

DOT 47

REPORT NO. 7095-V-3

NEW CAR ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS NOS. 212, 219, AND 301-75

TOYO KOGYO CO. LTD.

1982 MAZDA-626

4-DOOR SEDAN

NHTSA TEST NO. 447-3-553

CALSPAN CORPORATION

ADVANCED TECHNOLOGY CENTER

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FINAL REPORT

October 1982

Prepared for:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
400 SEVENTH STREET, S.W.
WASHINGTON, DC 20590

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FINAL REPORT ACCEPTED BY:

Contract Technical Manager

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16. Abstract A frontal load cell barrier test of a 1982 Mazda-626 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 was 35.26 mph. Ambient temperature on test date was 64°F. Post-test vehicle crush was 22.3 inches. Intrusion of firewall into compartment was 6.6 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 FMVSS 208 - Injury Criteria results were as follows: Driver - Passed Right Front Passenger - Failed Head - HIC number 1693.					
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SECTION 1

PURPOSE AND TEST PROCEDURE

This barrier test of a 1982 Mazda-626 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 NUMBER 447-3-553

A load cell barrier consisting of 36 load cells (Figure 10) was impacted by a 1982 Mazda-626 at a velocity of 35.26 mph. The test was performed at the Calspan Corporation Advanced Technology Center on September 28, 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 572, 50th percentile male Anthropomorphic Test Devices (ATD's) were placed in the 1982 Mazda-626 in the driver and right front passenger seating positions, according to dummy placement procedures specified in Laboratory Procedures for Vehicle Assessment TP-212-02.

The occupant dummies were instrumented with head and triaxial accelerometers and femur load cells. Load cells were also placed on the lap and shoulder belts to measure dummy torso and lap loading. The right front passenger ATD (Serial No. 153) had been used in a previous test (447-1-551). The FMVSS 208 Injury Criteria Values were not exceeded in that test. The driver ATD (Serial No. 109) had been certified prior to this test; verification details along with instrumentation calibration data are found in Appendix C of this report.

The crash test was recorded by one real time camera and 12 high-speed cameras. Camera locations and other pertinent camera information are found in Section 4 of this report.

The 68 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 68 data channels checked out prior to the test. The only data loss experienced during impact was accelerometer 5X (right front brake caliper). The signal wire was cut during the impact event.

GENERAL COMMENTS

The 1982 Mazda-626, four-door sedan was equipped with a 120.2 cubic inch, four cylinder engine, three speed automatic transmission and power brakes. The total test weight with two 50th percentile dummies, instrumentation and cameras was 2900 pounds.

The 1982 Mazda-626 which was involved in a frontal load cell barrier crash at a velocity of 35.26 mph complied with FMVSS Nos. 212- Windshield Mounting; 219- Windshield Zone Intrusion; and 301-75- Fuel System Integrity. There was 100 percent windshield retention, no intrusion into the protected zone, and no fuel leakage after impact or any phase of the roll over test.

The vehicle sustained 22.3 inches of static crush and approximately 27.5 inches of dynamic crush. Maximum firewall intrusion into the occupant compartment was 6.6 inches. The maximum load cell barrier force-measured by the 36 load cells was 89,000 pounds at 15 milliseconds.

At impact the windshield cracked along the bottom. All other glazing remained intact. Both front doors required the use of tools to open them.

The driver's head struck the steering wheel rim and the dash panel. The femurs contacted the underside of the dash panel. The driver did comply with all FMVSS 208- Injury Criteria with a HIC of 968.6, maximum chest deceleration over 3 milliseconds of 47g's, and femur loads of 1215 and 575. Belt spool-out was 6 inches and belt stretch was .96 inches per foot as measured between the retractor and "D" ring.

The right front passenger head struck the dash panel and failed to comply with the FMVSS 208- Head Injury Criteria with a HIC of 1692.9, but did comply with a maximum chest deceleration over 3 milliseconds of 50g's, and femur loads of 250 and 550 pounds. The belt spool-out was 5.8 inches and belt stretch was .98 inches per foot as measured between the "D" ring and retractor.

Table 1

CRASH TEST SUMMARY

TEST NO. 447-3-553 PROJECT: NEW CAR ASSESSMENT PROGRAM

DATE: 9/28/82 TIME: 13:40 TEMP: 64°

VEHICLE	<u>1982 Mazda-626</u>
TEST WEIGHT (lbs)	<u>2990</u>
IMPACT ANGLE (deg)*	<u>0</u>
IMPACT VELOCITY (mph)**	<u>35.26</u>
MAX. CRUSH (in) static	<u>23.3</u>
MAX. INTRUSION (in) static	<u>6.6</u>

DUMMIES

TYPE	<u>Hybrid II, Part 572</u>	<u>Hybrid II, Part 572</u>
LOCATION	<u>LF(1) 109</u>	<u>RF(2) 153</u>
RESTRAINT	<u>Production 3-point Belt System</u>	<u>Production 3-point Belt System</u>

NUMBER OF DATA CHANNELS 68

NUMBER OF HIGH SPEED CAMERAS 12 + 1 Real Time

*With respect to tow track Centerline

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

Table 2

VEHICLE TEST WEIGHTS AS TESTED

Left Front 720 lbs
 Right Front 730 lbs
 TOTAL FRONT 1450 lbs

Left Rear 730 lbs
 Right Rear 720 lbs
 TOTAL REAR 1450 lbs

Total Weight = 2900 lbs

Wheel Base = 99.75 inches

$Cg_{F.W.} = \frac{1450 \text{ lbs} \times 99.75 \text{ inches}}{2900 \text{ lbs}} = 49.87 \text{ inches}$

CALCULATION FOR TEST WEIGHT

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (2480 lbs)

VCW = Vehicle Capacity Weight (680 lbs)

DSC = Designated Seating Capacity (4)

$RCLW = VCW - 150 (DSC)$

$RCLW = 680 - 150 (4) = 80 \text{ lbs}$

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

$TEST \text{ WEIGHT} = 2480 \text{ lbs} + 80 \text{ lbs} + 2 (164 \text{ lbs})$

$TEST \text{ WEIGHT} = 2888 \text{ lbs}$

Table 3
SUMMARY OF TEST CONDITIONS

TEST VEHICLE INFORMATION

Vehicle Manufacturer Toyo Kogyo Company, Ltd.
Make/Model Mazda-626
Body Style 4-Door Model Year 1982
VIN JM1GB2211C0638983 Build Date 6/82
NHTSA No. 447-3-553 Color Lt. Brown
Engine Data: 4 cylinders 120.2 ci in³/cc displacement
Transmission Data: 3 speed () Manual (x) Automatic
Date Rec'd 9/10/82 Air Cond. - PW. STR. PW. BR. x
Dealer's Name & Address Halls, Lockport, N. Y.

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

Vehicle Manufactured by Toyo Kogyo Company, Ltd.
Date of Manufacture 6/82 VIN JM1GB2211C0638983
GVRW 3355 lbs GAWR: Front 1900 lbs Rear 1900 lbs

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

Vehicle Load (up to capacity) - Front 26 psi
Rear 26 psi
Recommended Tire Size 165 SR 13 Load Range: x B C D
Vehicle Capacity: Types of Seats Bench Bucket Split Bench
Number of Occupants (Designated Seating Capacity): 2 Front
2 Rear
4 TOTAL
Cargo Load = 80 lbs
TOTAL = 680 lbs

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

Right Front = 640 lbs Right Rear = 580 lbs
Left Front = 700 lbs Left Rear = 560 lbs
TOTAL FRONT WEIGHT = 1340 lbs (54 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1140 lbs (46 % of Total Vehicle Weight)
TOTAL DELV. WEIGHT = 2480 lbs

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 92 lbs CARGO

Right Front = 730 lbs Right Rear = 720 lbs
Left Front = 720 lbs Left Rear = 730 lbs
TOTAL FRONT WEIGHT = 1450 lbs (50 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1450 lbs (50 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 2900 lbs
Weight of ballast secured in vehicle trunk area = 0 lbs

(gFW = 49.87 inches)

Table 3

SUMMARY OF TEST CONDITIONS (Cont'd)TEST CONDITIONS

Date of Test 9/28/82 Time of Test 13:40 am/pm
 Ambient Temperature 64 °F at impact area
 Temperature in Occupant Compartment 72 °F
 Windshield Molding Temperature 66 °F

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitude: RF 25.1 LF 24.3 RR 25.2 LR 24.2
 Test Attitude: RF 23.8 LF 22.6 RR 24.0 LR 22.8

VEHICLE TIRE DATA

Recommended Cold Tire Pressure: Front = 26 psi Rear = 26 psi
 Recommended Tire Size 165SR13 Load Range B
 Tires on Vehicle 165SR13
 Is Spare Tire a "Space Saver" x yes 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* gal
 Test Volume 13.48 gal (93% of EPA Capacity)
 Fuel System Capacity (data from Owner's Manual) 14.5 gal
 Details of fuel system Electric fuel pump located forward of rear axle. Fuel tank is located aft of rear axle and secured in place by two tank straps. The filler tube is located on left side of vehicle and sealed by a twist type cap which is concealed by a hinged door.
 Electric Fuel Pump x Yes 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 171.41/L 171.5 inches
 Post-Test = R 150.1/L 151.4 inches

Crush = R 21.3 /L 20.1

FOR FRONTAL IMPACTS, distance from front of test vehicle to the barrier after impact = 10.75 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
- Retention Zone
- Fuel System Integrity FMVSS 301-75

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

TYPE OF TEST x Frontal (90°) Impact
 _____ Oblique (____ $^\circ$) Impact on _____ Left (Driver's) Side
 _____ Right Side
 _____ Lateral or Side Impact on _____ Left (Driver's) Side
 _____ Right Side
 _____ Rear Impact

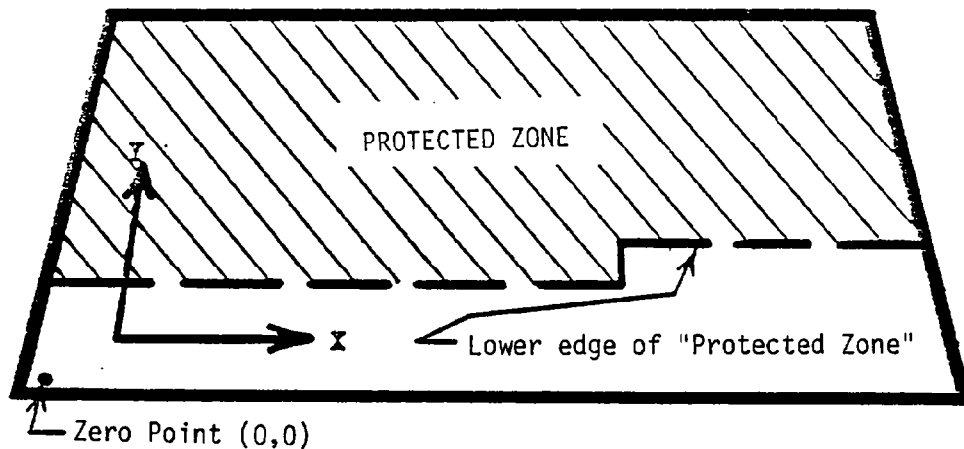
exiting the vehicle velocity measurement device = 18

Crush Details:

Crush Details:

Average = 10.75 in

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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

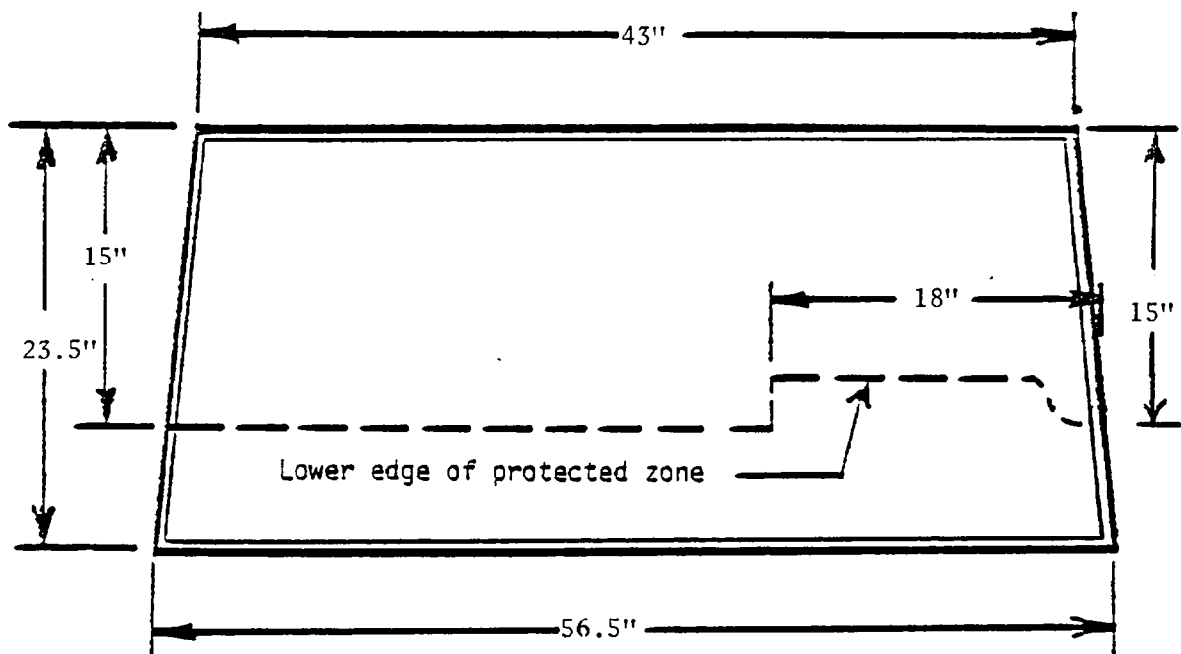
- (2) The area beneath the "Protected Zone" that the inner surface of the windshield was penetrated by a vehicle component.

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

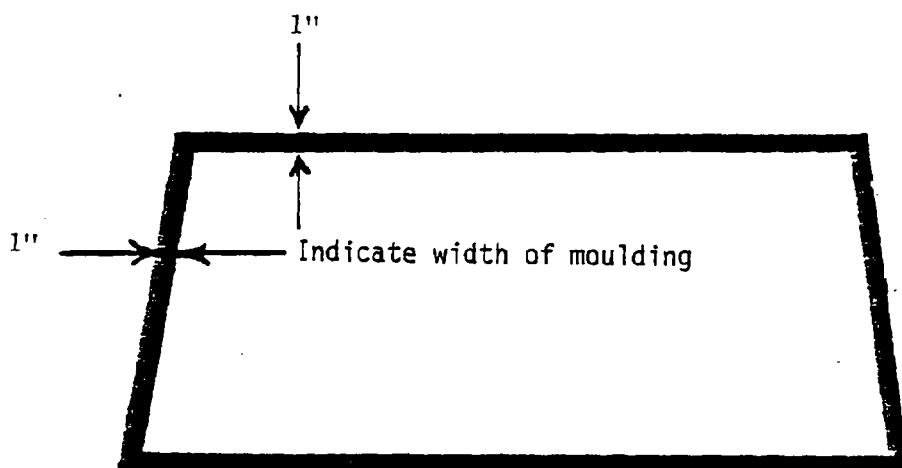
Details of windshield mounting (method of retention, type of trim, etc.):

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

	Windshield Periphery		
	Pre-Test	Post-Test	Retention %
Right Side	73.25	73.25	100%
Left Side	73.25	73.25	100%
TOTAL	146.50	146.50	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

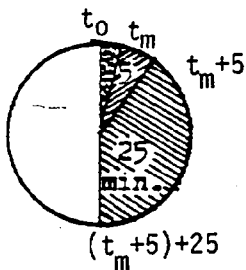
FMVSS No. 301-75

TEST VEHICLE NHTSA NO. 447-3-553 Test Date 9/28/82
 Vehicle Manufacture/Make/Model 1982 Toyo Kogyo - Mazda-626

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

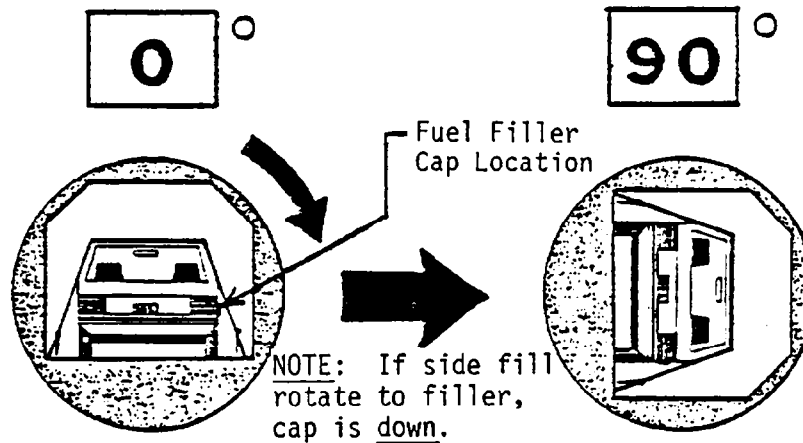
None

VEHICLE NHTSA ID NO. 447-3-553

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 48 seconds
(Spec. Range = 1 to 3 min.)
FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
TOTAL = 7 minutes 48 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	0	0	0
---	---	---	---

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

SOLVENT SPILLAGE LOCATION(S)

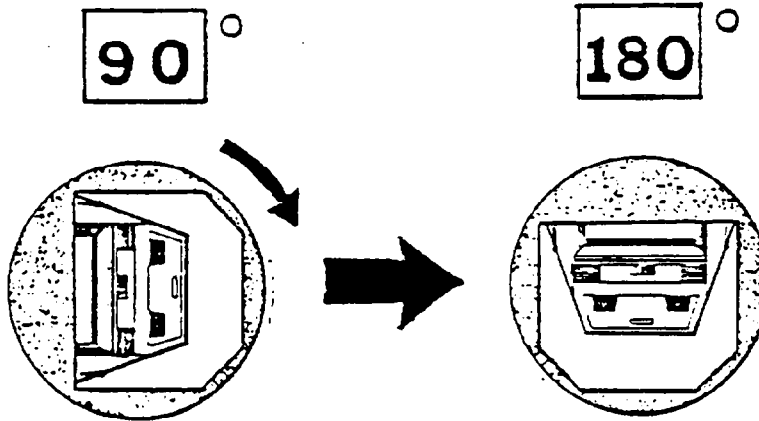
None

VEHICLE NHTSA ID NO. 447-3-553

Table 5B

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 51 seconds
(Spec. Range = 1 to 3 min.)
FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
TOTAL = 7 minutes 51 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	0	0	0
---	---	---	---

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

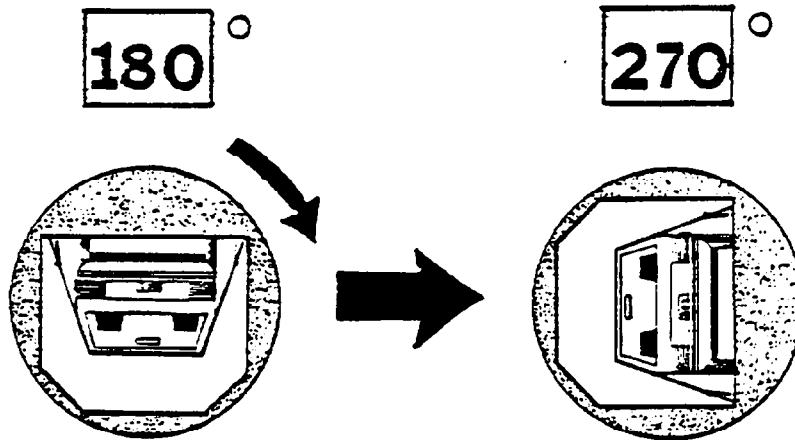
SOLVENT SPILLAGE LOCATION(S)

None

VEHICLE NHTSA ID NO. 447-3-553

Table 5C
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	0	0	0
---	---	---	---

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

SOLVENT SPILLAGE LOCATION(S)

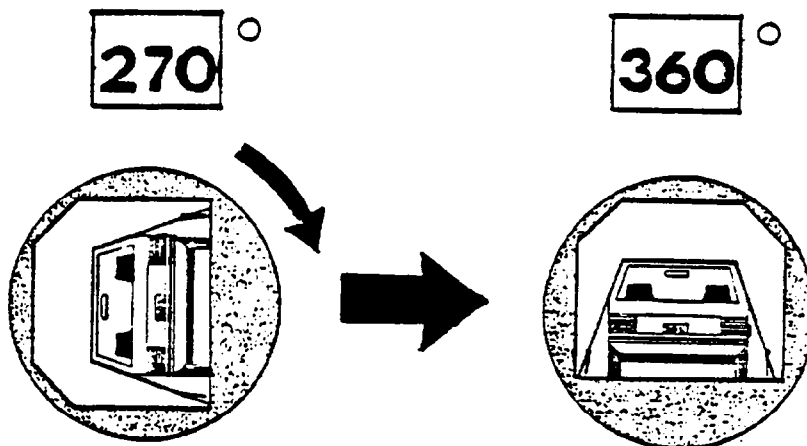
None

VEHICLE NHTSA ID NO. 447-3-553

Table 5D

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 57 seconds
(Spec. Range = 1 to 3 min.)
FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
TOTAL = 7 minutes 57 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	0	0	0
---	---	---	---

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

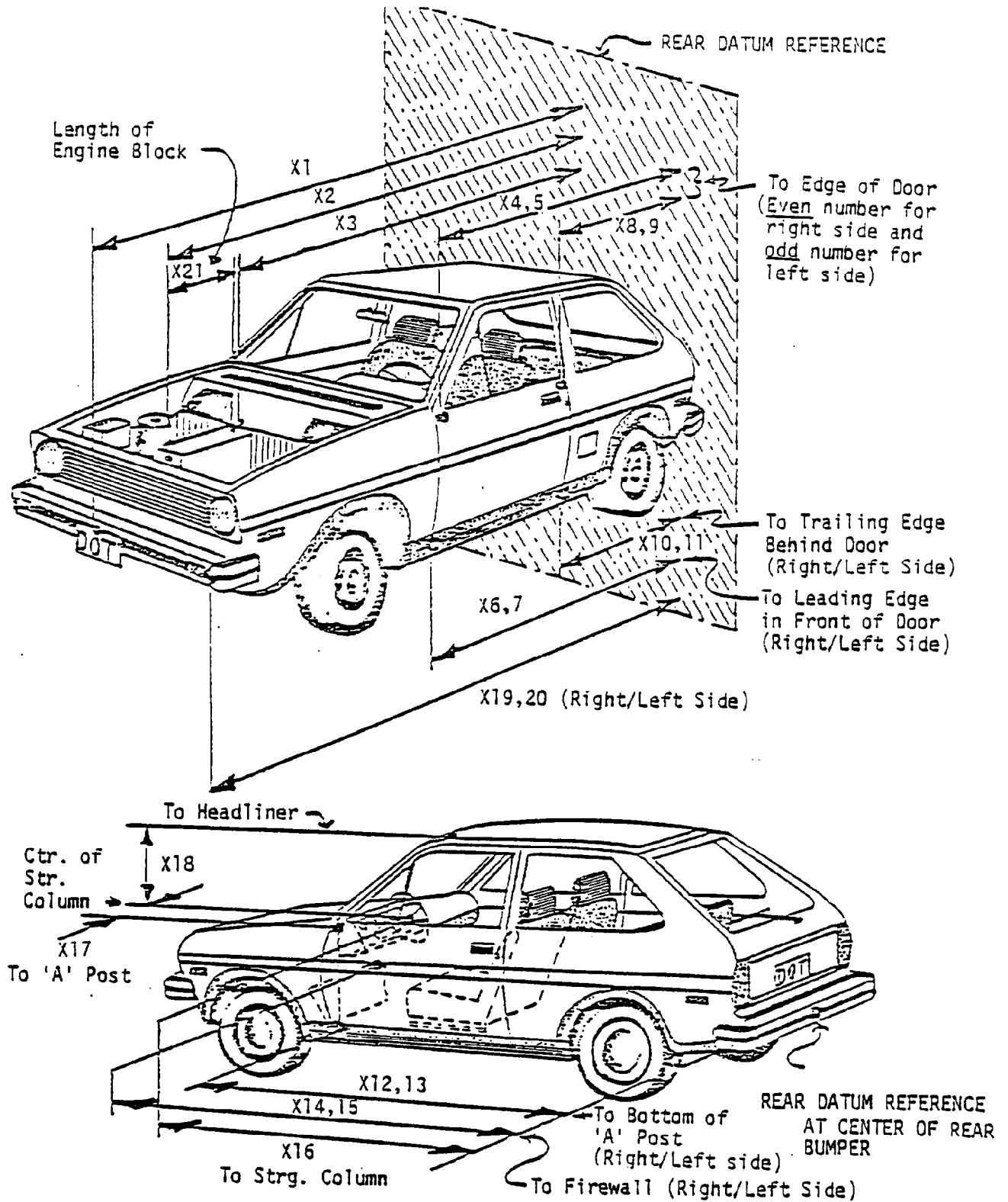
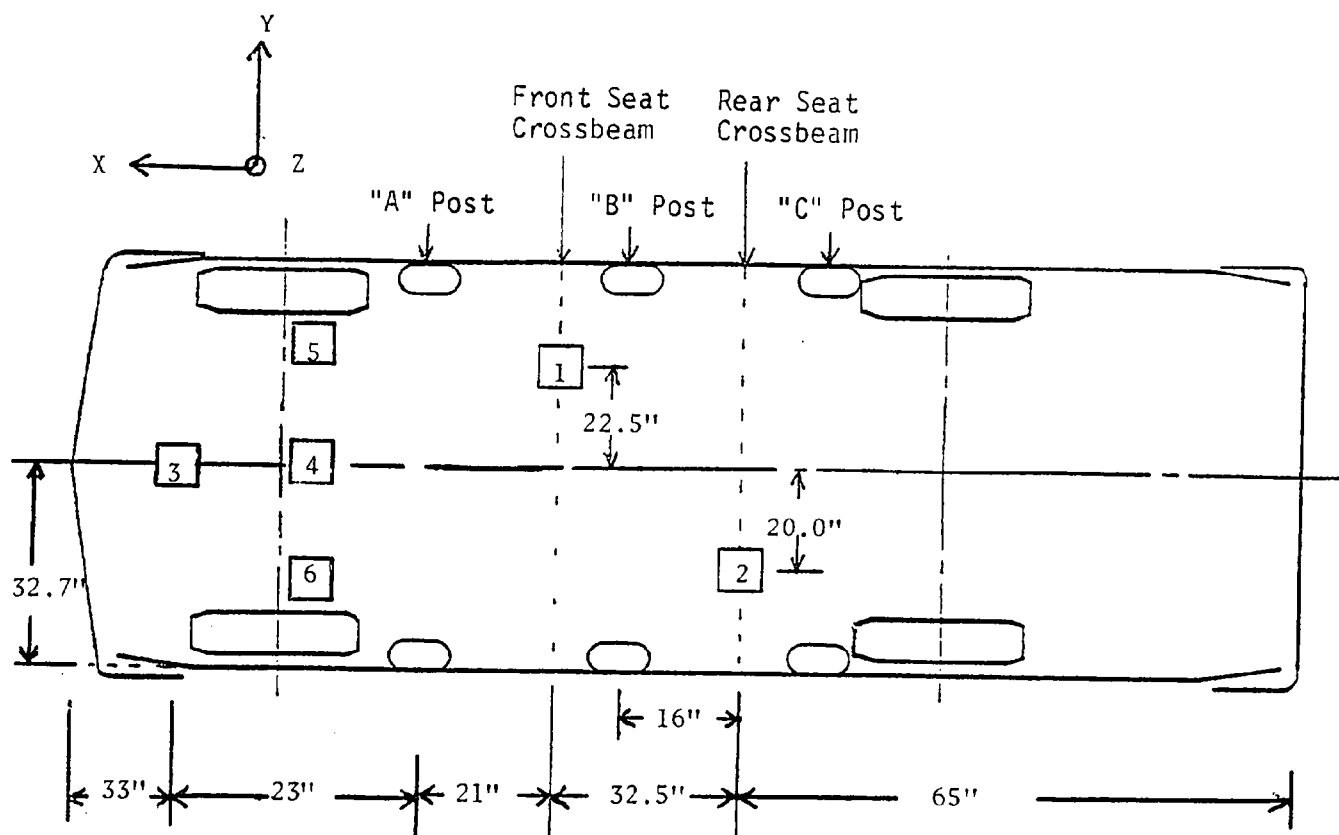


FIGURE 4 PRE-TEST AND POST-TEST MEASUREMENT POINTS

Table 6
VEHICLE MEASUREMENTS

All Dimensions in Inches				
No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	174.5	152.2	22.3
X2	Rear Surface of Vehicle to Front of Engine	149.5	141.1	8.4
X3	Rear Surface of Vehicle to Firewall	130.6	124.0	6.6
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	119.5	117.7	1.8
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	119.5	118.2	1.3
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	119.7	119.0	.7
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	119.7	119.5	.2
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	81.0	79.2	1.8
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	81.0	80.0	1.0
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	80.5	79.9	.6
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	80.6	80.5	.1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	119.5	119.0	.5
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	119.7	119.5	.2
X14	Rear Surface of Vehicle to Firewall, Right Side	129.0	127.0	2.0
X15	Rear Surface of Vehicle to Firewall, Left Side	128.2	126.7	1.5
X16	Rear Surface of Vehicle to Steering Column	103.5	105.5	-2.0
X17	Center of Steering Column to "A" Post	14.0	14.0	0
X18	Center of Steering Column to Headliner	16.5	18.5	-2.0
X19	Rear Surface of Vehicle to Right Side of Front Bumper	171.4	150.1	21.3
X20	Rear Surface of Vehicle to Left Side of Front Bumper	171.5	151.4	20.1
X21	Length of Engine Block	18.5	18.5	0



Accelerometers 3, 4, 5, and 6 are all in line 33" from front of vehicle.

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	Right Front Brake Caliper	X		
6	Left 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 11 and Table 12.

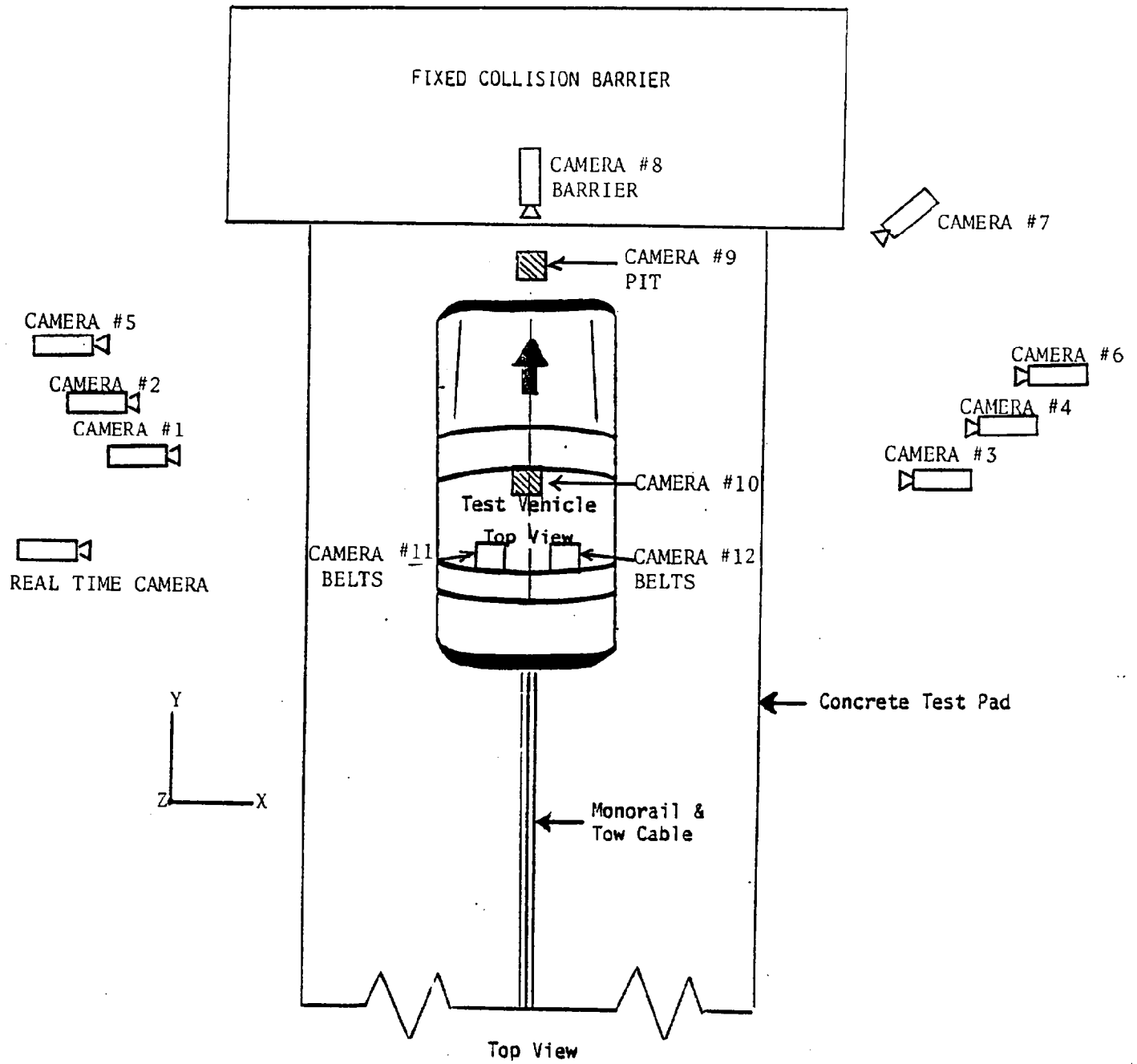


FIGURE 6 CAMERA POSITION FOR FRONTAL IMPACTS

Table 7

HIGH SPEED CAMERA LOCATIONSTest No.: 447-3-553Vehicle No. 1982 Mazda-626

CAMERA NUMBER	VIEW	CAMERA POSITIONS (IN)*			CAMERA ANGLE (DEG)**	FILM PLANE TO HEAD TARGET (IN) X
		X	Y	Z		
1	Driver (Redundant)	255	106	60	-4	238
2	Driver (Close)	289	89	57	-4	272
3	Right Front Passenger (Redundant)	238	140	41	-3	221
4	Right Front Passenger (Close)	277	136	54	-3	260
5	Vehicle Left Side	286	85	40	0	-
6	Vehicle Right Side	239	87	41	0	-
7	Windshield	72	-18	54	-7	-
8	Vehicle Front (Barrier)	0	0	120	-42	-
9	Pit Front Engine	0	40	-120	+90	-
10	Pit Rear Fuel Tank	0	132	-120	+90	-
11	Left Belt Retractor	-	-	-	-	-
12	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 447-3-553)

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)
1	Driver	Photosonic	35	900
2	Driver	Photosonic	50	875
3	Right Front Passenger	Photosonic	35	875
4	Right Front Passenger	Photosonic	50	900
5	Vehicle Left Side	Photosonic	13	920
6	Vehicle Right Side	Photosonic	13	900
7	Windshield	Photosonic	13	900
8	Vehicle Front (Barrier)	Photosonic	8	900
9	Pit Front (Engine)	Photosonic	13	800
10	Pit Rear (Fuel Tank)	Photosonic	13	850
11	Left Belt Retractor	Stalex	8	700
12	Right Belt Retractor	Stalex	8	720

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.

SEAT BELT RESTRAINT SYSTEM

To help protect you and your passengers from injuries in the event of an accident, your Mazda is equipped with seat lap-shoulder belts.

The front seat lap-shoulder belts are equipped with retractors which have inertia locks.

The retractors keep the belts out of the way while entering or exiting the vehicle. Inertia locks allow the belts to remain slack, for comfort, until a deceleration force occurs, such as a sudden stop or collision. At that time, the belts are automatically locked in position and the seat occupants are restrained from being thrown forward.

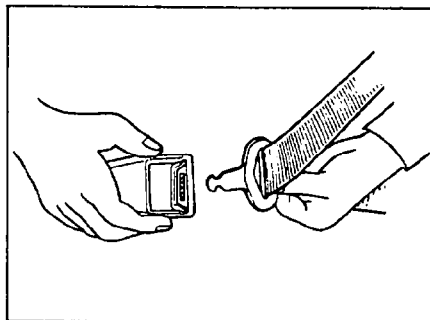
NOTE:

- The retractor will lock automatically if the vehicle inclines to an angle greater than about 25 degrees.
- Before fastening the seat belts, always adjust the seat to the position in which you will drive.

WARNING — Seat and shoulder belt assemblies must be replaced after they have been subjected to stress by occupants in a collision.

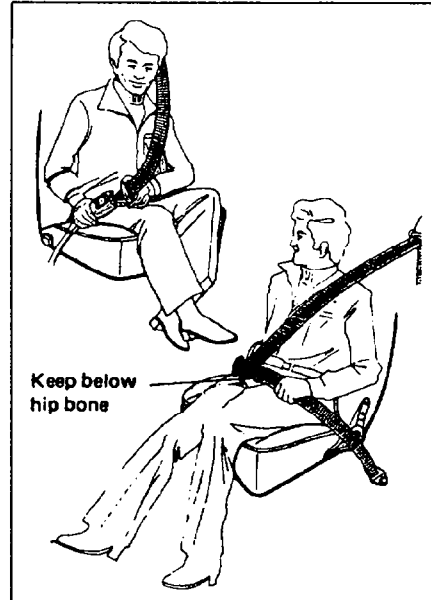
To Fasten Front Seat Belts:

1. Grasp the buckle end and tongue plate.
2. Slowly pull the lap-shoulder belt webbing out.
3. If the lap belt is not long enough to permit buckling, hold the tongue plate at right angles to the lap belt and pull the lap belt webbing through it until the desired length is obtained.
4. Insert the tongue plate into the open end of the buckle. An audible click will indicate that the belt is securely locked.



WARNING — Do not wear the shoulder belt under the arm, across the neck or over the inside shoulder. These practices may reduce the restraint system effectiveness.

Position the lap belt across your lap as **LOW ON THE HIPS** as possible. To reduce the risk of sliding under the



belt during an accident, adjust to a **SNUG FIT** by pulling the belt through the tongue plate. The belt retractor is designed to automatically take up excess webbing and maintain tension on the belt.

To Fasten Rear Seat Belts:

1. Grasp the buckle end.
2. Grasp the tongue plate and pull it until the desired length is obtained.

NOTE — If the belt locks when being pulled out, rewind the belt completely in the retractor and then pull out to the desired length.

3. Insert the tongue plate into the open end of the buckle until an

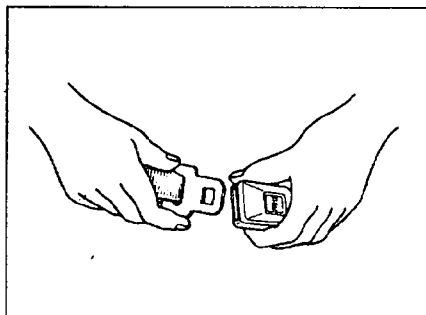


FIGURE 7 OWNER'S MANUAL SEAT BELT INSTRUCTIONS

FIGURE 8
PART 572 DUMMY IN-VEHICLE POSITION

Test No. 447-3-553

Vehicle 1982 Mazda-626

SEAT TYPE:

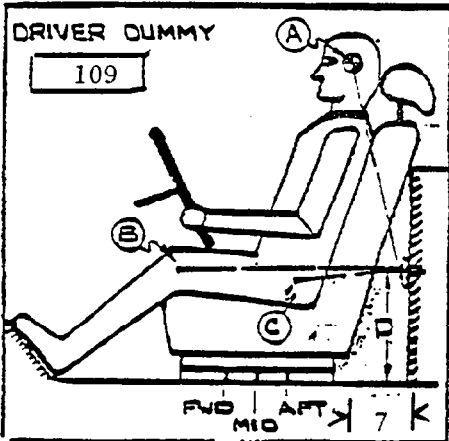
 Bench
 x Bucket
 Split Bench

ADJUSTER TYPE:

 x Manual
 Power

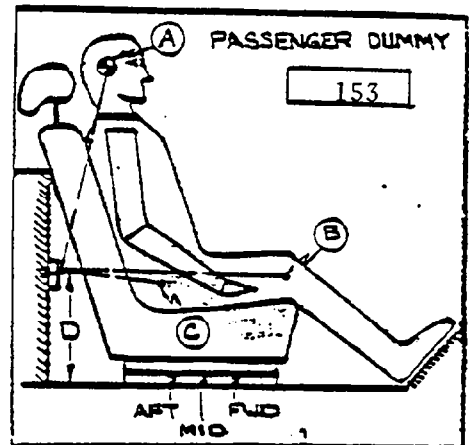
BUCKET SEAT BACK TYPE:

 Fixed
 x Adjustable Reclining



MEASUREMENT LOCATION

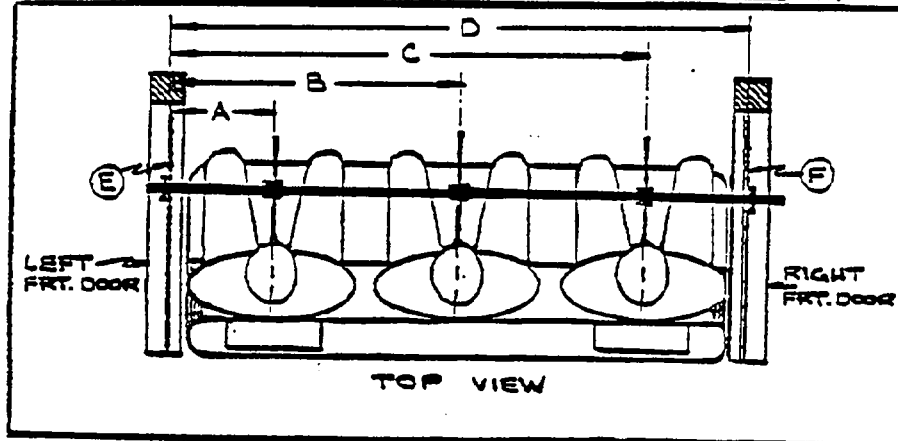
- A - Head Target
- B - Knee Joint
- C - Approximate 'H' Point
- D - Sill to Reference Point



A = 19.4 in. 2 Degrees
B = 22.5 in. 99 Degrees
C = 8.7 in. 133 Degrees
D = 15.1 in.

Seat Angle 21.3°

A = 21 in. 3 Degrees
B = 22.2 in. 98 Degrees
C = 8.5 in. 130 Degrees
D = 15.1 in.

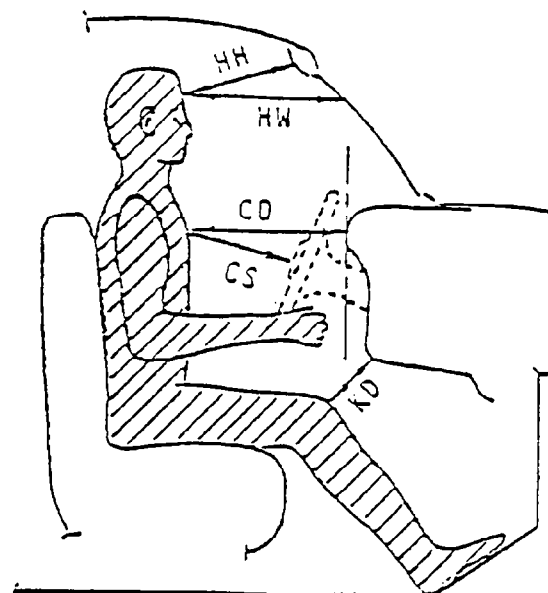


DUMMY ID

109 - 153

A	=	Left Door to Driver Centerline	<u>11.1</u> in.
B	=	Left Door to Center Passenger Centerline	<u> </u> in.
C	=	Left Door to Right Passenger Centerline	<u>36.3</u> in.
D	=	Left Door to Right Door	<u>47.5</u> in.
E, F	=	Window Glass Height (Right and Left Must be Equal)	<u>11</u> in.

	<u>DRIVER</u>	<u>PASS</u>
HH	13.5	13.0
HW	18.5	17.9
CD	20.7	22.0
CS	14.5	--
KDL	6.5	7.0
KDR	6.5	7.0



HR	5.0	5.25
HS	6.9	7.0
AD	2.0	3.5
HD	6.0	6.0

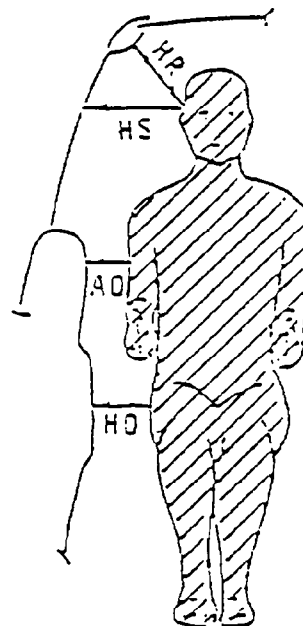


FIGURE 9 OCCUPANT CLEARANCE DIMENSIONS

Table 9
DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G") *							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R
DUMMY (1)	-80	10	43	83	-46	-16	9	47
DUMMY (2)	-94	50	81	131	-42	30	-12	50
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	1215	575
DUMMY (2)	250	550
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)	1562	Not Used	1450
DUMMY (2)	1575	1687	Not Used
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)	968.6	.06442	.09877	60.3	1335
DUMMY (2)	1692.9	.08392	.09765	108.8	2203
DUMMY (3)					
DUMMY (4)					

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

36 LOAD CELLS
4 ROWS
9 COLUMNS

FRONT VIEW

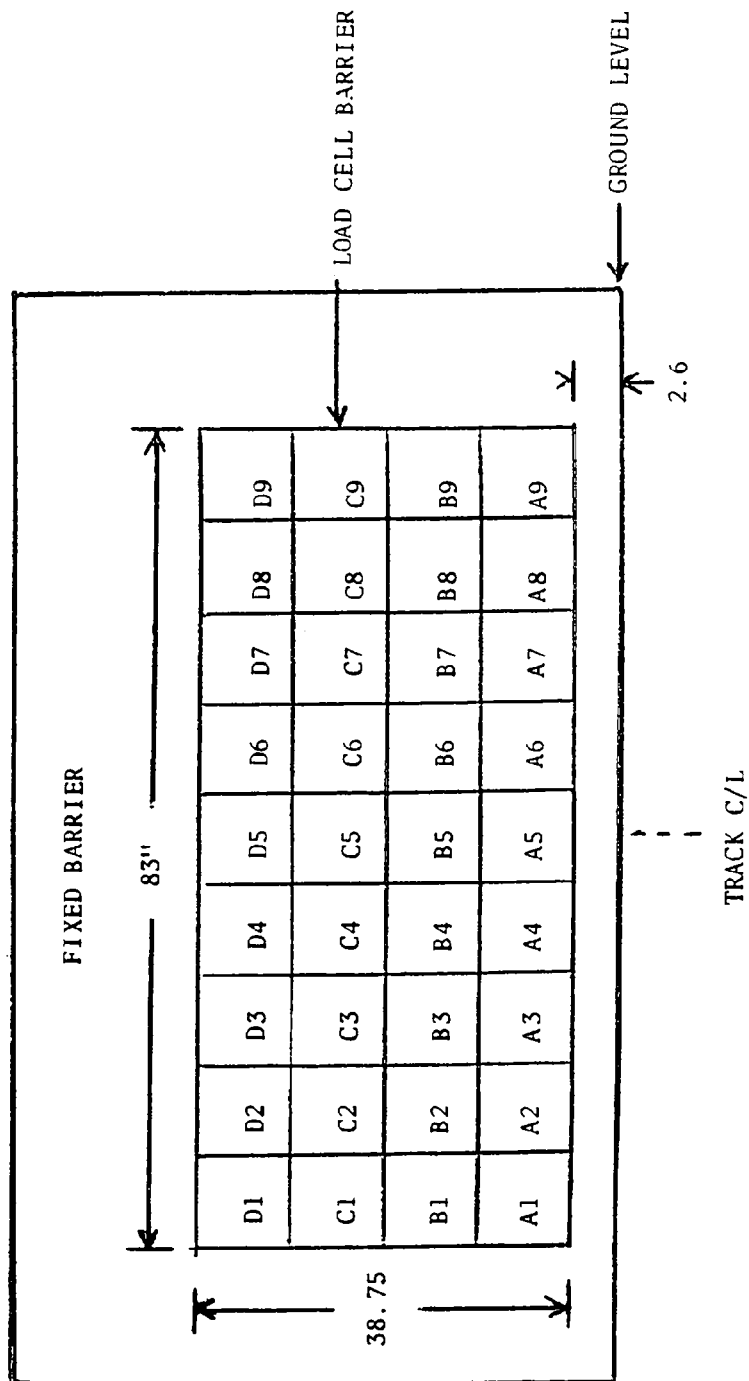


FIGURE 10 FIXED LOAD CELL BARRIER-LOAD CELL LOCATIONS

APPENDIX A

PHOTOGRAPHS

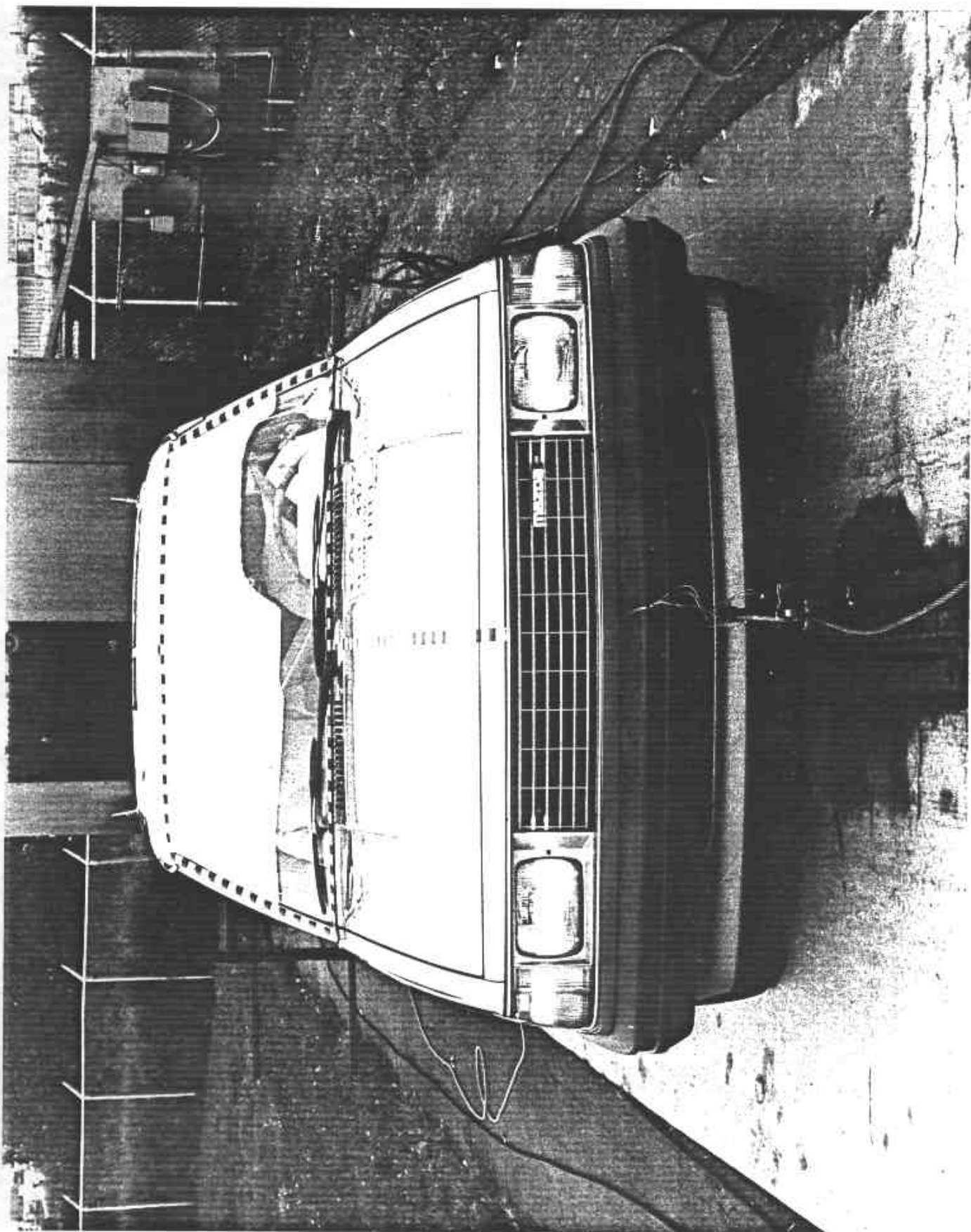


FIGURE A-1 PRE-TEST FRONT VIEW

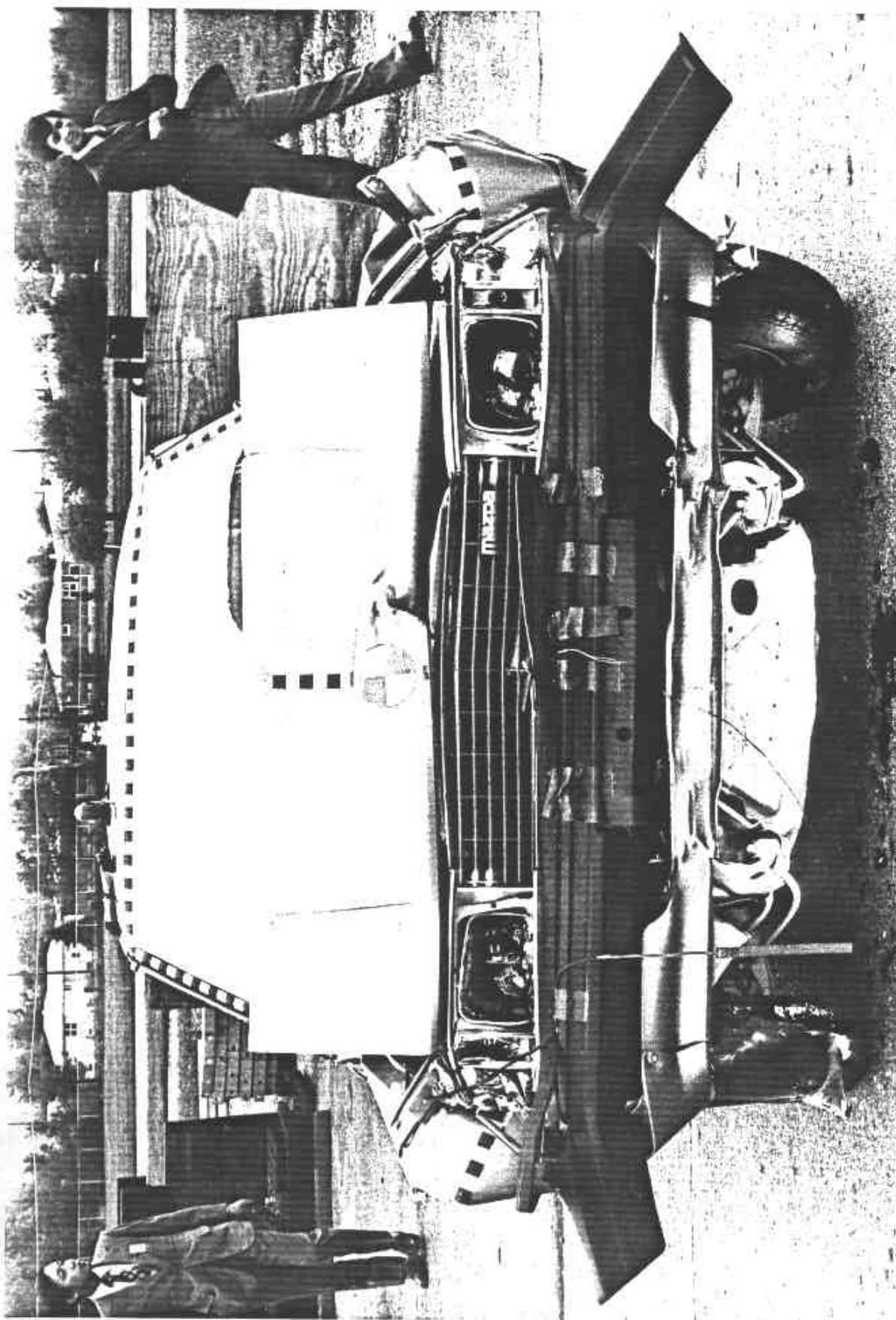


FIGURE A-2 POST-TEST FRONT VIEW

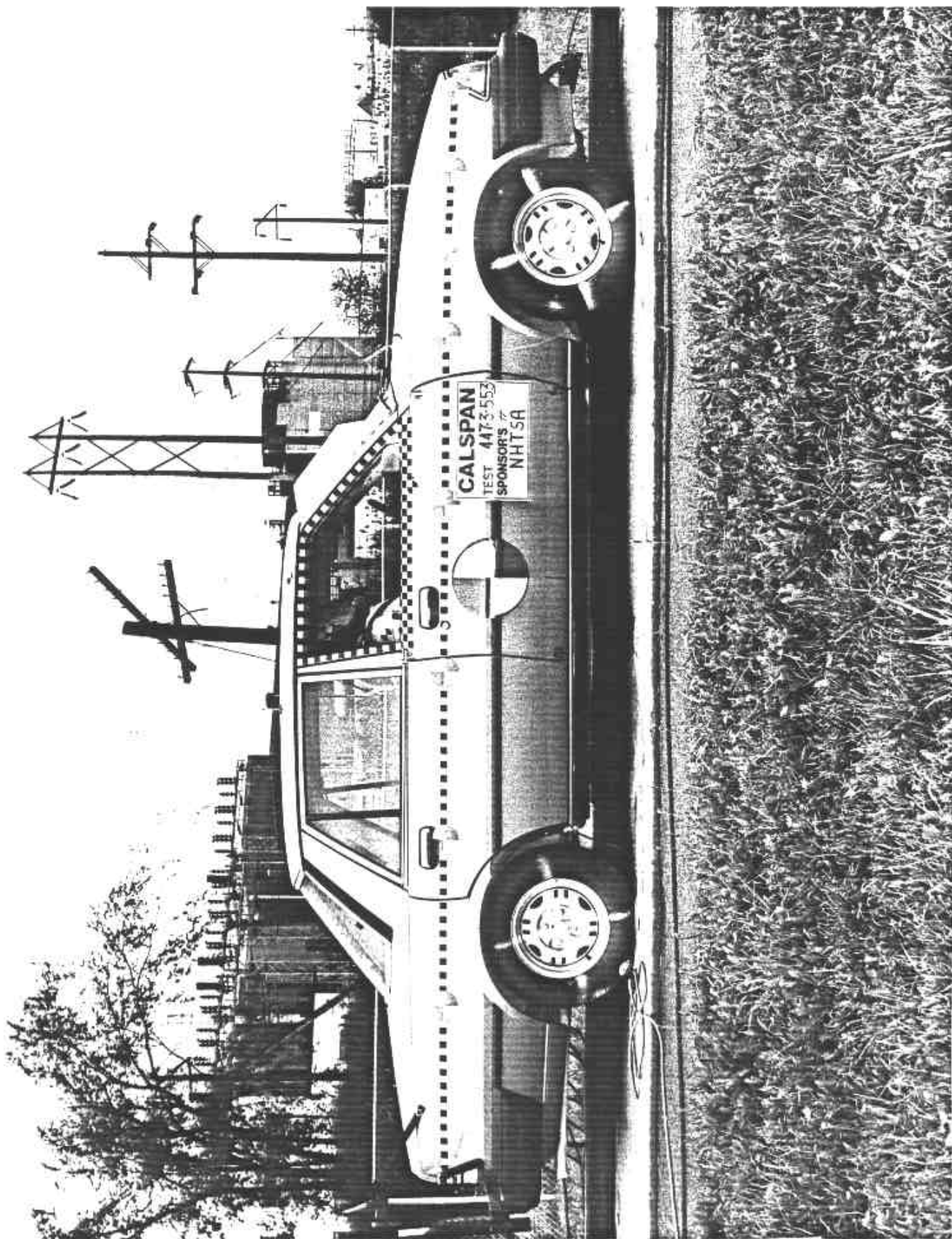


FIGURE A-3 PRE-TEST SIDE VIEW

A-4

7095-V-3

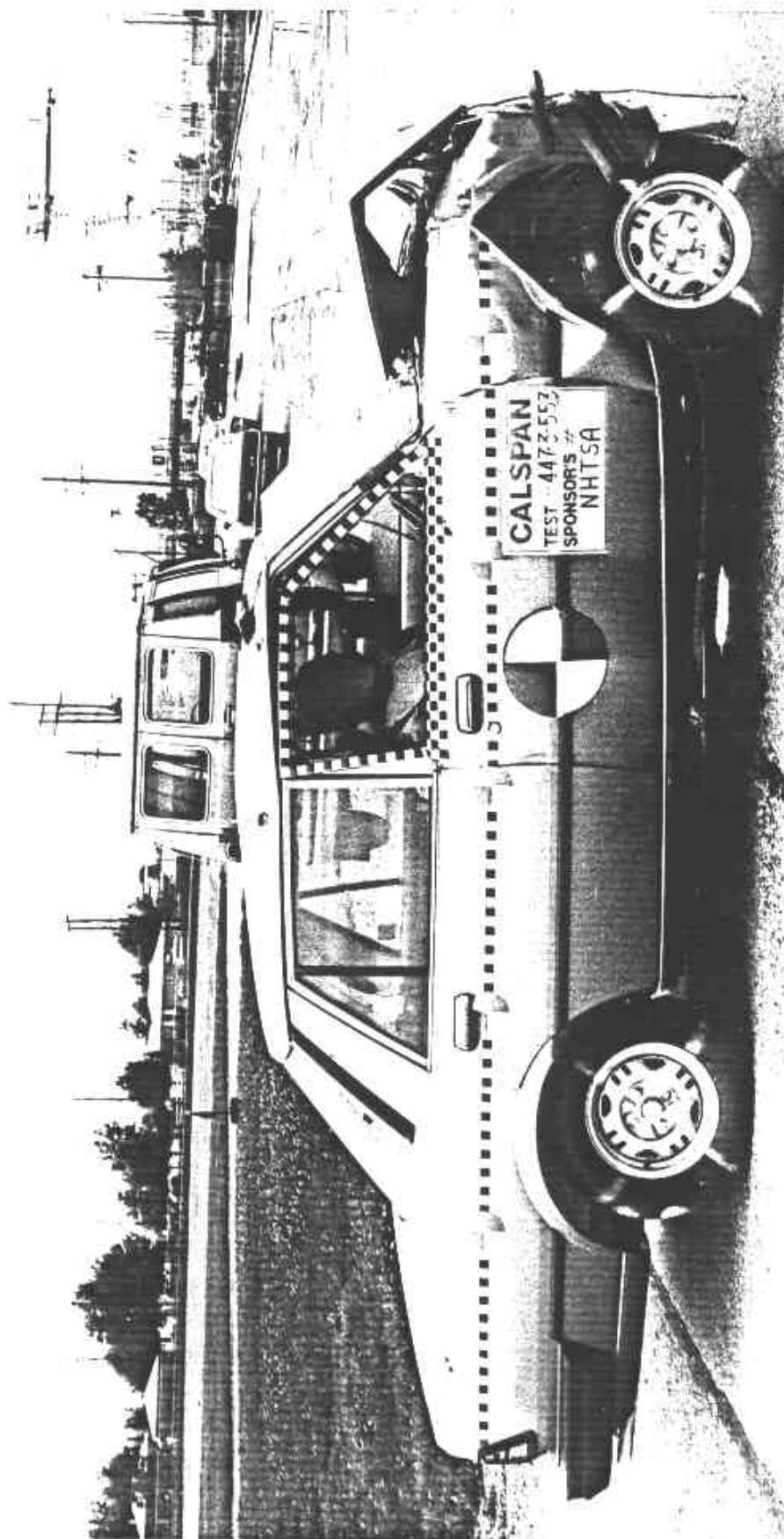


FIGURE A-4 POST-TEST SIDE VIEW

A-5

7095-V-3

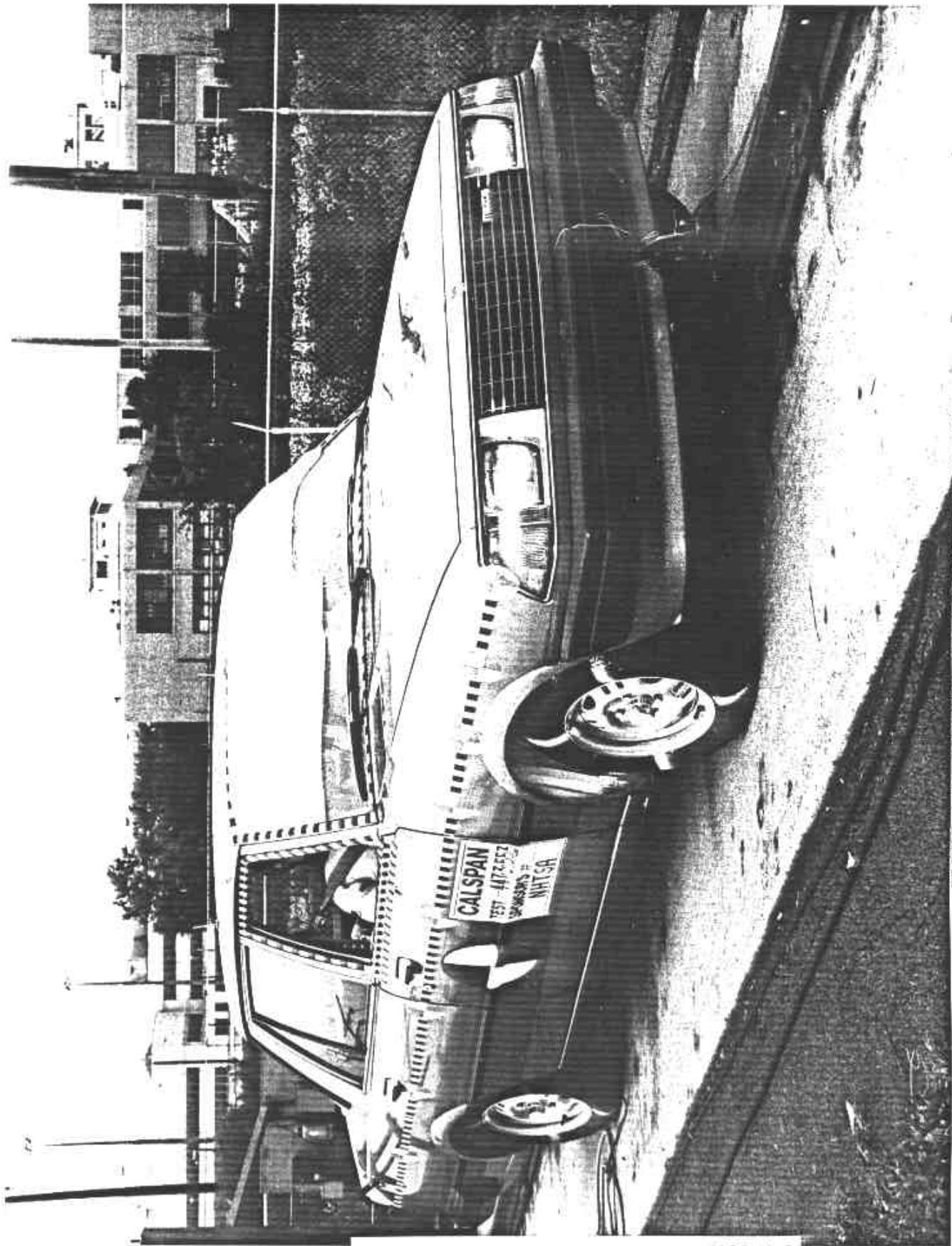
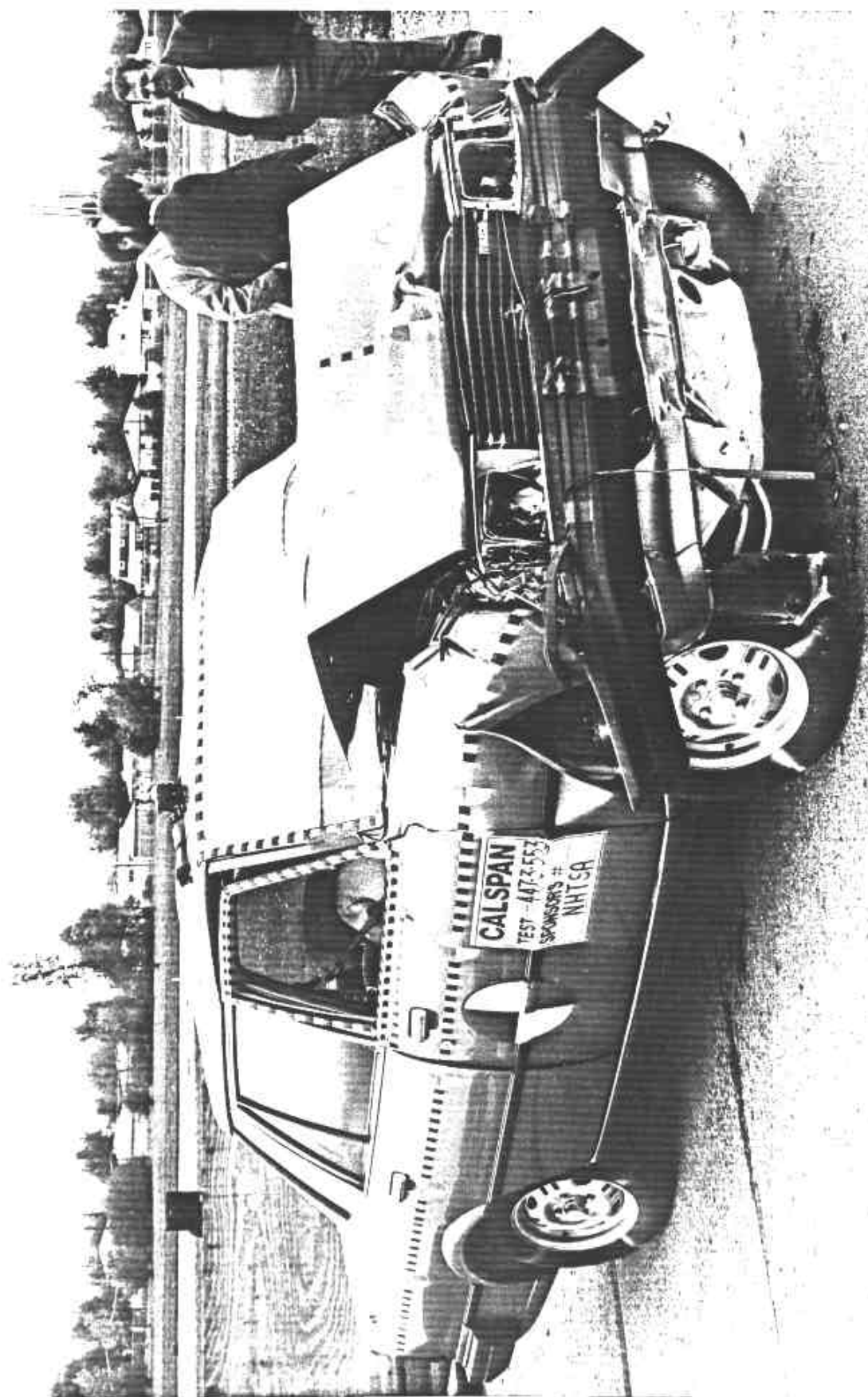


FIGURE A-5 PRE-TEST FRONT THREE QUARTER VIEW

A-6

7095-V-3



A-7

7095-V-3

FIGURE A-6 POST-TEST FRONT THREE QUARTER VIEW

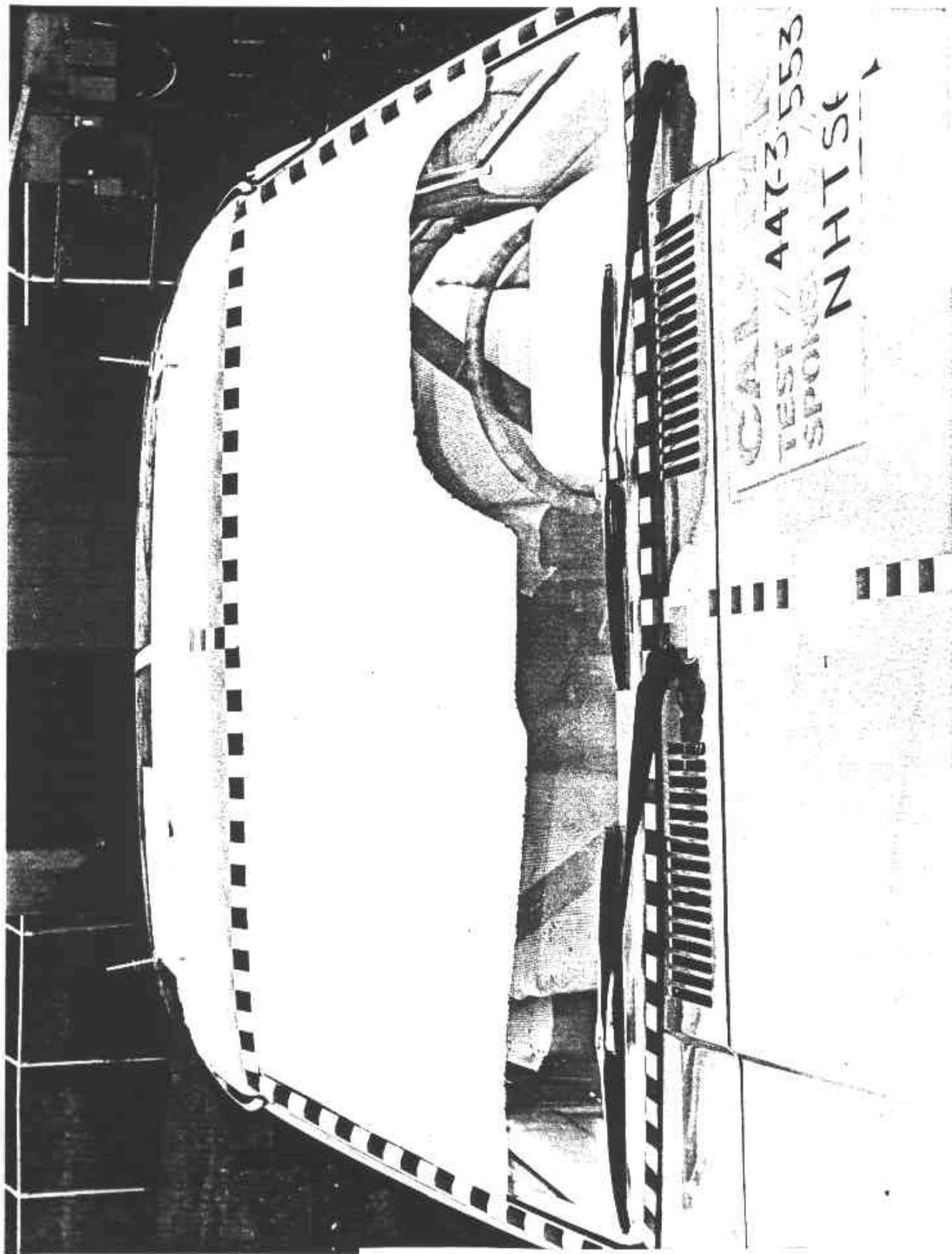


FIGURE A-7 PRE-TEST VIEW OF WINDSHIELD AND PROTECTED ZONE

A-8

7095-V-3

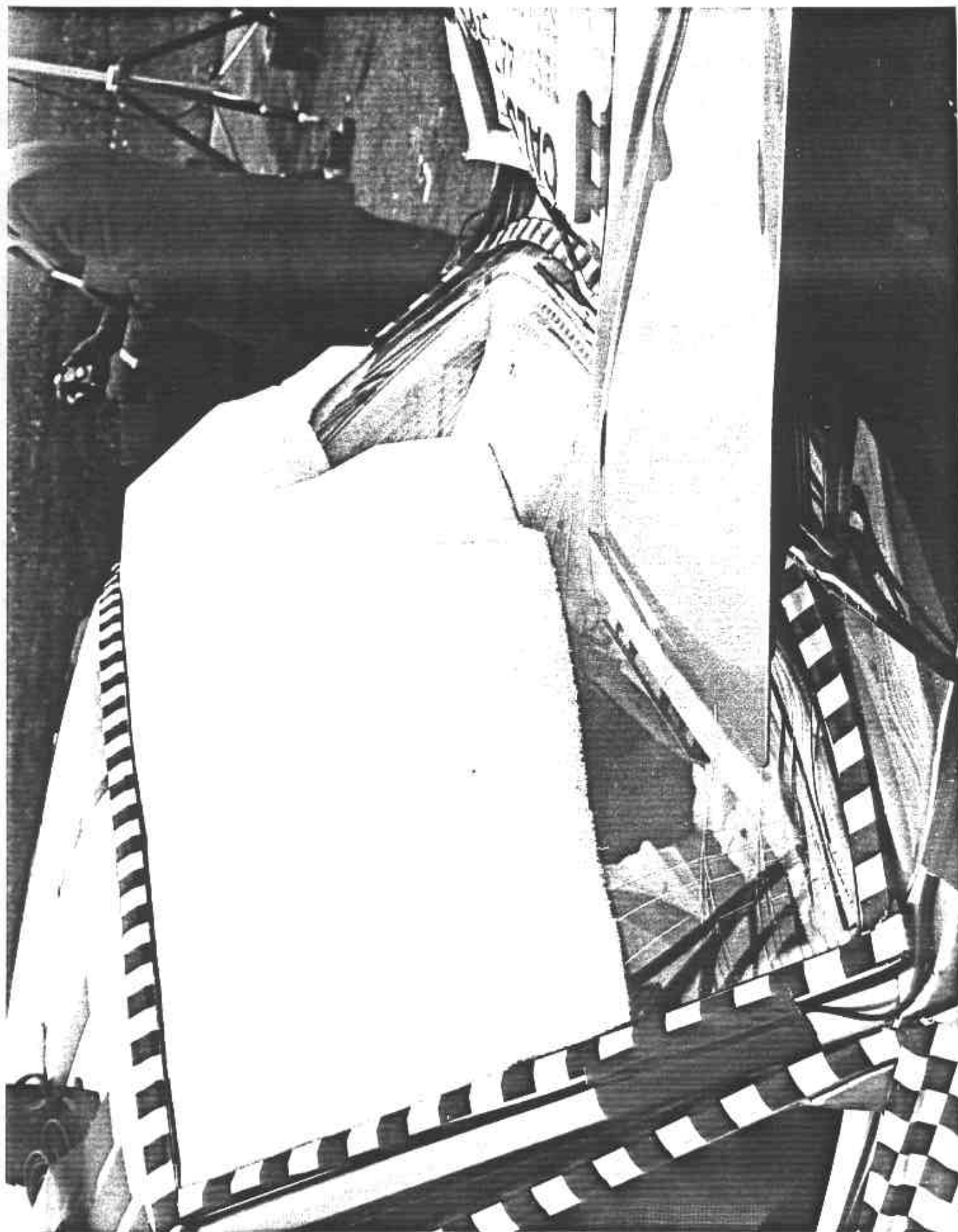


FIGURE A-8 POST-TEST VIEW OF WINDSHIELD AND PROTECTED ZONE

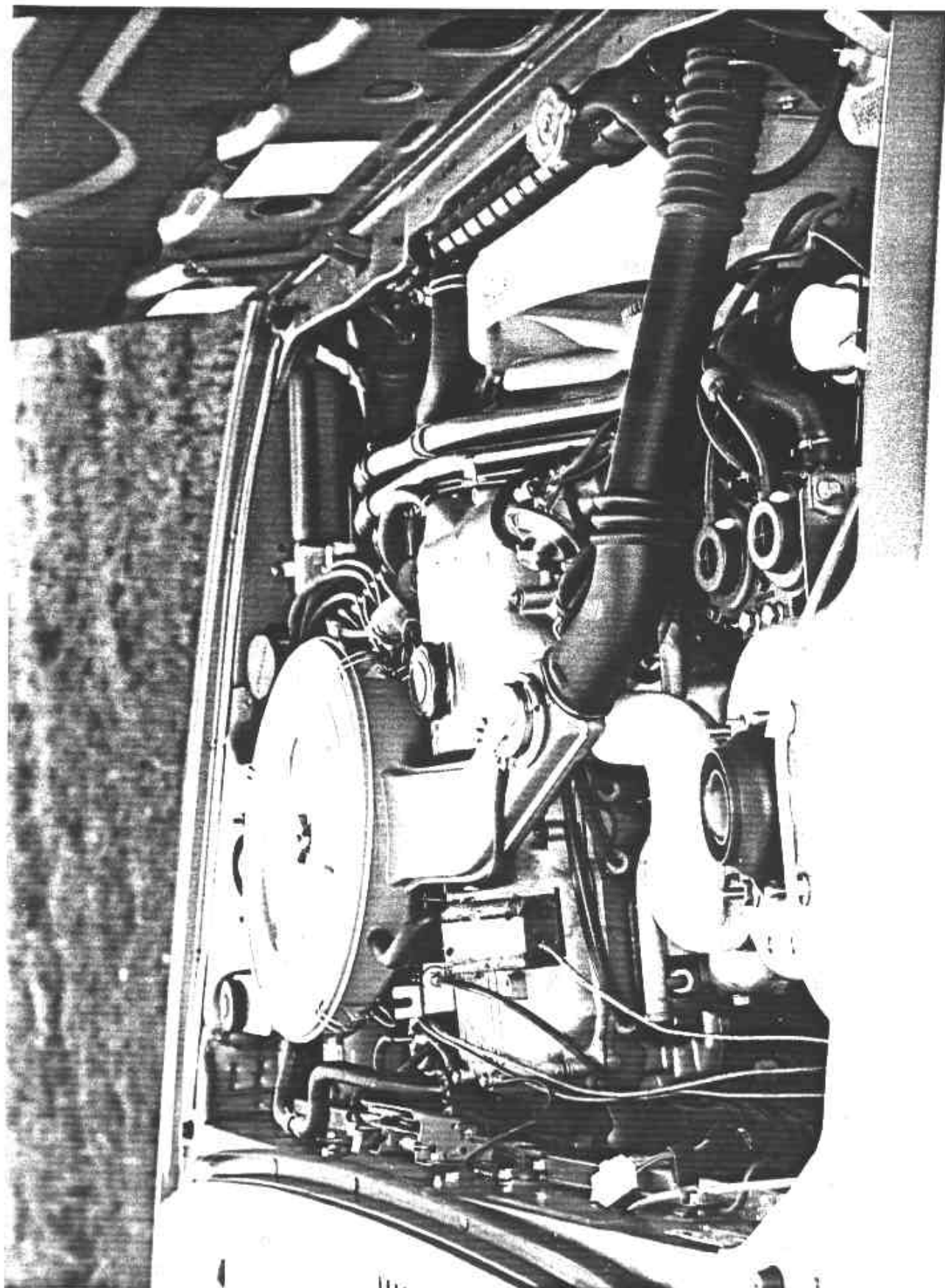


FIGURE A-9 PRE-TEST VIEW OF ENGINE COMPARTMENT

A-10

7095-V-3

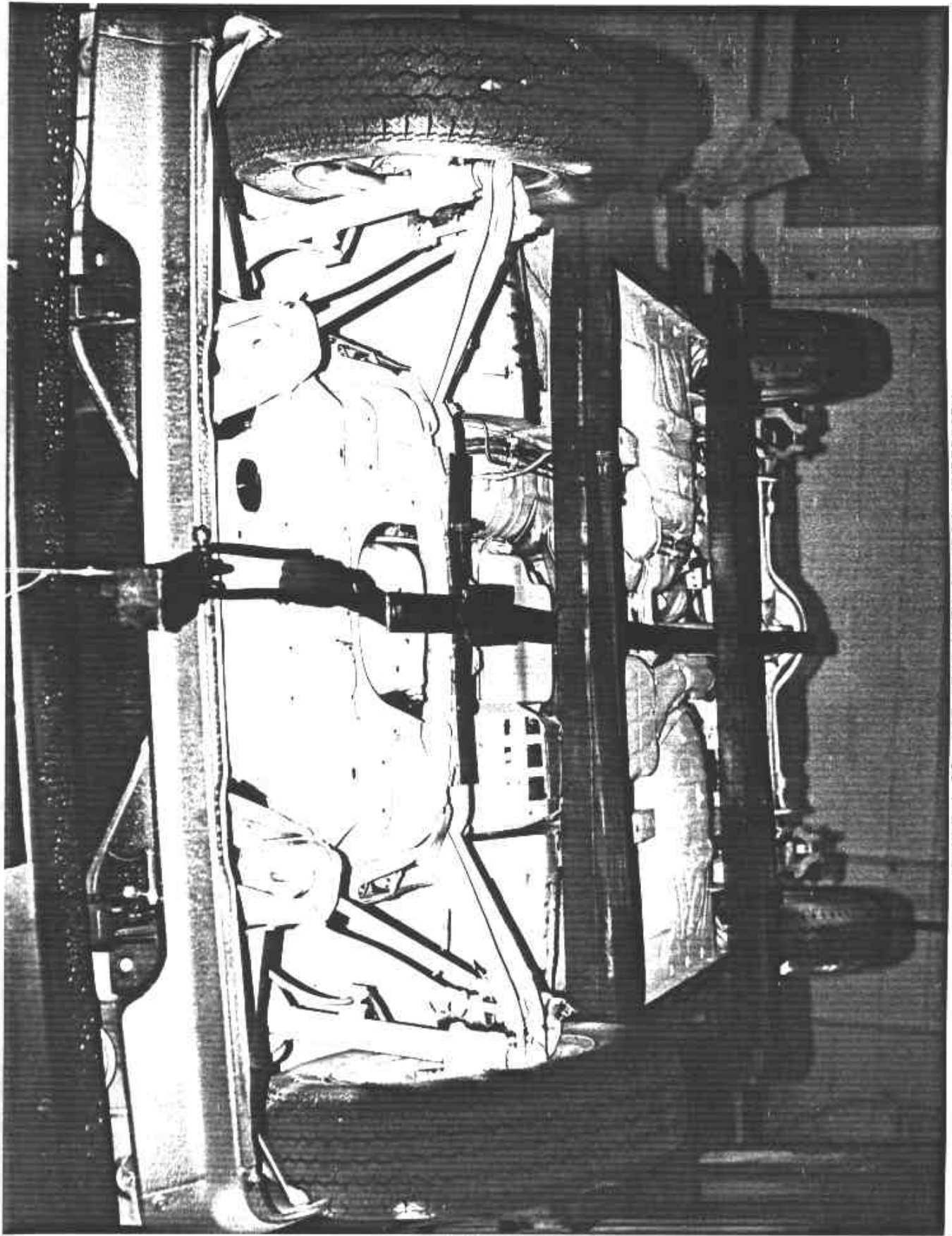


FIGURE A-10 PRE-TEST VIEW OF FRONT UNDERBODY

A-11

7095-V-3

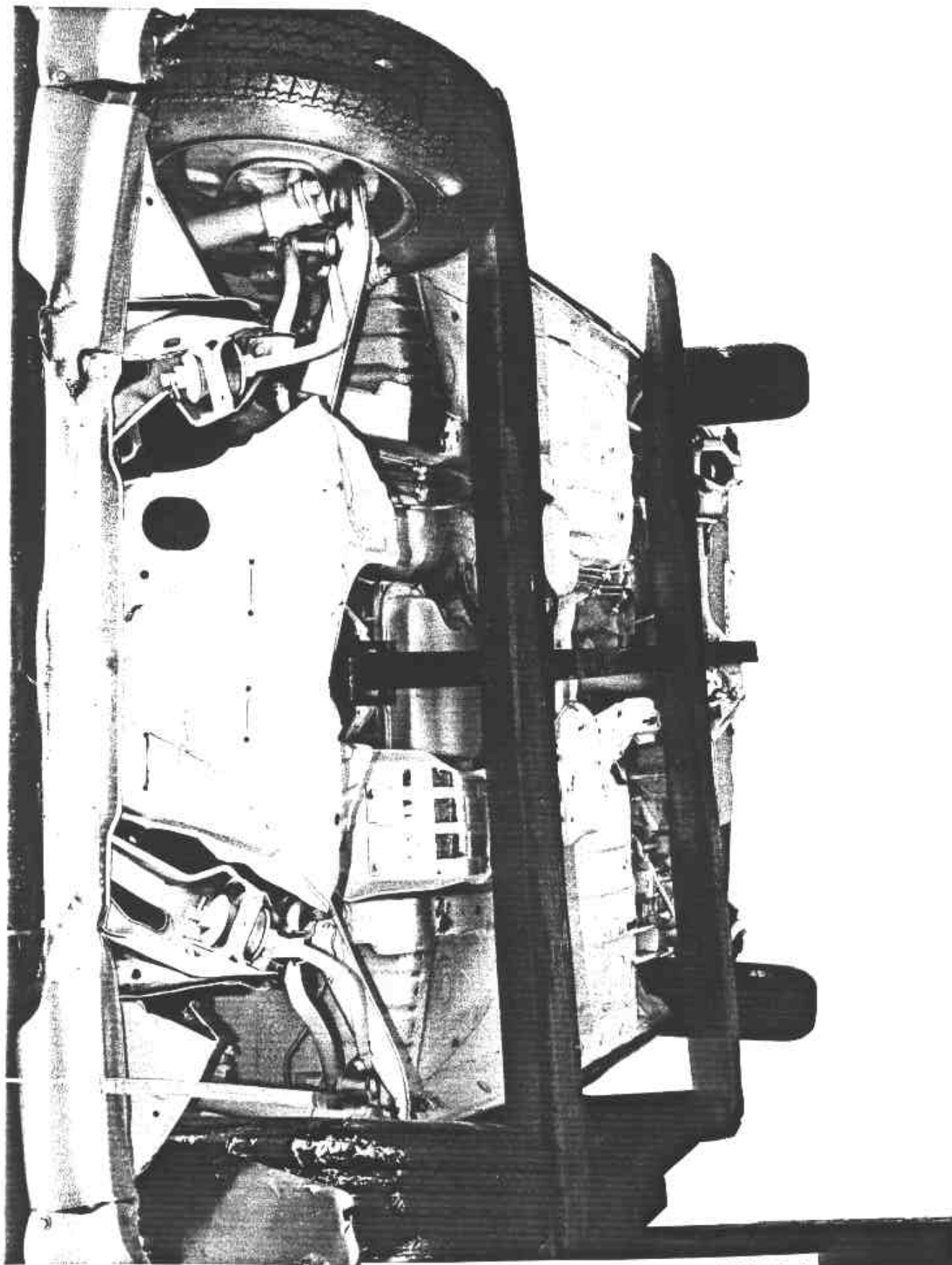


FIGURE A-11 POST-TEST VIEW OF FRONT UNDERBODY

A-12

7095-V-3

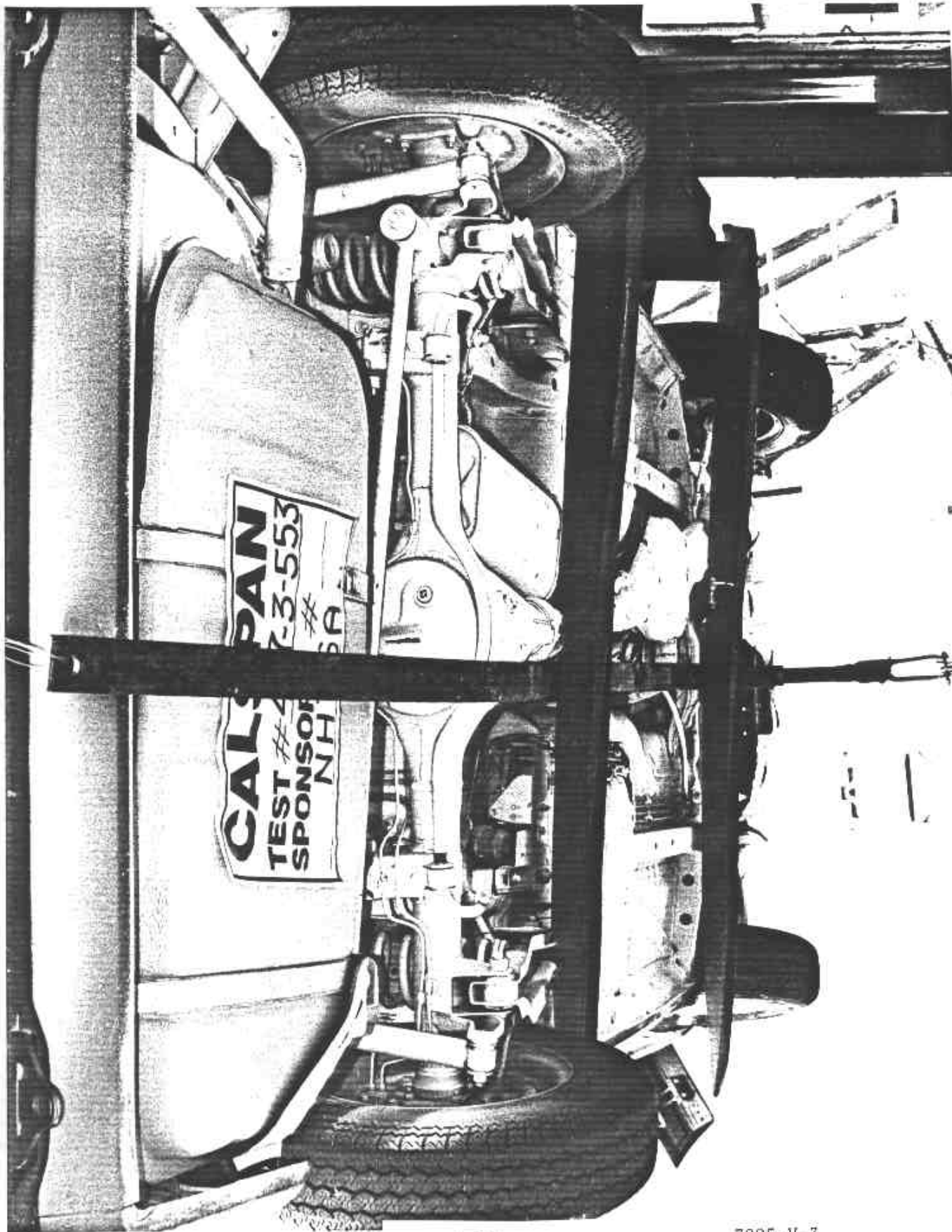


FIGURE A-12 POST-TEST VIEW OF REAR UNDERBODY

A-13

7095-V-3



FIGURE A-13 VIEW OF FUEL TANK AND FUEL LINES

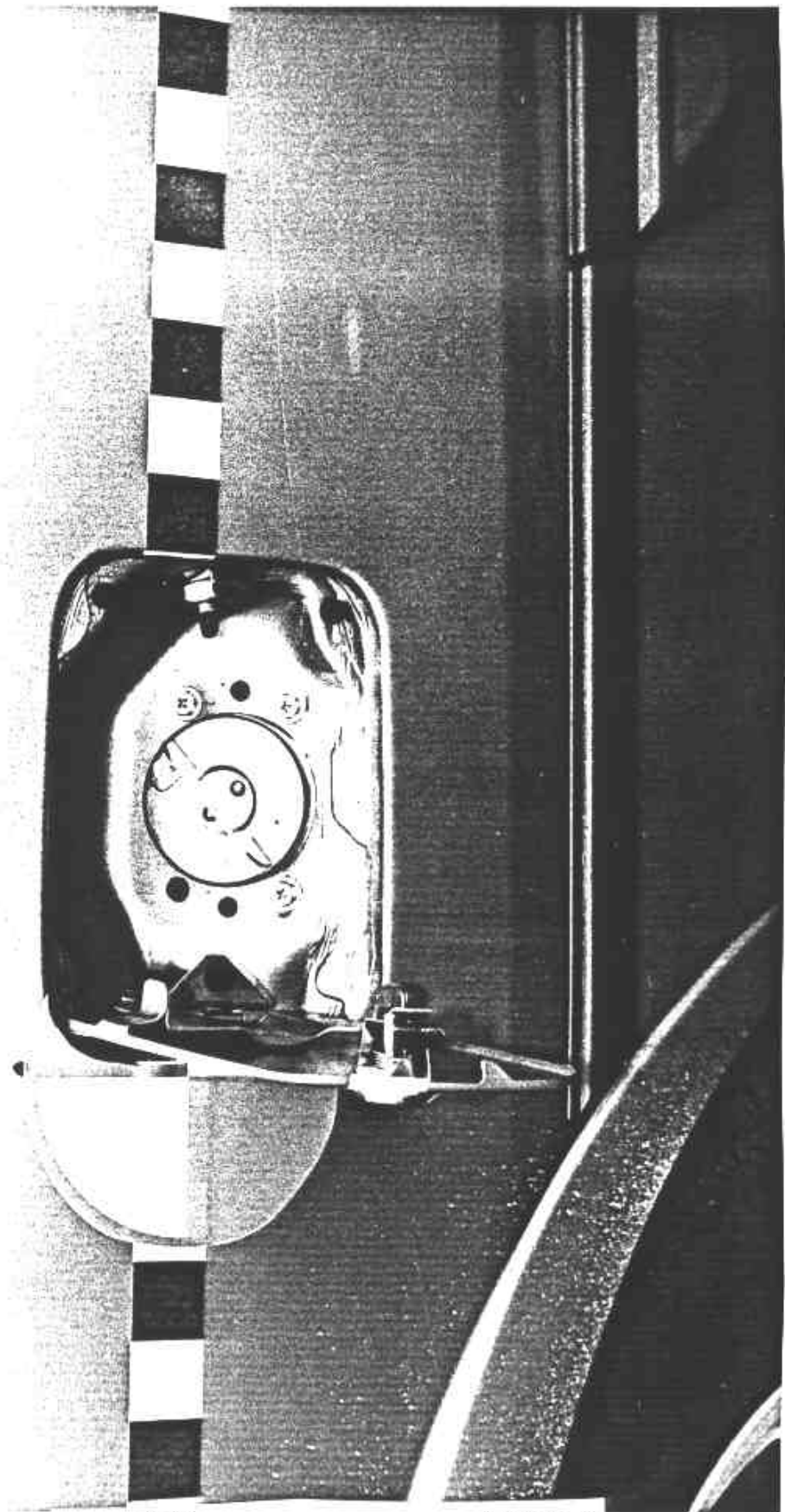


FIGURE A-14 VIEW OF FILLER TUBE AND CAP

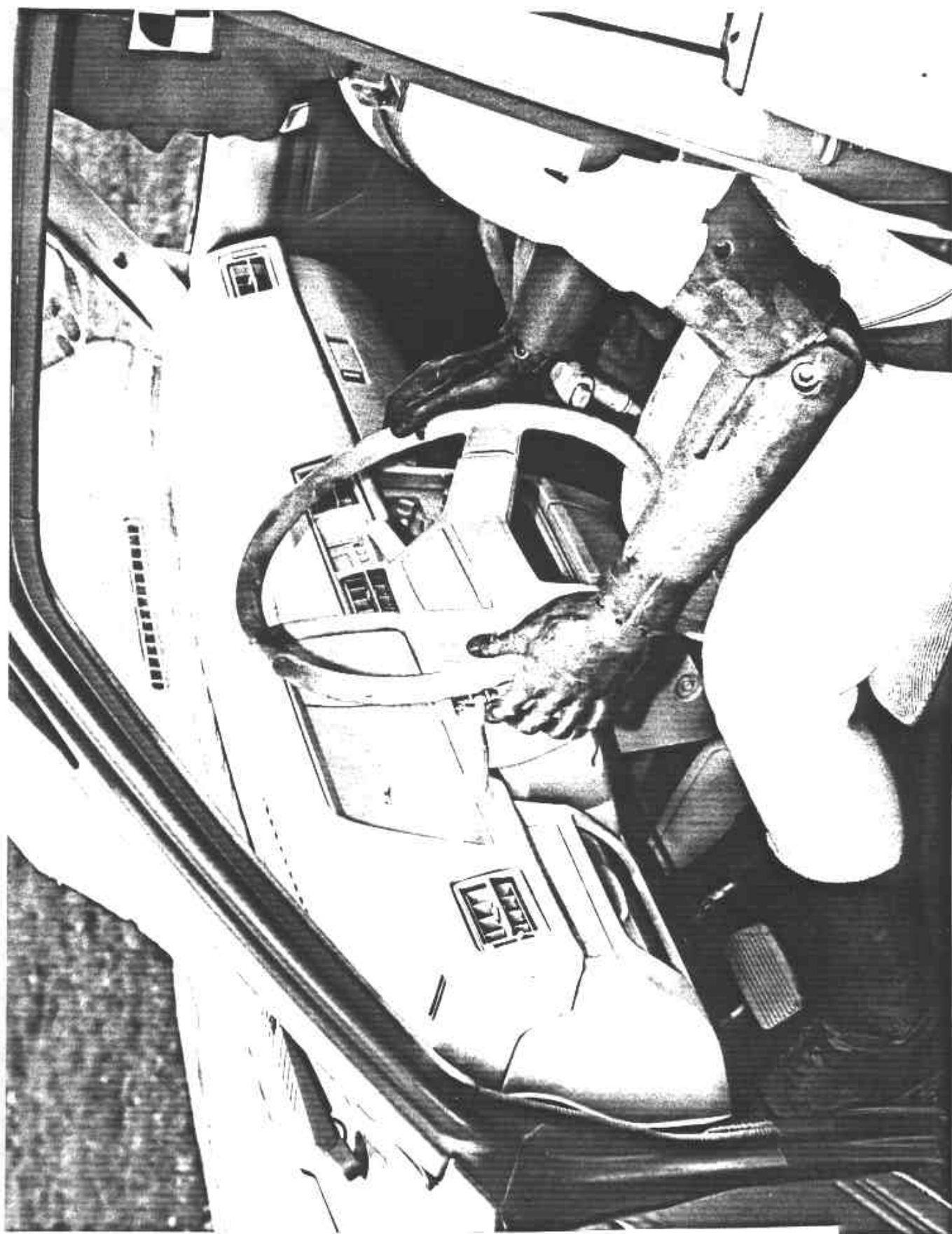


FIGURE A-15 PRE-TEST VIEW OF DRIVER AND INTERIOR



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

A-17

7095-V-3



FIGURE A-17 PRE-TEST VIEW OF RIGHT FRONT PASSENGER AND INTERIOR

A-18

7095-V-3

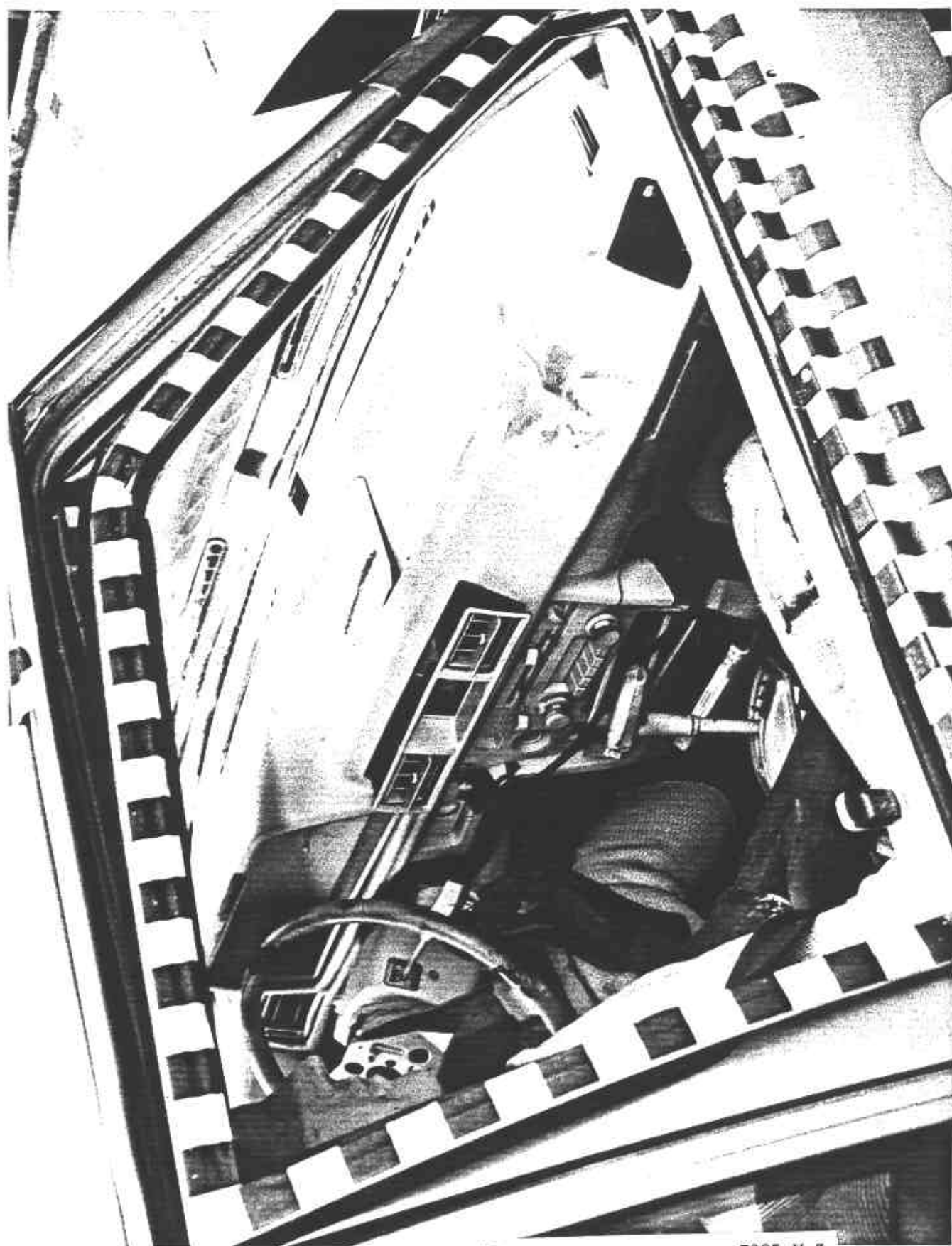


FIGURE A-18 POST-TEST VIEW OF RIGHT FRONT PASSENGER AND INTERIOR

A-19

7095-V-3

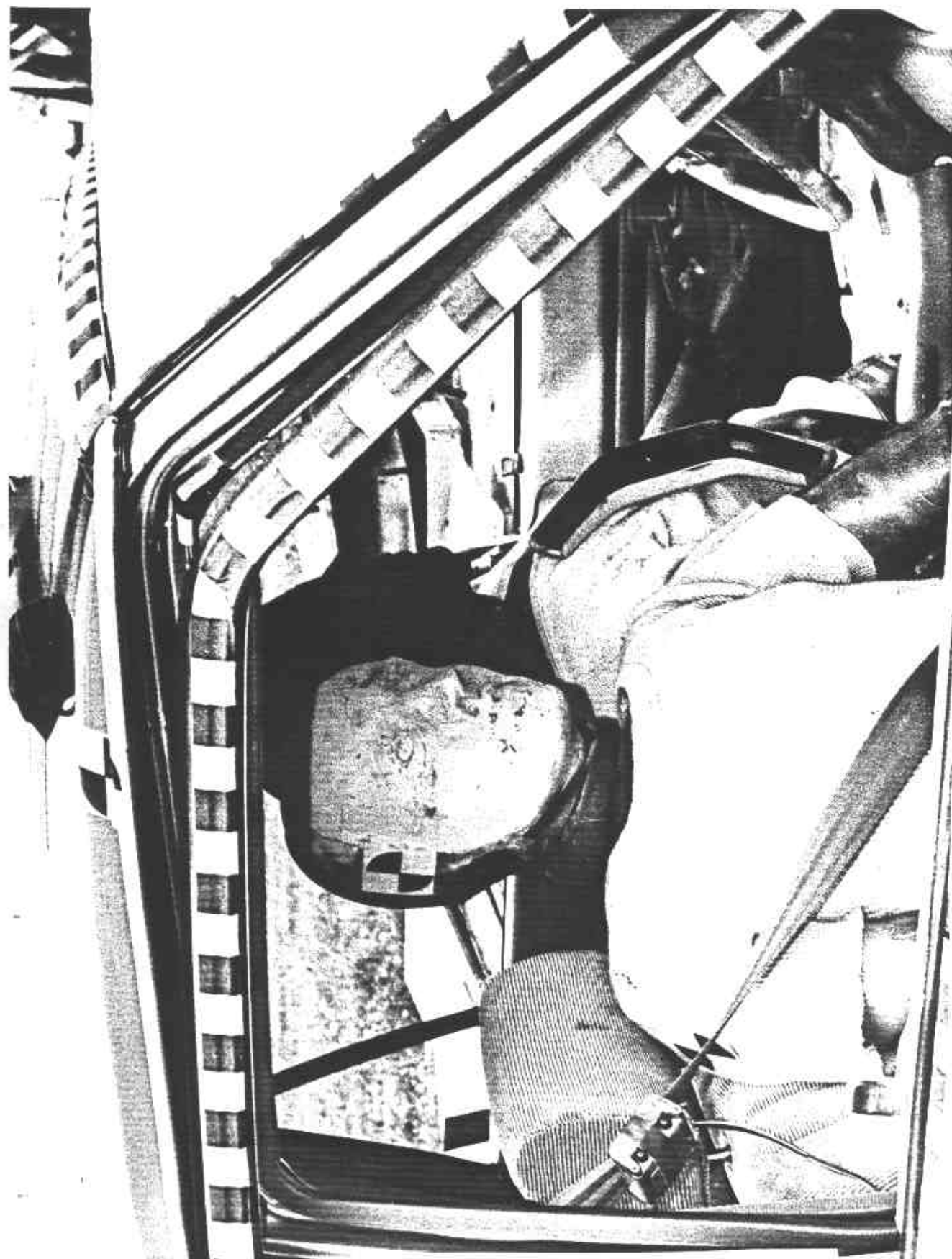


FIGURE A-19 POST-TEST VIEW OF DRIVER AND RIGHT FRONT PASSENGER

A-20

7095-V-3

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA

Test No. 447-3-553

1982 MAZDA-606

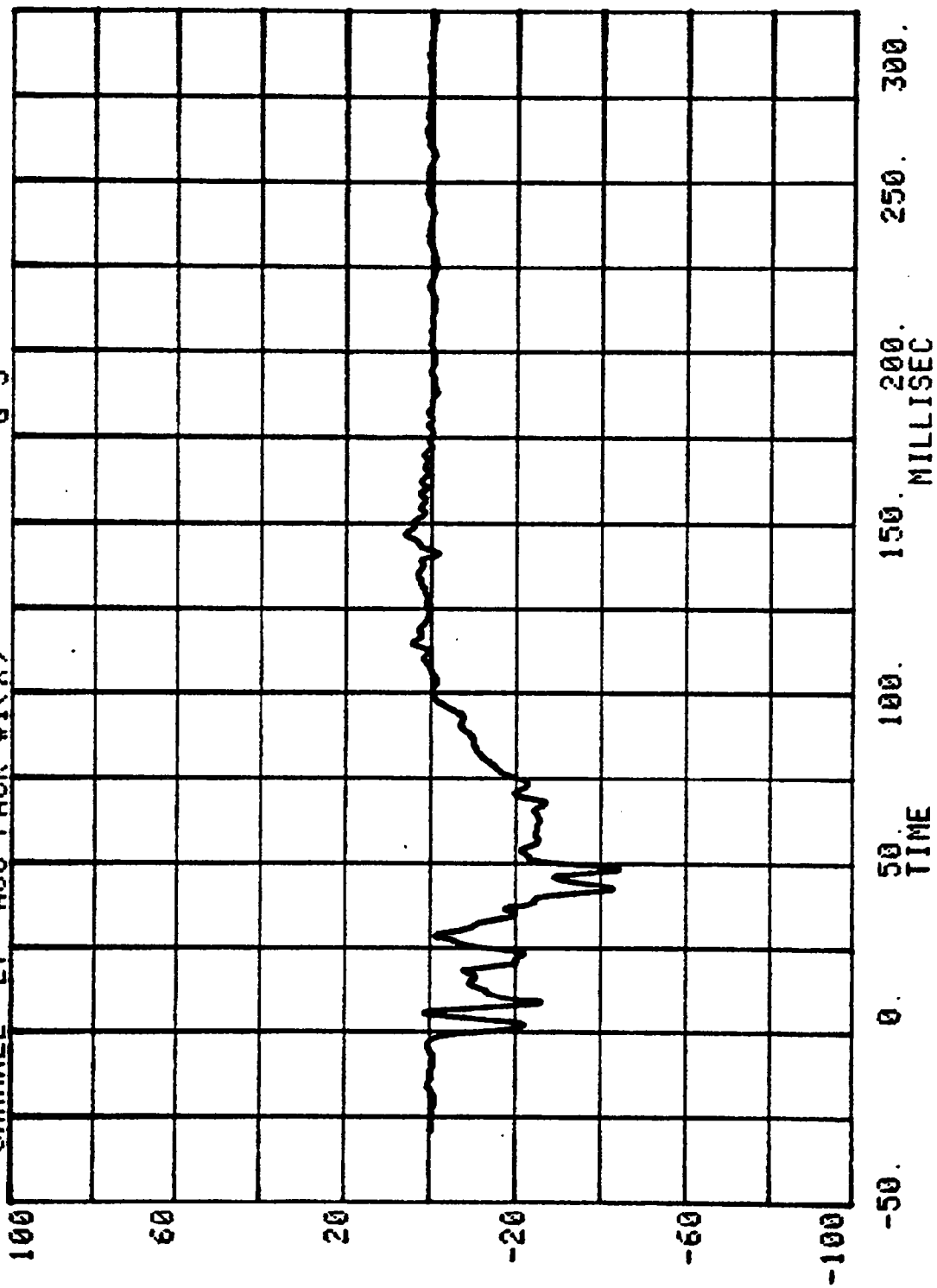
VEHICLE NO. 1 DATA

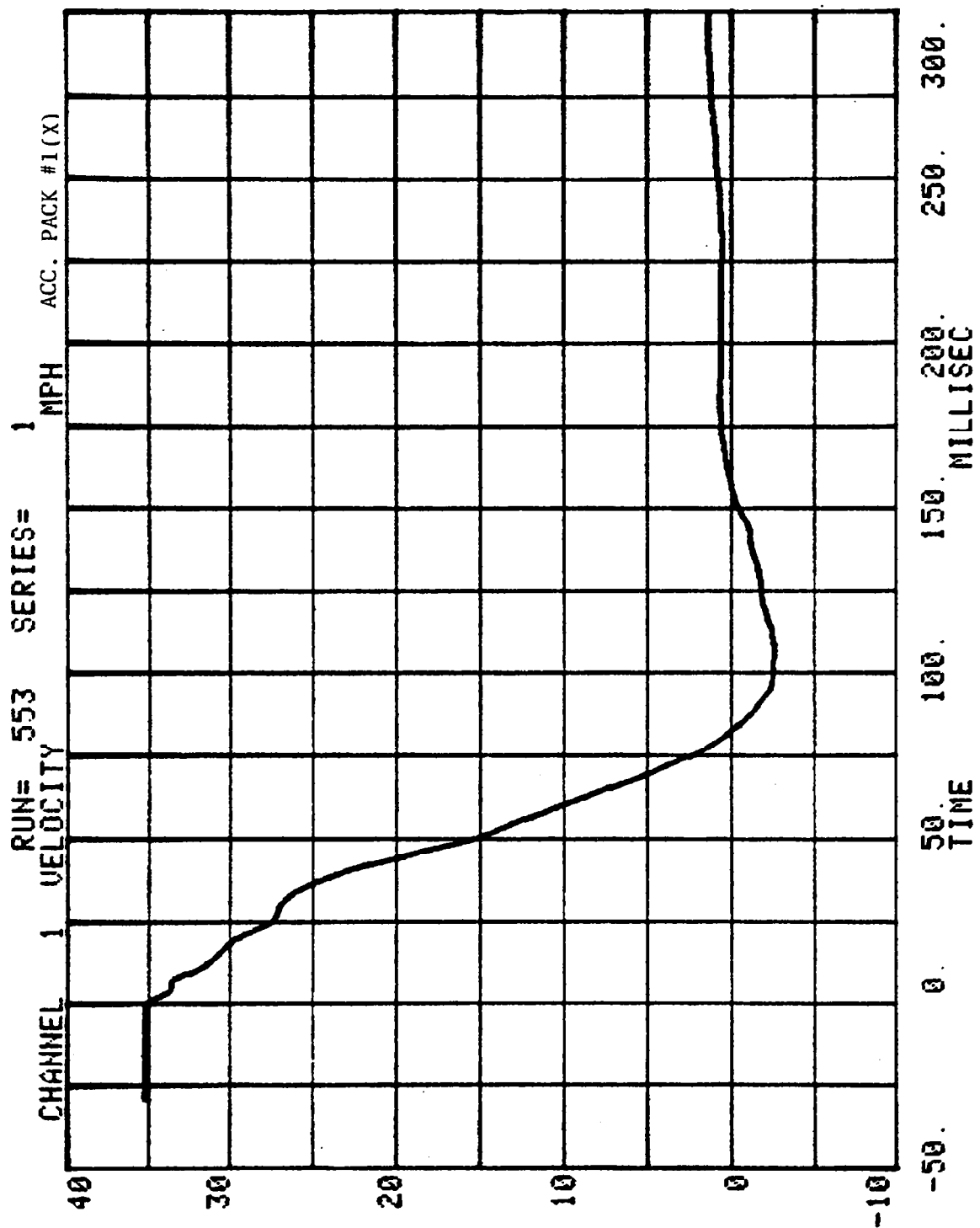
VEHICLE DATA

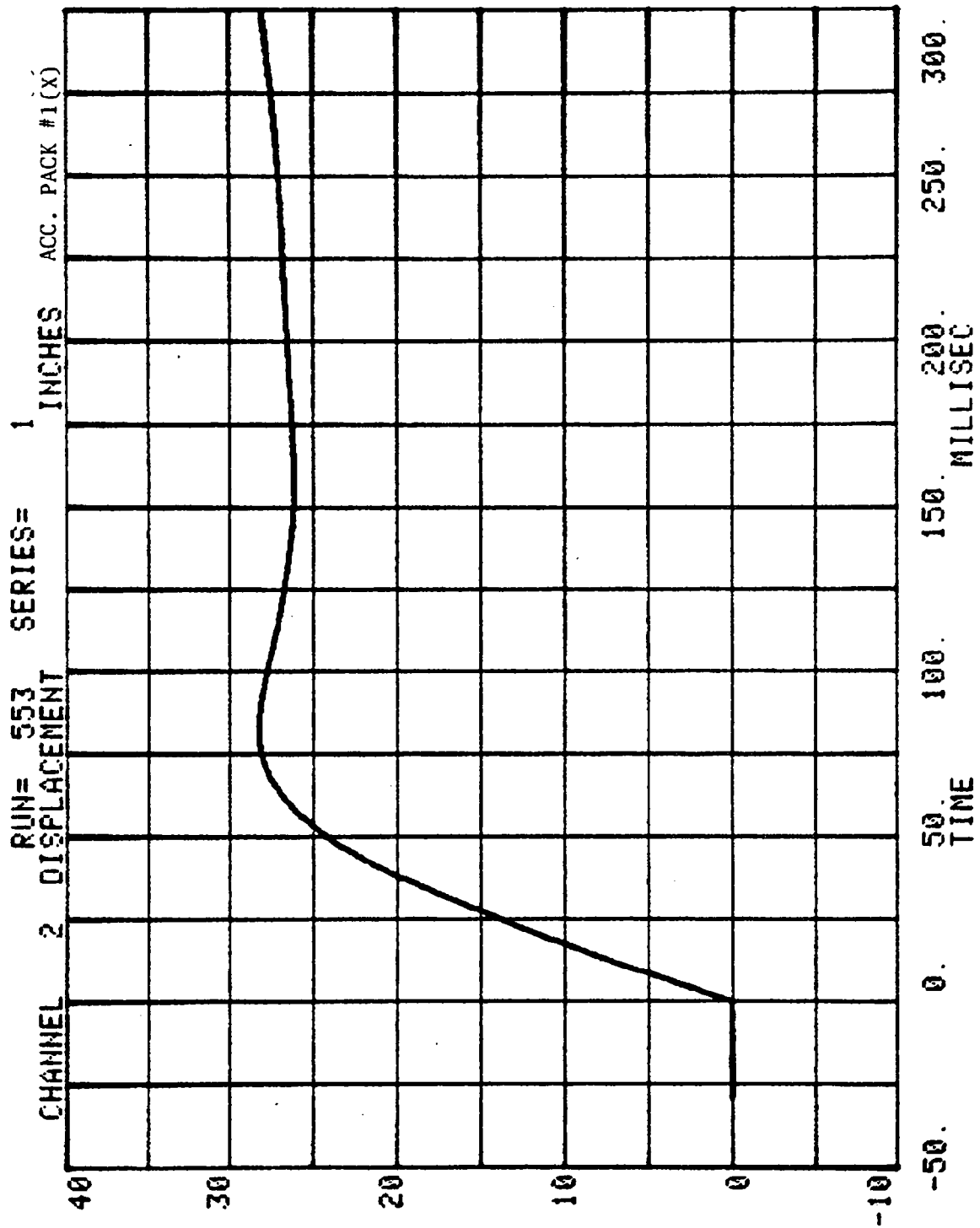
FILTER CHANNEL CLASS

60

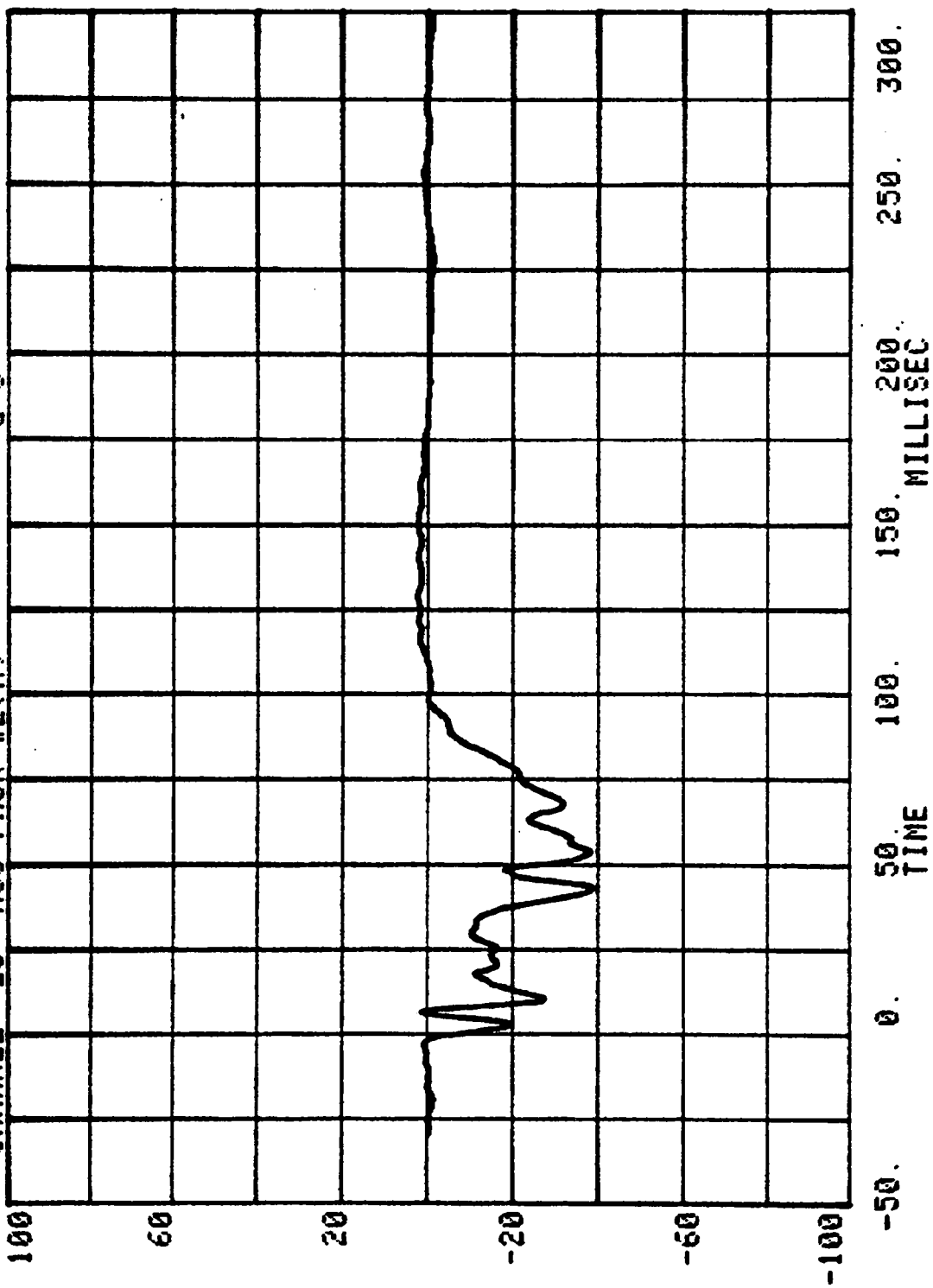
CHANNEL 27 ACC PACK #1(X) RUN= 553 SERIES= 1 G'S

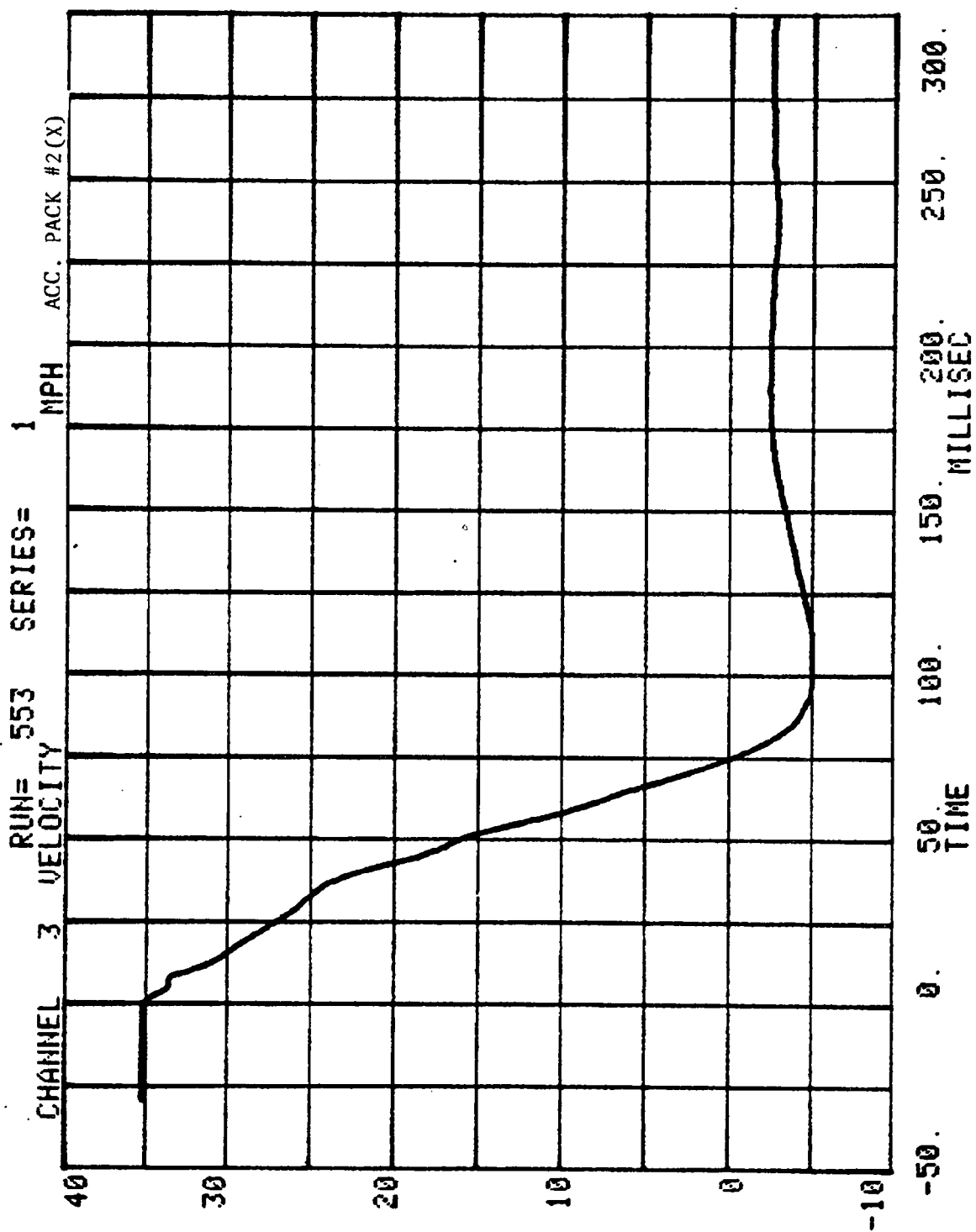


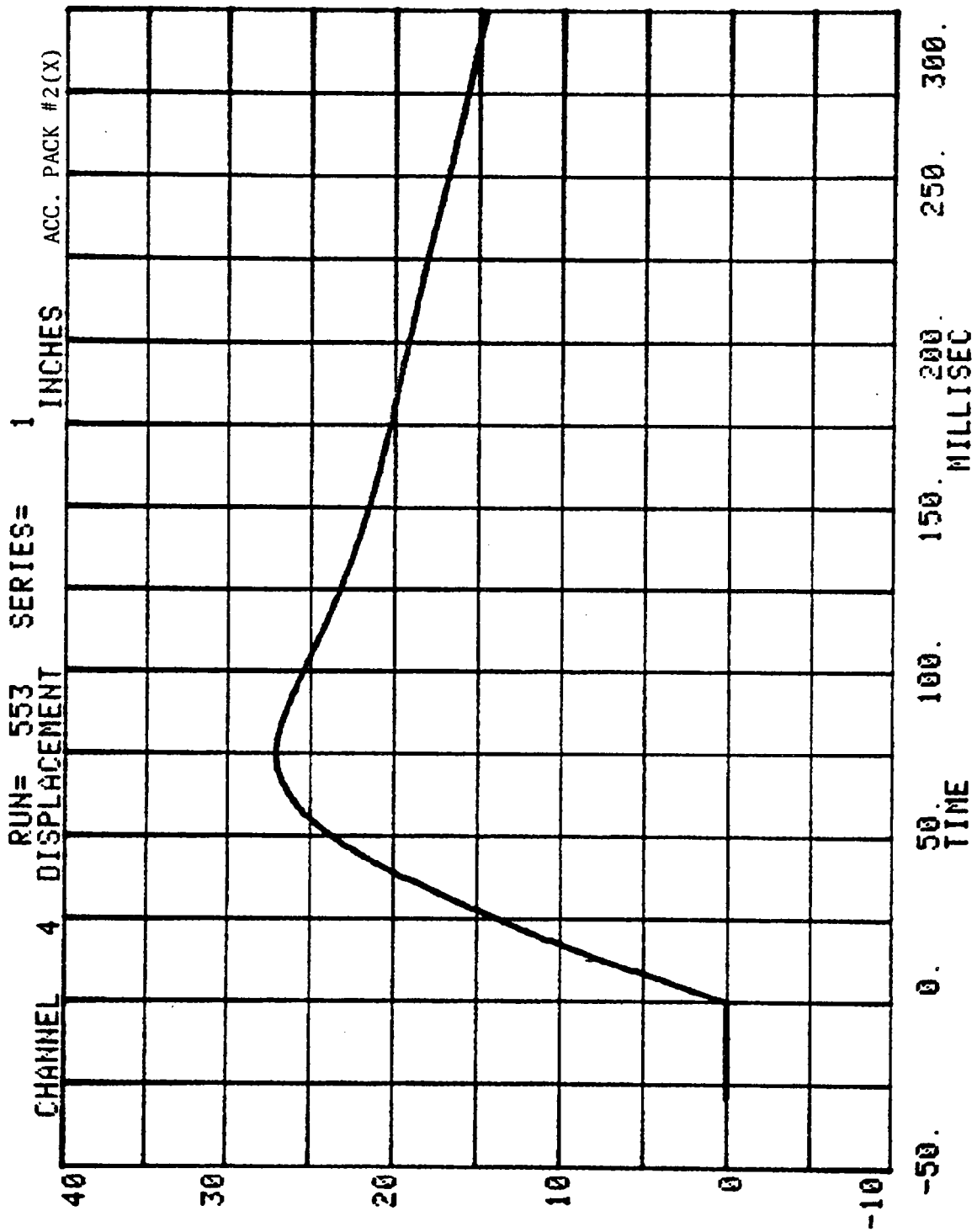




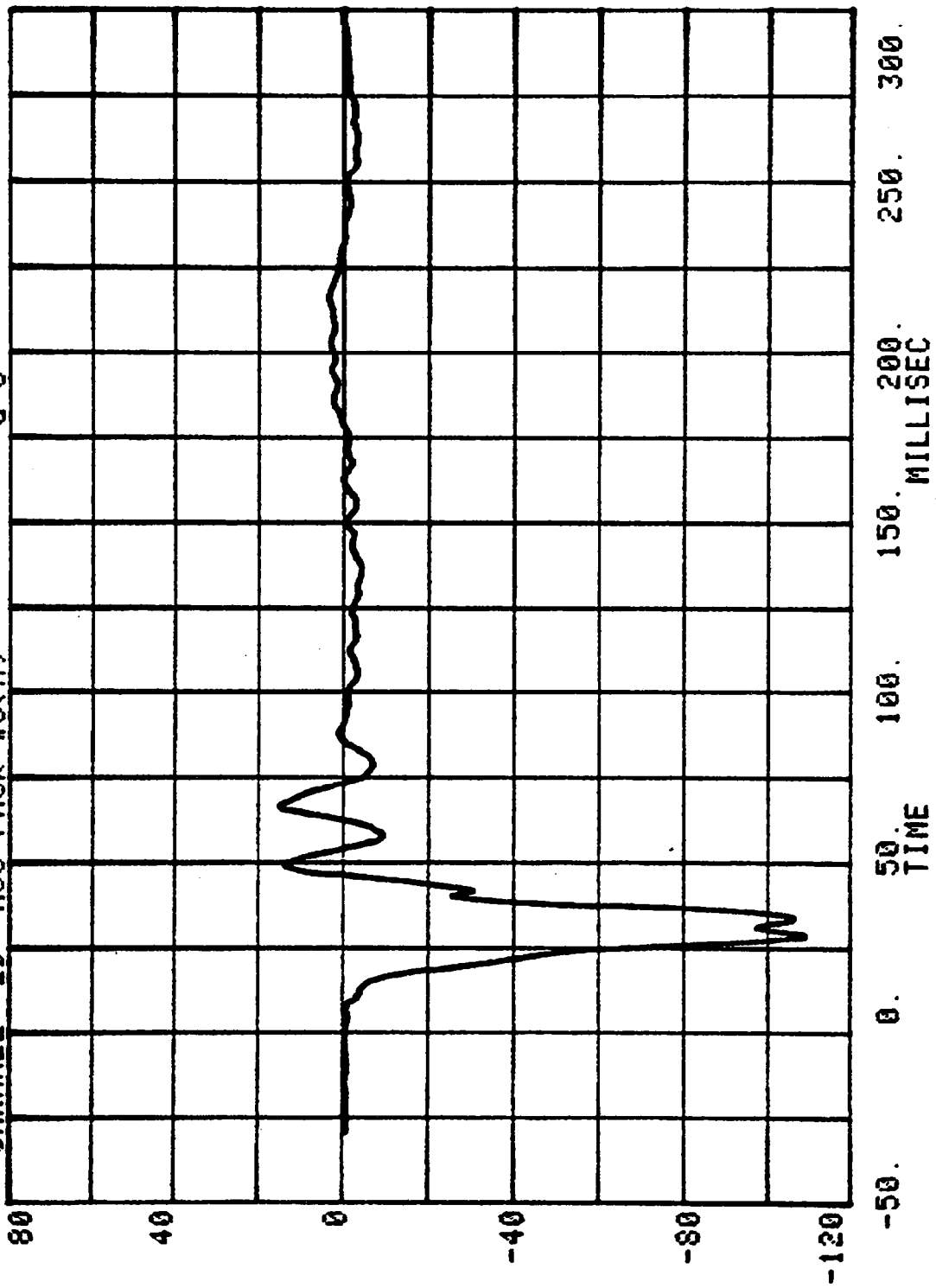
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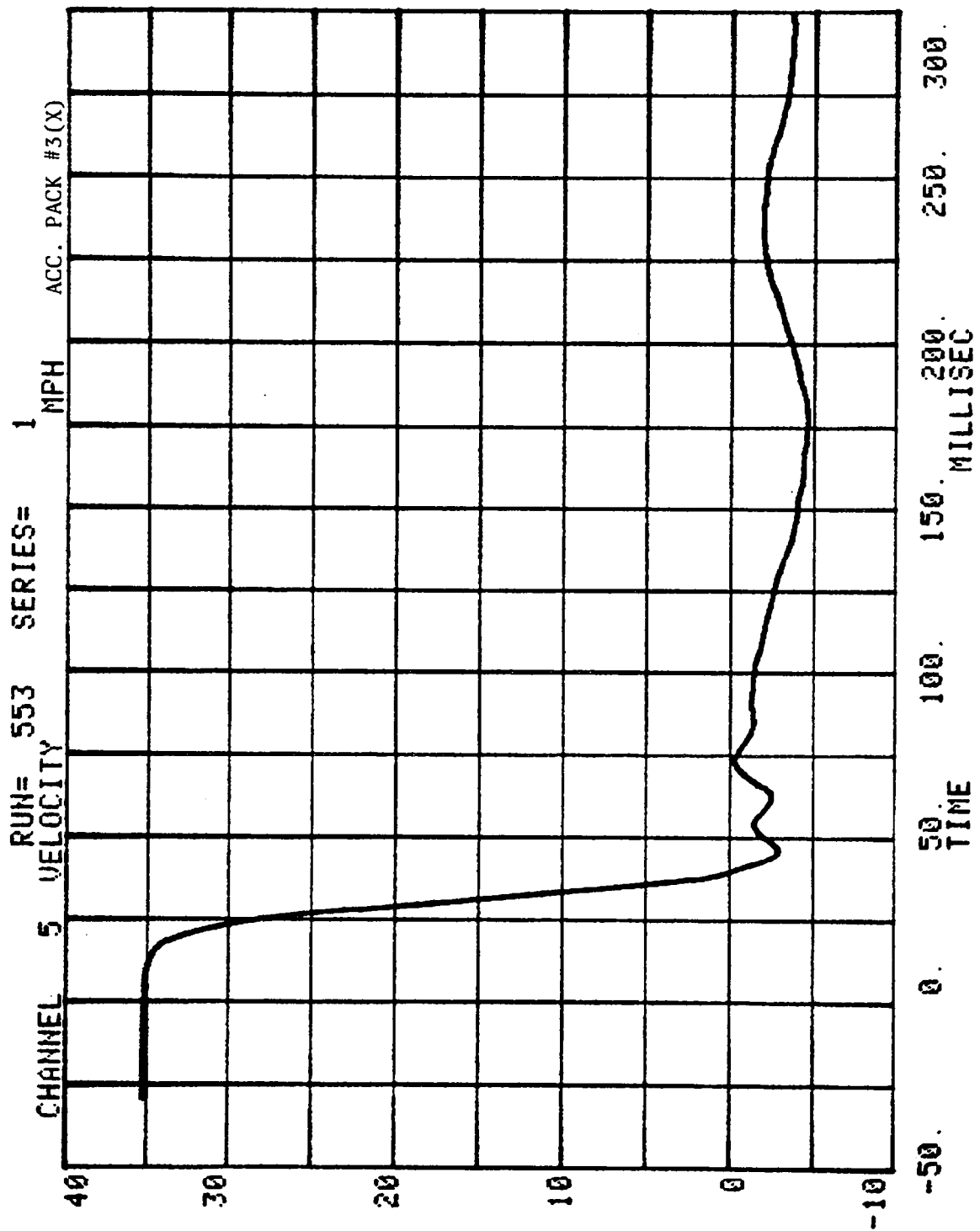


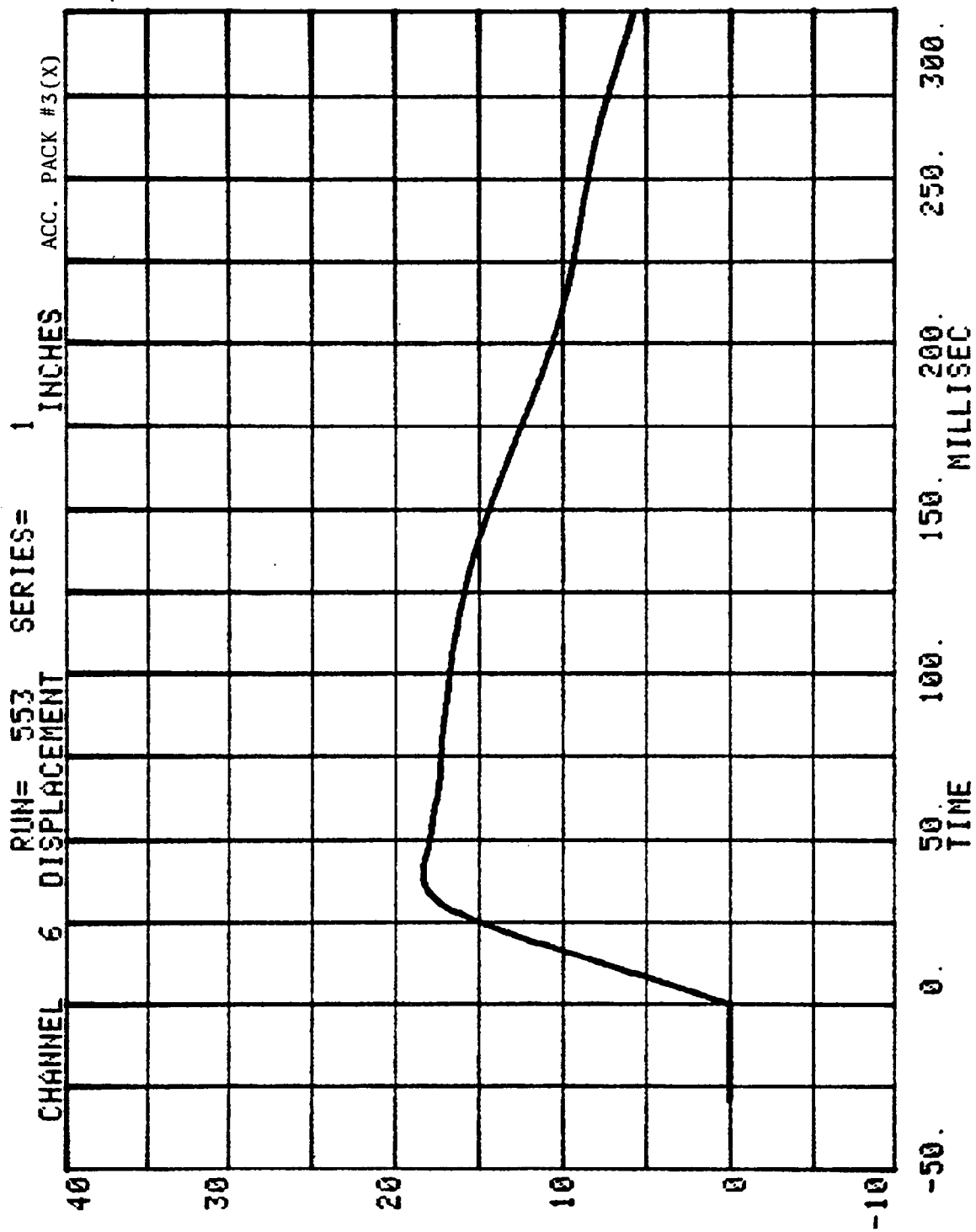


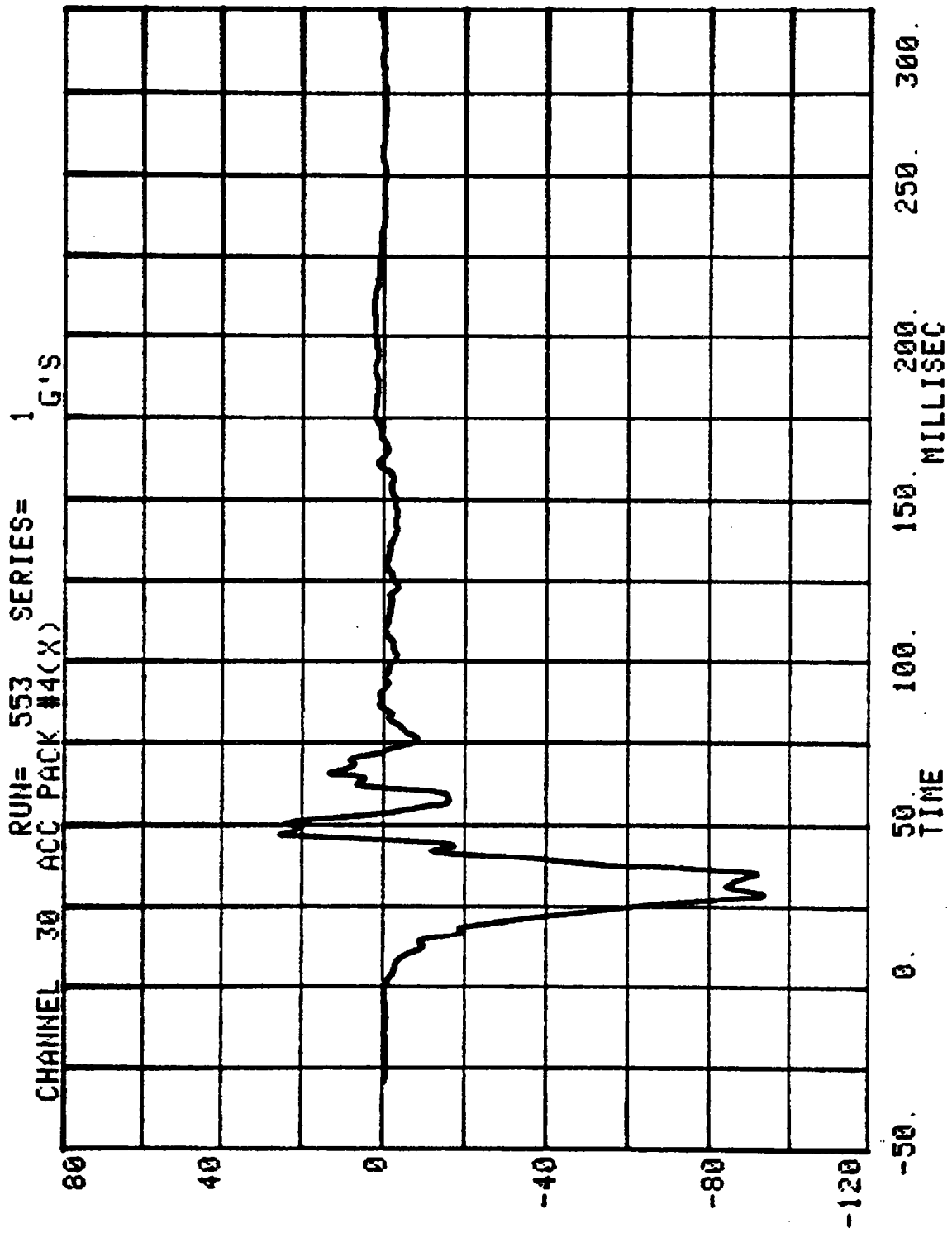


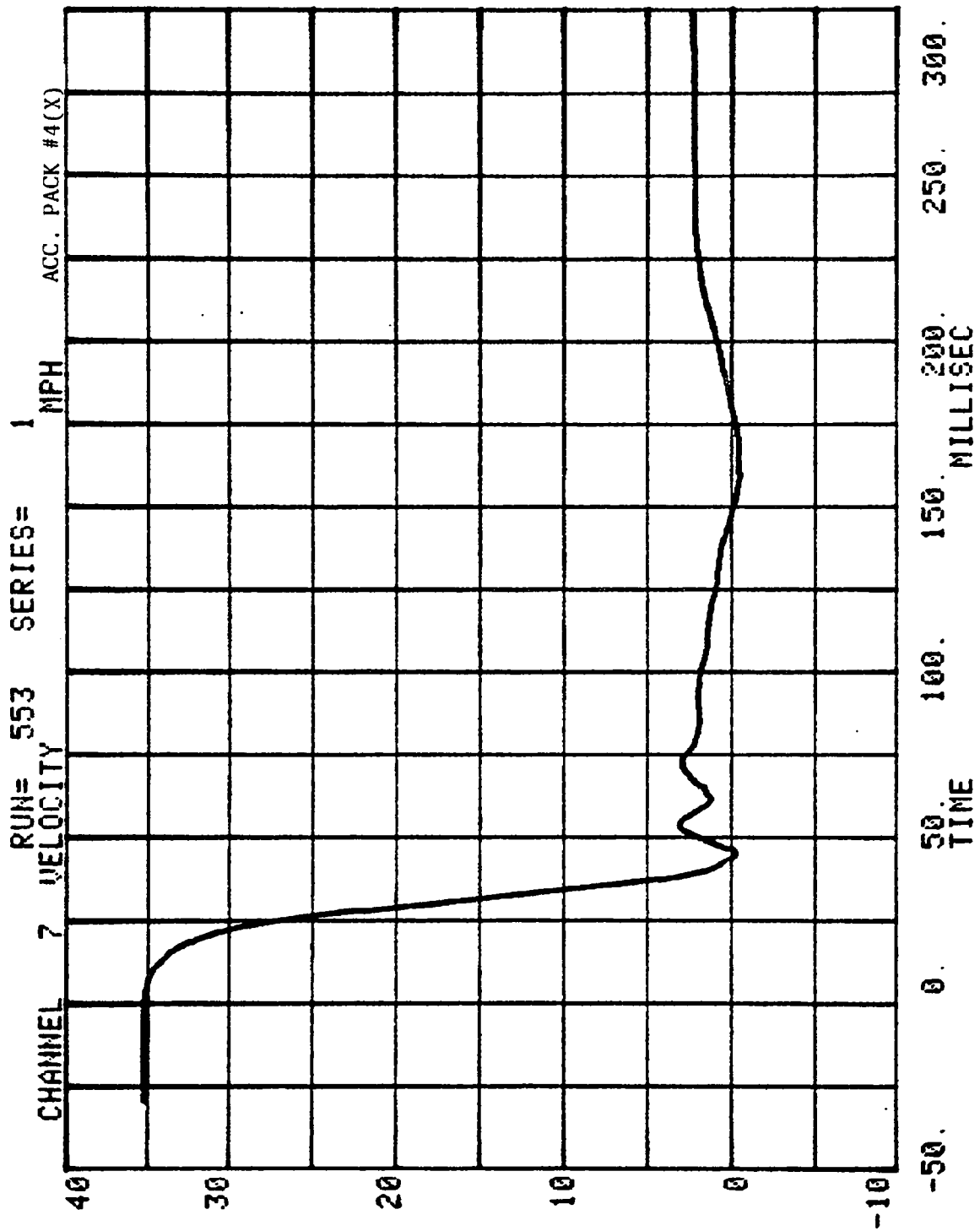
CHANNEL 29 ACC PACK #3(X) RUN= 553 SERIES= 1 G'S

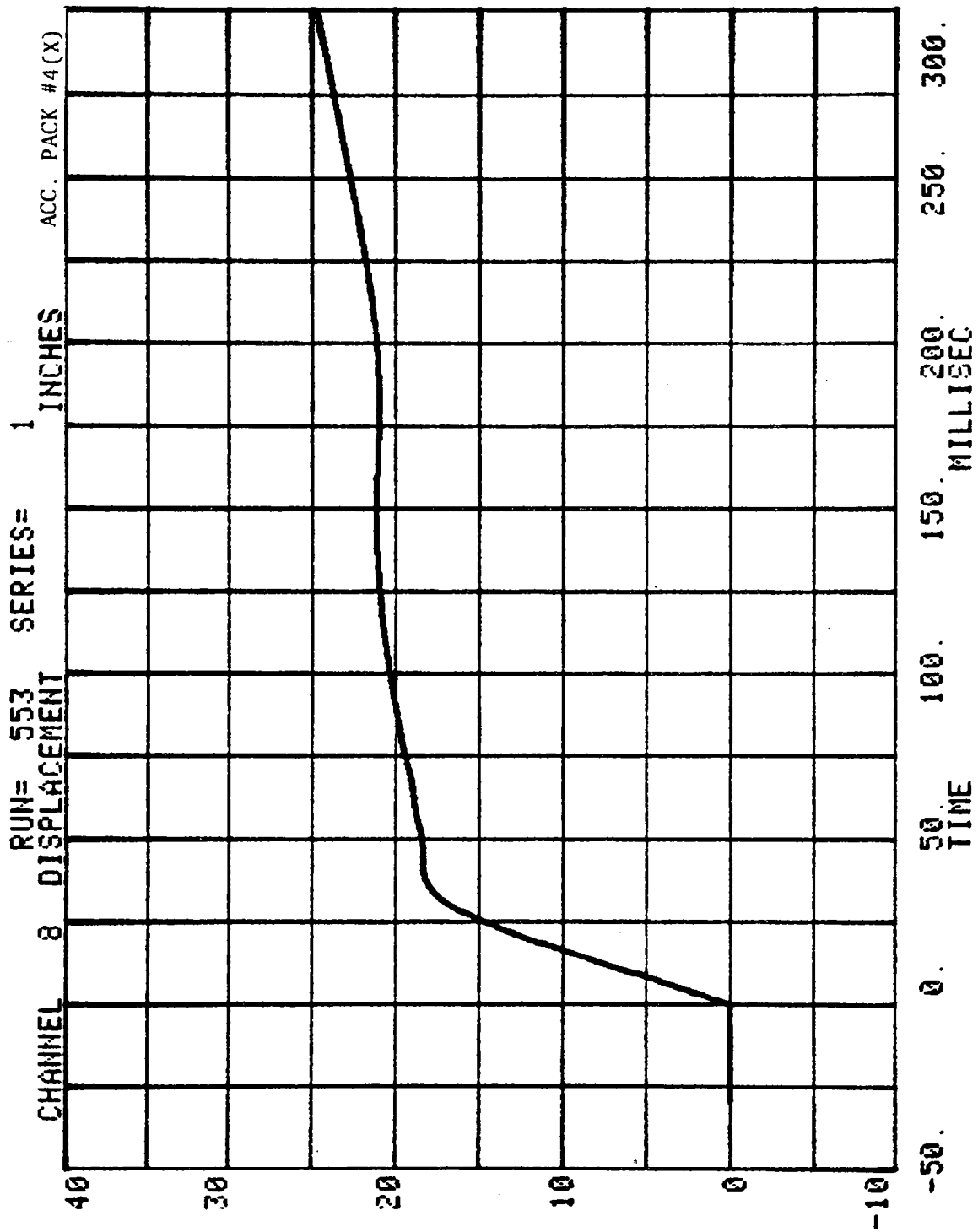




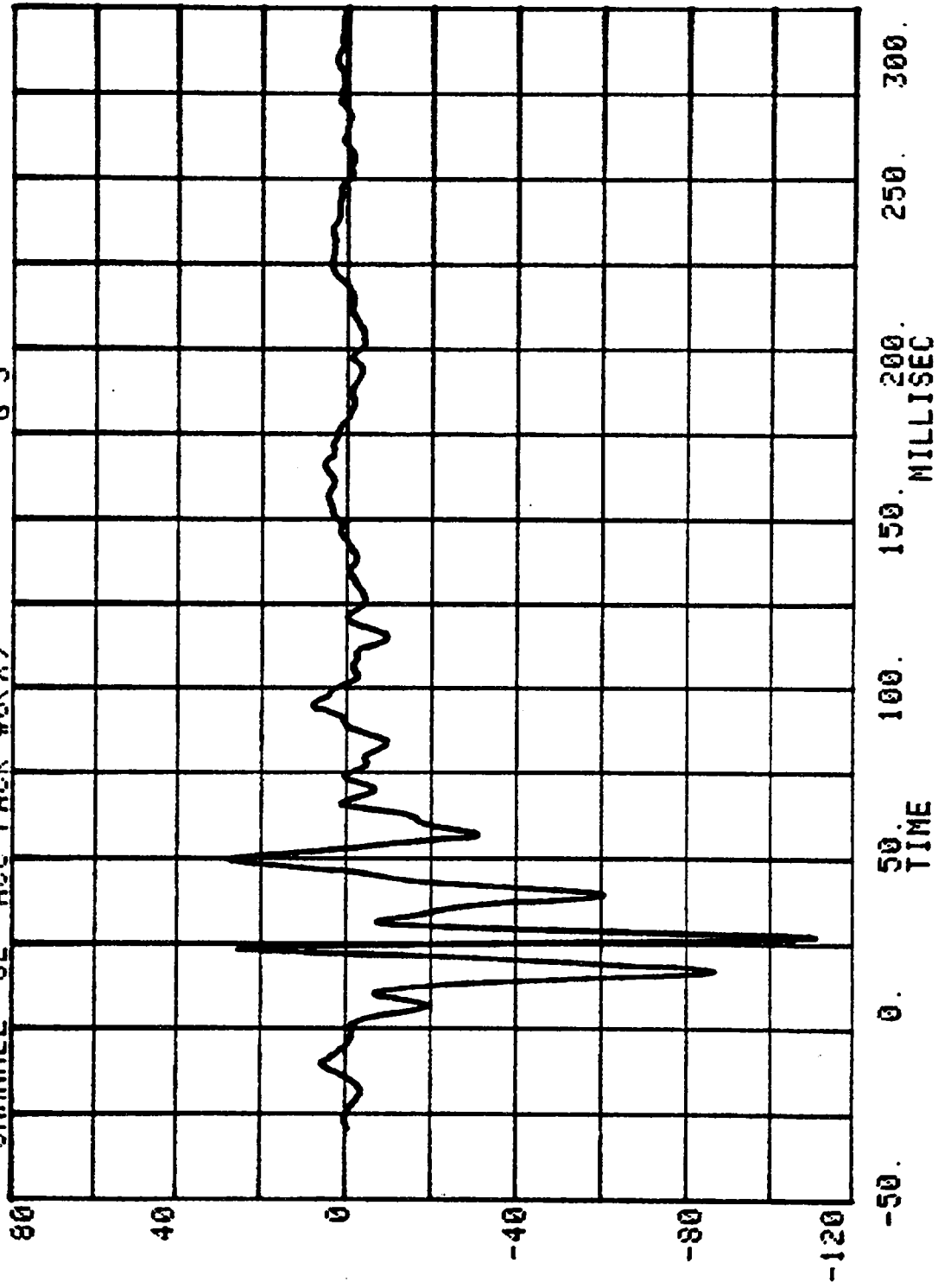


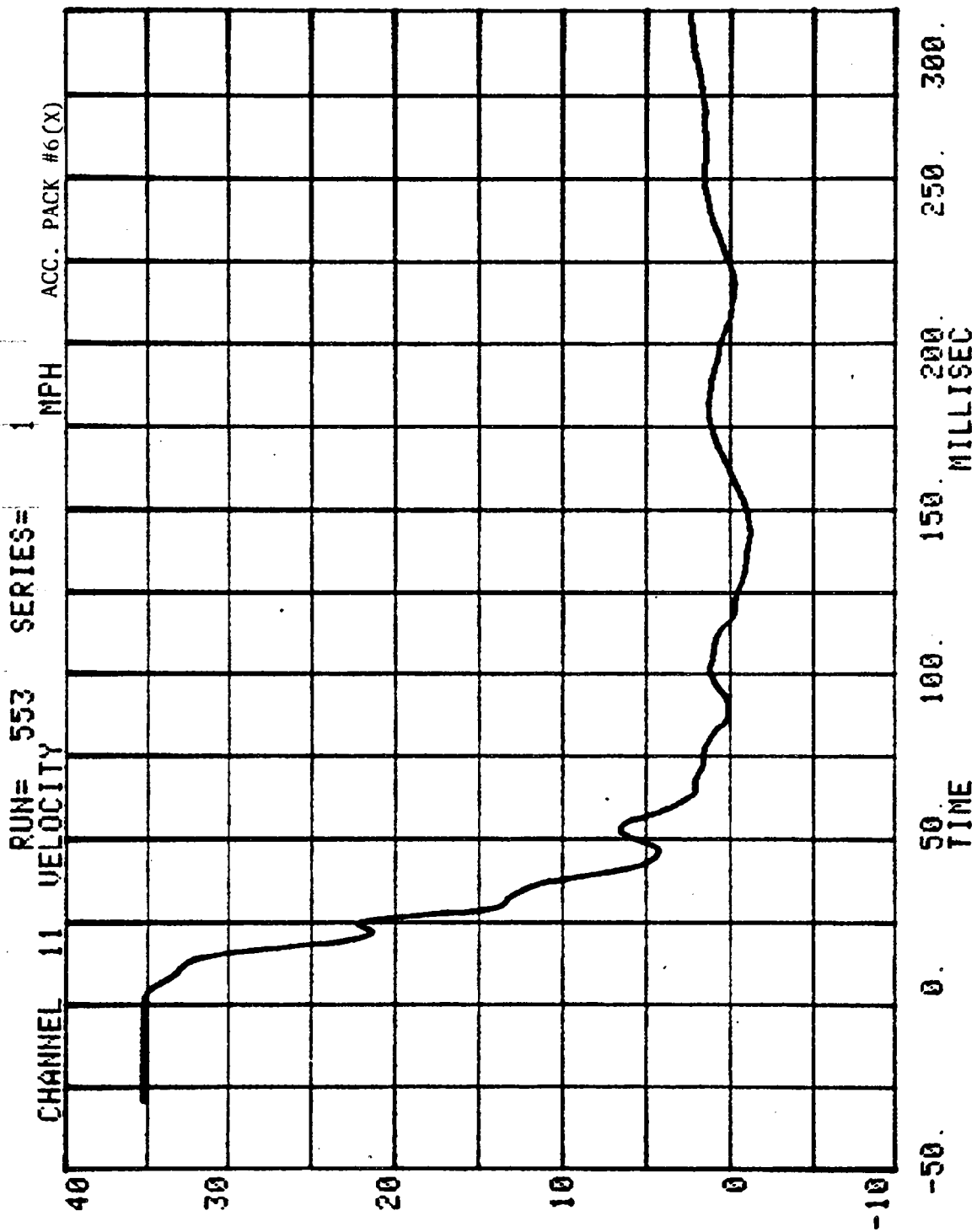


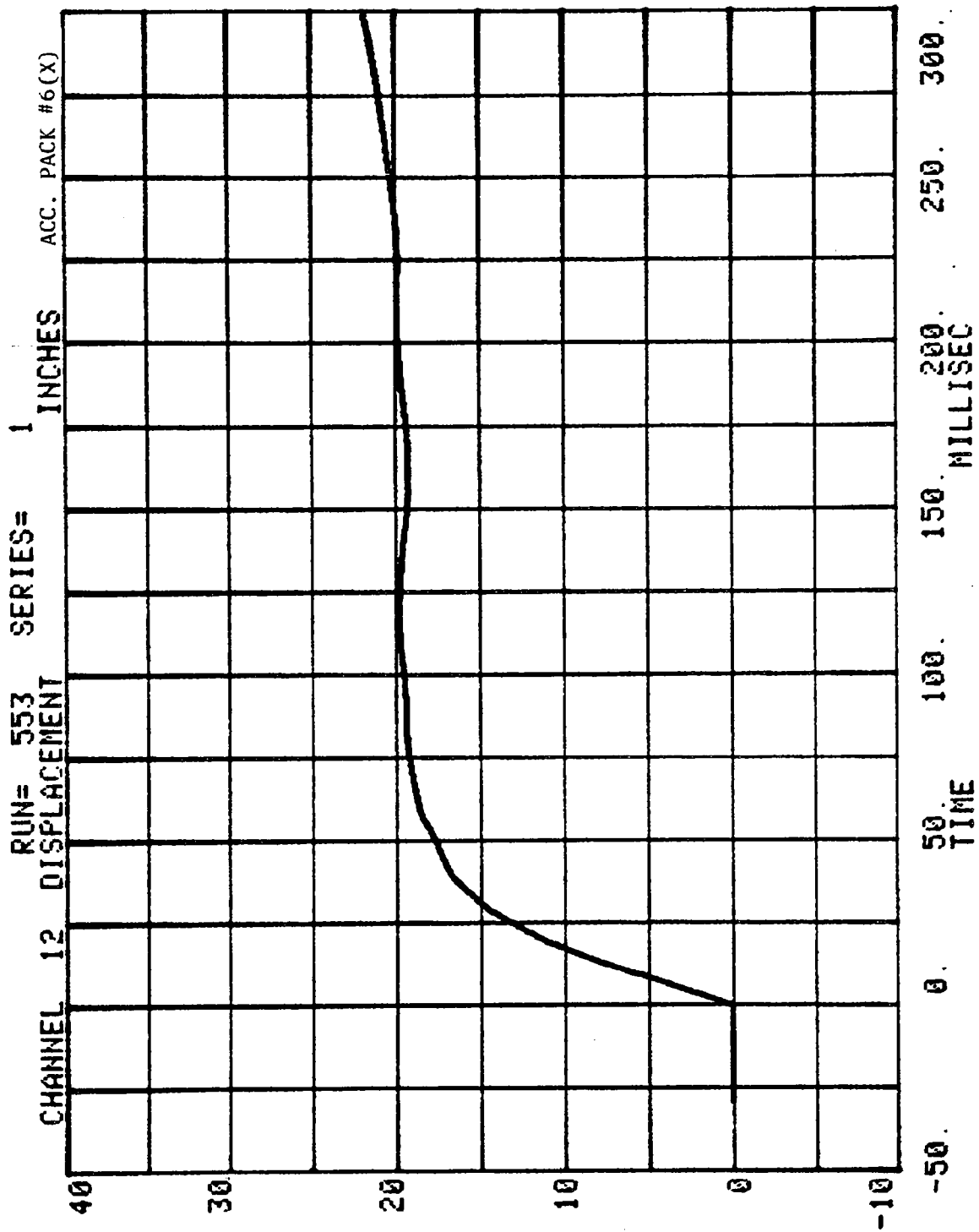




RUN= 553 SERIES= 1
CHANNEL 32 ACC PACK #6(X) G'S







Test No. 447-3-553

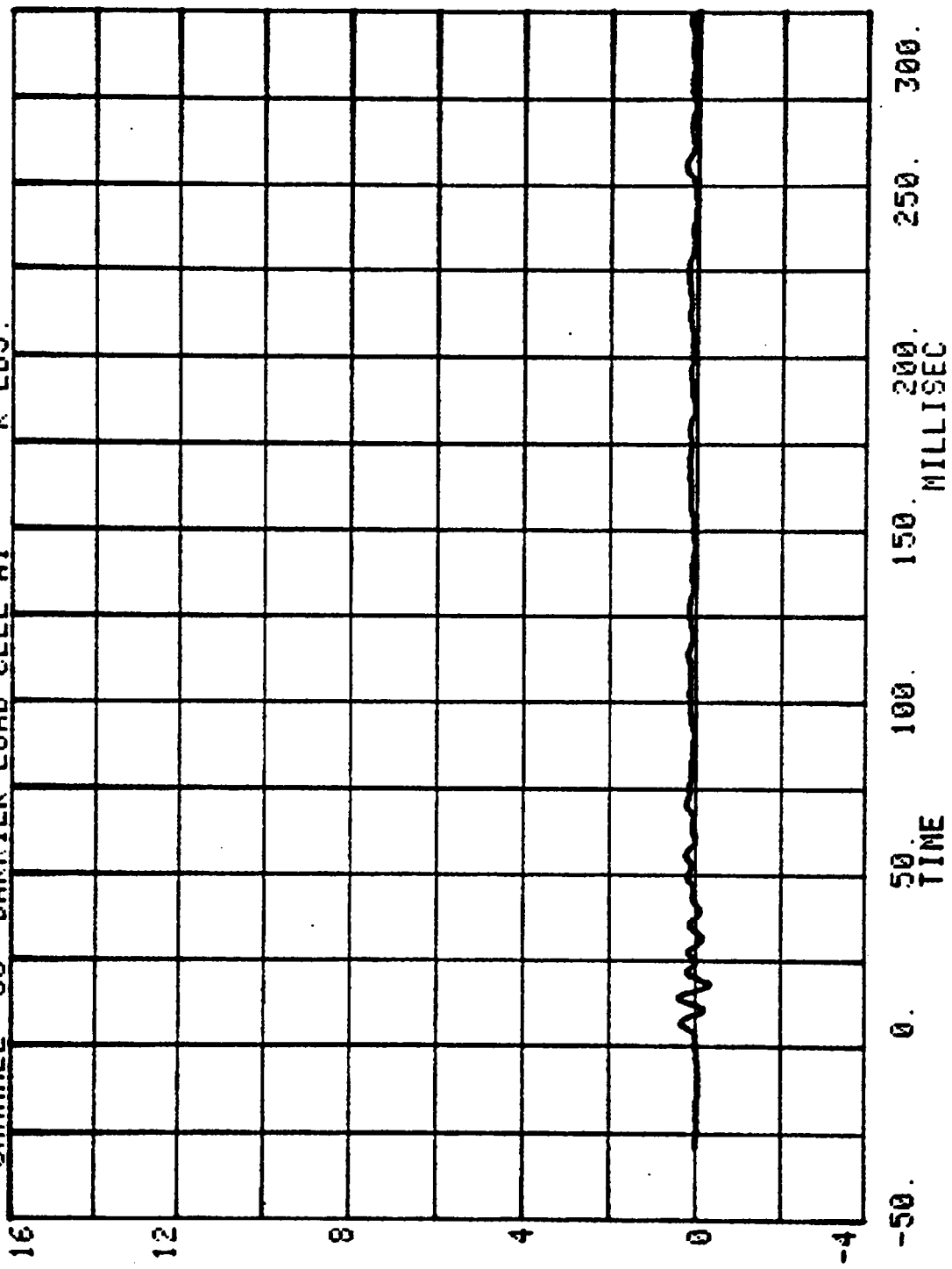
1982 MAZDA-626

LOAD CELL BARRIER DATA

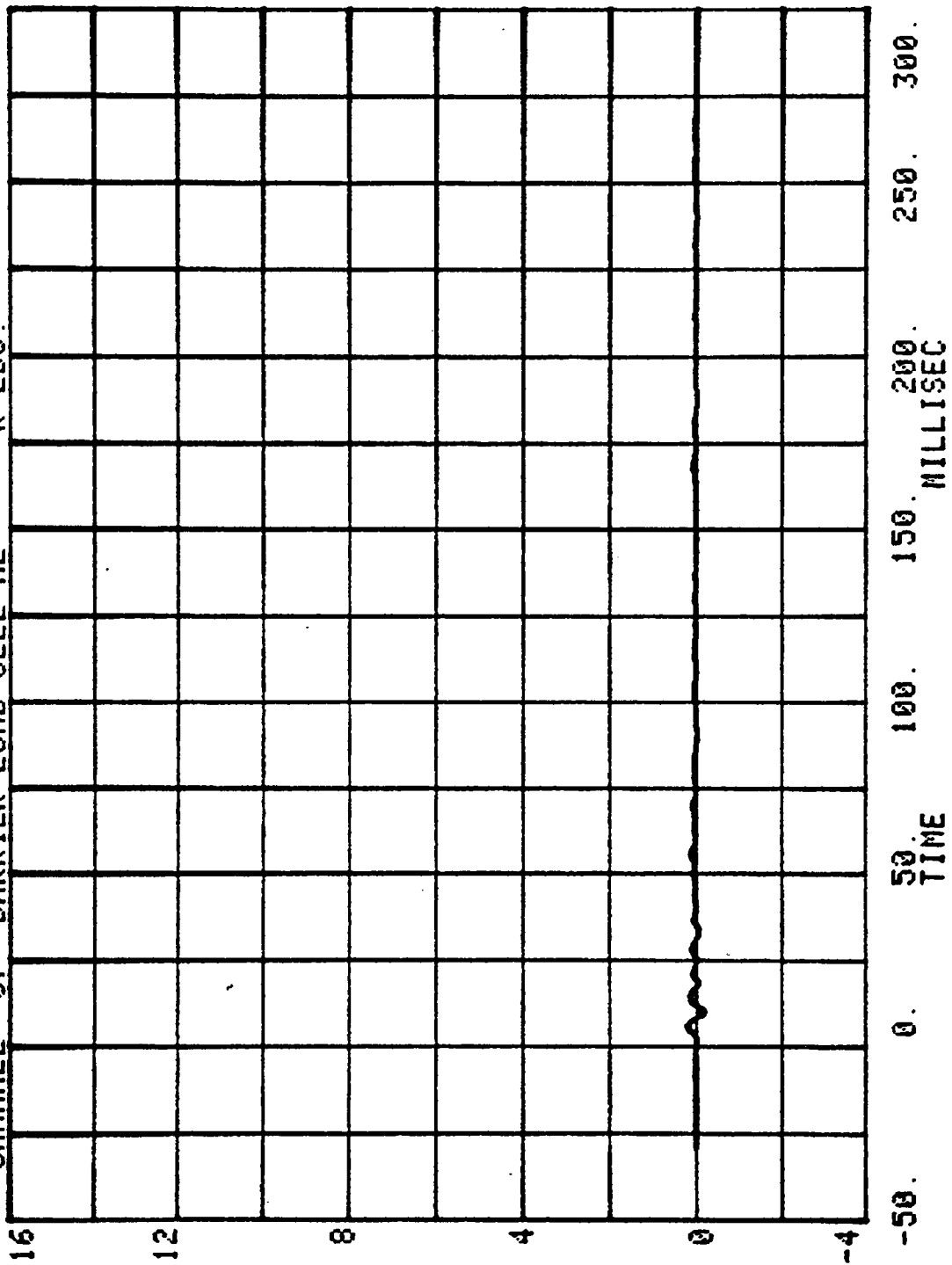
FILTER CHANNEL CLASS

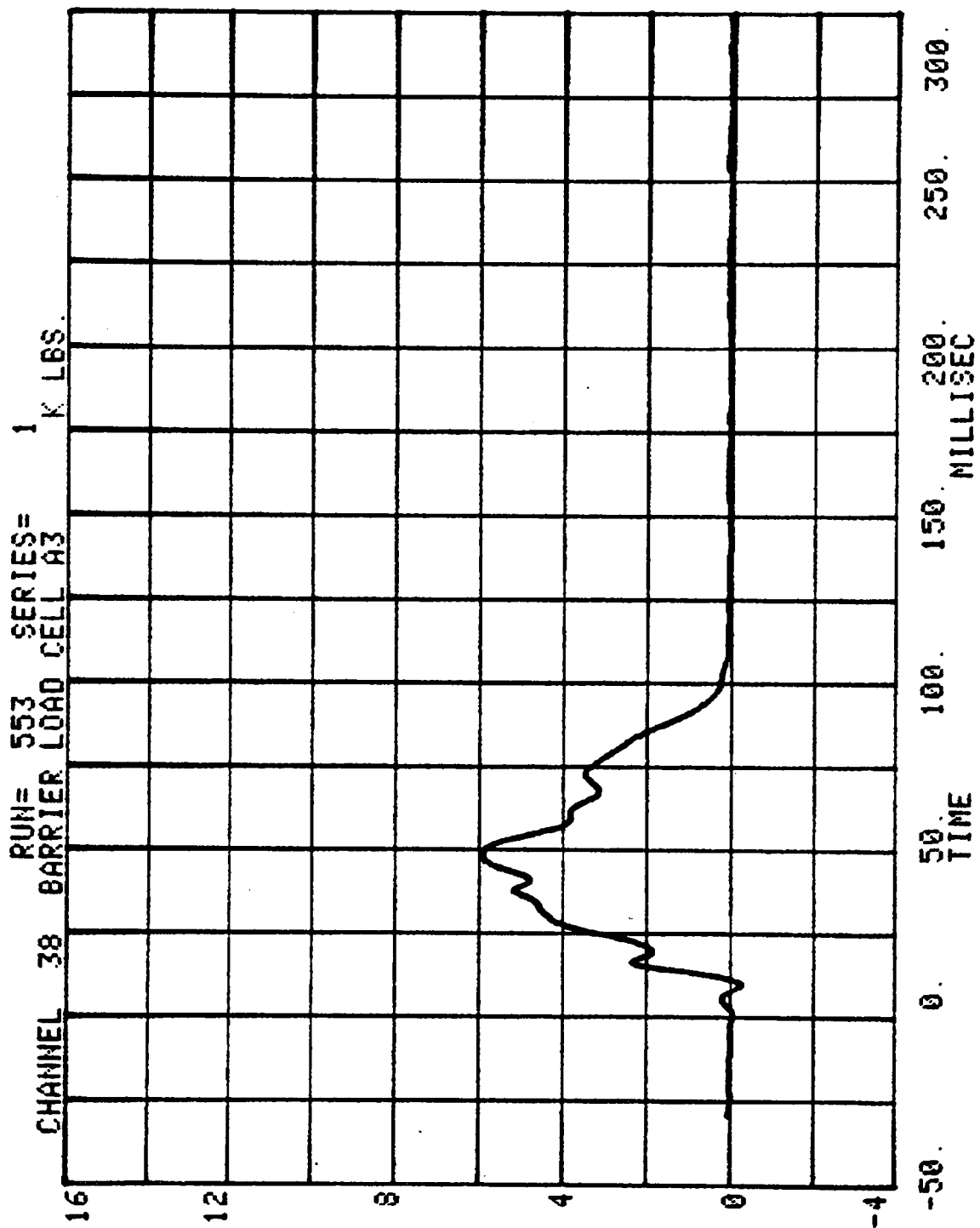
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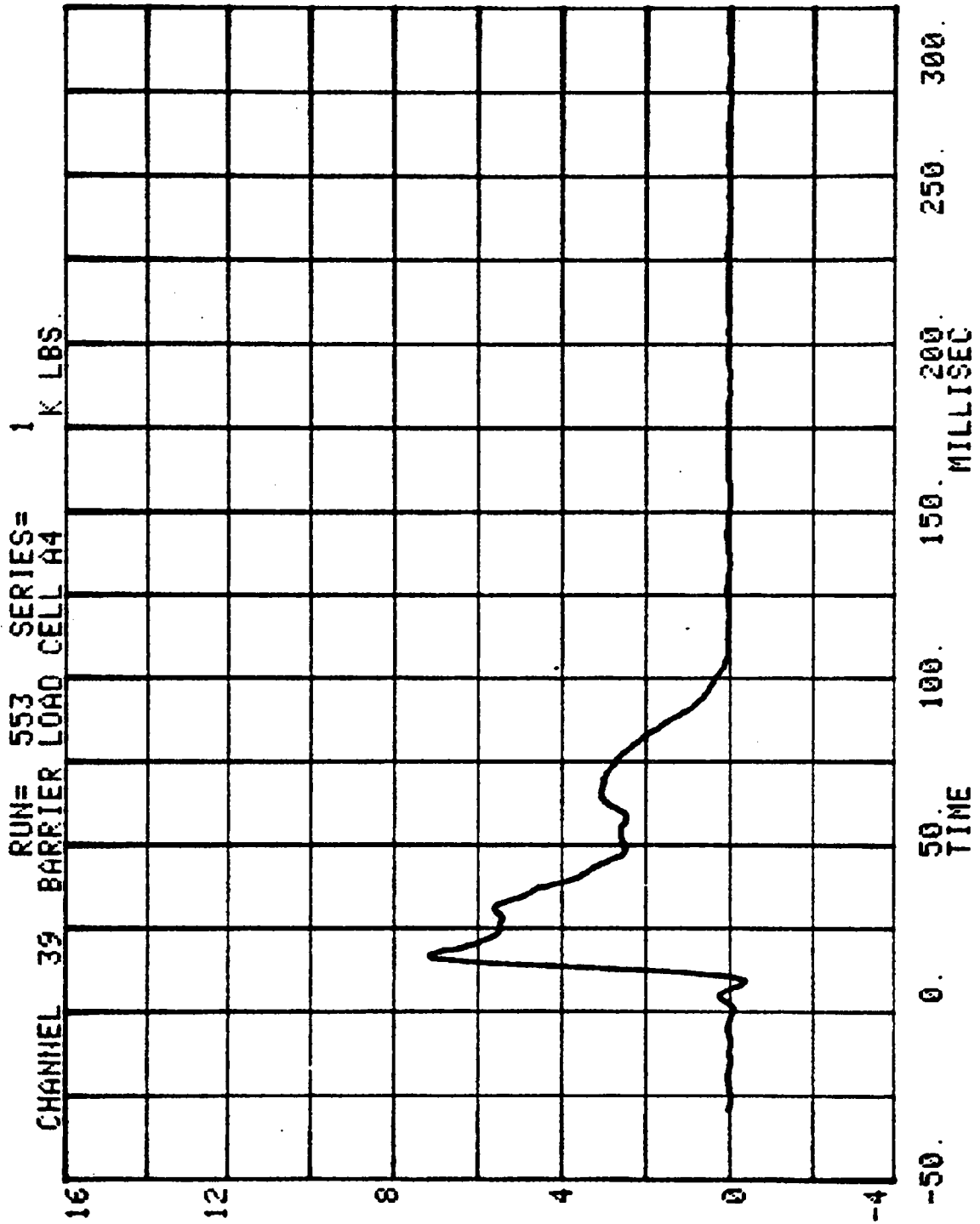
CHANNEL 36 RUN= 553 SERIES= 1 K LBS.
BARRIER LOAD CELL A1



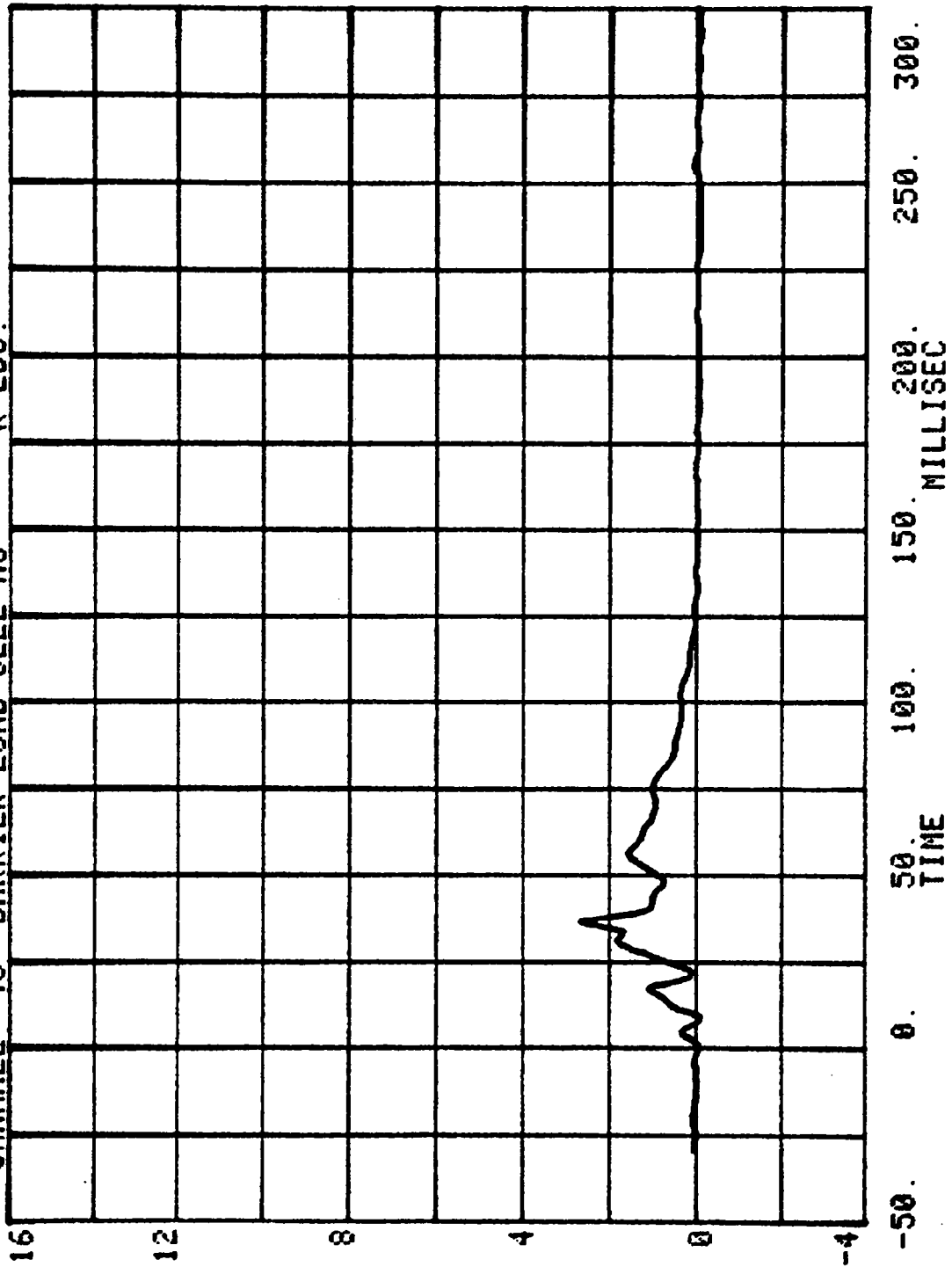
CHANNEL 37 RUN= 553 SERIES= 1 K LBS.
BARRIER LOAD CELL A2



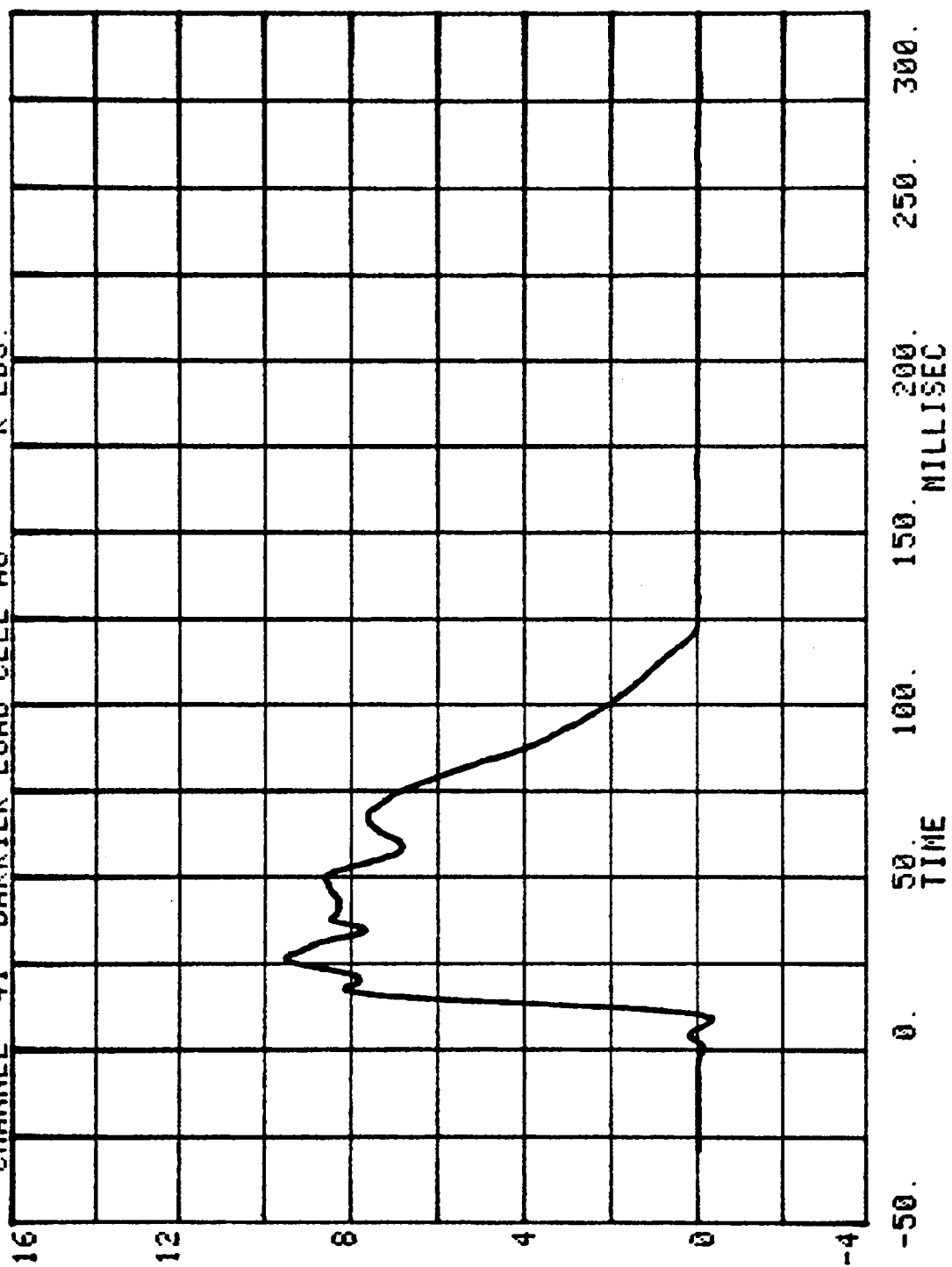




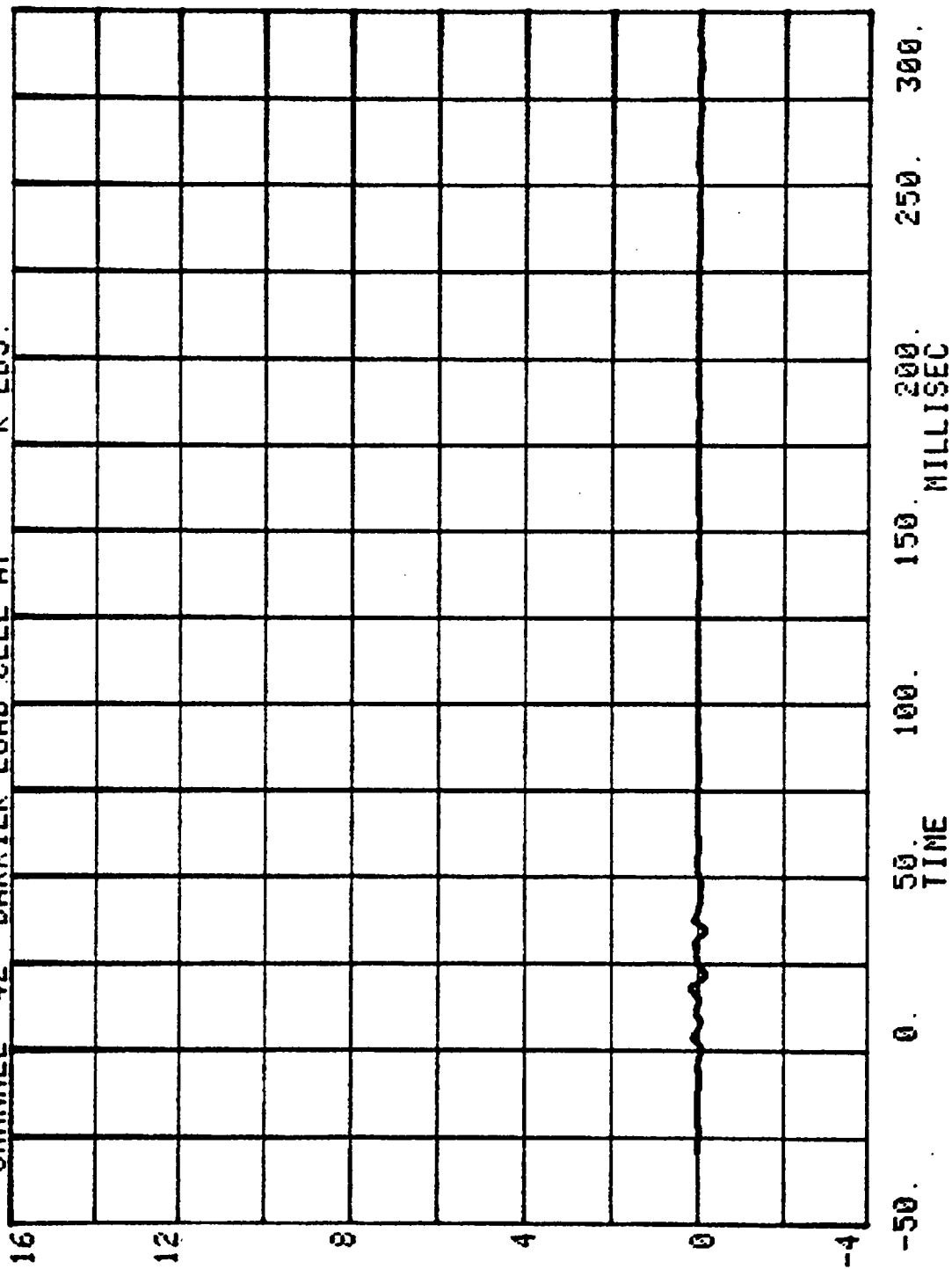
CHANNEL 40 BARRIER LOAD CELL A5 RUN= 553 SERIES= 1 K LBS.



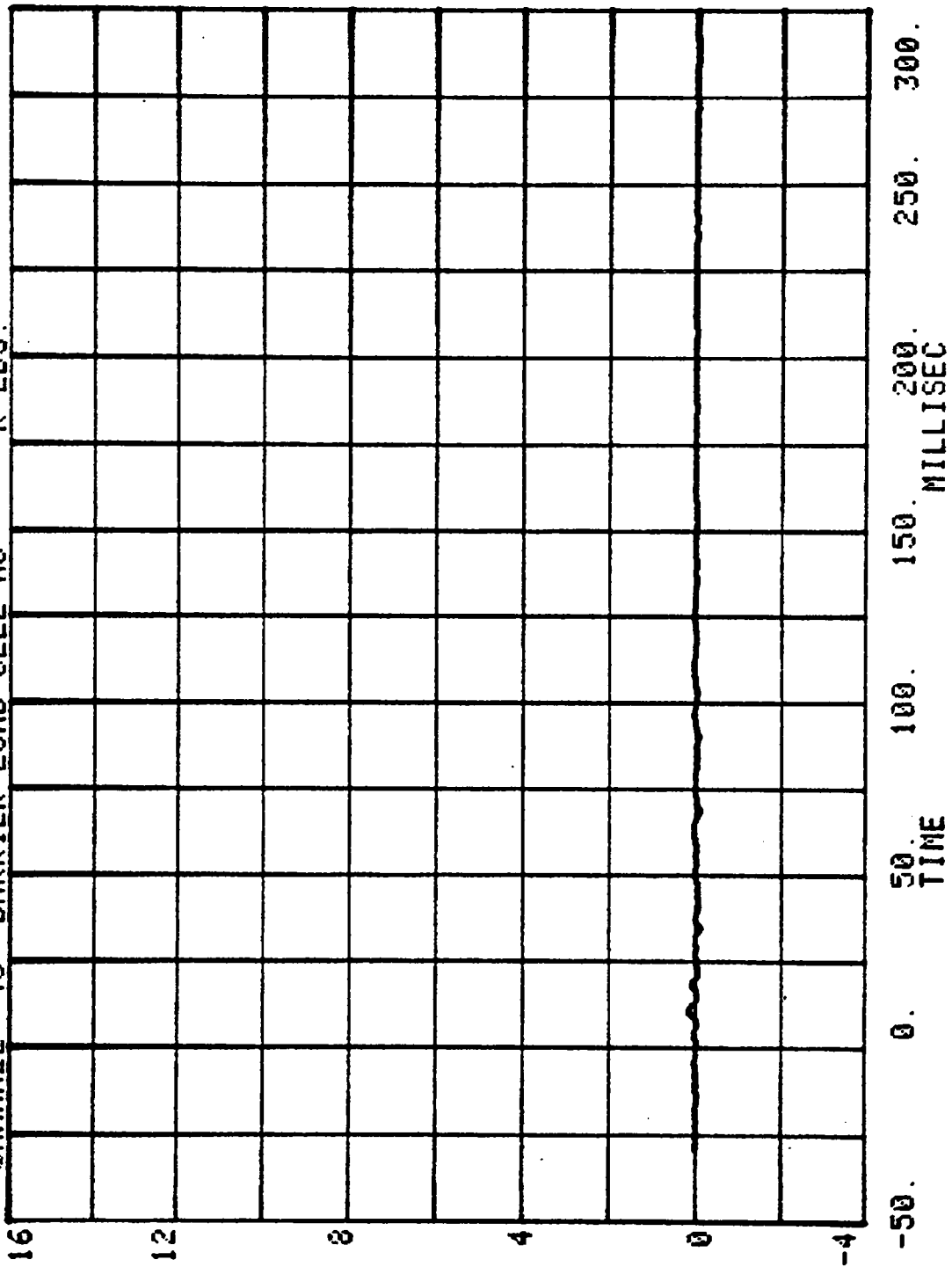
CHANNEL 41 BARRIER LOAD CELL A6 RUN= 553 SERIES= 1 K LBS.



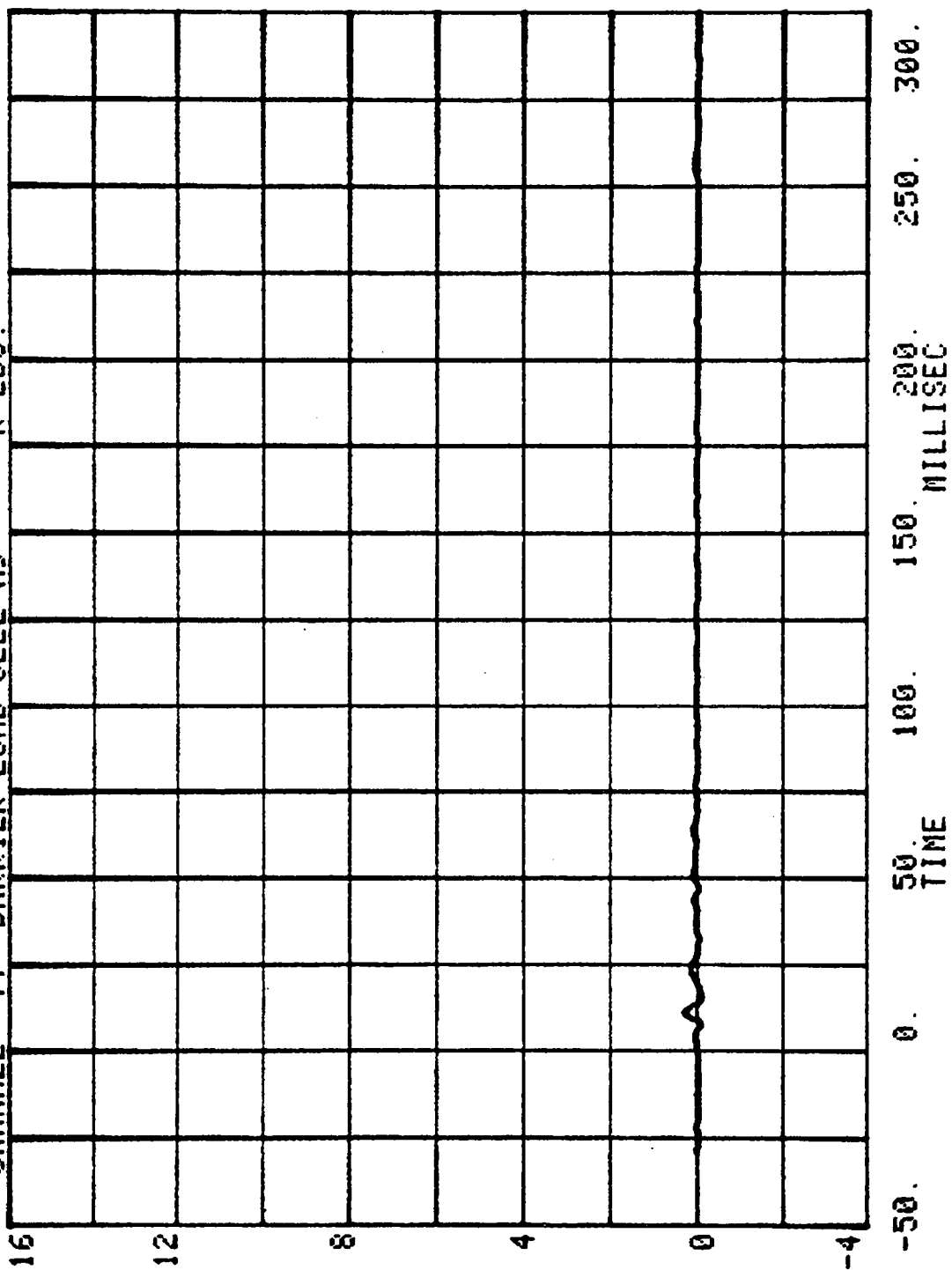
CHANNEL 42 BARRIER LOAD CELL A7 RUN= 553 SERIES= 1 K LBS.



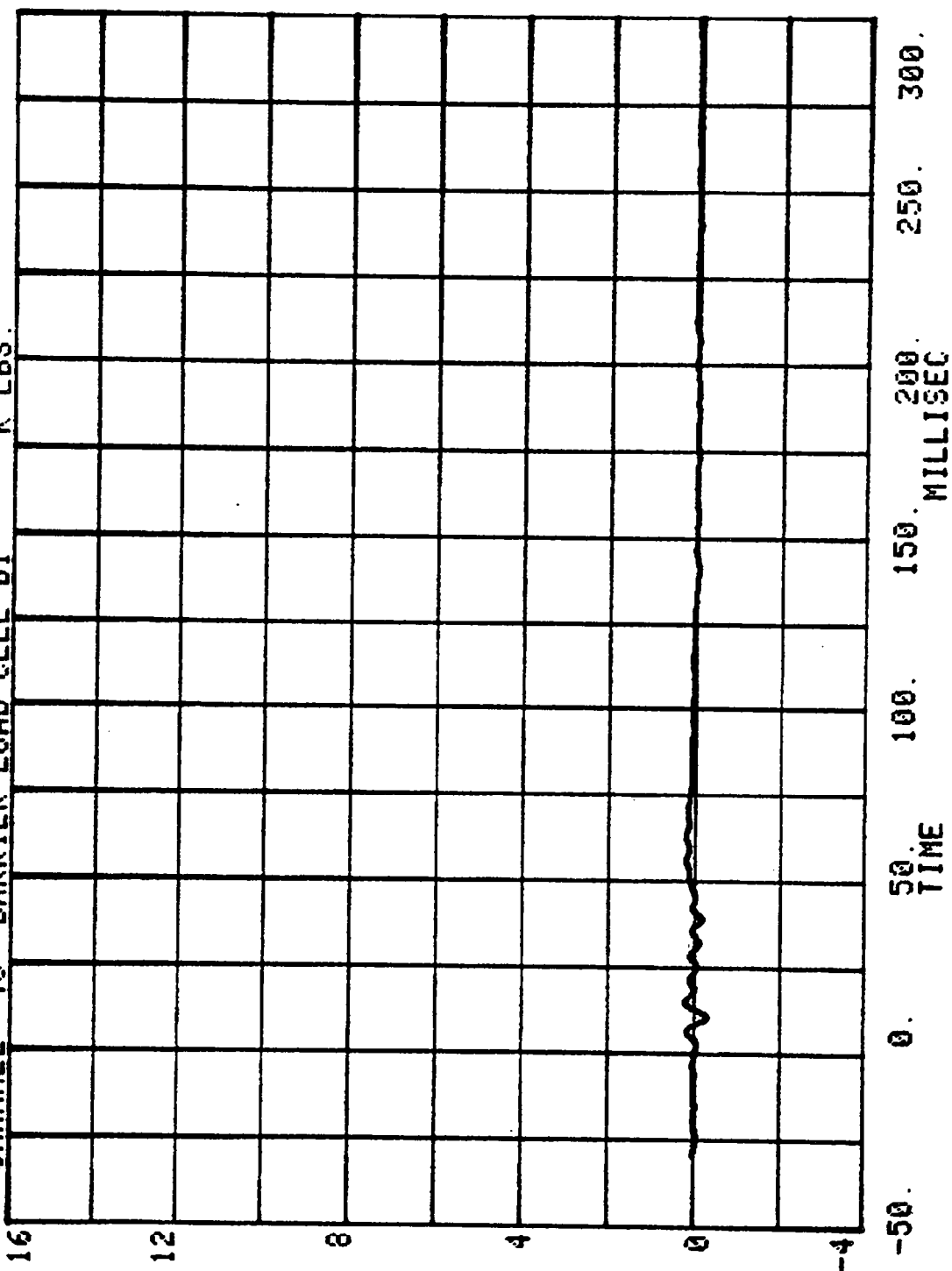
CHANNEL 43 RUN= 553 SERIES= 1 K LBS.
BARRIER LOAD CELL A8



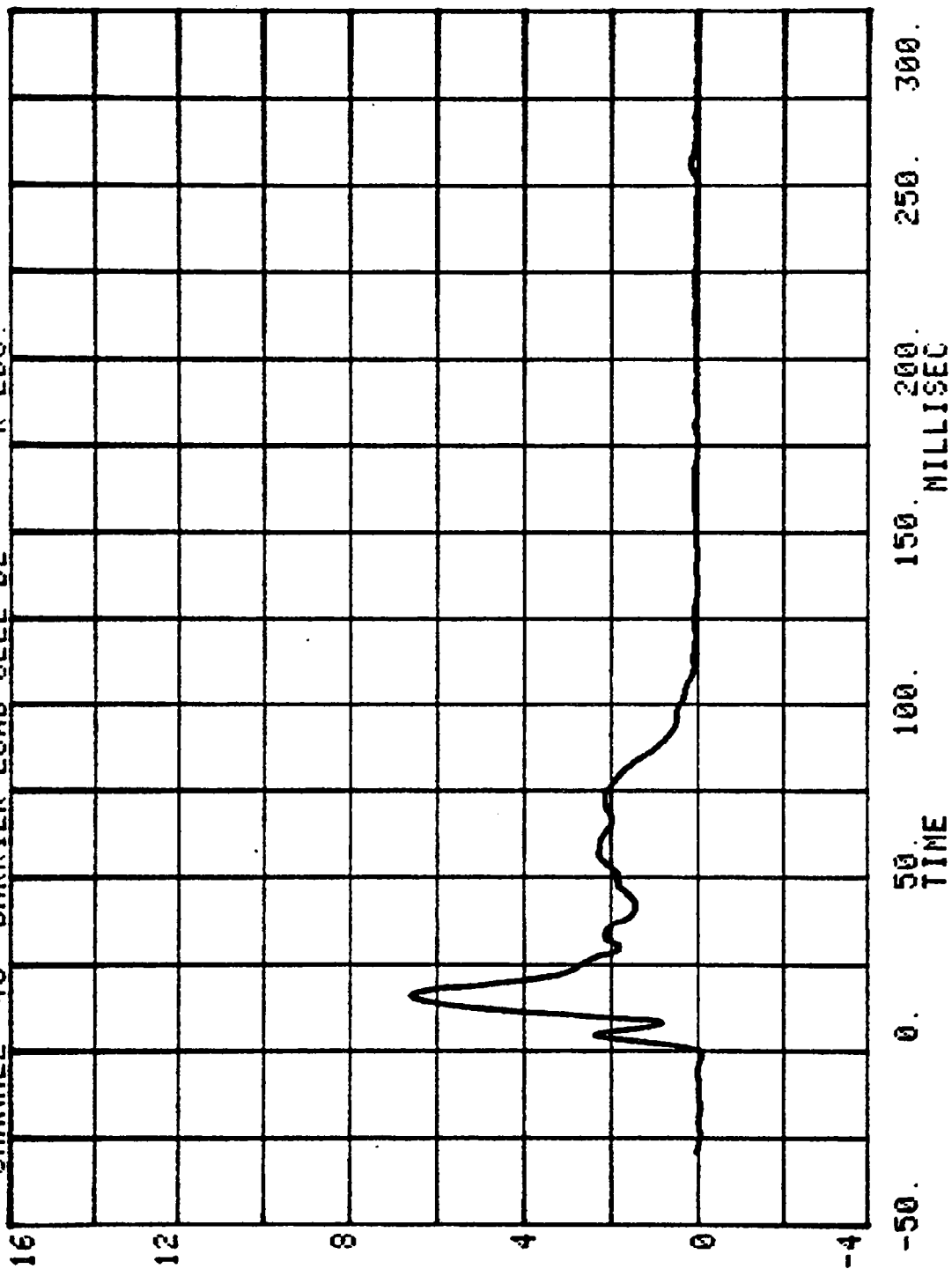
CHANNEL 44 BARRIER LOAD CELL A9 RUN= 553 SERIES= 1 K LBS.

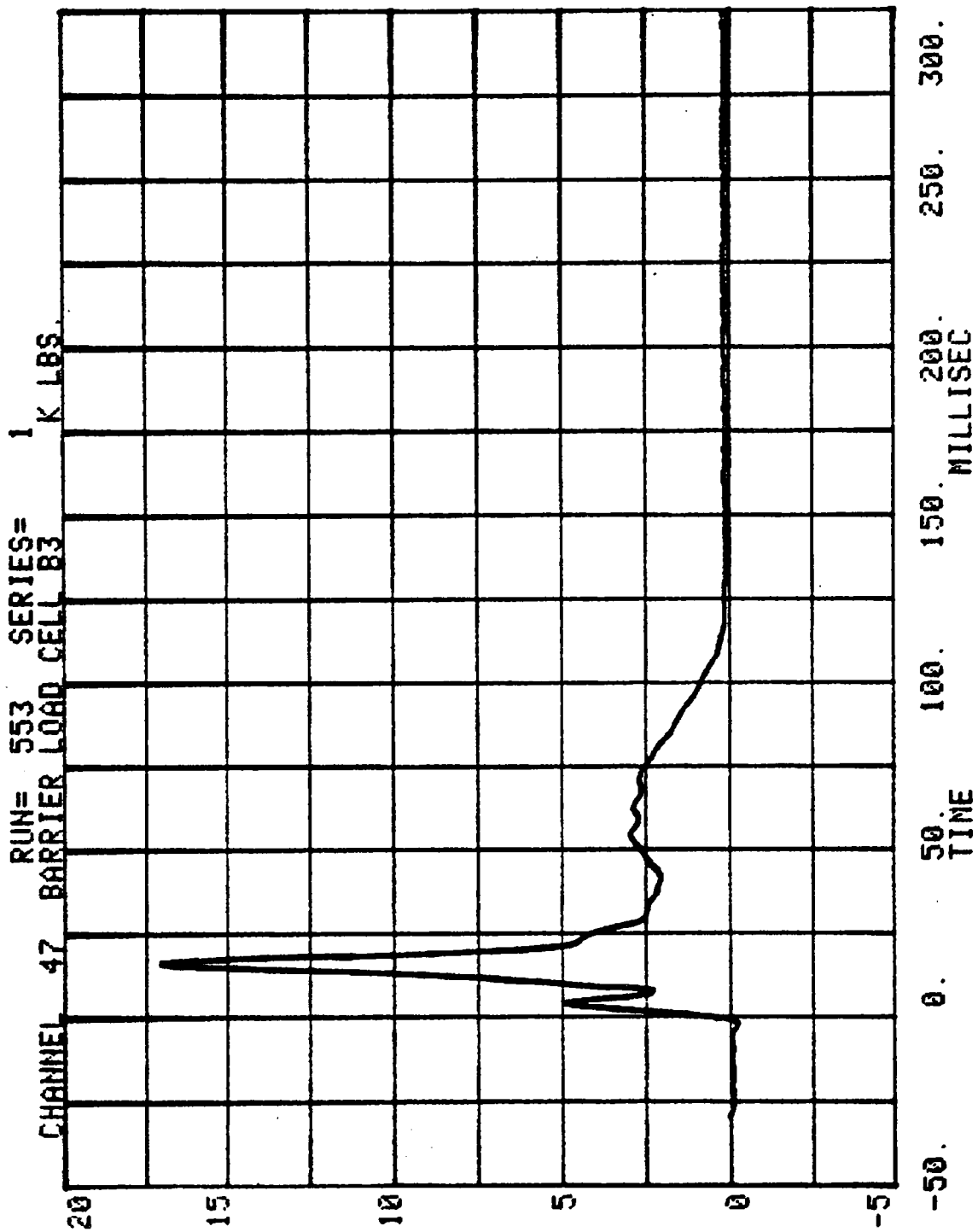


RUN= 553 SERIES= 1
CHANNEL 45 BARRIER LOAD CELL B1 K LBS.

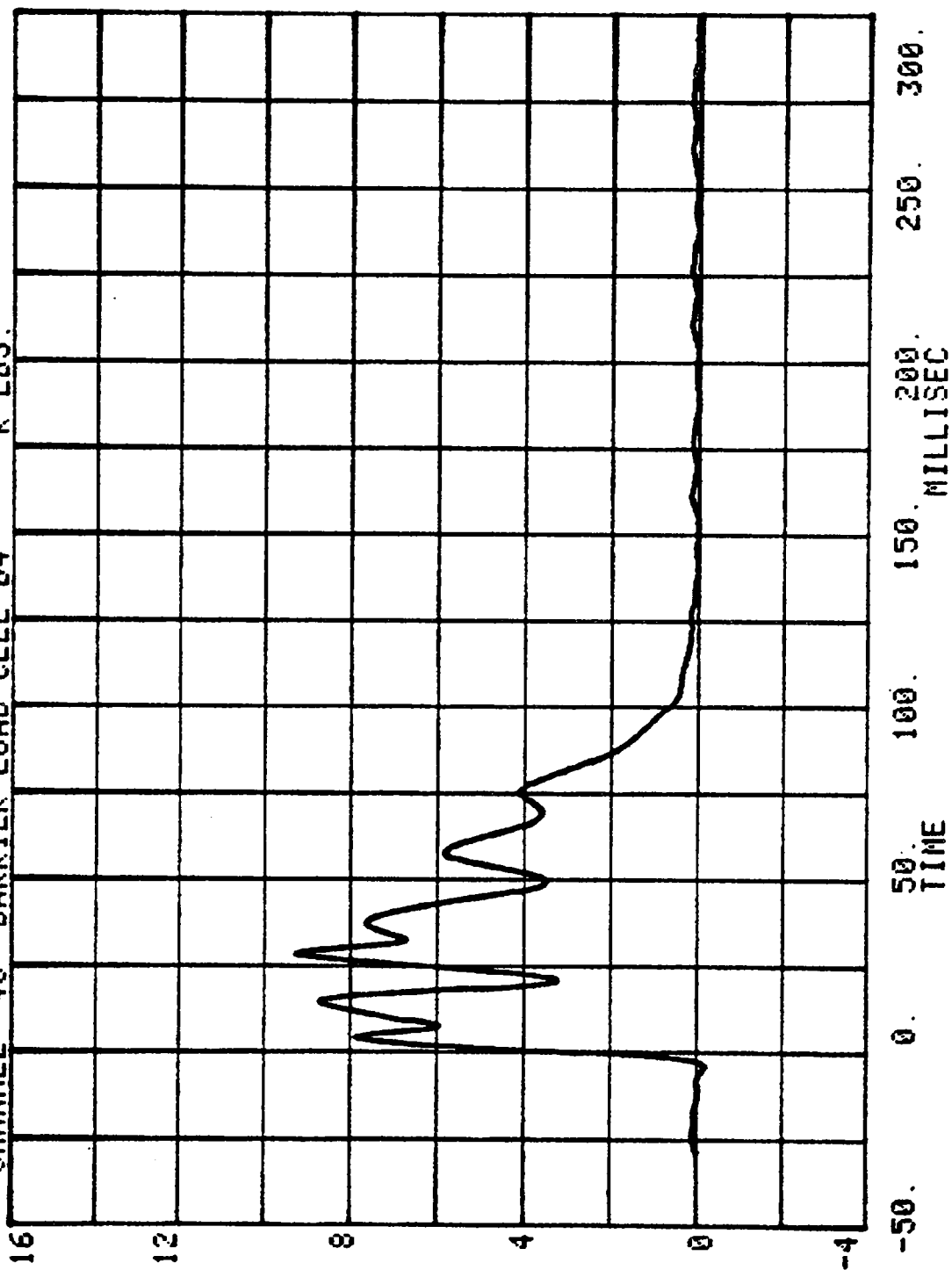


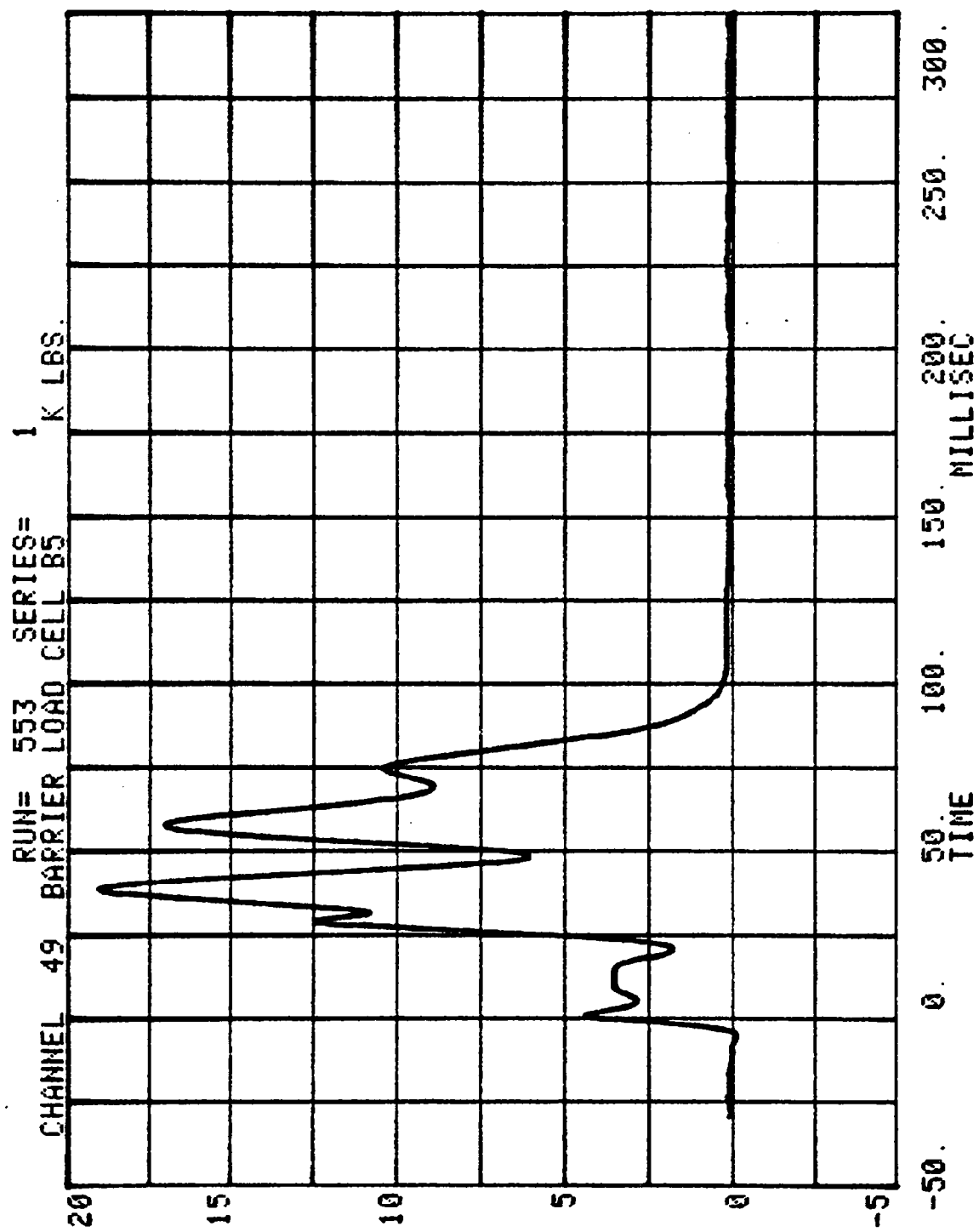
CHANNEL 46 BARRIER LOAD CELL B2 RUN= 553 SERIES= 1 K LBS.

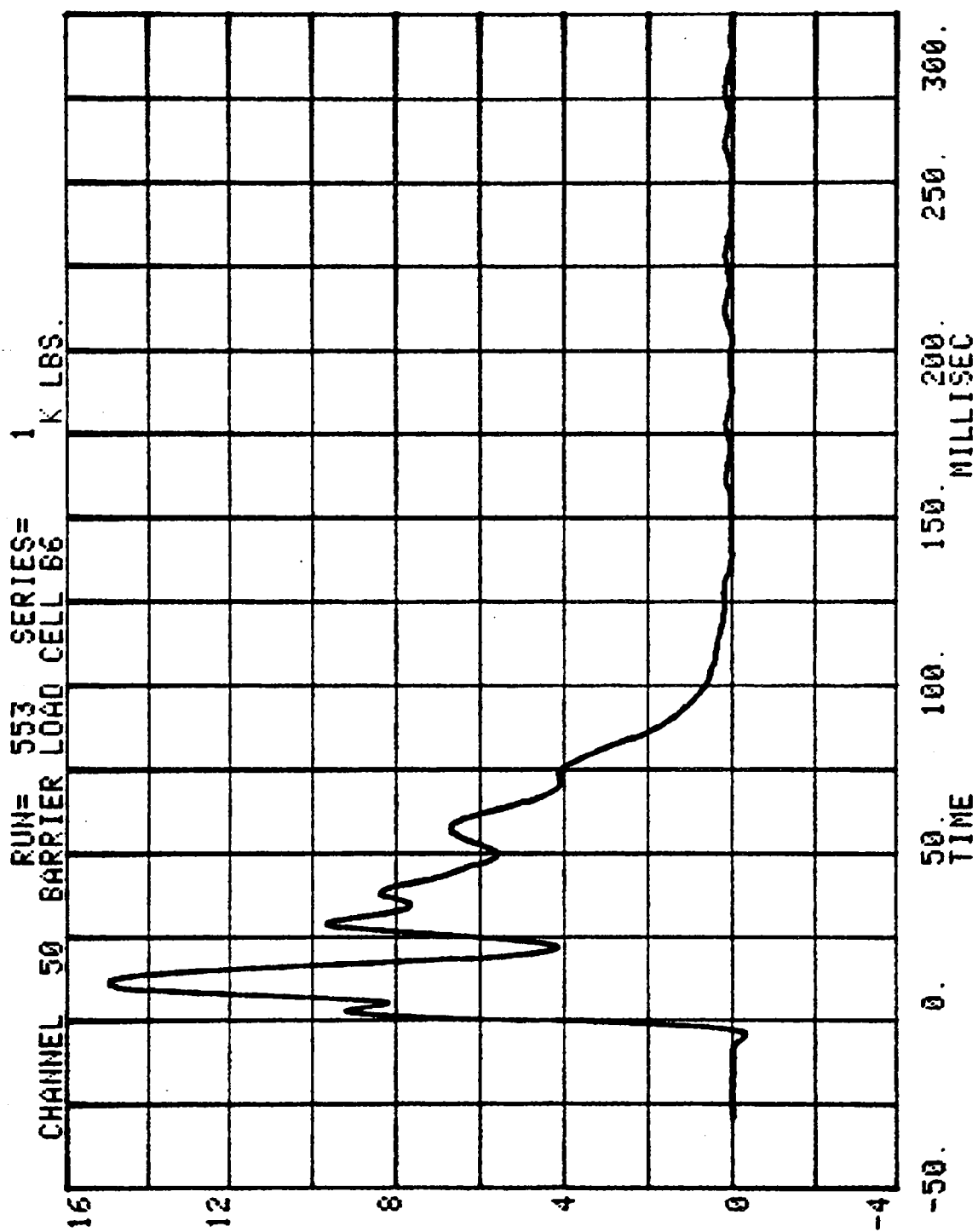




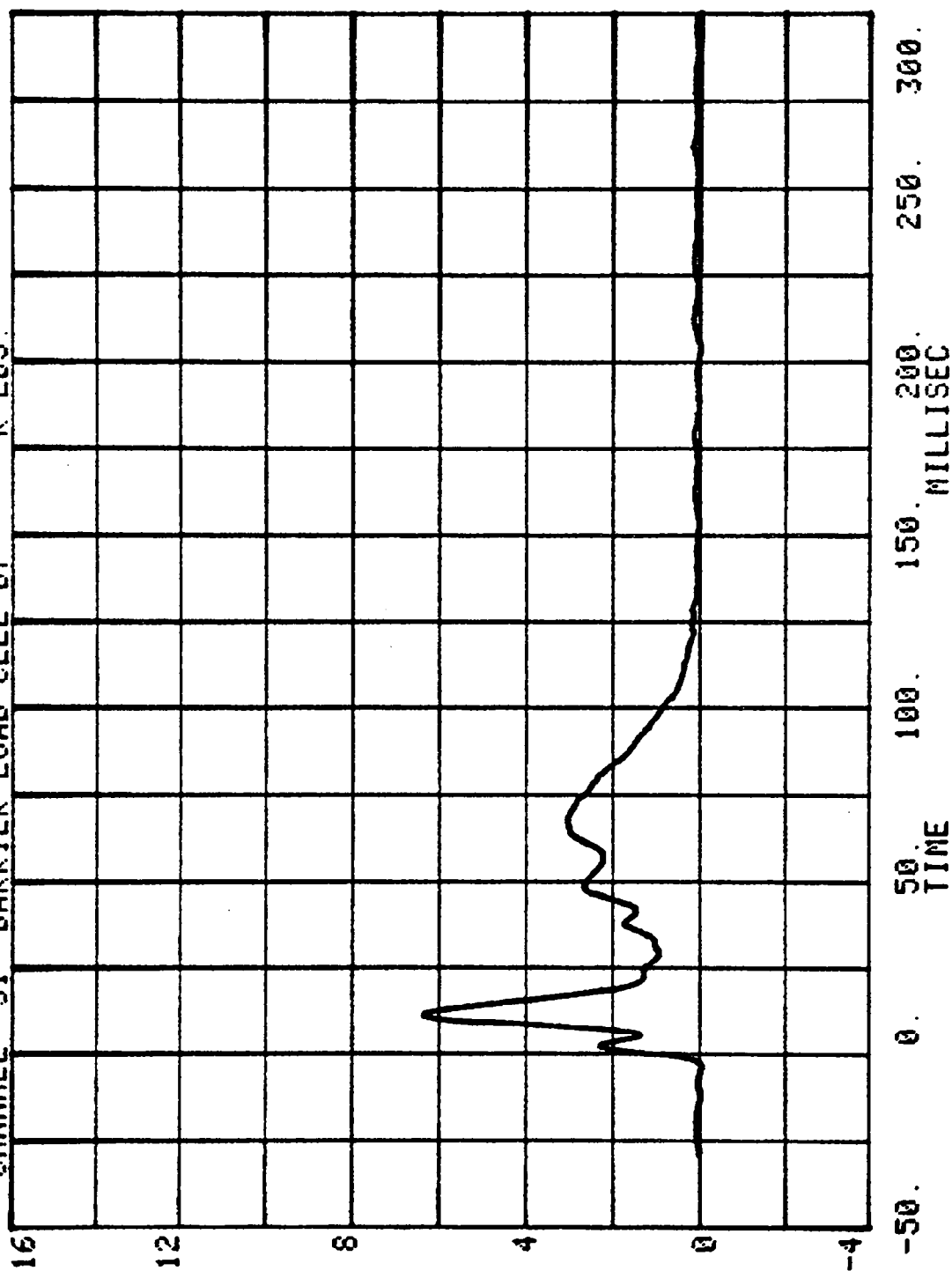
CHANNEL 48 BARRIER LOAD CELL B4
RUN= 553 SERIES= 1
K LBS.



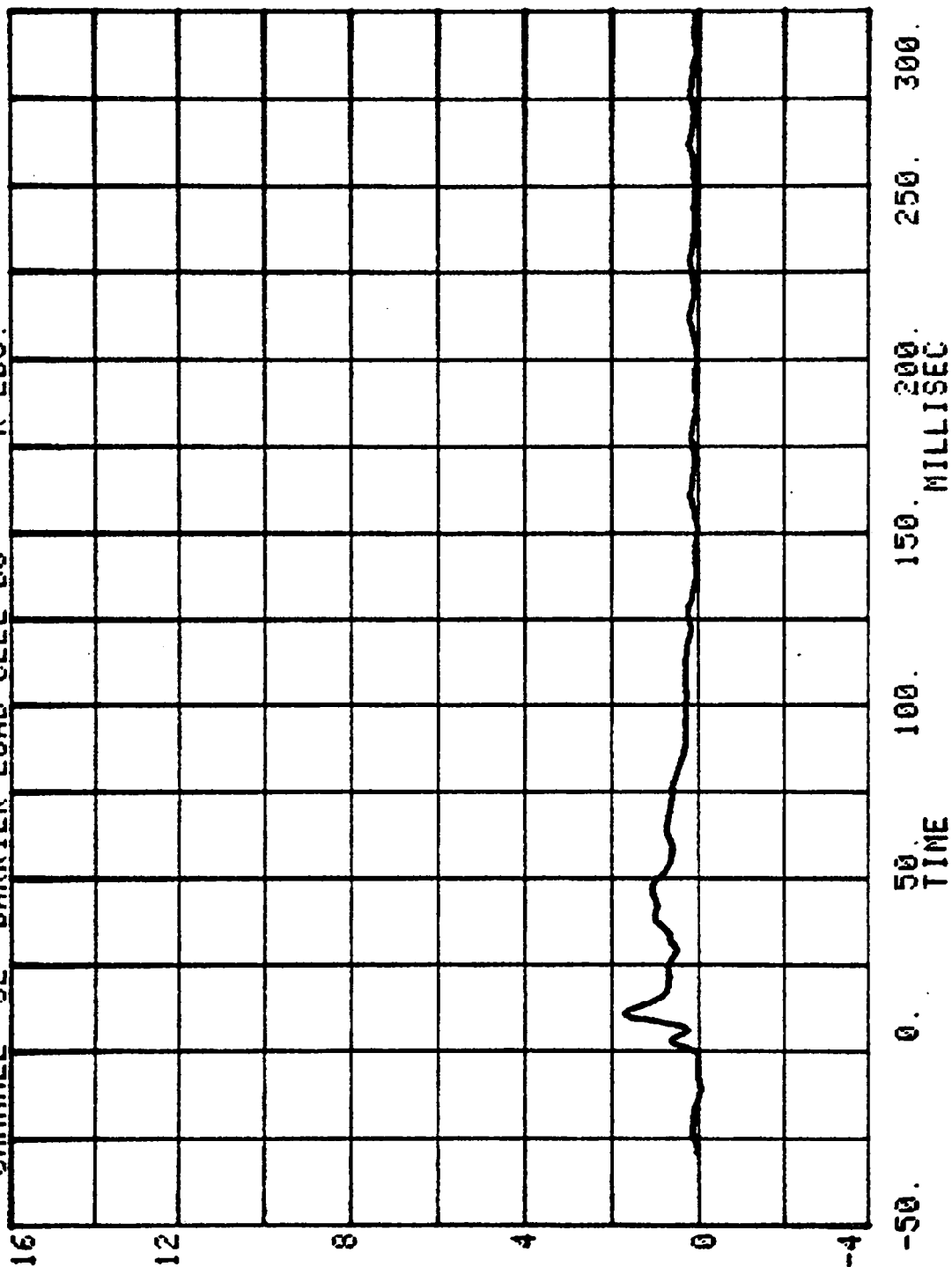




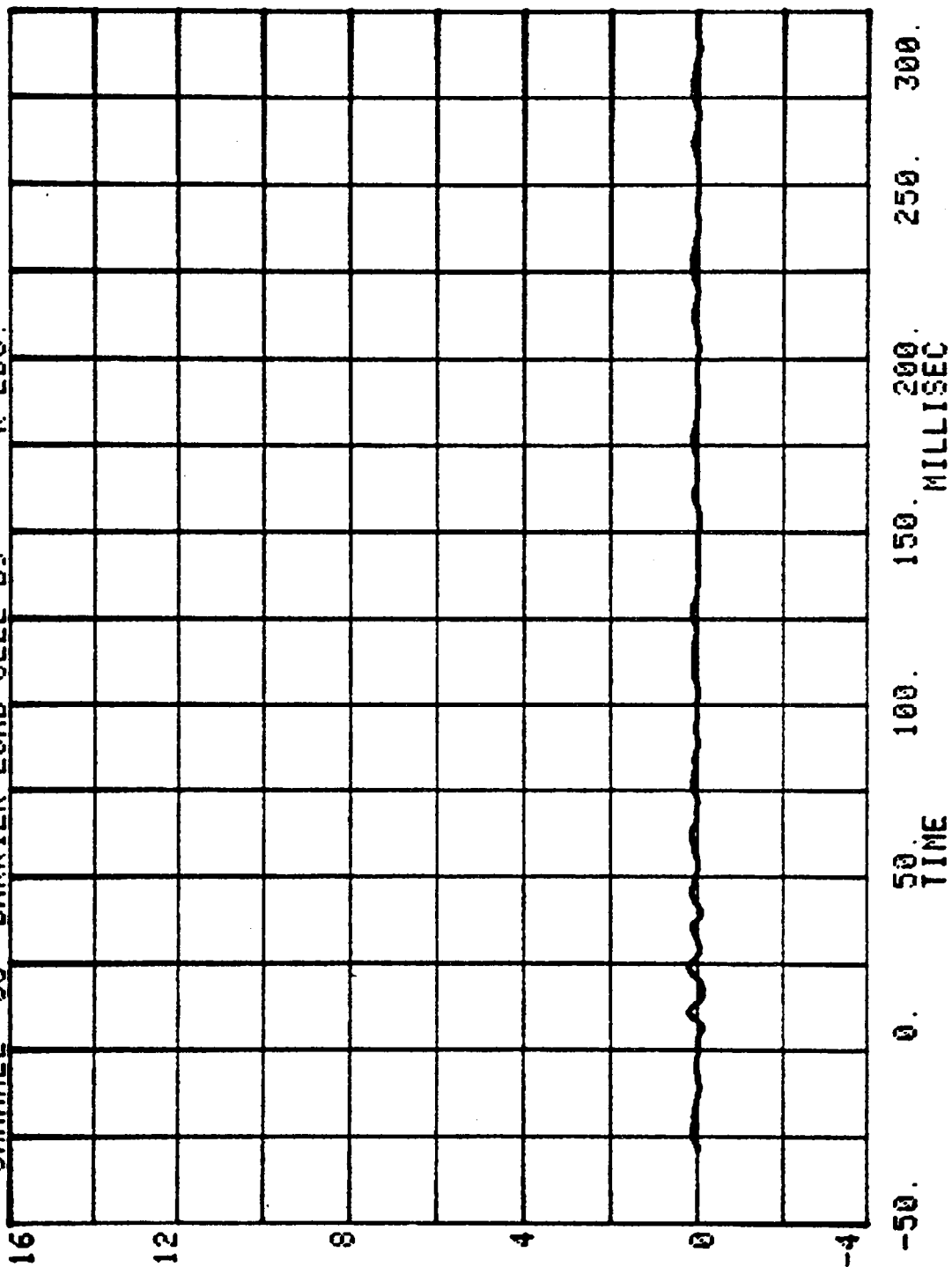
CHANNEL 51 RUN= 553 SERIES= 1 K LBS.
BARRIER LOAD CELL B7



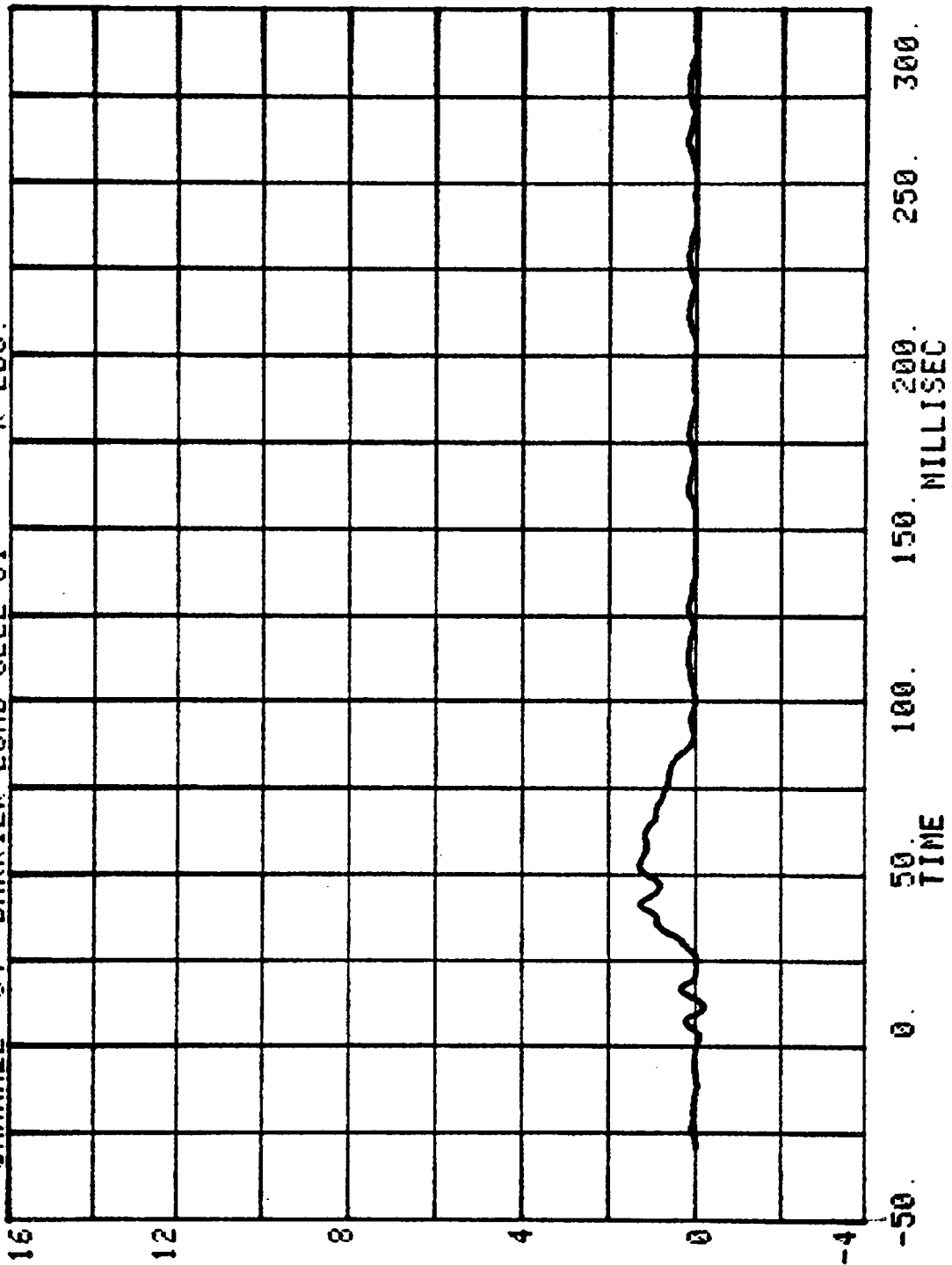
CHANNEL 52 RUN= 553 SERIES= 1 K LBS.
BARRIER LOAD CELL B8



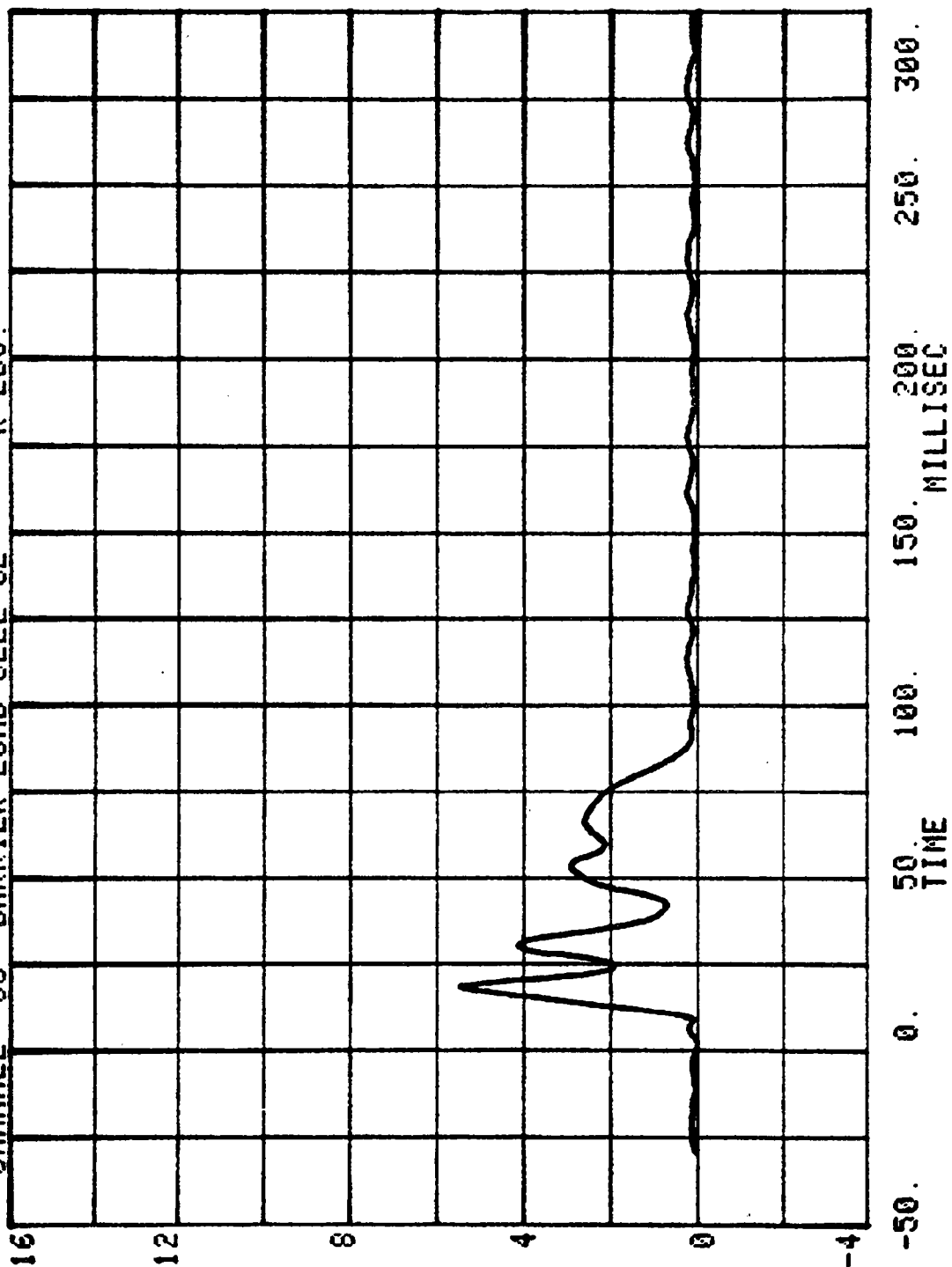
CHANNEL 53 BARRIER LOAD CELL B9 RUN= 553 SERIES= 1 K LBS.



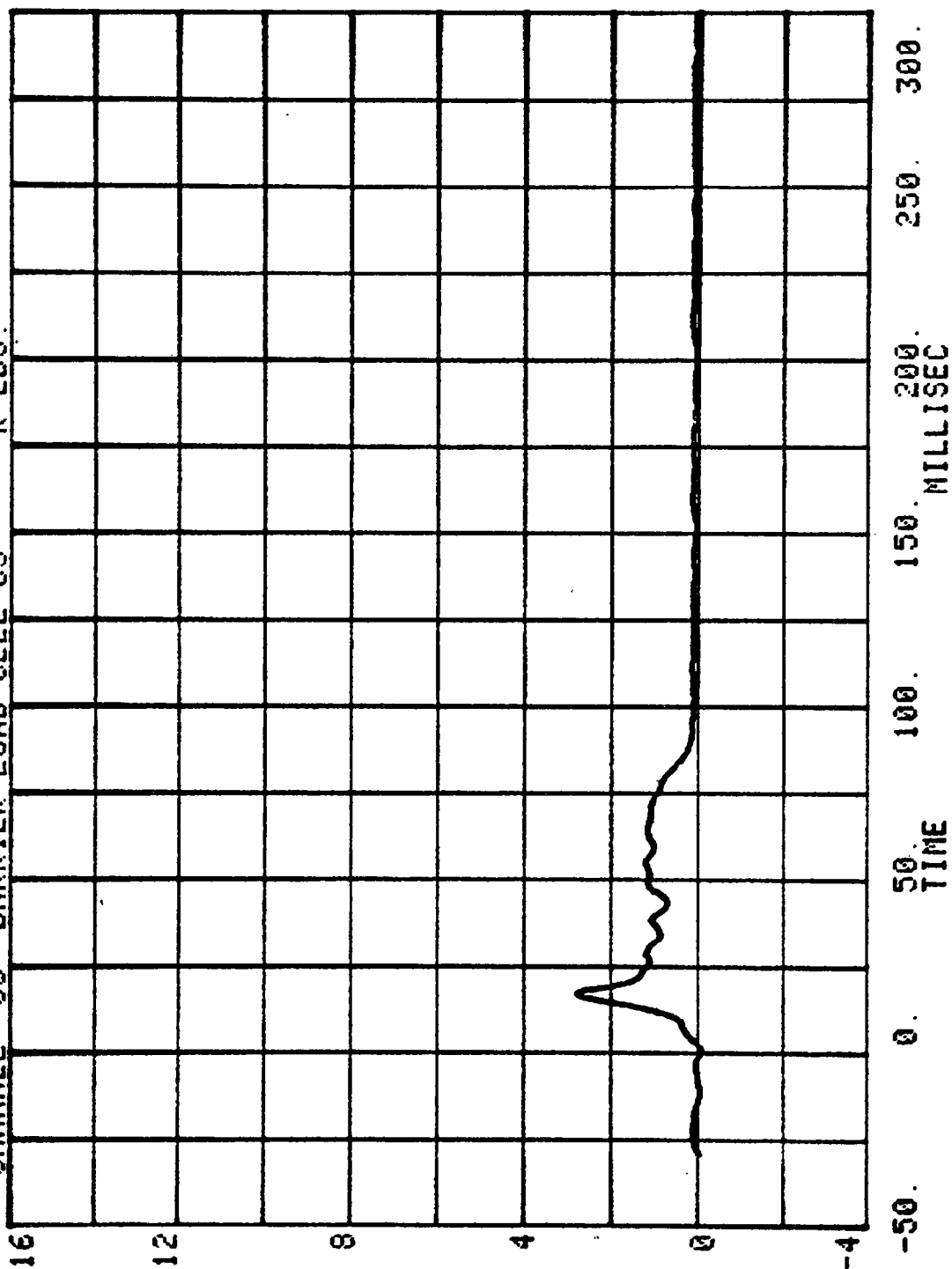
CHANNEL 54 RUN= 553 SERIES= 1 K LBS.
BARRIER LOAD CELL C1



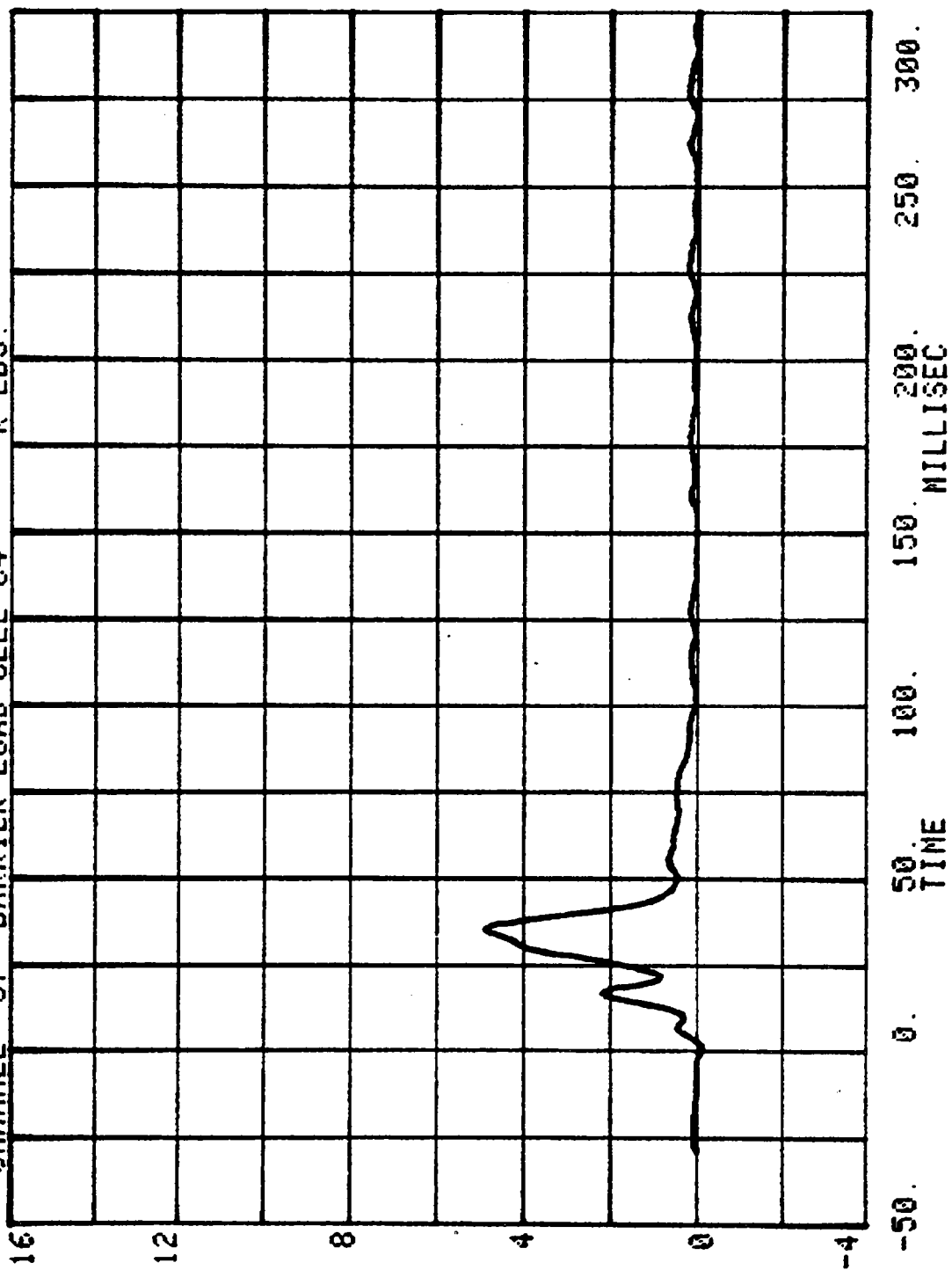
CHANNEL 55 RUN= 553 SERIES= 1 K LBS.
BARRIER LOAD CELL C2

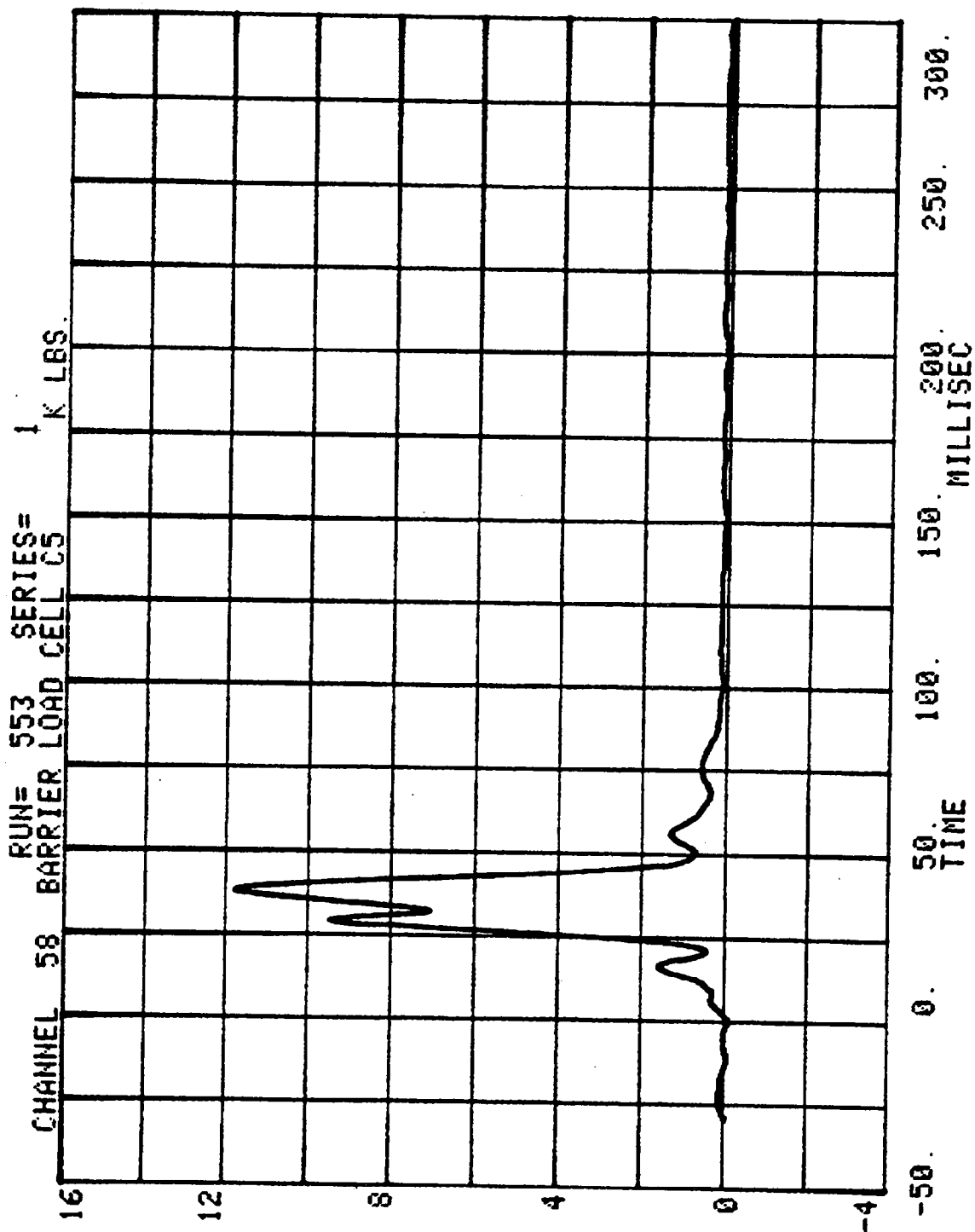


CHANNEL 56 BARRIER LOAD CELL C3
RUN= 553 SERIES= 1
K LBS.

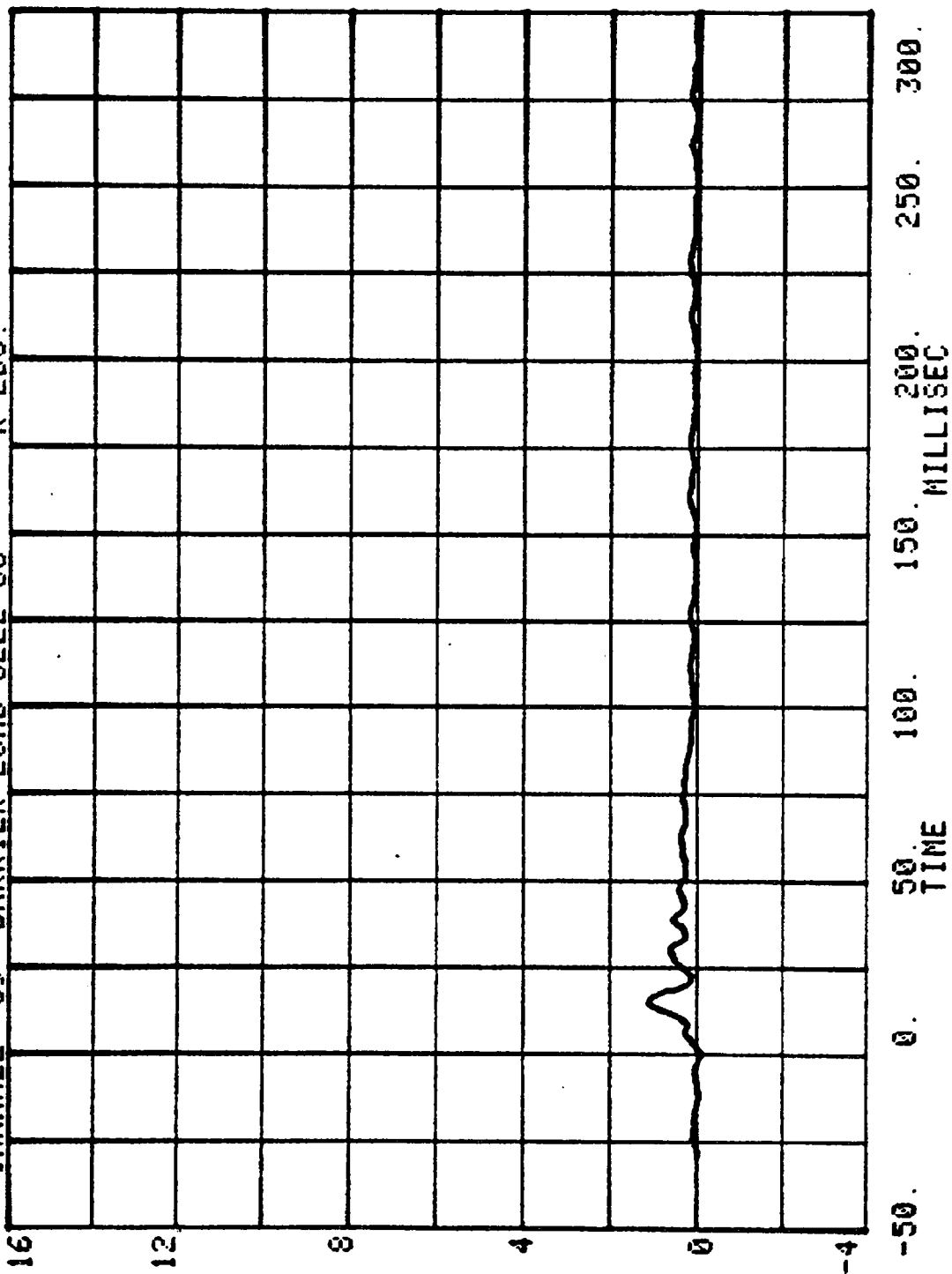


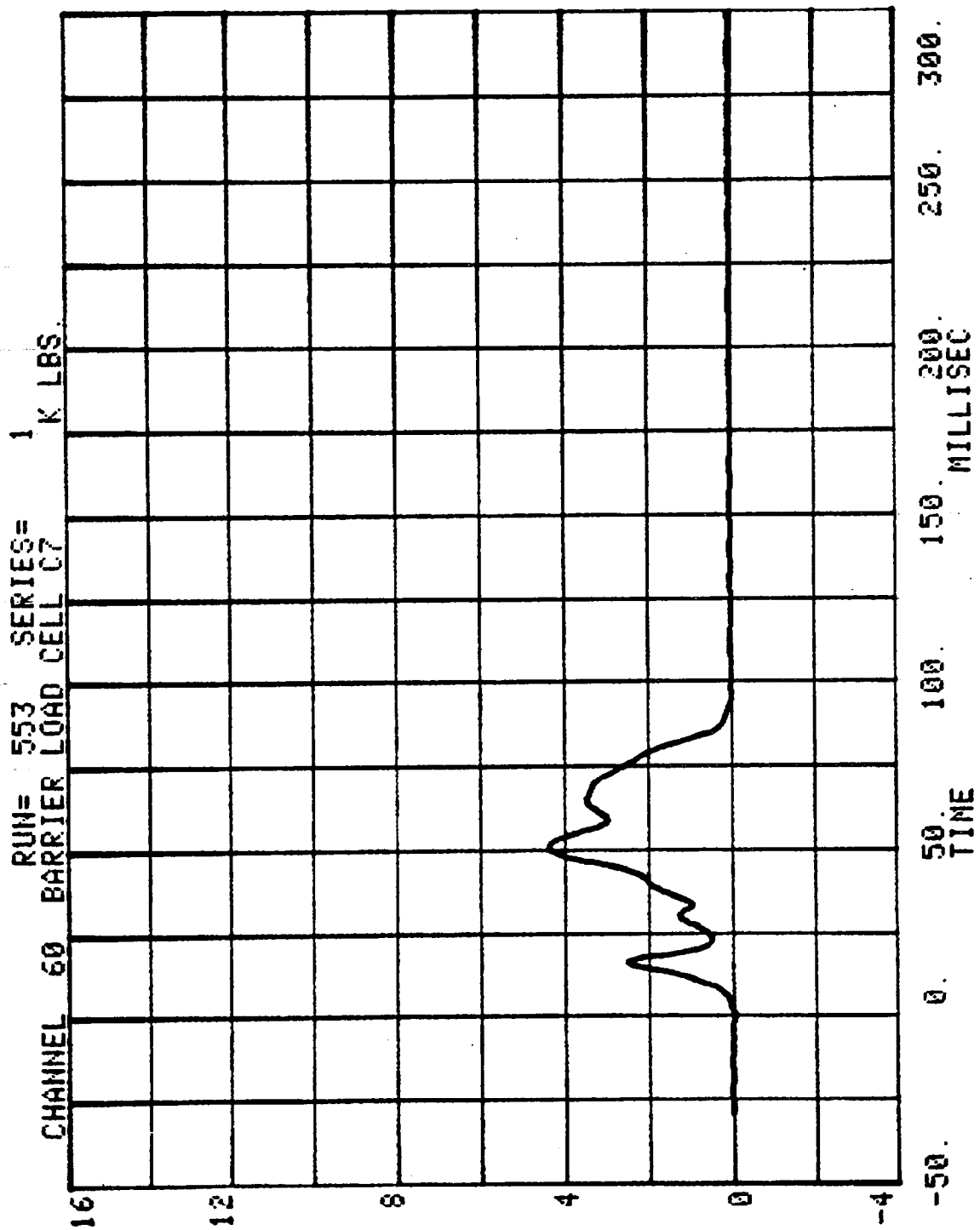
CHANNEL 57 RUN= 553 SERIES= 1 K LBS.
BARRIER LOAD CELL C4



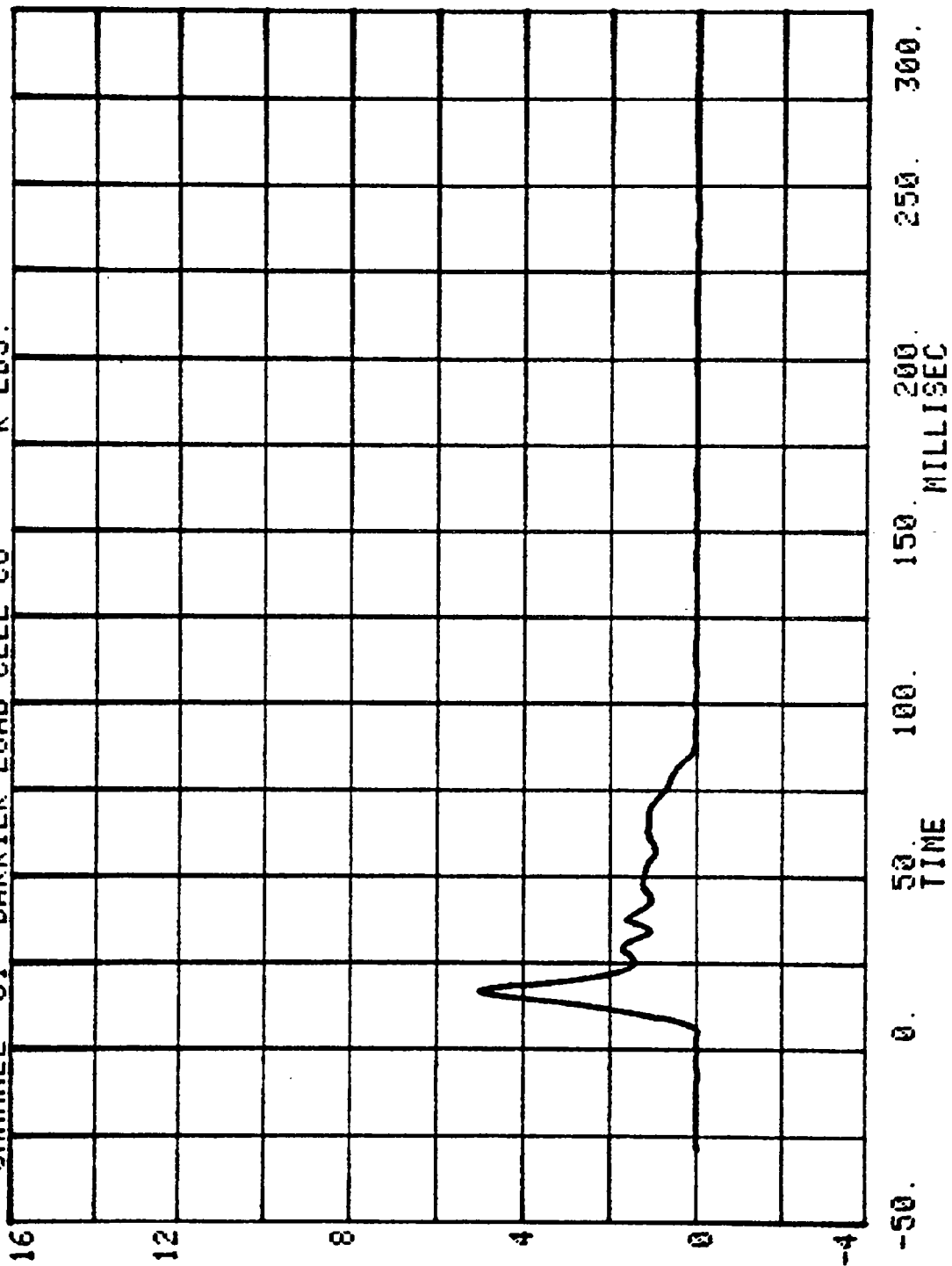


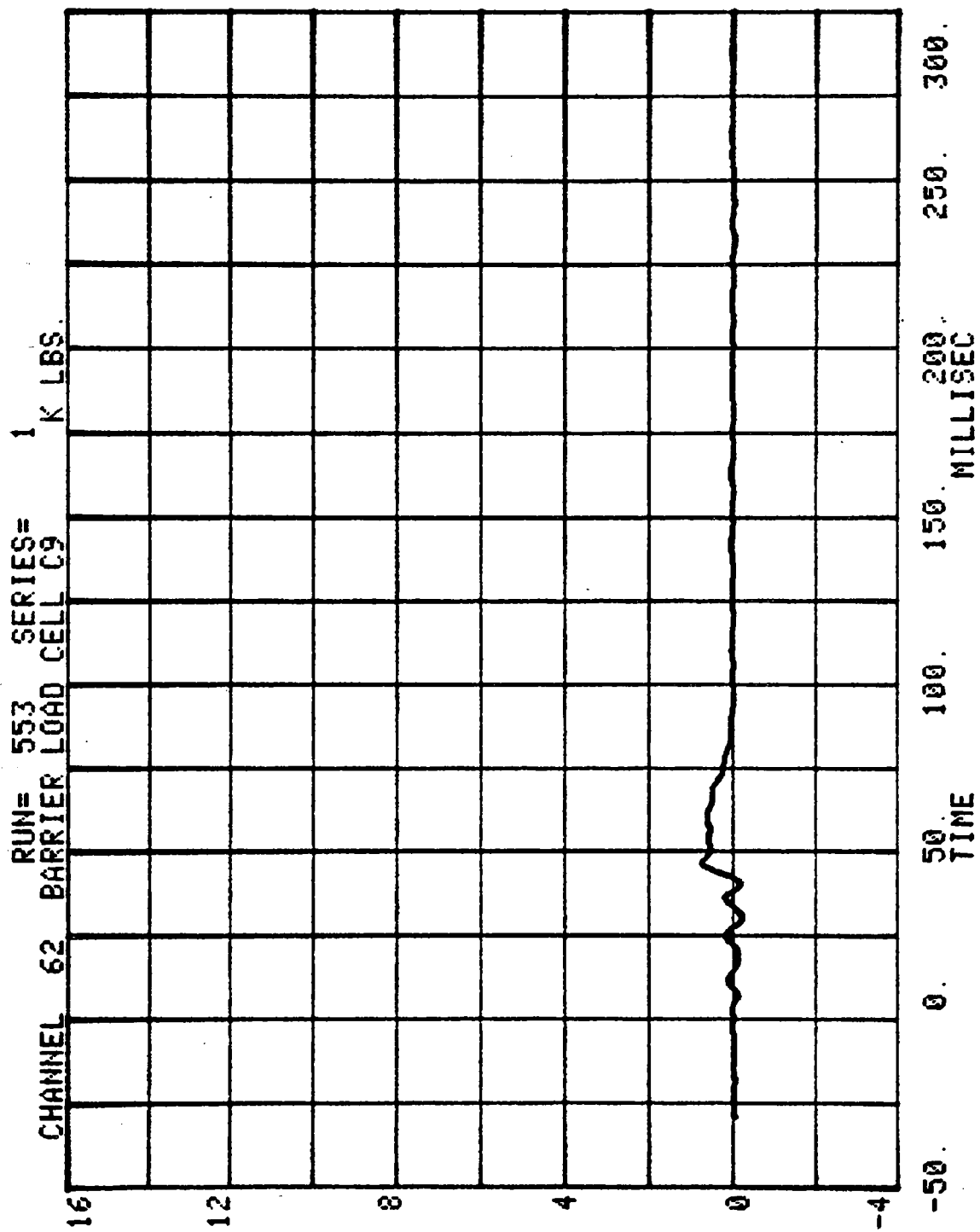
RUN= 553 SERIES= 1
CHANNEL 59 BARRIER LOAD CELL C6 K LBS.



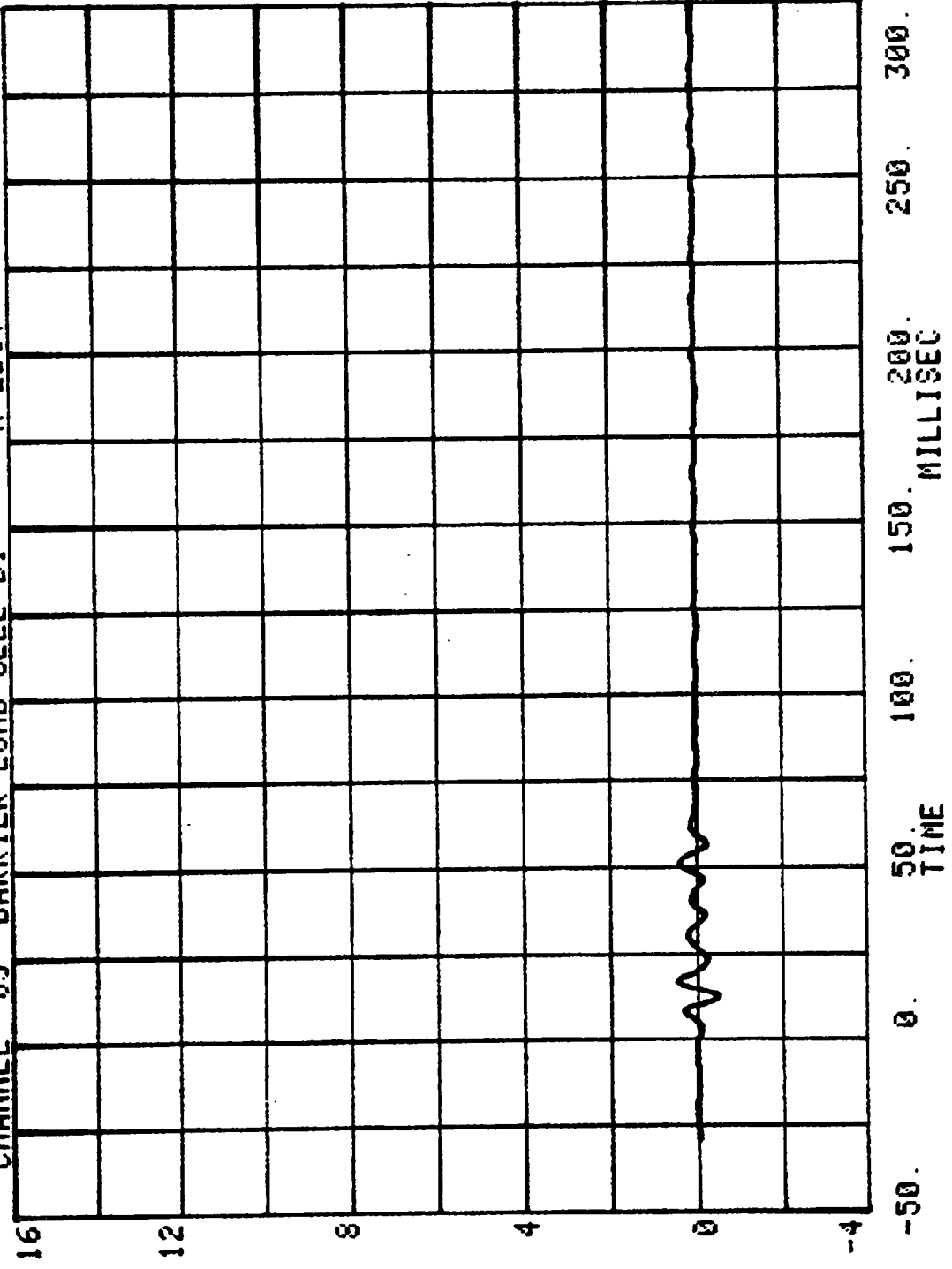


CHANNEL 61 BARRIER LOAD CELL C8 RUN= 553 SERIES= 1 K LBS.

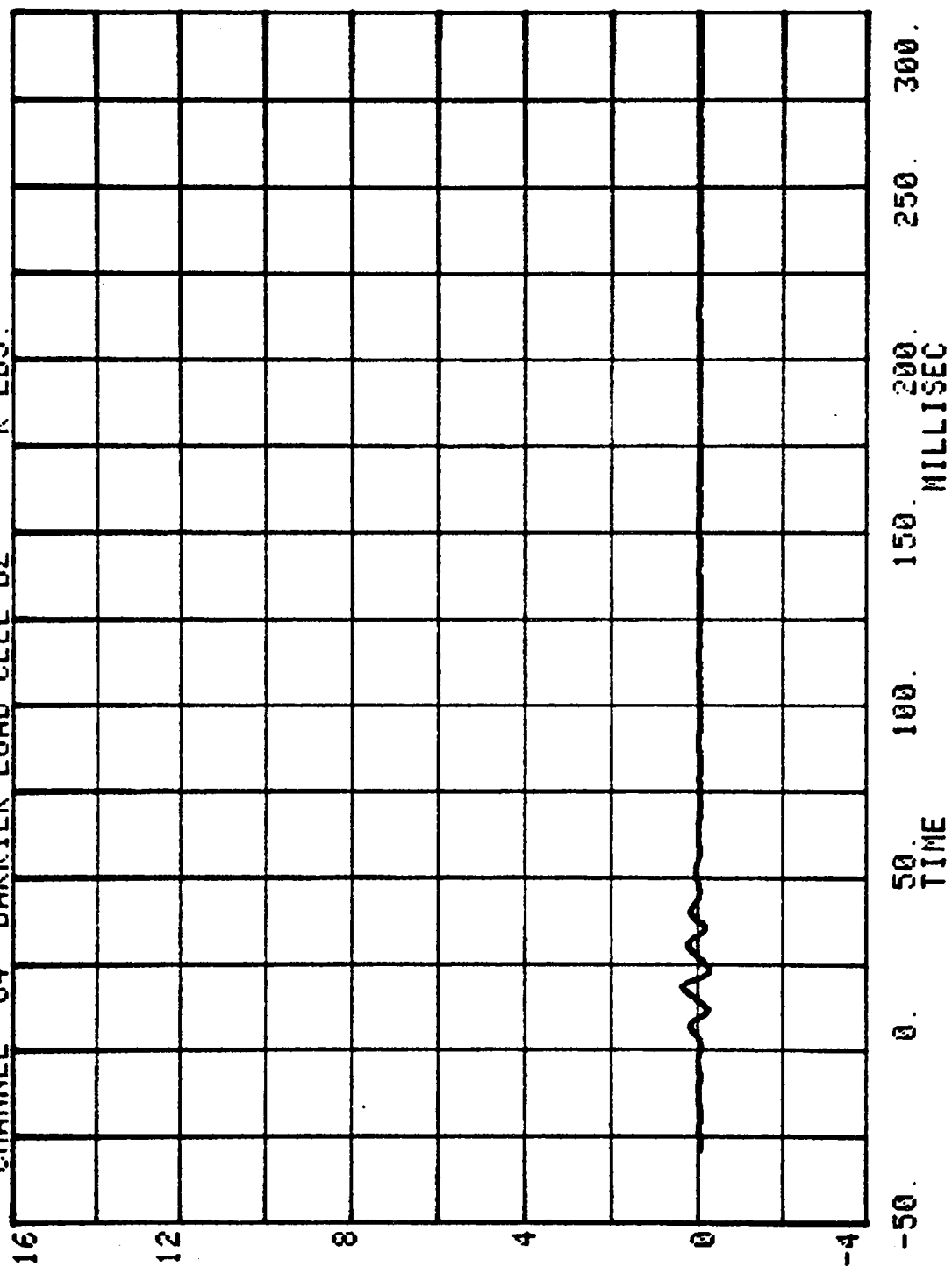




CHANNEL 63 BARRIER LOAD CELL D1 RUN= 553 SERIES= 1 K LBS.



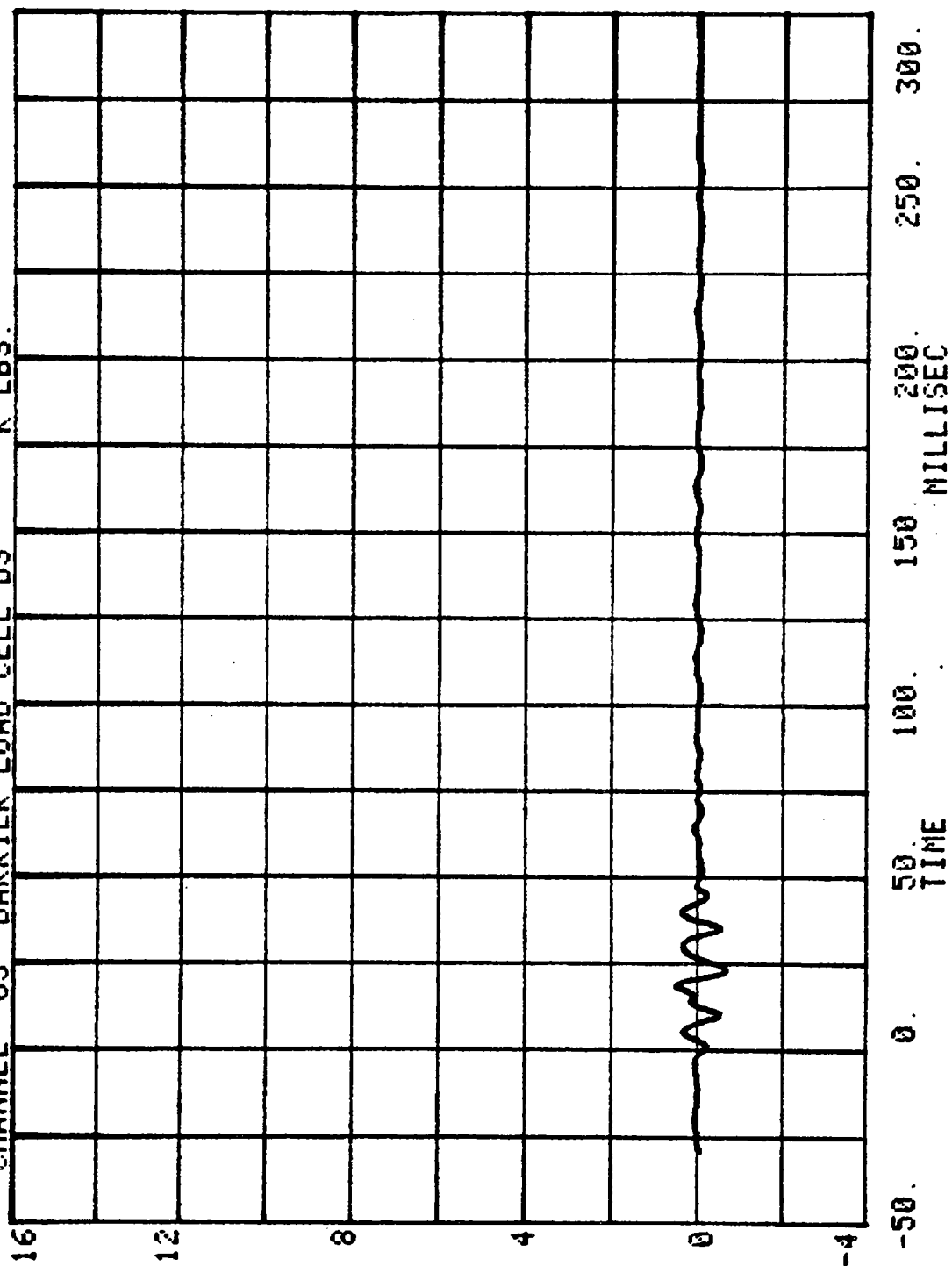
CHANNEL 64 BARRIER LOAD CELL 02 RUN= 553 SERIES= 1 K LBS.



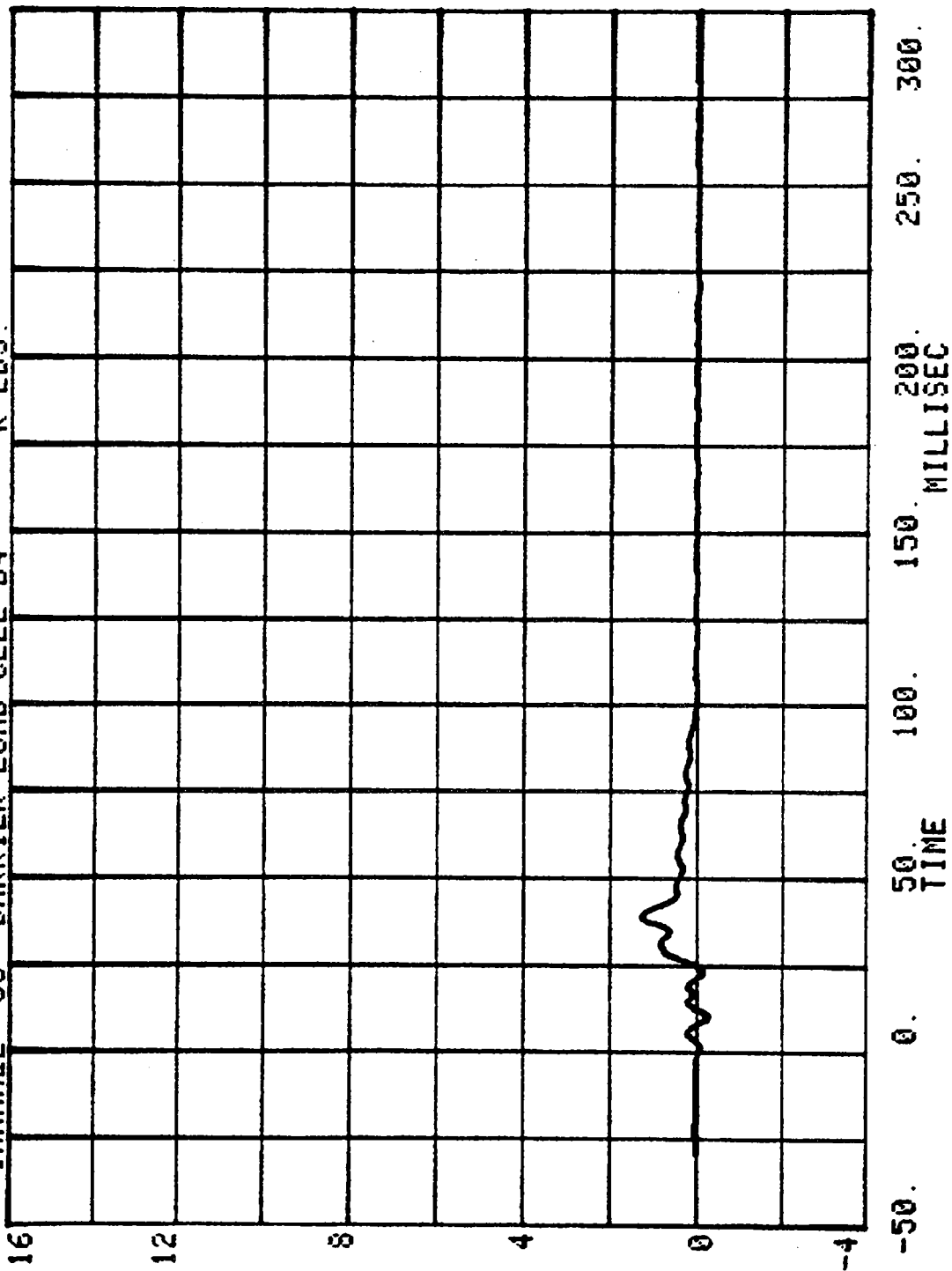
CHANNEL 65 BARRIER LOAD CELL D3

RUN= 553 SERIES= 1

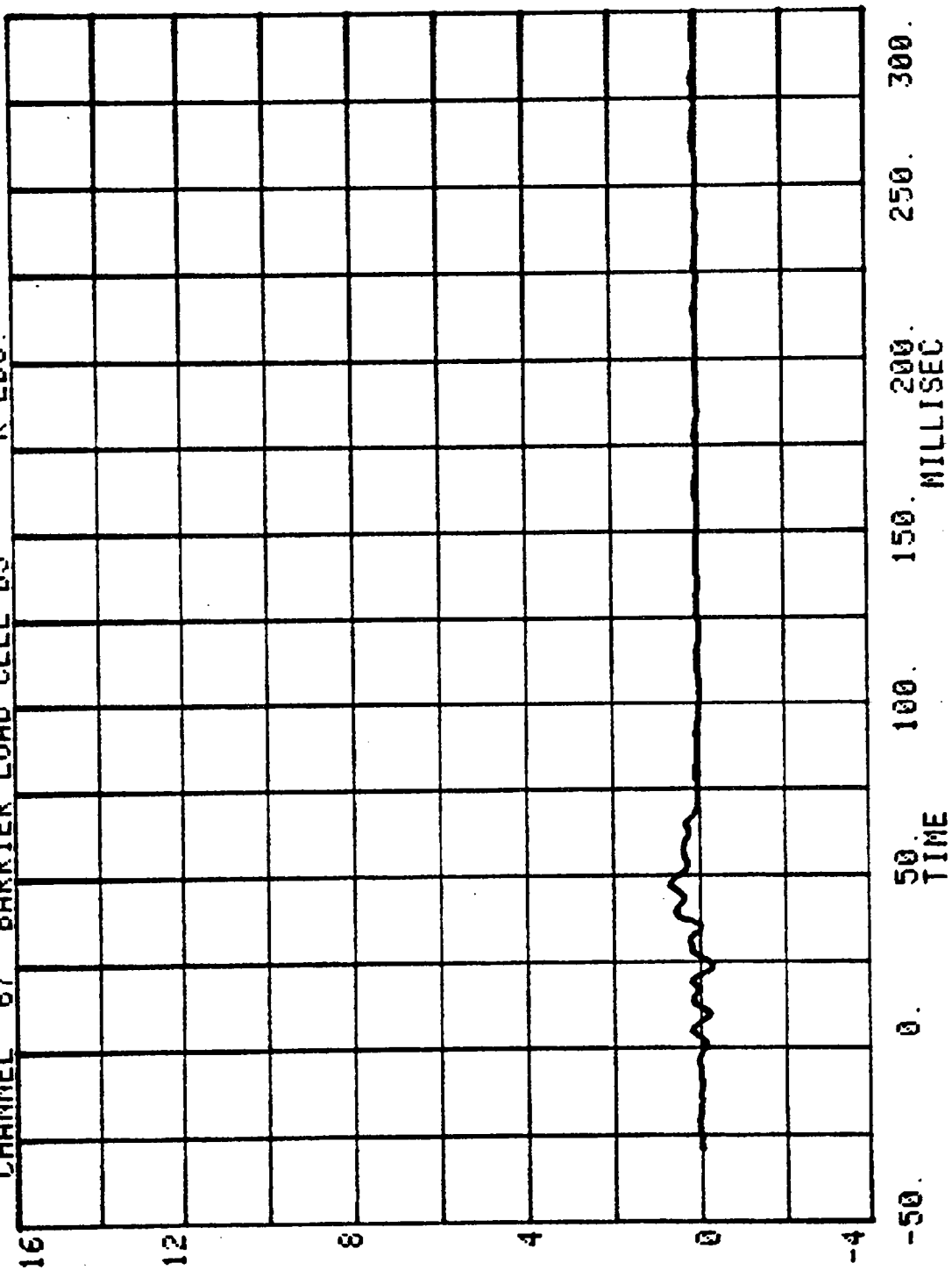
K LBS.



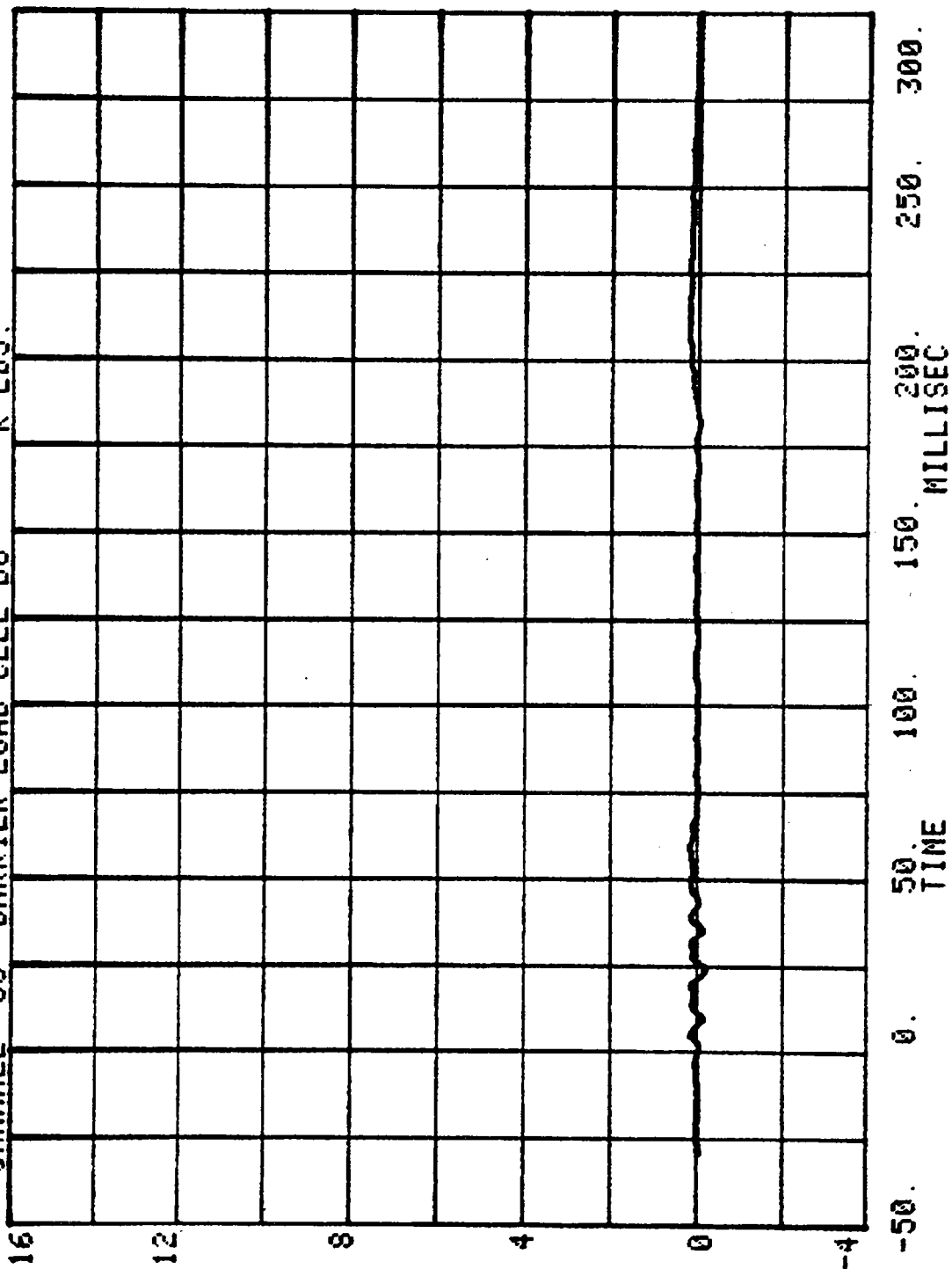
RUN= 553 SERIES= 1
CHANNEL 66 BARRIER LOAD CELL D4 K LBS.



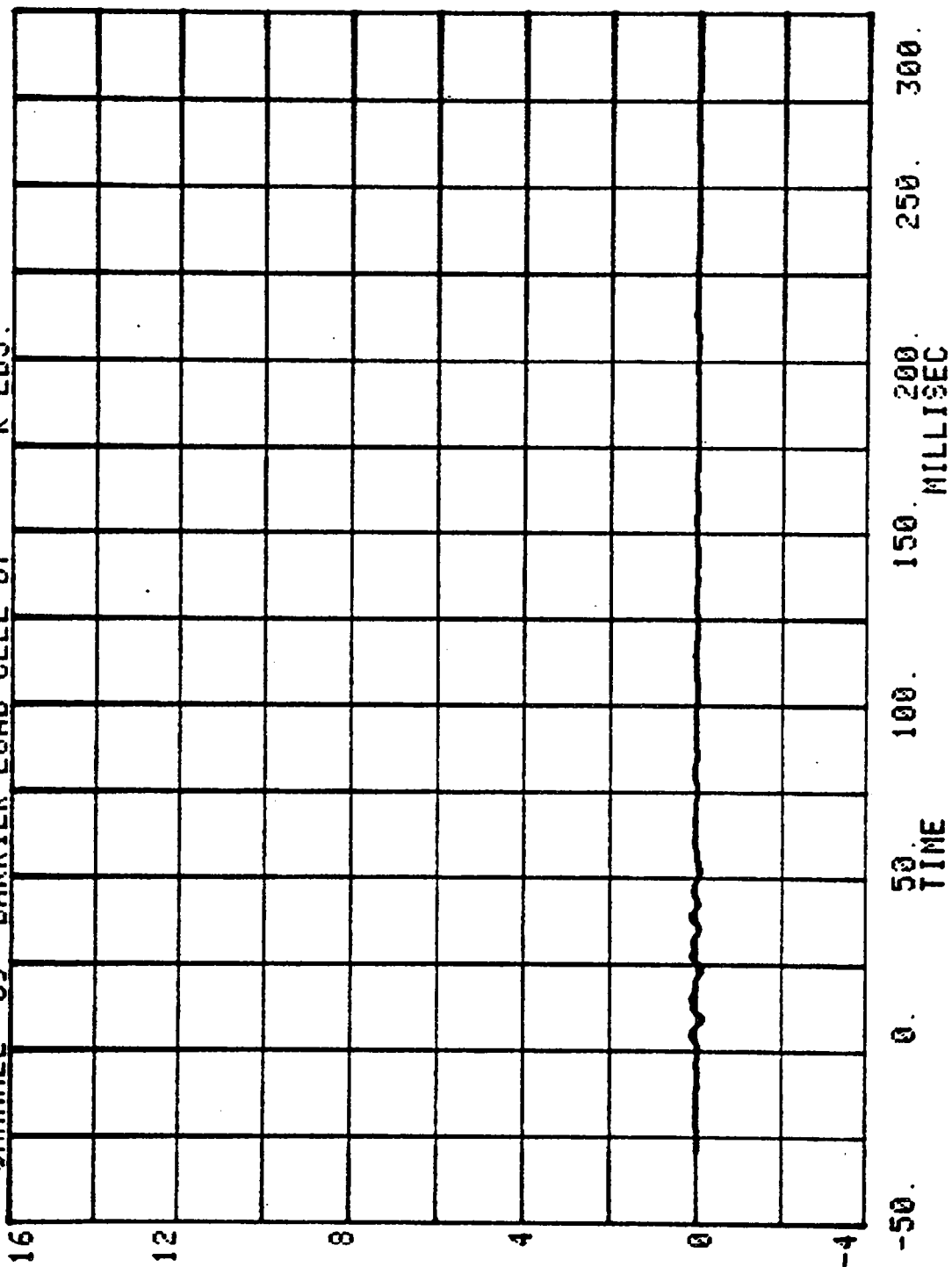
CHANNEL 67 BARRIER LOAD CELL D5 RUN= 553 SERIES= 1 K LBS.



CHANNEL 68 BARRIER LOAD CELL D6
RUN= 553 SERIES= 1
K LBS.



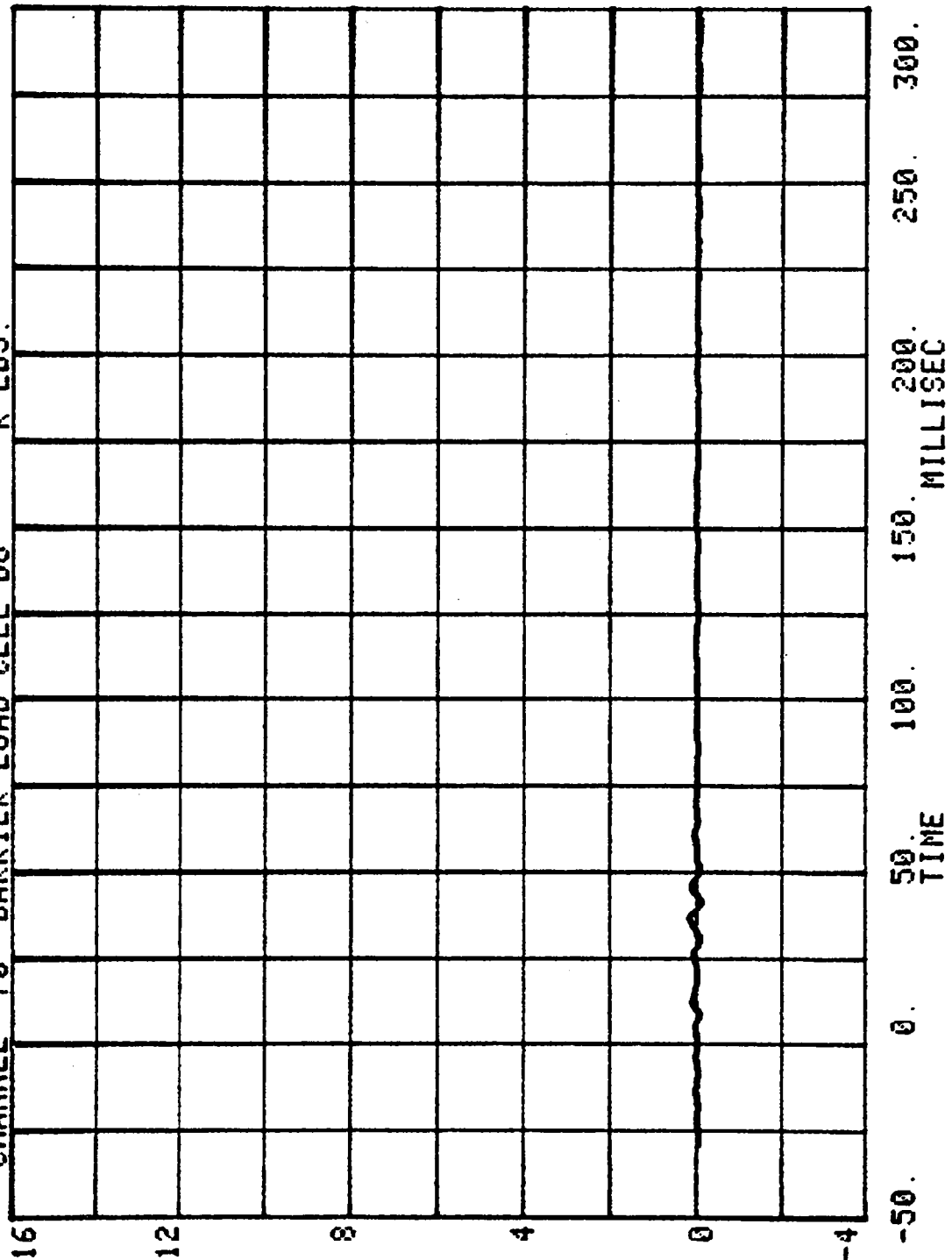
CHANNEL 69 RUN= 553 SERIES= 1 K LBS.
BARRIER LOAD CELL 07



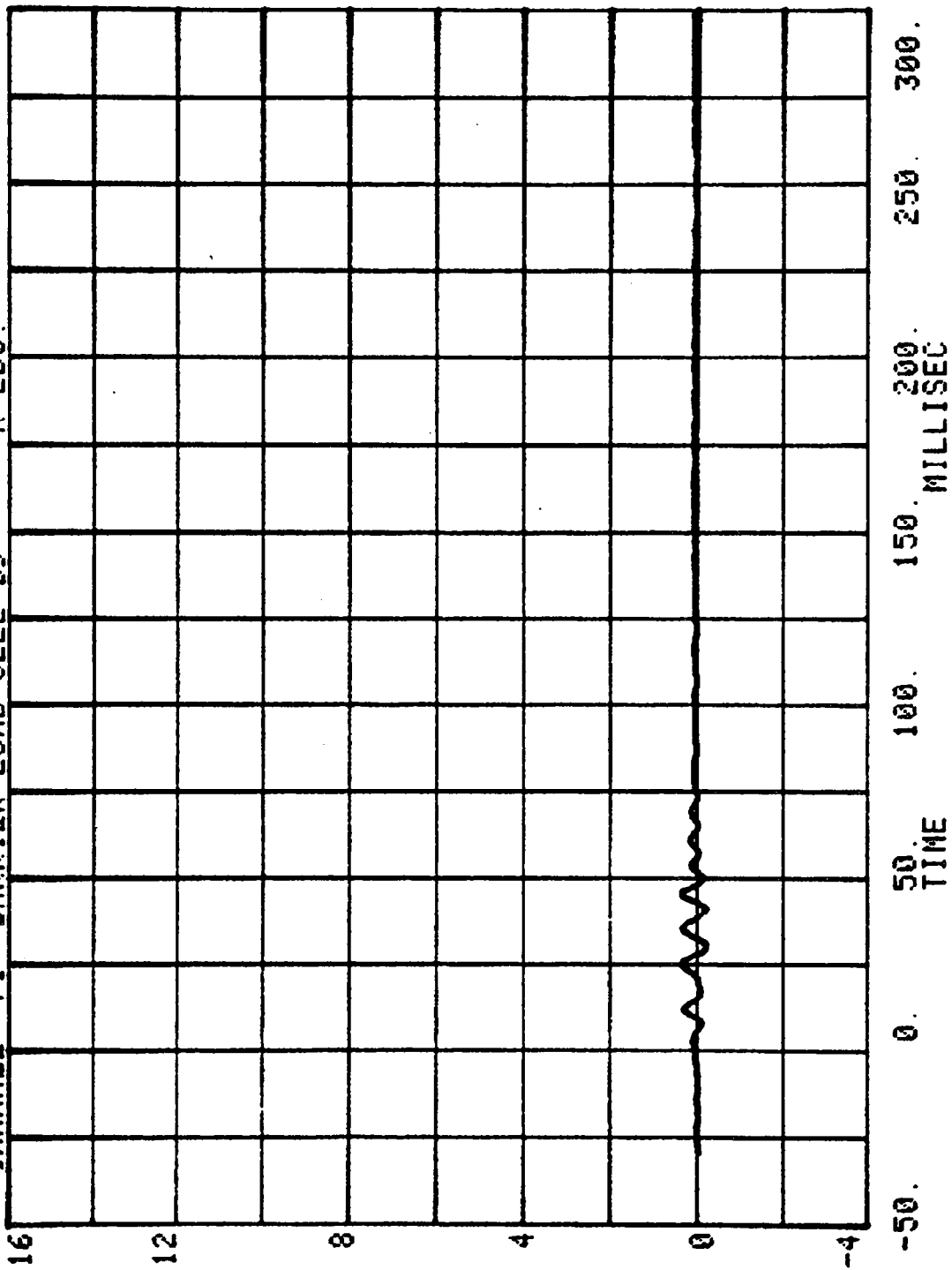
CHANNEL 70 BARRIER LOAD CELL D8

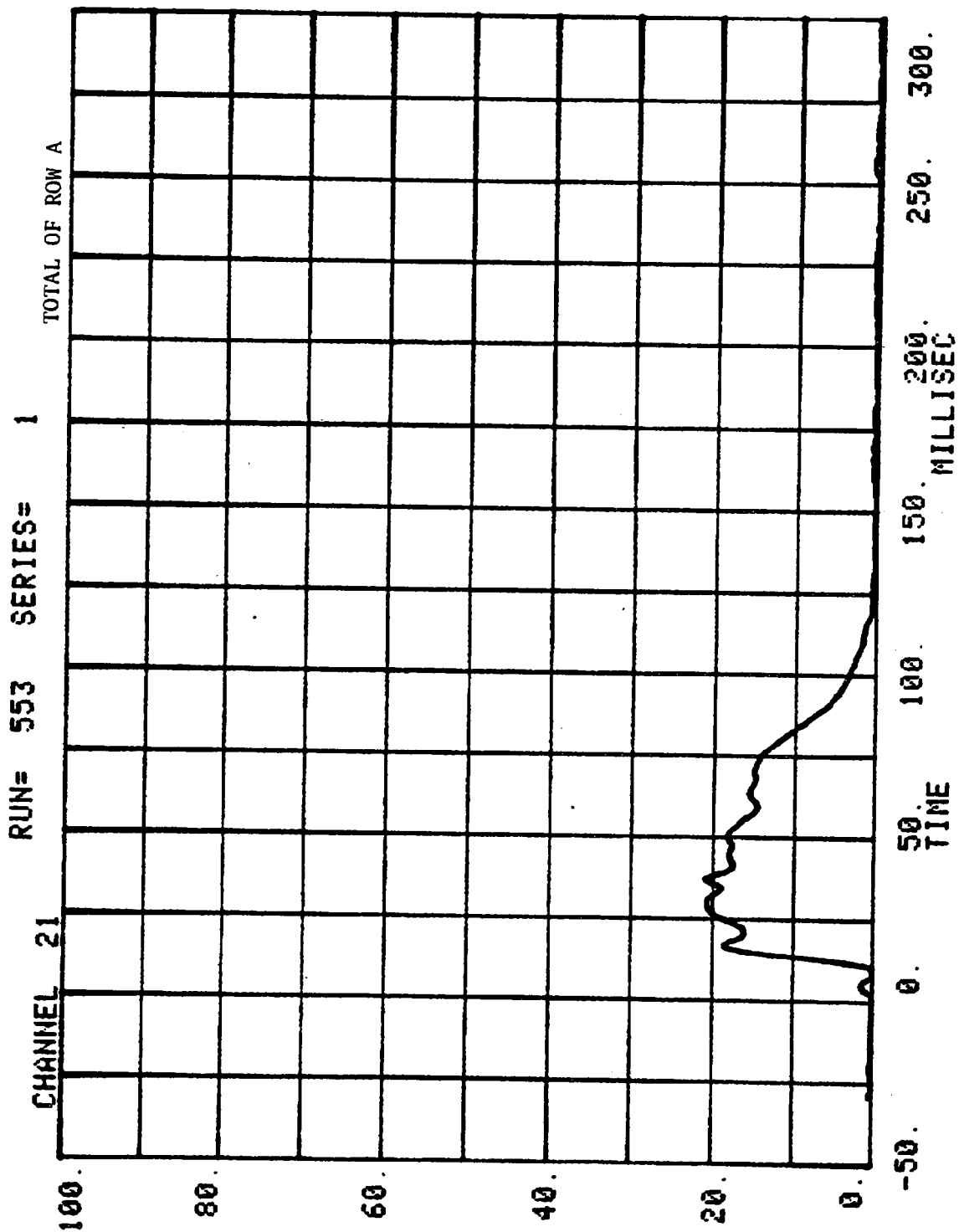
RUN= 553 SERIES= 1

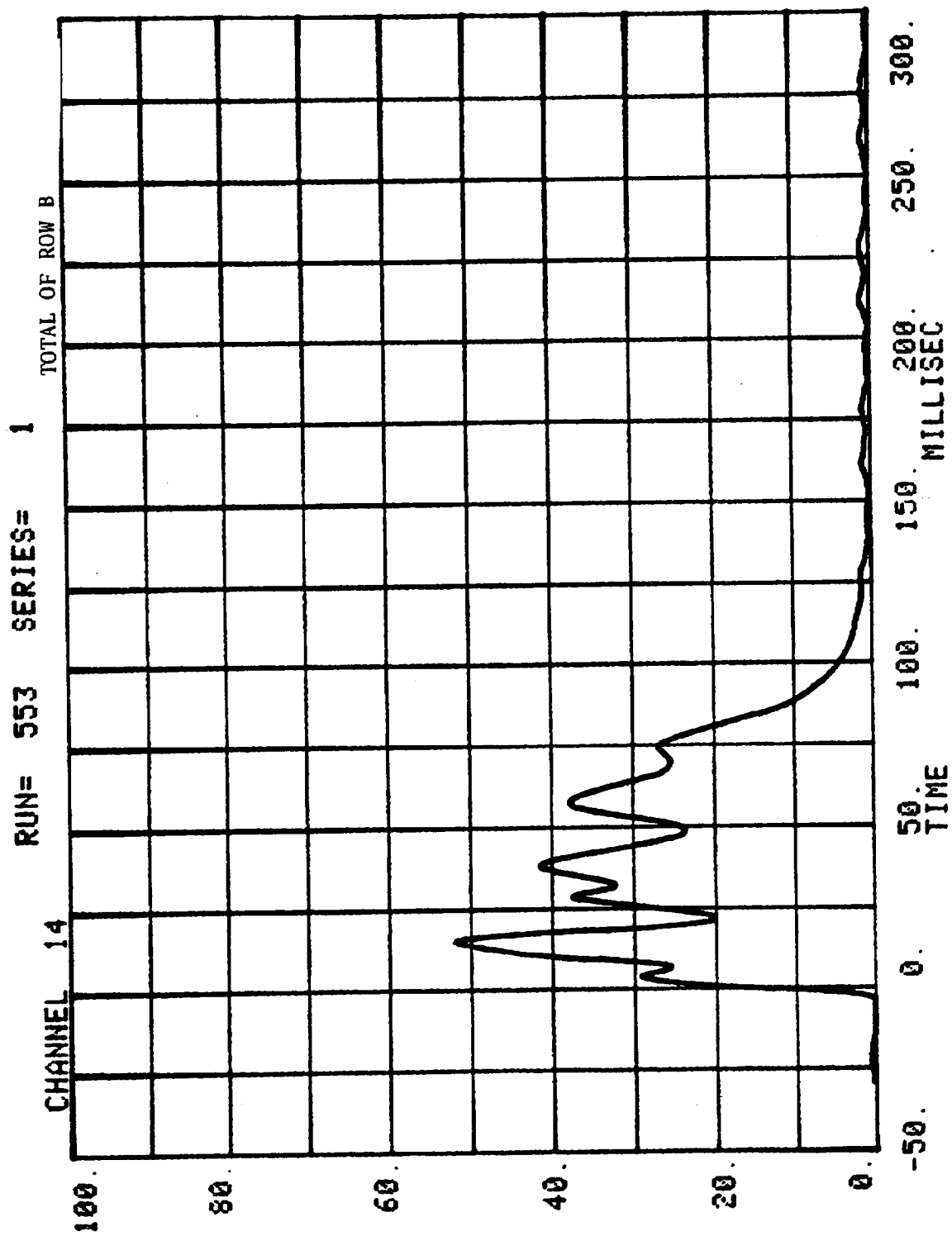
K LBS.

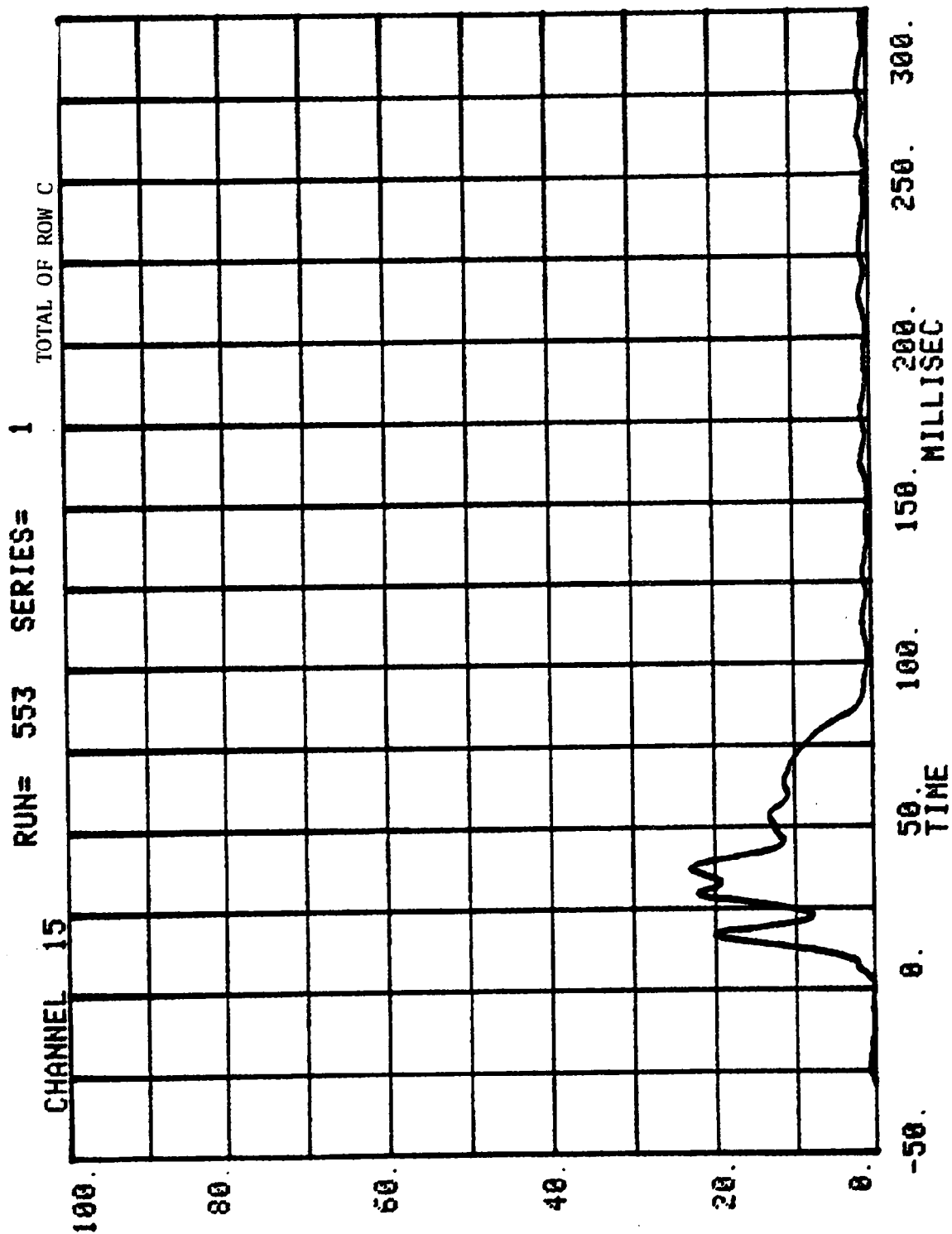


CHANNEL 71 BARRIER LOAD CELL Q9 1 K LBS.





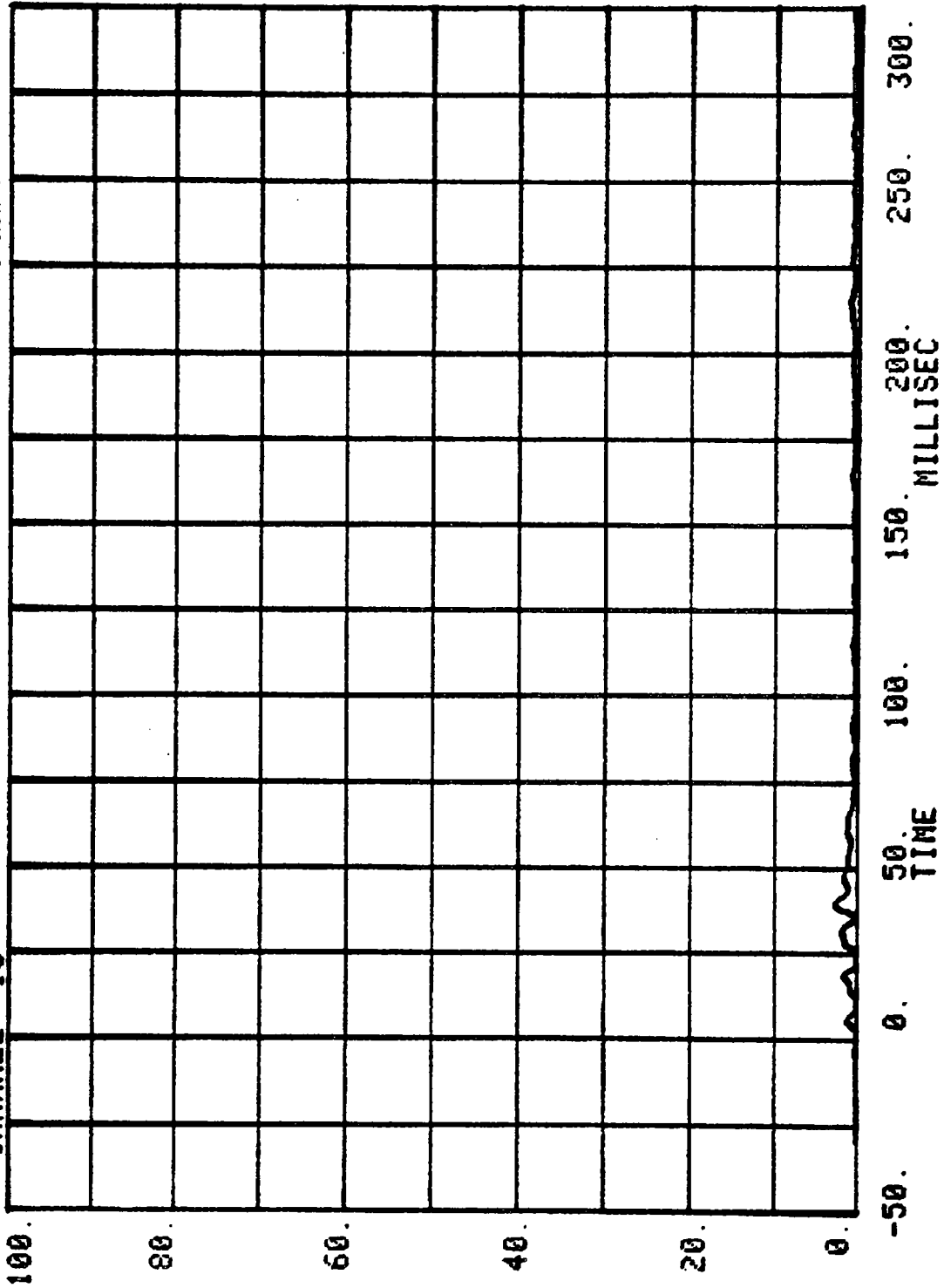


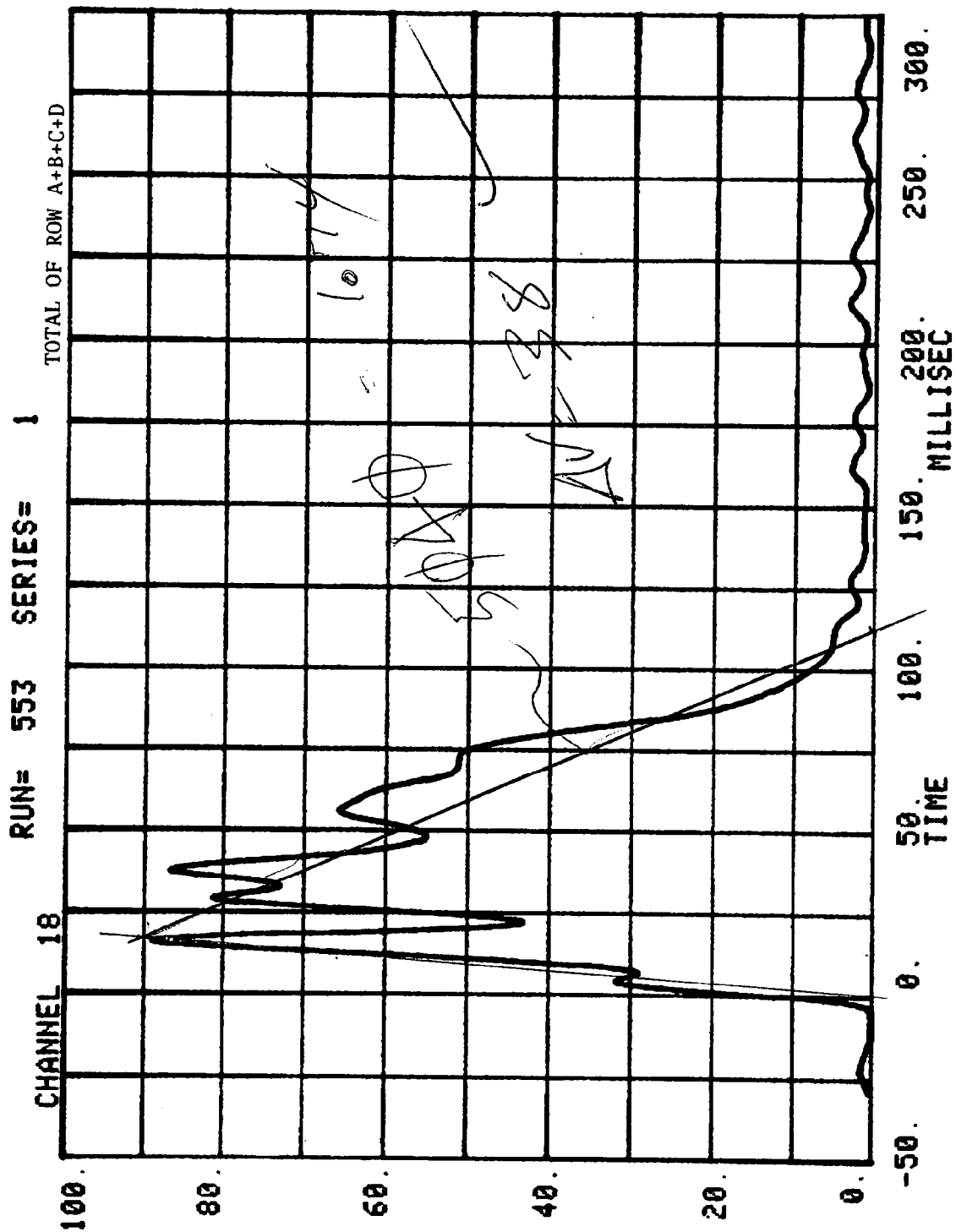


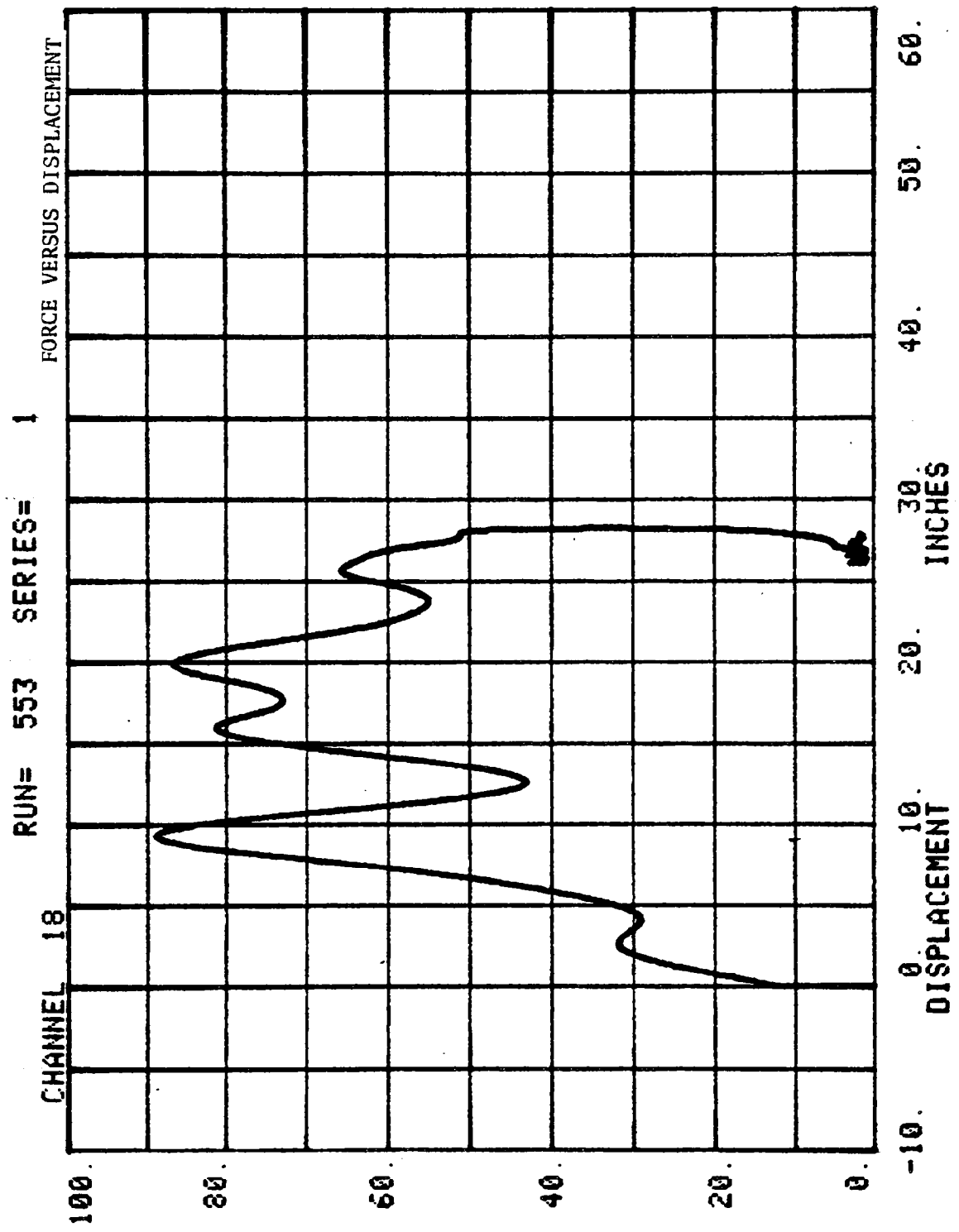
RUN= 553 SERIES= 1

CHANNEL 16

TOTAL OF ROW D







Test No. 447-3-553

1982 MAZDA-626

DUMMY DATA

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

HEAD INJURY CRITERION
HEAD SEVERITY INDEX

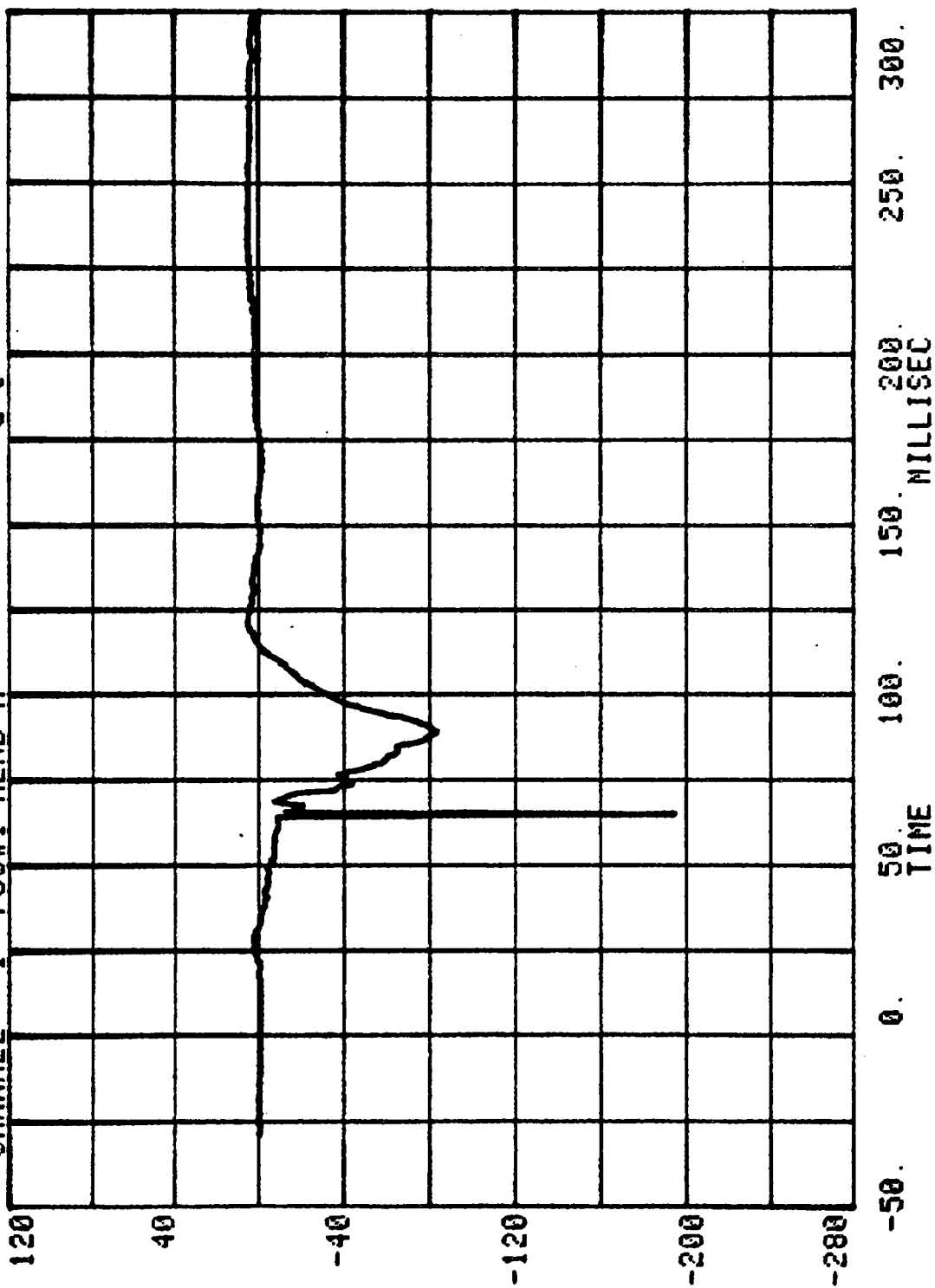
CAR TO LOAD CELL BARRIER

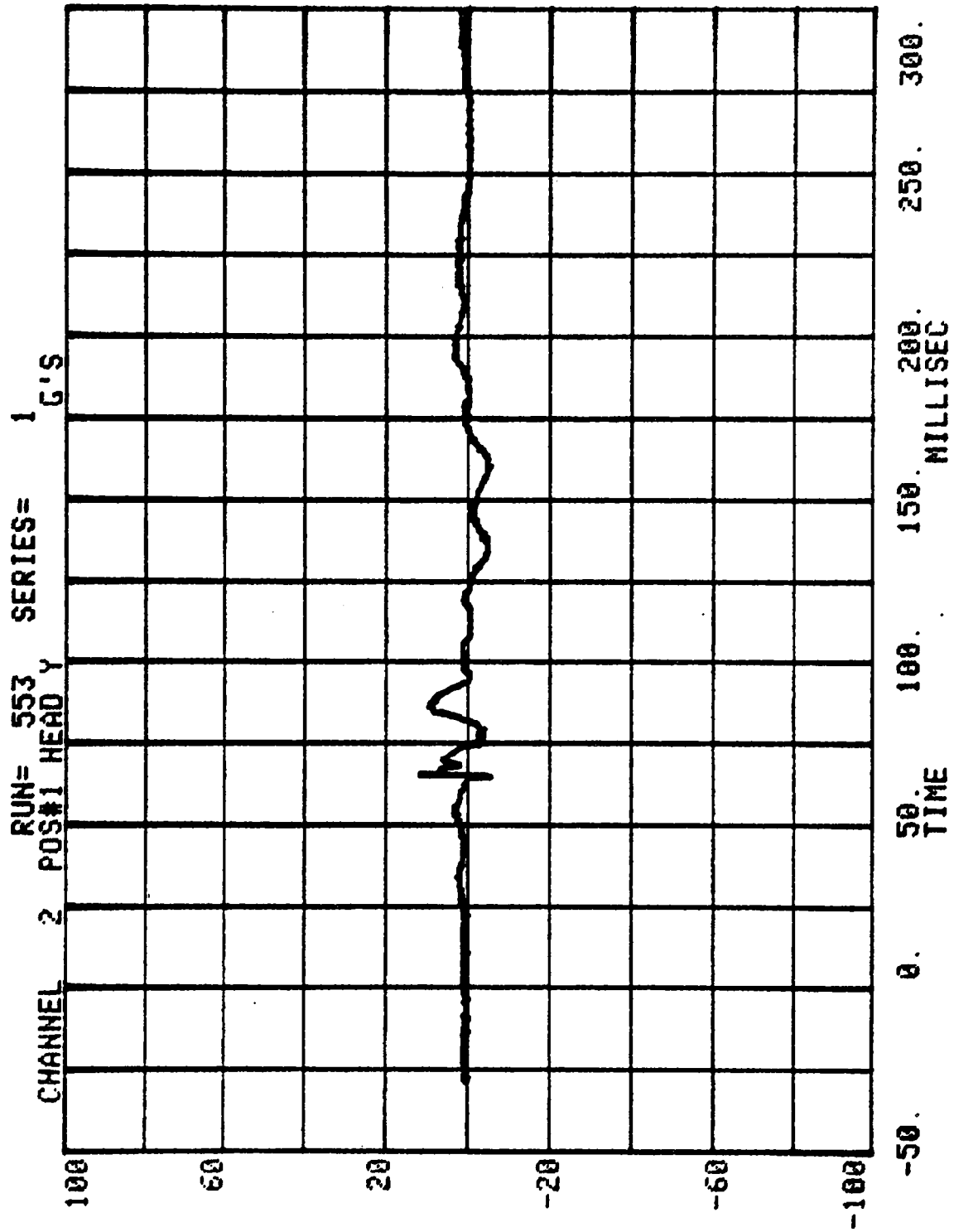
RUN= 553

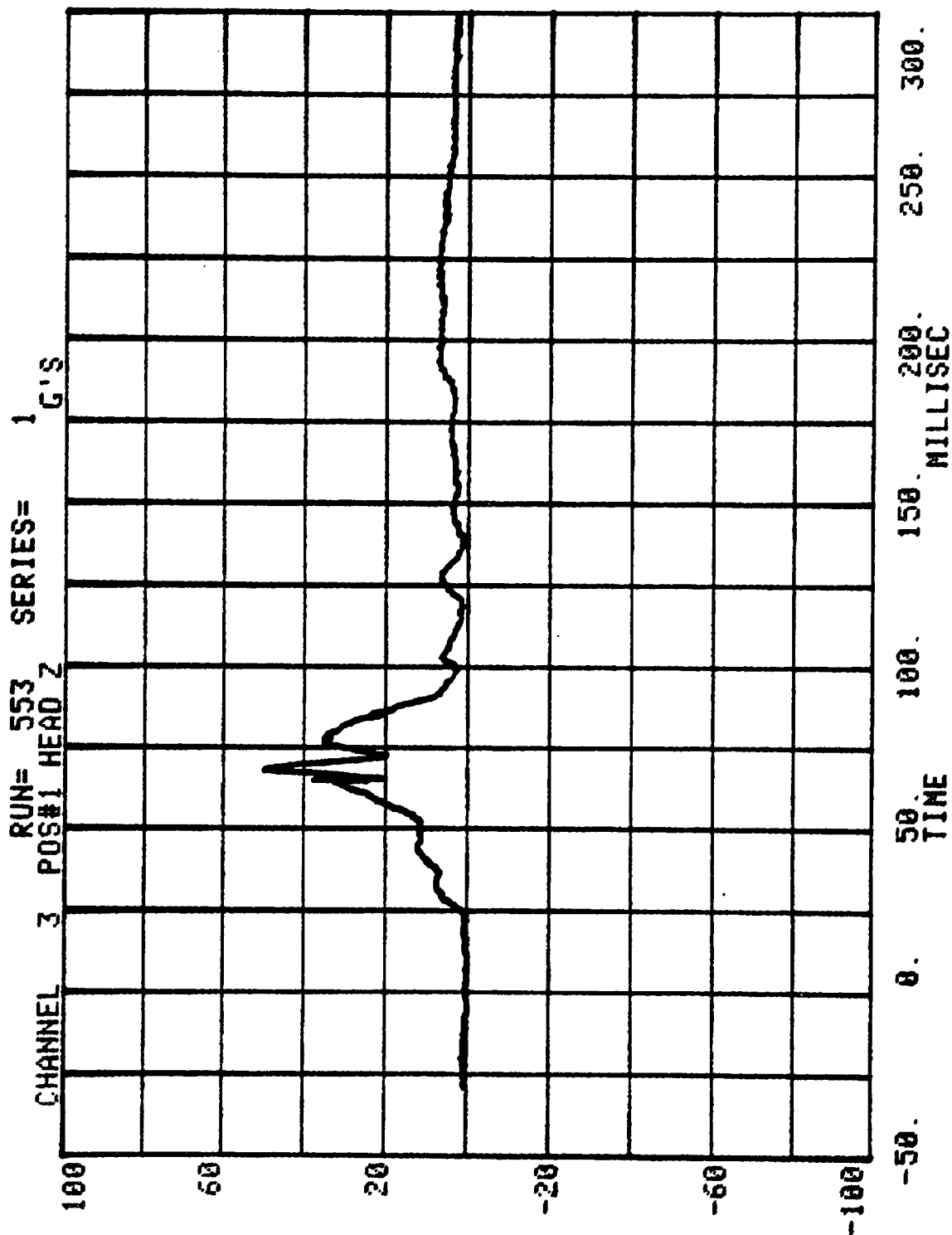
POS#1 HEAD RESULTANT

HIC= 968.6 FROM T1= .06442 TO T2= .09877
AVERAGE ACCELERATION BETWEEN T1 AND T2= 60.3G'S
EVENT TIME= 300.0 NSEC
SEVERITY INDEX=1335.0

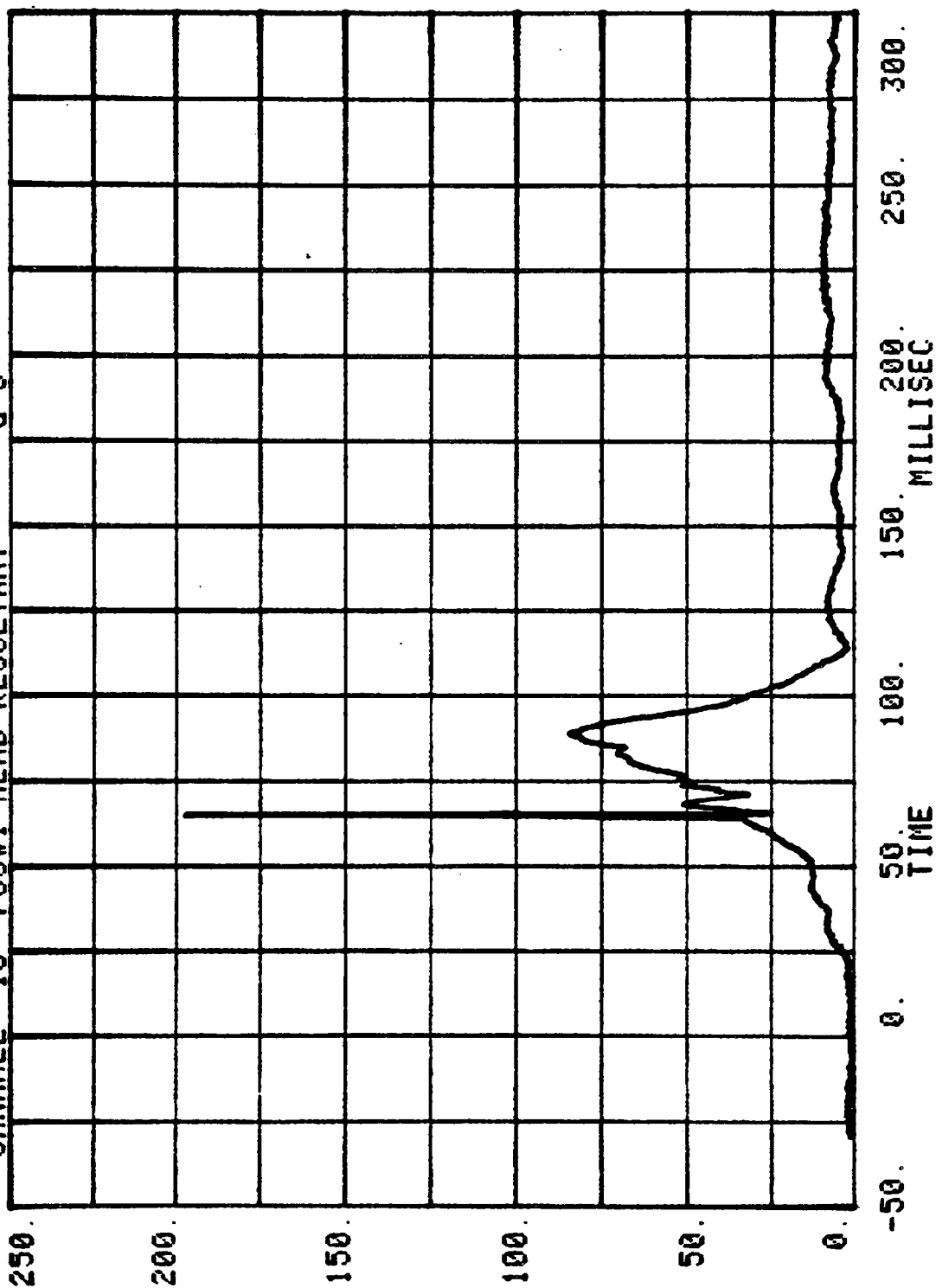
CHANNEL 1 POS#1 HEAD X RUN= 553 SERIES= 1 G'S



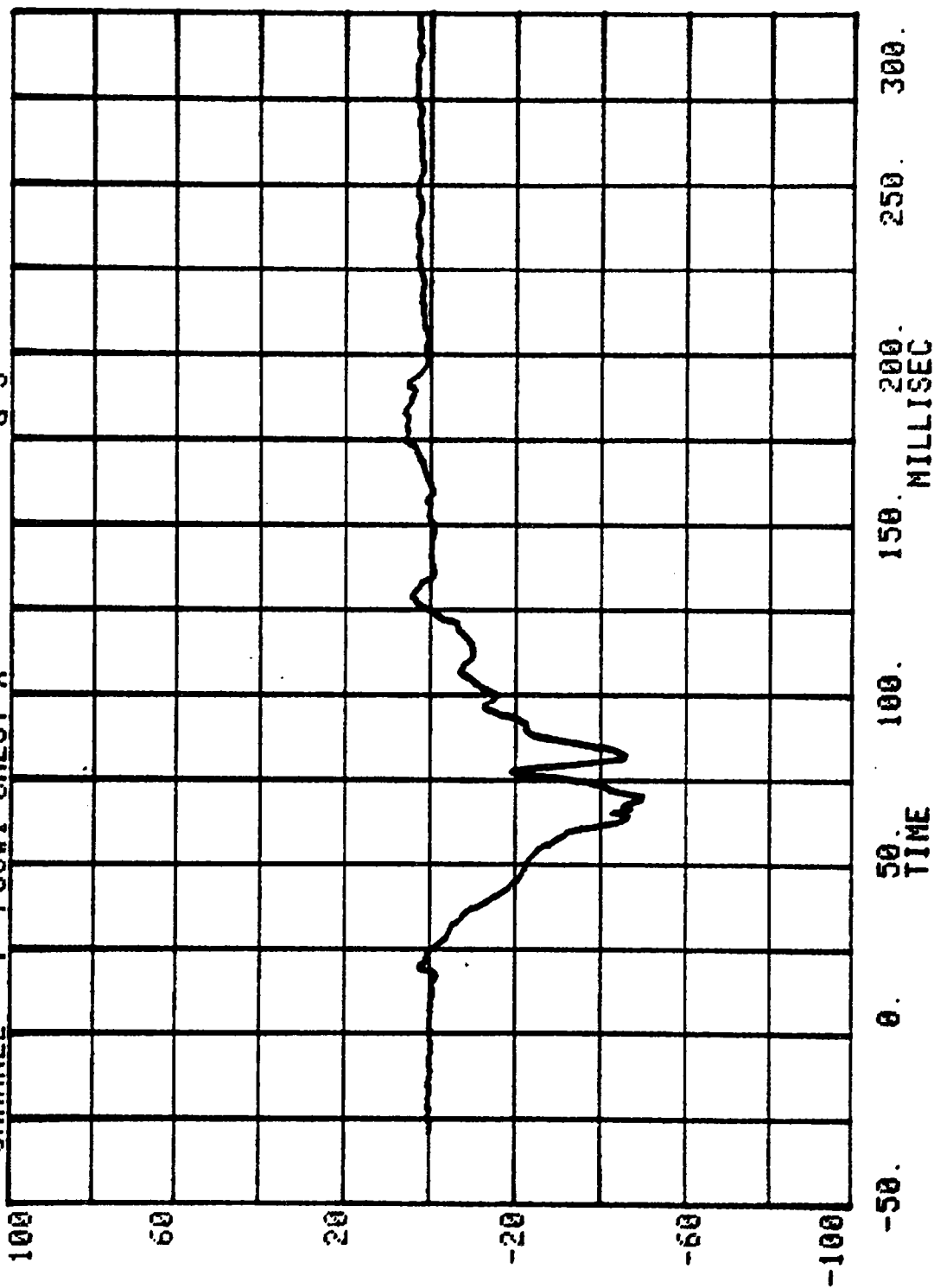




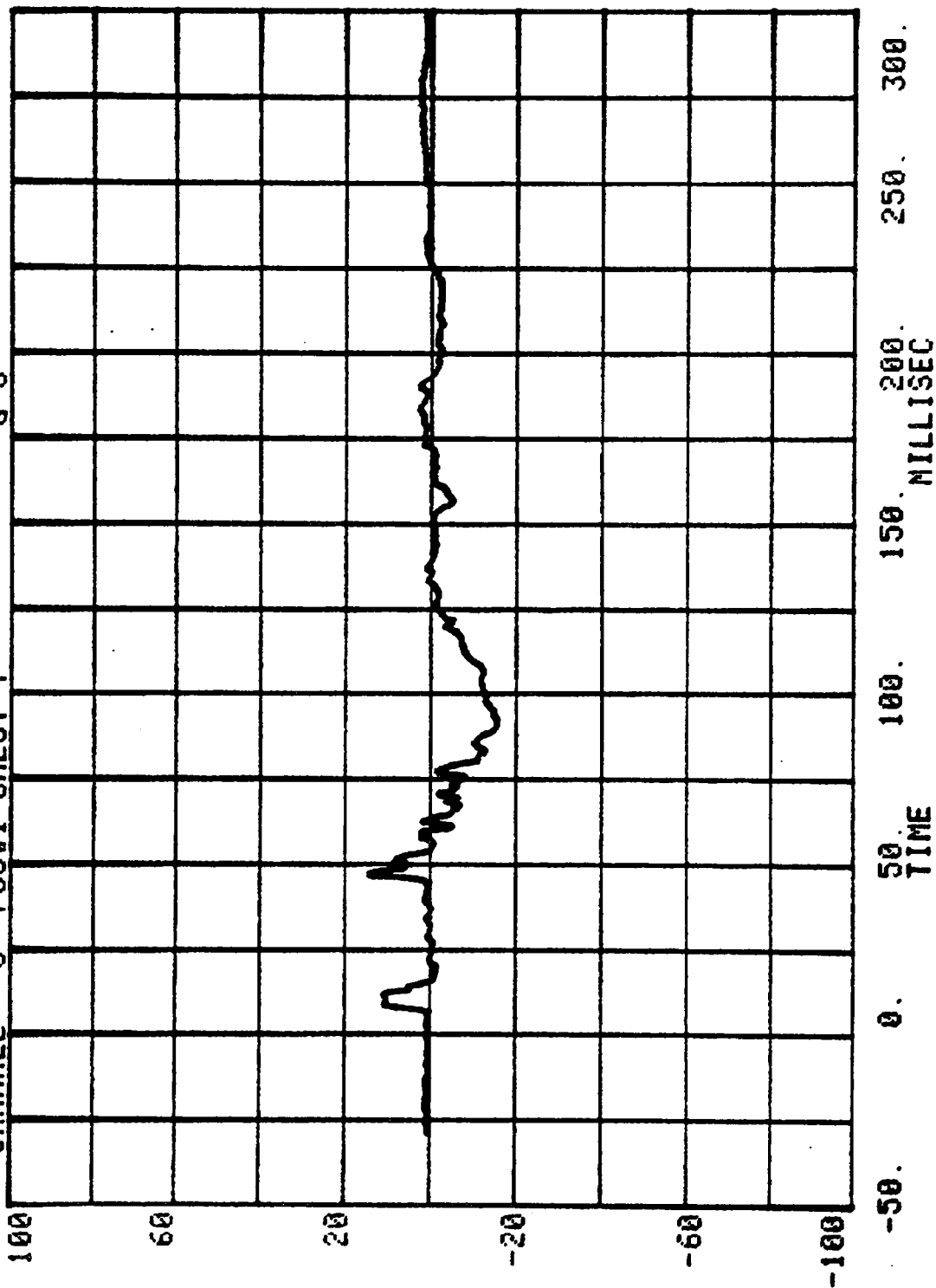
CHANNEL 10 POS#1 HEAD RESULTANT 1 G'S



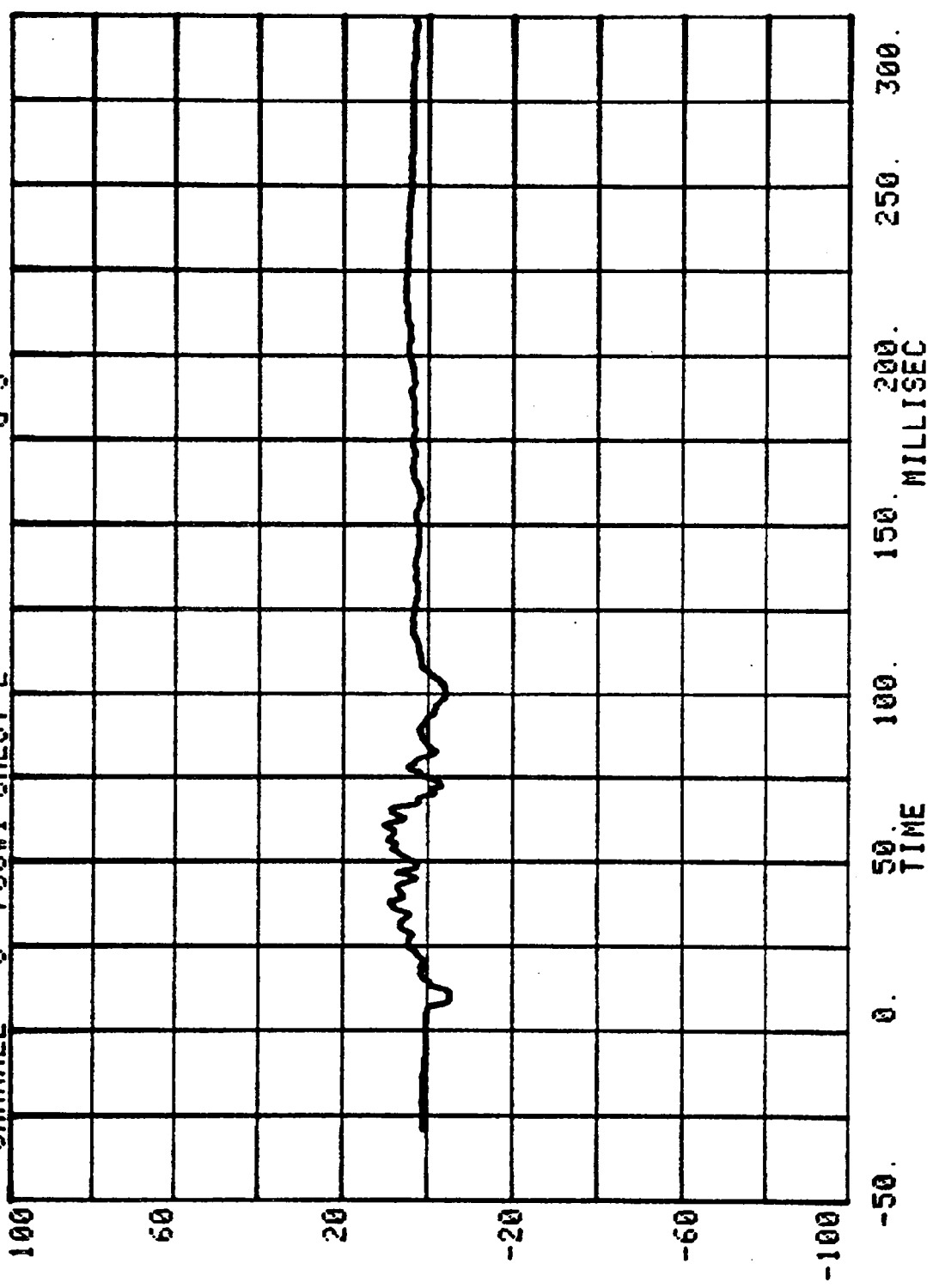
CHANNEL 4 POS#1 CHEST X
RUN= 553 SERIES= 1 G'S



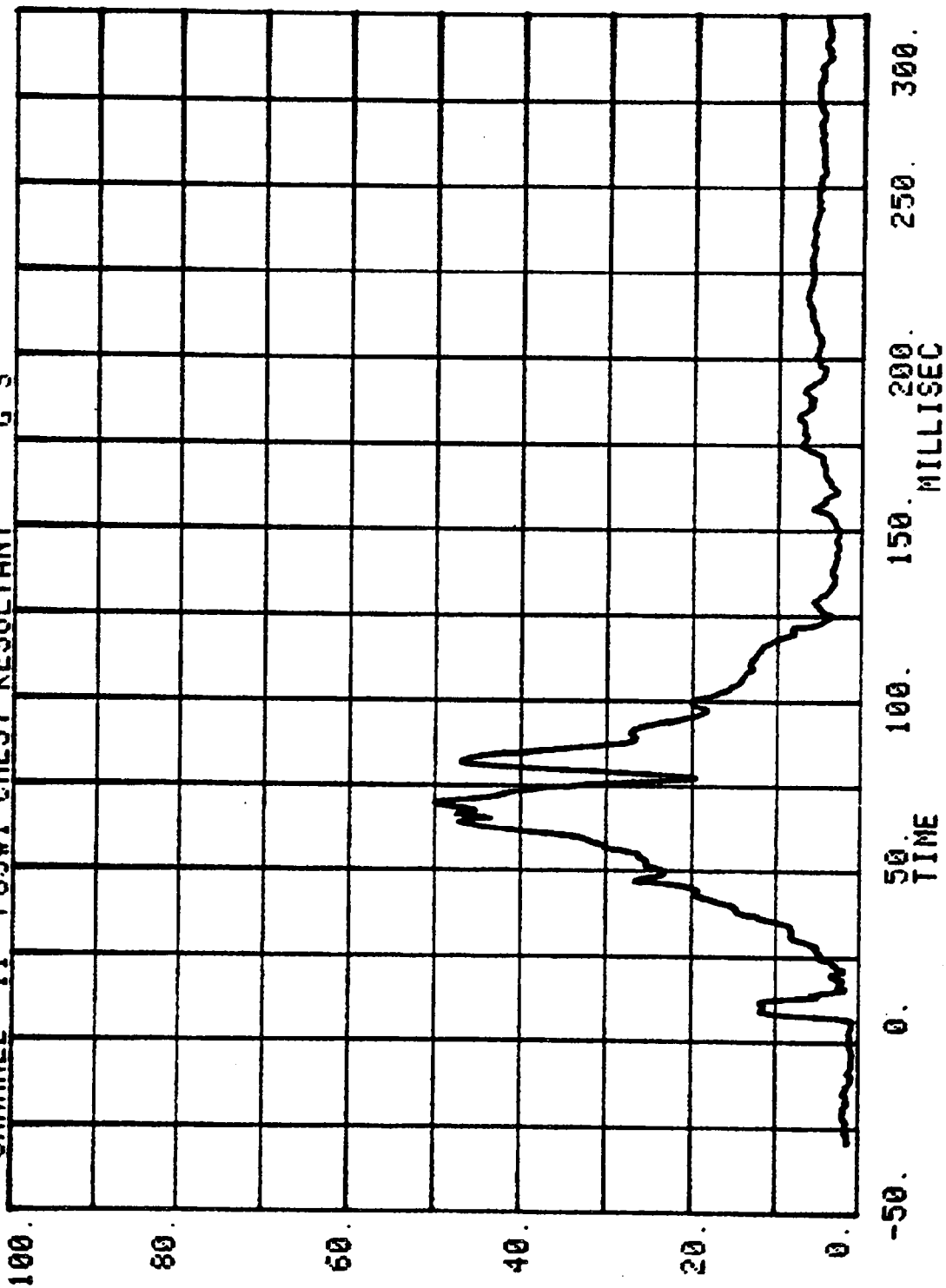
CHANNEL 5 POS#1 CHEST Y RUN= 553 SERIES= 1 G'S



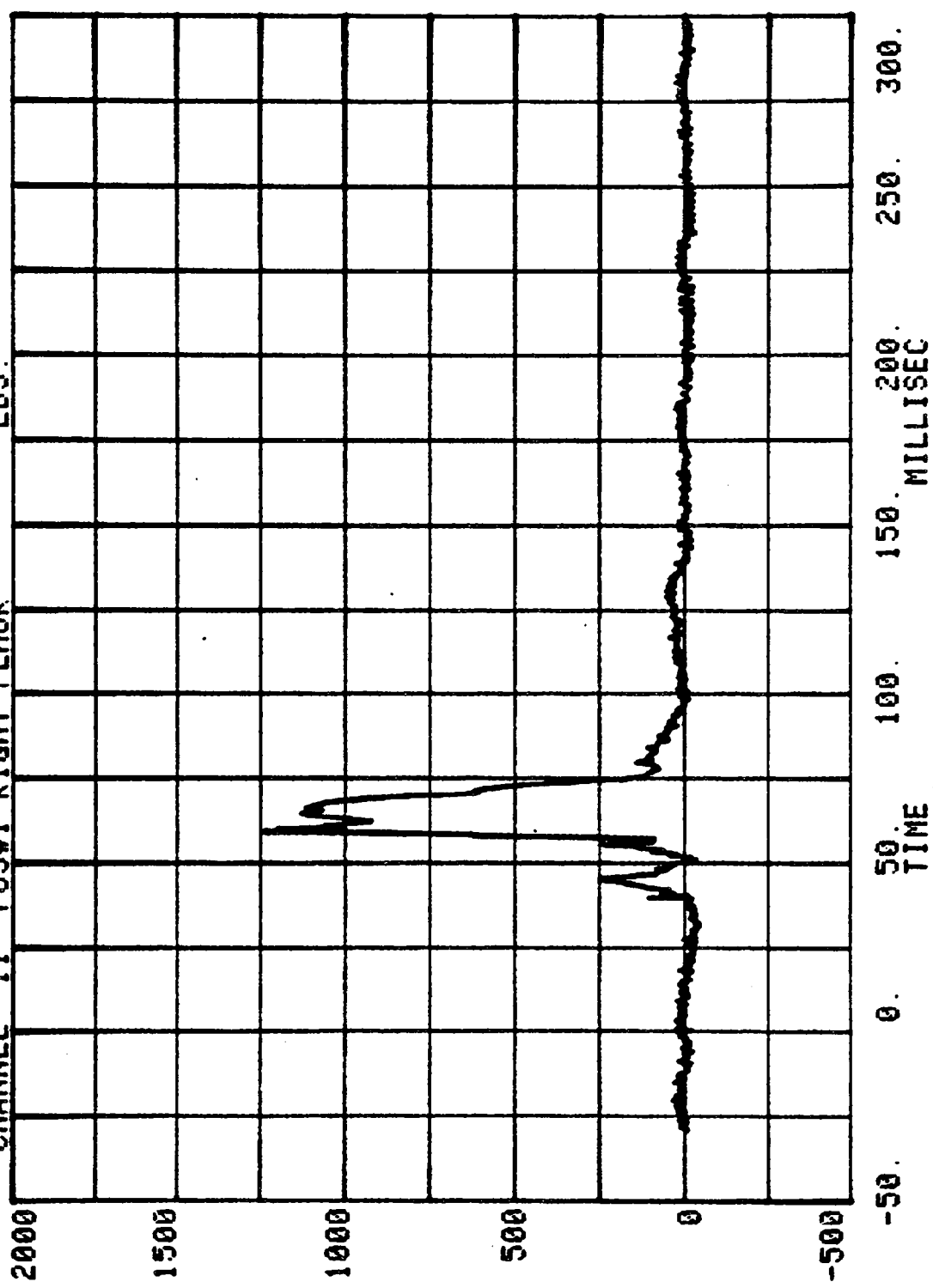
CHANNEL 6 POS#1 CHEST Z RUN= 553 SERIES= 1 G'S

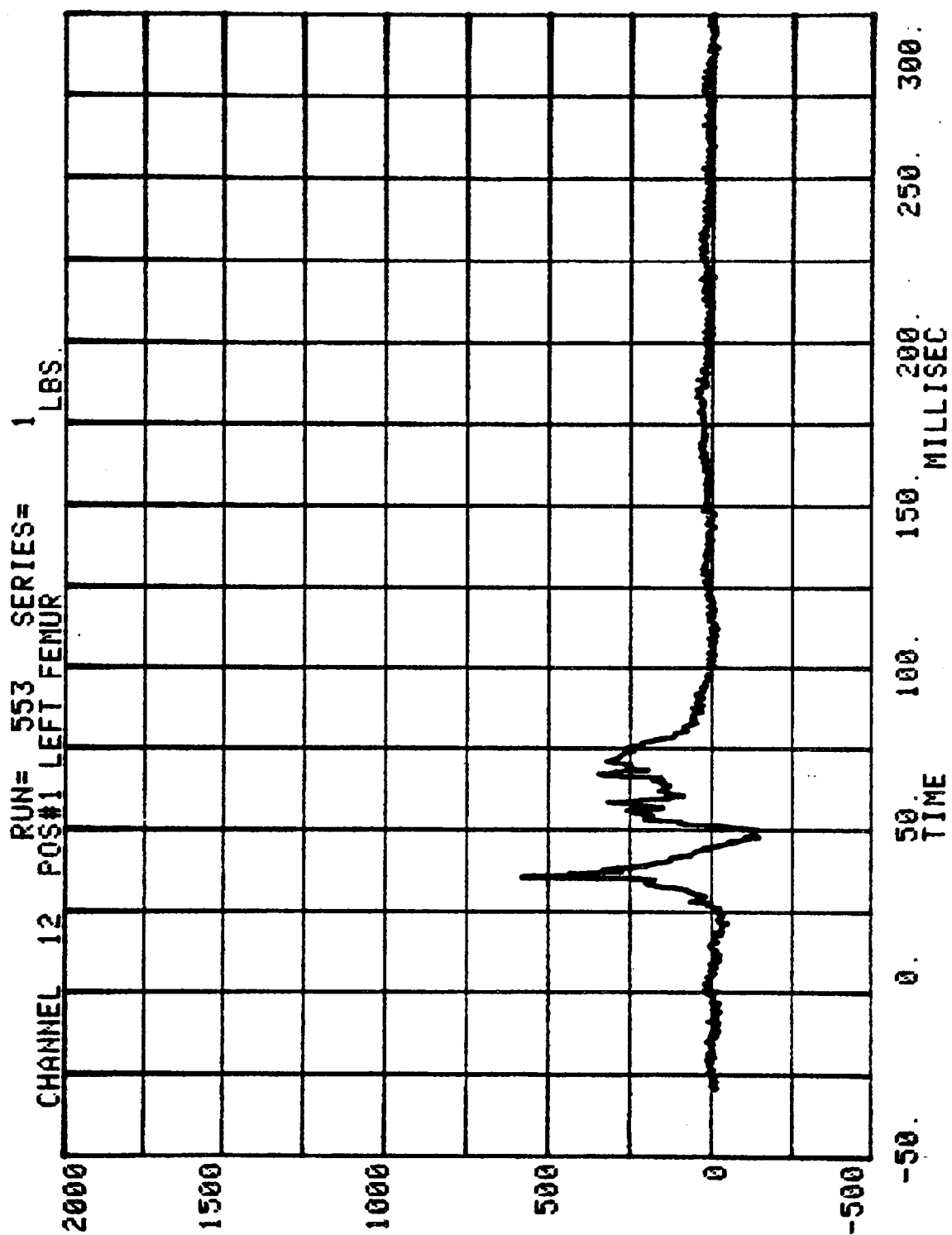


CHANNEL 11 RUN= 553 SERIES= 1
POS#1 CHEST RESULTANT G'S

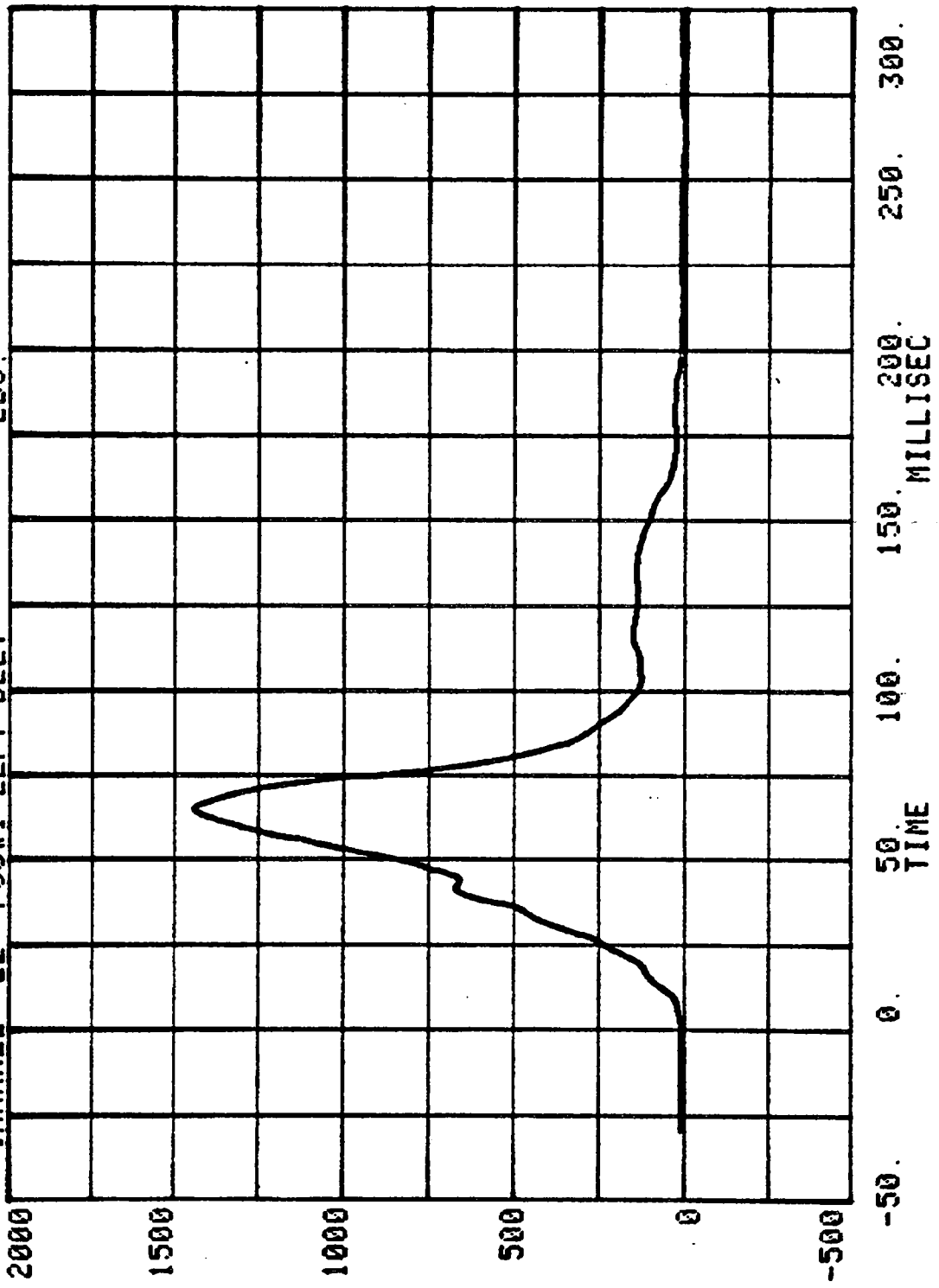


CHANNEL 11 POS#1 RIGHT FEMUR RUN= 553 SERIES= 1 LBS.

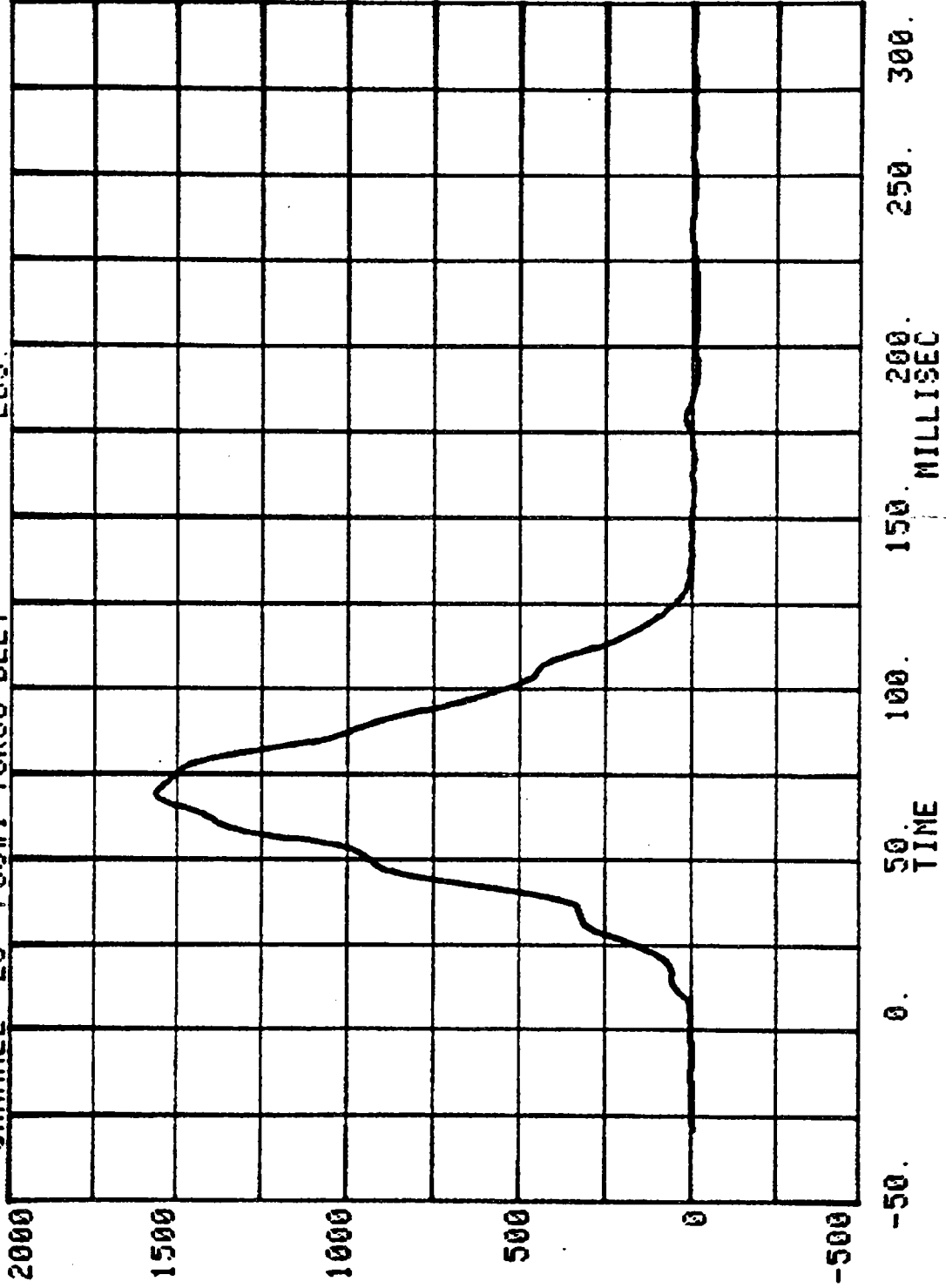


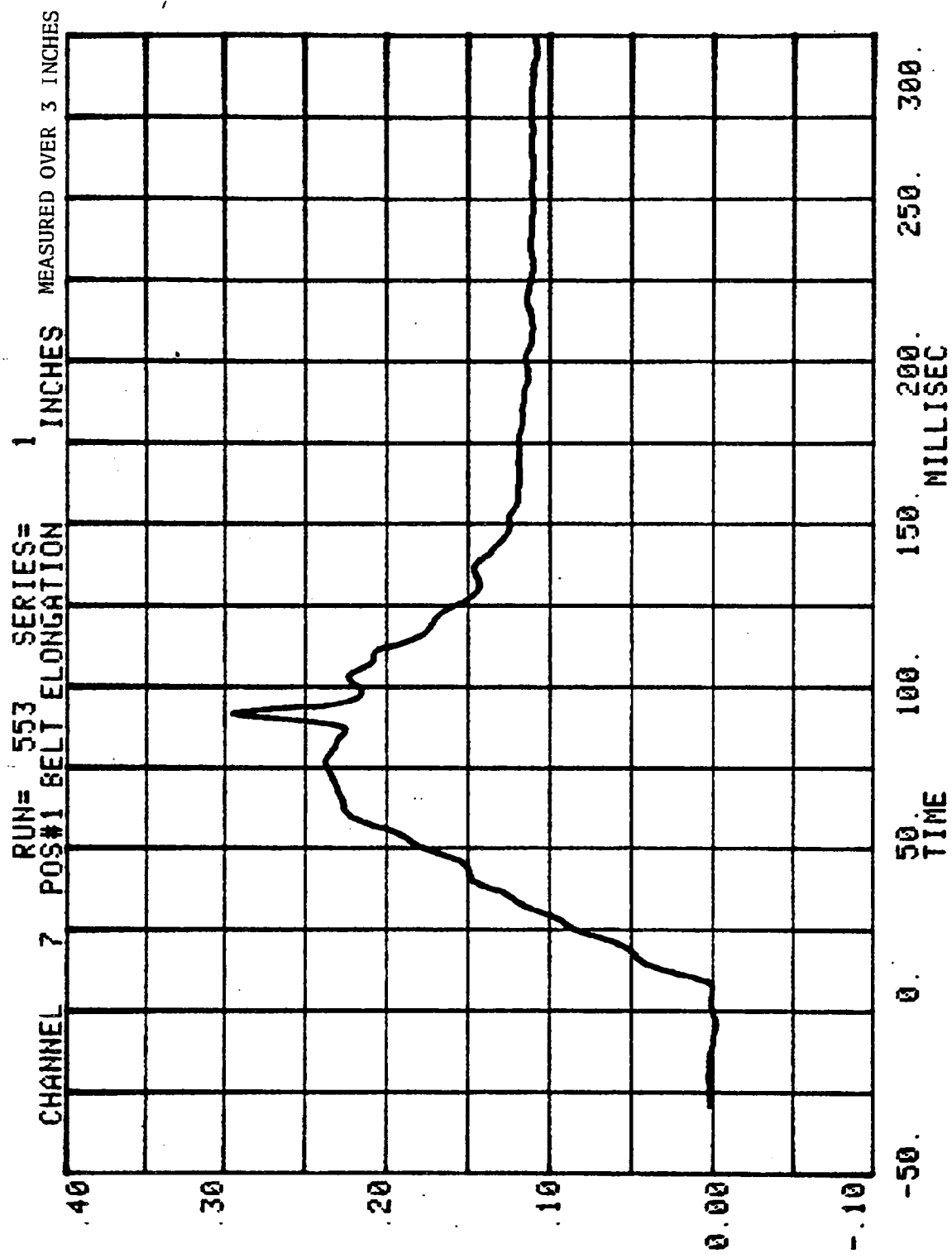


CHANNEL 22 POS#1 LEFT BELT
RUN= 553 SERIES= 1 LBS.

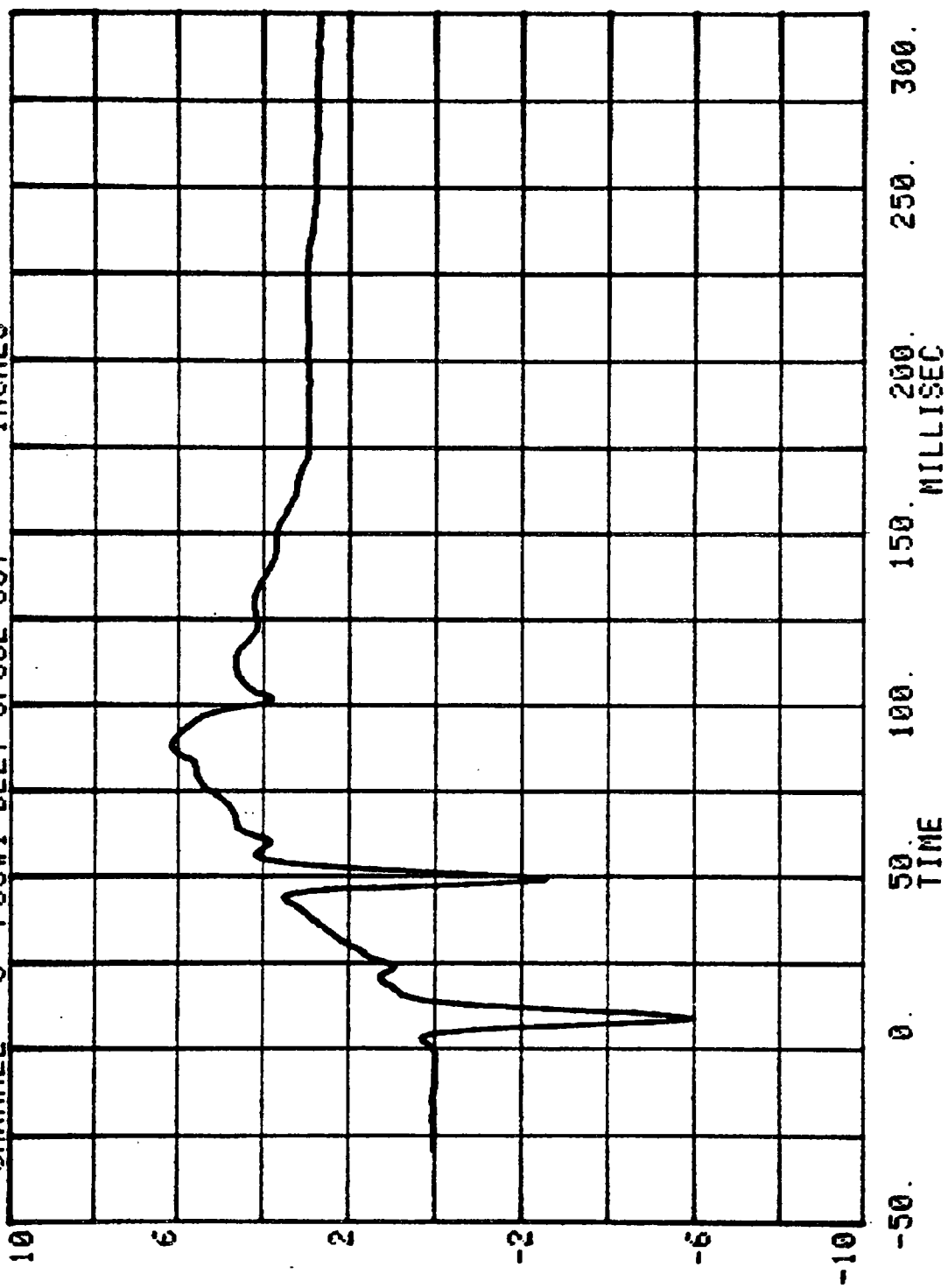


CHANNEL 23 POS#1 TORSO BELT
RUN= 553 SERIES= 1 LBS.





CHANNEL 8 POS#1 BELT SPOOL OUT 1 INCHES



HEAD INJURY CRITERION
HEAD SEVERITY INDEX

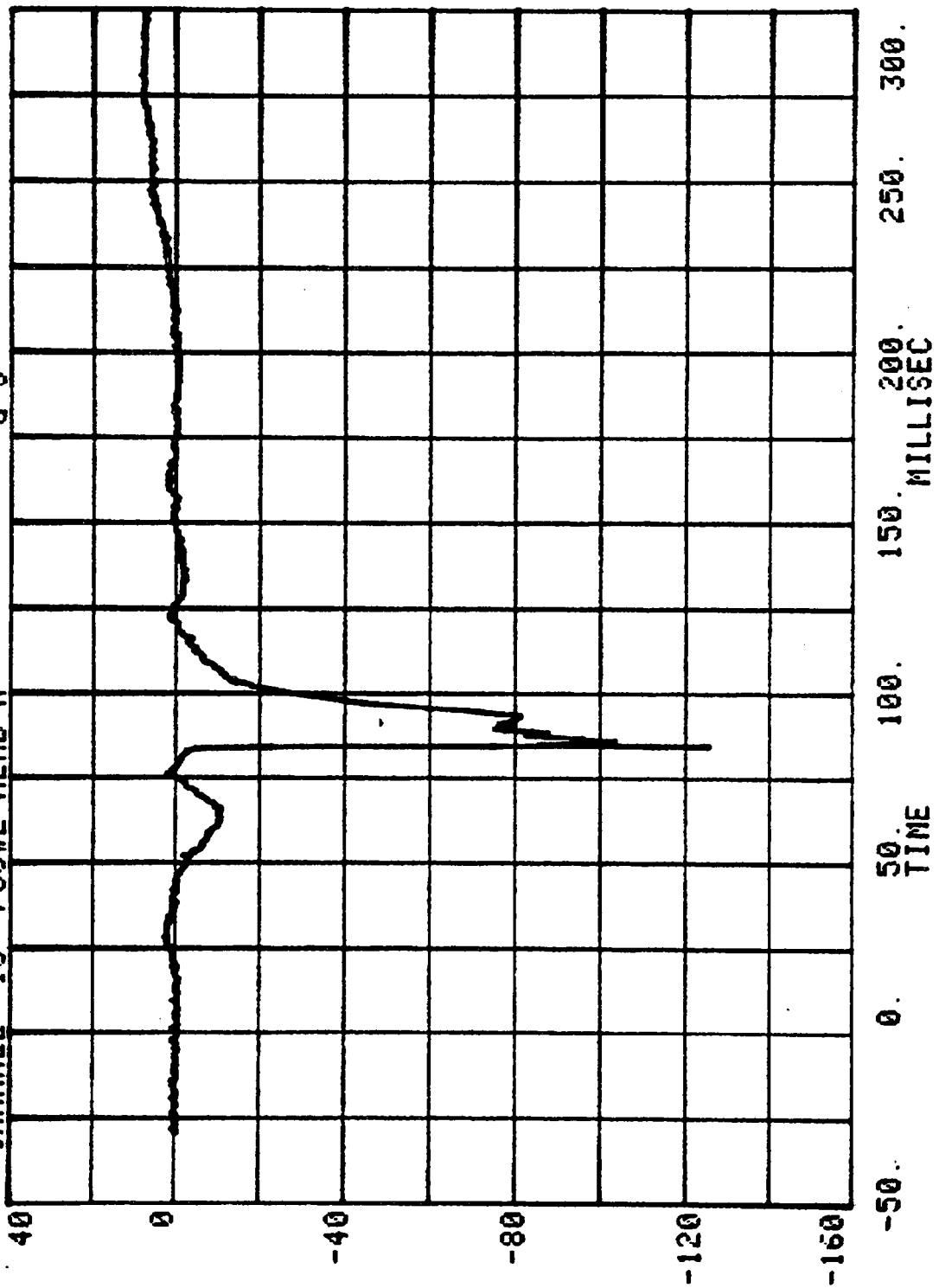
CAR TO LOAD CELL BARRIER

RUN= 553

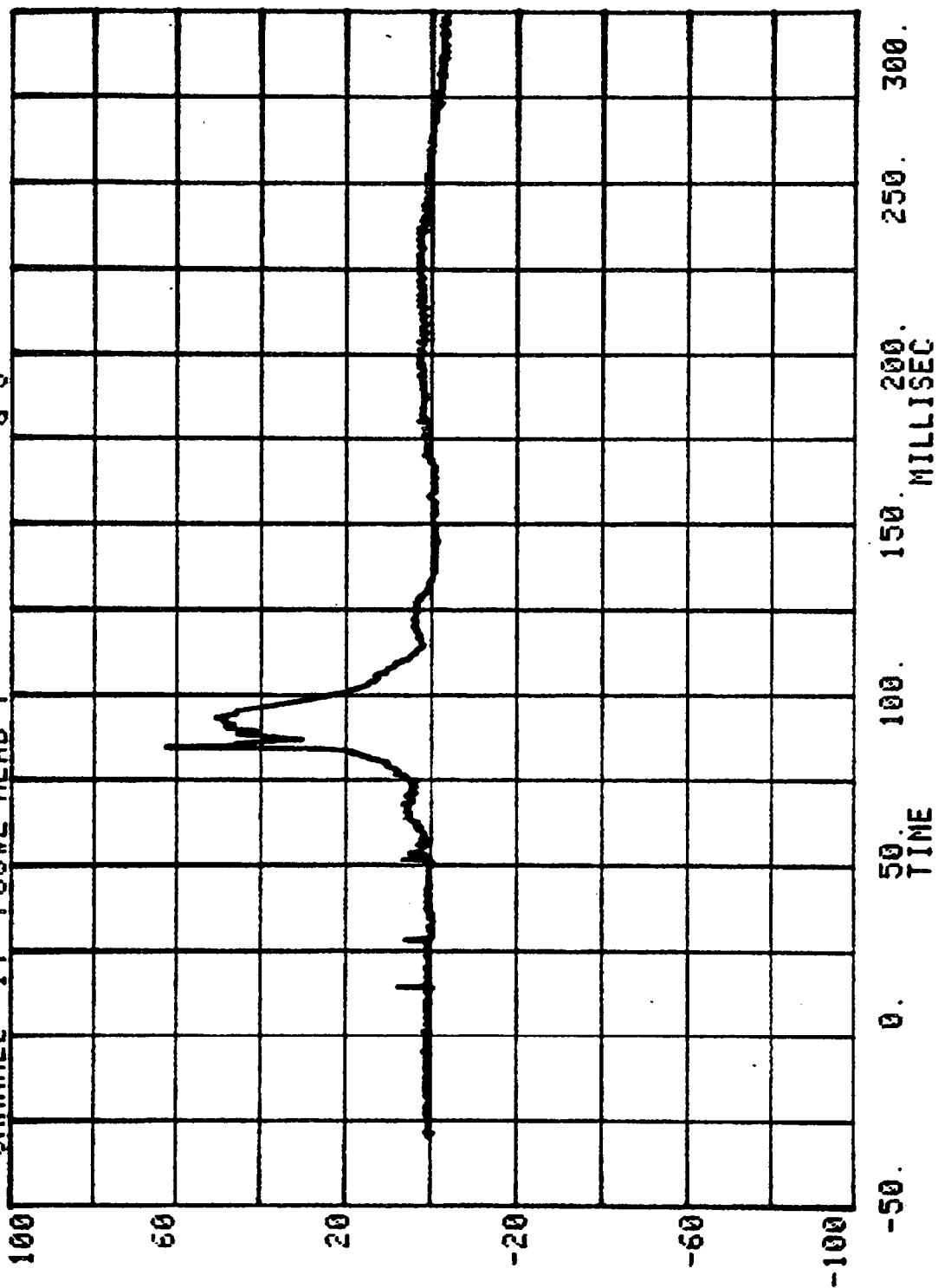
POS#2 HEAD RESULTANT

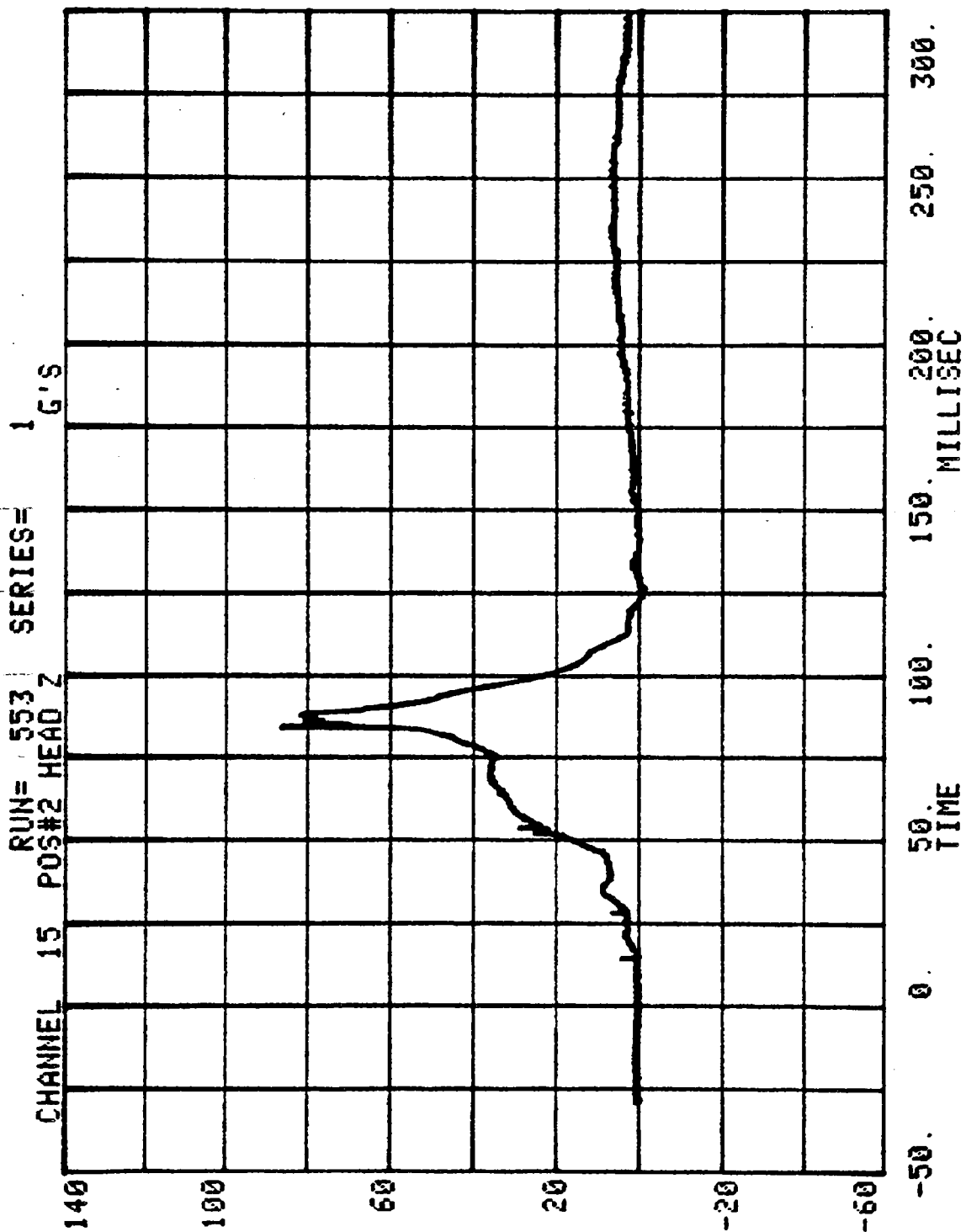
HIC=1692.9 FROM T1= .08392 TO T2= .09765
AVERAGE ACCELERATION BETWEEN T1 AND T2= 108.8G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=2203.5

CHANNEL 13 POS#2 HEAD X
RUN= 553 SERIES= 1 G'S

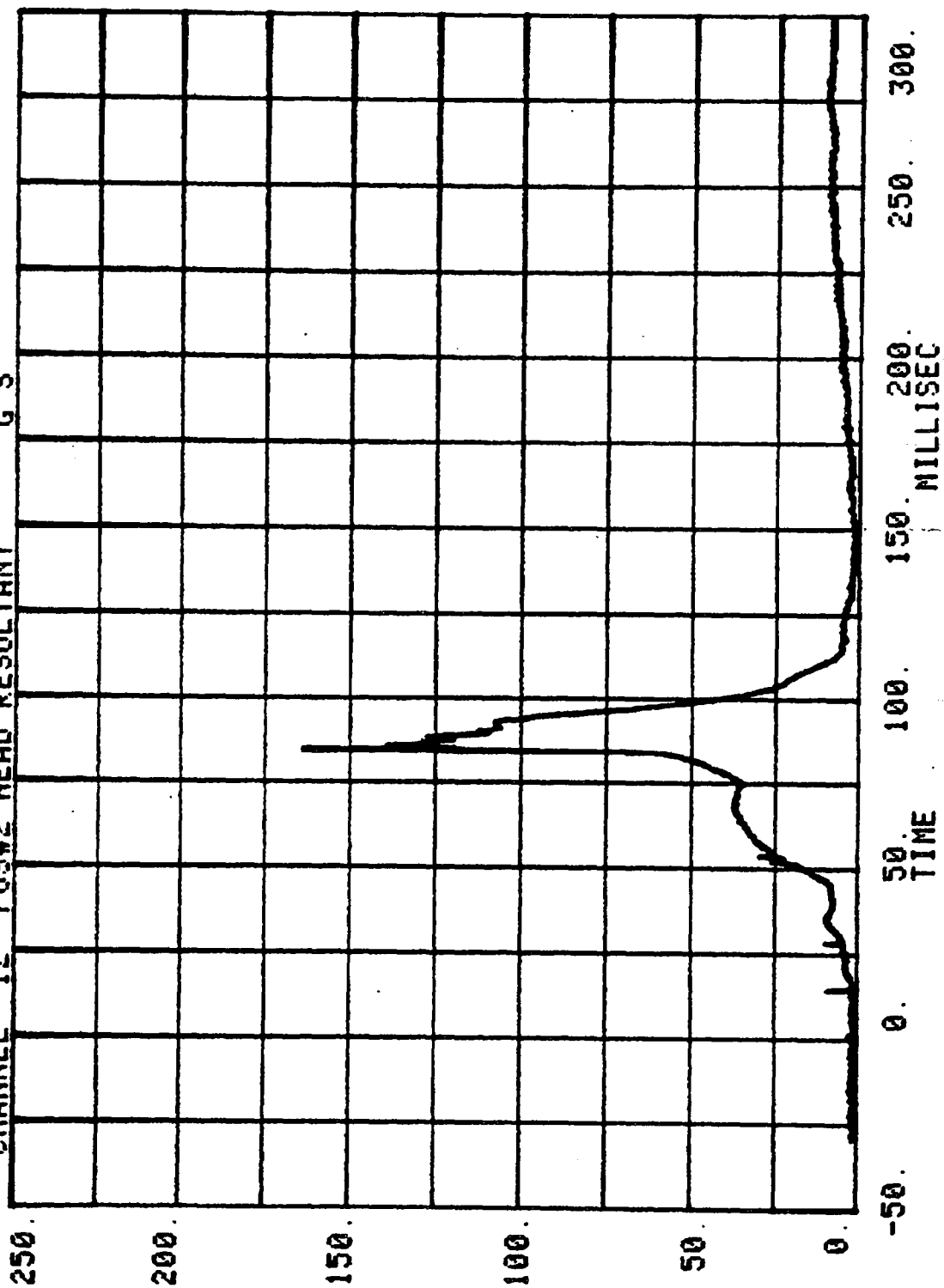


CHANNEL 14 POS#2 HEAD Y RUN= 553 SERIES= 1 G'S

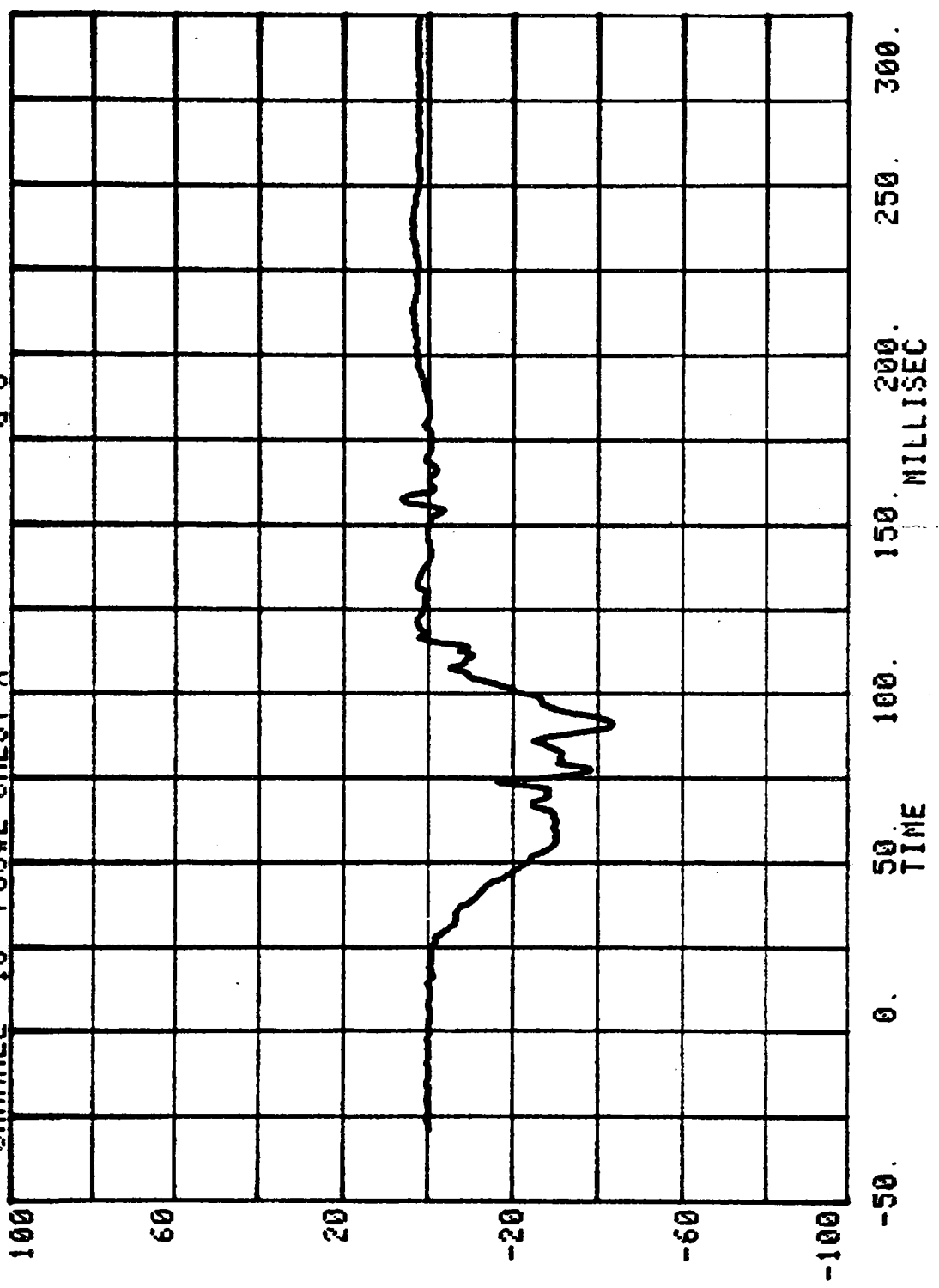




CHANNEL 12 POS#2 HEAD RESULTANT 1 G'S



RUN= 553 SERIES= 1 G'S
CHANNEL 16 POS#2 CHEST X

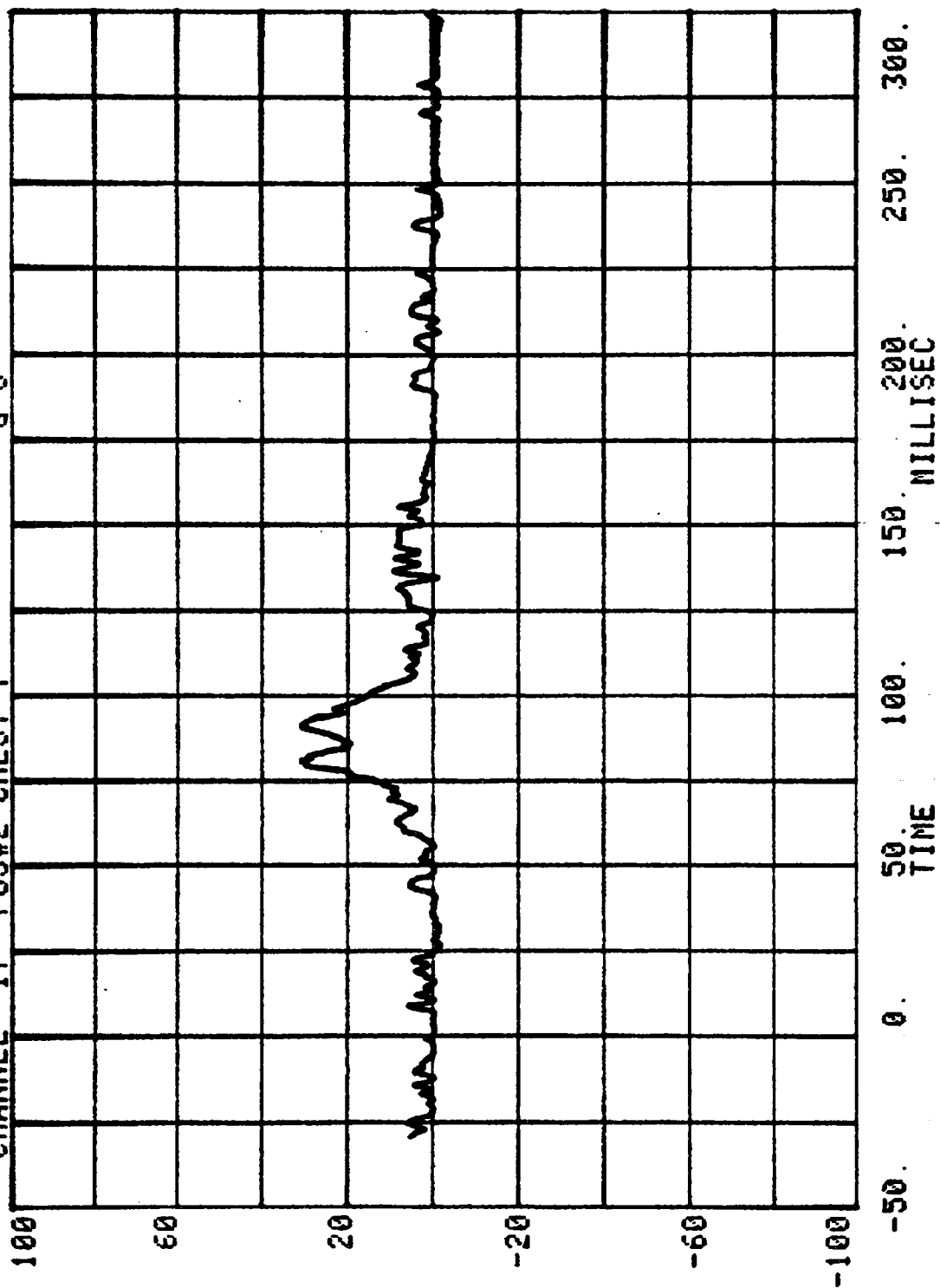


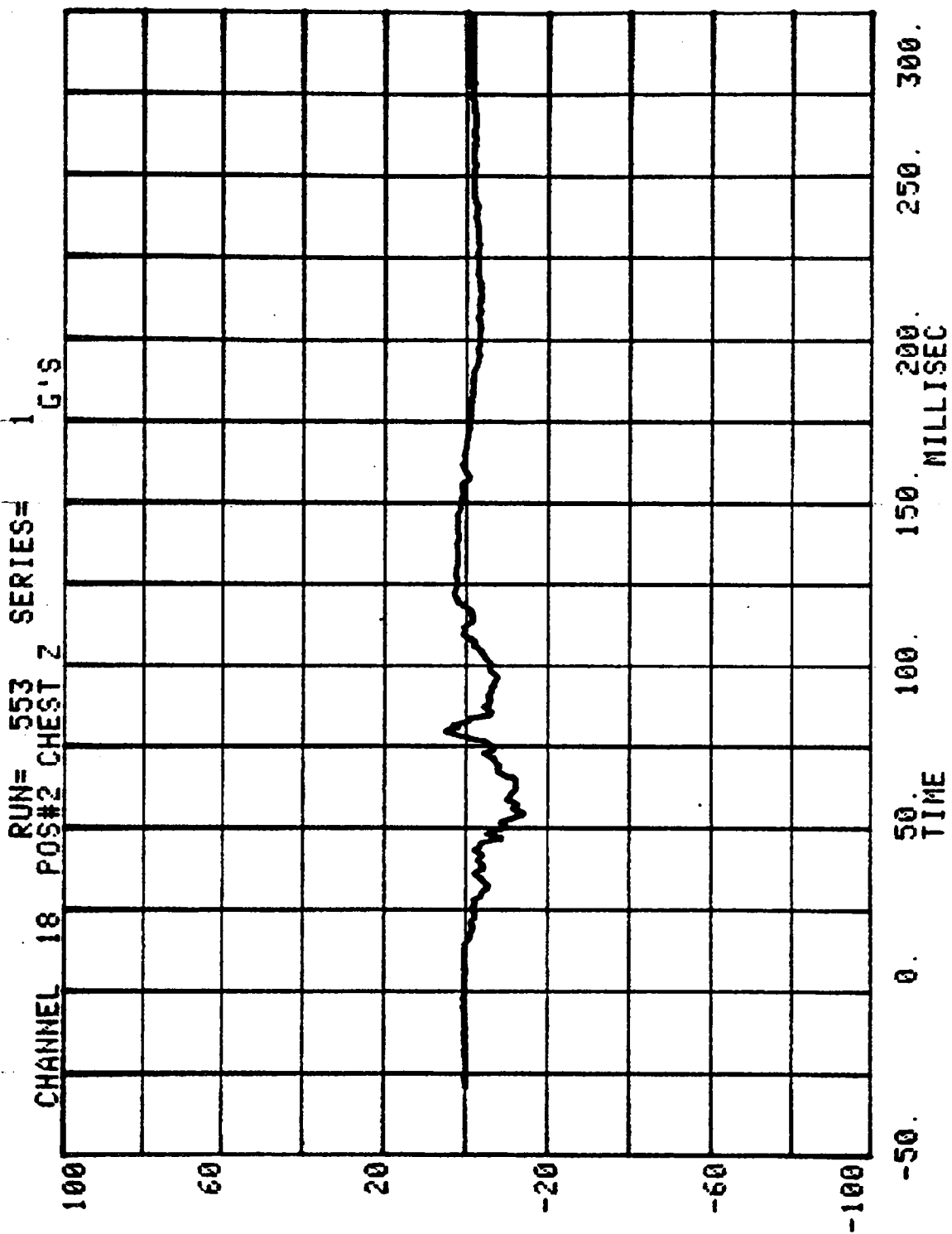
CHANNEL 17 POS#2 CHEST Y

RUN= 553

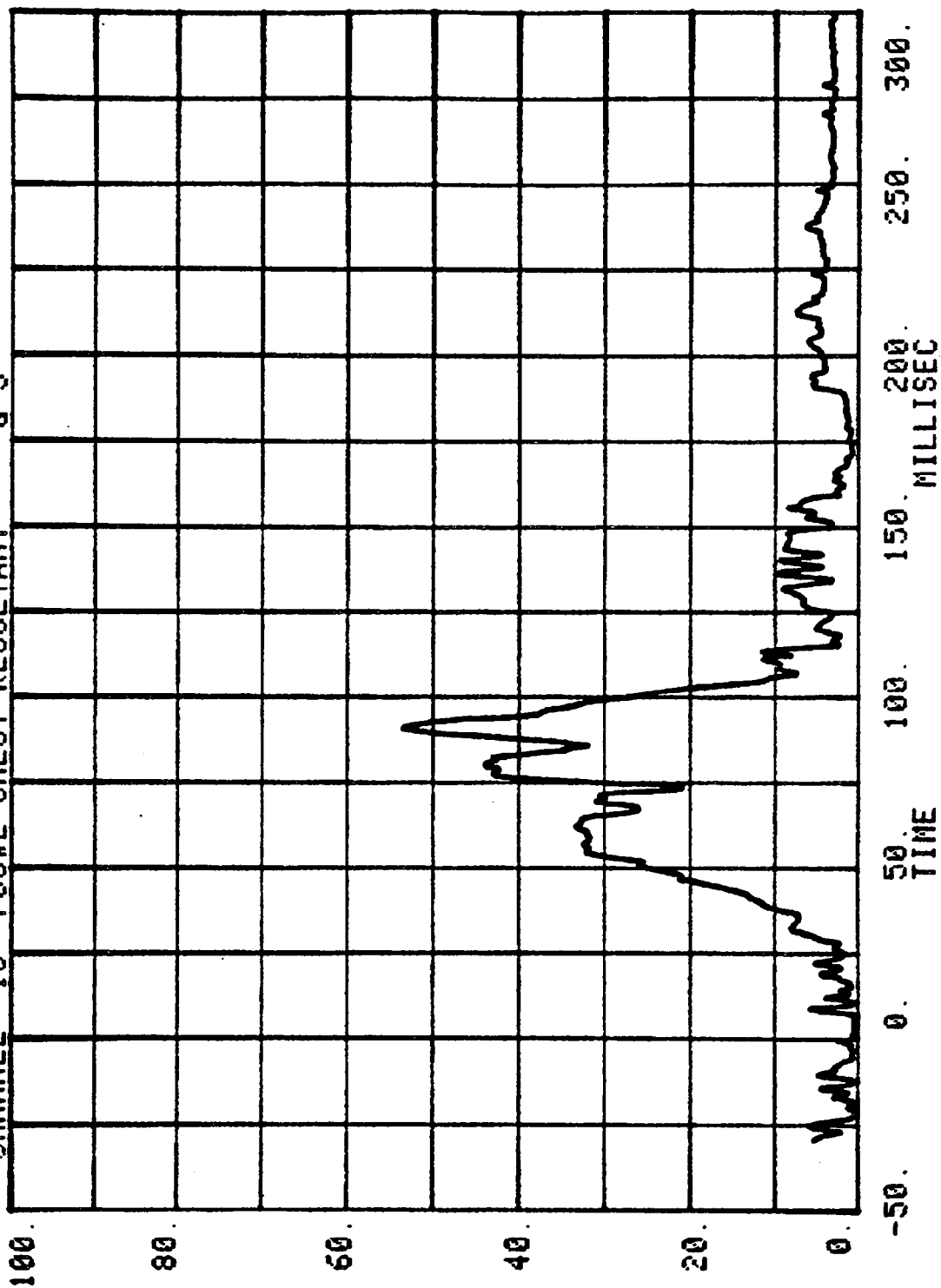
SERIES=

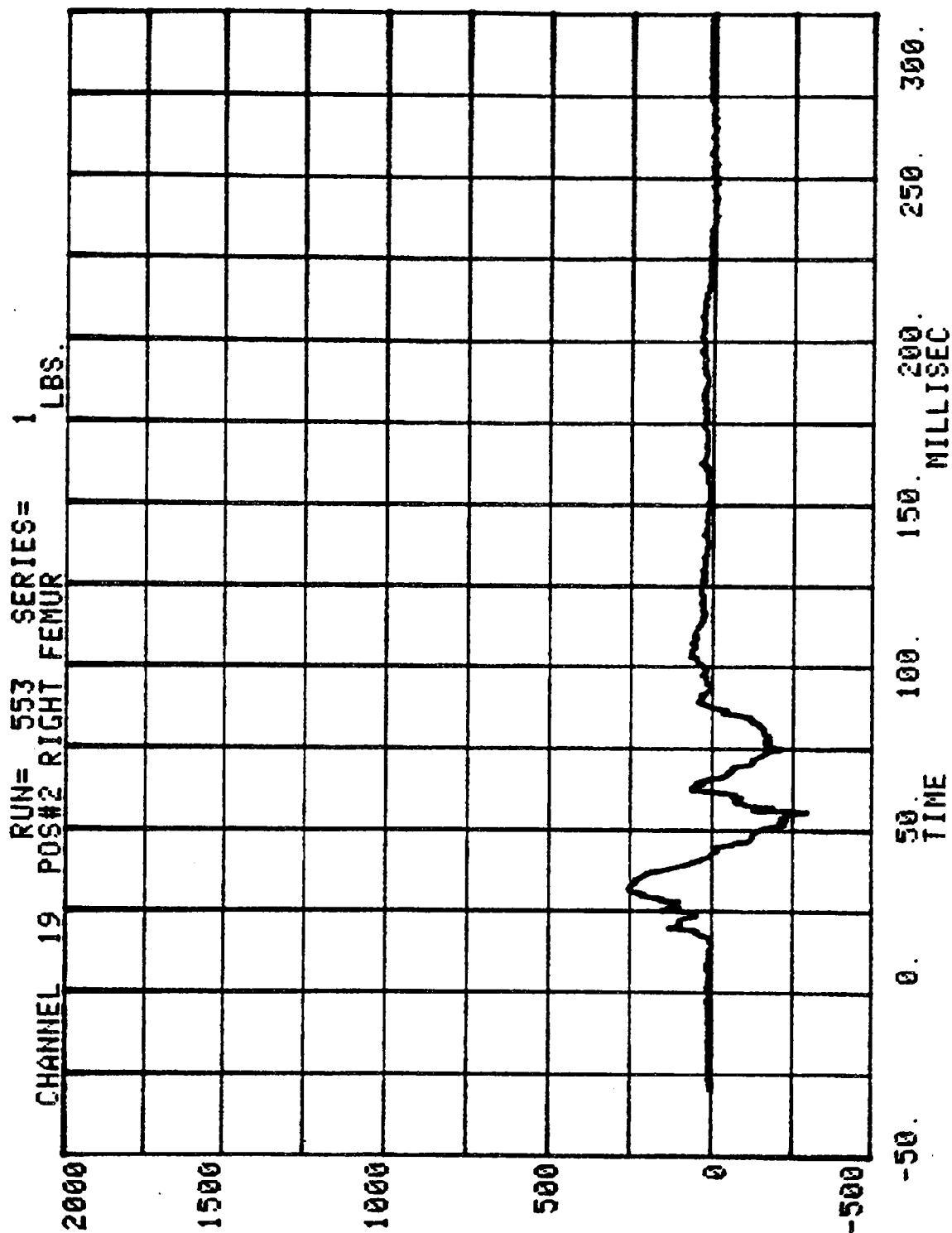
1 G'S



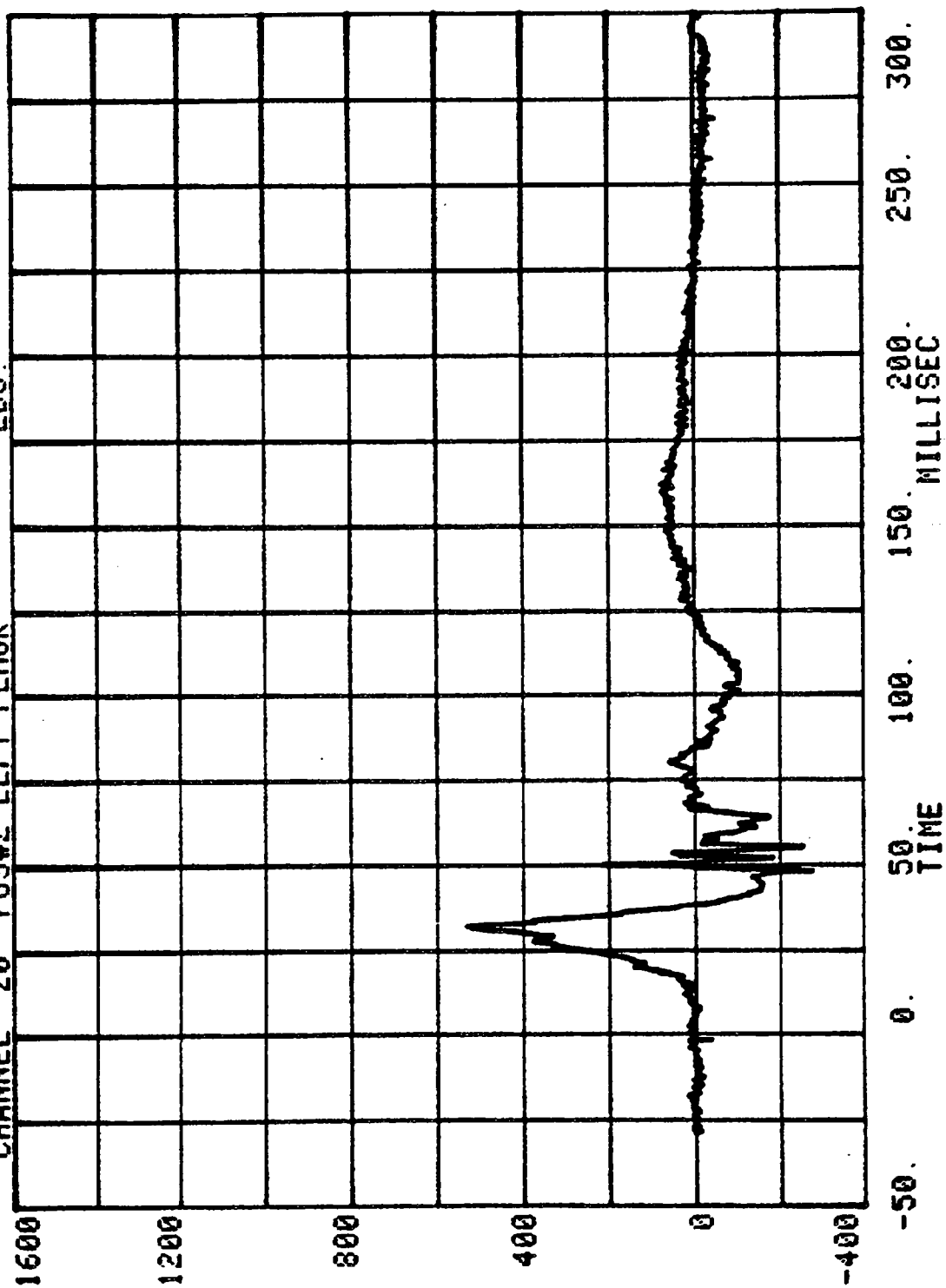


CHANNEL 13 RUN= 553 SERIES= 1 G'S
POS#2 CHEST RESULTANT

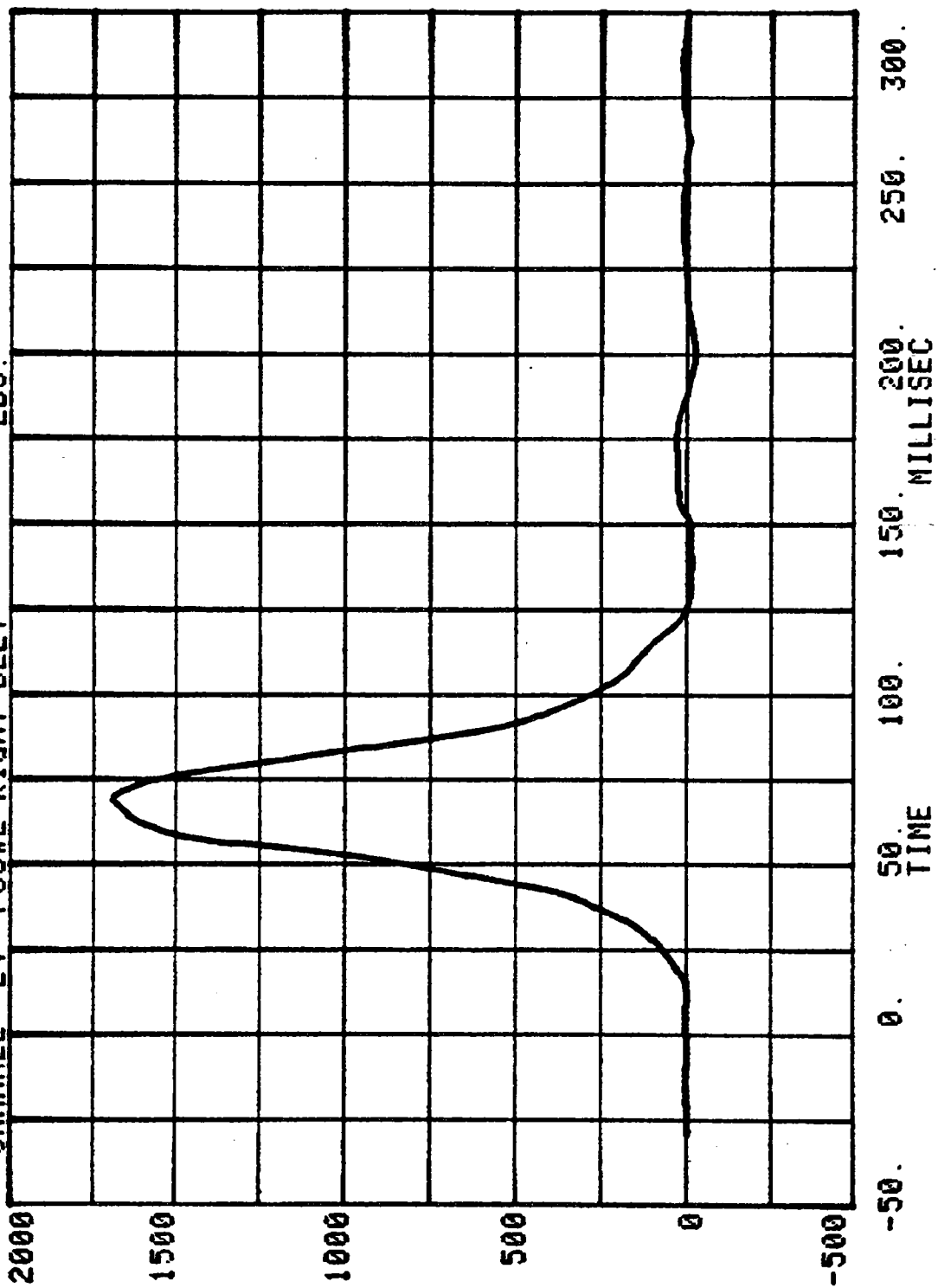




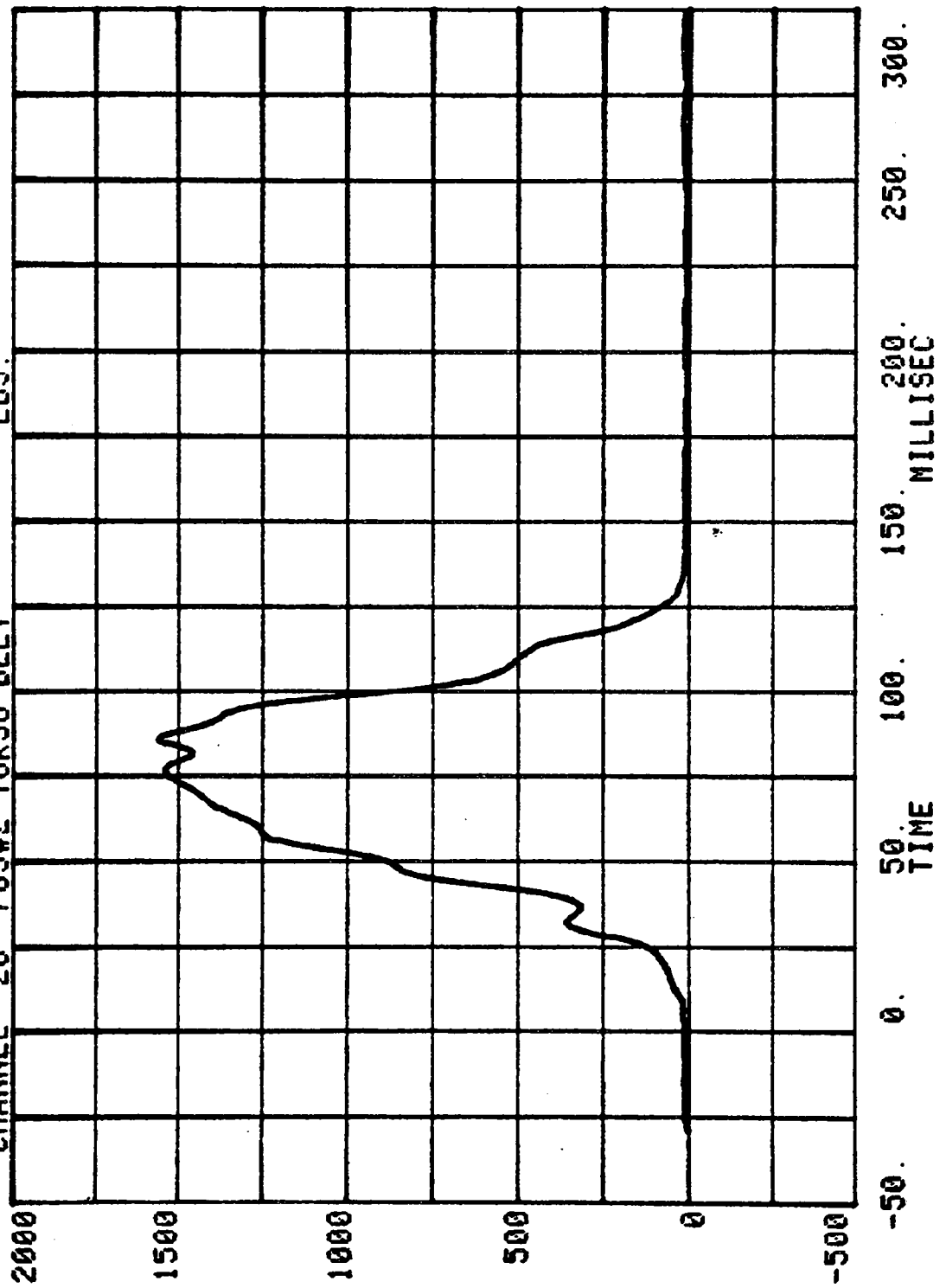
CHANNEL 20 POS#2 LEFT FEMUR RUN= 553 SERIES= 1 LBS.



CHANNEL 24 POS#2 RIGHT BELT
RUN= 553 SERIES= 1 LBS.

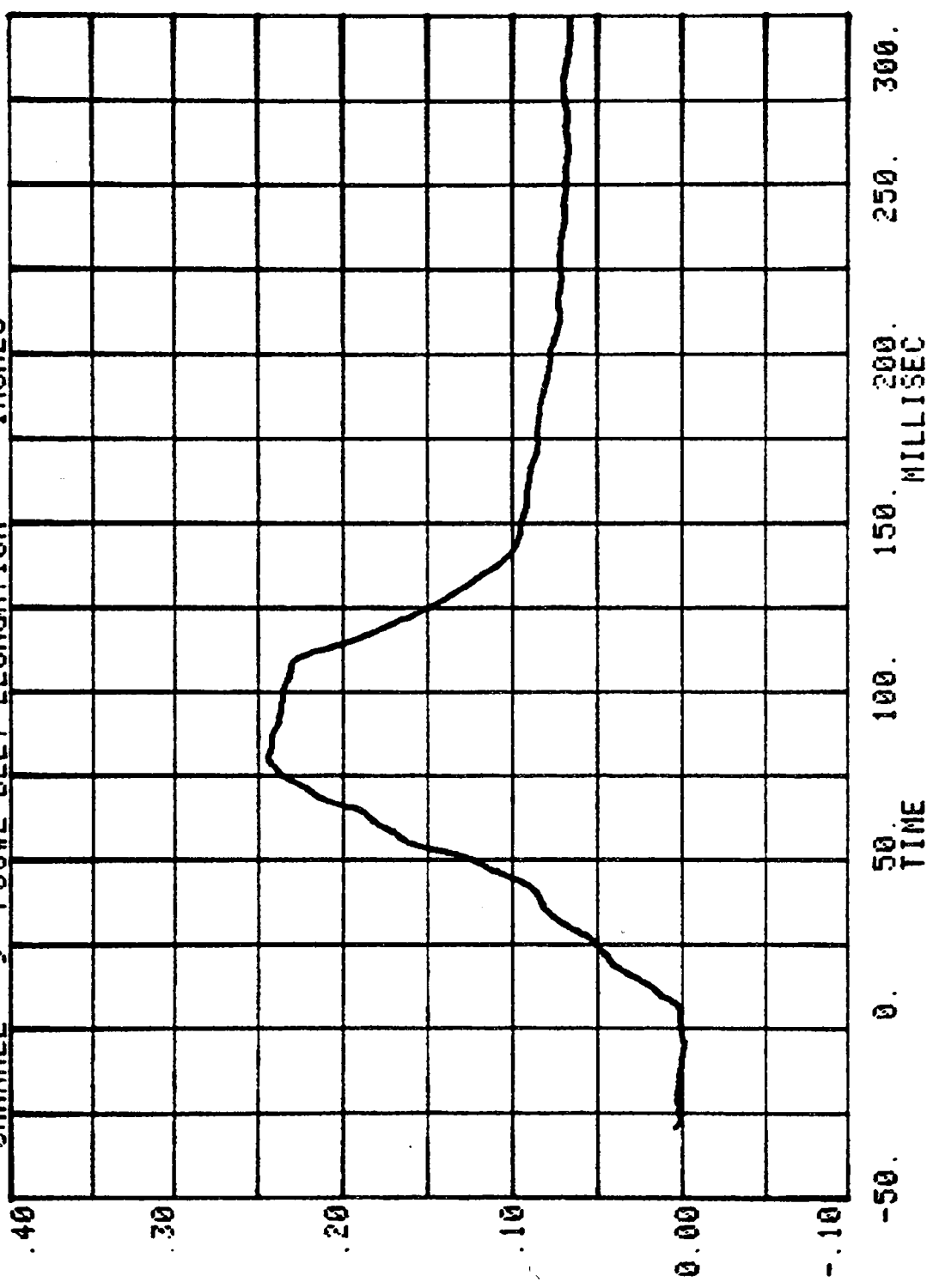


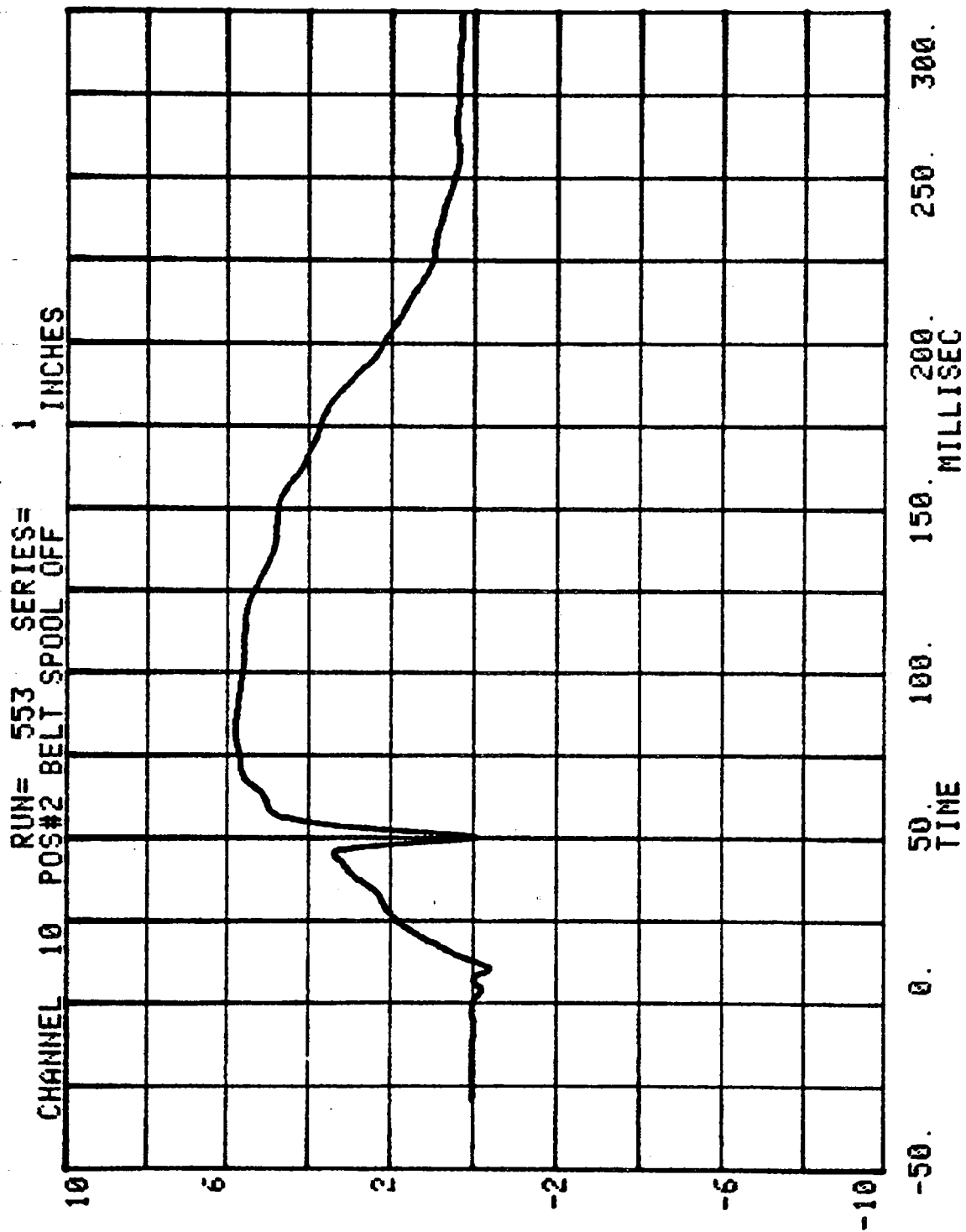
CHANNEL 26 POS#2 TORSO BELT 1 LBS. RUN= 553 SERIES=



CHANNEL 9 POS#2 BELT ELONGATION 1 INCHES

RUN= 553 SERIES=





Test No. 447-3-553

1982 MAZDA-626

DUMMY DATA

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

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 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, Vol. 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>
109	8/11/82
153	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 Number 6525-V-1.

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 109

LABORATORY TECHNICIAN: E. Cluckey

APPROVED BY: D. Cianoello

	Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -	8/11/82	
Calibration Sequential Number for Dummy - - - -	15	
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. <u>HEAD DROP TEST:</u>			
a. Peak Resultant Accel. -	210 to 260G	245 g	
b. Peak Lateral Accel. - -	≤10G	10 g	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.07 ms	
2. <u>NECK BENDING TEST:</u>			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	22.8 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -	20 to 24G	22.5 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	24.3 g	
d. Pendulum Decel. ($t_2 - t_1$)	≤3 ms	1.56 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 ms	
g. Pendulum Direction Reversal Time - - - -	≥123 ms	105.4 ms	
h. Max. Head Rotation - -	63 to 73°	65°	
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	30 ms
	Displ.	2.1 to 3.1 in.	2.7 in.
60°	Time	40.3 to 51.7 ms	45.6 ms
	Displ.	4.3 to 5.3 in.	5 in.
Maximum (°)	Time	53.2 to 66.8 ms	56.25 ms
	Displ.	5.0 to 6.0 in.	5.4 in.

Continued

TEST PARAMETER		SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. <u>NECK BENDING TEST</u> <u>Continued</u>				
i. Chordal Displacement: Head Rotation Angle --				
60°	Time	67.0 to 83.0 ms	67.18 ms	
	Displ.	4.3 to 5.3 in.	5 in.	
30°	Time	85.4 to 104.6 ms	87.5 ms	
	Displ.	2.1 to 3.1 in.	2.4 in.	
0°	Time	101.0 to 123.0 ms	102 ms	
	Displ.	-.5 to 0.5 in.	0 in.	
3. <u>ABDOMINAL COMPRESSION TEST:</u> (Preload = 10 pounds)				
a. Force @ 1" - - - - -		50 to 63 lbs.	55.0 lbs.	
b. Force @ 1.3" - - - - -		73 to 88 lbs.	87.0 lbs.	
4. <u>LUMBAR FLEXION TEST:</u>				
a. Force @ 20° - - - - -		22 to 34 lbs.	30.5 lbs.	
b. Force @ 30° - - - - -		34 to 46 lbs.	40.0 lbs.	
c. Force @ 40° - - - - -		46 to 58 lbs.	54.5 lbs.	
d. Return Angle - - - - -		12° maximum	6°	
5. <u>CHEST IMPACT TESTS:</u>				
a. High Speed				
(1) Probe Speed - - - - -		21.78-22.22 fps	22.12 fps	
(2) Peak Deflection - - - - -		1.7" maximum	1.6 in.	
(3) Peak Resistive Force - - - - -		2250 lbs. maximum	2100 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	56.8%	
b. Low Speed				
(1) Probe Speed - - - - -		13.86-14.14 fps	14.10 fps	
(2) Peak Deflection - - - - -		1.1" maximum	.98 in.	
(3) Peak Resistive Force - - - - -		1450 lbs. maximum	1220 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	55.6%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. 109

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	6.98 fps	
(2) Maximum Force - -	1850 to 2500 lbs	2250 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.1 ms	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.89 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2400 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.9 ms	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 109

CALIB. SEQ. NOS. FOR DUMMY: 15 &

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 CALIBRA
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. 153

LABORATORY TECHNICIAN: E. Cluckey

APPROVED BY: D. Bianello

		Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -		8/11/82	
Calibration Sequential Number for Dummy - - - -		5	
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. <u>HEAD DROP TEST:</u>			
a. Peak Resultant Accel. -	210 to 260G	210	
b. Peak Lateral Accel. - -	≤10G	7 g	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.23 ms	
2. <u>NECK BENDING TEST:</u>			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	23.5 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -	20 to 24G	22 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	23 g	
d. Pendulum Decel. ($t_2 - t_1$)	≤3 ms	2.5 ms	
e. Pendulum Decel. ($t_3 - t_2$)	25 to 30 ms	25.6 ms	
f. Pendulum Decel. ($t_4 - t_3$)	≤10 ms	7.5 ms	
g. Pendulum Direction Reversal Time - - - -	≥123 ms	103.1 ms	
h. Max. Head Rotation - -	63 to 73°	64°	
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.	2.5 in.
60°	Time	40.3 to 51.7 ms	44.7 ms
	Displ.	4.3 to 5.3 in.	4.6 in.
Maximum (°)	Time	53.2 to 66.8 ms	57.5 ms
	Displ.	5.0 to 6.0 in.	5.1 in.

Continued

TEST PARAMETER		SPECIFICATION	Pre-Test Calibration	Post Calib
2. <u>NECK BENDING TEST</u> <u>Continued</u>				
i. Chordal Displacement:				
Head Rotation Angle --				
60°	Time	67.0 to 83.0 ms	67.5 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.	2.3 in.	
0°	Time	101.0 to 123.0 ms	101.25 ms	
	Displ.	-.5 to 0.5 in.	0 in.	
3. <u>ABDOMINAL COMPRESSION TEST:</u>				
(Preload = 10 pounds)				
a. Force @ 1" - - - - -		50 to 63 lbs.	54.0 lbs.	
b. Force @ 1.3" - - - - -		73 to 88 lbs.	78.0 lbs.	
4. <u>LUMBAR FLEXION TEST:</u>				
a. Force @ 20° - - - - -		22 to 34 lbs.	30.0 lbs.	
b. Force @ 30° - - - - -		34 to 46 lbs.	37.0 lbs.	
c. Force @ 40° - - - - -		46 to 58 lbs.	50.0 lbs.	
d. Return Angle - - - - -		12° maximum	8°	
5. <u>CHEST IMPACT TESTS:</u>				
a. High Speed				
(1) Probe Speed - - - - -		21.78-22.22 fps	21.90 fps	
(2) Peak Deflection - - - - -		1.7" maximum	1.56 in.	
(3) Peak Resistive Force - - - - -		2250 lbs. maximum	1890 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	63.5%	
b. Low Speed				
(1) Probe Speed - - - - -		13.86-14.14 fps	14.01 fps	
(2) Peak Deflection - - - - -		1.1" maximum	1.07 in.	
(3) Peak Resistive Force - - - - -		1450 lbs. maximum	1190 lbs.	
(4) Internal Hysteresis- - - - -		50 to 70%	53.2%	

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TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post- Calibration
<u>6. KNEE IMPACT TESTS:</u>			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.10 fps	
(2) Maximum Force - -	1850 to 2500 lbs	1950 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.0 ms	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.07 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2250 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.9 ms	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 153 CALIB. SEQ. NOS. FOR DUMMY: 5 &

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 CALIBRA
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