REPORT NO. CAL-89-N06

1299

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

CHRYSLER CORPORATION

1989 PLYMOUTH ACCLAIM

4-DOOR SEDAN

NHTSA NO. MK0301

CALSPAN TEST NO. 7731-6

CALSPAN CORPORATION

ADVANCED TECHNOLOGY CENTER

P.O. BOX 400

BUFFALO, NEW YORK 14225

March 29, 1989

FINAL REPORT

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF MARKET INCENTIVES

400 SEVENTH STREET, S.W.

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15. Supplementary Notes

16. Abstract

A frontal barrier impact test of a 1989 Plymouth Acclaim 4-Door Sedan was performed at the Calspan Advanced Technology Center crash test facility in Buffalo, New York, on March 29, 1989.

The impact speed was 34.7 mph and the ambient temperature at the barrier face was 40°F. The maximum vehicle crush was 22.4 inches. The test vehicle was equipped with a manual 3-point belt system at each of the front outboard positions.

With regard to FMVSS 208-"Occupant Crash Protection," injury criteria, both the driver and passenger dummies appear 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 89 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 MK0301

A load cell barrier consisting of 36 load cells was impacted by a 1989 Plymouth Acclaim 4-Door Sedan at a velocity of 34.7 mph. The test was performed at the Calspan Corporation Advanced Technology Center on March 29, 1989. Pre-test and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 15 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

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

Both ATDs were fully instrumented with head and chest triaxial accelerometers and left/right femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. These ATDs had been certified prior to the test, and certification details, along with the 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. Position #2 Belt Elongation is not accurate after 80 milliseconds.

The driver's head struck the steering wheel rim and hub and his HIC was 663.4. The maximum chest deceleration over 3 milliseconds was 46.0 g's and femur loads were 1201.0 and 1552.4 pounds.

The right front passenger's HIC was 810.0. The maximum chest deceleration over 3 milliseconds was 49.5 g's and femur loads were 840.3 and 873.0 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1989 Plymouth Acclaim 4-Door Sedan

NHTSA NO.: MK0301 VIN.: 1P3BA46K3KF418851

BODY COLOR: Black Cherry DATE OF MANUFACTURE: January 1989

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

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

Date Received: 2/14/89 Odometer Reading: 03.9
- A/C; X P/S; X P/B; - P/wdo.; - 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: P185/70R14

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

Tires on Vehicle: P185/70R14; Manufacturer: Goodyear/Invicta GL

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) = 865 lbs. (A)

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

Rated Cargo and Luggage Weight (RCLW) A-B = 115 lbs.

GVWR 3993 lbs. GAWR: Front 2187 lbs. Rear 1881 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 = 840 lbs. Right Rear = 530 lbs.

Left Front = 910 lbs. Left Rear = 540 lbs.

TOTAL FRONT WEIGHT = 1750 lbs. (62 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1070 lbs. (38 % of Total Vehicle Weight)

TOTAL DELIVERY WEIGHT = 2820 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (2820 lbs.)

VCW = Vehicle Capacity Weight (115 lbs.)

DSC = Designated Seating Capacity (5)

RCLW = VCW - 150 (DSC) = 115 lbs.

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

Target Test Weight = 3263 lbs.

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

Right Front = 950 lbs. Right Rear = 660 lbs.

Left Front = 1000 lbs. Left Rear = 660 lbs.

TOTAL FRONT WEIGHT = 1950 lbs. (60 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1320 lbs. (40 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 3270 lbs.

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

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 27.0" LF 27.0" RR 27.6" LR 27.4"

Test Attitude: RF 27.1" LF 27.2" RR 25.6" LR 25.6"

Wheel Base: 103.3 in.; C.G. = 41.7 in. rearward of front wheel C/L

Remarks: _____

_____

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0 °

Date of Test: 3/29/89 Time of Test: 12:20

Ambient Temperature: 40 °F at impact area

Temperature in Occupant Compartment: 70 °F.

Windshield Molding Temperature: 70 °F.

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: primary = 34.7 mph, secondary = 34.7 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	176.1	C_L	181.0	L	176.3
	Post-test	= R	153.7	C_L	158.6	L	157.7
	Crush	= R	22.4	C_L	22.4	L	18.6

Distance from front of test vehicle to point of impact:

R 14.7 in. C/L 11.4 in. L 11.5 in.

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Steering rim and hub	Slight contact with dashpanel
Chest	No Contact	No Contact
Abdomen	Lower Steering Rim	No Contact
Left Knee	Dash Panel	Dash Panel
Right Knee	Dash Panel	Dash Panel

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	Front		Rear	
	Left	Right	Left	Right
Door Opening	Operable	Not Operable	Operable	Not Operable

	Front		Rear	
Seat Movement	Left	Right	Left	Right
Seat Back Failure	None	None	None	None
Seat Shift (in.)	None	None	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)	-82	-27	41	74	-45	14	16	46.0
DUMMY (2)	-104	62	80	136	-39	36	-28	49.5
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	LEFT FEMUR	RIGHT FEMUR
DUMMY (1)	1201.0	1552.4
DUMMY (2)	840.3	873.0
DUMMY (3)		
DUMMY (4)		

	MAXIMUM FORCE - SEAT BELT LOADS (LBS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	1700.2	-	1186.9
DUMMY (2)	2593.9	2110.2	-
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)	663.4	0.07320	0.10920	50.8
DUMMY (2)	810.0	0.08707	0.12307	55.1
DUMMY (3)				
DUMMY (4)				

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Figure 1

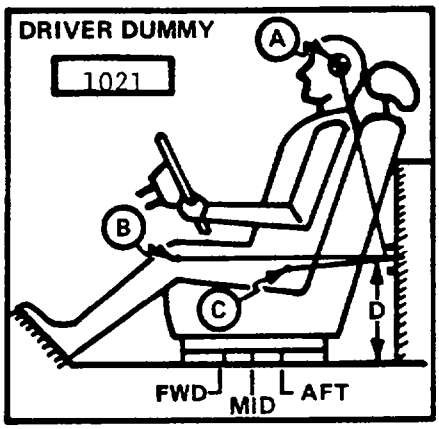
PART 572 DUMMY IN-VEHICLE POSITION

TEST NO.: MK0301 VEHICLE: 1989 Plymouth Acclaim

SEAT TYPE:
____ Bench
X Bucket
____ Split Bench

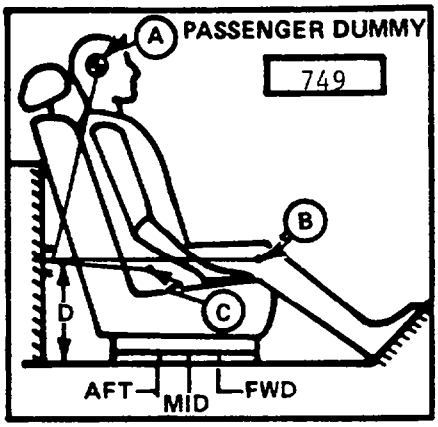
ADJUSTER TYPE:
X Manual
____ Power

BUCKET SEAT BACK TYPE:
____ Fixed
X Adjustable Reclining

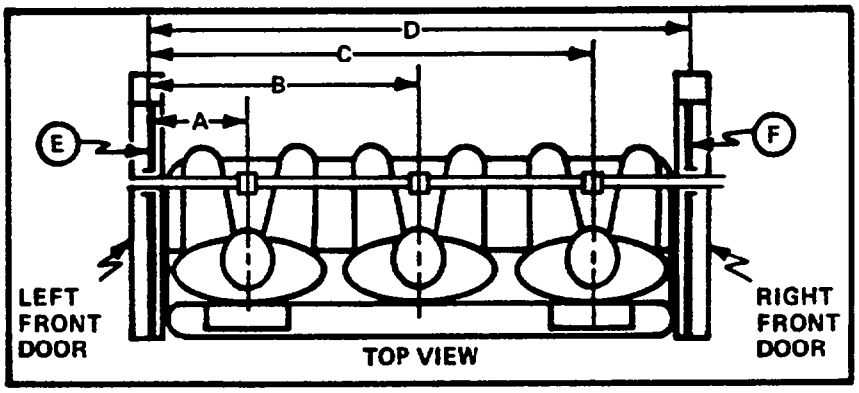


MEASUREMENT LOCATION

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



A =	21.0	in.	4	Degrees	A =	21.4	in.	2	Degrees
B =	23.2	in.	98	Degrees	B =	22.5	in.	100	Degrees
C =	8.5	in.	132	Degrees	C =	8.2	in.	137	Degrees
D =	15.1	in.			D =	15.1	in.		



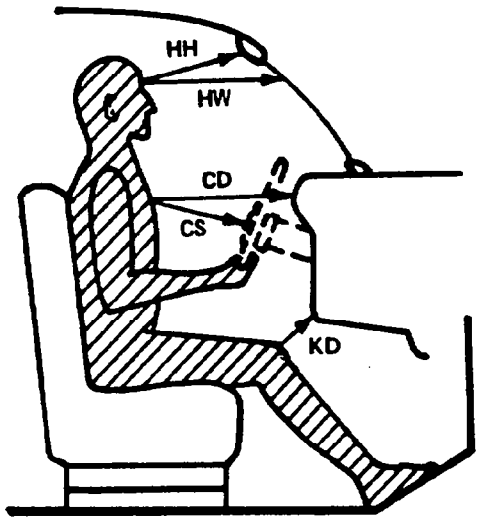
DUMMY ID

	1021	749
A = Left Door to Driver Centerline	12.0 in.	
B = Left Door to Center Passenger Centerline	- in.	
C = Left Door to Right Passenger Centerline	39.0 in.	
D = Left Door to Right Door	50.9 in.	
E, F = Window Glass Height (Right and Left Must Be Equal)	12.0 in.	

Figure 2

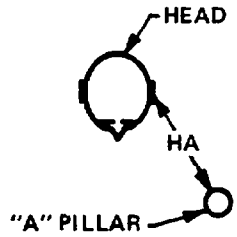
OCCUPANT CLEARANCE DIMENSIONS

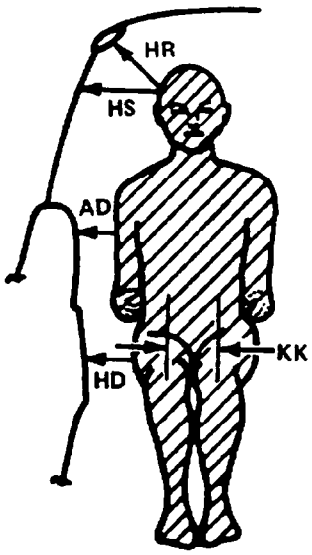
	DRIVER	PASSENGER
HH	16.0	16.2
HW	19.2	19.3
CD	21.0	22.5
CS	14.5	-
KDL	5.7	6.2
KDR	6.7	6.5
SA	22.0°	23.0°
TA	24.0°	24.0°



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

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

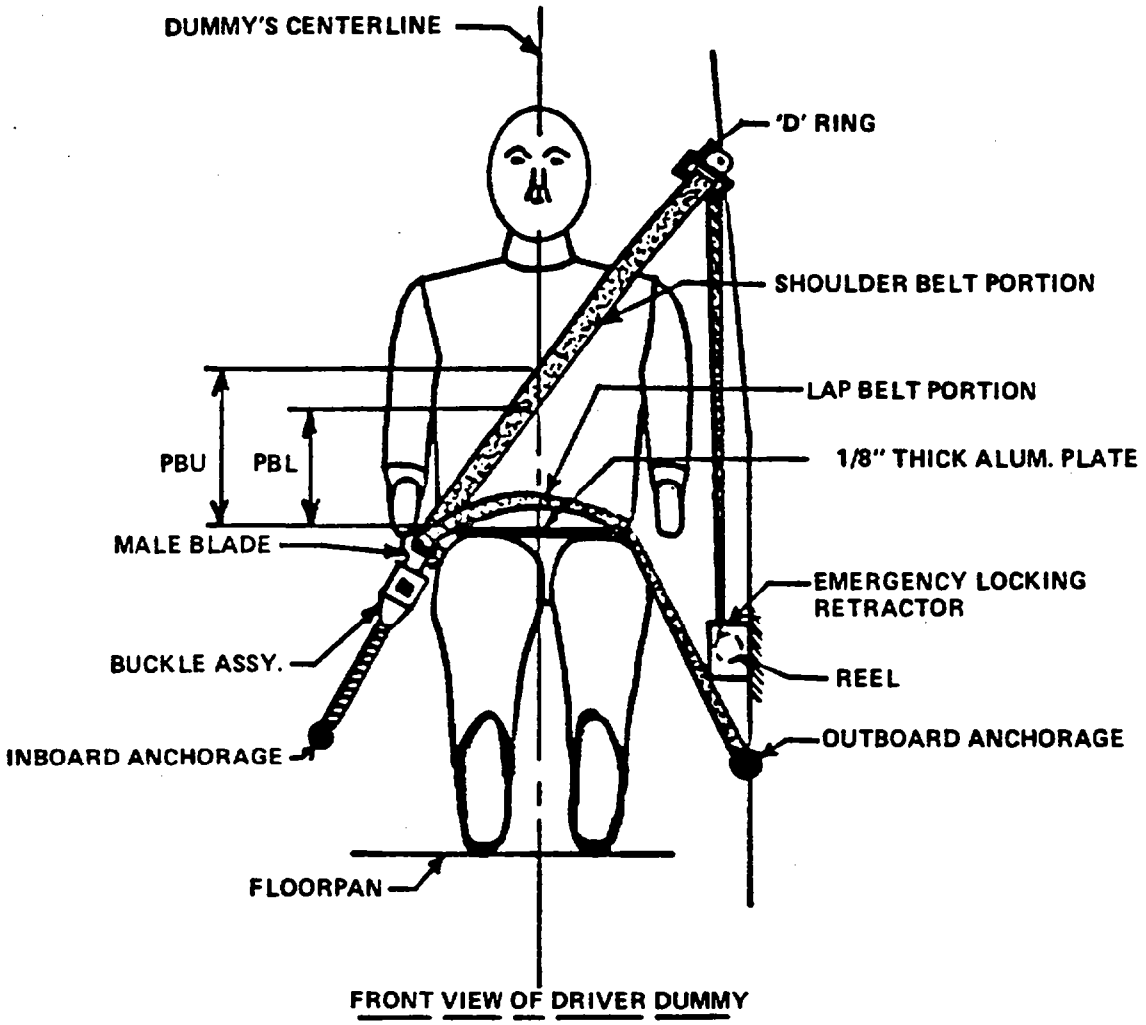




	DRIVER	PASSENGER
HR	5.3	5.4
HS	8.5	8.7
AD	4.3	4.7
HD	7.2	6.9
KK	8.5	8.4
HA	20.2	20.0

Figure 3

SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to belt upper edge	15.3	15.3
PBL -- Top surface of alum. plate to belt lower edge	12.3	12.5
LAP BELT TENSION	3.0	3.0
SHOULDER BELT TENSION	-	-

Table 3

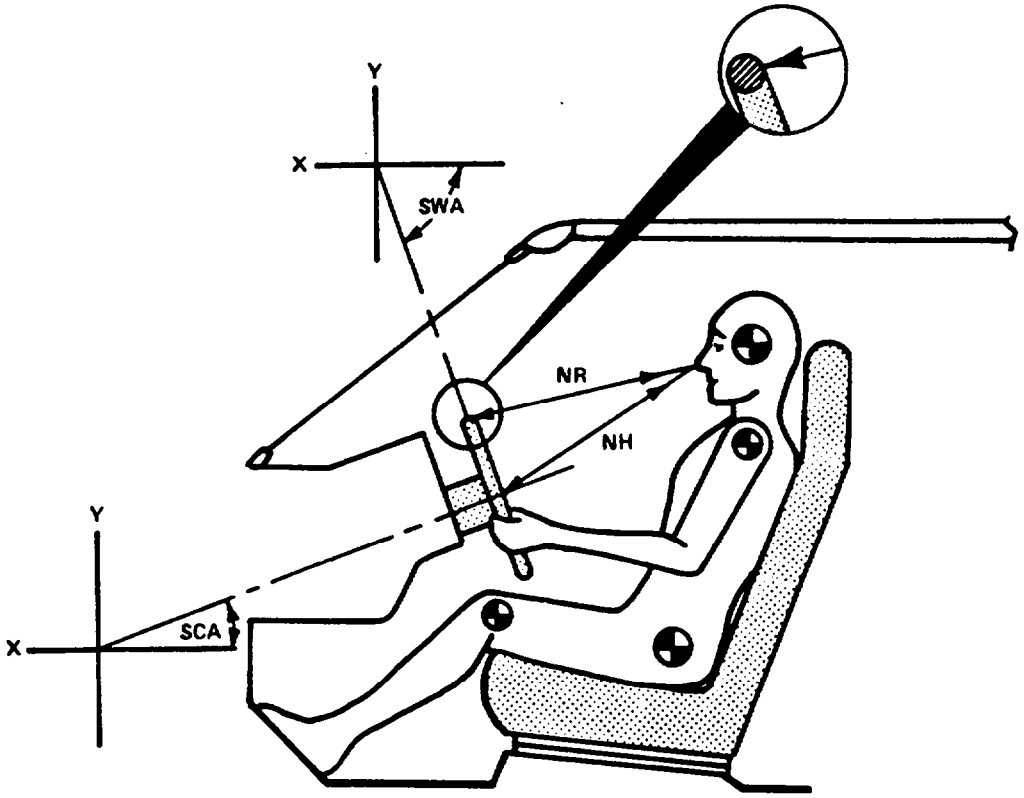
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	81.5"	80.5"
Shoulder belt length as measured on Part 572 Dummy.	31.0"	31.0"
Lap belt length as measured on Part 572 Dummy.	31.0"	30.0"
BELT SPOOL-OFF DATA:		
As determined by film analysis.	2.0"	2.3"
As determined mechanically.	2.0"	2.3"
As determined electronically.	2.0"	2.0"
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	.51 in/ft	See Note
Measured mechanically	None	None

NOTE: Data is not accurate after 80 msec.

Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



LEFT SIDE VIEW

	MEASUREMENTS	
NR -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	18.0	Inches
NH -- Distance from tip of dummy's nose to center of steering column hub	19.4	Inches
SCA -- Angle of steering column relative to the horizontal X axis	26.0	Degrees
SWA -- Angle of steering wheel relative to the horizontal X axis	-64.0	Degrees

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

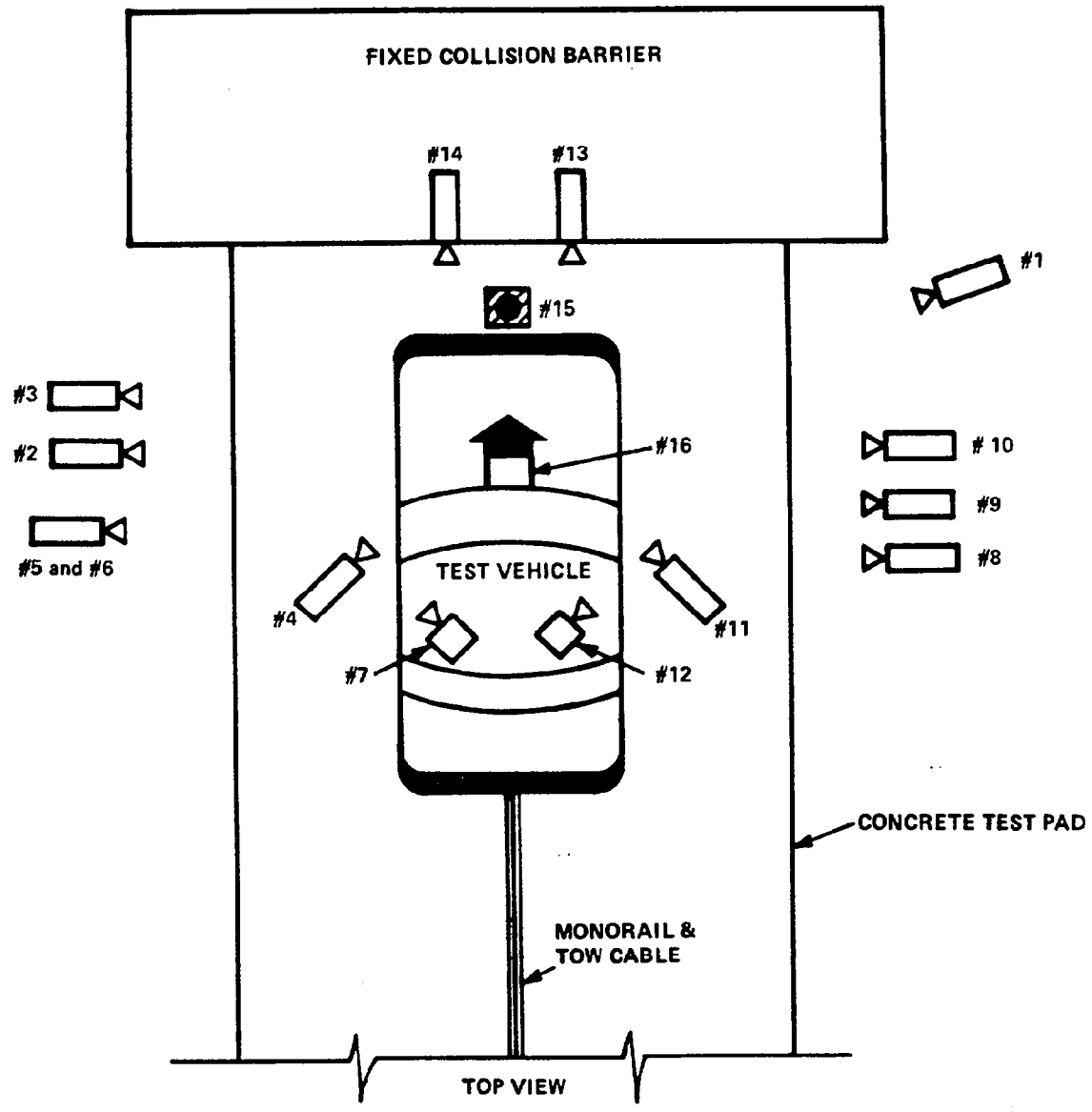


Table 4
HIGH-SPEED CAMERA LOCATIONS

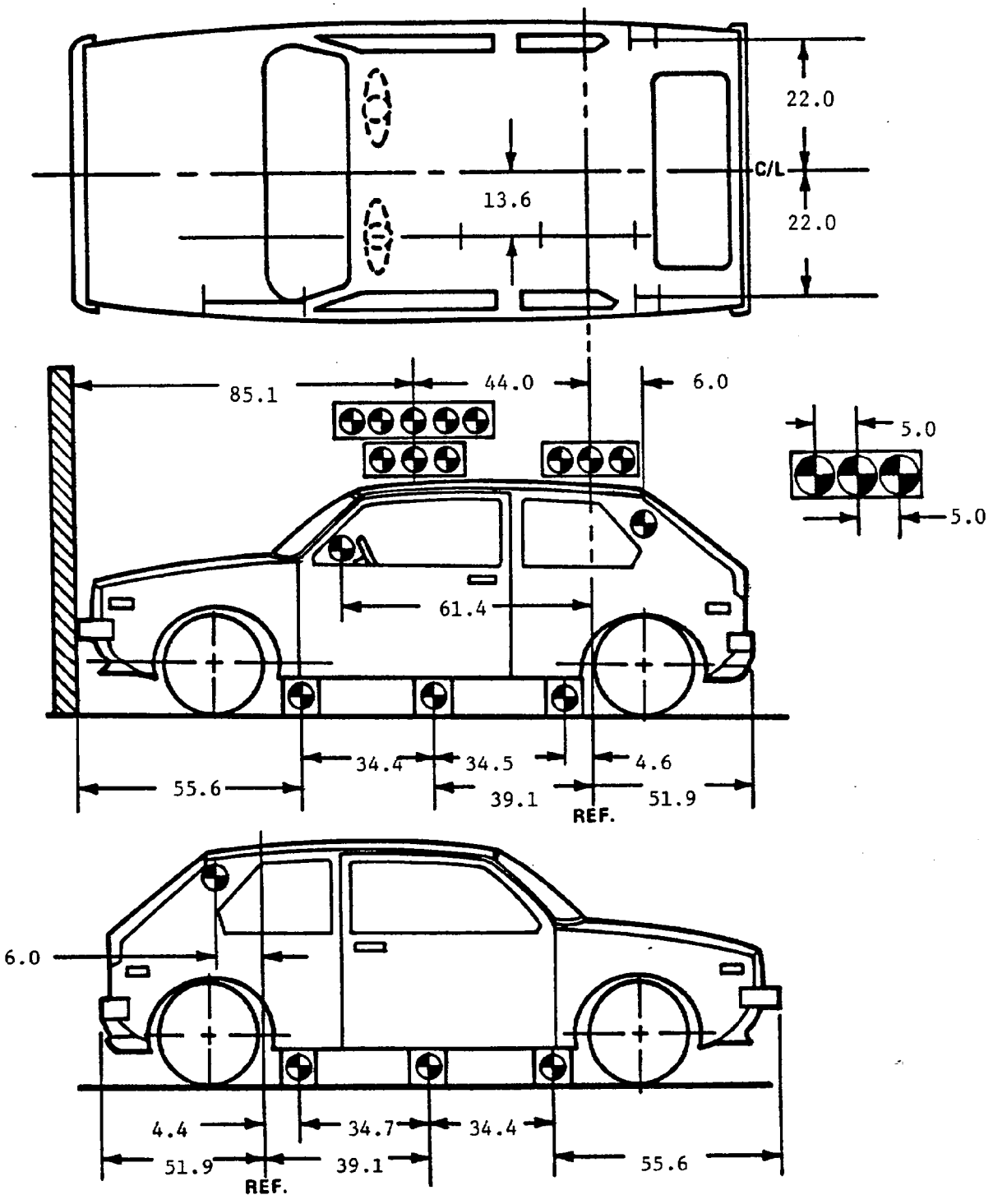
Test No. MK0301 Vehicle 1989 Plymouth Acclaim 4-Door Sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (in)* X	Y	Z	ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	238	58	41	-1	221.5	13	545
3	Left Side View	291	46	41.5	-1	274.5	25	545
4	Driver and Interior View	91	108	69	-18	74.5	13	800
5	Steering Column (Bottom)	287	80	47	-1	270.5	25	550
6	Steering Column (Top)	287	80	71	-8	270.5	25	555
7	Left Belt	-	-	-	-	-	8	575
8	Overall Right Side	234	76	41.5	-2	217.5	13	555
9	Right Side View	293	63	57	-4	276.5	25	790
10	Right Passenger View	290	81	41	-5	273.5	35	690
11	Passenger and Interior View	85	106	68	-18	68.5	25	605
12	Right Belt	-	-	-	-	-	8	690
13	Passenger Front View	24	-5	73	-40	-	13	550
14	Driver Front View	24	-5	73	-40	-	13	545
15	Windshield View	0	0	126	-45	-	13	540
16	Pit View of Engine	0	32	-120	90	-	13	950

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

Figure 6

VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

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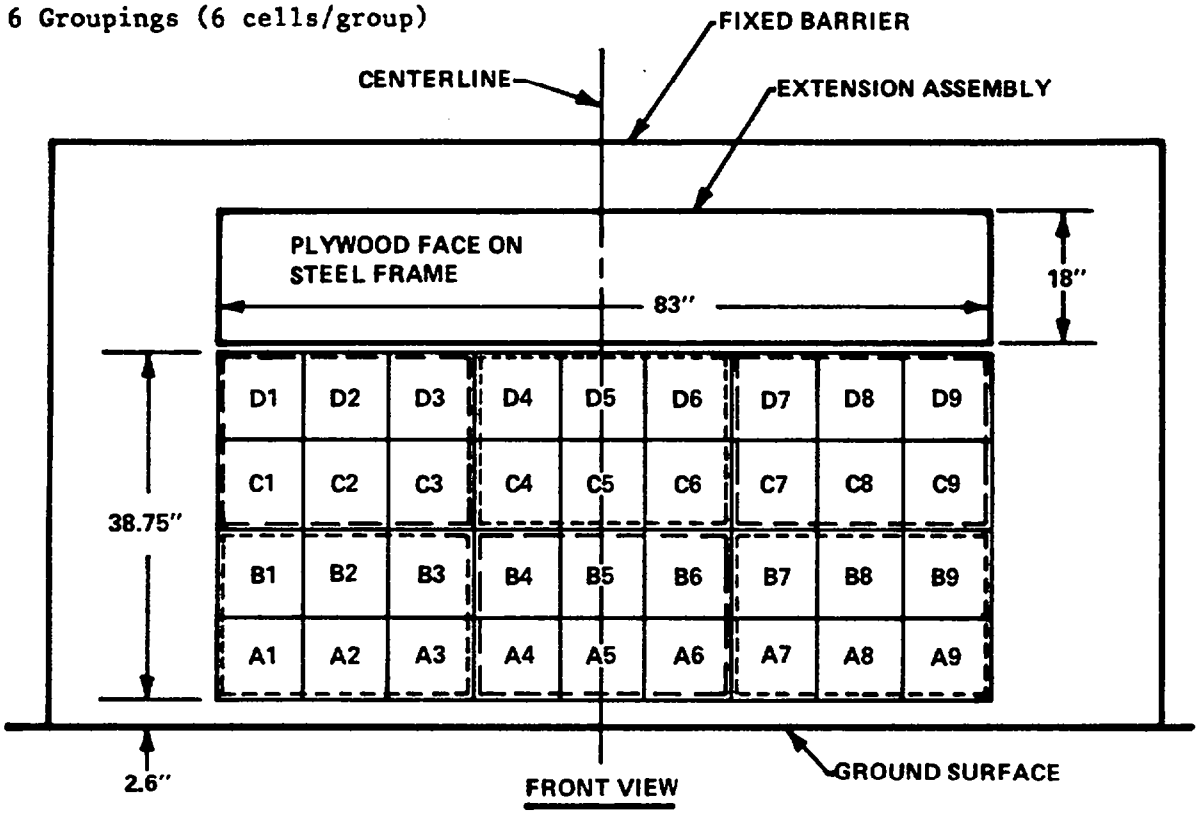
Figure 7

LOAD CELL LOCATIONS ON FIXED BARRIER

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



6 GROUPS OF 6 LOAD CELLS EACH

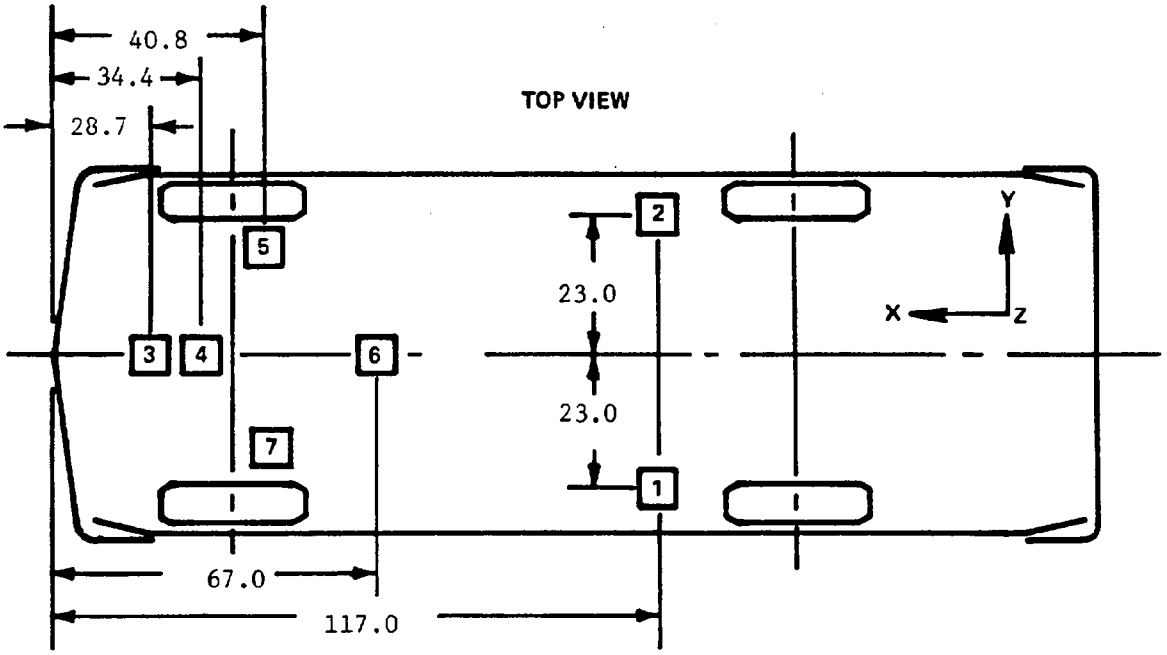
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

The following data is presented in Appendix B:

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

Figure 8

VEHICLE ACCELEROMETER LOCATIONS



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

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

Figure 9

TEST VEHICLE MEASUREMENTS

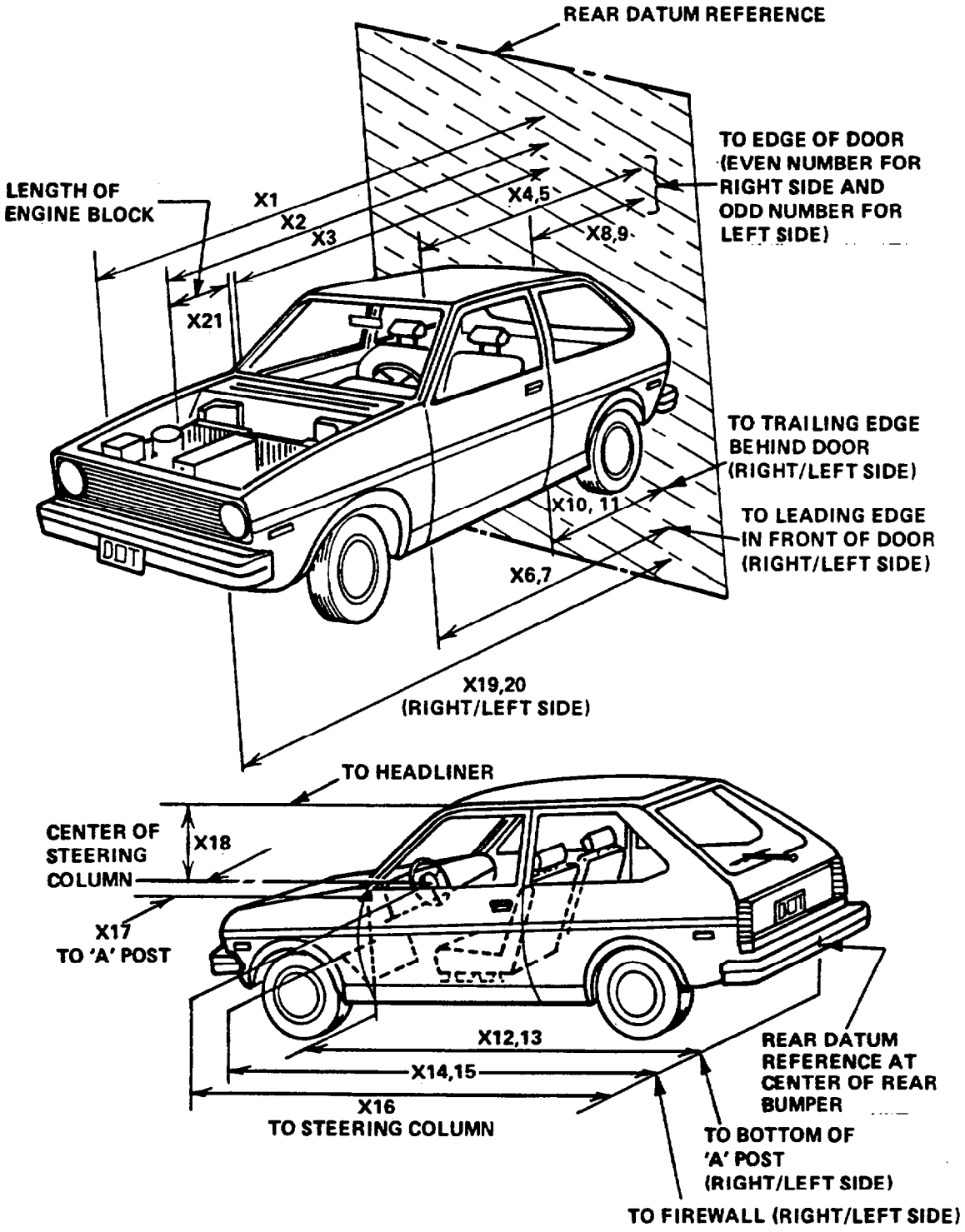


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Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	181.0	158.6	22.4
X2	Rear Surface of Vehicle to Front of Engine	156.0	148.1	7.9
X3	Rear Surface of Vehicle to Firewall	135.0	128.4	6.6
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	122.4	120.8	1.6
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	122.1	121.2	0.9
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	121.7	120.5	1.2
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	121.6	120.6	1.0
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	83.2	82.2	1.0
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	83.3	82.5	0.8
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	83.6	82.2	1.4
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	83.4	82.4	1.0
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	121.5	120.2	1.3
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	121.4	120.0	1.4
X14	Rear Surface of Vehicle to Firewall, Right Side	137.1	130.2	6.9
X15	Rear Surface of Vehicle to Firewall, Left Side	135.7	132.6	3.1
X16	Rear Surface of Vehicle to Steering Column	106.0	103.3	2.7
X17	Center of Steering Column to "A" Post	17.2	16.2	1.0
X18	Center of Steering Column to Headliner	17.8	18.1	-0.3
X19	Rear Surface of Vehicle to Right Side of Front Bumper	176.1	153.7	22.4
X20	Rear Surface of Vehicle to Left Side of Front Bumper	176.3	157.7	18.6
X21	Length of Engine Block	14.0	14.0	0.0

Appendix A

PHOTOGRAPHS

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Figure A-1 PRE-TEST FRONT VIEW

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

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Figure A-5 PRE-TEST RIGHT SIDE VIEW

7731-6

Figure A-6 POST-TEST RIGHT SIDE VIEW

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

7731-6

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

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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

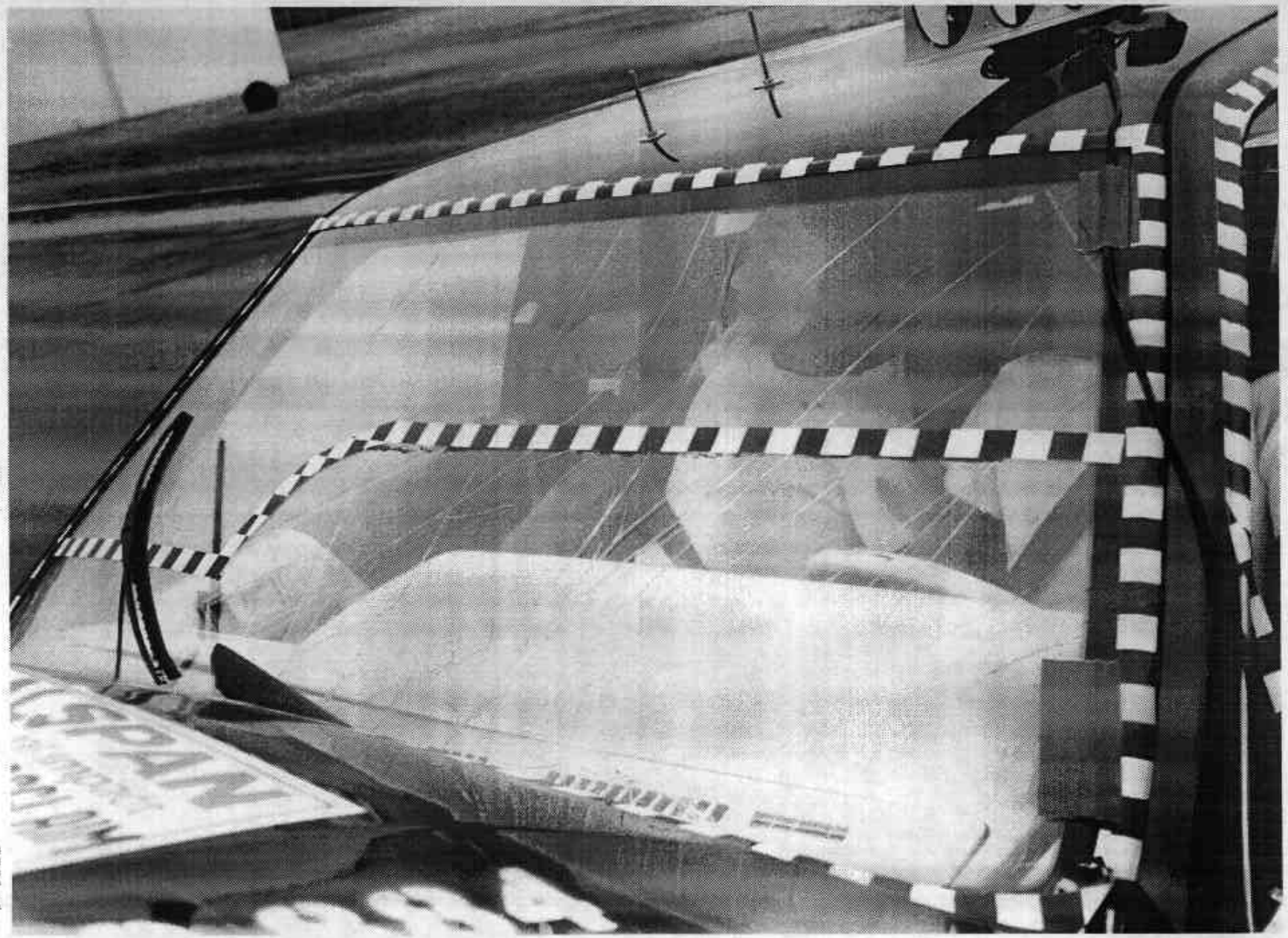

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Figure A-12 POST-TEST WINDSHIELD VIEW

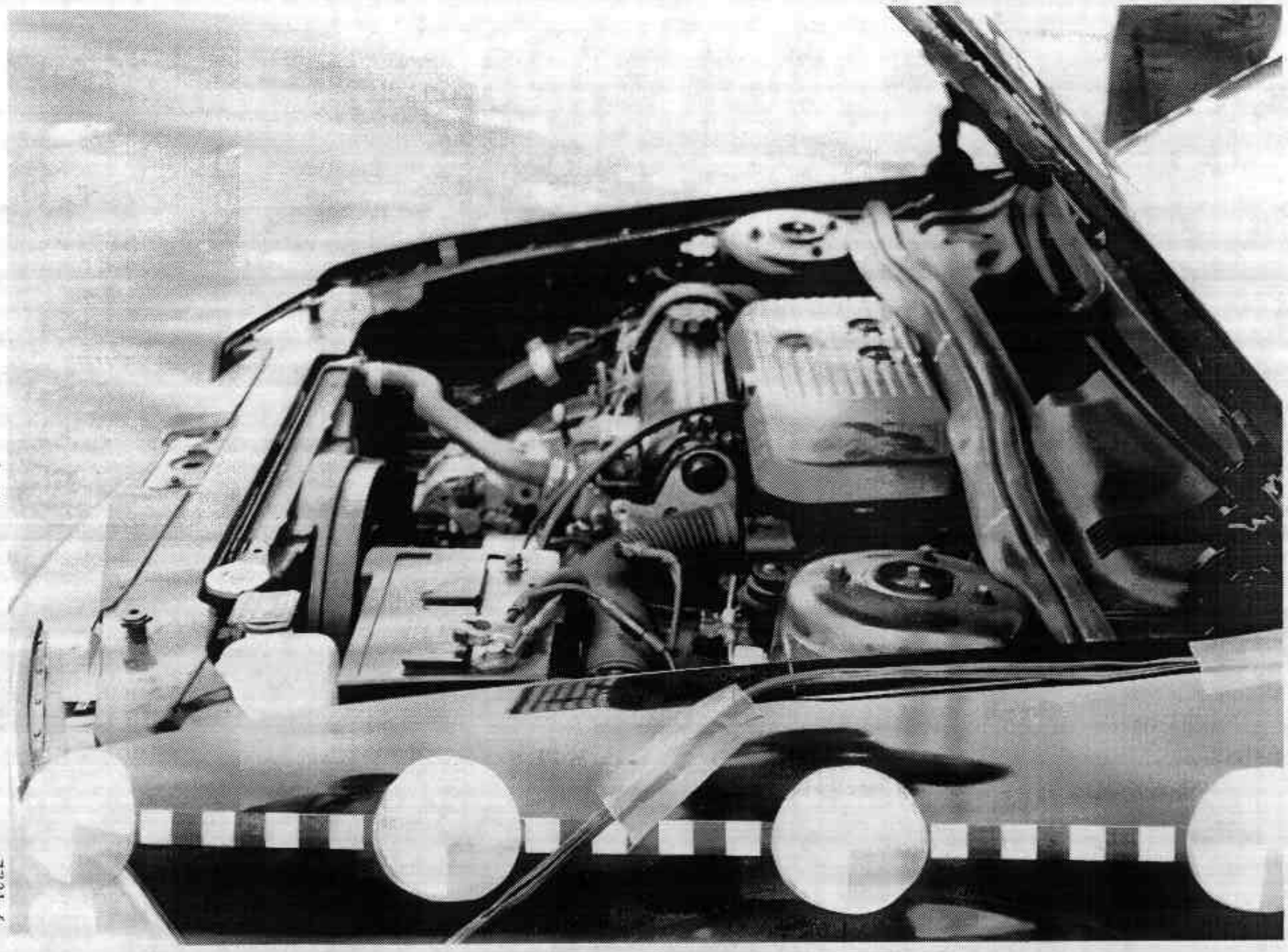


Figure A-13 PRE-TEST ENGINE COMPARTMENT VIEW

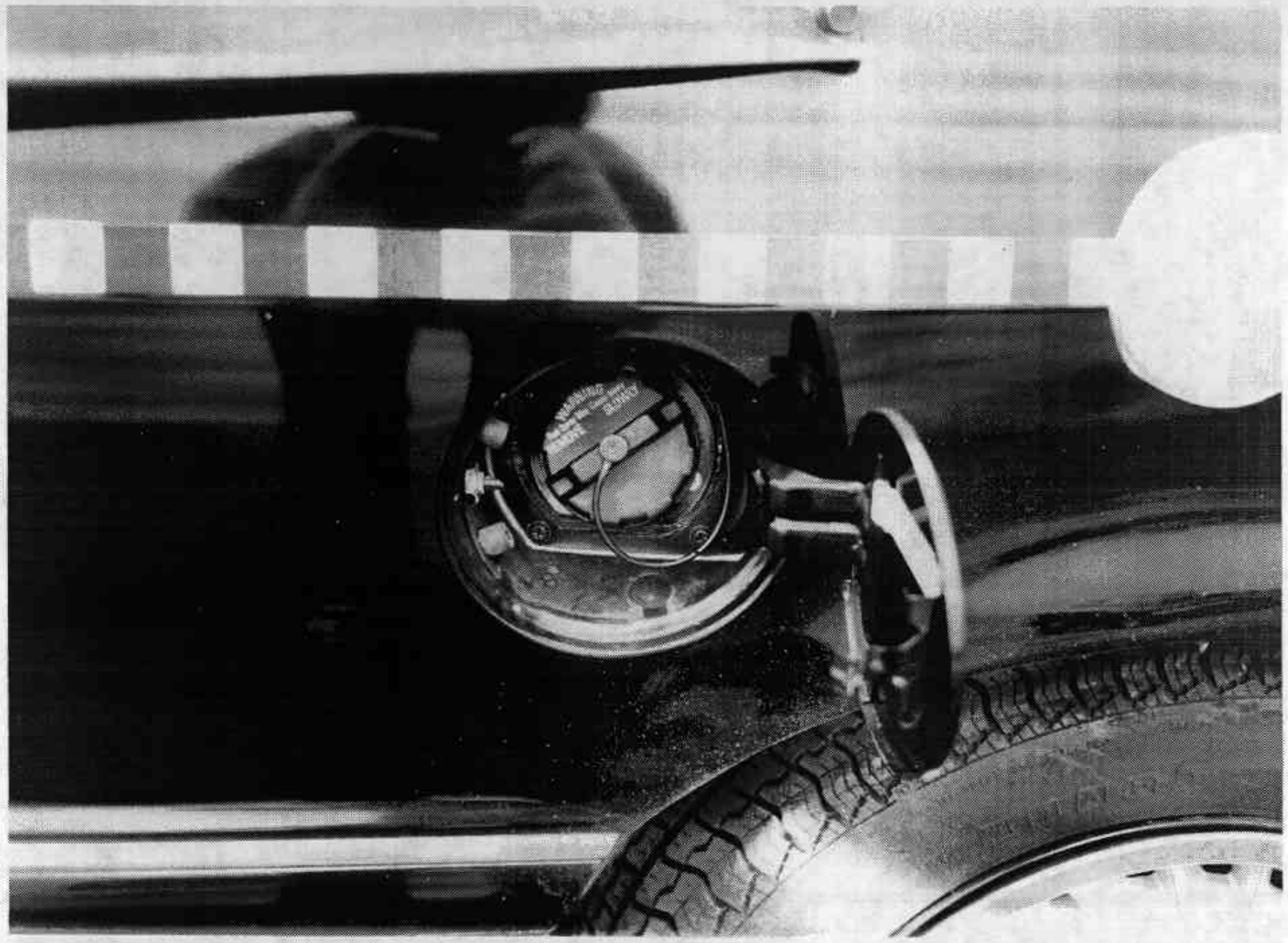
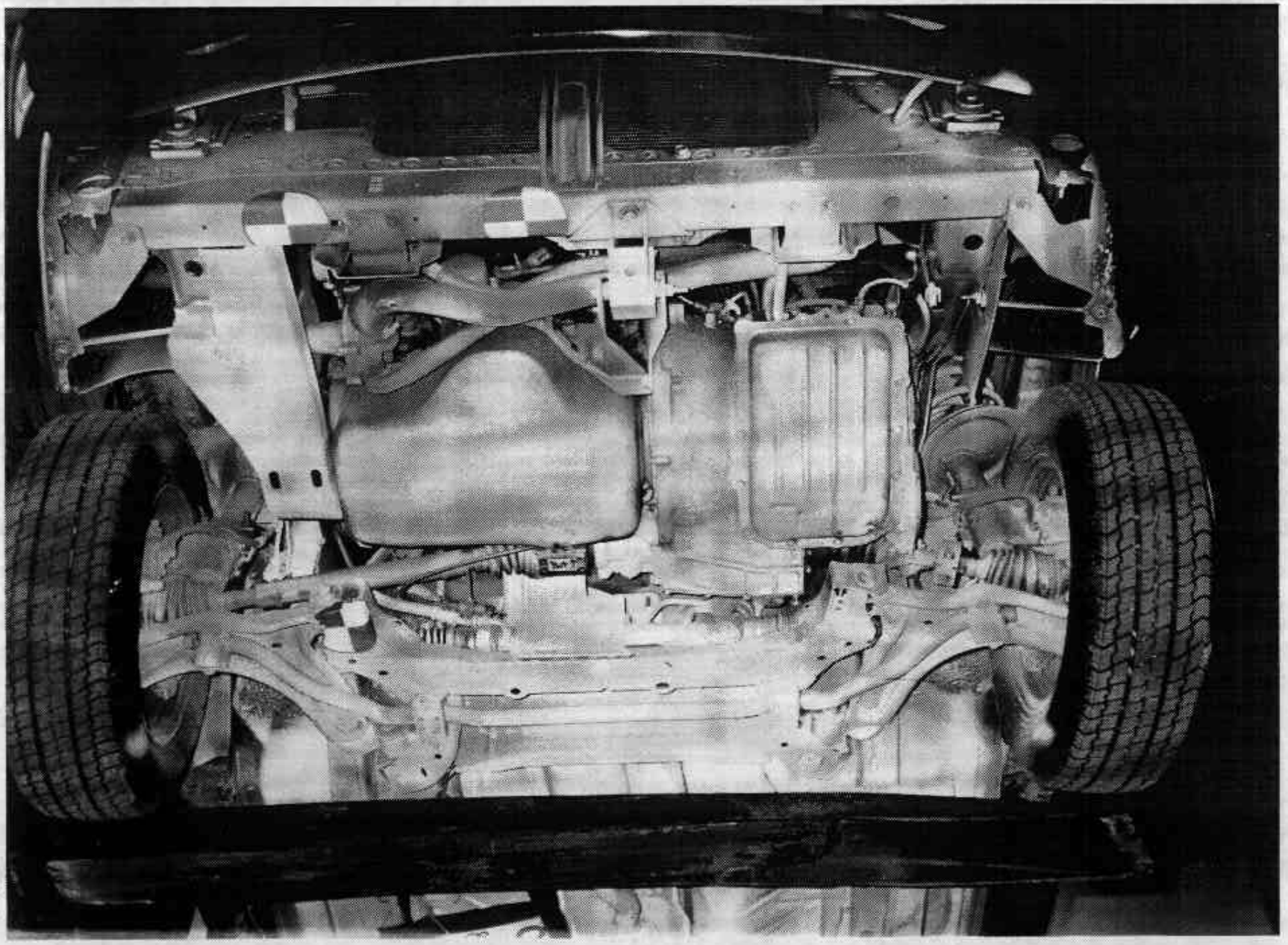


Figure A-14 PRE-TEST FUEL CAP VIEW



A-16

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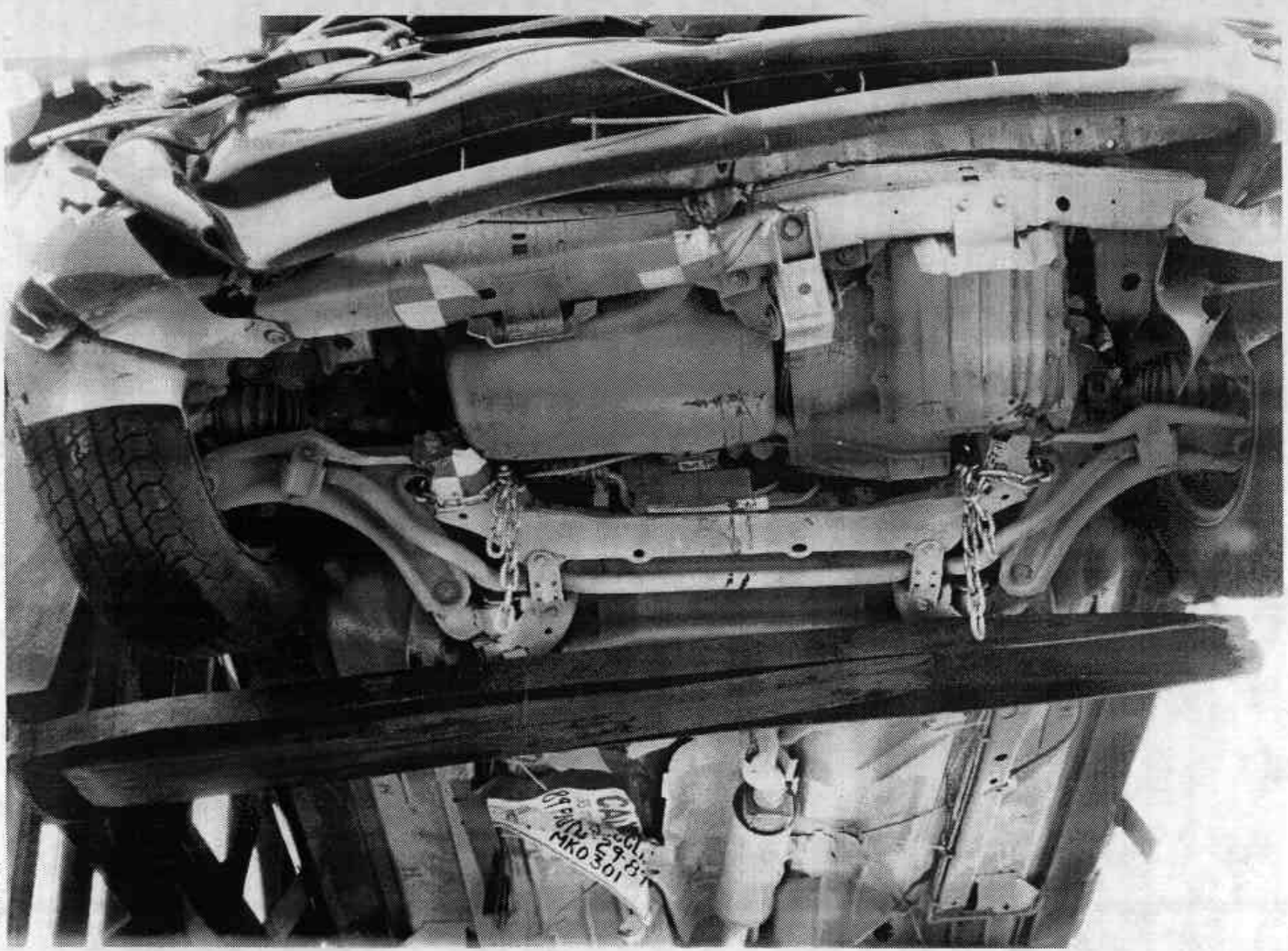
Figure A-15 PRE-TEST FRONT UNDERBODY VIEW



A-17

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Figure A-16 POST-TEST FRONT UNDERBODY VIEW

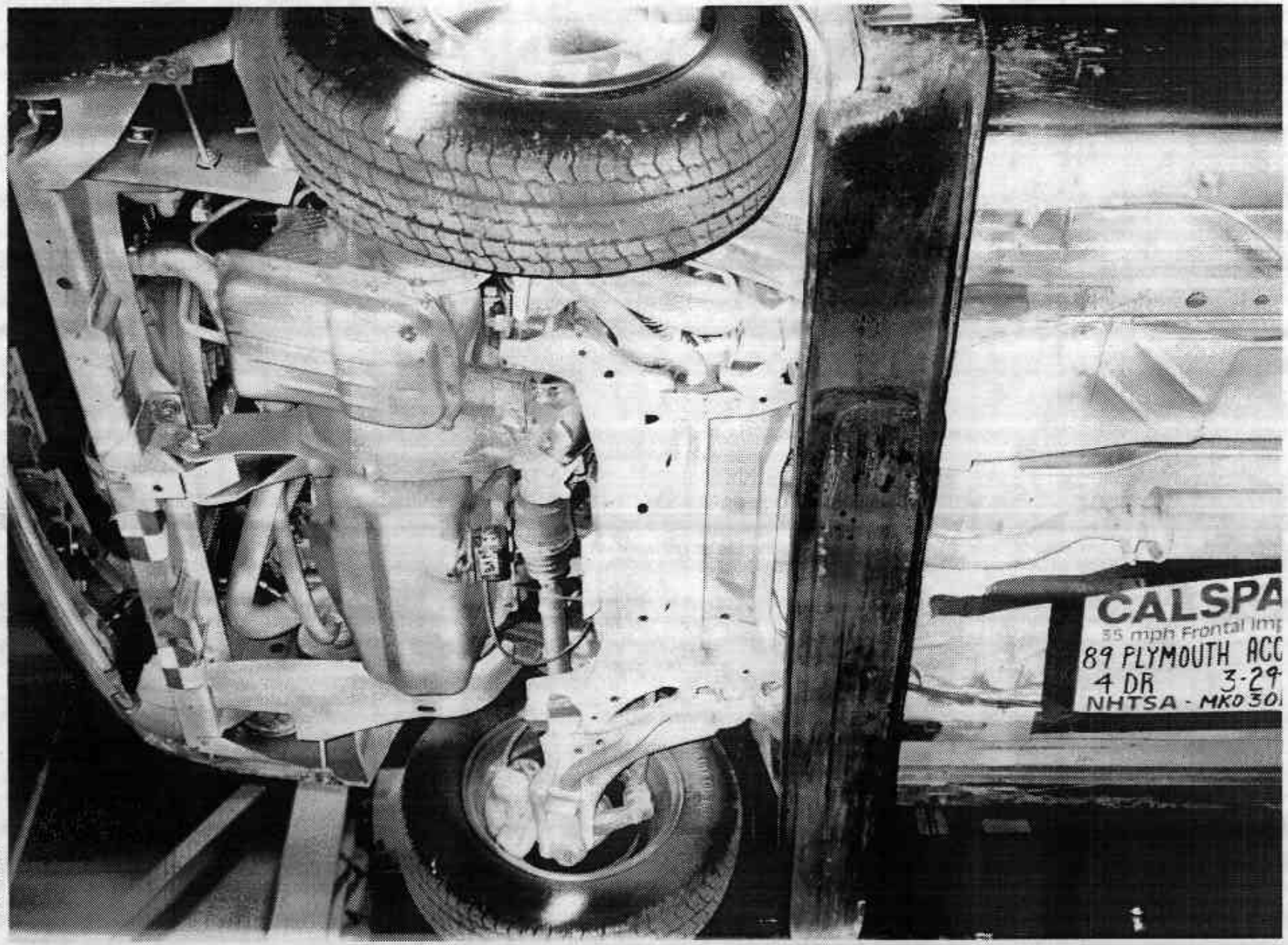

Figure A-17 PRE-TEST FRONT-SIDE UNDERBODY VIEW

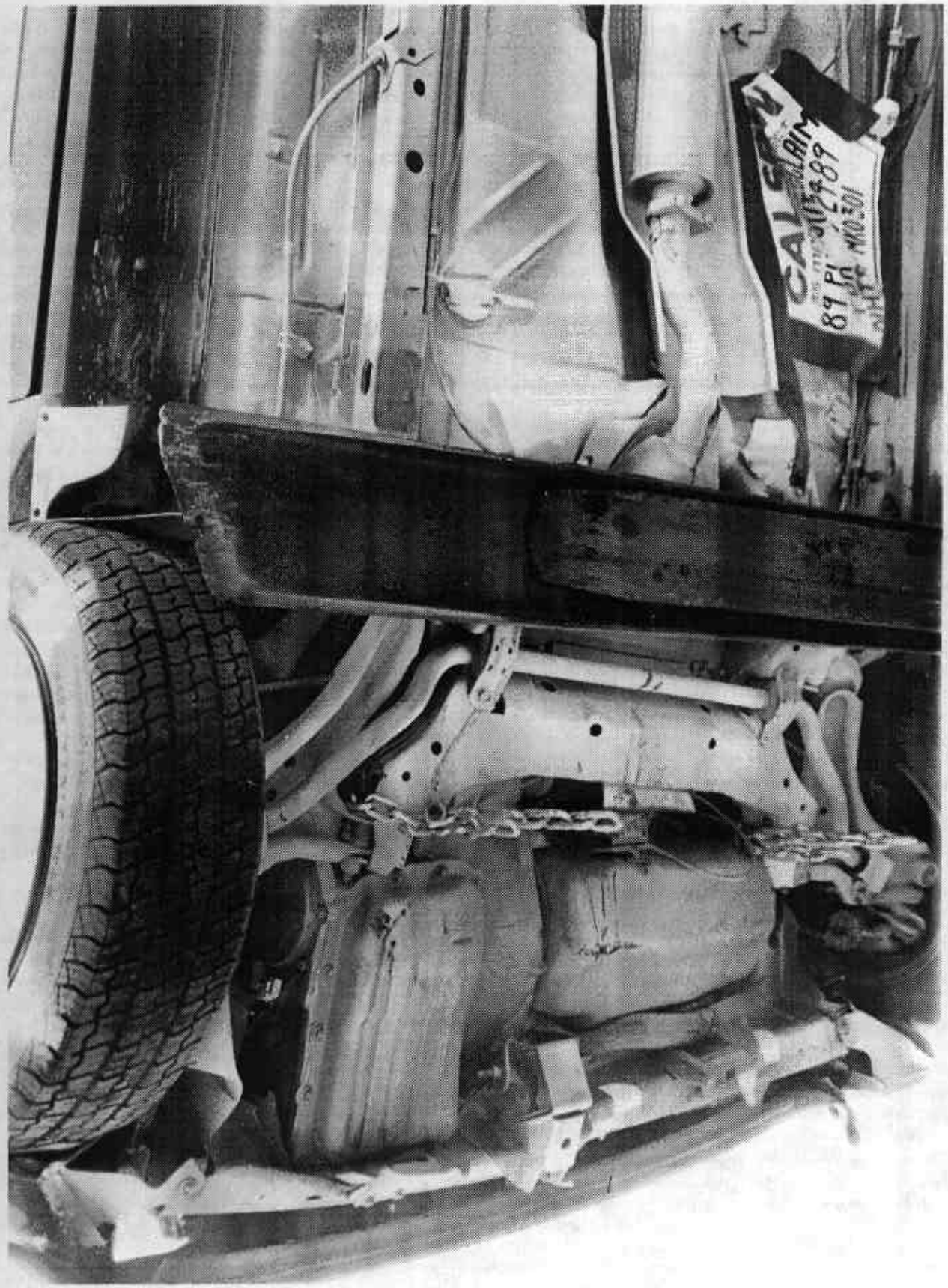

Figure A-18 POST-TEST FRONT-SIDE UNDERBODY VIEW

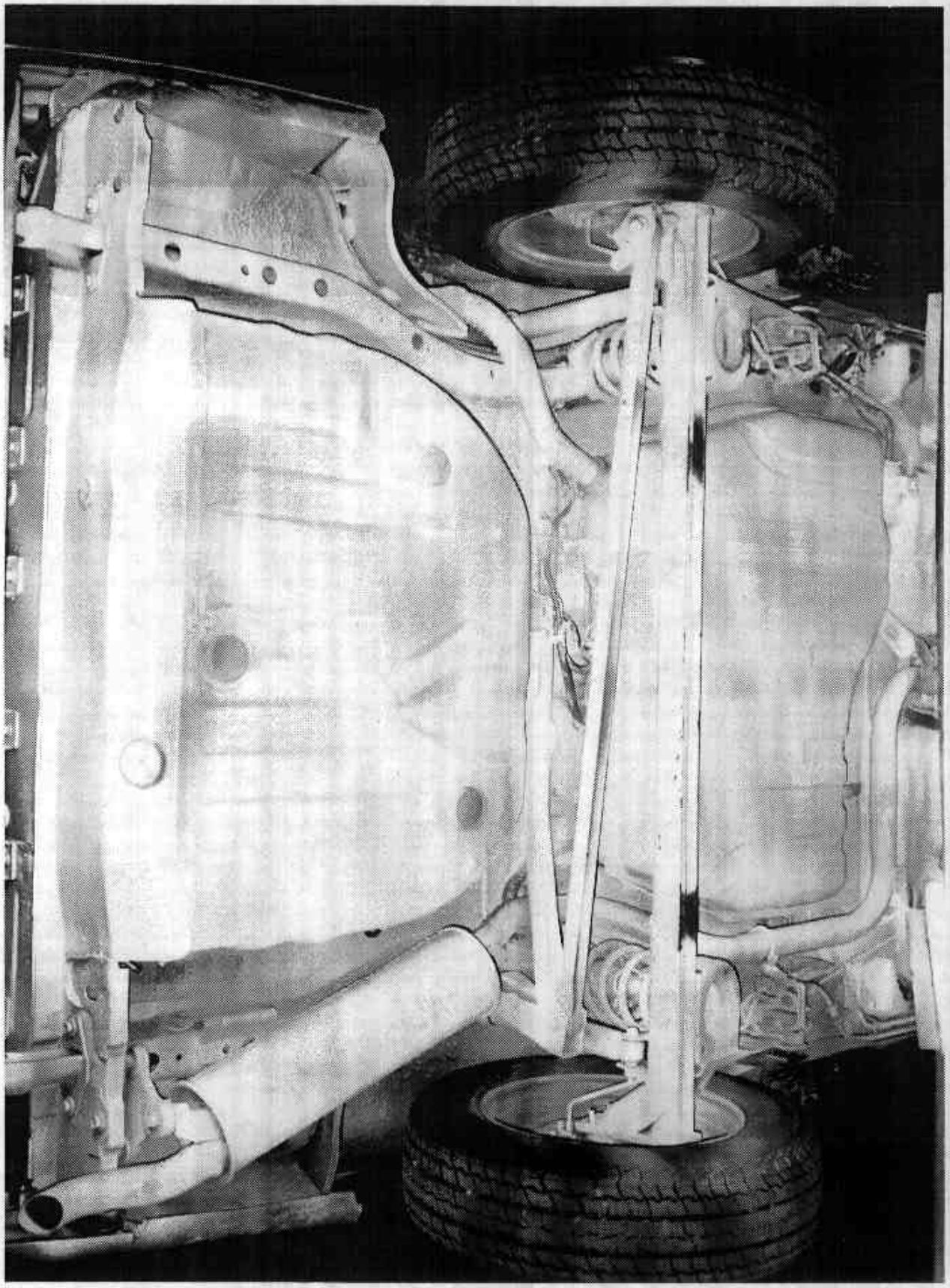

Figure A-19 PRE-TEST REAR UNDERBODY VIEW

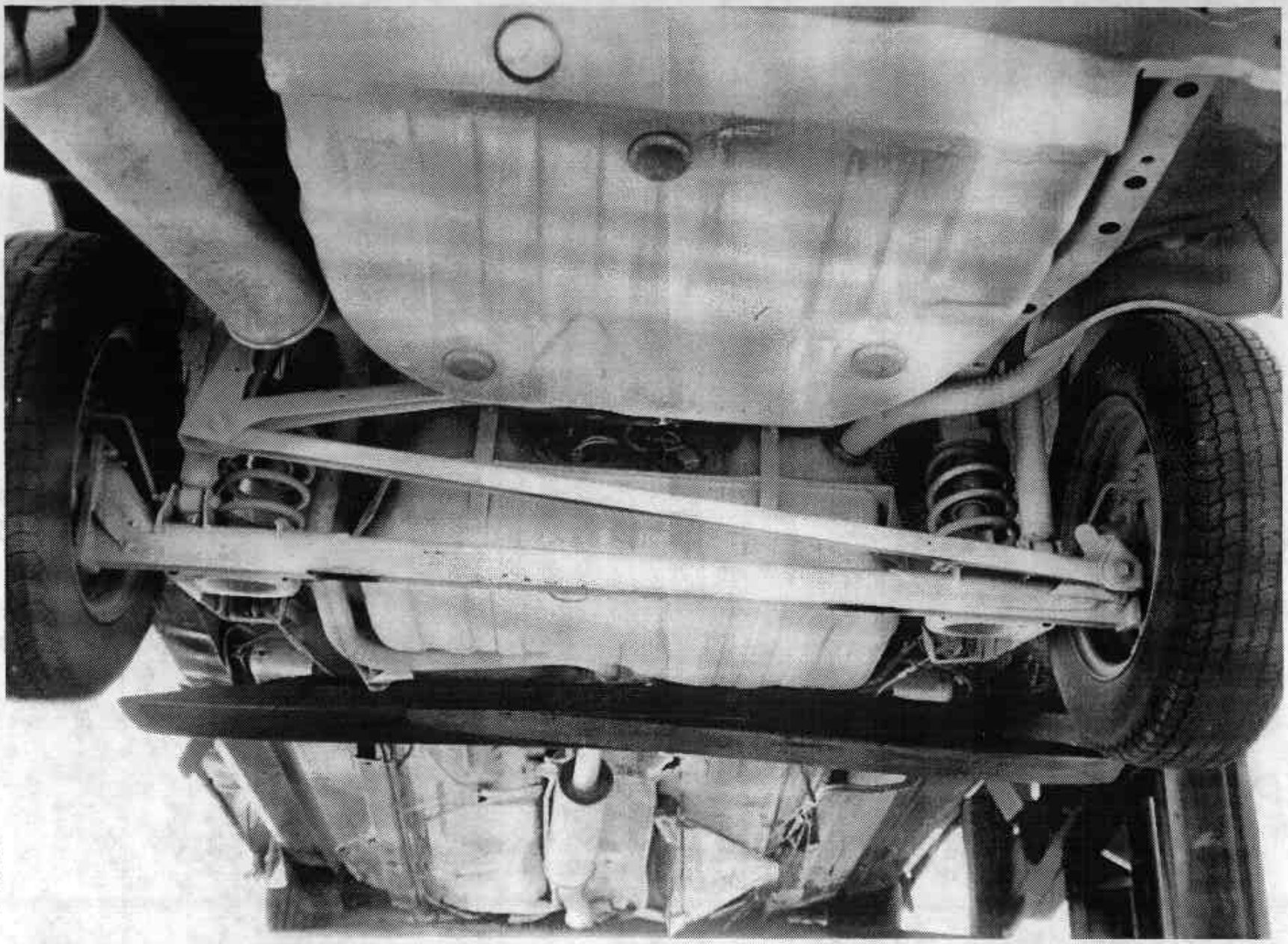

Figure A-20 POST-TEST REAR UNDERBODY VIEW

Figure A-21 PRE-TEST DRIVER POSITION VIEW

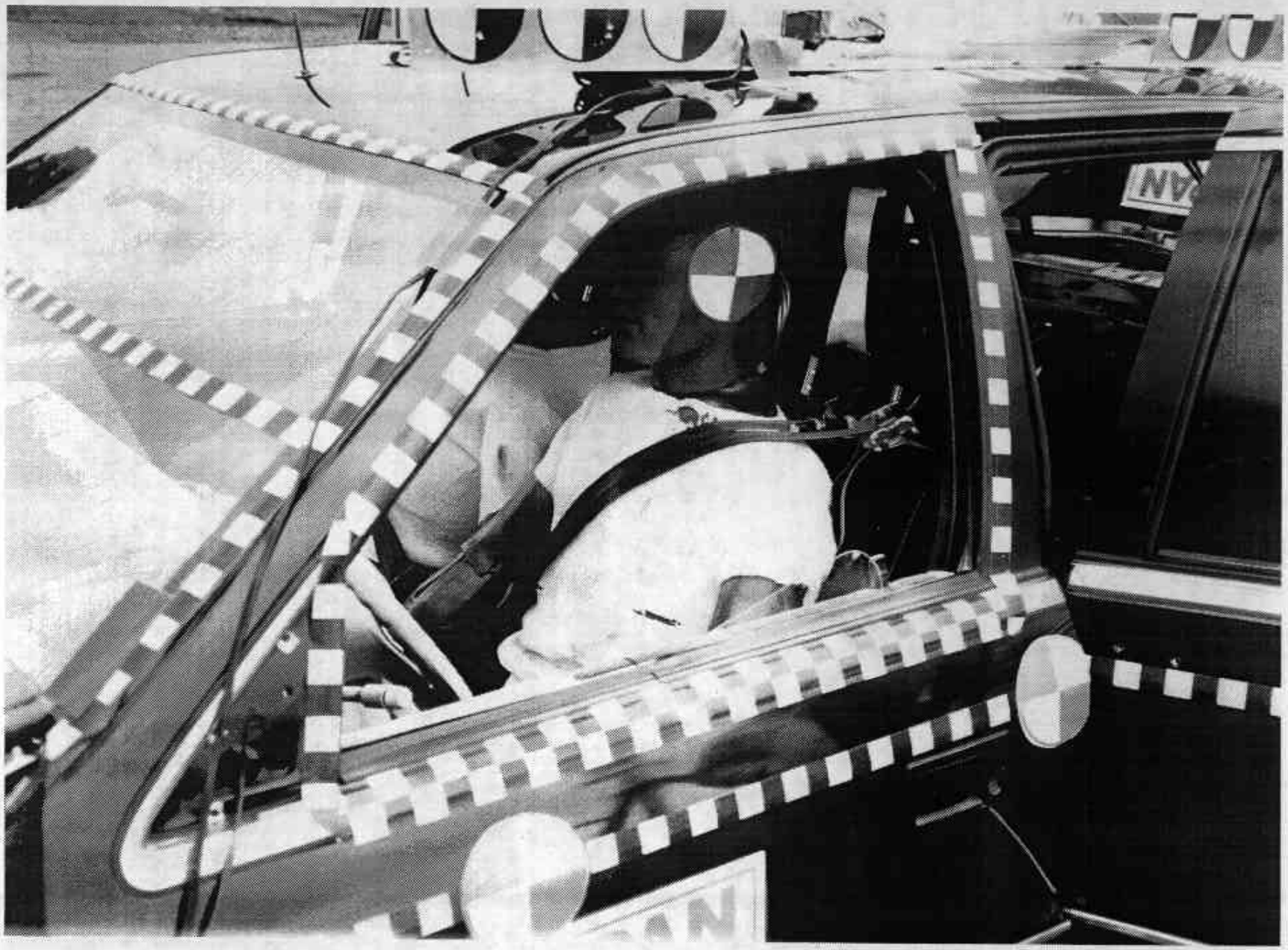

Figure A-22 POST-TEST DRIVER POSITION VIEW

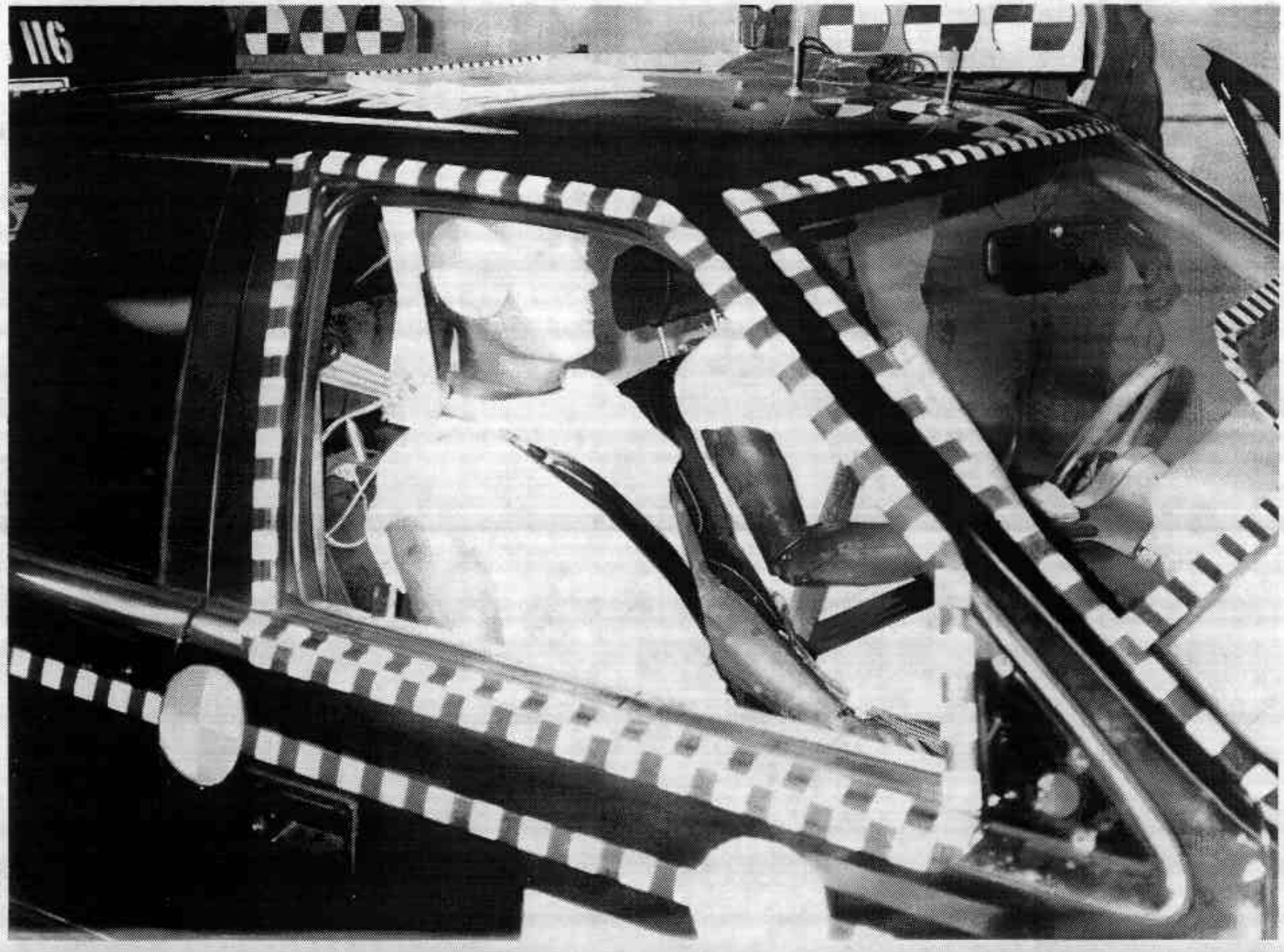

Figure A-23 PRE-TEST PASSENGER POSITION VIEW

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Figure A-24 POST-TEST PASSENGER POSITION VIEW

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Figure A-25 PRE-TEST DRIVER AND INTERIOR VIEW

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Figure A-26 POST-TEST DRIVER AND INTERIOR VIEW

Figure A-27 PRE-TEST PASSENGER AND INTERIOR VIEW

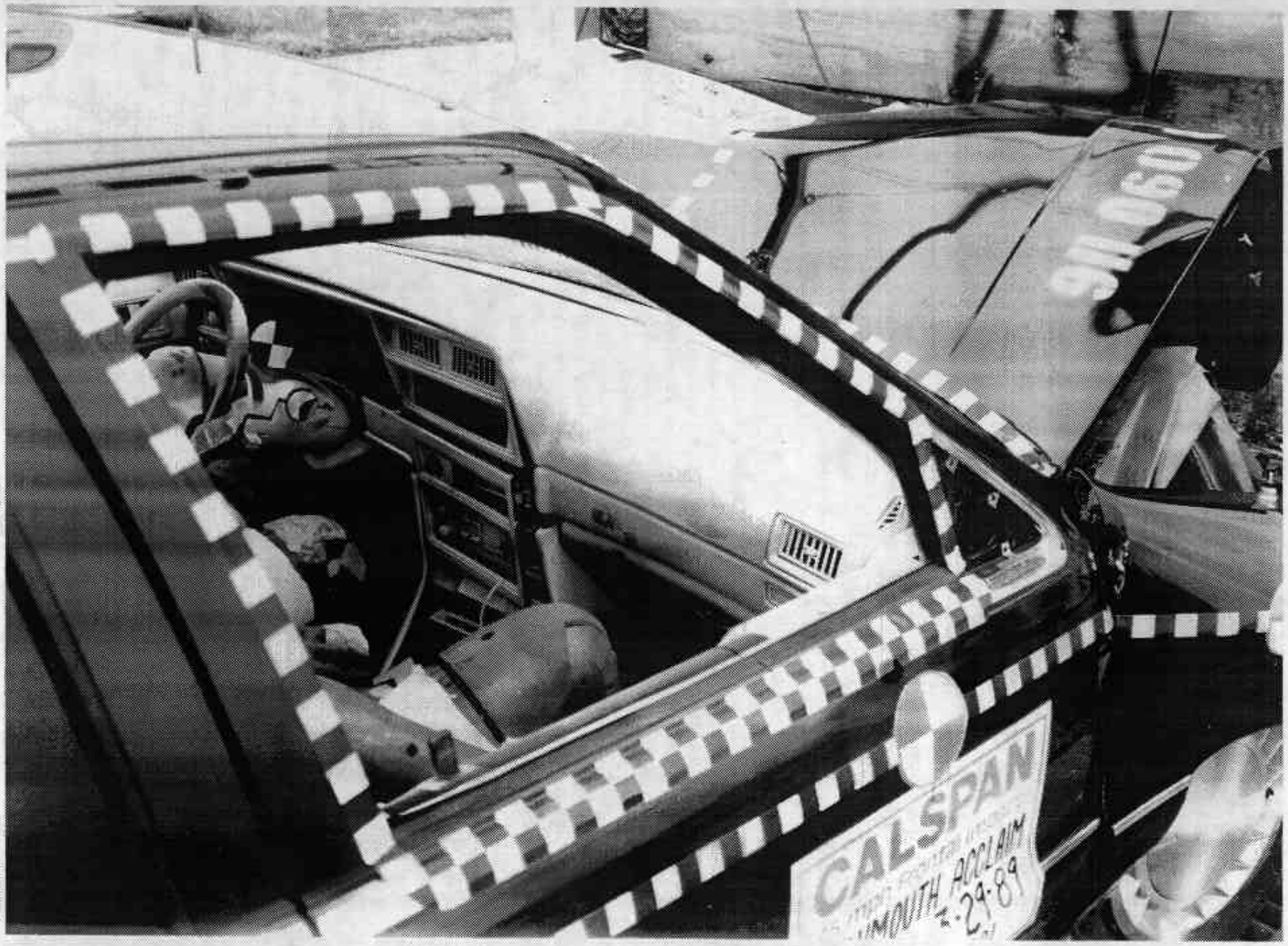


Figure A-28 POST-TEST PASSENGER AND INTERIOR VIEW

7731-6

Appendix B

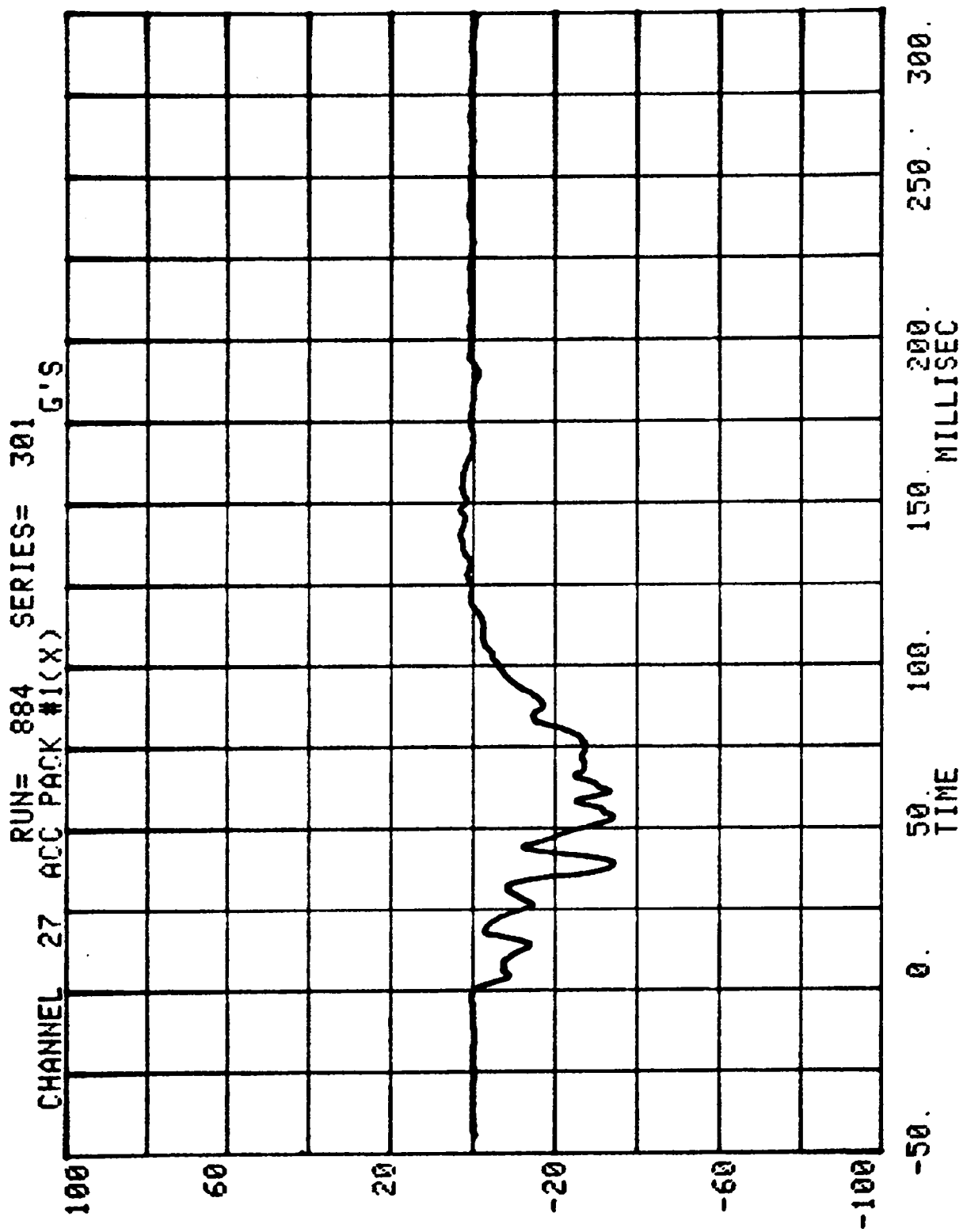
VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

TEST NO. MK0301

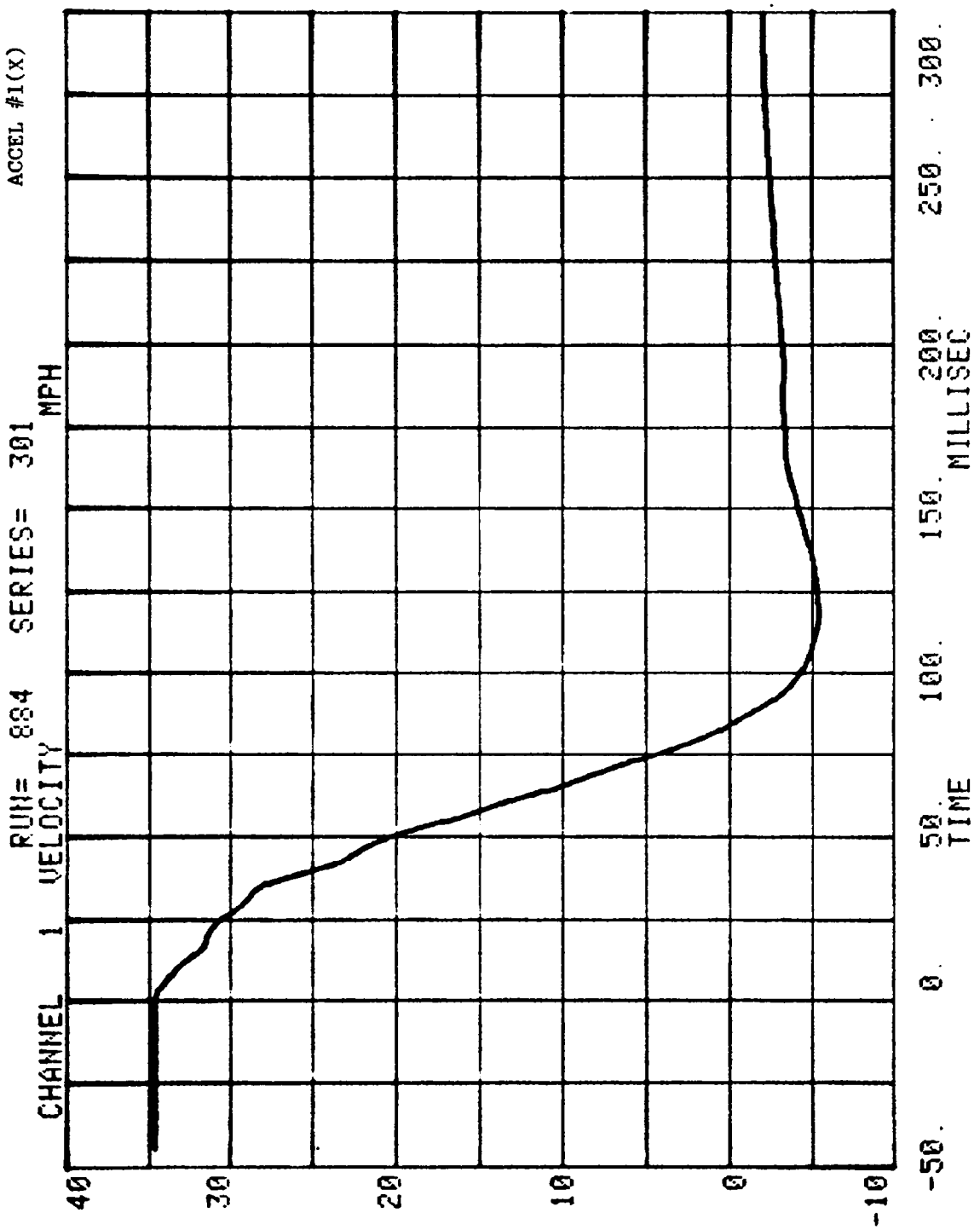
LOAD CELL BARRIER DATA

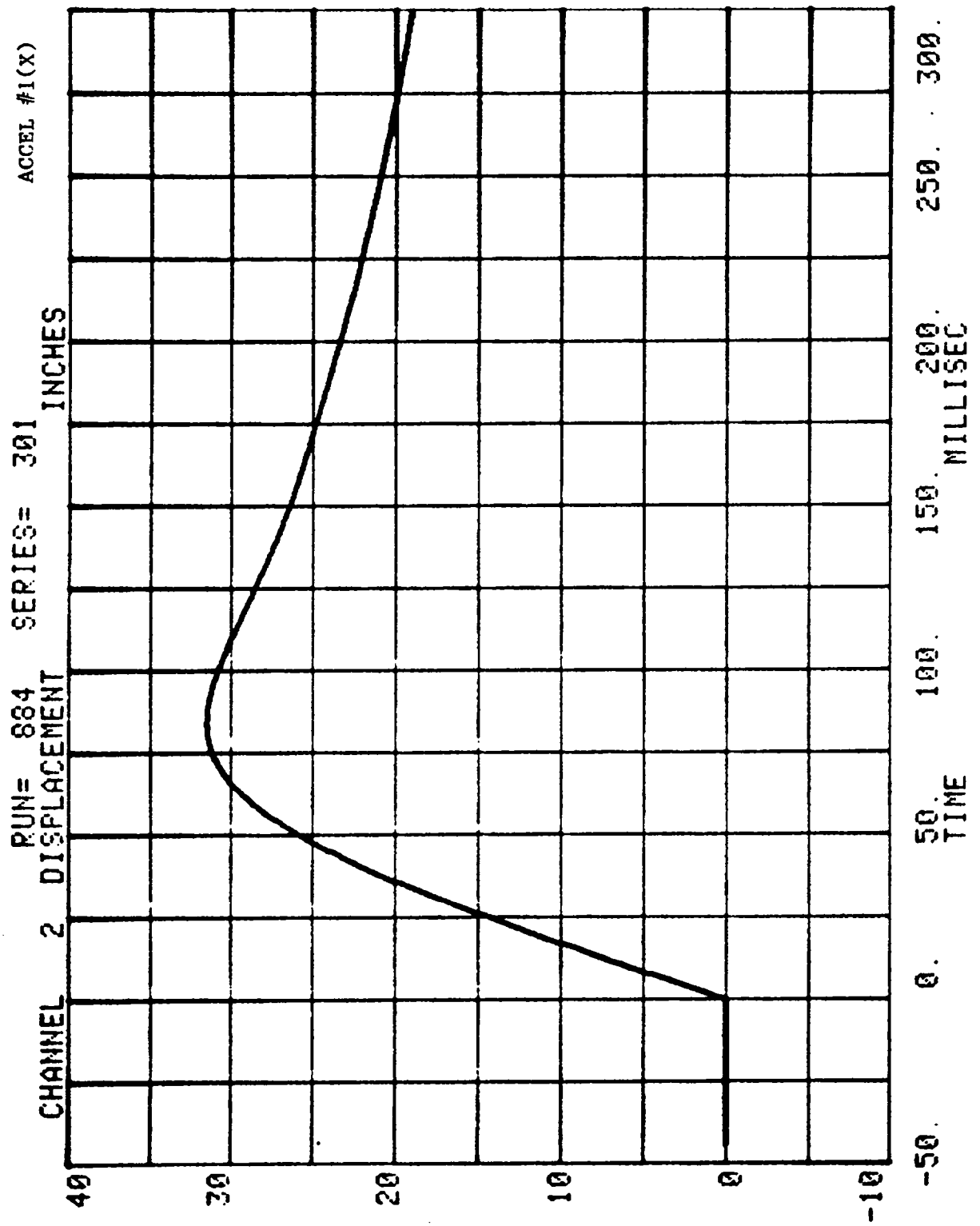
FILTER CHANNEL CLASS

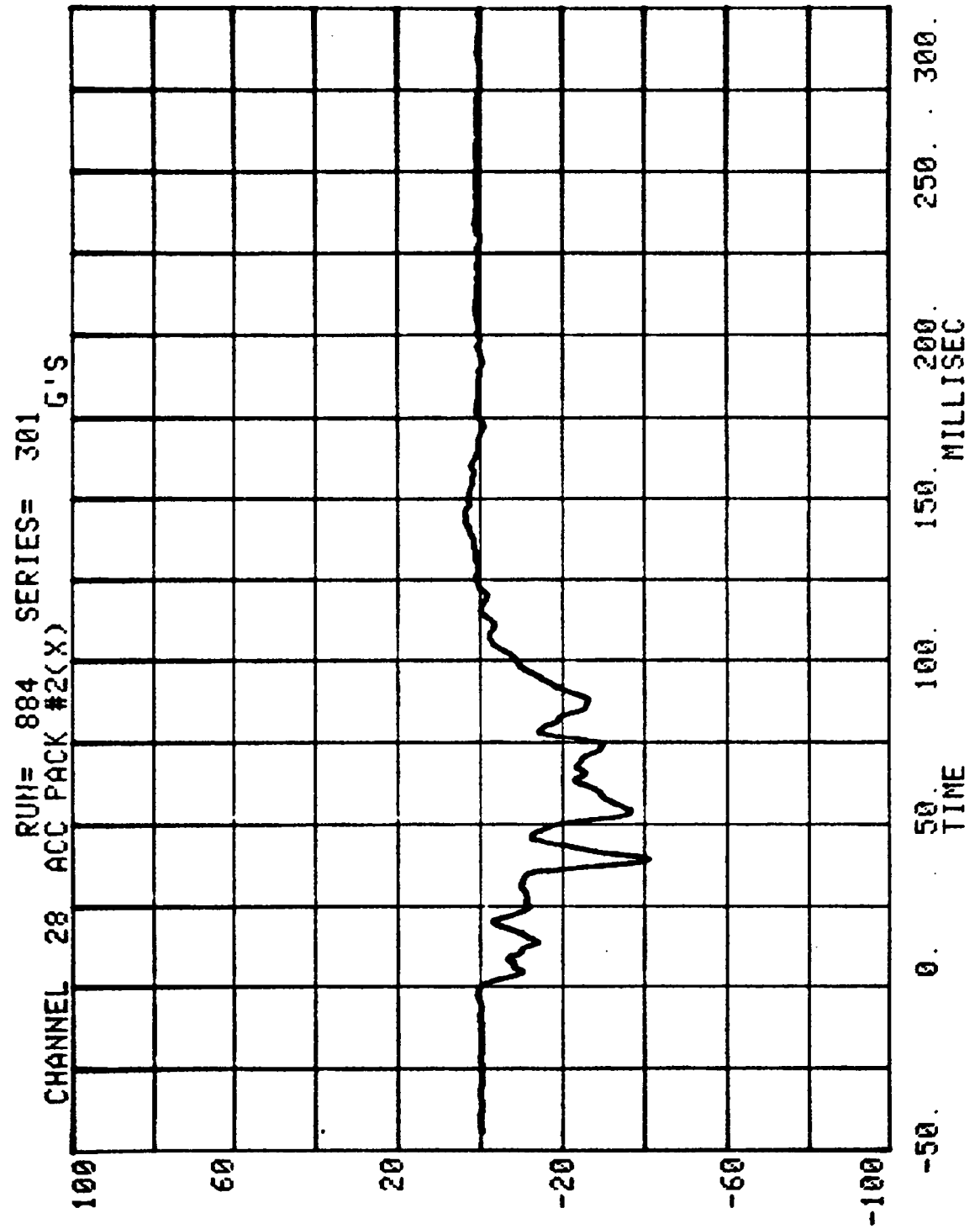
60

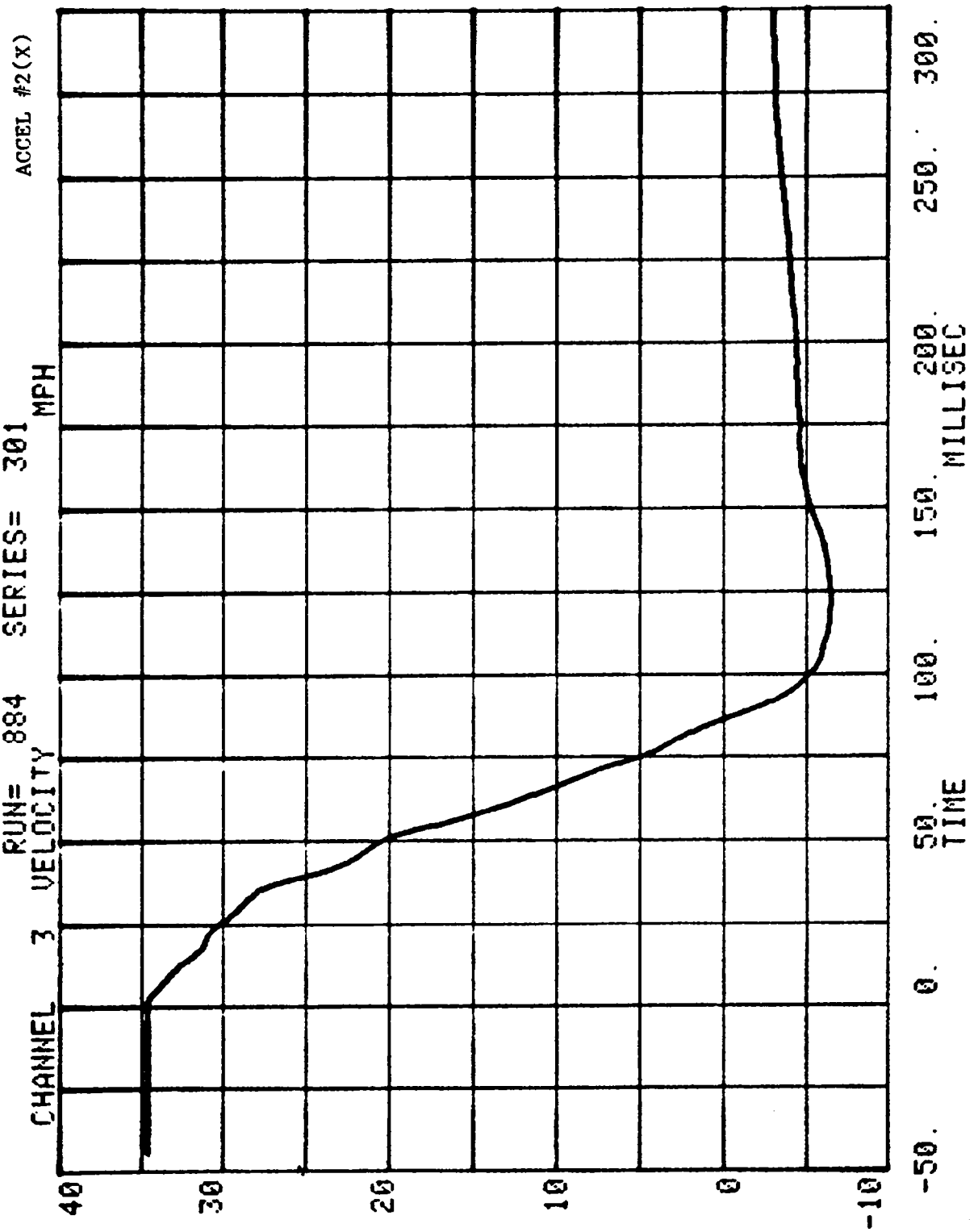

CHANNEL 27 ACC PACK #1(X)
RUN= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

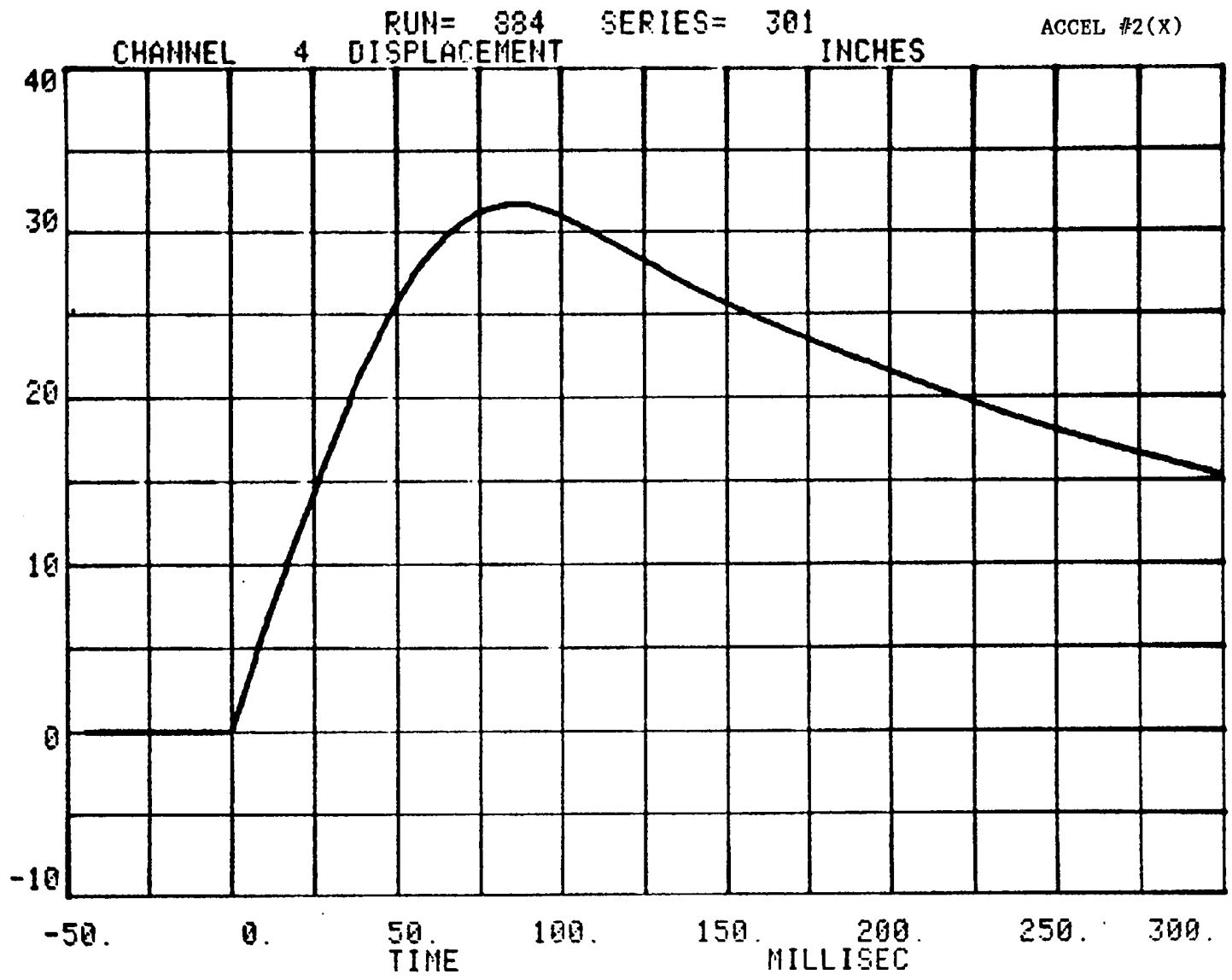
7731-6

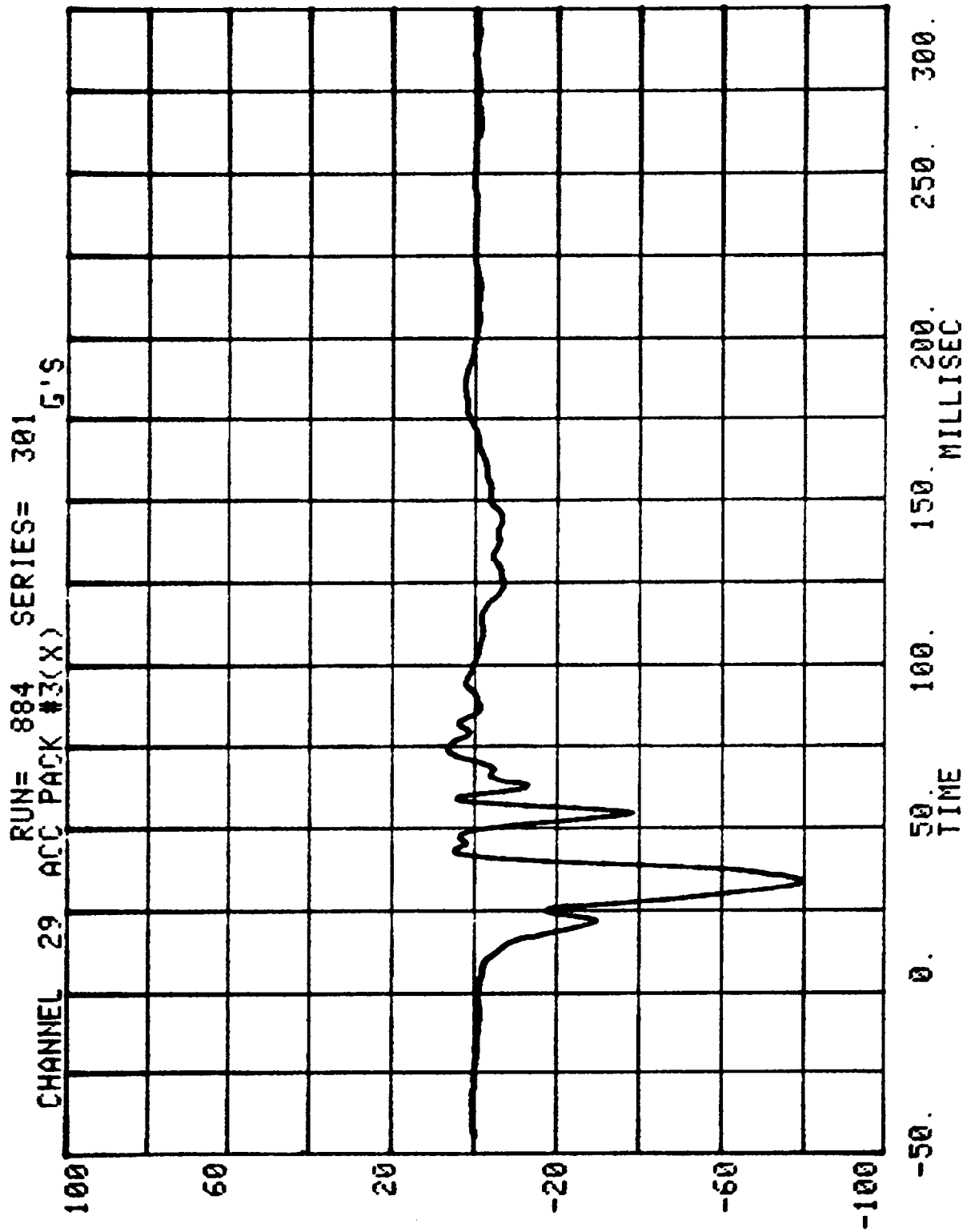

ACCEL #1(X)
CHANNEL 1 VELOCITY
RUN= 884 SERIES= 301
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

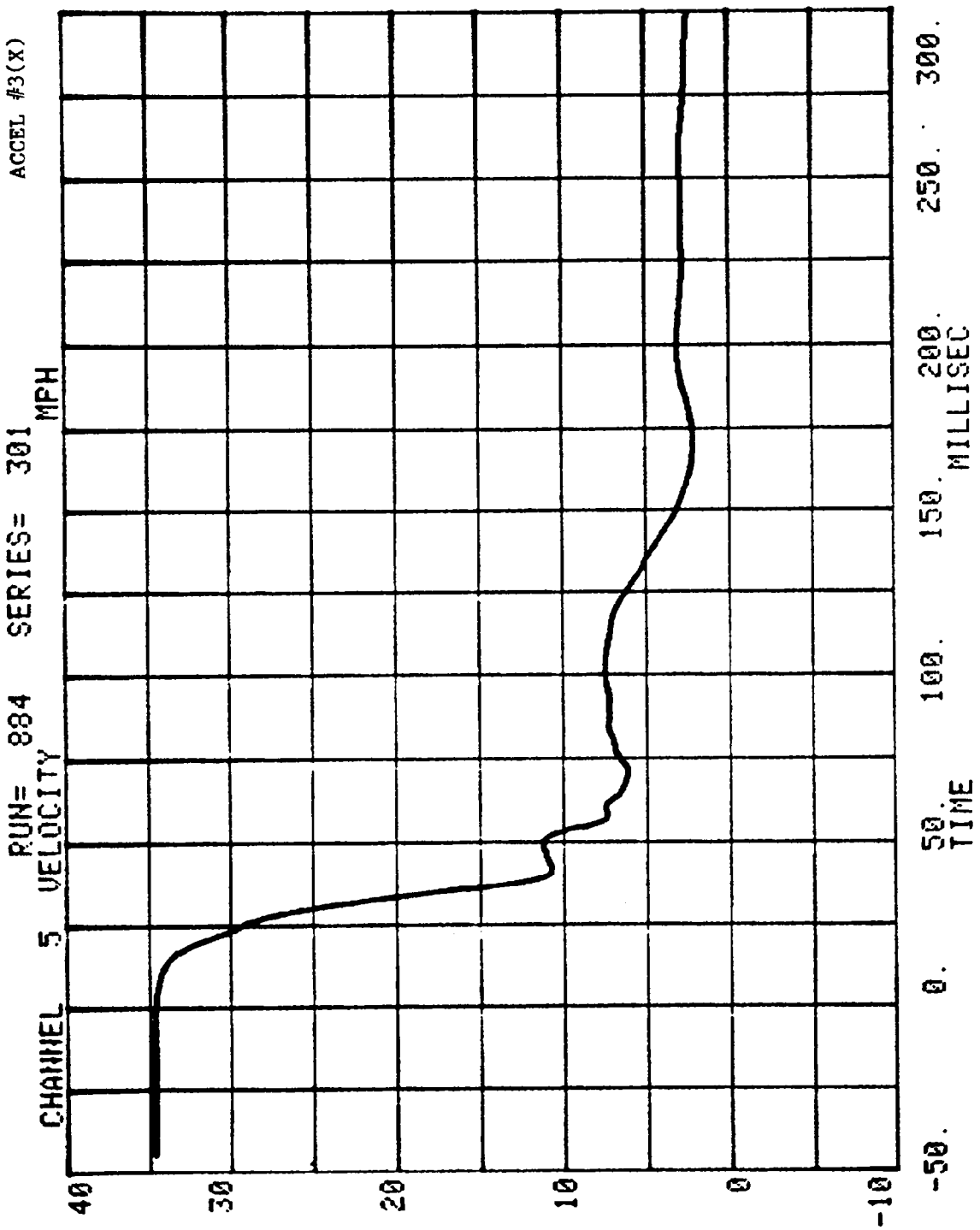

ACCEL #1(X)
CHANNEL 2 DISPLACEMENT
RUN= 884 SERIES= 301
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

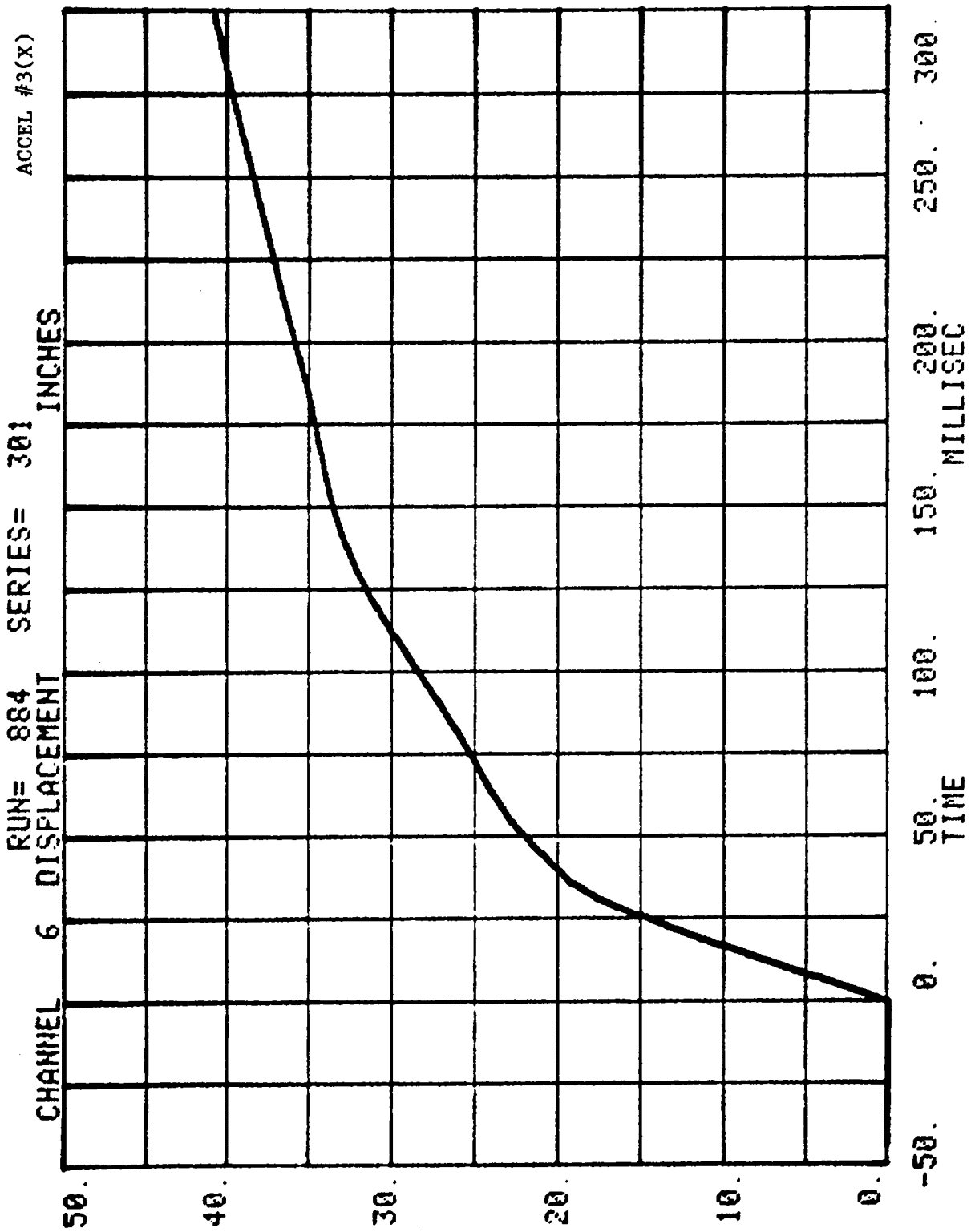

CHANNEL 28 ACC PACK #2(X)
RUN= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACCEL #2(X)
CHANNEL 3 VELOCITY
RUN= 884 SERIES= 301
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

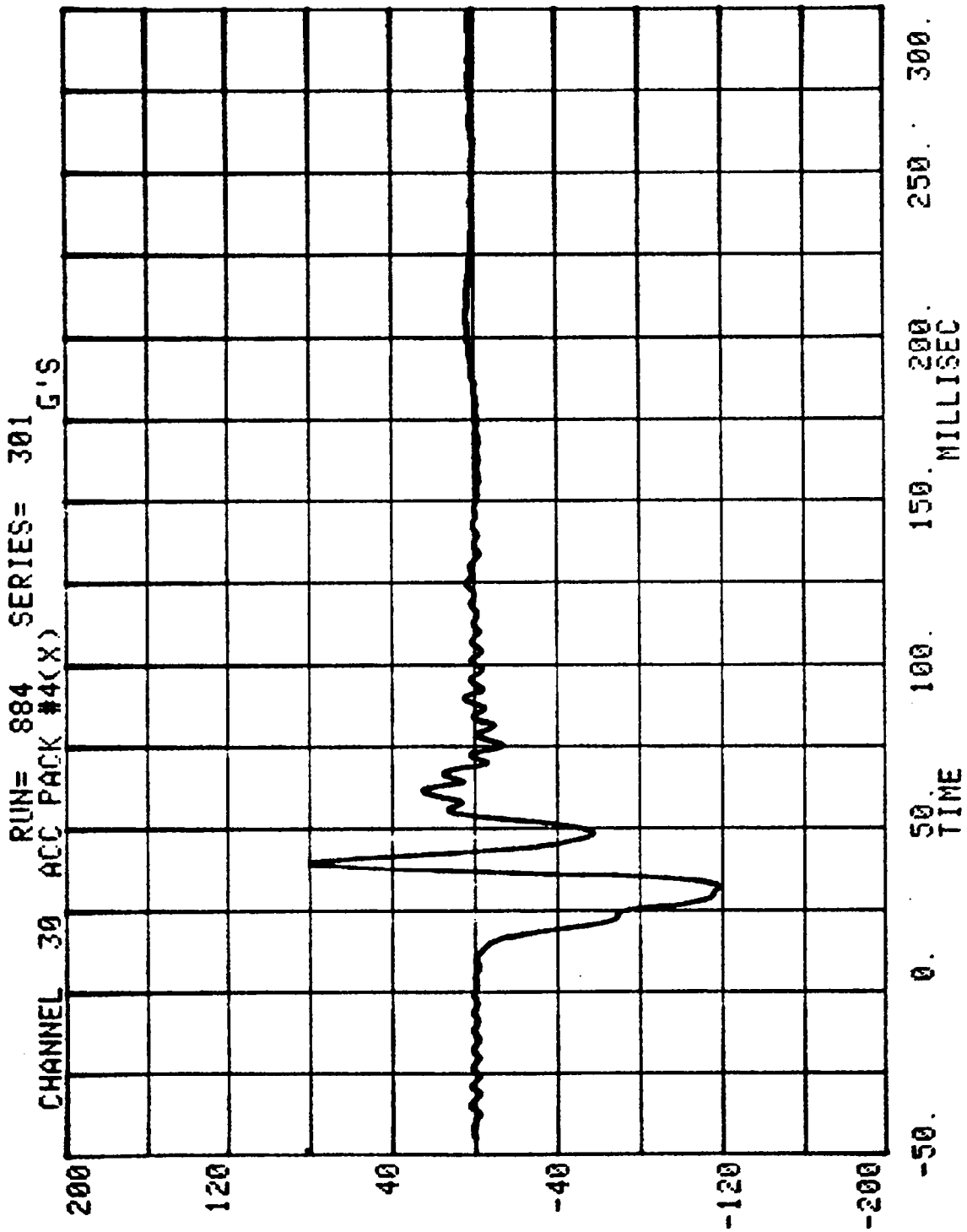

RUN= 884 SERIES= 301
ACCEL #2(X)
CHANNEL 4 DISPLACEMENT INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC


CHANNEL 29 ACC PACK #3(X)
RUN= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

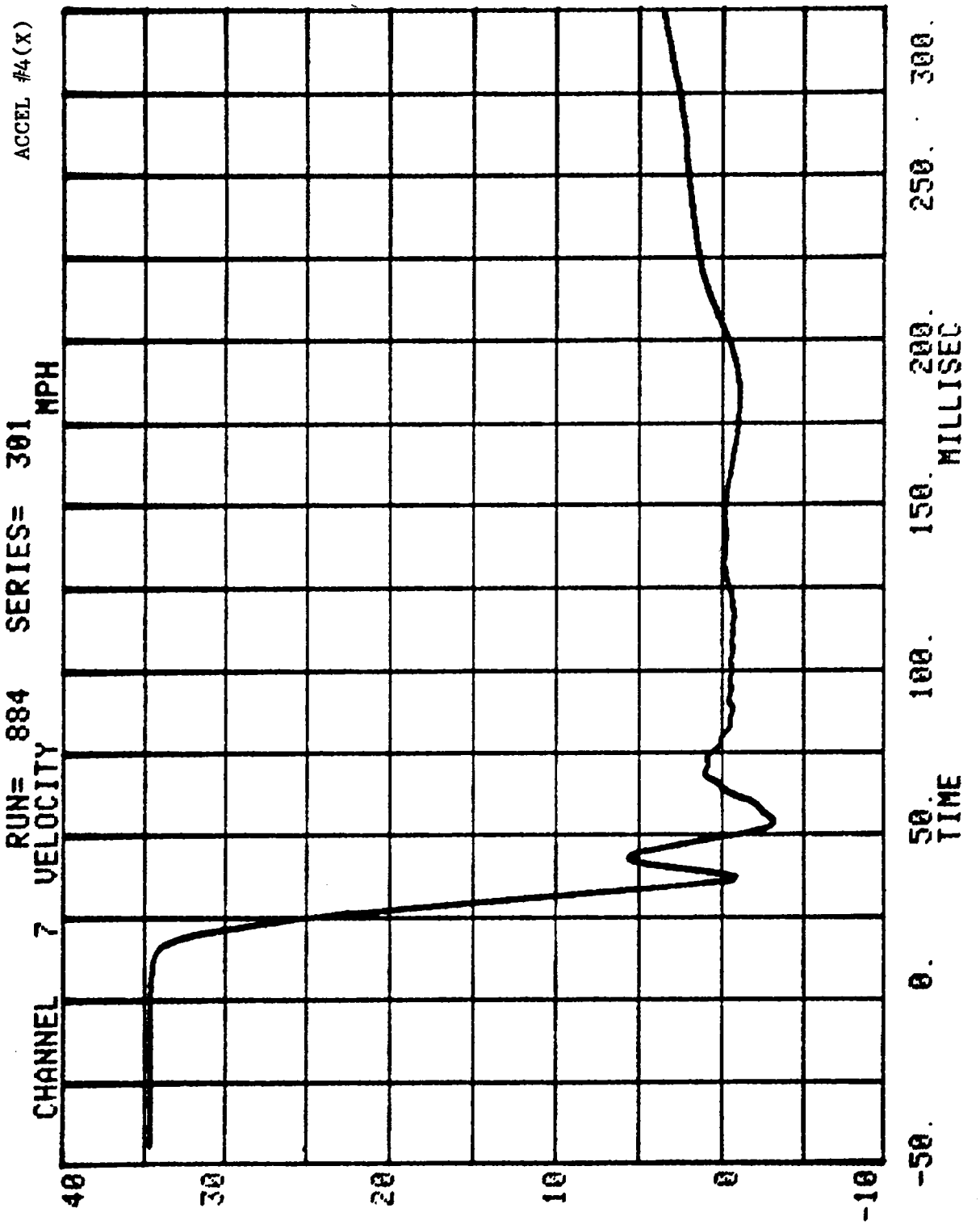

ACCEL #3(X)
CHANNEL 5 VELOCITY
RUN= 884 SERIES= 301
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACCEL #3(X)
CHANNEL 6 DISPLACEMENT
RUN= 884 SERIES= 301
INCHES
50.
40.
30.
20.
10.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

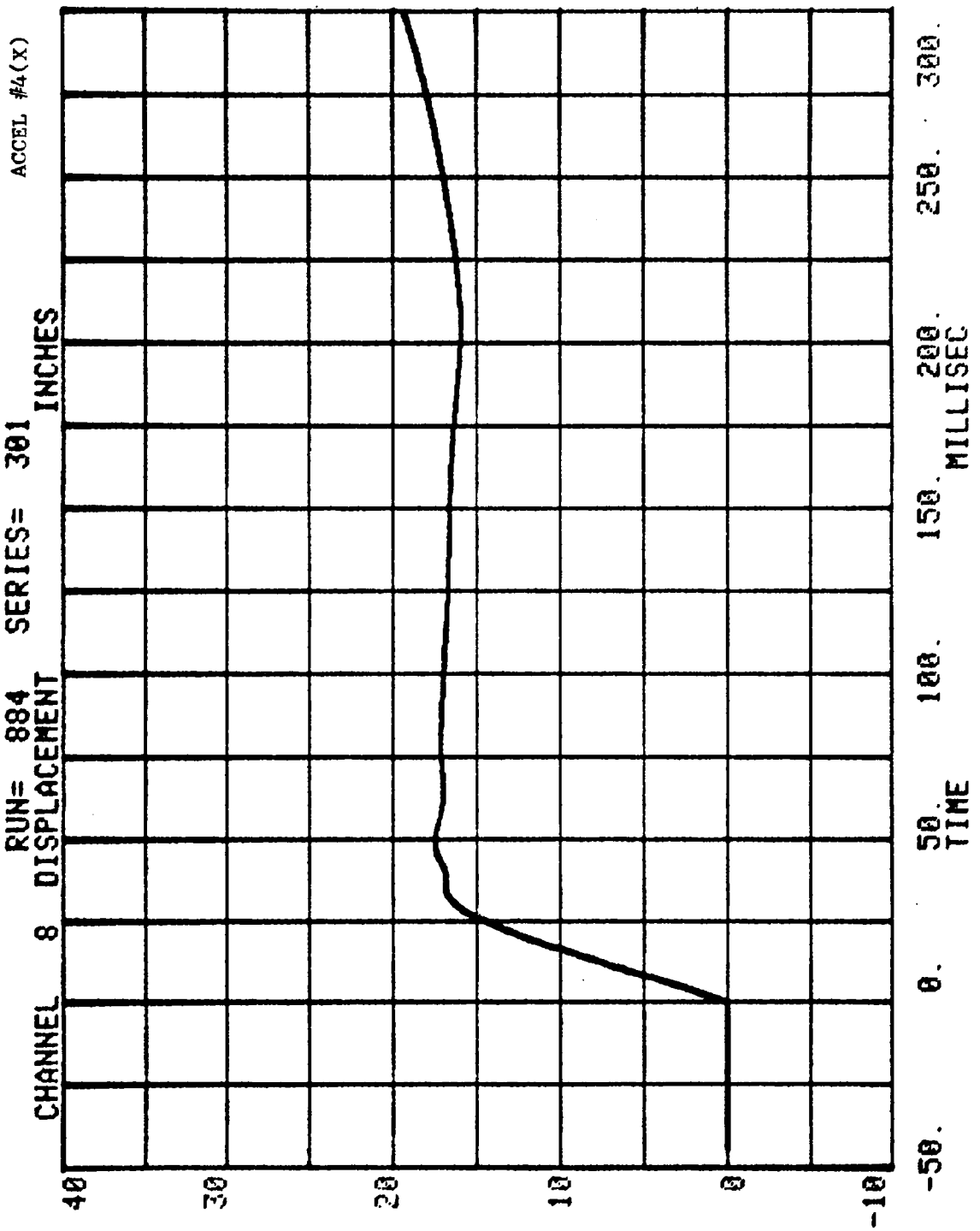
7731-6


CHANNEL 30 ACC PACK #4(X)
RUN= 884 SERIES= 301
G'S
200
120
40
-40
-120
-200
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


ACCEL #4(X)
CHANNEL 7 VELOCITY
RUN= 884 SERIES= 301
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


ACCEL #4(X)
CHANNEL 8 DISPLACEMENT
RUN= 884 SERIES= 301
INCHES
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30
20
10
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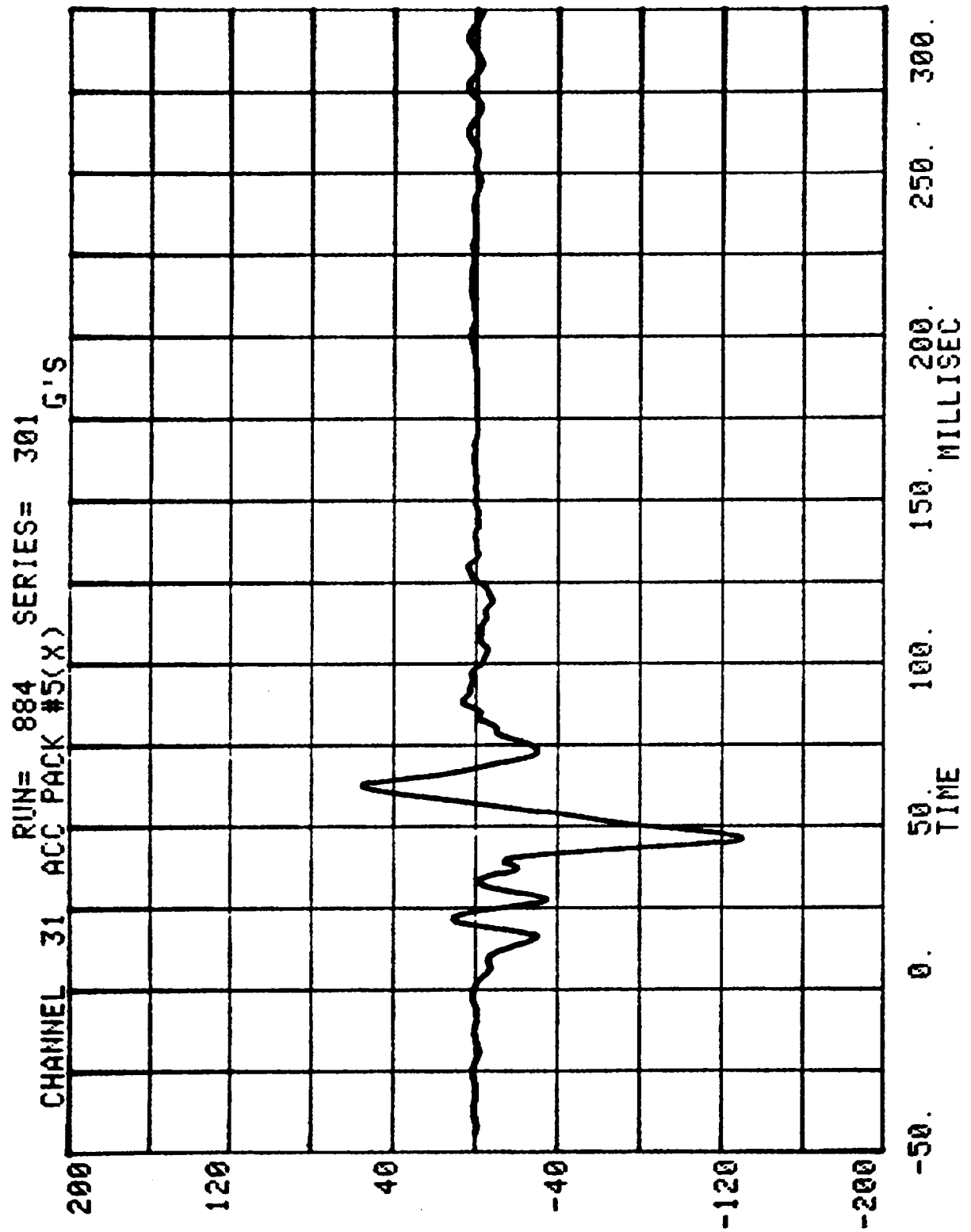
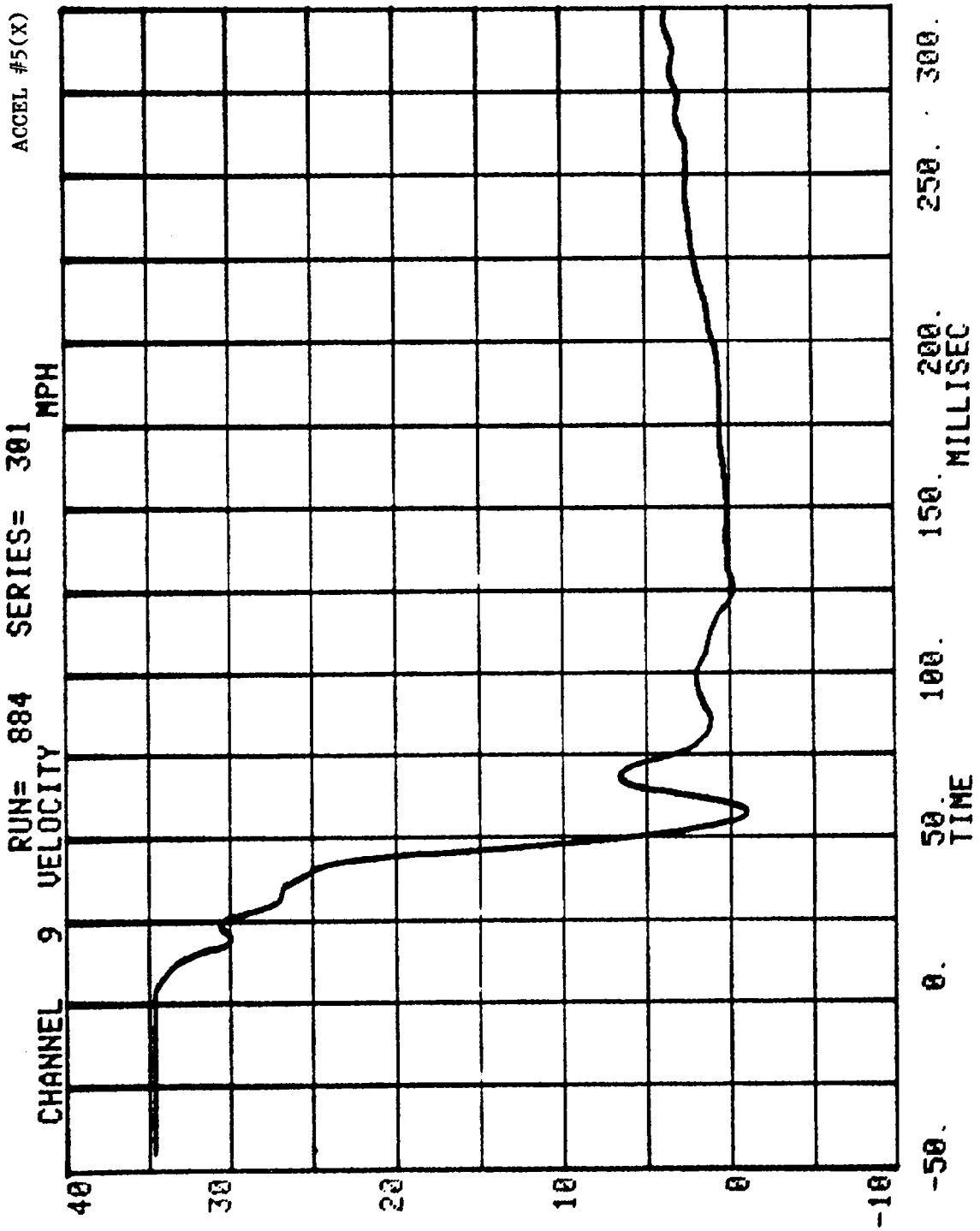
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

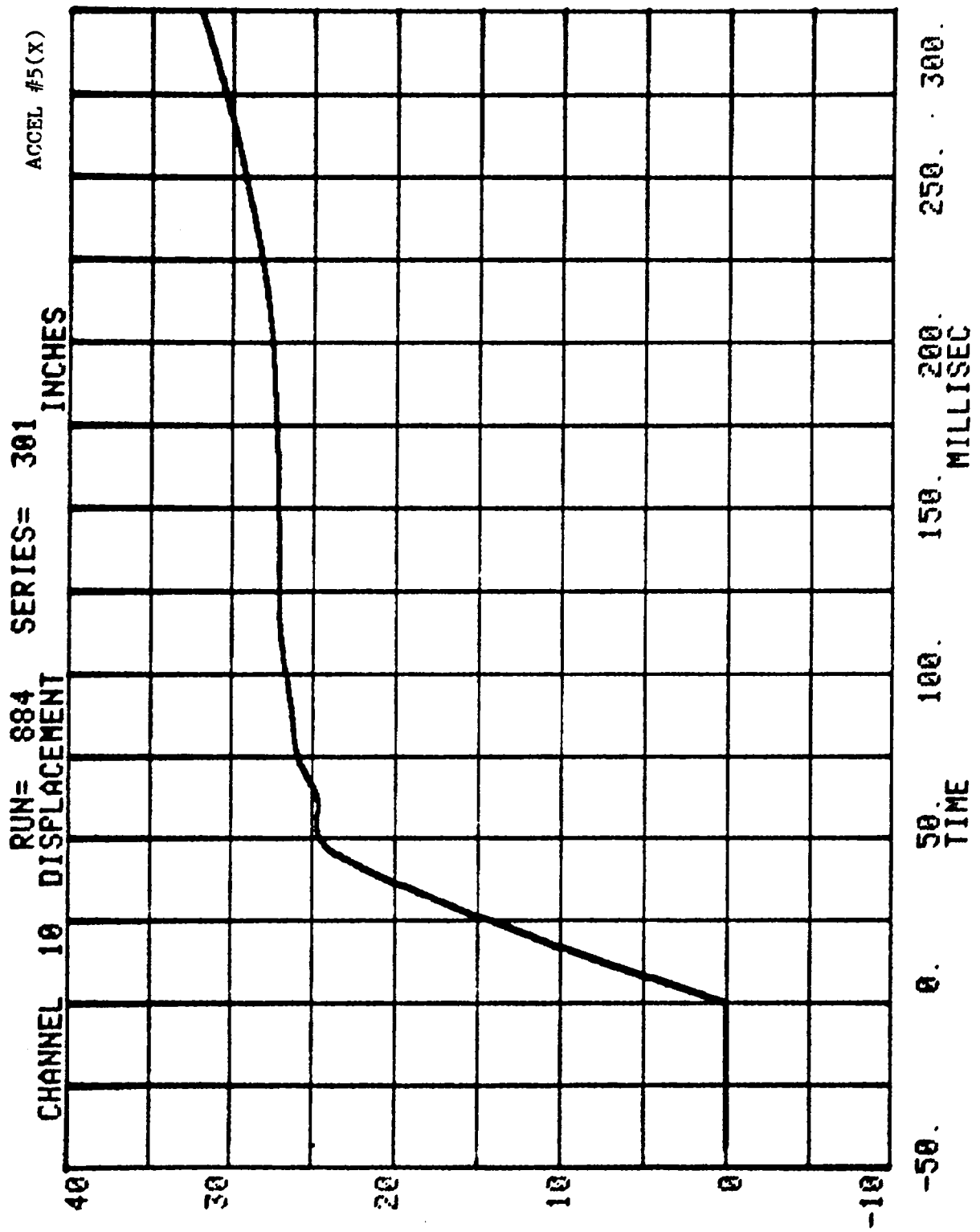
7731-6

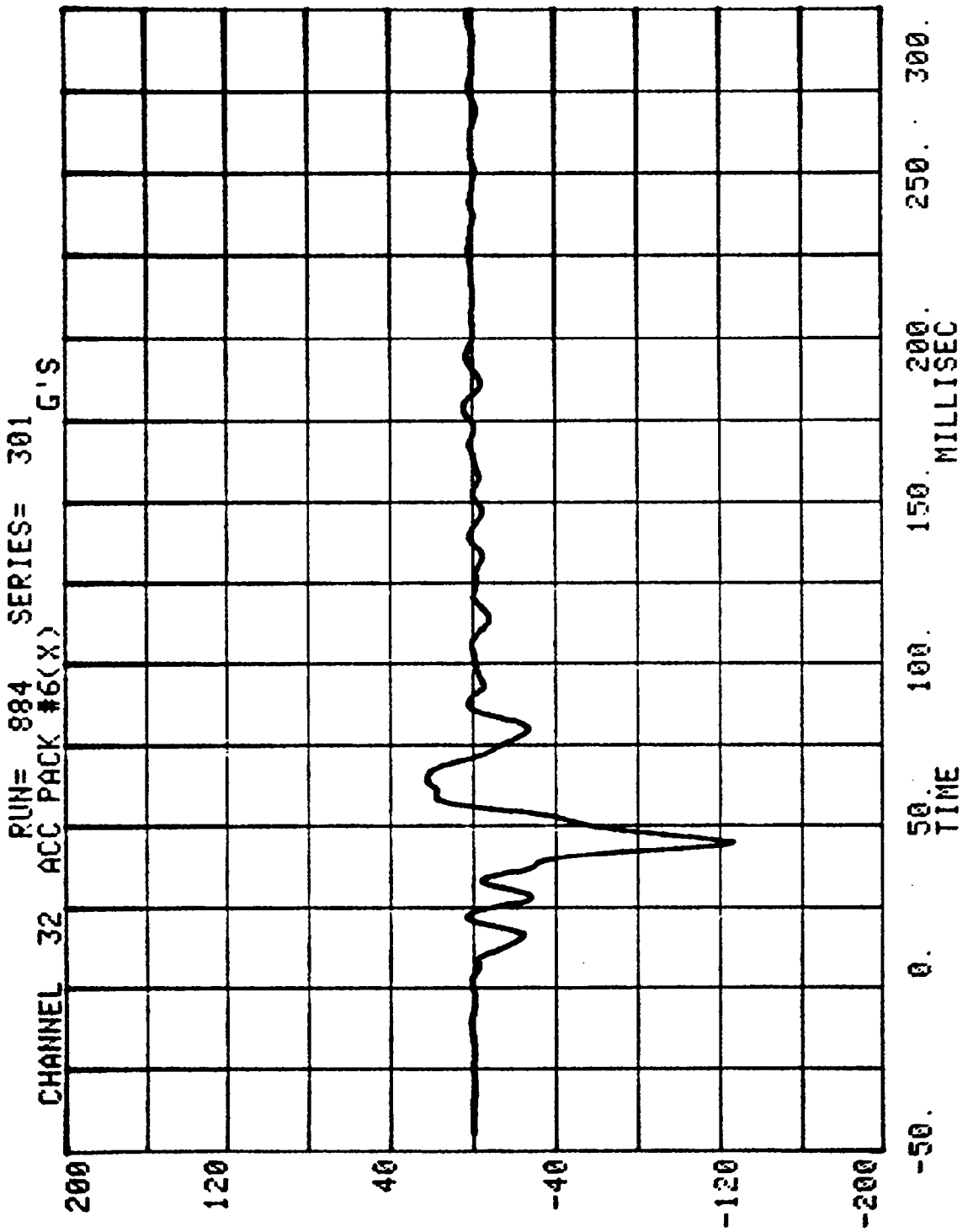

CHANNEL 31 ACC PACK #5(X)
RUN= 884 SERIES= 301
G'S
200
120
40
-40
-120
-200
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6

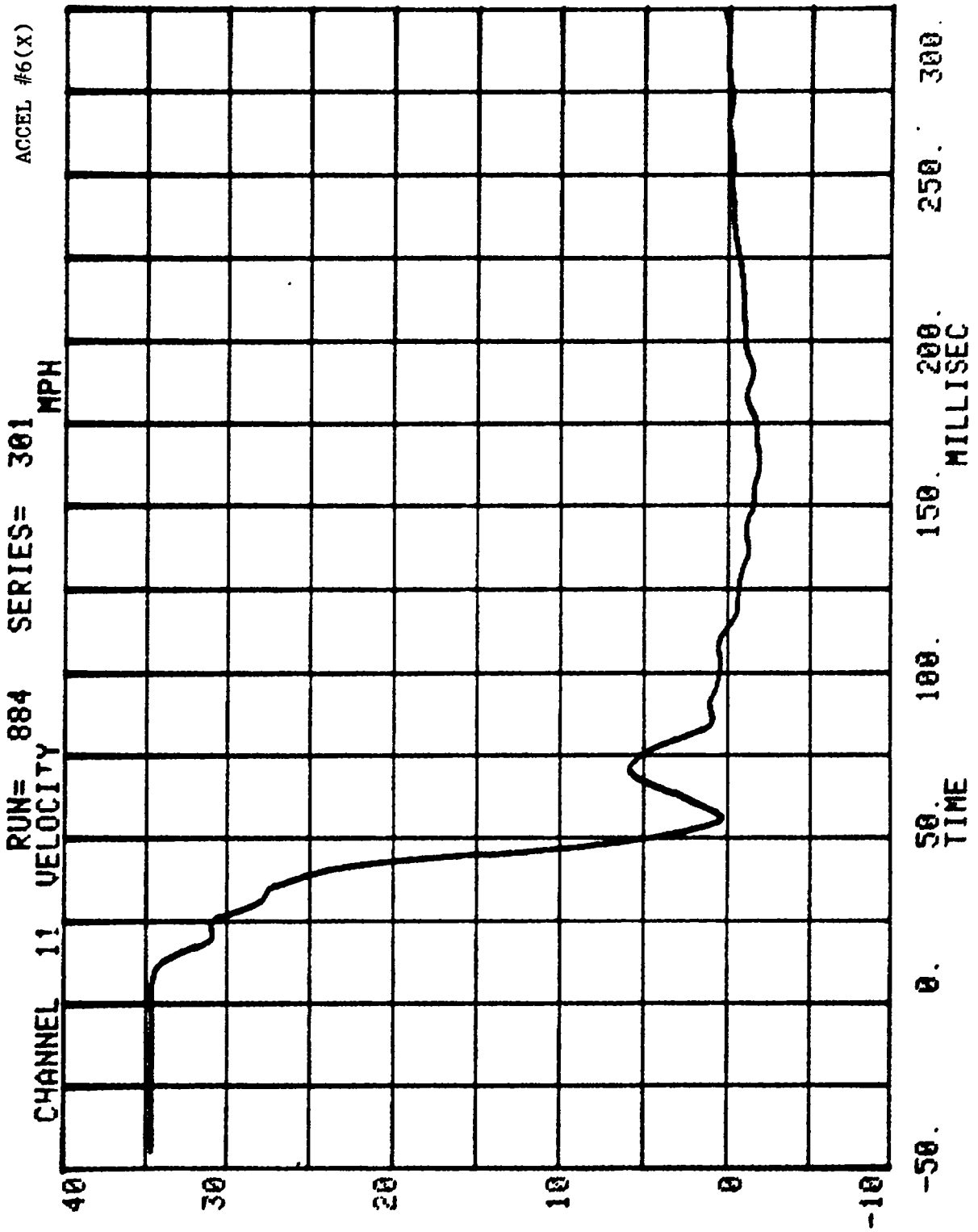

ACCEL #5(X)
CHANNEL 9 VELOCITY
RUN= 884 SERIES= 301
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


ACCEL #5(X)
CHANNEL 10 DISPLACEMENT
RUN= 884 SERIES= 301
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 32 ACC PACK #6(X)
RUN= 884 SERIES= 301
G'S
200
120
40
-40
-120
-200
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


ACCEL #6(X)
CHANNEL 11 VELOCITY
RUN= 884 SERIES= 301
MPH
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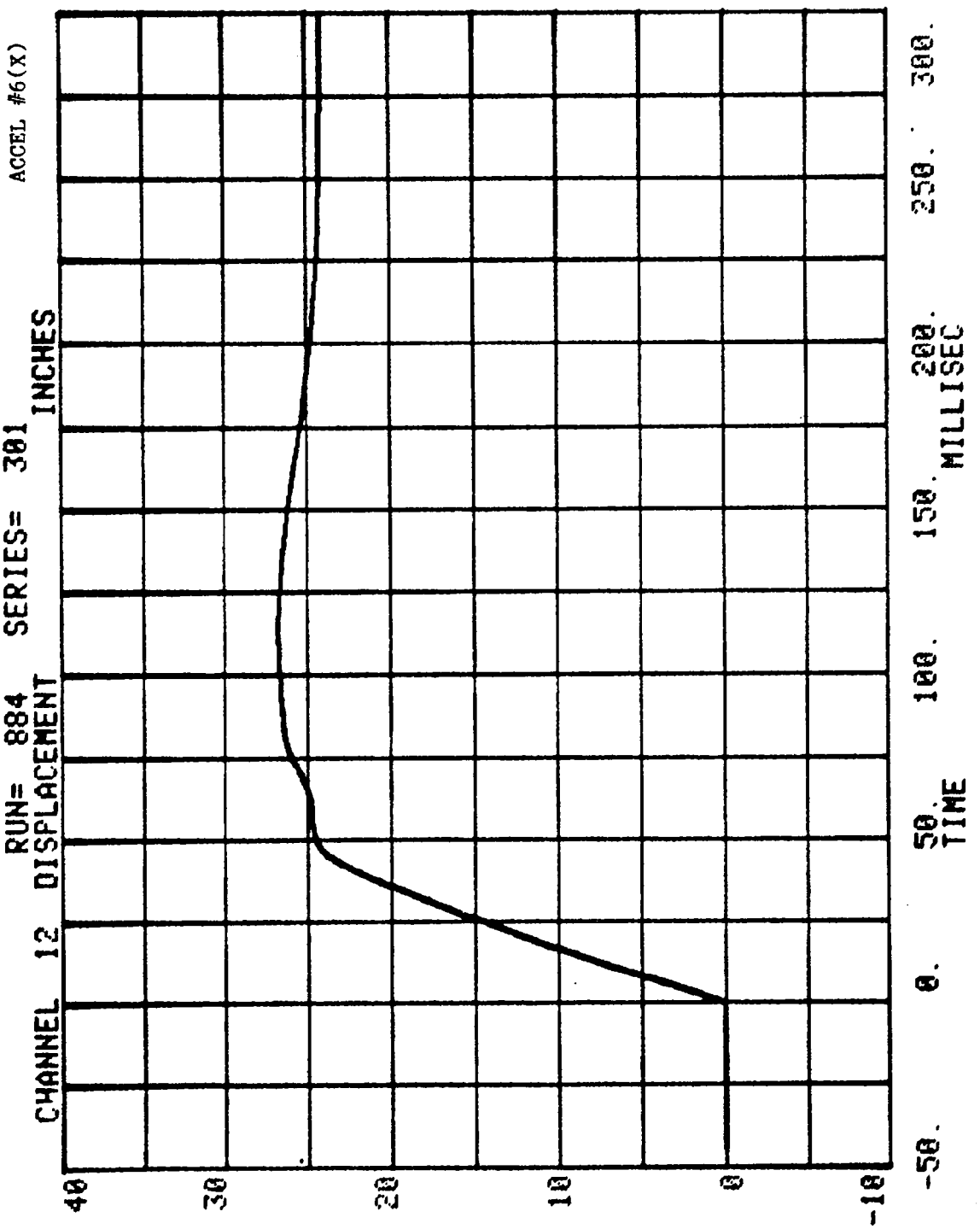
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACCEL #6(X)
CHANNEL 12 DISPLACEMENT
RUN= 884 SERIES= 301
INCHES
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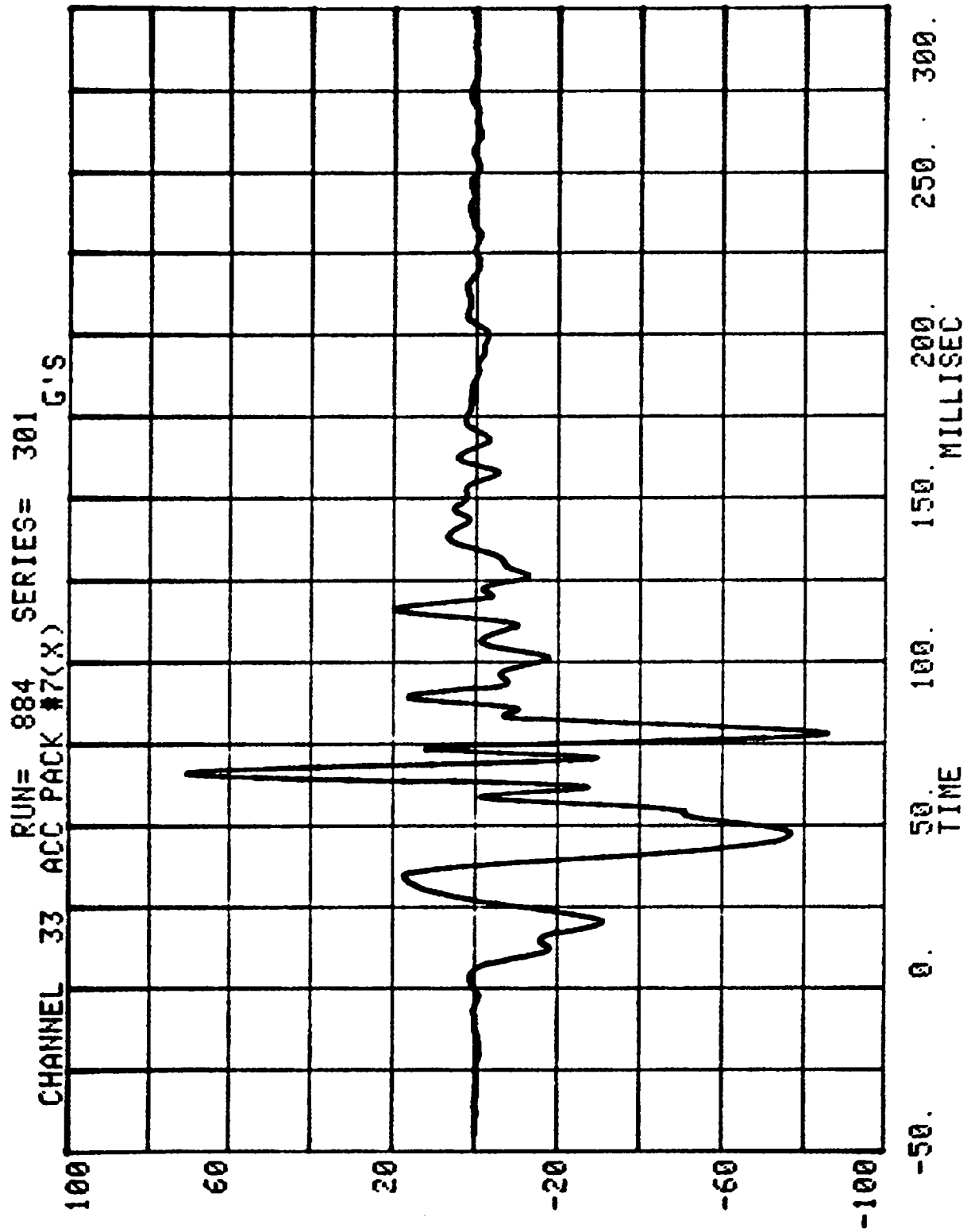
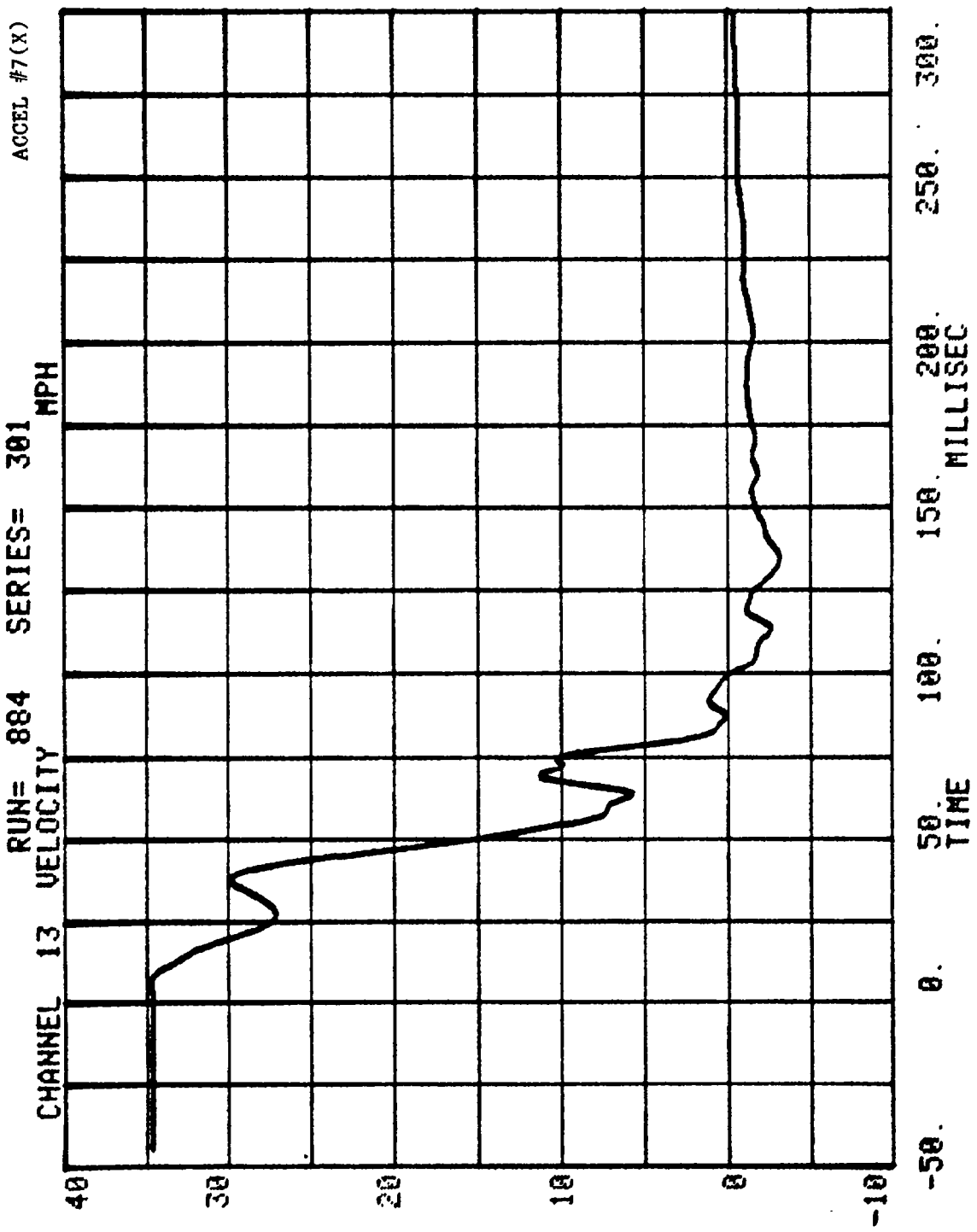
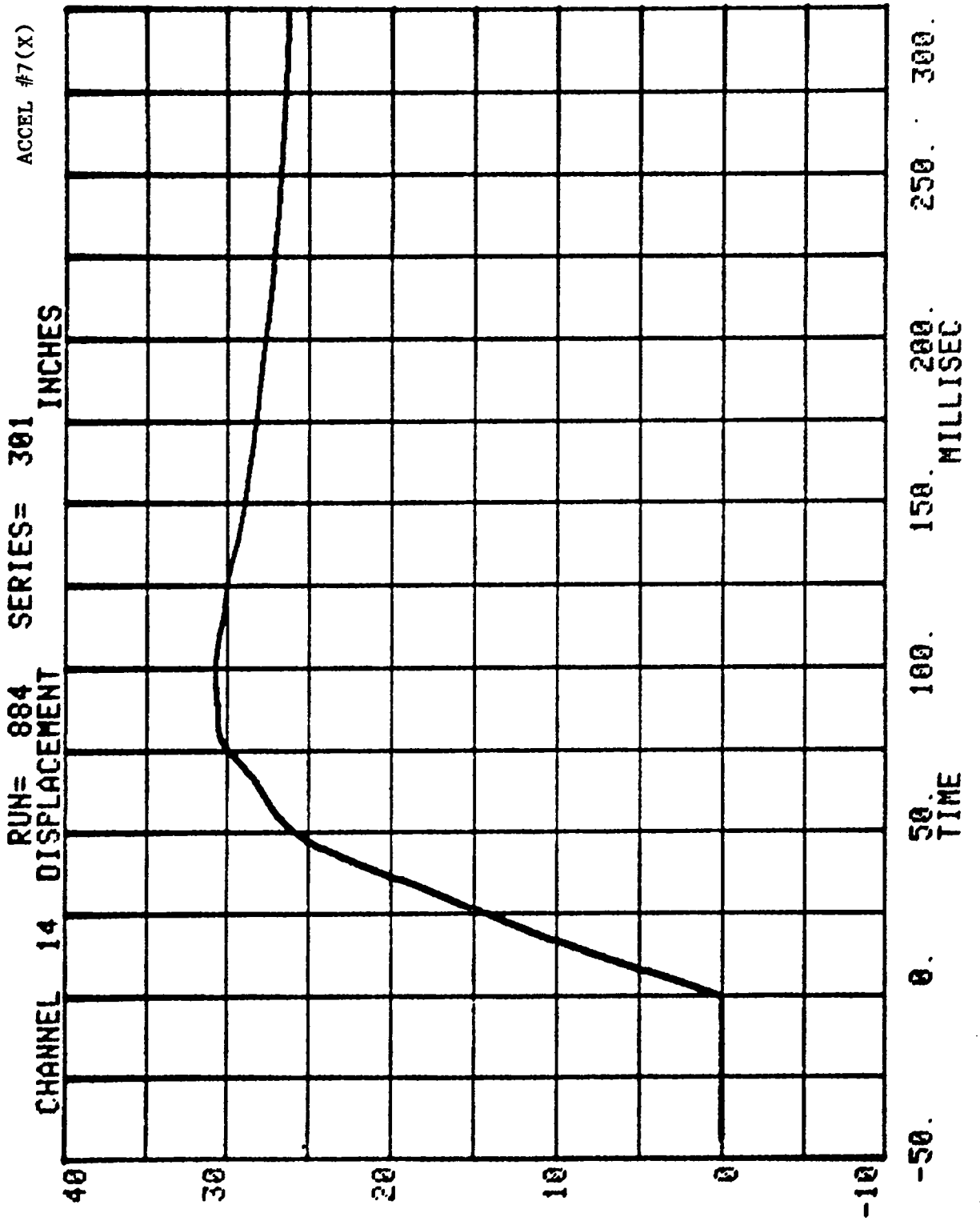
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 33 ACC PACK #7(X)
RUN= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


ACCEL #7(X)
CHANNEL 13 VELOCITY
RUN= 884 SERIES= 301
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


ACCEL #7(X)
CHANNEL 14 DISPLACEMENT
RUN= 884 SERIES= 301
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

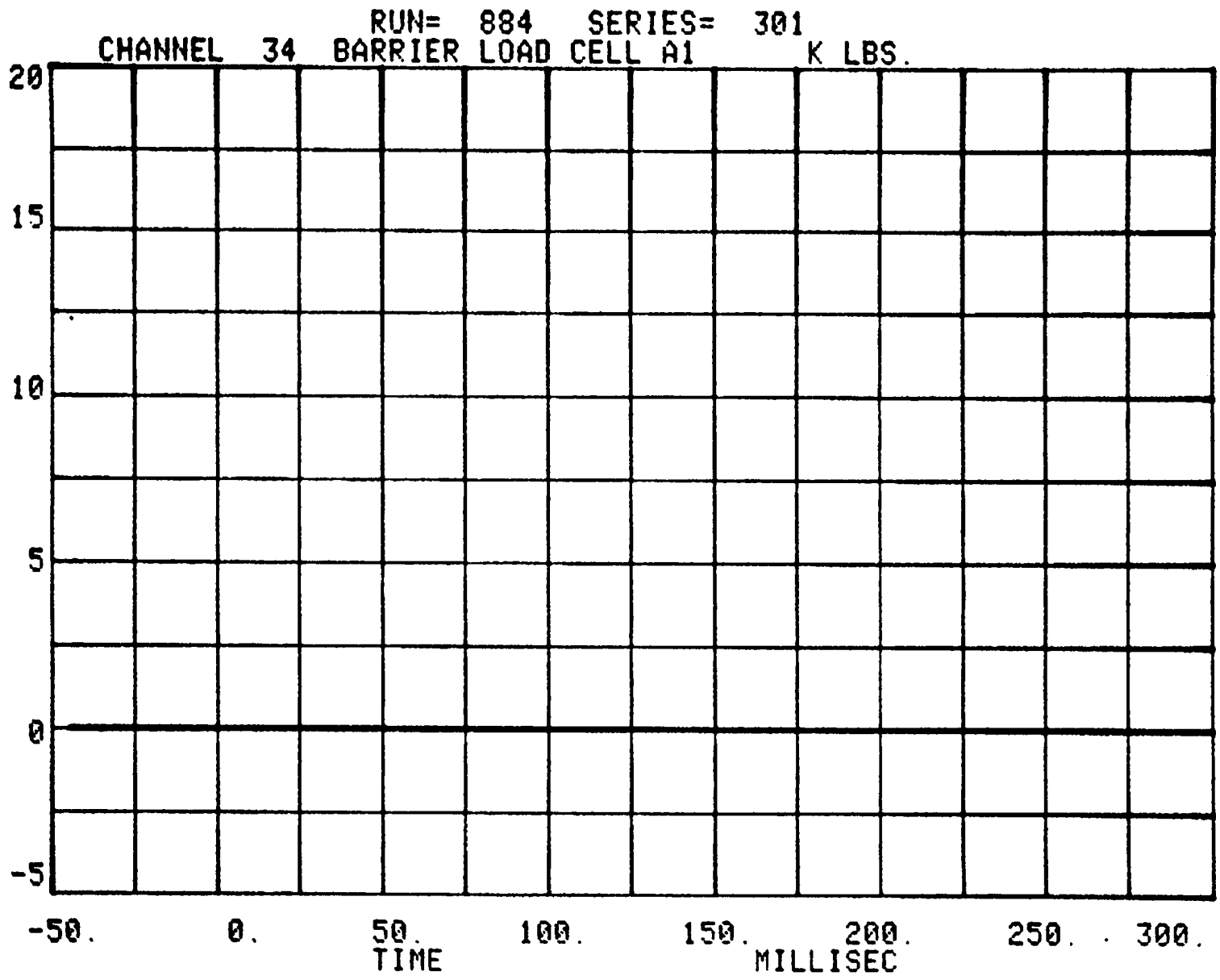
7731-6

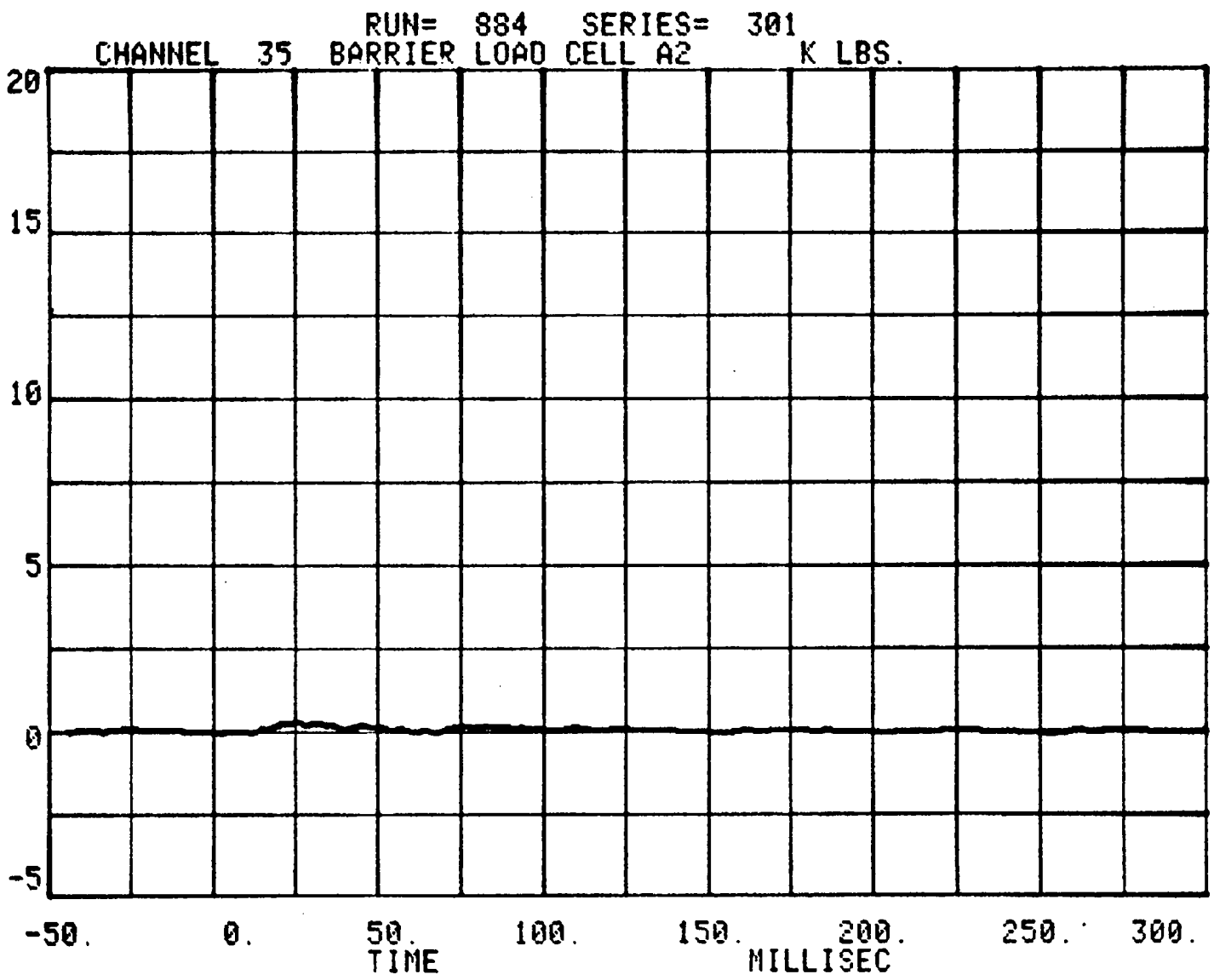
TEST NO. MK0301

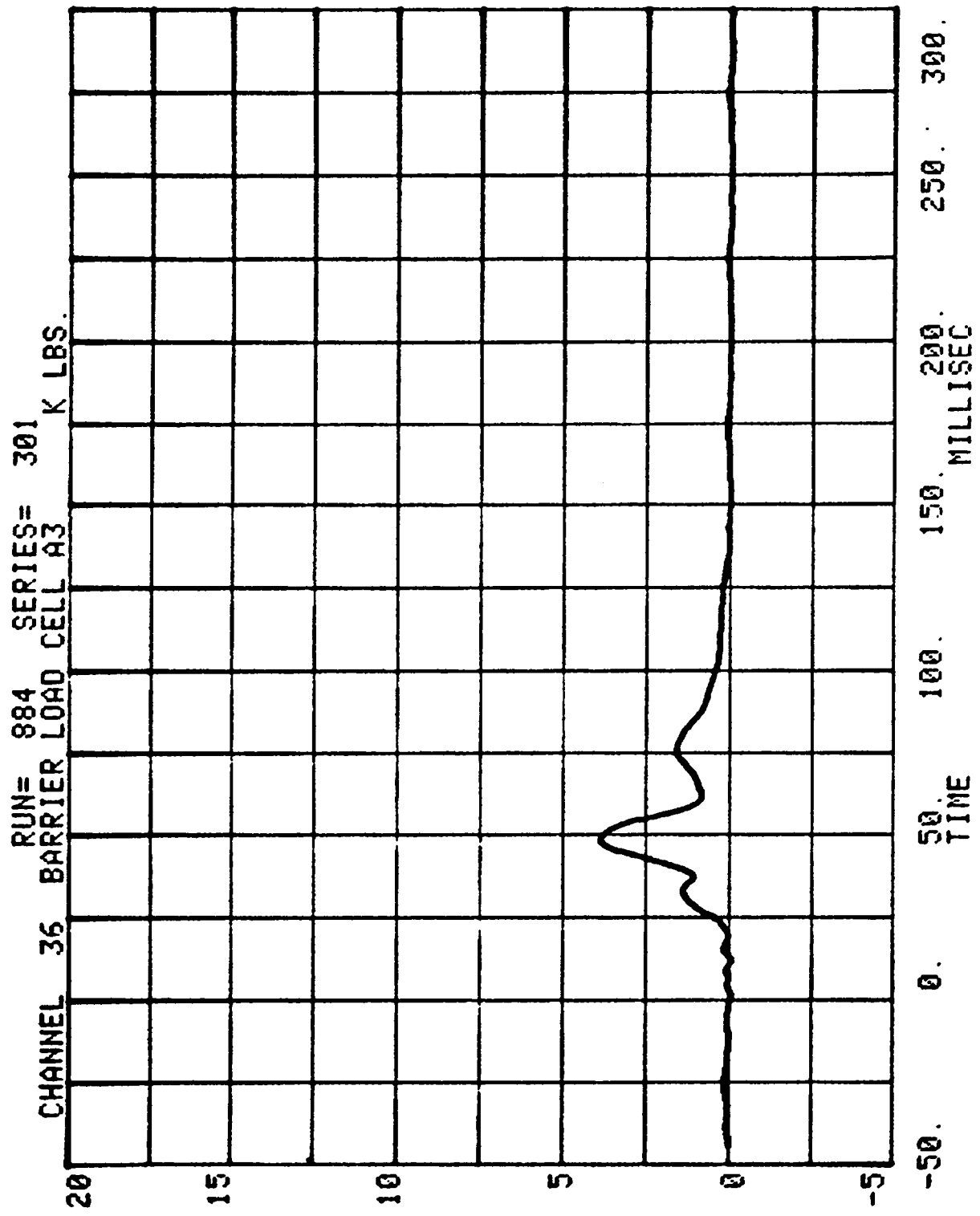
LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

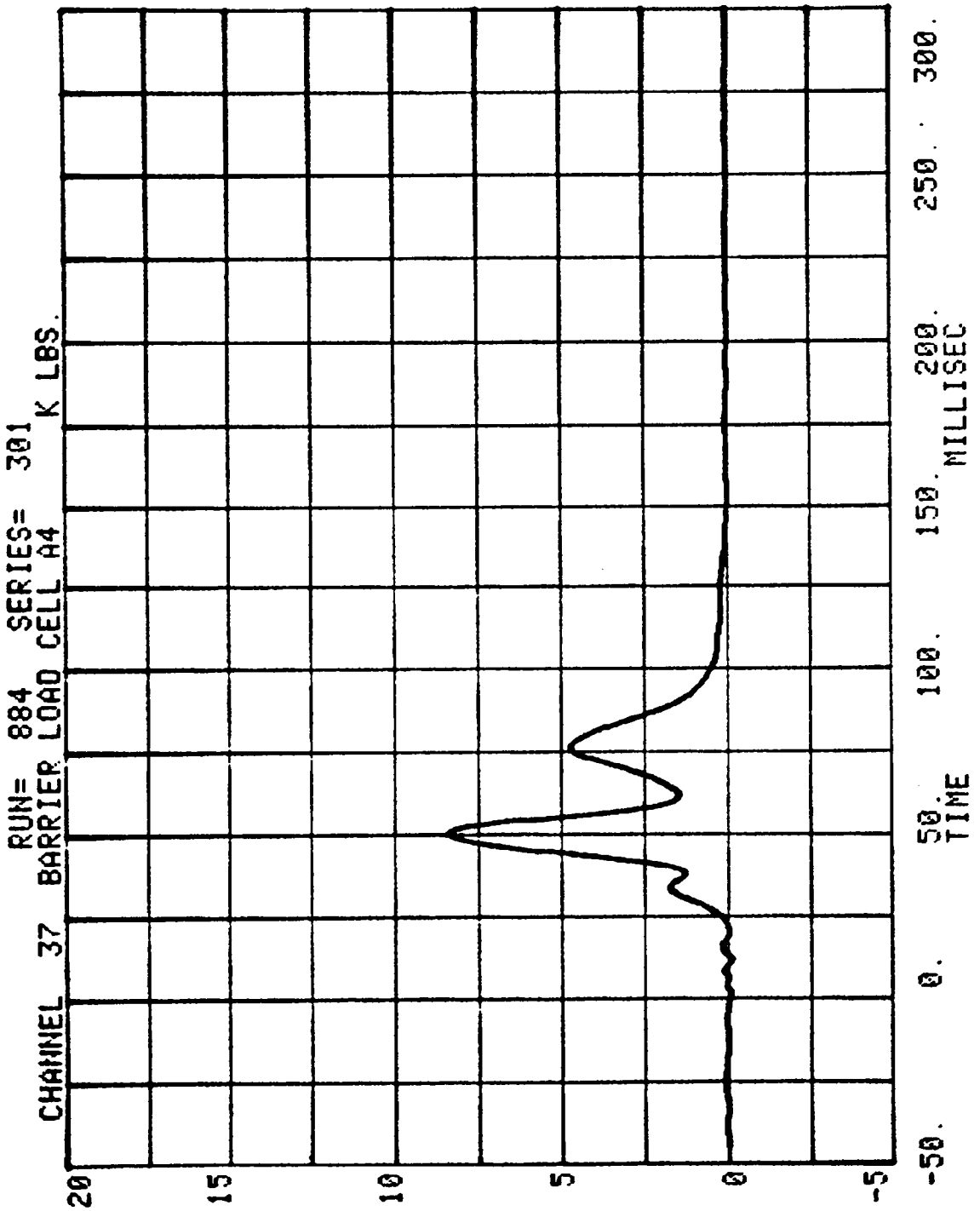
60


RUN= 884 SERIES= 301
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= 884 SERIES= 301
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 35 BARRIER LOAD CELL A3
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


CHANNEL 37
RUN= 884 SERIES= 301
BARRIER LOAD CELL A4
K LBS.
20
15
10
5
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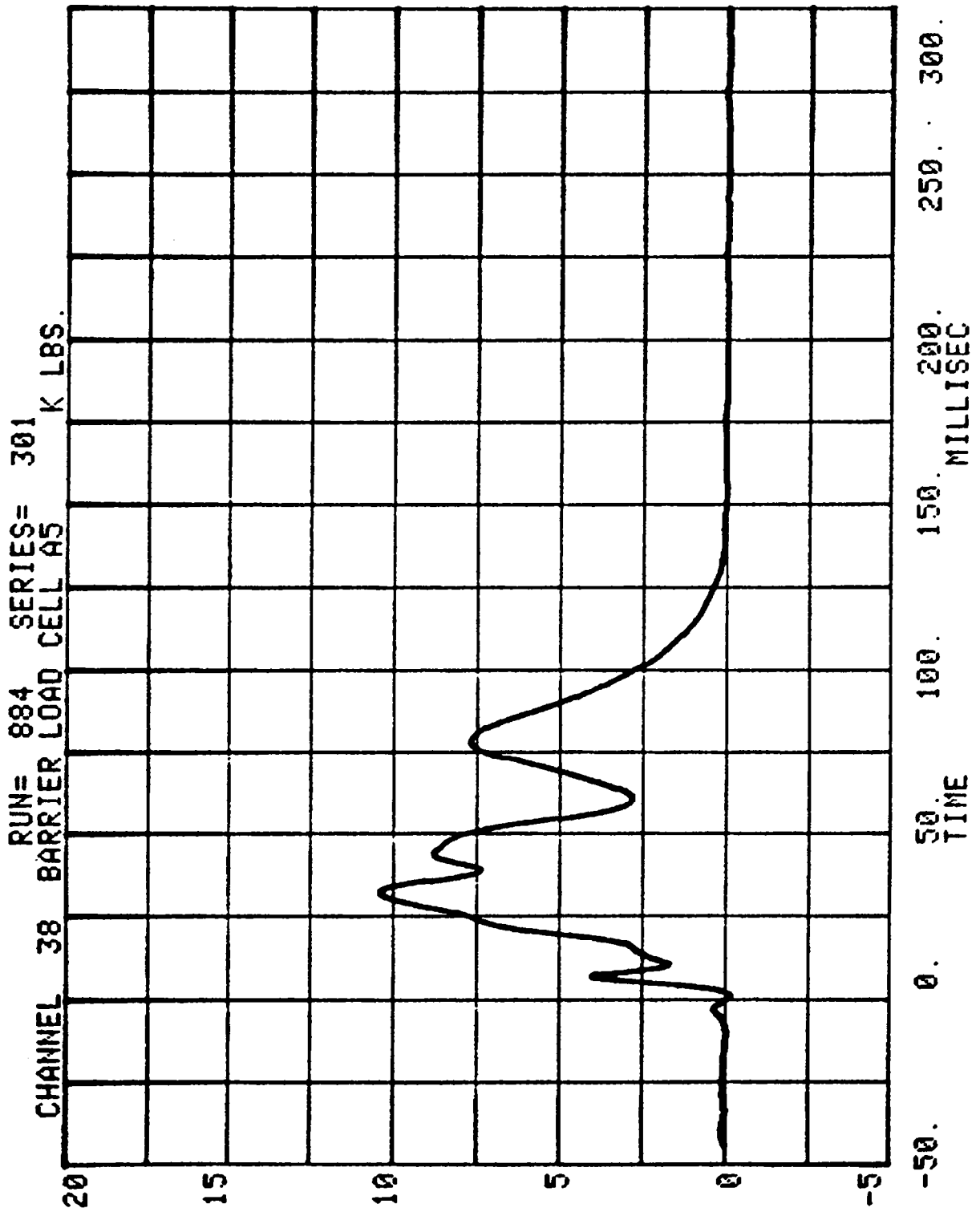
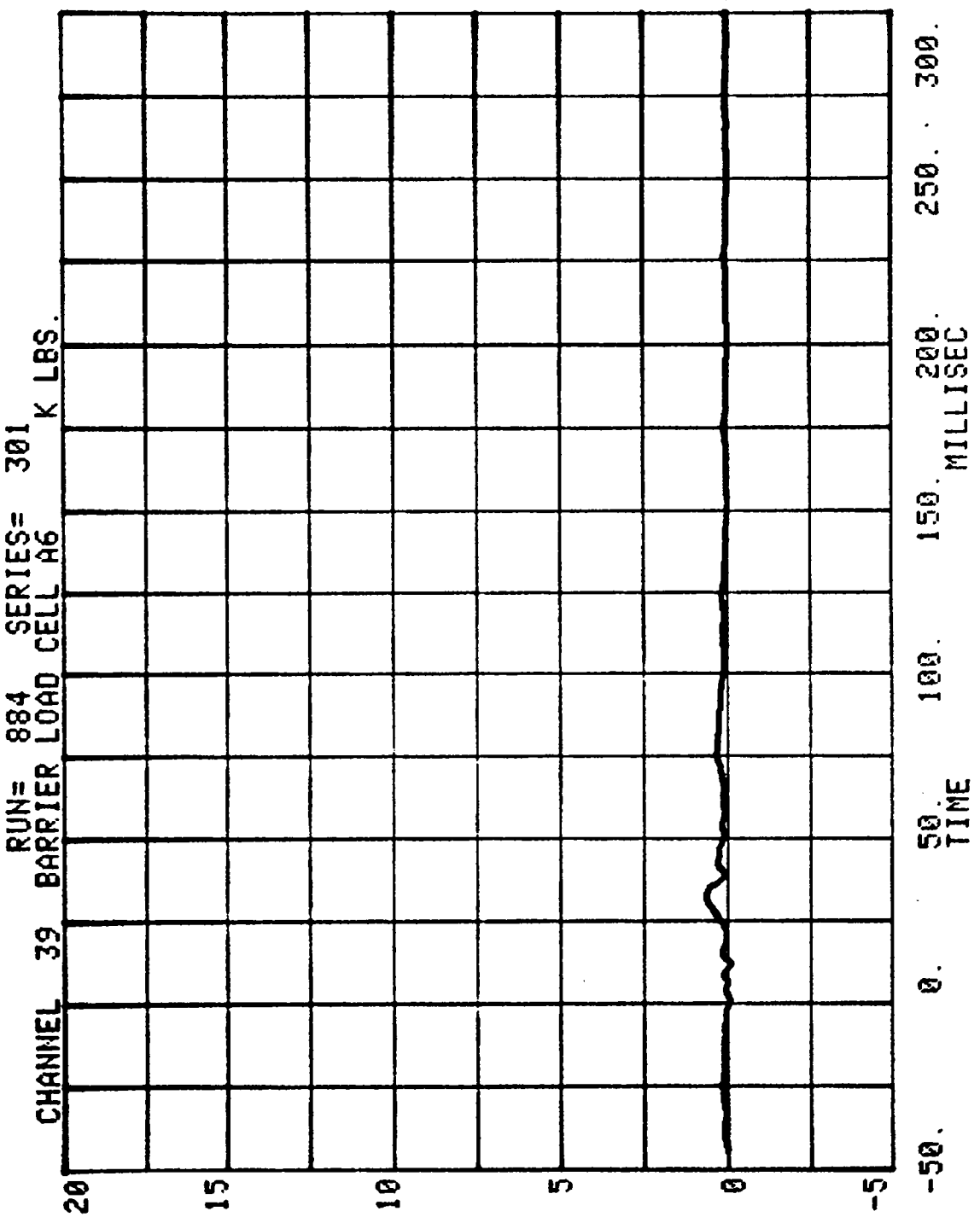
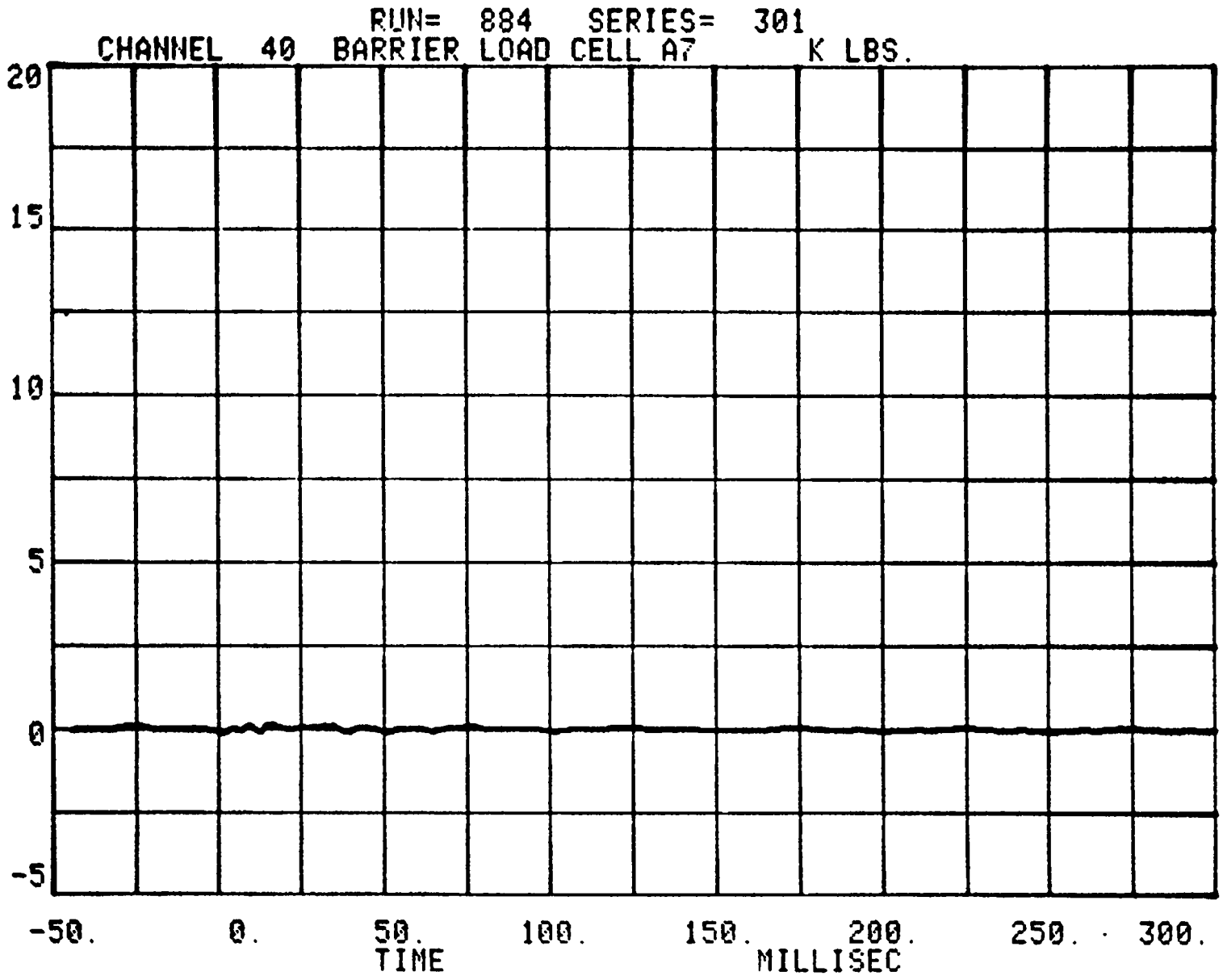
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

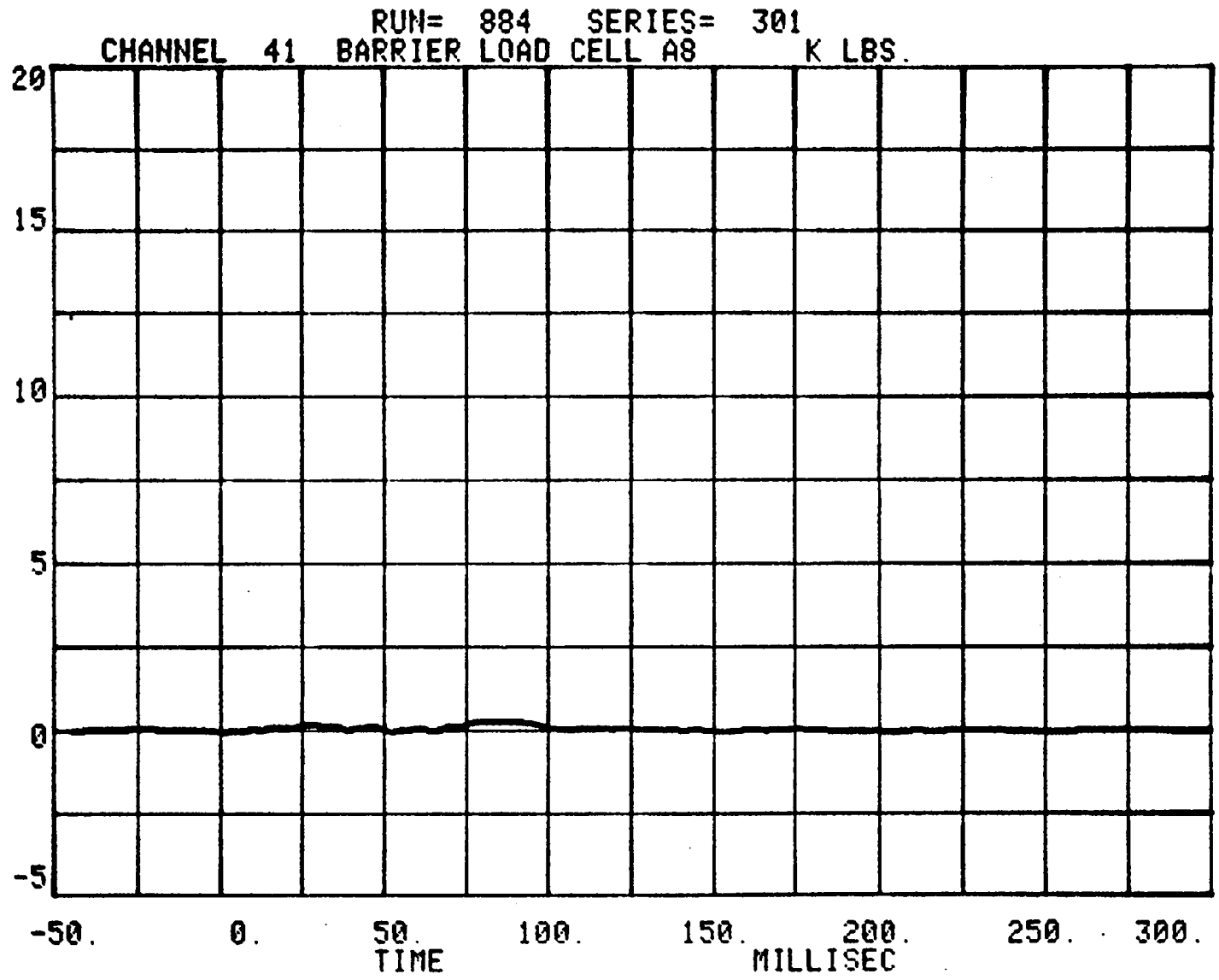
7731-6


CHANNEL 38 BARRIER LOAD CELL A5
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

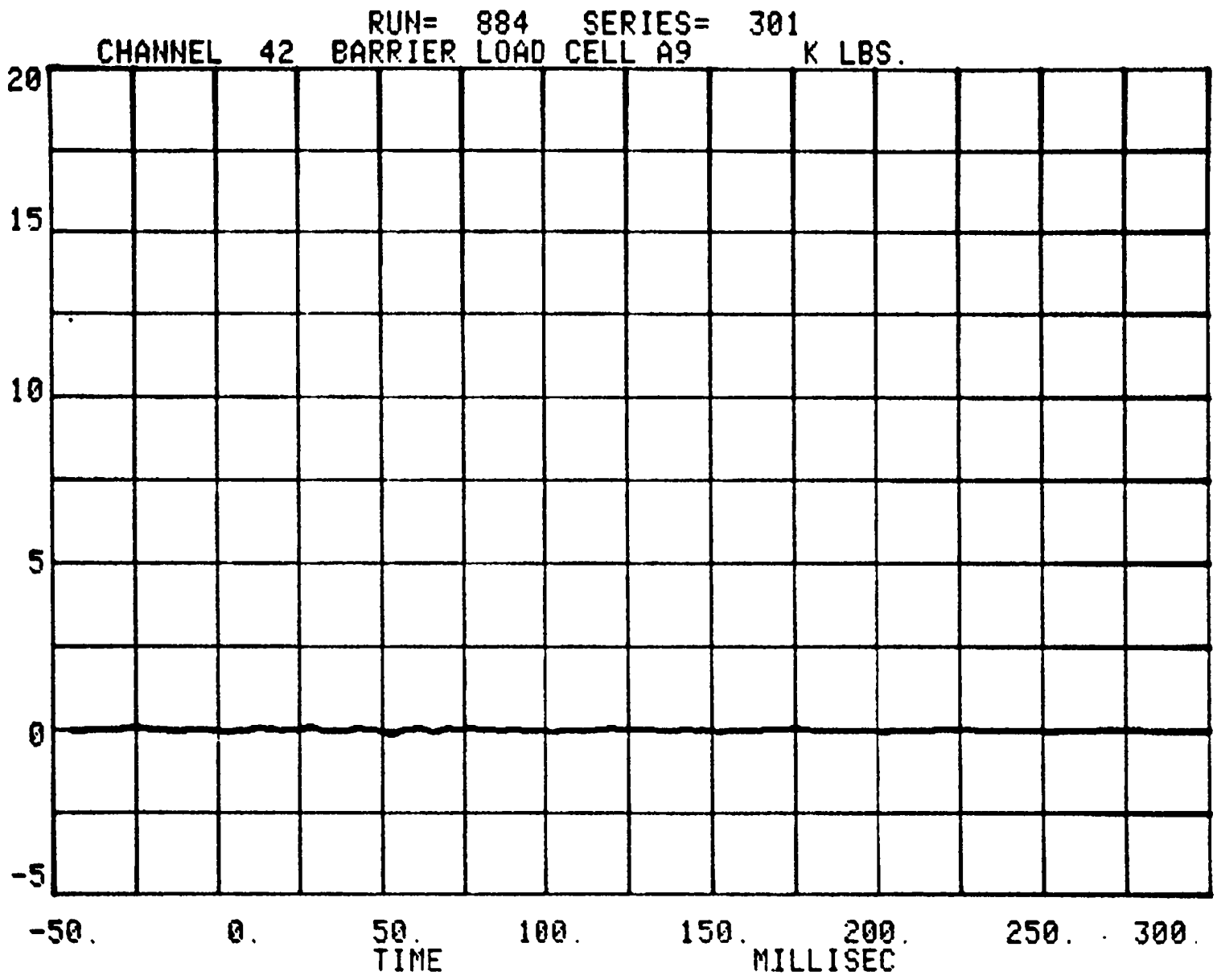

CHANNEL 39 BARRIER LOAD CELL A6
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

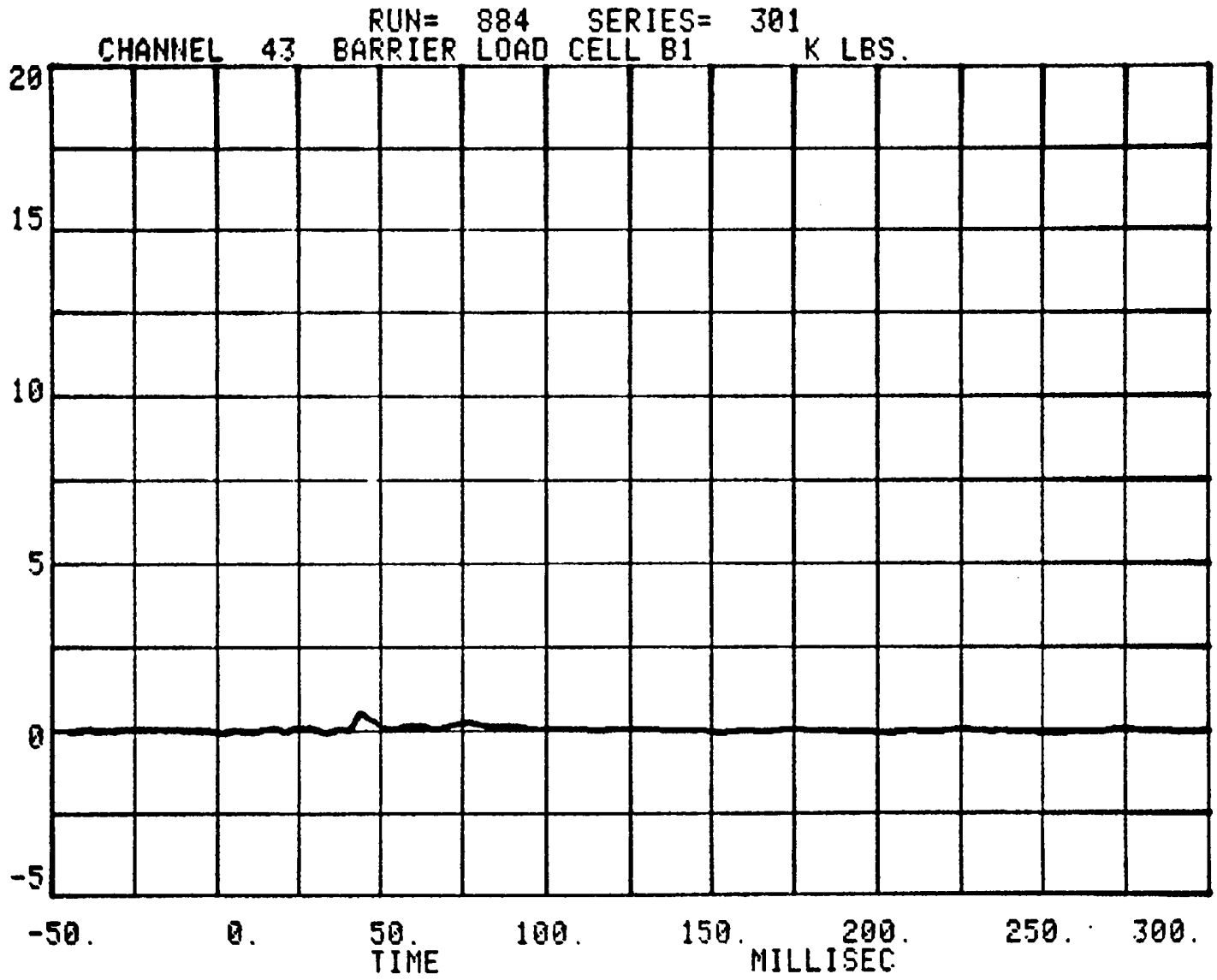
7731-6

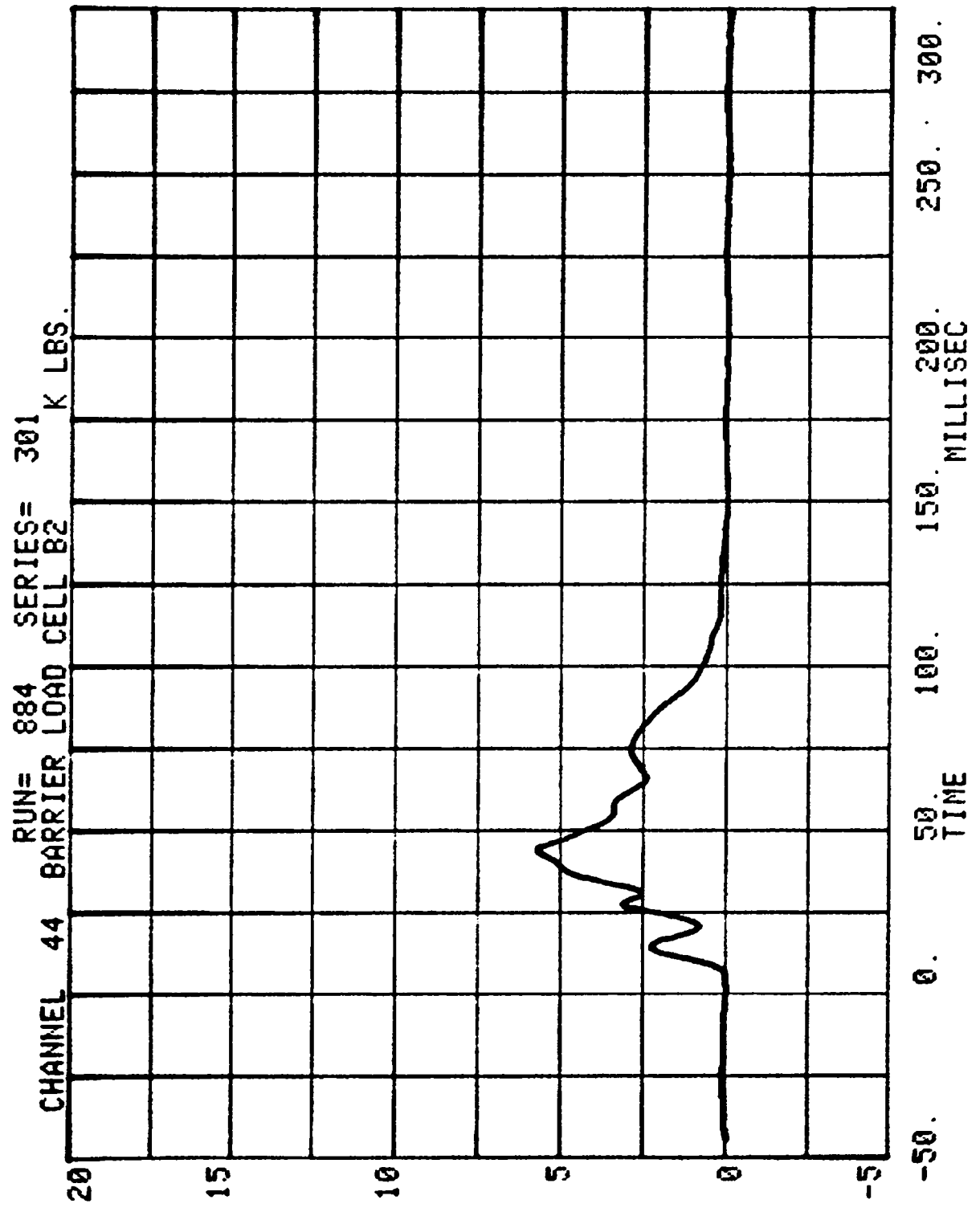

RUN= 884 SERIES= 301
CHANNEL 40 BARRIER LOAD CELL A7 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

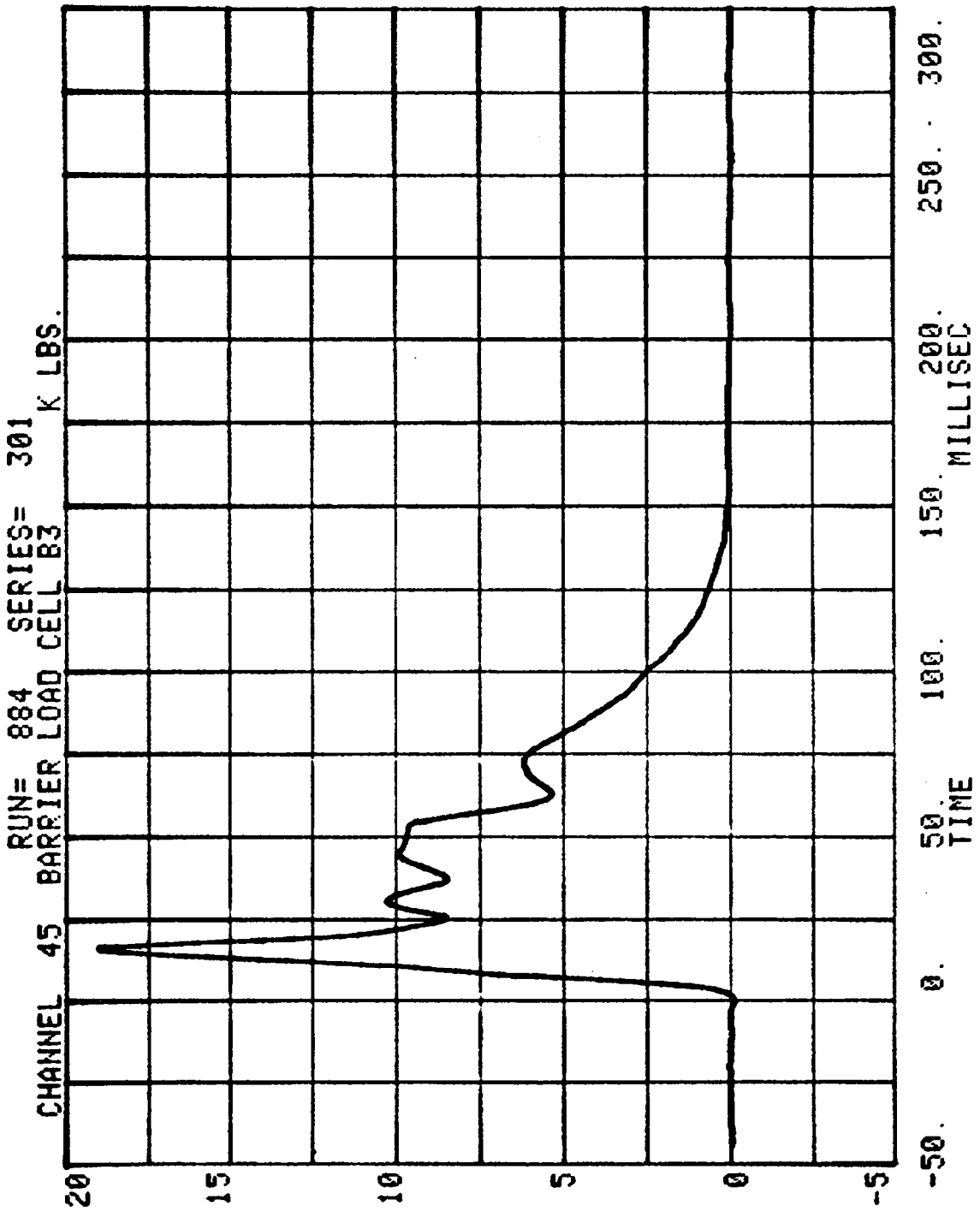

RUN= 884 SERIES= 301
CHANNEL 41 BARRIER LOAD CELL A8 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6

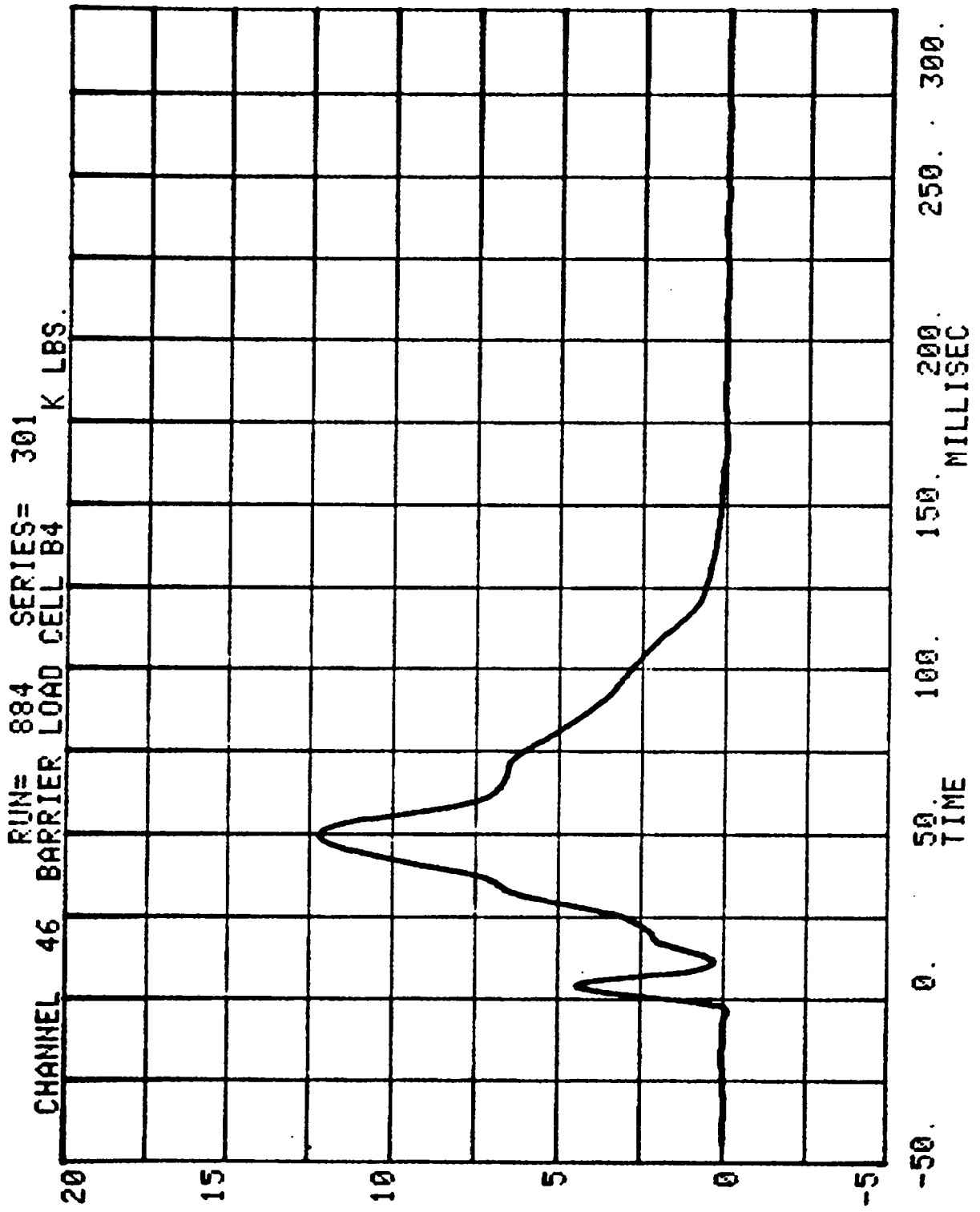

RUN= 884 SERIES= 301
CHANNEL 42 BARRIER LOAD CELL A9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 884 SERIES= 301
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 BARRIER LOAD CELL B2
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 45 BARRIER LOAD CELL B3
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


CHANNEL 46 BARRIER LOAD CELL B4
RUN= 884 SERIES= 301
K LBS.
20
15
10
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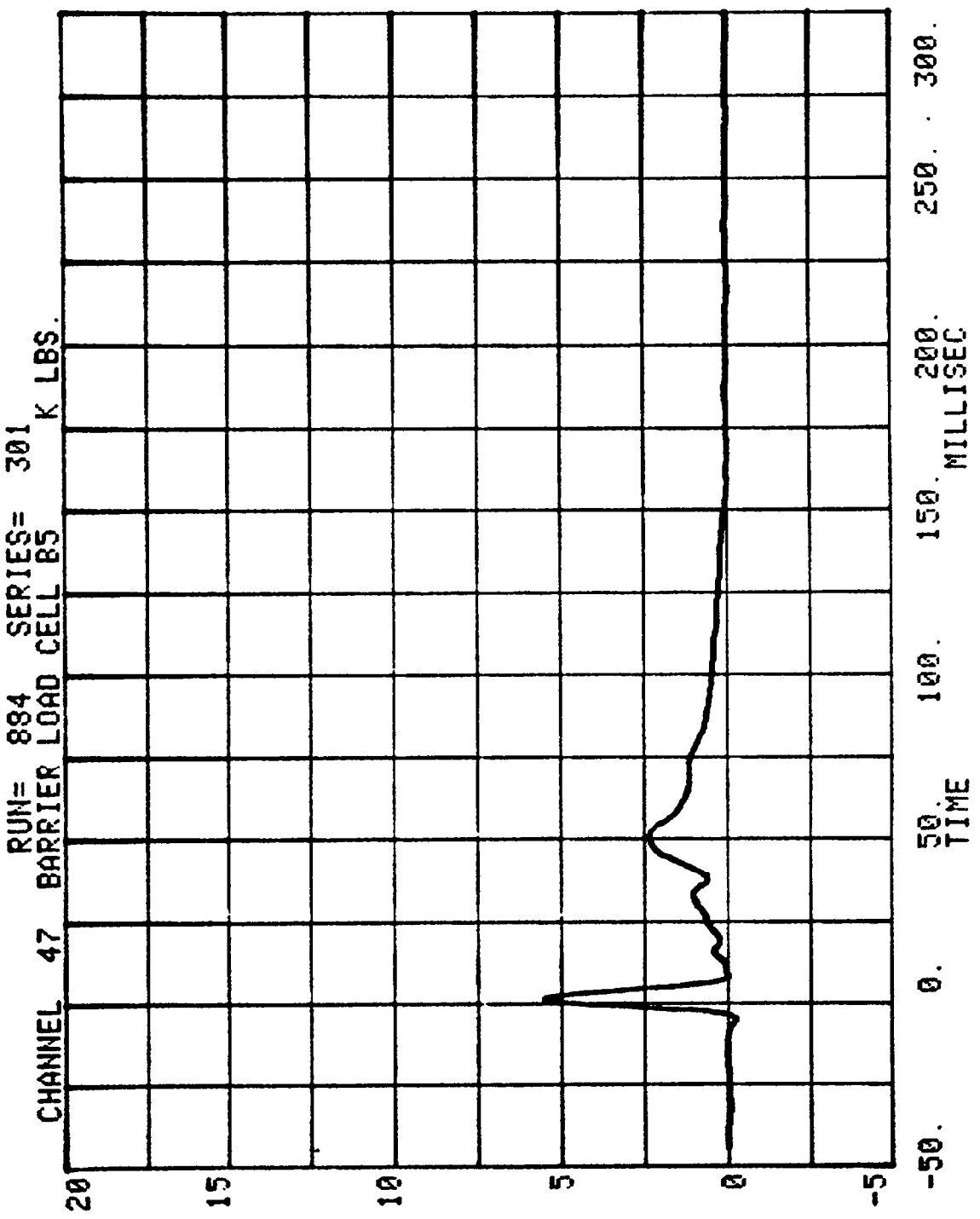
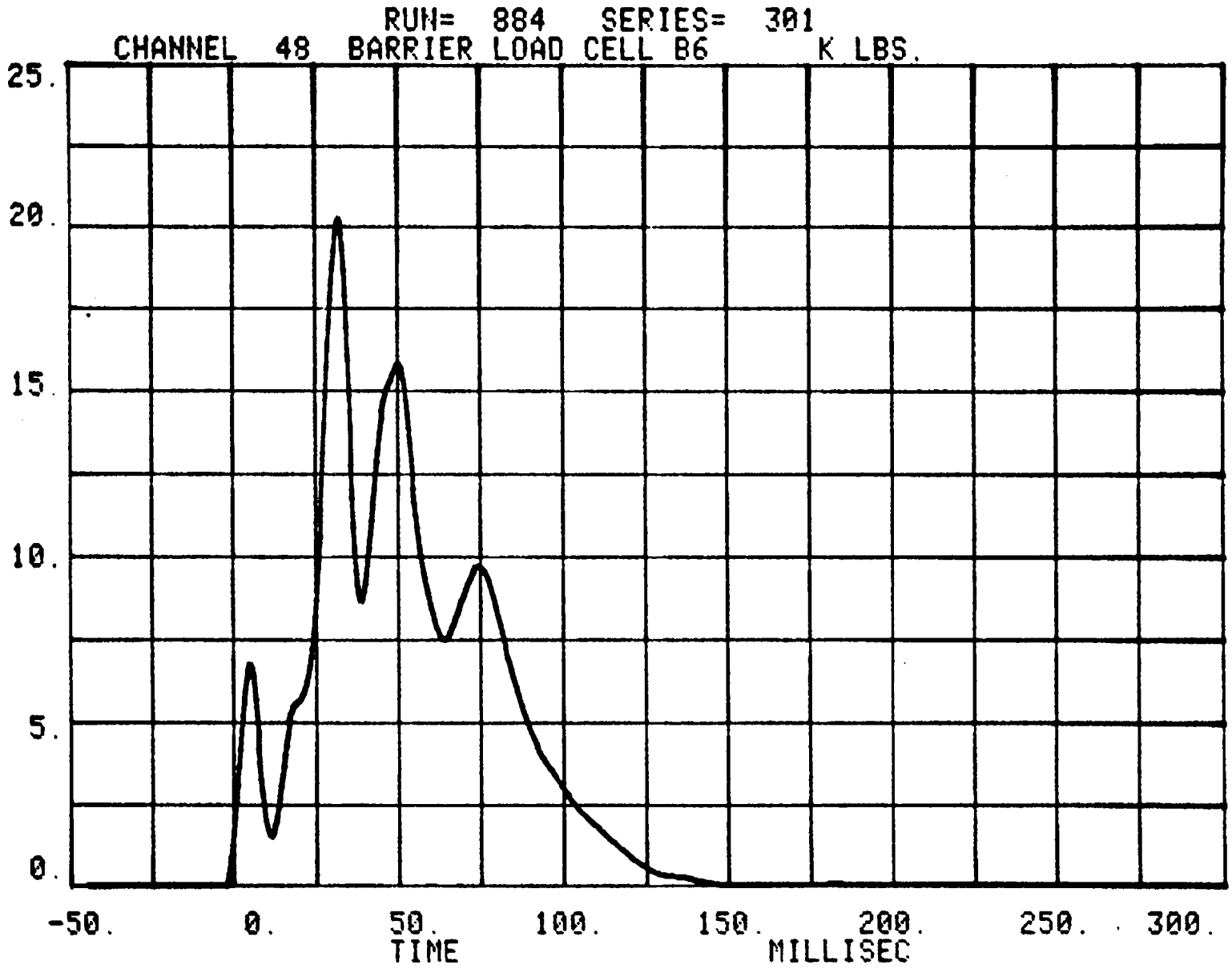
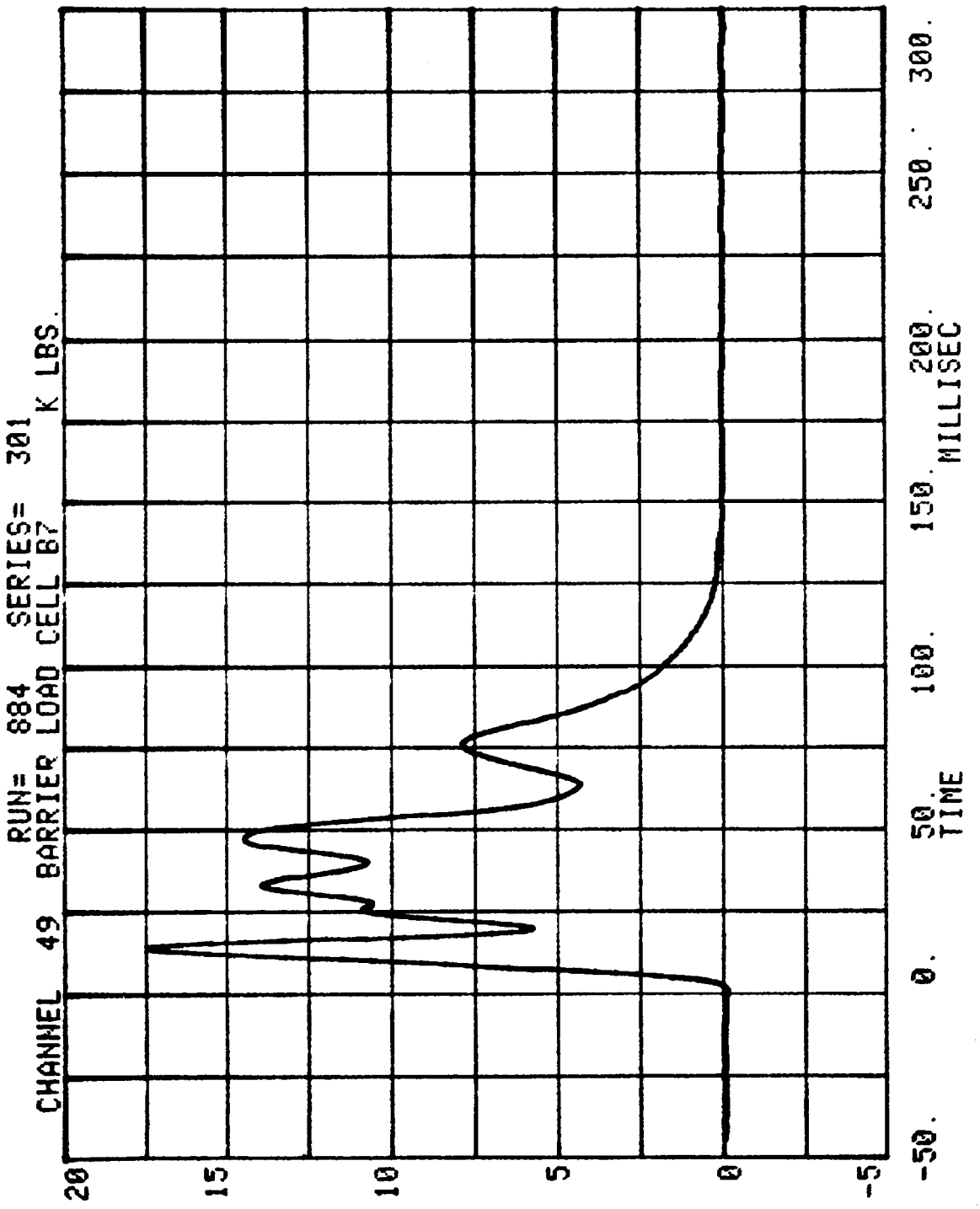
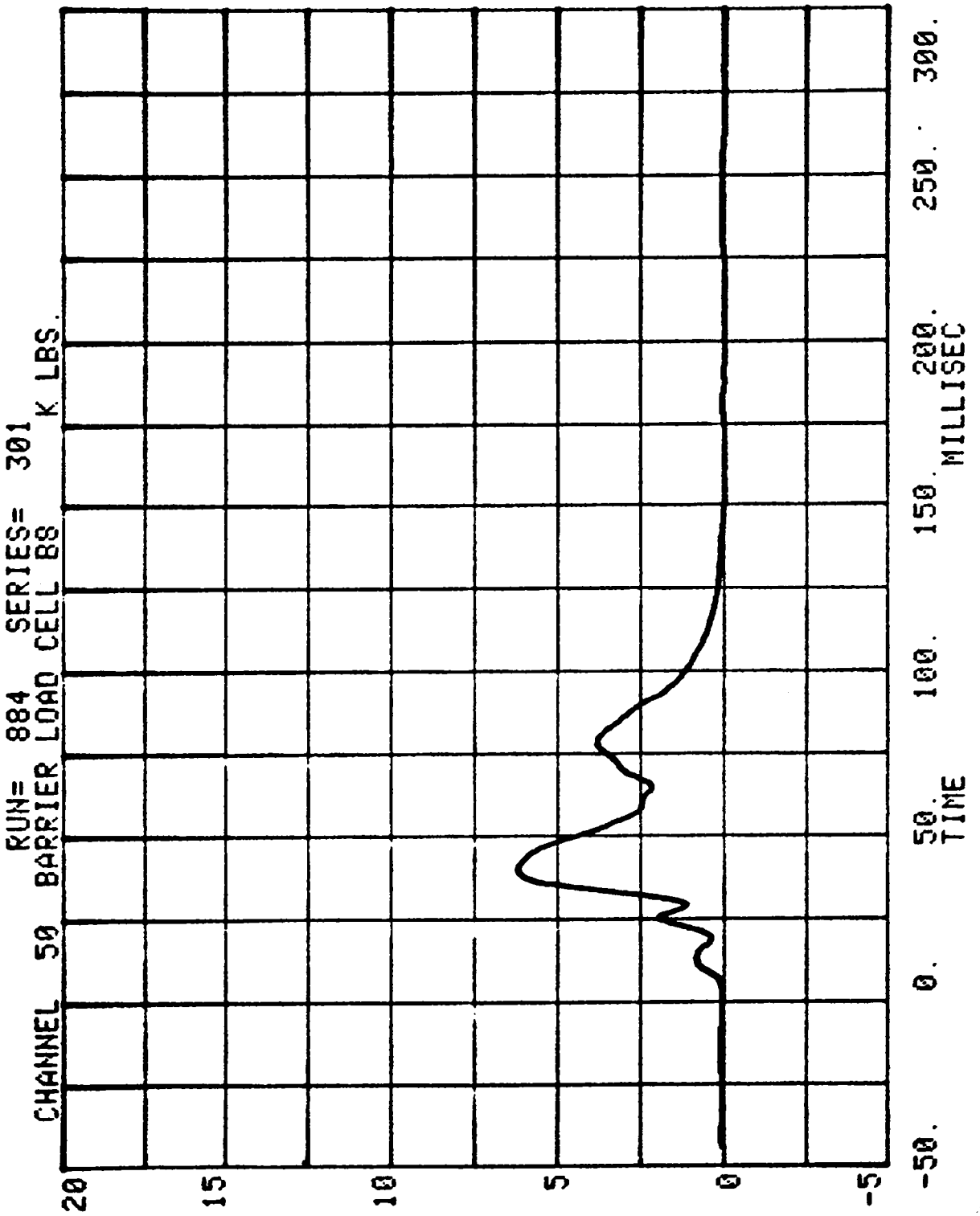
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

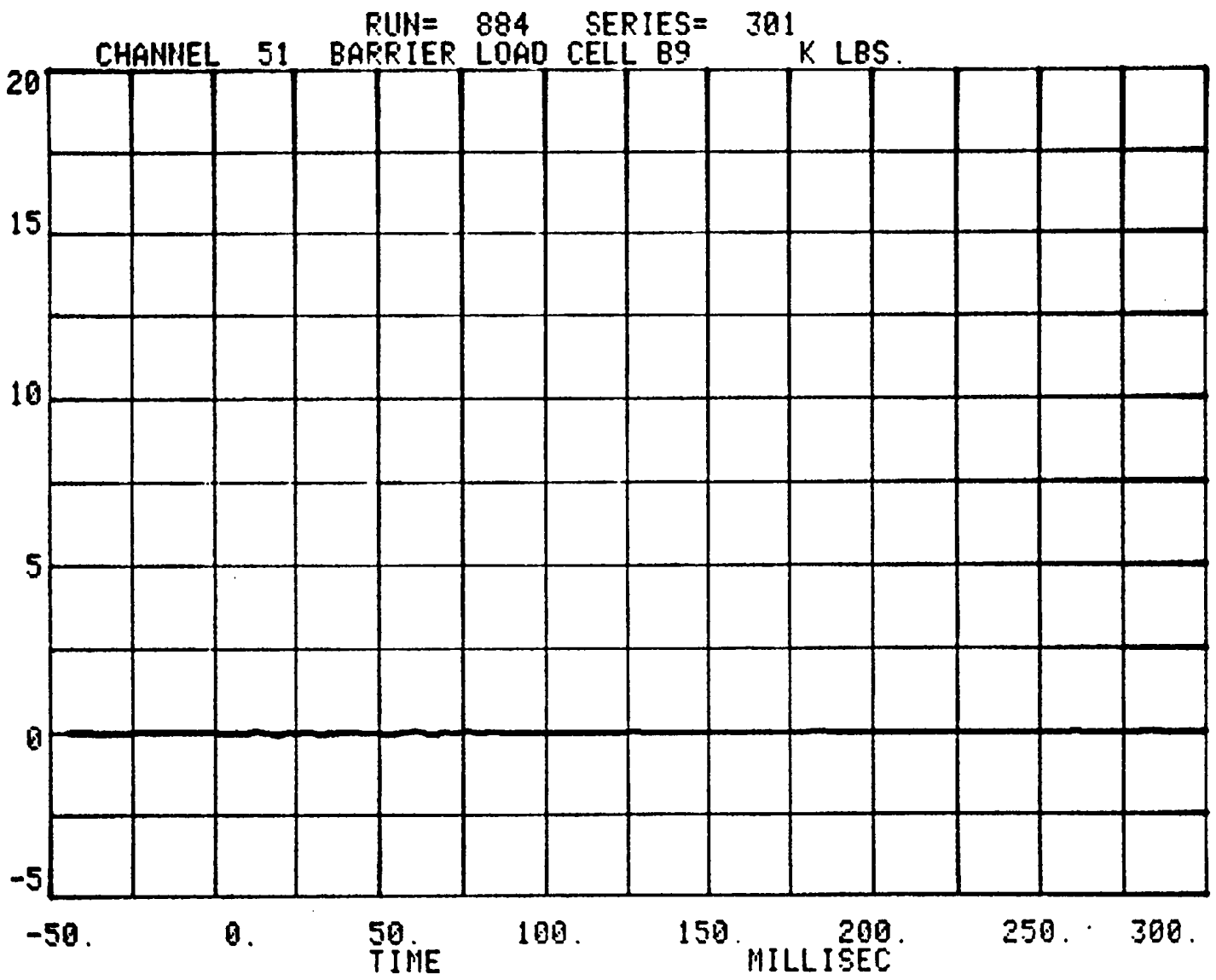

CHANNEL 47 BARRIER LOAD CELL B5
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

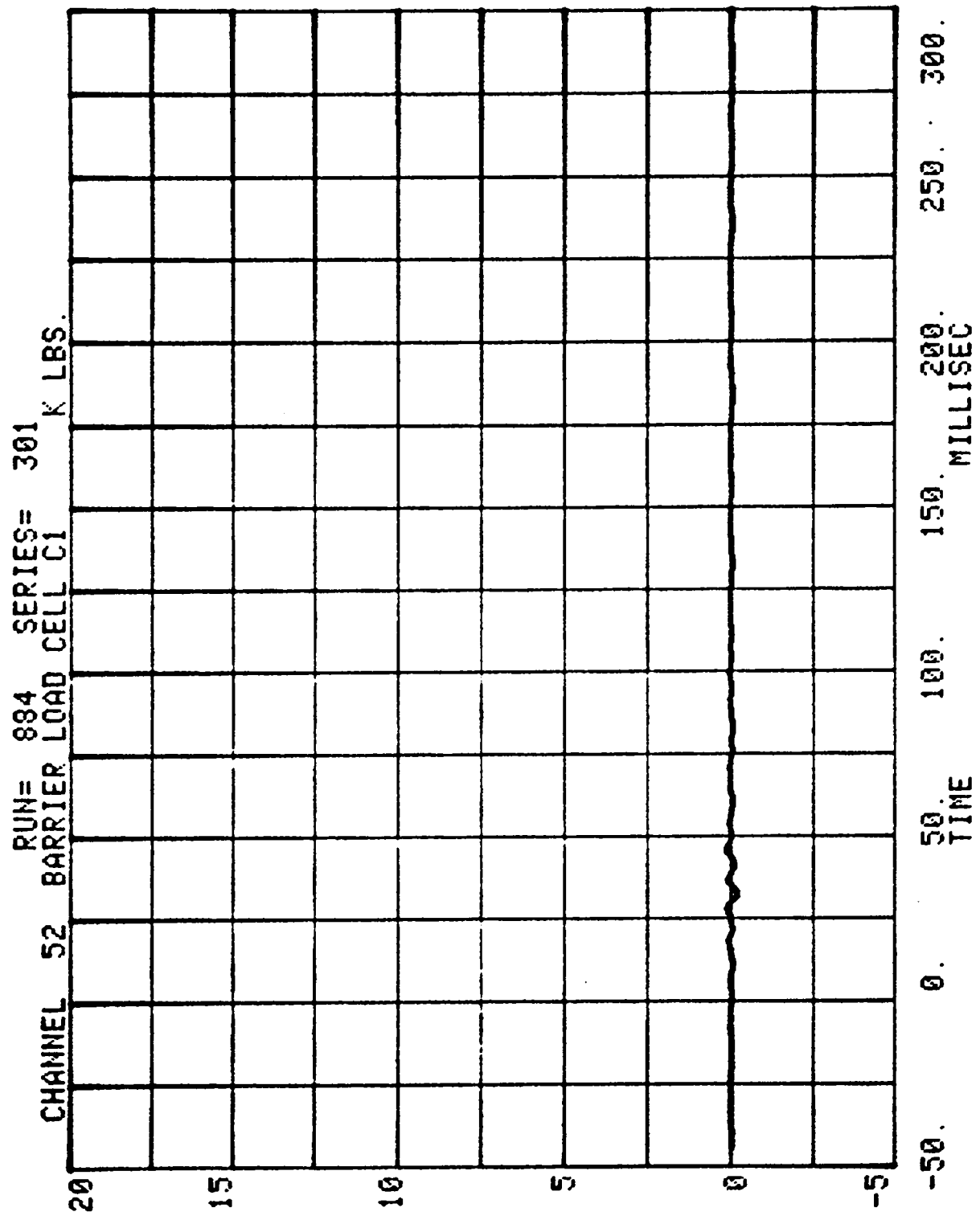
7731-6

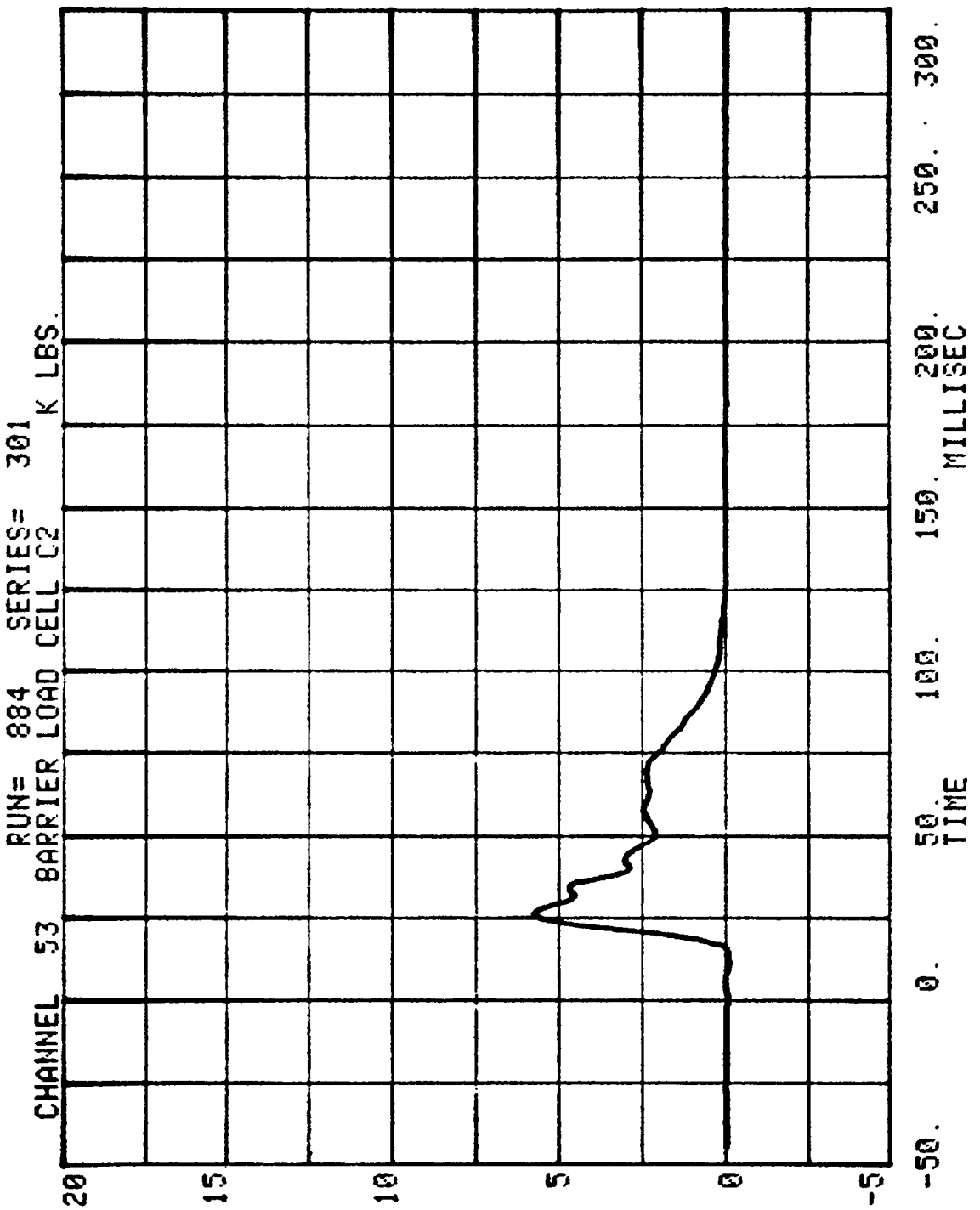

RUN= 884 SERIES= 301
CHANNEL 48 BARRIER LOAD CELL B6
K LBS.
25.
20.
15.
10.
5.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 49
RUN= 884 SERIES= 301
BARRIER LOAD CELL 87
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

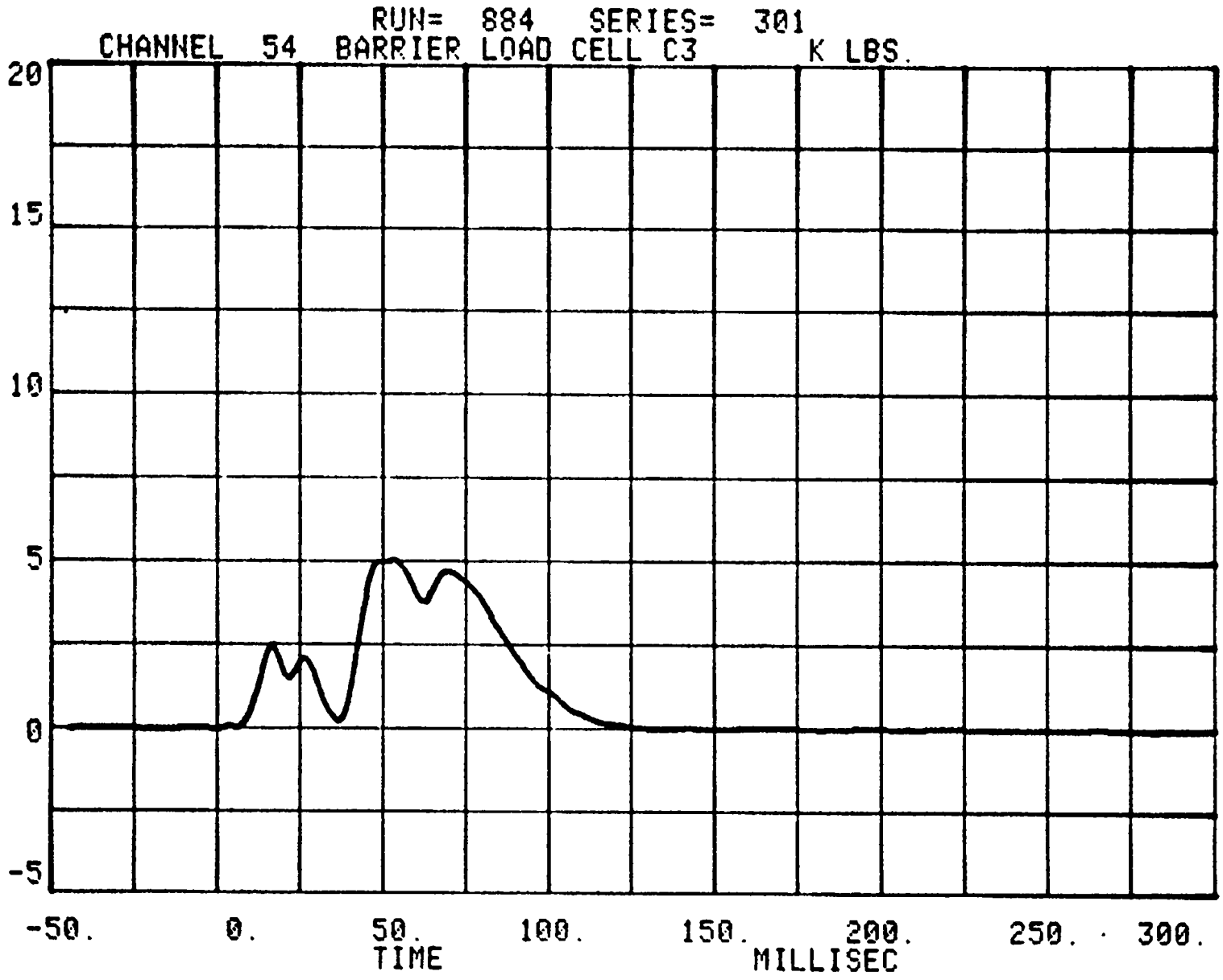

CHANNEL 50 BARRIER LOAD CELL 88
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

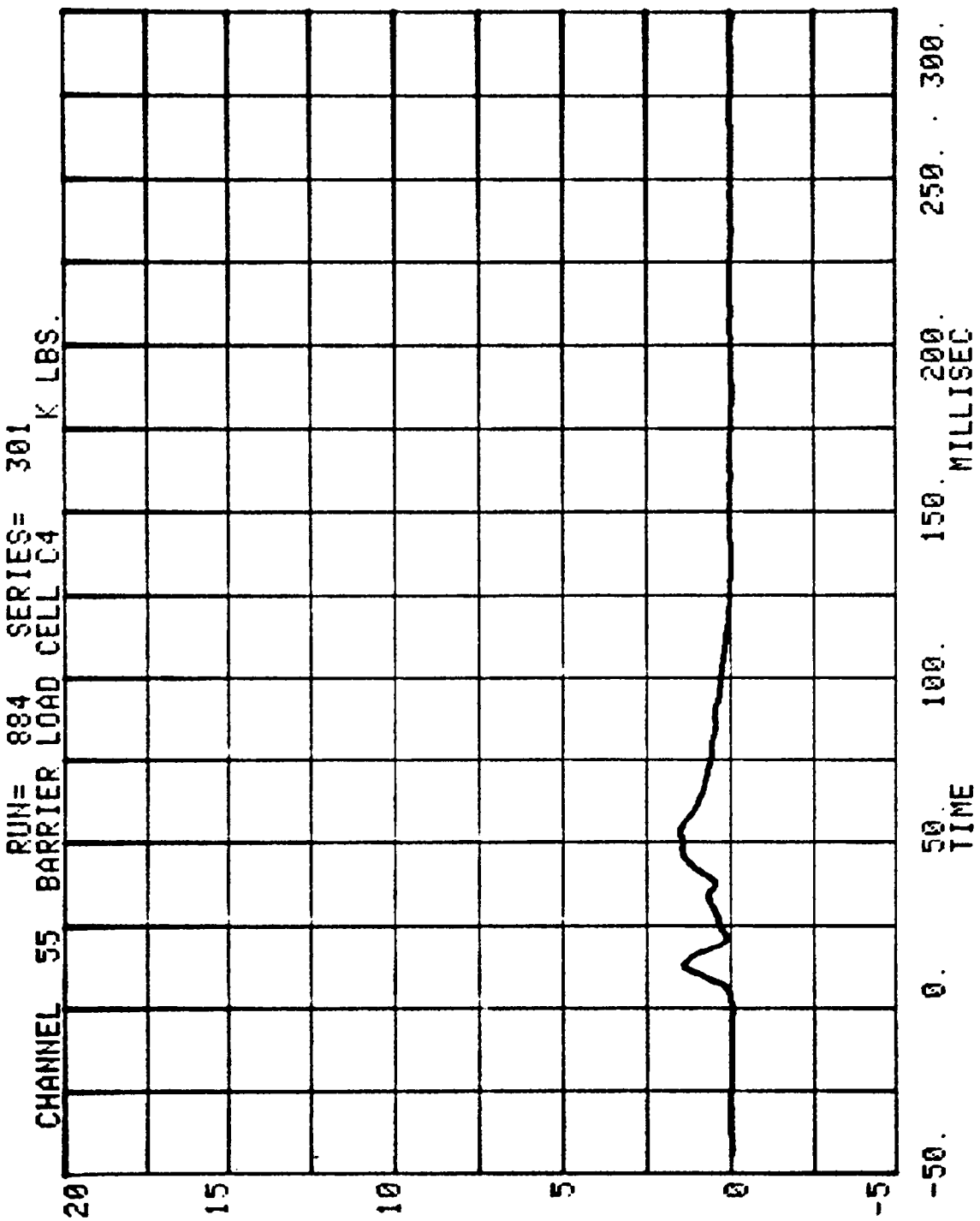

RUN= 884 SERIES= 301
CHANNEL 51 BARRIER LOAD CELL B9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 52 BARRIER LOAD CELL C1
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

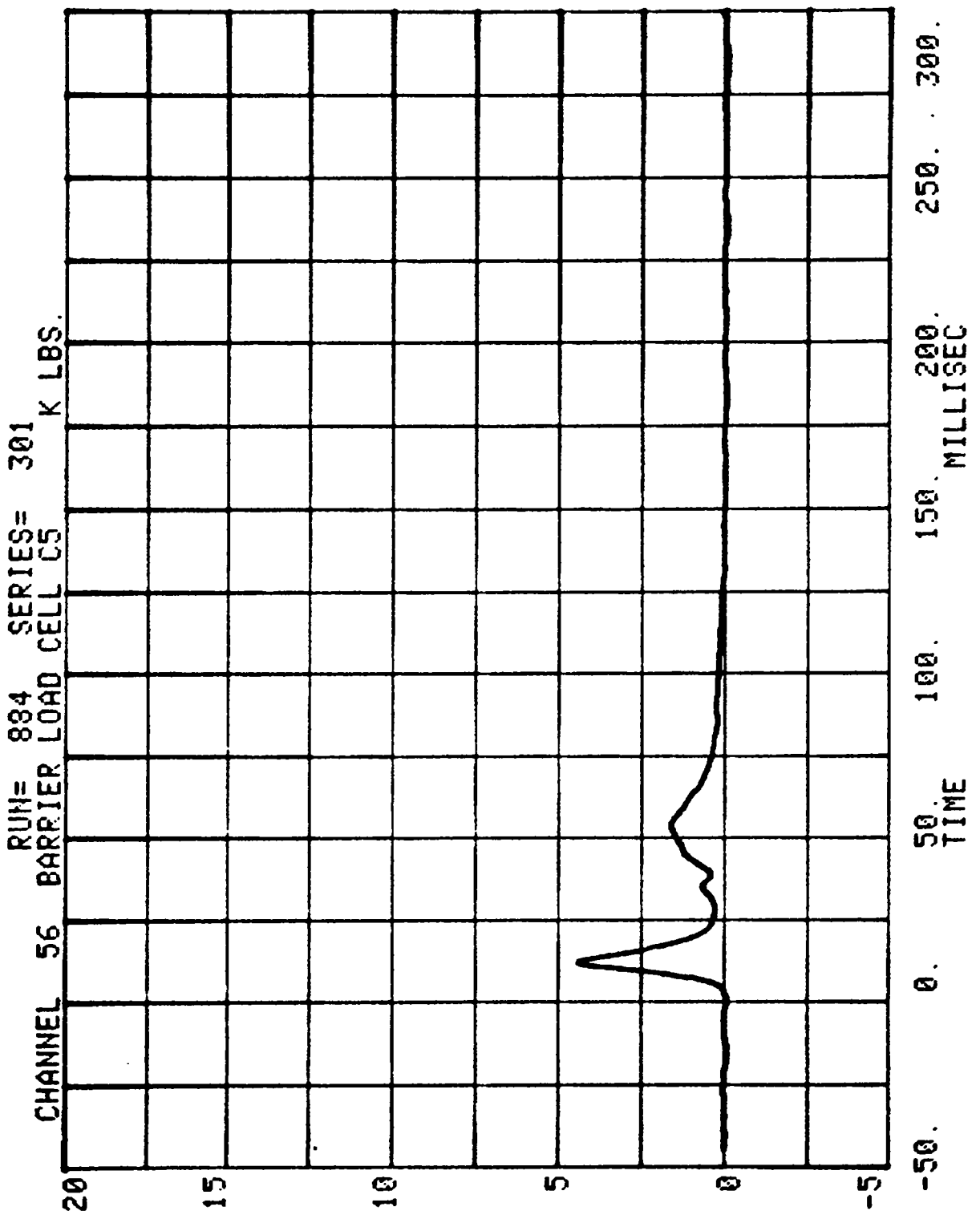

CHANNEL 53 BARRIER LOAD CELL C2
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6

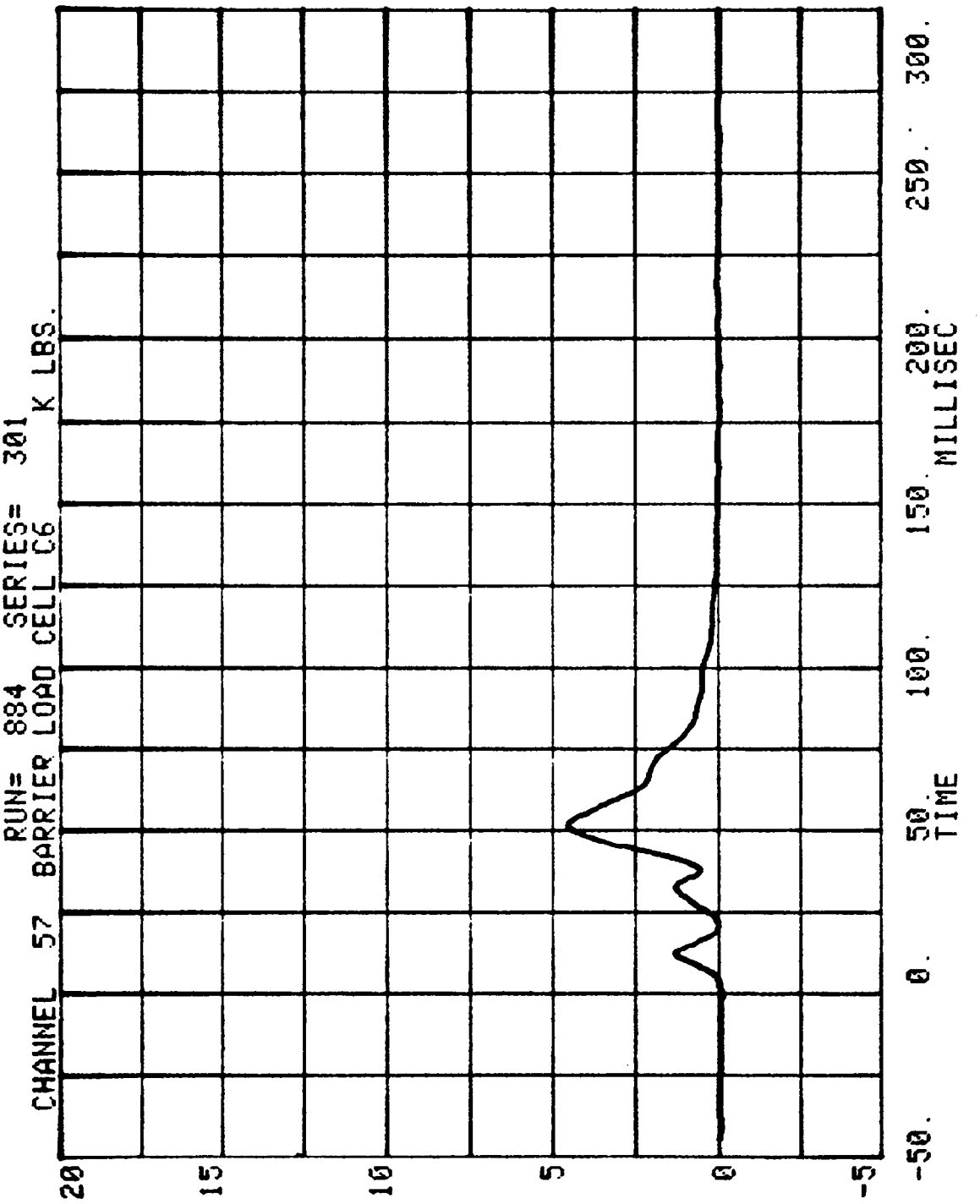

RUN= 884 SERIES= 301
CHANNEL 54 BARRIER LOAD CELL C3 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 55 BARRIER LOAD CELL C4
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

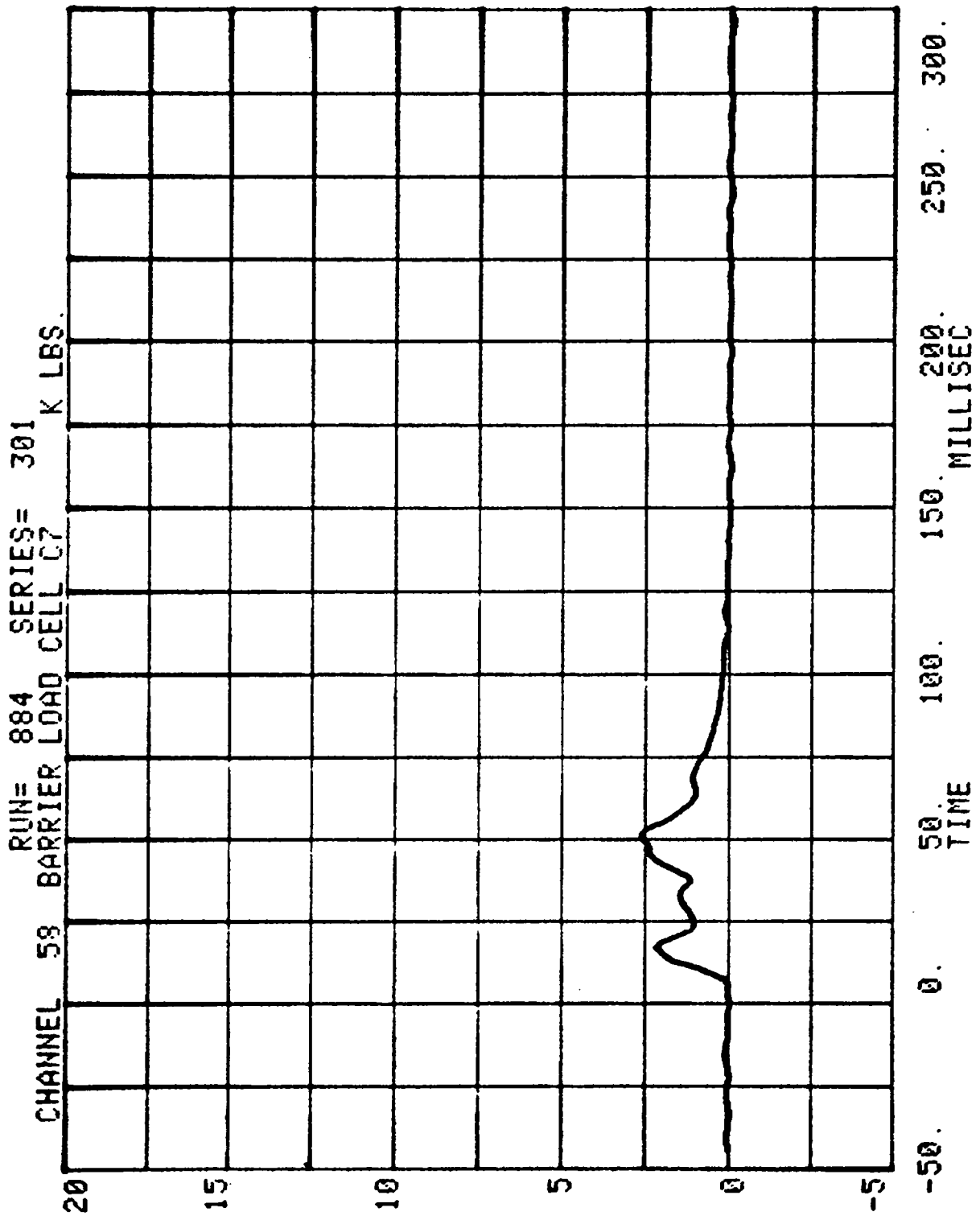
7731-6

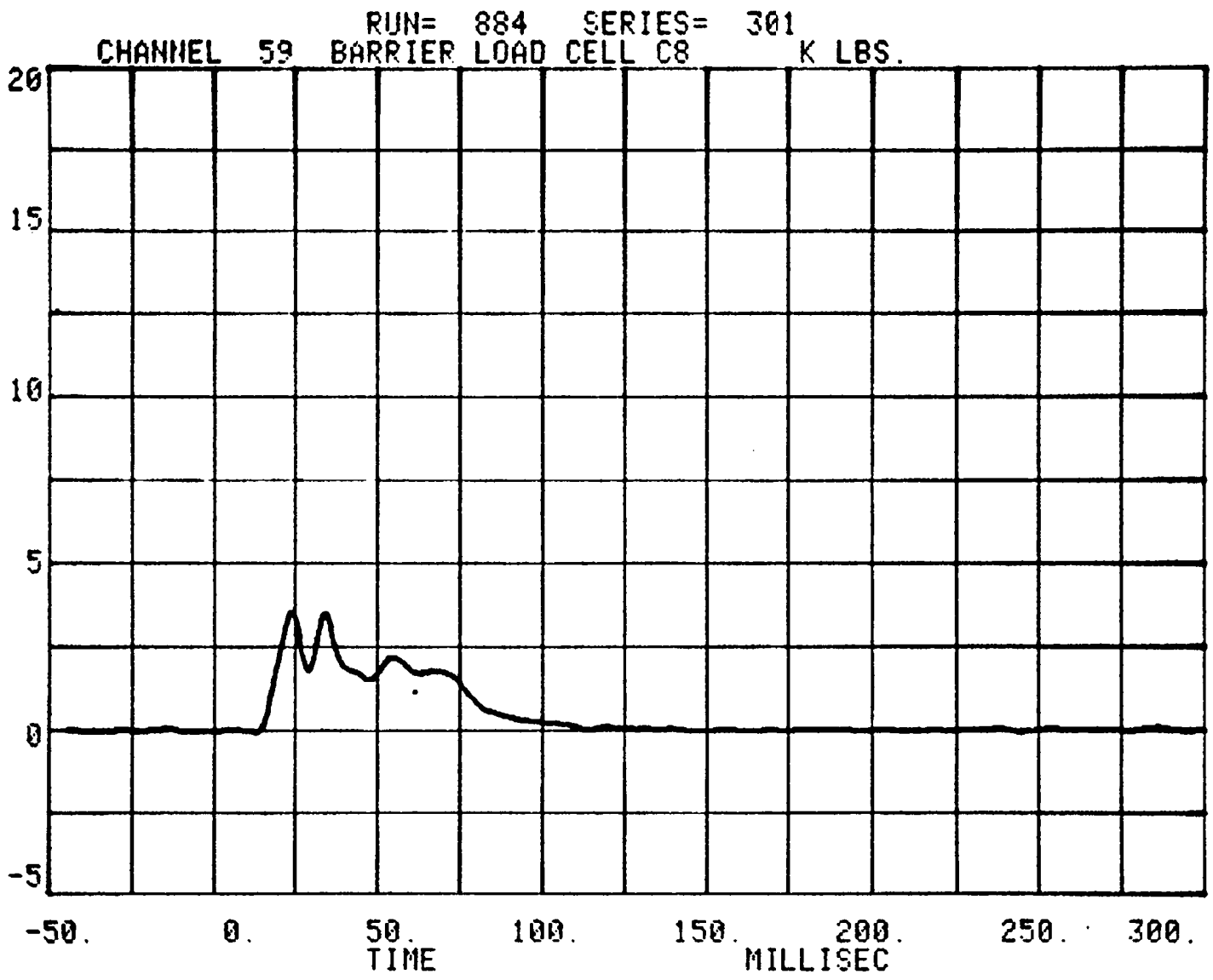

CHANNEL 56 BARRIER LOAD CELL C5
RUN= 834 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

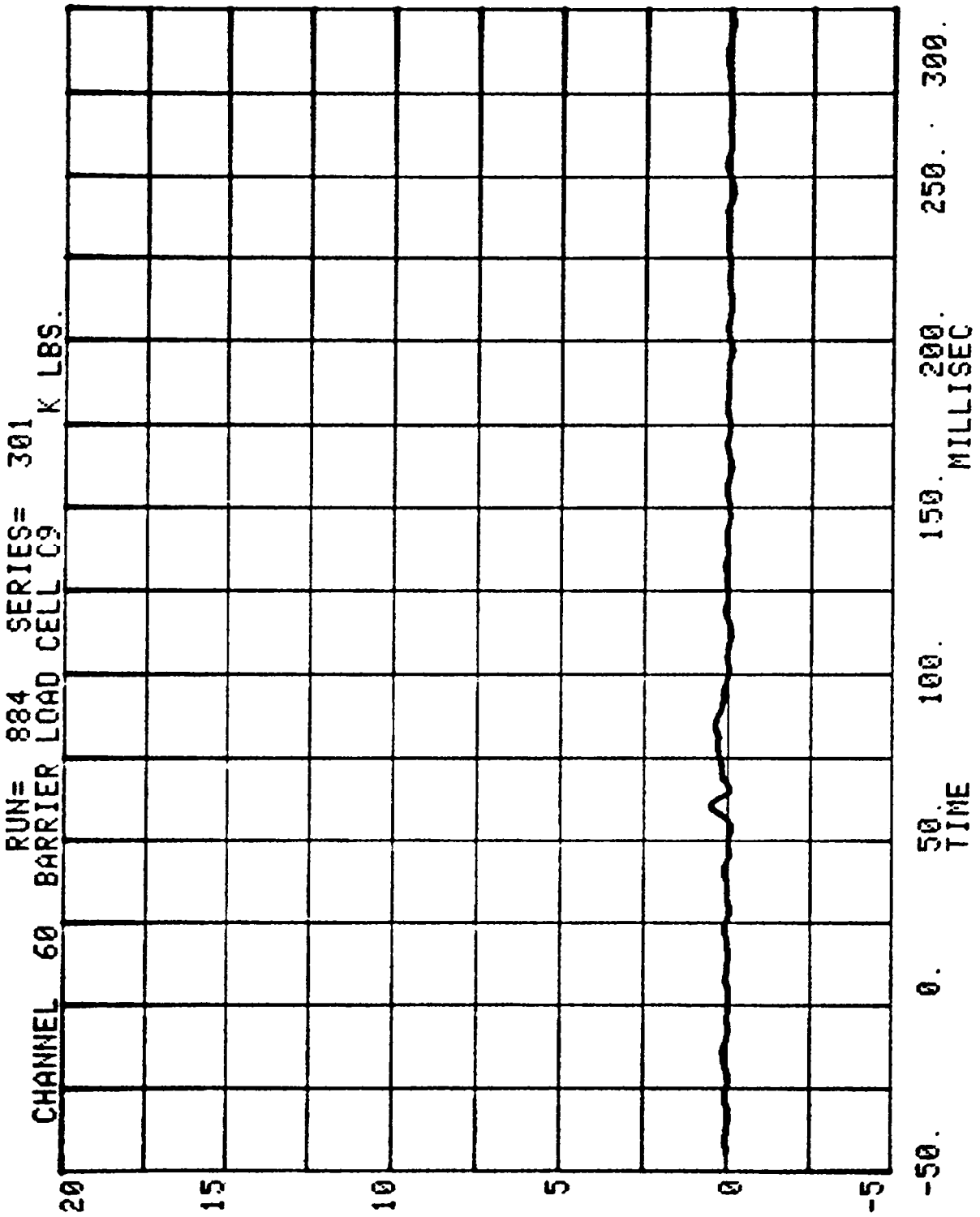
7731-6

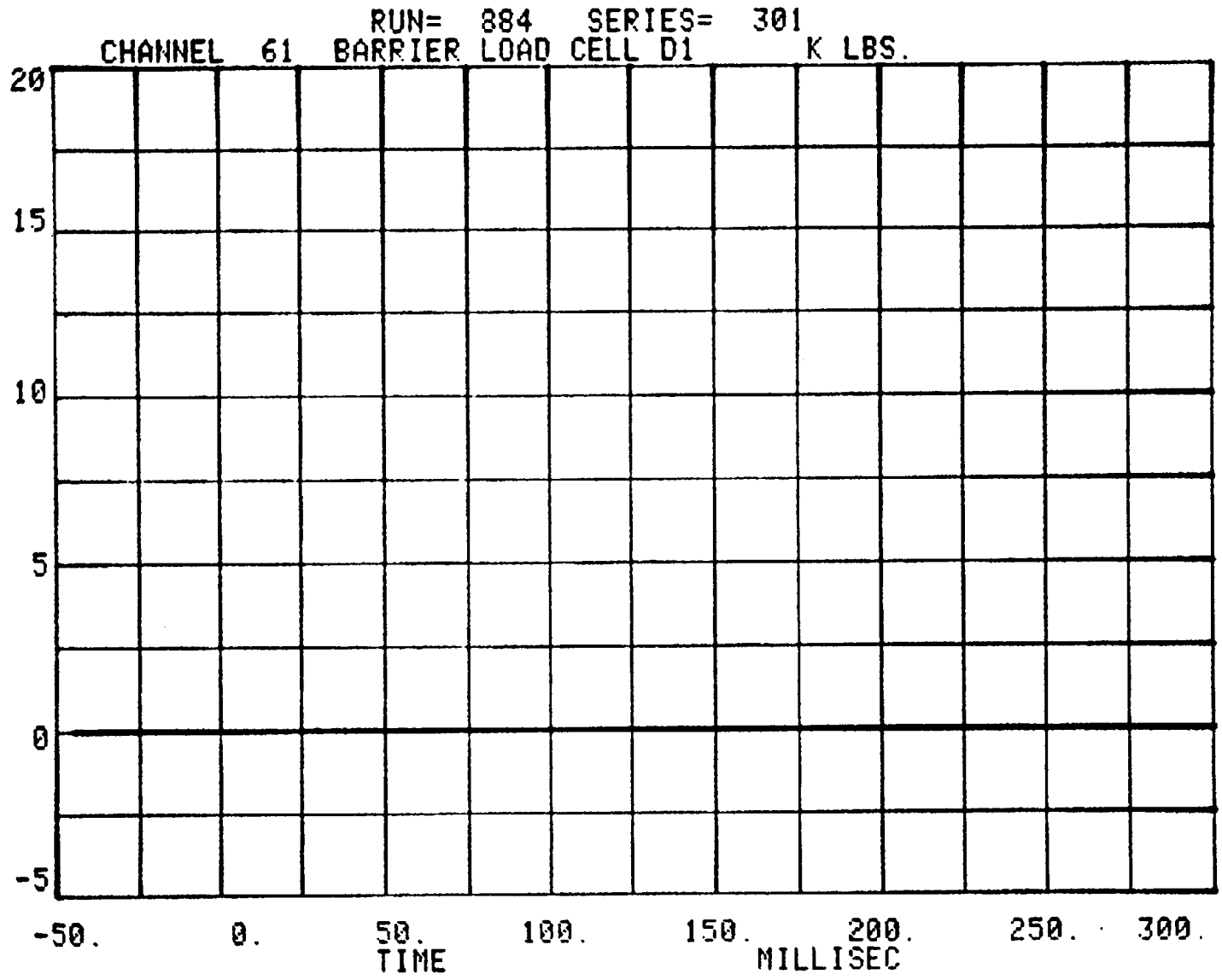

CHANNEL 57 BARRIER LOAD CELL C6
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

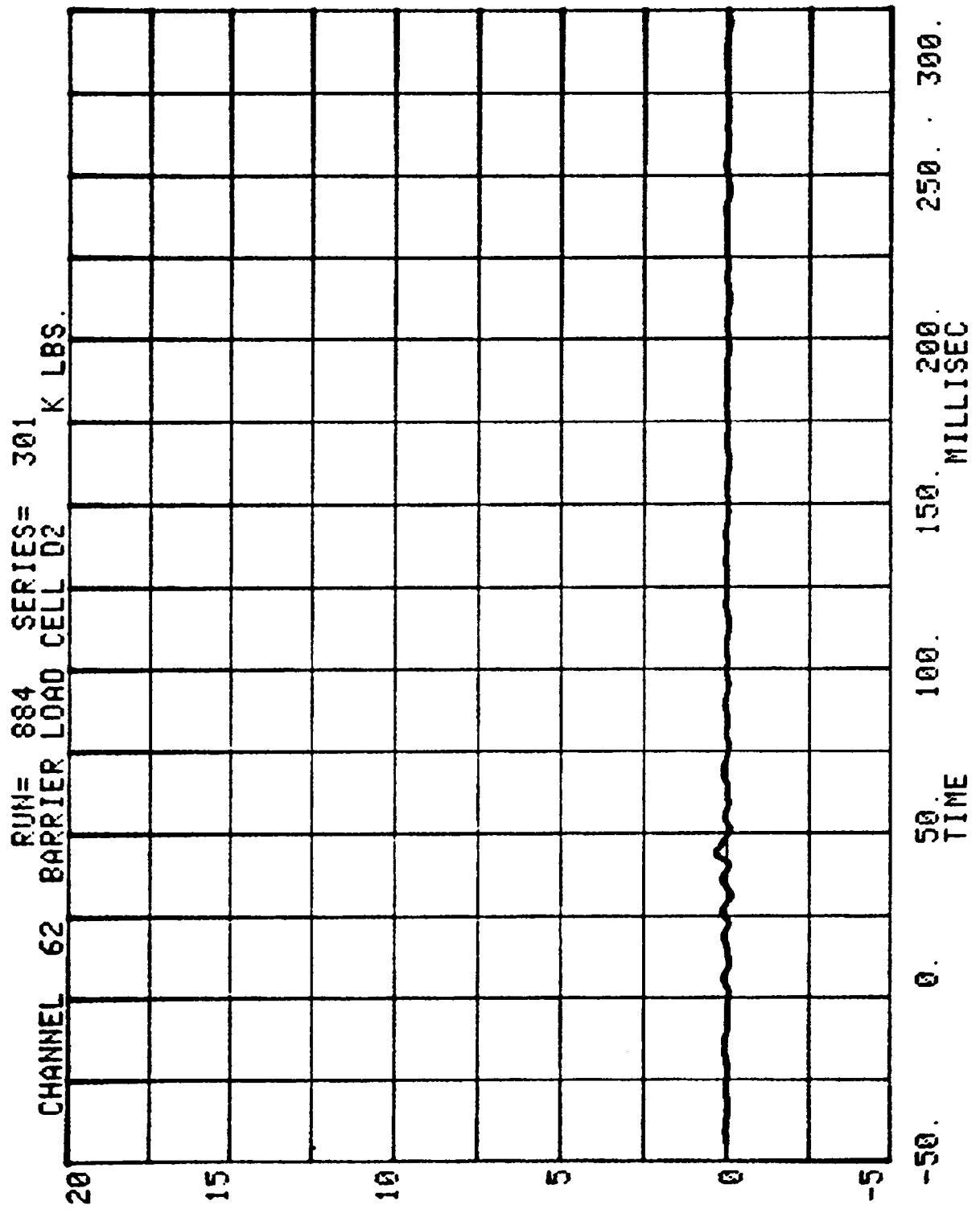
7731-6


CHANNEL 53 BARRIER LOAD CELL C7
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

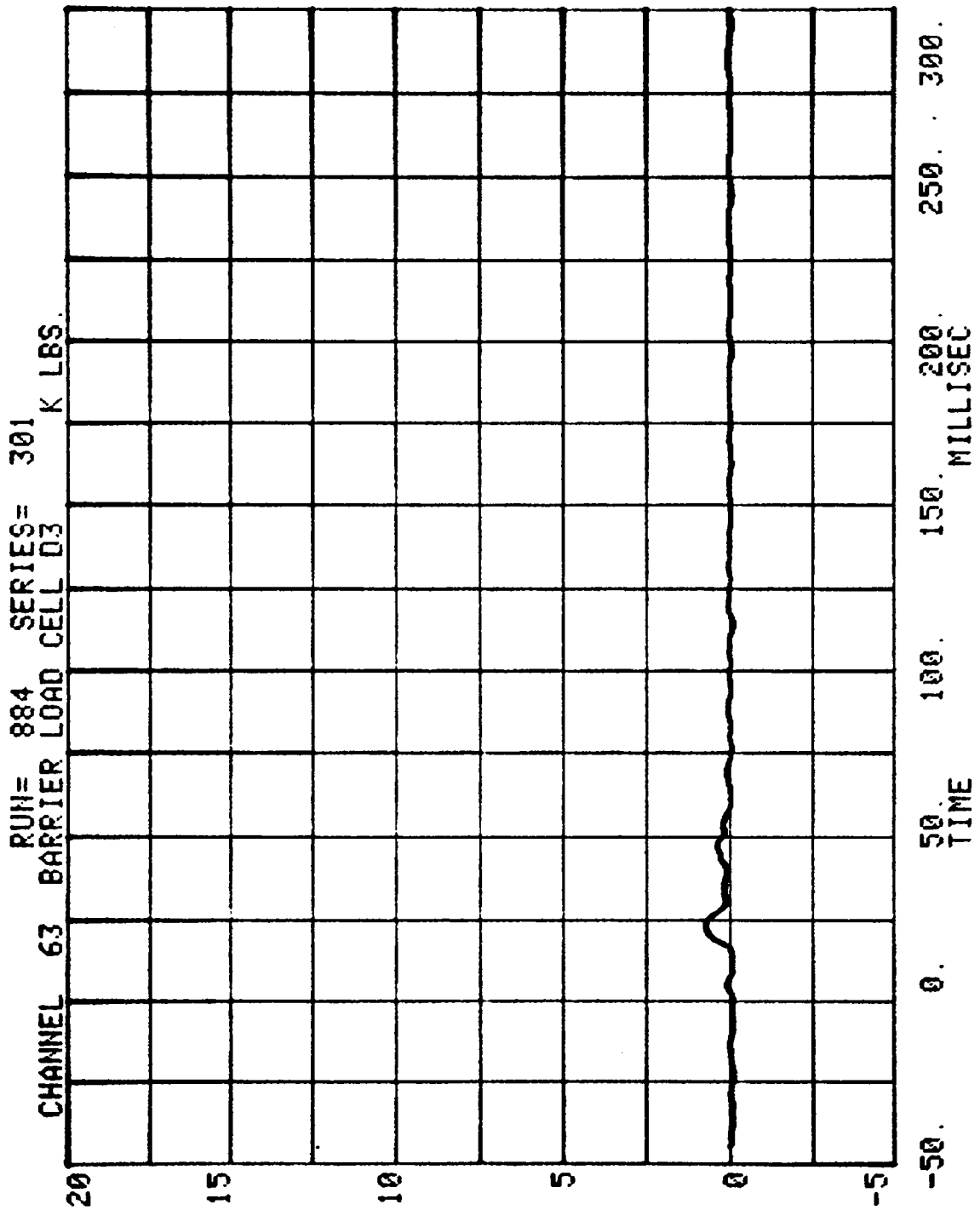

RUN= 884 SERIES= 301
CHANNEL 59 BARRIER LOAD CELL C8
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

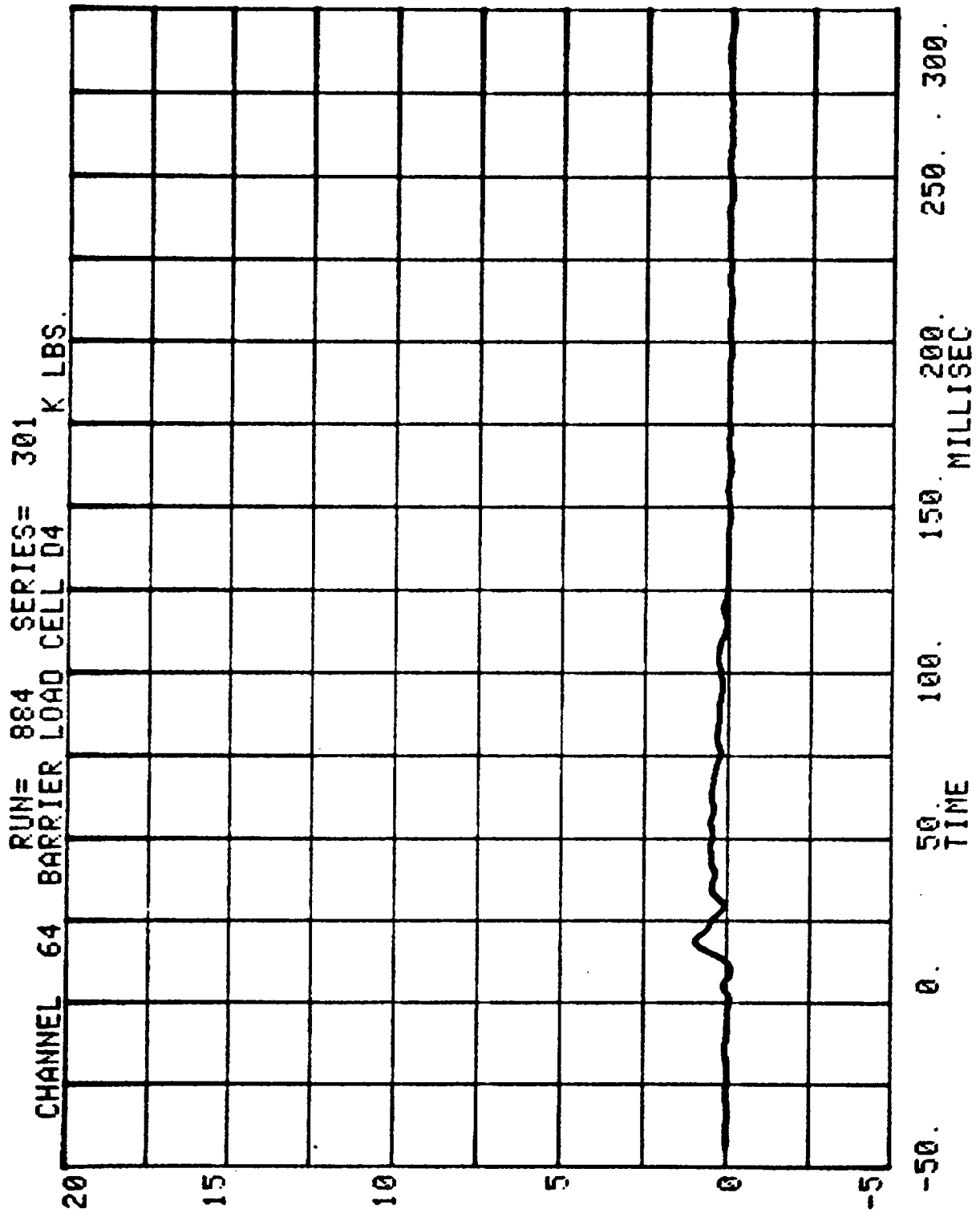

CHANNEL 60 BARRIER LOAD CELL C9
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 884 SERIES= 301
CHANNEL 61 BARRIER LOAD CELL D1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

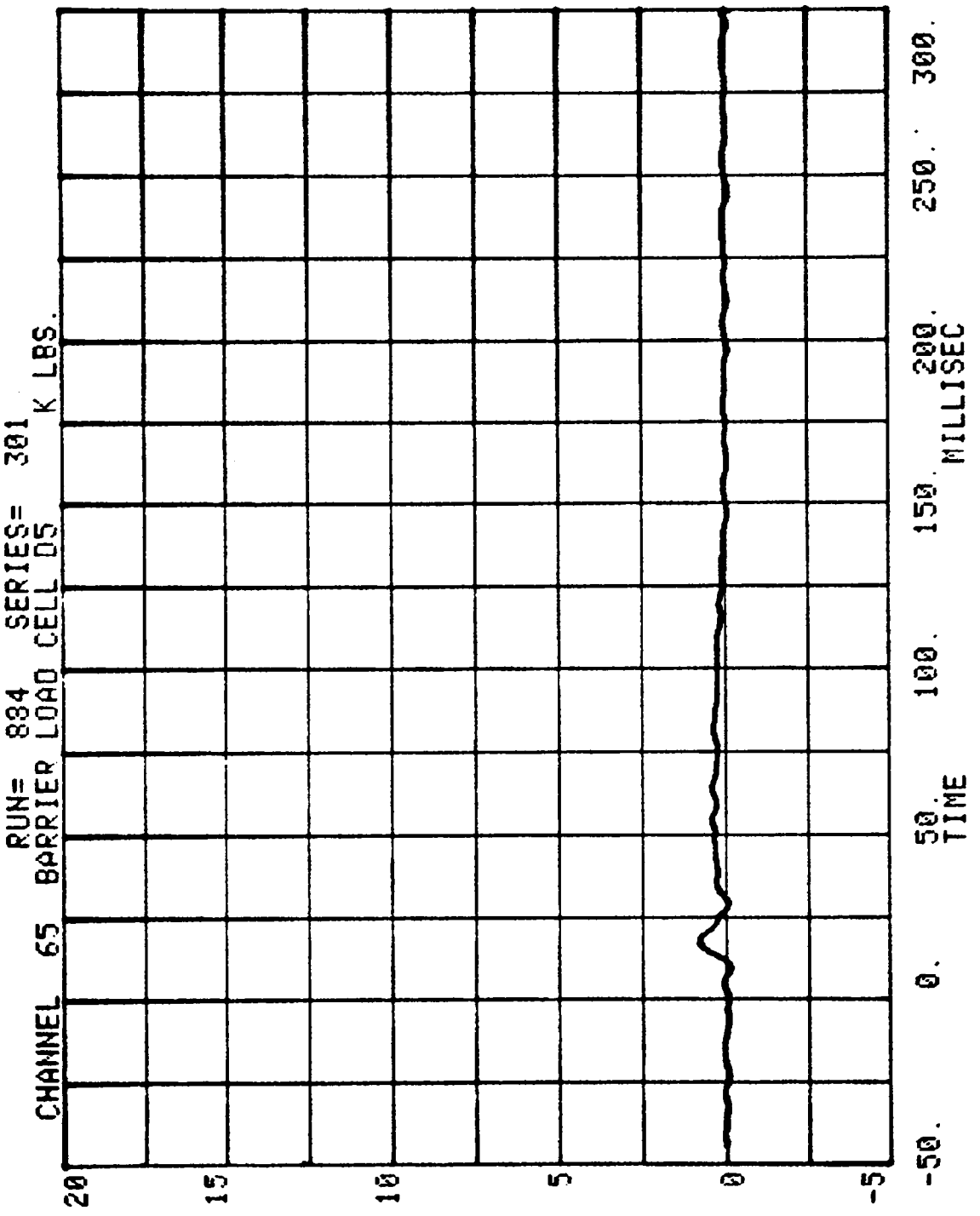

CHANNEL 62 BARRIER LOAD CELL D2
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

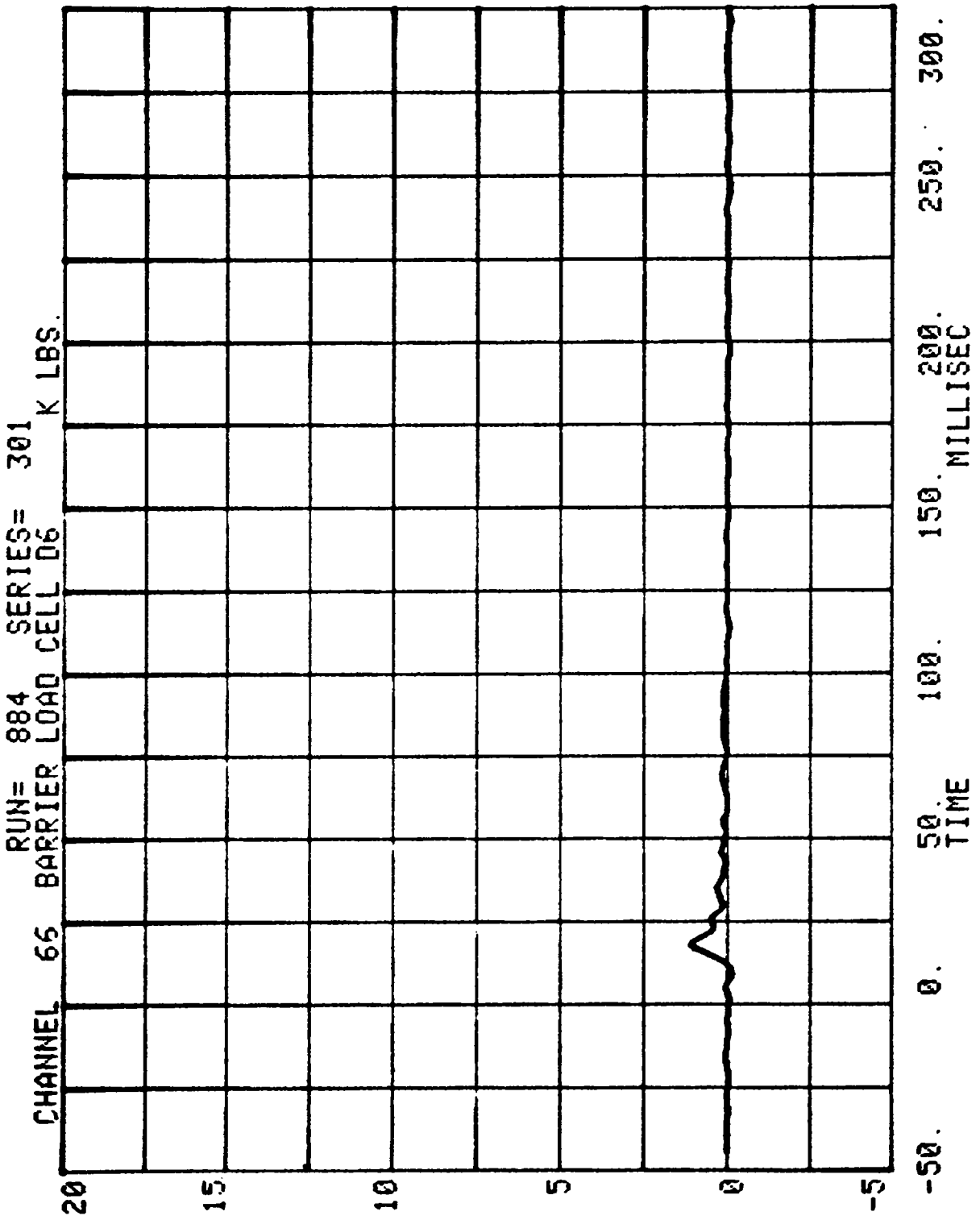
7731-6


CHANNEL 63 BARRIER LOAD CELL D3
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

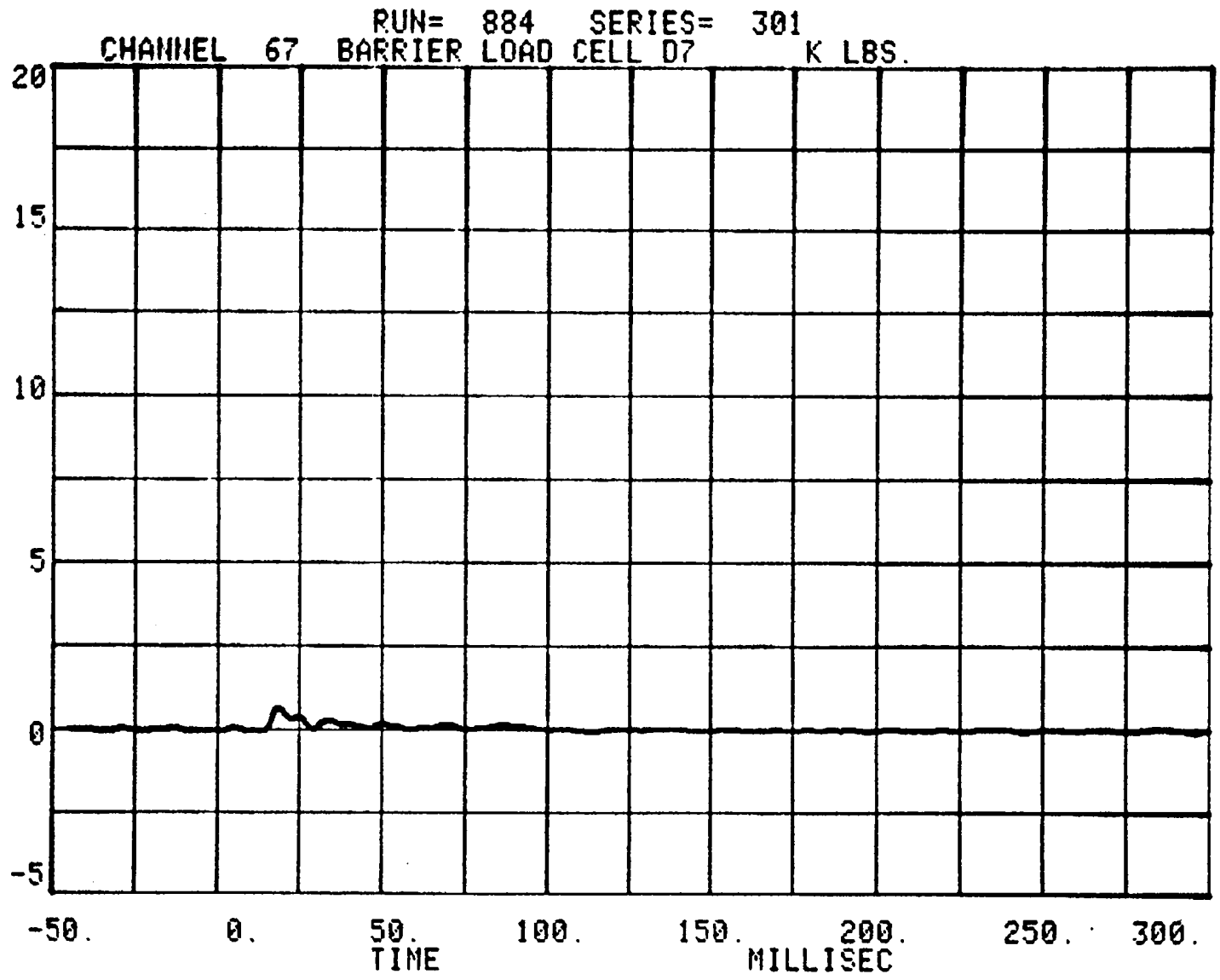

CHANNEL 64 BARRIER LOAD CELL 04
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

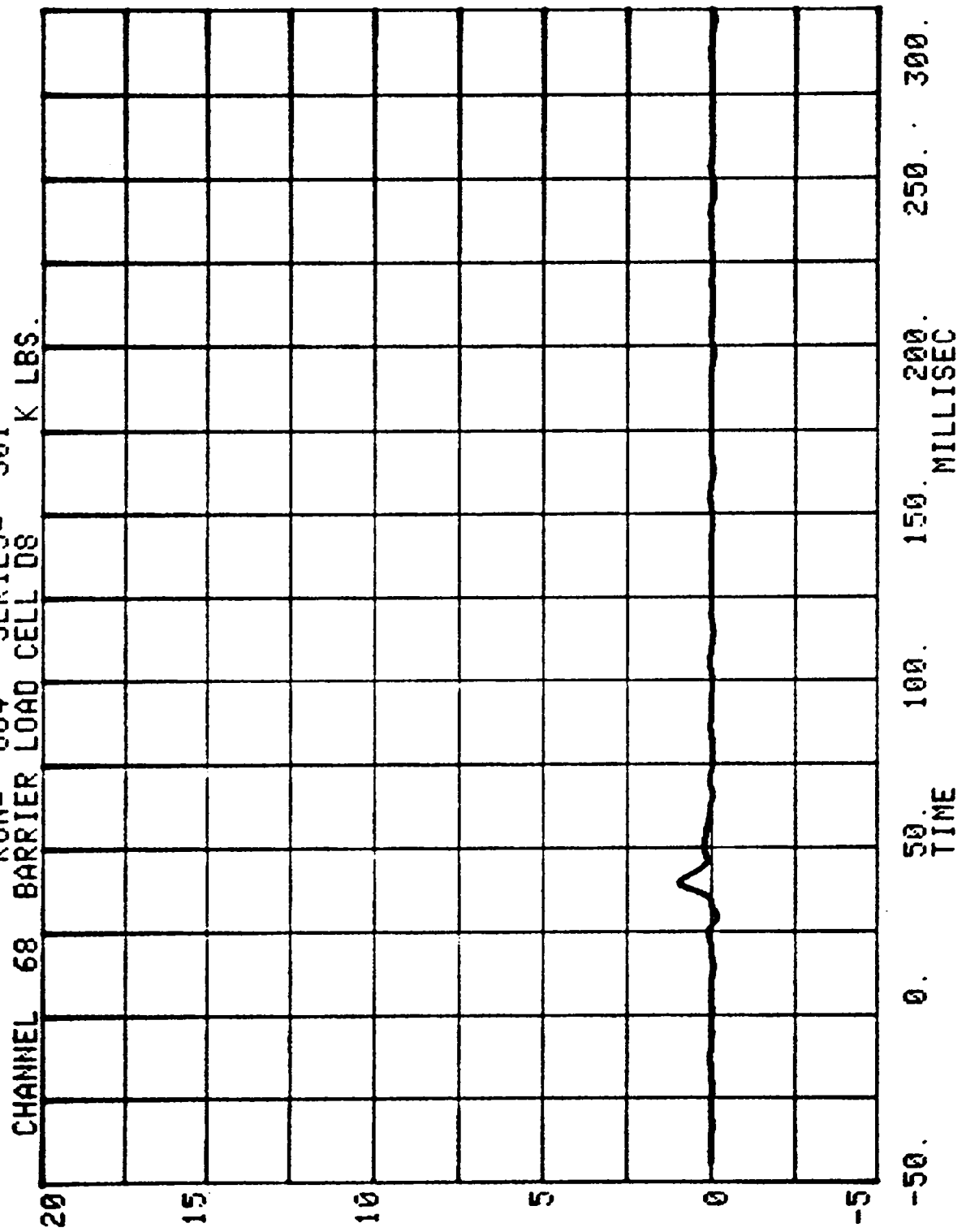
7731-6

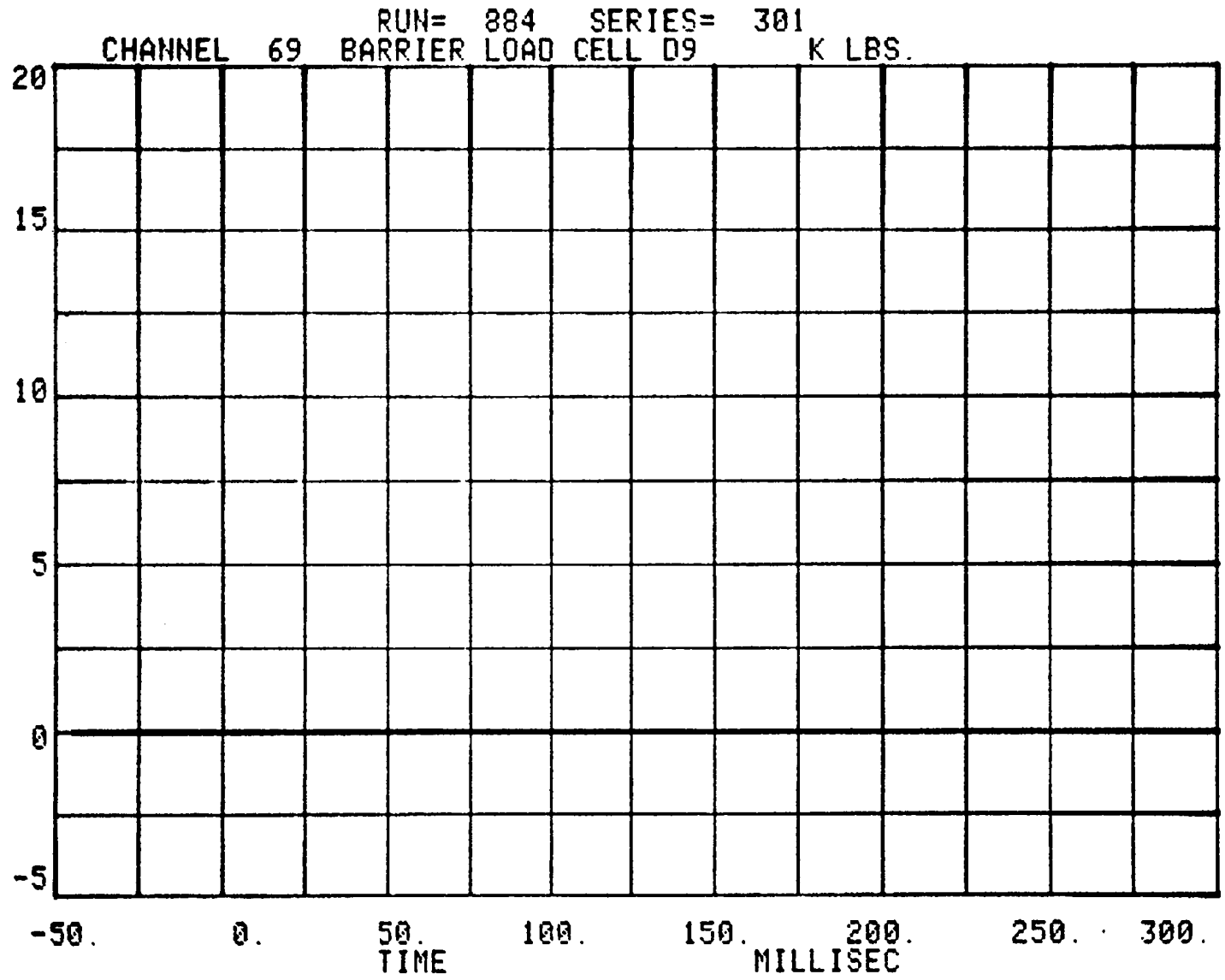

CHANNEL 65 BARRIER LOAD CELL 05
RUN= 834 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 65 BARRIER LOAD CELL 06
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


RUN= 884 SERIES= 301
CHANNEL 67 BARRIER LOAD CELL D7 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

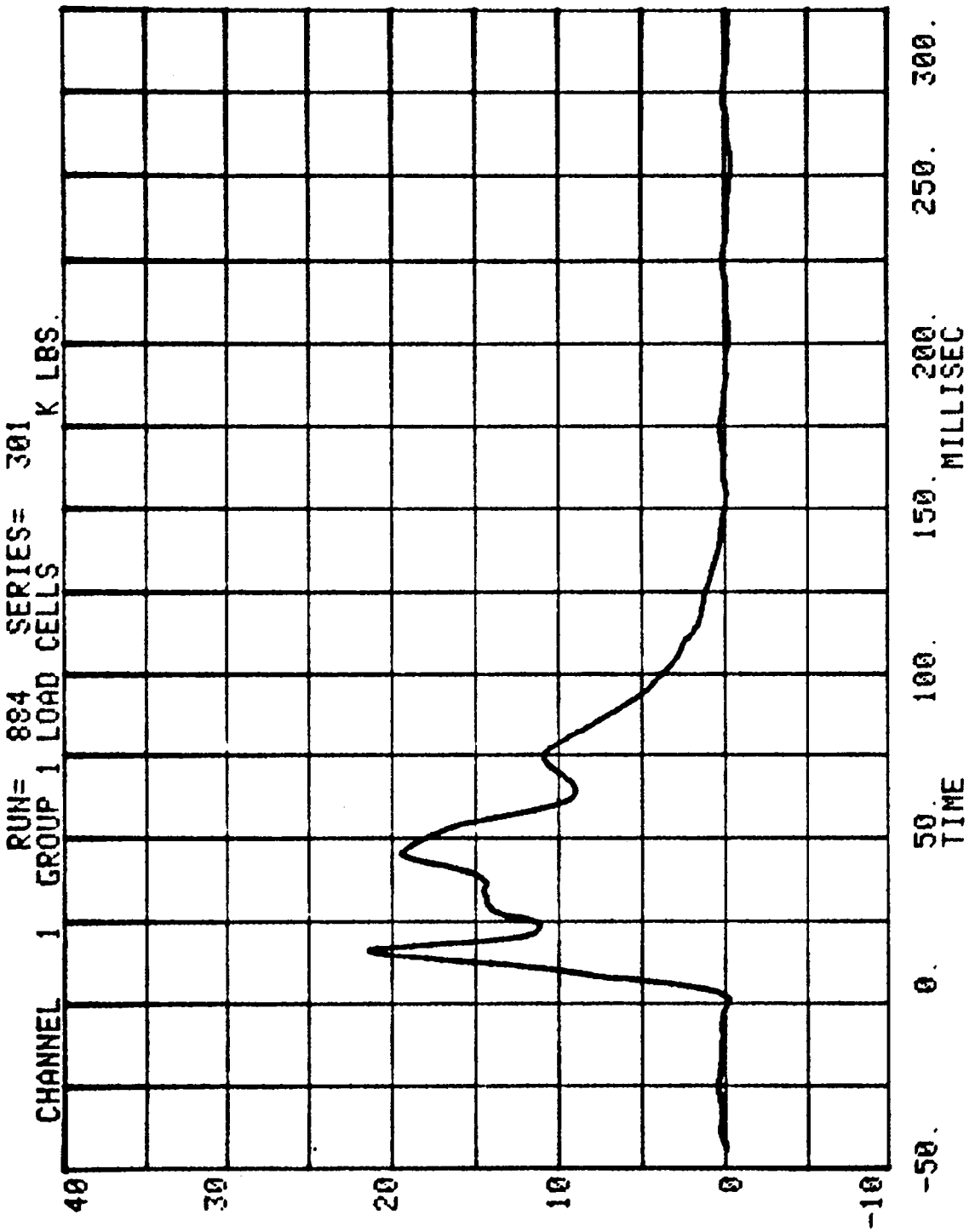

CHANNEL 68 BARRIER LOAD CELL 08
RUN= 884 SERIES= 301
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 884 SERIES= 301
CHANNEL 69 BARRIER LOAD CELL D9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC

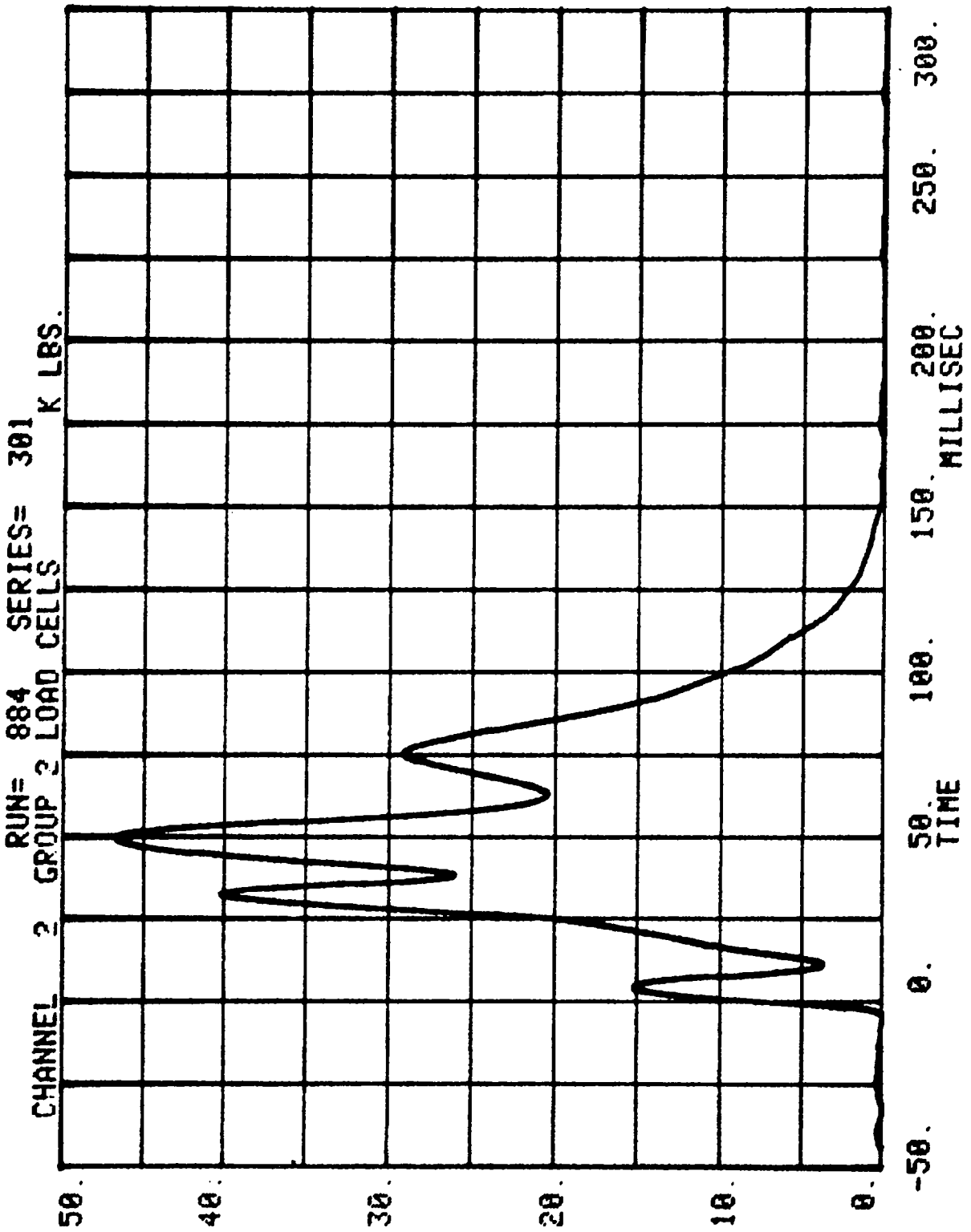
NEW CAR ASSESSMENT CRASH TEST - 1989

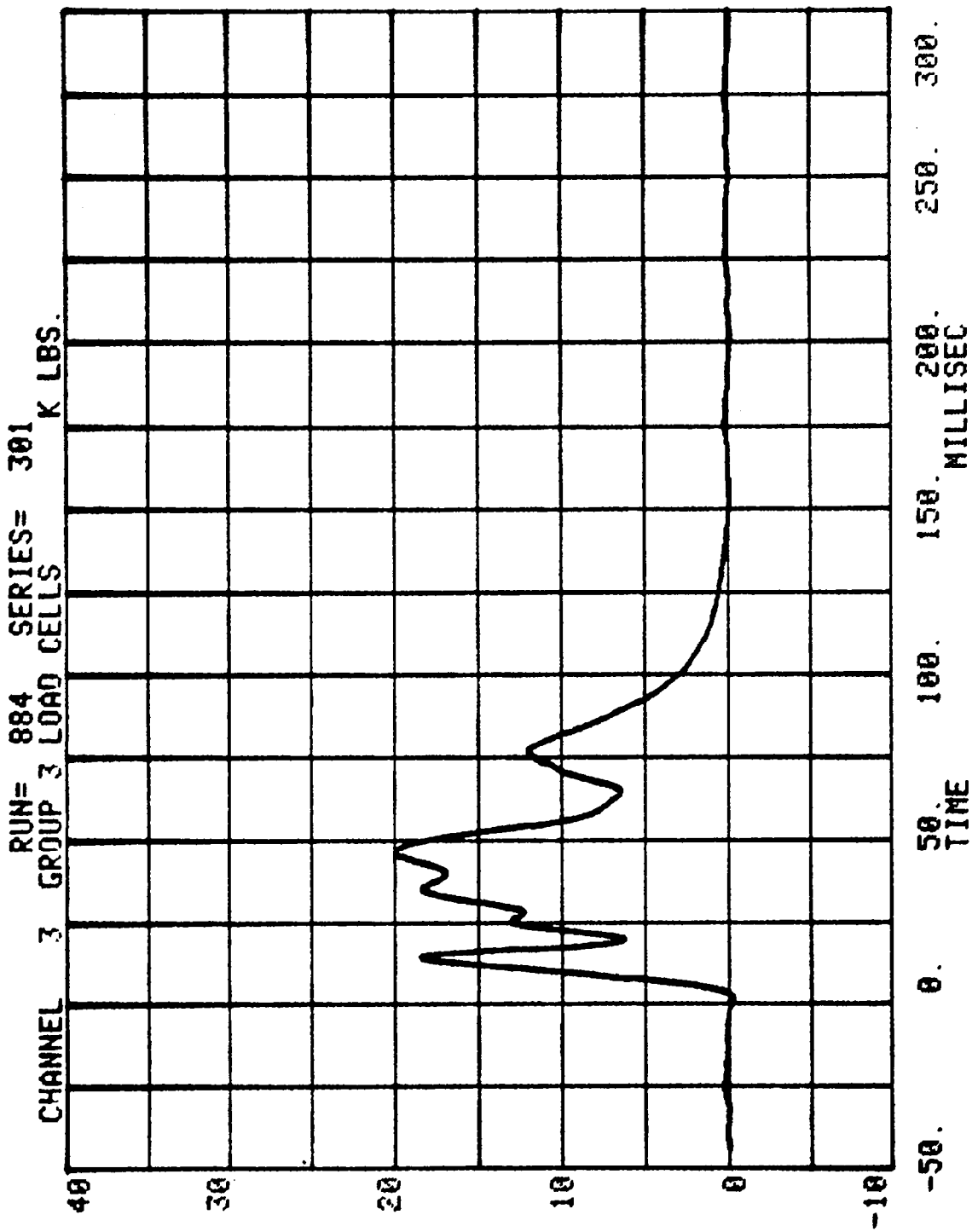
RUN # 884 SERIES # 301

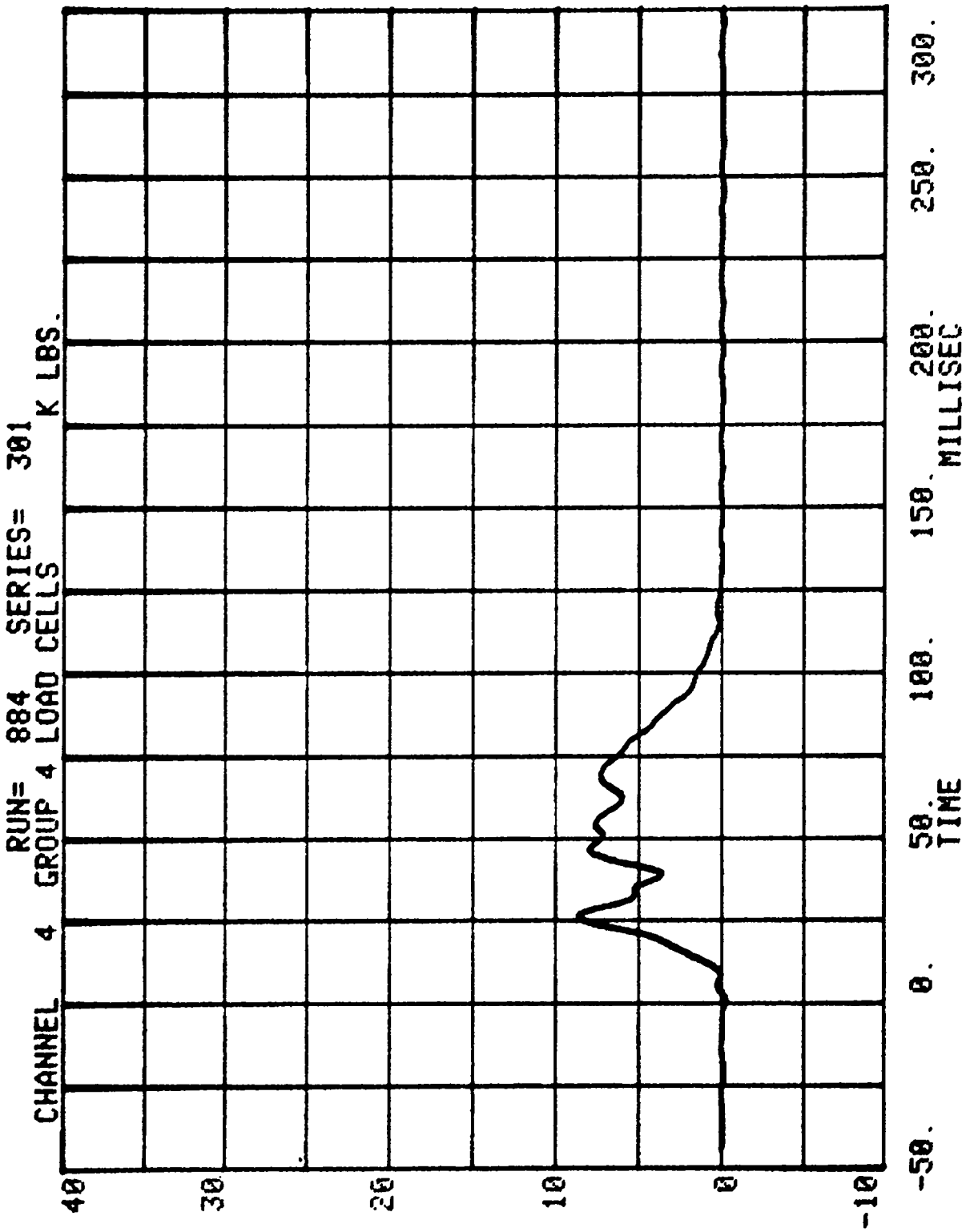
CHAN	TITLE	MINIMUM/MAXIMUM	AT	TIME
1	GROUP 1 LOAD CELLS	-.208 K LBS.		.82 MS.
		21.389 K LBS.		16.12 MS.
2	GROUP 2 LOAD CELLS	-.090 K LBS.		251.55 MS.
		46.762 K LBS.		49.65 MS.
3	GROUP 3 LOAD CELLS	-.239 K LBS.		1.05 MS.
		20.071 K LBS.		46.50 MS.
4	GROUP 4 LOAD CELLS	-.234 K LBS.		.67 MS.
		8.612 K LBS.		26.25 MS.
5	GROUP 5 LOAD CELLS	-.391 K LBS.		.30 MS.
		8.472 K LBS.		53.02 MS.
6	GROUP 6 LOAD CELLS	-.276 K LBS.		245.25 MS.
		5.214 K LBS.		33.97 MS.
7	TOTAL LOAD CELL SUM	-.788 K LBS.		296.25 MS.
		104.299 K LBS.		48.37 MS.


CHANNEL 1 GROUP 1 LOAD CELLS
RUN= 884 SERIES= 301
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

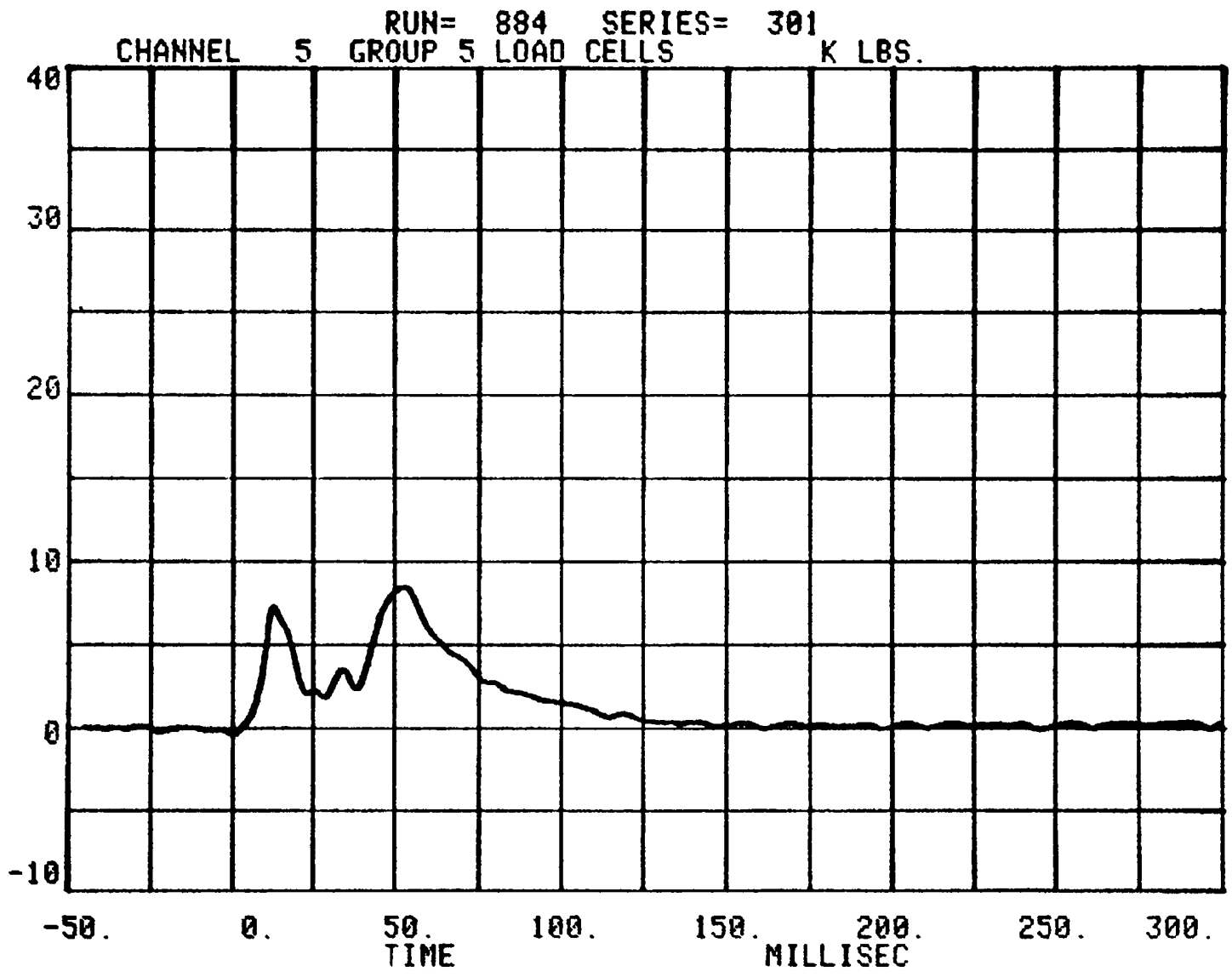
7731-6


RUN= 884 SERIES= 301
GROUP 2 LOAD CELLS
CHANNEL 2
K LBS.
50.
40.
30.
20.
10.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

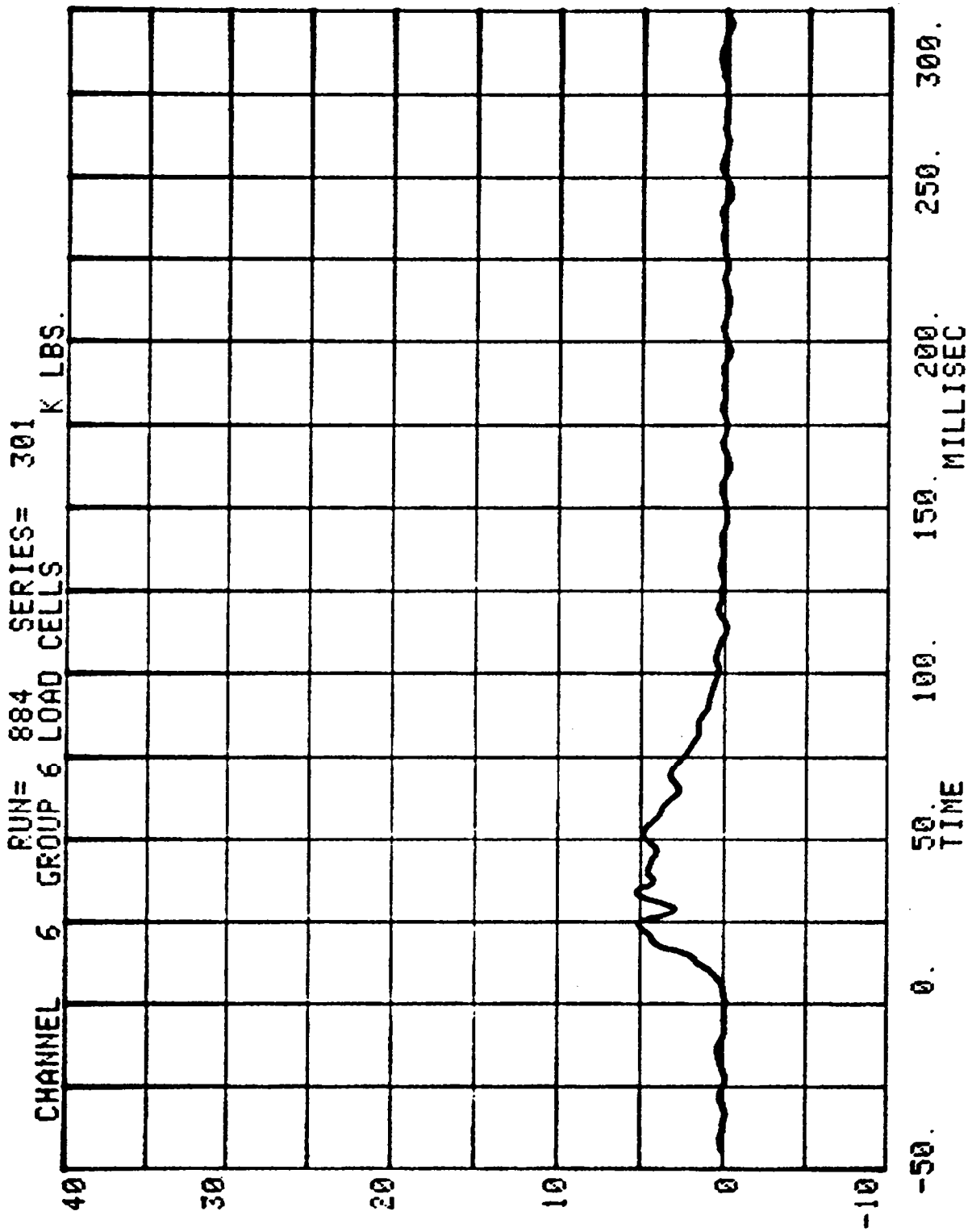

CHANNEL 3 GROUP 3 LOAD CELLS
RUN= 884 SERIES= 301
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

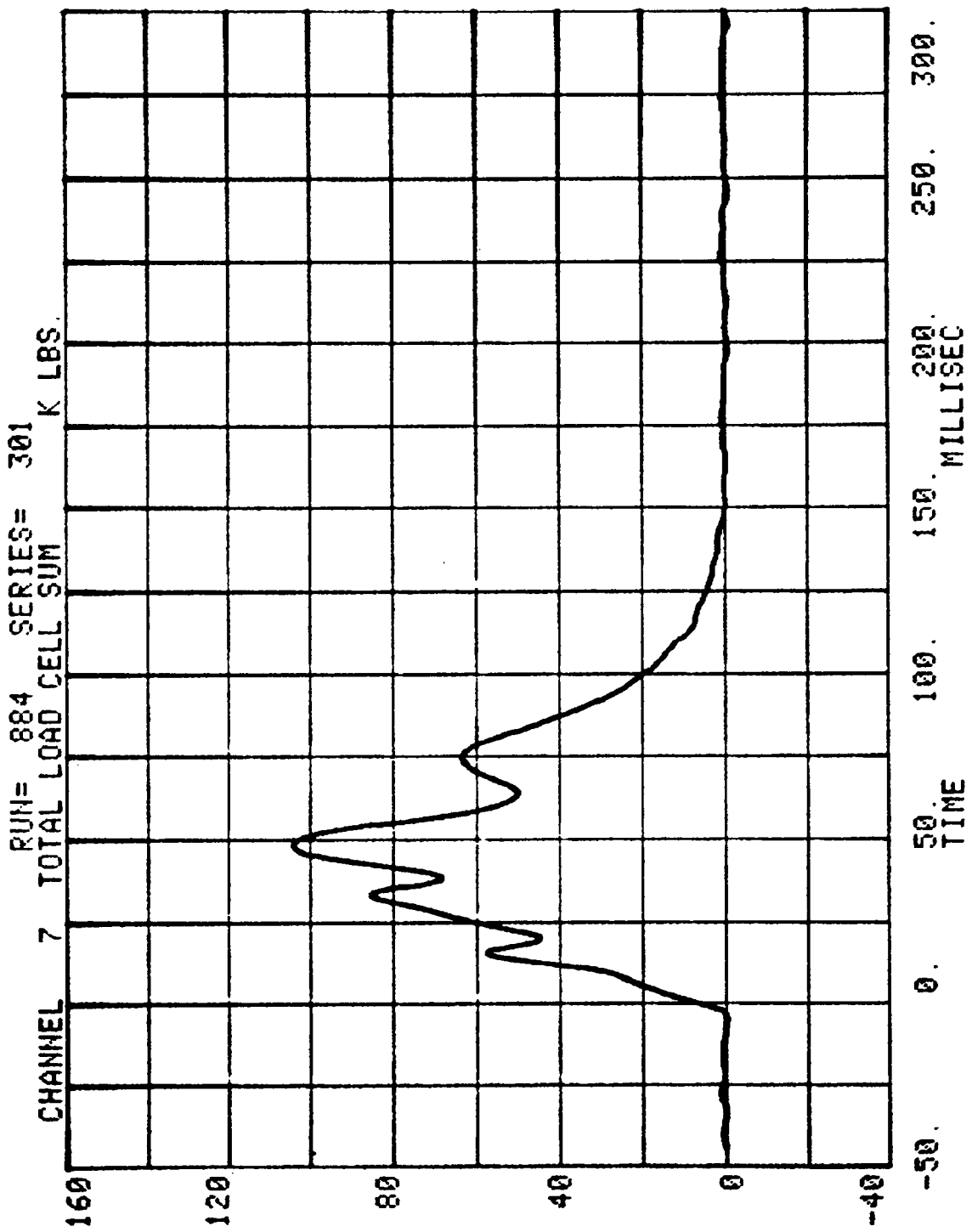

CHANNEL 4 GROUP 4 LOAD CELLS
RUN= 884 SERIES= 301
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


RUN= 884 SERIES= 301
CHANNEL 5 GROUP 5 LOAD CELLS
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


CHANNEL 6 GROUP 6 LOAD CELLS
RUN= 884 SERIES= 301
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 7 TOTAL LOAD CELL SUM
RUN= 884 SERIES= 301 K LBS.
160
120
80
40
0
-40
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6

TEST NO. MK0301

DUMMY DATA

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

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NEW CAR ASSESSMENT CRASH TEST - 1989

RUN= 884

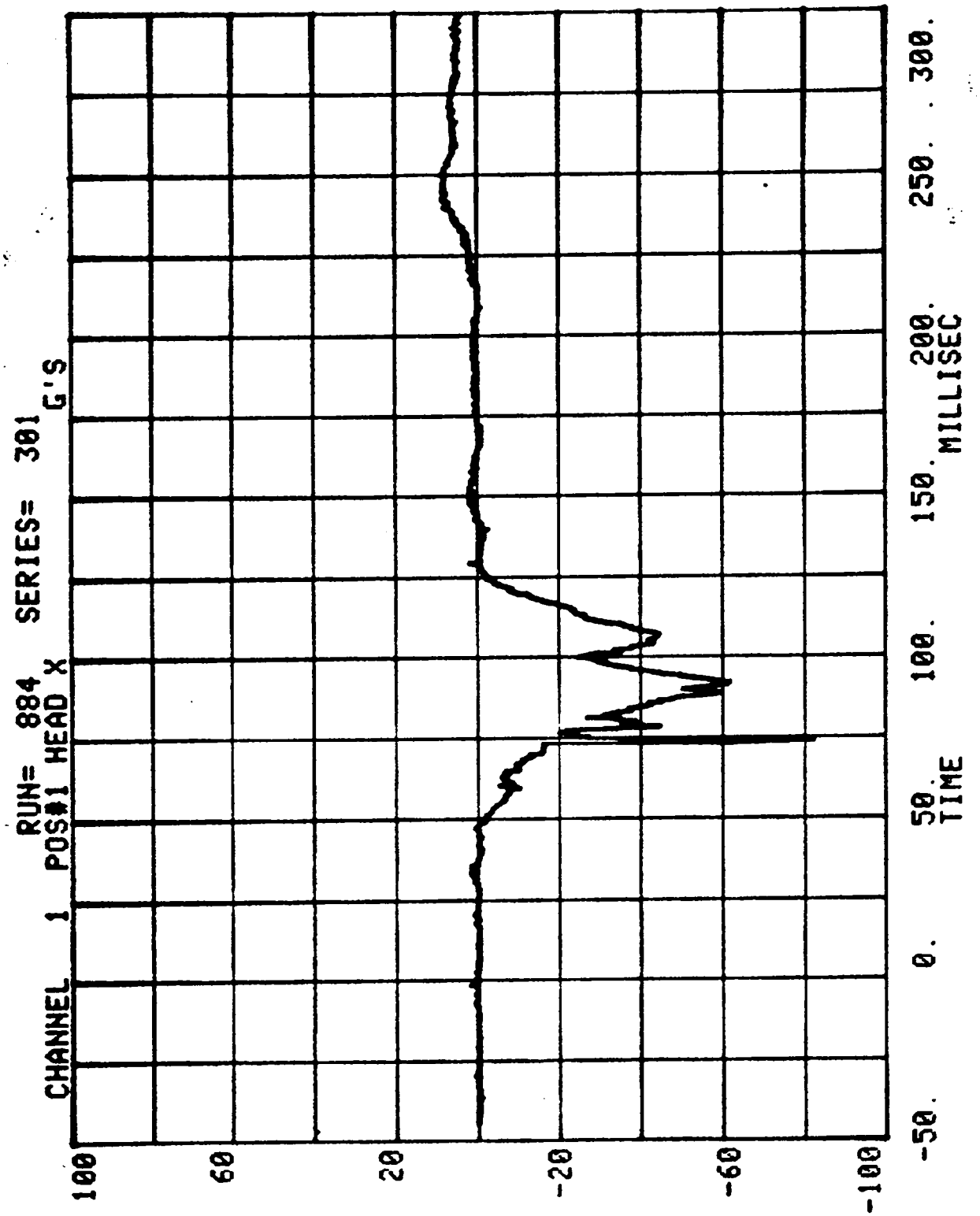
POS#1 HEAD R

HIC= 663.4 FROM T1= .07320 TO T2= .10920

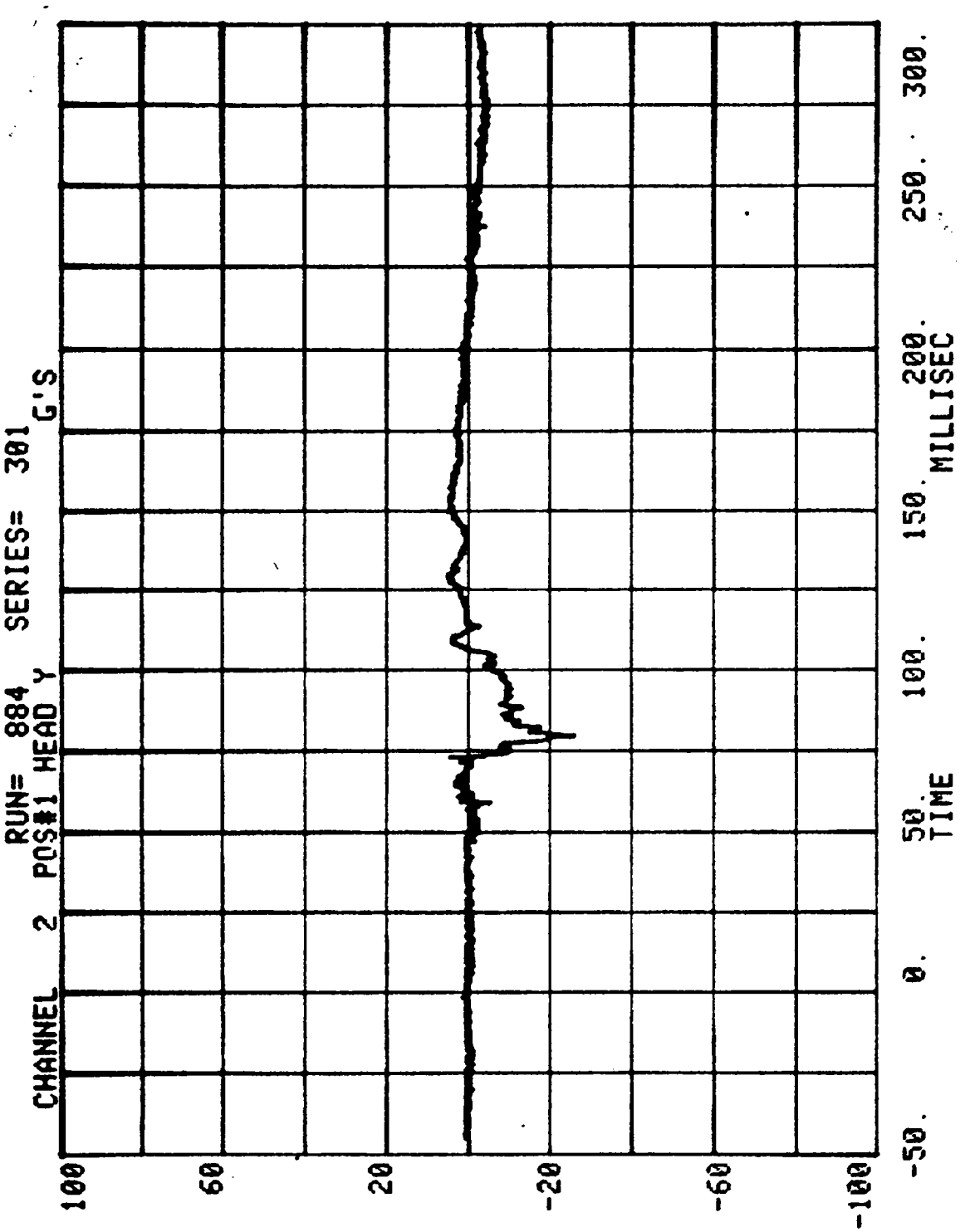
AVERAGE ACCELERATION BETWEEN T1 AND T2= 50.8G'S

EVENT TIME= 300.0 MSEC

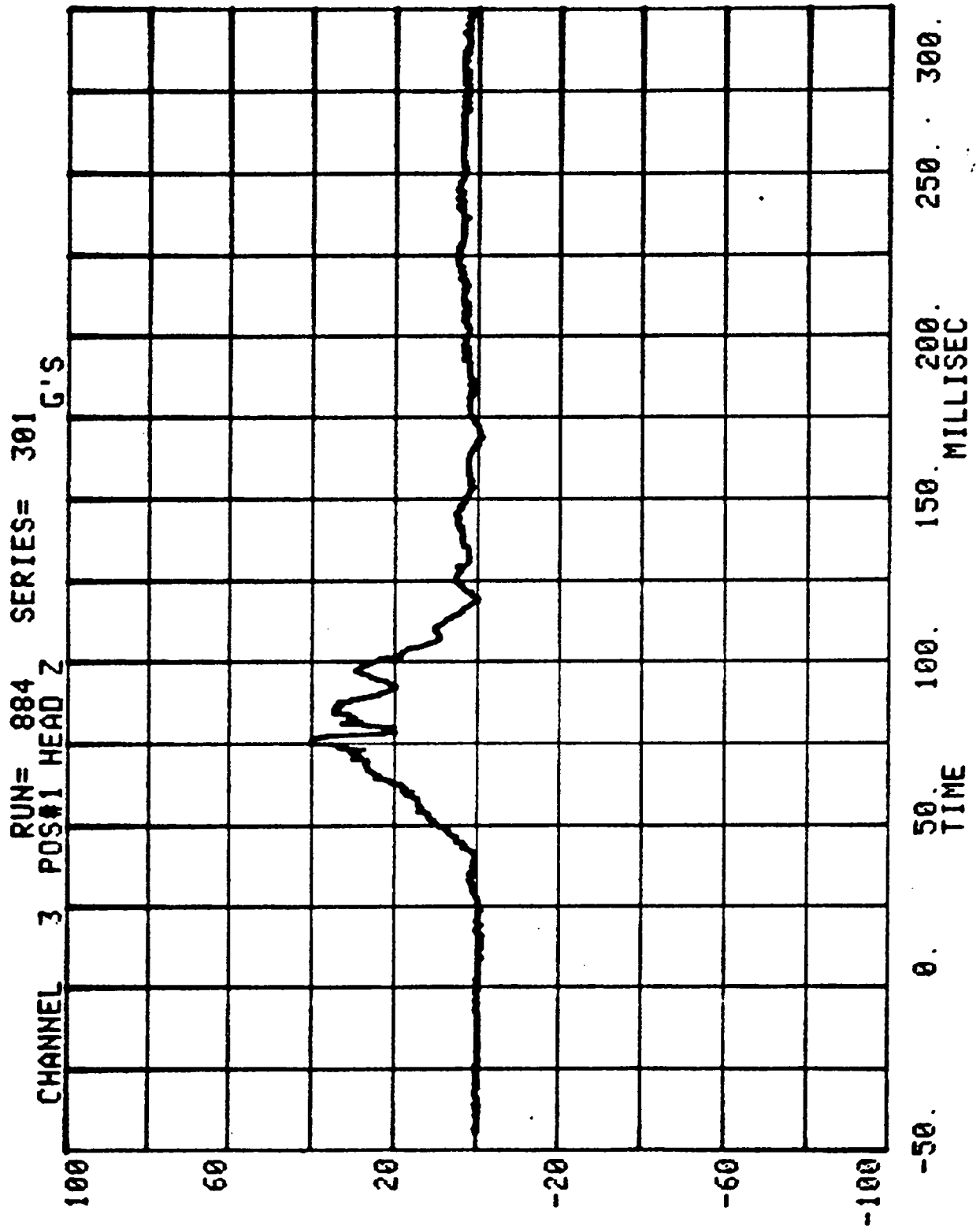
SEVERITY INDEX= 832.9


CHANNEL 1 POS#1 HEAD X
RUN= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

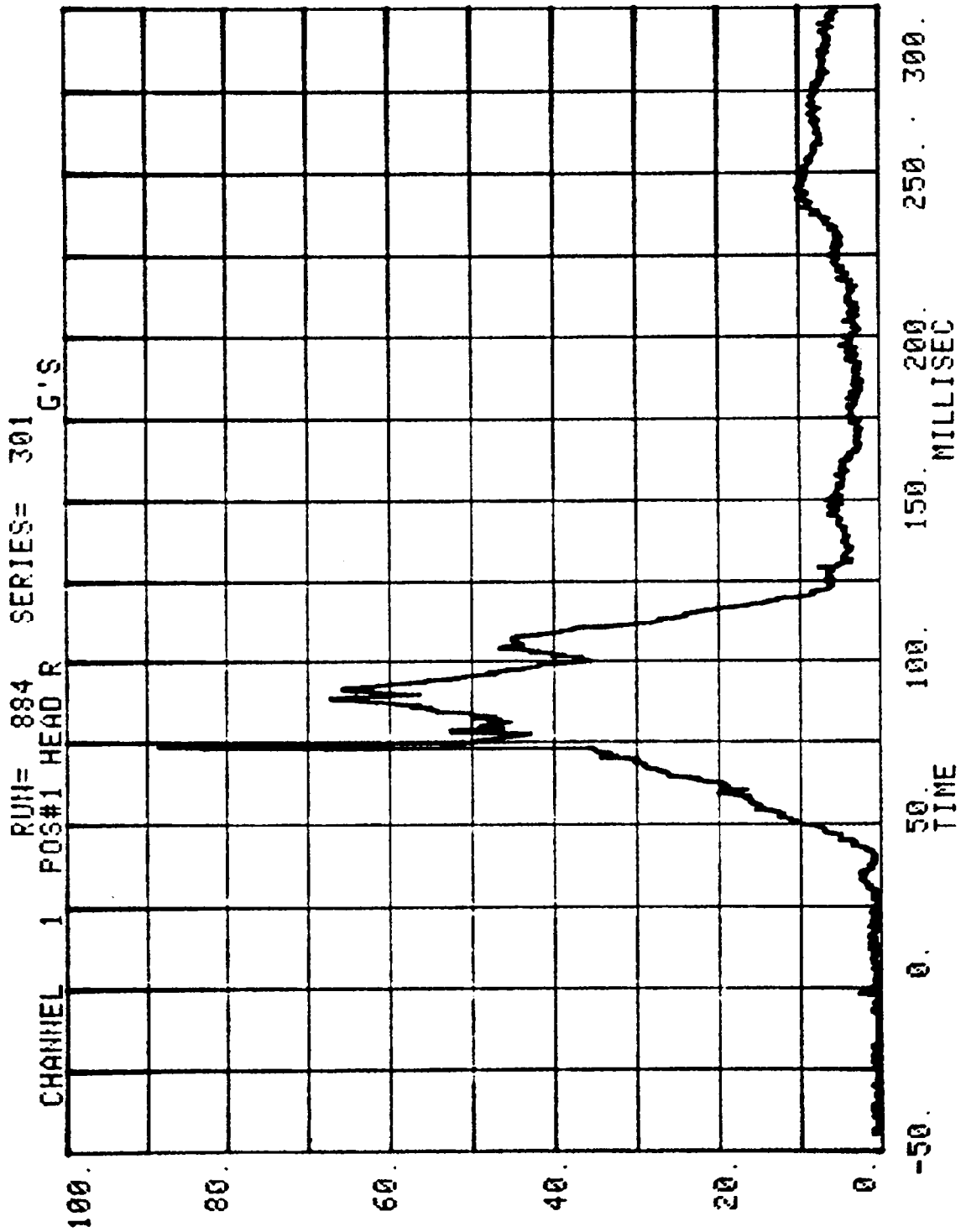
7731-6


CHANNEL 2 POS#1 HEAD Y
RUN= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

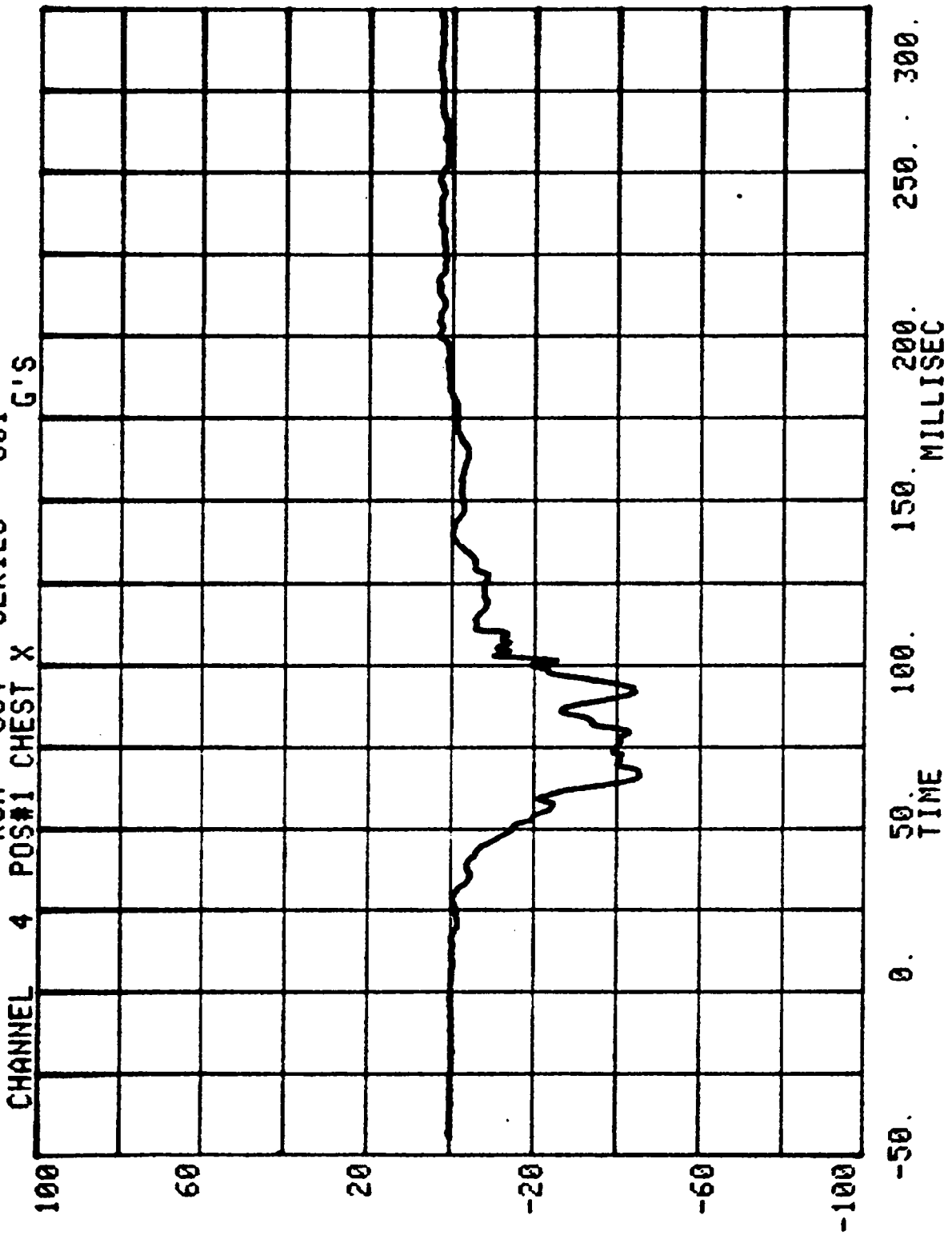
7731-6

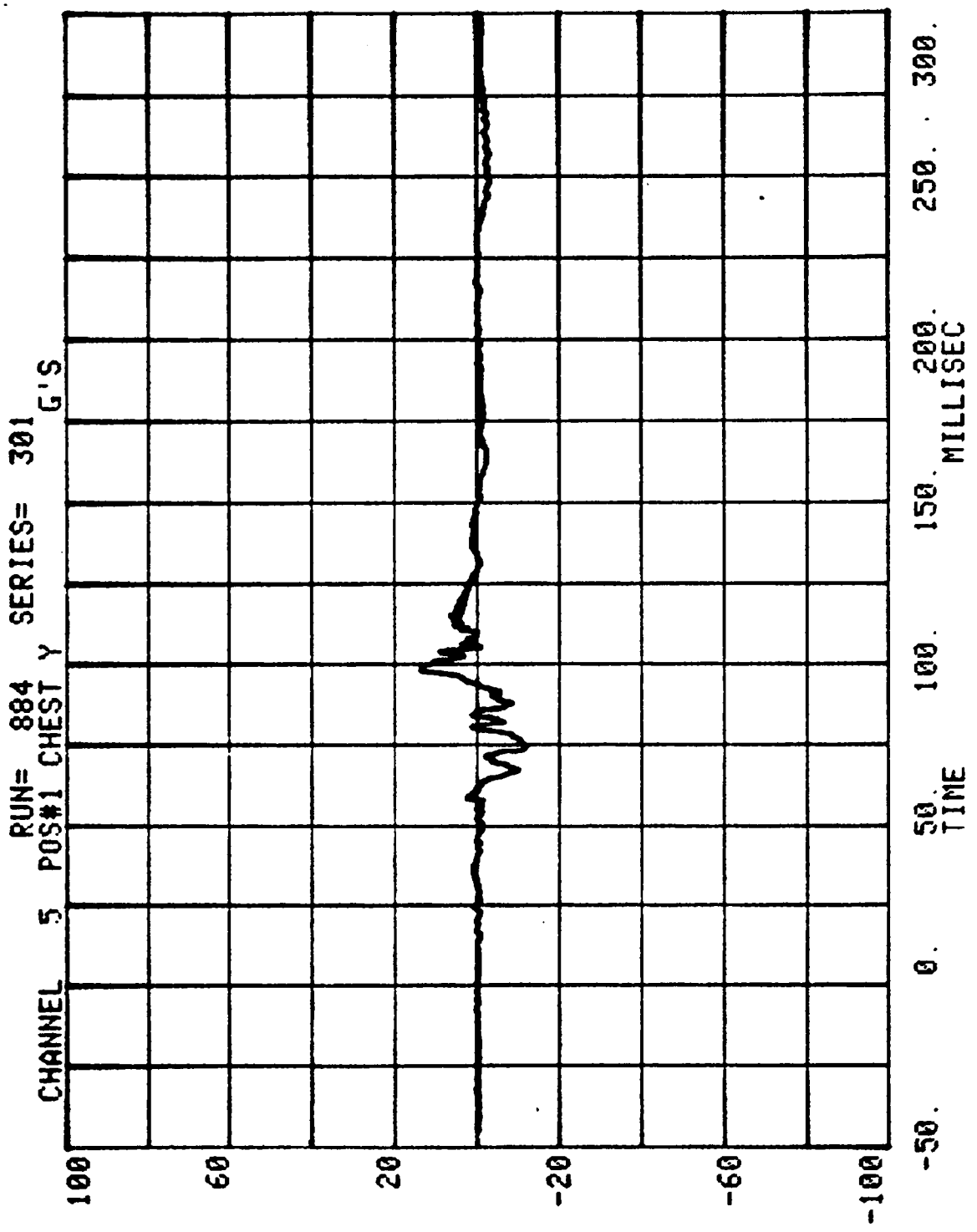

CHANNEL 3 POS#1 HEAD 2
RUN= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

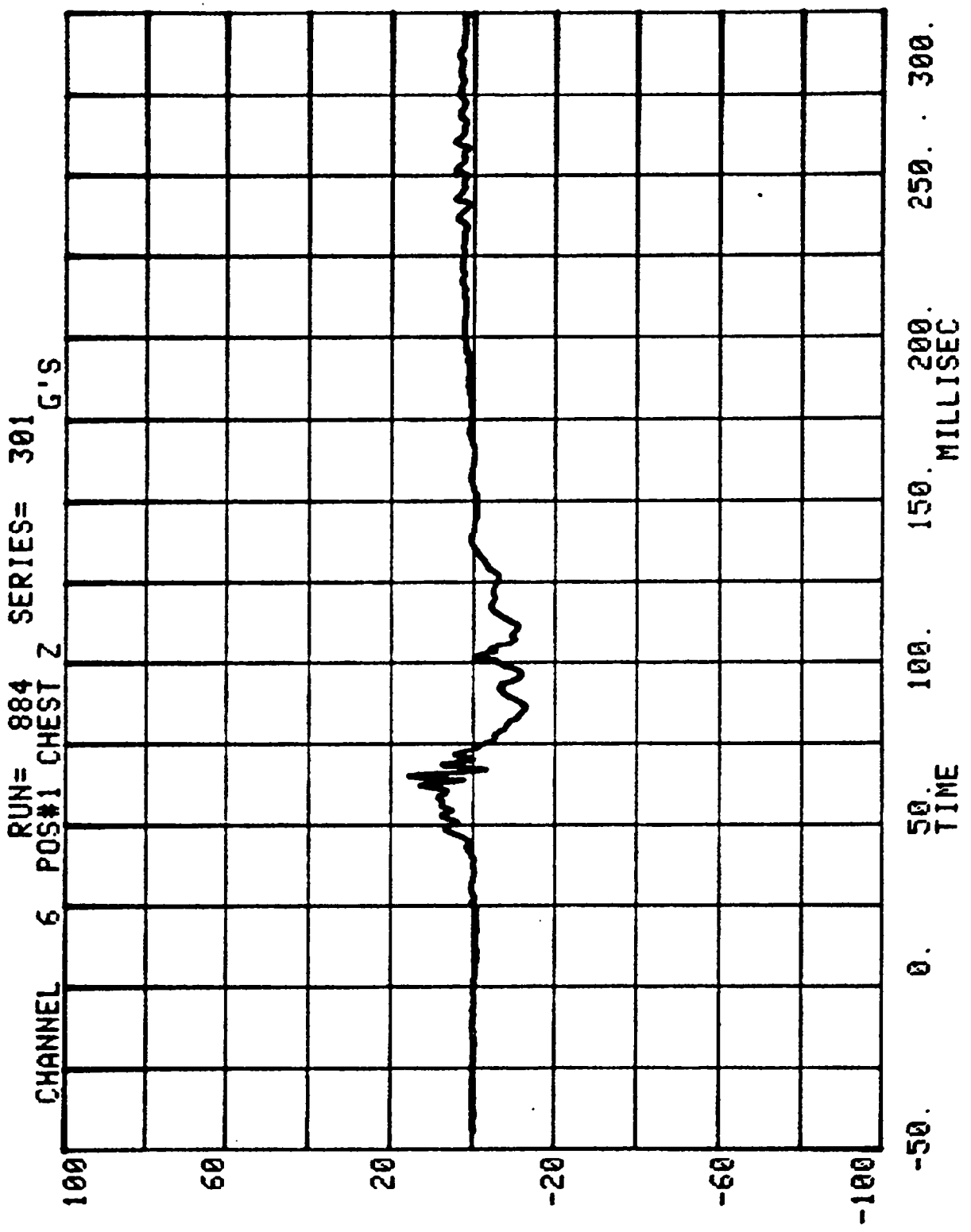
7731-6

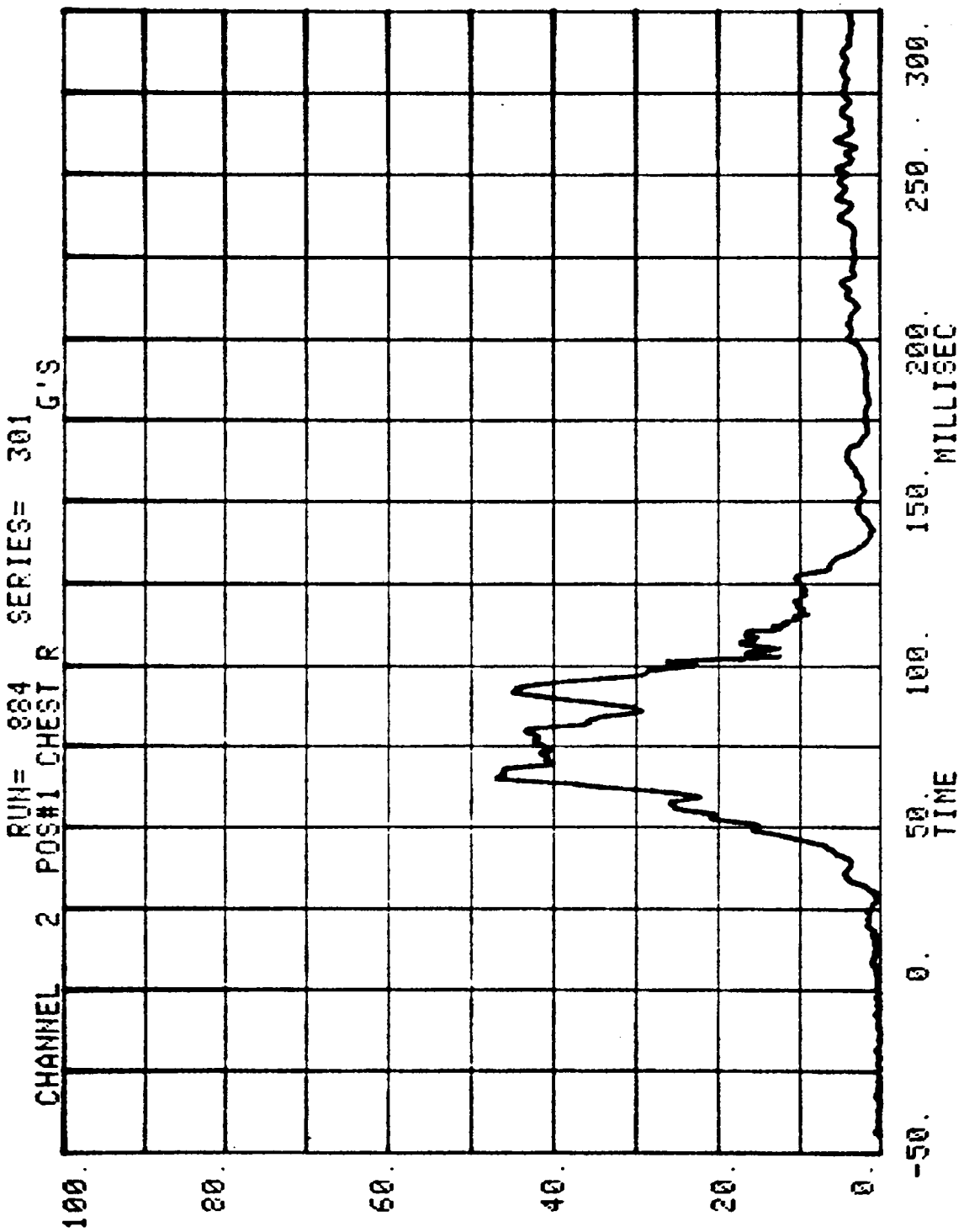

CHANNEL 1 POS#1 HEAD R
RUN= 884 SERIES= 301
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

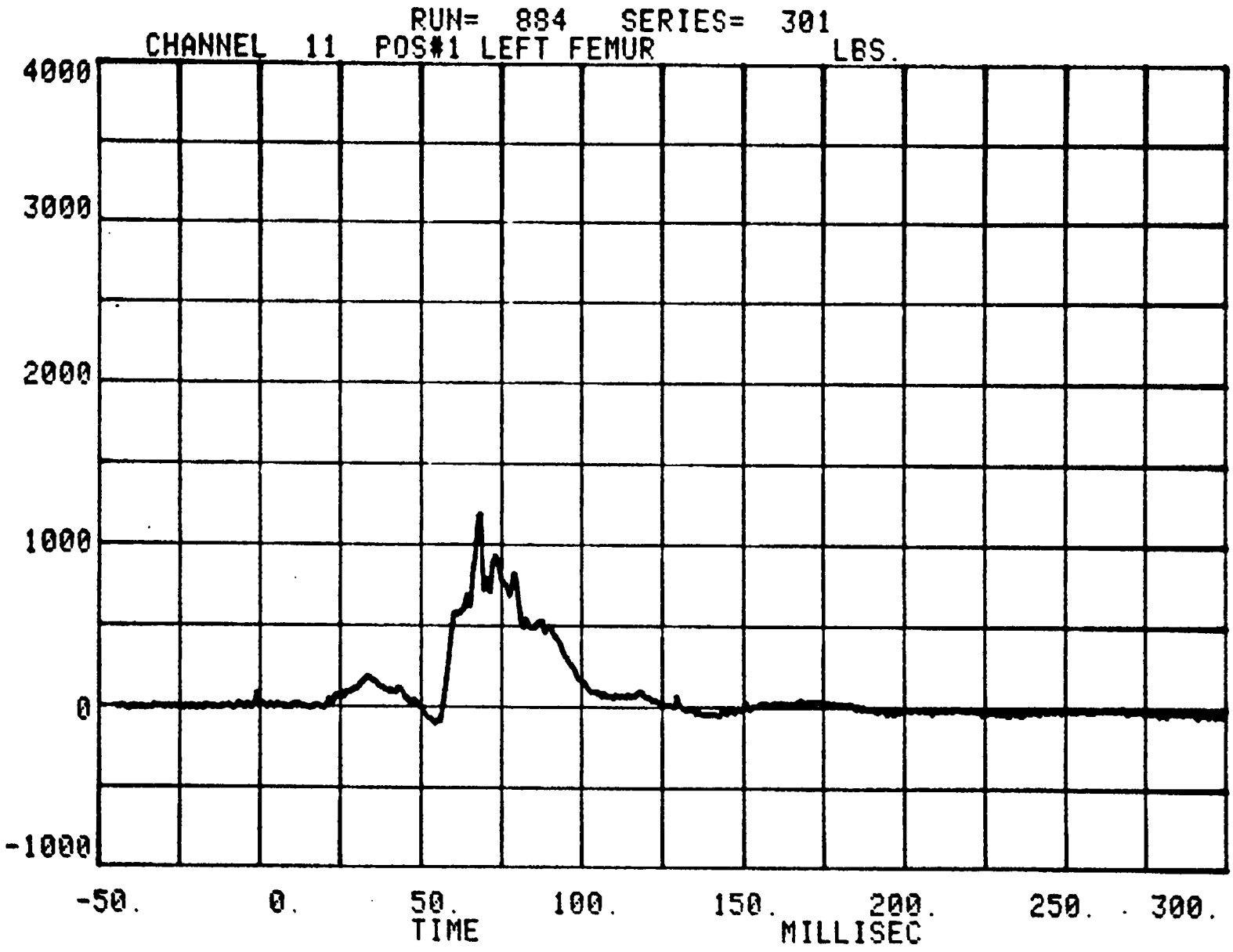
7731-6

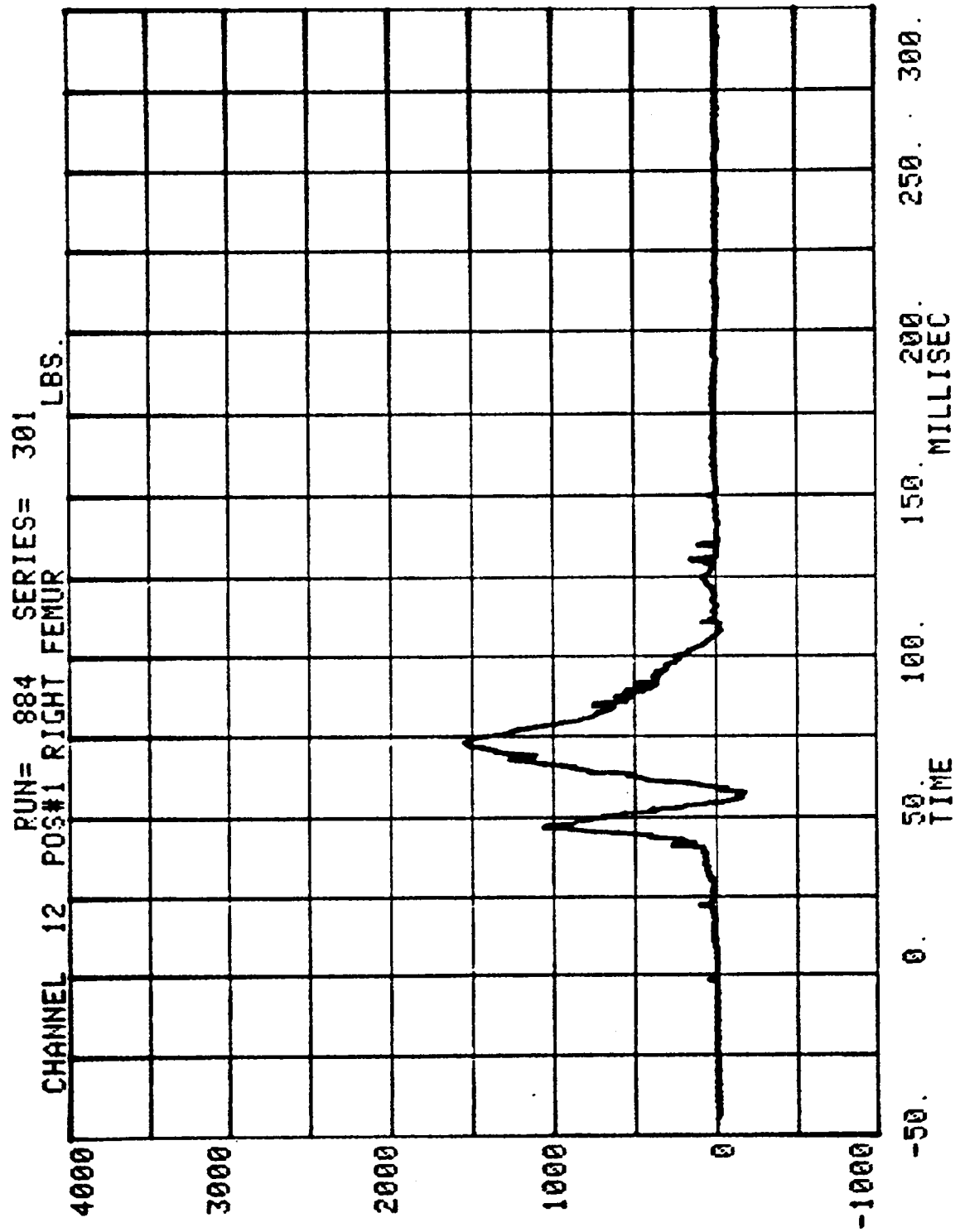

CHANNEL 4 POS#1 CHEST X
RUN= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 5 POS#1 CHEST Y
RUN= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 6 POS#1 CHEST Z
RUN= 884 SERIES= 301
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= 884 SERIES= 301
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 884 SERIES= 301
CHANNEL 11 POS#1 LEFT FEMUR
LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 12
RUN= 884 SERIES= 301
POS#1 RIGHT FEMUR
LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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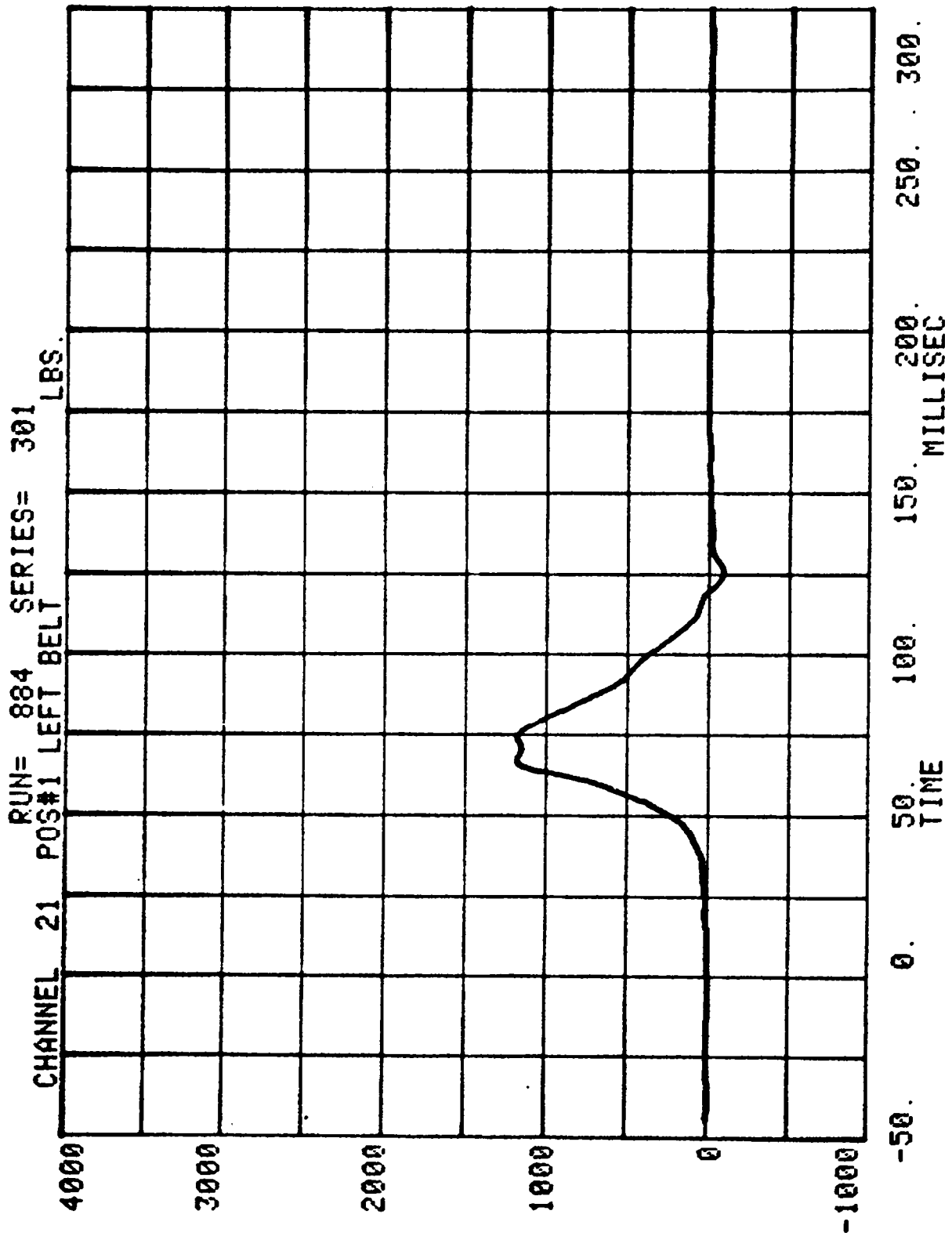
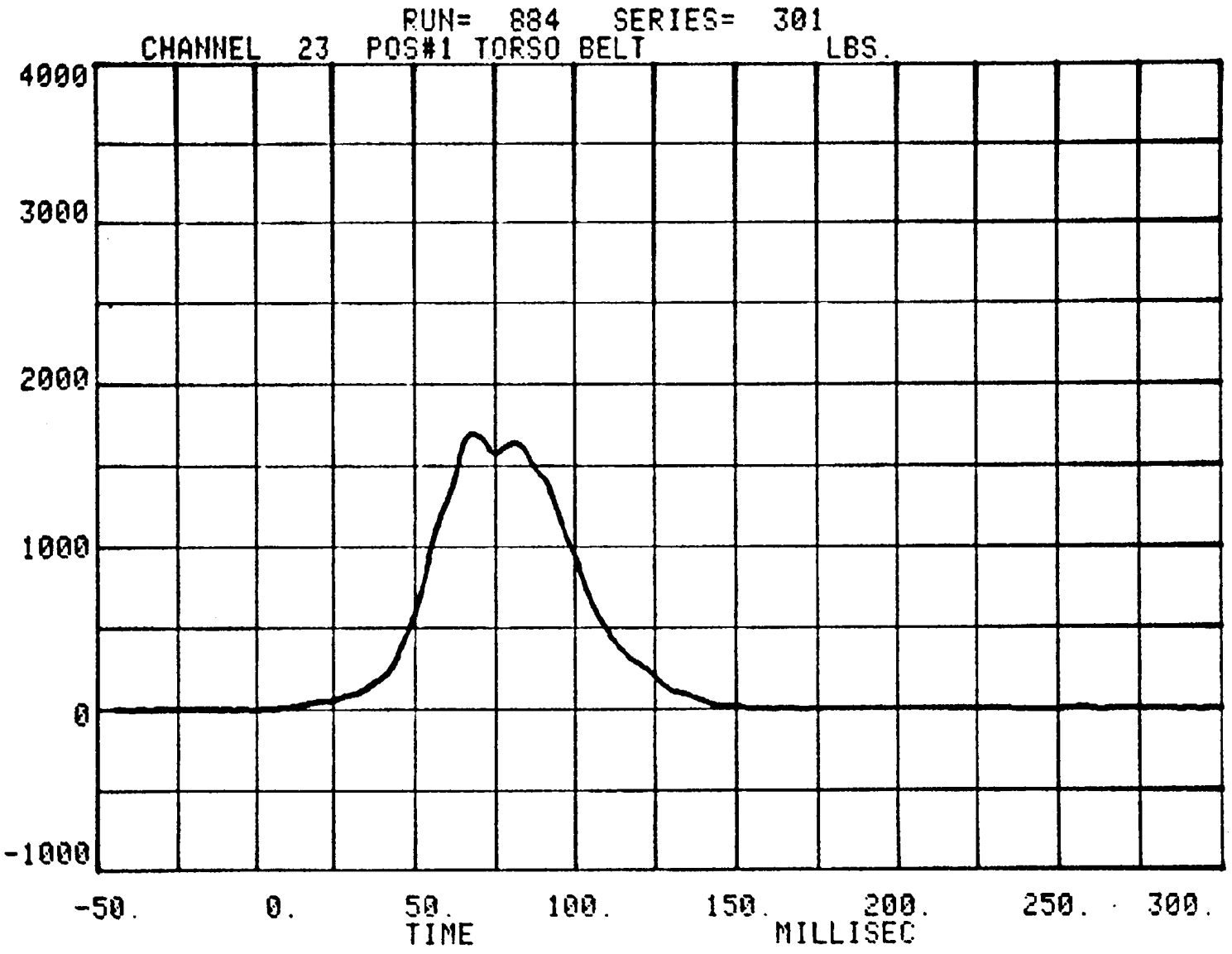
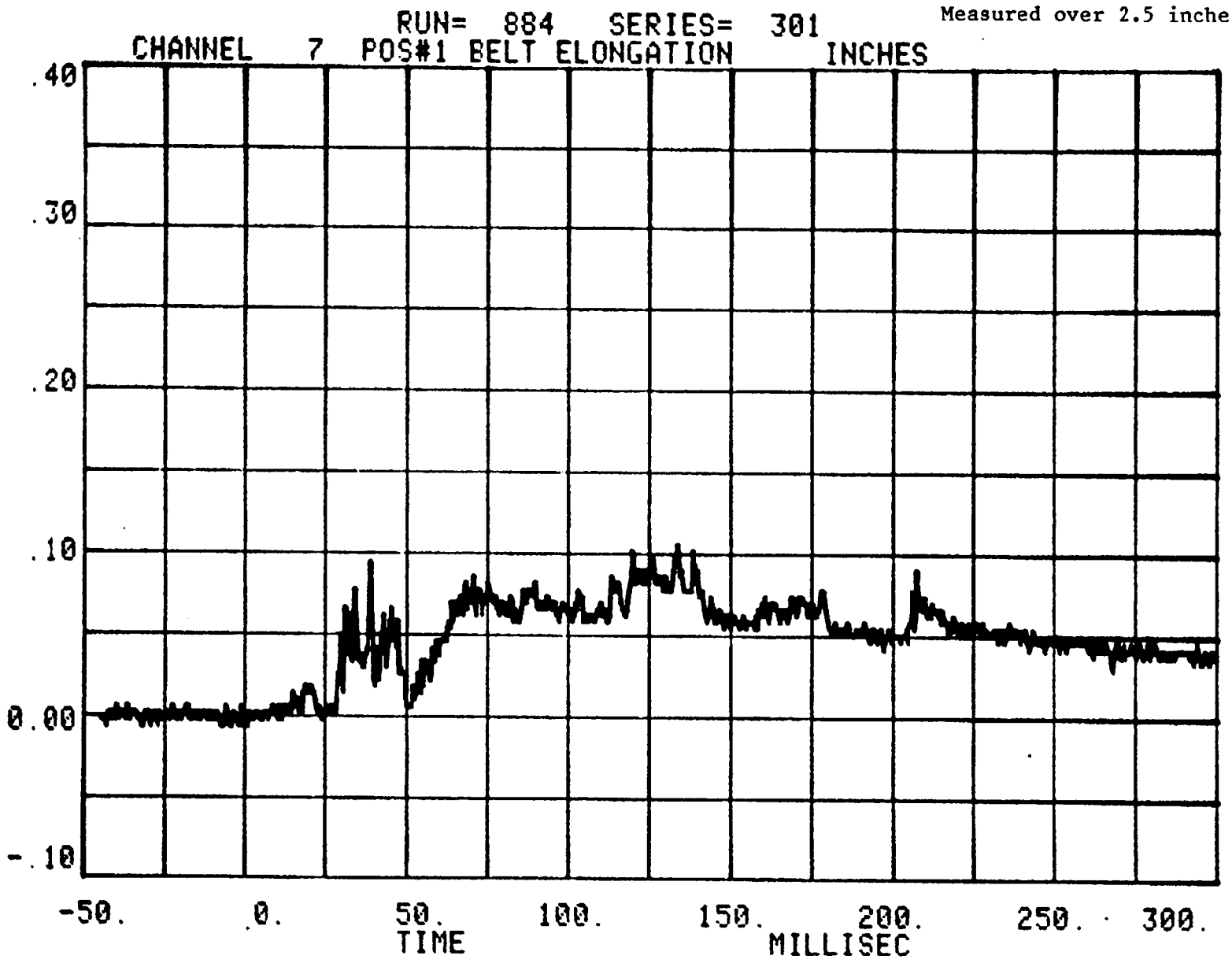
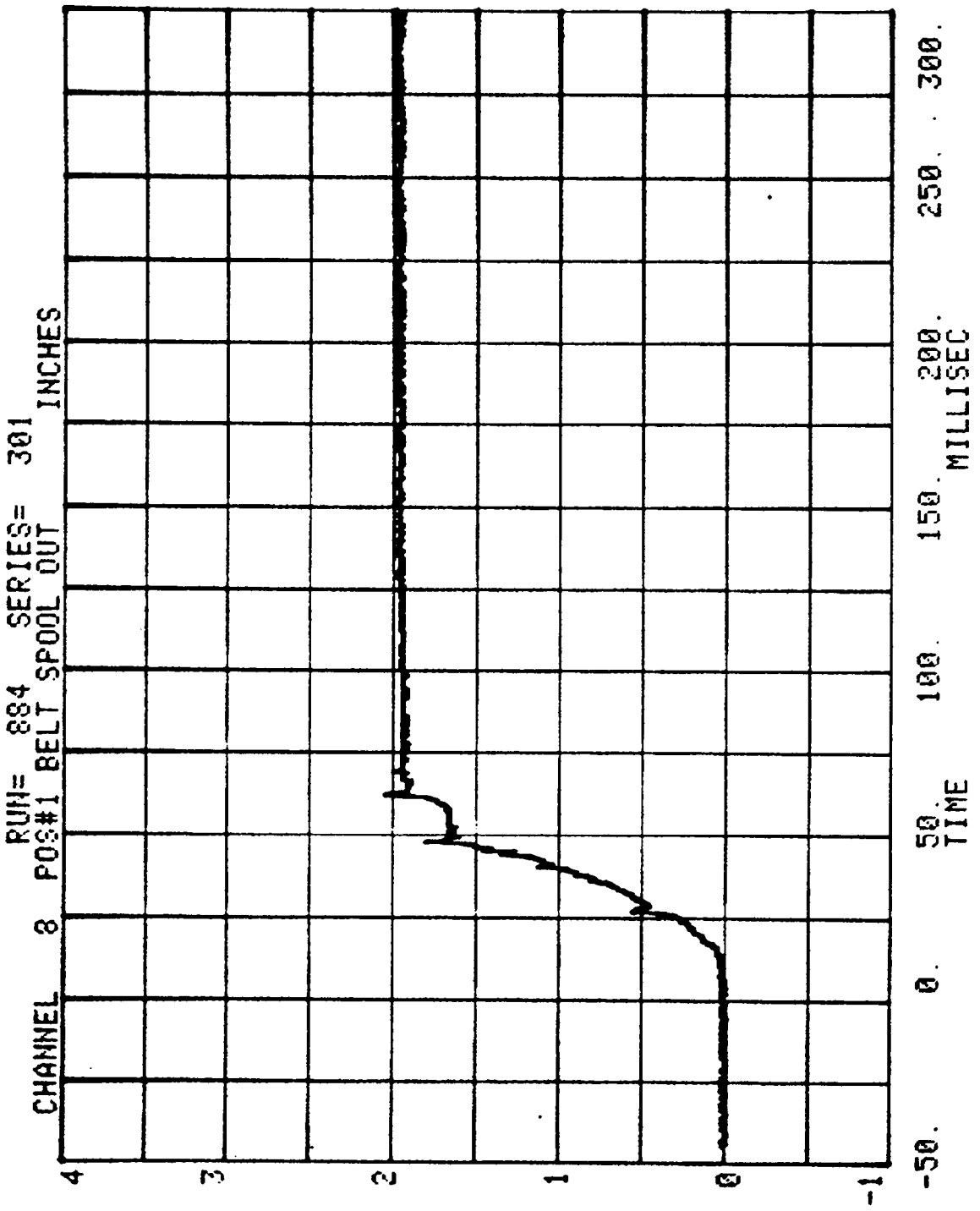

CHANNEL 21 POS#1 LEFT BELT
RUN= 884 SERIES= 301
LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7731-6


RUN= 884 SERIES= 301
CHANNEL 23 POS#1 TORSO BELT LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC


RUN= 884 SERIES= 301
Measured over 2.5 inches
CHANNEL 7 POS#1 BELT ELONGATION INCHES
.40
.30
.20
.10
0.00
-.10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 8 POS#1 BELT SPOOL OUT
RUN= 884 SERIES= 301
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 CRASH TEST - 1989

RUN= 884

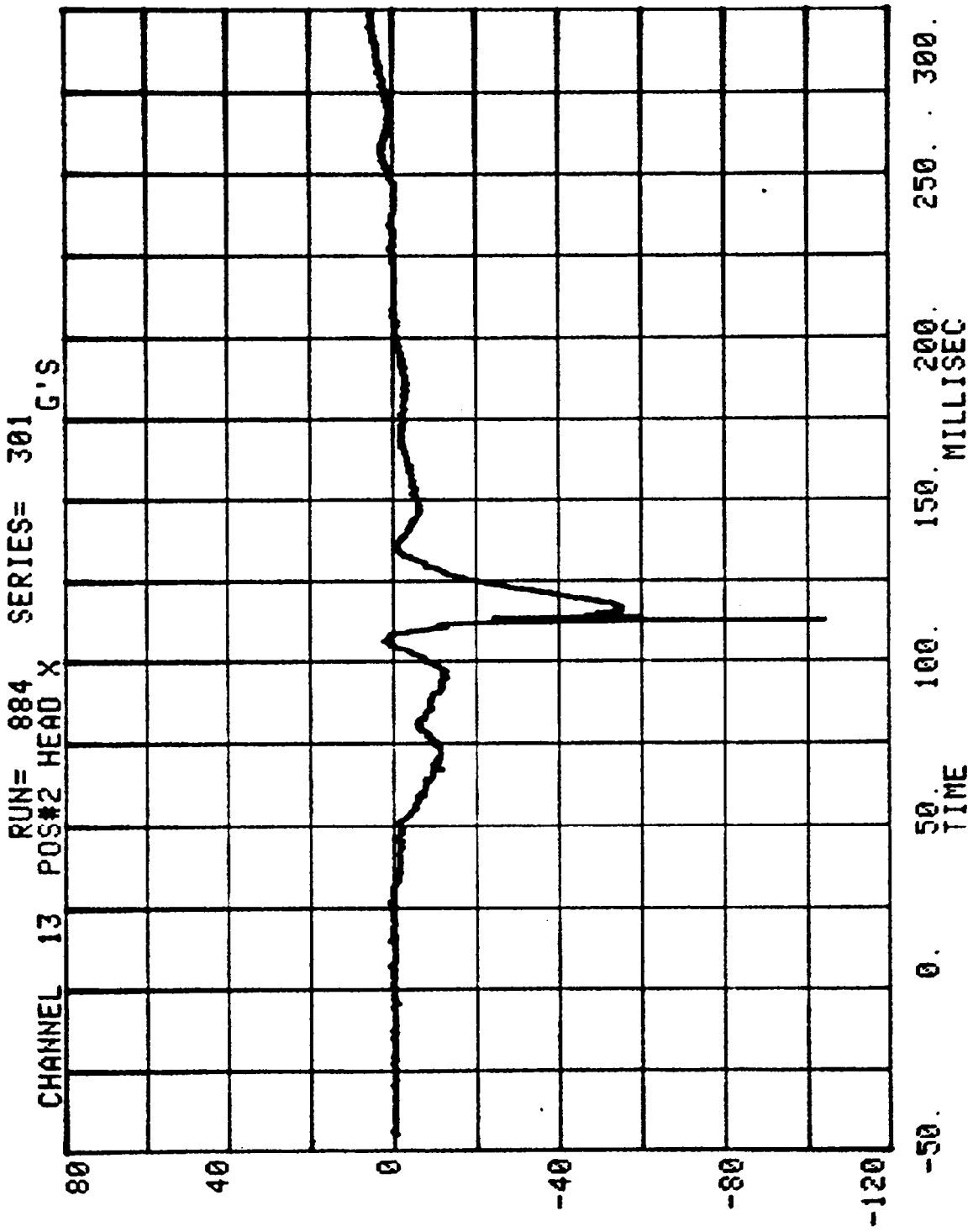
POS#2 HEAD R

HIC= 810.0 FROM T1= .08707 TO T2= .12307

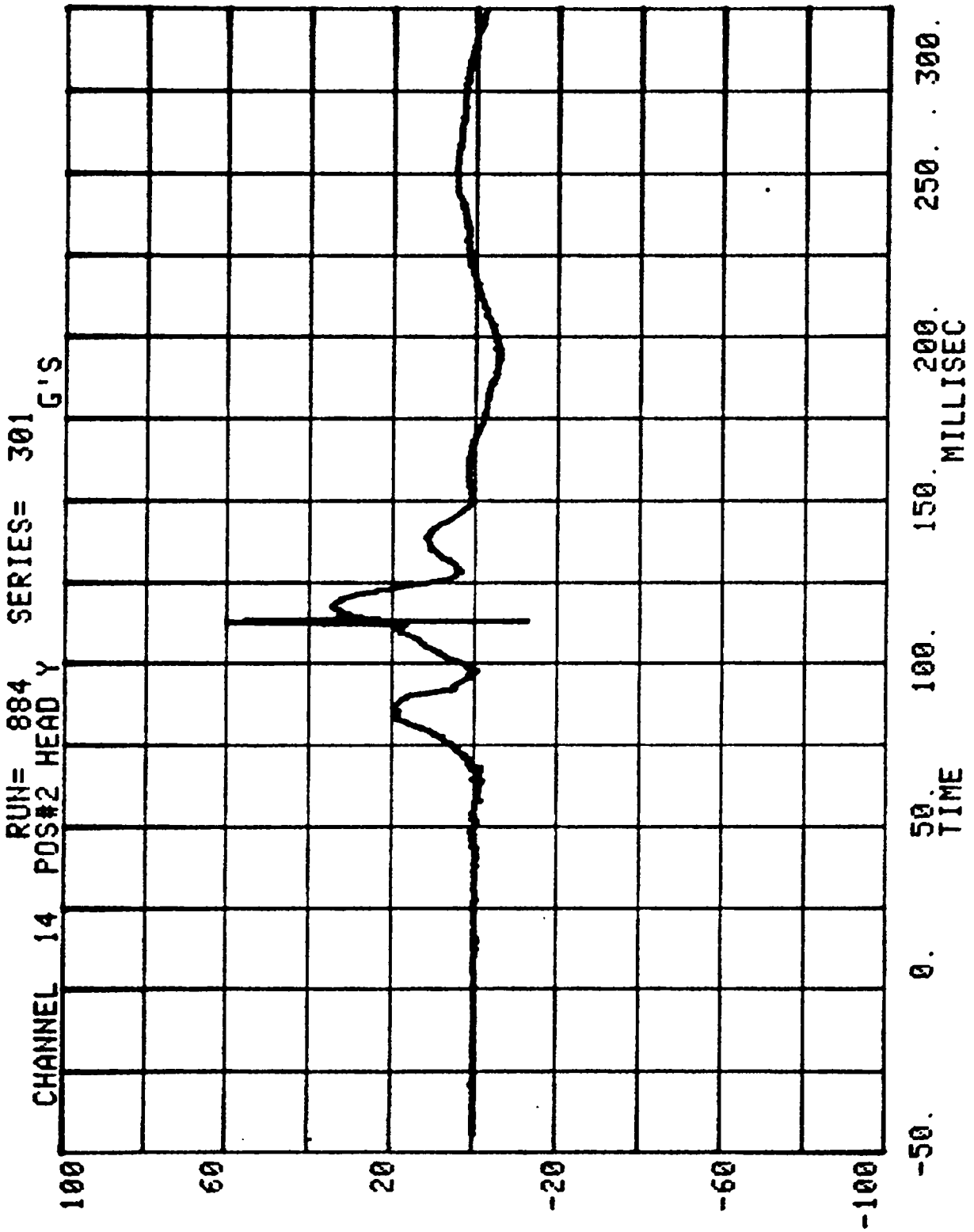
AVERAGE ACCELERATION BETWEEN T1 AND T2= 55.1G'S

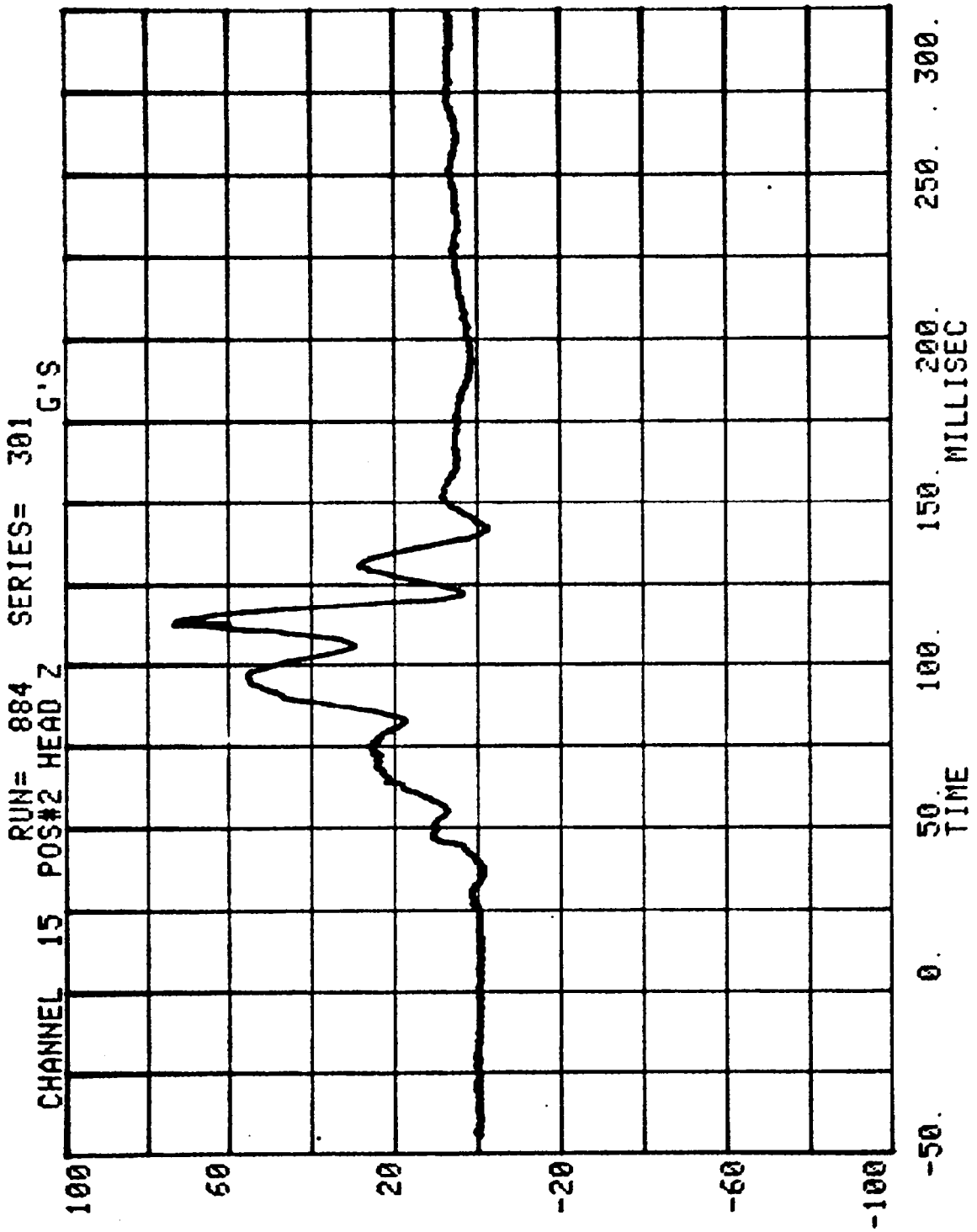
EVENT TIME= 300.0 MSEC

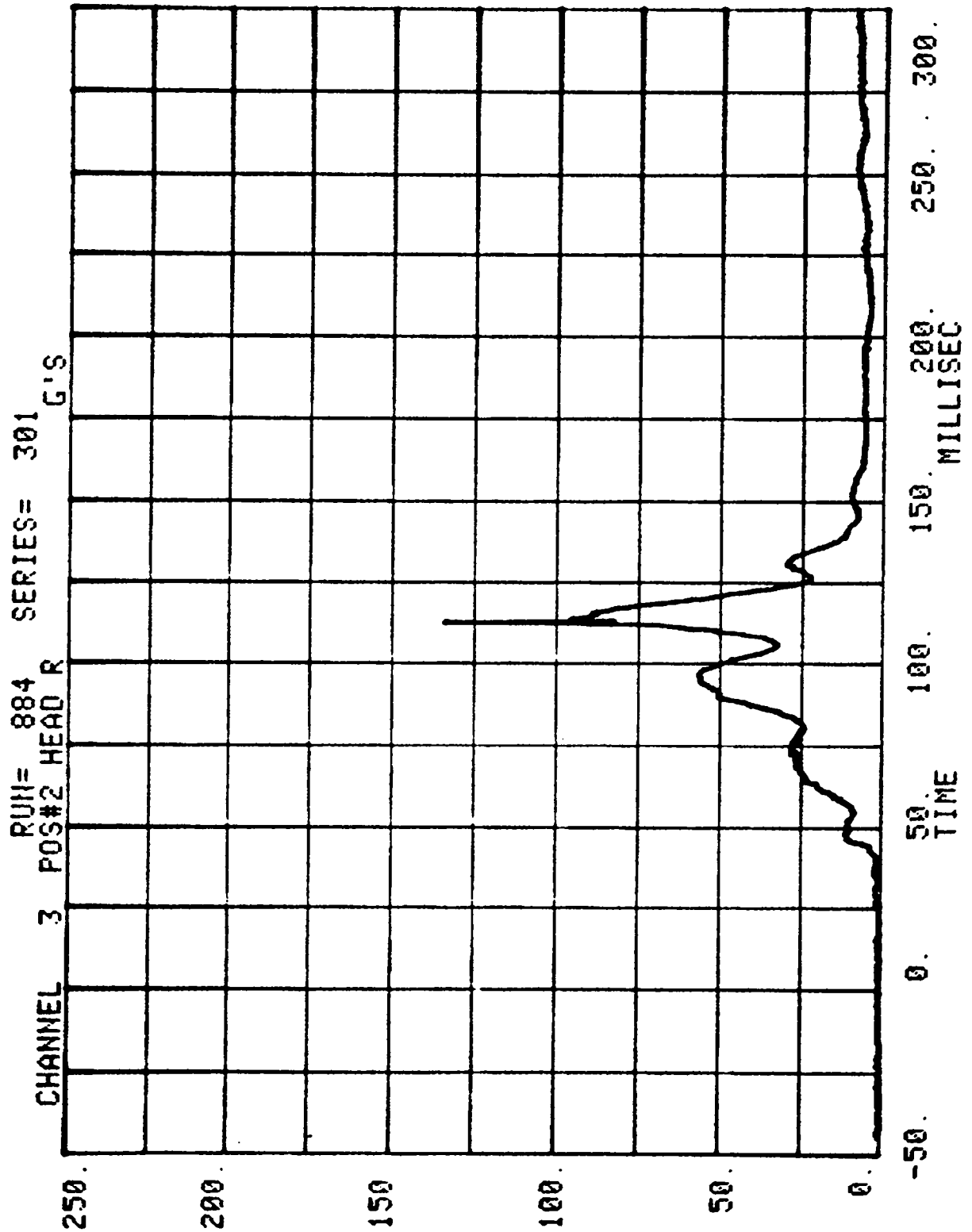
SEVERITY INDEX=1145.2

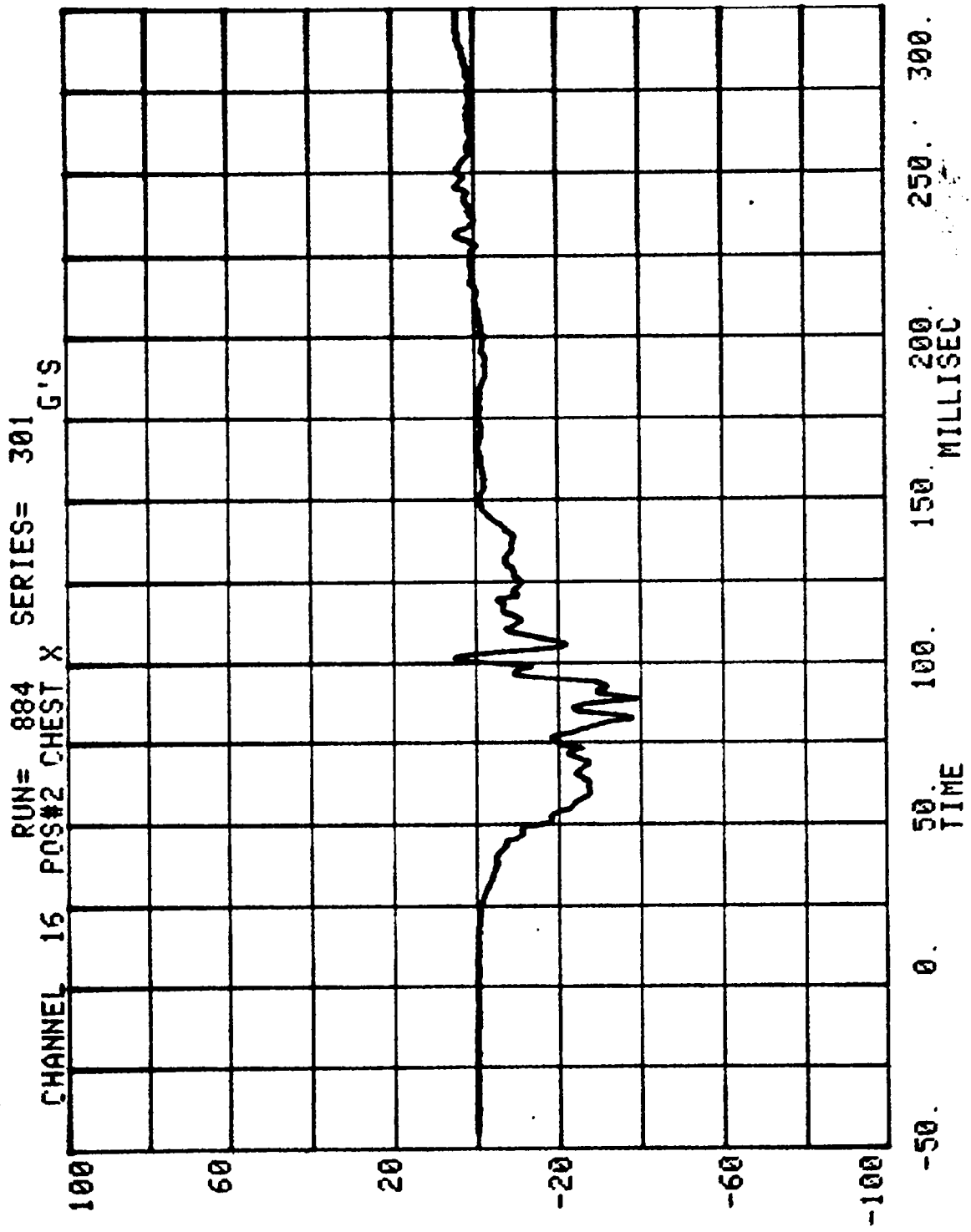

CHANNEL 13 POS#2 HEAD X
RUN= 884 SERIES= 301
G'S
80
40
0
-40
-80
-120
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

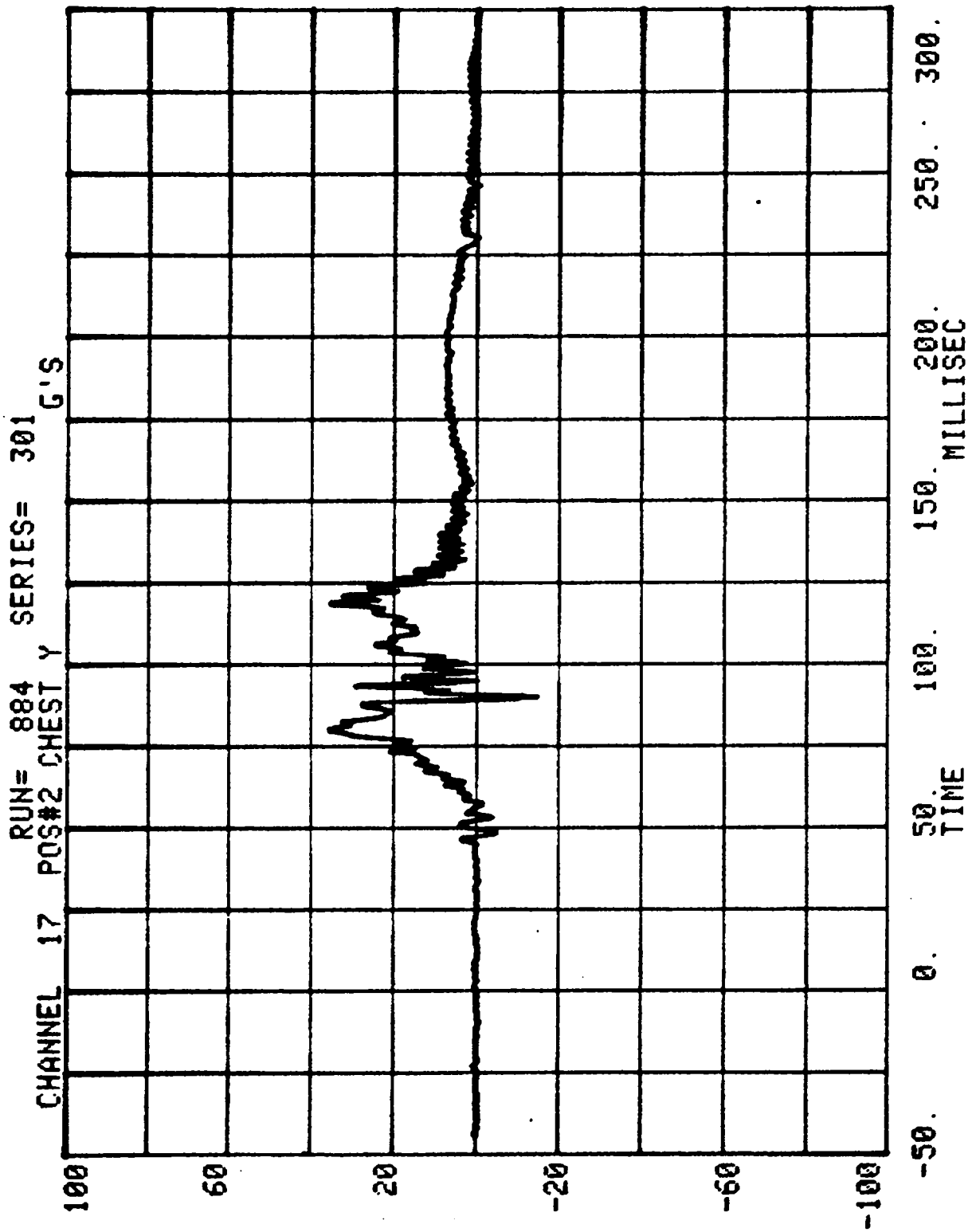
7731-6


CHANNEL 14
RUN= 884
POS#2 HEAD Y
SERIES= 301
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= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 3 POS#2 HEAD R
RUN= 884 SERIES= 301
G'S
250.
200.
150.
100.
50.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 15 POS#2 CHEST X
RUN= 884 SERIES= 301
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= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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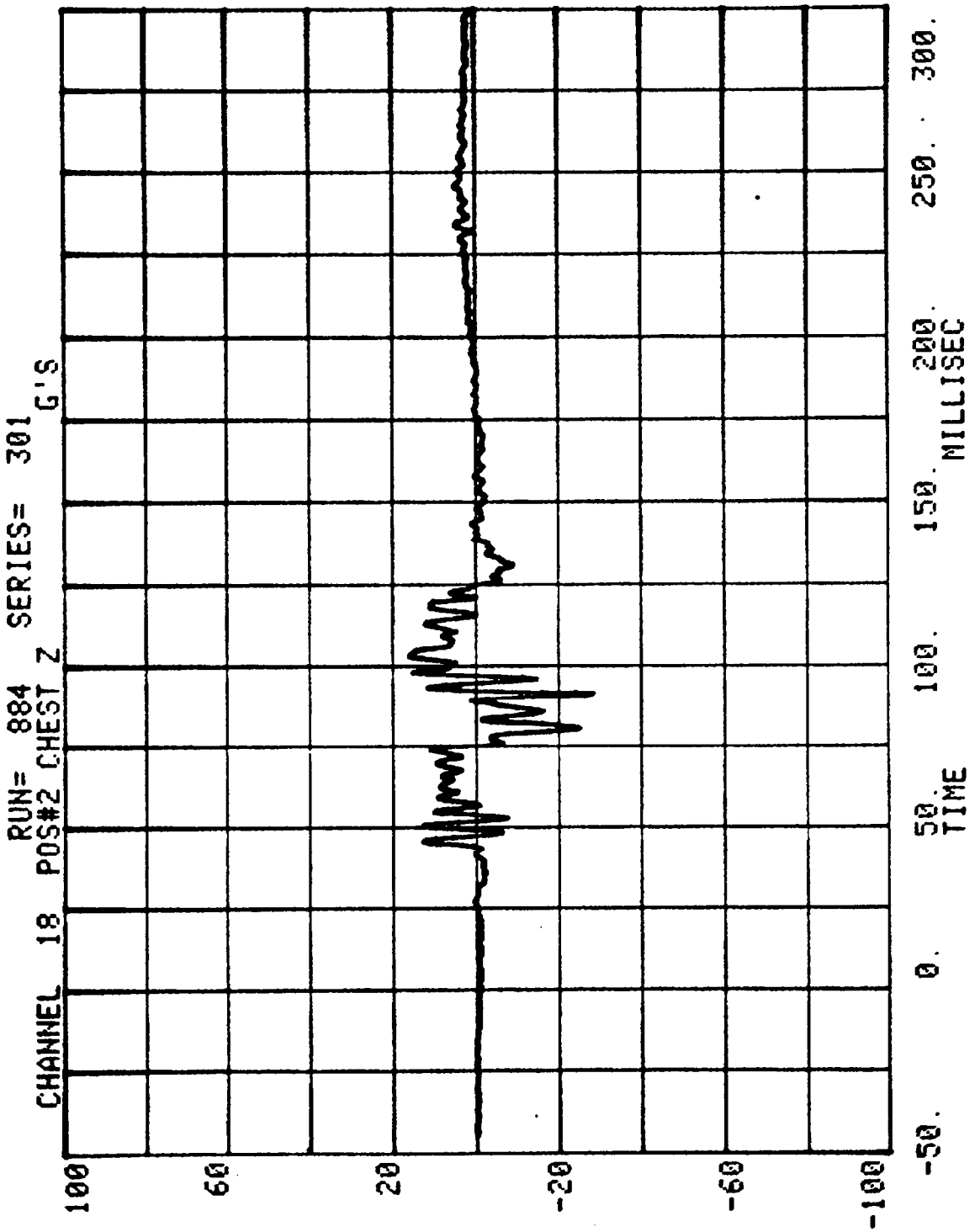
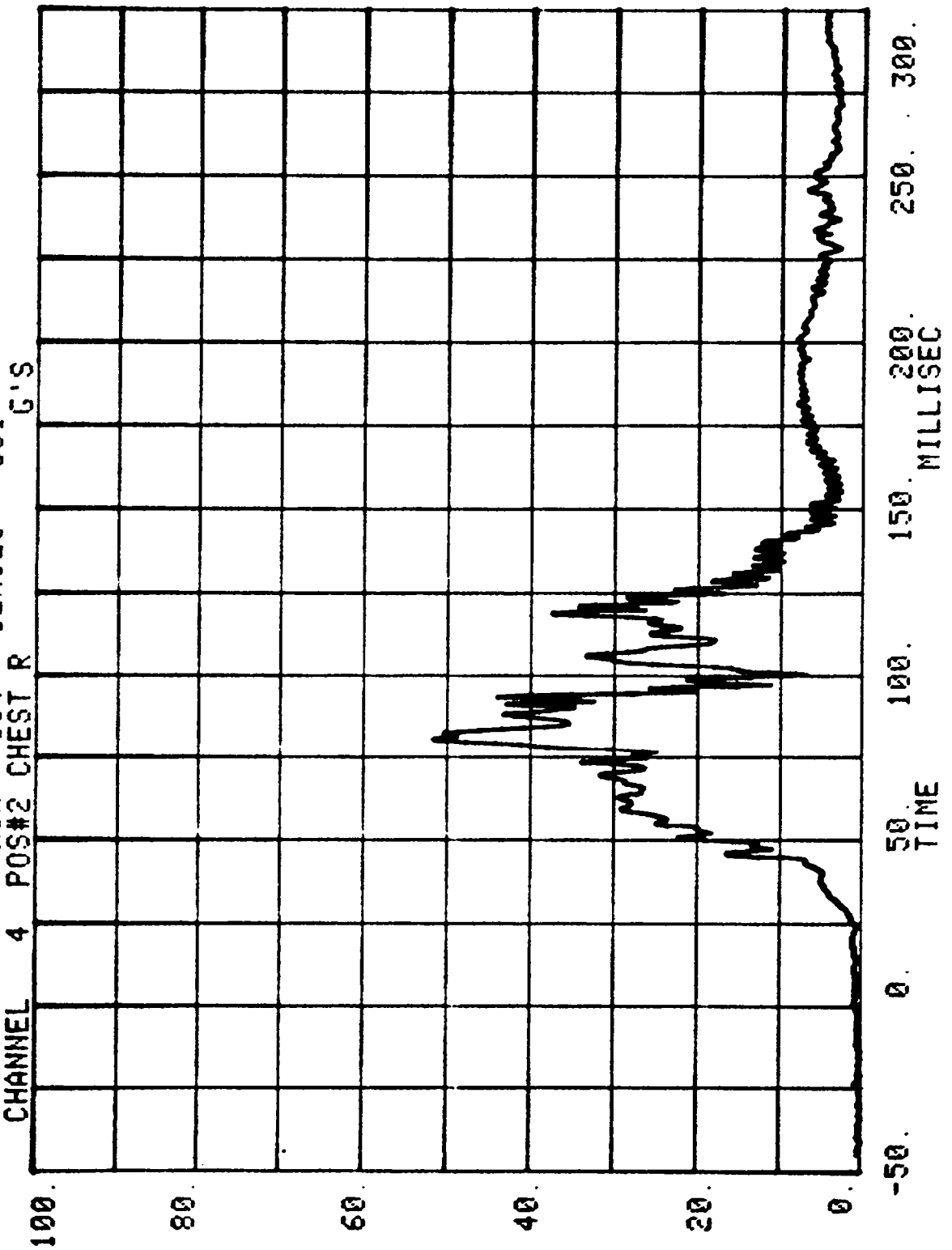
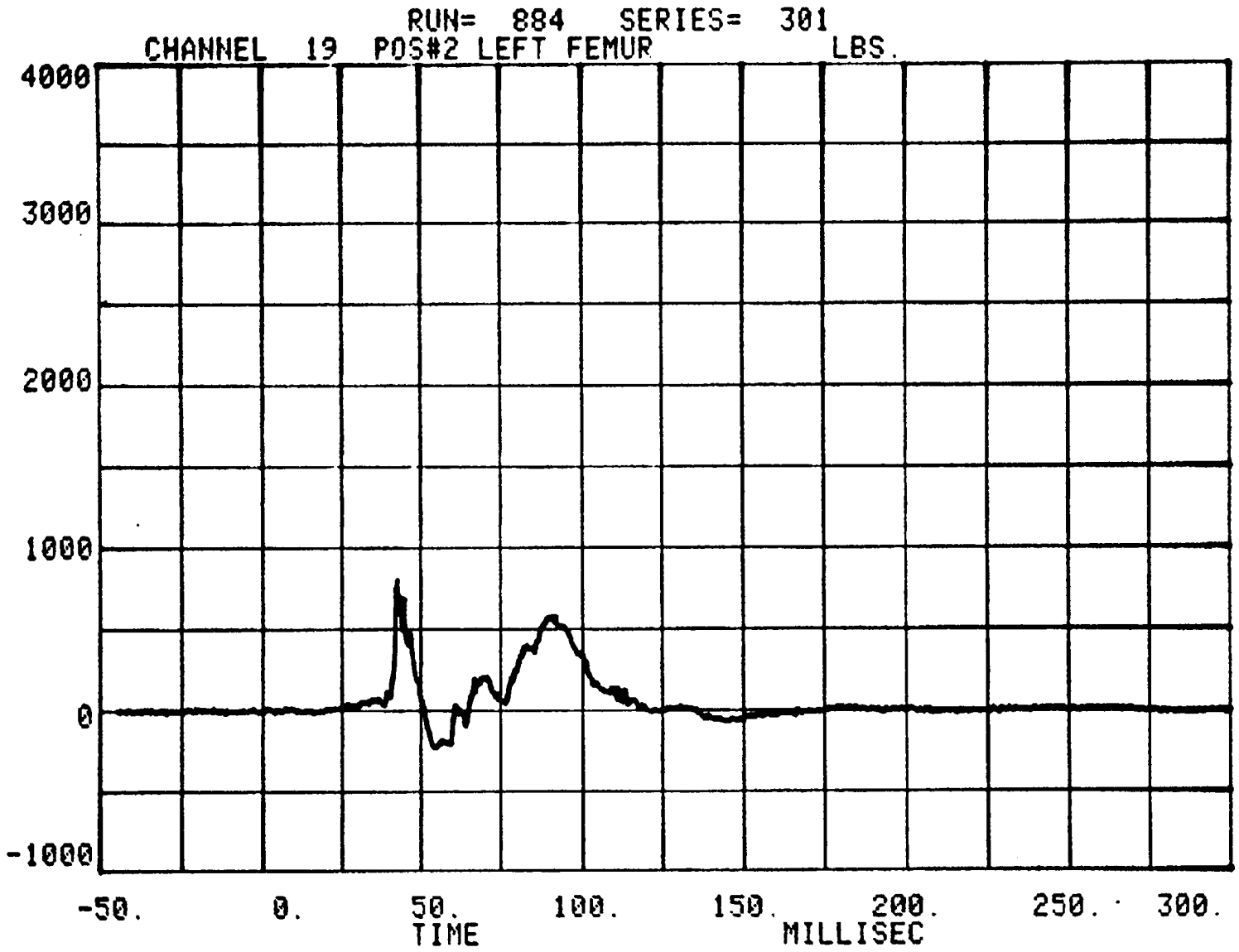
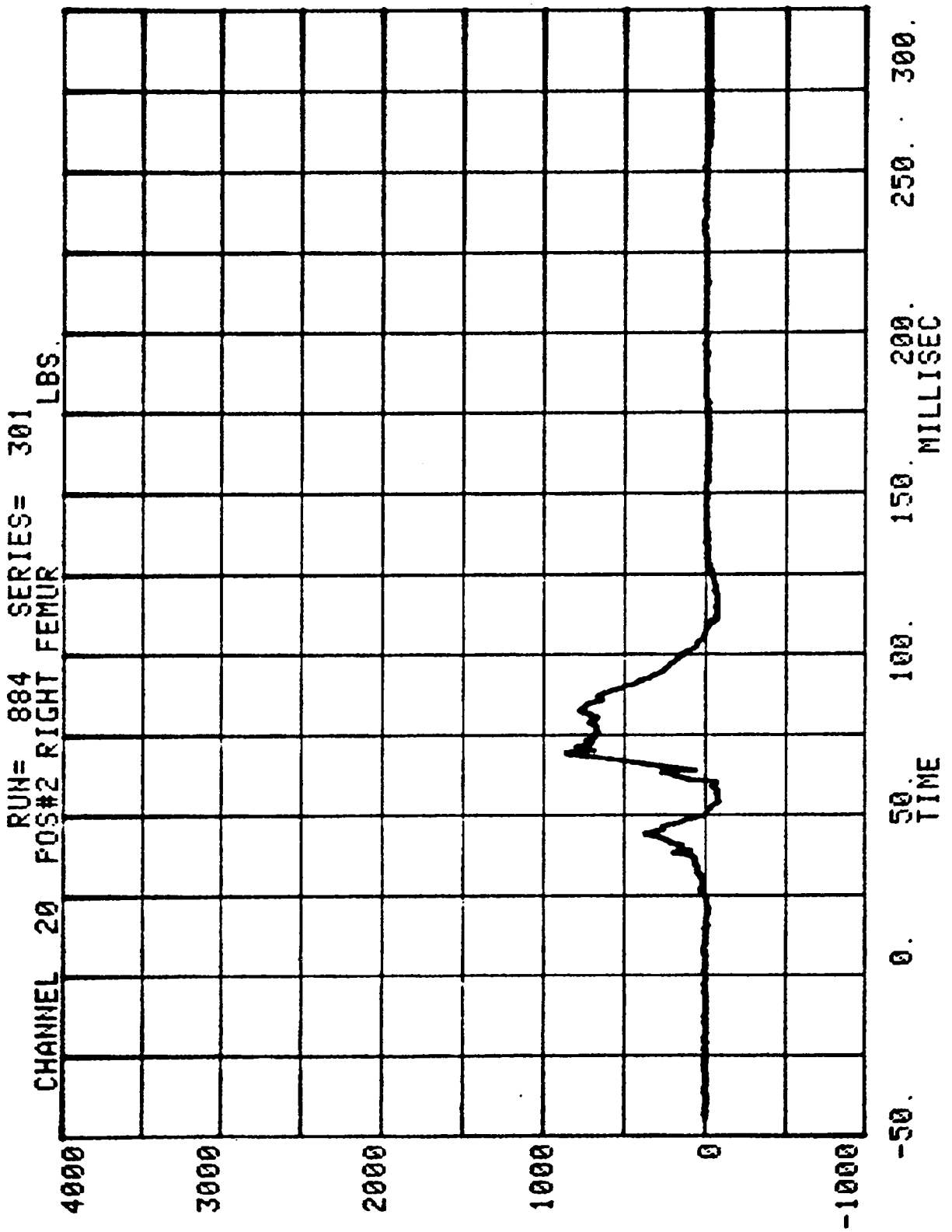
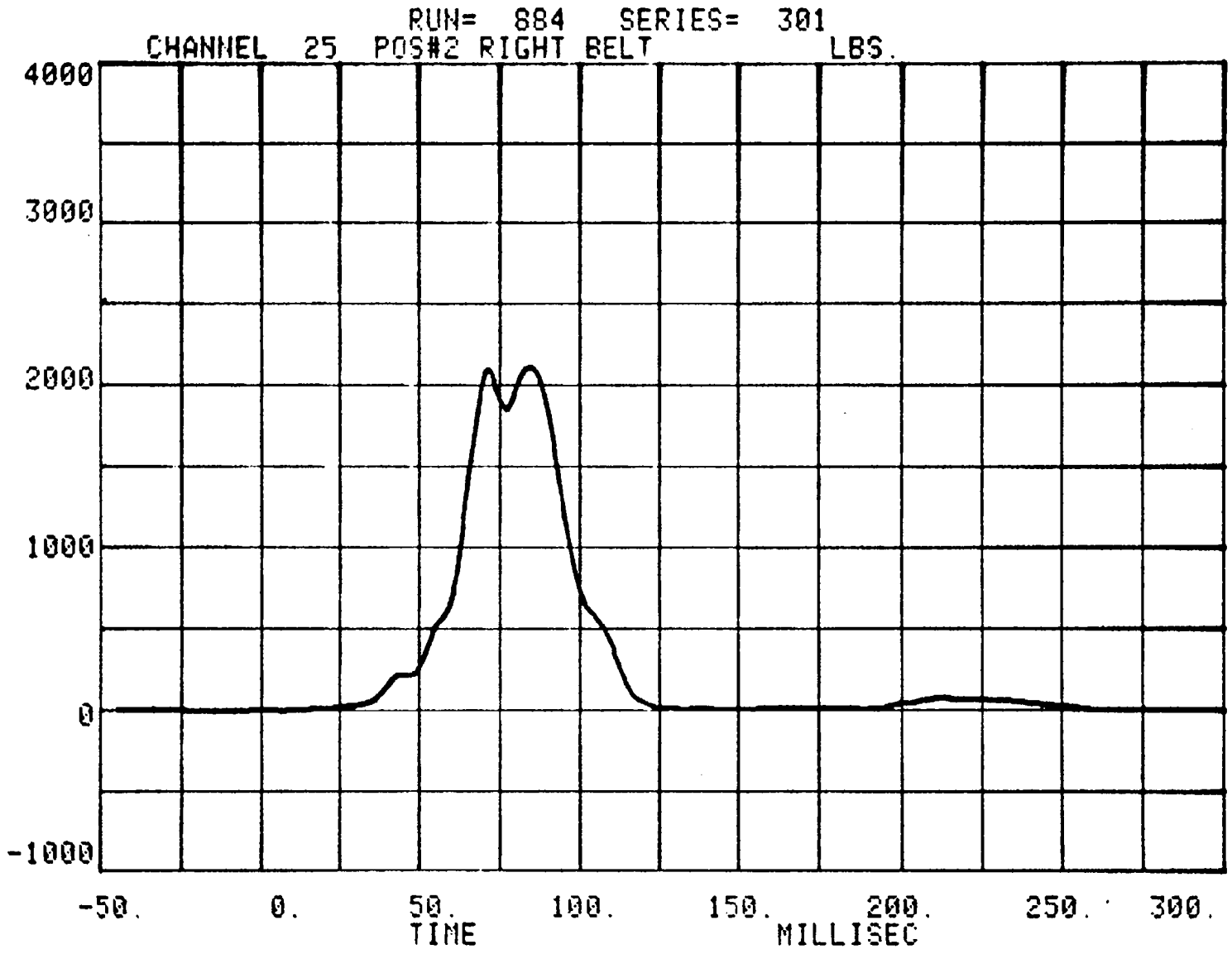
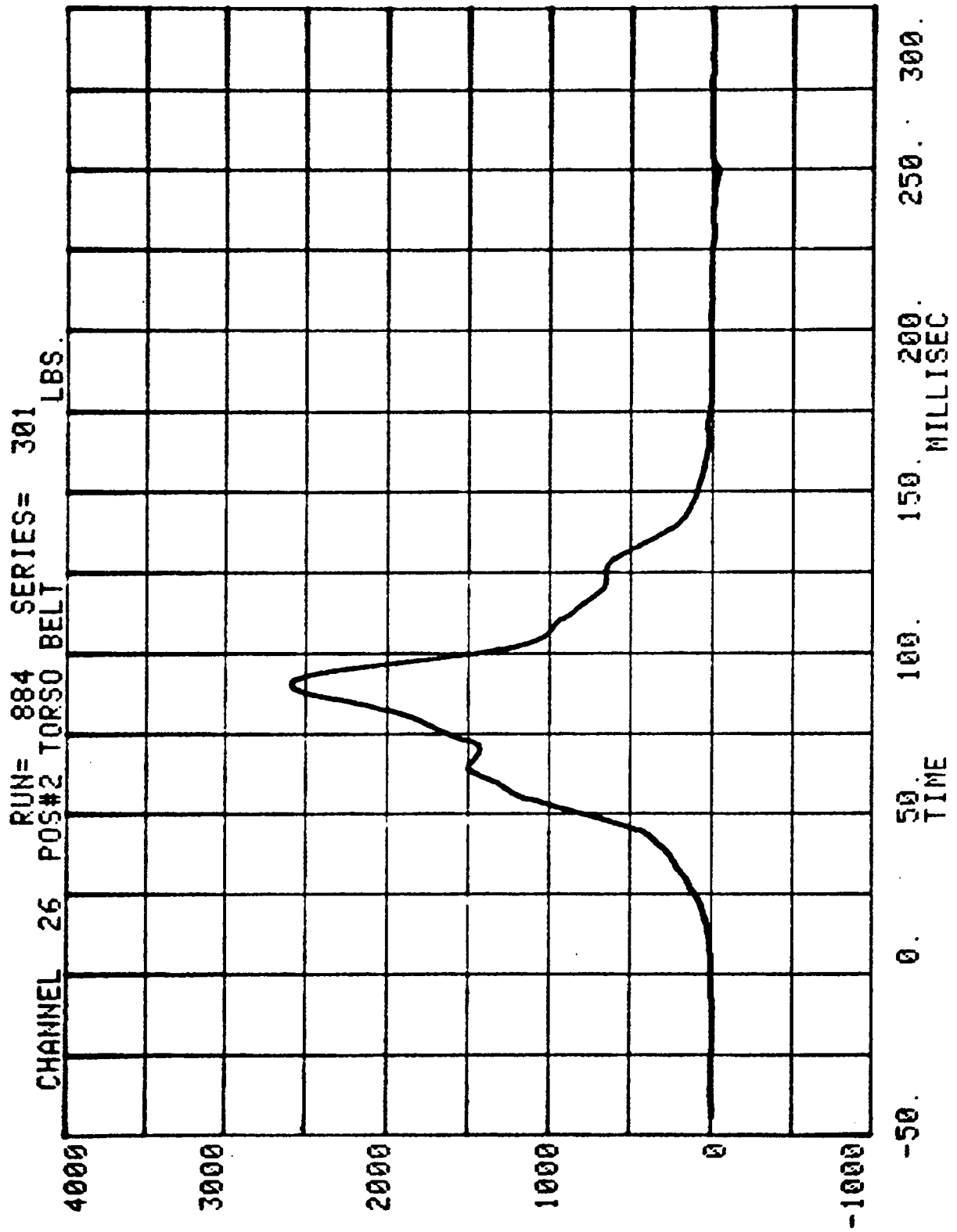

CHANNEL 18 POS#2 CHEST Z
RUN= 884 SERIES= 301
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 4 POS#2 CHEST R
RUN= 884 SERIES= 301
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 884 SERIES= 301
CHANNEL 19 POS#2 LEFT FEMUR LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 20 POS#2 RIGHT FEMUR
RUN= 884 SERIES= 301
LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 884 SERIES= 301
CHANNEL 25 POS#2 RIGHT BELT LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC


CHANNEL 26 POS#2 TORSO BELT
RUN= 884 SERIES= 301
LBS.
4000
3000
2000
1000
0
-1000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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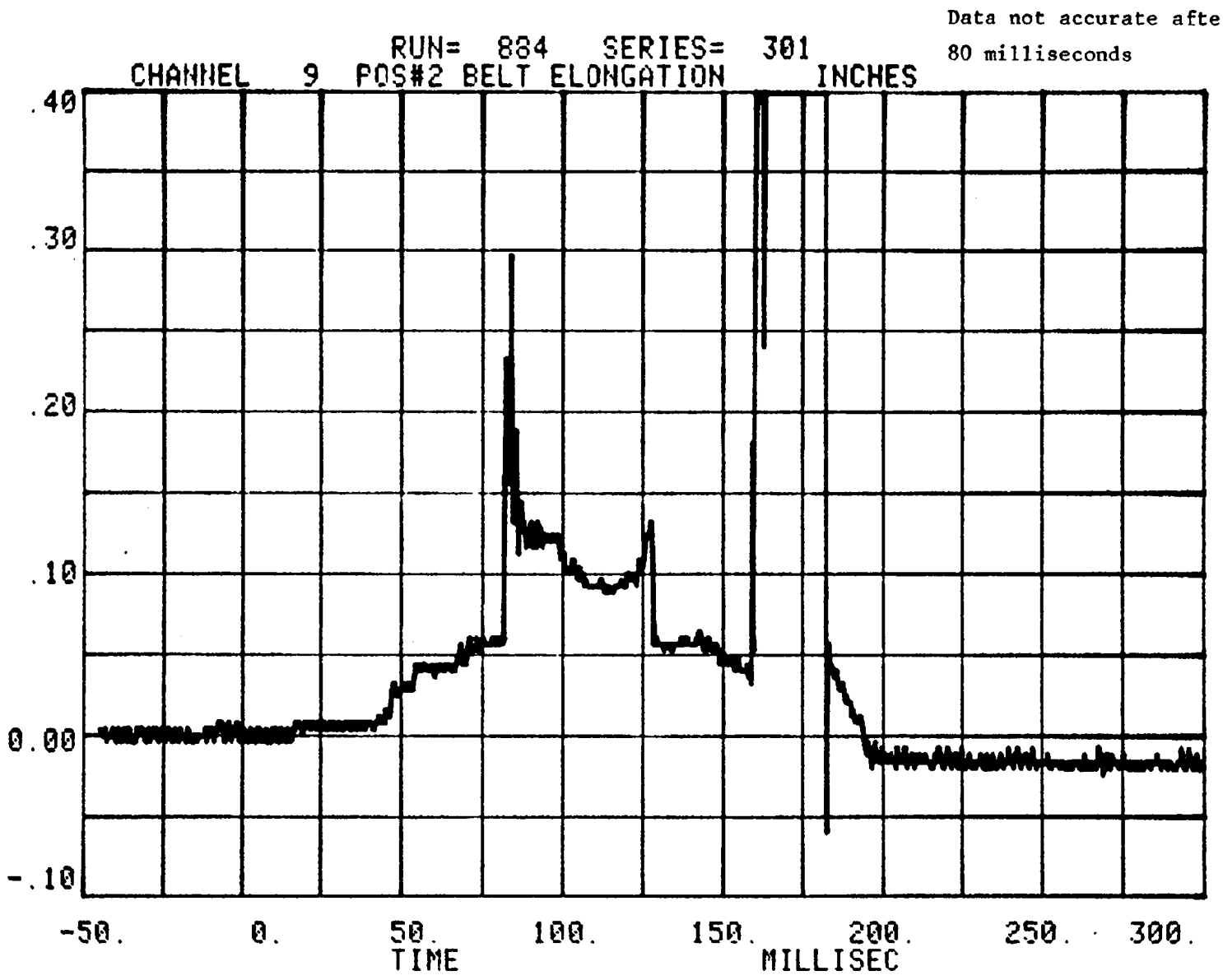
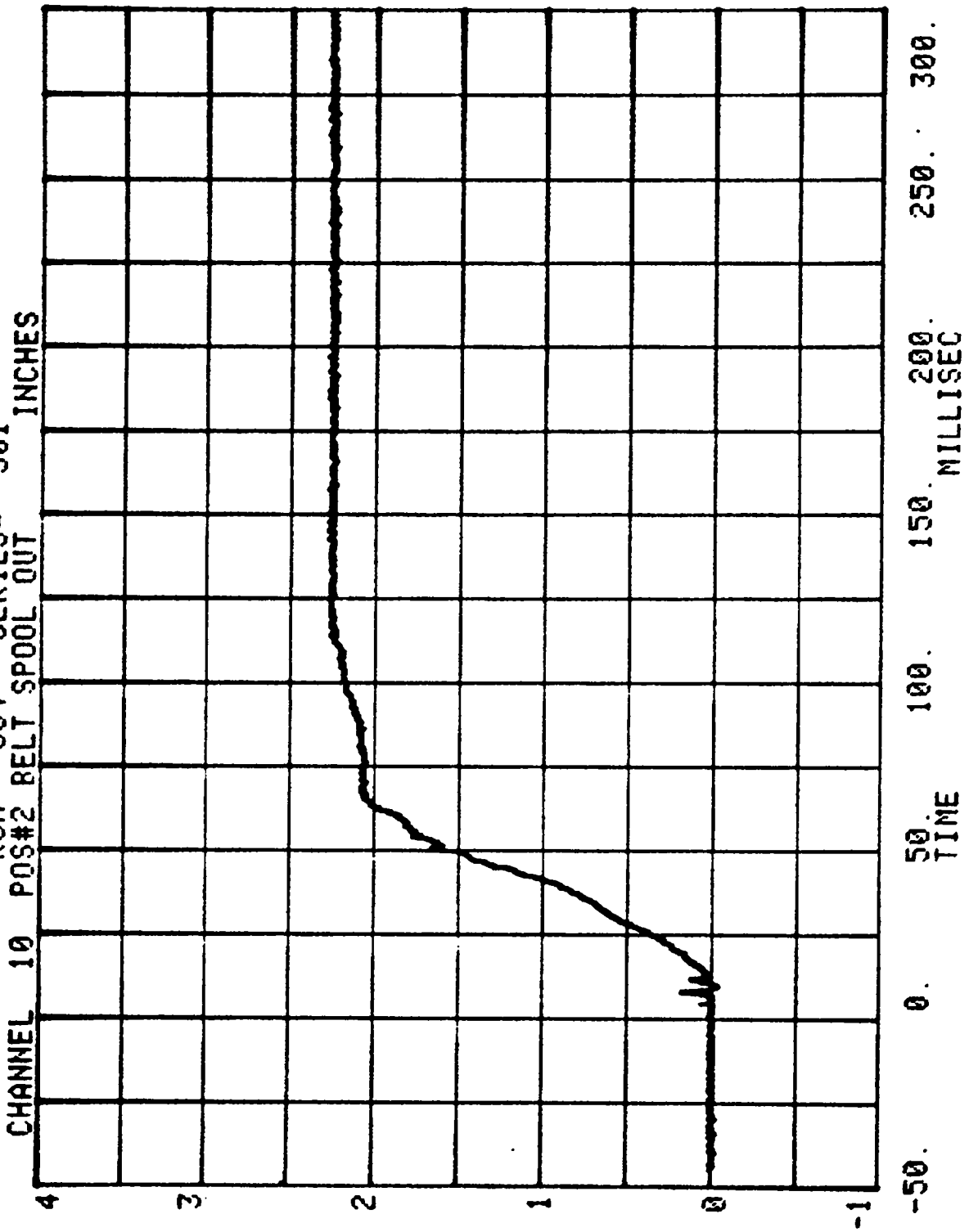
Data not accurate after
80 milliseconds




CHANNEL 10 POS#2 BELT SPOOL OUT
RUN= 884 SERIES= 301
INCHES
4
3
2
1
0
-1
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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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.

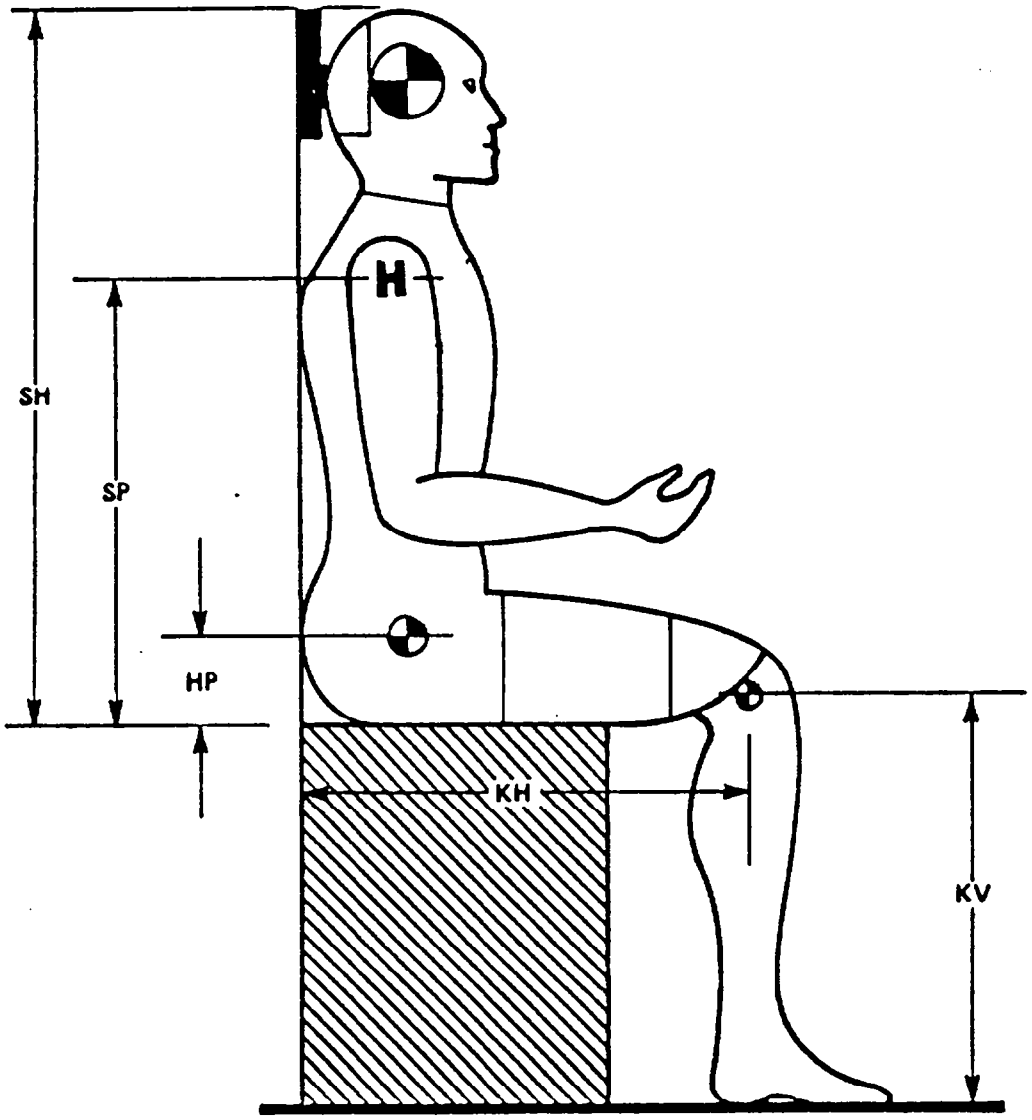
Dummy serial numbers and certification dates are:

Serial No.	Completion Date
1021	3-10-89
749	3-9-89

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	3-10-89	
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"	19.8 "	"
SW - Shoulder Width	17.8 to 18.4"	18.3 "	"
HW - Hip Width	14.0 to 15.4"	14.9 "	"

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		3-10-89	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		2	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-72 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		22-25 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	250 G's	G's
b. peak lateral accel.	<= 10 G's	2 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.15 ms	ms

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

TECHNICIAN'S NAME: _____

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.	22.4 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.	25.7 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	27 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	3.1 ms	
g. Max. Head Rotation		63 to 73 deg.	65 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.	27.1 ms	
	Displ.	2.1 to 3.1"	2.35 "	
60 deg.	Time	40.3 to 51.7 ms.	44 ms	
	Displ.	4.3 to 5.3"	4.7 "	
Maximum	Time	53.2 to 66.8 ms.	53.4 ms	
	Displ.	5.0 to 6.0"	5.2 "	
60 deg.	Time	67.0 to 83.0 ms.	71.1 ms	
	Displ.	4.3 to 5.3"	4.8 "	
30 deg.	Time	85.4 to 104.6 ms.	88 ms	
	Displ.	2.1 to 3.1"	2.4 "	
0 deg.	Time	101.0 - 123.0 ms.	102.8 ms	
	Displ.	-.5 to 0.5"	0.0 "	

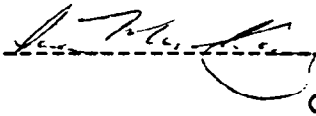
TECHNICIAN'S NAME: _____

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.	24 lbs	
b. Force @ 0.75"	36 to 50 lbs.	37.5 lbs	
c. Force @ 1.0"	50 to 63 lbs.	53 lbs	
d. Force @ 1.3"	73 to 88 lbs.	78 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	25.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	37.7 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	51 lbs	
d. Return Angle	12 deg. maximum	11 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	1.52 "	
(3) Peak Resistive Force	2250 lbs maximum	2236 lbs	
(4) Internal Hysteresis	50 to 70%	68.4 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.1 fps	
(2) Peak Deflection	1.1" maximum	1.08 "	
(3) Peak Resistive Force	1450 lbs maximum	1393 lbs	
(4) Internal Hysteresis	50 to 70%	65.2 %	

TECHNICIAN'S NAME: 

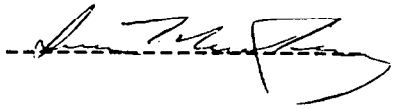
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

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.Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2210 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.7 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2155 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.75 ms	

REMARKS:

TECHNICIAN'S NAME: 

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	11-88	5-89
HY LATERAL--	ENDEVCO	CS41	11-88	5-89
HZ VERTICAL--	ENDEVCO	CH31	11-88	5-89
2. CHEST ACCELEROMETER-				
CX LONGITUDINAL--	CEC	A73	11-88	5-89
CY LATERAL--	ENDEVCO	CE06	11-88	5-89
CZ VERTICAL--	CEC	A44	11-88	5-89
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	552	12-88	5-89
LEFT SIDE	GSE	551	12-88	5-89
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A144	3-89	9-89
2. TEST PROBE ACCELEROMETER--	CEC	A142	11-88	5-89
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	11-88	5-89
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	11-88	5-89
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	11-88	5-89

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	XXXXXXXXXXXX	3-9-89	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXX	1	
SH - Seated Height	35.6 to 35.8"	35.6 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	22.0 "	"
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"	18.1 "	"
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		3-9-89	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-72 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		22-26 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	226 G's	G's
b. peak lateral accel.	<= 10 G's	7 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.15 ms	ms

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

TECHNICIAN'S NAME: _____

PART 572 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)
2. 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	23.5 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.	26.9 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	4.1 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.	28.3 ms	
	Displ.	2.1 to 3.1"	2.6 "	
60 deg.	Time	40.3 to 51.7 ms.	44 ms	
	Displ.	4.3 to 5.3"	4.6 "	
Maximum	Time	53.2 to 66.8 ms.	53.9 ms	
	Displ.	5.0 to 6.0"	5.1 "	
60 deg.	Time	67.0 to 83.0 ms.	74.4 ms	
	Displ.	4.3 to 5.3"	4.6 "	
30 deg.	Time	85.4 to 104.6 ms.	90.1 ms	
	Displ.	2.1 to 3.1"	2.2 "	
0 deg.	Time	101.0 - 123.0 ms.	105 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIAN'S NAME: [signature]

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.	26 lbs	
b. Force @ 0.75"	36 to 50 lbs.	39 lbs	
c. Force @ 1.0"	50 to 63 lbs.	54 lbs	
d. Force @ 1.3"	73 to 88 lbs.	77 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	28 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	41 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	51 lbs	
d. Return Angle	12 deg. maximum	9 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	1.42 "	
(3) Peak Resistive Force	2250 lbs maximum	2184 lbs	
(4) Internal Hysteresis	50 to 70%	50.1 %	
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	1362 lbs	
(4) Internal Hysteresis	50 to 70%	57.3 %	

TECHNICIAN'S NAME: _____

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)
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2125 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.75 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2295 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.8 ms	

REMARKS:

TECHNICIAN'S NAME: [signature]

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER _____749_____

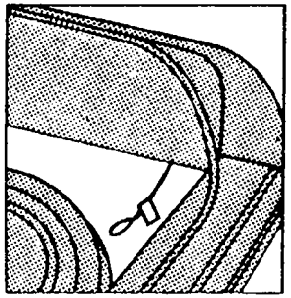
DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CK54	12-88	6-89
HY LATERAL--	ENDEVCO	CK78	12-88	6-89
HZ VERTICAL--	ENDEVCO	CD75	12-88	6-89
2. CHEST ACCELEROMETER-				
CX LONGITUDINAL--	CEC	A115	12-88	6-89
CY LATERAL--	ENDEVCO	CS09	12-88	6-89
CZ VERTICAL--	CEC	A29	12-88	6-89
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	548	12-88	6-89
LEFT SIDE	GSE	549	12-88	6-89
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A144	3-89	9-89
2. TEST PROBE ACCELEROMETER--	CEC	A142	11-88	5-89
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	11-88	5-89
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	11-88	5-89
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	11-88	5-89

Appendix D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

Fuel Filler Door Release

The fuel filler door can be opened from inside the vehicle by lifting a remote release lever. The lever is located just outboard of the driver's seat riser, adjacent to the sill trim and identified with a fuel pump symbol.



Emergency Filler Door Release Cable

Fuel Filler Door Emergency Release

A fuel filler door emergency release cable is located under the cargo area carpet, above the spare tire cover.

OCCUPANT RESTRAINTS

Safety Belts

Always use the safety belts. The chance of a serious injury is greatly reduced when the belts are properly used.

Safety belts provide protection against being thrown from the vehicle as well as reducing the risk of an injury caused by striking the interior of the vehicle.

Unibelts

The "UNIBELT", or single continuous-belt restraint system, incorporates an inertia sensitive belt webbing retractor which is designed to lock (i.e., prevent belt travel) *only during very sudden stops or impacts.* This feature allows the shoulder belt to move freely with the wearer under normal conditions. *The retractor will not lock by jerking or pulling the webbing rapidly by hand.*

D-2

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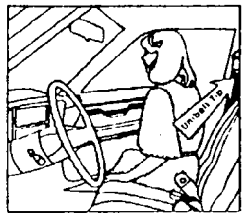
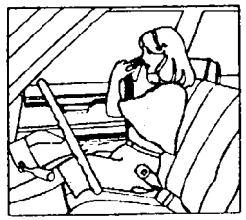
UNIBELT OPERATING INSTRUCTIONS



1

1. Enter the vehicle and close the door. Sit back and erect and adjust the seat. Note the metal tip of the unibelt in its stowed position.



2

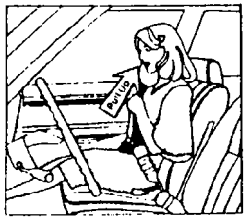
2. Grasp the metal tip and slide it up the webbing as far as necessary to go around your lap as you pull out the webbing.

3. As you pull the webbing across your lap and over your shoulder, move the metal tip toward the buckle.

Insert the tip into the buckle until a "click" is heard.

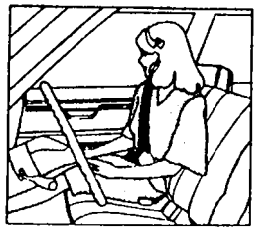
3

Do not wear the shoulder belt under your arm or otherwise out of position. Such use could increase the chance and/or severity of injury in a collision.



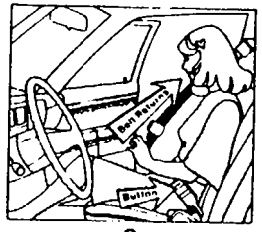
4

4. Position the lap belt with the upper edge of the belt drawn across the thighs and snug against the hips. Slack will automatically be removed due to tension created by the retractor. If a snug fit in the lap belt portion is desired, pull up on the shoulder belt as shown. *A snug belt reduces the risk of sliding under the belt in a collision.*



5

5. Position the shoulder belt on your chest so that it is comfortable and not resting on your neck. Any slack in the belt will be withdrawn automatically by the retractor.



6

6. To release the belt, push the red button marked "Press" on the buckle. The belt will automatically retract to its stowed position.

If needed, slide the tip down the webbing to allow the belt to fully retract.

Front Center and Rear Center Lap Belts (if so equipped)

The lap belts should be worn with the upper edge of the belt drawn across the thighs and snug against the hips. To reduce the risk of sliding under the belt in a collision, it should be adjusted as tight as comfort will allow, while sitting back and erect in the seat.

The center front and center rear seat belts are lengthened by tilting the tip (latch plate) relative to the webbing and pulling. To shorten the belt, pull the loose end of the webbing.

Never use the same lap belt on more than one person at a time.

Use of Seat Belts During Pregnancy

Chrysler Motors recommends that pregnant women use the available safety belts. This will reduce the possibility of injury to both the woman and the unborn child. The lap belt should be worn across the thighs and as snug against the hips as possible, *but not across the waist.*

Safety Belt Extender

If the safety belt is too short, even when fully extended, a safety belt extender can be purchased from your dealer. This extender should only be used if the existing belt is not long enough. When not required, it must be removed and stowed because use of the extender when not required may deactivate the seat belt locking mechanism.

CHILD RESTRAINT

According to accident statistics, children are safer when properly restrained in the rear seating positions than in the front. When transporting children in your vehicle, they should be properly restrained in an adequate child restraint system, or, if they are large enough, they should use the available safety belts. This is required by law in all states and in most Canadian Provinces. Failure to use a proper restraint system can result in severe or fatal injury to your child in the event of an accident, and fines and other penalties being assessed against you.

Infants and Small Children

Two different child restraint systems are generally available: the infant carrier for babies weighing up to 20 lbs. (9kg.), and the child seat for small children over 20 lbs. In addition, some manufacturers make systems that can be used first as an infant carrier, and then converted to a child seat as the child grows older. Both an infant carrier and a child seat are available from your dealer.

Before purchasing a restraint system, make sure that it has a label certifying that it meets Motor Vehicle Safety Standard 213.

The restraint system should be appropriate for your child's weight and height. This information can be found on the restraint system's label.

After purchasing the restraint system, carefully follow the