REPORT NO. CAL-88-N16

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

MAZDA MOTOR CORPORATION

1988 MAZDA 929

4-DOOR SEDAN

NHTSA NO. MJ5400

CALSPAN TEST NO. 7626-16

CALSPAN CORPORATION

ADVANCED TECHNOLOGY CENTER

P.O. BOX 400

BUFFALO, NEW YORK 14225

APRIL 21, 1988

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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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. Snarler

Manager, New Car Assessment Program (NCAP)

JUL 28 1988

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15. Supplementary Notes

16. Abstract

A frontal load cell barrier test of a 1988 Mazda 929 4-Door Sedan was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York on April 21, 1988.

Impact speed was 35.5 mph and the ambient temperature at the barrier face at the time of impact was 36°F. The maximum post-test vehicle crush was 24.3 inches. The test vehicle was equipped with a manual 3-point continuous belt system at each of the front outboard seating positions.

With regard to FMVSS No. 208, "Occupant Crash Protection," injury criteria, the driver and passenger appeared to satisfy the head, chest and femur requirements.

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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 requirement.

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 MJ5400

A load cell barrier consisting of 36 load cells was impacted by a 1988 Mazda 929 4-Door Sedan at a velocity of 35.5 mph. The test was performed at the Calspan Corporation Advanced Technology Center on April 21, 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. 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 lap and shoulder belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 749) had been used in two previous tests (MJ0107 and MJ0102) and the Injury Criteria values were not exceeded in either test. The passenger ATD (Serial No. 1021) was certified prior to the test. Certification details along with instrumentation calibration data, are found in Appendix C.

The 67 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the steering wheel rim and sun visor; the HIC was 273. The maximum chest deceleration over 3 milliseconds was 51 g's and femur loads were 774 and 1093 pounds.

The right front passenger's HIC was 859 and maximum chest deceleration over 3 milliseconds was 49 g's and femur loads were 450 and 450 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1988 Mazda 929 4-Door

NHTSA NO.: MJ5400 VIN.: JM1HC2217J0101193

BODY COLOR: White DATE OF MANUFACTURE: 7-87

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: 3-31-88 Odometer Reading: 60
X A/C; X P/S; X P/B; X P/wdo.; X Tilt Wheel
- P/seats; X Cruise Control

Type of Occupant Restraint: 3-point continuous belt system

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 30 psi, Rear 30 psi

Recommended Tire Size: P195/65R15 89H

Recommended Cold Tire Pressure: Front 30 psi, Rear 30 psi

Tires on Vehicle: 195/65 R15 89H ; Manufacturer: Yokohama

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) = 850 lbs. (A)

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

Rated Cargo and Luggage Weight (RCLW) A-B = 100 lbs.

GVWR 4345 lbs. GAWR: Front 2160 lbs. Rear 2335 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 = 930 lbs. Right Rear = 840 lbs.

Left Front = 930 lbs. Left Rear = 770 lbs.

TOTAL FRONT WEIGHT = 1860 lbs. (54 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1610 lbs. (46 % of Total Vehicle Weight)

TOTAL DELIVERY WEIGHT = 3470 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (3470 lbs.)

VCW = Vehicle Capacity Weight (850 lbs.)

DSC = Designated Seating Capacity (5)

RCLW = VCW - 150 (DSC) = 100 lbs.

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

Target Test Weight = 3898 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 122 POUNDS CARGO:

Right Front = 930 lbs. Right Rear = 970 lbs.

Left Front = 1010 lbs. Left Rear = 1010 lbs.

TOTAL FRONT WEIGHT = 1940 lbs. (50 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1980 lbs. (50 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 3920 lbs.

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

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 27.6 LF 27.5 RR 26.3 LR 26.2

Test Attitude: RF 27.5 LF 27.7 RR 24.5 LR 24.6

Wheel Base: 106.5 in.; C.G. = 53.8 in. rearward of front wheel C/L

Remarks: None

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0 o

Date of Test: 4/21/88 Time of Test: 12:05

Ambient Temperature: 36 °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 = 35.5 mph, secondary = 35.5 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	189.7	C_L	193.8	L	189.4
	Post-test	= R	167.3	C_L	169.5	L	167.3
	Crush	= R	22.4	C_L	24.3	L	22.1

Distance from front of test vehicle to point of impact:

R 3.4 C/L 2.7 L 3.3

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Sun Visor and Steering Rim	Sun Visor and 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		Rear	
	Left	Right	Left	Right
Door Opening	Operable	Operable	Operable	Operable

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

Glazing Damage

Backlight/Windshield — Windshield 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

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-68	-36	30	79	-52	24	-16	51
DUMMY (2)	-67	30	69	86	-42	37	24	49
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	774	1093
DUMMY (2)	450	450
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)	1777	-	1909
DUMMY (2)	1965	1656	-
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)	273	.04560	.07342	39.5
DUMMY (2)	859	.07987	.11587	56.4
DUMMY (3)				
DUMMY (4)				

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Figure 1

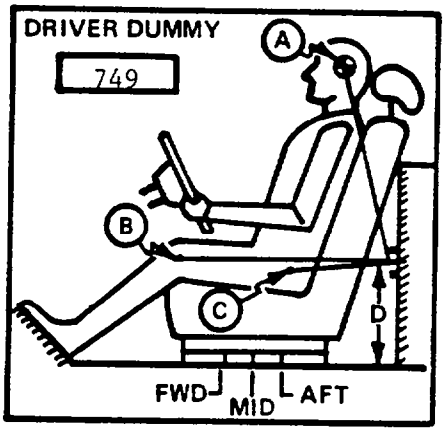
PART 572 DUMMY IN-VEHICLE POSITION

TEST NO.: MJ5400 VEHICLE: 1988 Mazda 929

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

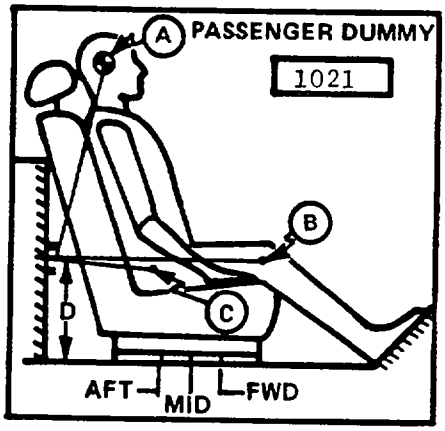
ADJUSTER TYPE:
- X Manual
- ____ Power

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

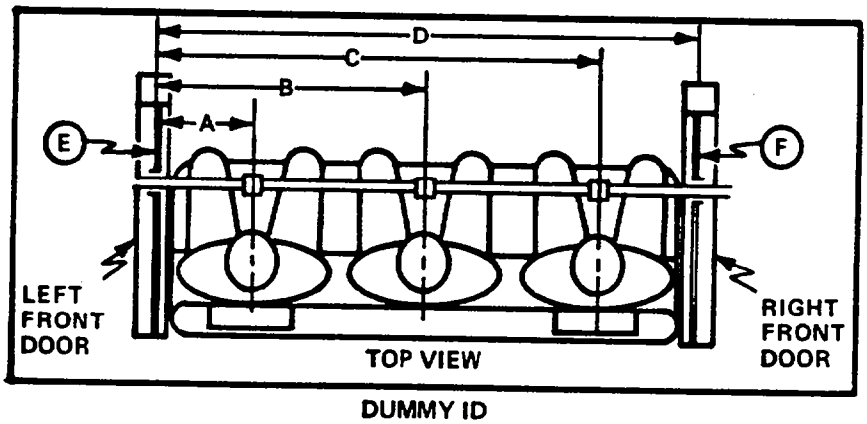


MEASUREMENT LOCATION

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



A =	22.6	in.	5	Degrees	A =	22.7	in. 3 Degrees
B =	23.0	in.	93	Degrees	B =	23.3	in. 93 Degrees
C =	8.5	in.	134	Degrees	C =	8.5	in. 121 Degrees
D =	13.5	in.			D =	13.5	in.



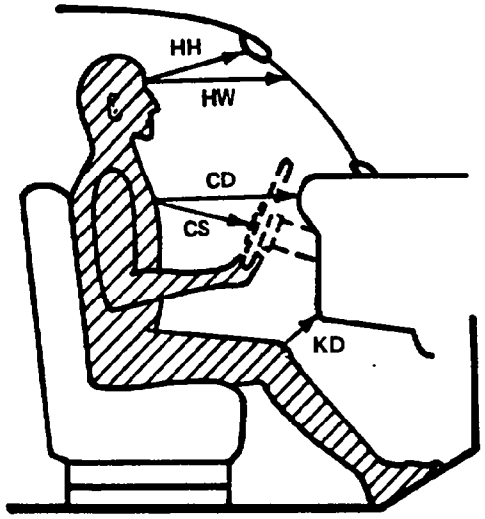
DUMMY ID

			749	1021
A	=	Left Door to Driver Centerline	11.2	in.
B	=	Left Door to Center Passenger Centerline	-	in.
C	=	Left Door to Right Passenger Centerline	40.5	in.
D	=	Left Door to Right Door	51.6	in.
E, F	=	Window Glass Height (Right and Left Must Be Equal)	11.5	in.

Figure 2

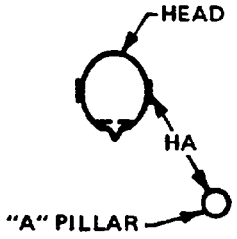
OCCUPANT CLEARANCE DIMENSIONS

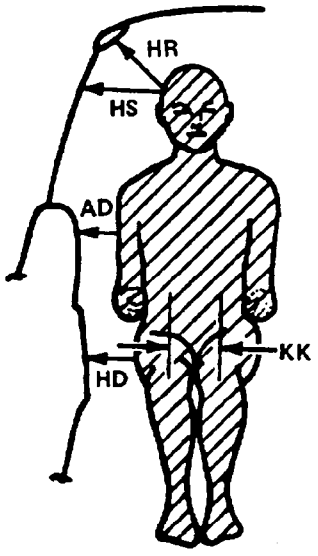
	DRIVER	PASSENGER
HH	13.9	14.4
HW	19.2	19.6
CD	22.5	24.0
CS	15.4	-
KDL	6.2	6.3
KDR	6.6	6.5
SA	22	22
TA	24	24



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

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

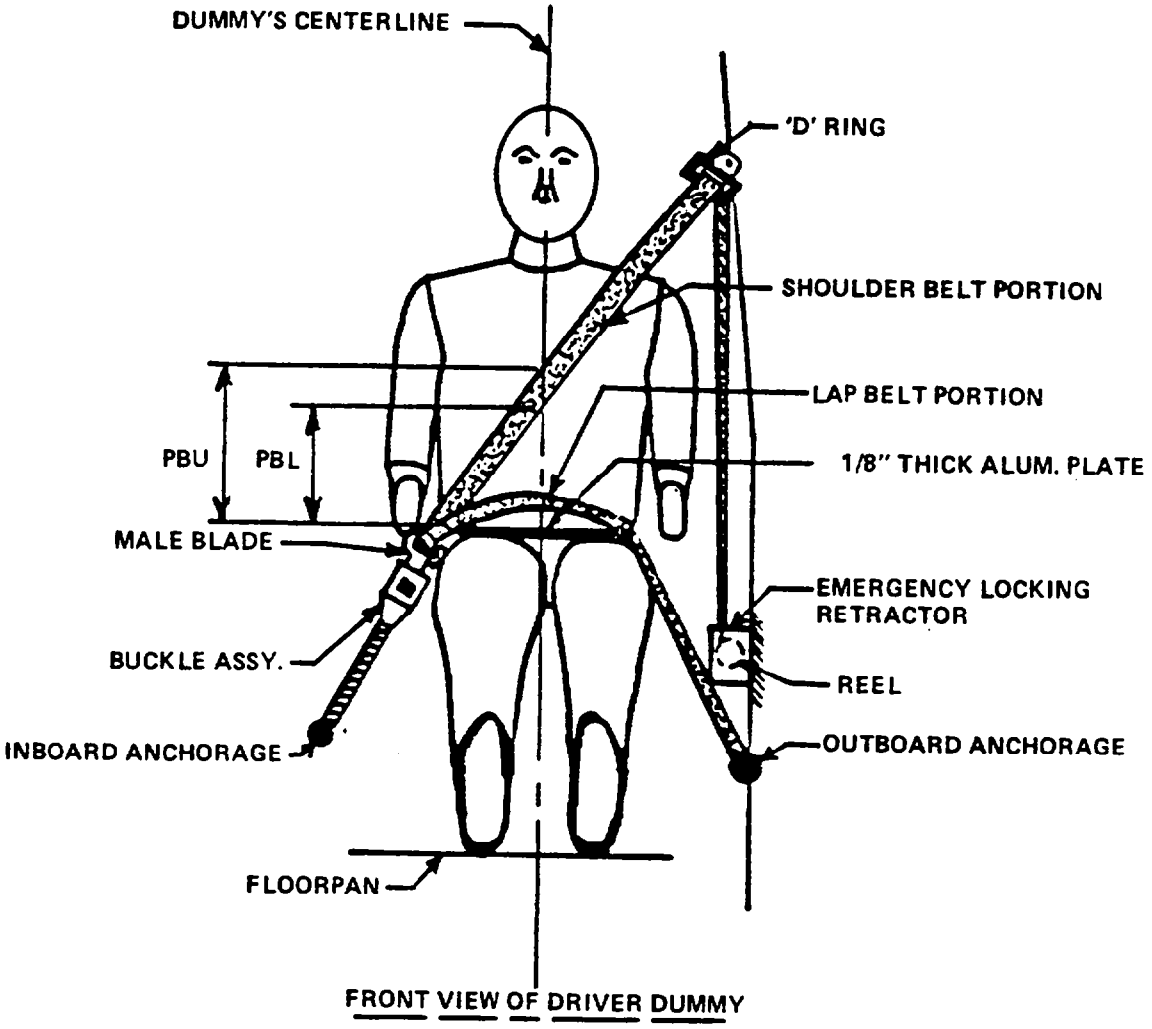




	DRIVER	PASSENGER
HR	5.0	5.2
HS	8.0	8.3
AD	3.7	4.1
HD	5.9	5.9
KK	8.8	9.0
HA	19.3	19.0

Figure 3

SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to upper edge	14.7	14.7
PBL -- Top surface of alum. plate to belt lower edge	11.4	11.5
LAP BELT TENSION	-	-
SHOULDER BELT TENSION	2 lb	2 lb

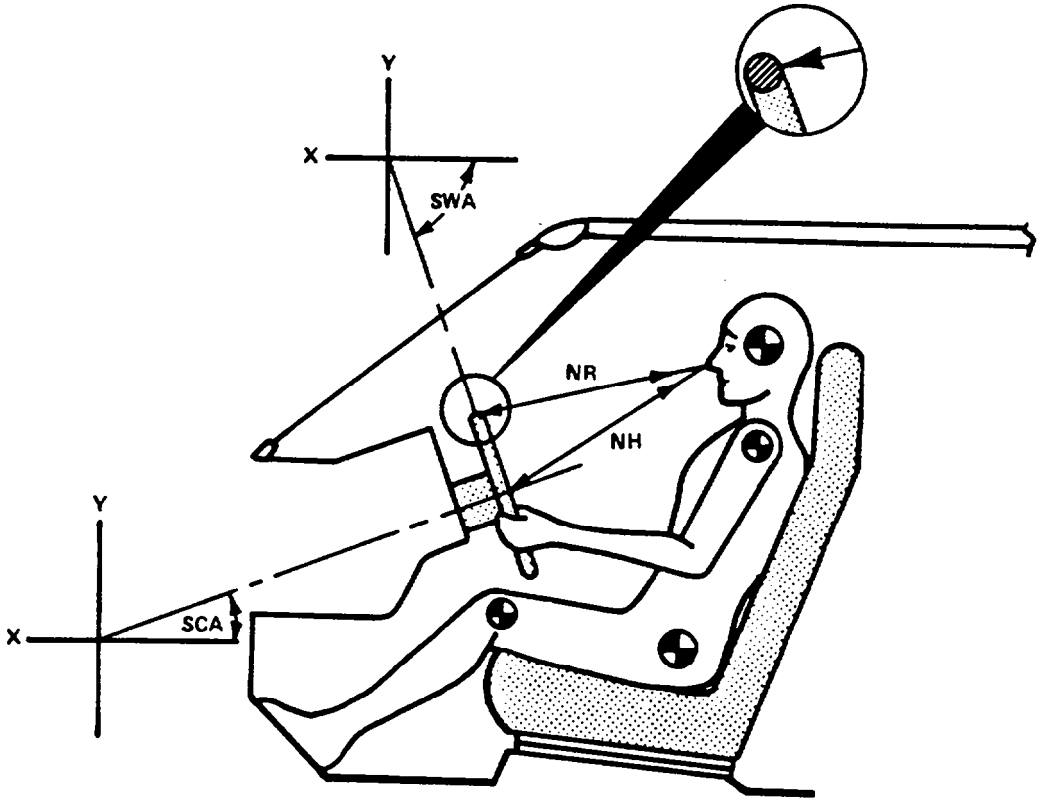
Table 3

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	80.5"	78.5"
Should belt length as measured on Part 572 Dummy.	36.0"	35.0"
Lap belt length as measured on Part 572 Dummy.	34.0"	33.0"
BELT SPOOL-OFF DATA:		
As determined by film analysis.	5.0"	3.0"
As determined mechanically.	3.5"	2.6"
As determined electronically.	2.3"	2.85"
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	0.34 in./ft.	1.25 in./ft.
Measured Mechanically	0.0 in./ft.	0.1 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	19.3	Inches
NH -- Distance from tip of dummy's nose to center of steering column hub	20.3	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

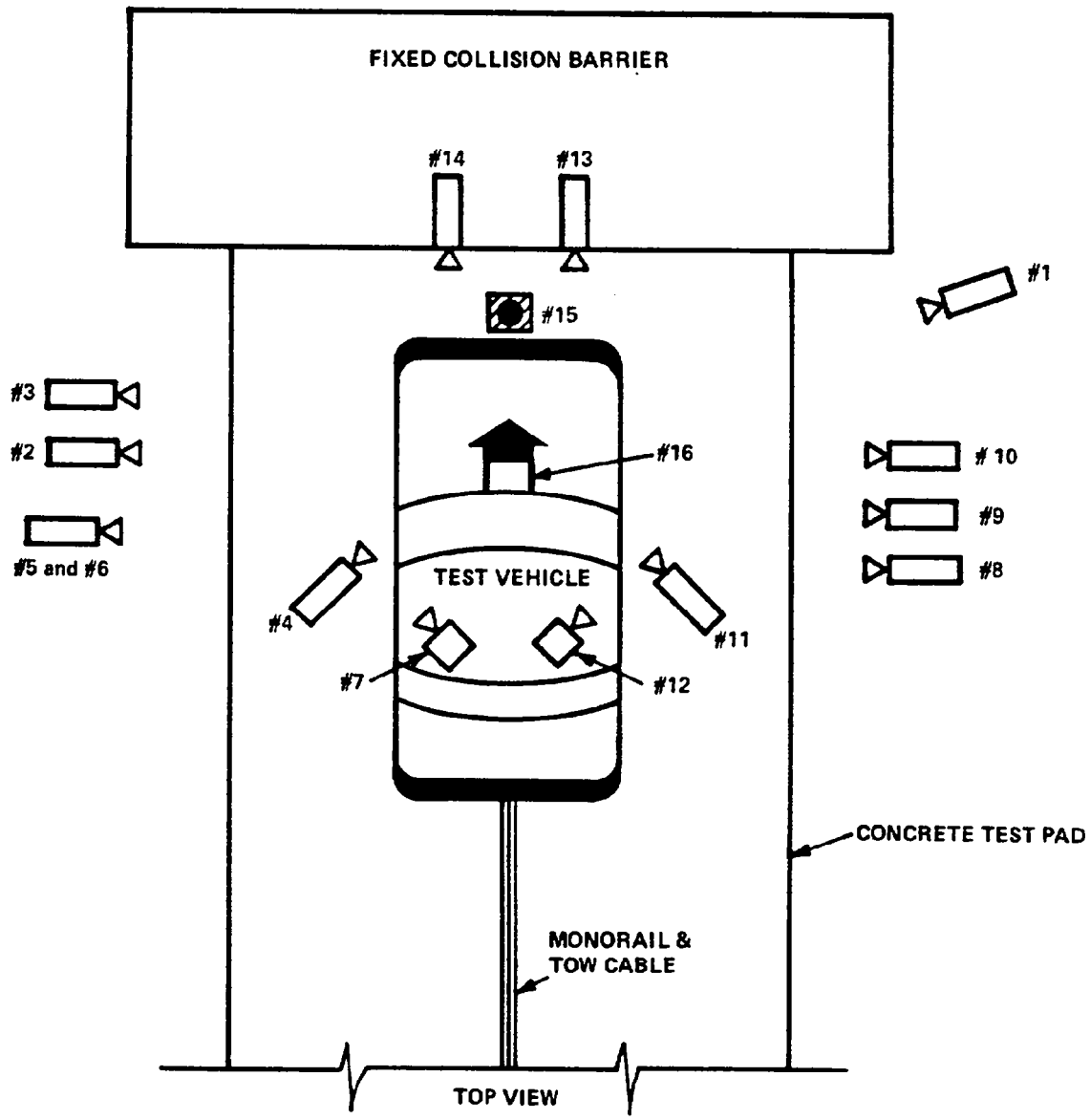


Table 4
HIGH-SPEED CAMERA LOCATIONS

Test No. MJ5400 Vehicle 1988 Mazda 929

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	250.0	62.0	42.0	-3	-	13	540
3	Left Side View	315.0	44.0	42.5	-4	-	25	540
4	Driver and Interior View	102.0	109.0	71.0	-19	-	13	700
5	Steering Column (Bottom)	298.0	78.0	47.5	-5	-	25	560
6	Steering Column (Top)	298.0	78.0	71.5	-9	-	25	550
7	Left Belt	-	-	-	-	-	8	525
8	Overall Right Side	248.0	68.0	42.0	-3	-	13	800
9	Right Side View	263.0	55.0	42.0	-1	-	25	730
10	Right Passenger View	294.0	61.0	53.5	-4	-	35	725
11	Passenger and Interior View	92.0	110.0	68.0	-18	-	25	610
12	Right Belt	-	-	-	-	-	8	1080
13	Passenger Front View	24.0	5.0	72.0	-33	-	13	555
14	Driver Front View	25.0	5.0	72.0	-32	-	13	550
15	Windshield View	0.0	0.0	126.0	-55	-	13	540
16	Pit View of Engine	0.0	30.0	-120.0	90	-	13	840

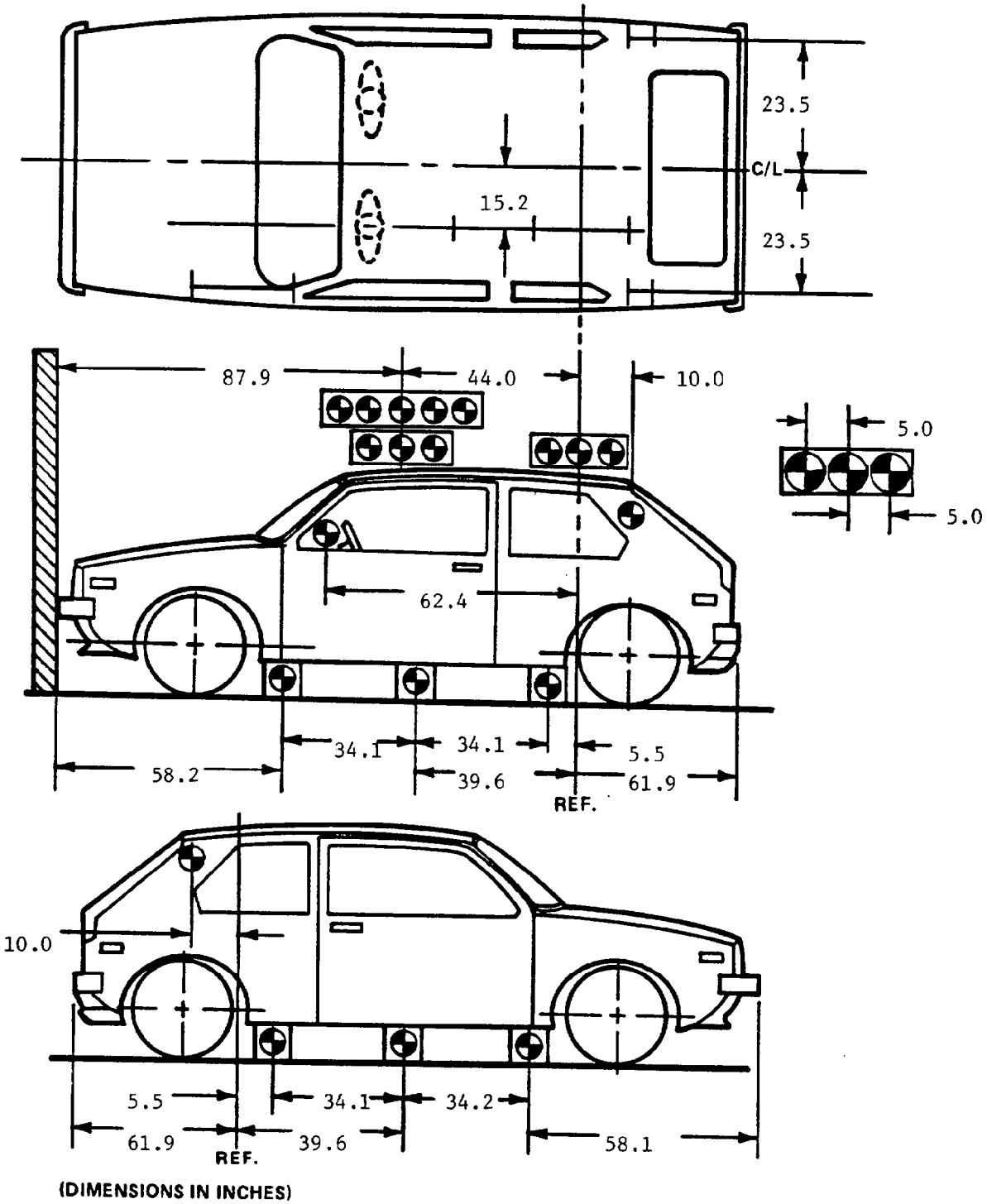
Se
No

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

Note: Film speed is on estimate.
Timing did not record.

Figure 6

VEHICLE TARGET LOCATIONS

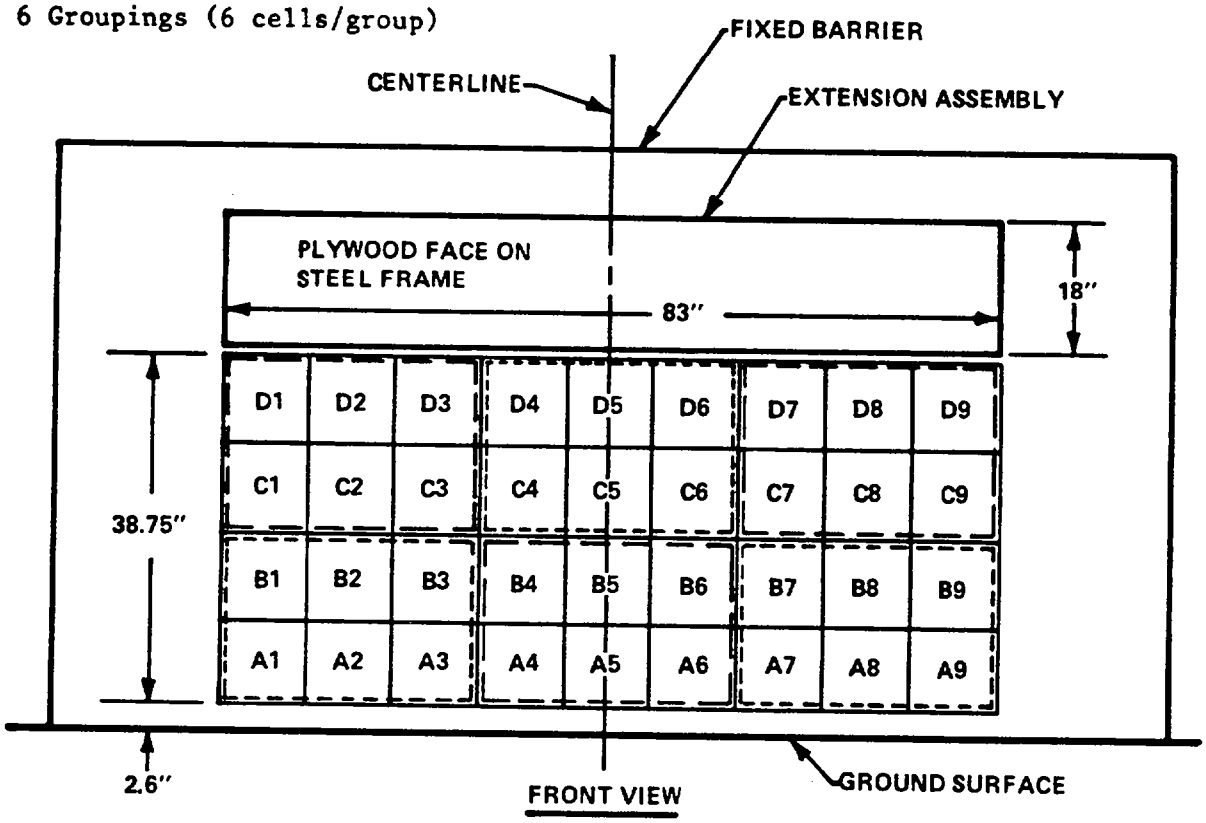


(DIMENSIONS IN INCHES)

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

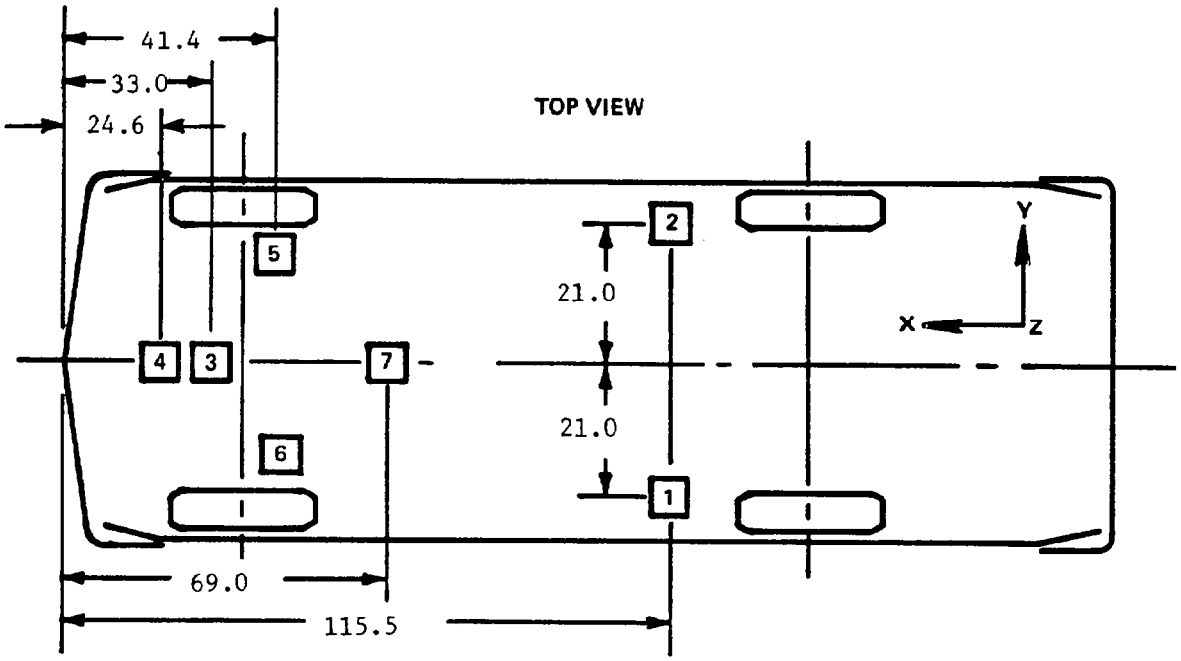
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

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	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

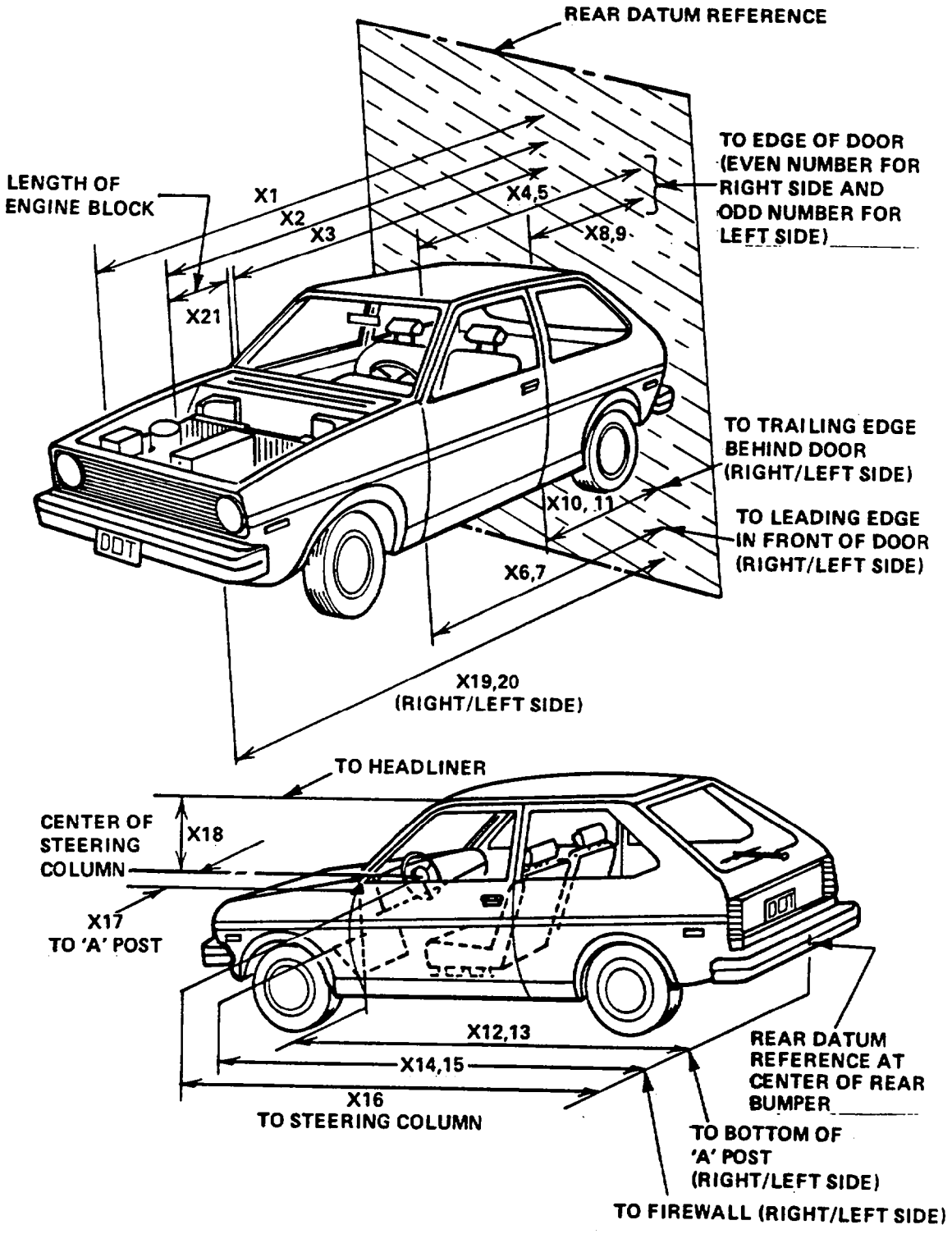


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	193.8	169.5	24.3
X2	Rear Surface of Vehicle to Front of Engine	167.5	158.8	8.7
X3	Rear Surface of Vehicle to Firewall	144.5	139.9	4.6
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	132.5	131.8	0.7
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	132.4	132.0	0.4
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	132.2	131.5	0.7
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	131.9	131.2	0.7
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	91.4	90.5	0.9
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	91.1	90.6	0.5
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	91.0	90.2	0.8
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	90.7	90.1	0.6
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	132.2	131.6	0.6
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	132.0	131.2	0.8
X14	Rear Surface of Vehicle to Firewall, Right Side	141.6	134.5	7.1
X15	Rear Surface of Vehicle to Firewall, Left Side	142.6	140.0	2.6
X16	Rear Surface of Vehicle to Steering Column	115.9	113.5	2.4
X17	Center of Steering Column to "A" Post	15.3	15.0	0.3
X18	Center of Steering Column to Headliner	17.7	18.4	-0.7
X19	Rear Surface of Vehicle to Right Side of Front Bumper	189.7	167.3	22.4
X20	Rear Surface of Vehicle to Left Side of Front Bumper	189.4	167.3	22.1
X21	Length of Engine Block	13.1	13.1	0.0

Appendix A

PHOTOGRAPHS

Figure A-1 PRE-TEST FRONT VIEW

91-2626

Figure A-2 POST-TEST FRONT VIEW

Figure A-3 PRE-TEST LEFT SIDE VIEW

7626-16

Figure A-4 POST-TEST LEFT SIDE VIEW

A-6

7626-16

Figure A-5 PRE-TEST RIGHT SIDE VIEW

Figure A-6 POST-TEST RIGHT SIDE VIEW

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

7626-16

A-9

7626-16

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

A-10

91-9294

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

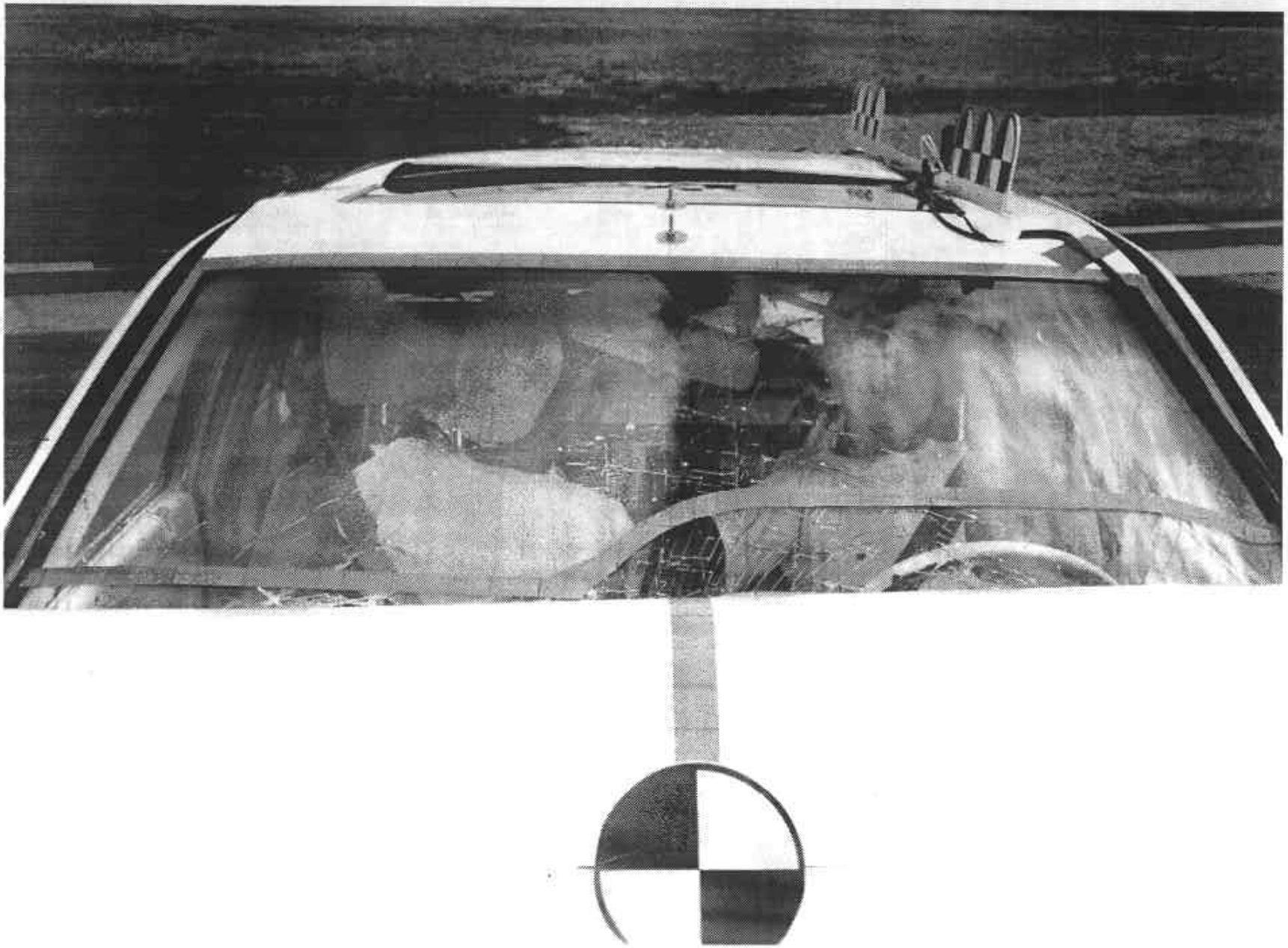
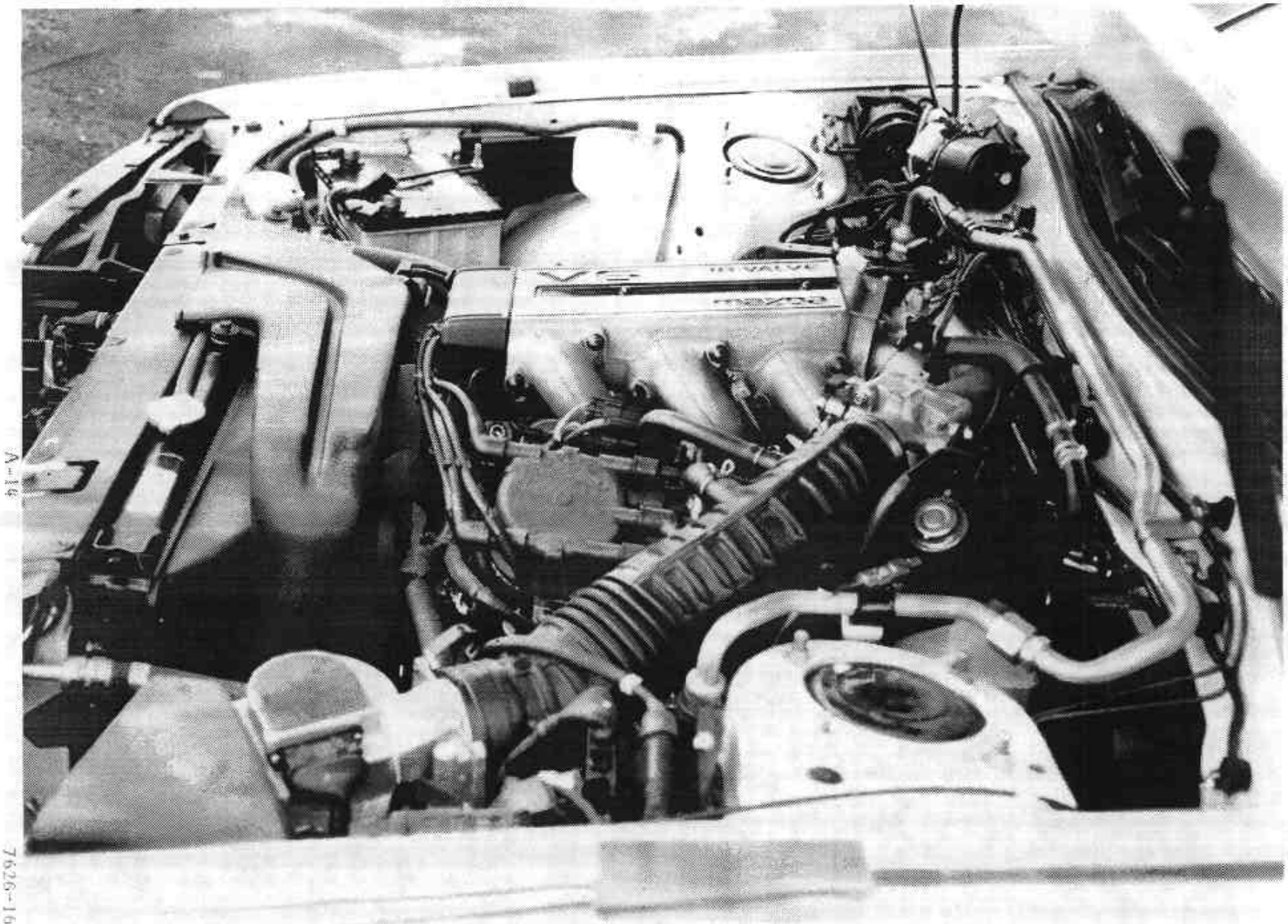


Figure A-12 POST-TEST WINDSHIELD VIEW



A-16

7626-16

Figure A-13 PRE-TEST ENGINE COMPARTMENT VIEW

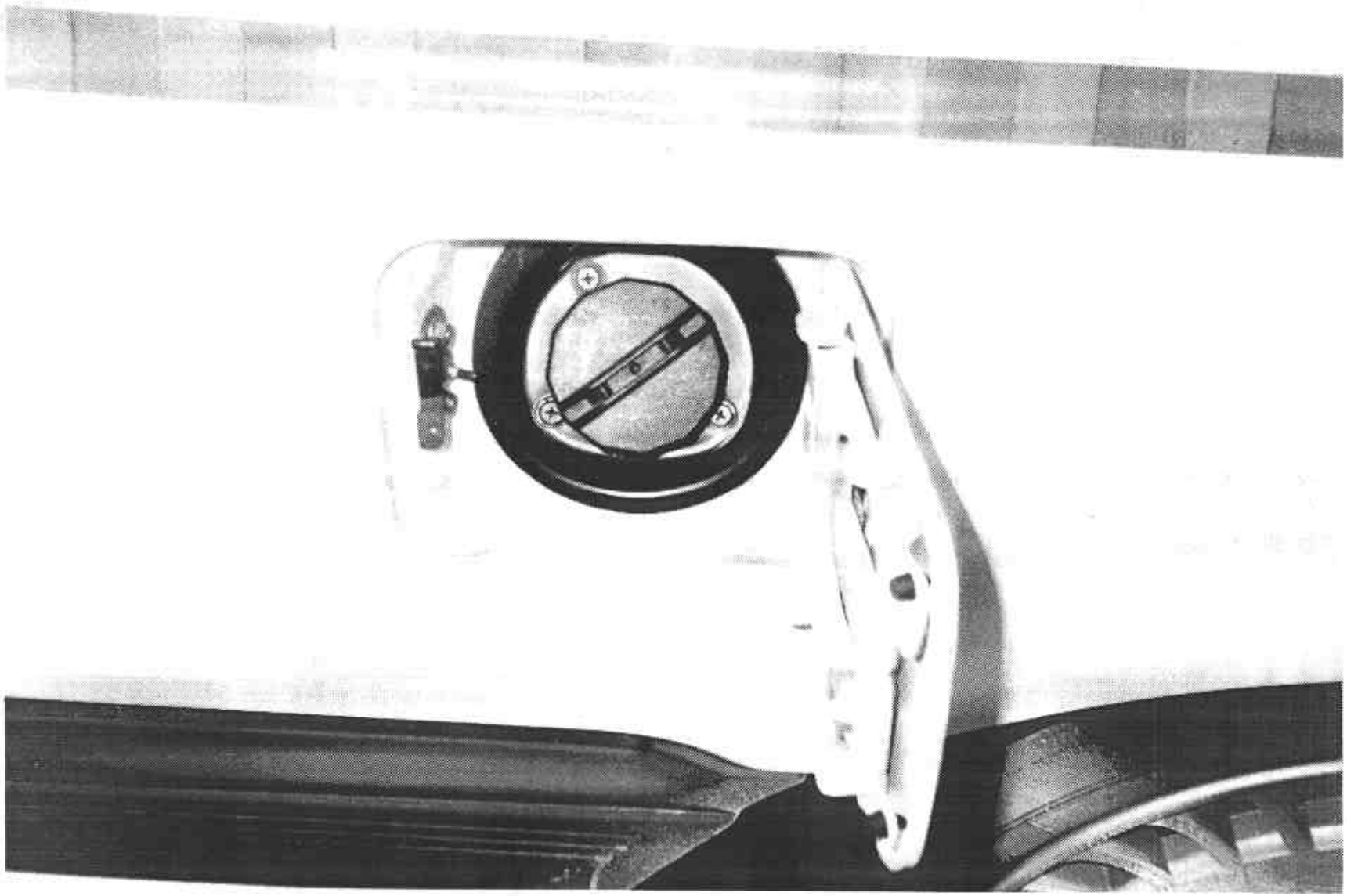
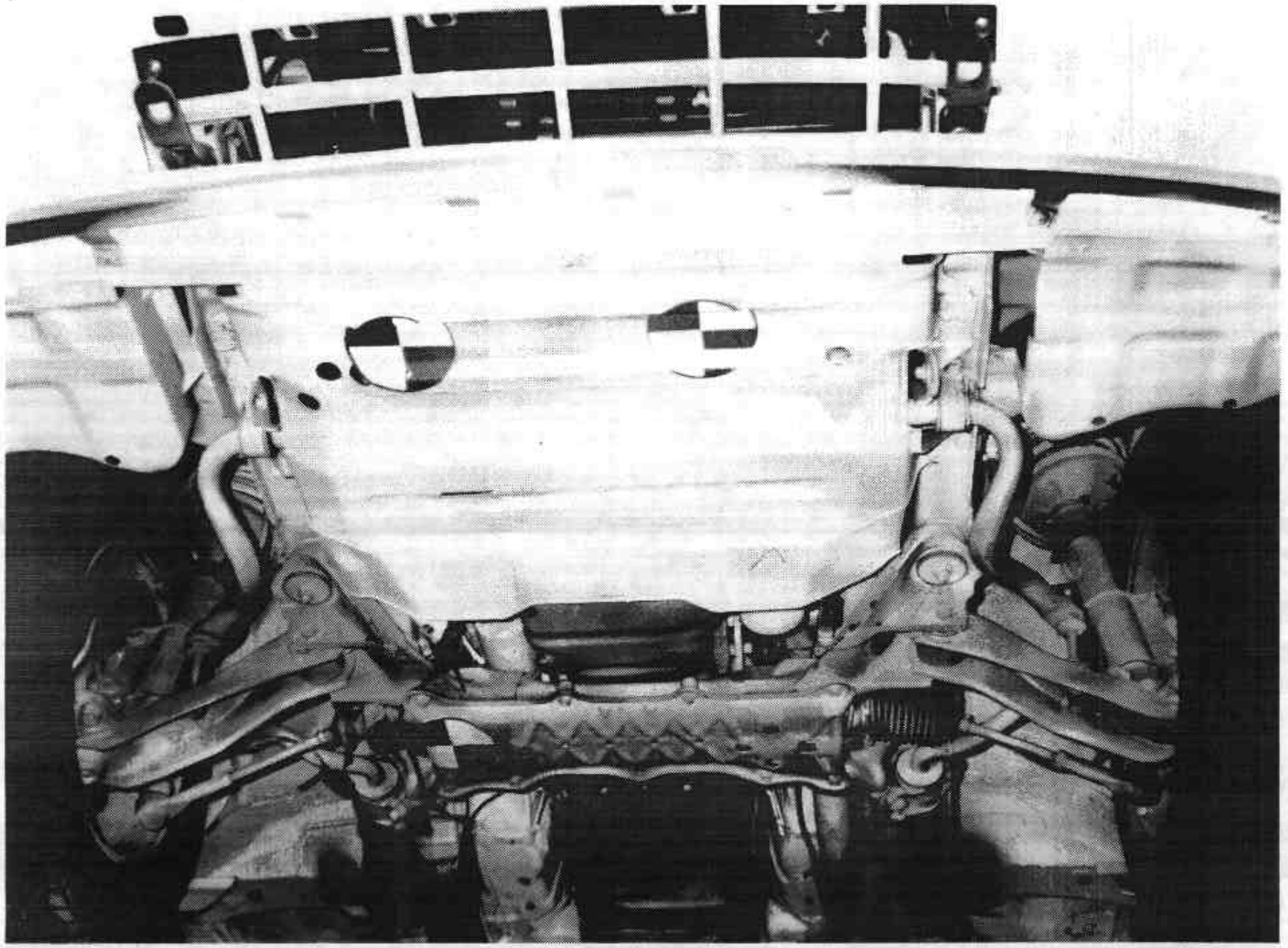


Figure A-14 PRE-TEST FUEL CAP VIEW



A-16

7626-16

Figure A-15 PRE-TEST FRONT UNDERBODY VIEW

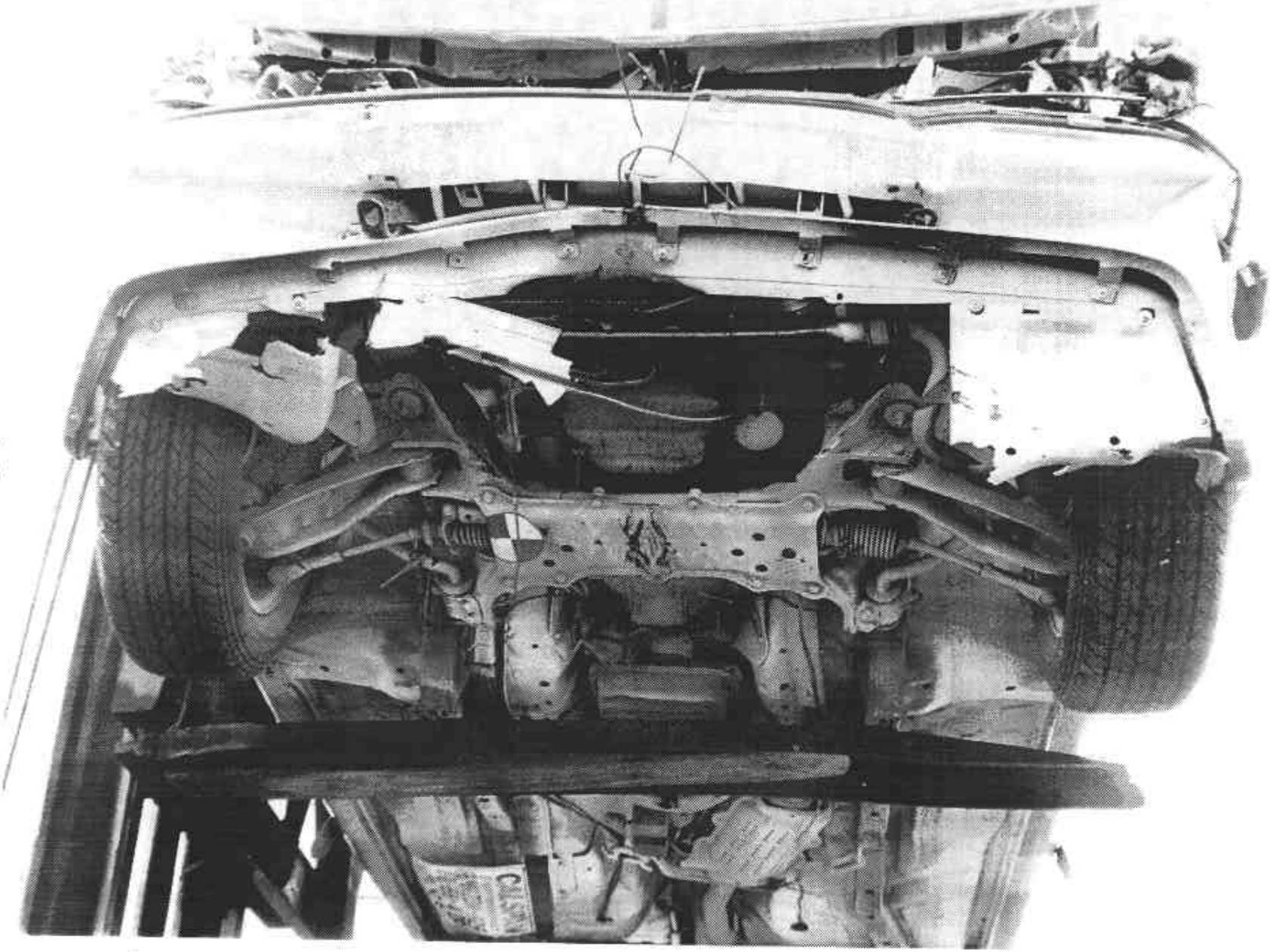


Figure A-16 POST-TEST FRONT UNDERBODY VIEW

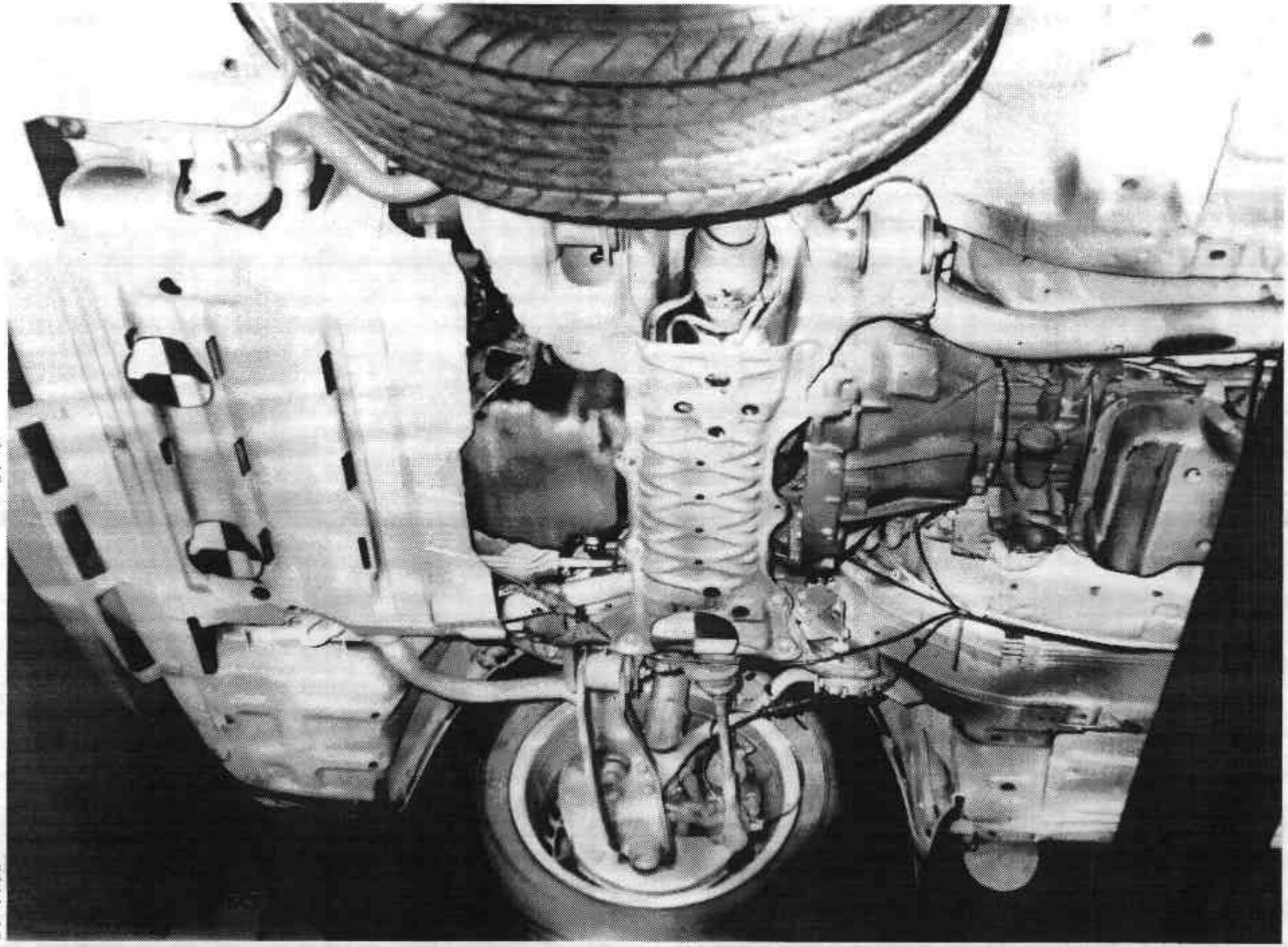


Figure A-17 PRE-TEST FRONT-SIDE UNDERBODY VIEW

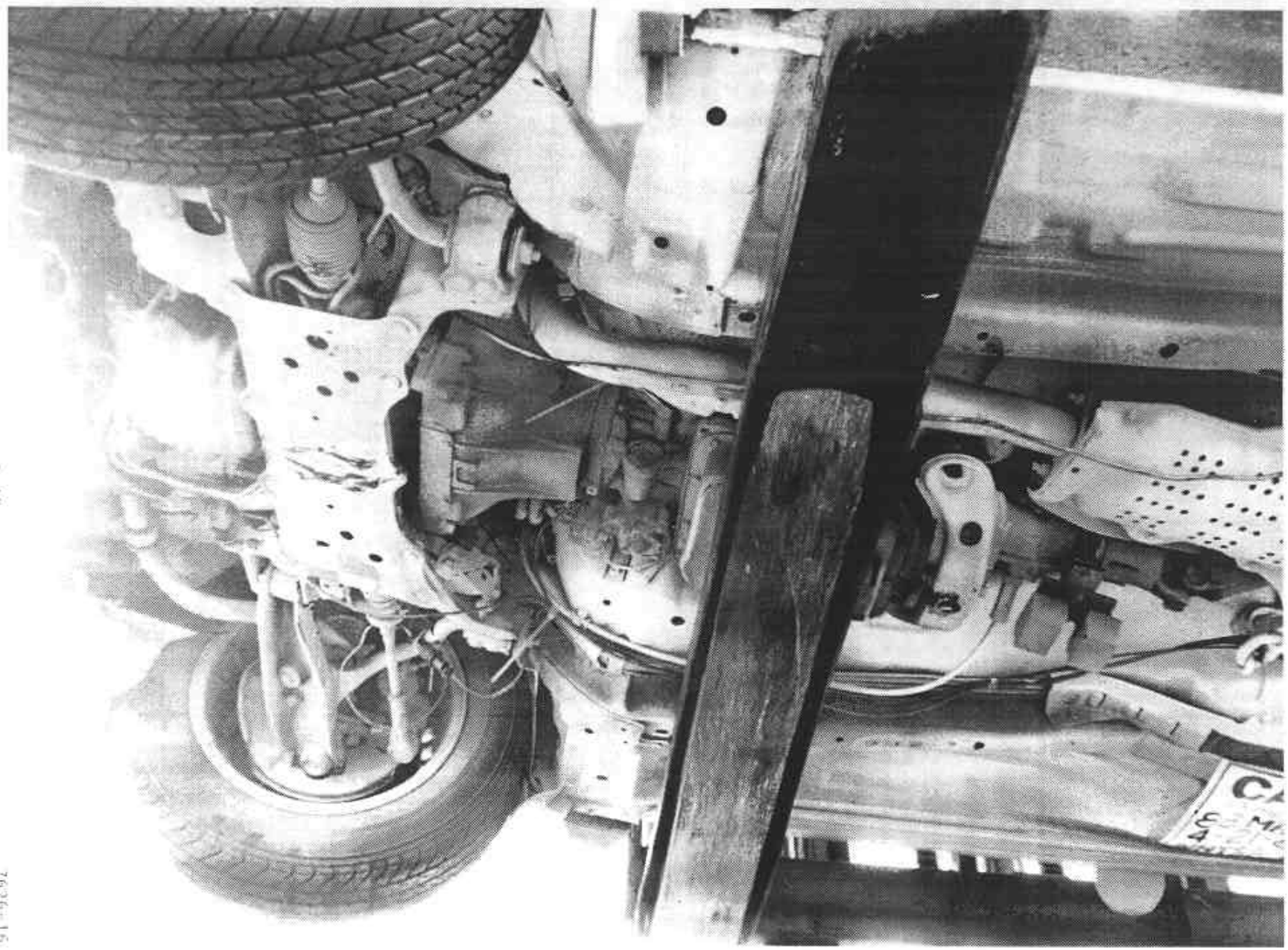


Figure A-18 POST-TEST FRONT-SIDE UNDERBODY VIEW

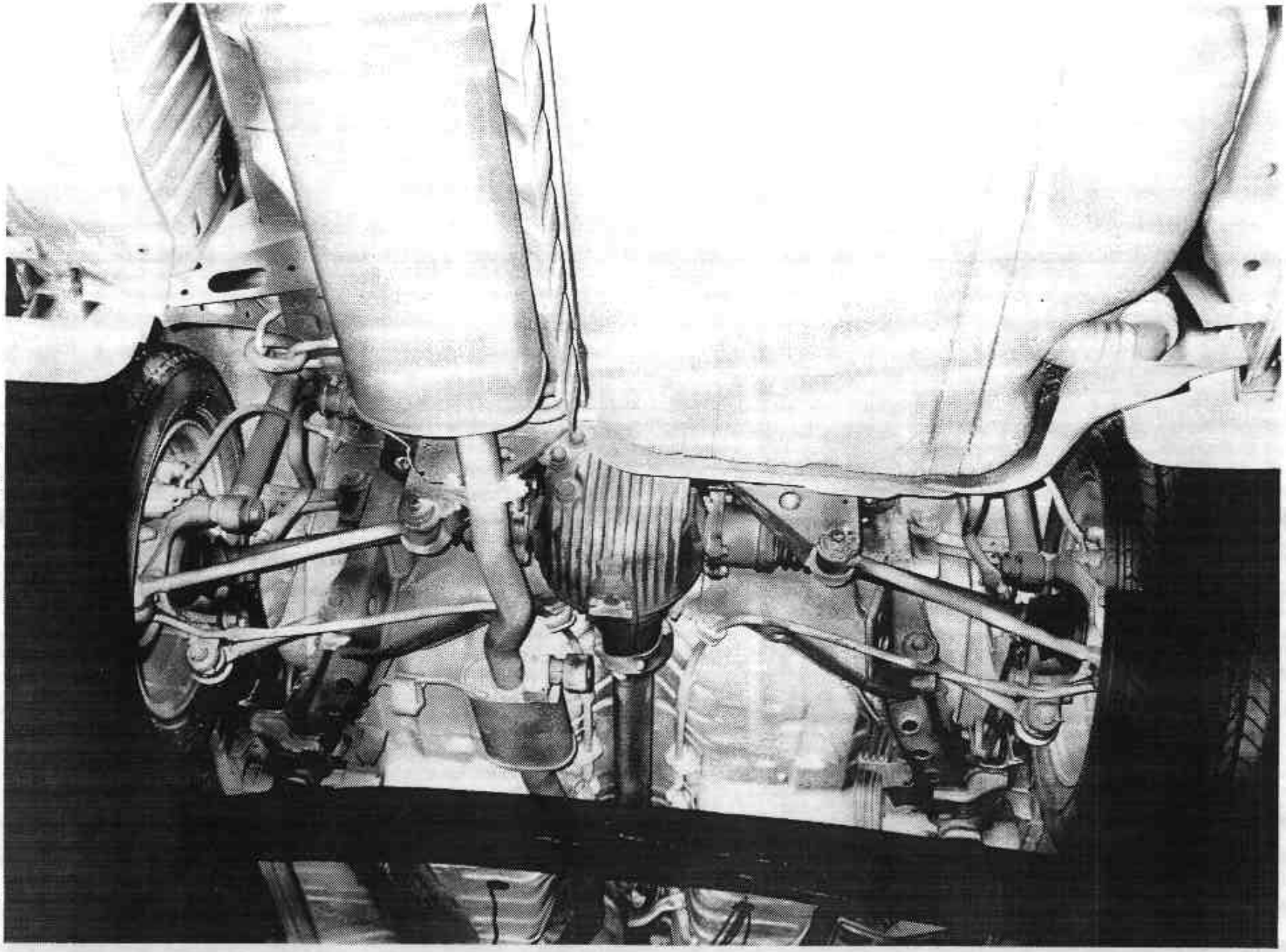


Figure A-19 PRE-TEST REAR UNDERBODY VIEW

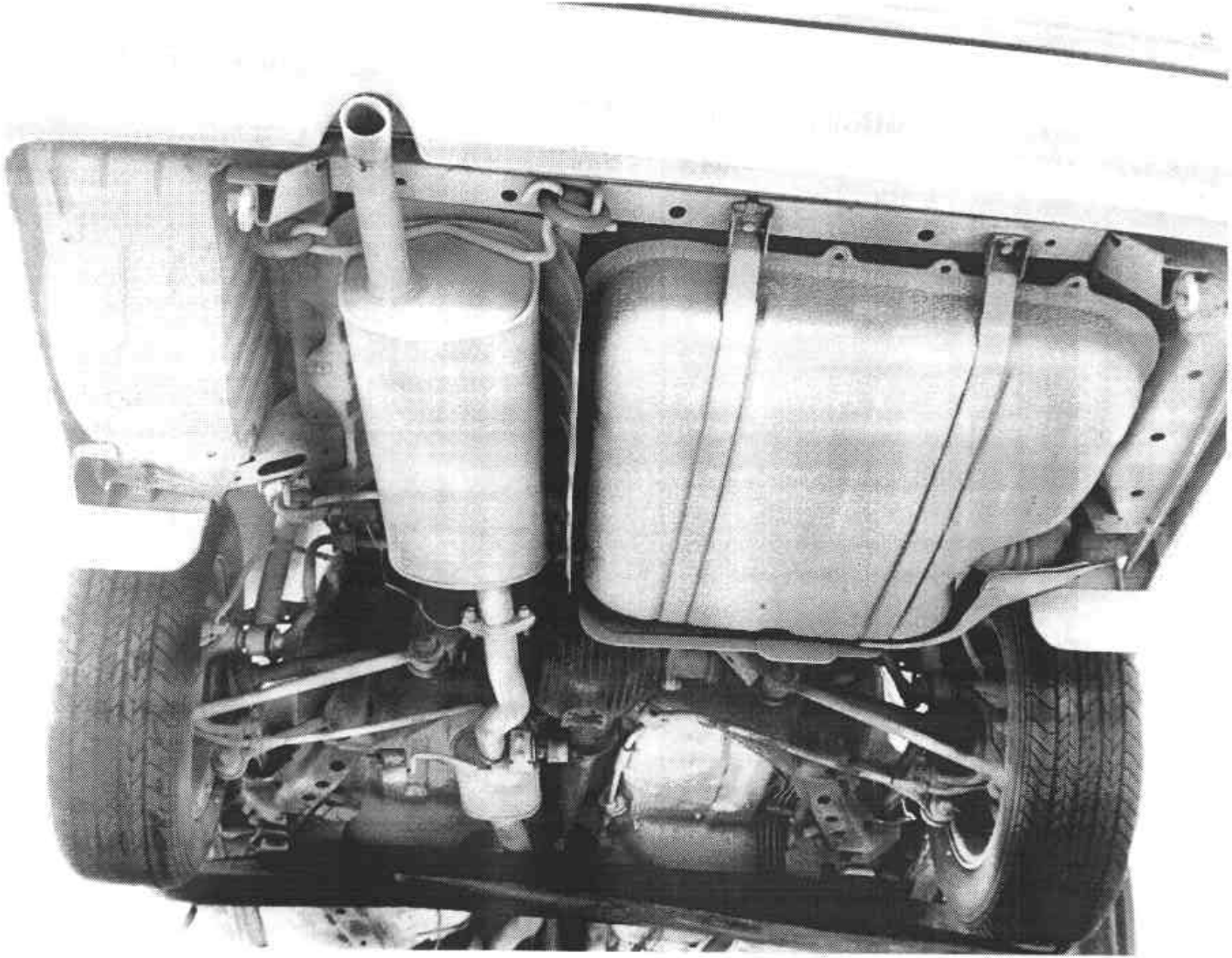


Figure A-20 POST-TEST REAR UNDERBODY VIEW

Figure A-21 PRE-TEST DRIVER POSITION VIEW

7625-16

Figure A-22 POST-TEST DRIVER POSITION VIEW

Figure A-23 PRE-TEST PASSENGER POSITION VIEW

Figure A-24 POST-TEST PASSENGER POSITION VIEW

Figure A-25 PRE-TEST DRIVER AND INTERIOR VIEW

3626-16

Figure A-26 POST-TEST DRIVER AND INTERIOR VIEW

Figure A-27 PRE-TEST PASSENGER AND INTERIOR VIEW

A-29

7628-16

Figure A-28 POST-TEST PASSENGER AND INTERIOR VIEW

Appendix B

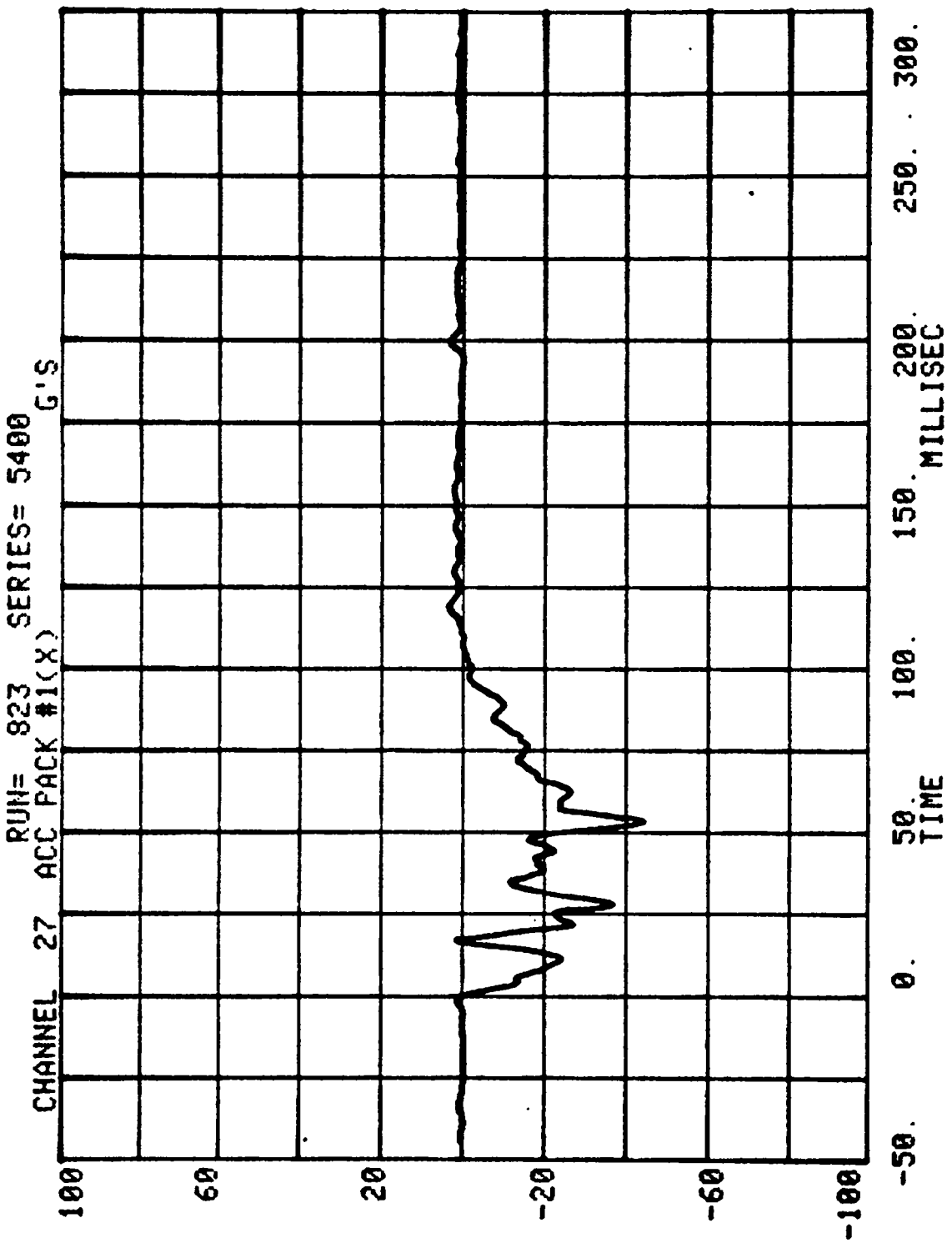
VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

TEST NO. MJ5400

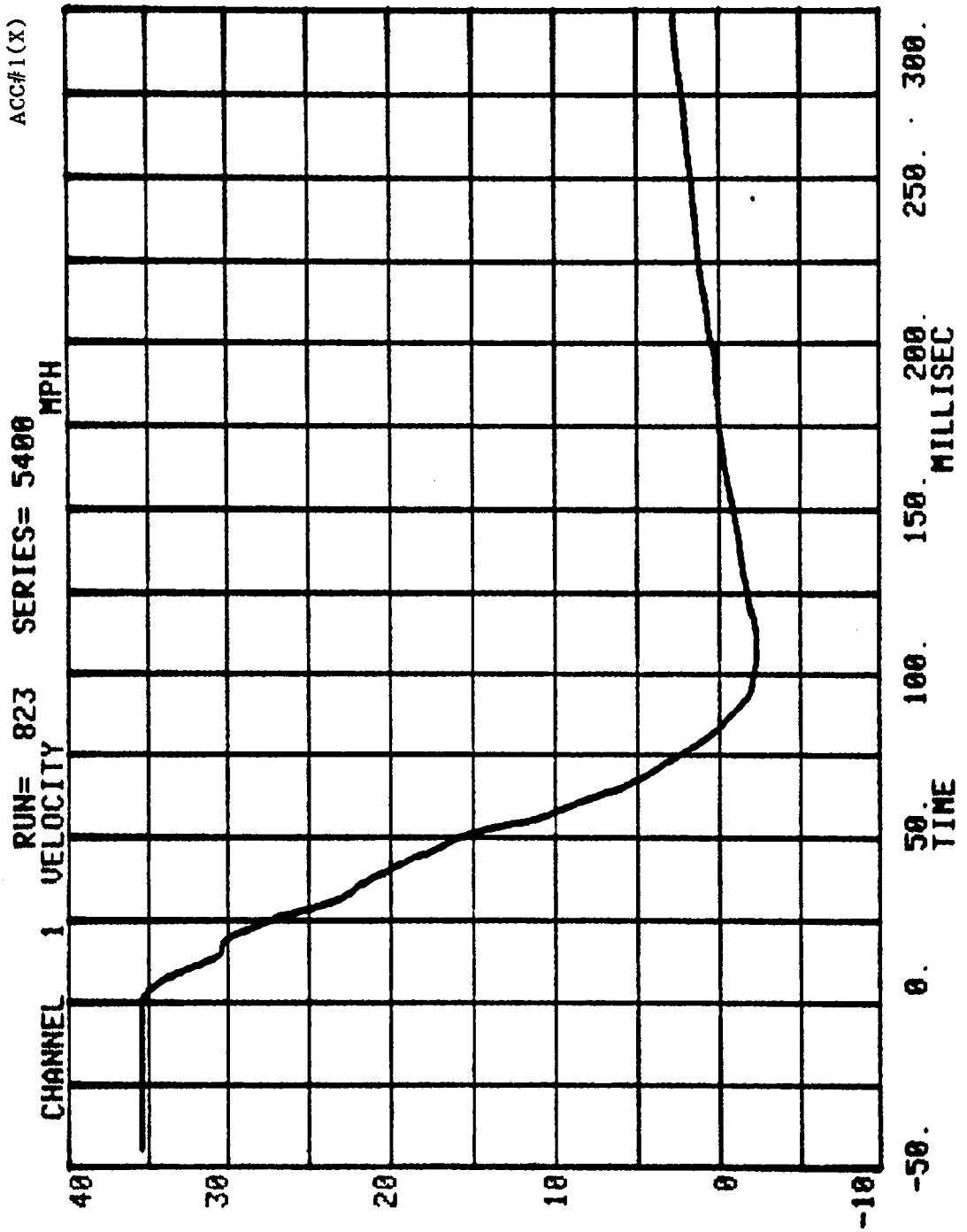
VEHICLE DATA

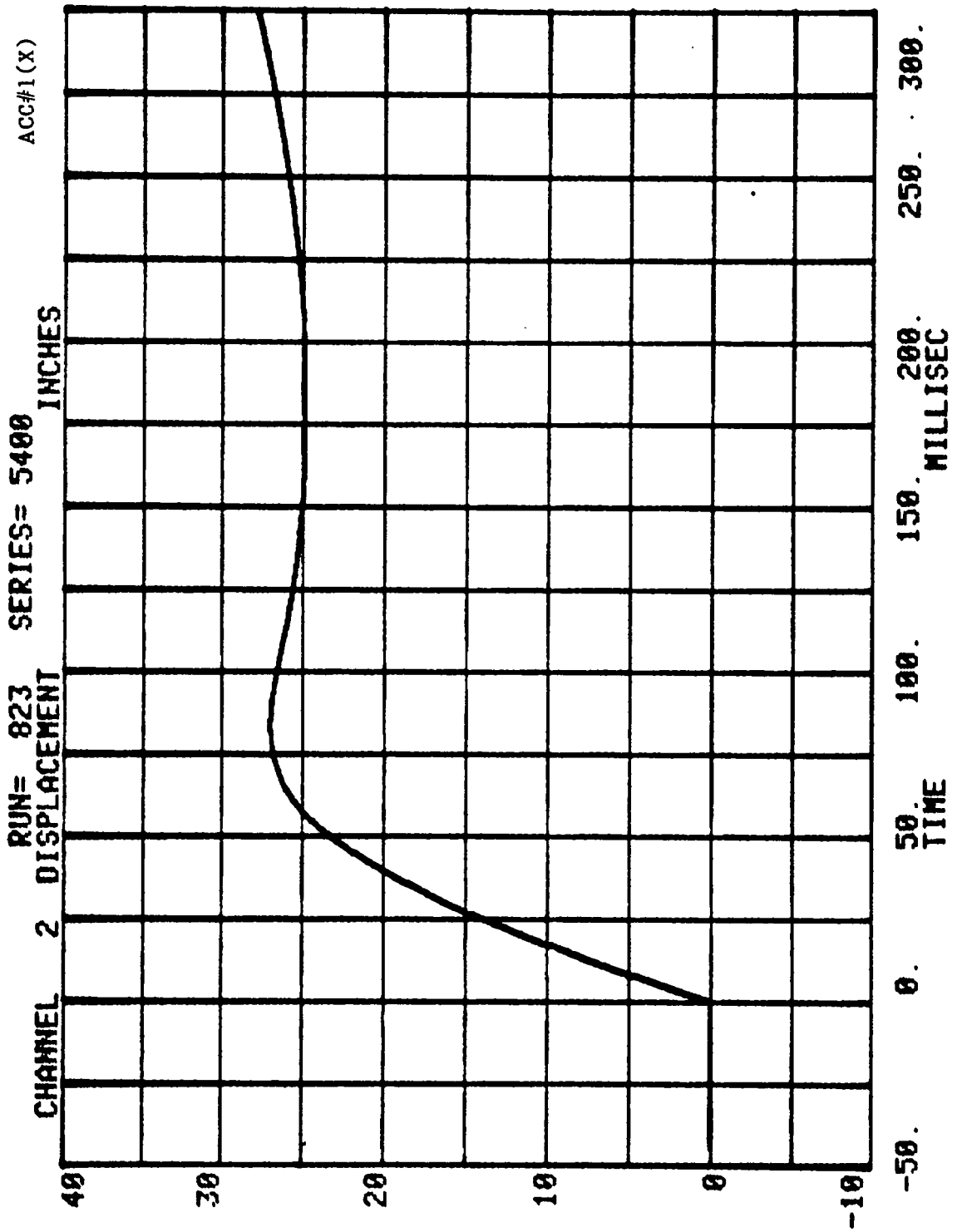
FILTER CHANNEL CLASS

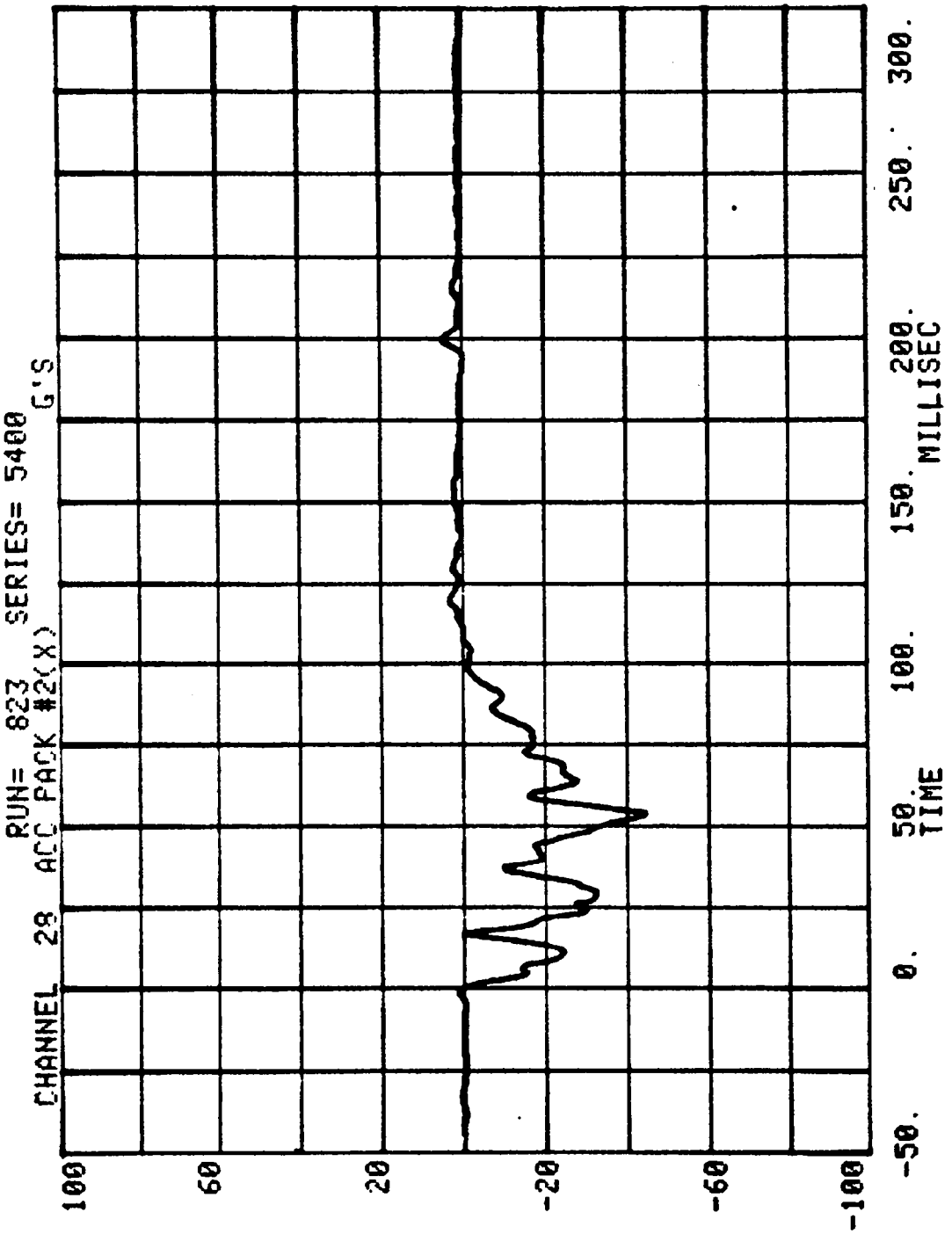
60


CHANNEL 27 ACC PACK #1(X)
RUN= 823 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

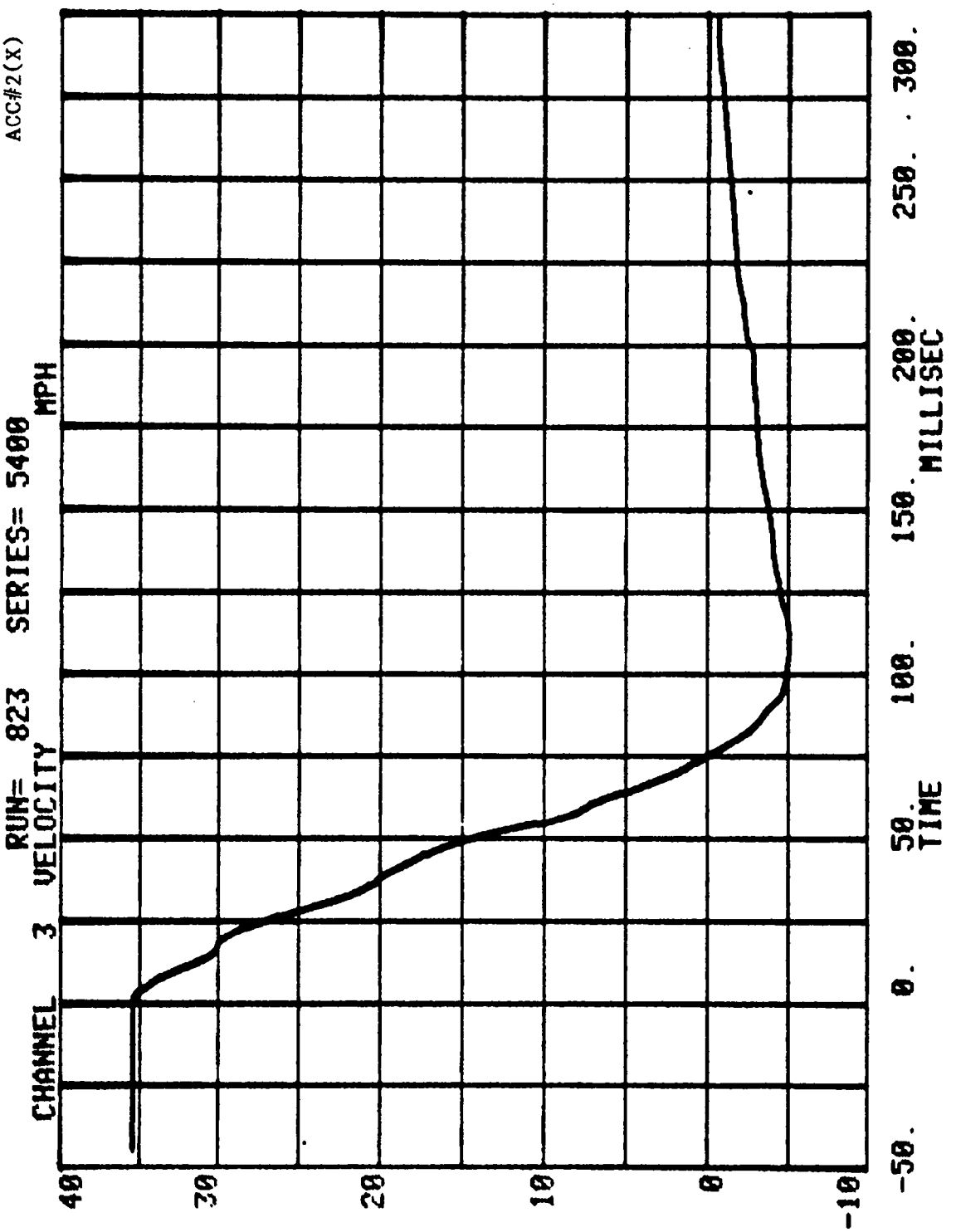
7626-16

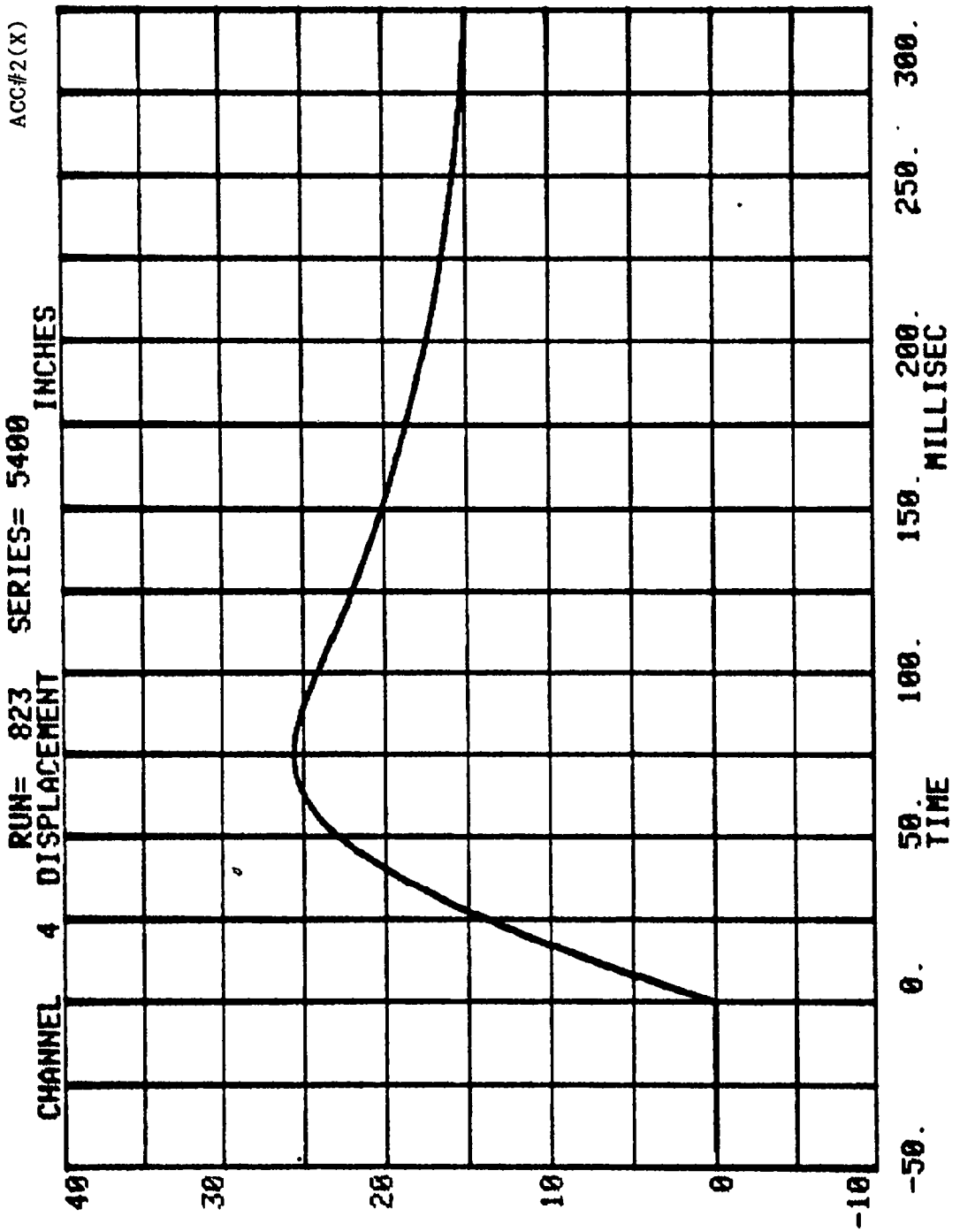

ACC#1(X)
CHANNEL 1 VELOCITY
RUN= 823 SERIES= 5400 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

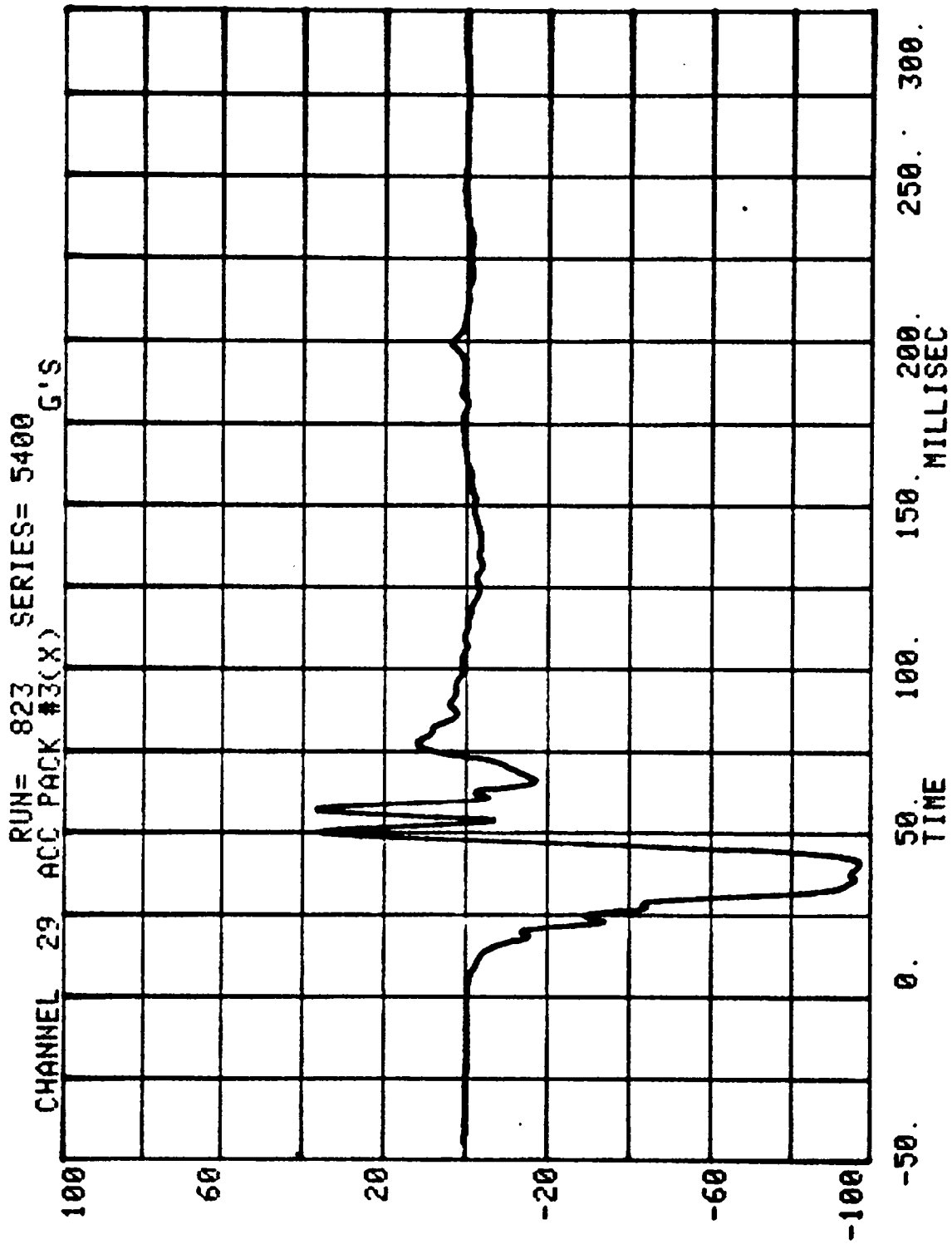

ACC#1(X)
CHANNEL 2 DISPLACEMENT
RUN= 823 SERIES= 5400
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

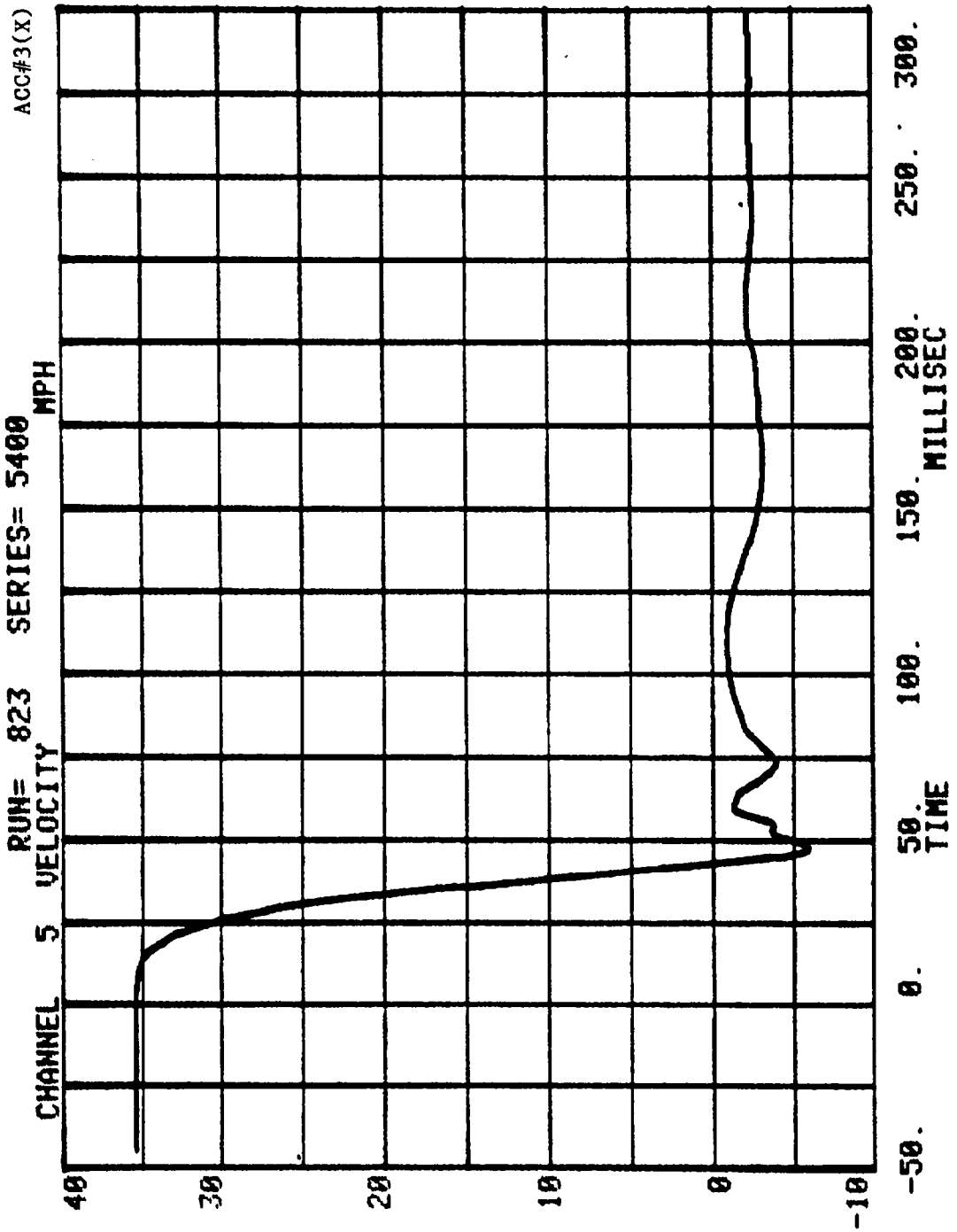

CHANNEL 28
ACC PACK #2(X)
RUN= 823
SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

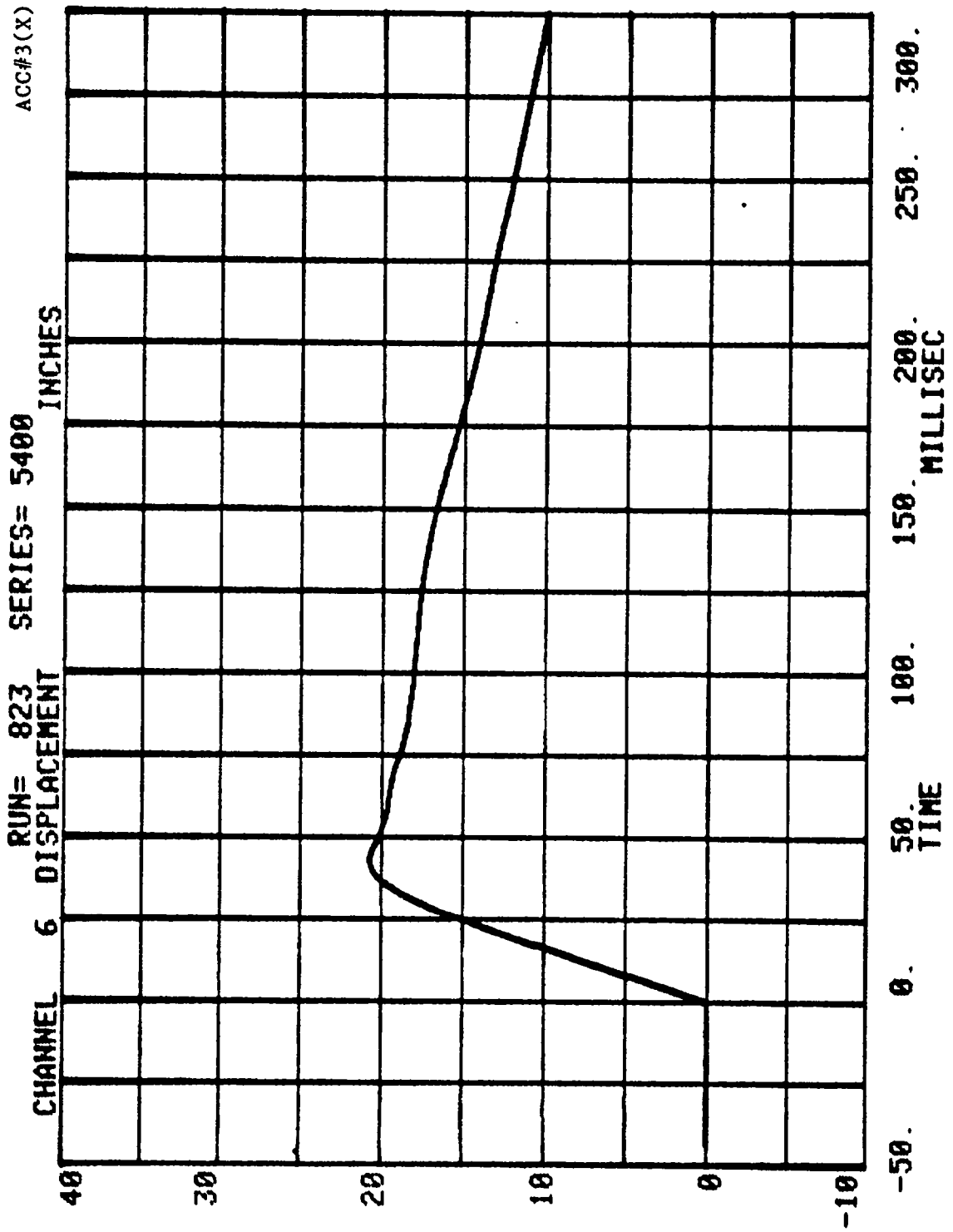
7626-16

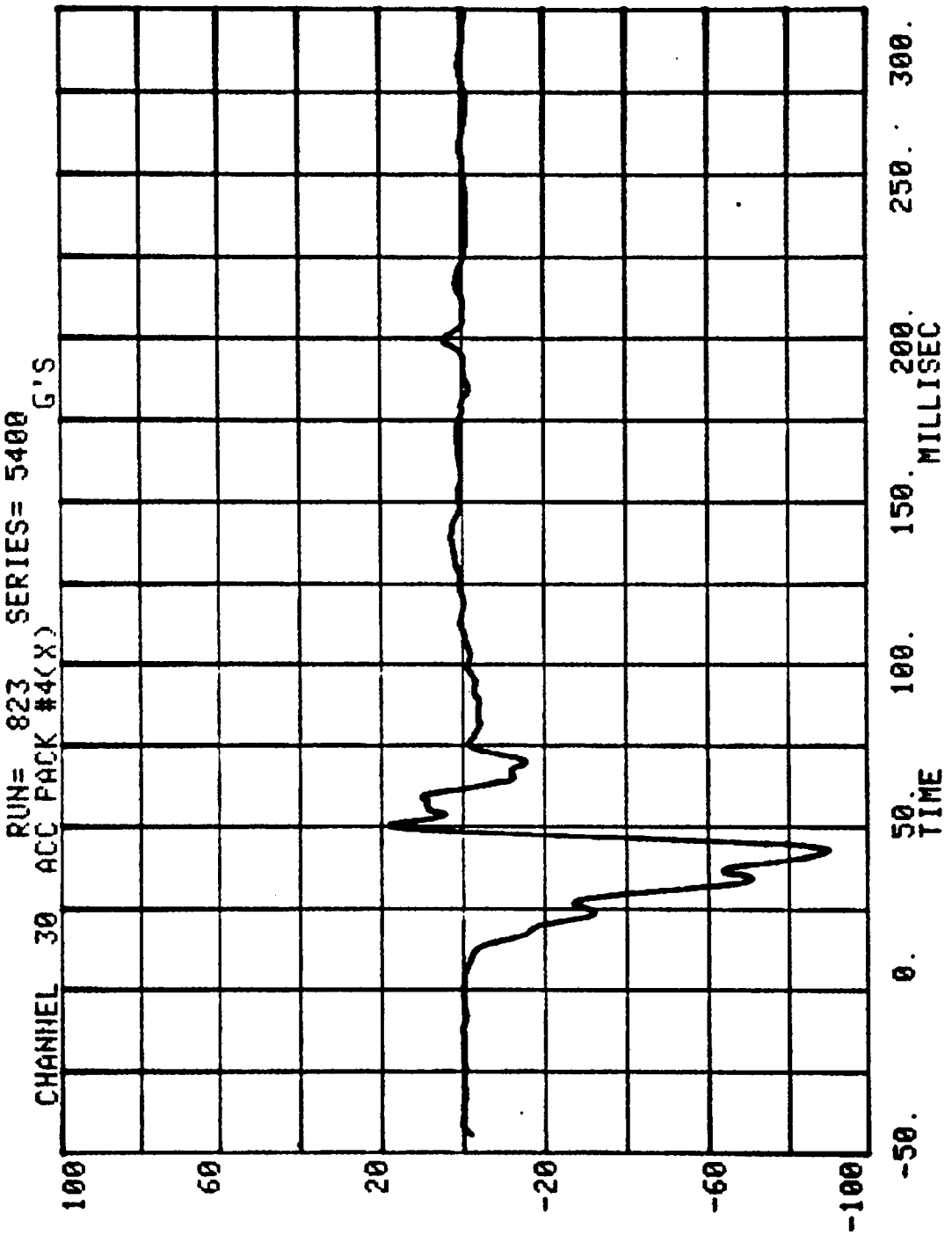

ACC#2(X)
CHANNEL 3 VELOCITY
RUN= 823 SERIES= 5400 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

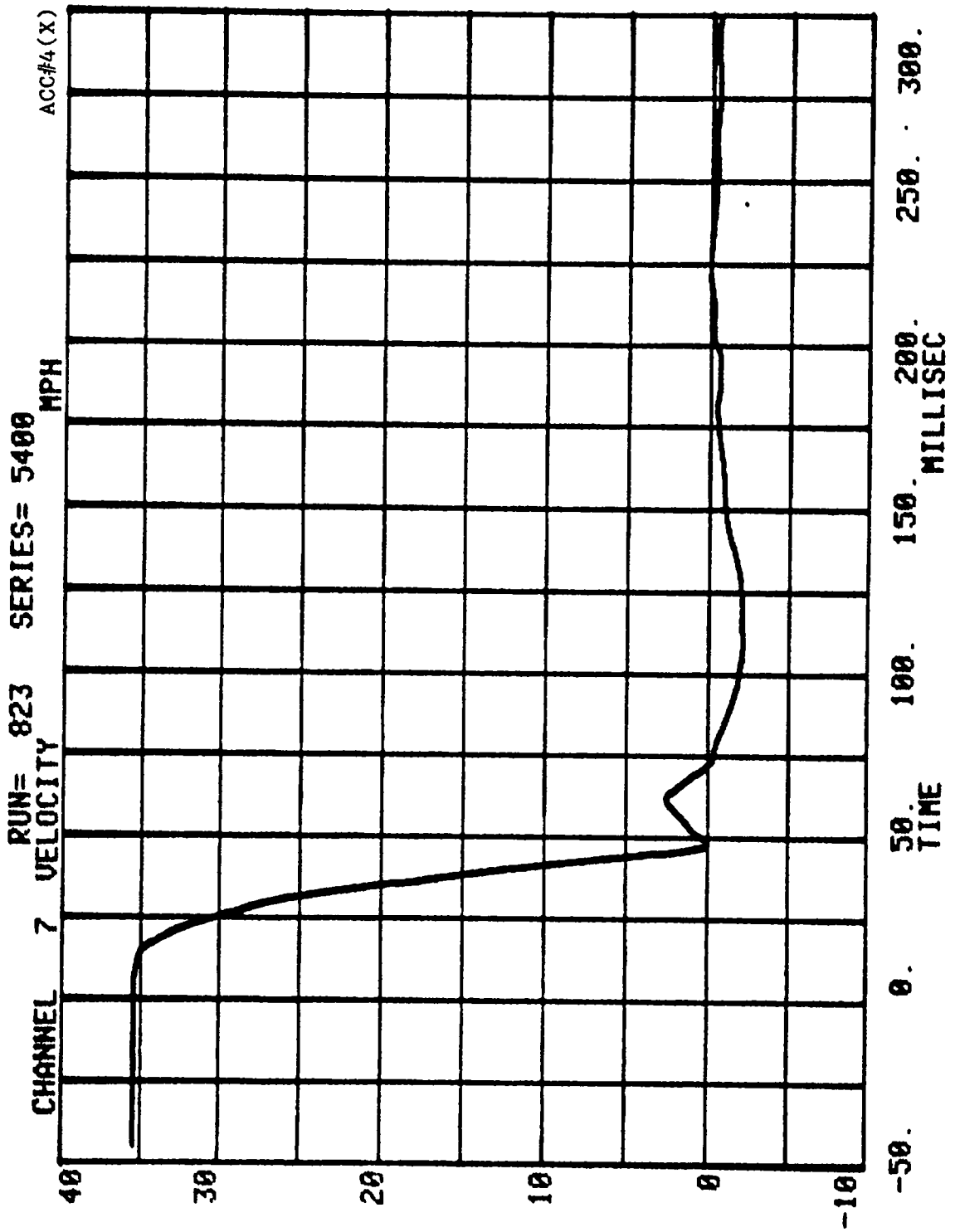

ACC#2(X)
CHANNEL 4 DISPLACEMENT
RUN= 823 SERIES= 5400 INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

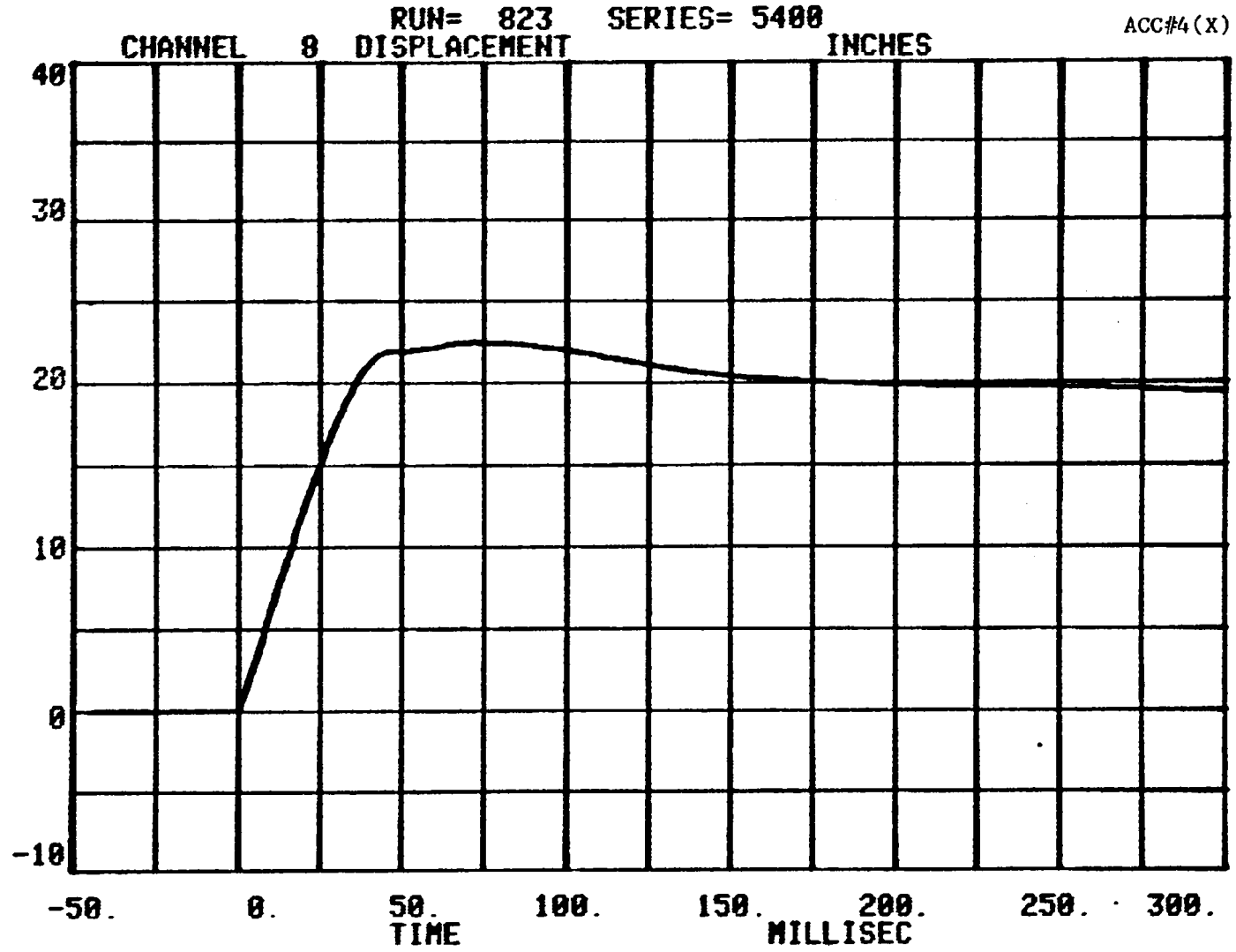

CHANNEL 29 ACC PACK #3(X)
RUN= 823 SERIES= 5400 G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC#3(X)
CHANNEL 5 VELOCITY
RUN= 823 SERIES= 5400 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

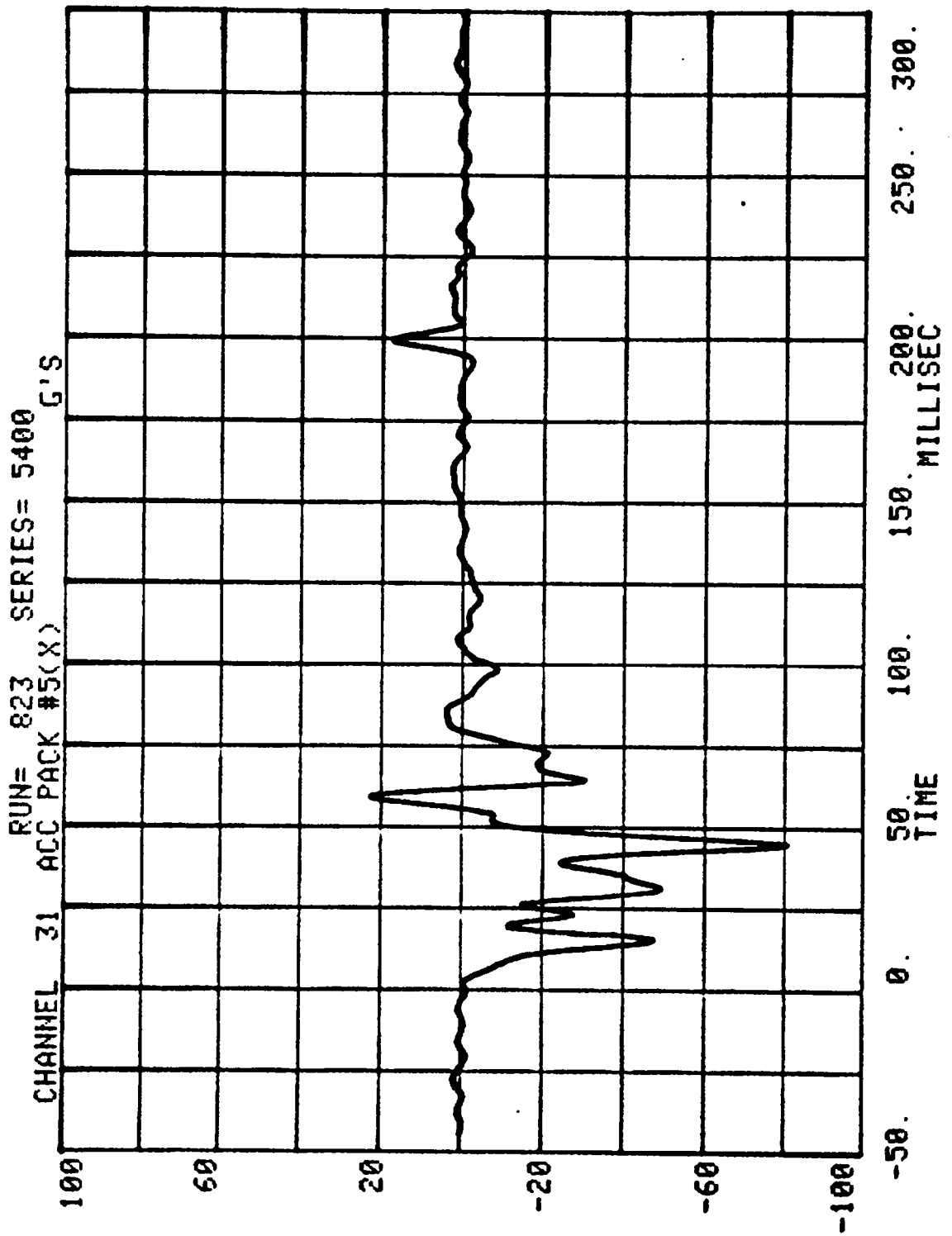

ACC#3(X)
CHANNEL 6 DISPLACEMENT
RUN= 823 SERIES= 5400
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 30 ACC PACK #4(X)
RUN= 823 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

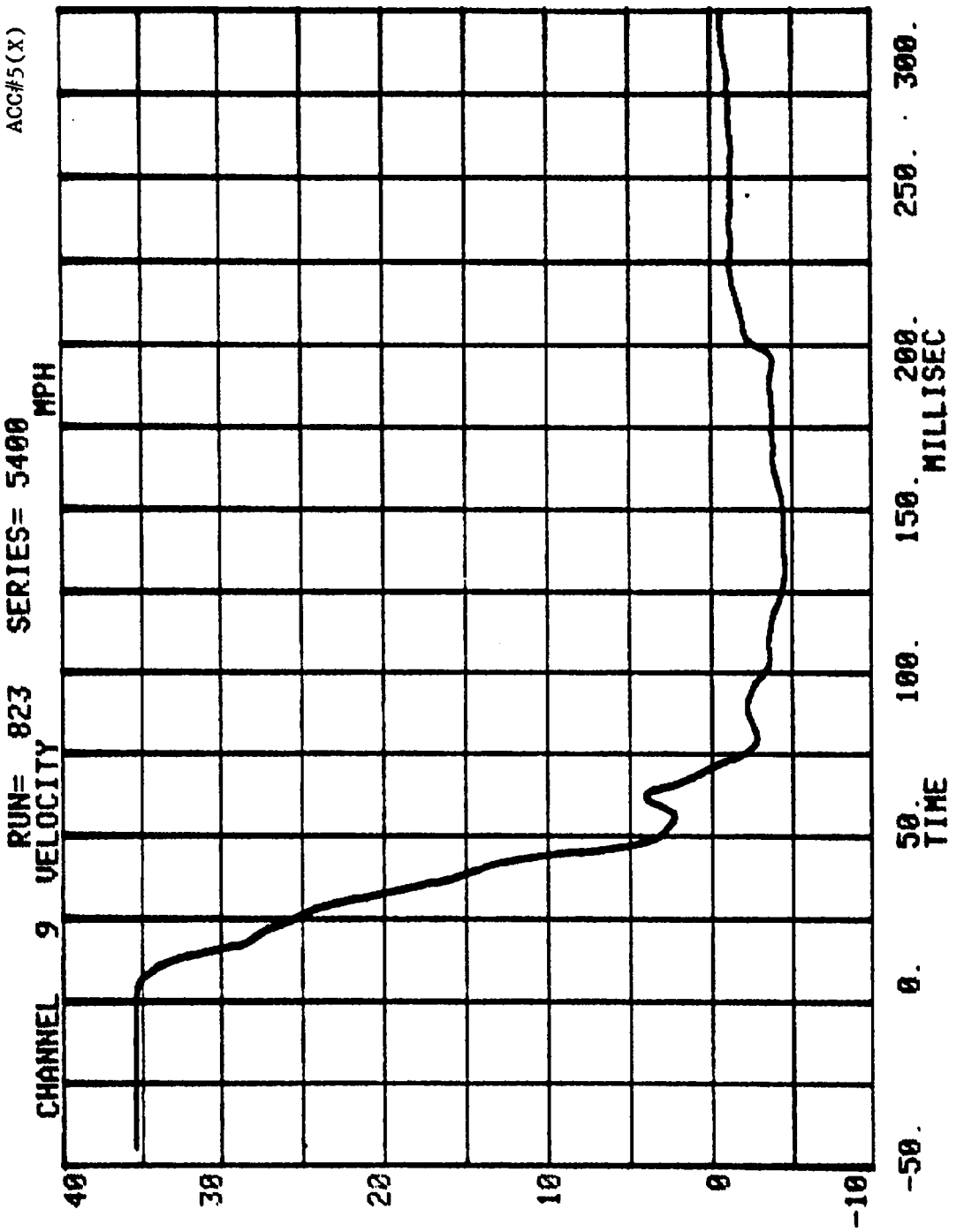

ACC#4(X)
CHANNEL 7 VELOCITY
RUN= 823 SERIES= 5400
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

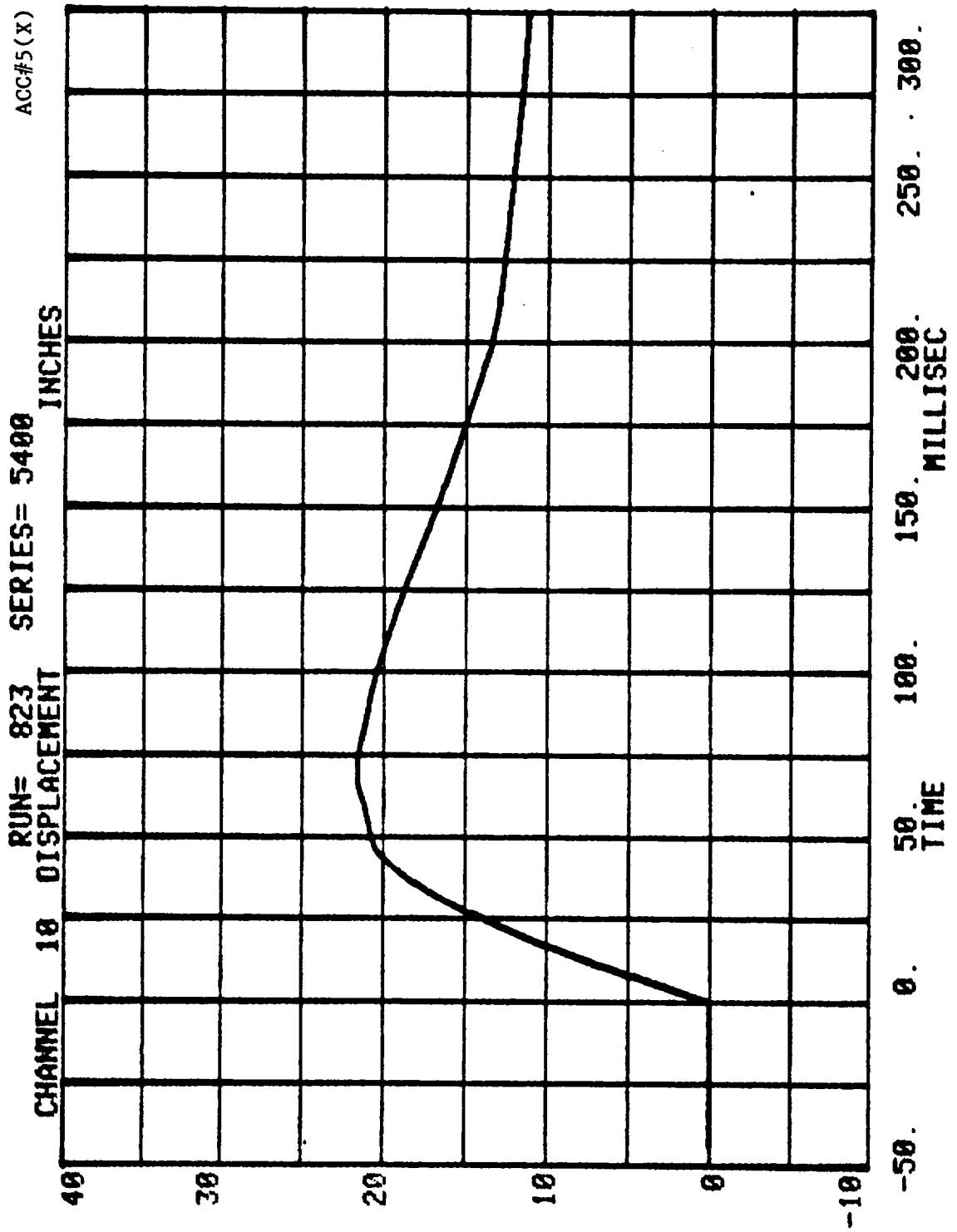

RUN= 823 SERIES= 5400
ACC#4(X)
CHANNEL 8 DISPLACEMENT INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

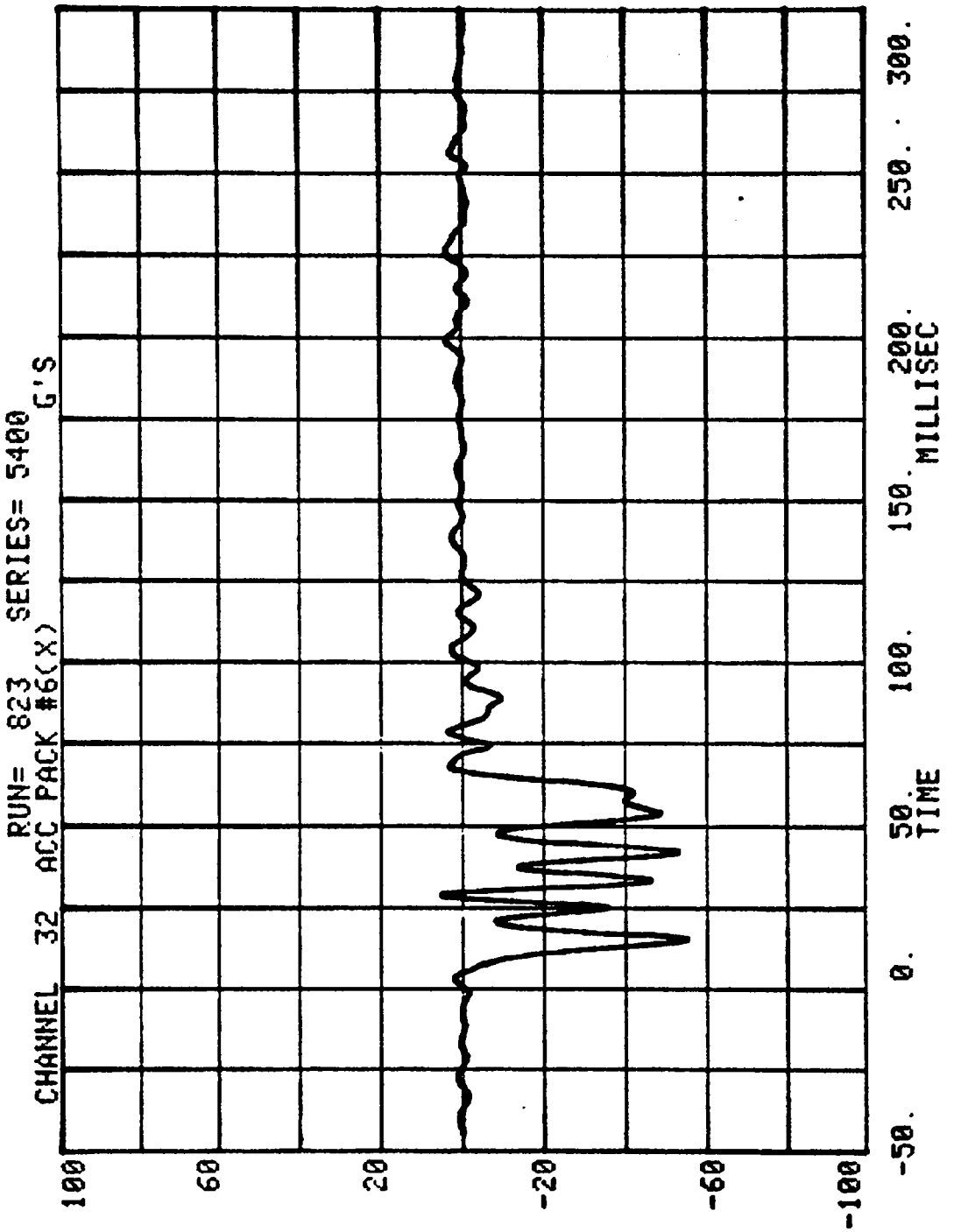
7626-16


CHANNEL 31 ACC PACK #5(X)
RUN= 823 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

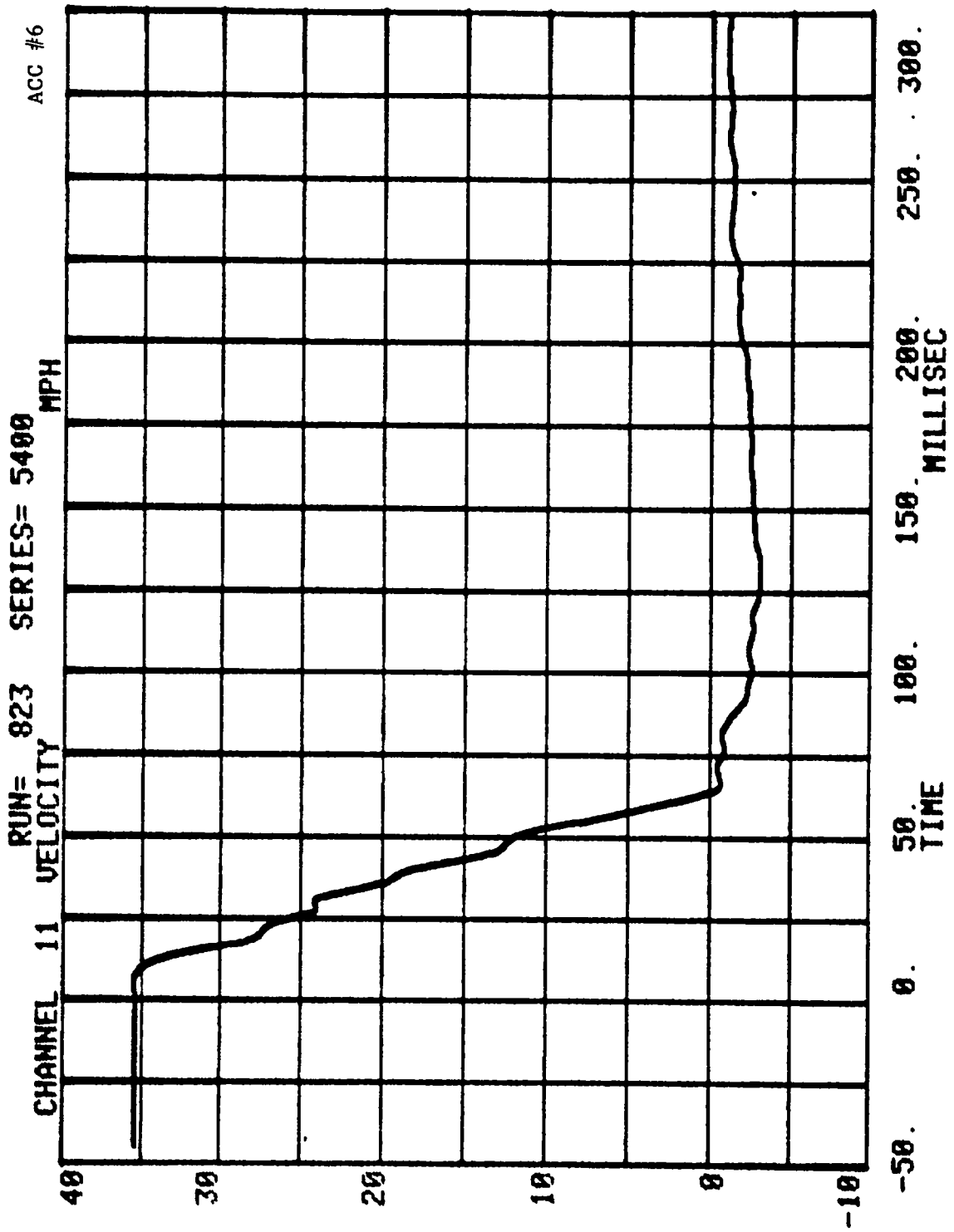
7626-16

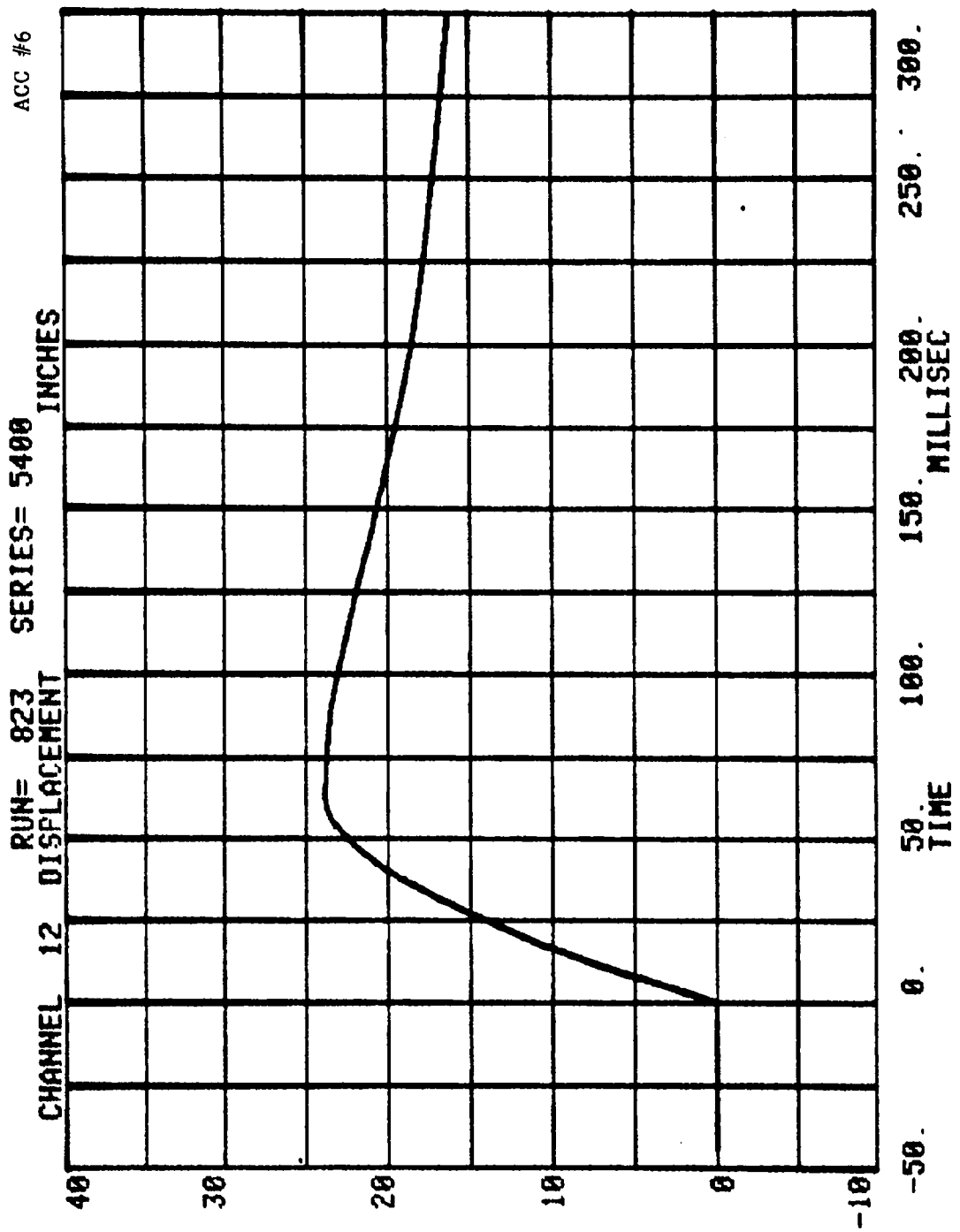

ACC#5(X)
CHANNEL 9 VELOCITY
RUN= 823 SERIES= 5400
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC#5(X)
CHANNEL 10 DISPLACEMENT
RUN= 823 SERIES= 5400
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

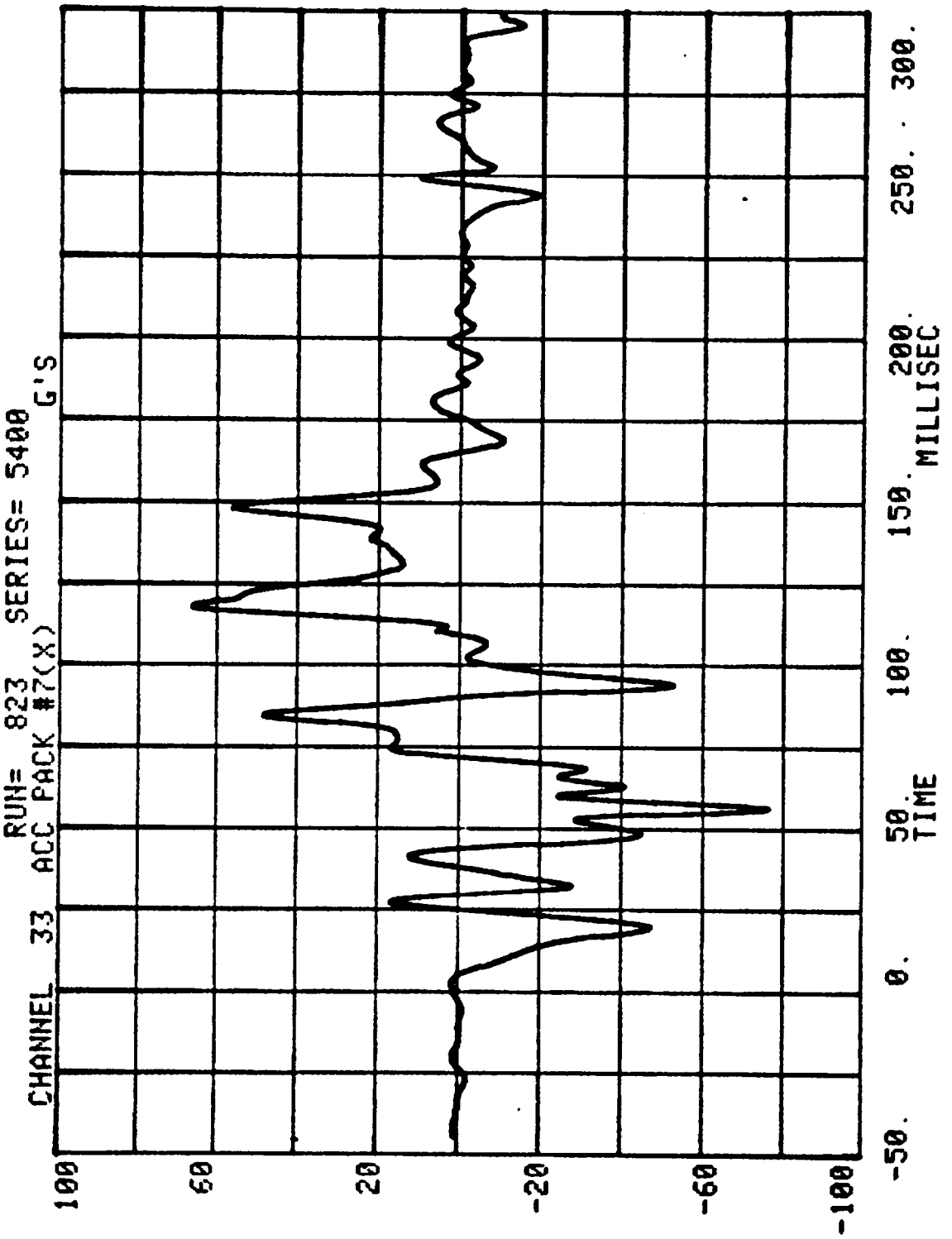

RUN= 823 SERIES= 5400
CHANNEL 32 ACC PACK #6(X)
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

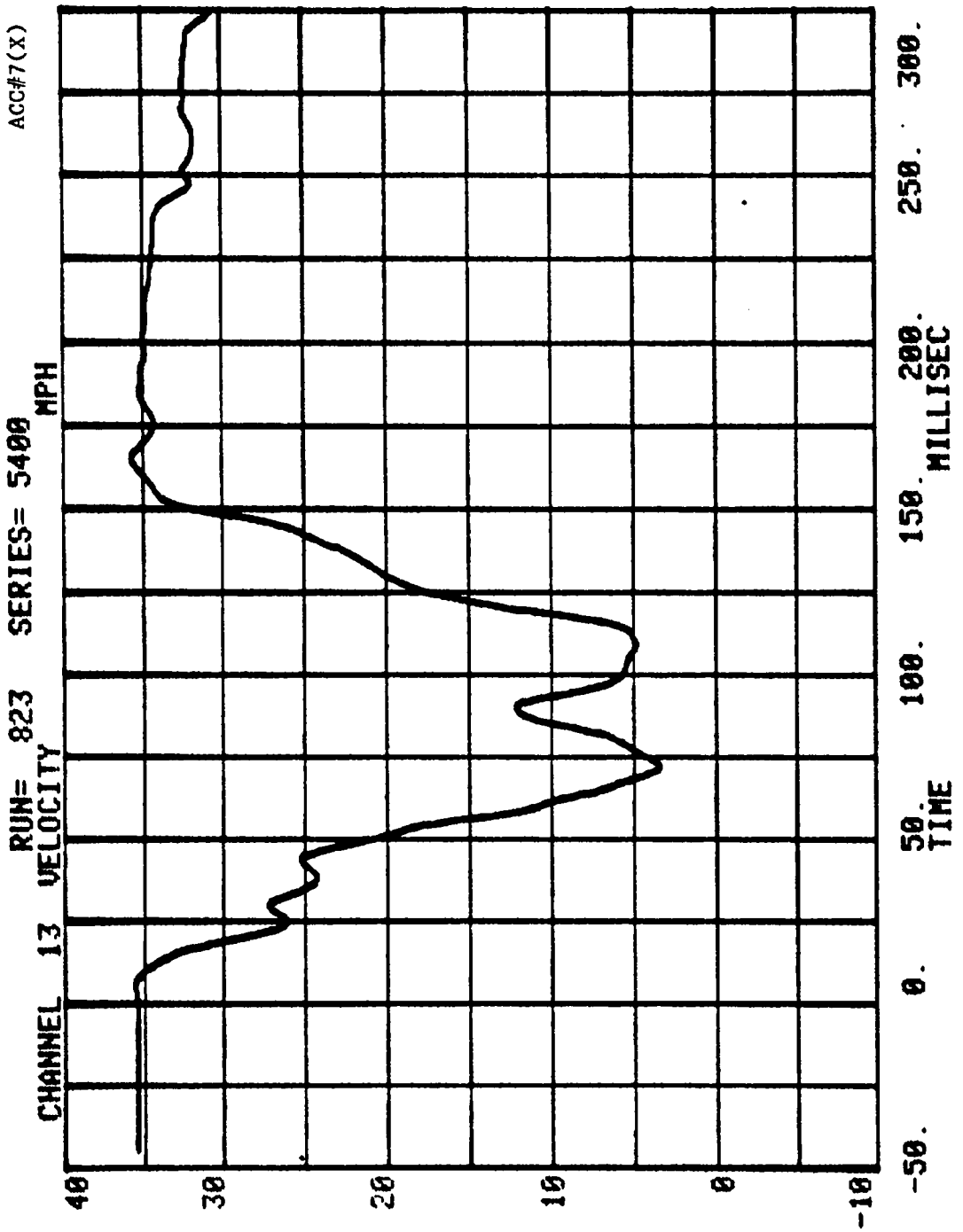
7626-16

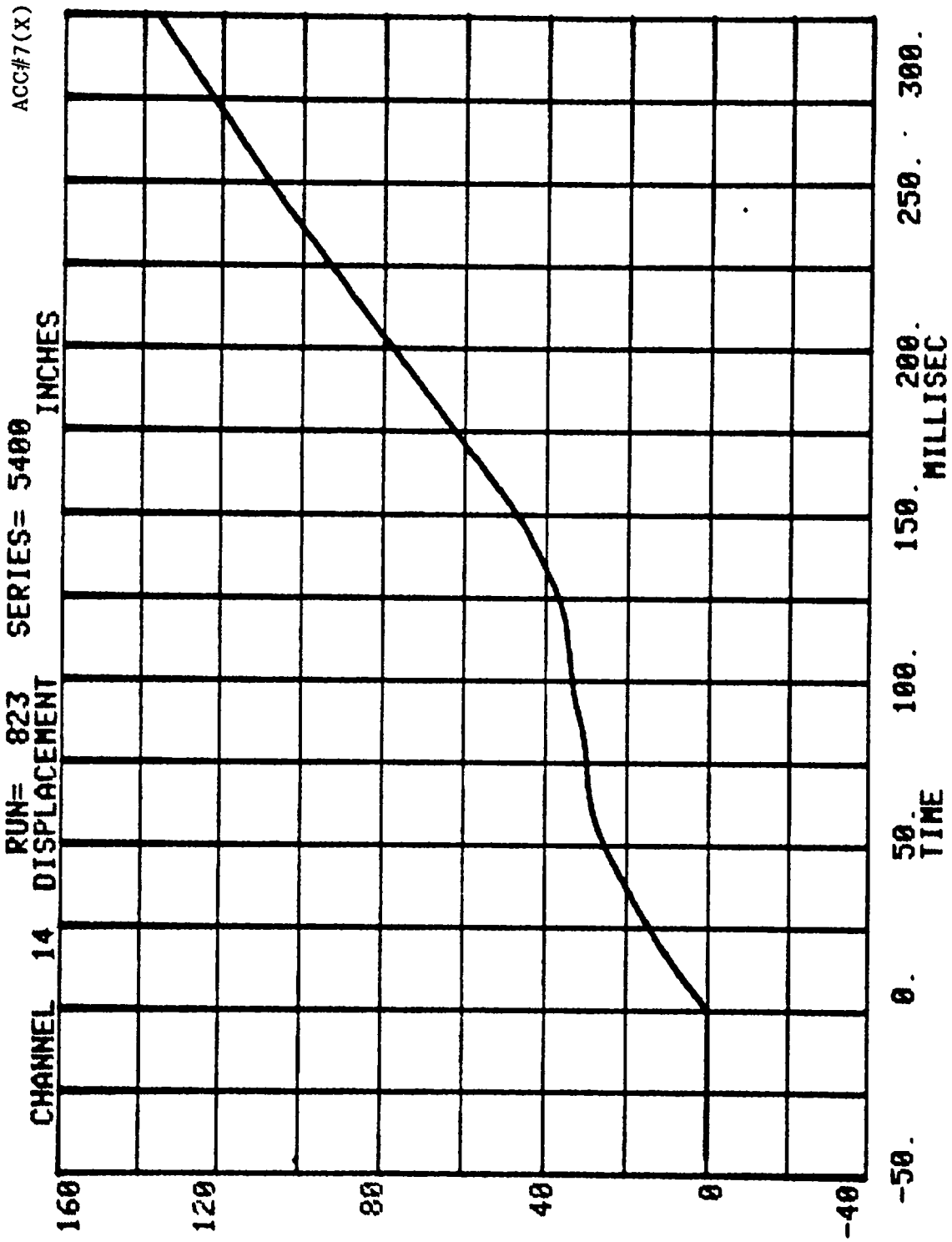

ACC #6
CHANNEL 11 VELOCITY
RUN= 823 SERIES= 5400
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC #6
CHANNEL 12 DISPLACEMENT
RUN= 823 SERIES= 5400 INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-16


CHANNEL 33 ACC PACK #7(X)
RUN= 823 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC#7(X)
CHANNEL 13 VELOCITY
RUN= 823 SERIES= 5400 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

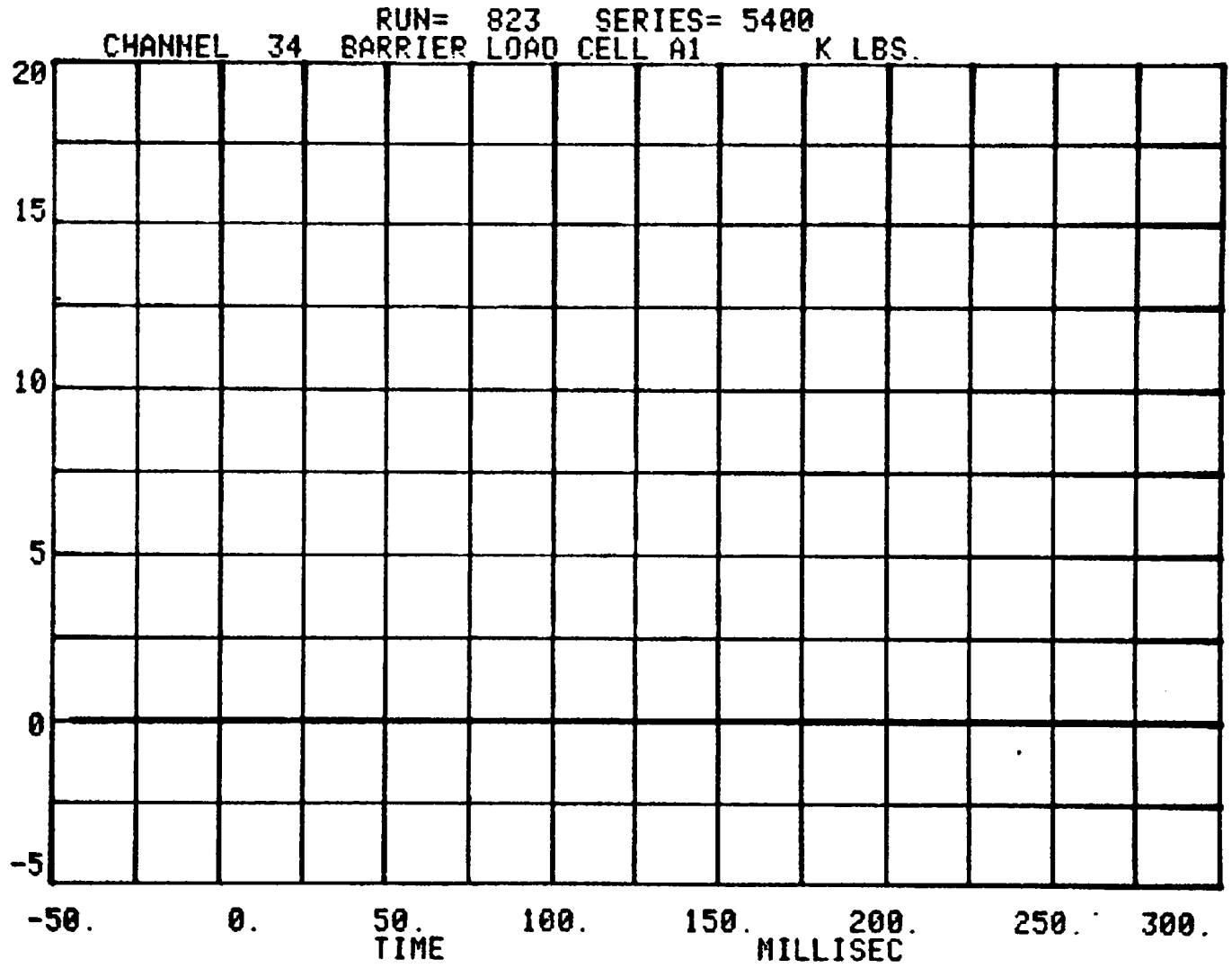

ACC#7(X)
CHANNEL 14 DISPLACEMENT
RUN= 823 SERIES= 5400
INCHES
160
120
80
40
0
-40
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

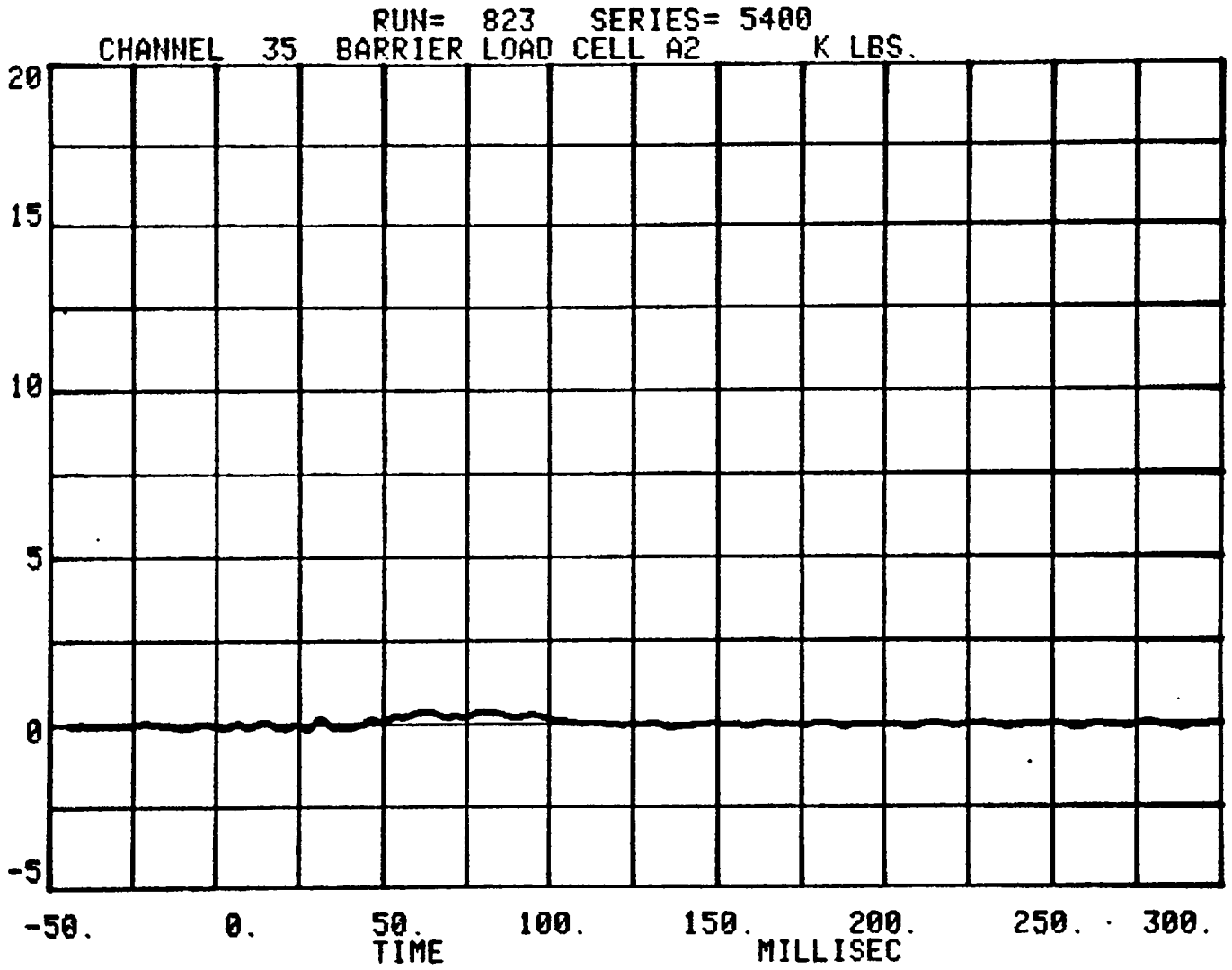
TEST NO. MJ5400

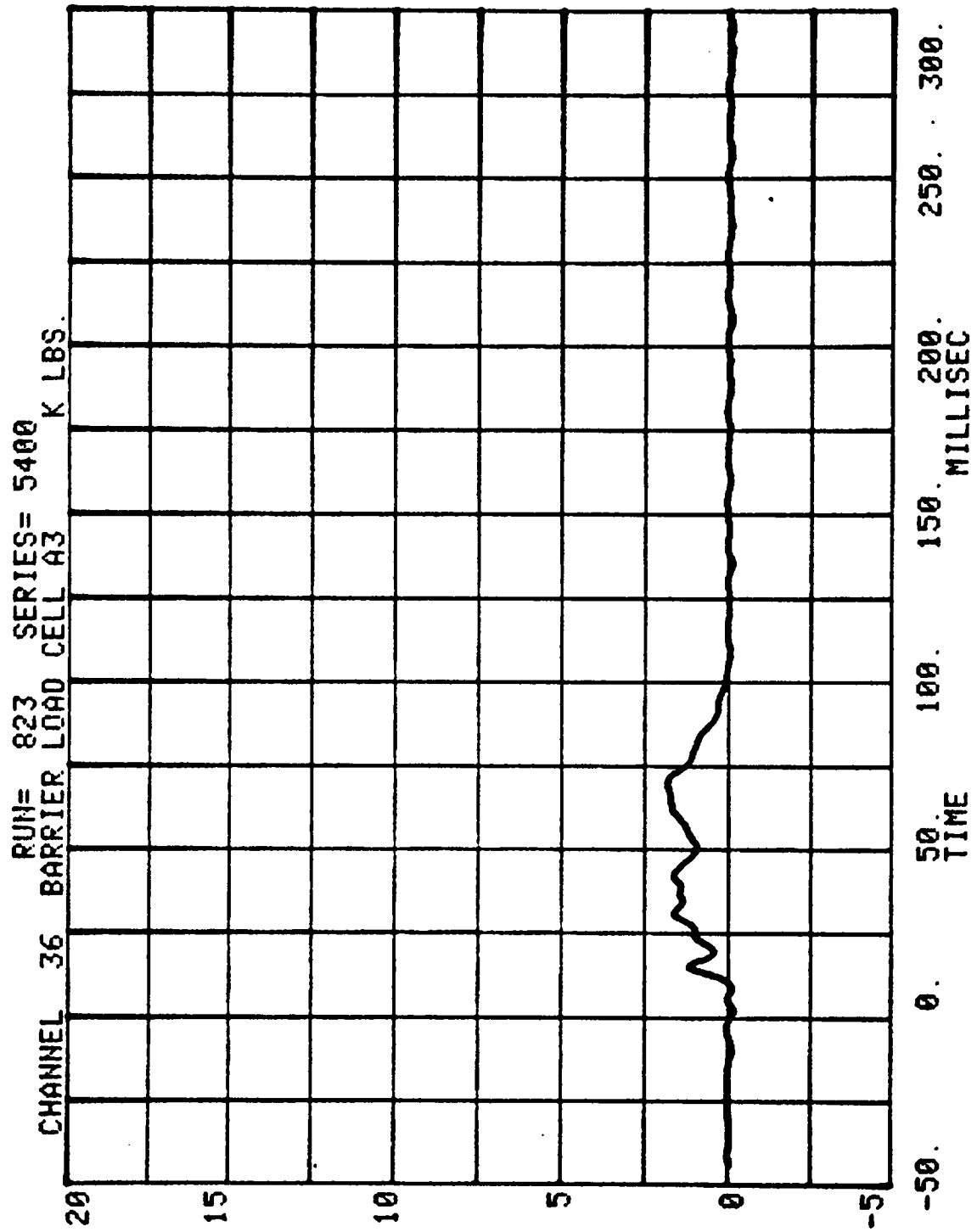
LOAD CELL BARRIER DATA

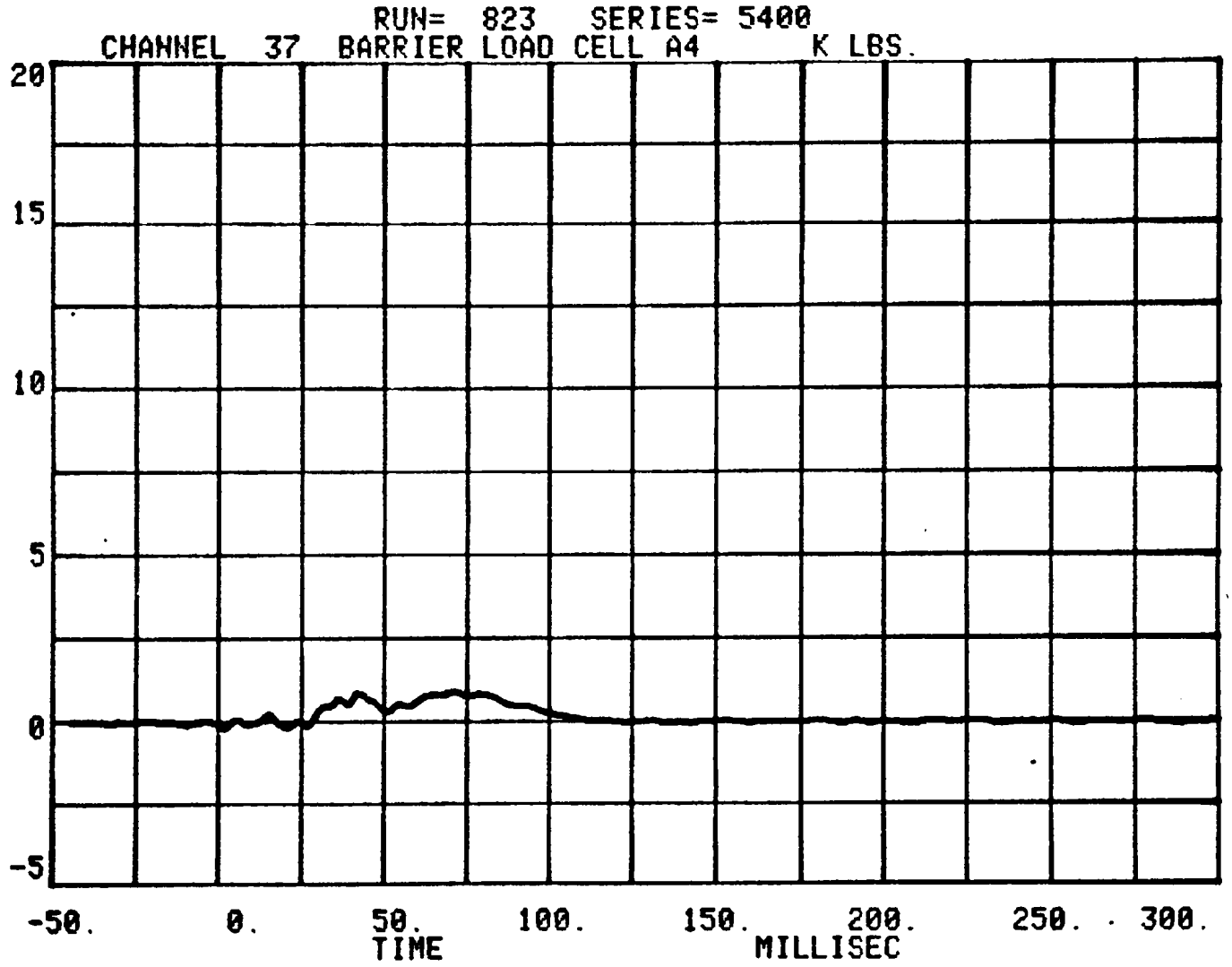
FILTER CHANNEL CLASS

60

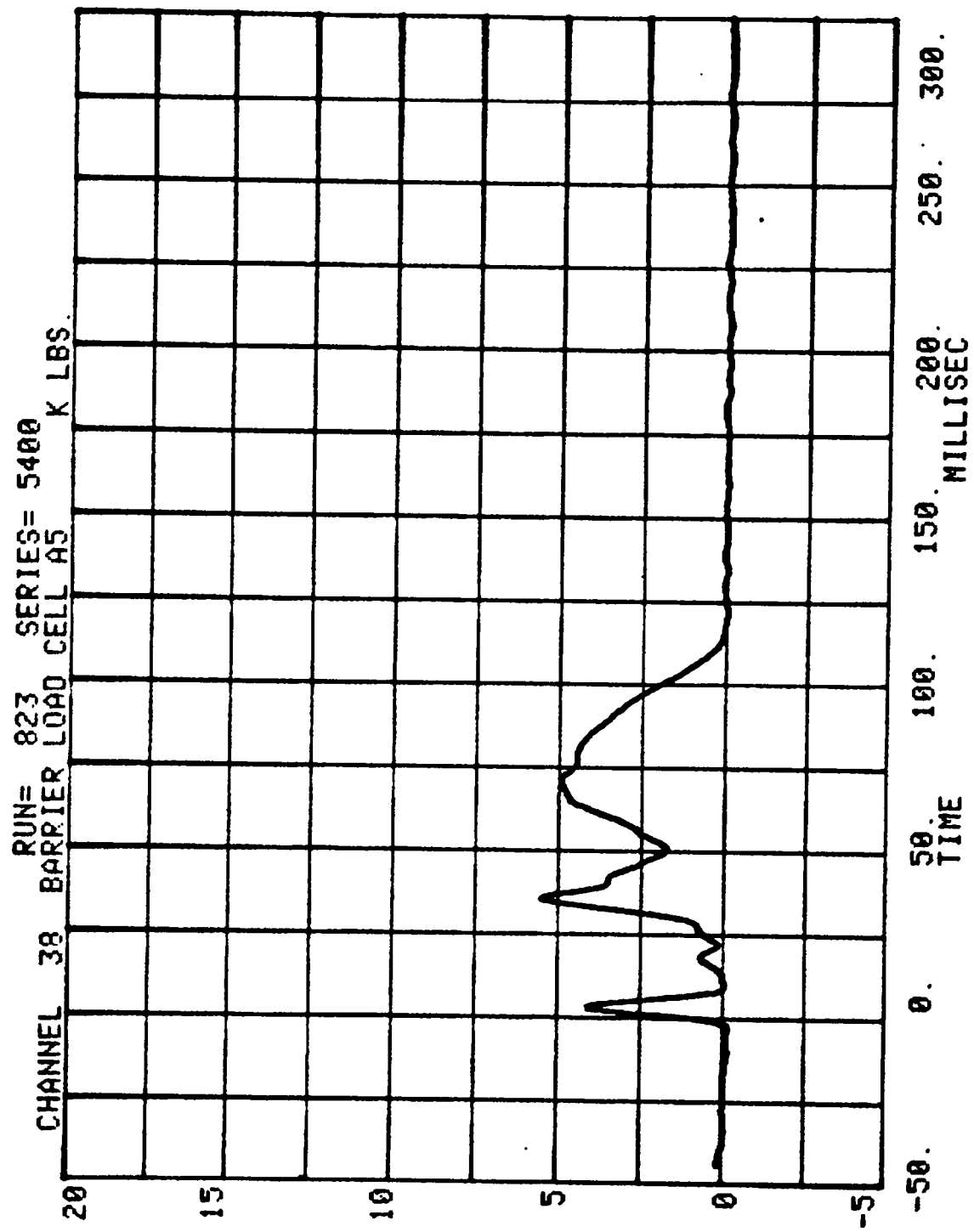

RUN= 823 SERIES= 5400
CHANNEL 34 BARRIER LOAD CELL A1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

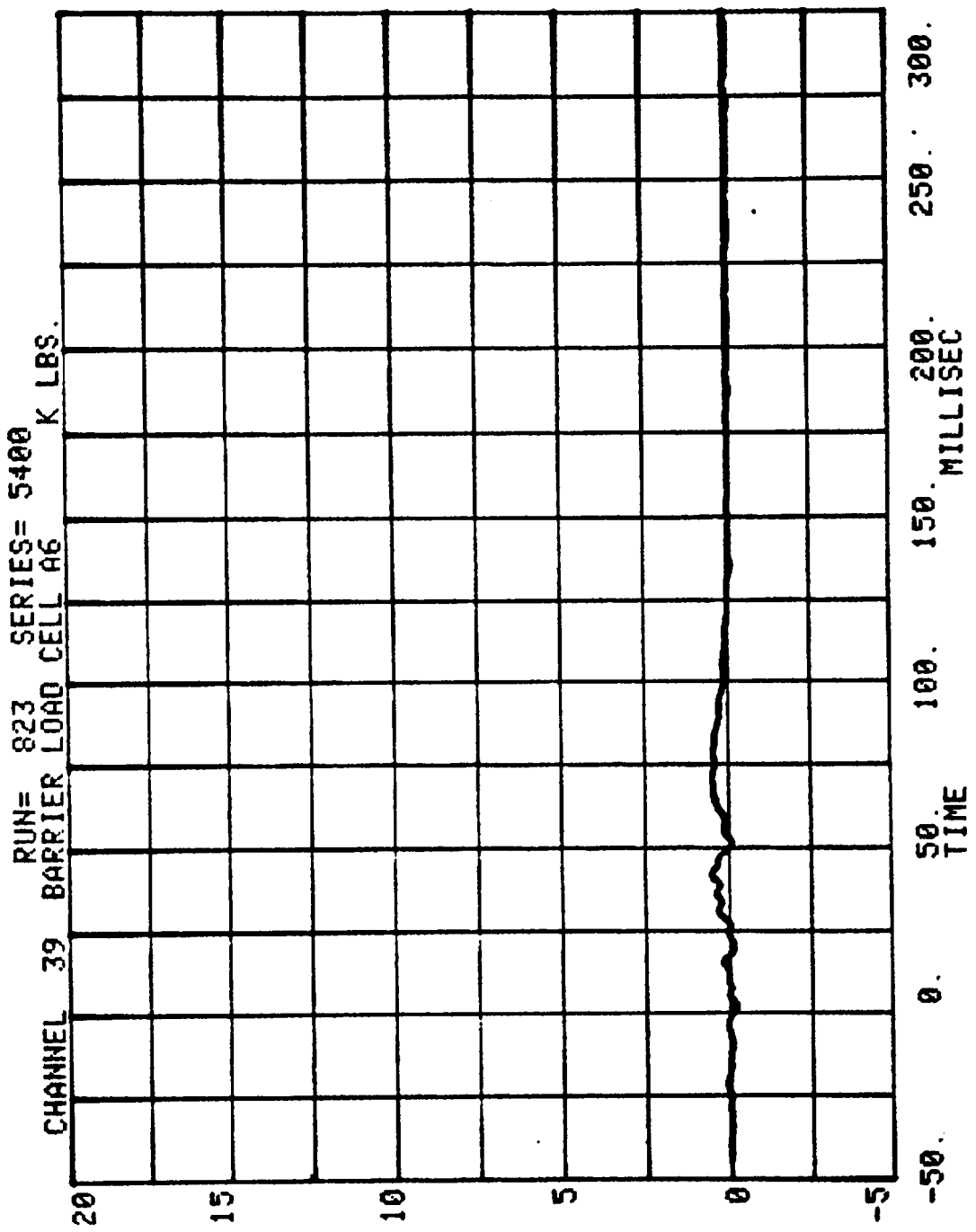

RUN= 823 SERIES= 5400
CHANNEL 35 BARRIER LOAD CELL A2 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

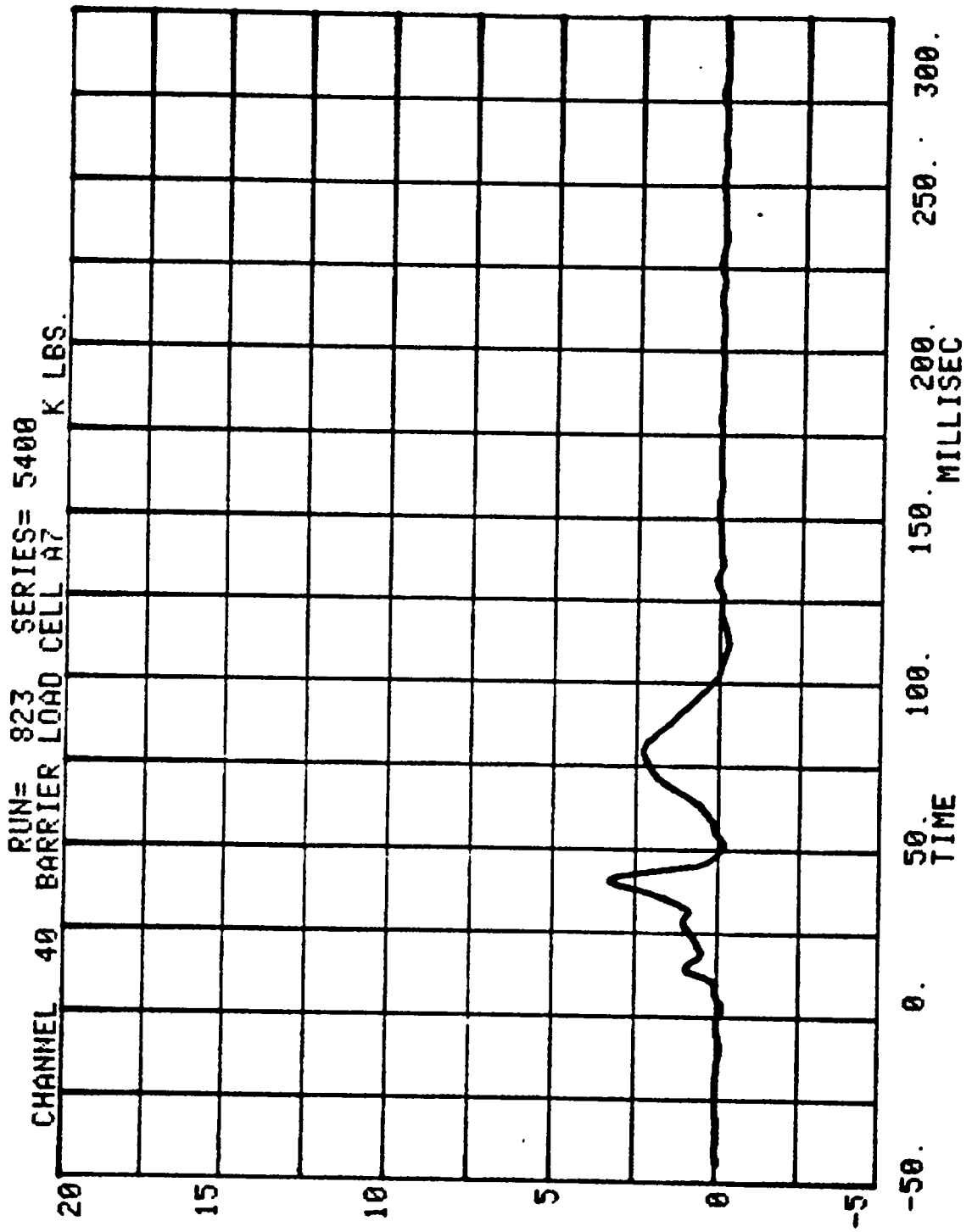

CHANNEL 36 BARRIER LOAD CELL A3
RUN= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

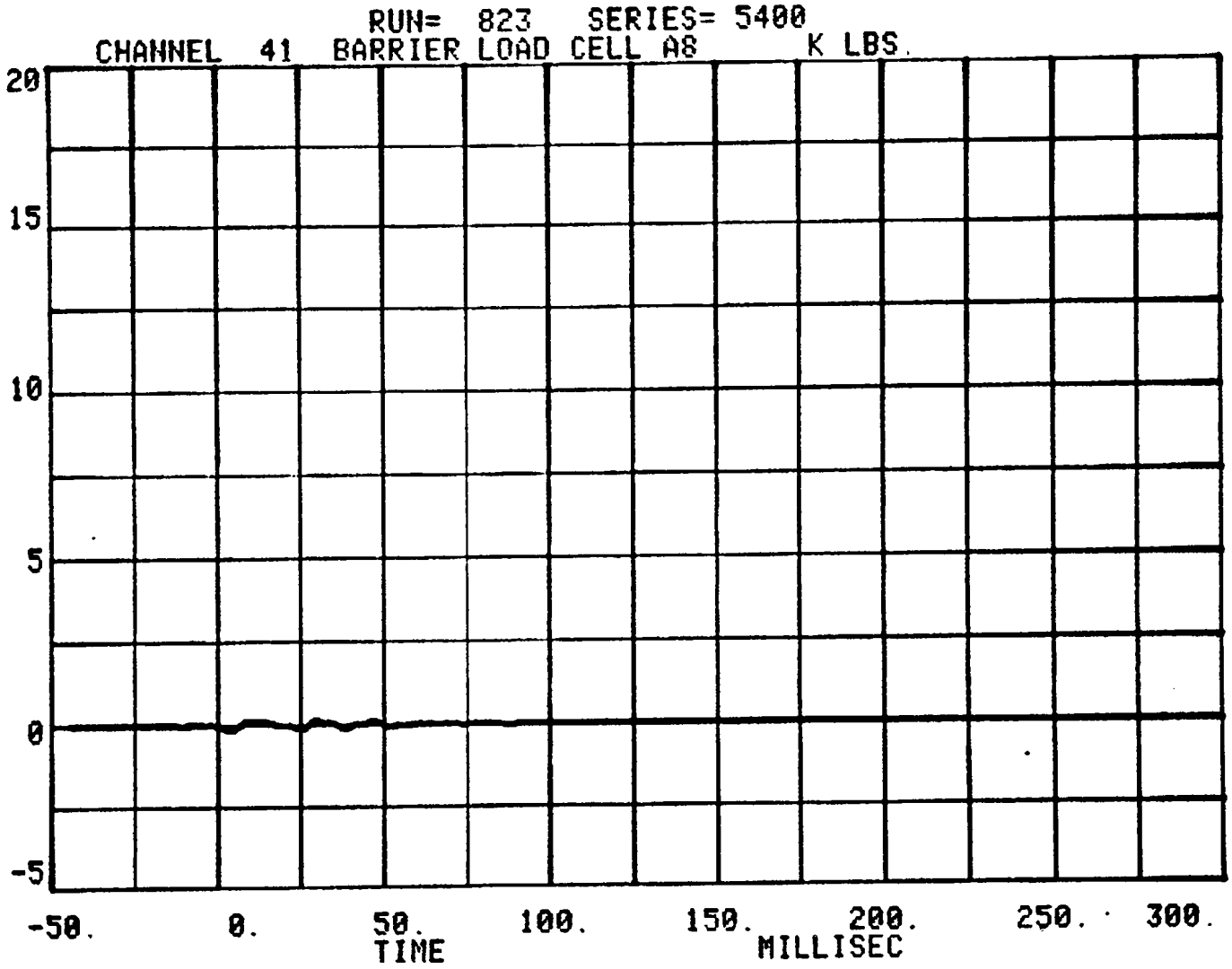

RUN= 823 SERIES= 5400
CHANNEL 37 BARRIER LOAD CELL A4
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

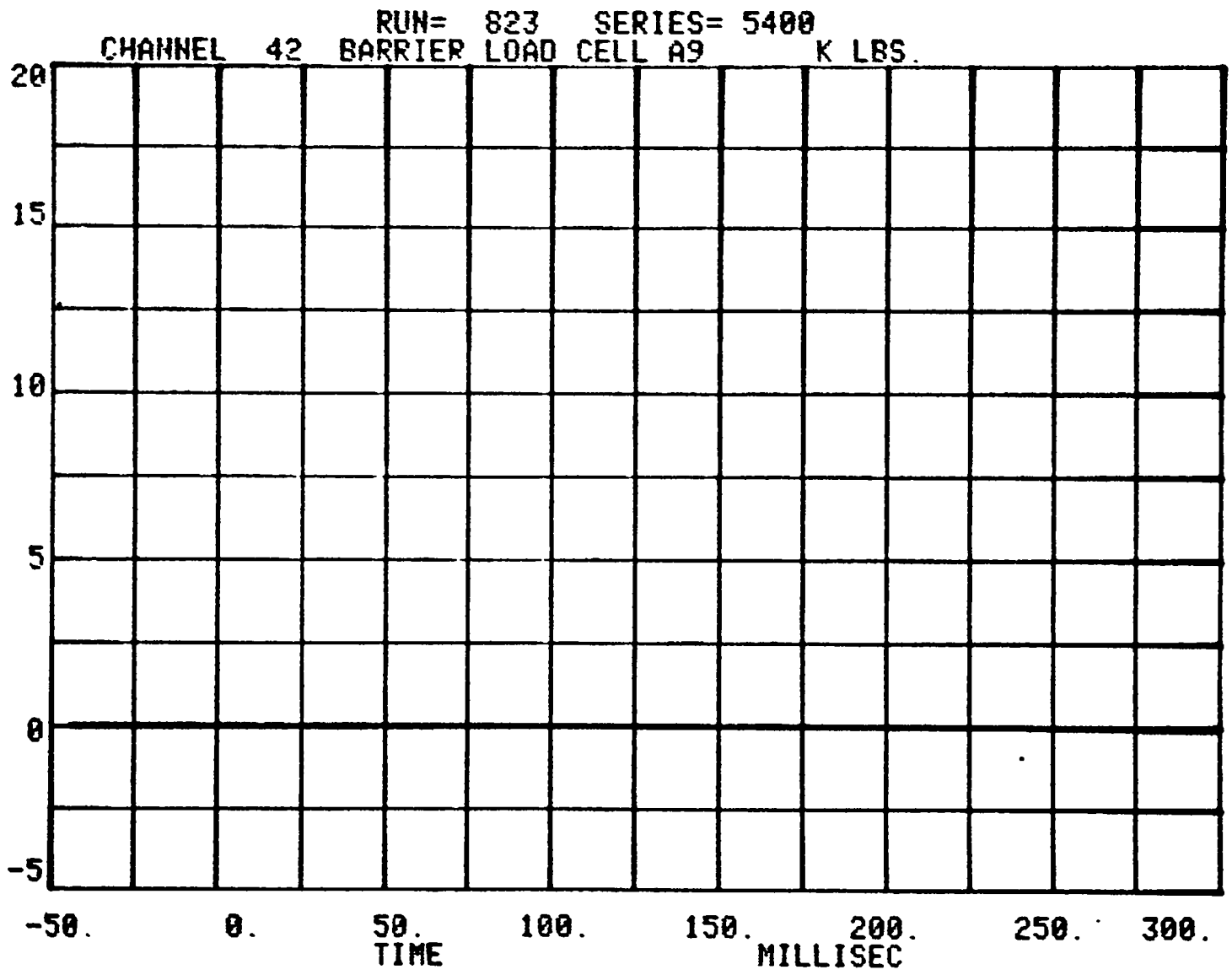
7626-16

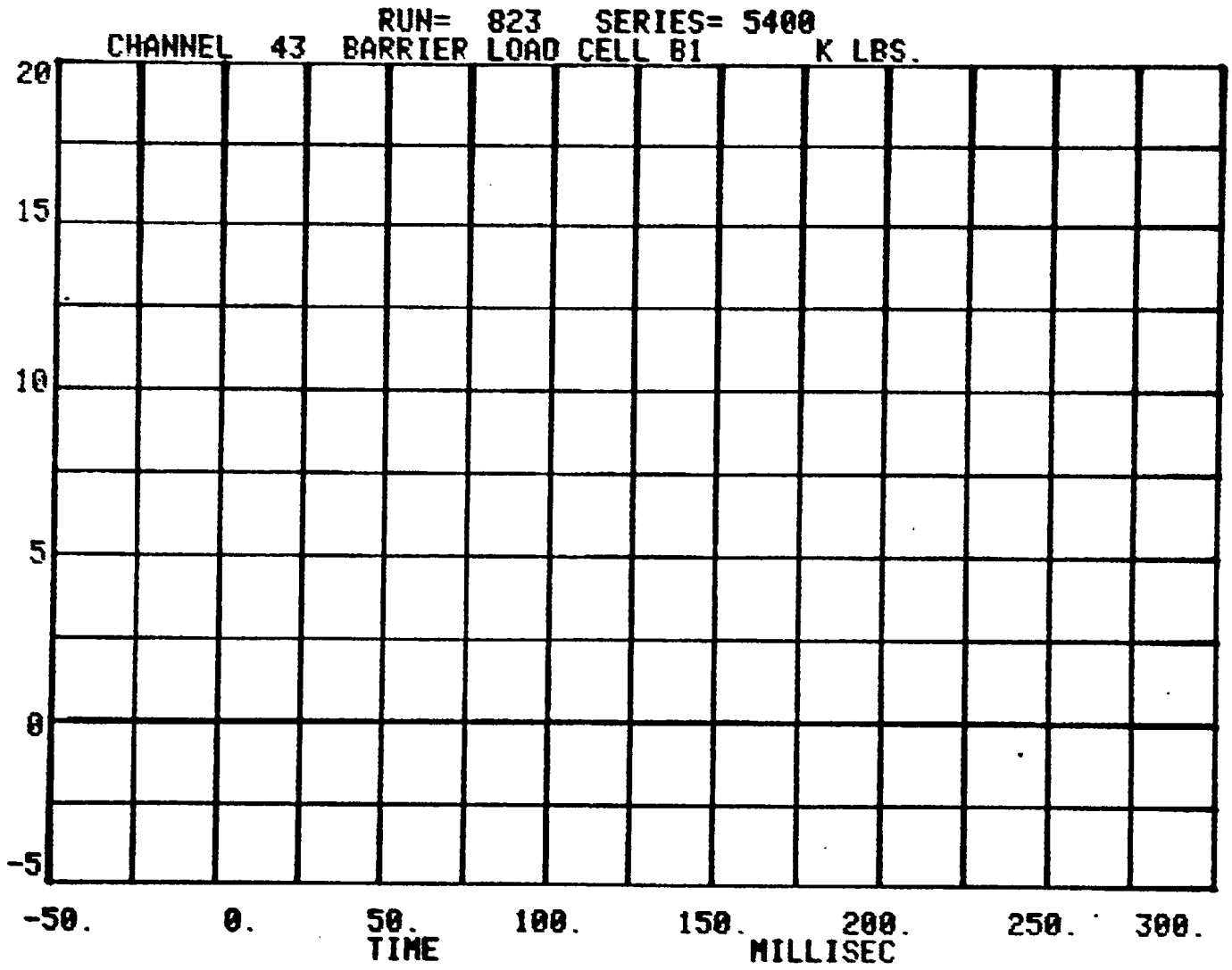

CHANNEL 38 BARRIER LOAD CELL A5
RUN= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

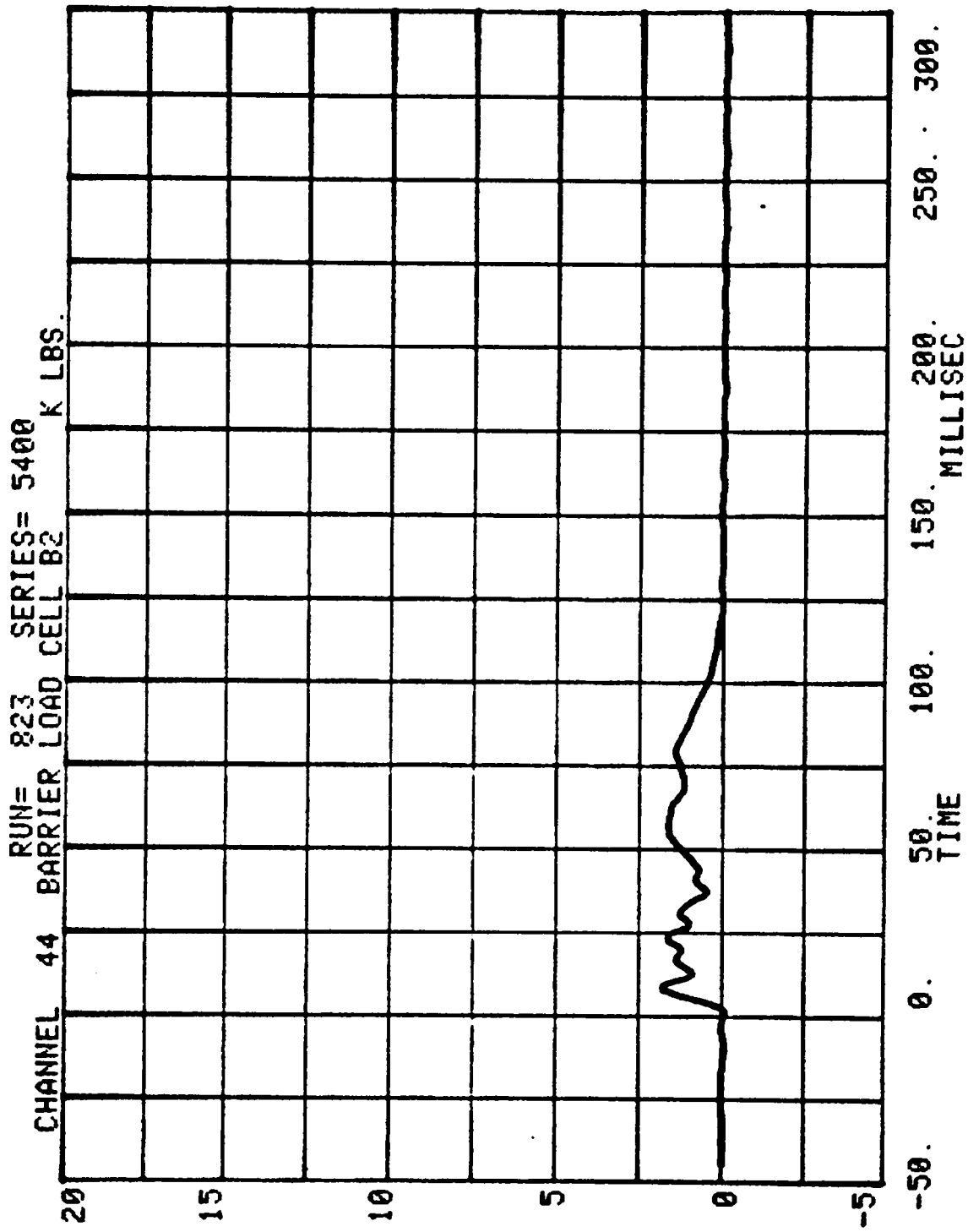

CHANNEL 39 BARRIER LOAD CELL A6
RUN= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

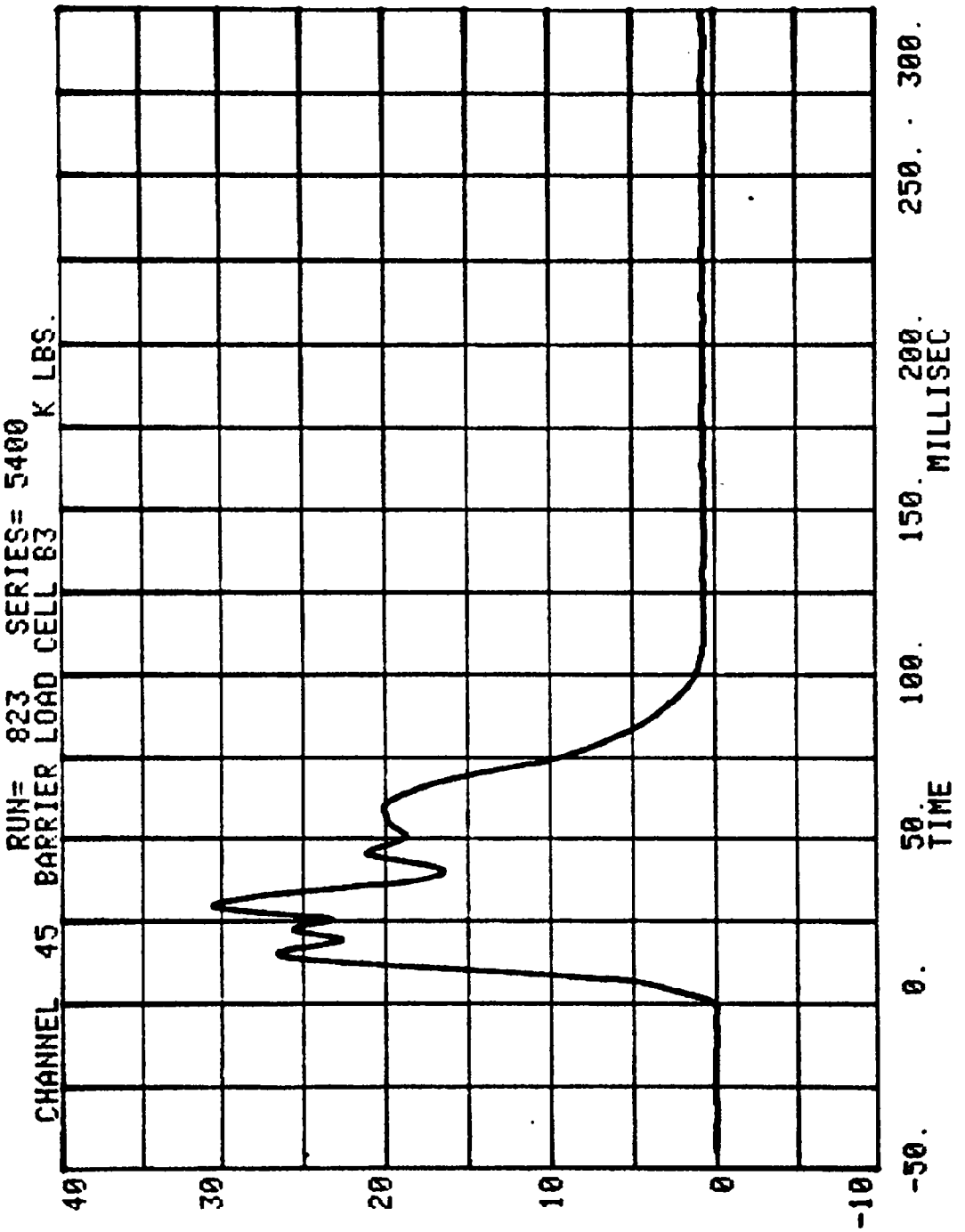

CHANNEL 40 BARRIER LOAD CELL A7
RUN= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

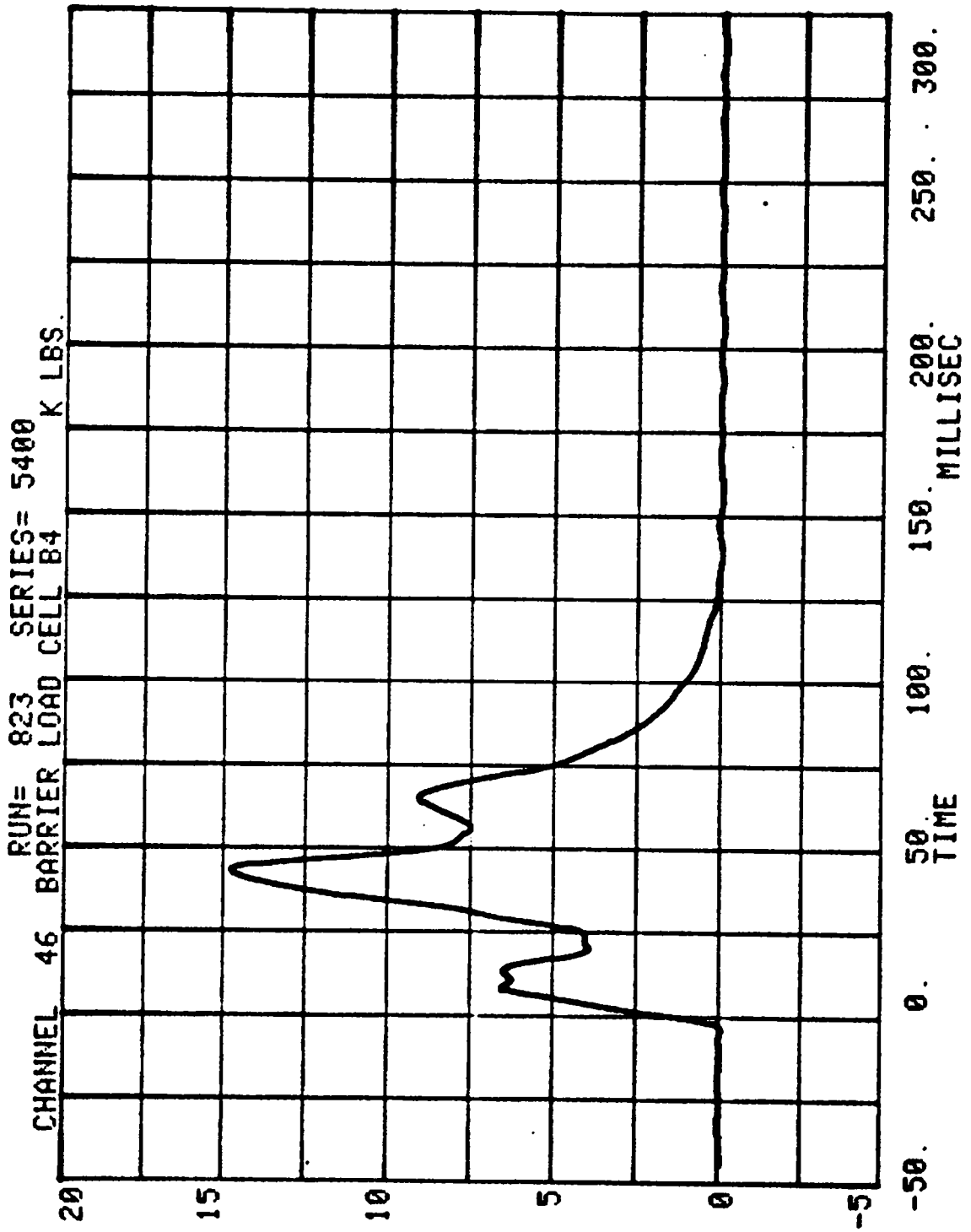

RUN= 823 SERIES= 5400
CHANNEL 41 BARRIER LOAD CELL A8 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

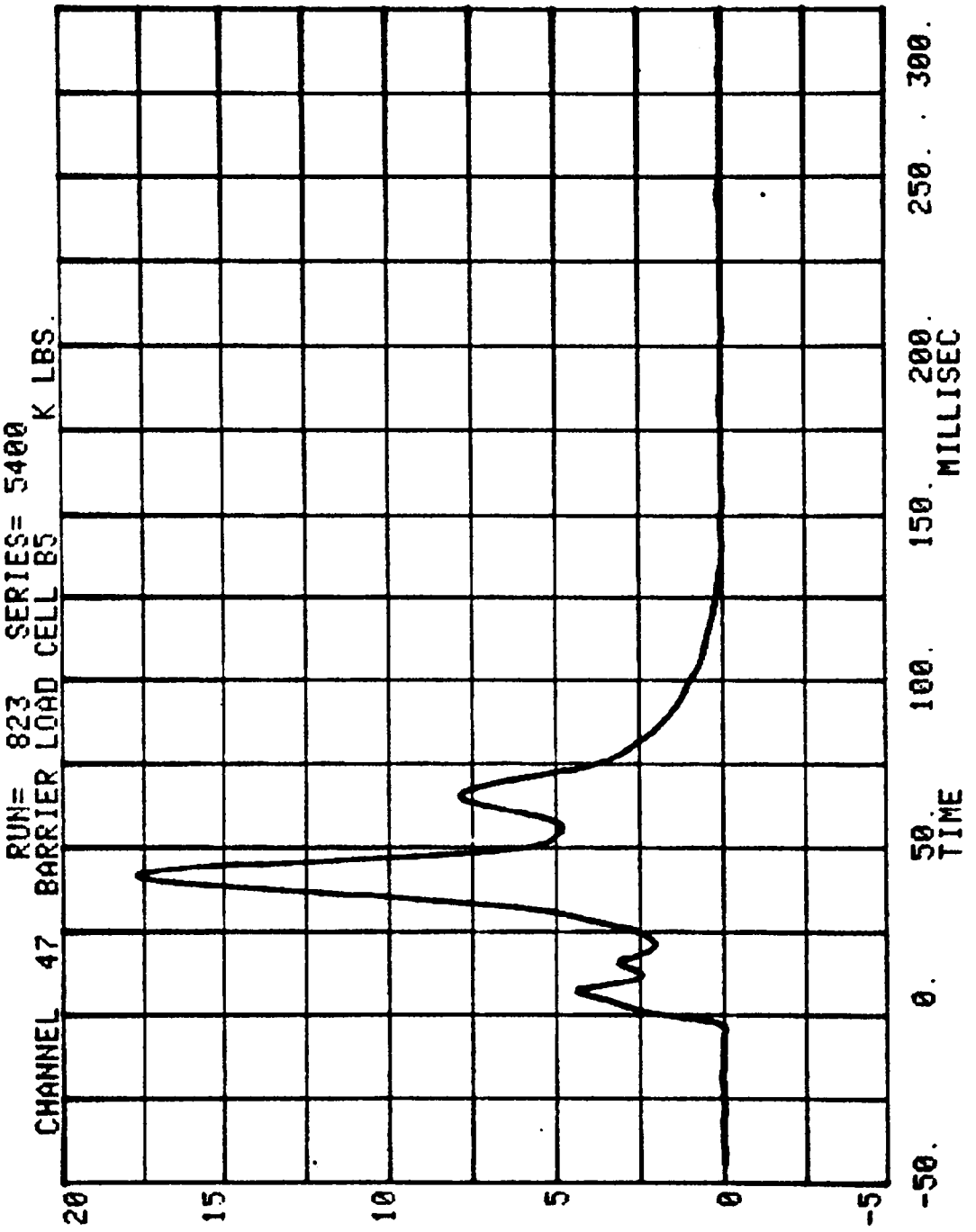

RUN= 823 SERIES= 5400
CHANNEL 42 BARRIER LOAD CELL A9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

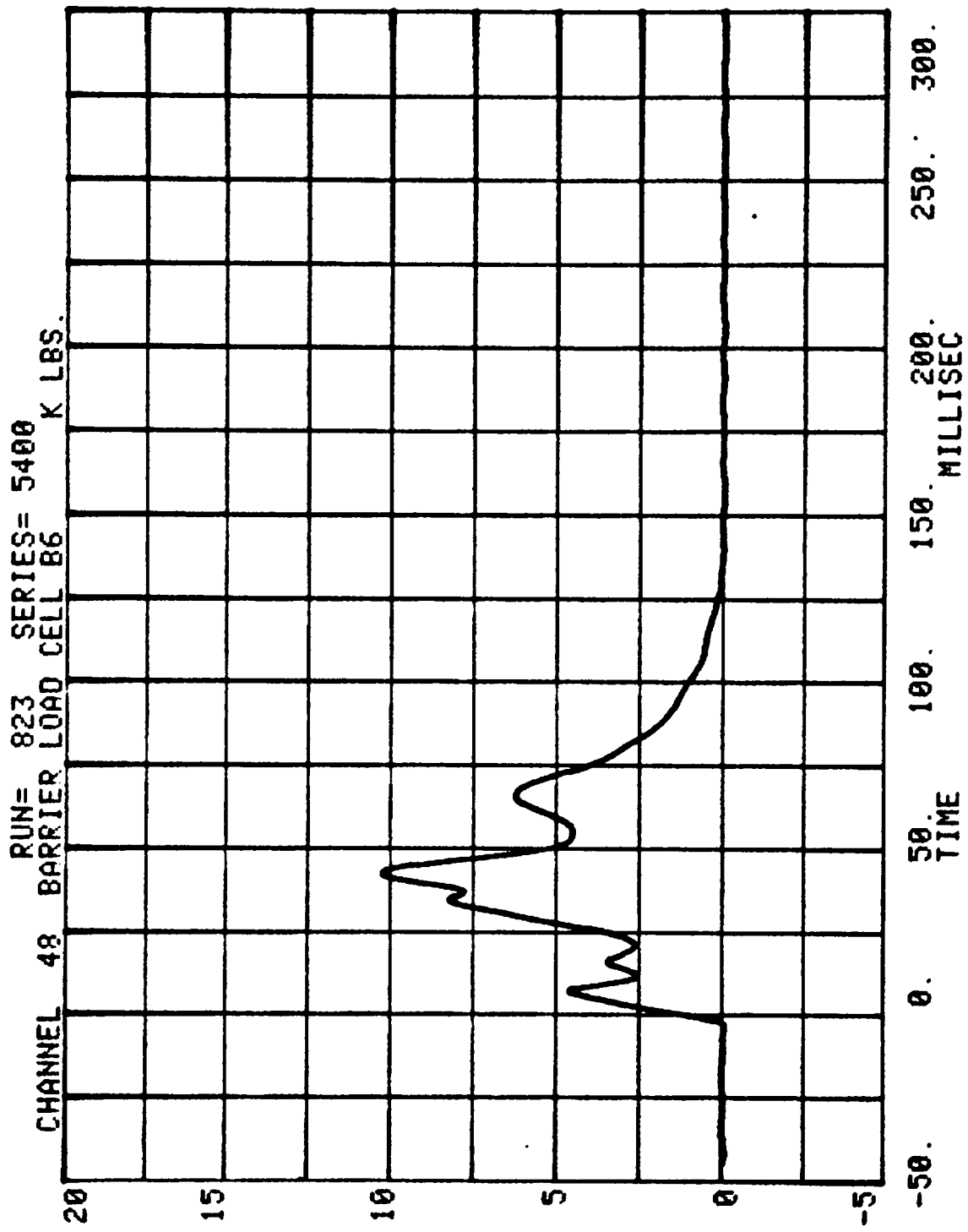

RUN= 823 SERIES= 5400
CHANNEL 43 BARRIER LOAD CELL B1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

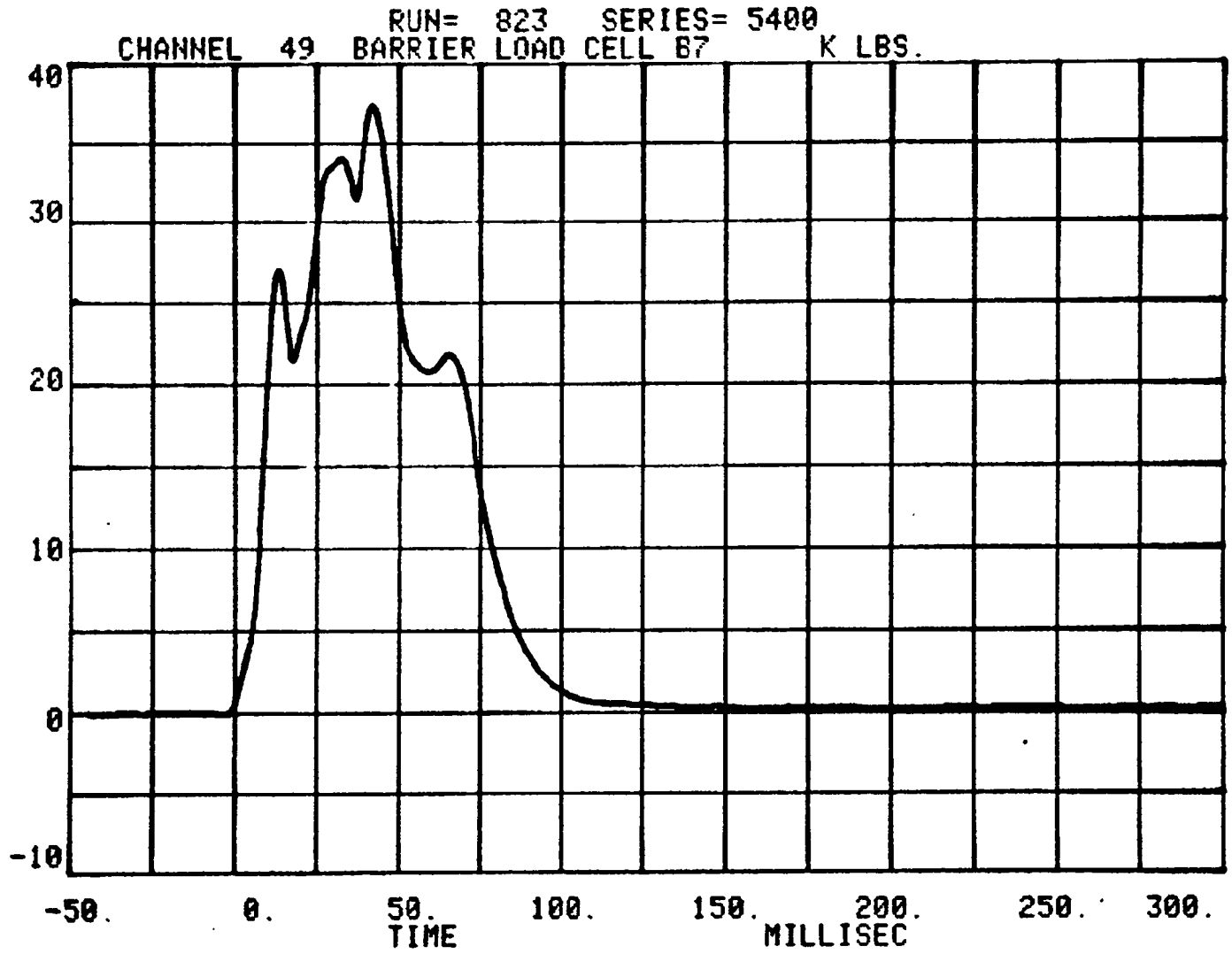

CHANNEL 44 RUN= 823 SERIES= 5400
BARRIER LOAD CELL B2
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 45 RUN= 823 SERIES= 5400
BARRIER LOAD CELL 83 K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

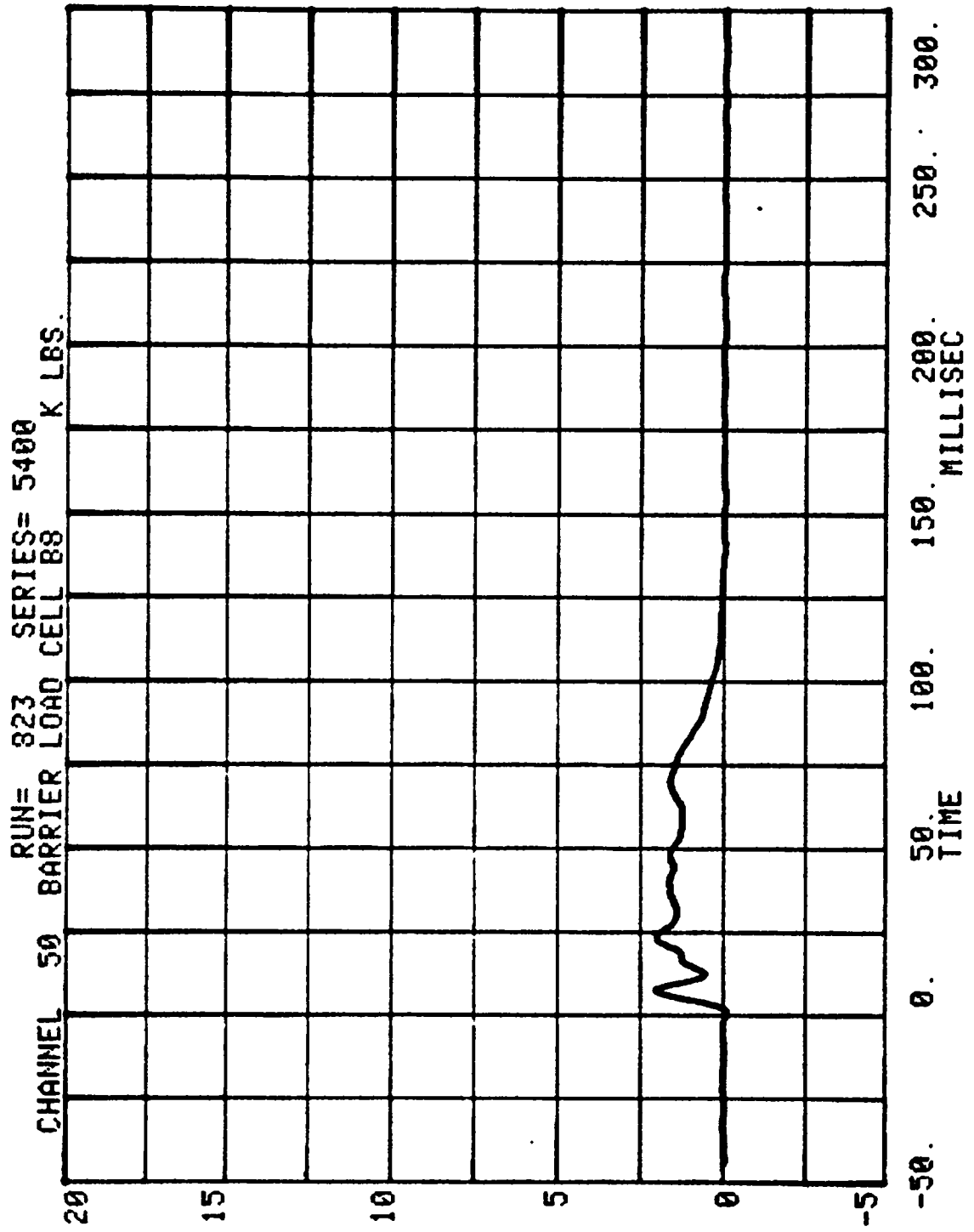

CHANNEL 46 BARRIER LOAD CELL B4
RUN= 823 SERIES= 5400 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 47 BARRIER LOAD CELL B5
RUN= 823 SERIES= 5400 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

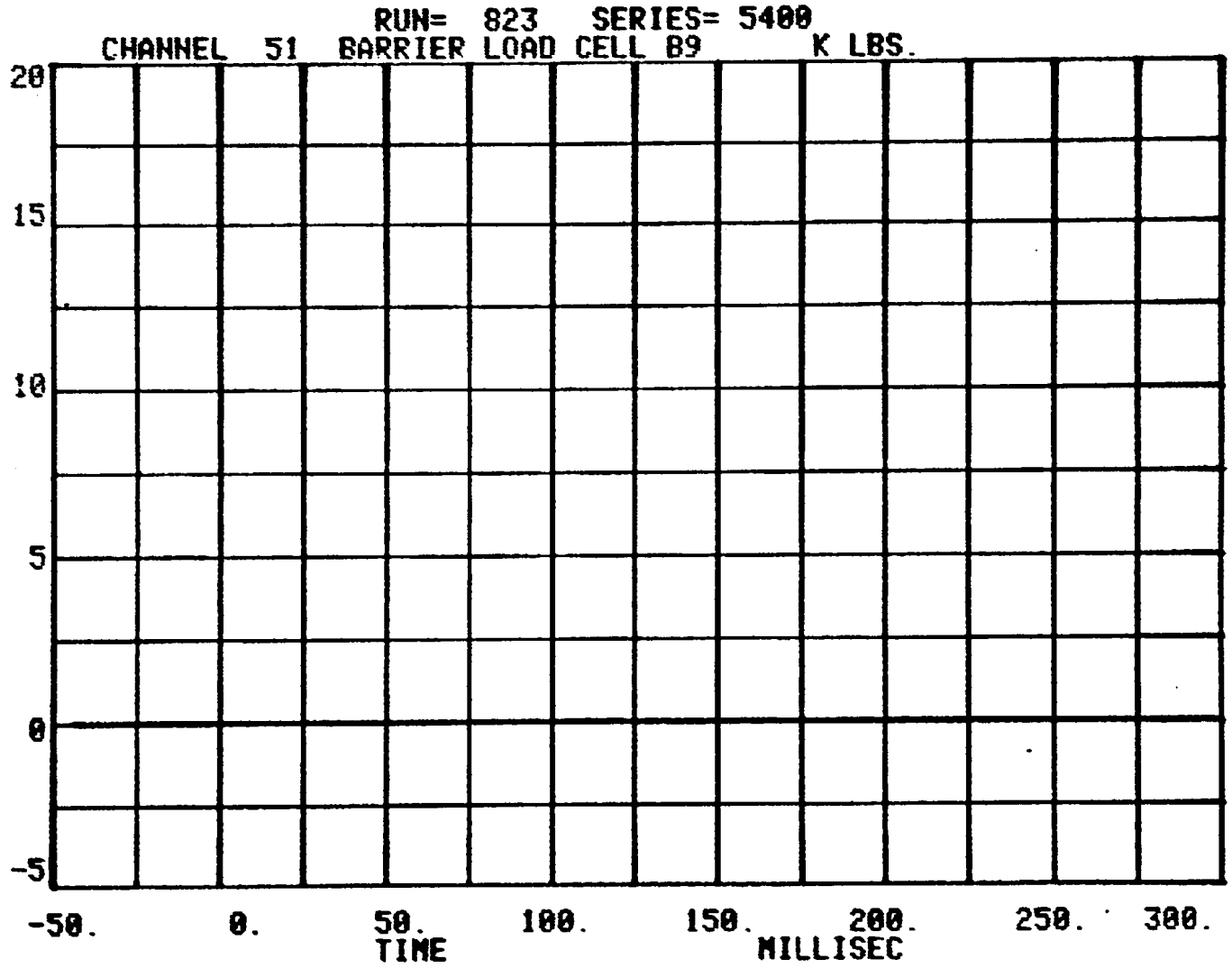

CHANNEL 48 BARRIER LOAD CELL B6
RUN= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 823 SERIES= 5400
CHANNEL 49 BARRIER LOAD CELL B7 K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

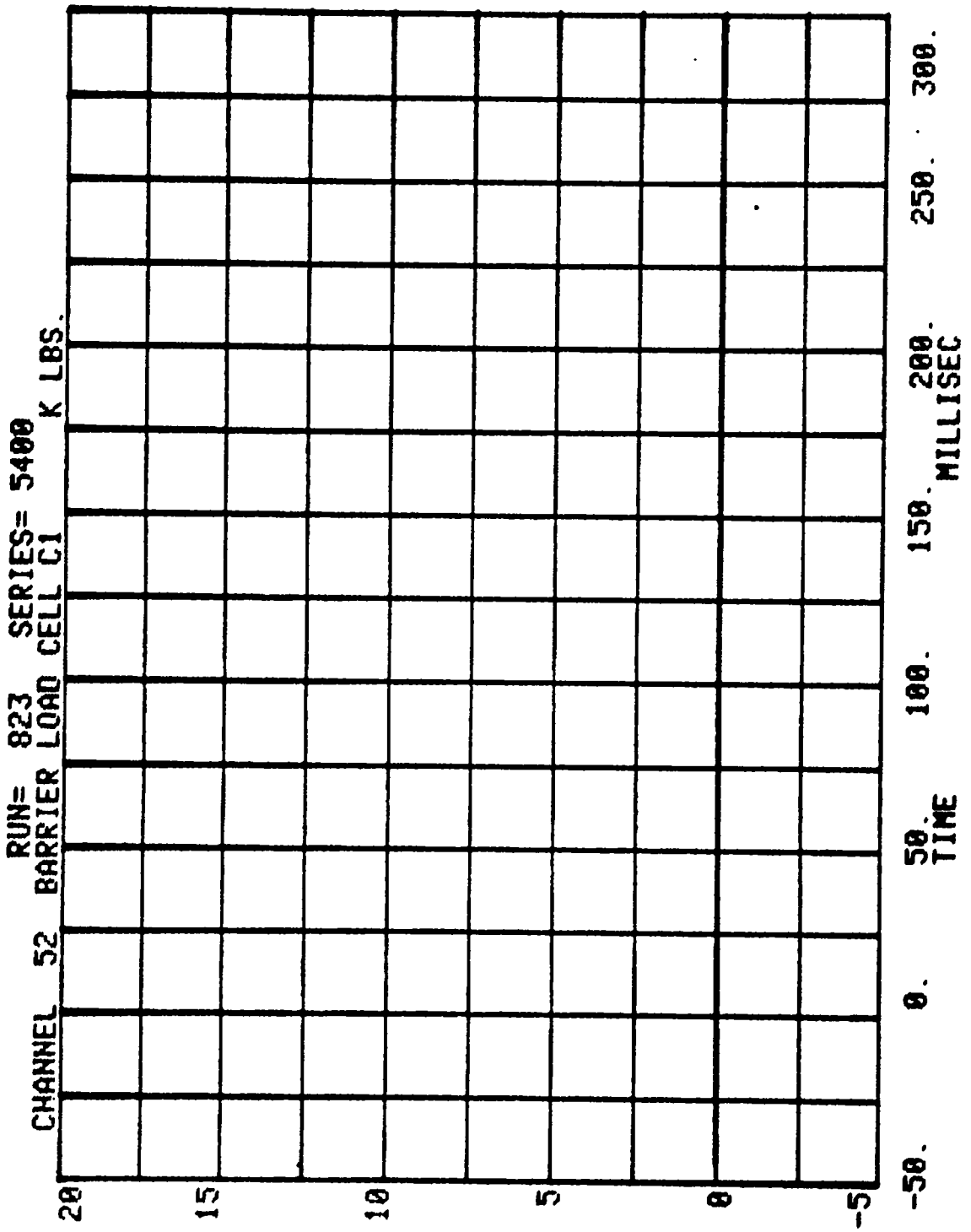
7626-16

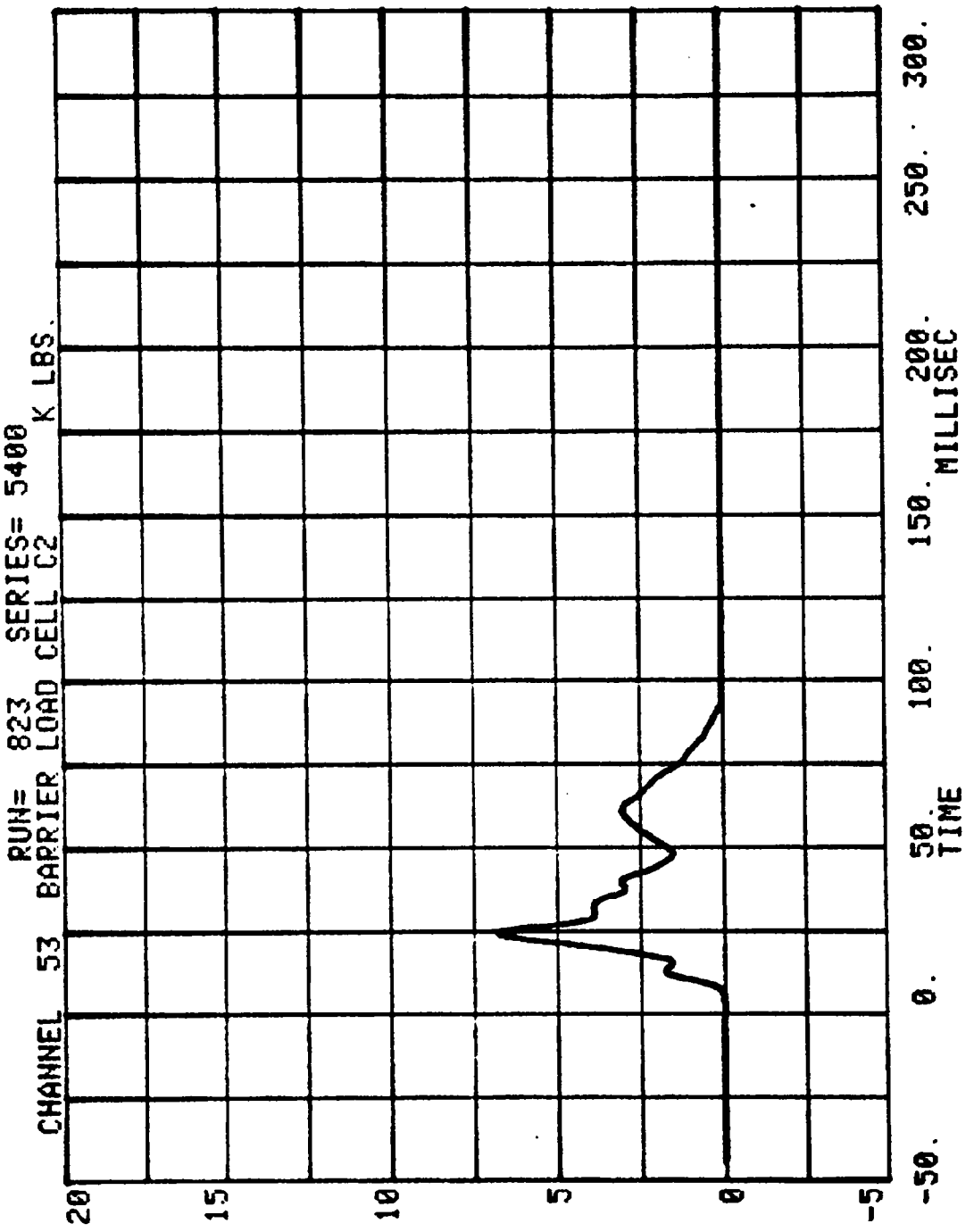

CHANNEL 50
RUN= 823 SERIES= 5400
BARRIER LOAD CELL B8
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

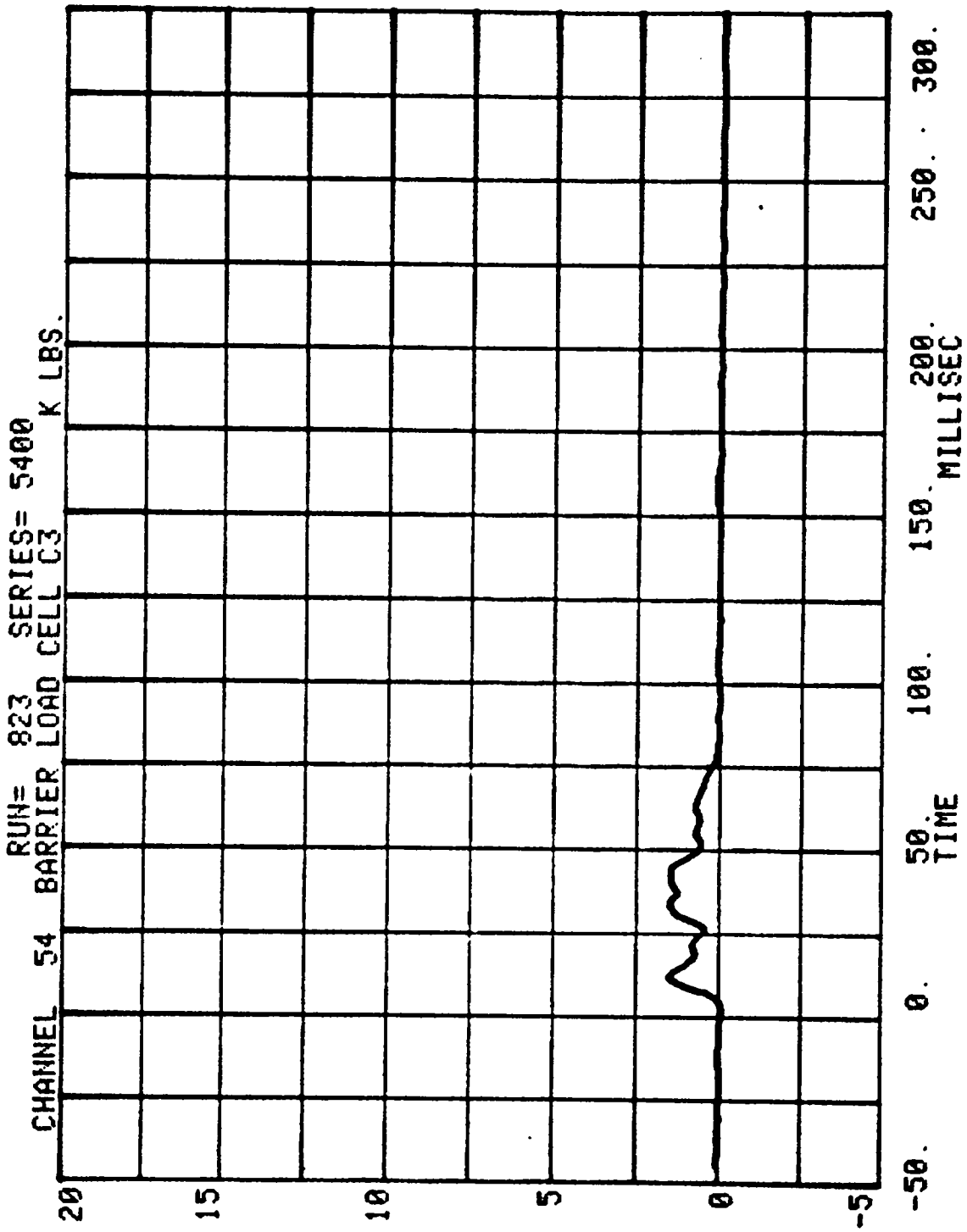
7626-16

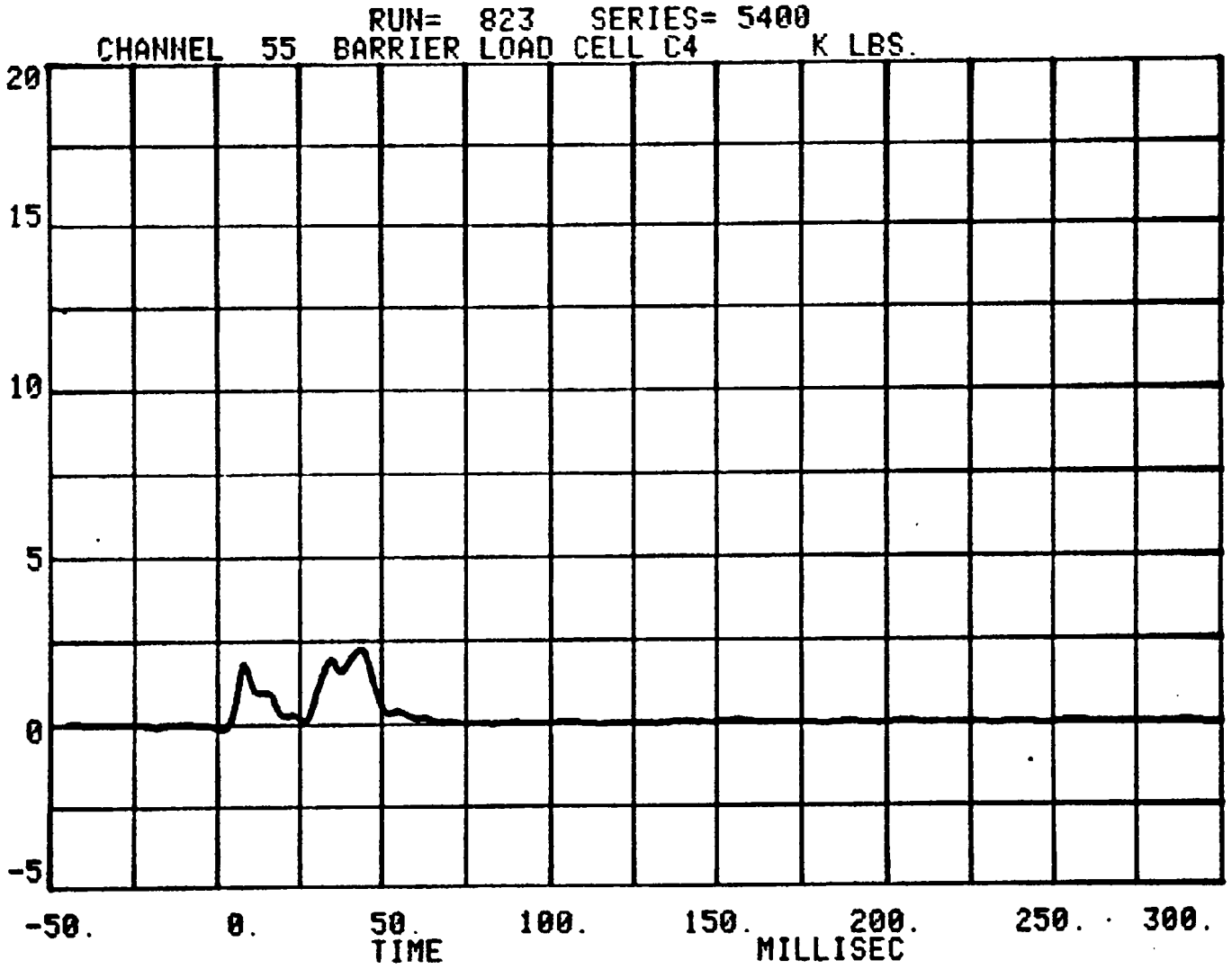

RUN= 823 SERIES= 5400
CHANNEL 51 BARRIER LOAD CELL B9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-16

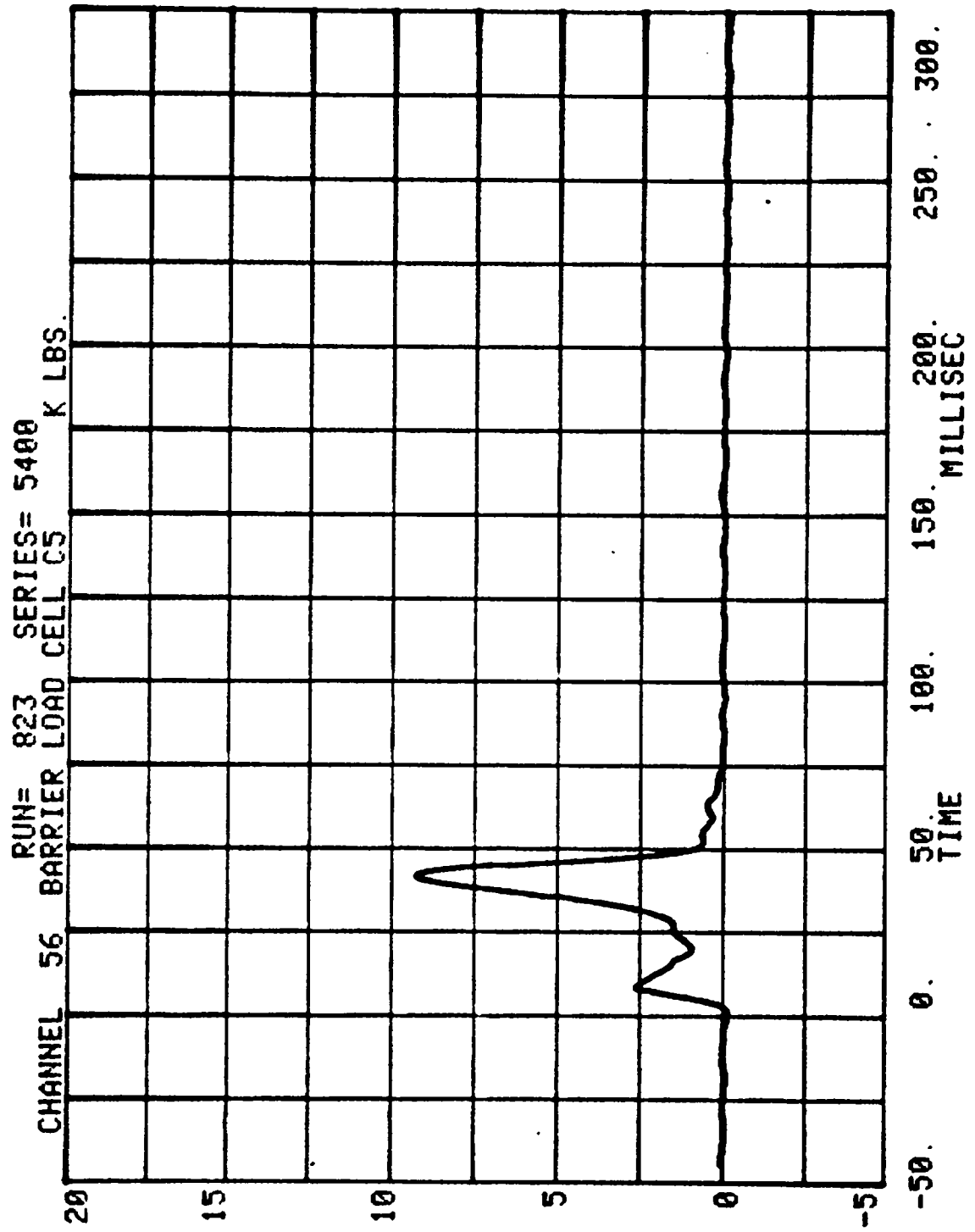

RUN= 823 SERIES= 5400
CHANNEL 52 BARRIER LOAD CELL C1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

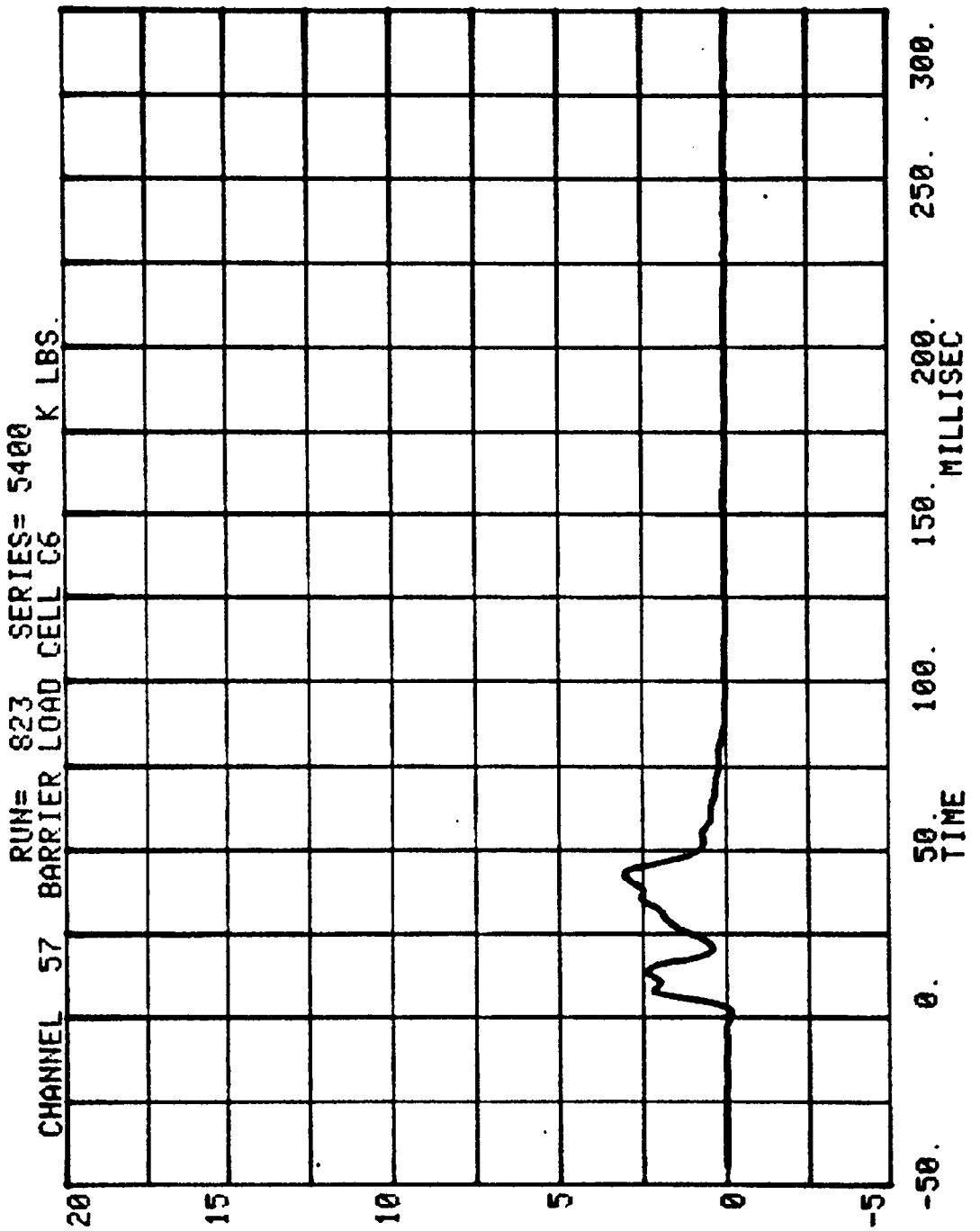

CHANNEL 53 BARRIER LOAD CELL C2
RUN= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

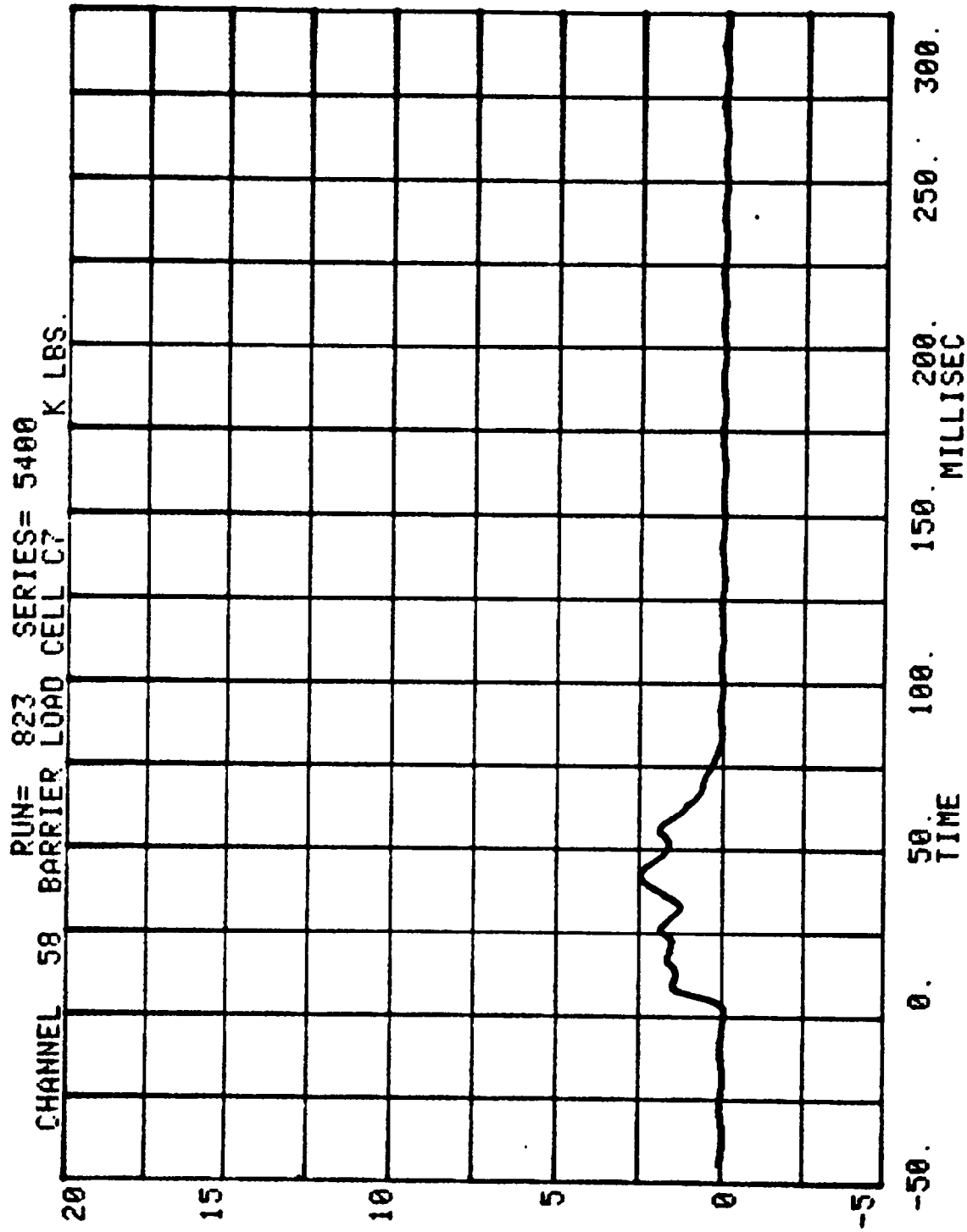

CHANNEL 54 BARRIER LOAD CELL C3
RUN= 823 SERIES= 5400 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 823 SERIES= 5400
CHANNEL 55 BARRIER LOAD CELL C4 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

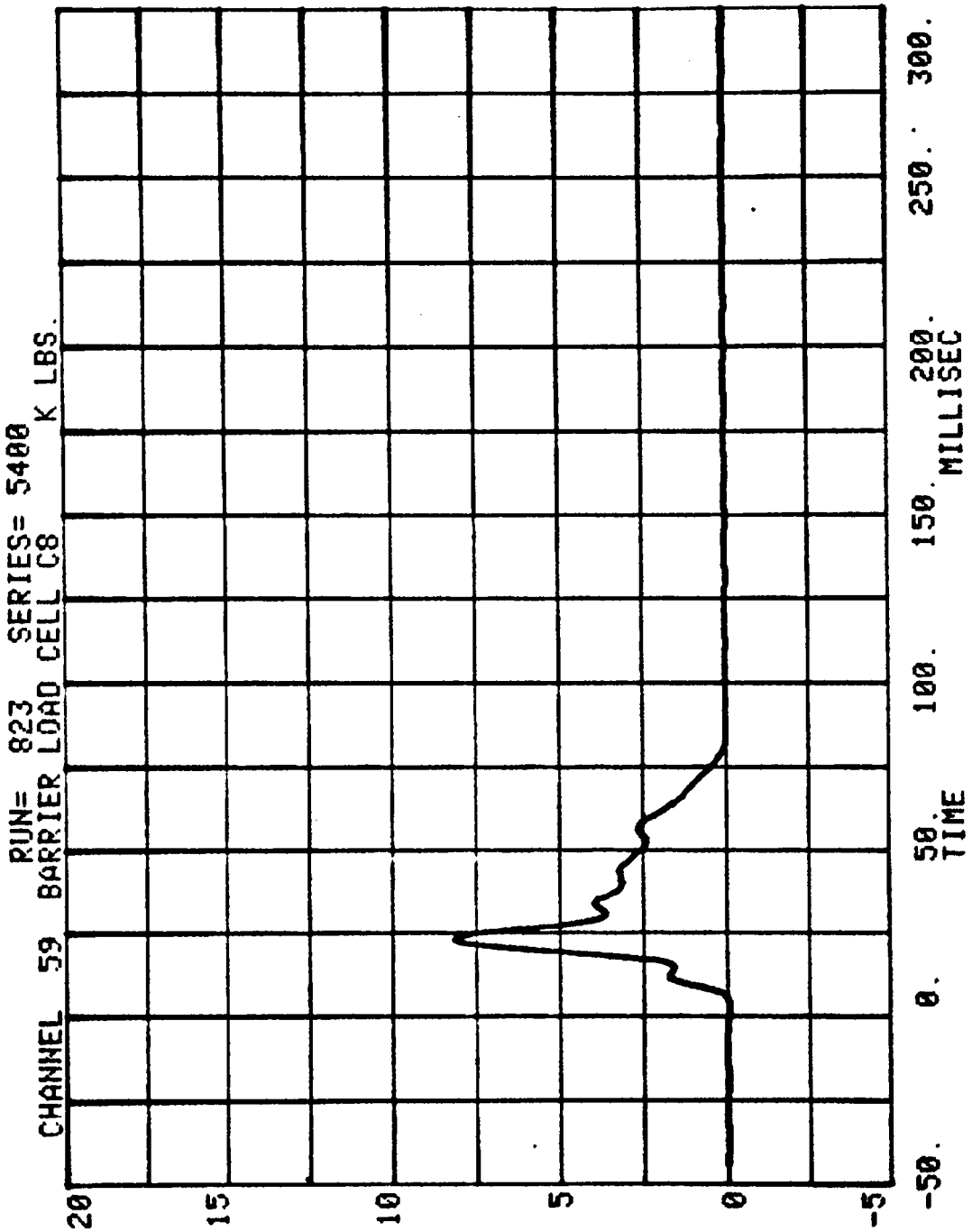
7626-16

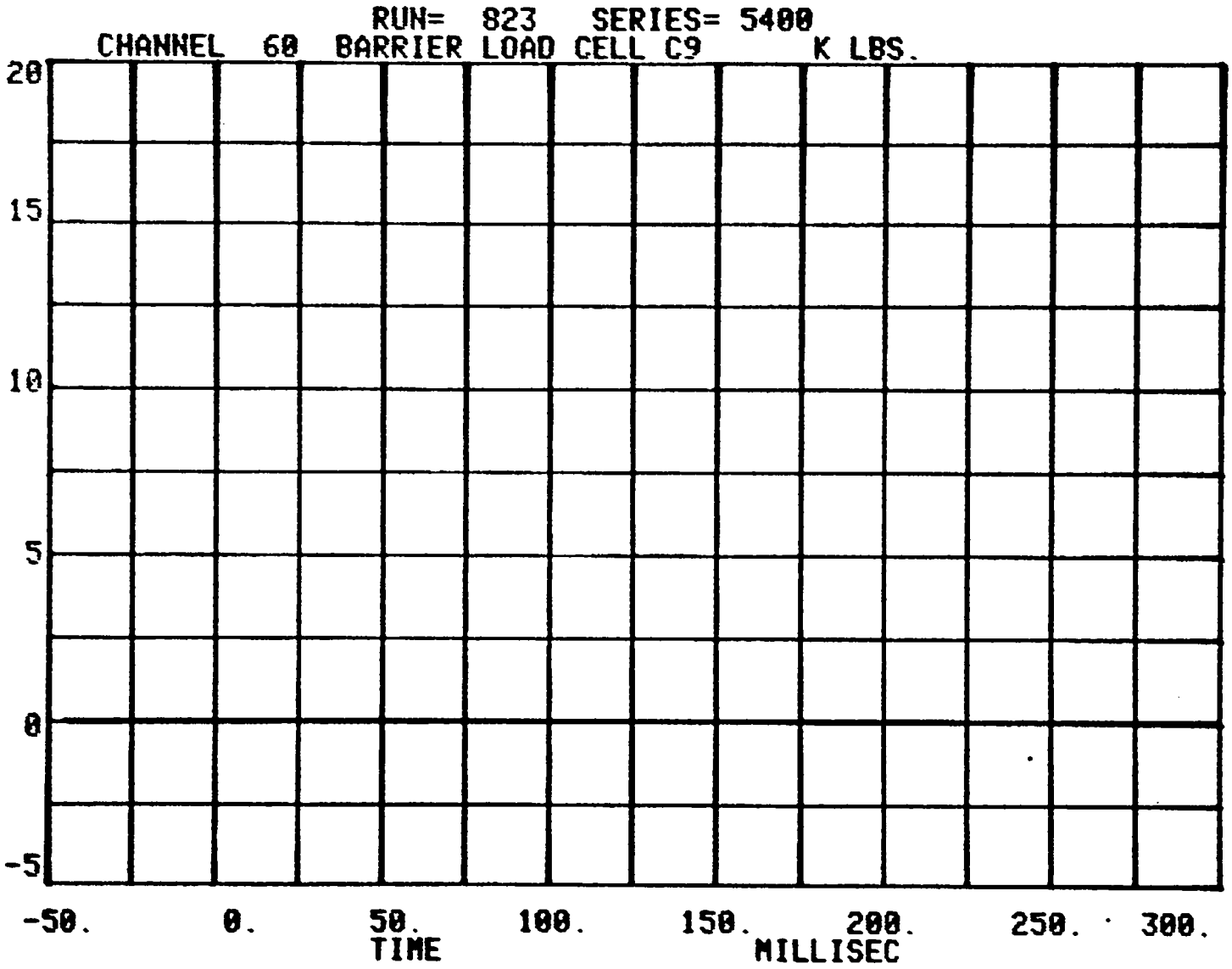

CHANNEL 56 BARRIER LOAD CELL C5
RUN= 823 SERIES= 5400 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

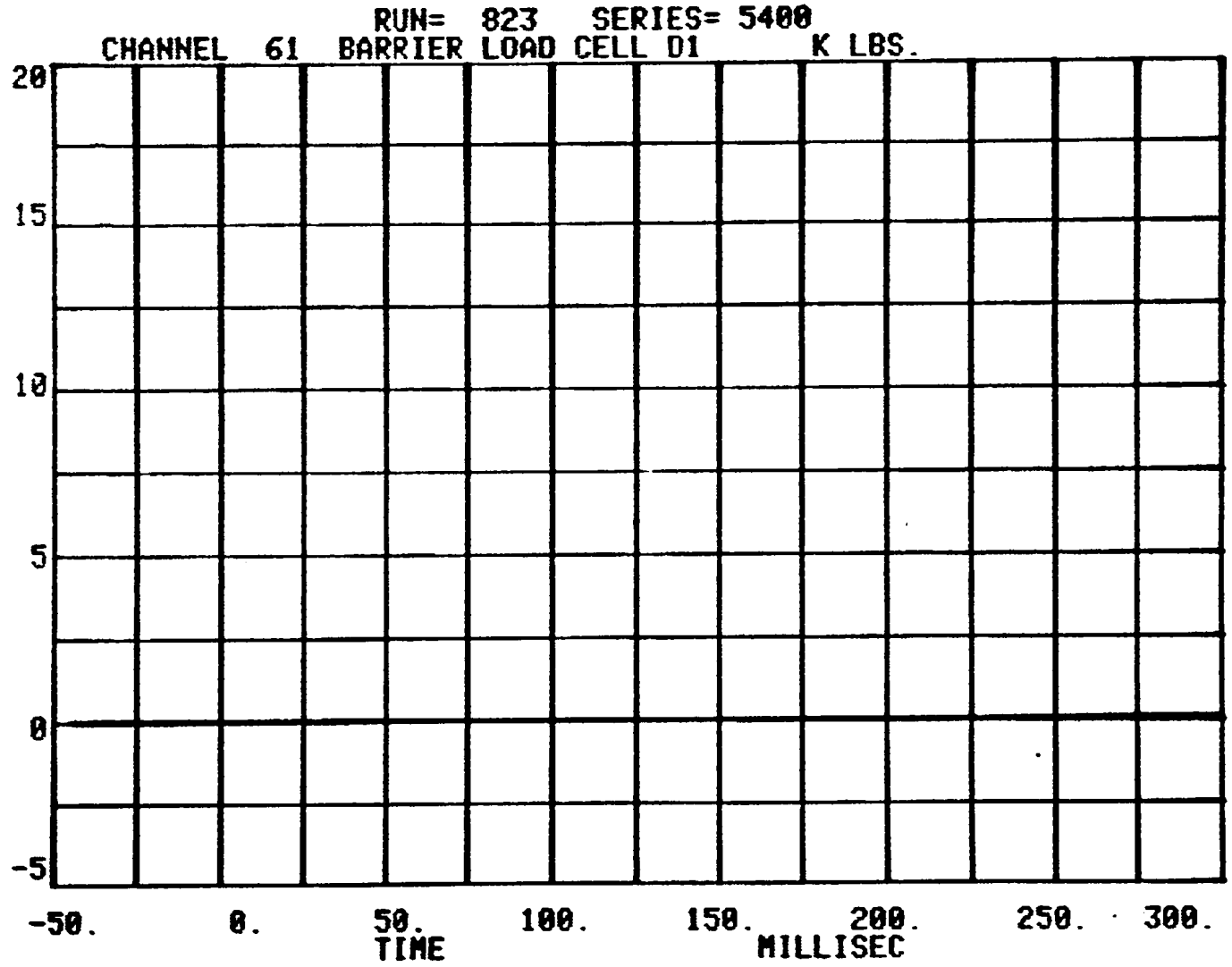

CHANNEL 57 BARRIER LOAD CELL C6
RUN= 823 SERIES= 5400 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

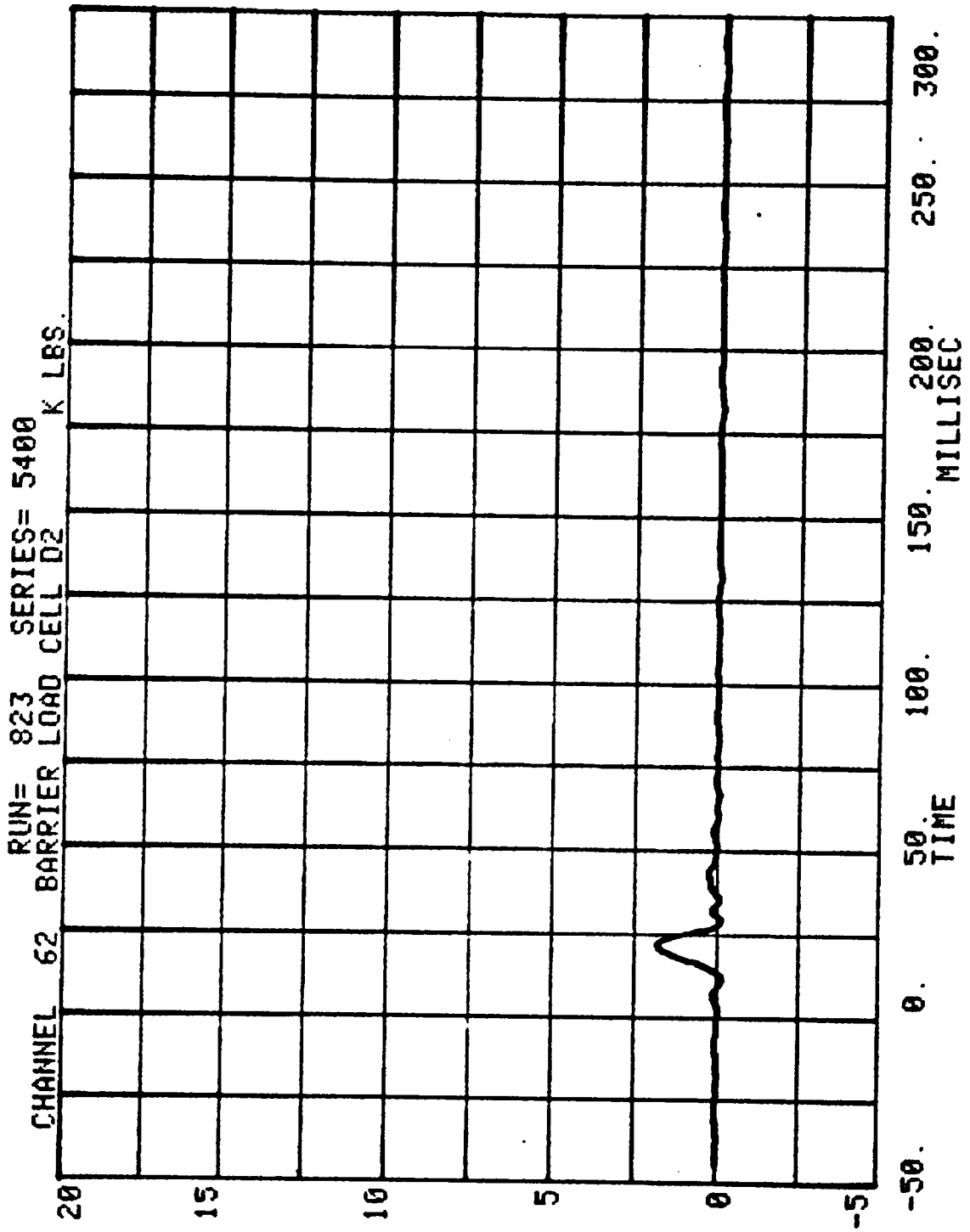

CHANNEL 58 BARRIER LOAD CELL C7 K LBS.
RUN= 823 SERIES= 5400
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

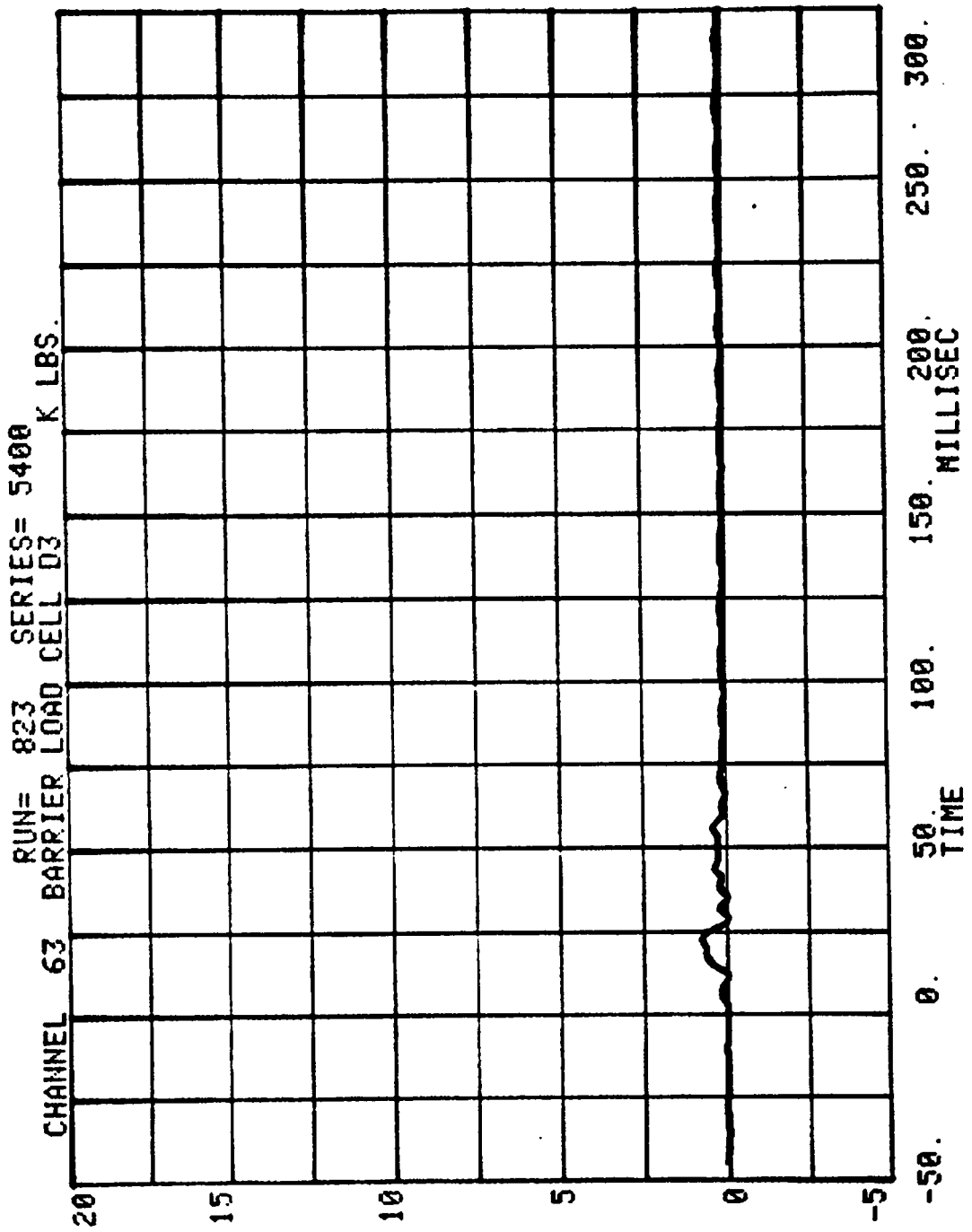
7626-16

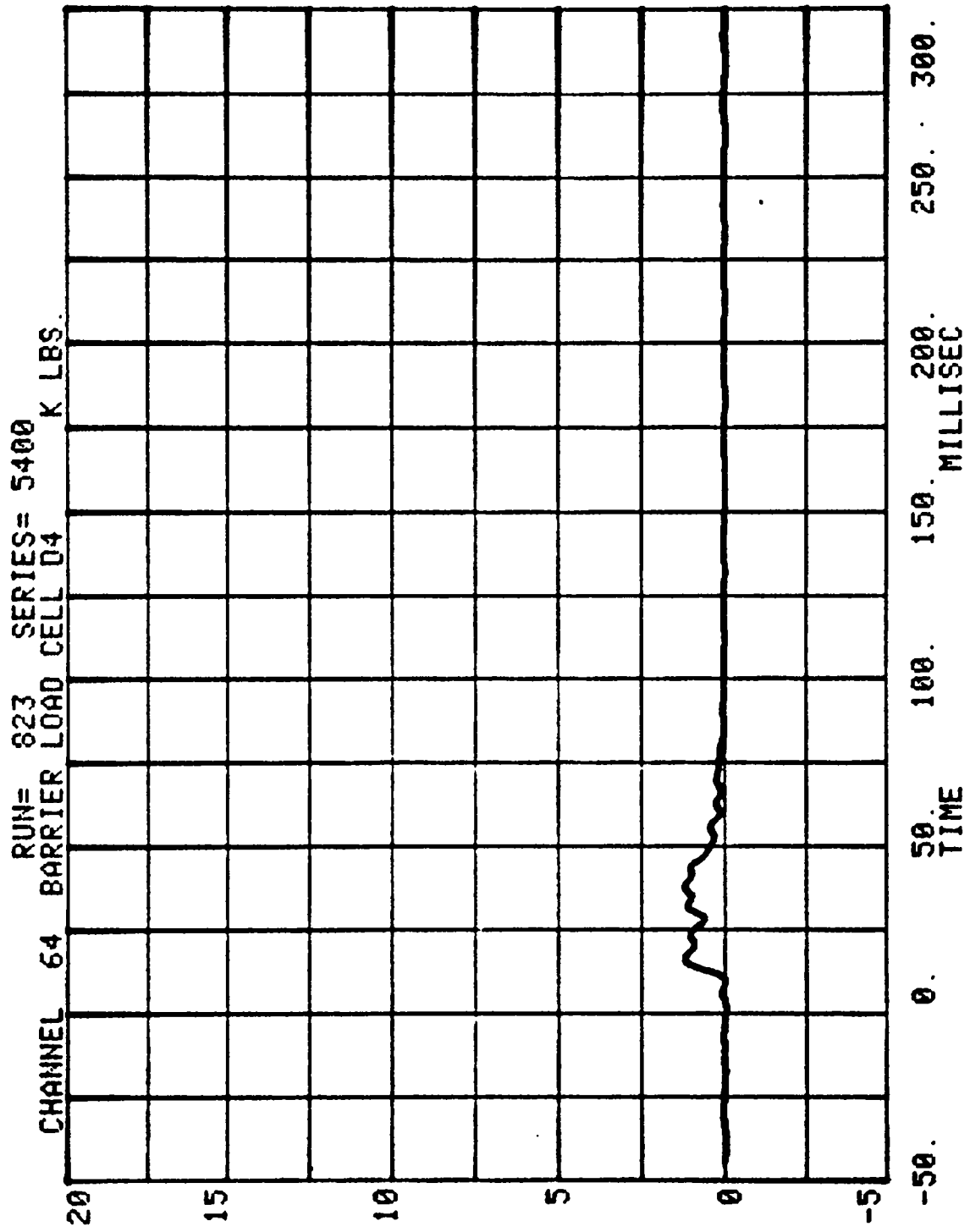

CHANNEL 59 BARRIER LOAD CELL C8
RUN= 823 SERIES= 5400 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 823 SERIES= 5400
CHANNEL 60 BARRIER LOAD CELL C9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

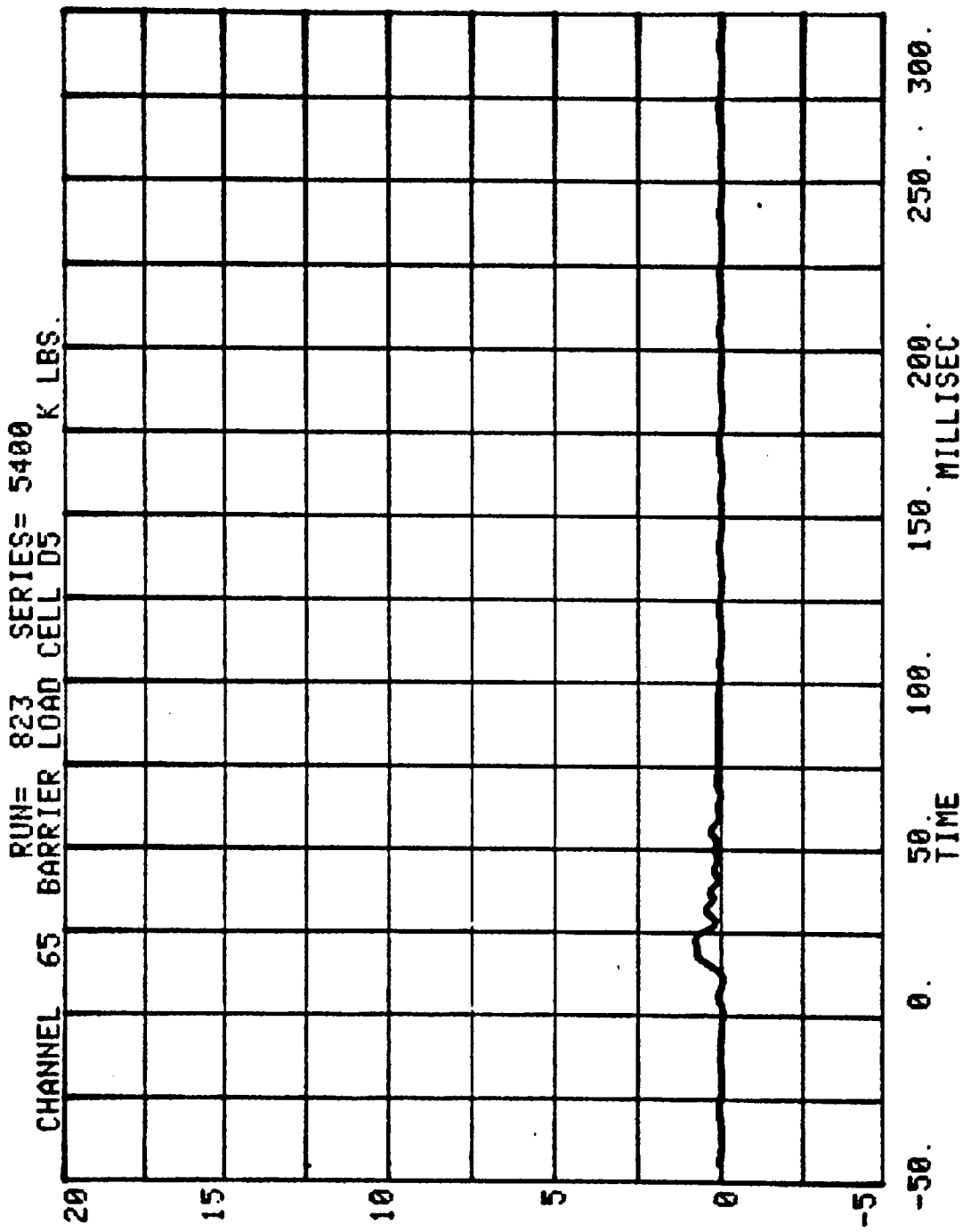

RUN= 823 SERIES= 5400
CHANNEL 61 BARRIER LOAD CELL D1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 62 BARRIER LOAD CELL D2
RUN= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

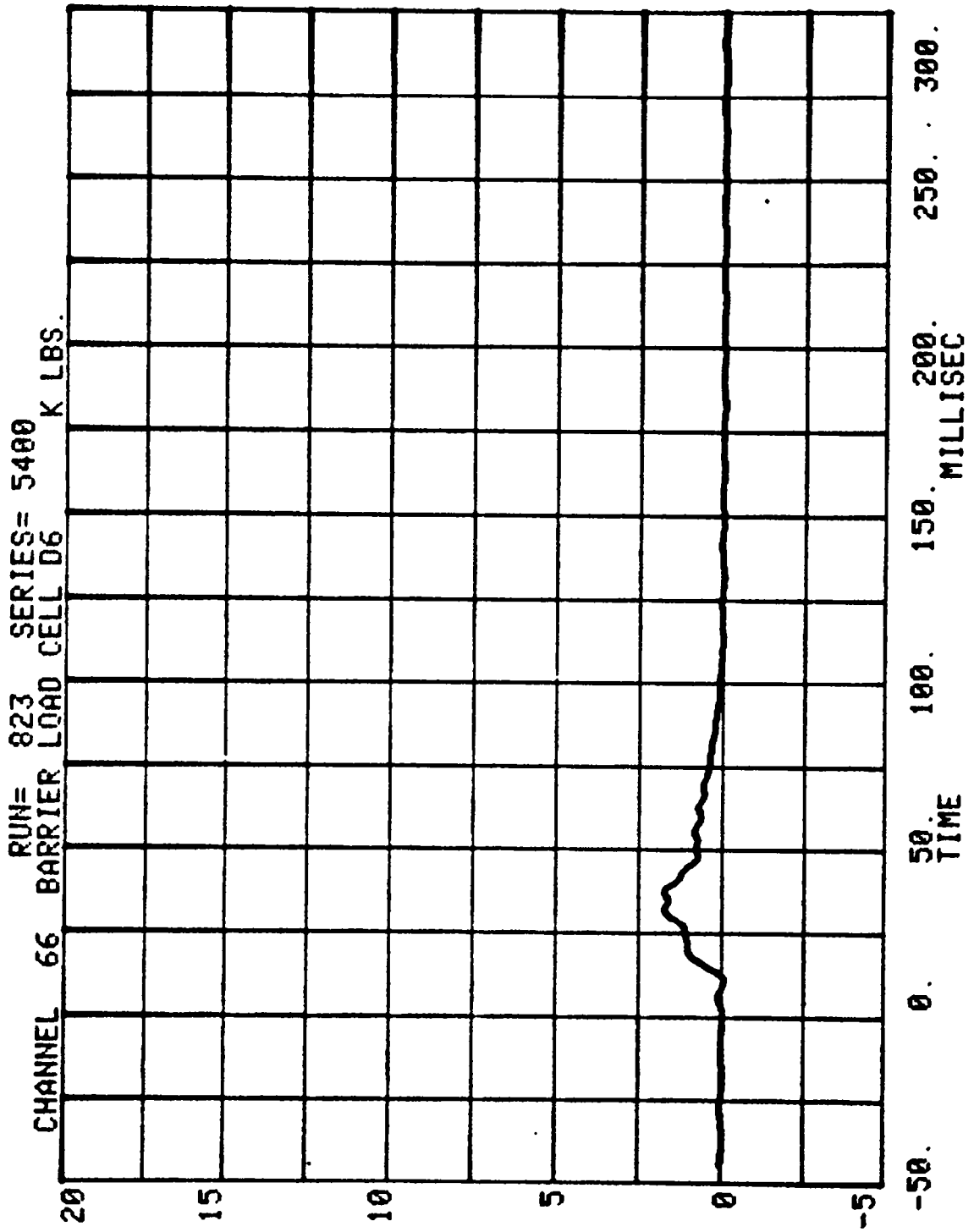

CHANNEL 63 BARRIER LOAD CELL D3
RUN= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

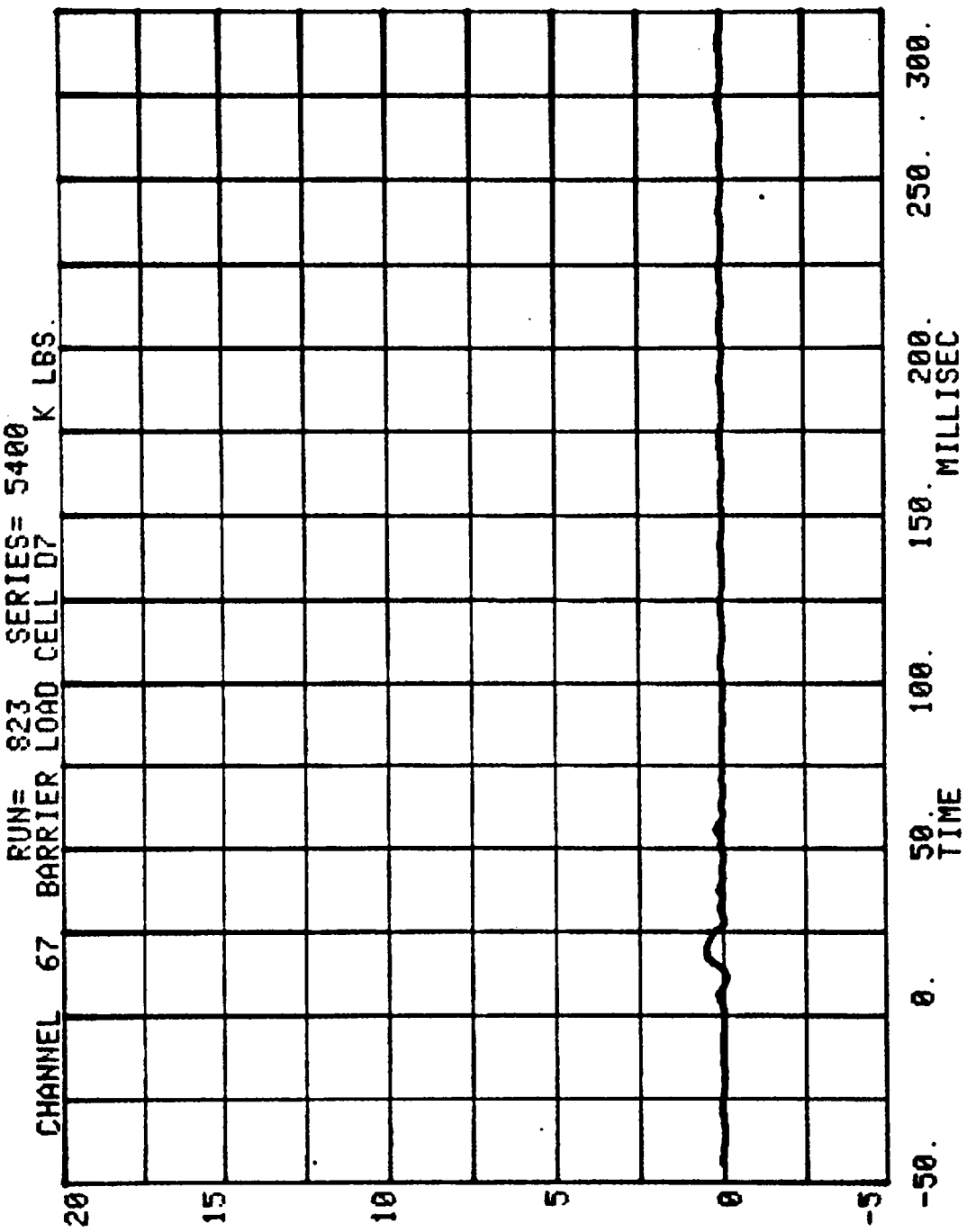

CHANNEL 64 BARRIER LOAD CELL 04
RUN= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

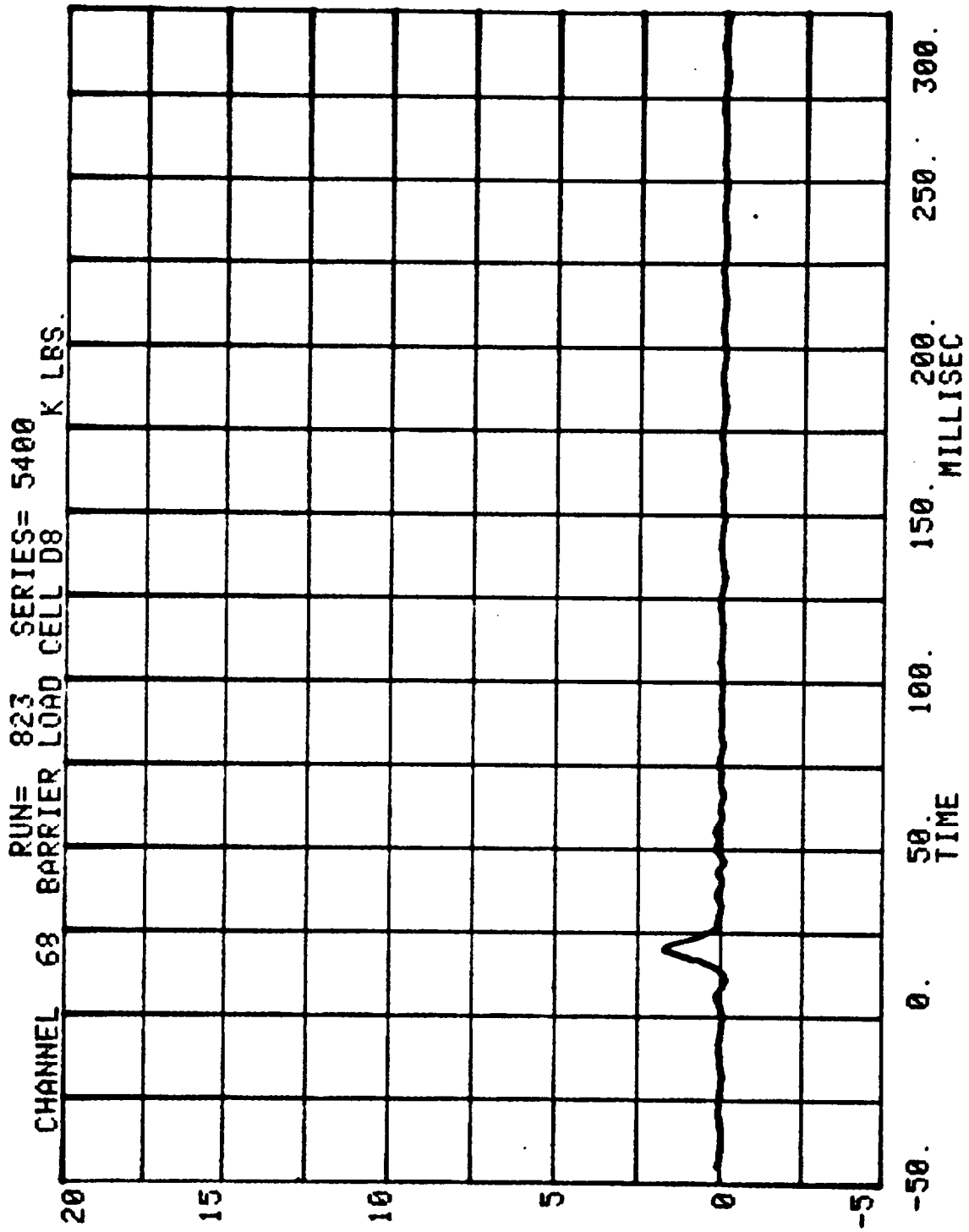
7626-16

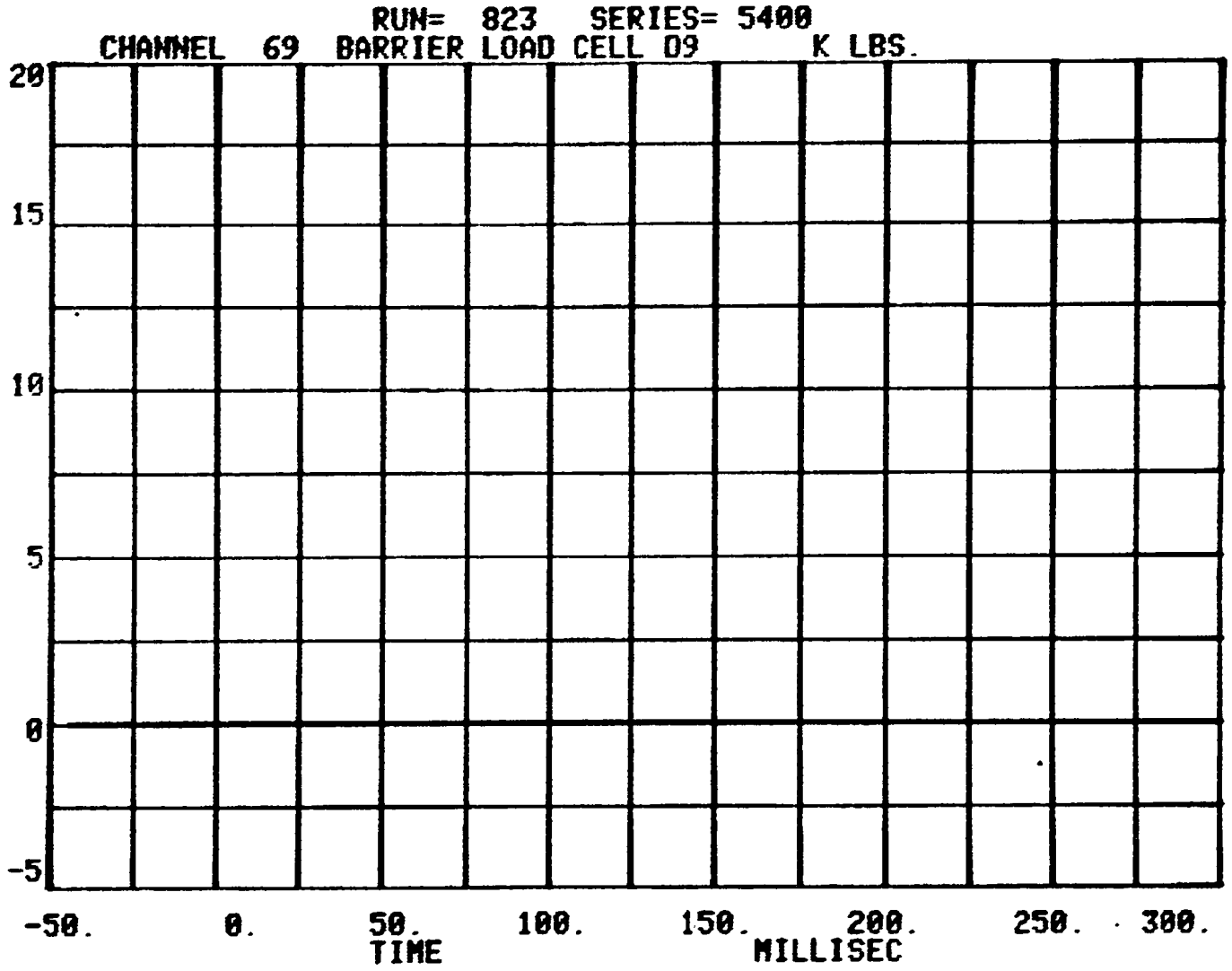

RUN= 823 SERIES= 5400
CHANNEL 65 BARRIER LOAD CELL D5 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-16


CHANNEL 66 BARRIER LOAD CELL D6
RUN= 823 SERIES= 5400
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= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 68 BARRIER LOAD CELL D8
RUN= 823 SERIES= 5400
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

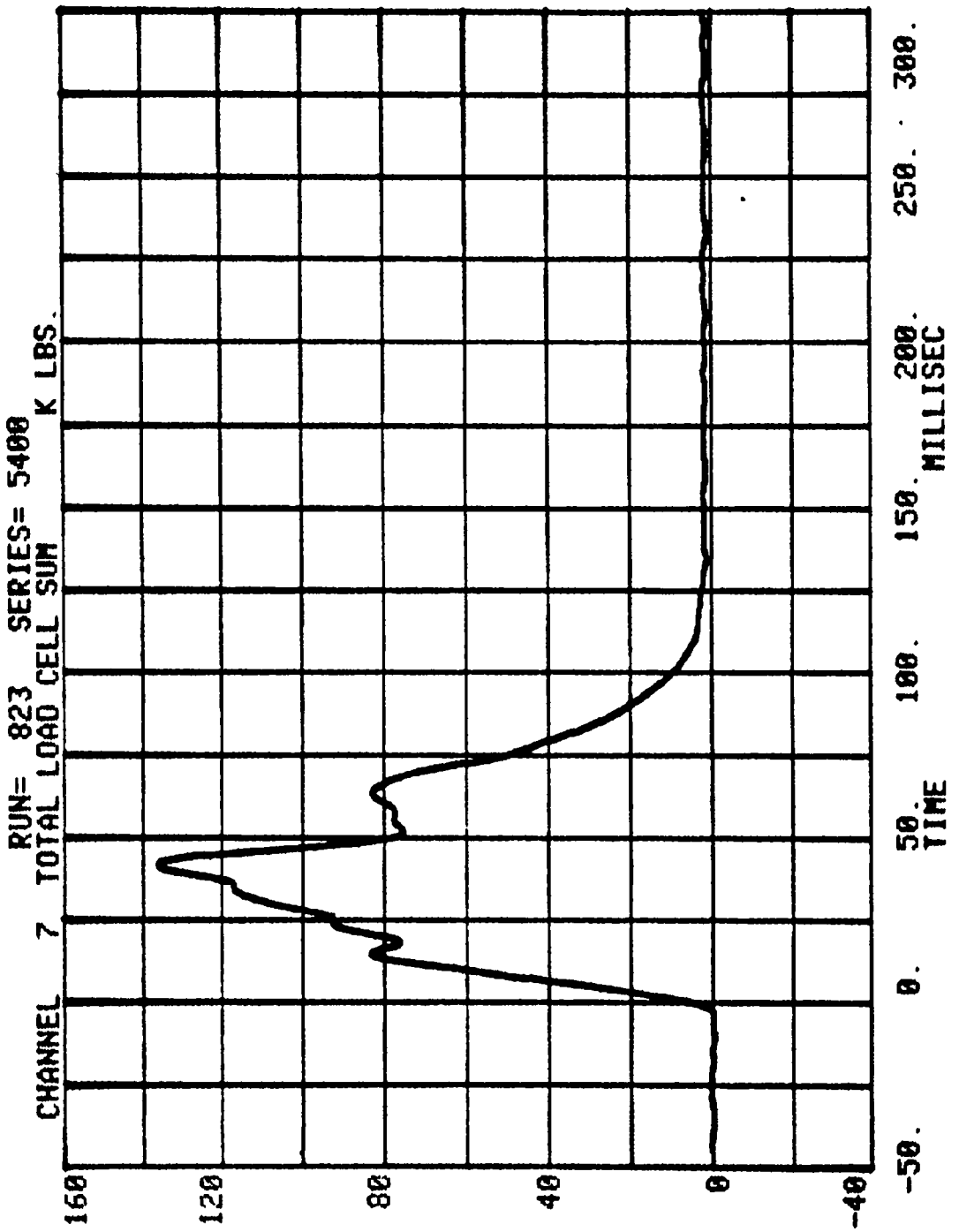

RUN= 823 SERIES= 5400
CHANNEL 69 BARRIER LOAD CELL 09 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7626-16

NEW CAR ASSESSMENT BARRIER TEST - 1988

RUN # 823 SERIES # 5400

CHAN	TITLE	MINIMUM	MAXIMUM
7	TOTAL LOAD CELL SUM	-.390	136.485 K LBS.


CHANNEL 7 TOTAL LOAD CELL SUM
RUN= 823 SERIES= 5400 K LBS.
160
120
80
40
0
-40
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

TEST NO. MJ5400

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= 823

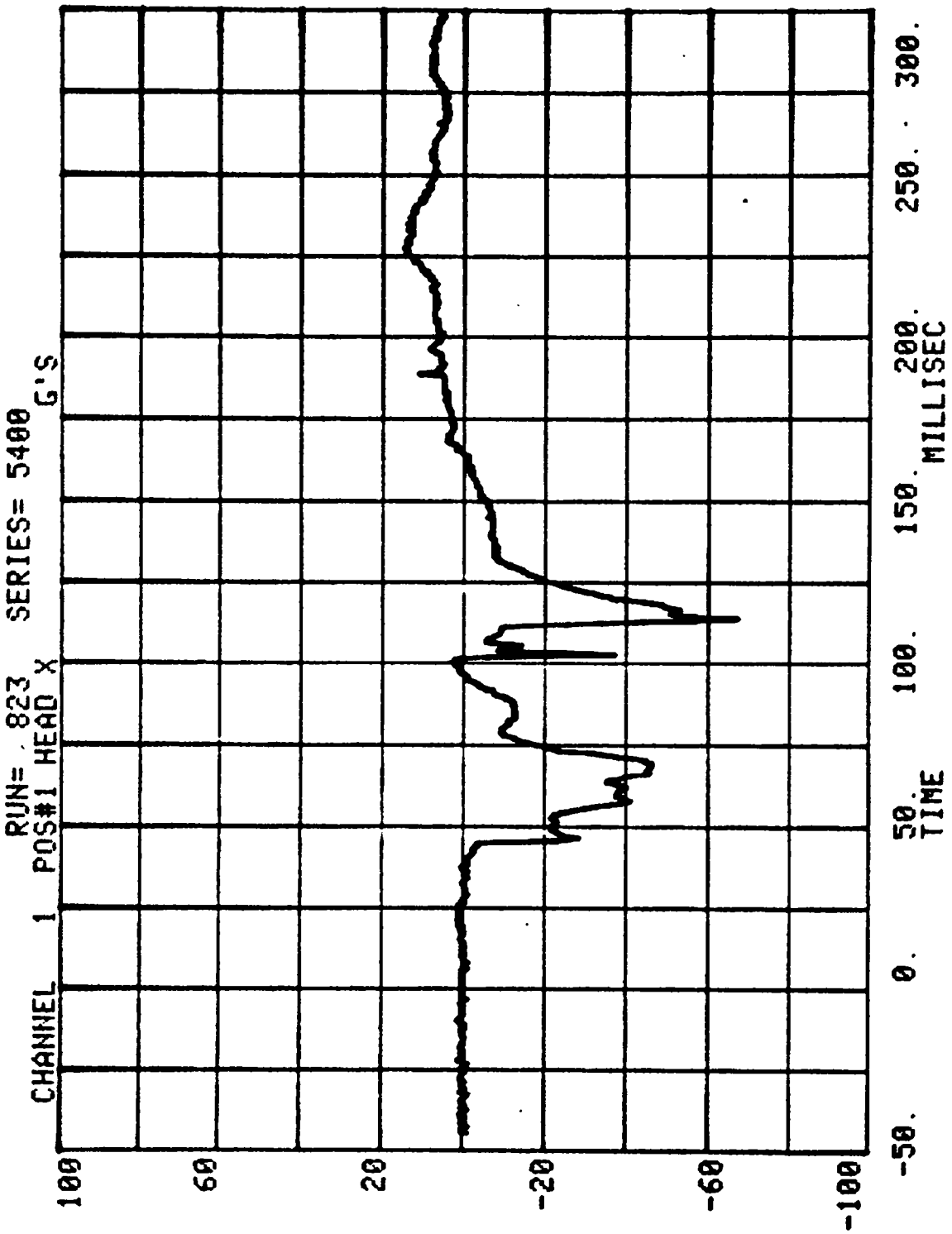
POS#1 HEAD R

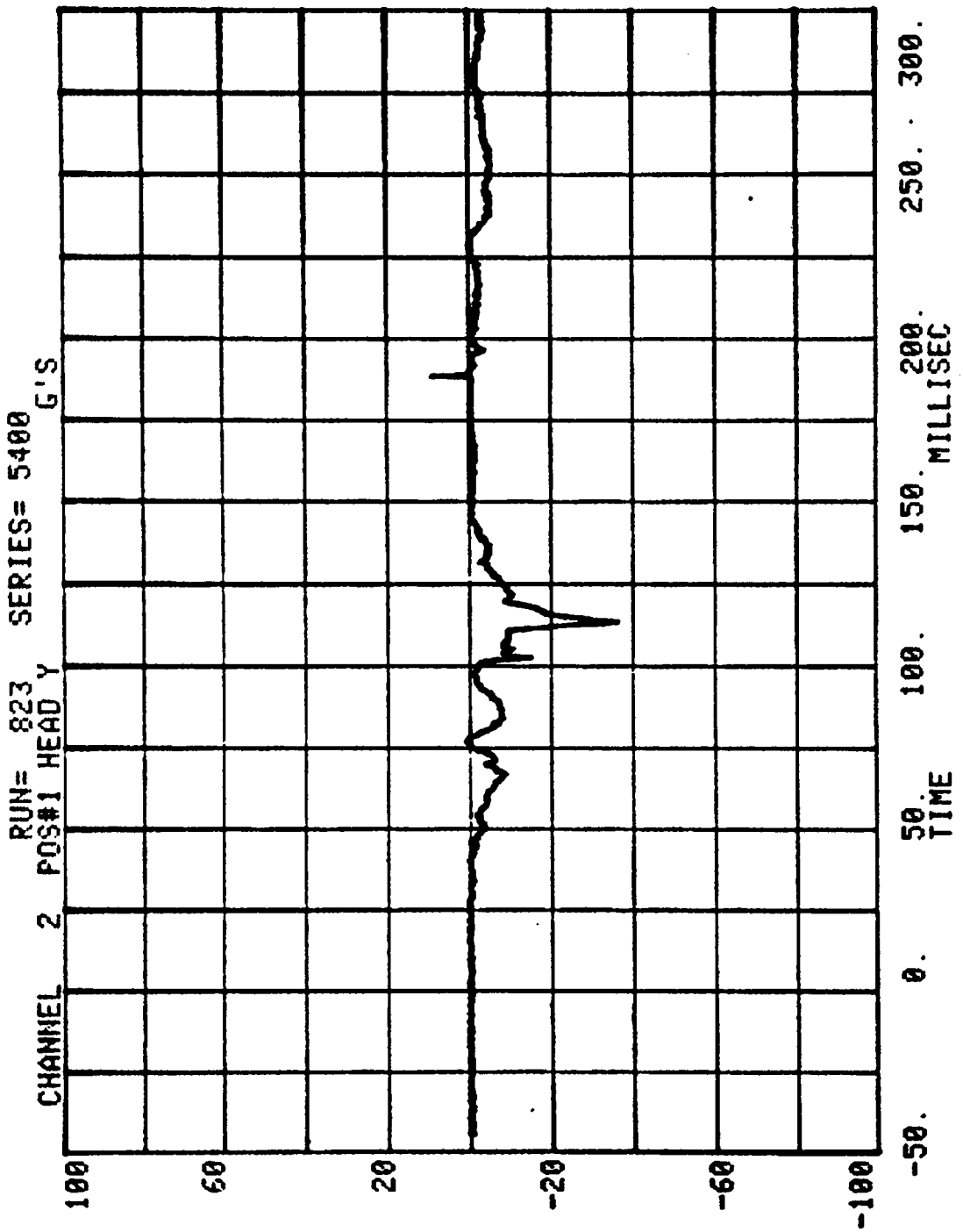
HIC= 272.7 FROM T1= .04560 TO T2= .07342

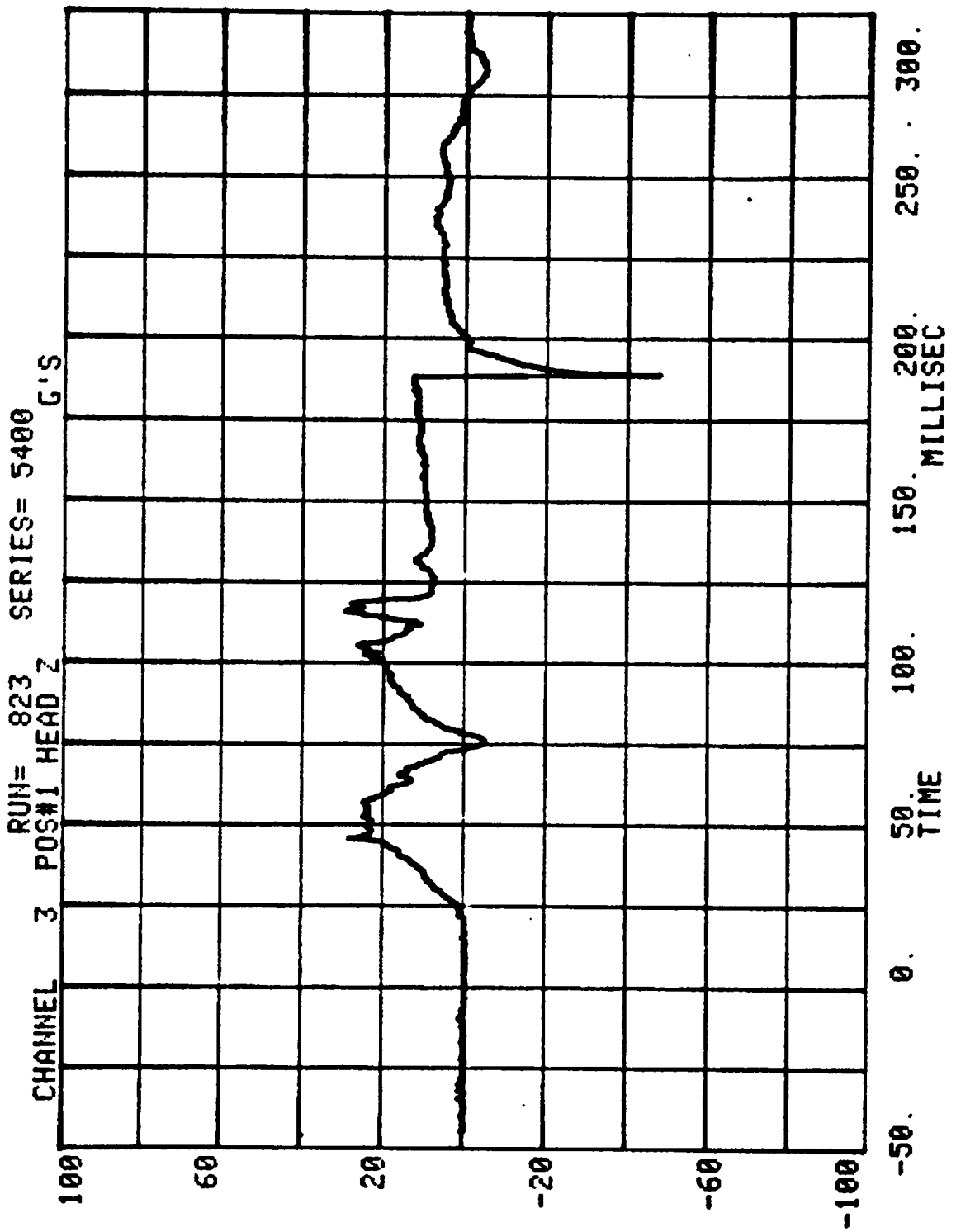
AVERAGE ACCELERATION BETWEEN T1 AND T2= 39.5G'S

EVENT TIME= 300.0 MSEC

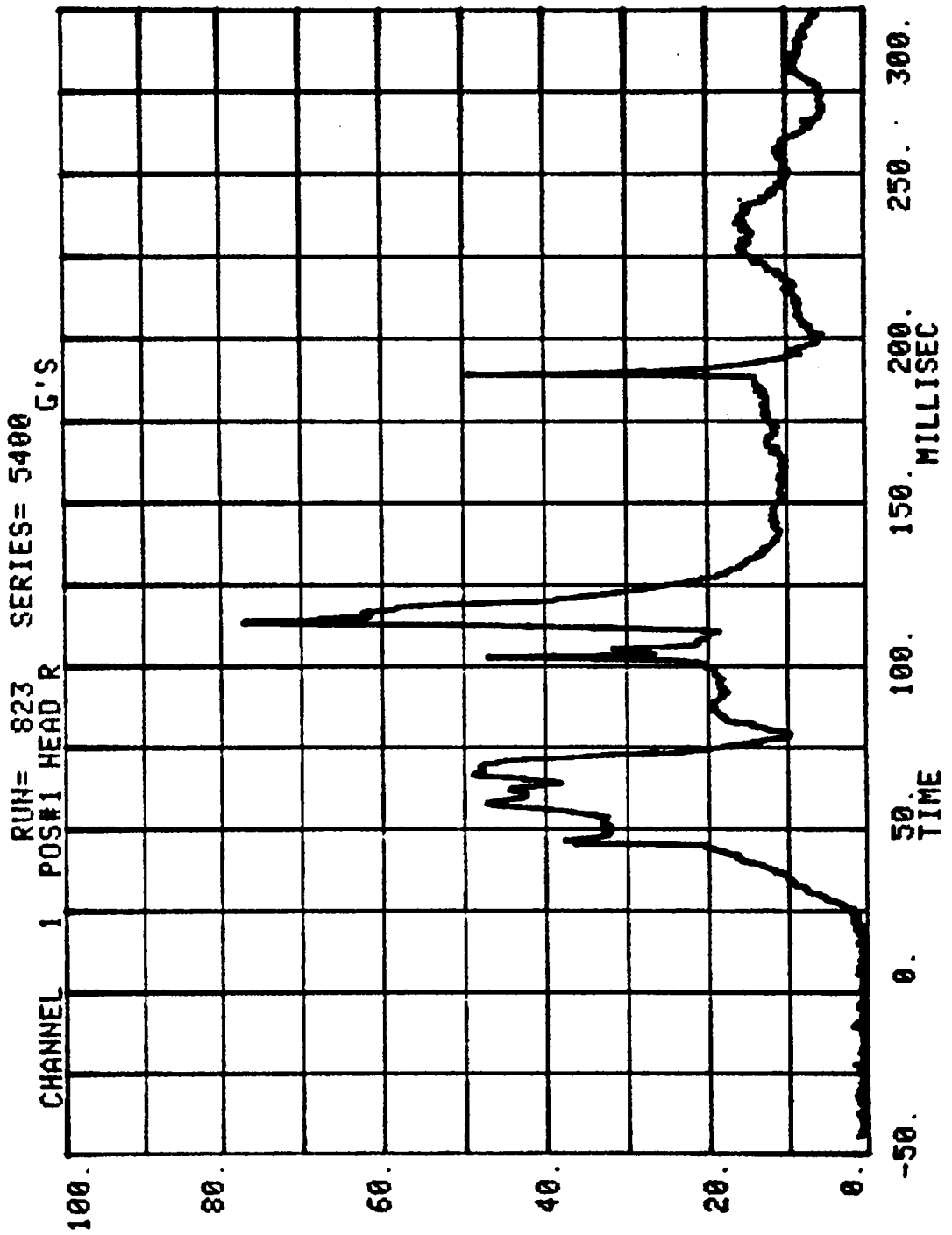
SEVERITY INDEX= 714.5


CHANNEL 1 POS#1 HEAD X
RUN= 823 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

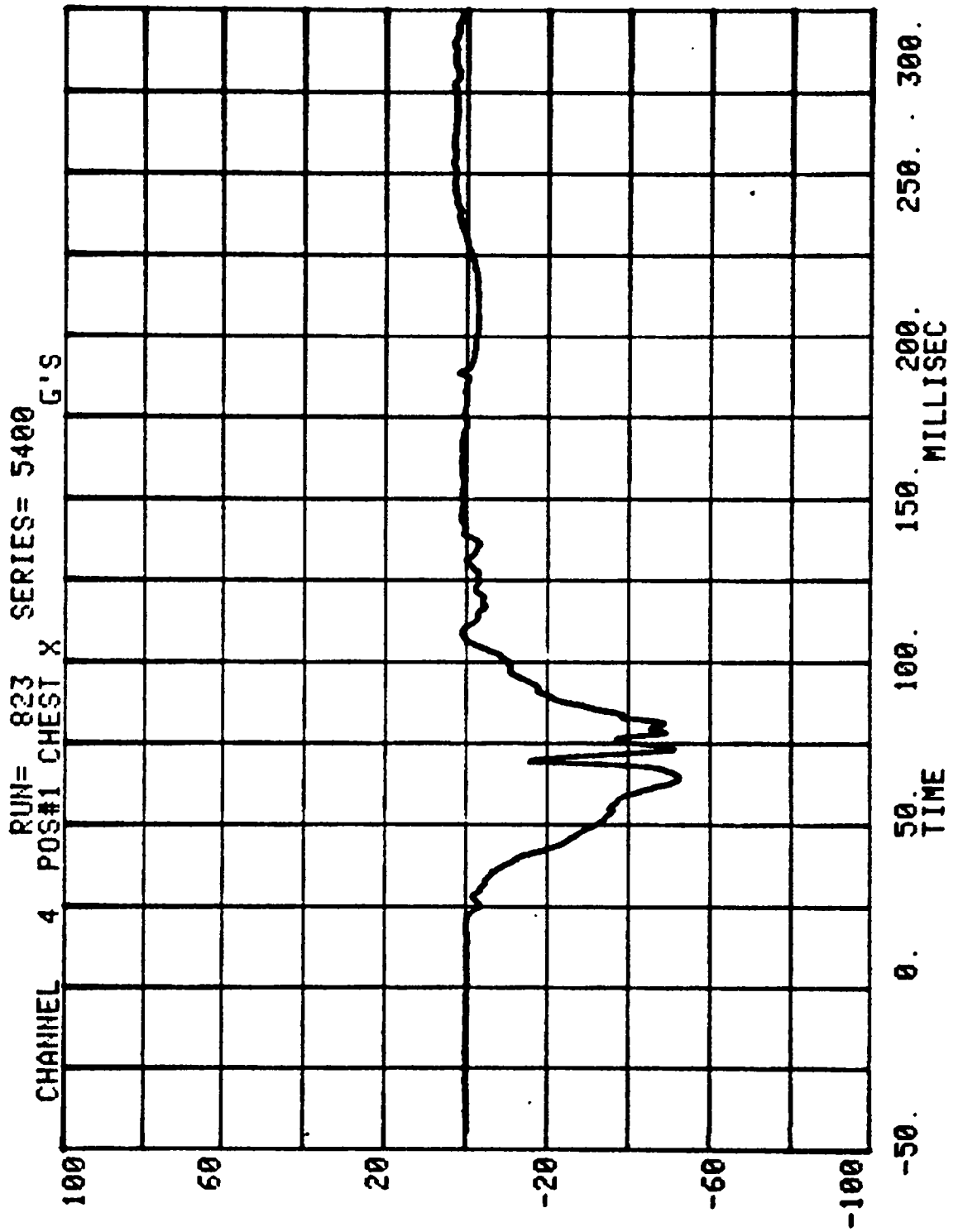

CHANNEL 2
RUN= 823
POS#1 HEAD Y
SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

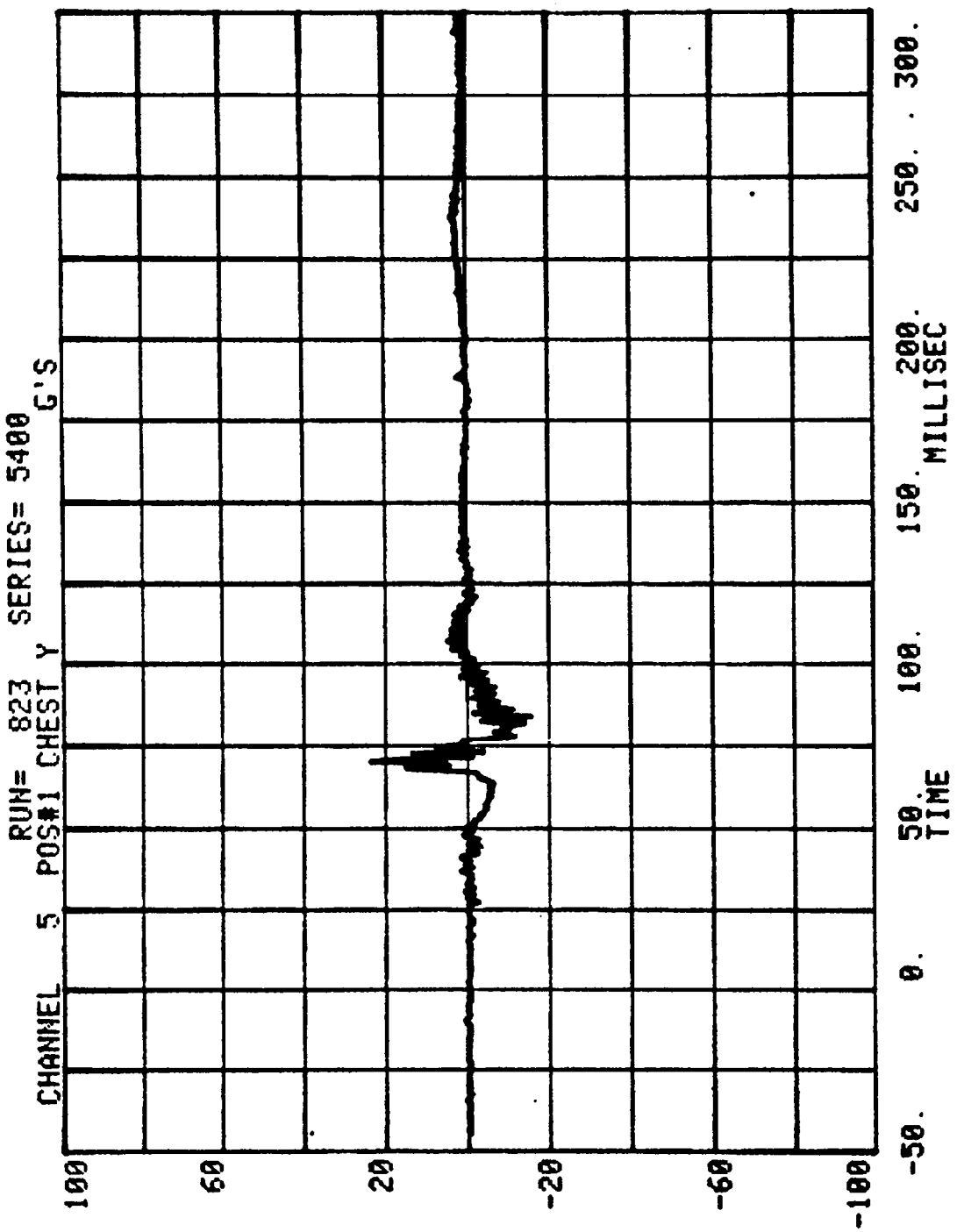

CHANNEL 3 POS#1 HEAD 2
RUN= 823 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

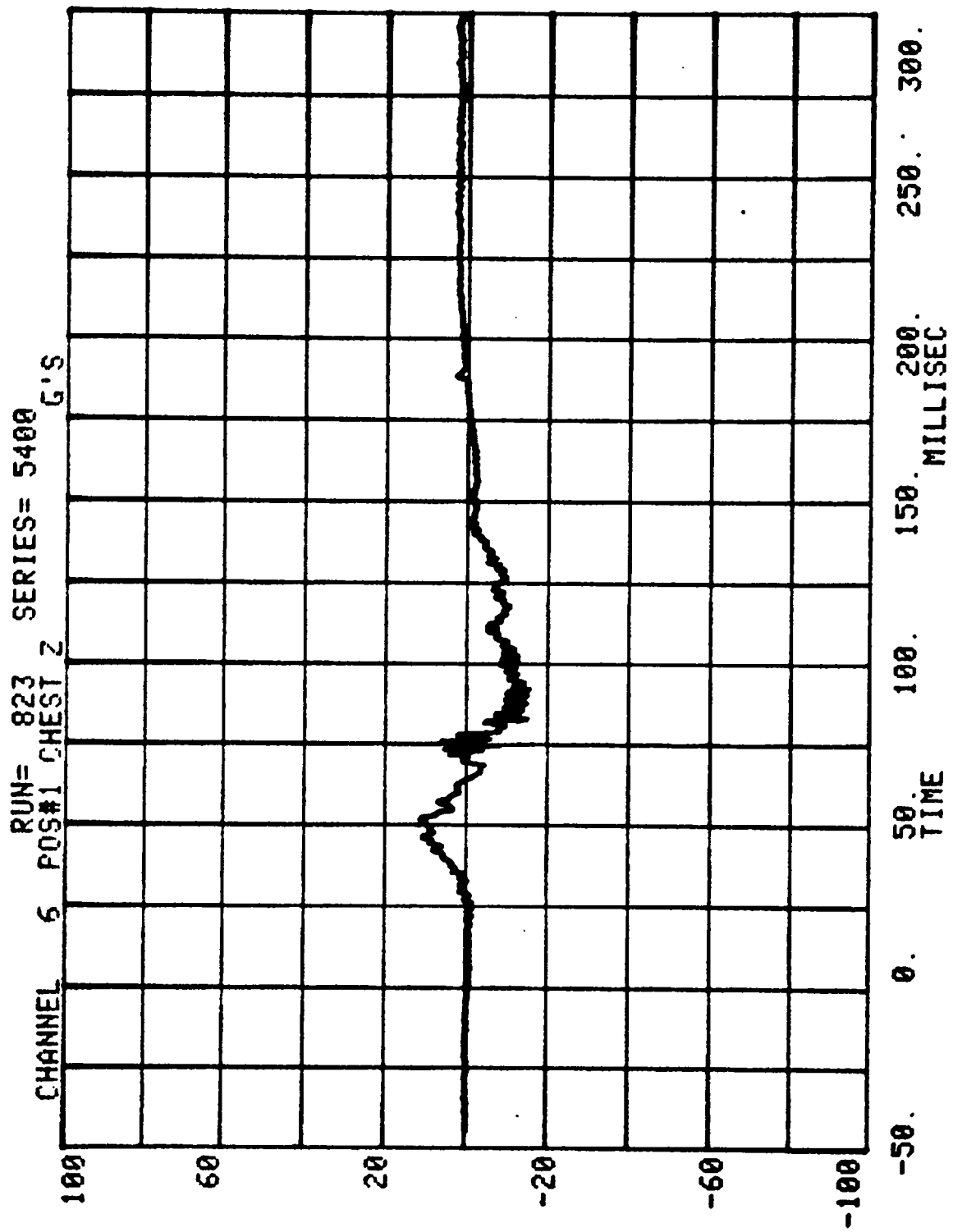
7626-16

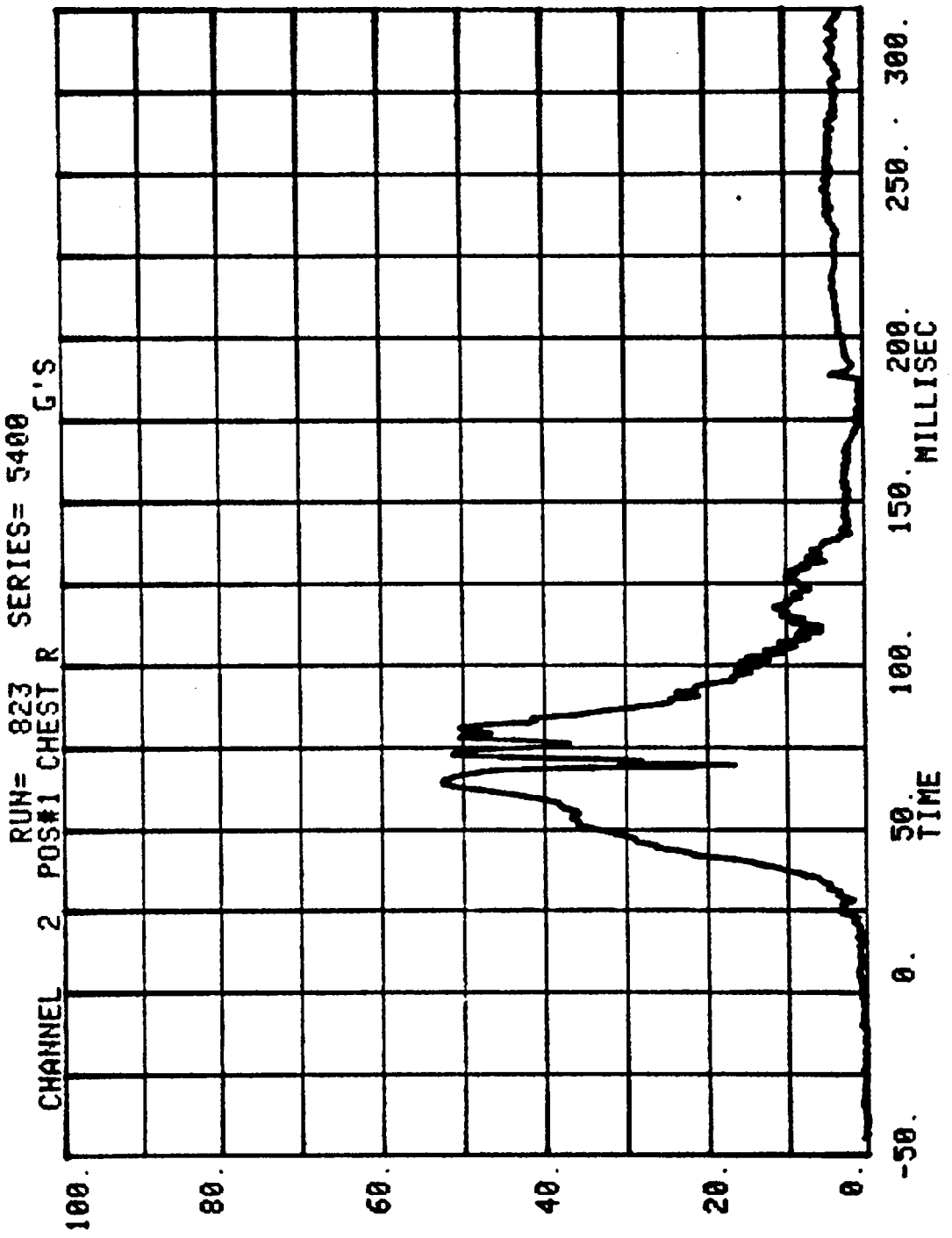

CHANNEL 1 POS#1 HEAD R
RUN= 823 SERIES= 5400
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

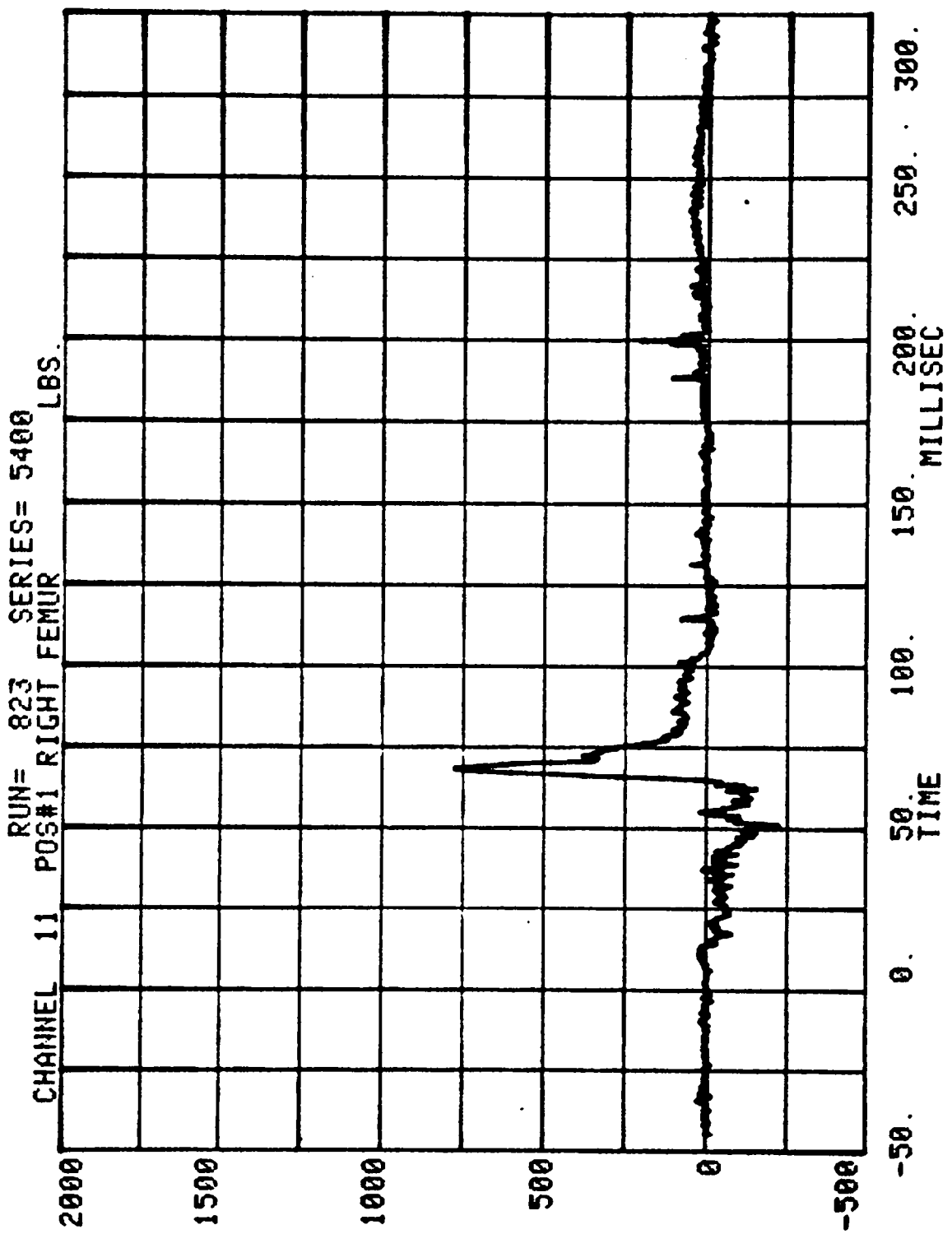
7626-16

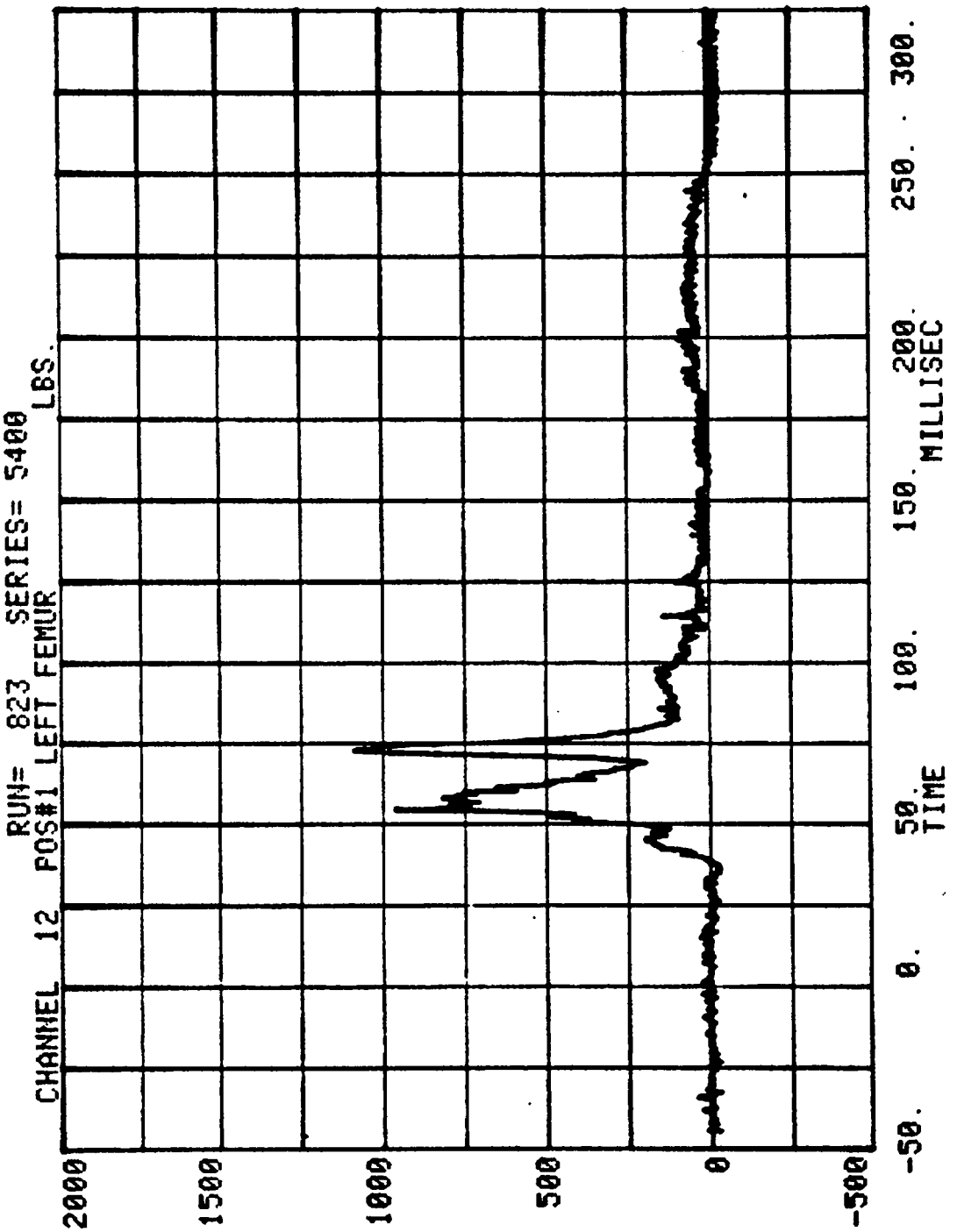

CHANNEL 4 POS#1 CHEST X
RUN= 823 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

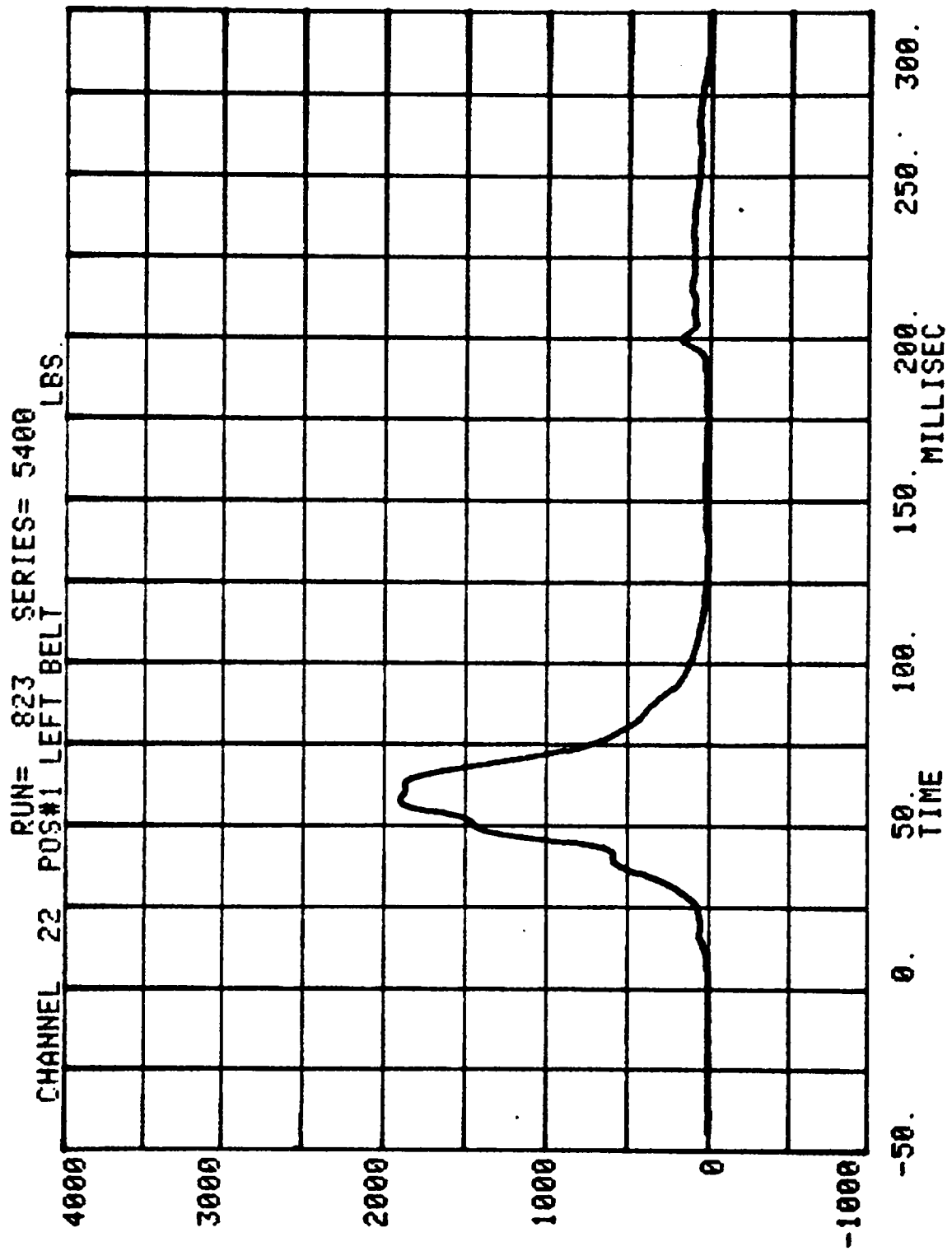

CHANNEL 5 POS#1 CHEST Y
RUN= 823 SERIES= 5400 G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

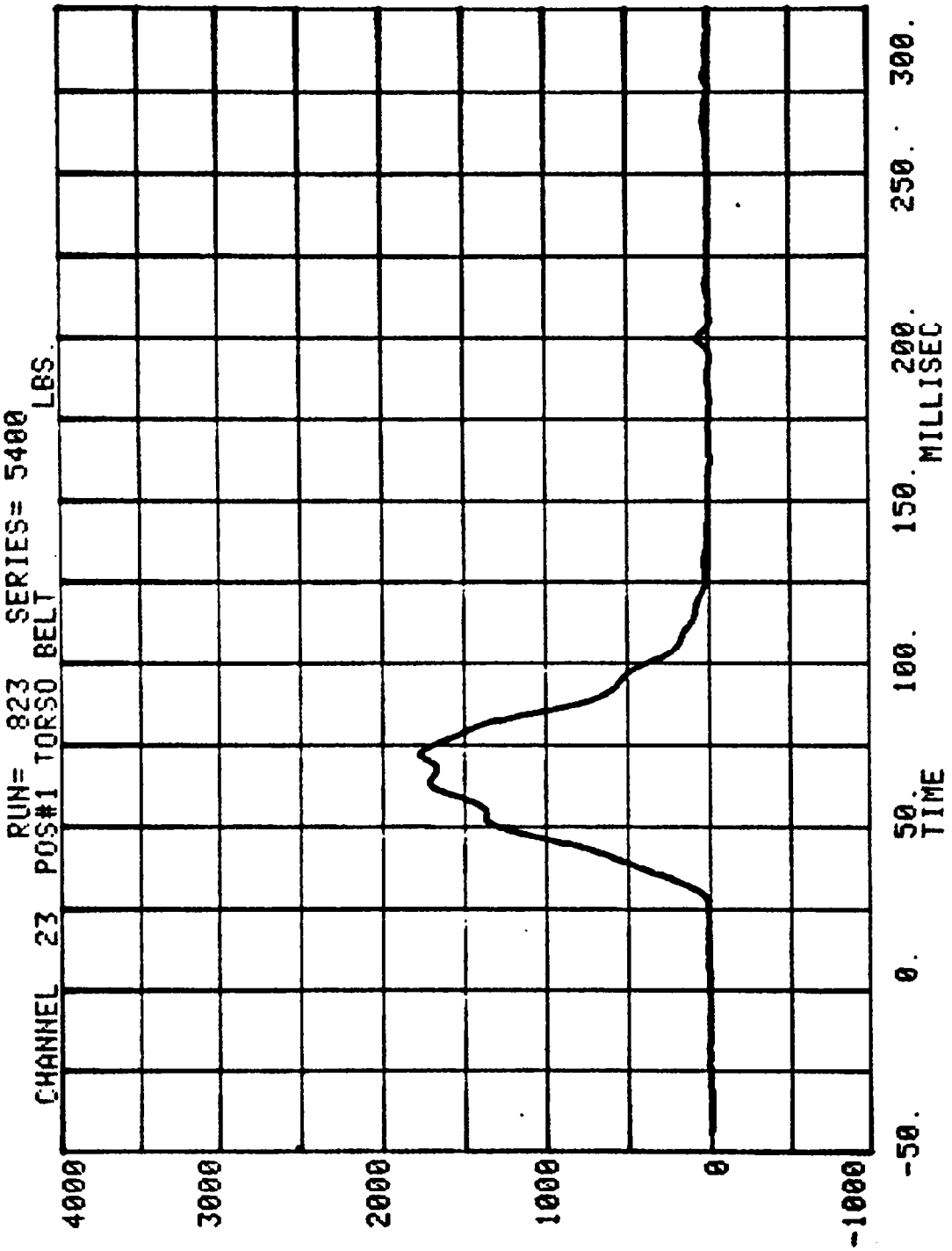

CHANNEL 6 RUN= 823 SERIES= 5400
POS#1 CHEST Z
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

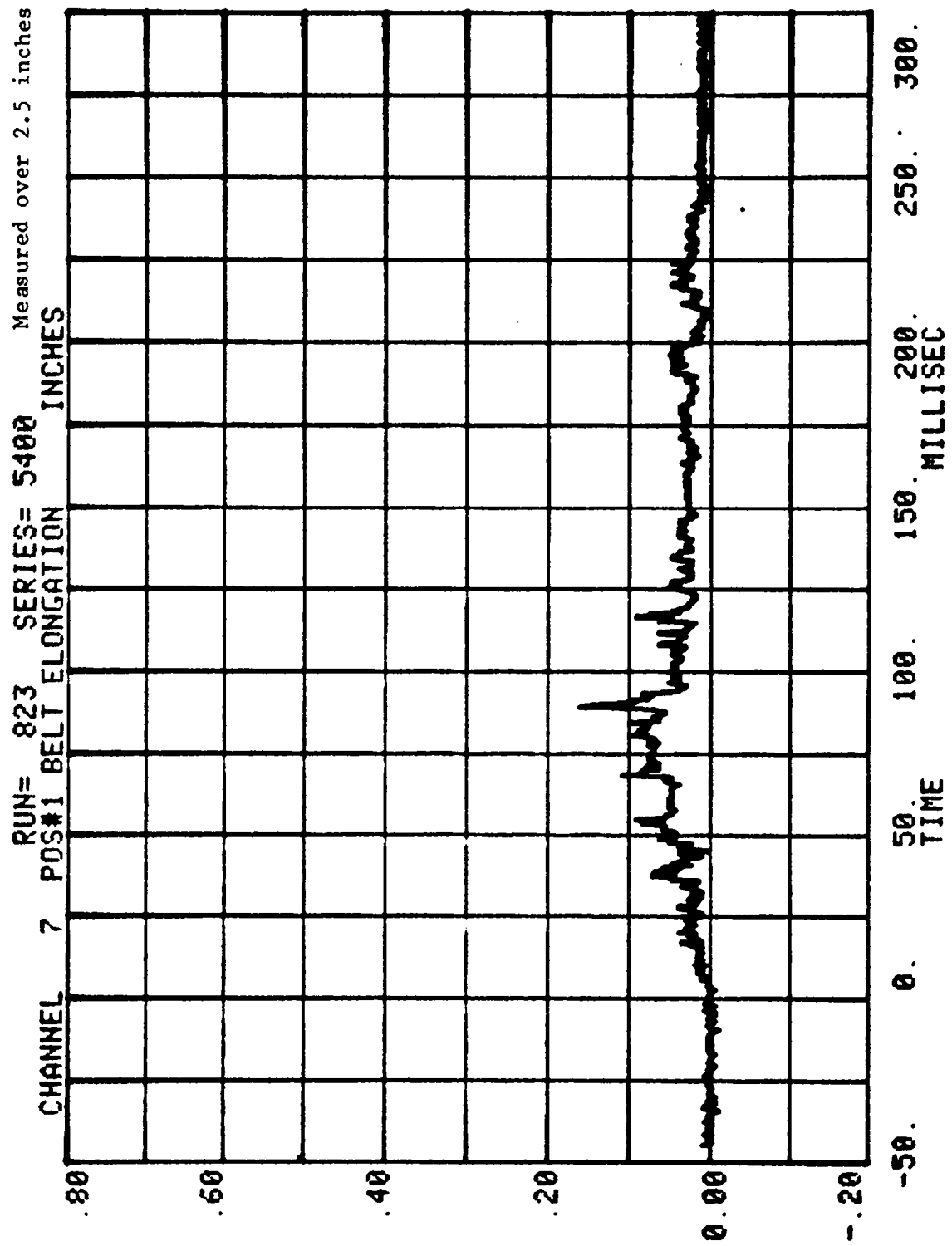

CHANNEL 2 POS#1 CHEST R
RUN= 823 SERIES= 5400
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

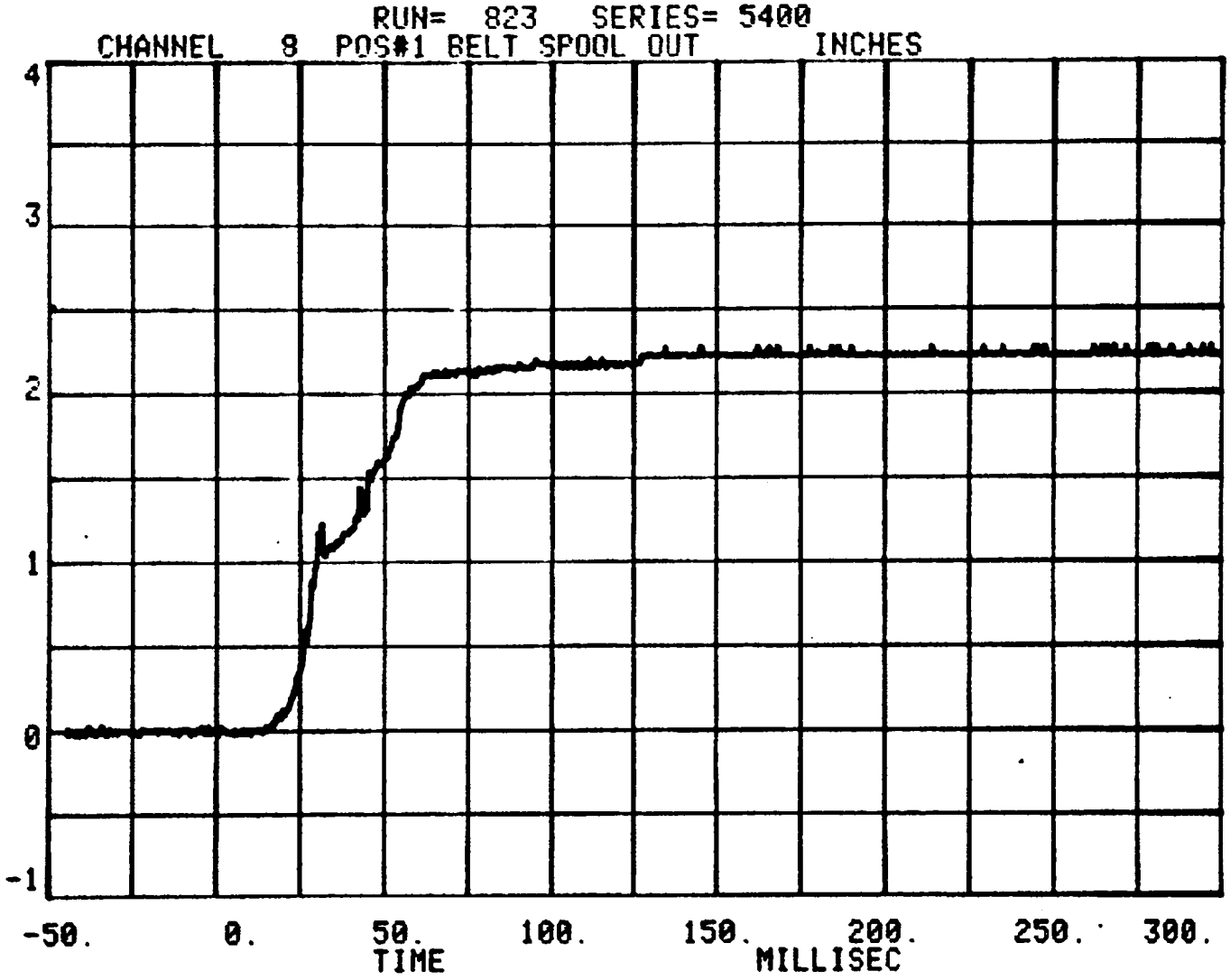

CHANNEL 11 POS#1 RIGHT FEMUR
RUN= 823 SERIES= 5400
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 12 POS#1 LEFT FEMUR
RUN= 823 SERIES= 5400 LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 22
RUN= 823
POS#1 LEFT BELT
SERIES= 5400
LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 23 RUN= 823 SERIES= 5400
POS#1 TORSO BELT LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 7 POS#1 BELT ELONGATION
RUN= 823 SERIES= 5400
INCHES
Measured over 2.5 inches
.80
.60
.40
.20
0.00
-.20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 823 SERIES= 5400
CHANNEL 8 POS#1 BELT SPOOL OUT INCHES
4
3
2
1
0
-1
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NEW CAR ASSESSMENT BARRIER TEST - 1988

RUN= 823

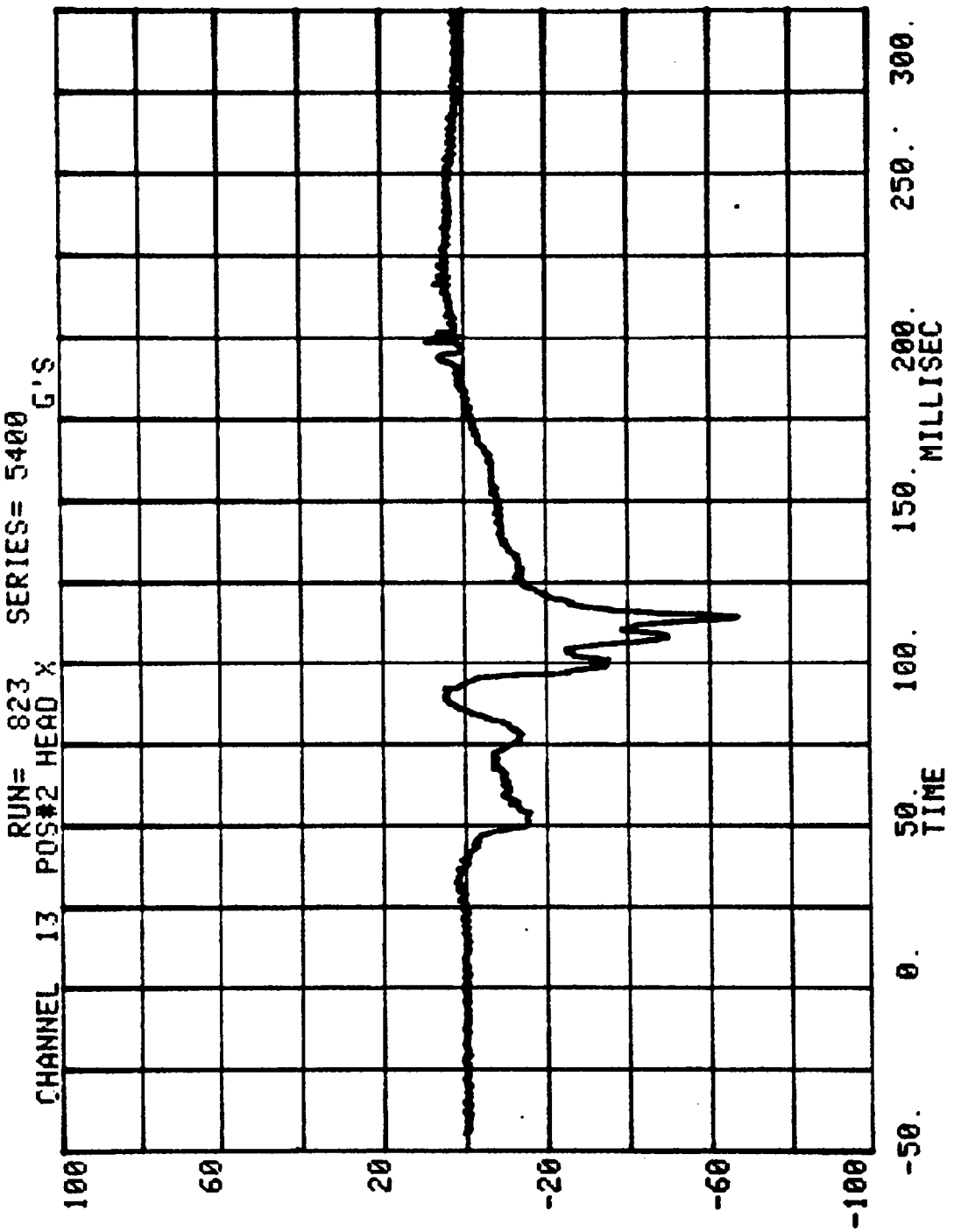
POS#2 HEAD R

HIC= 858.7 FROM T1= .07987 TO T2= .11587

AVERAGE ACCELERATION BETWEEN T1 AND T2= 56.4G'S

EVENT TIME= 300.0 MSEC

SEVERITY INDEX=1275.0


CHANNEL 13 POS#2 HEAD X
RUN= 823 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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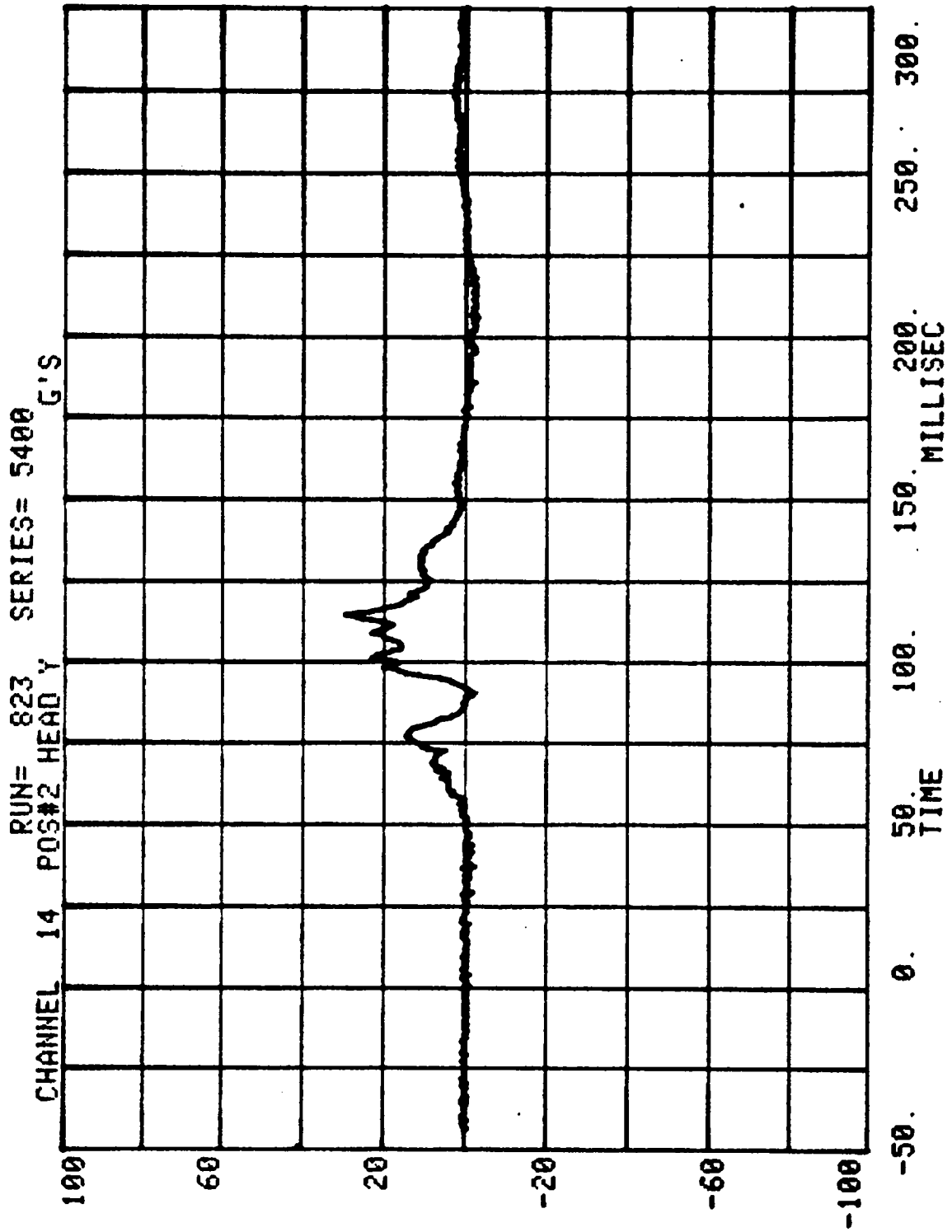
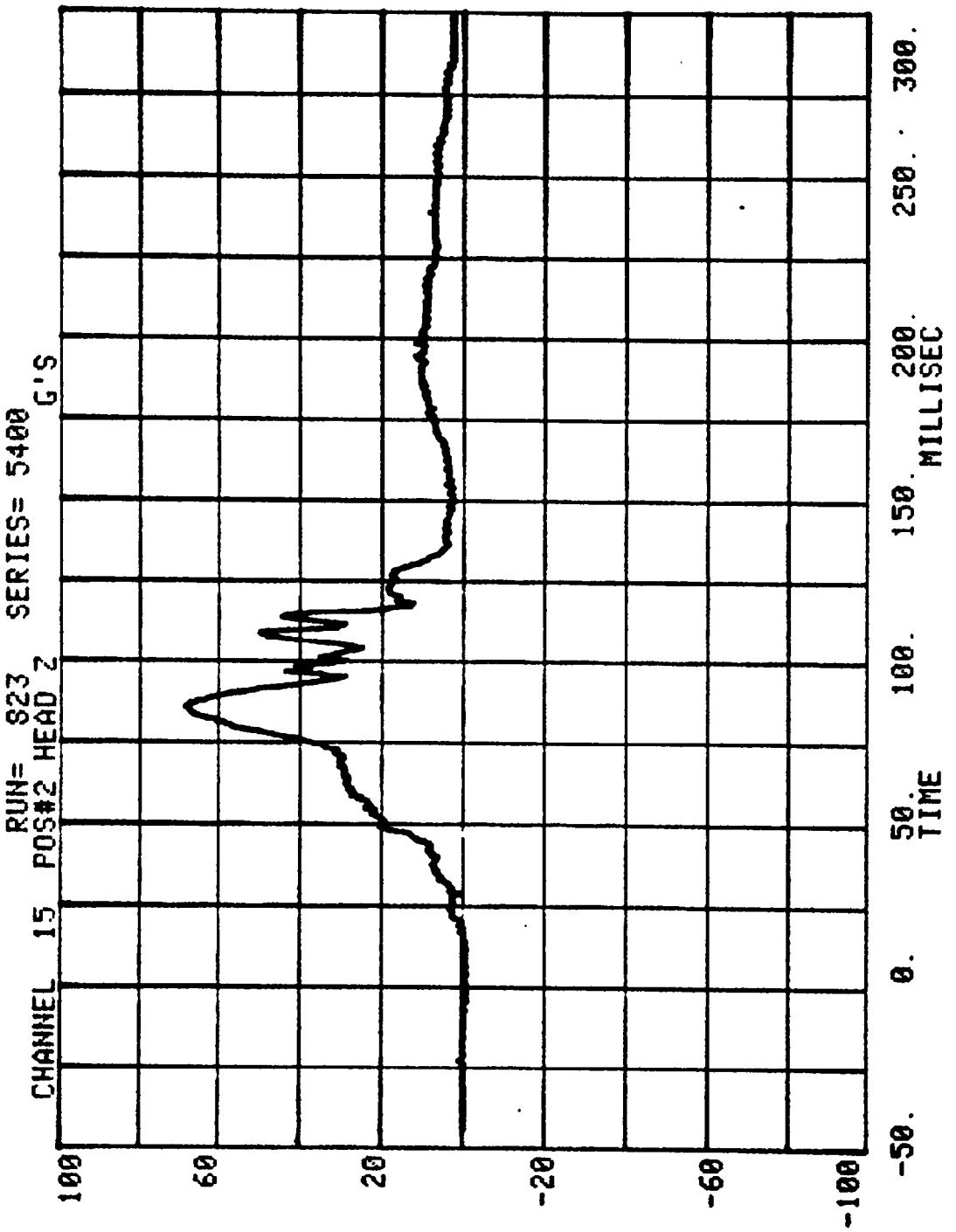

CHANNEL 14 POS#2 HEAD Y
RUN= 823 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 15 POS#2 HEAD 2
RUN= S23 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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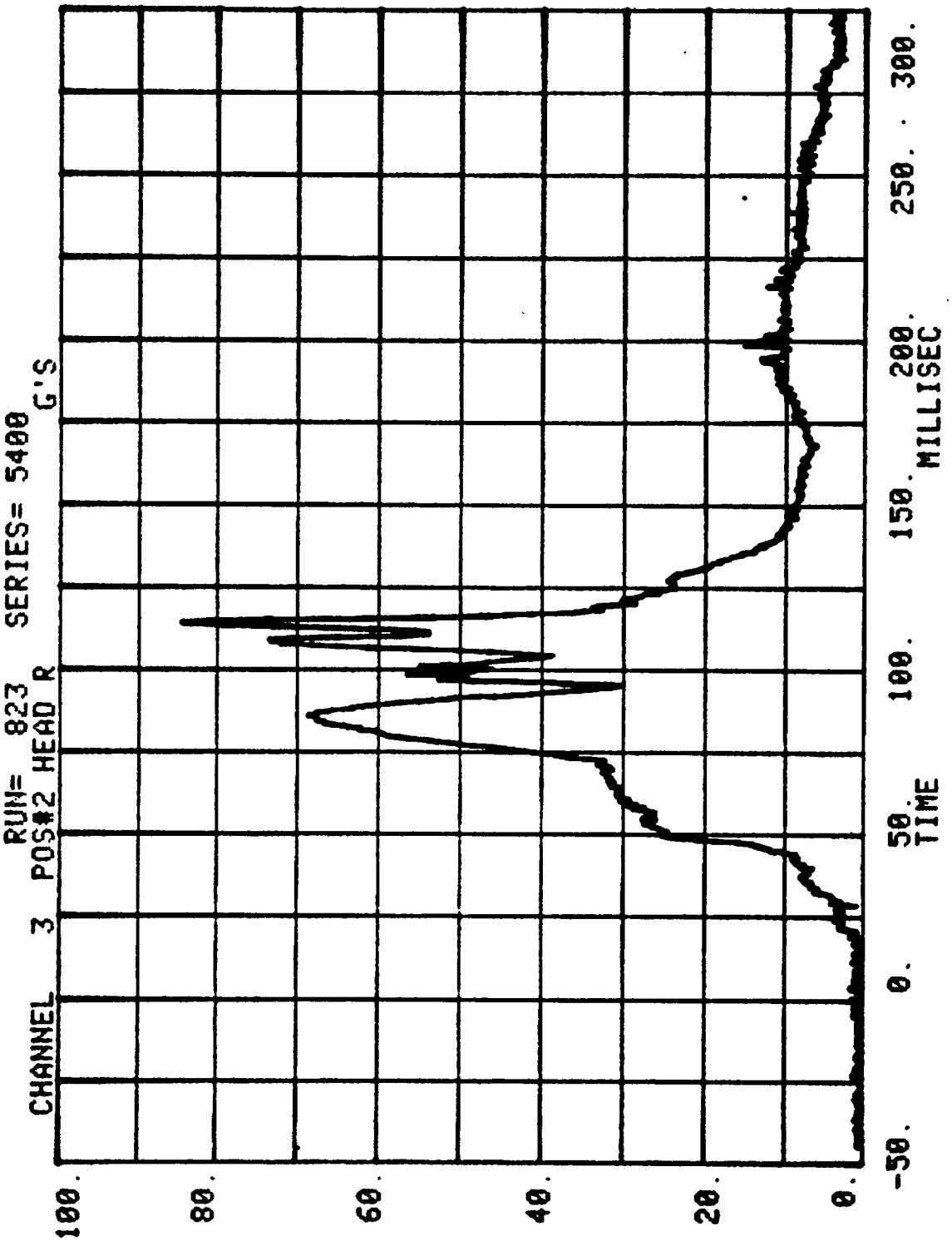
CHANNEL 3 POS#2 HEAD R
RUN= 823 SERIES= 5400
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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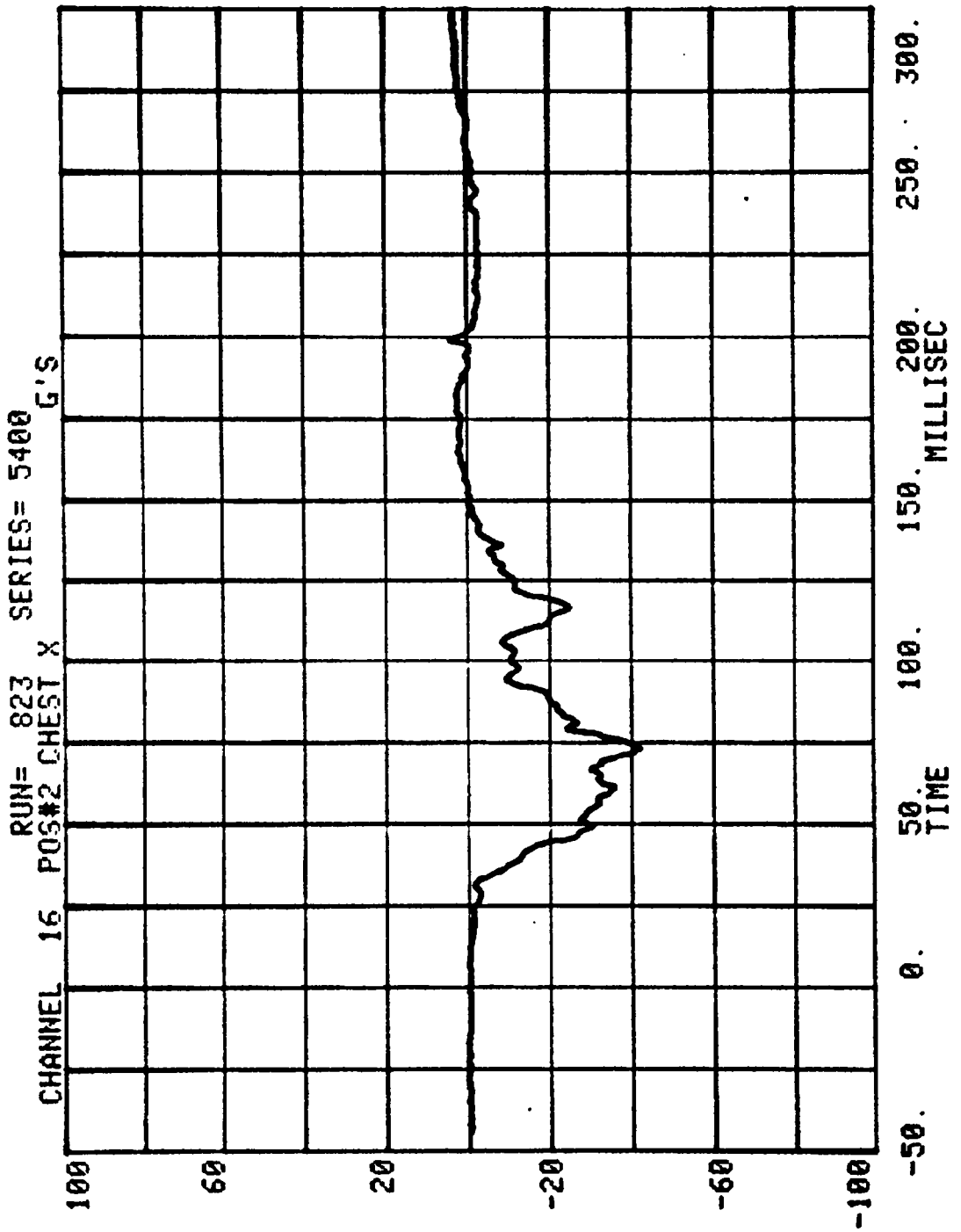
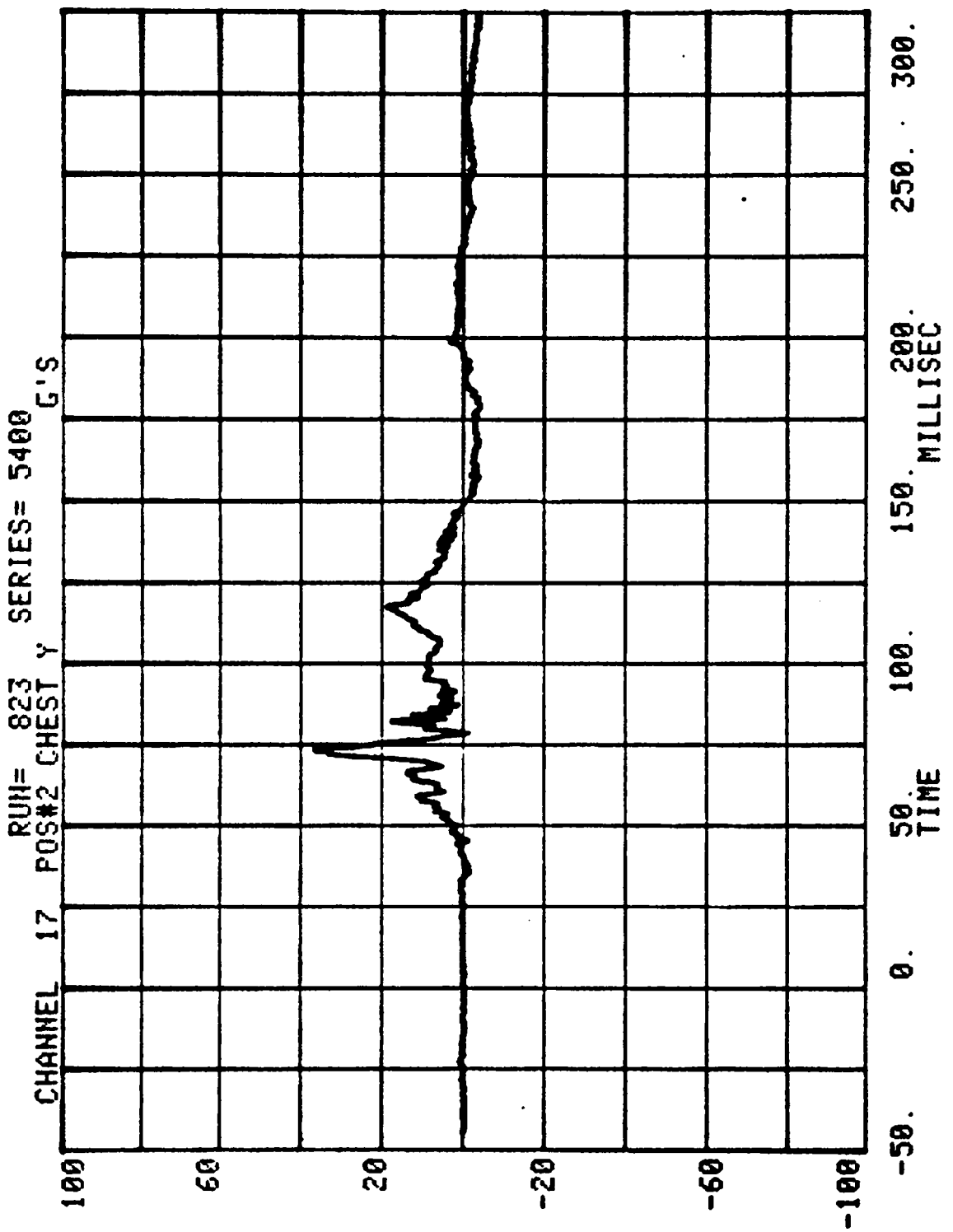
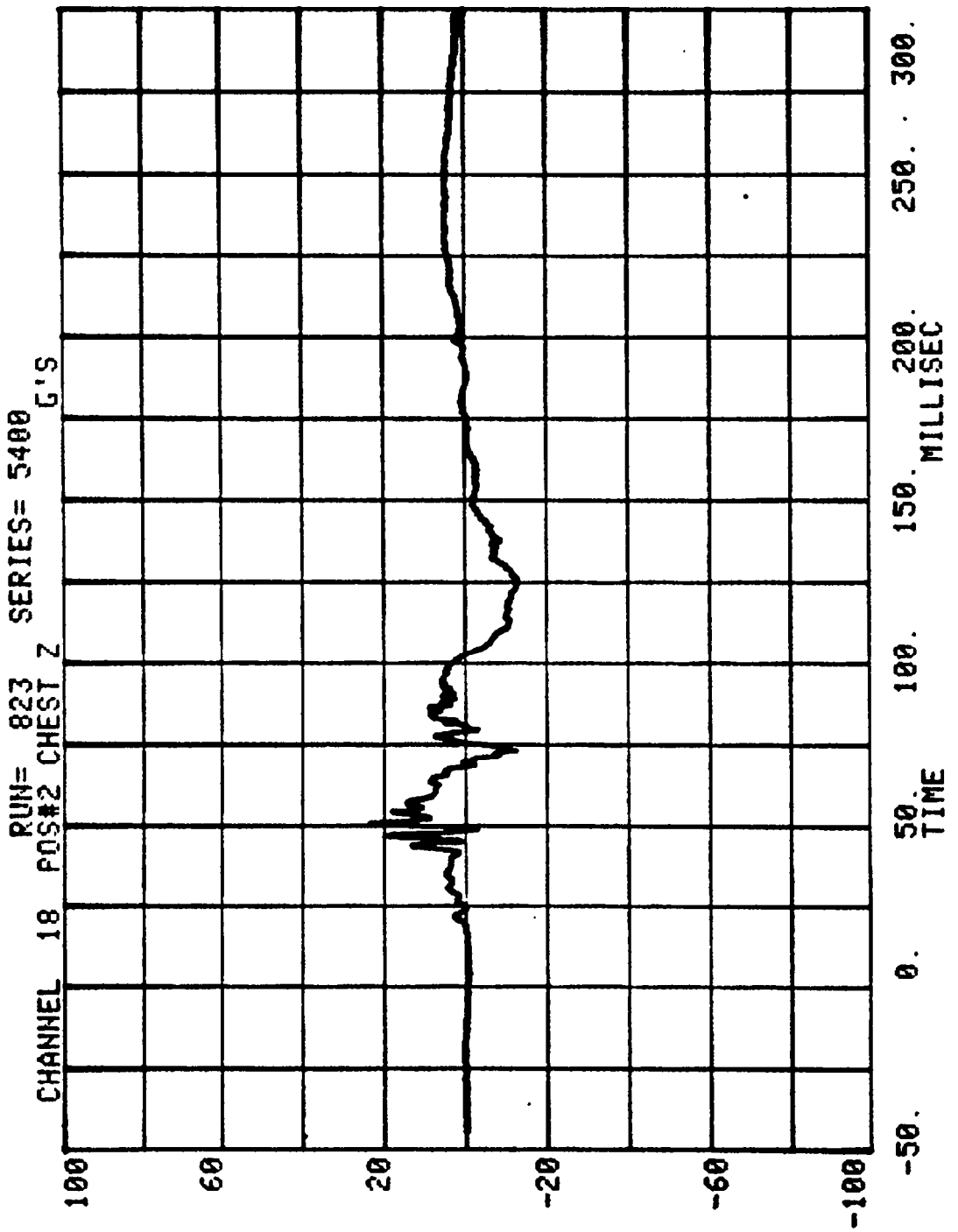
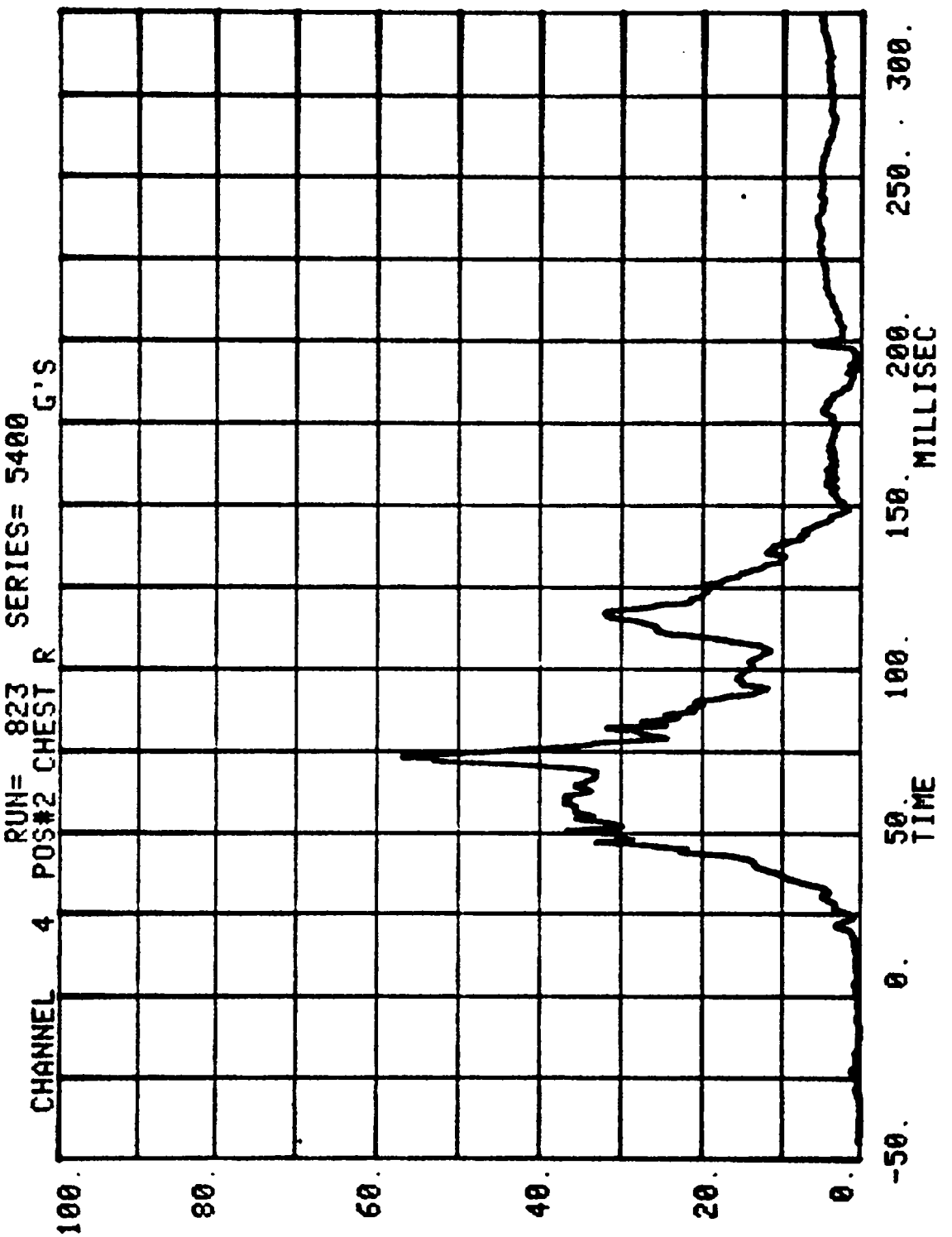
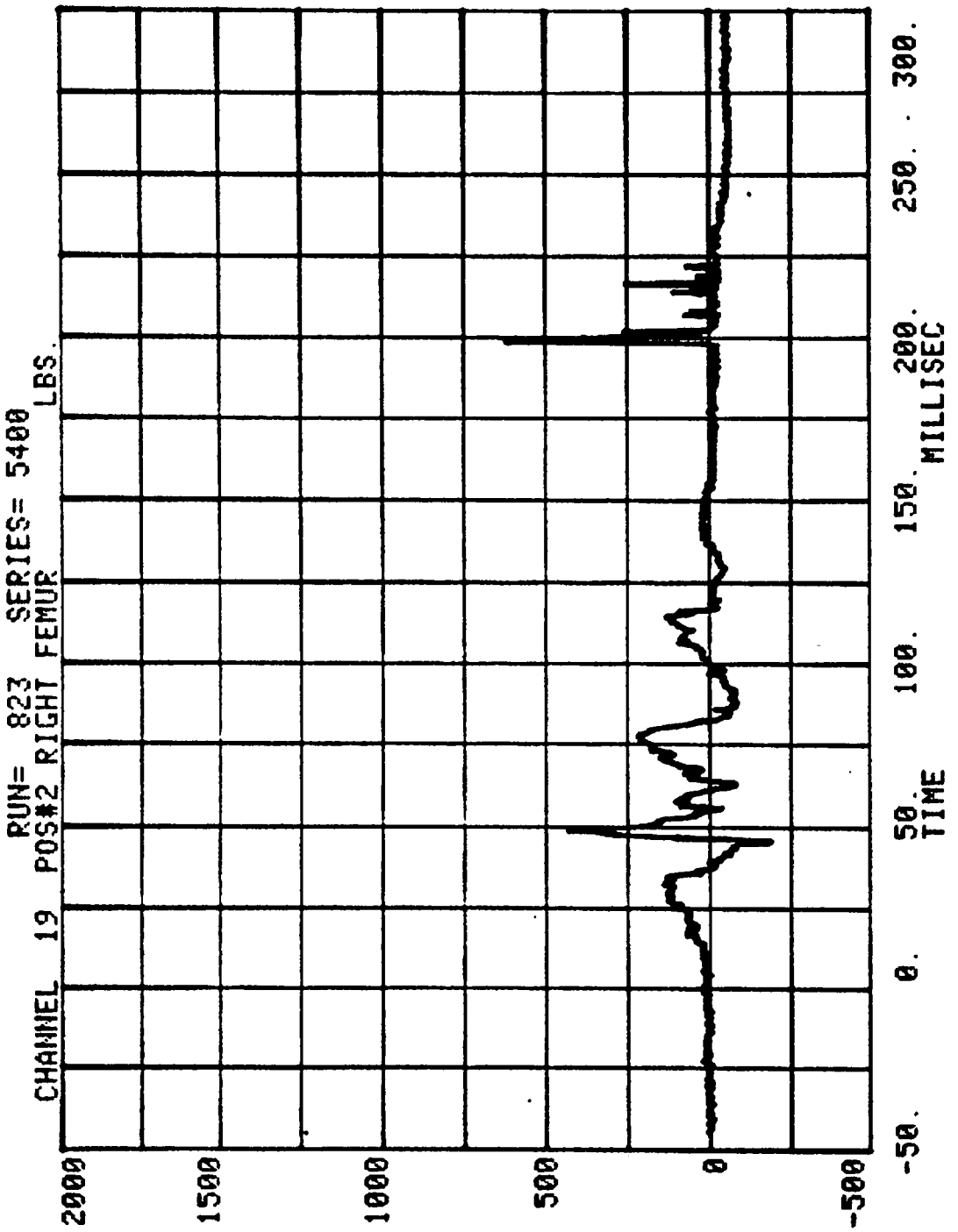

CHANNEL 16 RUN= 823 SERIES= 5400
POS#2 CHEST X
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 17 POS#2 CHEST Y
RUN= 823 SERIES= 5400
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 18 POS#2 CHEST Z
RUN= 823 SERIES= 5400 G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 4 RUN= 823 SERIES= 5400
POS#2 CHEST R
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 19 RUN= 823 SERIES= 5400
POS#2 RIGHT FEMUR
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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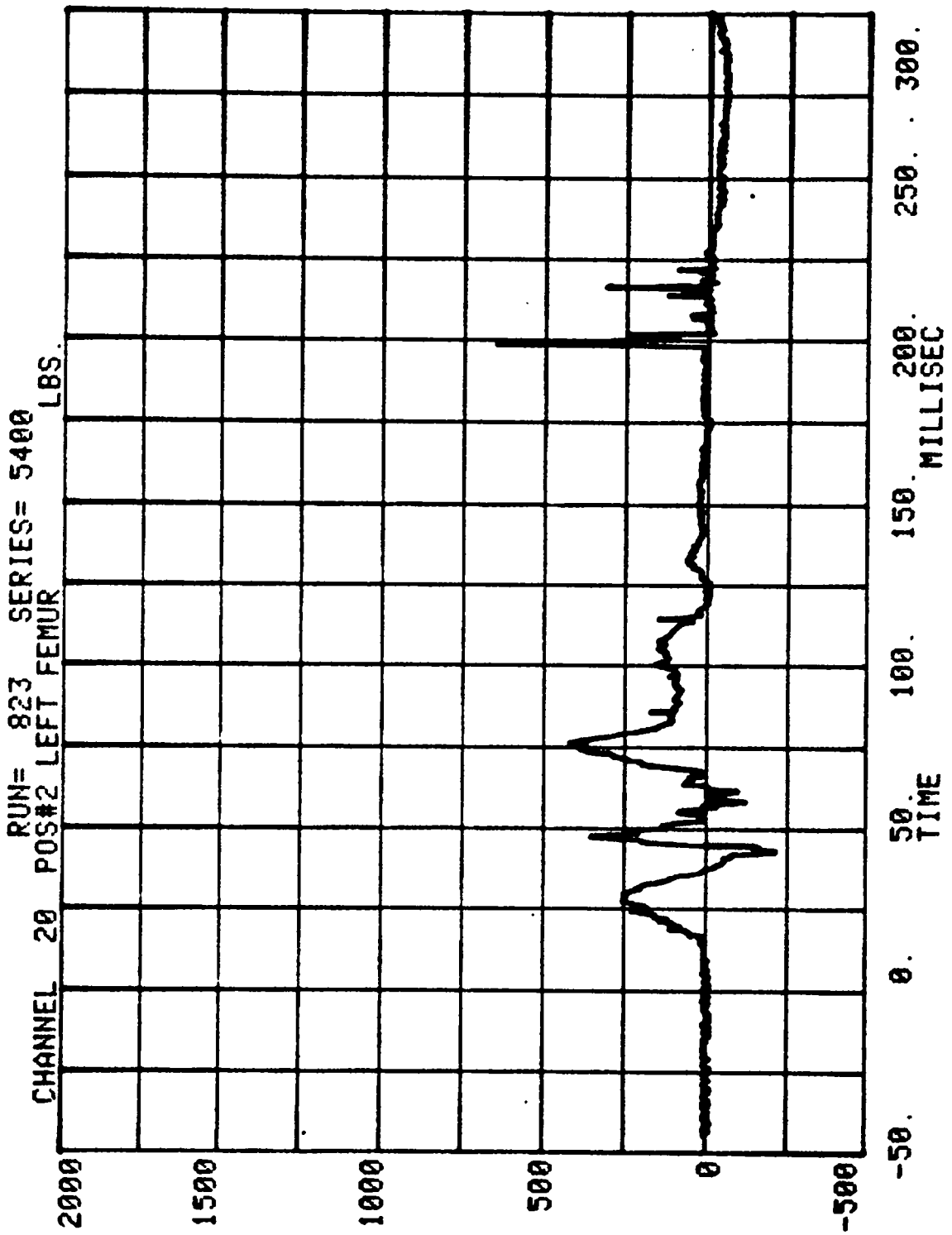
CHANNEL 20 POS#2 LEFT FEMUR
RUN= 823 SERIES= 5400
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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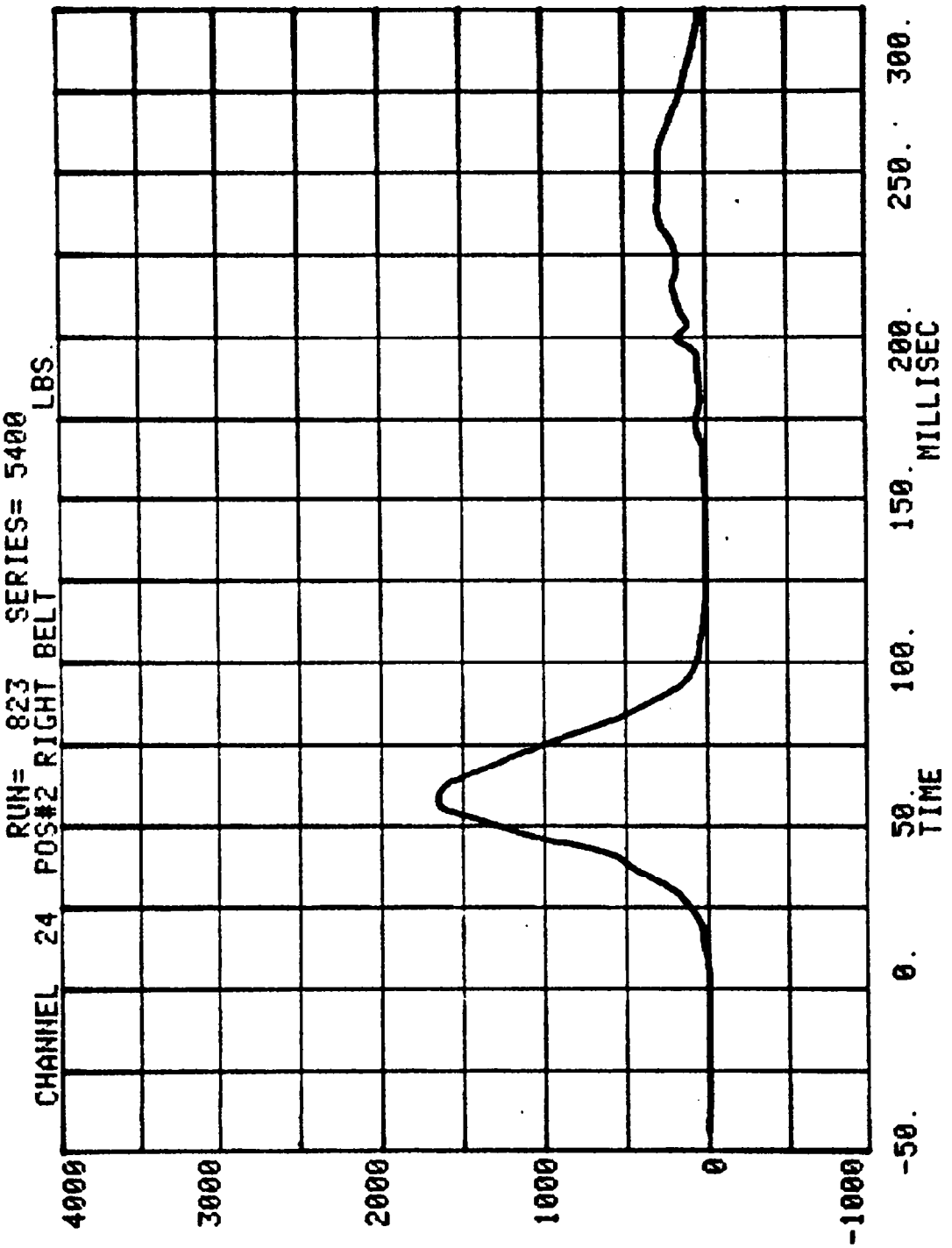
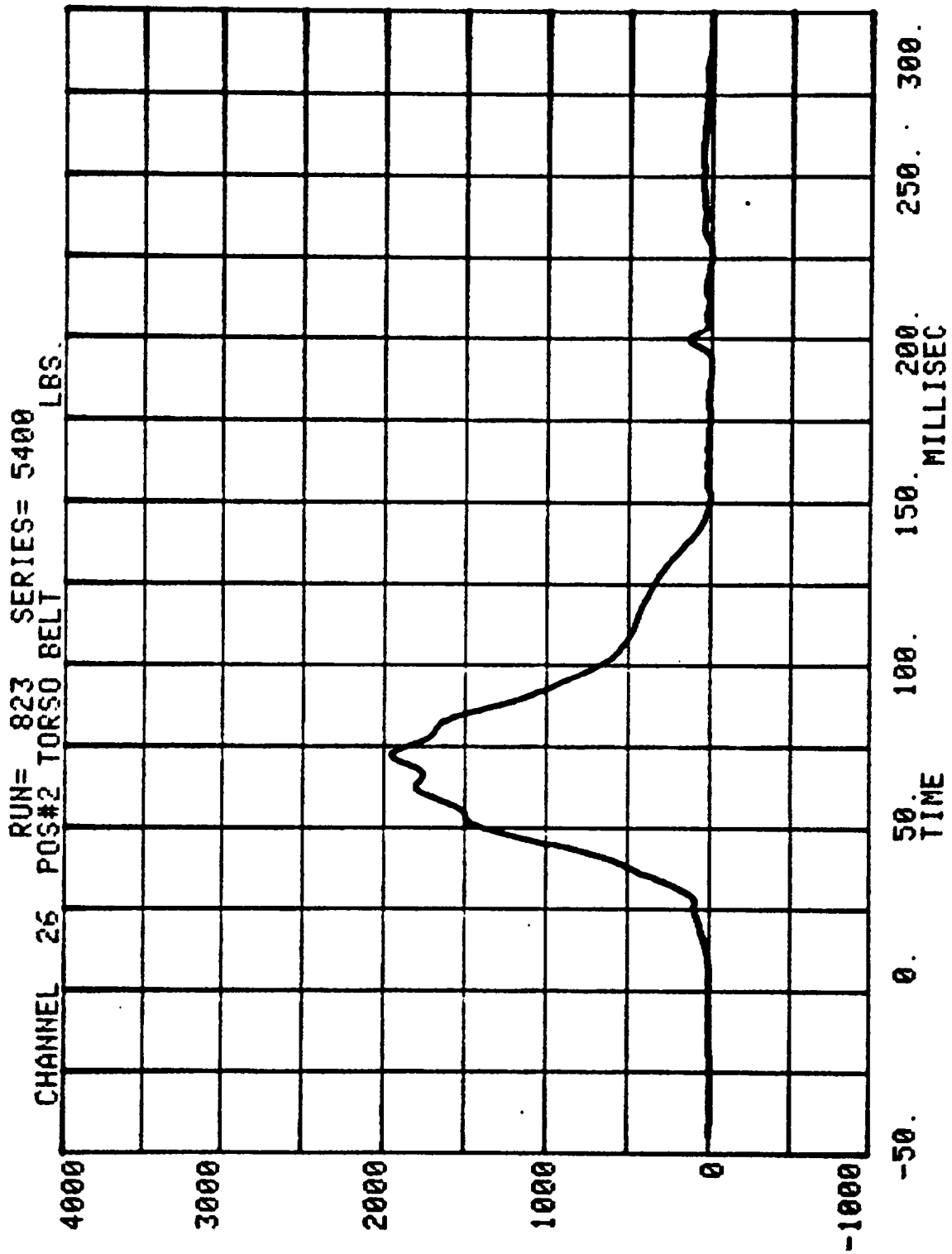
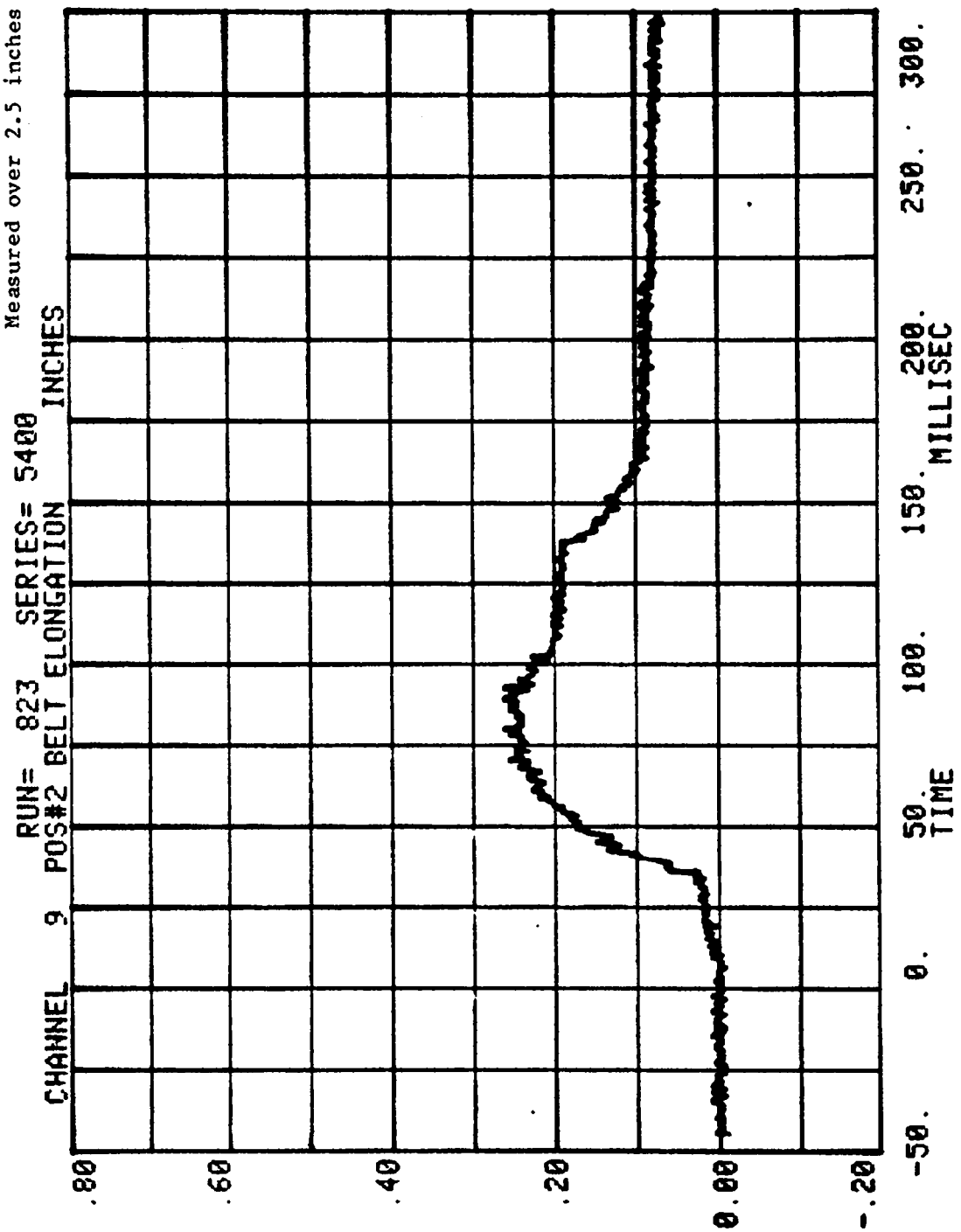
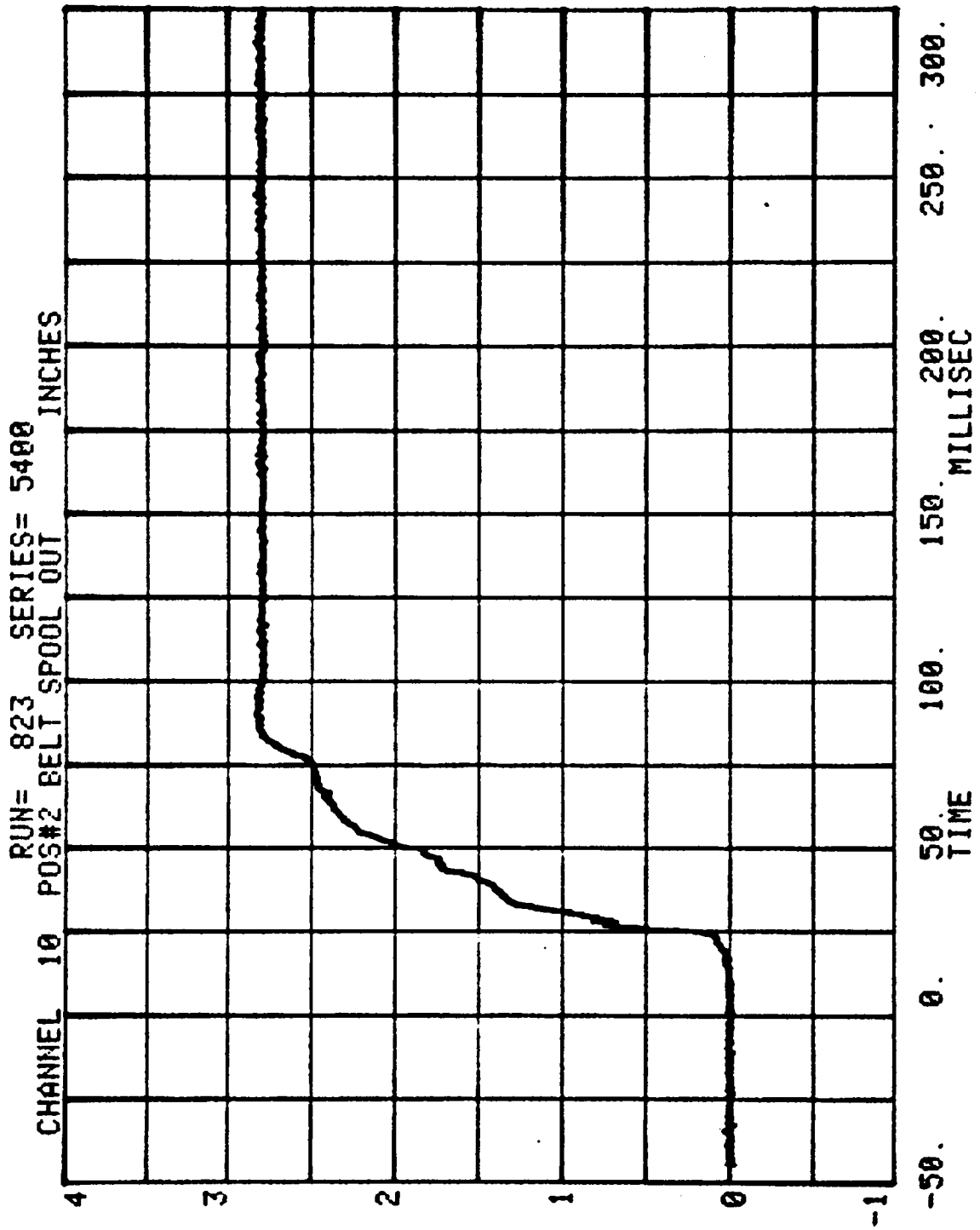

CHANNEL 24 POS#2 RIGHT BELT
RUN= 823 SERIES= 5400 LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 26 POS#2 TORSO BELT
RUN= 823 SERIES= 5400
LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 9 POS#2 BELT ELONGATION
RUN= 823 SERIES= 5400
Measured over 2.5 inches
INCHES
.80
.60
.40
.20
0.00
-.20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 10 POS#2 BELT SPOOL OUT
RUN= 823 SERIES= 5400
INCHES
4
3
2
1
0
-1
-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.

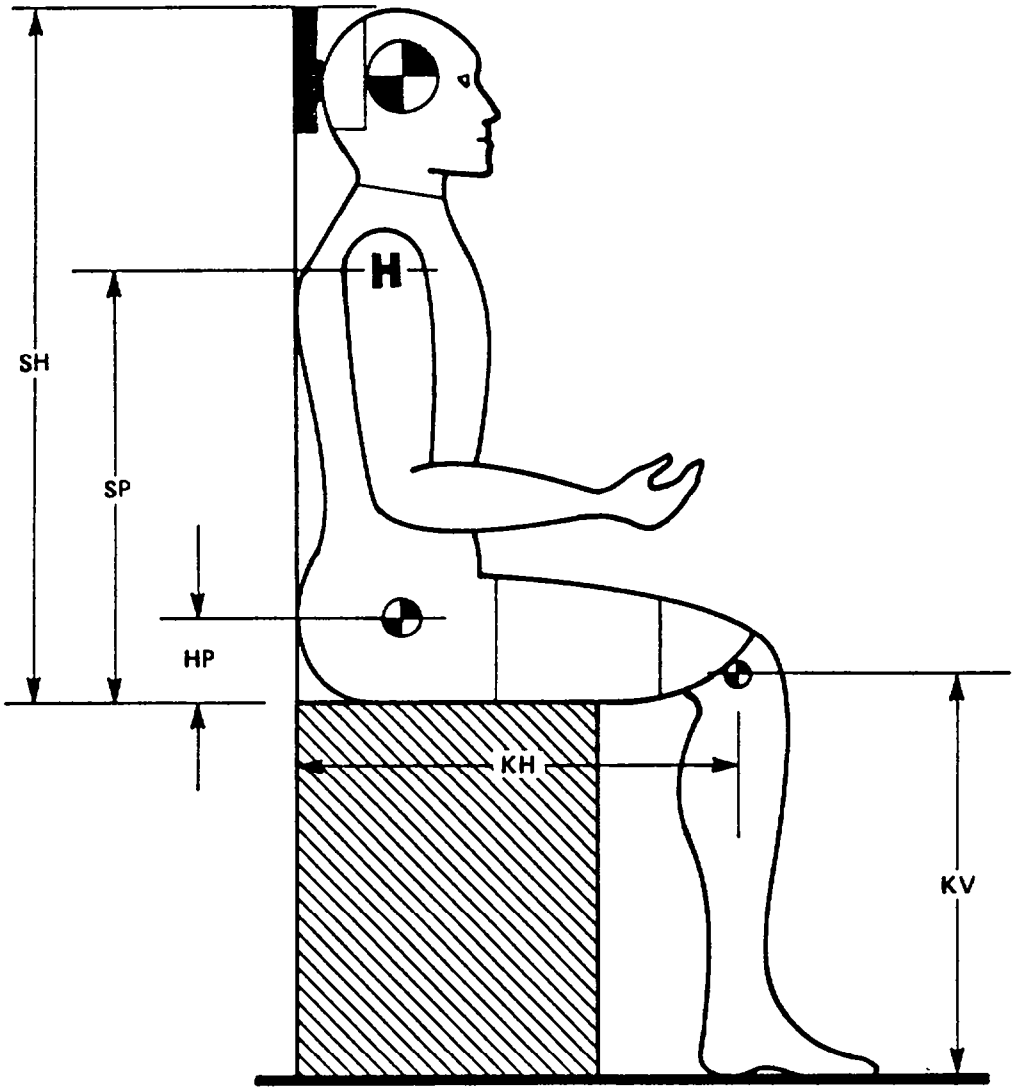
Dummy serial numbers and certification dates are:

Serial No.	Completion Date
749	3- 9-88
1021	4-20-88

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



PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 749

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXX	3-9-88	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXX	2	
SH - Seated Height	35.6 to 35.8"	35.7 "	
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"	19.7 "	
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		3-9-88	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		2	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-72 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		25-38 %	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	210 G's	
b. peak lateral accel.	<= 10 G's	4 G's	
c. Time above 100 G's	0.9 to 1.5 ms.	1.05 ms	

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

TECHNICIAN'S NAME: D W Hess

NHTSA DUMMY I.D. NUMBER: 749

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	21.8 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	22 G's	
c. Peak Resultant Head Acceleration		26 G's max.	21 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	26.3 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	3.5 ms	
g. Max. Head Rotation		63 to 73 deg.	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.	27.9 ms	
	Displ.	2.1 to 3.1"	3.1 "	
60 deg.	Time	40.3 to 51.7 ms.	42.5 ms	
	Displ.	4.3 to 5.3"	5.0 "	
Maximum (73 deg)	Time	53.2 to 66.8 ms.	57.9 ms	
	Displ.	5.0 to 6.0"	6.0 "	
60 deg.	Time	67.0 to 83.0 ms.	76.8 ms	
	Displ.	4.3 to 5.3"	4.8 "	
30 deg.	Time	85.4 to 104.6 ms.	93.7 ms	
	Displ.	2.1 to 3.1"	2.5 "	
0 deg.	Time	101.0 - 123.0 ms.	107.2 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIANS NAME: DW Hsa

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DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 749

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.	39 lbs	
c. Force @ 1.0"	50 to 63 lbs.	57 lbs	
d. Force @ 1.3"	73 to 88 lbs.	86 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	26 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	44.5 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	57 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.	21.9 fps	
(2) Peak Deflection	1.7" maximum	1.61 "	
(3) Peak Resistive Force	2250 lbs maximum	2028 lbs	
(4) Internal Hysteresis	50 to 70%	57.9 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.0 fps	
(2) Peak Deflection	1.1" maximum	1.0 "	
(3) Peak Resistive Force	1450 lbs maximum	1274 lbs	
(4) Internal Hysteresis	50 to 70%	59.9 %	

TECHNICIAN'S NAME: D W Hess

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 749

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
C. KNEE IMPACT TEST			
A. Right Side			
(1) Probe Speed	6.76 to 7.04 fps	6.8 fps	
(2) Maximum Force	1850 to 2500 lbs	1900 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.85 ms	
B. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	6.8 fps	
(2) Maximum Force	1850 to 2500 lbs	2050 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.7 ms	

REMARKS:

TECHNICIAN'S NAME: D W Hess

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER _____749_____

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CL60	4-88	10-88
HY LATERAL--	ENDEVCO	CG34	4-88	10-88
HZ VERTICAL--	ENDEVCO	FL03	3-88	9-88
2. CHEST ACCELEROMETER-				
CX LONGITUDINAL--	CEC	A129	3-88	9-88
CY LATERAL--	ENDEVCO	CN64	3-88	9-88
CZ VERTICAL--	CEC	A56	3-88	9-88
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	306	10-87	4-88
LEFT SIDE	GSE	310	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

I. CONFIGURATION VERIFICATION DATA

	F. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXX	4-20-88	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXX	5	
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"	19.5 "	
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		4-20-88	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		5	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		69-70 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		32-36 %	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	230 G's	
b. peak lateral accel.	<= 10 G's	3 G's	
c. Time above 100 G's	0.9 to 1.5 ms.	1.2 ms	

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

TECHNICIAN'S NAME: D W Hess

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	22.2 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	22 G's	
c. Peak Resultant Head Acceleration		26 G's max.	20 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	25.5 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	5 ms	
g. Max. Head Rotation		63 to 73 deg.	66 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.	29.9 ms	
	Displ.	2.1 to 3.1"	2.7 "	
60 deg.	Time	40.3 to 51.7 ms.	45.8 ms	
	Displ.	4.3 to 5.3"	5.2 "	
Maximum (66 deg)	Time	53.2 to 66.8 ms.	56 ms	
	Displ.	5.0 to 6.0"	5.8 "	
60 deg.	Time	67.0 to 83.0 ms.	72.1 ms	
	Displ.	4.3 to 5.3"	5.2 "	
30 deg.	Time	85.4 to 104.6 ms.	92.9 ms	
	Displ.	2.1 to 3.1"	2.1 "	
0 deg.	Time	101.0 - 123.0 ms.	109.2 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIANS NAME: D. Wilkins

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.	24 lbs	
b. Force @ 0.75"	30 to 50 lbs.	37 lbs	
c. Force @ 1.0"	50 to 63 lbs.	52 lbs	
d. Force @ 1.3"	73 to 88 lbs.	74 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	29.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	39 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	50.5 lbs	
d. Return Angle	12 deg. maximum	8°	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	22.0 fps	
(2) Peak Deflection	1.7" maximum	1.28 "	
(3) Peak Resistive Force	2250 lbs maximum	2158 lbs	
(4) Internal Hysteresis	50 to 70%	51.8 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.0 fps	
(2) Peak Deflection	1.1" maximum	.88 "	
(3) Peak Resistive Force	1450 lbs maximum	1300 lbs	
(4) Internal Hysteresis	50 to 70%	58.6 %	

TECHNICIAN'S NAME: DWH22

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)
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	1930 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.85 ms	
B. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	6.9 fps	
(2) Maximum Force	1850 to 2500 lbs	1950 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.8 ms	

REMARKS:

TECHNICIAN'S NAME: D. NEAD

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

APPENDIX D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

SEAT BELT RESTRAINT SYSTEM

To help decrease the possibility or severity of injury in accidents or sudden stops, we recommend that you and your passengers in the vehicle be properly restrained at all times, using the seat belts provided. The front and rear outboard seat lap and shoulder seat belts have retractors with inertia locks. Passenger sides are also equipped with a locking mechanism.
The retractors keep the belts out of the way while passengers enter or exit the vehicle. Inertia locks allow freedom of movement until a deceleration force occurs (such as a sudden stop or collision). At that time the belts automatically lock in position, and the passengers will not be thrown forward.

WARNING!

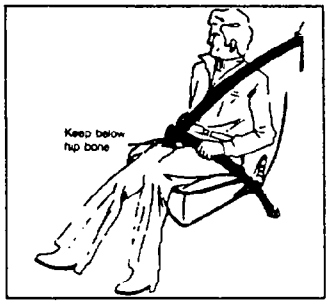
- Lap and shoulder belt assemblies may be damaged when subjected to stress by occupants in a collision and must be replaced.
- Passengers should not be allowed to ride in the cargo area of any vehicle. Persons who are not sitting in a seat with a fastened seat belt are much more likely to suffer serious bodily injury in the event of a collision.

FRONT SEAT BELTS

To Fasten Seat Belt

1. Grasp the buckle end and tongue plate.
2. Slowly pull out the lap-shoulder belt.
3. Insert the tongue plate into the open end of the buckle. An audible "click" will indicate the belt is securely locked.

Position the lap belt across your lap as LOW ON THE HIPS as possible to reduce the risk of sliding under it during an accident. Adjust it to a SNUG FIT by pulling the belt through the tongue plate. The belt retractor is designed to take up excess webbing automatically and maintain tension on the belt.



NOTE
If the belt does not fully retract, pull it out and check for kinks or twists. Then make sure that it remains untwisted as it retracts.

WARNING!
Never wear the shoulder belt under the arm. Never swing it around your neck and over the inside shoulder. Never use a single belt for more than one person. Be sure the lap portion of the belt is fitted snugly around the hips, not on the waist. Use the shoulder belt on the outside shoulder only. Failure to follow these precautions could increase the chance and/or severity of injury in an accident.

To Unfasten Seat Belts
Depress the button on the buckle

Seat belt warning light/buzzer system

1. As a reminder to you to fasten the lap-shoulder belt(s), the warning light will continue to glow for about 6 seconds after each time you turn the ignition switch to the "ON" position.
2. The reminder buzzer will also sound for about 6 seconds, or until the driver's seat belt is fastened (if the driver's seat belt is not fastened when the ignition switch is turned to the "ON" position)
3. If the system does not operate as described, consult your nearest Authorized Mazda Dealer.