

14-17-1401-320

REPORT NOS. 212-CAL-84-024

301-CAL-84-024

DOT 739

NHTSA NEW VEHICLE ASSESSMENT AND
STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS 212 AND 301-75

FORD MOTOR COMPANY
1984 FORD MUSTANG
2-DOOR CONVERTIBLE

NHTSA NO. ME0201
CALSPAN TEST NO. 7103-V-25

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JULY 1984



FINAL REPORT

Prepared for:

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ENFORCEMENT
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This Final Test Report was prepared for the U. S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-82-C-01140. This document is disseminated under the sponsorship of the U. S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 212-CAL-84-024 301-CAL-84-024		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NHTSA New Vehicle Assessment and Standards Enforcement Indicant Testing				5. Report Date July 1984	
				6. Performing Organization Code	
7. Author(s)				8. Performing Organization Report No.	
9. Performing Organization Name and Address Calspan Advanced Technology Center P.O. Box 400 Buffalo, NY 14225				10. Work Unit No. 454 Series	
				11. Contract or Grant No. DTNH22-82-C-01140	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 400 Seventh Street, S.W., Washington, DC 20590				13. Type of Report and Period Covered Final Report June-July 1984	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract A frontal load cell barrier test of a 1984 Ford Mustang 2-door convertible was performed at Calspan Corporation, Advanced Technology Center, Transportation Research/Physical Sciences Department facility, for the New Car Assessment and Standards Enforcement Testing of FMVSS 212, "Windshield Mounting" and FMVSS 301-75, "Fuel System Integrity" for the Office of Vehicle Safety Compliance, the Office of Market Incentives (OMI) and for Research and Development. Impact speed was 34.8 mph. Ambient temperature on the test date was 70°F. The post-test vehicle crush was 28.6 inches and intrusion of the firewall into compartment was 4.6 inches. The test vehicle appeared to comply with FMVSS 301-75, "Fuel System Integrity" but did not satisfy FMVSS 212, "Windshield Retention" with 83.3 percent windshield retention loss.					
17. Key Words Load Cell Barrier Frontal Impact FMVSS Compliance Testing FMVSS 212 FMVSS 301-75			18. Distribution Statement <u>Copies of this report are available from:</u> Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 400 Seventh St., S.W., Washington, DC 20590		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages	
				22. Price	

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SECTION 1
PURPOSE AND TEST PROCEDURE

This frontal barrier test is part of the Composite FY 84 Vehicle Barrier Impact Testing, sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract DTNH22-82-C-01140. The purpose of this test was to obtain crashworthiness and occupant restraint performance data for impact speeds in excess of the current FMVSS requirements.

The test was performed in accordance with the Office of Automotive Ratings Laboratory Procedure No. IP-212-02 dated April 4, 1980. Indicant test data for FMVSS 212, "Windshield Mounting," and FMVSS 301-75, "Fuel System Integrity," as well as occupant performance data for a nominally 35 mph impact are provided herein.

SECTION 2
SUMMARY OF TEST NUMBER ME0201

A load cell barrier consisting of 36 load cells (Figure 4) was impacted by a 1984 Ford Mustang 2-door convertible at a velocity of 34.8 mph. The test was performed at the Calspan Corporation Advanced Technology Center on June 14, 1984. 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 driver and right-front passenger seating positions, according to dummy placement procedures specified in Laboratory Procedure for Vehicle Assessment IP-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, and certification details, along with instrumentation calibration data, are found in Appendix C.

The crash event was recorded by one real-time camera and 15 high-speed cameras. Camera locations and other pertinent camera information are found in Section 4 of this report.

The 65 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces. The Injury Criteria Values are presented in Table 10.

Table 1

CRASH TEST SUMMARY

TEST NO. ME0201

PROJECT: FY84 New Car Assessment Program
FMVSS Nos. 212/301-75

DATE: 6/14/84

TIME: 1235 hrs. TEMP: 70°F.

VEHICLE	<u>1984 Ford Mustang 2-door convertible</u>
TEST WEIGHT (lbs)	<u>3560</u>
IMPACT ANGLE (deg)*	<u>0</u>
IMPACT VELOCITY (mph)**	<u>34.8</u>
MAX. CRUSH (in) static	<u>28.6</u>
MAX. INTRUSION (in)	<u>4.6</u>

DUMMIES

TYPE	<u>Hybrid II Part 572</u>	<u>Hybrid II Part 572</u>
LOCATION	<u>LF (1) Serial 1021</u>	<u>RF (2) Serial 1022</u>
RESTRAINT	<u>Production 3-point belt system</u>	<u>Production 3-point belt system</u>
NUMBER OF DATA CHANNELS	<u>65</u>	
NUMBER OF HIGH SPEED CAMERAS	<u>15 + 1 real time</u>	

*With respect to tow track Centerline

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

GENERAL COMMENTS

The 1984 Ford Mustang 2-door convertible was equipped with a 232.0 cubic inch, 6 cylinder engine, three speed automatic transmission, power brakes, power steering and air conditioner. The total test weight with two 50th percentile male dummies and instrumentation was 3560 pounds.

The 1984 Ford Mustang 2-door convertible which was involved in a frontal load cell barrier crash at a velocity of 34.8 mph did not satisfy FMVSS Nos. 212, "Windshield Mounting" with 83.3 percent windshield retention loss (Figure 1). The vehicle did comply with FMVSS 301-75, "Fuel System Integrity." There was no fuel leakage after impact or any phase of the roll-over test.

The vehicle sustained 28.6 inches of static crush and approximately 34.0 inches of dynamic crush. Maximum post-test firewall intrusion into the occupant compartment was 4.6 inches. The maximum load cell barrier force measured by the 36 load cells was 100,100 pounds at 53.7 milliseconds.

The driver's head and chest struck the steering wheel rim and the femurs contacted the underside of the dash panel. The driver's HIC was 894.0, maximum chest deceleration over 3 milliseconds was 54.6 g's and femur loads were 1180 and 830 pounds.

The right-front passenger head struck the upper edge of the dash panel. Passenger HIC was 1111.8, maximum chest deceleration over 3 milliseconds was 37.5 g's and femur loads were 1400 and 960 pounds.

Belt-related data for each occupant are presented in Table 11 of this report.

GENERAL TEST AND VEHICLE PARAMETER DATA

Make/Model Ford Mustang Body Style Convertible
Model Year 1984 NHTSA No. ME0201 Color Light Blue
Engine Data: 6 cylinders, 232 cubic inches
Transmission Data: 3 speed, () manual (X) automatic
Date Rec'd 5/17/84 Air Cond. yes Pw. Str. yes Pw. Brks. yes
Dealer's Name & Address Muck Motors - Getzville, NY 14068
Odometer Reading 053

Vehicle Manufactured by: Ford Motor Company
Date of Manufacture 4/84 VIN 1FABP2736EF184855
GVWR 4058 lbs., GAWR: front 2081 lbs., rear 1997 lbs.

Vehicle Load (up to capacity): front 35 psi
rear 35 psi

Recommended Tire Size P185/75R14 Load Range X B C D Std X

Recommended Cold Tire Pressure: front 35 psi, rear 35 psi

Tires on Vehicle P185/75R14

Is Spare Tire a "Space Saver?" X yes no

Is Spare Tire Standard Equipment? X yes no

Vehicle Capacity: Types of Seats: bench, X bucket, split bench

Number of Occupants (Designated Seating Capacity): 2 front
2 rear
4 TOTAL

RCLW Cargo Load: 100 lbs.

VCW TOTAL = 700 lbs.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 920 lbs. Right Rear = 680 lbs.
 Left Front = 900 lbs. Left Rear = 660 lbs.
 TOTAL FRONT WEIGHT = 1820 lbs. (57.6 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1340 lbs. (42.4 % of Total Vehicle Weight)
 TOTAL DELIVERY WEIGHT = 3160 lbs.

CALCULATION FOR TARGET TEST WEIGHT

RCLW = Rated Cargo and Luggage Weight
 UDW = Unloaded Delivered Weight (3160 lbs.)
 VCW = Vehicle Capacity Weight (700 lbs.)
 DSC = Designated Seating Capacity (4)
 RCLW = VCW - 150 (DSC) = 100 lbs.
 Target Test Weight = UDW + RCLW + (2 dummies X 164 lbs./dummy)
 Target Test Weight = 3588 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 72 POUNDS CARGO

Right Front = 960 lbs. Right Rear = 840 lbs.
 Left Front = 940 lbs. Left Rear = 820 lbs.
 TOTAL FRONT WEIGHT = 1900 lbs. (53.4 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1660 lbs. (46.6 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 3560 lbs.
 Weight of ballast secured in vehicle trunk area = 0 lbs.

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitude: RF 27.7 LF 28.5 RR 27.5 LR 27.7
 Test Attitude: RF 27.4 LF 27.8 RR 25.5 LR 26.0
 Remarks: Wheel Base = 100.7
CG = 46.9 inches rearward of front wheel C/L

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)POST-IMPACT DATA

Type of Test Frontal Barrier Impact Angle 0 °
 Date of Test 6/14/84 Time of Test 1235 hrs.
 Ambient Temperature 70 °F at impact area
 Temperature in Occupant Compartment 70 °F
 Windshield Molding Temperature 67 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 34.8 mph, secondary 34.78 mph

VEHICLE REBOUND AND CRUSH (inches)

Vehicle Length: Pre-test = R 176.0 C 179.4 L 176.0
 Post-test = R 150.8 C 150.8 L 151.4
 Crush = R 25.2 C 28.6 L 24.6
 Distance from front of test vehicle to point of impact:
 R 7.8 C/L 7.5 L 8.0

VISIBLE DUMMY CONTACT POINTS

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Steering wheel rim</u>	<u>Sun visor and dash</u>
Chest	<u>Steering wheel</u>	<u>None</u>
Abdomen	<u>None</u>	<u>None</u>
Left Knee	<u>Dash panel</u>	<u>Glove compartment door</u>
Right Knee	<u>Dash panel</u>	<u>Glove compartment door</u>

	<u>Front</u>
	<u>Left</u> <u>Right</u>
Door Opening	<u>Operable</u> <u>Operable</u>

Table 2 (cont'd)

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	<u>Front</u>	
<u>Seat Movement</u>	<u>Left</u>	<u>Right</u>
Seat Back Failure	<u>None</u>	<u>None</u>
Seat Shift (in.)	<u>.5 forward</u>	<u>.7 forward</u>

Glazing Damage

Backlight/Windshield	<u>Windshield did not comply with FMVSS No. 212, "Windshield Mounting"</u>
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SECTION 3

SUMMARY OF RESULTS OF FMVSS NOS. 212 AND 301-75

- Summary of FMVSS 212 and 301 Data
- Post-Impact Data for FMVSS Nos. 212 and 301-75
- Windshield Retention, FMVSS No. 212 Data
- Fuel System Integrity, FMVSS No. 301-75 Data

Table 3
SUMMARY OF FMVSS 212 AND 301 DATA

PRE-IMPACT DATA

Make/Model: Ford Mustang
Body Style: Convertible Model Year: 1984
NHTSA No.: ME0201 Color: Blue

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Ford Motor Company
Date of Manufacture: 4/84 VIN: 1FABP2736EF184855
GVWR: 4058 lbs., GAWR: Front 2081 lbs., Rear 1997 lbs.

POST-IMPACT DATA

Type of Test: Frontal load cell barrier impact
Date of Test: 6/14/84 Time: 1235 hrs. Temp.: 70 °F
Required Impact Velocity Range: 34.5 to 35.5 mph
Impact Velocity: Primary = 34.8 mph, Secondary = 34.78 mph
Test Weight 3560 lbs., Static Crush Max. 28.6 in., Rebound 8.0 in.

FUEL SYSTEM DATA

Test Fluid Type: Red Stoddard Solvent #2, Spec. Grav.: 0.764
Kinematic Viscosity 0.96 Centistokes
EPA Capacity* 15.4 gal.
Test Volume 14.3 gal. (93% of EPA Capacity)
Fuel System Capacity (data from Owner's Manual) 15.4 gal.
Electric Fuel Pump? yes ☒ no, Fuel Injection? yes ☒ no
Does electric fuel pump operate with ignition switch "on" and the engine
not operating? -- yes -- no

Test vehicle fuel tank filled to 93% of "usable" capacity with
Stoddard Solvent and with electric fuel pump operating (if it will
operate without engine operation) until start of static roll.

*with entire fuel system filled from fuel tank through carburetor bowl

Table 3

SUMMARY OF FMVSS 212 AND 301 DATA (cont'd)

Details of fuel system: The fuel tank is located aft of rear wheels and
secured in place by two tank straps. The fuel filler tube is located on the
right side of the vehicle and is sealed with a screw type cap which is
concealed by a hinged door.

Table 4

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

TYPE OF TEST X Frontal (0°) Impact
 Oblique (°) Impact on Left (Driver's) Side
 Right Side
 Lateral or Side Impact on Left (Driver's) Side
 Right Side
 Rear Impact

DATE OF TEST 6/14/84 TIME 1235 hrs. TEMP 70 °F

VEHICLE NHTSA NO. ME0201 VIN 1FABP2736EF184855

REQUIRED VEHICLE VELOCITY RANGE 34.5 to 35.5 mph

IMPACT VELOCITY (traps within 5 feet of impact event)

Trap No. 1 = 34.8 mph Trap No. 2 = 34.78 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 = 24.6 in Passenger's Side = 25.2 in

C/L = 28.6 in. Average = 26.2 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 = 8.0 in Passenger's Side = 7.8 in

C/L = 7.5 in. Average = 7.8 in.

REMARKS

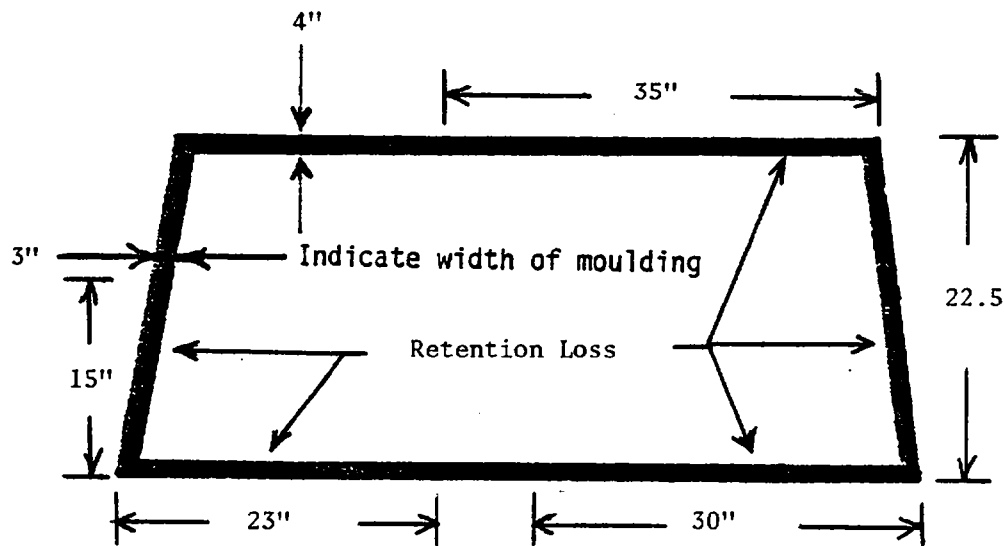
Details of windshield mounting (method of retention, type of trim, etc.):

Windshield is bonded in place and has a plastic molding along the top and sides.

	Windshield Periphery		
	Pre-Test	Post-Test	Retention %
Right Side	76.25	0	0
Left Side	76.25	25.5	33.4
TOTAL	152.5	25.5	16.7

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 1 WINDSHIELD RETENTION, FMVSS NO. 212 DATA

Table 5

"FUEL SYSTEM INTEGRITY" POST-IMPACT TEST DATA

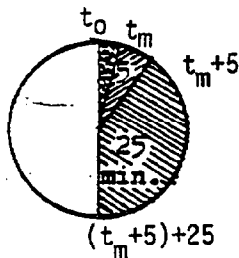
FMVSS No. 301-75

TEST VEHICLE NHTSA NO. ME0201Test Date 6/14/84Vehicle Manufacture/Make/Model 1984 Ford Mustang 2-door convertible

Test vehicle fuel tank filled to 92-94% 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)

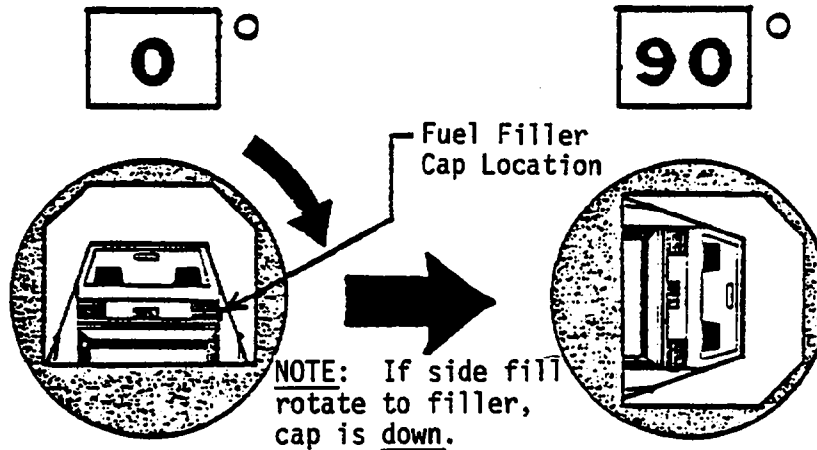
FUEL SPILLAGE MEASUREMENT

	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

SOLVENT SPILLAGE DETAILS

None

Table 6
FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASEDETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 49 seconds
 (Spec. Range = 1 to 3 min.)

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

TOTAL = 7 minutes 49 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.
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Maximum Allowable Solvent Spillage

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

0	0	0	0
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NOTE: Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

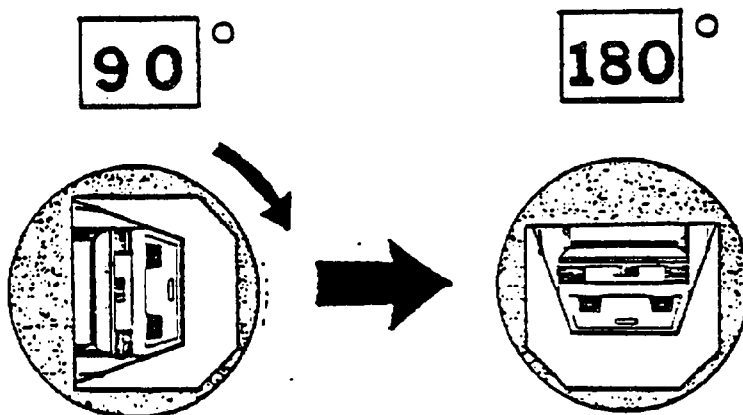
None

VEHICLE NHTSA ID NO. ME0201

Table 6 (cont'd)

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 47 seconds
(Spec. Range = 1 to 3 min.)
FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
TOTAL = 7 minutes 47 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.
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Maximum Allowable Solvent Spillage

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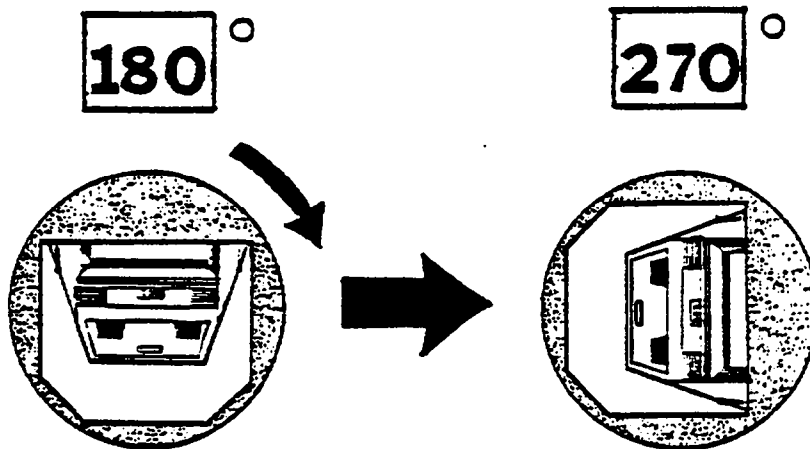
ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0
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NOTE: Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

None

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEETTEST PHASEDETERMINATION 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	0	0	0
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NOTE: Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

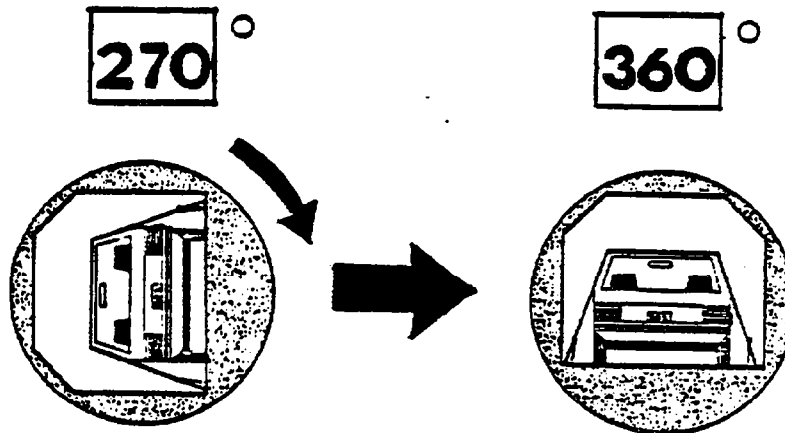
None

VEHICLE NHTSA ID NO. ME0201

Table 6 (cont'd)

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 (OMI AND AID DATA)

- Vehicle Measurements
- Vehicle Accelerometer Locations
- Load Cell Barrier-Load Cells Locations
- AID Data Summary
- Camera Positions and Locations
- Owner's Manual Seat Belt Instructions
- Dummy In-Vehicle Positioning
- Dummy Injury Criteria Values
- Belt Related Data

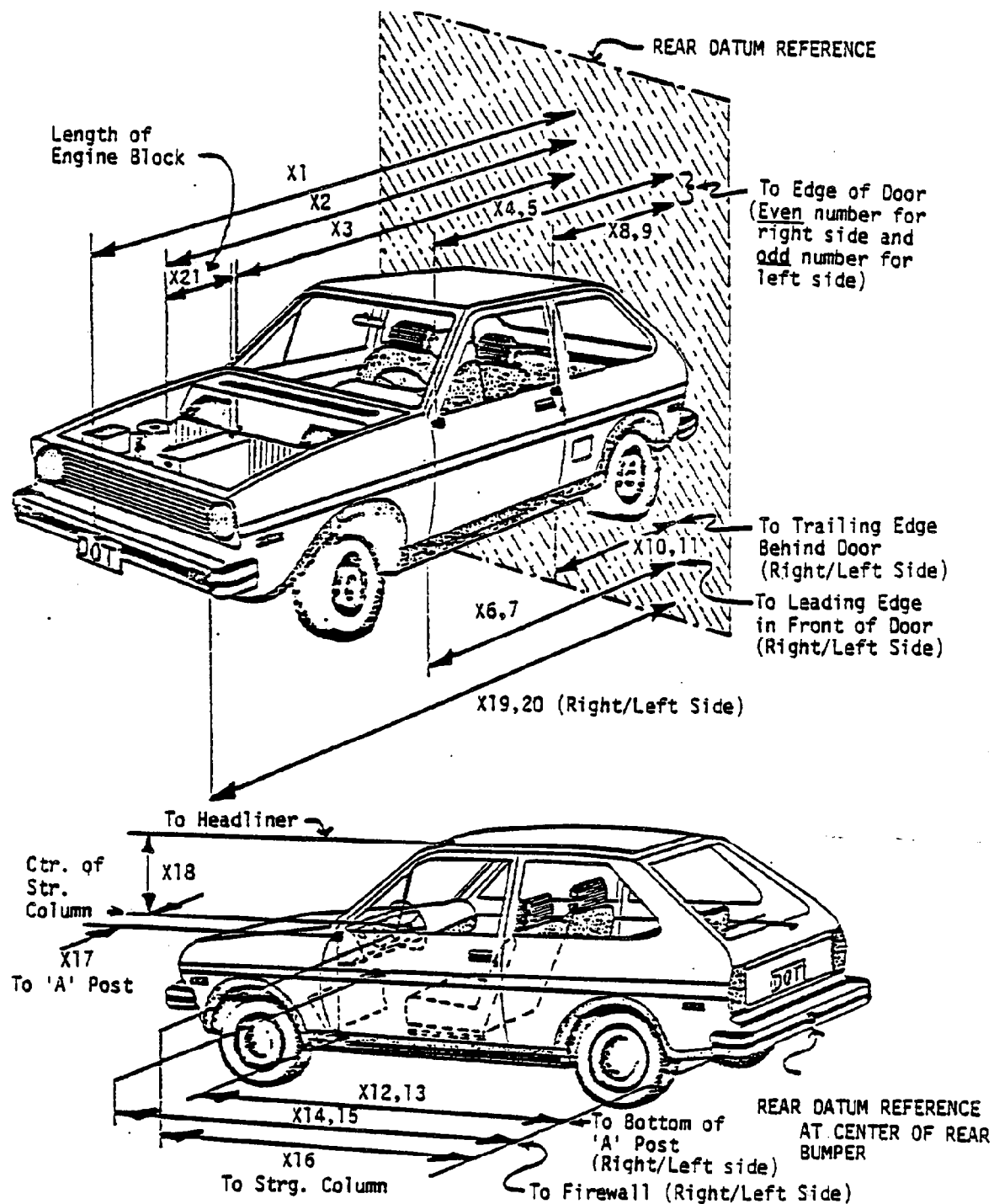
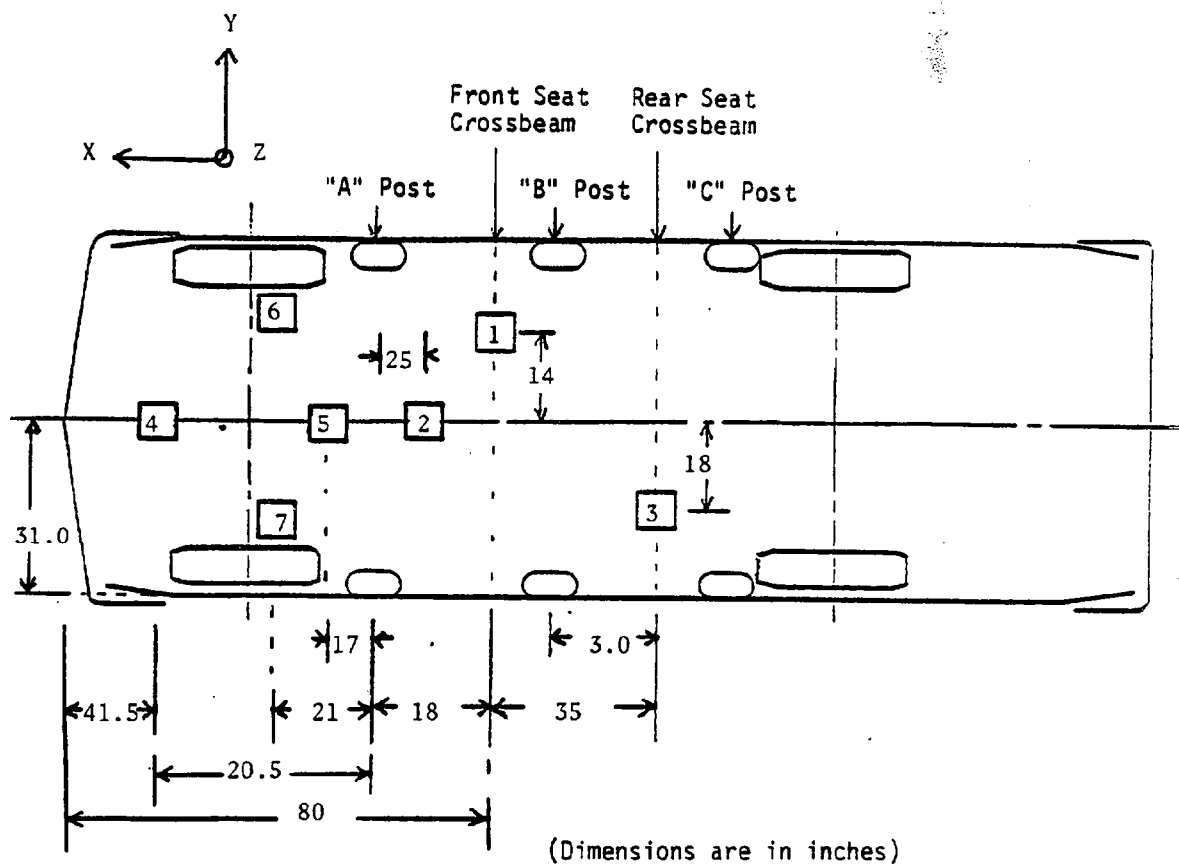


Figure 2 PRE- AND POST-TEST MEASUREMENT POINTS

Table 7

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	179.4	150.8	28.6
X2	Rear Surface of Vehicle to Front of Engine	151.8	145.4	6.4
X3	Rear Surface of Vehicle to Firewall	127.8	123.2	4.6
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	112.0	112.0	0
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	112.1	112.3	-.2
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	115.2	114.9	.3
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	115.3	114.9	.4
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	64.9	64.6	.3
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	65.0	64.9	.1
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	64.6	64.6	0
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	64.7	64.1	.6
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	114.6	114.6	0
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	114.7	114.6	.1
X14	Rear Surface of Vehicle to Firewall, Right Side	125.5	120.9	4.6
X15	Rear Surface of Vehicle to Firewall, Left Side	125.3	123.1	2.2
X16	Rear Surface of Vehicle to Steering Column	98.5	96.5	2.0
X17	Center of Steering Column to "A" Post	15.7	15.2	.5
X18	Center of Steering Column to Headliner	15.5	19.0	-3.5
X19	Rear Surface of Vehicle to Right Side of Front Bumper	176.0	150.8	25.2
X20	Rear Surface of Vehicle to Left Side of Front Bumper	176.0	151.4	24.6
X21	Length of Engine Block	20.1	20.1	0



ACCELEROMETER NUMBER *	ACCELEROMETER LOCATION	DIRECTION		
		X	Y	Z
1	Front Seat Crossmember	X		
2	Vehicle C.G.	X		
3	Rear Seat Crossmember	X		
4	Top of Engine	X		
5	Bottom of Engine	X		
6	Right Front Brake Caliper	X		
7	Left Front Brake Caliper	X		

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

FIGURE 3 VEHICLE ACCELEROMETER LOCATIONS

36 LOAD CELLS
4 ROWS
9 COLUMNS

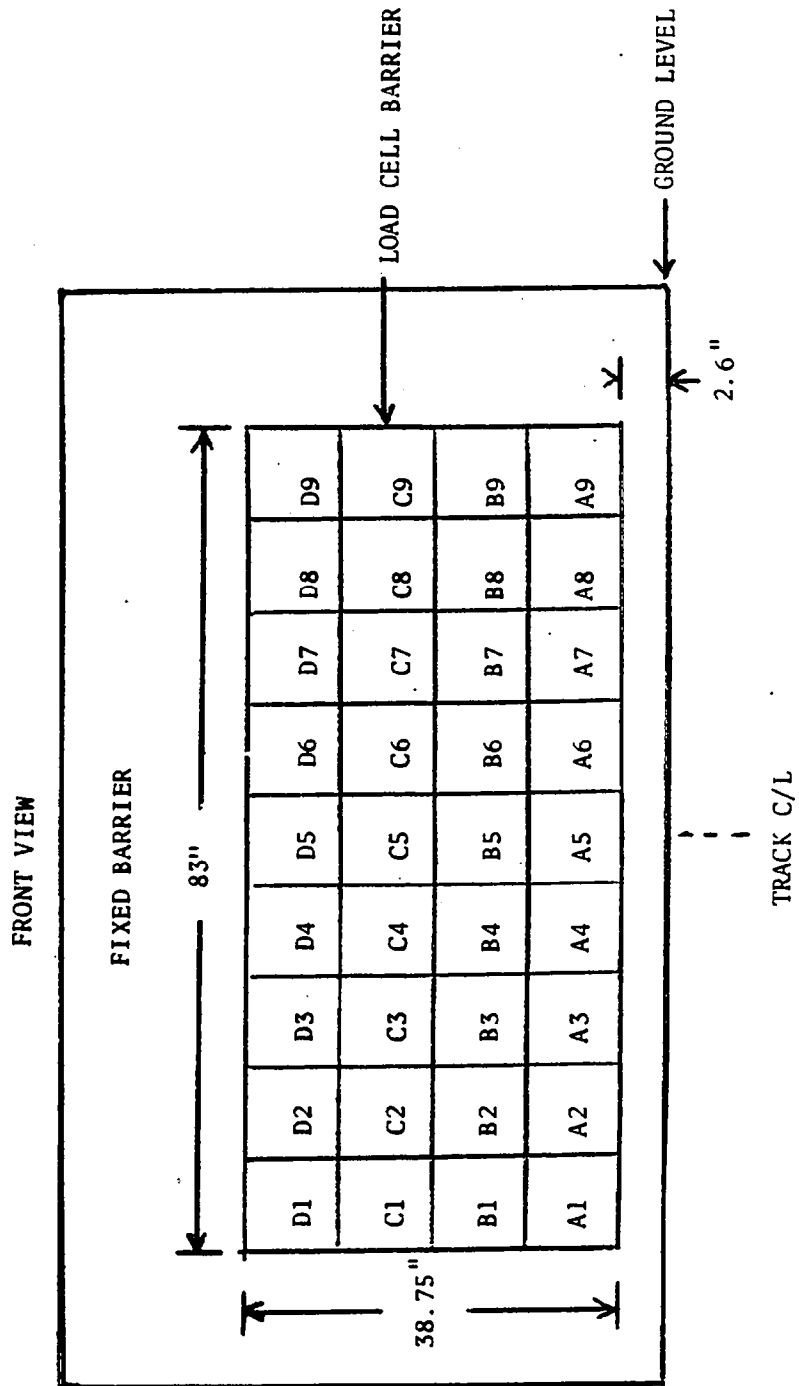


Figure 4 FIXED LOAD CELL BARRIER-LOAD CELL LOCATIONS

Table 8
ACCIDENT INVESTIGATION DIVISION
Data Summary

Test No. ME0201

Date 6/14/84

Vehicle No. 1

Impact Description	Frontal load cell barrier
Make	Ford Mustang
Model	Convertible
Year	1984
Size Category	Compact
Test Weight (lb.)	3560
Wheelbase (in.)	100.7
Front Overhang (in.)	39.0
Overall Width (in.)	69.1
Accelerometer Location	46.9" rearward of front wheel C/L
Calibration Procedure	Shaker table/least squares
Accelerometer Linearity	$\pm 0.75\%$
Integration Algorithm	Hybrid Simpson-Newton 3/8
Impact Speed (mph)	34.8
Time of Separation (msec)	255.15
Velocity Change (mph)	36.28
CDC	12FDEW3
Damage Length (in.)	L: 59.0
Crush Dimensions (in.)	C1: 24.75
	C2: 28.0
	C3: 28.4
	C4: 28.4
	C5: 28.4
	C6: 25.4
Midpoint of Damage	D: 0

National Accident Sampling System — Continuous Sampling Subsystem: Vehicle Data

FIELD MEASUREMENTS

1984 FORD MUSTANG CONVERTIBLE 1FABP2736EF184855

Complete When Applicable

End Damage	Side Damage
Undeformed end width <u>59"</u> Corner shift: A1 _____ A2 _____ End shift at frame (CDC) (check one) < 4 inches _____ ≥ 4 inches _____	Bowing: B1 _____ X1 _____ B2 _____ X2 _____ Bowing constant $\frac{X1 + X2}{2} = \underline{\hspace{2cm}}$

Note: Measure C1 to C6 from Driver to Passenger side in Front or Rear impacts—
Rear to Front in Side impacts.

12FD6W3

Specific Impact Number	Plane* of C-Measurements	Direct Damage		Field L**	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	±D
		Width** (CDC)	Max*** Crush								
1	Bumper Frame	59	28.5	59	28.75	29.0	28.5	28.5	28.5	29.4	Ø
	F/Space		-.1		4.0	1.0	.1	.1	1.0	4	
1	Actual CRUSH		28.4		24.75	28.0	28.4	28.4	28.4	25.4	Ø
NOTE: C's TAKEN to BUMPER REINFORCEMENT AREA, NOT ENDURA COVER											

*Identify the plane at which the C-measurements are taken (e.g., at bumper, above bumper, at sill, above sill, at beltline, etc.) or label adjustments (e.g., free space).

Free space value is defined as the distance between the baseline and the original body contour taken at the individual C locations. This may include the following: bumper lead, bumper taper, side protrusion, side taper, etc. Record the value for each C-measurement and maximum crush.

**Measure and document on the vehicle diagram the beginning or end of the direct damage width and field L (e.g., side damage with respect to undamaged axle).

***Measure and document on the vehicle diagram the location of the maximum crush.

Note: Use as many lines/columns as necessary to describe each damage profile.



DAMAGE DESCRIPTION

Tire—Wheel Damage

- a. Rotation physically restricted b. Tire deflated

RF 1
LF 1
RR 2
LR 2

RF 2
LF 2
RR 2
LR 2

(1) Yes, (2) No, (8) NA, (9) Unk.

Vehicle No.: '84 Mustang Conv.

TYPE OF TRANSMISSION

___ Manual ☒ Automatic

Average Track: N/A

Maximum Width: N/A

curb Weight: 3560

Overall Length: 179.4

Engine Size: cyl. 6

displ. 161

WHEEL STEER ANGLES

(For locked front wheels or displaced rear axles only)

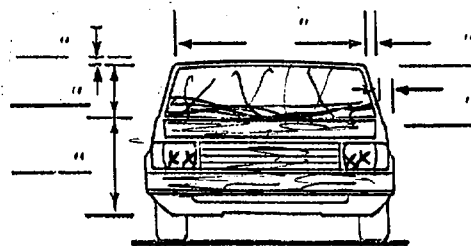
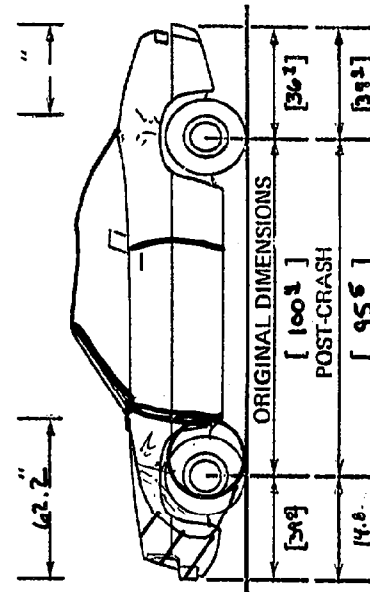
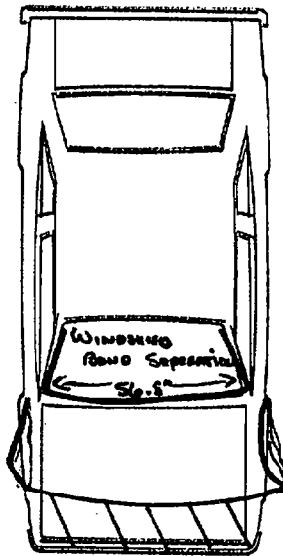
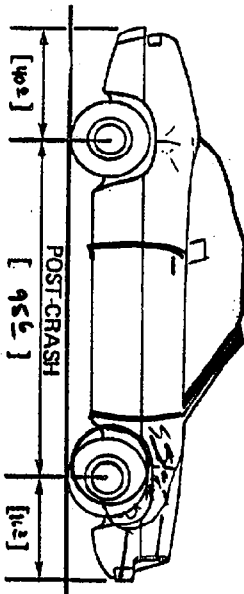
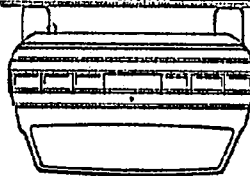
RF $\pm$ 0.0°

LF $\pm$ 0.2°

RR $\pm$ N/A°

LR $\pm$ N/A°

Within $\pm$ 5 degrees



Note: Sketch new perimeter and cross hatch direct damage and single hatch induced damage on all views. Annotate observations which might be useful in reconstructing the accident (e.g., grass in tire bead, direction of striations, scuff on sidewall, etc.)

If pulling trailer sketch type of trailer and damage received on reverse side.

Annotate any damage caused by extrication such as component removal by torching, prying or hydraulic shears.

NOTE: Camera Information Shown on Table 9

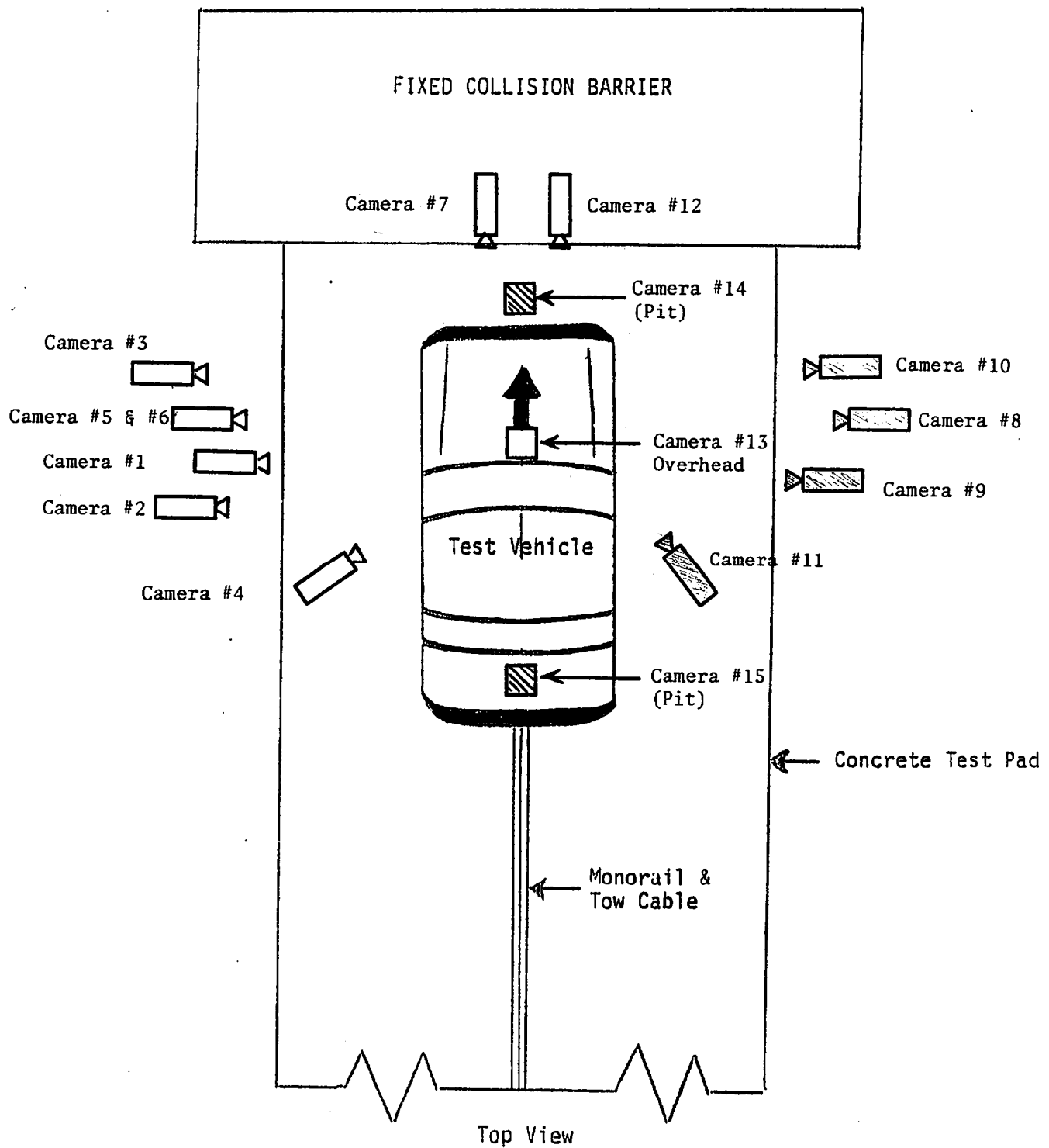


Figure 6 CAMERA POSITION FOR FRONTAL IMPACTS

Table 9

Vehicle 1984 Ford Mustang 2-door convertible

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

BEFORE DRIVING YOUR VEHICLE

OCCUPANT RESTRAINT SYSTEMS

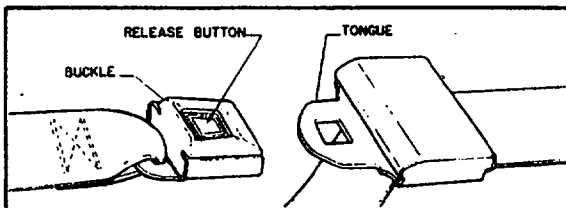
Ford Motor Company recommends that you always "buckle up". In some areas seat belt use is required by law.

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

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

After entering your vehicle, close the door and adjust the front seat to obtain the best position for your driving comfort, access to controls, and visibility. Then pull the lap-shoulder belt from the retractor so the shoulder portion of the belt crosses your shoulder and chest and insert the belt tongue into the proper buckle until you hear a snap and feel it latch.



As you drive and settle into a comfortable seating position, slight movements will cause the lap and shoulder portions of the belt to adjust automatically to a snug position. If the shoulder belt is uncomfortably tight, a tension reliever is provided in the shoulder belt retractor to reduce belt pressure against your chest. The shoulder belt is adjusted much like a window shade to maintain a small amount of slack in the belt. The adjacent door must be closed to use this comfort feature.

Adjustment Procedure

To set the tension reliever, the shoulder belt initially should be positioned against the chest. If the belt is not snug, the tension reliever may be engaged. Disengagement should be accomplished by the following procedure:

Figure A — Pull the shoulder belt outward 4 or 5 inches (10 to 13 cm), then release it and allow belt to fully retract. Repeat procedure if belt is not snug to the chest.

Figure B — Now the belt tension may be adjusted by pulling down slightly on the shoulder belt and releasing. The least amount of slack needed to relieve tension, but not more than 1½ inches (3.8 cm), should be chosen when using the tension reliever system.

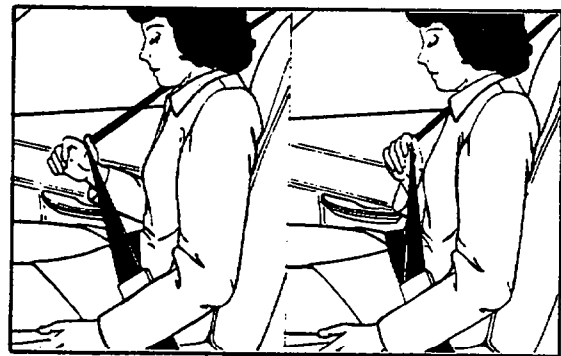


FIGURE A

FIGURE B

- If the desired setting is not achieved or excess slack develops as you change seat position, repeat the above procedure.
- When the door is opened, the tension reliever will automatically release, permitting the lap-shoulder belt to retract. After unbuckling the belt it is recommended that you guide the tongue during retraction to prevent it from striking you or the vehicle.

WARNING — Never allow more than 1½ inches (3.8 cm) of slack to be introduced into your seat belt system. 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 lap portion of the belt is fitted snugly around the hips, not on the waist. Use shoulder belt on outside shoulder only. Failure to follow these precautions could increase the chance and/or severity of injury in an accident.

Figure 8
PART 572 DUMMY IN-VEHICLE POSITION

Test No. ME0201

Vehicle 1984 Ford Mustang Convertible

SEAT TYPE:

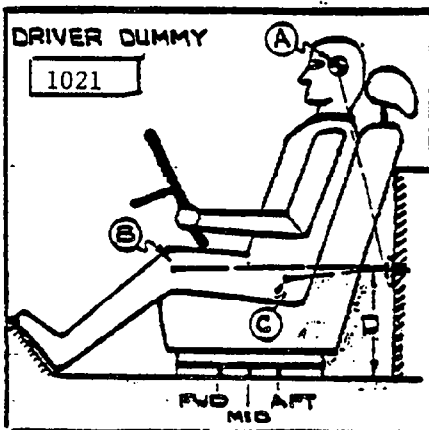
 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

 X Manual
 Power

BUCKET SEAT BACK TYPE:

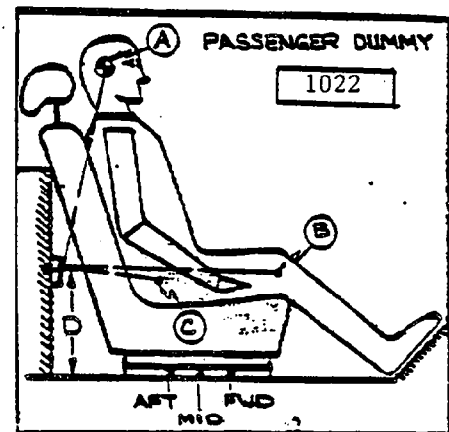
 Fixed
 X Adjustable Reclining



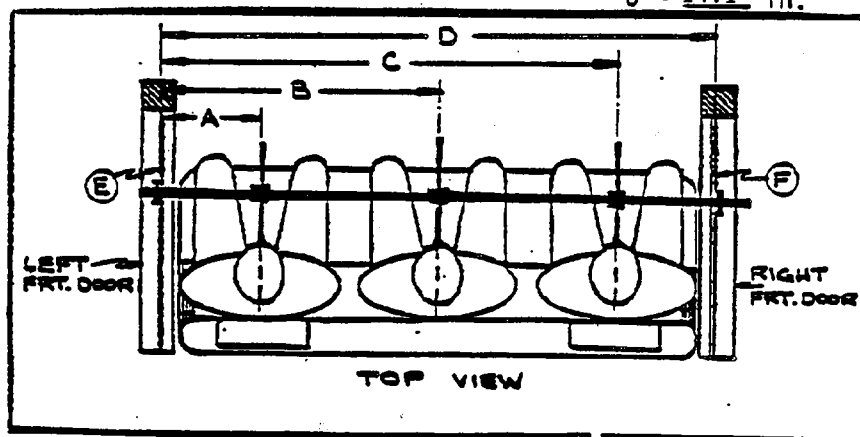
A = 24.2 in. 32 Degrees
B = 36 in. 95 Degrees
C = 20.5 in. 109 Degrees
D = 14.3 in.

MEASUREMENT
LOCATION

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



A = 23.6 in. 30 Degrees
B = 36 in. 94 Degrees
C = 20.2 in. 108 Degrees
D = 14.1 in.



DUMMY ID

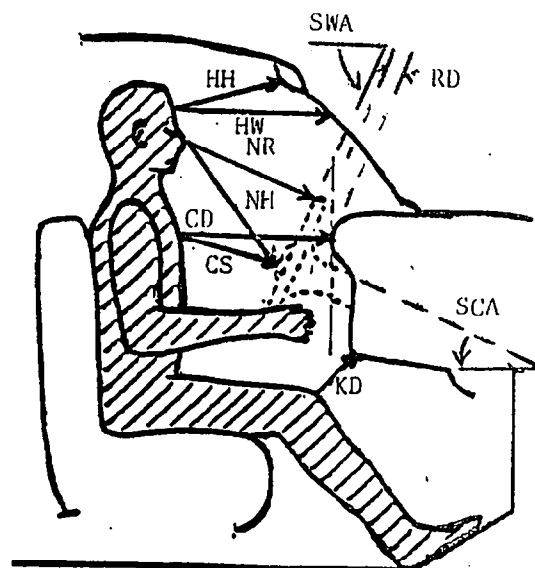
1021

1022

A	=	Left Door to Driver Centerline	<u>11.5</u> in.
B	=	Left Door to Center Passenger Centerline	<u>--</u> in.
C	=	Left Door to Right Passenger Centerline	<u>41.0</u> in.
D	=	Left Door to Right Door	<u>52.5</u> in.
E, F	=	Window Glass Height (Right and Left Must be Equal)	<u>11</u> in.

Driver		
NR	17.5	
NH	18.0	
SCA	23.0°	
SWA	65.0°	
RD	4.0	Passenger
HH	11.7	11.5
HW	18.3	18.2
CD	21.5	22.5
CS	14.5	--
KDL	5.2	7.0
KDR	6.2	7.0
SA	3rd Notch	3rd Notch
TA	25°	25°

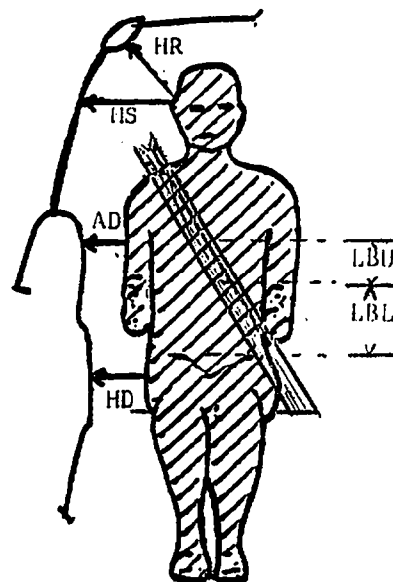
NR = Nose to Rim
 NH = Nose to Hub
 SCA = Steering Column Angle
 SWA = Steering Wheel Rim Angle
 RD = Rim to Dash



HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD = Knee to Dash
 SA = Seat Back Angle (3 notches counting the forward most notch)
 TA = Torso Angle

HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door

	Driver	Passenger
LBU	14.6	14.5
LBL	11.3	11.2
LBT	--	--
SBT	--	--
HR	4.3	4.4
HS	8.0	8.0
AD	3.3	4.0
HD	6.2	6.1



LBU = Lap to Belt Upper Edge
 LBL = Lap to Belt Lower Edge
 LBT = Lap Belt Tension
 SBT = Shoulder Belt Tension

Figure 9 OCCUPANT CLEARANCE DIMENSIONS

Table 10
DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R *
DUMMY (1)	-186	-35	57	191	-55	22	-21	54.6
DUMMY (2)	-88	44	96	142	-32	40	17	37.5
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	1180	830
DUMMY (2)	1400	960
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)	3600	--	1300
DUMMY (2)	1660	1790	--
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)	894.0	.07582	.11857	53.5	1265.5
DUMMY (2)	1111.8	.09720	.11400	84.8	1626.3
DUMMY (3)					
DUMMY (4)					

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Table 11
BELT RELATED DATA

	<u>Driver</u>	<u>Passenger</u>
Belt Spool-off (in.)		
film	2.0	2.3
electronic	2.0	1.0
Belt Strain ⁽¹⁾	not measured	not measured
Belt Length Data (in.)		
total length ⁽²⁾	covered	covered
retractor to "D" ring ⁽²⁾	no "D" ring	no "D" ring
torso belt ⁽³⁾	40.7	40.5
lap belt ⁽³⁾	33.5	33
remainder on spool	20.0	20.5

(1) as measured between retractor and "D" ring

(2) retractor spool to bolt hole anchor point for unbelted

(3) as measured on Part 572 dummy

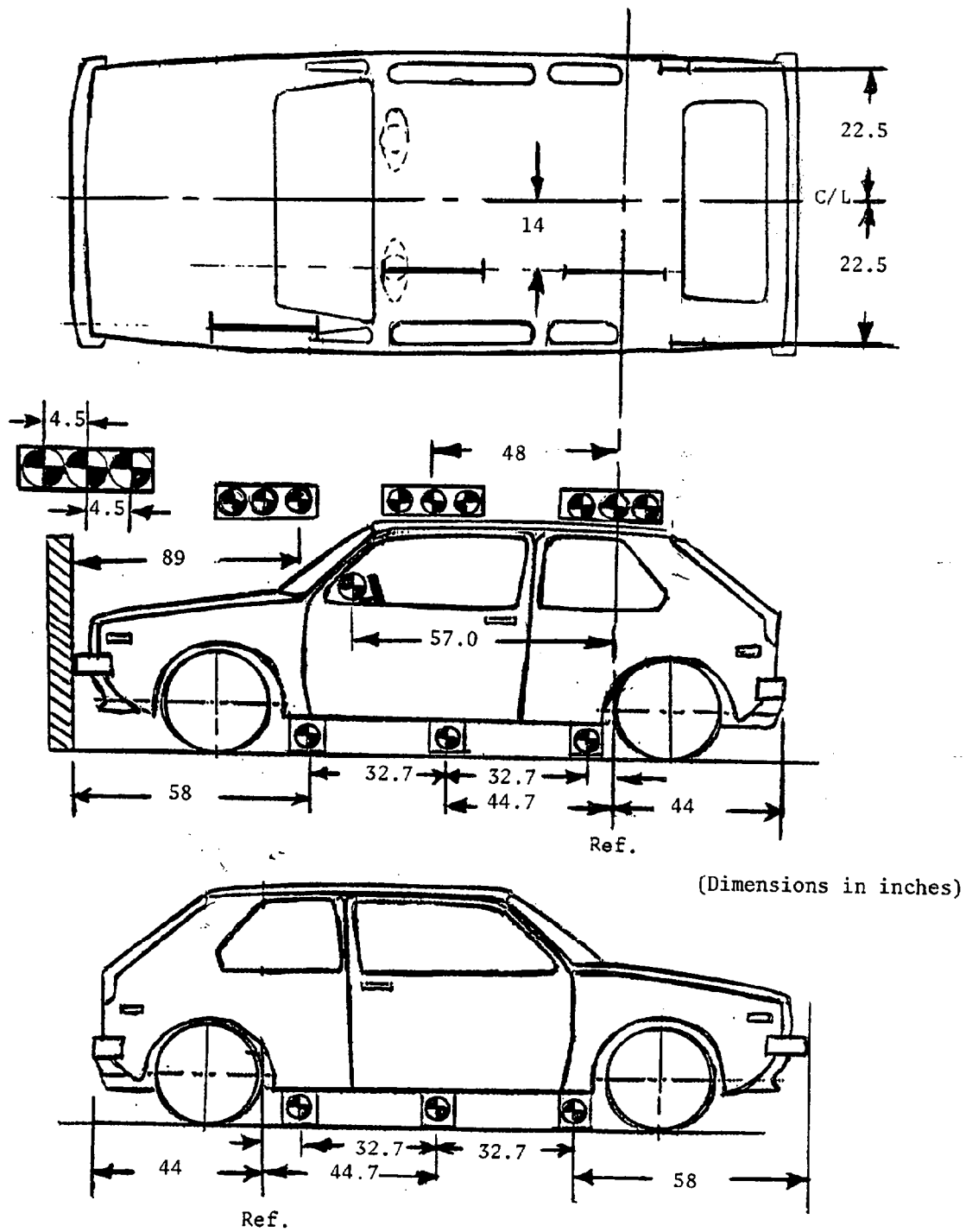


Figure 10 VEHICLE TARGET LOCATIONS

APPENDIX A
PHOTOGRAPHS

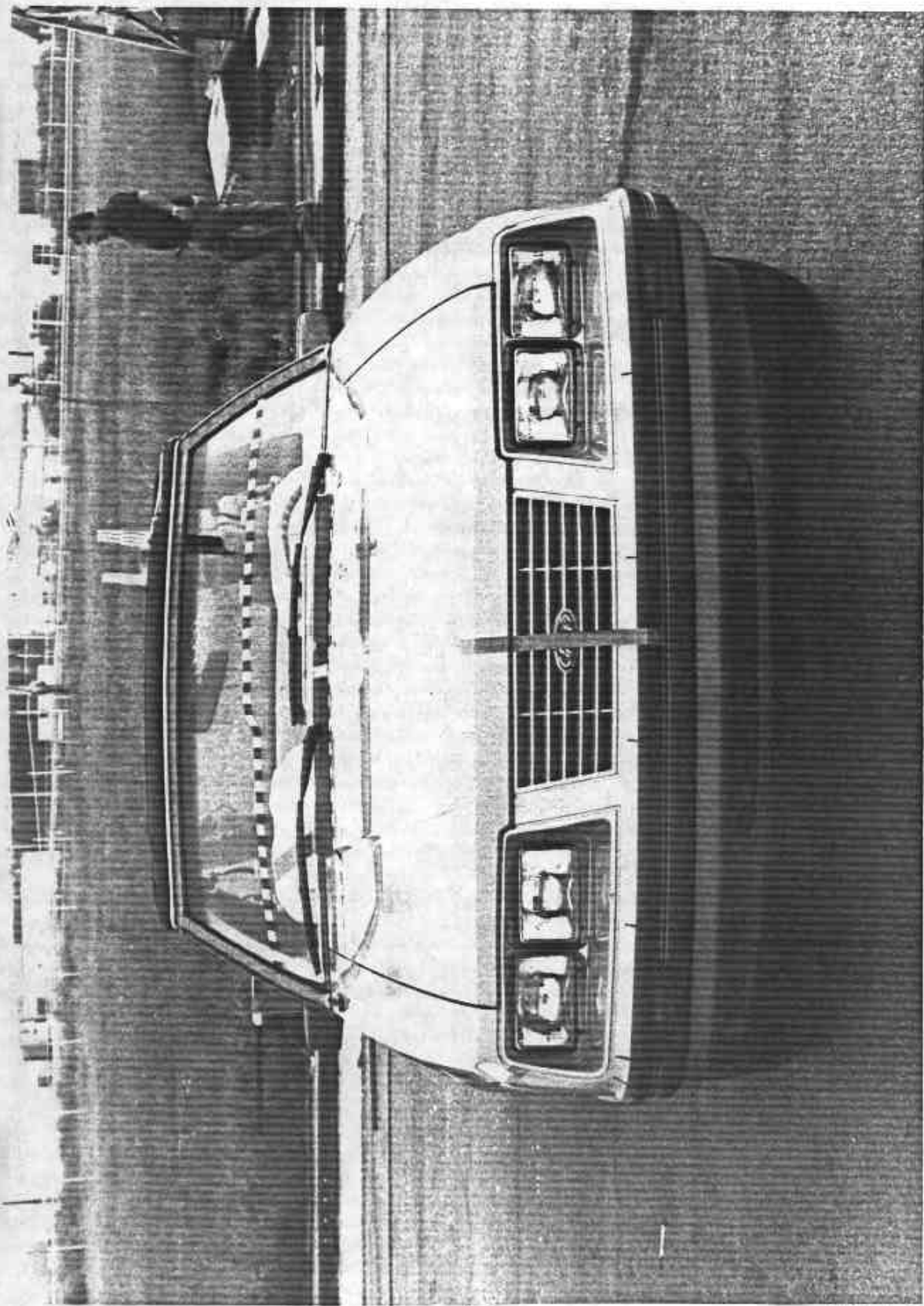


Figure A-1 PRE-TEST FRONT VIEW

A-2

7103-V-25

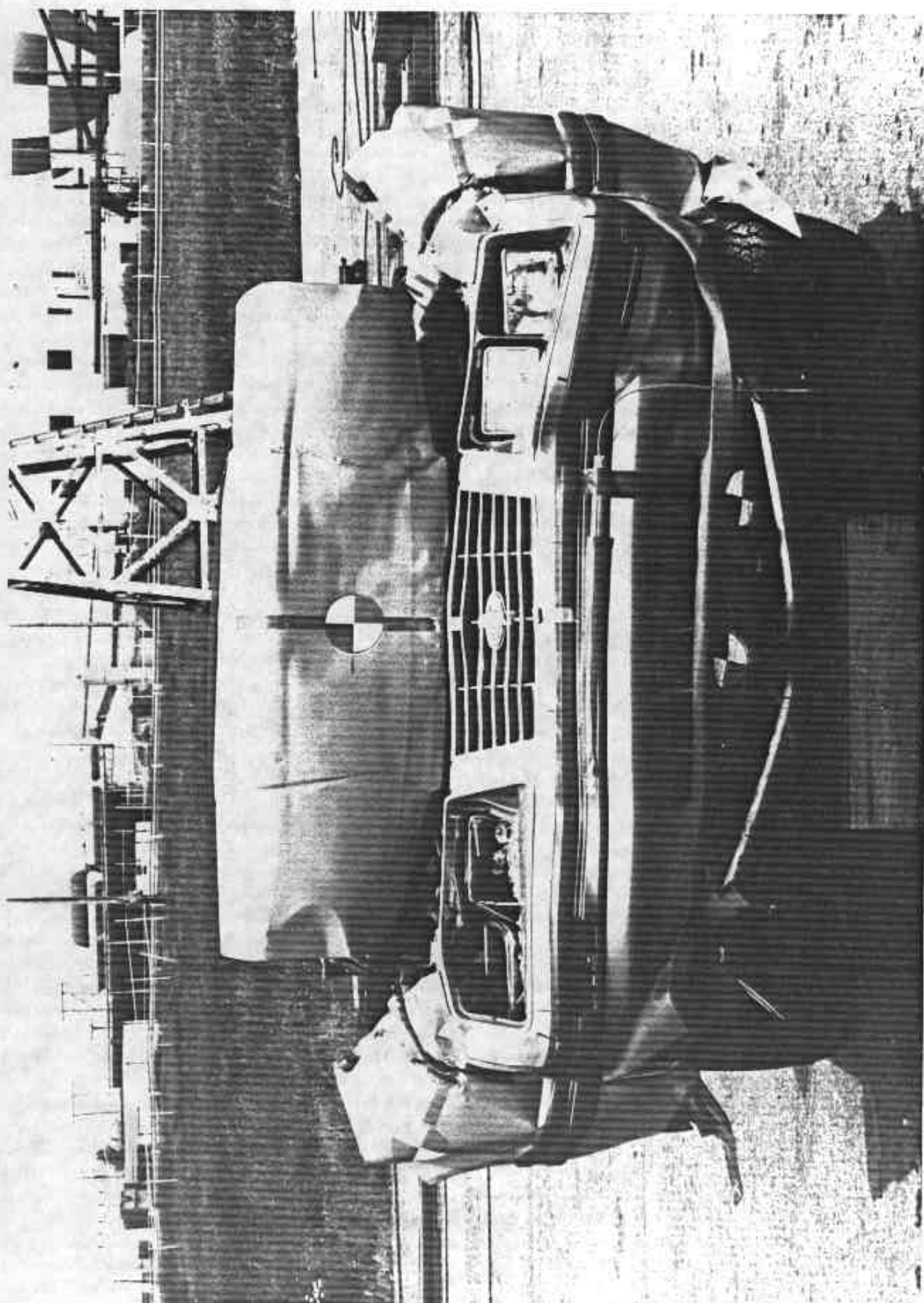


Figure A-2 POST-TEST FRONT VIEW

A-3

7103-V-25



Figure A-3 PRE-TEST LEFT SIDE VIEW



Figure A-4 POST-TEST LEFT SIDE VIEW

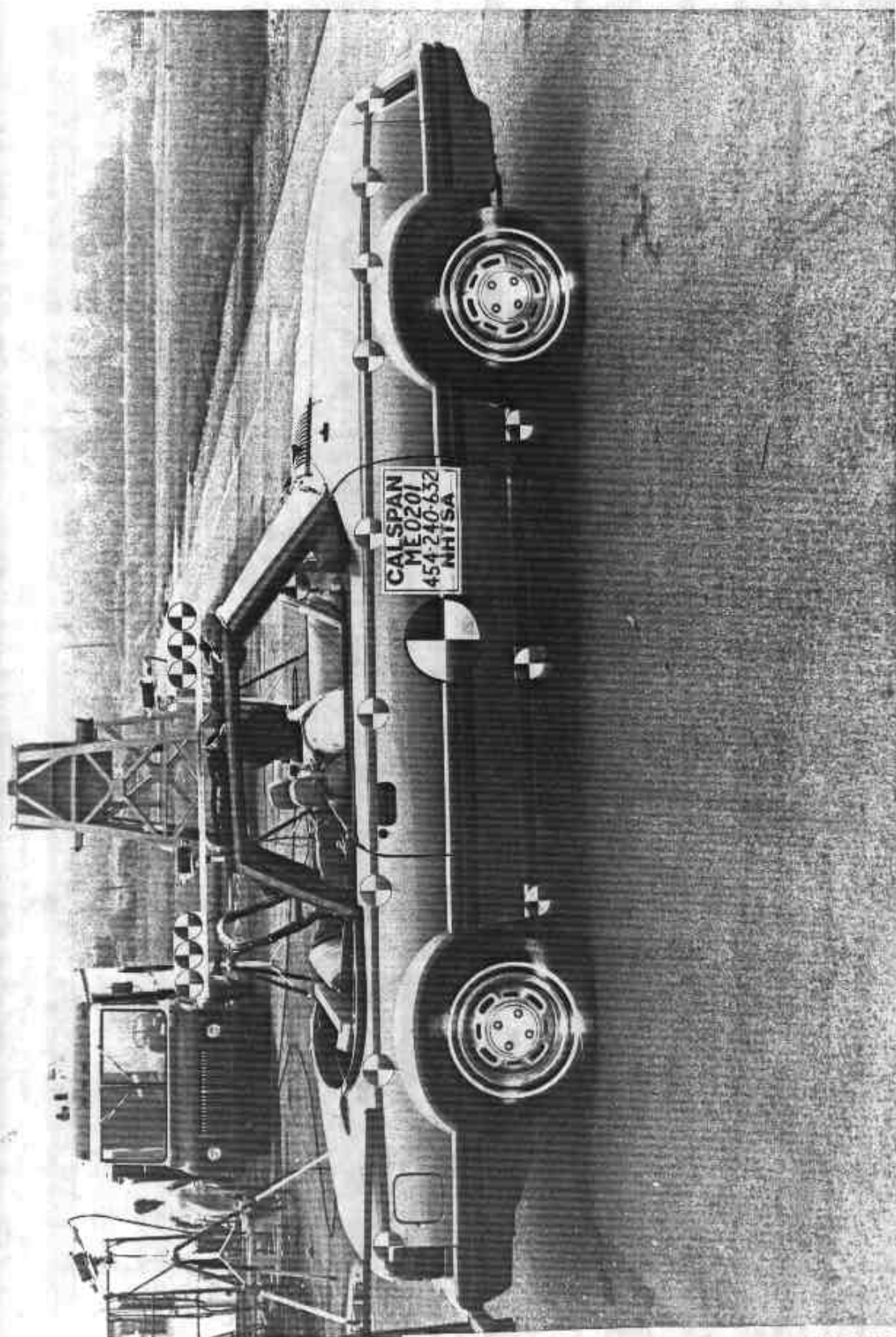


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-6

7103-V-25

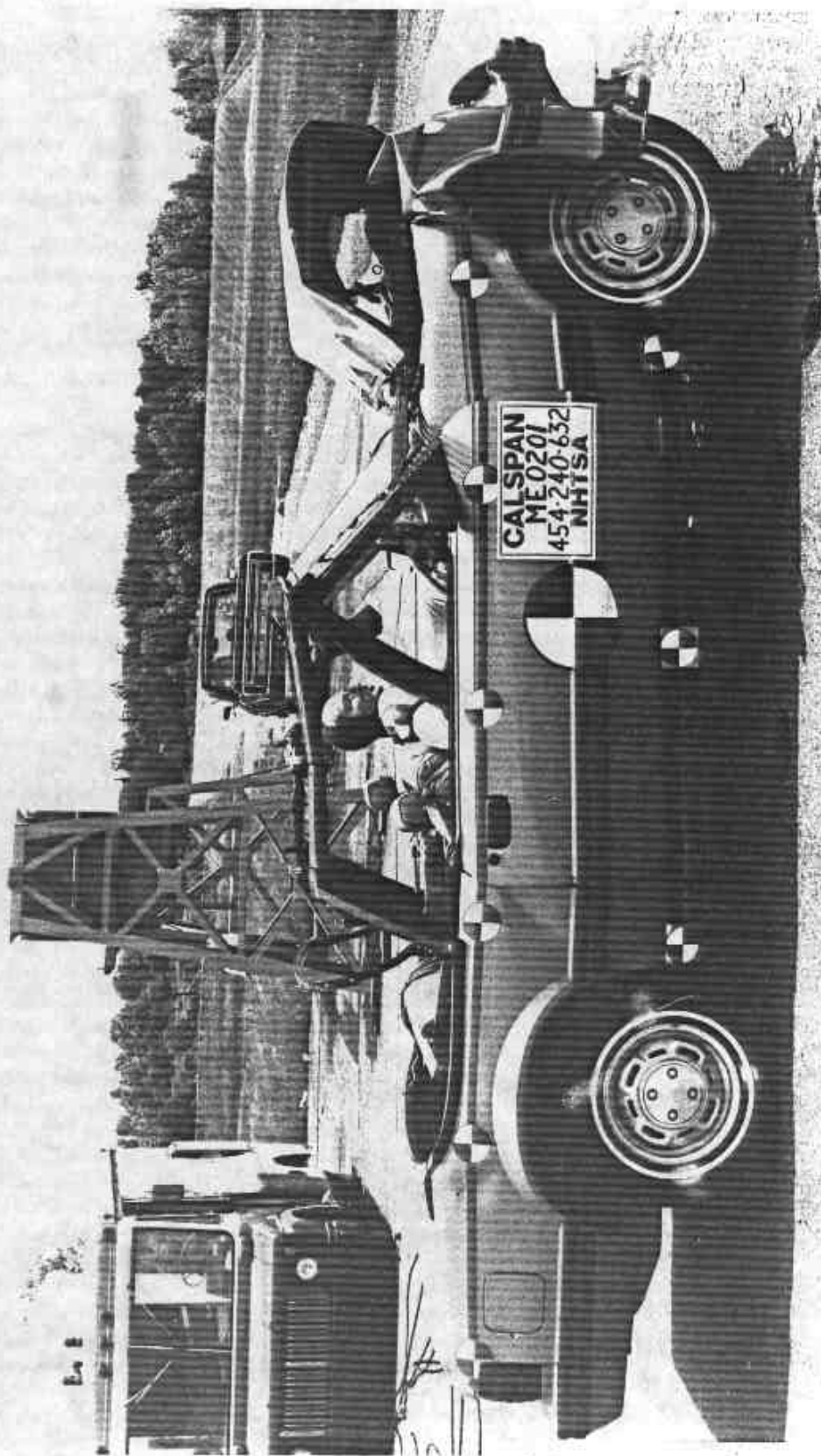


Figure A-6 POST-TEST RIGHT SIDE VIEW



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

A-8

7103-V-25

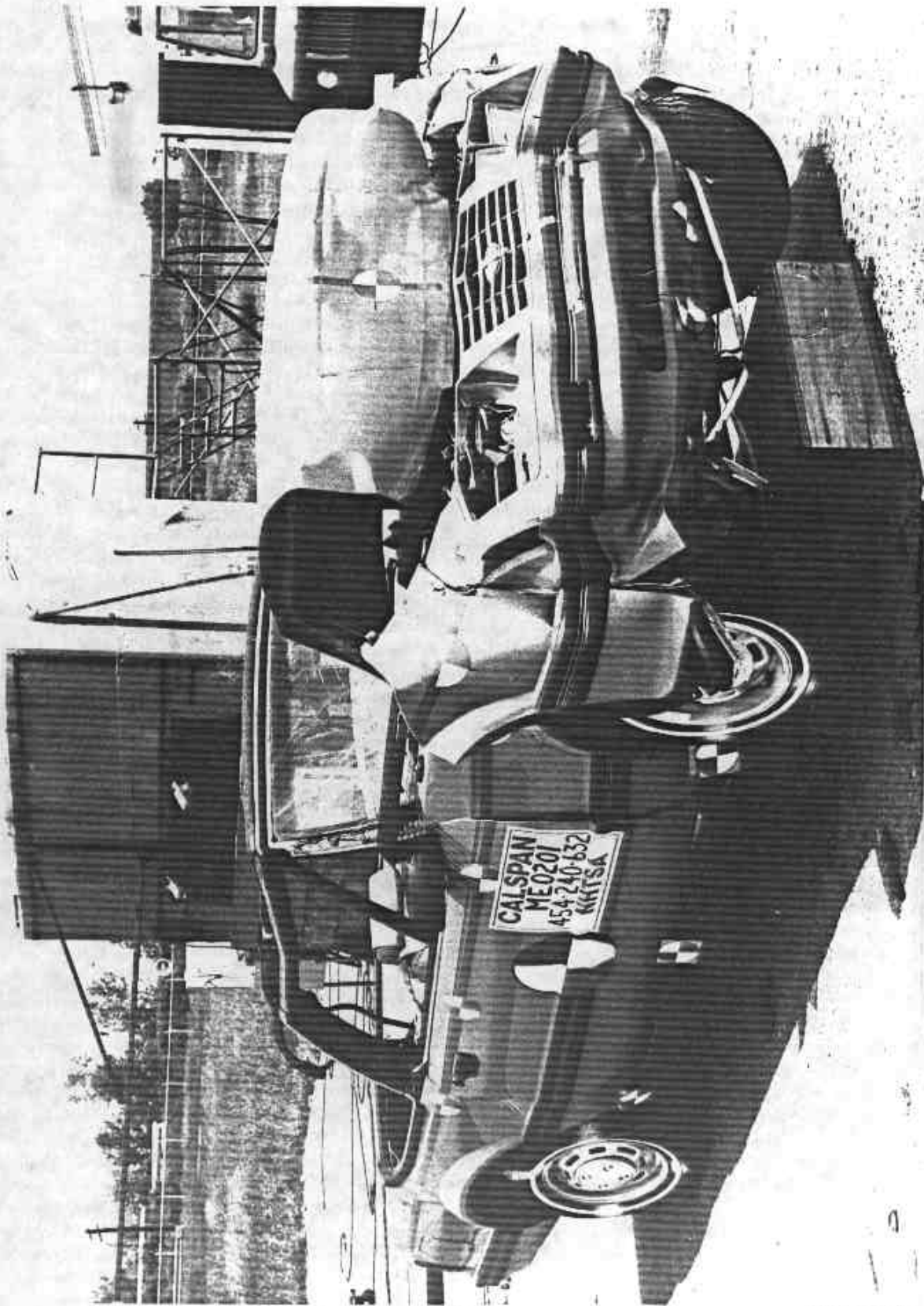


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-9

7103-V-25

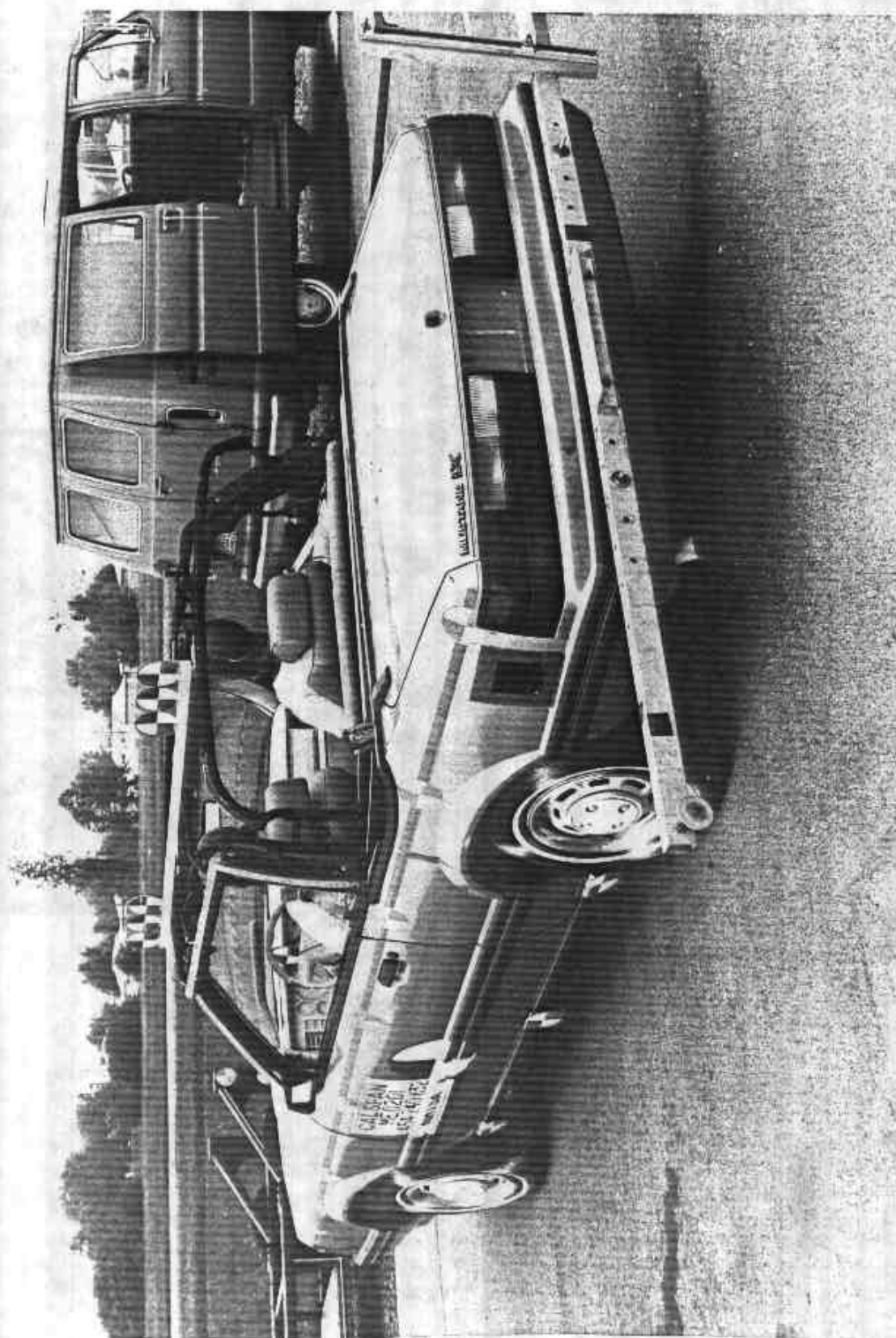


Figure A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW

A-10

7103-V-25

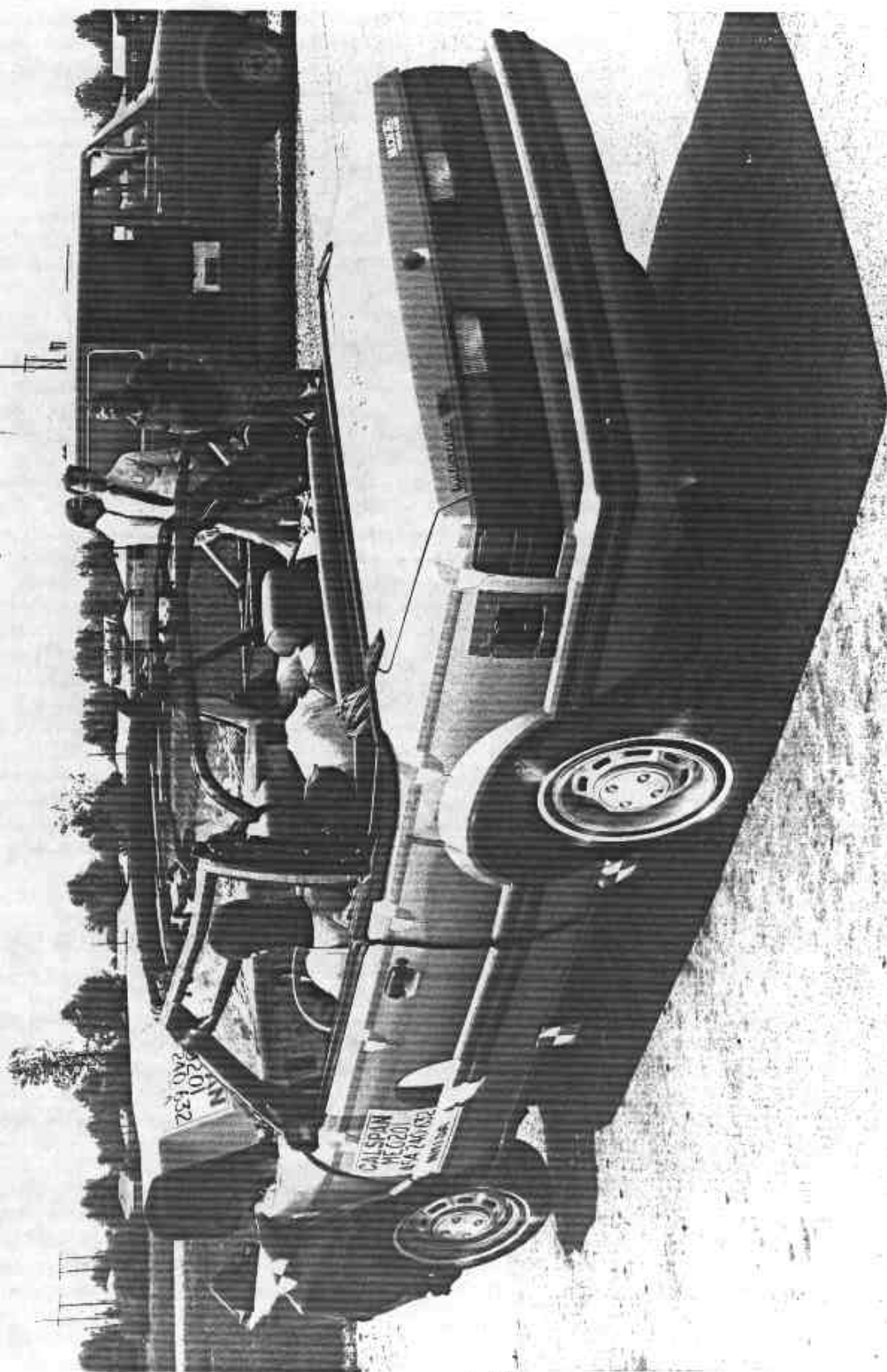


Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

A-11

7103-V-25

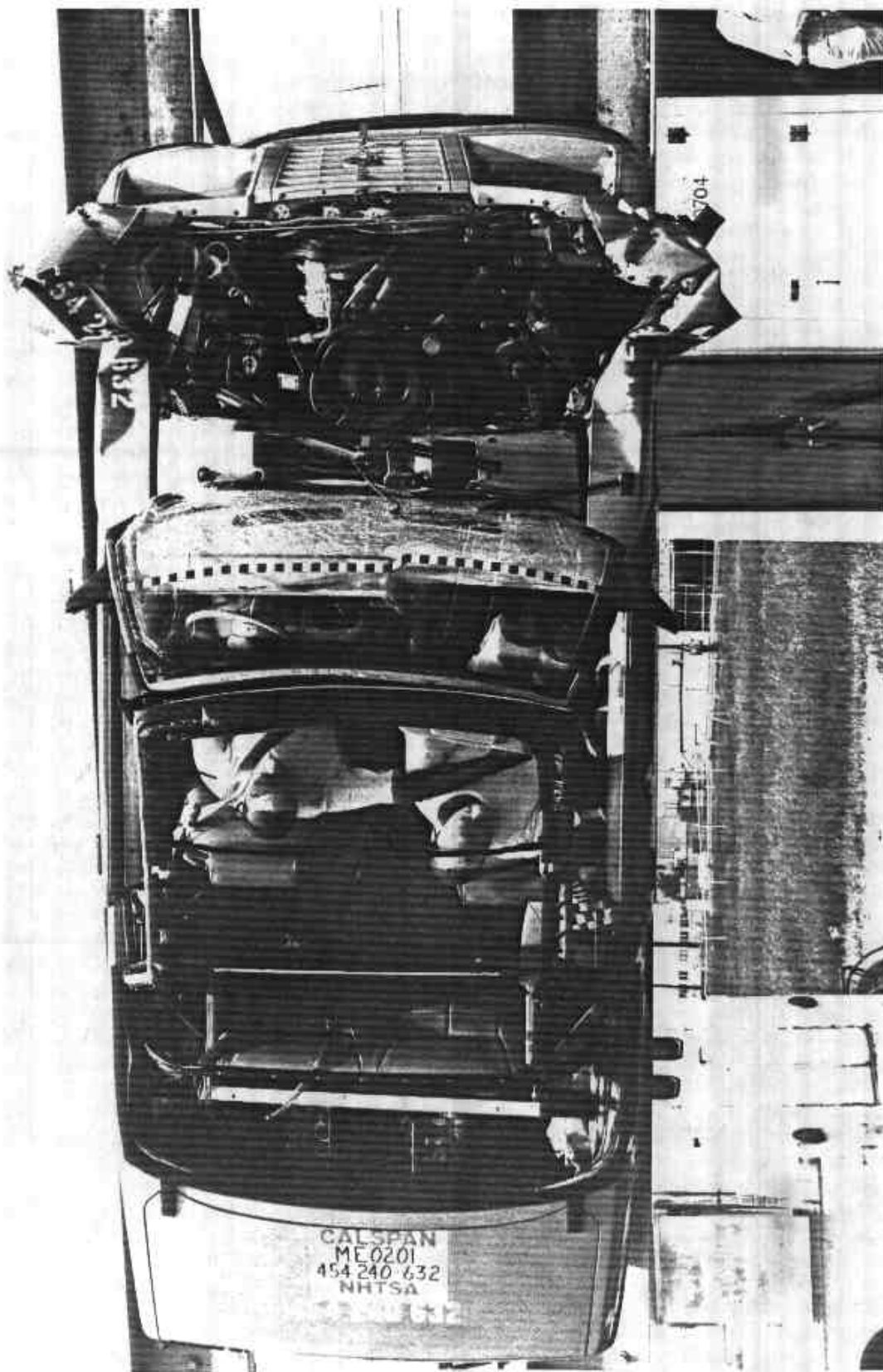


Figure A-11 POST-TEST TOP VIEW

A-12

7103-V-25

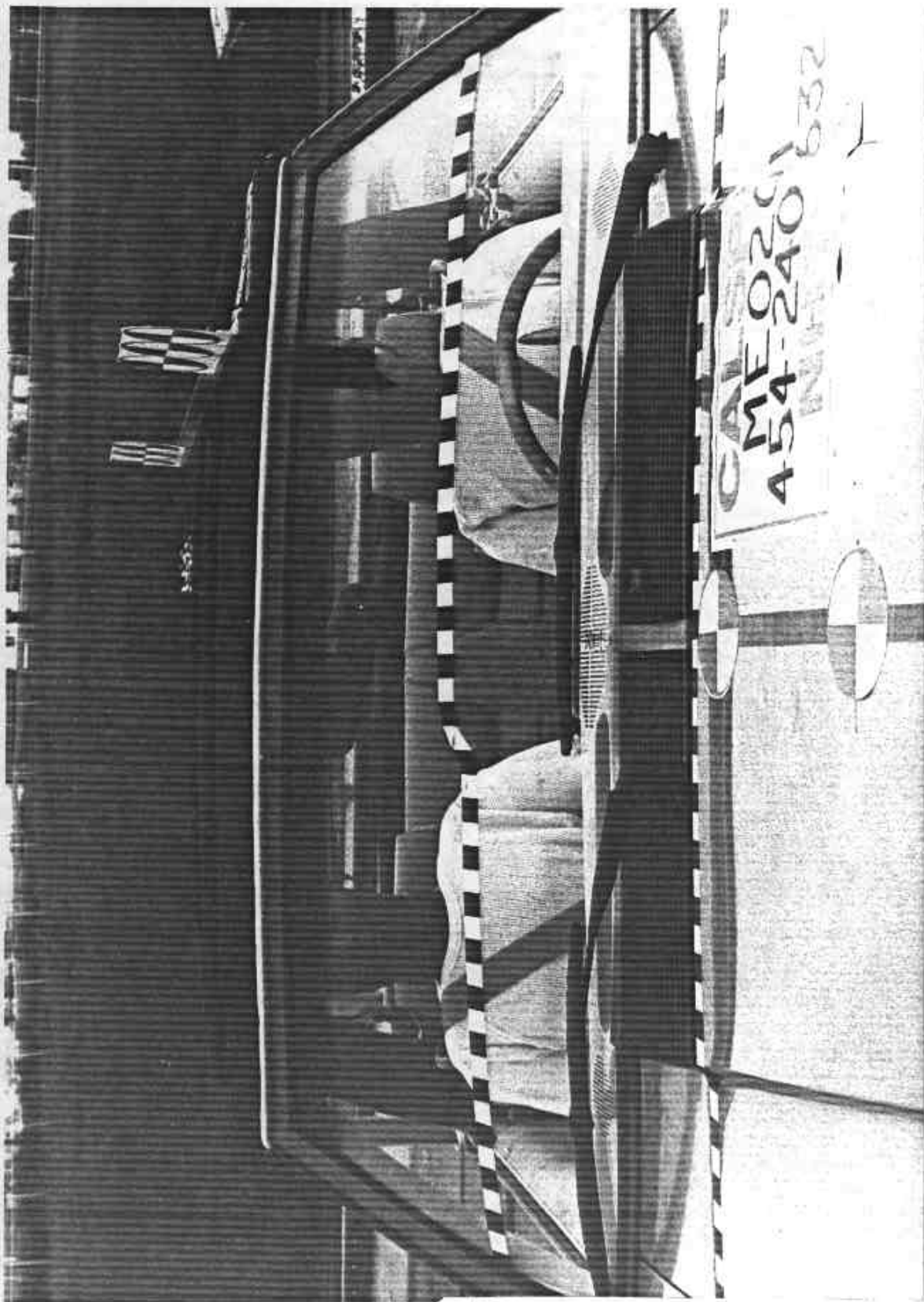
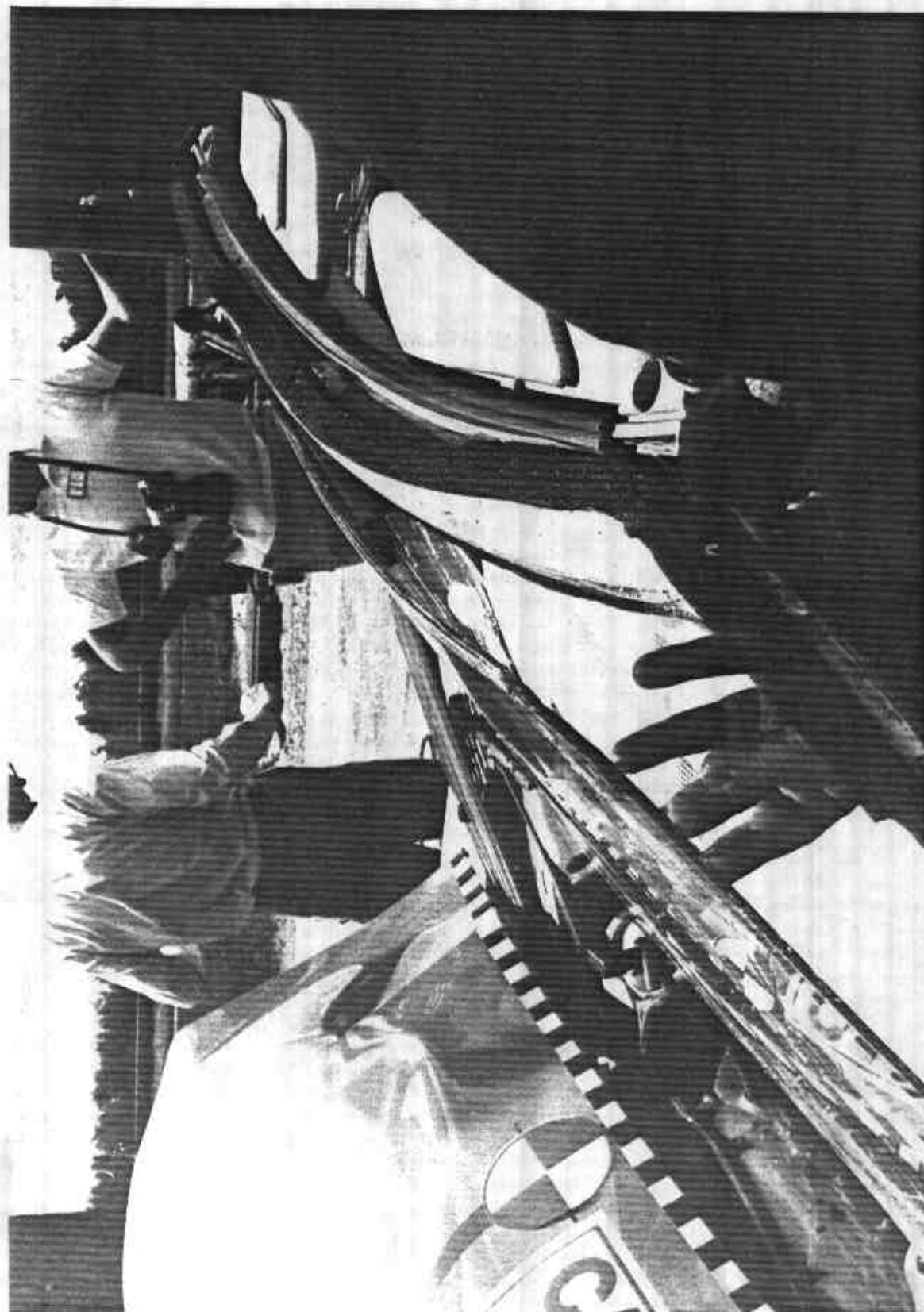


Figure A-12 PRE-TEST WINDSHIELD VIEW



A-14

7103-V-25

Figure A-13 POST-TEST WINDSHIELD RETENTION LOSS VIEW

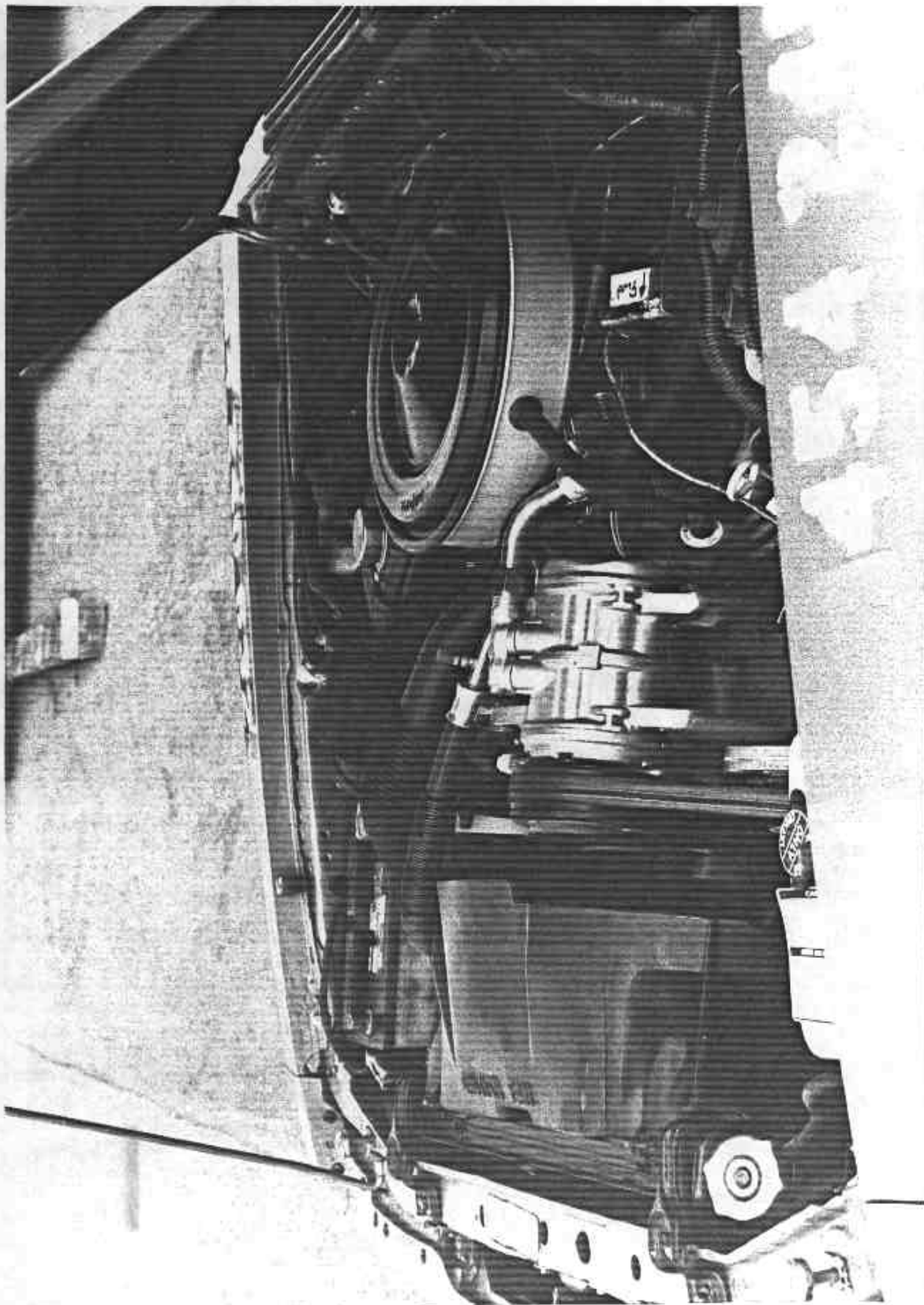


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

A-15

7103-V-25

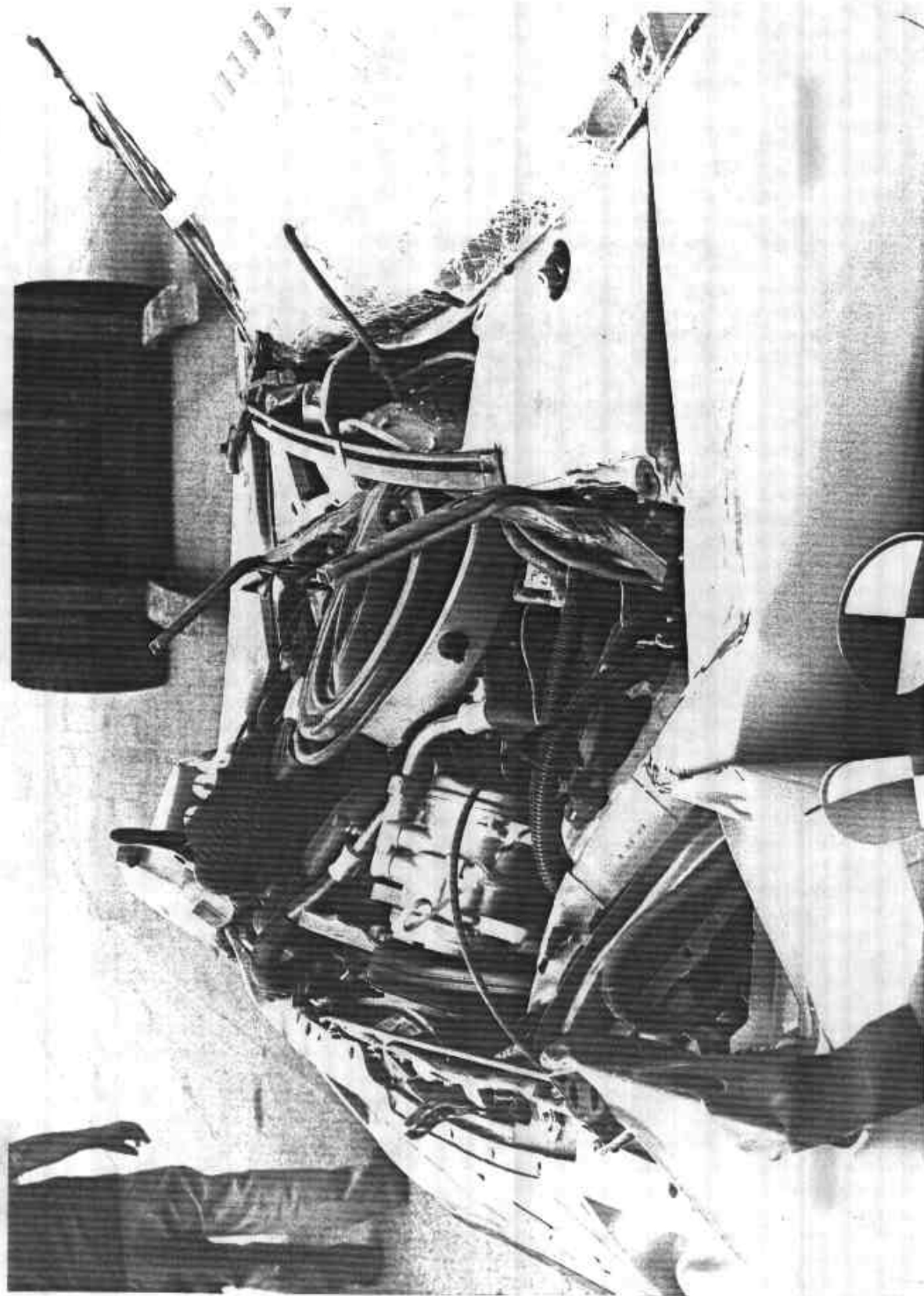


Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

A-16

7103-V-25

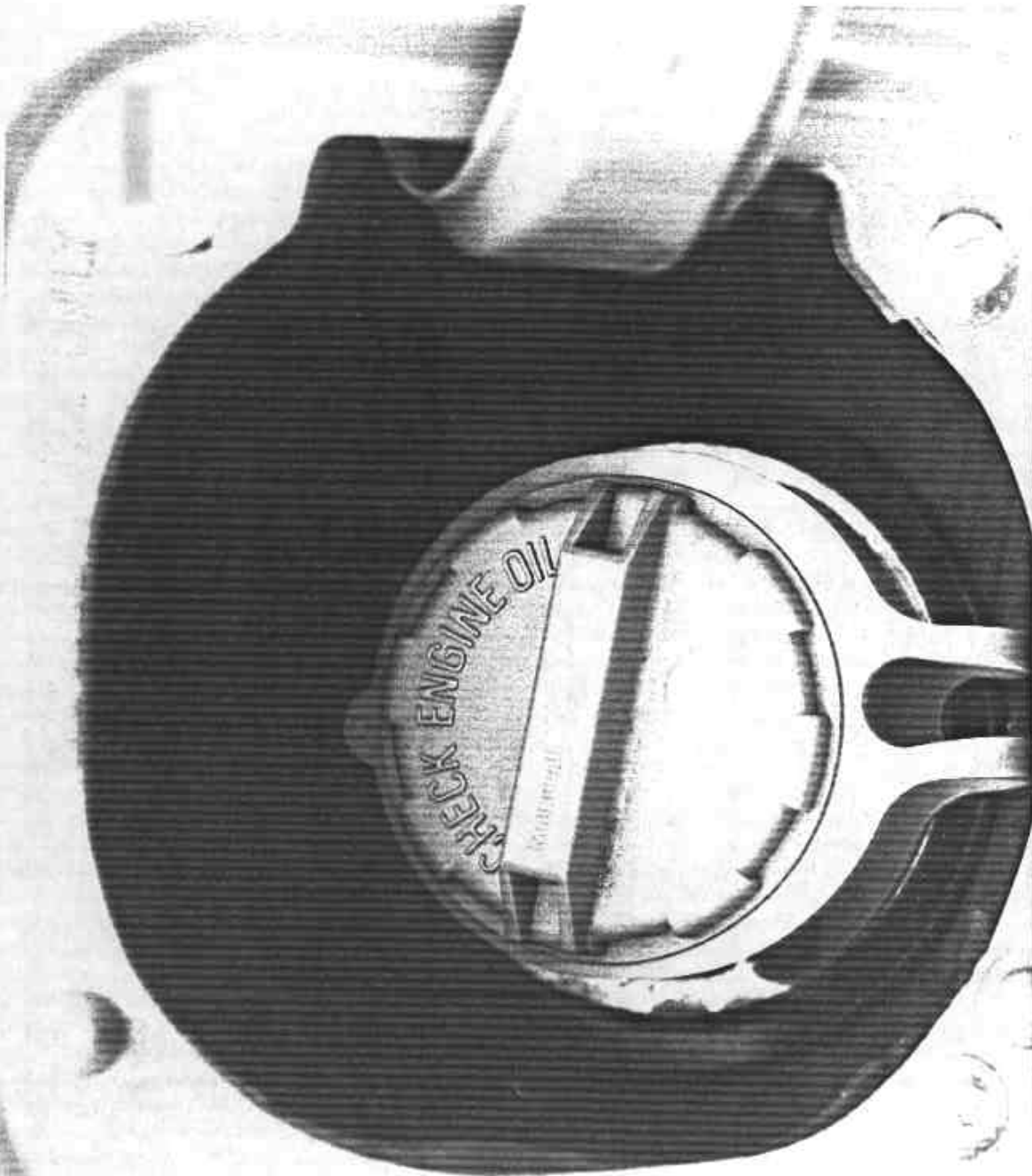


Figure A-16 PRE-TEST FILLER CAP VIEW



Figure A-17 PRE-TEST FRONT UNDERBODY VIEW

A-18

7103-V-25

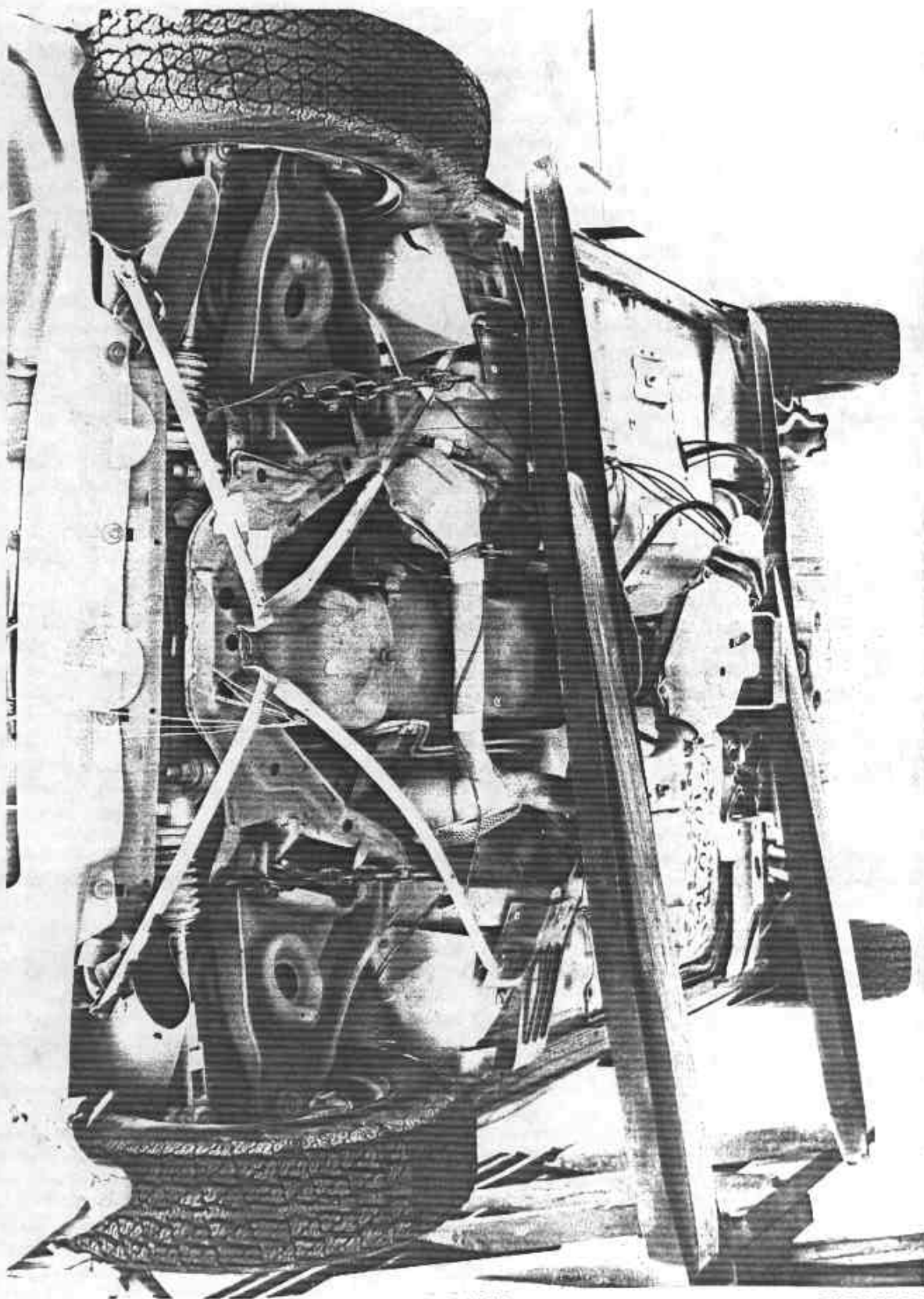


Figure A-18 POST-TEST FRONT UNDERBODY VIEW

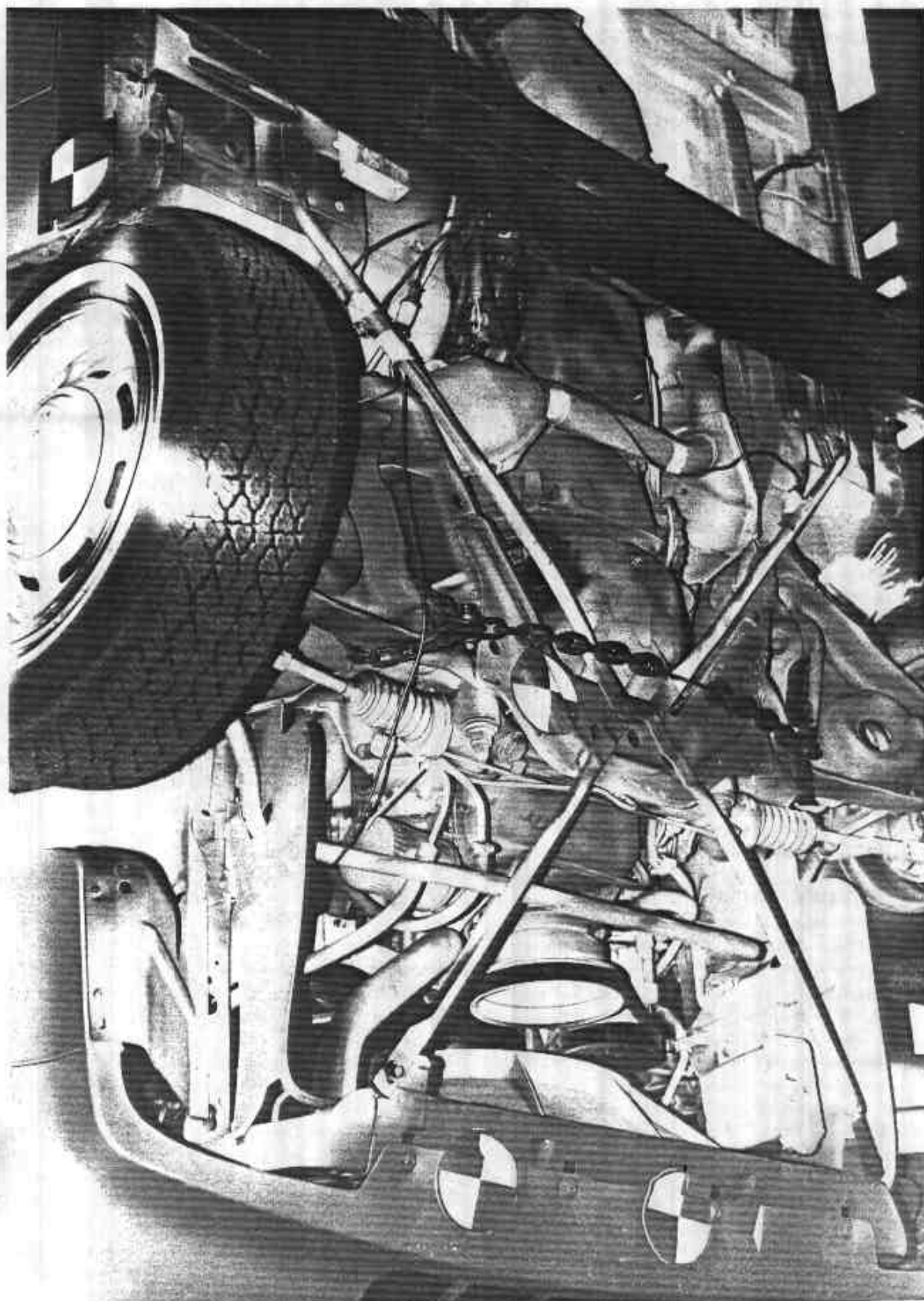


Figure A-19 PRE-TEST FRONT-SIDE UNDERBODY VIEW

A-20

7103-V-25

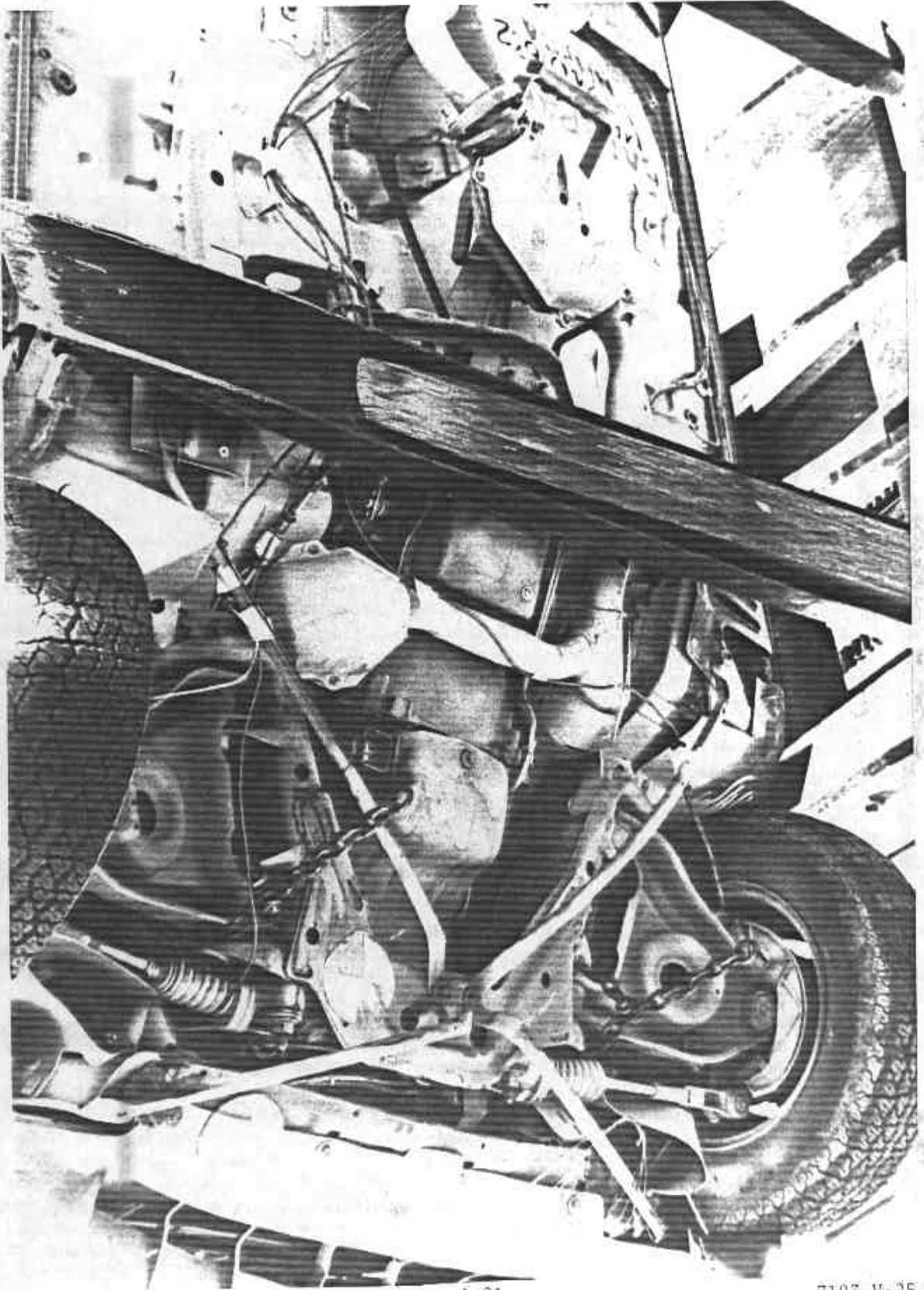


Figure A-20 POST-TEST FRONT-SIDE UNDERBODY VIEW

A-21

7103-V-25

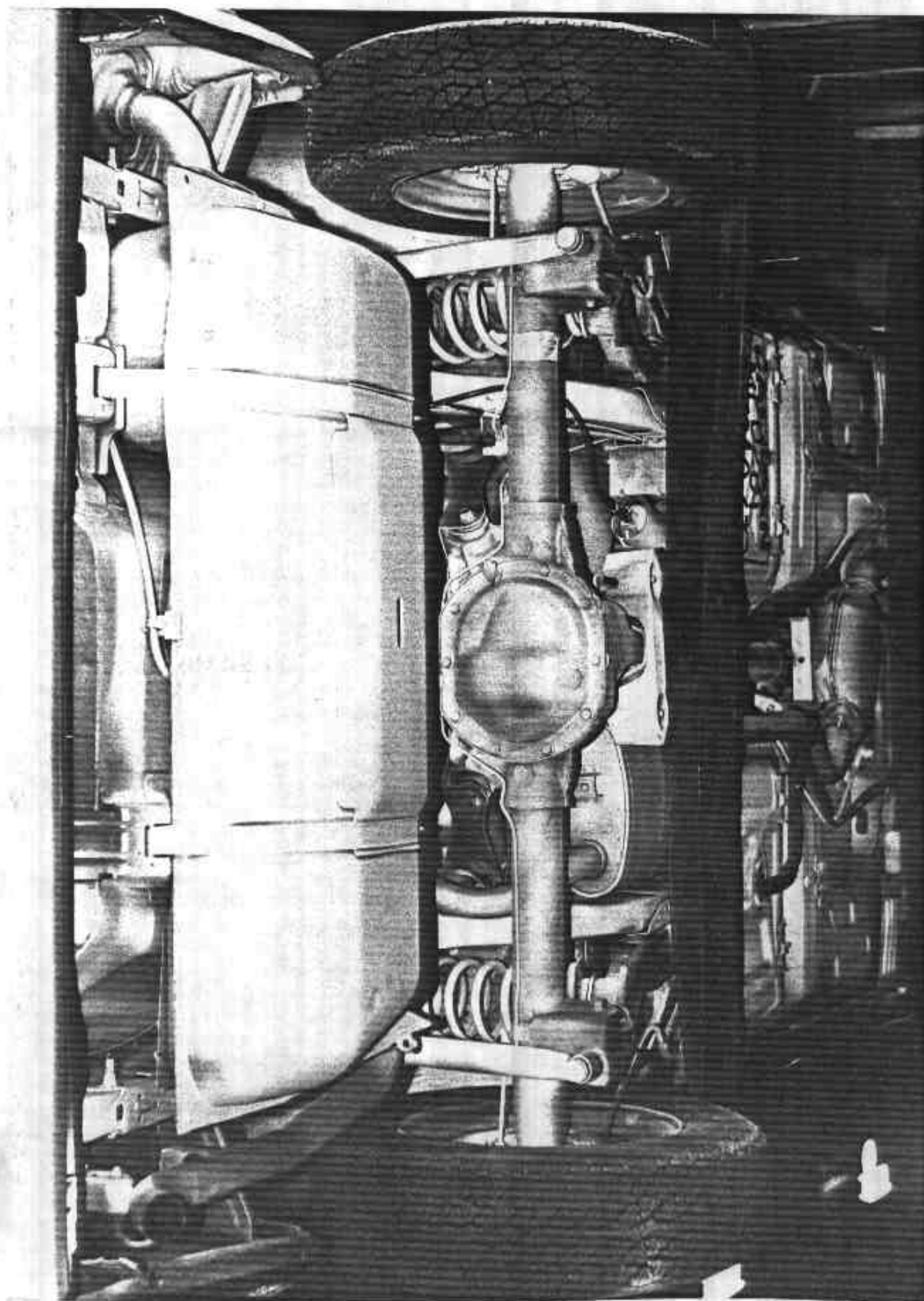


Figure A-21 PRE-TEST REAR UNDERBODY VIEW

A-22

7103-V-25

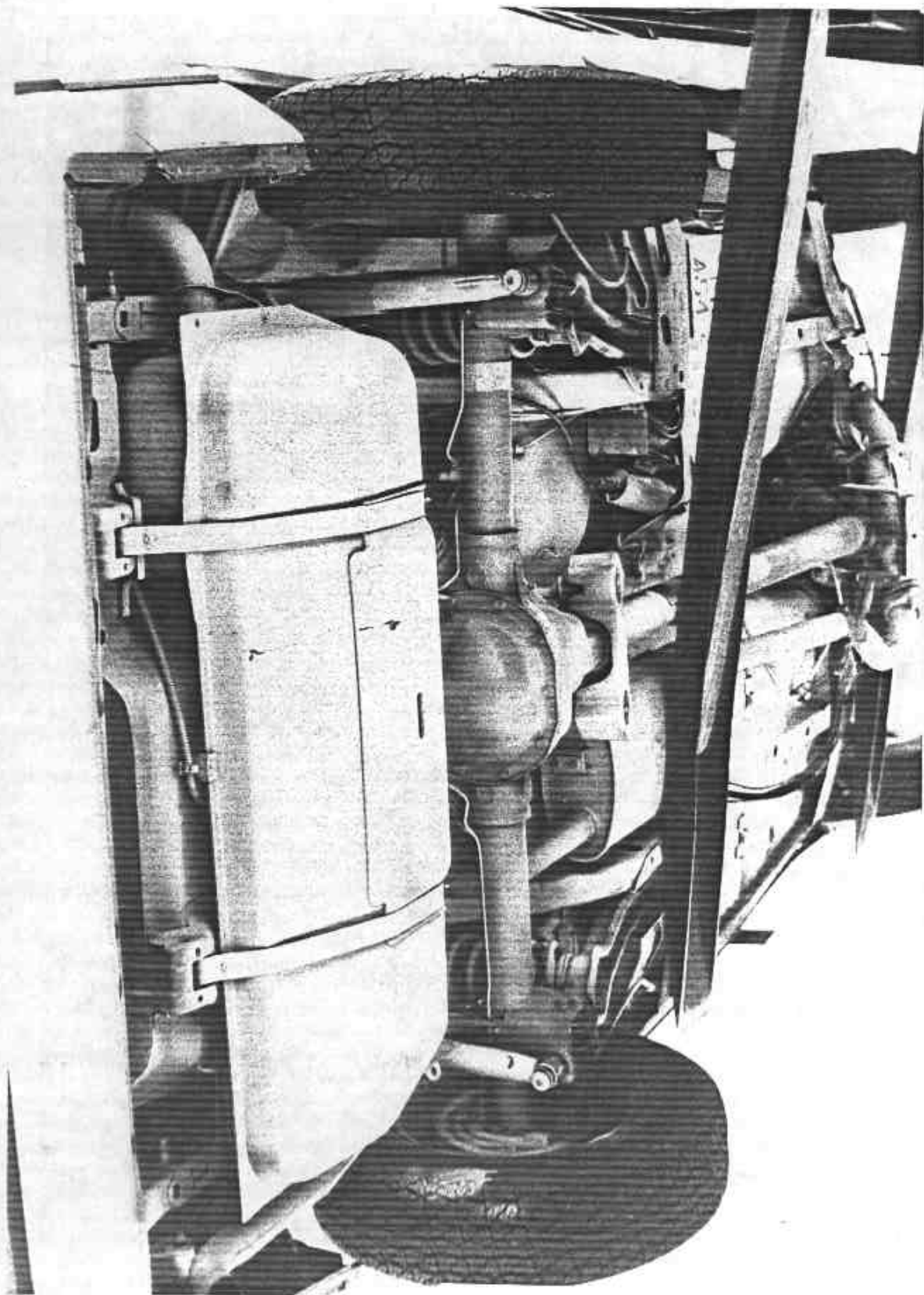


Figure A-22 POST-TEST REAR UNDERBODY VIEW

A-23

7103-V-25



Figure A-23 PRE-TEST DRIVER POSITION VIEW

A-24

7103-V-25

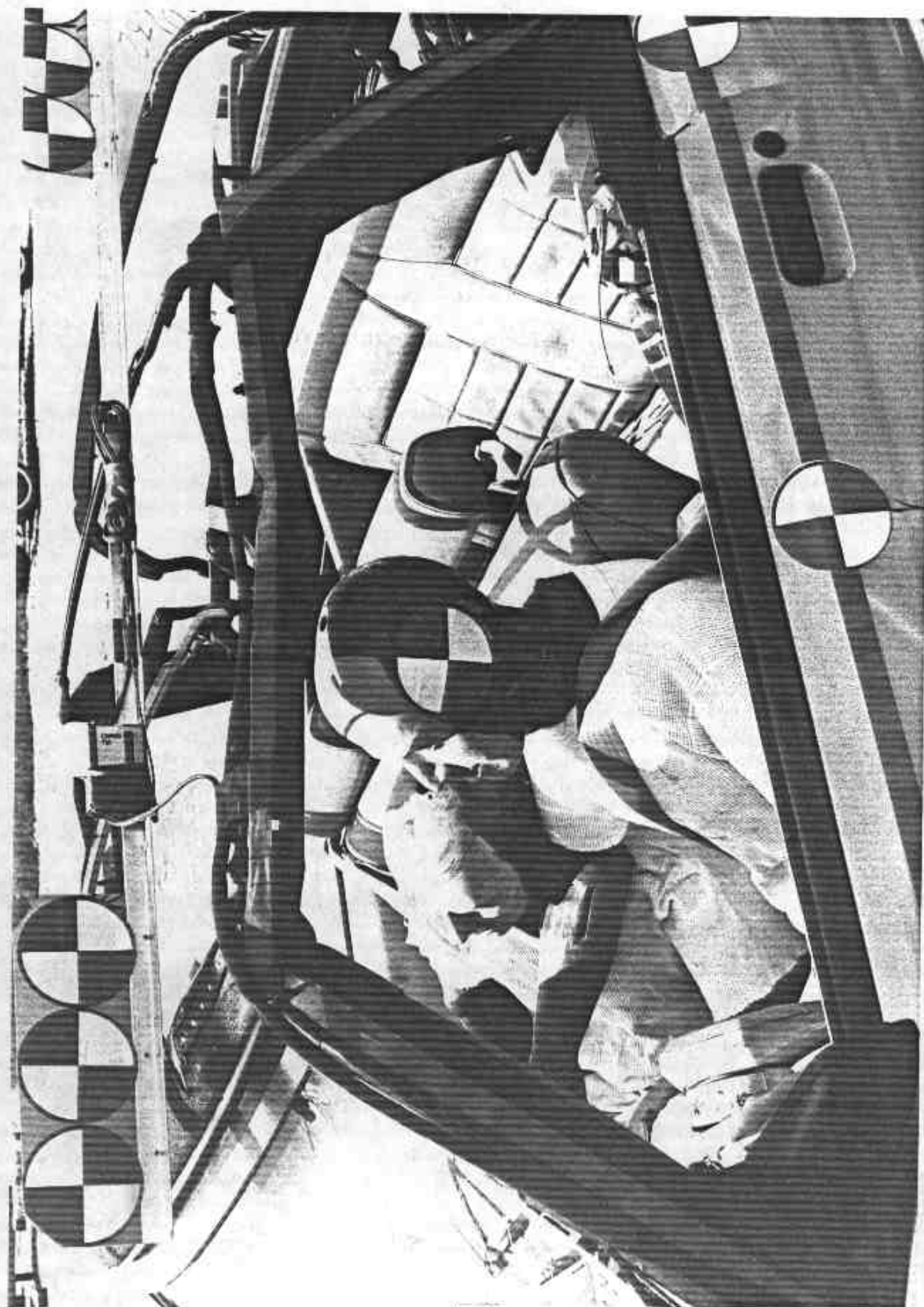


Figure A-24 POST-TEST DRIVER POSITION VIEW

A-25

7103-V-25



Figure A-25 PRE-TEST DRIVER AND INTERIOR VIEW

A-26

7103-V-25



Figure A-26 POST-TEST DRIVER AND INTERIOR VIEW

A-27

7103-V-25



Figure A-27 PRE-TEST PASSENGER POSITION VIEW

A-28

7103-V-25



Figure A-28 POST-TEST PASSENGER POSITION VIEW

A-29

7103-V-25



Figure A-29 PRE-TEST PASSENGER AND INTERIOR VIEW

A-30

7103-V-25



Figure A-30 POST-TEST PASSENGER AND INTERIOR VIEW

A-31

7103-V-25

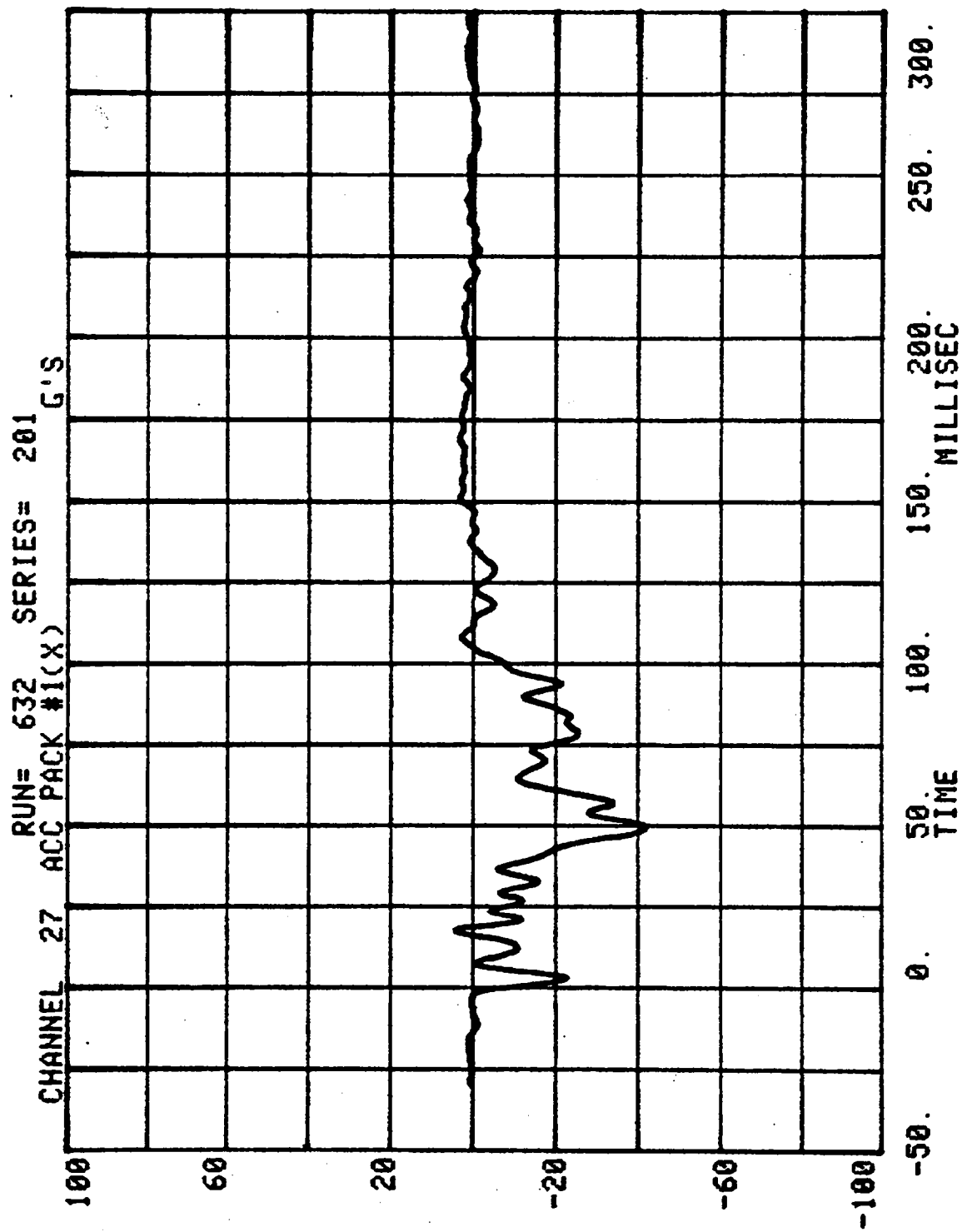
APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA

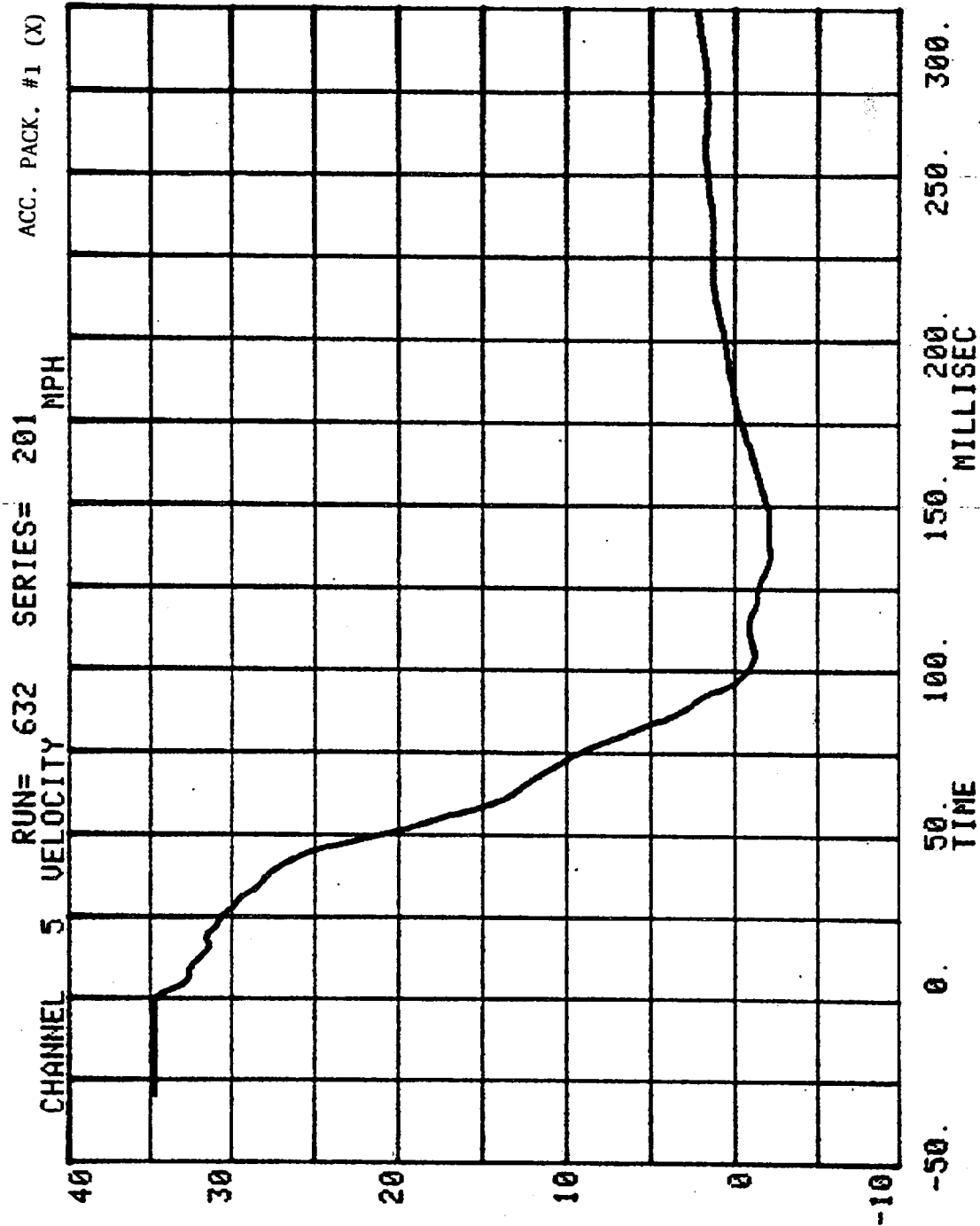
TEST NO. ME0201

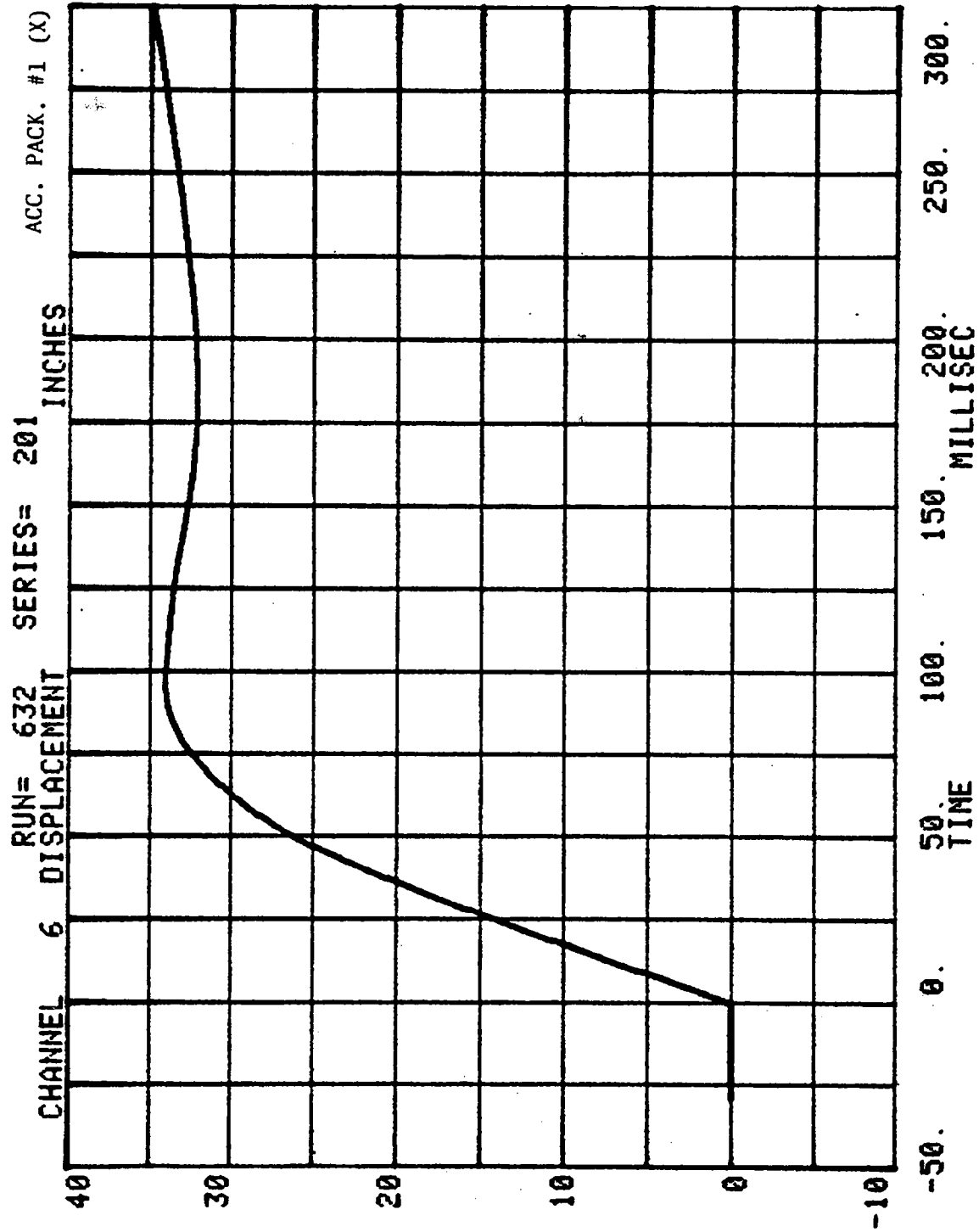
VEHICLE DATA

FILTER CHANNEL CLASS

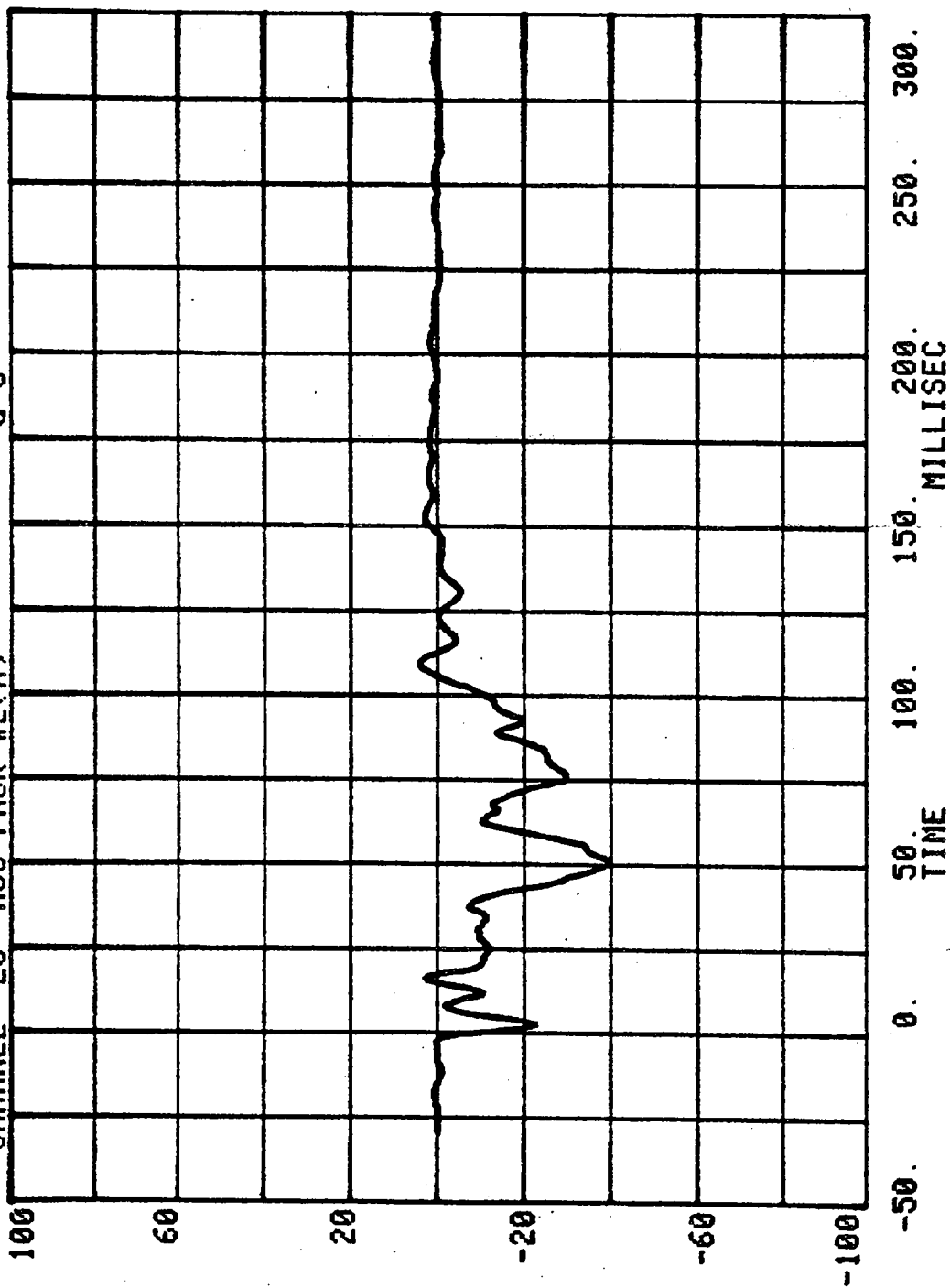
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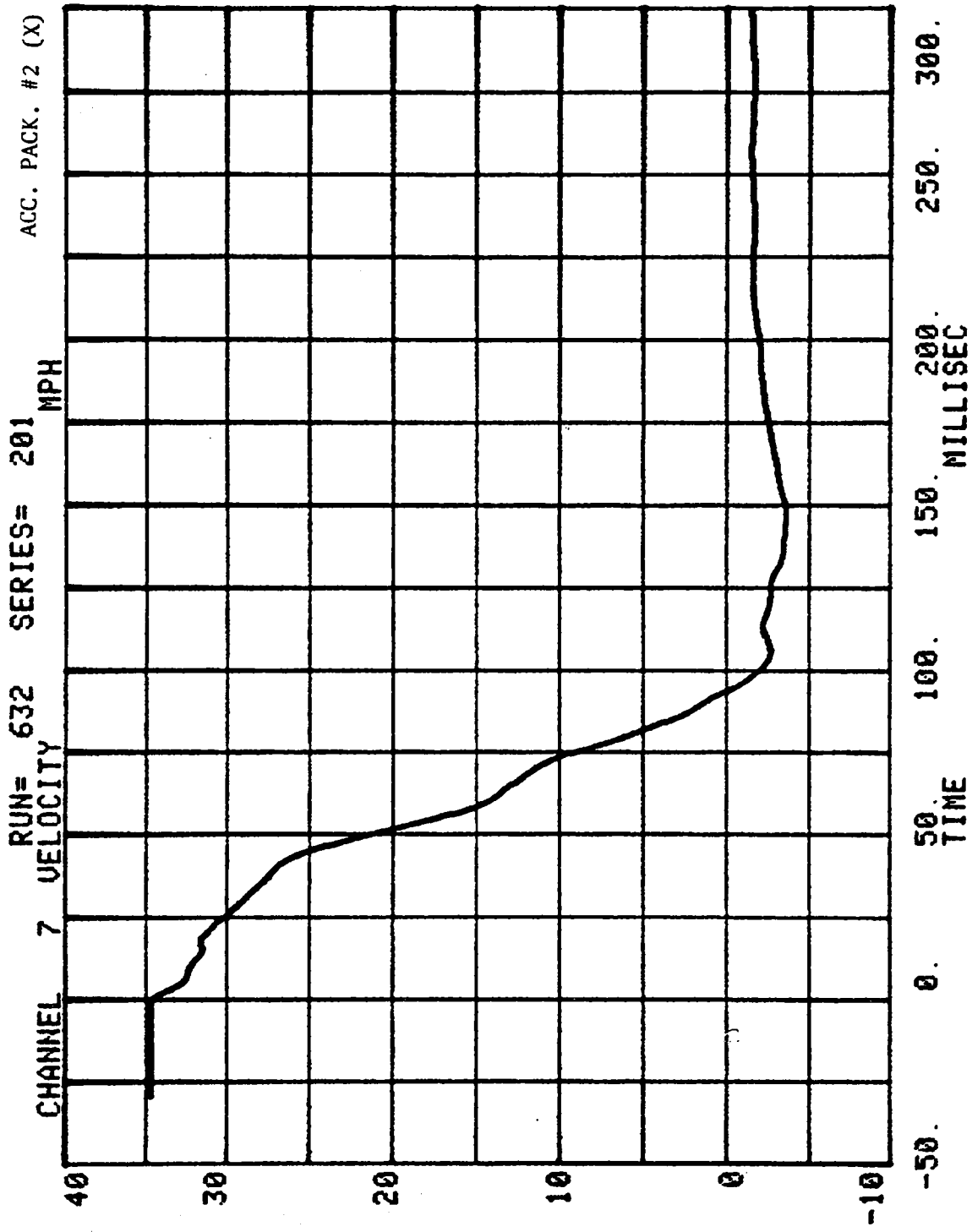


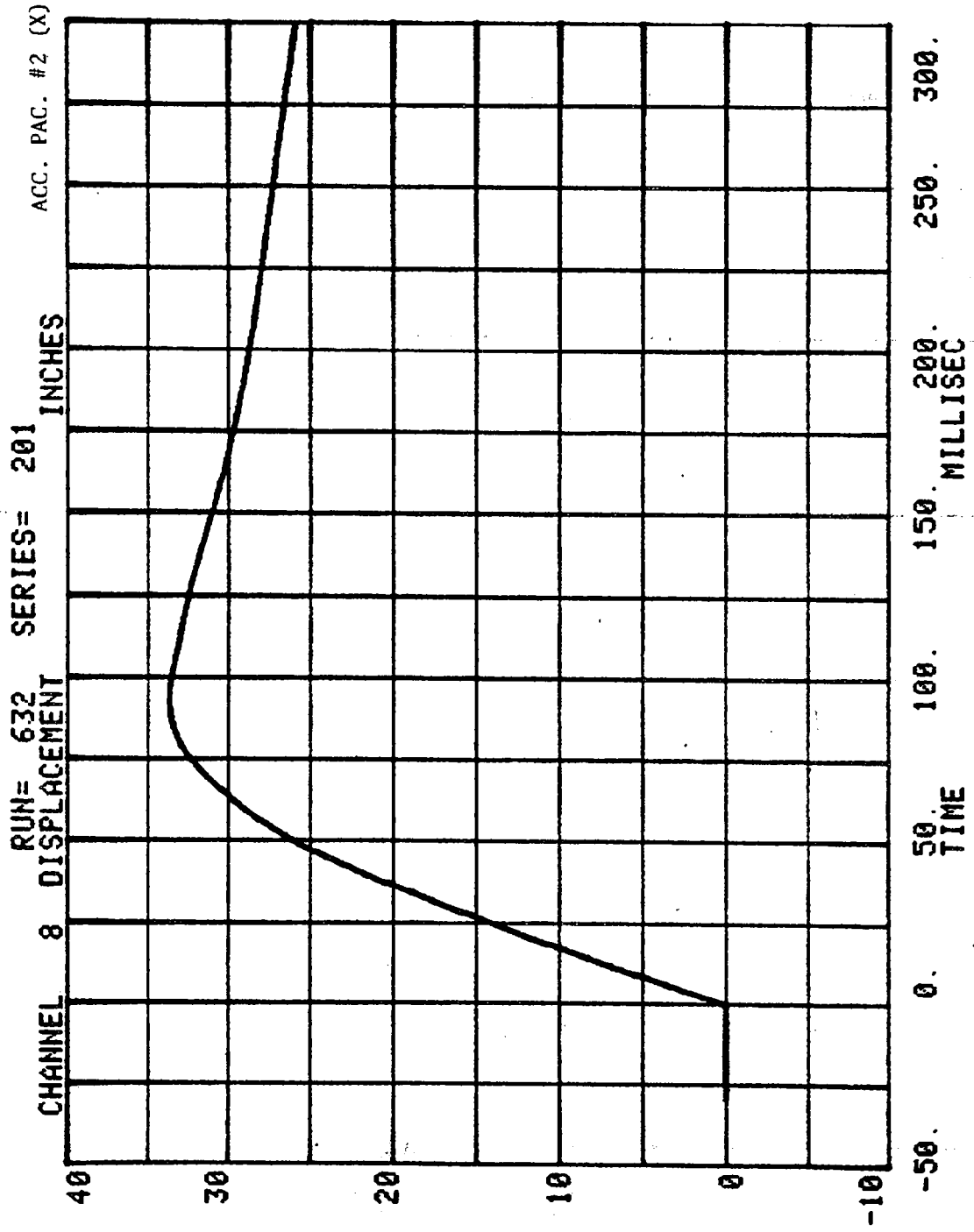




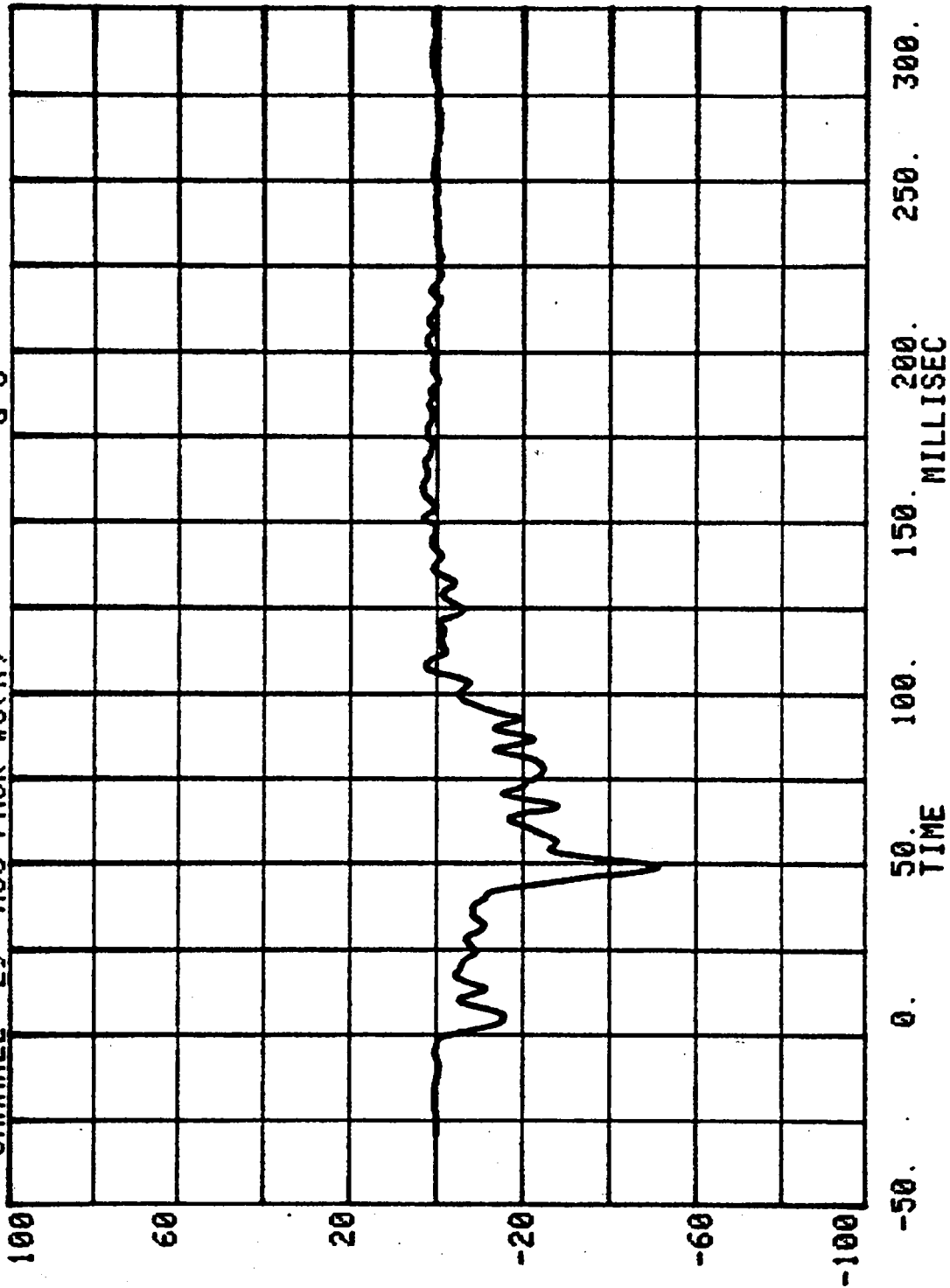
CHANNEL 28 ACC PACK #2(X) RUN= 632 SERIES= 201 G'S

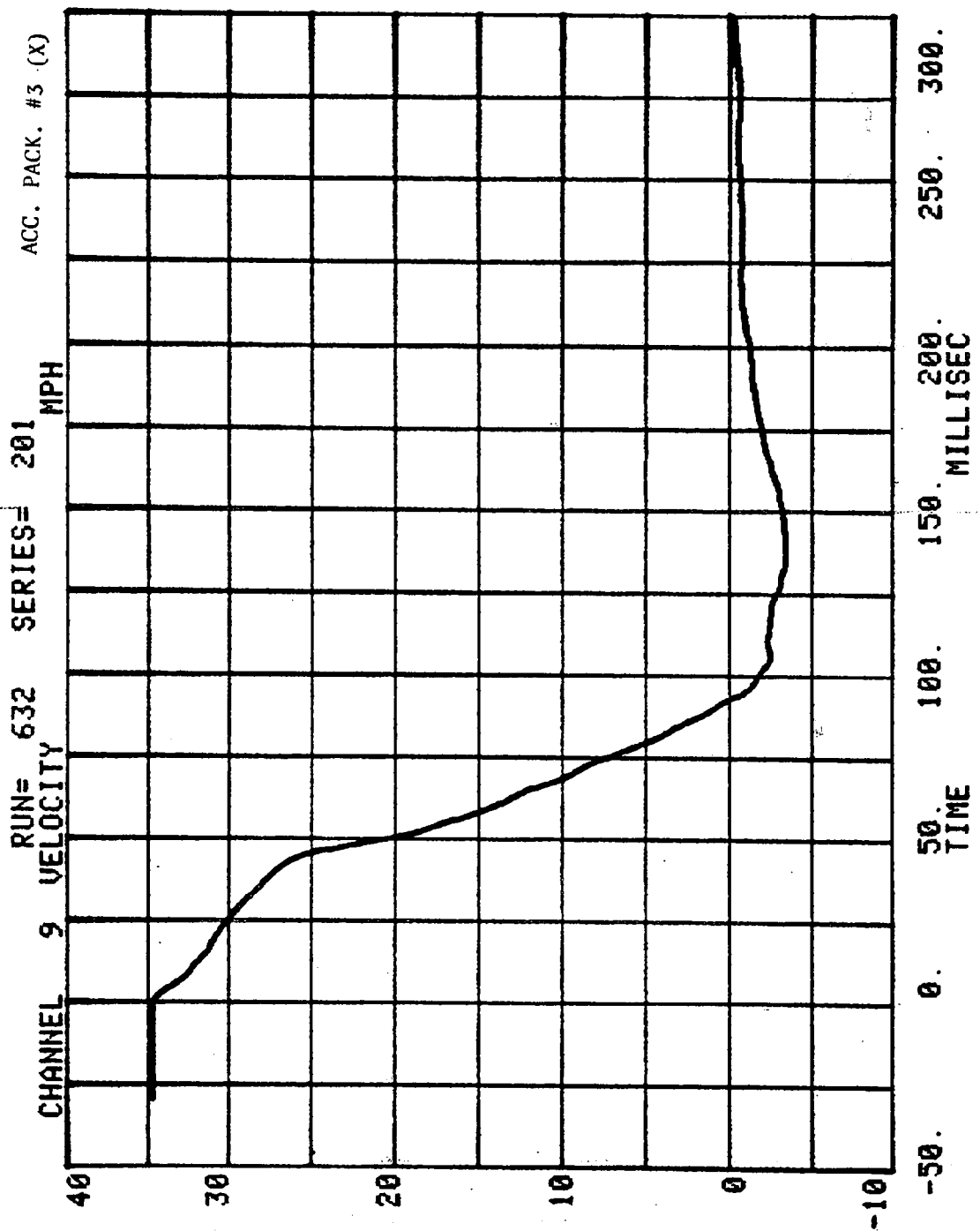


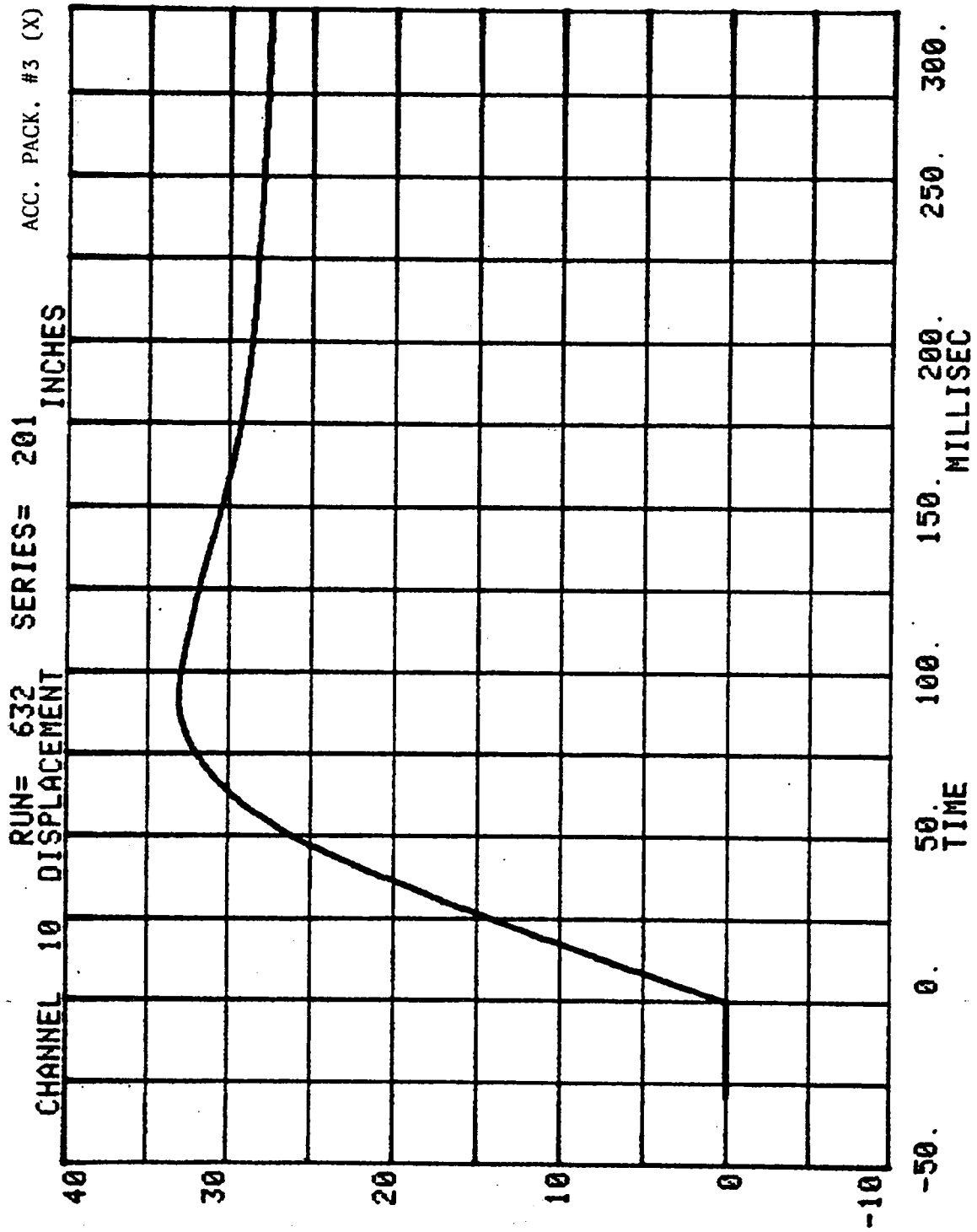


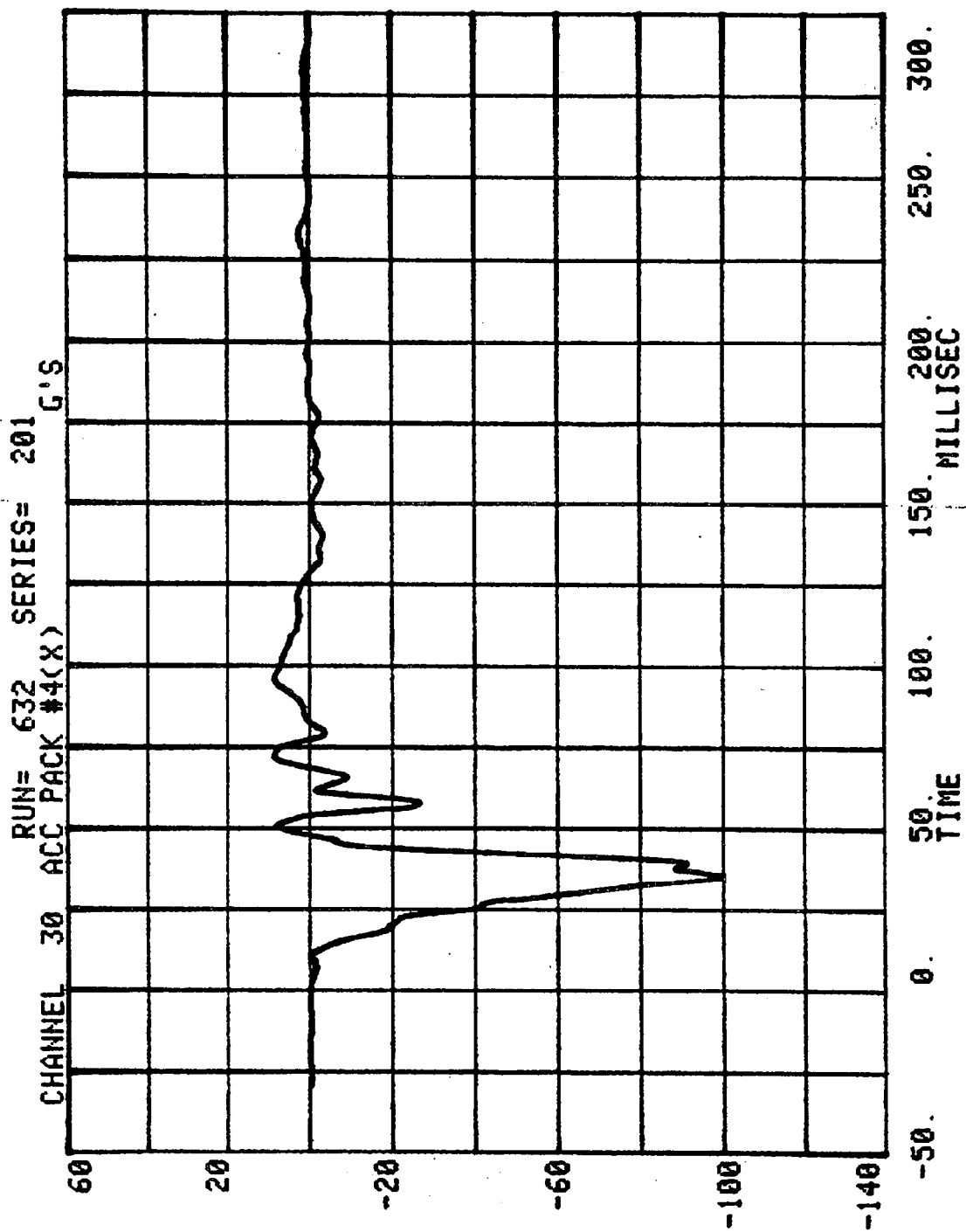


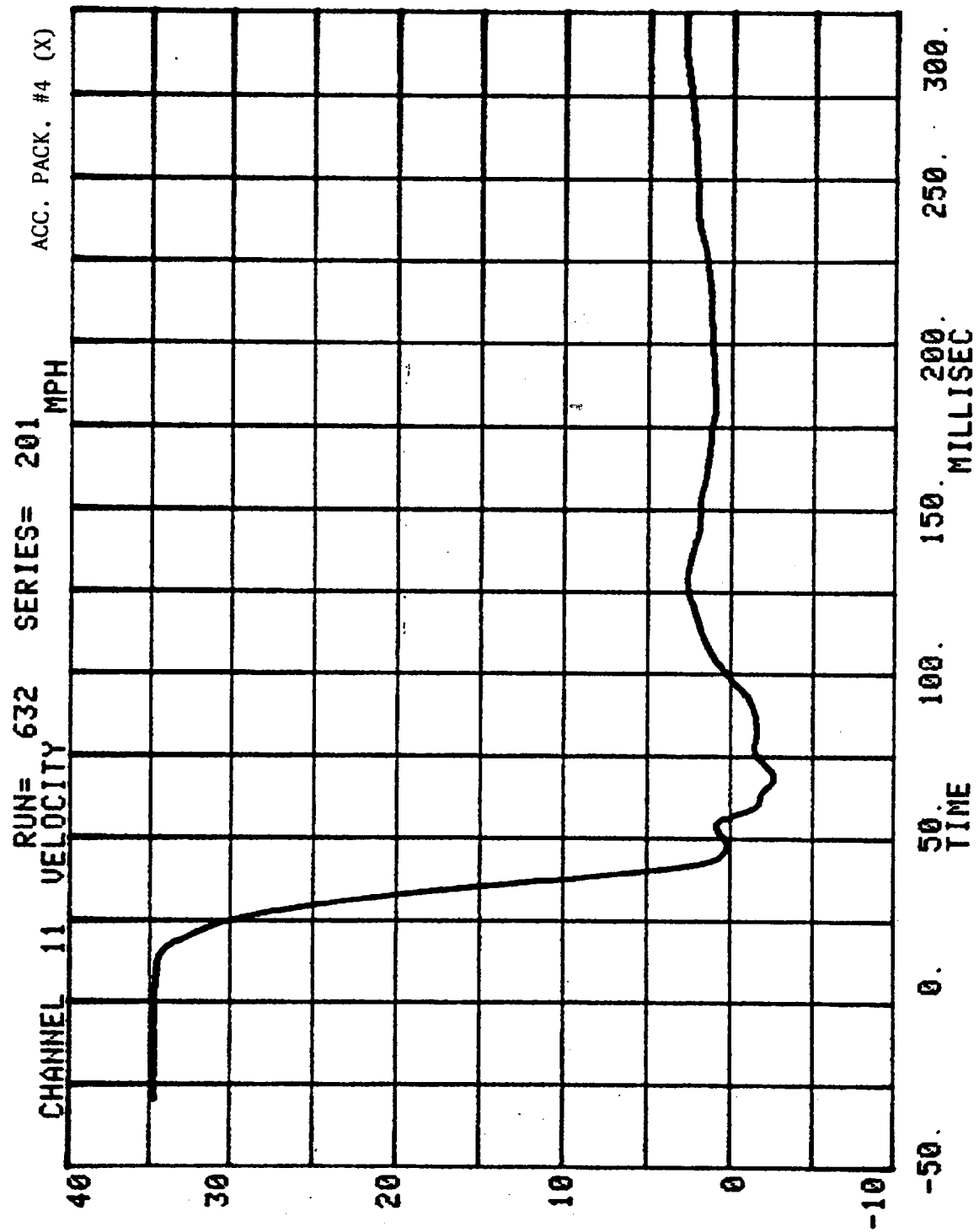
CHANNEL 29 ACC PACK #3(X) RUN= 632 SERIES= 201 G'S

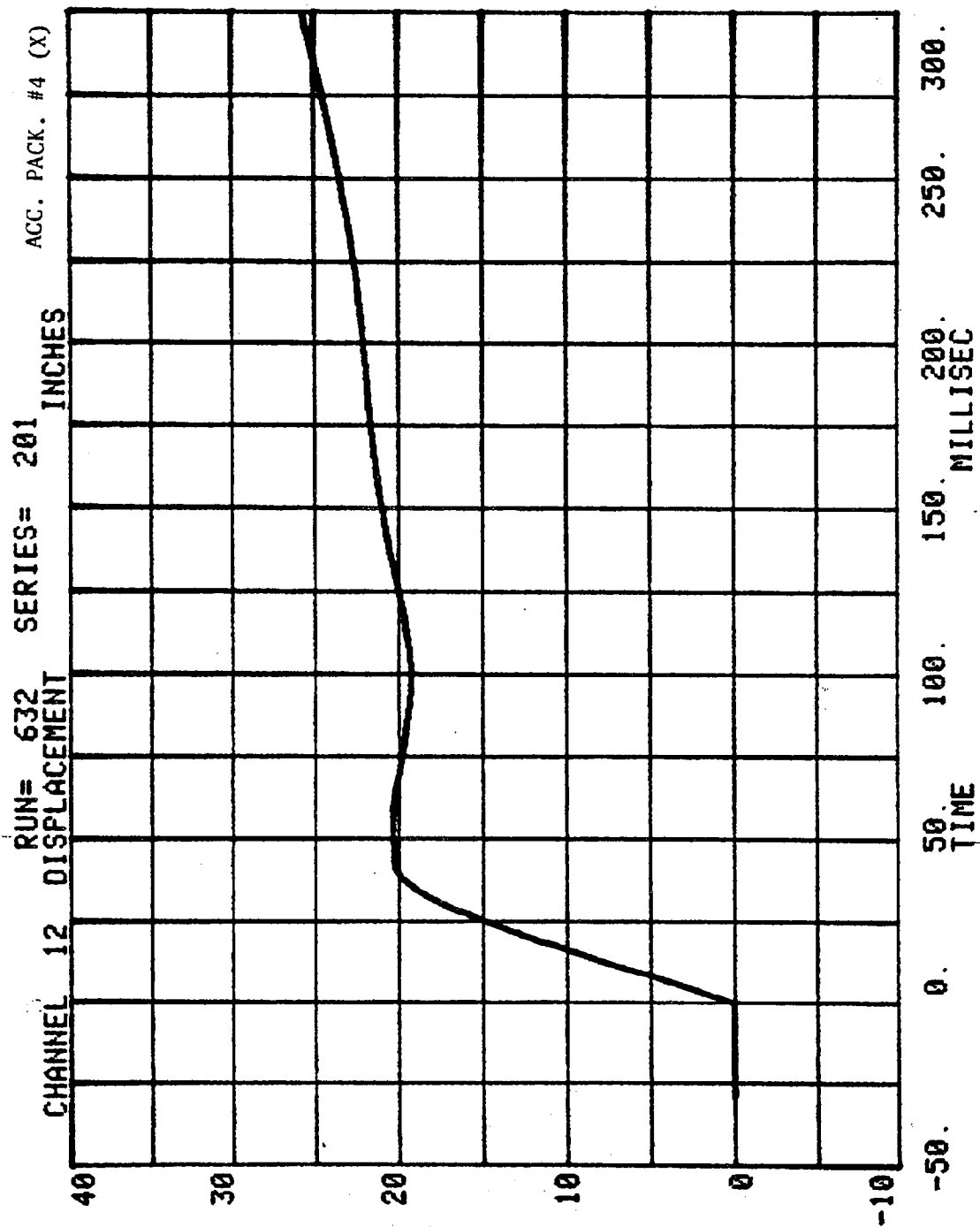




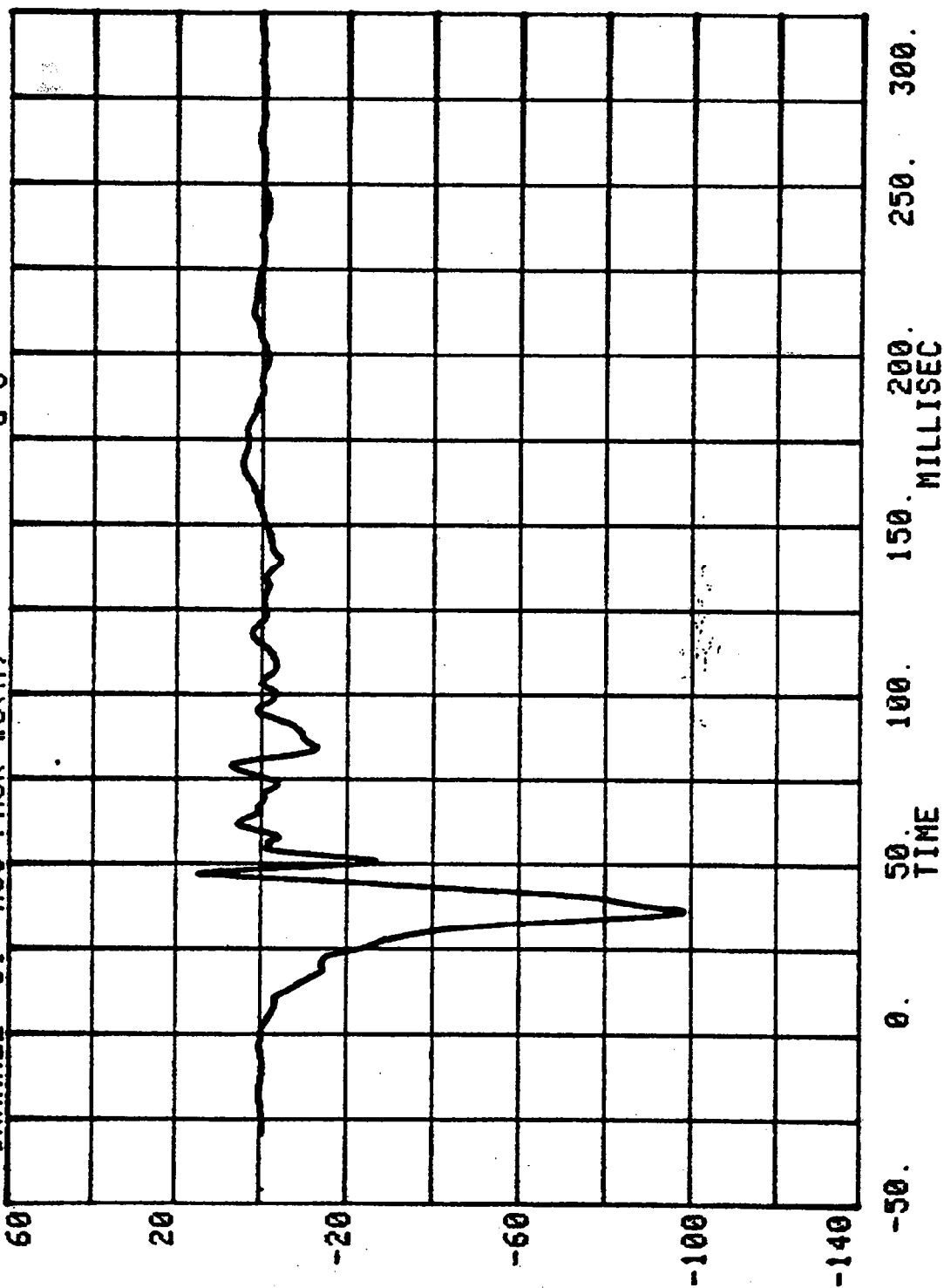


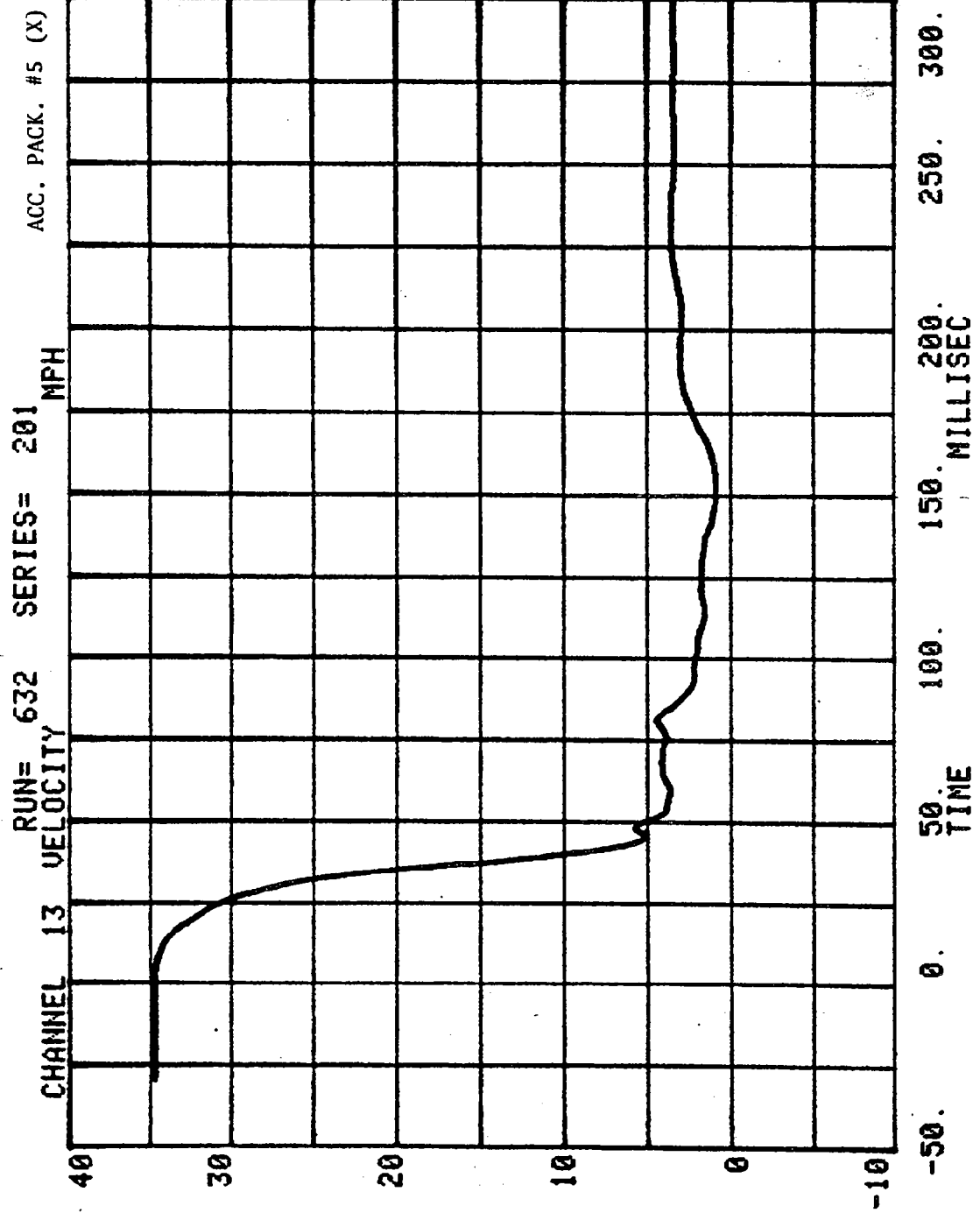


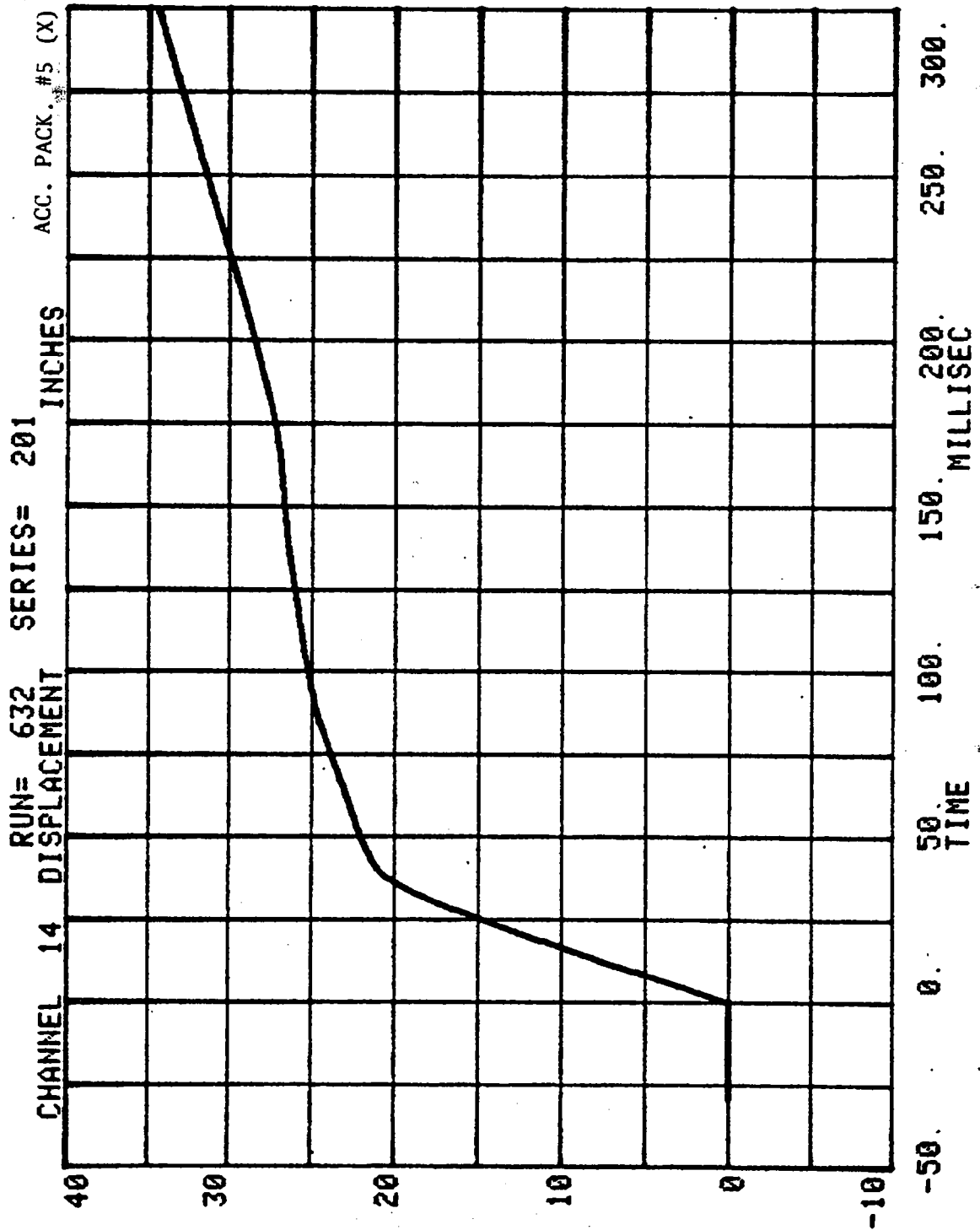




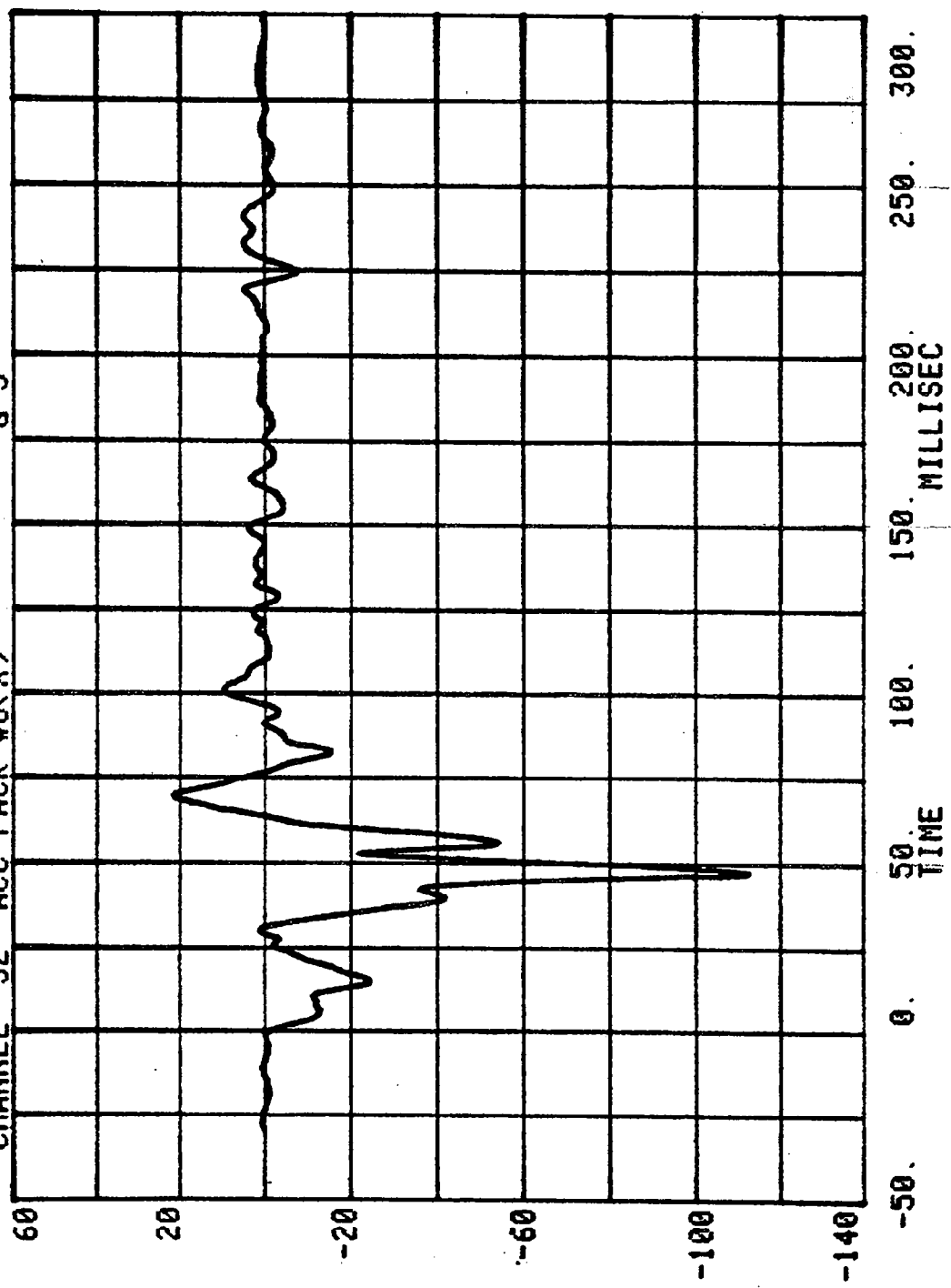
CHANNEL 31 ACC PACK #5(X) RUN= 632 SERIES= 201 G'S

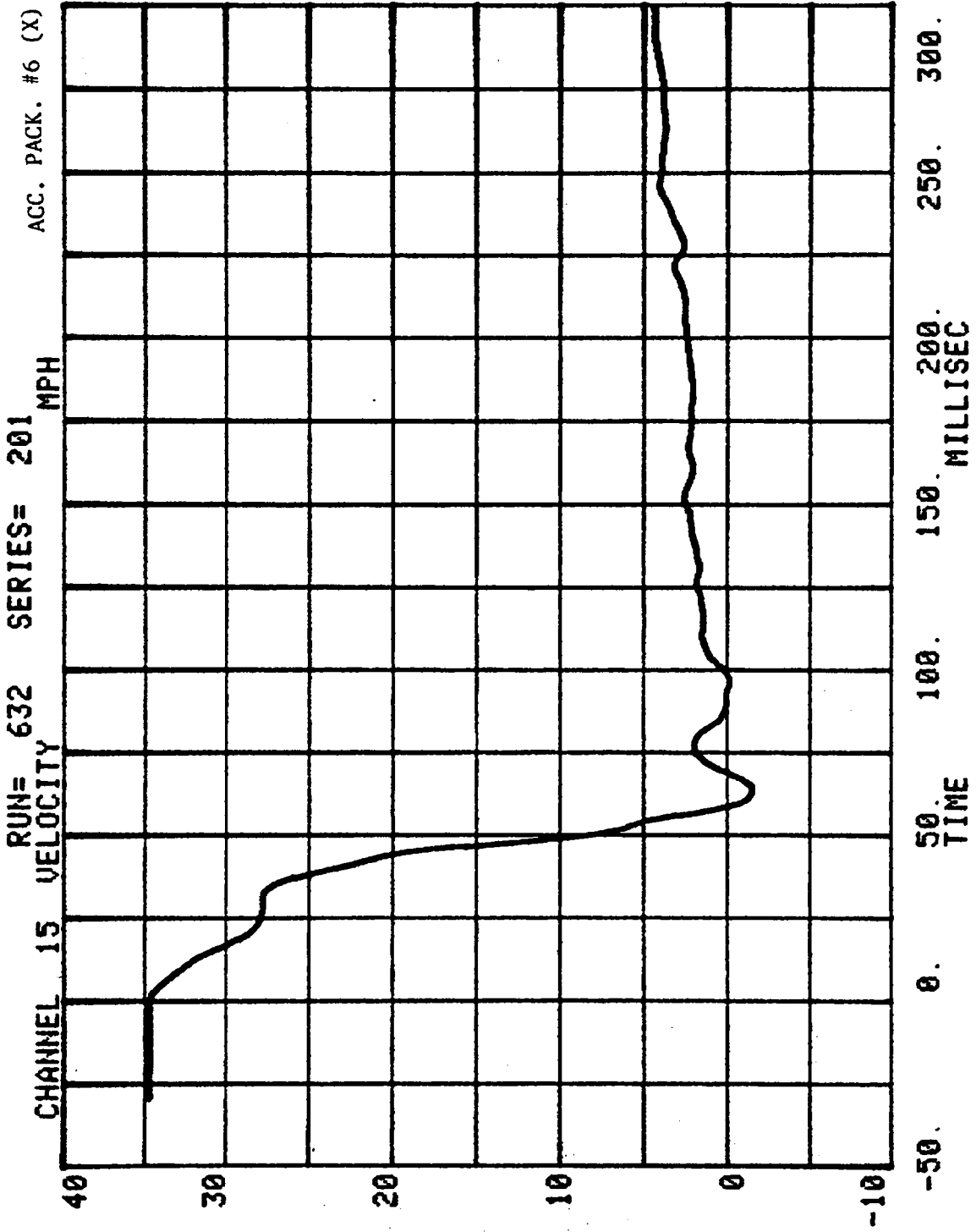


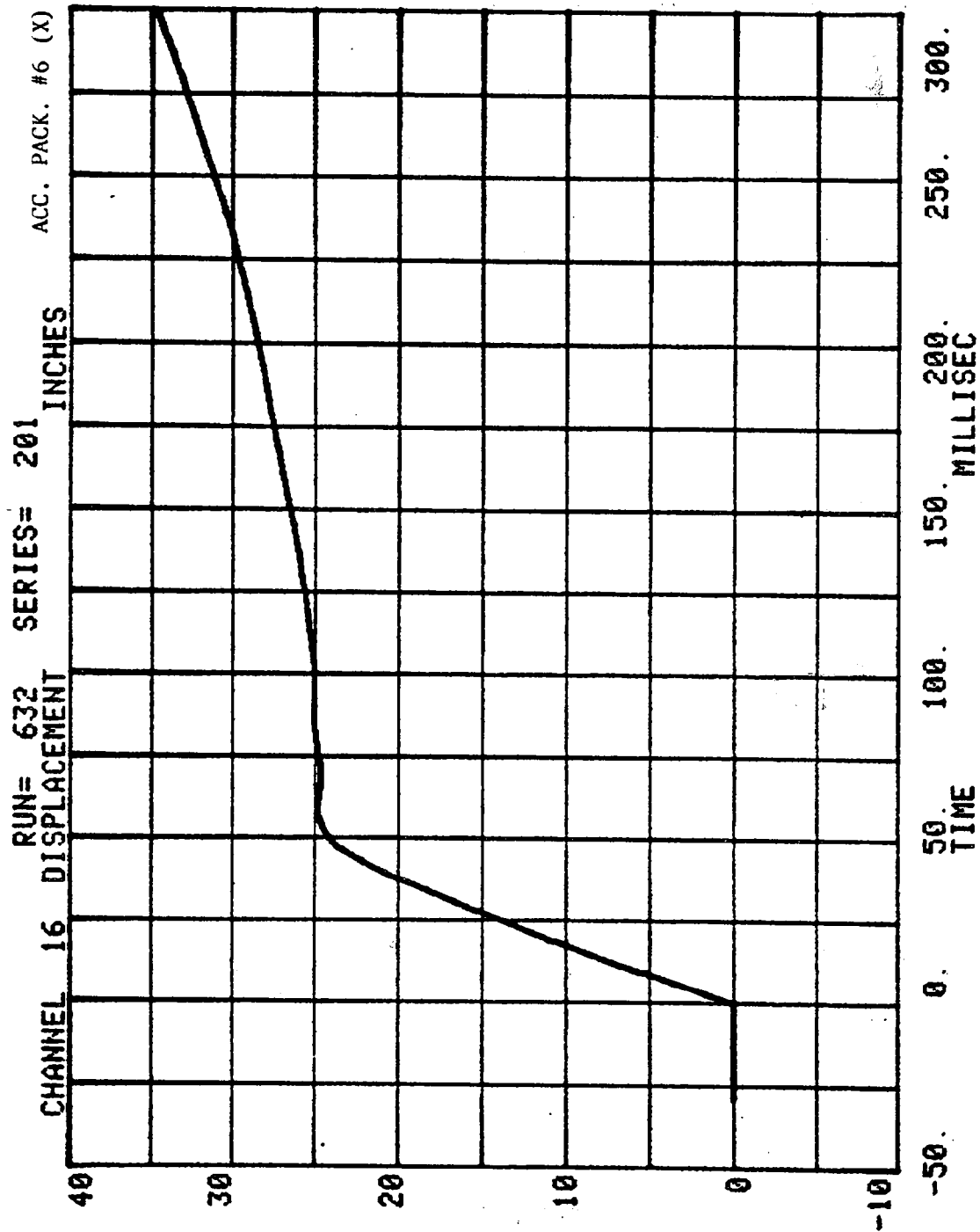


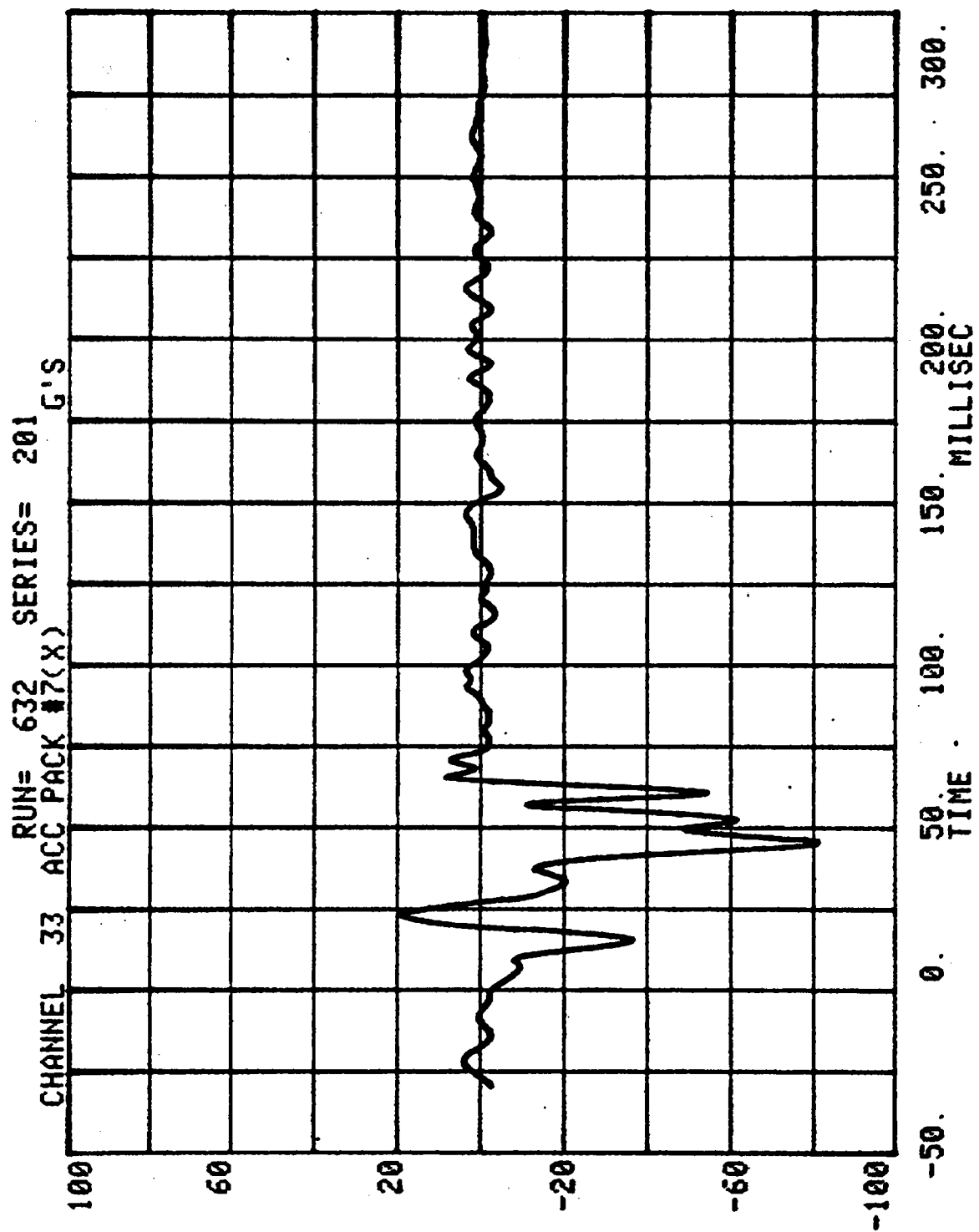


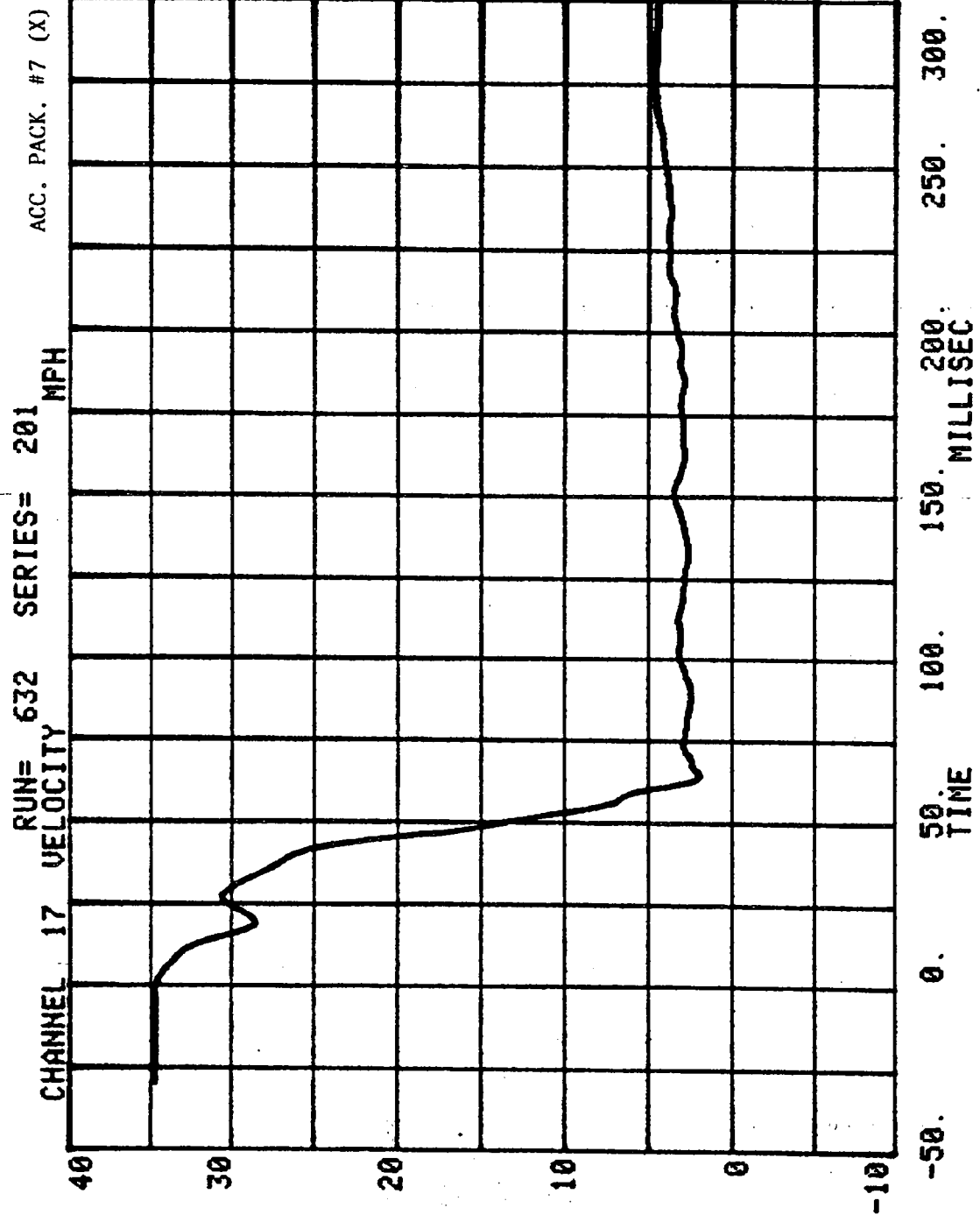
CHANNEL 32 ACC PACK #6(X) RUN= 632 SERIES= 201 G'S

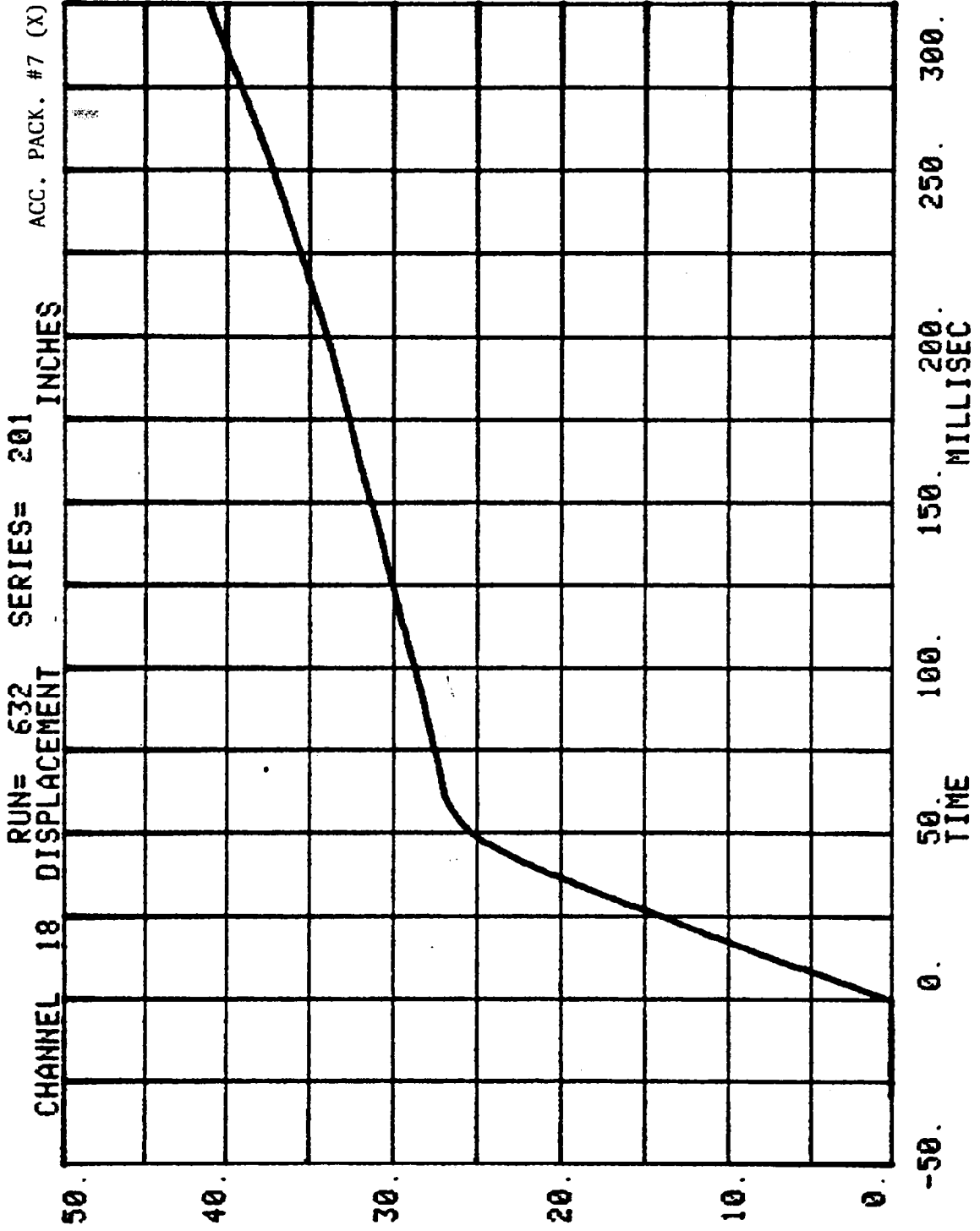










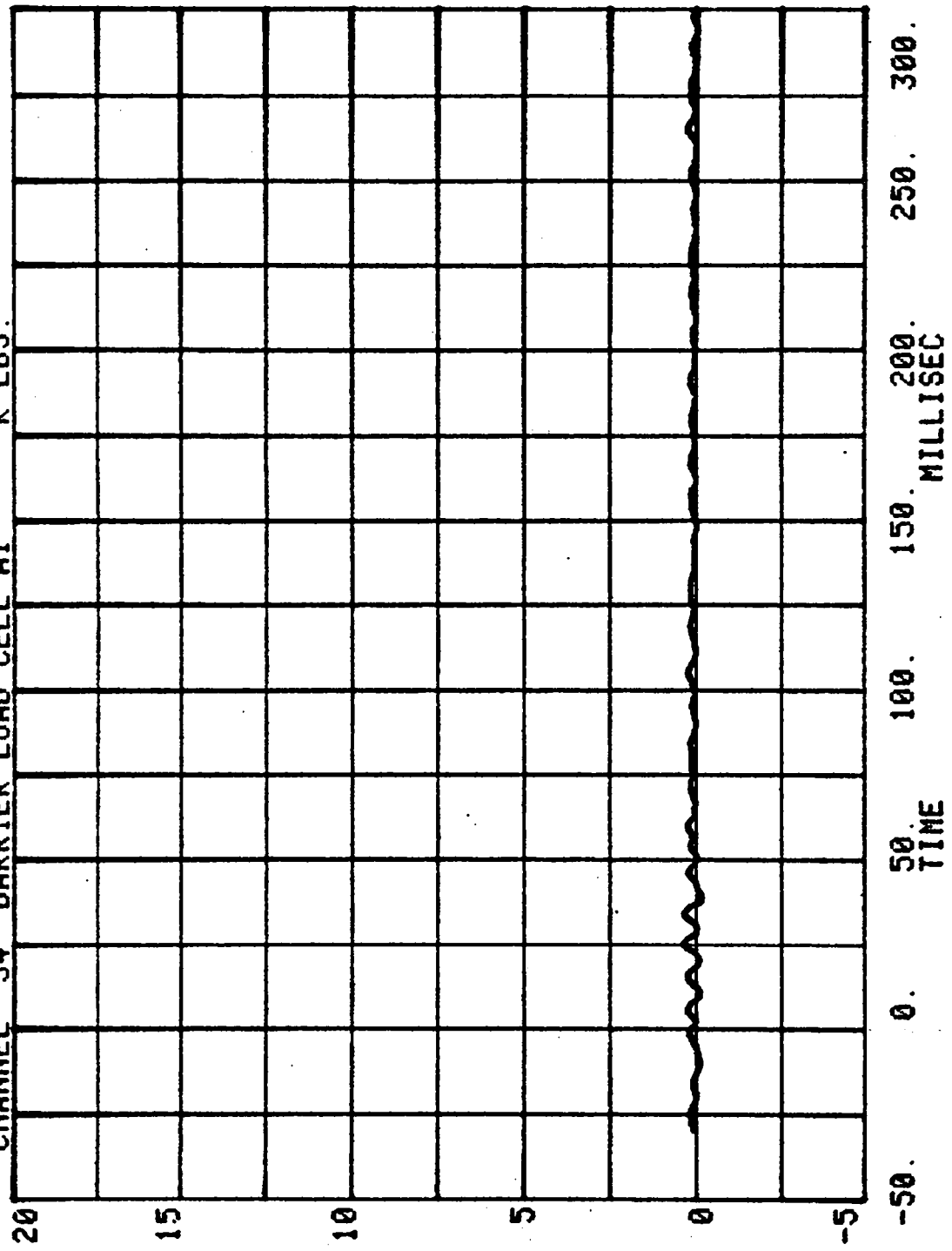


TEST NO. ME0201

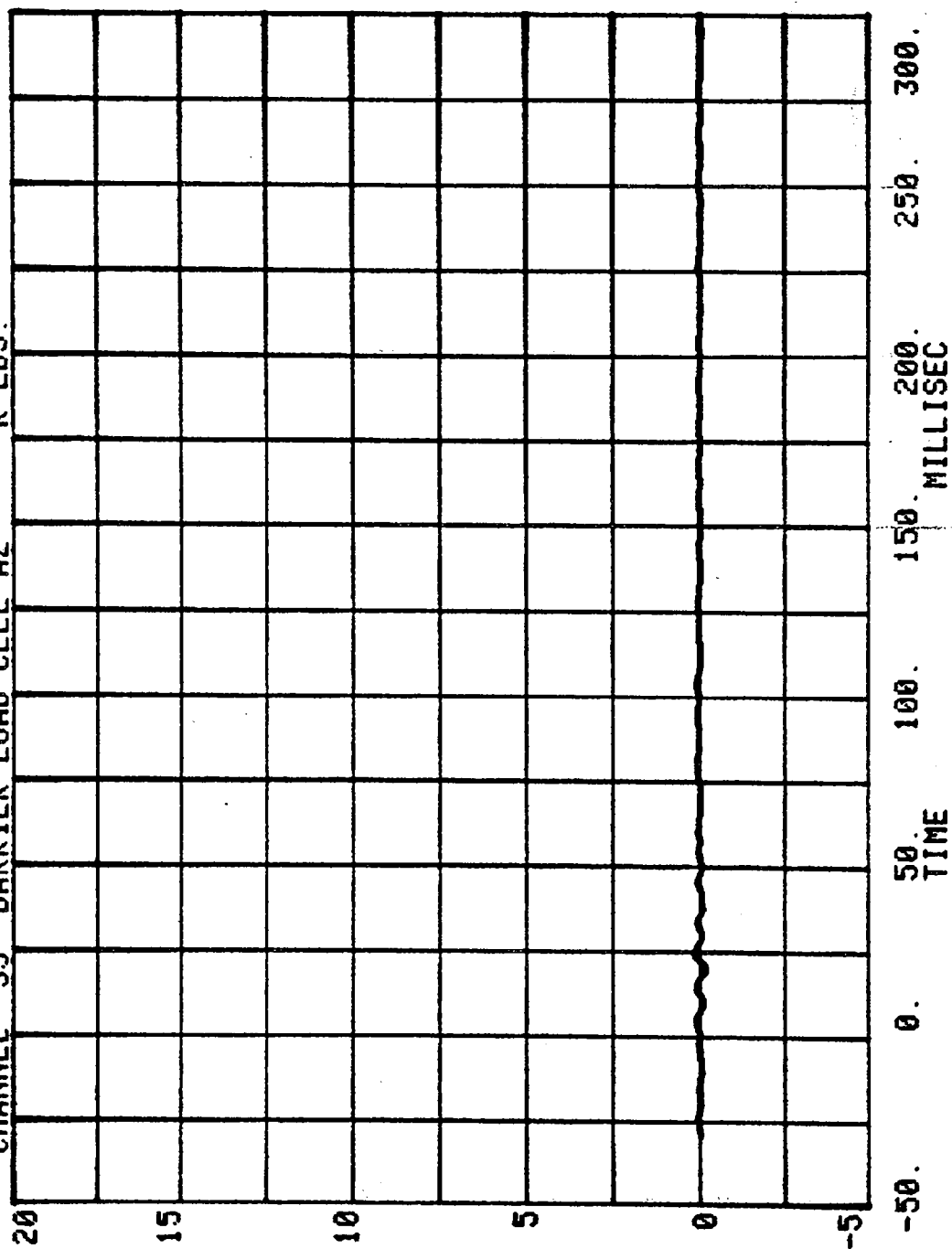
LOAD CELL BARRIER DATA
FILTER CHANNEL CLASS

60

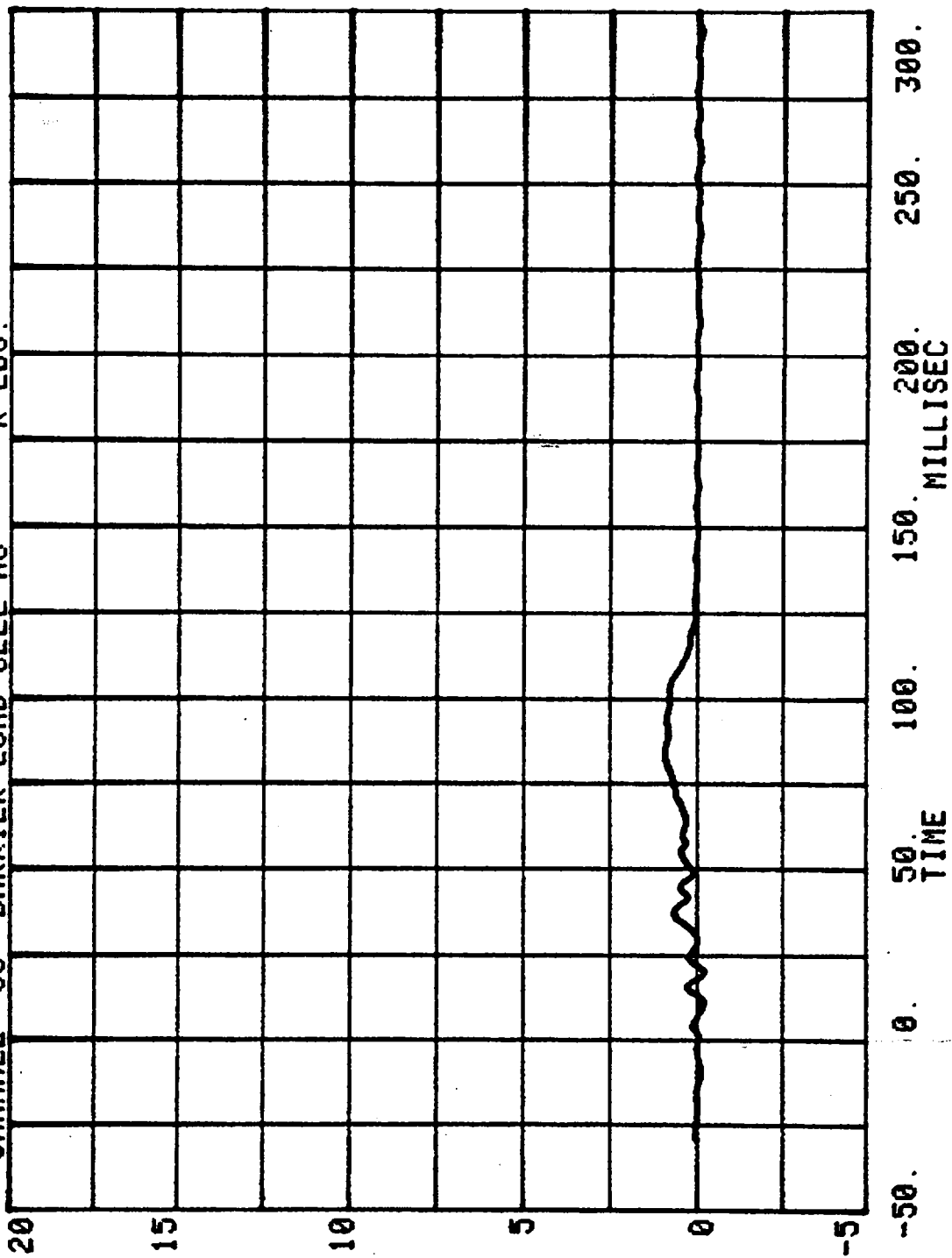
CHANNEL 34 BARRIER LOAD CELL A1
RUN= 632 SERIES= 201 K LBS.



RUN= 632 SERIES= 201
CHANNEL 35 BARRIER LOAD CELL A2 K LBS.

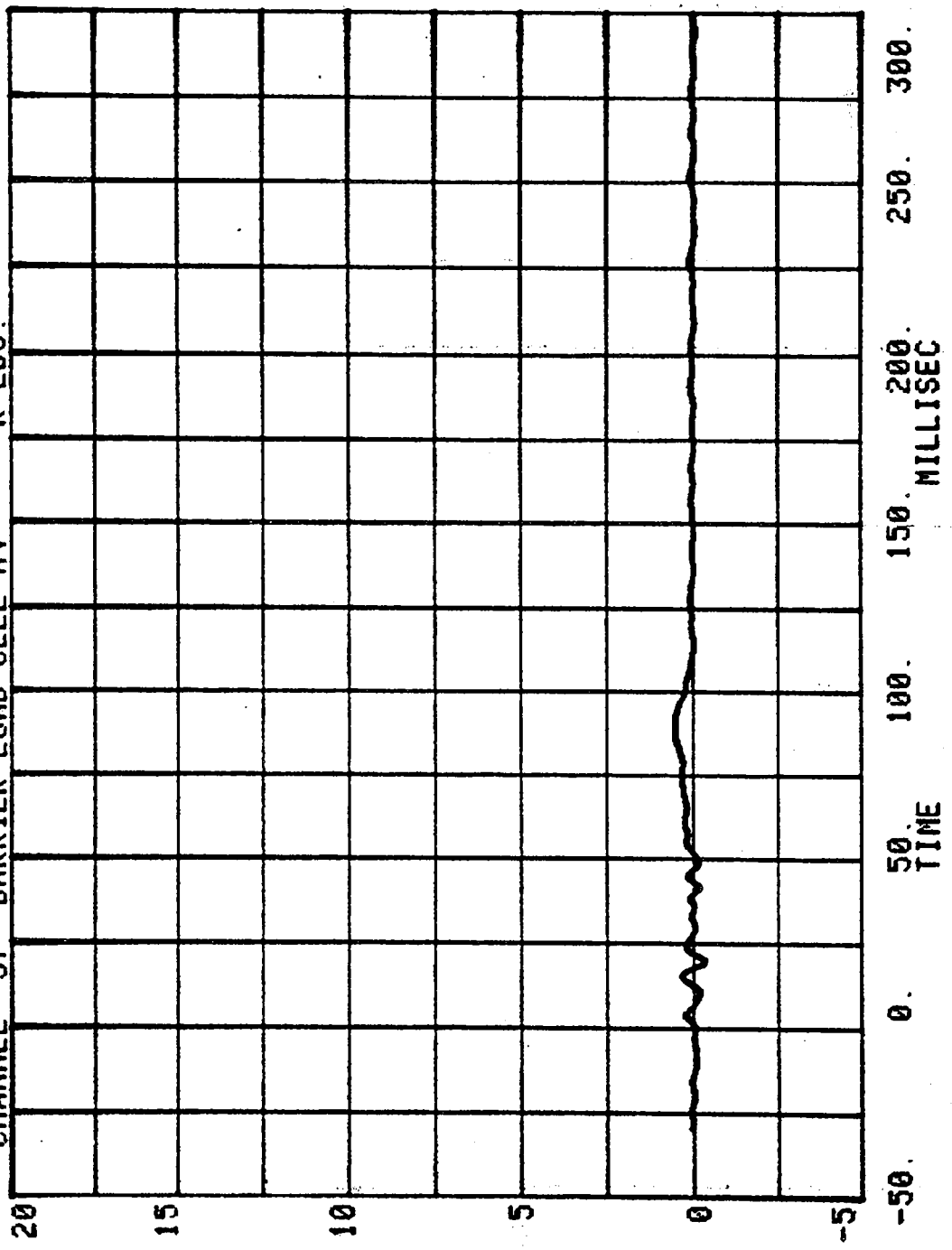


RUN= 632 SERIES= 201
CHANNEL 36 BARRIER LOAD CELL A3 K LBS.

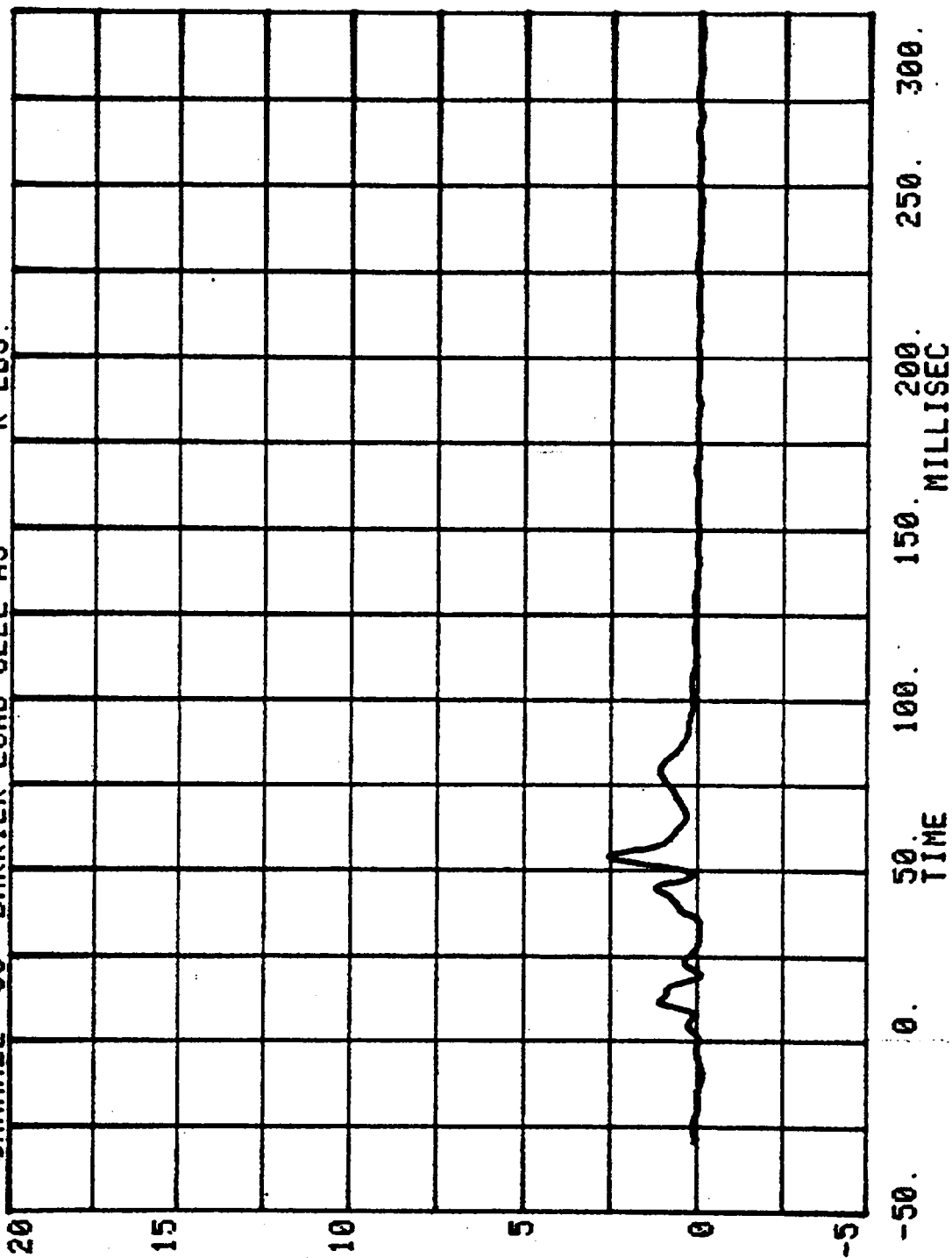


CHANNEL 37 BARRIER LOAD CELL #4 K LBS.

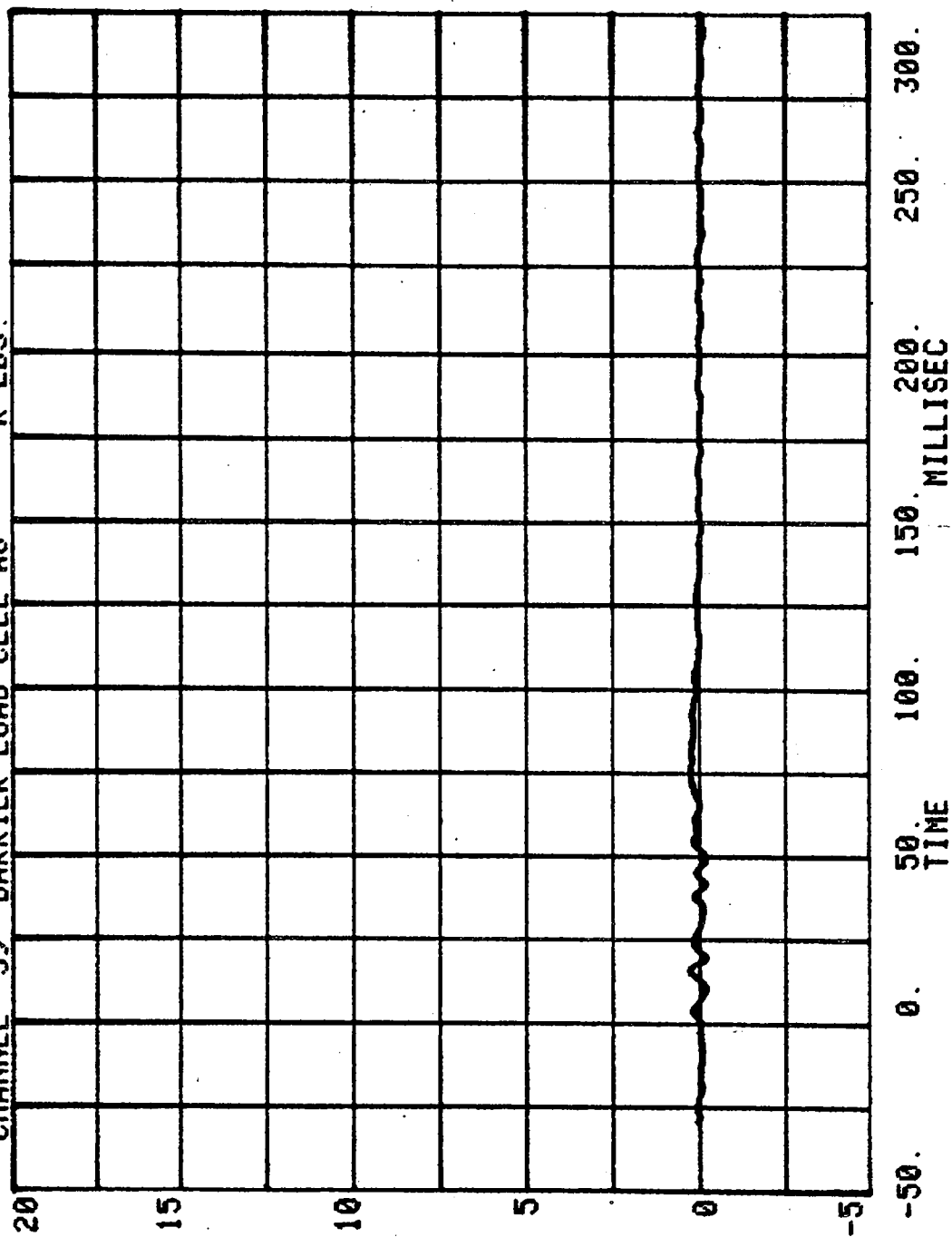
RUN= 632 SERIES= 201



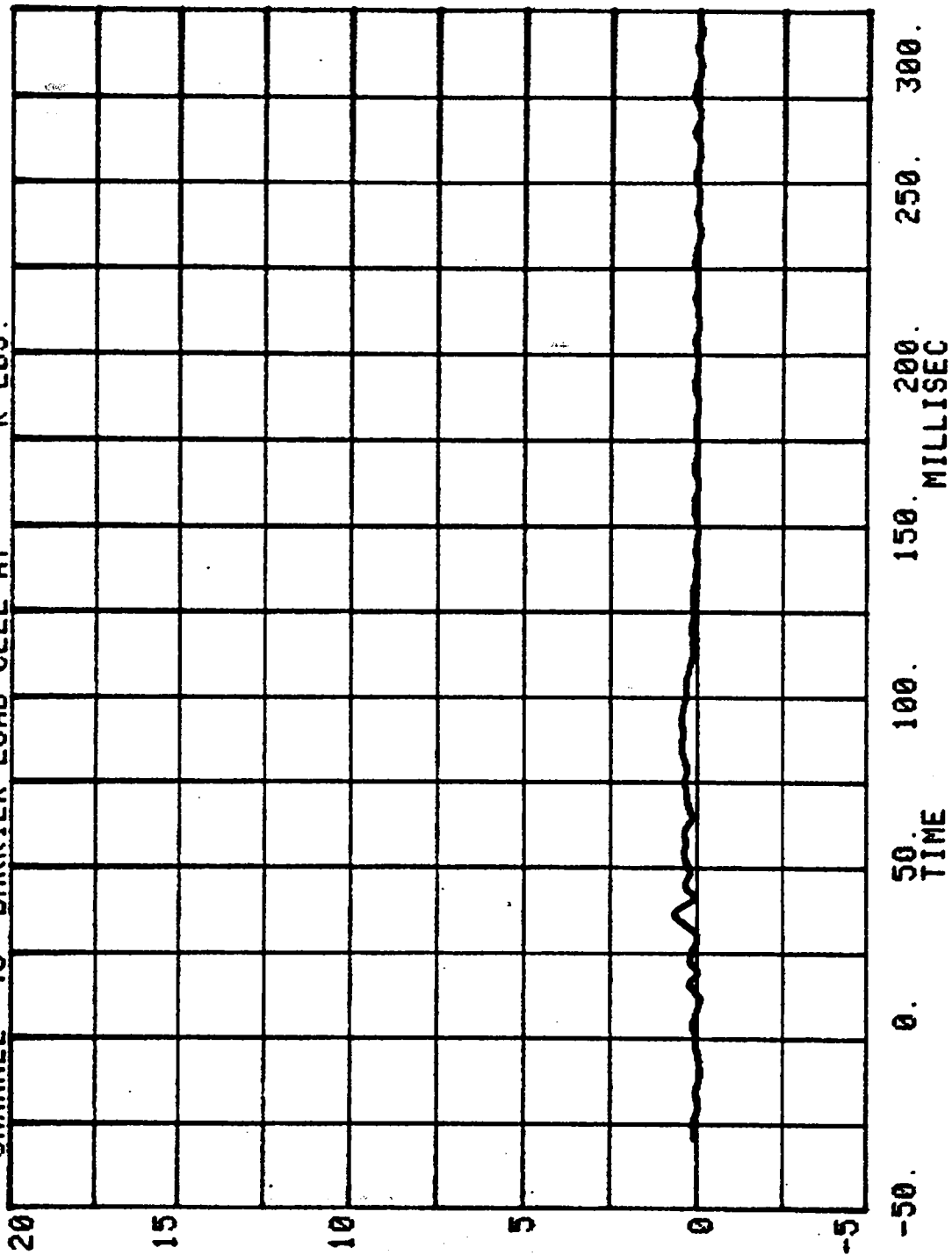
CHANNEL 38 BARRIER LOAD CELL A5 RUN= 632 SERIES= 201 K LBS.



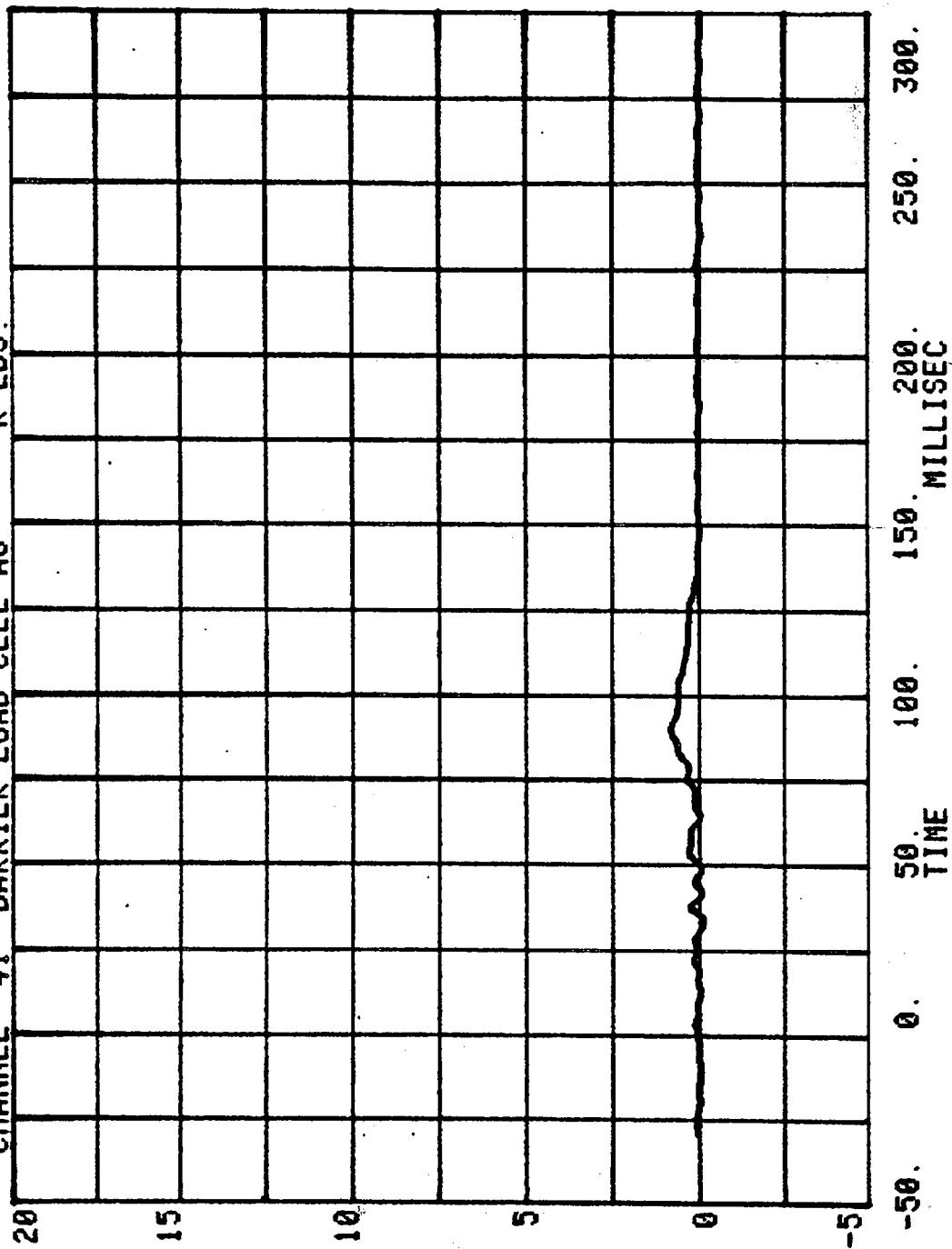
CHANNEL 39 BARRIER LOAD CELL A6 RUN= 632 SERIES= 201 K LBS.



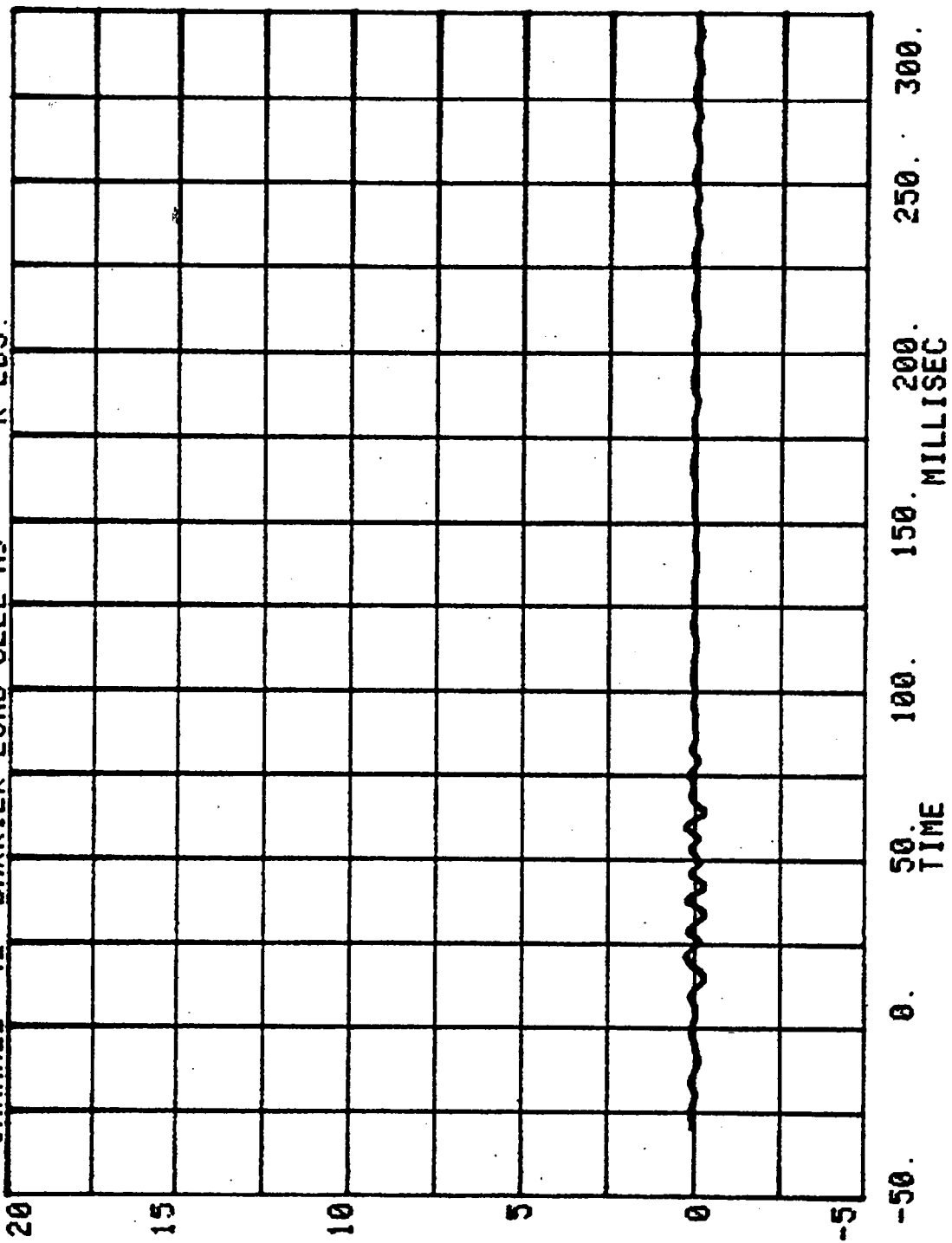
CHANNEL 40 BARRIER LOAD CELL A7 RUN= 632 SERIES= 201 K LBS.



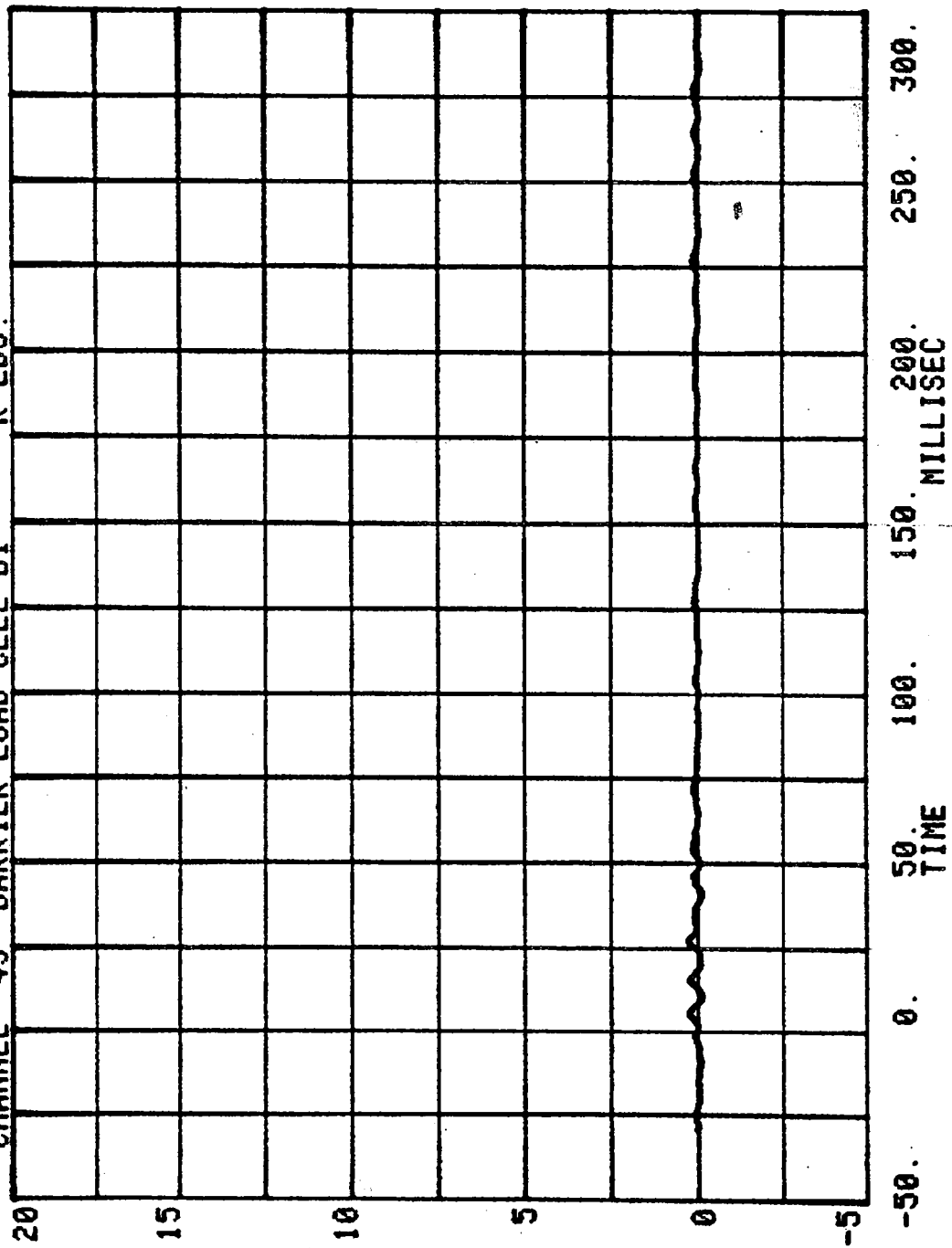
CHANNEL 41 BARRIER LOAD CELL A8 RUN= 632 SERIES= 201 K LBS.



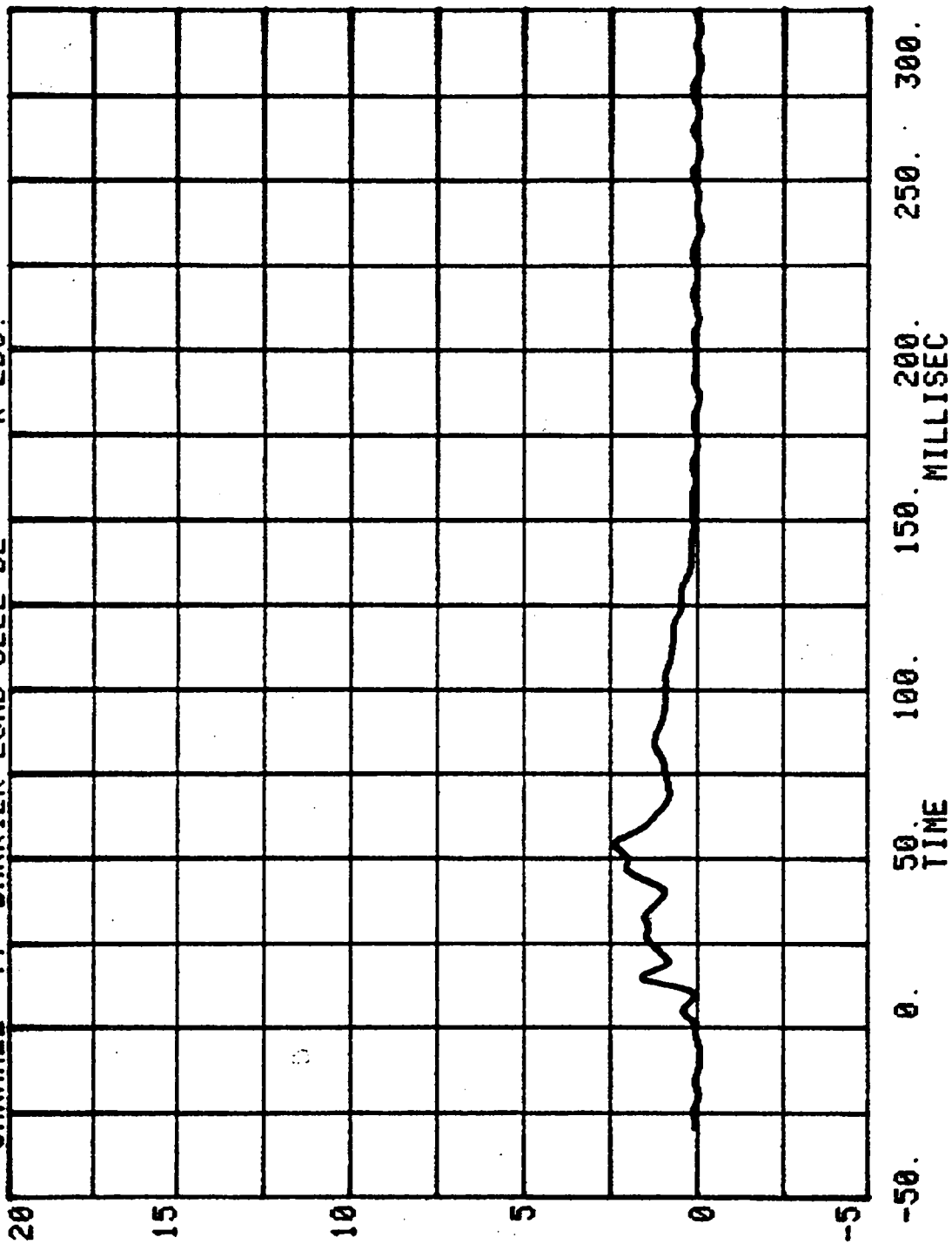
CHANNEL 42 BARRIER LOAD CELL A9 RUN= 632 SERIES= 201 K LBS.

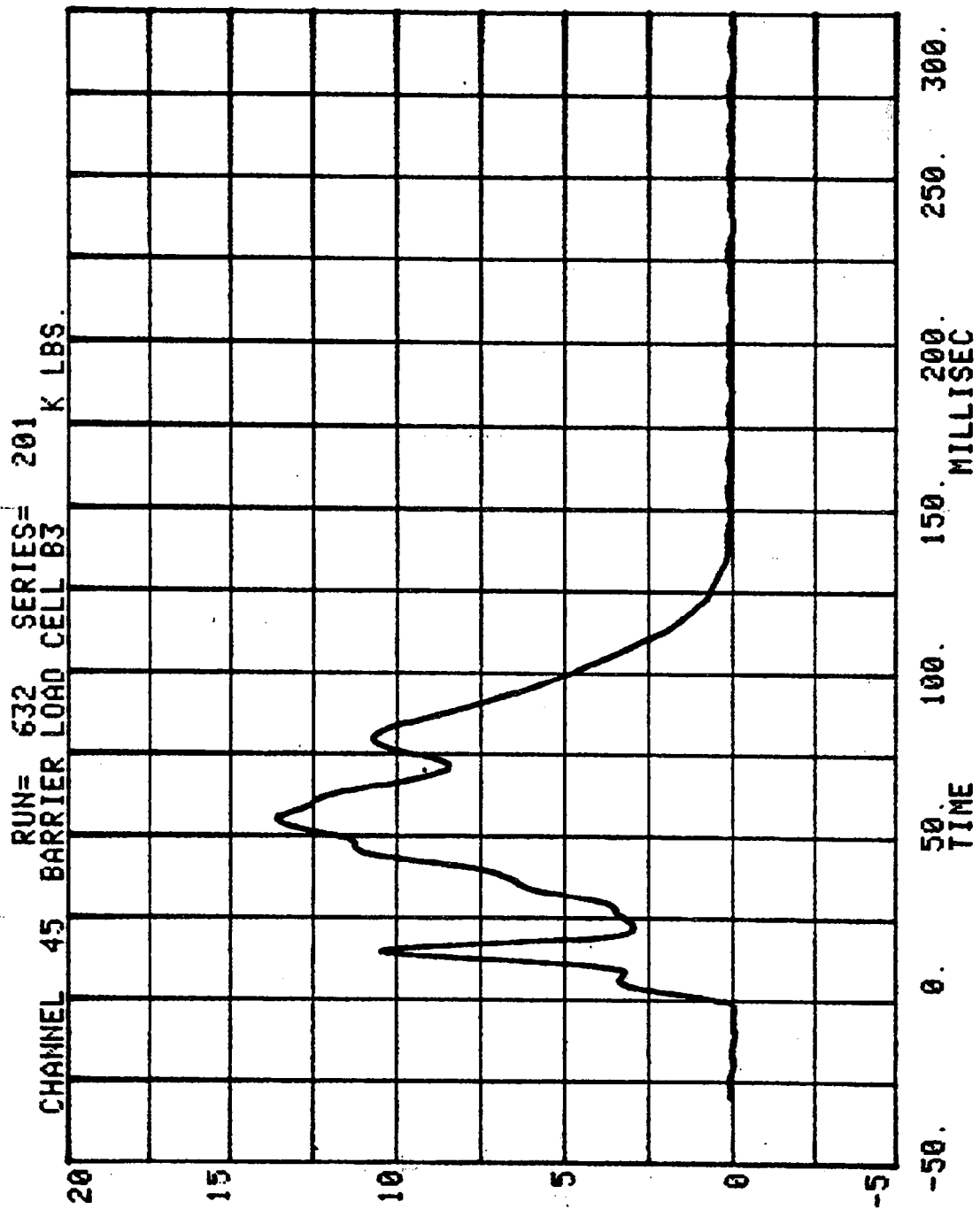


RUN= 632 SERIES= 201
CHANNEL 43 BARRIER LOAD CELL B1 K LBS.

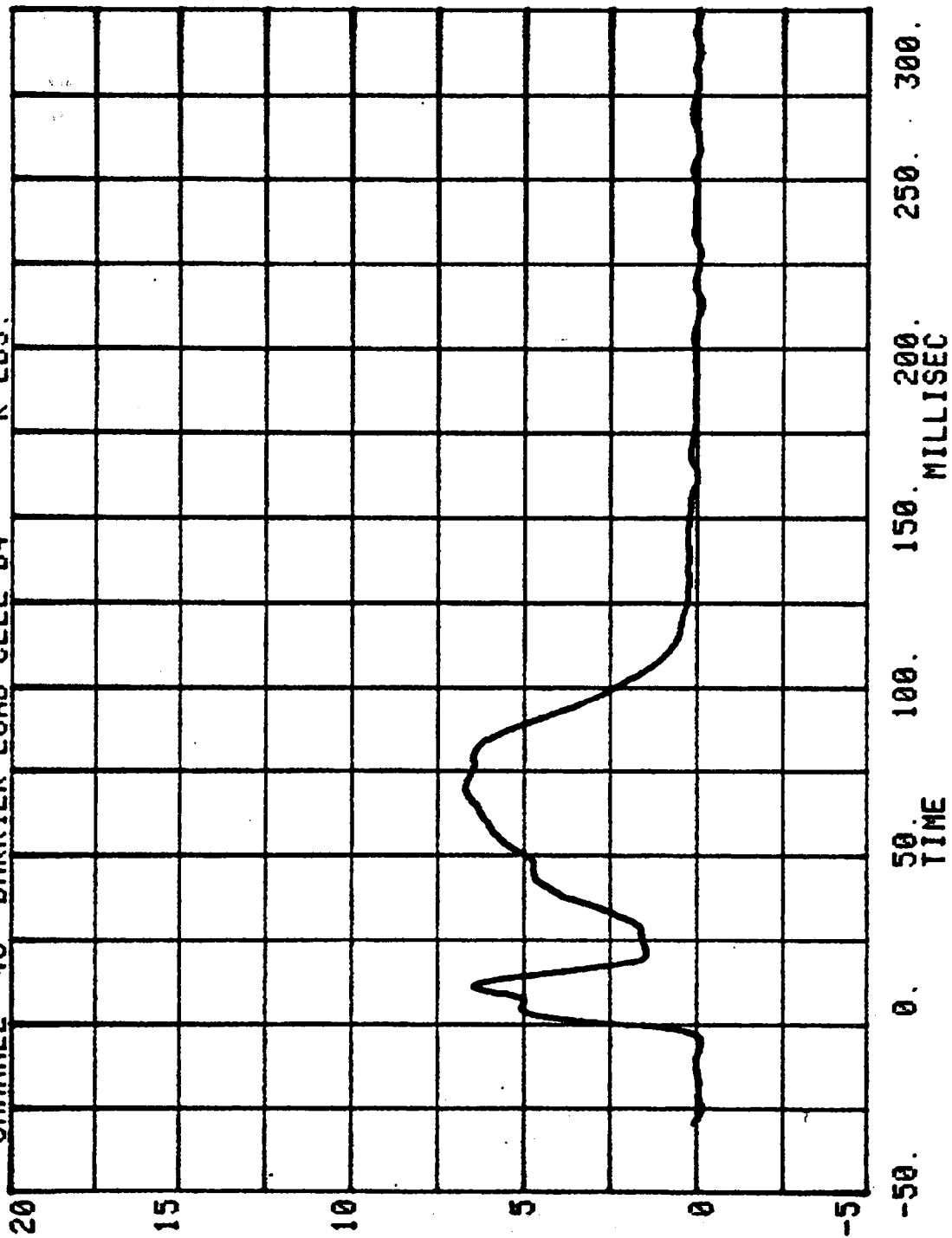


CHANNEL 44 BARRIER LOAD CELL 82 K LBS.
RUN= 632 SERIES= 201





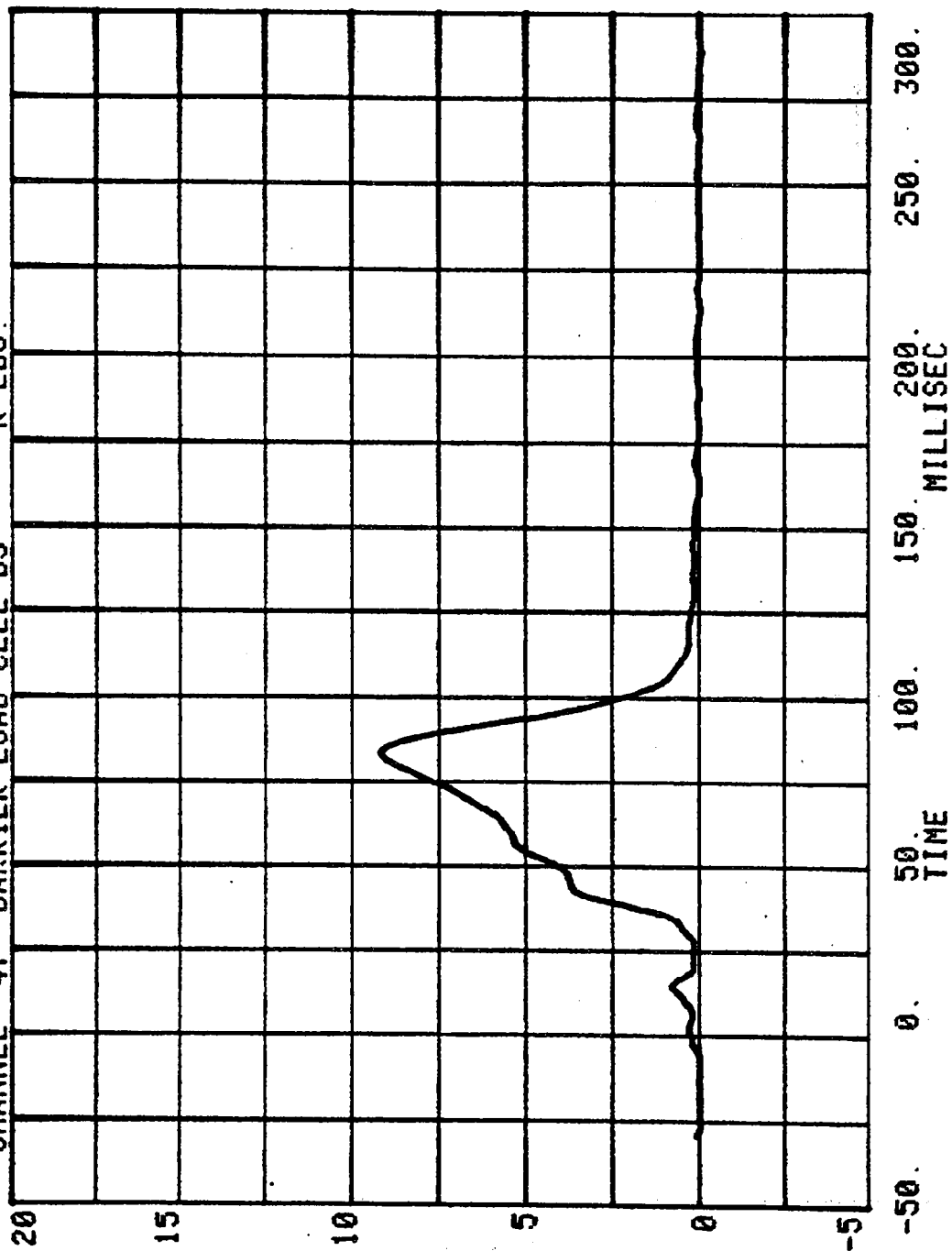
CHANNEL 46 BARRIER LOAD CELL B4
RUN= 632 SERIES= 201 K LBS.



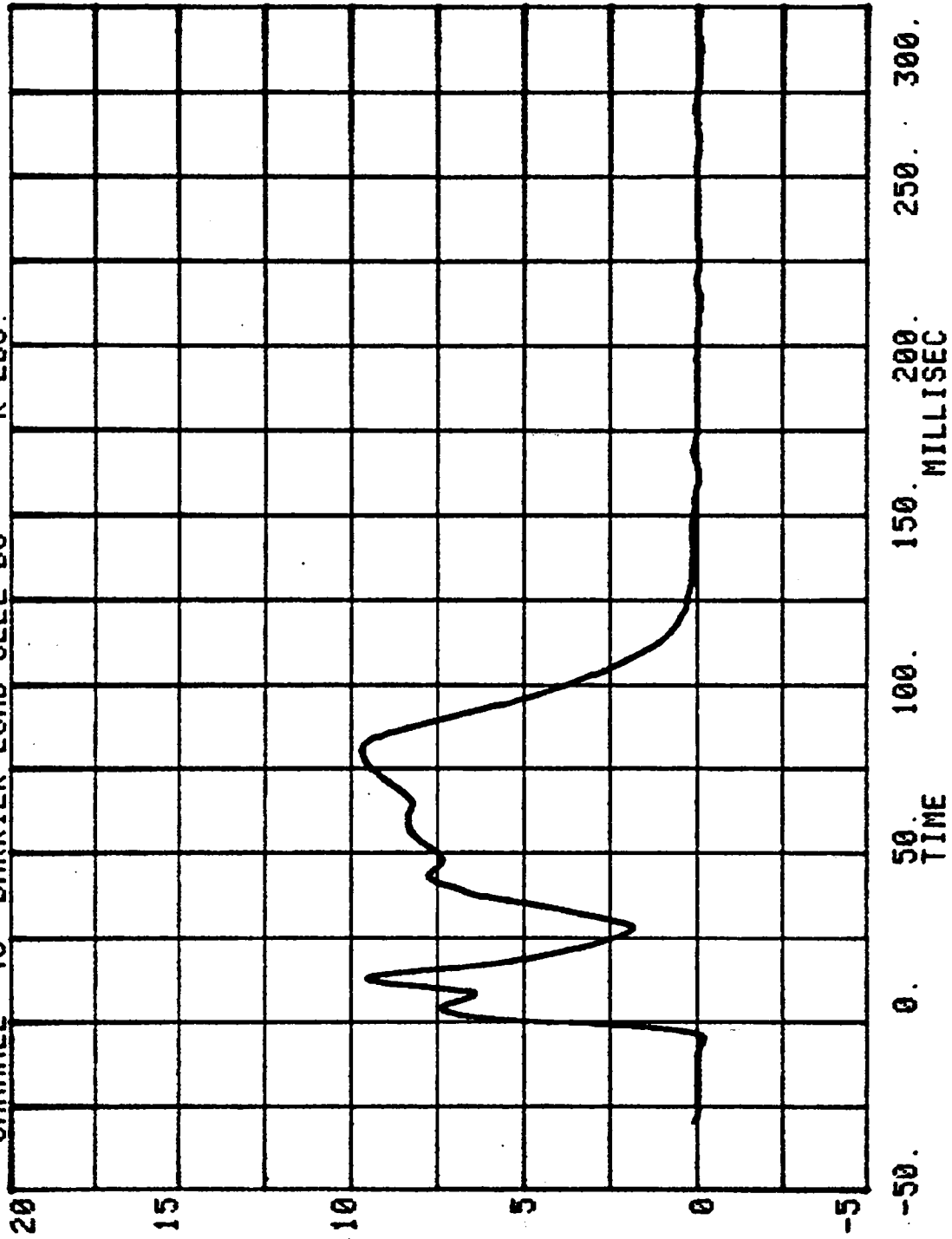
CHANNEL 47 BARRIER LOAD CELL B5

RUN= 632 SERIES= 201

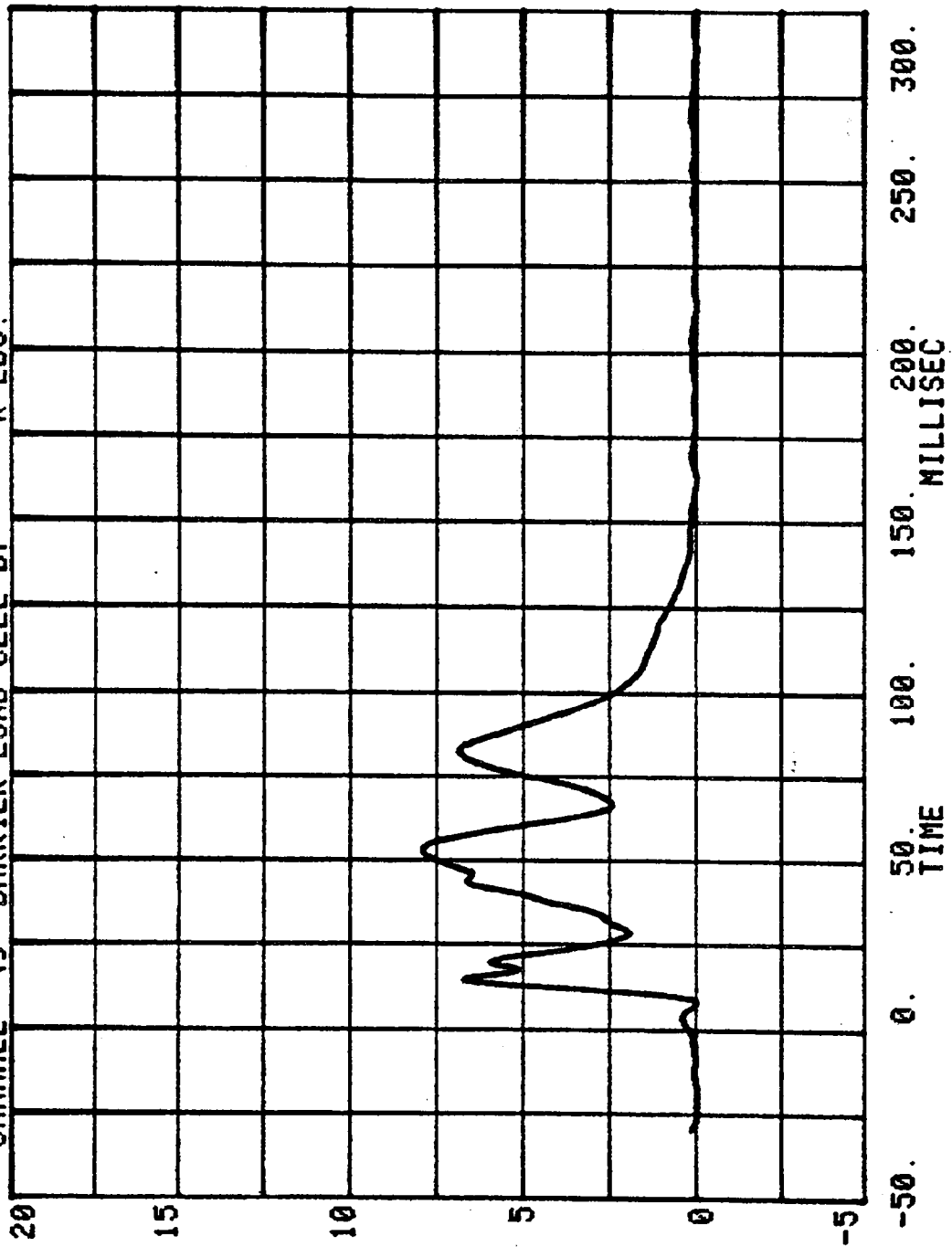
K LBS.



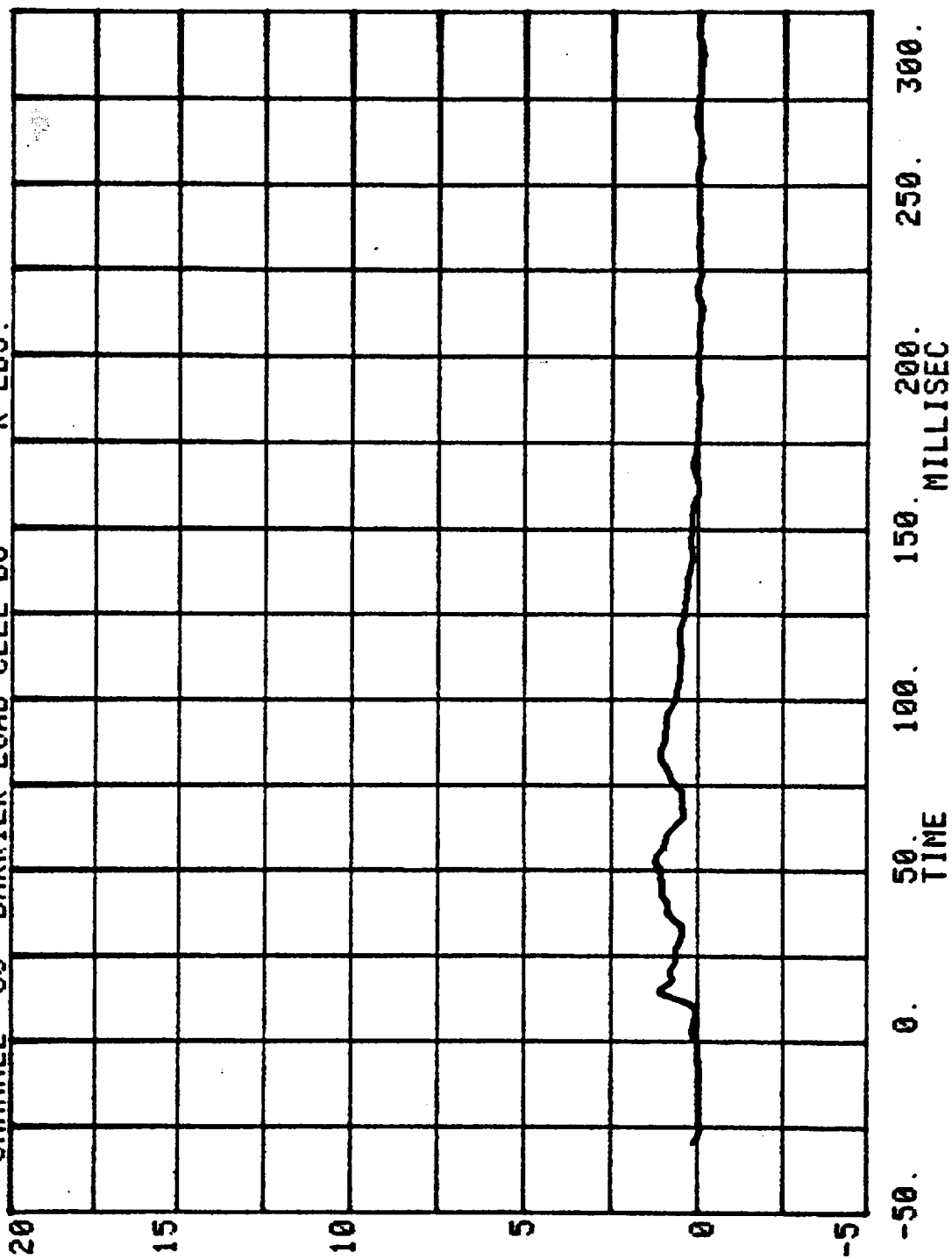
CHANNEL 48 BARRIER LOAD CELL B6 RUN= 632 SERIES= 201 K LBS.



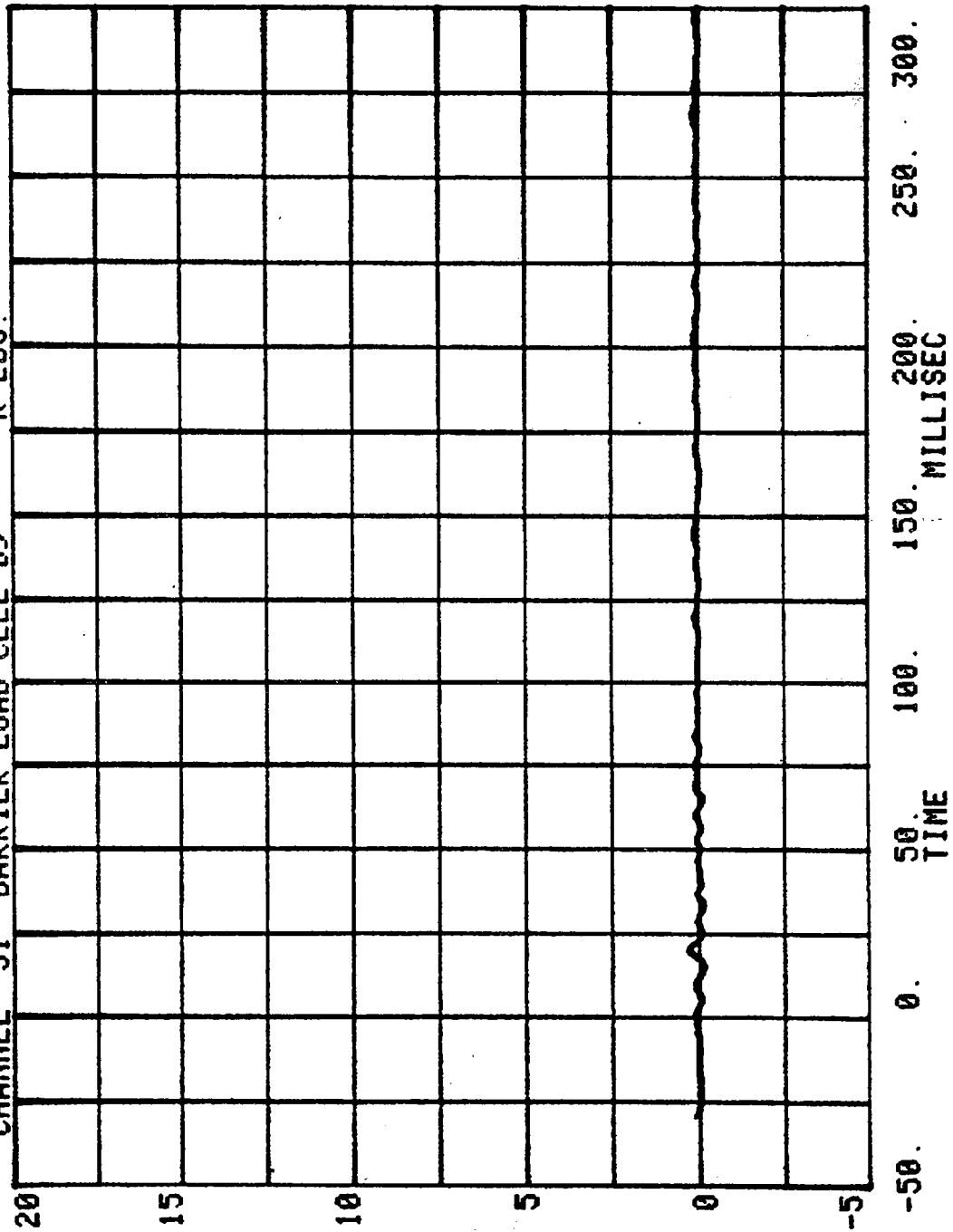
CHANNEL 49 BARRIER LOAD CELL B7
RUN= 632 SERIES= 201 K LBS.



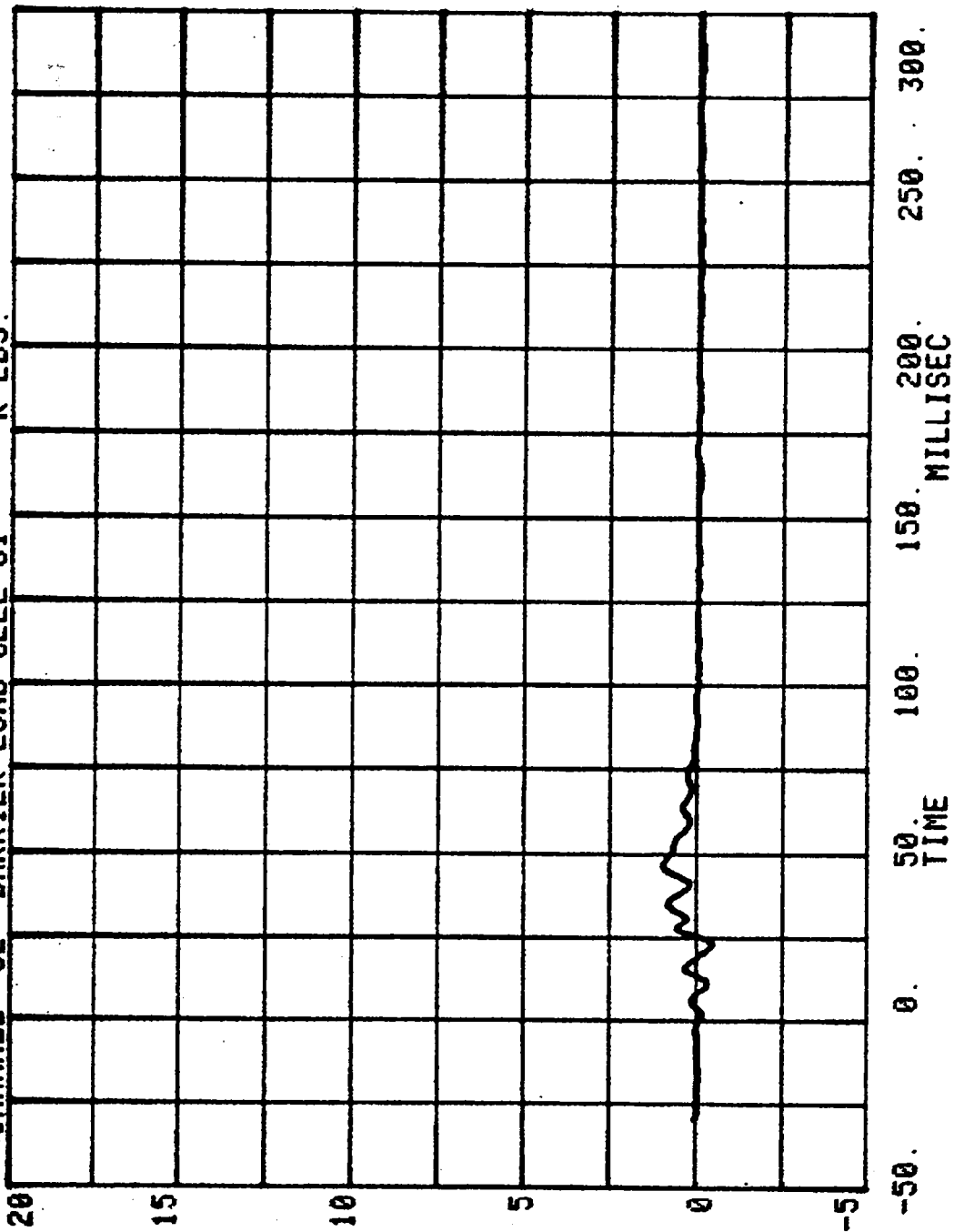
RUN= 632 SERIES= 201
CHANNEL 50 BARRIER LOAD CELL B8 K LBS.

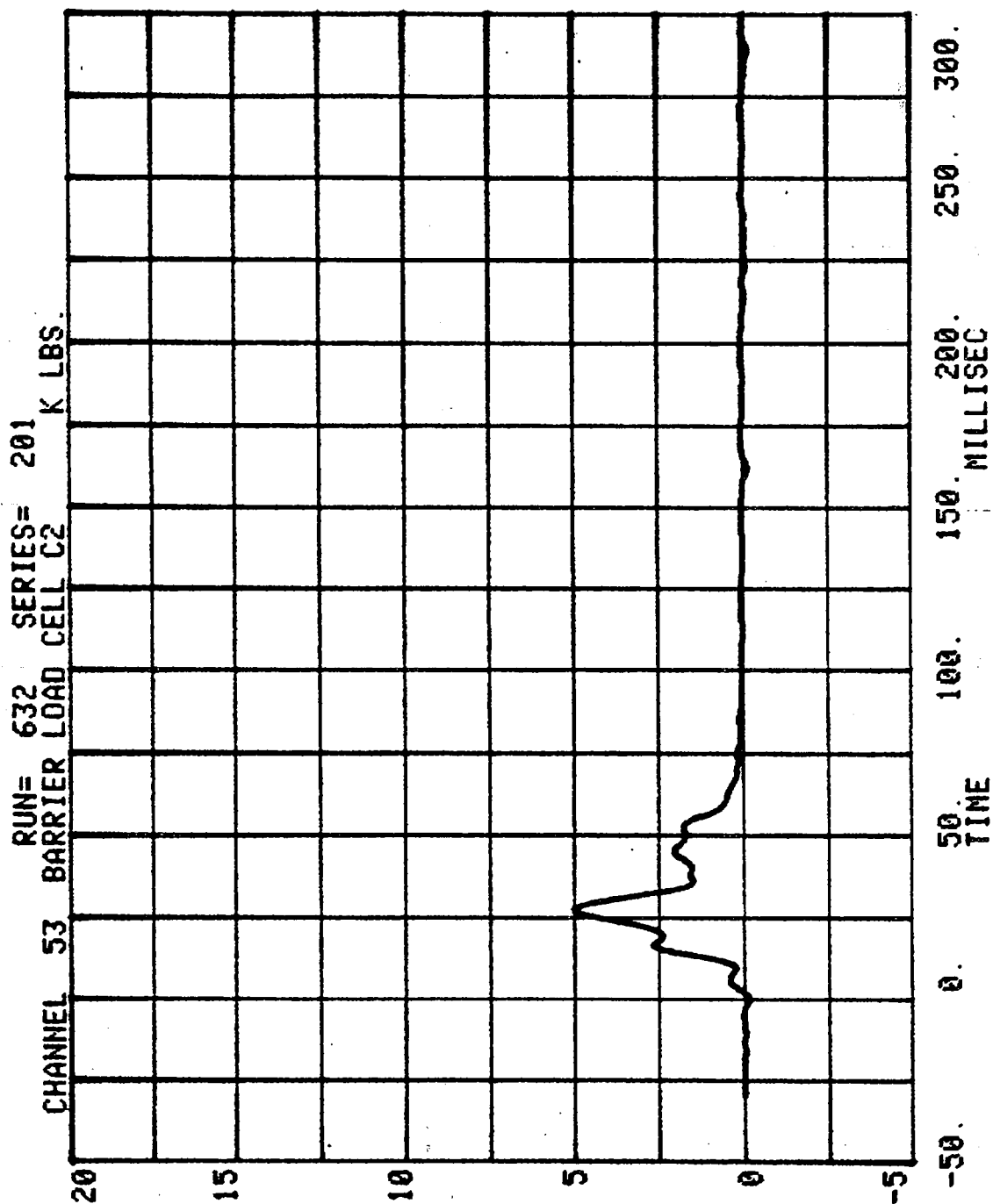


CHANNEL 51 BARRIER LOAD CELL B9 RUN= 632 SERIES= 201 K LBS.



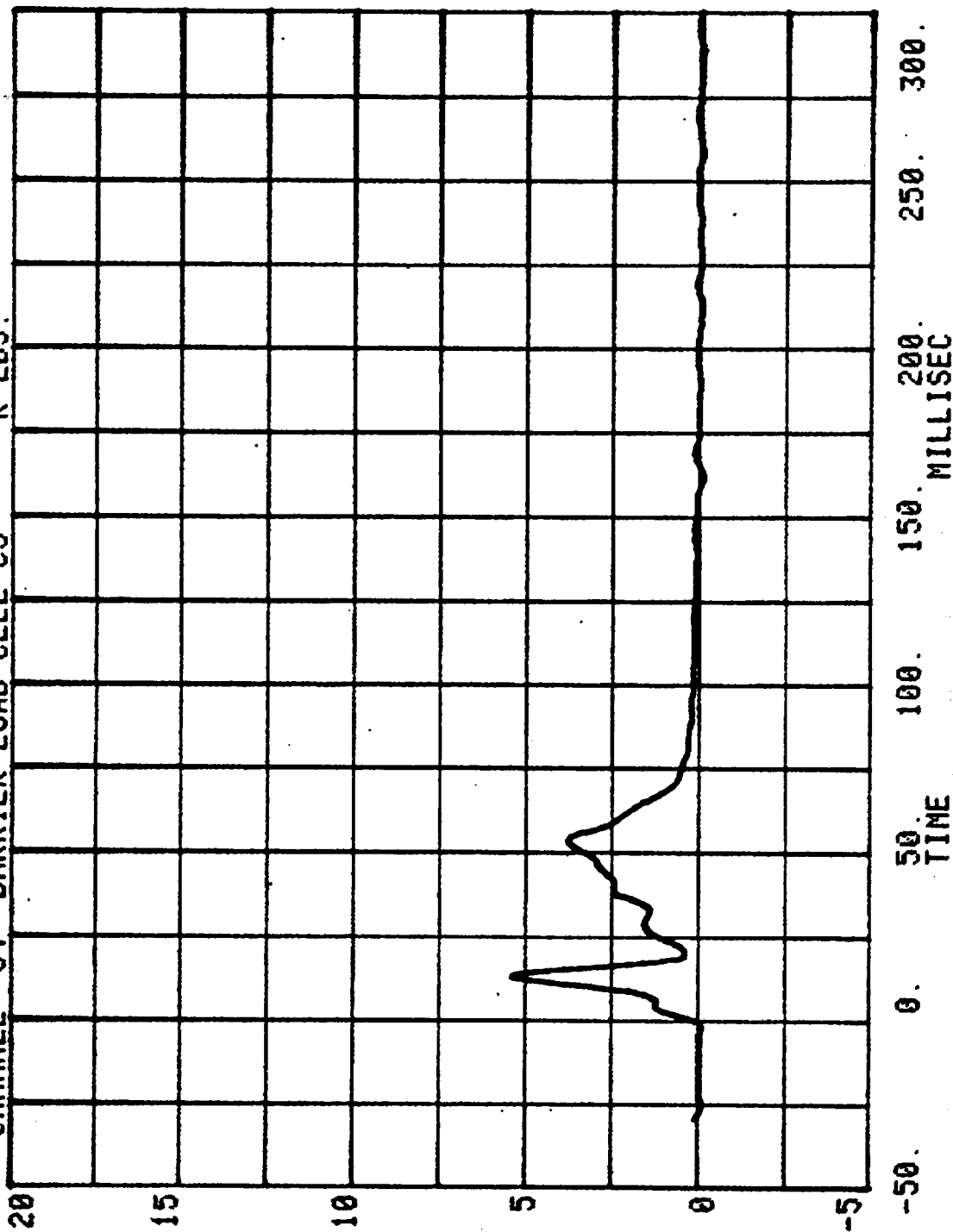
RUN= 632 SERIES= 201
CHANNEL 52 BARRIER LOAD CELL C1 K LBS.





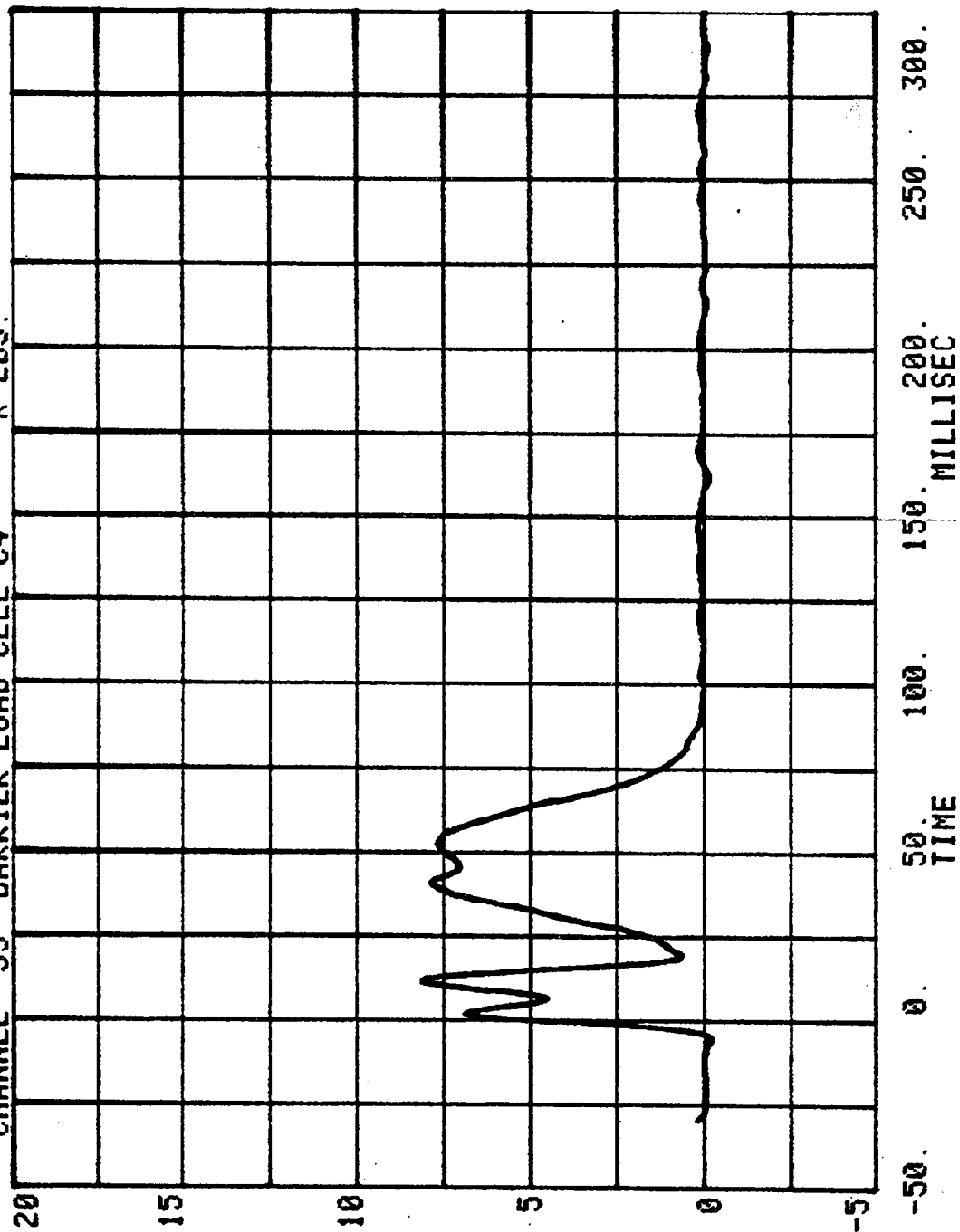
CHANNEL 54 BARRIER LOAD CELL C3 K LBS.

RUN= 632 SERIES= 201



CHANNEL 55 BARRIER LOAD CELL C4 K LBS.

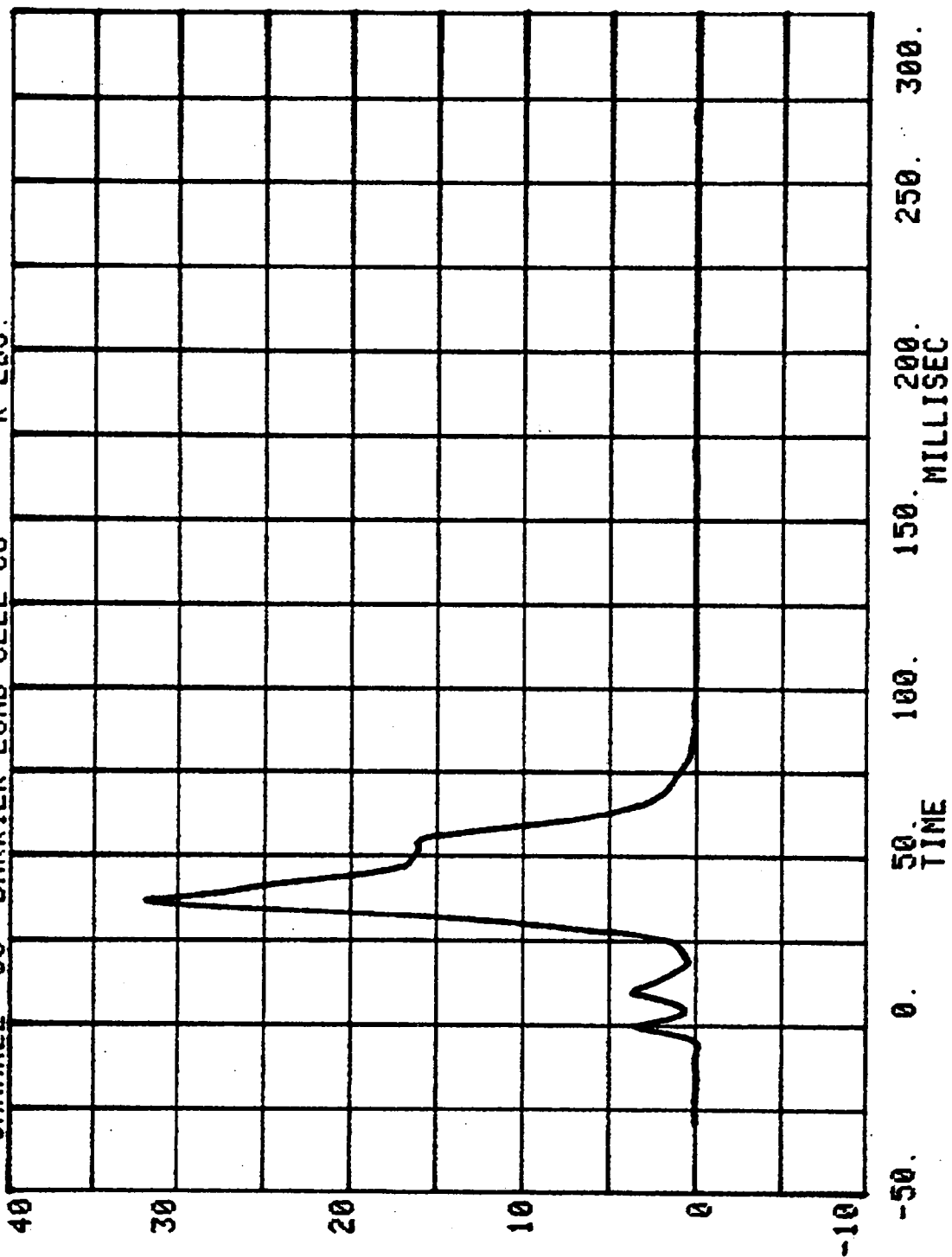
RUN= 632 SERIES= 201



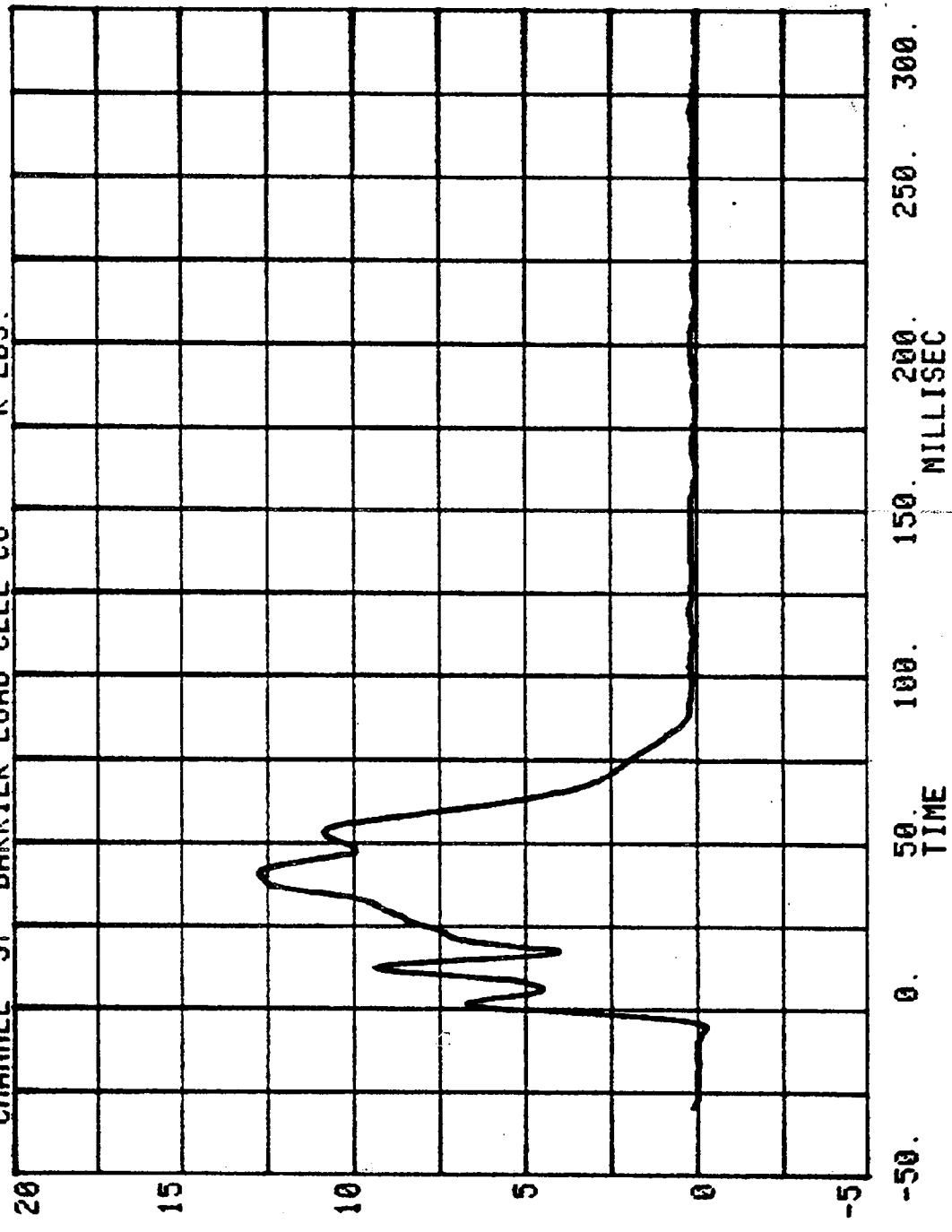
CHANNEL 56 BARRIER LOAD CELL C5

RUN= 632 SERIES= 201

K LBS.



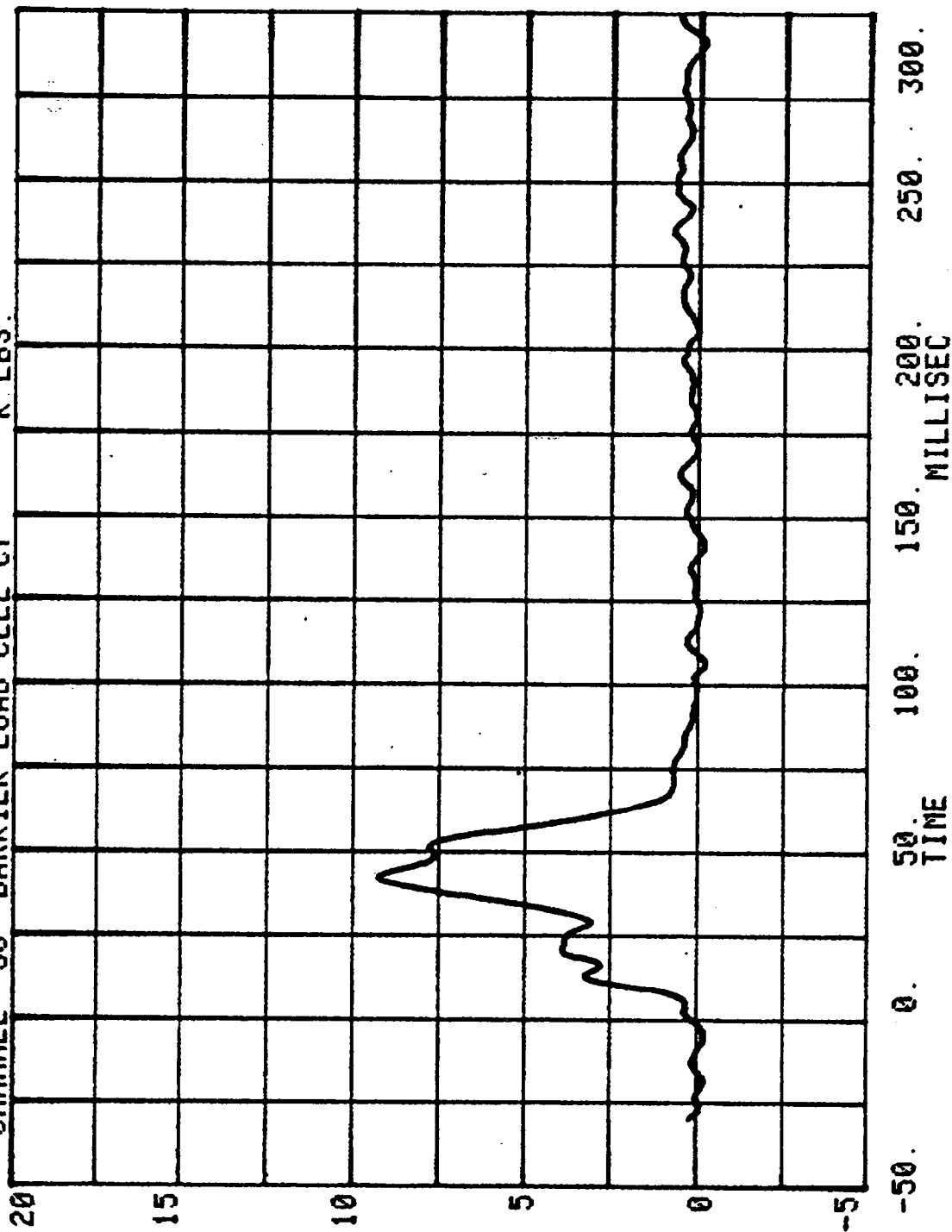
CHANNEL 57 BARRIER LOAD CELL C6 RUN= 632 SERIES= 201 K LBS.

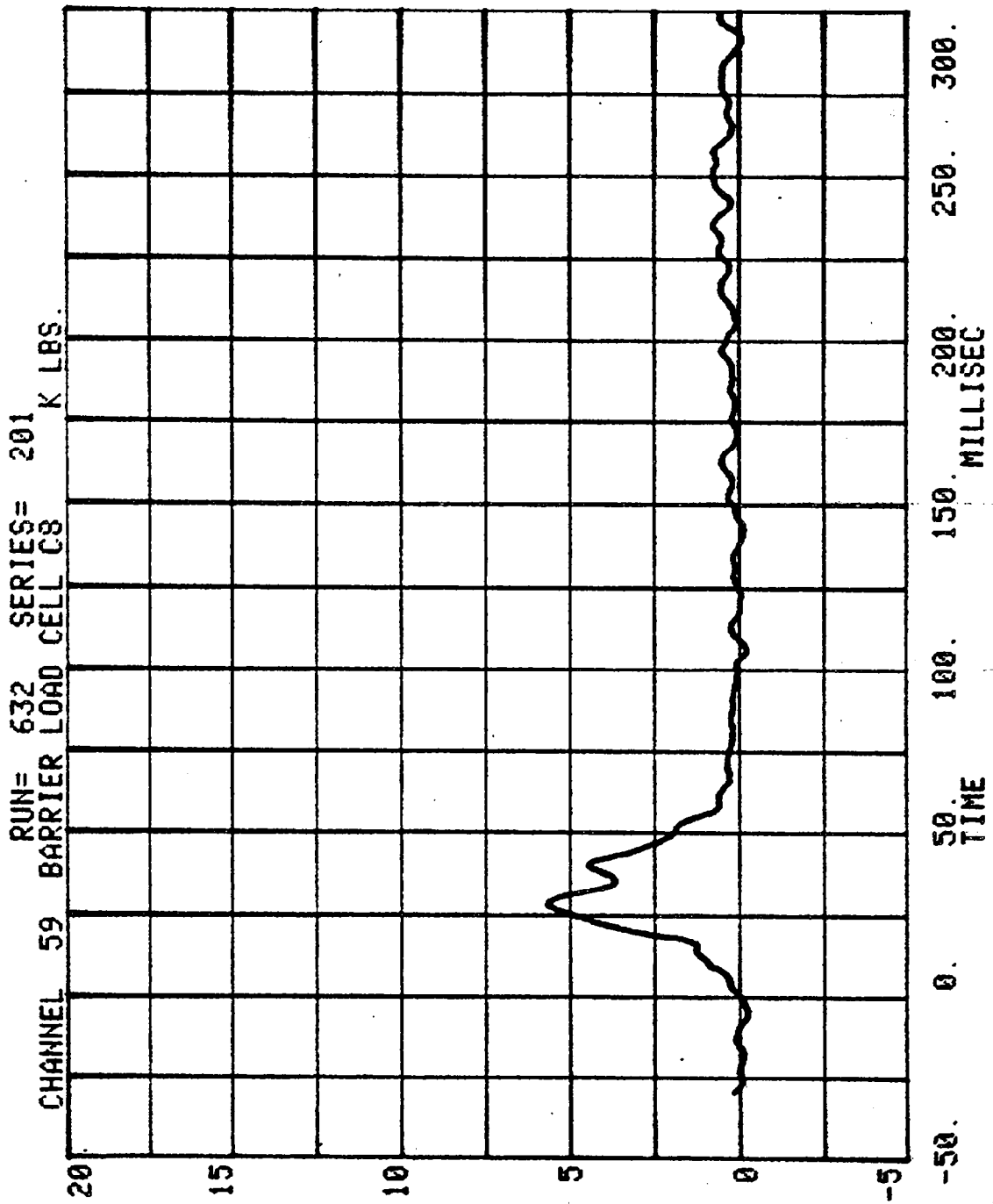


CHANNEL 58 BARRIER LOAD CELL C7

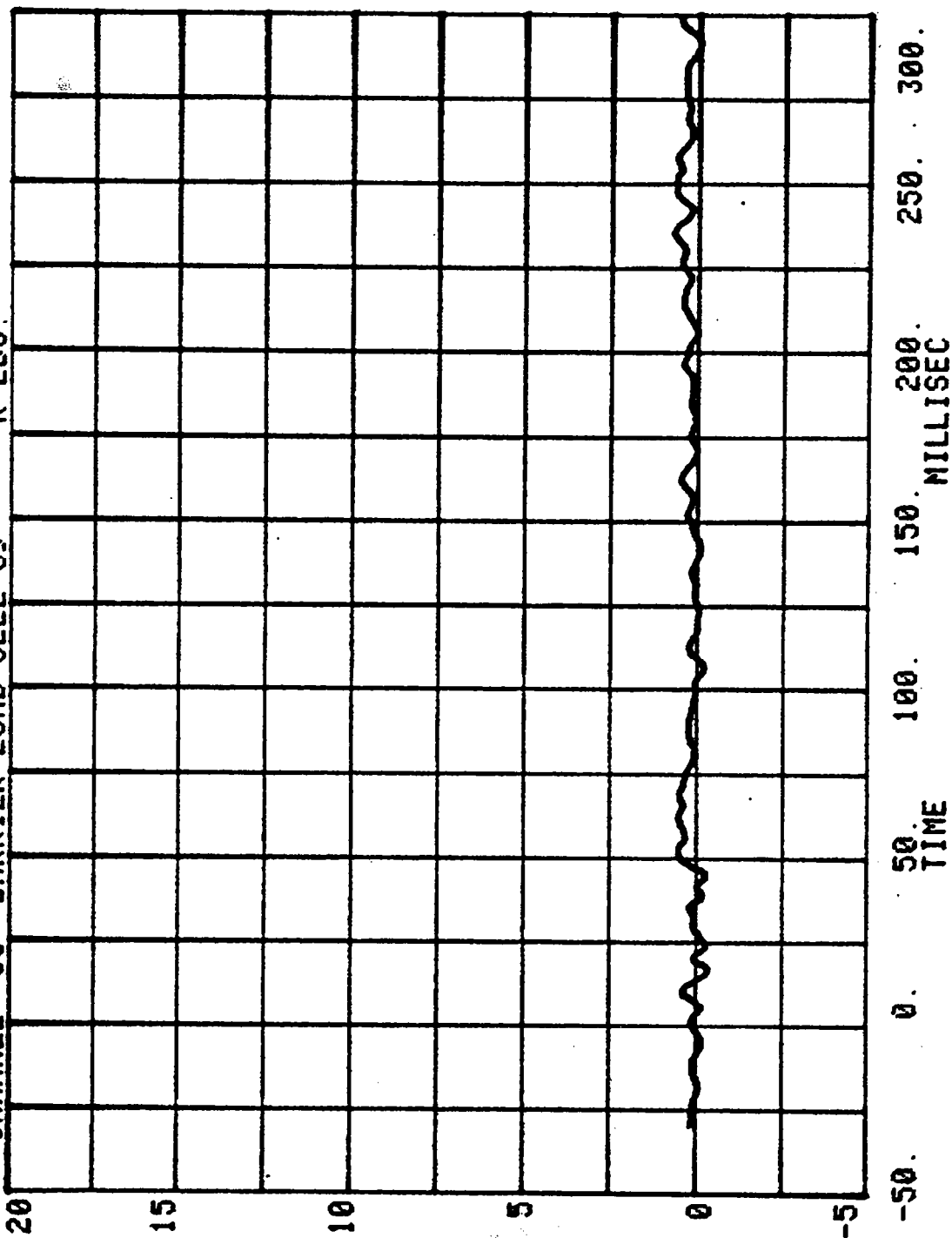
RUN= 632 SERIES= 201

K LBS.

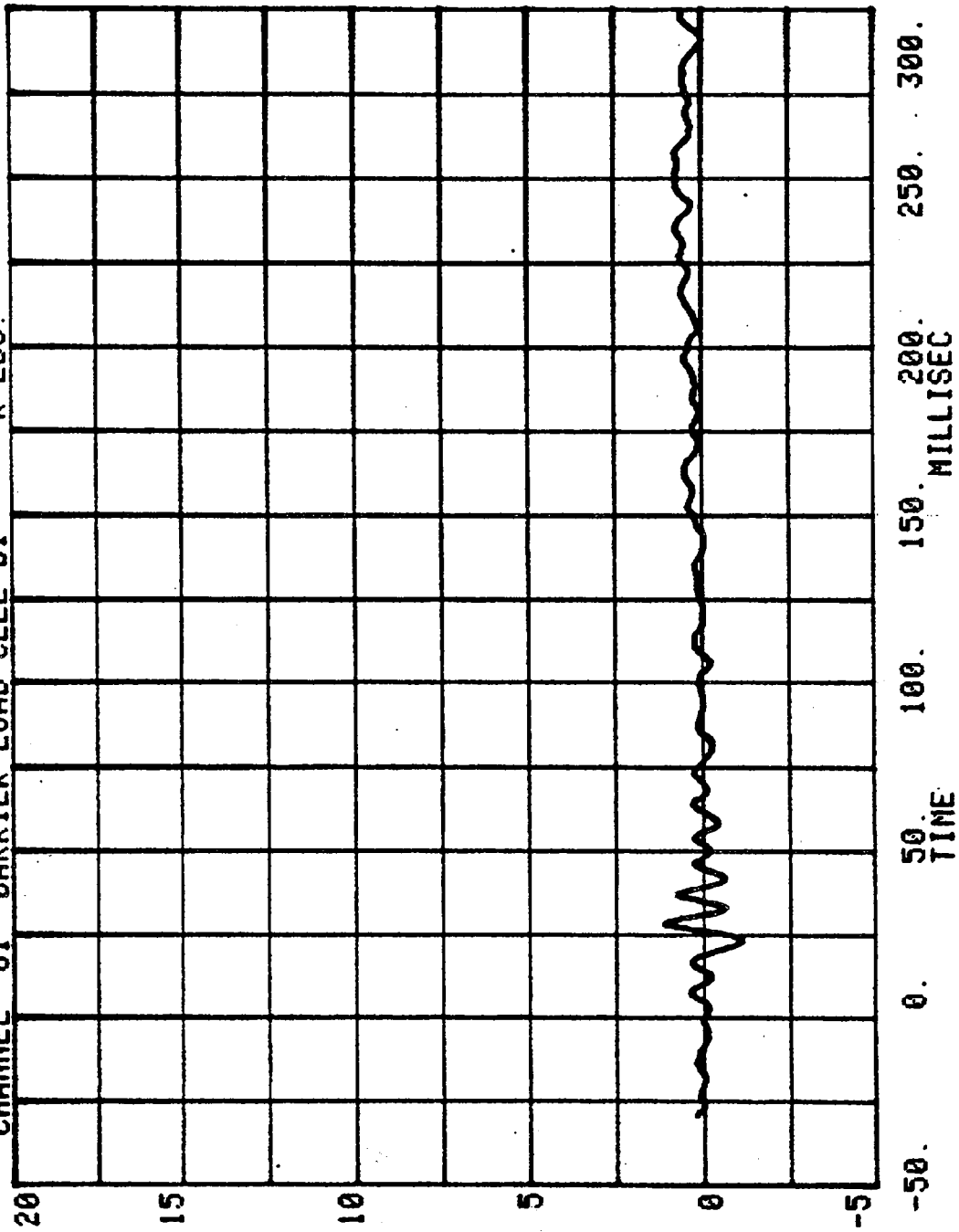




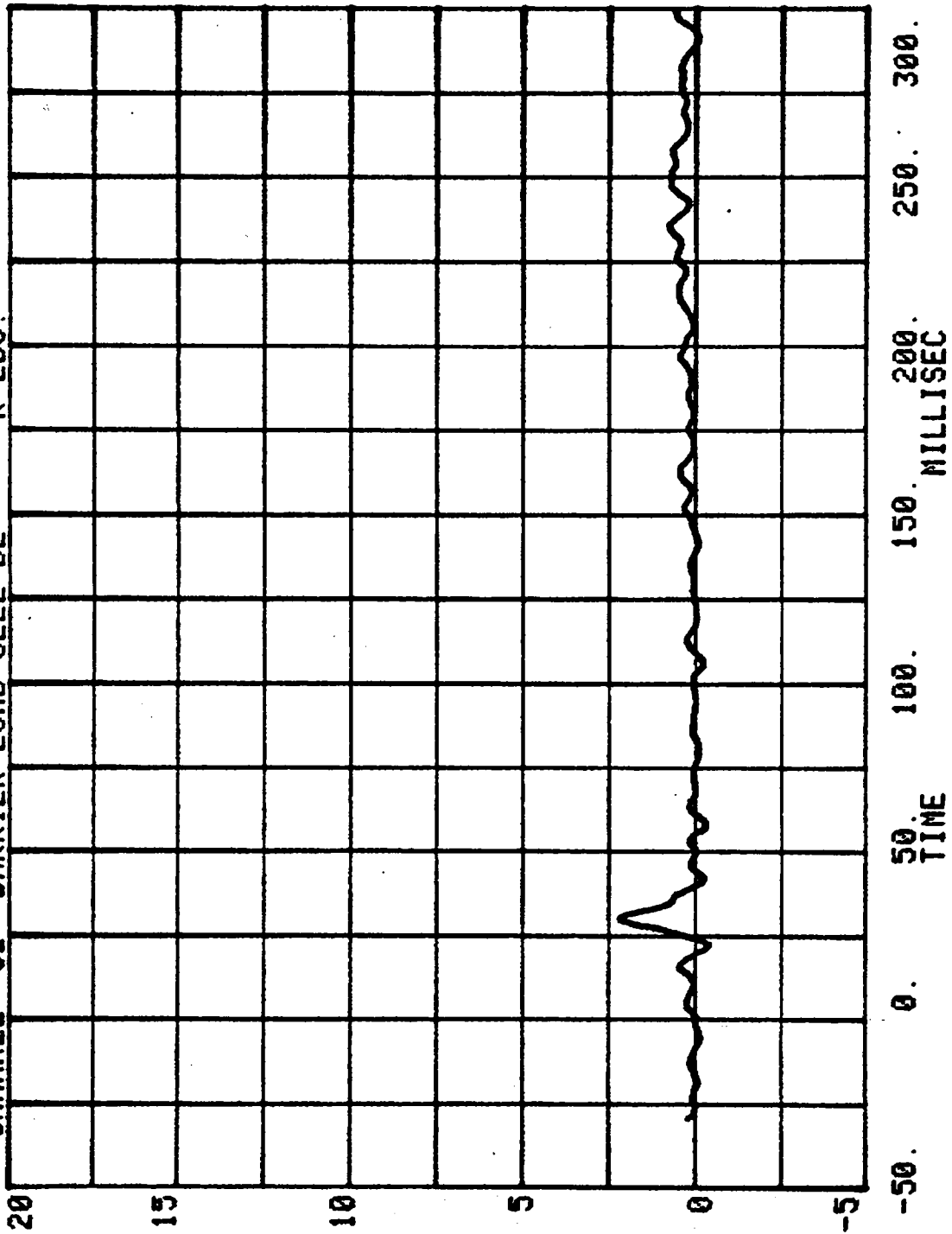
RUN= 632 SERIES= 201
CHANNEL 60 BARRIER LOAD CELL C9 K LBS.

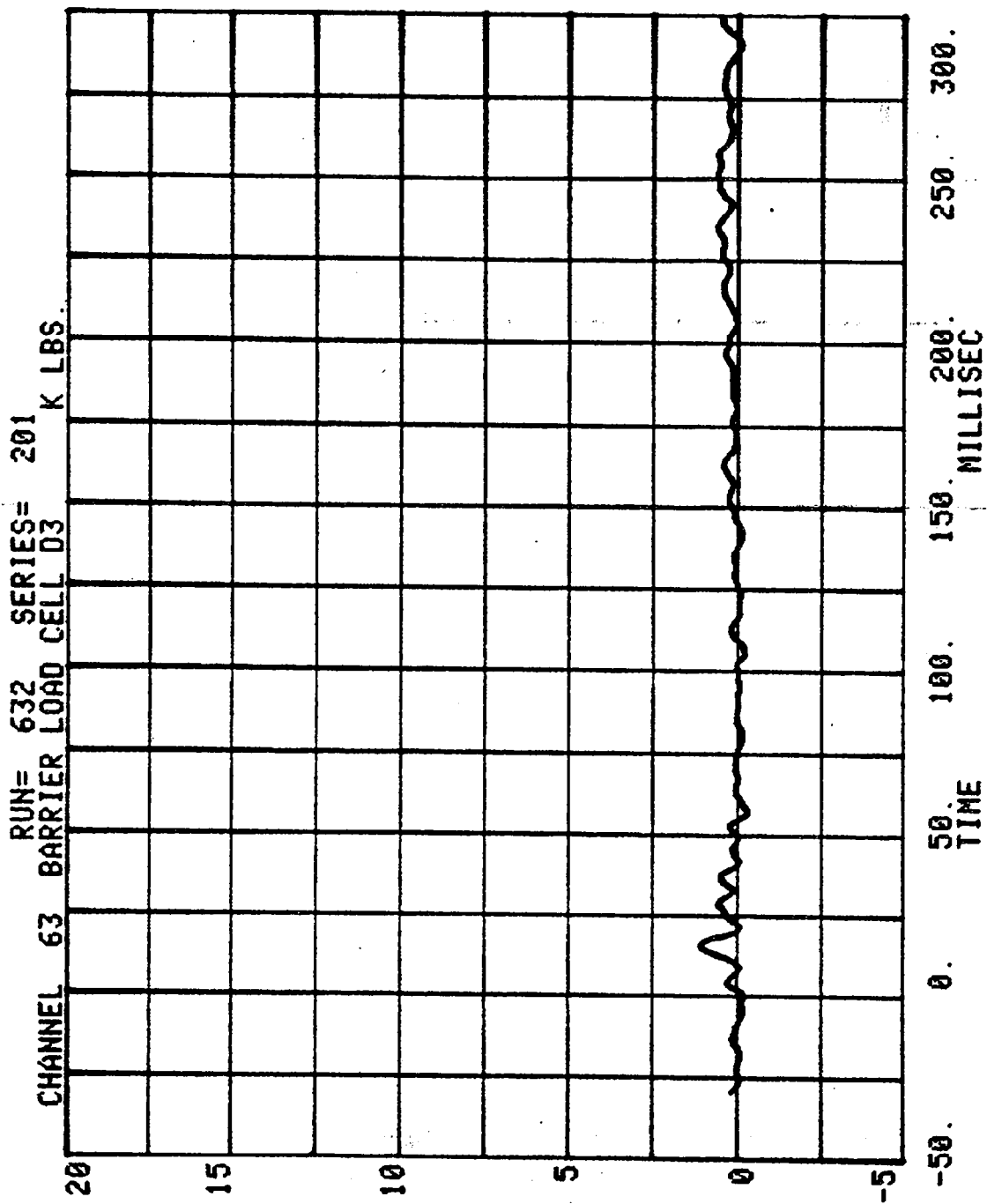


RUN= 632 SERIES= 201
CHANNEL 61 BARRIER LOAD CELL D1 K LBS.



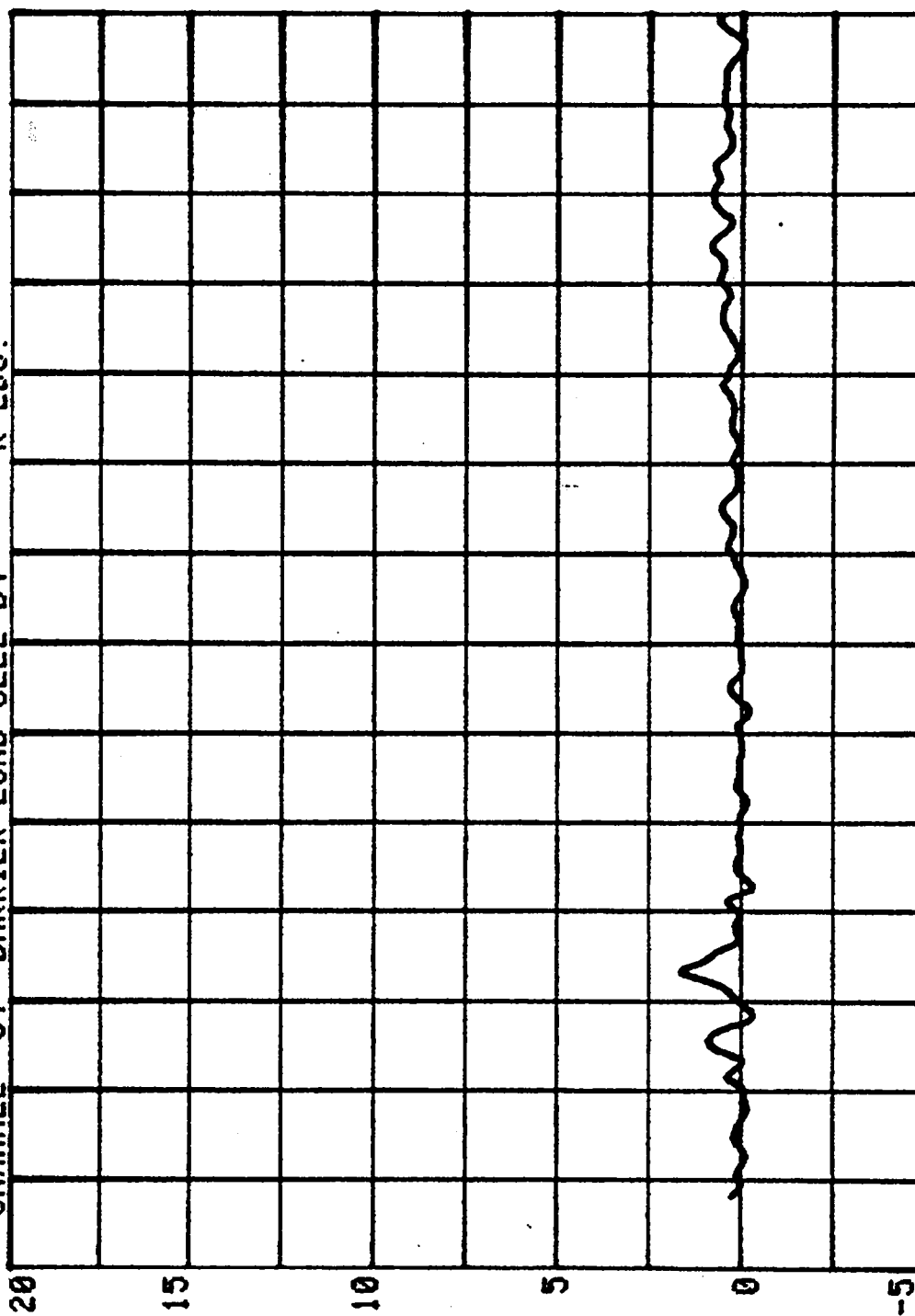
CHANNEL 62 BARRIER LOAD CELL D2
RUN= 632 SERIES= 201 K LBS.





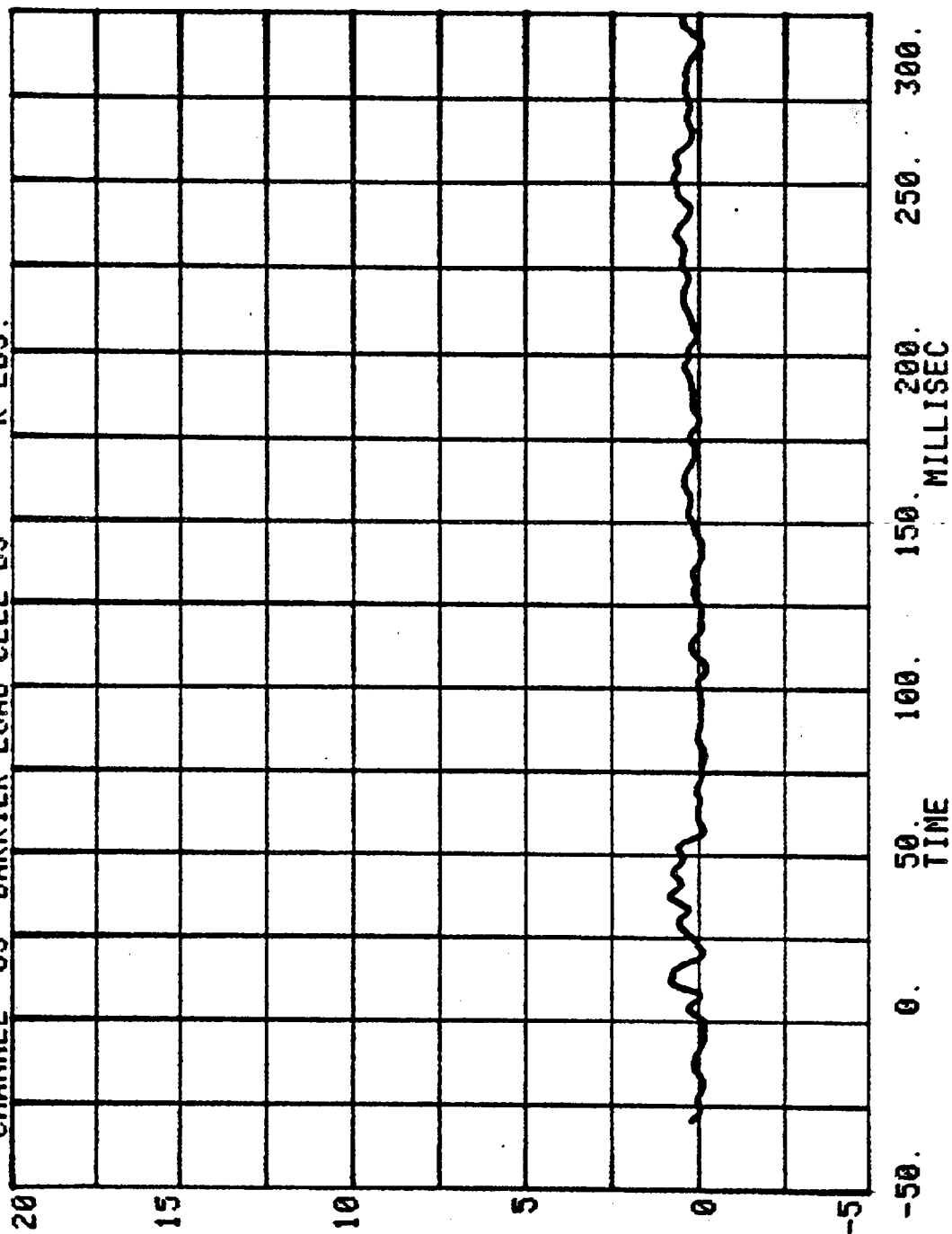
CHANNEL 64 BARRIER LOAD CELL D4 K LBS.

RUN= 632 SERIES= 201

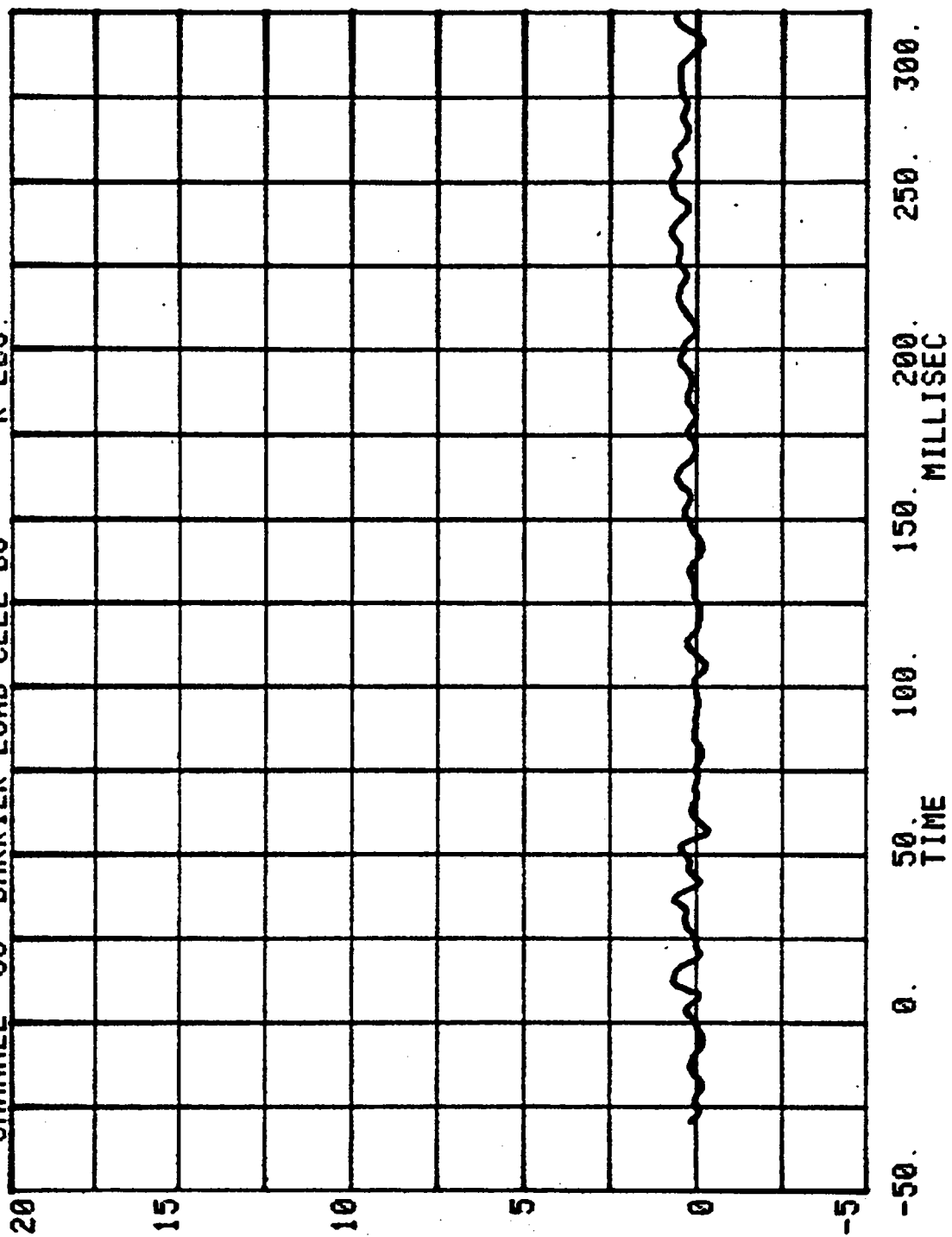


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 65 BARRIER LOAD CELL D5
RUN= 632 SERIES= 201 K LBS.

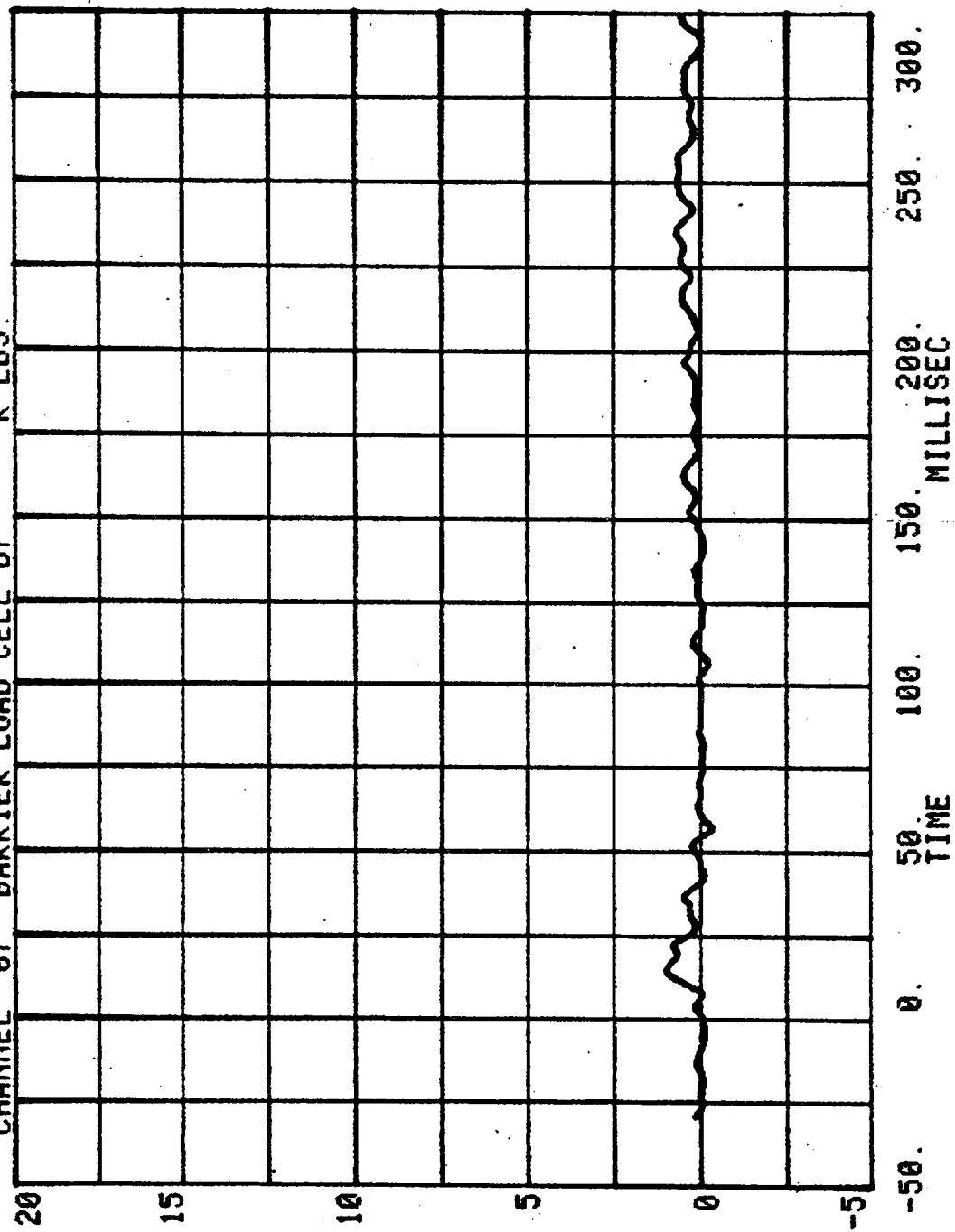


CHANNEL 66 BARRIER LOAD CELL D6 RUN= .632 SERIES= 201 K LBS.



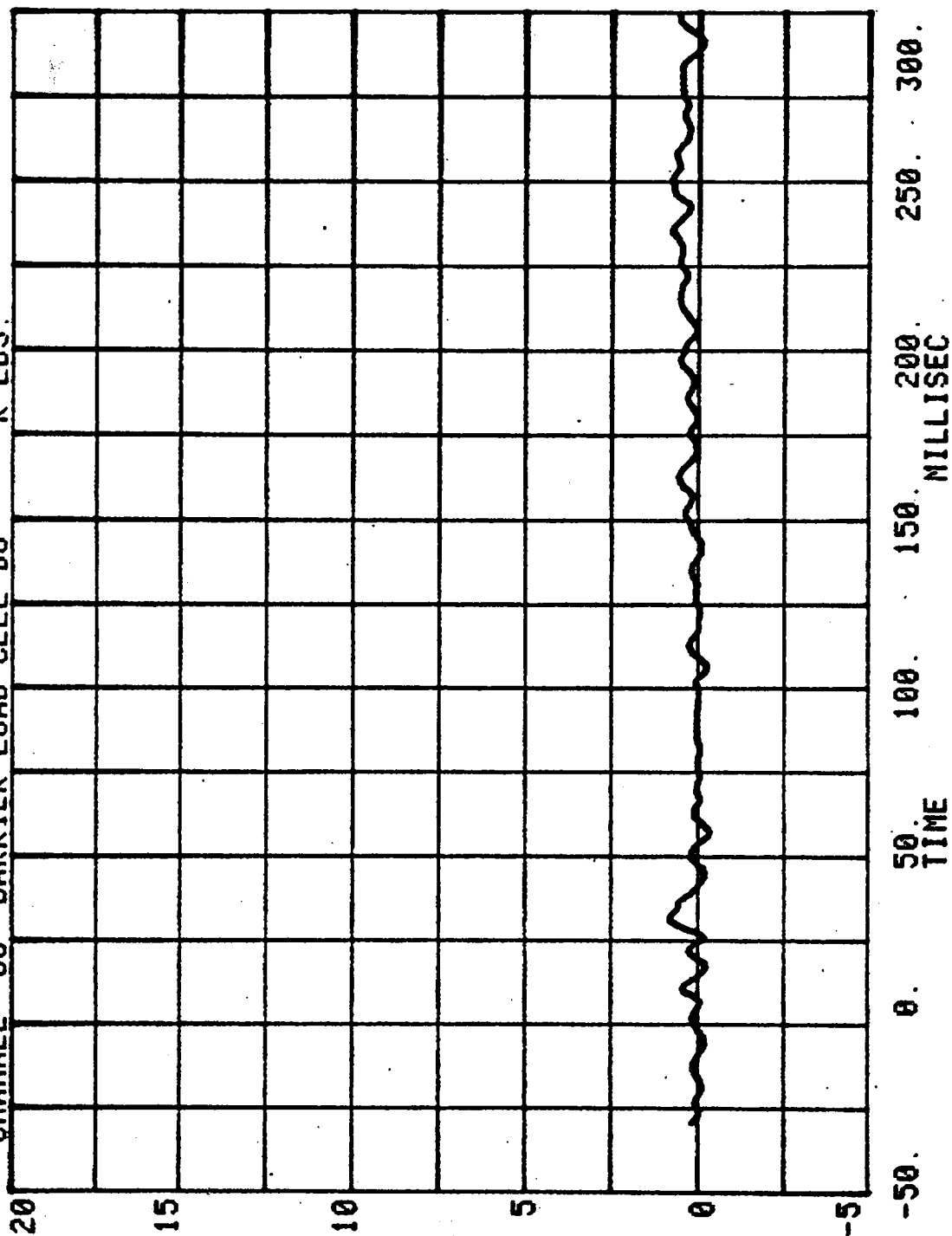
CHANNEL 67 BARRIER LOAD CELL 07 K LBS.

RUN= 632 SERIES= 201

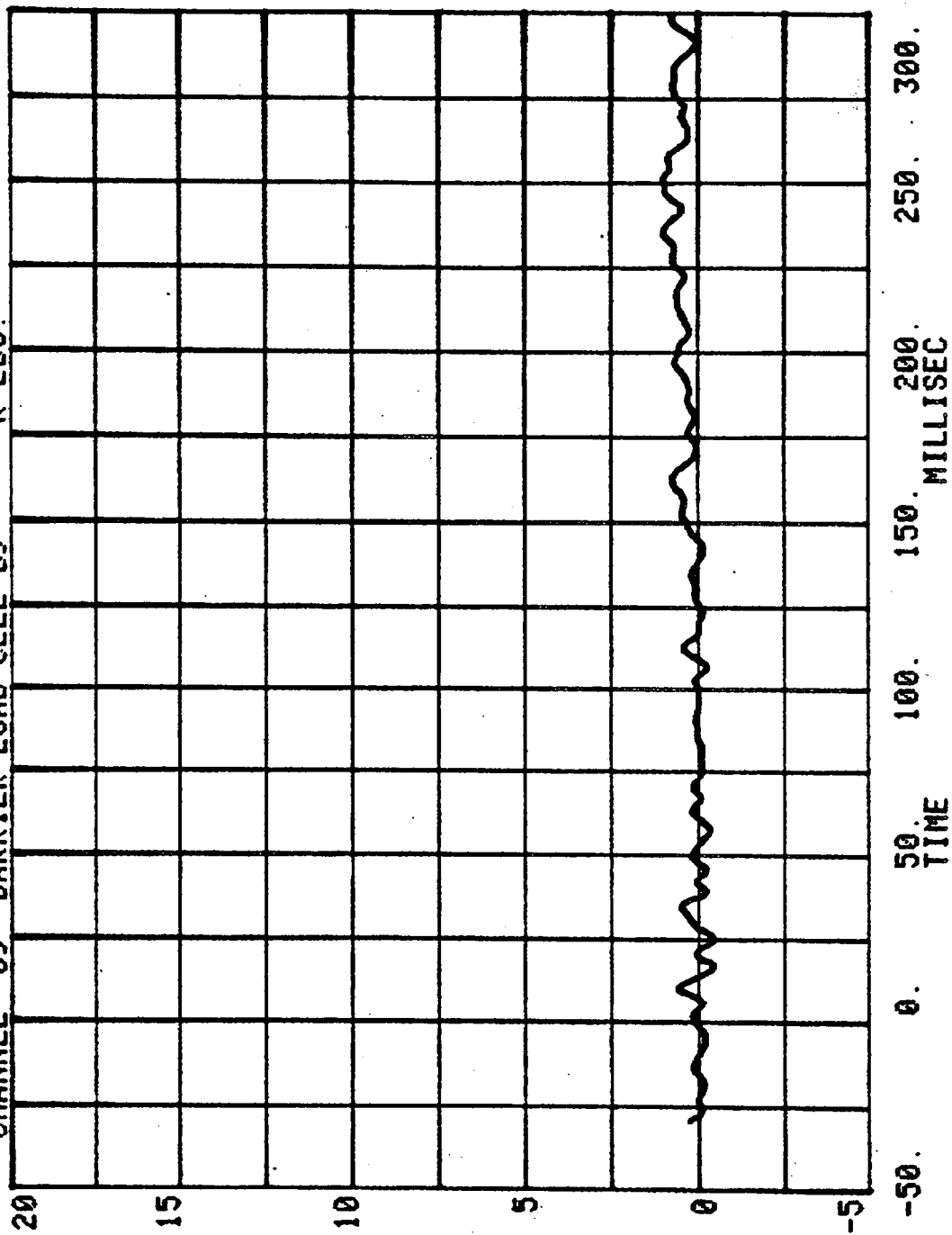


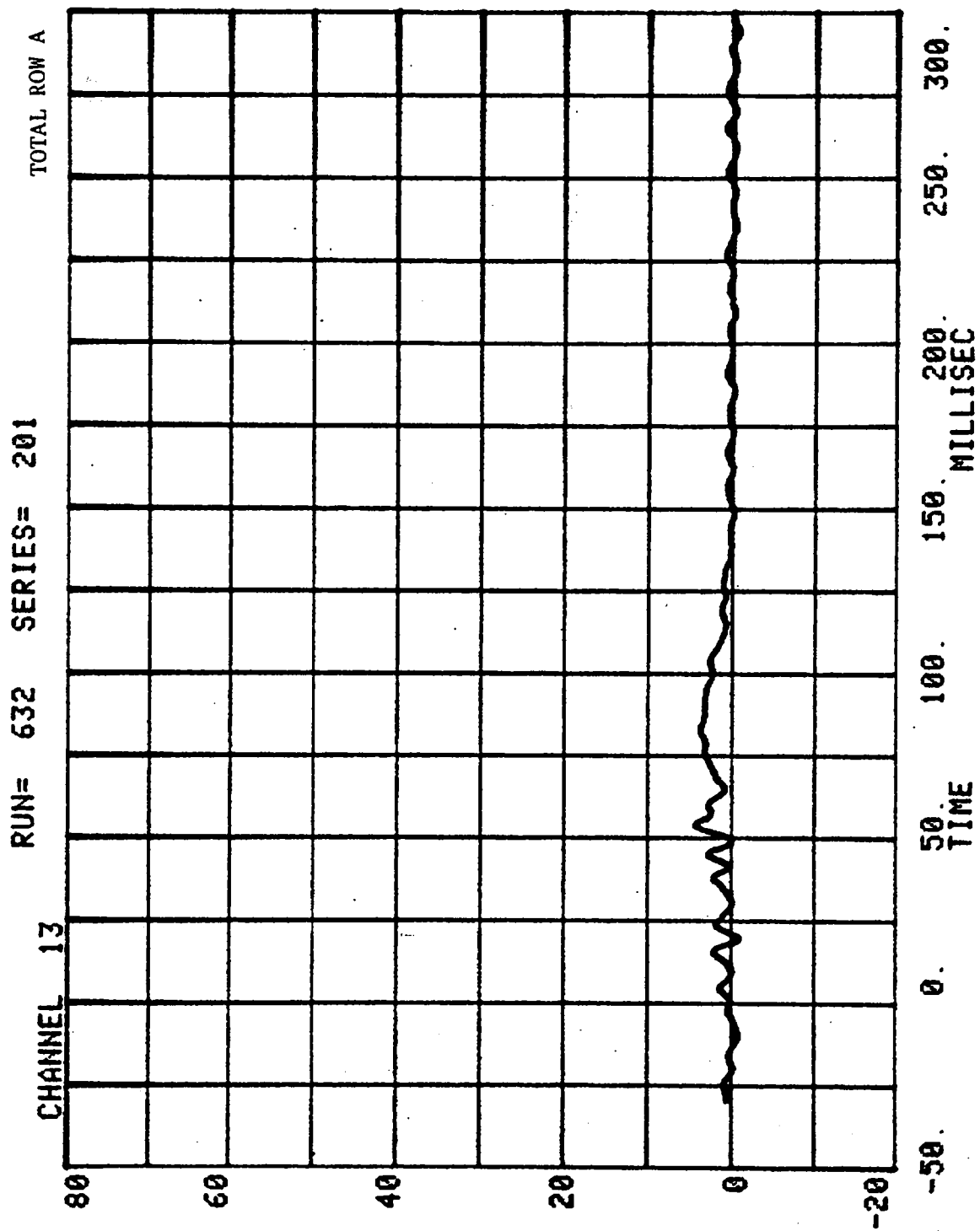
CHANNEL 68 BARRIER LOAD CELL D8 K LBS.

RUN= 632 SERIES= 201



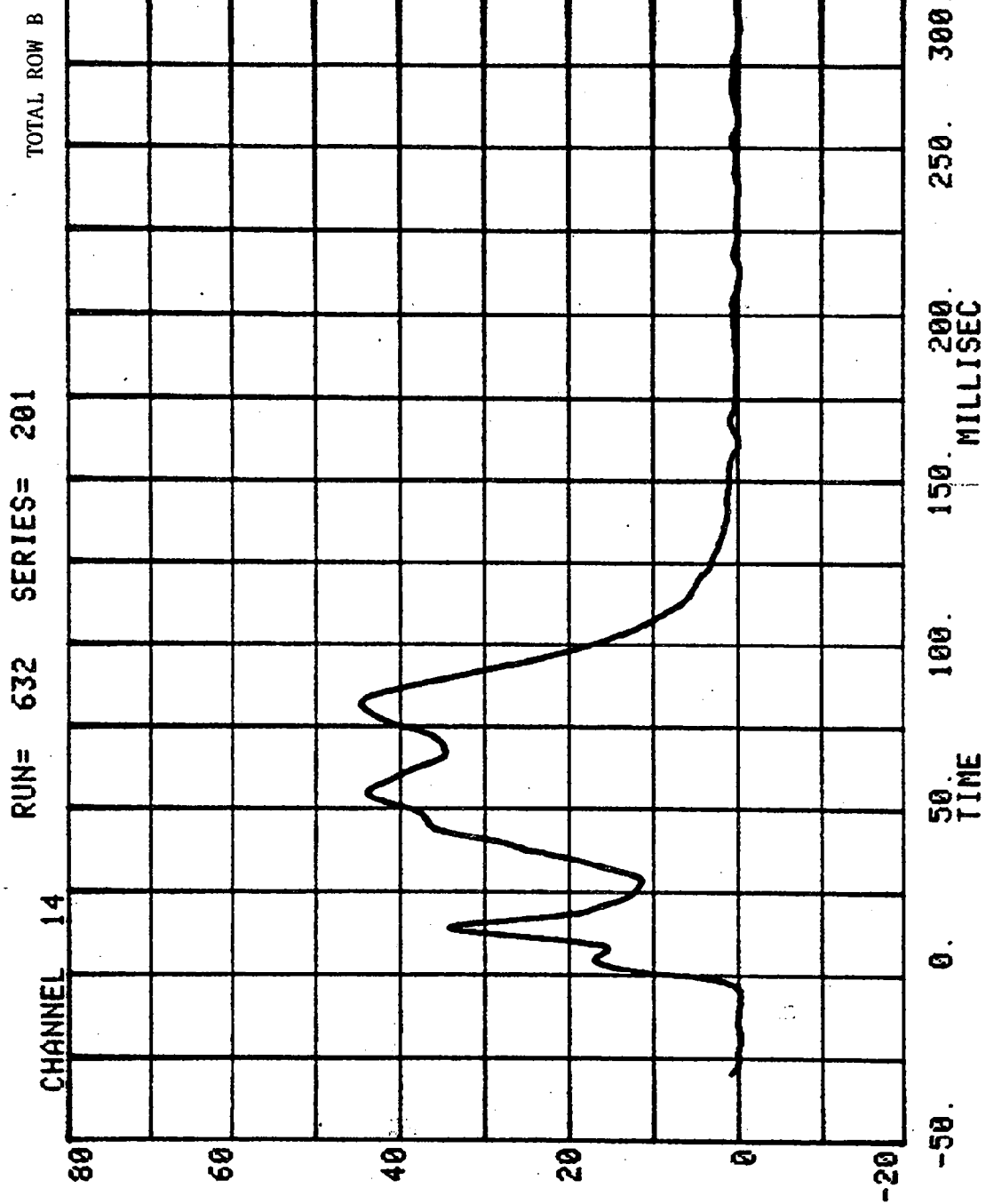
CHANNEL 69 BARRIER LOAD CELL D9
RUN= 632 SERIES= 201 K LBS.





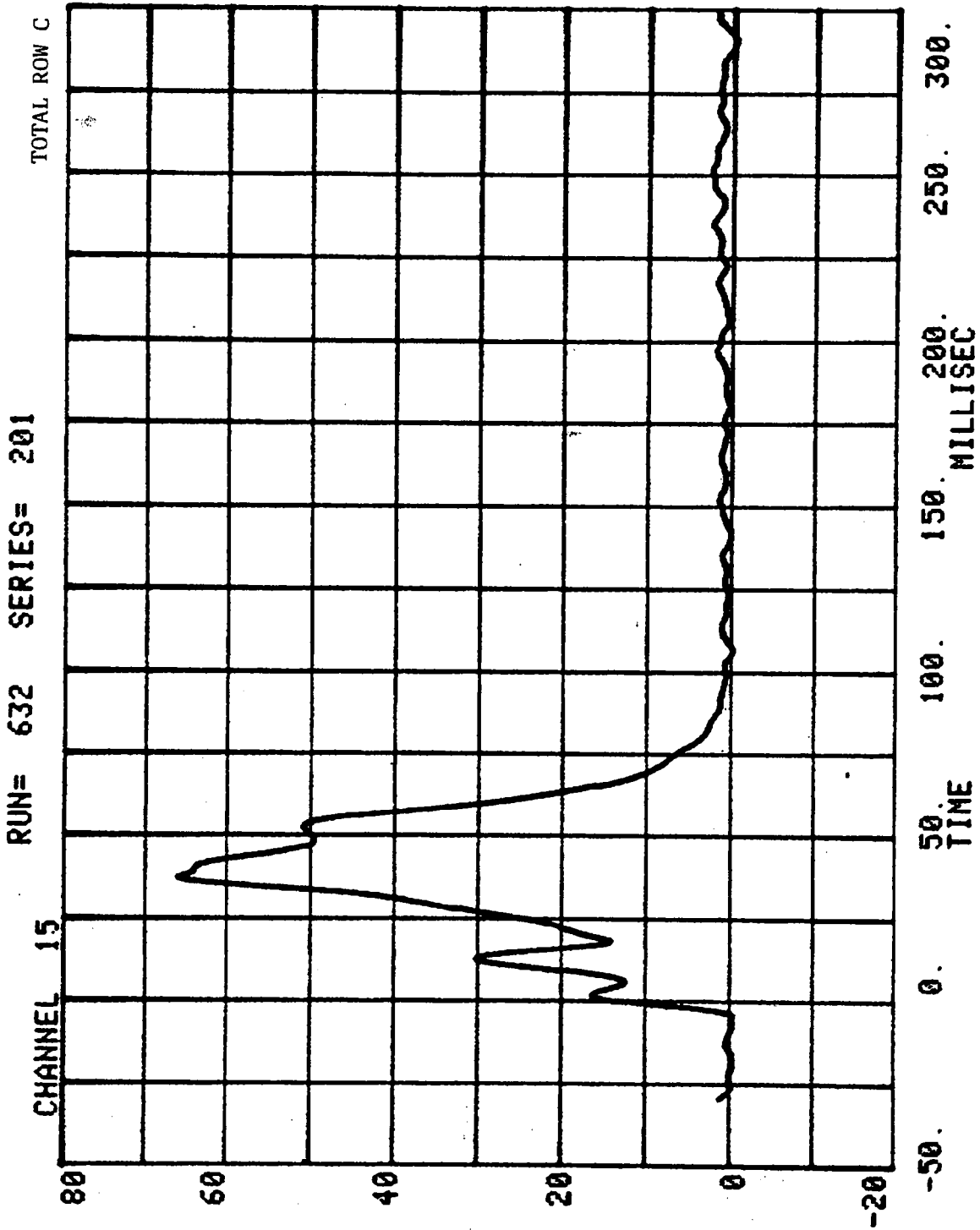
B-61

7103-V-25



B-62

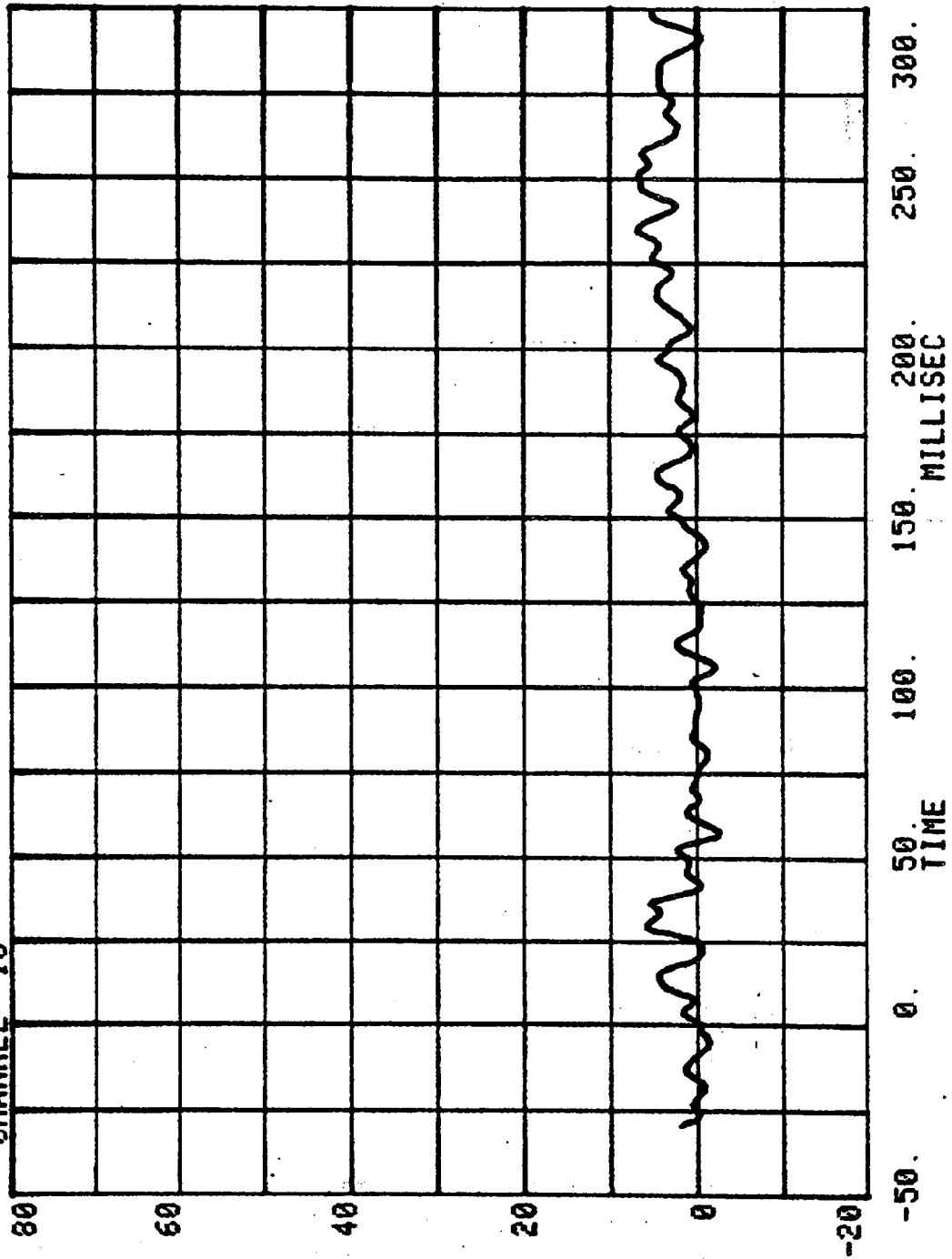
7103-V-25

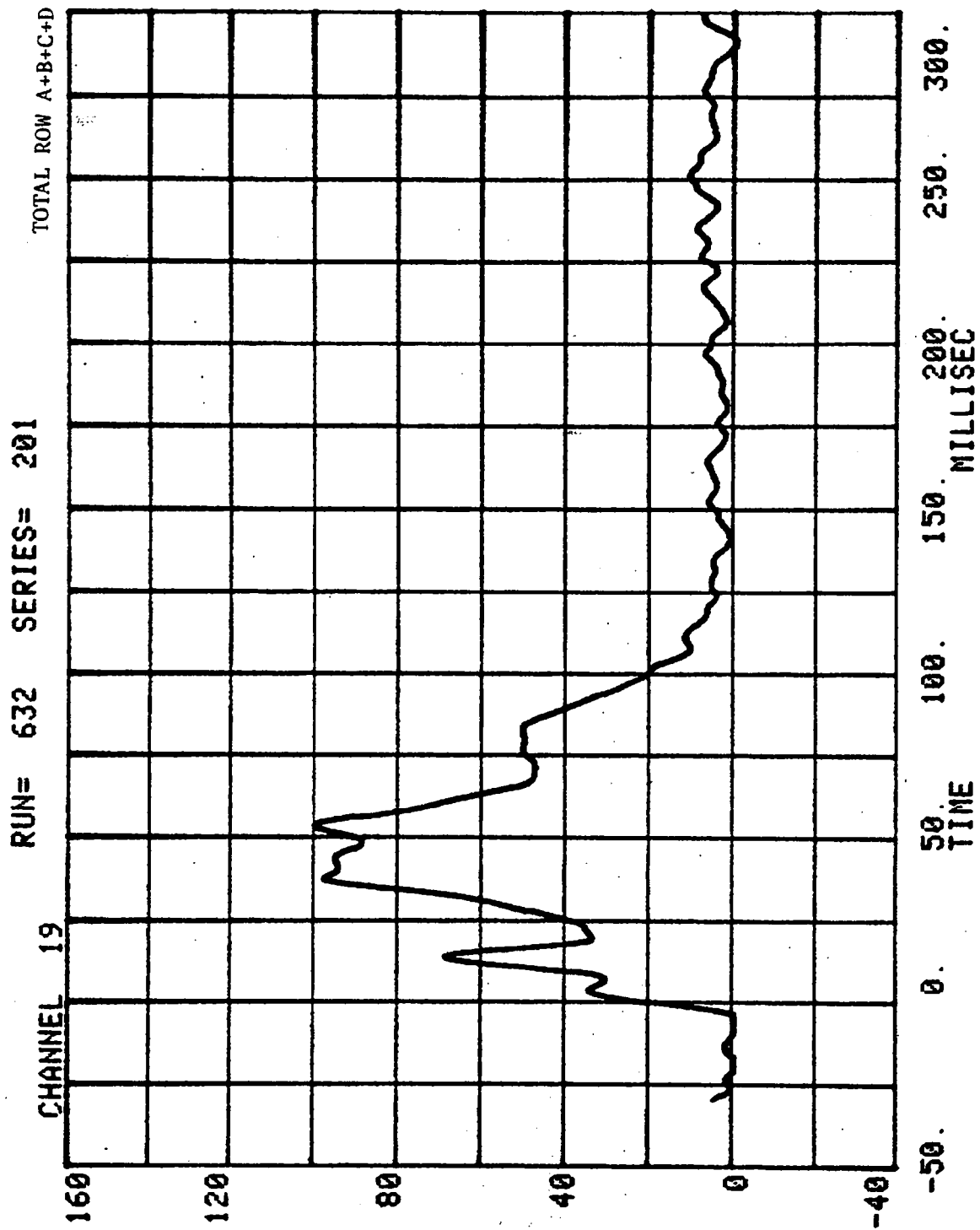


TOTAL ROW D

RUN= 632 SERIES= 201

CHANNEL 16





TEST NO. ME0201

DUMMY DATA

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

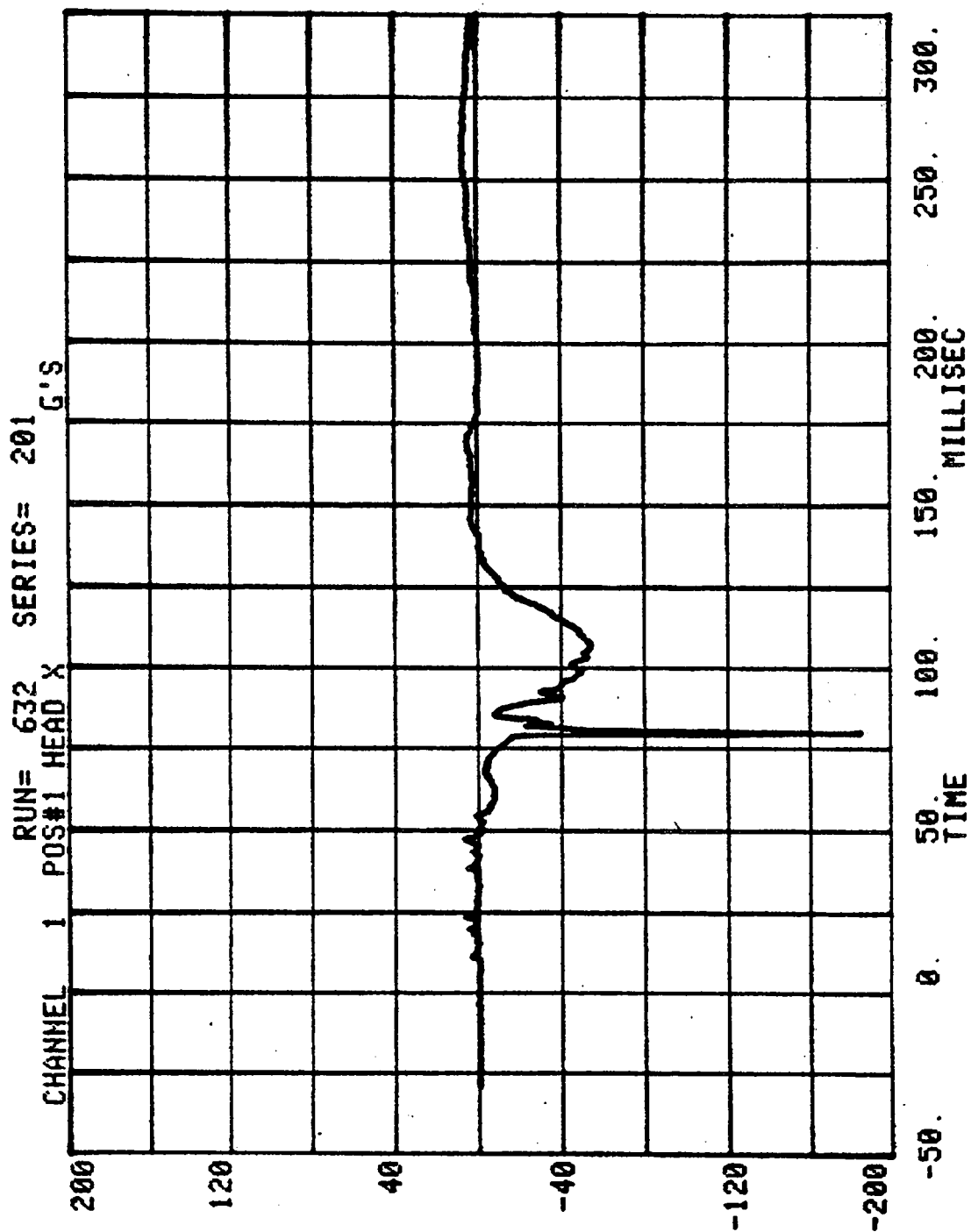
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

CAR TO LOAD CELL BARRIER

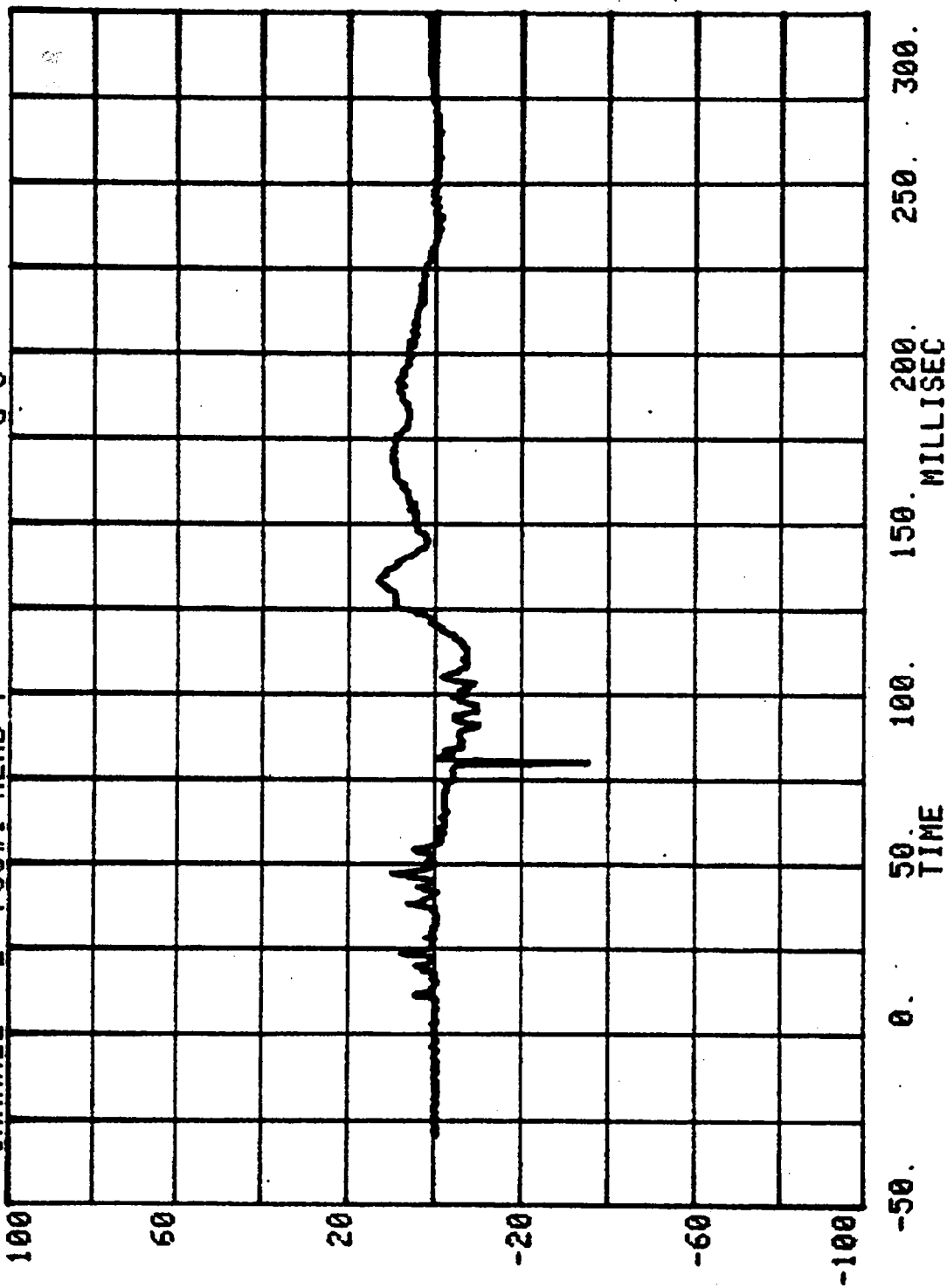
RUN= 632

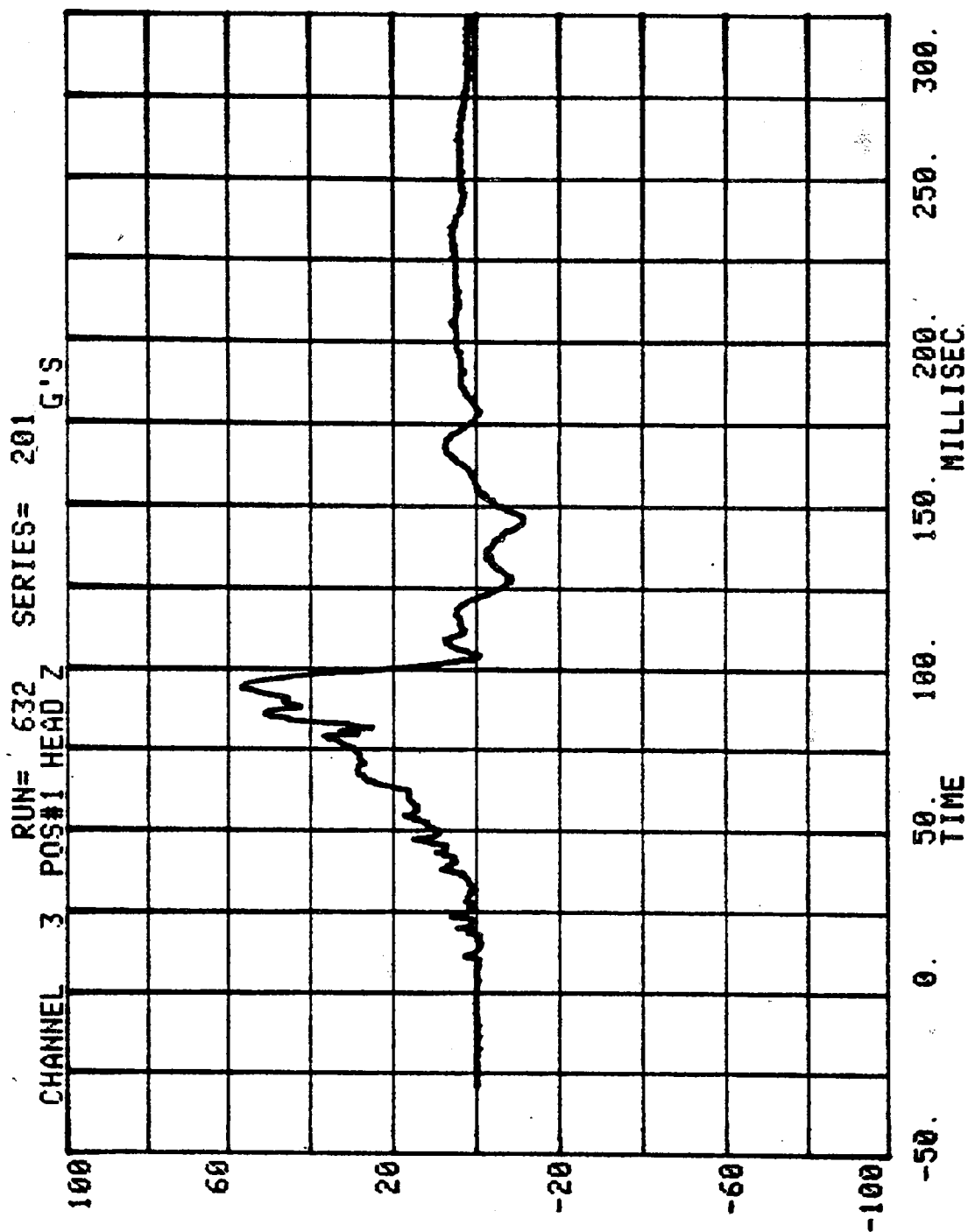
POS#1 HEAD RESULTANT

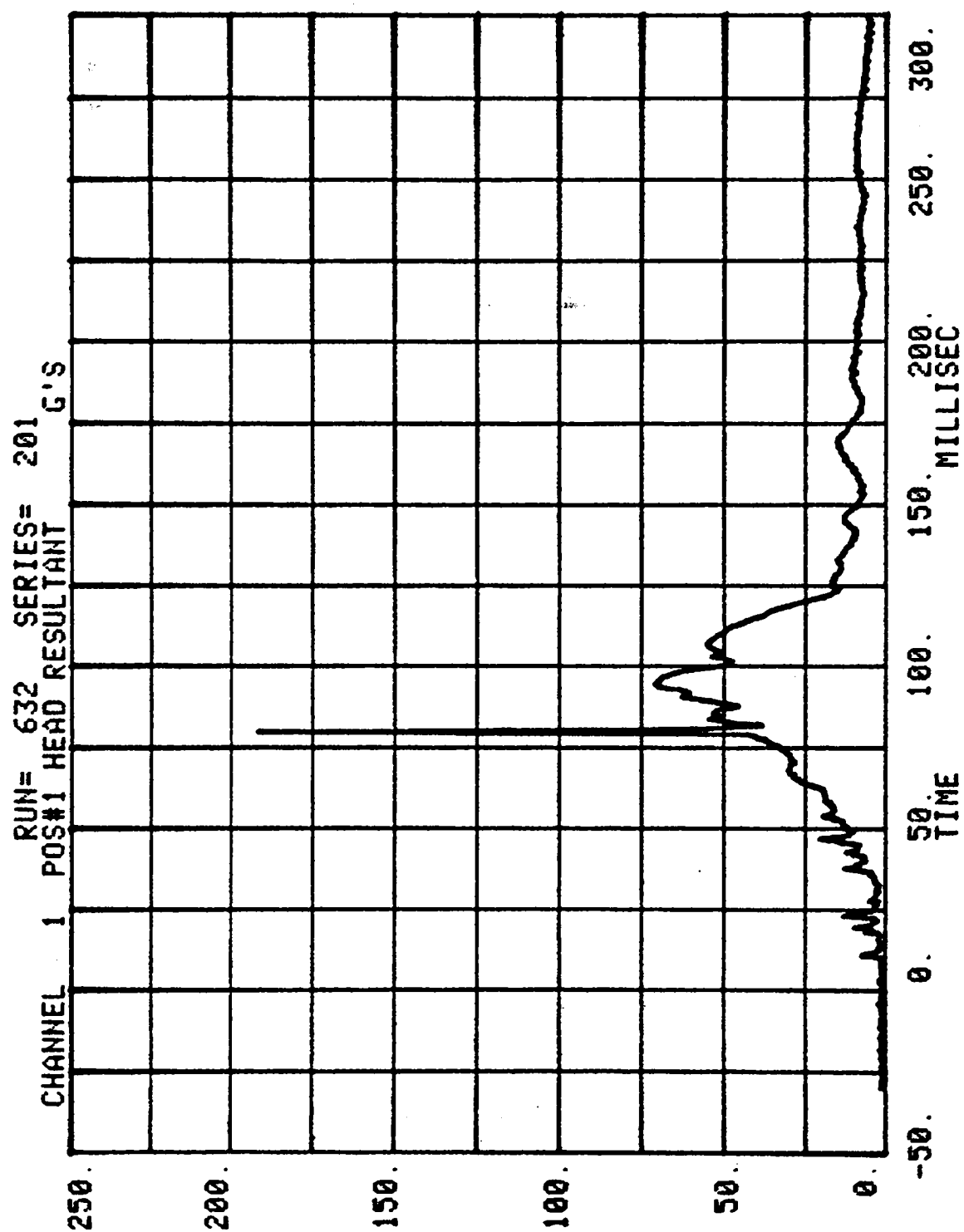
HIC= 894.0 FROM T1= .07582 TO T2= .11857
AVERAGE ACCELERATION BETWEEN T1 AND T2= 53.5G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=1265.5



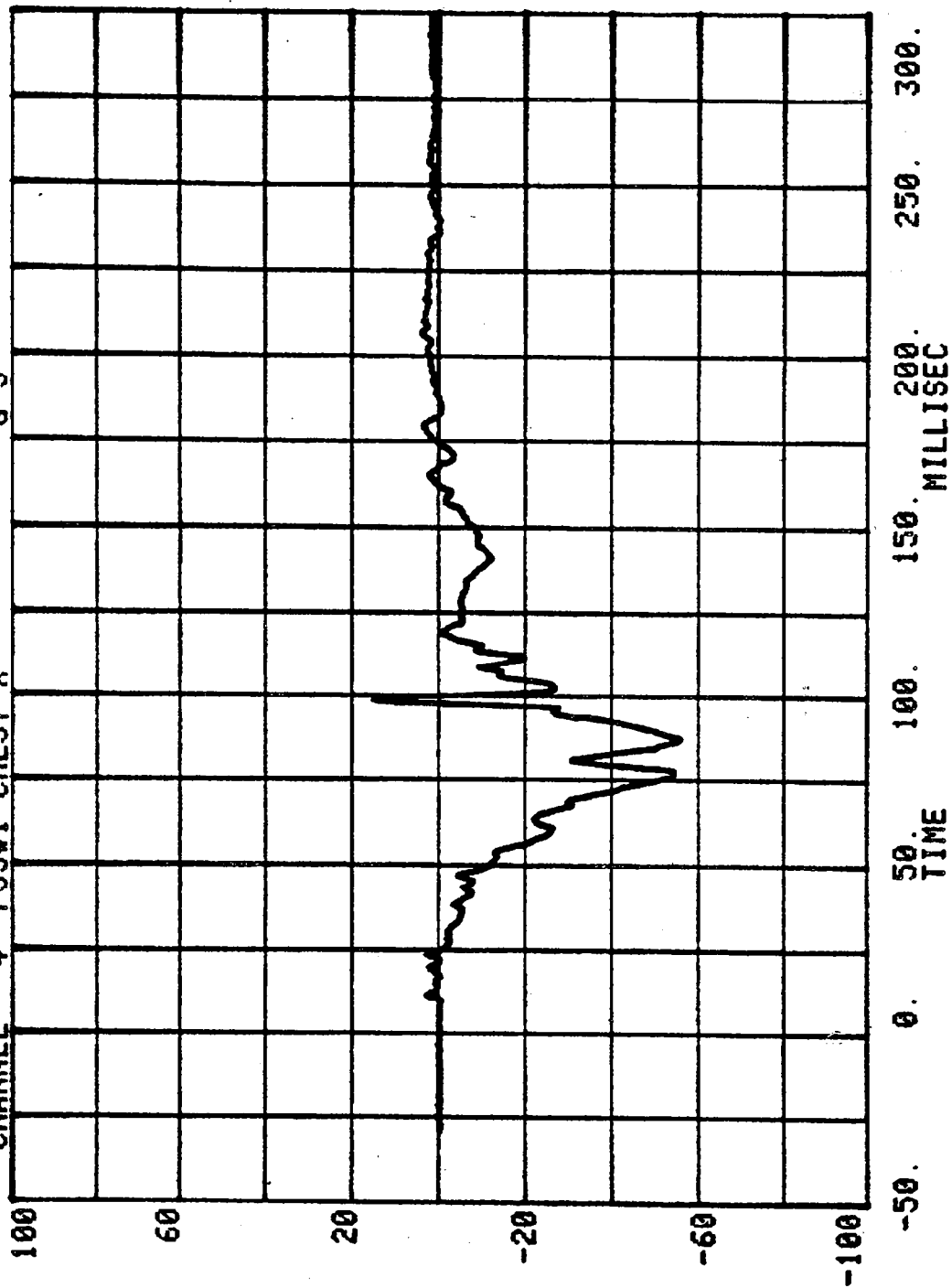
CHANNEL 2 POS#1 HEAD Y RUN= 632 SERIES= 201 G'S

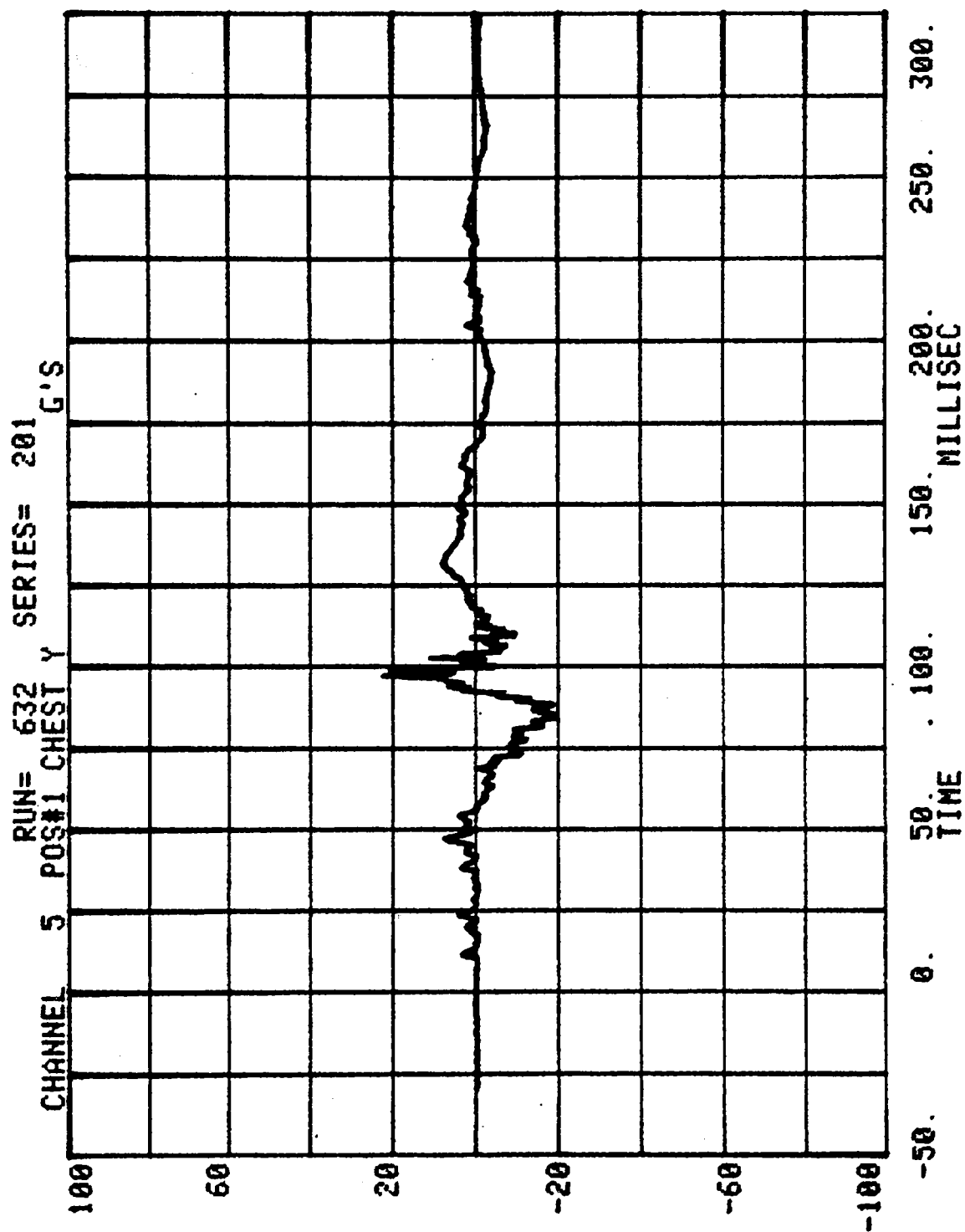


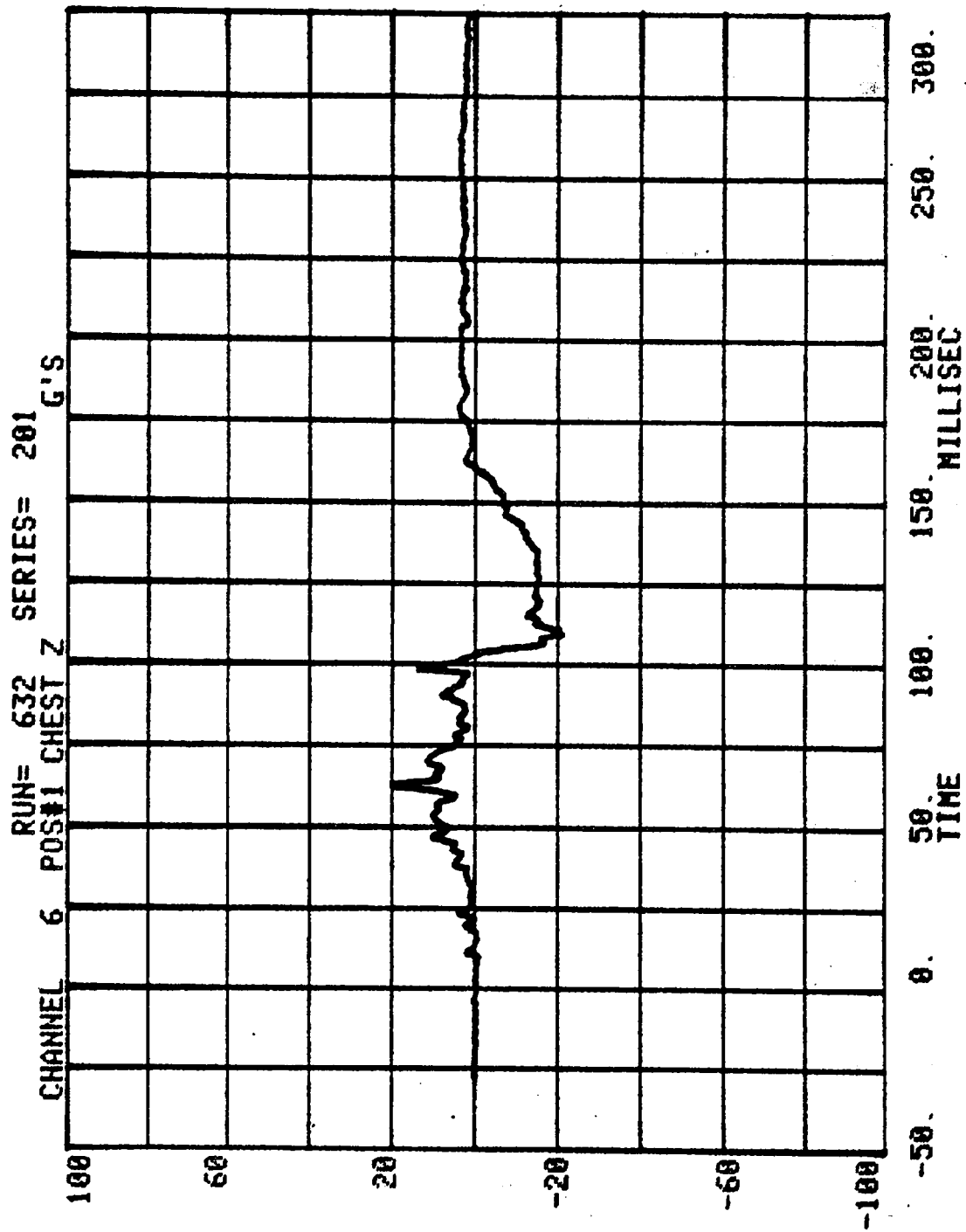




CHANNEL 4 POS#1 CHEST X
RUN= 632 SERIES= 201 G'S

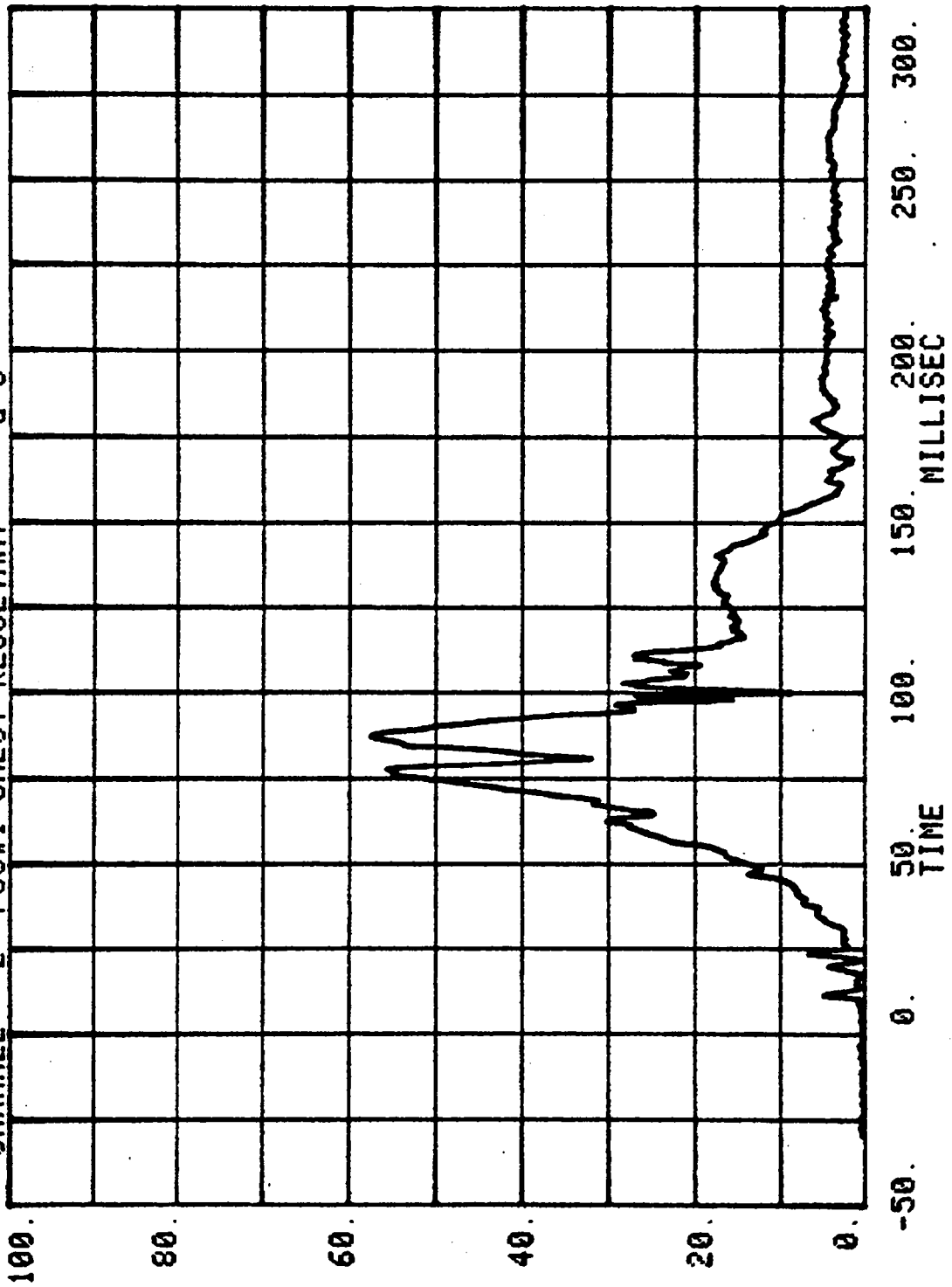


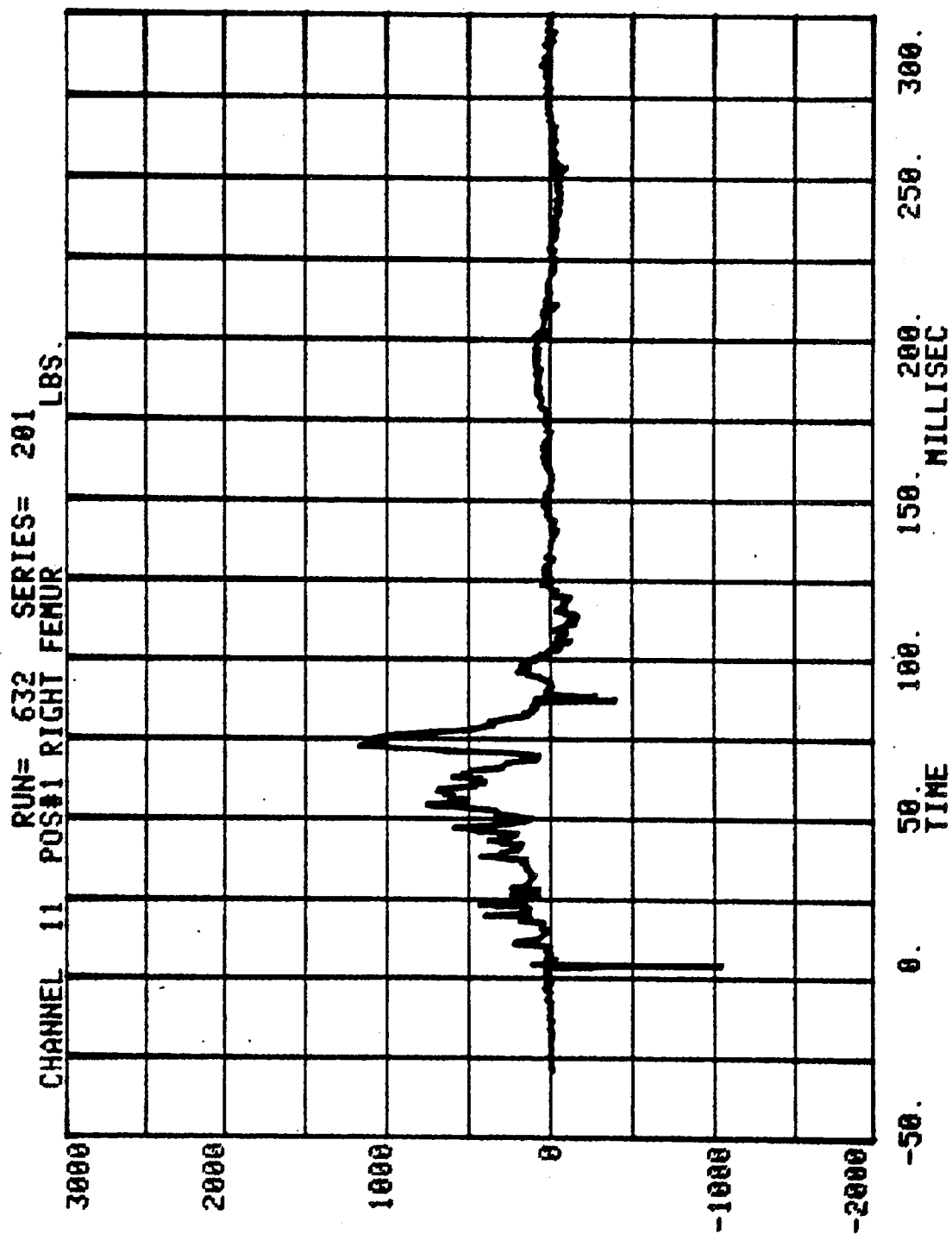




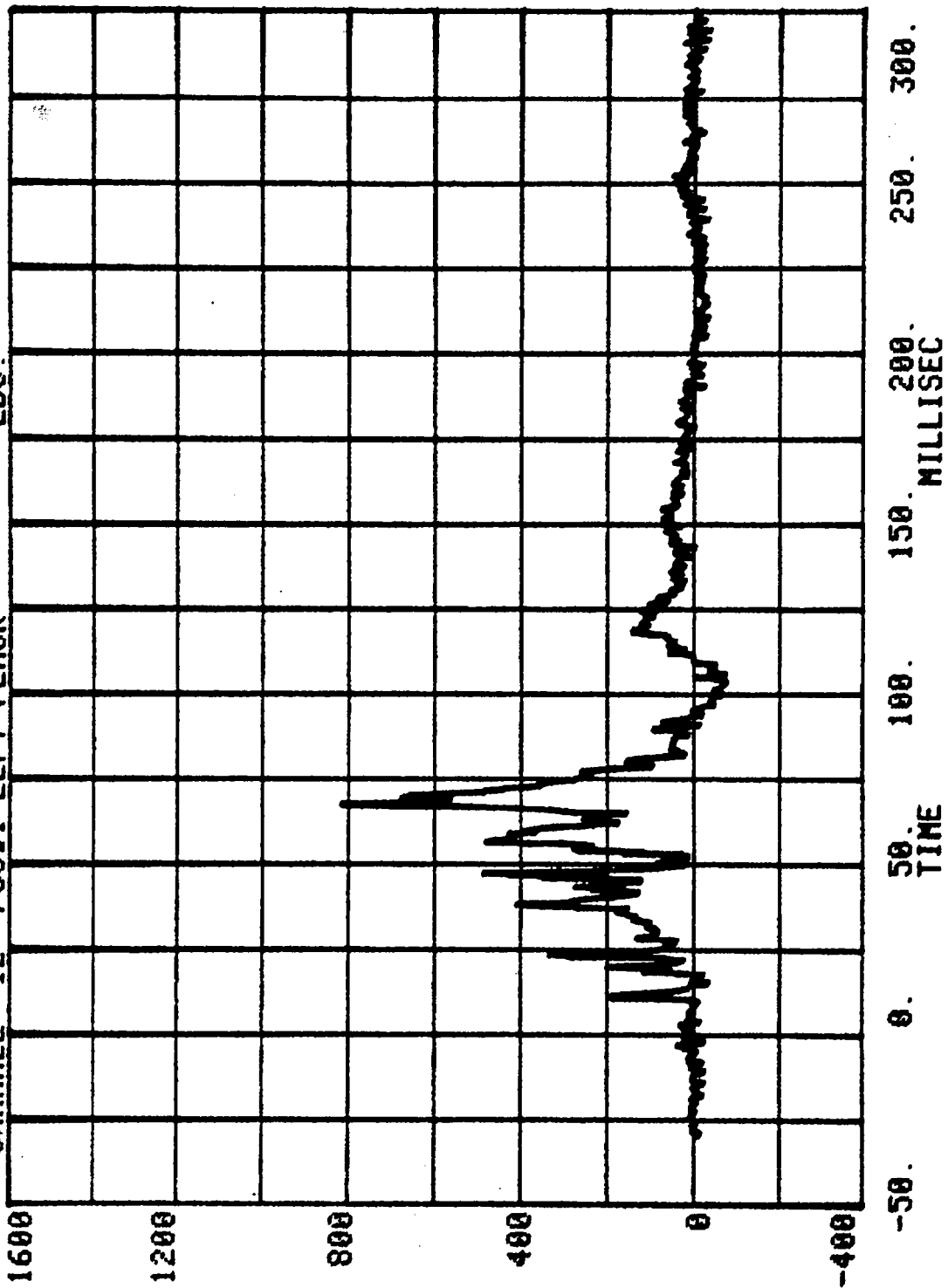
CHANNEL 2 POS#1 CHEST RESULTANT G'S

RUN= 632 SERIES= 201



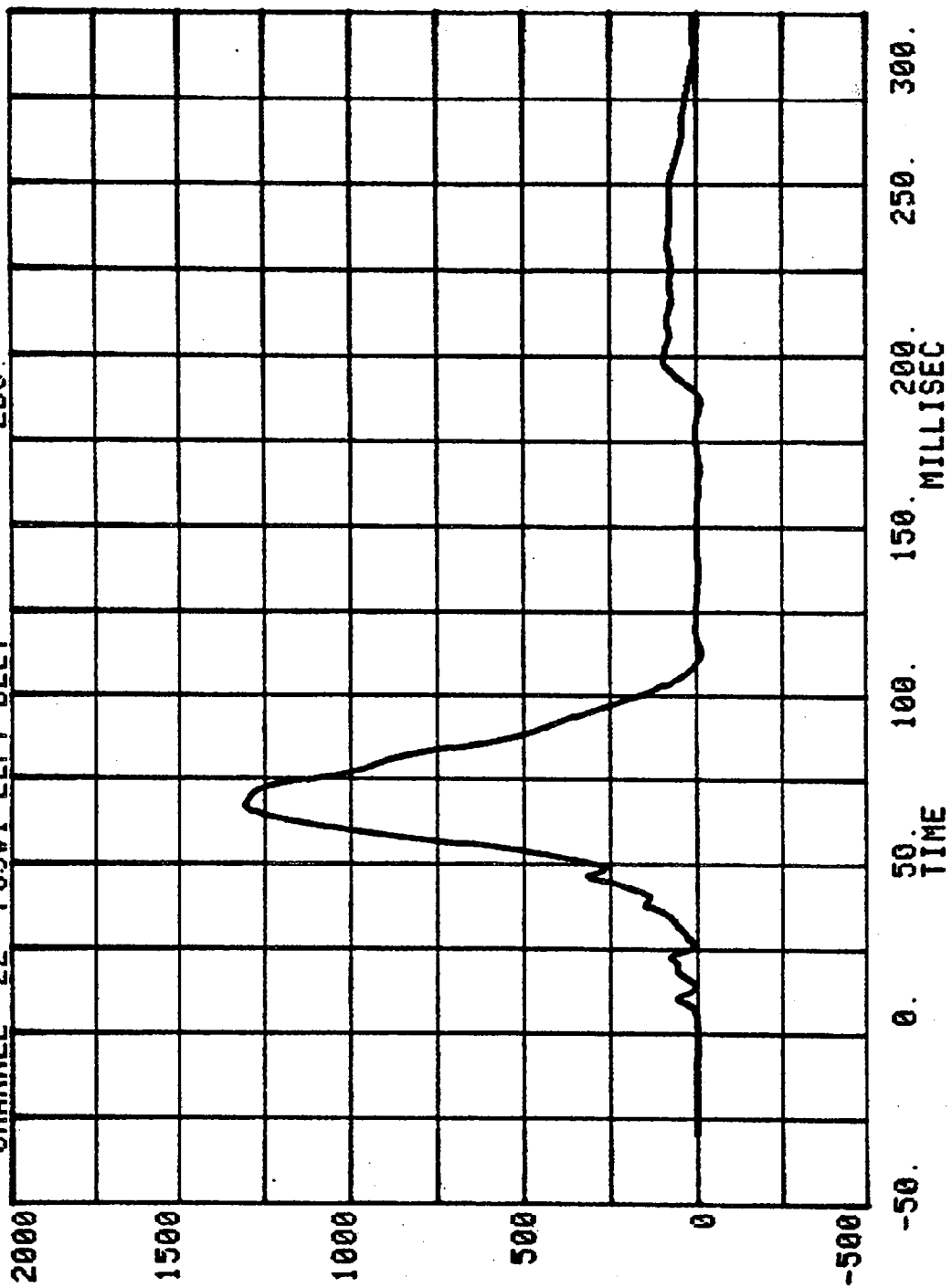


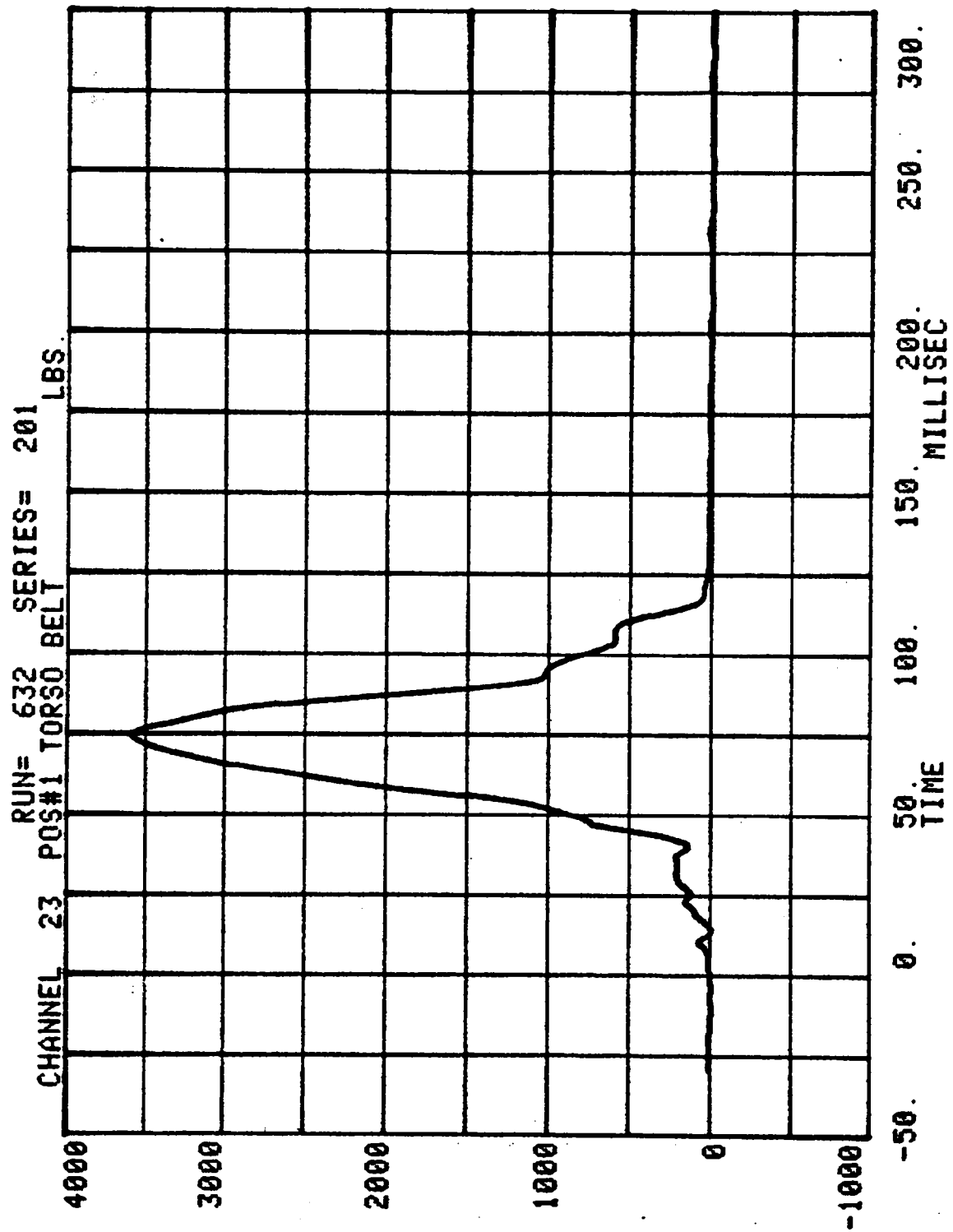
RUN= 632 SERIES= 201 LBS.
CHANNEL 12 POS#1 LEFT FEMUR

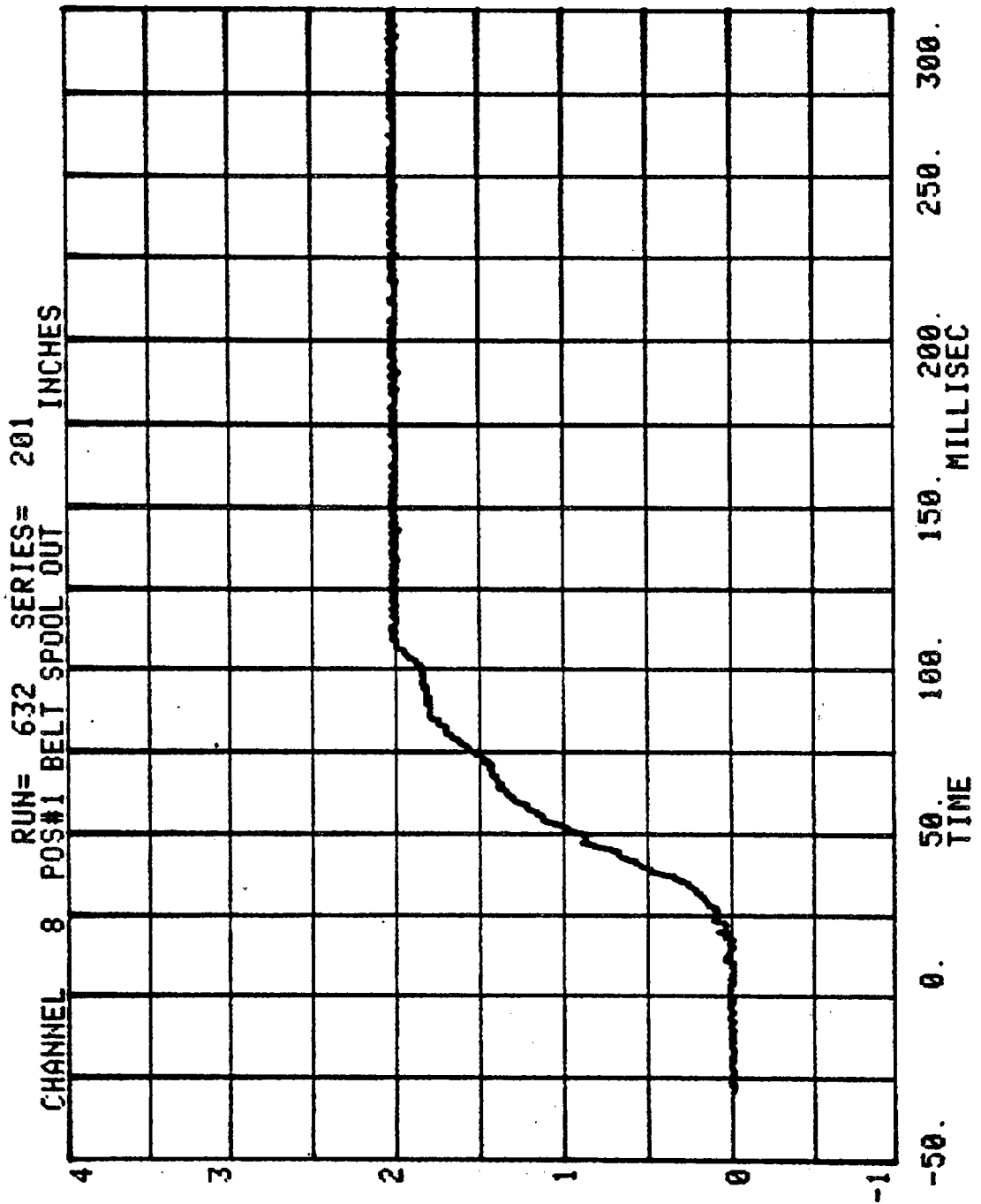


CHANNEL 22 POS#1 LEFT BELT

RUN= 632 SERIES= 201 LBS.







HEAD INJURY CRITERION
HEAD SEVERITY INDEX

CAR TO LOAD CELL BARRIER

RUN= 632

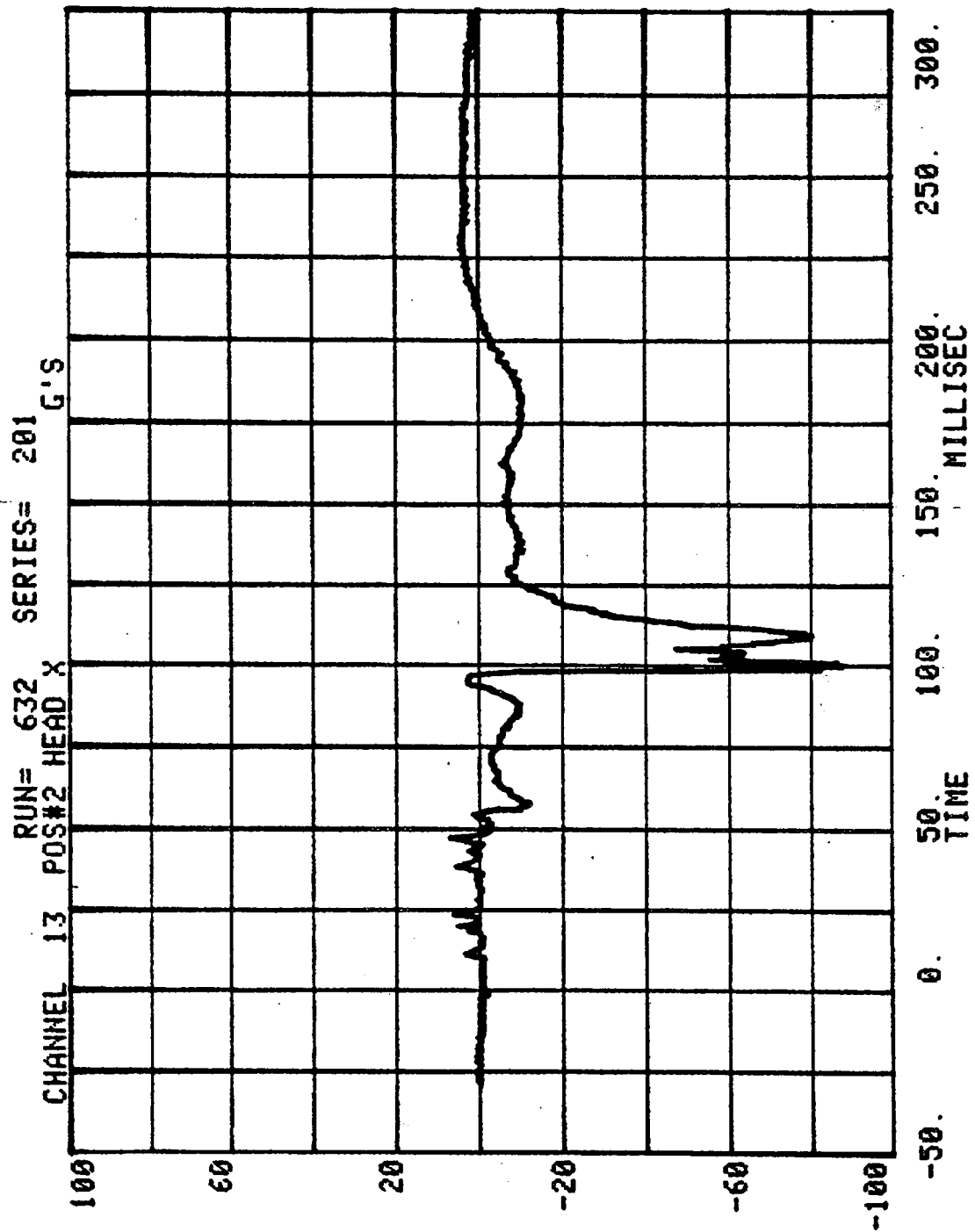
POS#2 HEAD RESULTANT

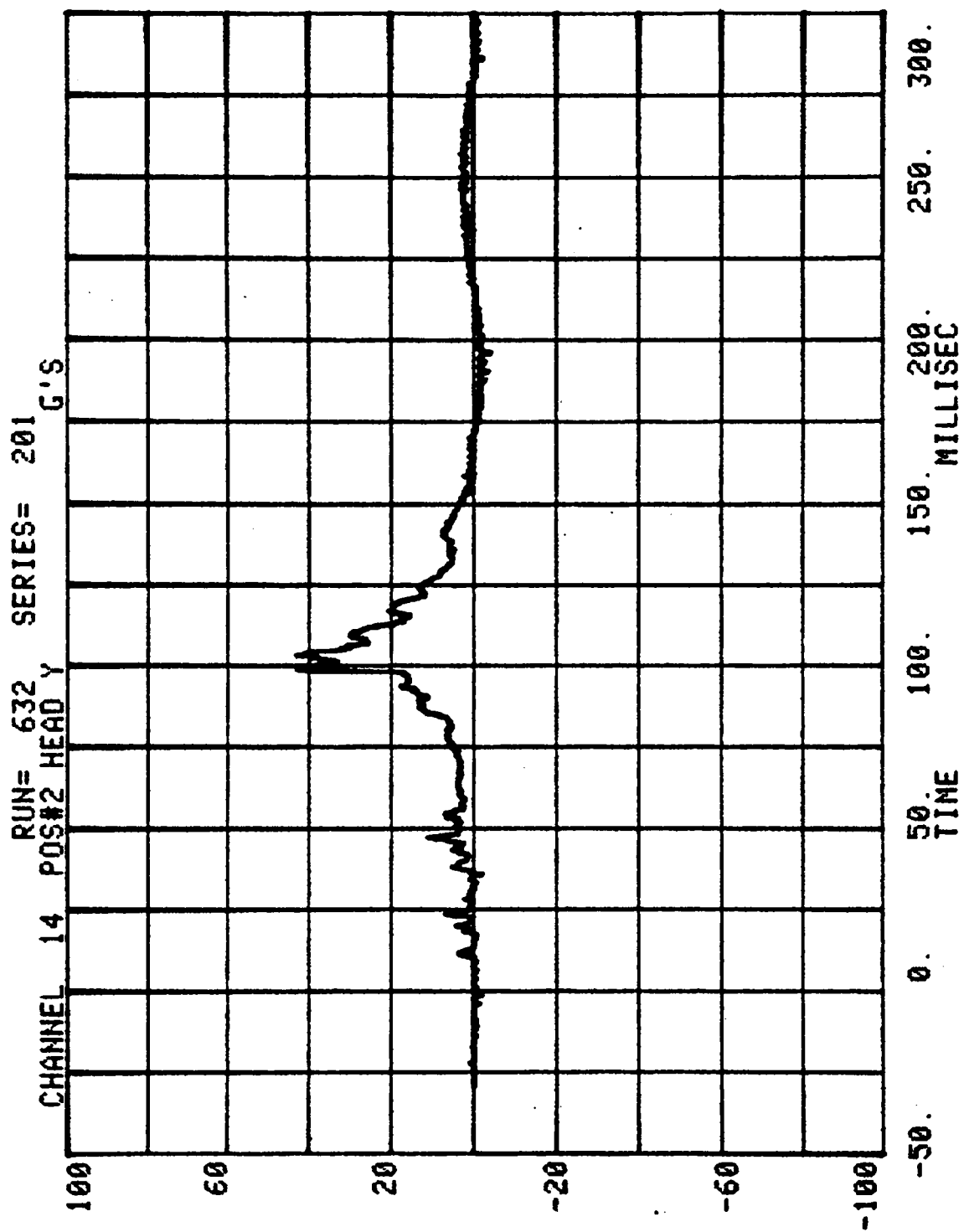
HIC=1111.8 FROM T1= .09720 TO T2= .11400

AVERAGE ACCELERATION BETWEEN T1 AND T2= 84.8G'S

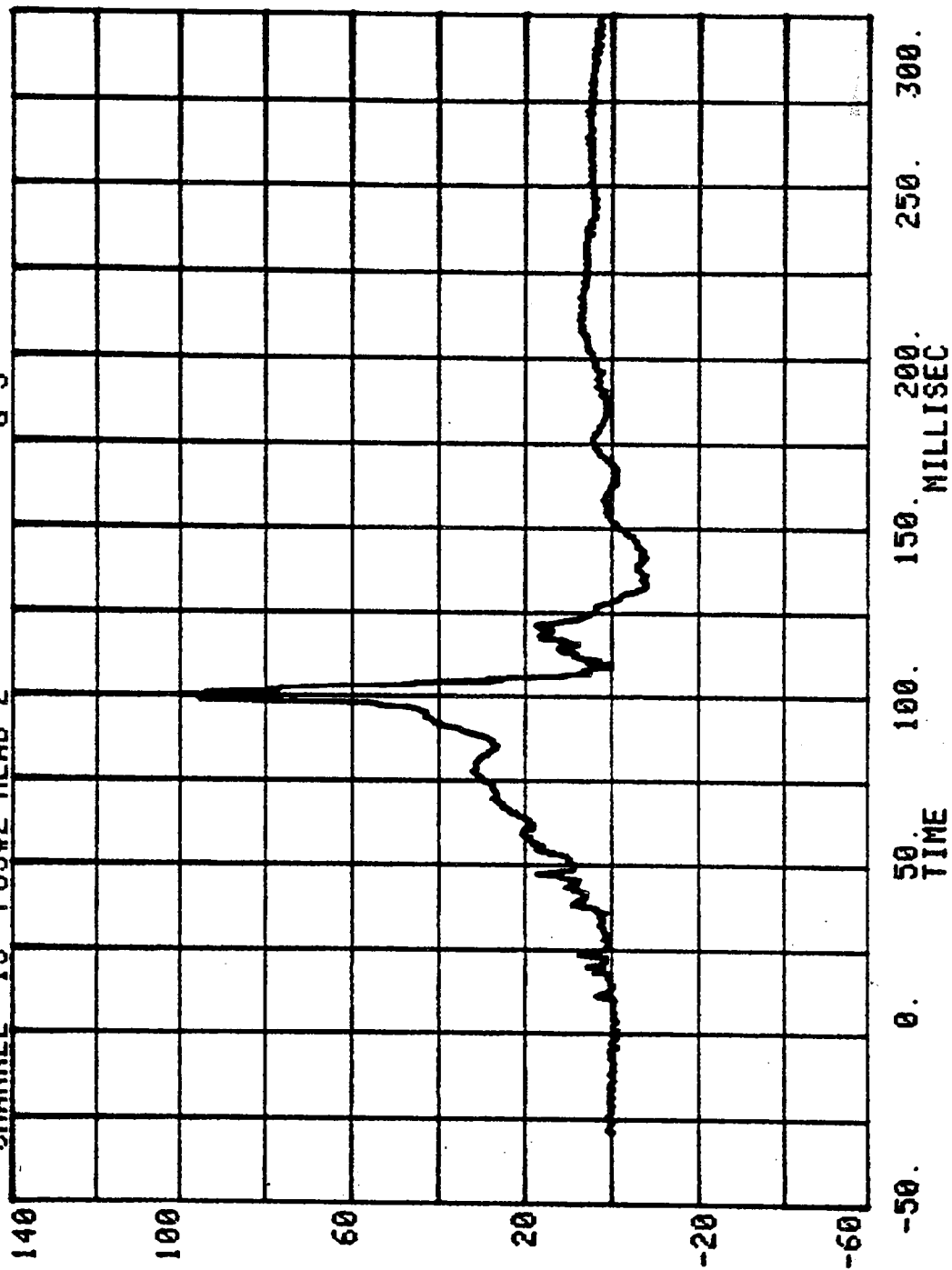
EVENT TIME= 300.0 MSEC

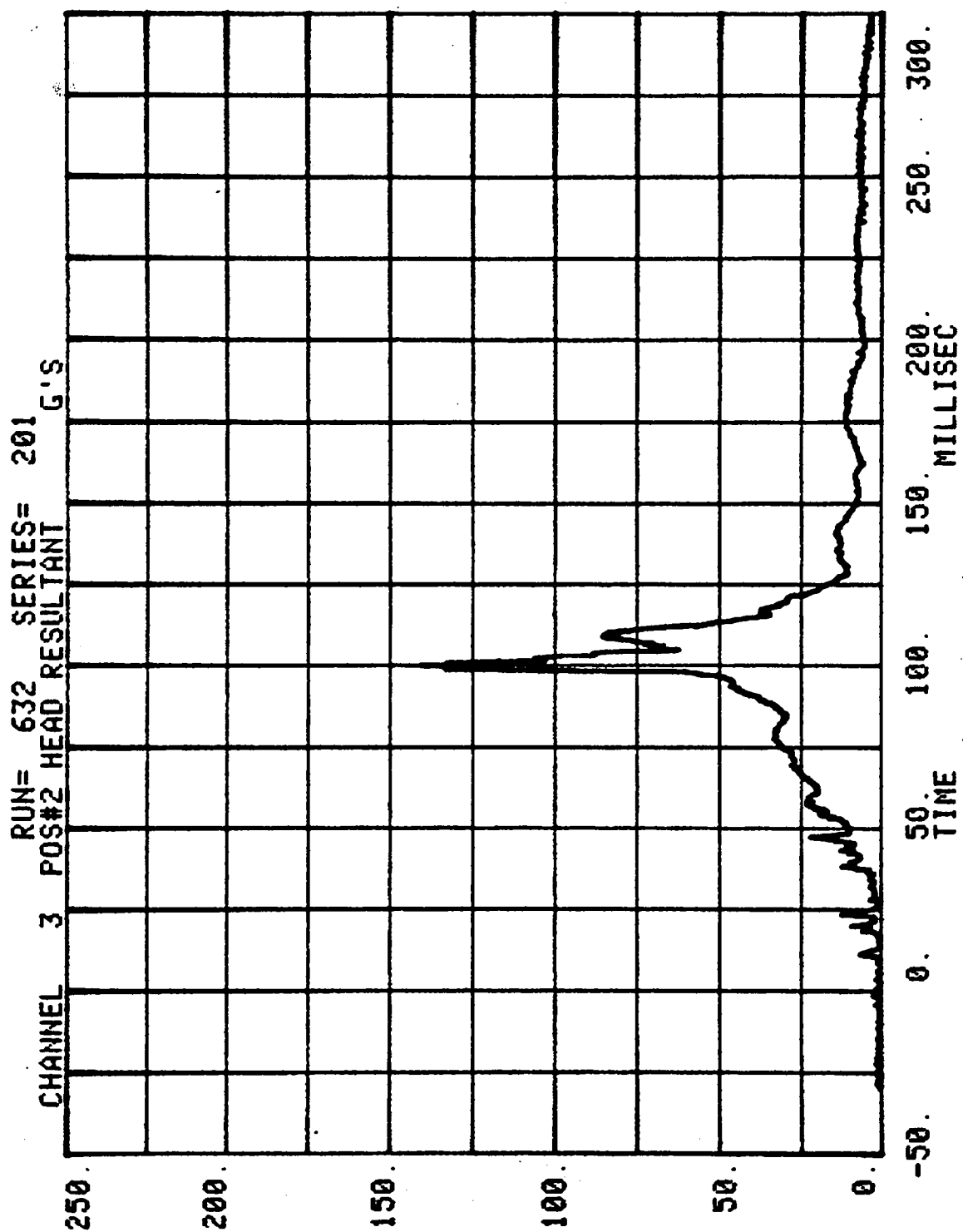
SEVERITY INDEX=1626.3



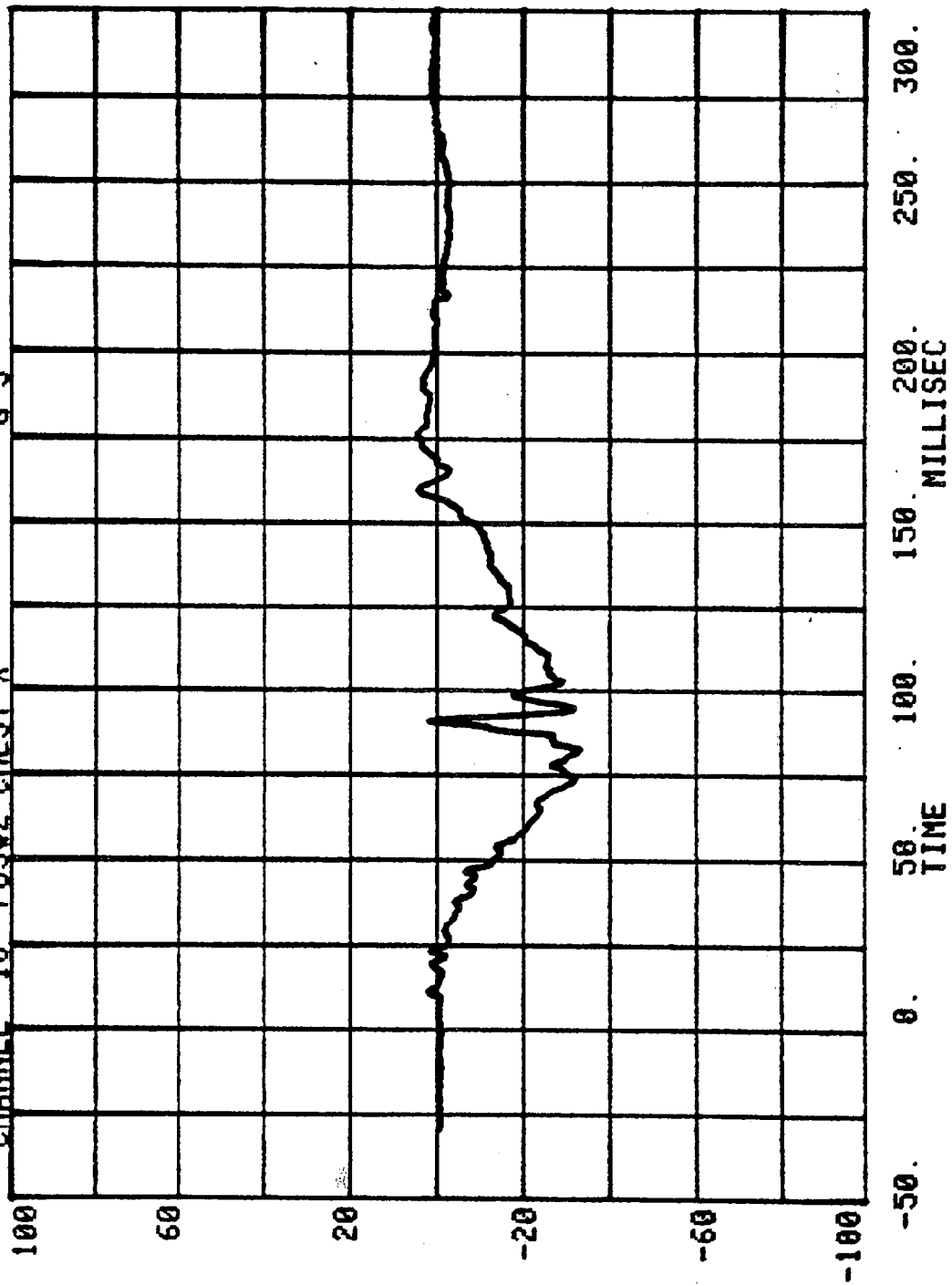


CHANNEL 15 POS#2 HEAD Z RUN= 632 SERIES= 201 G'S



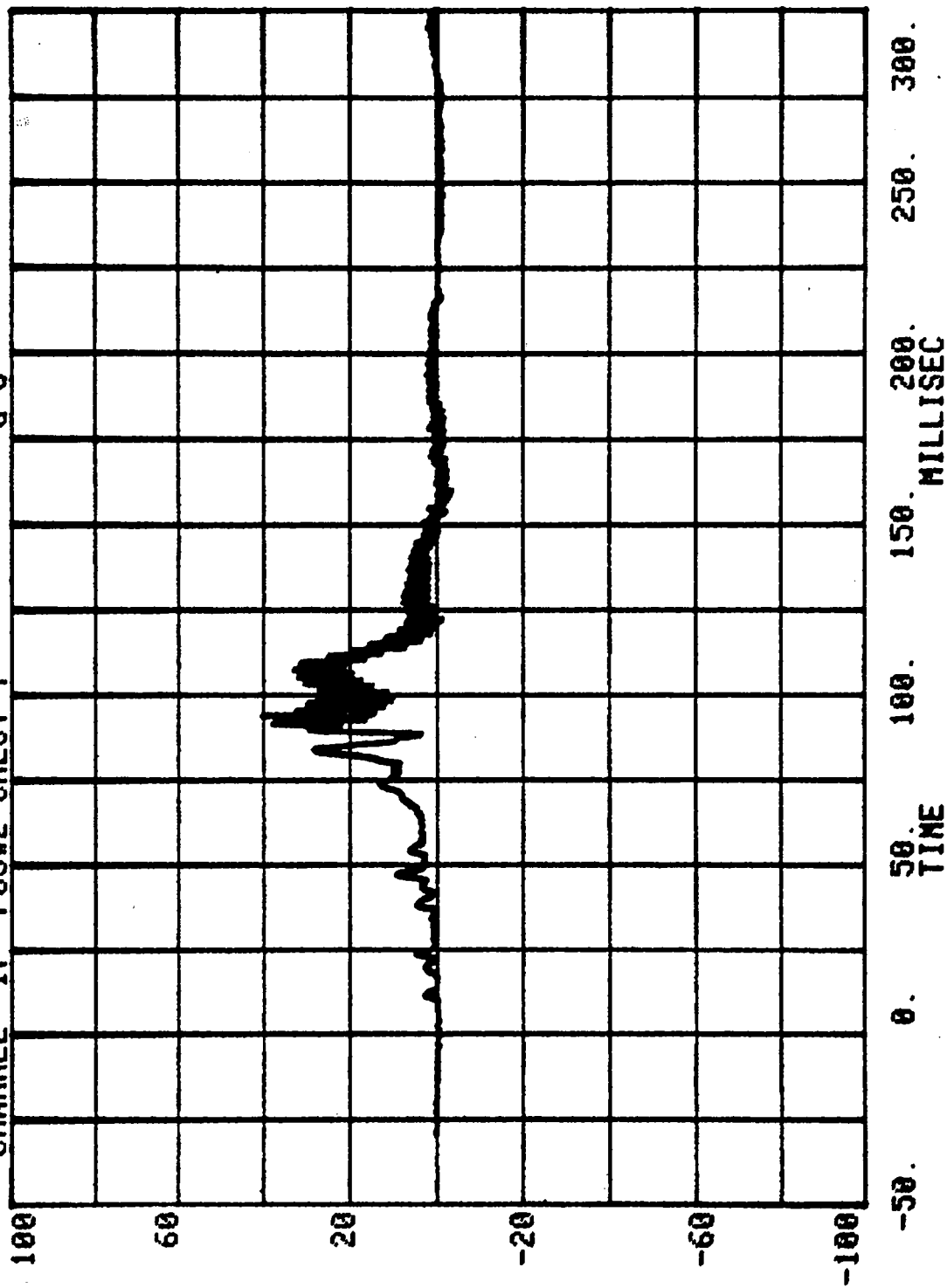


CHANNEL 16 POS#2 CHEST X
RUN= 632 SERIES= 201 G'S

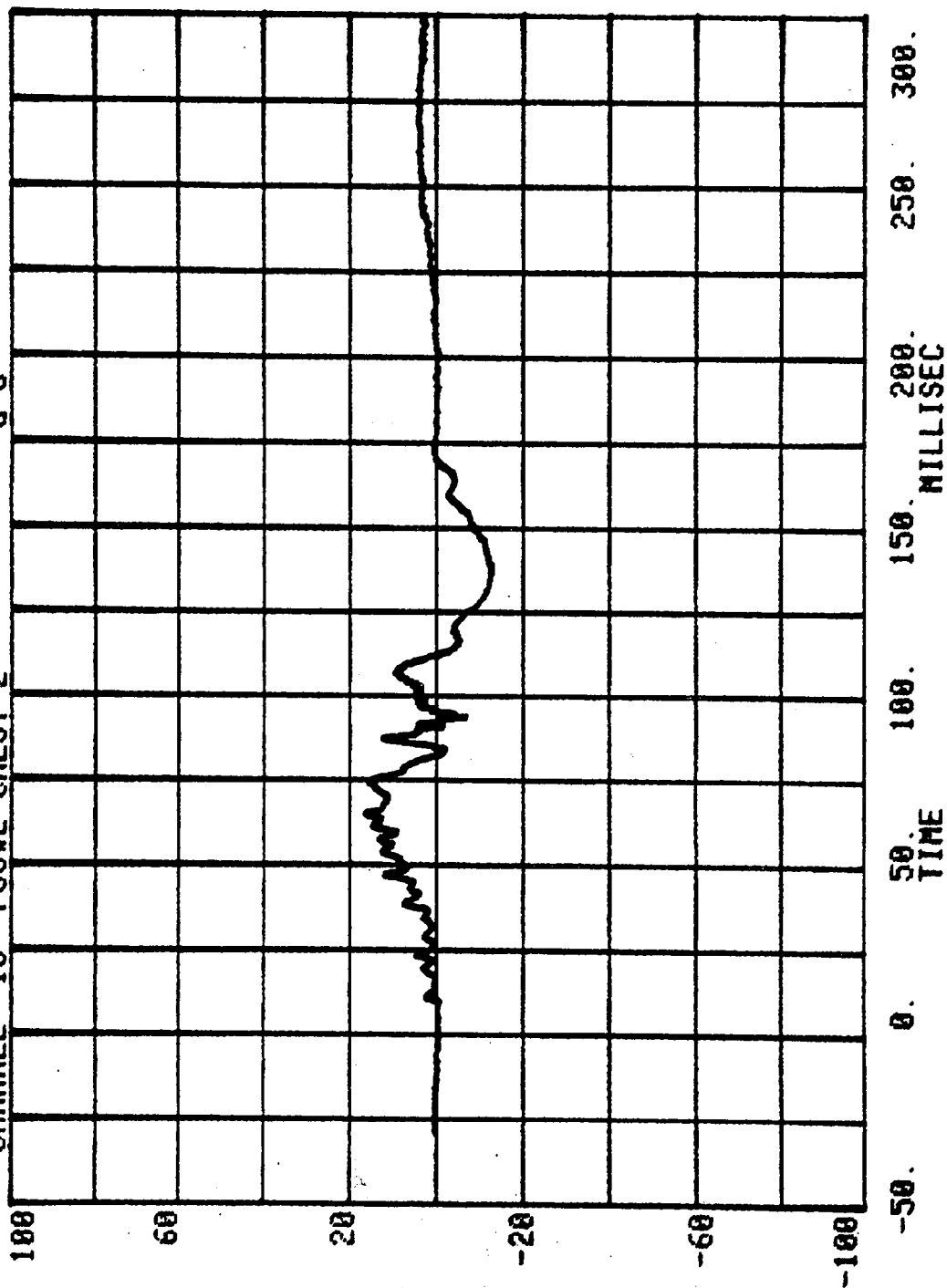


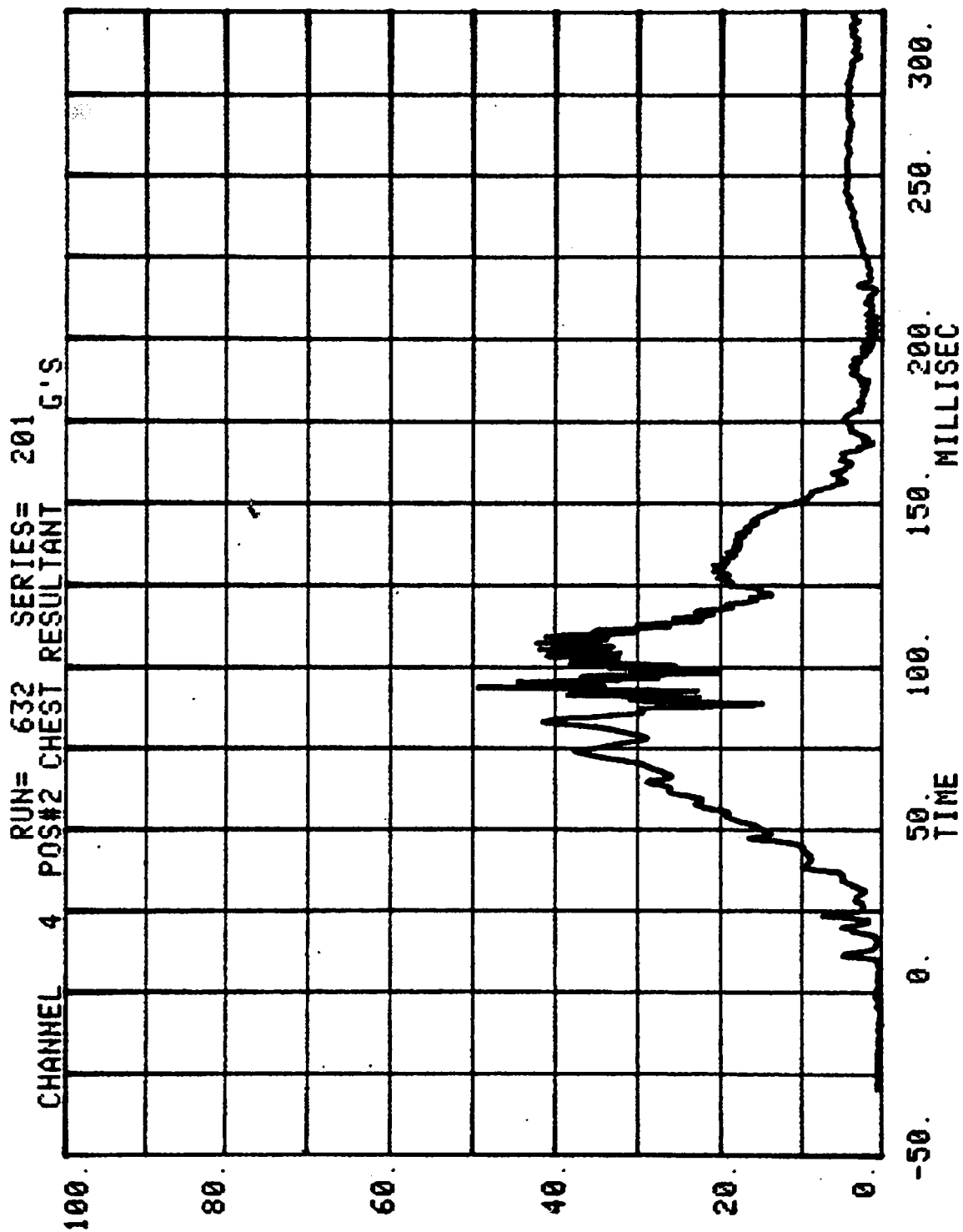
CHANNEL 17 POS#2 CHEST Y G'S

RUN= 632 SERIES= 281

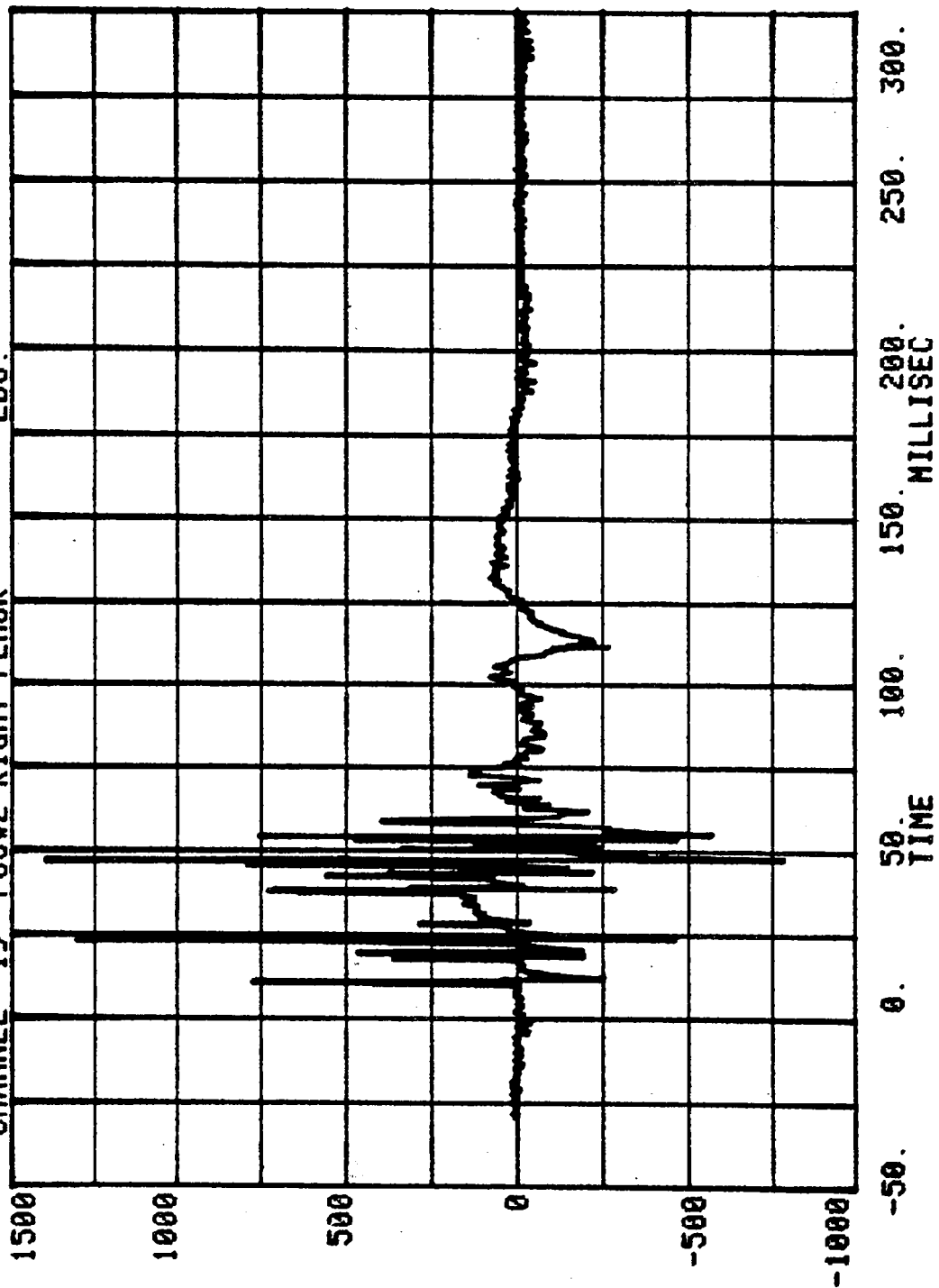


CHANNEL 18 POS#2 CHEST Z RUN= 632 SERIES= 201 G'S

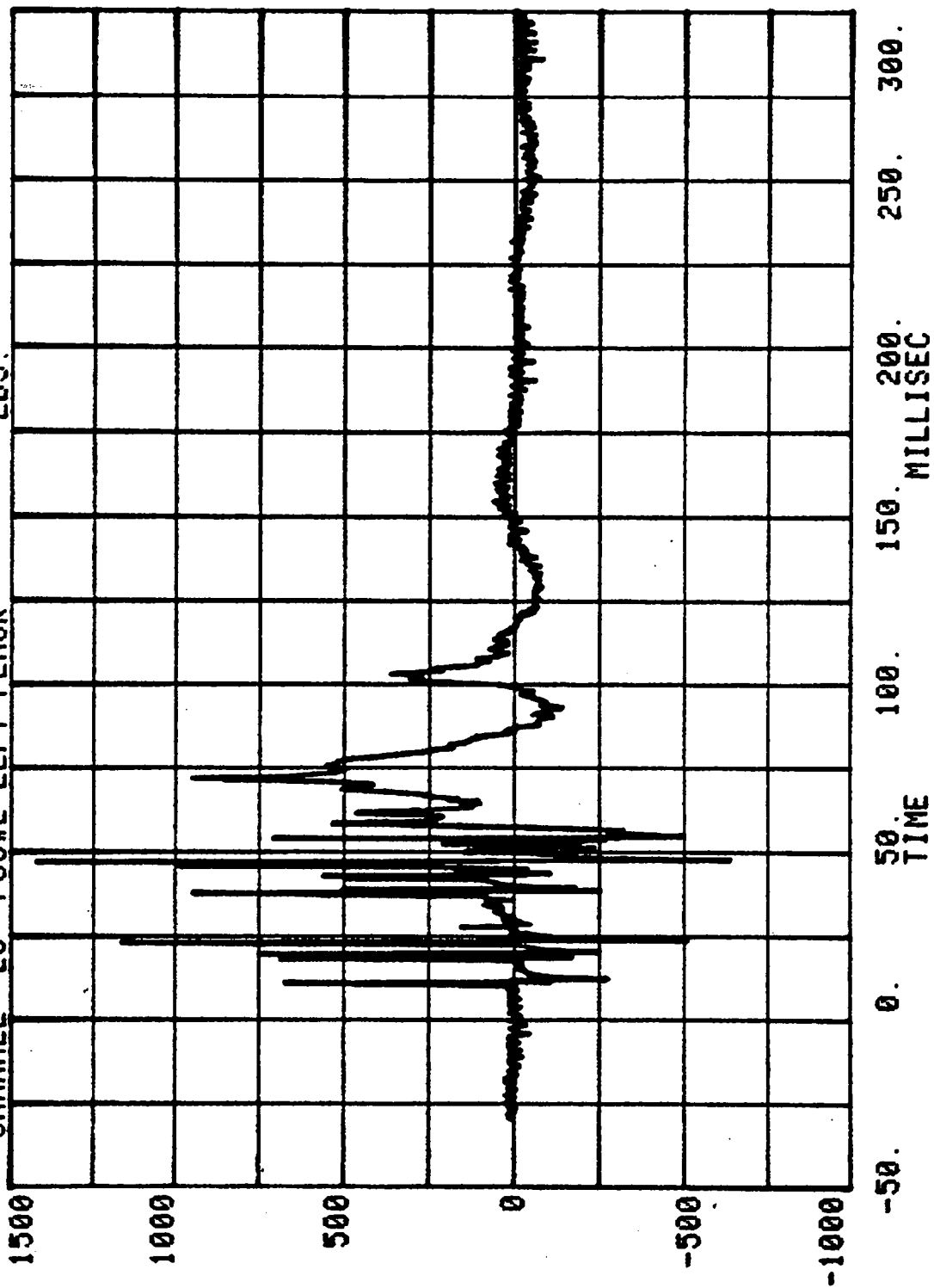


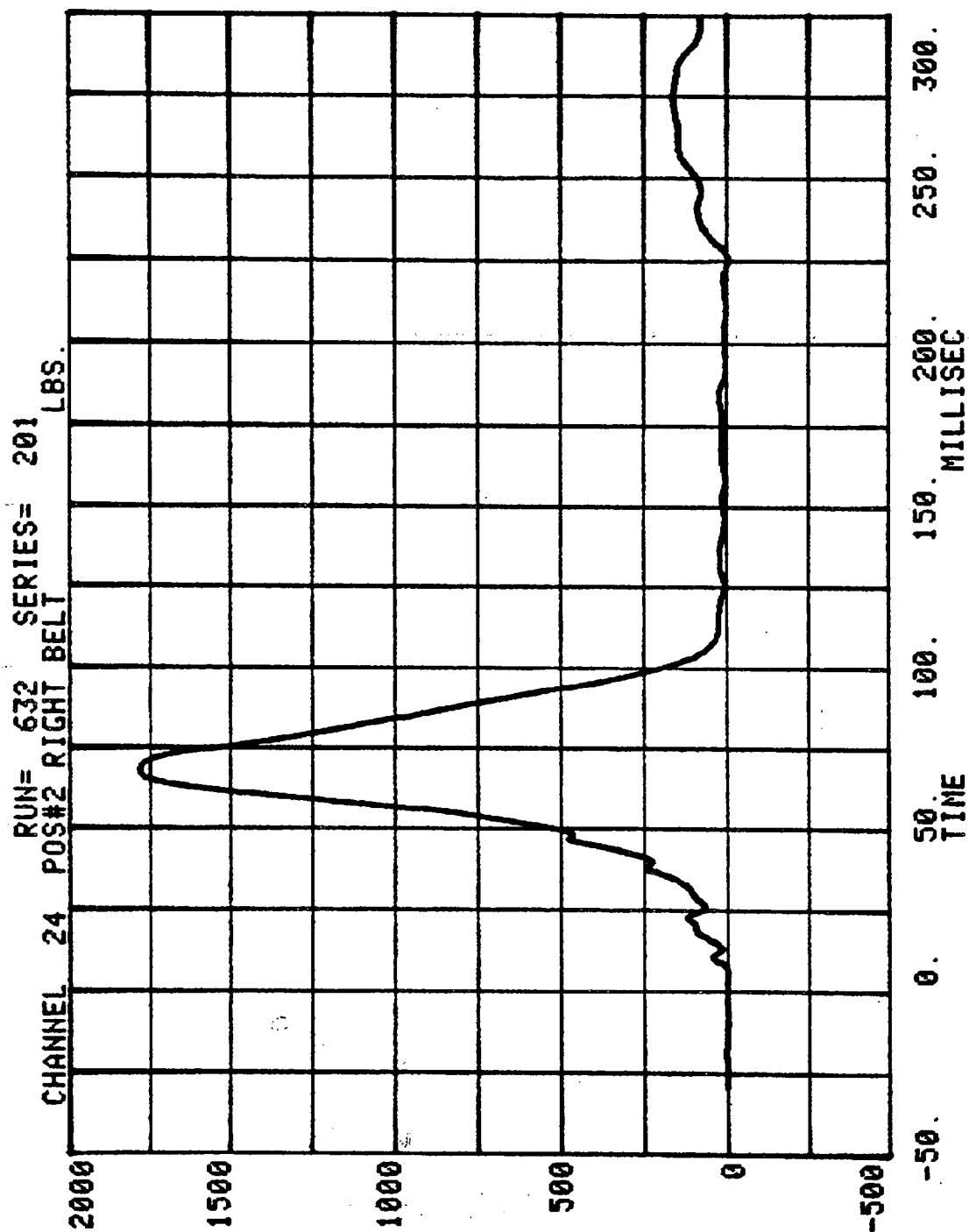


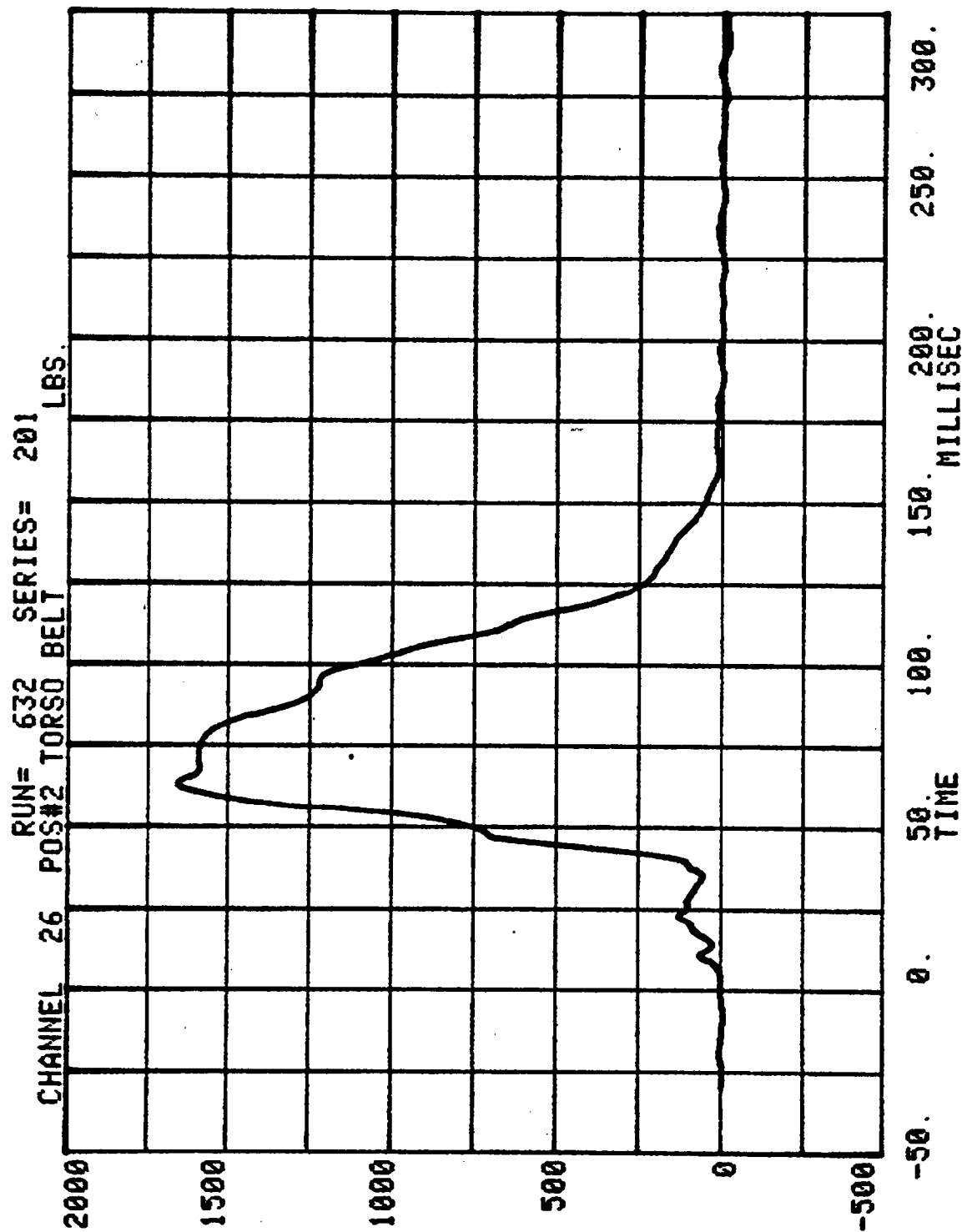
CHANNEL 19 POS#2 RIGHT FEMUR
RUN= 632 SERIES= 201 LBS.



CHANNEL 20 POS#2 LEFT FEMUR
RUN= 632 SERIES= 201 LBS.

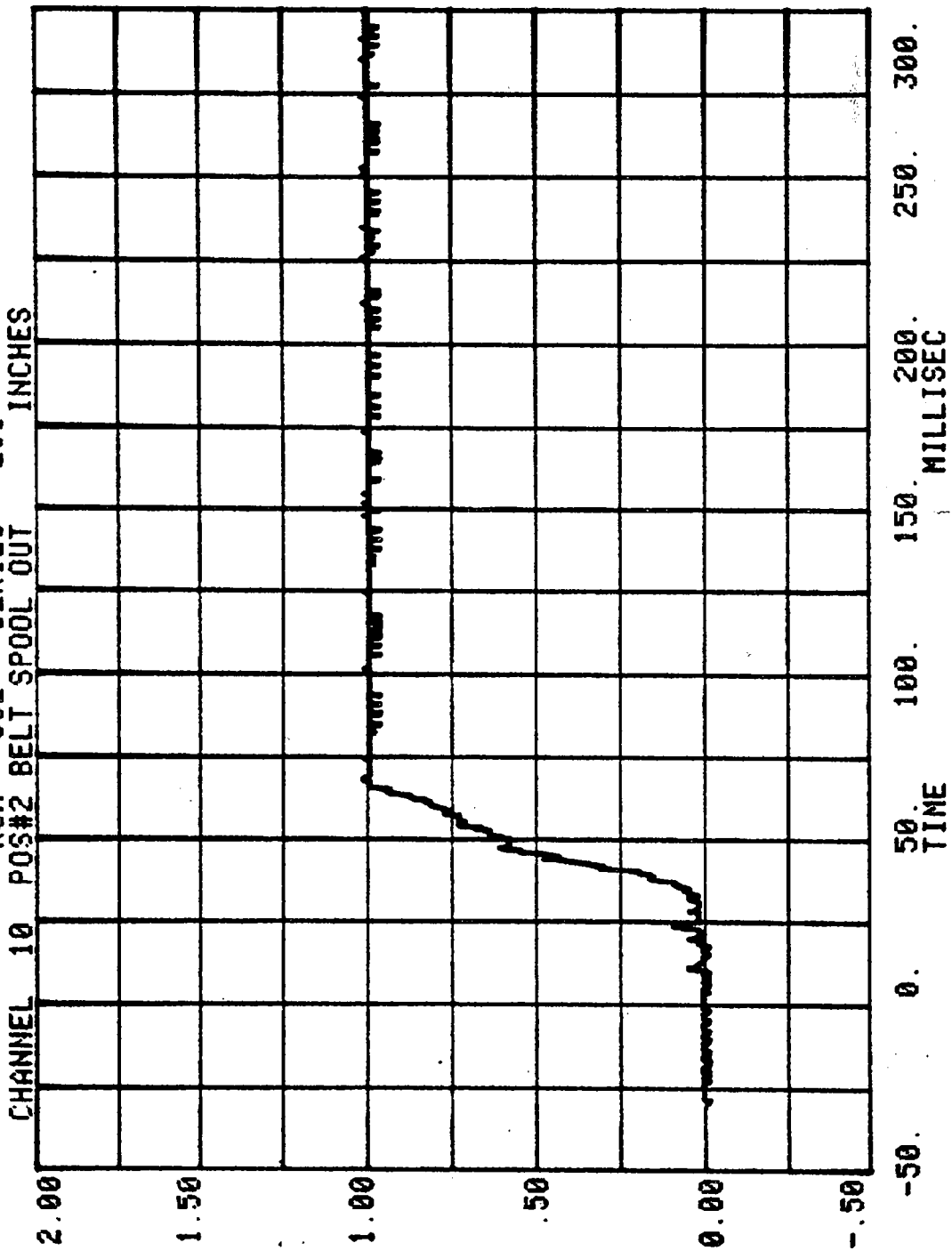






CHANNEL 10 POS#2 BELT SPOOL OUT

RUN= 632 SERIES= 201



APPENDIX C
DUMMY CERTIFICATION TESTS

Appendix C contains the results from certification tests performed on the 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, 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>
1021	6/6/84
1022	5/4/84

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. 1021

LABORATORY TECHNICIAN: G. R. Gestwick

APPROVED BY: *[Signature]*

		Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -		6/4/84-6/6/84	
Calibration Sequential Number for Dummy - - - -		5	
Temperature in Lab. (Spec. = 66 to 78°F)- - - -		70 to 76°F	
Relative Humidity in Lab. (Spec. = 10 to 70%) -		45 to 48%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST:			
a. Peak Resultant Accel. -	210 to 260G	235 g	
b. Peak Lateral Accel. - -	≤10G	7 g	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.1 ms.	
2. NECK BENDING TEST:			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	23.0 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -	20 to 24G	23 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	24 g	
d. Pendulum Decel. ($t_2 - t_1$)	≤ 3 ms	3.0 ms.	
e. Pendulum Decel. ($t_3 - t_2$)	25 to 30 ms	25 ms.	
f. Pendulum Decel. ($t_4 - t_3$)	≤10 ms	6 ms.	
g. Pendulum Direction Reversal Time - - - -		115 ms.	
h. Max. Head Rotation - -	63 to 73°	72°	
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	29 ms.
	Displ.	2.1 to 3.1 in.	2.6 in.
60°	Time	40.3 to 51.7 ms	44 ms.
	Displ.	4.3 to 5.3 in.	4.8 in.
Maximum (72°)	Time	53.2 to 66.8 ms	60 ms.
	Displ.	5.0 to 6.0 in.	5.6 in.

Continued

P, 572 DUMMY CALIBRATION TEST DATA Continued:

NHTSA DUMMY ID NO. 1021

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	79 ms.	
	Displ.	4.3 to 5.3 in.	4.7 in.	
30°	Time	85.4 to 104.6 ms	95 ms.	
	Displ.	2.1 to 3.1 in.	2.5 in.	
0°	Time	101.0 to 123.0 ms	109 ms.	
	Displ.	-.5 to 0.5 in.	0.2 in.	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ 1" - - - - -		50 to 63 lbs.	57 lbs.	
b. Force @ 1.3" - - - - -		73 to 88 lbs.	88 lbs.	
4. LUMBAR FLEXION TEST:				
a. Force @ 20° - - - - -		22 to 34 lbs.	32.5 lbs.	
b. Force @ 30° - - - - -		34 to 46 lbs.	42.0 lbs.	
c. Force @ 40° - - - - -		46 to 58 lbs.	55.5 lbs.	
d. Return Angle - - - - -		12° maximum	2°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed - - - - -		21.78-22.22 fps	22.02 fps	
(2) Peak Deflection - - - - -		1.7" maximum	1.68 in.	
(3) Peak Resistive Force - - - - -		2250 lbs. maximum	1940 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	57.2%	
b. Low Speed				
(1) Probe Speed - - - - -		13.86-14.14 fps	14.07 fps	
(2) Peak Deflection - - - - -		1.1" maximum	1.06 in.	
(3) Peak Resistive Force - - - - -		1450 lbs. maximum	1220 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	52.7%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. 1021

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	6.96 fps	
(2) Maximum Force - -	1850 to 2500 lbs	2050 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.0 ms.	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.92 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2000 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.15 ms.	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1021

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 OF NEXT CALIBRATION
ENDEVCO	DB47	1/84	7/84
ENDEVCO	CX05	1/84	7/84
ENDEVCO	CJ54	1/84	7/84
GSE	312	1/84	7/84
GSE	311	1/84	7/84
CEC	22707	1/84	7/84
CEC	22958	1/84	7/84
TRANSDUCER INC	20051	1/84	7/84
BLH	72952	1/84	7/84
CIC	567-11	1/84	7/84

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 1022

LABORATORY TECHNICIAN: G. R. Gestwick

APPROVED BY: *Saverio J. Pignatelli*

		Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -		5/1/84-5/4/84	
Calibration Sequential Number for Dummy - - - -		4	
Temperature in Lab. (Spec. = 66 to 78°F) - - - -		68 to 76°F	
Relative Humidity in Lab. (Spec. = 10 to 70%) -		20 to 32%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST:			
a. Peak Resultant Accel. -	210 to 260G	235 g	
b. Peak Lateral Accel. - -	≤10G	5 g	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.2 ms	
2. NECK BENDING TEST:			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	22.62 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -	20 to 24G	22.5 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	21 g	
d. Pendulum Decel. ($t_2 - t_1$)	≤3 ms	2.8 ms.	
e. Pendulum Decel. ($t_3 - t_2$)	25 to 30 ms	25.9 ms.	
f. Pendulum Decel. ($t_4 - t_3$)	≤10 ms	7.5 ms.	
g. Pendulum Direction Reversal Time - - - -		113 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	29.5 ms.
	Displ.	2.1 to 3.1 in.	2.7 in.
60°	Time	40.3 to 51.7 ms	46 ms.
	Displ.	4.3 to 5.3 in.	4.8 in.
Maximum (70°)	Time	53.2 to 66.8 ms	59.5 ms.
	Displ.	5.0 to 6.0 in.	5.3 in.

Continued

P, 572 DUMMY CALIBRATION TEST DATA Continued:

NHTSA DUMMY ID NO. 1022

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	75 ms.
	Displ.	4.3 to 5.3 in.	4.6 in.
30°	Time	85.4 to 104.6 ms	92 ms.
	Displ.	2.1 to 3.1 in.	2.4 in.
0°	Time	101.0 to 123.0 ms	107 ms.
	Displ.	-.5 to 0.5 in.	0.0 in.
3. ABDOMINAL COMPRESSION TEST:			
(Preload = 10 pounds)			
a. Force @ 1" - - - - -	50 to 63 lbs.	53 lbs.	
b. Force @ 1.3" - - - - -	73 to 88 lbs.	75 lbs.	
4. LUMBAR FLEXION TEST:			
a. Force @ 20° - - - - -	22 to 34 lbs.	31 lbs.	
b. Force @ 30° - - - - -	34 to 46 lbs.	40 lbs.	
c. Force @ 40° - - - - -	46 to 58 lbs.	48.5 lbs.	
d. Return Angle - - - - -	12° maximum	6°	
5. CHEST IMPACT TESTS:			
a. High Speed			
(1) Probe Speed - - - - -	21.78-22.22 fps	22.08 fps	
(2) Peak Deflection - - - - -	1.7" maximum	1.66 in.	
(3) Peak Resistive Force - - - - -	2250 lbs. maximum	1900 lbs.	
(4) Internal Hysteresis - - - - -	50 to 70%	55.8%	
b. Low Speed			
(1) Probe Speed - - - - -	13.86-14.14 fps	14.09 fps	
(2) Peak Deflection - - - - -	1.1" maximum	.92 in.	
(3) Peak Resistive Force - - - - -	1450 lbs. maximum	1190 lbs.	
(4) Internal Hysteresis - - - - -	50 to 70%	59.1%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. 1022

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. KNEE IMPACT TESTS:			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.01 fps	
(2) Maximum Force - -	1850 to 2500 lbs	2400 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.85 ms.	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.87 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2200 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.9 ms.	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1022

CALIB. SEQ. NOS. FOR DUMMY: 4 &

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 OF NEXT CALIBRATION
ENDEVCO	DB47	1/84	7/84
ENDEVCO	CX05	1/84	7/84
ENDEVCO	CJ54	1/84	7/84
GSE	312	1/84	7/84
GSE	311	1/84	7/84
CEC	22707	1/84	7/84
CEC	22958	1/84	7/84
TRANSDUCER INC	20051	1/84	7/84
BLH	72952	1/84	7/84
CIC	567-11	1/84	7/84