

DOT 468

REPORT NO. 7095-V-2

NEW CAR ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS NOS. 212, 219 AND 301-75

FORD MOTOR COMPANY

1982 FORD LTD

4-DOOR SEDAN

NHTSA TEST NO. 447-2-552

CALSPAN CORPORATION

ADVANCED TECHNOLOGY CENTER

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October 1982

FINAL REPORT

Prepared for:

U. S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

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16. Abstract A frontal load cell barrier test of a 1982 Ford LTD 2-door sedan was performed at Calspan Corporation, Advanced Technology Center, Transportation Research Department facility for the New Car Assessment and Standards Enforcement Indicant Testing of FMVSS 212 - Windshield Mounting; FMVSS 219 - Windshield Zone Intrusion; FMVSS 301-75 - Fuel System Integrity for the Office of Vehicle Safety Compliance, the Office of Automotive Rating and for Research and Development. Impact speed as 35.45 mph. Ambient temperature on test date was 64°F. Post-test vehicle crush was 31.3 inches. Intrusion of firewall into compartment was 8.2 inches. The test vehicle complied in all respects with the following: FMVSS 212 - Windshield Retention FMVSS 219 - Windshield Intrusion FMVSS 301-75 - Fuel System Integrity Occupant injury criteria as assessed by FMVSS 208 were as follows: Driver - Passed Right Front Passenger - Passed					
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SECTION 1

PURPOSE AND TEST PROCEDURE

This barrier test of a 1982 Ford LTD is part of the New Car Assessment Program B.O.A., Task 12, sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract DTNH22-81-C-87088. The purpose of this test was to obtain structural information and dummy Injury Criteria Values with belted dummies in both driver and passenger seating positions at a nominal impact velocity of 35 mph.

The Calspan Corporation, Advanced Technology Center, Transportation Research Department Test Procedure for the New Car Assessment crash test submitted to, and approved by, the Contract Technical Manager (CTM) contains the specific procedures used to perform this test.

SECTION 2

SUMMARY OF TEST NO. 447-2-552

A load cell barrier consisting of 36 load cells (Figure 9) was impacted by a 1982 Ford LTD at a velocity of 35.45 mph. The test was performed at the Calspan Corporation, Advanced Technology Center on September 24, 1982. Pre- and post-test photographs of the vehicle and occupants can be found in Appendix A. Table 1 presents pertinent crash test information.

Two Part 572, 50th percentile male Anthropomorphic Test Devices (ATDs) were placed in the 1982 Ford LTD in the driver and right-front passenger seating positions, according to dummy placement procedures specified in Laboratory Procedures for Vehicle Assessment TP-212-02.

Both ATDs were fully instrumented with femur load cells and triaxial accelerometers in the head and chest areas. These ATDs had been certified prior to the test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The crash event was recorded by one real time and 12 high-speed cameras. The two pit cameras (engine and fuel tank views) were lost due to an external lighting failure caused by a cut wire. Camera locations and other pertinent camera information are found in Section 4 of this report.

The 71 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle and dummy response data traces, and the Injury Criteria Values are presented in Table 9. All 71 data channels checked out prior to the test, and the only data anomalies experienced during impact were as follows:

Accelerometer 3X - top of engine - zero shift
Accelerometer 5X - right front brake caliper - cut wire
Accelerometer 6X - left front brake caliper - reason unknown
Load Cell Barrer A2 - zero shift

General Comments

The 1982 Ford LTD was a 4-door sedan having a 255 cubic inch, 8 cylinder engine, equipped with 3-speed automatic transmission, power brakes, and power steering. The total test weight with two 50th percentile dummies, instrumentation, and two onboard cameras was 4130 pounds.

The 1982 Ford LTD 4-door sedan which was involved in a frontal load cell barrier crash at a velocity of 35.45 mph complied with FMVSS Nos. 212 - Windshield Mounting; 219 - Windshield Zone Intrusion, and 301-75 - Fuel System Integrity. There was 100 percent retention of the windshield, no intrusion into the protected zone and no fuel leakage after impact or any phase of the rollover test.

The vehicle sustained 31.3 inches of static crush and approximately 35.5 inches of dynamic crush. The maximum post-test firewall intrusion was 8.2 inches. Maximum load cell barrier forces measured by the 36 load cells was 135,000 pounds at 50 milliseconds.

At impact the windshield cracked (Figure A-8); all other windows remained intact. The split bench right seat rail failed and moved forward at impact. Neither front door was operable after impact.

The driver head struck the upper steering wheel rim and center hub, and the femurs contacted the dash panel. The driver did comply with all FMVSS 208 Injury Criteria with a HIC value of 960, maximum chest decelerations over 3 milliseconds of 50 g's, and femur loads of 640 and 360 pounds. Belt spool-out for the driver was 3.9 inches and belt stretch was 0.3 inches per foot between the retractor and "D" ring.

The right-front passenger complied with all FMVSS 208 Injury Criteria with a HIC number of 808, maximum chest deceleration over 3 milliseconds of 43 g's, and femur loads of 180 and 350. The right-front passenger head struck the dash panel and the femurs contacted the glove compartment door. Belt spool out was 3.9 inches and belt stretch was 0.48 inches per foot between the retractor and "D" ring.

Table 1

CRASH TEST SUMMARYTEST NO. 447-2-552PROJECT: NEW CAR ASSESSMENT PROGRAMDATE: 9/24/82TIME: 1105TEMP: 64°F

VEHICLE	<u>1982 Ford LTD</u>
TEST WEIGHT (lbs)	<u>4130</u>
IMPACT ANGLE (deg)*	<u>0</u>
IMPACT VELOCITY (mph)**	<u>35.45</u>
MAX. CRUSH (in) static	<u>31.3</u>
MAX. INTRUSION (in) static	<u>8.2</u>

DUMMIES

TYPE	<u>Hybrid II Part 572</u>	<u>Hybrid II Part 572</u>
LOCATION	<u>LF(1) 97</u>	<u>RF (2) 118</u>
RESTRAINT	<u>production 3-point belt system</u>	<u>production 3-point belt system</u>
NUMBER OF DATA CHANNELS	<u>68</u>	
NUMBER OF HIGH SPEED CAMERAS	<u>12 + 1 real time</u>	

*With respect to tow track Centerline

**Speed trap measurement (+ .05% accuracy)

Table 2

VEHICLE TEST WEIGHTS AS TESTED

Left Front	1130 lbs	Left Rear	1090 lbs
Right Front	960 lbs	Right Rear	950 lbs
TOTAL FRONT	2090 lbs	TOTAL REAR	2040 lbs

$$\text{Total Weight} = 2090 + 2040 = 4130 \text{ lbs}$$

$$\text{Wheel Base} = 114.5 \text{ inches}$$

$$Cg_{F.W.} = \frac{2040 \text{ lbs} \times 114.5 \text{ inches}}{4130 \text{ lbs}} = 56.6 \text{ inches}$$

CALCULATION FOR TEST WEIGHT

- RCLW = Rated Cargo and Luggage Weight
- UDW = Unloaded Delivered Weight (3620 lbs)
- VCW = Vehicle Capacity Weight (1100 lbs)
- DSC = Designated Seating Capacity (6)

$$RCLW = VCW - 150 (DSC)$$

$$RCLW = 1100 - 150 (6) = 200 \text{ lbs}$$

$$\text{TEST WEIGHT} = UDW + RCLW + (\text{No. Dummies} \times 164 \text{ lbs})$$

$$\text{TEST WEIGHT} = 3620 \text{ lbs} + 200 \text{ lbs} + 2 (164 \text{ lbs})$$

$$\text{TEST WEIGHT} = 4148 \text{ lbs}$$

Table 3

SUMMARY OF TEST CONDITIONSTEST VEHICLE INFORMATION

Vehicle Manufacturer Ford Motor Co.
 Make/Model Ford LTD
 Body Style 4-door sedan Model Year 1982
 VIN 2FABP318CB209695 Build Date 6/82
 NHTSA No. 447-2-552 Color Black
 Engine Data: 8 cylinders 255 in³/cc displacement
 Transmission Data: 3 speed () Manual (X) Automatic
 Date Rec'd 8/82 Air Cond. No PW. STR. Yes PW. BR. Yes
 Dealer's Name & Address Al Maroone Ford

DATA FROM CERTIFICATION LABEL ON LEFT DOOR REAR FACE OR 'B' POST

Vehicle Manufactured by Ford Motor Corp.
 Date of Manufacture June 1982 VIN 2FABP318CB209695
 GVRW 5348 lbs GAWR: Front 2681 lbs Rear 2717 lbs

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVE BOX, ETC.

Vehicle Load (up to capacity) - Front 31 psi
 Rear 35 psi
 Recommended Tire Size P205/75R14 Load Range: X B C D
 Vehicle Capacity: Types of Seats Bench Bucket X Split Bench
 Number of Occupants (Designated Seating Capacity): 3 Front
3 Rear
6 TOTAL
 Cargo Load = 200 lbs
 TOTAL = 1100 lbs

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS)

Right Front = 1020 lbs Right Rear = 810 lbs
 Left Front = 1000 lbs Left Rear = 790 lbs
 TOTAL FRONT WEIGHT = 2020 lbs (55.8 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1600 lbs (44.2 % of Total Vehicle Weight)
 TOTAL DELV. WEIGHT = 3620 lbs

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 182 lbs CARGO

Right Front = 960 lbs Right Rear = 950 lbs
 Left Front = 1130 lbs Left Rear = 1090 lbs
 TOTAL FRONT WEIGHT = 2090 lbs (50.6 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 2040 lbs (49.4 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 4130 lbs
 Weight of ballast secured in vehicle trunk area = 0 lbs

SUMMARY OF TEST CONDITIONS (Cont'd)

TEST CONDITIONS

Date of Test 9/24/82 Time of Test 1105
Ambient Temperature 64 °F at impact area
Temperature in Occupant Compartment 71 °F
Windshield Molding Temperature 70 °F

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitude: RF 28.7 LF 28.2 RR 28.0 LR 27.2
Test Attitude: RF 27.2 LF 28.0 RR 25.7 LR 26.6

VEHICLE TIRE DATA

Recommended Cold Tire Pressure: Front = 31 psi Rear = 35 psi
Recommended Tire Size P205/75R14 Load Range B
Tires on Vehicle P205/75R14
Is Spare Tire a "Space Saver" yes X no
Is Spare Tire Standard Equipment X yes no

TEST FLUID DATA

Test Fluid Type: Red Stoddard Solvent #2 Spec. Grav.: 0.764
Kinematic Viscosity 0.96 Centistokes
EPA Capacity* 20 gal
Test Volume 18.6 gal (93% of EPA Capacity)
Fuel System Capacity (data from Owner's Manual) 20 gal
Details of fuel system Engine-operated fuel pump. Fuel tank is located
aft of rear axle and held in place by two tank straps. The fuel tube is
on the left side of vehicle and sealed by a twist-type cap which is
concealed by a hinged access door.
Electric Fuel Pump Yes X No Fuel Injection Yes X No
Does electric fuel pump operate with ignition switch "on" and the engine
not operating Yes X No

VEHICLE REBOUND AND CRUSH

Overall Length of Test Vehicle: Pre-Test = R 205.7 / L 205.6 inches
Post-Test = R 178.6 / L 182.5 inches
Crush = R 27.1 / L 23.1
FOR FRONTAL IMPACTS, distance from front of test vehicle to the barrier
after impact = 16.1 inches

*With entire fuel system filled from fuel tank through carburetor bowl.

SECTION-3

SUMMARY OF FMVSS NOS. 212, 219, AND 301-75

- Post-Impact Data
- Windshield Zone Intrusion FMVSS 219
- Protected Zone
- Summary of FMVSS 212 Data
- Fuel System Integrity FMVSS 301-75

POST-IMPACT DATA - FMVSS NOS. 212, 219, AND 301-75

[illegible]

VEHICLE NHTSA NO.	447-2-552	VIN	2FABP318CB209695
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REQUIRED VEHICLE VELOCITY RANGE 34.5 to 35.5 mph

IMPACT VELOCITY (traps within 5 feet of impact event) 35.45

Trap No. 1 = 35.46 mph Trap No. 2 = 35.43 mph

Distance from the vehicle's front bumper to the barrier face entering the vehicle velocity measurement device = 58

exiting the vehicle velocity measurement device = 18

VEHICLE STATIC CRUSH (for frontal and rear impacts only)

Driver's Side = 23.1 in Passenger's Side = 27.1 in

Average = 25.1 in

Crush Details:

VEHICLE STATIC CRUSH (for side impacts only)

Amount of Crush = -- inches on -- side

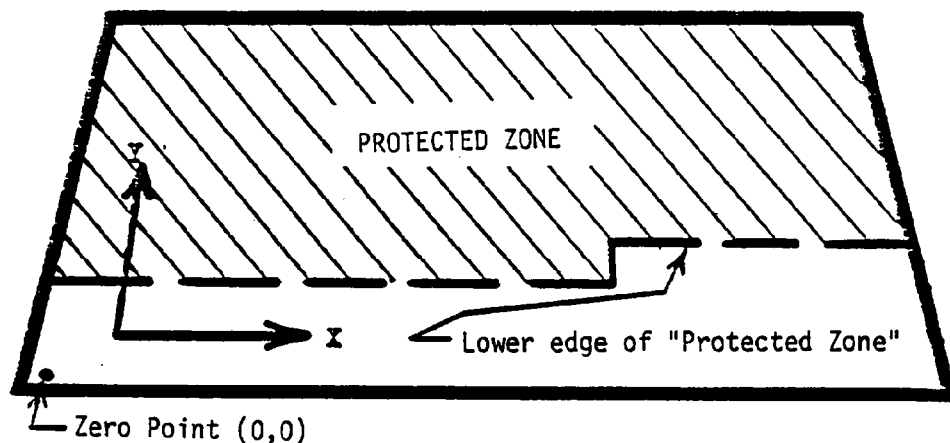
Crush Details:

VEHICLE REBOUND (from rigid barrier only)

Driver's Side = 16.0 in Passenger's Side = 16.2 in

Average = 16.1 in

REMARKS



FRONT VIEW

With the zero coordinate for the X-Y grid located at the lower right corner (passenger side) of the windshield, record the following positions:

- (1) The area that the "Protected Zone" template was penetrated more than .25 inches by a vehicle component other than one which is normally in contact with the windshield.

NONE

Coordinates	
X	Y

- (2) The area beneath the "Protected Zone" that the inner surface of the windshield was penetrated by a vehicle component.

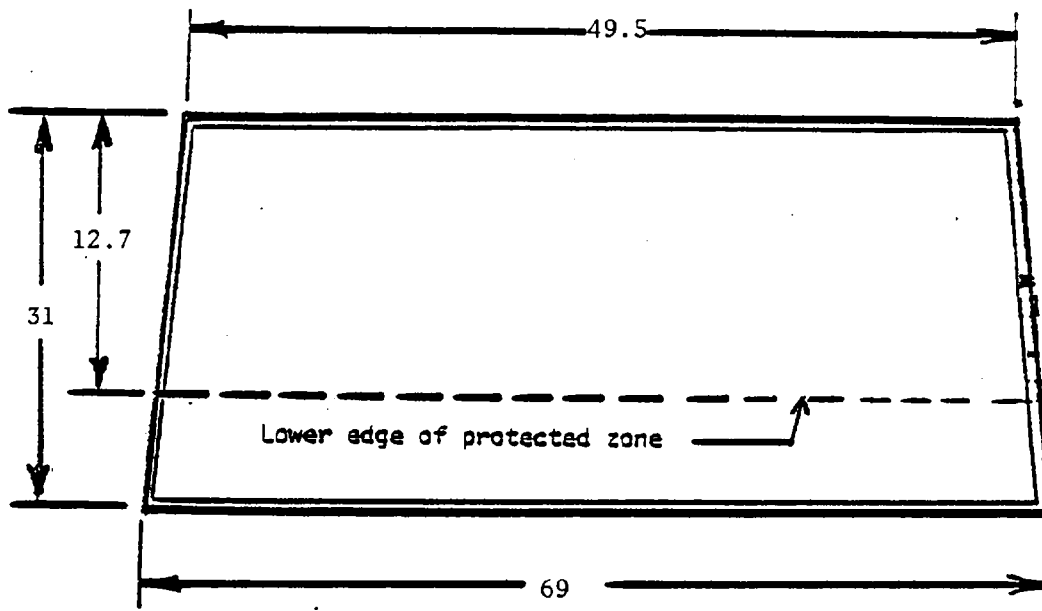
NONE

Coordinates	
X	Y

- (3) Record any windshield retention clips or brackets used to insure that the windshield would not disengage from the body.

Figure 1

WINDSHIELD ZONE INTRUSION, FMVSS 219 - DATA SHEET



FRONT VIEW OF WINDSHIELD

Provide all dimensions necessary to reproduce the protected zone.

Method of adhering styrofoam to the windshield:

Silicone rubber sealant adhesive applied to windshield surface
and to backside of styrofoam which was then clamped in place
until dry.

Figure 2 PROTECTED ZONE FOR FMVSS 219

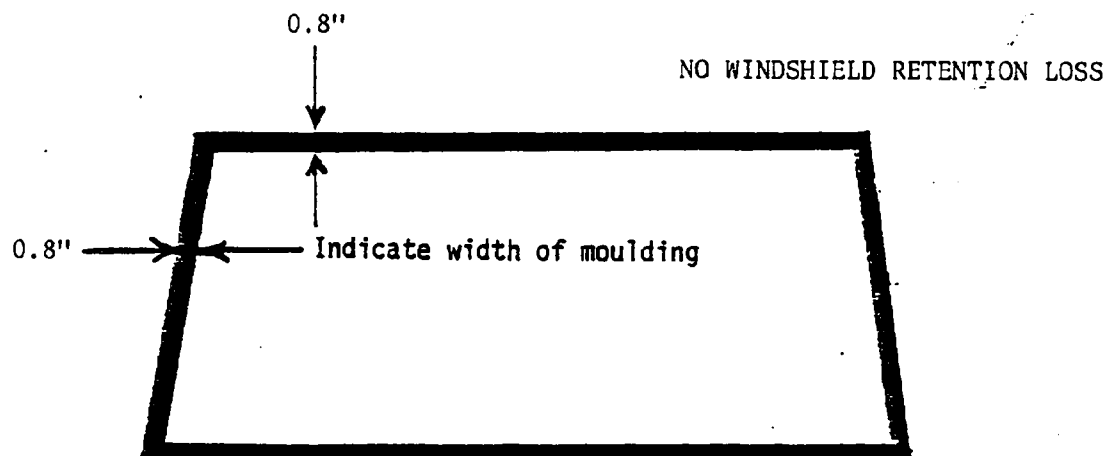
Details of windshield mounting (method of retention, type of trim, etc.):

Windshield is bonded in place and has a 0.8 inch chrome strip along the top the sides.

	Windshield Periphery		Retention %
	Pre-Test	Post-Test	
Right Side	90.25	90.25	100
Left Side	90.25	90.25	100
TOTAL	180.50	180.50	100

The standard requires that Post-Test be a minimum of 75 percent of the Pre-Test total periphery measurement for vehicle not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles which are equipped with occupant passive restraints.

AREA OF RETENTION FAILURE



FRONT VIEW

Figure 3 WINDSHIELD RETENTION, FMVSS NO. 212 DATA

Table 5

"FUEL SYSTEM INTEGRITY" POST-IMPACT TEST DATA

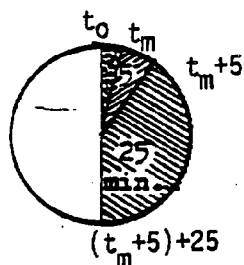
FMVSS No. 301-75

TEST VEHICLE NHTSA NO. 447-2-552 Test Date 9/24/82
 Vehicle Manufacture/Make/Model 1982 Ford LTD

Test vehicle fuel tank filled to 90-91% of capacity with Stoddard Solvent and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE

- ☒ Frontal (35 mph)
☐ Oblique (30 mph) with _____° barrier face first contacting
 _____ driver _____ passenger side
☐ Rear Moving Barrier (35 mph)
☐ Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT

	Actual	Max. Allow.
From impact until vehicle motion ceases	0	1 oz
For 5 min. period after vehicle motion ceases	0	5 oz
For next 25 min.	0	1 oz/1 min

TEST VEHICLE STATIC ROLLOVER

Test information will be added to the following static rollover data sheets

- (1) Figure 5A - Rollover data for 0° to 90° test phase
- (2) Figure 5B - Rollover data for 90° to 180° test phase
- (3) Figure 5C - Rollover data for 180° to 270° test phase
- (4) Figure 5D - Rollover data for 270° to 360° test phase

SOLVENT SPILLAGE DETAILS

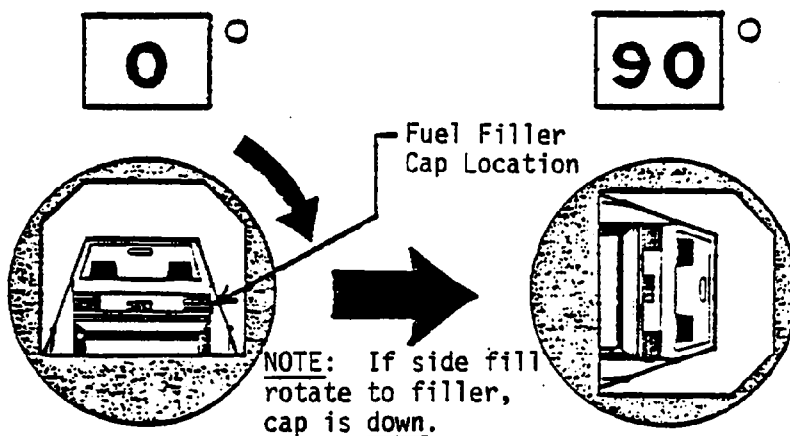
None.

VEHICLE NHTSA ID NO. 447-2-552

Table 5A

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 53 seconds
(Spec. Range = 1 to 3 min.)
FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
TOTAL = 7 minutes 53 seconds
Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
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ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0 ounces	0 ounce	0 ounce	0 ounces
----------	---------	---------	----------

NOTE: Record spillage for whole minute intervals only as determined above.

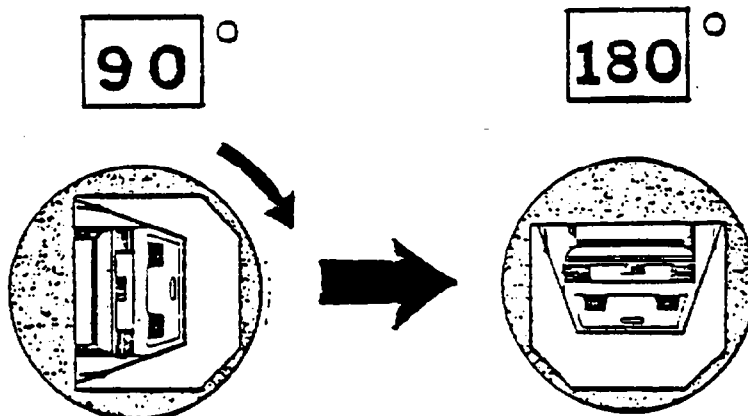
SOLVENT SPILLAGE LOCATION(S)

None.

VEHICLE NHTSA ID NO. 447-2-552

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 55 seconds
(Spec. Range = 1 to 3 min.)
FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
TOTAL = 7 minutes 55 seconds
Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0 ounces	0 ounce	0 ounce	0 ounce
----------	---------	---------	---------

NOTE: Record spillage for whole minute intervals only as determined above.

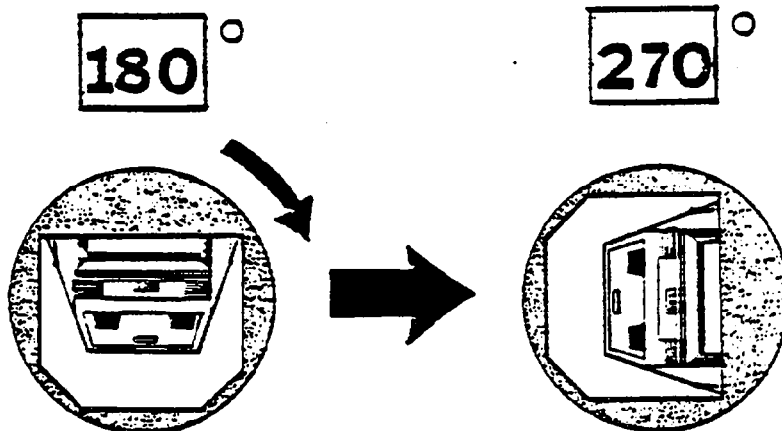
SOLVENT SPILLAGE LOCATION(S)

None.

VEHICLE NHTSA ID NO. 447-2-552

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 58 seconds
(Spec. Range = 1 to 3 min.)

FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds

TOTAL = 7 minutes 58 seconds

Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0 ounces	0 ounce	0 ounce	0 ounce
----------	---------	---------	---------

NOTE: Record spillage for whole minute intervals only as determined above.

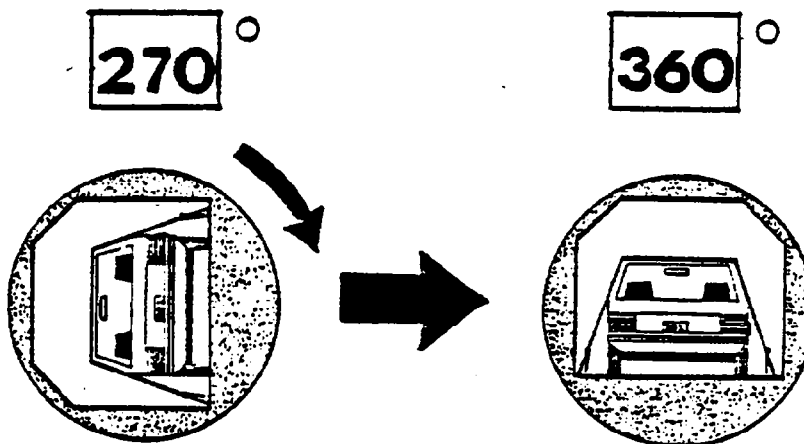
SOLVENT SPILLAGE LOCATION(S)

None.

VEHICLE NHTSA ID NO. 447-2-552

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 56 seconds
(Spec. Range = 1 to 3 min.)
FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
TOTAL = 7 minutes 56 seconds
Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0 ounces	0 ounce	0 ounce	0 ounce
----------	---------	---------	---------

NOTE: Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

None.

SECTION 4

OCCUPANT AND VEHICLE INFORMATION

- Vehicle Measurements
- Vehicle Accelerometer Locations
- Camera Positions and Locations
- Dummy In-Vehicle Position
- Dummy Injury Criteria Values

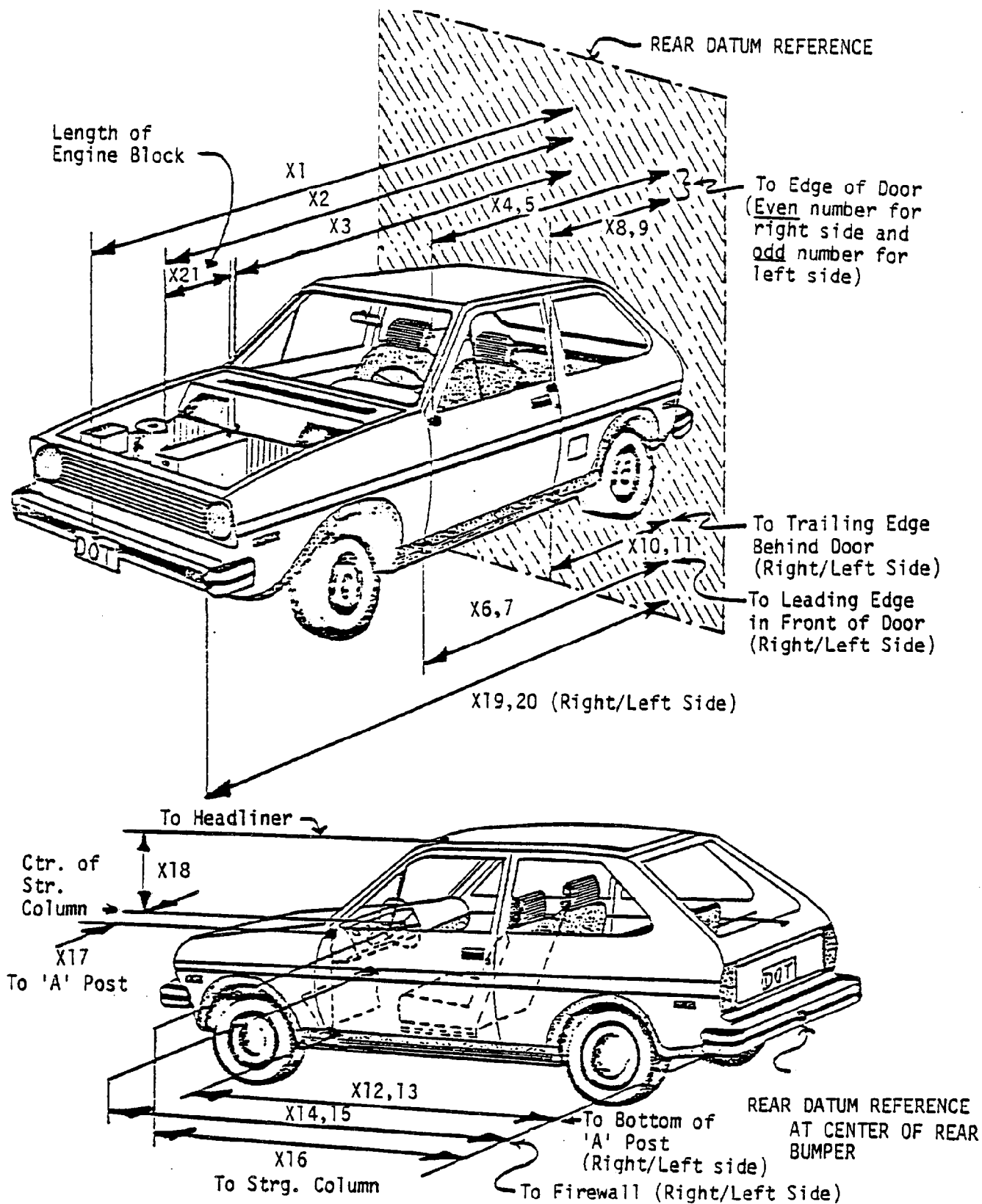
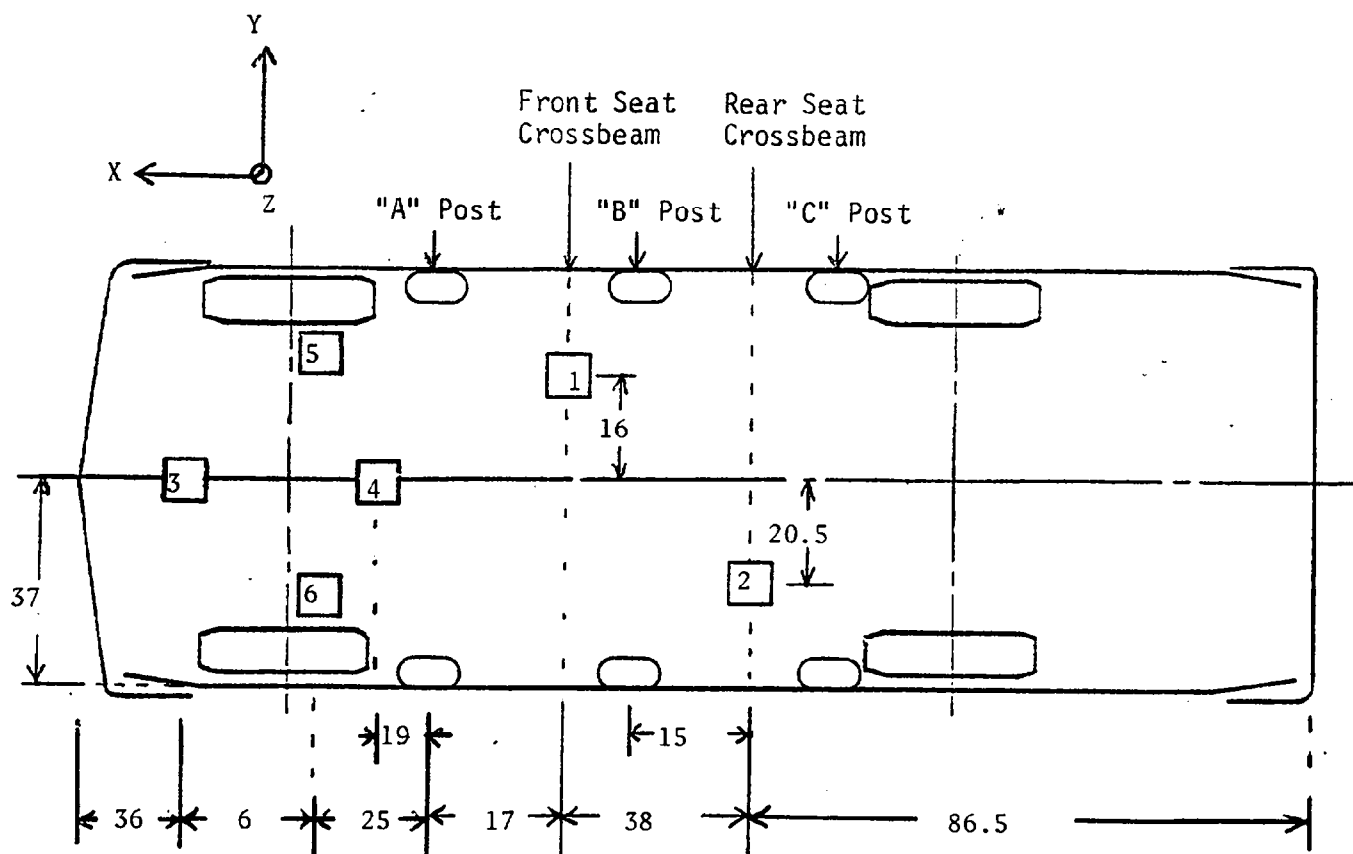


Figure 4 Pre- and Post-Test Measurement Points

Table 6

VEHICLE MEASUREMENTS

No.		1982 Ford LTD 4-door Sedan	All Dimensions in Inches		
			Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline		208.5	177.2	31.3
X2	Rear Surface of Vehicle to Front of Engine		177.5	165.7	11.8
X3	Rear Surface of Vehicle to Firewall		149.5	141.3	8.2
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door		140.0	140.0	0.0
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door		140.2	139.7	0.5
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door		140.2	139.5	0.7
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door		140.5	139.5	1.0
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door		99.8	99.6	0.2
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door		100.1	99.5	0.6
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door		98.0	97.5	0.5
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door		98.2	97.5	0.7
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side		140.0	139.2	0.8
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side		139.7	139.0	0.7
X14	Rear Surface of Vehicle to Firewall, Right Side		145.0	142.2	2.8
X15	Rear Surface of Vehicle to Firewall, Left Side		149.7	141.5	8.2
X16	Rear Surface of Vehicle to Steering Column		122.5	122.0	0.5
X17	Center of Steering Column to "A" Post		17.2	17.0	0.2
X18	Center of Steering Column to Headliner		17.7	18.6	-0.9
X19	Rear Surface of Vehicle to Right Side of Front Bumper		205.7	178.6	27.1
X20	Rear Surface of Vehicle to Left Side of Front Bumper		205.6	182.5	23.1
X21	Length of Engine Block		20.5	20.5	0.0



ACCELEROMETER NUMBER *	ACCELEROMETER LOCATION	DIRECTION		
		X	Y	Z
1	Front Seat Crossmember	x		
2	Rear Seat Crossmember	x		
3	Top of Engine	x		
4	Bottom of Engine	x		
5	RT Front Brake Caliper	x		
6	LF Front Brake Caliper	x		

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

FIGURE 5 VEHICLE ACCELEROMETER LOCATIONS

NOTE: Camera Information Shown on Table 8.

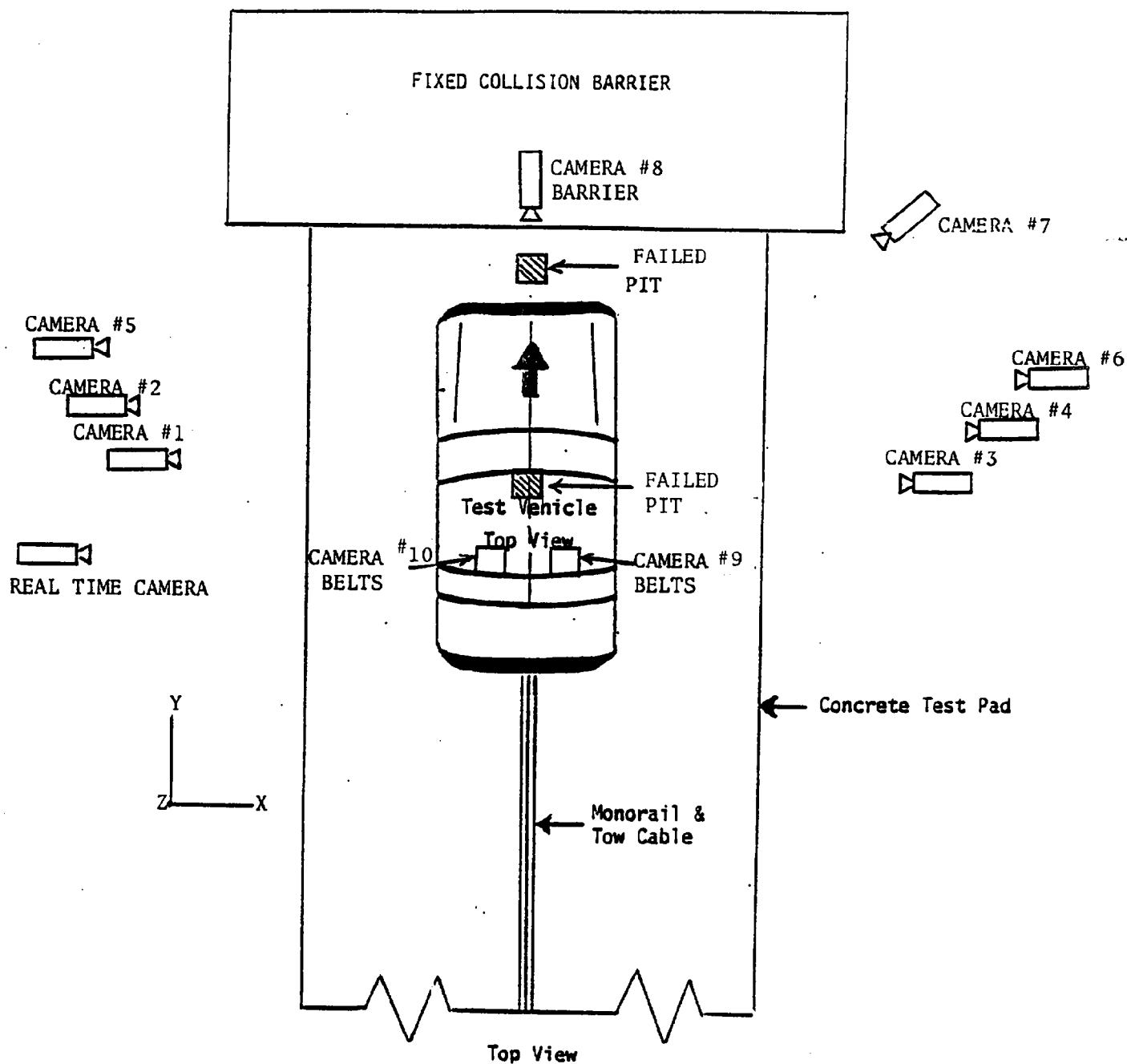


Figure 6 CAMERA POSITION FOR FRONTAL IMPACTS

Table 7

HIGH SPEED CAMERA LOCATIONSTest No.: 447-2-552Vehicle No. 1982 Ford LTD

CAMERA NUMBER	VIEW	CAMERA POSITIONS (IN)*			CAMERA ANGLE (DEG)**	FILM PLANE TO HEAD TARGET (IN) X
		X	Y	Z		
1	Driver	285	108	60	-4	265
2	Driver	318	90	57	-3	298
3	RT Front Passenger	268	141	51	-2	248
4	RT Front Passenger	305	138	54	-3	285
5	Vehicle Left Side	318	87	40	+1	---
6	Vehicle Right Side	268	90	41	-1	---
7	Windshield	72	-18	54	-6	---
8	Vehicle Front (Barrier)	0	0	120	-40	---
9	Left Belt Retractor	---	---	---	--	---
10	Right Belt Retractor	---	---	---	--	---

*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

**Referenced to Horizontal Plane

Table 8

HIGH SPEED CAMERA INFORMATION (TEST 774-2-552)

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)
1	Driver	Photosonic	35	600
2	Driver	Photosonic	50	650
3	RT Front Passenger	Photosonic	35	600
4	RT Front Passenger	Photosonic	50	600
5	Vehicle Left Side	Photosonic	13	620
6	Vehicle Right Side	Photosonic	13	700
7	Windshield	Photosonic	13	620
8	Vehicle Front Barrier	Photosonic	8	620
9	Left Belt Retractor	Stalex	8	800
10	Right Belt Retractor	Stalex	8	600

NOTE: CAMERAS ARE NUMBERED ACCORDING TO SPLICING SEQUENCE OF FILM.

(24 fps) REAL TIME MOVIE FILM COVERAGE OF PRE-CRASH, POST-CRASH
AND CRASH EVENT SPLICED AT START OF FILM.

BEFORE DRIVING YOUR VEHICLE

OCCUPANT RESTRAINT SYSTEMS

Head Restraints

Raise the head restraint by lifting up on it. Lower the head restraint by pressing down on it with enough force to overcome the retaining friction.

WARNING — Adjust the head restraint so that it is just behind your head and never behind your neck to reduce the chance of injury in the event of a collision.

Continuous Loop Lap Shoulder Belt System

Ford Motor Company recommends that you always "buckle up" for safety. In some areas, seat belt usage is required by law.

Your vehicle is equipped with a continuous loop lap-shoulder belt system for the driver and right front seating positions. The driver's position also contains a seat belt warning system. If the driver does not buckle up before turning the ignition on, the buzzer (optional chime) will sound for four to eight seconds. The seat belt warning light will remain on for the same time period with or without the belts buckled.

For infants up to 20 pounds (9 kg) in weight, we recommend the Ford Infant Carrier. For children 20 to 50 pounds (9 kg to 23 kg) in weight, we recommend the Ford Tot-Guard. For details, refer to the Infant and Child Restraint section of this guide. Both units are secured with front seat lap-shoulder belts or rear seat lap belts. All other passengers should use the belts as provided.

WARNING — Passengers should not be allowed to ride in the cargo area of any vehicle. Persons who are not riding in a seat with a fastened seat belt are much more likely to suffer serious bodily injury in the event of a collision.

Front Lap-Shoulder Belts

After entering your vehicle, adjust the front seat to obtain the best position for your driving comfort and visibility. Then use the following procedure for fastening belts.



BEFORE DRIVING YOUR VEHICLE

- Pull the lap-shoulder belt from the retractor so the shoulder portion of the belt crosses your shoulder and chest and insert the belt slip tongue into the proper buckle until you hear a snap and feel it latch.

- The shoulder restraint portion of the belt adjusts automatically to a snug position.

To relieve belt pressure on your shoulder after the belt is fastened, a shoulder harness comfort regulator is provided in the retractor. This regulator allows you to adjust your shoulder belt length for optimum comfort. This comfort regulator works like a window shade.

- Close the door.

- Pull several inches of shoulder belt away from your body and release.

- Pull down a small amount of shoulder belt and release.

- If the desired setting is not achieved repeat the above procedure.

- The comfort regulator is designed to automatically release when the respective front door is opened. As the seat belt is unbuckled, it should be hand-guided back to the retractors to prevent the belt tongue from striking occupants or objects nearby during retraction.

The inertia reel allows freedom of movement, locking tight only on hard braking or impacts of approximately 5 mph (8 km/h) or more. The reel cannot be made to lock by jerking on the webbing.

The lap portion of the belt adjusts automatically to a snug position.

WARNING — Never allow more slack than is required to insert a fist between the shoulder belt and the chest. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Be sure the belt is fitted around the hips, not 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.

Center Front and Rear Lap Belts

Because the center lap belts do not have retractors, they should be shortened and fastened when not in use. To lengthen the belt, tip the tongue at a right angle to the belt, and pull the belt over your lap until the tongue reaches the buckle.

To fasten the belt, insert the tongue into the open end of the proper buckle until you hear a snap and feel the latch engage. The belt should be snug across the hips, never across the waist.

FIGURE 7
PART 572 DUMMY IN-VEHICLE POSITION

Test No. 447-2-552

Vehicle 1982 Ford LTD

SEAT TYPE:

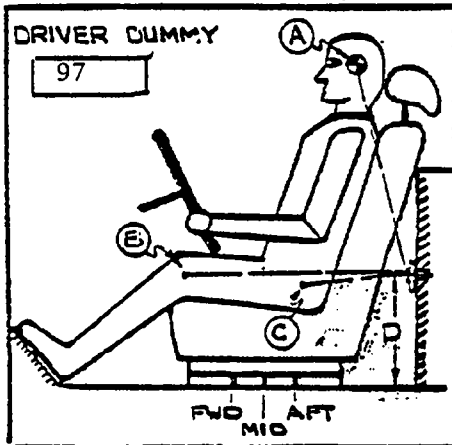
☒ Bench
☐ Bucket
☐ Split Bench

ADJUSTER TYPE:

☒ Manual
☐ Power

BUCKET SEAT BACK TYPE:

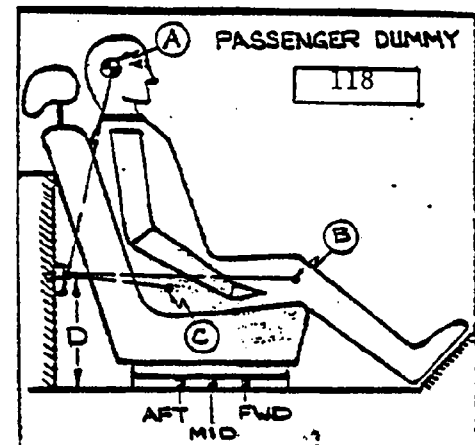
☒ Fixed
☐ Adjustable Reclining



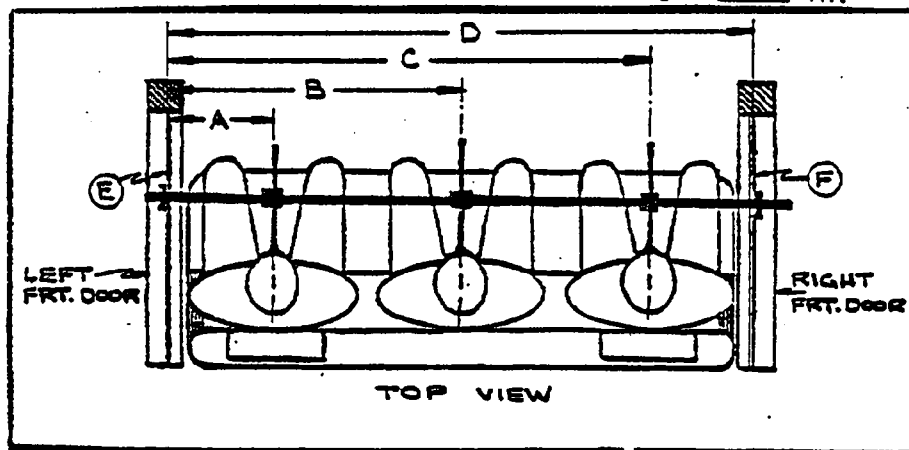
A = 20 in. 1 Degrees
B = 25 in. 95 Degrees
C = 10 in. 128 Degrees
D = 17 in.

MEASUREMENT LOCATION

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



A = 19 in. 2 Degrees
B = 25.5 in. 98 Degrees
C = 9.7 in. 128 Degrees
D = 17 in.



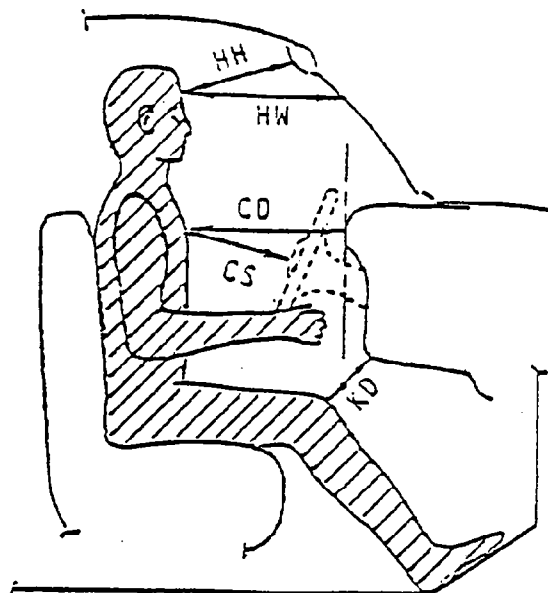
DUMMY ID

97

118

A	=	Left Door to Driver Centerline	<u>13.5</u> in.
B	=	Left Door to Center Passenger Centerline	<u>---</u> in.
C	=	Left Door to Right Passenger Centerline	<u>74.5</u> in.
D	=	Left Door to Right Door	<u>57.7</u> in.
E, F	=	Window Glass Height (Right and Left Must be Equal)	<u>11.2</u> in.

	<u>DRIVER</u>	<u>PASS</u>
HH	14.0	13.5
HW	20.2	20.2
CD	21.0	21.0
CS	13.2	--
KDL	6.5	7.0
KDR	7.0	7.0



HR	5.0	5.5
HS	9.2	9.3
AD	5.2	6.2
HD	7.3	8.0

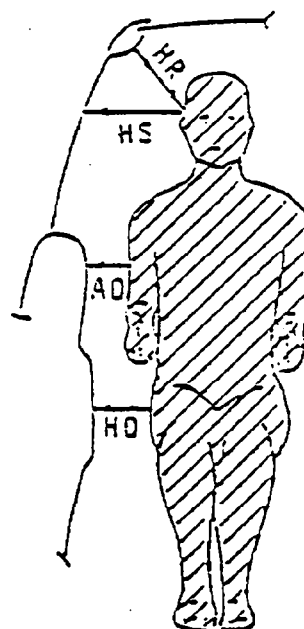


Figure 8 OCCUPANT CLEARANCE DIMENSIONS

Table 9

DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G") *							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R
DUMMY (1)	-100	-43	60	126	-44	-26	-17	50
DUMMY (2)	-38	45	59	73	-34	32	34	43
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	640	360
DUMMY (2)	180	350
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)	1180	1950	1170
DUMMY (2)	1750	1325	2200
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**				SEVERITY INDEX
	HIC	t ₁ (SEC)	t ₂ (SEC)	AVE. ACC. (g) t ₁ TO t ₂	HEAD
DUMMY (1)	960.1	.07800	.11130	60.8	1429.7
DUMMY (2)	808.0	.06510	.12607	44.6	1093.1
DUMMY (3)					
DUMMY (4)					

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

36 LOAD CELLS
4 ROWS
9 COLUMNS

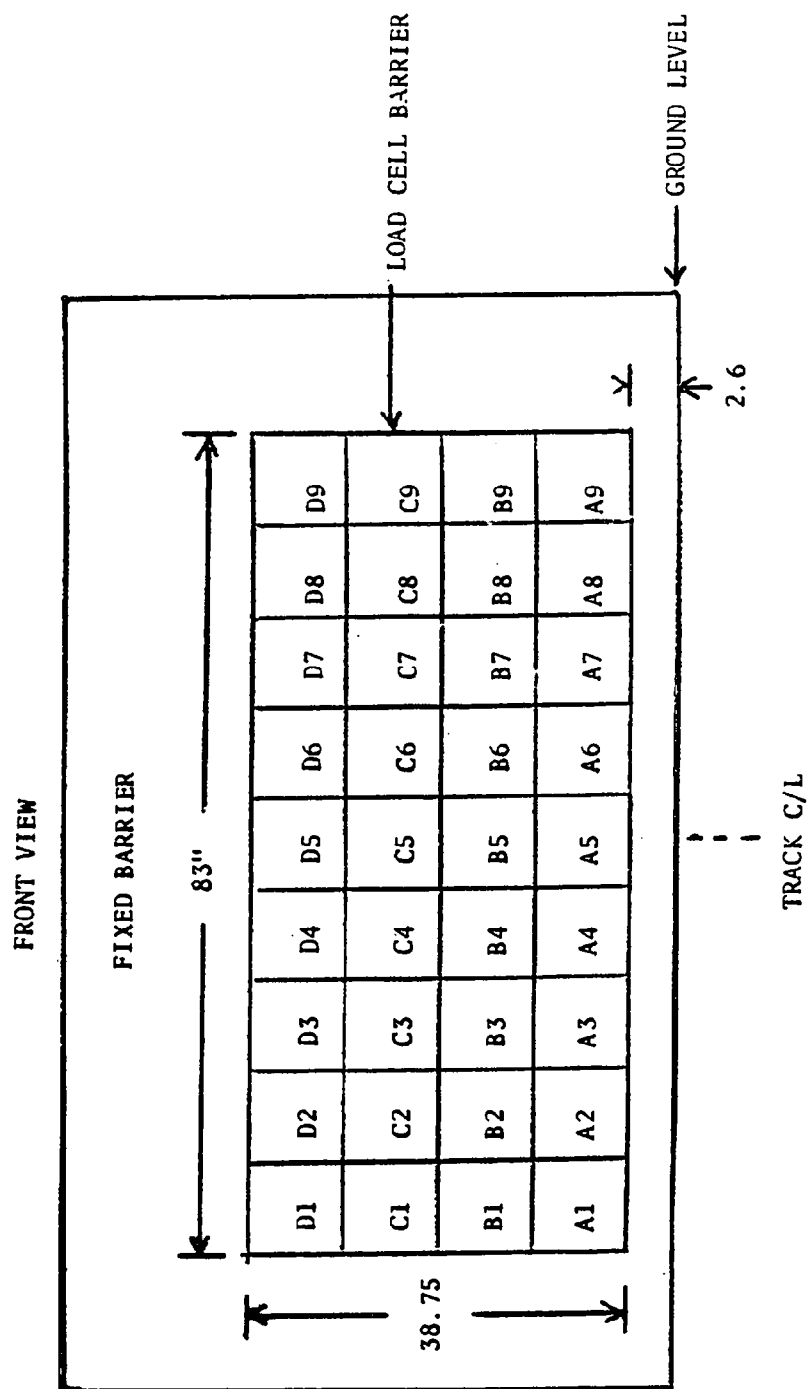


Figure 9 FIXED LOAD CELL BARRIER-LOAD CELL LOCATIONS

APPENDIX A
PHOTOGRAPHS

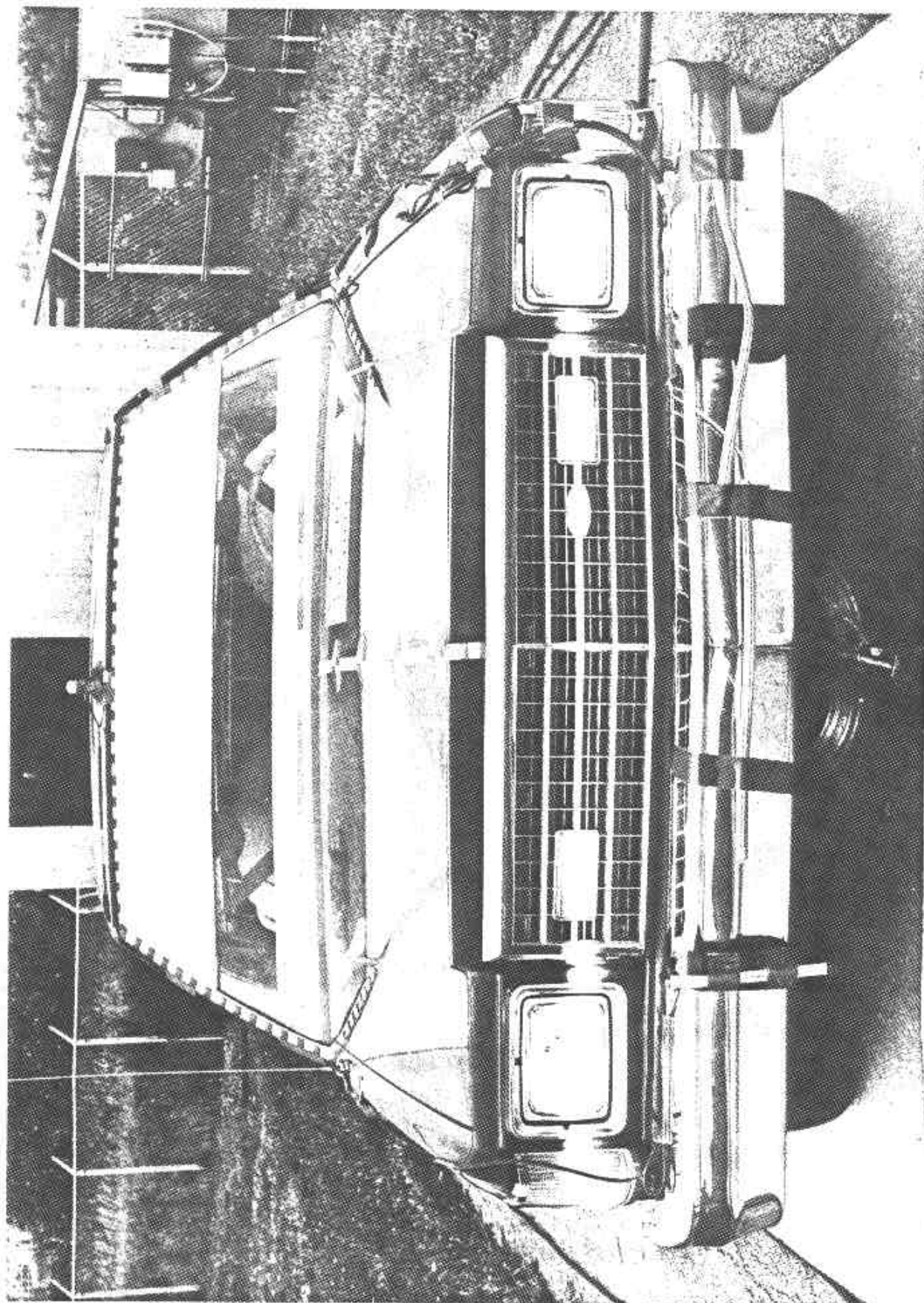


Figure A-1 PRE-TEST FRONT VIEW

A-2

7095-V-2

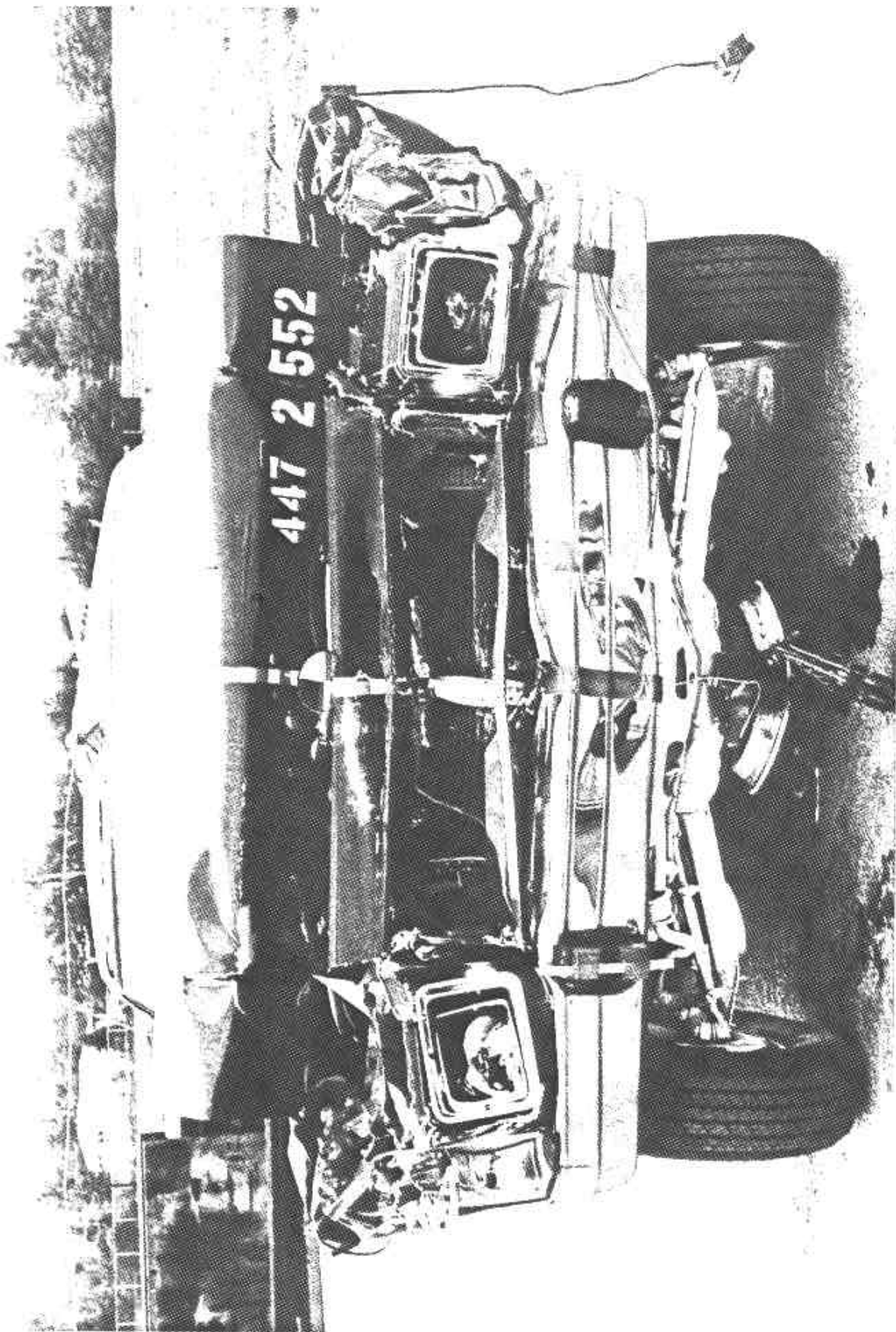


Figure A-2 POST-TEST FRONT VIEW

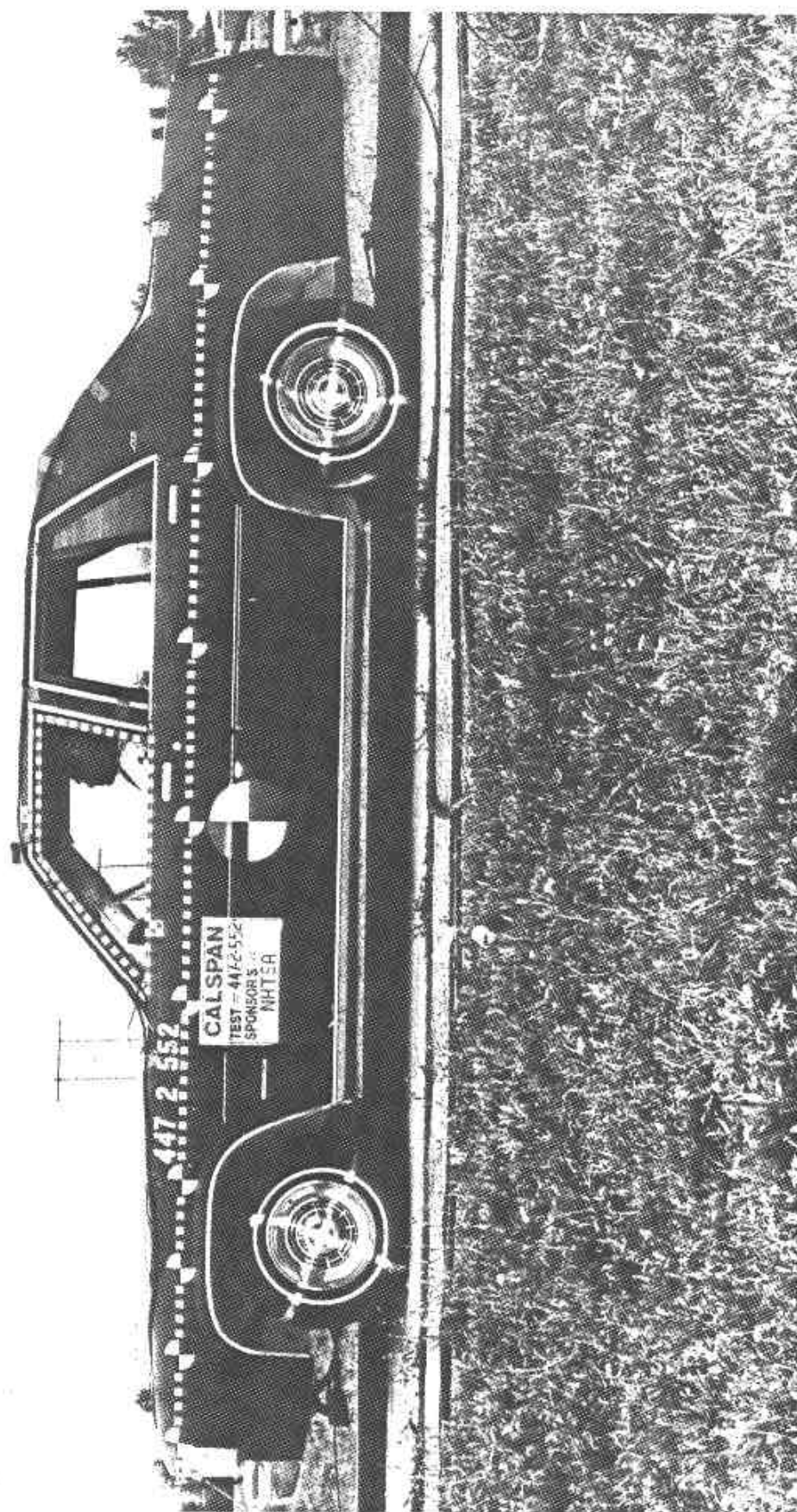


Figure A-3 PRE-TEST SIDE VIEW

A-4

709S-V-2

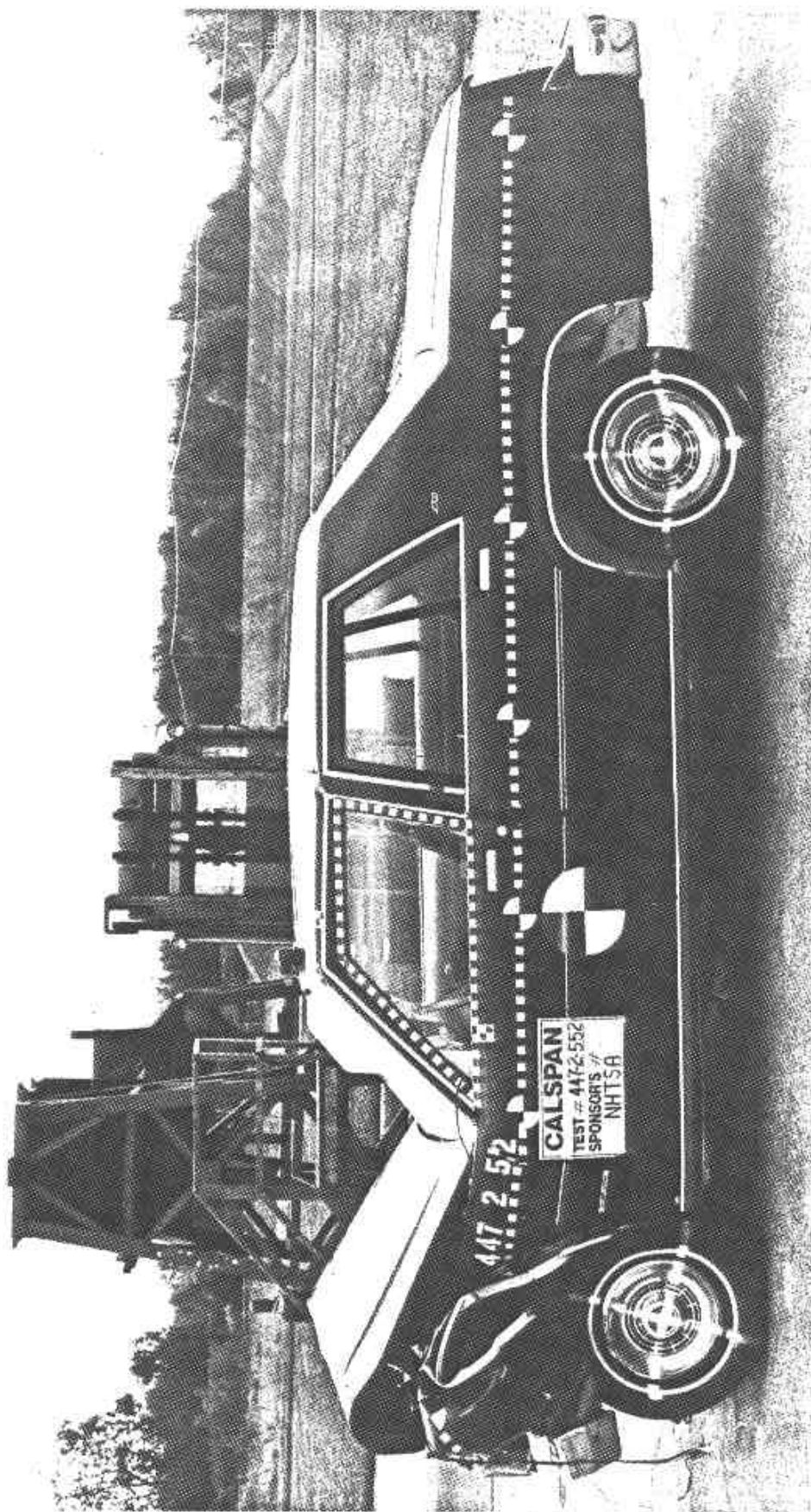


Figure A-4 POST-TEST SIDE VIEW



Figure A-5 PRE-TEST FRONT THREE-QUARTERS VIEW

A-6

7095-V-2

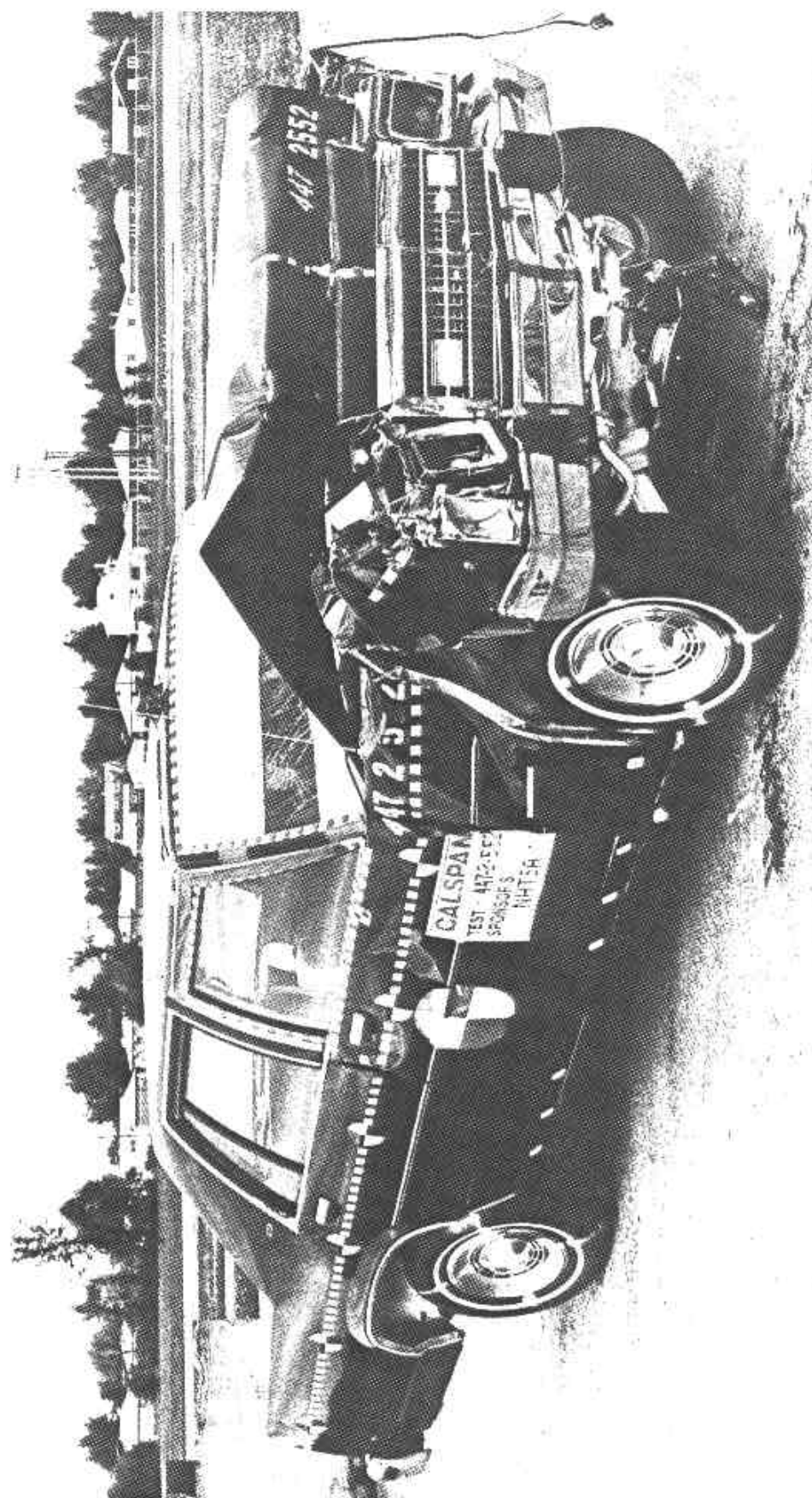


Figure A-6 POST-TEST FRONT THREE-QUARTERS VIEW

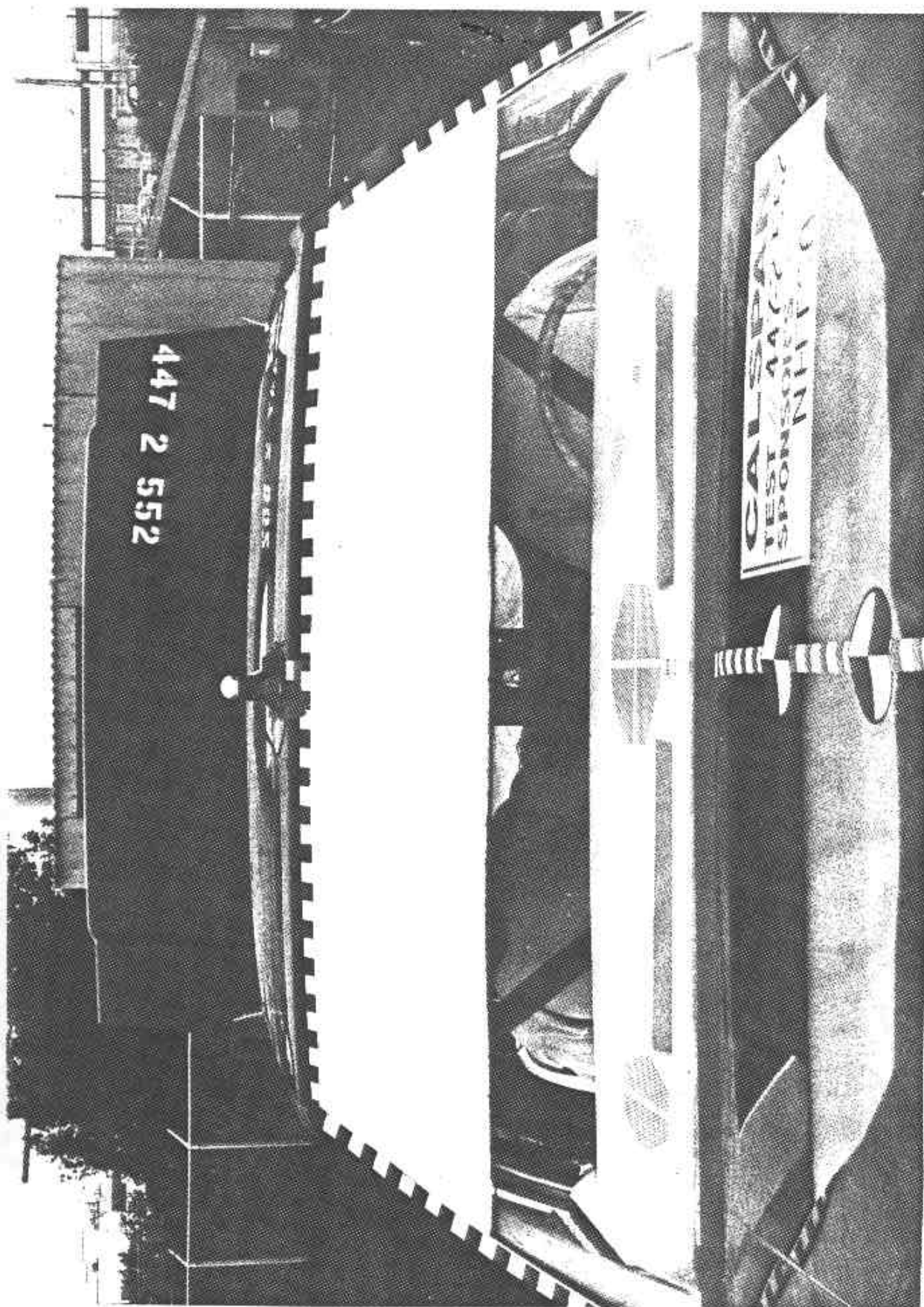


Figure A-7 PRE-TEST VIEW OF WINDSHIELD AND PROTECTED ZONE

A-8

7095-V-2

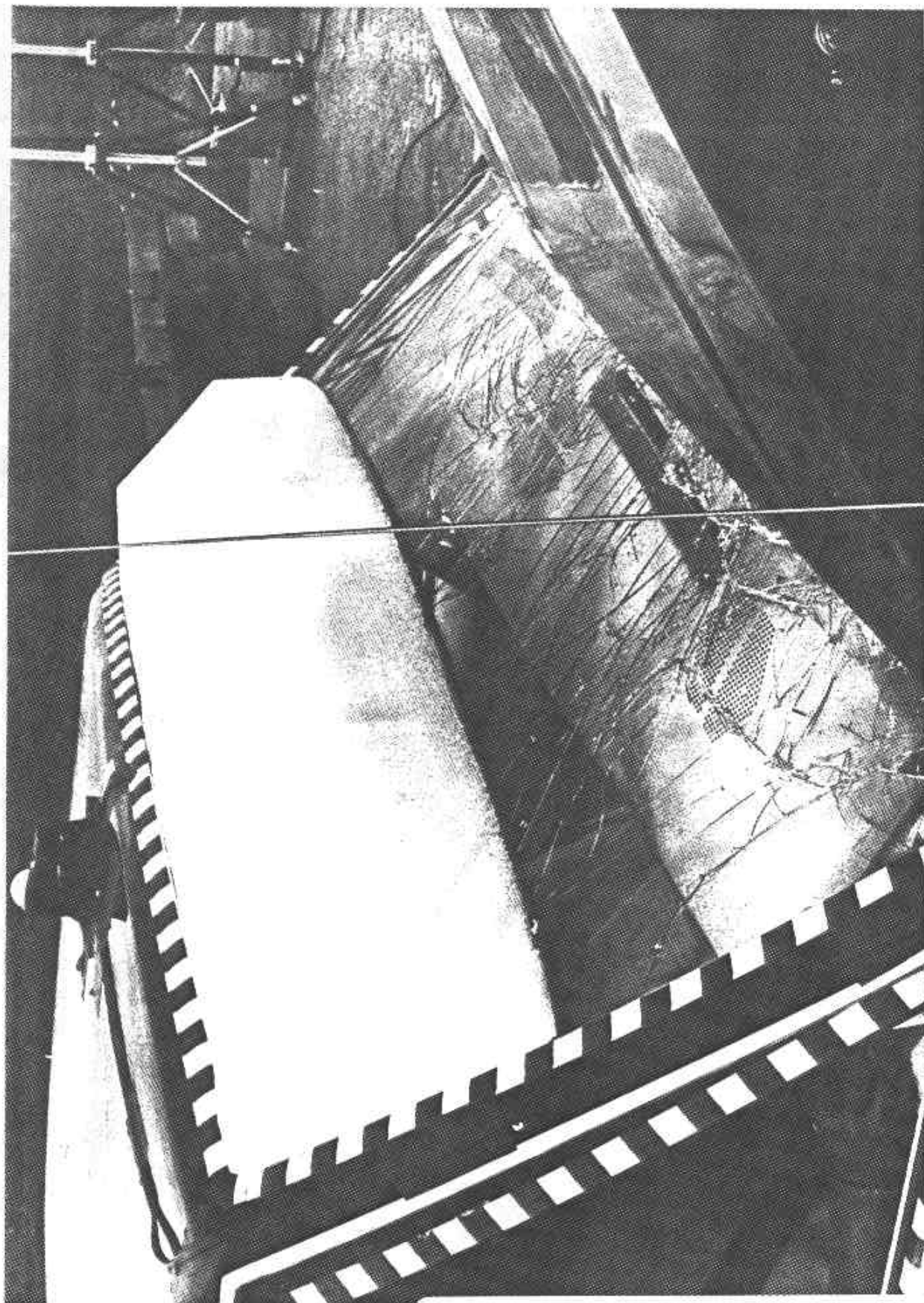


Figure A-8 POST-TEST VIEW OF WINDSHIELD AND PROTECTED ZONE

A-9

7095-V-2

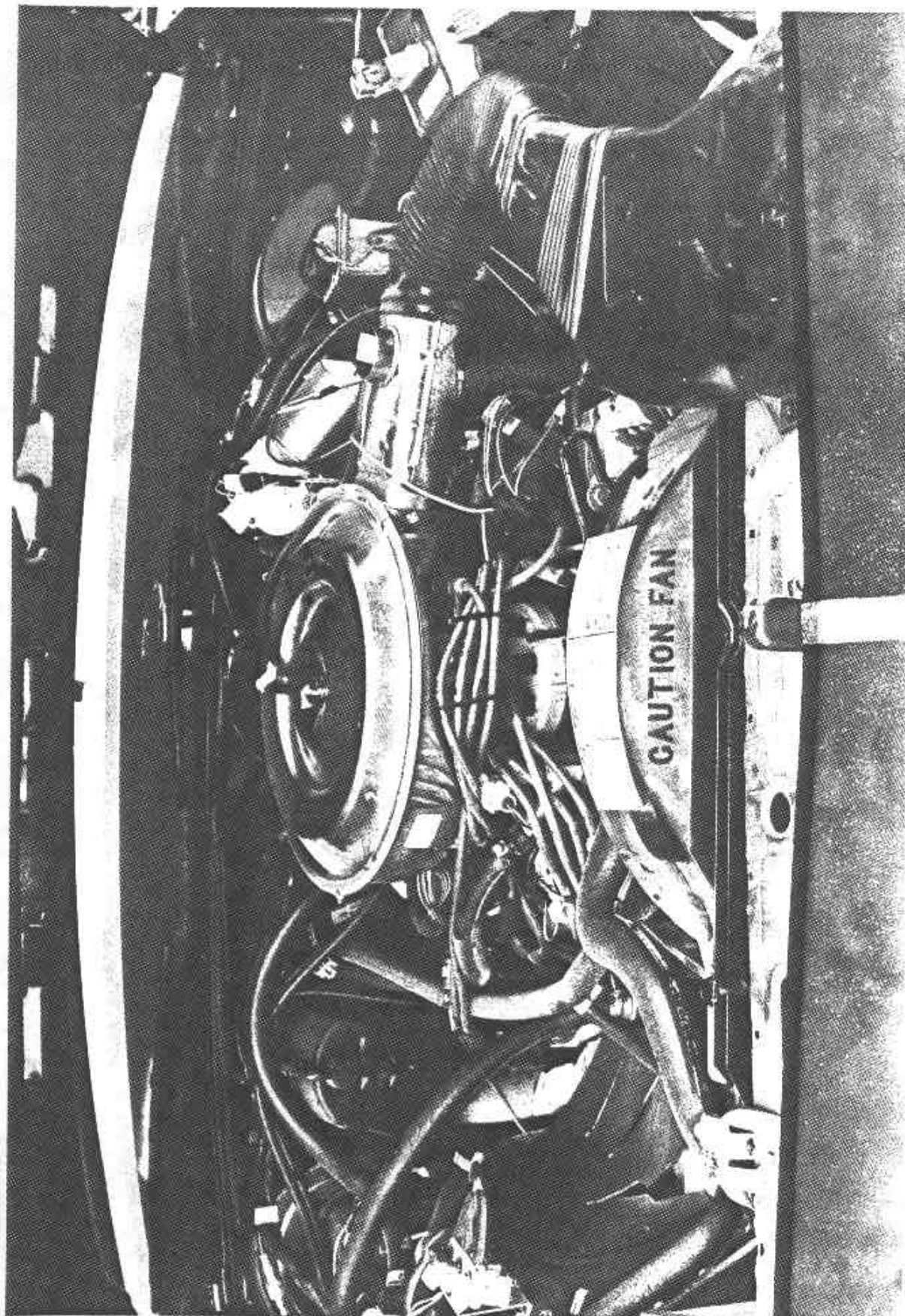


Figure A-9 PRE-TEST VIEW OF ENGINE COMPARTMENT

A-10

7095-V-2

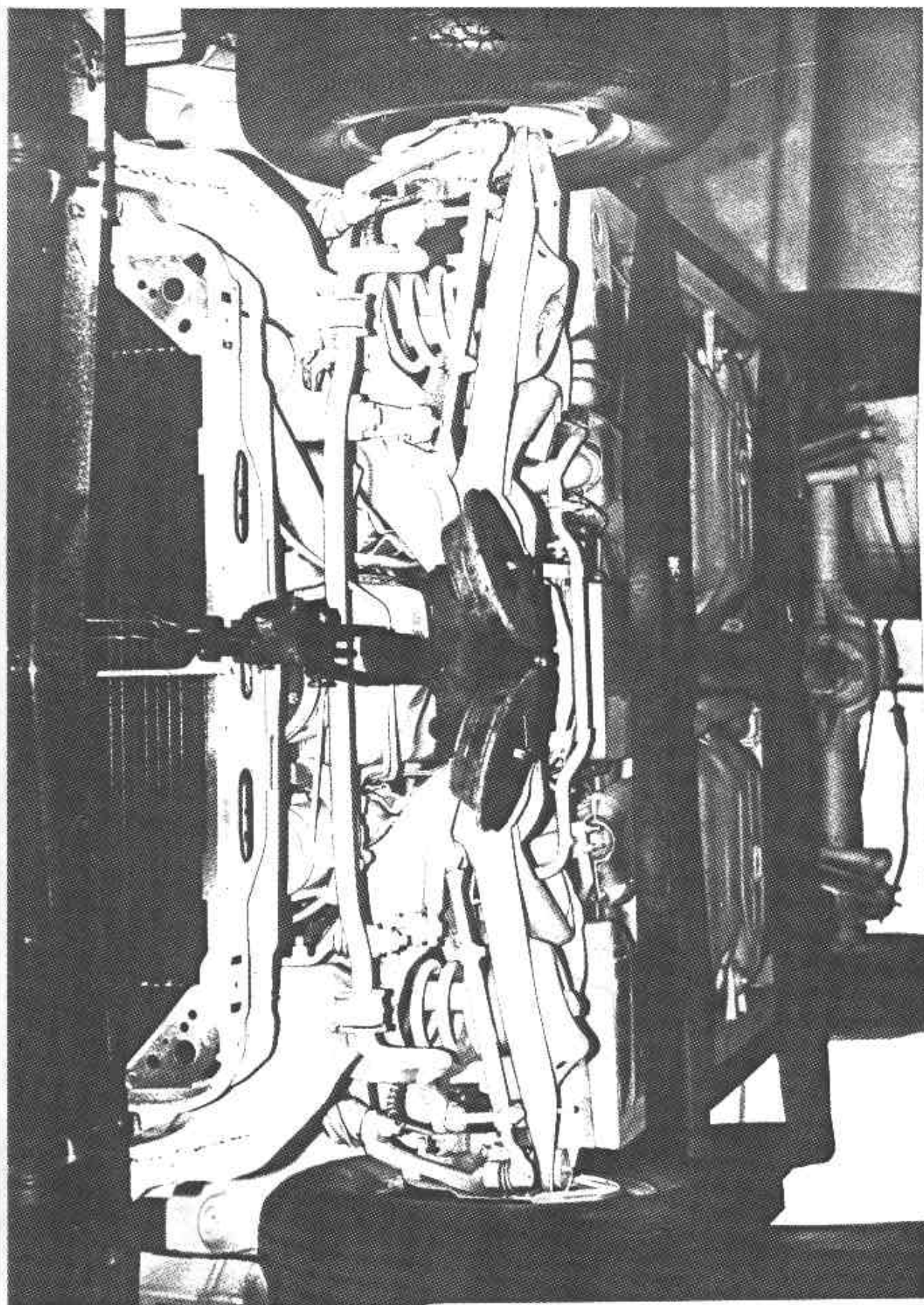
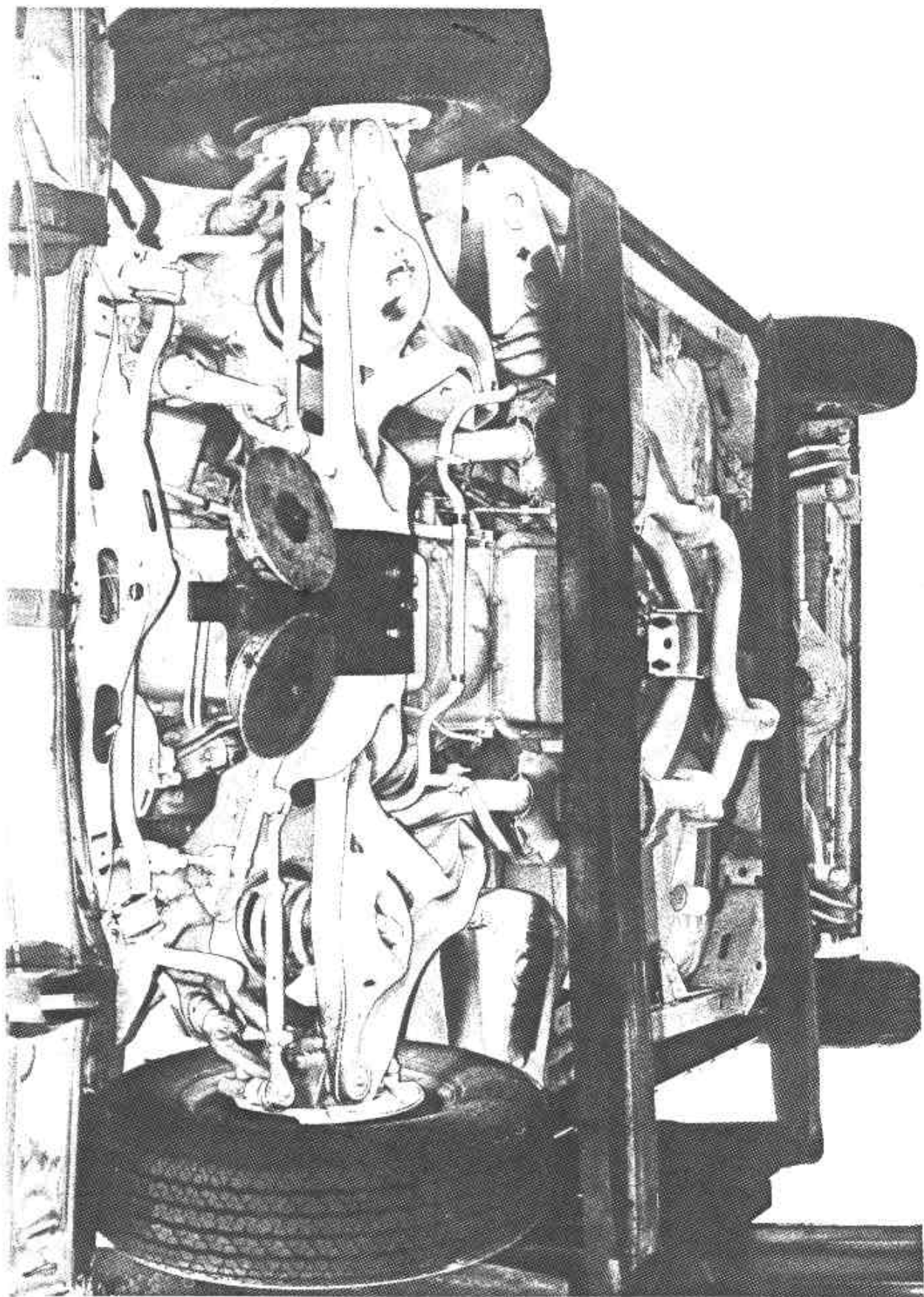


Figure A-10 PRE-TEST VIEW OF FRONT UNDERBODY

A-11

7095-V-2



A-12

7095-V-2

Figure A-11 POST-TEST VIEW OF FRONT UNDERBODY

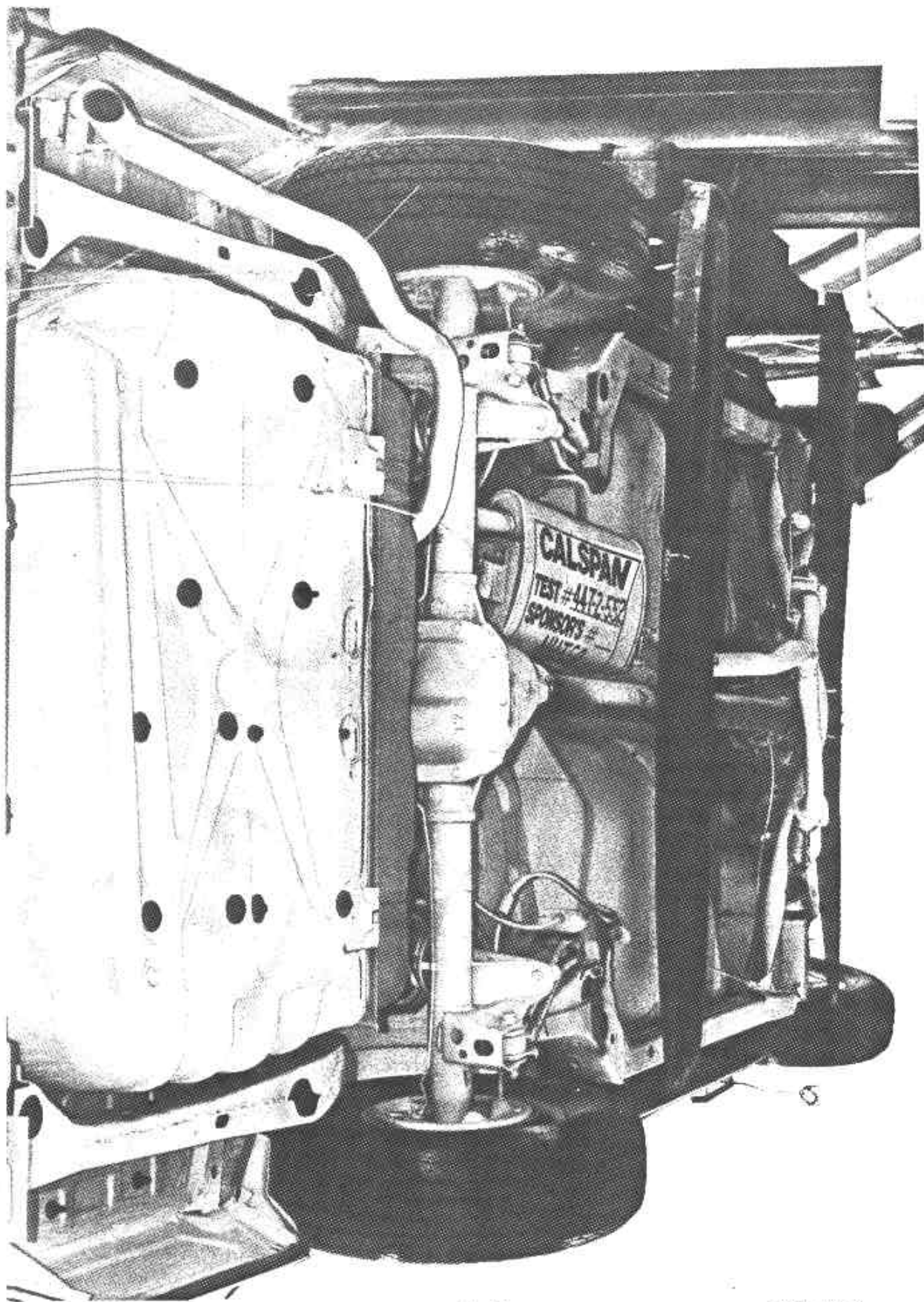


Figure A-12 POST-TEST VIEW OF REAR UNDERBODY

A-13

7095-V-2



Figure A-13 VIEW OF FUEL TANK AND FUEL LINES

A-14

7095-V-2

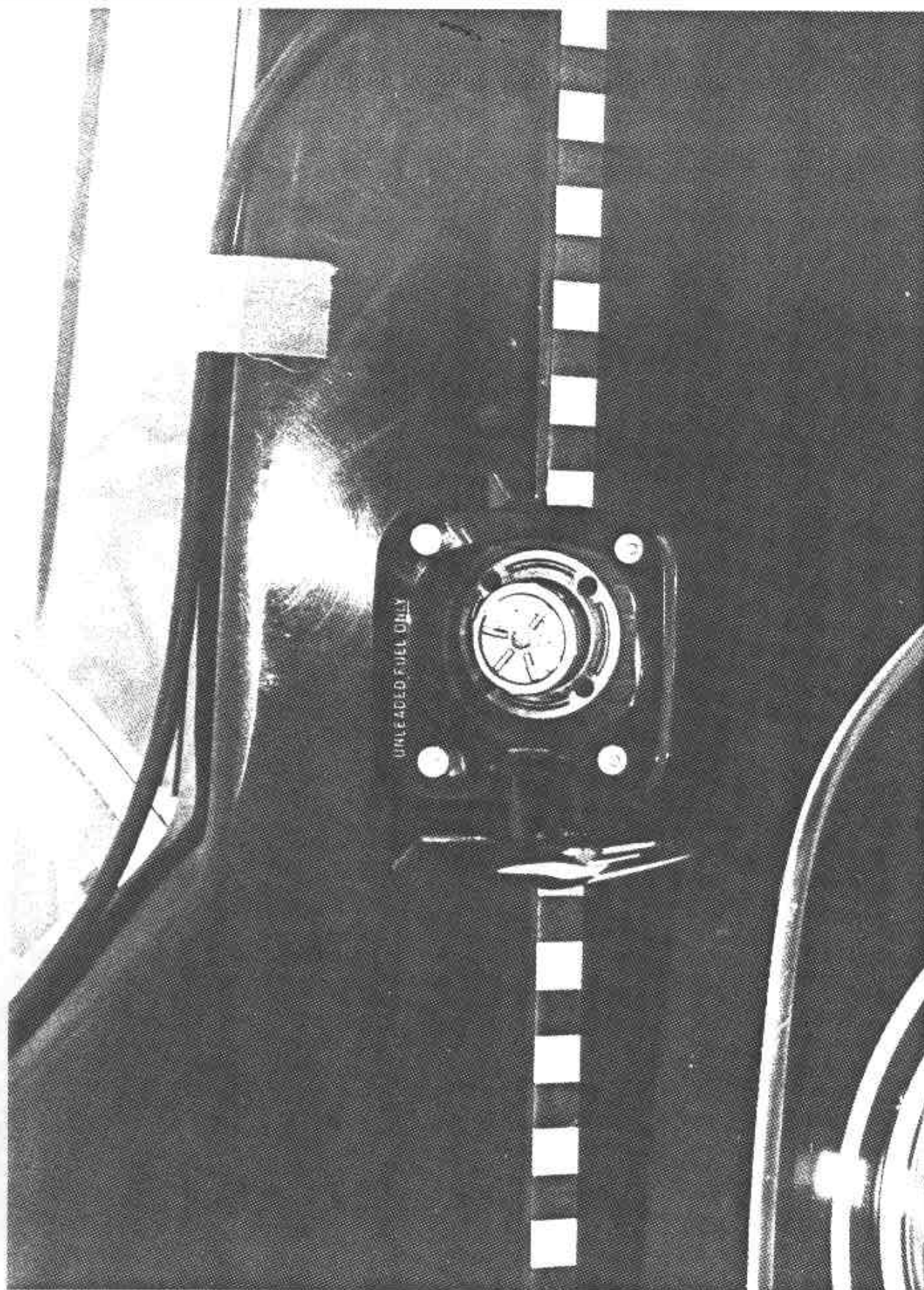


Figure A-14 VIEW OF FILLER TUBE AND CAP

A-15

7095-V-2



Figure A-15 PRE-TEST VIEW OF DRIVER POSITION

A-16

7095-V-2

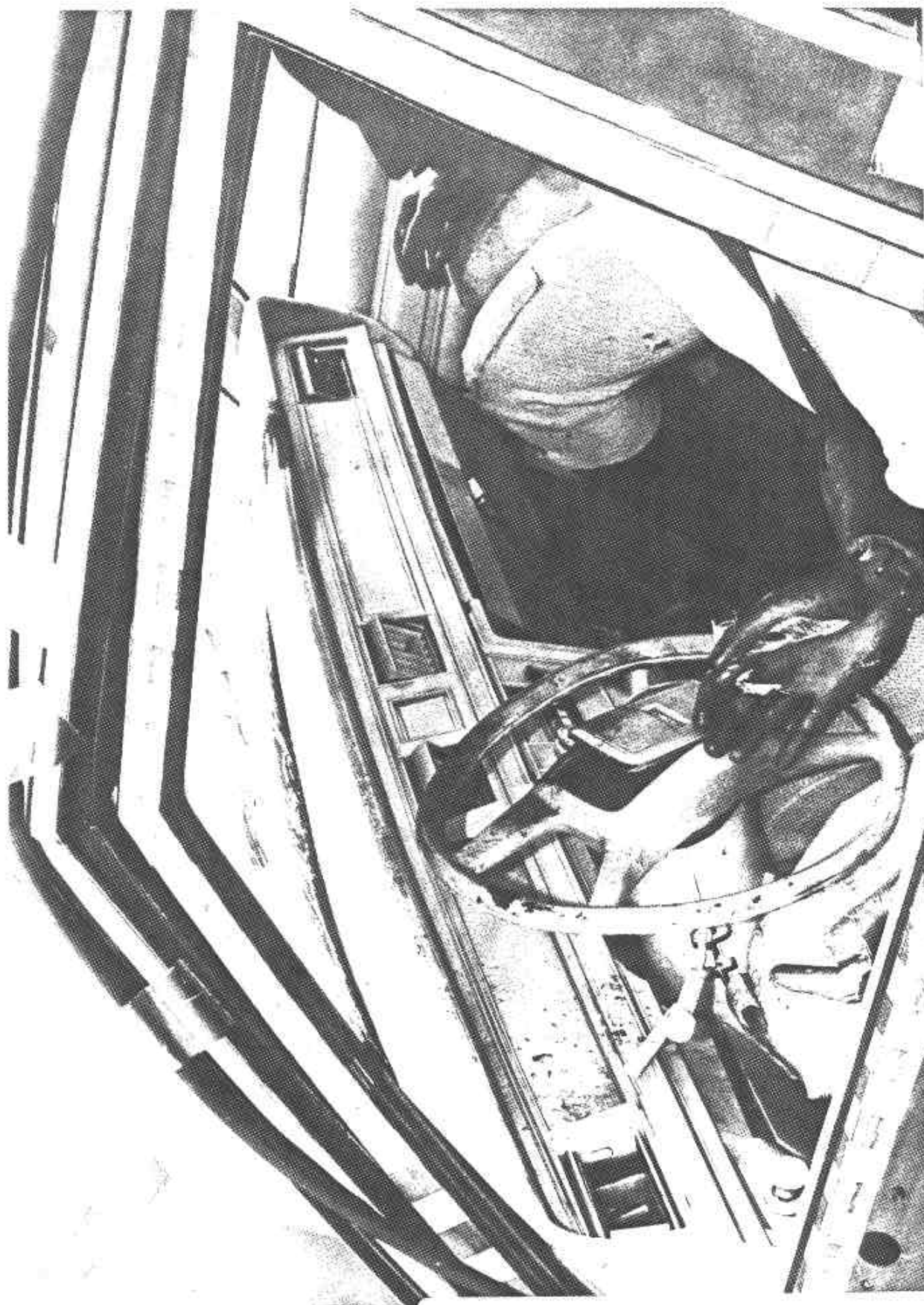


Figure A-16 POST-TEST VIEW OF DRIVER AND INTERIOR

A-17

7095-V-2



Figure A-17 PRE-TEST VIEW OF RIGHT FRONT PASSENGER

A-18

7095-V-2

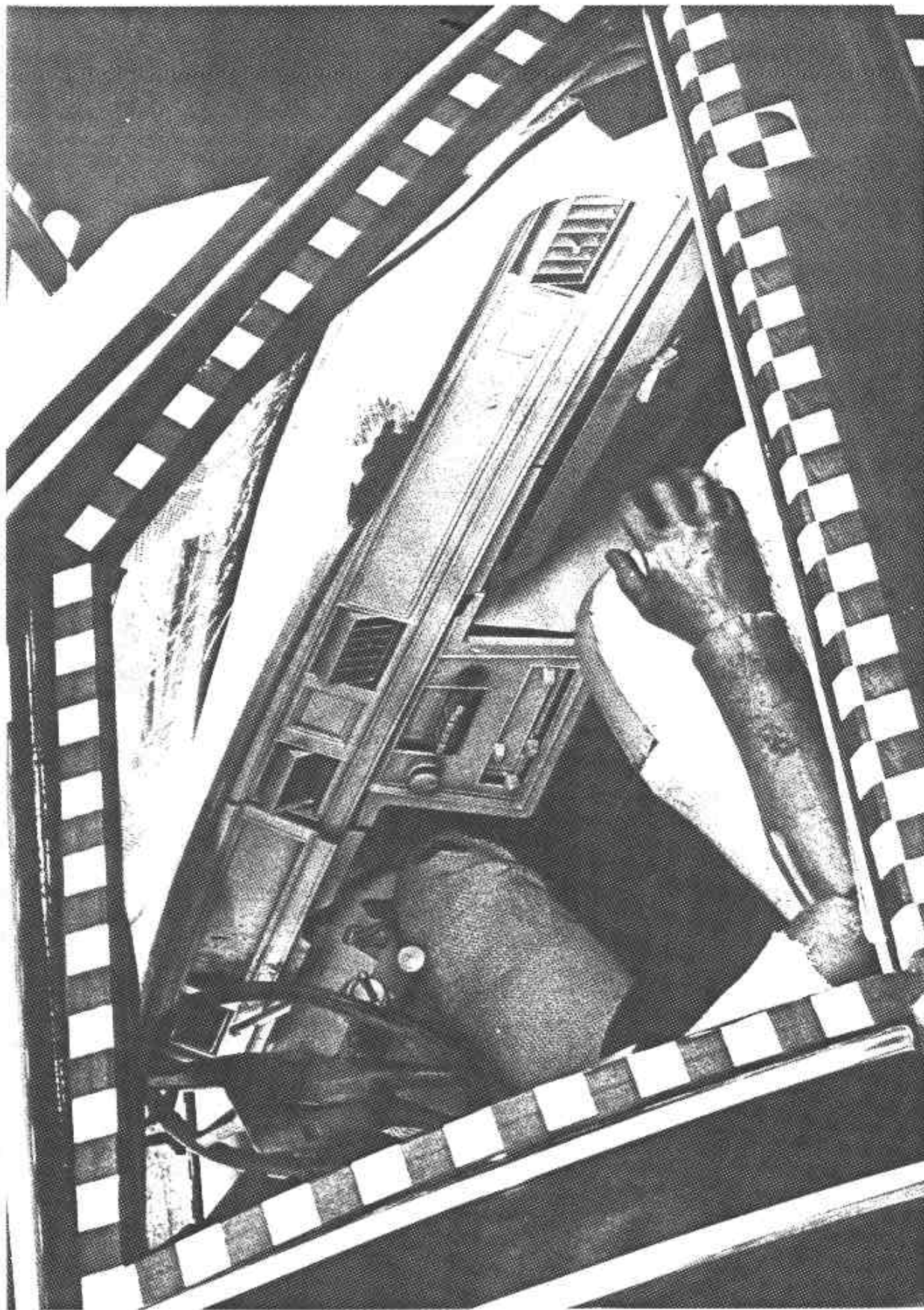


Figure A-18 POST-TEST VIEW OF RIGHT FRONT PASSENGER AND INTERIOR

A-19

7095-V-2



A-20

7095-V-2

Figure A-19 POST-TEST VIEW OF DRIVER AND RIGHT FRONT PASSENGER POSITIONS

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA

Test No. 447-2-552

1982 Ford LTD

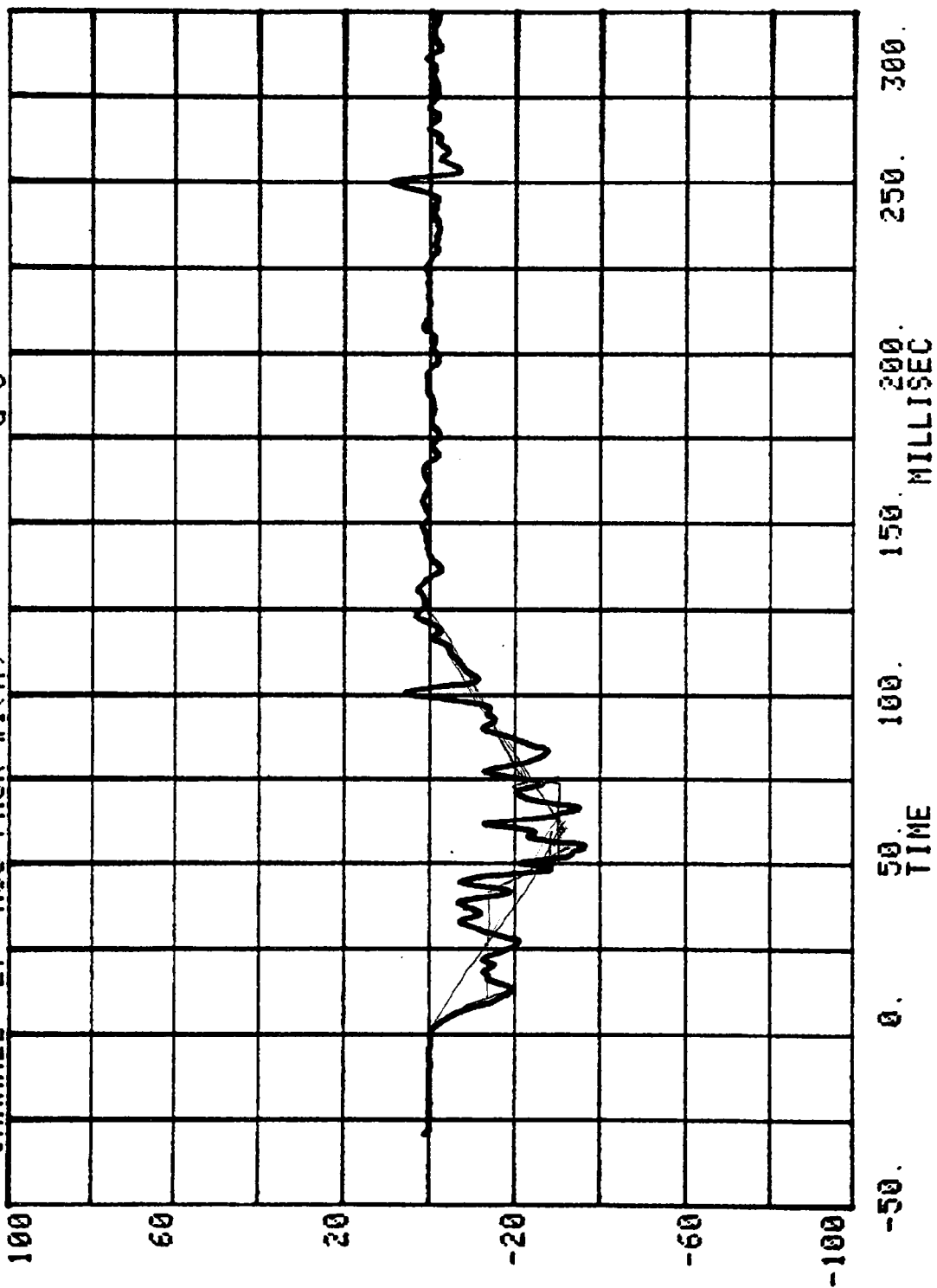
VEHICLE NO. 1 DATA

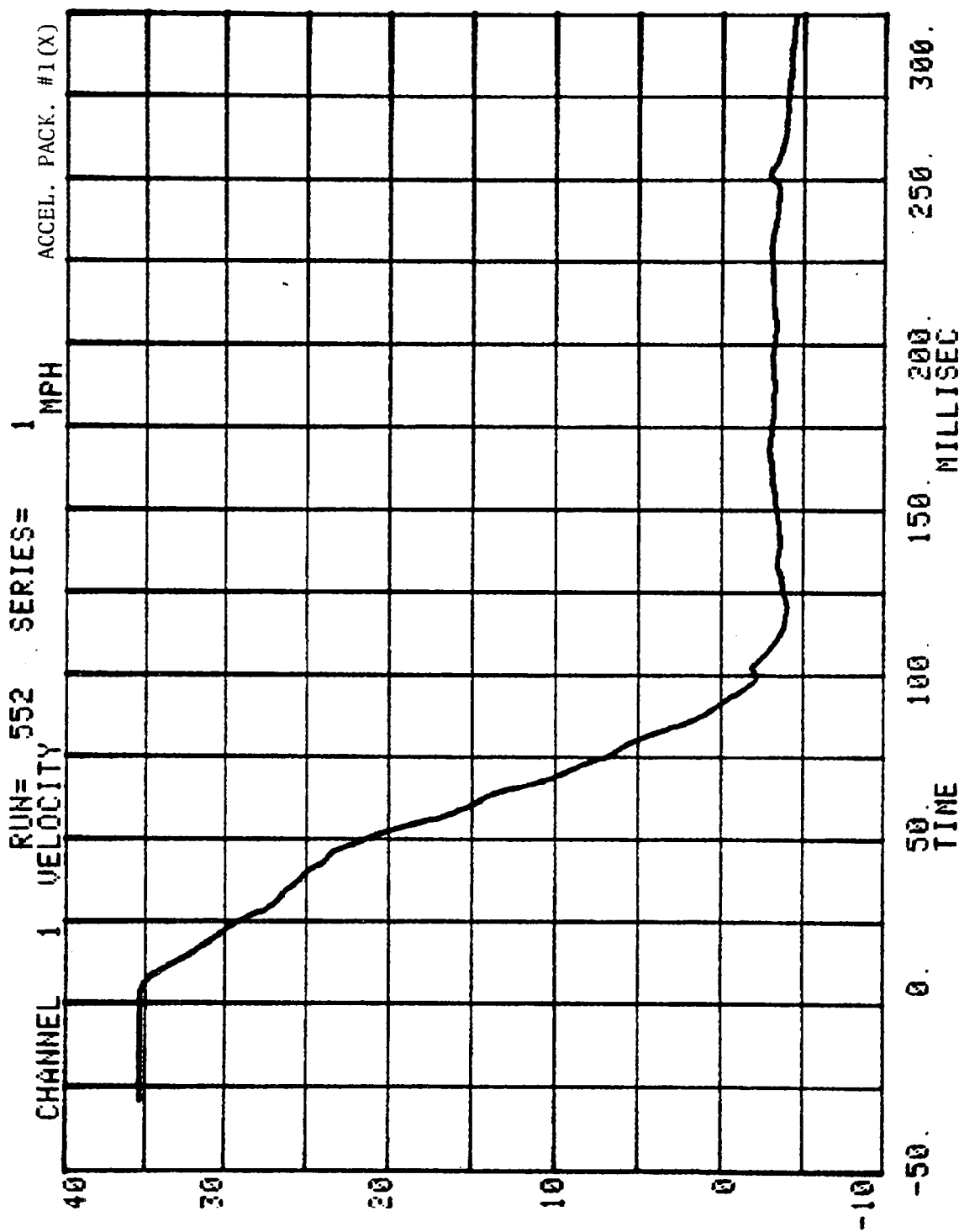
VEHICLE DATA

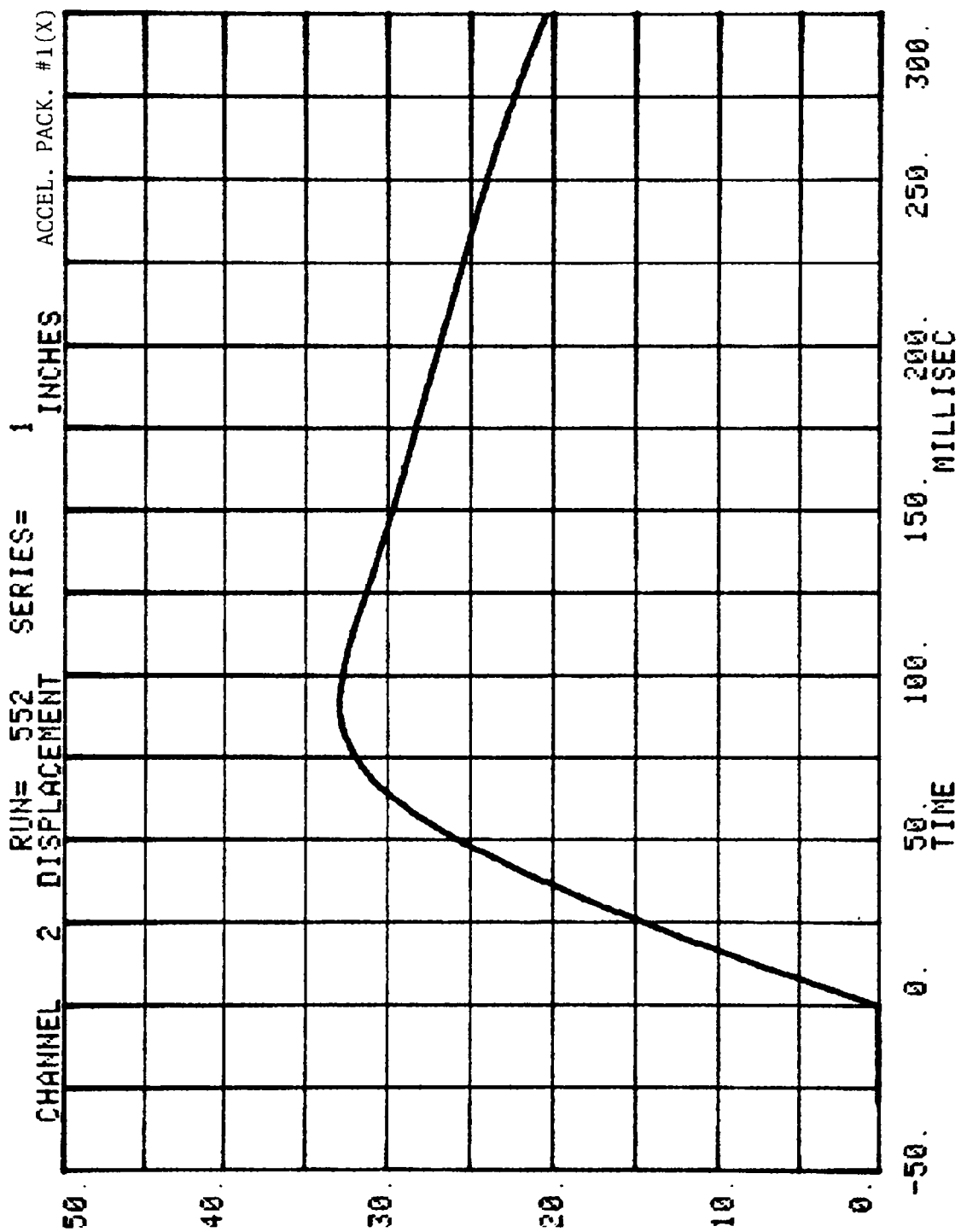
FILTER CHANNEL CLASS

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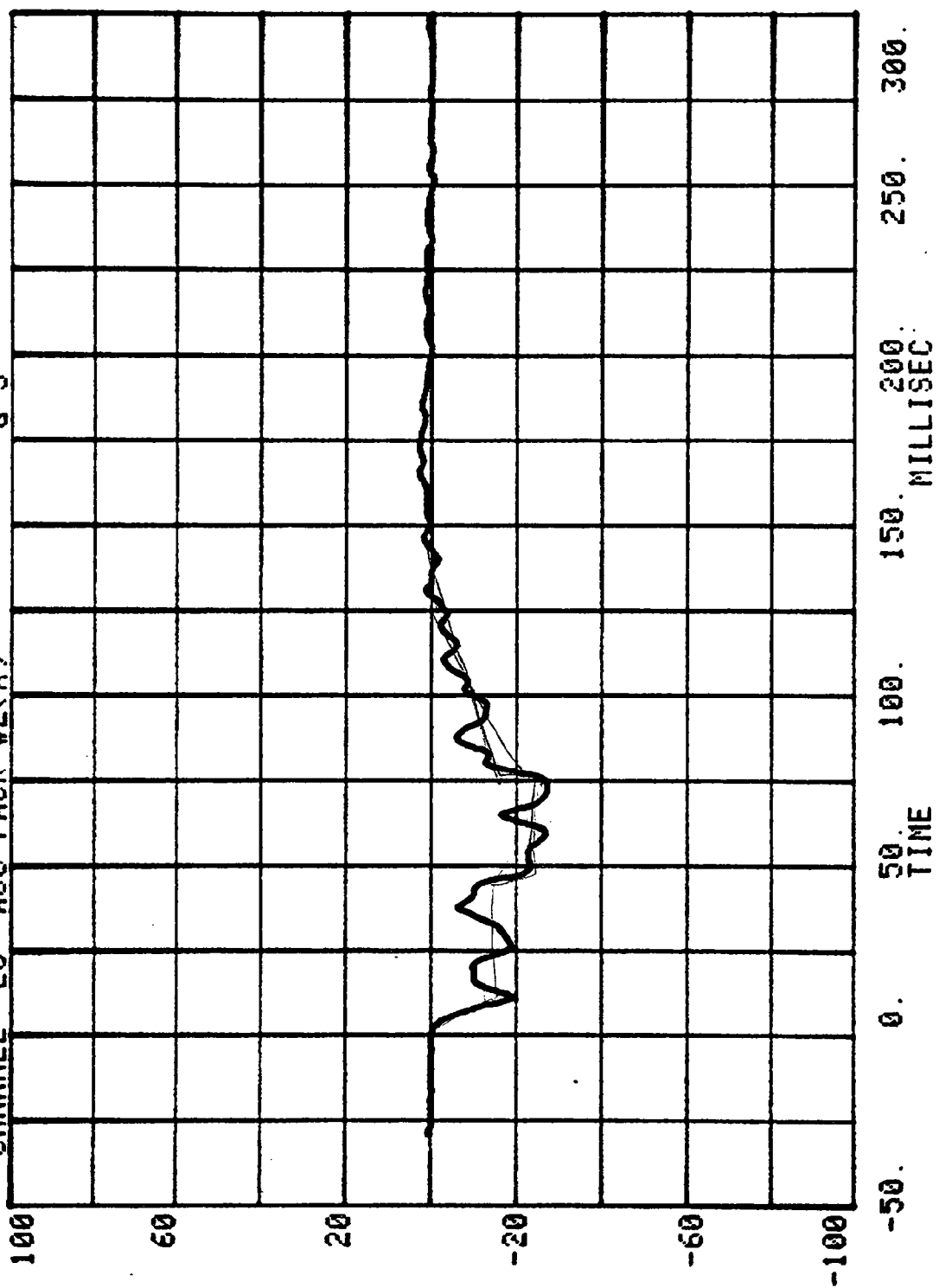
CHANNEL 27 ACC PACK #1(X) RUN= 552 SERIES= 1 G'S

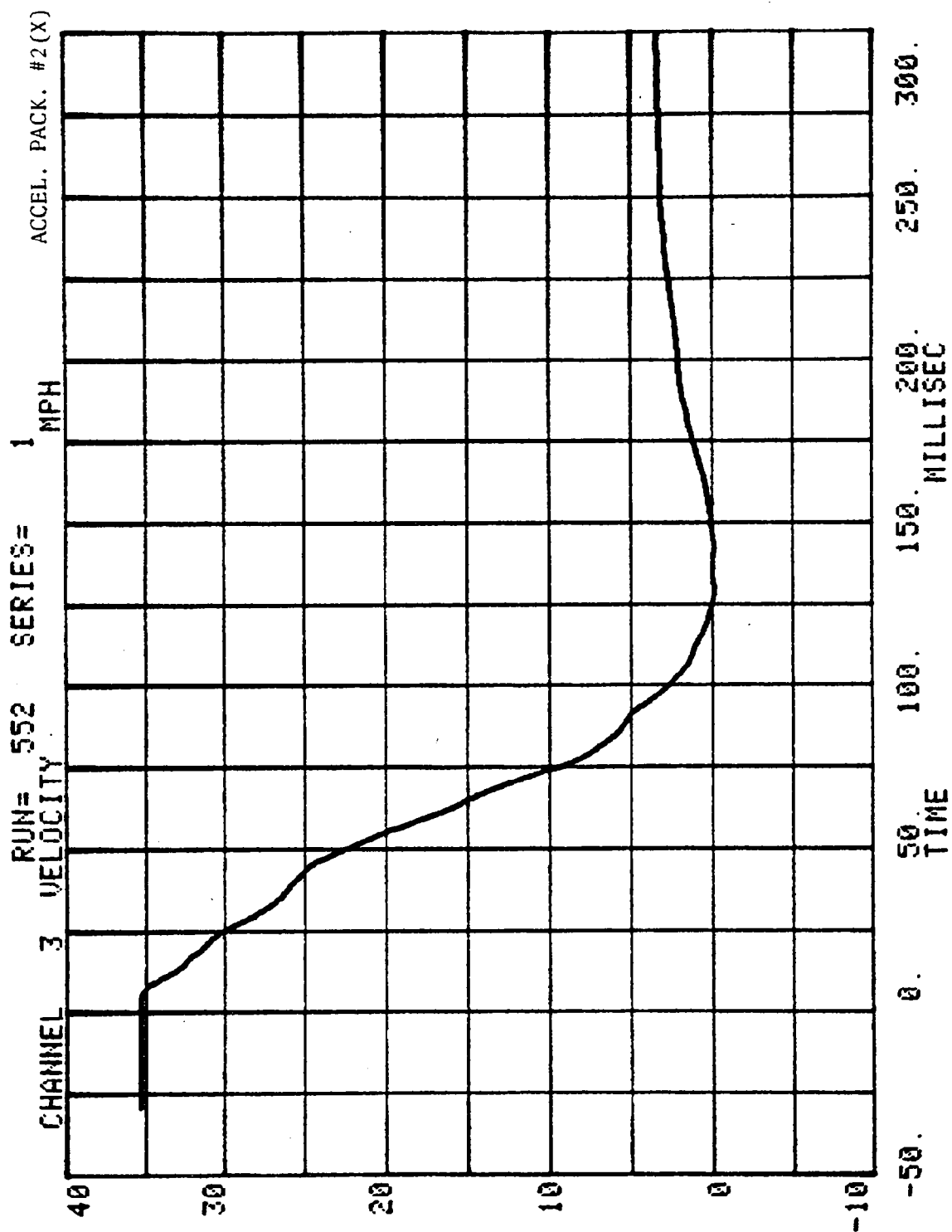


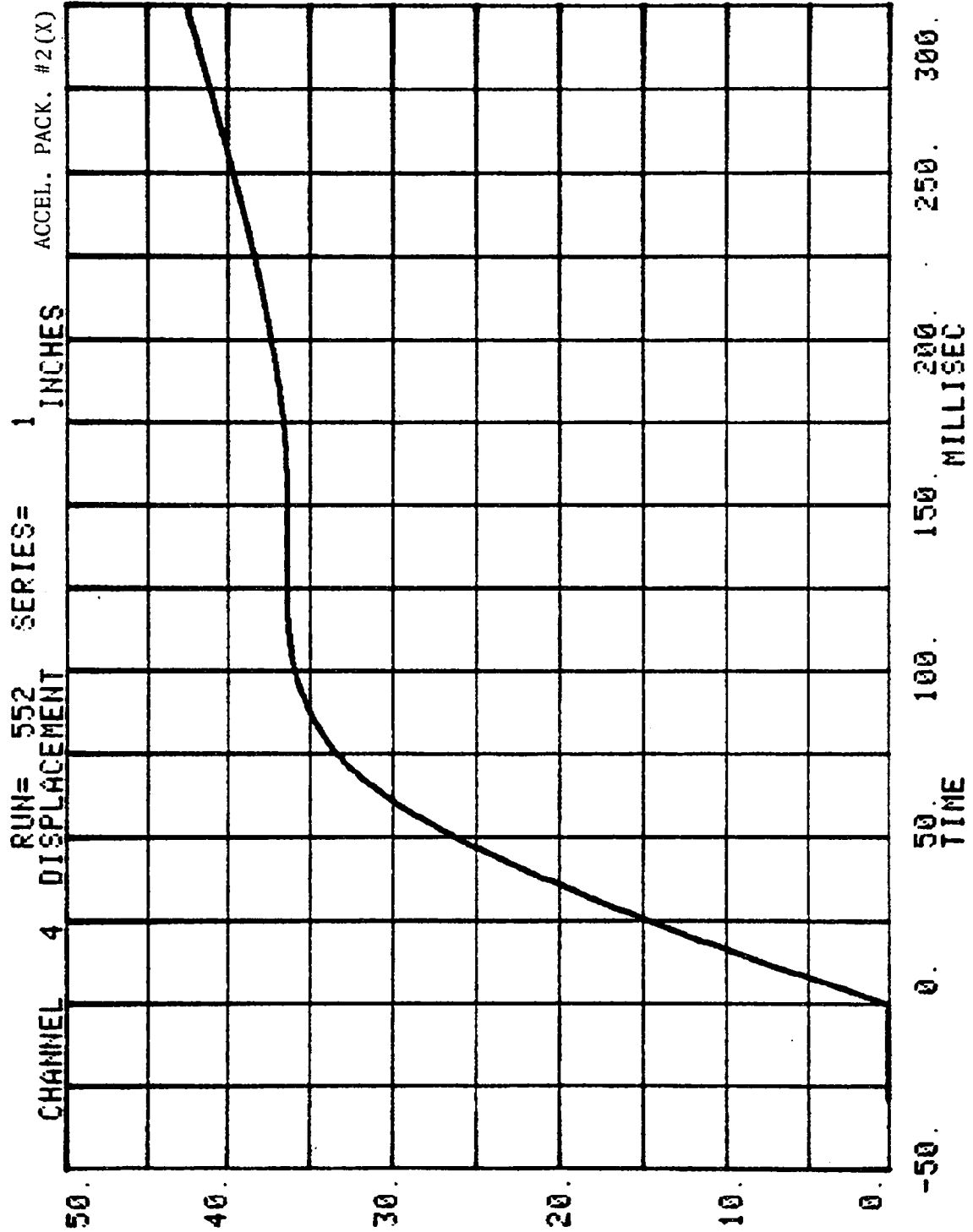


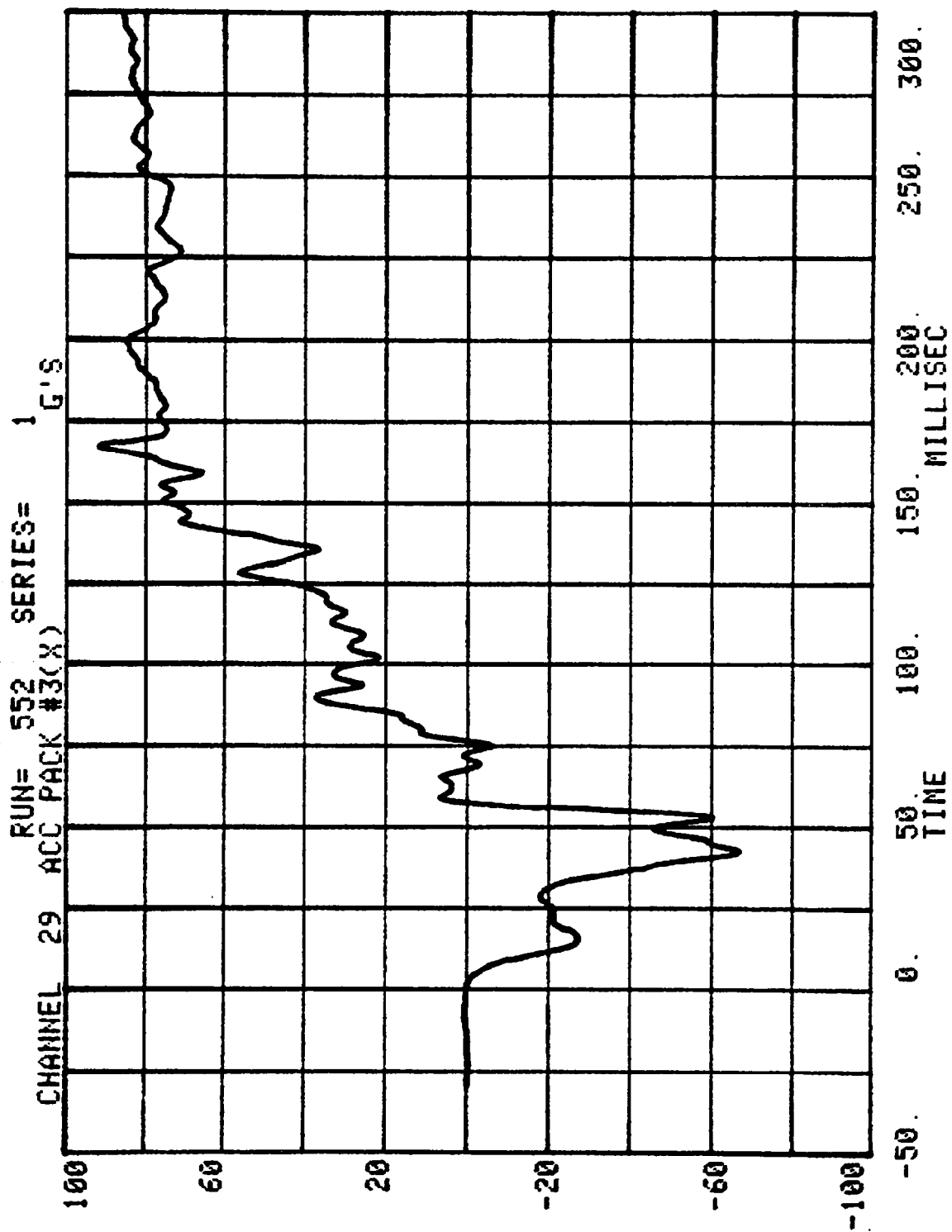


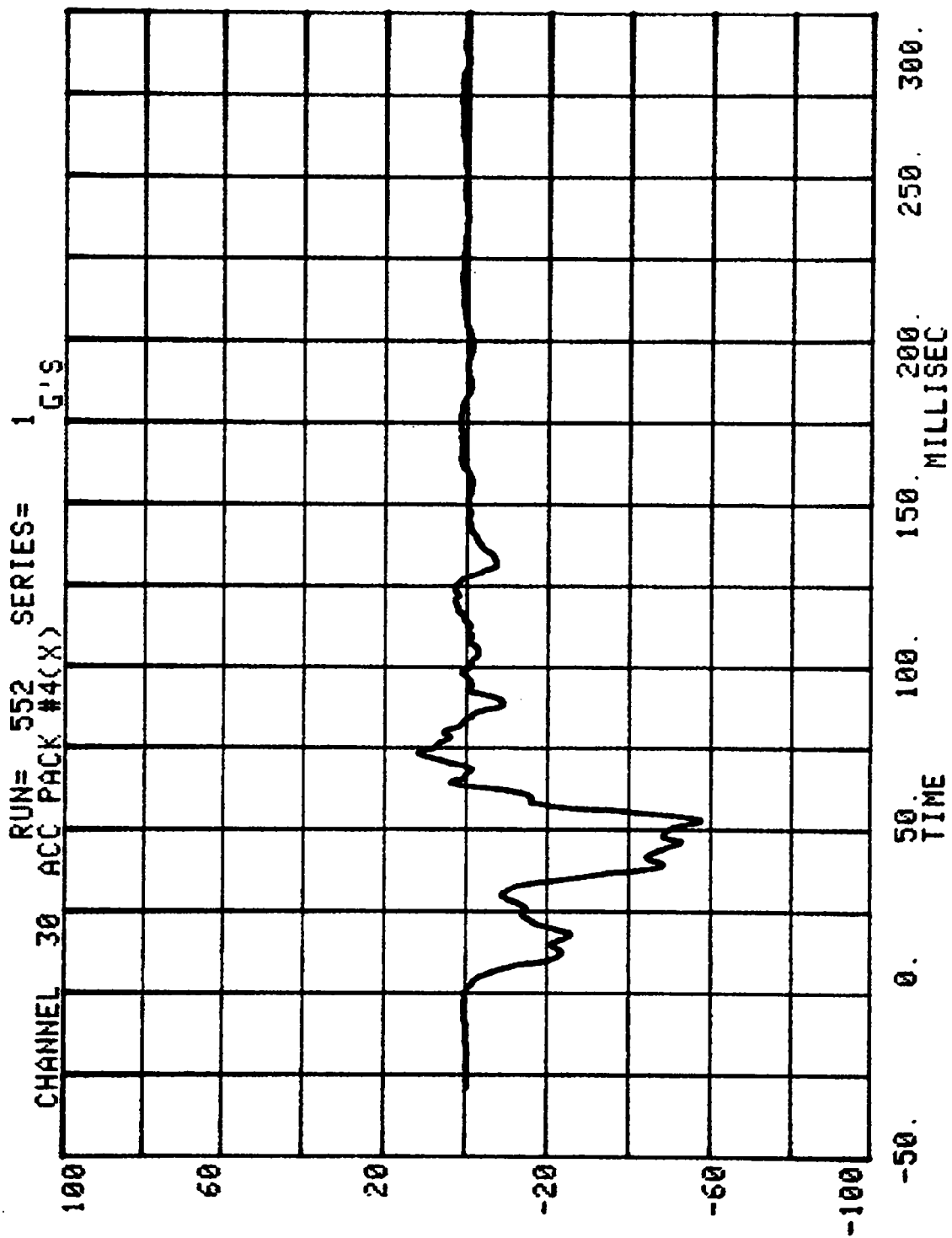
CHANNEL 28 ACC PACK #2(X) RUN= 552 SERIES= 1 G'S

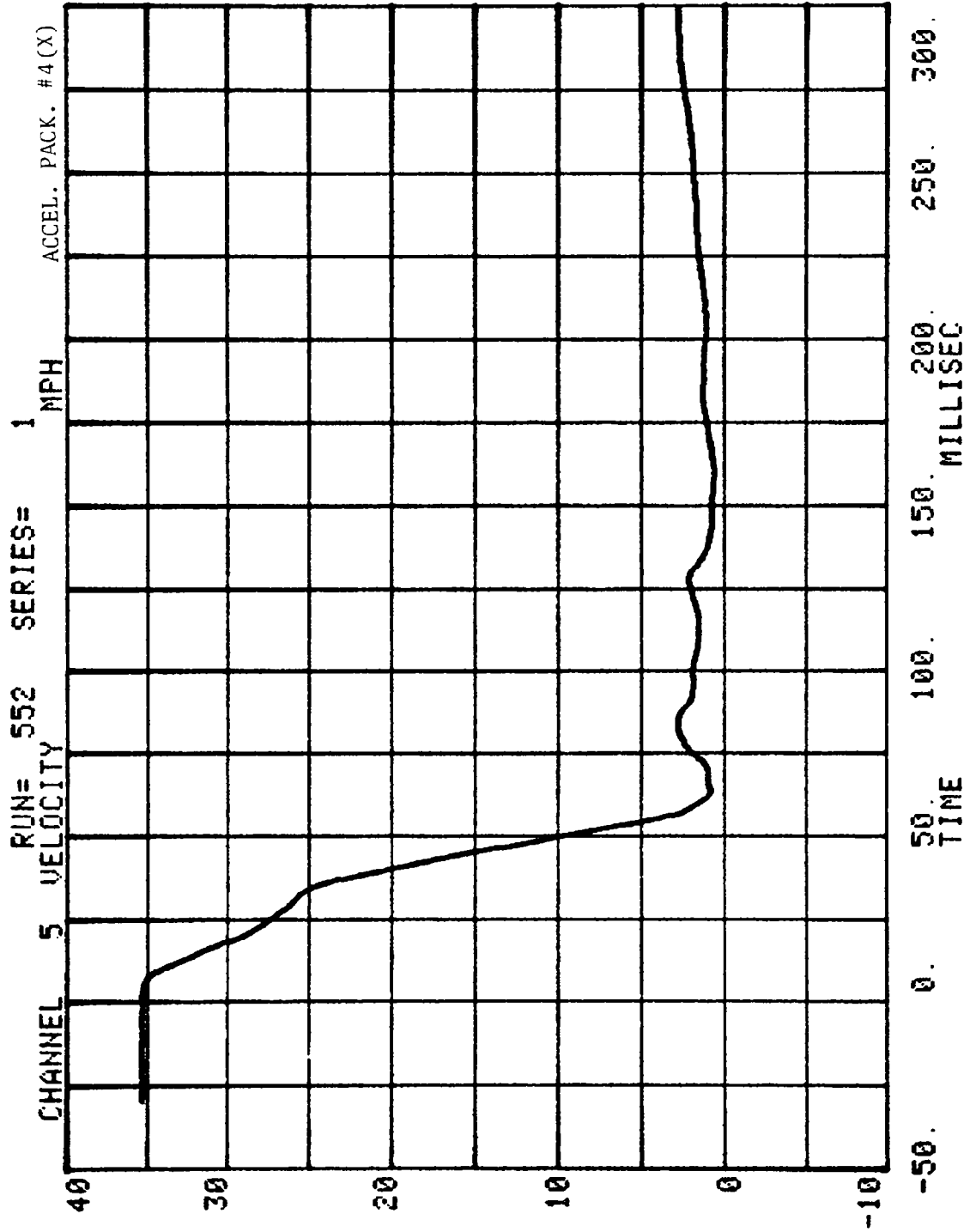


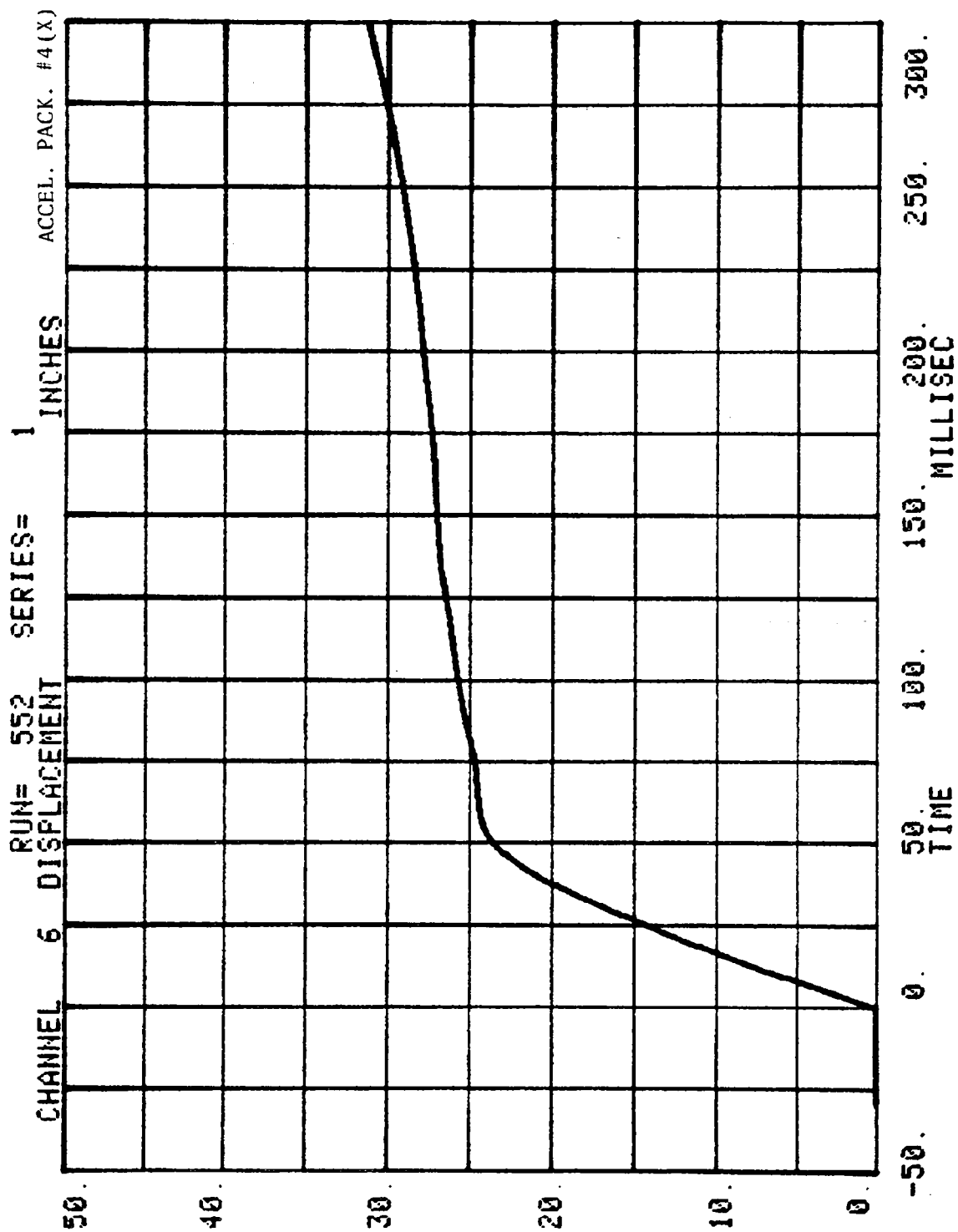












Test No. 447-2-552

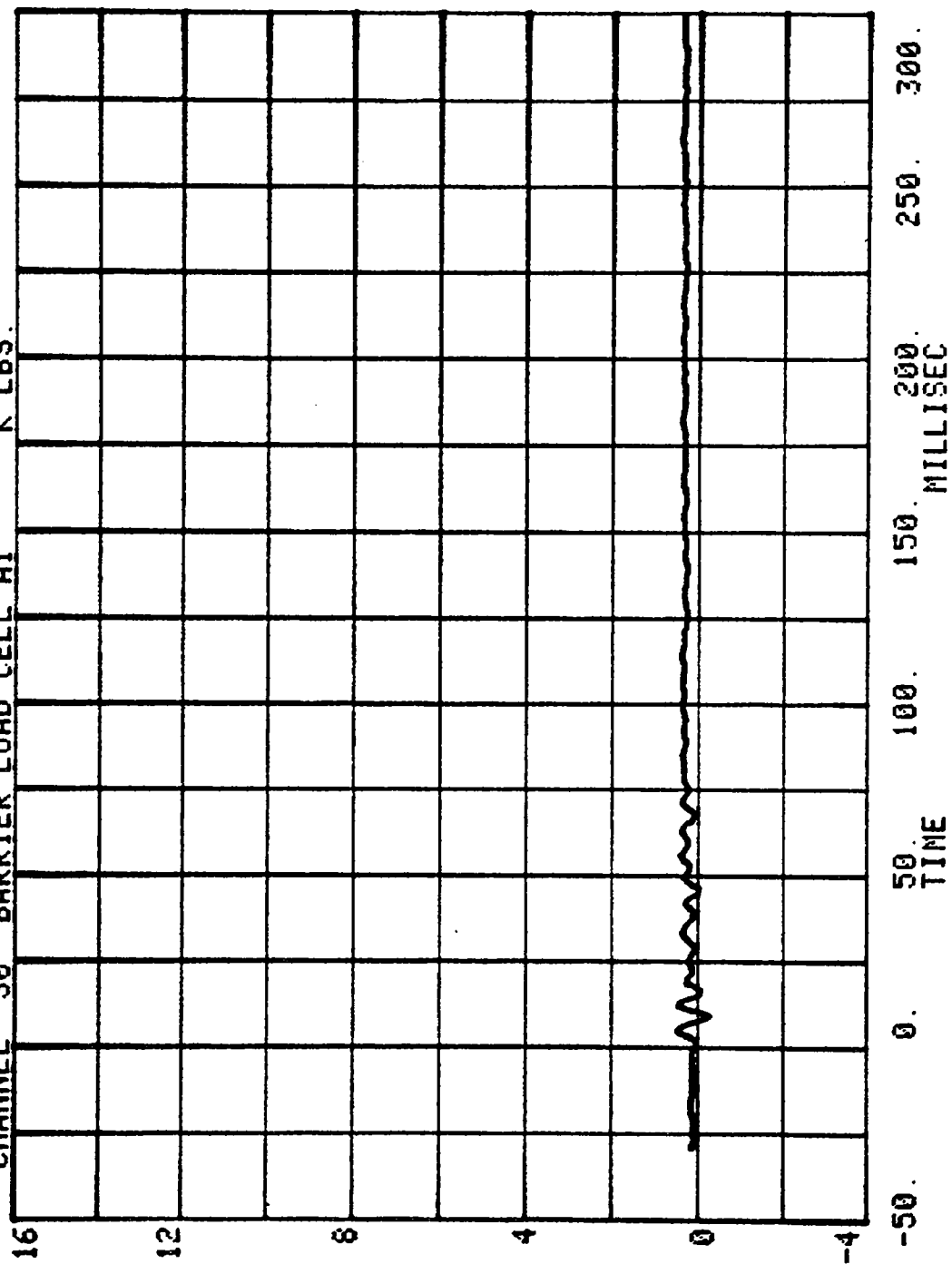
1982 Ford LTD

LOAD CELL BARRIER DATA

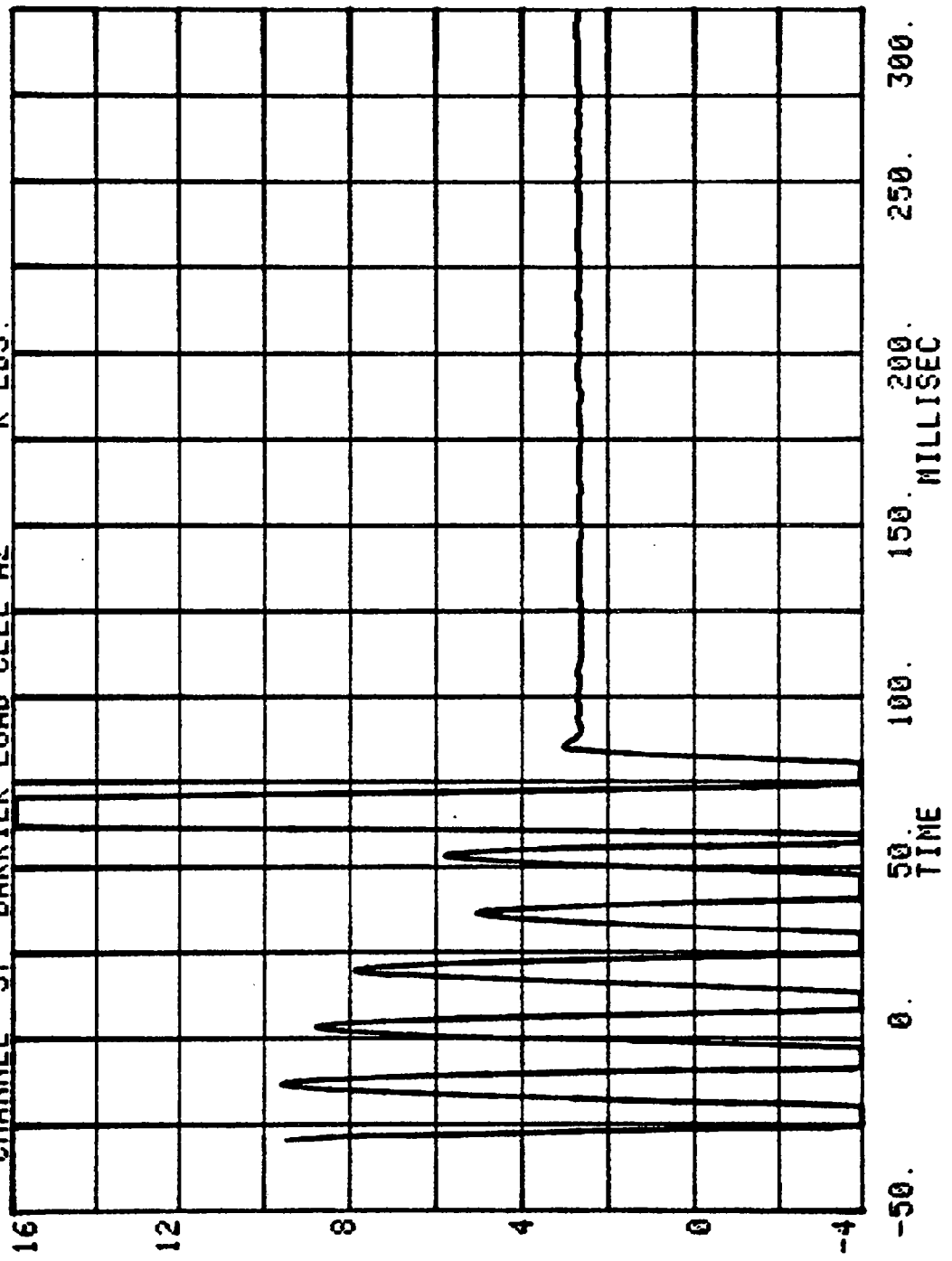
FILTER CHANNEL CLASS

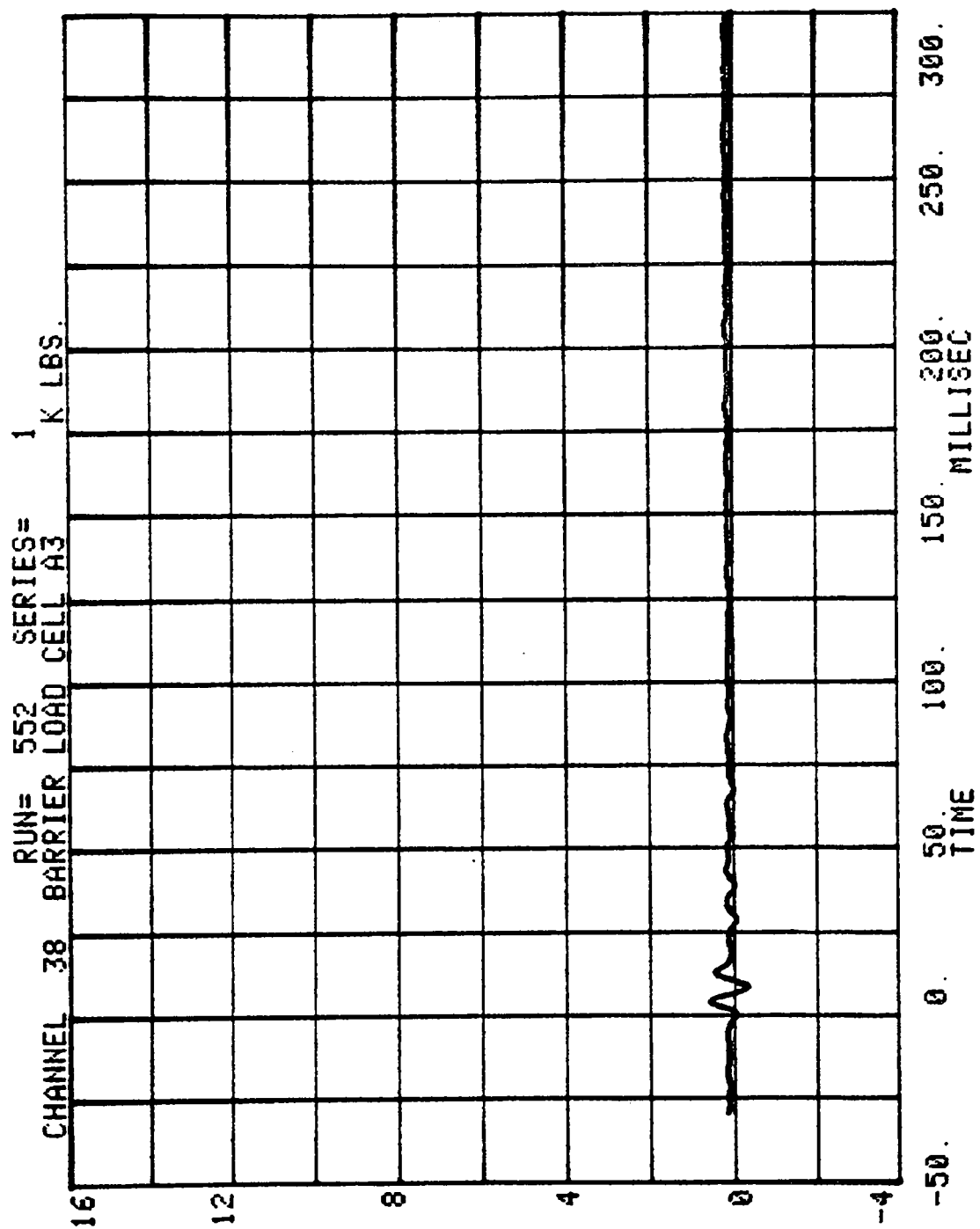
60

CHANNEL 36 RUN= 552 SERIES= 1 K LBS.
BARRIER LOAD CELL A1

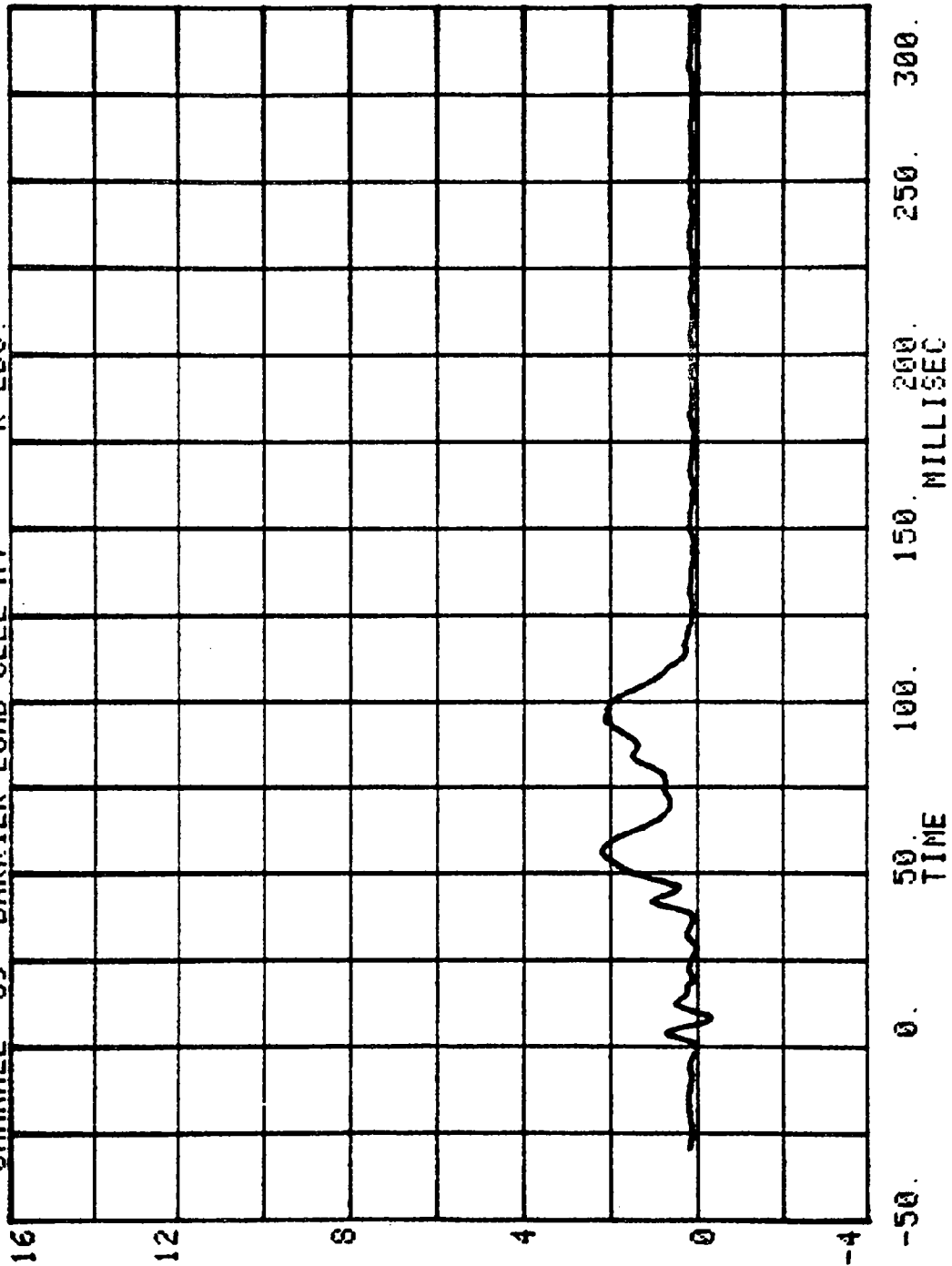


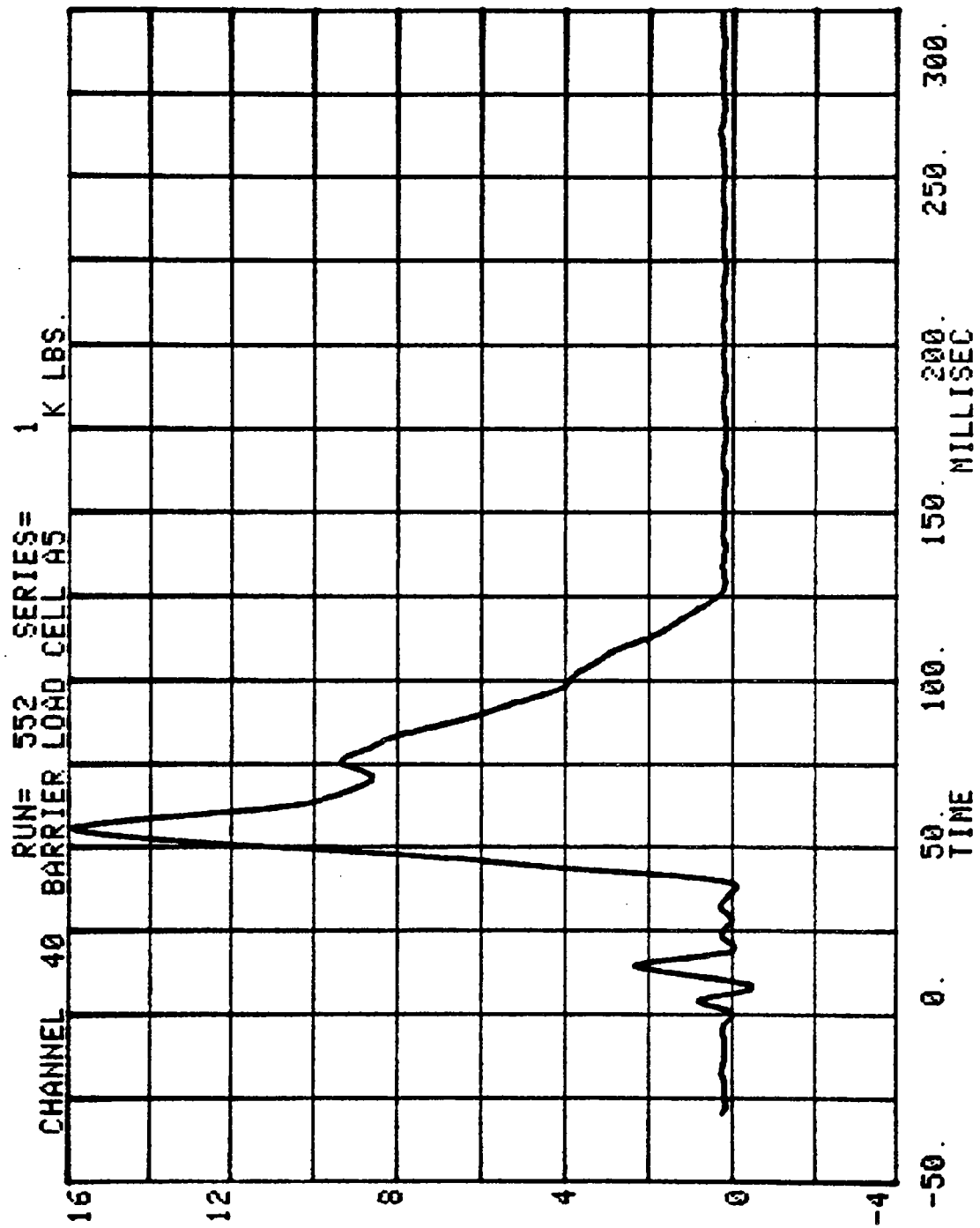
CHANNEL 37 BARRIER LOAD CELL A2 RUN= 552 SERIES= 1 K LBS.



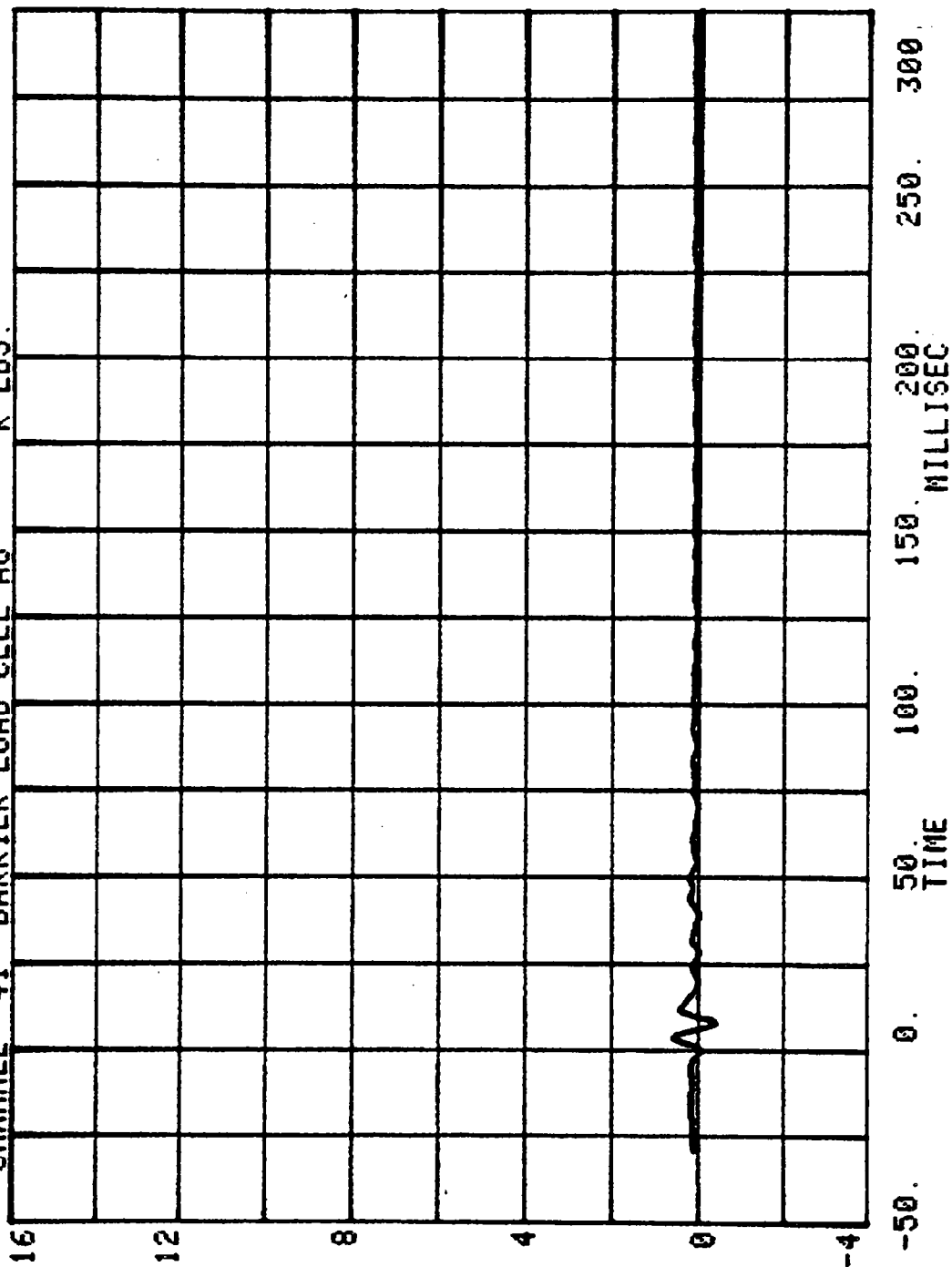


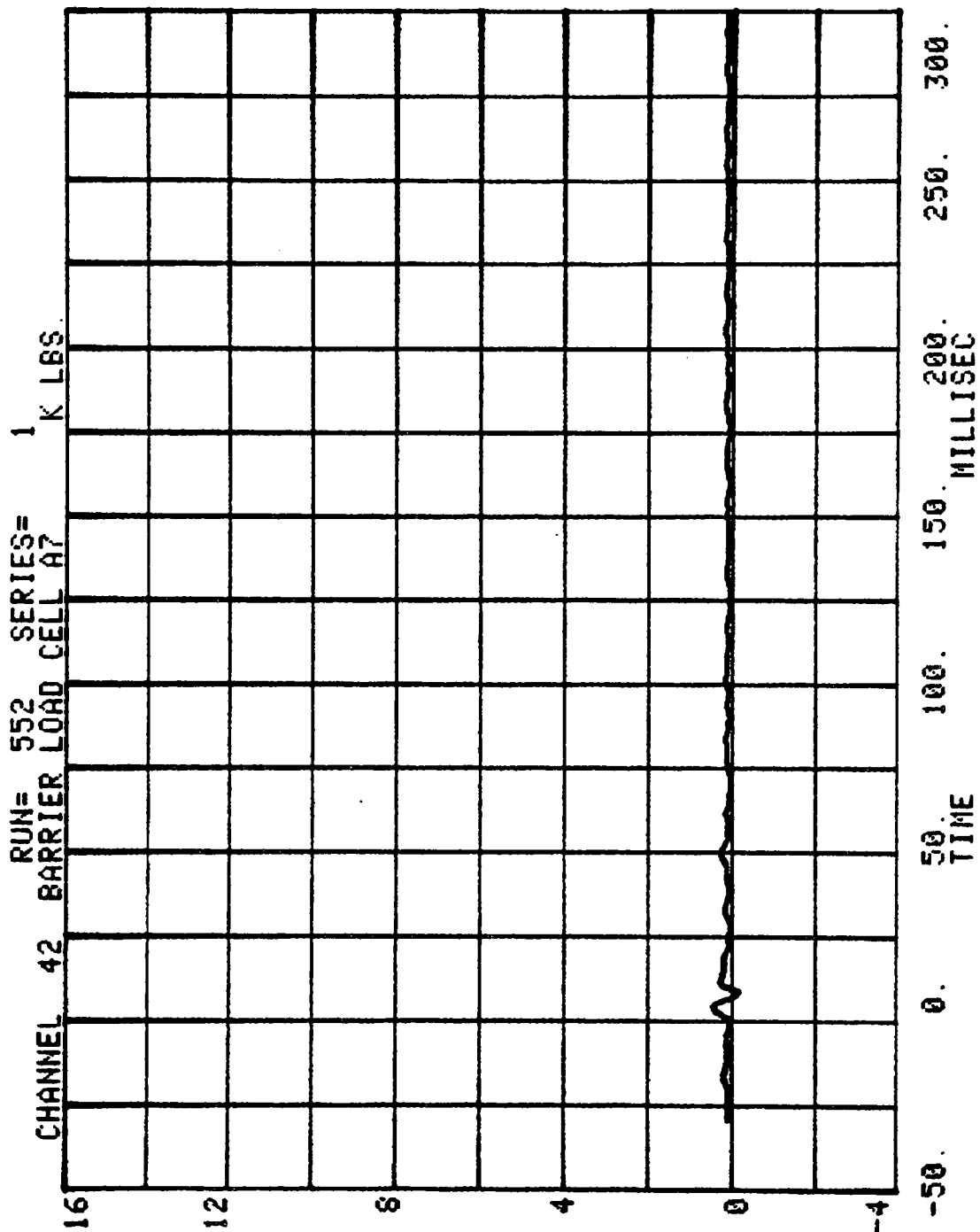
CHANNEL 39 BARRIER LOAD CELL A4 RUN= 552 SERIES= 1 K LBS.

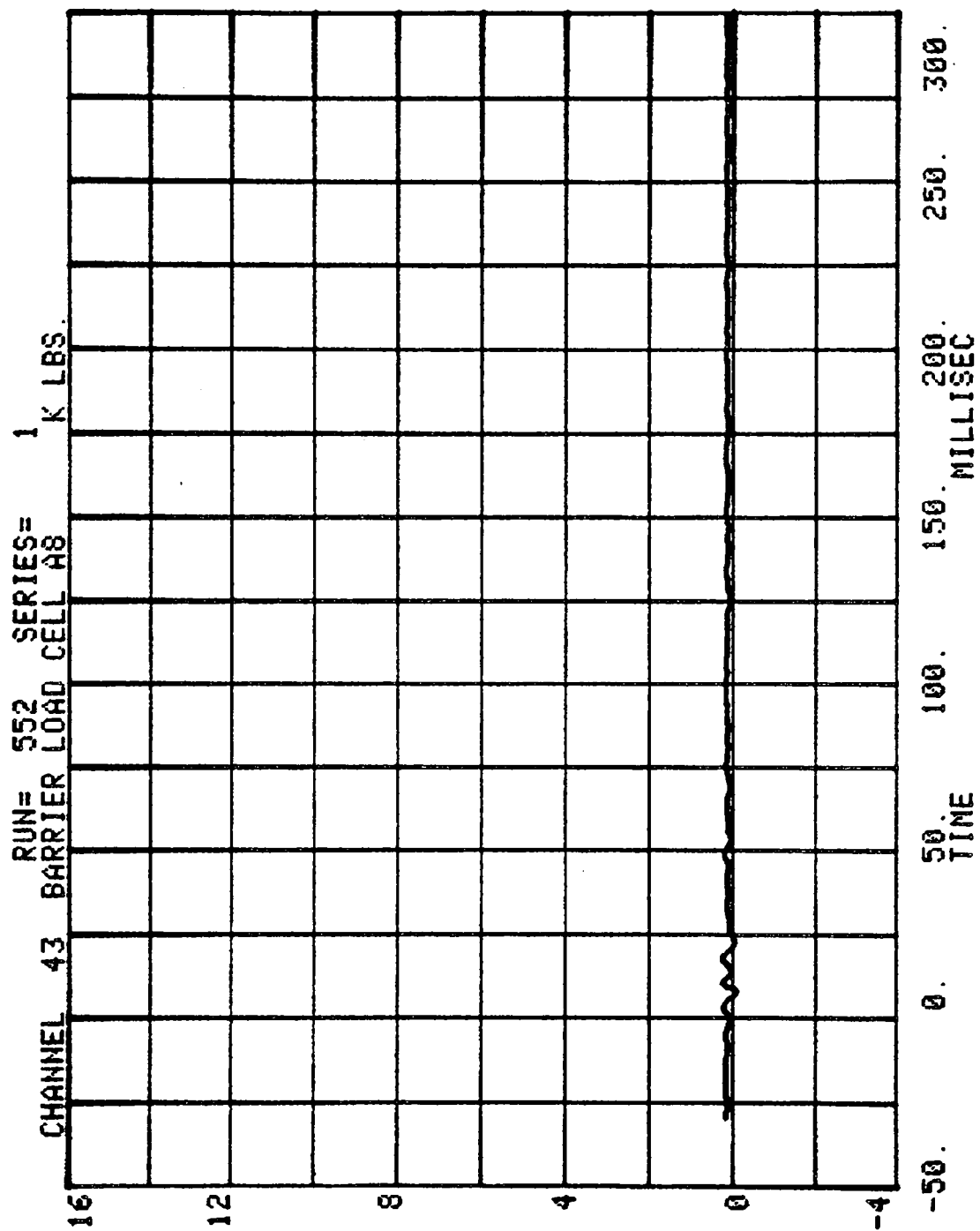


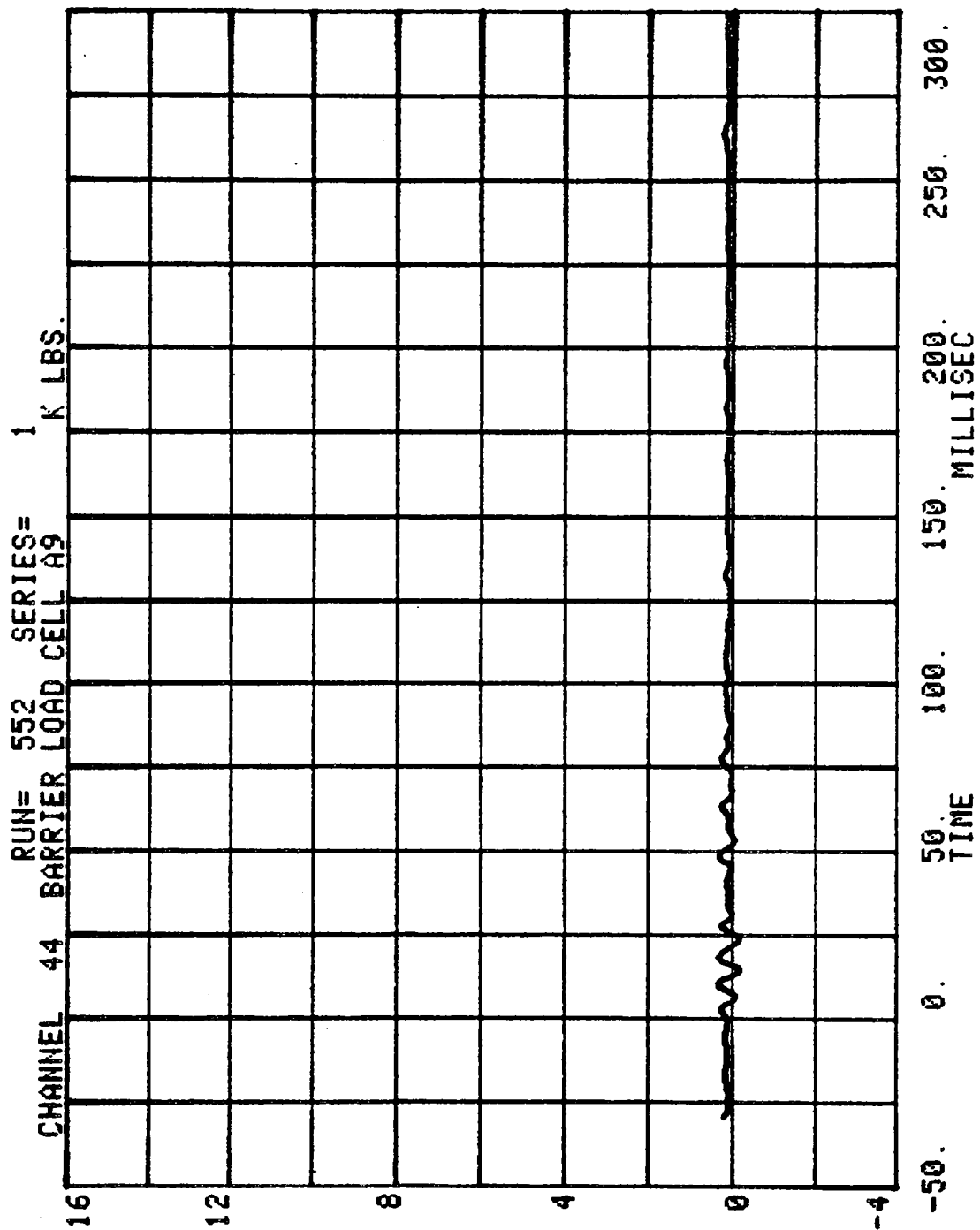


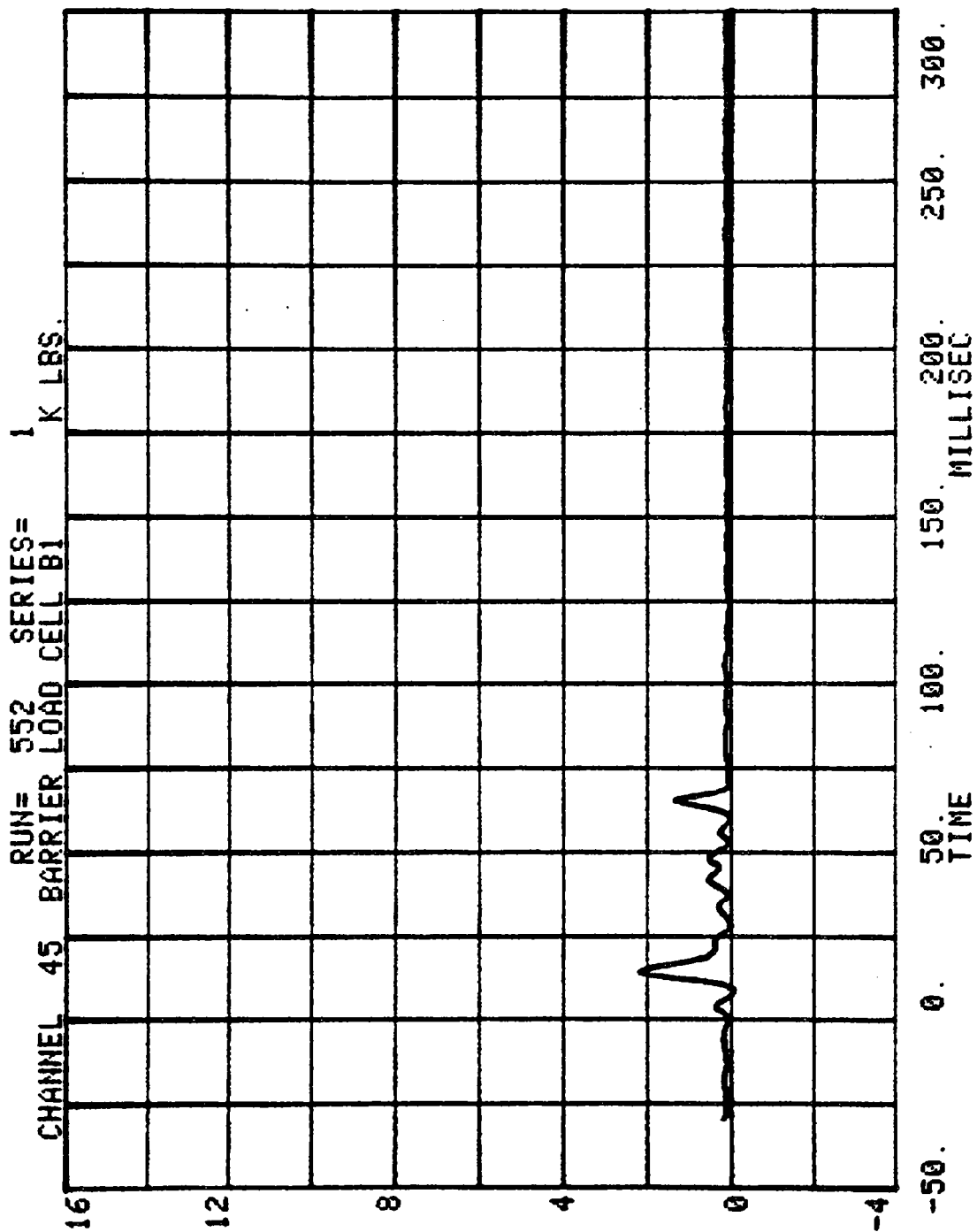
CHANNEL 41 BARRIER LOAD CELL A6 RUN= 552 SERIES= 1 K LBS.

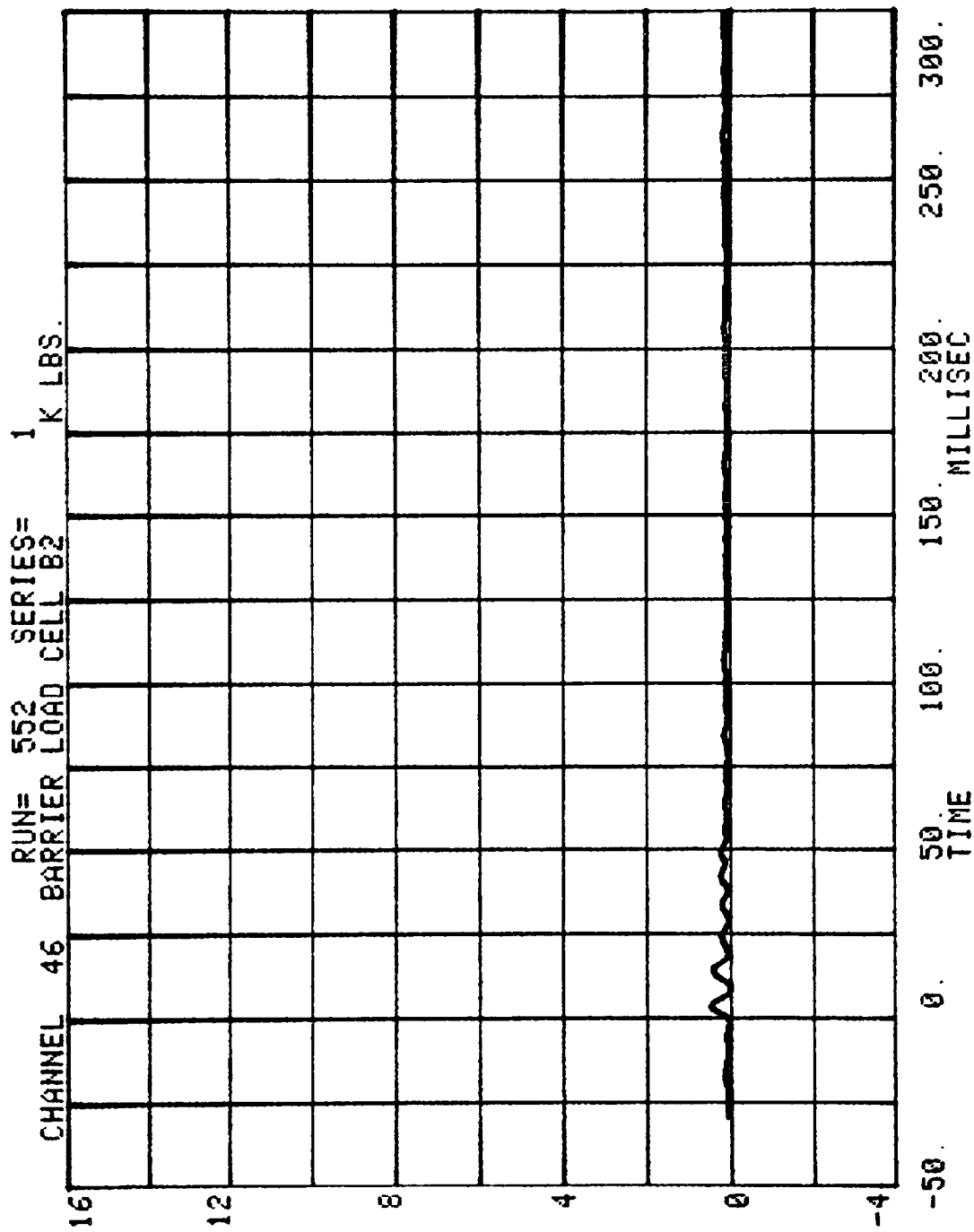


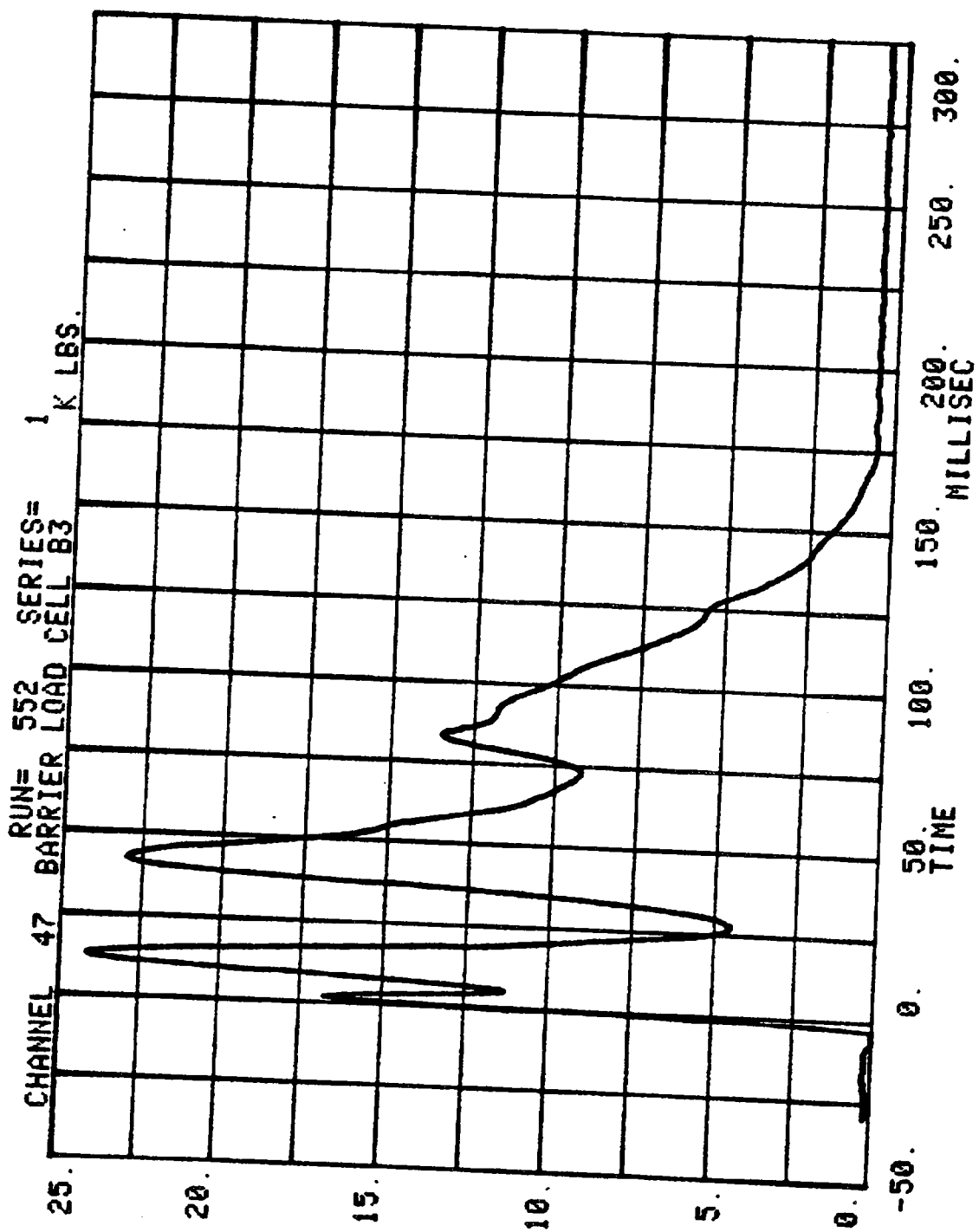




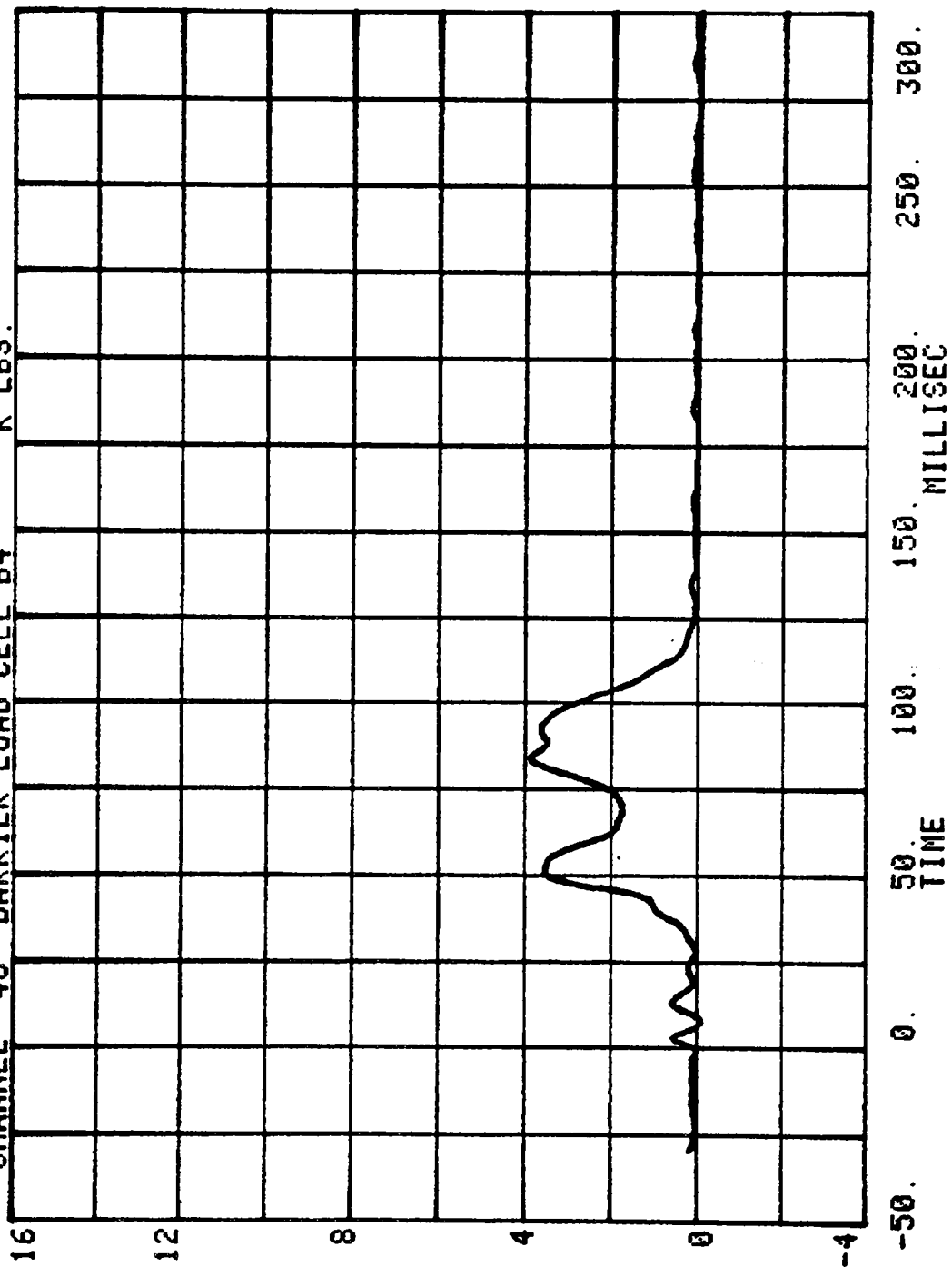


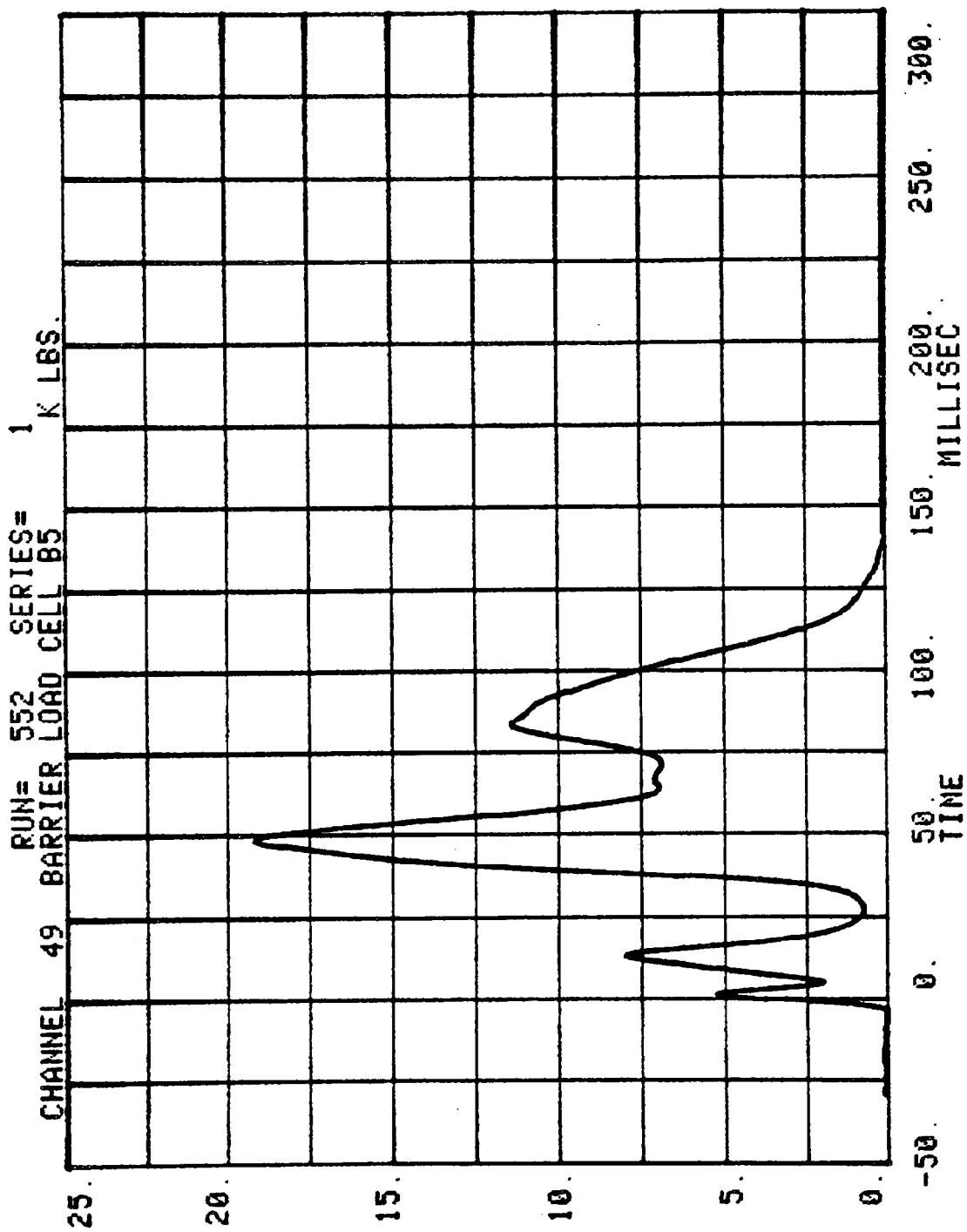


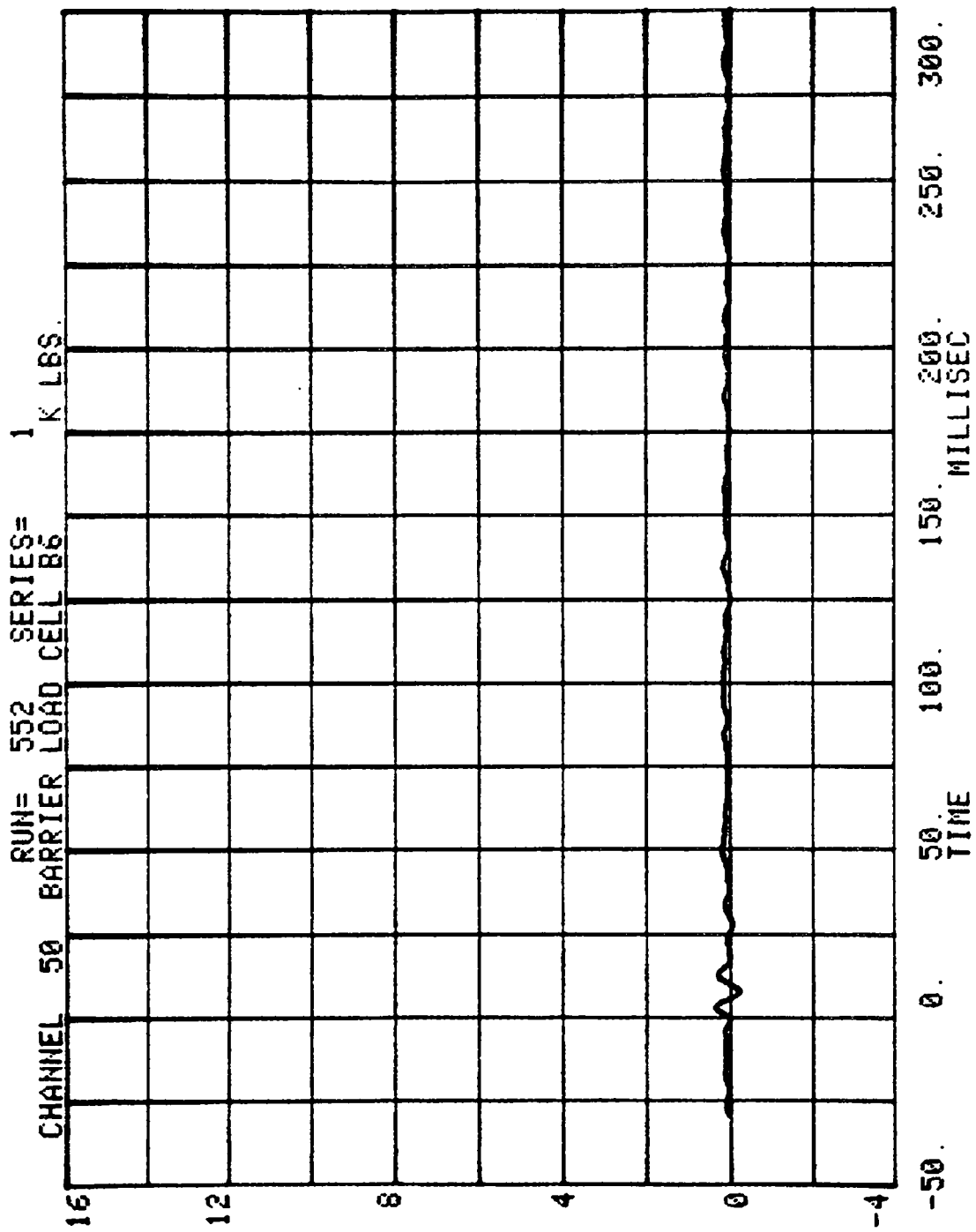


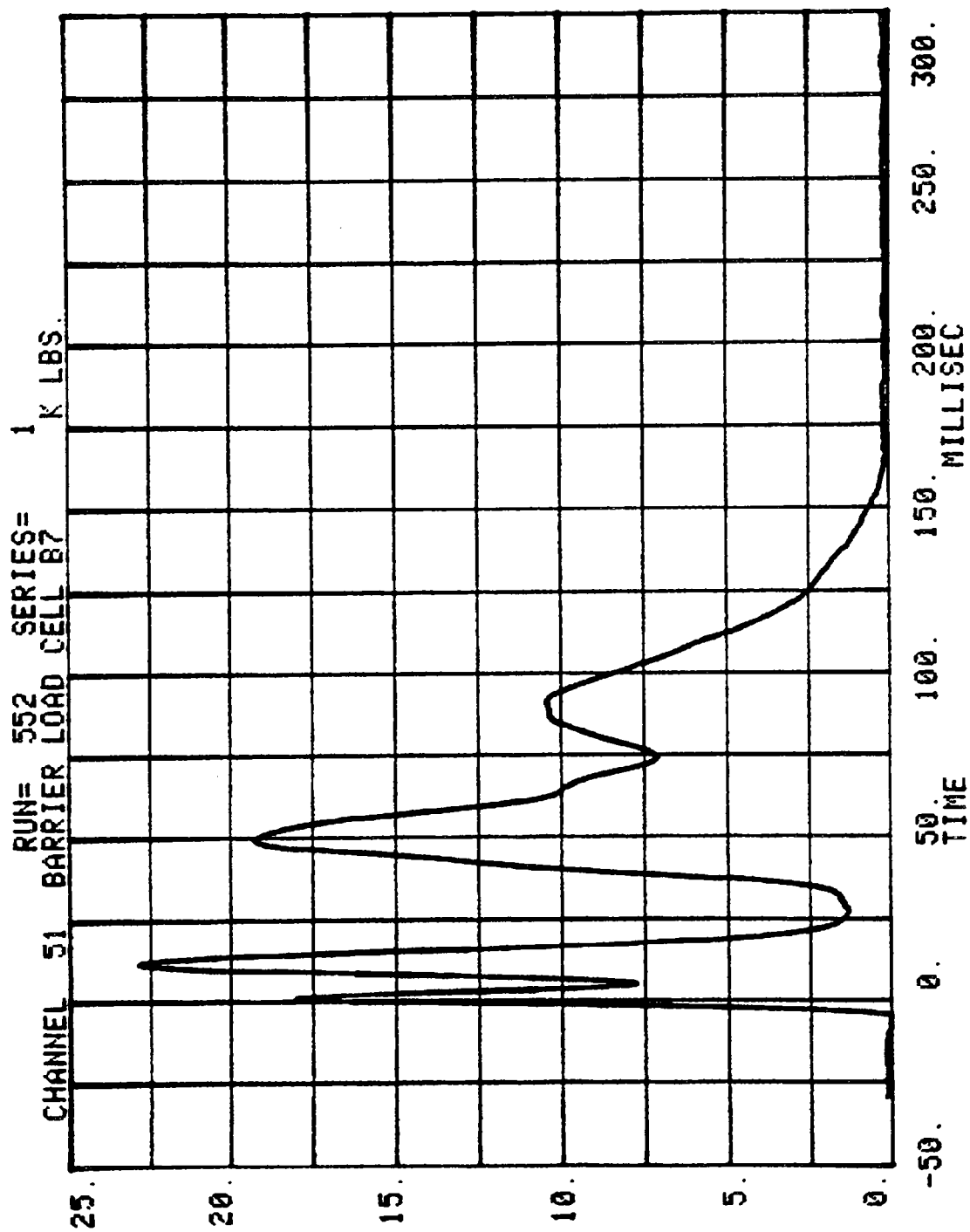


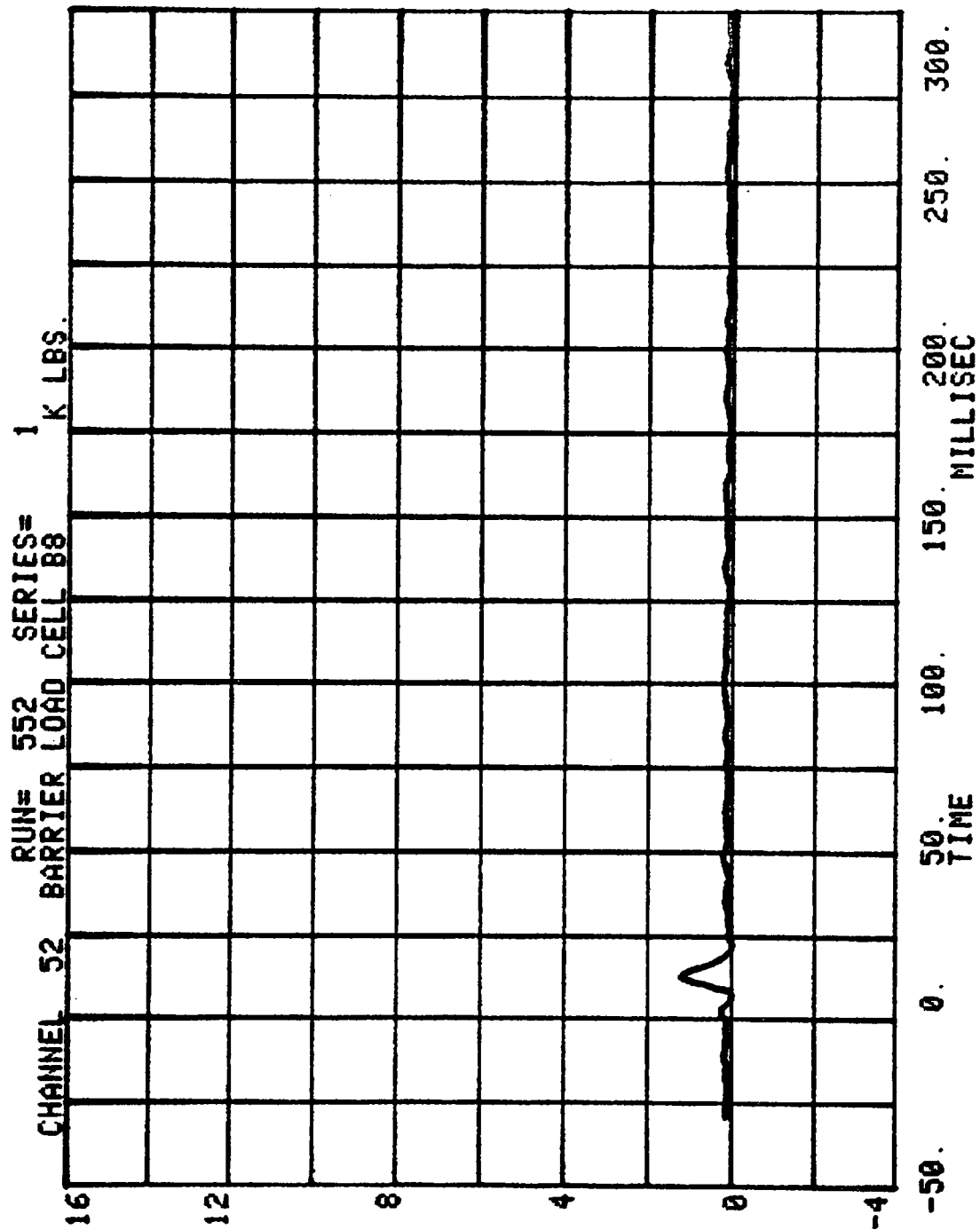
CHANNEL 48 BARRIER LOAD CELL B4 RUN= 552 SERIES= 1 K LBS.

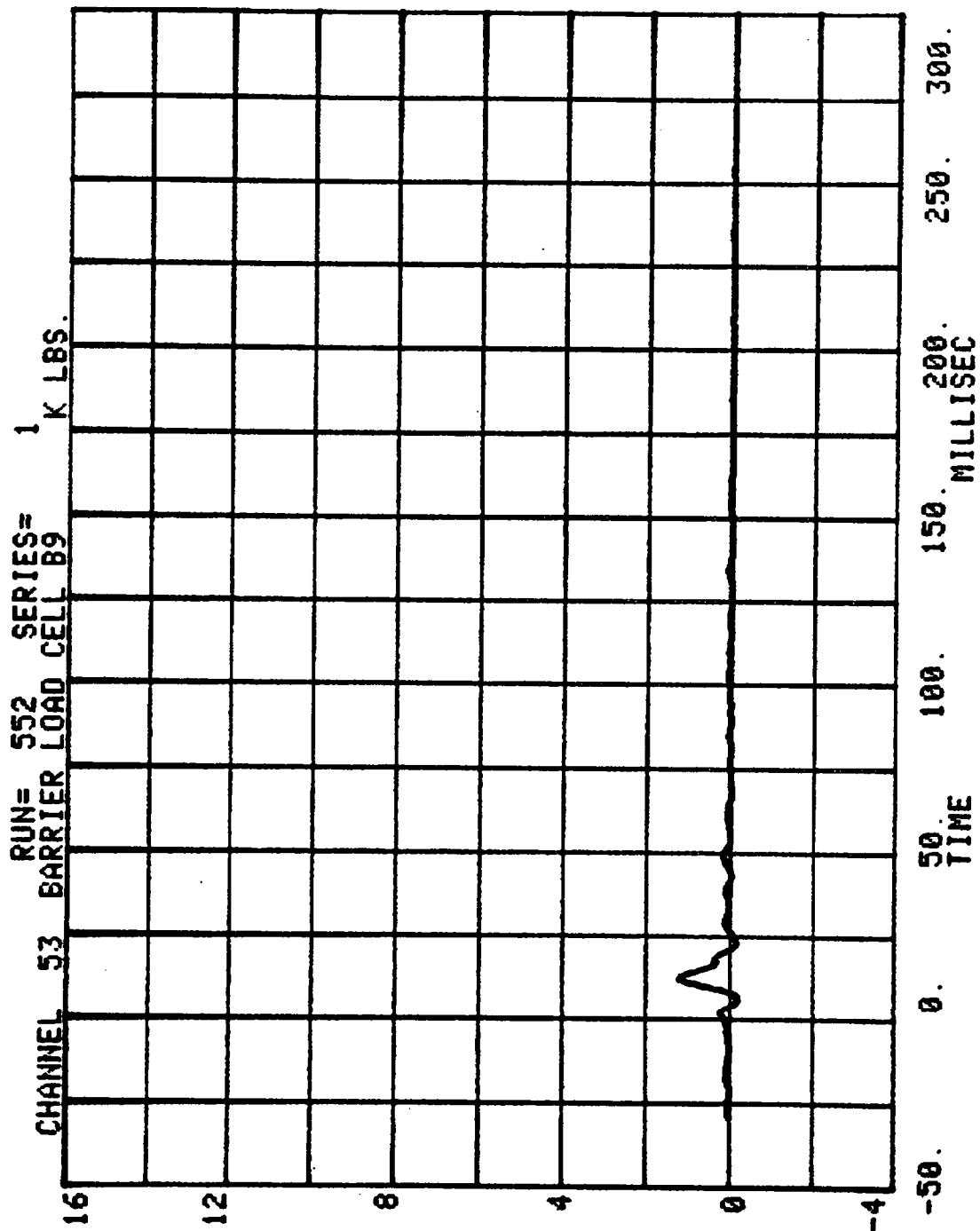




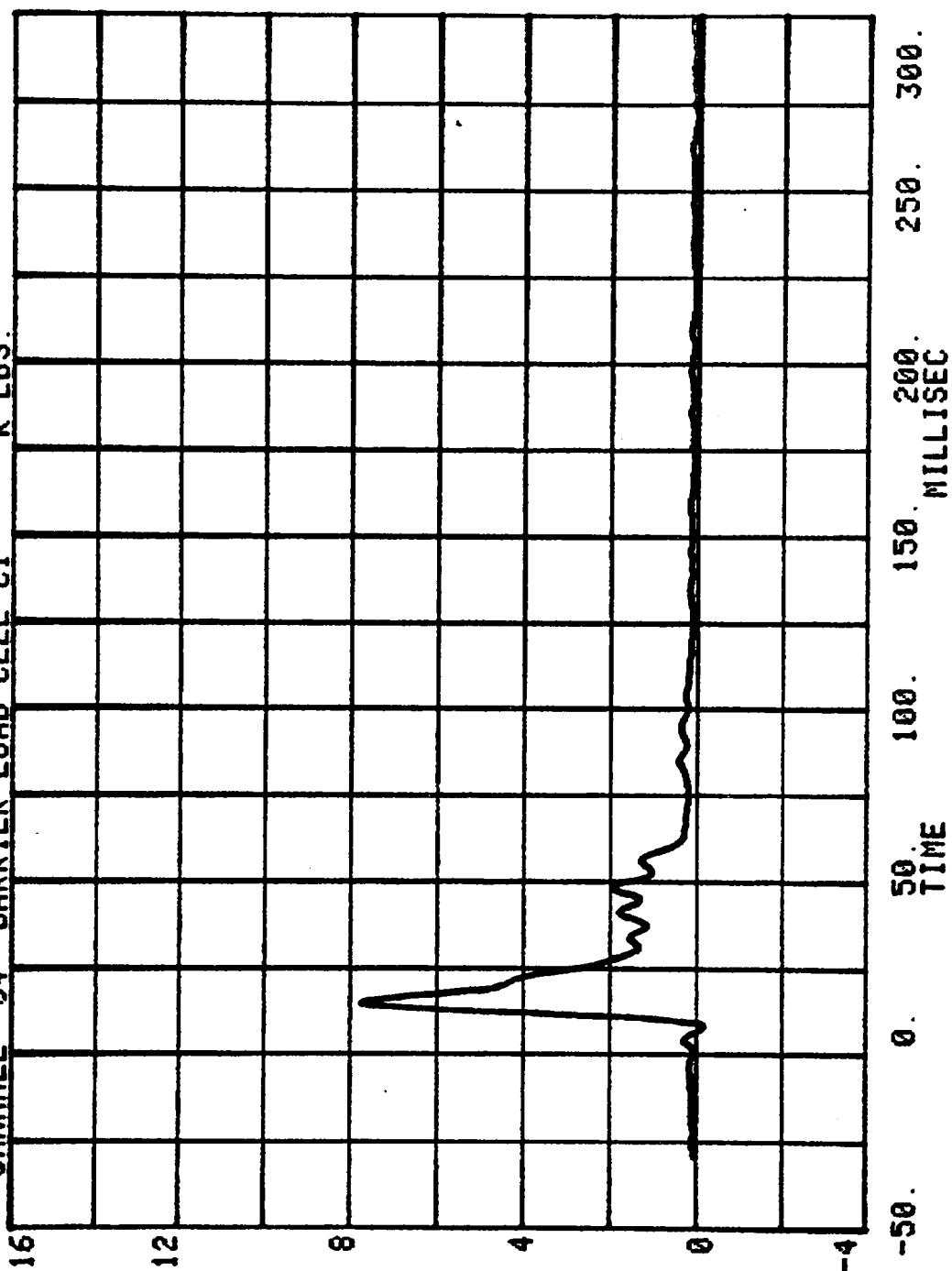




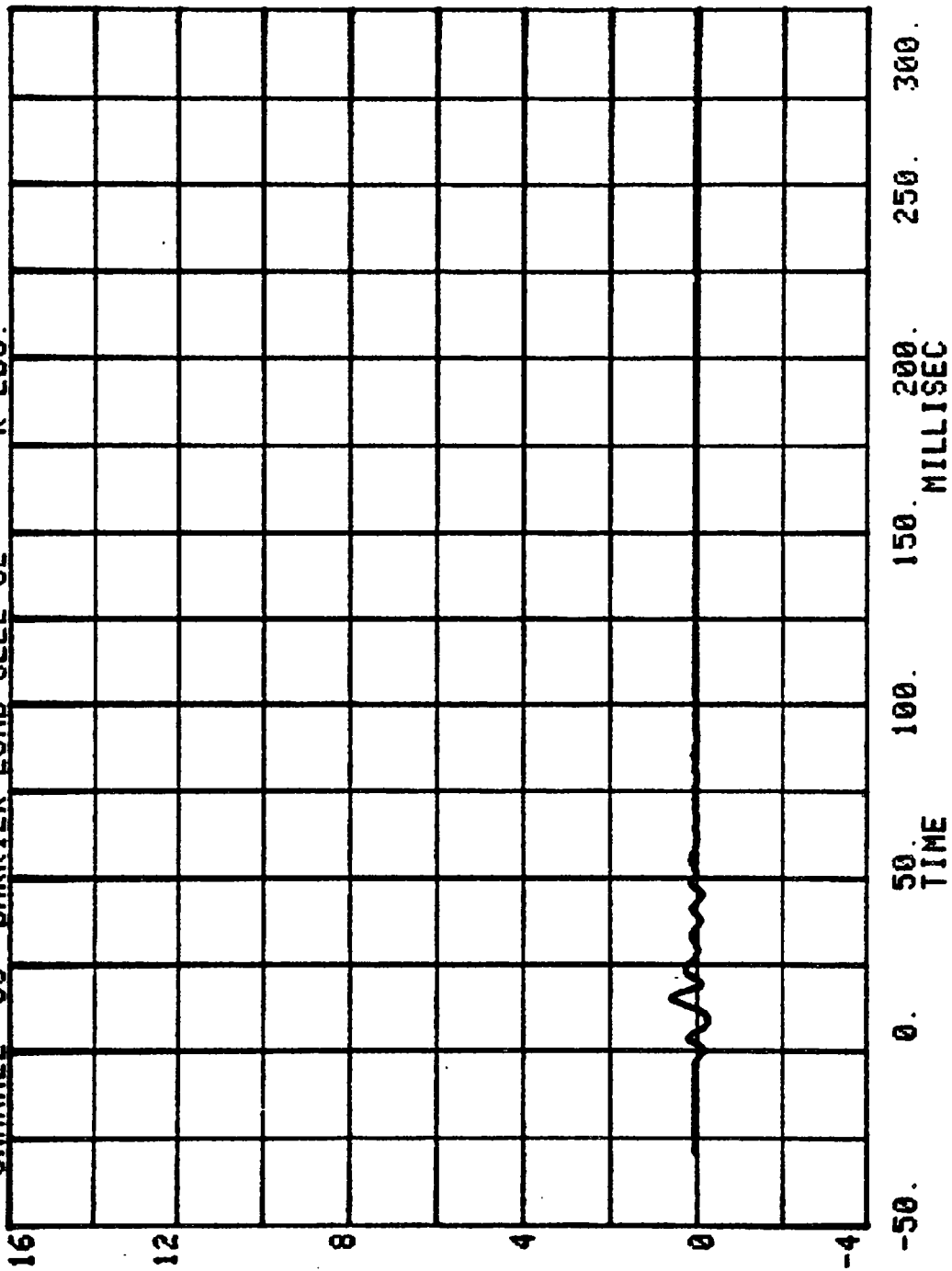


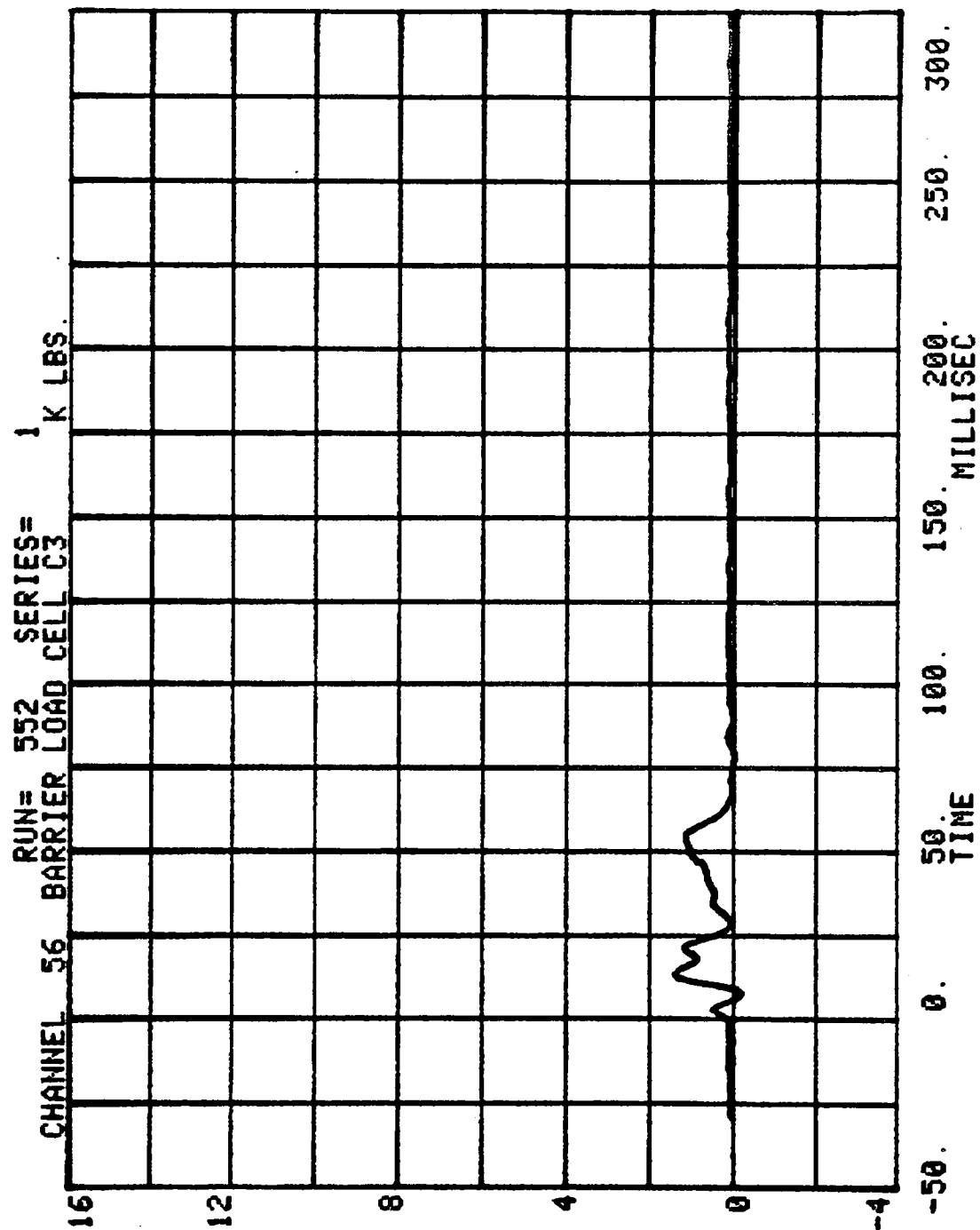


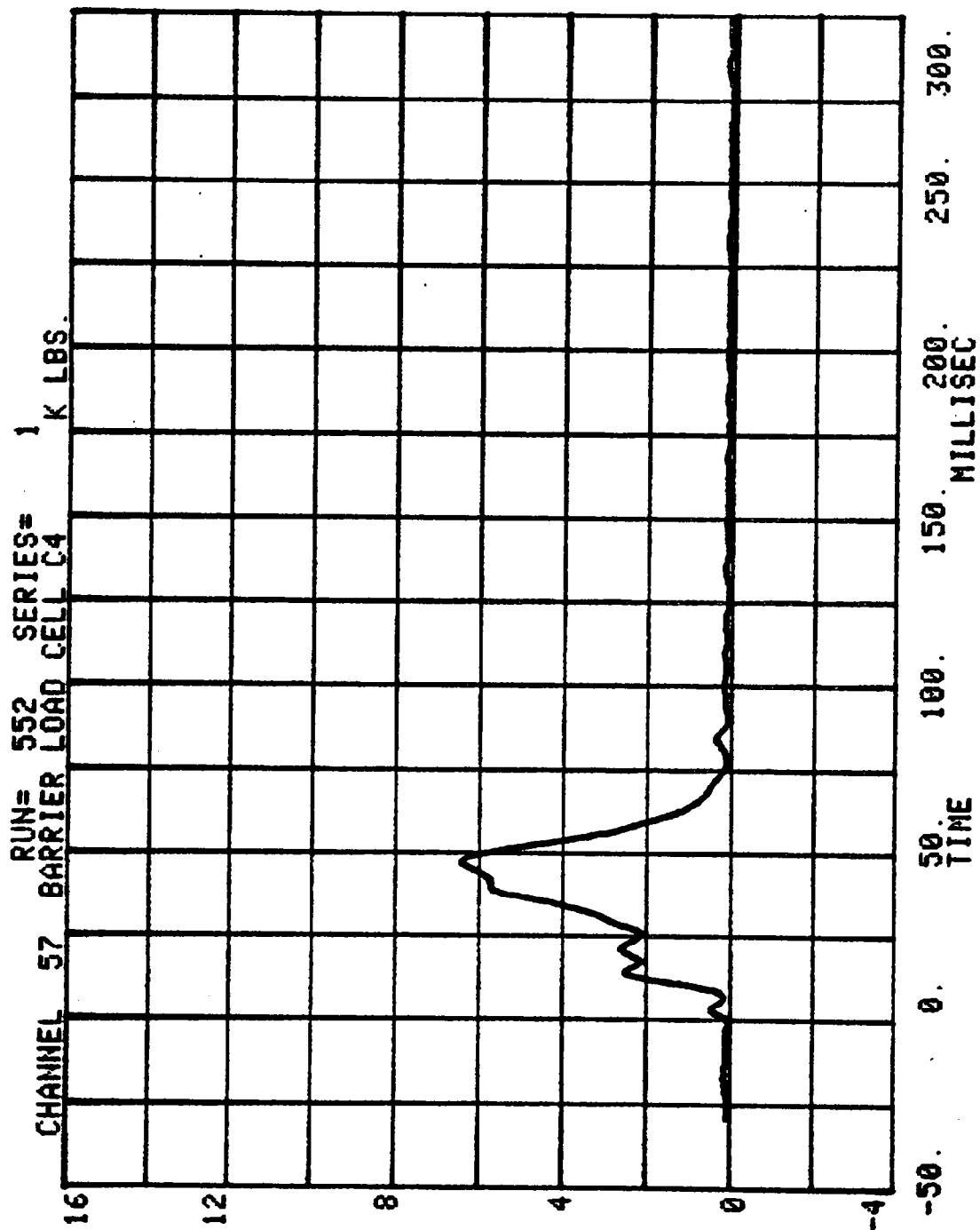
CHANNEL 54 BARRIER LOAD CELL C1
RUN= 552 SERIES= 1
K LBS.

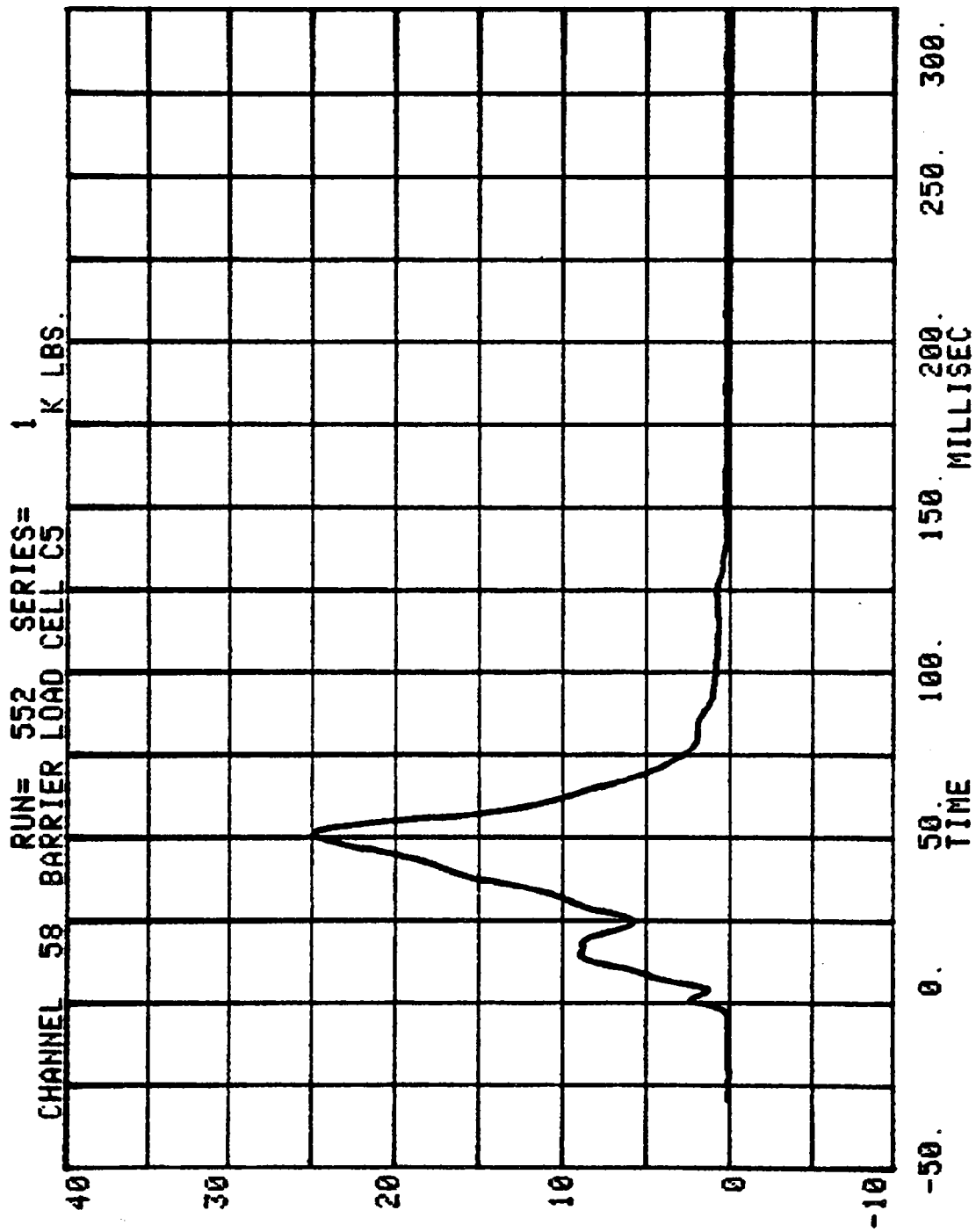


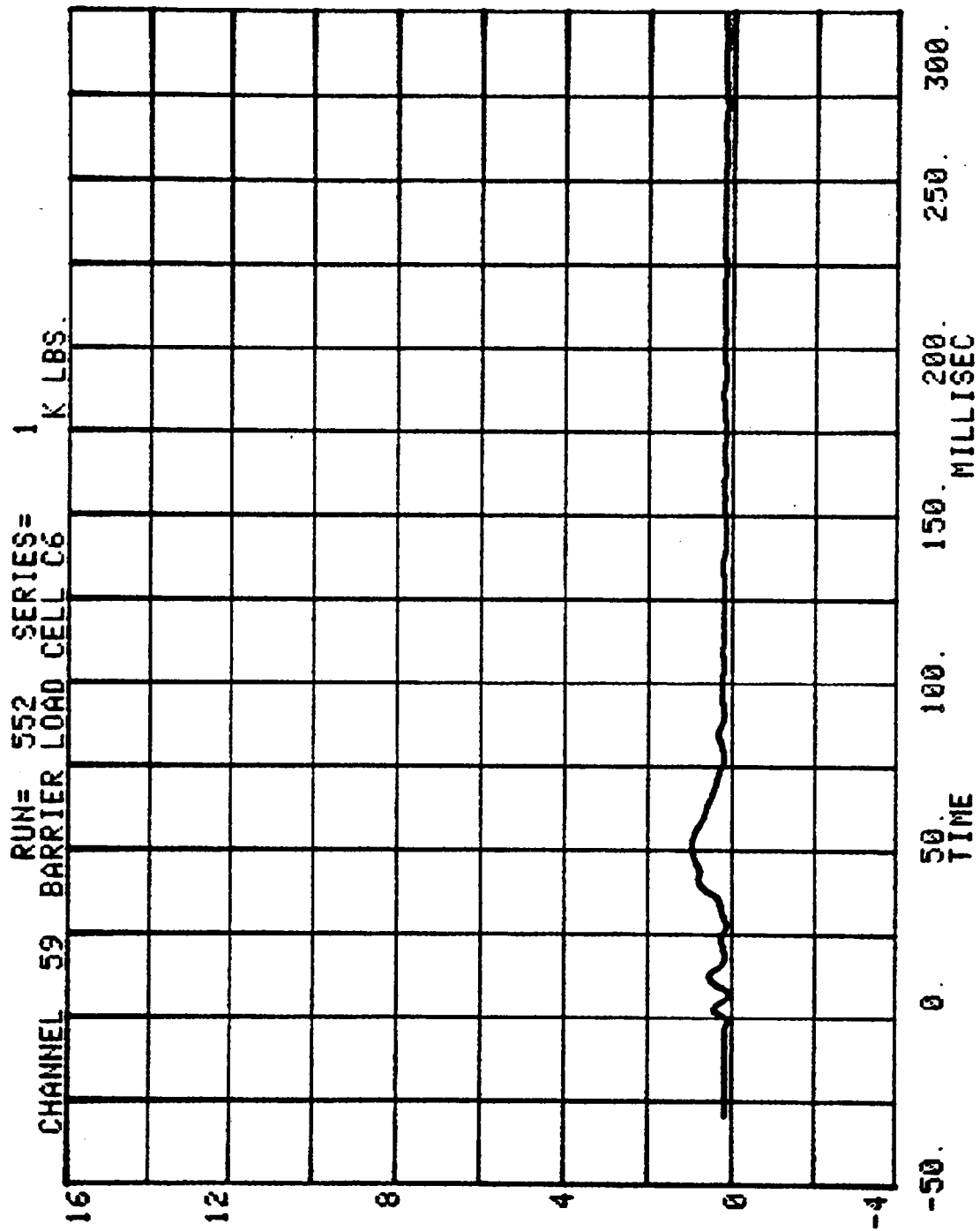
CHANNEL 55 BARRIER LOAD CELL C2 RUN= 552 SERIES= 1 K LBS.

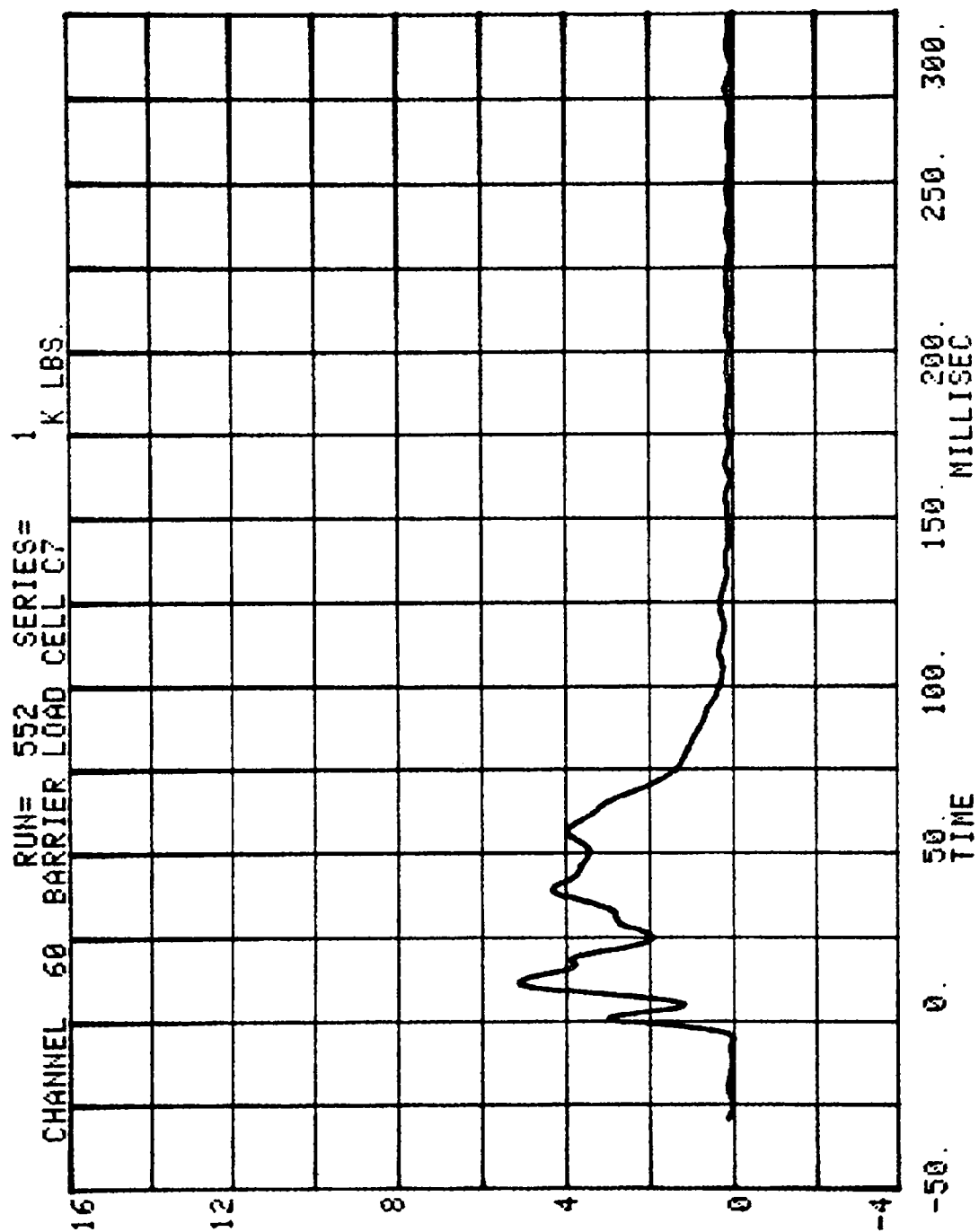


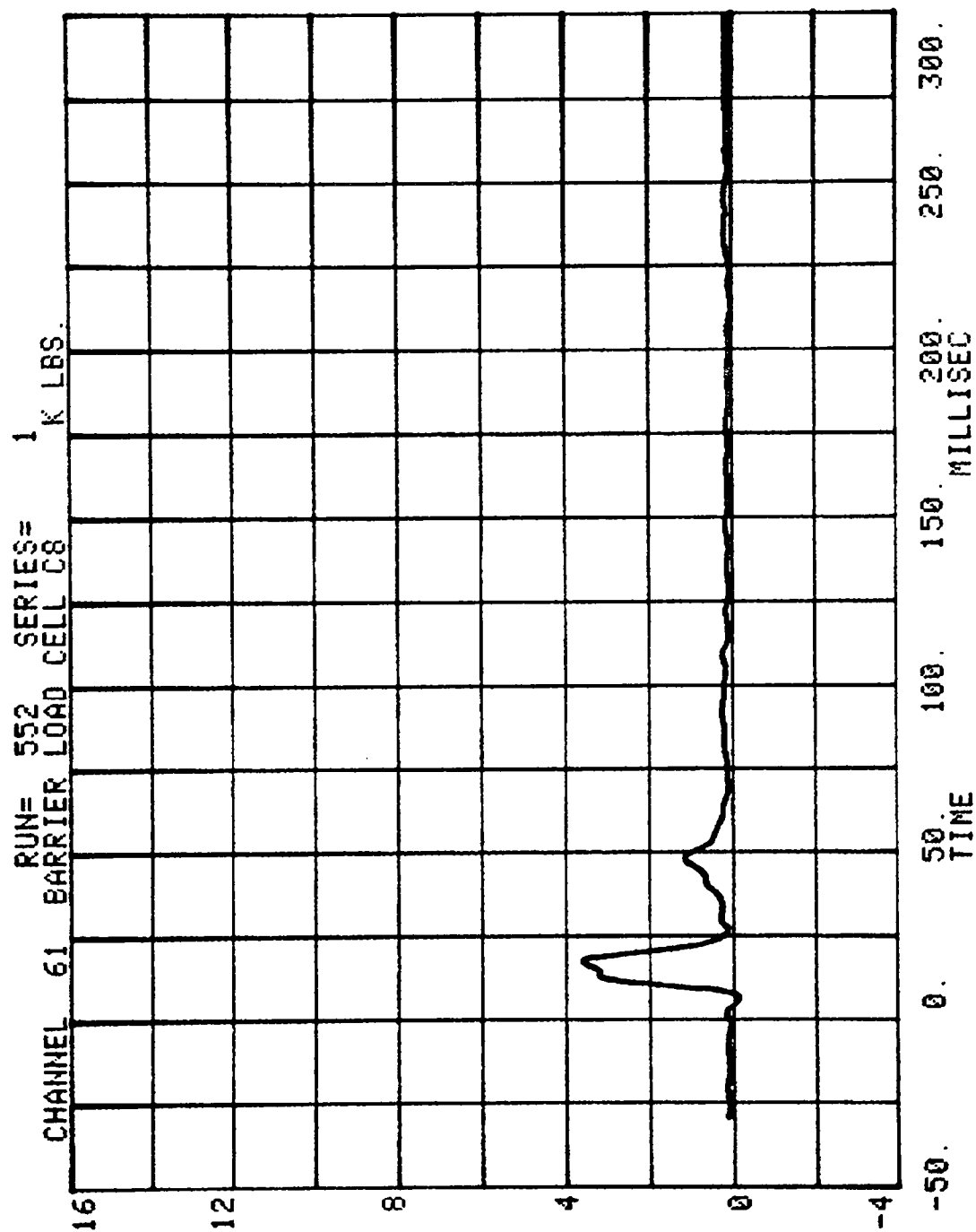


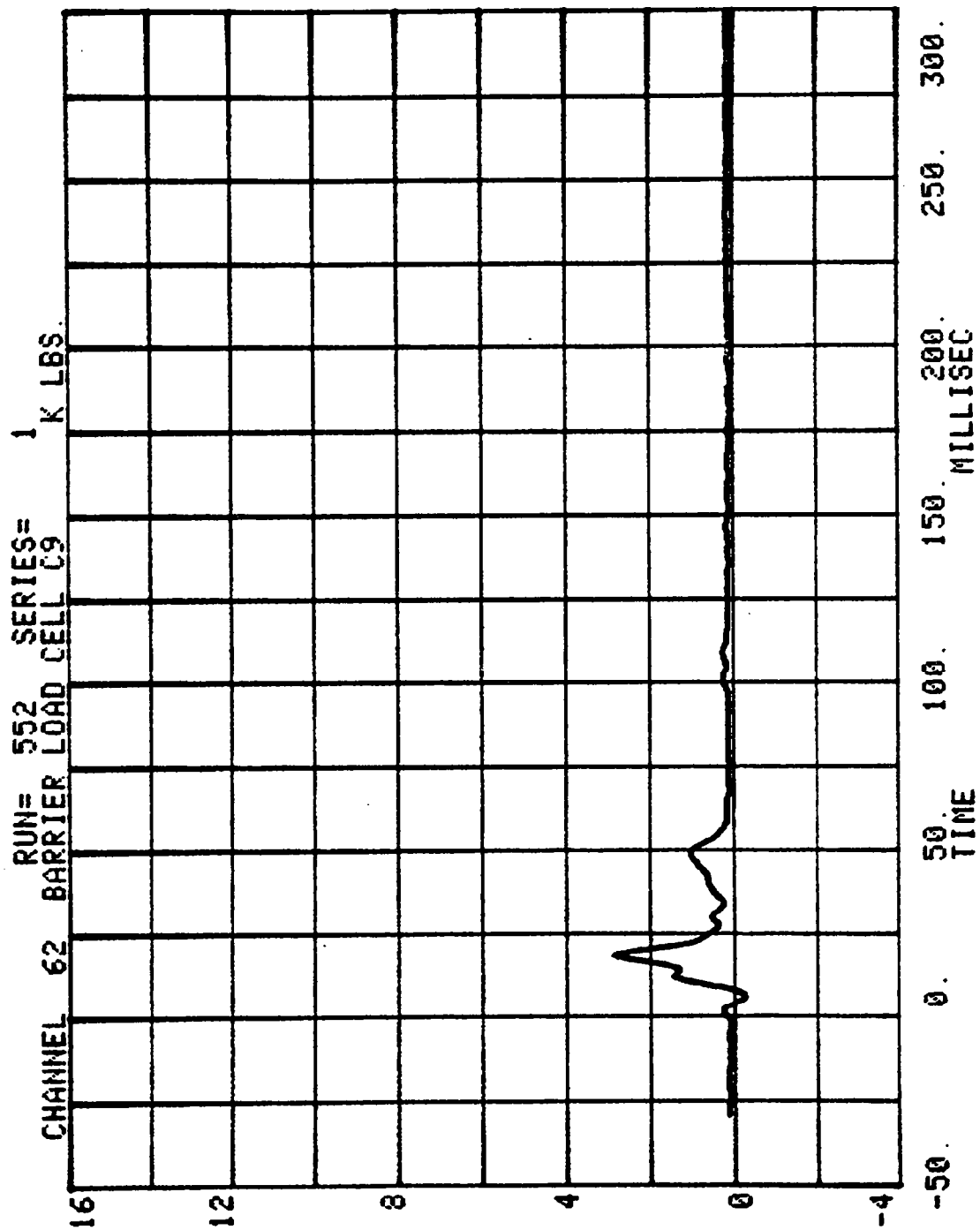


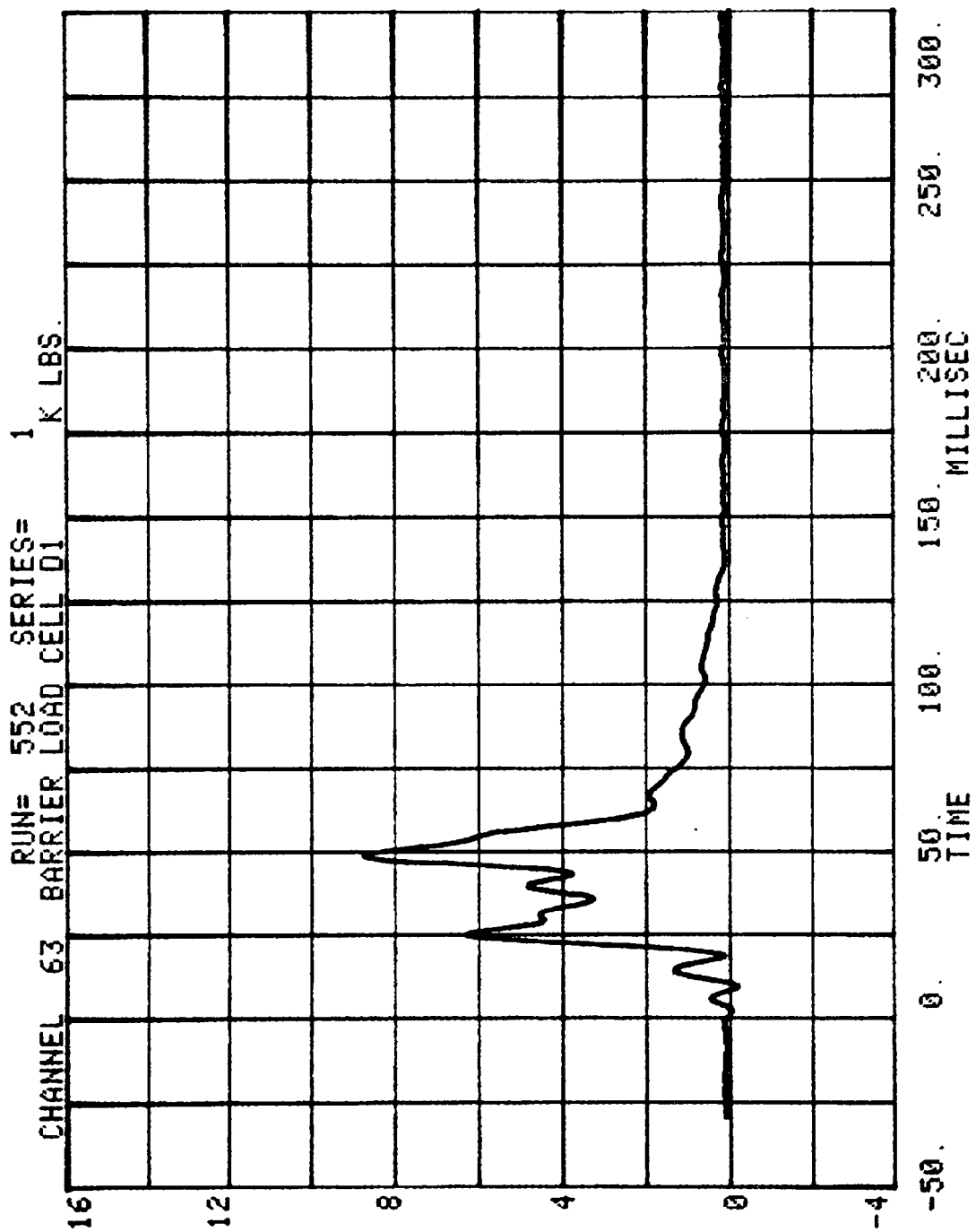


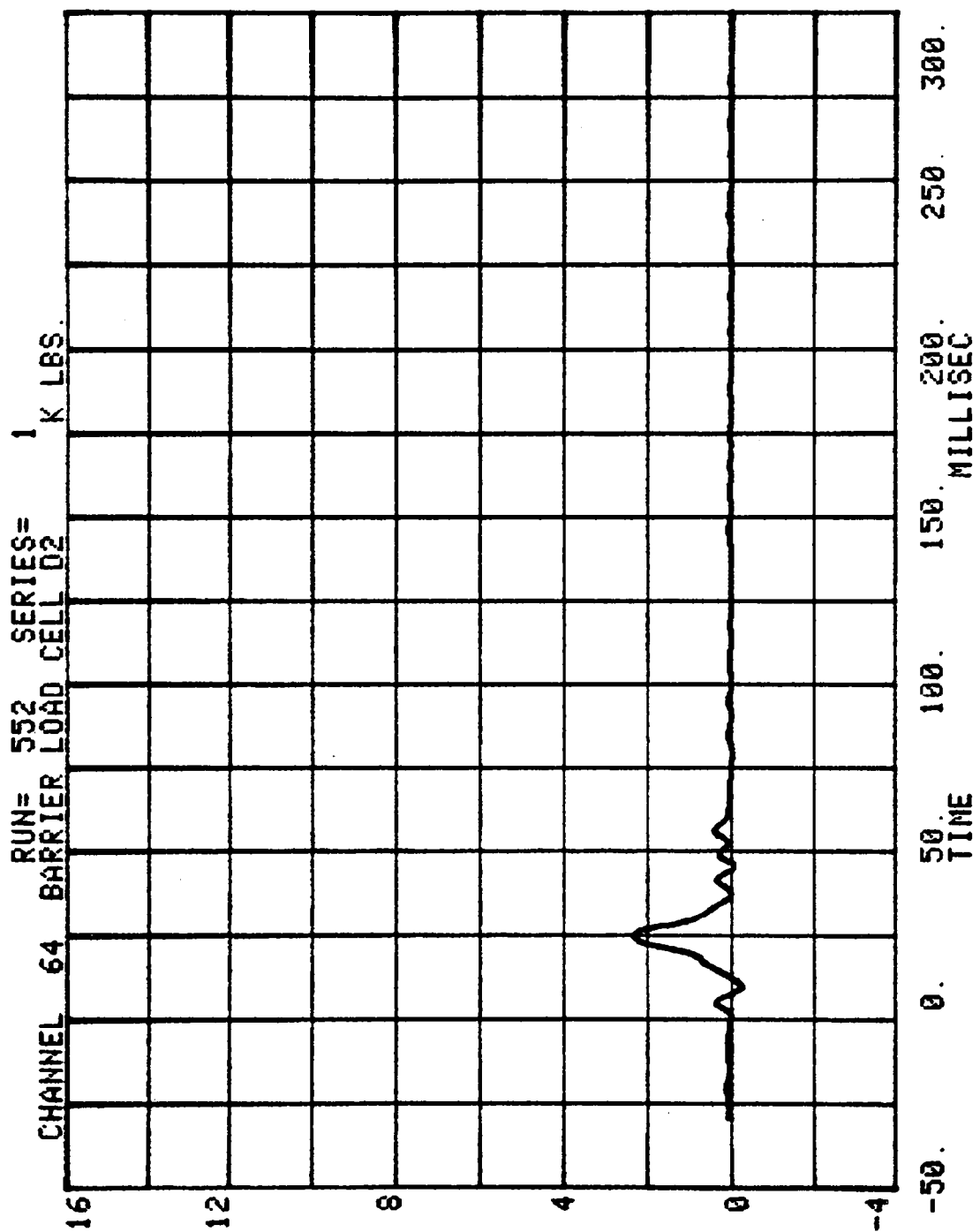


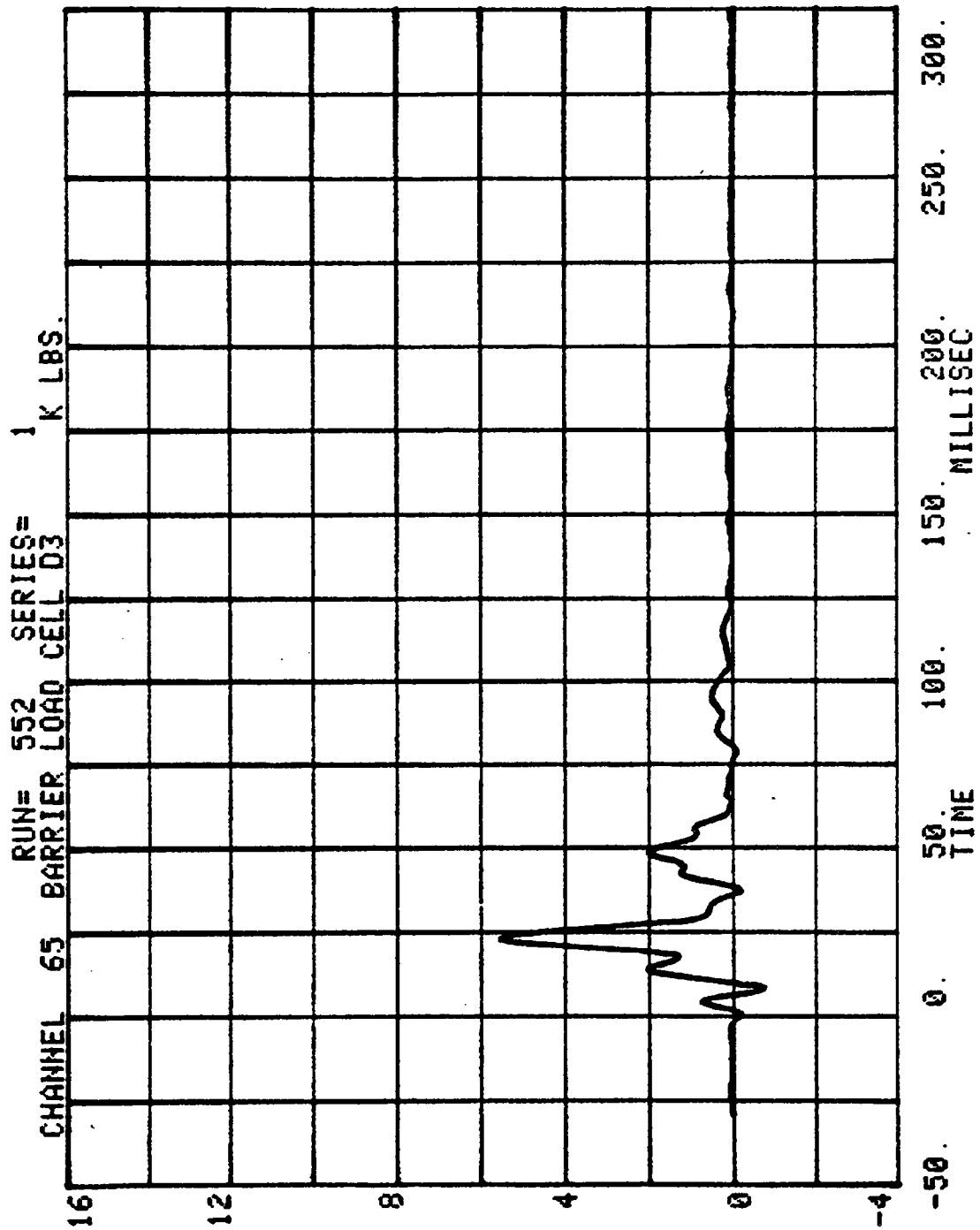


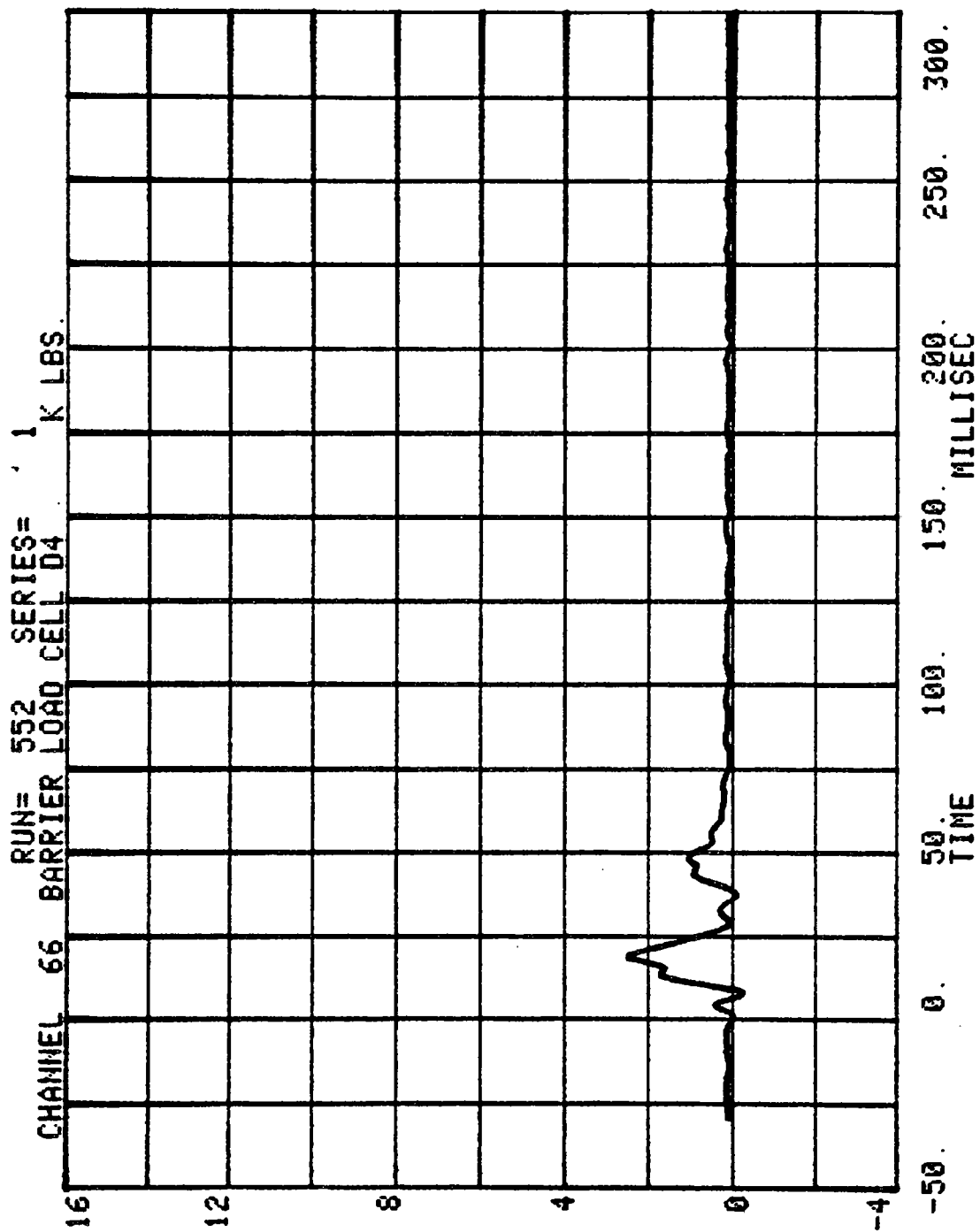


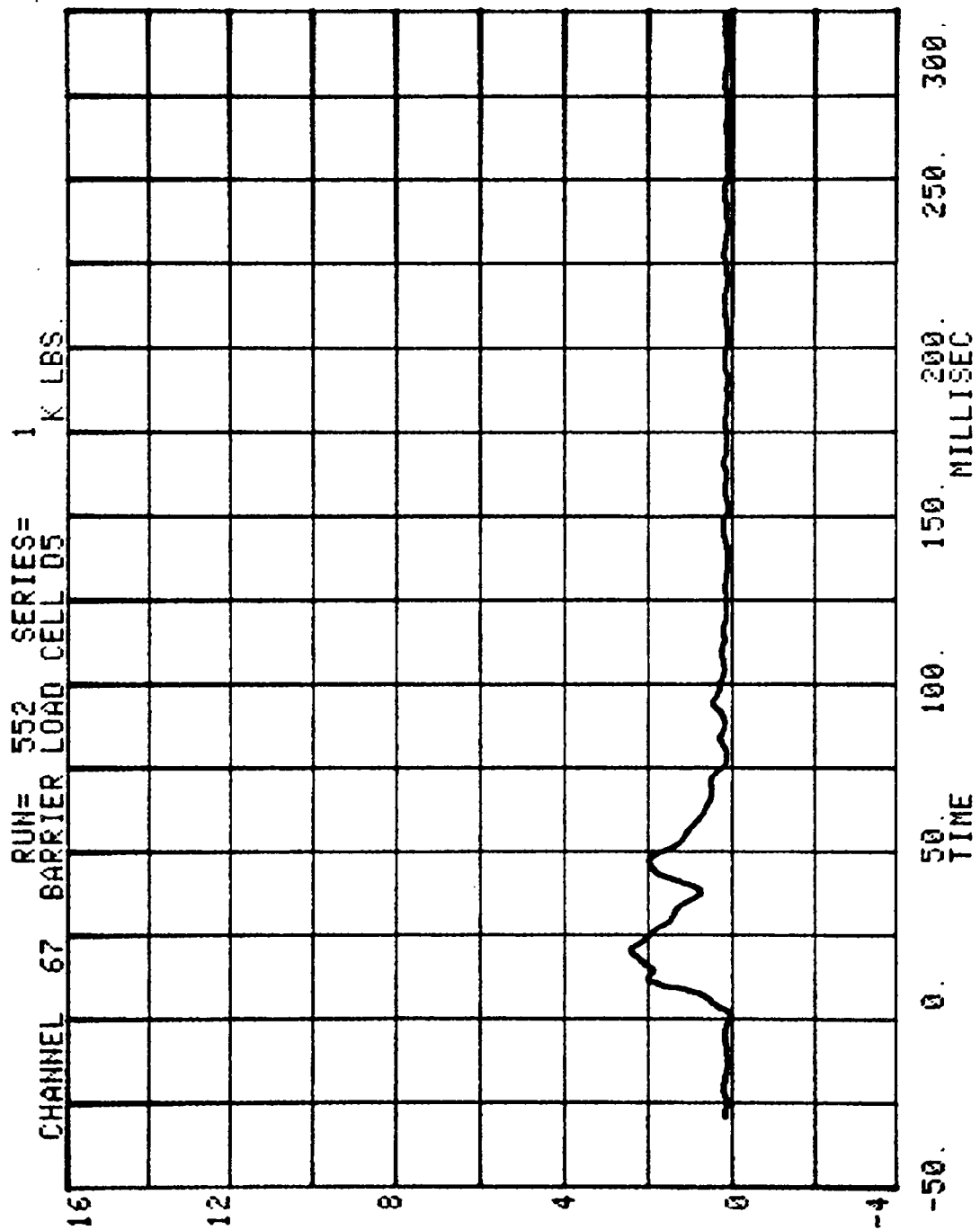


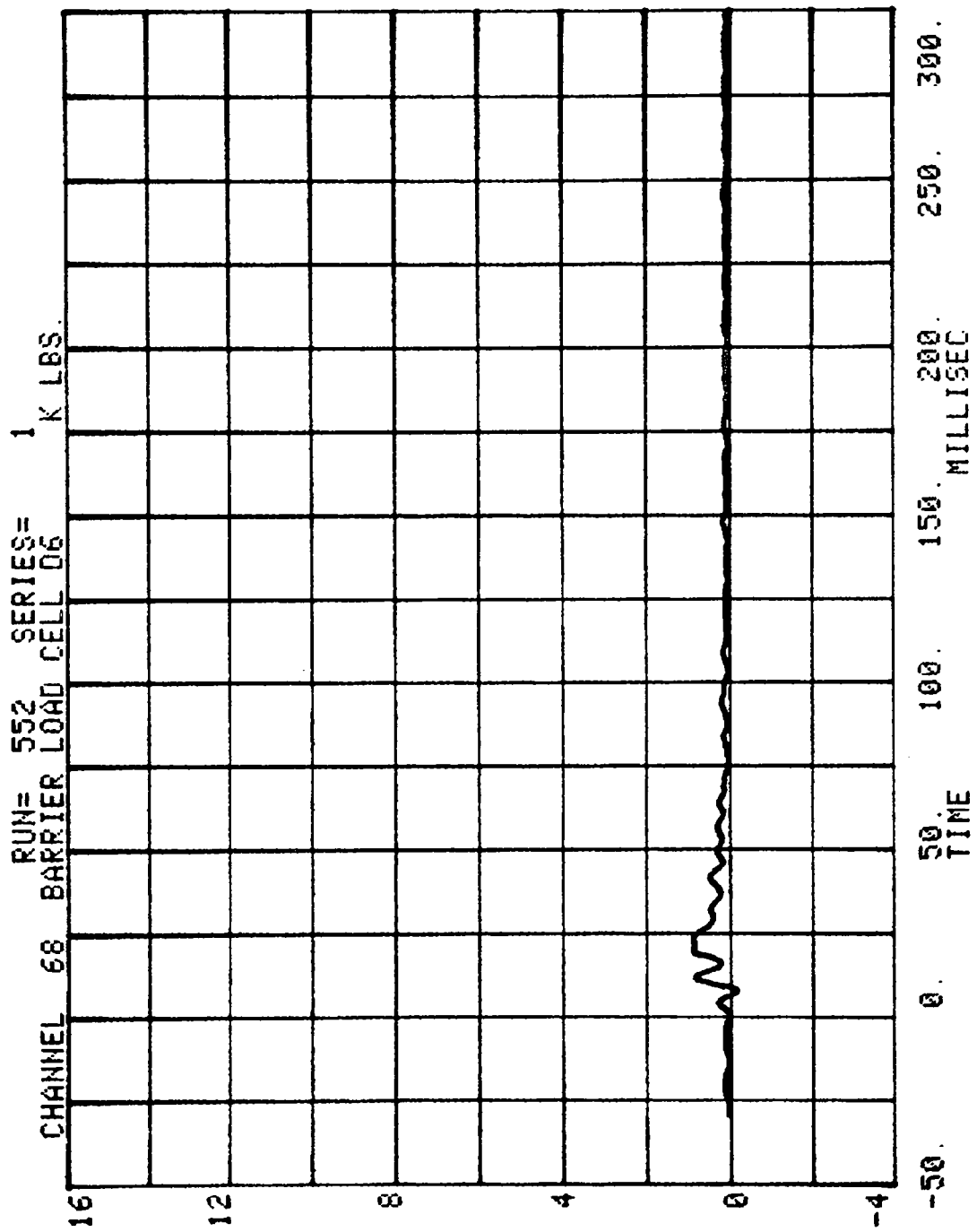


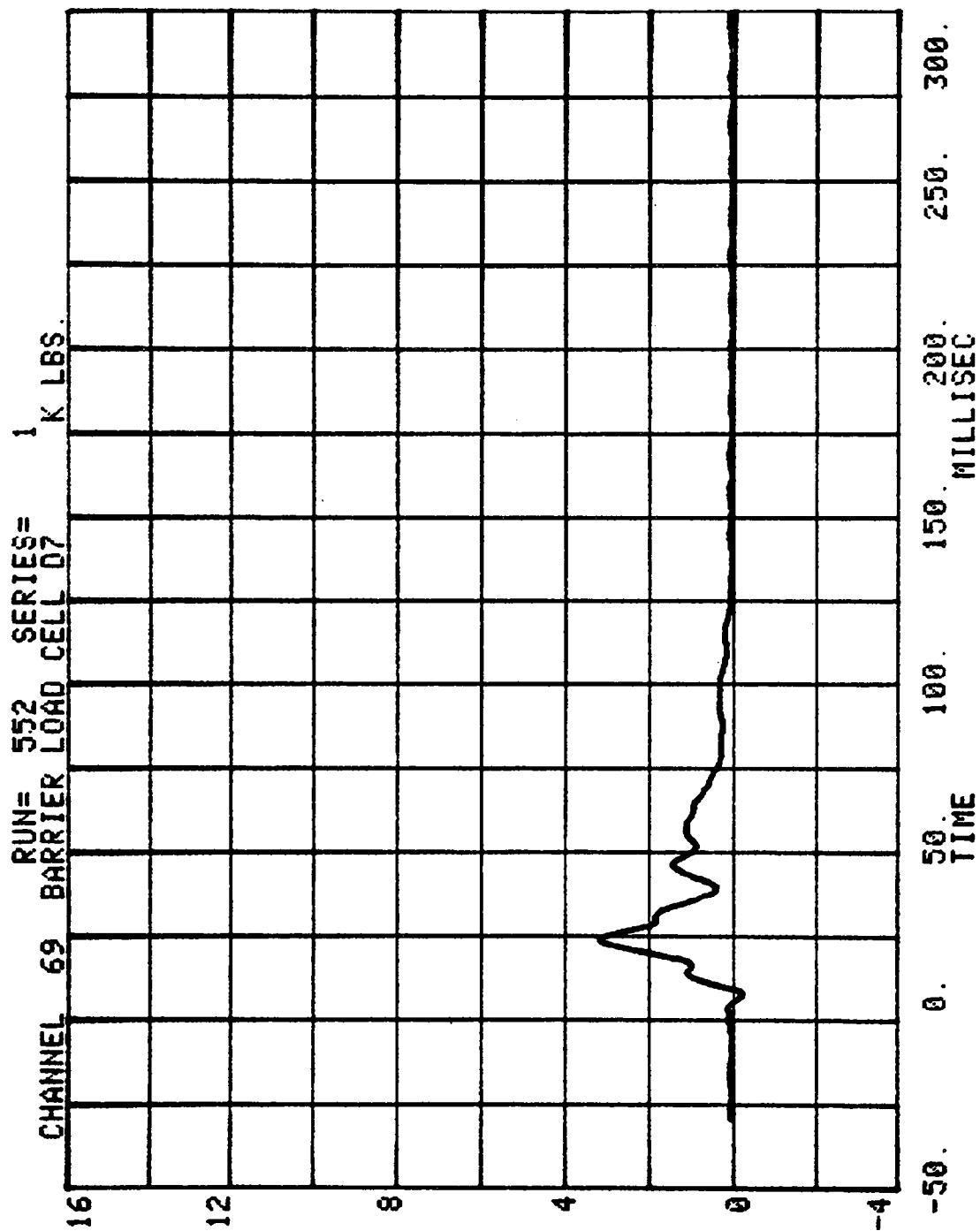


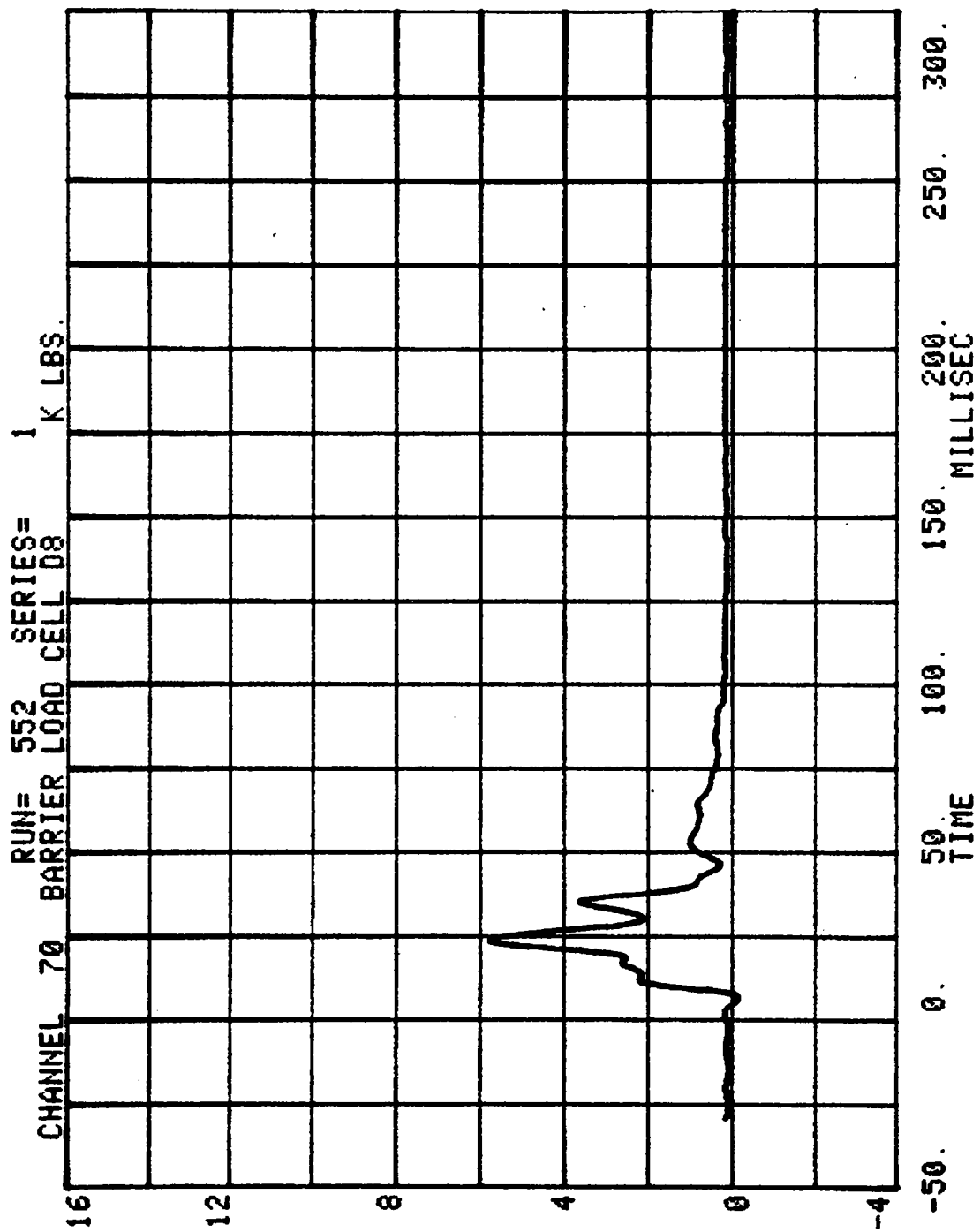


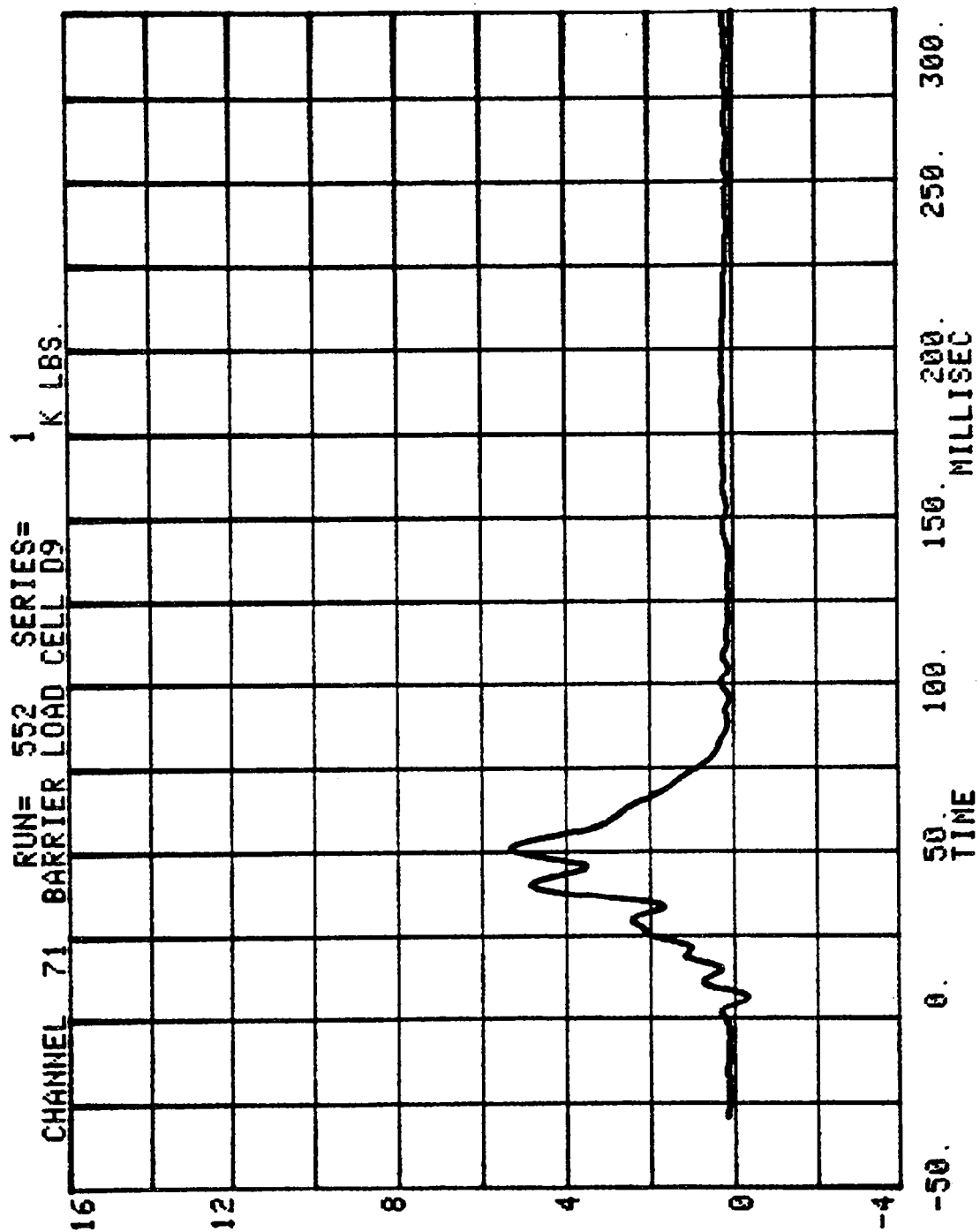


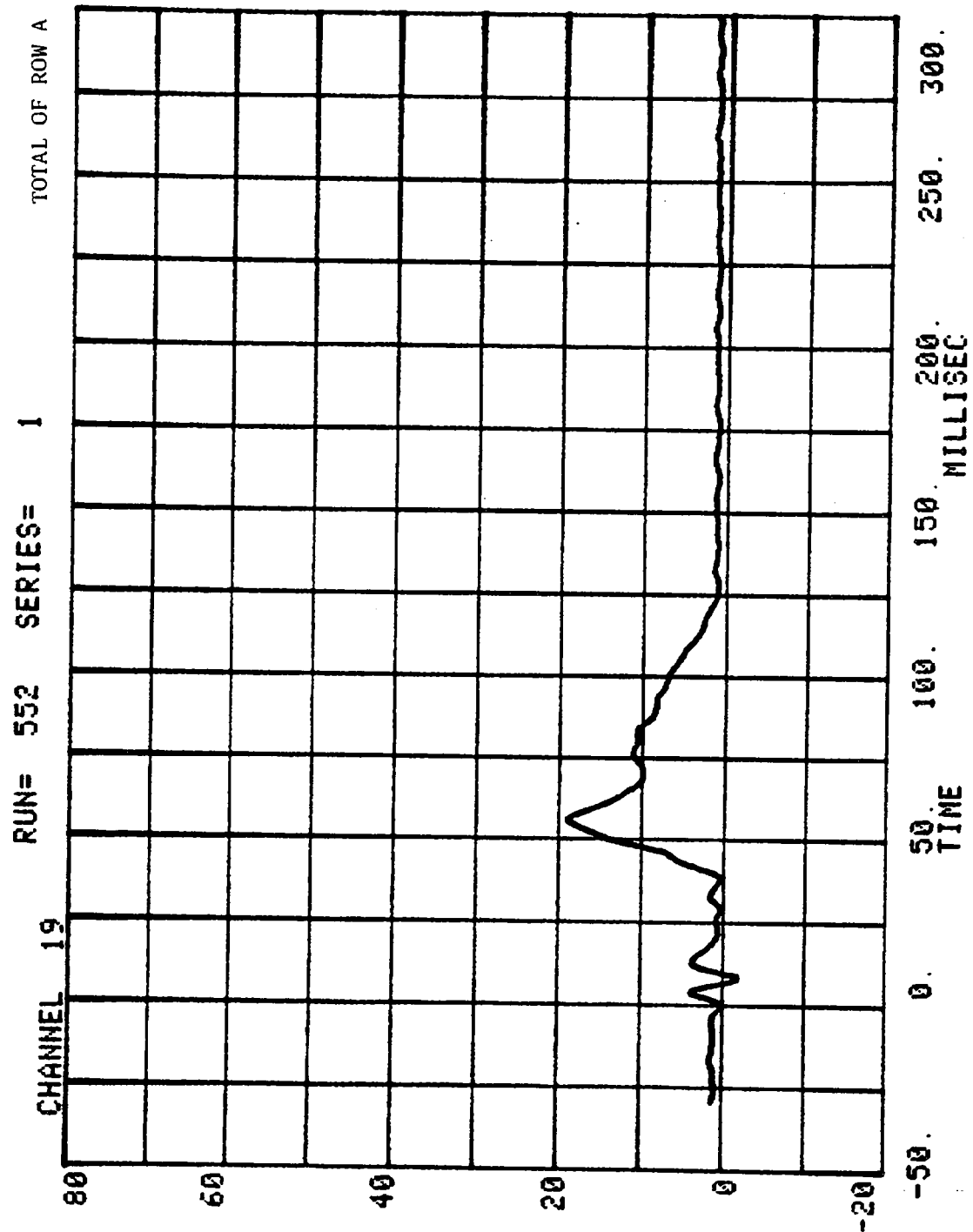


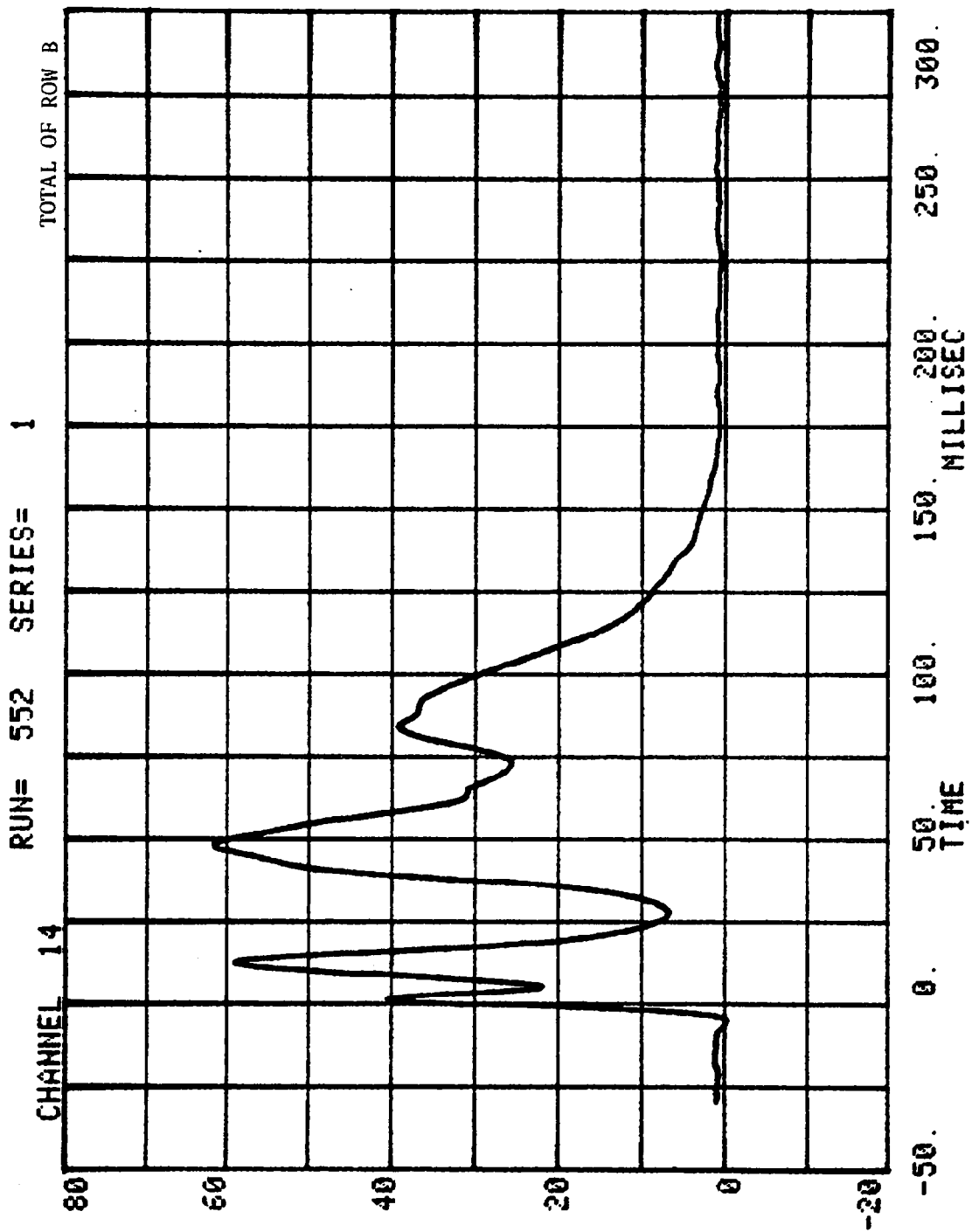


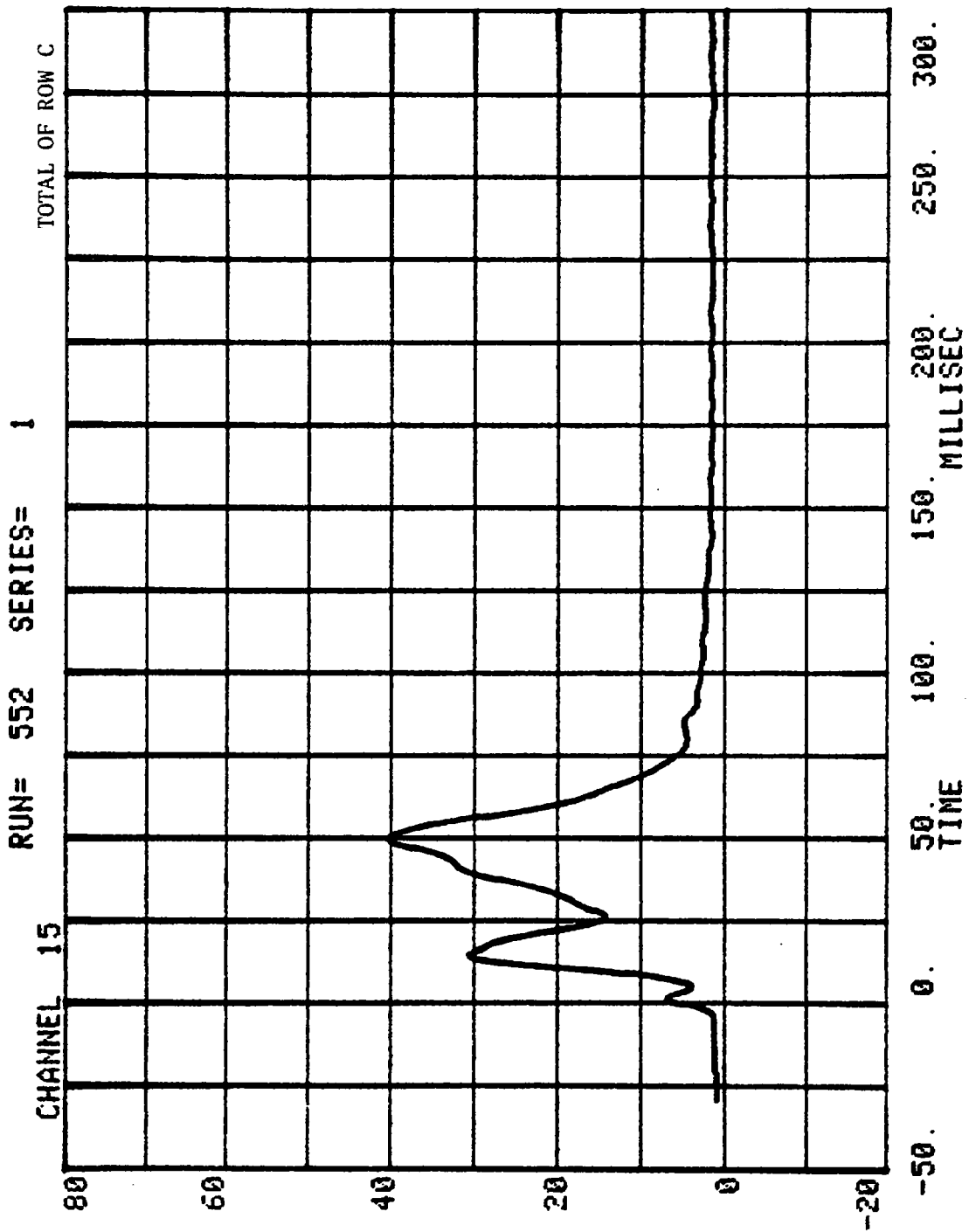


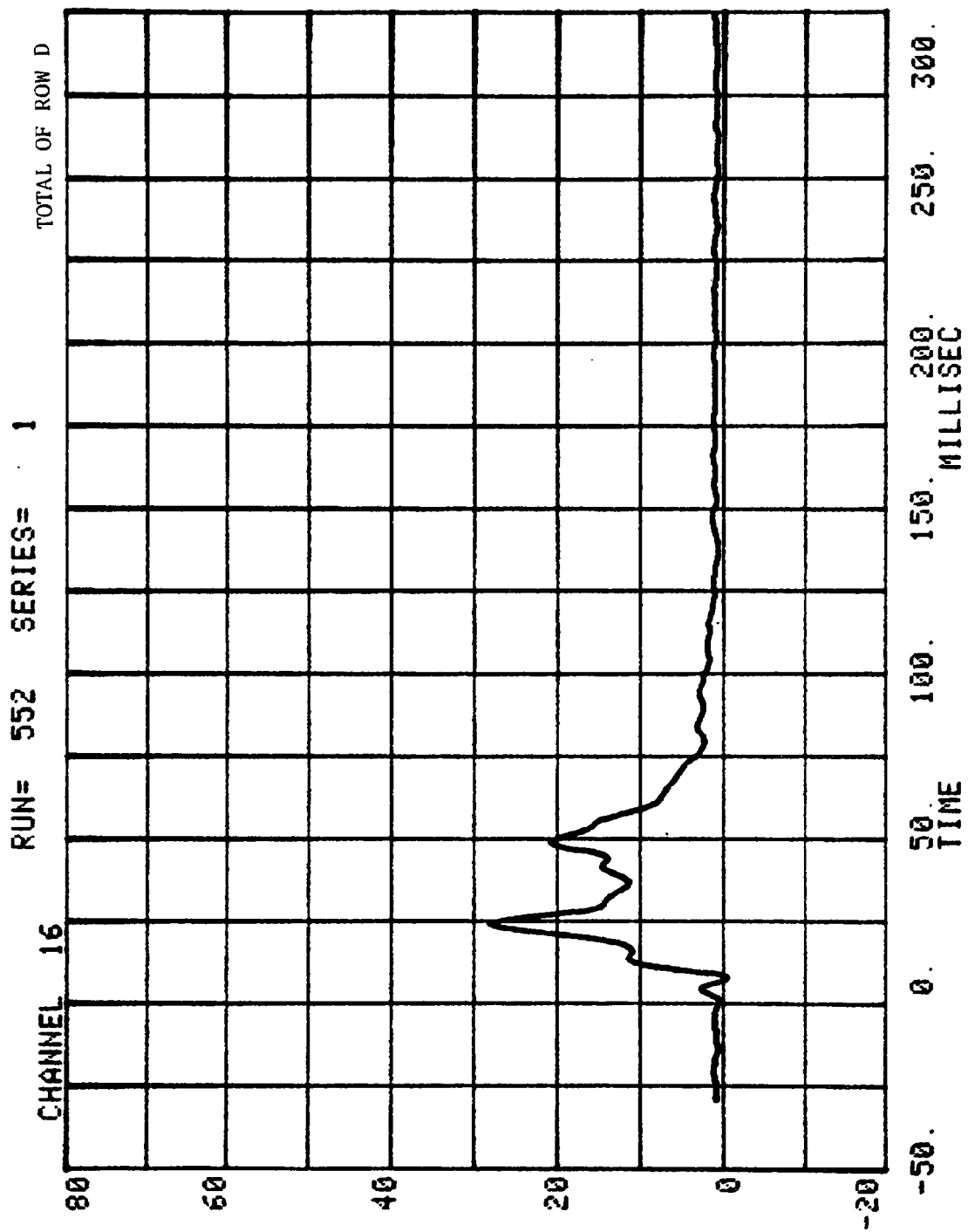


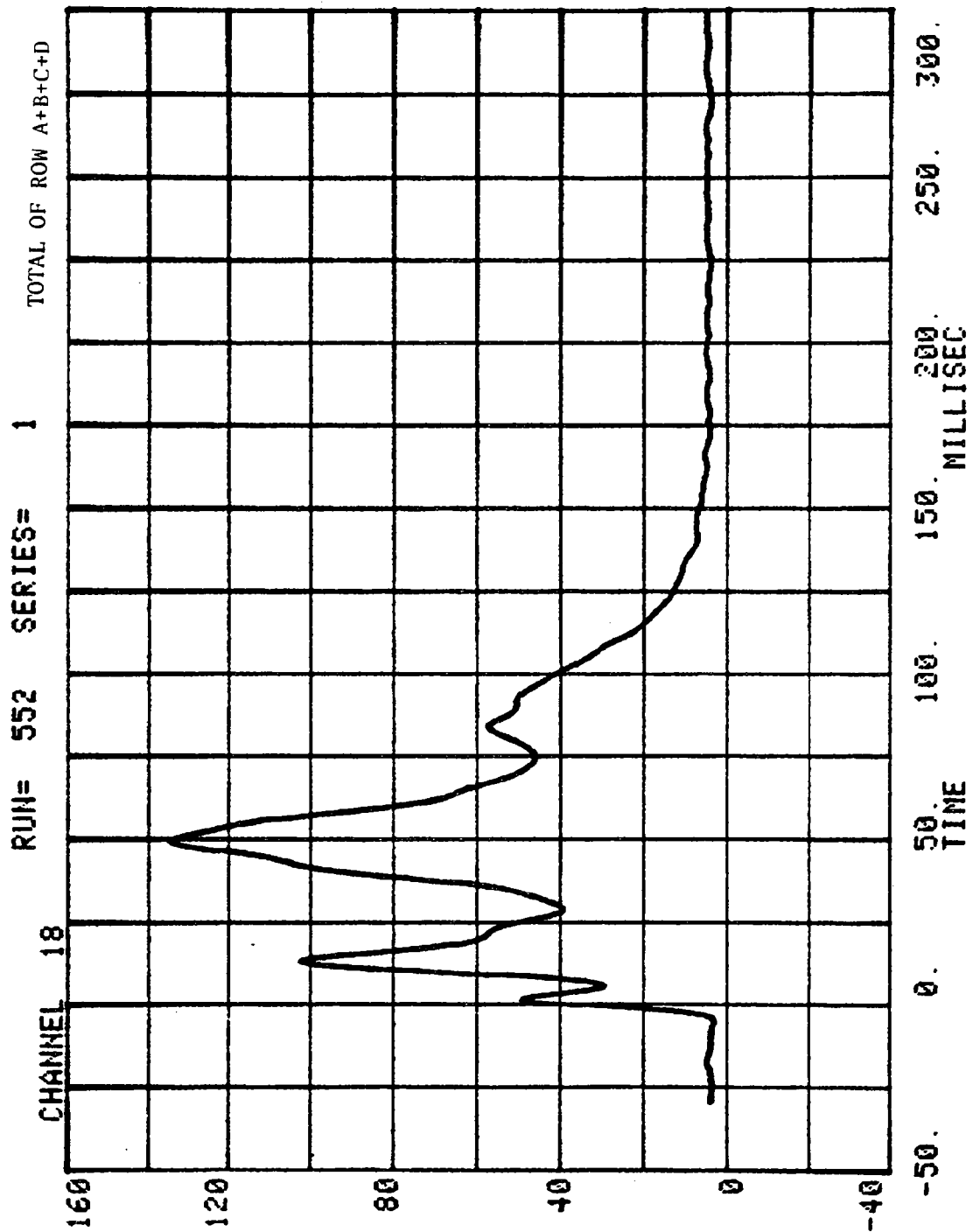






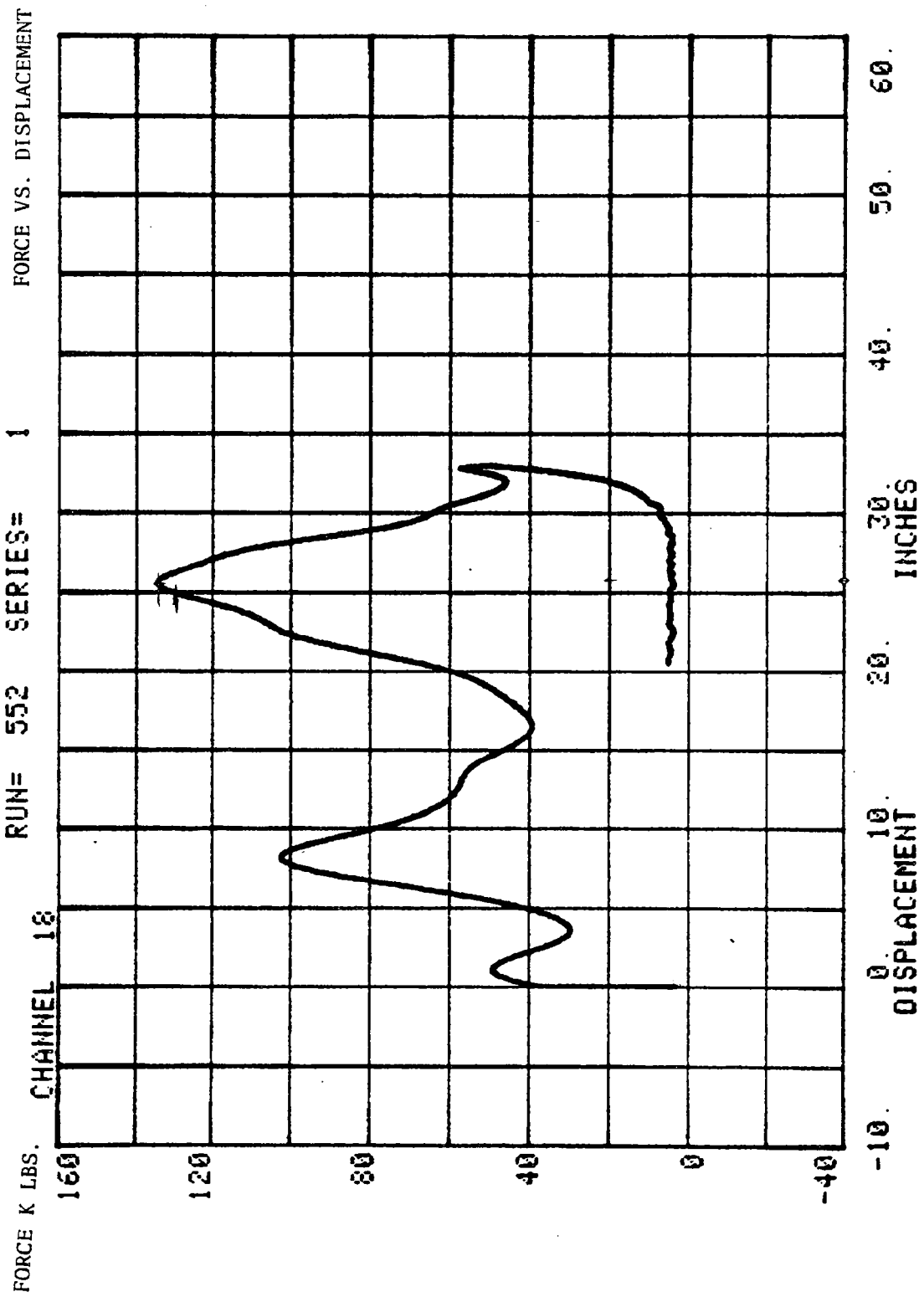






B-55

7095-V-2



Test No. 447-2-552

1982 Ford LTD

DUMMY DATA

FILTER CHANNEL CLASS

HEAD ACCELERATIONS	1000
CHEST ACCELERATIONS	180
FEMUR FORCES	600
BELT LOADS	60

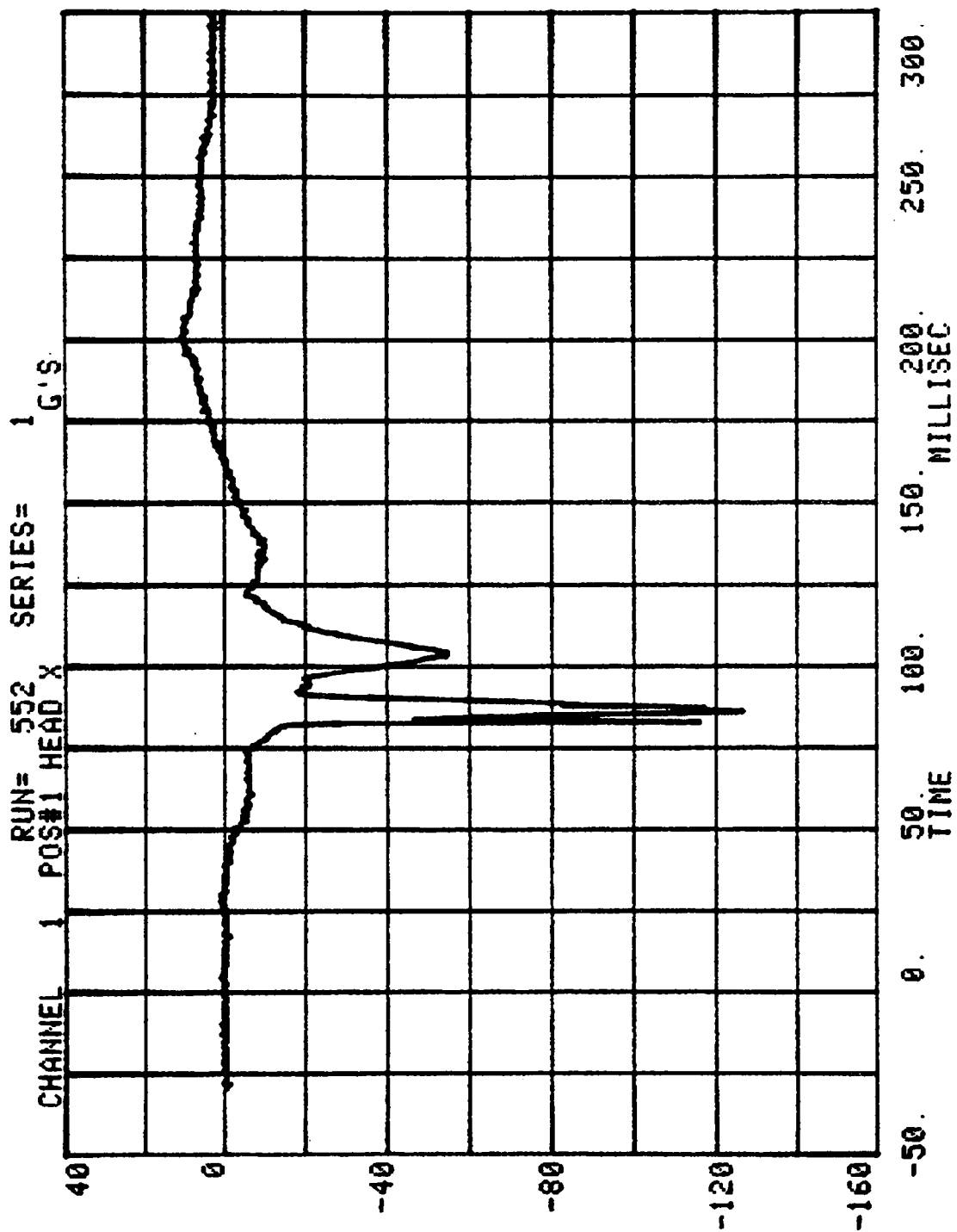
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

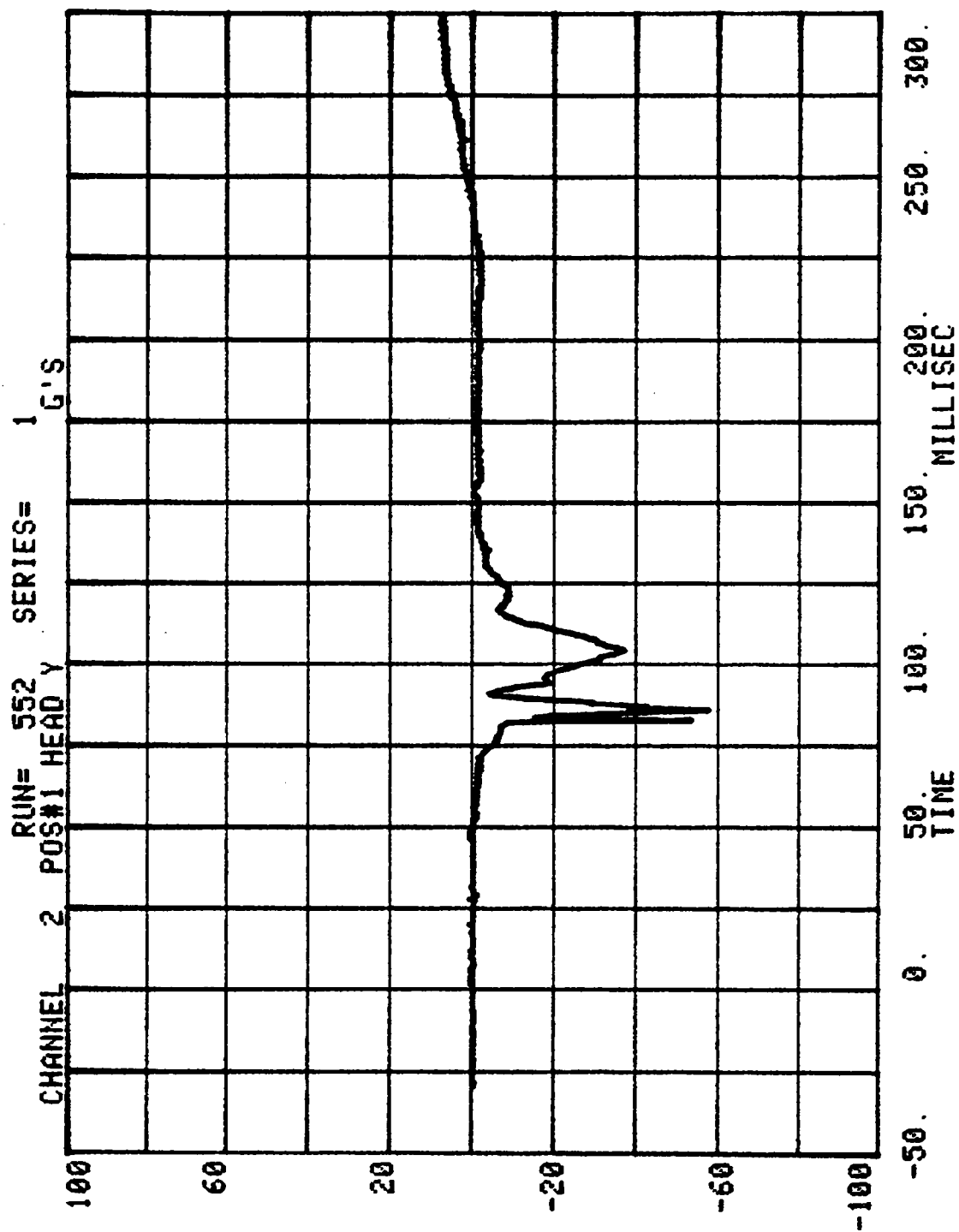
CAR TO LOAD CELL BARRIER

RUN= 552

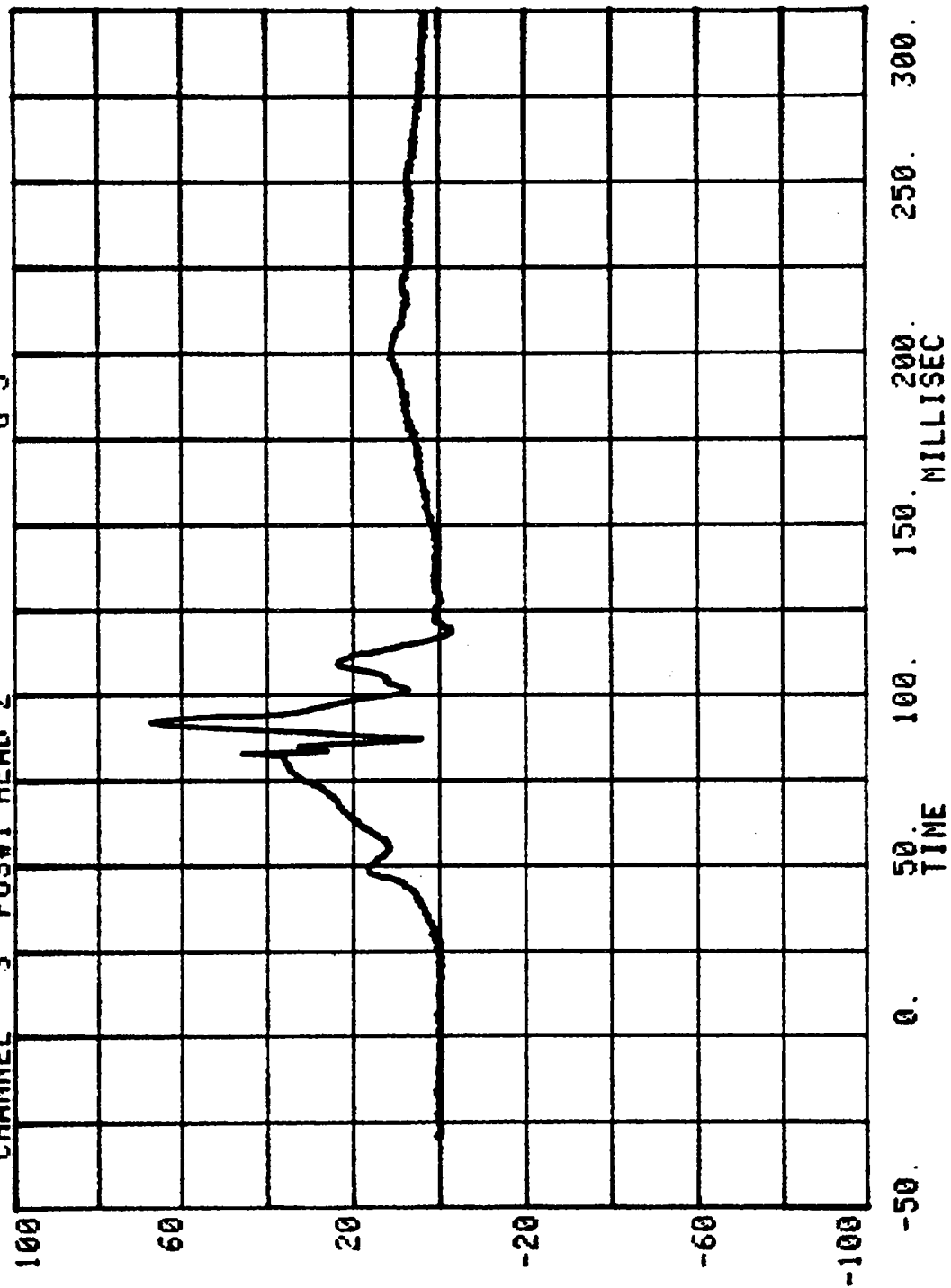
POS#1 HEAD RESULTANT

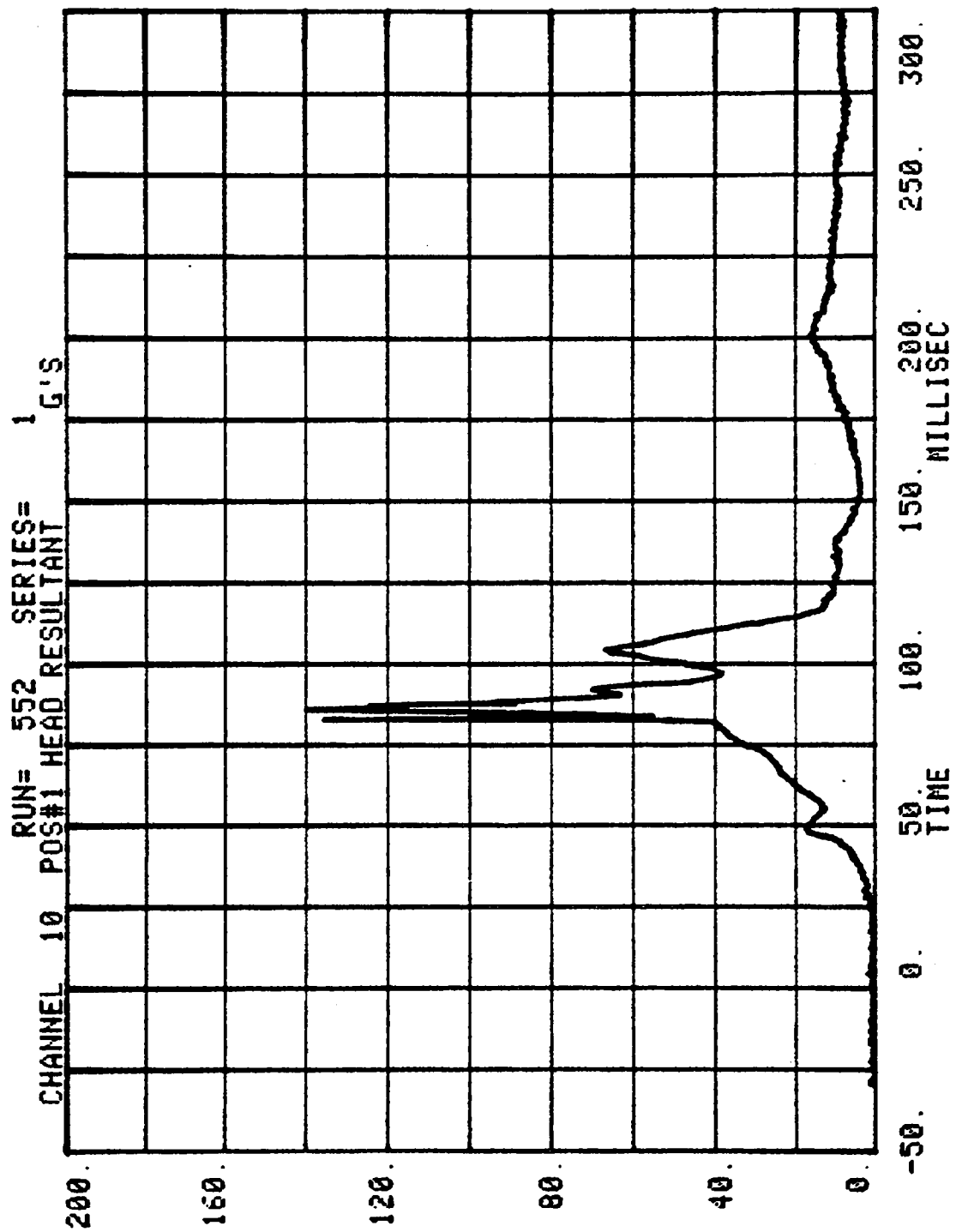
HIC= 960.1 FROM T1= .07800 TO T2= .11130
AVERAGE ACCELERATION BETWEEN T1 AND T2= 60.8G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=1429.7

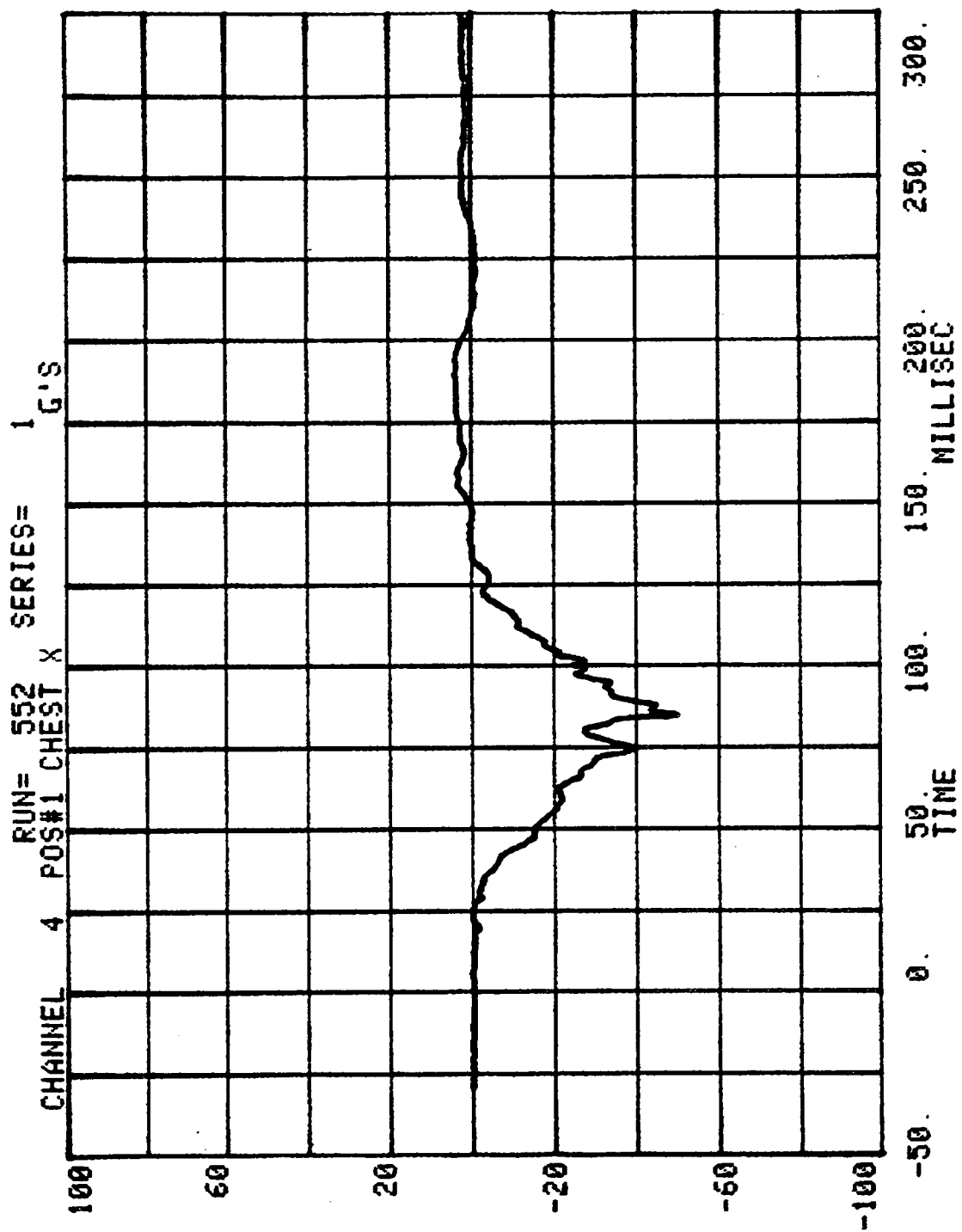


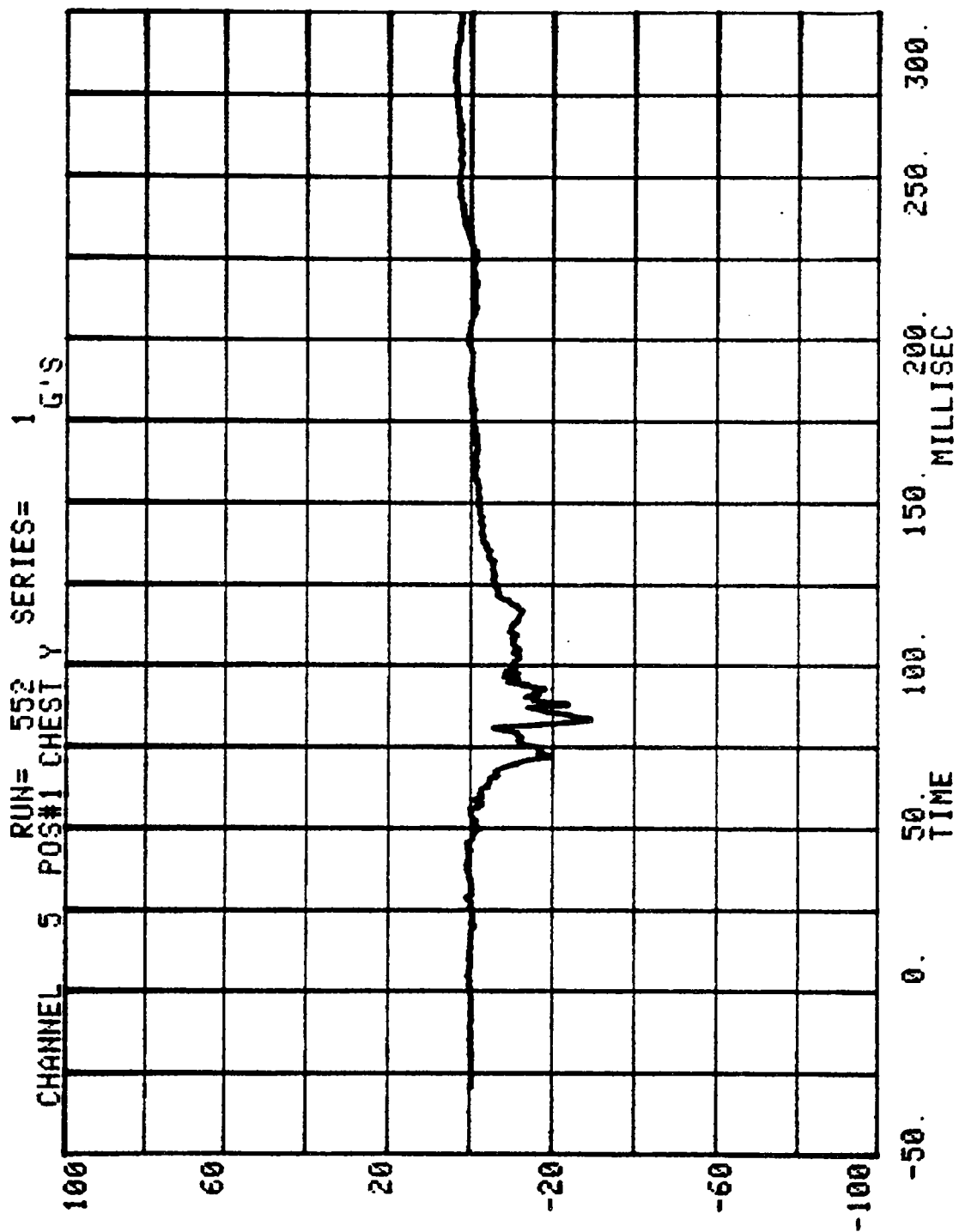


CHANNEL 3 POS#1 HEAD 2 RUN= 552 SERIES= 1 G'S

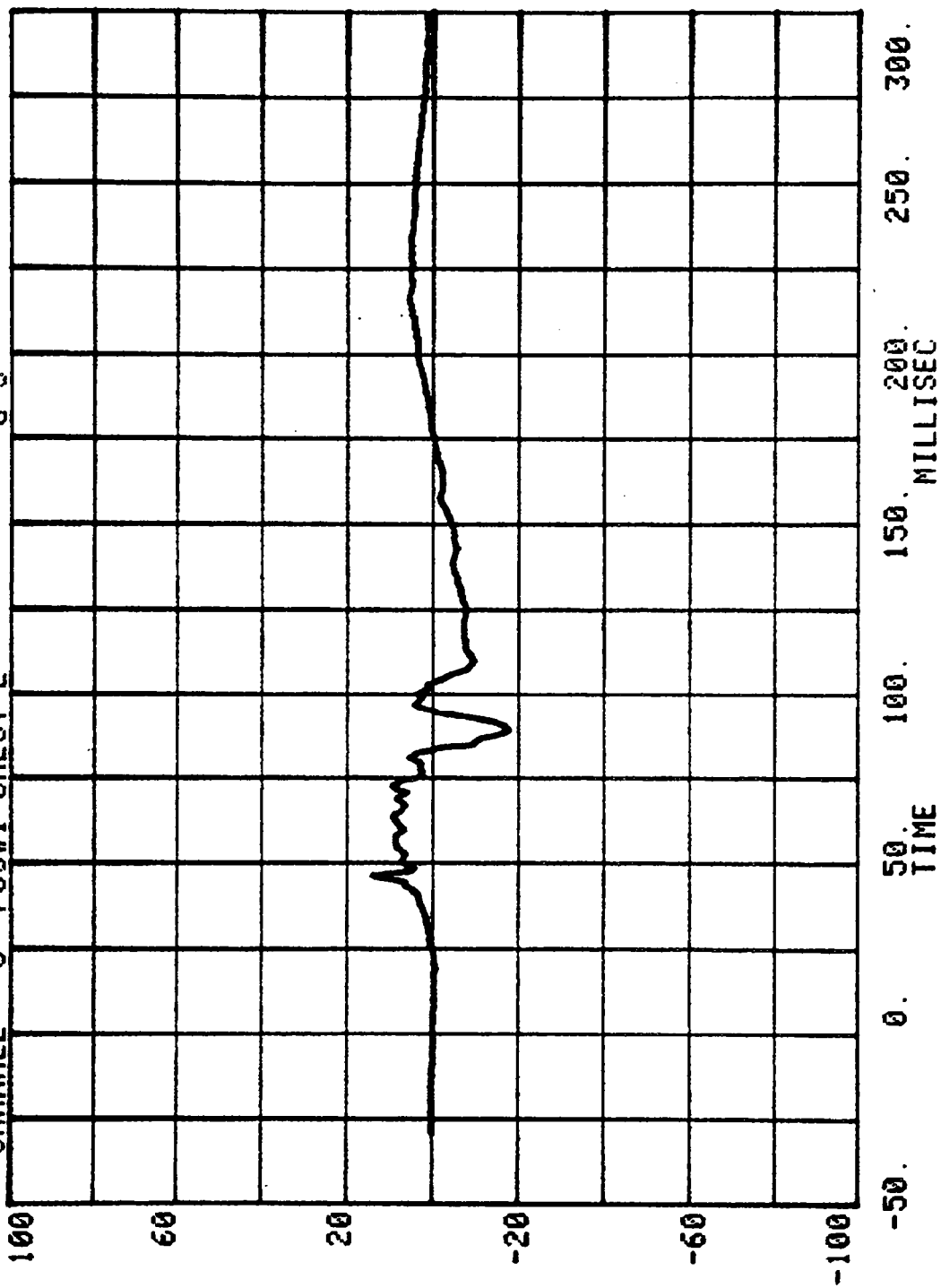


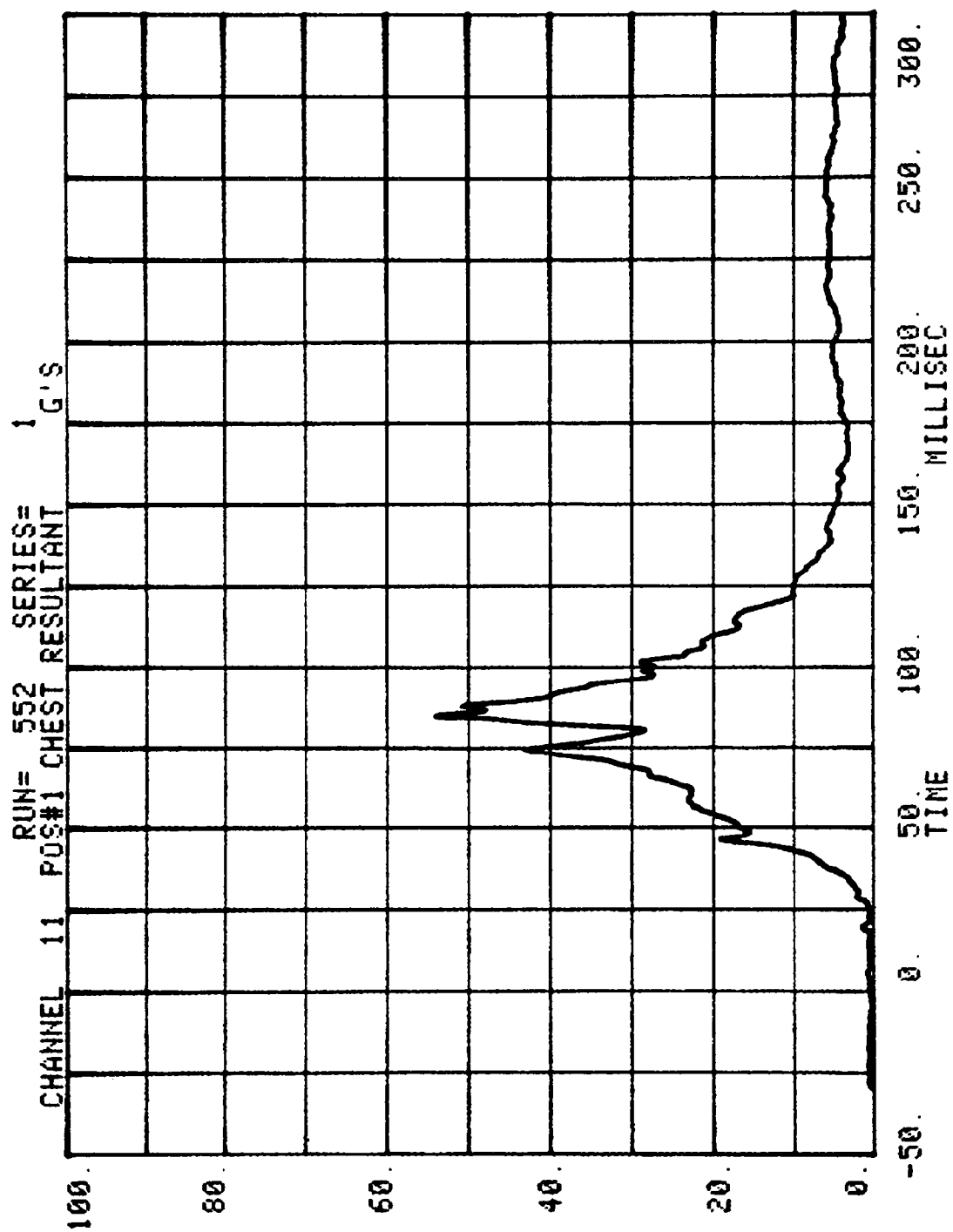


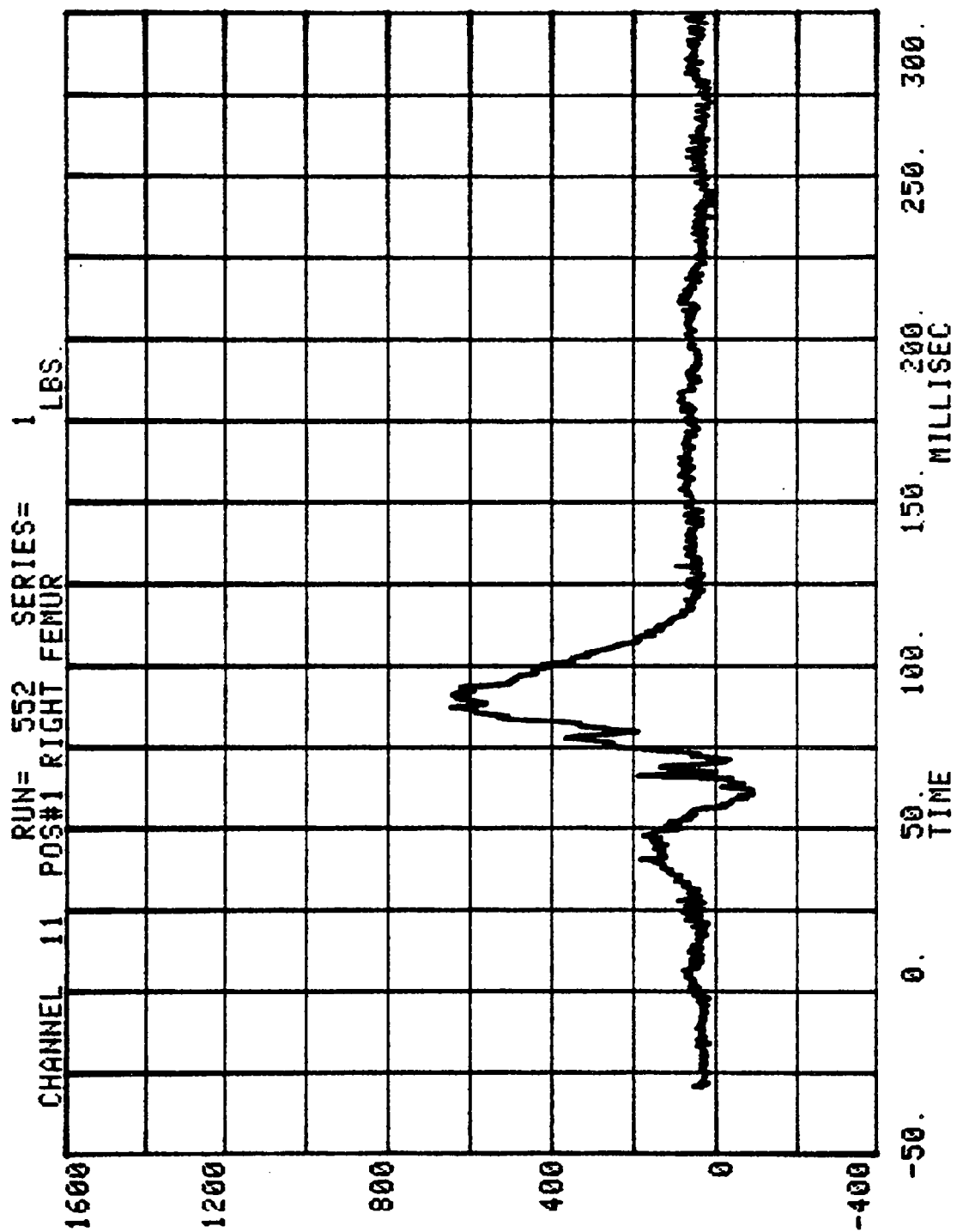


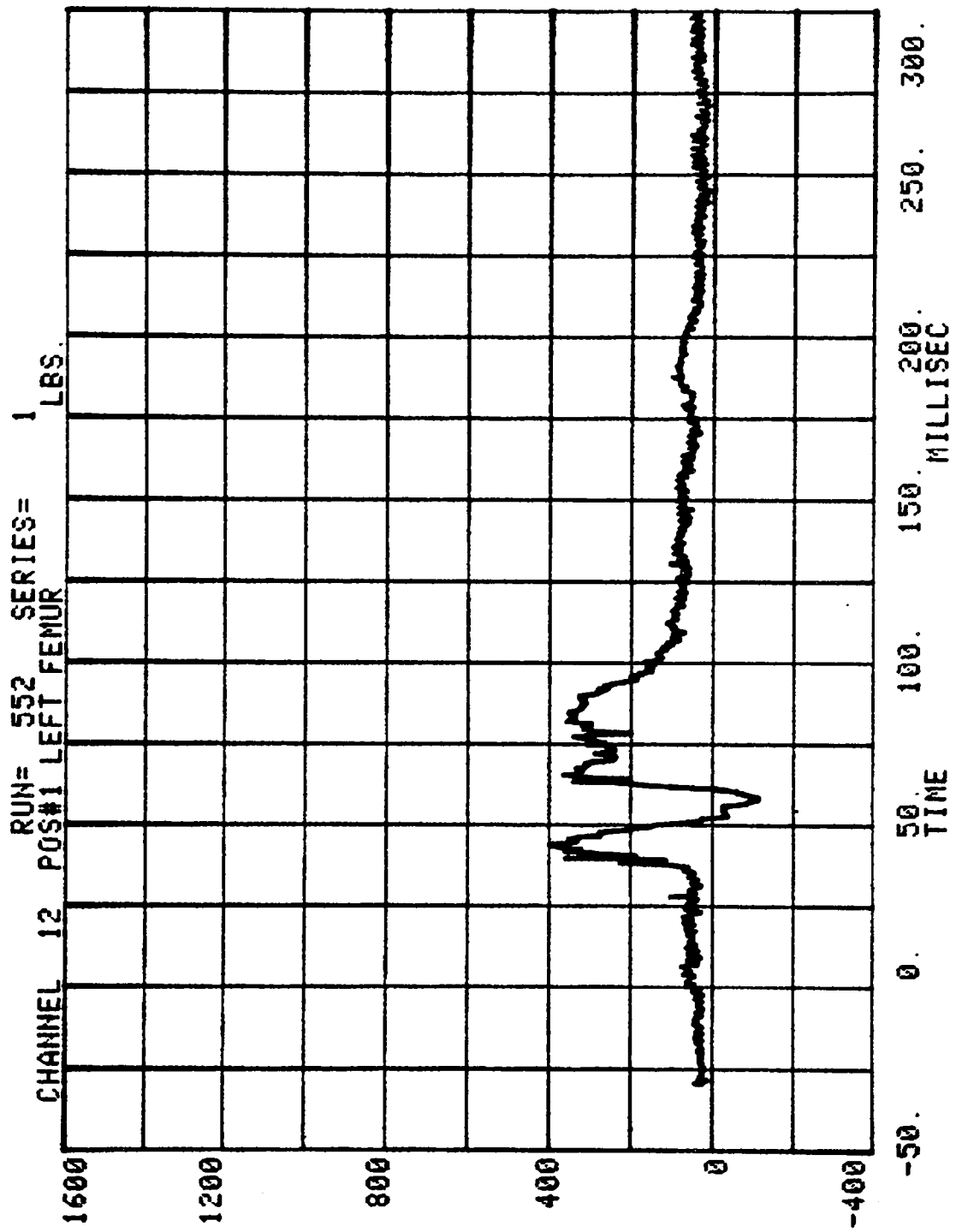


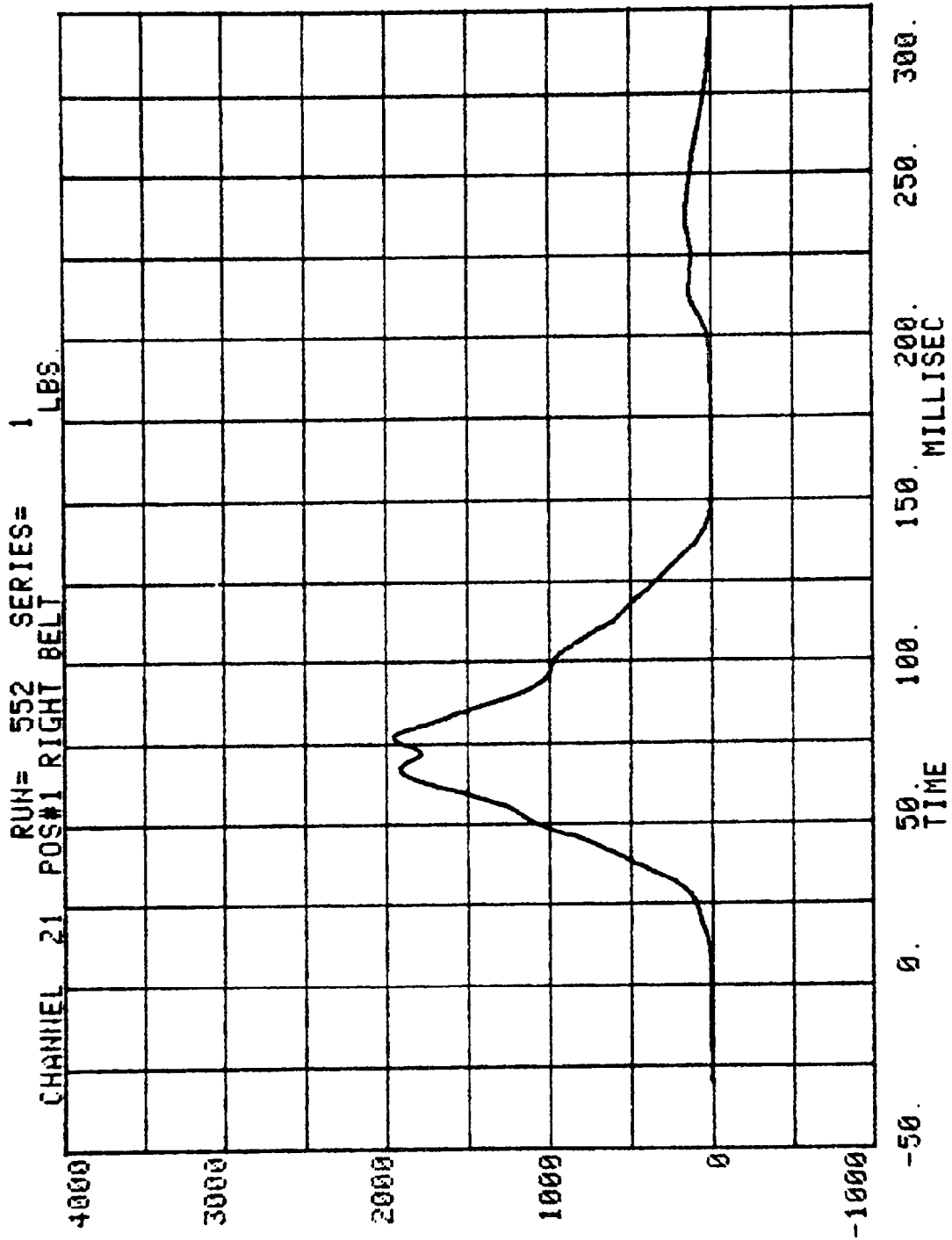
CHANNEL 6 POS#1 CHEST Z RUN= 552 SERIES= 1 G'S

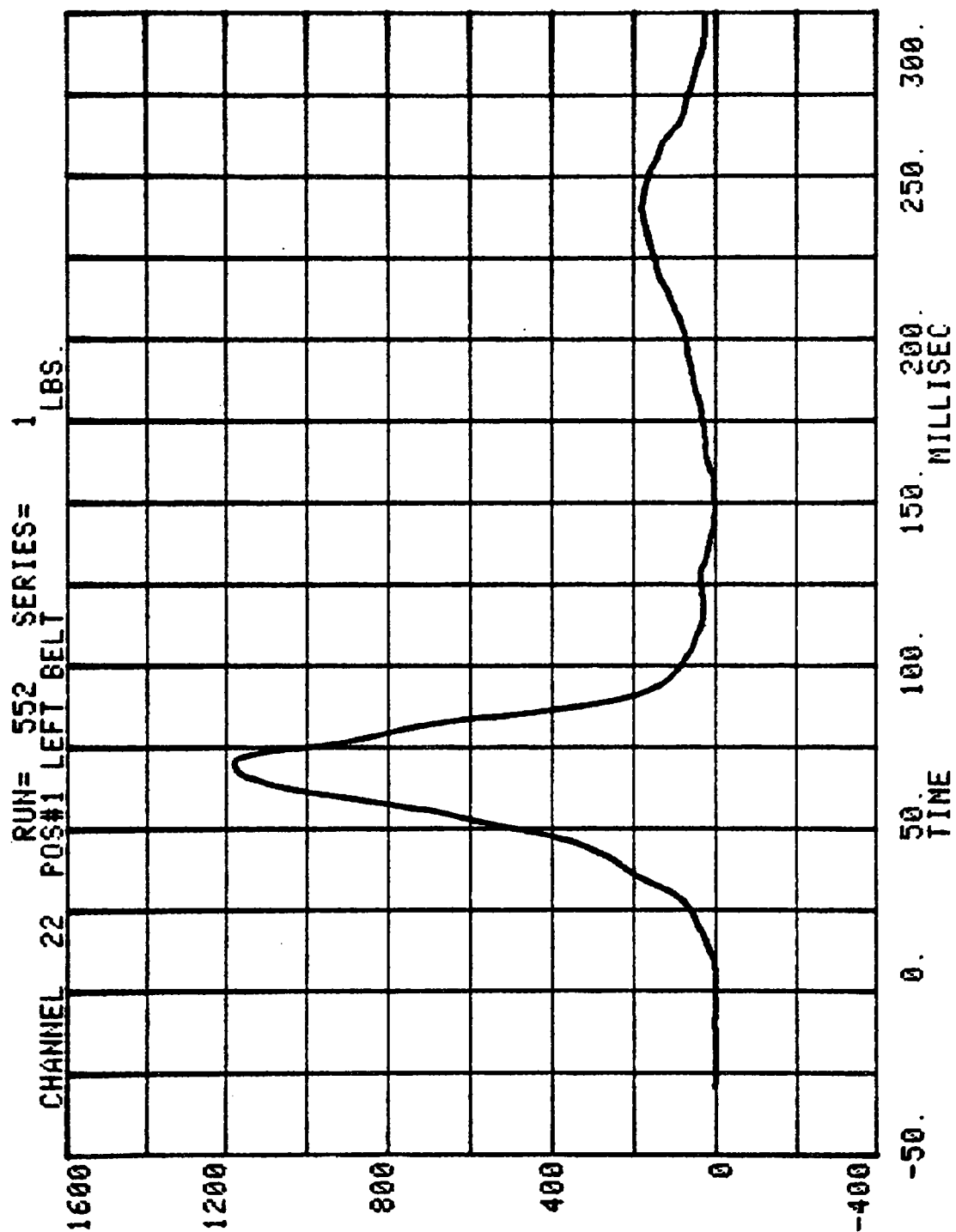


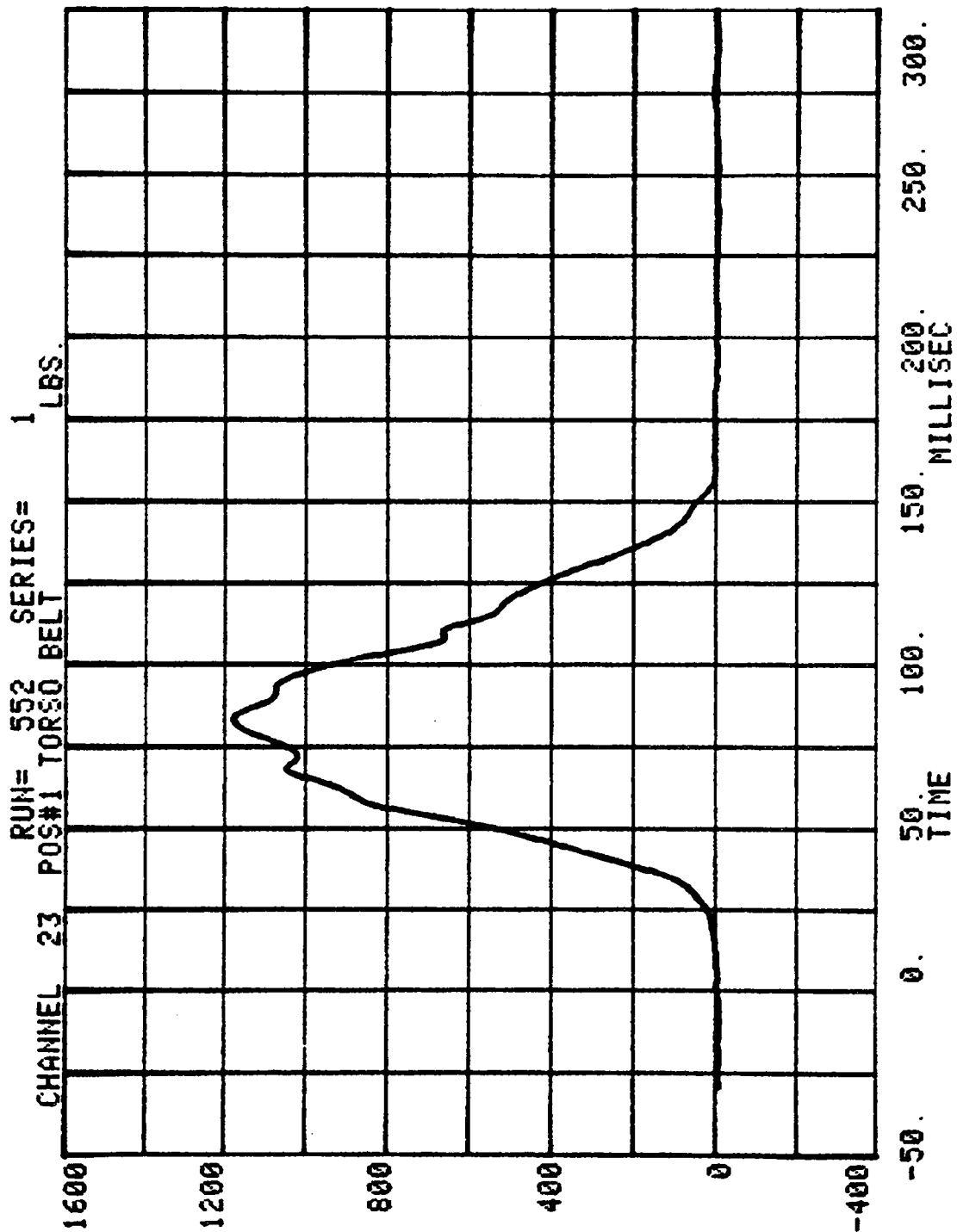


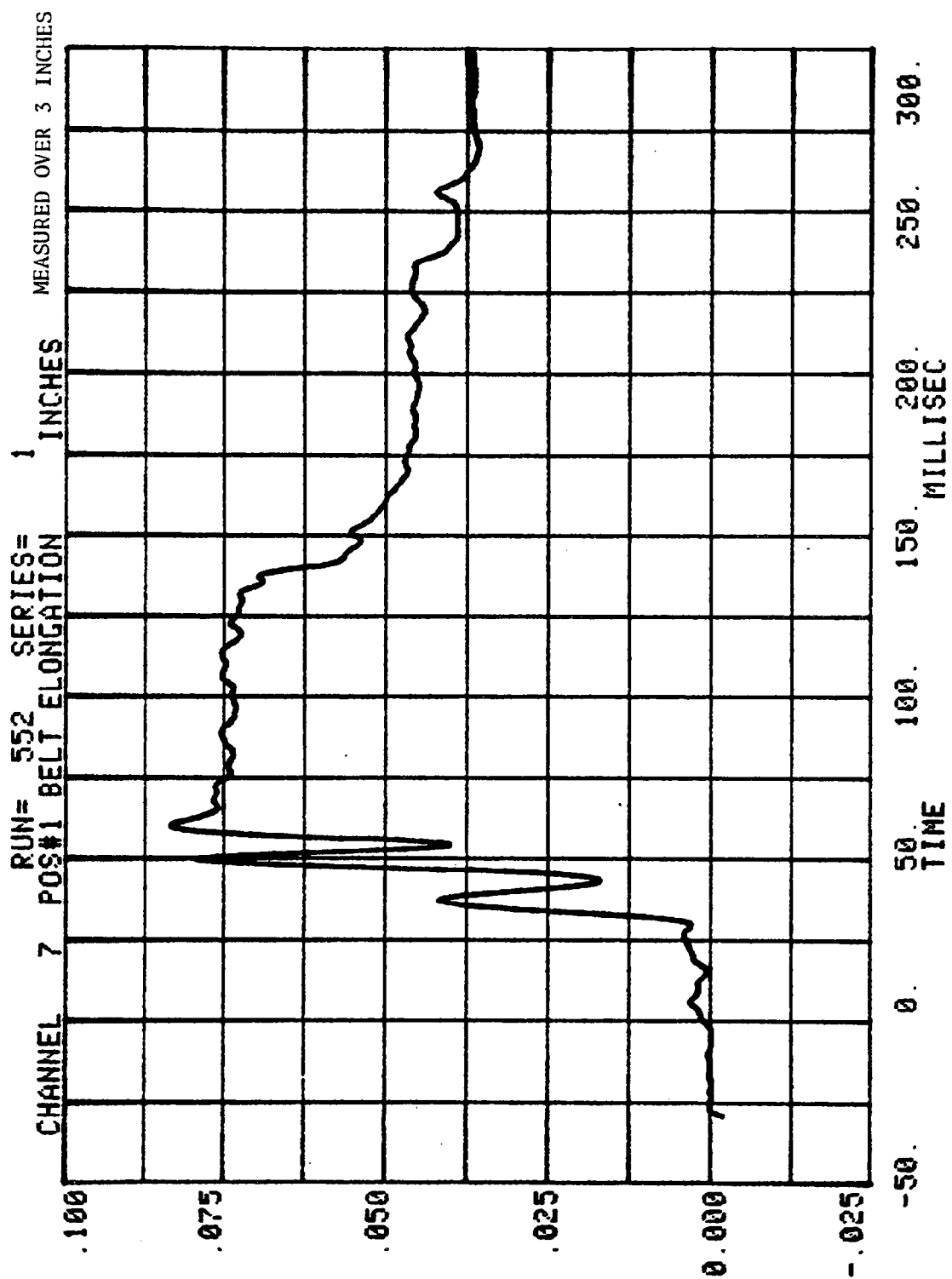


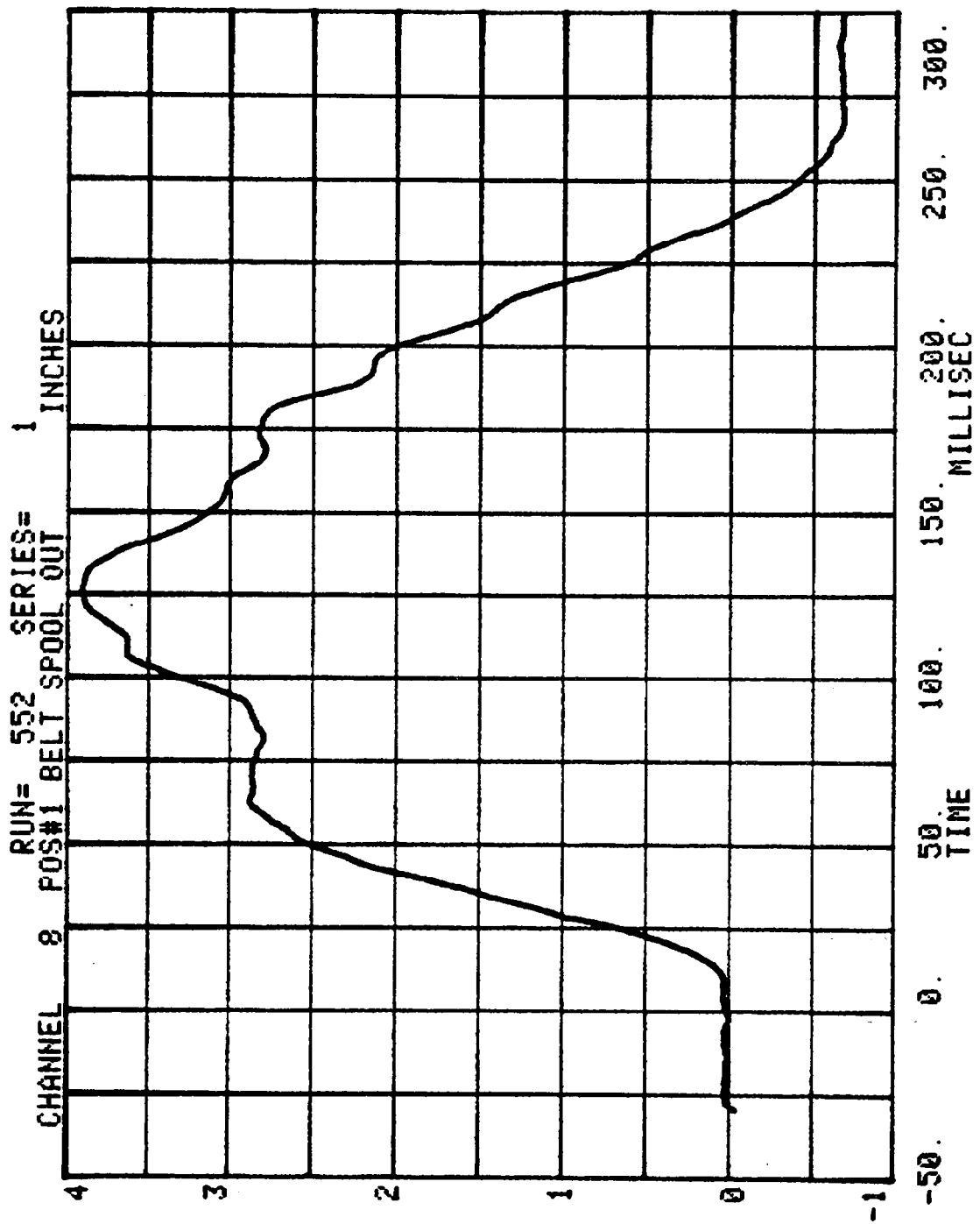












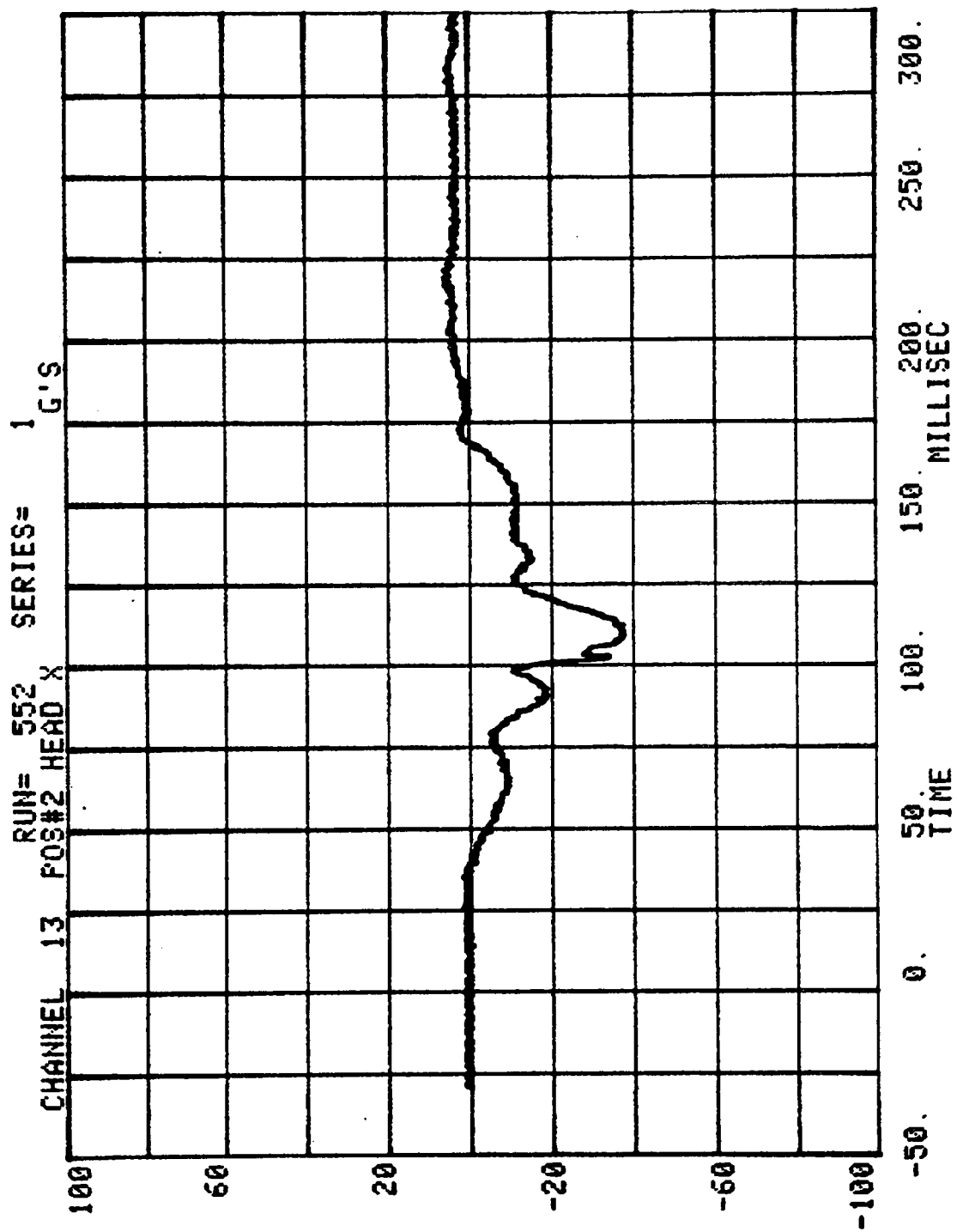
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

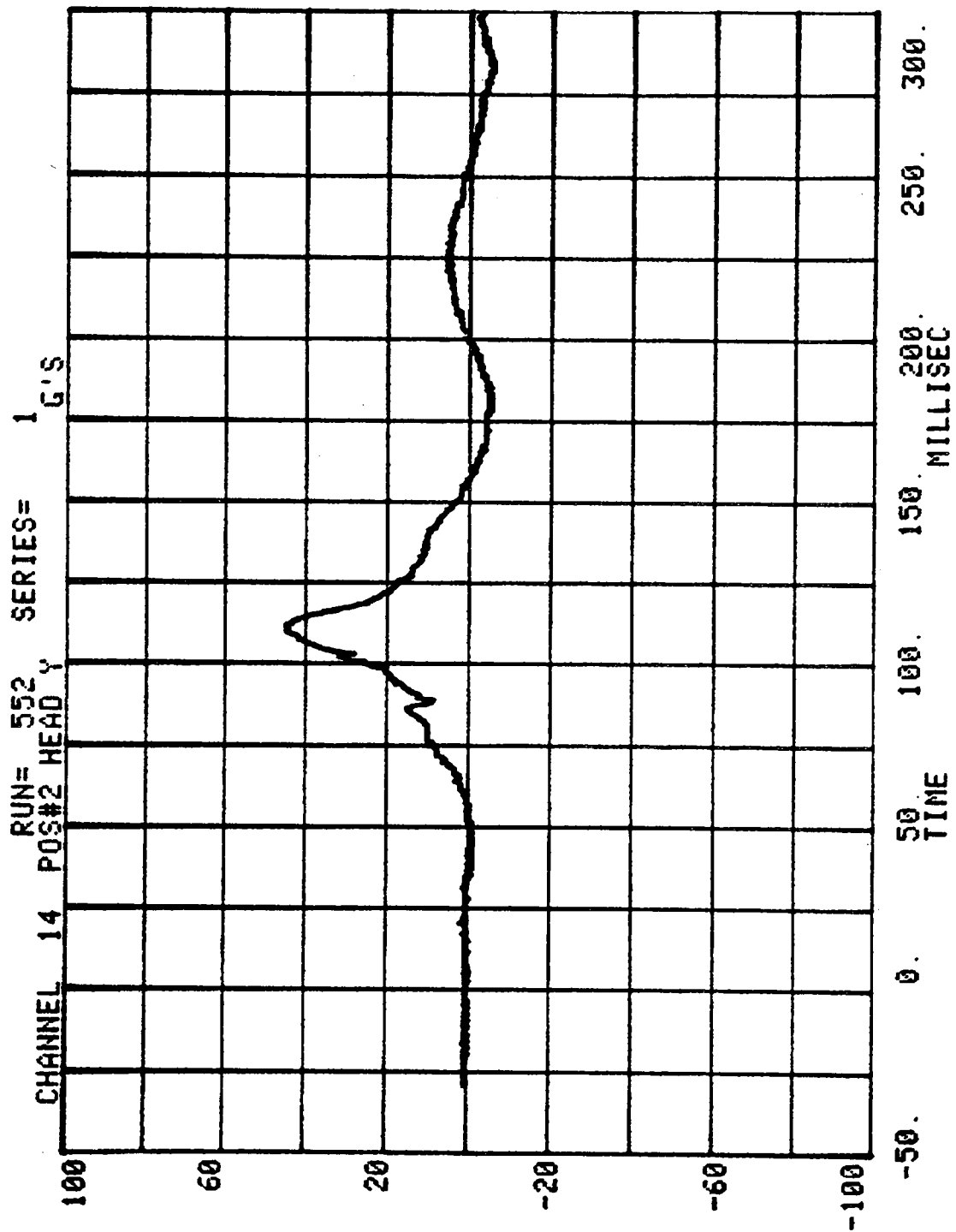
CAR TO LOAD CELL BARRIER

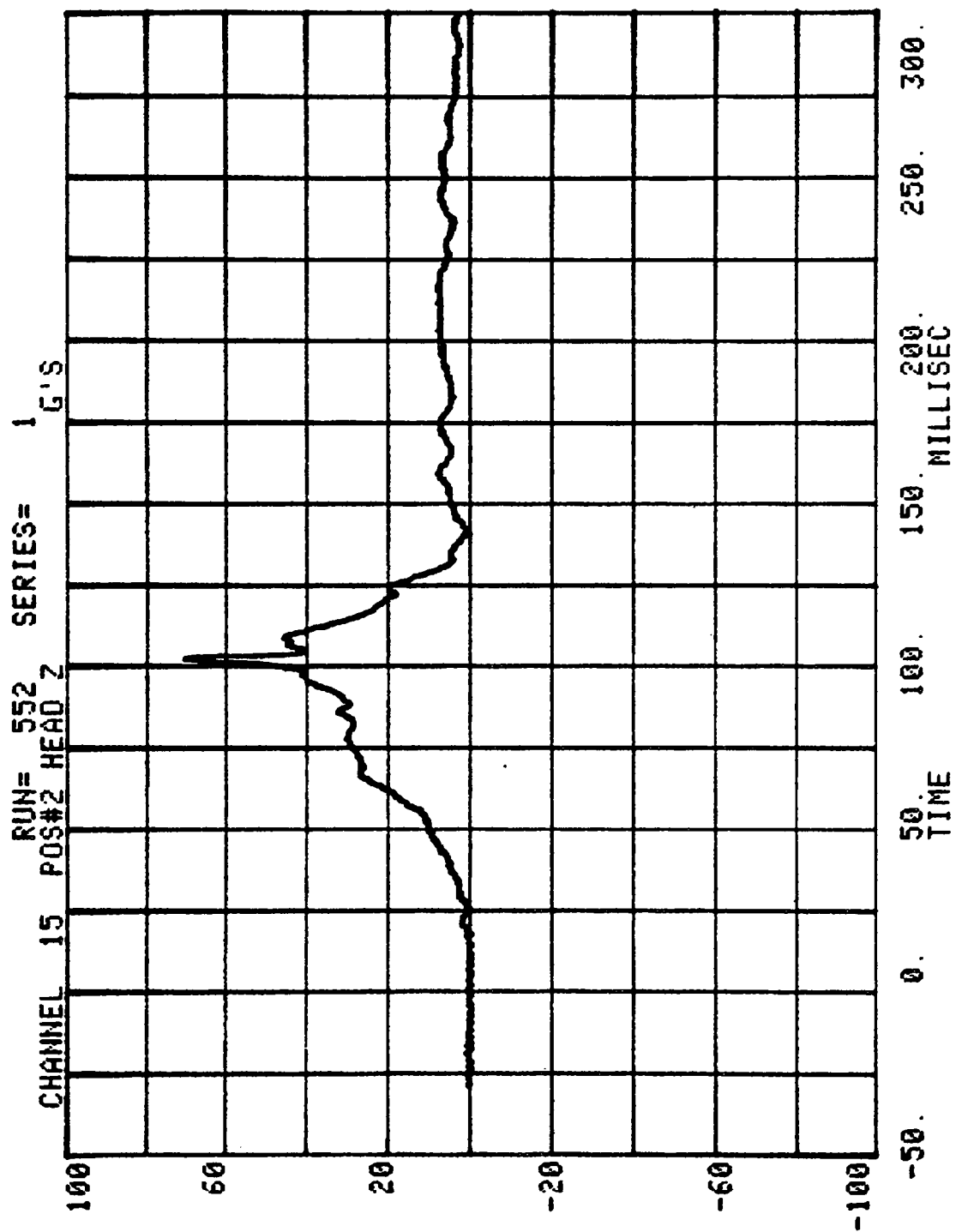
RUN= 552

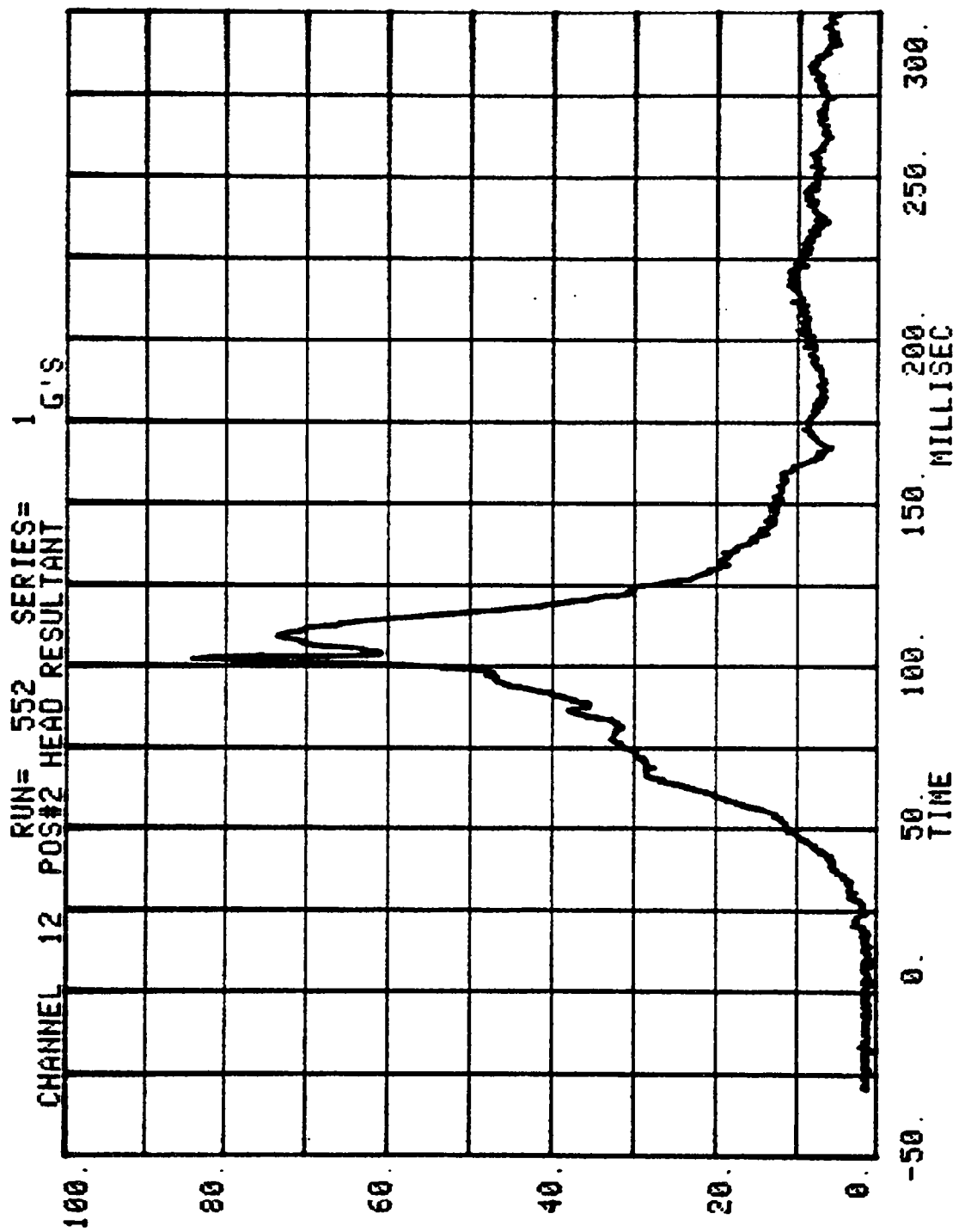
POS#2 HEAD RESULTANT

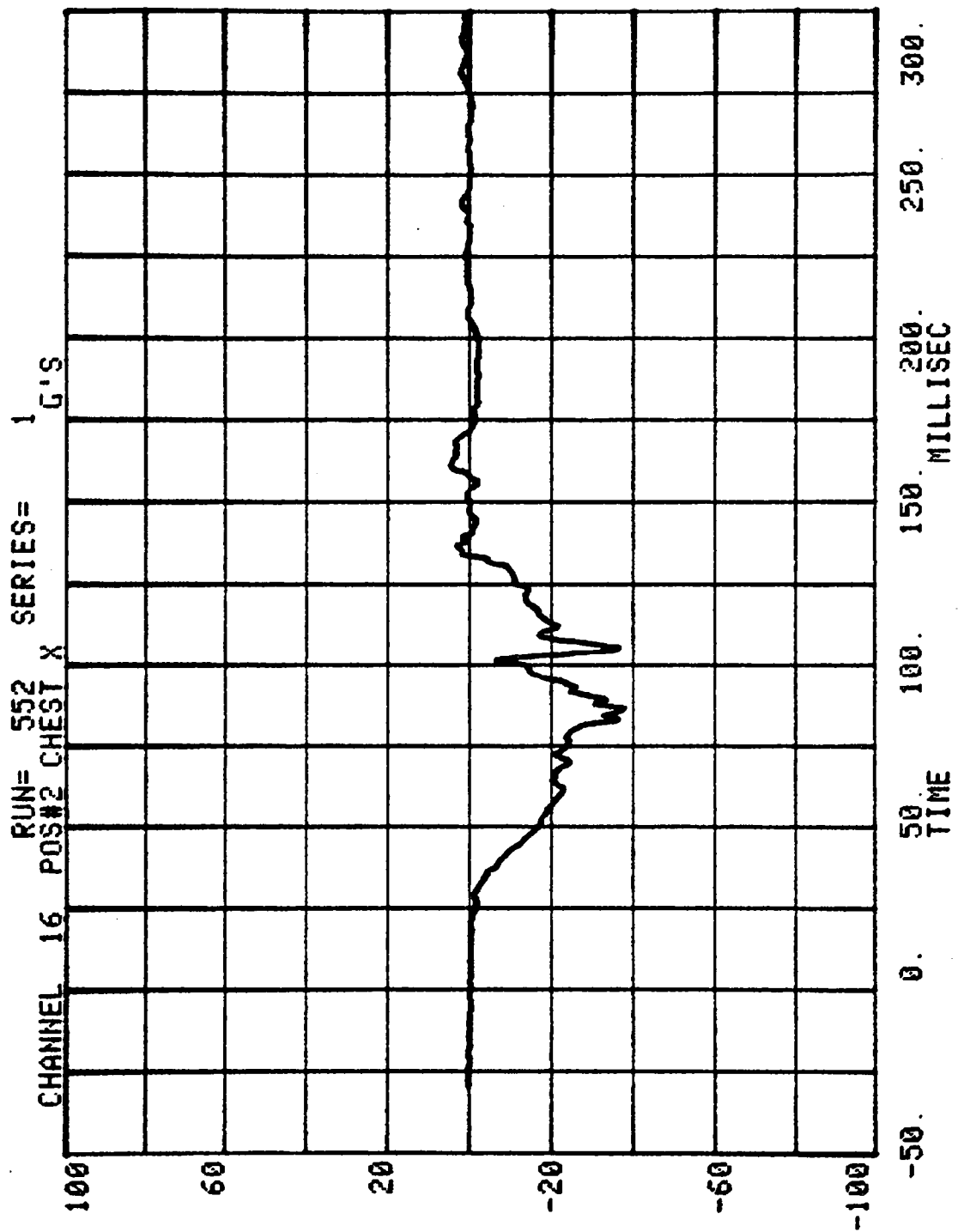
HIC= 808.0 FROM T1= .06510 TO T2= .12607
AVERAGE ACCELERATION BETWEEN T1 AND T2= 44.6G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=1093.1

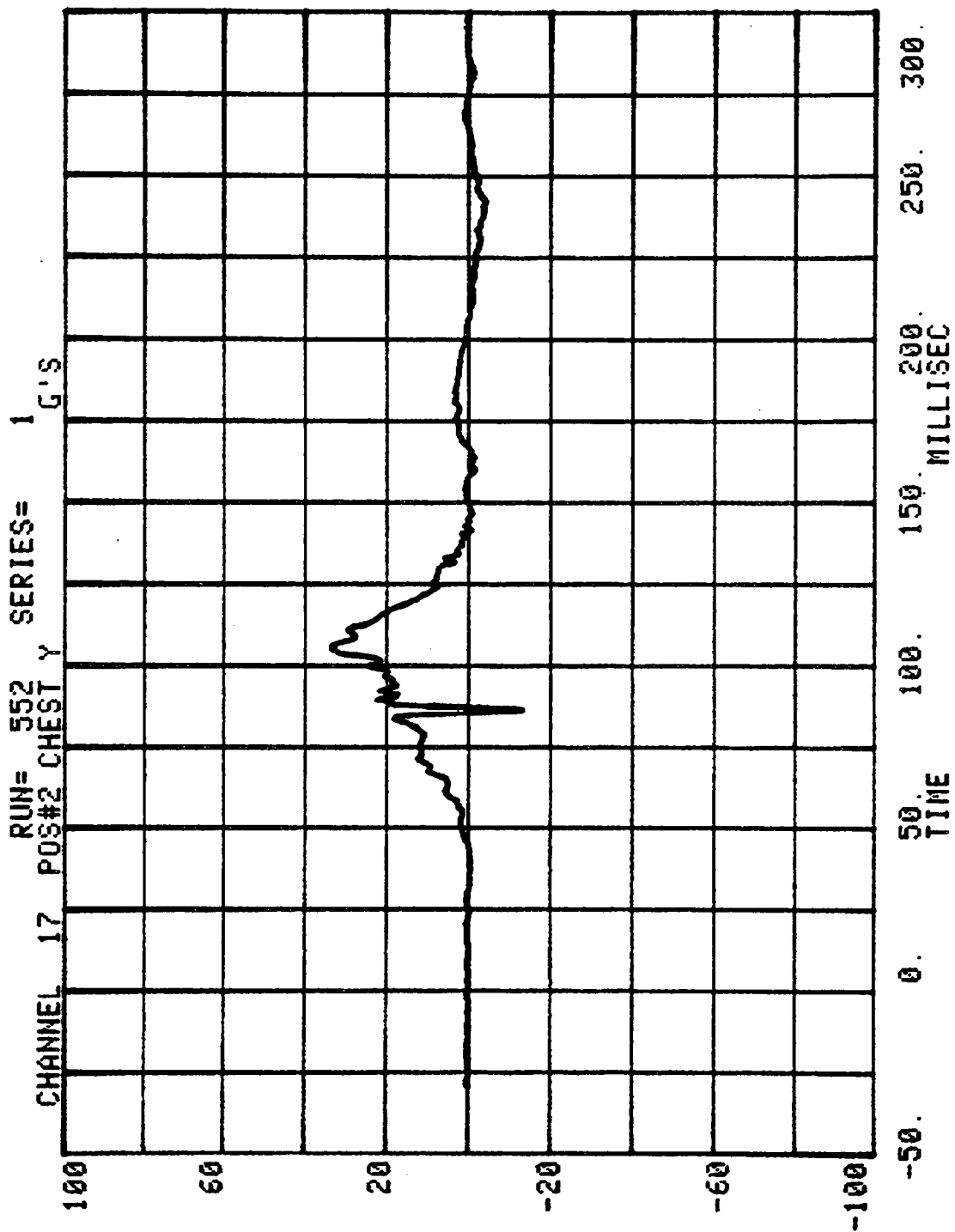


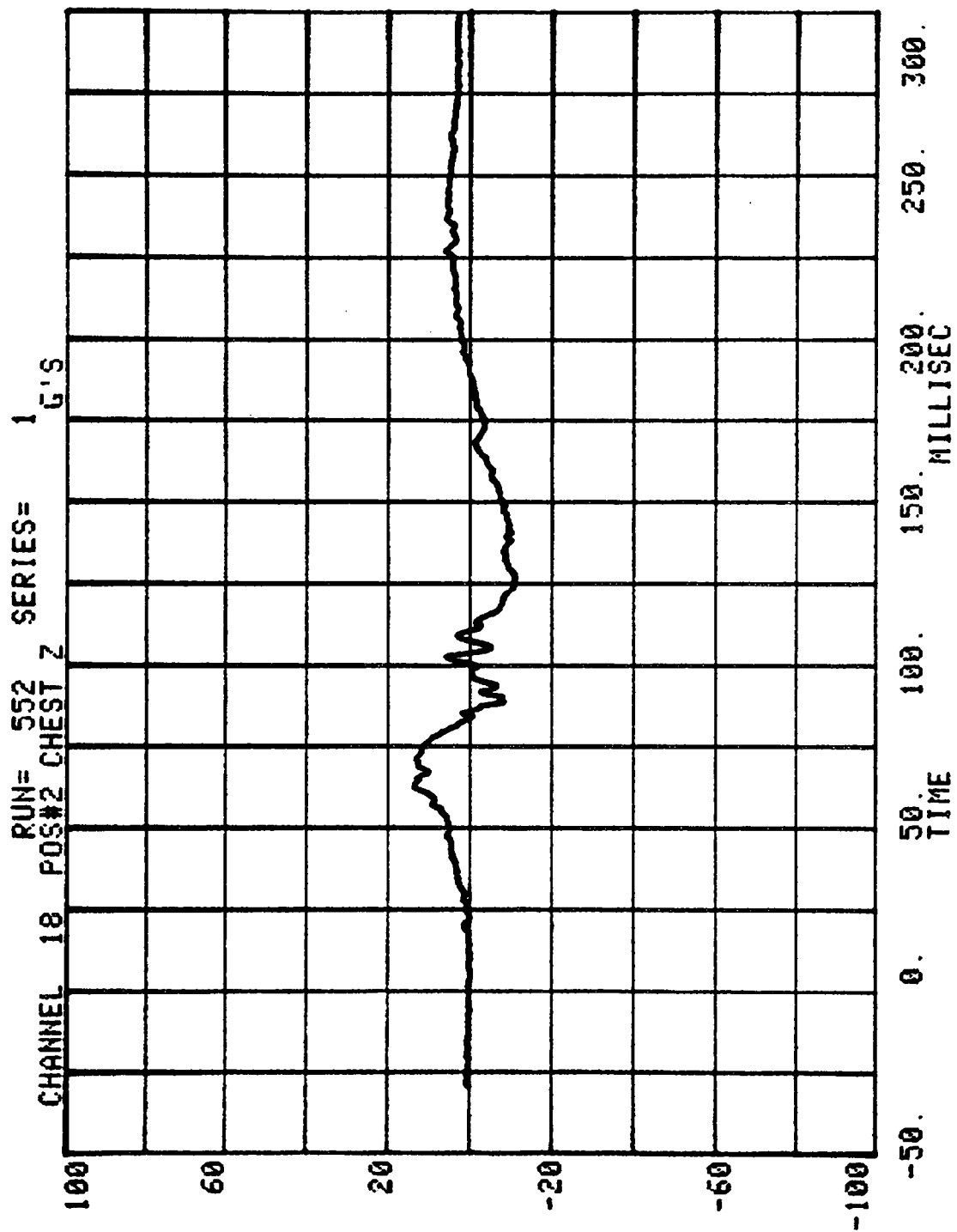


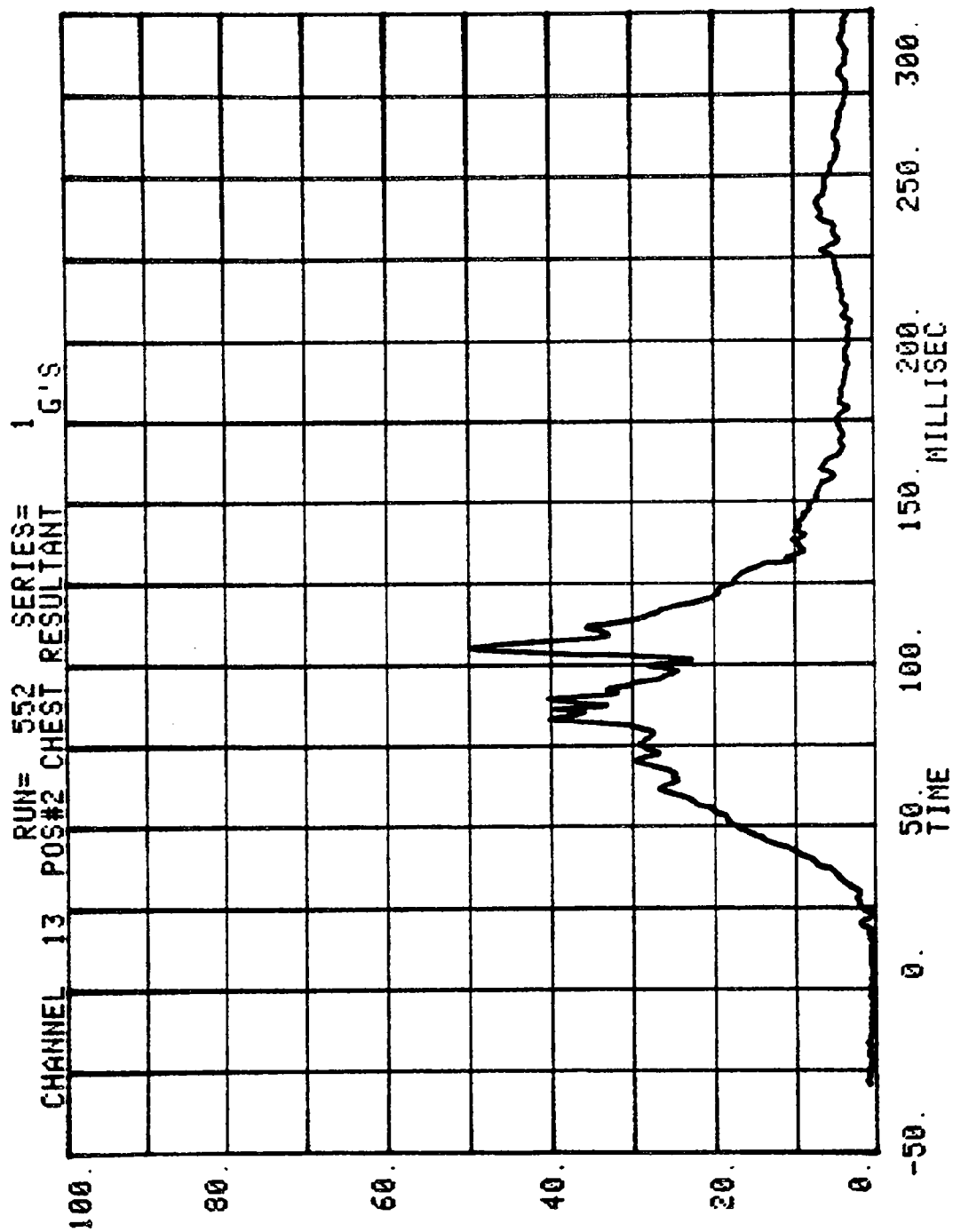


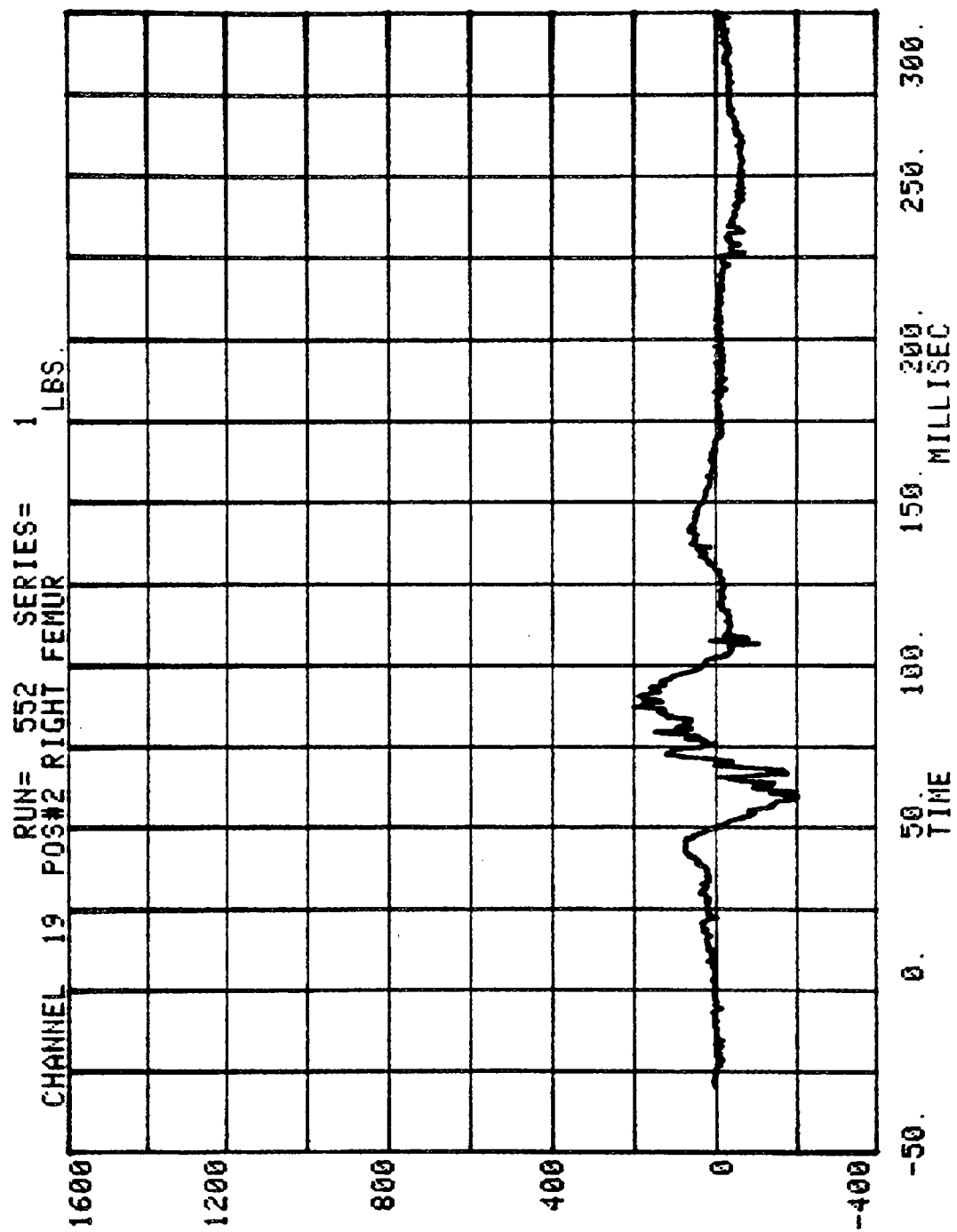


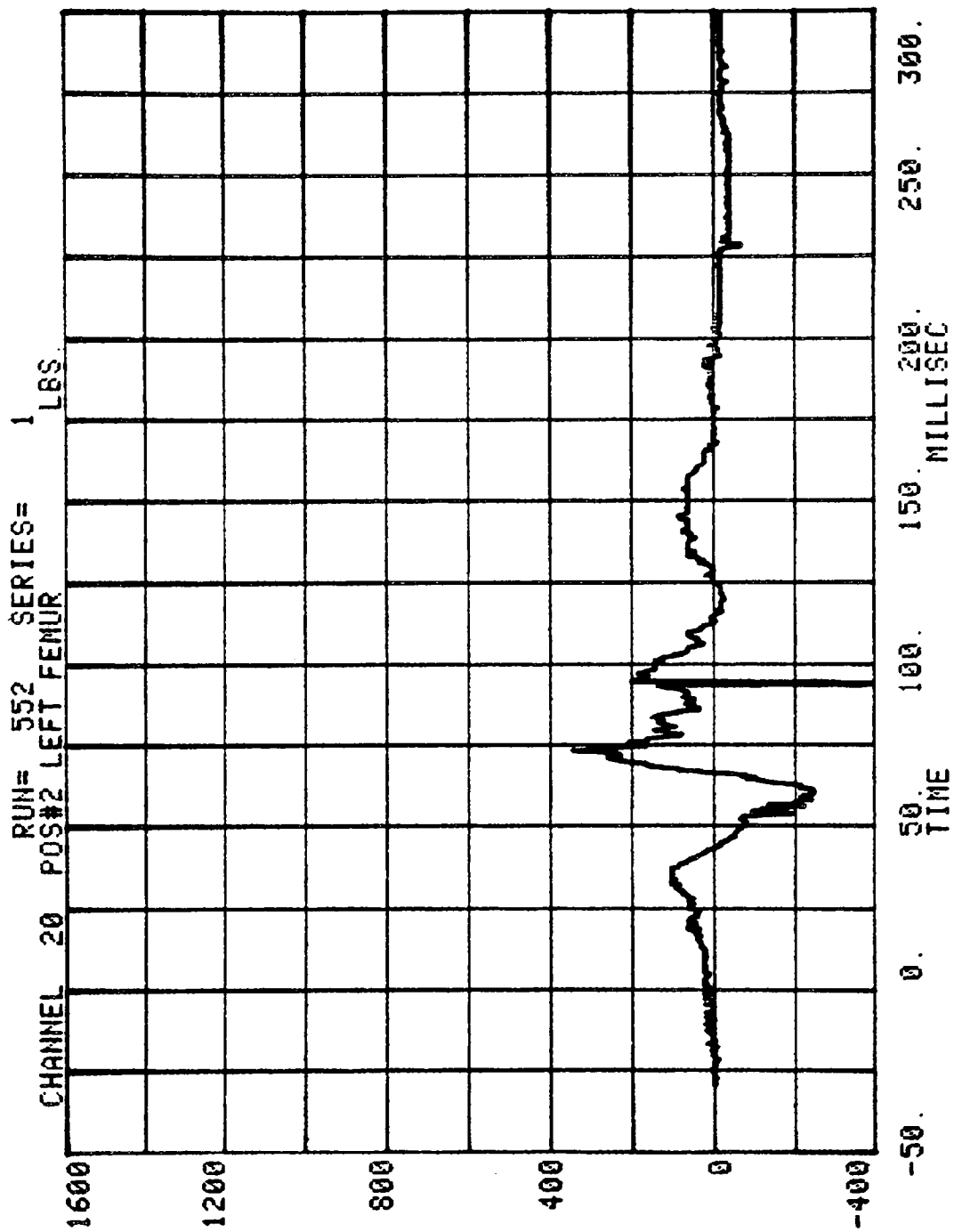


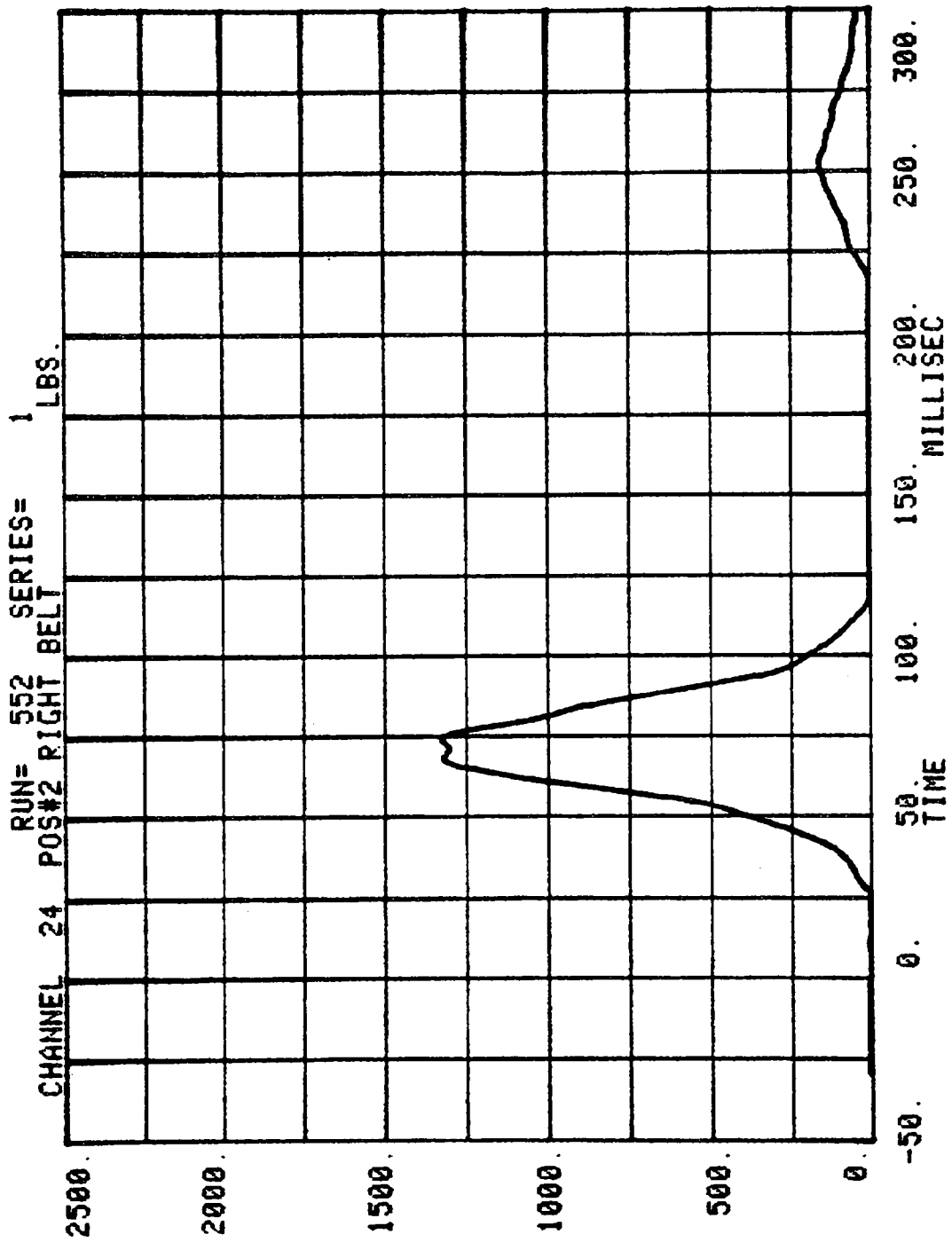


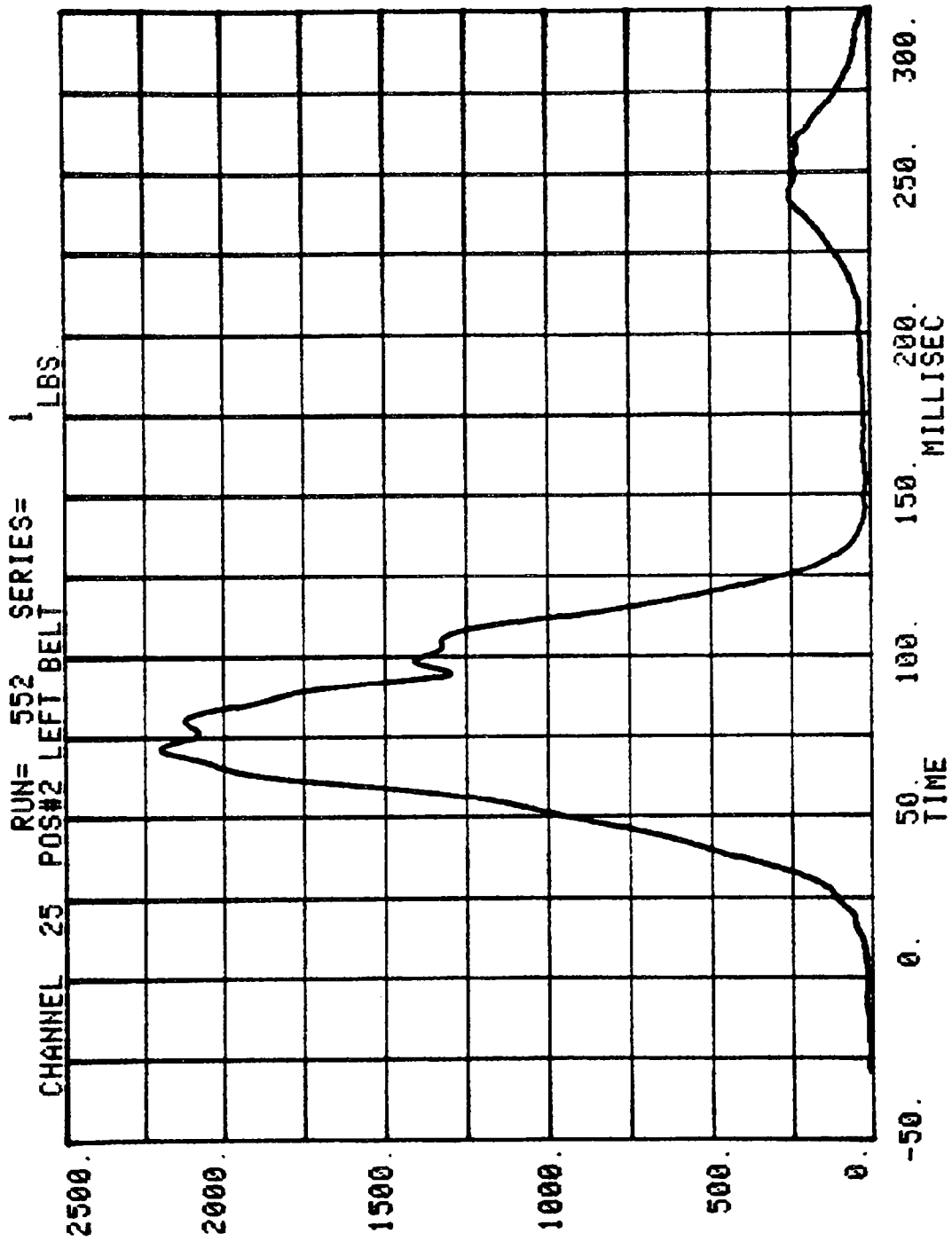


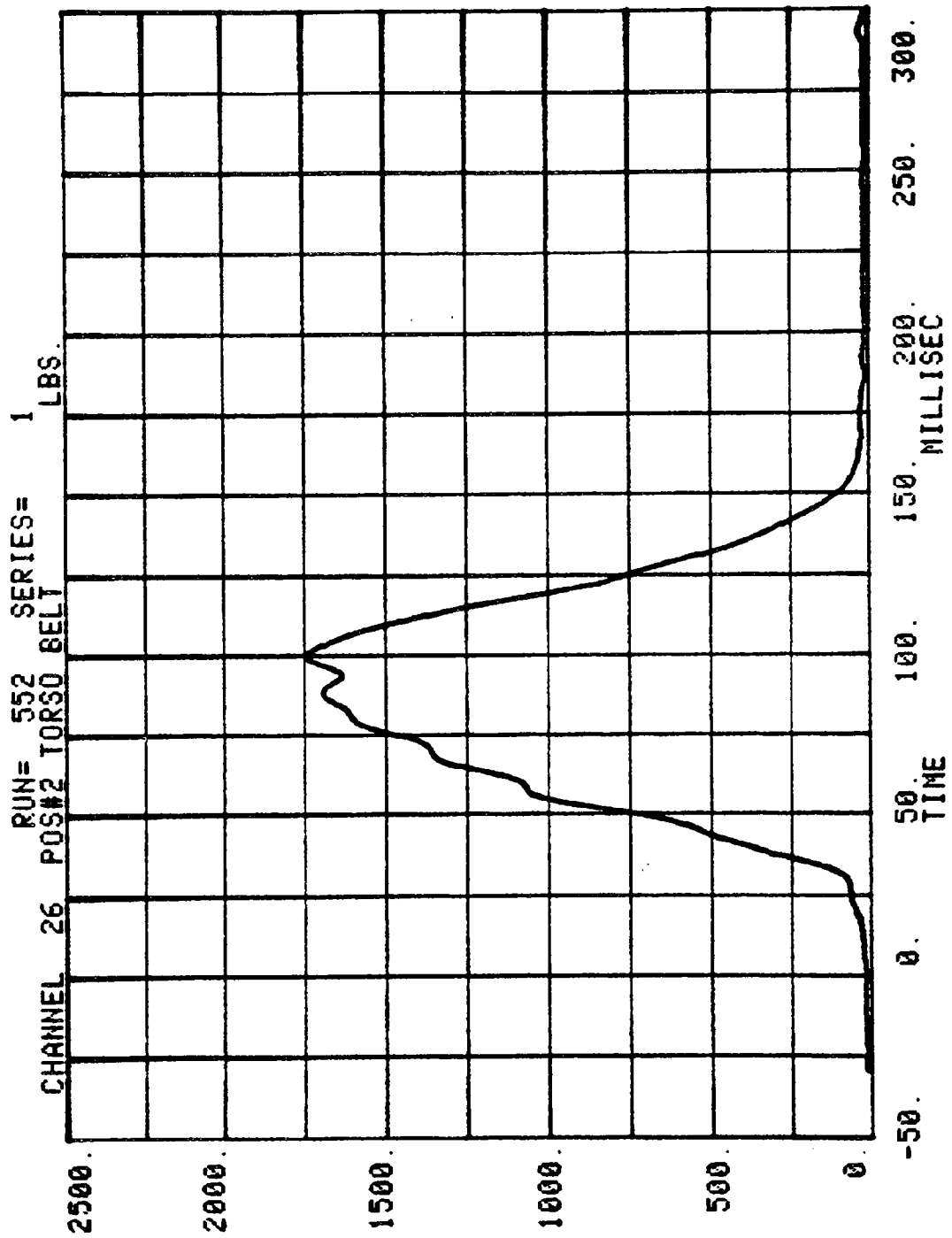


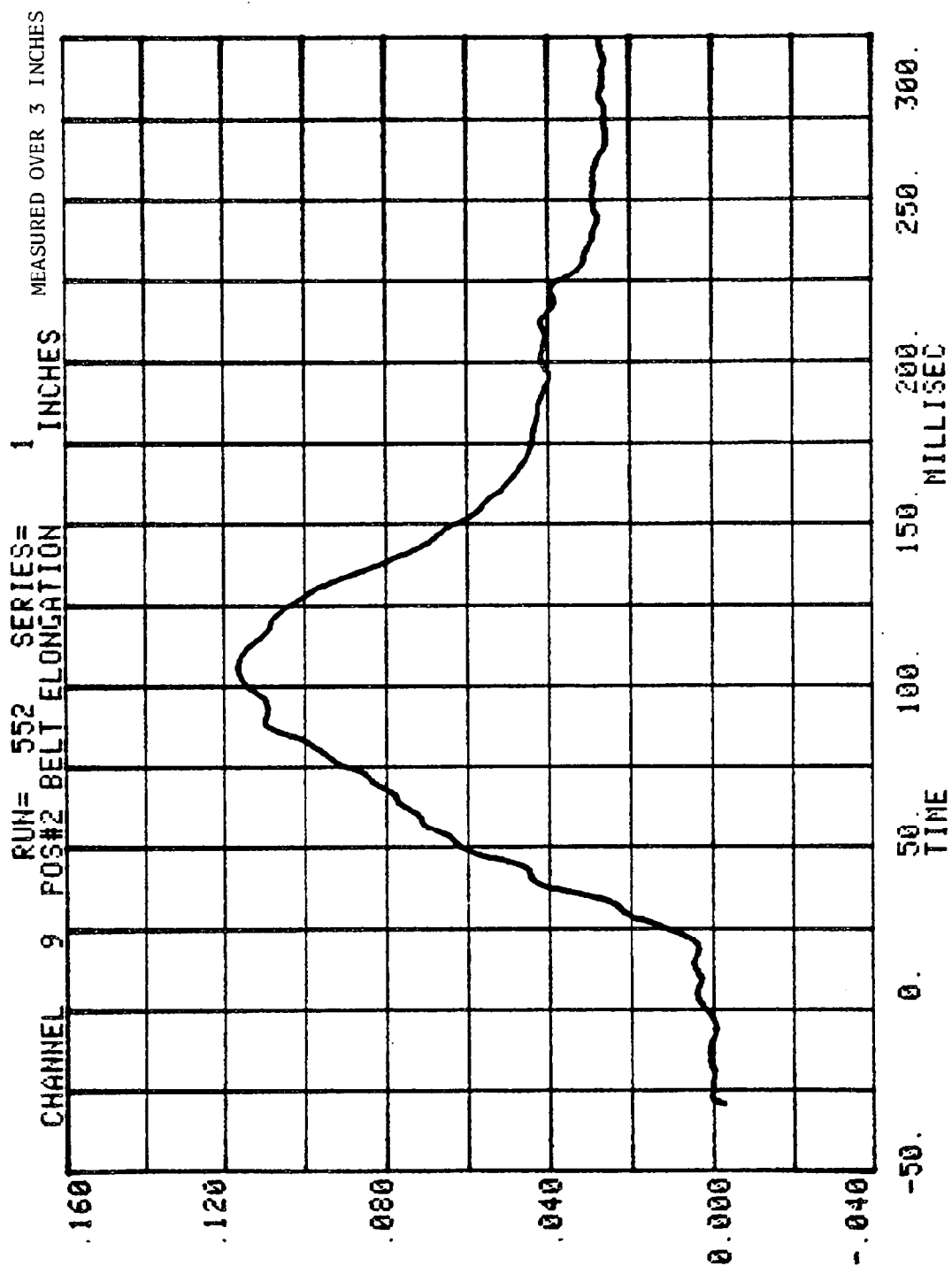


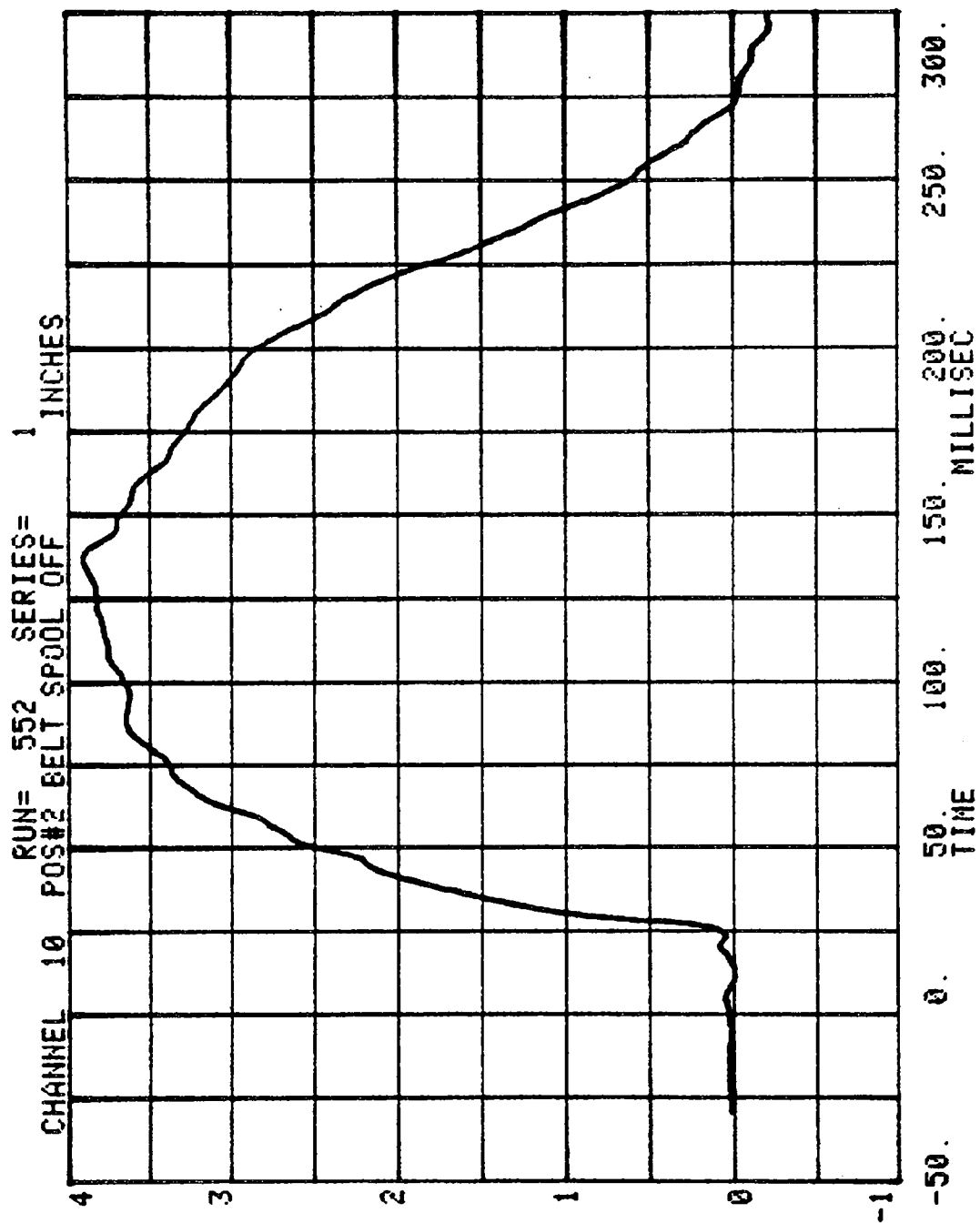












APPENDIX C
DUMMY CERTIFICATION TESTS

Appendix C contains the results from certification tests performed on the Alderson Research Laboratories Model ATD 30034, 50th percentile male anthropometric test devices utilized for this crash tests. 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:

<u>Serial No.</u>	<u>Completion Date</u>
97	8/11/82
818	8/11/82

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.

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 097

LABORATORY TECHNICIAN: E. Cluckey

APPROVED BY: D. Alianello

		Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -		8/11/82	
Calibration Sequential Number for Dummy - - -		7	
Temperature in Lab. (Spec. = 66 to 78°F) - - -		68°-75°F	
Relative Humidity in Lab. (Spec. = 10 to 70%) -		40-50%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST:			
a. Peak Resultant Accel. -	210 to 260G	210 g	
b. Peak Lateral Accel. - -	≤10G	1 g	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.027 ms	
2. NECK BENDING TEST:			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	23.4 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -	20 to 24G	23.5 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	22.5 g	
d. Pendulum Decel. ($t_2 - t_1$)	≤ 3 ms	1.9 ms	
e. Pendulum Decel. ($t_3 - t_2$)	25 to 30 ms	26.25 ms	
f. Pendulum Decel. ($t_4 - t_3$)	≤10 ms	5.3 ms	
g. Pendulum Direction Reversal Time - - - -	≥123 ms	106.8 ms	
h. Max. Head Rotation - -	63 to 73°	66°	
i. Chordal Displacement:			
Head Rotation Angle - -			
0°	Time	-2 to 2 ms	0 ms
	Displ.	-.5 to .5 in	0 in.
30°	Time	25.6 to 34.4 ms	28.75 ms
	Displ.	2.1 to 3.1 in.	2.6 in.
60°	Time	40.3 to 51.7 ms	44.5 ms
	Displ.	4.3 to 5.3 in.	4.7 in.
Maximum (°)	Time	53.2 to 66.8 ms	56.85 ms
	Displ.	5.0 to 6.0 in.	5.2 in.

Continued

TEST PARAMETER		SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. NECK BENDING TEST Continued				
i. Chordal Displacement:				
Head Rotation Angle --				
60°	Time	67.0 to 83.0 ms	67.1 ms	
	Displ.	4.3 to 5.3 in.	4.7 in.	
30°	Time	85.4 to 104.6 ms	86.9 ms	
	Displ.	2.1 to 3.1 in.	2.4 in.	
0°	Time	101.0 to 123.0 ms	101.25 ms	
	Displ.	-.5 to 0.5 in.	0 in.	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ 1" - - - - -		50 to 63 lbs.	60.0 lbs.	
b. Force @ 1.3" - - - - -		73 to 88 lbs.	85.0 lbs.	
4. LUMBAR FLEXION TEST:				
a. Force @ 20° - - - - -		22 to 34 lbs.	31.0 lbs.	
b. Force @ 30° - - - - -		34 to 46 lbs.	38.5 lbs.	
c. Force @ 40° - - - - -		46 to 58 lbs.	49.0 lbs.	
d. Return Angle - - - - -		12° maximum	4°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed - - - - -		21.78-22.22 fps	22.17 fps	
(2) Peak Deflection - - - - -		1.7" maximum	1.68 in.	
(3) Peak Resistive Force - - - - -		2250 lbs. maximum	1950 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	54.9%	
b. Low Speed				
(1) Probe Speed - - - - -		13.86-14.14 fps	13.91 fps	
(2) Peak Deflection - - - - -		1.1" maximum	.99 in.	
(3) Peak Resistive Force - - - - -		1450 lbs. maximum	1200 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	54.5%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. 097

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. <u>KNEE IMPACT TESTS:</u>			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.82 fps	
(2) Maximum Force - -	1850 to 2500 lbs	1900 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.25 ms	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.01 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2250 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.0 ms	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 97

CALIB. SEQ. NOS. FOR DUMMY: 7 &

A. DUMMY INSTRUMENTS:

1. Head Accelerometers--

a. Triaxial unit - - - - -

b. Uniaxial units

(1) Longitudinal (A_x) -

(2) Lateral (A_y) - - -

(3) Vertical (A_z) - - -

2. Chest Accelerometers-- (Vehicle Crash Test Usage)

a. Triaxial unit - - - - -

b. Uniaxial units

(1) Longitudinal (A_x) -

(2) Lateral (A_y) - - -

(3) Vertical (A_z) - - -

3. Chest Potentiometer - - -

4. Femur Load Cells--

a. Right Side - - - - -

b. Left Side

B. CALIB. LAB. INSTRUMENTS:

1. Pendulum Accelerometer - -

2. Test Probe Accelerometer -

3. Lumbar Flexion Test Push
Force Gauge - - - - -

4. Abdominal Compression Test
Force Gauge - - - - -

5. Abdominal Compression Test
Displacement Gauge - - - -

MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE NEXT CALIBRATION
ENDEVCO	DB47	6/82	1/83
ENDEVCO	CX05	6/82	1/83
ENDEVCO	CJ54	6/82	1/83
GSE	312	6/82	1/83
GSE	311	6/82	1/83
CEC	22707	6/82	1/83
CEC	22958	6/82	1/83
TRANSDUCER INC.	20051	6/82	1/83
BLH	72952	6/82	1/83
CIC	567-11	6/82	1/83

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 818

LABORATORY TECHNICIAN: E. Cluckey

APPROVED BY: D. Lionello

		Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -		8/11/82	
Calibration Sequential Number for Dummy - - - -		1	
Temperature in Lab. (Spec. = 66 to 78°F) - - - -		68°-75°F	
Relative Humidity in Lab. (Spec. = 10 to 70%) -		40-50%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST:			
a. Peak Resultant Accel. -	210 to 260G	240 g	
b. Peak Lateral Accel. - -	≤10G	6 g	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.0 ms	
2. NECK BENDING TEST:			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	23.5 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -	20 to 24G	24 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	24 g	
d. Pendulum Decel. ($t_2 - t_1$)	≤3 ms	2.2 ms	
e. Pendulum Decel. ($t_3 - t_2$)	25 to 30 ms	27.2 ms	
f. Pendulum Decel. ($t_4 - t_3$)	≤10 ms	5.6 ms	
g. Pendulum Direction Reversal Time - - - -	≥123 ms	106 ms	
h. Max. Head Rotation - -	63 to 73°	70°	
i. Chordal Displacement:			
Head Rotation Angle - -			
0°	Time	-2 to 2 ms	0 ms
	Displ.	-.5 to .5 in	0.0 in.
30°	Time	25.6 to 34.4 ms	26.5 ms
	Displ.	2.1 to 3.1 in.	2.6 in.
60°	Time	40.3 to 51.7 ms	42.5 ms
	Displ.	4.3 to 5.3 in.	4.6 in.
Maximum (°)	Time	53.2 to 66.8 ms	54 ms
	Displ.	5.0 to 6.0 in.	5.0 in.

Continued

TEST PARAMETER		SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. NECK BENDING TEST <u>Continued</u>				
i. Chordal Displacement:				
Head Rotation Angle --				
60°	Time	67.0 to 83.0 ms	70 ms	
	Displ.	4.3 to 5.3 in.	4.63 in.	
30°	Time	85.4 to 104.6 ms	87 ms	
	Displ.	2.1 to 3.1 in.	2.2 in.	
0°	Time	101.0 to 123.0 ms	101 ms	
	Displ.	-.5 to 0.5 in.	0.0 in.	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ 1" - - - - -		50 to 63 lbs.	54.0 lbs.	
b. Force @ 1.3" - - - - -		73 to 88 lbs.	87.0 lbs.	
4. LUMBAR FLEXION TEST:				
a. Force @ 20° - - - - -		22 to 34 lbs.	33.5 lbs.	
b. Force @ 30° - - - - -		34 to 46 lbs.	41.5 lbs.	
c. Force @ 40° - - - - -		46 to 58 lbs.	47.0 lbs.	
d. Return Angle - - - - -		12° maximum	10°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed - - - - -		21.78-22.22 fps	14.08 fps	
(2) Peak Deflection - - - - -		1.7" maximum	1.54 in.	
(3) Peak Resistive Force - - - - -		2250 lbs. maximum	1925 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	61.4%	
b. Low Speed				
(1) Probe Speed - - - - -		13.86-14.14 fps	13.94 fps	
(2) Peak Deflection - - - - -		1.1" maximum	1.02 in.	
(3) Peak Resistive Force - - - - -		1450 lbs. maximum	1190 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	52.7%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. 818

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. <u>KNEE IMPACT TESTS:</u>			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.99 fps	
(2) Maximum Force - -	1850 to 2500 lbs	2200 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.2 ms	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.04 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2300 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.0 ms	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 818

CALIB. SEQ. NOS. FOR DUMMY: 1 &

A. DUMMY INSTRUMENTS:

1. Head Accelerometers--

a. Triaxial unit - - - - -

b. Uniaxial units

(1) Longitudinal (A_x) -

(2) Lateral (A_y) - - -

(3) Vertical (A_z) - - -

2. Chest Accelerometers-- (Vehicle Crash Test Usage)

a. Triaxial unit - - - - -

b. Uniaxial units

(1) Longitudinal (A_x) -

(2) Lateral (A_y) - - -

(3) Vertical (A_z) - - -

3. Chest Potentiometer - - -

4. Femur Load Cells--

a. Right Side - - - - -

b. Left Side

B. CALIB. LAB. INSTRUMENTS:

1. Pendulum Accelerometer - -

2. Test Probe Accelerometer -

3. Lumbar Flexion Test Push
Force Gauge - - - - -

4. Abdominal Compression Test
Force Gauge - - - - -

5. Abdominal Compression Test
Displacement Gauge - - - -

MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE NEXT CALIBRATION
ENDEVCO	DB47	6/82	1/83
ENDEVCO	CX05	6/82	1/83
ENDEVCO	CJ54	6/82	1/83
GSE	312	6/82	1/83
GSE	311	6/82	1/83
CEC	22707	6/82	1/83
CEC	22958	6/82	1/83
TRANSDUCER INC.	20051	6/82	1/83
BLH	72952	6/82	1/83
CIC	567-11	6/82	1/83