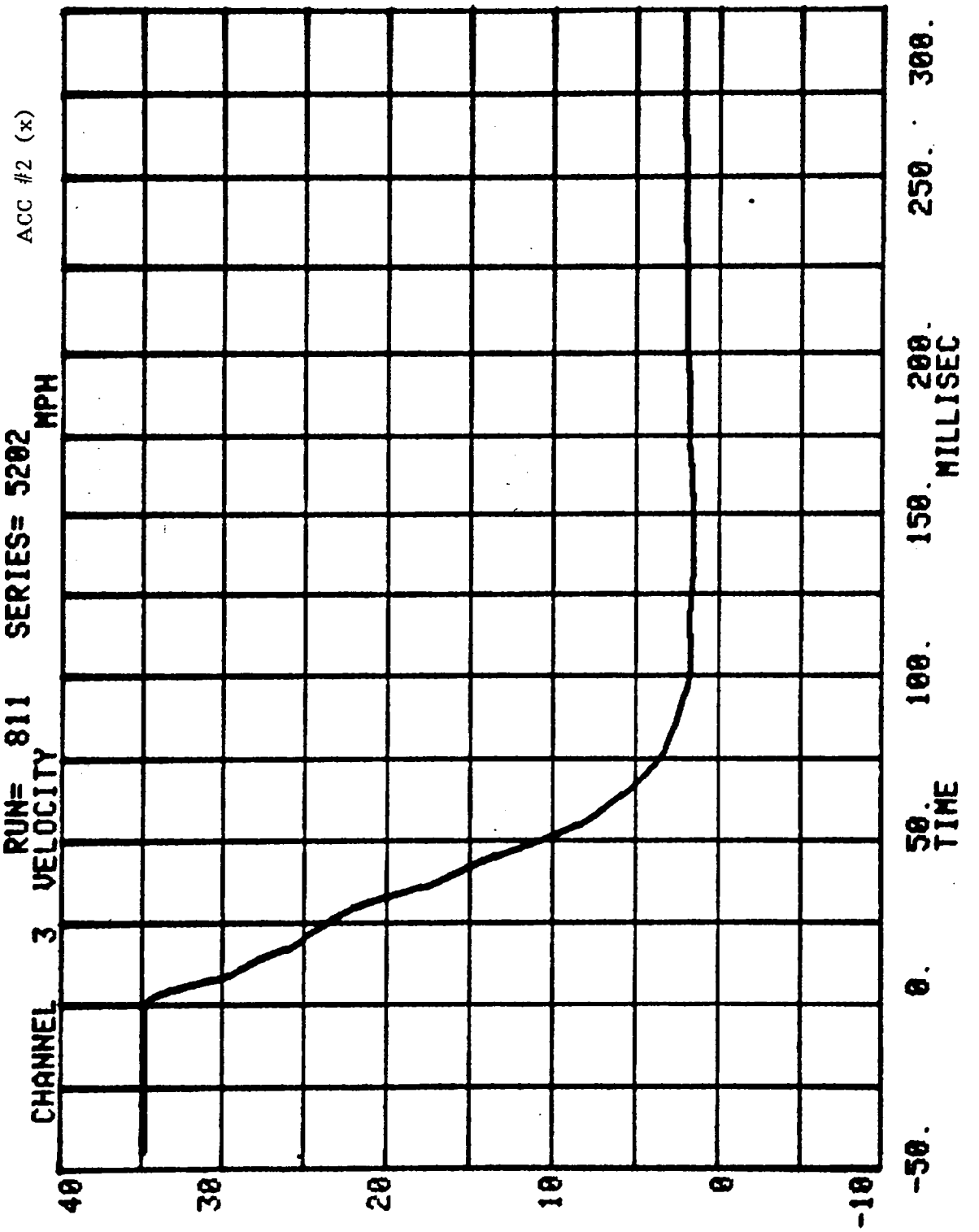

RUN= 811 SERIES= 5202
CHANNEL 27 ACC PACK #1(X) G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9

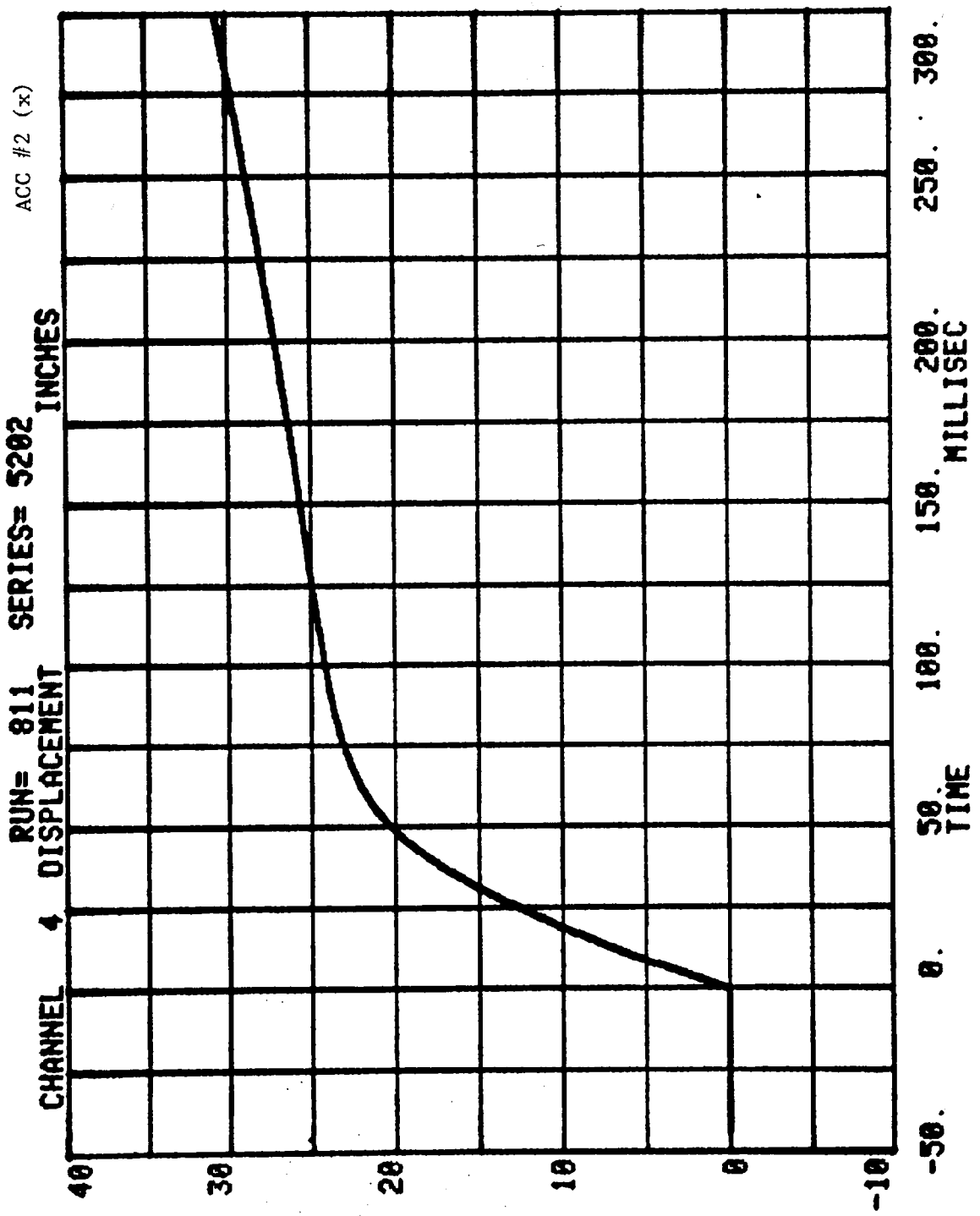

RUN= 811 SERIES= 5202
ACC #1 (x)
CHANNEL 1 VELOCITY
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

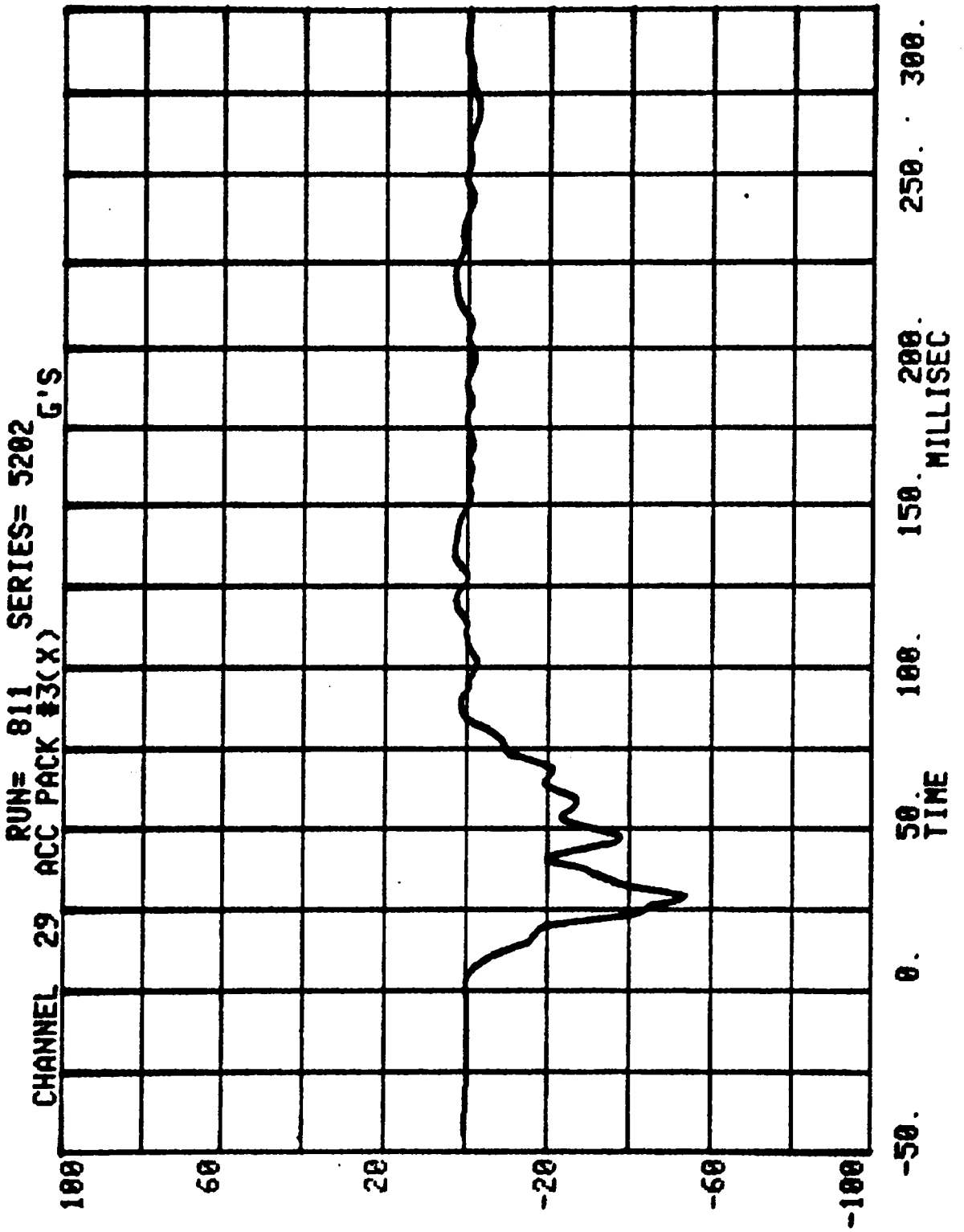

RUN= 811 SERIES= 5202
ACC #1 (x)
CHANNEL 2 DISPLACEMENT INCHES
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC


CHANNEL 28 ACC PACK #2(X)
RUN= 811 SERIES= 5202
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

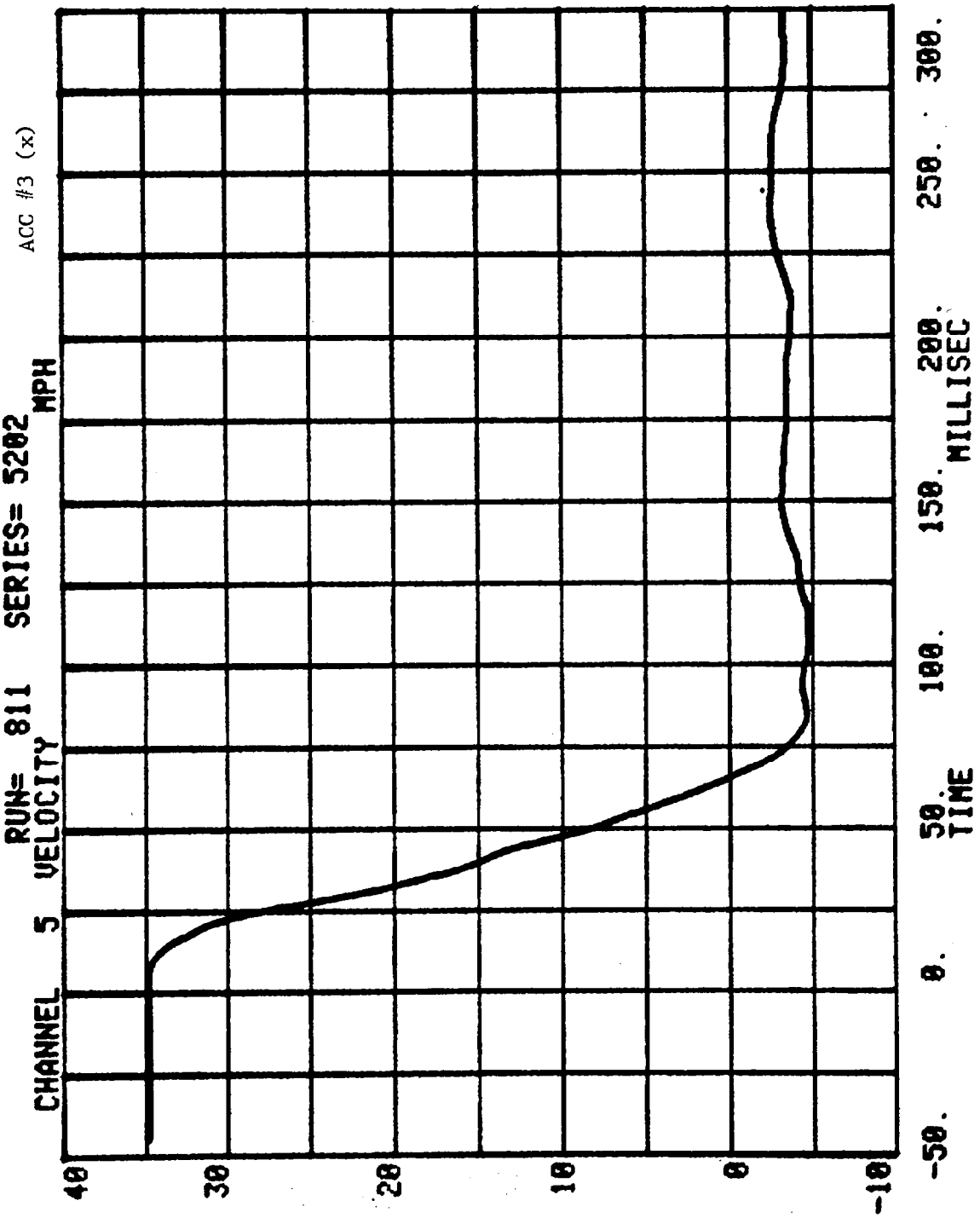

ACC #2 (x)
CHANNEL 3 VELOCITY
RUN= 811 SERIES= 5202
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

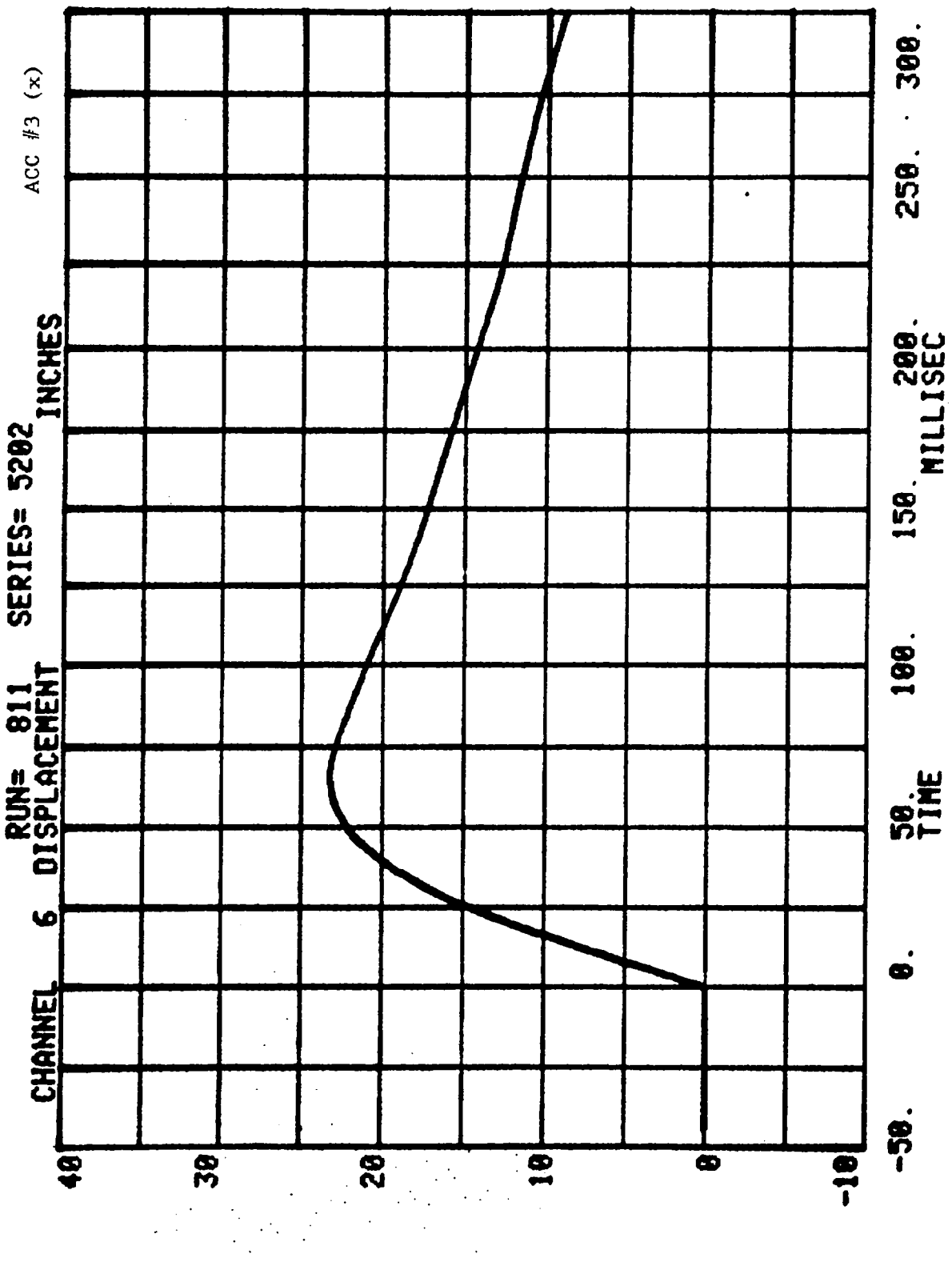
7626-9

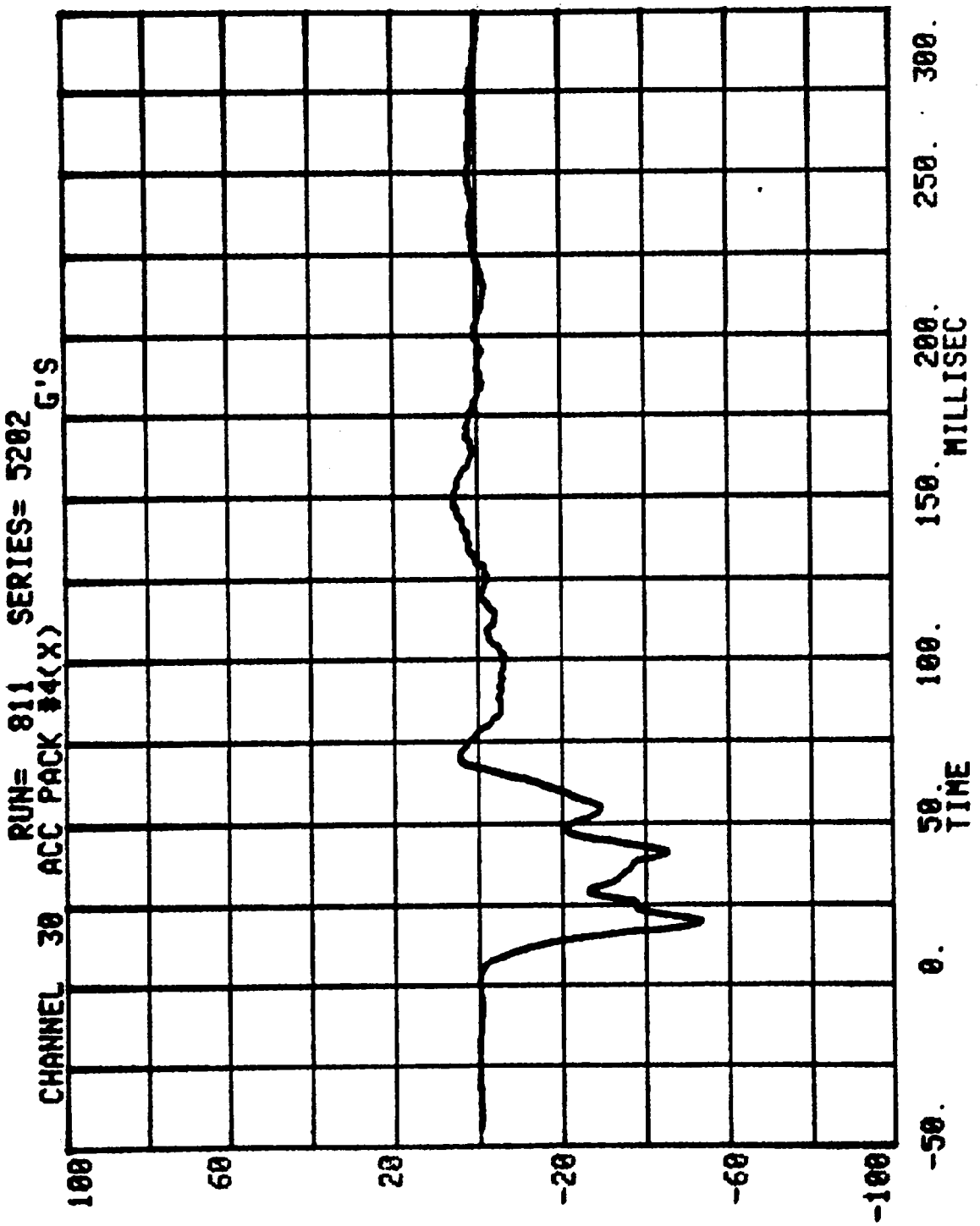

ACC #2 (x)
CHANNEL 4 DISPLACEMENT
RUN= 811 SERIES= 5202
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

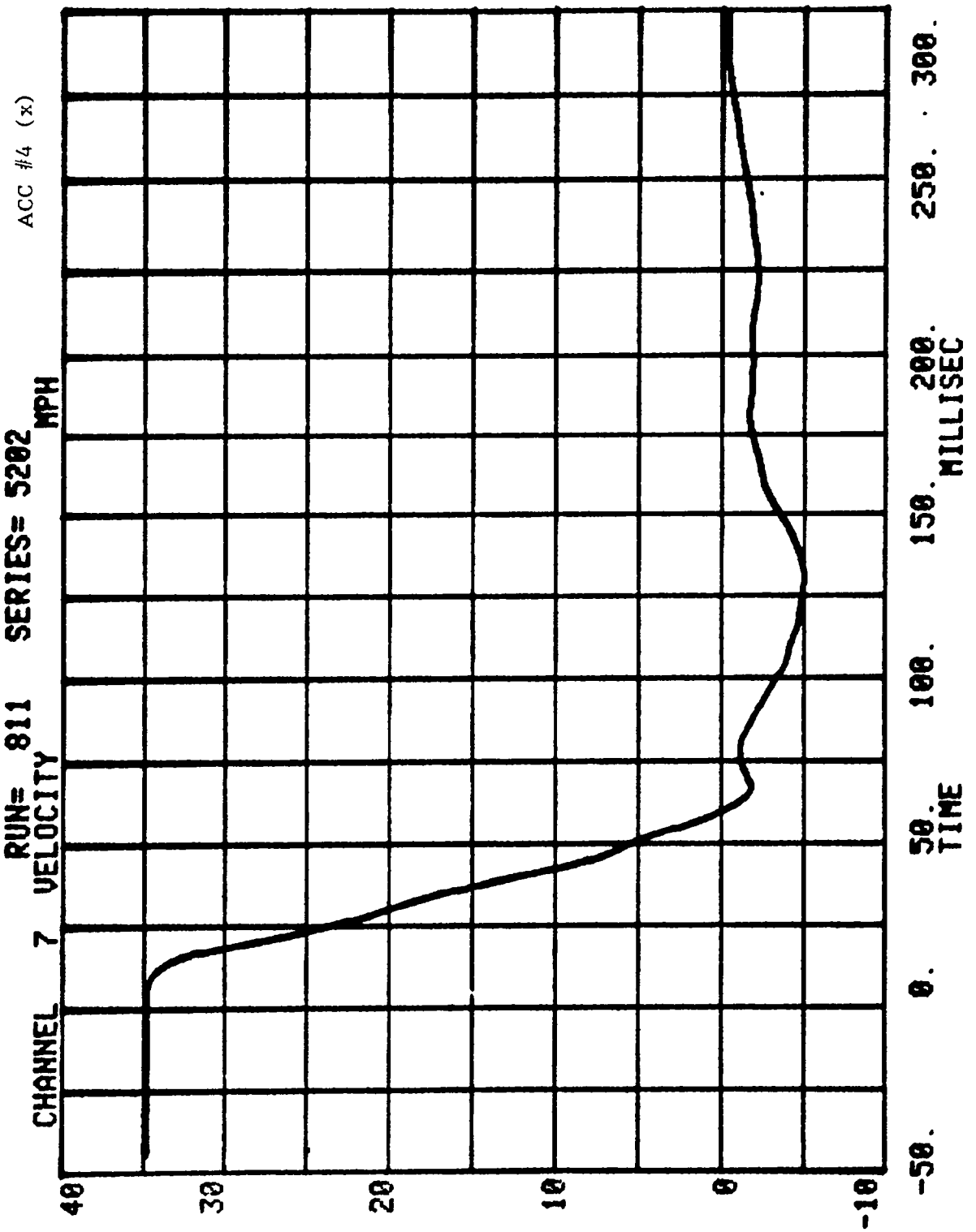

RUN= 811 SERIES= 5202
CHANNEL 29 ACC PACK #3(X)
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9

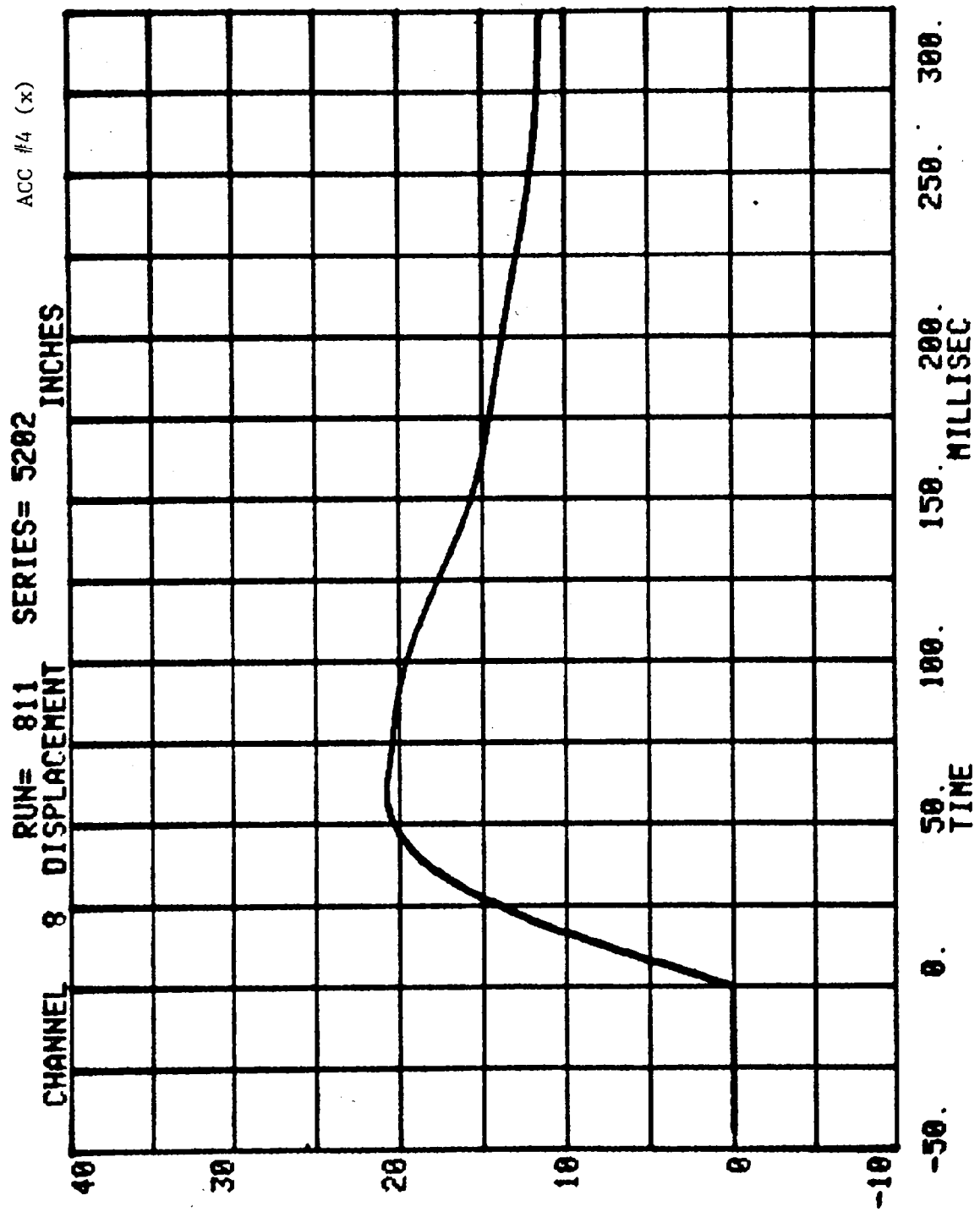

ACC #3 (x)
CHANNEL 5 VELOCITY
RUN= 811 SERIES= 5202
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

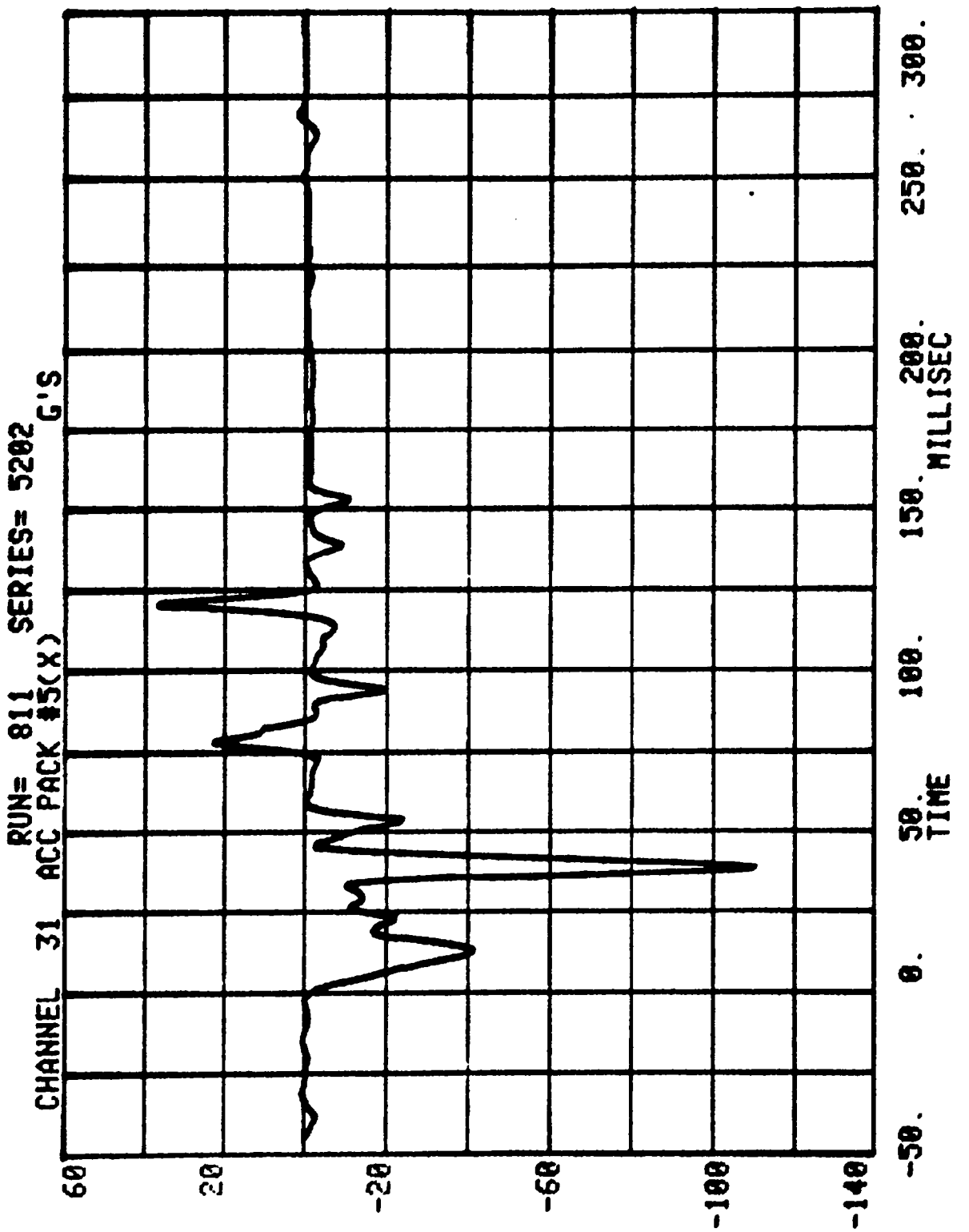

ACC #3 (x)
CHANNEL 6 DISPLACEMENT
RUN= 811 SERIES= 5202
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 30 ACC PACK #4(X)
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

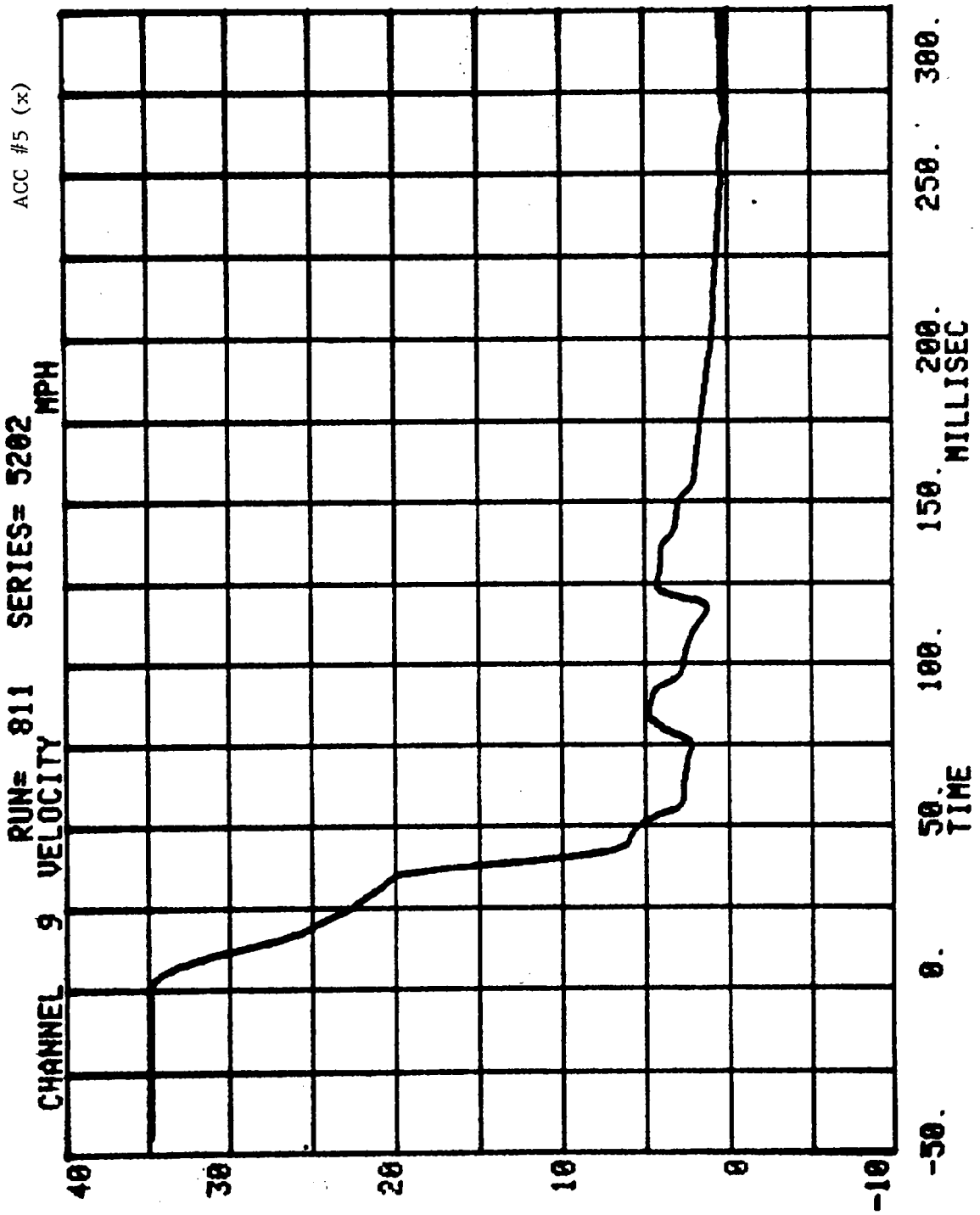

ACC #4 (x)
CHANNEL 7 VELOCITY
RUN= 811 SERIES= 5202
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9

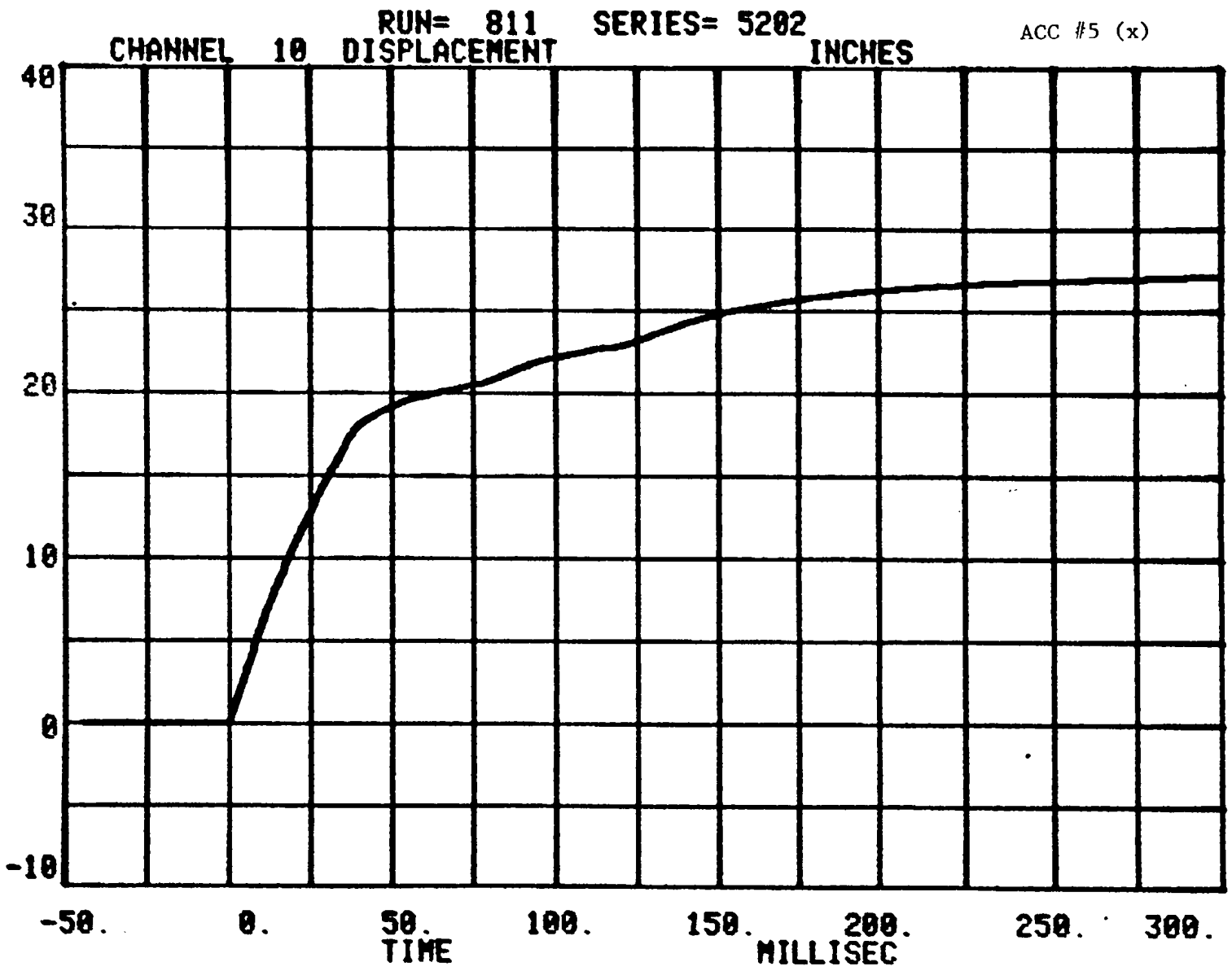

ACC #4 (x)
CHANNEL 8 DISPLACEMENT
RUN= 811 SERIES= 5202
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

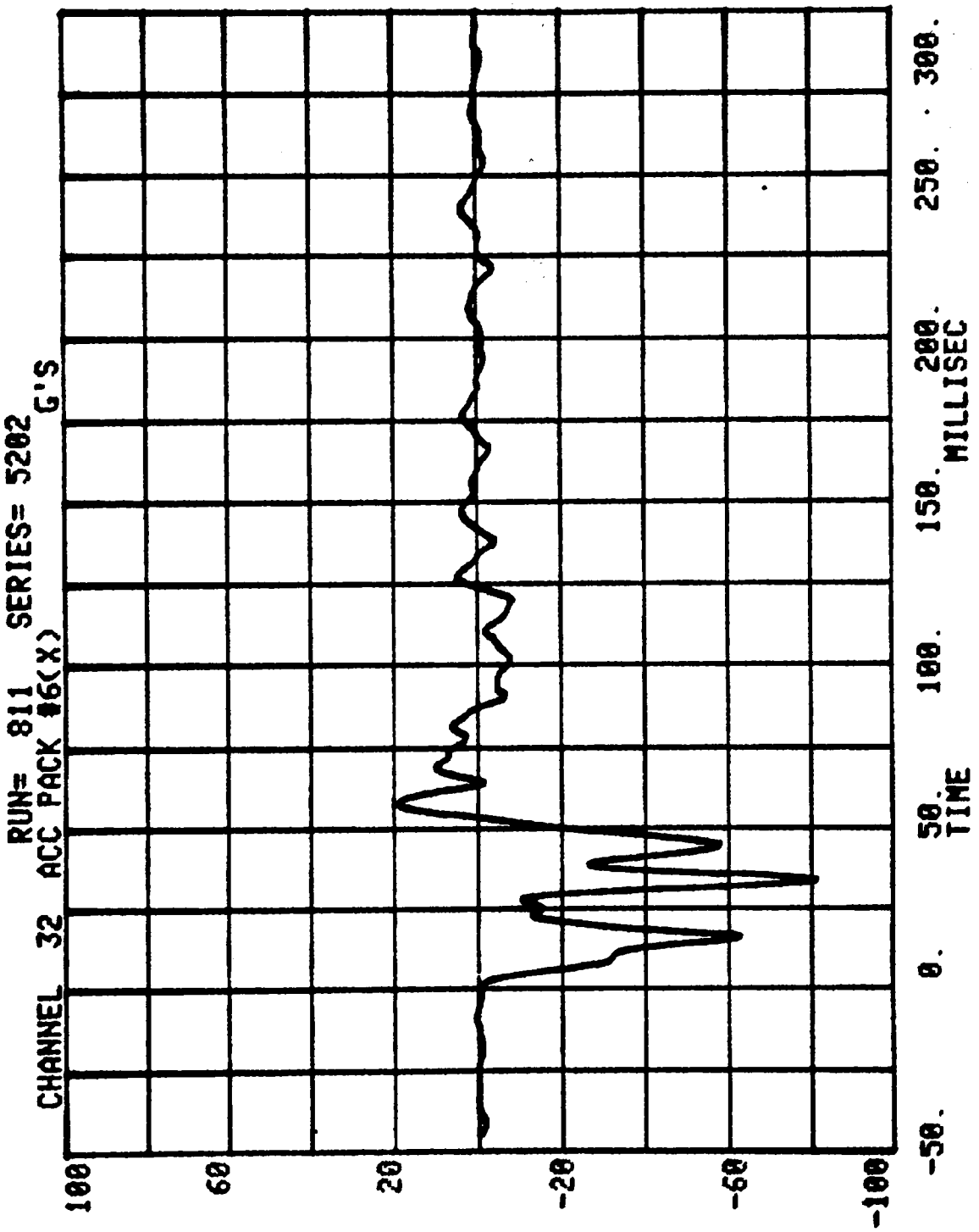

CHANNEL 31 ACC PACK #5(X)
RUN= 811 SERIES= 5202
G'S
60
20
-20
-60
-100
-140
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9

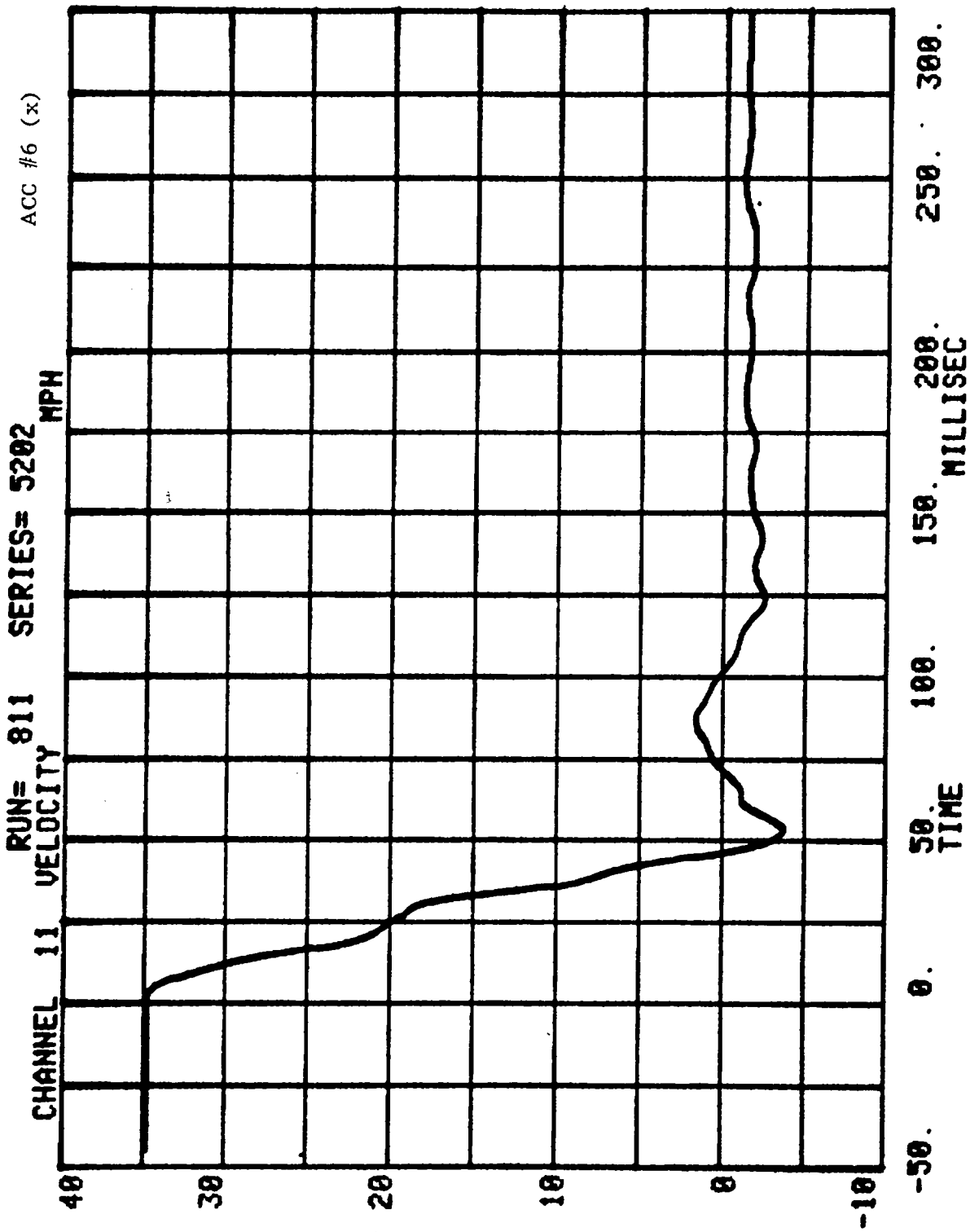

ACC #5 (x)
CHANNEL 9 VELOCITY
RUN= 811 SERIES= 5202
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

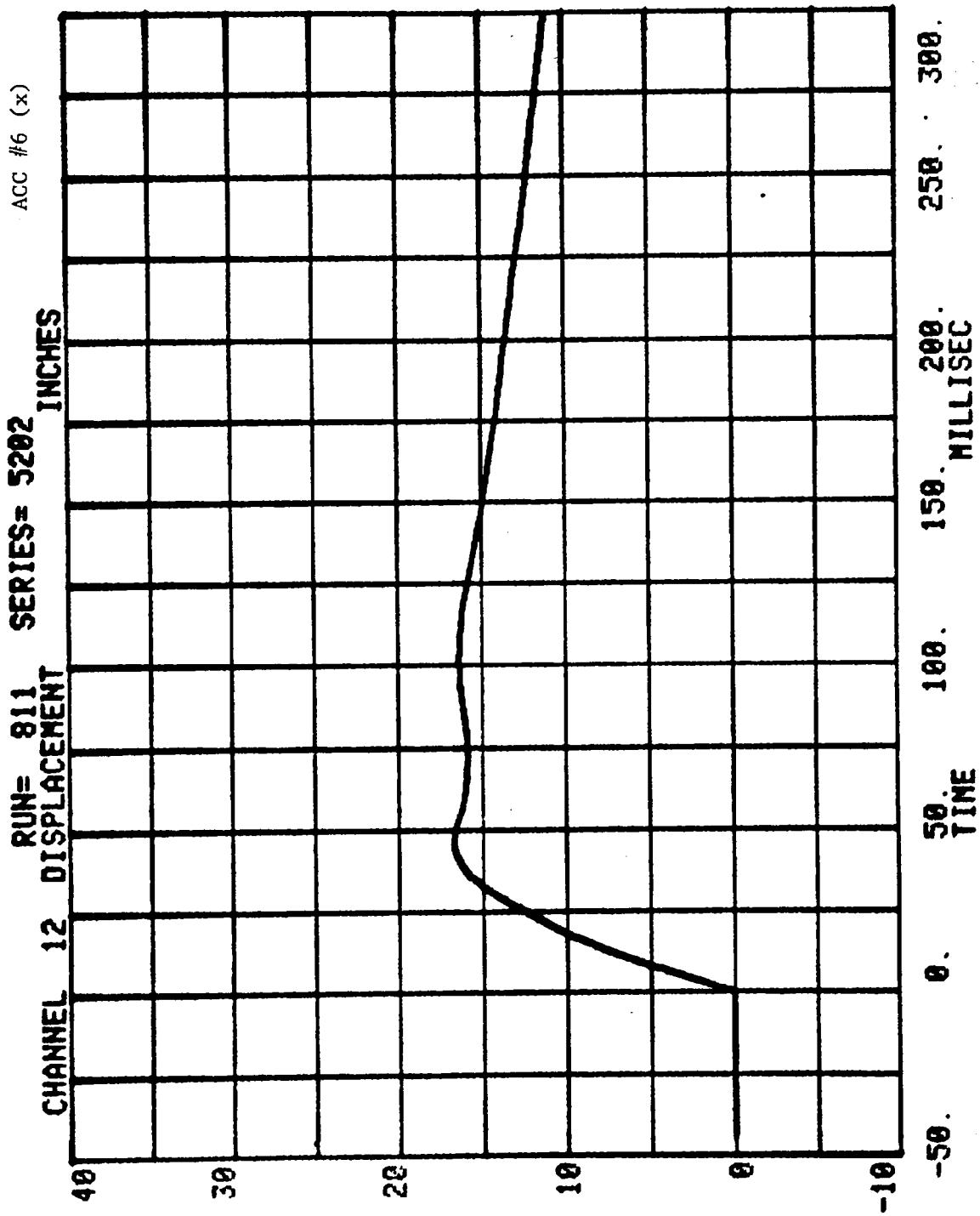
7626-9

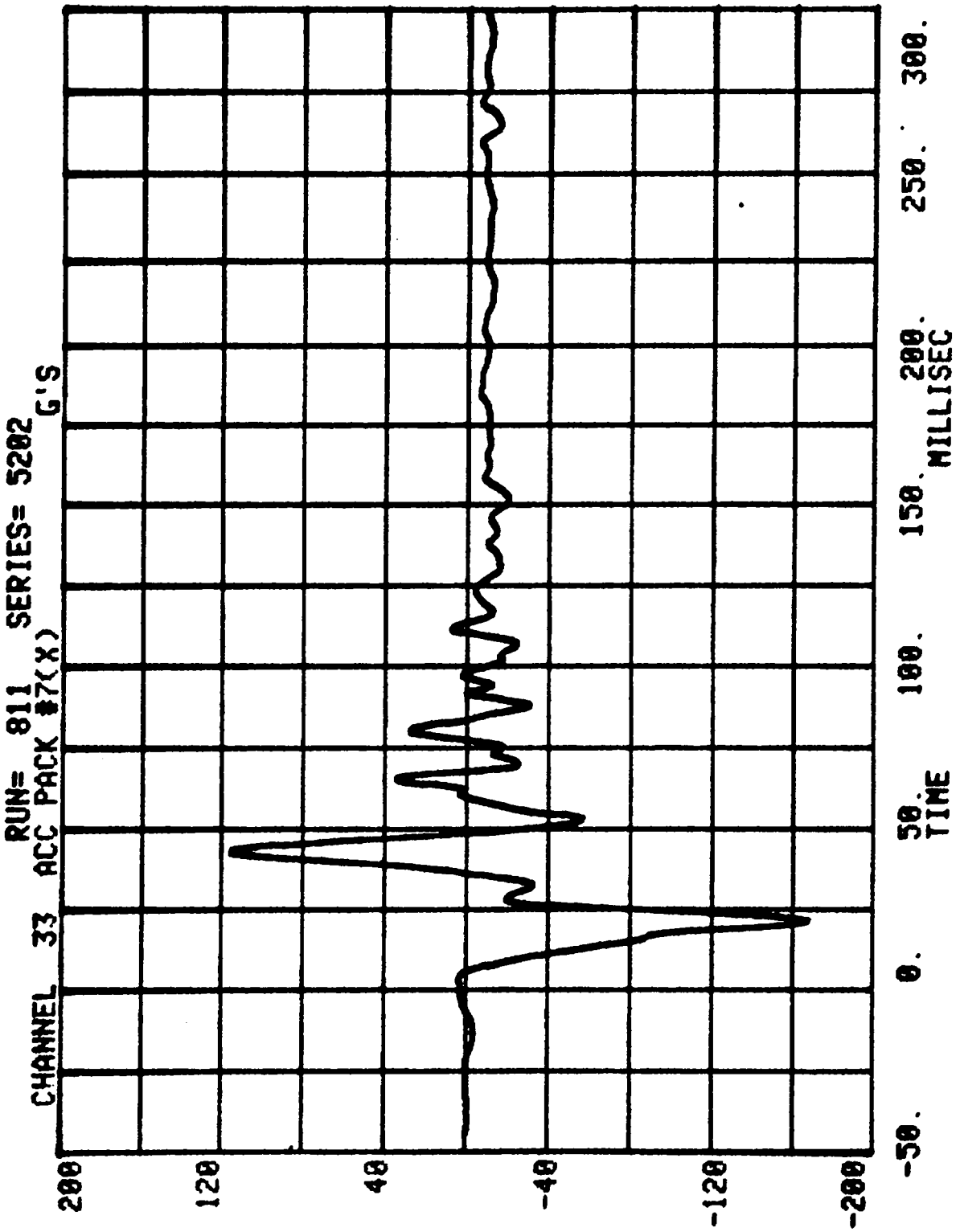

RUN= 811 SERIES= 5202
CHANNEL 10 DISPLACEMENT INCHES
ACC #5 (x)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC


CHANNEL 32 ACC PACK #6(X)
RUN= 811 SERIES= 5202
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

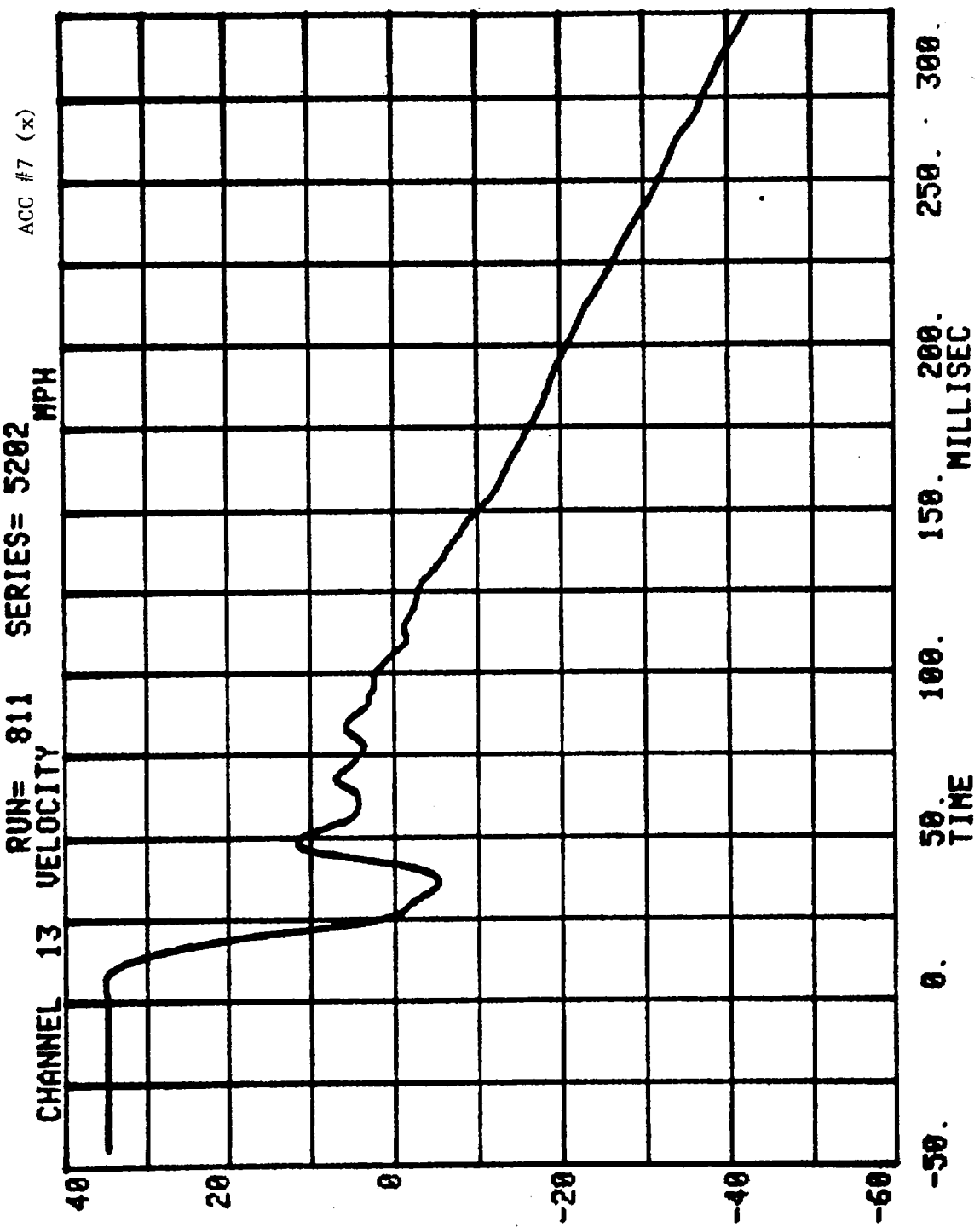
7626-9

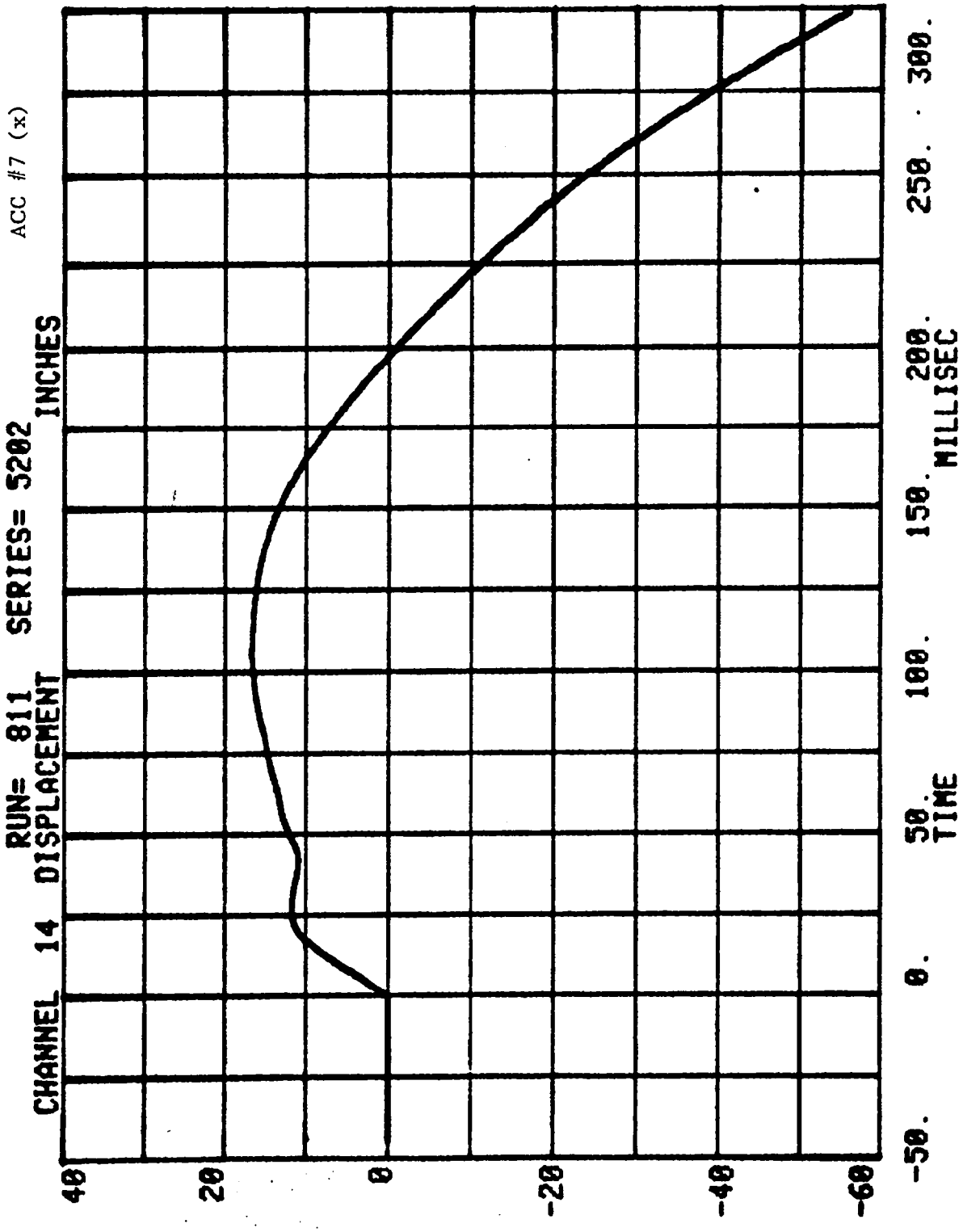

ACC #6 (x)
CHANNEL 11 VELOCITY
RUN= 811 SERIES= 5202
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC #6 (x)
CHANNEL 12 DISPLACEMENT
RUN= 811 SERIES= 5202
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 33 ACC PACK #7(X)
G'S
200
120
40
-40
-120
-200
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9


CHANNEL 13 VELOCITY
RUN= 811 SERIES= 5202
ACC #7 (x)
MPH
40
20
0
-20
-40
-60
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

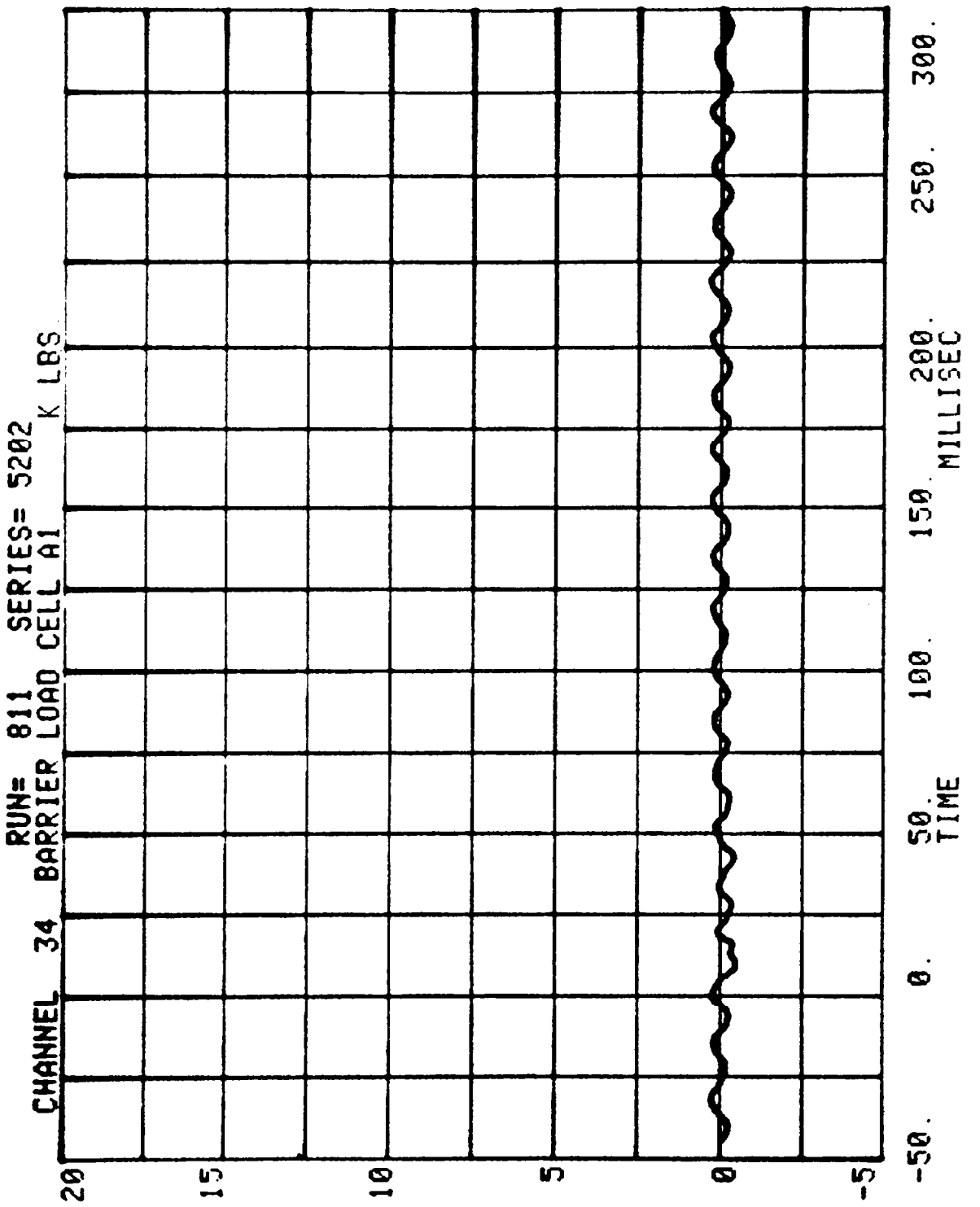

ACC #7 (x)
CHANNEL 14 DISPLACEMENT
RUN= 811 SERIES= 5202
INCHES
40
20
0
-20
-40
-60
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

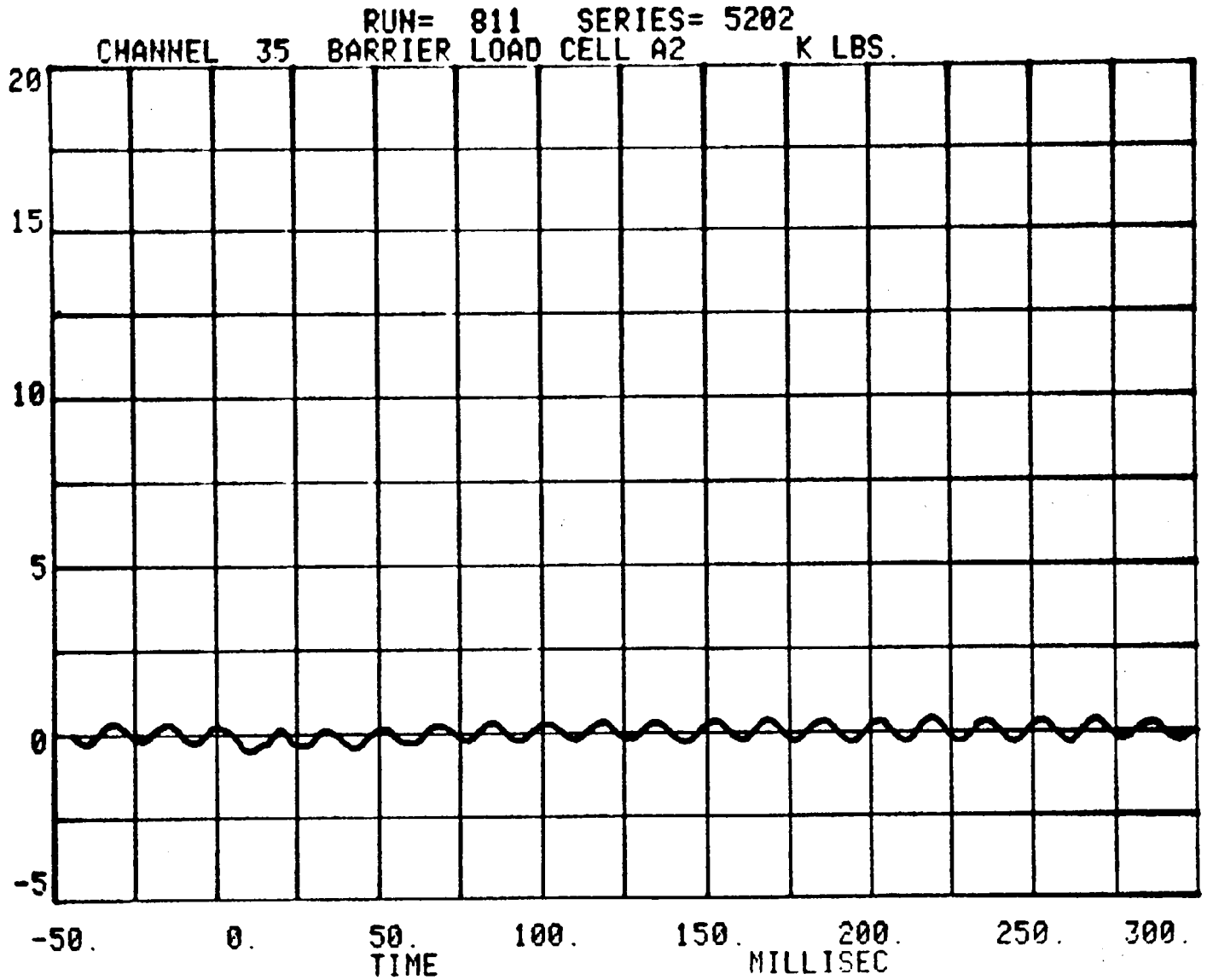
TEST NO. MJ5202

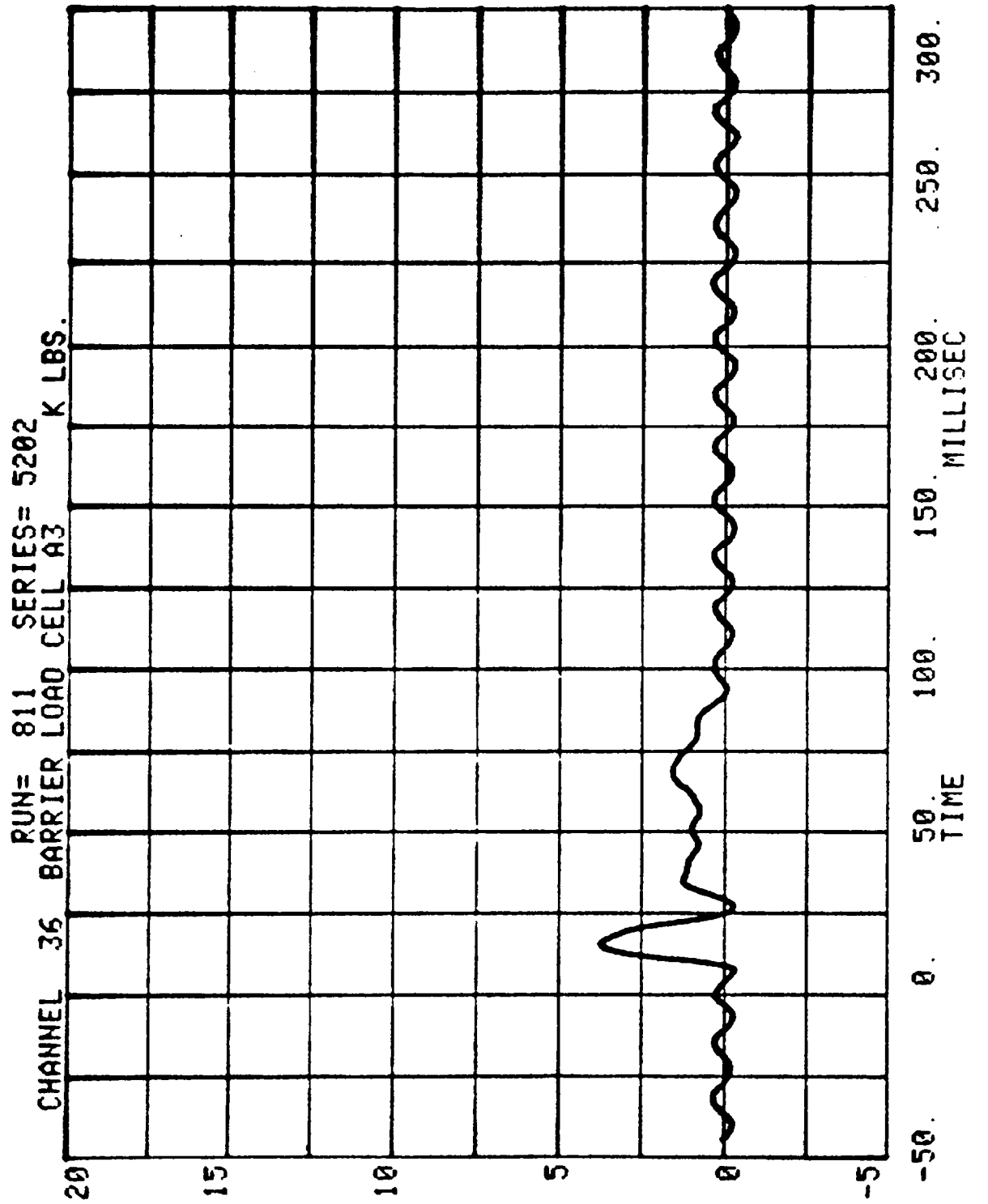
LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

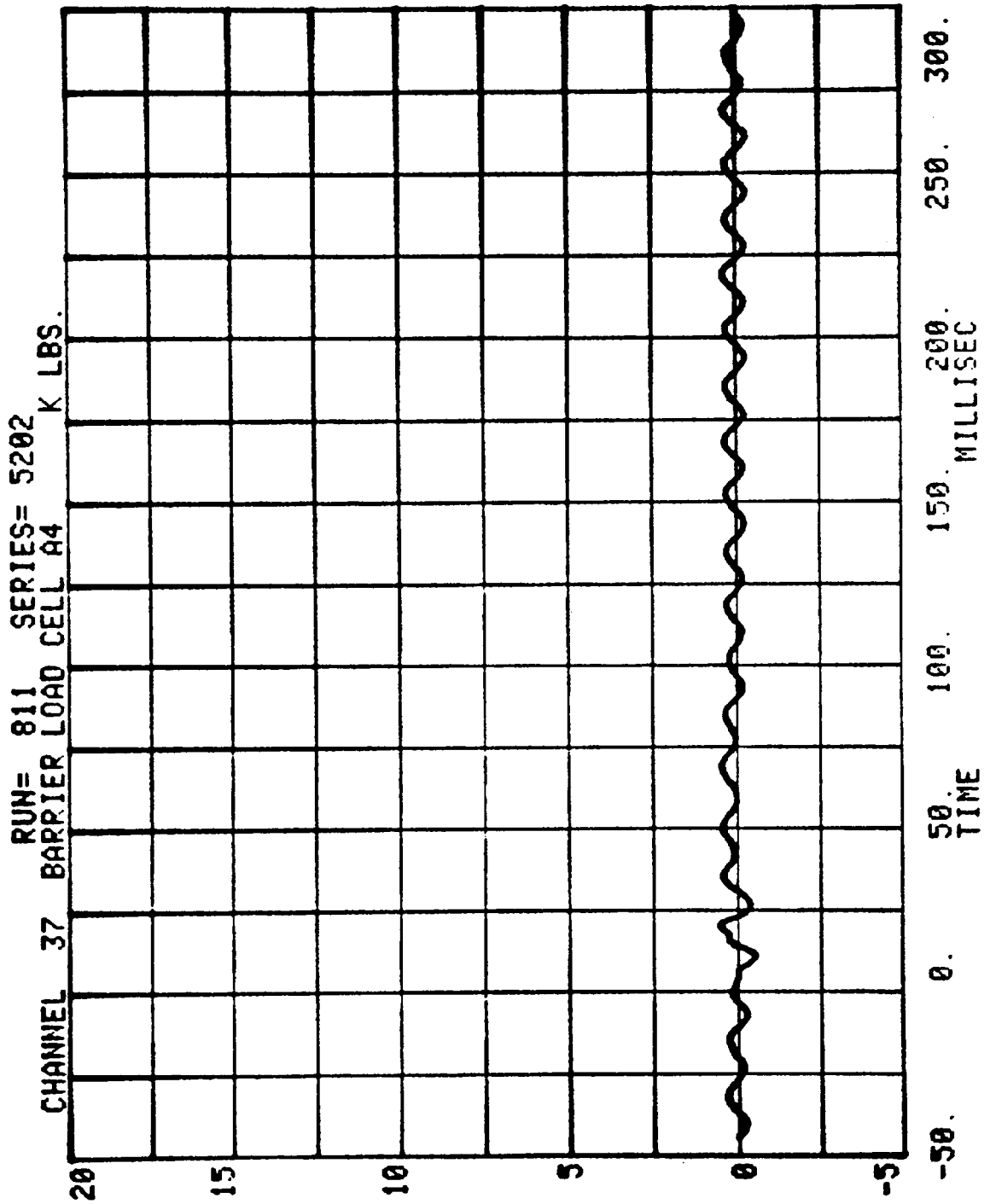
60


CHANNEL 34 BARRIER LOAD CELL A1
RUN= 811 SERIES= 5202
K LBS
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

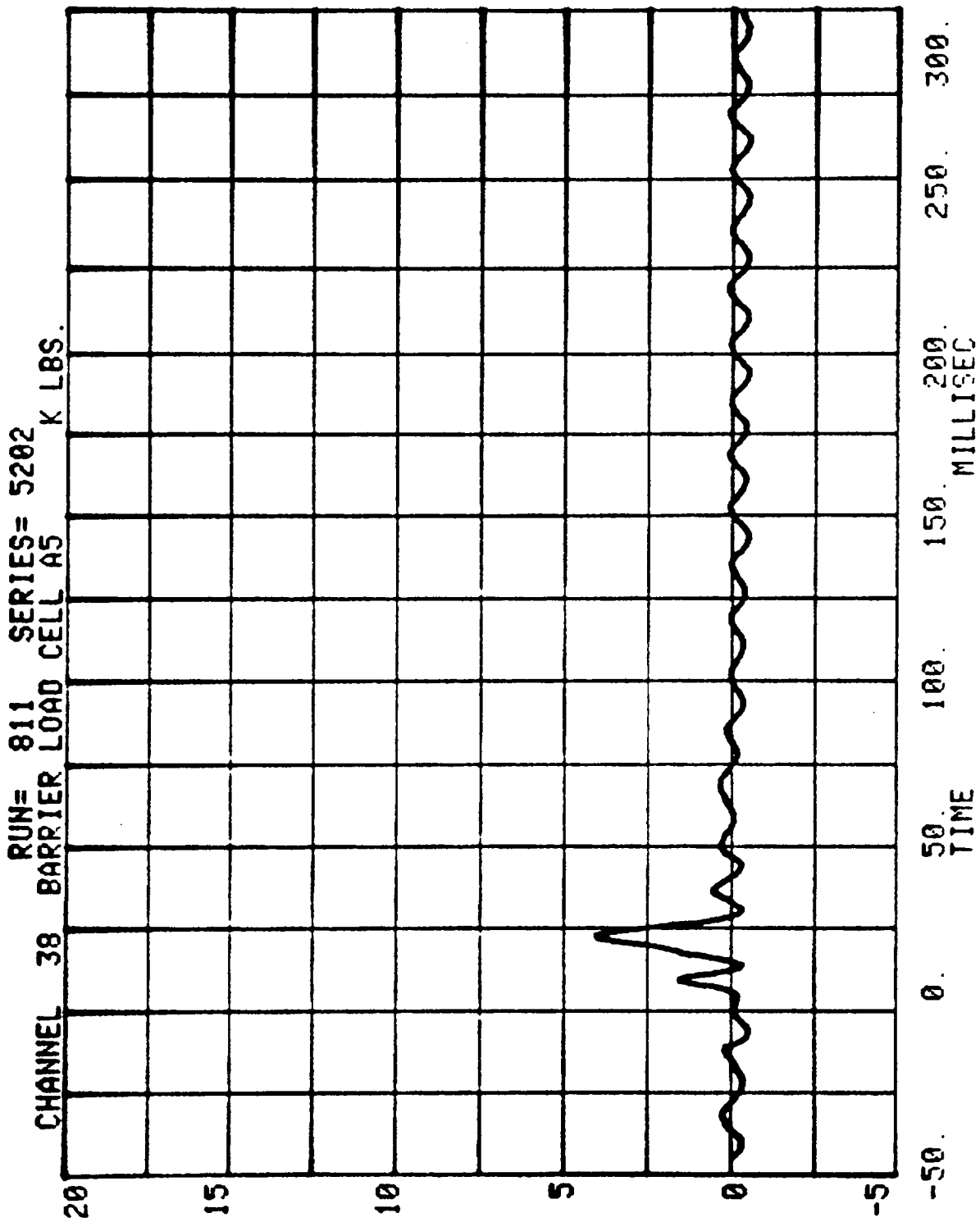

RUN= 811 SERIES= 5202
CHANNEL 35 BARRIER LOAD CELL A2
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

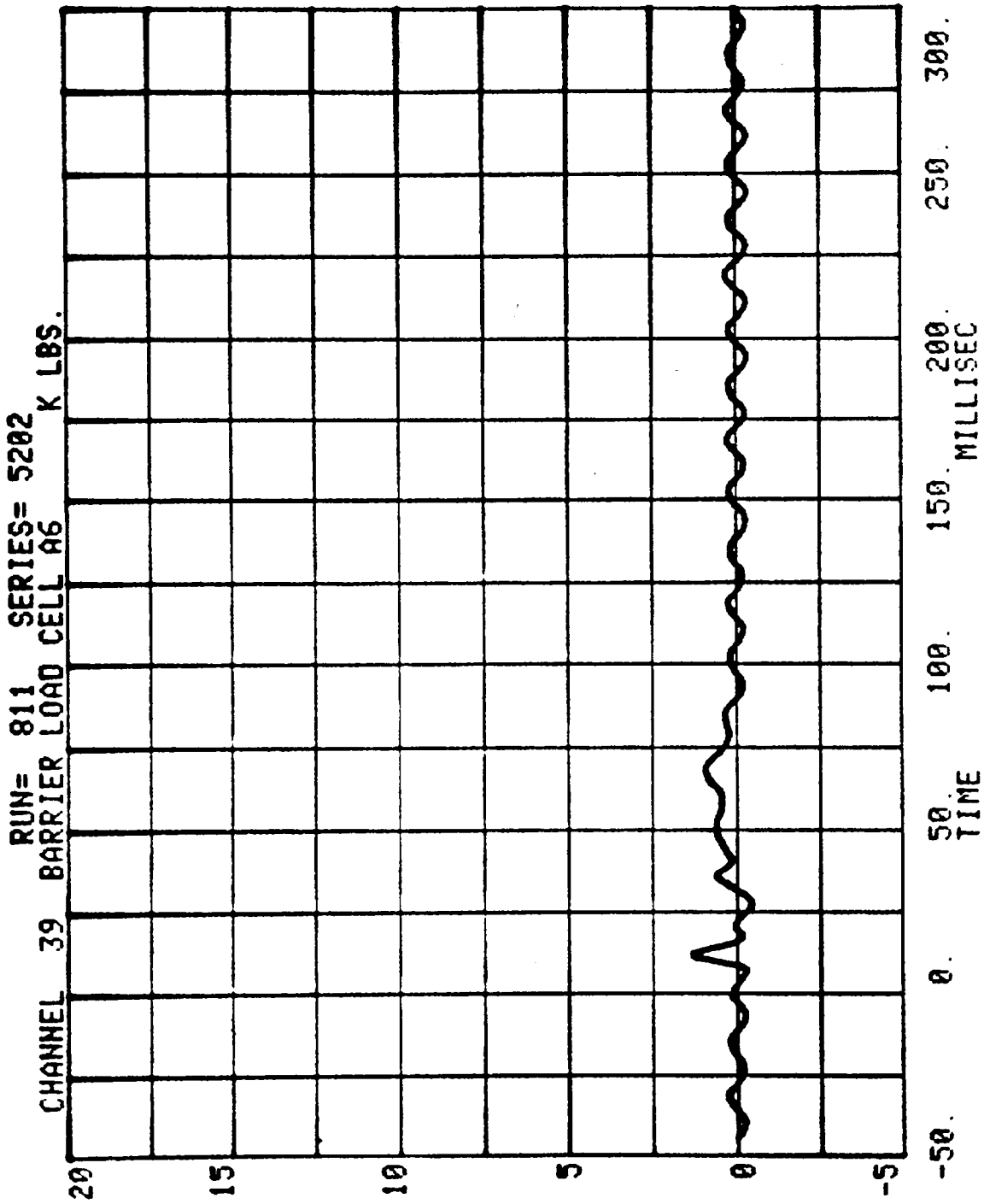

CHANNEL 36 BARRIER LOAD CELL A3
RUN= 811 SERIES= 5202
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

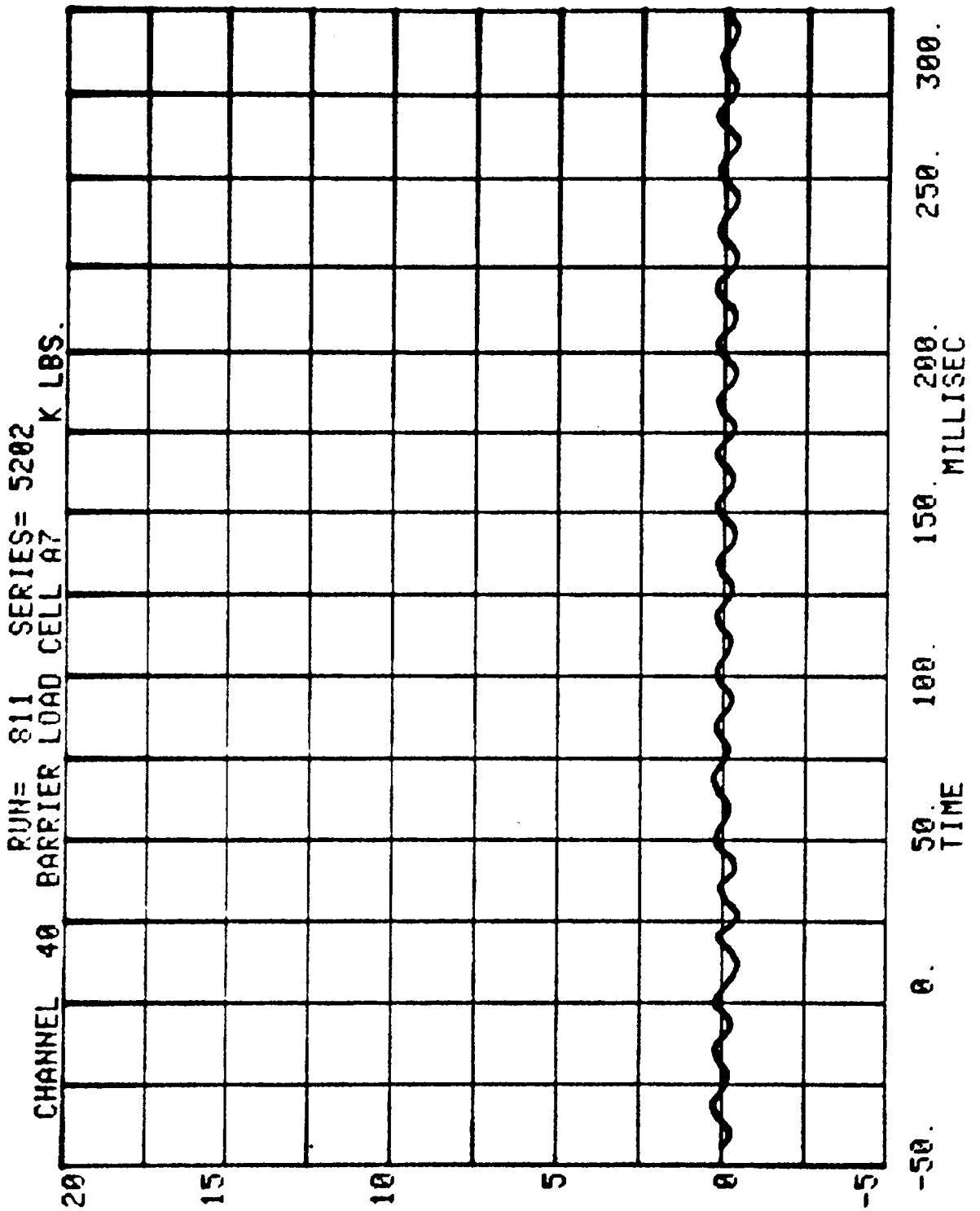
7626-9

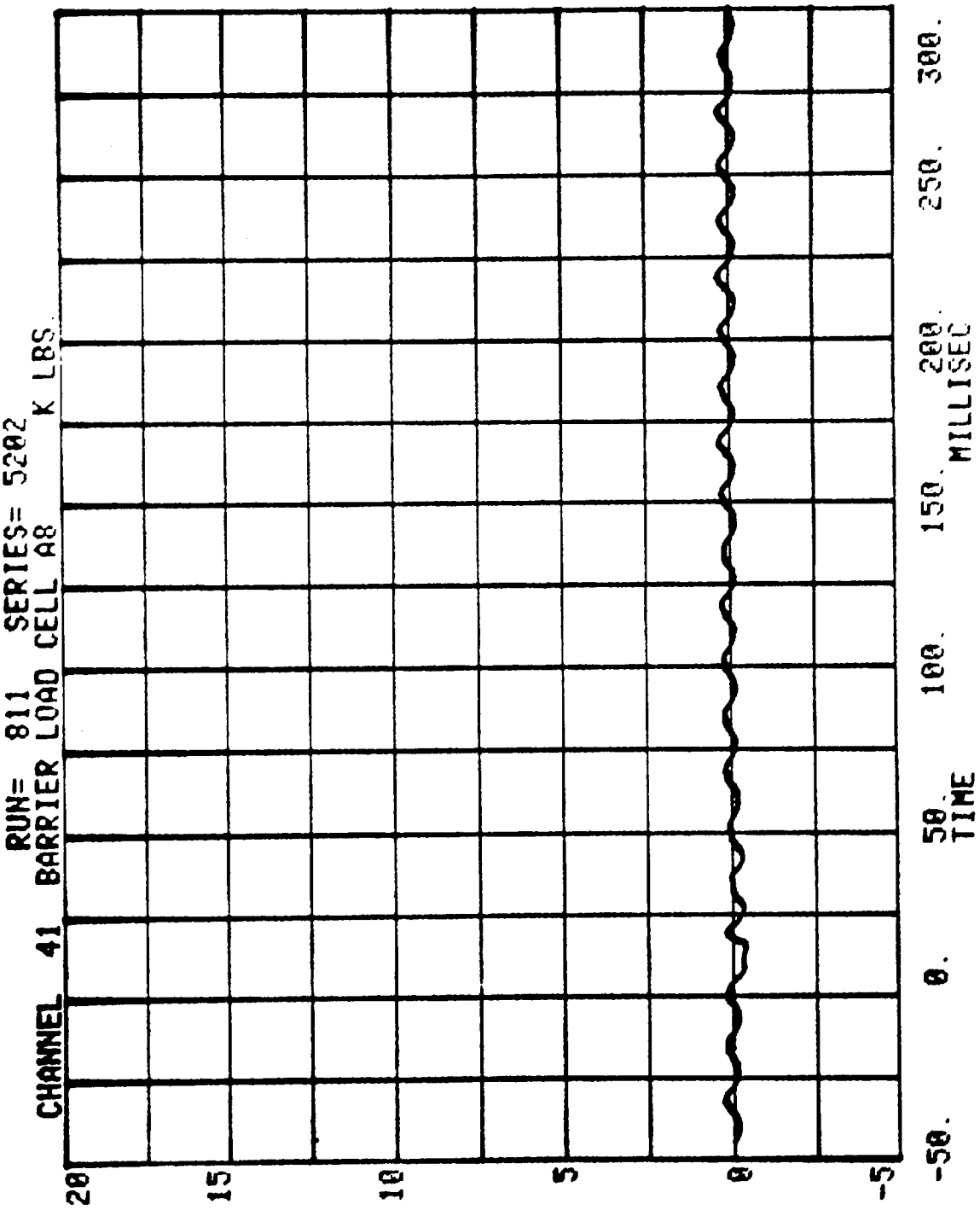

CHANNEL 37 BARRIER LOAD CELL A4
RUN= 811 SERIES= 5202
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

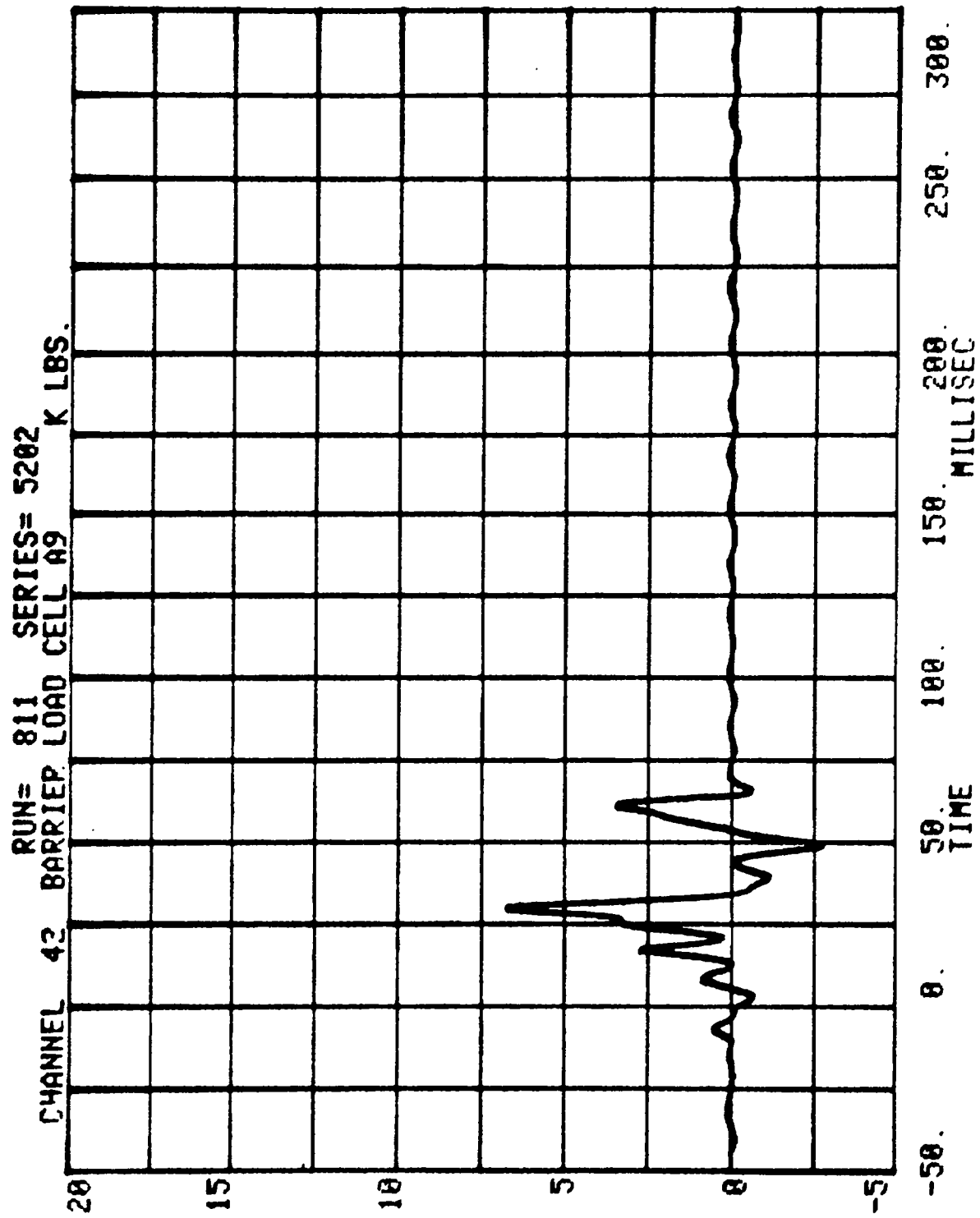
7626-9


RUN= 811 SERIES= 5202
CHANNEL 38 BARRIER LOAD CELL A5 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

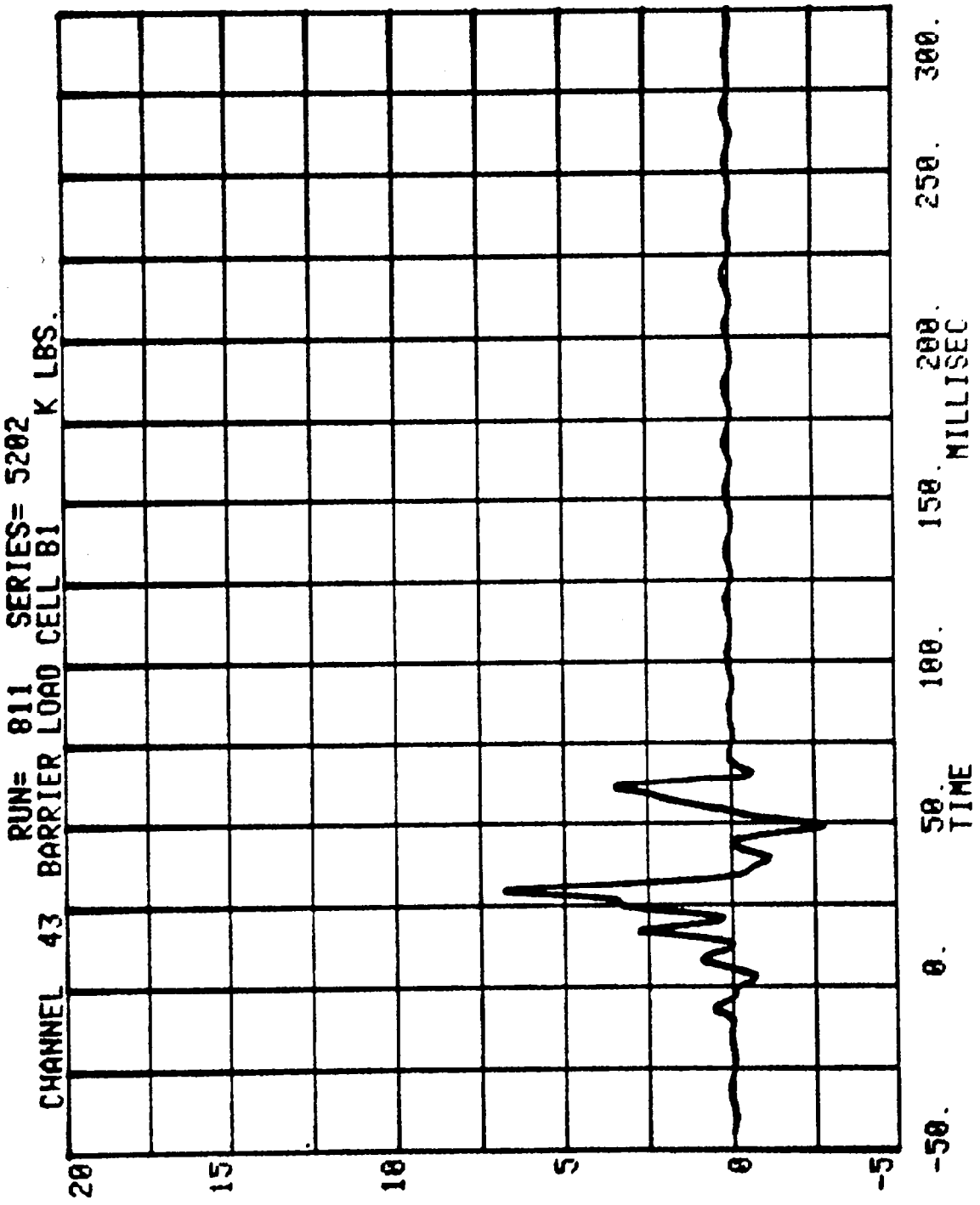

RUN= 811 SERIES= 5202
CHANNEL 39 BARRIER LOAD CELL A6
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

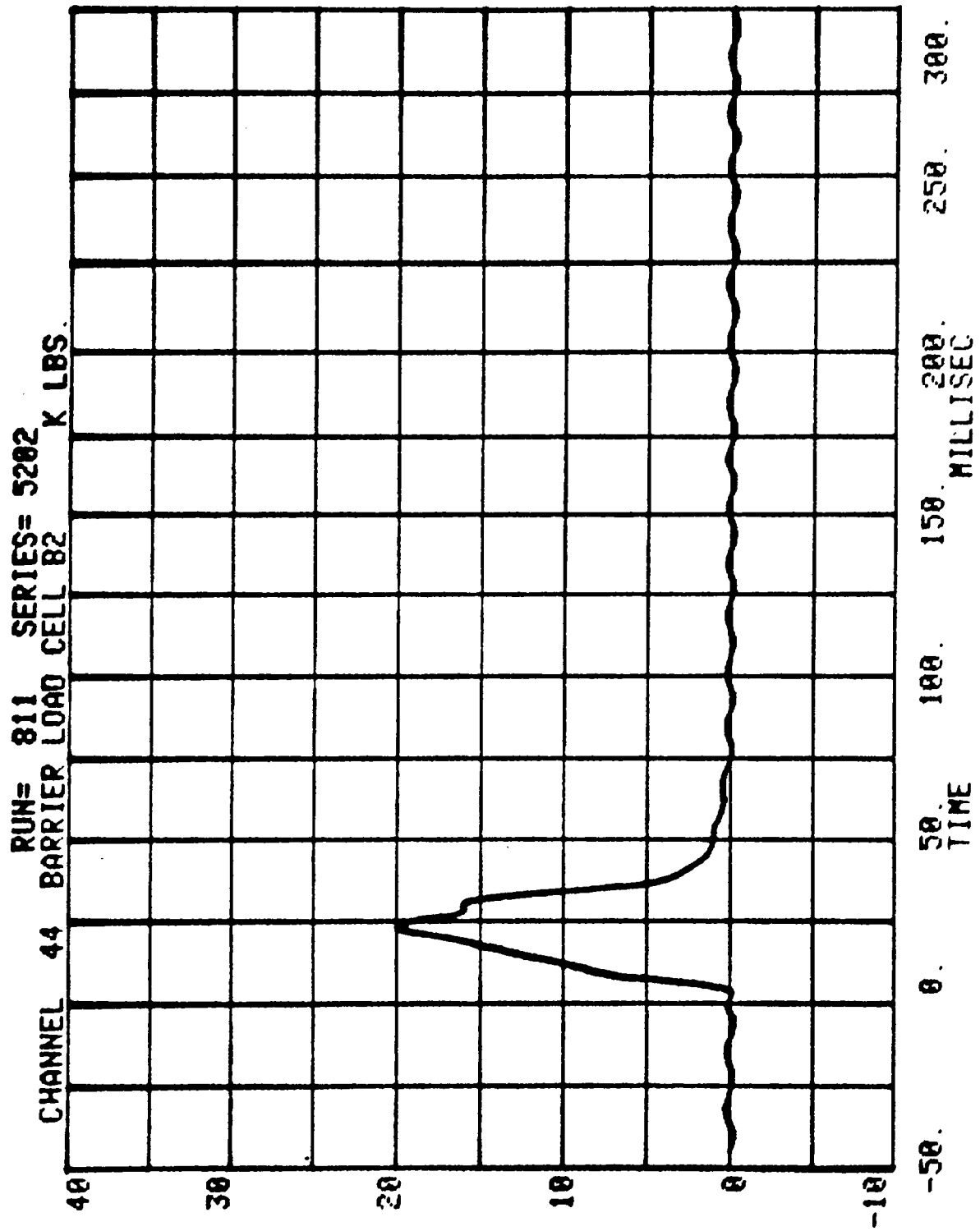

CHANNEL 40 BARRIER LOAD CELL A7
RUN= 811 SERIES= 5202
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 41 BARRIER LOAD CELL A8
RUN= 811 SERIES= 5202
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

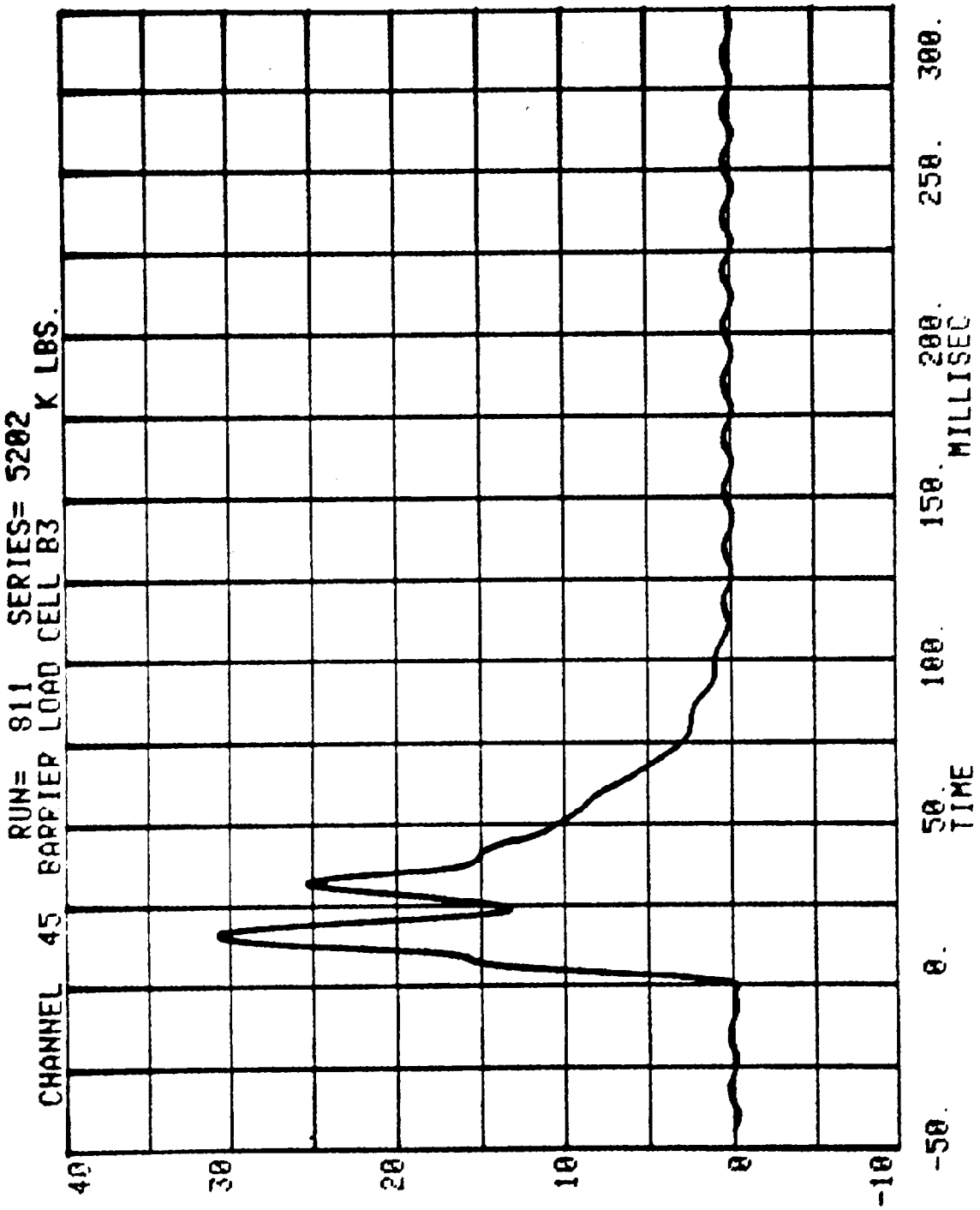

RUN= 811 SERIES= 5202
CHANNEL 42 BARRIER LOAD CELL A9
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

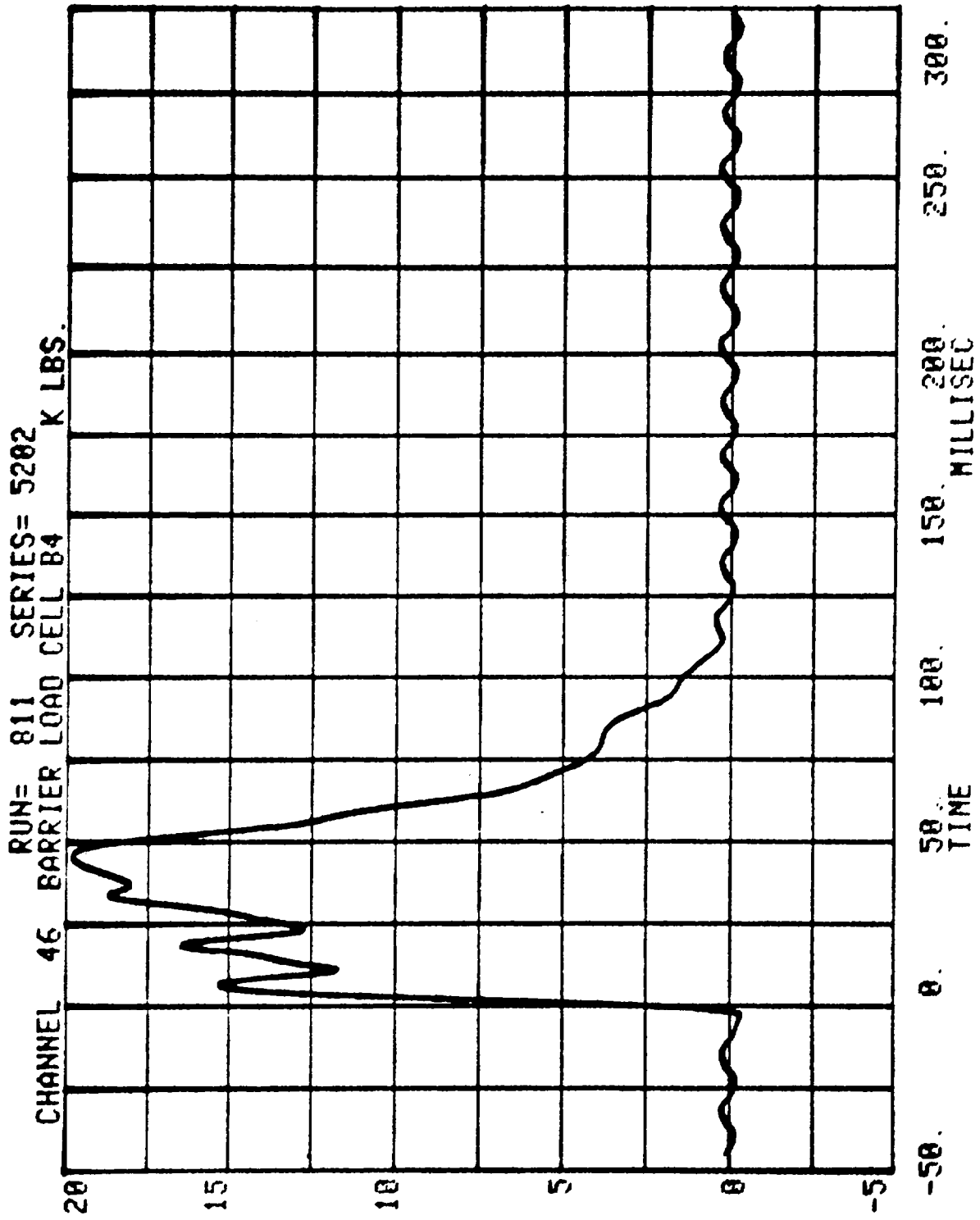
7626-9


RUN= 811 SERIES= 5202
CHANNEL 43 BARRIER LOAD CELL B1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

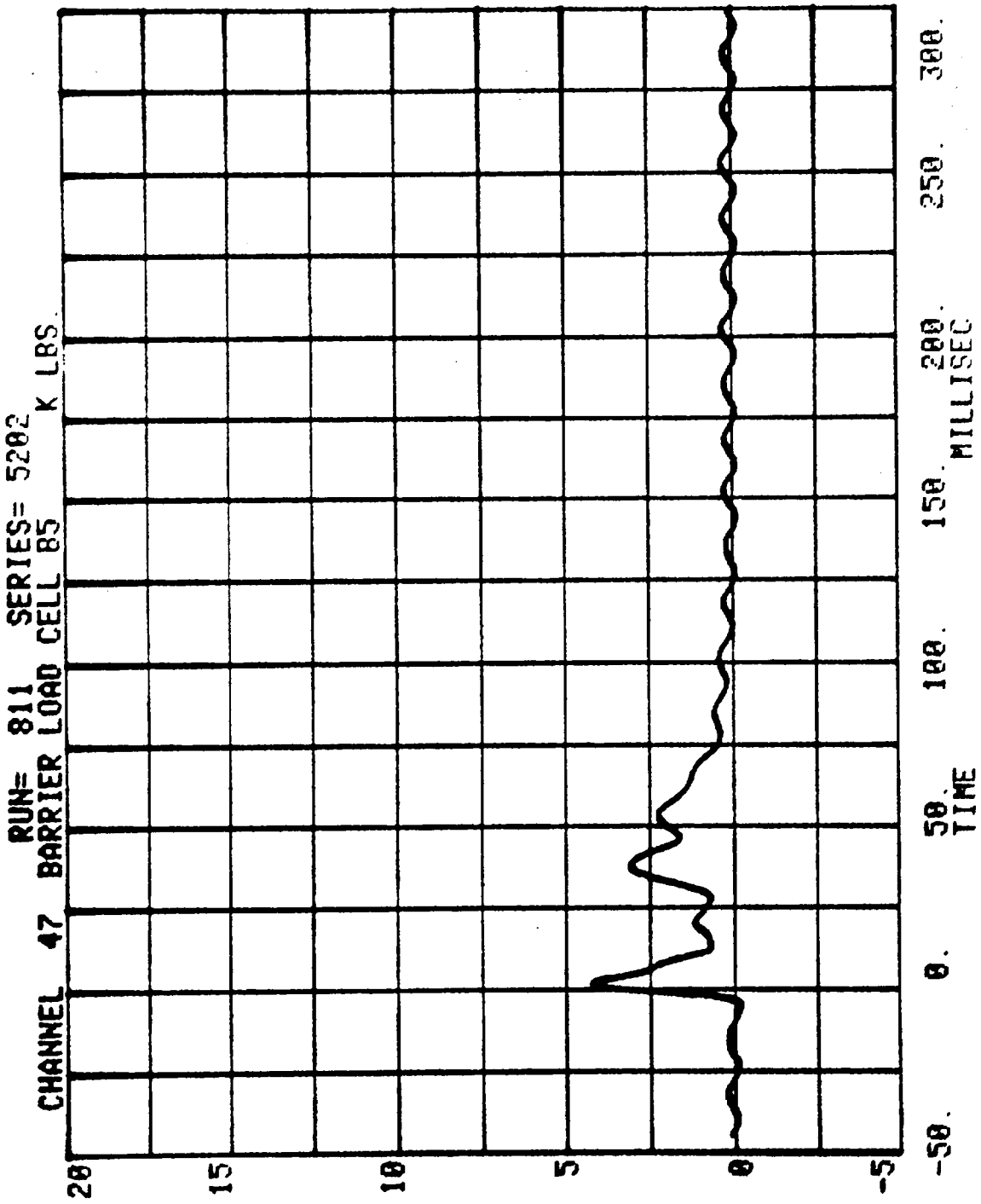

RUN= 811 SERIES= 5202
CHANNEL 44 BARRIER LOAD CELL B2
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9

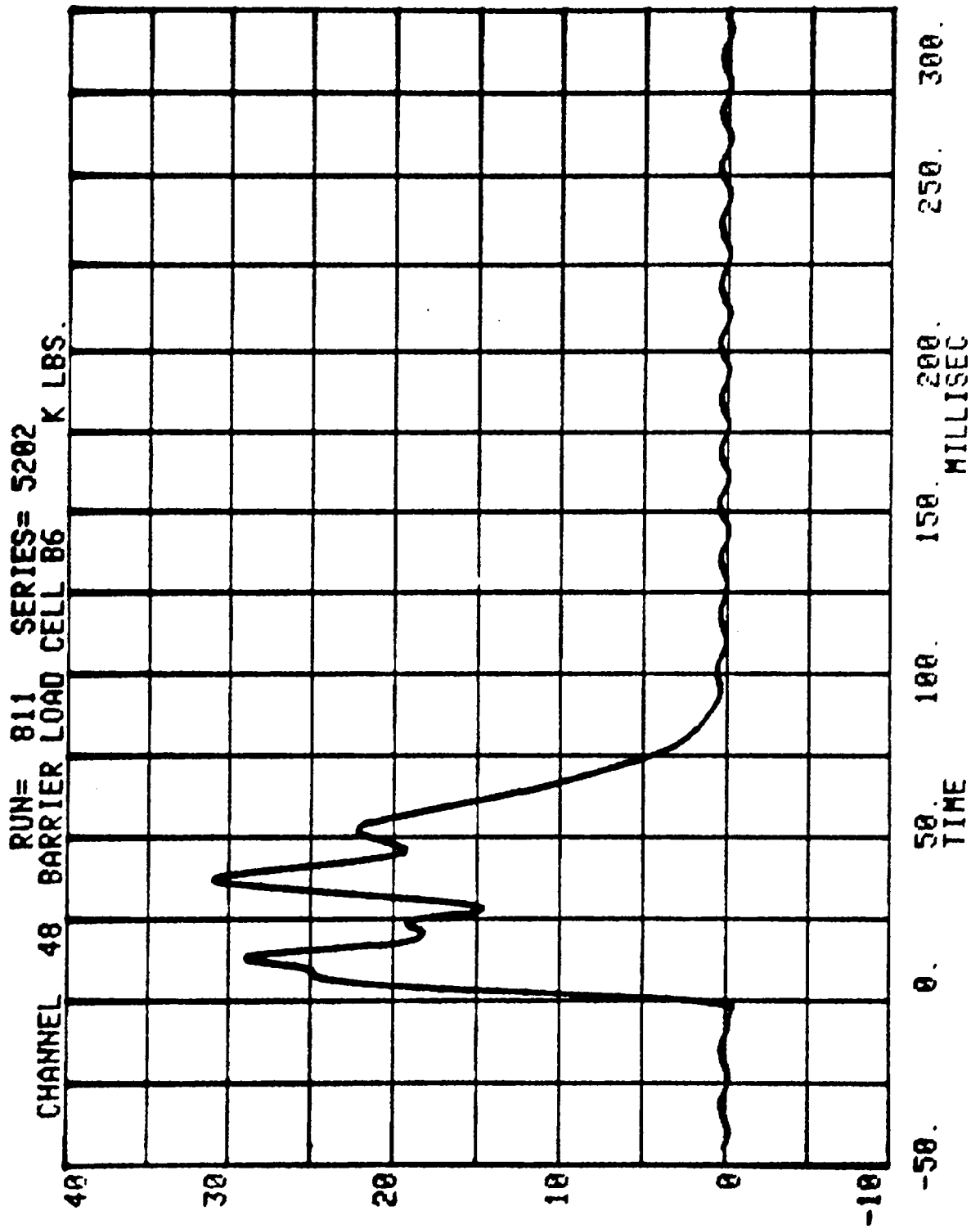

CHANNEL 45 BARRIER LOAD CELL B3
RUN= 811 SERIES= 5202
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

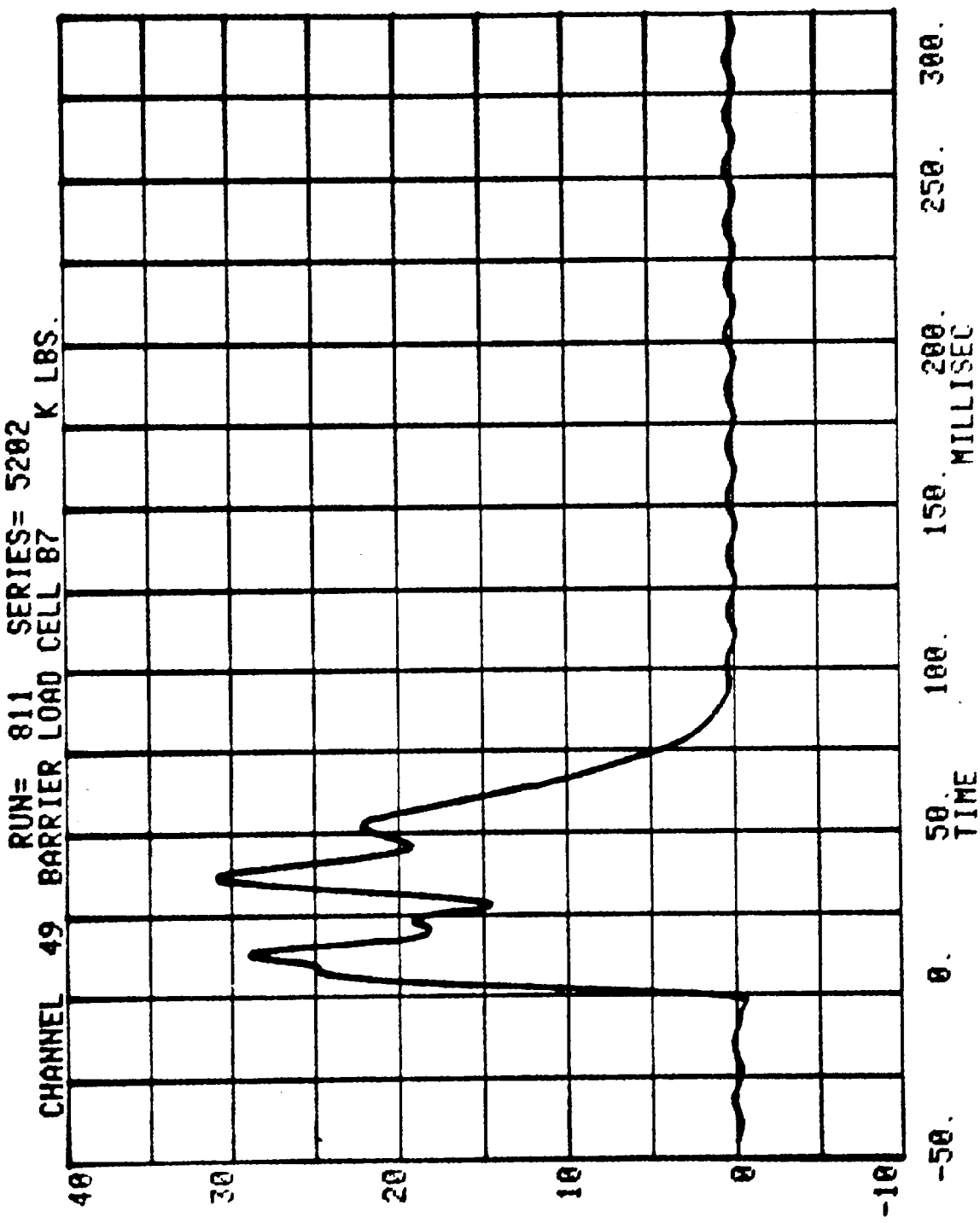

RUN= 811 SERIES= 5202
CHANNEL 46 BARRIER LOAD CELL B4
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

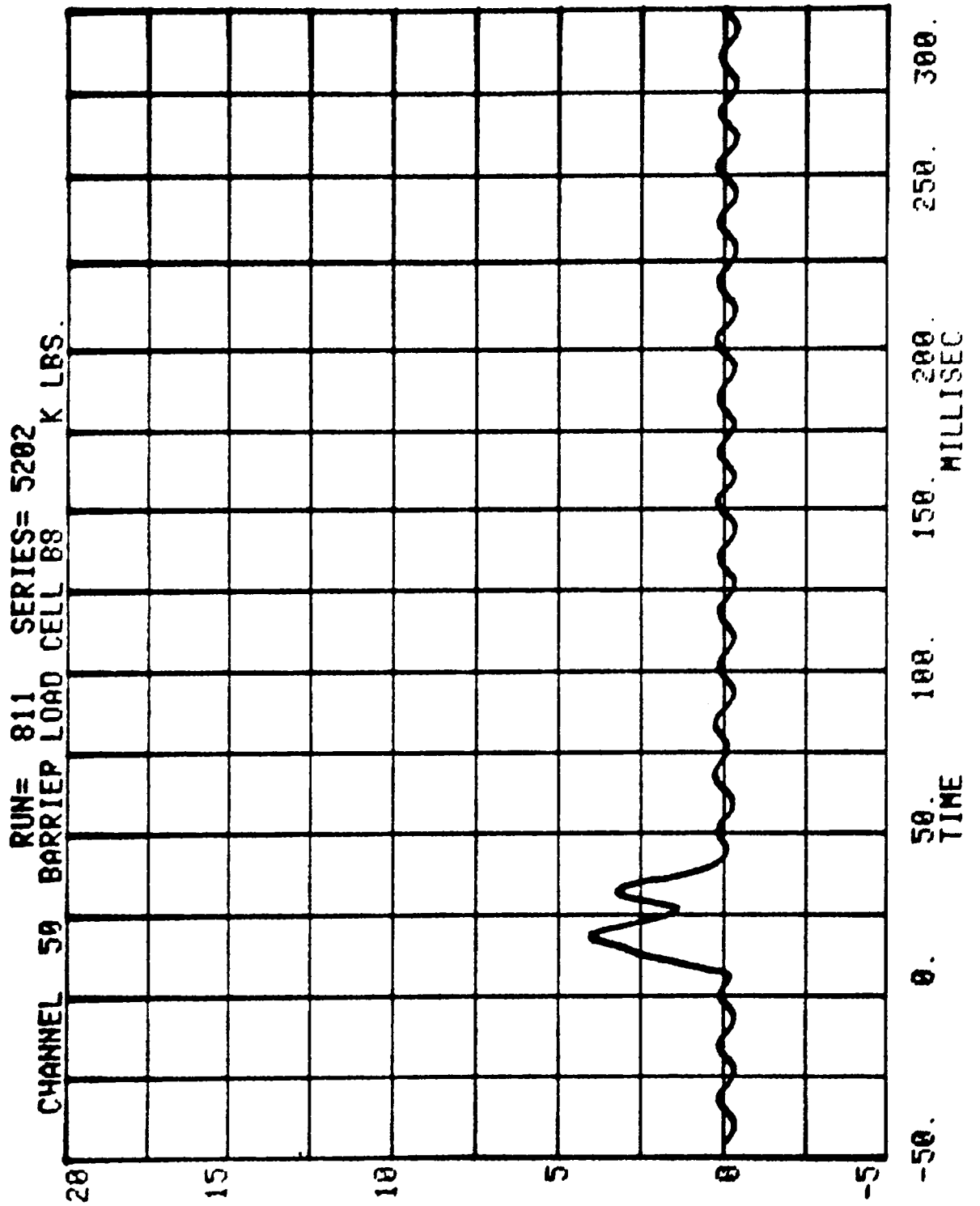
7626-9

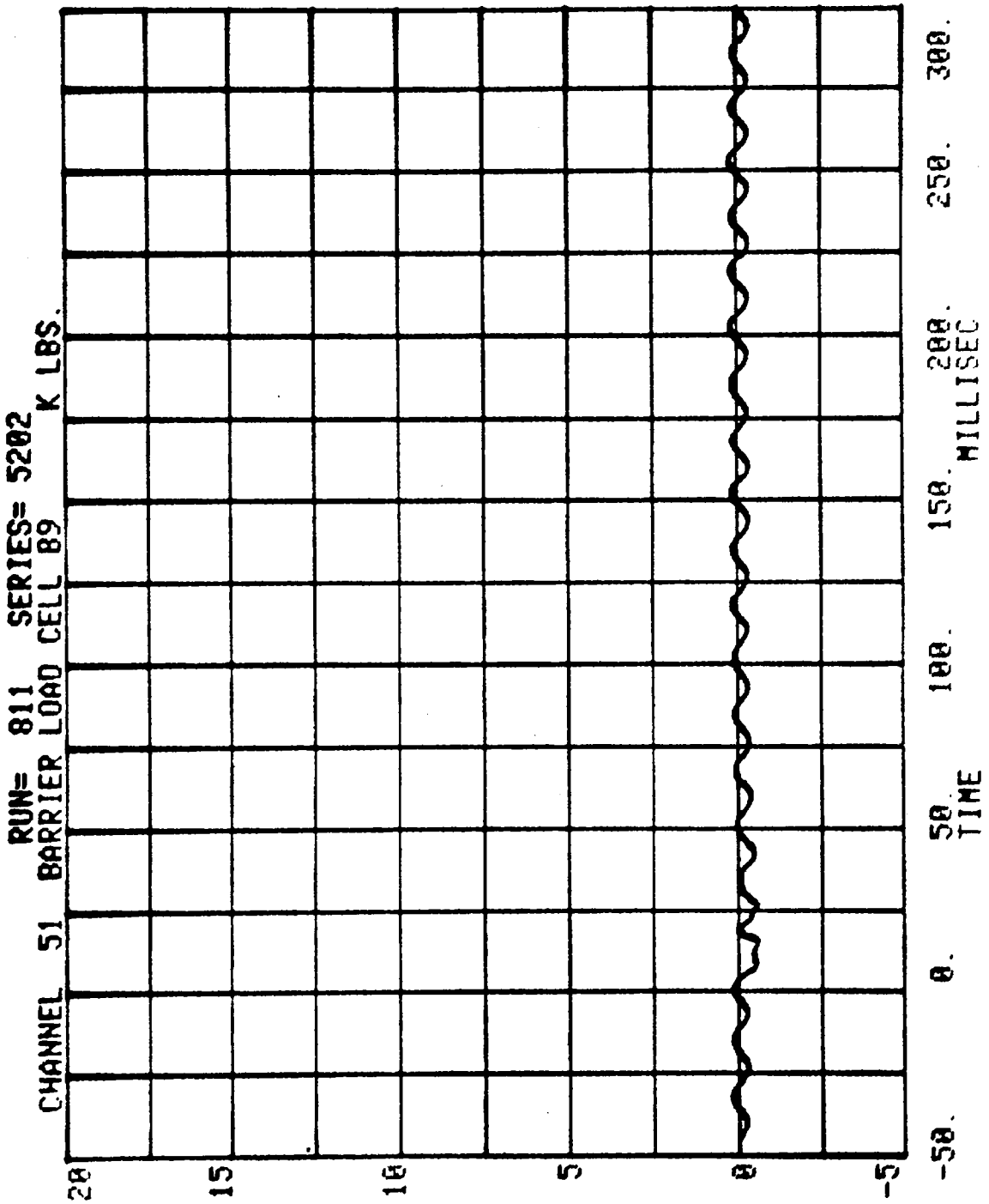

CHANNEL 47 BARRIER LOAD CELL 85
RUN= 811 SERIES= 5202
K LBS
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

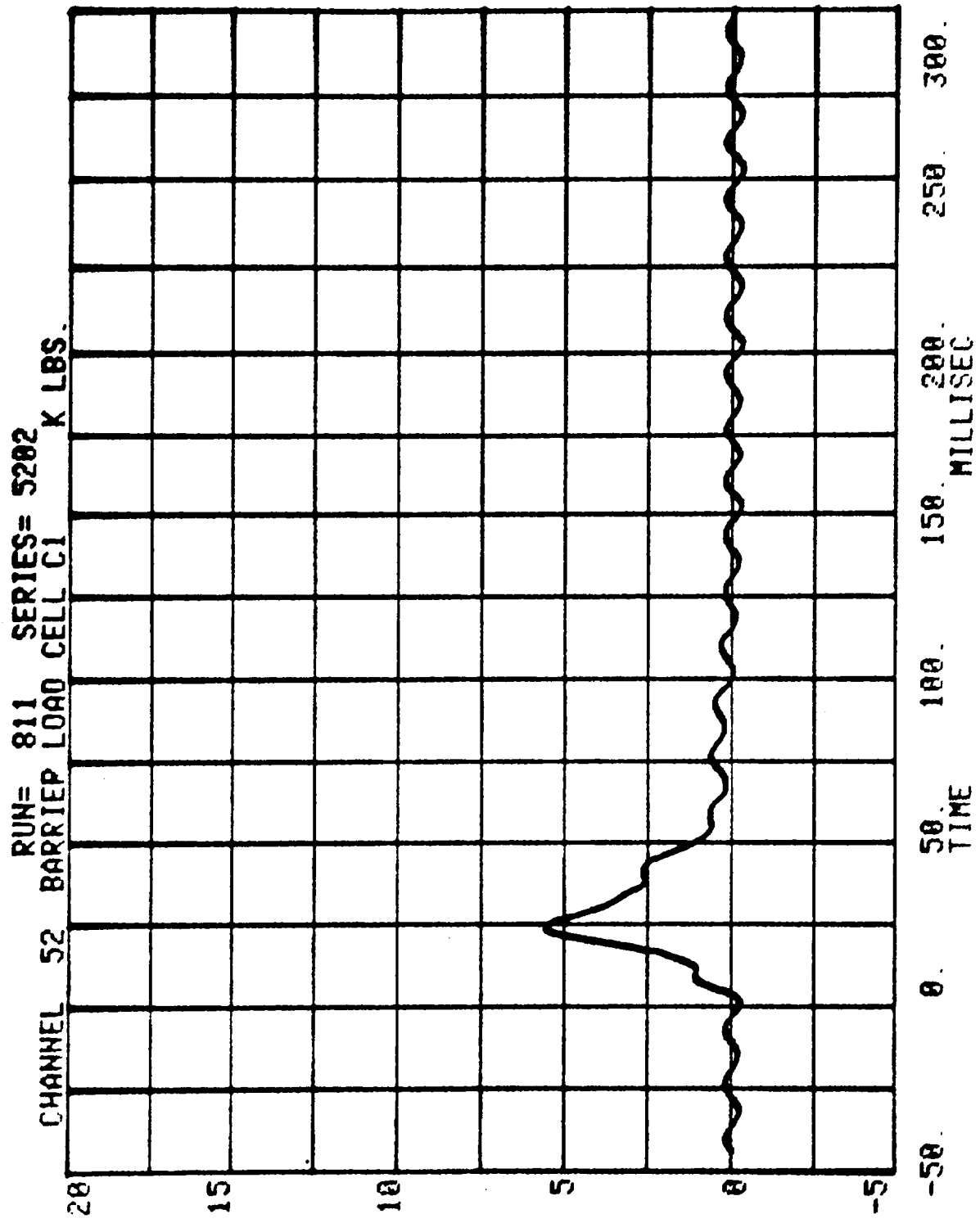
7626-9

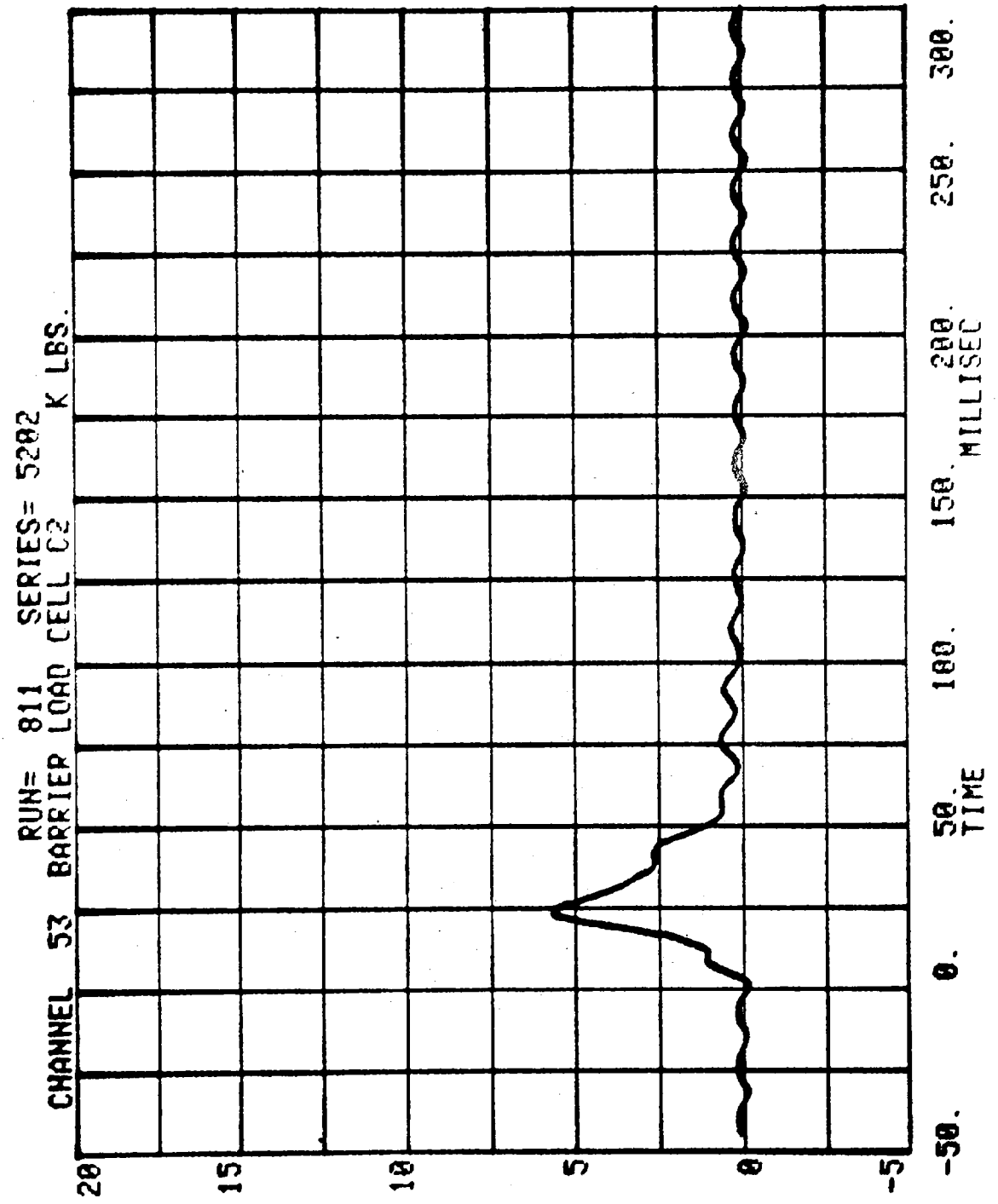

CHANNEL 48 BARRIER LOAD CELL B6
RUN= 811 SERIES= 5202
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 49 BARRIER LOAD CELL 87
RUN= 811 SERIES= 5202
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

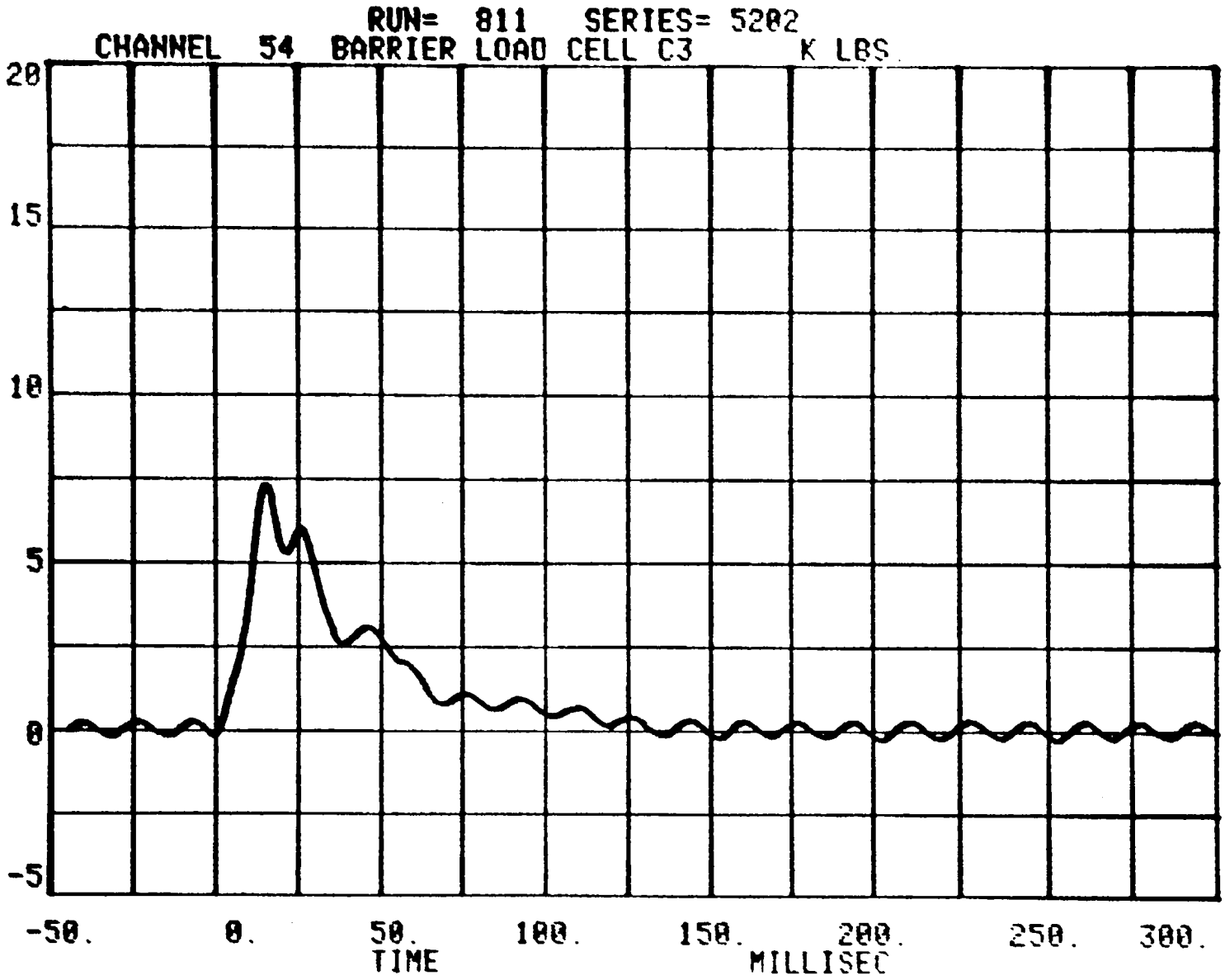

RUN= 811 SERIES= 5202
CHANNEL 59 BARRIEP LOAD CELL 88 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

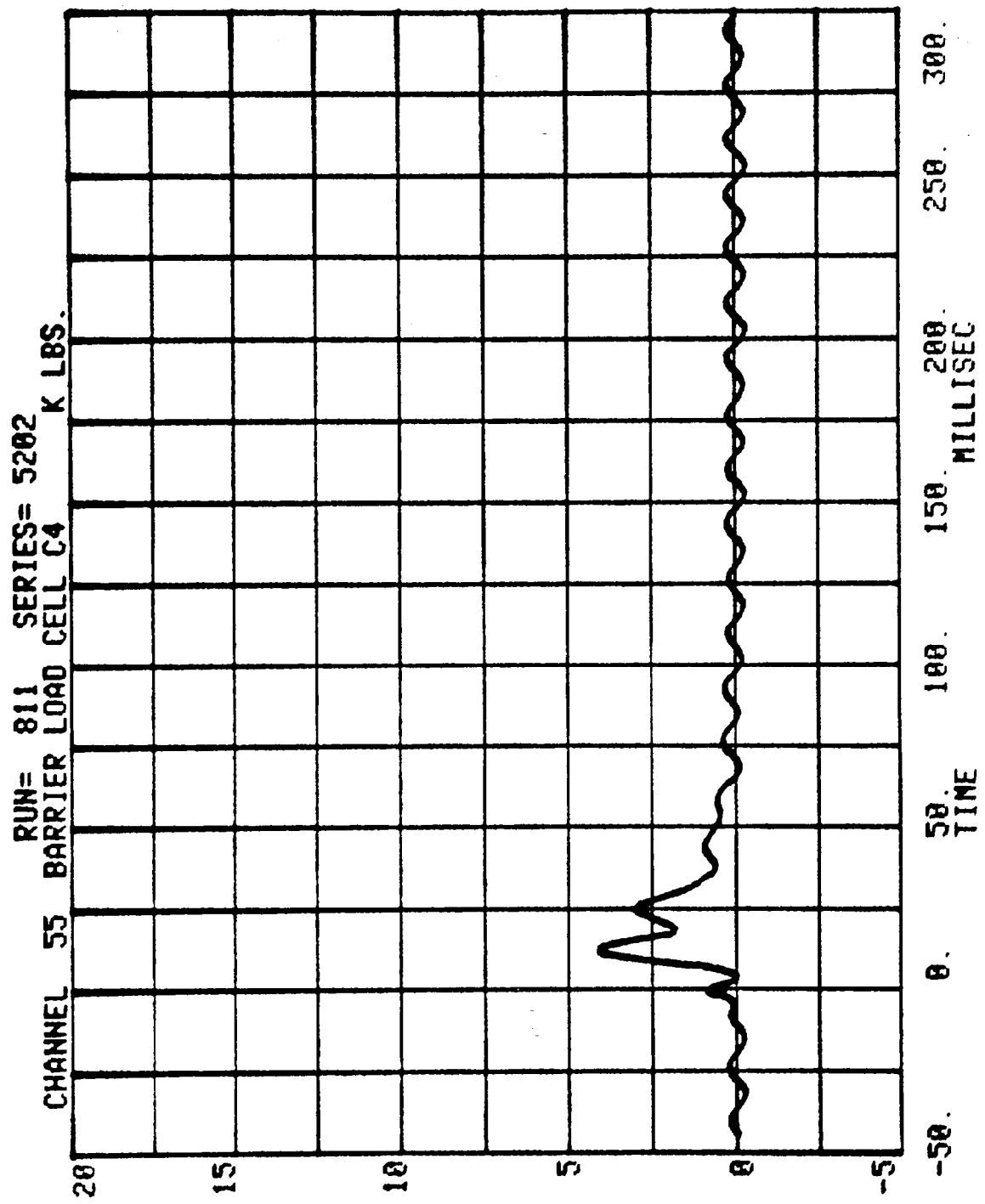

RUN= 811 SERIES= 5202
CHANNEL 51 BARRIER LOAD CELL 89 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 52 BARRIEP LOAD CELL C1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

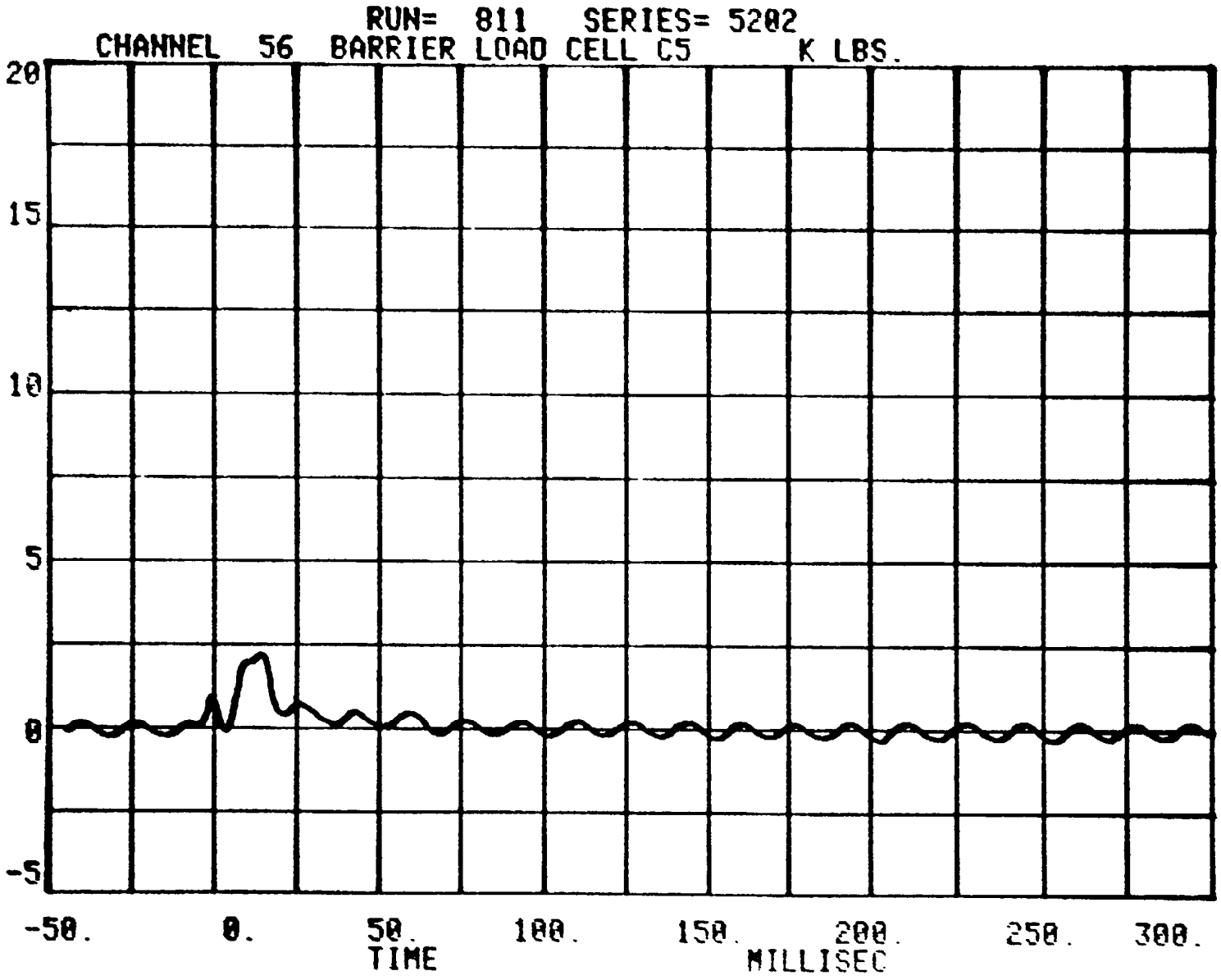

CHANNEL 53 BARRIER LOAD CELL C2
RUN= 811 SERIES= 5202
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

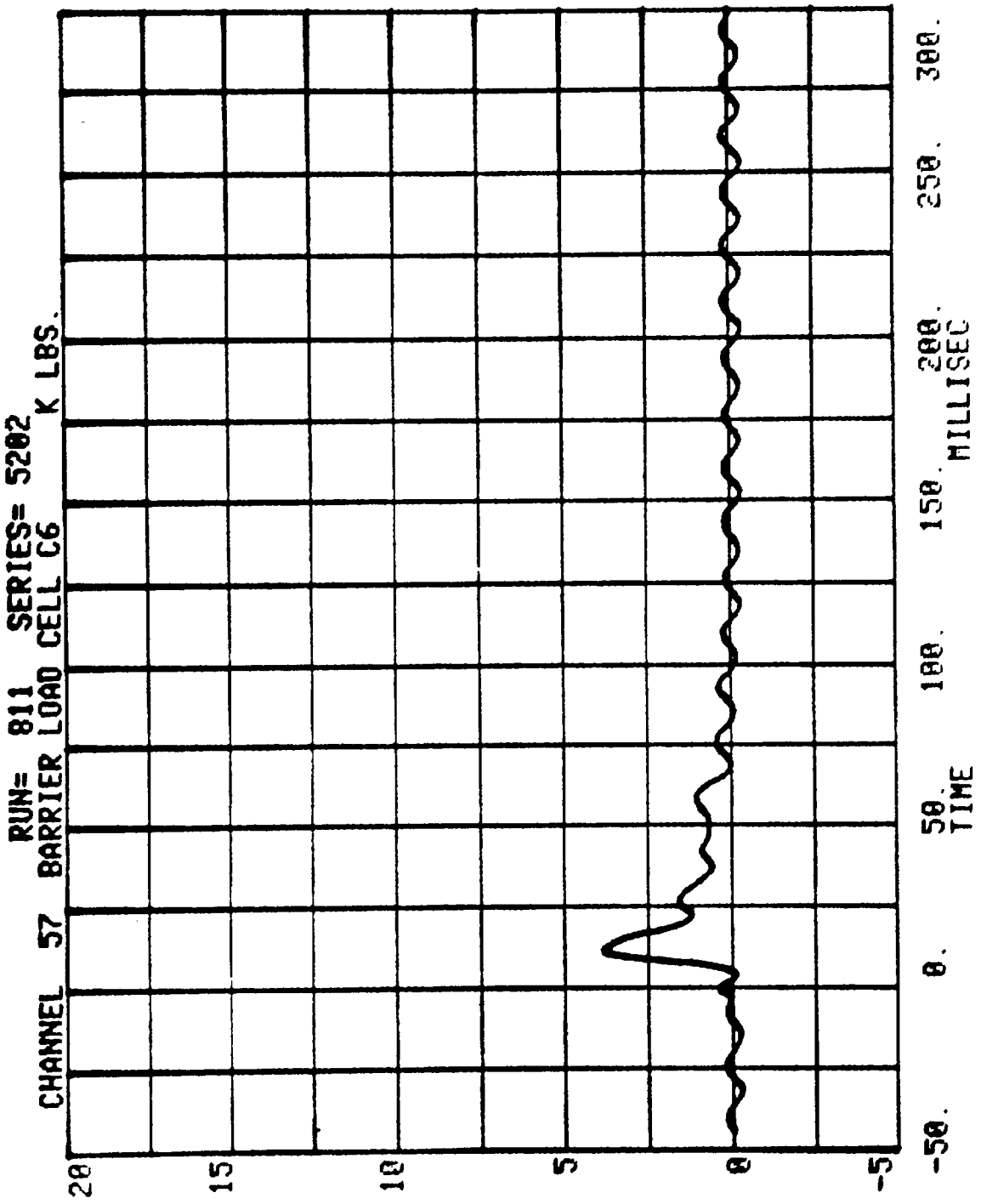
7626-9


RUN= 811 SERIES= 5202
CHANNEL 54 BARRIER LOAD CELL C3 K LBS
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

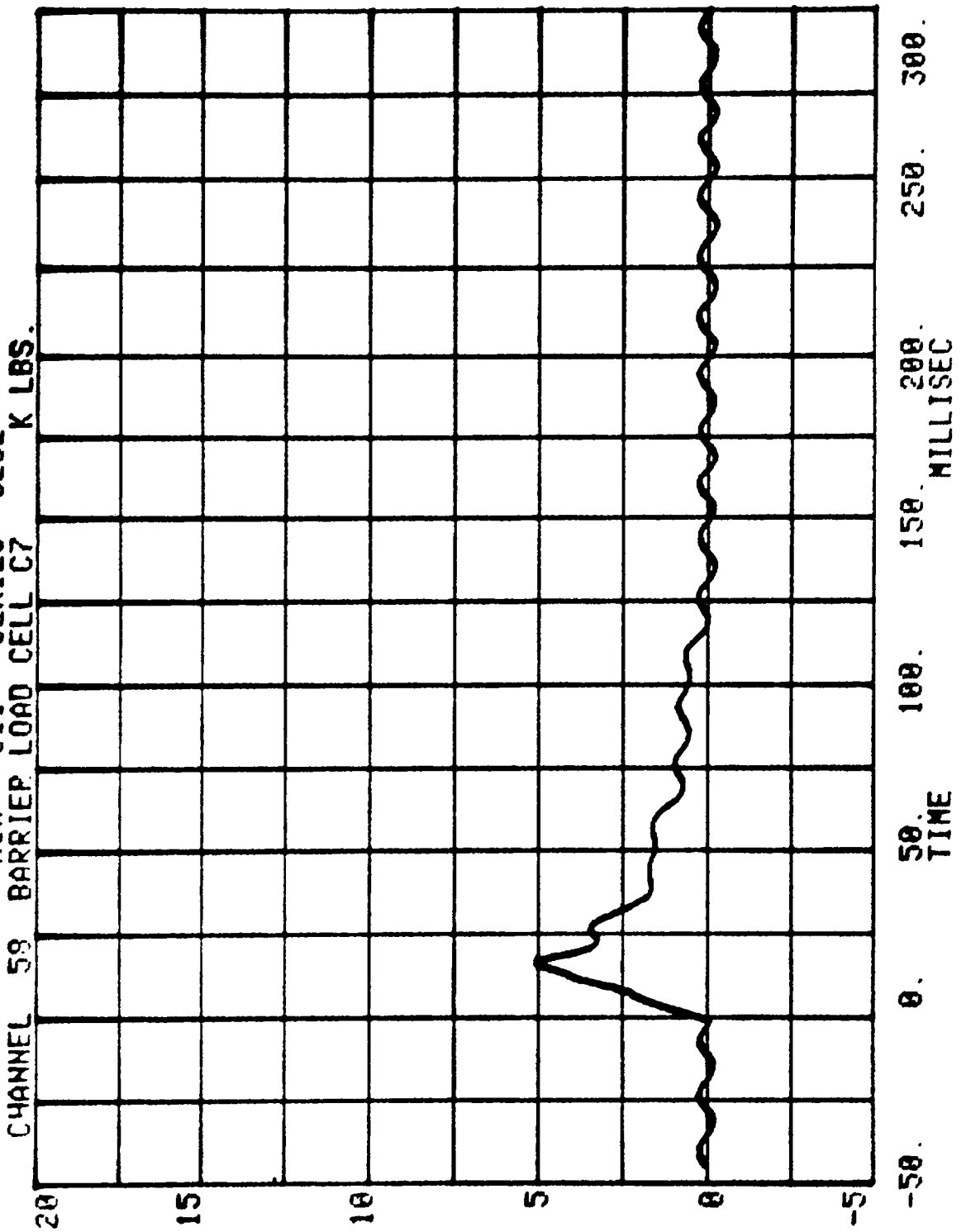

CHANNEL 55 BARRIER LOAD CELL C4
RUN= 811 SERIES= 5202
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

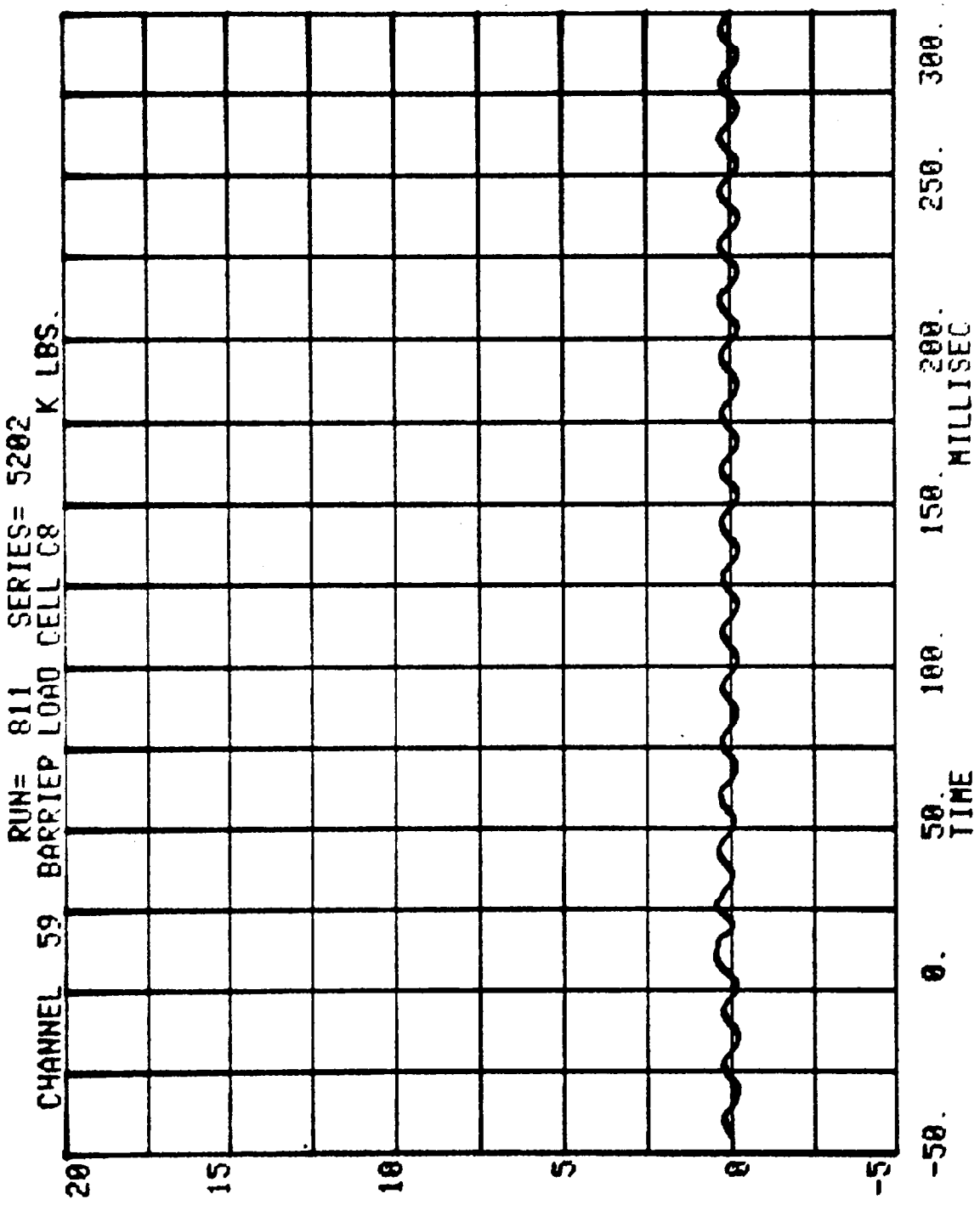
7626-9

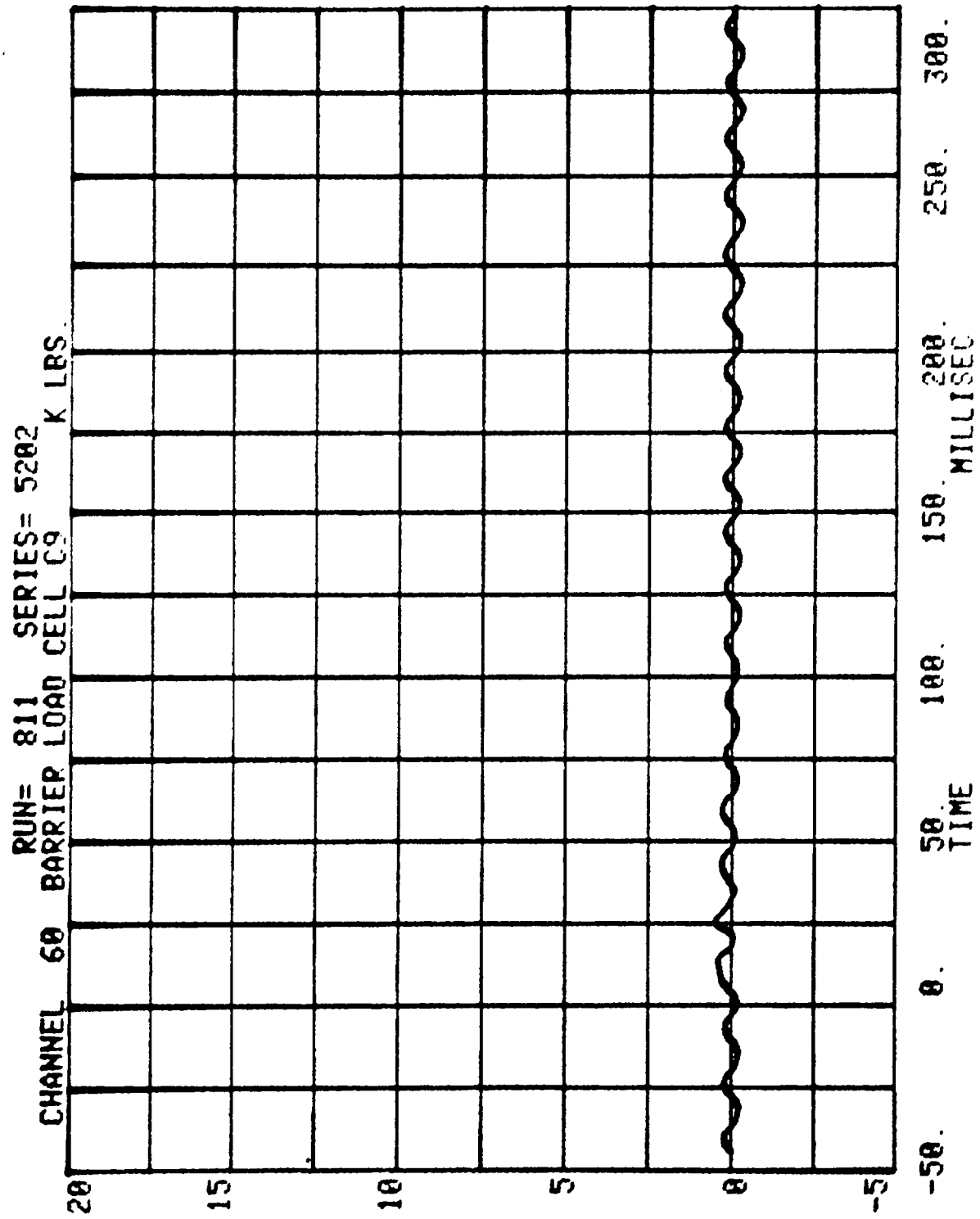

RUN= 811 SERIES= 5202
CHANNEL 56 BARRIER LOAD CELL C5 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

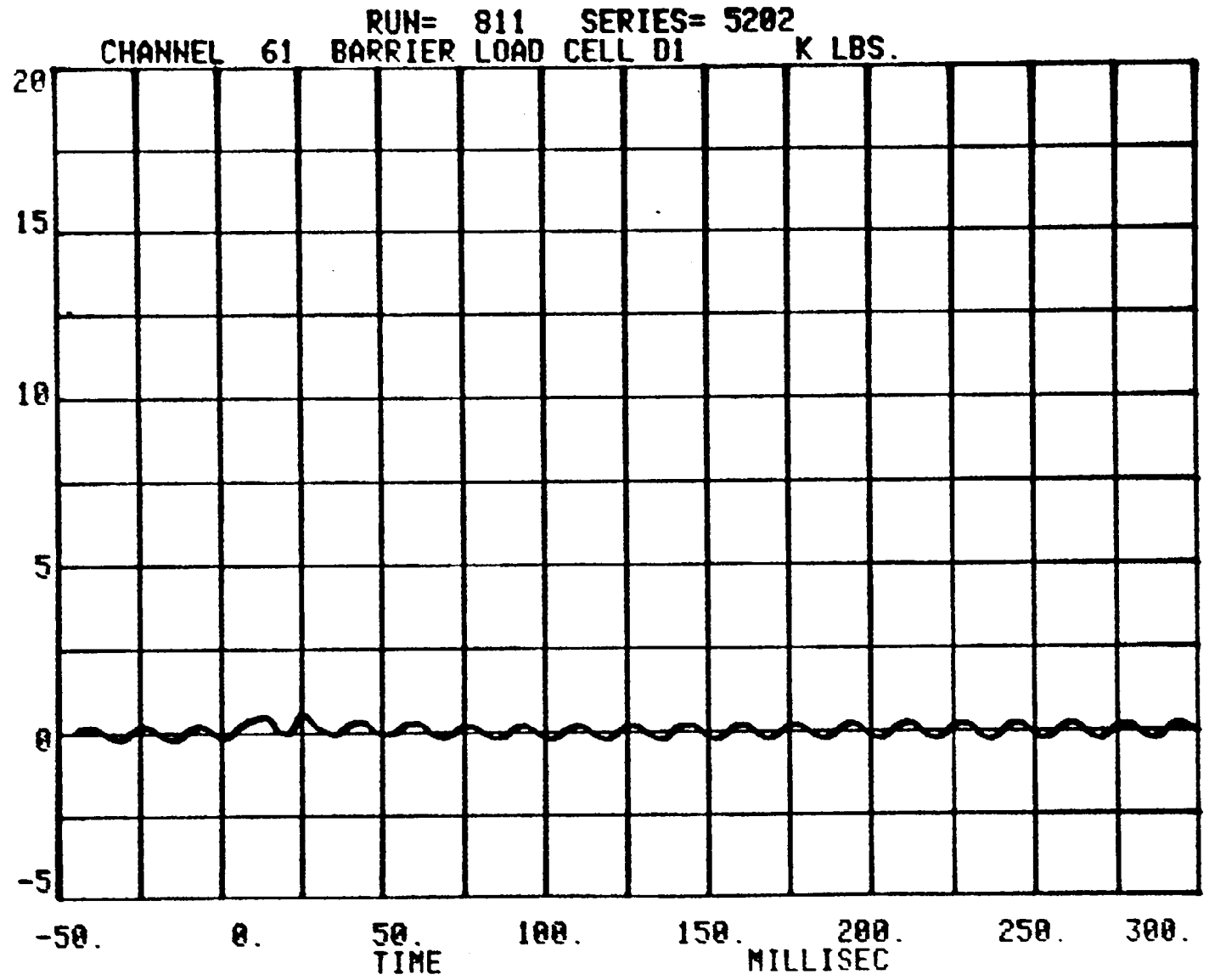

CHANNEL 57 BARRIER LOAD CELL C6
RUN= 811 SERIES= 5202
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

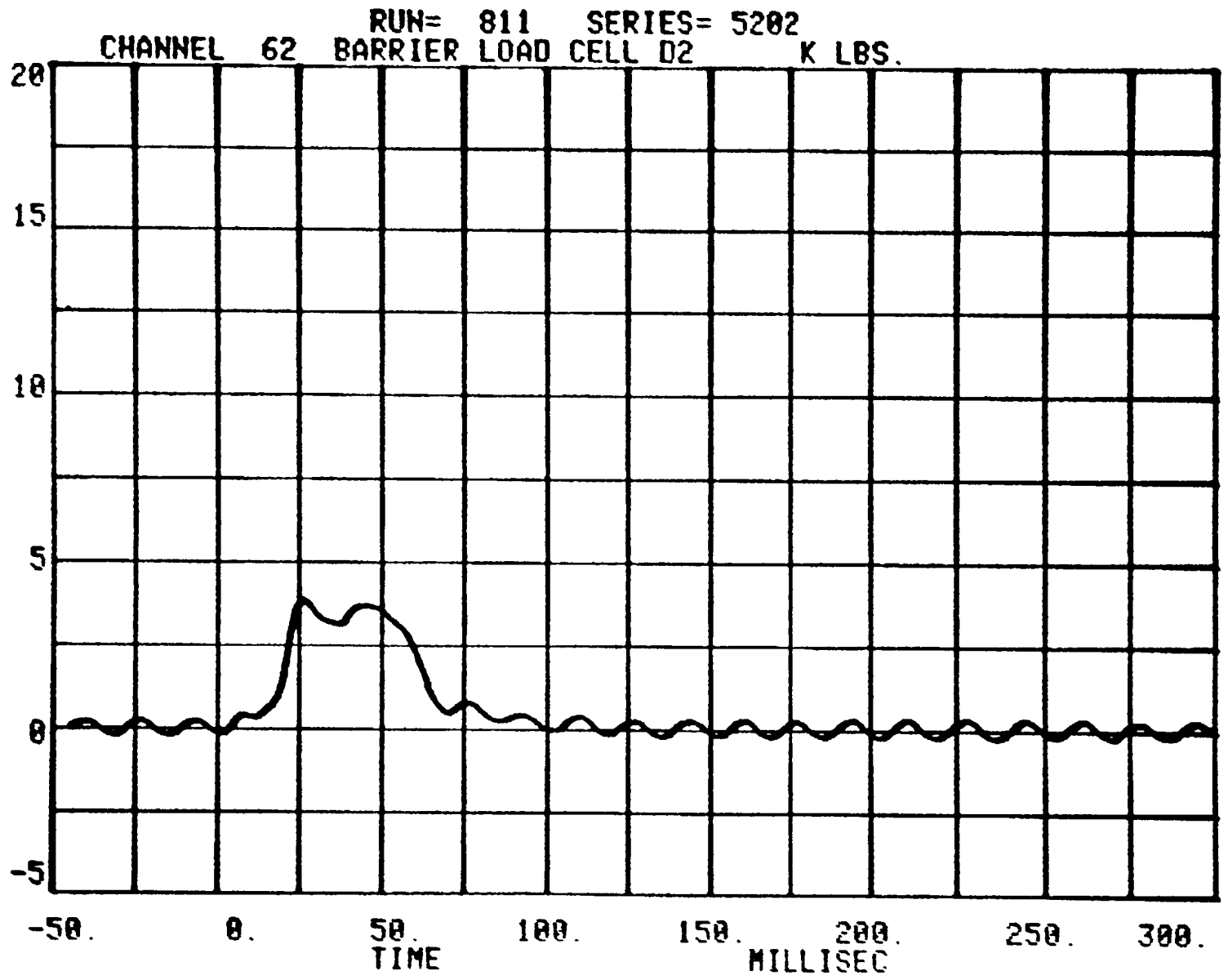
7626-9

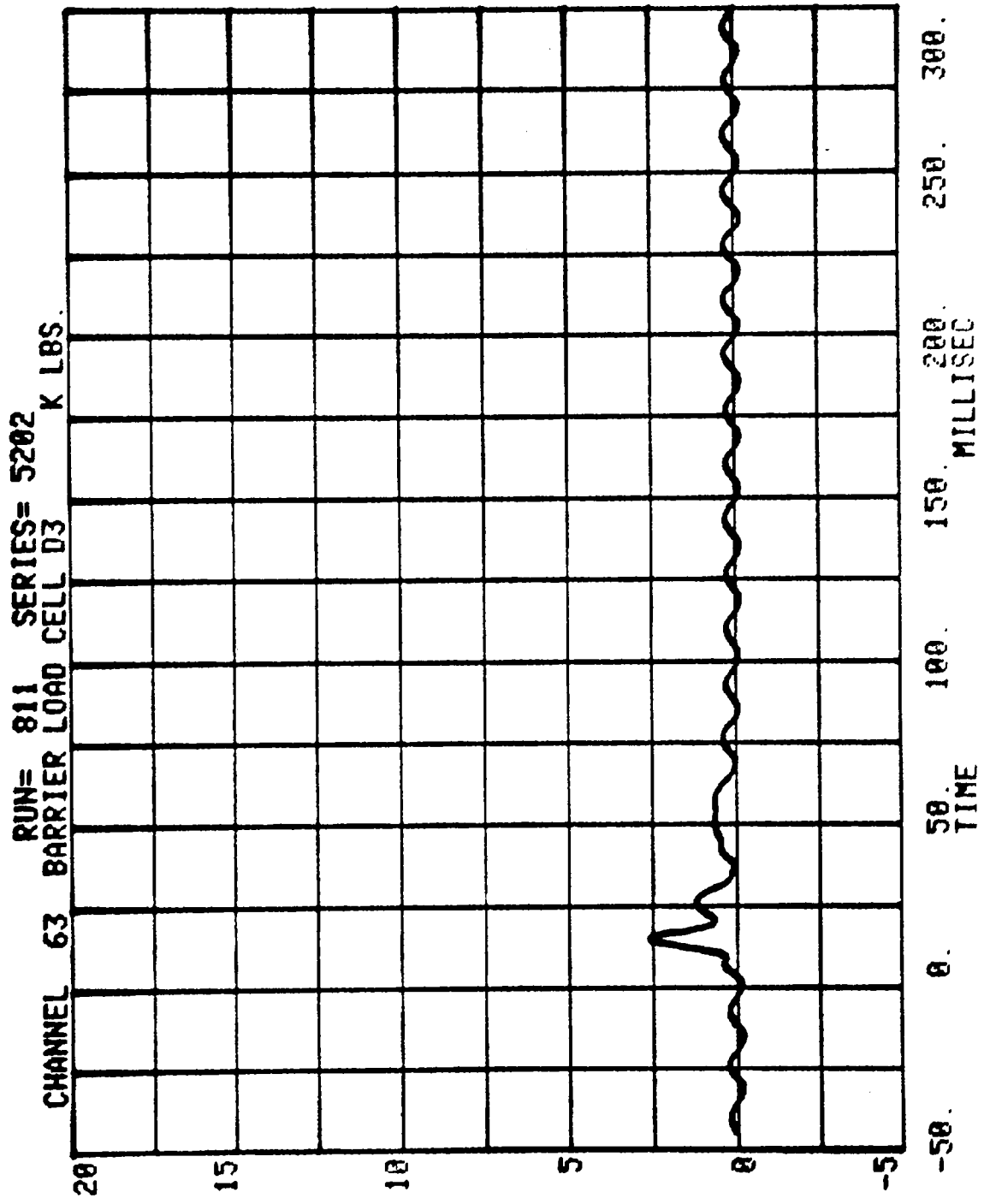

RUN= 811 SERIES= 5202
CHANNEL 59 BARRIER LOAD CELL C7 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 59 BARRIEP LOAD CELL C8
RUN= 811 SERIES= 5202
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

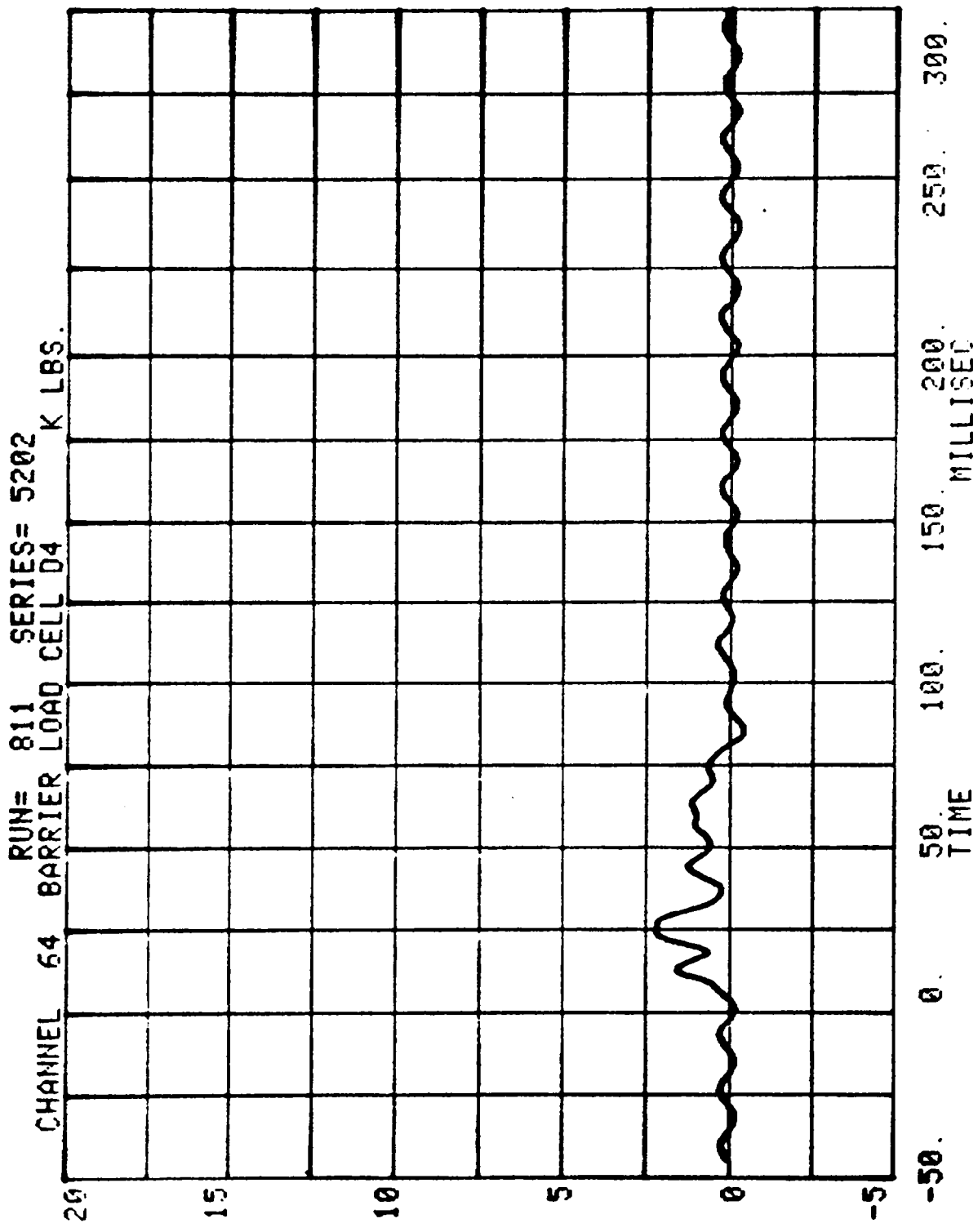

RUN= 811 SERIES= 5202
CHANNEL 60 BARRIER LOAD CELL C9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 61 BARRIER LOAD CELL D1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC

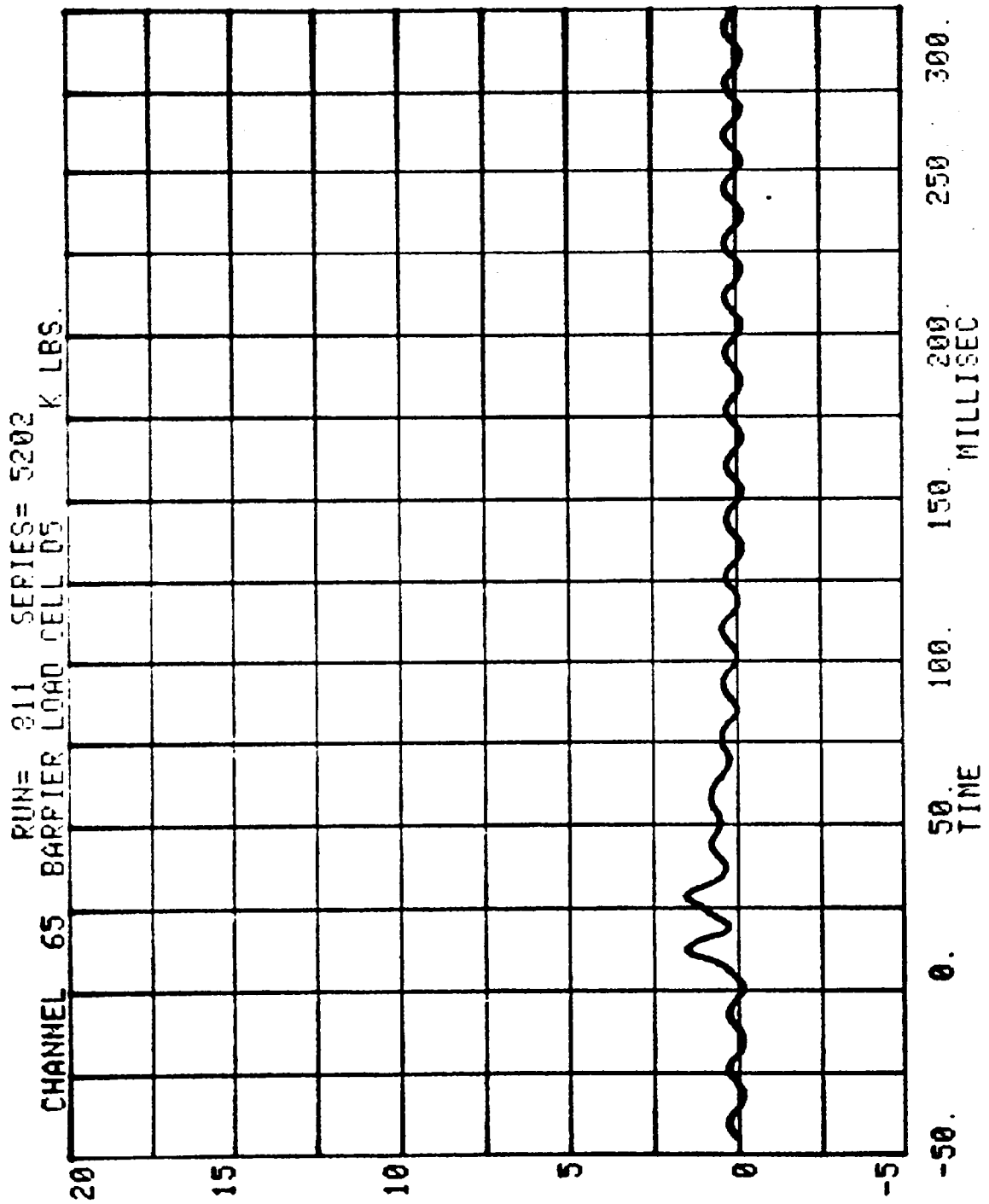

RUN= 811 SERIES= 5202
CHANNEL 62 BARRIER LOAD CELL D2 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 63 BARRIER LOAD CELL 03
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

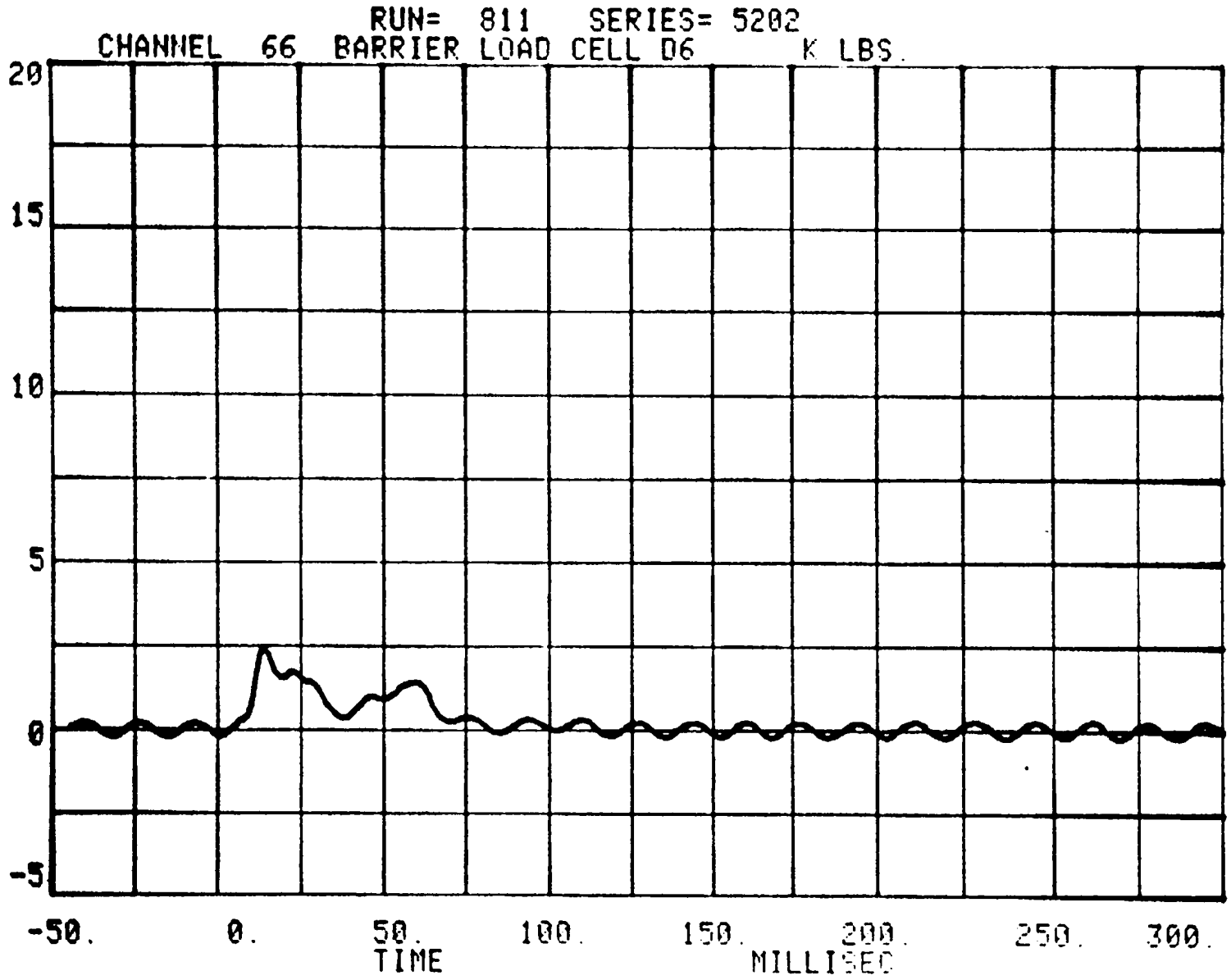
7626-9

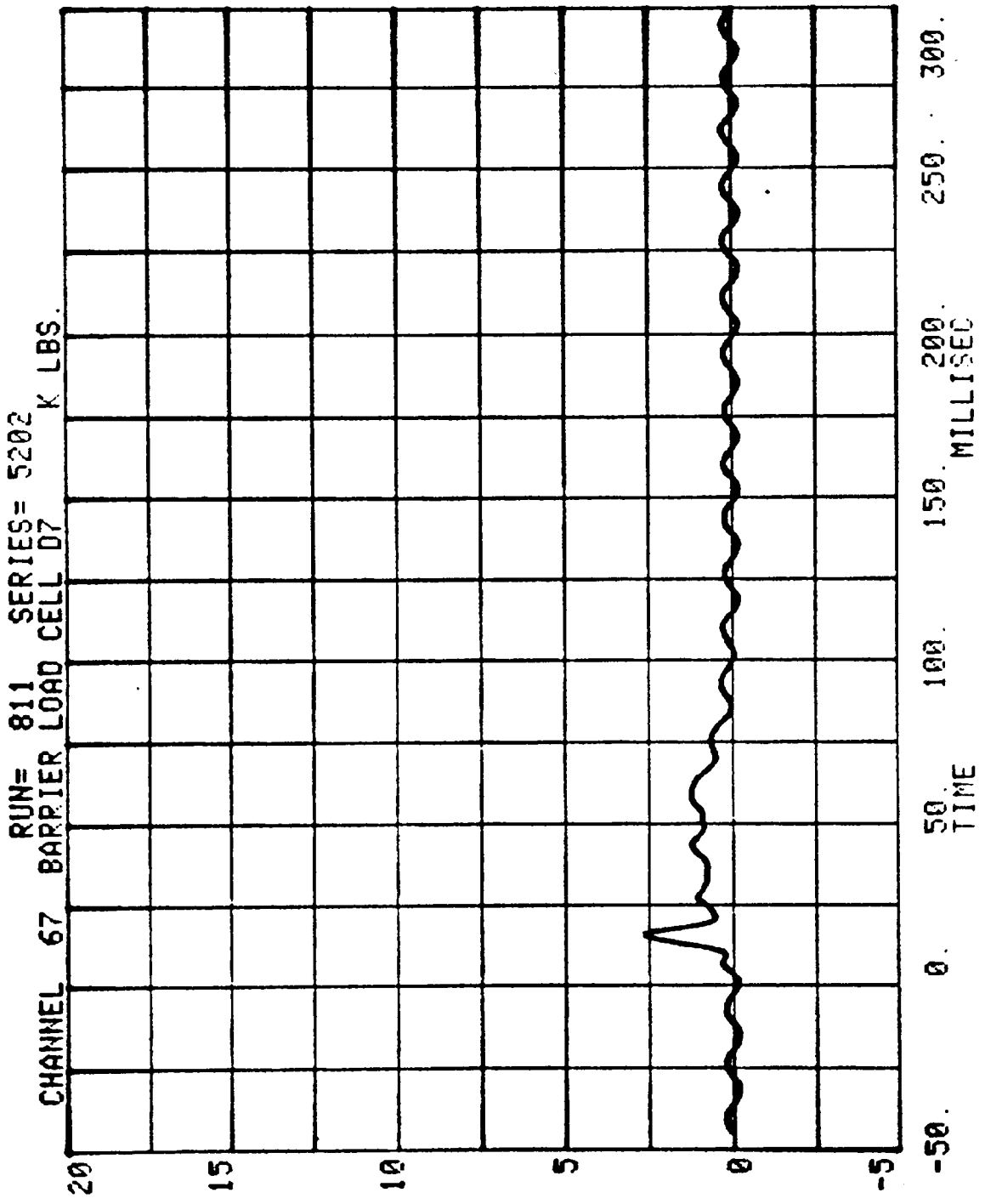

CHANNEL 64 BARRIER LOAD CELL D4
RUN= 811 SERIES= 5202
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9

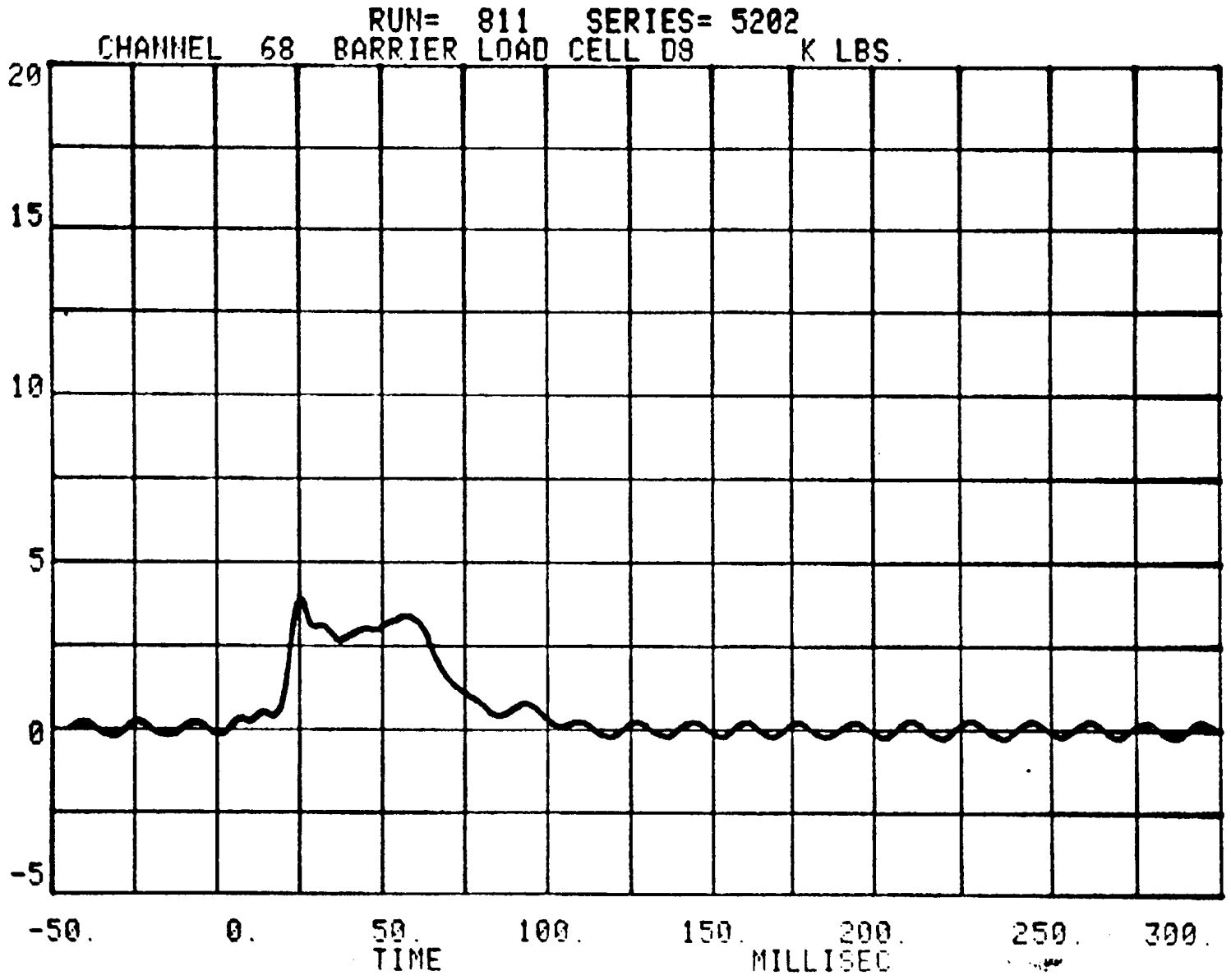

CHANNEL 65
RUN= 211 SERIES= 5202
BARRIER LOAD CELL 05
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250
300.
TIME
MILLISEC

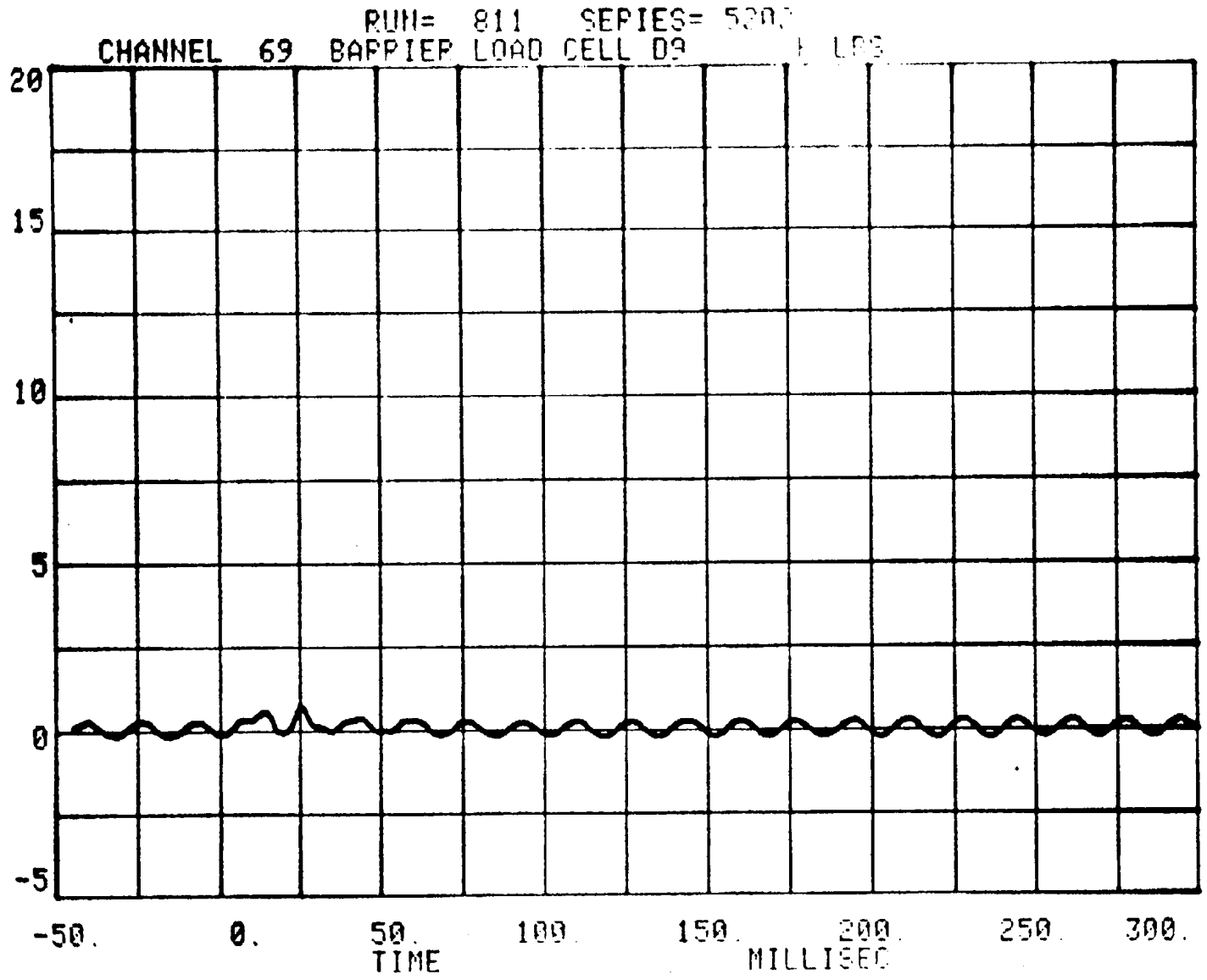
7626-9


RUN= 811 SERIES= 5202
CHANNEL 66 BARRIER LOAD CELL D6 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 67 BARRIER LOAD CELL D7
RUN= 811 SERIES= 5202
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9

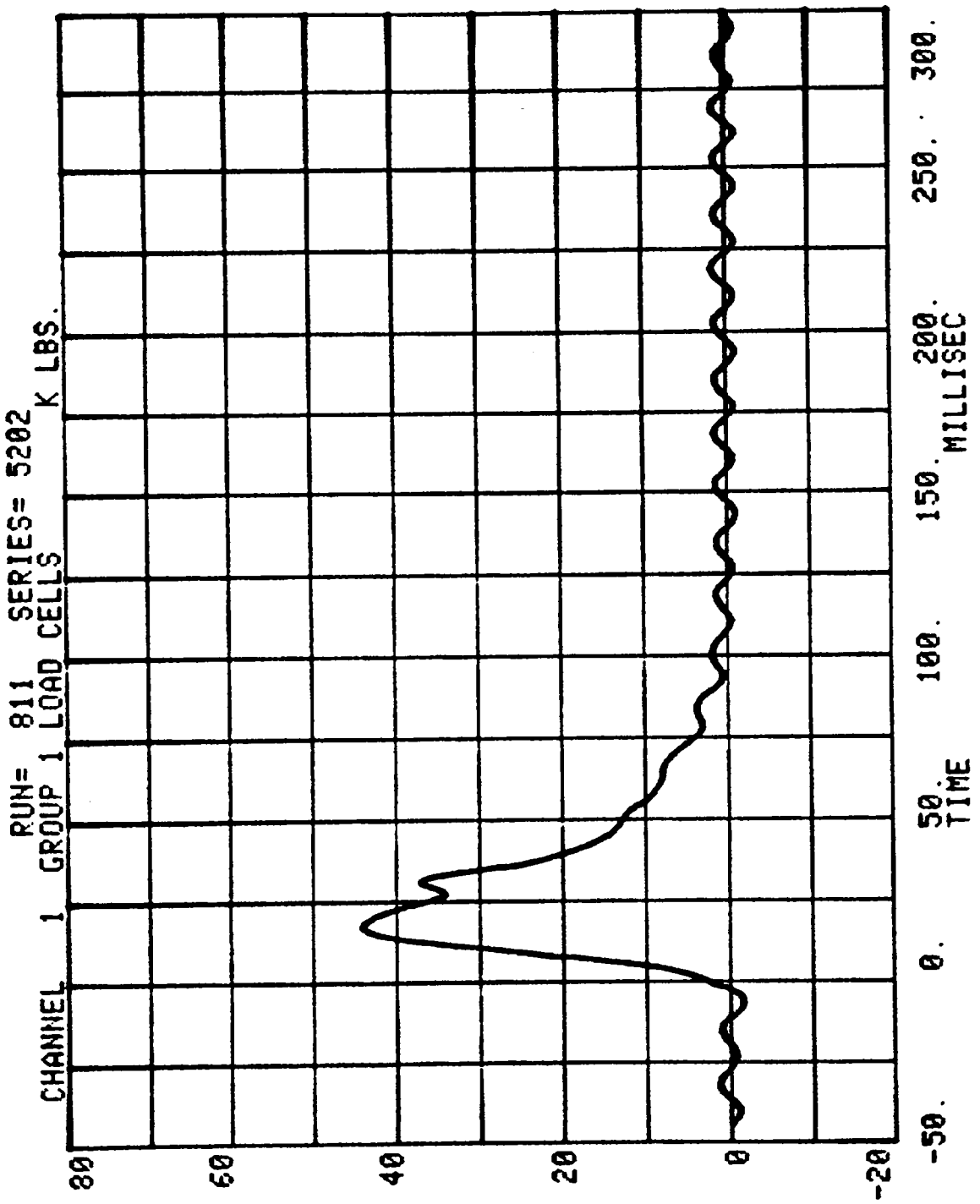

RUN= 811 SERIES= 5202
CHANNEL 68 BARRIER LOAD CELL D8 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

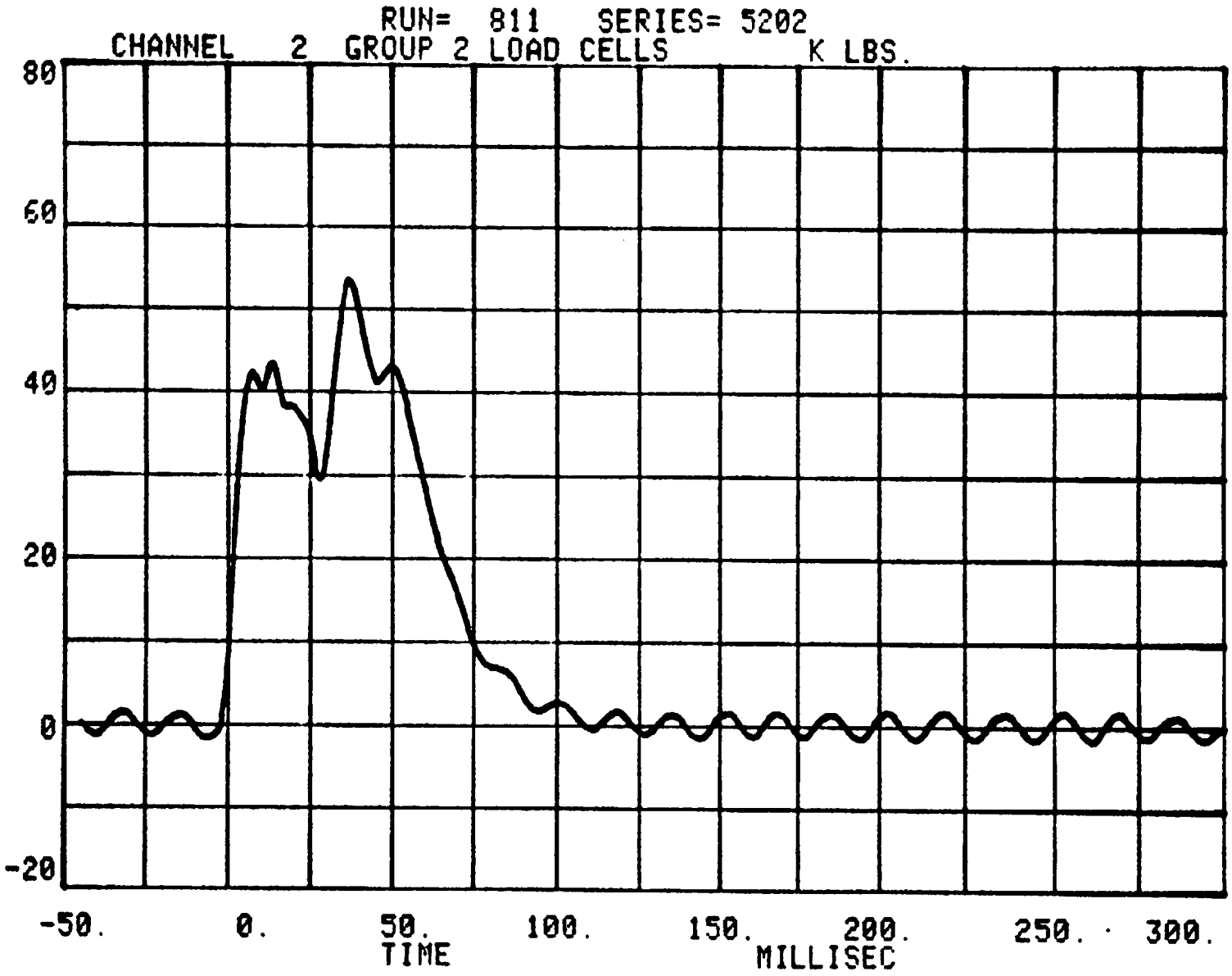

RUN= 811 SERIES= 530
CHANNEL 69 BARRIER LOAD CELL D9
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

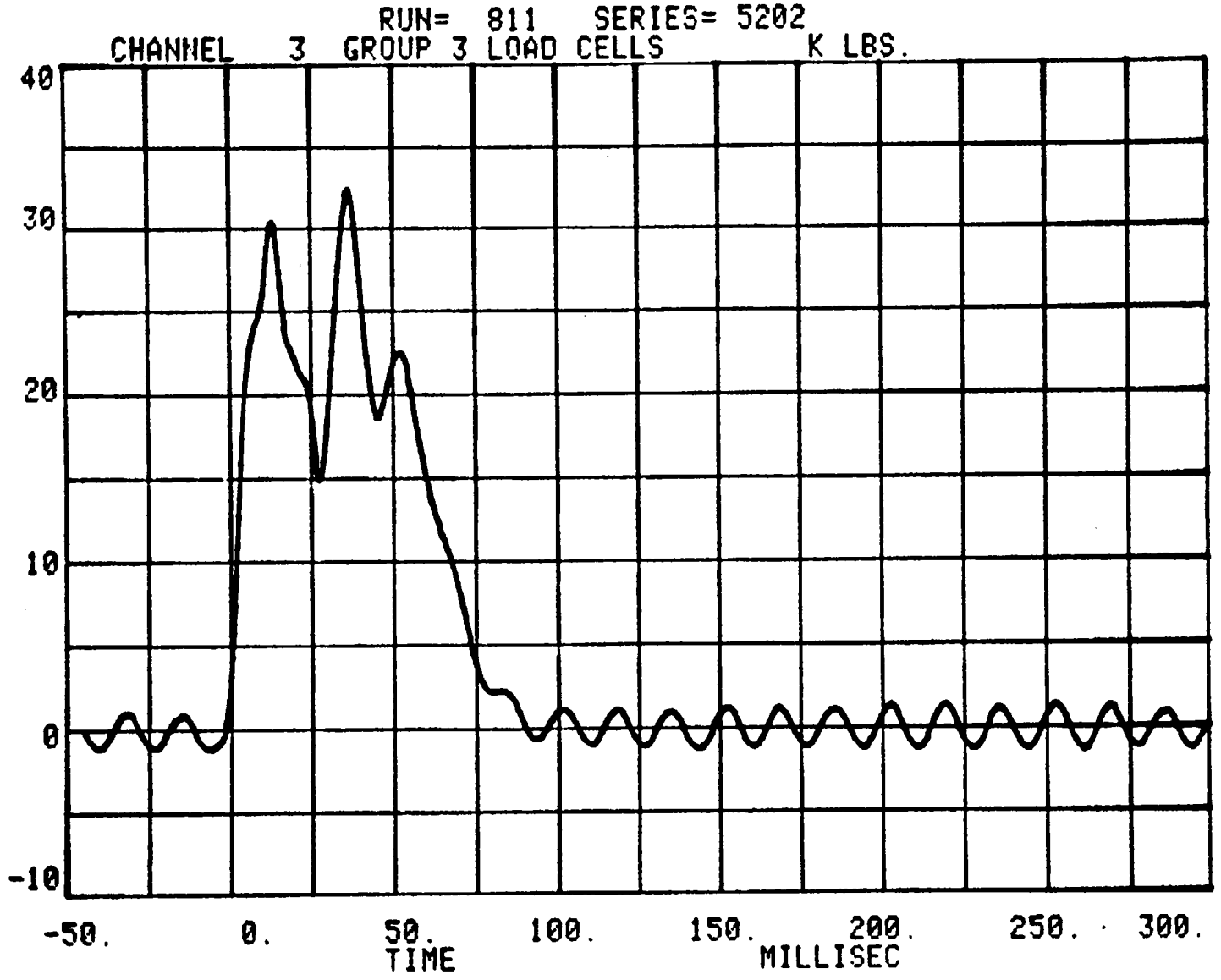
NEW CAR ASSESSMENT BARRIER TEST - 1988

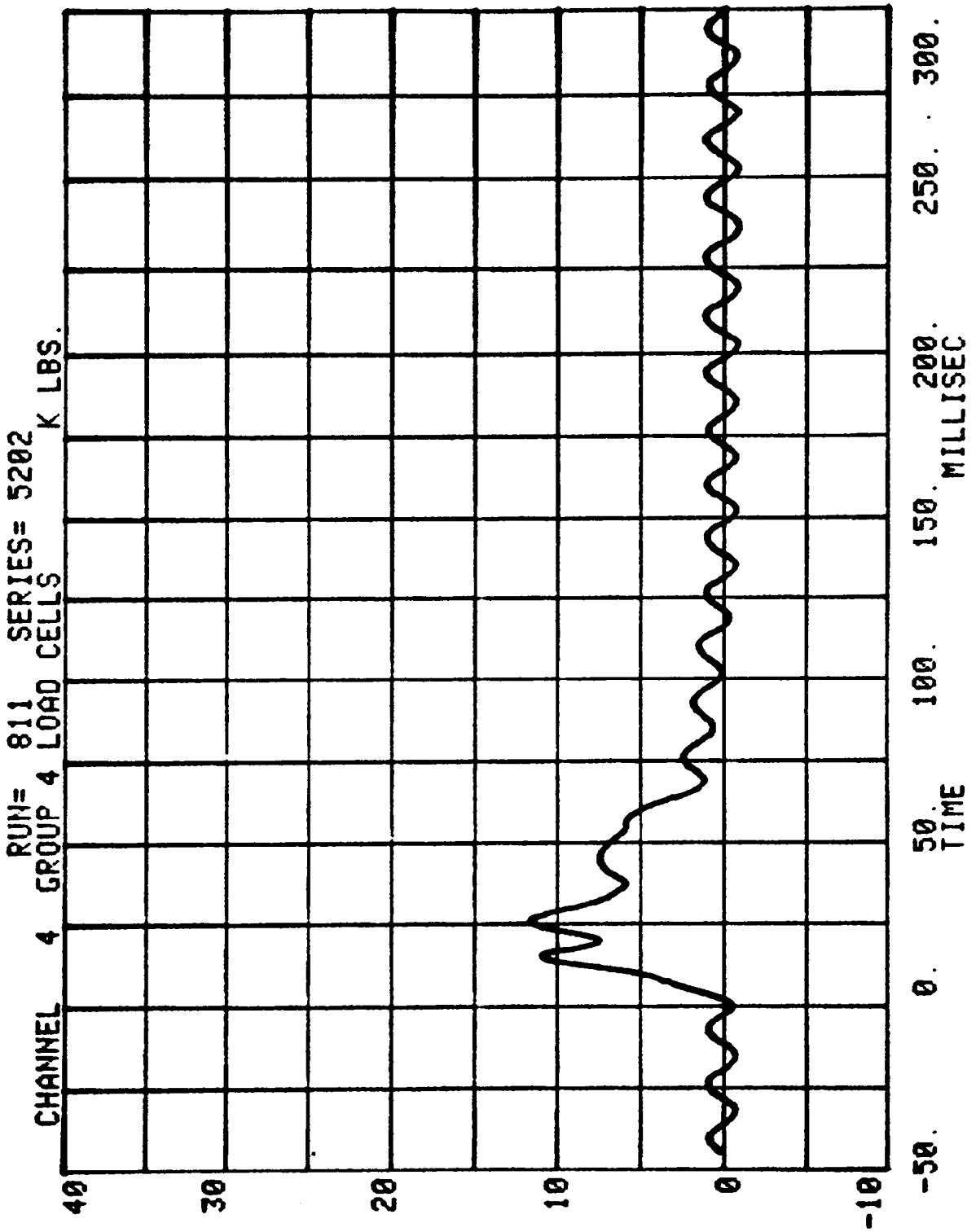
RUN # 811 SERIES # 5202

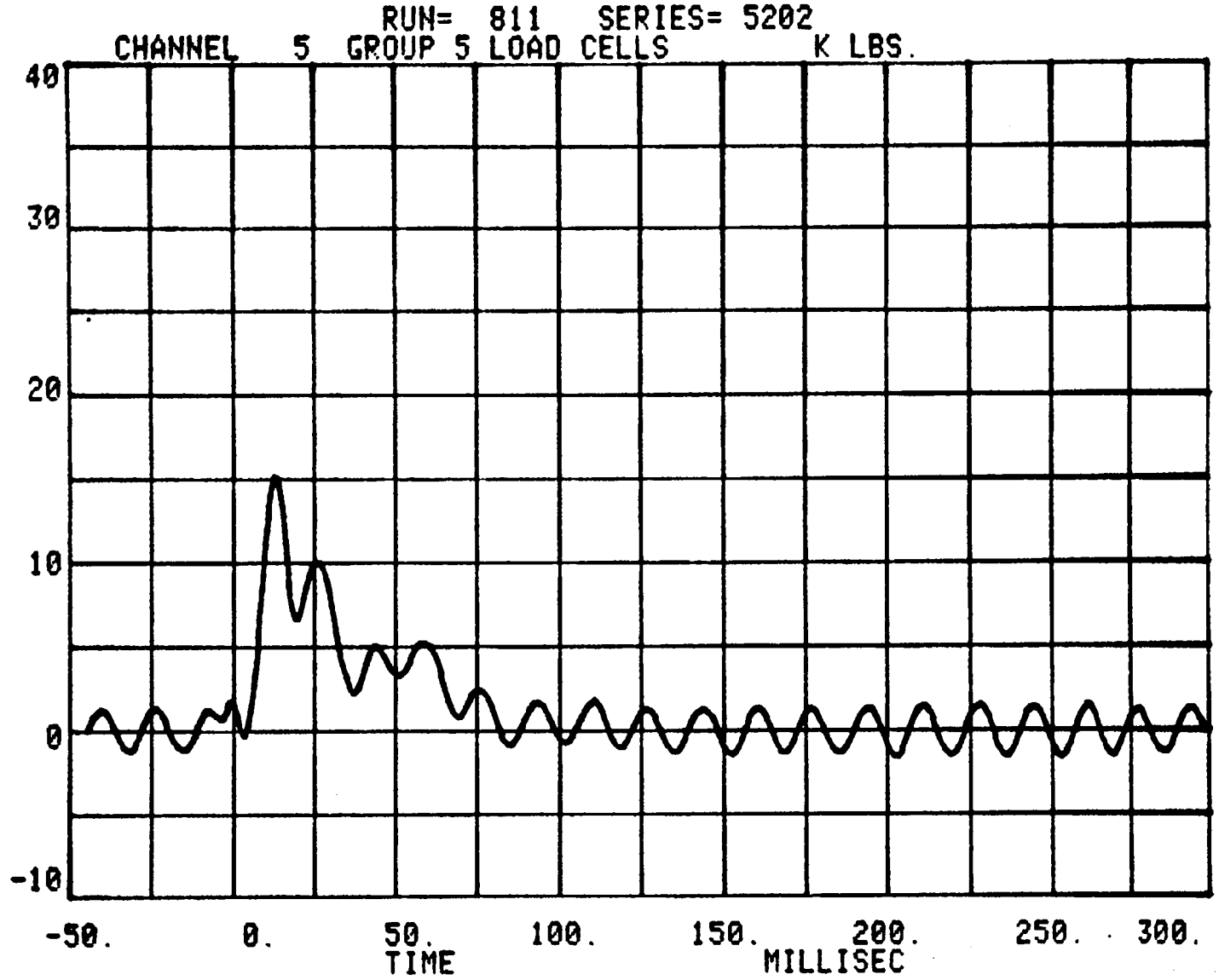
CHAN	TITLE	MINIMUM	MAXIMUM
1	GROUP 1 LOAD CELLS	-1.559	44.103 K LBS.
2	GROUP 2 LOAD CELLS	-1.626	53.475 K LBS.
3	GROUP 3 LOAD CELLS	-1.335	32.373 K LBS.
4	GROUP 4 LOAD CELLS	-.877	11.631 K LBS.
5	GROUP 5 LOAD CELLS	-1.542	15.156 K LBS.
6	GROUP 6 LOAD CELLS	-1.481	11.235 K LBS.
7	TOTAL LOAD CELL SUM	-1.170	147.761 K LBS.

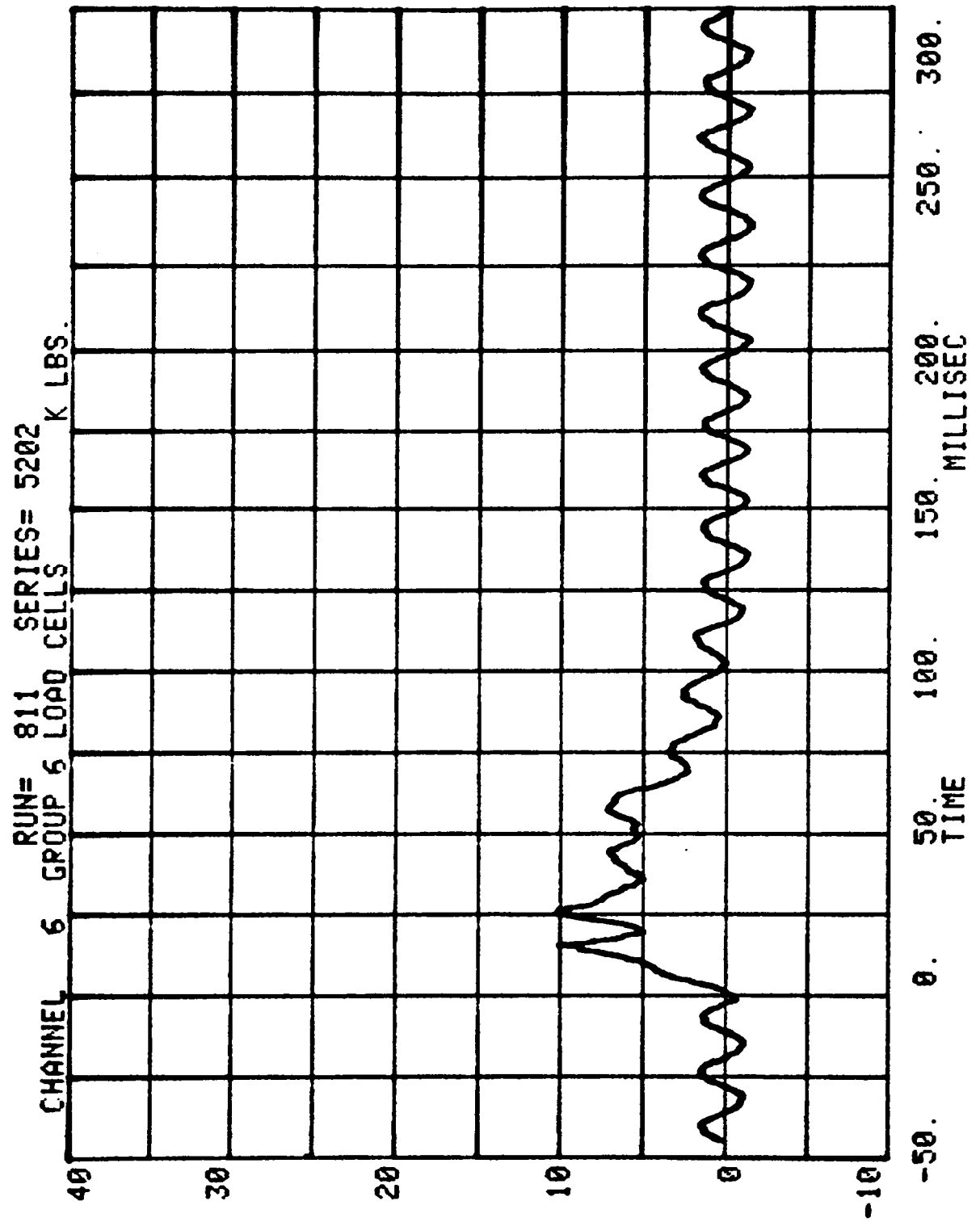

CHANNEL 1 GROUP 1 LOAD CELLS
RUN= 811 SERIES= 5202
K LBS.
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

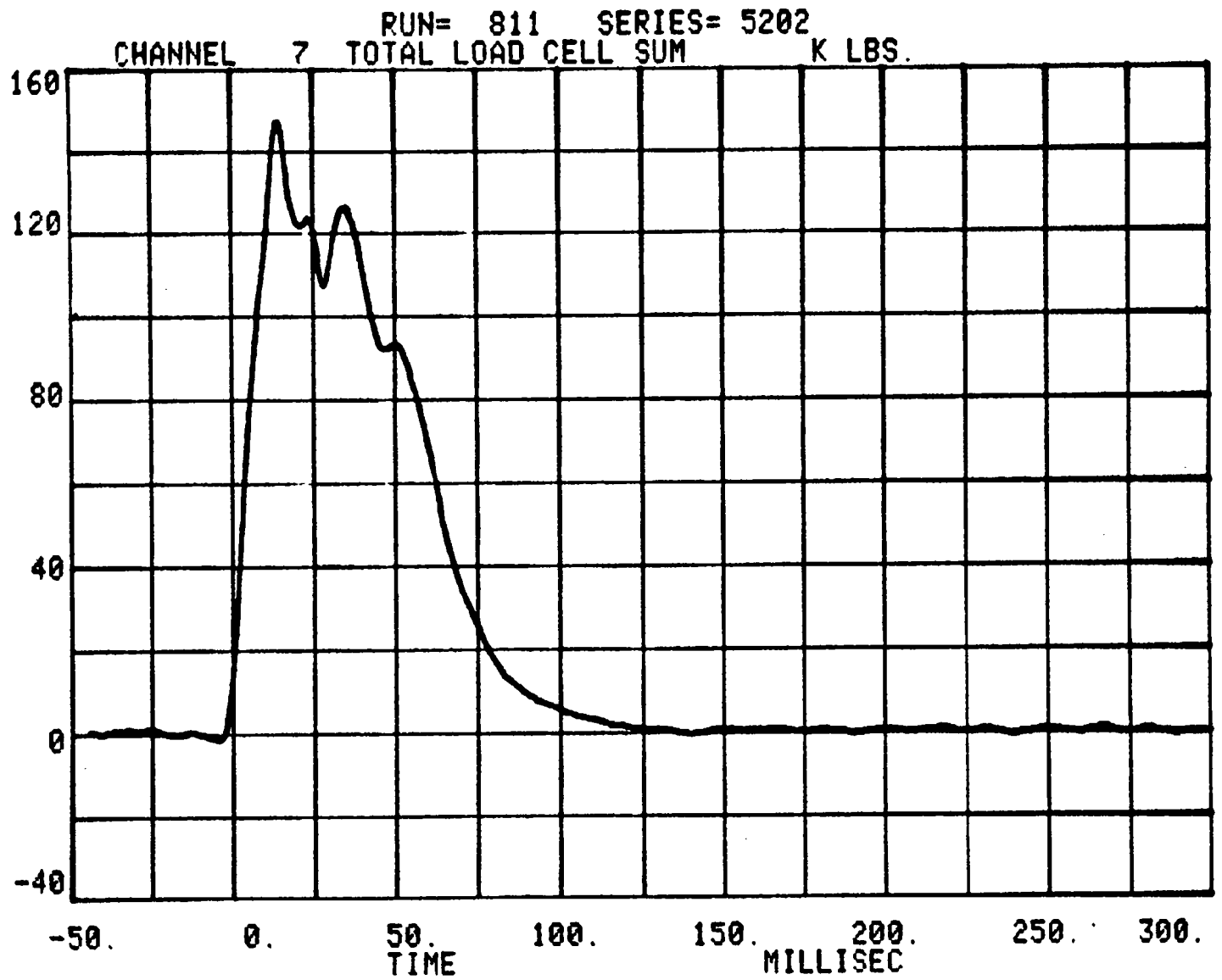

RUN= 811 SERIES= 5202
CHANNEL 2 GROUP 2 LOAD CELLS K LBS.
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 3 GROUP 3 LOAD CELLS K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 4 GROUP 4 LOAD CELLS
RUN= 811 SERIES= 5202
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 5 GROUP 5 LOAD CELLS 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= 811 SERIES= 5202
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
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. MJ5202

DUMMY DATA

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

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NEW CAR ASSESSMENT BARRIER TEST - 1988

RUN= 811

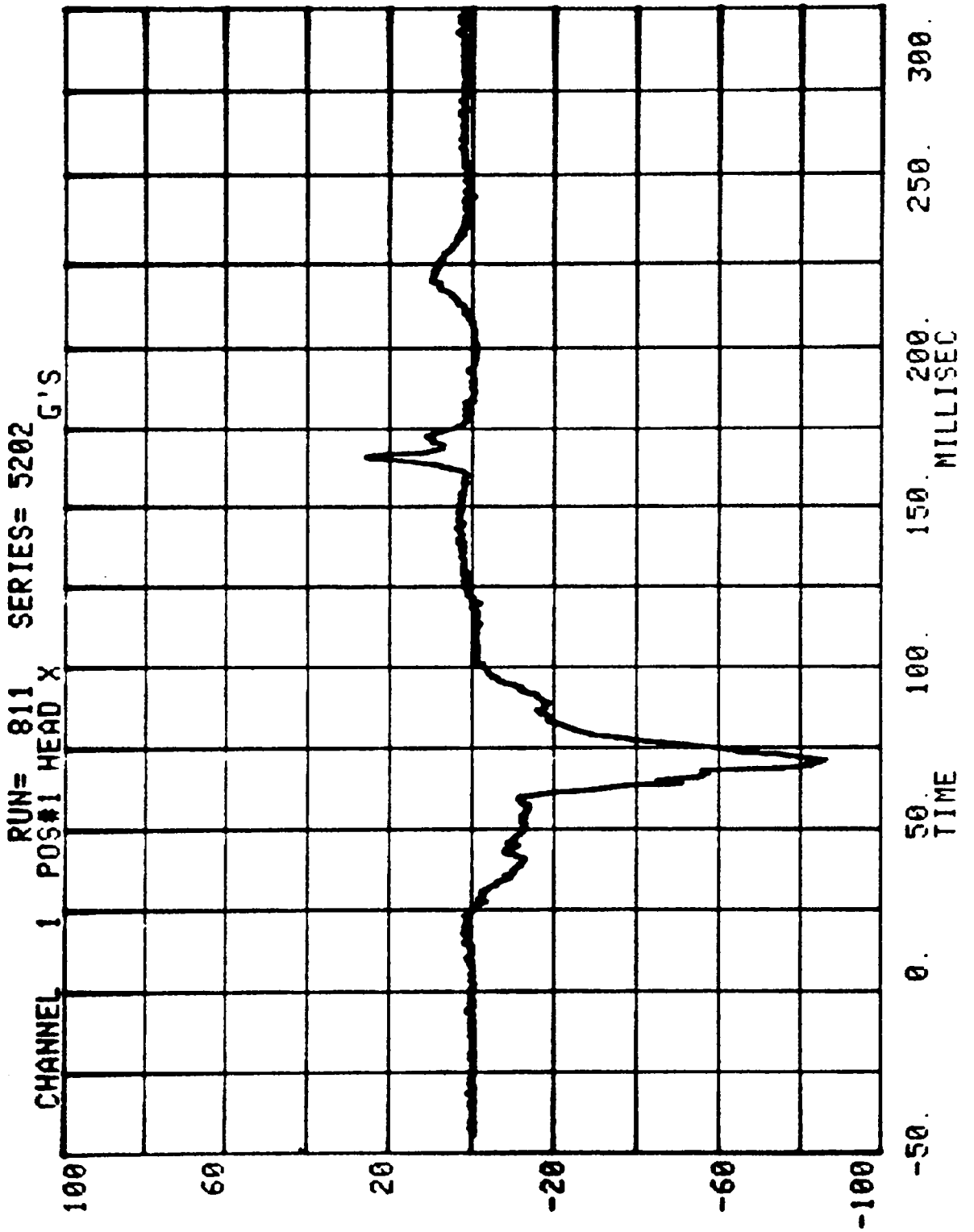
POS#1 HEAD R

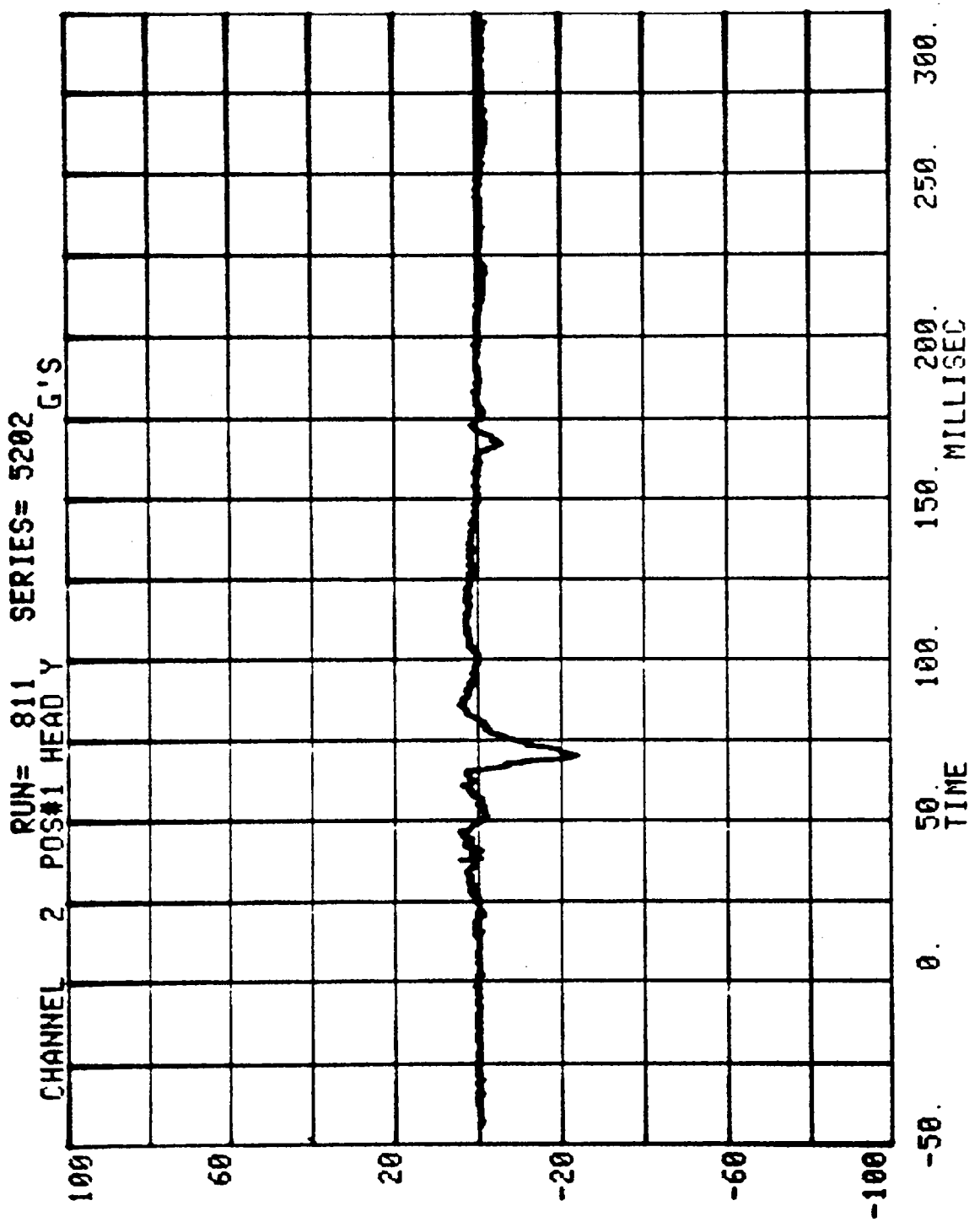
HIC= 949.0 FROM T1= .06405 TO T2= .08010

AVERAGE ACCELERATION BETWEEN T1 AND T2= 81.0G'S

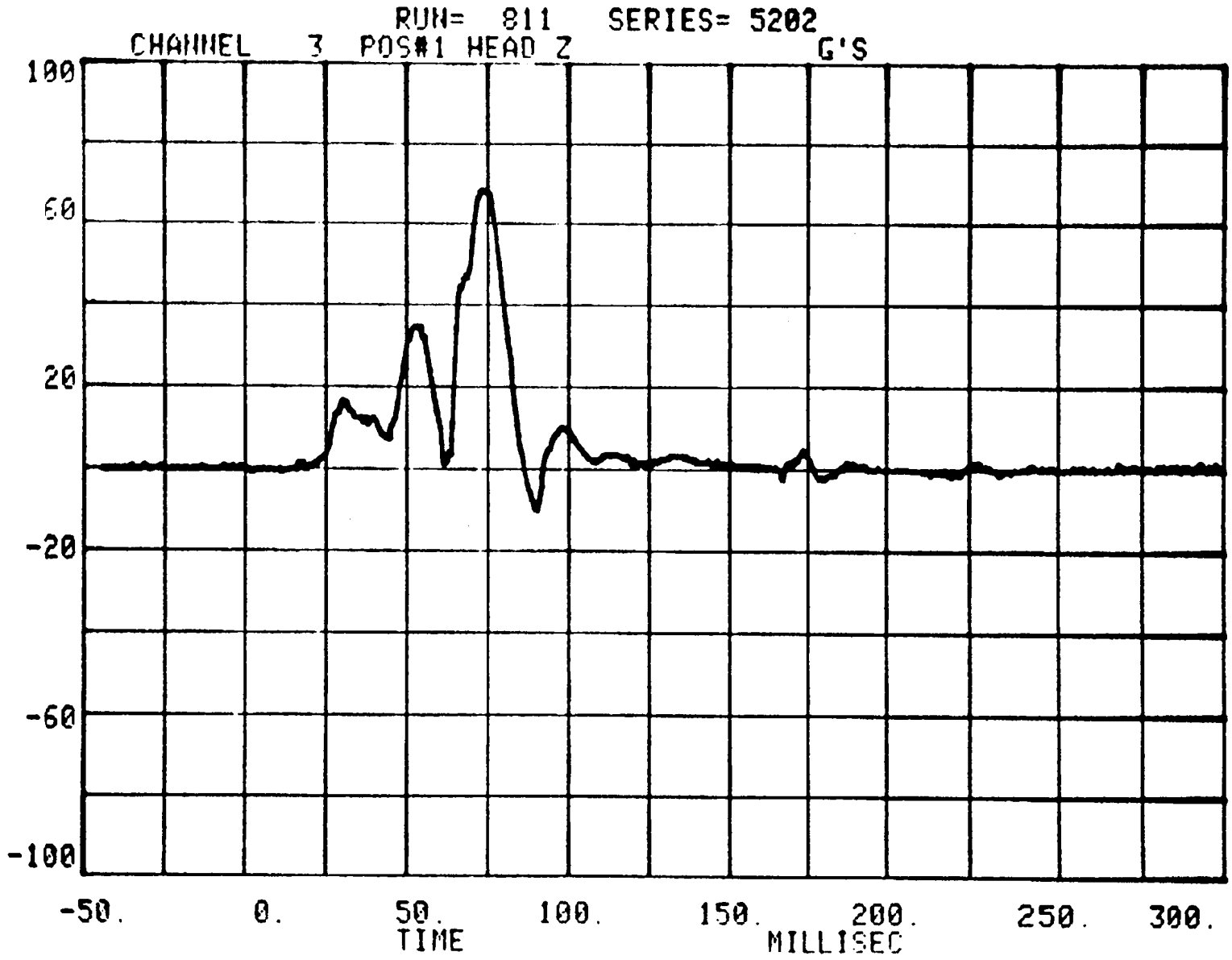
EVENT TIME= 300.0 MSEC

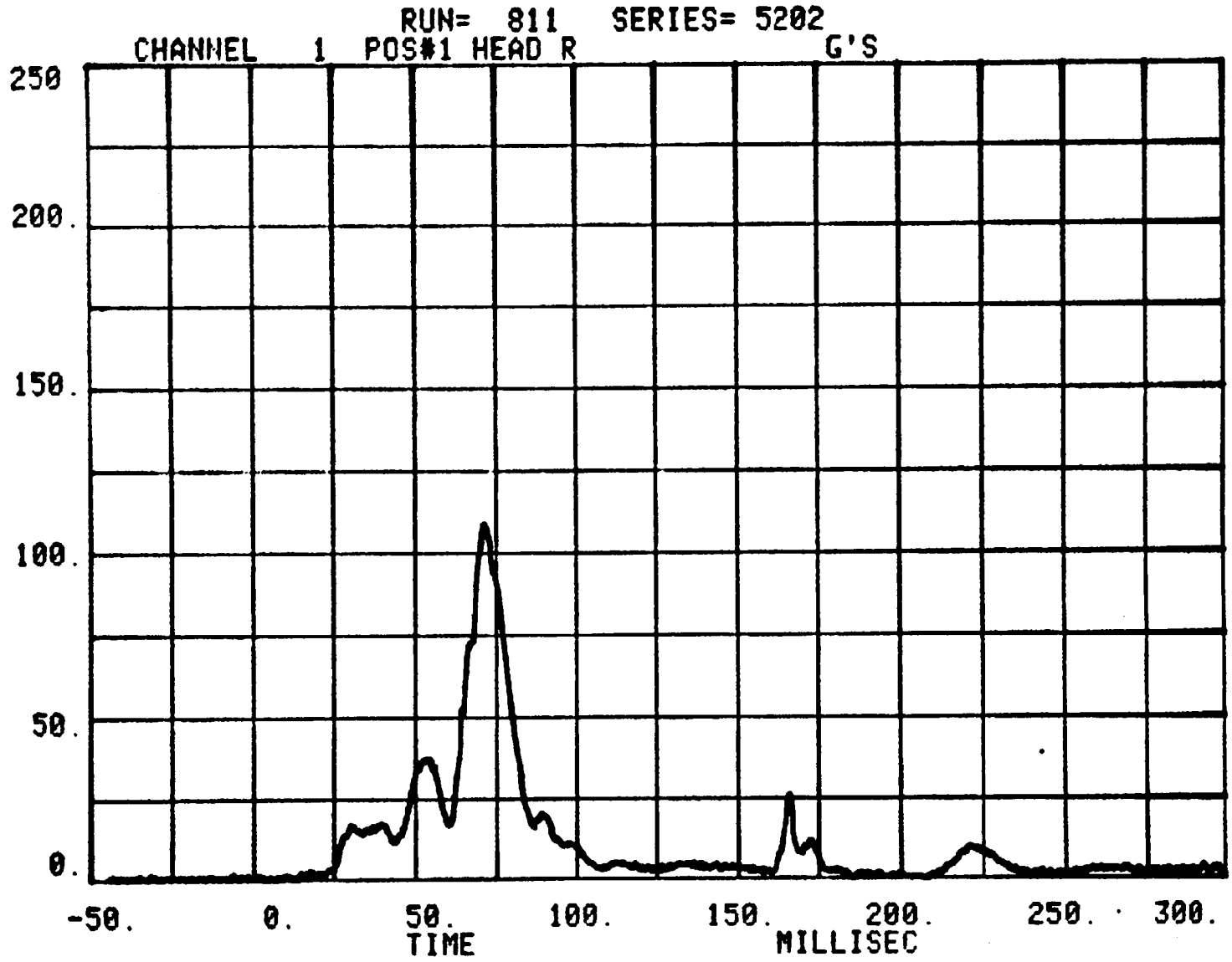
SEVERITY INDEX=1213.2


CHANNEL 1 POS#1 HEAD X
RUN= 811 SERIES= 5202
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

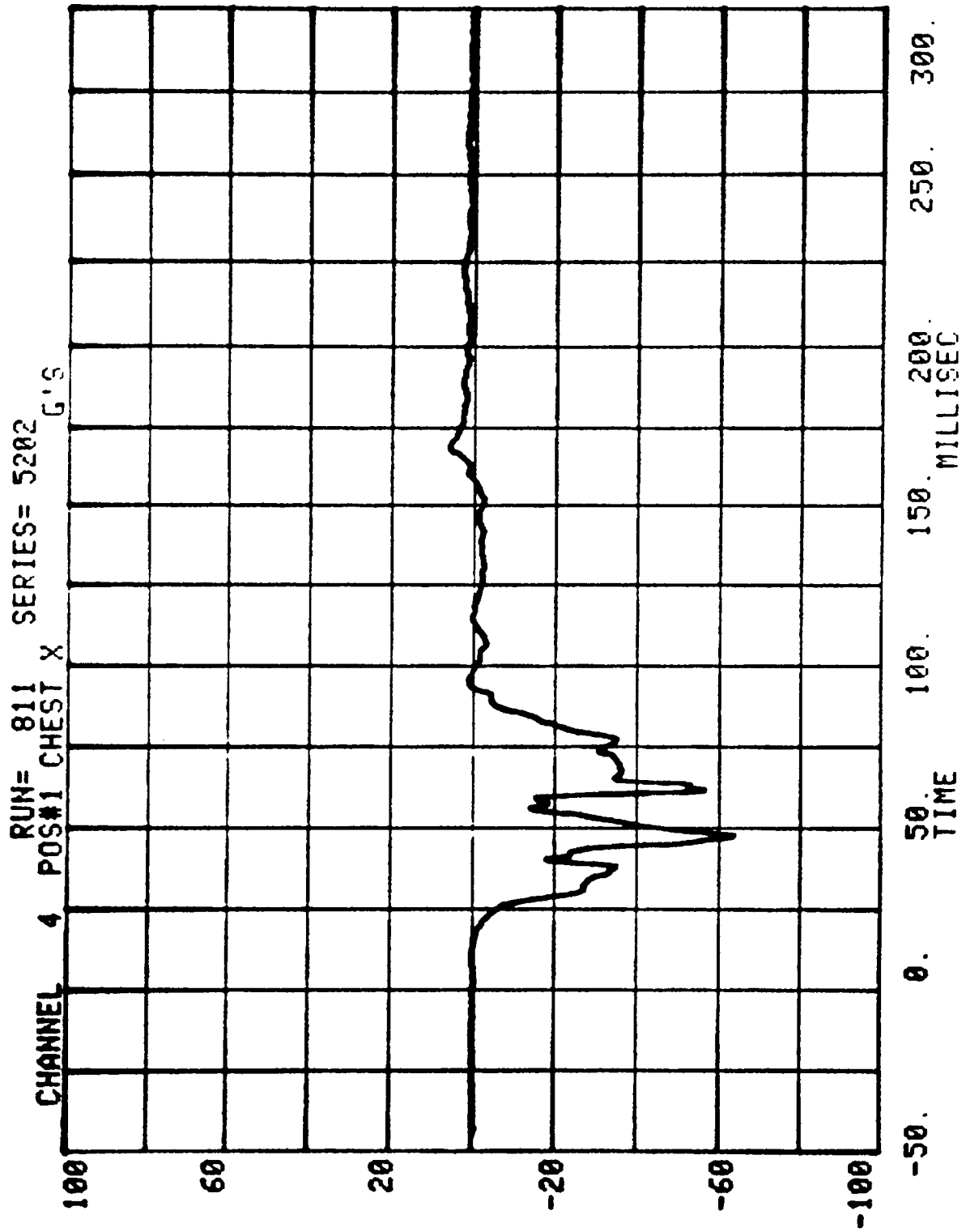

CHANNEL 2 POS#1 HEAD Y
RUN= 811 SERIES= 5202
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

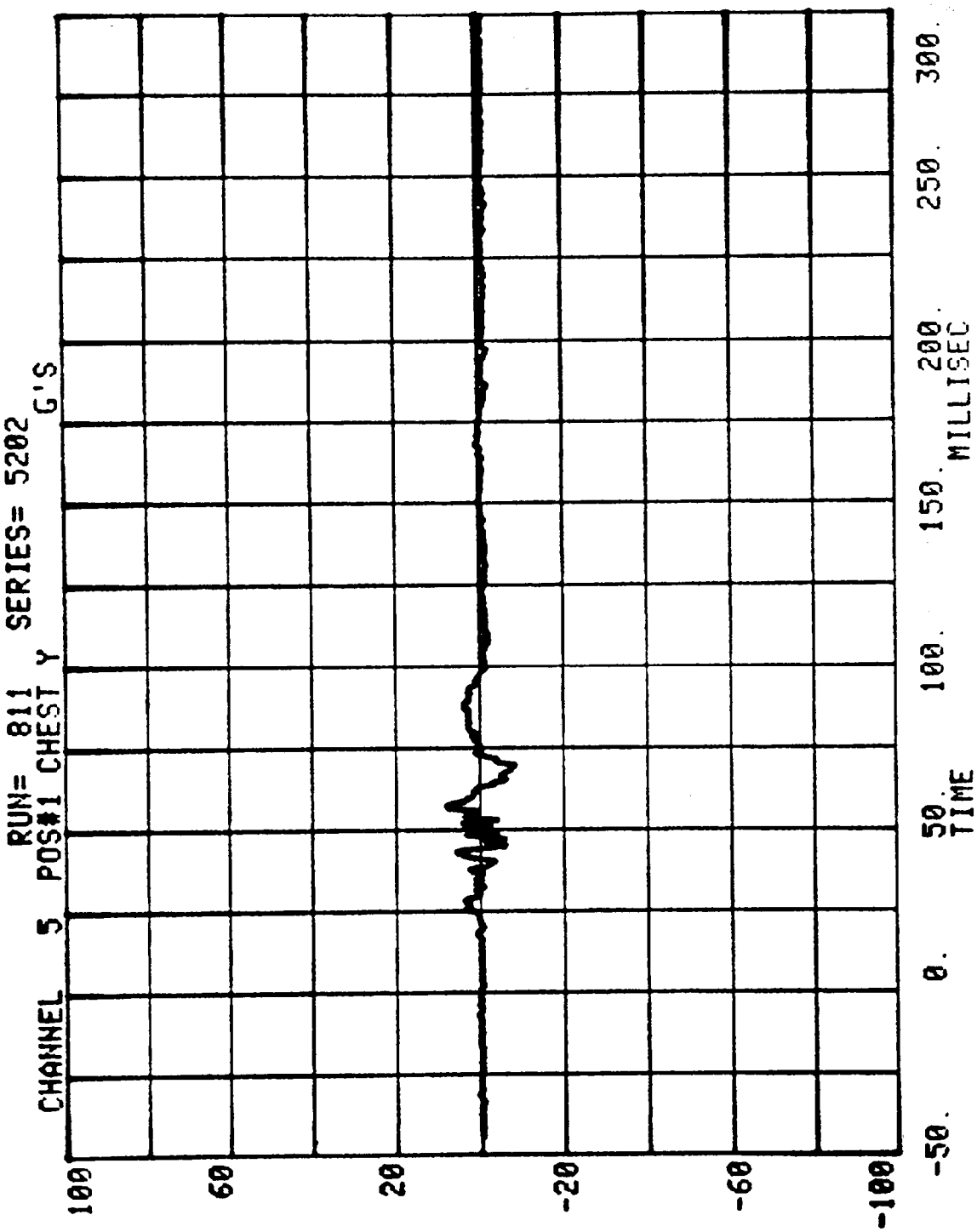
7626-9

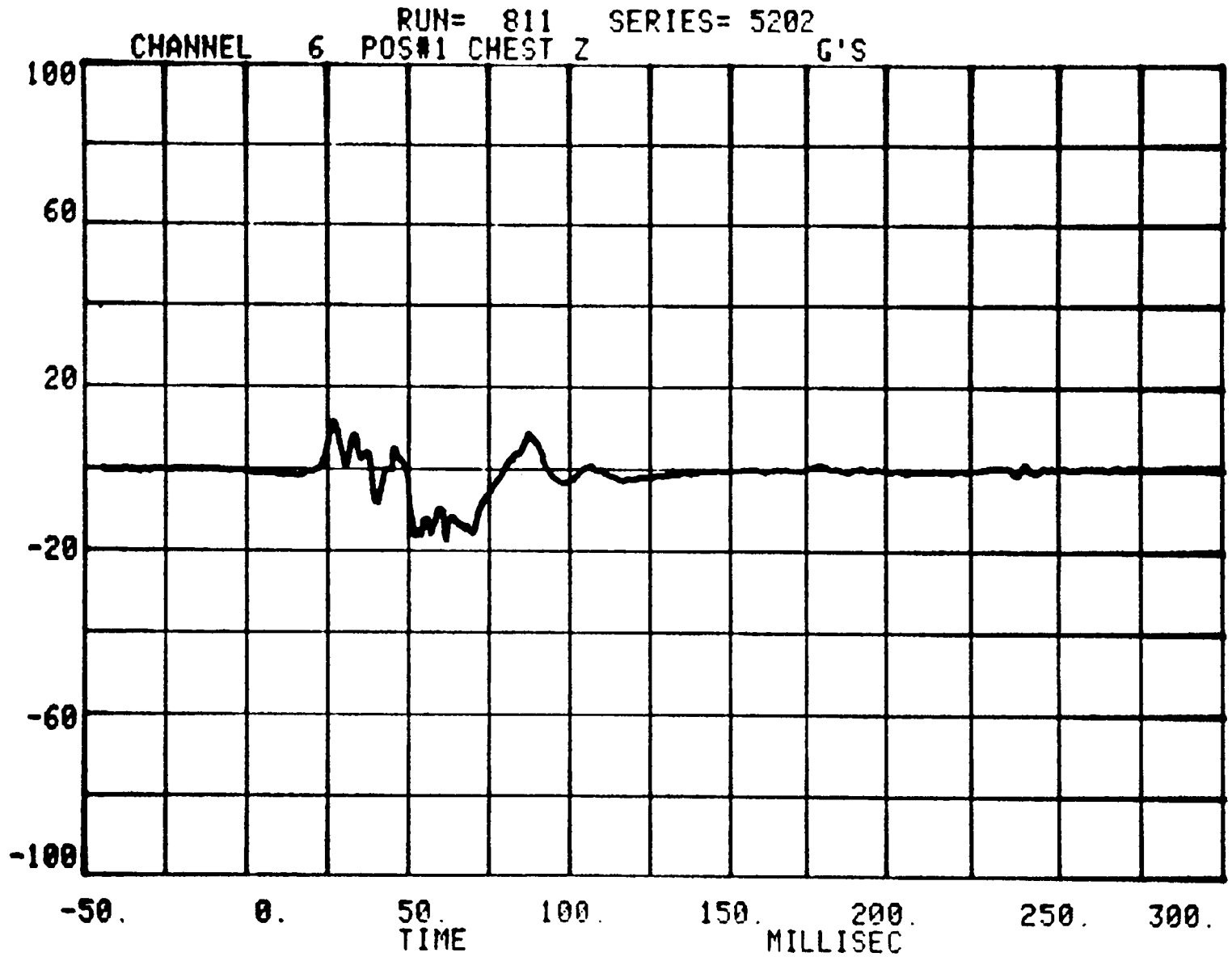

RUN= 811 SERIES= 5202
CHANNEL 3 POS#1 HEAD Z
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

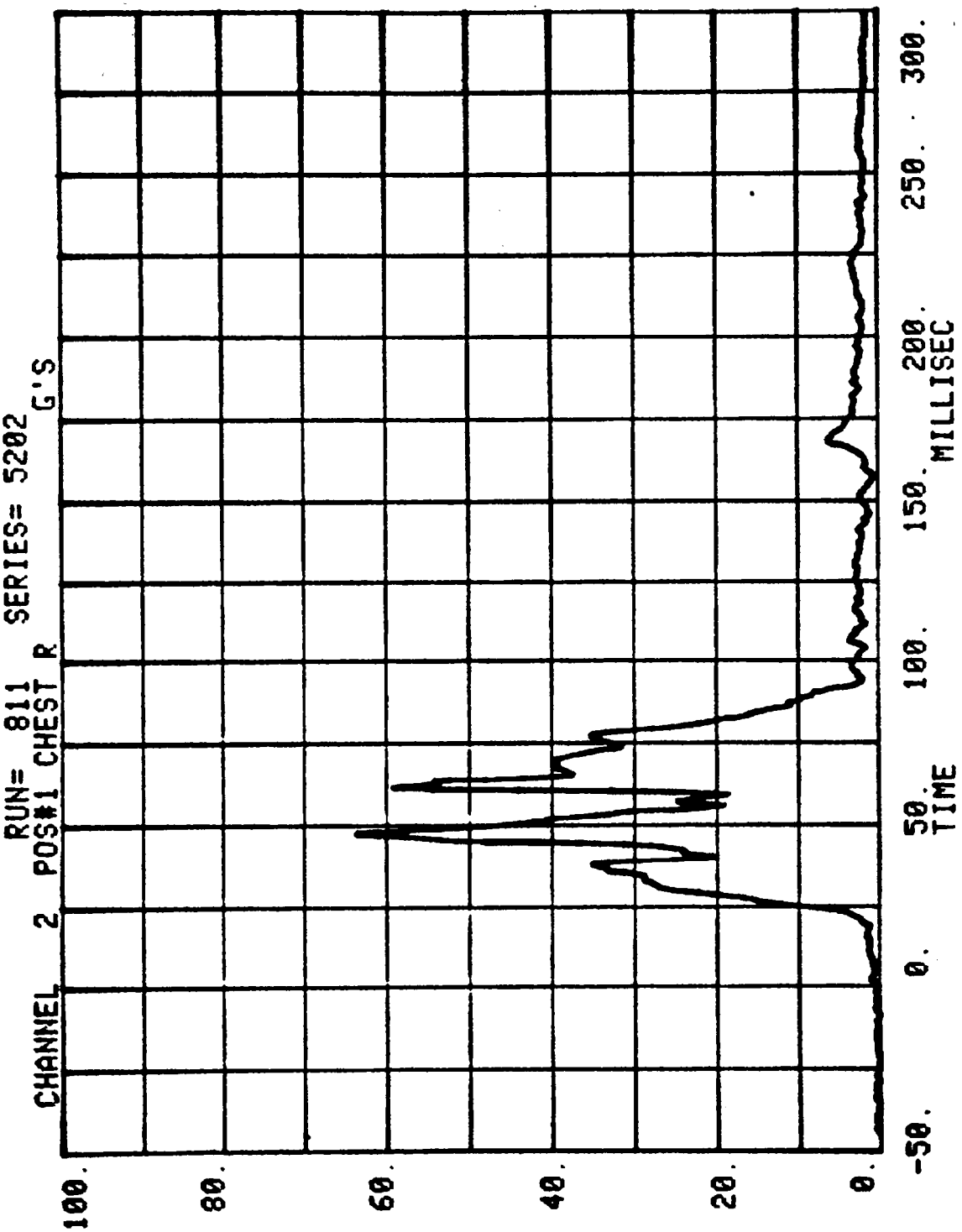

RUN= 811 SERIES= 5202
CHANNEL 1 POS#1 HEAD R
G'S
250
200.
150.
100.
50.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

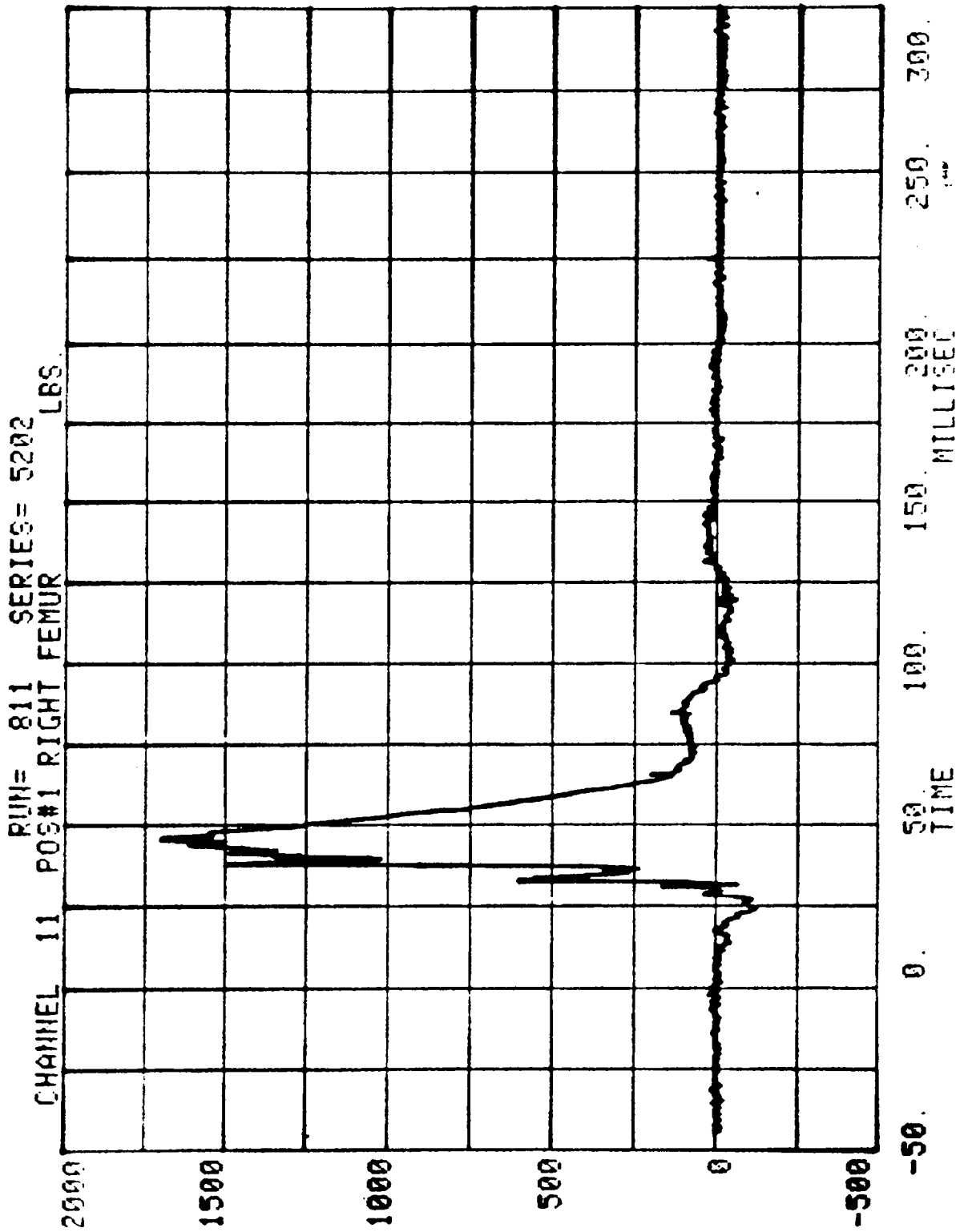
7626-9


CHANNEL 4 POS#1 CHEST X
RUN= 811 SERIES= 5202
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

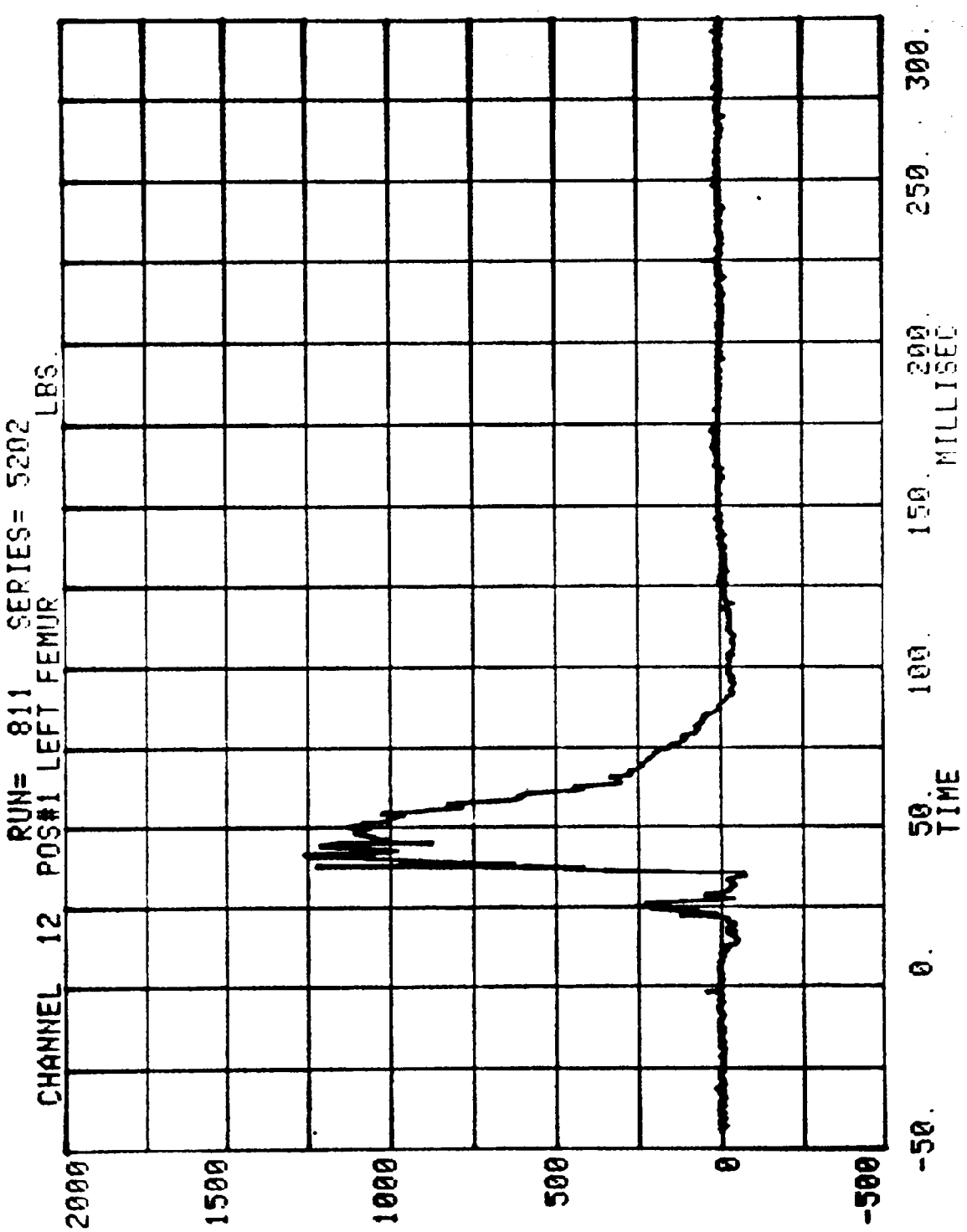

CHANNEL 5 POS#1 CHEST Y
RUN= 811 SERIES= 5202
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 6 POS#1 CHEST Z
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

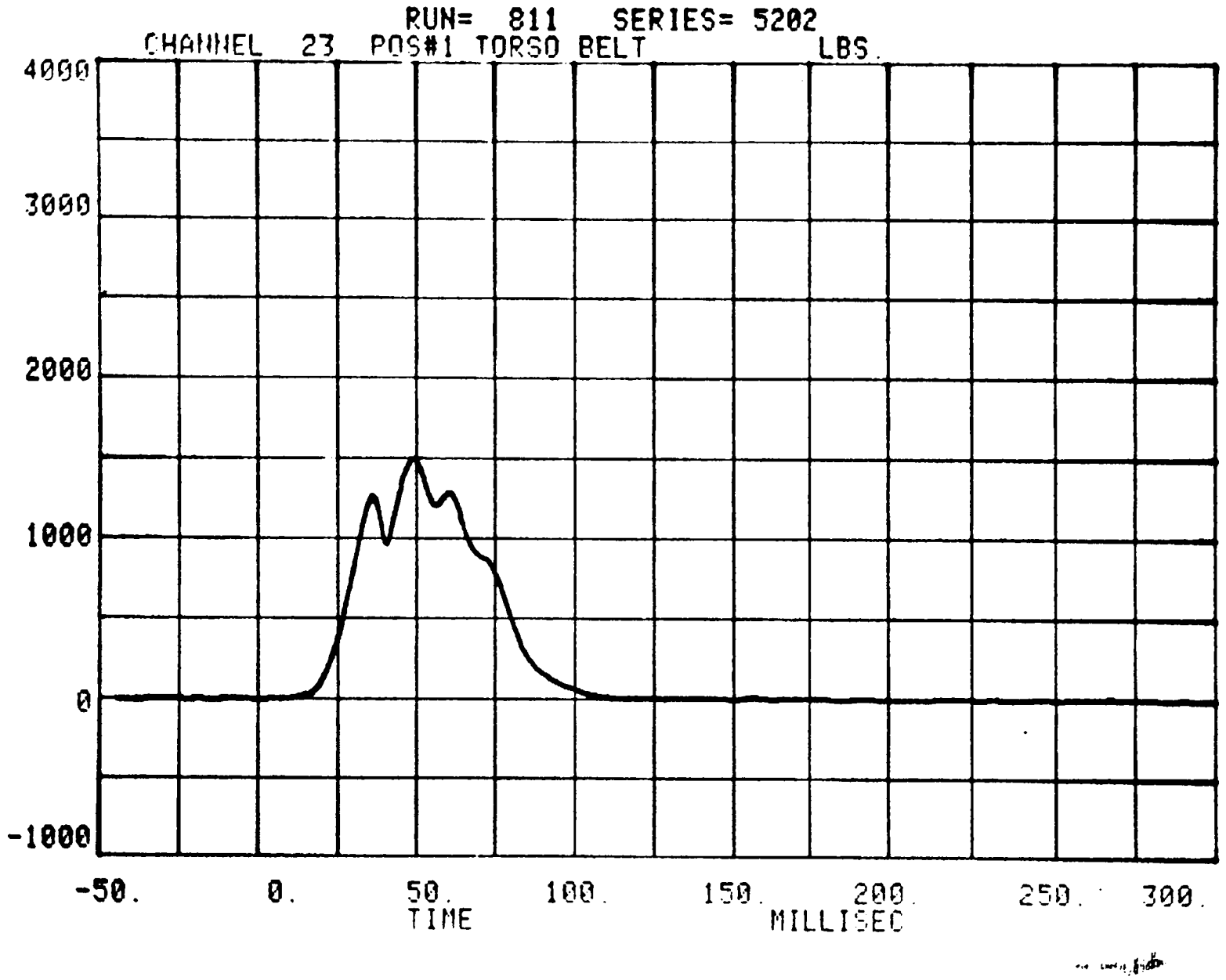

CHANNEL 2 POS#1 CHEST R
RUN= 811 SERIES= 5202
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
TIME
100.
150.
200.
250.
300.
MILLISEC

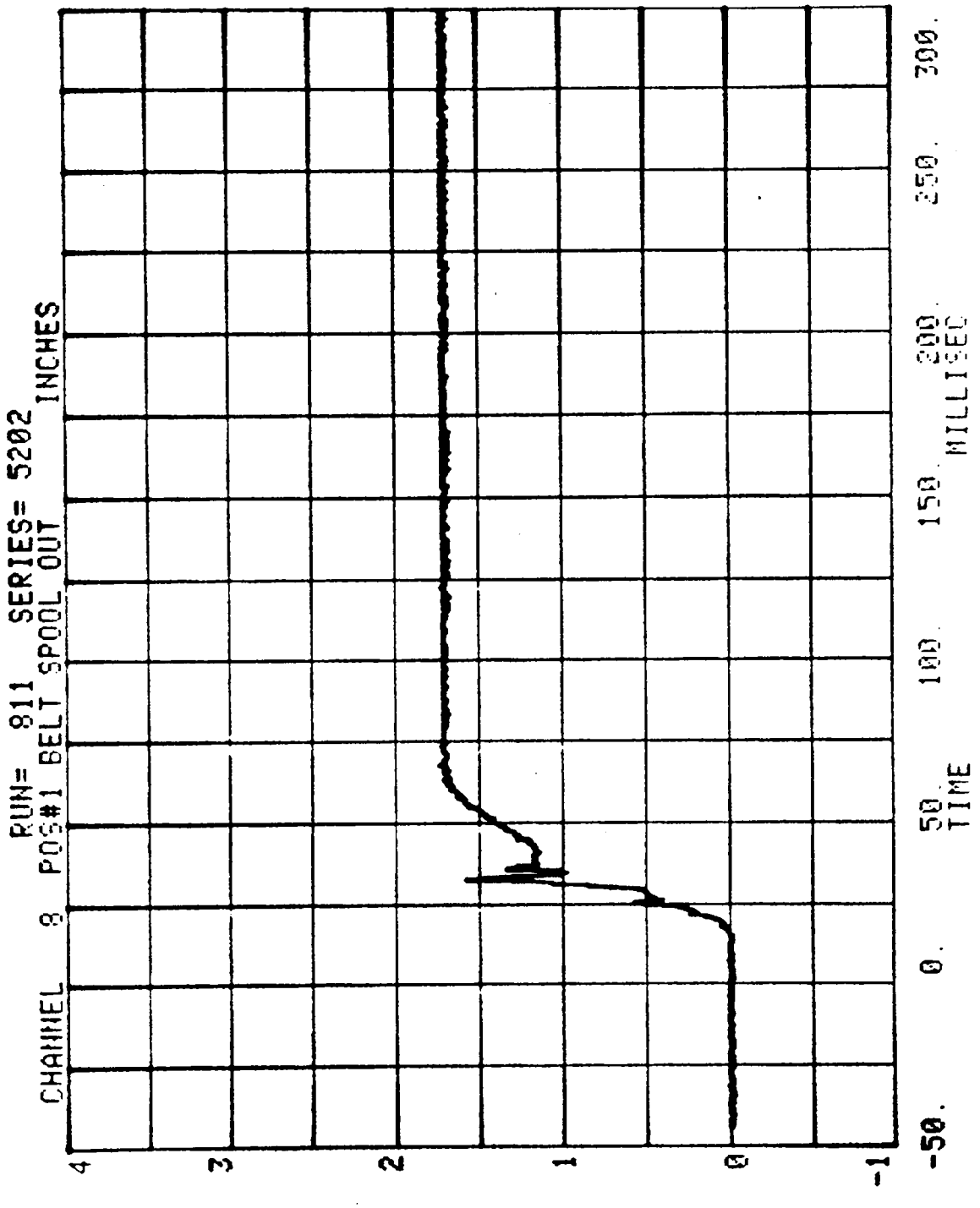

CHANNEL 11 POS#1 RIGHT FEMUR
RUN= 811 SERIES= 5202
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

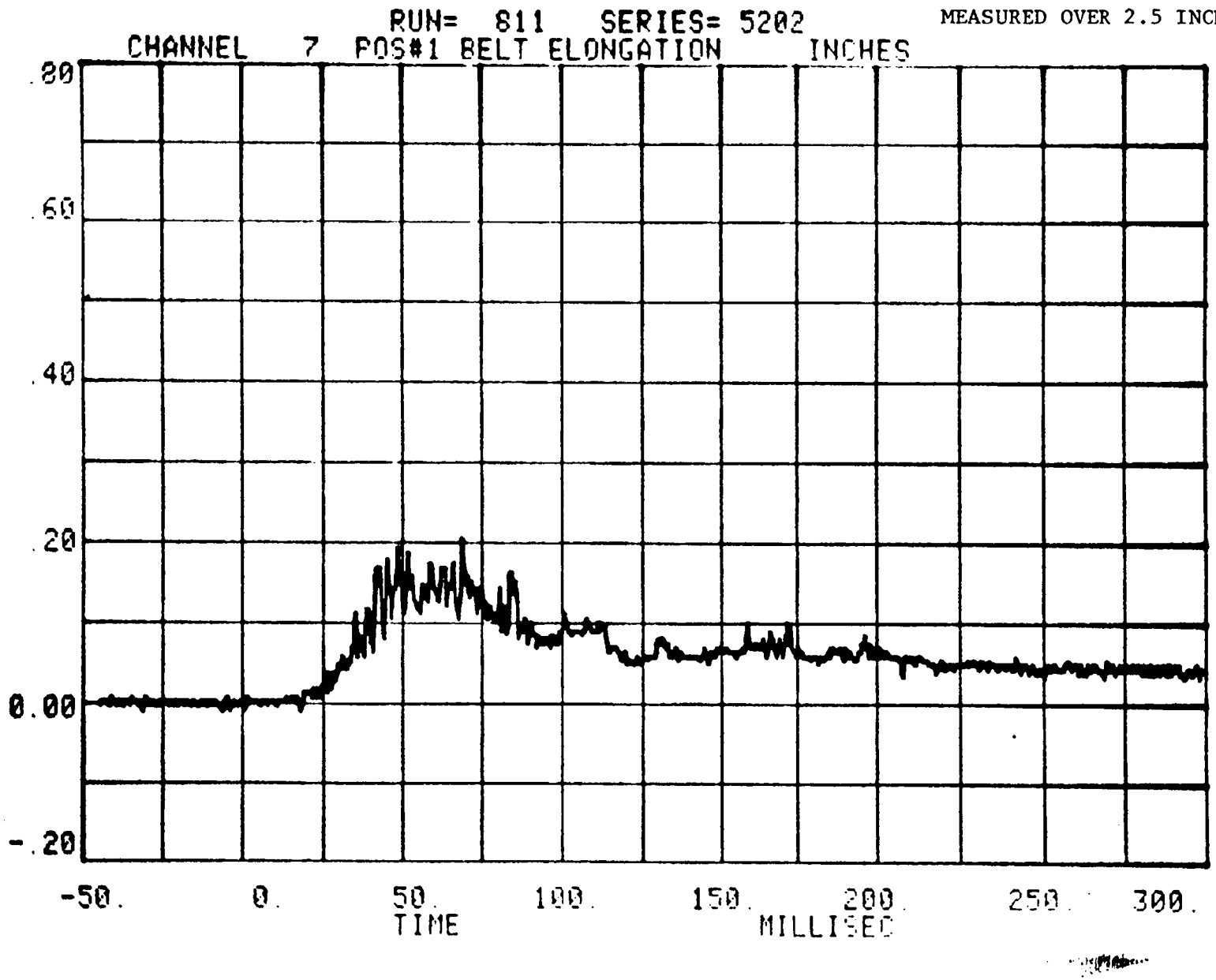
7626-9


CHANNEL 12 POS#1 LEFT FEMUR
RUN= 811 SERIES= 5202
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9


RUN= 811 SERIES= 5202
CHANNEL 23 POS#1 TORSO BELT LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC


CHANNEL 8 POS#1 BELT SPOOL OUT
RUN= 811 SERIES= 5202 INCHES
4
3
2
1
0
-1
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
MEASURED OVER 2.5 INCHES
CHANNEL 7 POS#1 BELT ELONGATION INCHES
.80
.60
.40
.20
0.00
-.20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NEW CAR ASSESSMENT BARRIER TEST - 1988

RUN= 811

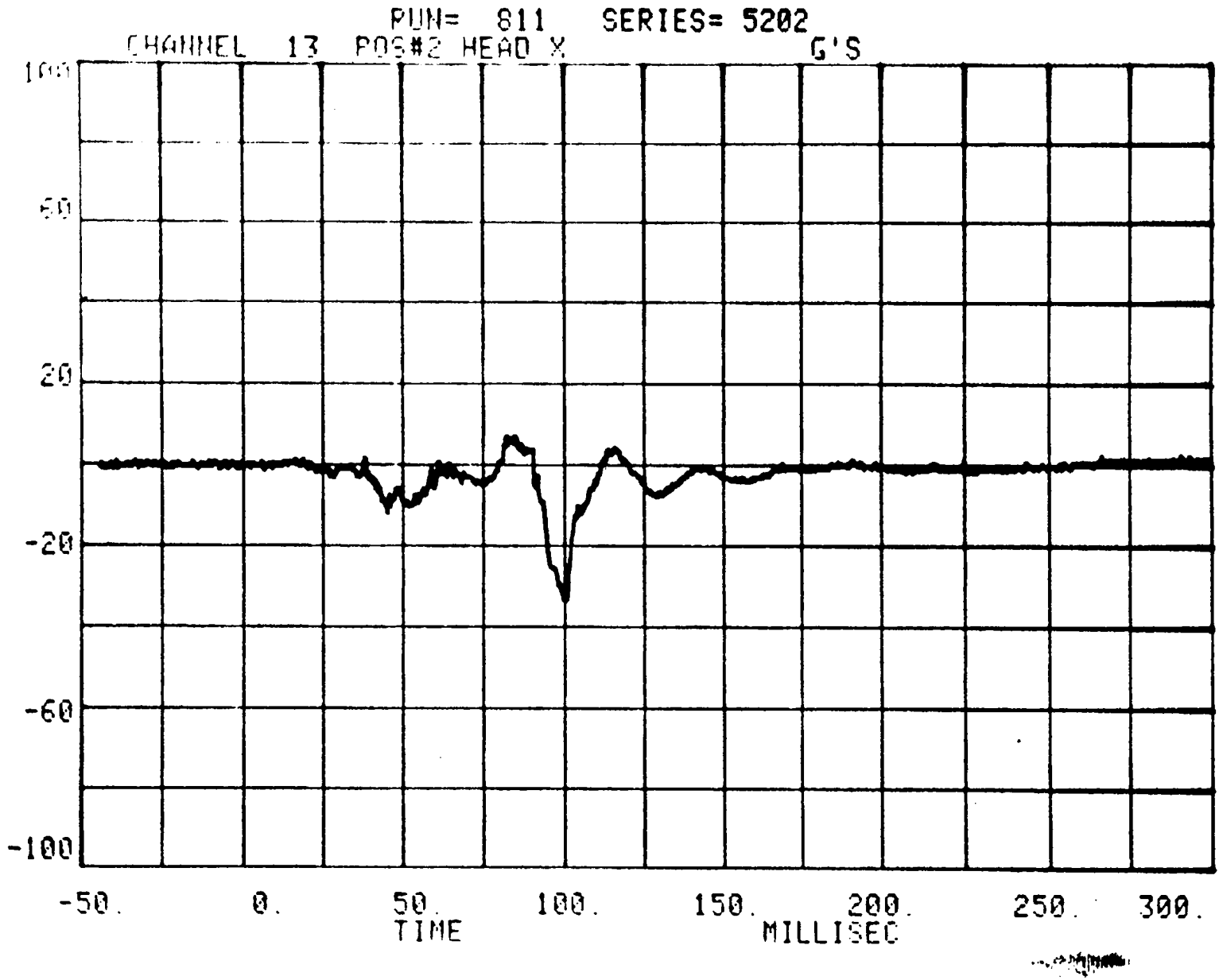
POS#2 HEAD R

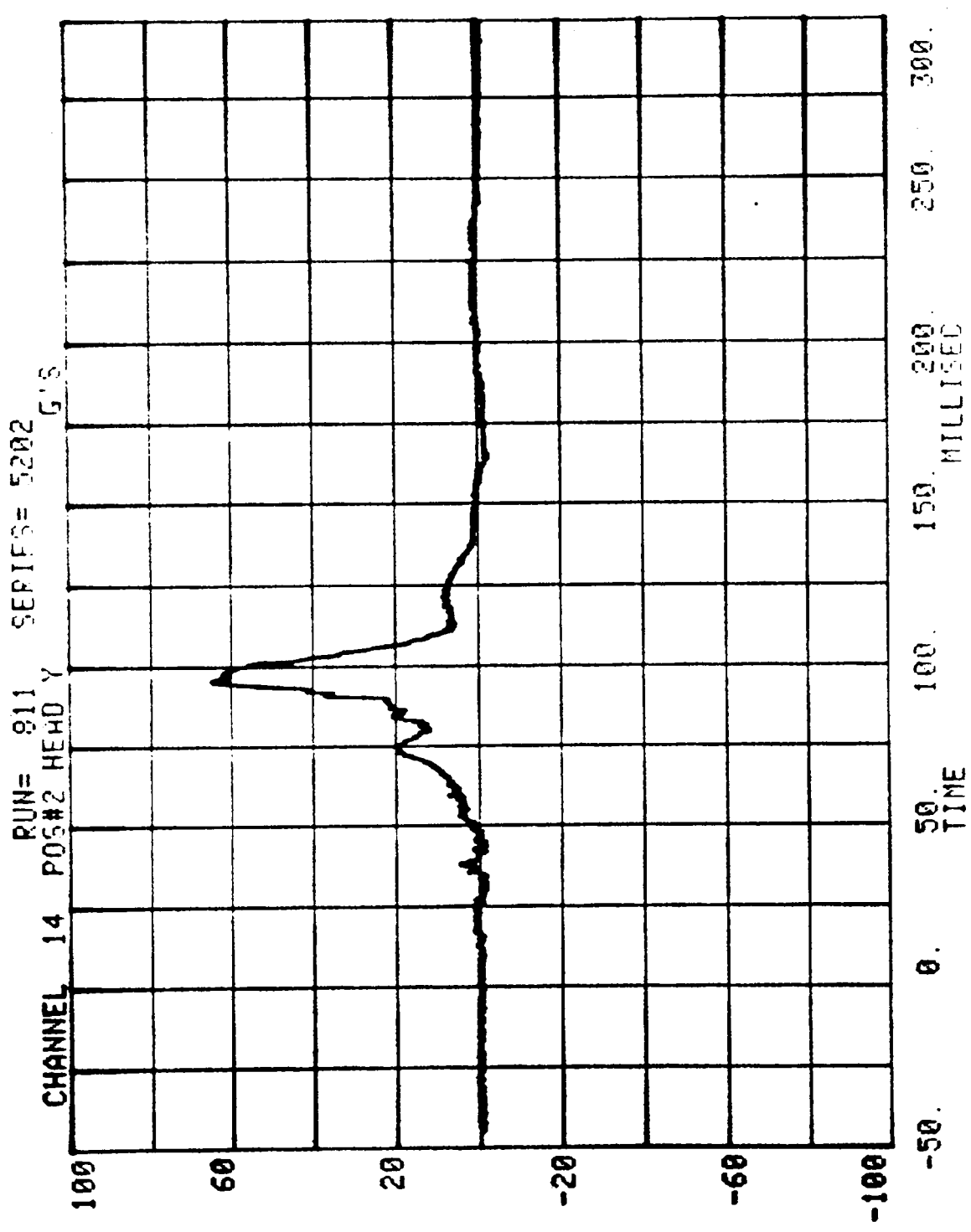
HIC= 597.2 FROM T1= .06832 TO T2= .10432

AVERAGE ACCELERATION BETWEEN T1 AND T2= 48.7G'S

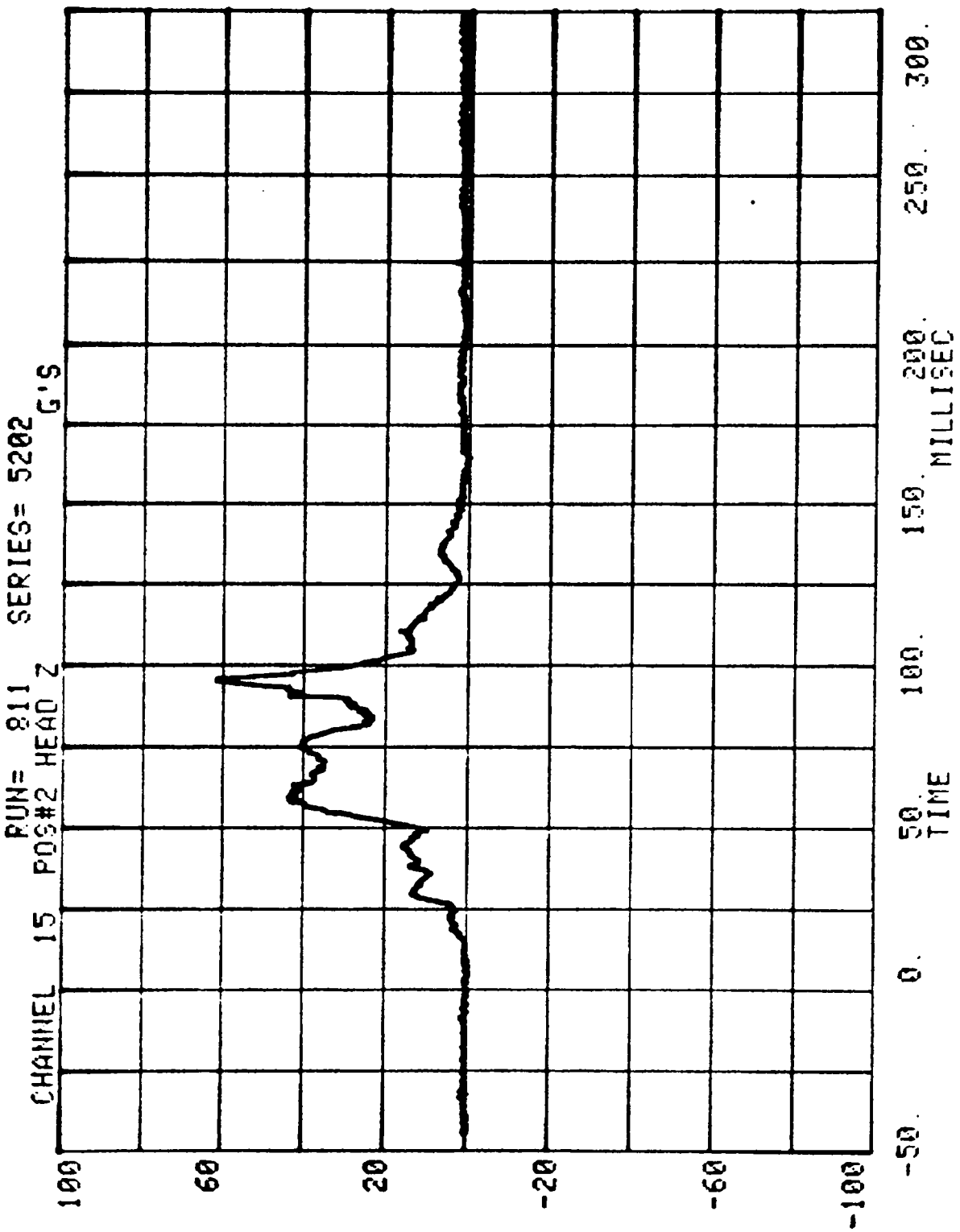
EVENT TIME= 300.0 MSEC

SEVERITY INDEX= 955.9

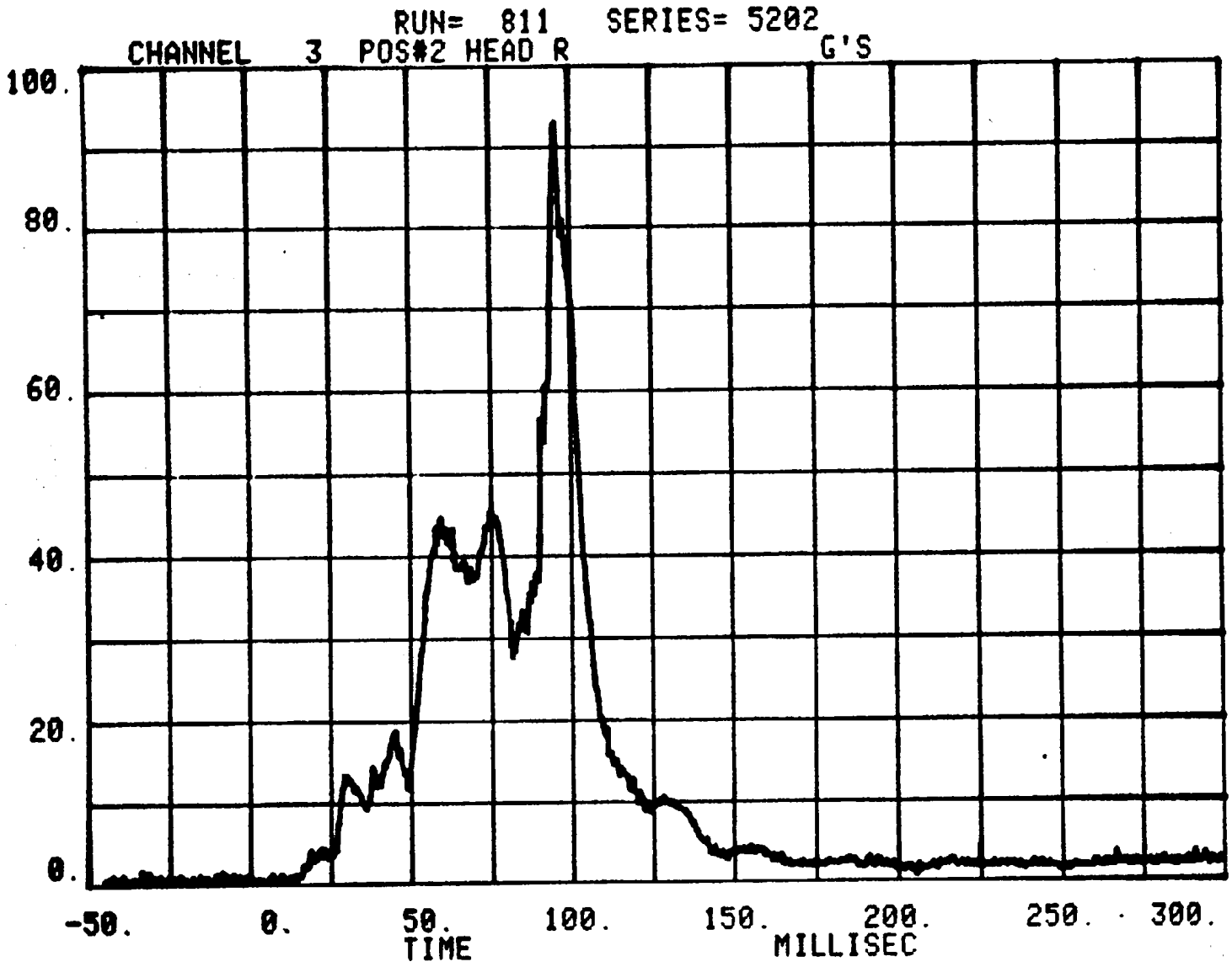

RUN= 811 SERIES= 5202
CHANNEL 13 POS#2 HEAD X G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC

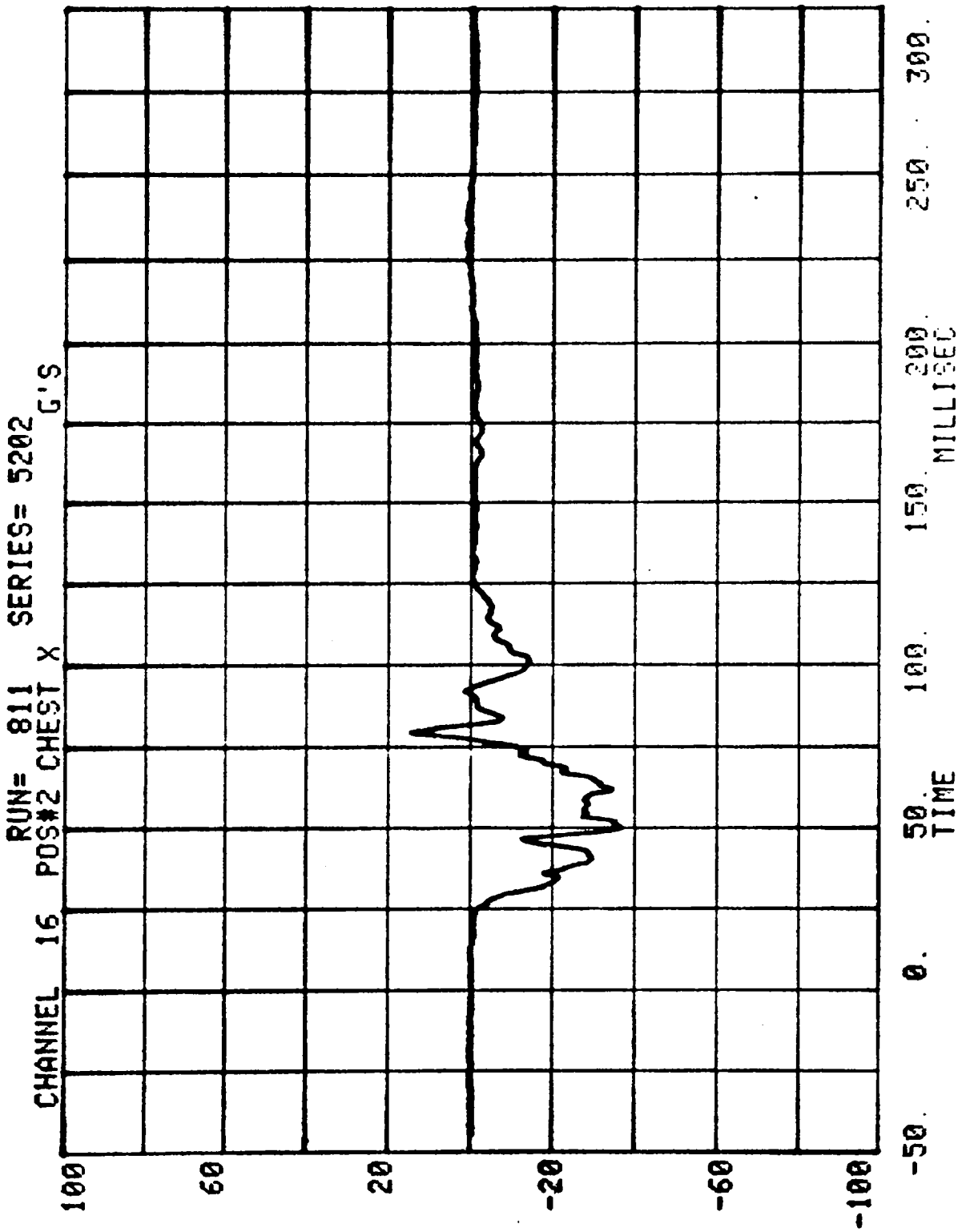

CHANNEL 14 POS#2 HEAD Y
RUN= 811 SERIES= 5202
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

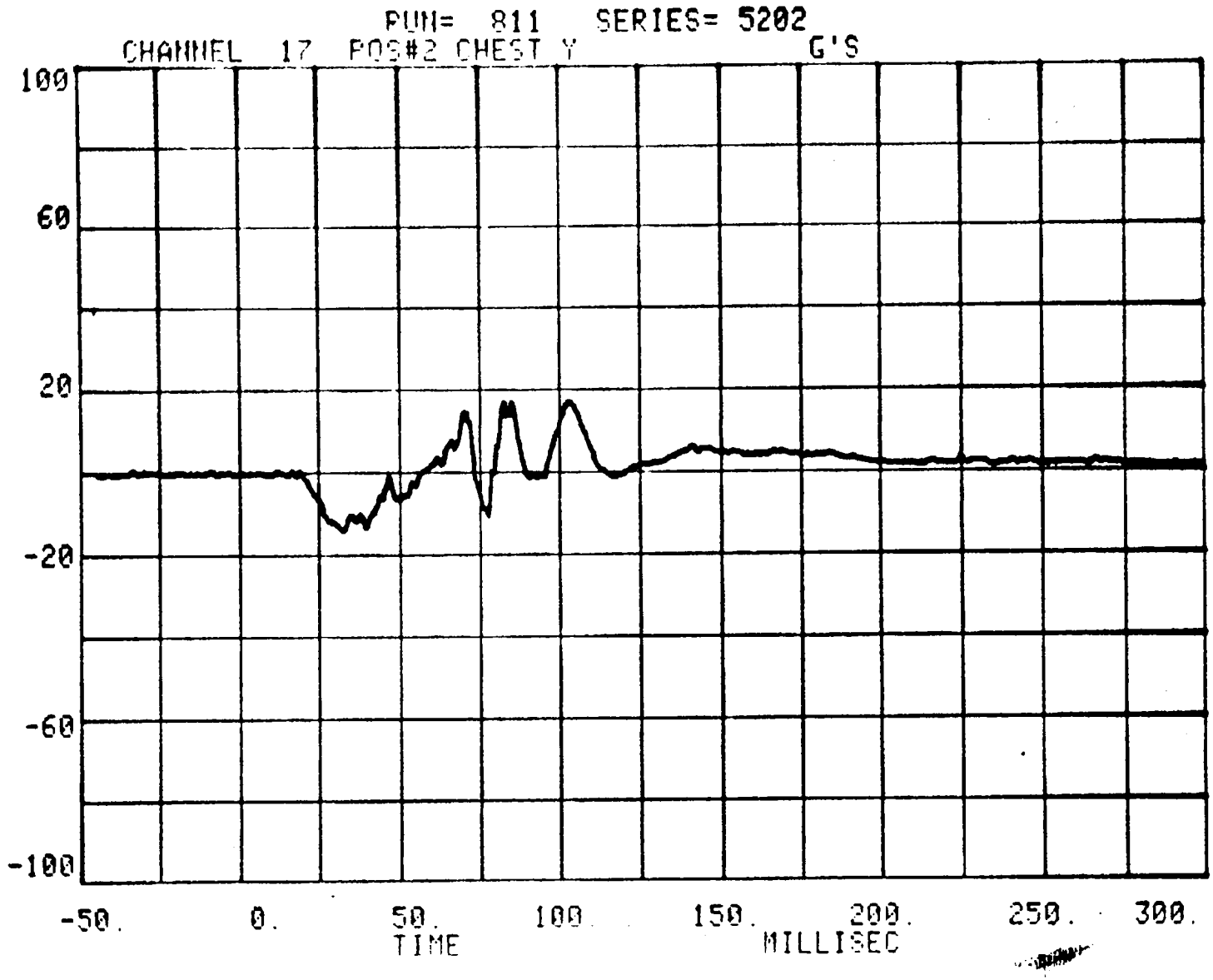
7626-9

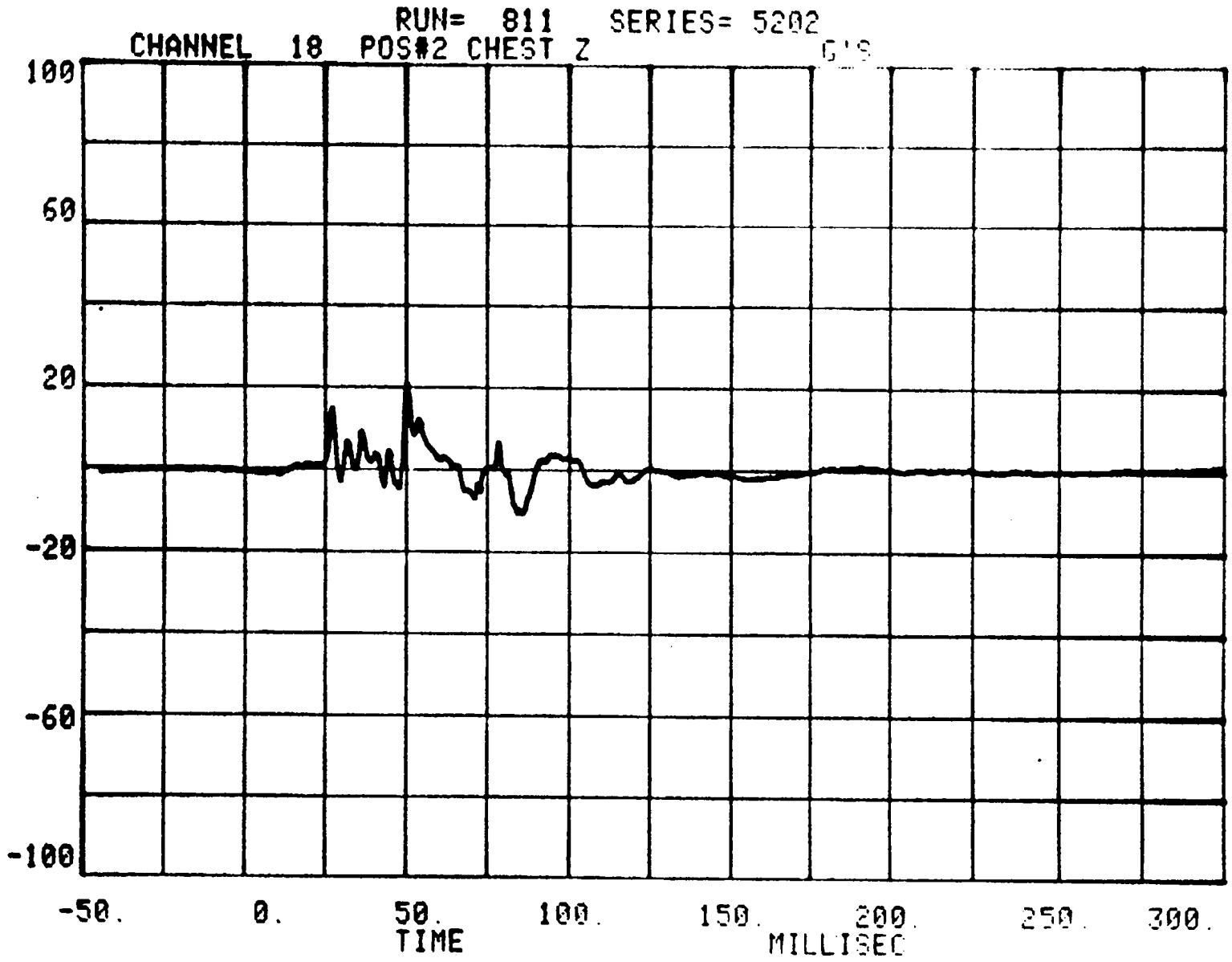

CHANNEL 15 POS#2 HEAD Z
RUN= 811 SERIES= 5202
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9

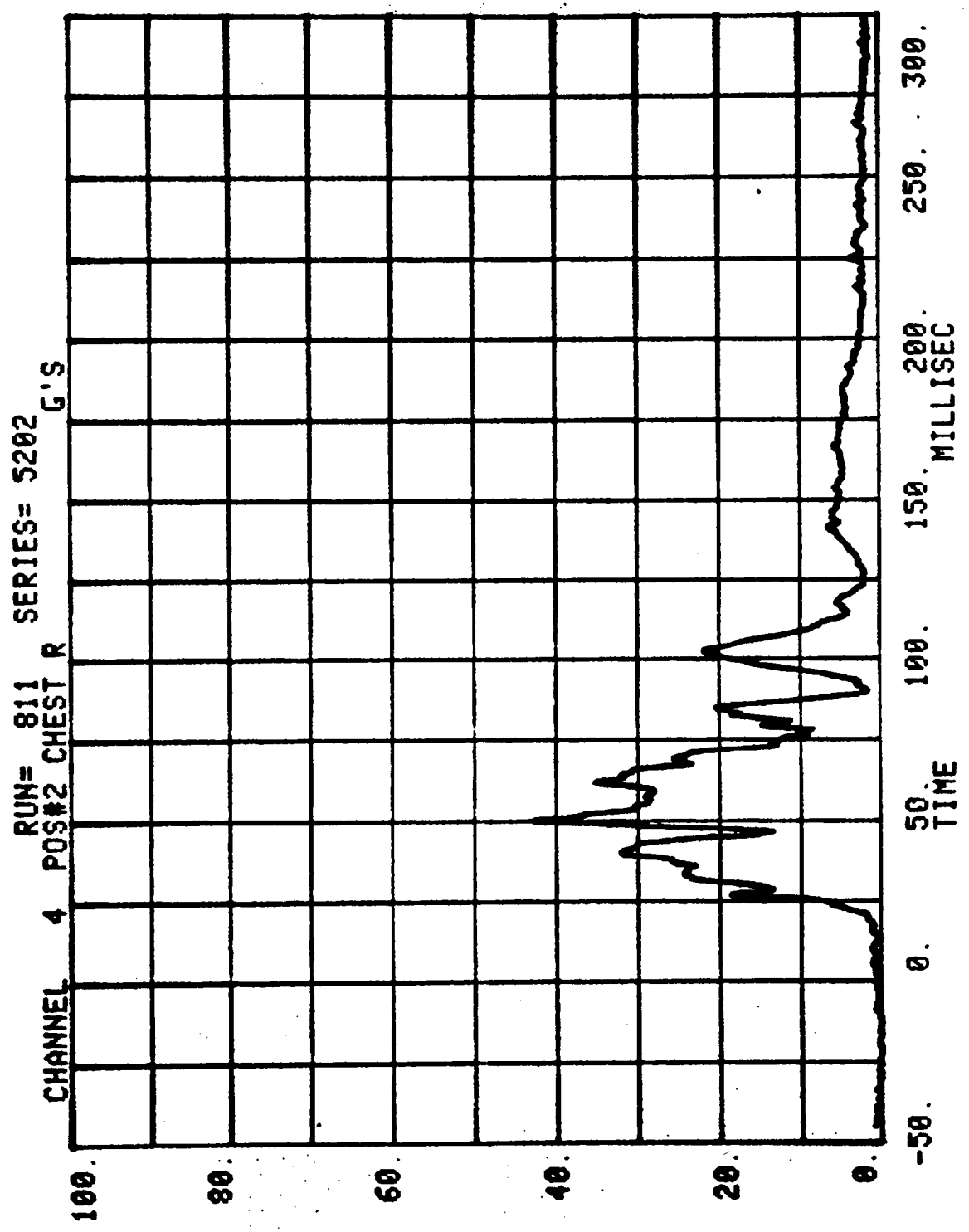

RUN= 811 SERIES= 5202
CHANNEL 3 POS#2 HEAD R
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 16 POS#2 CHEST X G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

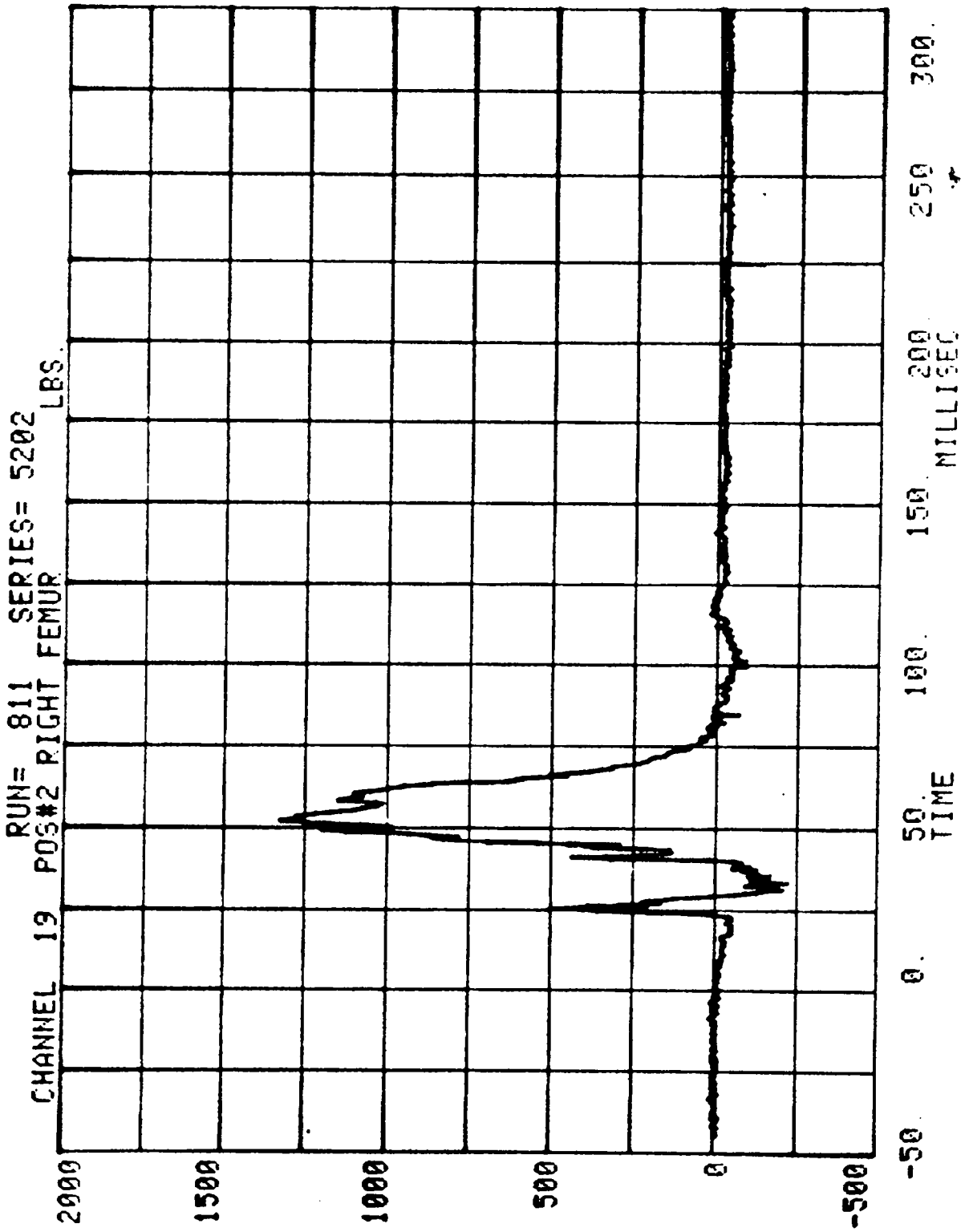

RUN= 811 SERIES= 5202
CHANNEL 17 POS#2 CHEST Y
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 18 POS#2 CHEST Z
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-9


CHANNEL 4 POS#2 CHEST R
RUN= 811 SERIES= 5202
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
TIME
100.
150.
200.
250.
300.
MILLISEC

7626-9


RUN= 811 SERIES= 5202
CHANNEL 19 POS#2 RIGHT FEMUR
LBS.
2000
1500
1000
500
0
-500
-50
0.
50.
100.
150.
200
300.
TIME
MILLISEC

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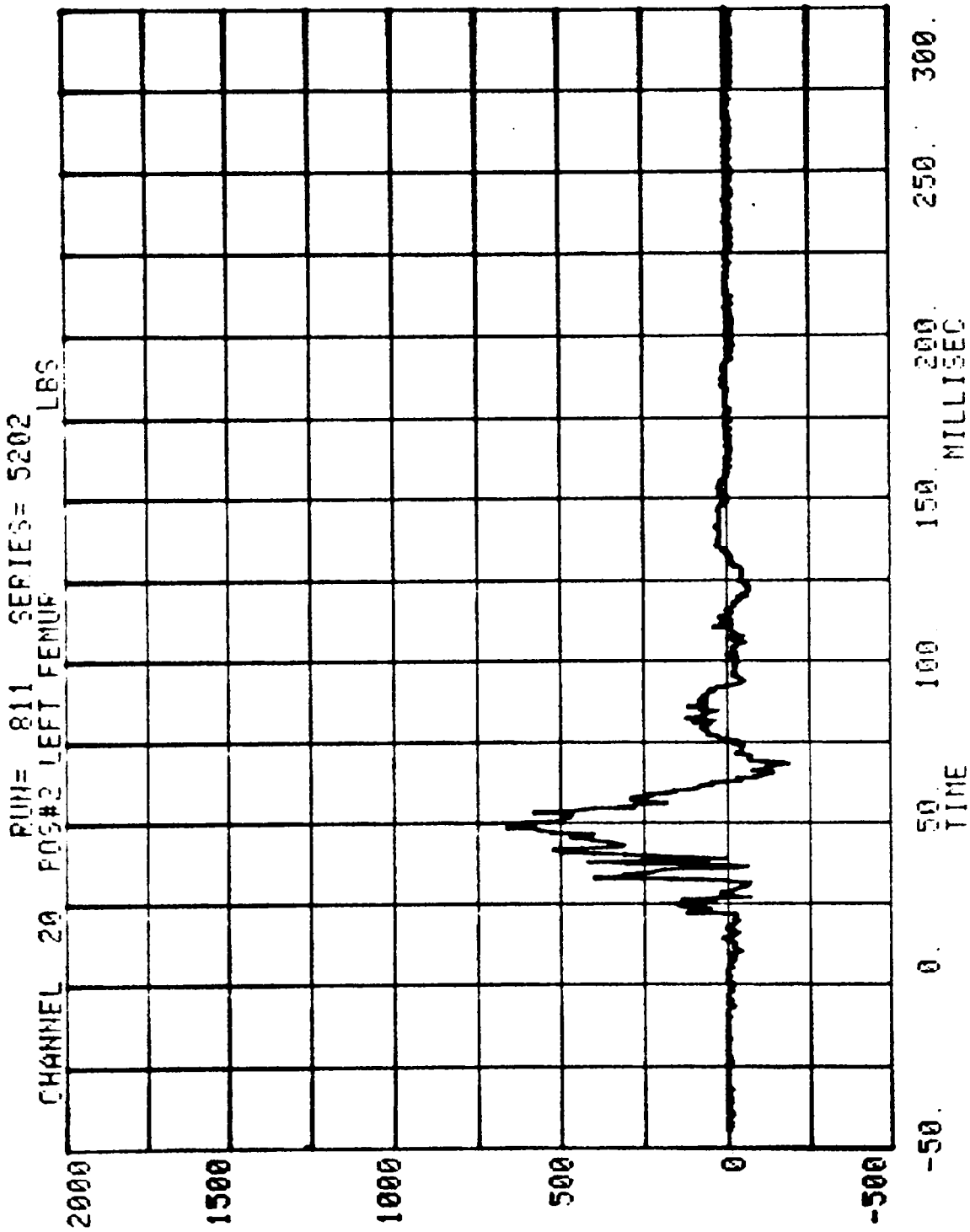
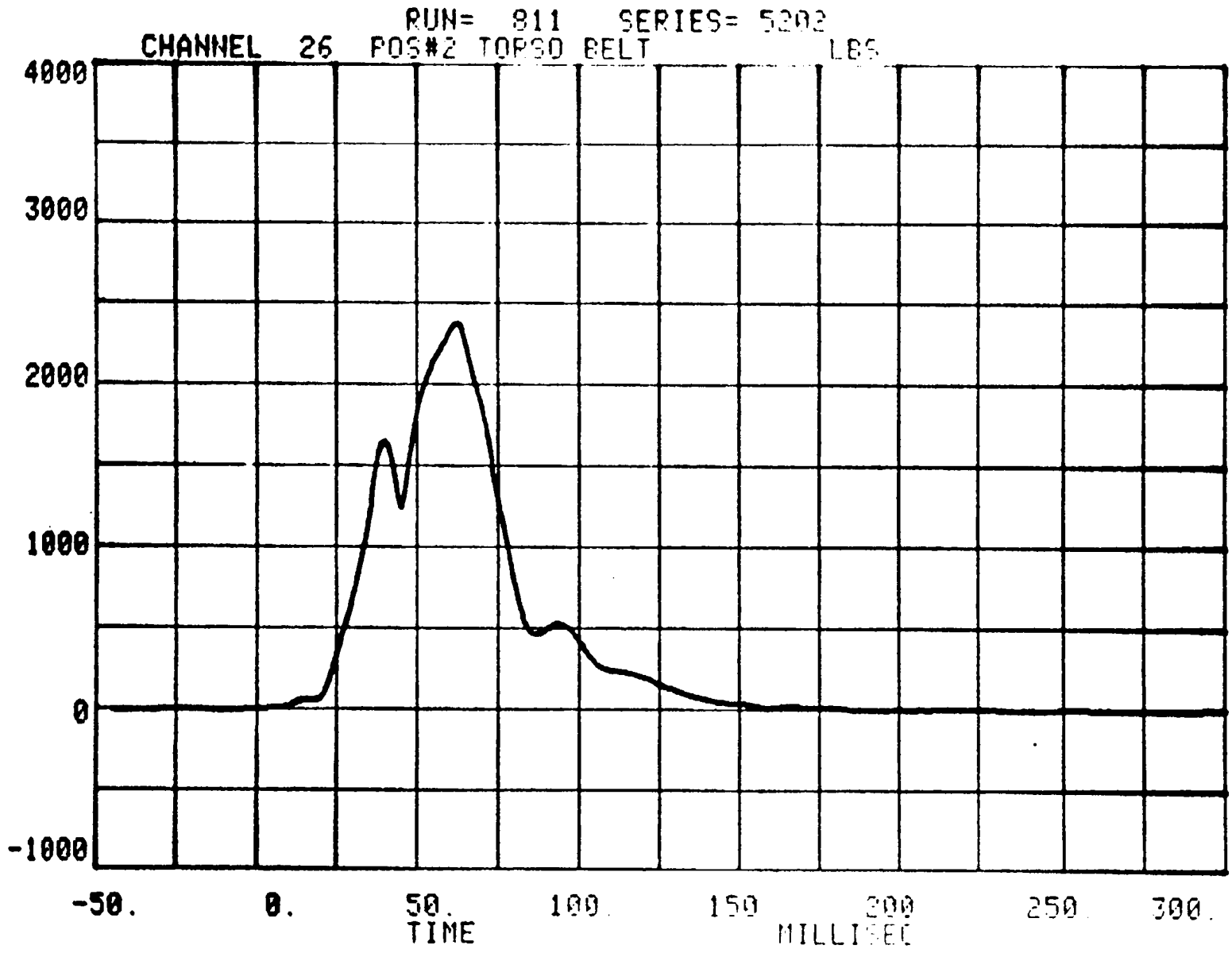
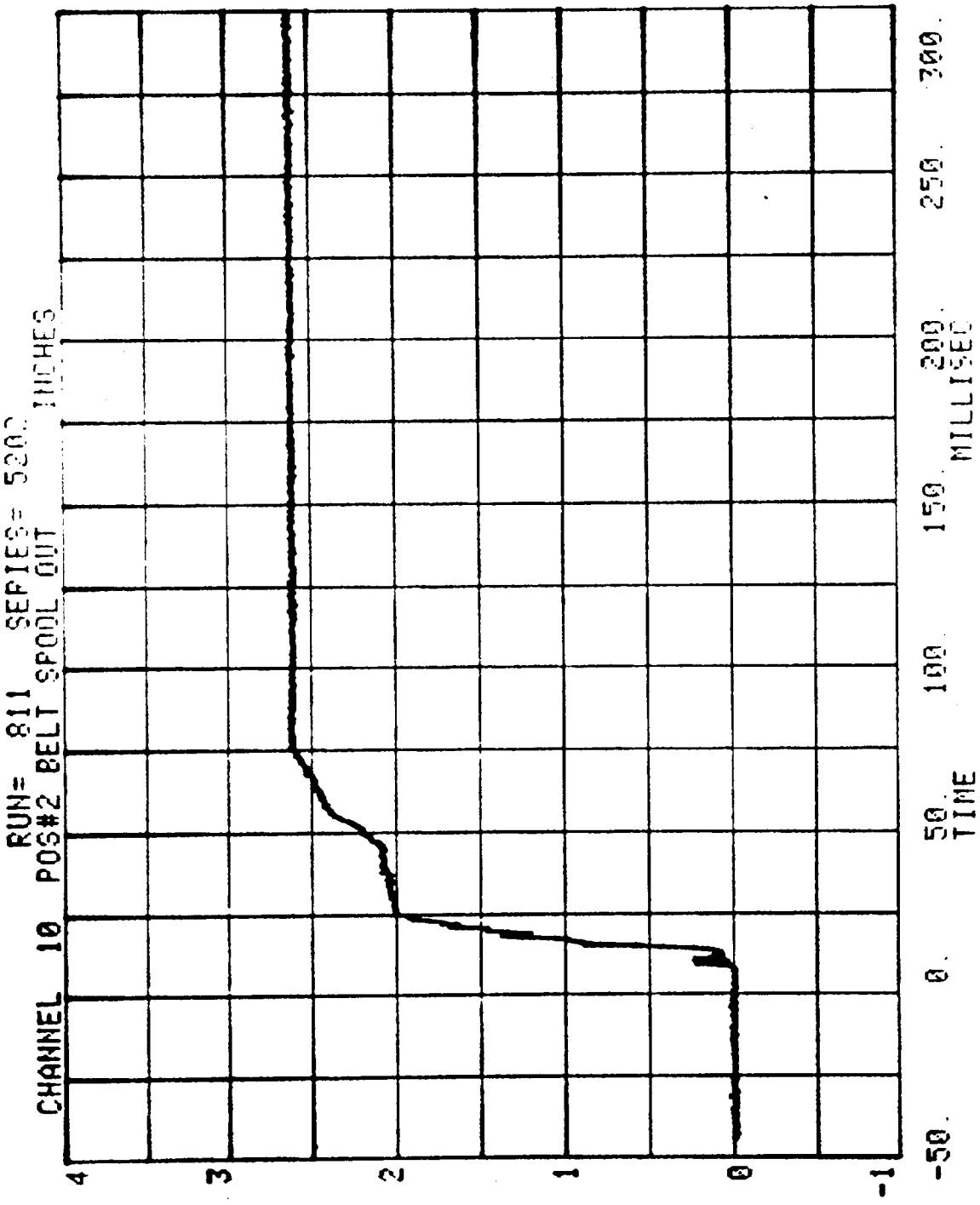
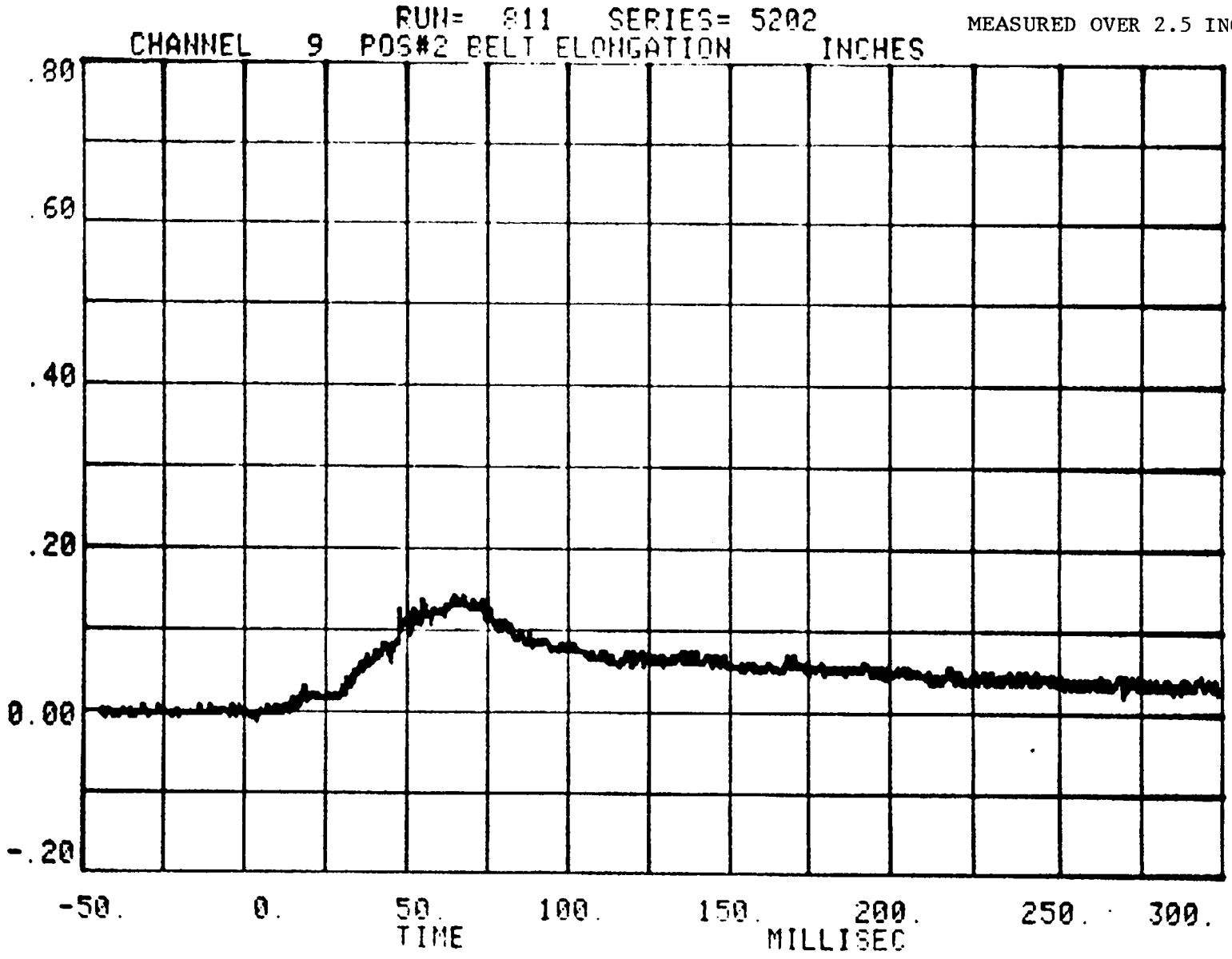

RUN= 811 SERIES= 5202
CHANNEL 20 POS#2 LEFT FEMUR
LBS
2000
1500
1000
500
0
-500
-50.
0.
50.
100
150
200
250.
300.
TIME
MILLISEC


RUN= 811 SERIES= 5202
CHANNEL 26 POS#2 TORSO BELT LBS
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC


CHANNEL 10 POS#2 BELT SPOOL OUT
RUN= 811 SERIES= 5200
INCHES
4
3
2
1
0
-1
-50.
0.
50.
100
150
200.
250.
300.
TIME
MILLISEC

7626-9


RUN= 811 SERIES= 5202
MEASURED OVER 2.5 INCHES
CHANNEL 9 POS#2 BELT ELONGATION INCHES
.80
.60
.40
.20
0.00
-.20
-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.

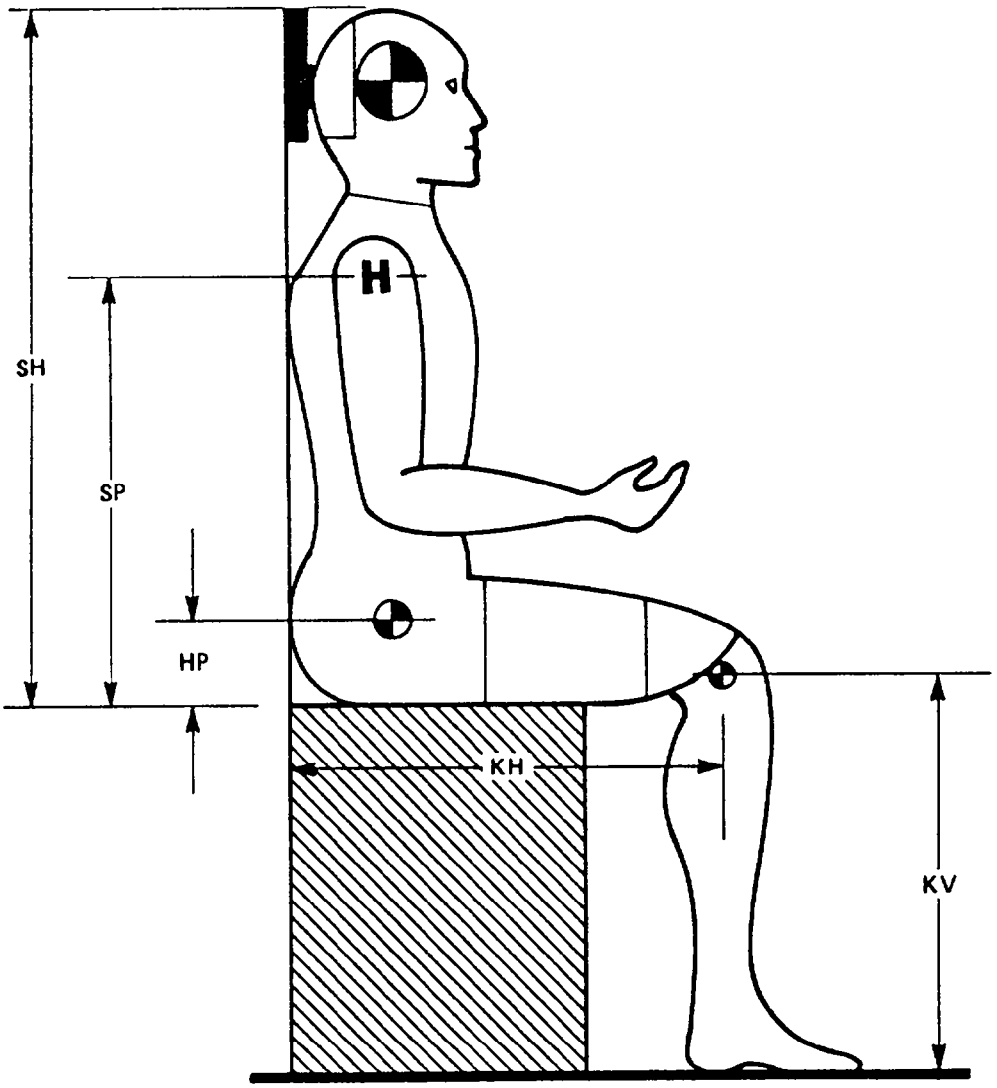
Dummy serial numbers and certification dates are:

Serial No.	Completion Date
1021	2-2-88
1022	2-5-88

Electronic Test Equipment

The complement of signal conditioning recording and display equipment in conjunction with dummy certification testing can be found in New Car Assessment and Standards Indicant Testing Final Report, Report No. 6525-V-1.

FIGURE 10 DUMMY CONFIGURATION DIMENSIONS



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PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 1021

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXX	2-2-88	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXX	3	
SH - Seated Height	35.6 to 35.8"	35.7"	
SP - Shoulder Pivot Height	21.8 to 22.4"	22.1"	
HP - Hip Pivot Height	3.9" ref.	3.9"	
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.4"	
KV - Knee Pivot from floor	19.3 to 19.9"	19.5"	
SW - Shoulder Width	17.8 to 18.4"	18.1"	
HW - Hip Width	14.0 to 15.4"	14.8"	

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required
DATE OF PERFORMANCE VERIFICATION		2-2-88	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		3	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-72 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		20-39%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	225 G's	
b. peak lateral accel.	<= 10 G's	2 G's	
c. Time above 100 G's	0.9 to 1.5 ms.	1.2 ms	

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

TECHNICIAN'S NAME: Dale Head

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. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

EST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required
. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	21.8 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	26 G's	
c. Peak Resultant Head Acceleration		26 G's max.	24 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.5 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	26 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	3.7 ms	
g. Max. Head Rotation		63 to 73 deg.	72 deg	
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	0.0 ms	
	Displ.	-.5 to .5"	0.0"	
30 deg.	Time	25.6 to 34.4 ms.	27.3 ms	
	Displ.	2.1 to 3.1"	2.8"	
60 deg.	Time	40.3 to 51.7 ms.	42.2 ms	
	Displ.	4.3 to 5.3"	5.0"	
Maximum (72 deg)	Time	53.2 to 66.8 ms.	56.1 ms	
	Displ.	5.0 to 6.0"	5.8"	
60 deg.	Time	67.0 to 83.0 ms.	74 ms	
	Displ.	4.3 to 5.3"	4.8"	
30 deg.	Time	85.4 to 104.6 ms.	92 ms	
	Displ.	2.1 to 3.1"	2.3"	
0 deg.	Time	101.0 - 123.0 ms.	106 ms	
	Displ.	-.5 to 0.5"	0.0"	

ECHNICIANS NAME: D. L. Hood

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

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.	27 lbs	
b. Force @ 0.75"	36 to 50 lbs.	41 lbs	
c. Force @ 1.0"	50 to 63 lbs.	56 lbs	
d. Force @ 1.3"	73 to 88 lbs.	85 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	31.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	41.5 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	56 lbs	
d. Return Angle	12 deg. maximum	8 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.8 fps	
(2) Peak Deflection	1.7" maximum	1.48"	
(3) Peak Resistive Force	2250 lbs maximum	2210 lbs	
(4) Internal Hysteresis	50 to 70%	57%	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.1 fps	
(2) Peak Deflection	1.1" maximum	1.0"	
(3) Peak Resistive Force	1450 lbs maximum	1352 lbs	
(4) Internal Hysteresis	50 to 70%	61.8%	

TECHNICIAN'S NAME: D. Wood

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

I. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required
6. KNEE IMPACT TEST			
A.Right Side			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2150 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.96 ms	
B. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2300 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.82 ms	

REMARKS:

TECHNICIAN'S NAME: D. W. Hess

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER ____1021_____

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CJ22	2-88	8-88
HY LATERAL--	ENDEVCO	CS41	2-88	8-88
HZ VERTICAL--	ENDEVCO	CH31	2-88	8-88
2. CHEST ACCELEROMETER-				
CX LONGITUDINAL--	CEC	A73	2-88	8-88
CY LATERAL--	ENDEVCO	CE06	2-88	8-88
CZ VERTICAL--	CEC	A44	2-88	8-88
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	552	10-87	4-88
LEFT SIDE	GSE	551	10-87	4-88
CALIBRATION LABORATORY INSRUTMENTS--				
1. PENDULUM ACC.--	CEC	A144	12-87	6-88
2. TEST PROBE ACCELEROMETER--	CEC	A142	12-87	6-88
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	11-87	5-88
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	11-87	5-88
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	11-87	5-88

NHTSA DUMMY I.D. NUMBER.: 1022

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXX	2-5-88	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXX	3	
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"	20.5"	
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"	

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required
DATE OF PERFORMANCE VERIFICATION		2-5-88	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		3	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-72 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		22-39%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	240 G's	
b. peak lateral accel.	<= 10 G's	2 G's	
c. Time above 100 G's	0.9 to 1.5 ms.	1.2 ms	

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

TECHNICIAN'S NAME: DW Hess

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

. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

EST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required
. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	22.3 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	24 G's	
c. Peak Resultant Head Acceleration		26 G's max.	25 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	26.4 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	8.5 ms	
g. Max. Head Rotation		63 to 73 deg.	69 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.	27.9 ms	
	Displ.	2.1 to 3.1"	2.4"	
60 deg.	Time	40.3 to 51.7 ms.	43.4 ms	
	Displ.	4.3 to 5.3"	4.9"	
Maximum (69 deg)	Time	53.2 to 66.8 ms.	56.7 ms	
	Displ.	5.0 to 6.0"	5.4"	
60 deg.	Time	67.0 to 83.0 ms.	71 ms	
	Displ.	4.3 to 5.3"	4.7"	
30 deg.	Time	85.4 to 104.6 ms.	88.9 ms	
	Displ.	2.1 to 3.1"	2.2"	
0 deg.	Time	101.0 - 123.0 ms.	103.1 ms	
	Displ.	-.5 to 0.5"	0.0"	

TECHNICIANS NAME: DW Hess

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	25.5 lbs	
b. Force @ 0.75"	36 to 50 lbs.	41 lbs	
c. Force @ 1.0"	50 to 63 lbs.	57 lbs	
d. Force @ 1.3"	73 to 88 lbs.	82 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	24.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	37 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	50 lbs	
d. Return Angle	12 deg. maximum	9.5 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	22.0 fps	
(2) Peak Deflection	1.7" maximum	1.48"	
(3) Peak Resistive Force	2250 lbs maximum	2158 lbs	
(4) Internal Hysteresis	50 to 70%	60%	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.1 fps	
(2) Peak Deflection	1.1" maximum	.88"	
(3) Peak Resistive Force	1450 lbs maximum	1248 lbs	
(4) Internal Hysteresis	50 to 70%	57.3%	

TECHNICIAN'S NAME: DW Hess

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Right Side			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2400 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.75 ms	
B. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	1900 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.96 ms	

REMARKS:

TECHNICIAN'S NAME: DW Hess

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER ____1022_____

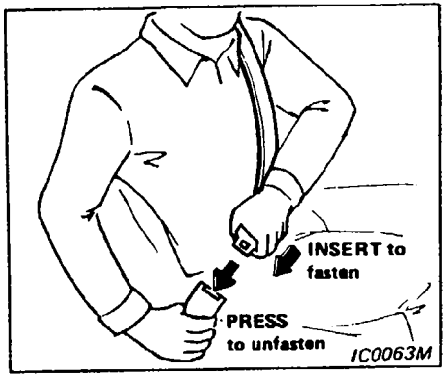
DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CK54	2-88	8-88
HY LATERAL--	ENDEVCO	CK78	2-88	8-88
HZ VERTICAL--	ENDEVCO	CD75	2-88	8-88
2. CHEST ACCELEROMETER-				
CX LONGITUDINAL--	CEC	A115	9-87	3-88
CY LATERAL--	ENDEVCO	CS09	9-87	3-88
CZ VERTICAL--	CEC	A29	9-87	3-88
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	077	10-87	4-88
LEFT SIDE	GSE	076	10-87	4-88
CALIBRATION LABORATORY INSRUTMENTS--				
1. PENDULUM ACC.--	CEC	A144	12-87	6-88
2. TEST PROBE ACCELEROMETER--	CEC	A142	12-87	6-88
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	11-87	5-88
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	11-87	5-88
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	11-87	5-88

APPENDIX D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

SEAT BELTS

3-POINT TYPE WITH RETRACTOR



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

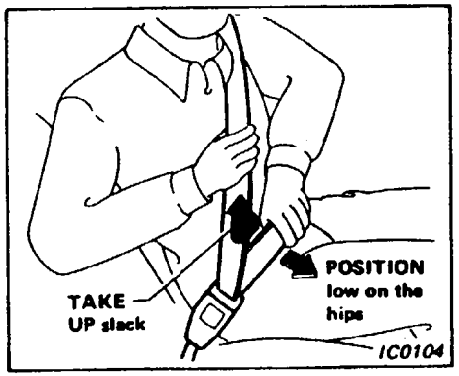
Fastening the belts

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

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

1) When the belt is pulled quickly from the retractor.
2) When the vehicle slows down rapidly.

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

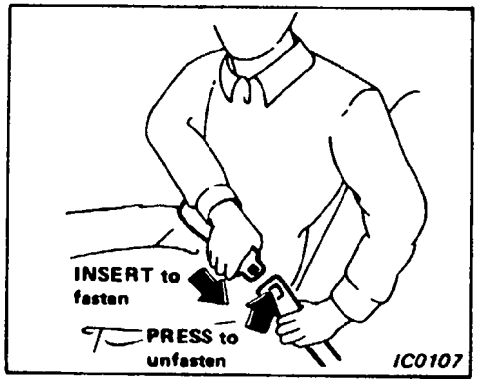
- Grasp the shoulder belt and pull quickly forward. The retractor should lock and restrict further belt movement.

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

Replacing front seat belt

The front seat belts are shock absorber type. Replace the belt when the loop has been pulled out and "REPLACE BELT" is visible as this indicator means the seat belt has been overstressed.

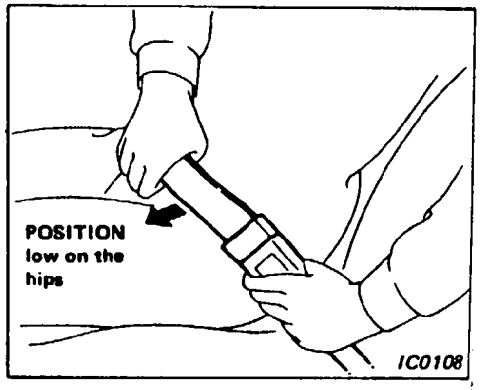
2-POINT TYPE WITH RETRACTOR



Fastening the belts

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

If the retractor locks and restricts further movement, let the belt rewind into the retractor, then slowly pull the belt out.

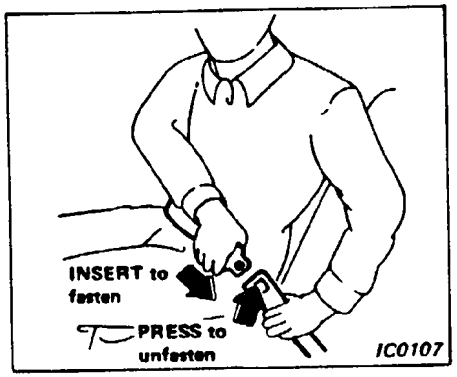


2. Position the lap belt **low on the hips** as shown.
3. Pull the belt toward the retractor to take up extra slack.

Unfastening the belts

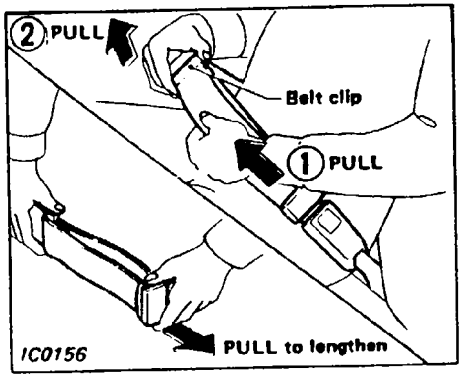
To unfasten the belt, press the button on the buckle. The seat belt will automatically retract.

2-POINT TYPE WITHOUT RETRACTOR

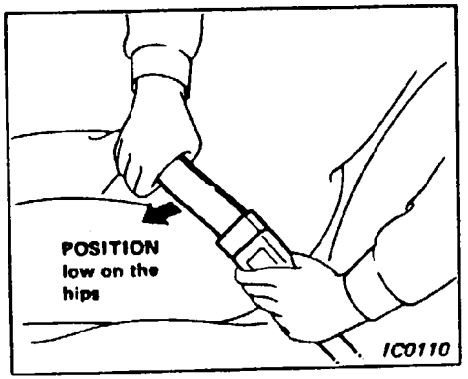


Fastening the belts

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.



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.