

REPORT NOS. 212-CAL-84-030

301-CAL-84-030

NHTSA NEW VEHICLE ASSESSMENT AND
STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS 212, 301-75

GENERAL MOTORS CORPORATION
1984 PONTIAC PARISIENNE
4-DOOR SEDAN

NHTSA NO. CE0108
CALSPAN TEST NO. 7209-3

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
P. O. BOX 400
BUFFALO, NEW YORK 14225

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FINAL REPORT

Prepared for:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, S.W., NASSIF BUILDING
WASHINGTON, DC 20590

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Prepared by: Walter E. Levan
W. E. Levan, Test Engineer

Approved by: A. L. Russo
A. L. Russo
Transportation Research
Physical Sciences Department

FINAL REPORT ACCEPTED BY:

Robert Krauss
Contract Technical Manager

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Date of Report Acceptance

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16. Abstract A frontal load cell barrier test of a 1984 Pontiac Parisienne 4-door sedan 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; 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 34.88 mph. Ambient temperature on the test date was 52°F. The post-test vehicle crush was 31.4 inches and intrusion of the firewall into compartment was 6.5 inches. The test vehicle appeared to comply with the following vehicle performance standards: FMVSS 212 - Windshield Retention FMVSS 301-75 - Fuel System Integrity With regard to occupant injury criteria (FMVSS 208), both the driver and passenger dummy head HIC responses appeared to exceed the 1000 limit. All other injury criteria (femurs, chest) values appeared to be acceptable.					
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SECTION 1
PURPOSE AND TEST PROCEDURE

This frontal barrier test is part of the Composite FY-83 Vehicle Barrier Impact Testing program, sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract DTNH22-82-C-01140. The purpose of this test was to obtain vehicle crashworthiness, occupant restraint performance, and indicant standards enforcement data for impact speeds in excess of the current FMVSS requirements.

The test was performed in accordance with the Office of Market Incentives (OMI) 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 nominal 35 mph impact is provided herein.

SECTION 2
SUMMARY OF TEST NO. CE0108

A load cell barrier consisting of 36 load cells (Figure 4) was impacted by a 1984 Pontiac Parisienne at a velocity of 34.88 mph. The test was performed at the Calspan Corporation Advanced Technology Center on October 27, 1983. 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 (ATD's) 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 67 channels of data were recorded on six 14-channel FM tape recorders. There were no data losses experienced during the test. Appendix B contains the vehicle and dummy response data traces. The Injury Criteria Values are presented in summary form in Table 10.

Table 1

CRASH TEST SUMMARY

TEST NO. <u>CE0108</u>	PROJECT: <u>FY-84 New Car Assessment Program</u> <u>FMVSS No. 208/212/301-75</u>
DATE: <u>10/27/83</u>	TIME: <u>1145 hrs.</u> TEMP: <u>52°F.</u>

VEHICLE	<u>1984 Pontiac Parisienne</u>
TEST WEIGHT (lbs)	<u>4140</u>
IMPACT ANGLE (deg)*	<u>0</u>
IMPACT VELOCITY (mph)**	<u>34.88</u>
MAX. CRUSH (in)	<u>31.4</u>
MAX. INTRUSION (in)	<u>6.5</u>

DUMMIES

TYPE	<u>Hybrid II Part 572</u>	<u>Hybrid II Part 572</u>
LOCATION	<u>LF (1) Serial #162</u>	<u>RF (2) Serial #1022</u>
RESTRAINT	<u>production 3-point</u> <u>belt system</u>	<u>production 3-point</u> <u>belt system</u>
NUMBER OF DATA CHANNELS	<u>67</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 Pontiac Parisienne 4-door sedan was equipped with a 3.8 liter, V6 engine, three speed automatic transmission, power brakes and power steering. The total test weight with two 50th percentile male dummies, instrumentation and two on-board cameras was 4140.

The 1983 Pontiac Parisienne which was involved in a frontal load cell barrier crash at a velocity of 34.88 mph appeared to comply with FMVSS Nos. 212, "Windshield Mounting;" and 301-75, "Fuel System Integrity". There was 100 percent windshield retention and no fuel leakage after impact or any phase of the rollover test.

The vehicle sustained 31.4 inches of static crush and approximately 34.5 inches of dynamic crush. Maximum load cell barrier force measured by the 36 load cells was 114,000 pounds at 58.7 milliseconds.

The driver's head struck the upper steering wheel rim and hub. The femurs contacted the underside of the dash panel. The driver's head X accelerometer became noisy between 26 and 94.7 milliseconds after impact. The HIC was calculated from the resultant starting at 94.7 milliseconds. Head contact with the steering wheel occurred at approximately 96 milliseconds. The driver did not appear to meet the FMVSS 208 "Head Injury Criteria" (HIC=1607.6). Since the HIC calculation was only computed for the time interval of 94.7 to 300 milliseconds, 1607.6 represents a lower bound for the actual HIC. The actual HIC value (assuming the intermittent noise had not occurred) would be greater than or at best equal to 1607.6. The remaining criteria were satisfactory as indicated by a maximum chest deceleration over 3 milliseconds of 52.2 g's and femur loads of 180 and 540 pounds.

The right front passenger head struck the dash panel and thus did not meet the FMVSS 208 "Head Injury Criteria" (HIC=1055.2) but did meet all other criteria. A maximum chest deceleration over 3 milliseconds of 47.8 g's and femur loads of 465 and 495 pounds were recorded.

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

GENERAL TEST AND VEHICLE PARAMETER DATA

Make/Model Pontiac Parisienne Body Style 4-door sedan
Model Year 1984 NHTSA No. CE0108 Color Silver-Maroon
Engine Data: V6 cylinders, 3.8 liter
Transmission Data: 3 speed, () manual (X) automatic
Date Rec'd 9/28/83 Air Cond. Pw. Str. X Pw. Brks. X
Dealer's Name & Address Austin Pontiac - West Seneca, NY 14224
Odometer Reading 14

Vehicle Manufactured by: General Motors Corporation
 Date of Manufacture 8/83 VIN 1G2AL69A3EX200657
 GVRW 4685 lbs., GAWR: front 2191 lbs., rear 2494 lbs.

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

Recommended Tire Size P205/75R15 Load Range X B C D

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

Tires on Vehicle P205/75R15

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): 3 front
3 rear
6 TOTAL

Cargo Load: 200 lbs.

Vehicle Capacity Weight: 1100 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 = 990 lbs. Right Rear = 840 lbs.
 Left Front = 960 lbs. Left Rear = 840 lbs.
 TOTAL FRONT WEIGHT = 1950 lbs. (53.7 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1680 lbs. (46.3 % of Total Vehicle Weight)
 TOTAL DELIVERY WEIGHT = 3630 lbs.

CALCULATION FOR TARGET TEST WEIGHT

RCLW = Rated Cargo and Luggage Weight
 UDW = Unloaded Delivered Weight (3630 lbs.)
 VCW = Vehicle Capacity Weight (1100 lbs.)
 DSC = Designated Seating Capacity (6)
 RCLW = VCW - 150 (DSC) = 200 lbs.
 Target Test Weight = UDW + RCLW + (2 dummies X 164 lbs./dummy)
 Target Test Weight = 4158 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 182 POUNDS CARGO

Right Front = 1050 lbs. Right Rear = 1030 lbs.
 Left Front = 1050 lbs. Left Rear = 1010 lbs.
 TOTAL FRONT WEIGHT = 2100 lbs. (50.7 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 2040 lbs. (49.3 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 4140 lbs.
 Weight of ballast secured in vehicle trunk area = 0 lbs.

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitude:	RF	<u>29.0</u>	LF	<u>29.1</u>	RR	<u>28.5</u>	LR	<u>29.0</u>
Test Attitude:	RF	<u>28.8</u>	LF	<u>28.8</u>	RR	<u>26.7</u>	LR	<u>27.2</u>

Remarks: Wheelbase = 115.5
Vehicle CG - 56.9 inches rearward of front wheel C/L

Table 2

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

Type of Test Frontal Impact Impact Angle 0 °
 Date of Test 10/27/83 Time of Test 1145 hrs.
 Ambient Temperature 52 °F at impact area
 Temperature in Occupant Compartment 68 °F
 Windshield Molding Temperature 55 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 34.88 mph, secondary 34.83 mph

VEHICLE REBOUND AND CRUSH (inches)

Vehicle Length: Pre-test = R 209.1 C 213.4 L 209.4
 Post-test = R 180.2 C 182.0 L 181.6
 Crush = R 28.9 C 31.4 L 27.8
 Distance from front of test vehicle to point of impact:
 R 18" C/L 18.25" L 18"

VISIBLE DUMMY CONTACT POINTS

	<u>Driver</u>		<u>Passenger</u>	
Head	<u>wheel rim and hub</u>		<u>instrument panel</u>	
Chest	<u>--</u>		<u>--</u>	
Abdomen	<u>--</u>		<u>--</u>	
Left Knee	<u>lower dash</u>		<u>lower dash</u>	
Right Knee	<u>lower dash</u>		<u>lower dash</u>	

	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Door Opening	<u>operable</u>	<u>not operable</u>	<u></u>	<u></u>
	<u></u>	<u></u>	<u></u>	<u></u>
	<u></u>	<u></u>	<u></u>	<u></u>

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

<u>Seat Movement</u>	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Seat Back Failure	No	No	NA	NA
Seat Shift (in.)	No	No	NA	NA

Glazing Damage

Backlight/Windshield Windshield Intact

Other notable impact effects: None

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

Table 3
SUMMARY OF FMVSS 212 AND 301 DATA

PRE-IMPACT DATA

Make/Model: Pontiac Parisienne
Body Style: 4-door sedan Model Year: 1984
NHTSA No.: CE0108 Color: Silver and Maroon

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: General Motors Corporation
Date of Manufacture: 8/83 VIN: 1G2AL69A3EX200657
GVWR: 4685 lbs., GAWR: Front 2191 lbs., Rear 2494 lbs.

POST-IMPACT DATA

Type of Test: Frontal Load Cell Barrier Impact
Date of Test: 10/27/83 Time: 1145 hrs. Temp.: 52 °F
Required Impact Velocity Range: 34.5 to 35.5 mph
Impact Velocity: Primary = 34.88 mph, Secondary = 34.83 mph
Test Weight 4140 lbs., Static Crush max. 31.4 lbs., Rebound 18 in.

FUEL SYSTEM DATA

Test Fluid Type: Red Stoddard Solvent #2, Spec. Grav.: 0.764
Kinematic Viscosity 0.96 Centistokes
EPA Capacity* 25 gal.
Test Volume 23.25 gal. (93% of EPA Capacity)
Fuel System Capacity (data from Owner's Manual) 25 gal.
Electric Fuel Pump? yes X no, Fuel Injection? yes X no
Does electric fuel pump operate with ignition switch "on" and the engine
not operating? yes X no

Test vehicle fuel tank filled to 93% of "usable" plus "unusable" 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, 219, AND 301 DATA (cont'd)

Details of fuel system: Engine operated fuel pump. The fuel tank is located
aft of the rear axle and held in place by two tank straps. The fuel tube is
at the rear center of the vehicle and sealed by a screw-type cap which is con-
cealed by the hinged license plate 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 10/27/83 TIME 1145 hrs. TEMP 52 °F

VEHICLE NHTSA NO. CE0108 VIN 1G2AL69A3EX200657

REQUIRED VEHICLE VELOCITY RANGE 34.5 to 35.5 mph

IMPACT VELOCITY (traps within 5 feet of impact event)

Trap No. 1 = 34.88 mph Trap No. 2 = 34.83 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 = 27.8 in Passenger's Side = 28.9 in

C/L = 31.4 in. Average = 29.4 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 = 18 in Passenger's Side = 18 in

C/L = 18.25 in. Average = 18.1 in.

REMARKS

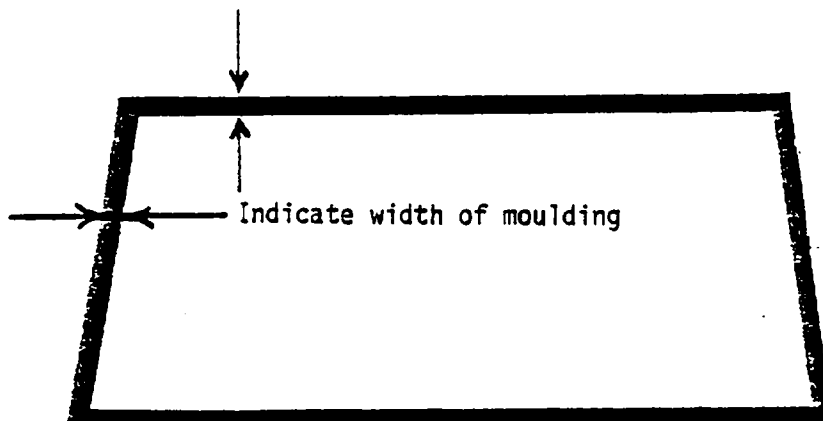
Details of windshield mounting (method of retention, type of trim, etc.):

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

	Windshield Periphery		
	Pre-Test	Post-Test	Retention %
Right Side	86.25	86.25	100%
Left Side	86.25	86.25	100%
TOTAL	172.5	172.5	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 1 WINDSHIELD RETENTION, FMVSS NO. 212 DATA

Table 5
"FUEL SYSTEM INTEGRITY" POST-IMPACT TEST DATA
 FMVSS No. 301-75

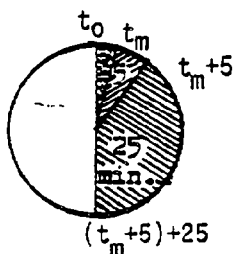
TEST VEHICLE NHTSA NO. CE0108 Test Date 10/27/83
 Vehicle Manufacture/Make/Model 1984 Pontiac Parisienne

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



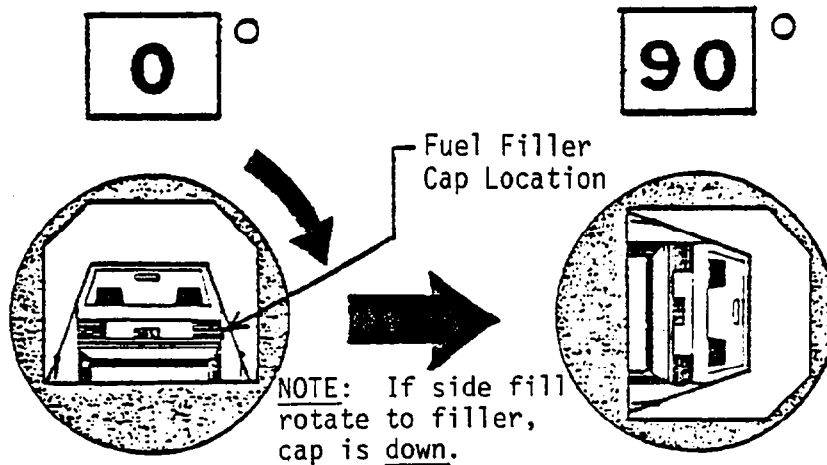
	Actual	Max. Allow.
From impact until vehicle motion ceases	0	1 oz
For 5 min. period after vehicle motion ceases	0	5 oz
For next 25 min.	0	1 oz/1 min

SOLVENT SPILLAGE DETAILS

None

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

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

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

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

TOTAL = 7 minutes 58 seconds

Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

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

Maximum Allowable Solvent Spillage

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

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0
---	---	---	---

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

SOLVENT SPILLAGE LOCATION(S)

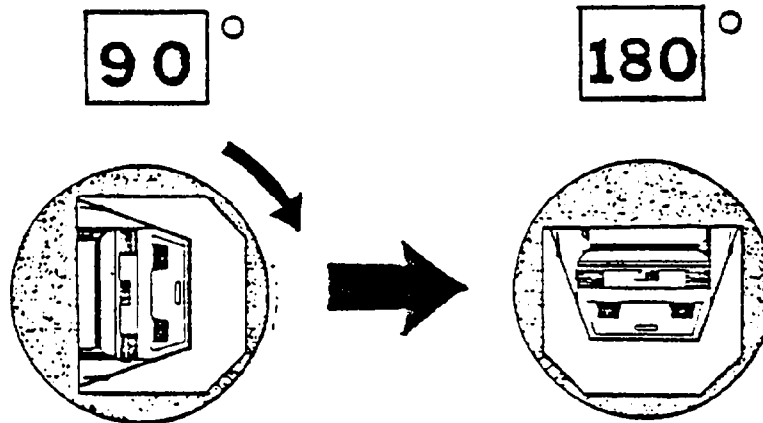
None

VEHICLE NHTSA ID NO. CE0108

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.
--	----------	----------	-------------------

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)

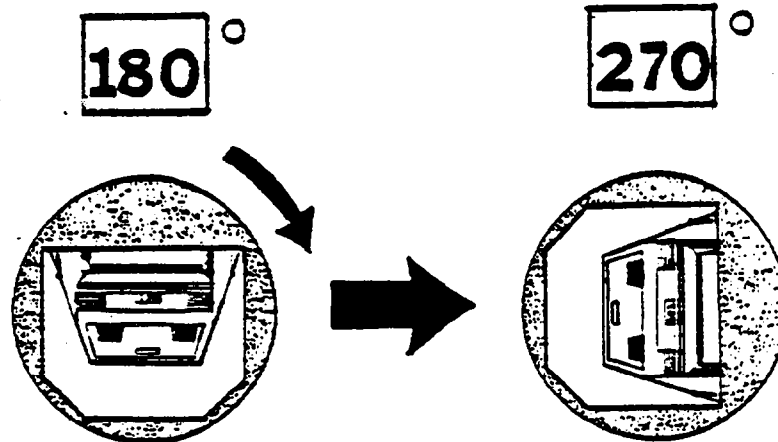
None

VEHICLE NHTSA ID NO. CE0108

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 52 seconds
(Spec. Range = 1 to 3 min.)
FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
TOTAL = 7 minutes 52 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)

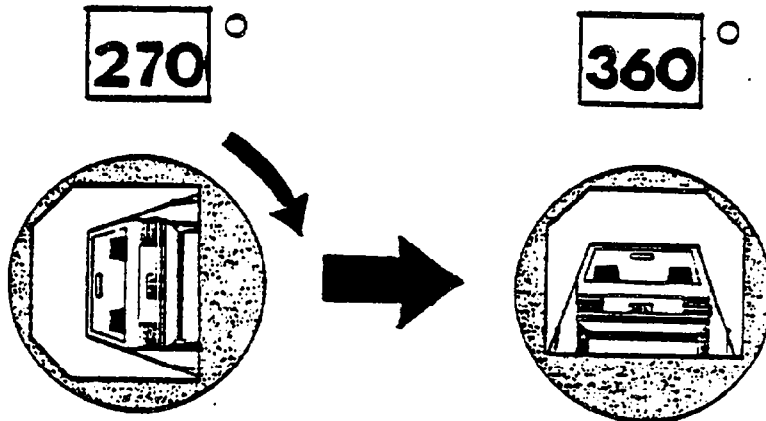
None

VEHICLE NHTSA ID NO. CE0108

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

FMVSS 301-75 REQUIREMENTS

Time Period

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

Maximum Allowable Solvent Spillage

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

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	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

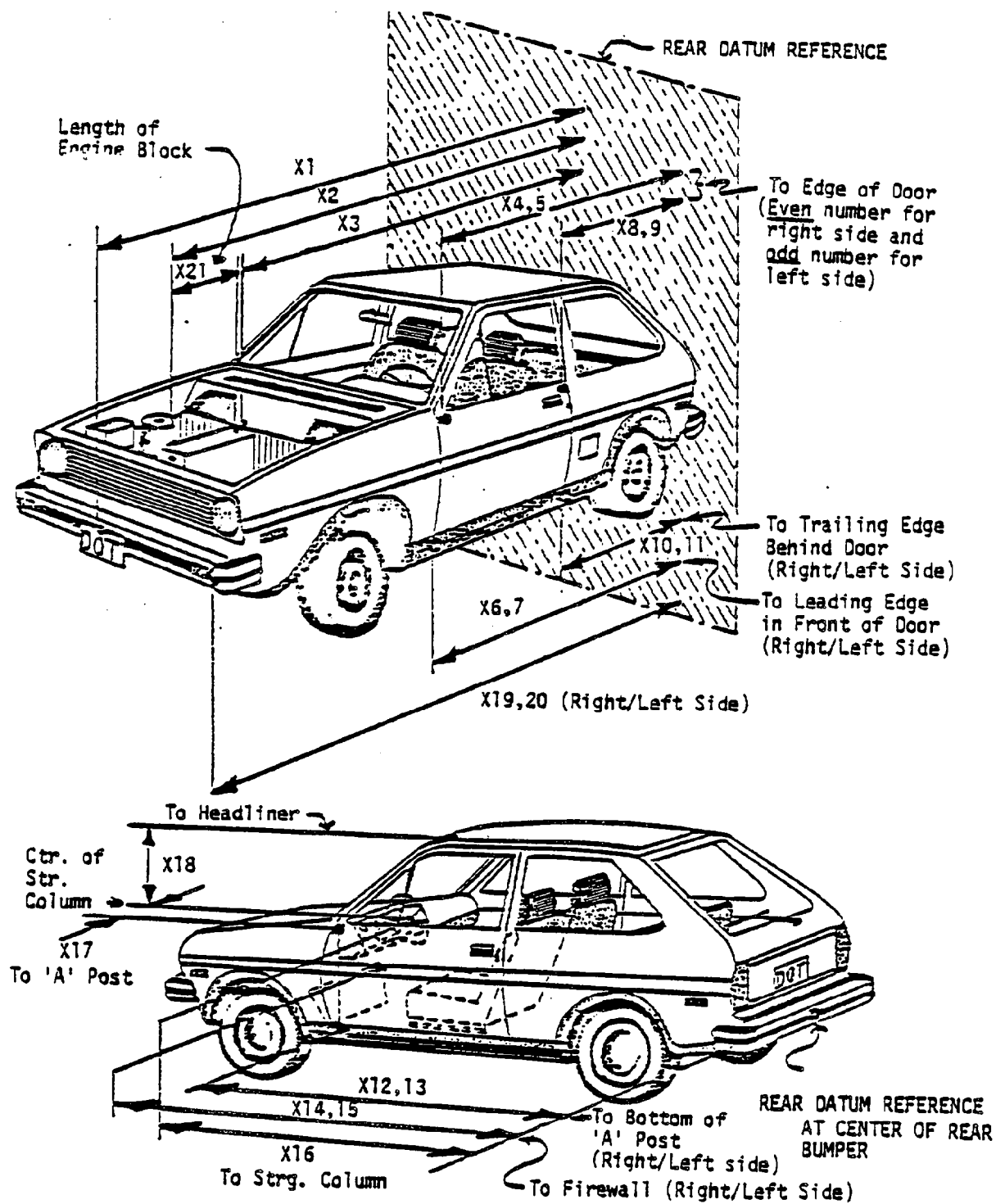
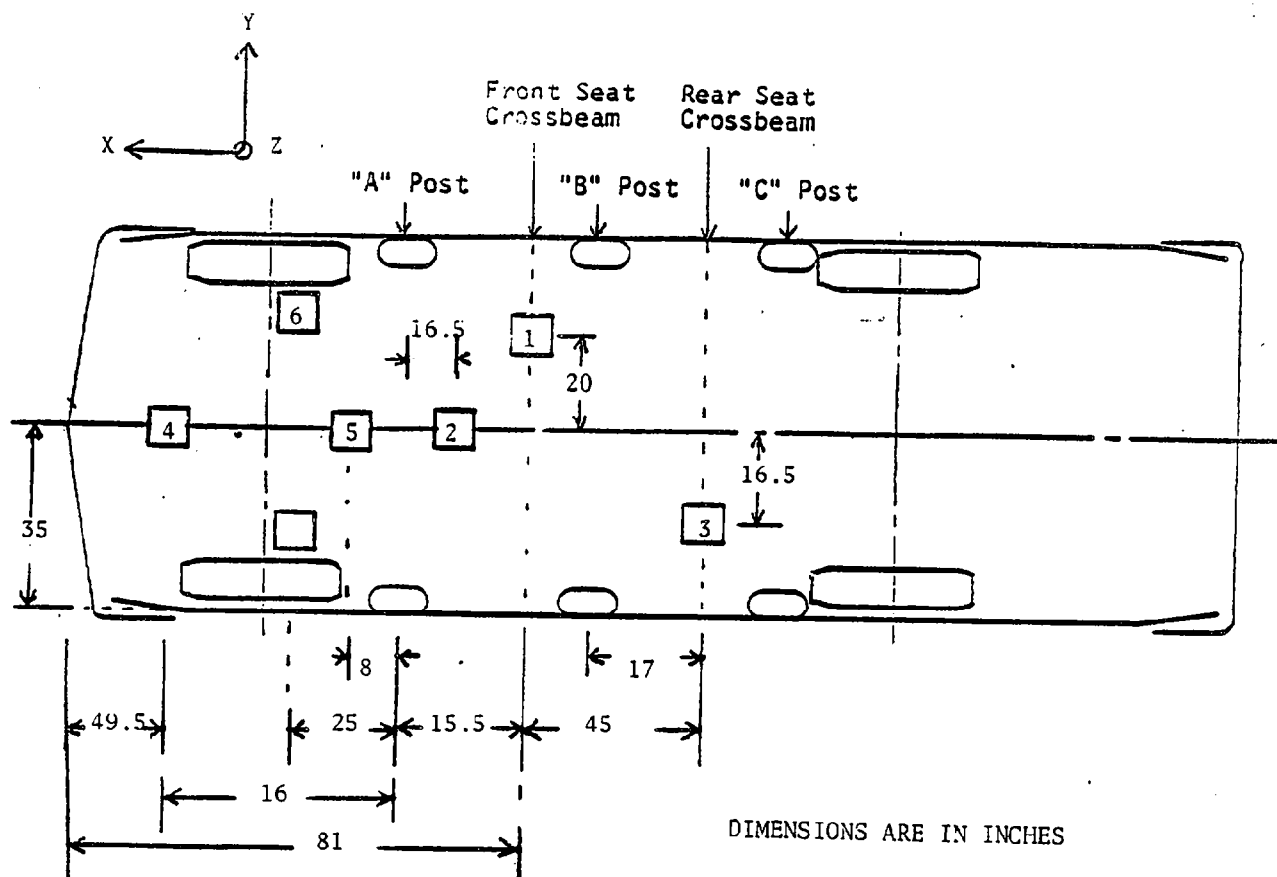


Figure 2 PRE- AND POST-TEST MEASUREMENT POINTS

Table 7

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	213.4	182.0	31.4
X2	Rear Surface of Vehicle to Front of Engine	174.9	171.7	3.2
X3	Rear Surface of Vehicle to Firewall	149.6	149.7	- 0.1
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	140.4	140.4	0.0
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	140.4	140.7	- 0.3
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	144.5	144.3	0.2
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	144.9	144.5	0.4
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	102.0	101.8	0.2
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	102.1	102.1	0.0
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	102.0	102.0	0.0
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	102.1	101.9	0.2
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	142.9	143.0	- 0.1
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	143.2	143.0	0.2
X14	Rear Surface of Vehicle to Firewall, Right Side	153.1	148.0	5.1
X15	Rear Surface of Vehicle to Firewall, Left Side	152.2	145.7	6.5
X16	Rear Surface of Vehicle to Steering Column	125.7	127.4	- 1.7
X17	Center of Steering Column to "A" Post	18.5	17.5	1.0
X18	Center of Steering Column to Headliner	17.4	18.9	- 1.5
X19	Rear Surface of Vehicle to Right Side of Front Bumper	209.1	180.2	28.9
X20	Rear Surface of Vehicle to Left Side of Front Bumper	209.4	181.6	27.8
X21	Length of Engine Block	17.7	17.7	0.0



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

FRONT VIEW

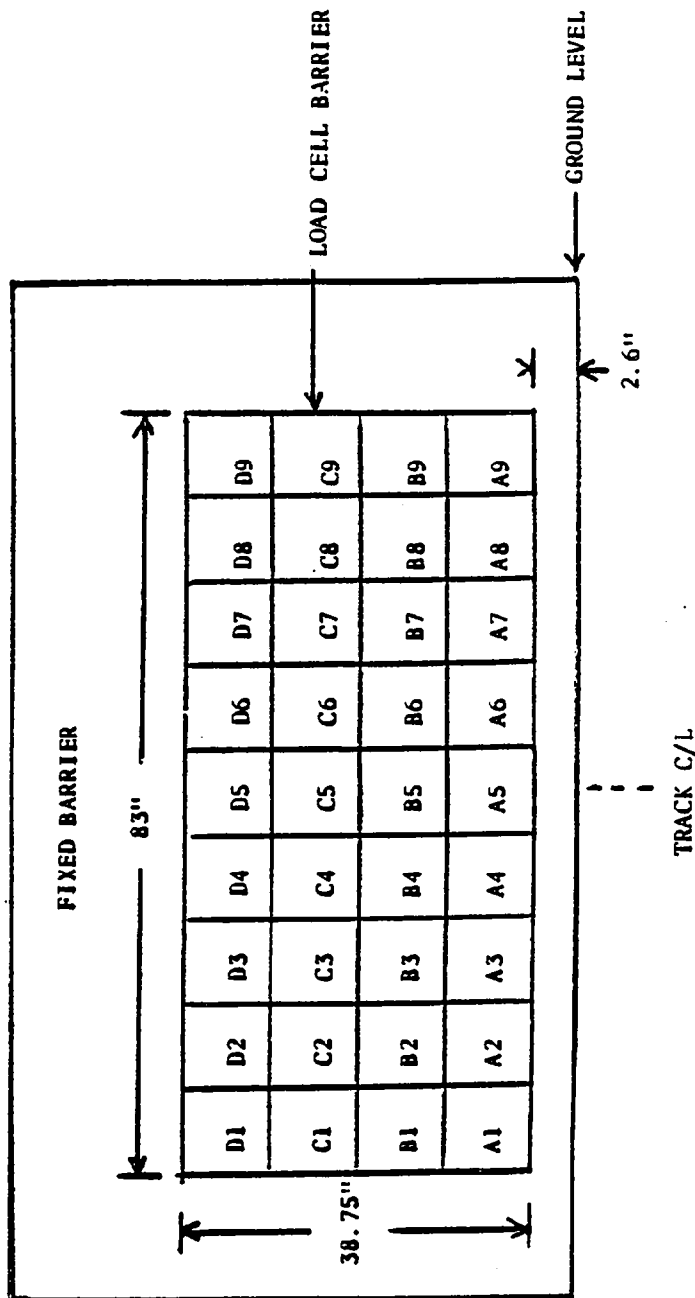


Figure 4 FIXED LOAD CELL BARRIER-LOAD CELL LOCATIONS

Table 8
ACCIDENT INVESTIGATION DIVISION
Data Summary

Test No. CE0108
Date 10/27/83.

Vehicle No. 1

Impact Description	Frontal Load Cell Barrier
Make	Pontiac Parisienne
Model	4-door sedan
Year	1984
Size Category	Full Size
Test Weight (lb.)	4140
Wheelbase (in.)	115.5
Front Overhang (in.)	36.1
Overall Width (in.)	75.0
Accelerometer Location	56.9 inches readward of frontwheel C/L
Calibration Procedure	Shaker Table/Least Squares
Accelerometer Linearity	$\pm 0.75\%$
Integration Algorithm	Hybrid Simpson-Newton 3/8
Impact Speed (mph)	34.88
Time of Separation (msec)	140.25
Velocity Change (mph)	43.42
CDC	12 FDEW3
Damage Length (in.)	L: 70.5
Crush Dimensions (in.)	C1: 27.6
	C2: 29.75
	C3: 31.15
	C4: 31.35
	C5: 30.25
	C6: 28.9
Midpoint of Damage	D: 0

National Accident Sampling System – Continuous Sampling Subsystem: Vehicle Data

FIELD MEASUREMENTS

1984 Pontiac 4Dr Parisienne 35 mph Barrier Test

Complete When Applicable

End Damage	Side Damage
Undeformed end width <u>70.5</u>	Bowing: B1 _____ X1 _____
Corner shift: A1 _____	B2 _____ X2 _____
A2 _____	Bowing constant
End shift at frame (CDC) (check one)	$\frac{X1 + X2}{2} = \underline{\hspace{2cm}}$
< 4 inches _____	12 FDEW.3
≥ 4 inches _____	

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

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	70.5	31.4	70.5	32.6	31.75	31.9	32.1	32.25	33.9	0
	Free/Space		0		-5.0	-2.5	-7.5	-7.5	-2.5	-5.0	
1	Actual crush	70.5	31.4	70.5	27.6	28.25	31.15	31.35	30.25	28.9	0

*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.

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NATIONAL ACCIDENT SAMPLING SYSTEM—CONTINUOUS SAMPLING SUBSYSTEM: VEHICLE

Page 3A

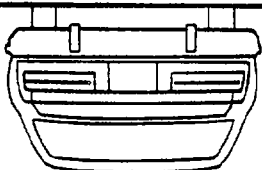
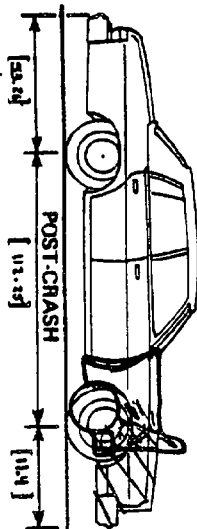
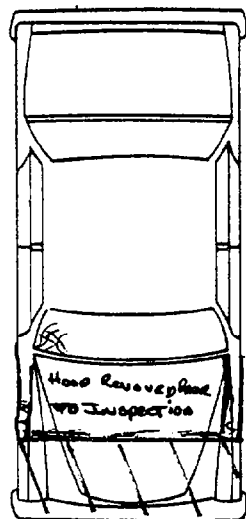
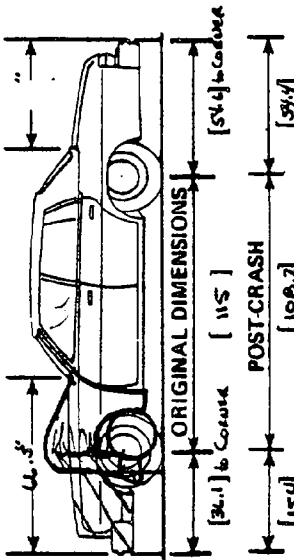
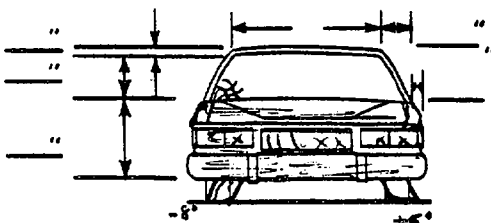
DAMAGE DESCRIPTION		TYPE OF TRANSMISSION	WHEEL STEER ANGLES
Tire—Wheel Damage a. Rotation physically restricted b. Tire deflated RF <u>1</u> RF <u>2</u> LF <u>1</u> LF <u>1</u> RR <u>1</u> RR <u>2</u> LR <u>1</u> LR <u>2</u>		_____ Manual ☒ Automatic Average Track: _____ Maximum Width: <u>75.0</u> Test Gross Weight: <u>4140.0</u> Overall Length: <u>213.4</u>	(For locked front wheels or displaced rear axles only) RF $\pm$ <u>0.0</u> ° LF $\pm$ <u>0.0</u> ° RR $\pm$ <u>0.0</u> ° LR $\pm$ <u>0.0</u> ° Within $\pm$ 5 degrees
(1) Yes, (2) No, (8) NA, (9) Unk.		213.4 - 182.0 31.4	
			
  			
			
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.			

Figure 5 TEST VEHICLE DAMAGE DETAILS

NOTE: Camera Information Shown on Table 9

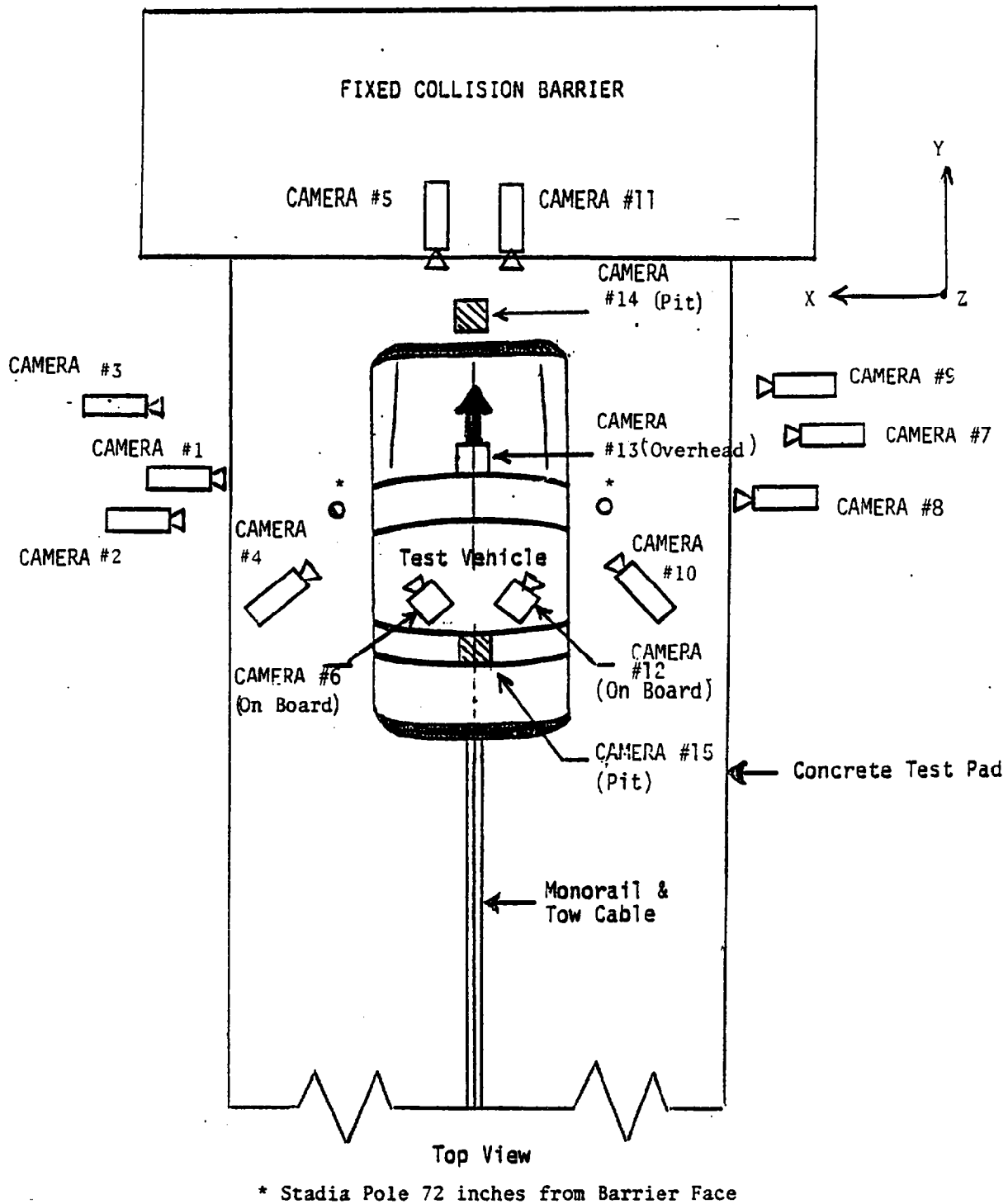


Figure 6 --CAMERA POSITION FOR FRONTAL IMPACTS

Table 9
HIGH-SPEED CAMERA LOCATIONS

Test No. CE0108 Vehicle 1984 Pontiac Parisienne

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Vehicle Left Side	230	54	56	-6	-	13	880
2	Driver	246	72	48	-0	208	35	900
3	Driver	315	26	59	-3	277	50	900
4	Driver	90	108	72	-22	-	13	No Timing
5	Driver (Barrier)	20	0	70	-30	85	13	890
6	Left Belt Retractor	-	-	-	-	-	8	1070
7	Vehicle Right Side	281	41	48	-2	-	13	890
8	Passenger	268	66	45	-3	230	35	950
9	Passenger	228	24	44	-3	274	50	940
10	Passenger	90	104	69	-21	-	13	No Timing
11	Passenger (Barrier)	20	0	70	-30	85	13	890
12	Right Belt Retractor	-	-	-	-	-	8	1140
13	Overhead	0	40	216	-90	-	25	1000
14	Engine (Pit.)	0	36	-120	90	-	25	840
15	Fuel Tank (Pit.)	0	140	-120	90	-	25	800

*X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

** = referenced to horizontal plane

SEAT BELT SYSTEMS

CAUTION: To help reduce the risk of personal injury in collisions or sudden maneuvers, use the seat belts following the instructions in this section on their proper use, maintenance, and application with child restraint systems. This includes pregnant women; pregnant women should select a seat with a lap-shoulder belt whenever possible.

NEVER:

- Put the lap portion of a seat belt over any armrest.
- Wear a shoulder belt under your arm nearest the door.
- Use a belt for more than one person at a time.
- Wear the belts twisted.
- Let the belt system become damaged by a door or seat.
- Put anything into the opening where the seat belt passes through the trim panel. (This may jam the retractor or damage the belt.)

Front Seat Lap-Shoulder Belt

1. Adjust the seat as needed and sit well back and straight up. Grasp the latch plate and:
 - Pull the belt as far as it will reach across your lap.
 - Hold the latch plate at a right angle to the webbing and slide it further (toward the front of the car).
 - Then pull it across your lap and push it into the buckle until it clicks.
2. To reduce the risk of sliding under the belt during a collision, position the belt across your lap as **LOW ON YOUR HIPS** as possible and adjust it to a **SNUG FIT** by pulling the "shoulder" portion upward through the latch plate.

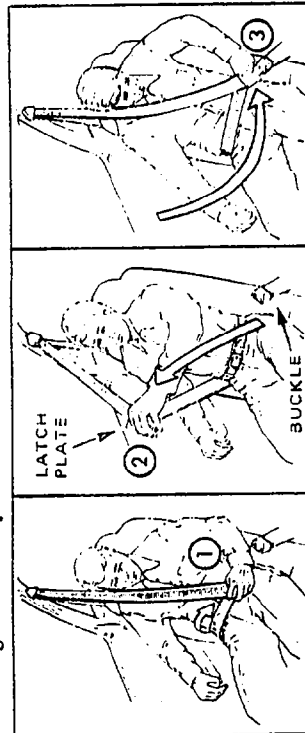
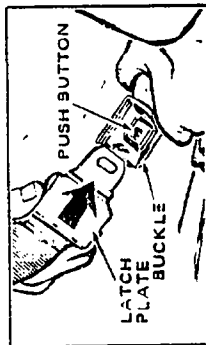
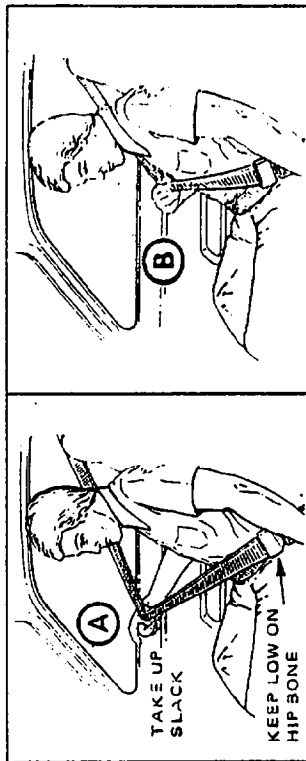


Figure 7 OWNER'S MANUAL SEAT BELT INSTRUCTION

BEFORE DRIVING YOUR CAR

1-7



The shoulder portion of the belt is designed to lock only during a sudden stop or impact. At other times it should move freely.

3. If the shoulder belt is too snug:
 - A. Pull the shoulder belt out at least 130 millimeters (five inches) so that when you let go, it returns to your chest.
 - B. Then pull down on the shoulder belt the least amount needed to ease pressure but no more than 25 mm or one inch and let go.
4. To get rid of the slack in the belt, pull the belt out as you did in Step 3A. above.

Keep any shoulder belt slack to a minimum. Too much belt slack could reduce the amount of protection in an accident because the belt is too loose to restrain you properly.
5. To unfasten the belt, push in the button in the center of the buckle. To stow the belt, pull it out about 180 millimeters (seven inches) and hold it while it retracts. On four-door models, the belt should retract when the buckle is unlatched and the door is opened. If the belt does not retract fully, slide the latch plate down the webbing. To help prevent damage to the seat belt and interior trim, before closing the door be sure the belt is fully retracted and the latch plate is out of the way.

Figure 8
PART 572 DUMMY IN-VEHICLE POSITION

Test No. CE0108

Vehicle 1984 Pontiac Parisienne

SEAT TYPE:

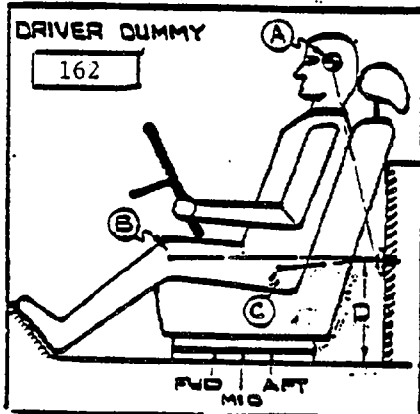
 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

 X Manual
 Power

BUCKET SEAT BACK TYPE:

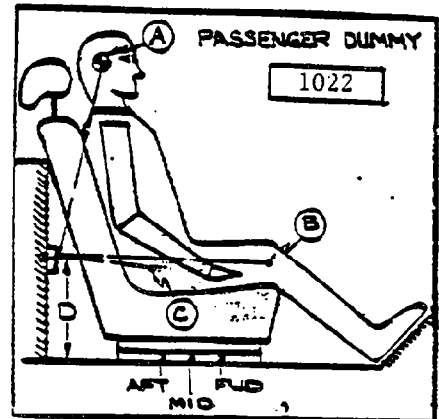
 X Fixed
 Adjustable Reclining



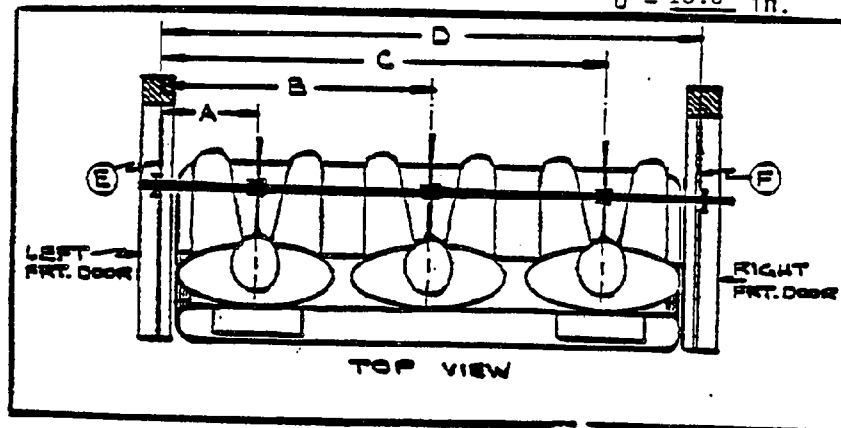
A = 22.3 in. 0 Degrees
B = 22.7 in. 94 Degrees
C = 8.4 in. 117 Degrees
D = 13.8 in.

MEASUREMENT LOCATION

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



A = 22.7 in. 0 Degrees
B = 23.2 in. 93 Degrees
C = 8.6 in. 115 Degrees
D = 13.8 in.



DUMMY ID

162

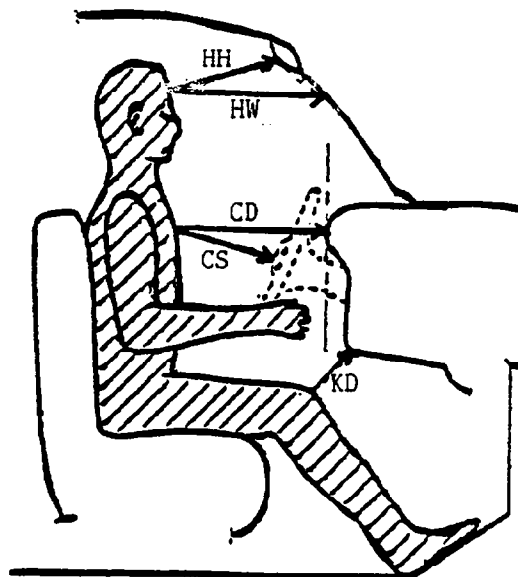
-

1022

A	=	Left Door to Driver Centerline	<u>14.7</u> in.
B	=	Left Door to Center Passenger Centerline	<u>--</u> in.
C	=	Left Door to Right Passenger Centerline	<u>45.5</u> in.
D	=	Left Door to Right Door	<u>60</u> in.
E, F	=	Window Glass Height (Right and Left Must be Equal)	<u>10.5</u> in.

	DRIVER	PASSENGER
HH	15.2"	13.5"
HW	22.5"	22"
CD	22"	21.2"
CS	15.2"	--
KDL	8.4"	9.7"
KDR	8.7"	9.7"
SA	25°	26°
TA	20°	20°

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
 TA = Torso Angle



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

	DRIVER	PASSENGER
HR	6.8"	6.7"
HS	10.6"	10.7"
AD	1.5"	2"
HD	5.5"	5.7"

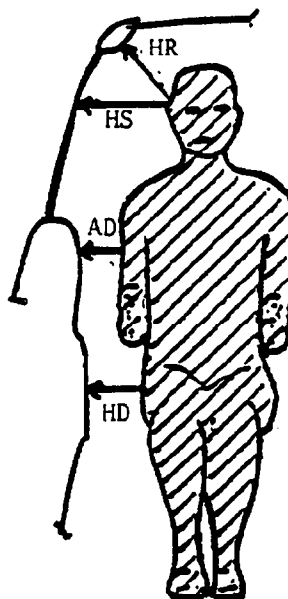


Figure 9 OCCUPANT CLEARANCE DIMENSIONS

Table 10
DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-173	-62	170	191	-55	-21	20	52.2
DUMMY (2)	-48	41	80	90	-40	42	21	47.8
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	180	540
DUMMY (2)	465	495
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)	1833	--	1700
DUMMY (2)	1720	1565	--
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)	1607.6	.09472	.11242	96.2	2485.5
DUMMY (2)	1055.2	.07447	.15037	45.4	1364.3
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	2.8	2.7
electronic	2.9	2.5
Belt Strain ⁽¹⁾	.5" per ft.	.75" per ft.
Belt Length Data (in.)		
total length ⁽²⁾	105.5	104.4
retractor to "D" ring ⁽³⁾	20.5	20.5
torso belt ⁽³⁾	31.6	32
lap belt ⁽³⁾	26.5	27
remainder on spool	27.5	25.0

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

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

(3) as measured on Part 572 dummy

APPENDIX A
PHOTOGRAPHS

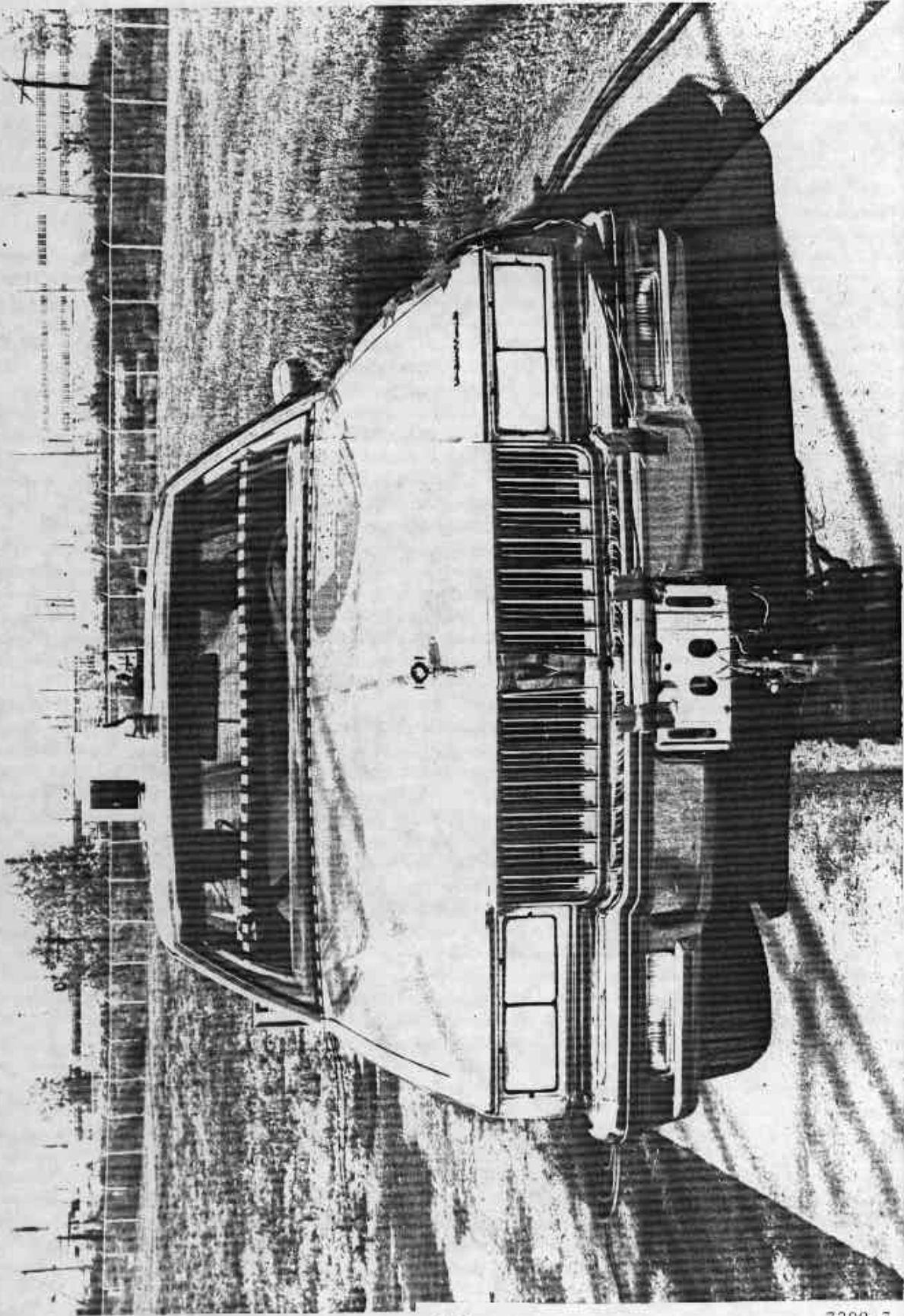


Figure A-1 PRE-TEST FRONT VIEW

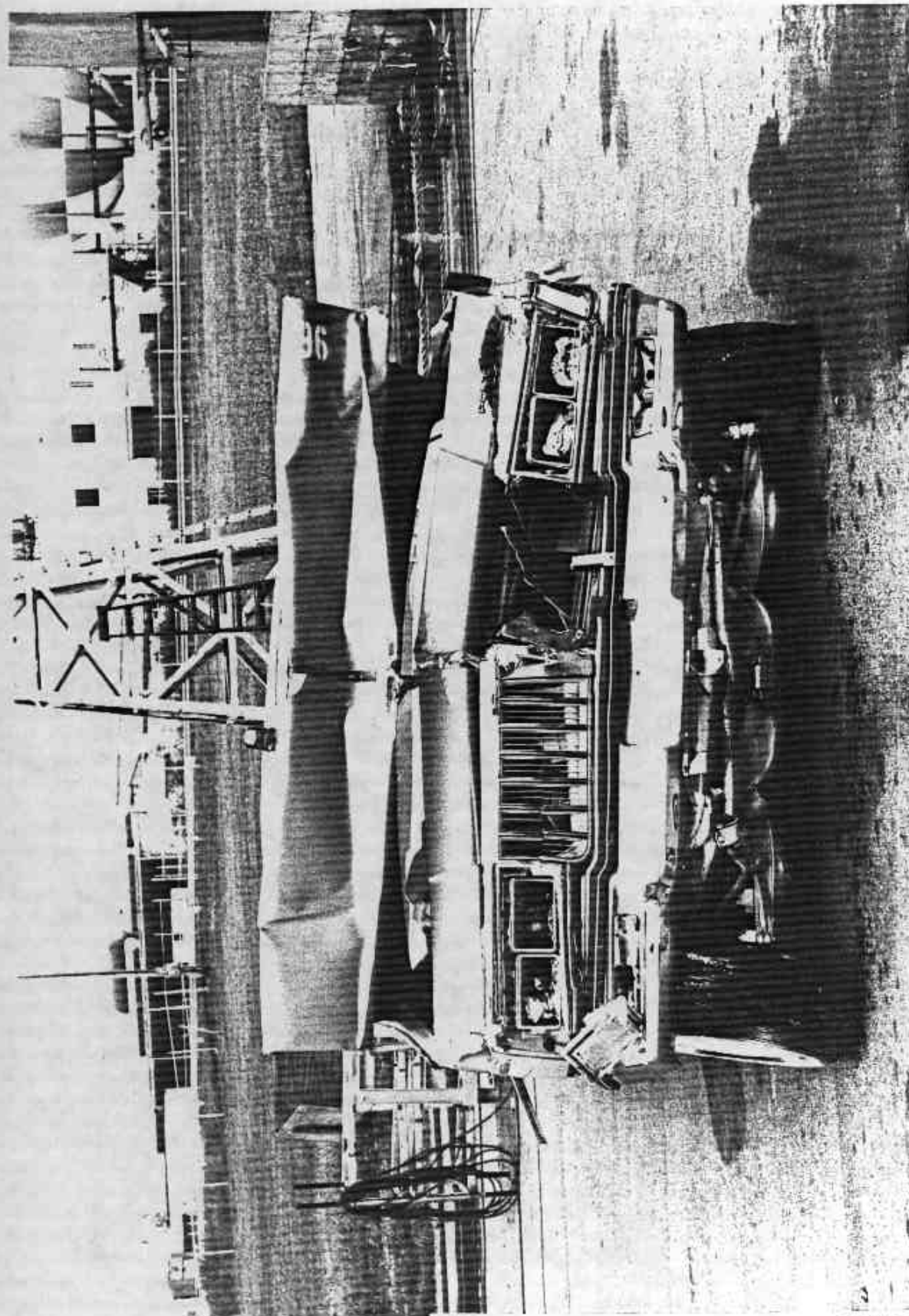


Figure A-2 POST-TEST FRONT VIEW

A-3

7209-3

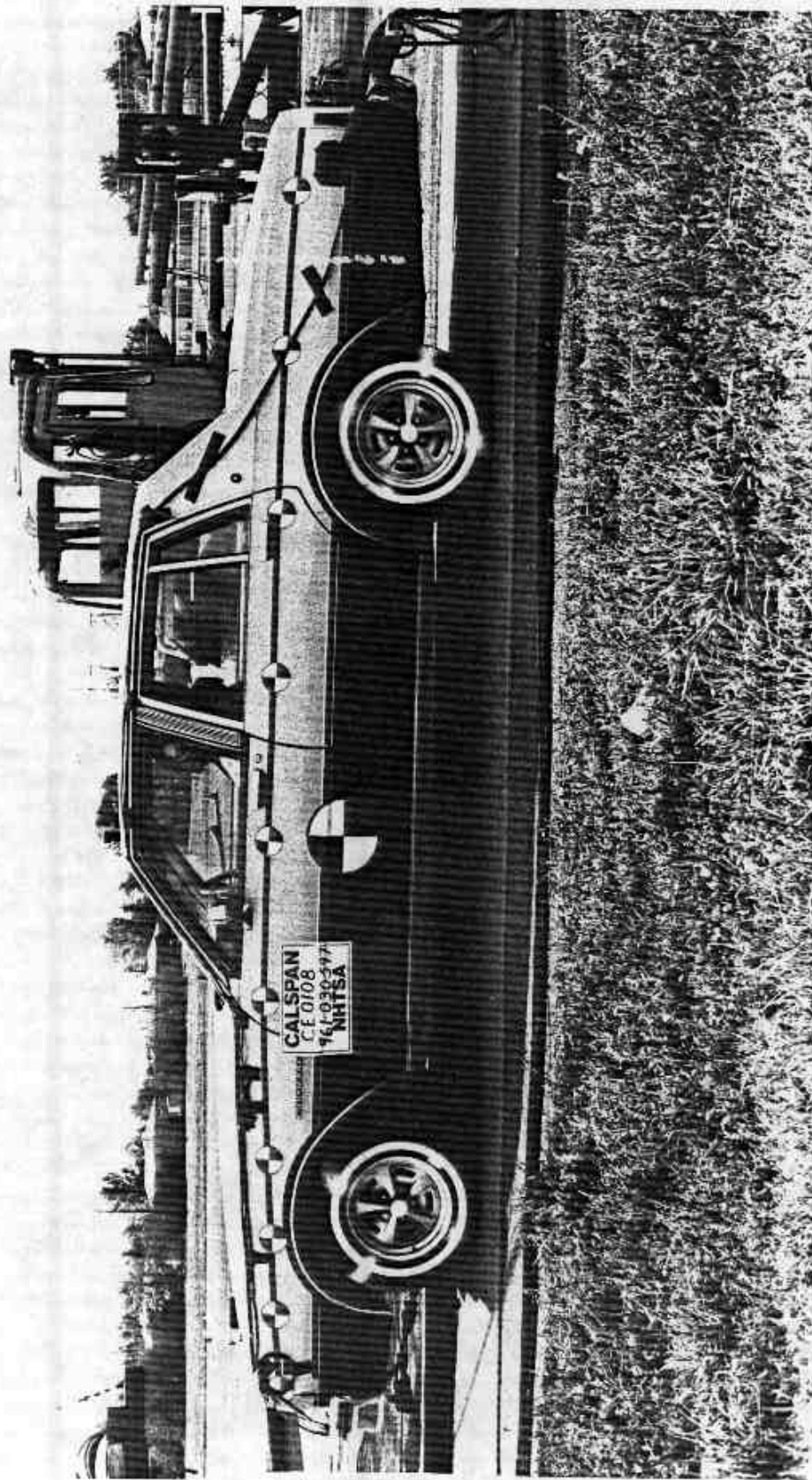


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-4

7209-3



Figure A-4 POST-TEST LEFT SIDE VIEW

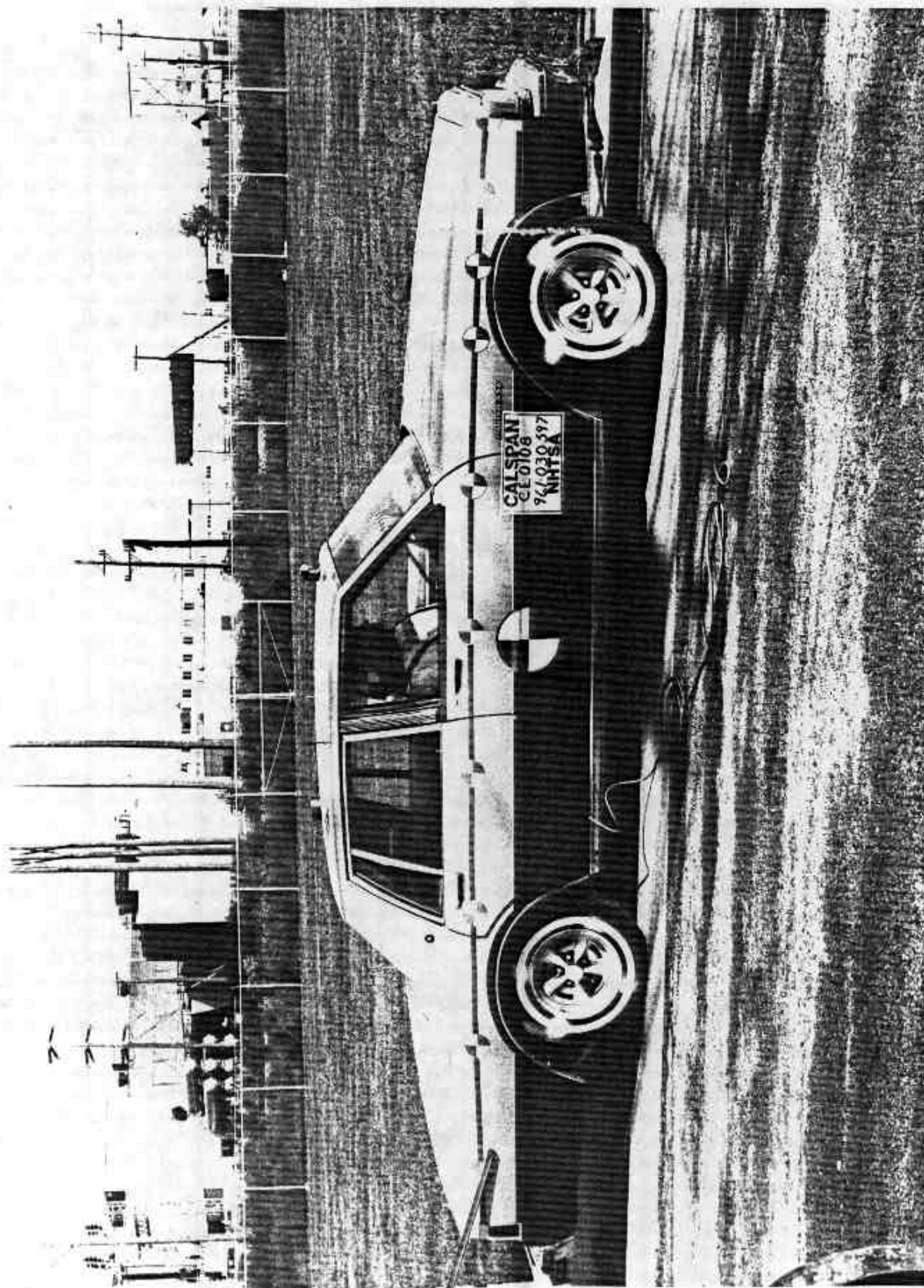


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-6

7209-3

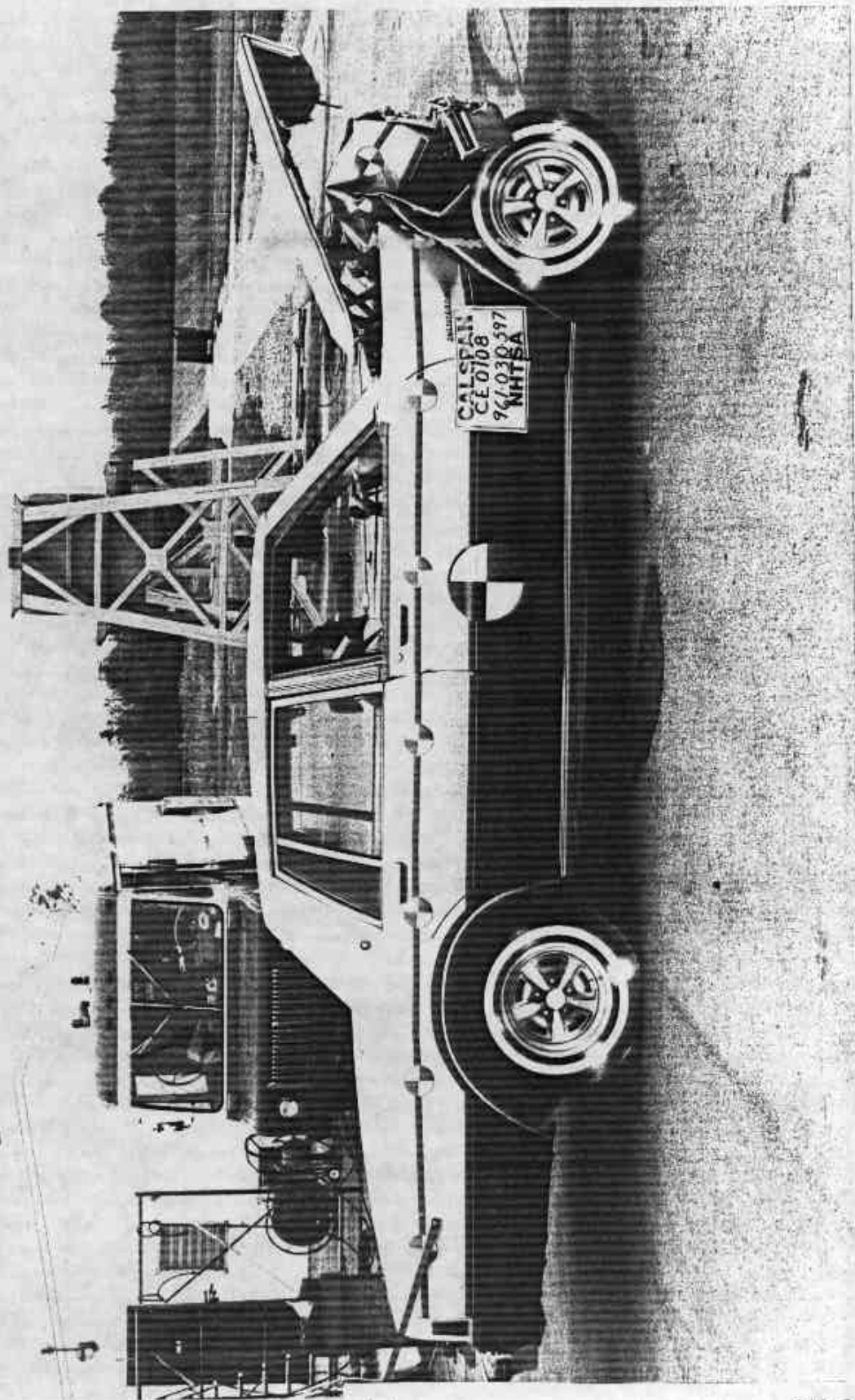


Figure A-6 POST-TEST RIGHT SIDE VIEW



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

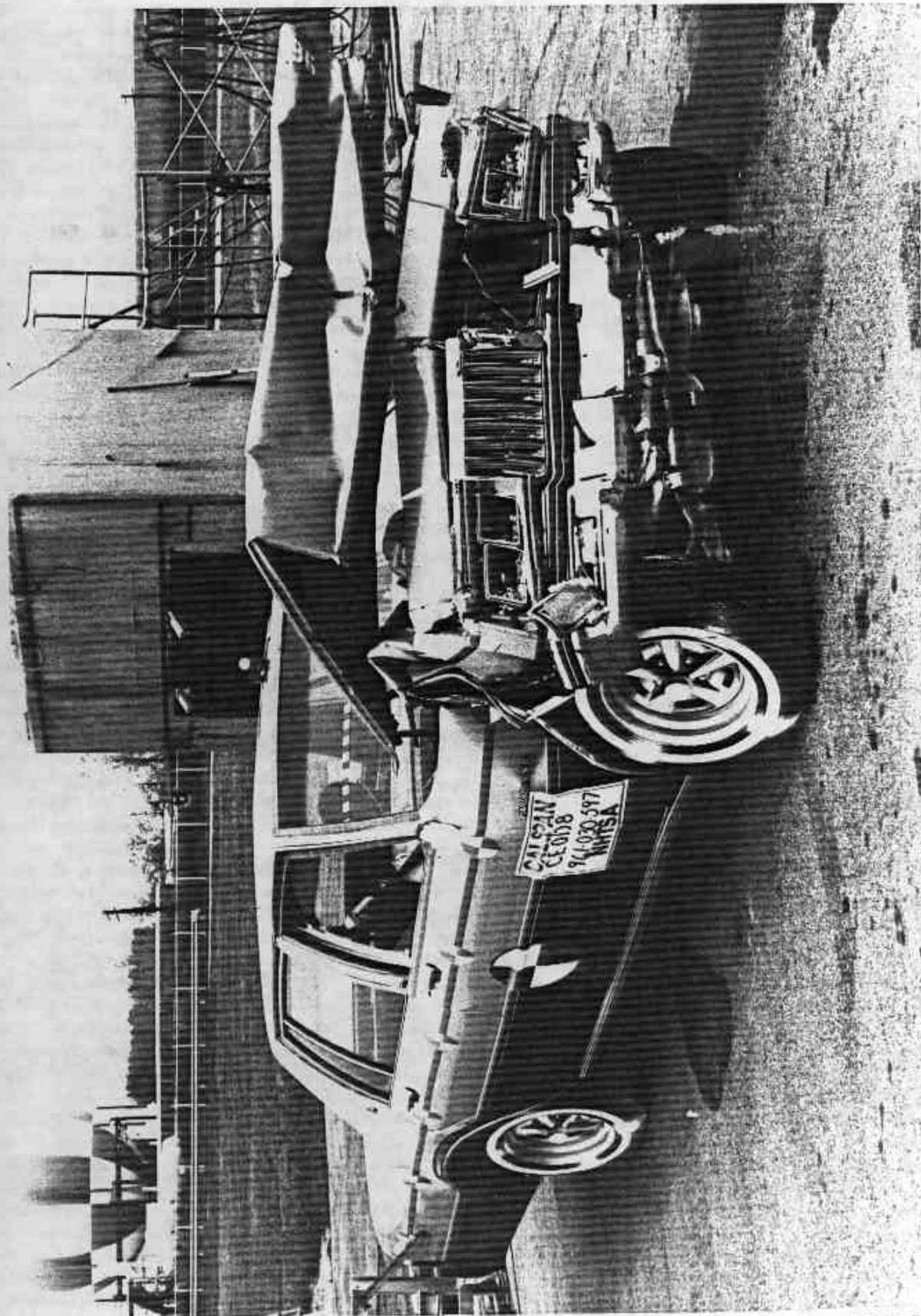


Figure A-8 POST-TEST RIGHT FRONT THREE QUARTER VIEW

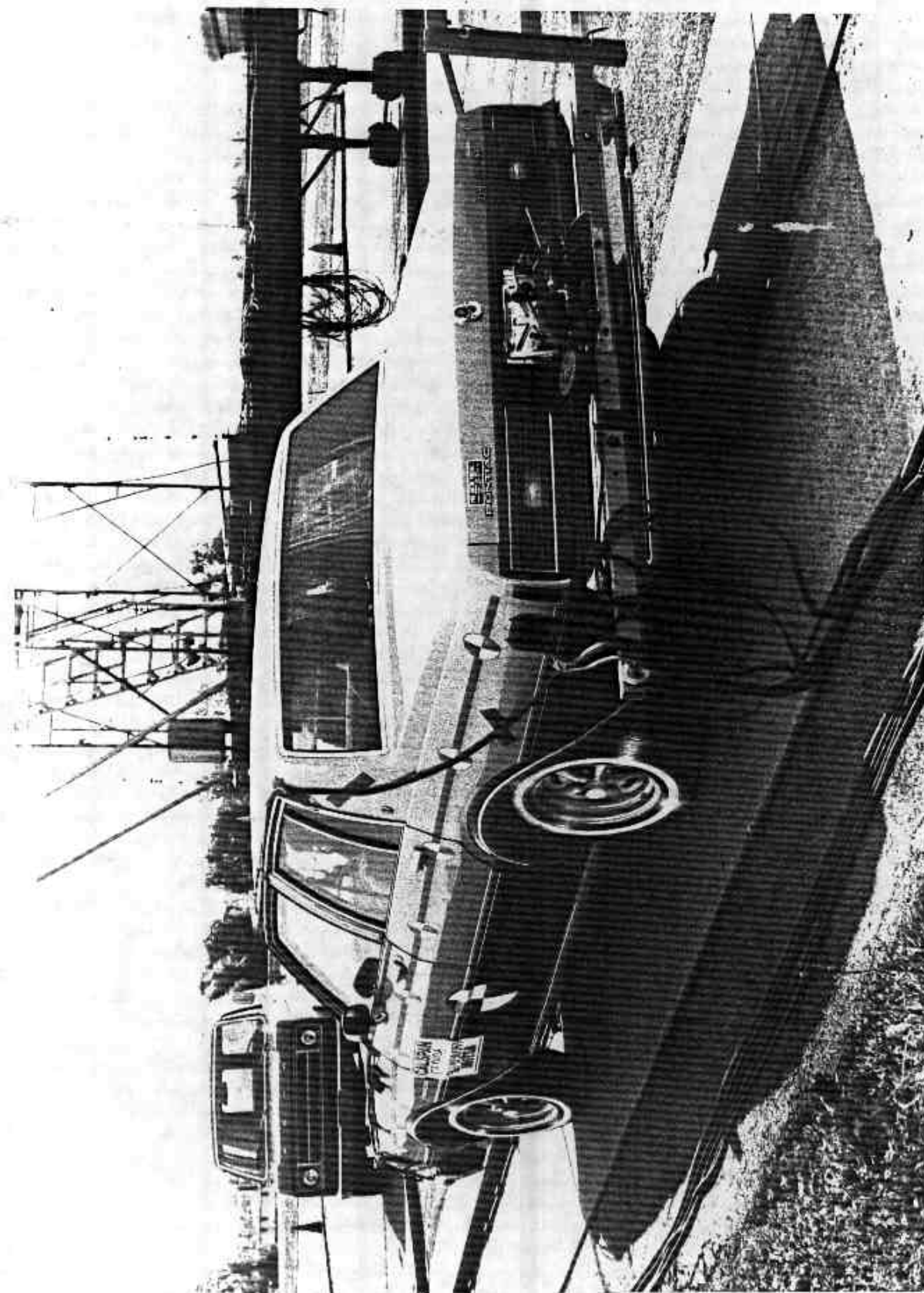


Figure A-9 PRE-TEST LEFT REAR THREE QUARTER VIEW

A-10

7209-5

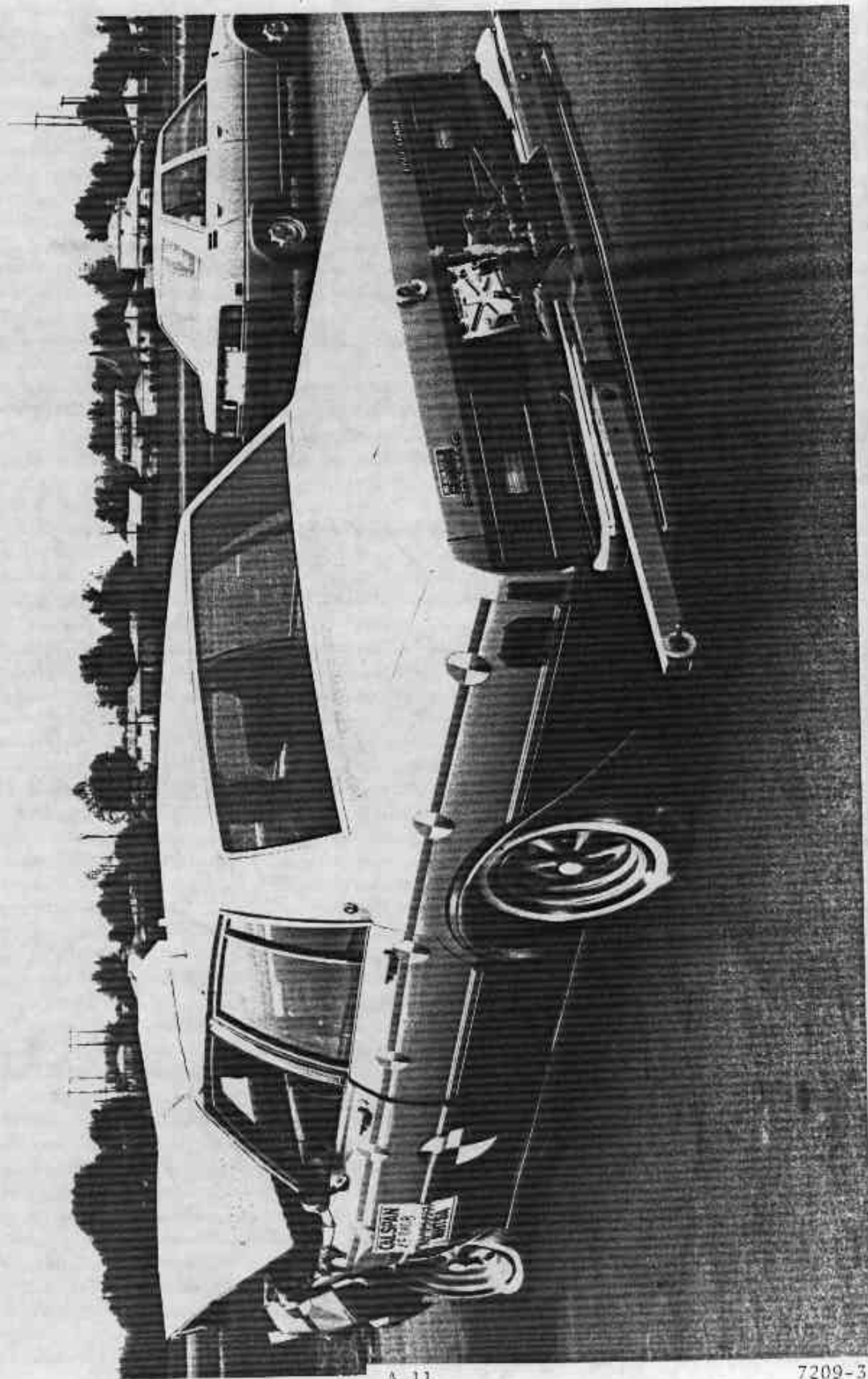
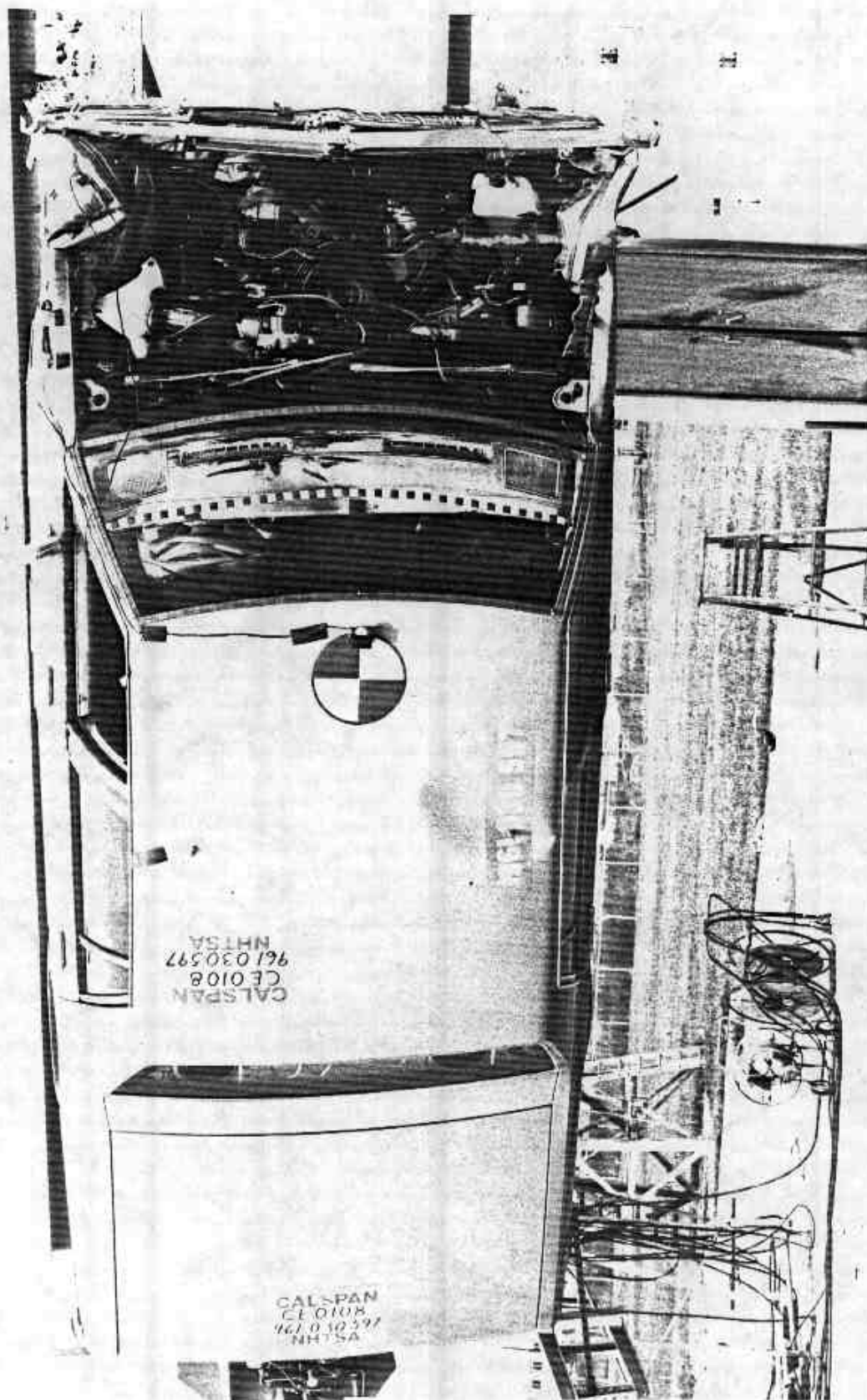


Figure A-10 POST-TEST LEFT REAR THREE QUARTER VIEW

A-11

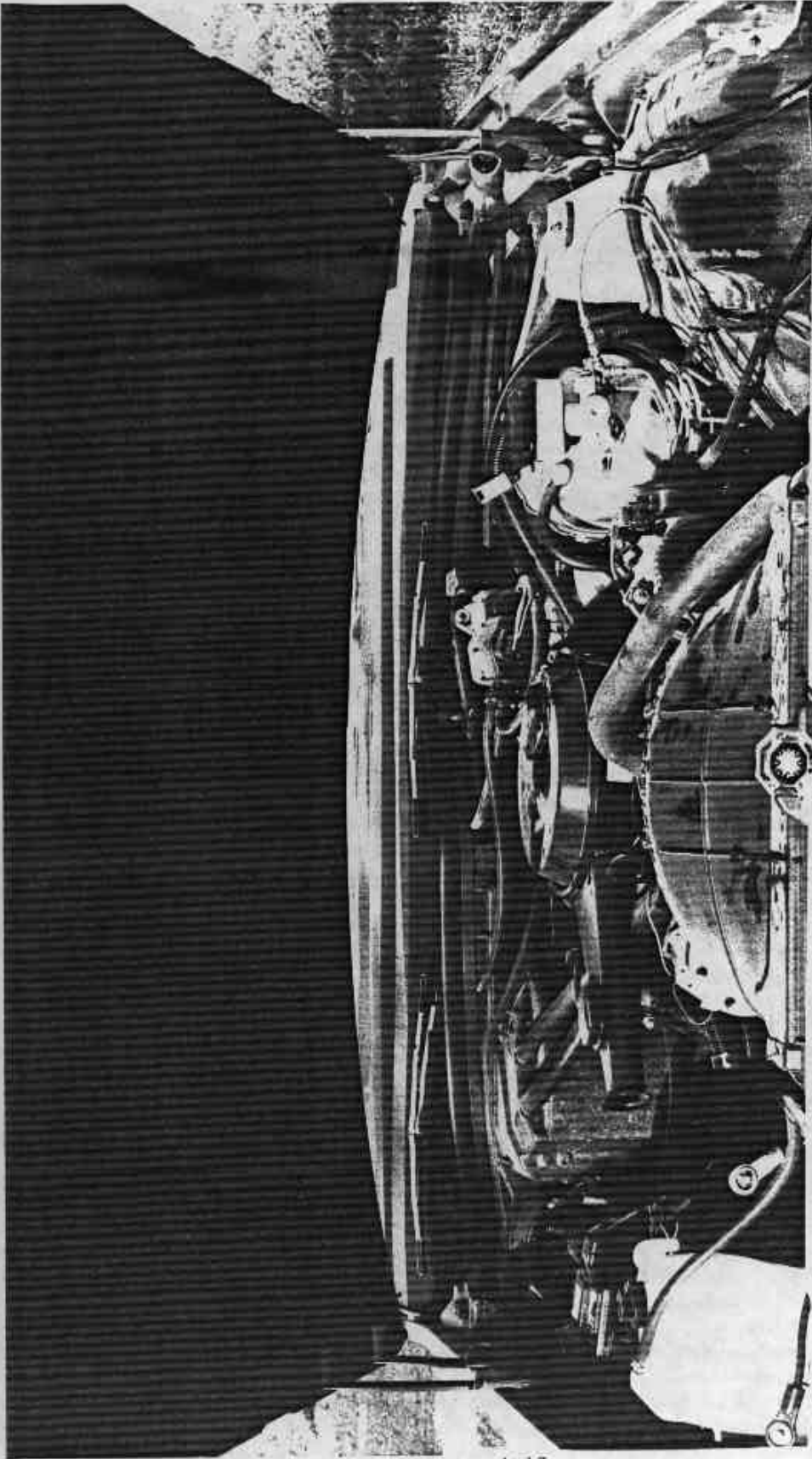
7209-3



A-12

7209-3

Figure A-11 POST-TEST TOP VIEW

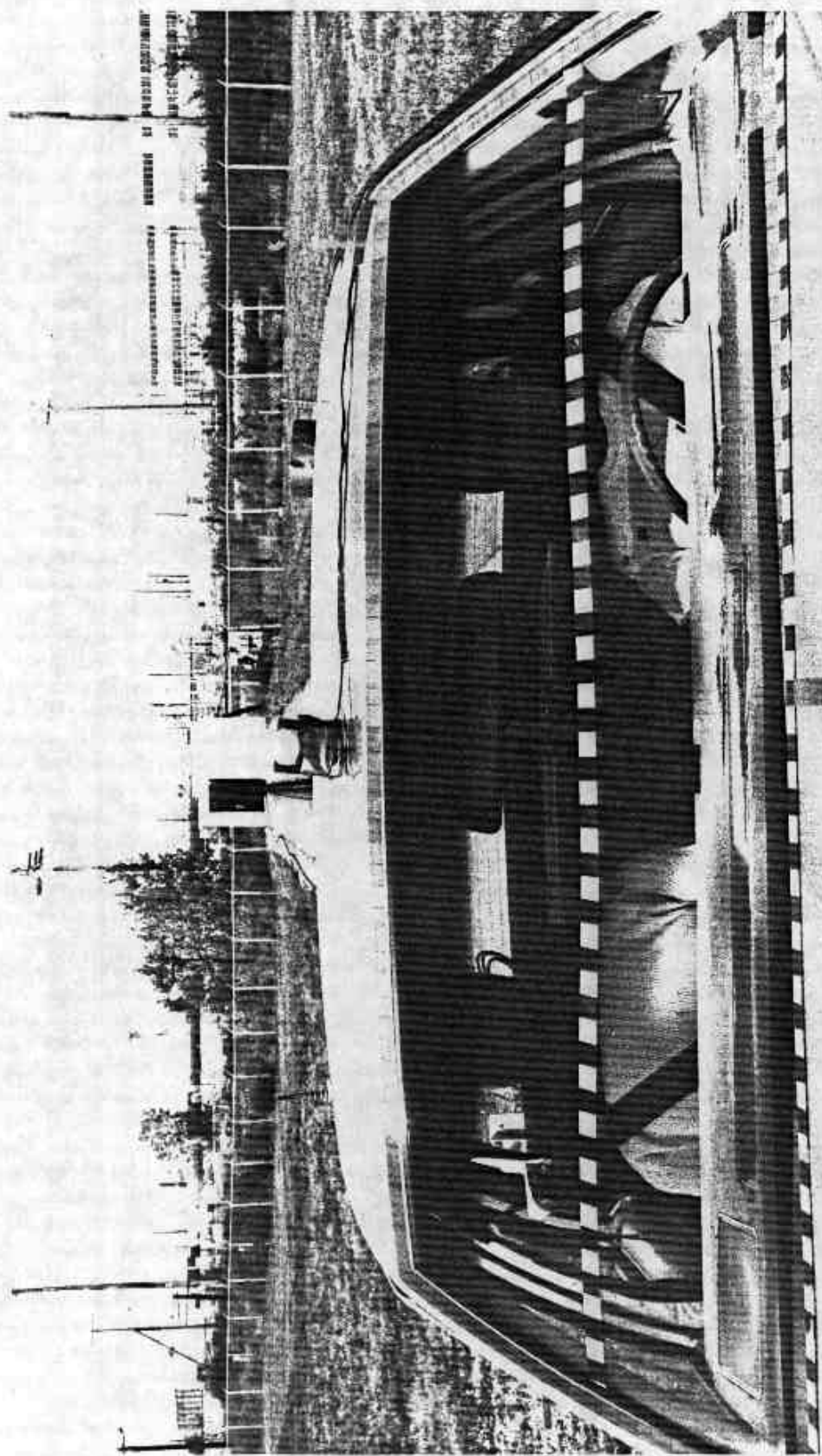


A-13



7209-3

Figure A-12 PRE-TEST ENGINE COMPARTMENT VIEW



A-14

7209-3

961 0102
961 0103

Figure A-13 PRE-TEST WINDSHIELD VIEW

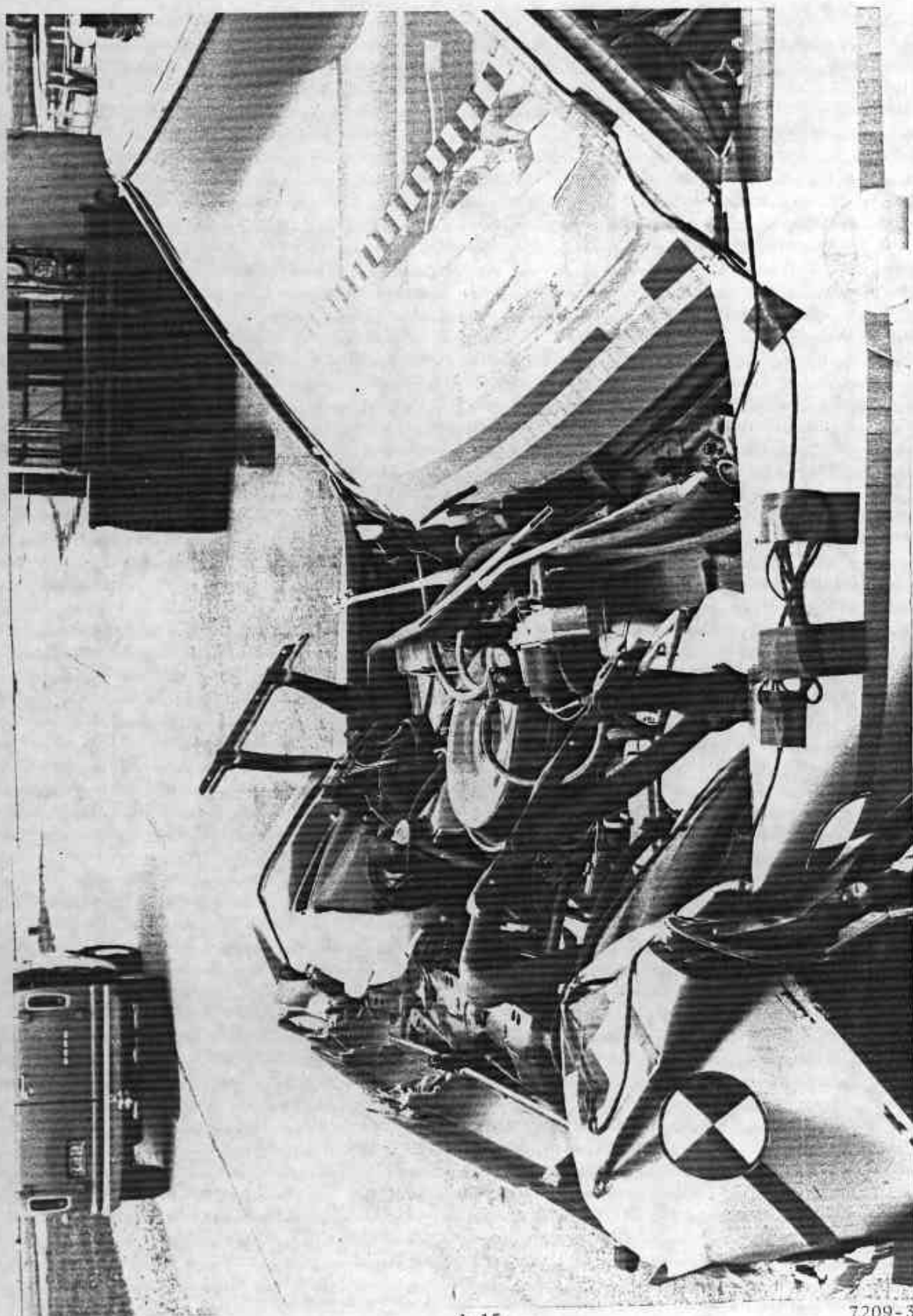


Figure A-14 POST-TEST ENGINE AND WINDSHIELD VIEW

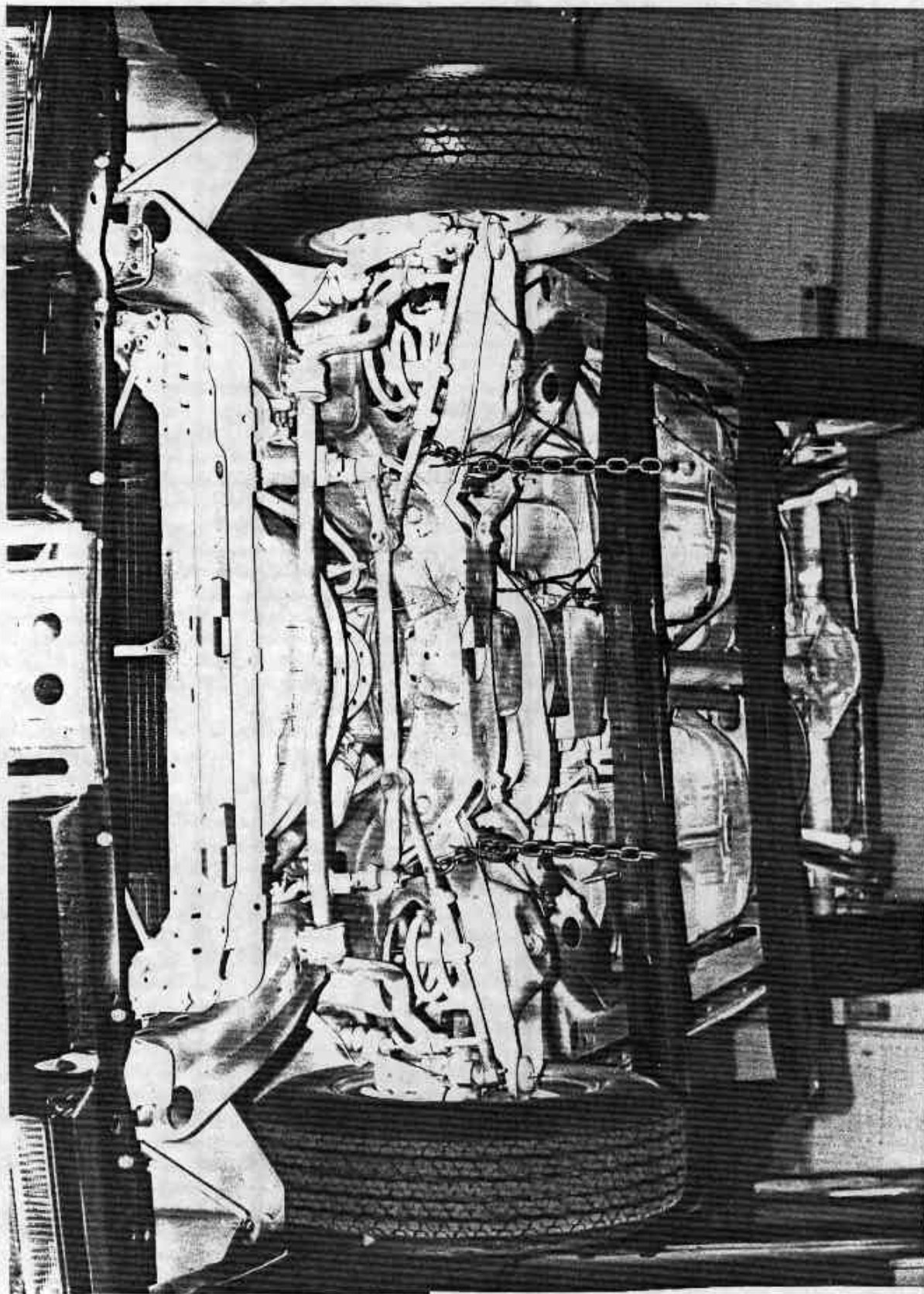


Figure A-15 PRE-TEST FRONT UNDERBODY VIEW

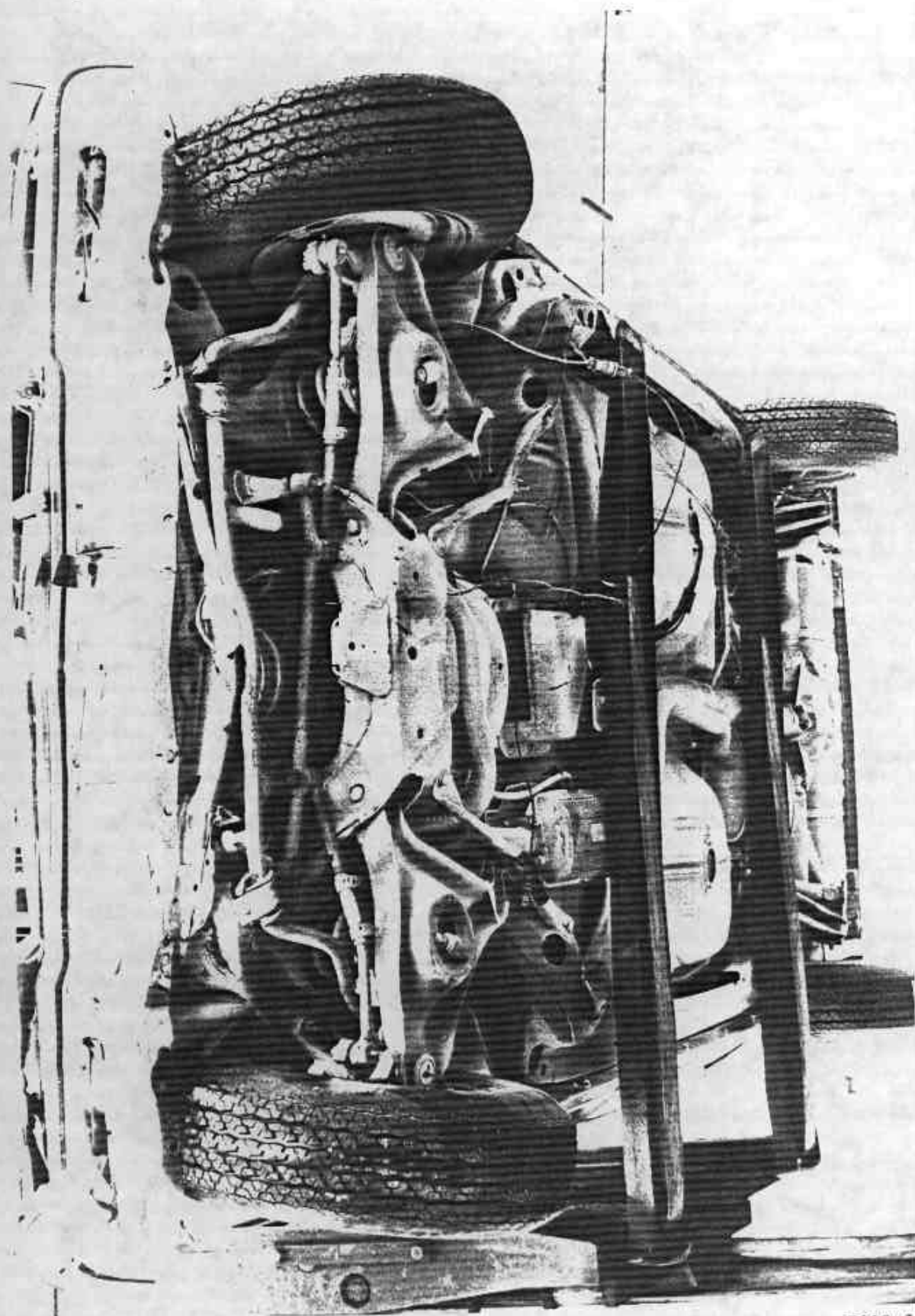


Figure A-16 POST-TEST FRONT UNDERBODY VIEW

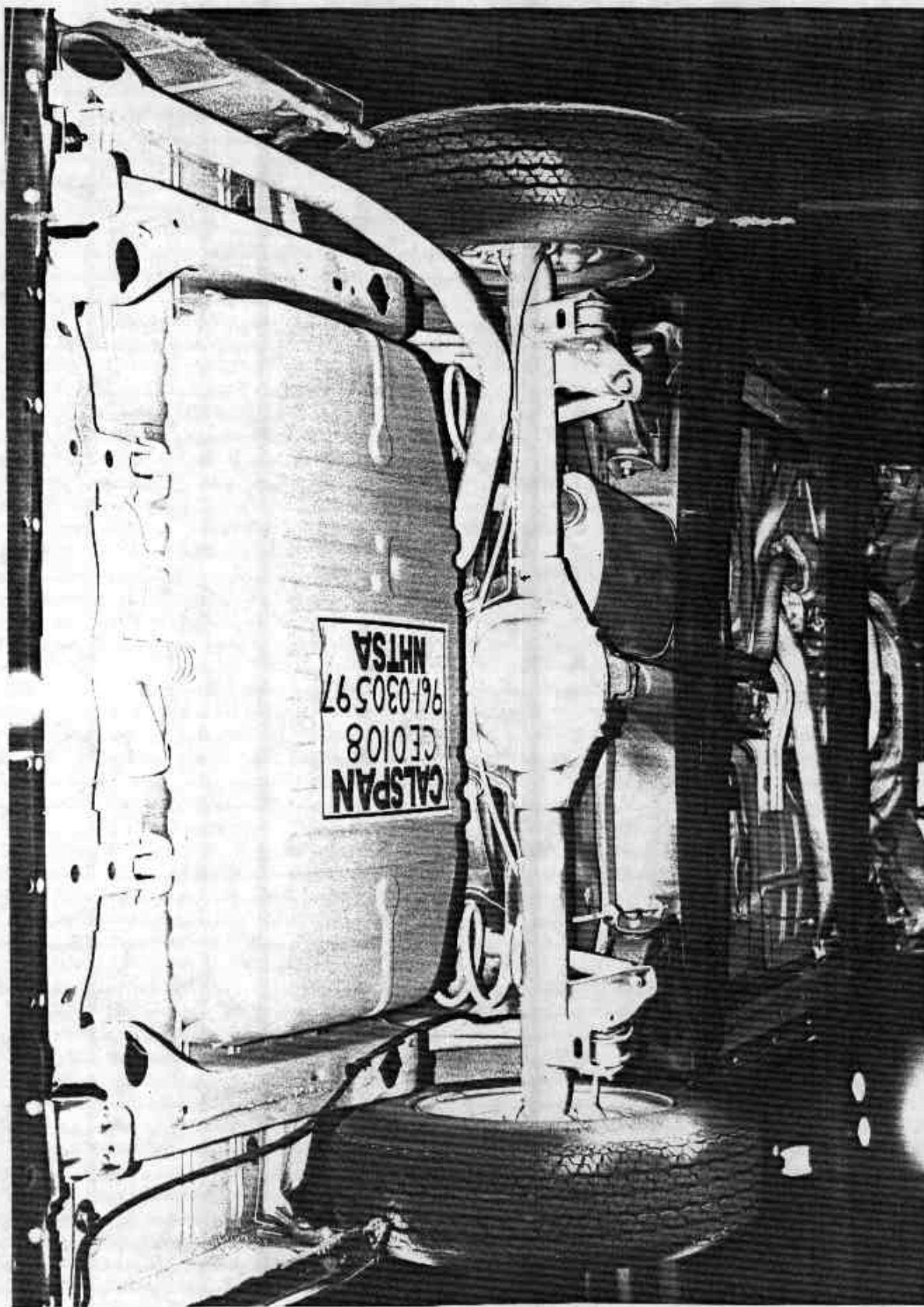


Figure A-17 PRE-TEST REAR UNDERBODY VIEW

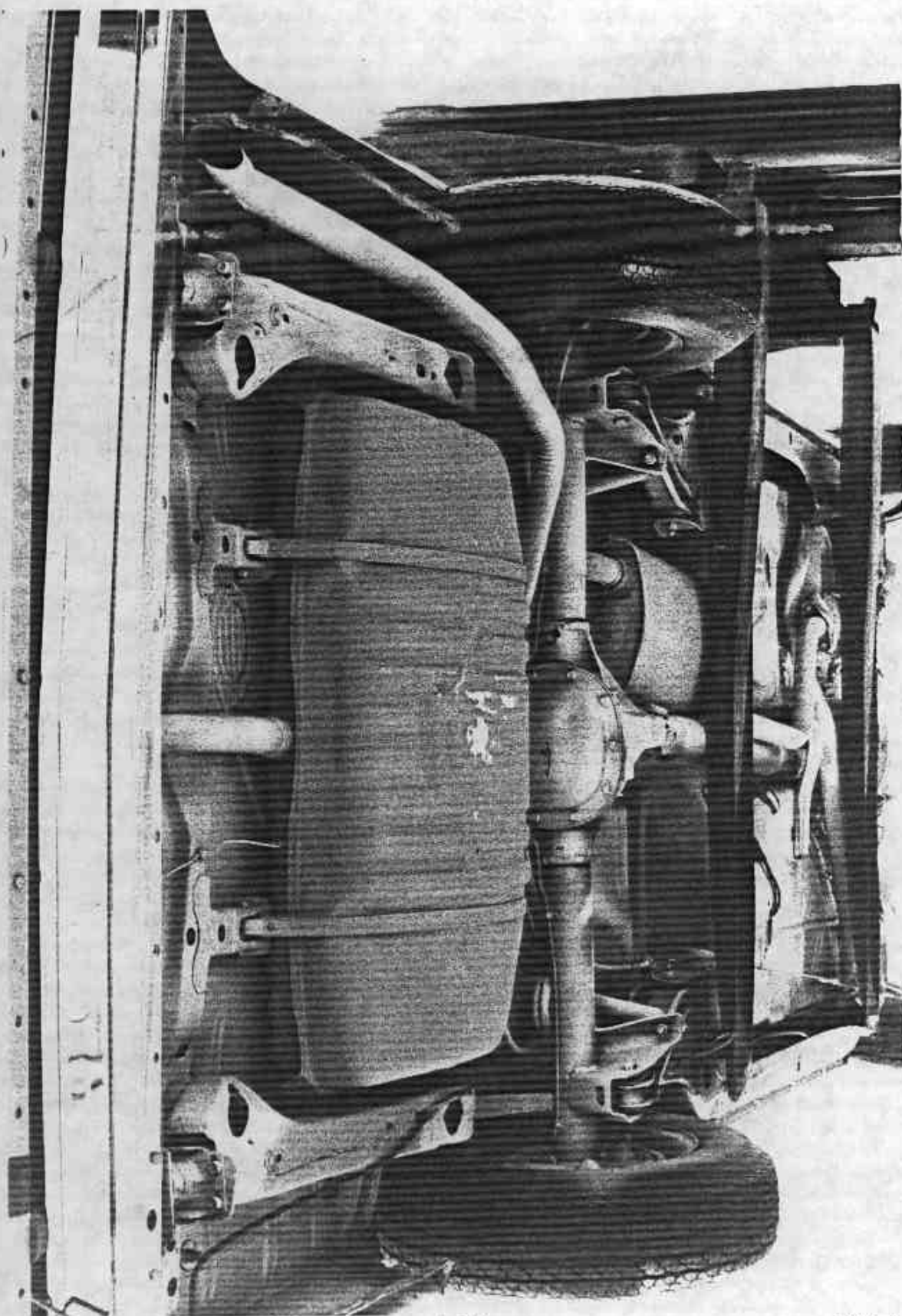


Figure A-18 POST-TEST REAR UNDERBODY VIEW

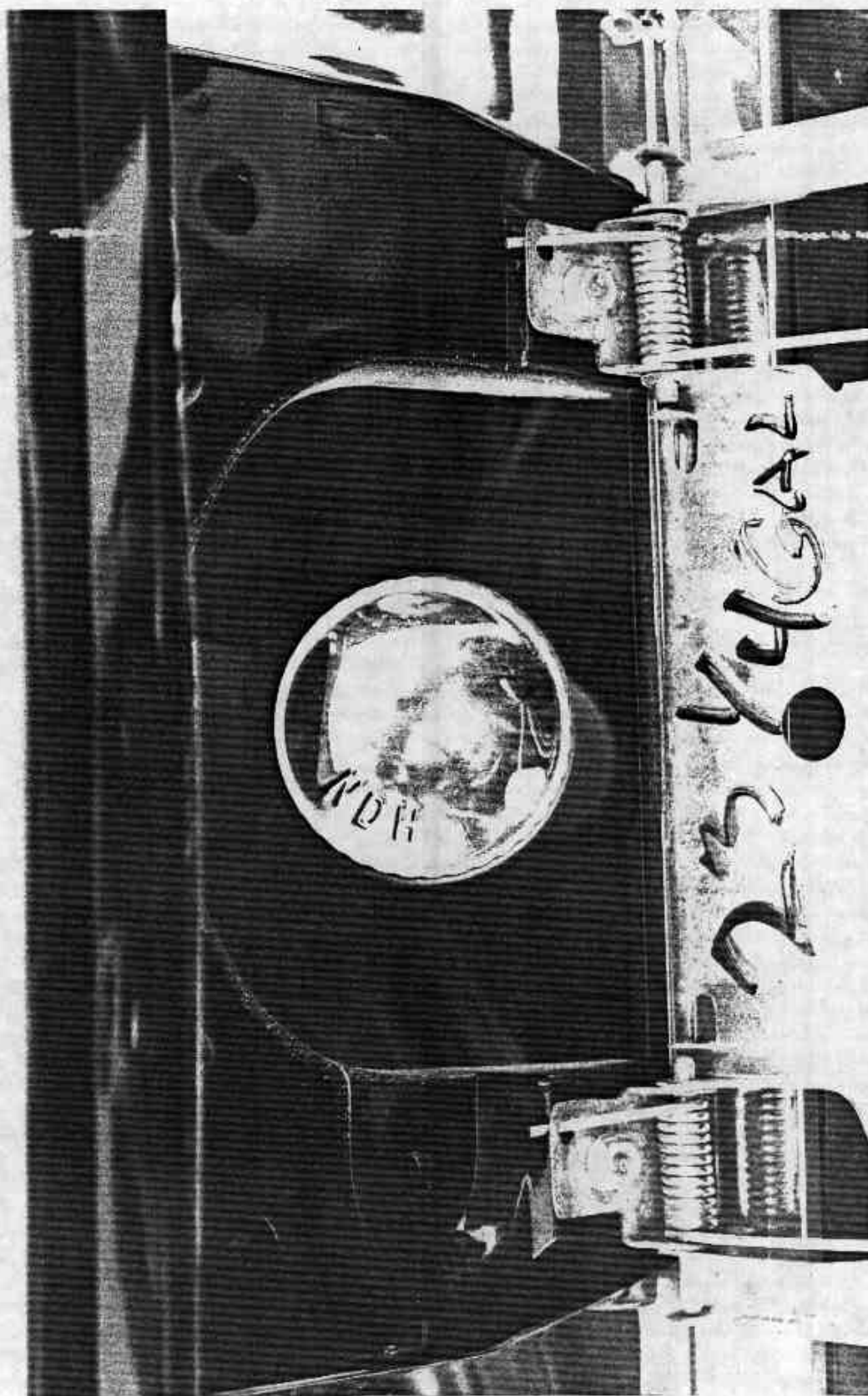


Figure A-19 PRE-TEST FILLER CAP VIEW



Figure A-20 PRE-TEST DRIVER VIEW



Figure A-21 POST-TEST DRIVER VIEW

A-22

7209-3

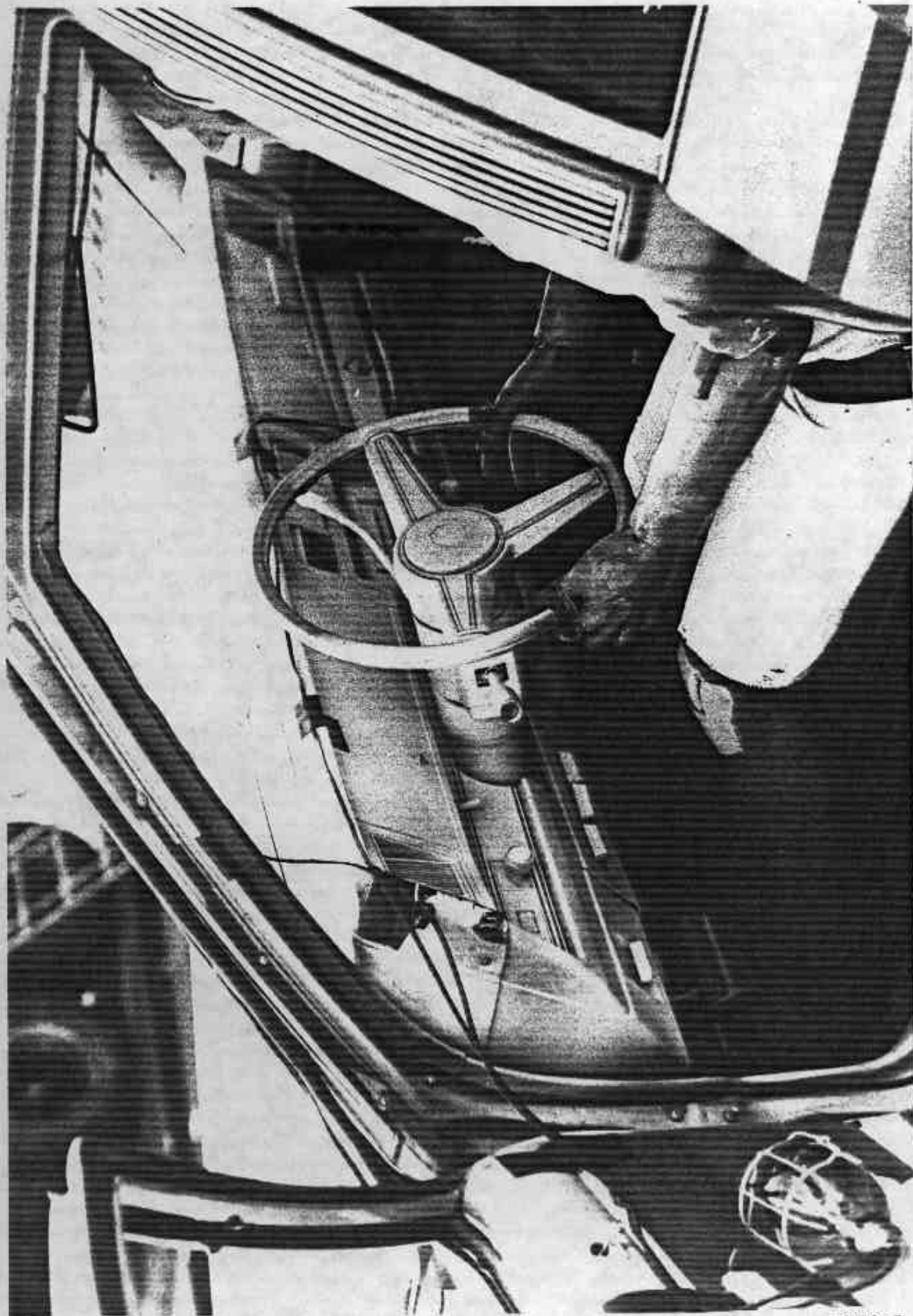


Figure A-22 PRE-TEST DRIVER AND INTERIOR VIEW

A-23

7209-3

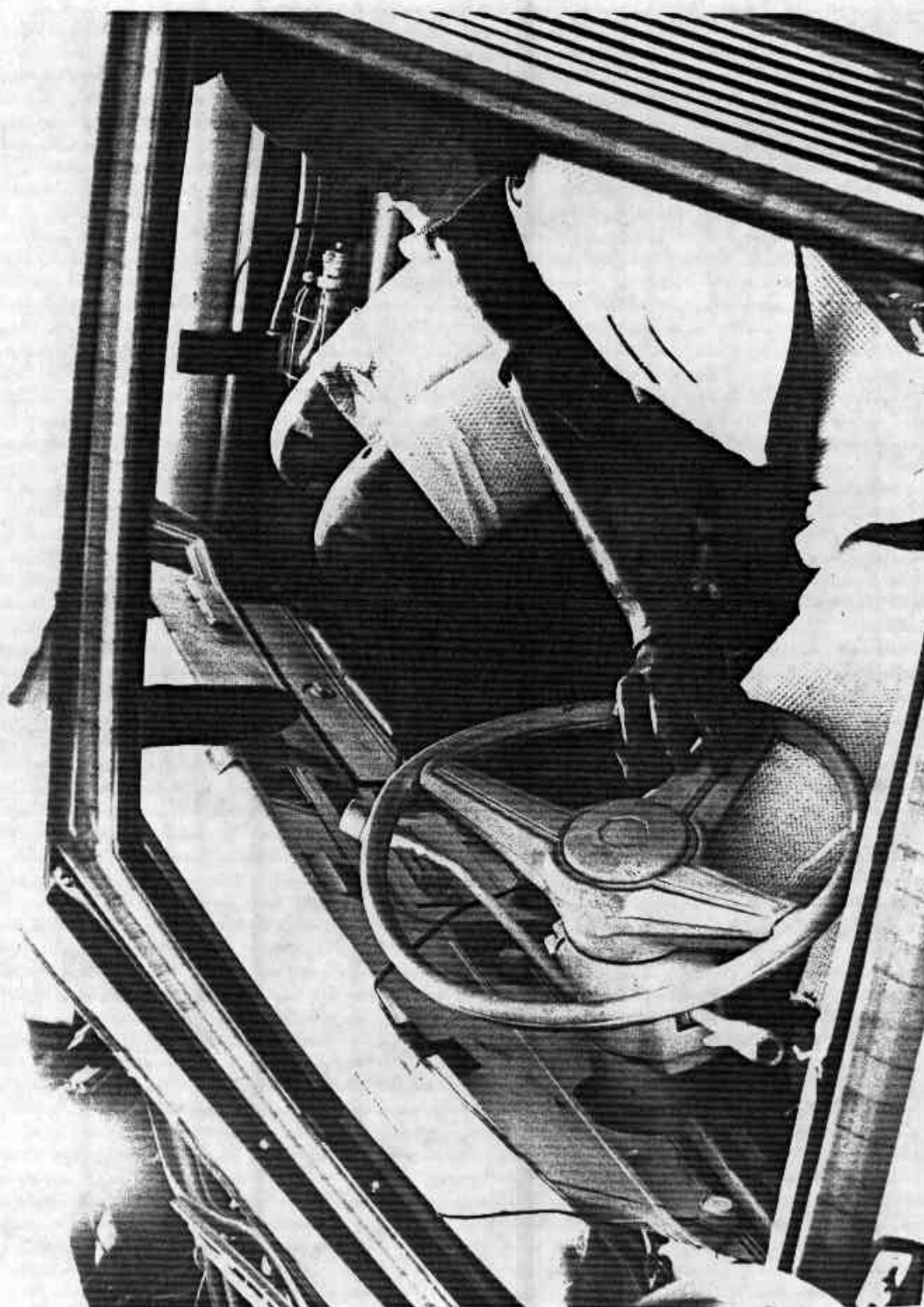


Figure A-23 POST-TEST DRIVER AND INTERIOR VIEW

A-24

7209-3



Figure A-24 PRE-TEST PASSENGER VIEW

A-25

7209-3

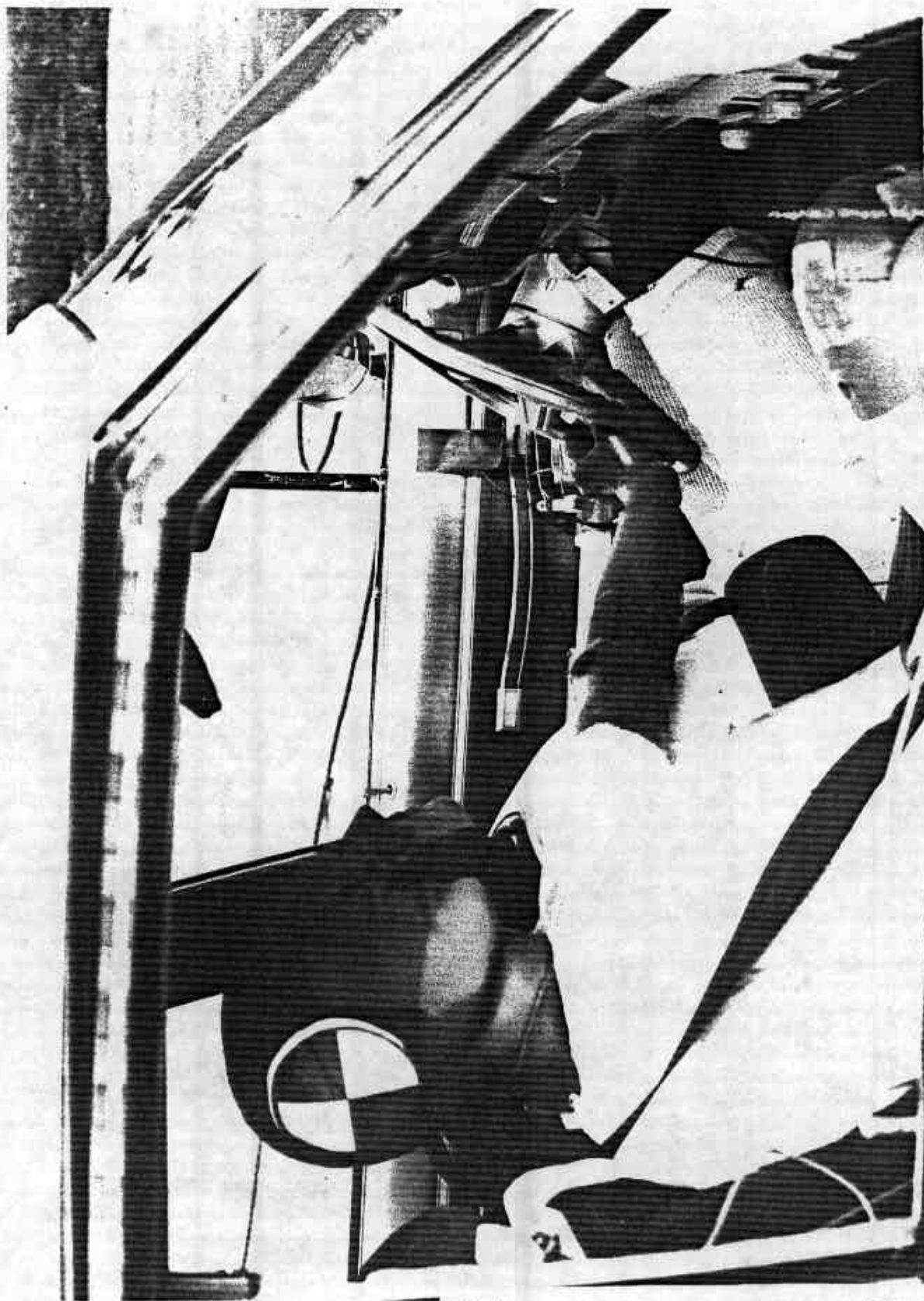


Figure A-25 POST-TEST PASSENGER VIEW

A-26

7209-3

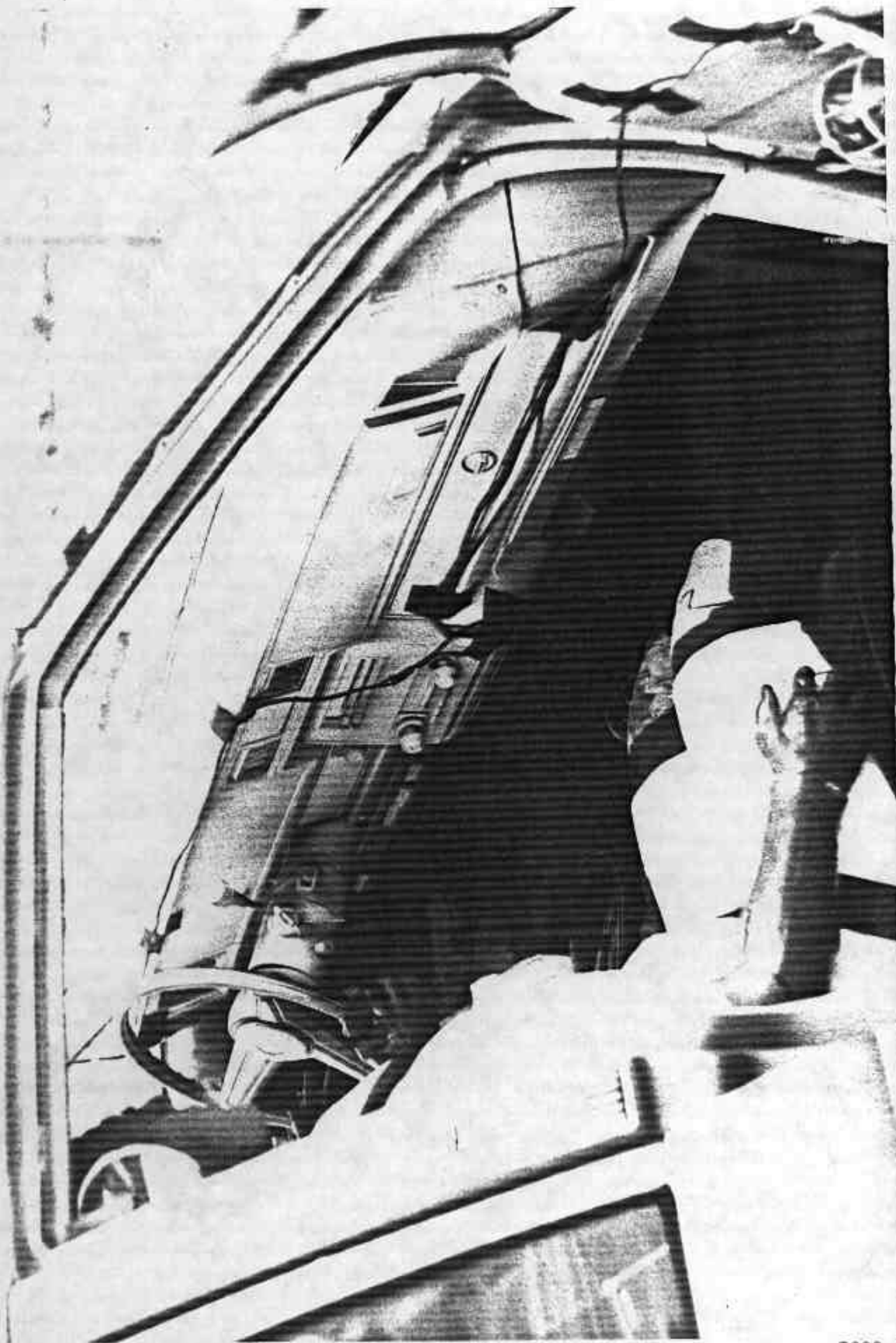


Figure A-26 PRE-TEST PASSENGER AND INTERIOR VIEW

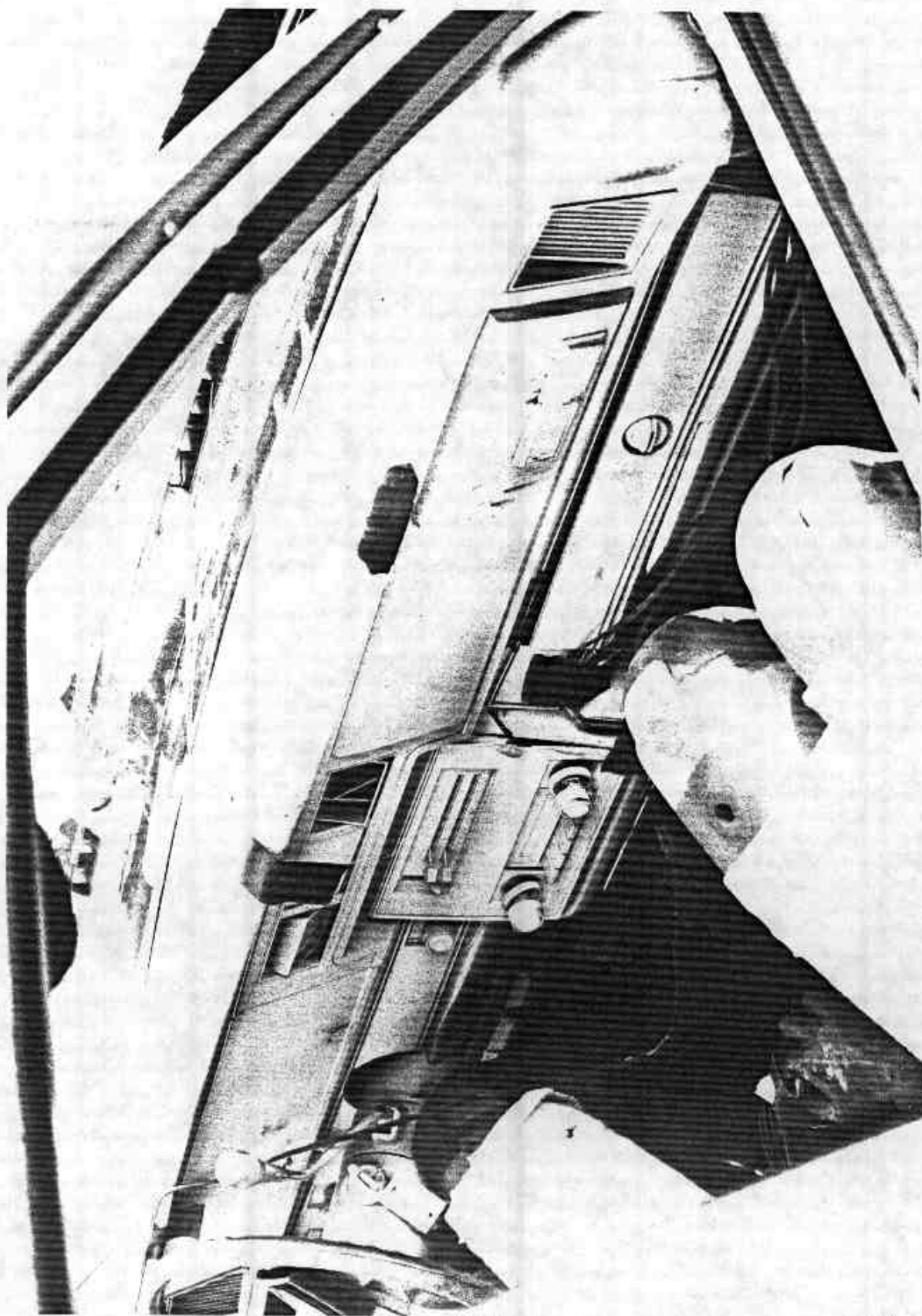


Figure A-27 POST-TEST PASSENGER AND INTERIOR VIEW

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA

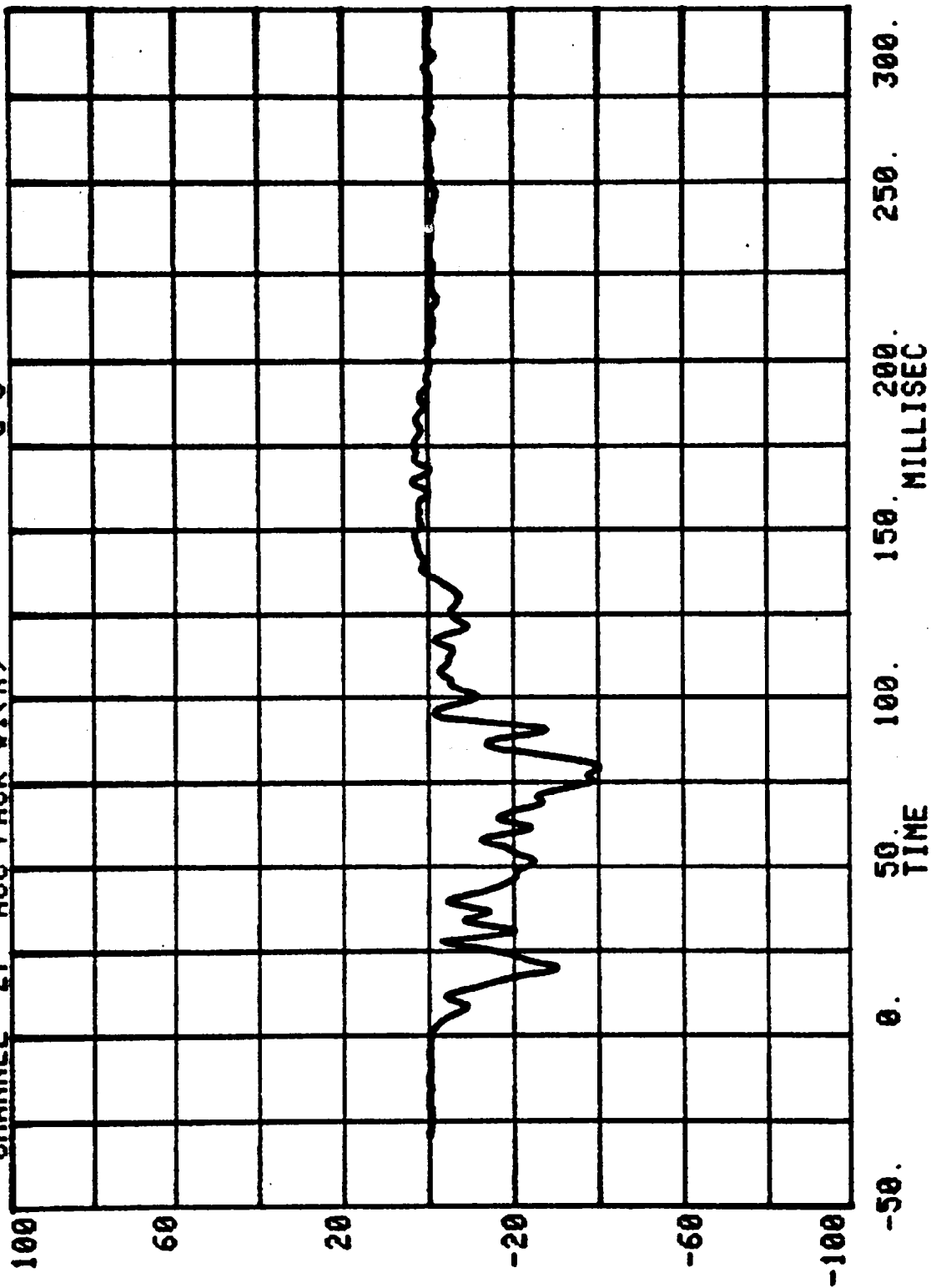
TEST NO. CE0108

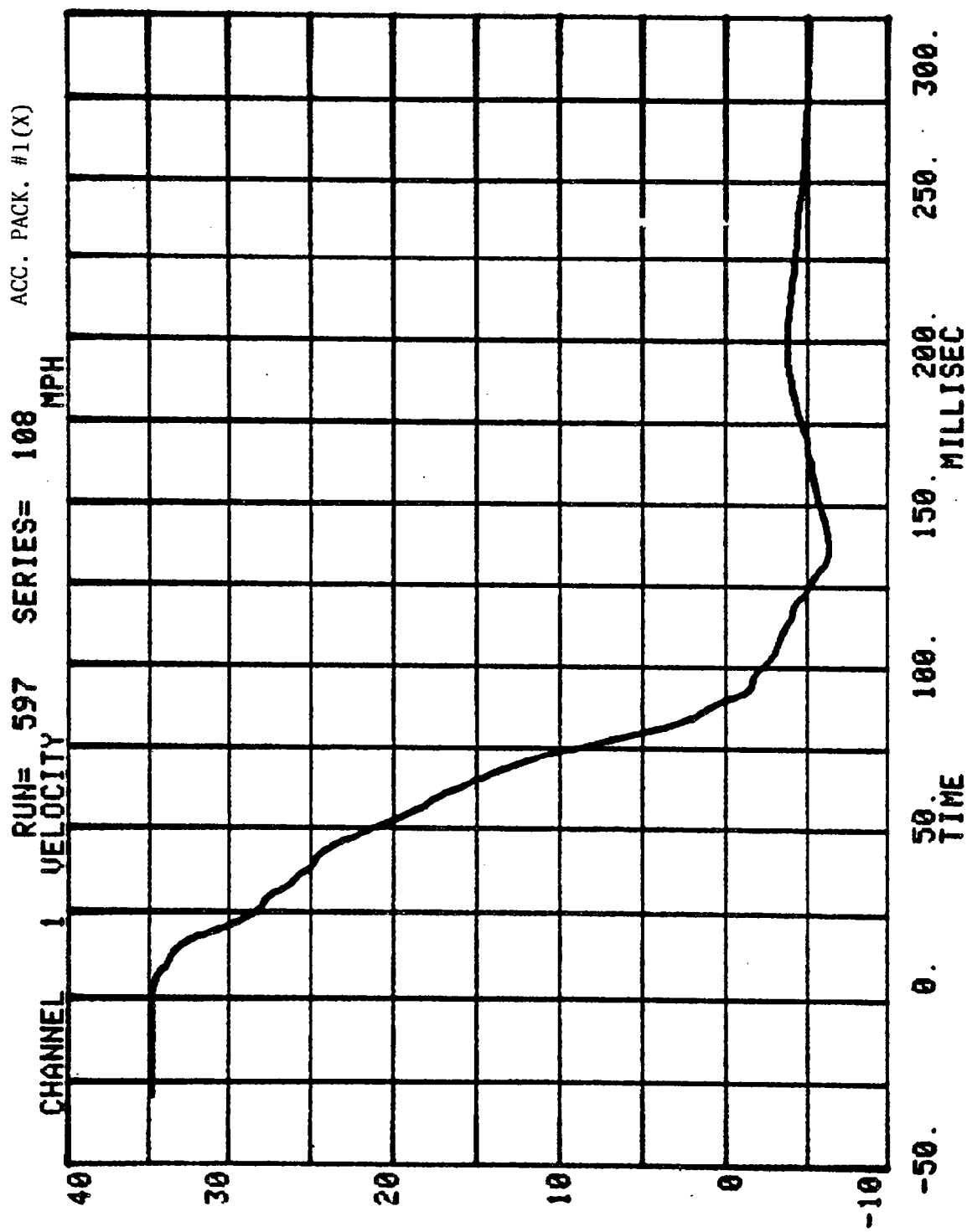
VEHICLE DATA

FILTER CHANNEL CLASS

60

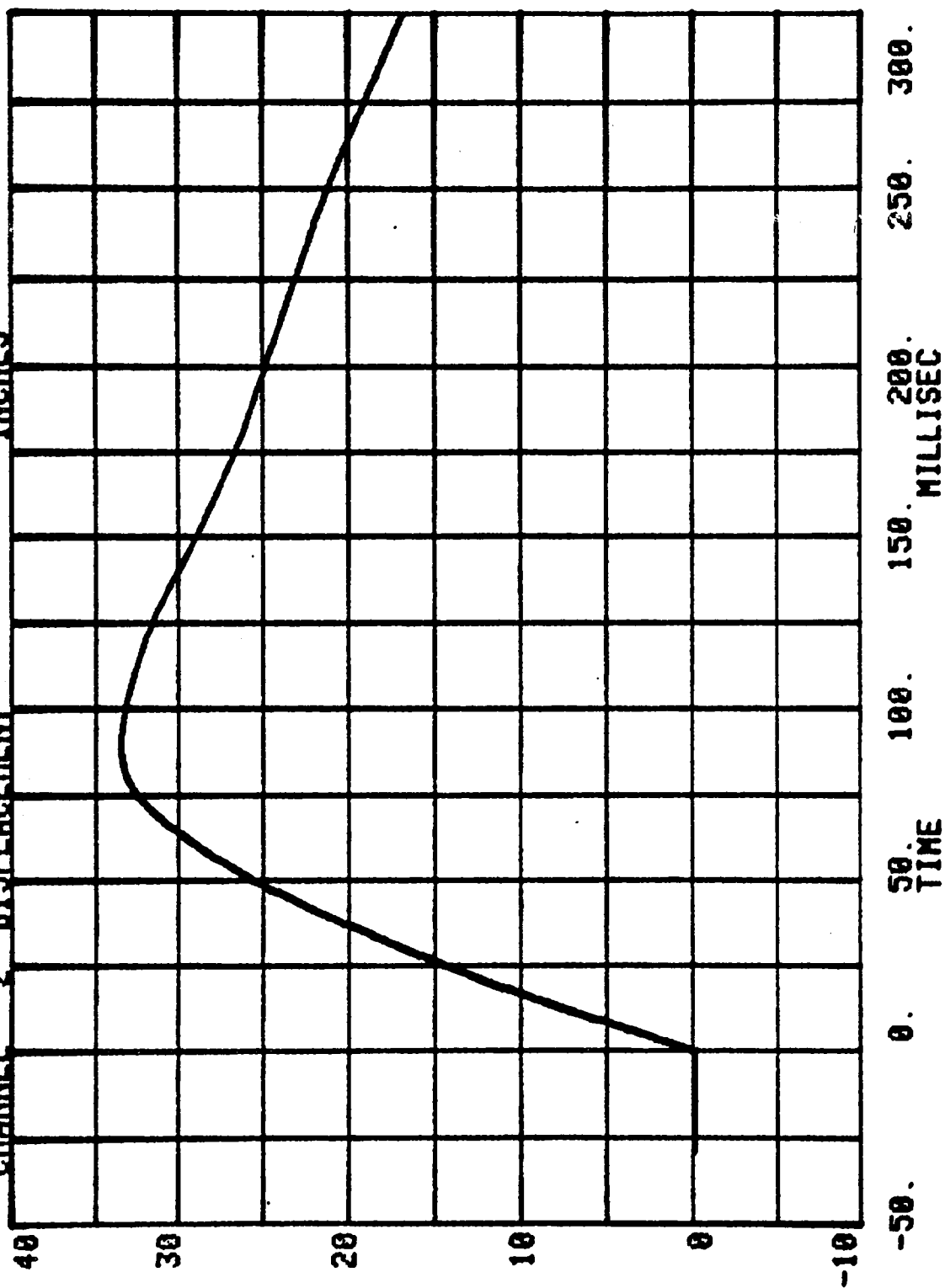
RUN= 597 SERIES= 108
CHANNEL 27 ACC PACK #1(X) G'S



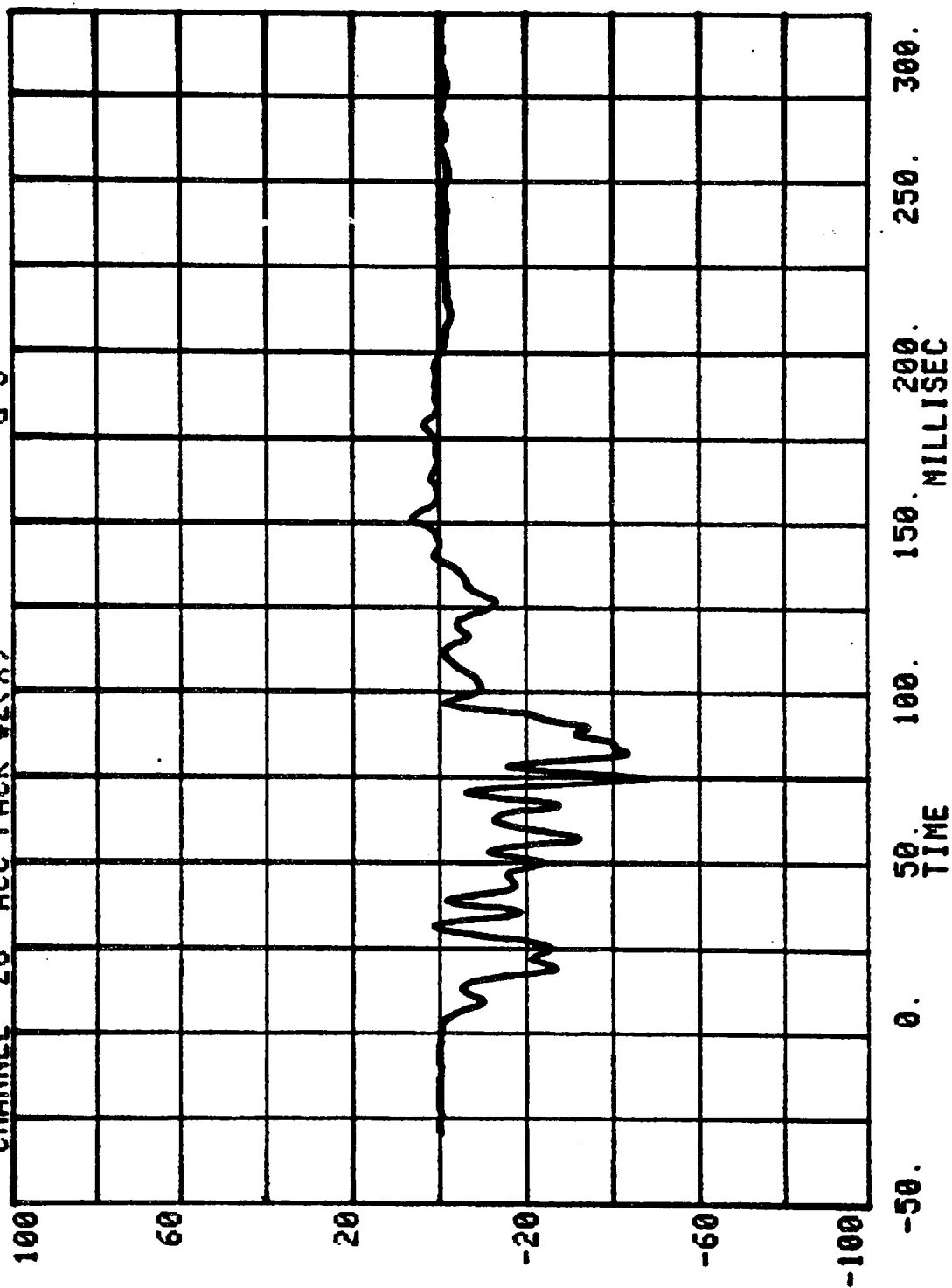


ACC. PACK. #1(X)

RUN= 597 SERIES= 108
CHANNEL 2 DISPLACEMENT INCHES

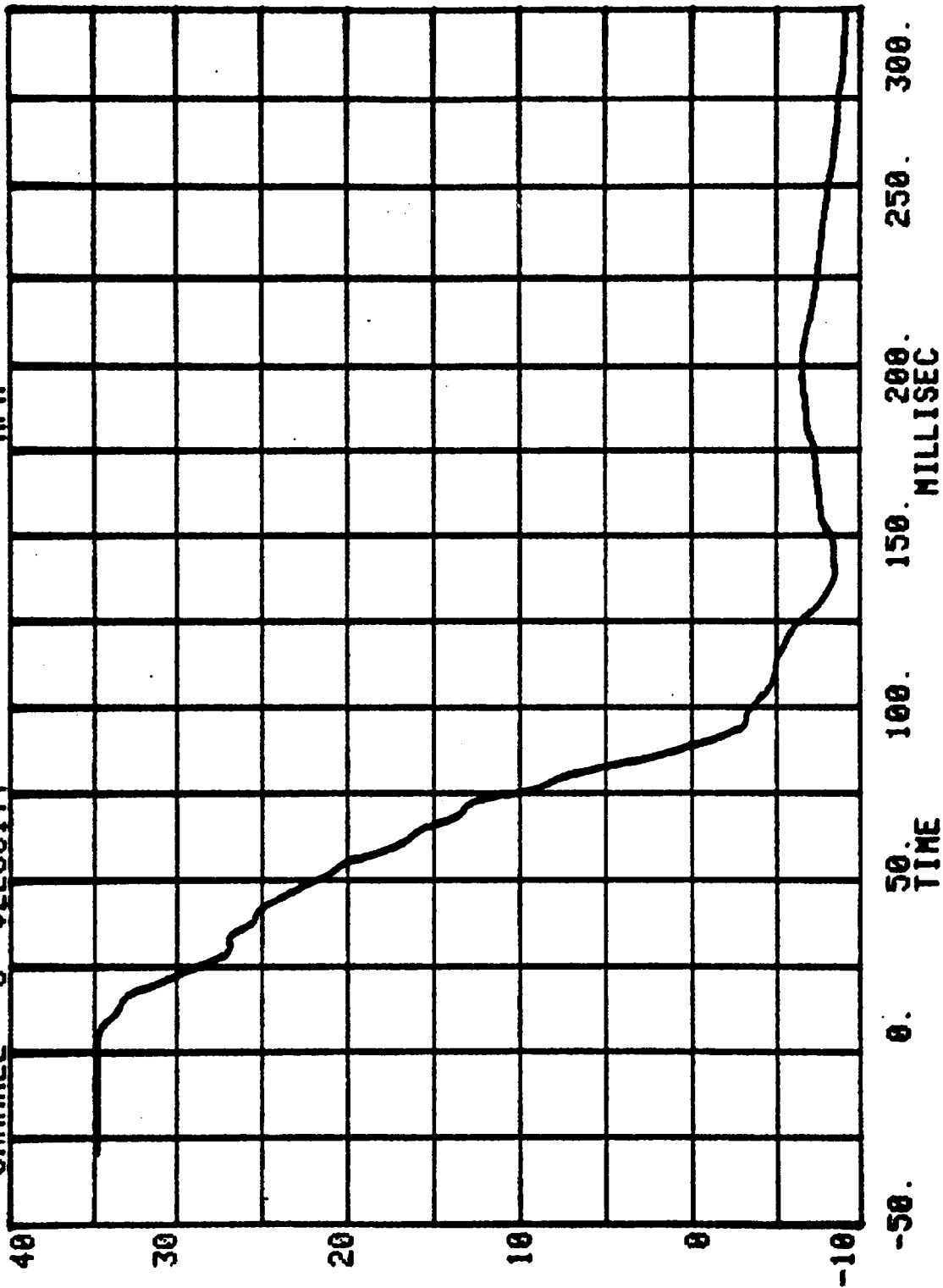


CHANNEL 28 ACC PACK #2(X) RUN= 597 SERIES= 108 G'S



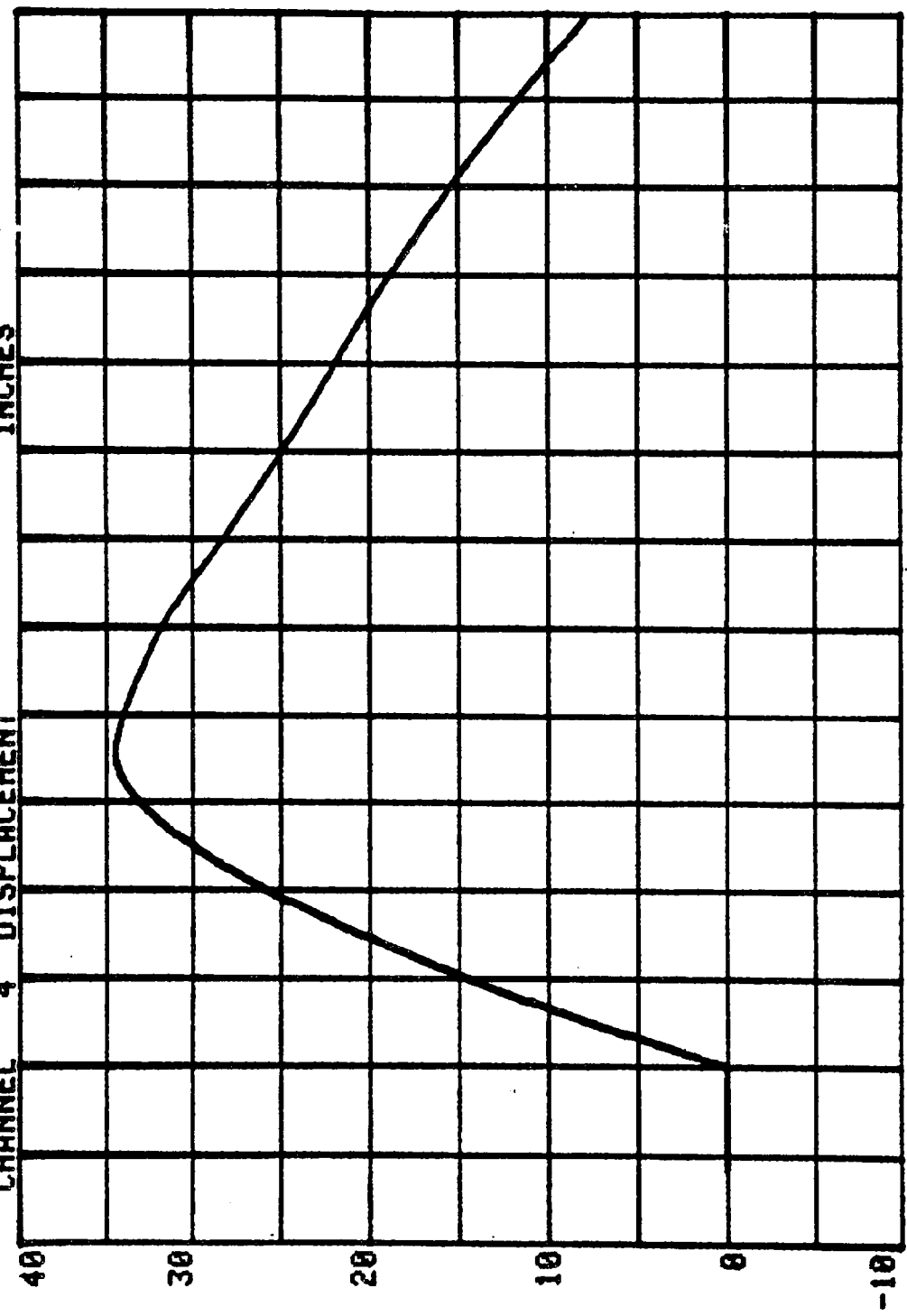
ACC. PACK. #2(X)

CHANNEL 3 VELOCITY
RUN= 597 SERIES= 108 MPH



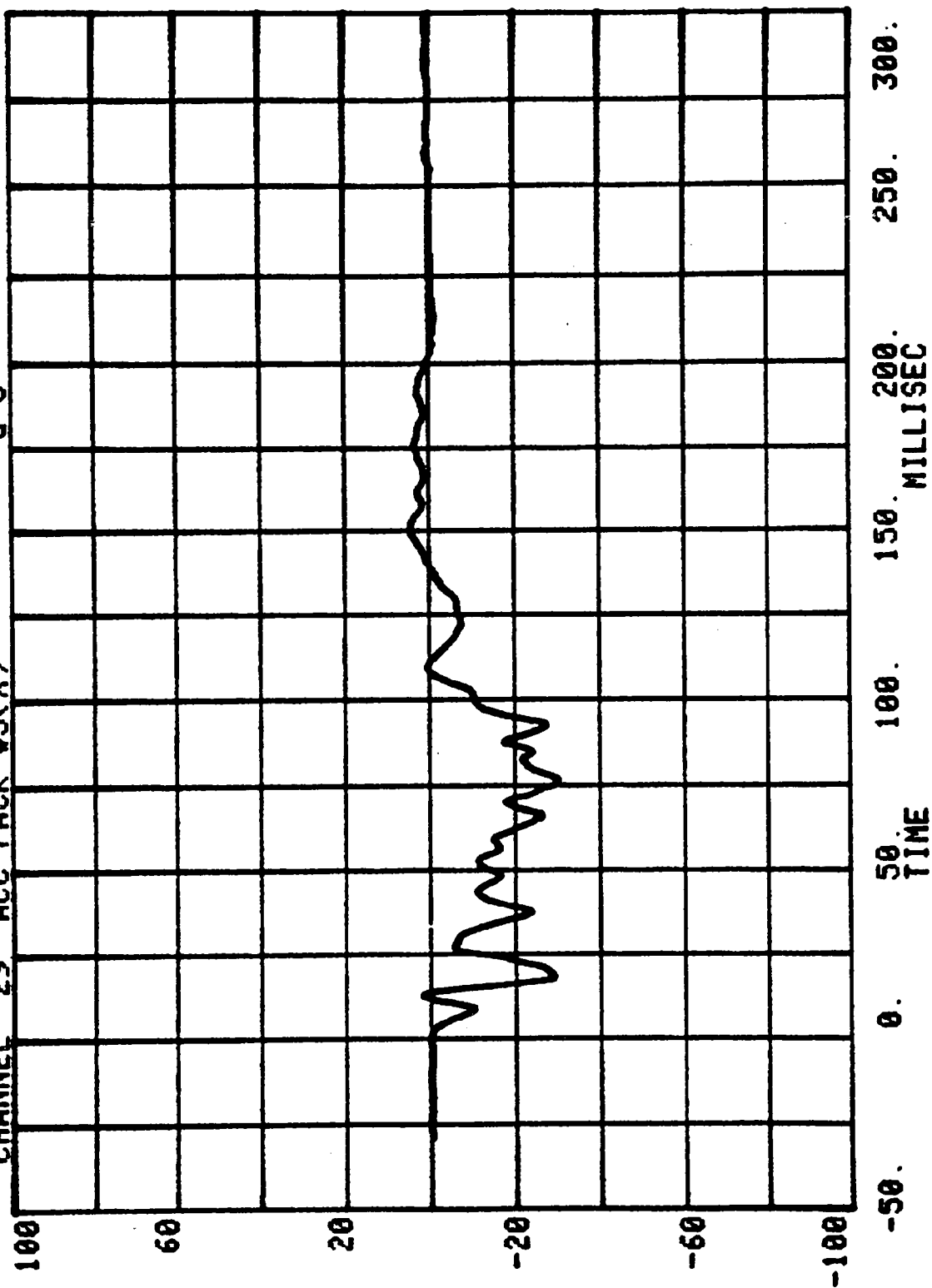
ACC. PACK. #2(X)

CHANNEL 4 DISPLACEMENT RUN= 597 SERIES= 108 INCHES



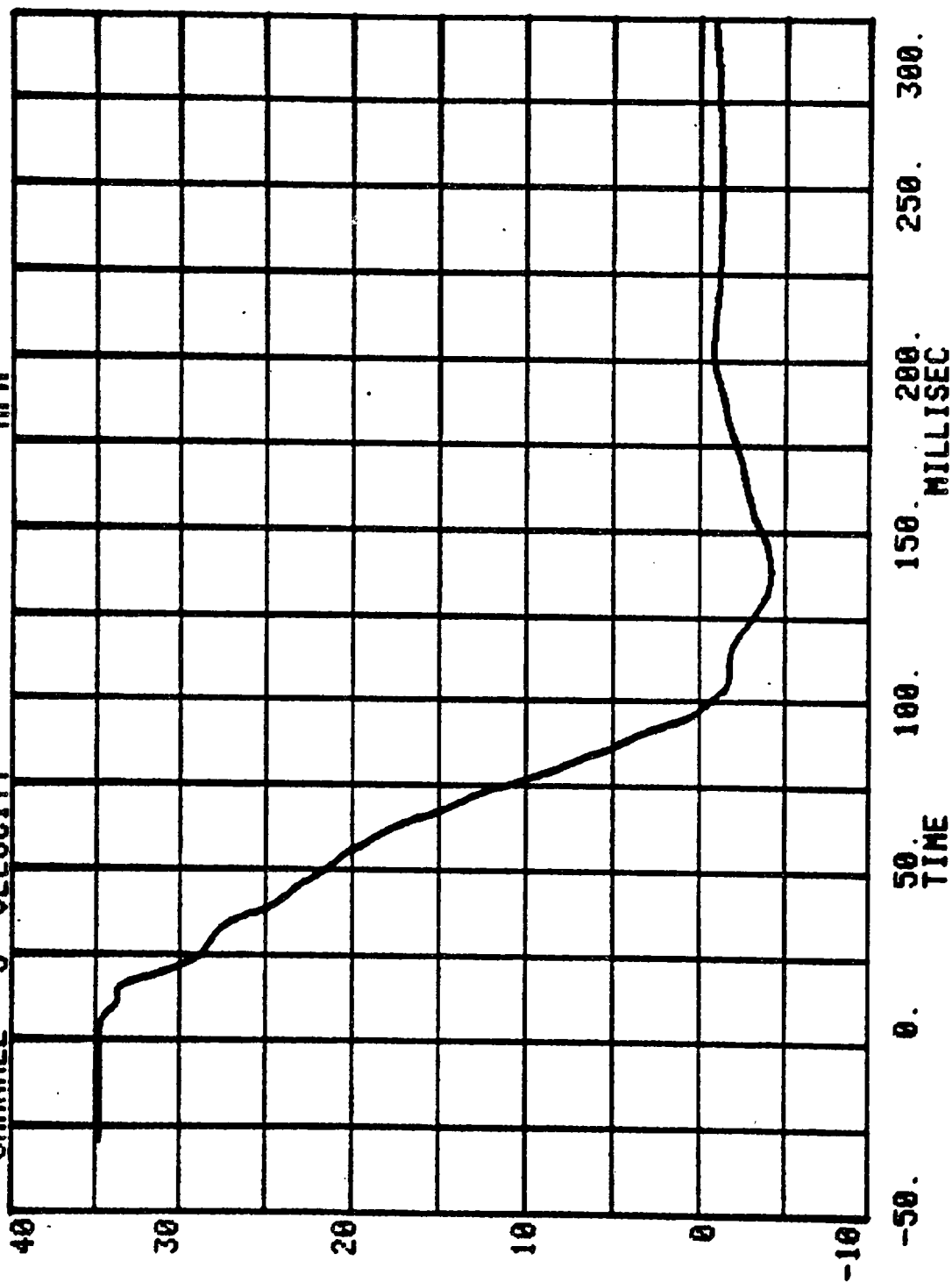
-50. 0. 50. 100. 150. 200. 250. 300.
TIME

CHANNEL 29 ACC PACK #3(X) RUN= 597 SERIES= 108 G'S



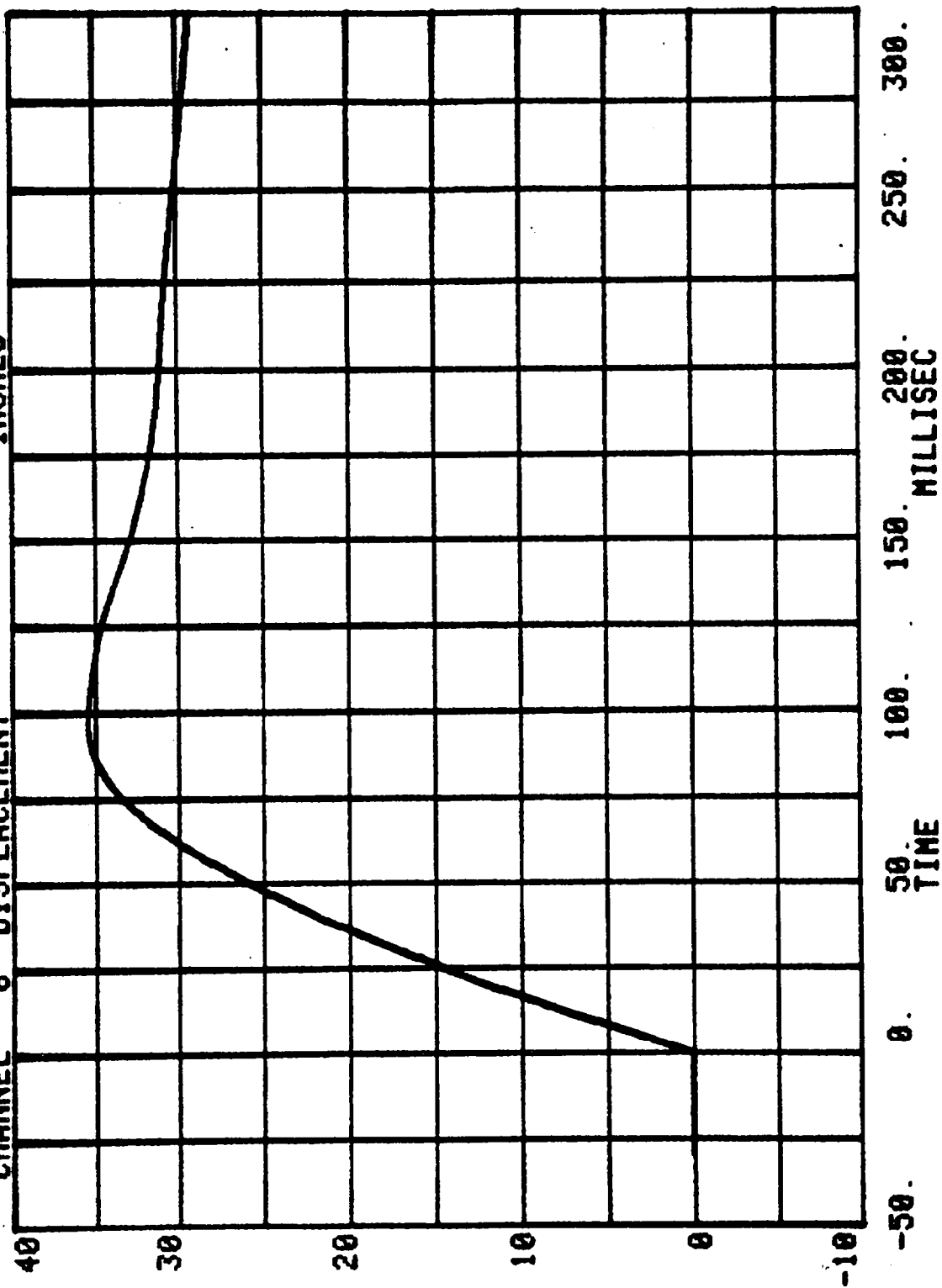
ACC. PACK. #3(X)

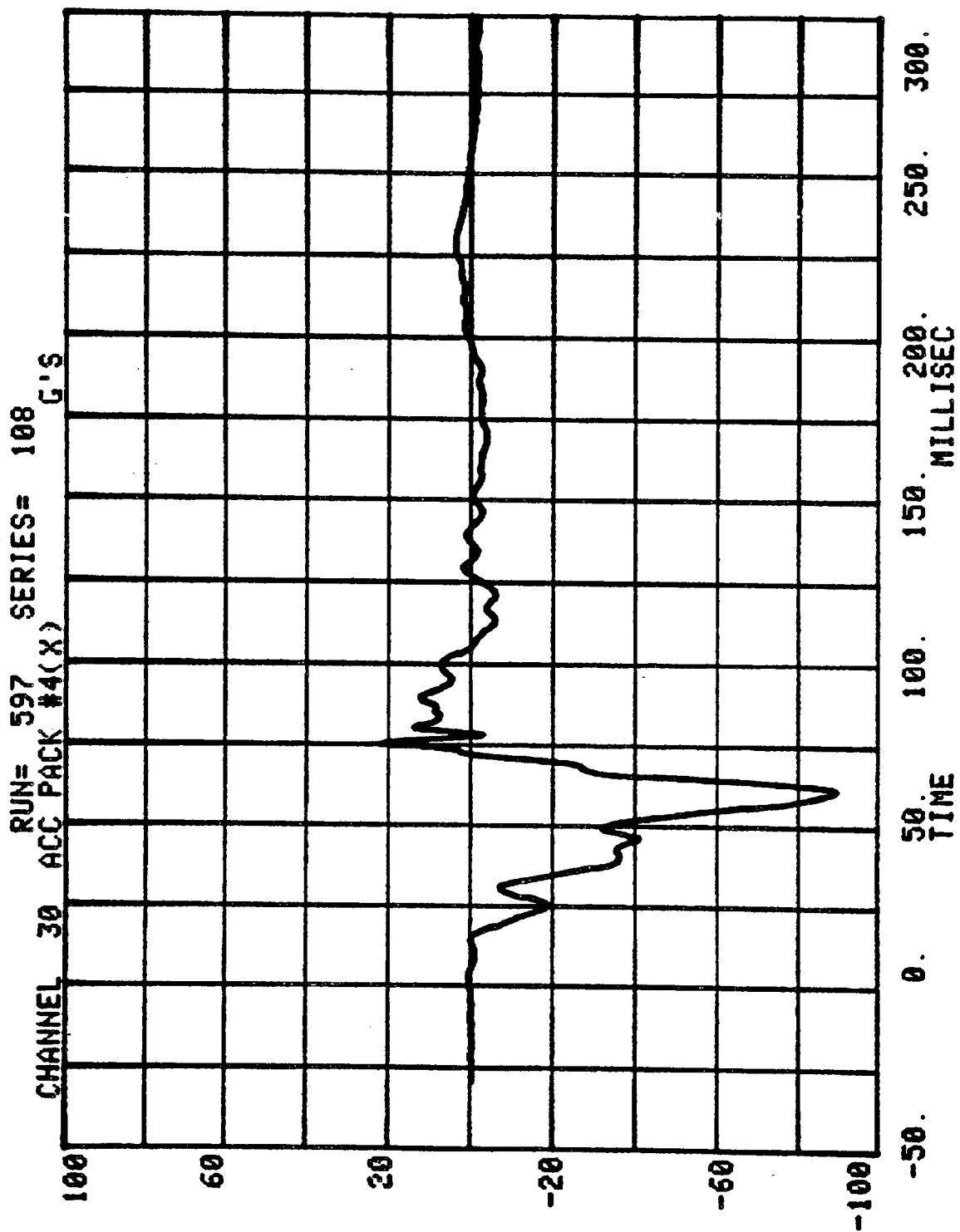
RUN= 597 SERIES= 108
CHANNEL 5 VELOCITY MPH



ACC. PACK. #3(X)

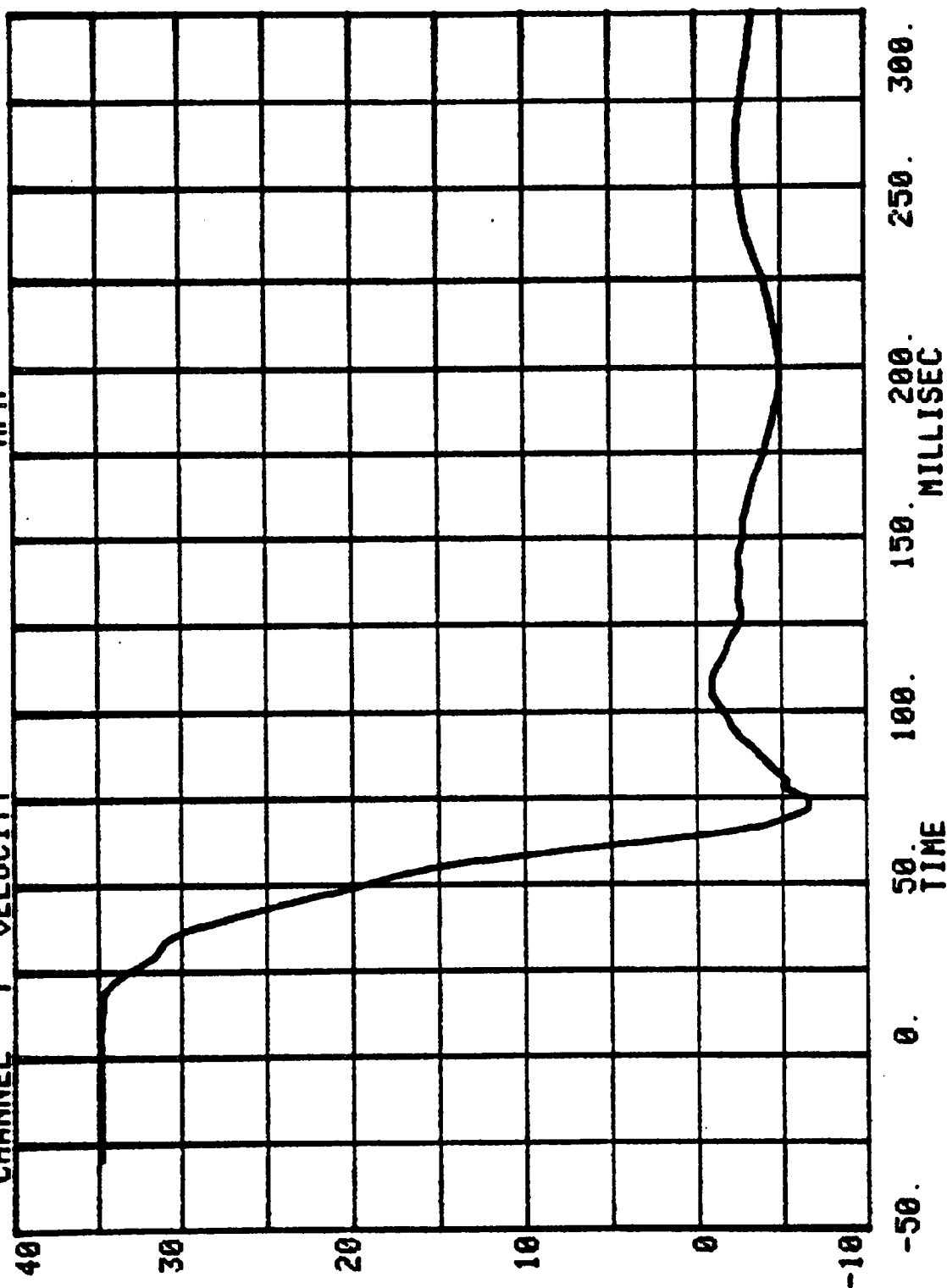
CHANNEL 6 DISPLACEMENT
RUN= 597 SERIES= 108 INCHES





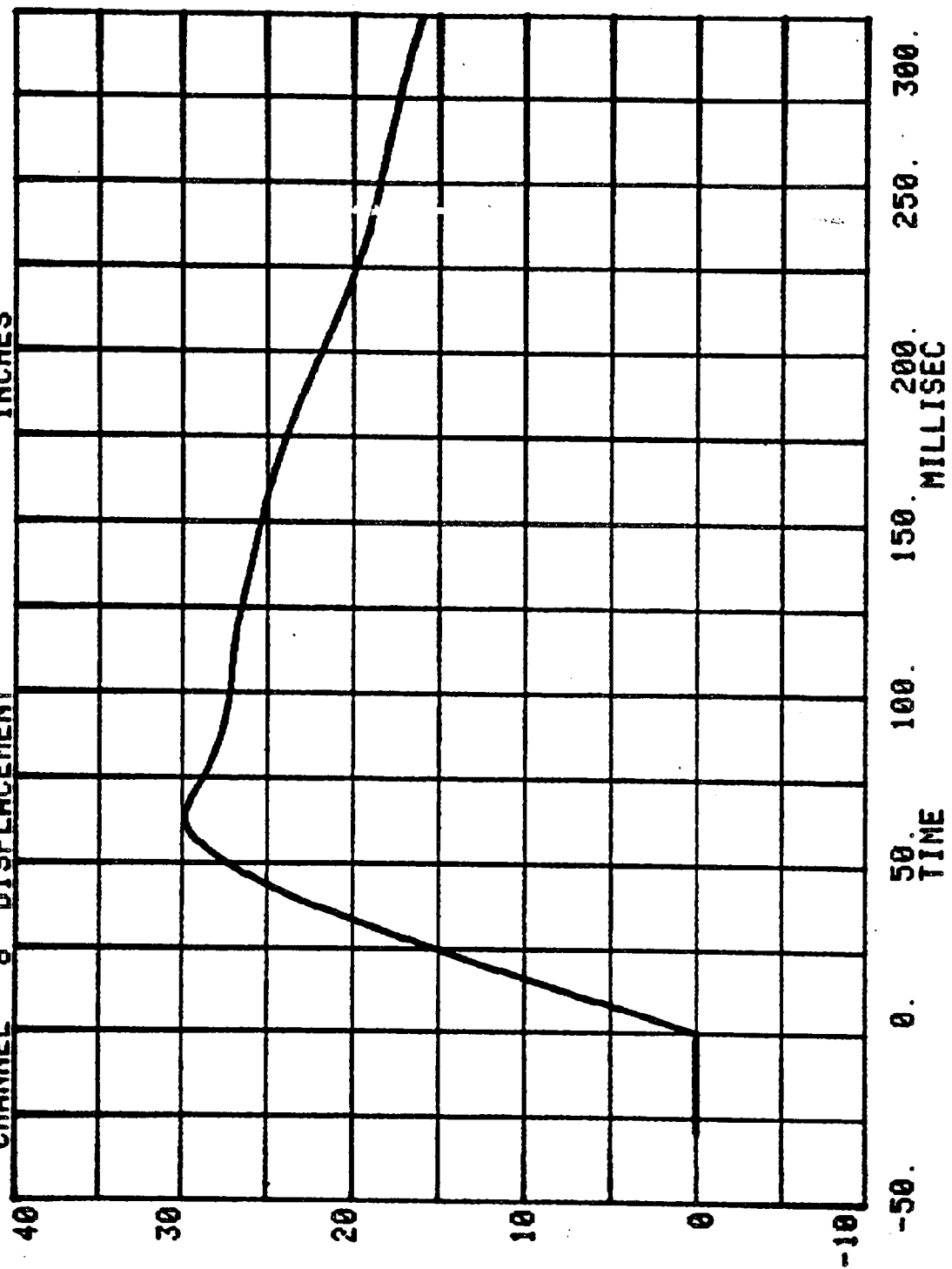
ACC. PACK. #4(X)

CHANNEL 7 VELOCITY
RUN= 597 SERIES= 108 MPH

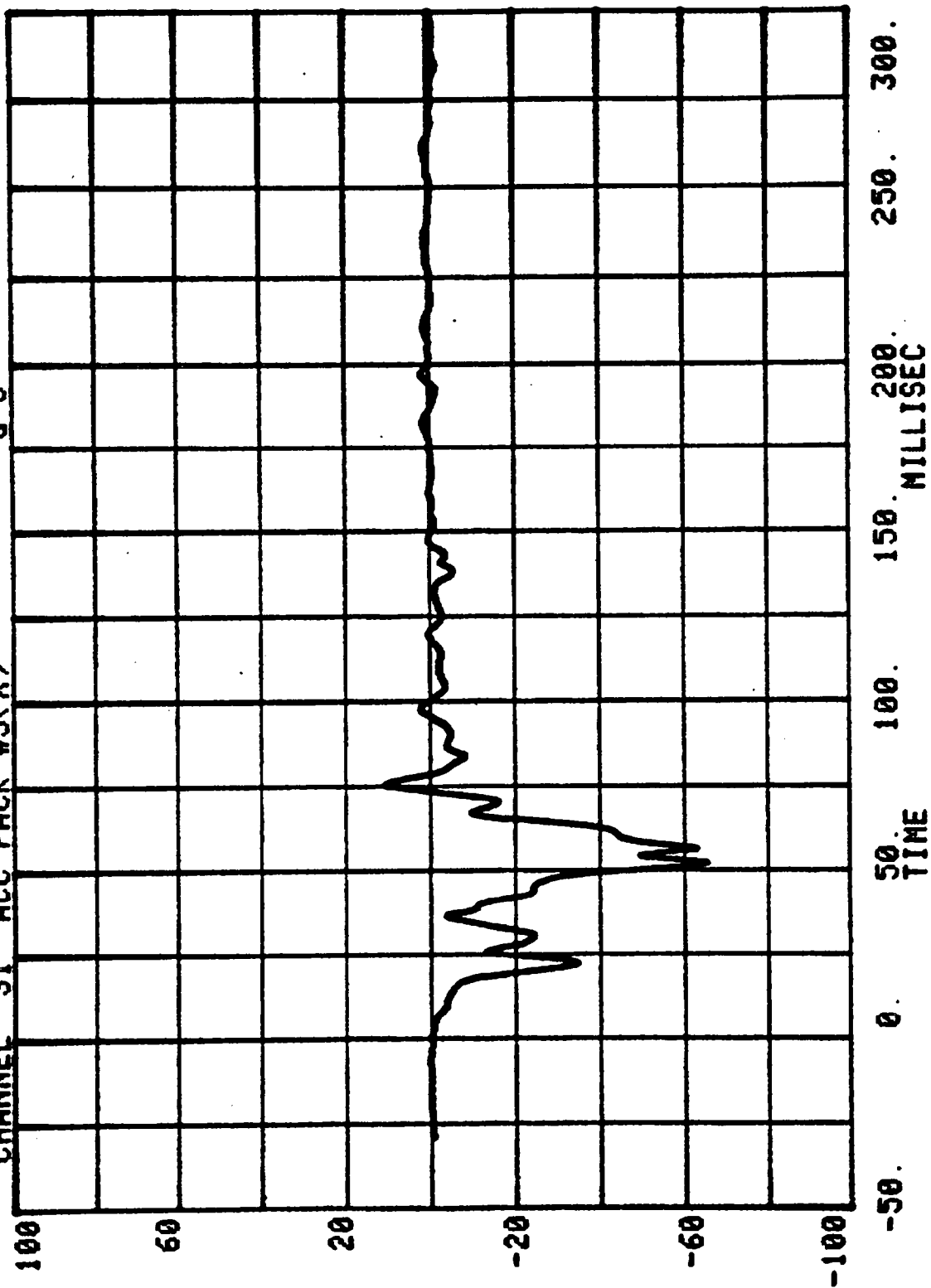


ACC. PACK. #4 (X)

CHANNEL 8 DISPLACEMENT
RUN= 597 SERIES= 108 INCHES

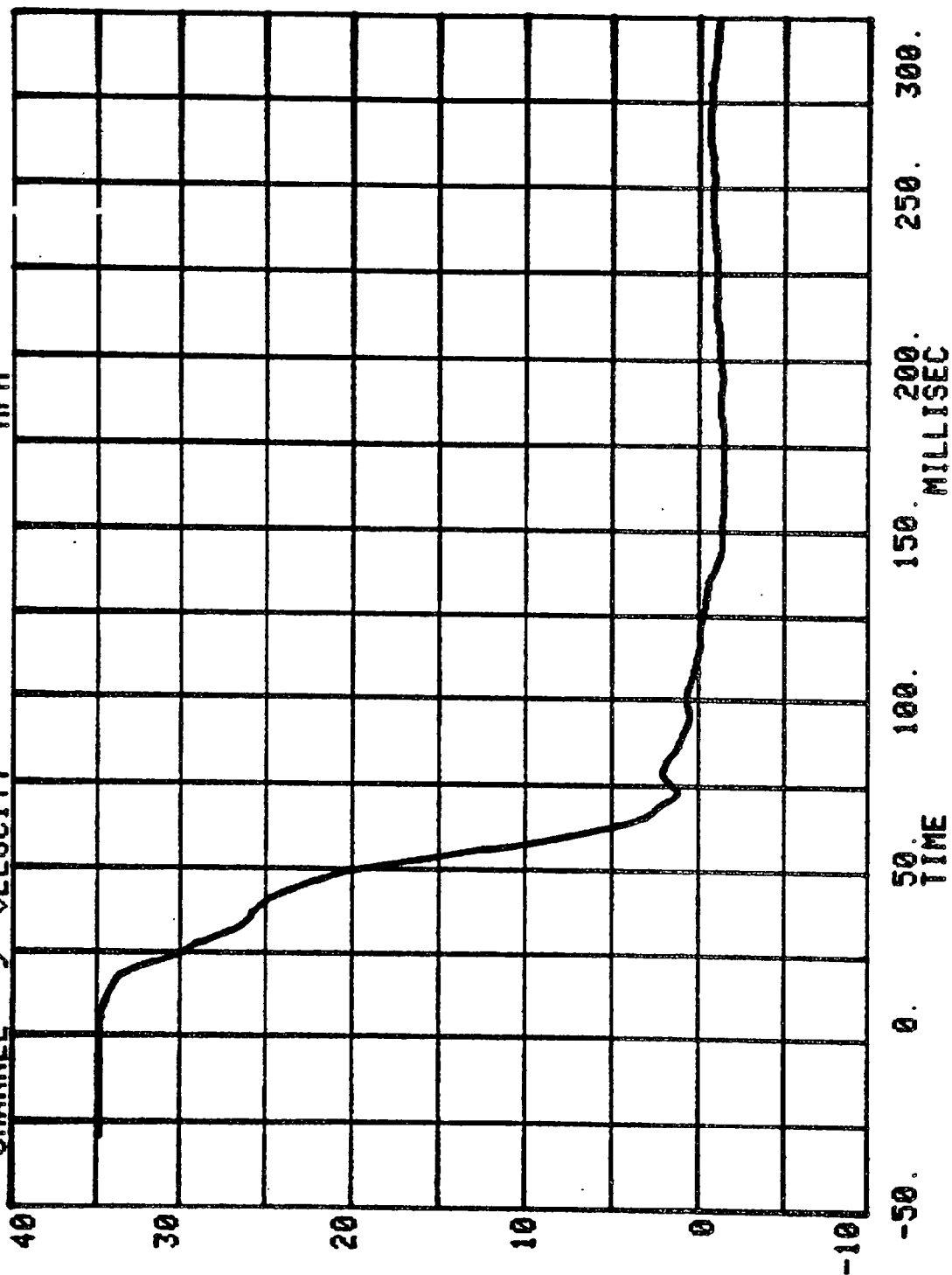


CHANNEL 31 RUN= 597 SERIES= 108 G'S
ACC PACK #5(X)



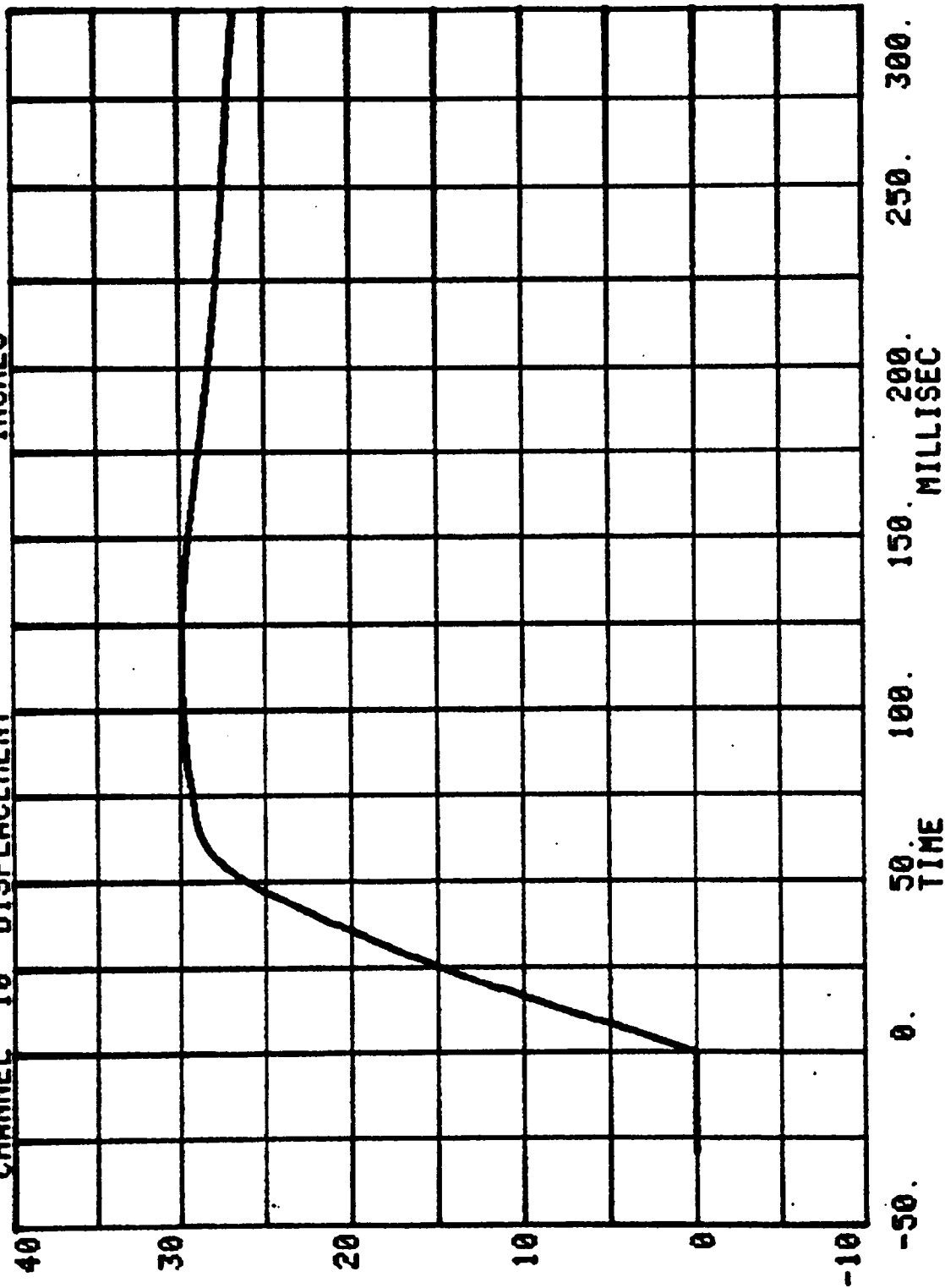
ACC. PACK. #5(X)

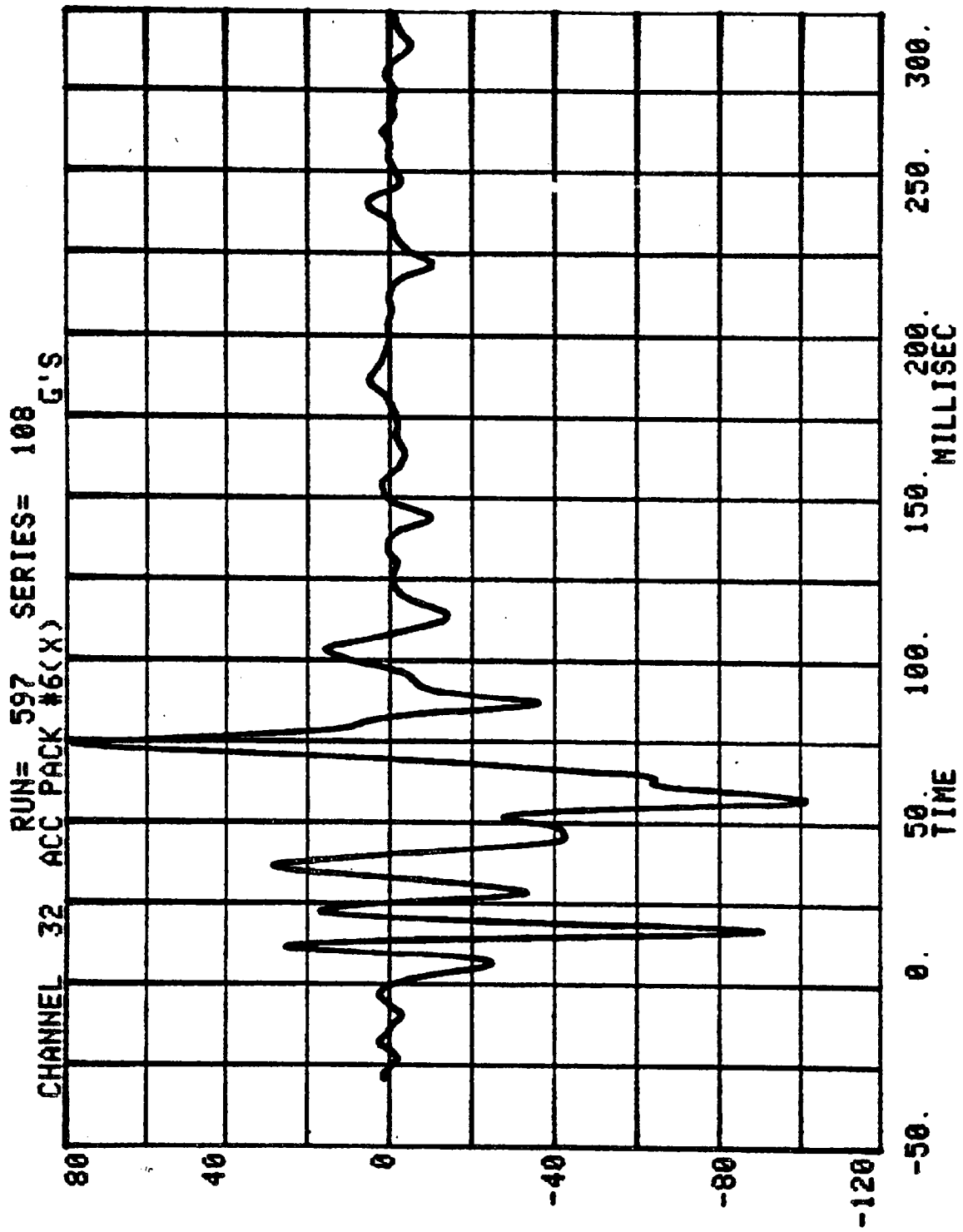
CHANNEL 9 VELOCITY
RUN= 597 SERIES= 108 MPH



ACC. PACK...#5(X)

CHANNEL 10 DISPLACEMENT
RUN= 597 SERIES= 108 INCHES



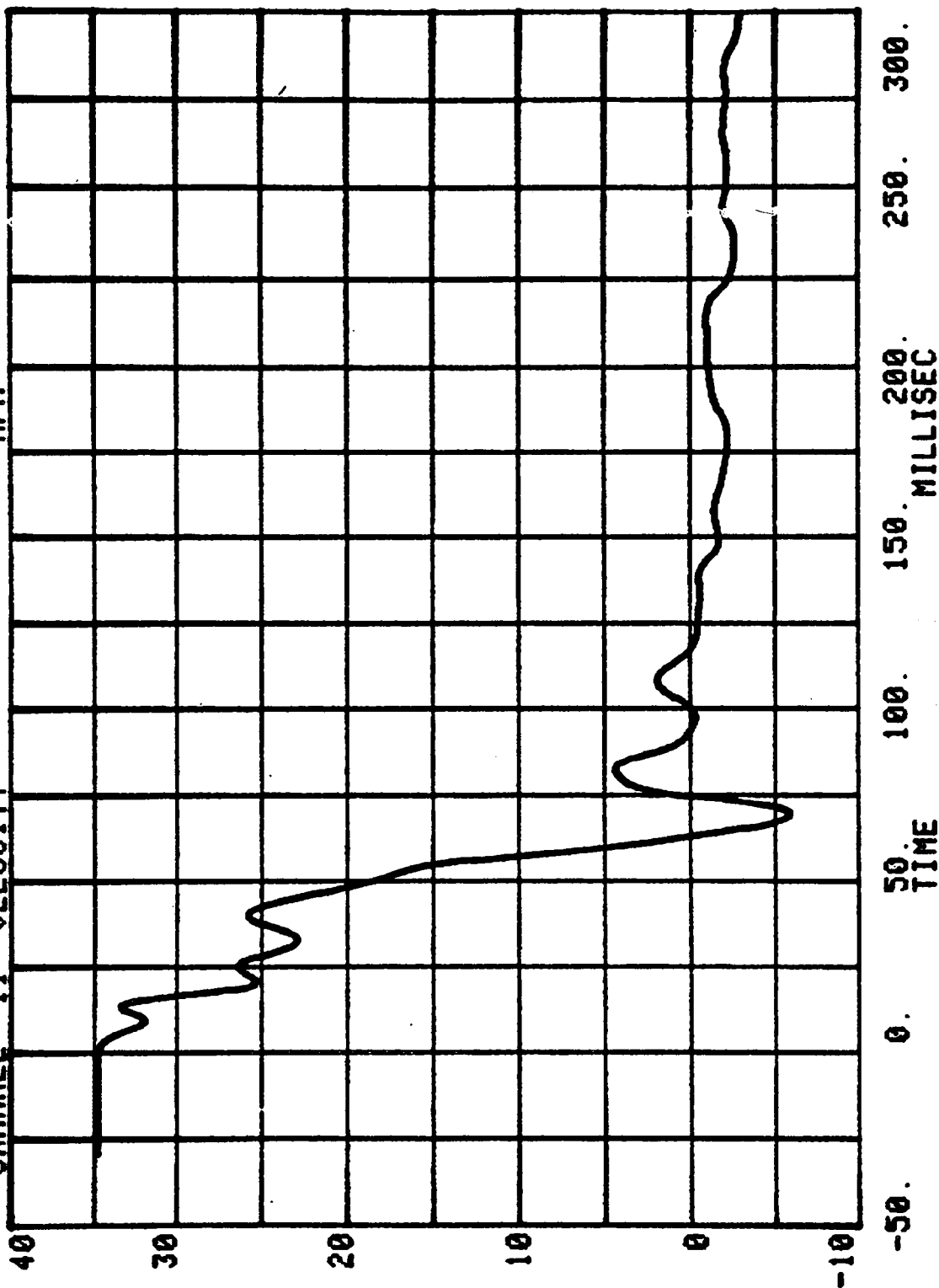


ACC. PAC'Y. #6(X)

RUN= 597 SERIES= 108

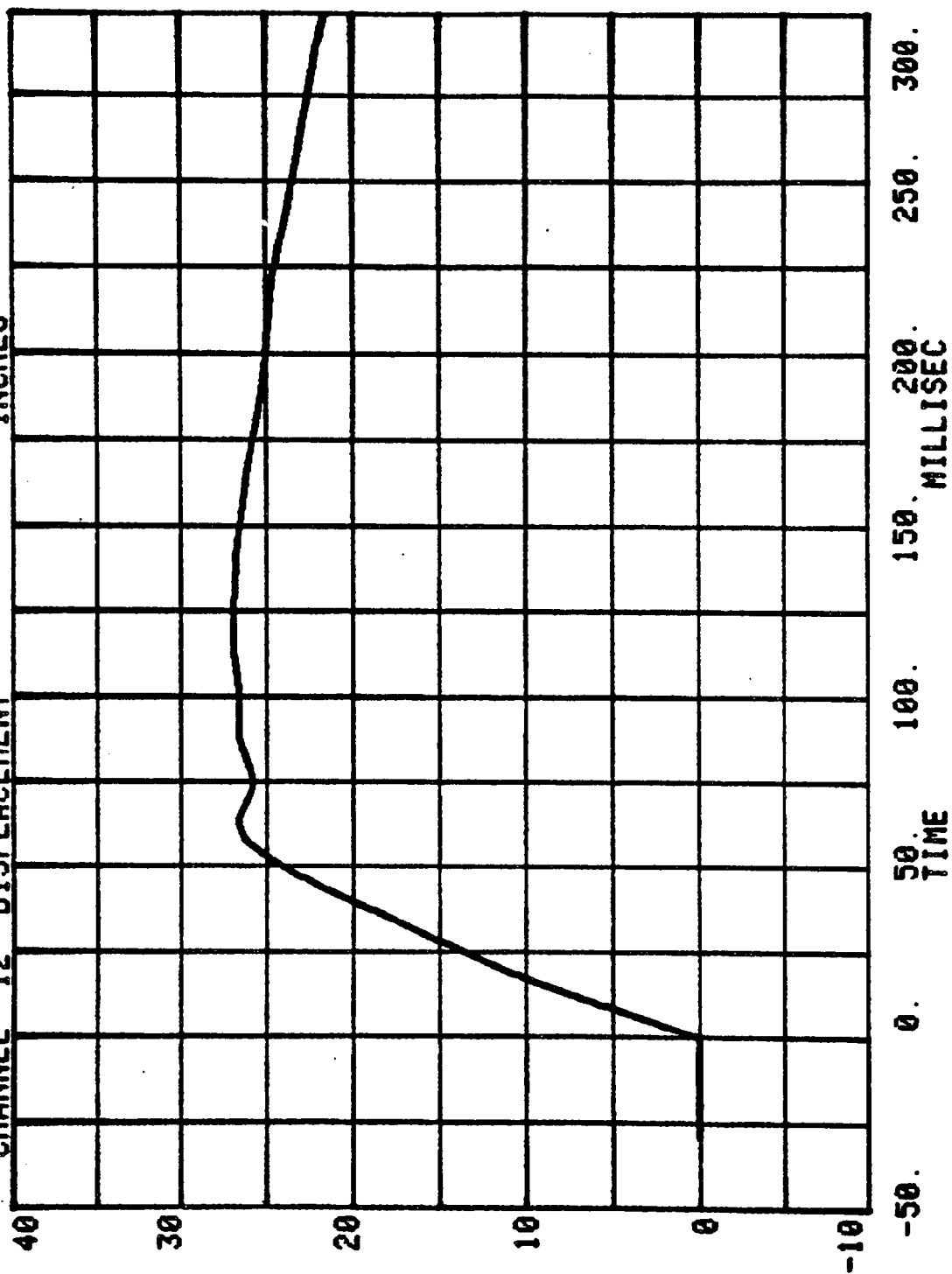
MPH

CHANNEL 11 VELOCITY

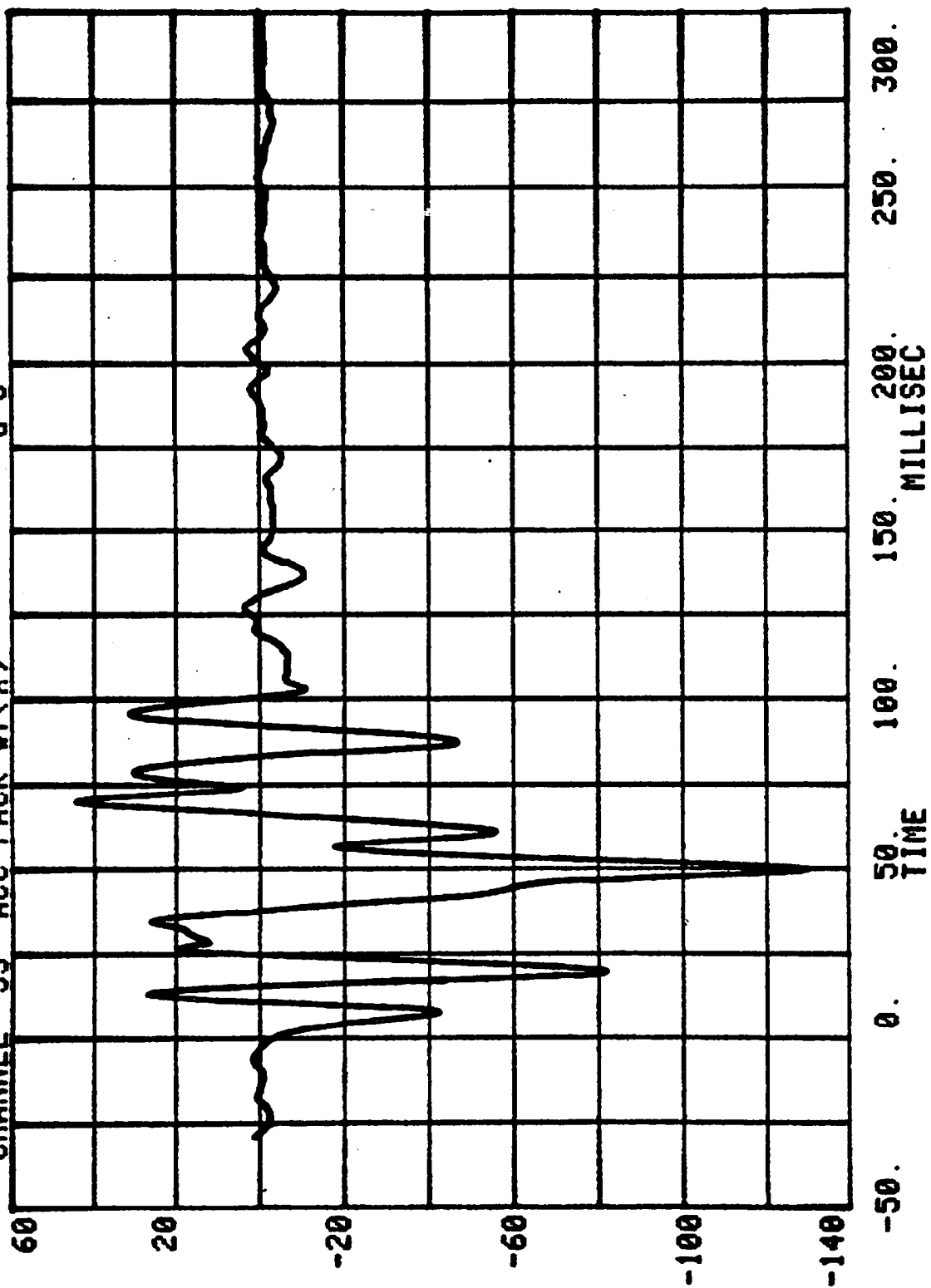


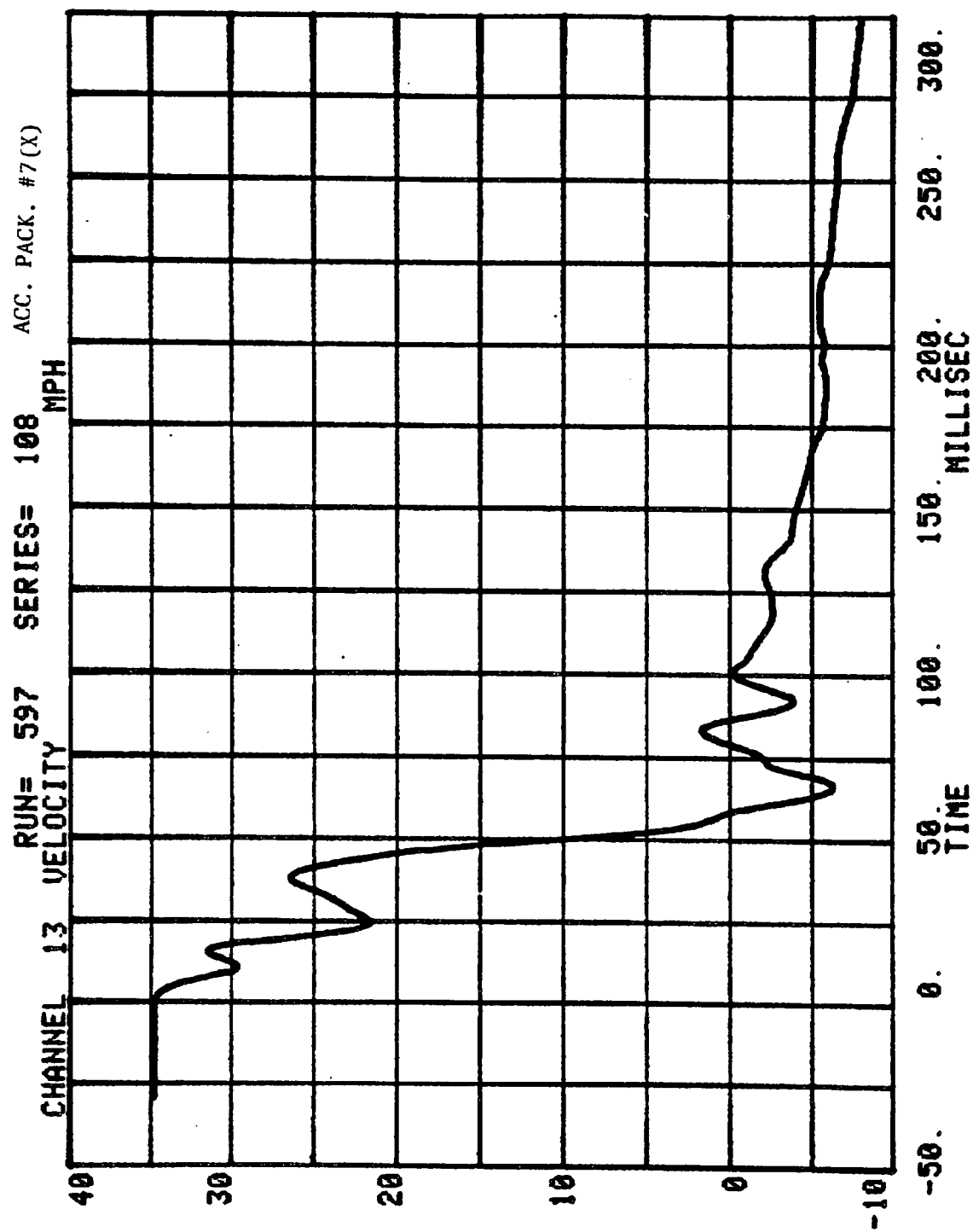
ACC. PACK. #6(X)

CHANNEL 12 DISPLACEMENT
RUN= 597 SERIES= 108 INCHES



RUN= 597 SERIES= 108 G'S
CHANNEL 33 ACC PACK #7(X)

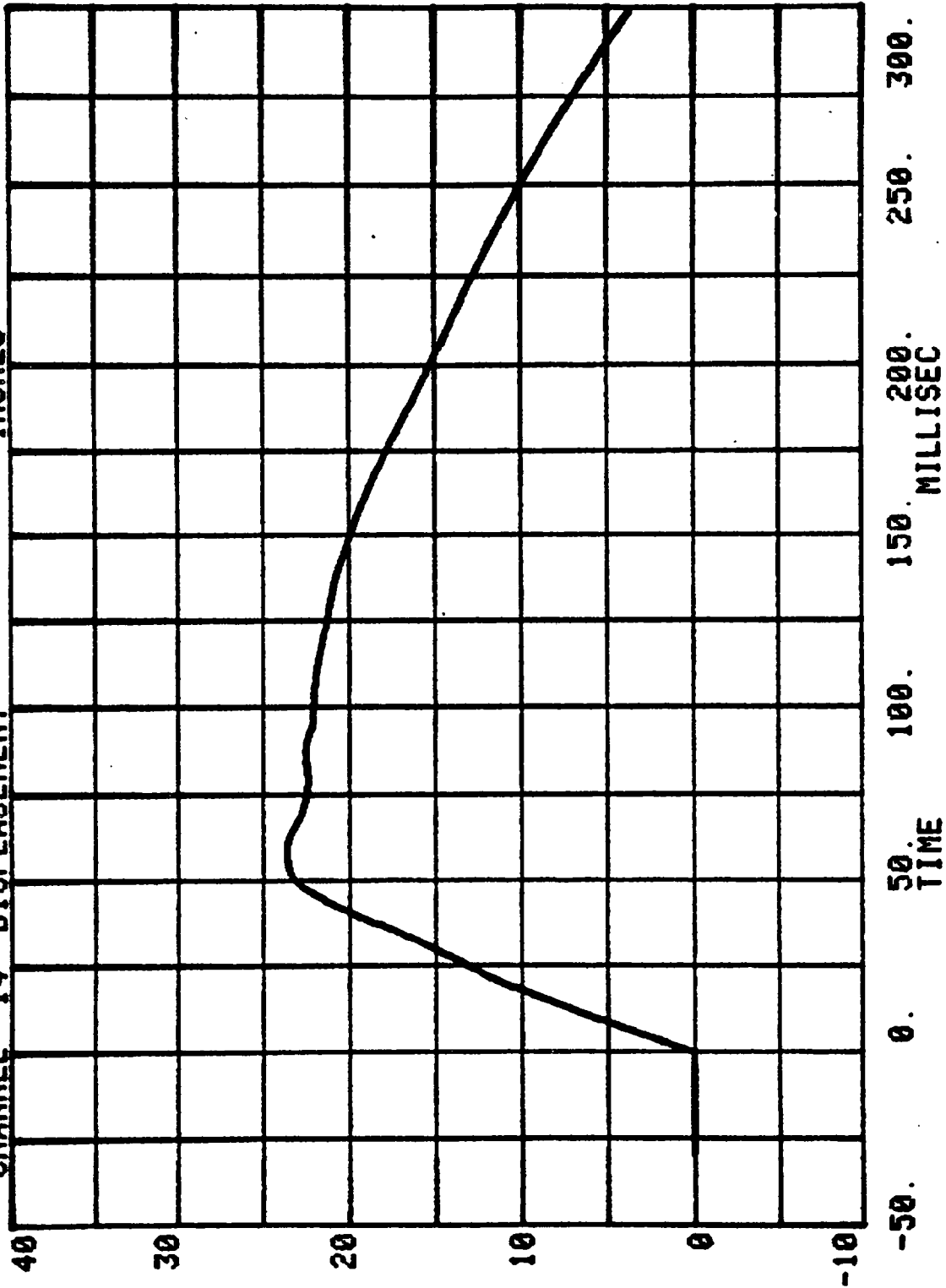




ACC. PACK. #7(X)

SERIES= 108 INCHES

RUN= 597
CHANNEL 14 DISPLACEMENT

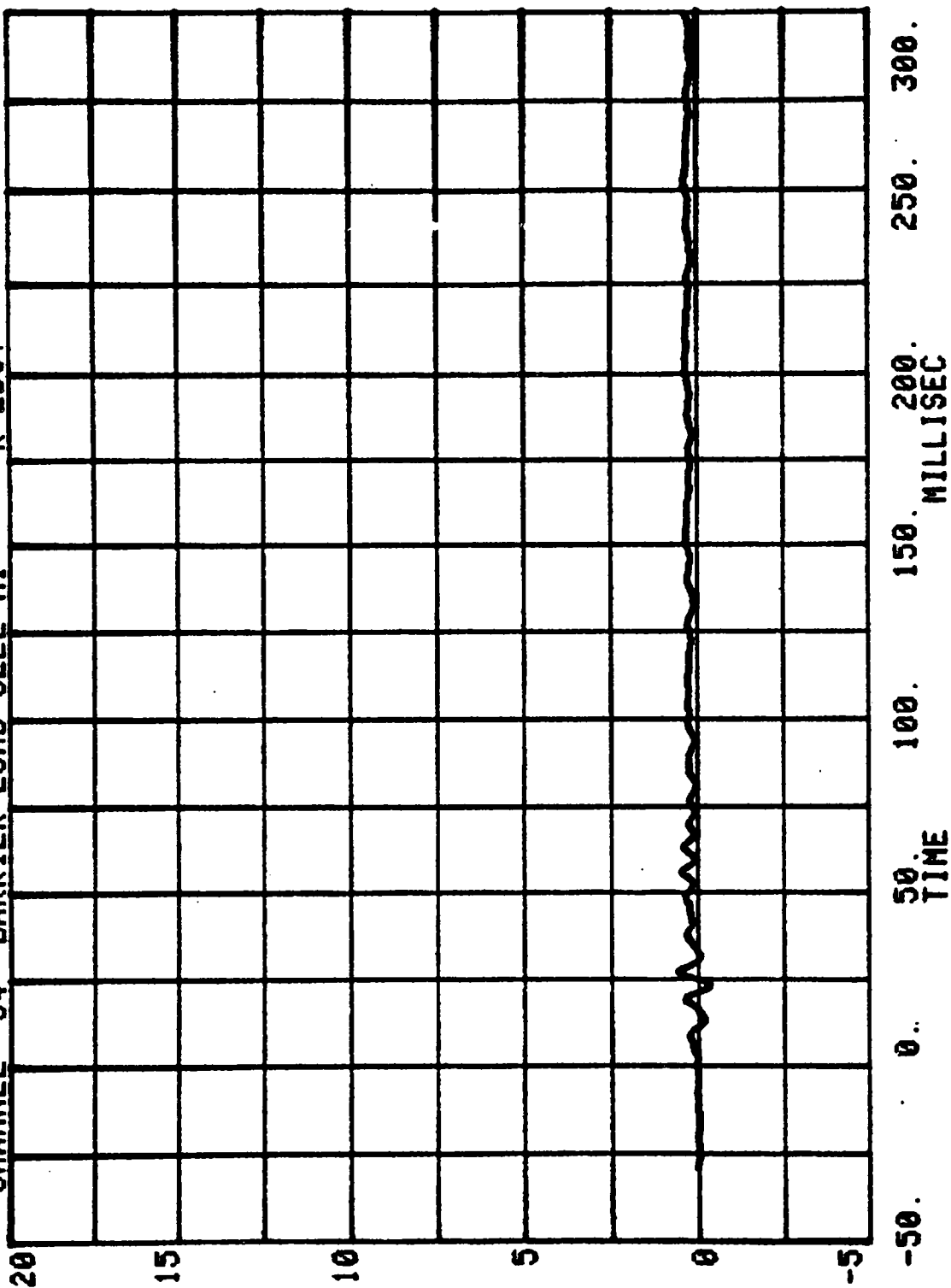


TEST NO. CE0108

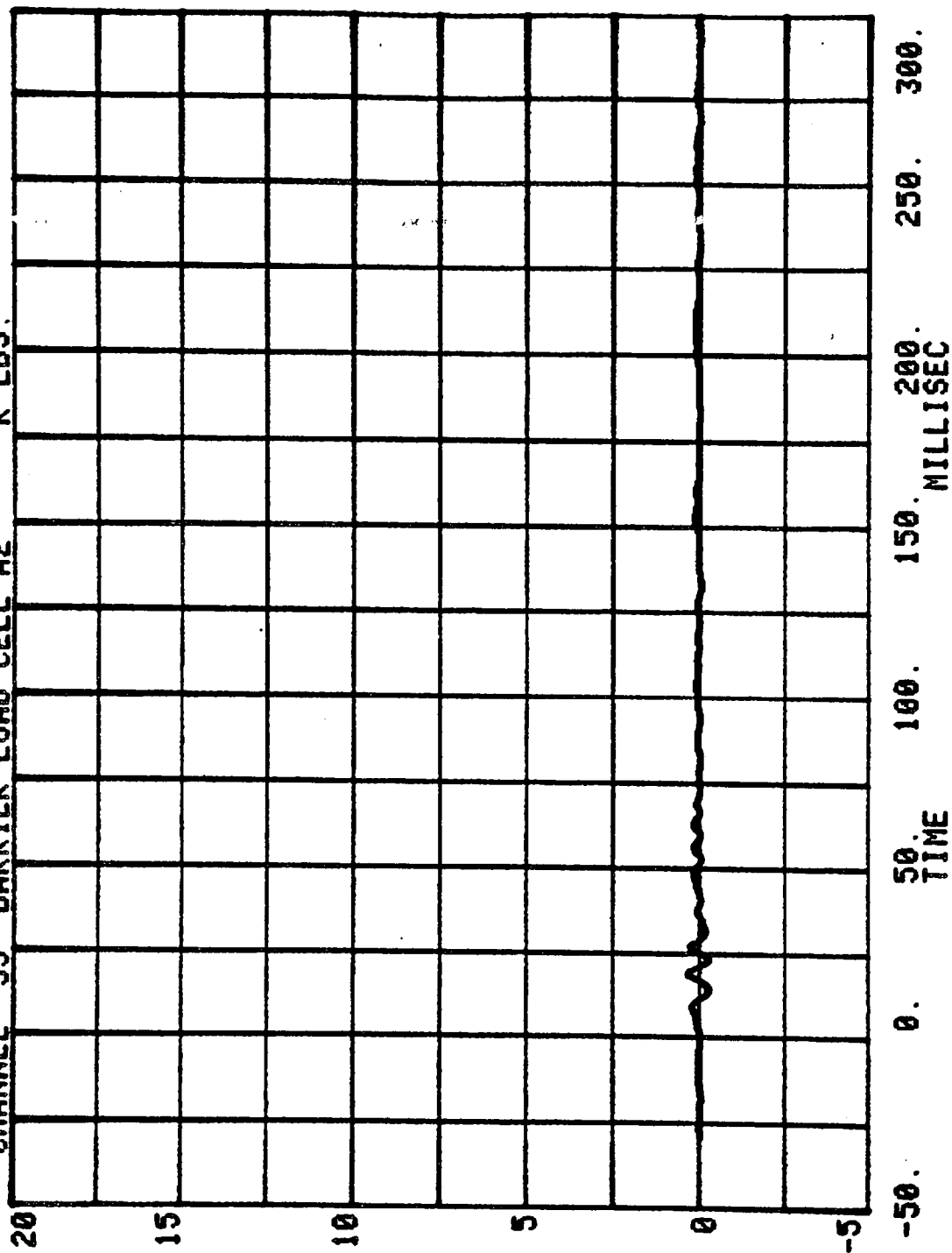
LOAD CELL BARRIER DATA
FILTER CHANNEL CLASS

60

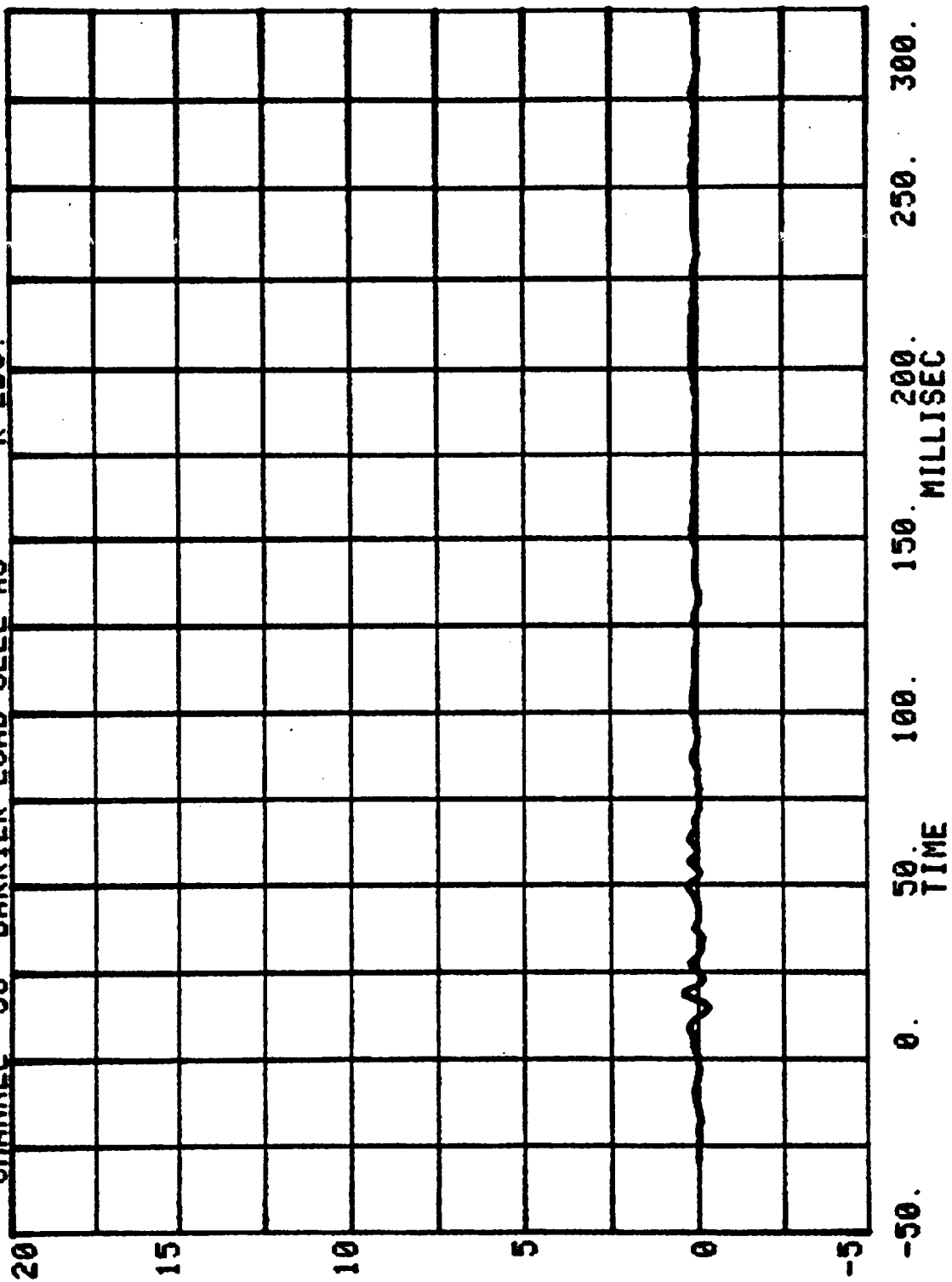
CHANNEL 34 BARRIER LOAD CELL A1 RUN= 597 SERIES= 108 K LBS.

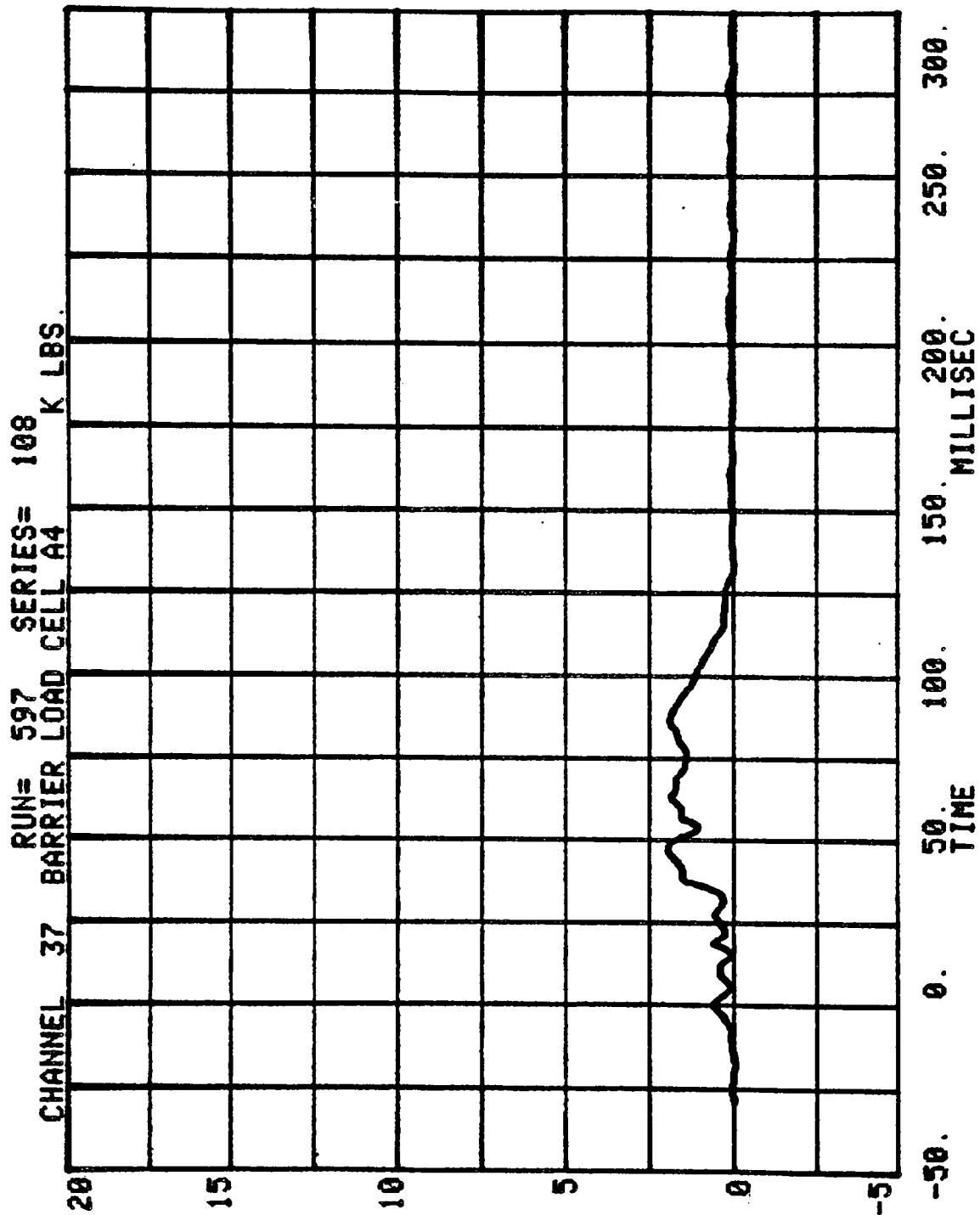


CHANNEL 35 BARRIER LOAD CELL A2 RUN= 597 SERIES= 108 K LBS.

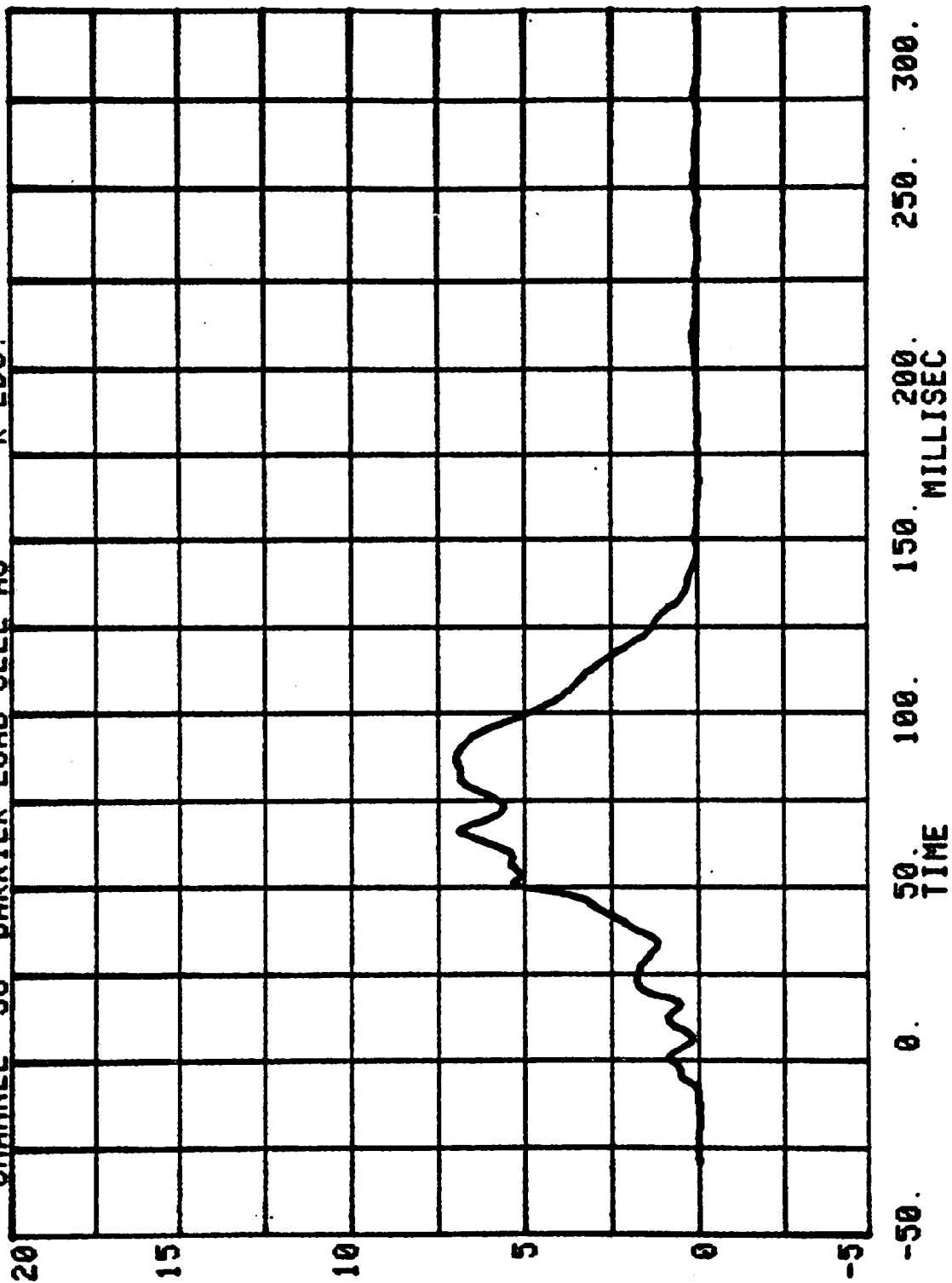


CHANNEL 36 BARRIER LOAD CELL A3 RUN= 597 SERIES= 108 K LBS.



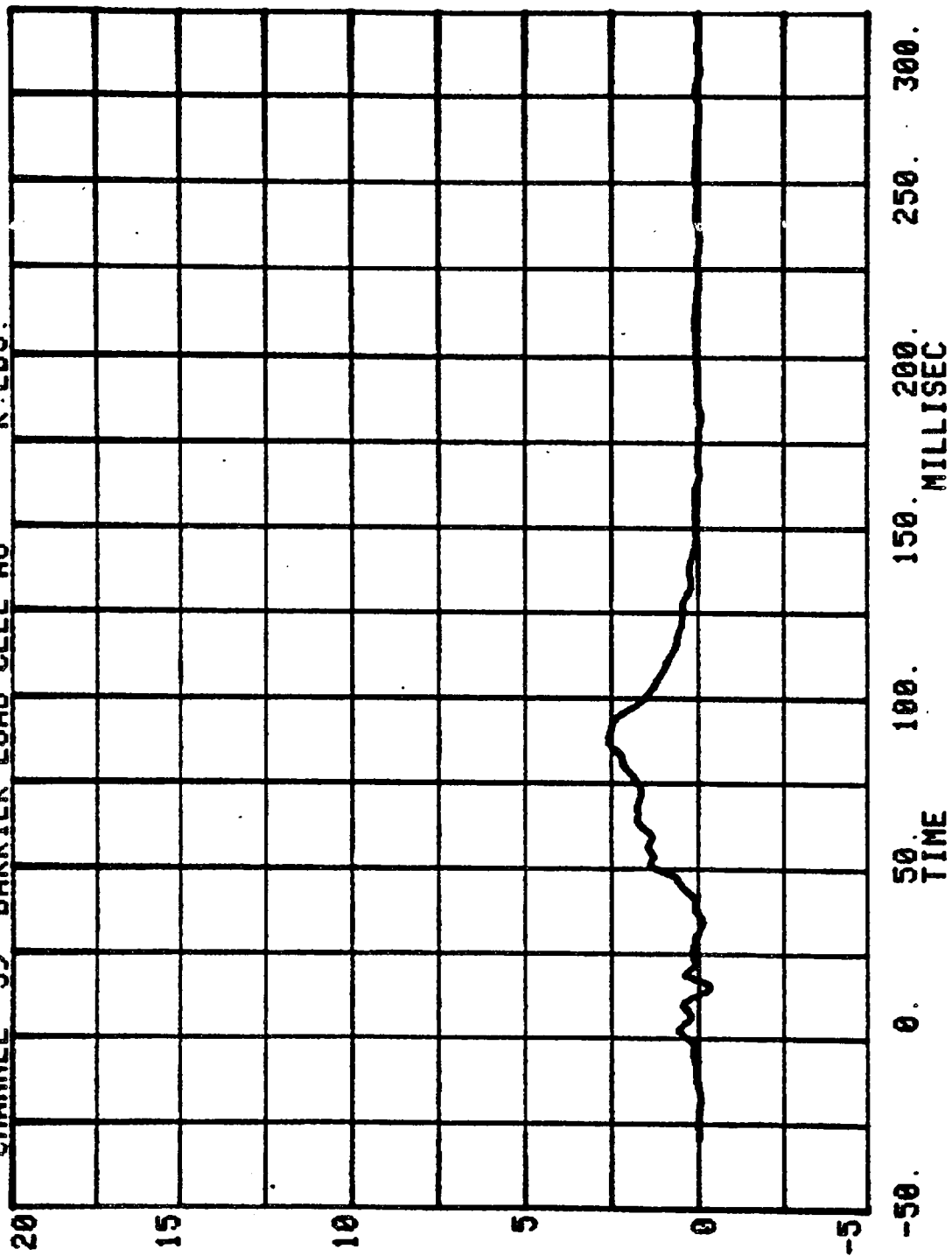


CHANNEL 38 BARRIER LOAD CELL A5
RUN= 597 SERIES= 108 K LBS.

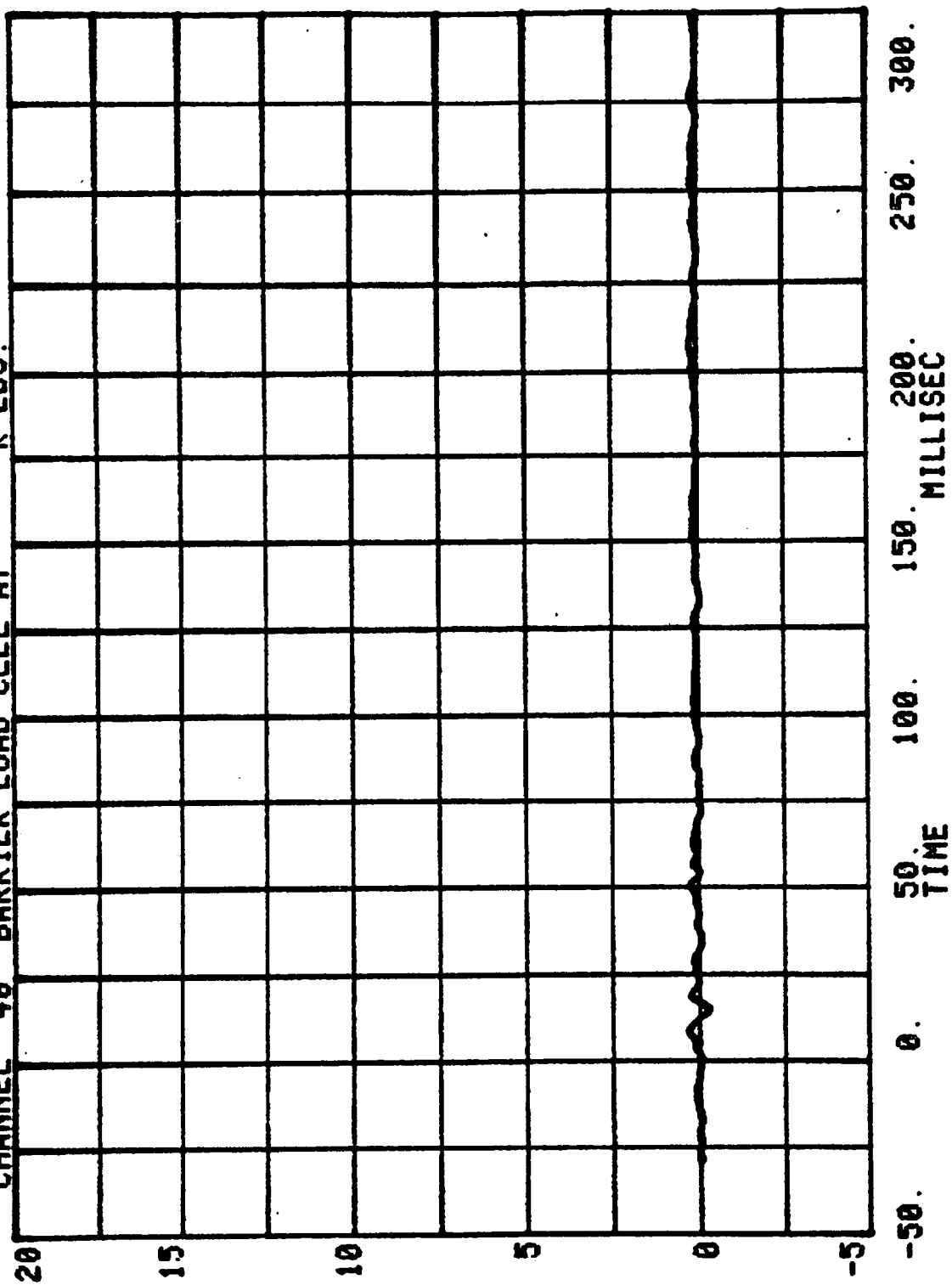


CHANNEL 39 BARRIER LOAD CELL A6 K.LBS.

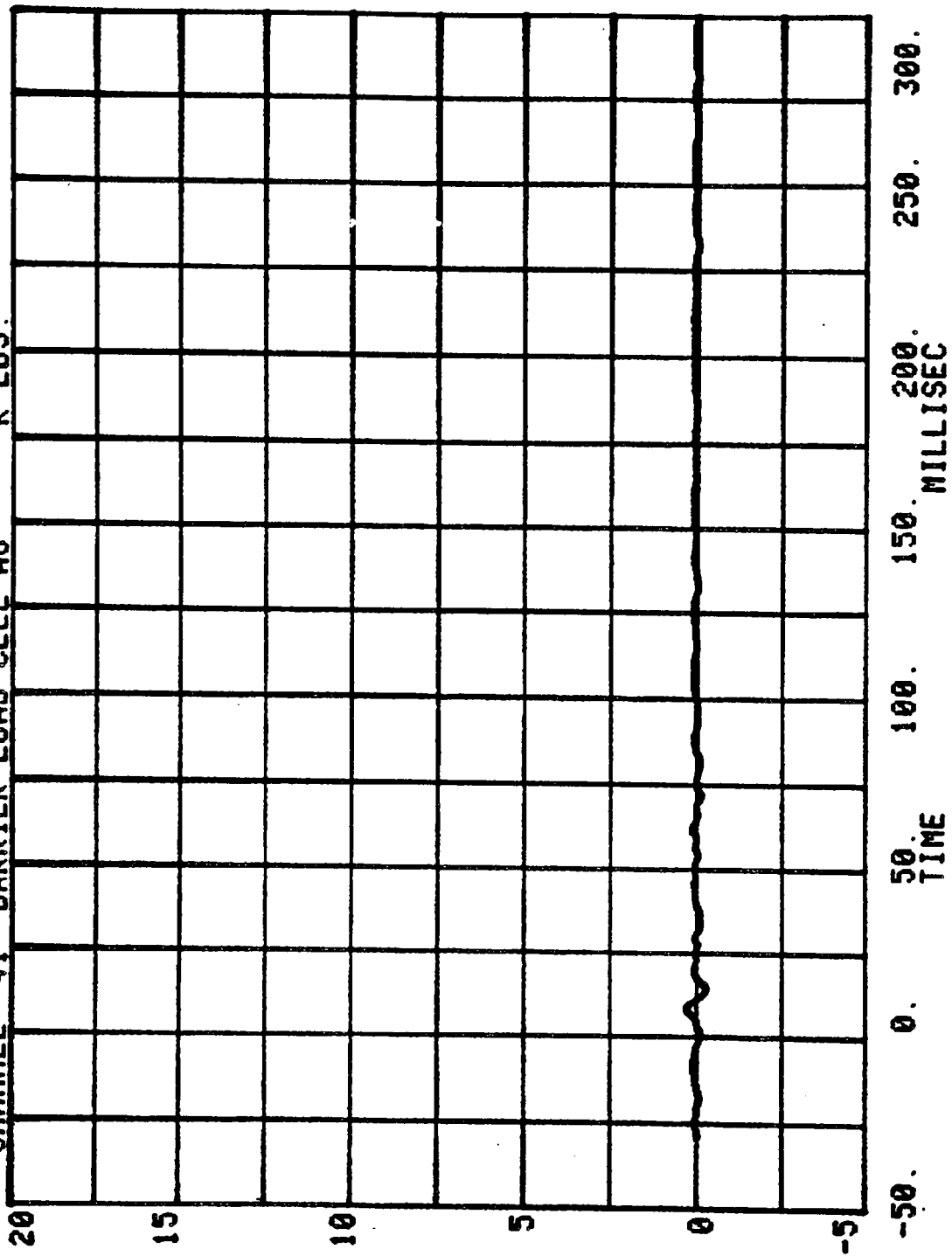
RUN= 597 SERIES= 108



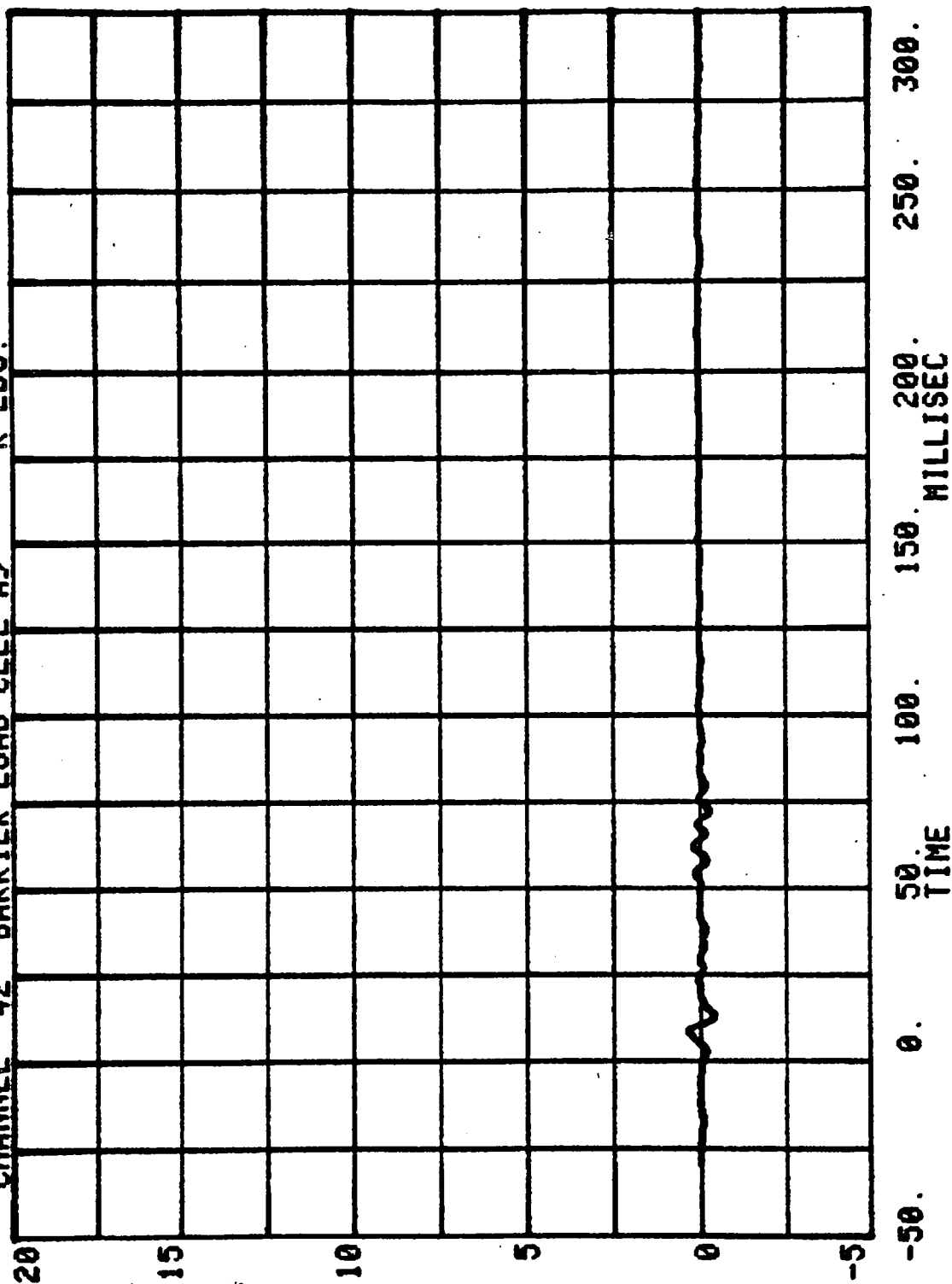
CHANNEL 40 BARRIER LOAD CELL A7 RUN= 597 SERIES= 108 K LBS.



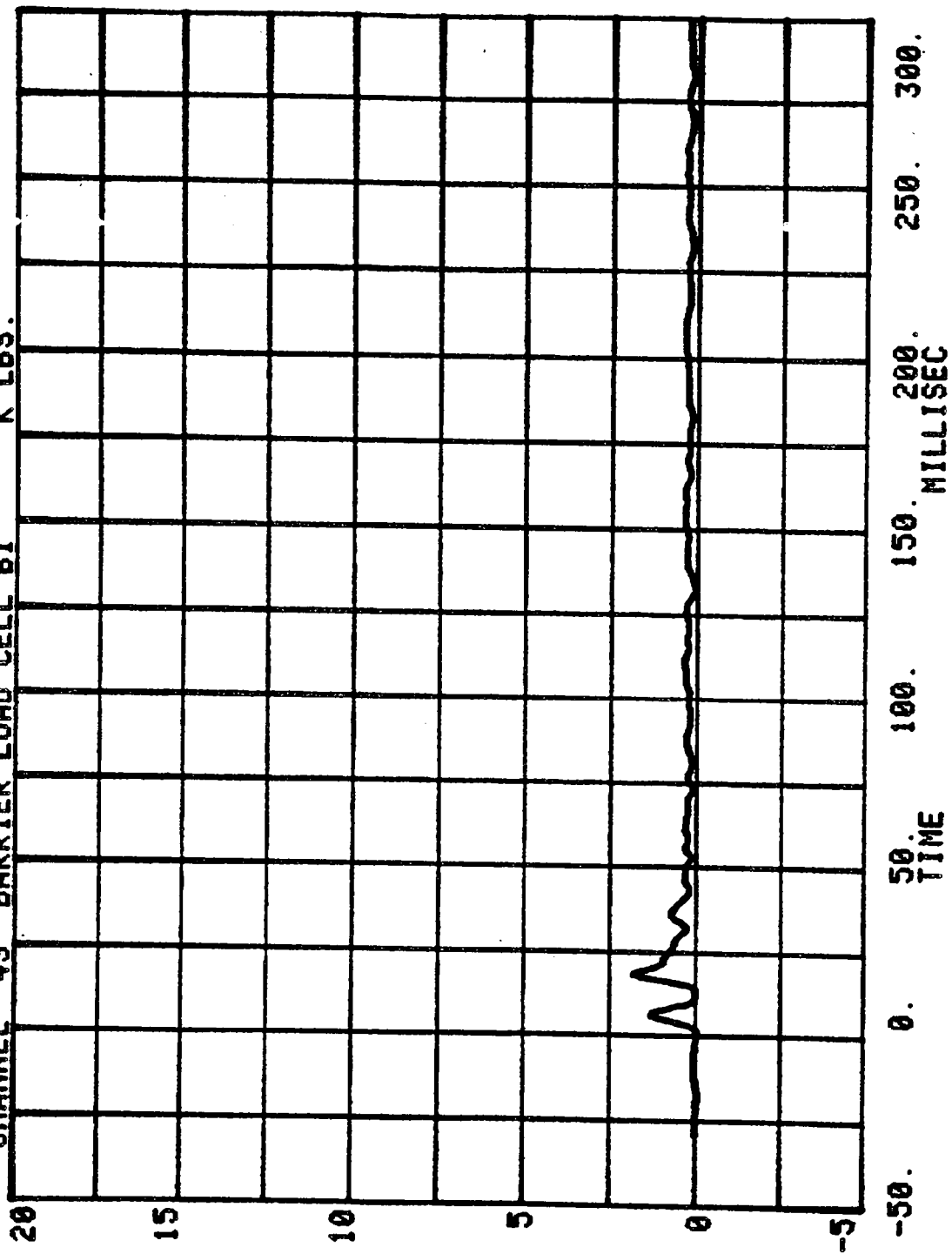
CHANNEL 41 BARRIER LOAD CELL A8 RUN= 597 SERIES= 108 K LBS.



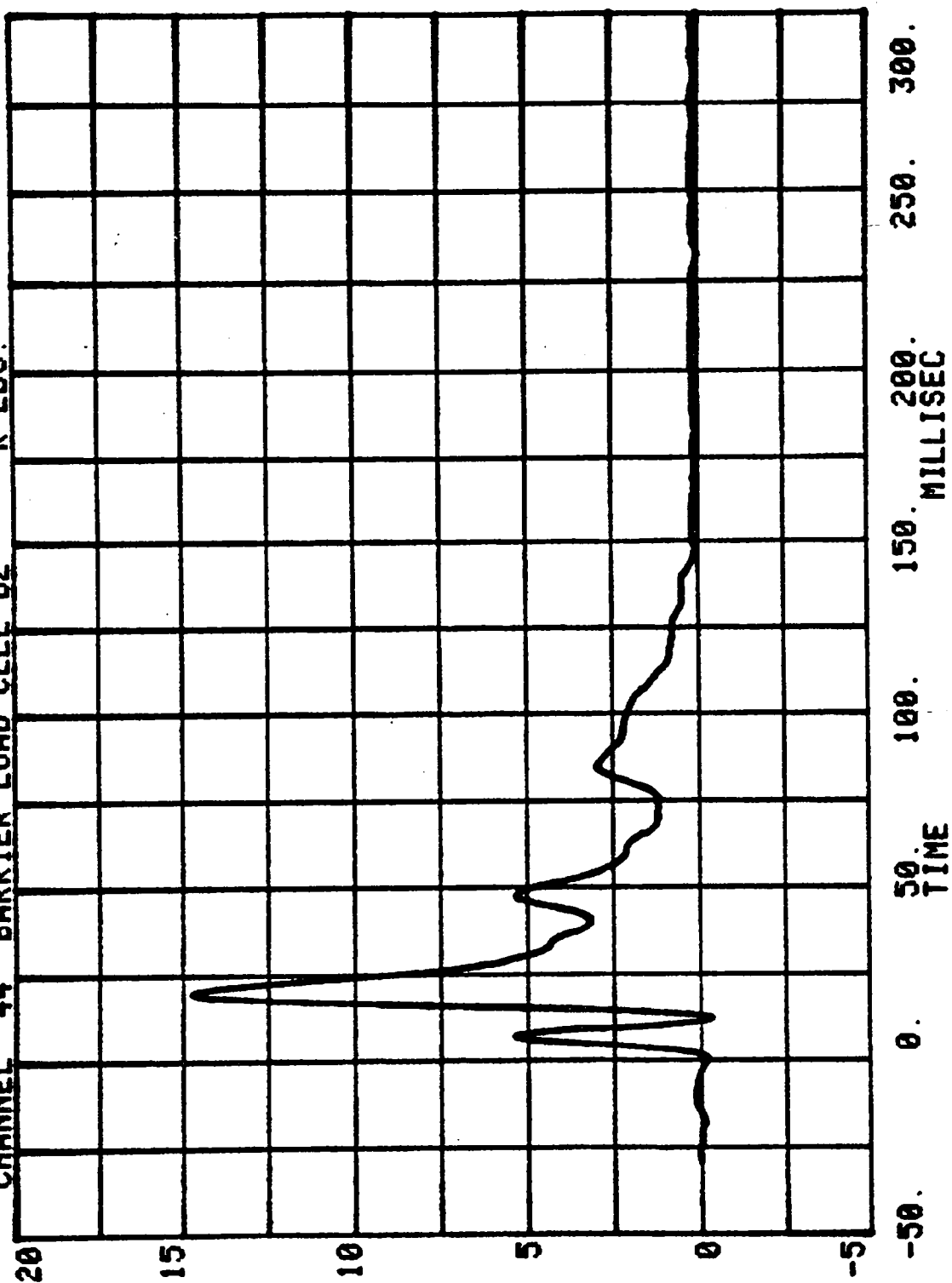
CHANNEL 42 BARRIER LOAD CELL A9 RUN= 597 SERIES= 108 K LBS.

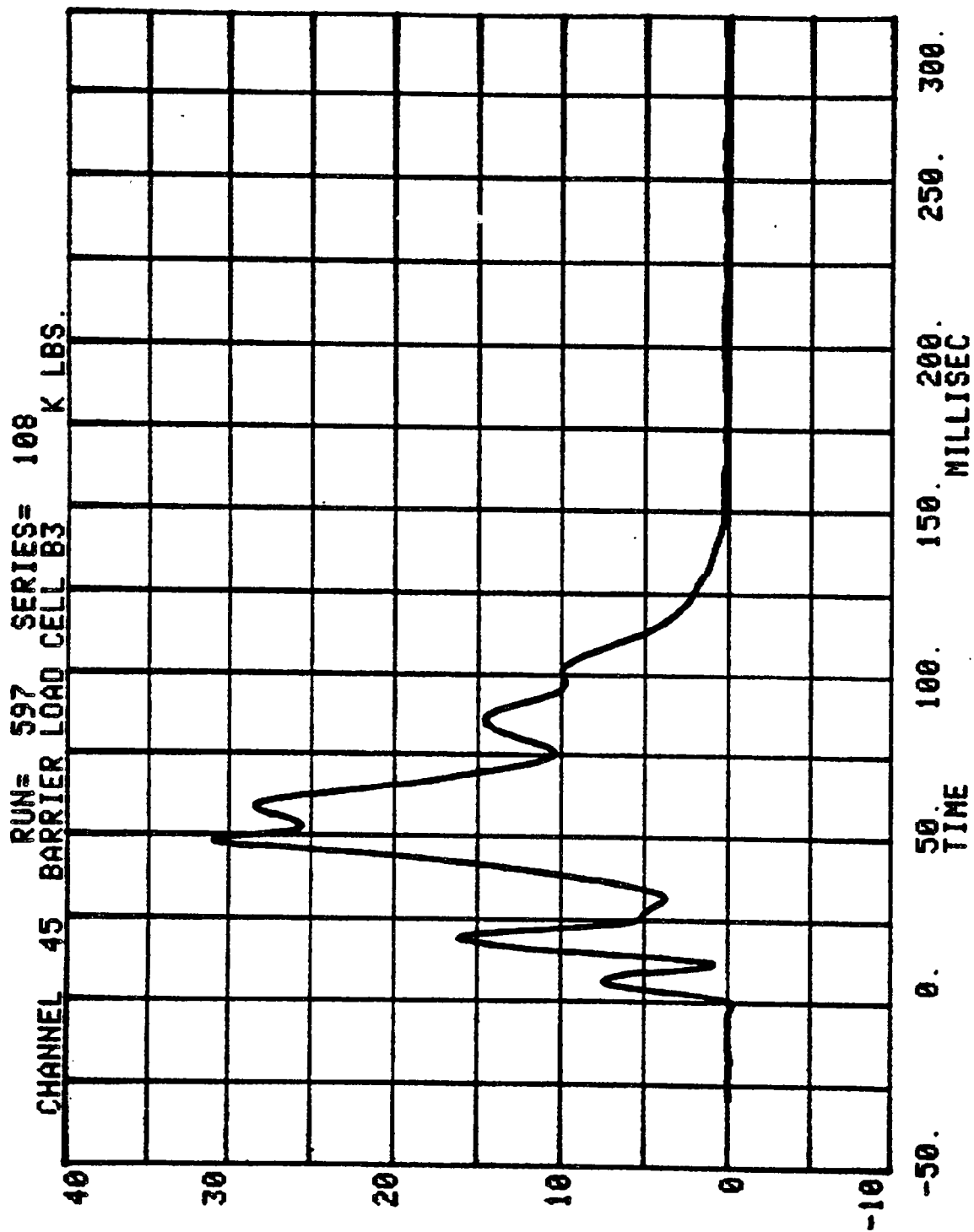


CHANNEL 43 BARRIER LOAD CELL B1
RUN= 597 SERIES= 108 K LBS.

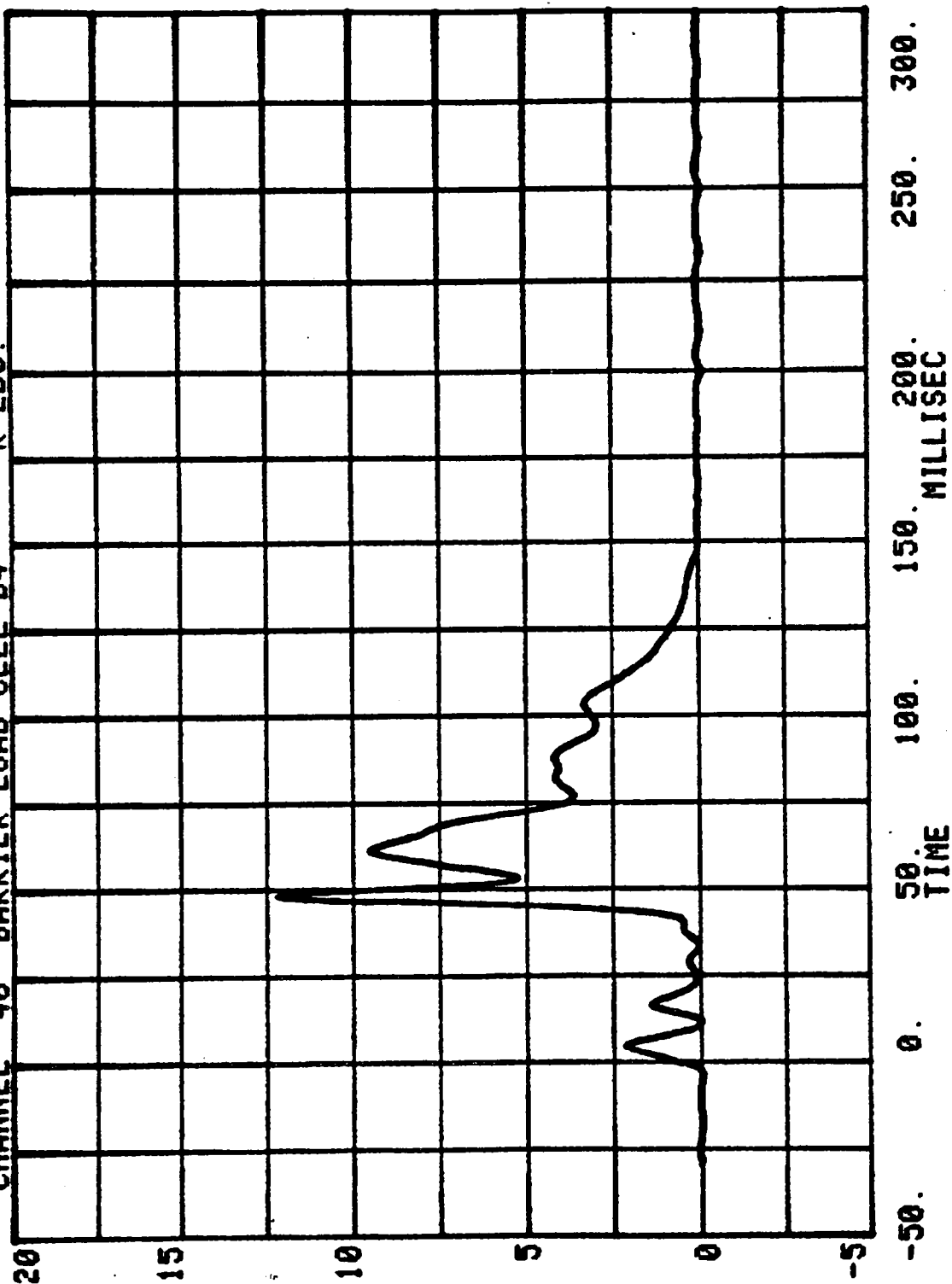


RUN= 597 SERIES= 108 K LBS.
CHANNEL 44 BARRIER LOAD CELL B2

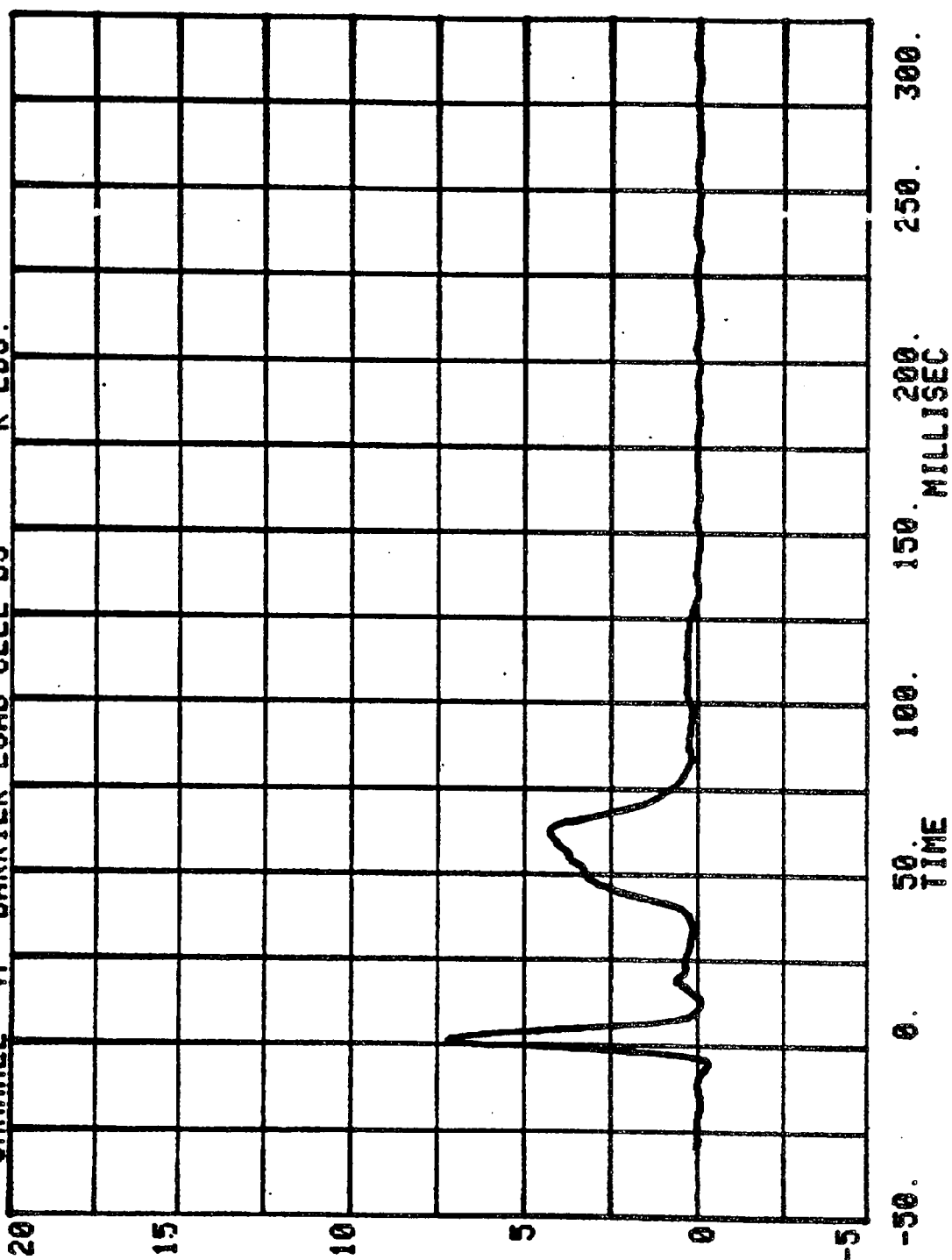




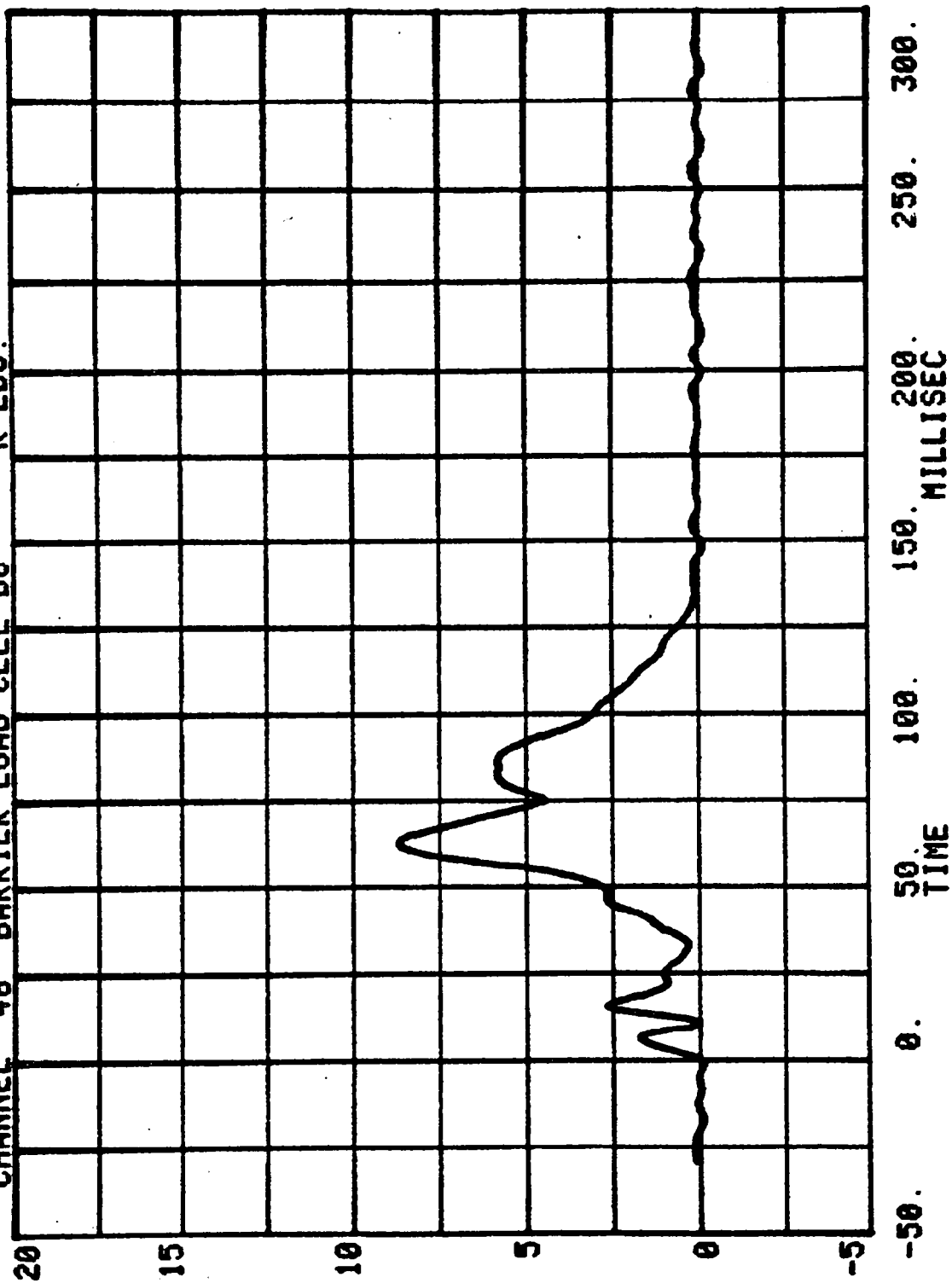
RUN= 597 SERIES= 108
CHANNEL 46 BARRIER LOAD CELL B4 K LBS.



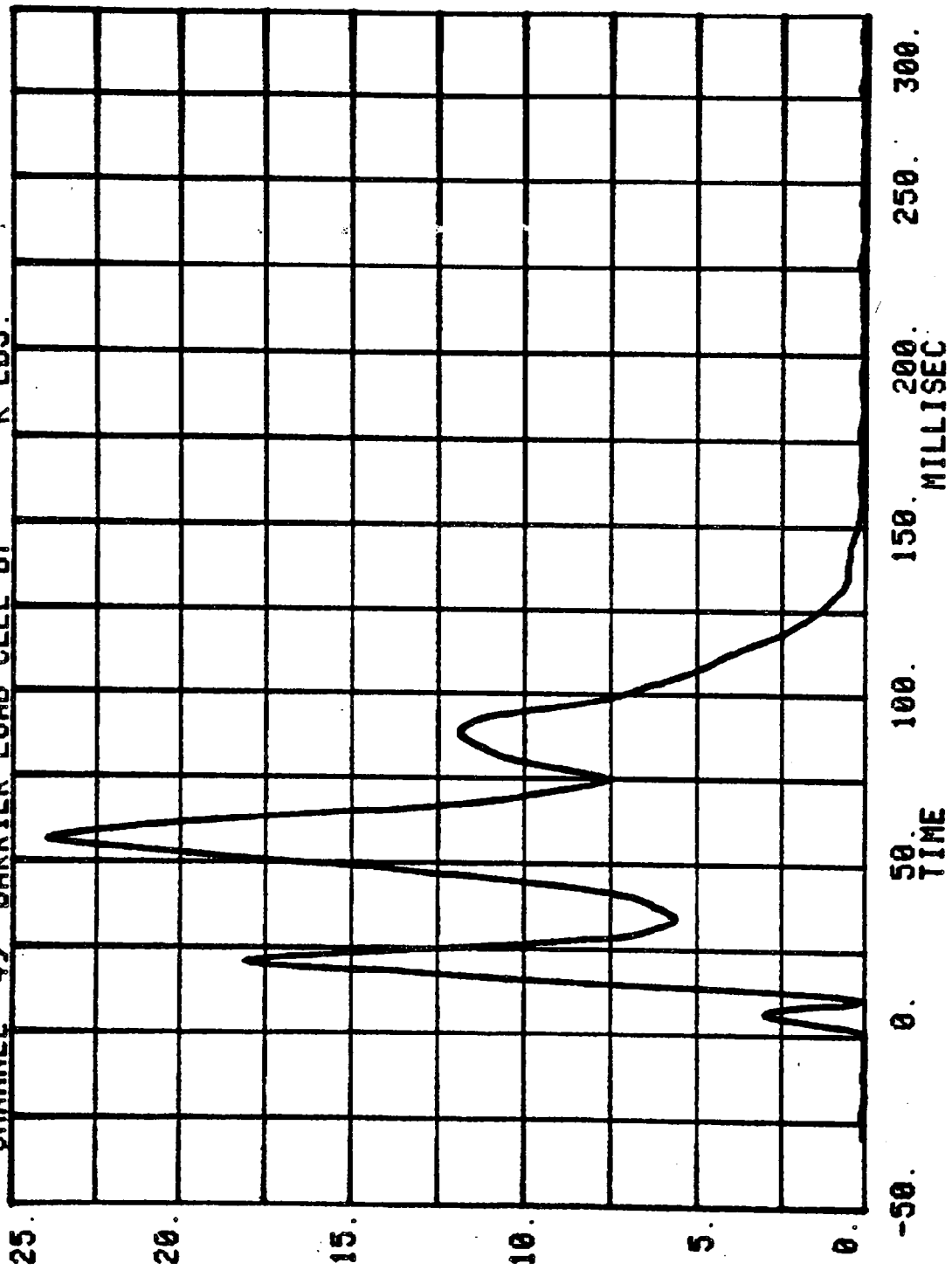
CHANNEL 47 RUN= 597 SERIES= 108
BARRIER LOAD CELL B5 K LBS.



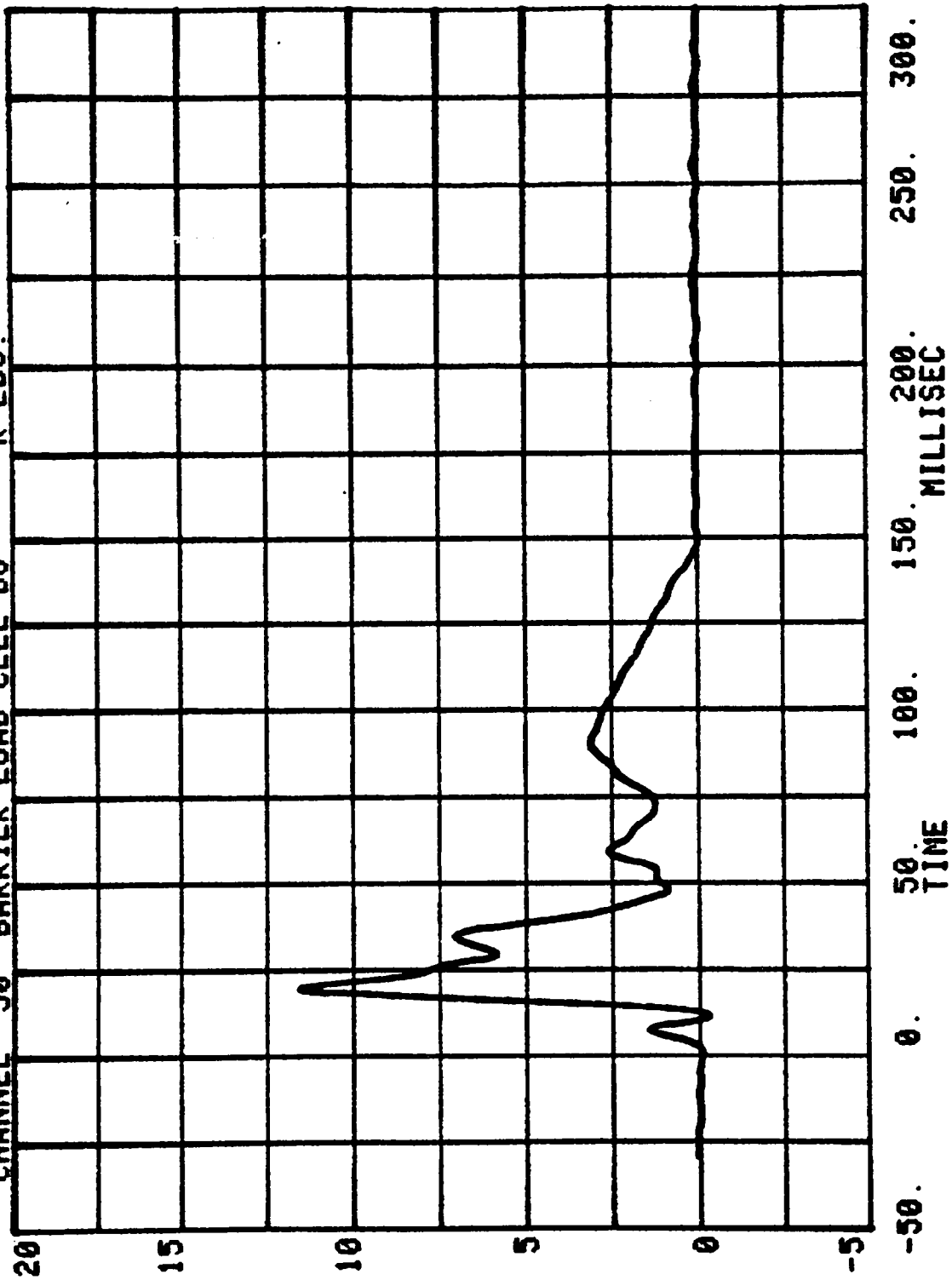
CHANNEL 48 RUN= 597 SERIES= 108
BARRIER LOAD CELL B6 K LBS.



CHANNEL 49 BARRIER LOAD CELL B7
RUN= 597 SERIES= 108
K LBS.

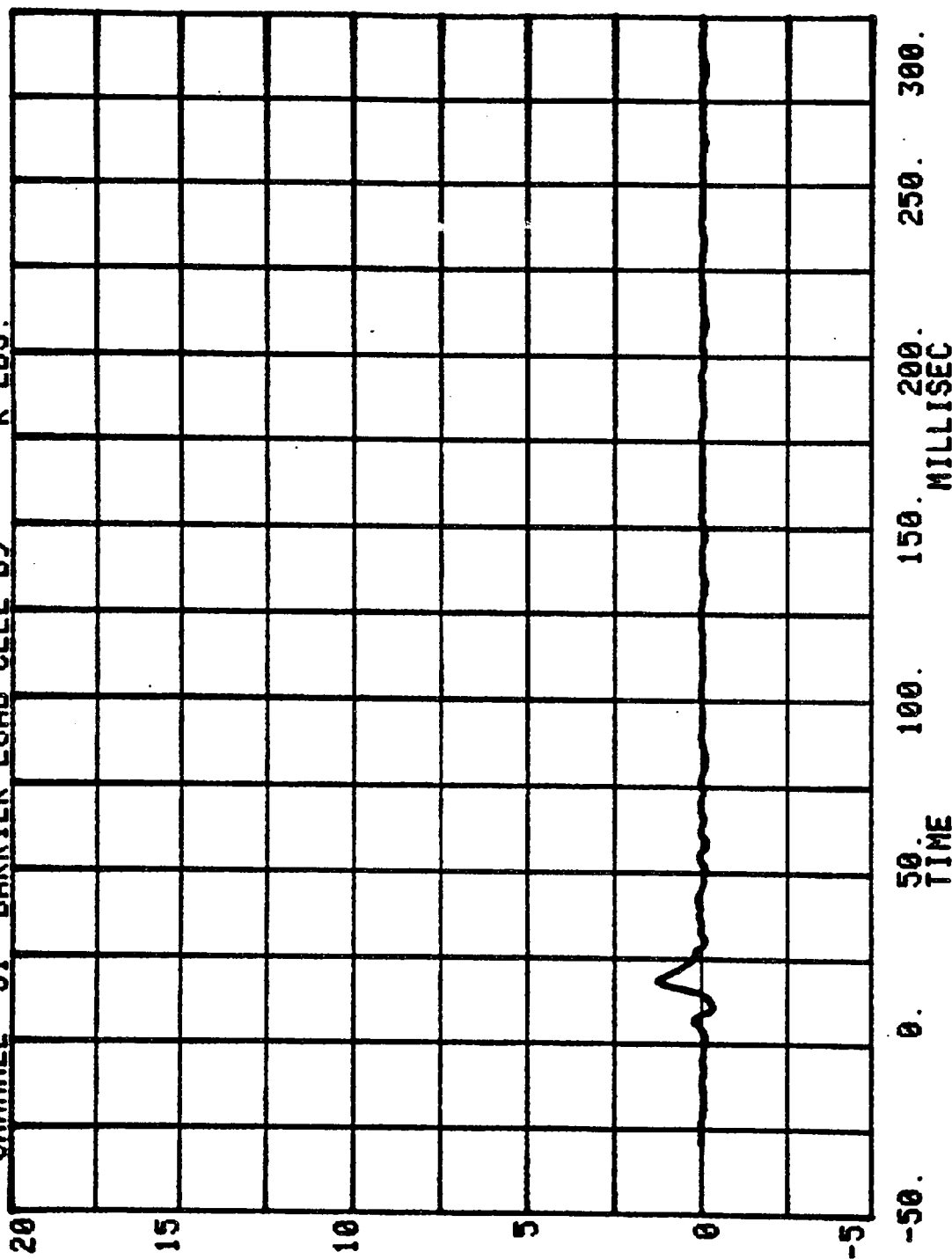


RUN= 597 SERIES= 108
CHANNEL 50 BARRIER LOAD CELL B8 K LBS.

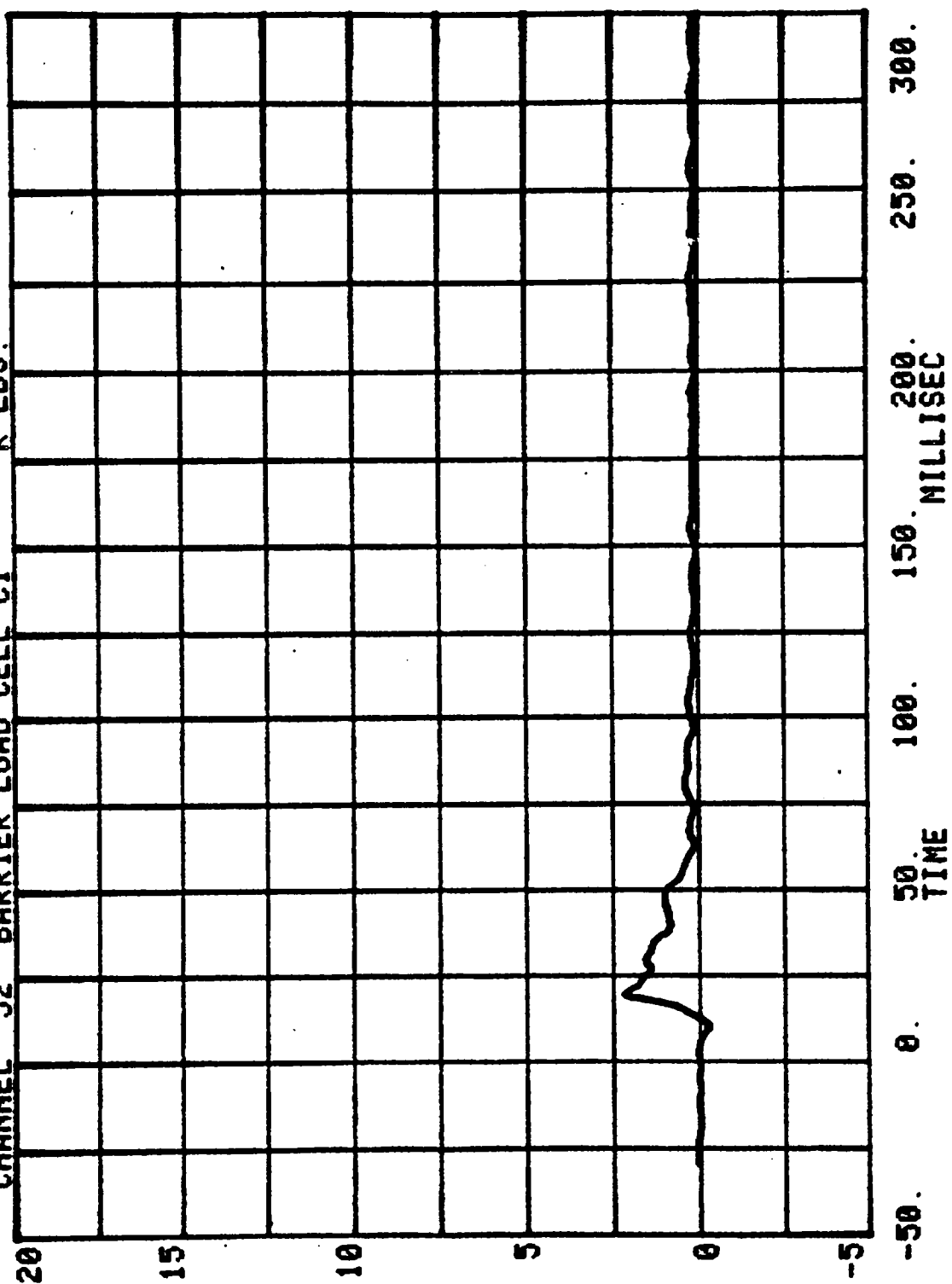


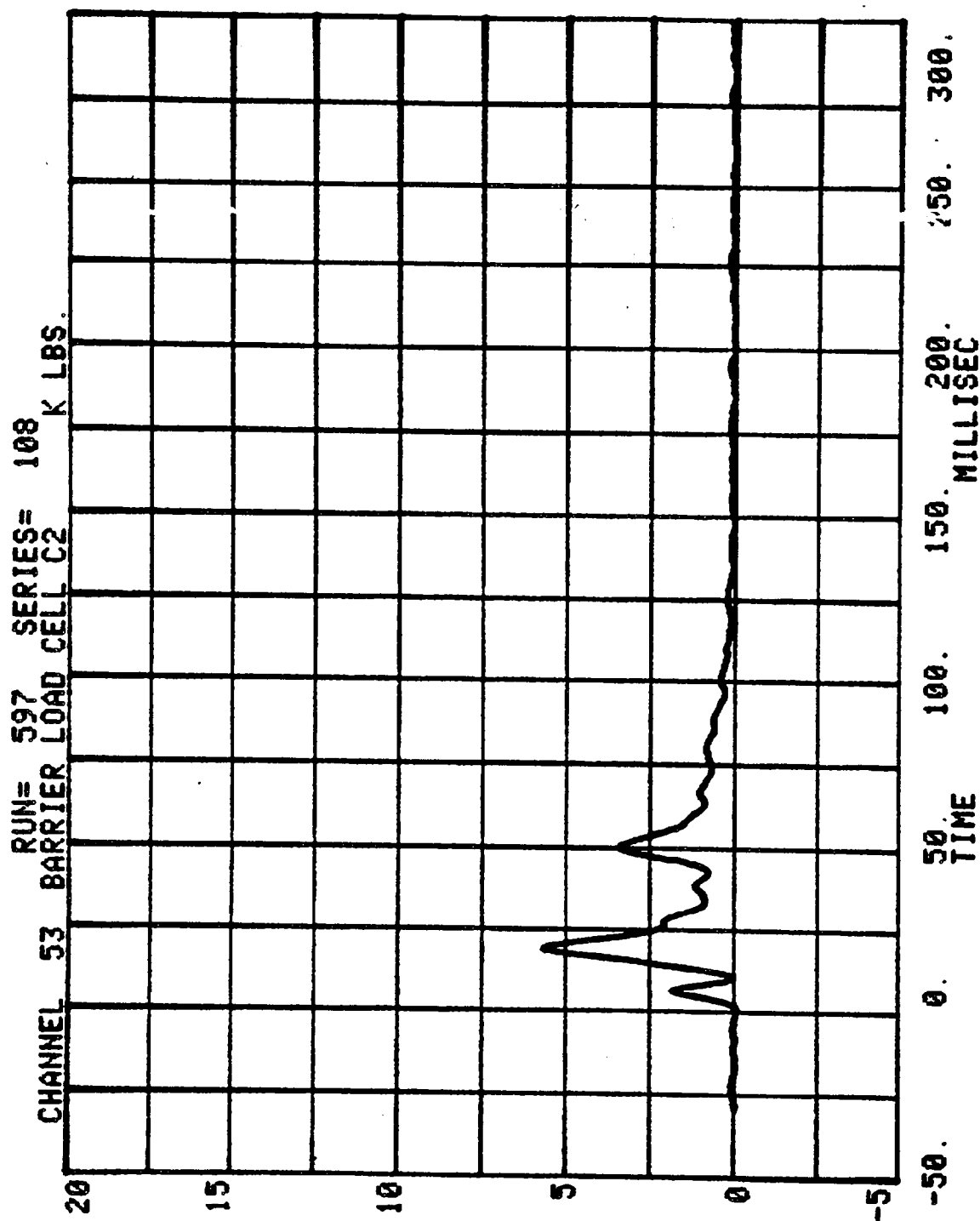
CHANNEL 51 BARRIER LOAD CELL B9 K LBS.

RUN= 597 SERIES= 108

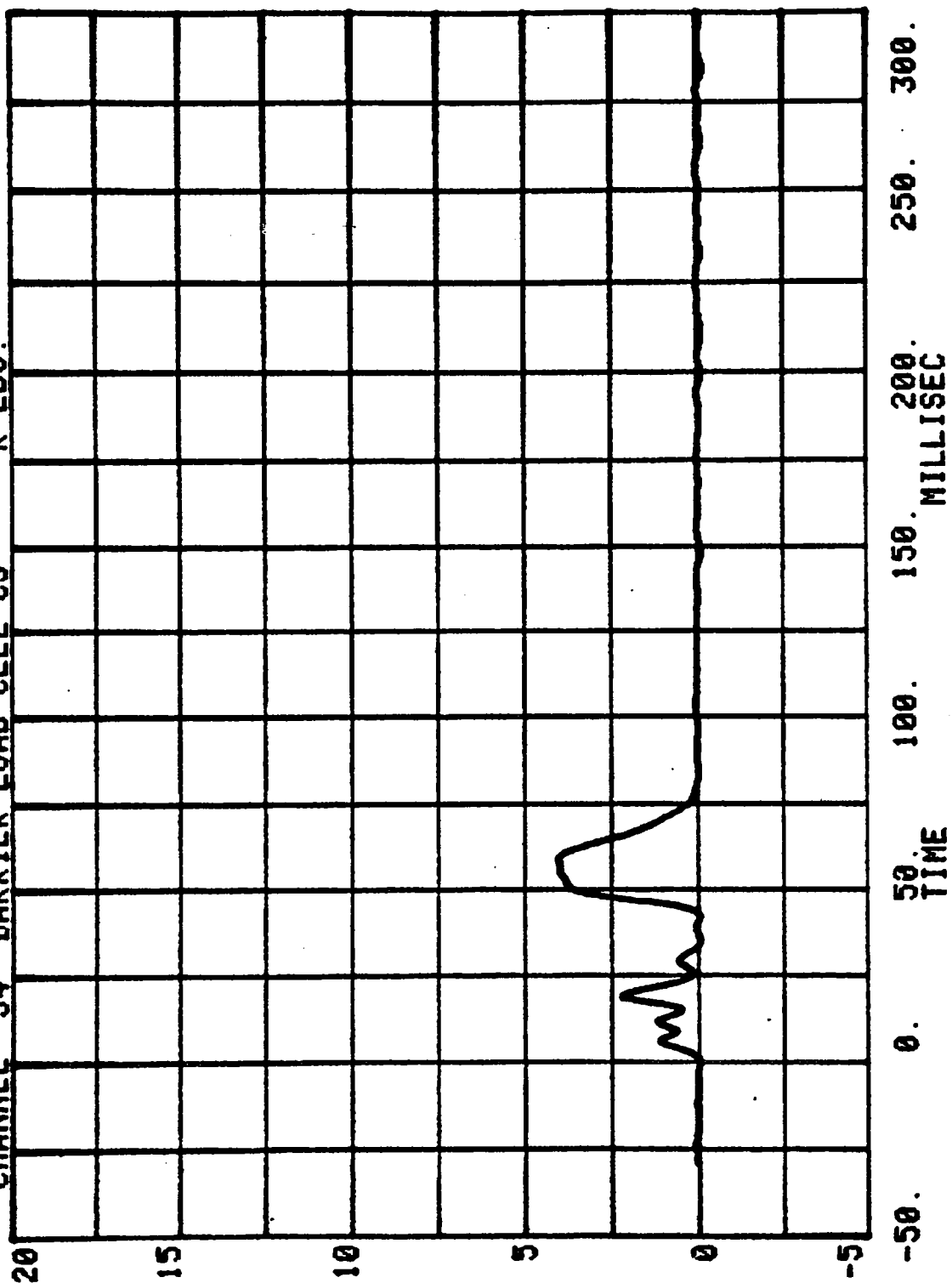


RUN= 597 SERIES= 108 K LBS.
CHANNEL 52 BARRIER LOAD CELL C1

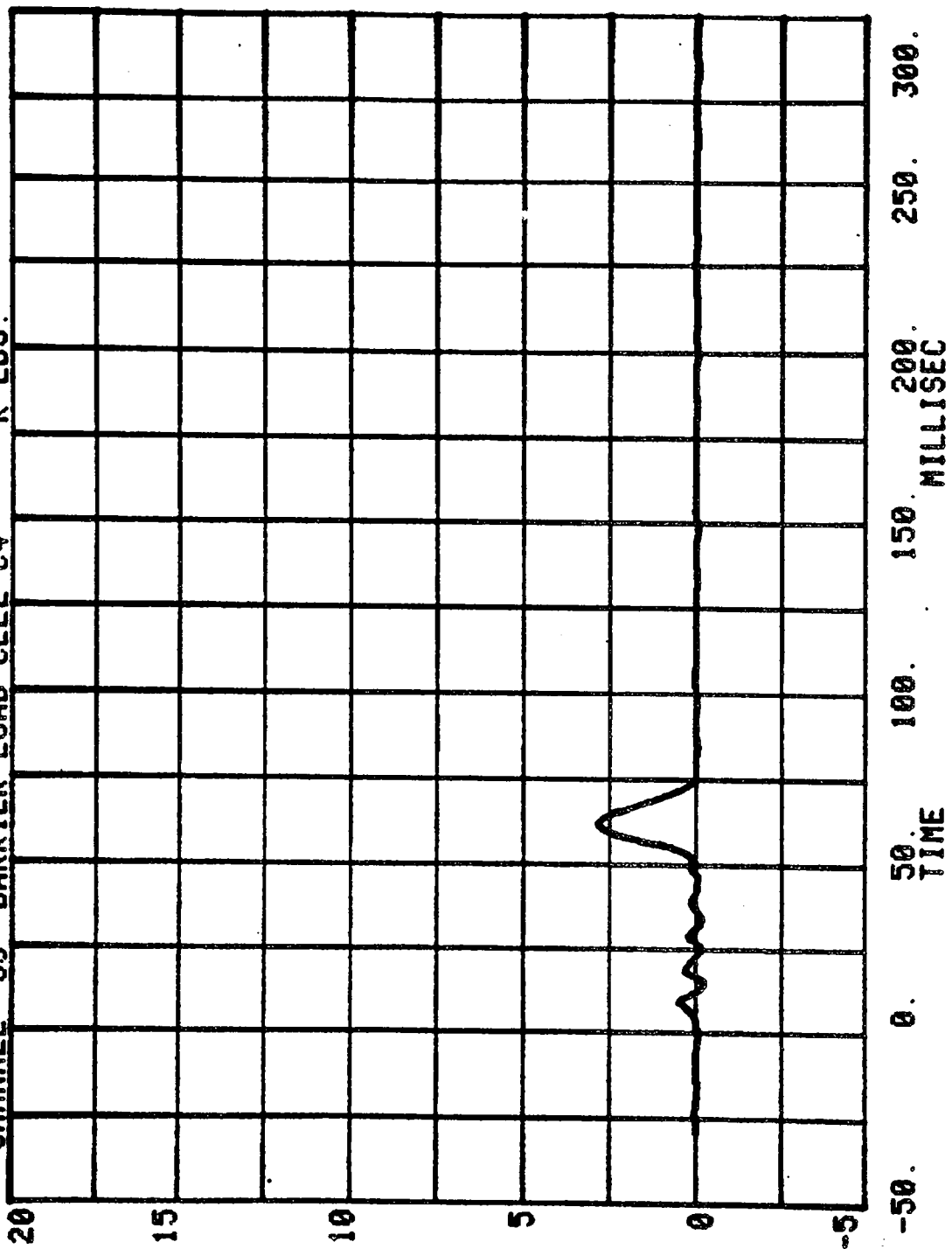




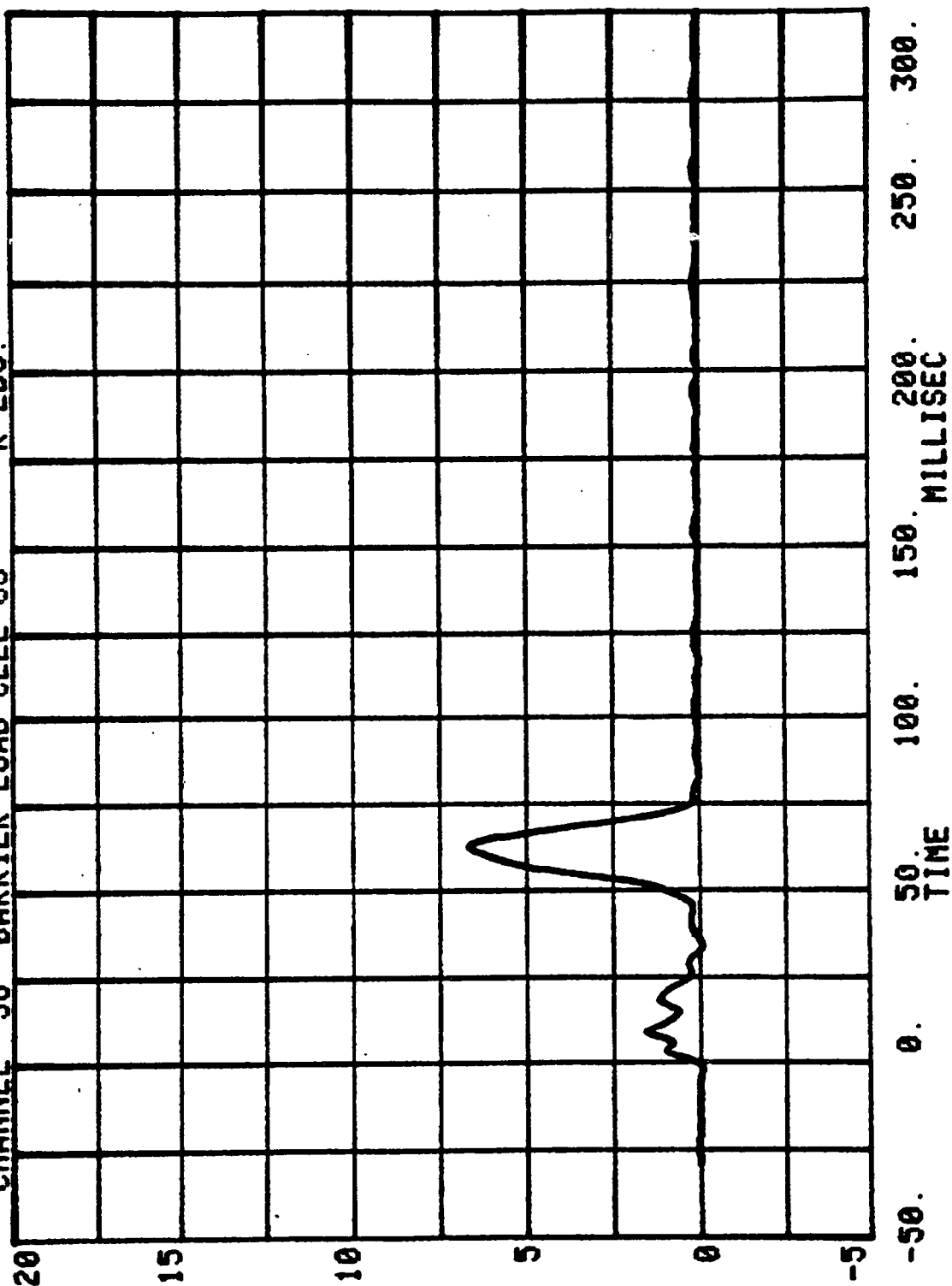
RUN= 597 SERIES= 108
CHANNEL 54 BARRIER LOAD CELL C3 K LBS.



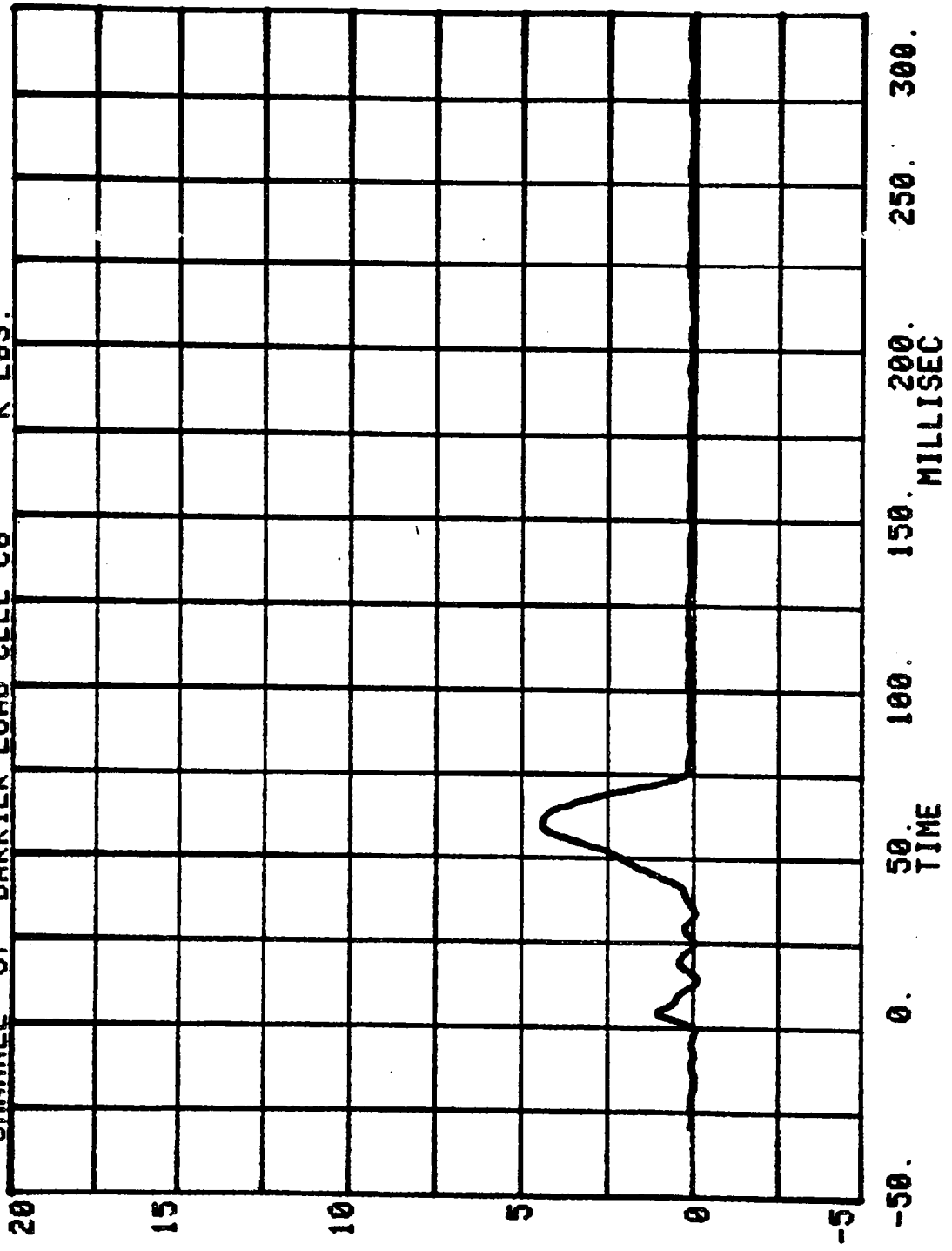
CHANNEL 55 BARRIER LOAD CELL C4 RUN= 597 SERIES= 108 K LBS.



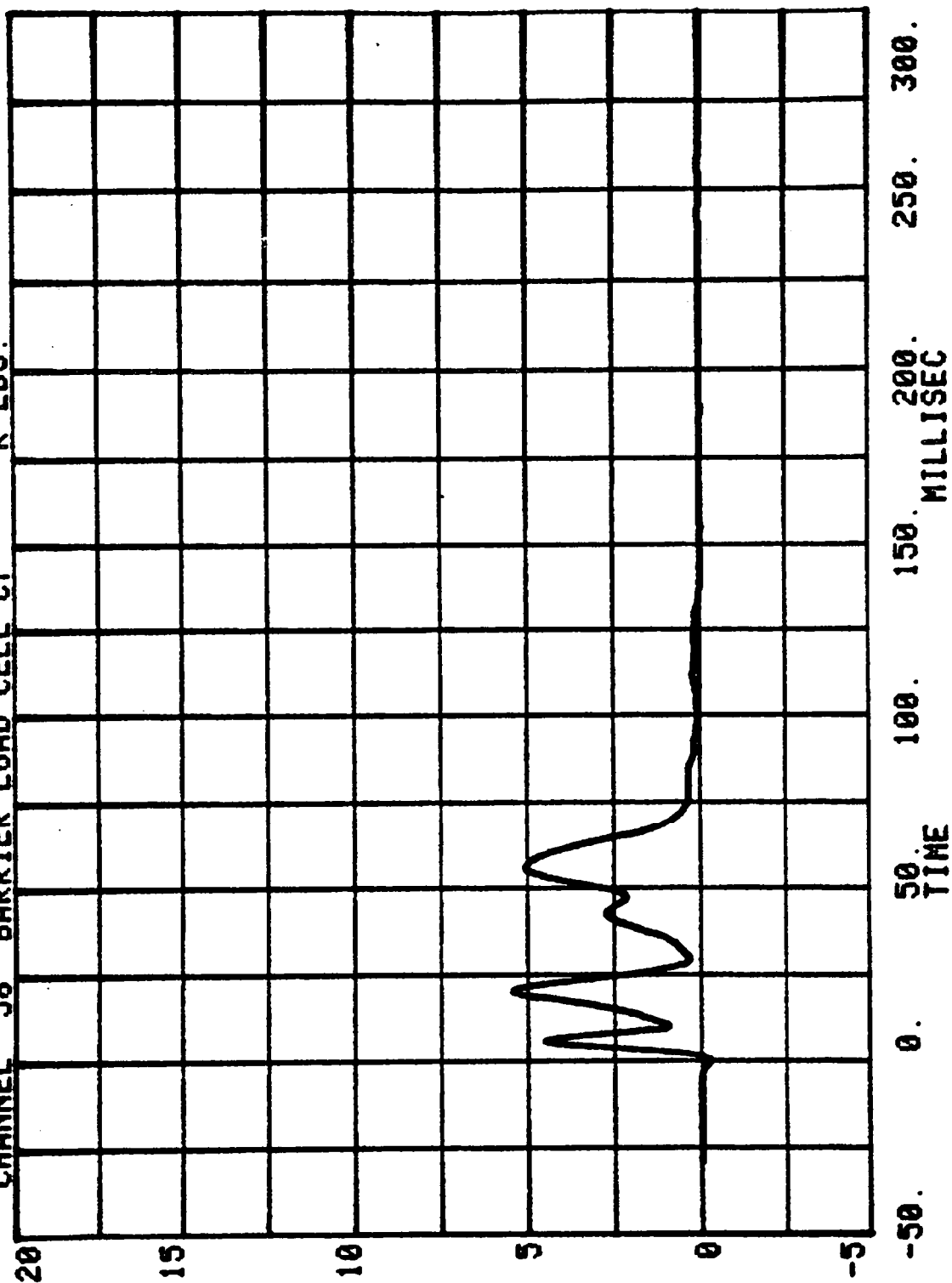
CHANNEL 56 BARRIER LOAD CELL C5 RUN= 597 SERIES= 108 K LBS.



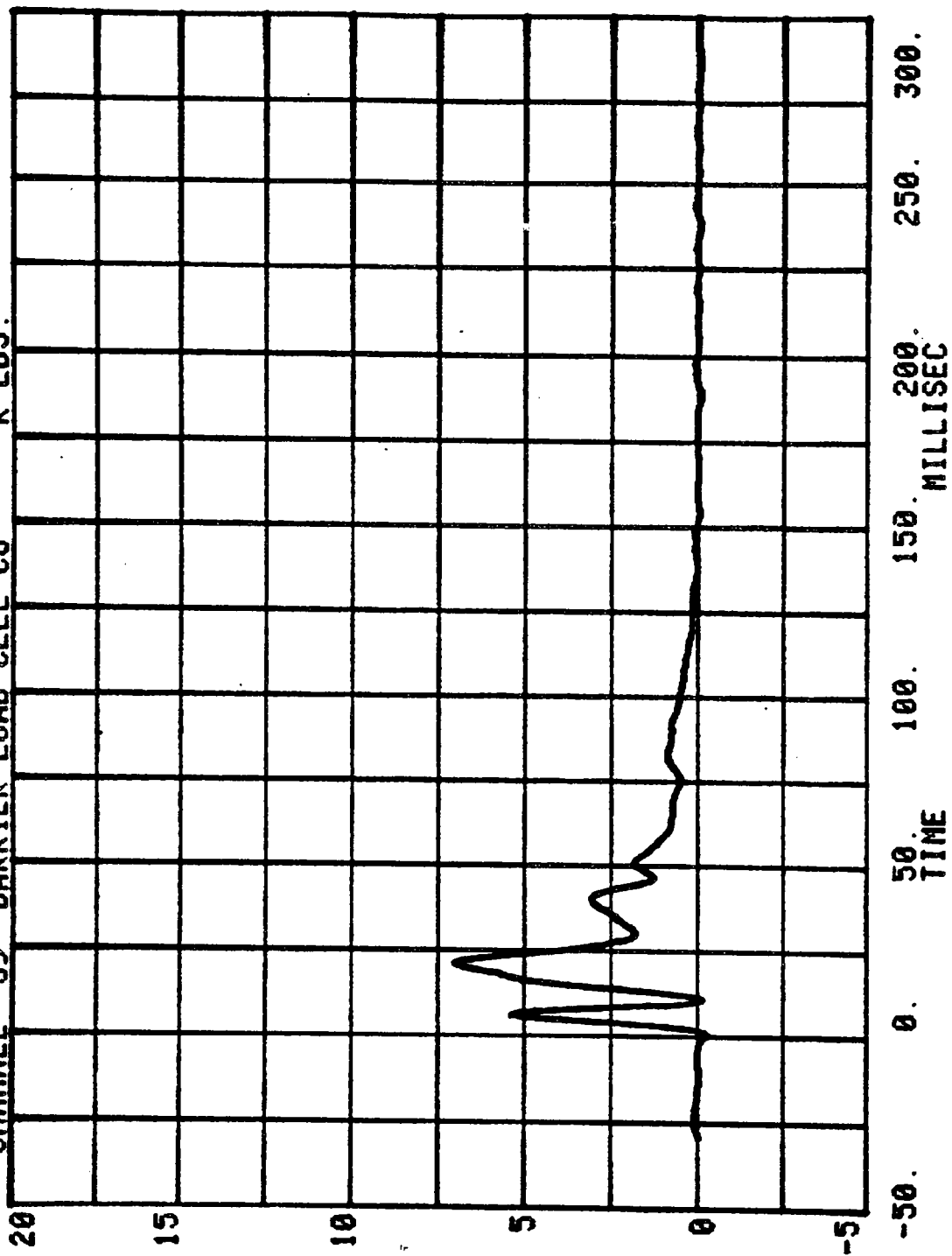
CHANNEL 57 BARRIER LOAD CELL C6 RUN= 597 SERIES= 108 K LBS.



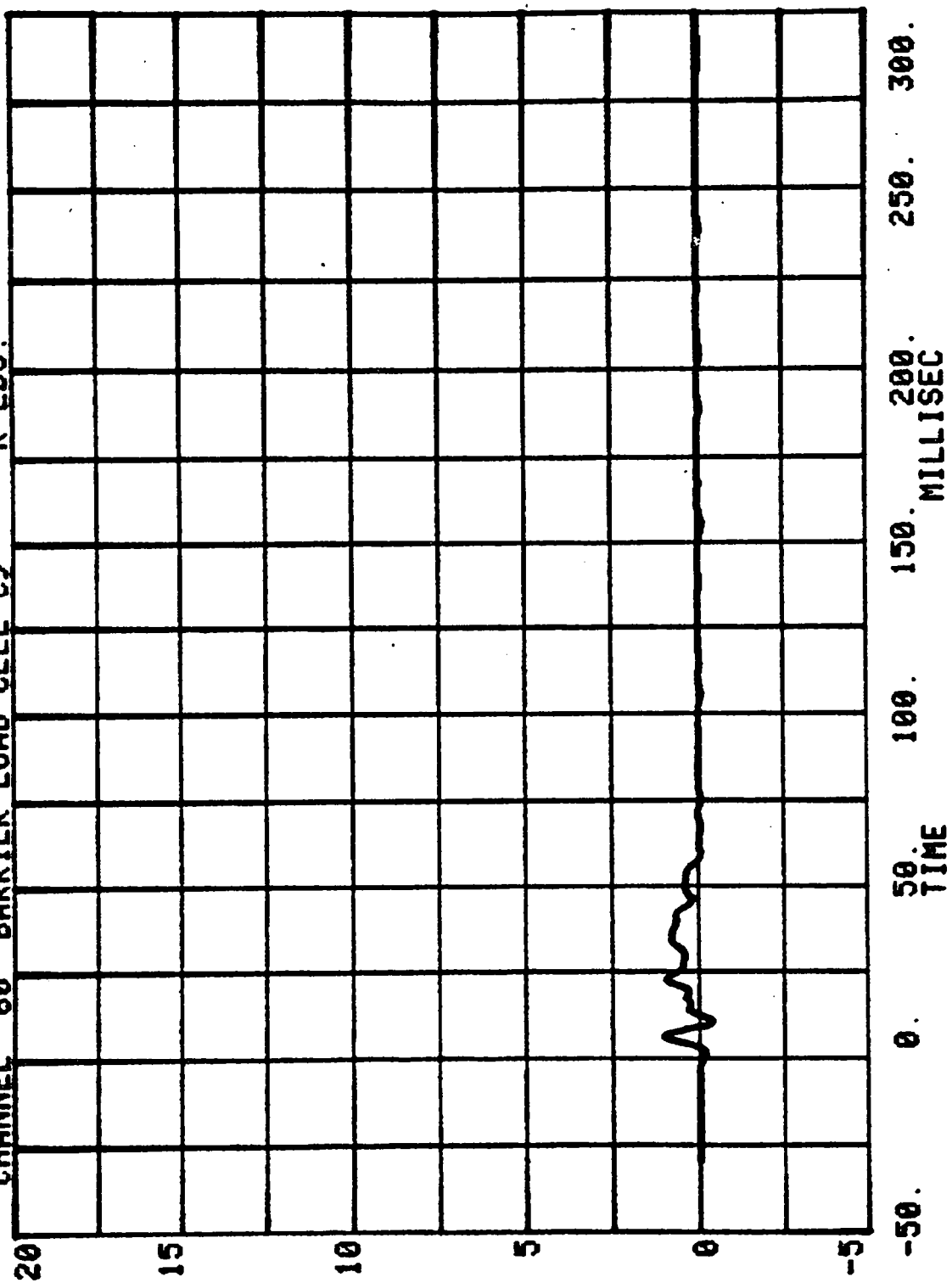
RUN= 597 SERIES= 108
CHANNEL 58 BARRIER LOAD CELL C7 K LBS.



CHANNEL 59 BARRIER LOAD CELL C8 RUN= 597 SERIES= 108 K LBS.

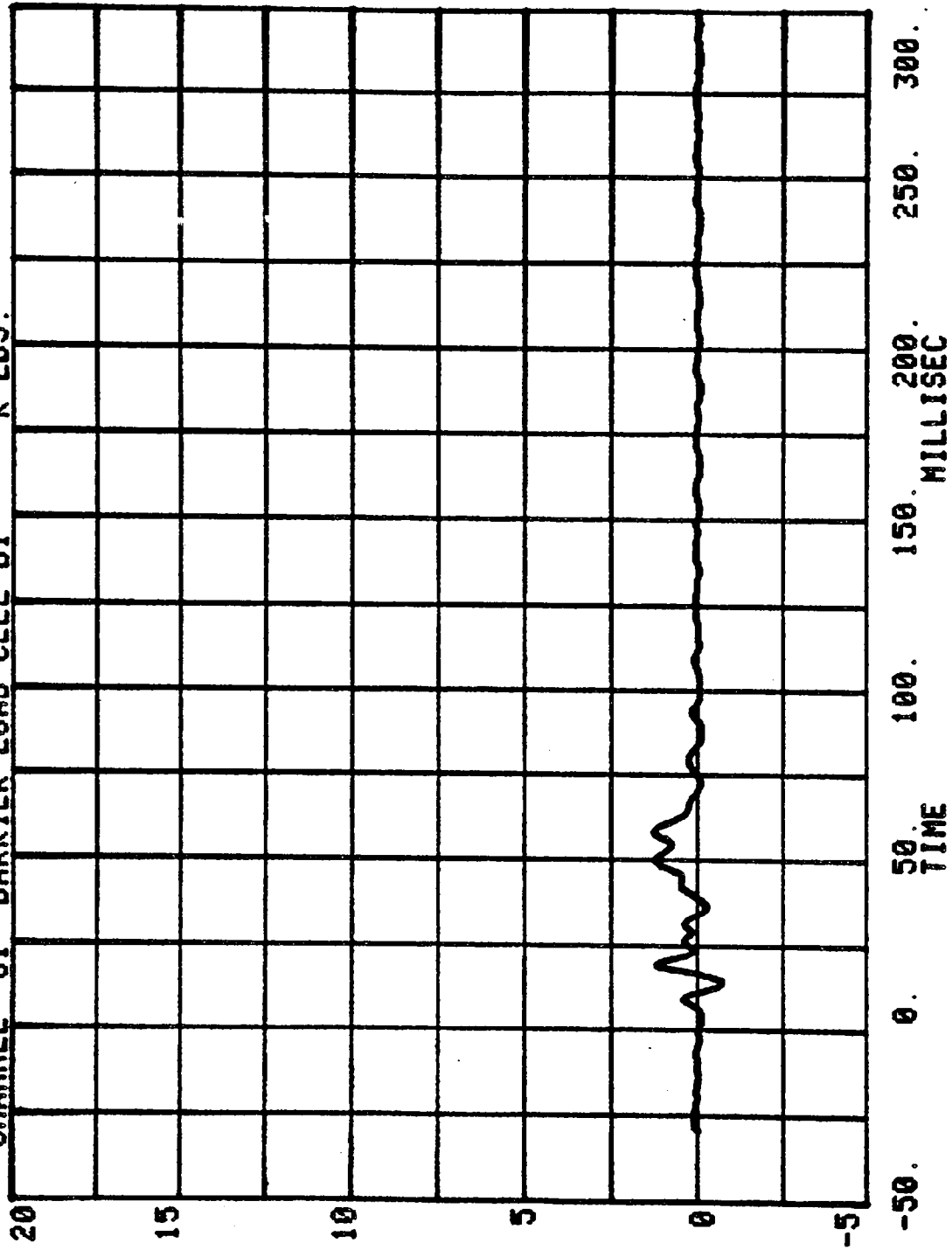


RUN= 597 SERIES= 108
CHANNEL 60 BARRIER LOAD CELL C9 K LBS.

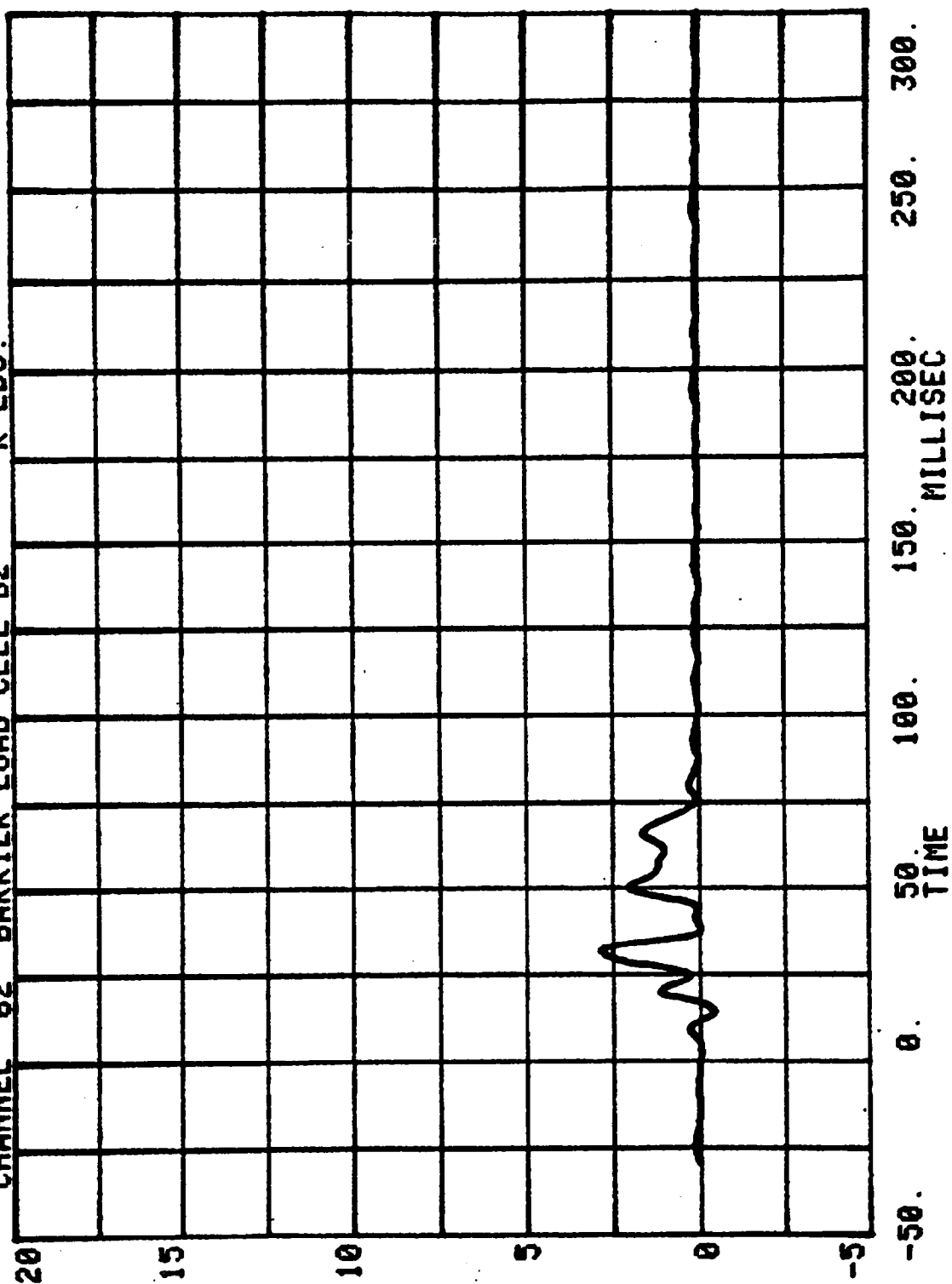


CHANNEL 61 BARRIER LOAD CELL 01 K LBS.

RUN= 597 SERIES= 108

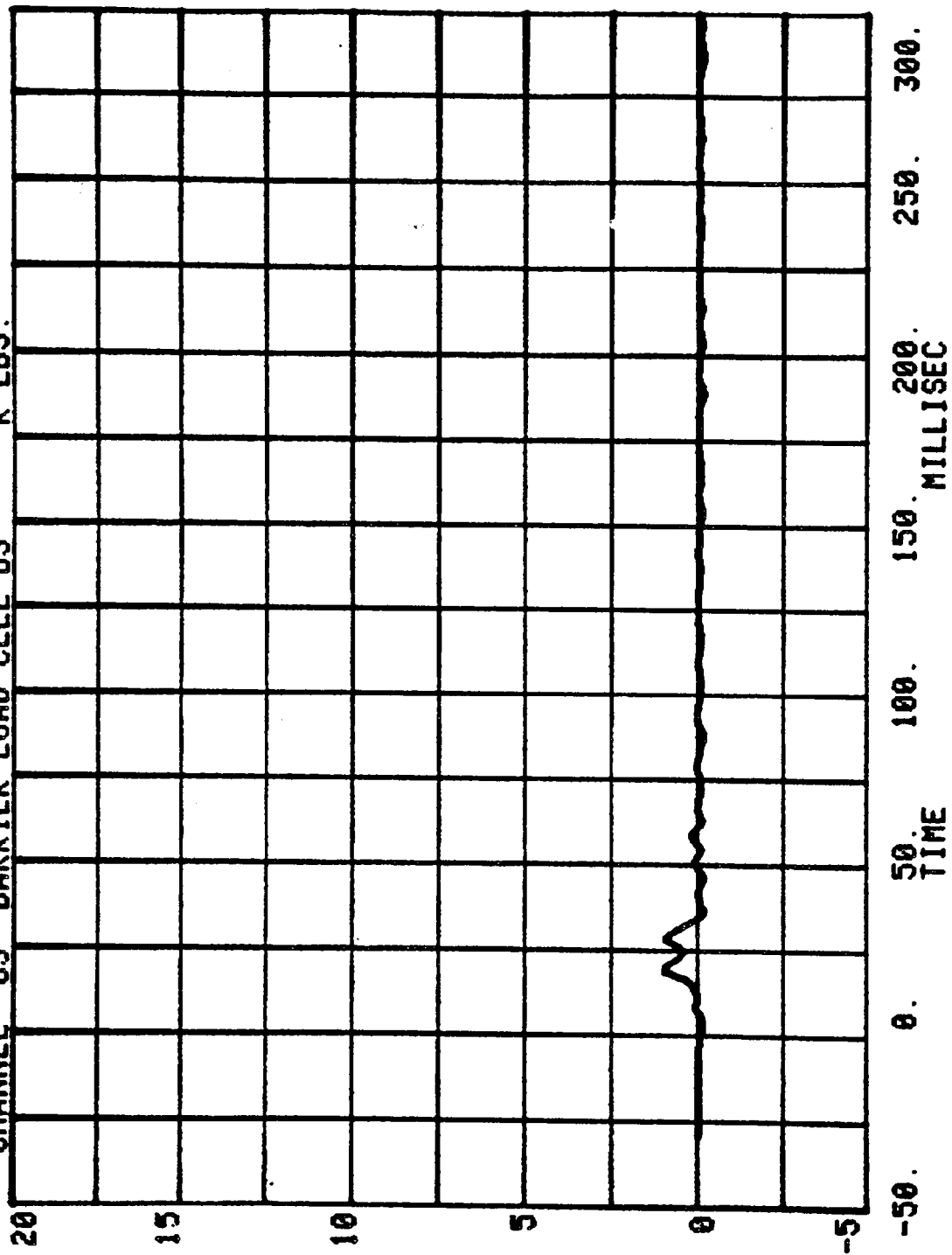


CHANNEL 62 RUN= 597 SERIES= 108 K LBS.
BARRIER LOAD CELL D2



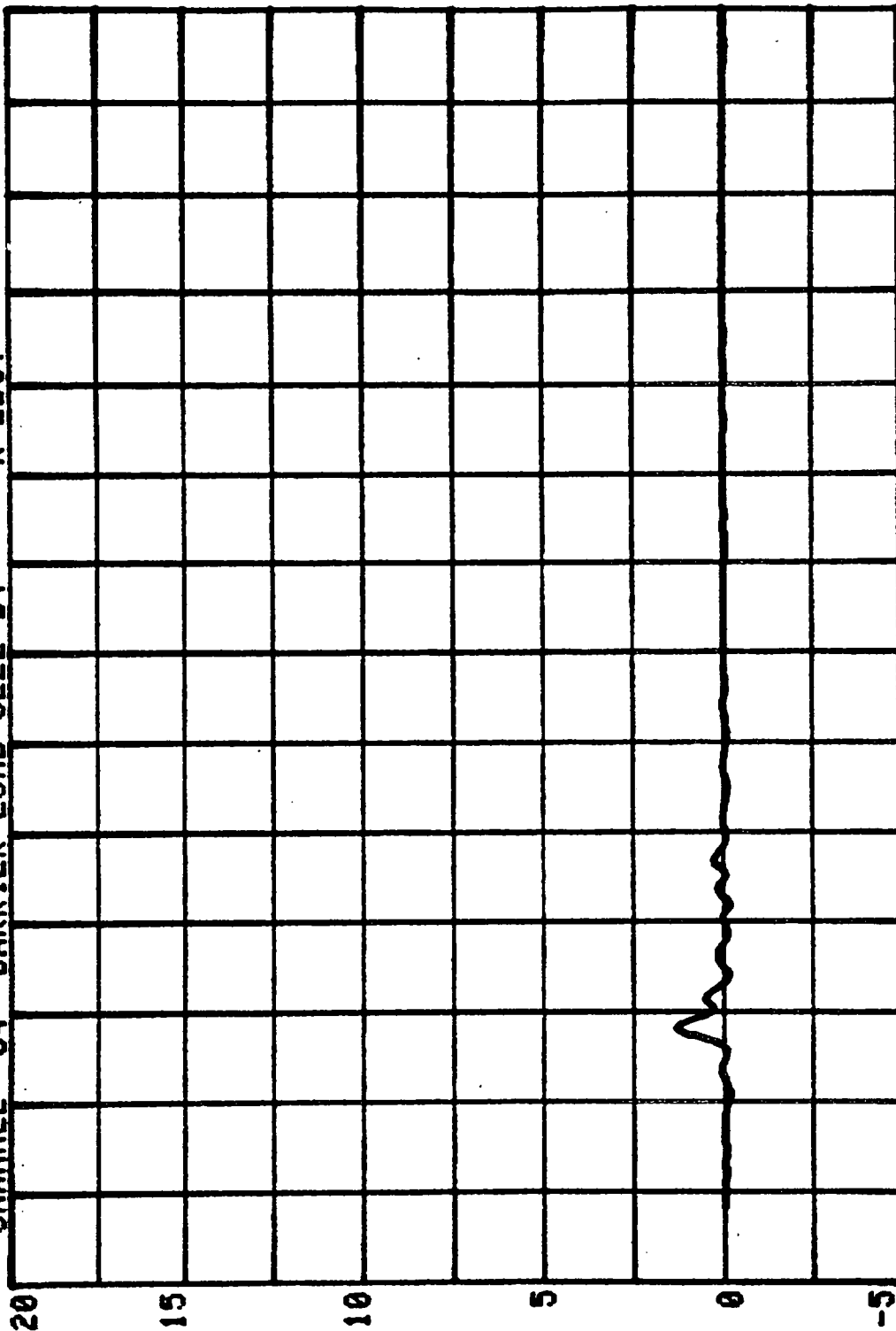
CHANNEL 63 BARRIER LOAD CELL 03 K LBS.

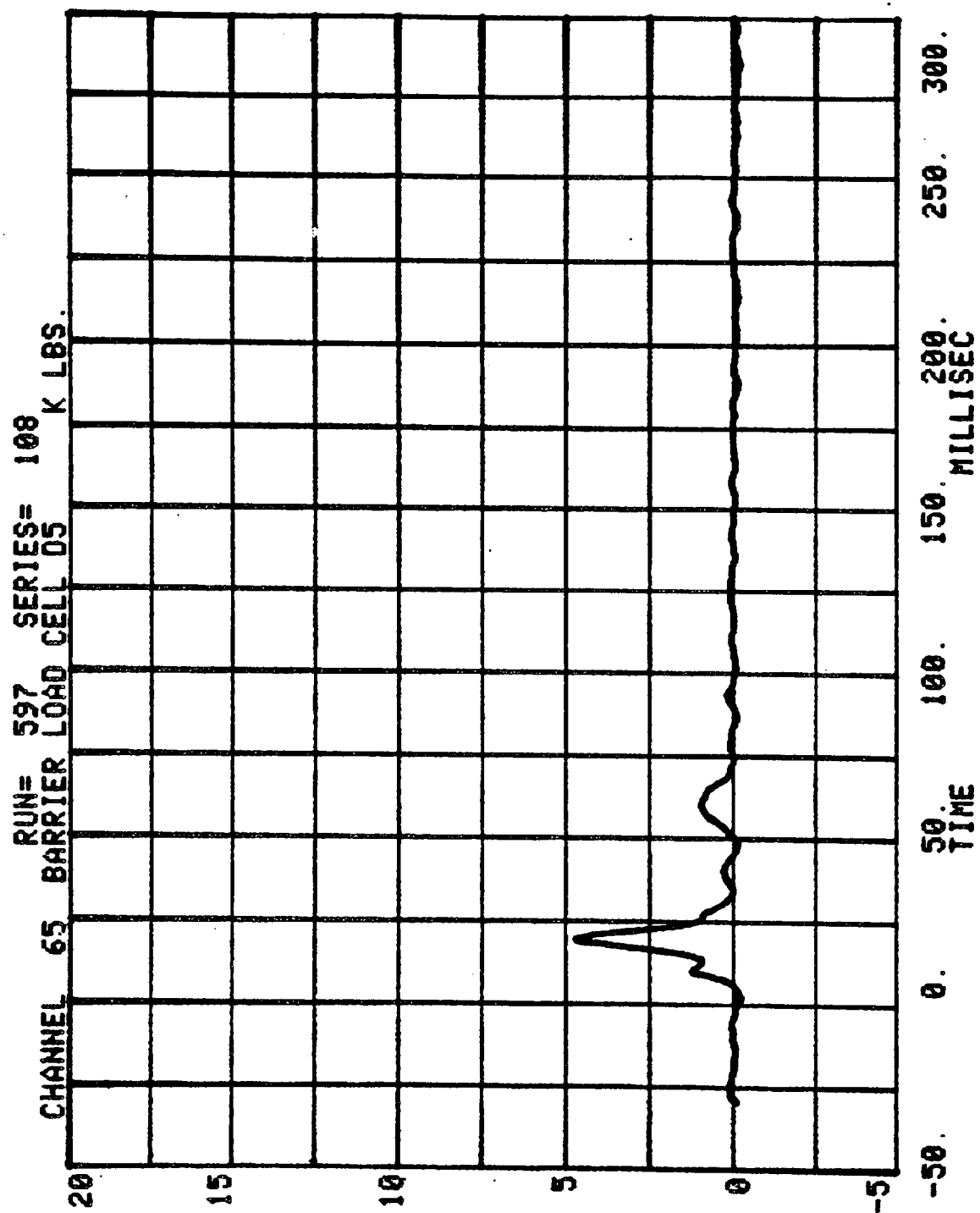
RUN= 597 SERIES= 108



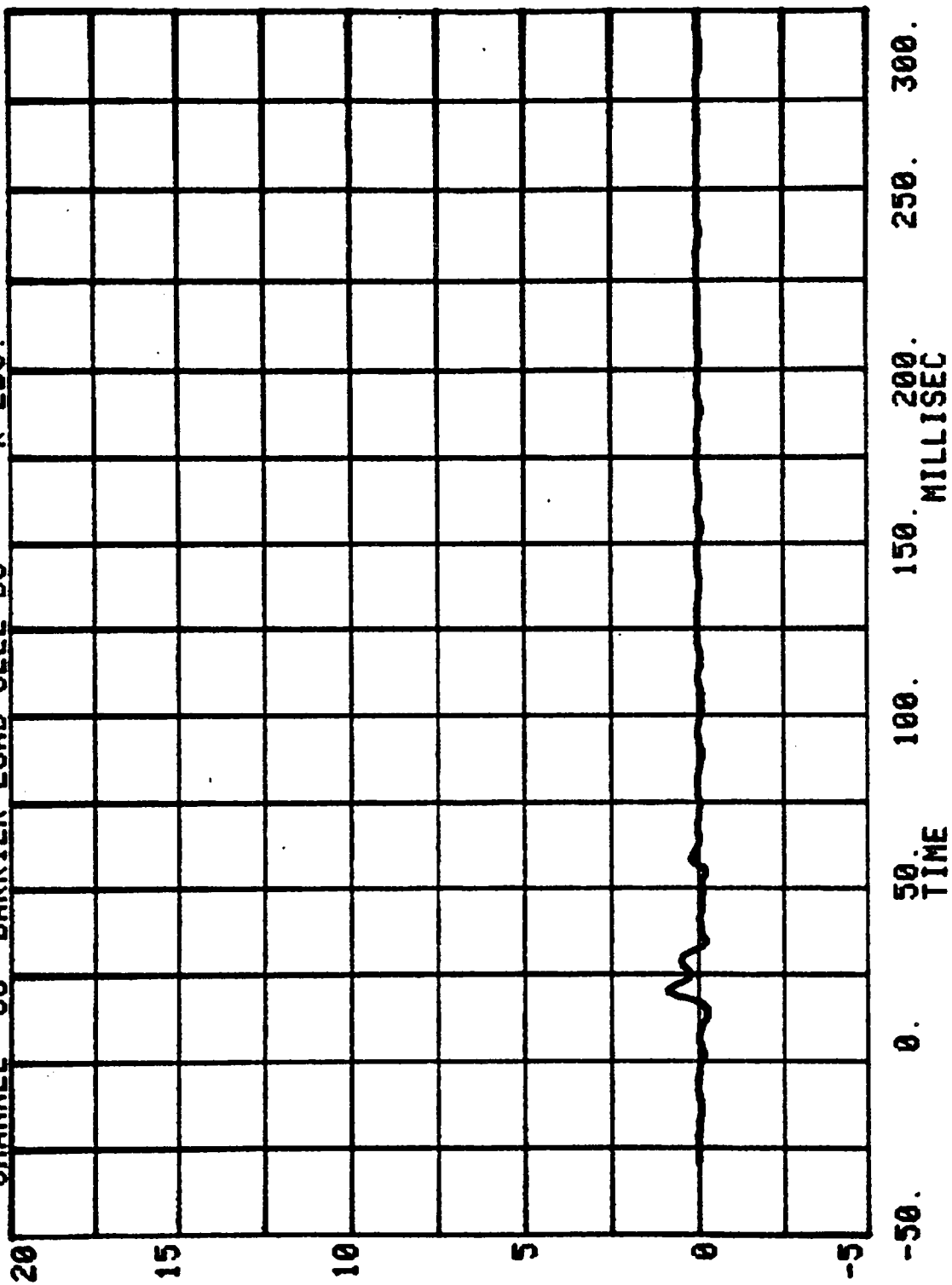
CHANNEL 64 BARRIER LOAD CELL D4 K LBS.

RUN= 597 SERIES= 108

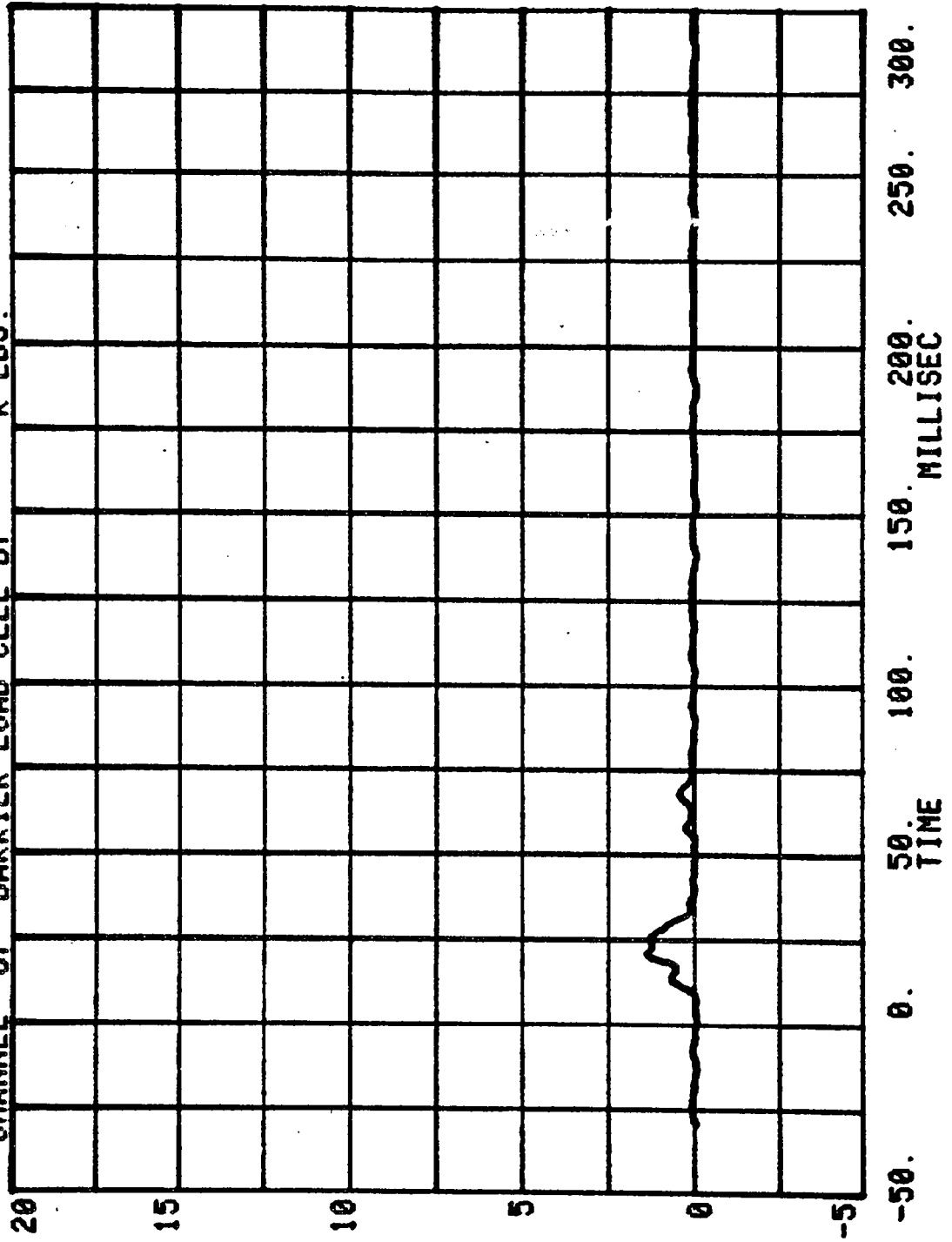




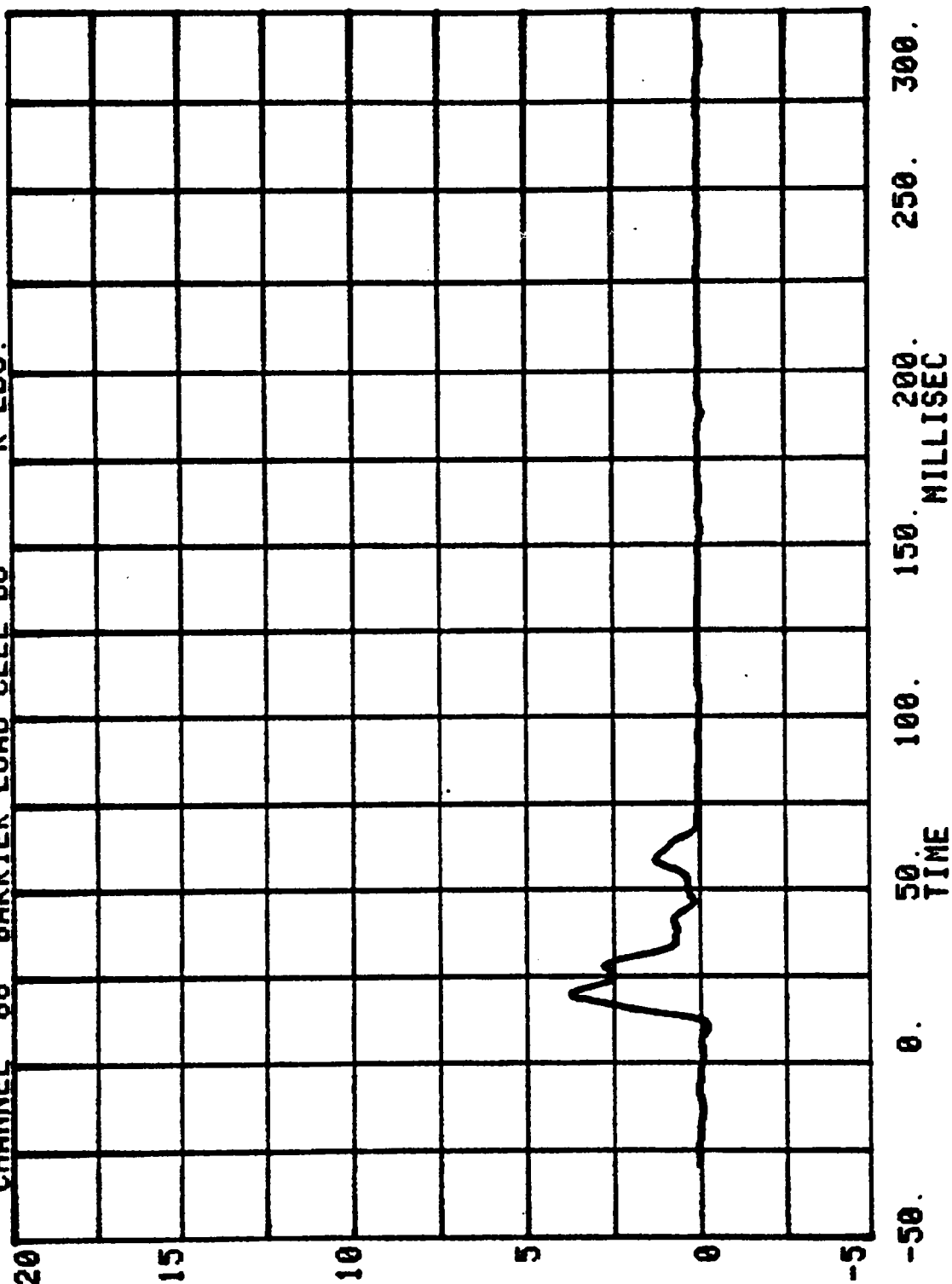
RUN= 597 SERIES= 108
CHANNEL 66 BARRIER LOAD CELL D6 K LBS.



CHANNEL 67 BARRIER LOAD CELL D7
RUN= 597 SERIES= 108 K LBS.

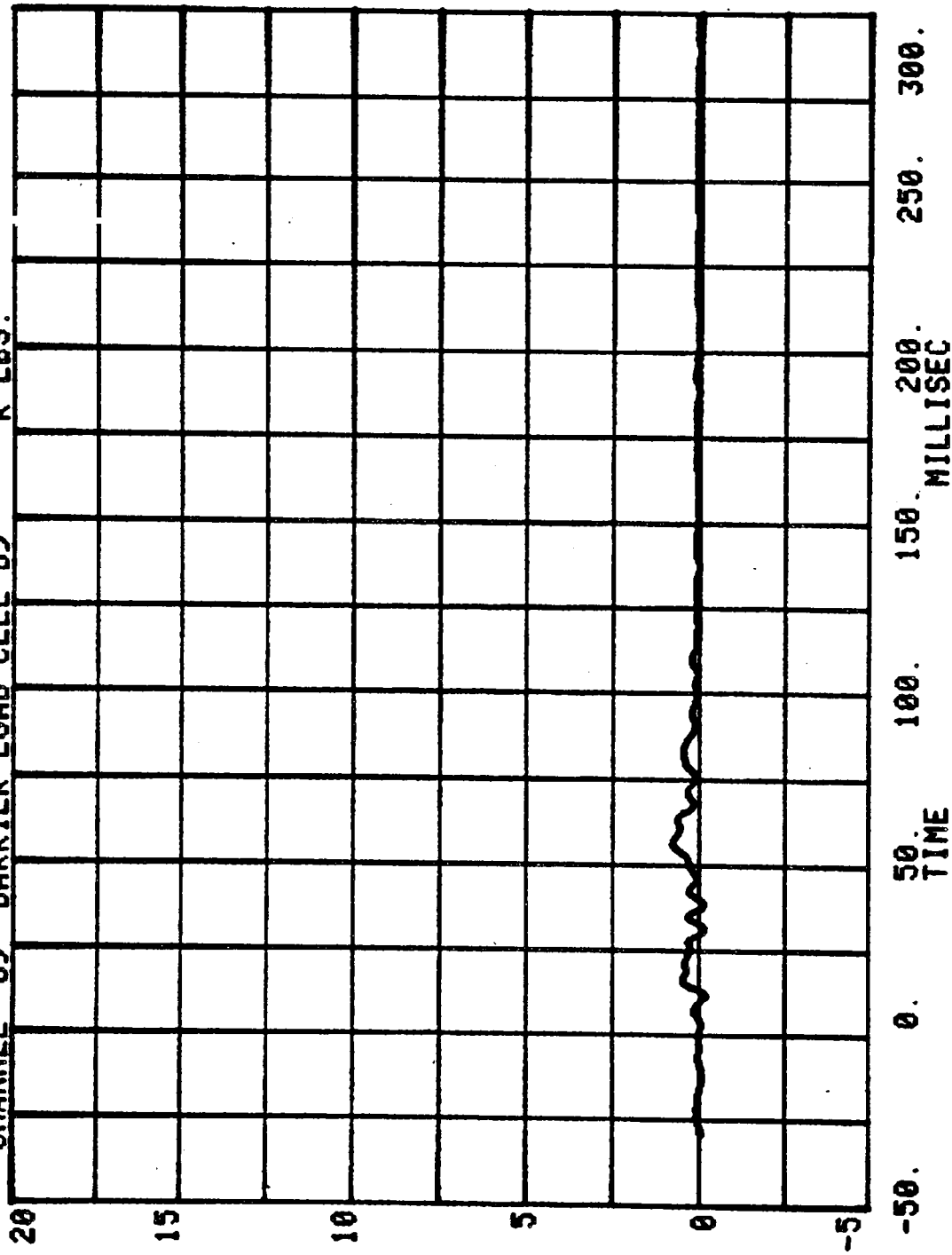


CHANNEL 68 RUN= 597 SERIES= 108 K LBS.
BARRIER LOAD CELL D8



CHANNEL 69 BARRIER LOAD CELL D9 K LBS.

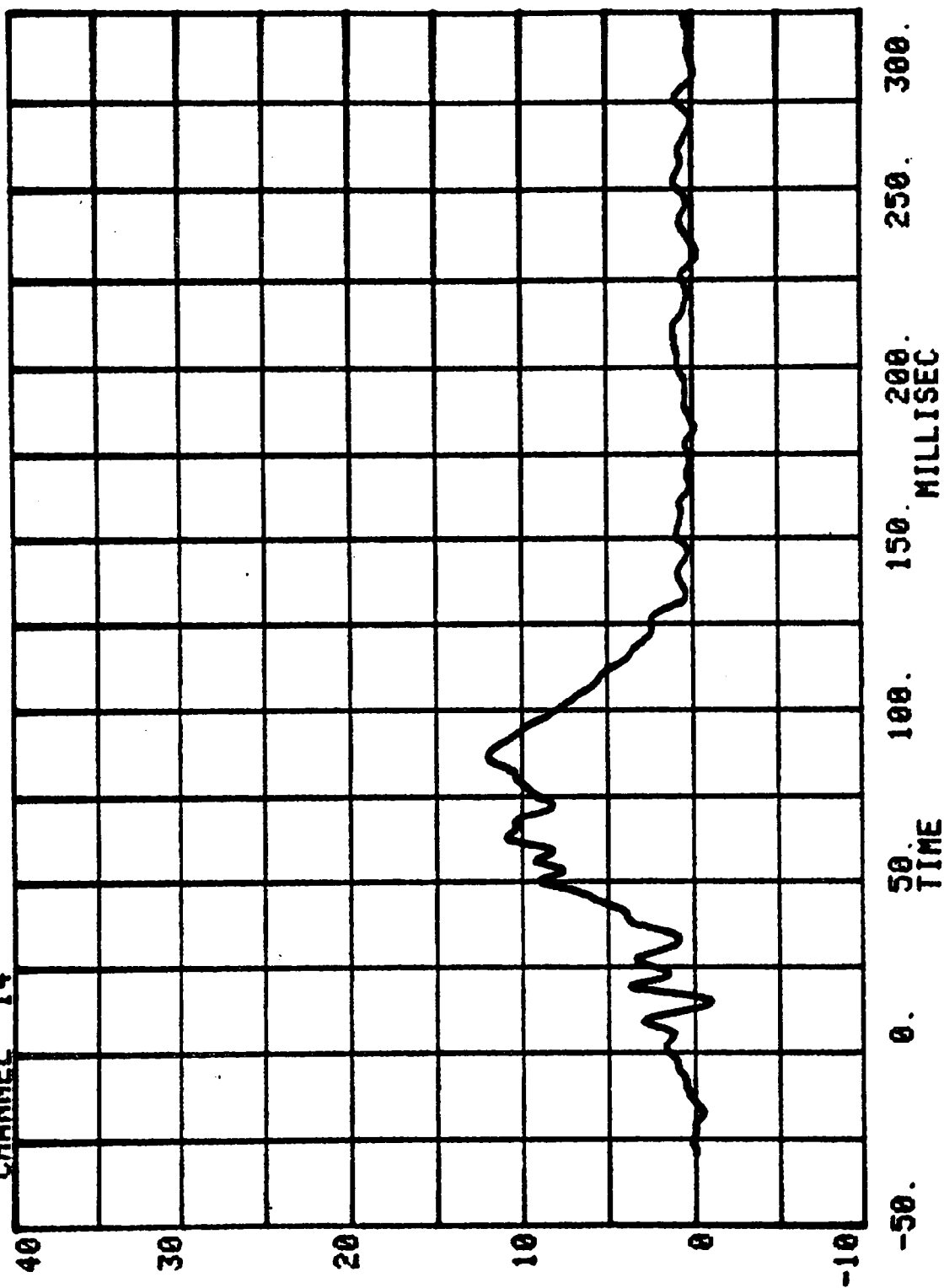
RUN= 597 SERIES= 108



TOTAL OF ROW A

RUN= 597 SERIES= 108

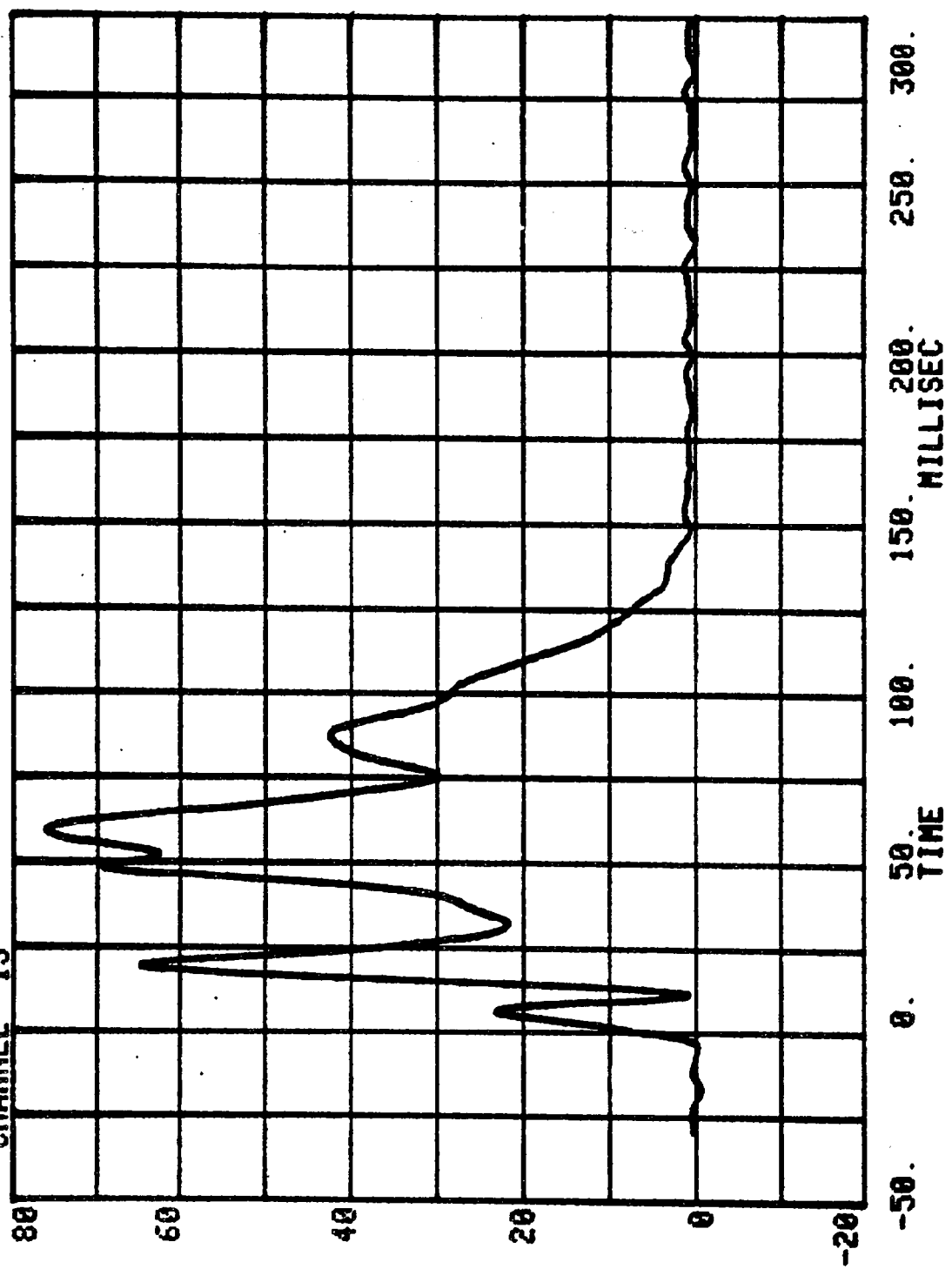
CHANNEL 14



TOTAL OF ROW B

RUN= 597 SERIES= 108

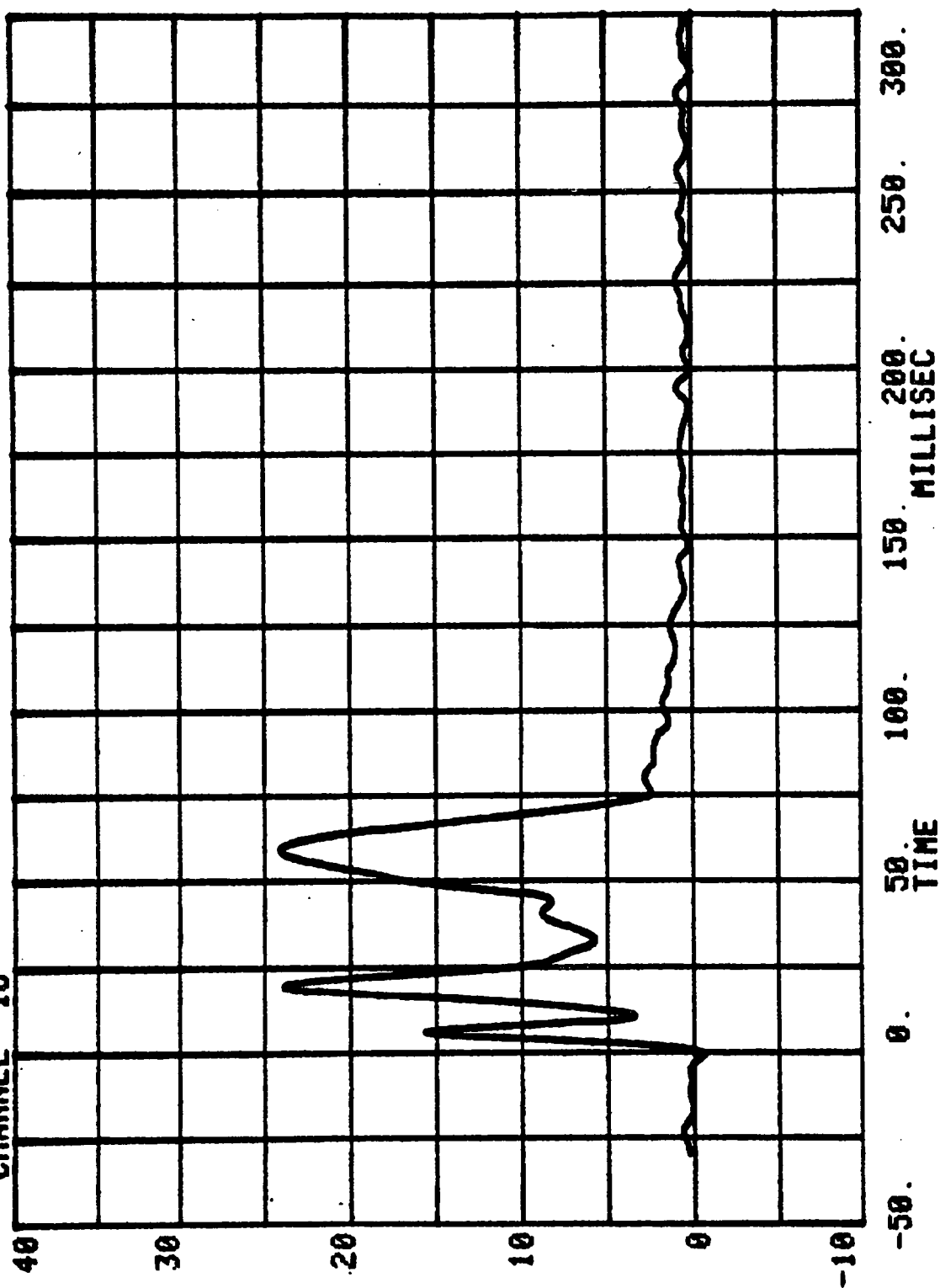
CHANNEL 15



TOTAL OF ROW C

RUN= 597 SERIES= 108

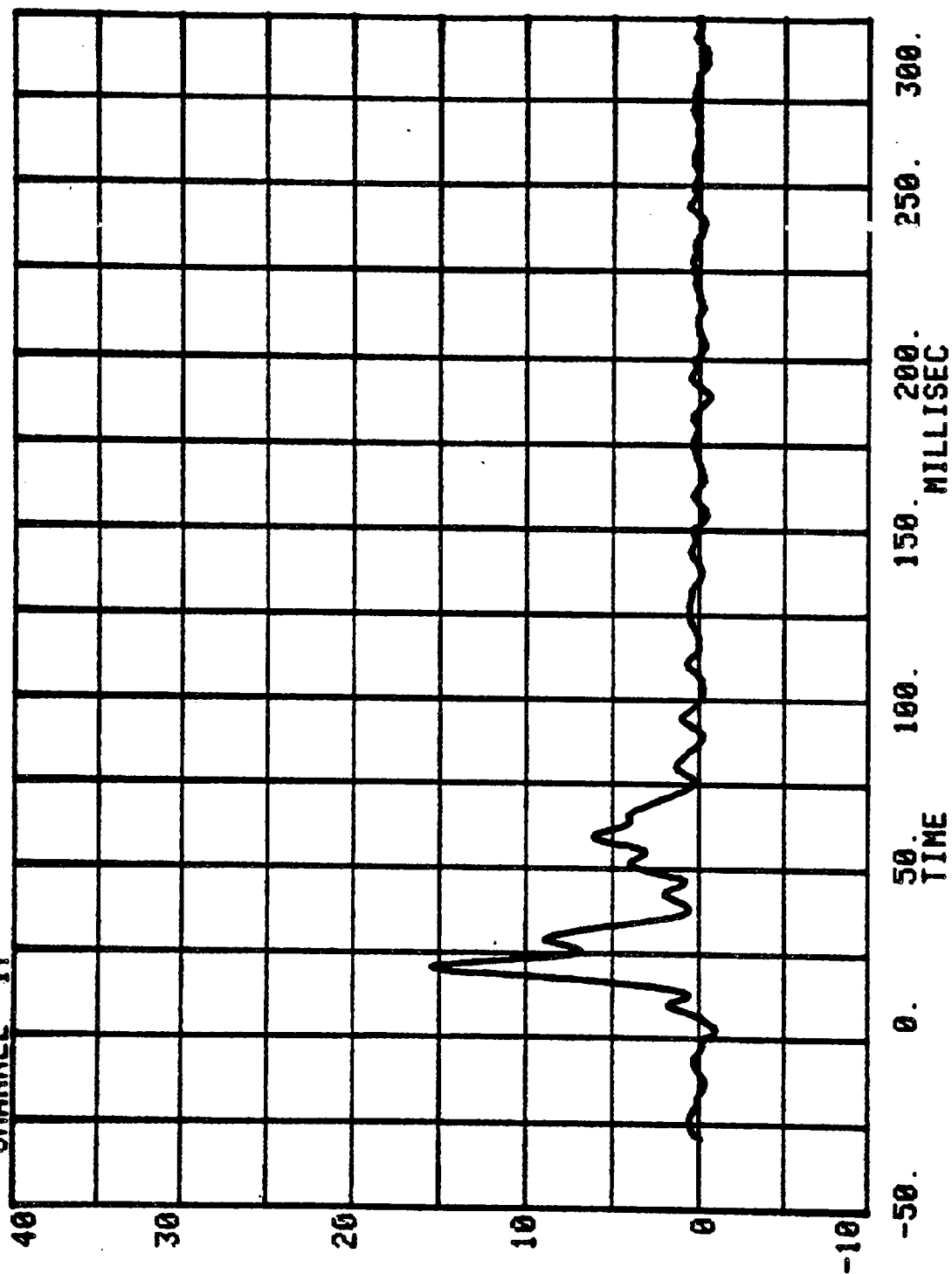
CHANNEL 16



TOTAL OF ROW D

RUN= 597 SERIES= 108

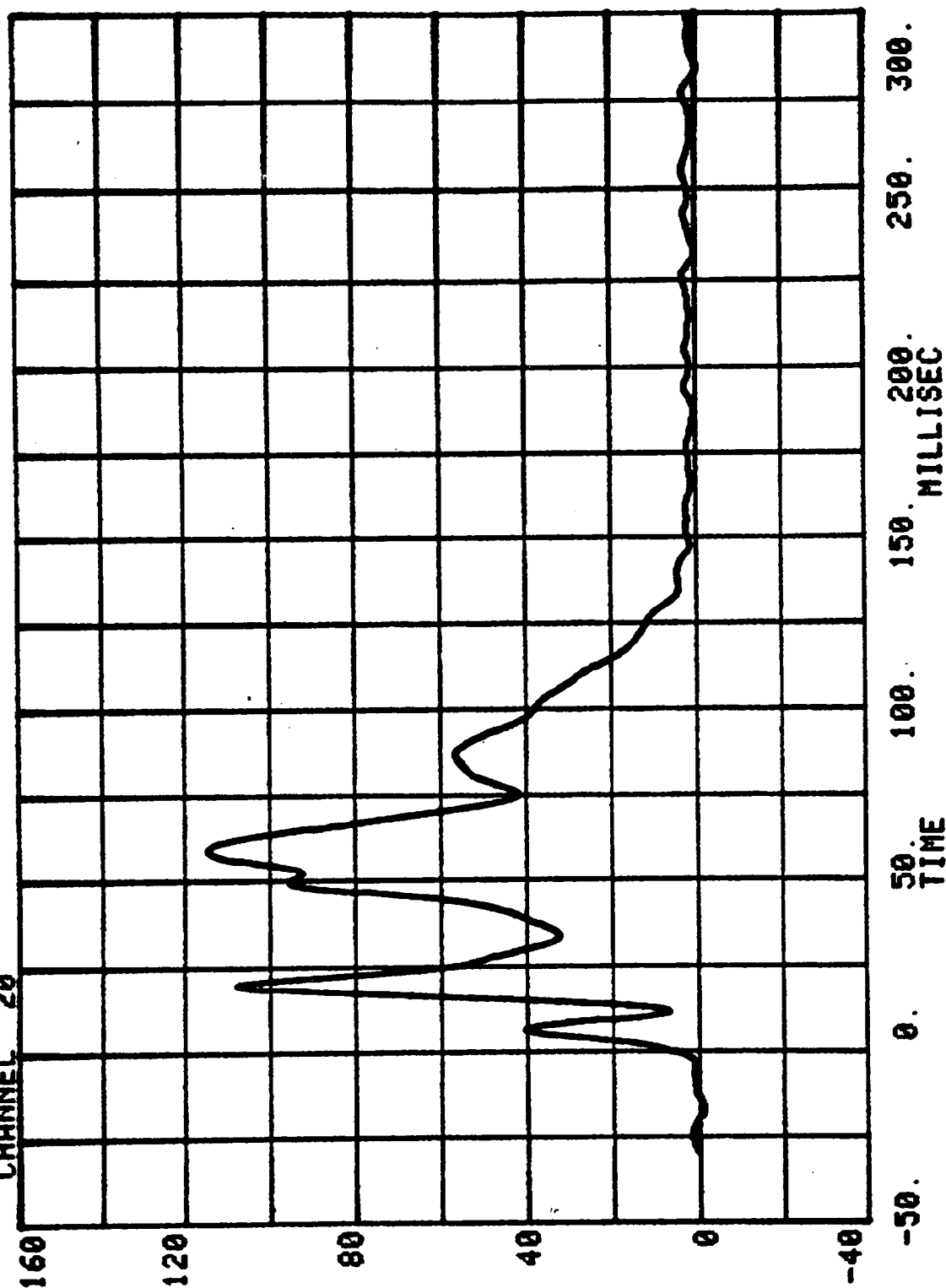
CHANNEL 17



TOTAL OF ROWS A+B+C+D

RUN= 597 SERIES= 108

CHANNEL 20



TEST NO. CE0108

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= 597

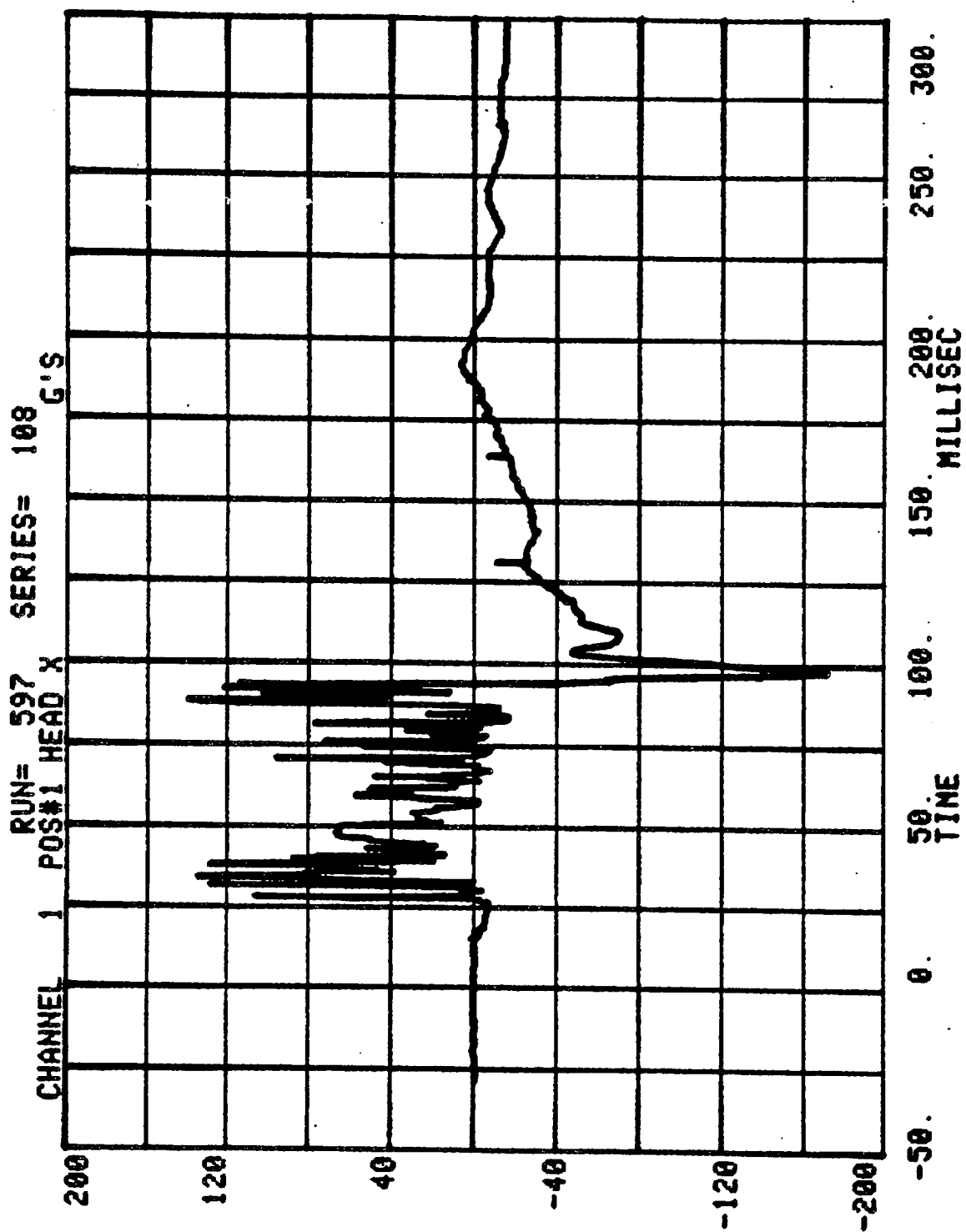
POS#1 HEAD RESULTANT

HIC=1607.6 FROM T1= .09472 TO T2= .11242

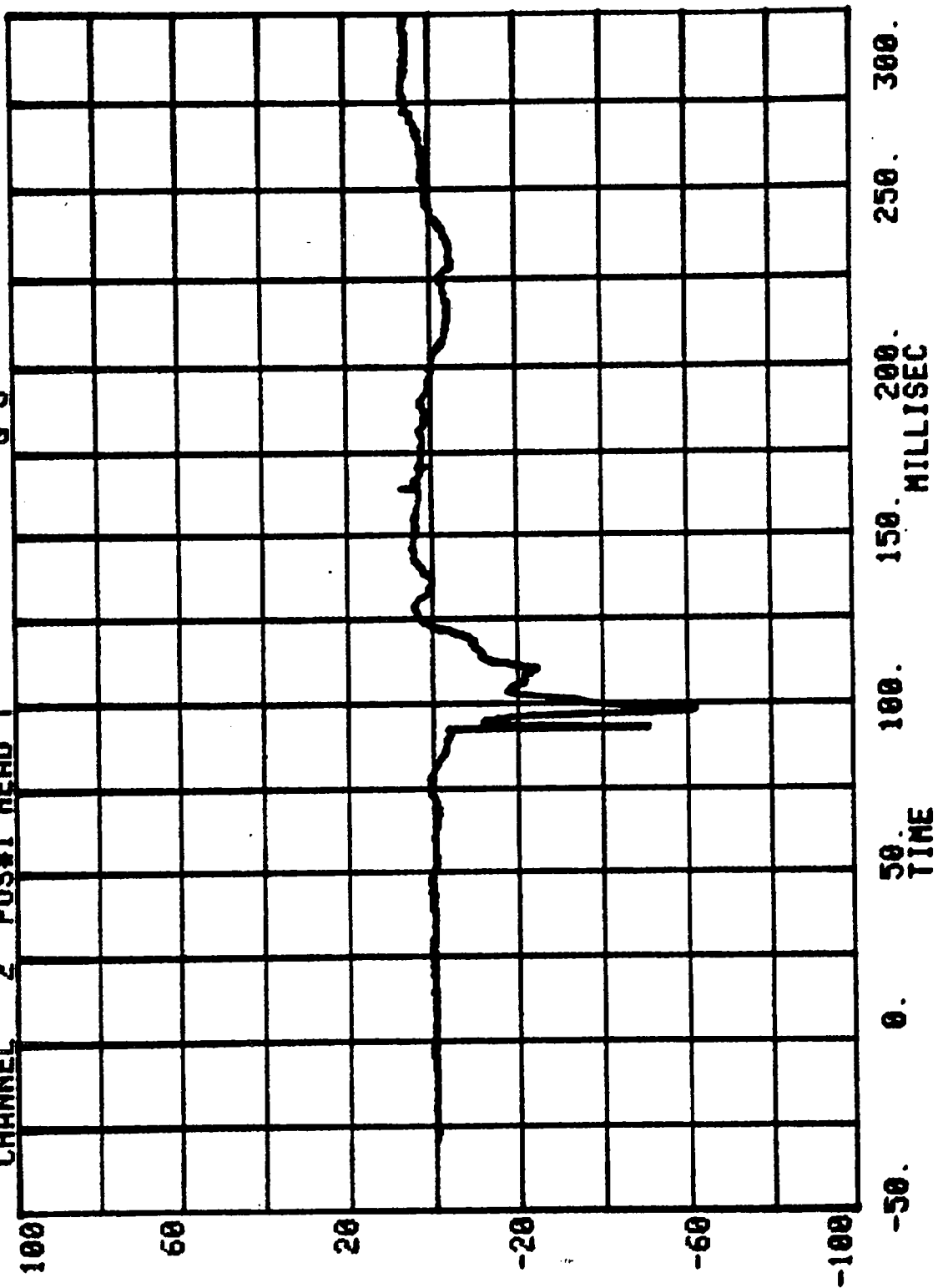
AVERAGE ACCELERATION BETWEEN T1 AND T2= 96.2G'S

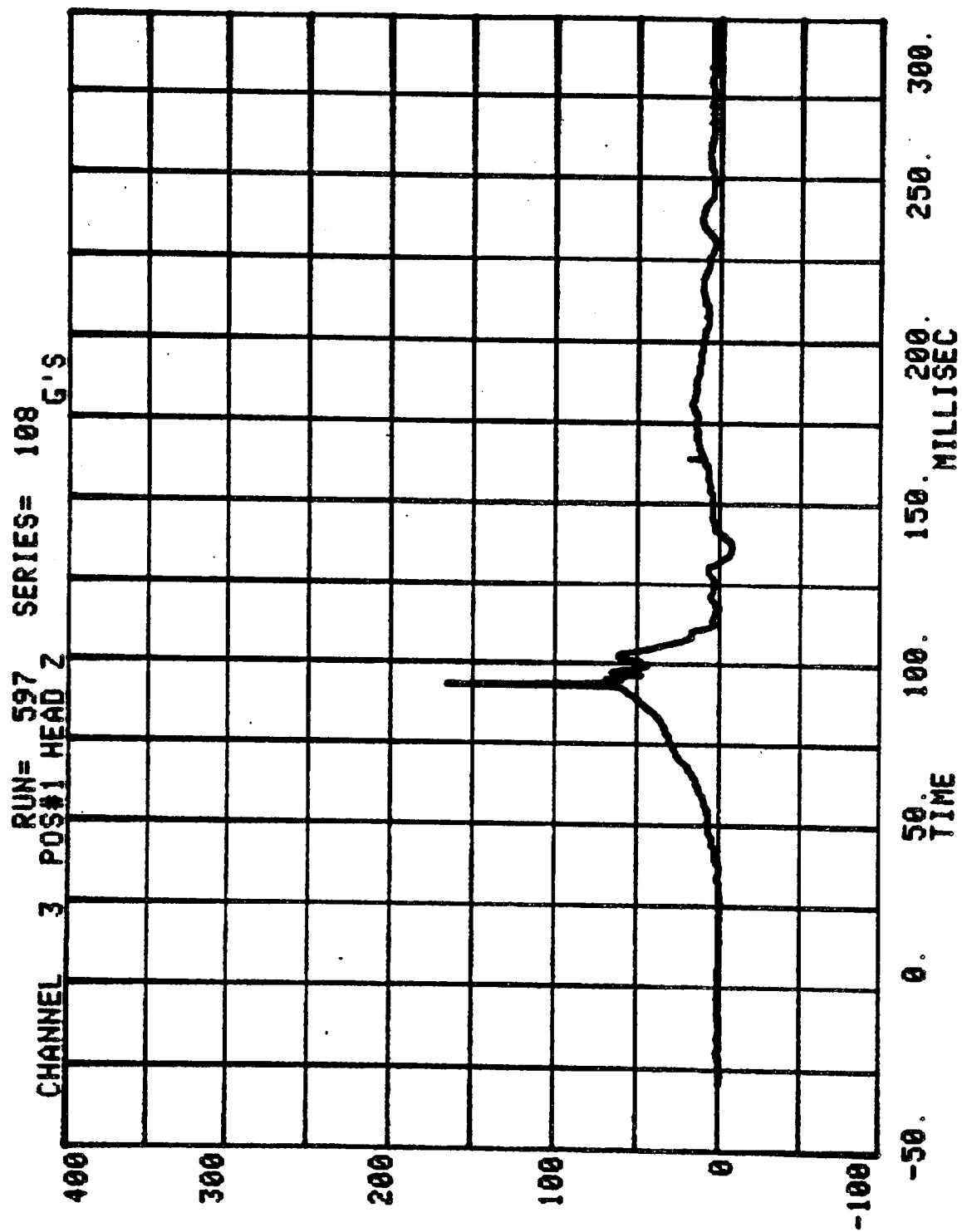
EVENT TIME= 205.2 MSEC

SEVERITY INDEX=2485.5

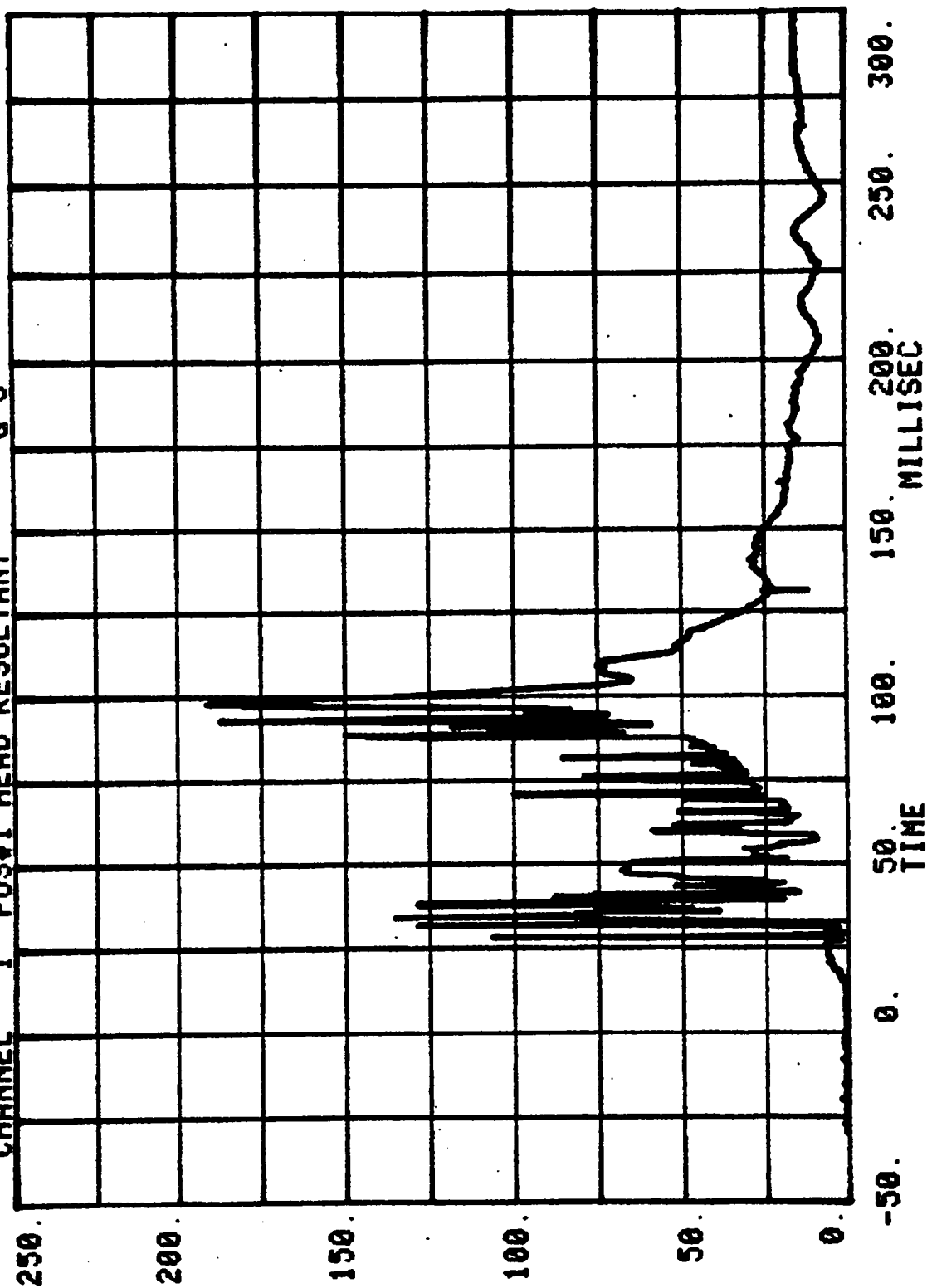


CHANNEL 2 POS#1 HEAD Y RUN= 597 SERIES= 108 G'S

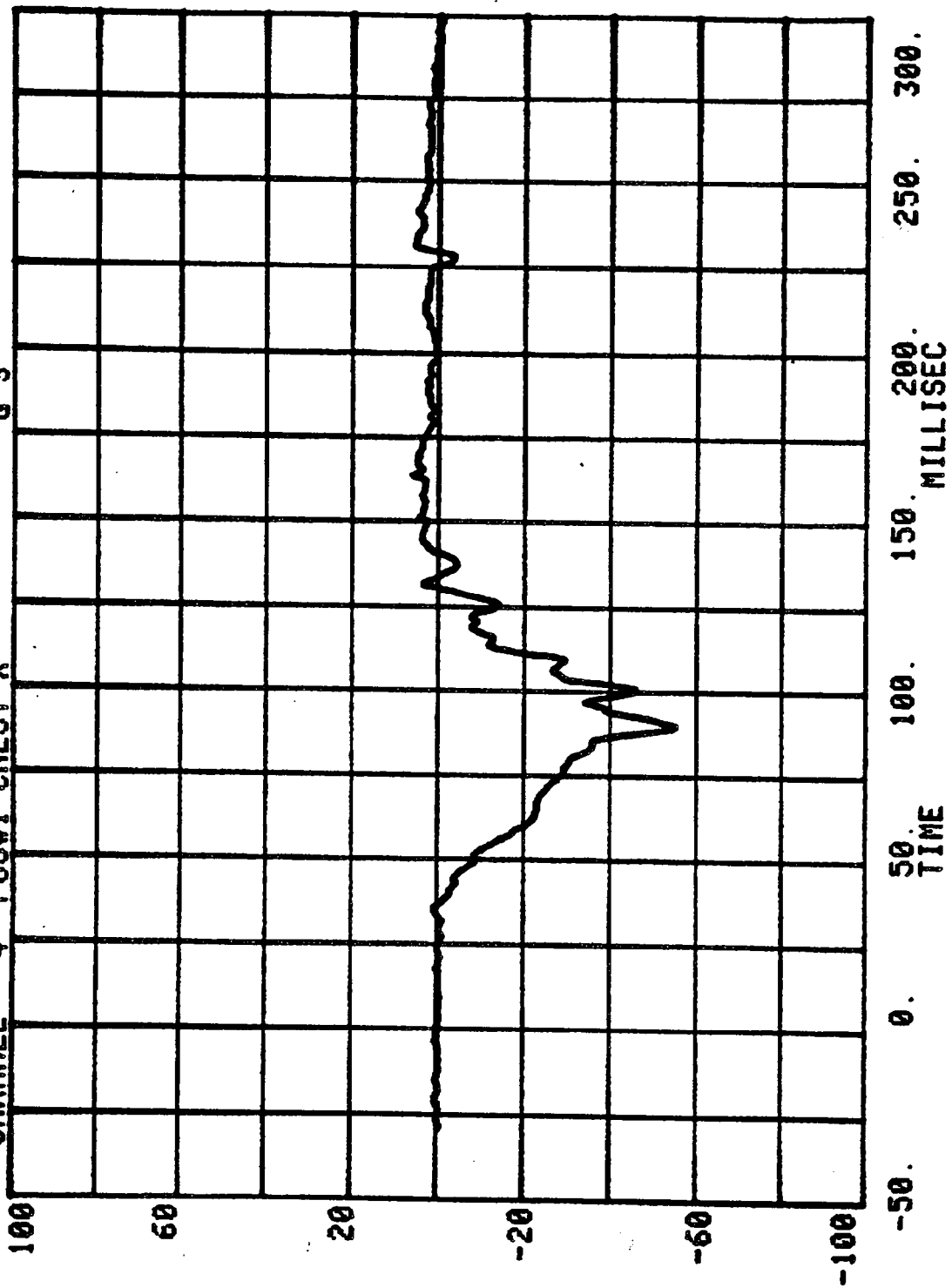


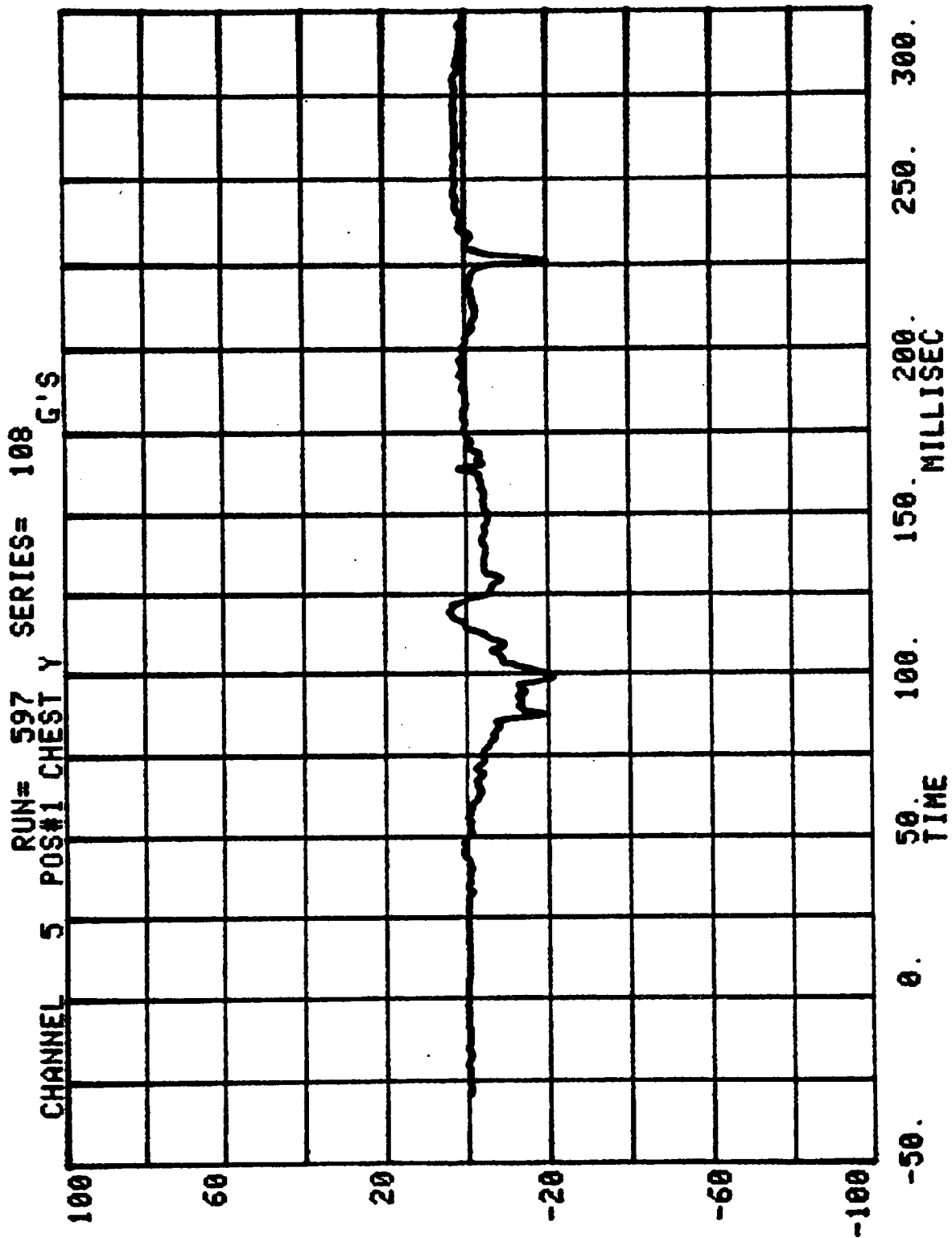


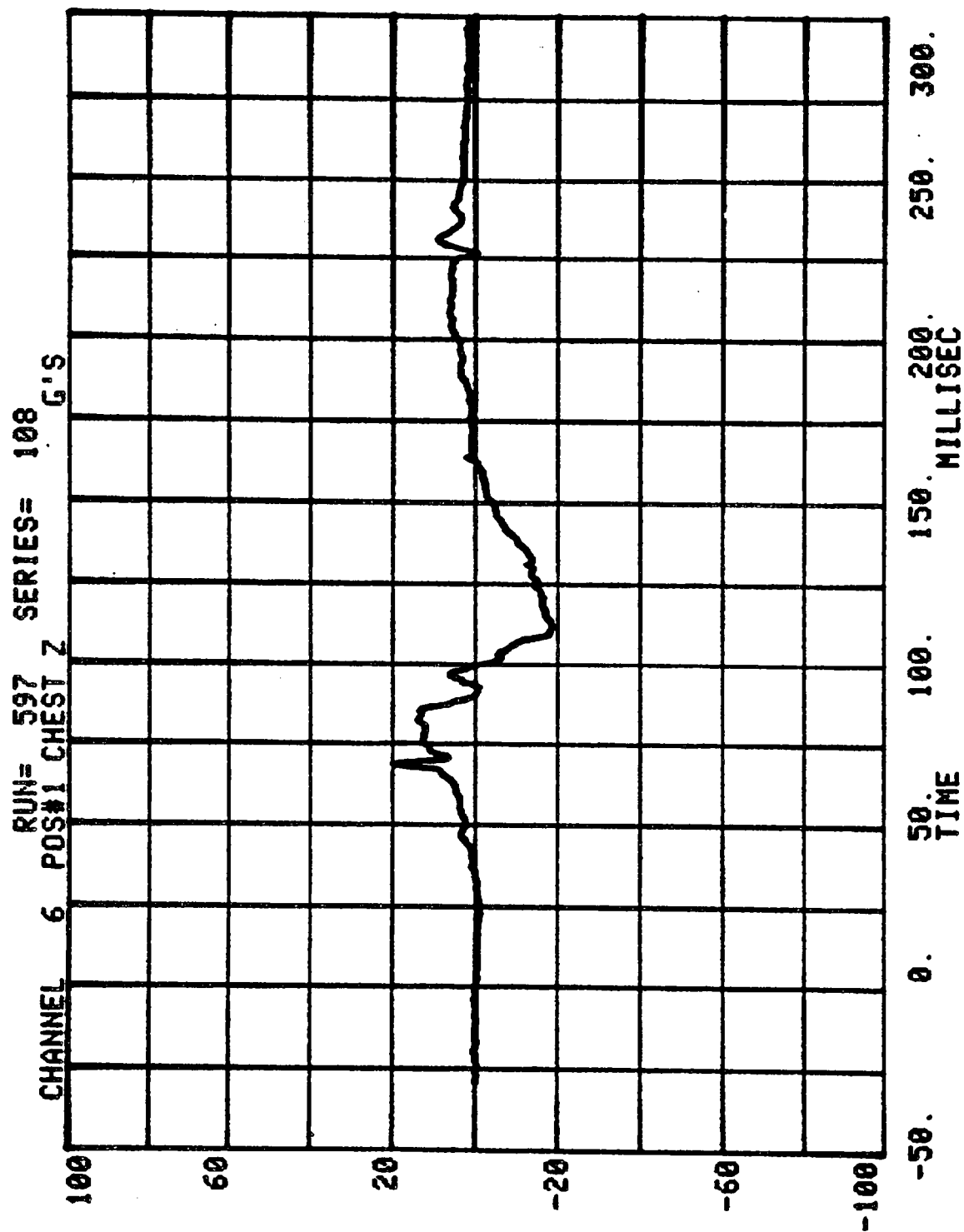
RUN= 597 SERIES= 108
CHANNEL 1 POS#1 HEAD RESULTANT G'S



CHANNEL 4 POS#1 CHEST X RUN= 597 SERIES= 108 G'S

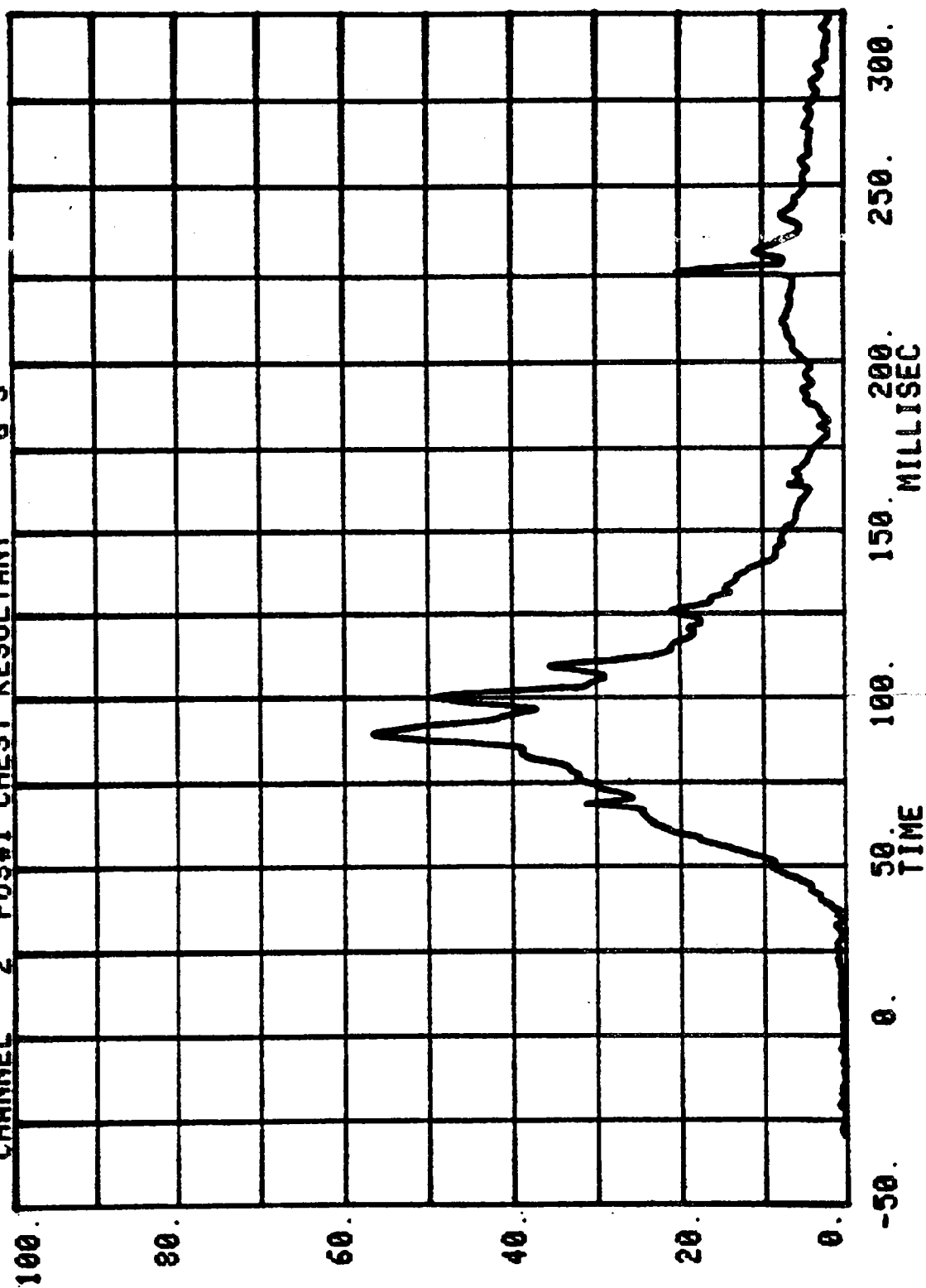


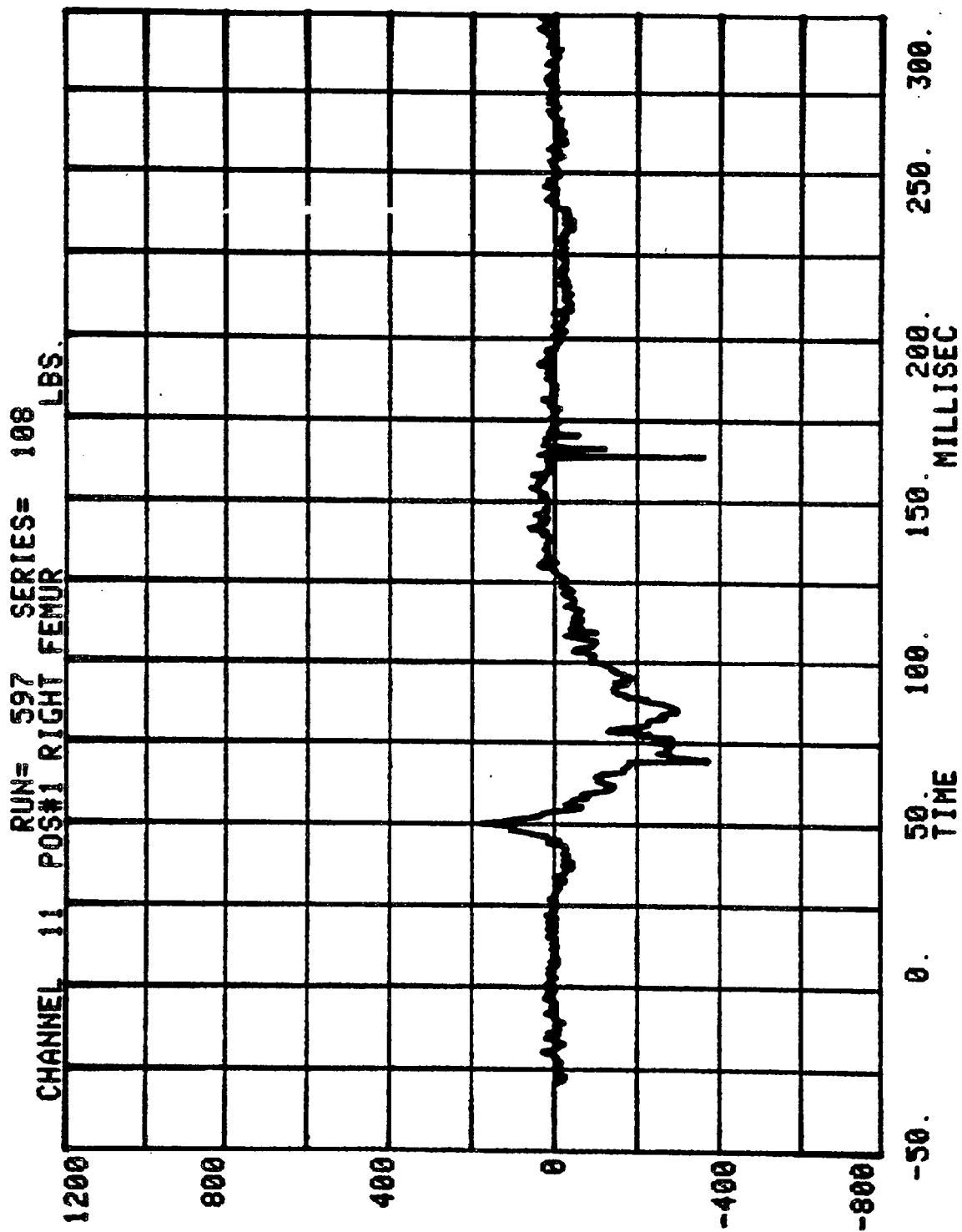




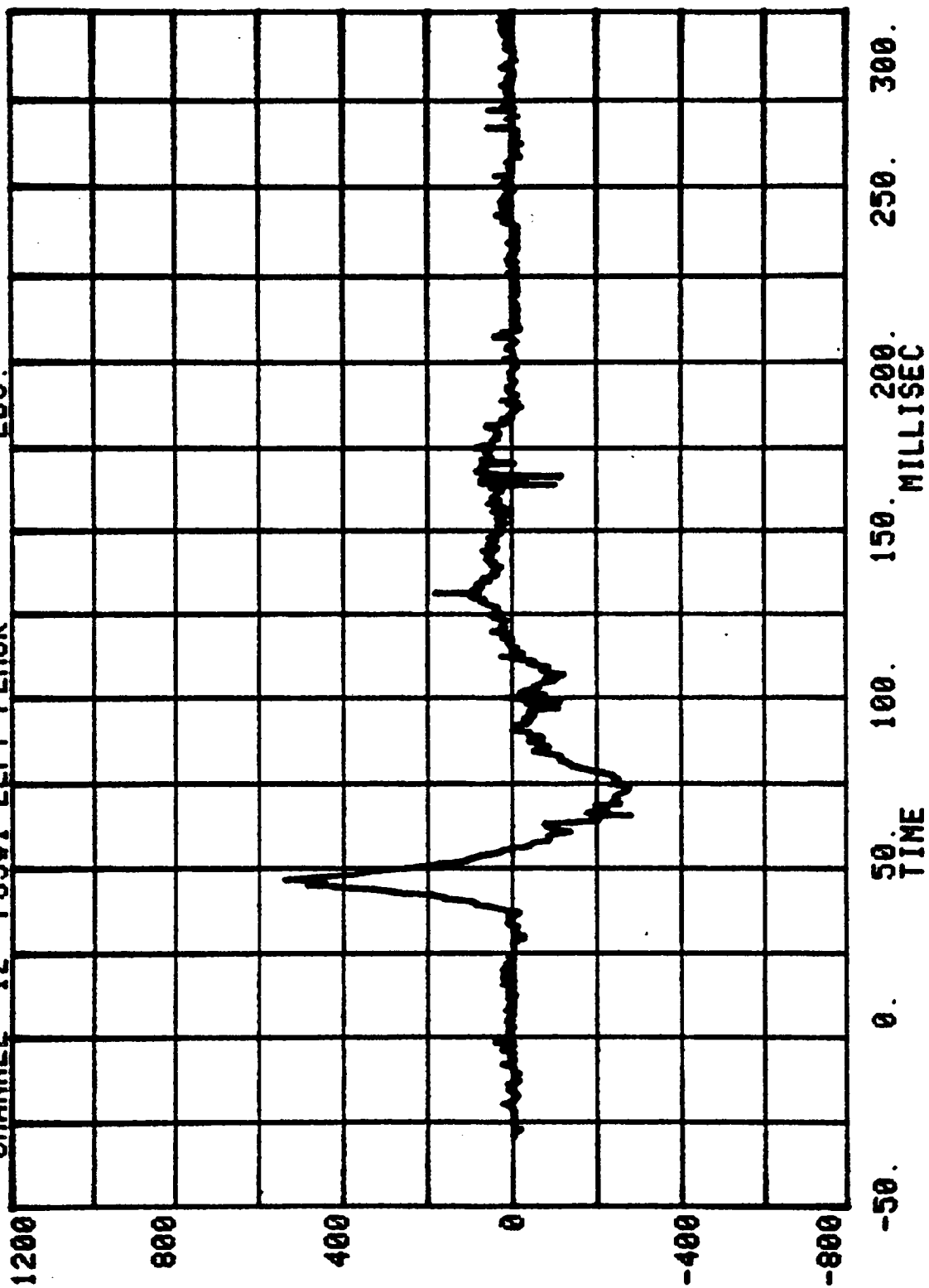
CHANNEL 2 POS#1 CHEST RESULTANT G'S

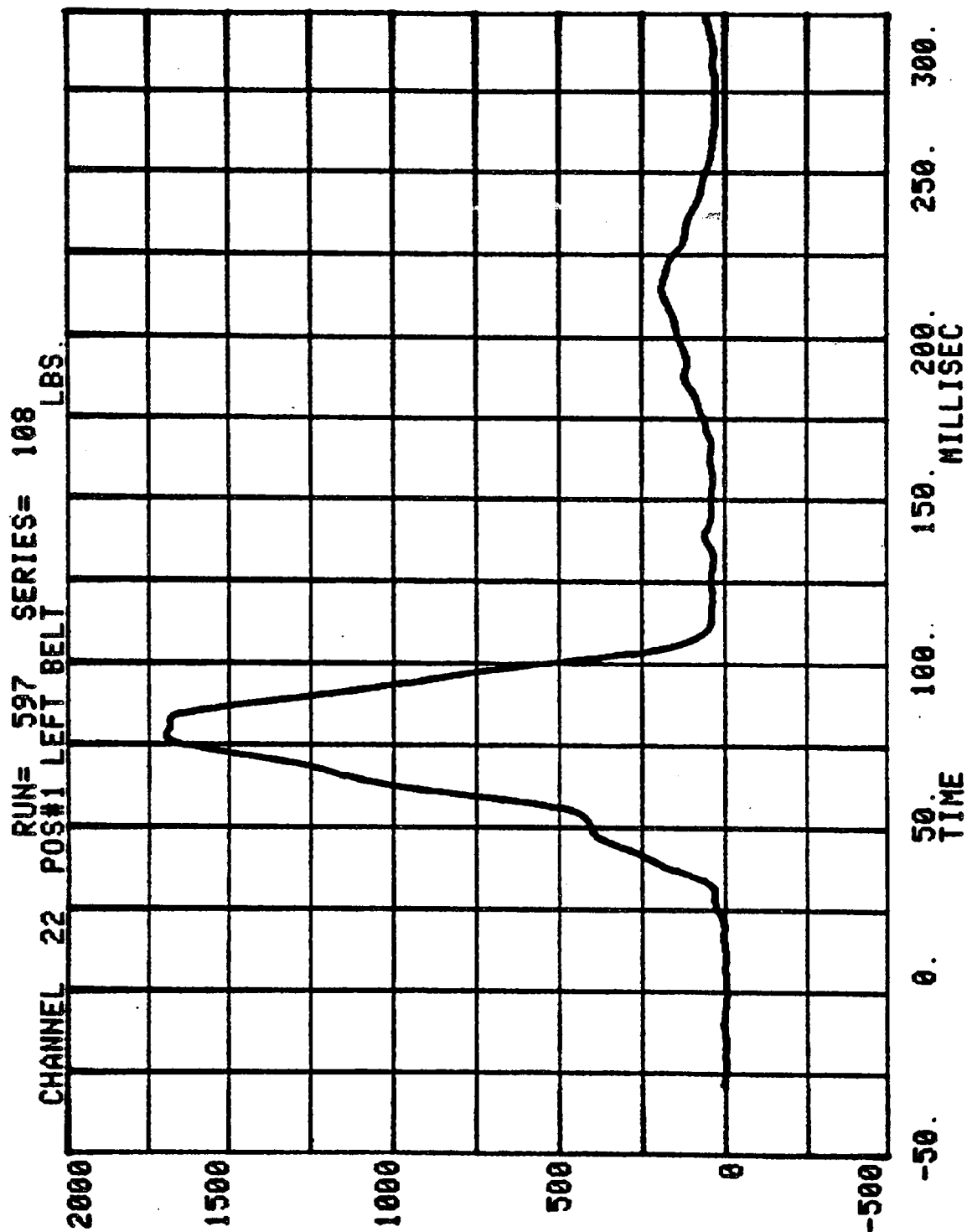
RUN= 597 SERIES= 108



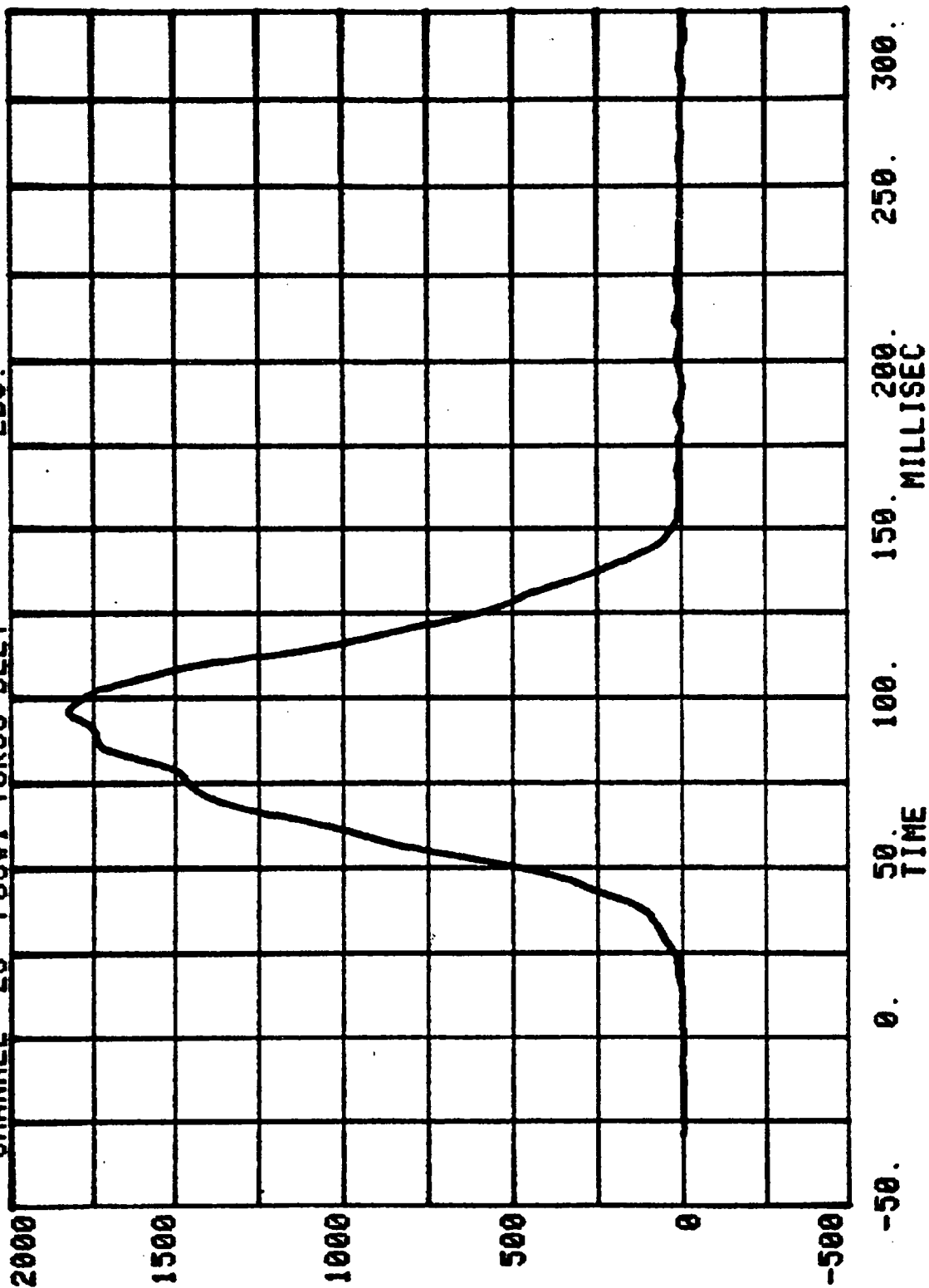


RUN= 597 SERIES= 108 LBS.
CHANNEL 12 POS#1 LEFT FEMUR



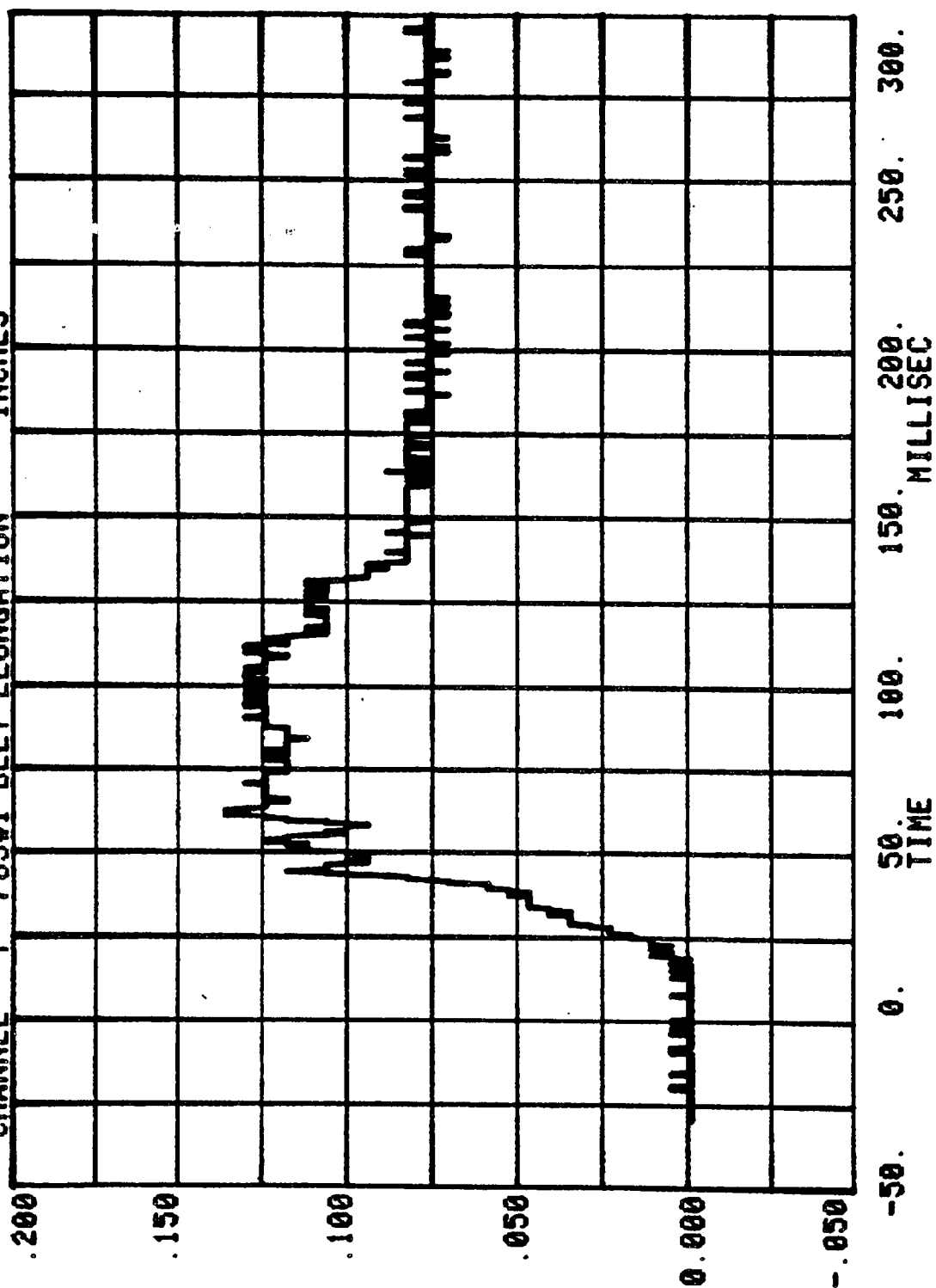


CHANNEL 23 POS#1 TORSO BELT
RUN= 597 SERIES= 108 LBS.

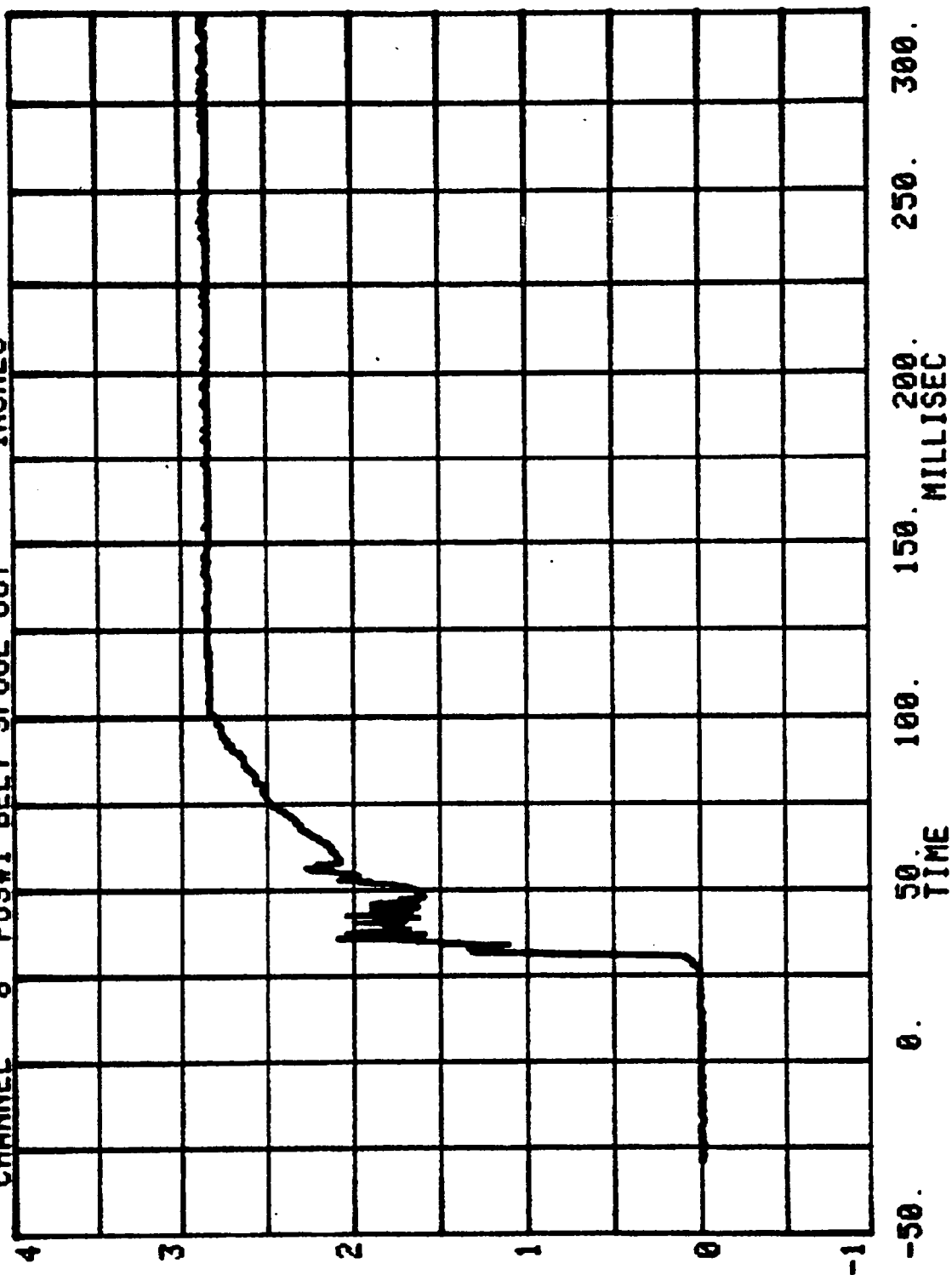


(MEASURED OVER 3 IN.)

CHANNEL 7 POS#1 BELT ELONGATION SERIES= 108 INCHES



RUN= 597 SERIES= 108
CHANNEL 8 POS#1 BELT SPOOL OUT INCHES



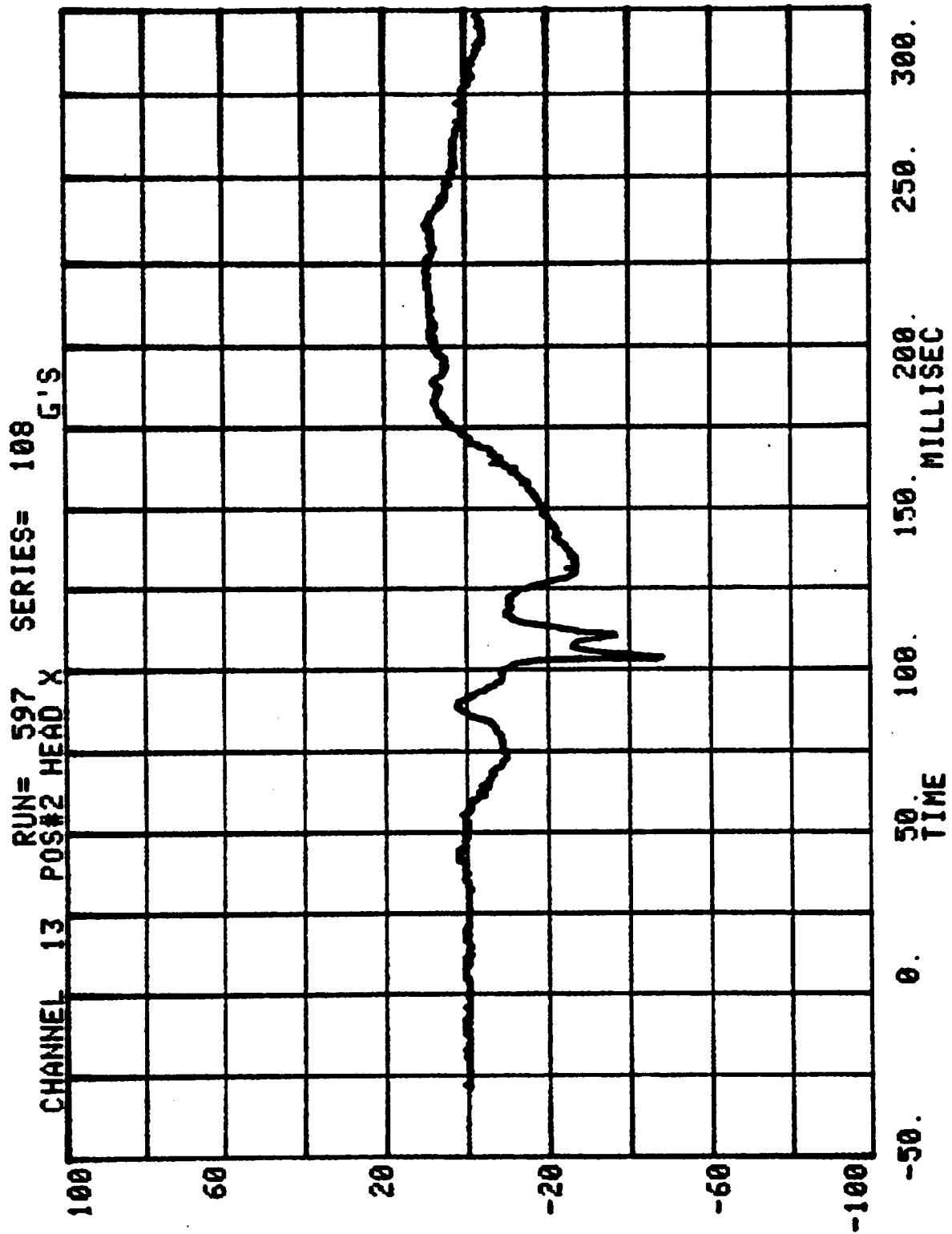
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

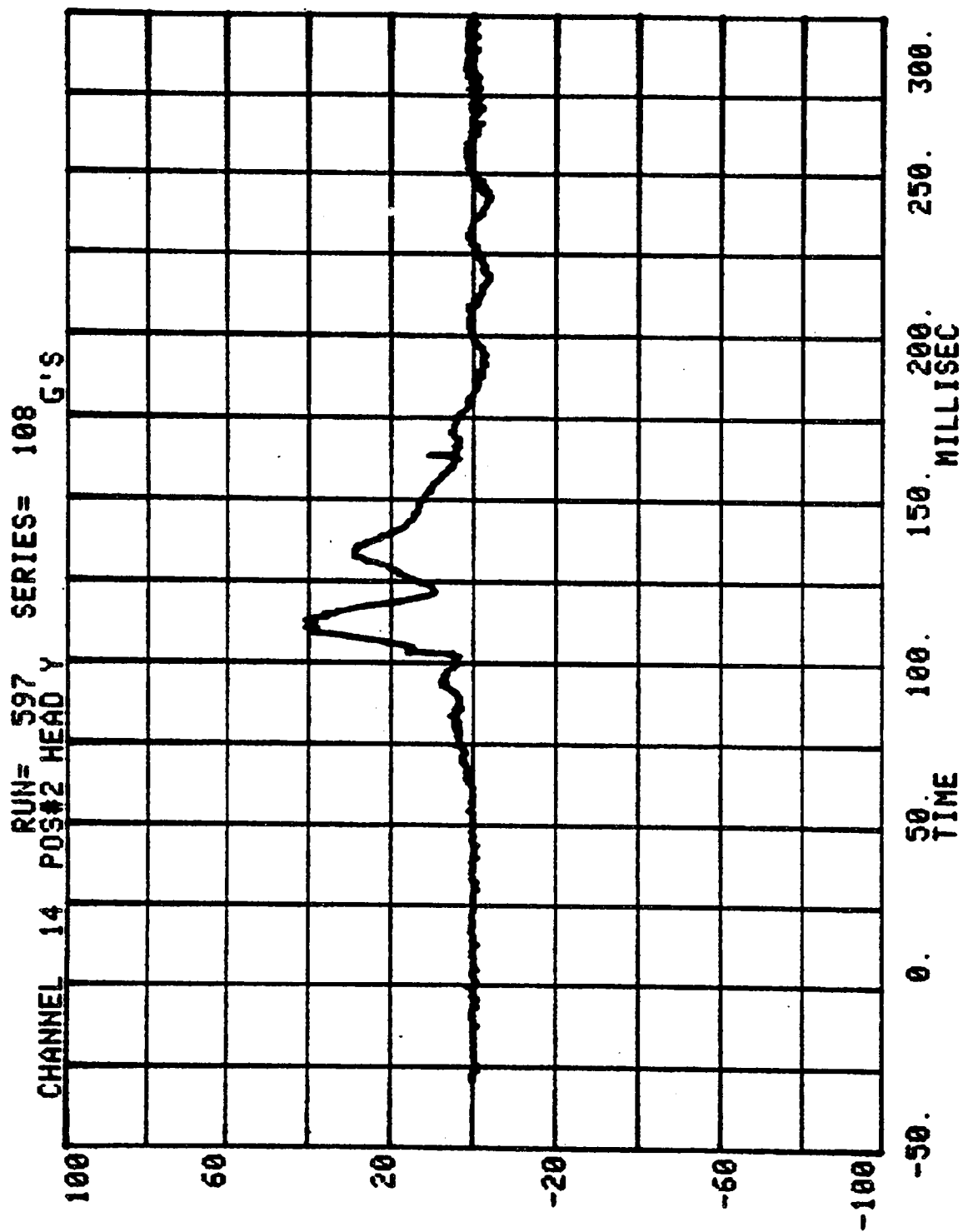
CAR TO LOAD CELL BARRIER

RUN= 597

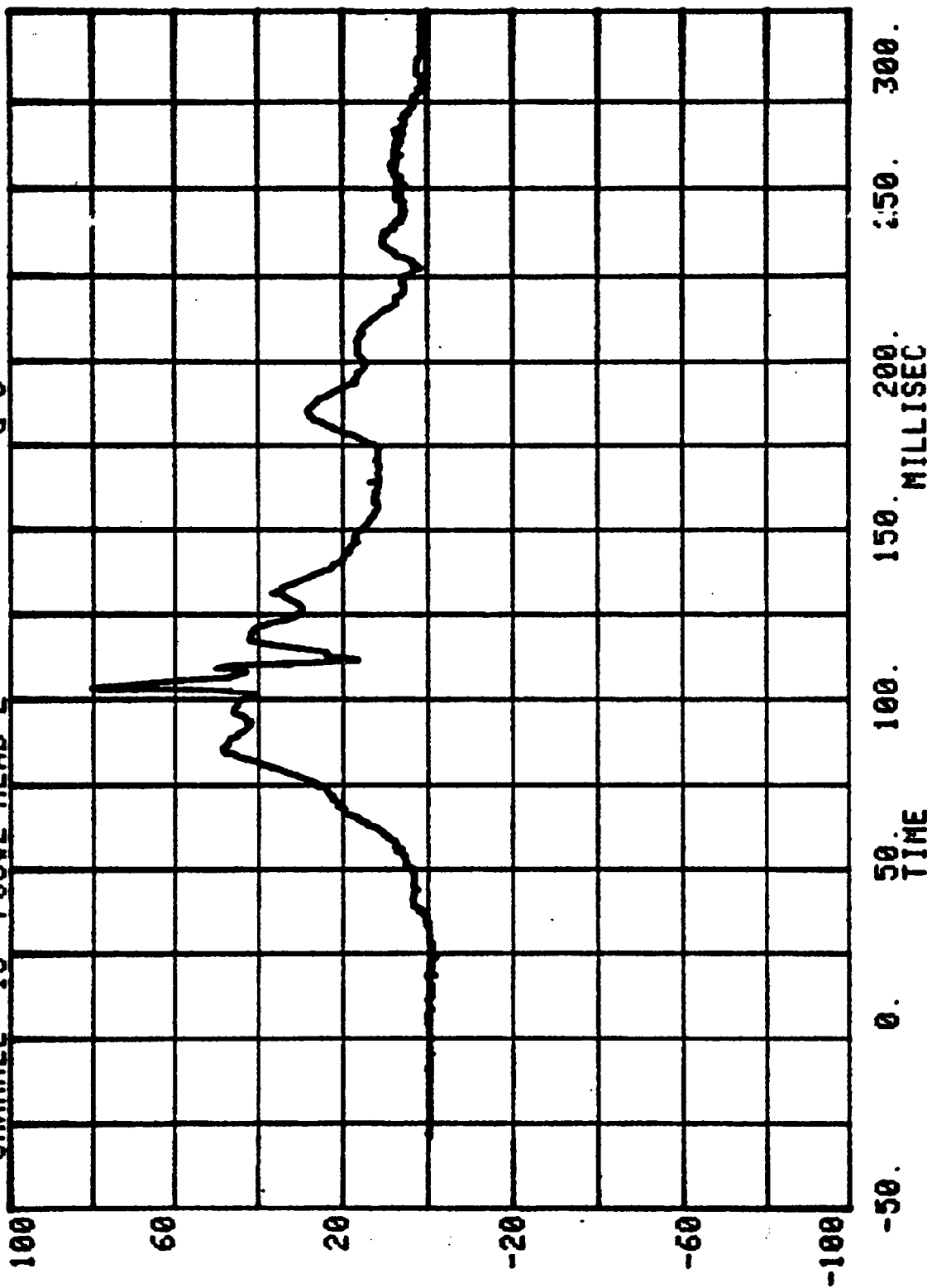
POS#2 HEAD RESULTANT

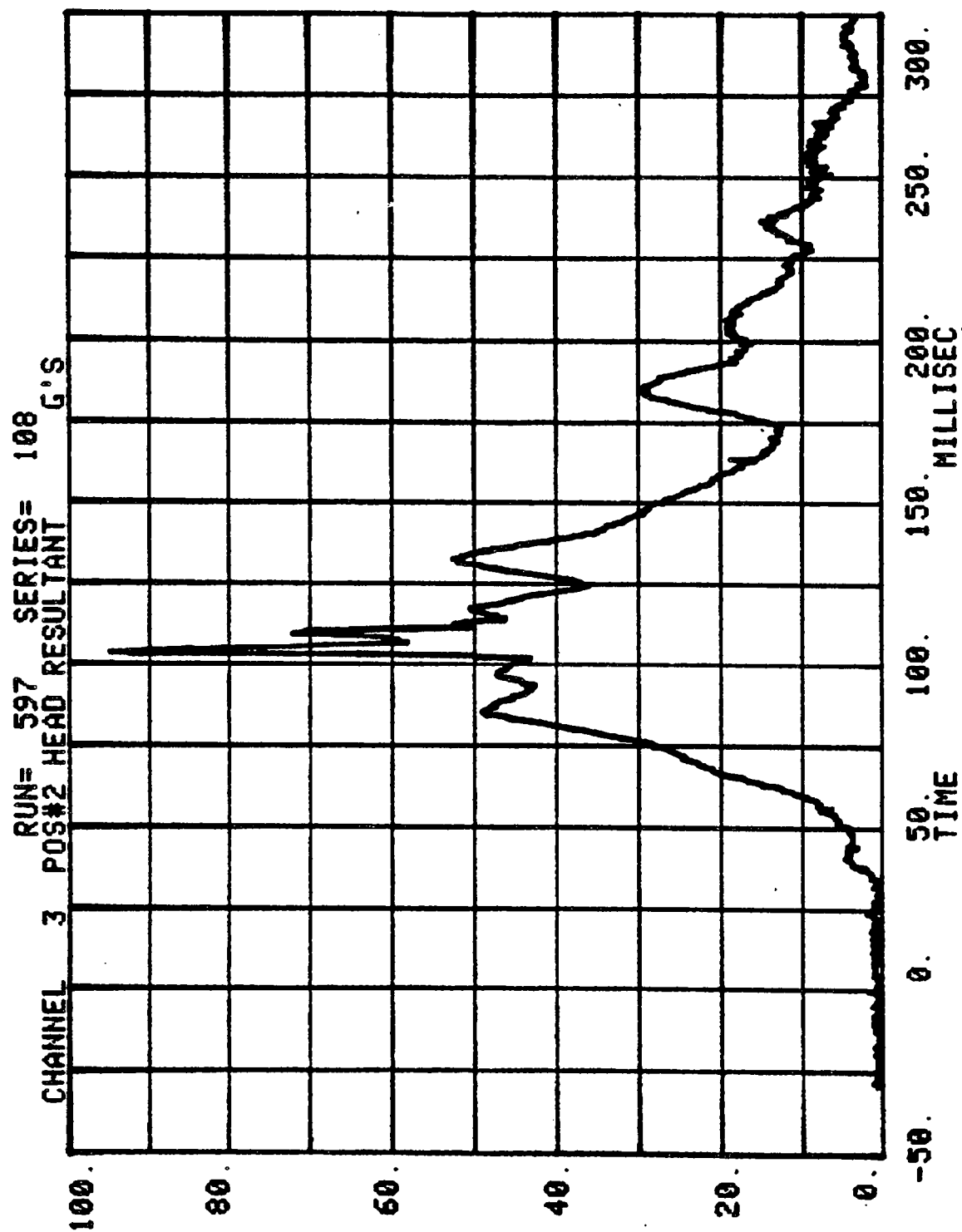
HIC=1055.2 FROM T1= .07447 TO T2= .15037
AVERAGE ACCELERATION BETWEEN T1 AND T2= 45.4G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=1364.3



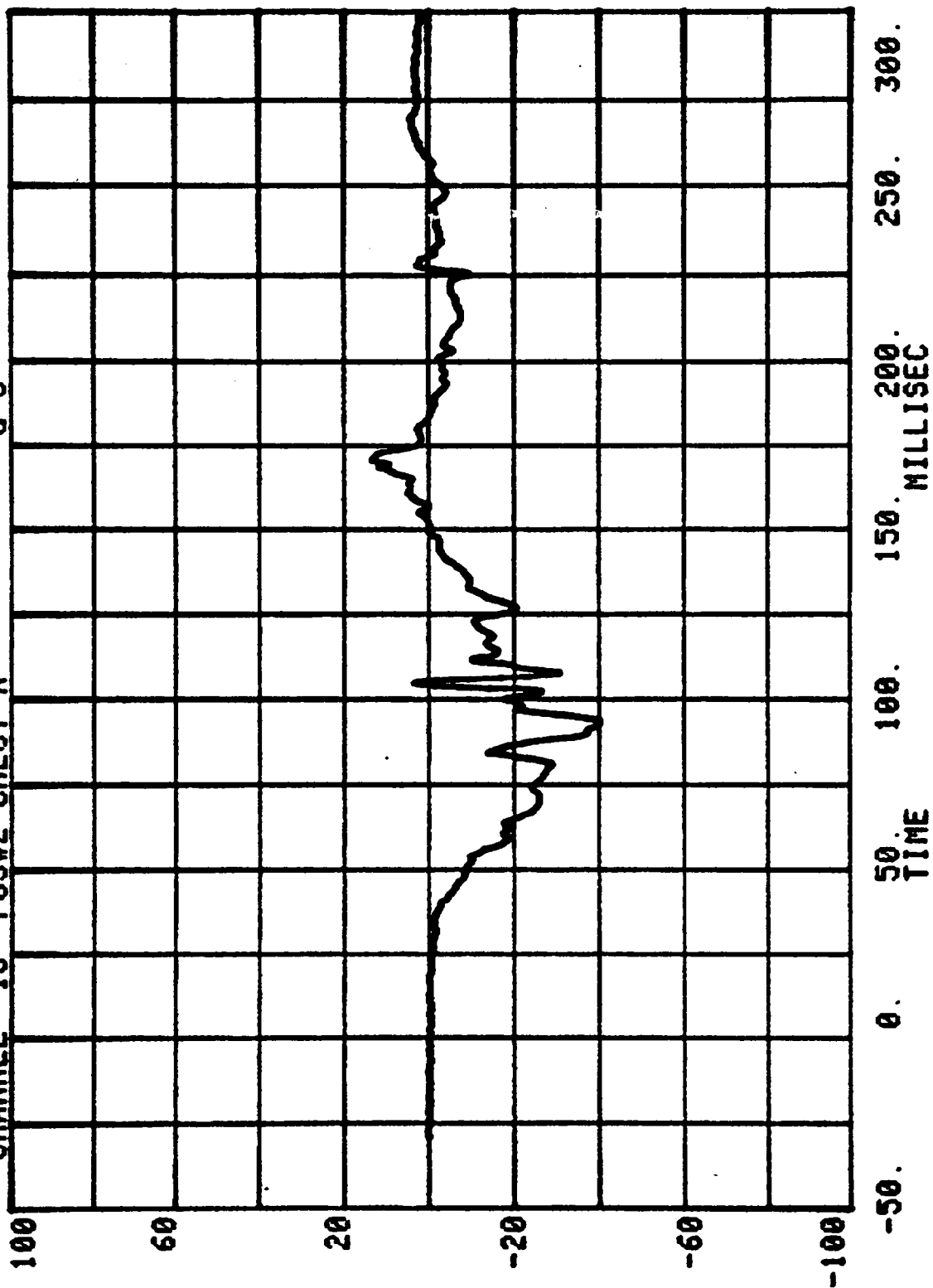


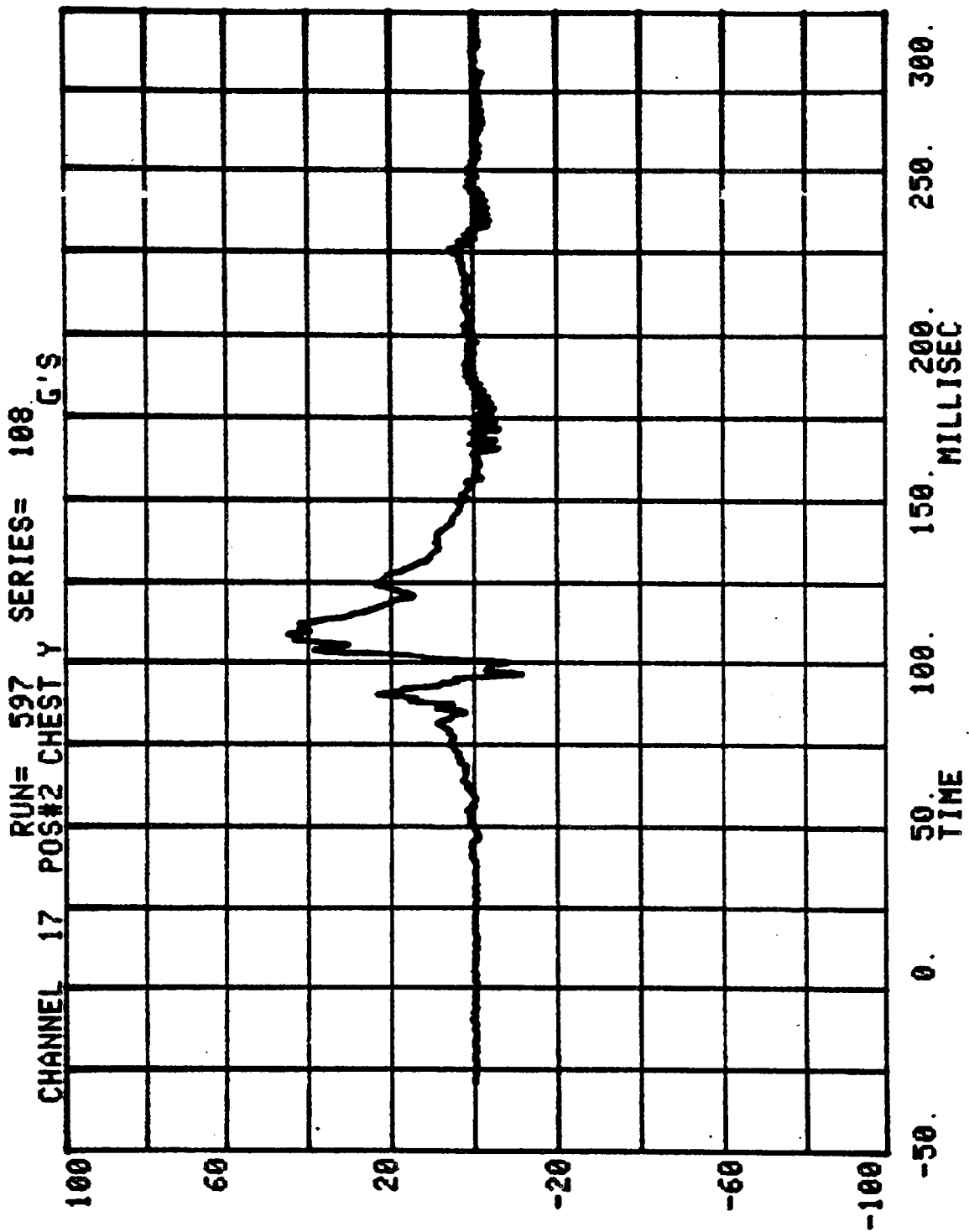
CHANNEL 15 POS#2 HEAD 2 RUN= 597 SERIES= 108 G'S



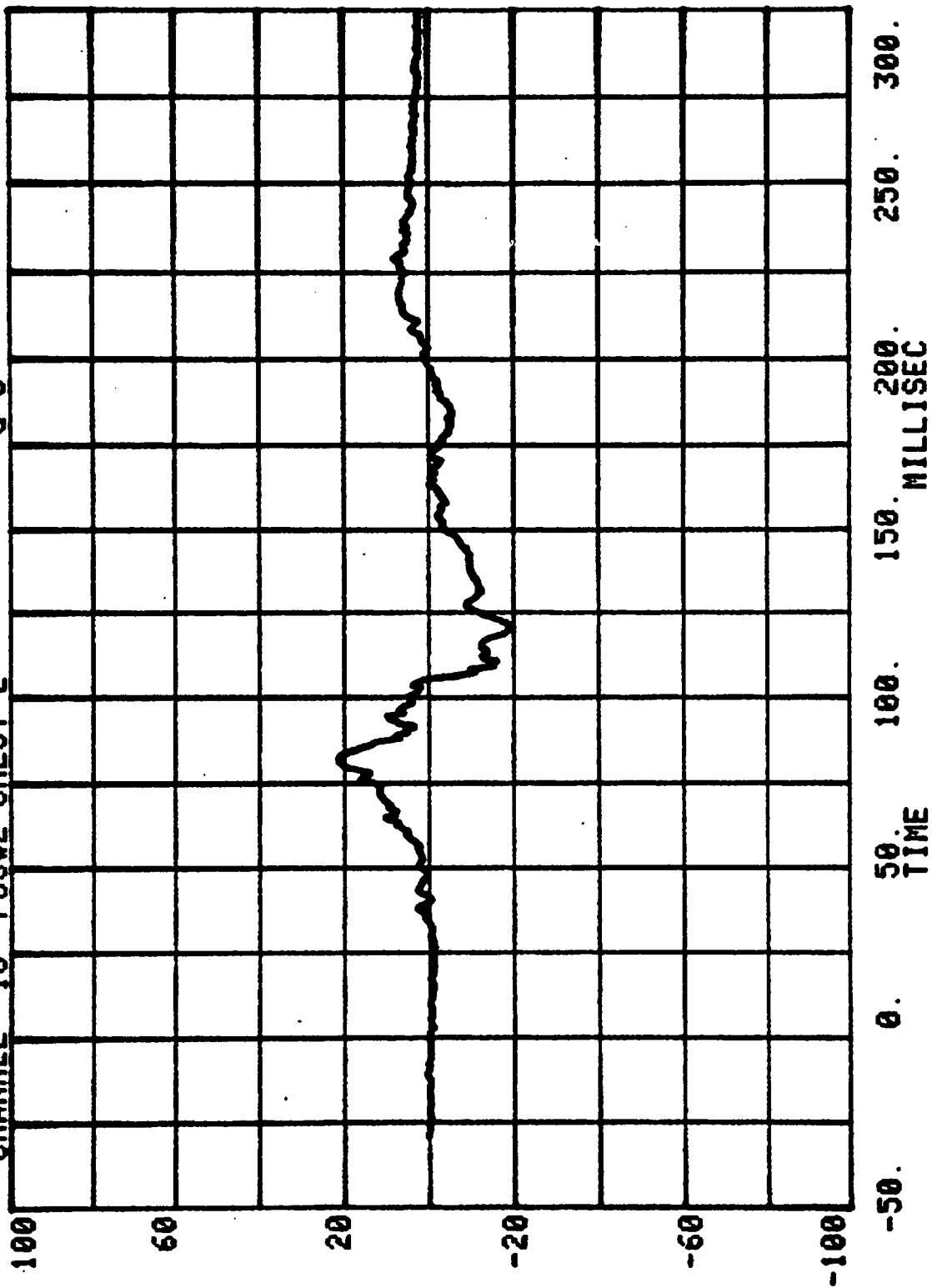


CHANNEL 16 POS#2 CHEST X
RUN= 597 SERIES= 108 G'S



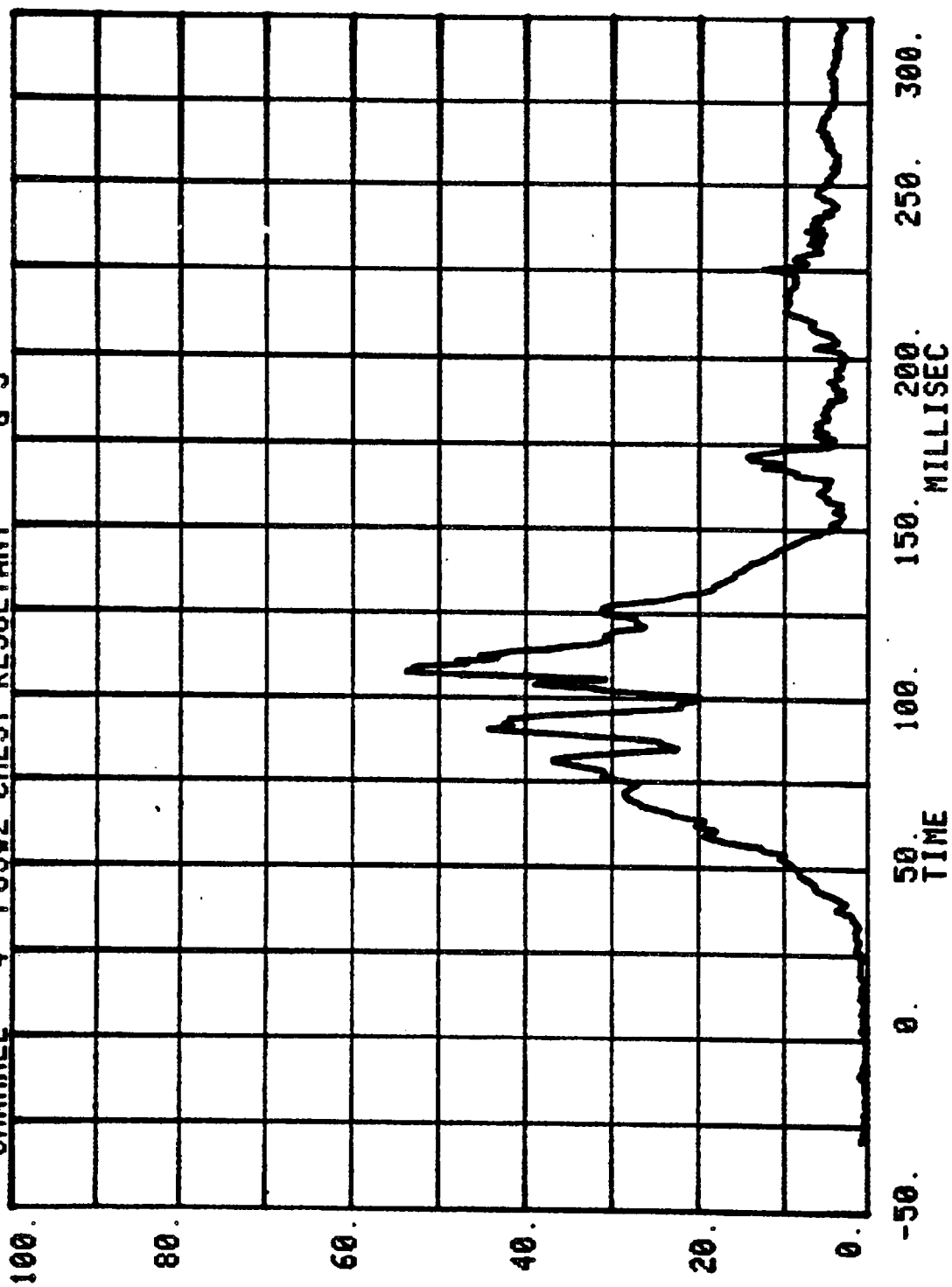


CHANNEL 18 POS#2 CHEST Z RUN= 597 SERIES= 108 G'S



CHANNEL 4 POS#2 CHEST RESULTANT G'S

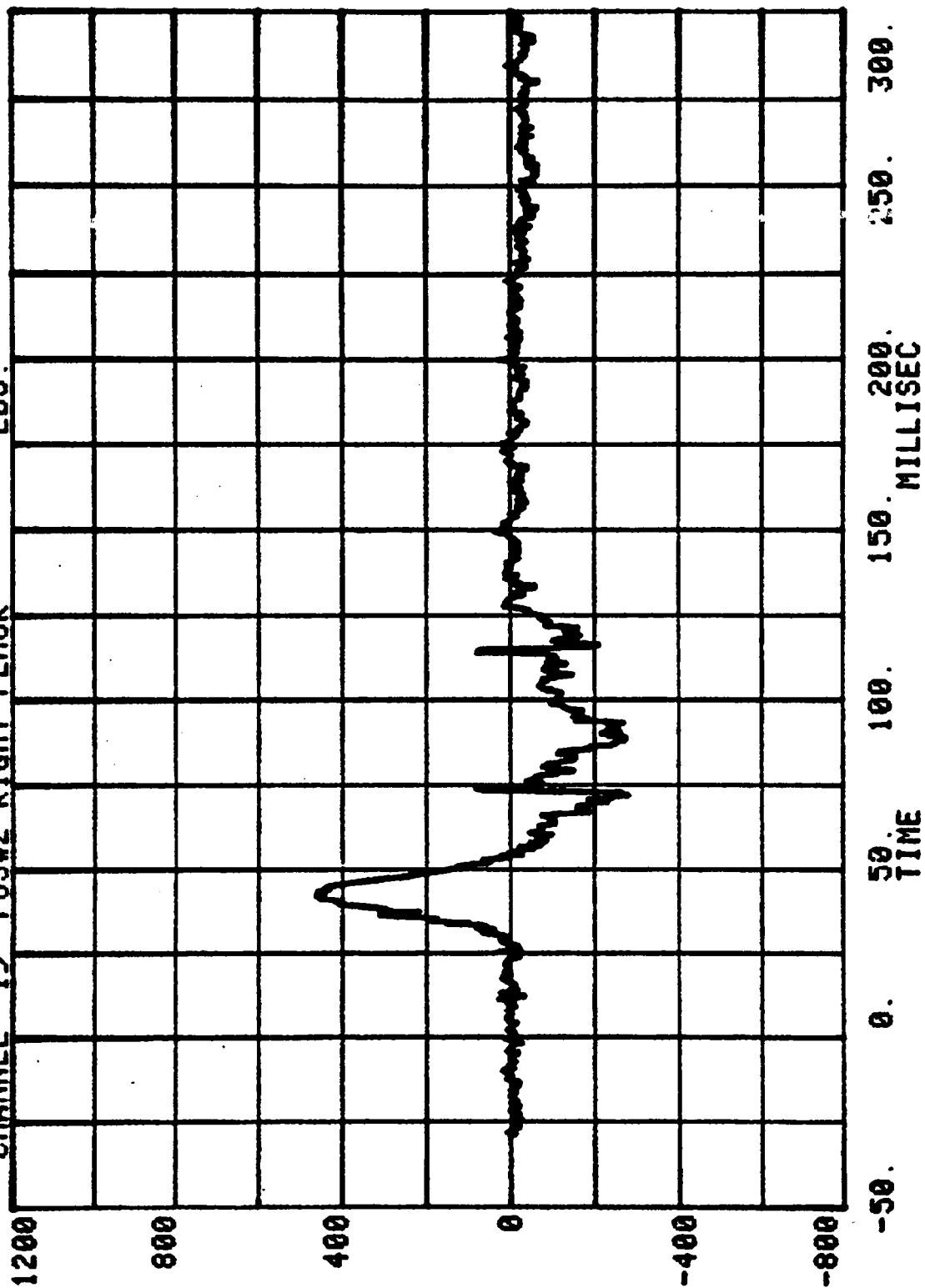
RUN= 597 SERIES= 108

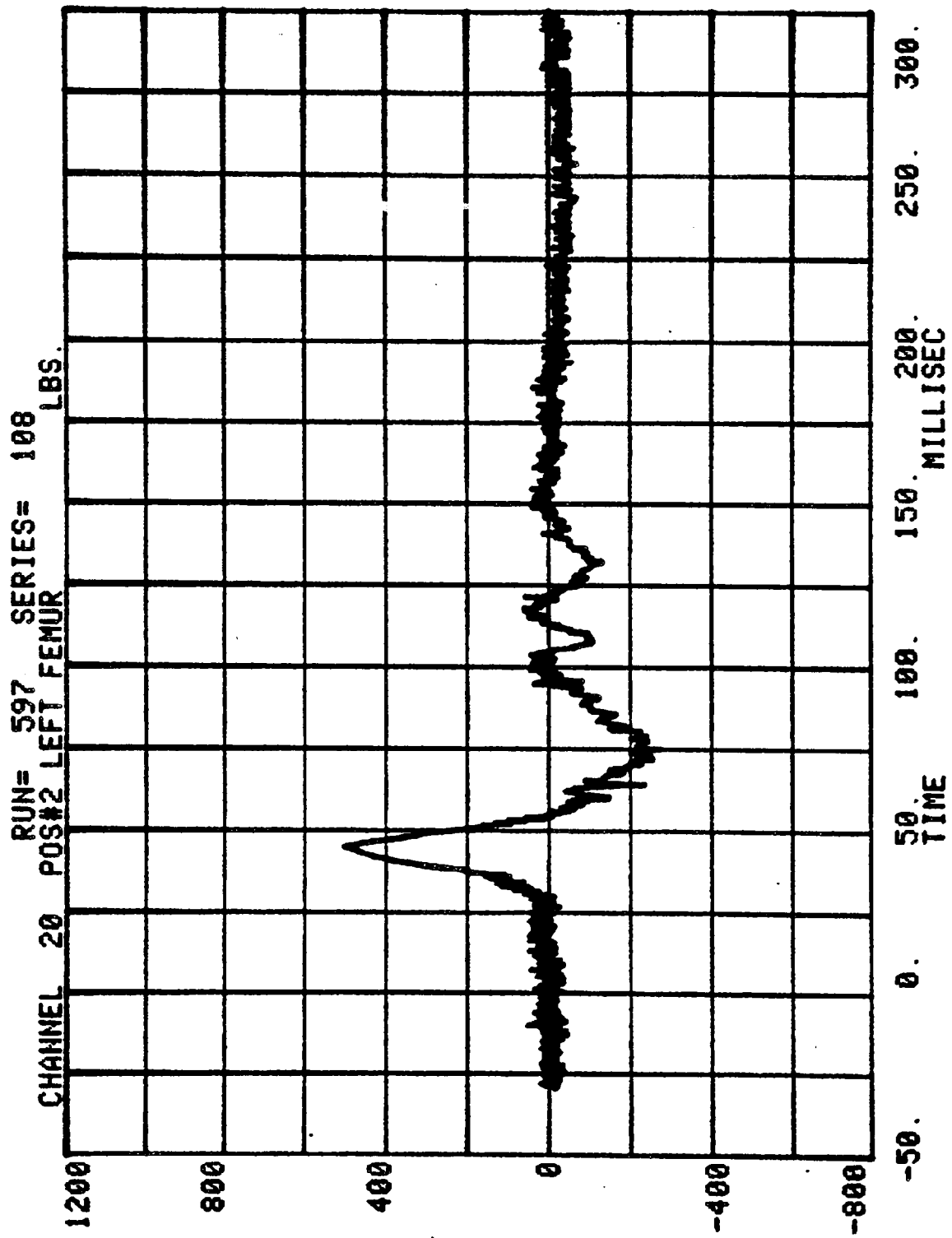


CHANNEL 19 POS#2 RIGHT FEMUR

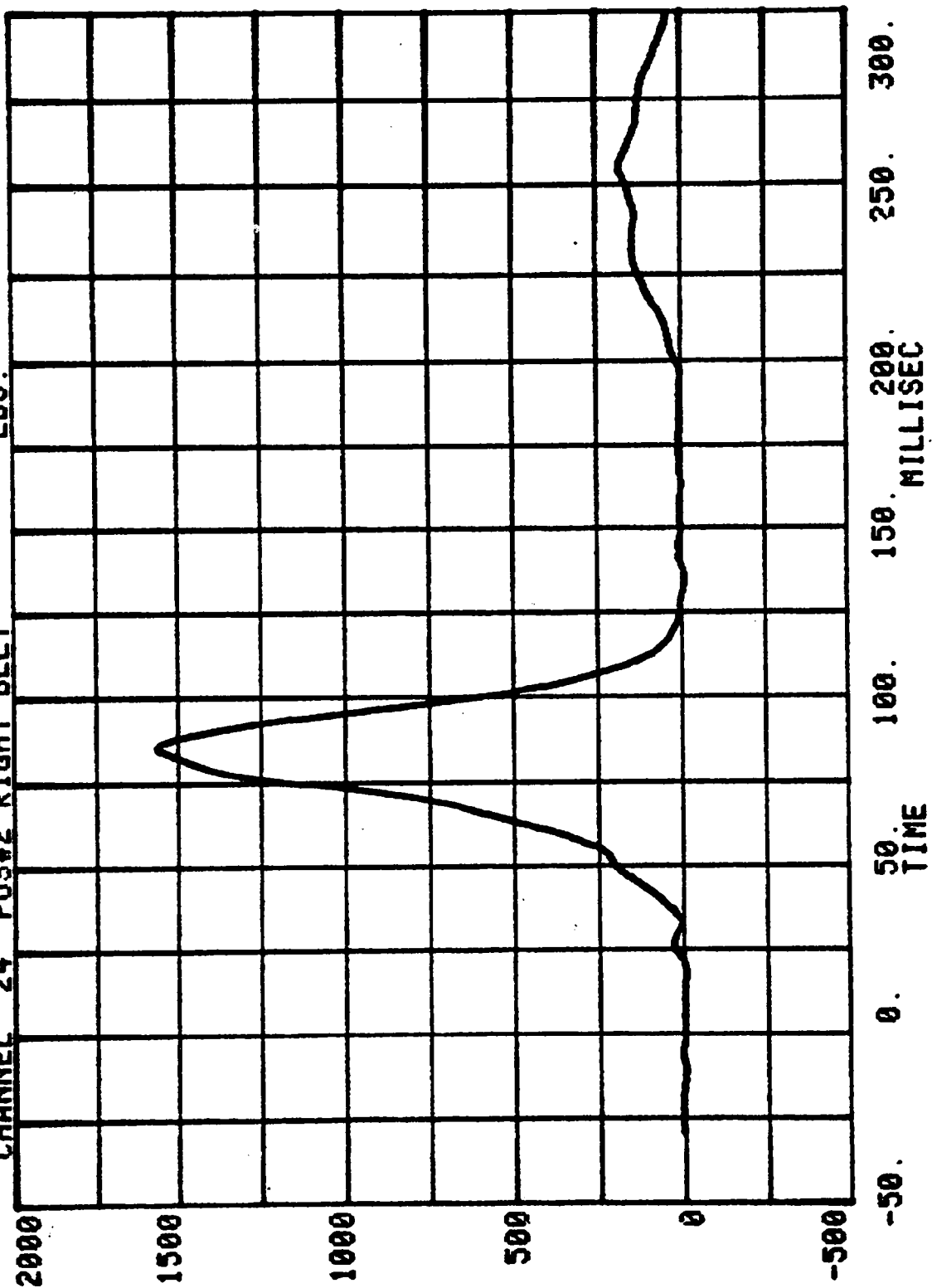
RUN= 597 SERIES= 108

LBS.

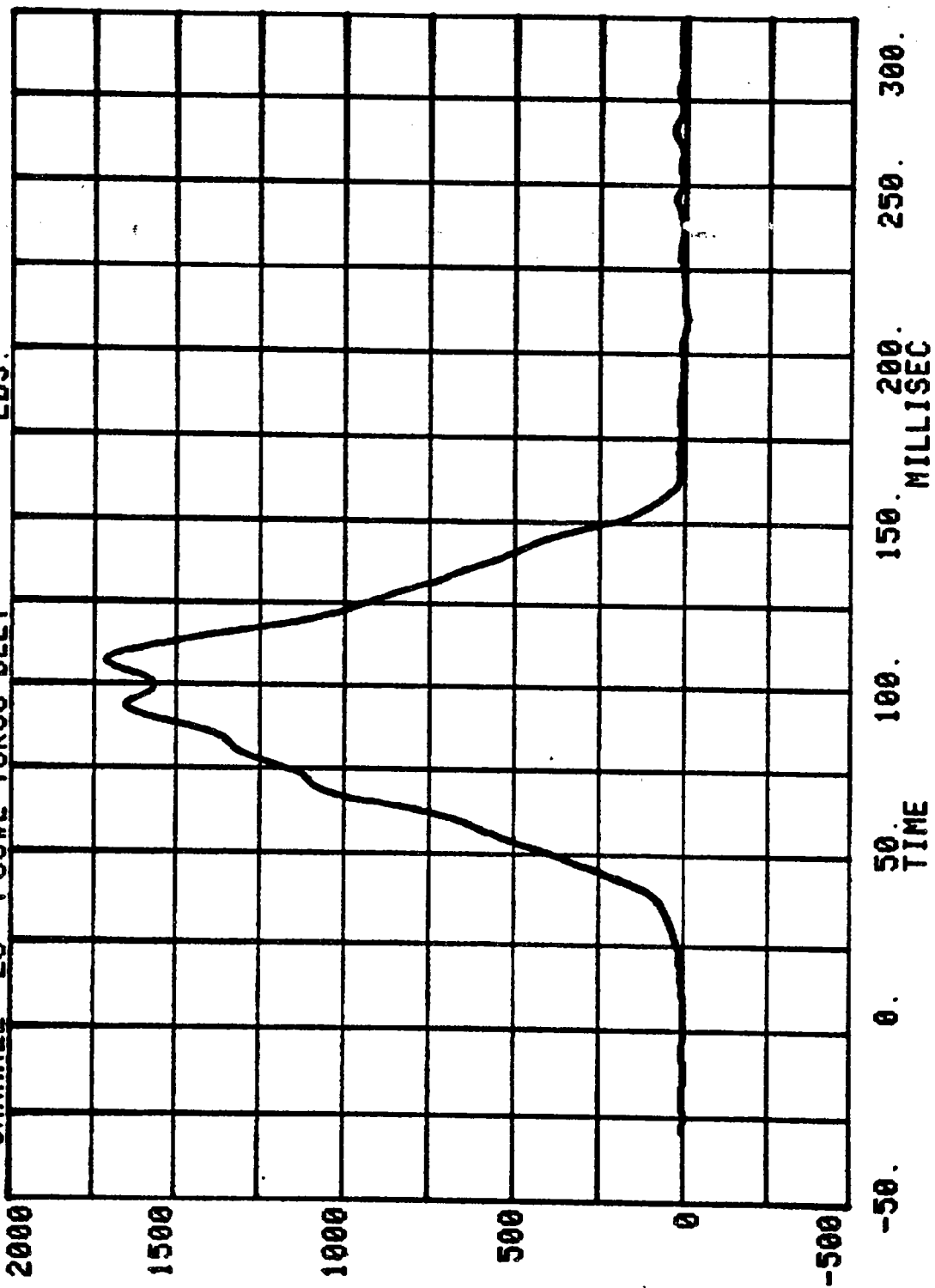




CHANNEL 24 POS#2 RIGHT BELT
RUN= 597 SERIES= 108 LBS.



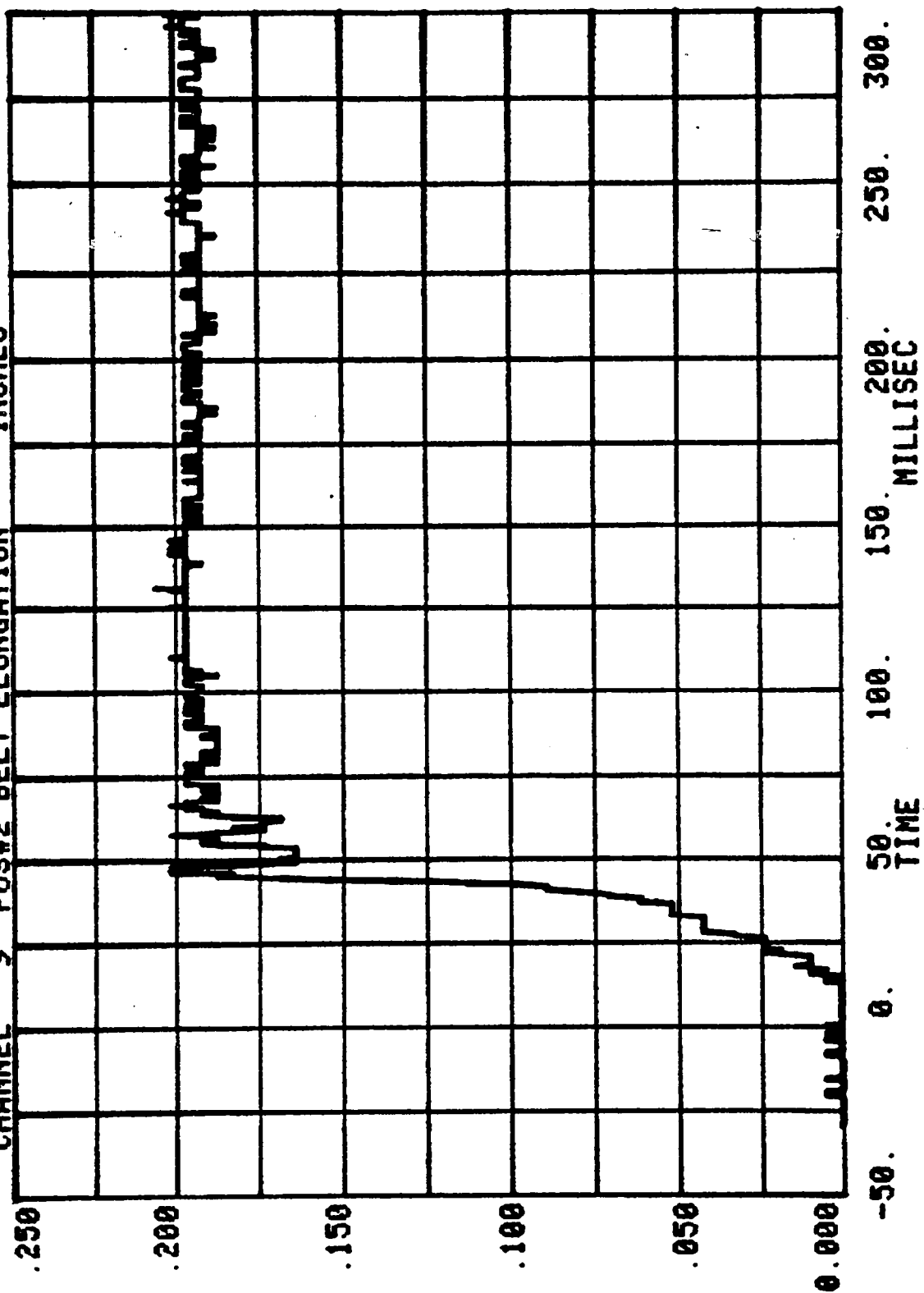
CHANNEL 26 POS#2 TORSO BELT
RUN= 597 SERIES= 108 LBS.



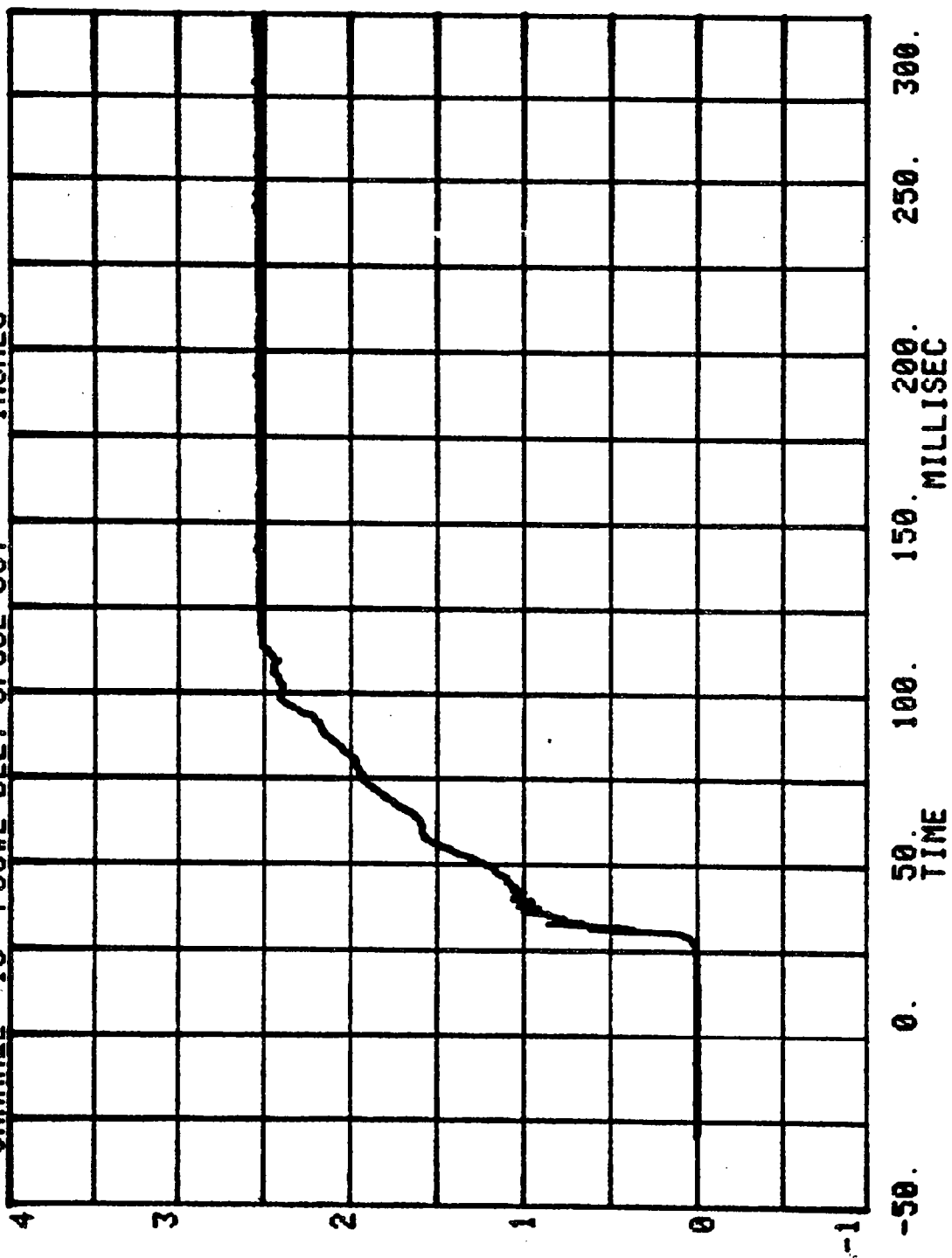
(MEASURED OVER 3 IN.)

CHANNEL 9 POS#2 BELT ELONGATION INCHES

RUN= 597 SERIES= 108



CHANNEL 10 POS#2 BELT SPOOL OUT 108 INCHES



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>
162	9/20/83
1022	9/20/83

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. 162

LABORATORY TECHNICIAN: Gary Gestwick

APPROVED BY: S. Cilione

		Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -		9/13/83-9/20/83	
Calibration Sequential Number for Dummy - - -		9	
Temperature in Lab. (Spec. = 66 to 78°F) - - -		72° - 76°	
Relative Humidity in Lab. (Spec. = 10 to 70%) -		44% - 60%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST:			
a. Peak Resultant Accel. -	210 to 260G	260 g	
b. Peak Lateral Accel. - -	≤10G	4 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	21.7 fps	
b. Pendulum Avg. Decel. (over t ₃ - t ₂) - - -	20 to 24G	24 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	25 g	
d. Pendulum Decel. (t ₂ -t ₁)	≤3 ms	2.2 ms.	
e. Pendulum Decel. (t ₃ -t ₂)	25 to 30 ms	27.5 ms.	
f. Pendulum Decel. (t ₄ -t ₃)	≤10 ms	3.4 ms.	
g. Pendulum Direction Reversal Time - - - -		103 ms.	
h. Max. Head Rotation - -	63 to 73°	67°	
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.	2.8 in.
60°	Time	40.3 to 51.7 ms	45 ms.
	Displ.	4.3 to 5.3 in.	4.8 in.
Maximum	Time	53.2 to 66.8 ms	55.5 ms.
(°)	Displ.	5.0 to 6.0 in.	5.2 in.

Continued

P, 572 DUMMY CALIBRATION TEST DATA Continued:

NHTSA DUMMY ID NO. 162

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. NECK BENDING TEST			
<u>Continued</u>			
i. Chordal Displacement:			
Head Rotation Angle --			
60°	Time	67.0 to 83.0 ms	68 ms.
	Displ.	4.3 to 5.3 in.	4.8 in.
30°	Time	85.4 to 104.6 ms	86 ms.
	Displ.	2.1 to 3.1 in.	2.6 in.
0°	Time	101.0 to 123.0 ms	101 ms.
	Displ.	-.5 to 0.5 in.	0.0 in.
3. ABDOMINAL COMPRESSION TEST:			
(Preload = 10 pounds)			
a. Force @ 1" - - - -	50 to 63 lbs.	52 lbs.	
b. Force @ 1.3" - - - -	73 to 88 lbs.	80 lbs.	
4. LUMBAR FLEXION TEST:			
a. Force @ 20° - - - -	22 to 34 lbs.	27 lbs.	
b. Force @ 30° - - - -	34 to 46 lbs.	39 lbs.	
c. Force @ 40° - - - -	46 to 58 lbs.	51 lbs.	
d. Return Angle - - -	12° maximum	4°	
5. CHEST IMPACT TESTS:			
a. High Speed			
(1) Probe Speed - -	21.78-22.22 fps	21.87 fps	
(2) Peak Deflection -	1.7" maximum	1.24 in.	
(3) Peak Resistive Force - - - - -	2250 lbs. maximum	2100 lbs.	
(4) Internal Hysteresis - - - -	50 to 70%	65.8%	
b. Low Speed			
(1) Probe Speed - - -	13.86-14.14 fps	13.89 fps	
(2) Peak Deflection -	1.1" maximum	.84 in.	
(3) Peak Resistive Force - - - - -	1450 lbs. maximum	1290 lbs.	
(4) Internal Hysteresis- - - -	50 to 70%	50.7%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. 162

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	6.90 fps	
(2) Maximum Force - -	1850 to 2500 lbs	1950 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.2 ms.	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.04 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2350 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.8 ms.	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 162

CALIB. SEQ. NOS. FOR DUMMY: 9 &

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	7/83.	1/84
ENDEVCO	CX05	7/83	1/84
ENDEVCO	CJ54	7/83	1/84
GSE	312	7/83	1/84
GSE	311	7/83	1/84
CEC	22707	7/83	1/84
CEC	22958	7/83	1/84
TRANSDUCER INC	20051	7/83	1/84
BLH	72952	7/83	1/84
CIC	567-11	7/83	1/84

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 1022

LABORATORY TECHNICIAN: Gary Gestwick

APPROVED BY: *E. J. ...*

		Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -		9/13/83-9/20/83	
Calibration Sequential Number for Dummy - - - -		2	
Temperature in Lab. (Spec. = 66 to 78°F) - - - -		72° - 76°	
Relative Humidity in Lab. (Spec. = 10 to 70%) -		44% - 60%	
TEST PARAMETER	SPECIFICATION		
1. <u>HEAD DROP TEST:</u>			
a. Peak Resultant Accel. -	210 to 260G	255 g	
b. Peak Lateral Accel. - -	≤10G	4 g	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.1 ms.	
2. <u>NECK BENDING TEST:</u>			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	21.8 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	2.5 ms.	
e. Pendulum Decel. ($t_3 - t_2$)	25 to 30 ms	26.6 ms.	
f. Pendulum Decel. ($t_4 - t_3$)	≤10 ms	5.3 ms.	
g. Pendulum Direction Reversal Time - - - -		110.5 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	31.5 ms.
	Displ.	2.1 to 3.1 in.	3.0 in.
60°	Time	40.3 to 51.7 ms	44.5 ms.
	Displ.	4.3 to 5.3 in.	4.7 in.
Maximum	Time	53.2 to 66.8 ms	56.5 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			
<u>Continued</u>			
i. Chordal Displacement:			
Head Rotation Angle --			
60°	Time	67.0 to 83.0 ms	73 ms.
	Displ.	4.3 to 5.3 in.	4.6 in.
30°	Time	85.4 to 104.6 ms	91.5 ms.
	Displ.	2.1 to 3.1 in.	2.6 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.	54 lbs.	
b. Force @ 1.3" - - - -	73 to 88 lbs.	80 lbs.	
4. LUMBAR FLEXION TEST:			
a. Force @ 20° - - - -	22 to 34 lbs.	33 lbs.	
b. Force @ 30° - - - -	34 to 46 lbs.	45 lbs.	
c. Force @ 40° - - - -	46 to 58 lbs.	55 lbs.	
d. Return Angle - - -	12° maximum	7°	
5. CHEST IMPACT TESTS:			
a. High Speed			
(1) Probe Speed - -	21.78-22.22 fps	21.88 fps	
(2) Peak Deflection -	1.7" maximum	1.25 in.	
(3) Peak Resistive Force - - - - -	2250 lbs. maximum	1920 lbs.	
(4) Internal Hysteresis - - - -	50 to 70%	60.4%	
b. Low Speed			
(1) Probe Speed - - -	13.86-14.14 fps	13.95 fps	
(2) Peak Deflection -	1.1" maximum	.84 in.	
(3) Peak Resistive Force - - - - -	1450 lbs. maximum	1165 lbs.	
(4) Internal Hysteresis- - - -	50 to 70%	56.7%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. 1022

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	7.0 fps	
(2) Maximum Force - -	1850 to 2500 lbs	1850 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.2 ms.	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.94 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2250 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.1 ms.	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1022

CALIB. SEQ. NOS. FOR DUMMY: 2 &

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	7/83	1/84
ENDEVCO	CX05	7/83	1/84
ENDEVCO	CJ54	7/83	1/84
GSE	312	7/83	1/84
GSE	311	7/83	1/84
CEC	22707	7/83	1/84
CEC	22958	7/83	1/84
TRANSDUCER INC	20051	7/83	1/84
BLH	72952	7/83	1/84
CIC	567-11	7/83	1/84