

DOT 818

REPORT NO. CAL-85-N-13

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

FORD MOTOR COMPANY
1985 FORD TEMPO
4-DOOR SEDAN

NHTSA NO. CF0202
CALSPAN TEST NO. 7333-14

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MAY 16, 1985



FINAL REPORT

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U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
400 SEVENTH STREET, S.W.
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16. Abstract A frontal load cell barrier test of a 1985 Ford Tempo 4-door sedan was performed at the Calspan Corporation, Advanced Technology Center crash test facility in Buffalo, New York, on April 16, 1985. Impact speed was 34.8 mph, and the ambient temperature at the barrier force at the time of impact was 58°F. The maximum post-test vehicle crush was 22.8 inches. The test vehicle appeared to comply with the indicant requirements of the following Federal Motor Vehicle Safety Standard. 1. FMVSS No. 212, "Windshield Mounting" 2. FMVSS No. 219 (Partial), "Windshield Zone Intrusion" 3. FMVSS No. 301-75, "Fuel System Integrity" <u>Type of Restraint System</u> 3-point continuous webbing manual system at each front outboard seating position.					
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SECTION 1

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 85 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-84-D-01149. The purpose of this test was to obtain vehicle crash-worthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph FMVSS 212/219/301-75 requirements.

The 35 mph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test Procedure. Standards Enforcement Indicant Test Program data for FMVSS No. 212, "Windshield Mounting," FMVSS No. 219 (Partial), "Windshield Zone Intrusion," FMVSS No. 301-75, "Fuel System Integrity," as well as occupant performance data are provided herein.

SECTION 2
SUMMARY OF TEST NUMBER CF0202

A load cell barrier consisting of 36 load cells was impacted by a 1985 Ford Tempo 4-door sedan at a velocity of 34.8 mph. The test was performed at the Calspan Corporation Advanced Technology Center on April 16, 1985. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 16 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

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

Both ATDs were fully instrumented with head and chest triaxial accelerometers and right/left femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver ATD (Serial 1020) and the right-front passenger ATD (Serial 1022) had been used in a previous test (CF5902) and the Injury Criteria values were not exceeded in that test. Certification details, along with instrumentation calibration data are found in Appendix C.

The 67 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the steering wheel rim and hub and his HIC was 1207. The maximum chest deceleration over 3 milliseconds was 52 g's and femur loads were 580 and 870.

The right-front passenger HIC was 932 and maximum chest deceleration over 3 milliseconds was 40 g's. Femur loads were 310 and 440 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

Vehicle Year/Make/Model/Body Style 1985 Ford Tempo 4-door sedan

NHTSA No. CF0202 VIN. 2FABP22X6FB159953

Body Color Dark Red Date of Manufacture 12-84

Engine: 4 cylinders; -- C.I.D.; 2.3 Liters; -- CC
X Gas; -- Diesel; -- Turbocharged
-- Longitudinal; -- Transverse

Transmission 5 Speed X Manual -- Automatic -- Overdrive
Final Drive; X Front Wheel; -- Rear Wheel; -- Four Wheel

Date Received 1-3-85 Odometer Reading; 16
-- A/C; -- P/S; X P/B; -- P/wdo.; -- Tilt Wheel
-- P/seats; -- Cruise Control

Type of Occupant Restraint 3-Point Continuous Belt

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 30 psi, Rear 30 psi

Recommended Tire Size: P175/80R13

Recommended Cold Tire Pressure: Front 30 psi, Rear 30 psi

Tires on Vehicle: P175/80R13; Manufacture: Michelin

Number of Occupants: 2 Front; 3 Rear; -- 3rd Seat; 5 TOTAL

Type of Front Seats: X Bucket; -- Bench; -- Split Bench

Type of Front Seat Back: -- Fixed; X Adj. With X Lever -- Rot. Knob

Vehicle Capacity Weight (VCW) = 850 lbs. (A)

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

Rated Cargo and Luggage Weight (RCLW) A-B = 100 lbs.

GVWR 3650 lbs. GAWR: Front 1954 lbs. Rear 1795 lbs.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 780 lbs. Right Rear = 510 lbs.
 Left Front = 760 lbs. Left Rear = 560 lbs.
 TOTAL FRONT WEIGHT = 1540 lbs. (59 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1070 lbs. (41 % of Total Vehicle Weight)
 TOTAL DELIVERY WEIGHT = 2610 lbs.

CALCULATION FOR TARGET TEST WEIGHT

UDW = Unloaded Delivered Weight (2610 lbs.)
 VCW = Vehicle Capacity Weight (850 lbs.)
 DSC = Designated Seating Capacity (5)
 RCLW = VW - 150 (DSC) = 100 lbs.
 Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)
 Target Test Weight = 3038 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 52 POUNDS CARGO

Right Front = 860 lbs. Right Rear = 640 lbs.
 Left Front = 820 lbs. Left Rear = 670 lbs.
 TOTAL FRONT WEIGHT = 1680 lbs. (56.2 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1310 lbs. (43.8 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 2990 lbs.

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

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitude: RF 26.2 LF 26.5 RR 25.5 LR 25.5
 Test Attitude: RF 25.4 LF 25.7 RR 23.8 LR 24.0
 Wheel Base: 100.0 in.; C.G. = 43.8 in. rearward of front wheel C/L
 Remarks: None

Table 1

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

Type of Test Frontal Barrier Impact Angle 0 °

Date of Test 4/16/85 Time of Test 1155 hrs.

Ambient Temperature 58 °F. at impact area

Temperature in Occupant Compartment 72 °F.

Windshield Molding Temperature 68 °F.

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: primary = 34.8 mph, secondary 35.0 mph

Distance From Front Bumper to Barrier Face When Entering Speed Trap 52 inches; Exiting Speed Trap 12 inches

VEHICLE REBOUND AND CRUSH (inches)

Vehicle Length: Pre-test = R 174.5 C 176.3 L 174.5

Post-test = R 153.5 C 154.0 L 151.7

Crush = R 21.0 C 22.3 L 22.8

Distance from front of test vehicle to point of impact:

R 11.6 C/L 12.1 L 13.3

VISIBLE DUMMY CONTACT POINTS

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Steering Wheel Rim and Hub</u>	<u>Dash Panel</u>
Chest	<u>None</u>	<u>None</u>
Abdomen	<u>Lower Wheel Rim</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>

Table 1
GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Door Opening	<u>Not</u> <u>Operable</u>	<u>Not</u> <u>Operable</u>	<u>Not</u> <u>Operable</u>	<u>Not</u> <u>Operable</u>
	<u>Front</u>			
<u>Seat Movement</u>	<u>Left</u>	<u>Right</u>		
Seat Back Failure	<u>Intact</u>	<u>Intact</u>		
Seat Shift (in.)	<u>None</u>	<u>2" Forward</u>		
 <u>Glazing Damage</u>				
Backlight/Windshield	<u>slight cracks in windshield</u>			

SECTION 3

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

- o "Windshield Mounting," FMVSS No. 212 Data
- o "Windshield Zone Intrusion," FMVSS No. 219 (Partial) Data
- o "Fuel System Integrity," FMVSS No. 301-75

Figure 1

FMVSS NO. 212, "WINDSHIELD MOUNTING", DATA SHEET

Details of windshield mounting such as retention method, trim type, etc.:

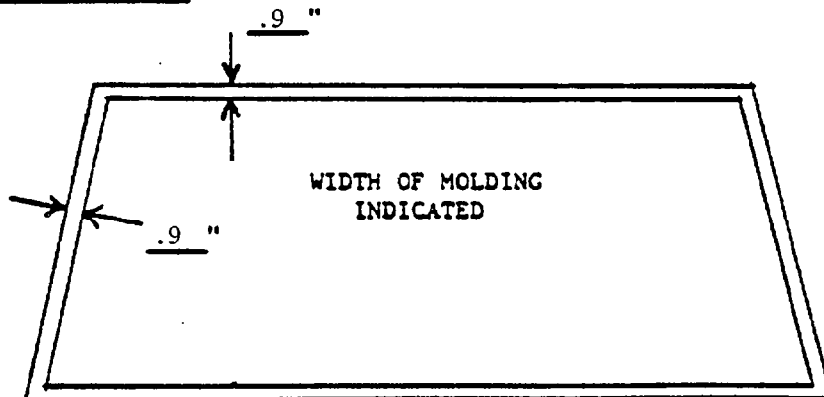
Windshield is bonded in place and has a .9 inch chrome strip along the top and sides.

FMVSS 212 REQUIREMENTS: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		
	PRE-TEST (in.)	POST-TEST (in.)	PERCENT RETENTION
RIGHT SIDE	76.7	76.7	100%
LEFT SIDE	76.7	76.7	100%
TOTAL	153.4	153.4	100%

AREA OF RETENTION FAILURE:



FAILURE DETAILS:

None

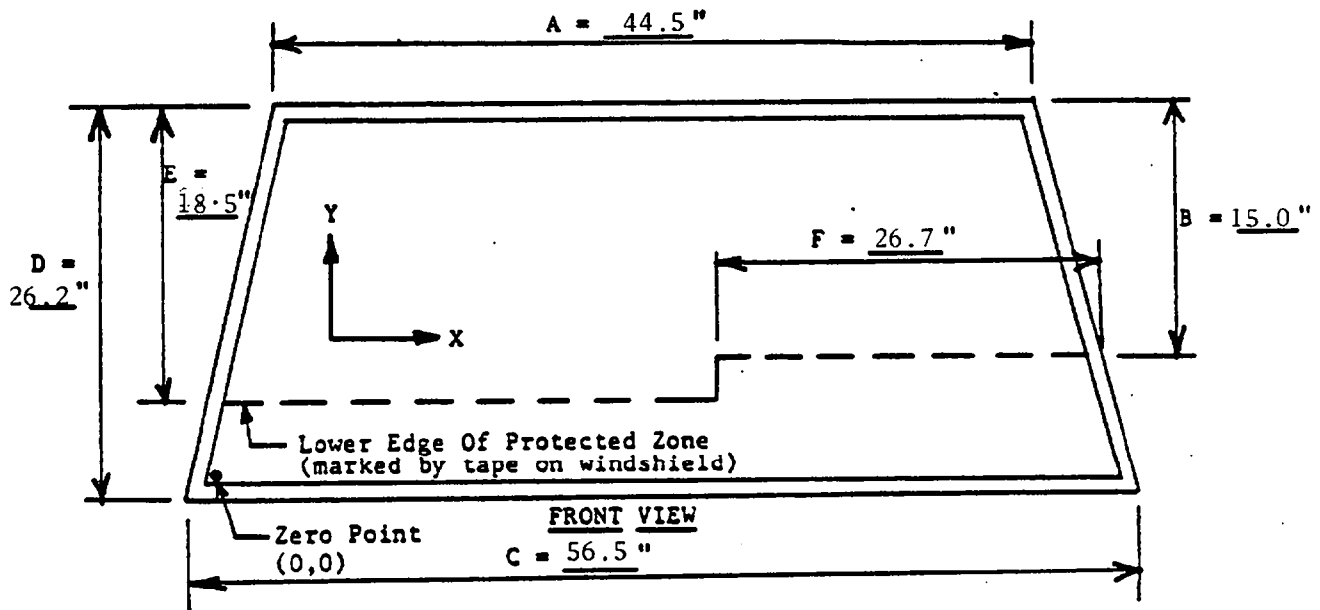
Figure 2

FMVSS NO. 219, (PARTIAL) "WINDSHIELD ZONE INTRUSION", DATA SHEET

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 1/2" distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

FMVSS 219 TEST DATA:



DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":
(Show location of penetration on above sketch)

None

COORDINATES	
X	Y
1.	
2.	
3.	
4.	

Figure 3

FMVSS NO. 301-75, "FUEL SYSTEM INTEGRITY", DATA SHEETS

TEST VEHICLE NHTSA NO.: CF0202; TEST DATE: 4/16/85

VEHICLE MAKE/MODEL/BODY STYLE: 1985 Ford Tempo 4-door sedan

USABLE CAPACITY OF VEHICLE'S FUEL TANK: 15.2 Gallons (figure furnished by
vehicle manufacturer)

TEST REQUIREMENTS:

Test vehicle's engine operated to "run dry" condition, and then a small amount of Stoddard solvent which has been dyed RED shall be added to the vehicle's fuel tank. Operate the fuel pump enough to completely fill the fuel system ahead of the fuel tank, and add 92 to 94% of the stated USABLE CAPACITY to the fuel tank.

AMOUNT OF STODDARD SOLVENT ADDED TO VEHICLE'S FUEL TANK:

14.1 Gallons Which is 93 % of the Stated USABLE CAPACITY.

SOLVENT SPILLAGE MEASUREMENT AFTER 35 MPH FRONTAL BARRIER IMPACT TEST:

	<u>Actual</u>	<u>Maximum Allowable</u>
From impact until vehicle motion ceases - - - -	<u>0</u>	1 oz.
For 5 min. period after vehicle motion ceases -	<u>0</u>	5 oz.
For next 25 minutes at barrier face - - - - -	<u>0</u>	1 oz./1 minute

SOLVENT SPILLAGE DETAILS:

None

STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1 to 3 minutes)

Time reqd. for machine to rotate 90° = 2 minutes, 57 seconds
FMVSS 301-75 Position Hold Time = 5 minutes, 0 seconds
TOTAL- - - - - = 7 minutes, 57 seconds
Next Whole Minute Interval - - - - - = 8 minutes

Figure 3

FMVSS NO. 301-75 TEST DATA....Continued:

VEHICLE STATIC ROLLOVER DATA:

	First 5 Minutes FROM ONSET OF ROTATION	6th. Minute	7th. Minute	8th. Minute
Maximum Allowable Solvent Spillage - -	5 oz.	1 oz.	1 oz.	1 oz.
0 to 90° (filler cap down) - - - - -	0	0	0	0
90 to 180° - - - - -	0	0	0	0
180 to 270° - - - - -	0	0	0	0
270 to 360° - - - - -	0	0	0	0

Note: Tailpipe struck and slightly dented fuel tank at impact (Figure A-23).

OMI FINAL DATA

SECTION 4

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Driver Dummy to Steering Column Dimensions
6. Camera Locations
7. Vehicle Target Locations

II. OVR DATA

1. Load Cell Barrier Data
2. Vehicle Accelerometer Data

III. AID DATA

1. Test Vehicle Measurements
2. Accident Investigation Damage Data Summary

Table 2

DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R *
DUMMY (1)	-152	-27	98	180	-51	-12	15	52
DUMMY (2)	-34	51	109	117	-42	-41	15	40
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	580	870
DUMMY (2)	310	440
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)	1910	--	1015
DUMMY (2)	1750	1525	--
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**			
	HIC	t ₁ (SEC)	t ₂ (SEC)	AVE. ACC. (g) t ₁ TO t ₂
DUMMY (1)	1207	.07290	.08700	94
DUMMY (2)	932	.07980	.10920	63
DUMMY (3)				
DUMMY (4)				

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Figure 4

PART 572 DUMMY IN-VEHICLE POSITION

Test No. CF0202

Vehicle 1985 Ford Tempo 4-Door Sedan

SEAT TYPE:

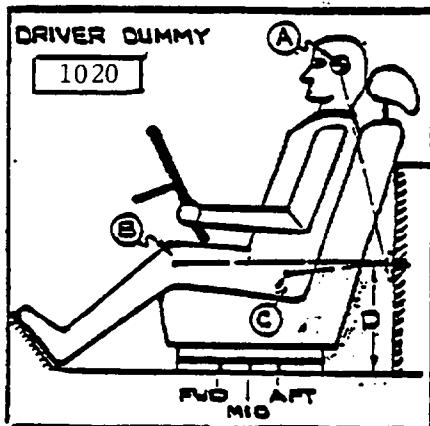
 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

 X Manual
 Power

BUCKET SEAT BACK TYPE:

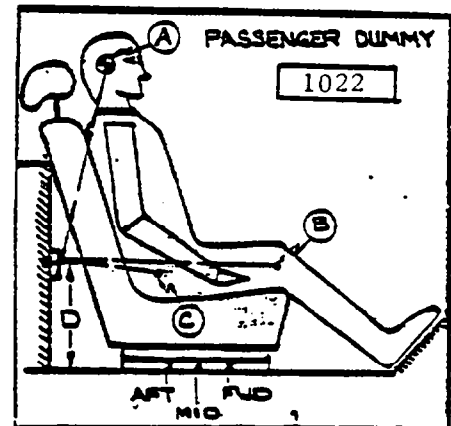
 Fixed
 X Adjustable Reclining



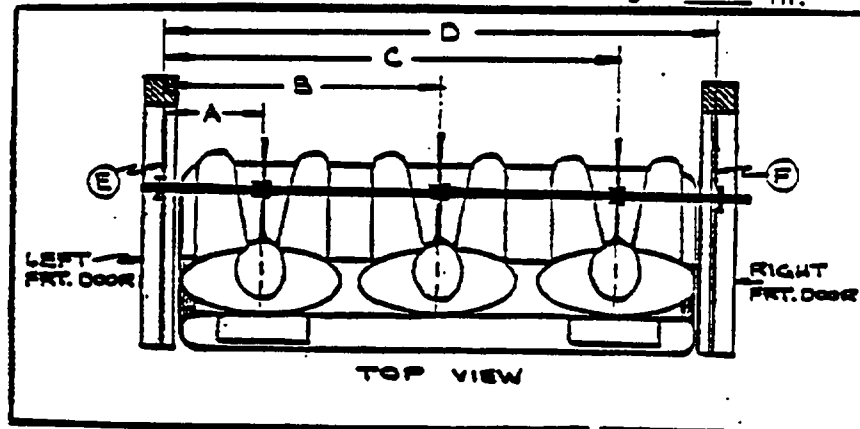
A = 20.2 in. -1 Degrees
B = 21.1 in. 97 Degrees
C = 8.0 in. 140 Degrees
D = 14.5 in.

MEASUREMENT LOCATION

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



A = 20.7 in. 0 Degrees
B = 21.2 in. 99 Degrees
C = 7.8 in. 140 Degrees
D = 14.5 in.



DUMMY ID

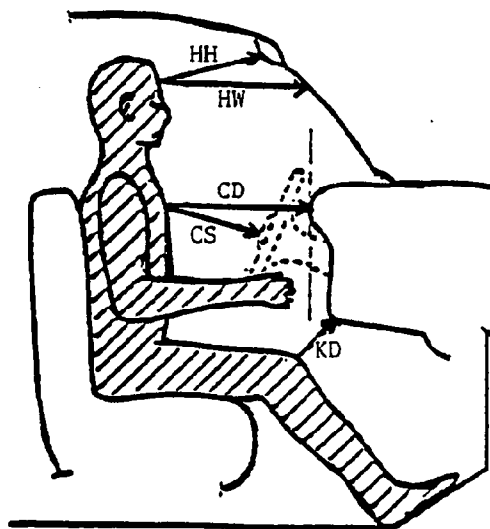
1020

1022

A	=	Left Door to Driver Centerline	<u>11.7 in.</u>
B	=	Left Door to Center Passenger Centerline	<u>-- in.</u>
C	=	Left Door to Right Passenger Centerline	<u>37.7 in.</u>
D	=	Left Door to Right Door	<u>49.4 in.</u>
E, F	=	Window Glass Height (Right and Left Must be Equal)	<u>10.7 in.</u>

	DRIVER	PASSENGER
HH	10.2"	10.0"
HW	17.7"	17.7"
CD	21.0"	22.5"
CS	13.7"	--
KDL	3.4"	5.1"
KDR	4.2"	5.1"
SA	2nd Notch	2nd Notch
TA	25°	25°

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 seat rail has 15 notches and the seat was set in the 8th notch.

Passenger seat rail has 13 notches and the seat was set in the 7th notch.

	DRIVER	PASSENGER
HR	5.5"	5.5"
HS	8.7"	8.8"
AD	3.7"	4.2"
HD	6.4"	6.6"

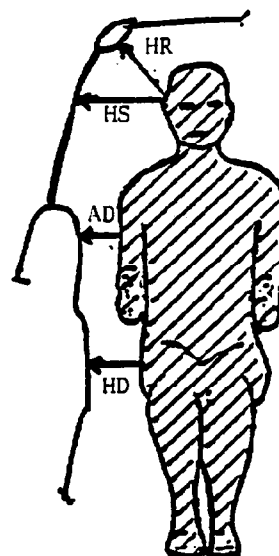
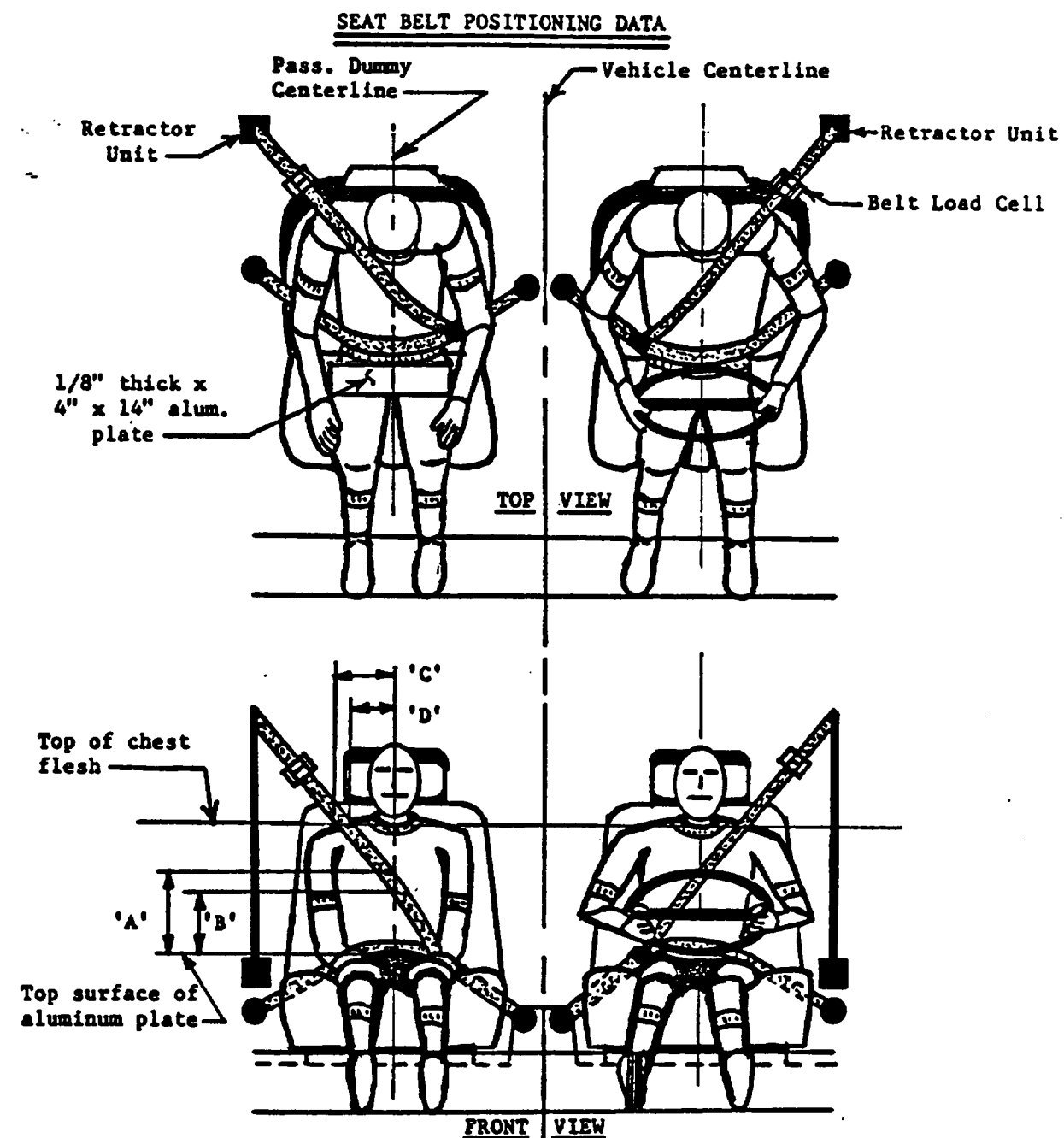


Figure 5 OCCUPANT CLEARANCE DIMENSIONS

Figure 6



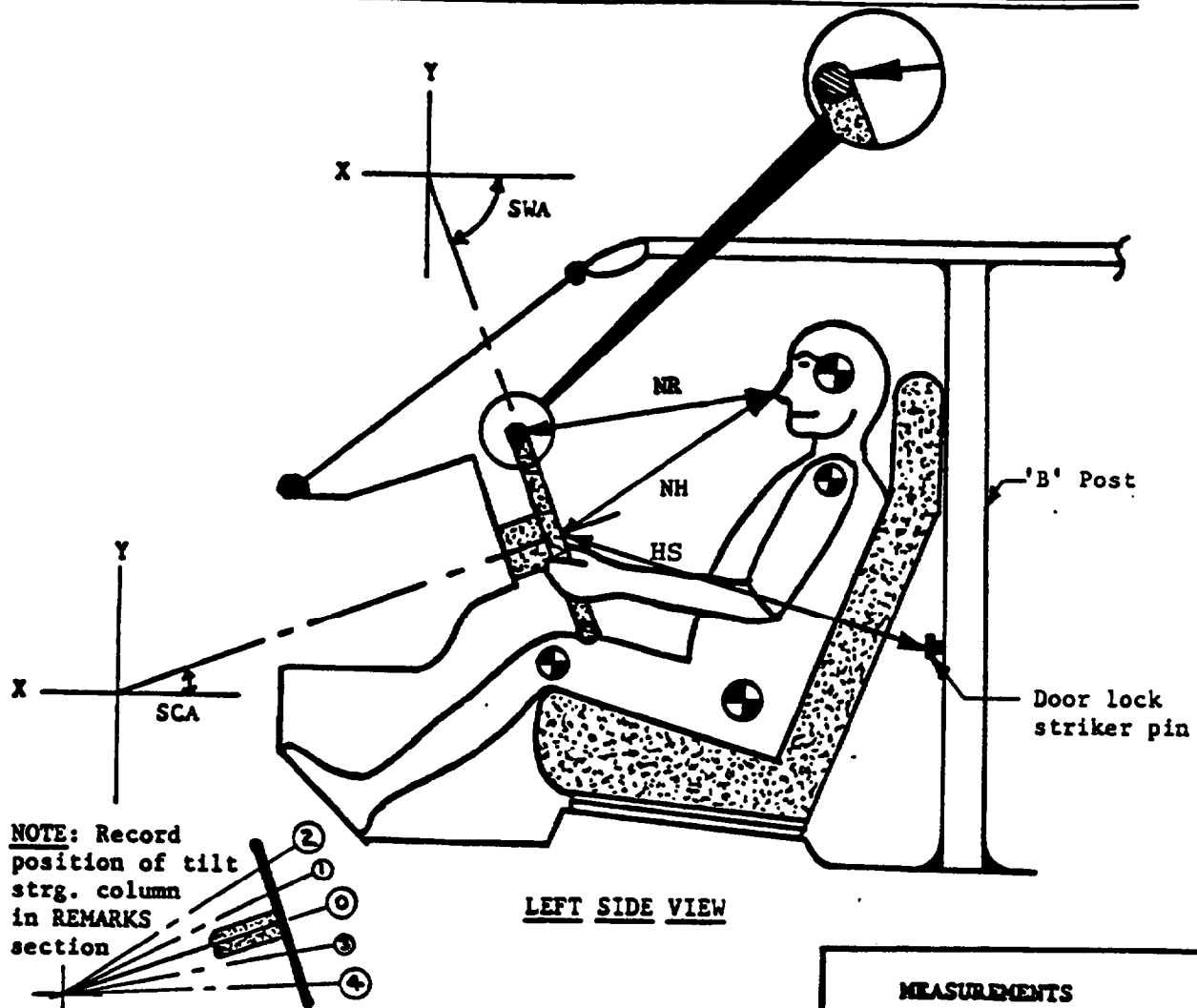
	DRIVER DUMMY (in.)	PASS. DUMMY (in.)
1. Dimension 'A'--alum. plate to belt upper edge on dummy centerline	13	13.0
2. Dimension 'B'--alum. plate to belt lower edge on dummy centerline	10	9.8
3. Dimension 'C'--dummy centerline to outer edge at chest flesh top	5.7	6.0
4. Dimension 'D'--dummy centerline to inner edge at chest flesh top	3.5	3.8
5. Lap belt tension (lbs.)	--	--
6. Shoulder belt tension (lbs.)	4.0 lbs.	4.0 lbs.

Table 3

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

<u>Belt Length Data:</u>	<u>Driver</u>	<u>Passenger</u>
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	<u>87.7"</u>	<u>88.3"</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>31.7"</u>	<u>32.2"</u>
Lap belt length as measured on Part 572 Dummy.	<u>33.5"</u>	<u>33.6"</u>
<u>Belt Spool-Off Data:</u>		
As determined by film analysis.	<u>2.6"</u>	<u>2.2"</u>
As determined mechanically.	<u>2.5"</u>	<u>2.3"</u>
As determined electronically.	<u>2.0"</u>	<u>2.7"</u>
<u>Belt Stretch Data:</u>		
Measured electronically between shoulder belt load cell and the "D" ring.	<u>.9" per ft.</u>	<u>.42" per ft.</u>
Measured mechanically.	<u>.5" per ft.</u>	<u>.5" per ft.</u>

Figure 7

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS

REMARKS CONCERNING ADJUSTABLE OR TILT STEERING COLUMN IF VEHICLE IS SO EQUIPPED:

Not adjustable

NOTE: Camera Information Shown on Table 4

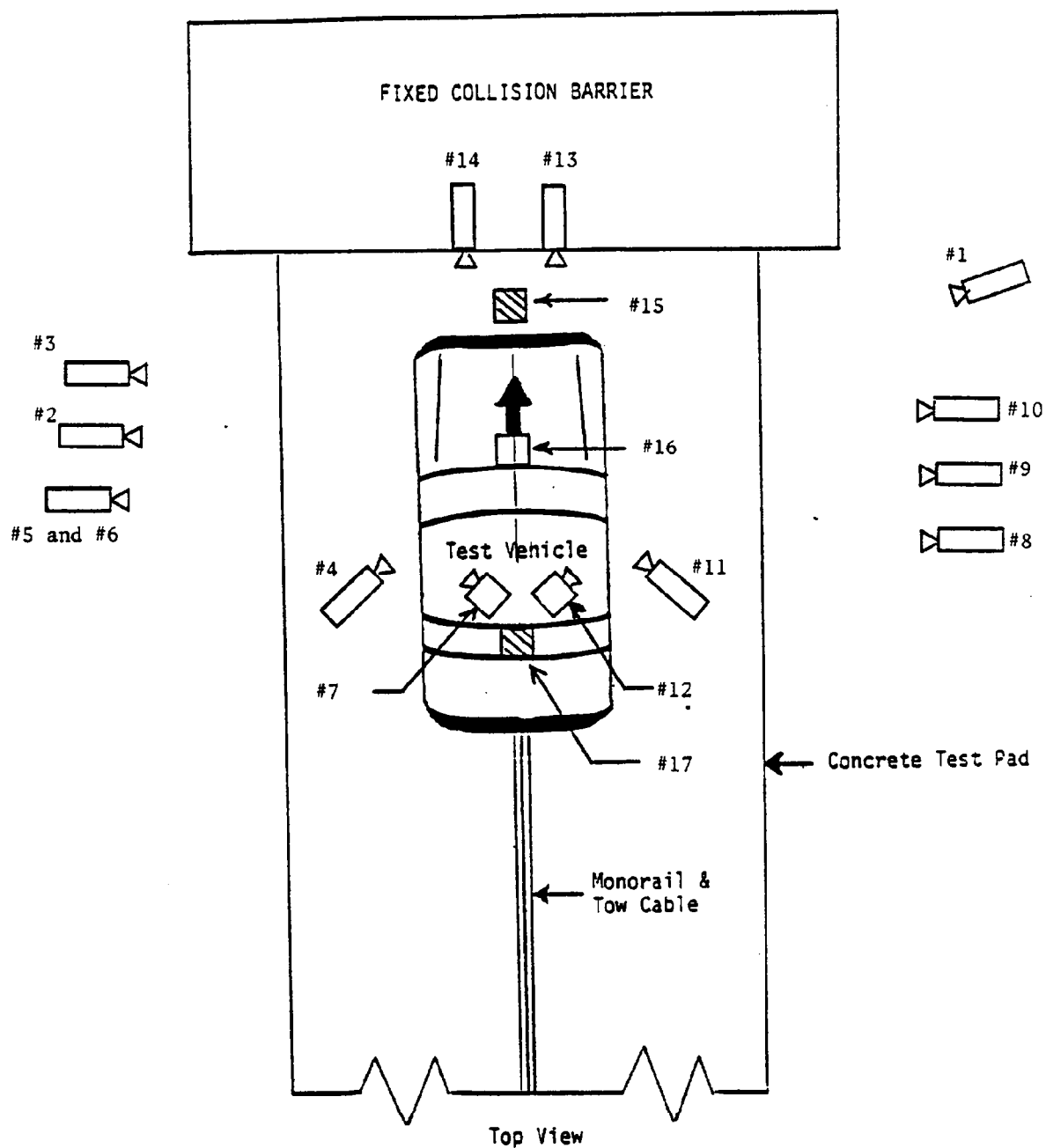


Figure 8 CAMERA POSITION FOR FRONTAL IMPACTS

Table 4
HIGH-SPEED CAMERA LOCATIONS

Test No. CF0202 Vehicle 1985 Ford Tempo 4-Door Sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (in) *			ANGLE ** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real Time Camera	--	--	--	--	--	--	24
2	Overall Left Side	260	57	41	-5	--	13	540
3	Left Side View	230	50	48	-3	--	25	530
4	Driver and Interior View	101	124	72	-15	--	25	550
5	Steering Column (Bottom)	284	75	46	-5	267	25	550
6	Steering Column (Top)	284	75	70	-10	267	25	560
7	Left Belt	--	--	--	--	--	8	1270
8	Overall Right Side	289	91	58	-6	--	13	NO TIMING
9	Right Side View	265	79	47	-5	--	25	840
10	Right Passenger View	289	67	51	-4	272	35	740
11	Passenger and Interior View	101	124	72	-15	--	25	600
12	Right Belt	--	--	--	--	--	8	1090
13	Passenger Front View	21	0	72	-33	97	13	NO TIMING
14	Driver Front View	21	0	72	-33	97	13	NO TIMING
15	Windshield View	0	0	126	-53	--	13	520
16	Pit View of Engine	0	36	-120	90	--	13	700
17	Pit View of Fuel Tank	0	85	-120	90	--	13	720

* X = film plane to monorail centerline

Y = film plane to impact location

Z = film plane to ground

** = referenced to horizontal plane

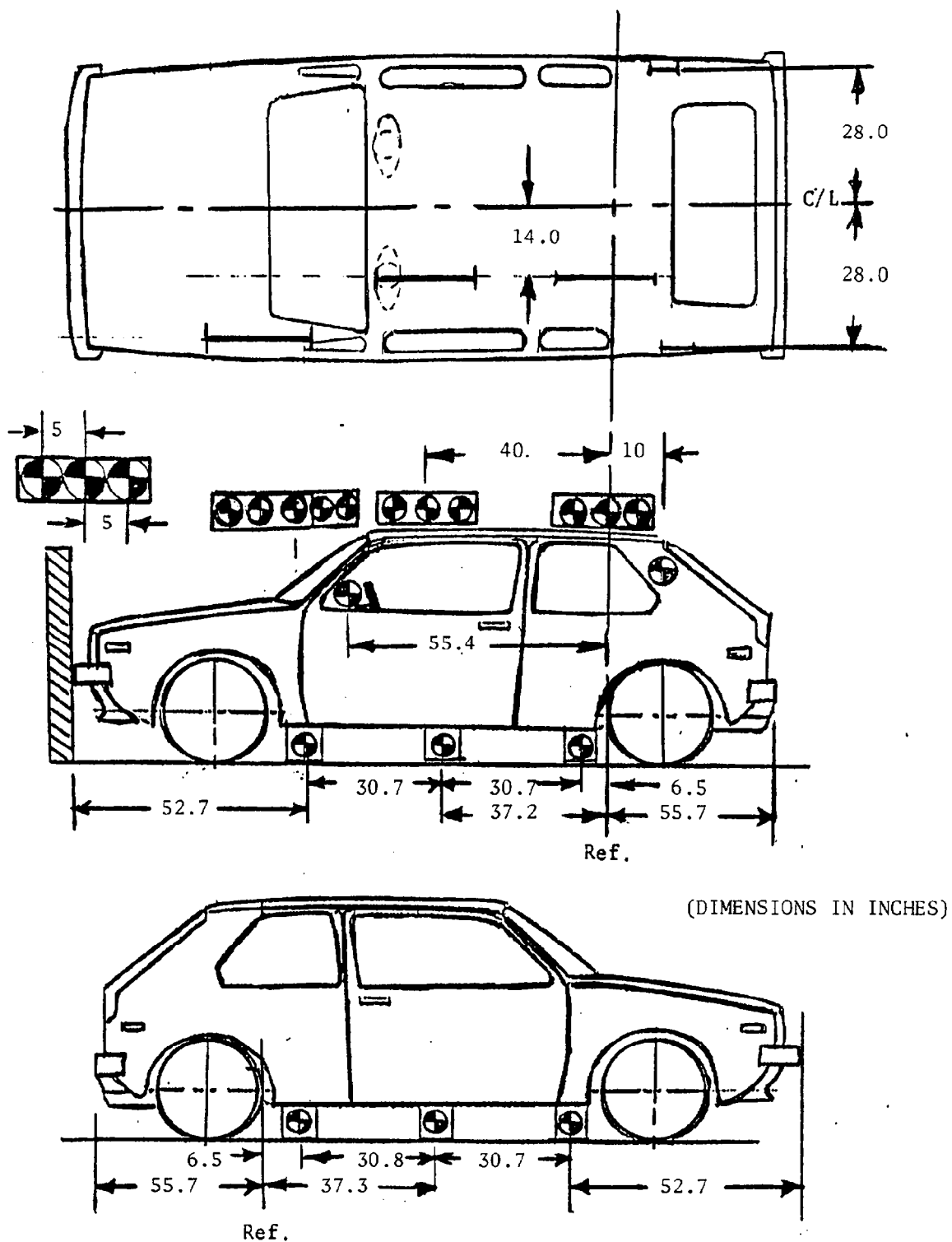


Figure 9 VEHICLE TARGET LOCATIONS

Figure 10

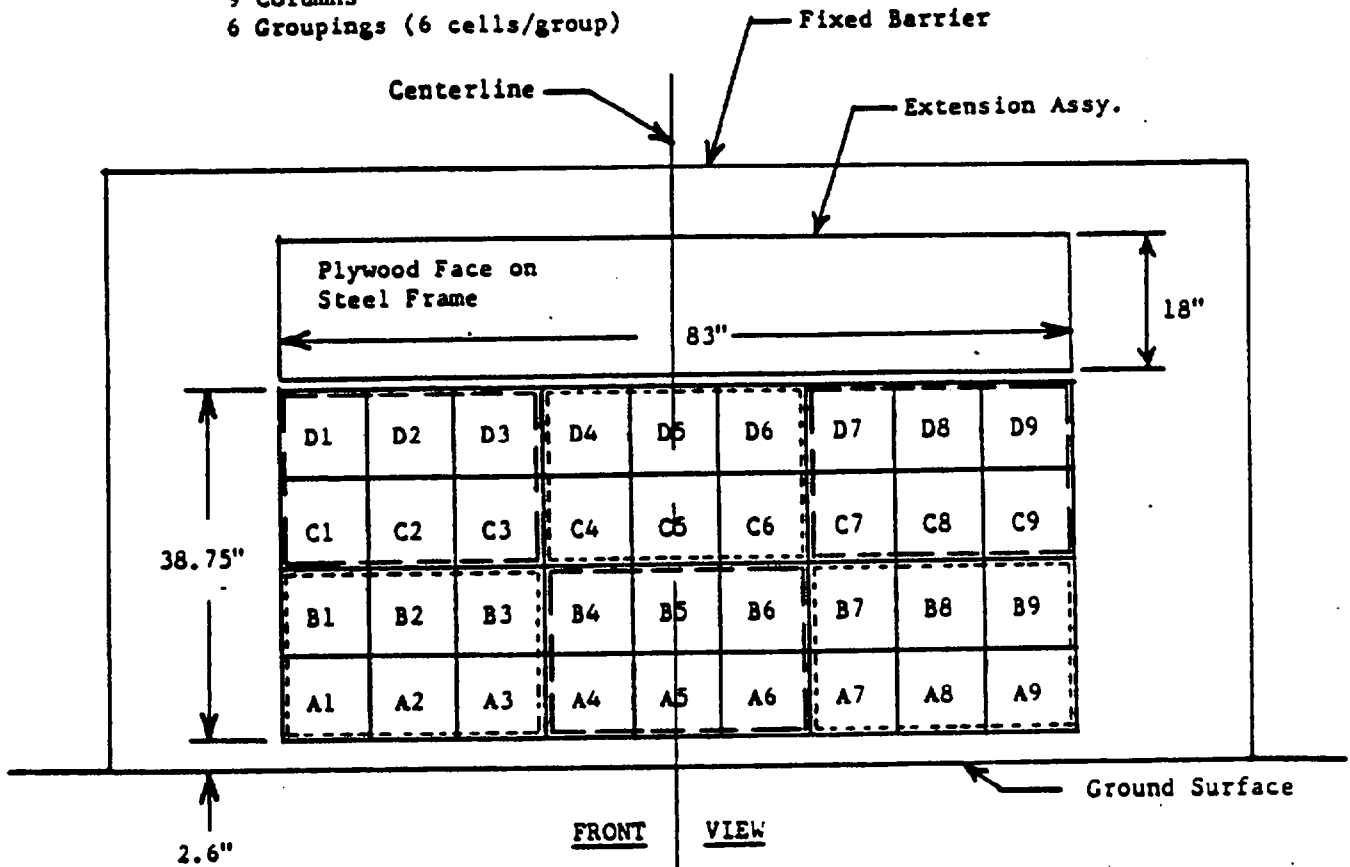
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells

4 Rows

9 Columns

6 Groupings (6 cells/group)

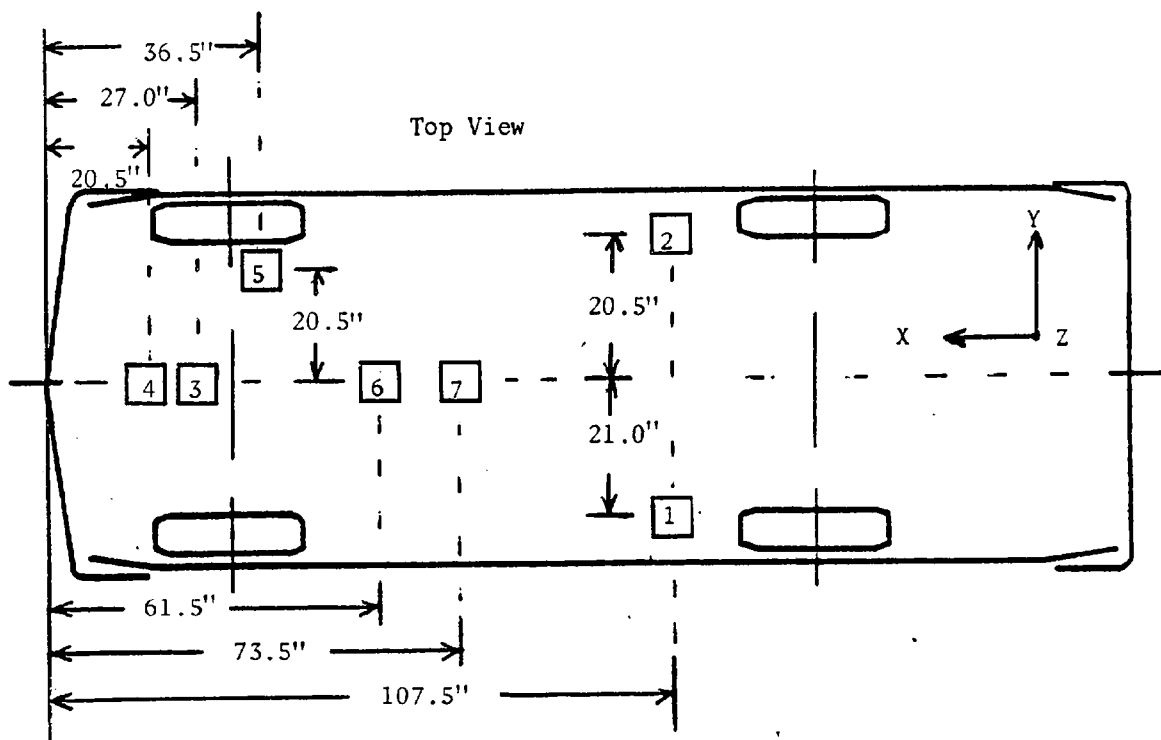


6 GROUPINGS OF 6 LOAD CELLS EACH

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

The following data is presented in Appendix B:

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



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

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

FIGURE 11 VEHICLE ACCELEROMETER LOCATIONS

Figure 12

TEST VEHICLE MEASUREMENTS

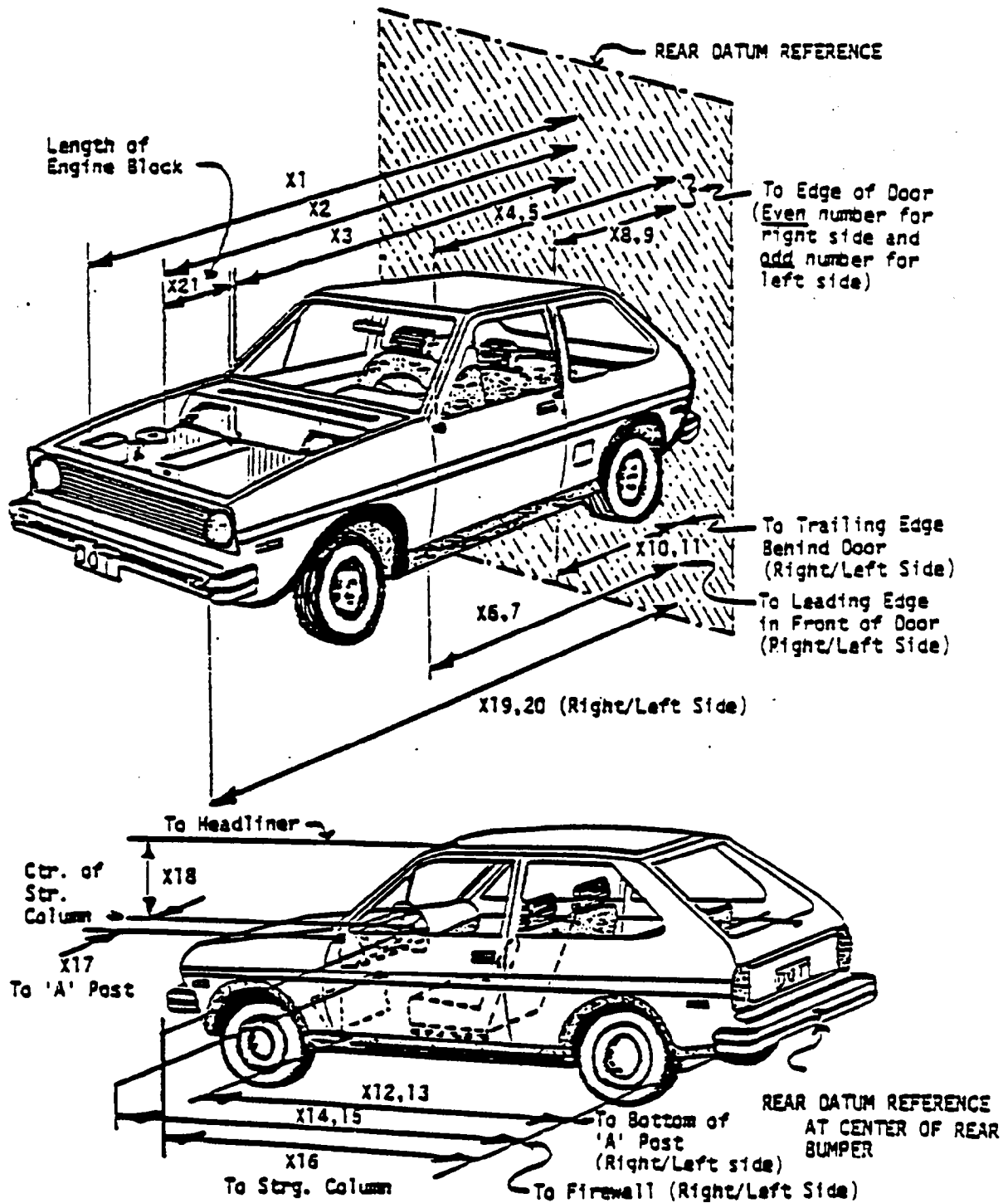


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	176.3	154.0	22.3
X2	Rear Surface of Vehicle to Front of Engine	154.6	142.6	12.0
X3	Rear Surface of Vehicle to Firewall	134.8	129.3	5.5
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	123.2	121.8	1.4
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	123.2	121.1	2.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	121.5	120.0	1.5
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	121.5	119.5	2.0
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	83.4	82.2	1.2
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	83.2	81.9	1.3
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	84.1	82.6	1.5
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	84.1	82.2	1.9
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	120.8	119.5	1.3
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	120.8	118.9	1.9
X14	Rear Surface of Vehicle to Firewall, Right Side	132.3	126.3	6.0
X15	Rear Surface of Vehicle to Firewall, Left Side	133.5	125.2	8.3
X16	Rear Surface of Vehicle to Steering Column	104.9	102.7	2.2
X17	Center of Steering Column to "A" Post	15.9	16.2	-.3
X18	Center of Steering Column to Headliner	16.5	16.4	.1
X19	Rear Surface of Vehicle to Right Side of Front Bumper	174.5	153.5	21.0
X20	Rear Surface of Vehicle to Left Side of Front Bumper	174.5	151.7	22.8
X21	Length of Engine Block	18.4	18.4	0

Table 6

ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1985 Ford Tempo 4-door sedan
 VEH. NHTSA NO.: CF0202; VIN: 2FABP22X6FB159953
 MODEL YEAR: 1985; BUILD DATE: 12-84; TEST DATE: 4/16/85
 VEH. SIZE CATEGORY: Compact; TEST WEIGHT: 2990
 VEH. WHEELBASE: 100.0; FRONT OVERHANG: 34.2; OVERALL WIDTH: 66.2

ACCELEROMETER DATA:

LOCATION: 43.8 inches rearward of front wheel C/L
 CALIBRATION PROCEDURE: shaker table/least squares
 LINEARITY: + 0.75%; INTEGRATION ALGORITHM: Hybrid Simpson-Newton 3/8

VEH. IMPACT SPEED: 34.8 mph; TIME OF SEPARATION: 104.7 milliseconds
 VELOCITY CHANGE: 43.1 mph

■ COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

F (Frontal) 12 FDEW3

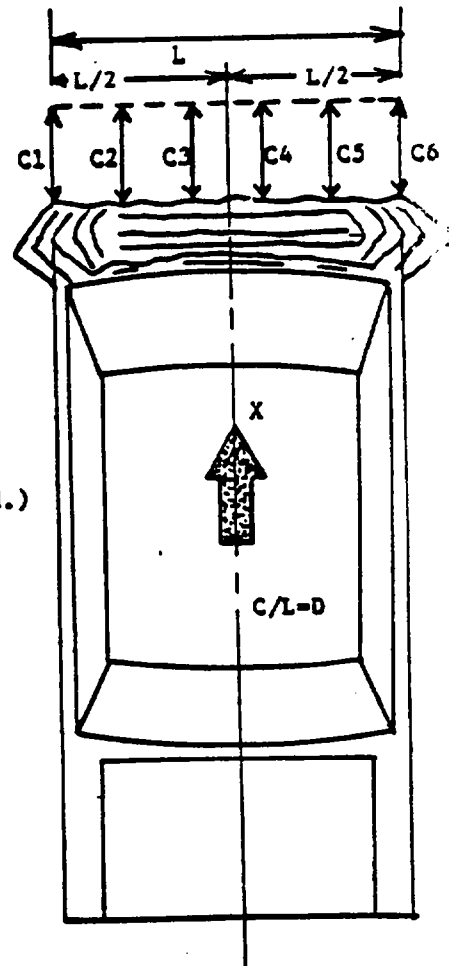
CRUSH DEPTH
DIMENSIONS:

C1=	<u>22.8</u>	<u>inches</u>
C2=	<u>23.0</u>	<u>inches</u>
C3=	<u>22.6</u>	<u>inches</u>
C4=	<u>22.5</u>	<u>inches</u>
C5=	<u>22.0</u>	<u>inches</u>
C6=	<u>20.9</u>	<u>inches</u>

MIDPOINT OF DAMAGE: D = Vehicle Centerline (Longitud.)

LENGTH OF DAMAGED
REGION:

L = 55 inches



National Accident Sampling System — Continuous Sampling Subsystem: Vehicle Data

FIELD MEASUREMENTS

1985 FORD TEMPO

Complete When Applicable	
End Damage	Side Damage
Undeformed end width <u>55"</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.

12FDEW3

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	55"	24.0	55"	25.1	24.0	23.1	23.0	23.0	23.2	Ø
	Free/space		-1		2.3	1.0	.5	.5	1.0	2.3	
1	Actual Crush	55"	23.8	55"	22.8	23.0	22.6	22.5	22.0	20.9	Ø

*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.

TYPE OF TRANSMISSION

☒ Manual ☐ Automatic

Average Track: _____
Maximum Width: 66.2
~~Curb~~ Weight: 2990
Overall Length: 176.3
Wheel Base: 99.9
Engine Size: cyl. 4
displ. 140 CUIN

WHEEL STEER ANGLES

(For locked front wheels or displaced rear axles only)

RF 0.1°

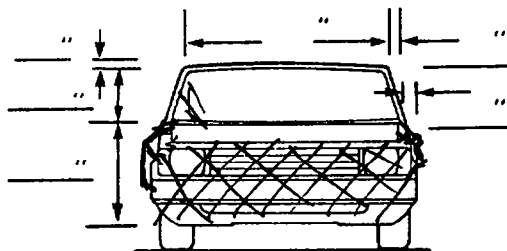
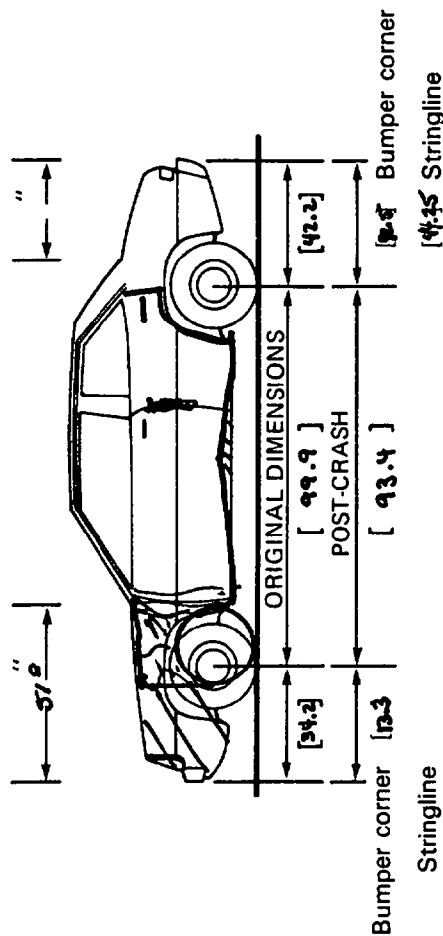
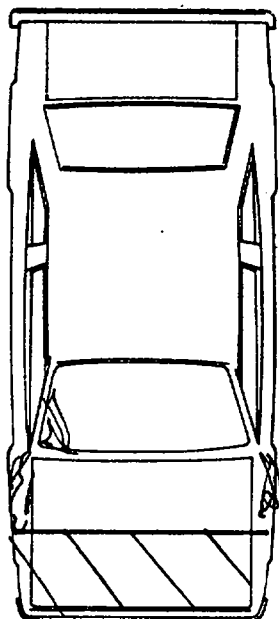
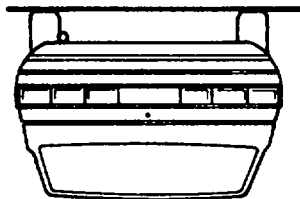
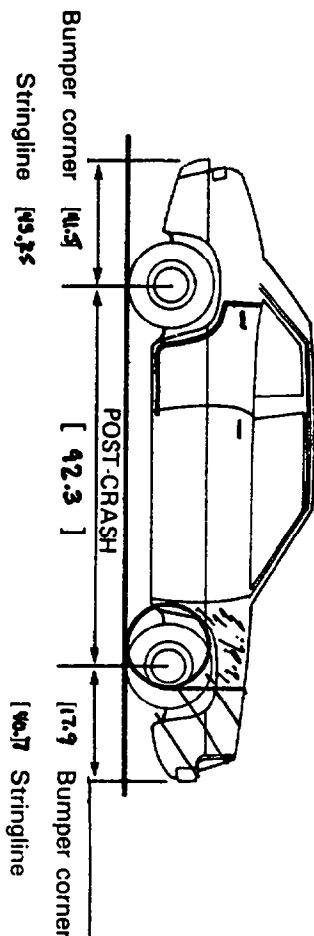
LF 0.1°

RR N/A°

LR N/A°

Within ± 5 degrees

1985 FORD TEMPO
2FA8P22X6FB159953



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 the back of this page. Annotate any damage caused by extrication such as component removal by torching, prying or hydraulic shears. If the vehicle contacted a pedestrian, complete page 6R.

APPENDIX A
PHOTOGRAPHS

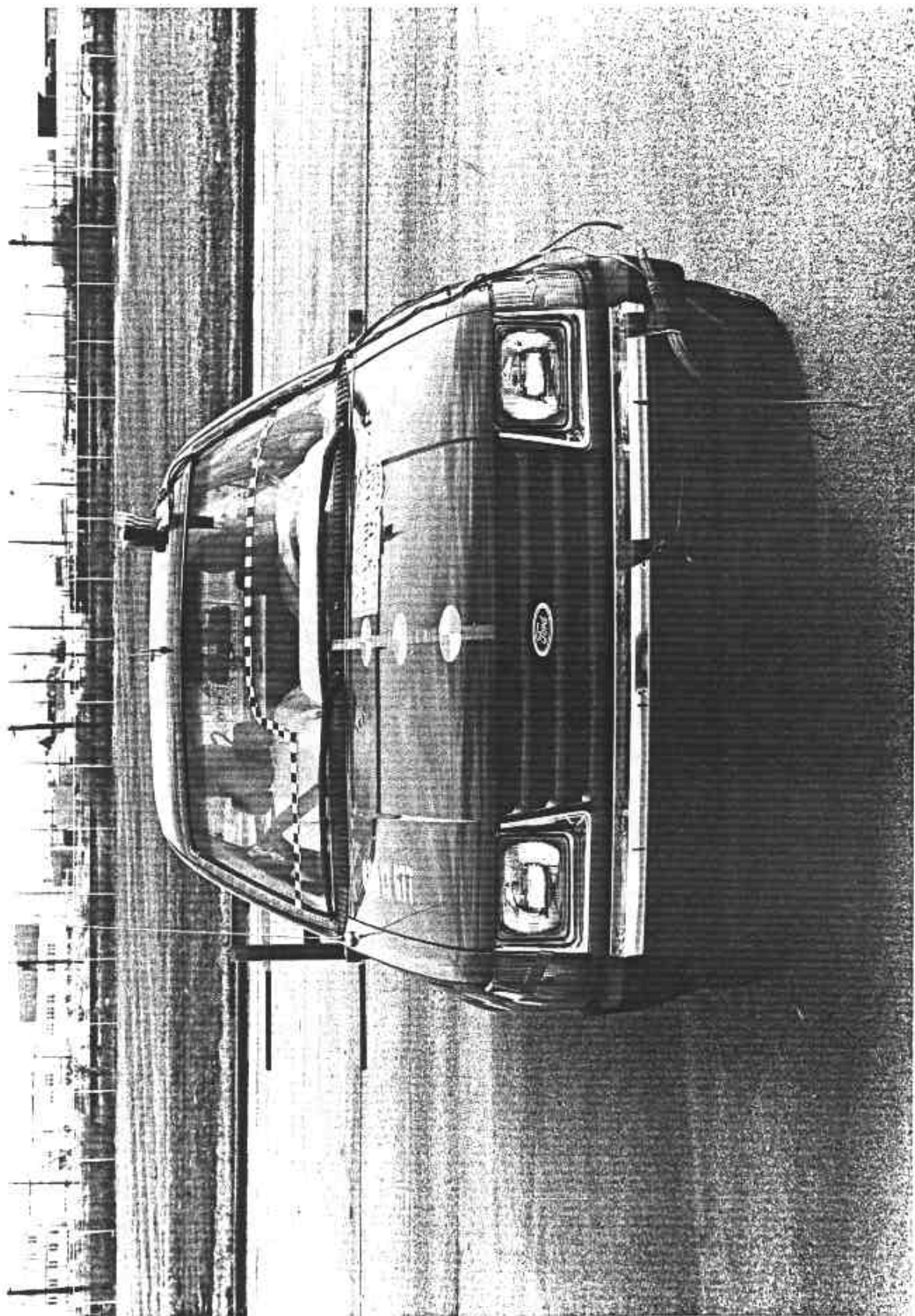


Figure A-1 PRE-TEST FRONT VIEW

A-2

7333-14

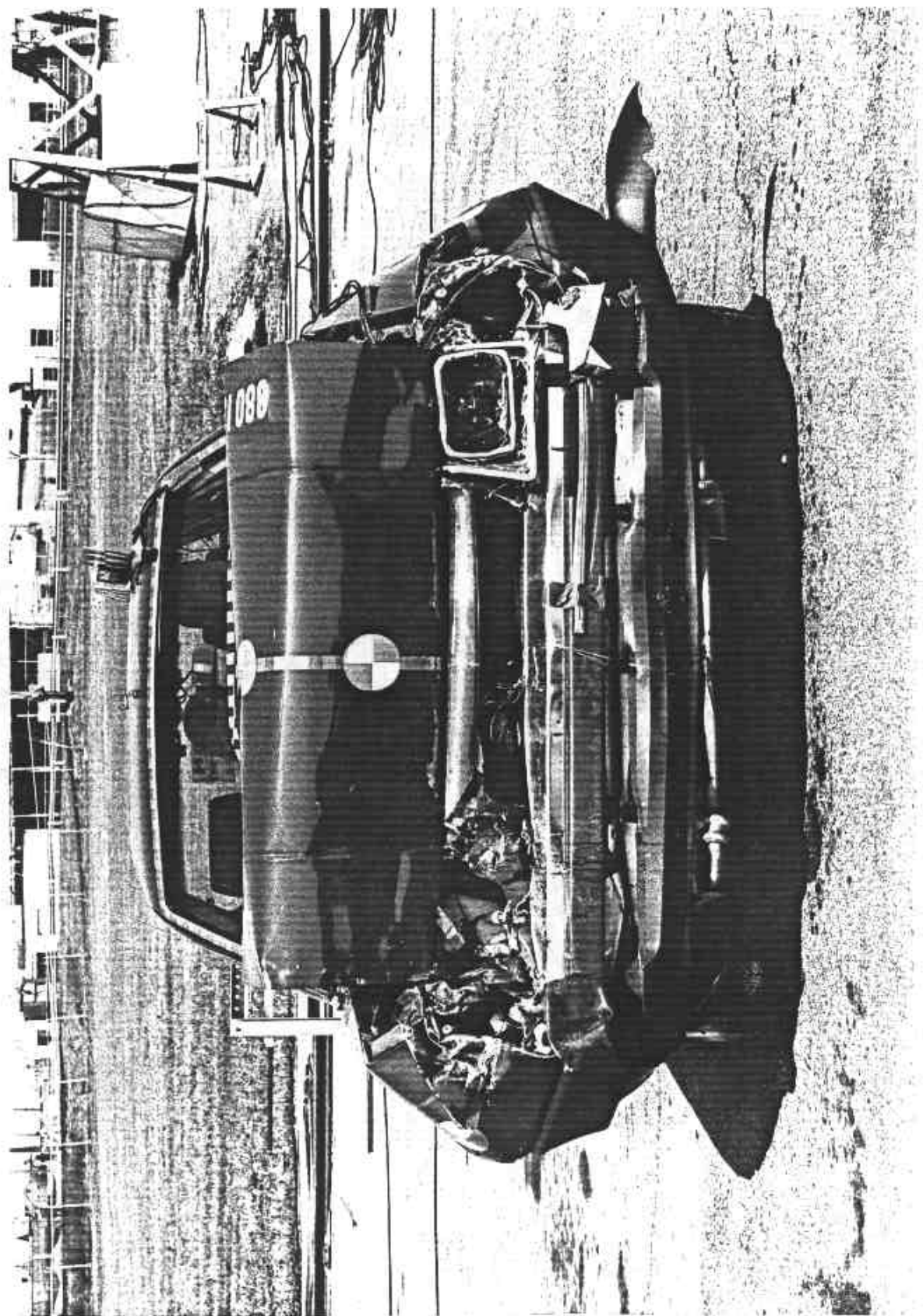


Figure A-2 POST-TEST FRONT VIEW

A-3

7333-14

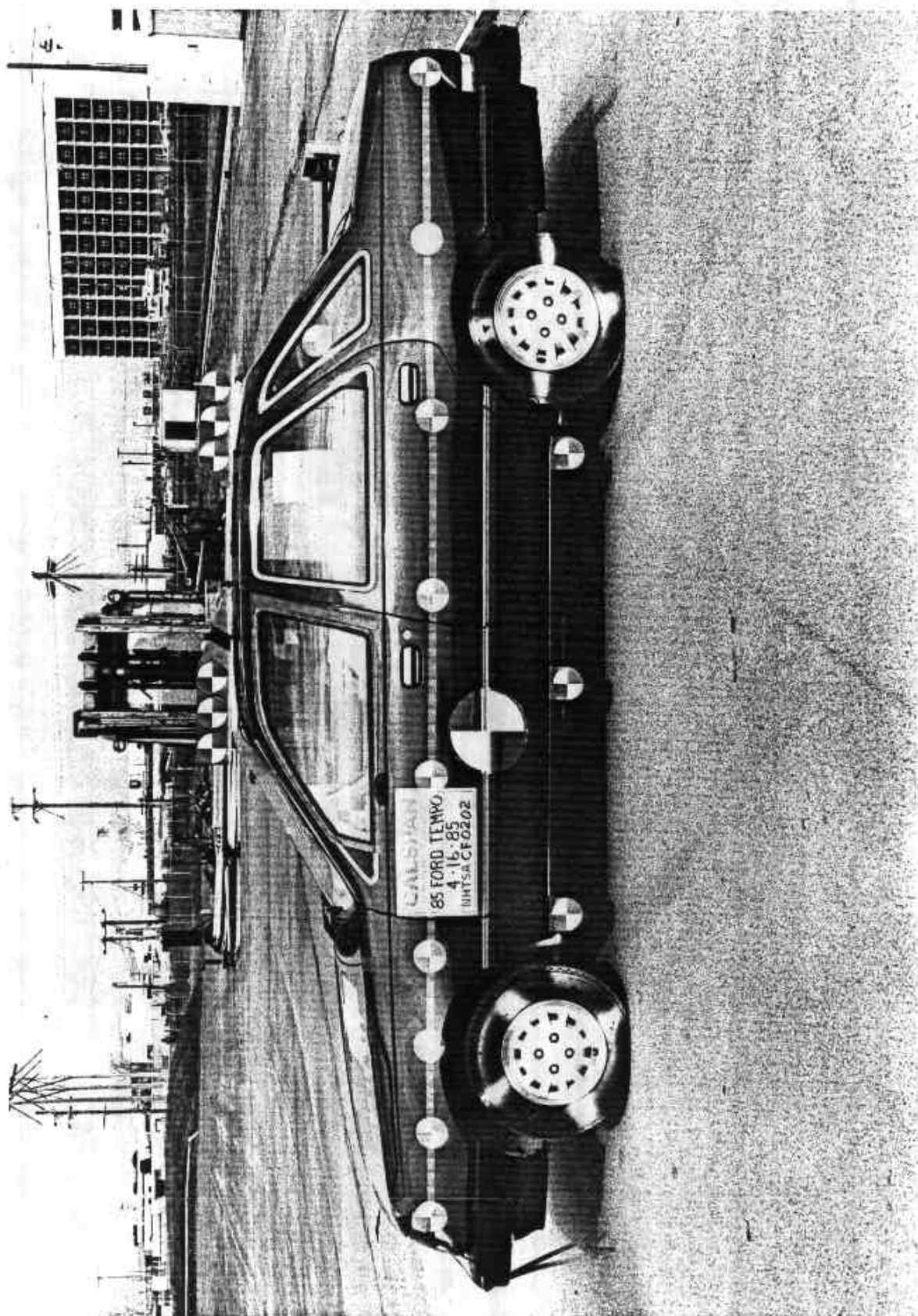


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-4

7333-14

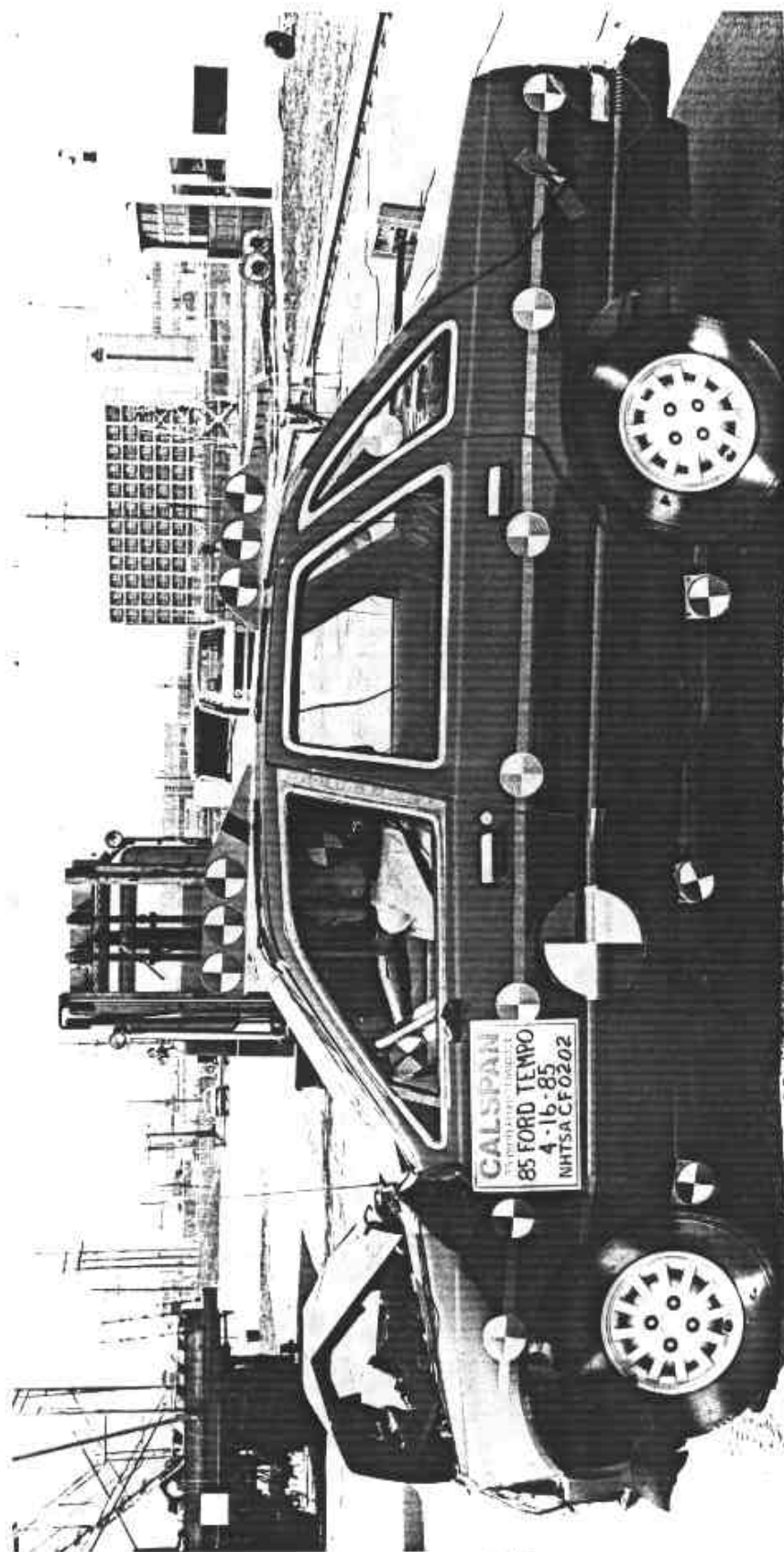
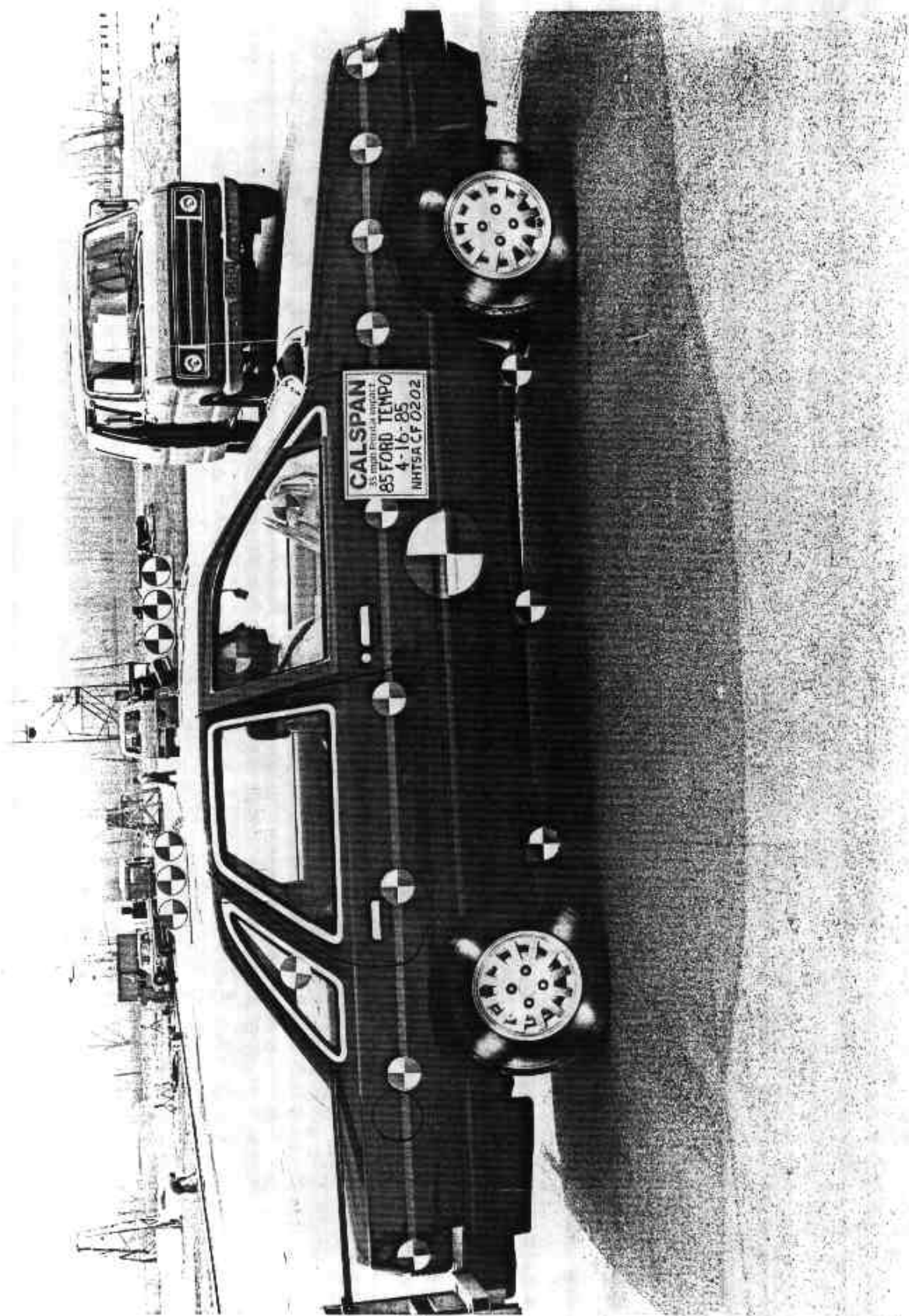


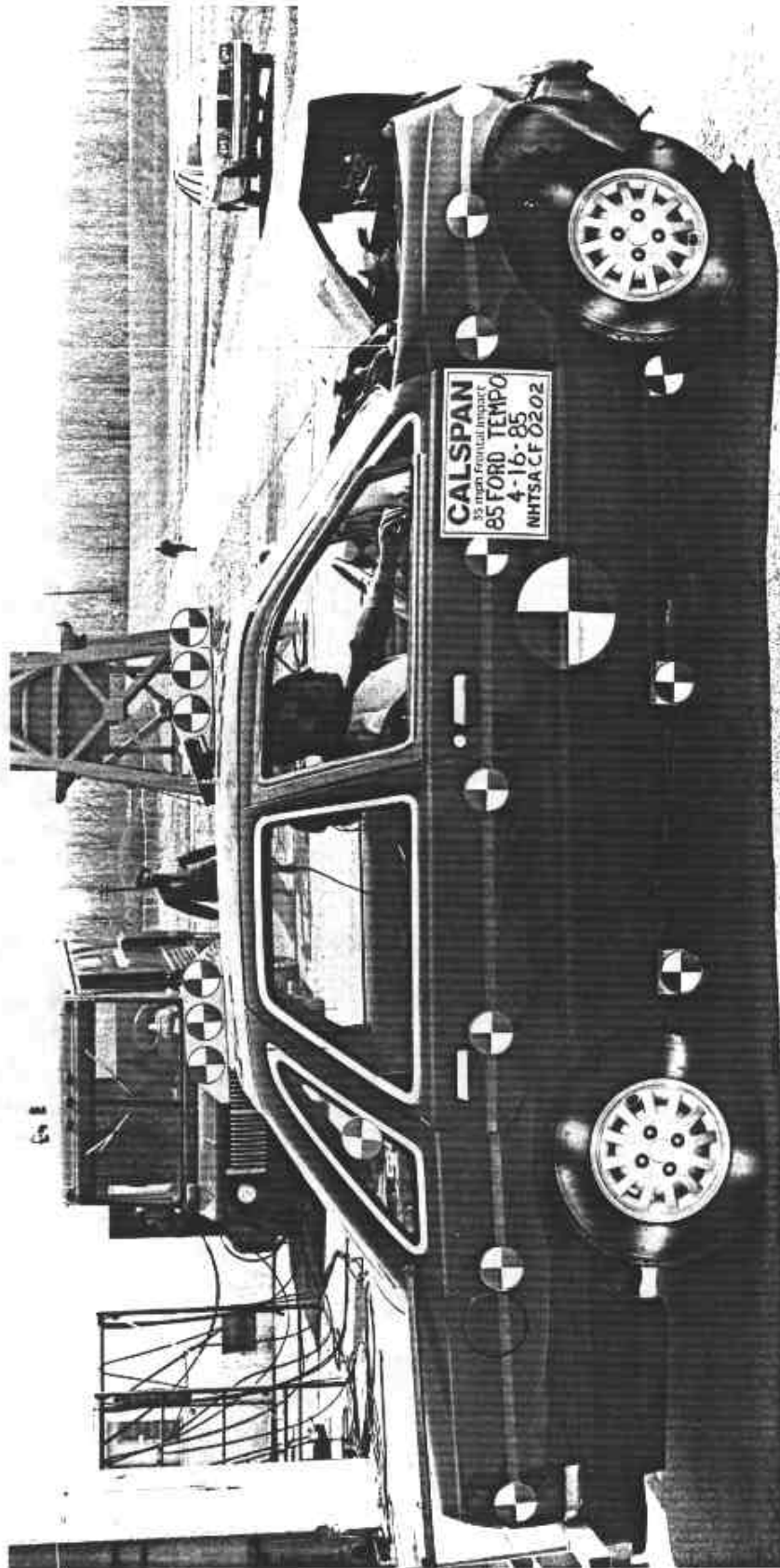
Figure A-4 POST-TEST LEFT SIDE VIEW



A-6

7333-14

Figure A-5 PRE-TEST RIGHT SIDE VIEW



A-7

7333-14

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

A-9

7333-14



A-10

7333-14

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

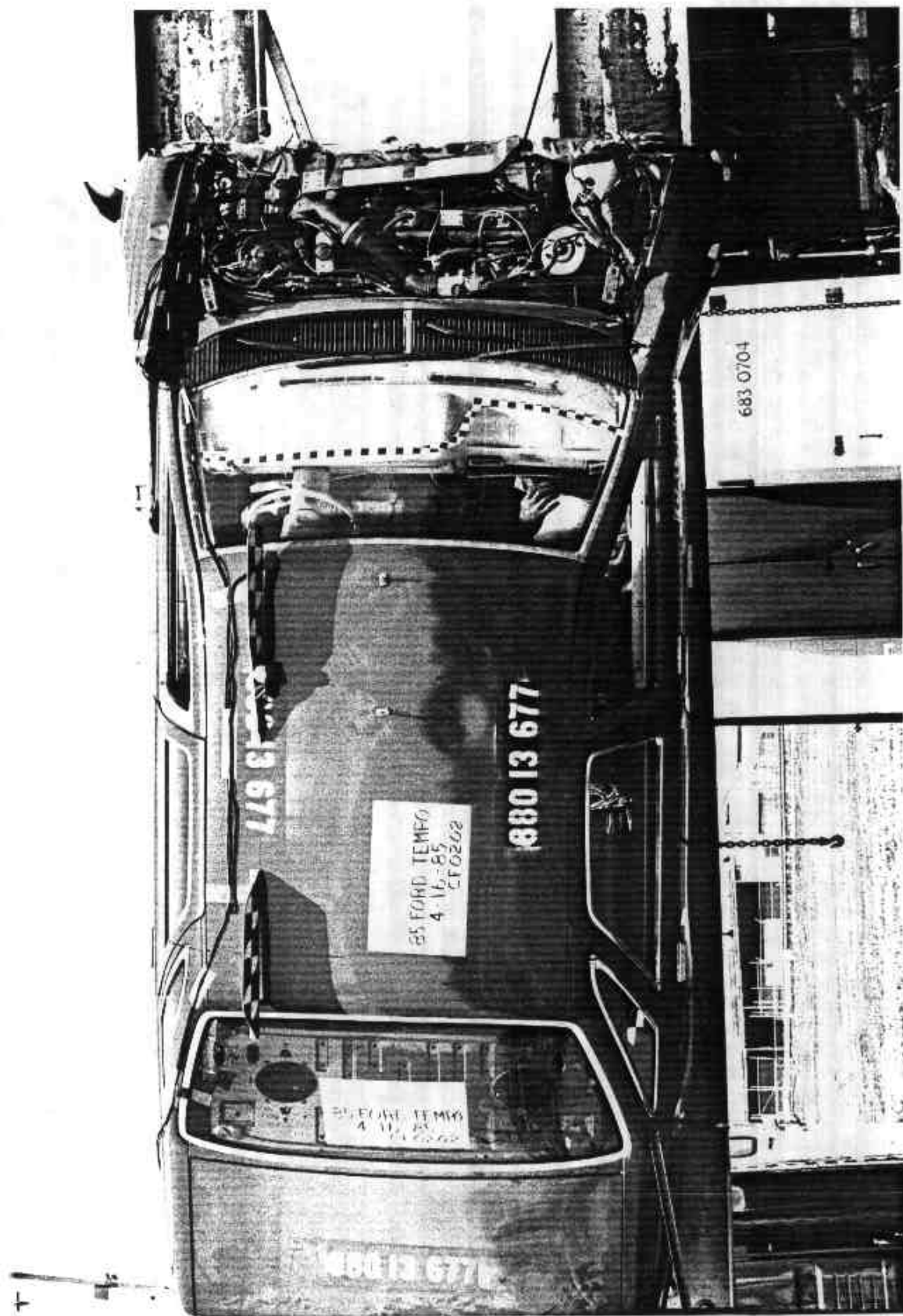


Figure A-11 POST-TEST TOP VIEW

A-12

7333-14

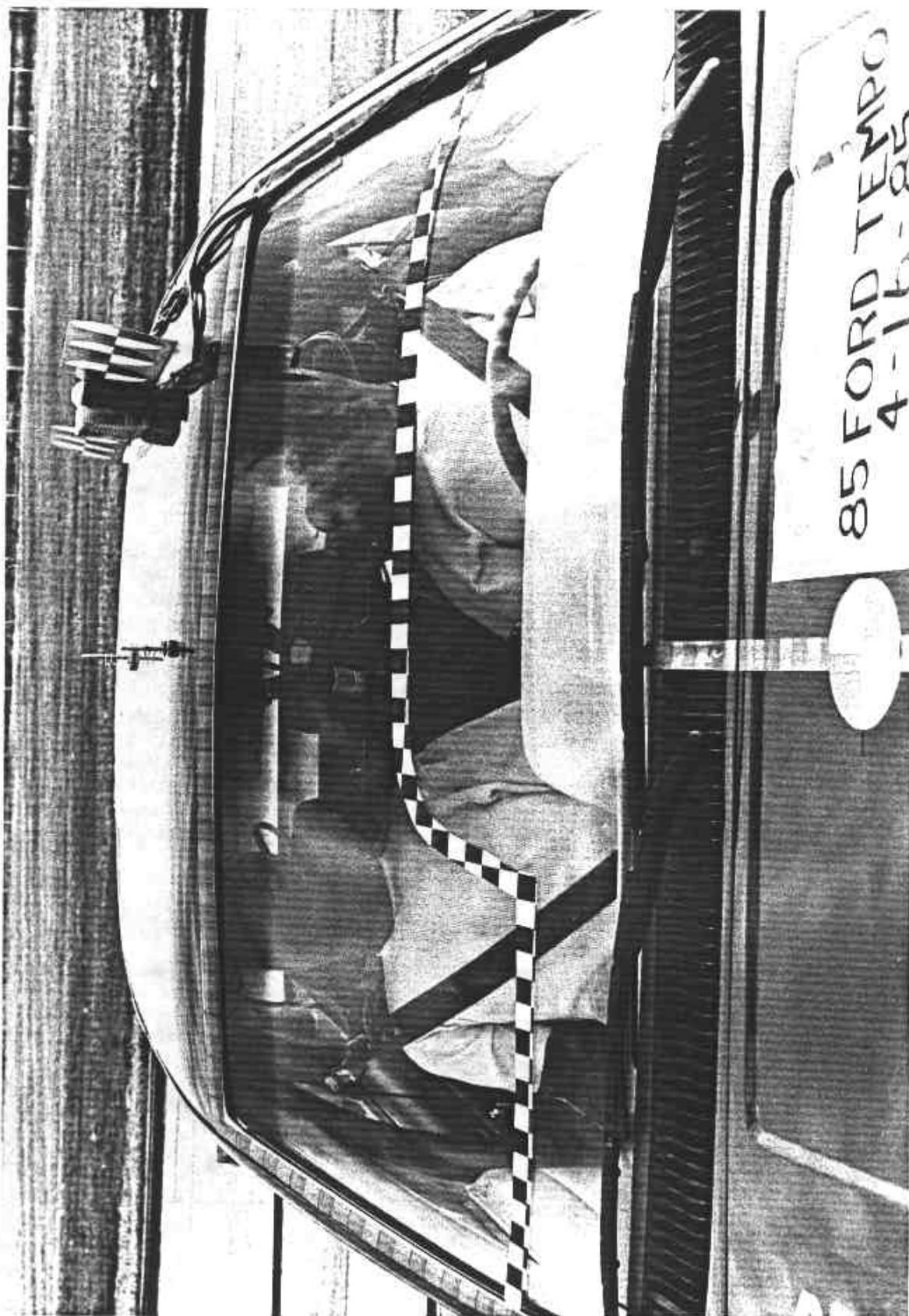


Figure A-12 PRE-TEST WINDSHIELD VIEW

A-13

7335-14

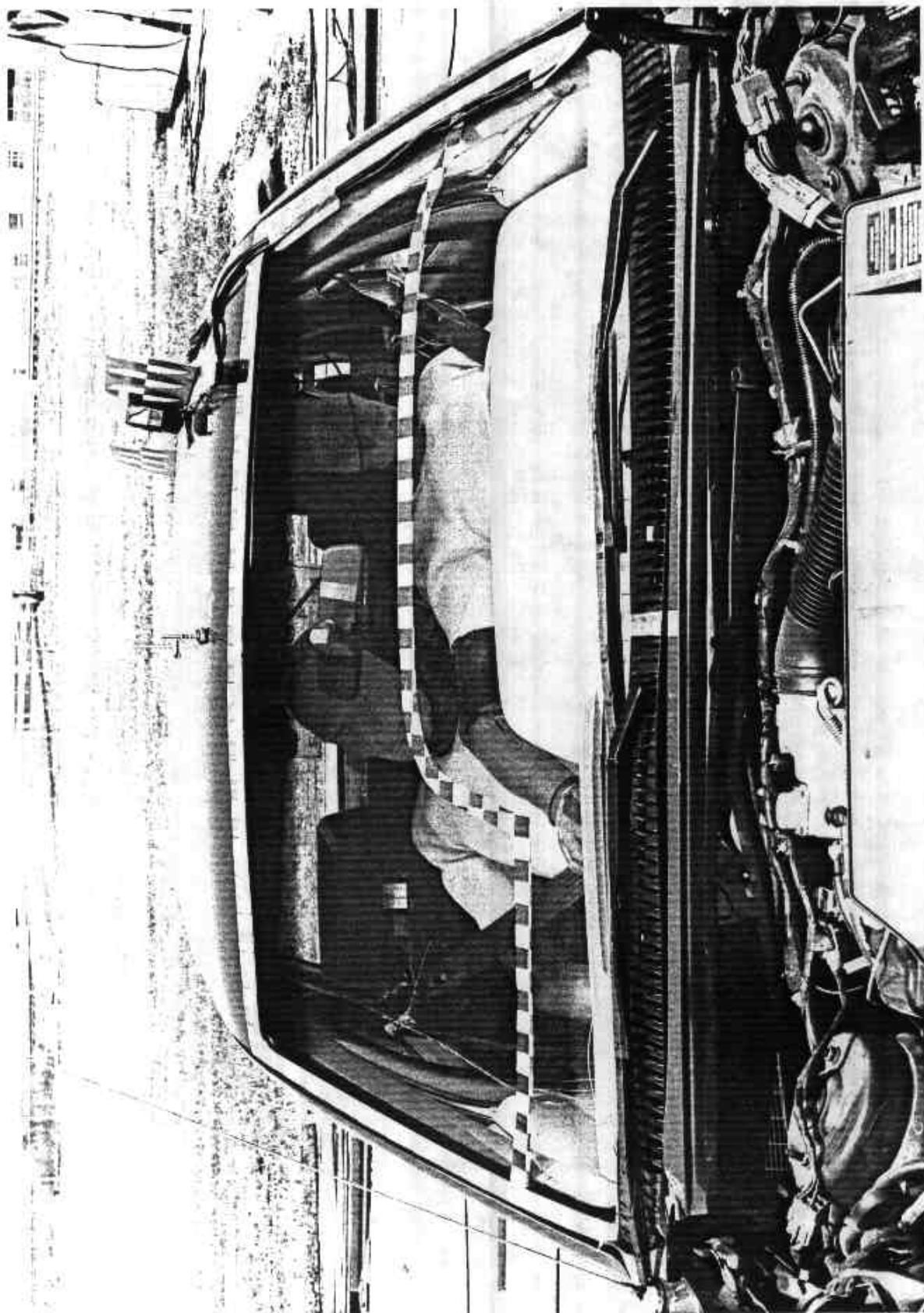


Figure A-13 POST-TEST WINDSHIELD VIEW

A-14

7333-14

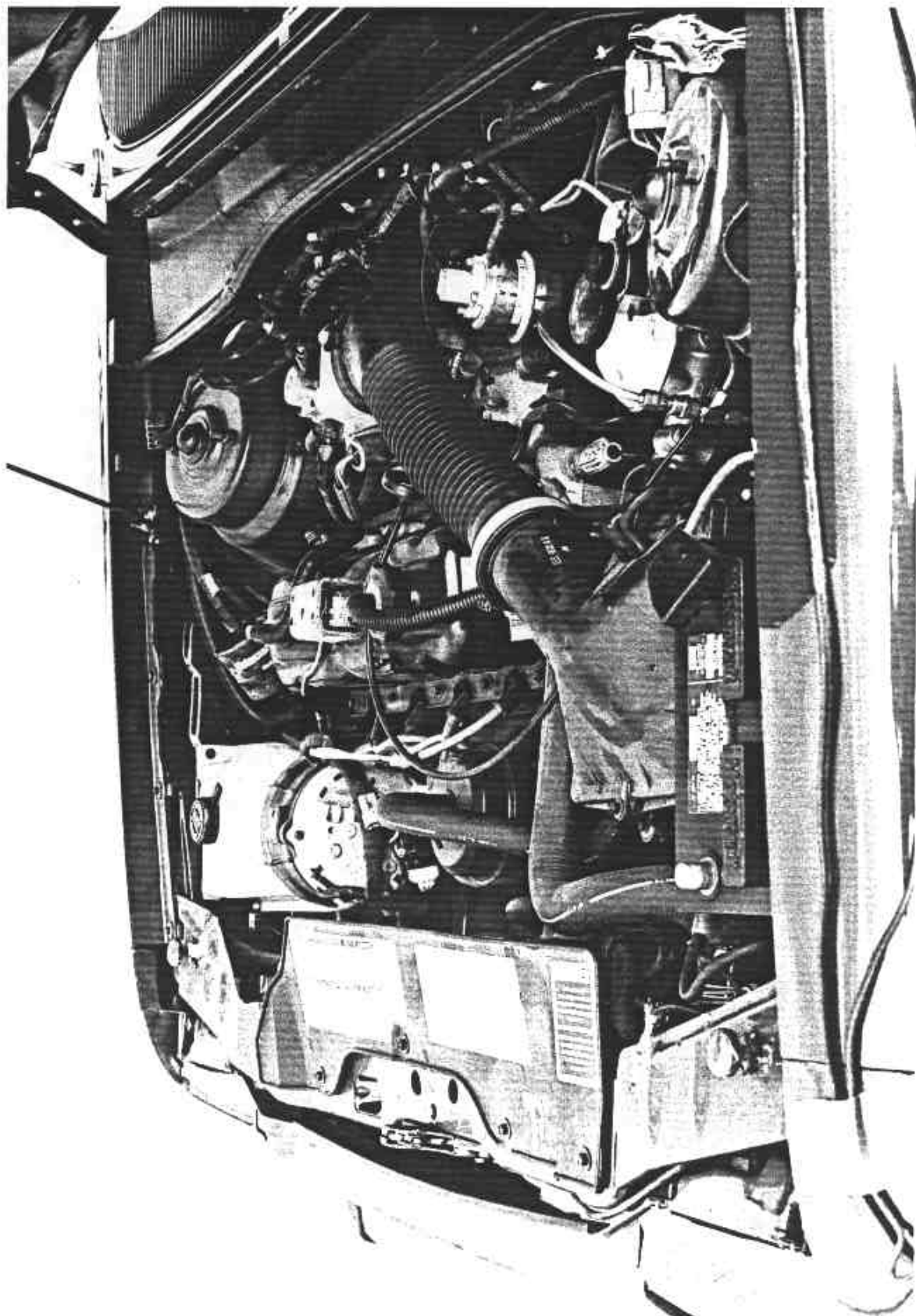


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

A-15

7333-14

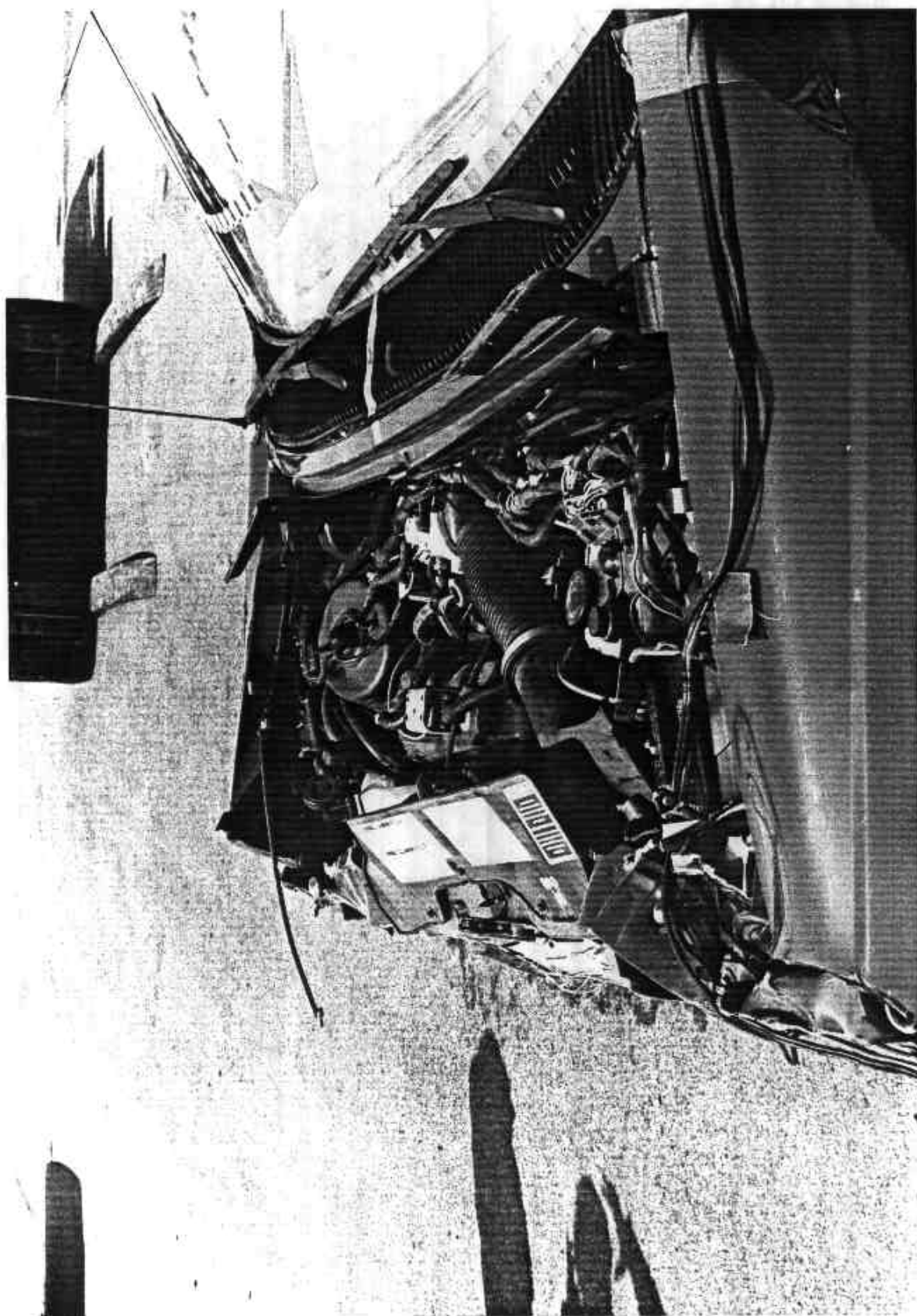


Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

A-16

7333-14

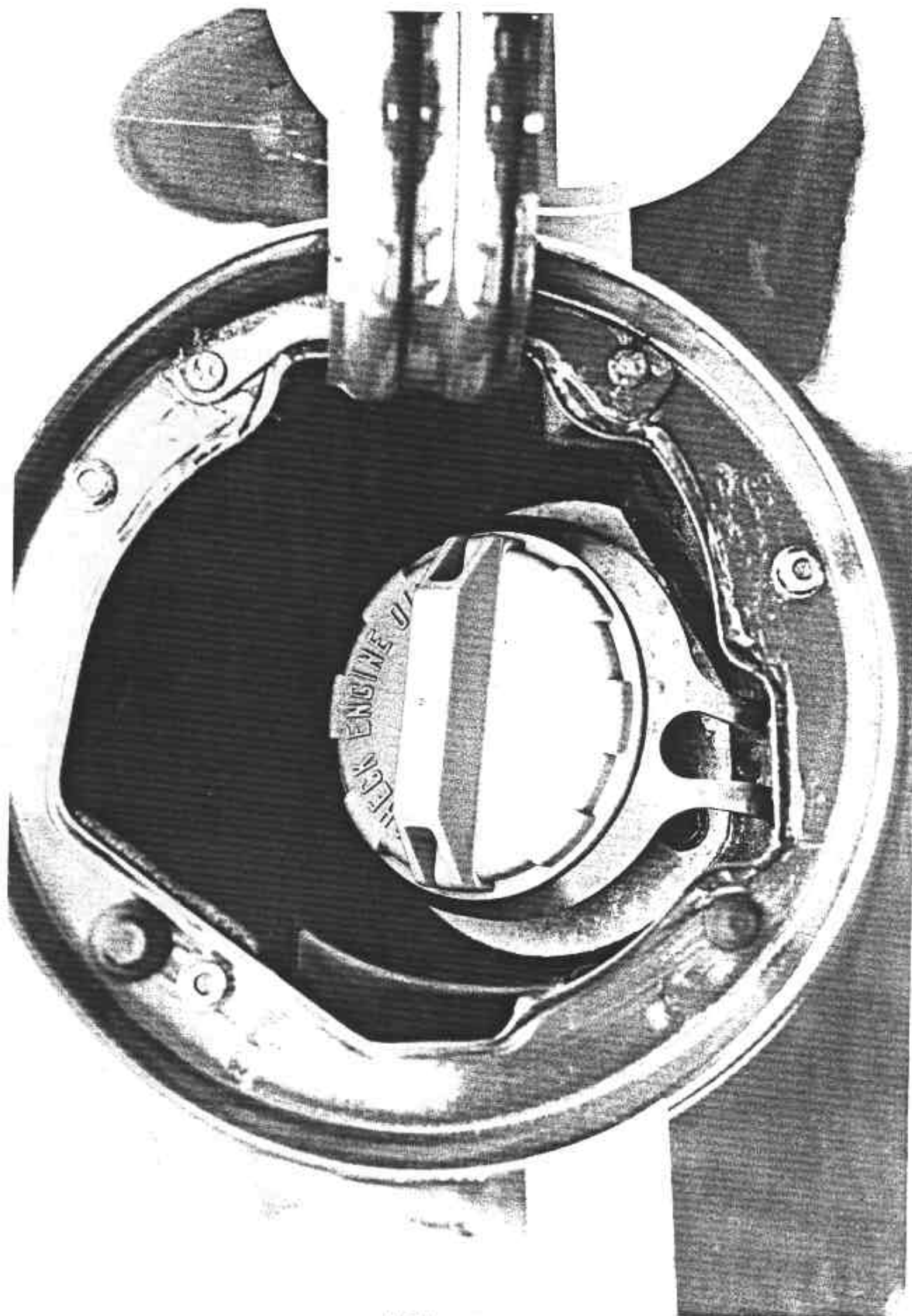


Figure A-16 PRE-TEST FUEL FILLER CAP VIEW

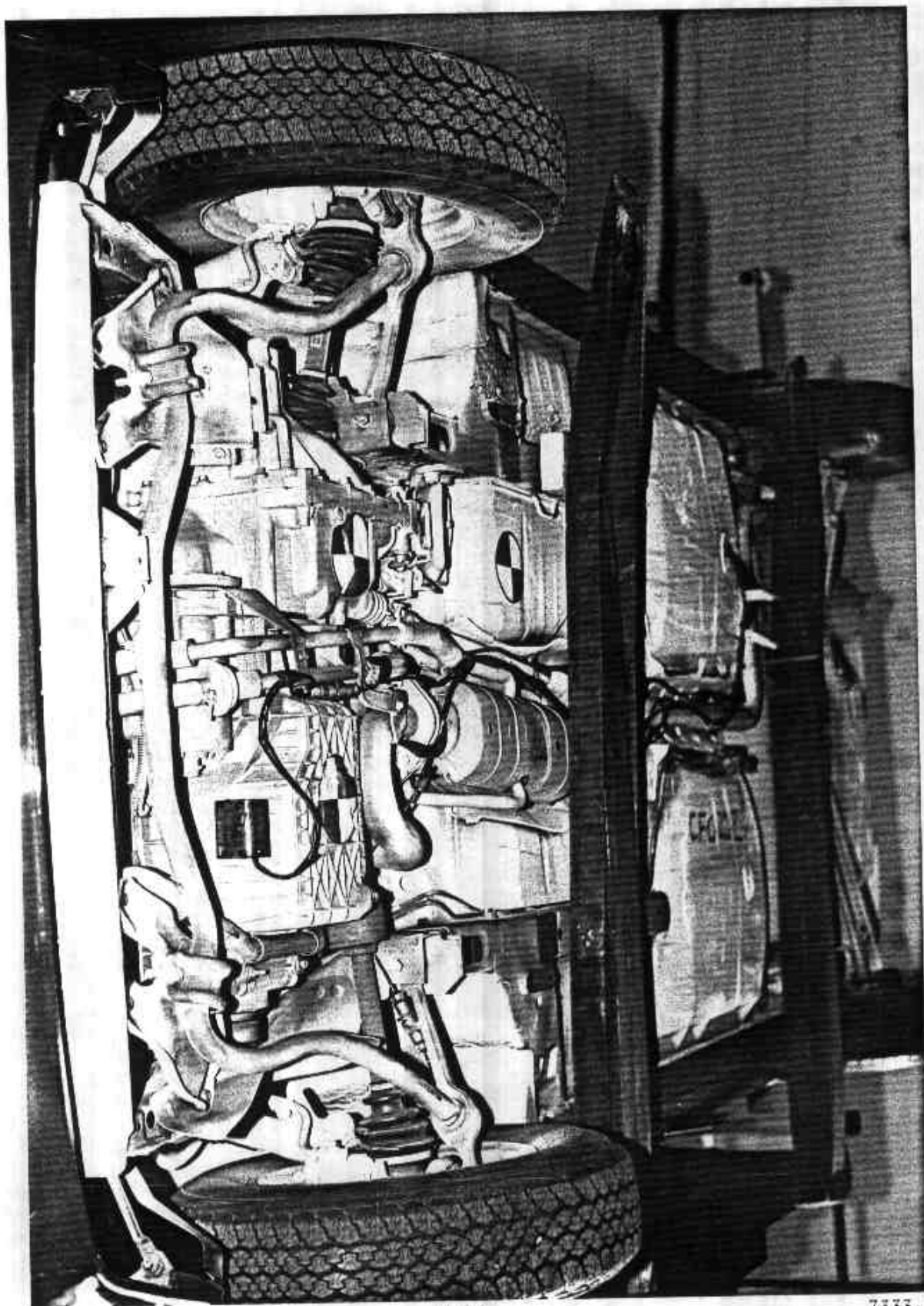


Figure A-17 PRE-TEST FRONT UNDERBODY VIEW

A-13

7333-14

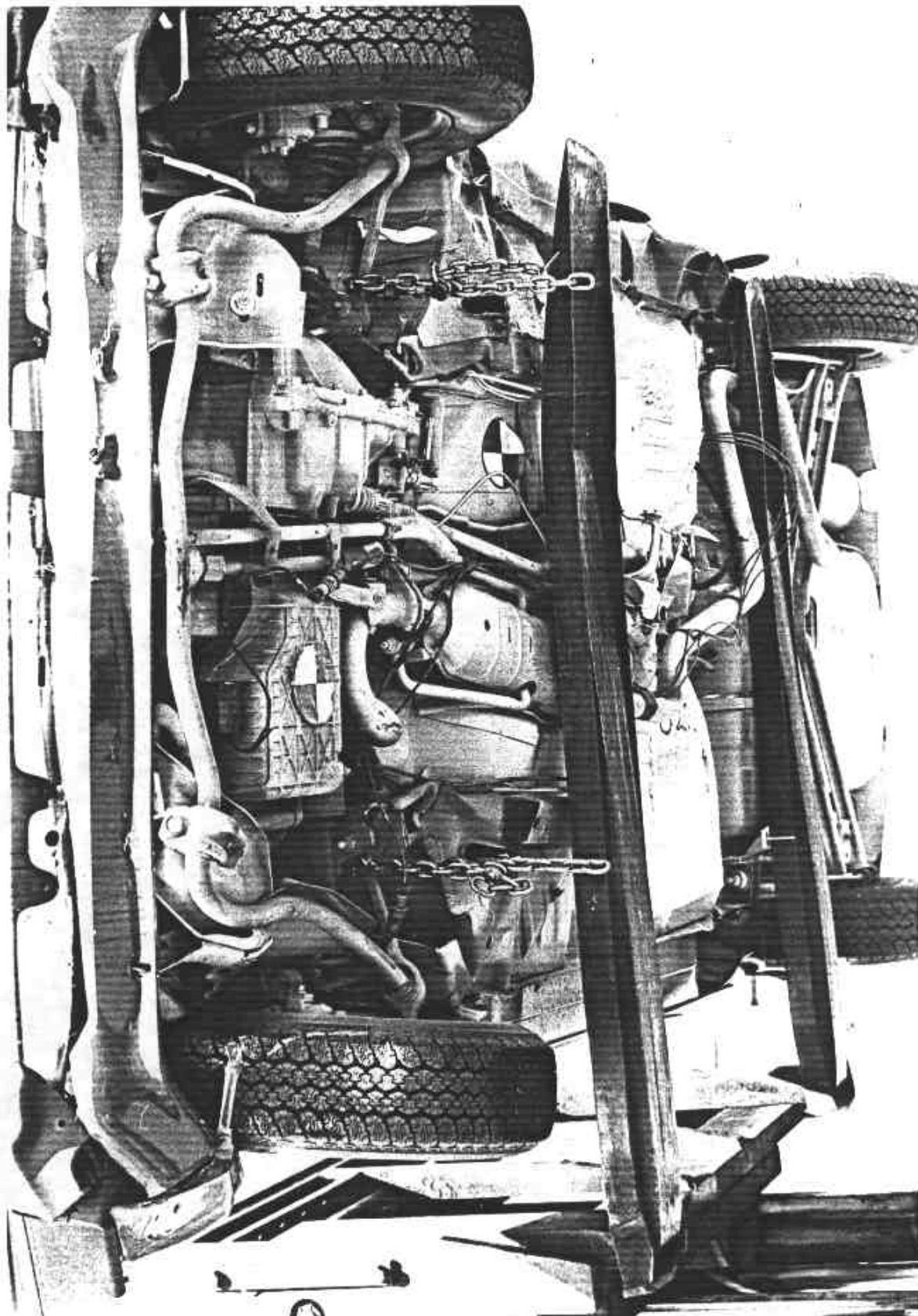


Figure A-18. POST-TEST FRONT UNDERBODY VIEW

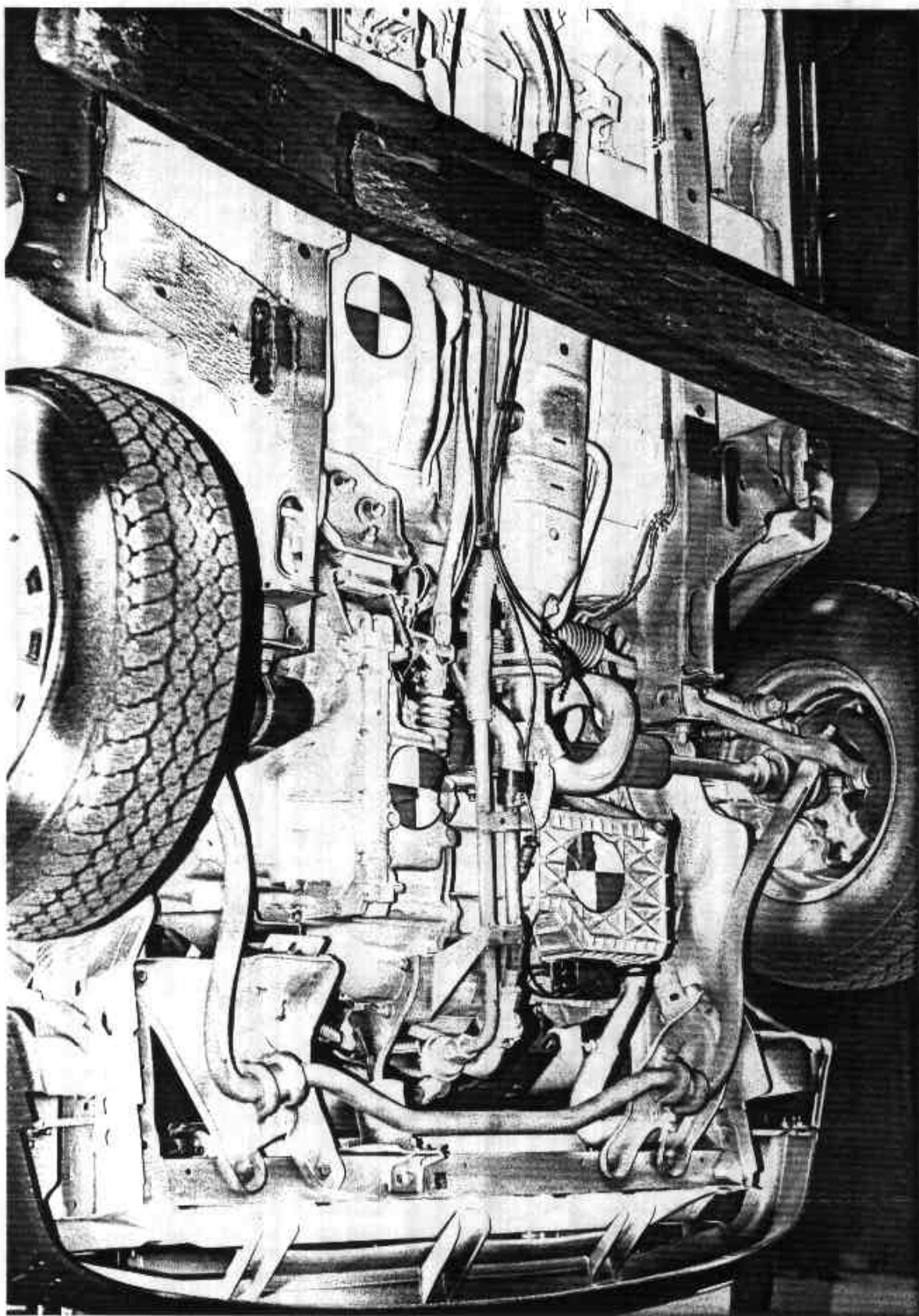


Figure A-19 PRE-TEST FRONT-SIDE UNDERBODY VIEW

A-20

7333-14

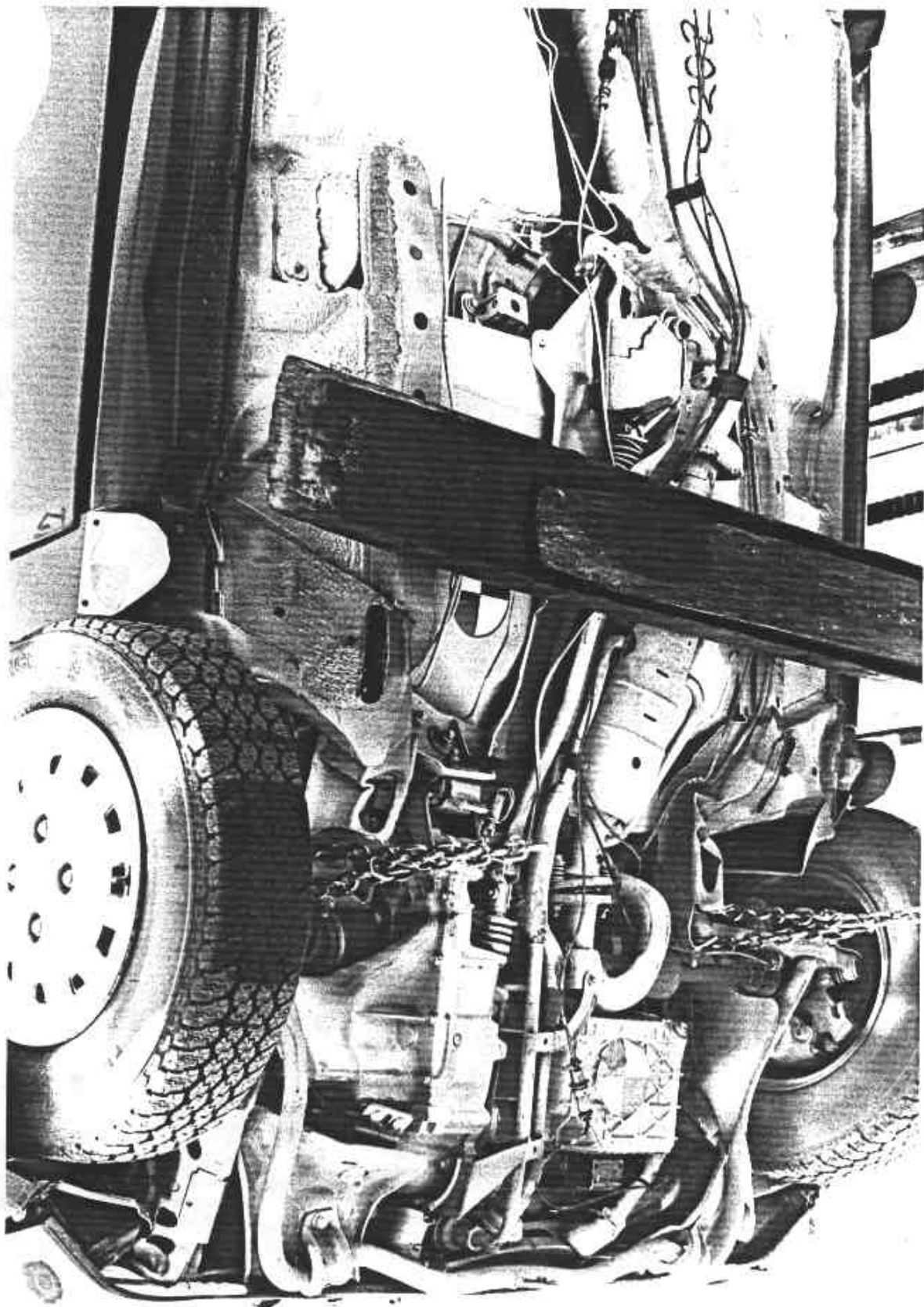


Figure A-20 POST-TEST FRONT-SIDE UNDERBODY VIEW

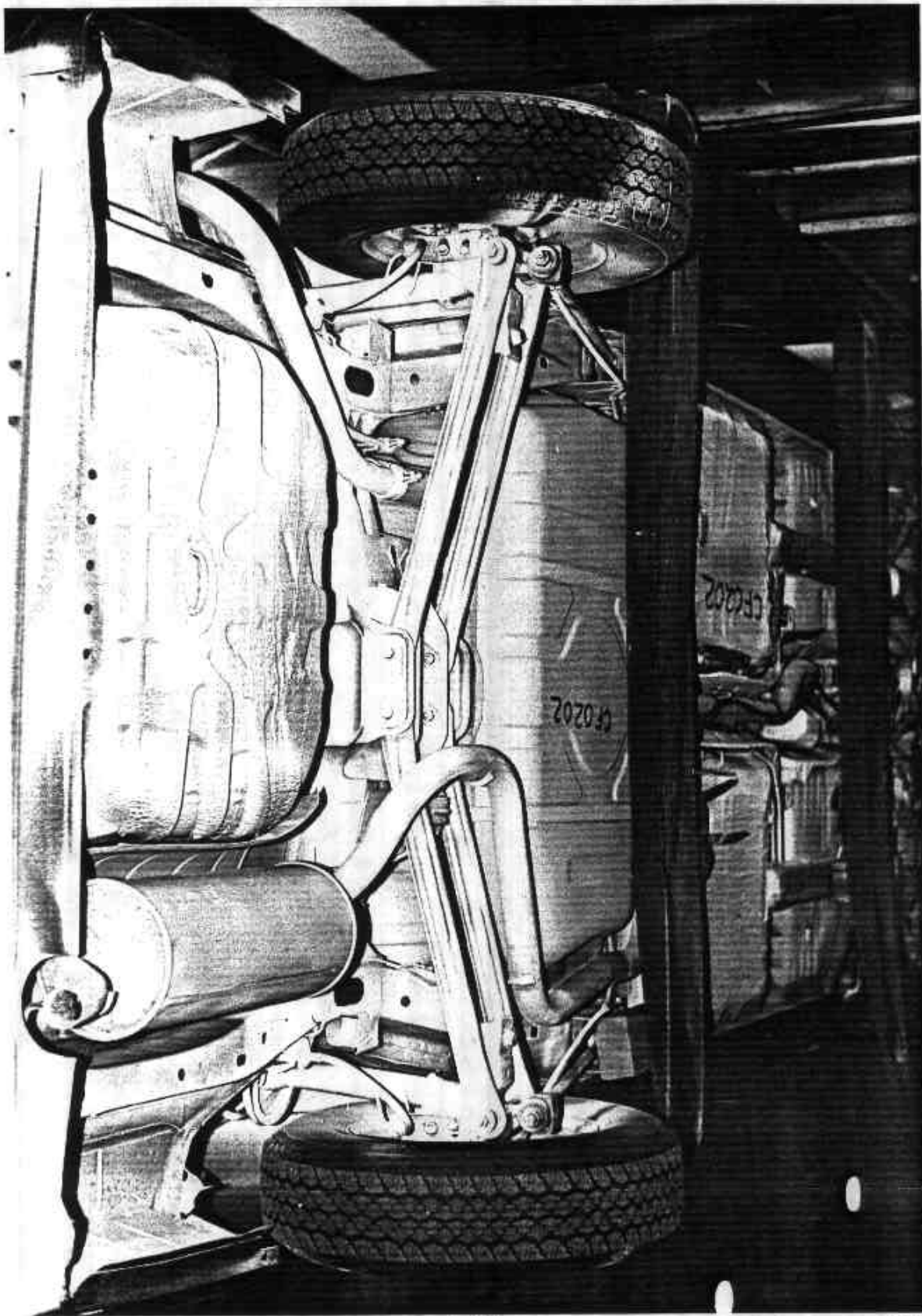


Figure A-21 PRE-TEST REAR UNDERBODY VIEW

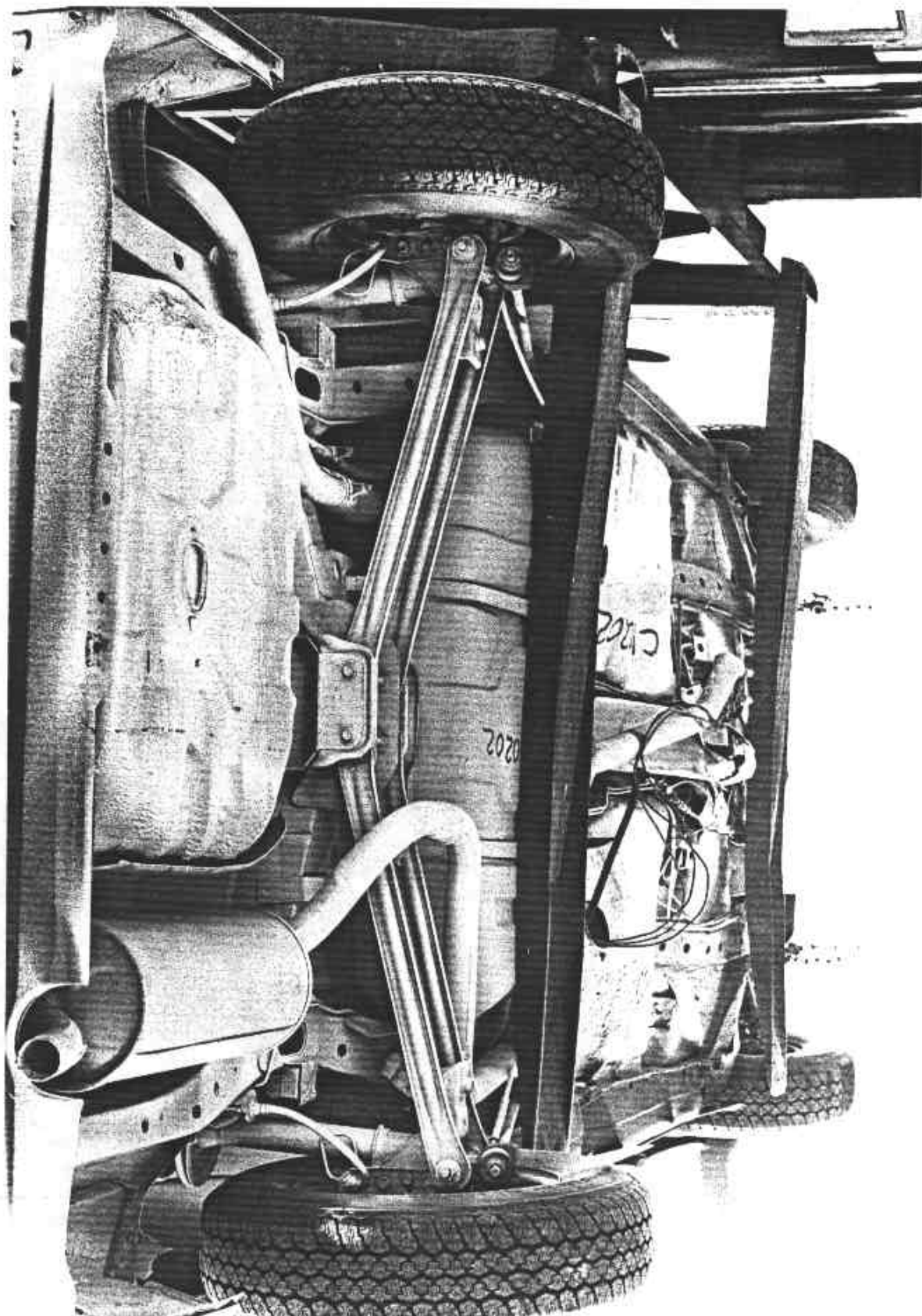


Figure A-22 POST-TEST REAR UNDERBODY VIEW

A-23

7333-14

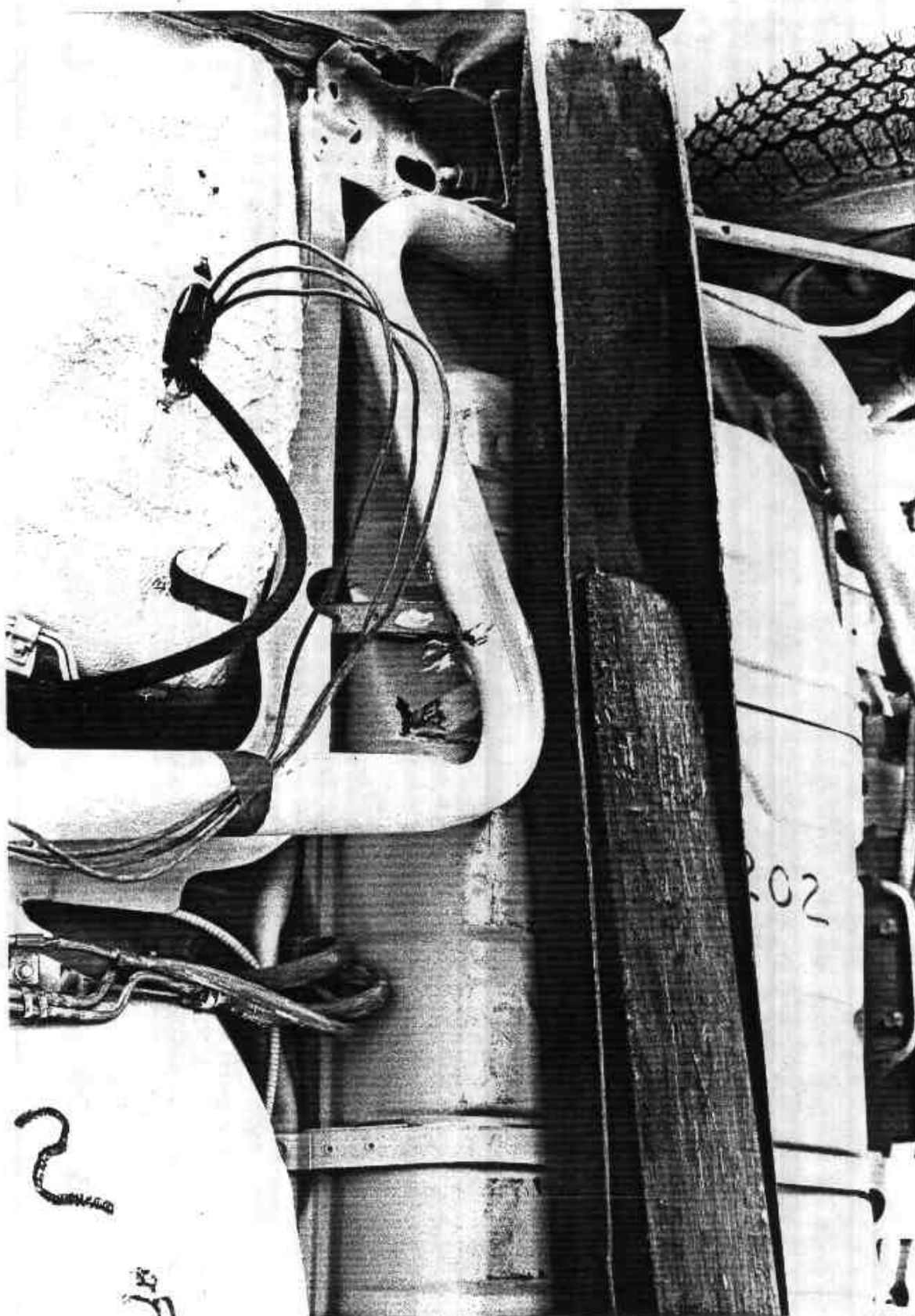


Figure A-23 POST-TEST TAIL PIPE AND FUEL TANK CONTACT VIEW

A-24

7333-14



Figure A-24 PRE-TEST DRIVER POSITION VIEW

A-25.

7333-14



Figure A-25 POST-TEST DRIVER POSITION VIEW

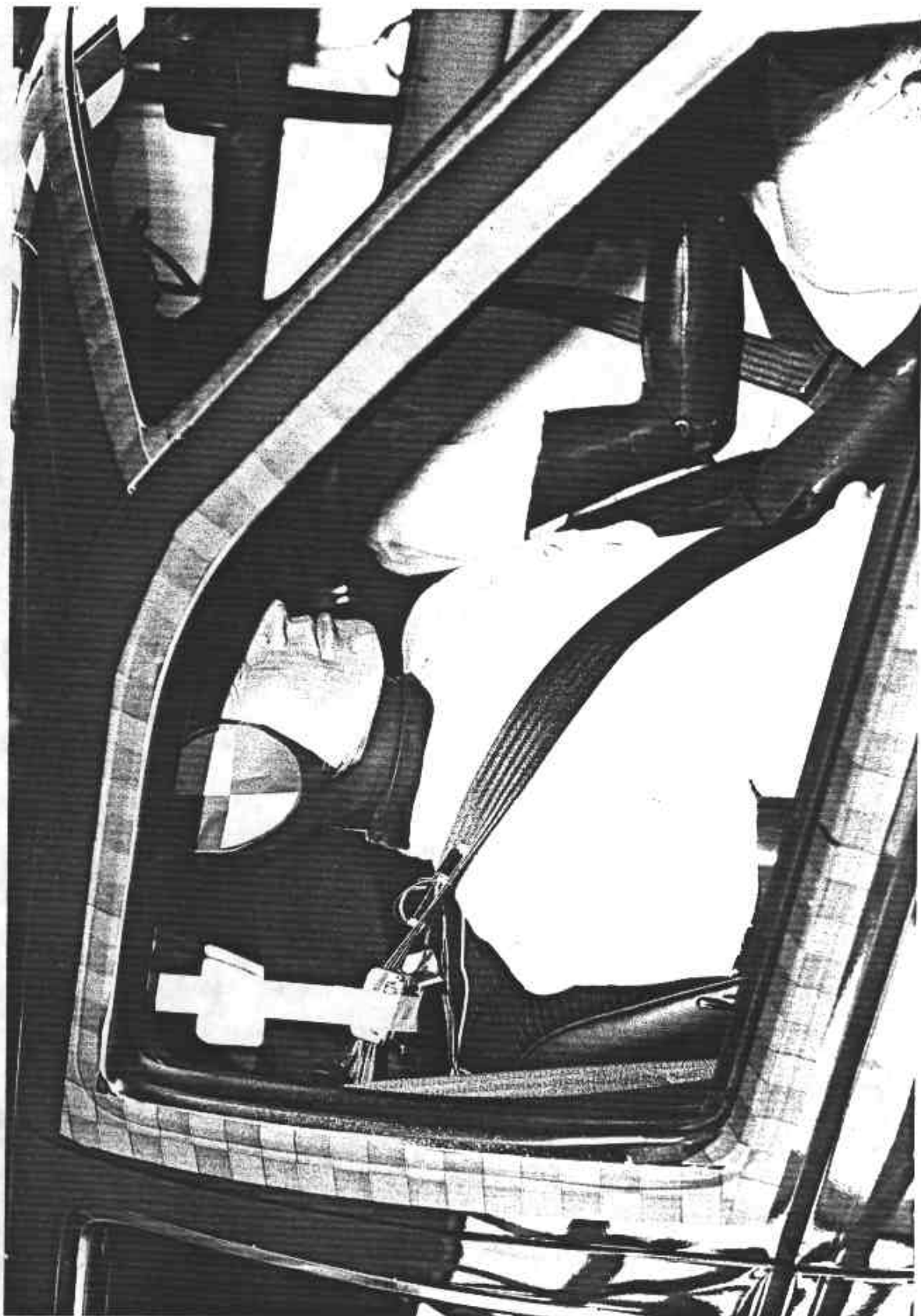


Figure A-26 PRE-TEST PASSENGER POSITION VIEW



Figure A-27 POST-TEST PASSENGER POSITION VIEW

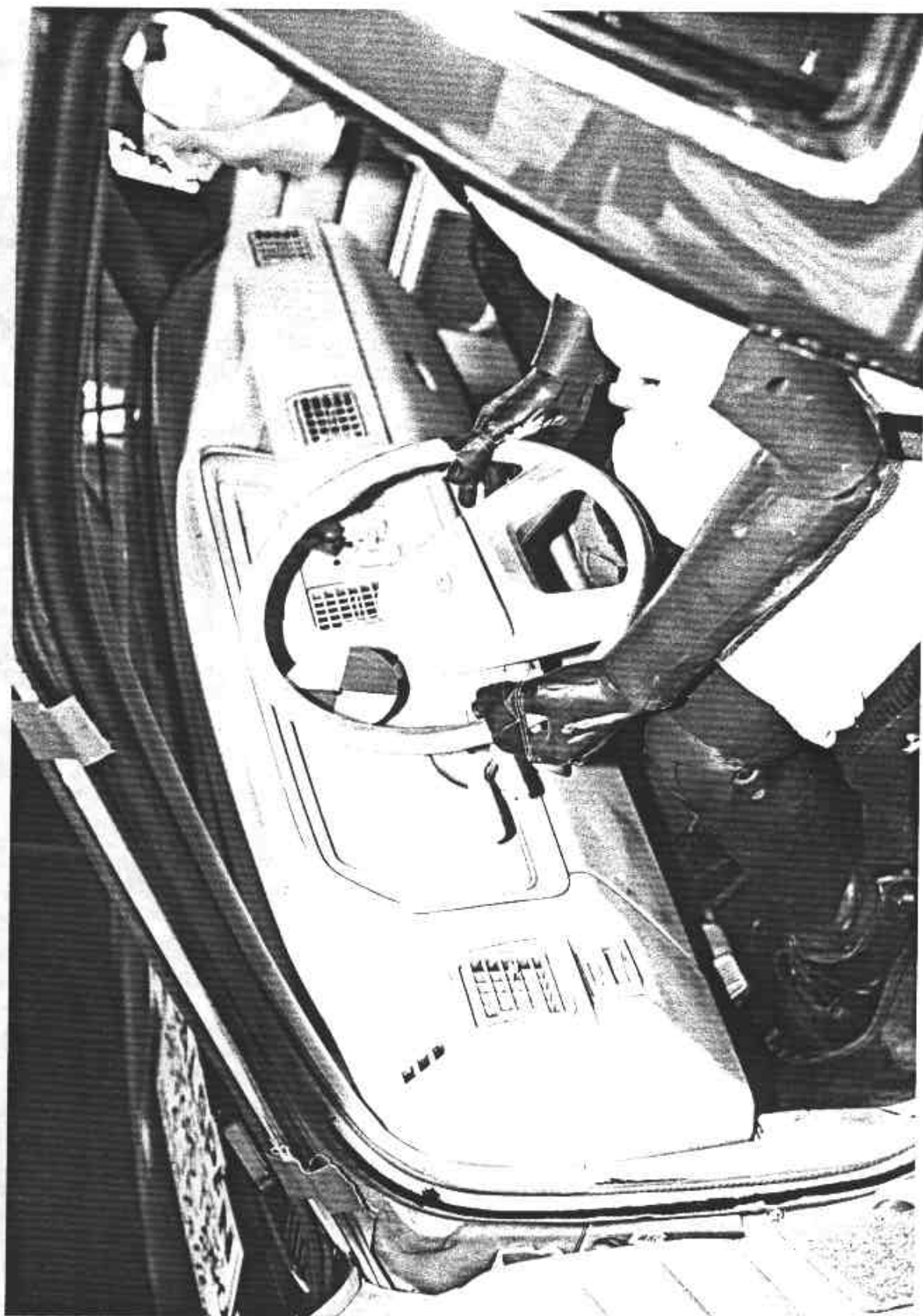


Figure A-28 PRE-TEST DRIVER AND INTERIOR VIEW

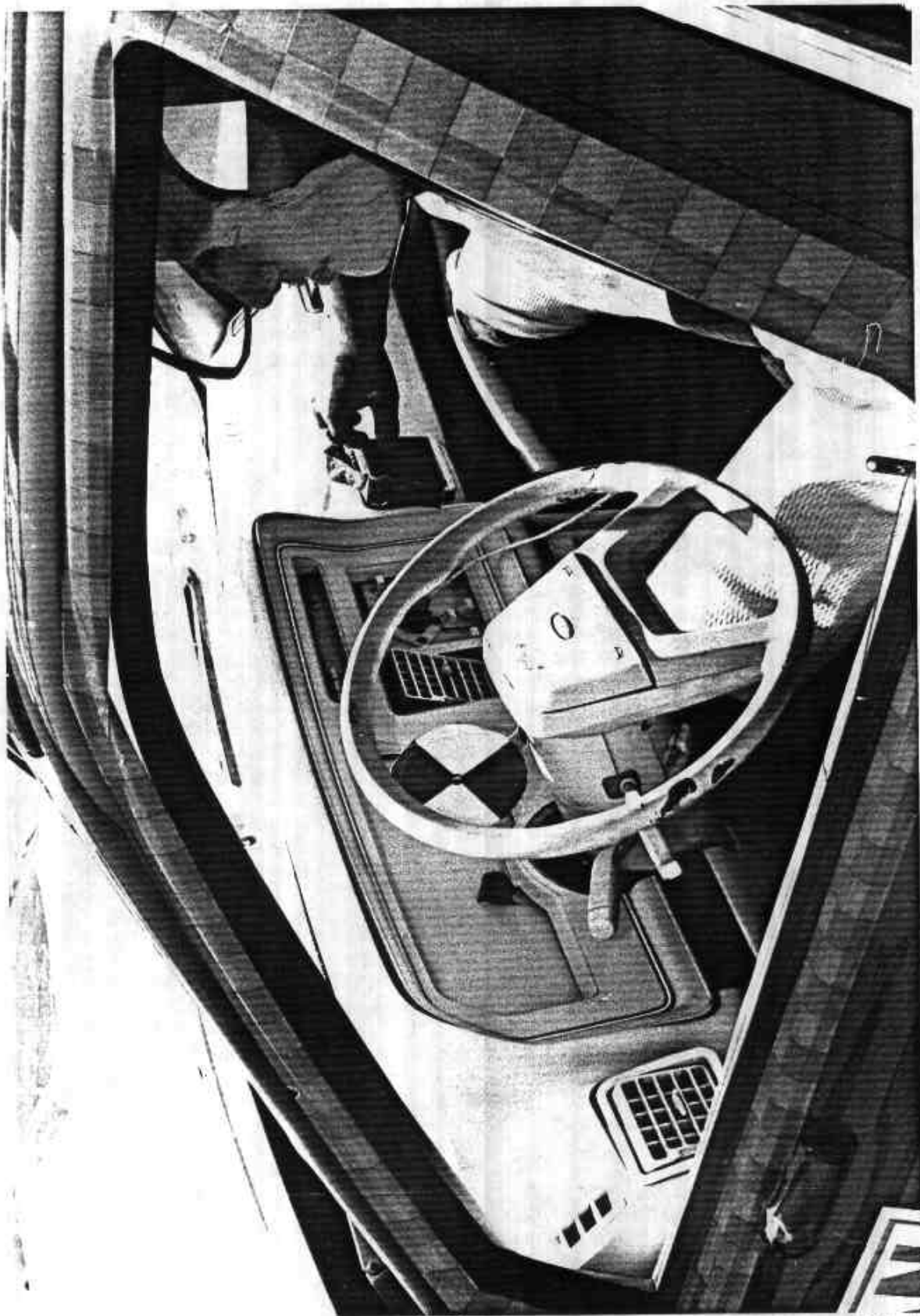


Figure A-29 POST-TEST DRIVER AND INTERIOR VIEW

A-30

7333-14



Figure A-30 PRE-TEST PASSENGER AND INTERIOR VIEW

A-31

7333-14



Figure A-31 POST-TEST PASSENGER AND INTERIOR VIEW

A-32

7333-14

APPENDIX B
VEHICLE, DUMMY RESPONSE DATA AND
LOAD CELL BARRIER DATA

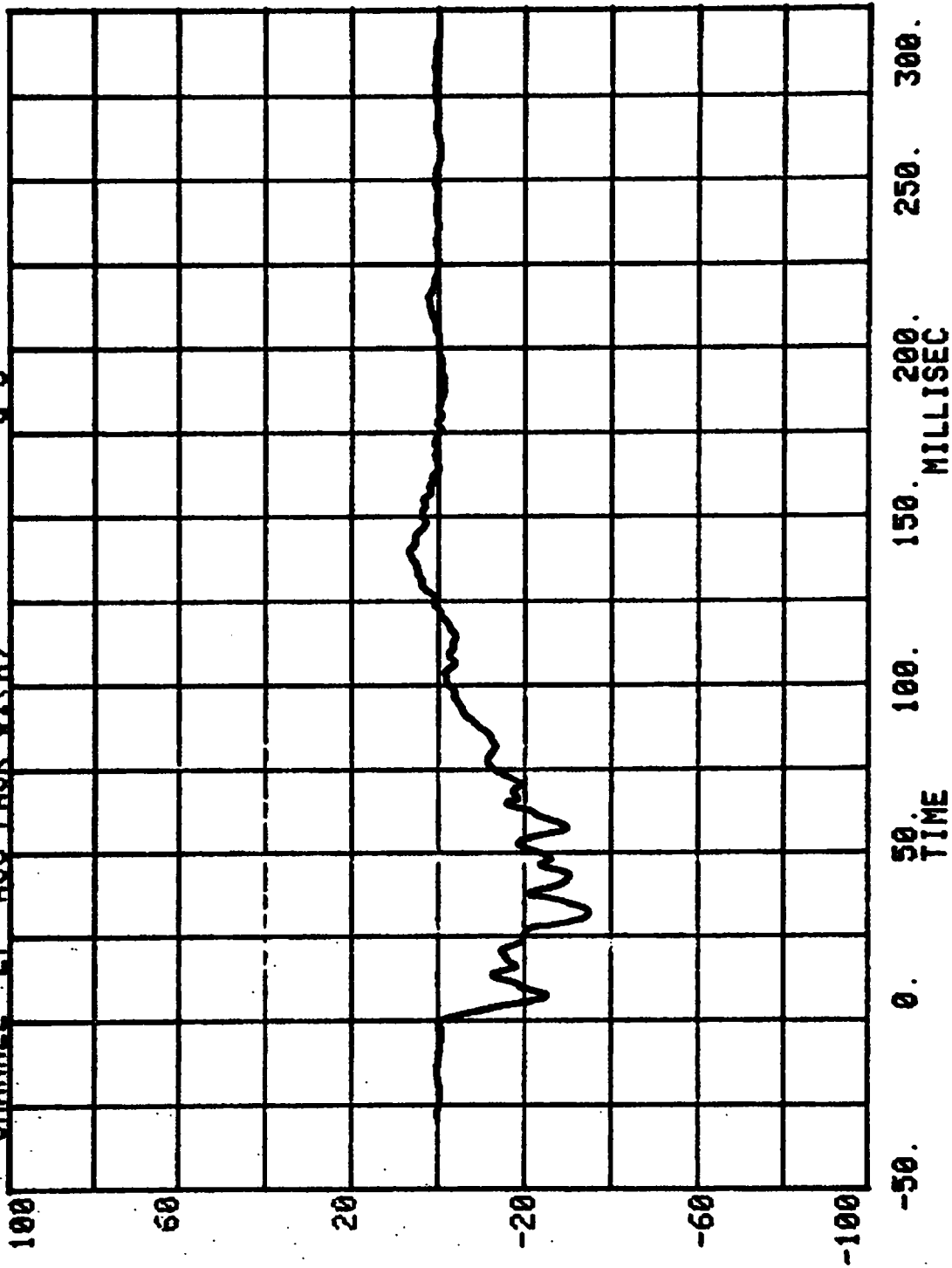
TEST NO. GF0202

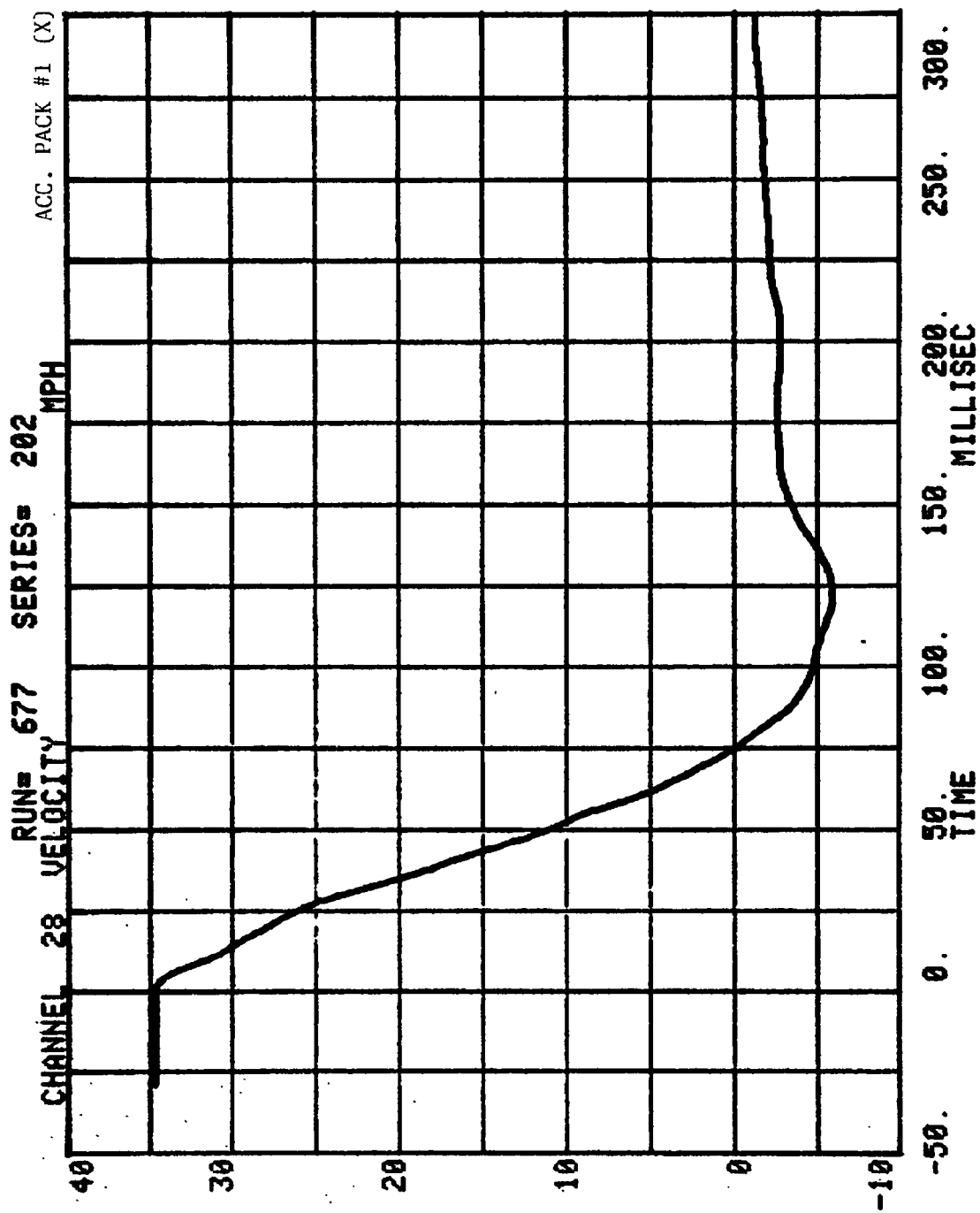
VEHICLE DATA

FILTER CHANNEL CLASS

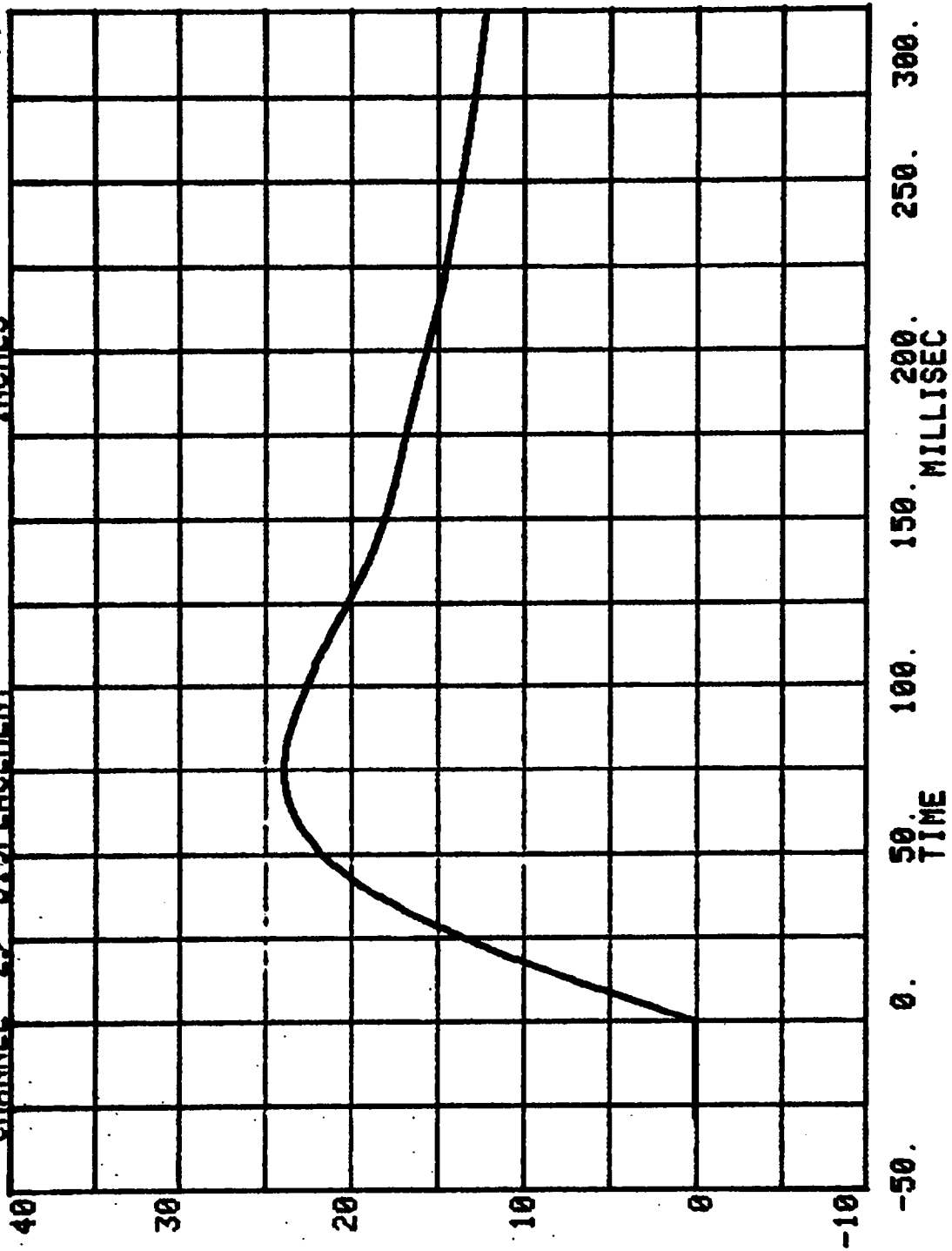
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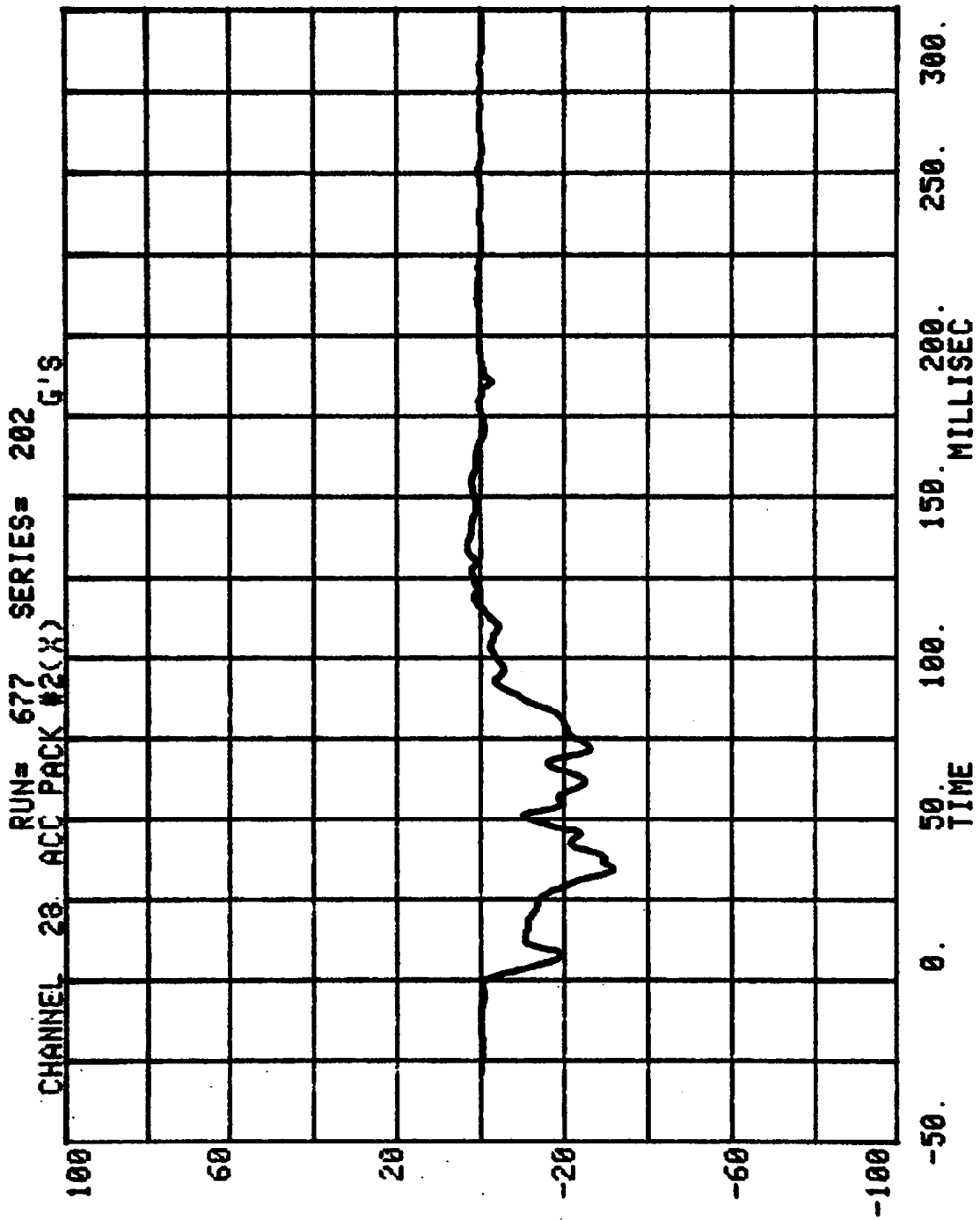
RUN= 677 SERIES= 202 G'S
CHANNEL 27 ACC PACK #1(X)

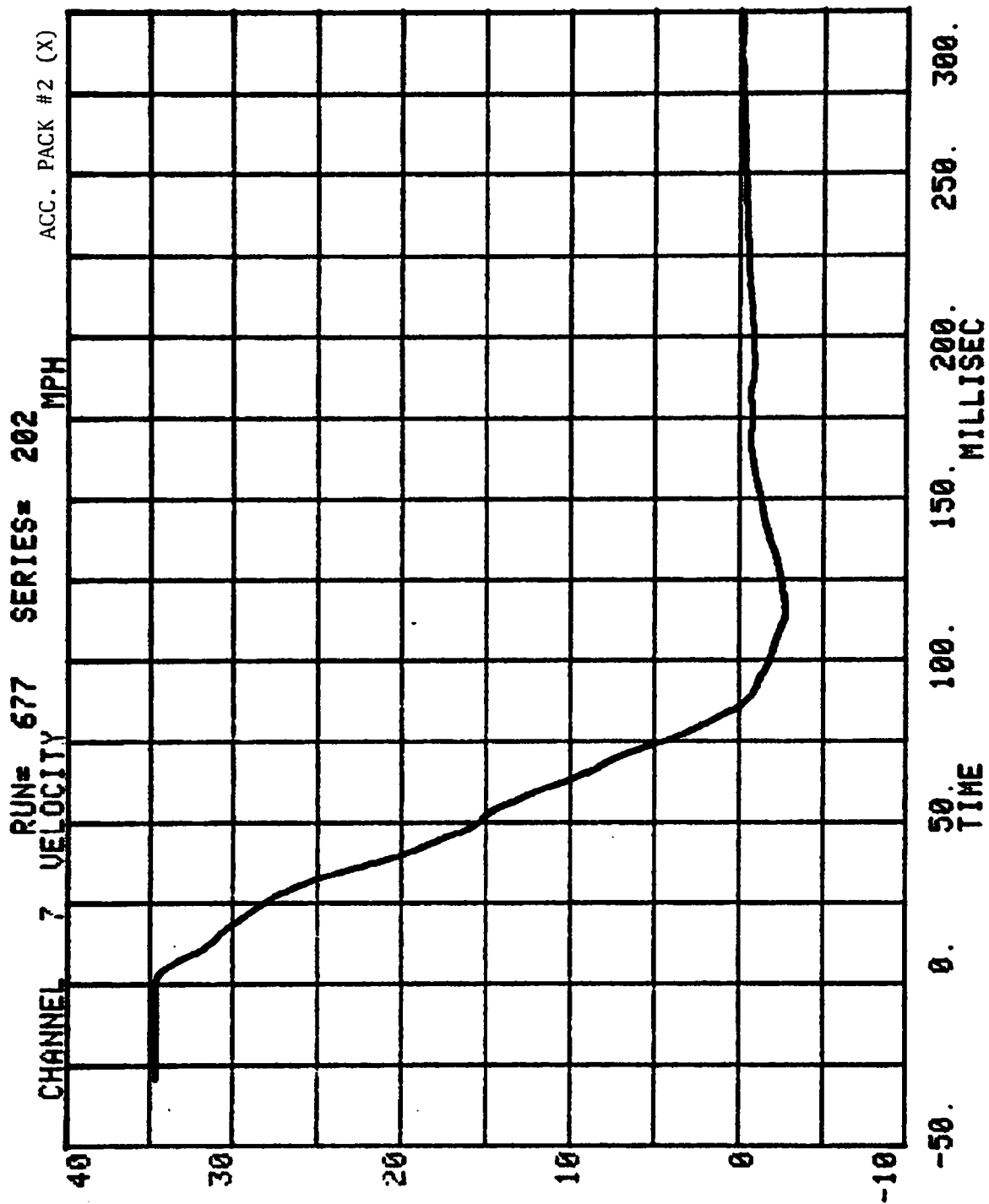


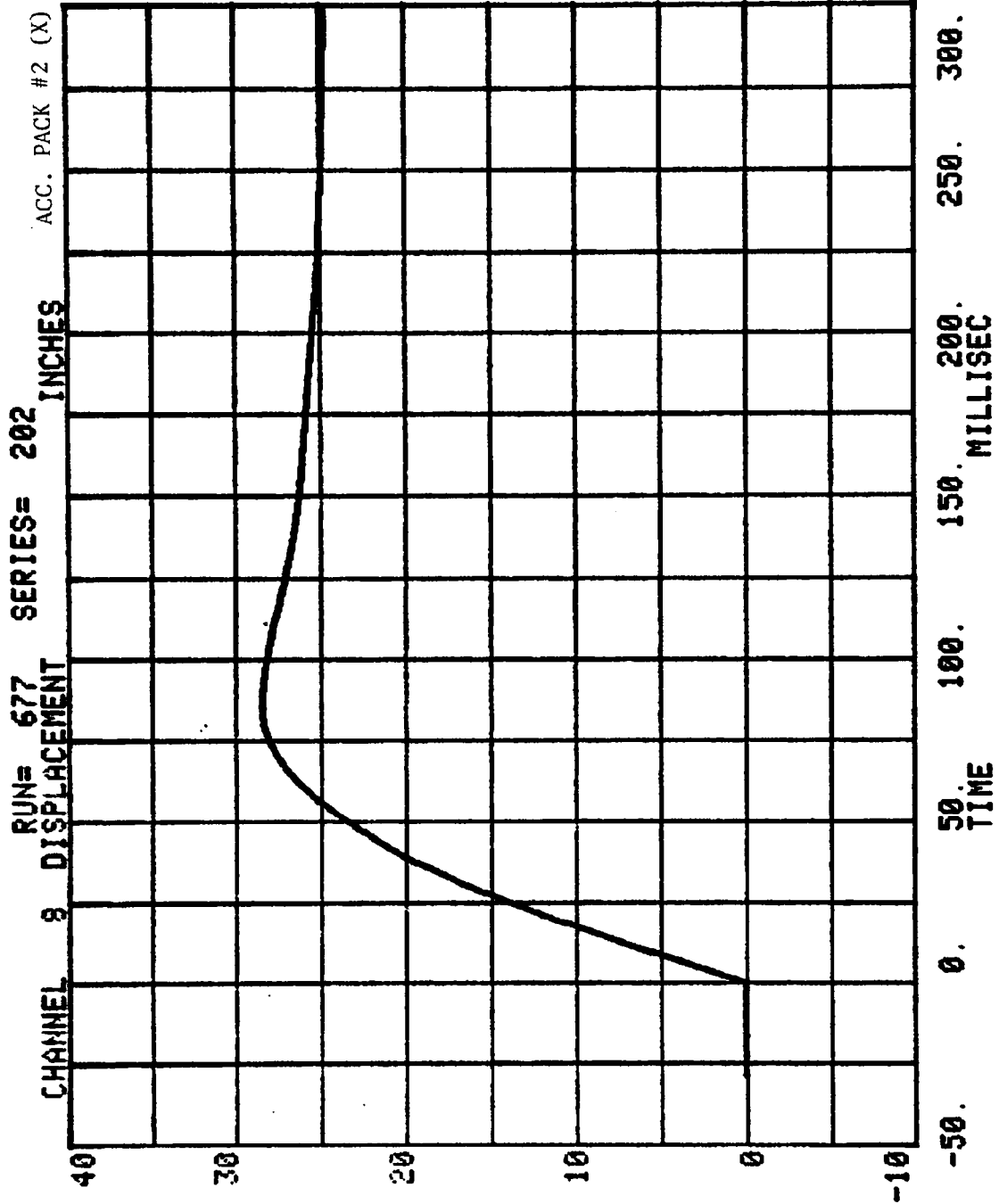


RUN= 677 SERIES= 202
CHANNEL 29 DISPLACEMENT INCHES ACC. PACK #1 (X)

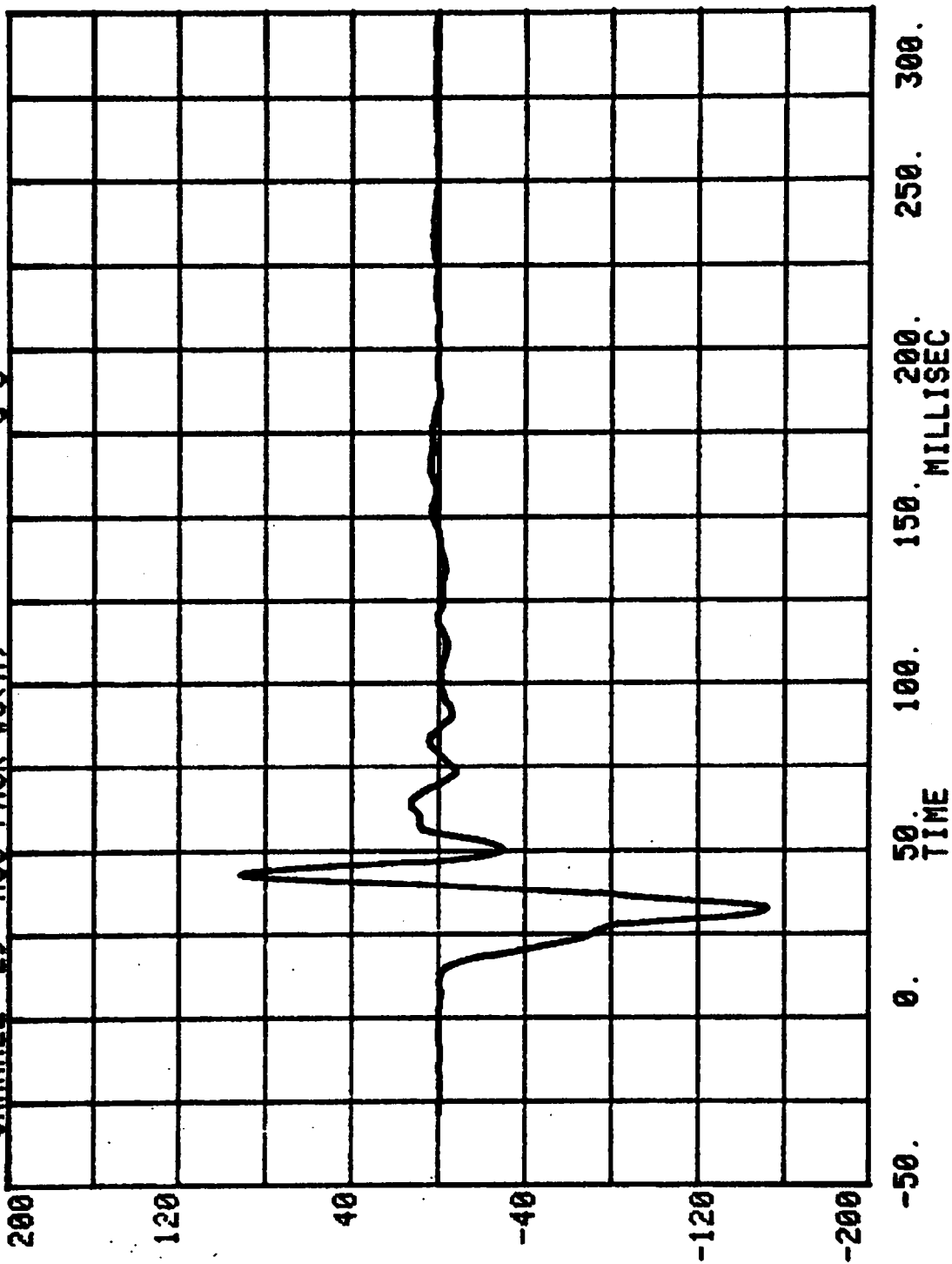


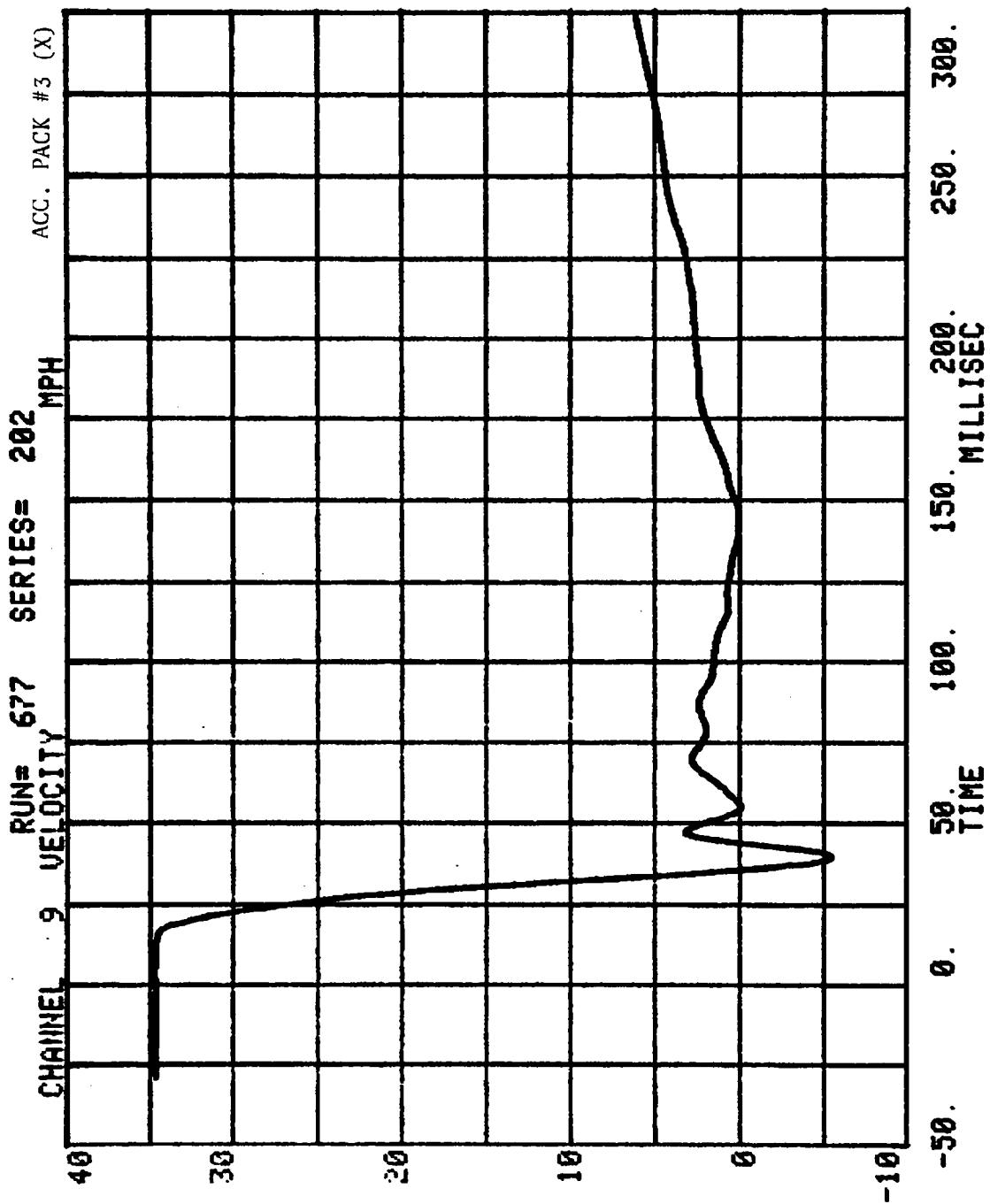


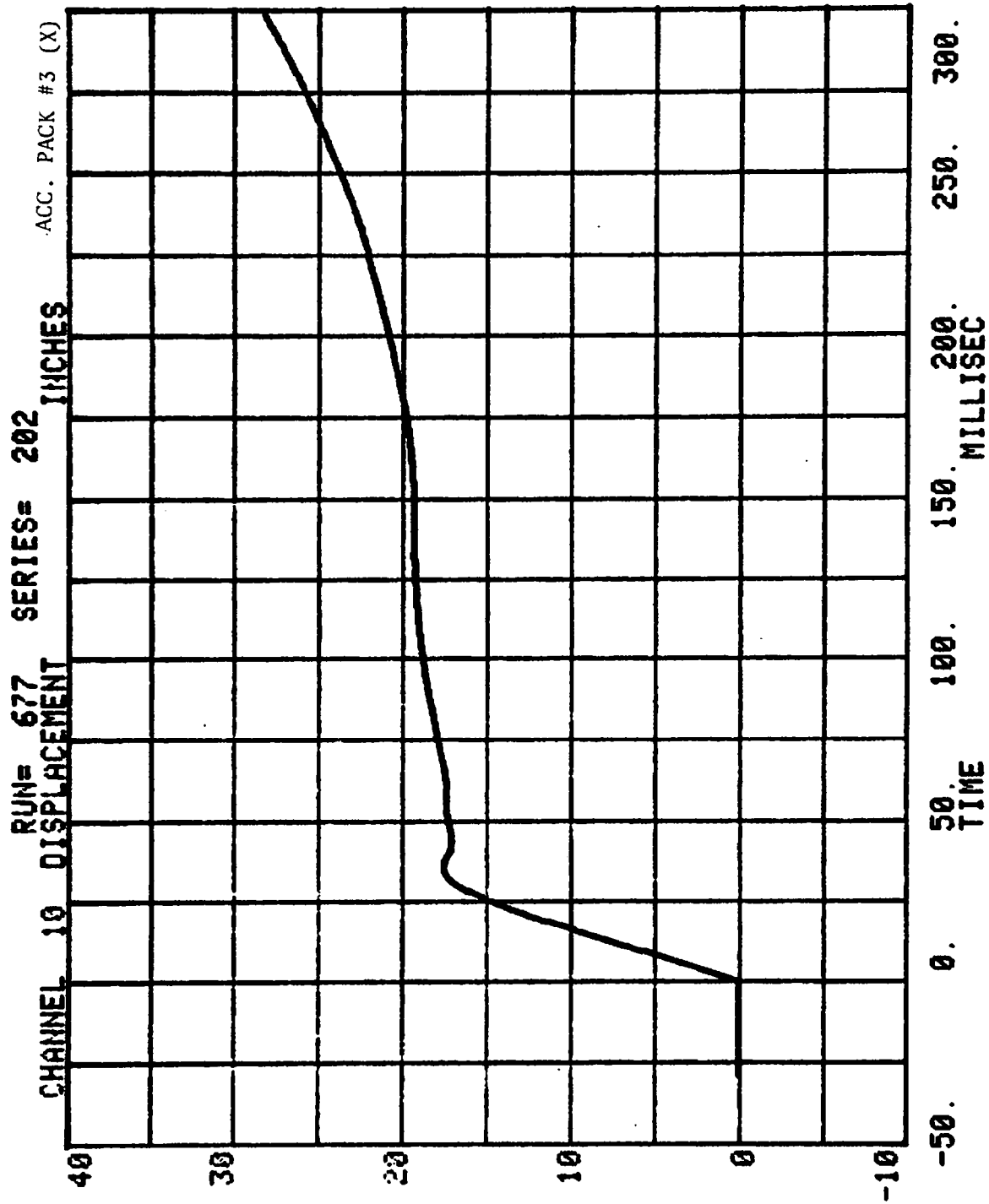




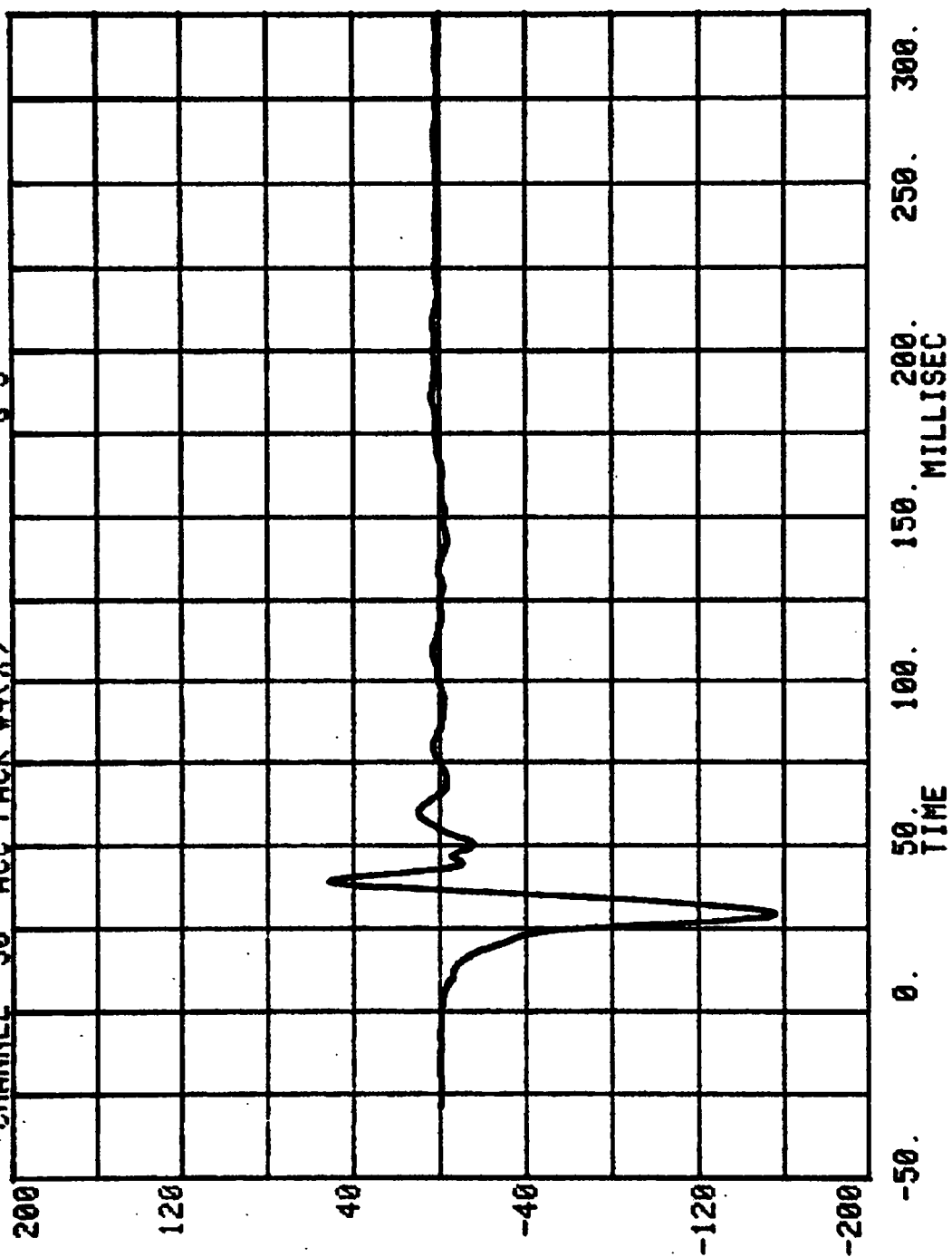
CHANNEL 29 ACC PACK #3(X) RUN= 677 SERIES= 202 G'S

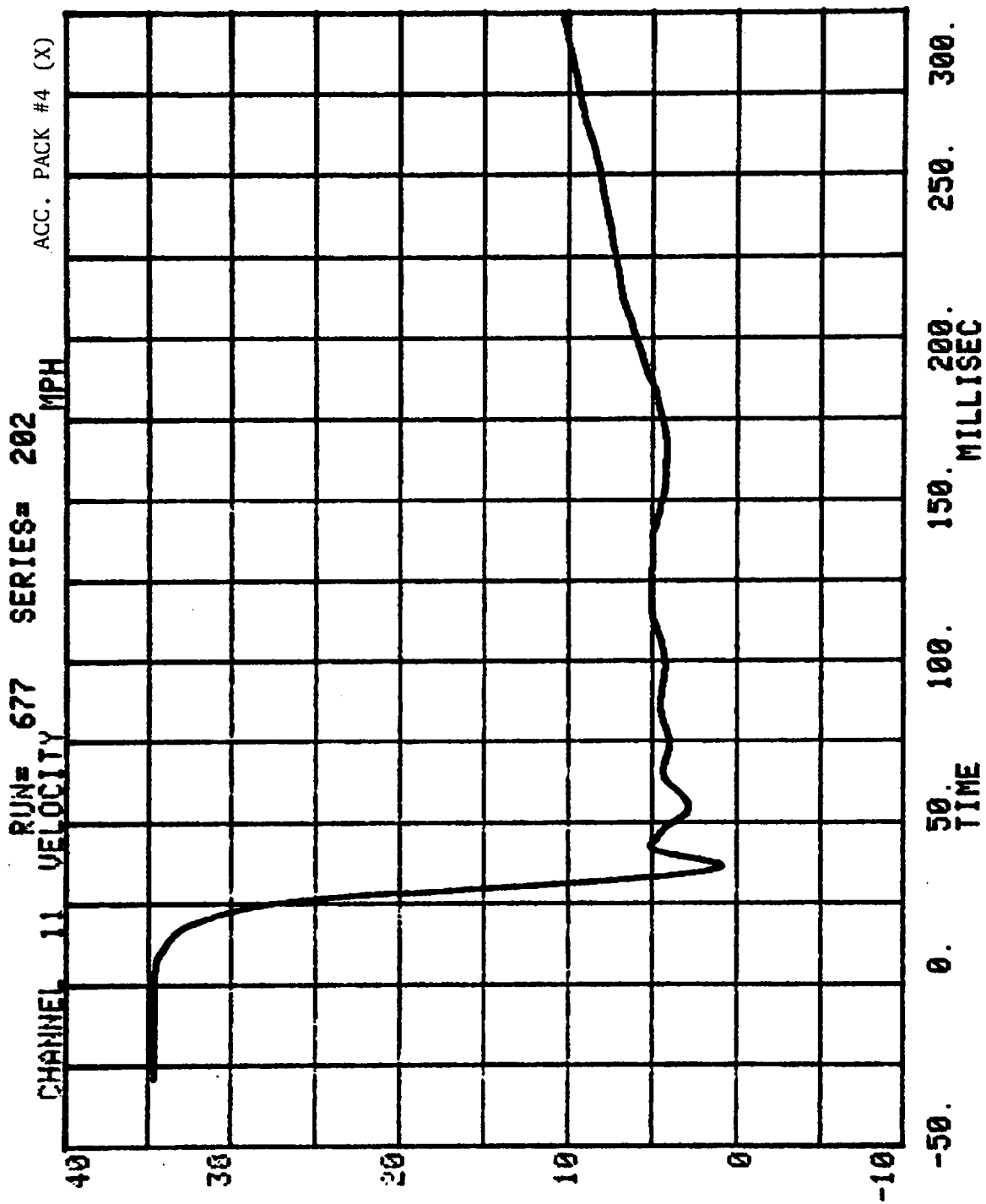


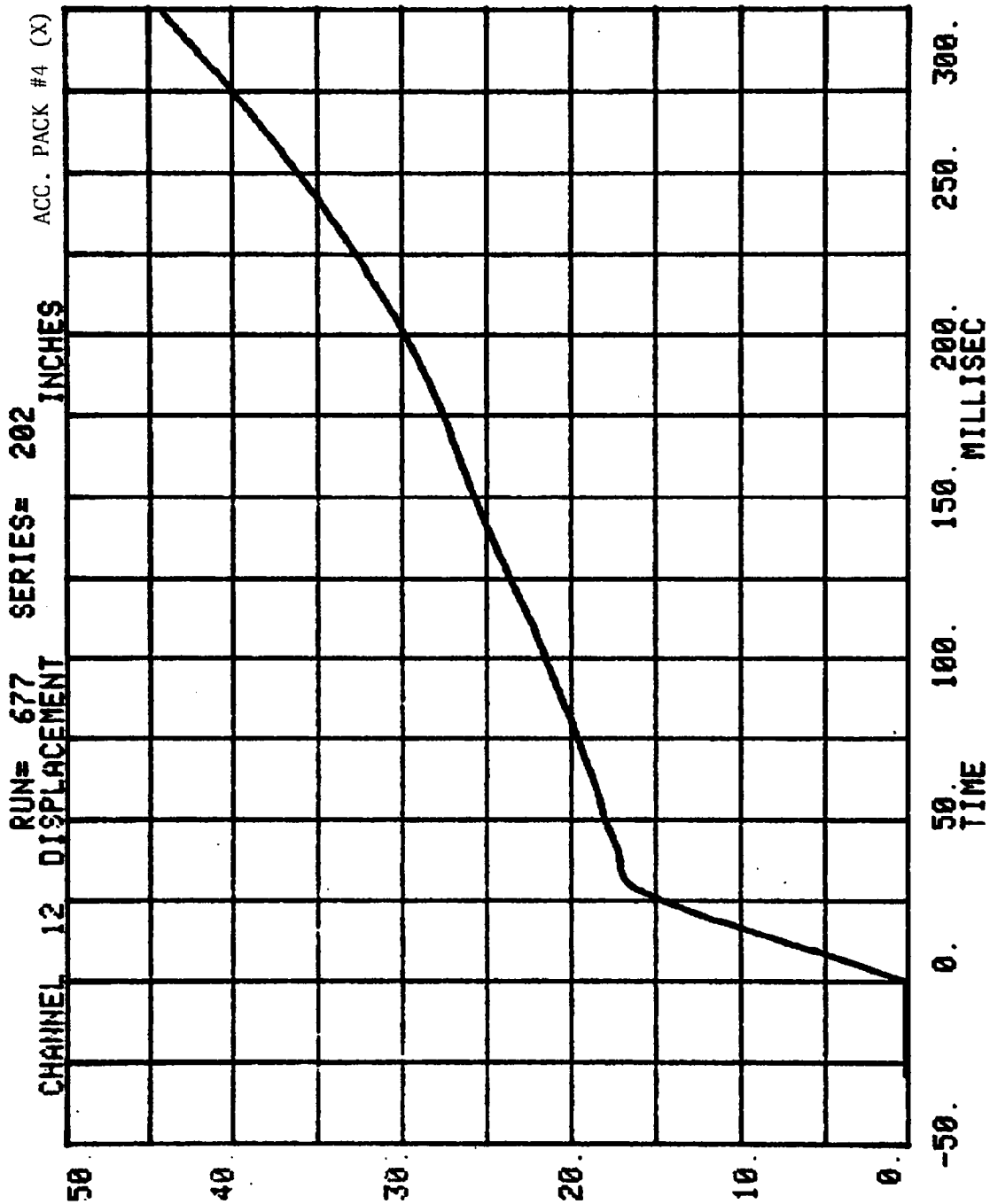




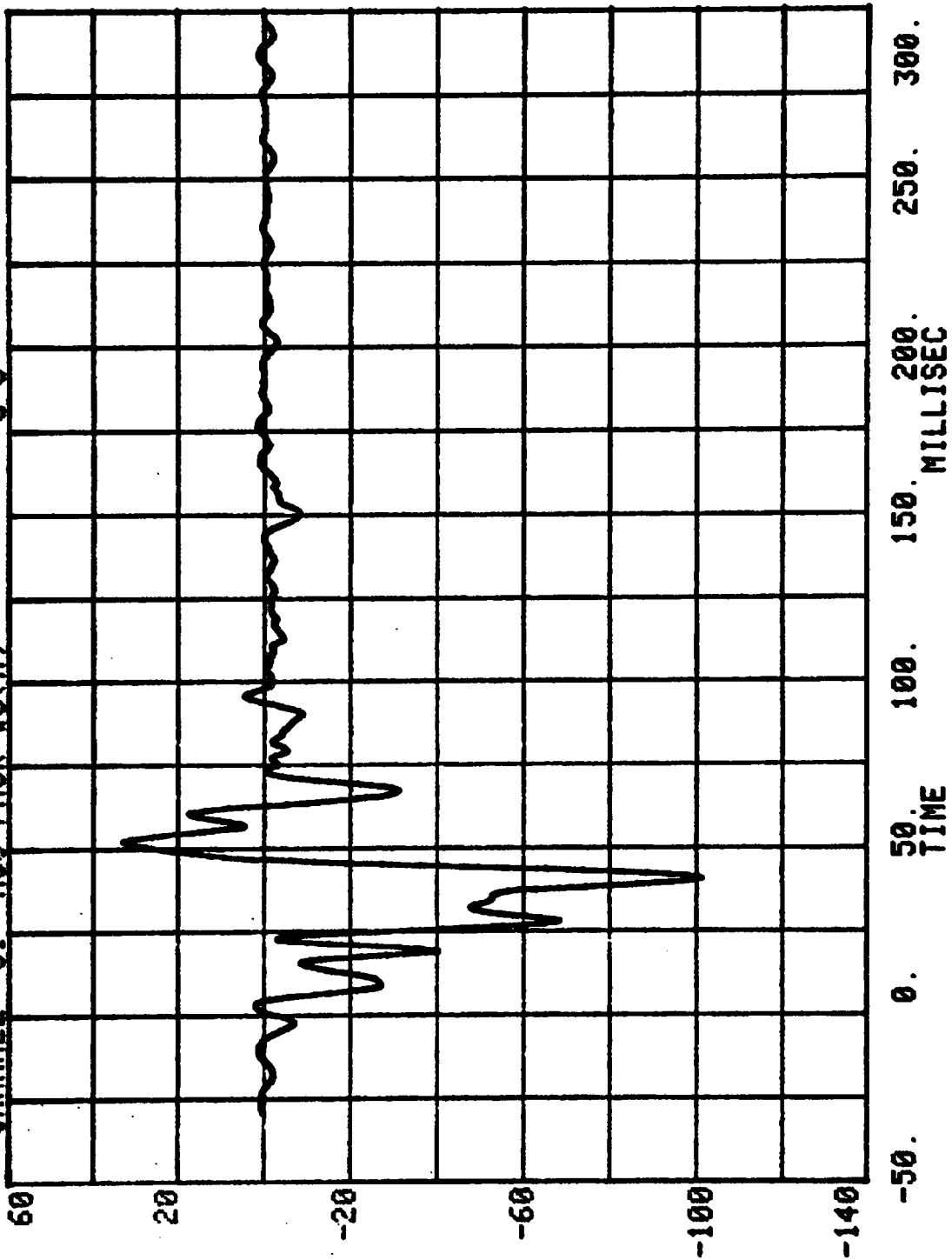
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CHANNEL 30 ACC PACK #4(X)

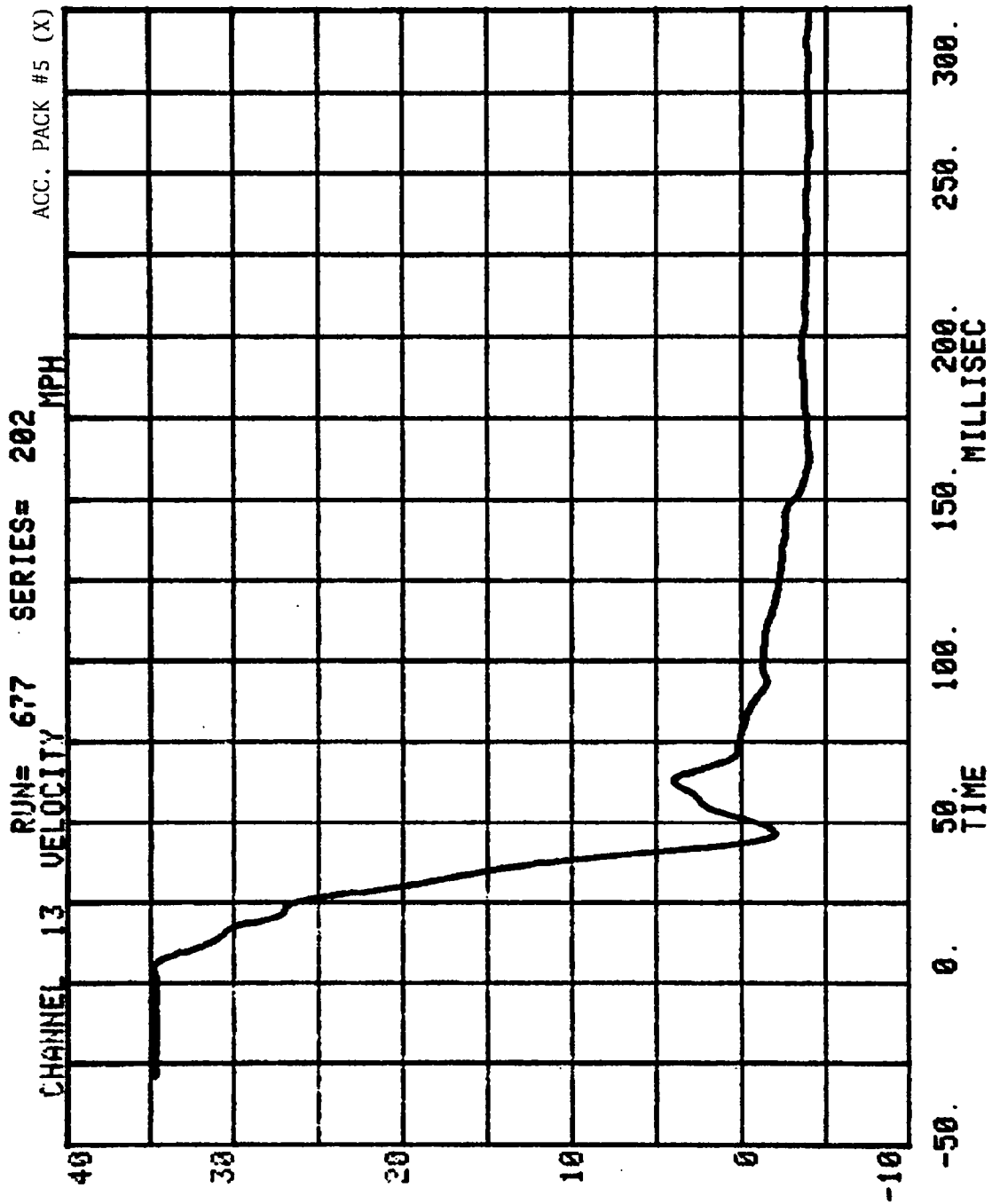


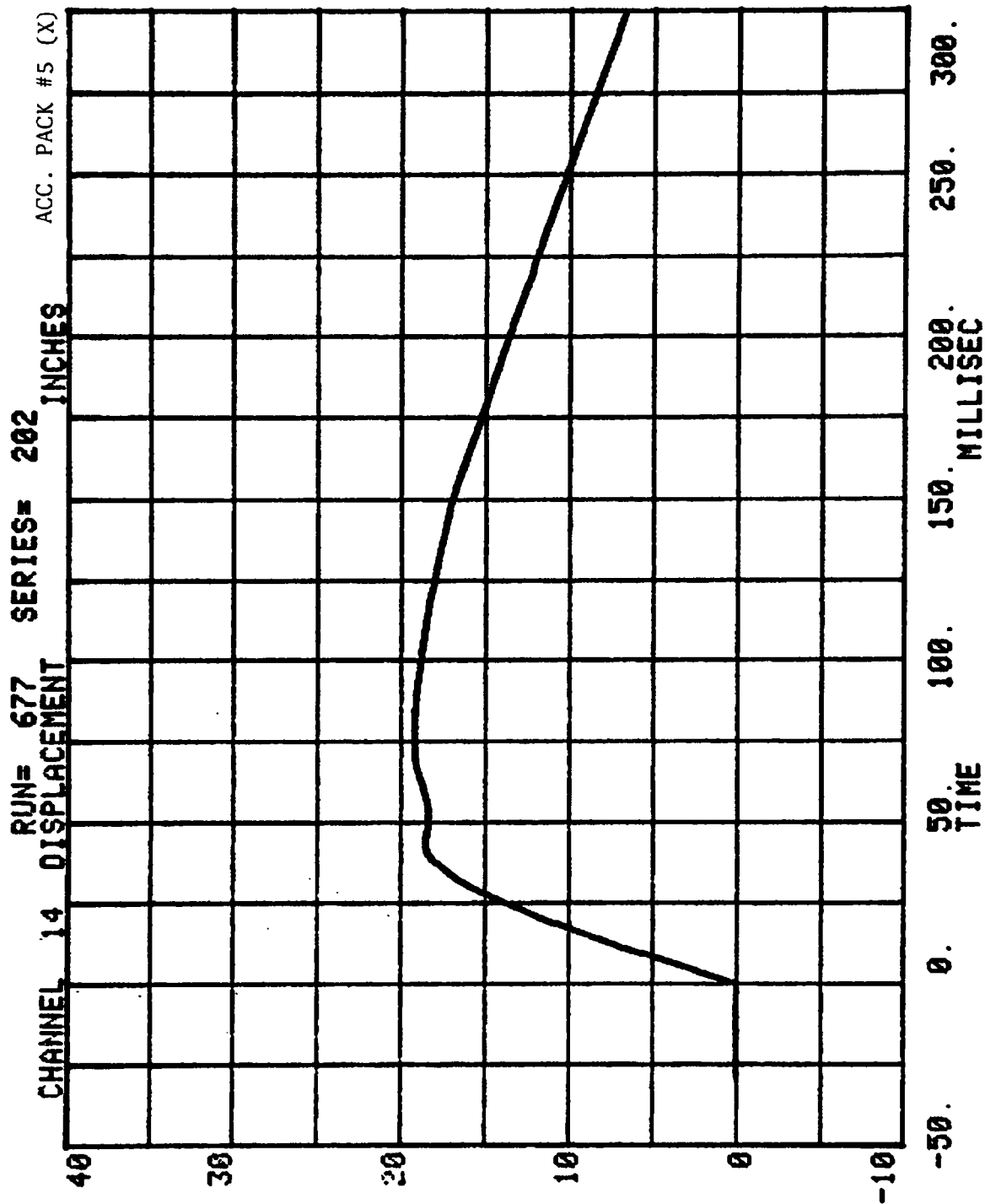


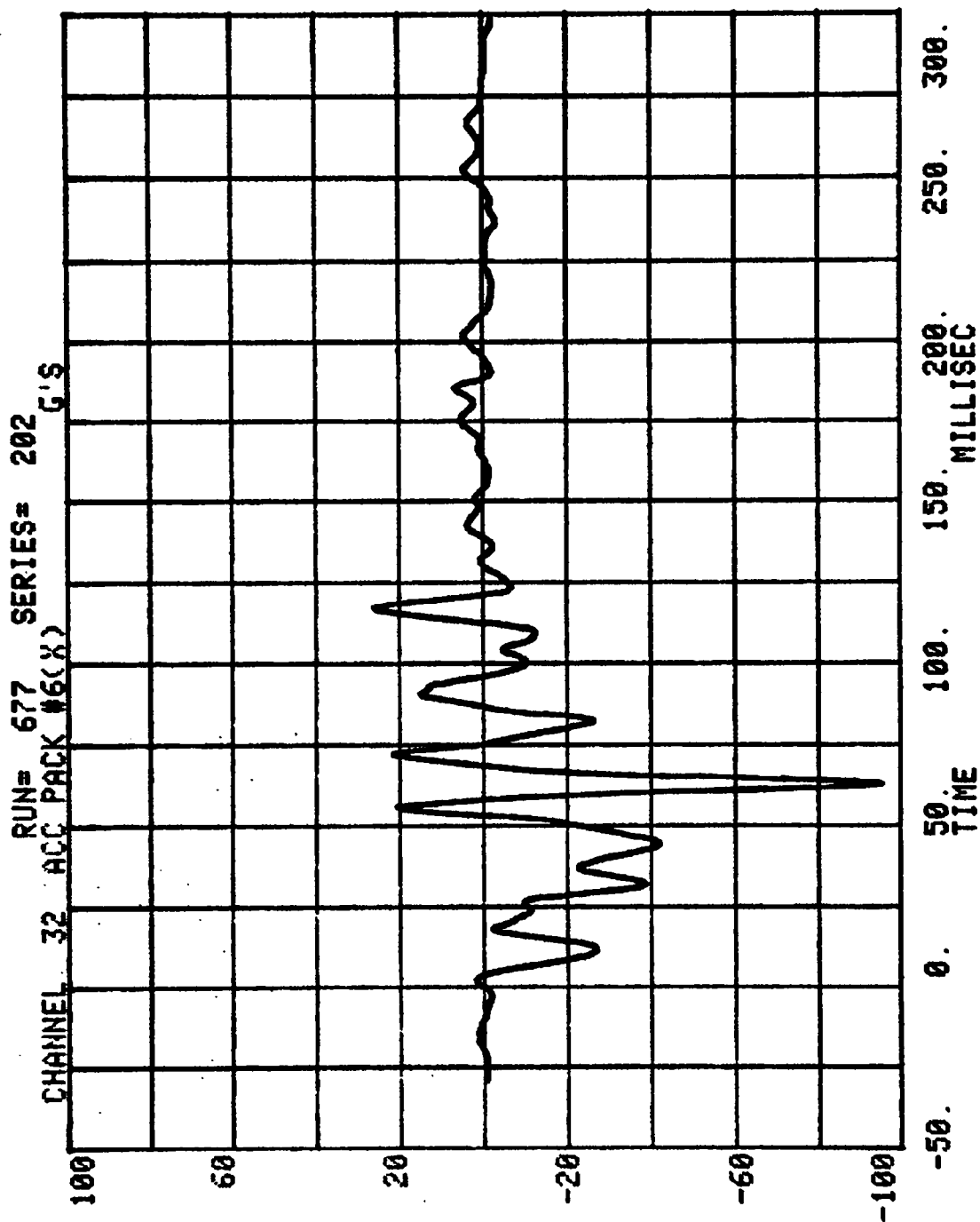


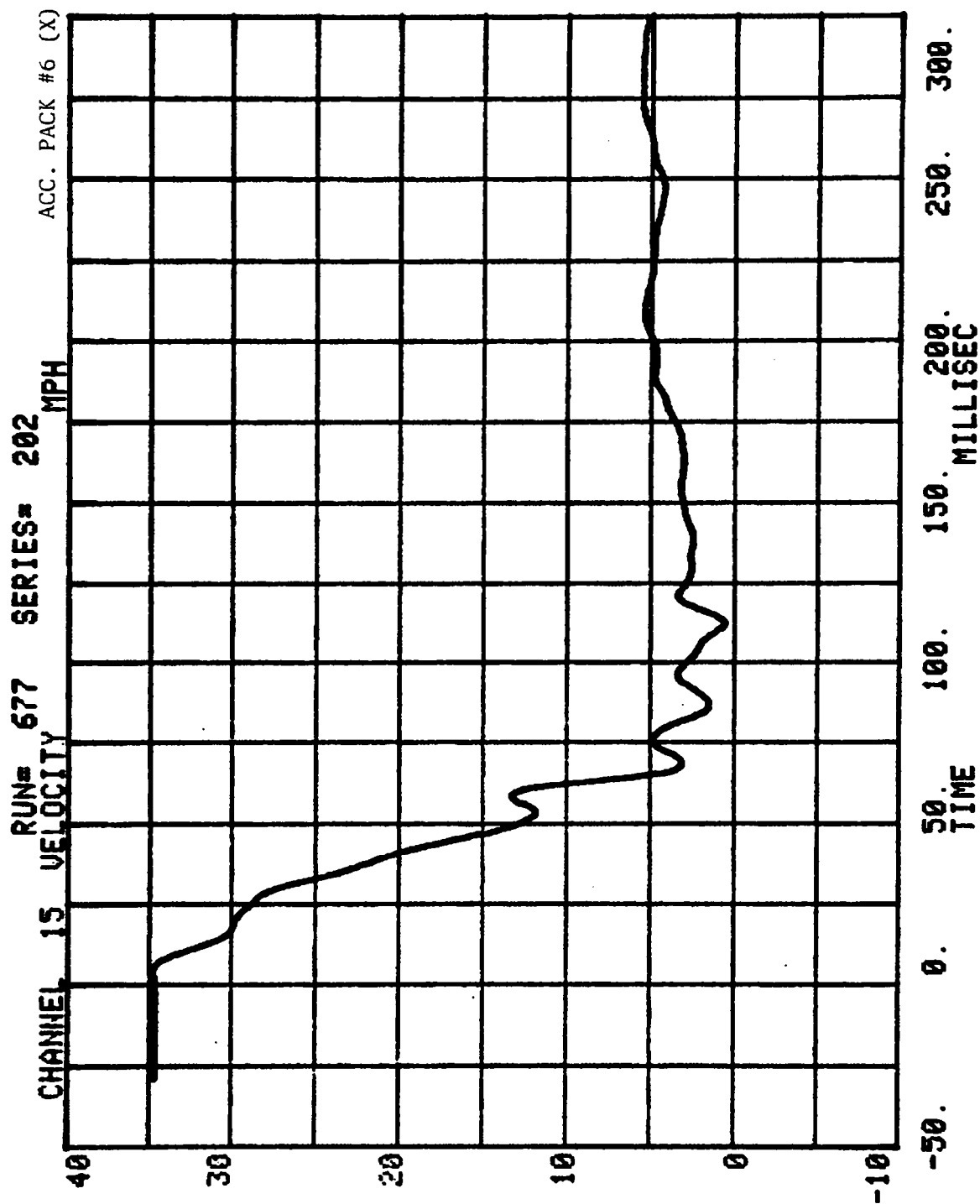
CHANNEL 31 ACC PACK #5(X) RUN= 677 SERIES= 202 G'S

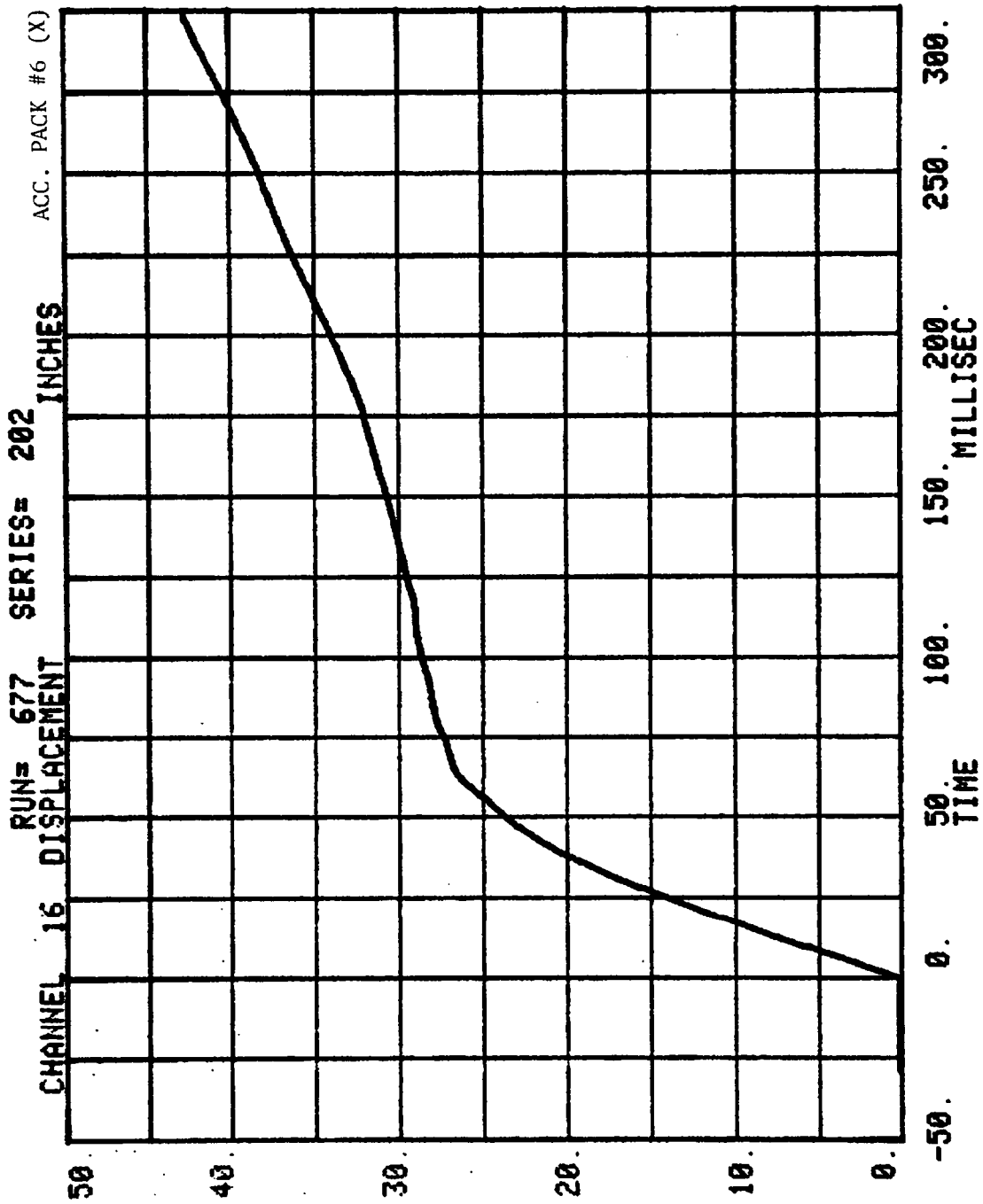




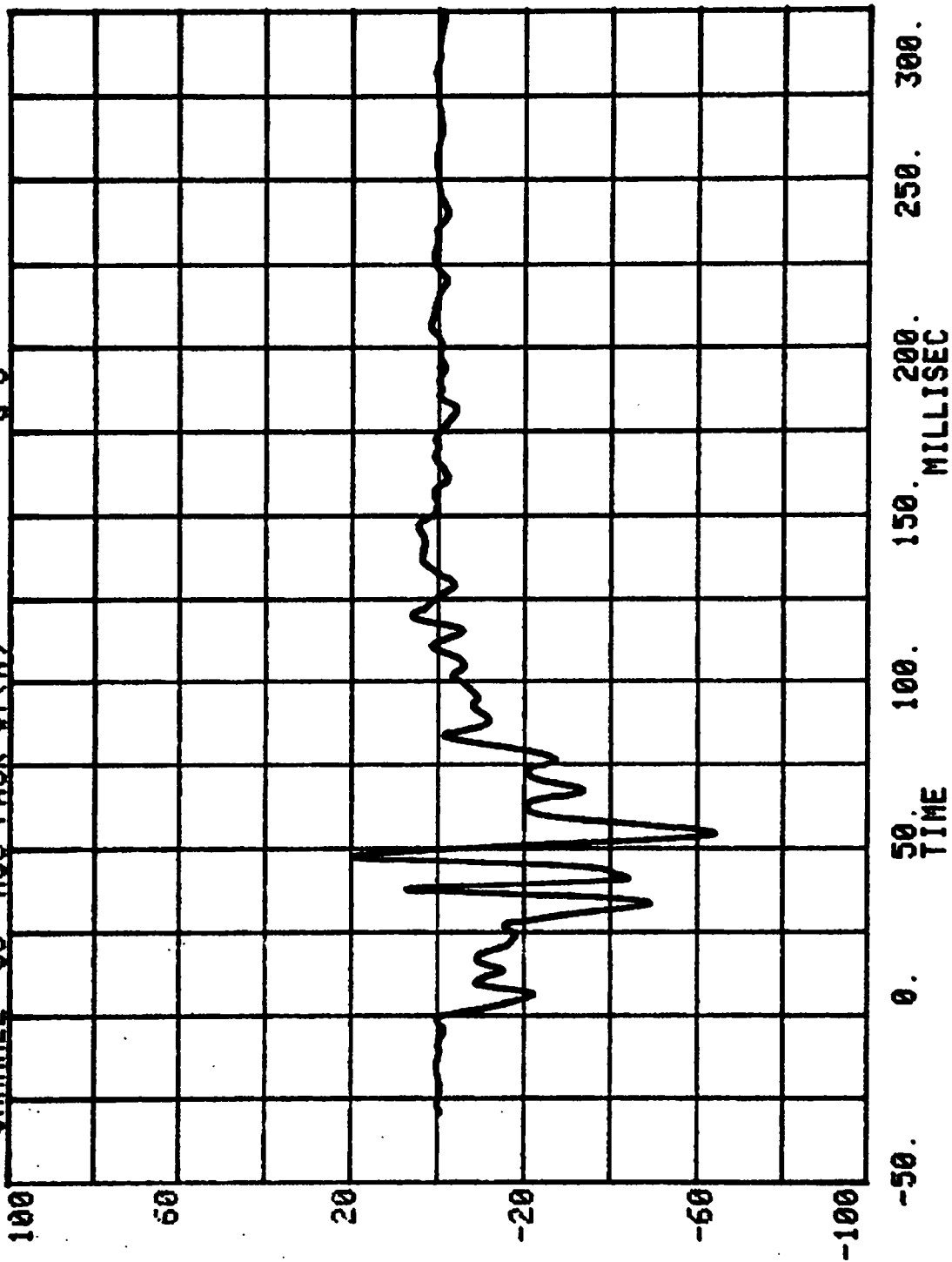


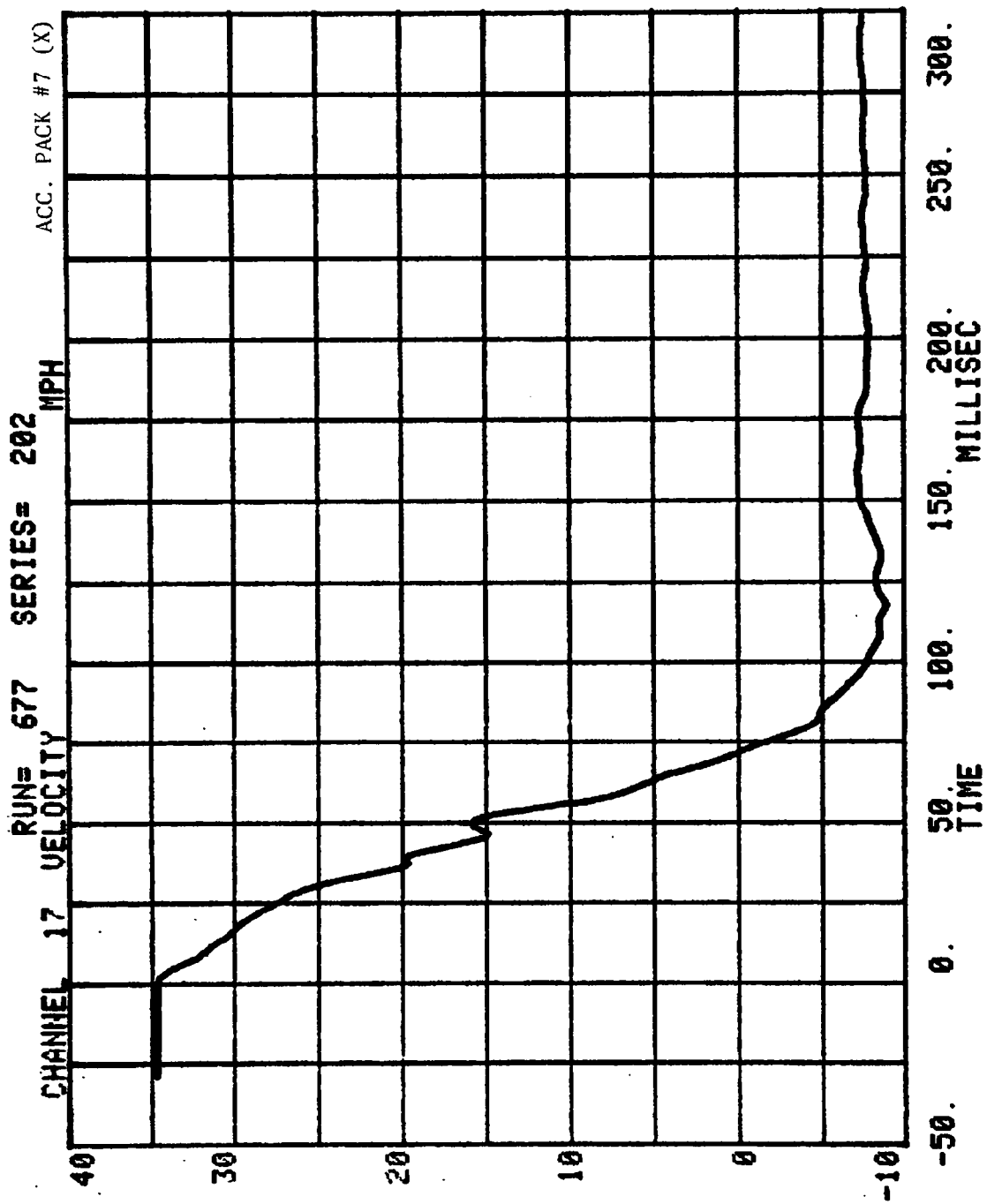


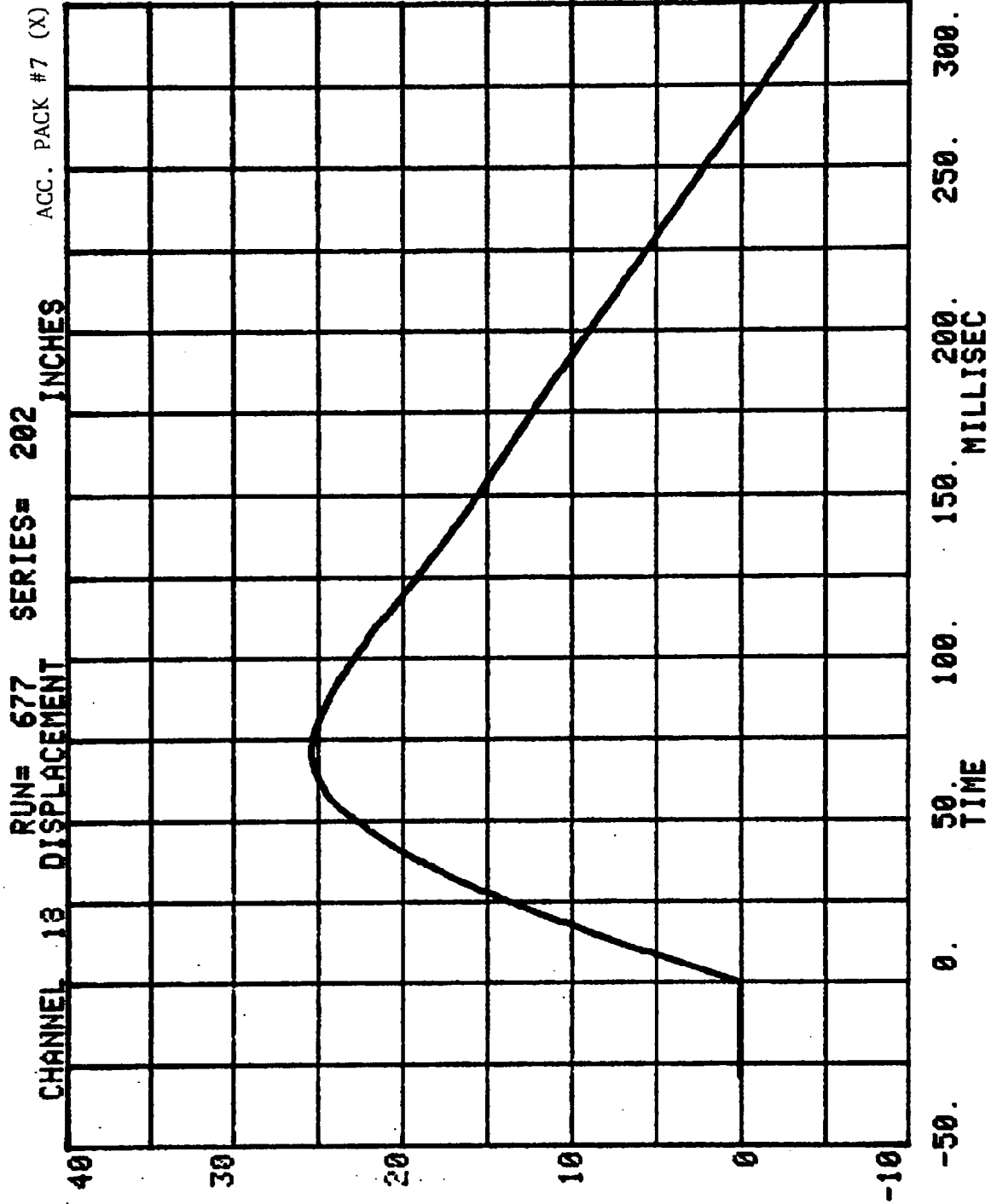




CHANNEL 33 ACC PACK #7(X) RUN= 677 SERIES= 202 G'S





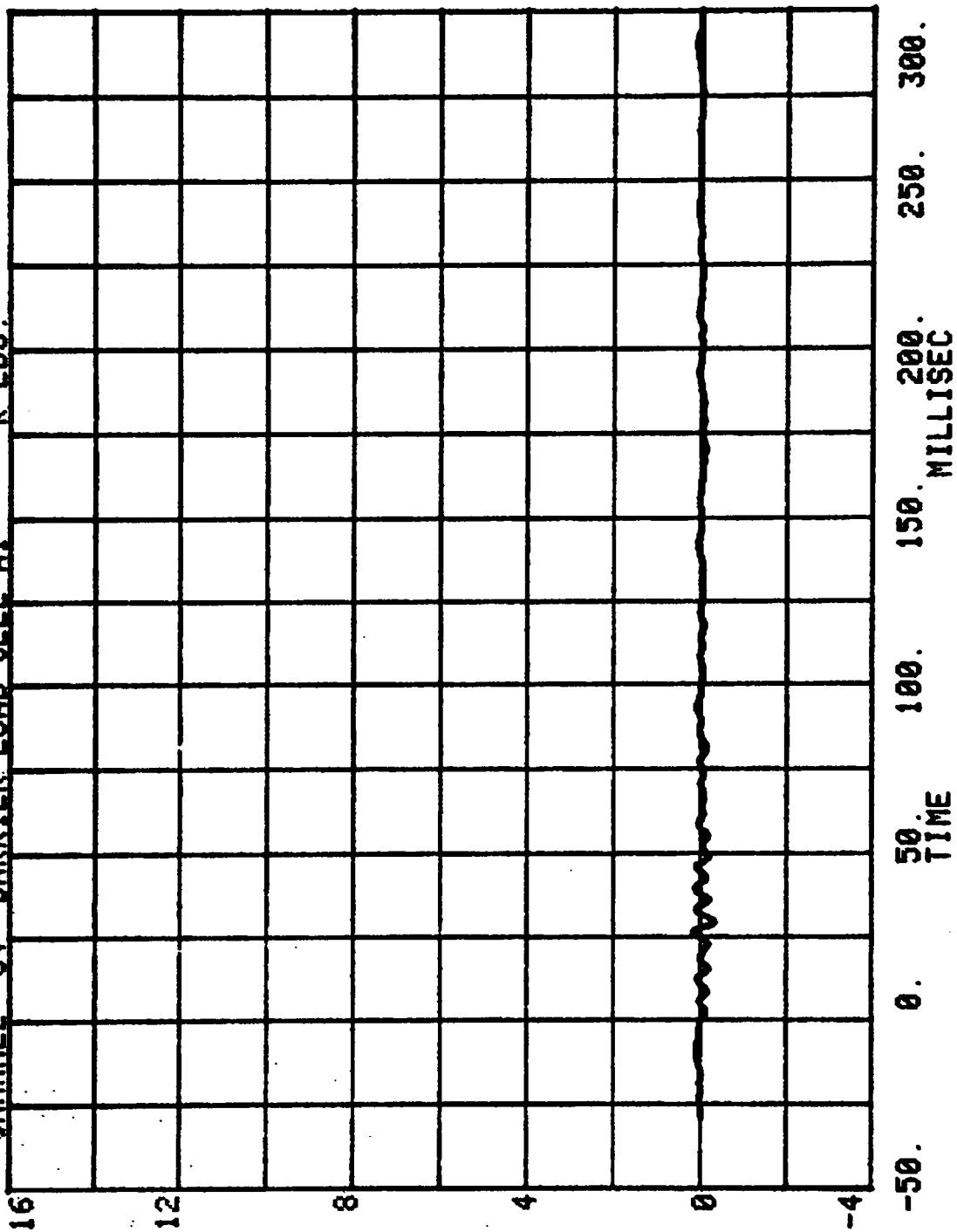


TEST NO. CF0202

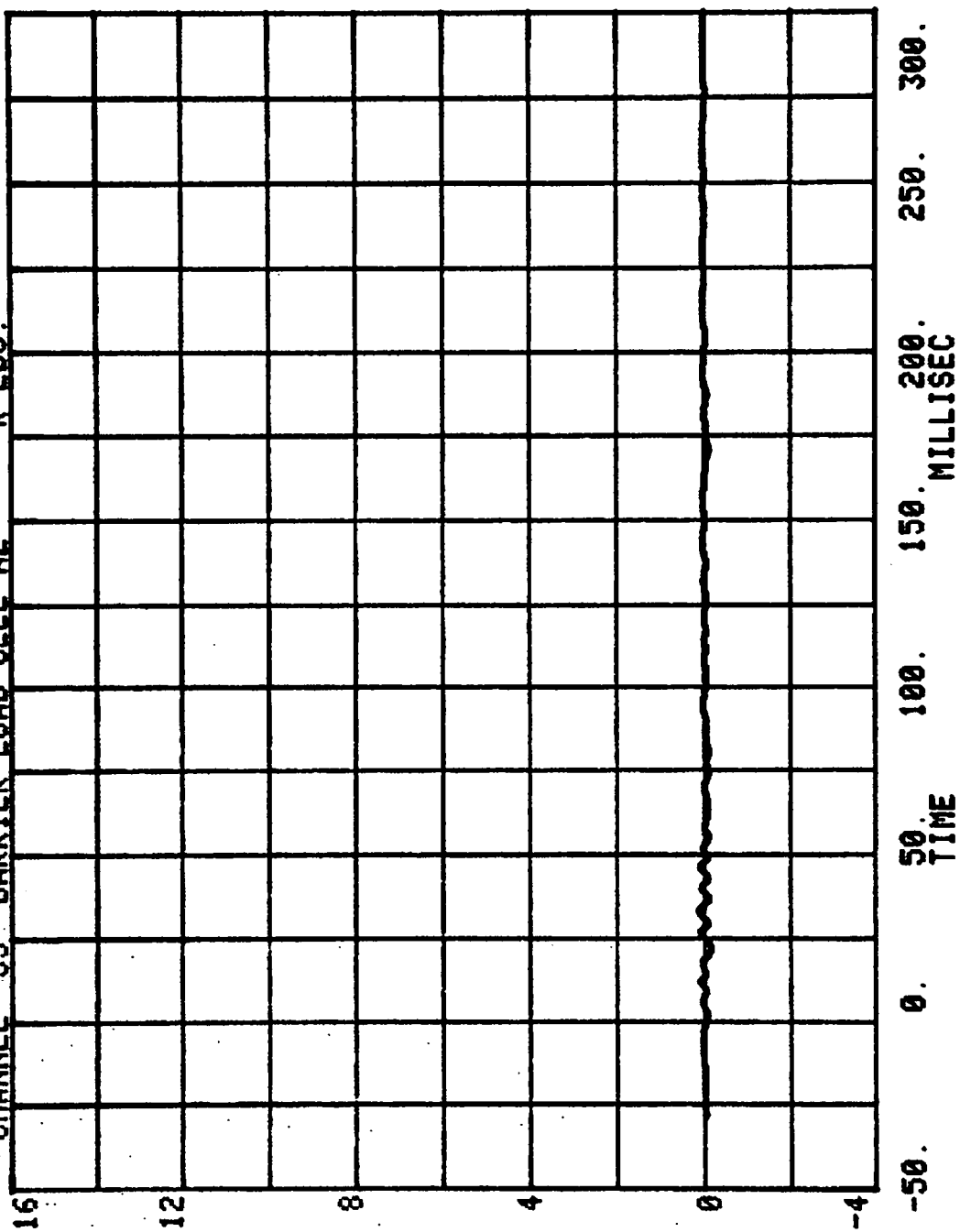
LOAD CELL BARRIER DATA
FILTER CHANNEL CLASS

60

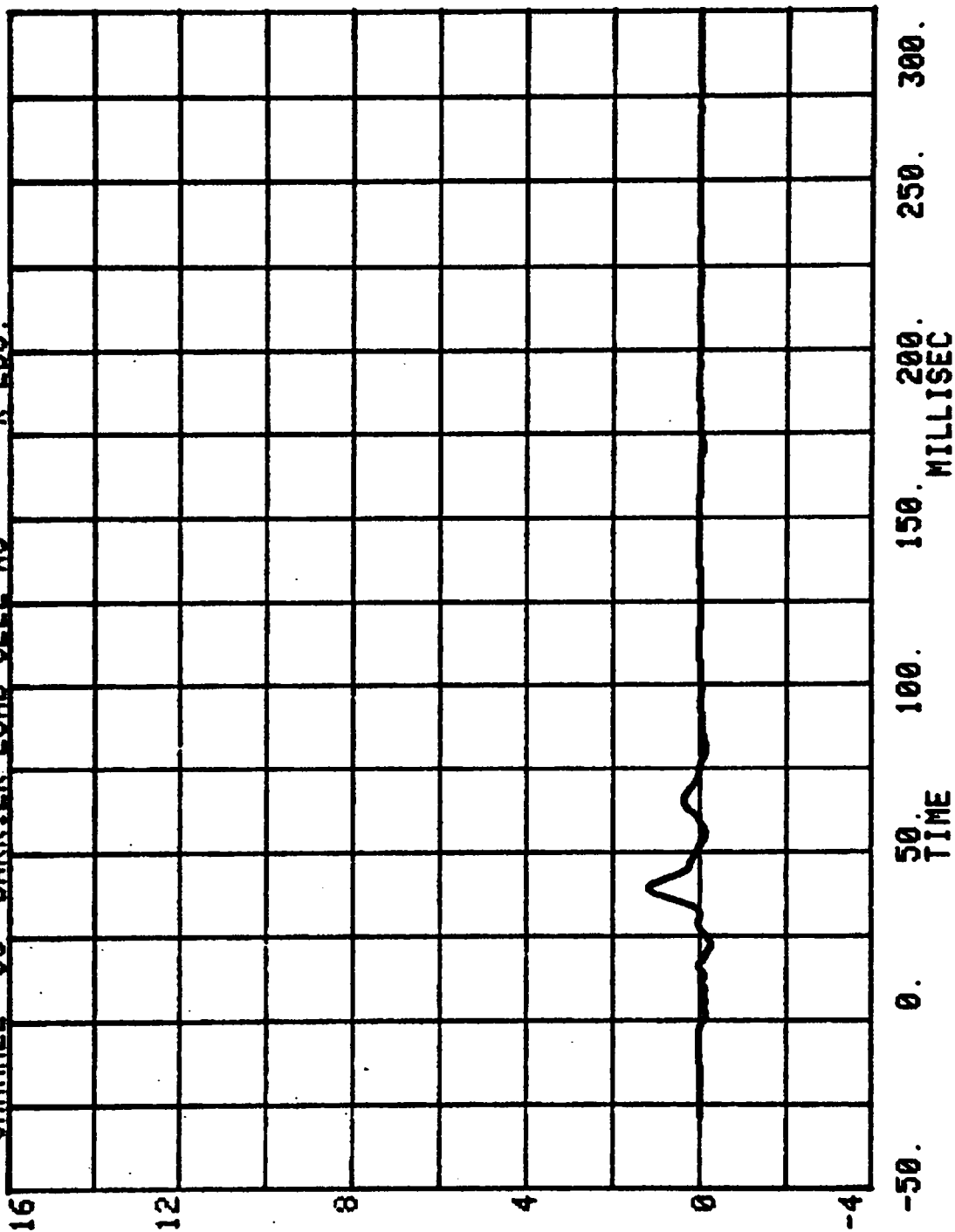
CHANNEL 34 RUN= 677 SERIES= 202
BARRIER LOAD CELL A1 K LBS.



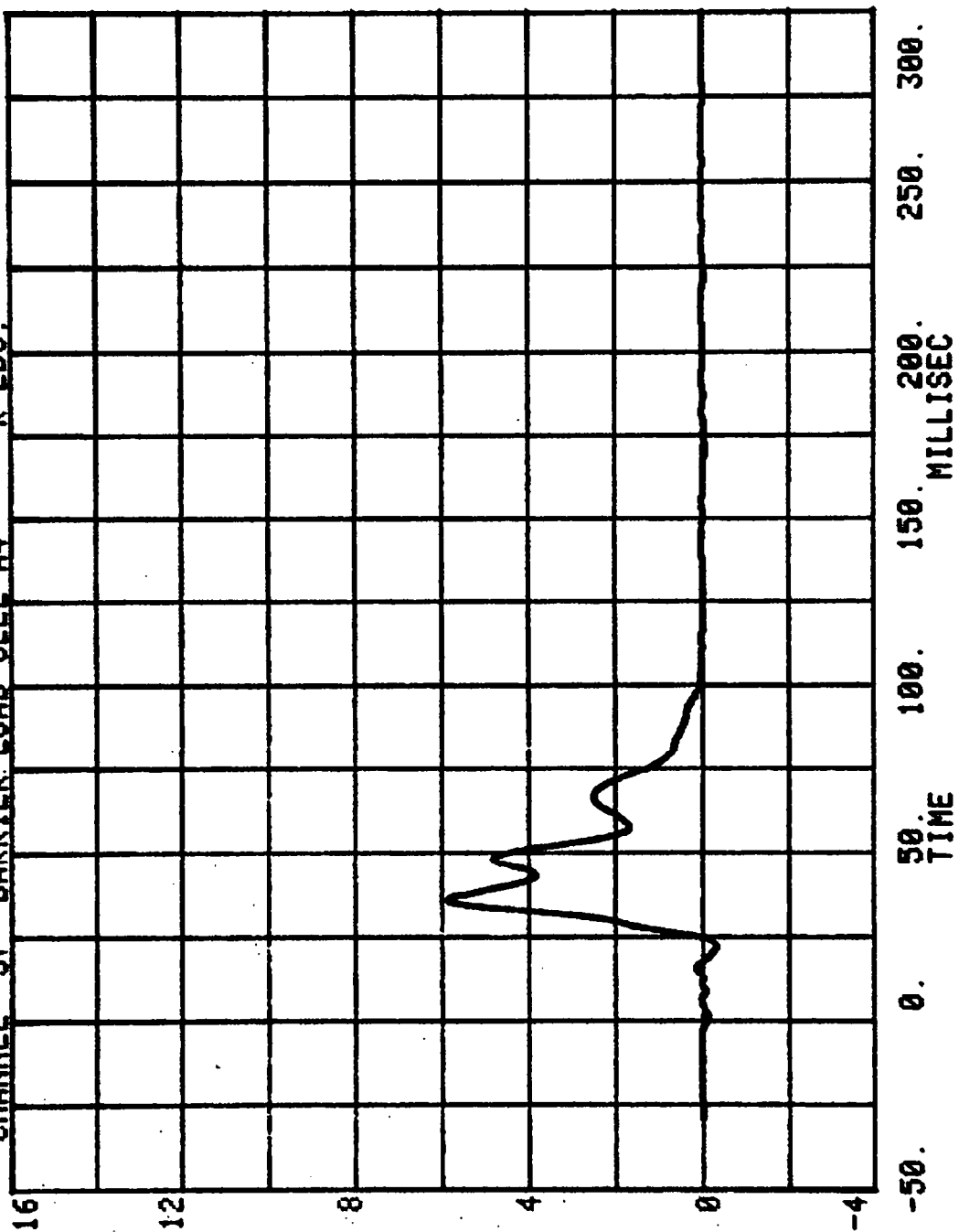
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CHANNEL 35 BARRIER LOAD CELL A2 K LBS.



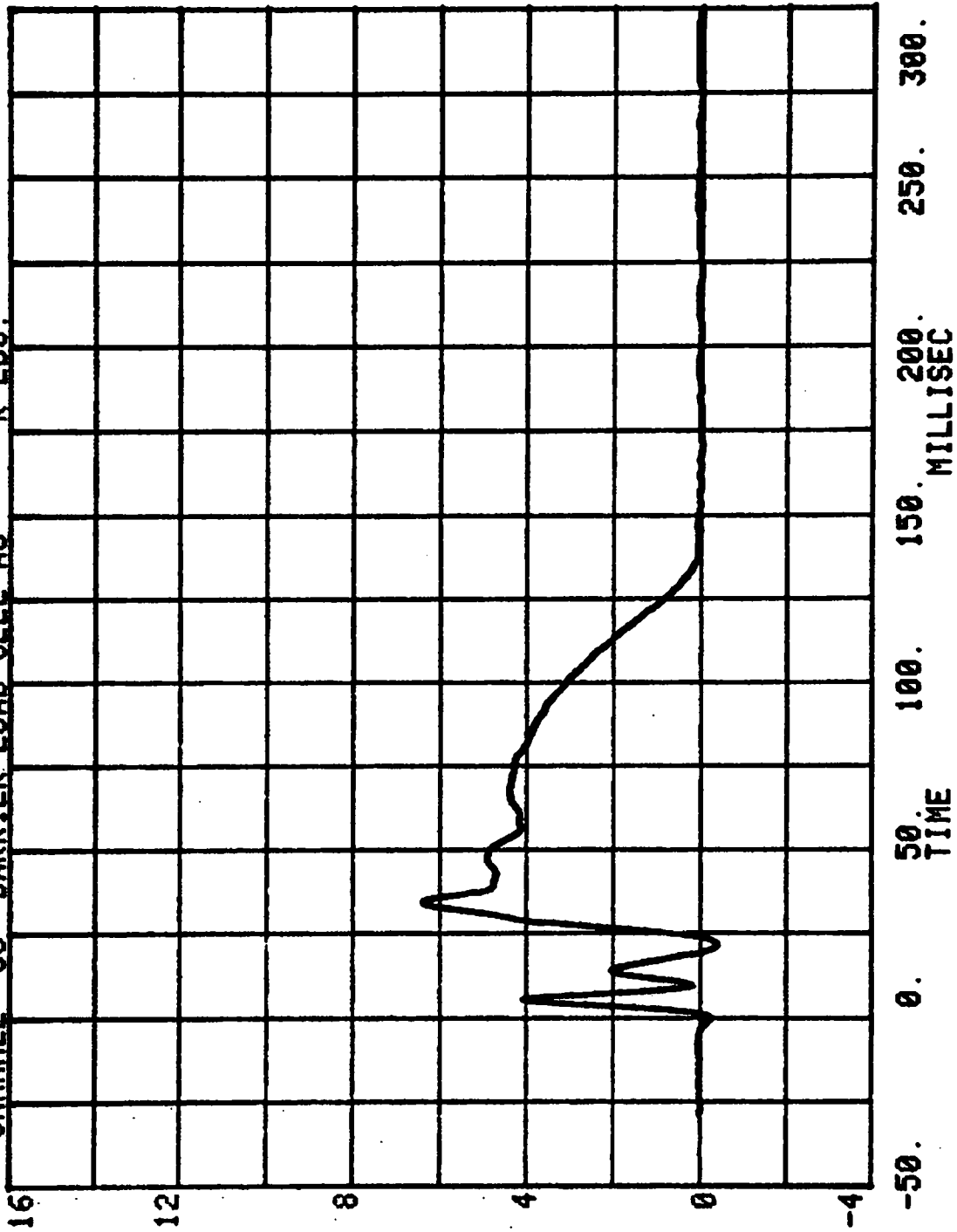
RUN= 677 SERIES= 202
CHANNEL 36 BARRIER LOAD CELL A3 K LBS.

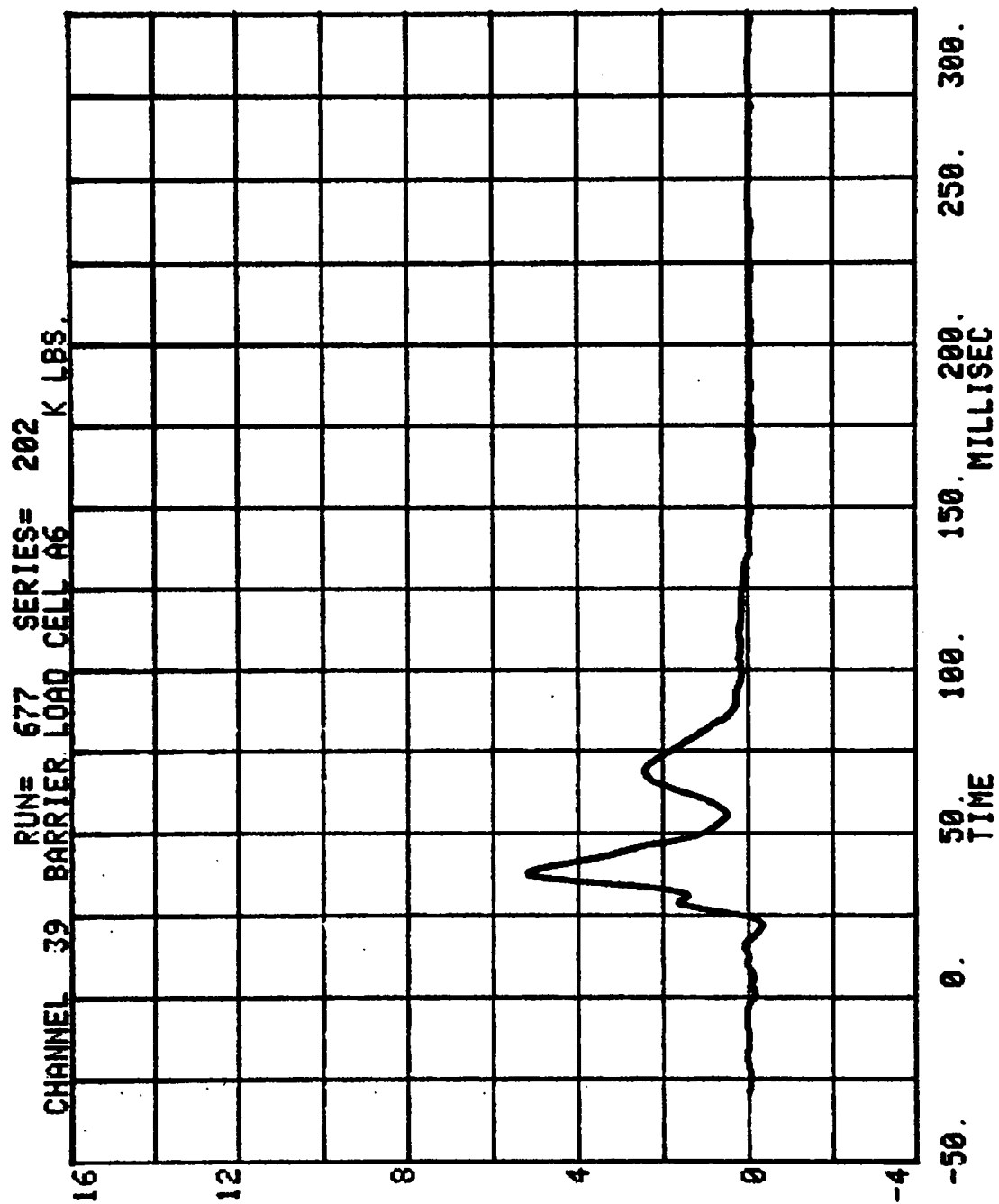


RUN= 677 SERIES= 202
CHANNEL 37 BARRIER LOAD CELL A4 K LBS.

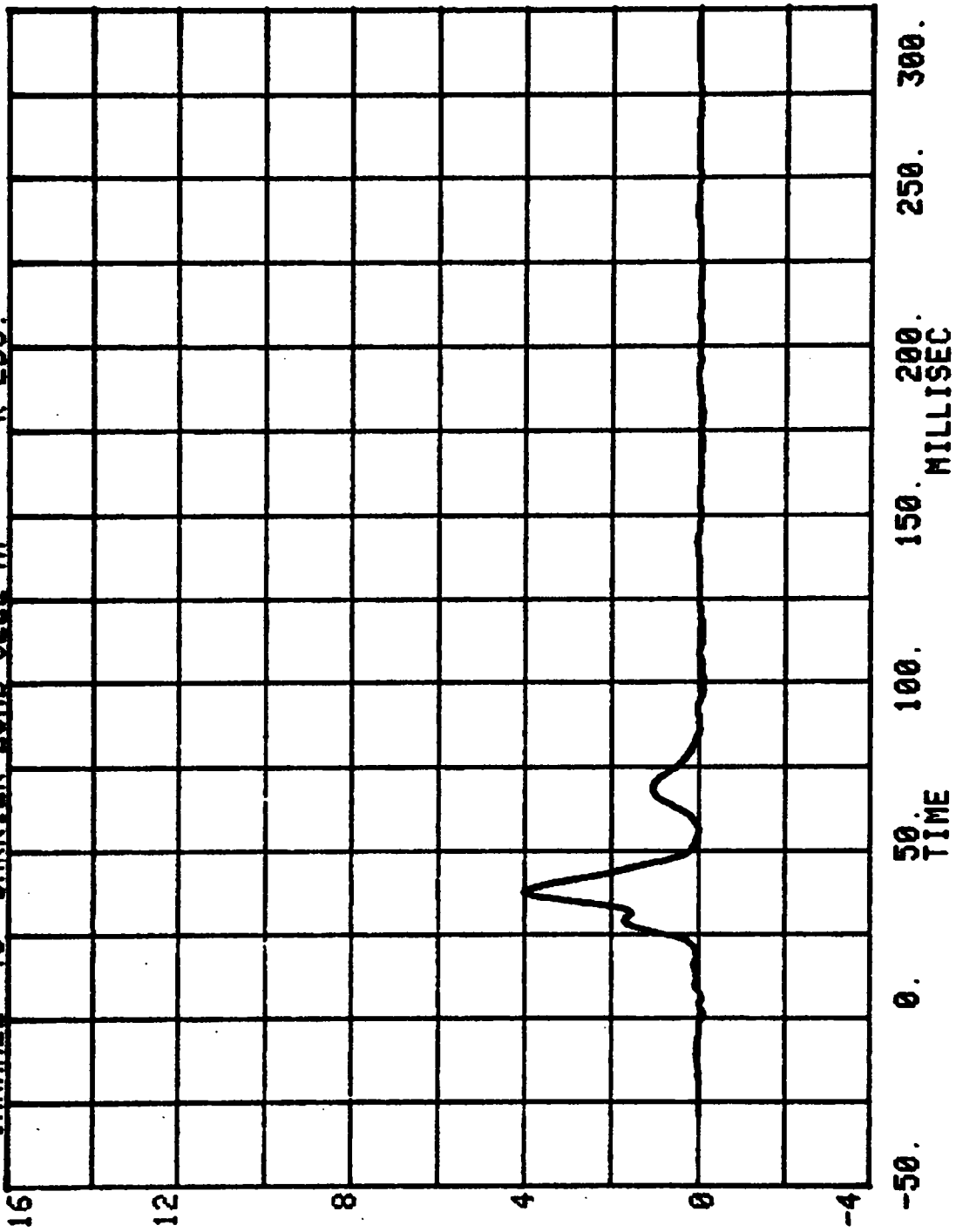


CHANNEL 38 RUN= 677 SERIES= 202
BARRIER LOAD CELL A5 K LBS.

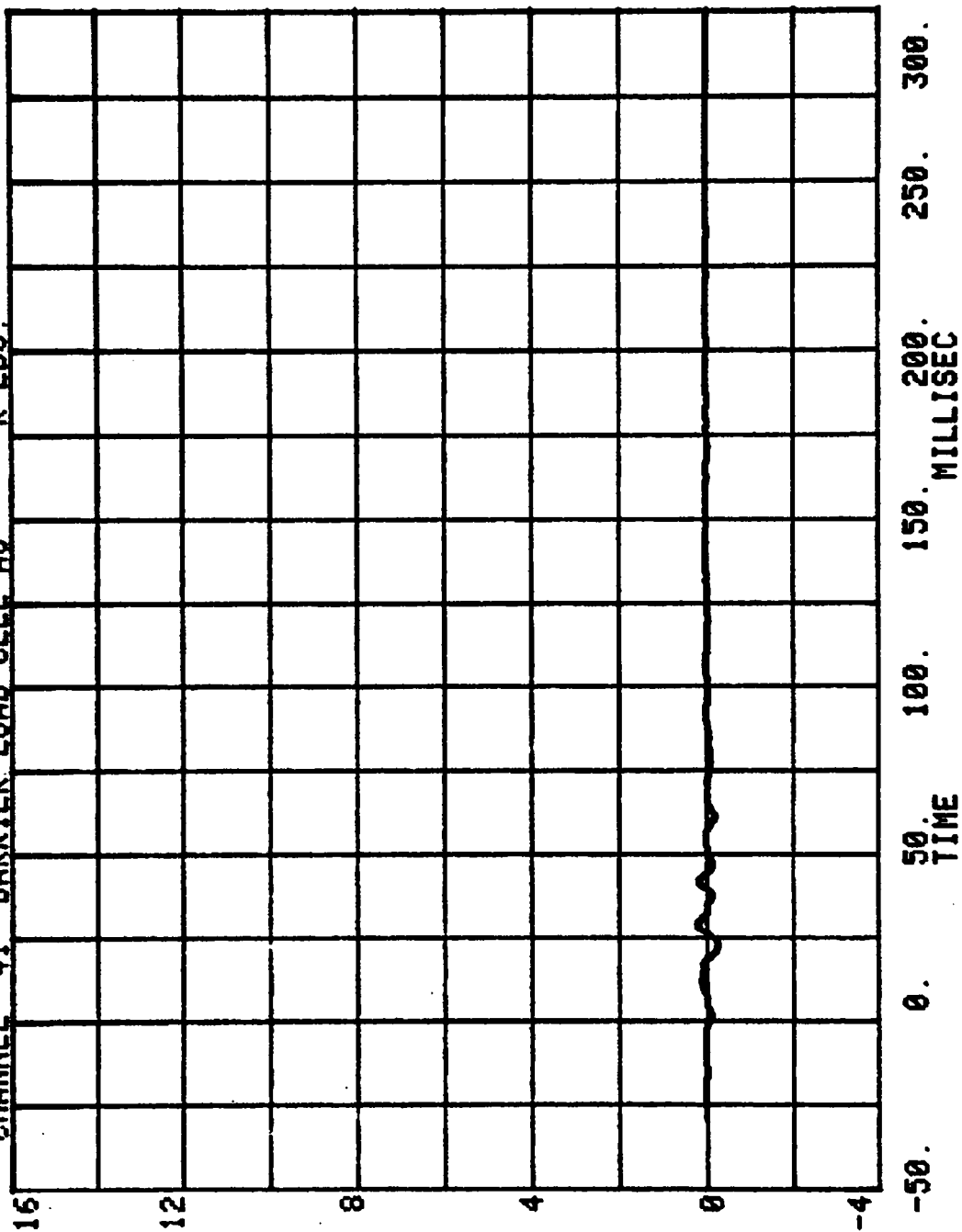




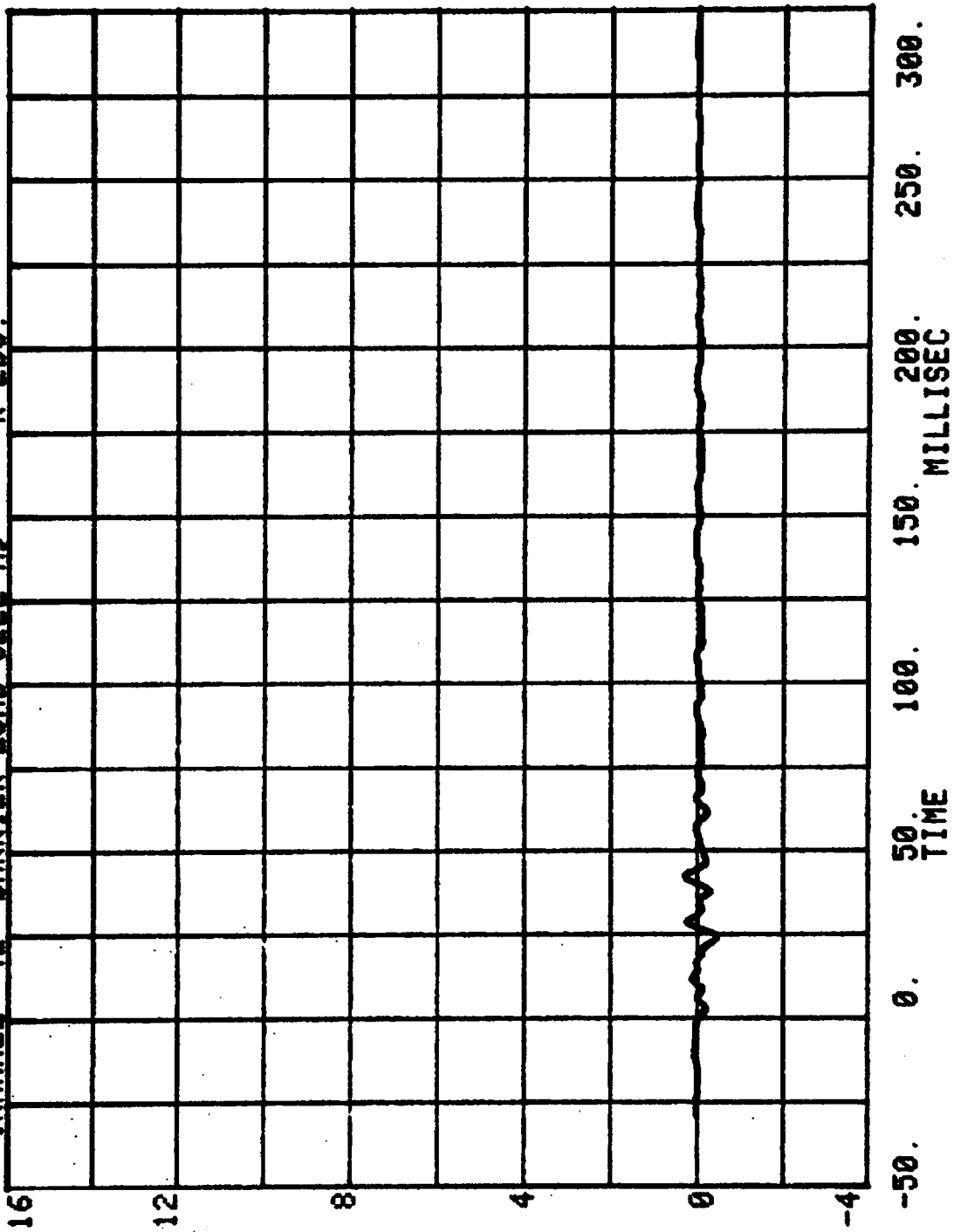
RUN= 677 SERIES= 202
CHANNEL 40 BARRIER LOAD CELL A7 K LBS.



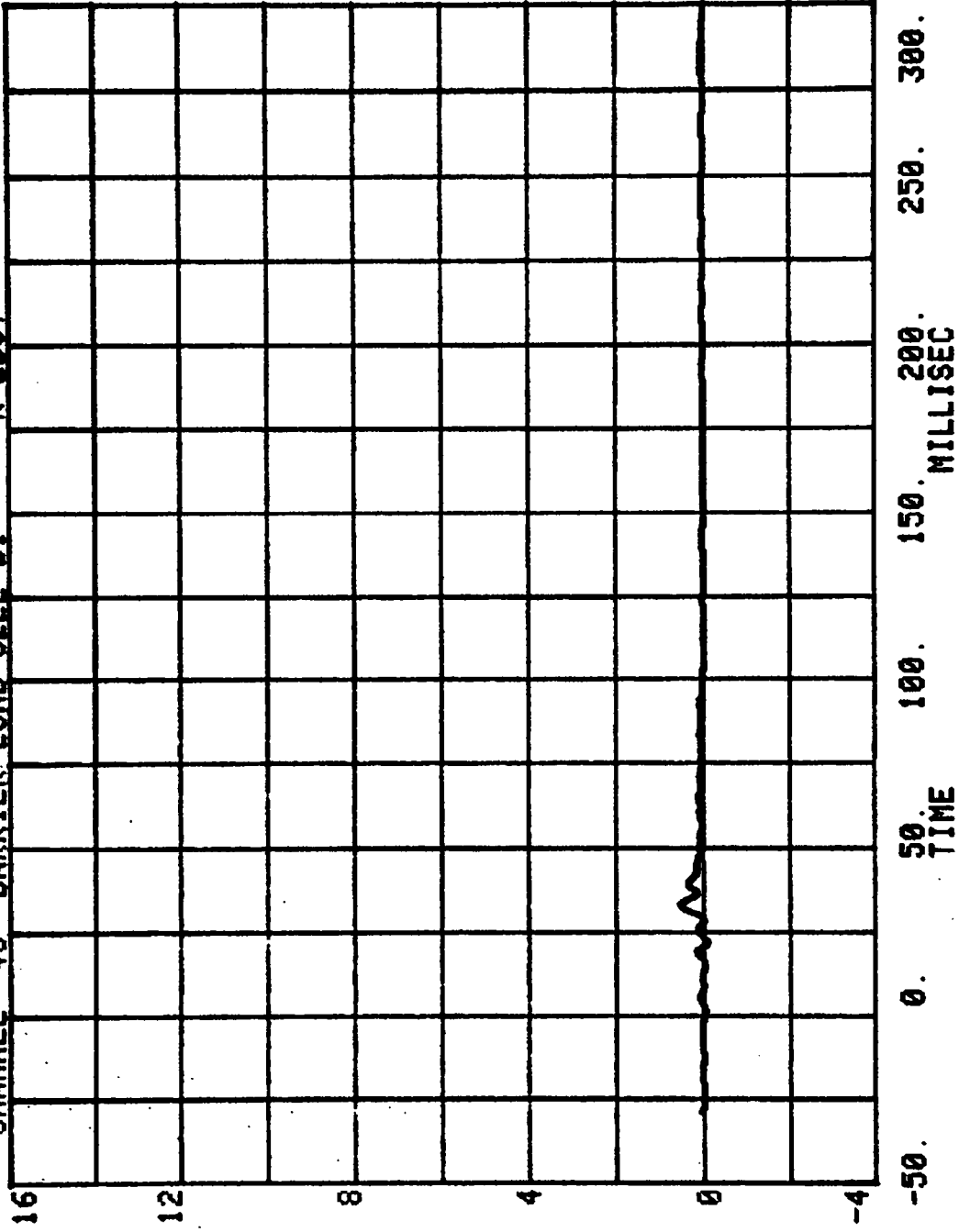
RUN= 677 SERIES= 202
CHANNEL 41 BARRIER LOAD CELL A0 K LBS.



CHANNEL 42 BARRIER LOAD CELL A9
RUN= 677 SERIES= 202 K LBS.

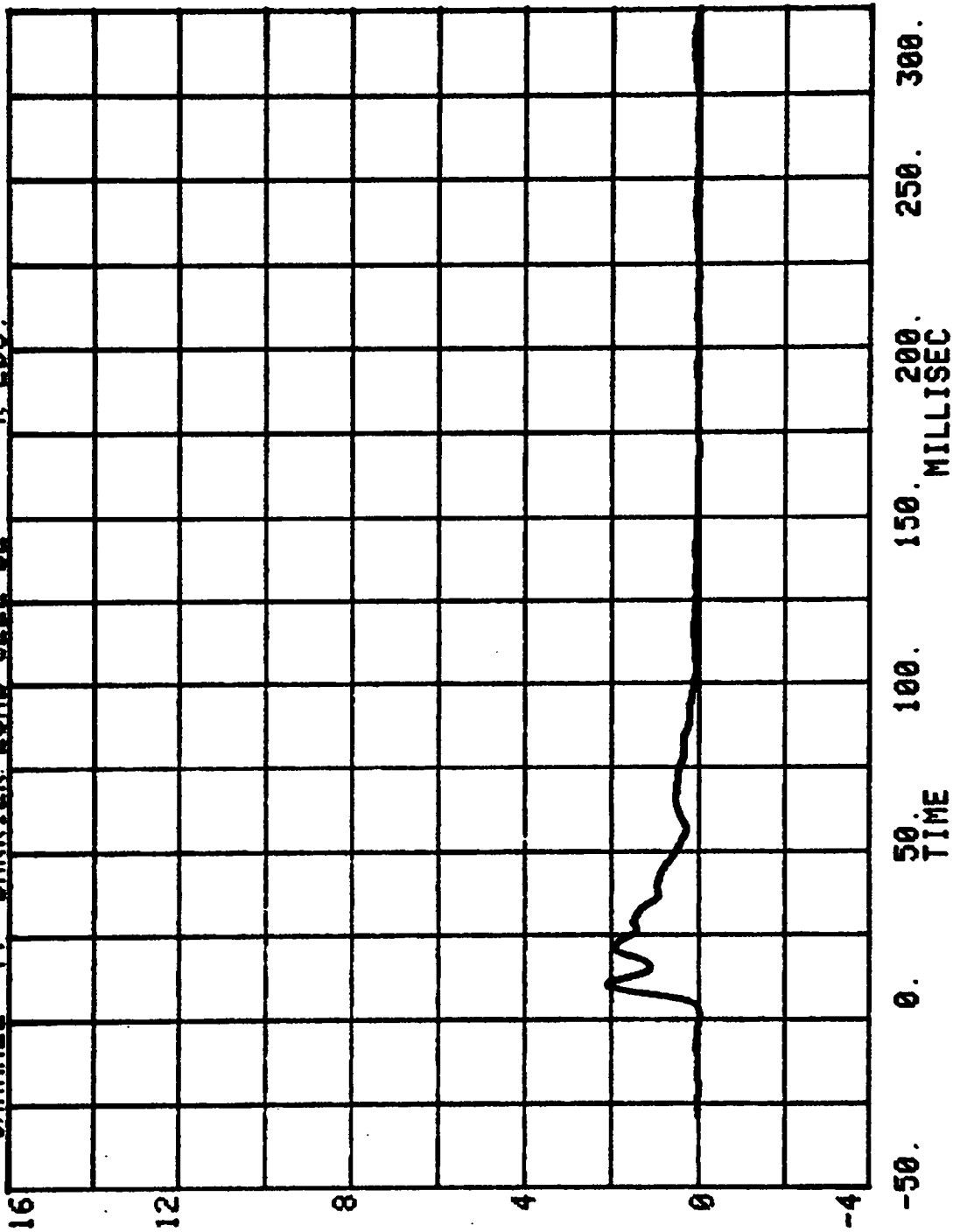


CHANNEL 43 RUN= 677 SERIES= 202
BARRIER LOAD CELL B1 K LBS.

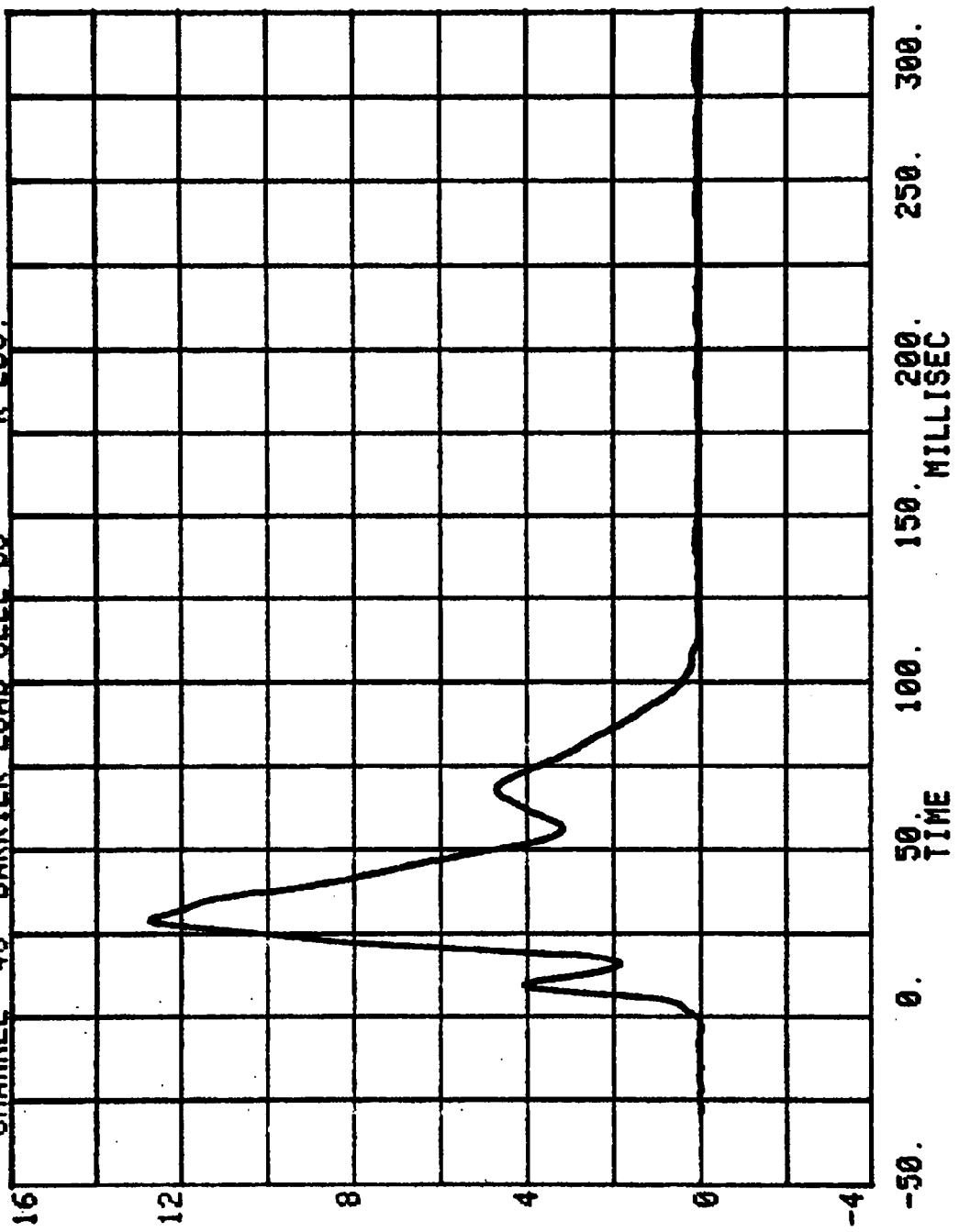


CHANNEL 44 BARRIER LOAD CELL B2 K LBS.

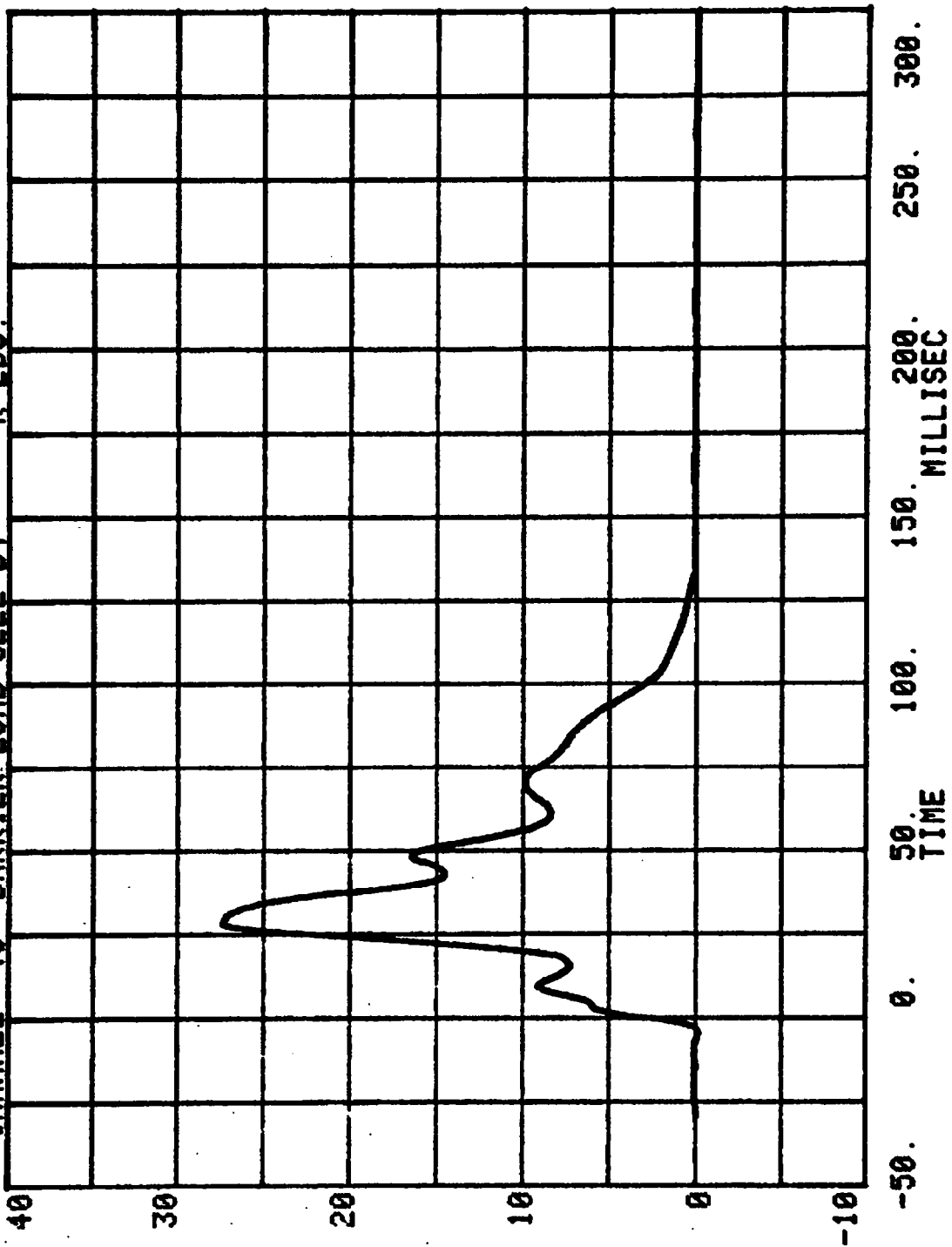
RUN= 677 SERIES= 202



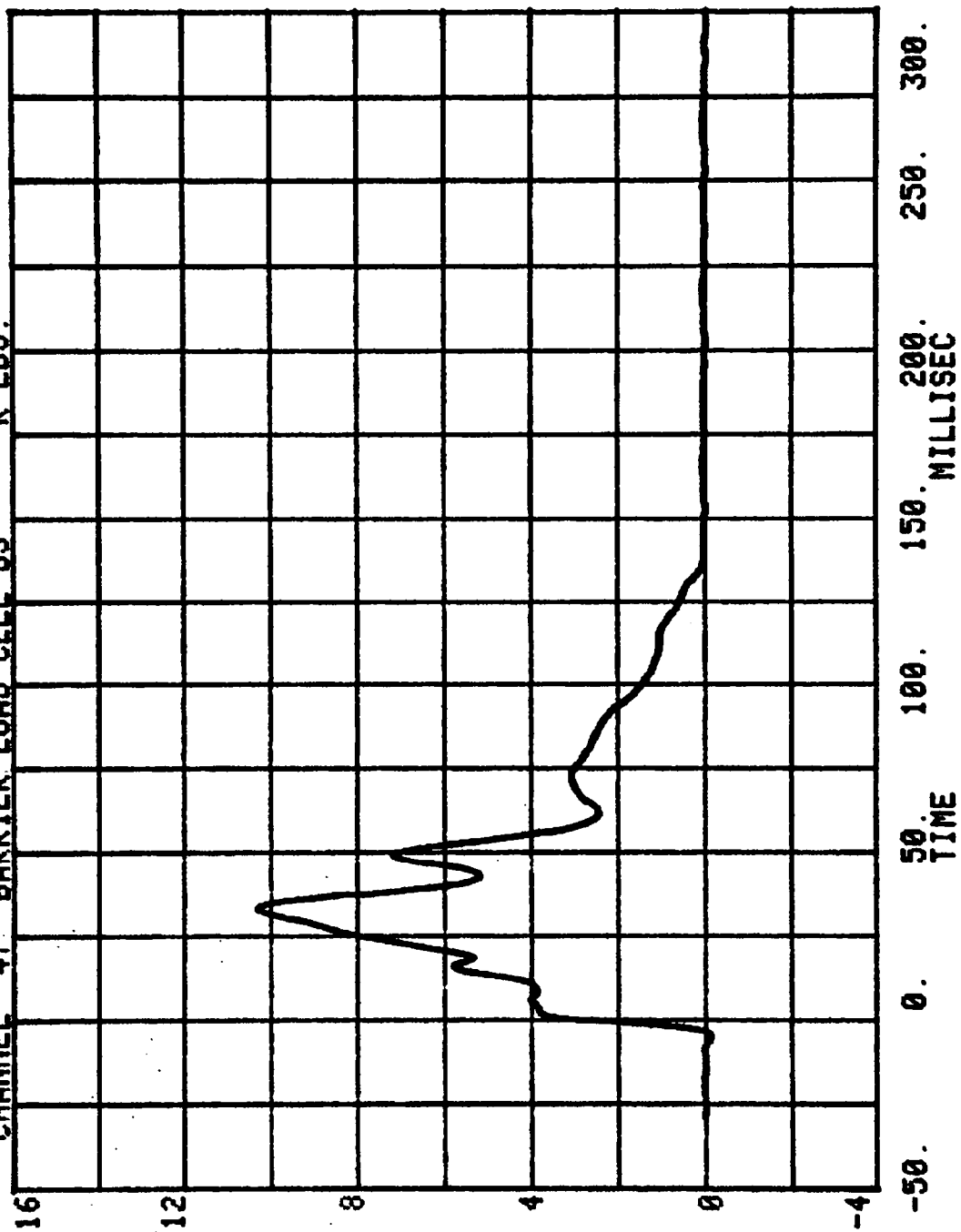
RUN= 677 SERIES= 202
CHANNEL 45 BARRIER LOAD CELL B3 K LBS.



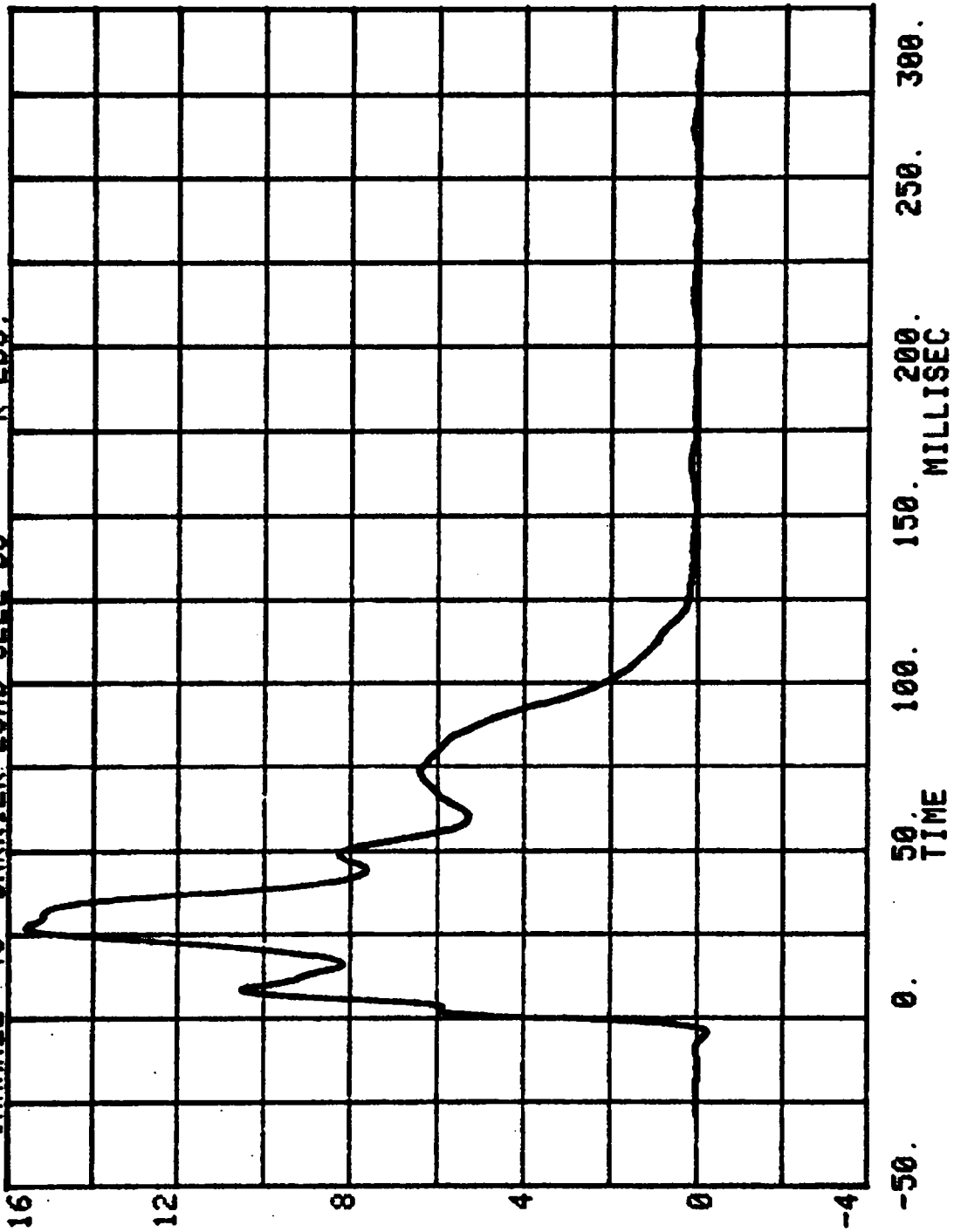
RUN= 677 SERIES= 202
CHANNEL 46 BARRIER LOAD CELL B4 K LBS.



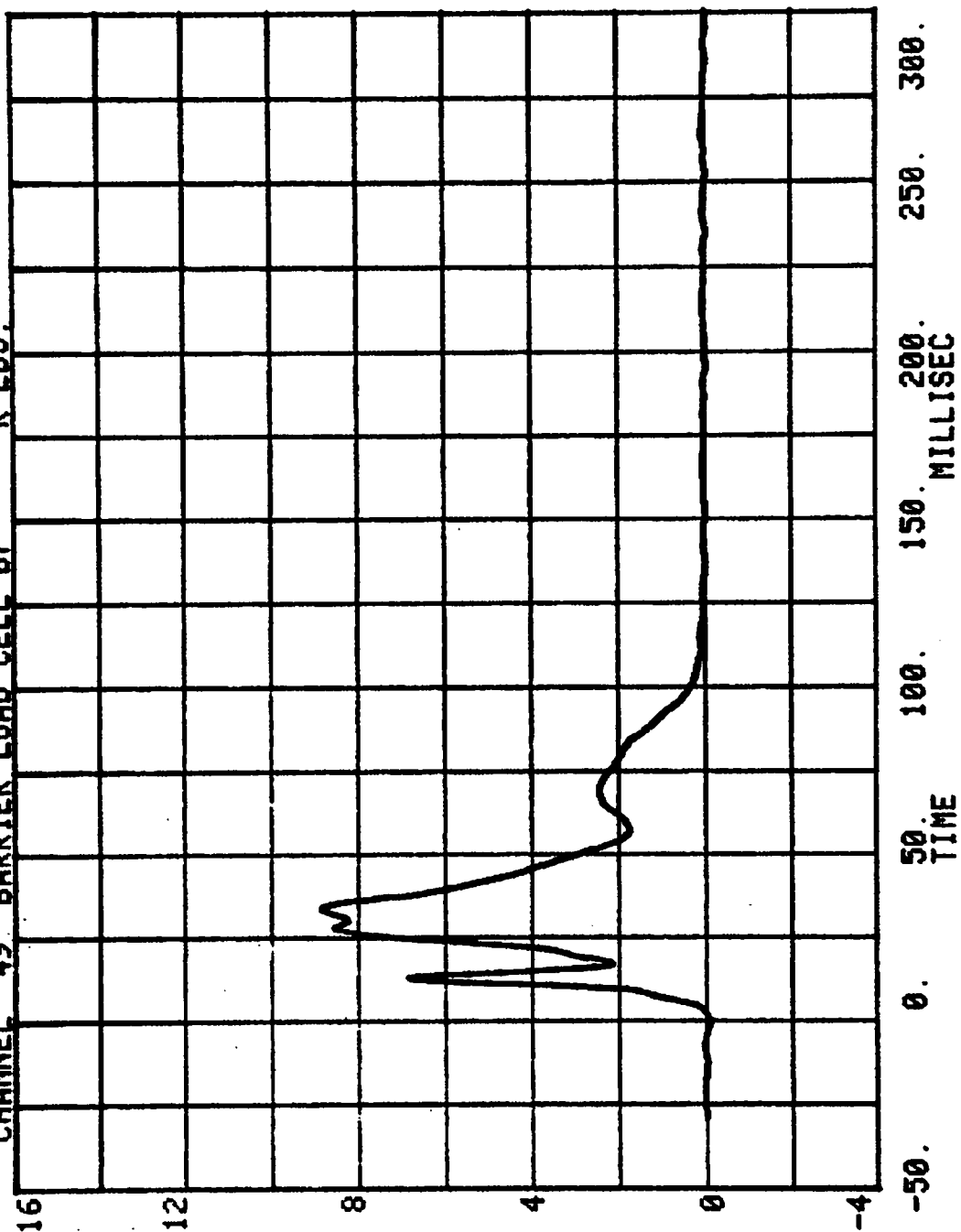
RUN= 677 SERIES= 202
CHANNEL 47 BARRIER LOAD CELL B5 K LBS.

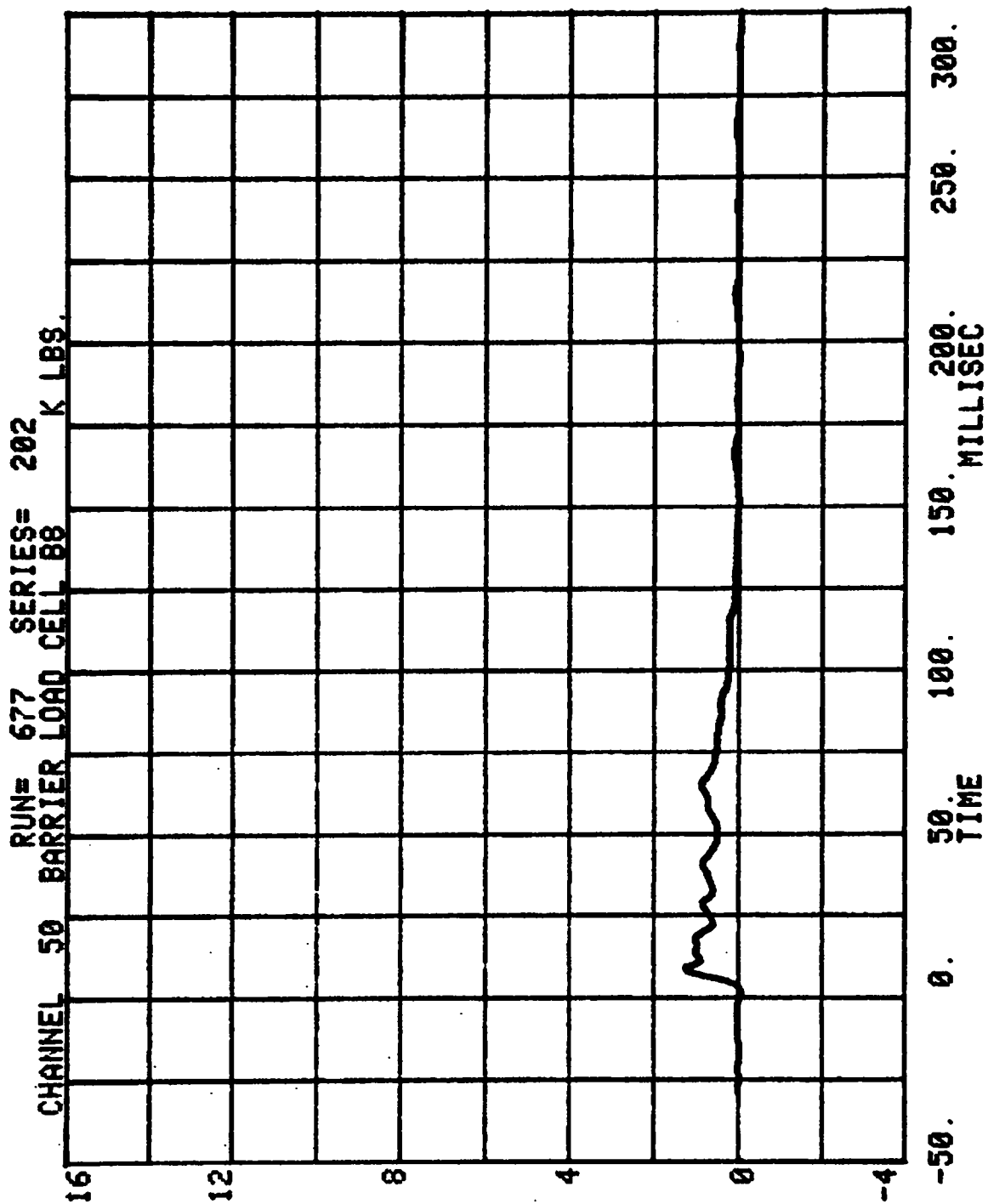


CHANNEL 48 BARRIER LOAD CELL B6
RUN= 677 SERIES= 202
K LBS.

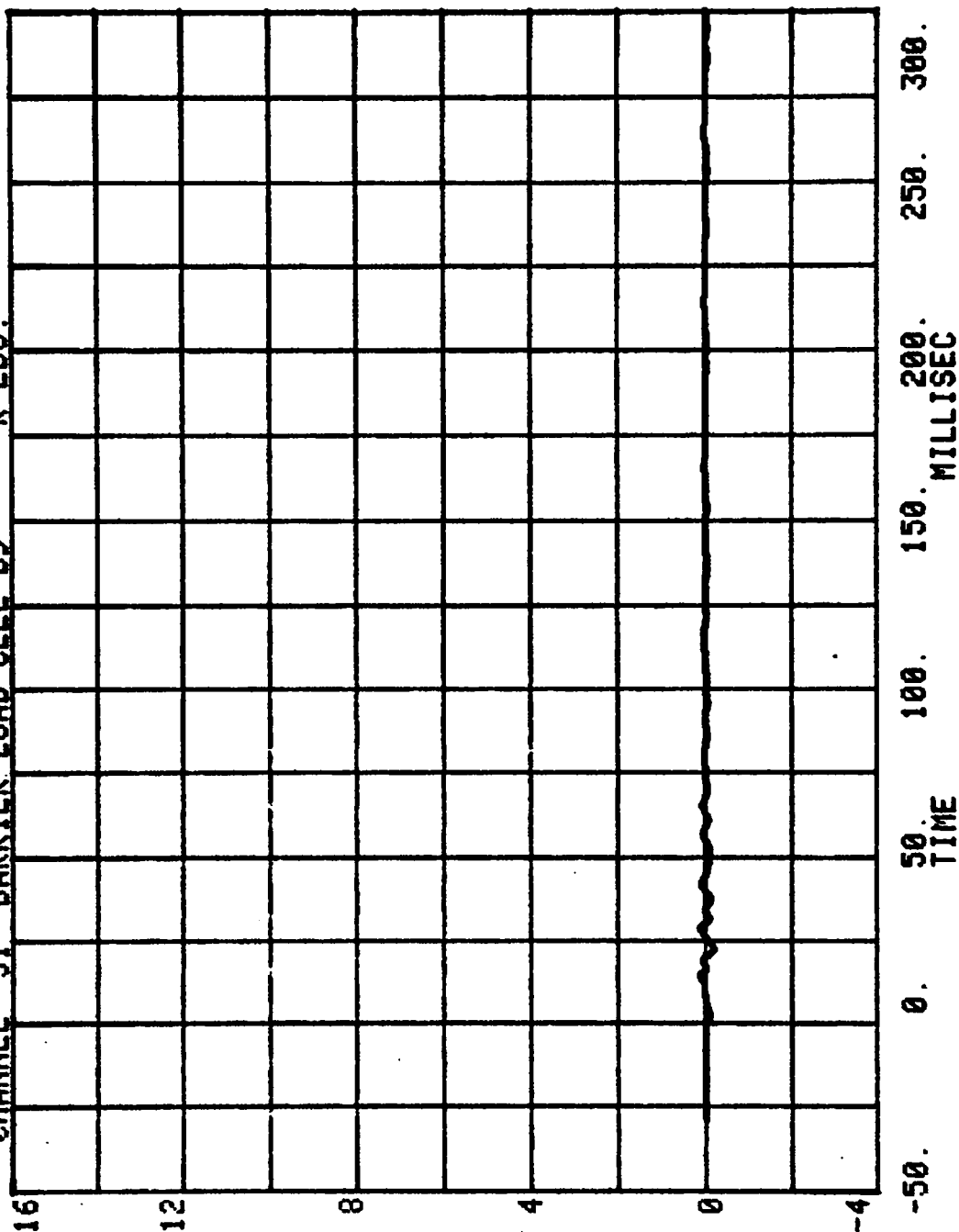


CHANNEL 49 BARRIER LOAD CELL B7
RUN= 677 SERIES= 202 K LBS.

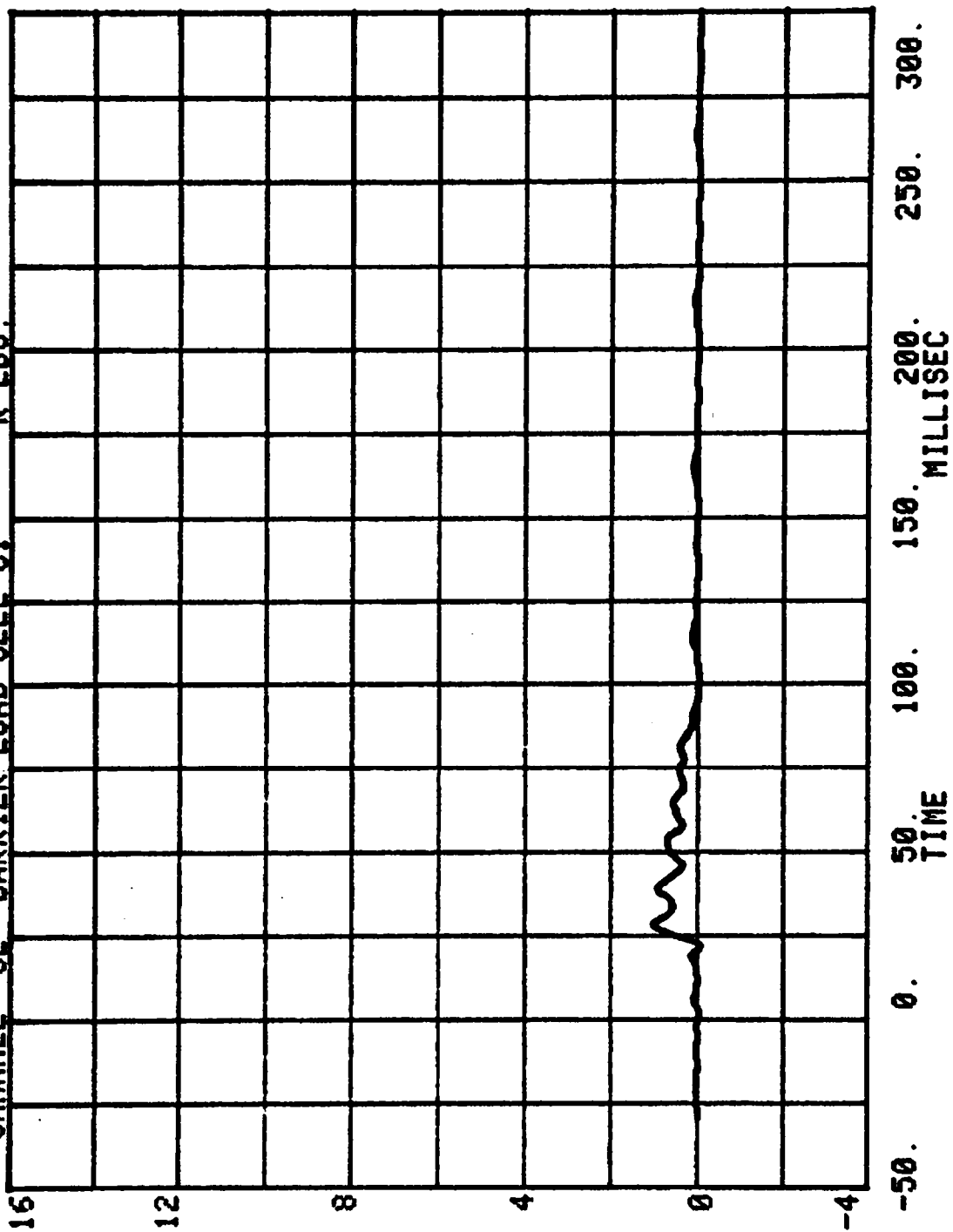




RUN= 677 SERIES= 202 K LBS.
CHANNEL 51 BARRIER LOAD CELL B9



RUN= 677 SERIES= 202
CHANNEL 52 BARRIER LOAD CELL C1 K LBS.

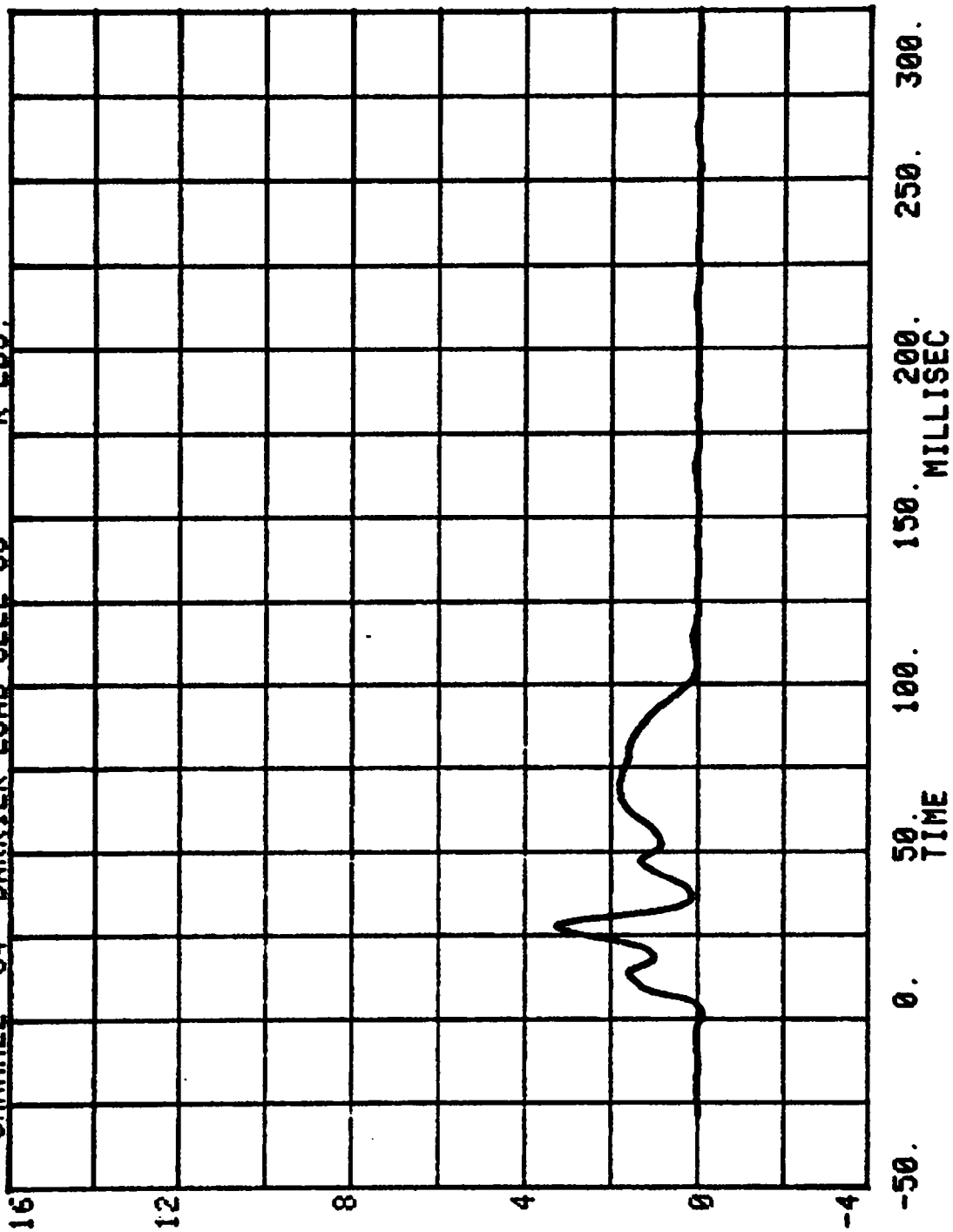


VOLTAGE

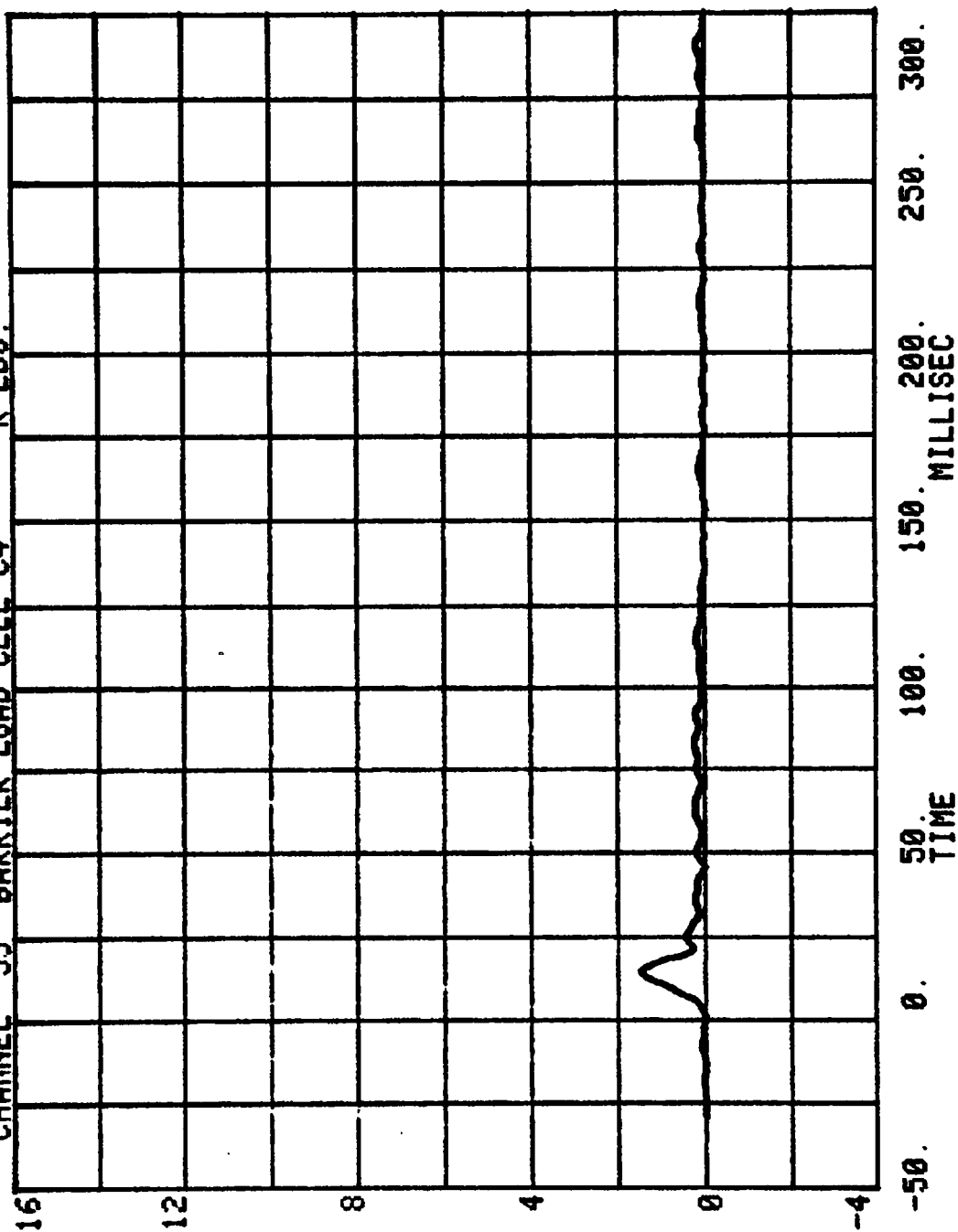
TIME

30 CHANNEL LONG CELL OF R 522

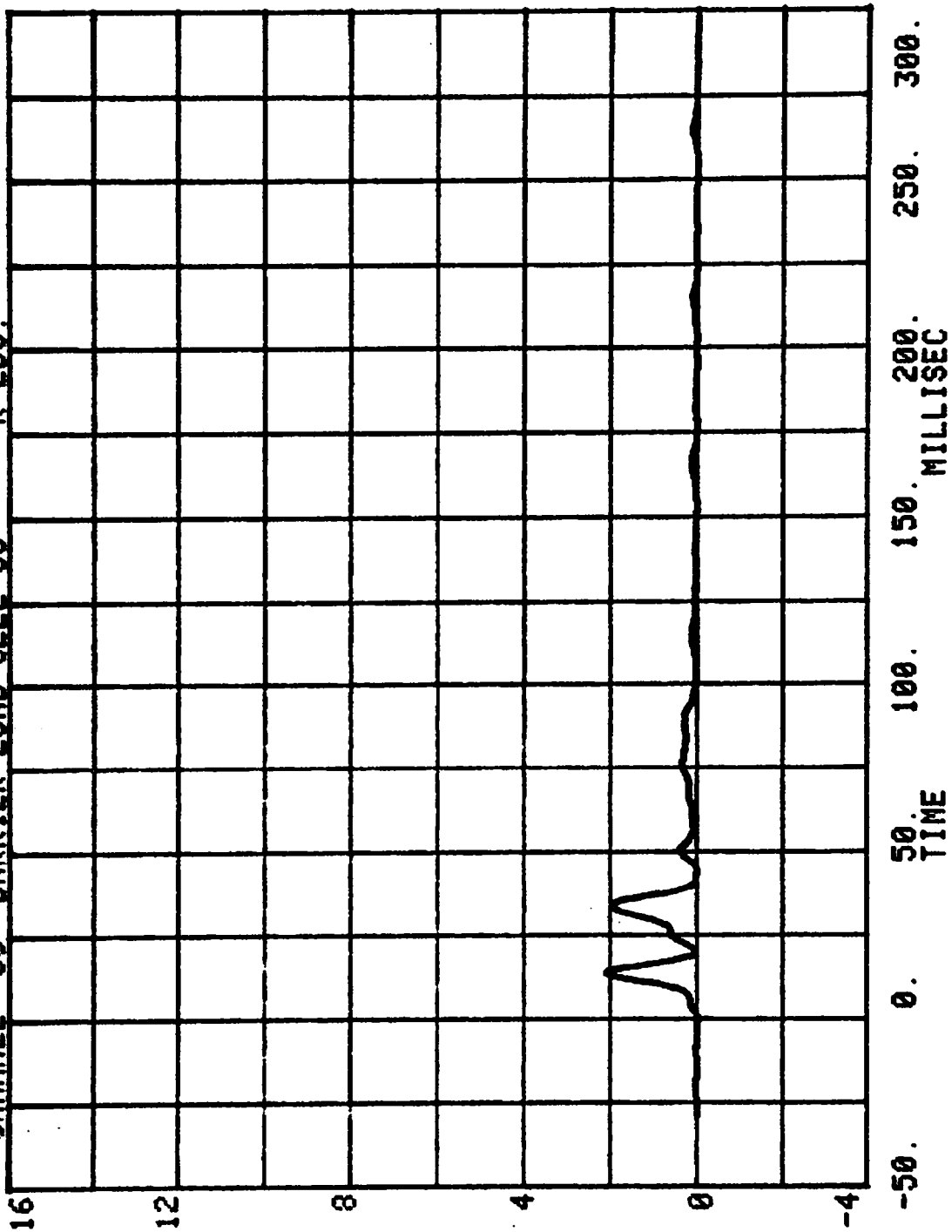
RUN= 677 SERIES= 202
CHANNEL 54 BARRIER LOAD CELL C3 K LBS.



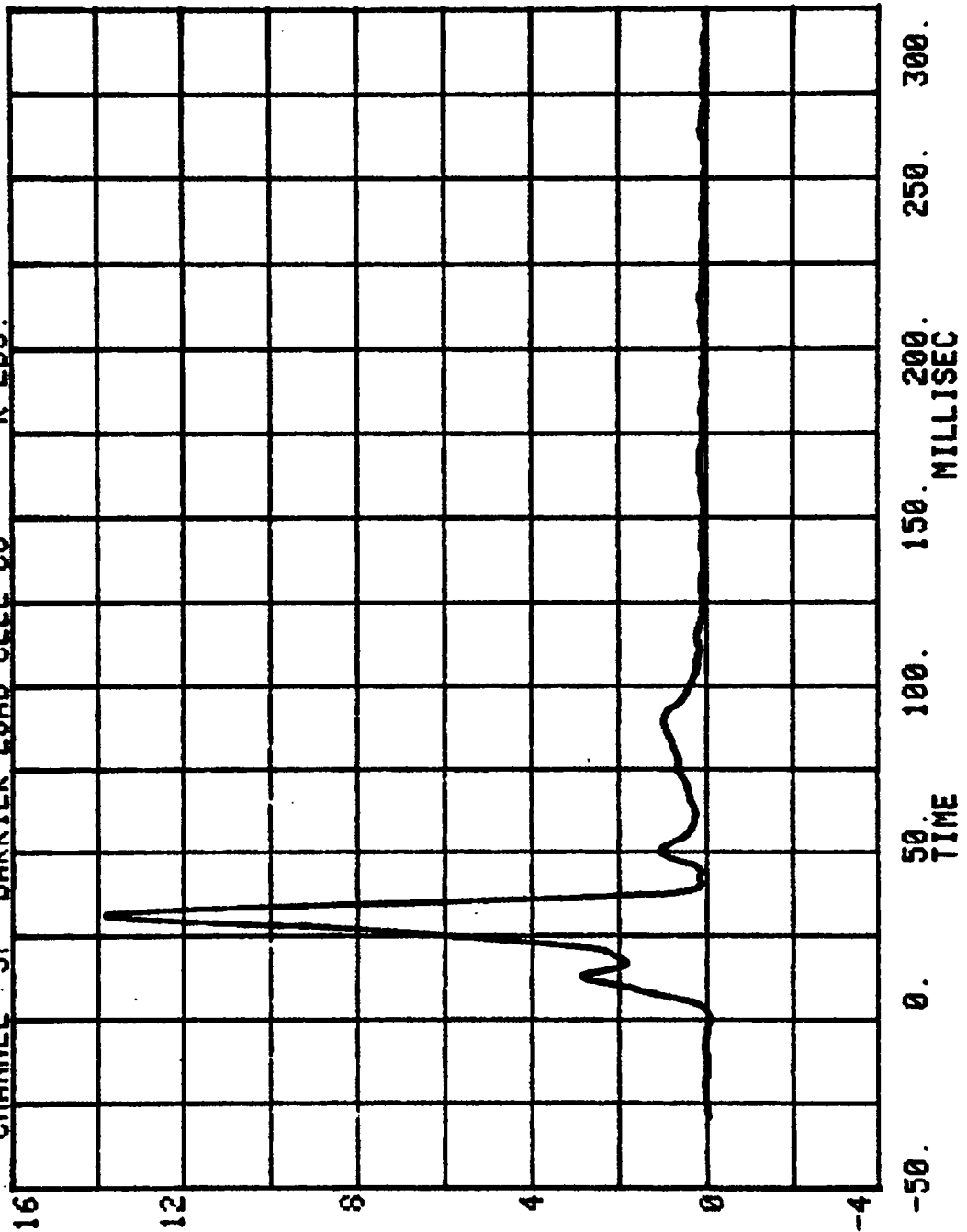
RUN= 677 SERIES= 202
CHANNEL 55 BARRIER LOAD CELL C4 K LBS.



CHANNEL 56 BARRIER LOAD CELL C5
RUN= 677 SERIES= 202 K LBS.

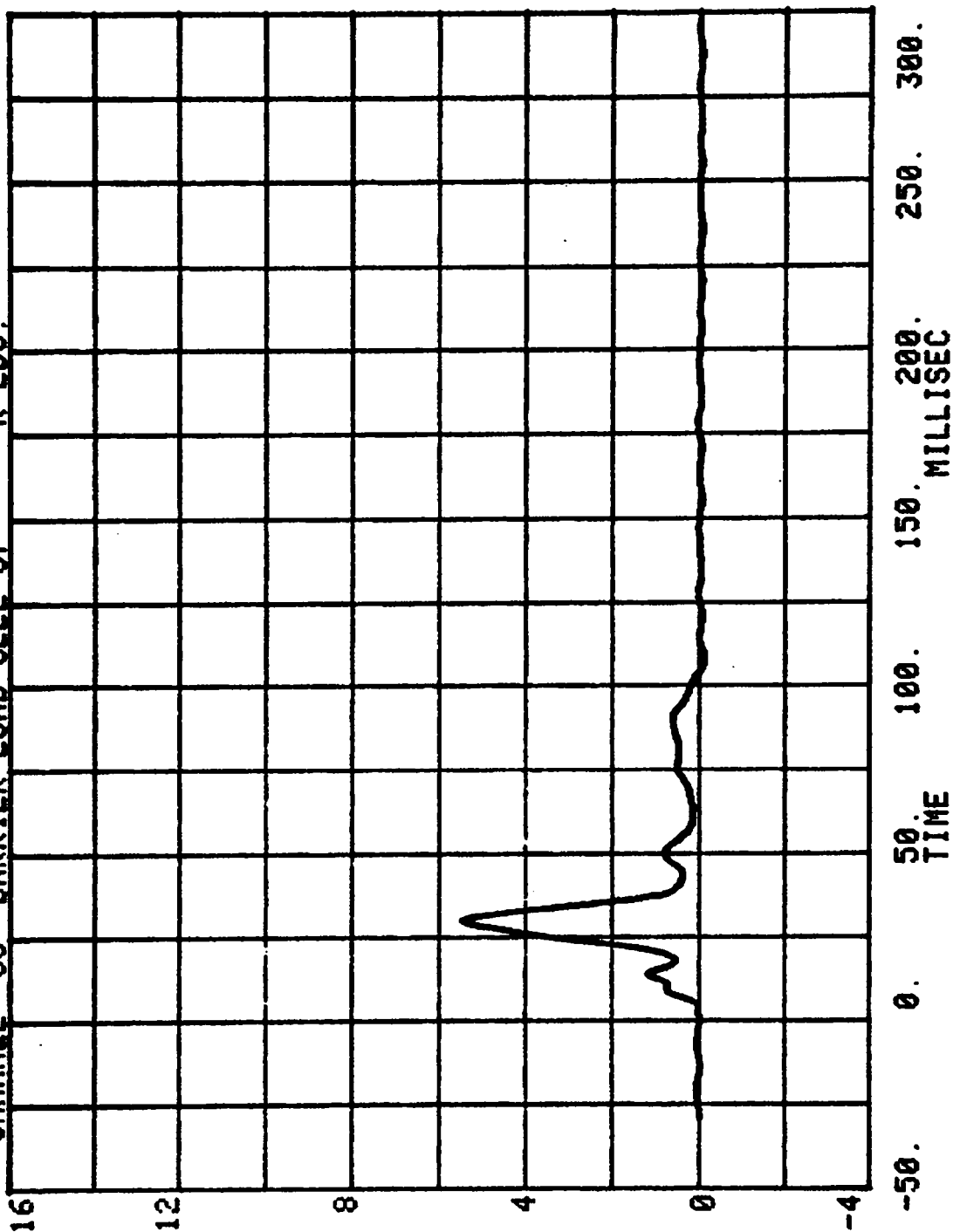


RUN= 677 SERIES= 202
CHANNEL 57 BARRIER LOAD CELL C6 K LBS.



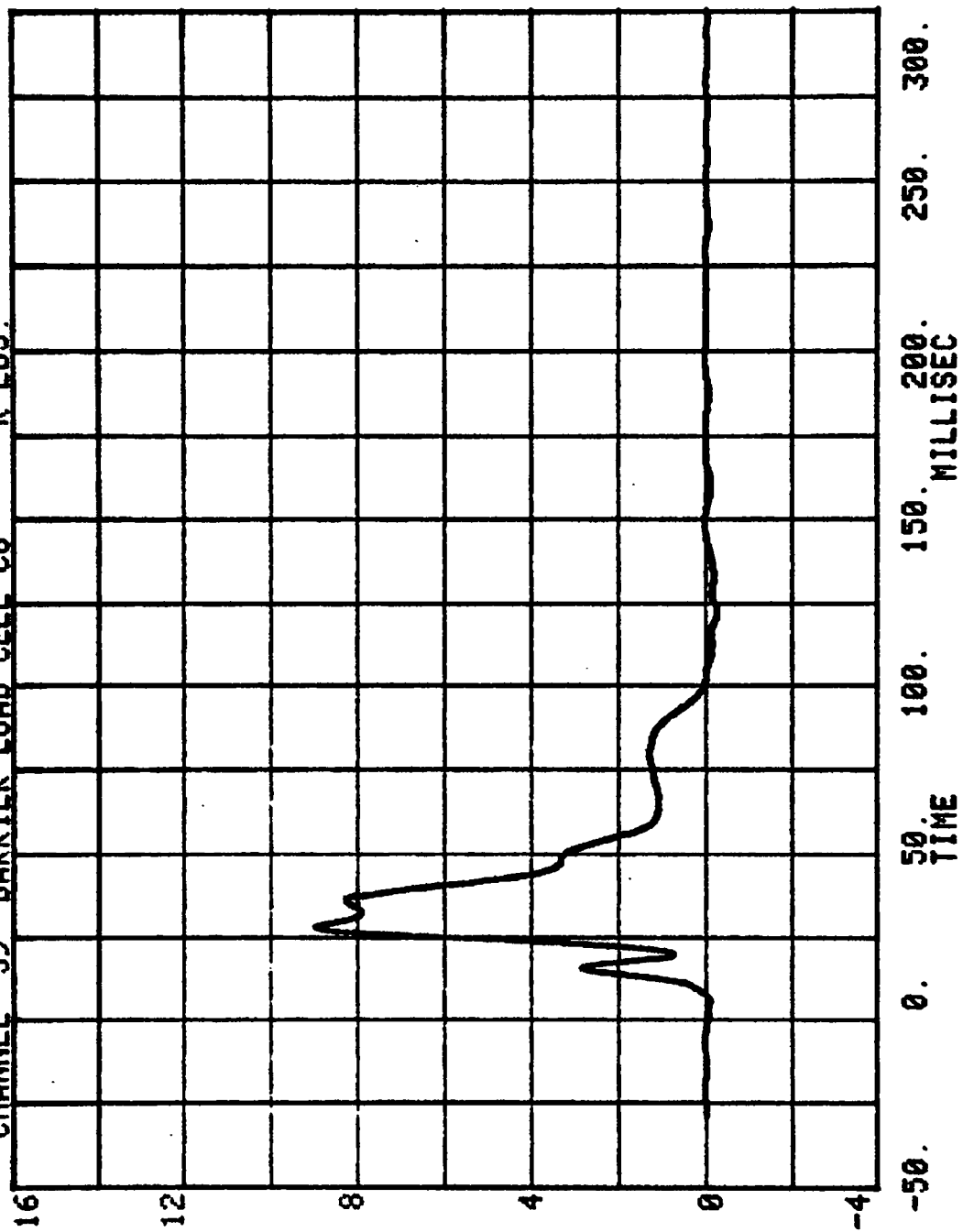
CHANNEL 58 BARRIER LOAD CELL C7 K LBS.

RUN= 677 SERIES= 202

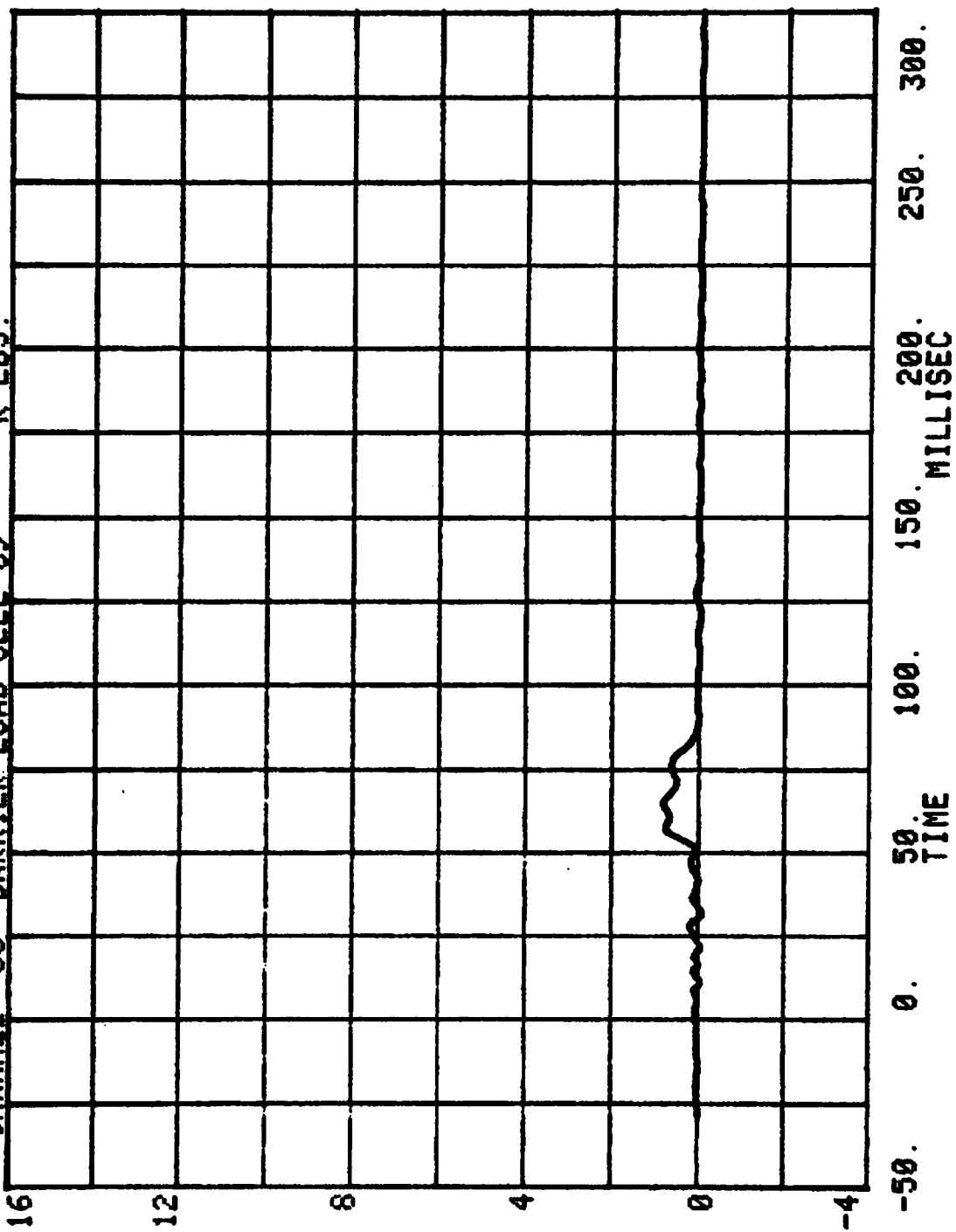


CHANNEL 59 BARRIER LOAD CELL C8 K LBS.

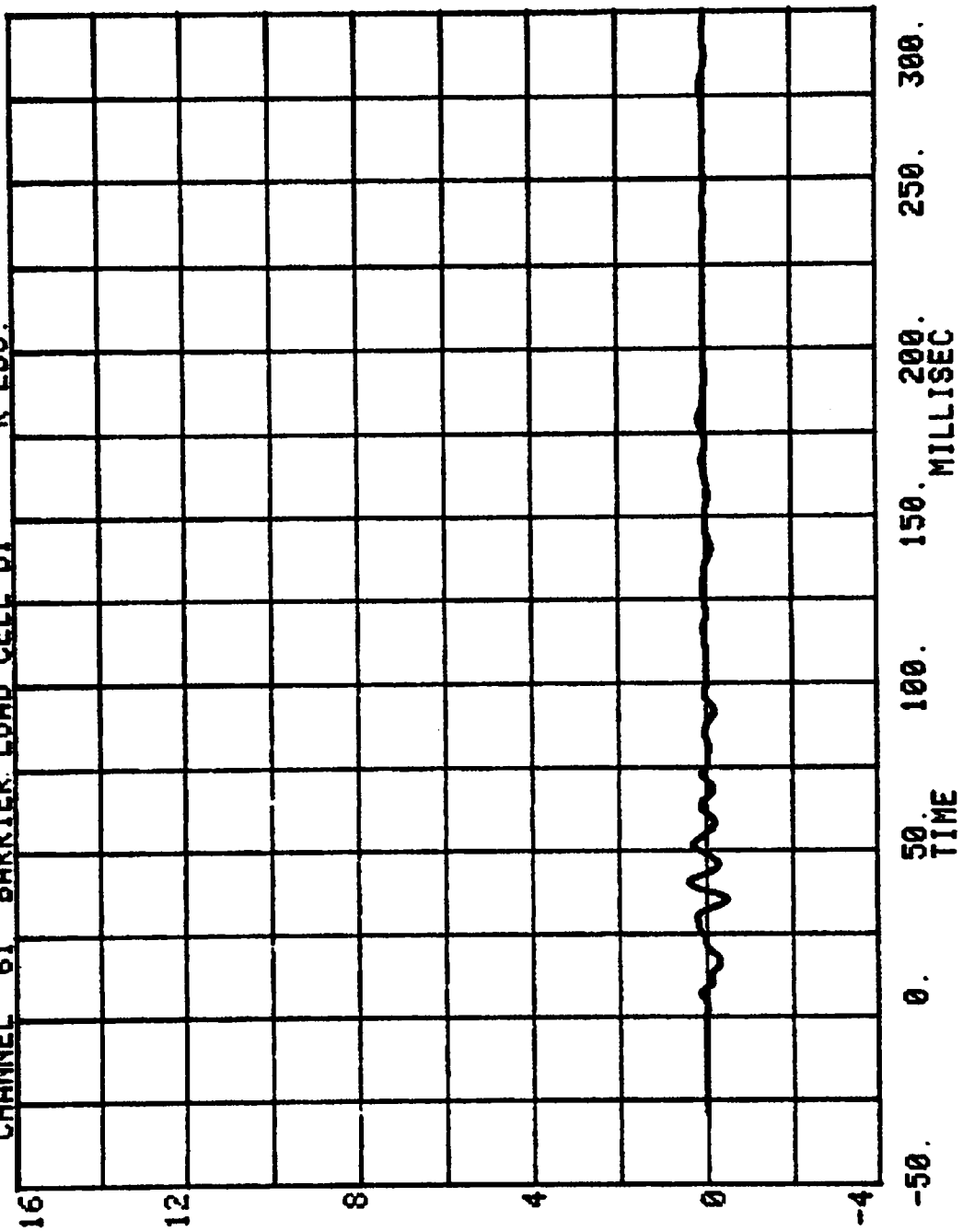
RUN= 677 SERIES= 202



RUN= 677 SERIES= 202
CHANNEL 60 BARRIER LOAD CELL C9 K LBS.

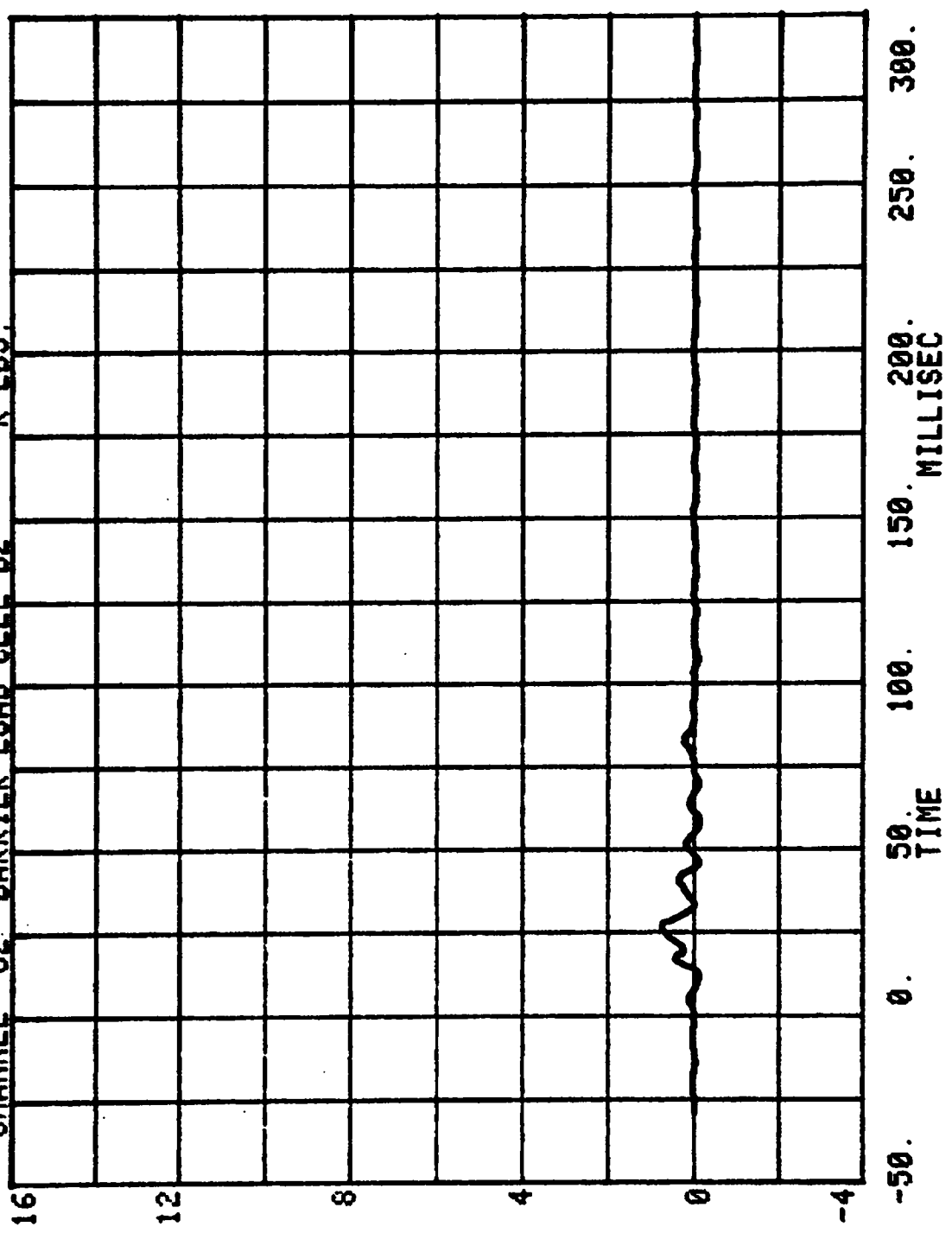


RUN= 677 SERIES= 202
CHANNEL 61 BARRIER LOAD CELL D1 K LBS.

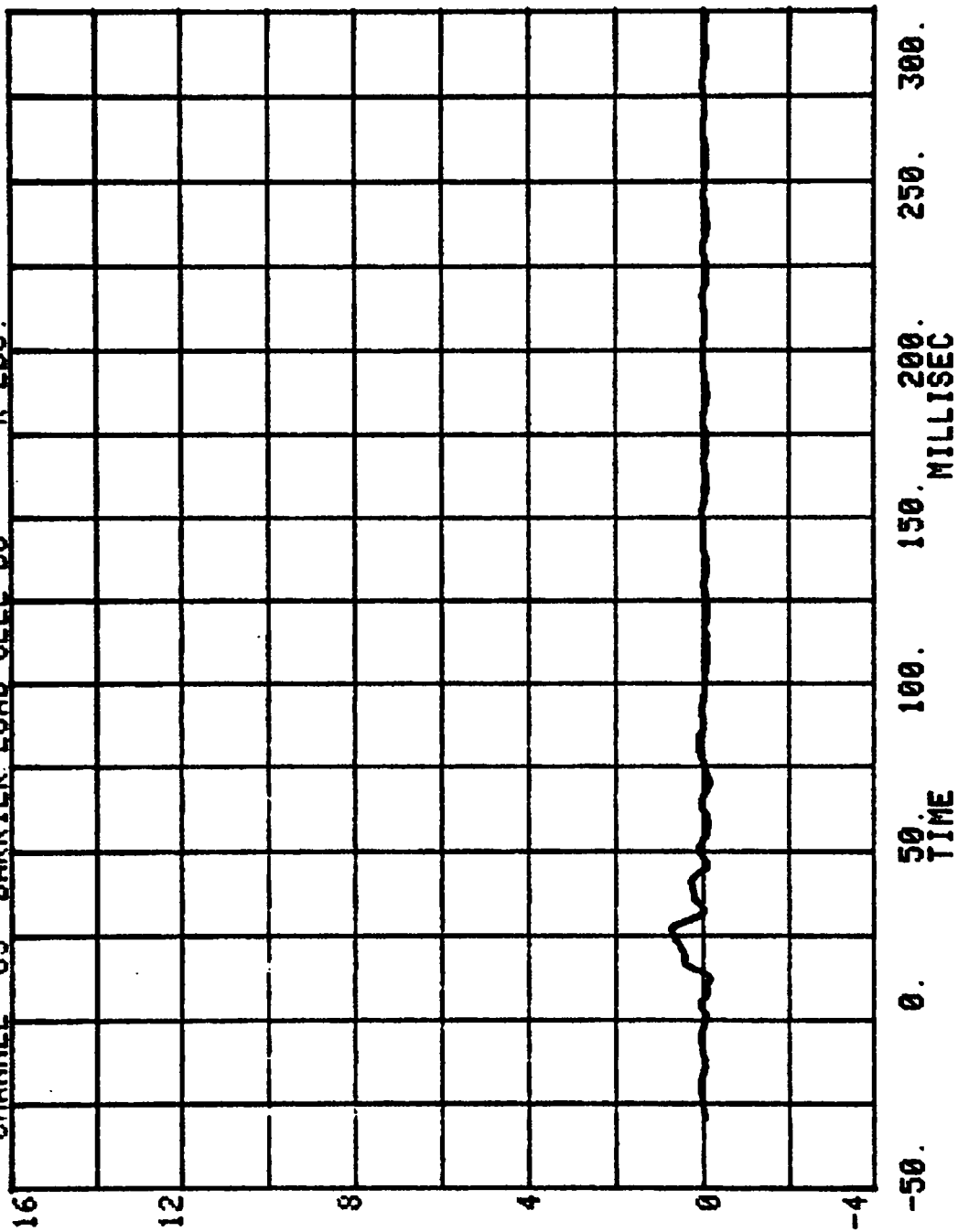


CHANNEL 62 BARRIER LOAD CELL D2 K LBS.

RUN= 677 SERIES= 202

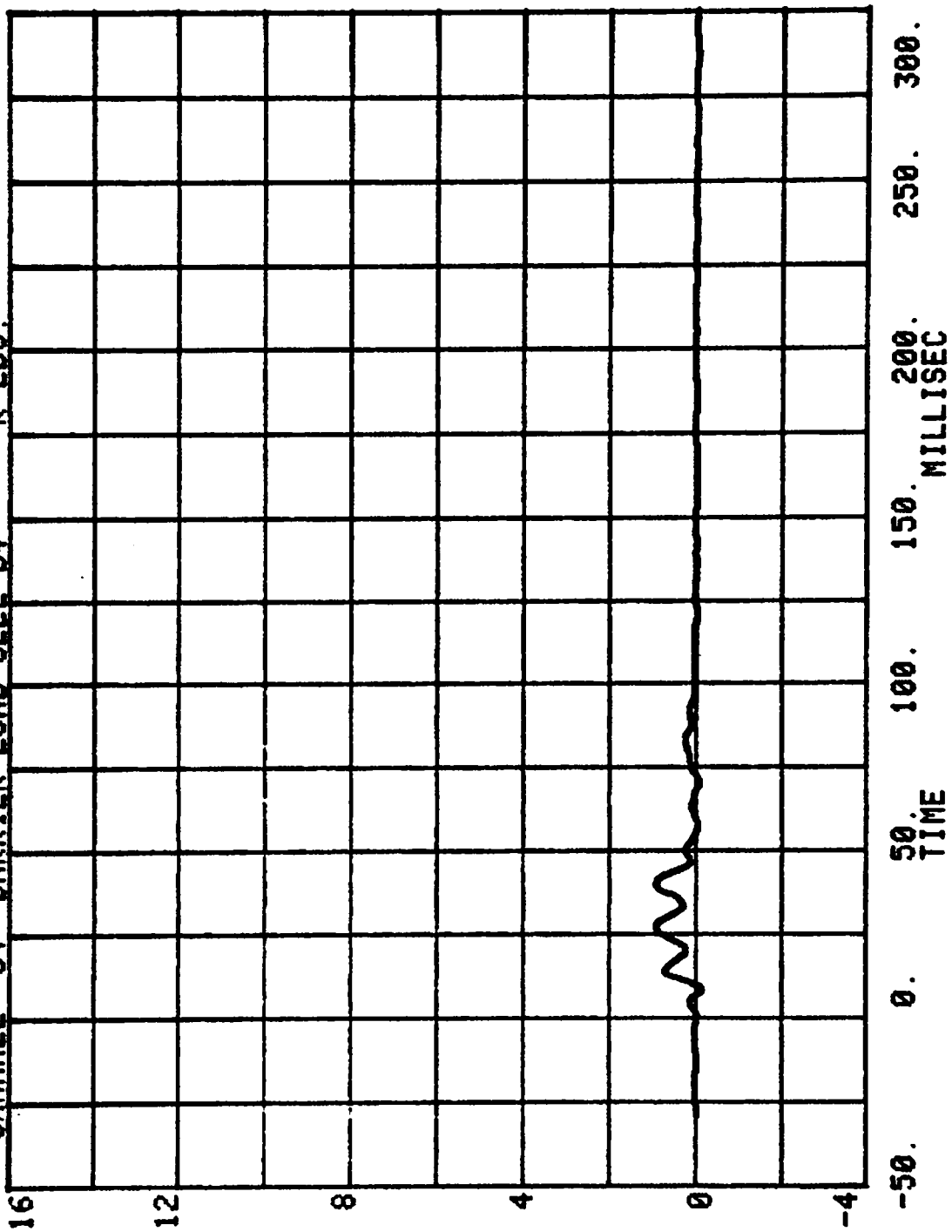


RUN= 677 SERIES= 202
CHANNEL 63 BARRIER LOAD CELL D3 K LBS.



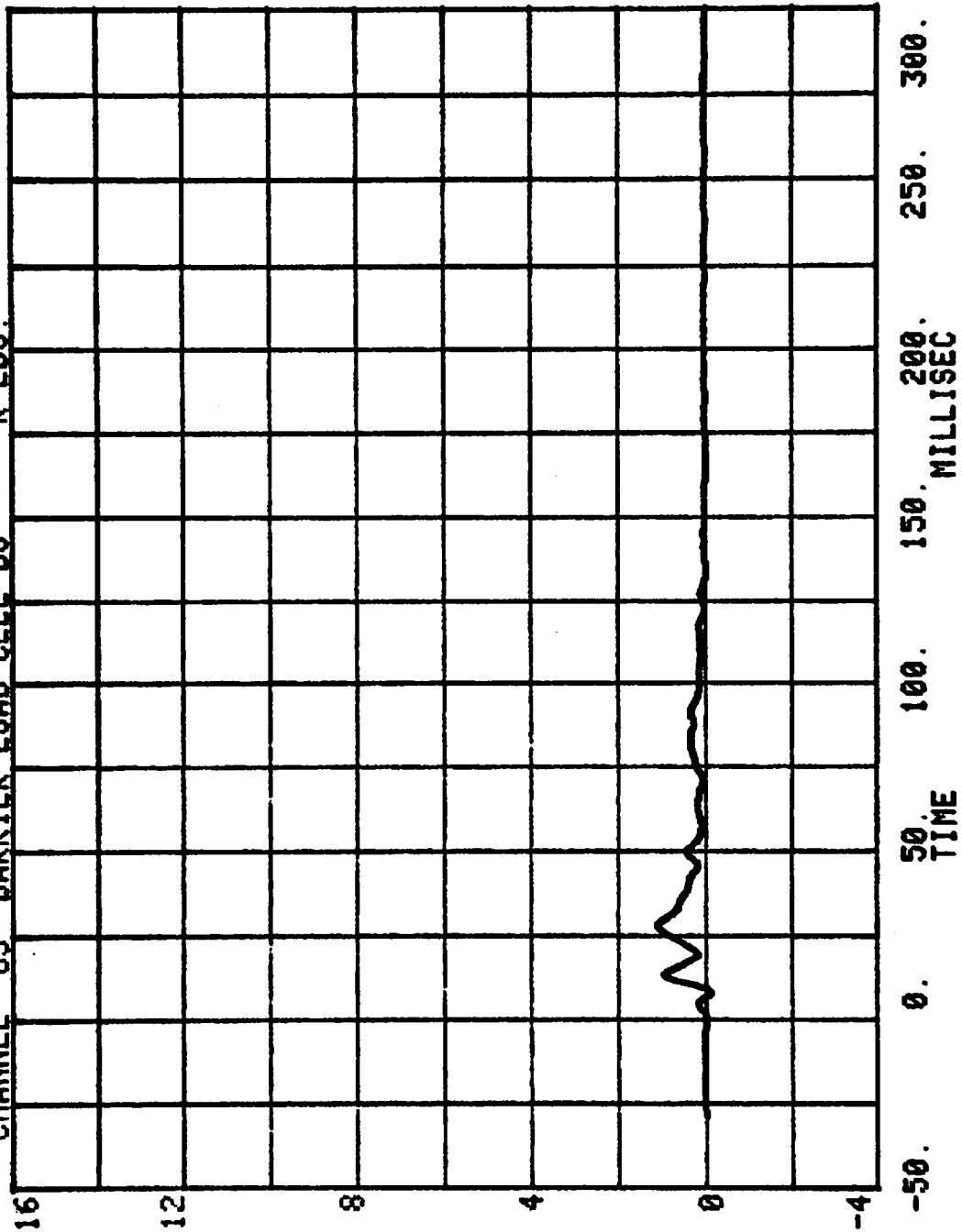
CHANNEL 64 BARRIER LOAD CELL D4 K LBS.

RUN= 677 SERIES= 202



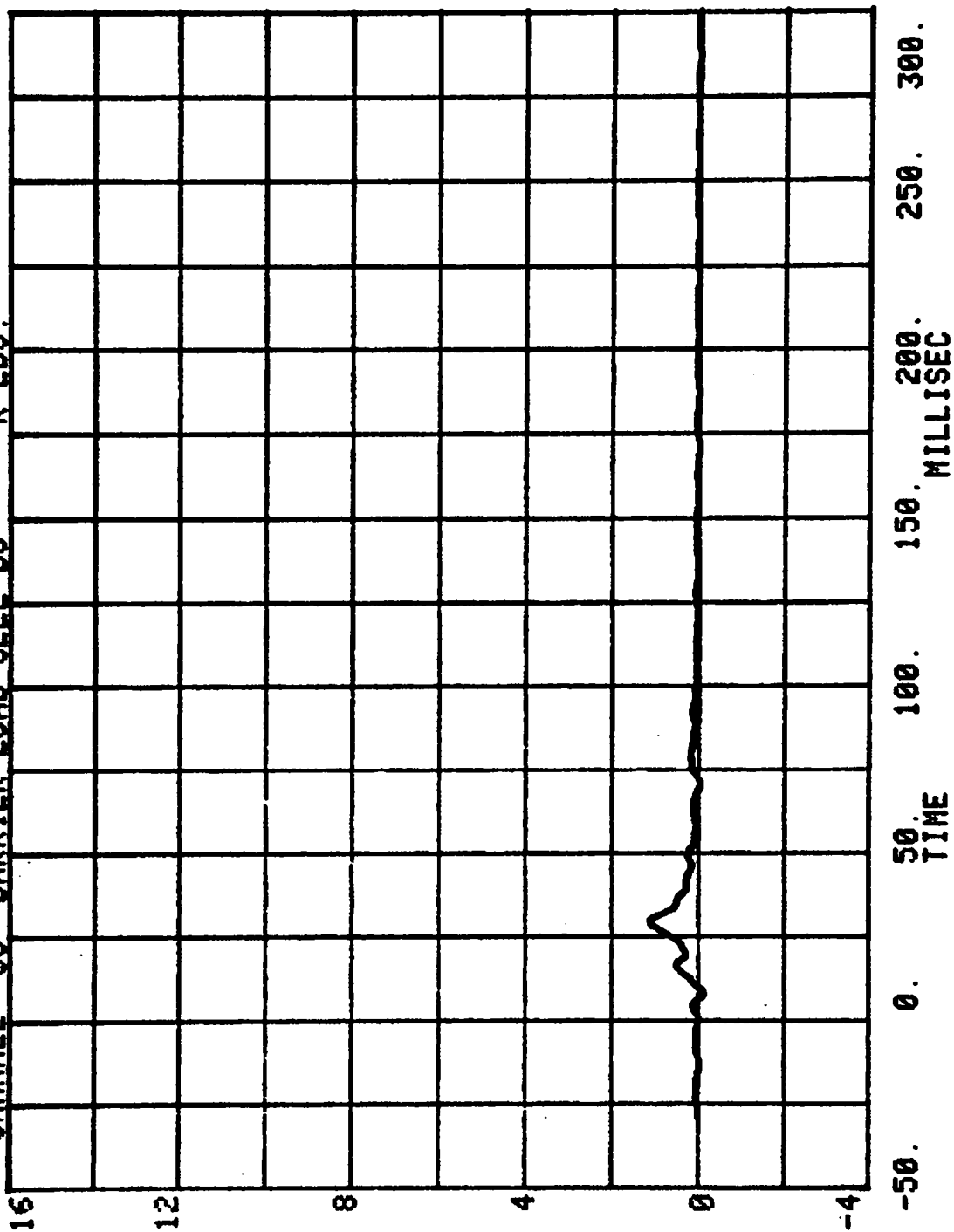
CHANNEL 65 BARRIER LOAD CELL D5 K LBS.

RUN= 677 SERIES= 202

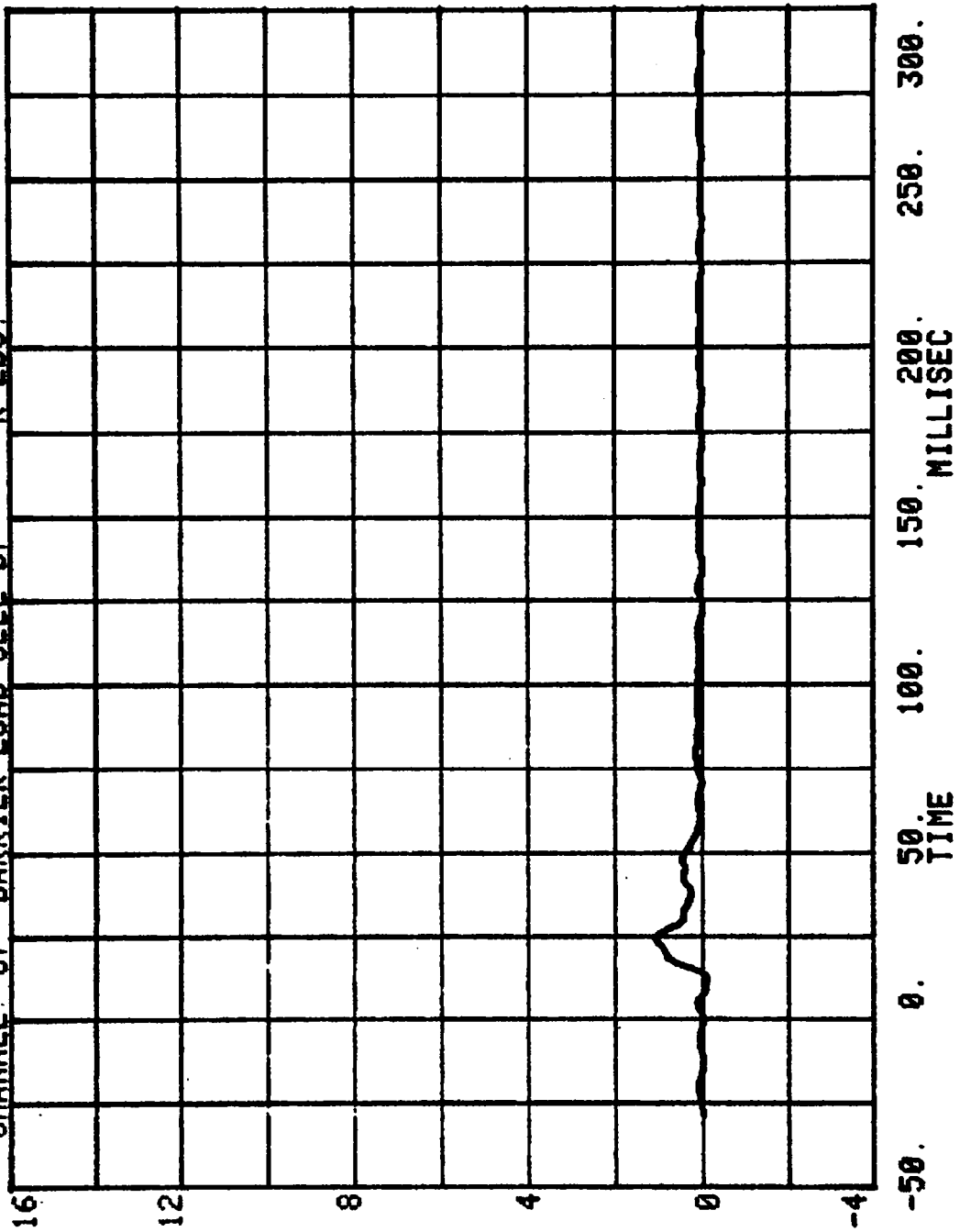


CHANNEL 66 BARRIER LOAD CELL 06 K LBS.

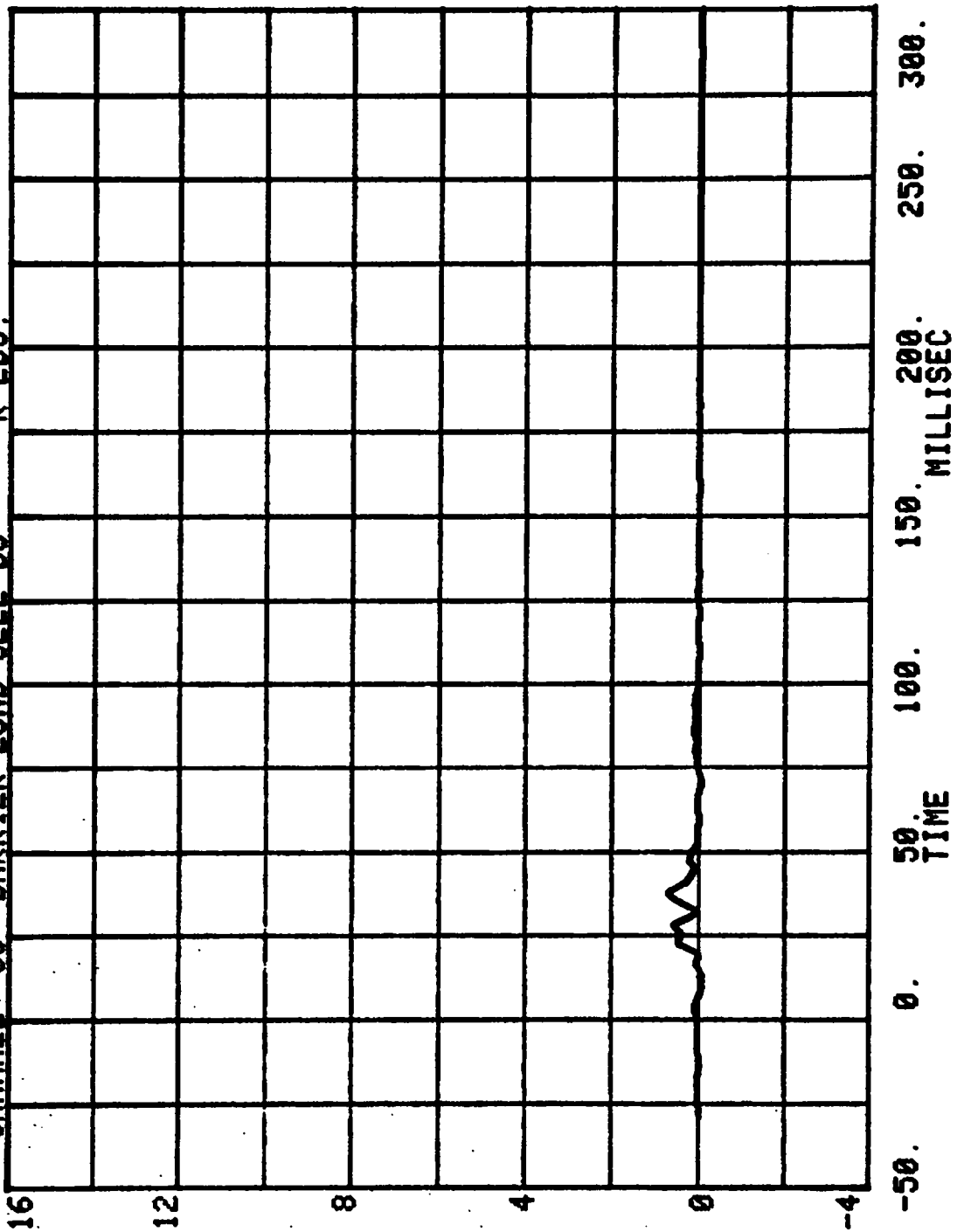
RUN= 677 SERIES= 202



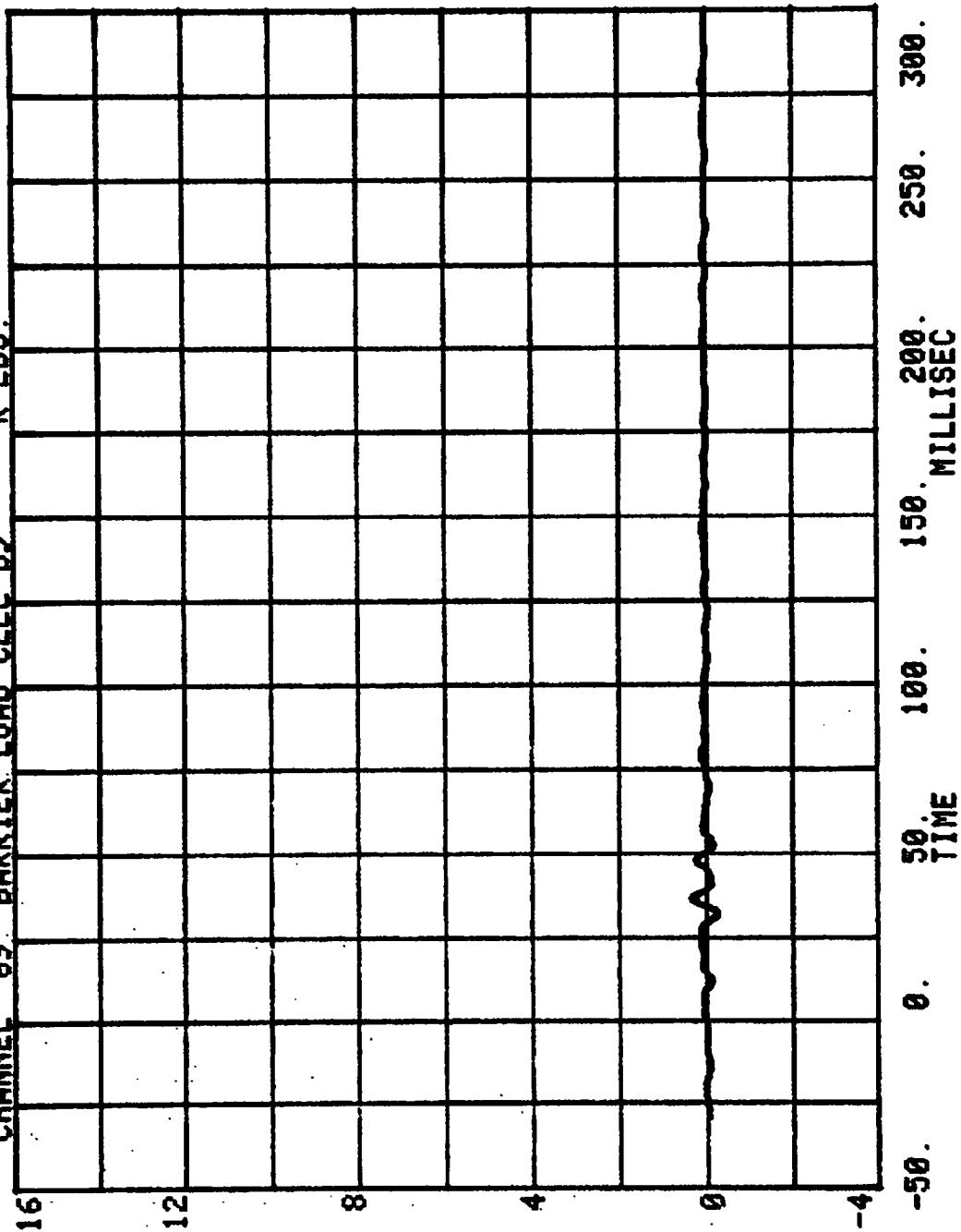
CHANNEL 67 RUN= 677 SERIES= 202
BARRIER LOAD CELL D7 K LBS.



CHANNEL 60 RUN= 677 SERIES= 202
BARRIER LOAD CELL D8 K LBS.



RUN= 677 SERIES= 202
CHANNEL 69 BARRIER LOAD CELL D9 K LBS.



CAR TO LOAD CELL BARRIER

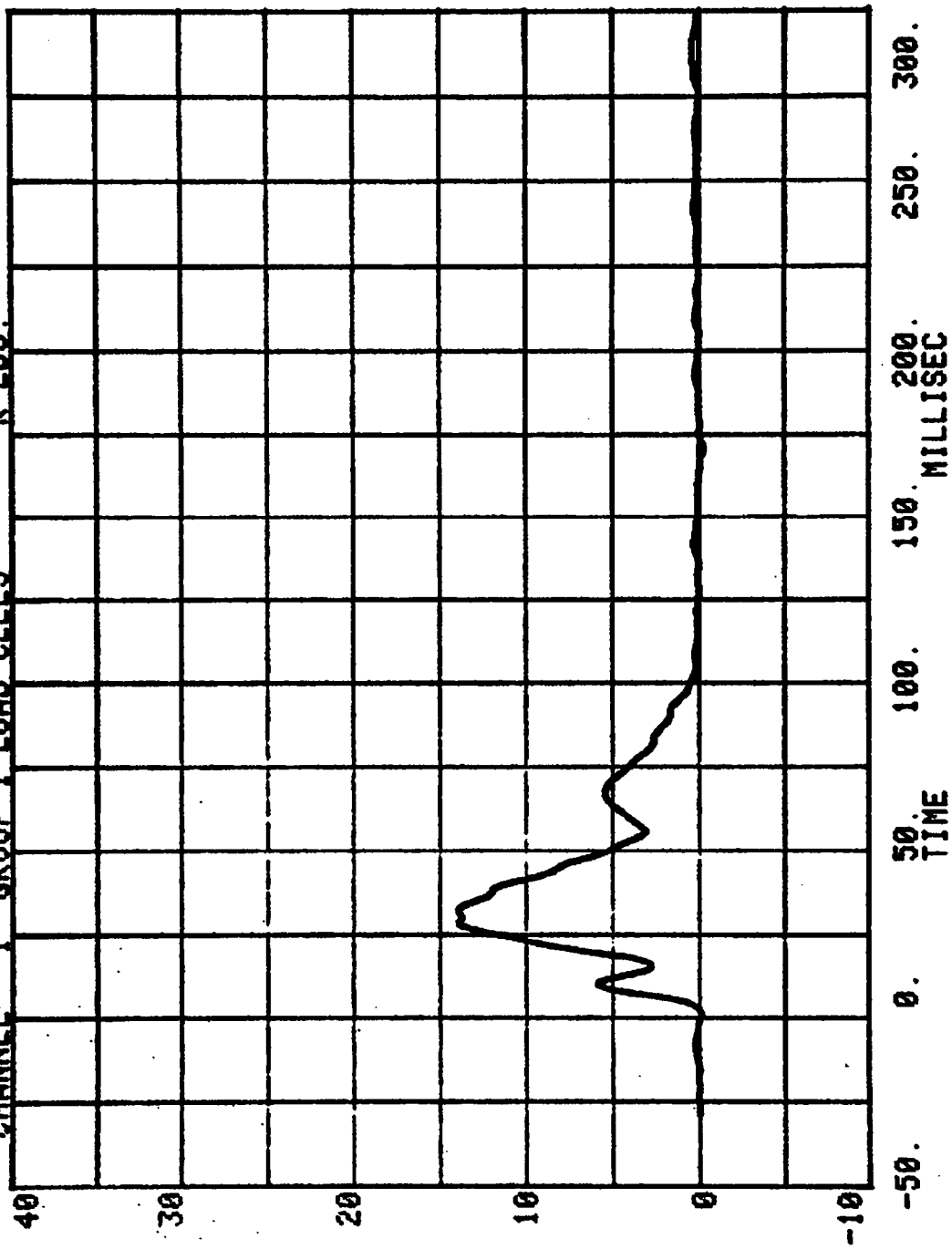
RUN # 677

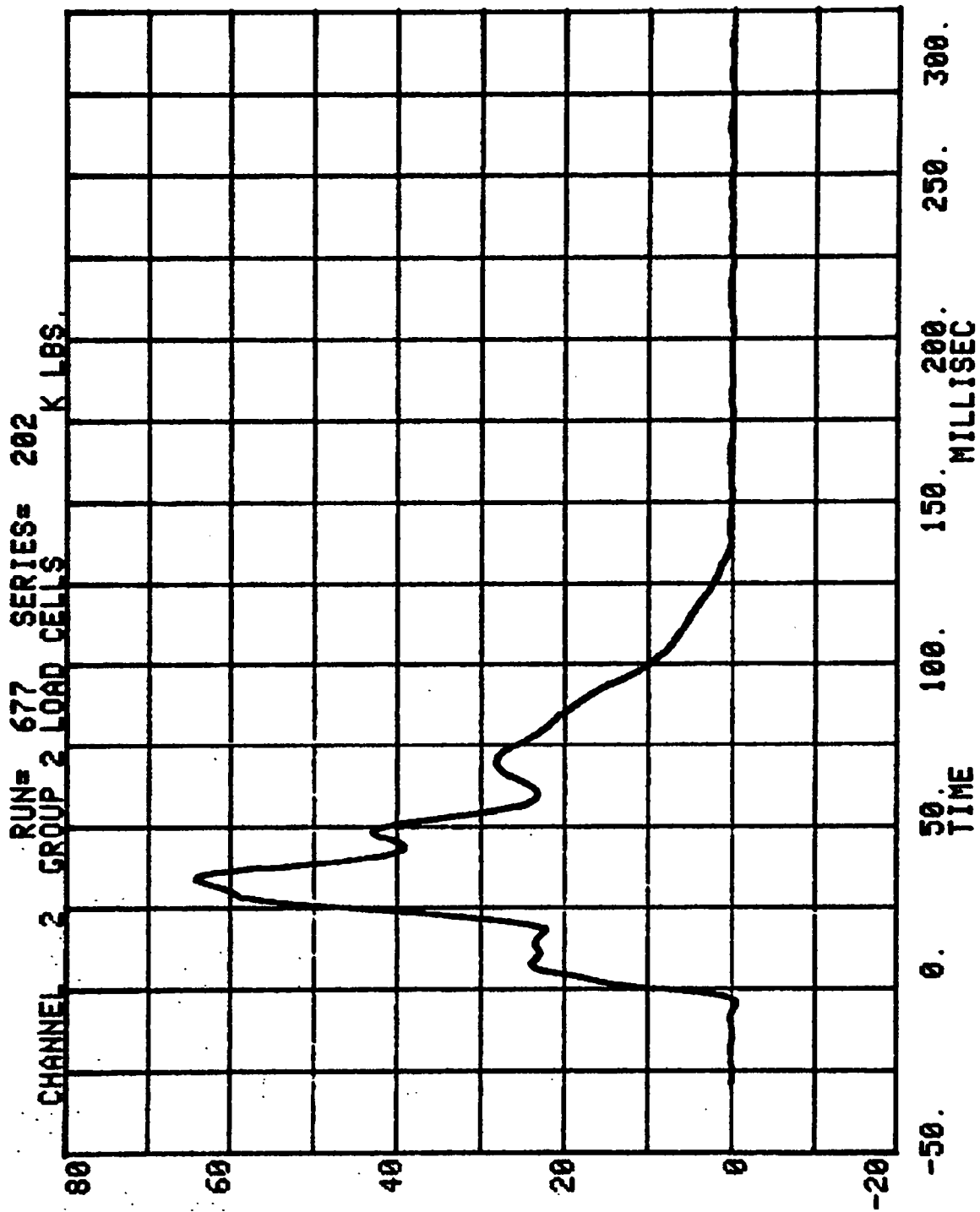
SERIES # 202

CHAN	TITLE	MINIMUM	MAXIMUM
1	GROUP 1 LOAD CELLS	-.273	13.969 K LBS.
2	GROUP 2 LOAD CELLS	-.517	64.415 K LBS.
3	GROUP 3 LOAD CELLS	-.606	12.219 K LBS.
4	GROUP 4 LOAD CELLS	-.297	15.864 K LBS.
5	GROUP 5 LOAD CELLS	-.259	17.730 K LBS.
6	GROUP 6 LOAD CELLS	-.473	15.440 K LBS.
7	TOTAL LOAD CELL SUM	-.599	130.913 K LBS.

CHANNEL 1 GROUP 1 LOAD CELLS K LBS.

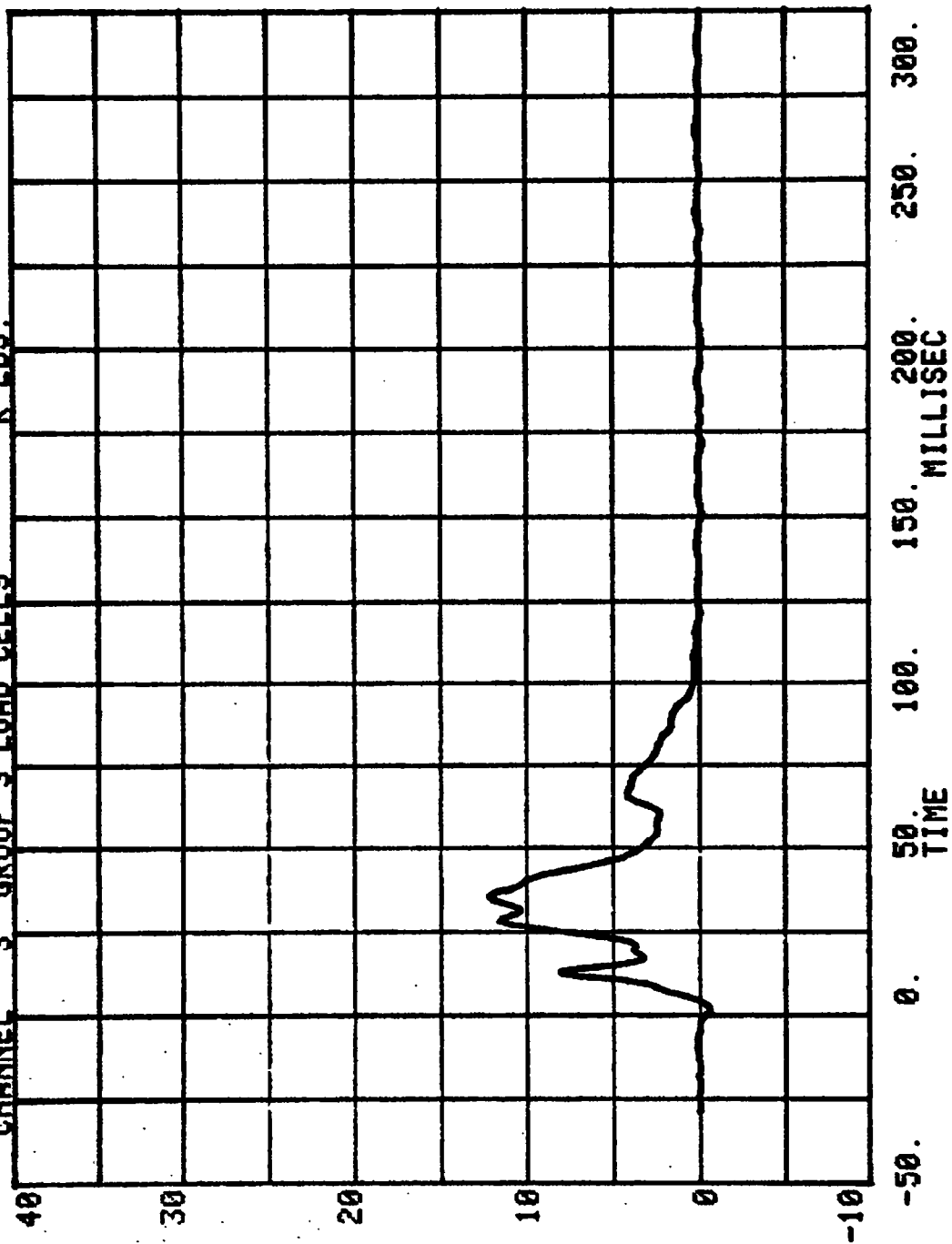
RUN= 677 SERIES= 202





CHANNEL 3 GROUP 3 LOAD CELLS K LBS.

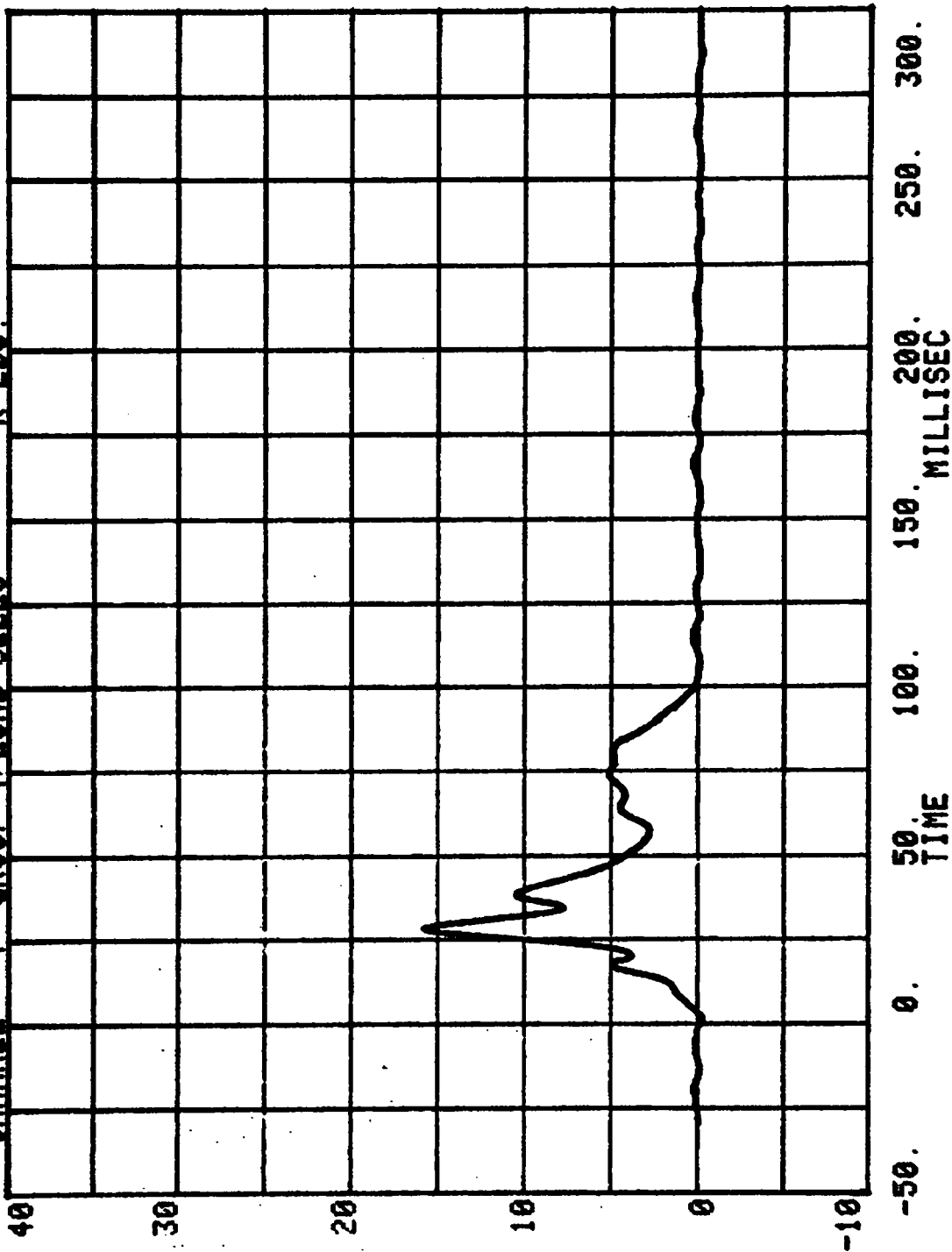
RUN= 677 SERIES= 202



CHANNEL 4 GROUP 4 LOAD CELLS

RUN= 677 SERIES= 202

K LBS.



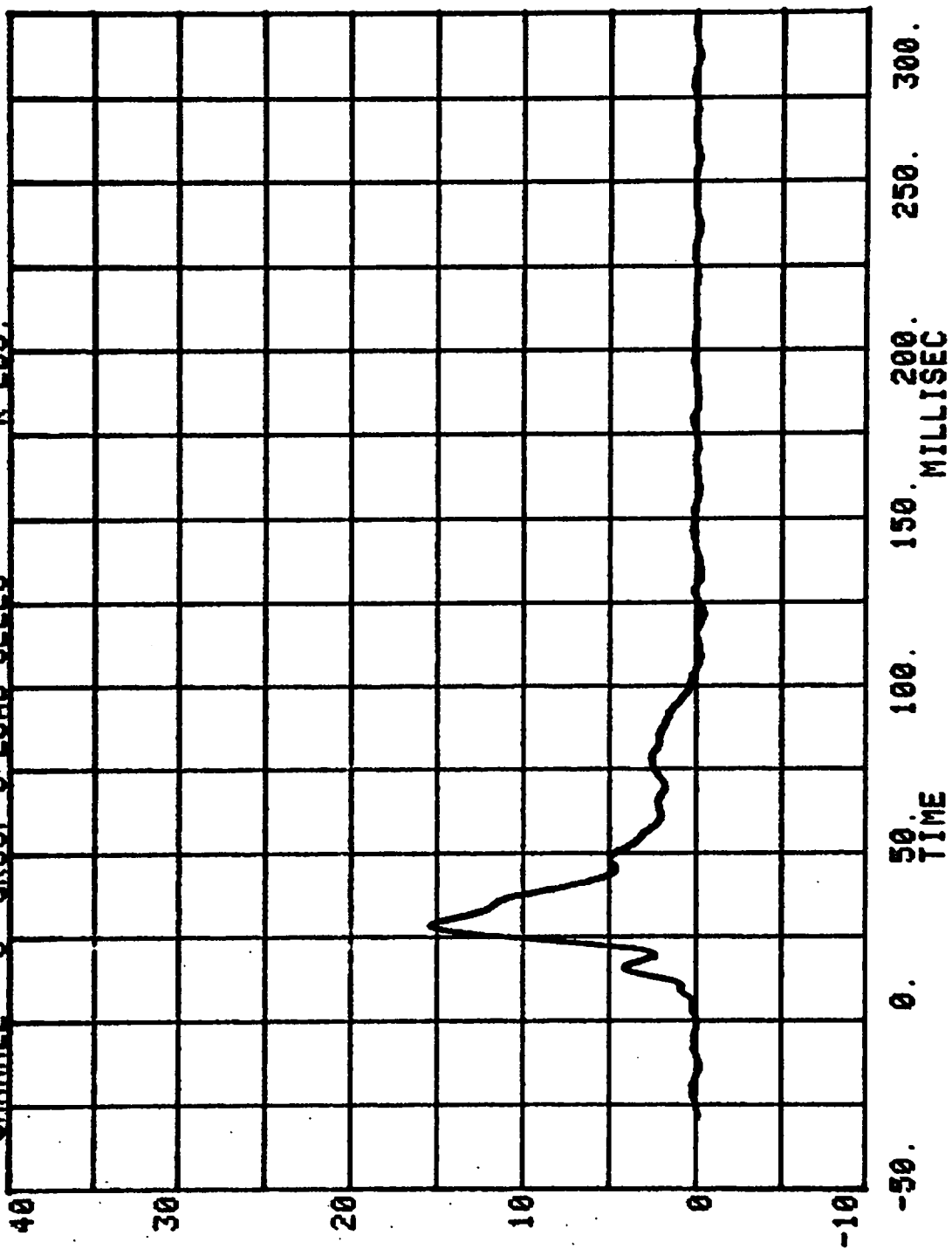
CHANNEL 5 GROUP 3 LOAD CELLS
RUN= 677 SERIES= 202
K LBS.

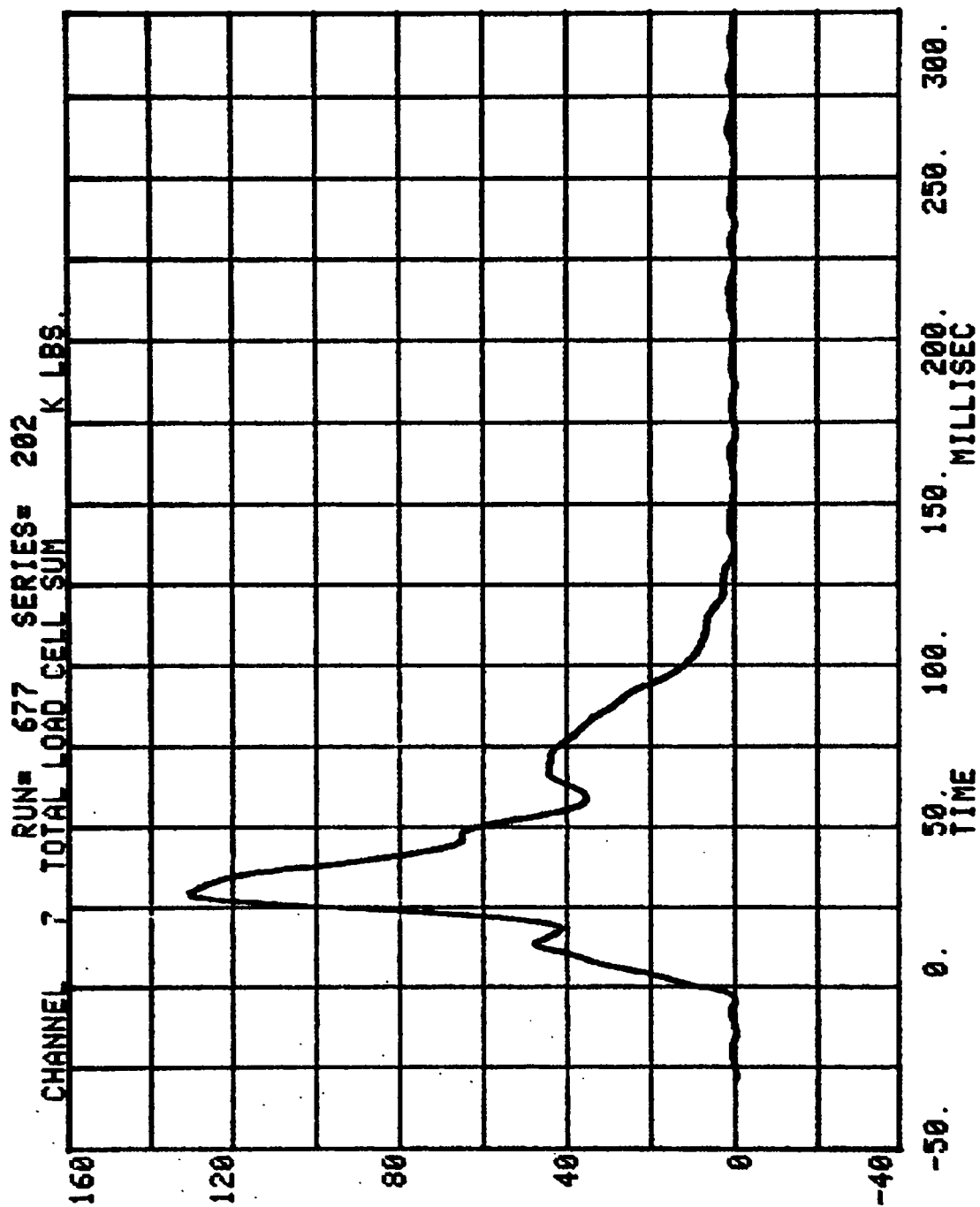


CHANNEL 6 GROUP 6 LOAD CELLS

RUN= 677 SERIES= 202

K LBS.





TEST NO. CF5202

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= 677

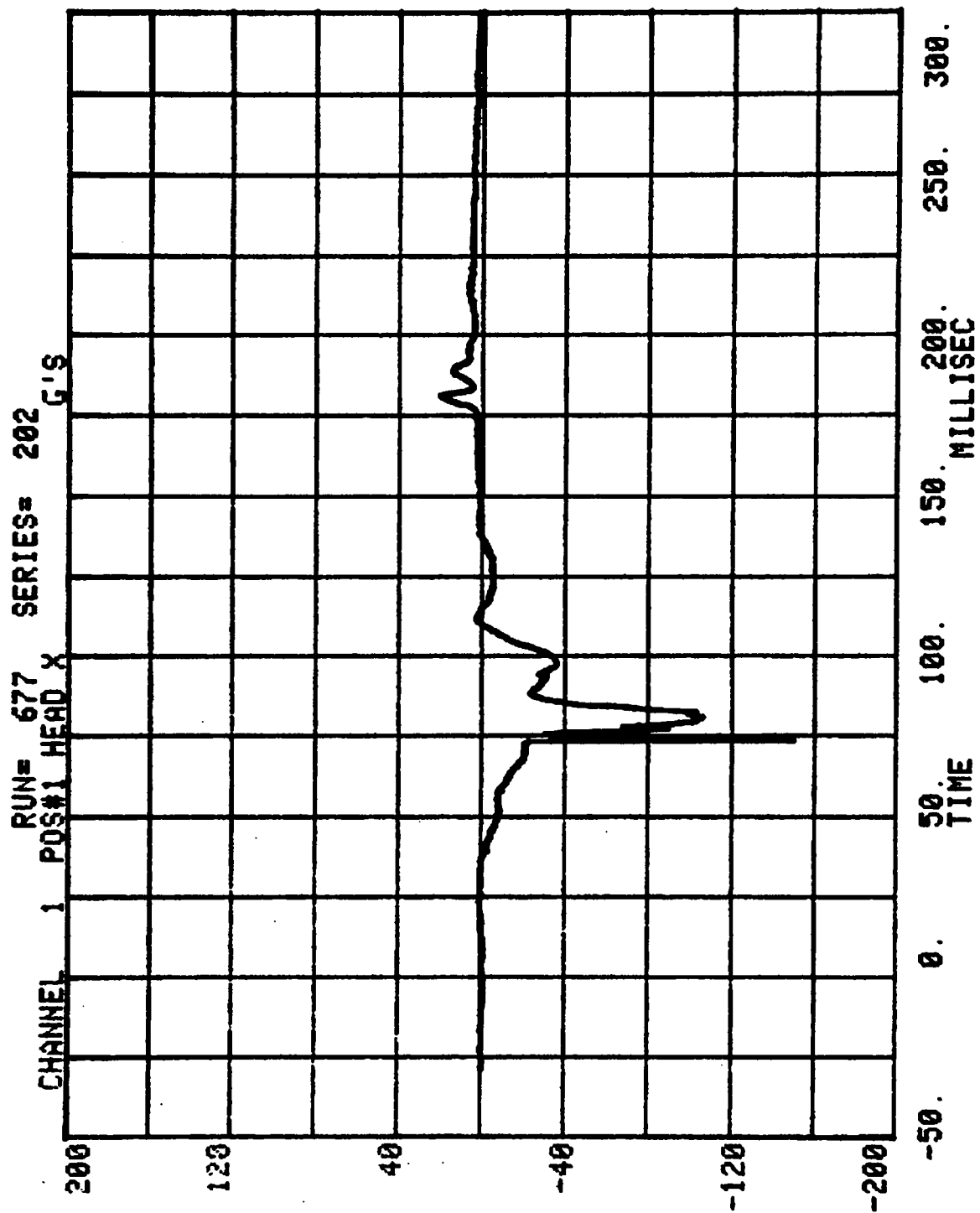
POS#1 HEAD RESULTANT

HIC=1207.3 FROM T1= .07290 TO T2= .08700

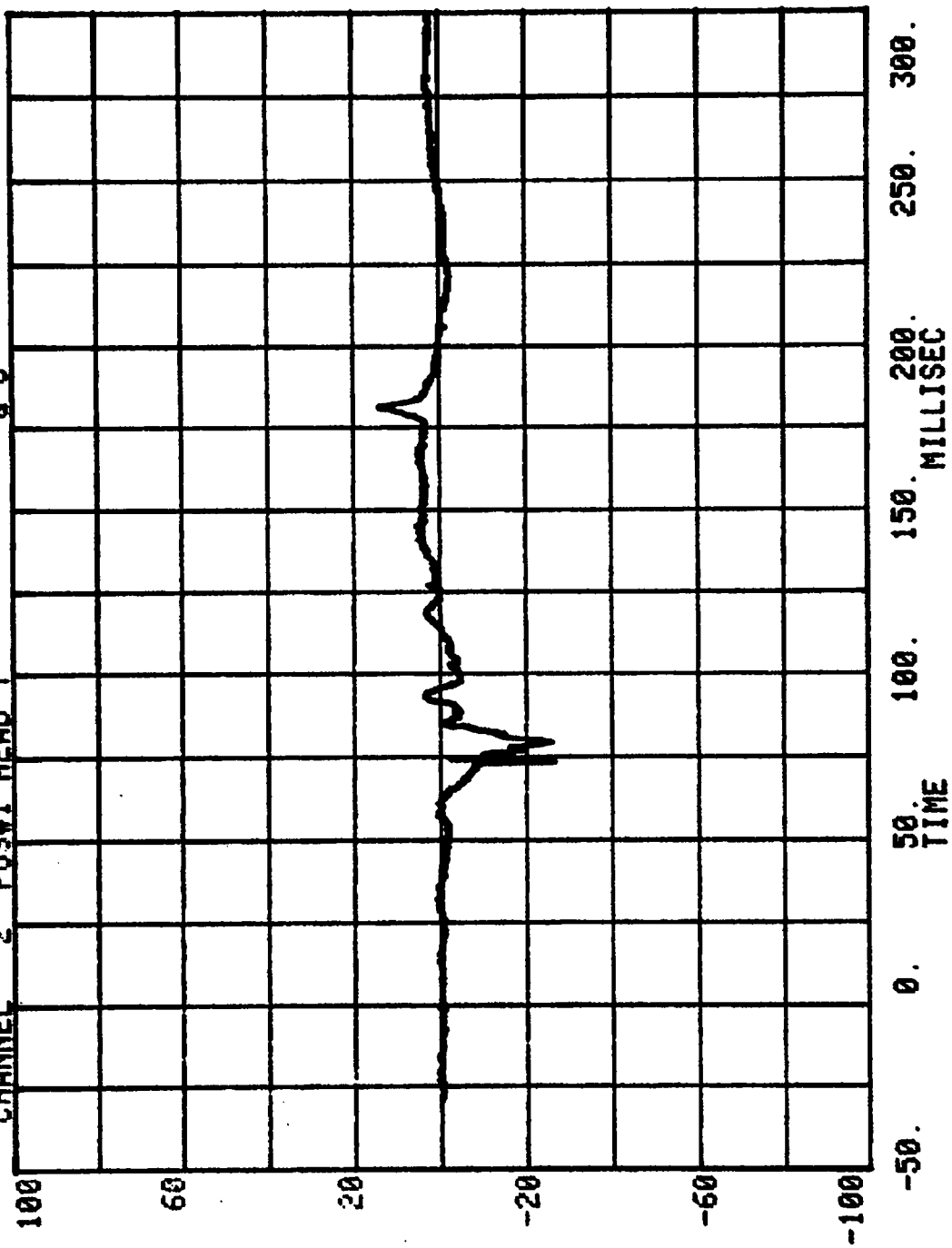
AVERAGE ACCELERATION BETWEEN T1 AND T2= 94.0G'S

EVENT TIME= 300.0 MSEC

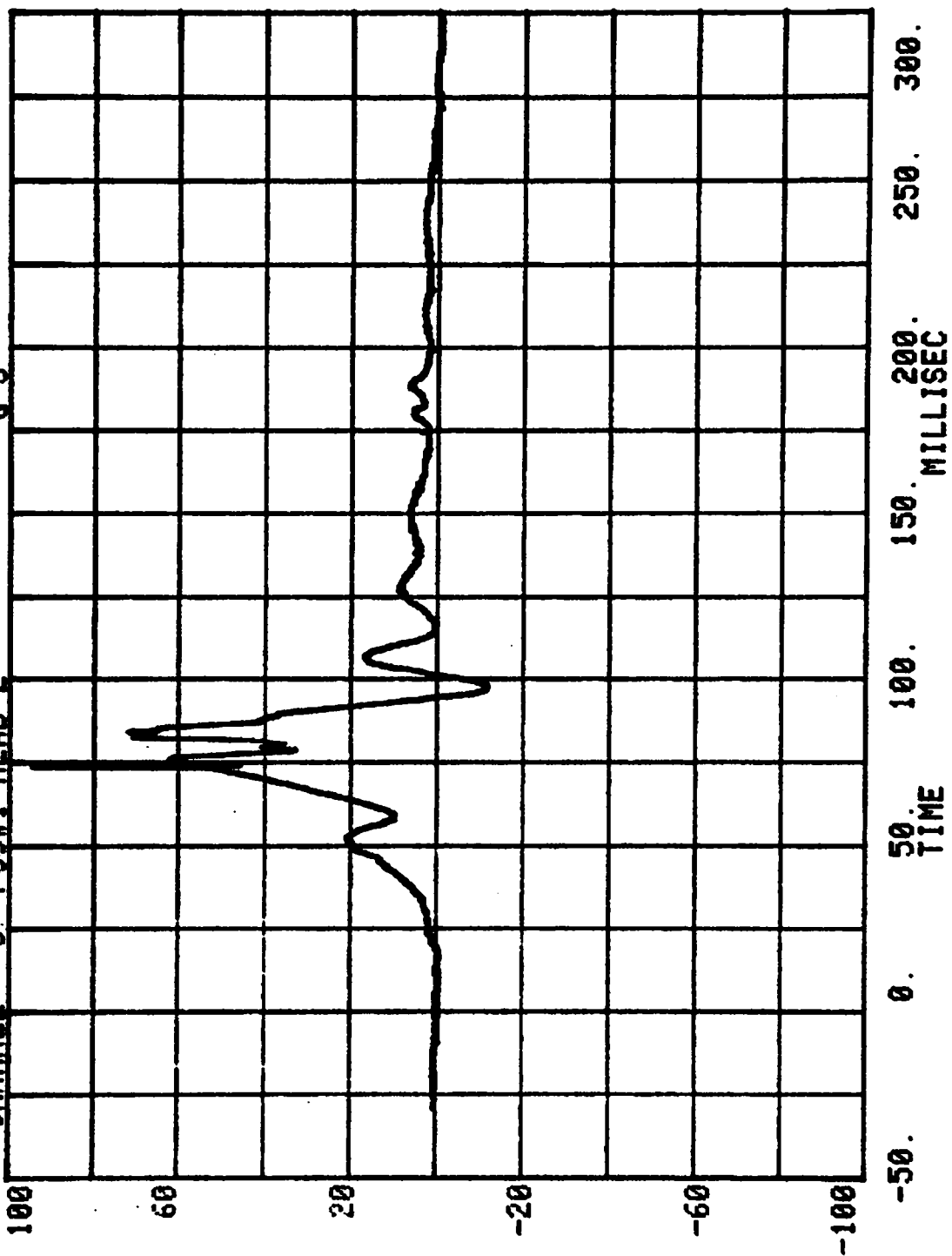
SEVERITY INDEX=1661.7



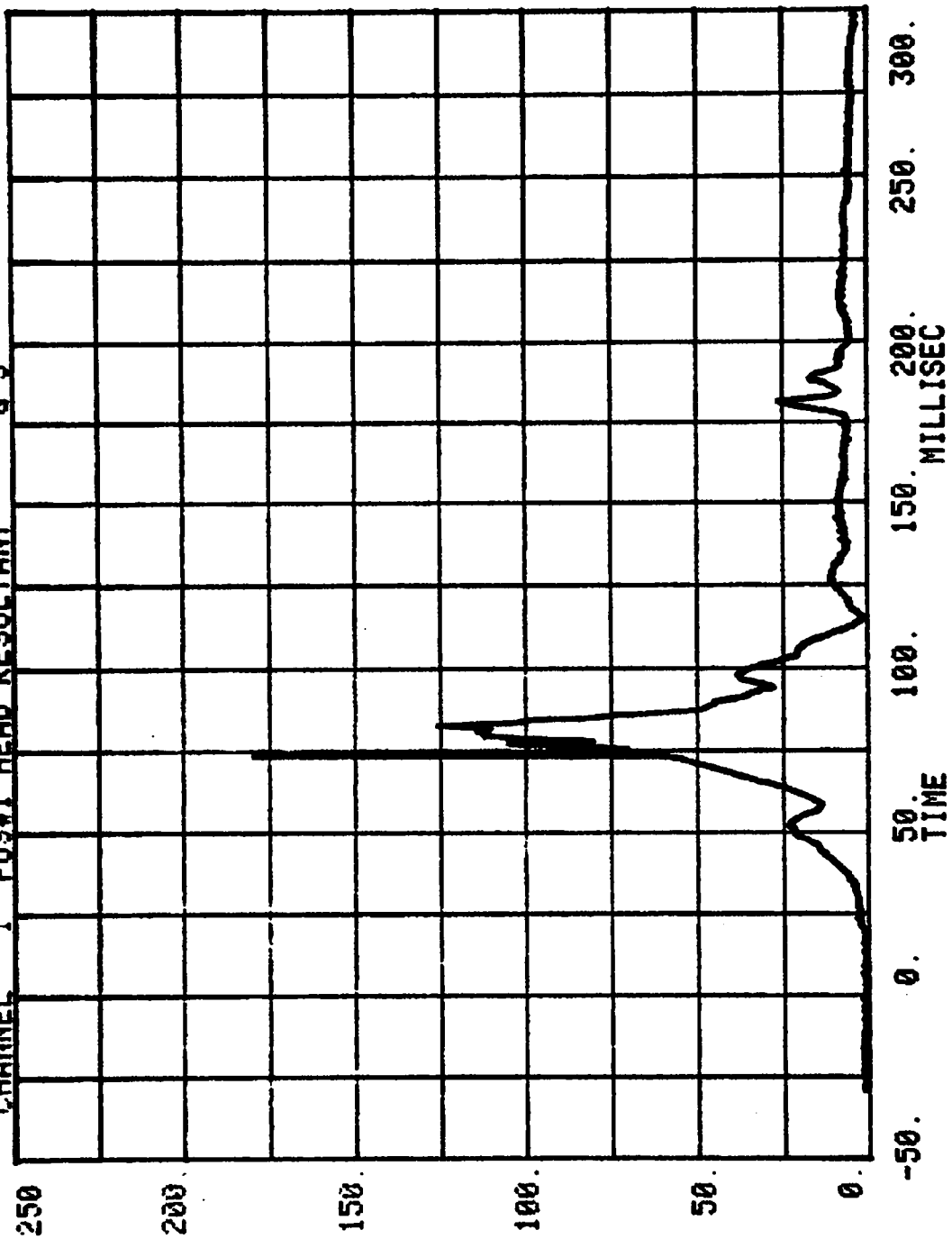
CHANNEL 2 POS#1 HEAD Y
RUN= 677 SERIES= 202 G'S



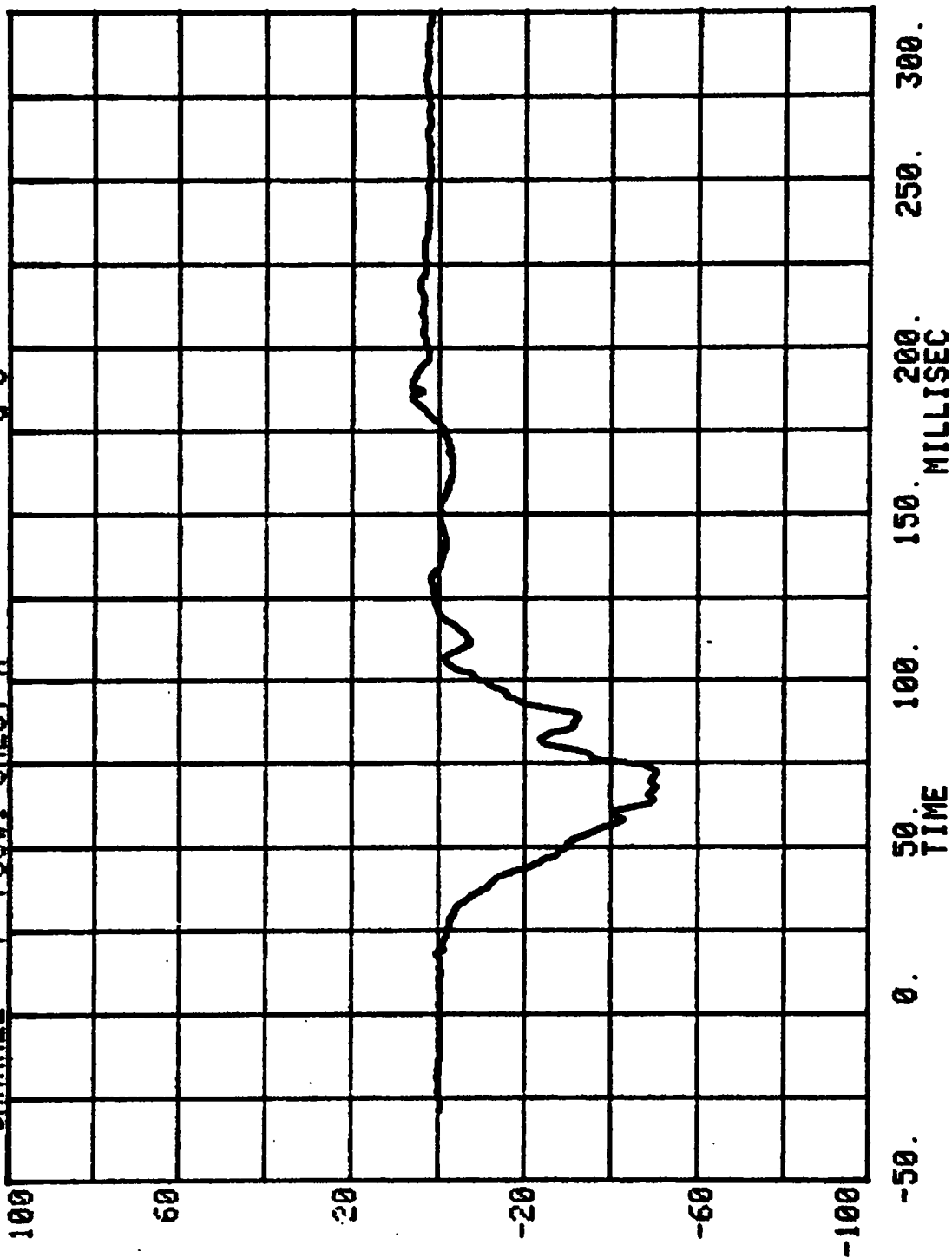
RUN= 677 SERIES= 202
CHANNEL 3 POS#1 HEAD 2 G'S

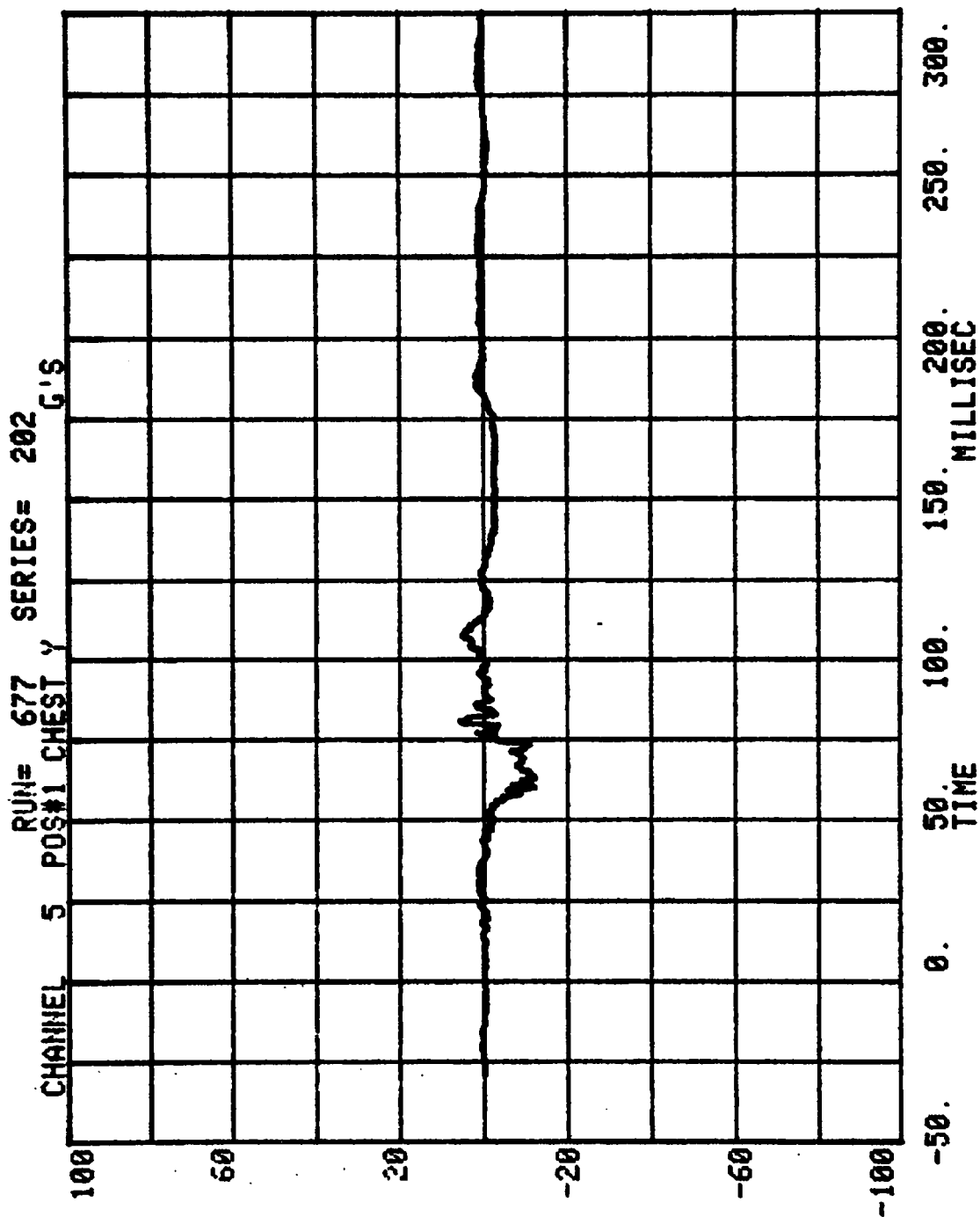


CHANNEL 1 RUN= 677 SERIES= 202
POS#1 HEAD RESULTANT G'S

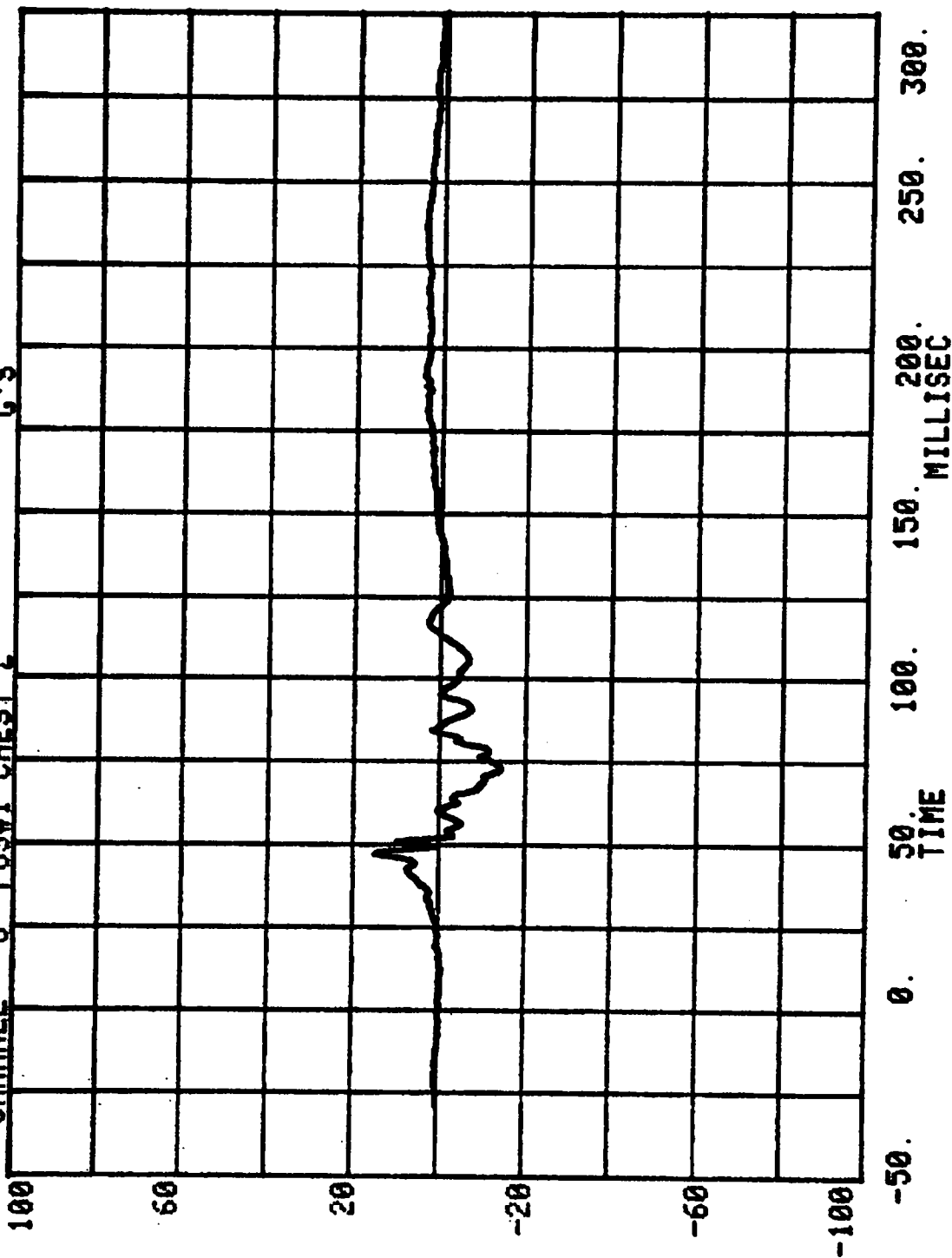


CHANNEL 4 POS#1 CHEST X RUN= 677 SERIES= 202 G'S



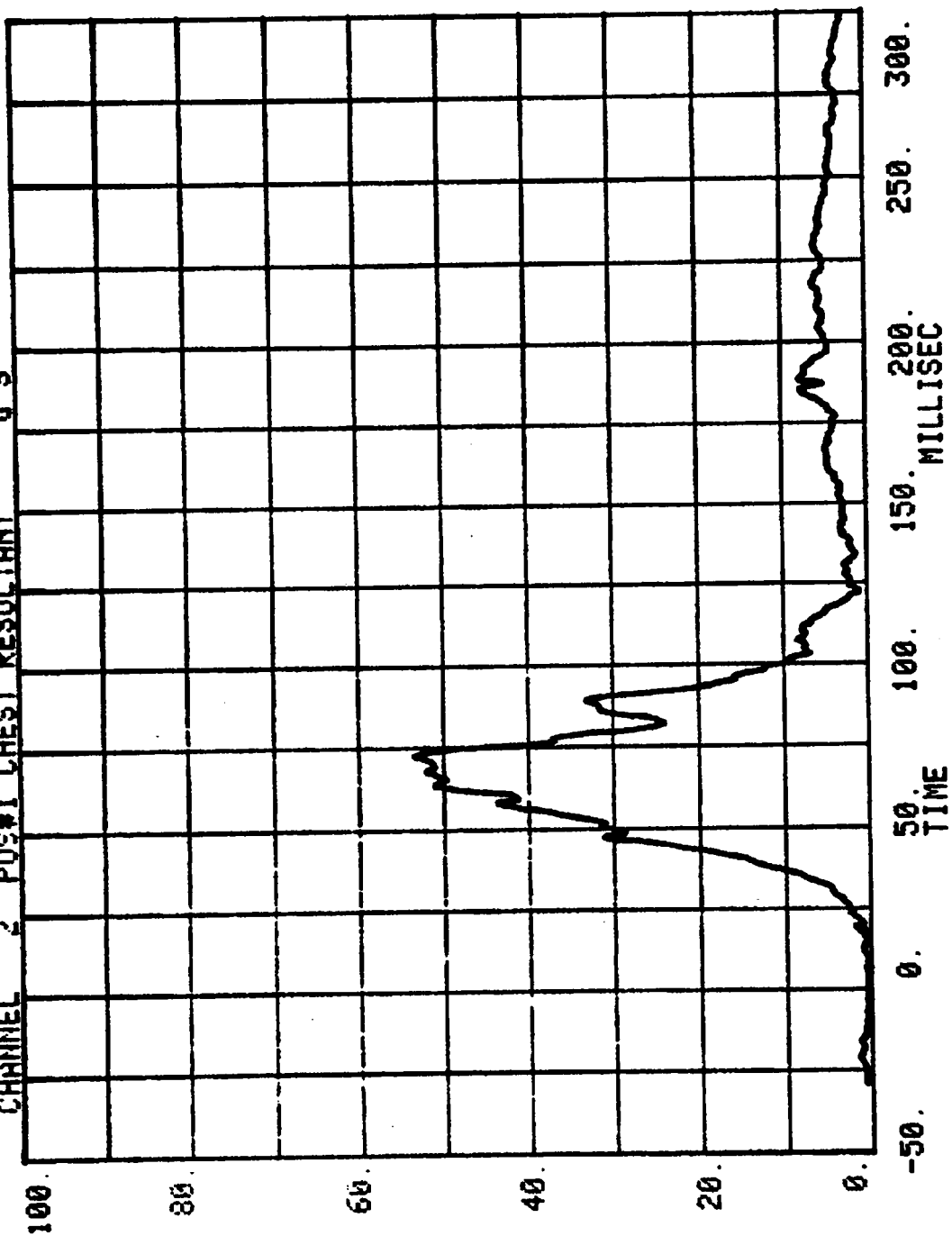


CHANNEL 6 POS#1 CHEST 2
RUN= 677 SERIES= 202
G'S



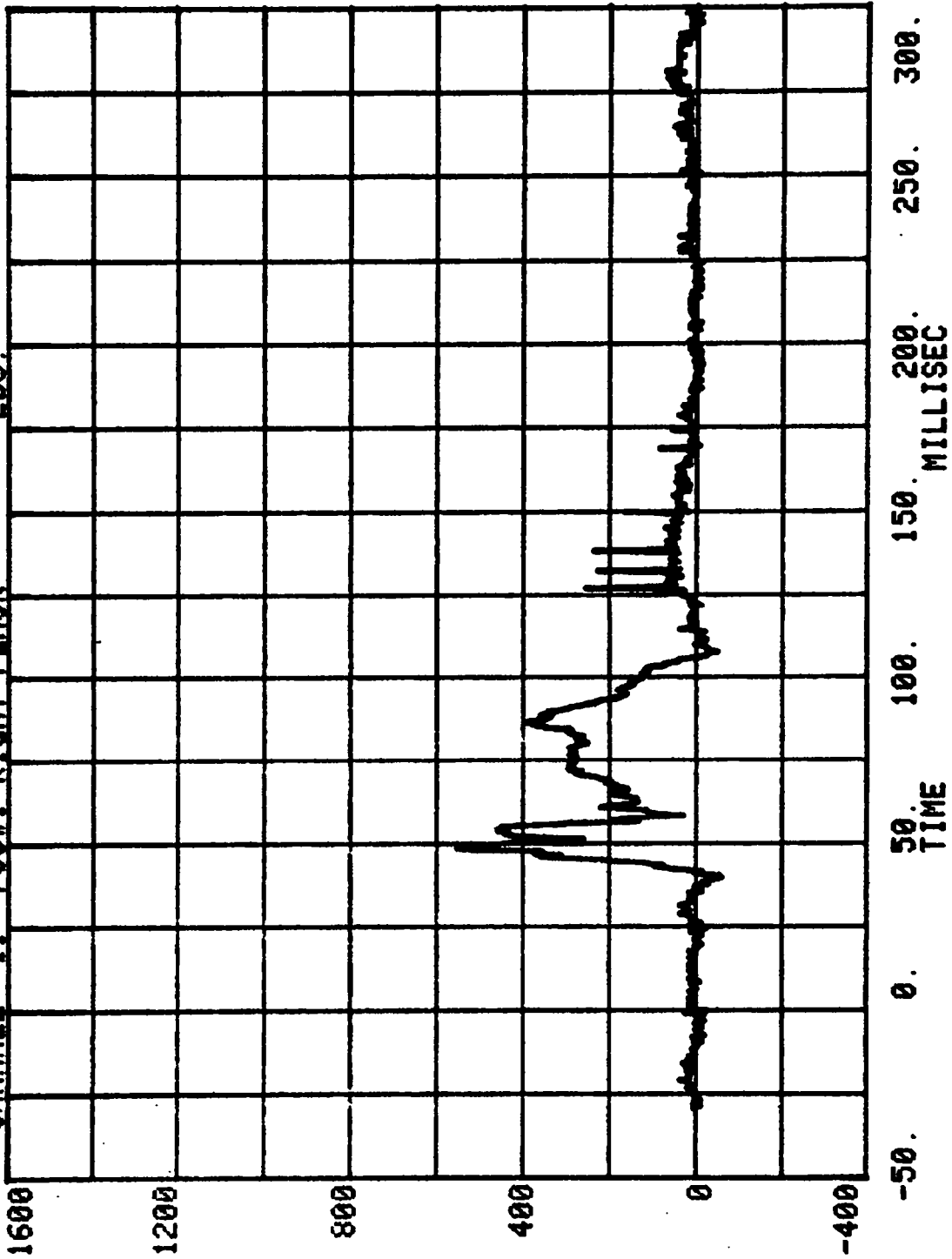
CHANNEL 2 POS#1 CHEST RESULTANT G'S

RUN= 677 SERIES= 202



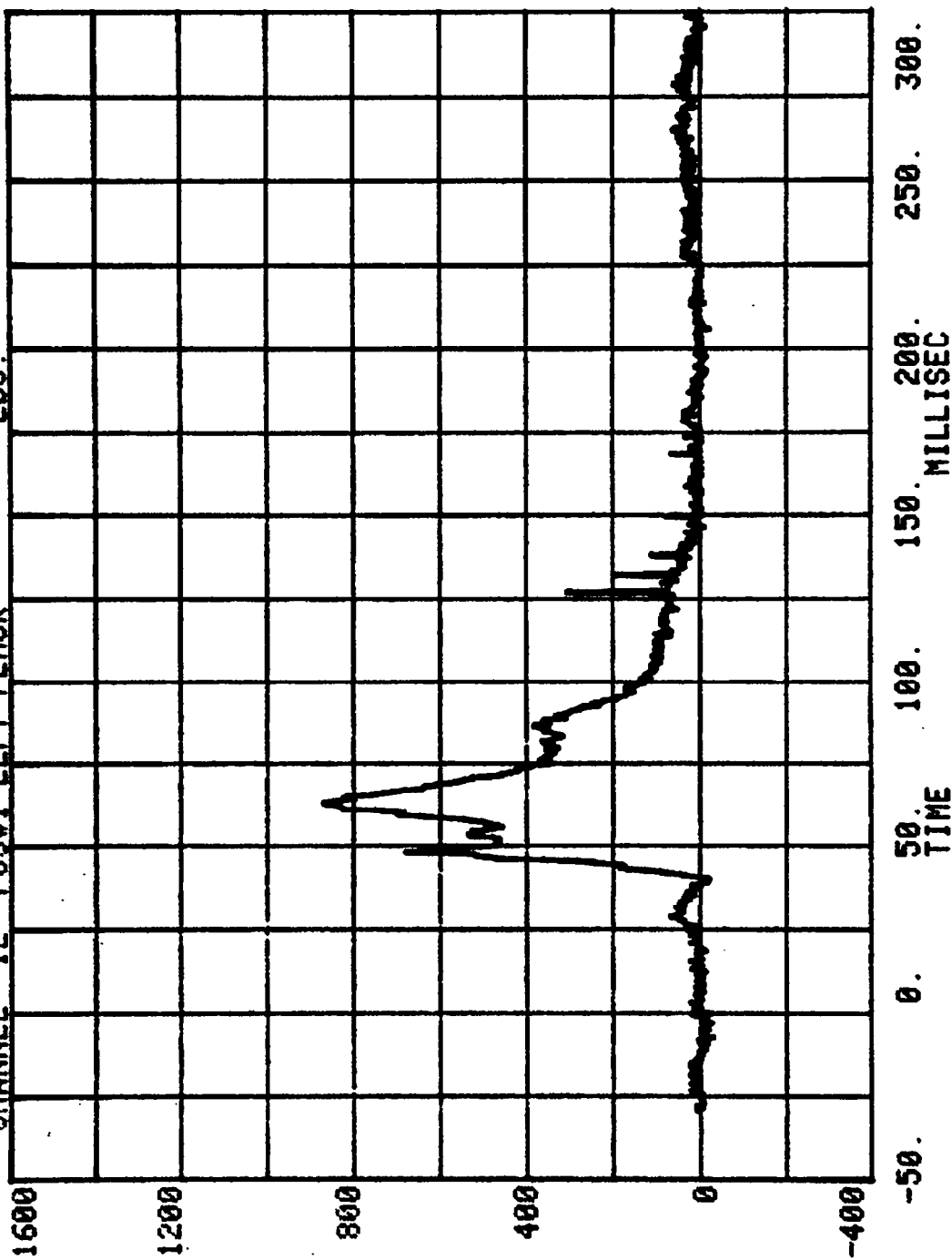
CHANNEL 11 POS#1 RIGHT FEMUR LBS.

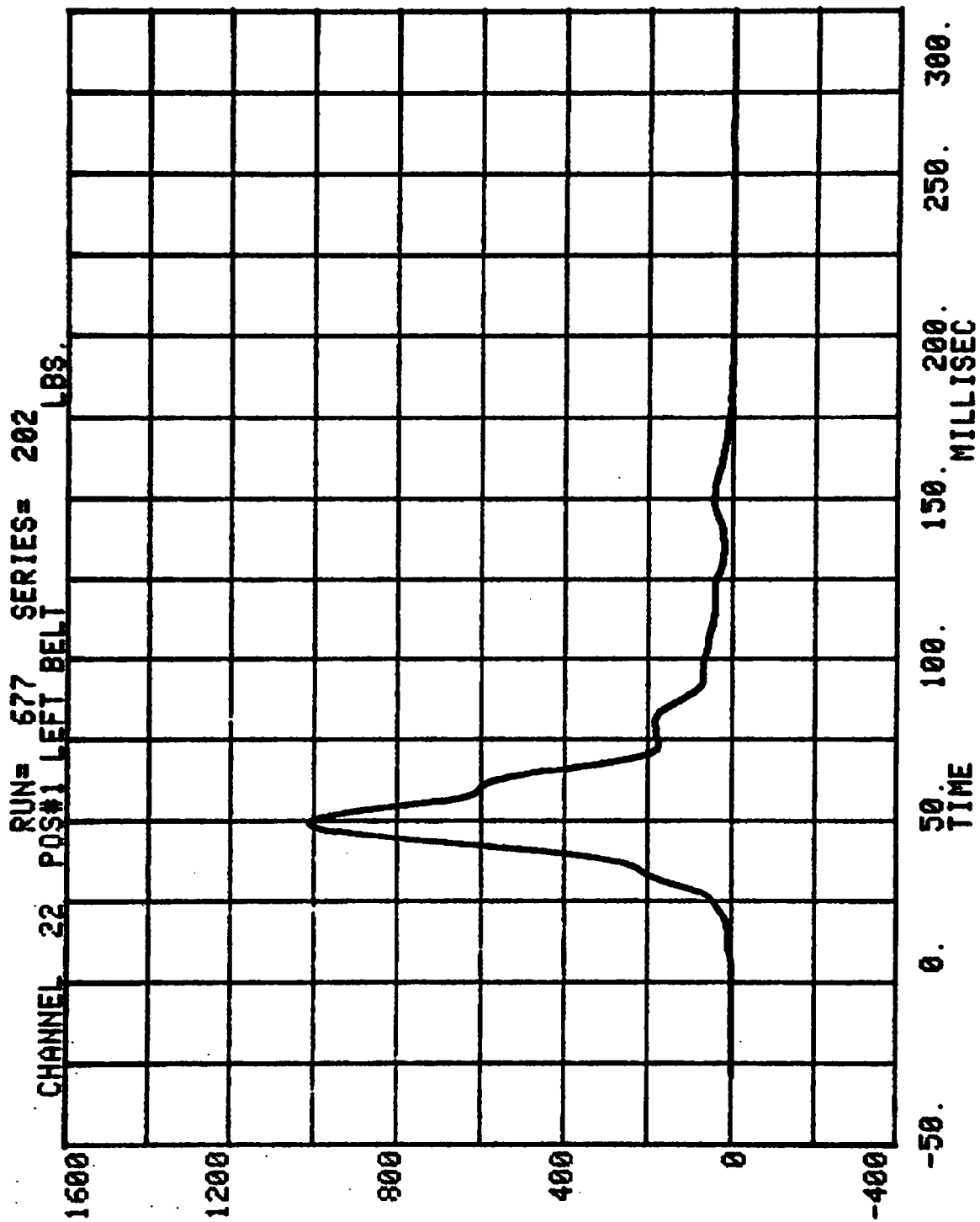
RUN= 677 SERIES= 202

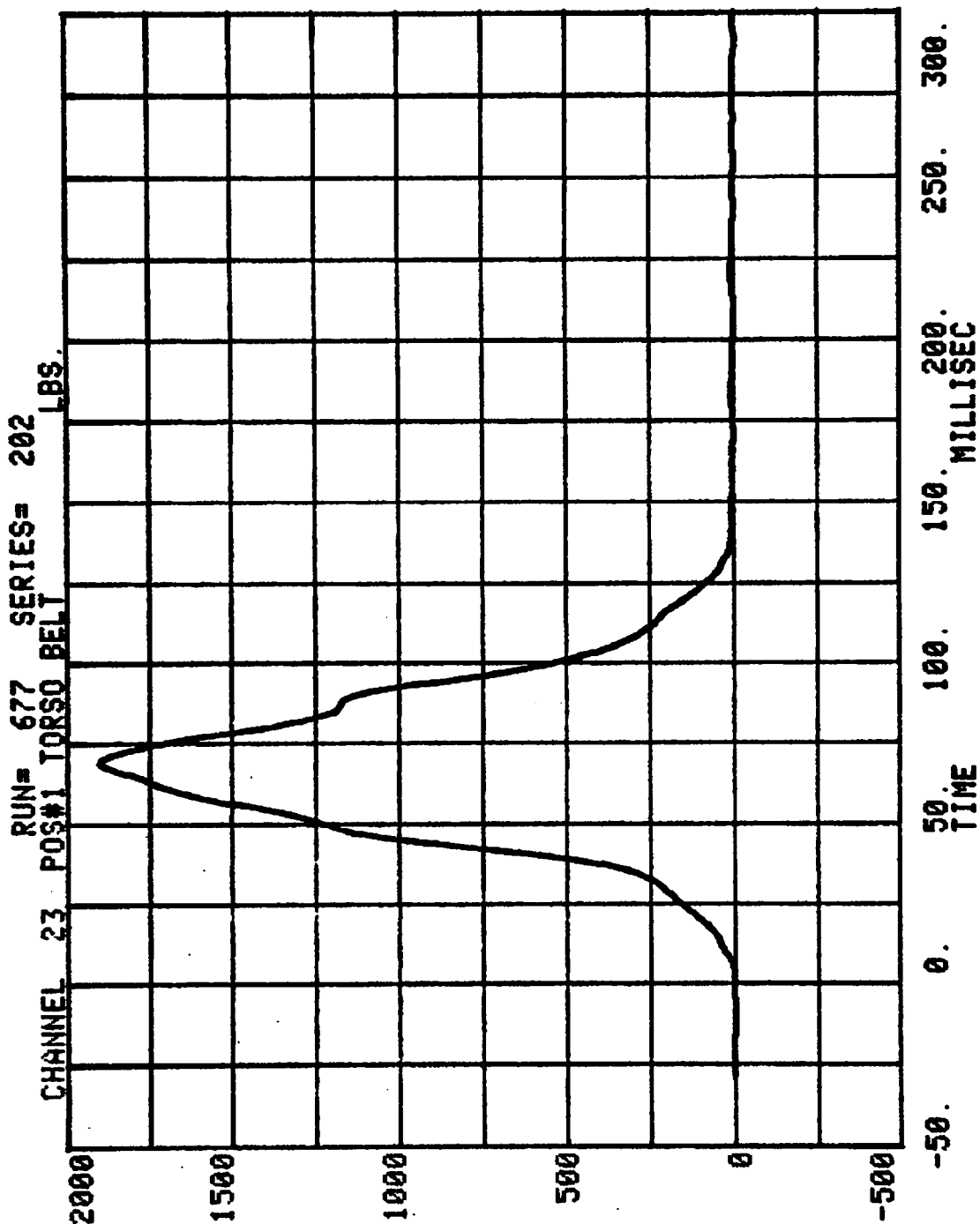


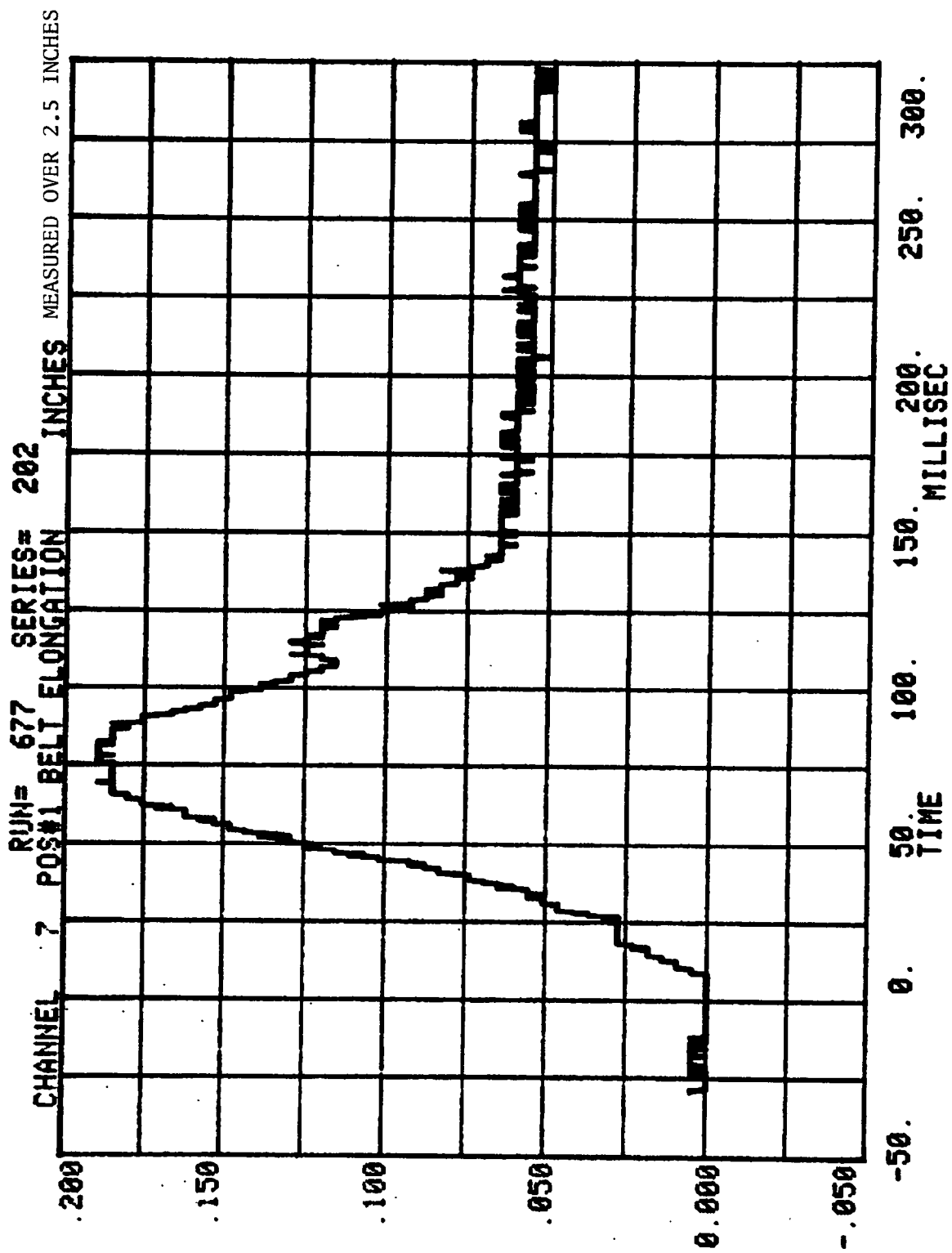
CHANNEL 12 POS#1 LEFT FEMUR LBS.

RUN= 677 SERIES= 202



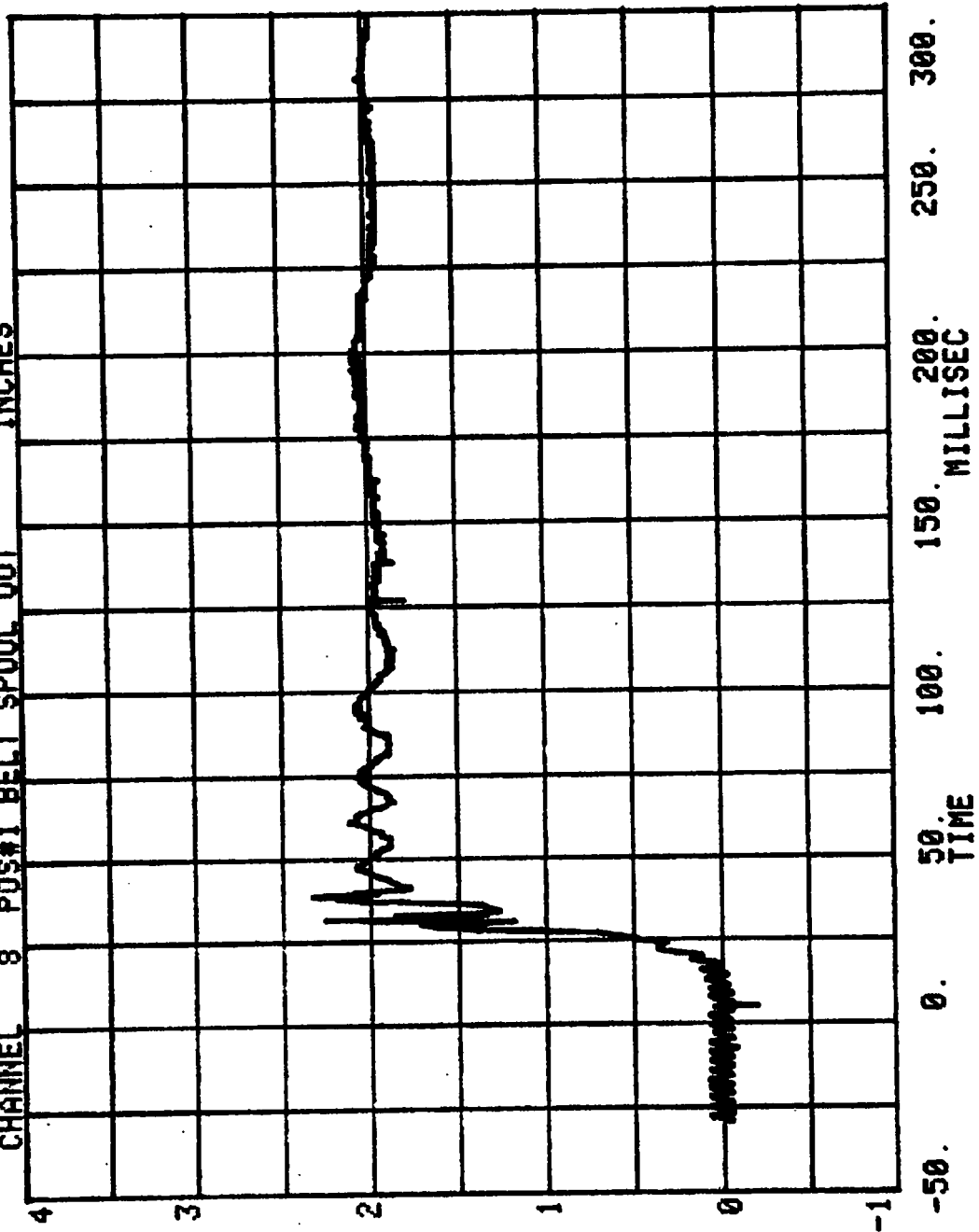






CHANNEL 8 POS#1 BELT SPOOL OUT

RUN= 677 SERIES= 202 INCHES



HEAD INJURY CRITERION
HEAD SEVERITY INDEX

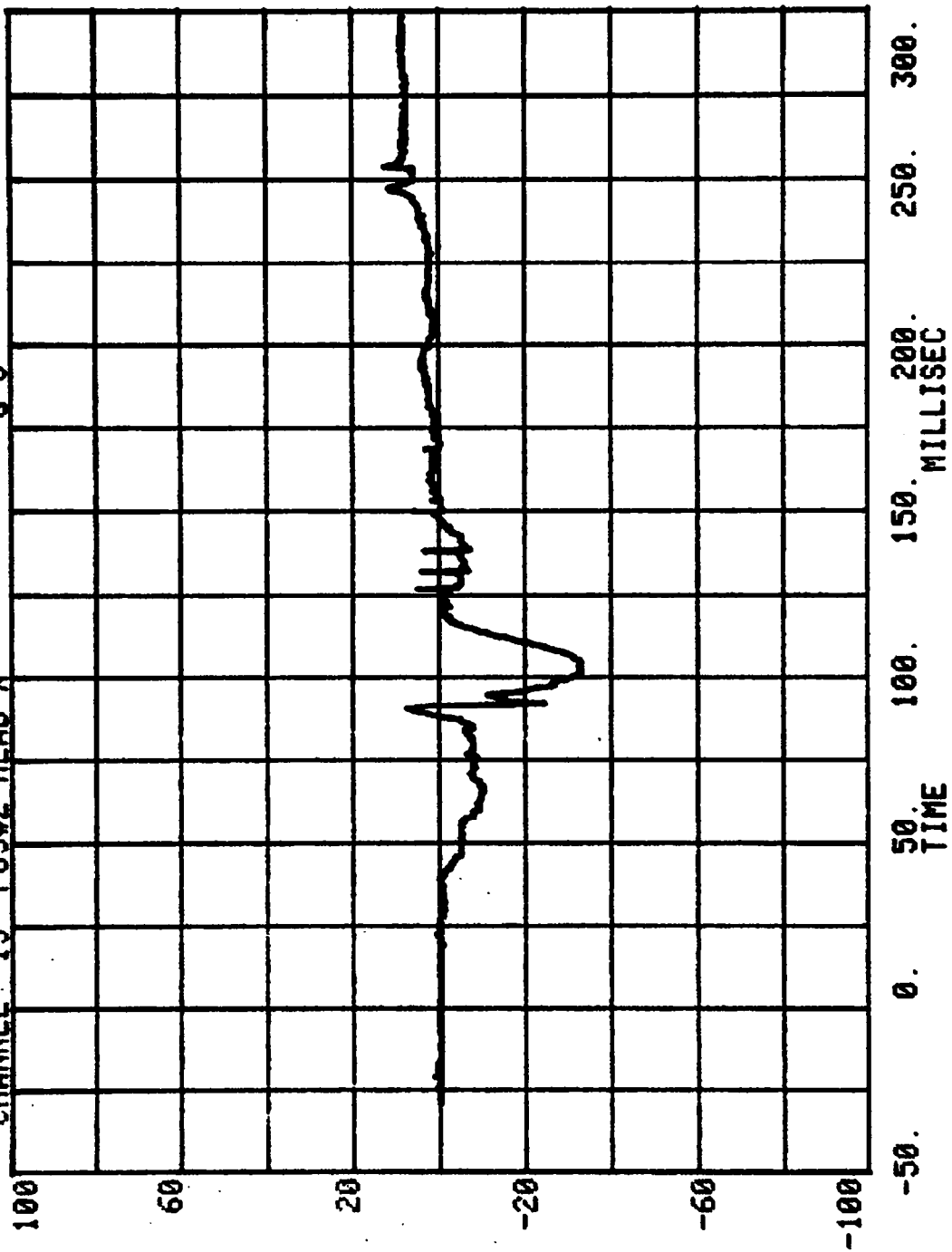
CAR TO LOAD CELL BARRIER

RUN= 677

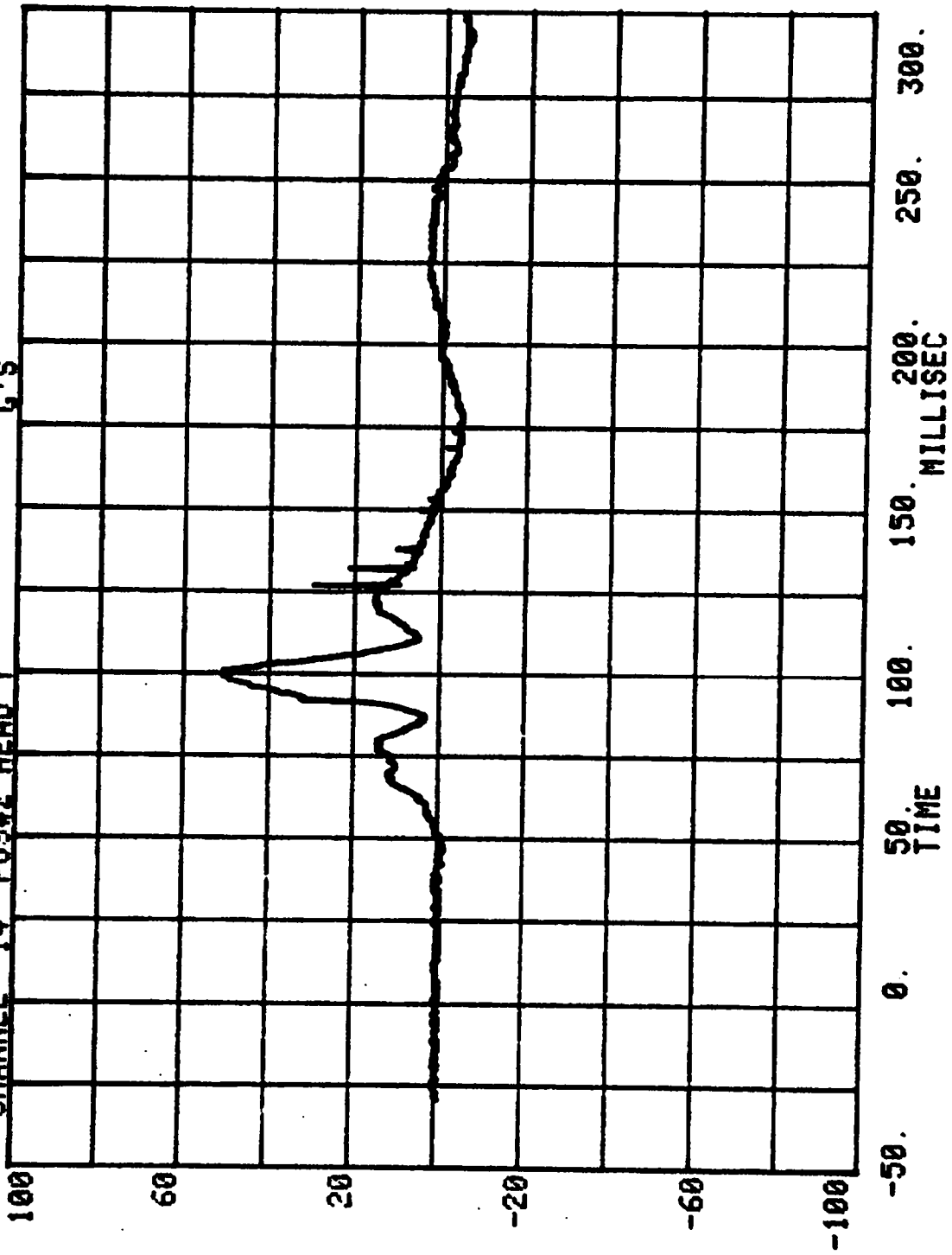
POS#2 HEAD RESULTANT

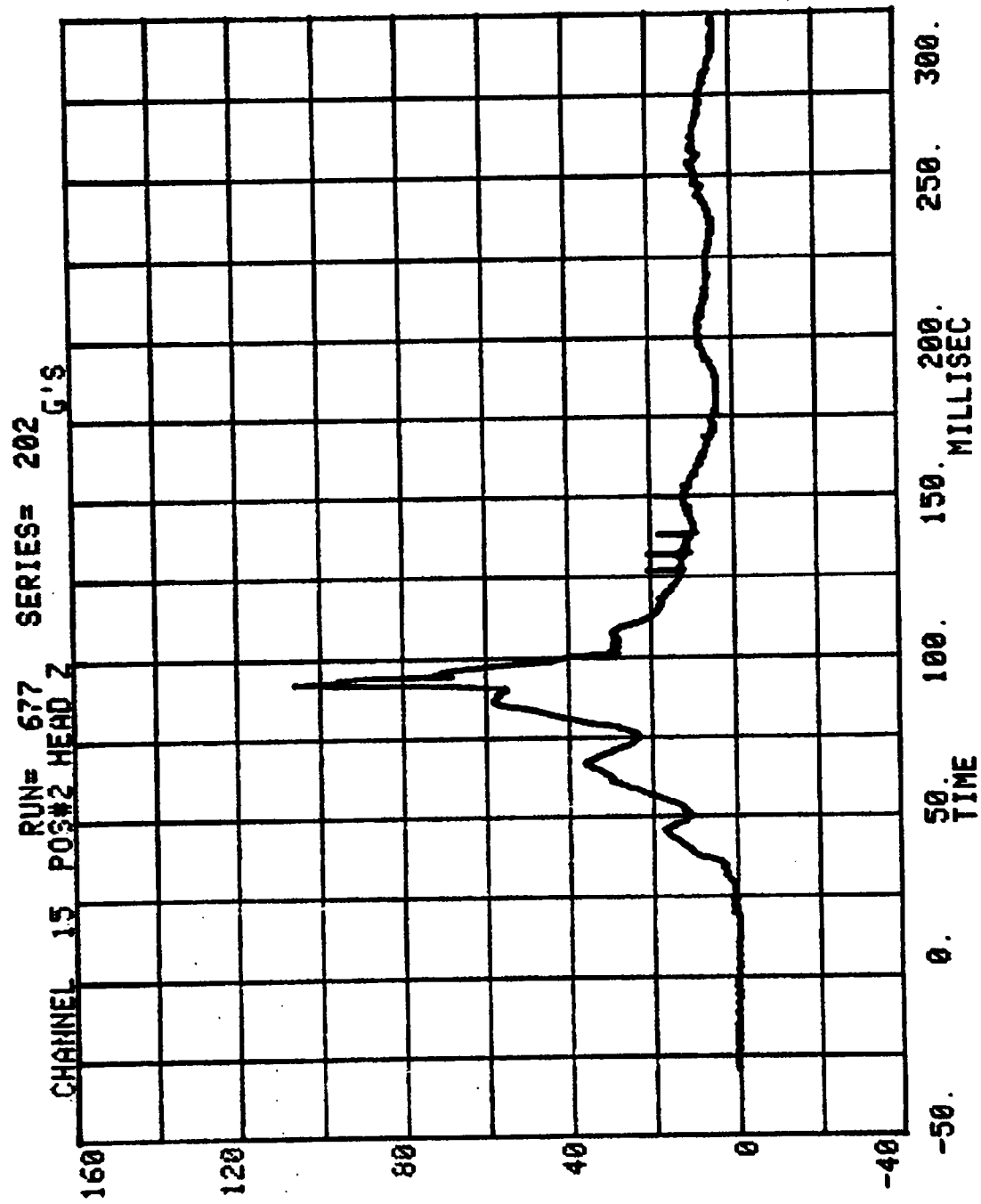
HIC= 931.7 FROM T1= .07980 TO T2= .10920
AVERAGE ACCELERATION BETWEEN T1 AND T2= 63.2G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=1344.4

CHANNEL 13 POS#2 HEAD X
RUN= 677 SERIES= 202 G'S



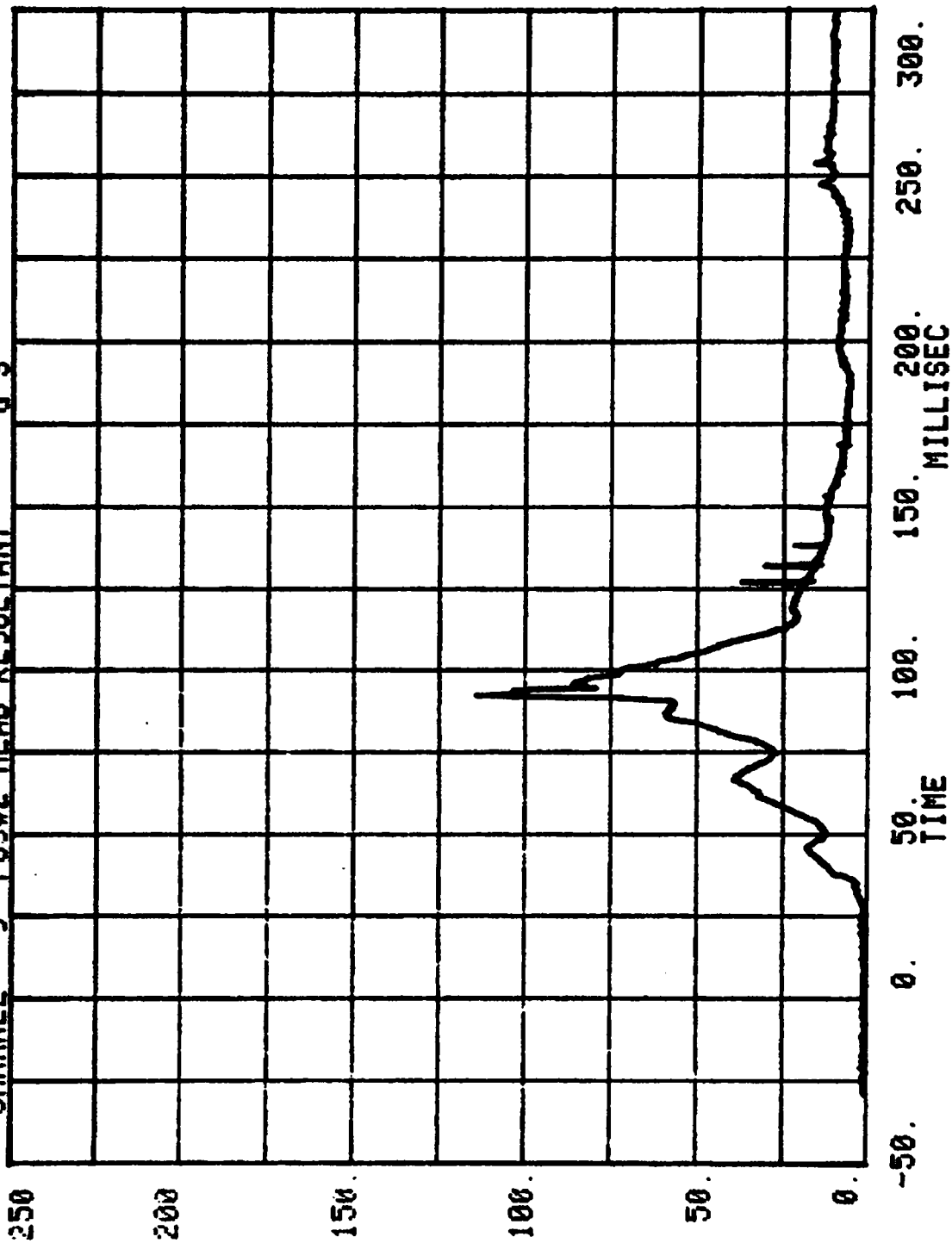
CHANNEL 14 POS#2 HEAD Y RUN= 677 SERIES= 202 G'S



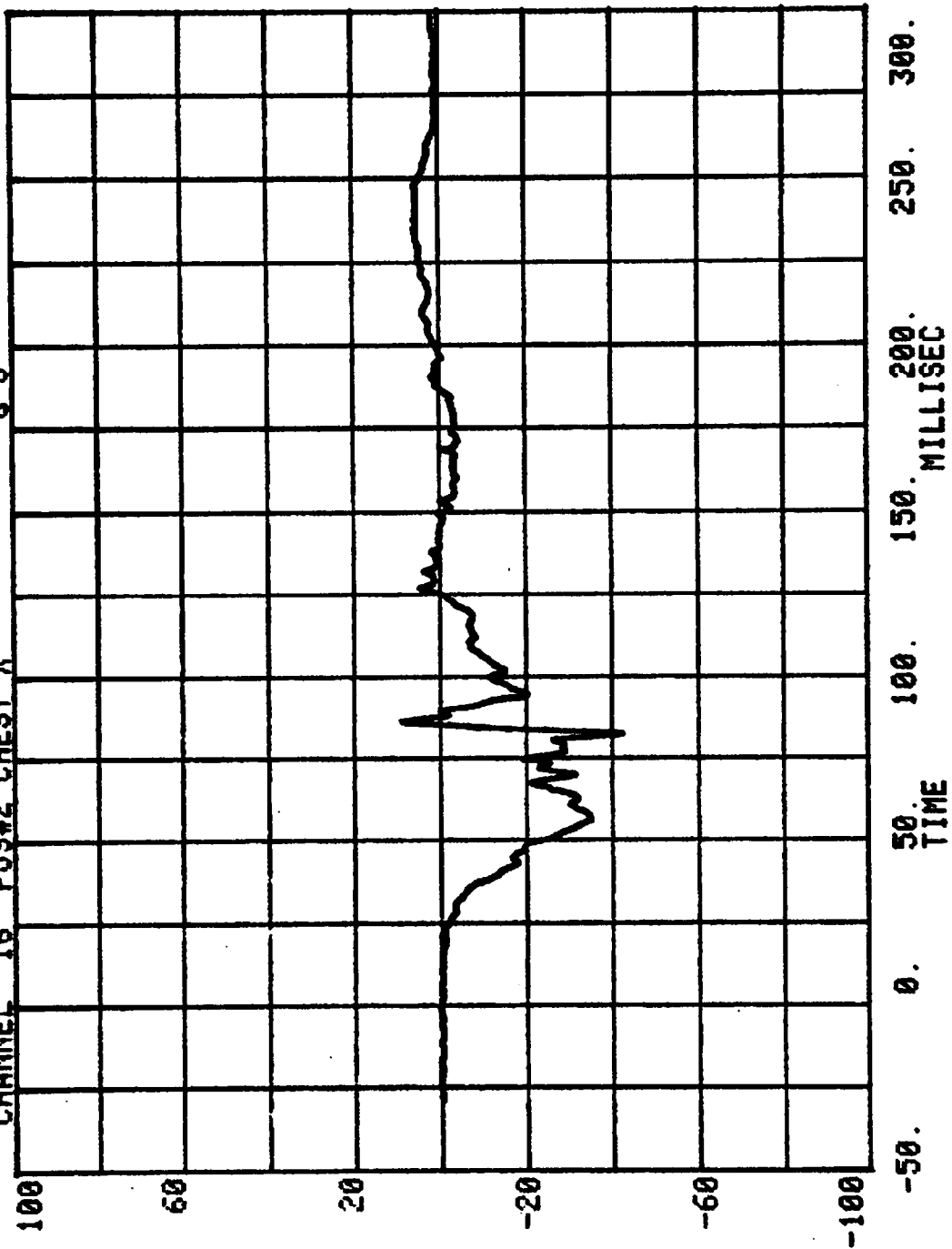


CHANNEL 3 POS#2 HEAD RESULTANT G'S

RUN= 677 SERIES= 202

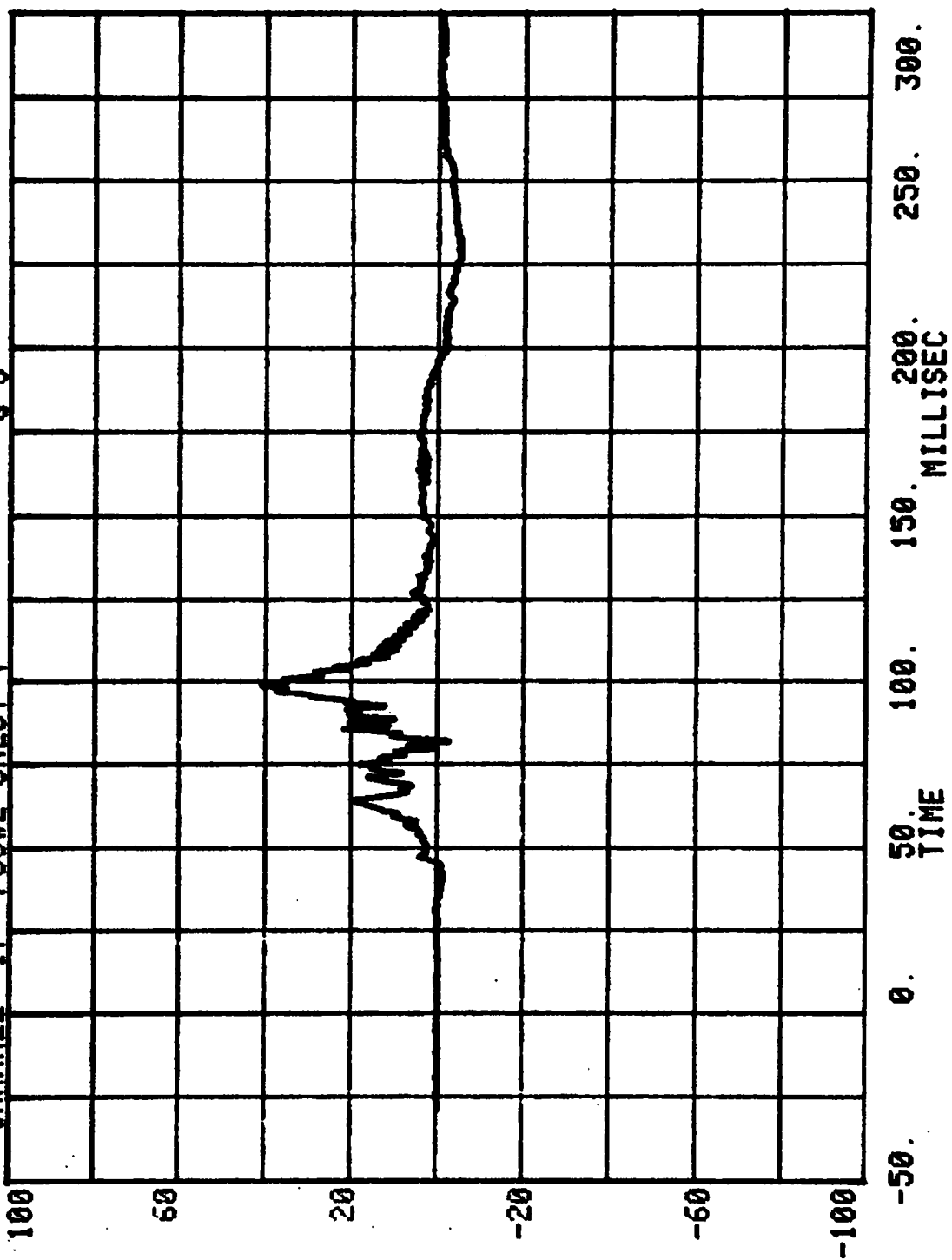


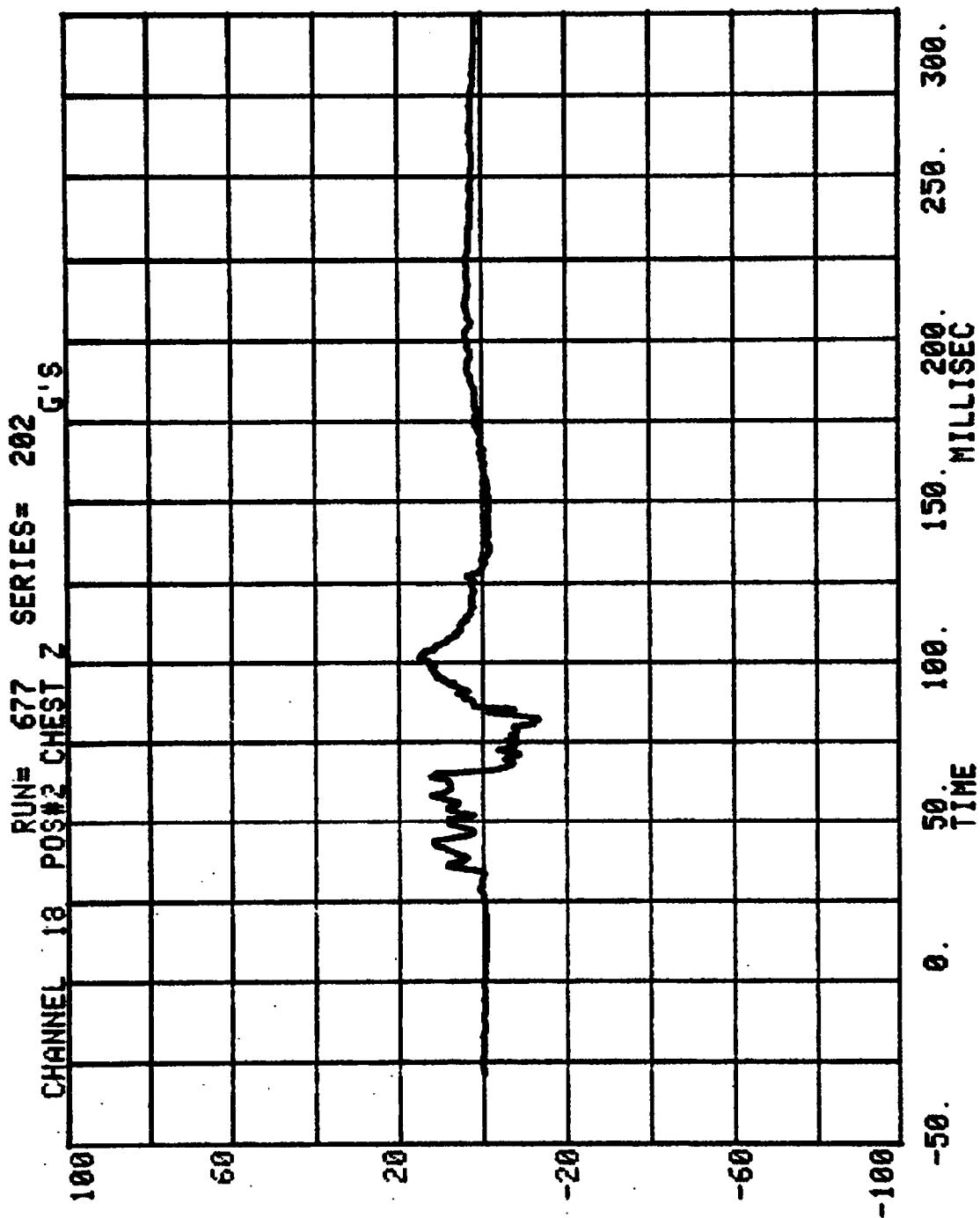
CHANNEL 16 POS#2 CHEST X
RUN= 677 SERIES= 202 G'S



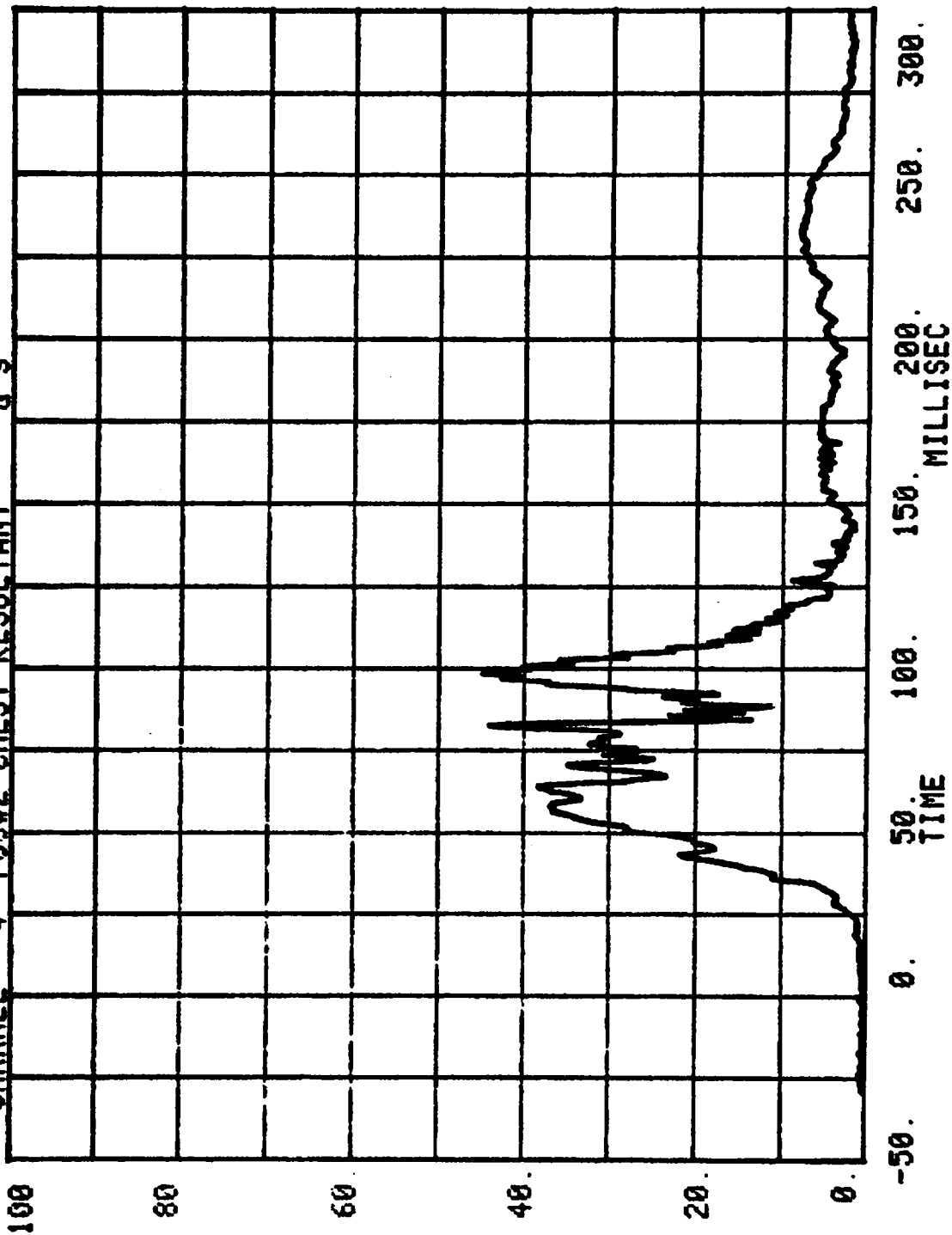
CHANNEL 17 POS#2 CHEST Y G'S

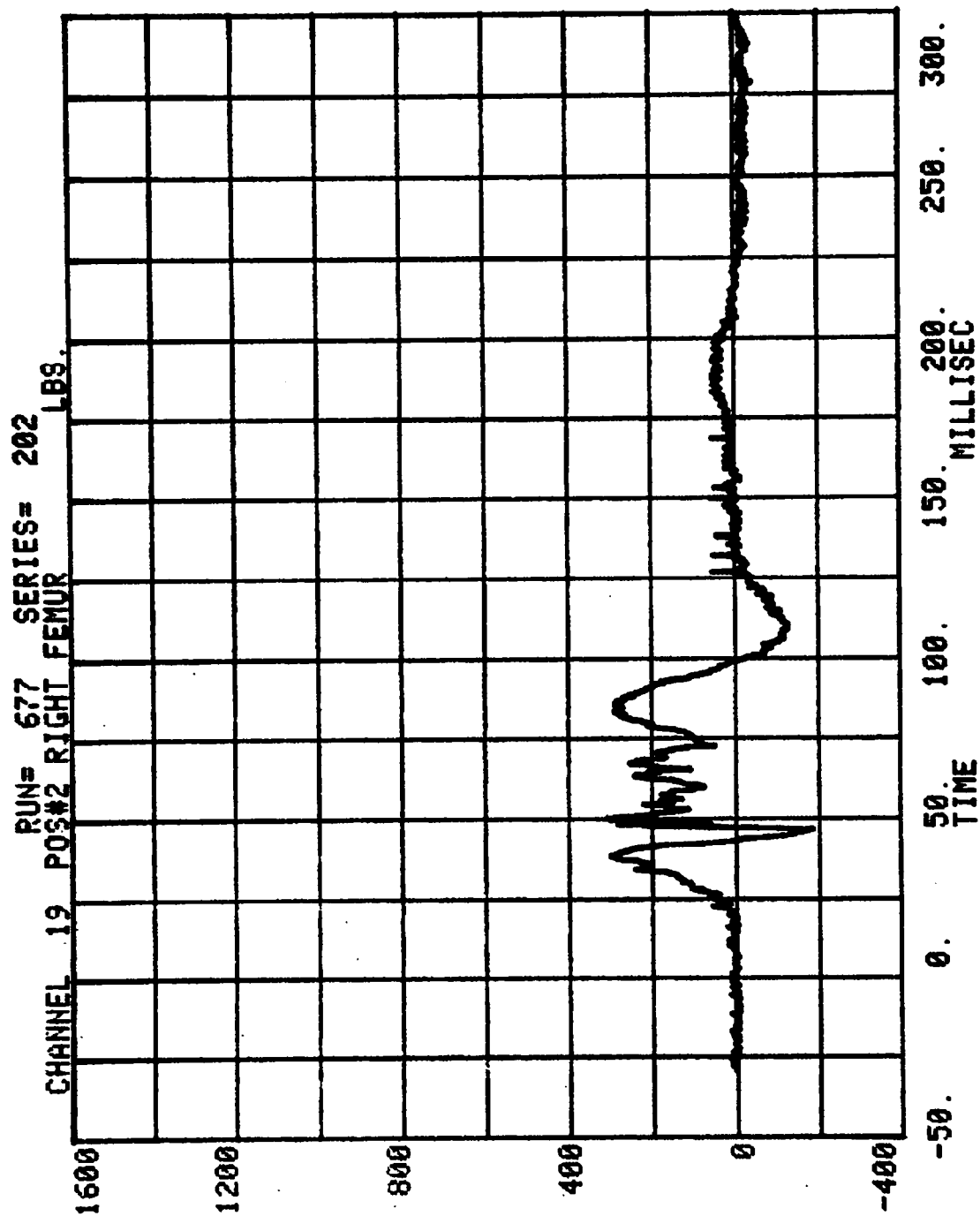
RUN= 677 SERIES= 202



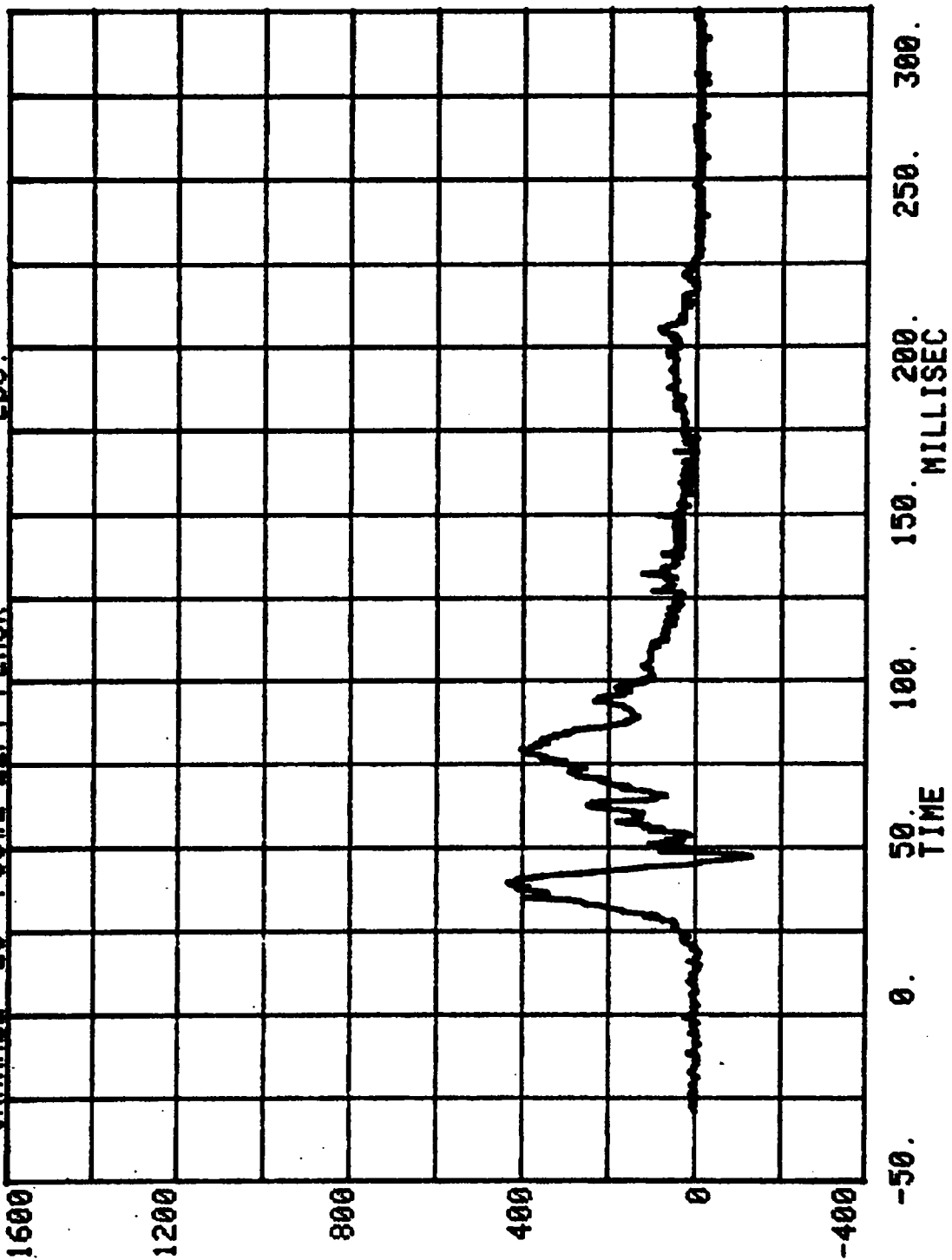


CHANNEL 4 RUN# 677 SERIES= 202
POS#2 CHEST RESULTANT G'S

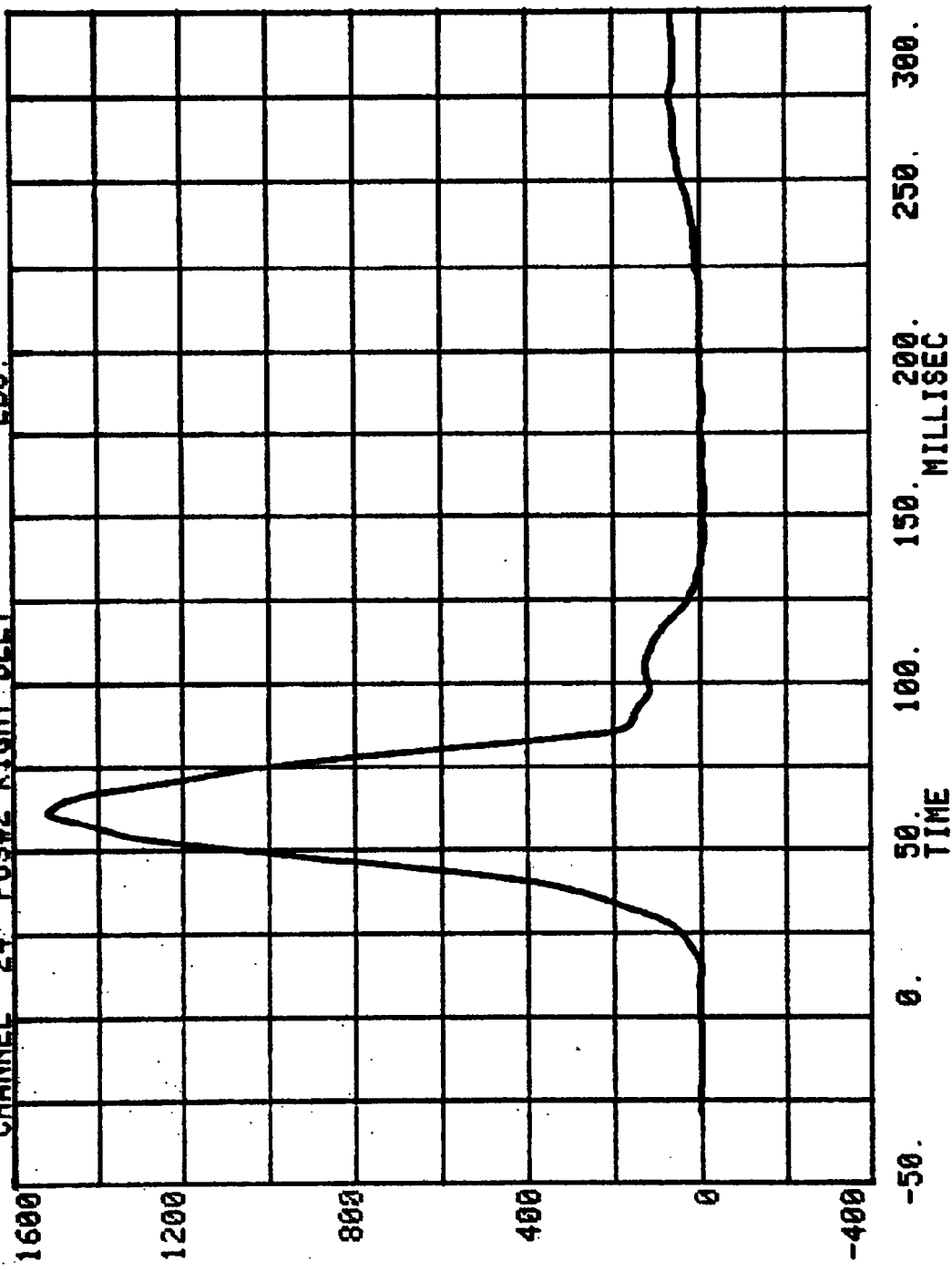




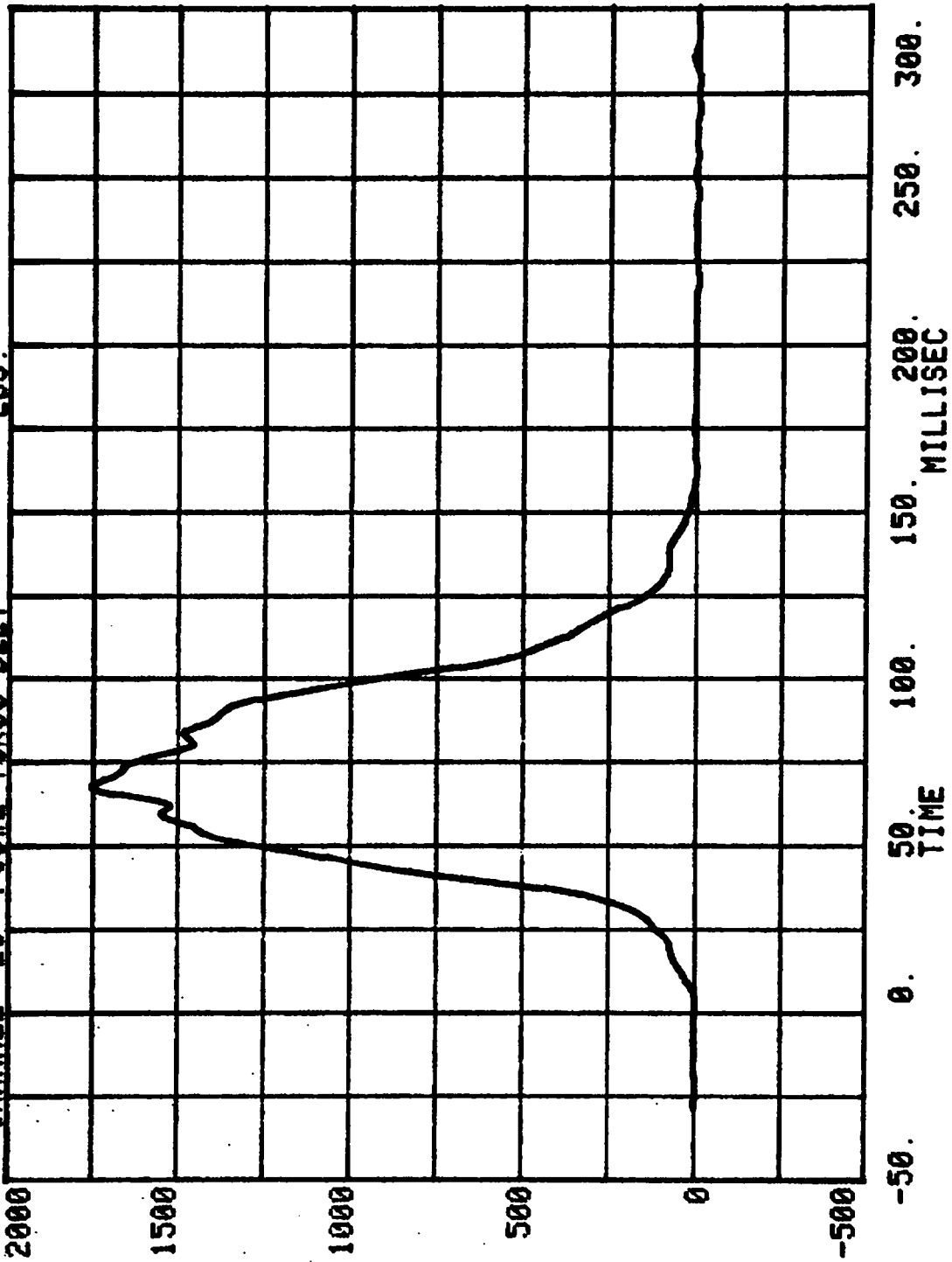
RUN= 677 SERIES= 202 LBS.
CHANNEL 20 POS#2 LEFT FEMUR



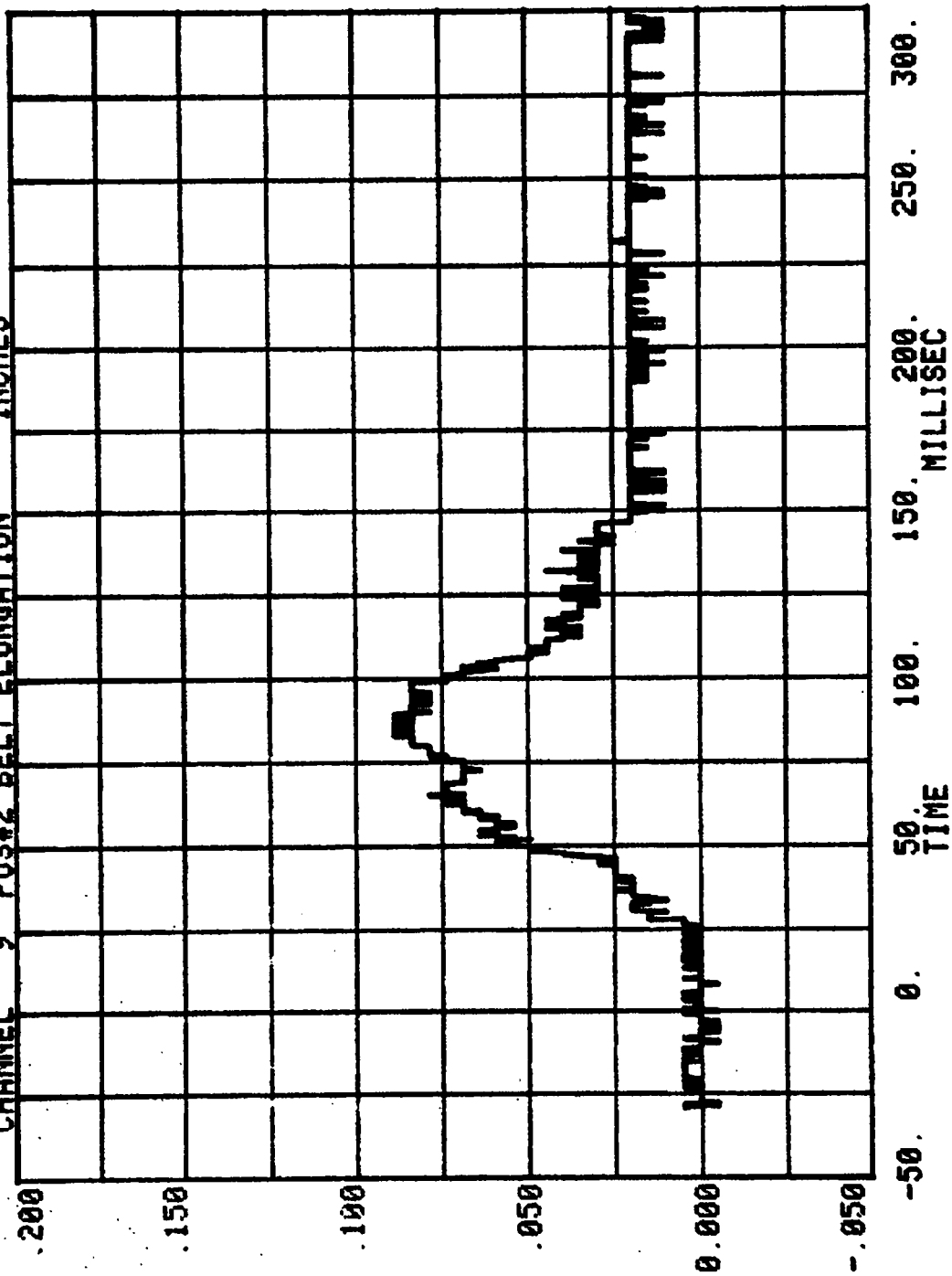
CHANNEL 24 POS#2 RIGHT BELT
RUN= 677 SERIES= 202 LBS.



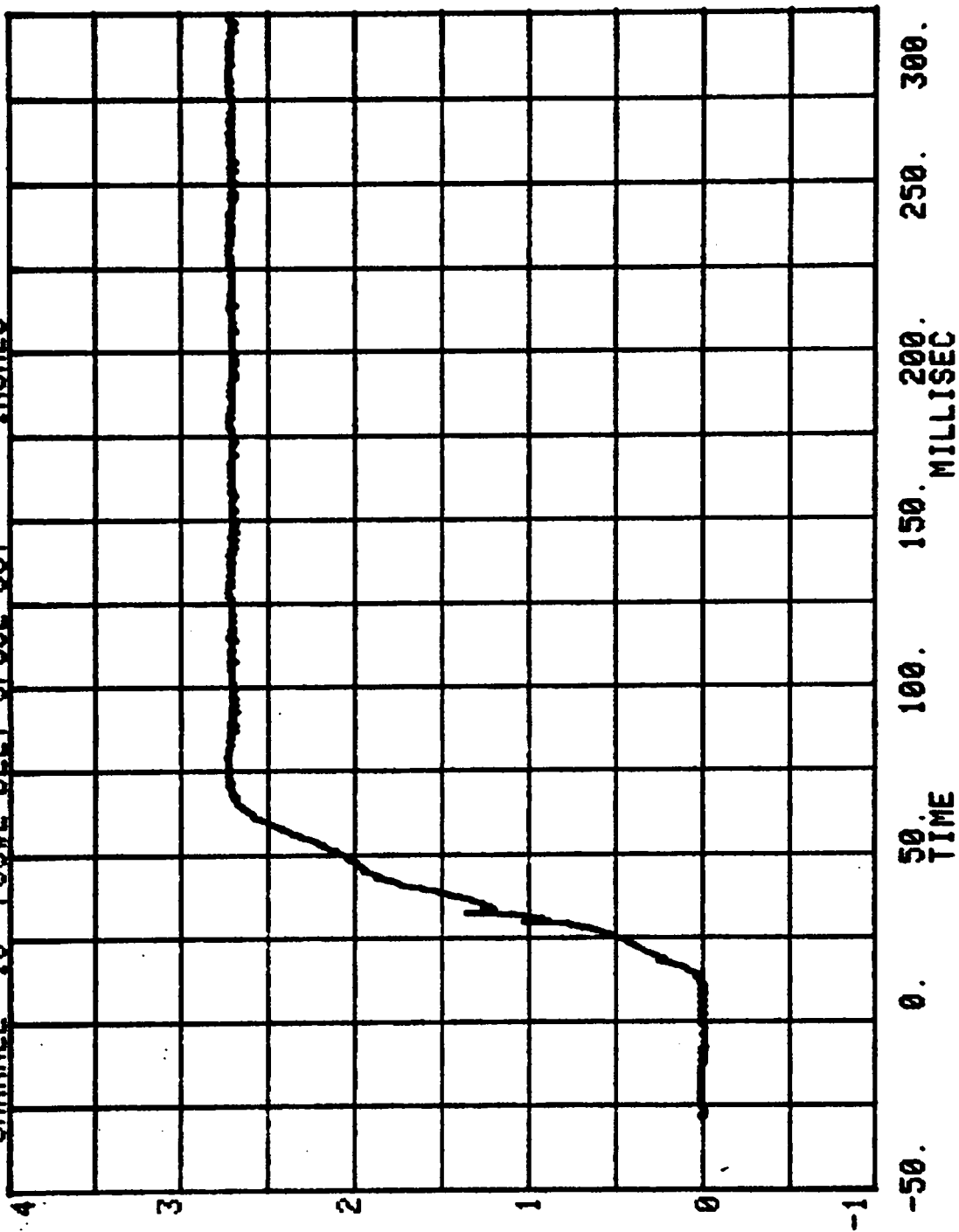
CHANNEL 26 POS#2 TORSO BELT LBS.
RUN= 677 SERIES= 202



RUN= 677 SERIES= 202
CHANNEL 2 POS#2 BELT ELONGATION INCHES



RUN= 677 SERIES= 202
CHANNEL 10 POS#2 BELT SPOOL OUT 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>
1020	2/19/85
1022	2/21/85

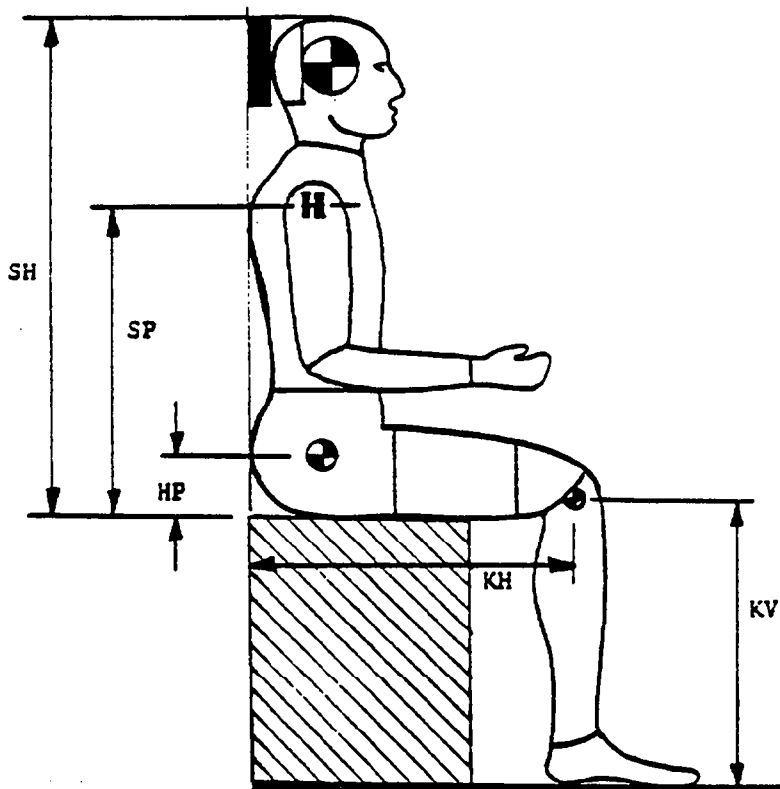
Electronic Test Equipment

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.

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NO.: 1020

I. CONFIGURATION VERIFICATION DATA:



	P.572 SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
DATE OF CONFIGURATION VERIFICATION		2/19/85	
VERIFICATION NUMBER FOR DUMMY*		2	
SH - Seated Height- - - - -	35.6 to 35.8"	35.6"	
SP - Shoulder Pivot Height- - -	21.8 to 22.4"	22.0"	
HP - Hip Pivot Height - - - - -	3.9" ref.	3.9"	
KH - Knee Pivot from back line- -	20.1 to 20.7"	20.6"	
KV - Knee Pivot from floor- - -	19.3 to 19.9"	19.6"	
SW - Shoulder Width - - - - -	17.8 to 18.4"	17.9"	
HW - Hip Width- - - - -	14.0 to 15.4"	14.6"	

TECHNICIAN'S NAME: G. Gestwick

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

DUMMY CONFIG. & PERF. VERIF. DATA....Continued:

II. PERFORMANCE VERIFICATION DATA:

NHTSA DUMMY I.D. NO.: 1020

TECHNICIAN'S NAME: G. Gestwick

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION-----		2/25/85	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY*-----		2	
VERIF. LAB. TEMPERATURE (66 to 78°F Range)-----		68° - 70° °F.	°F.
VERIF. LAB. HUMIDITY (10 to 70% Range)		22% - 37% %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST--			
a. Peak Resultant Accel.-	210 to 260G	250 g	
b. Peak Lateral Accel.-	≤ - 10G	6 g	
c. Time above 100G- - -	0.9 to 1.5ms	1.2 ms	
2. NECK BENDING TEST--			
a. Pendulum Speed - - -	21.5 to 25.5 fps	23.7 fps	
b. Pend. Avg. Decel. over t ₃ - t ₂	20 to 24G	23.5 g	
c. Peak Resultant Head Acceleration - - - -	26G max.	26 g	
d. Pendulum Decel.(t ₂ -t ₁)	≤ - 3ms	2.5 ms	
e. Pendulum Decel.(t ₃ -t ₂)	25 to 30 ms	28.1 ms	
f. Pendulum Decel.(t ₄ -t ₃)	≤ - 10ms	5.3 ms	
g. Max. Head Rotation - -	63 to 73°	72°	
h. Chordal Displacement--			
Head Rotation Angle-			
0°	Time- - -2 to 2 ms	0 ms	
	Displ.- -.5 to .5"	0.0"	
30°	Time- - 25.6 to 34.4ms	29.5 ms	
	Displ.- 2.1 to 3.1"	3.1"	
60°	Time- - 40.3 to 51.7ms	43.5 ms	
	Displ.- 4.3 to 5.3"	5.2"	
Maximum (72 °)	Time- - 53.2 to 66.8ms	59 ms	
	Displ.- 5.0 to 6.0"	6.0"	

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

DUMMY CONFIG. & PERF. VERIF. DATA....Continued:

II. PERFORMANCE VERIFICATION DATA (Continued)

NHTSA DUMMY I.D. NO.: 1020

TECHNICIAN'S NAME: G. Gestwick

TEST PARAMETER		SPECIFICATION	Pre-Test (if required)	Post-Test (if required)
2. NECK BENDING TEST....				
<u>Continued:</u>				
h. Chordal Displacement:				
Head Rotation Angle--				
60°	Time	67.0 to 83.0 ms	76 ms	
	Displ.	4.3 to 5.3 in.	5.0"	
30°	Time	85.4 to 104.6 ms	93 ms	
	Displ.	2.1 to 3.1 in.	2.6"	
0°	Time	101.0 to 123.0 ms	107.5 ms	
	Displ.	-.5 to 0.5 in.	0.0"	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ .5" - - - -		23 to 36 lbs.	25 lbs.	
b. Force @ .75" - - - -		36 to 50 lbs.	50 lbs.	
c. Force @ 1.0" - - - -		50 to 63 lbs.	59 lbs.	
d. Force @ 1.5" - - - -		73 to 88 lbs.	85 lbs.	
4. LUMBAR FLEXION TEST:				
a. Force @ 20° - - - -		22 to 34 lbs.	27.5 lbs.	
b. Force @ 30° - - - -		34 to 46 lbs.	35 lbs.	
c. Force @ 40° - - - -		46 to 58 lbs.	46.5 lbs.	
d. Return Angle - - - -		12° maximum	5°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed- - -	21.78-22.22 fps	22.15 fps		
(2) Peak Deflection-	1.7" maximum	1.6"		
(3) Peak Resistive Force- - - - -	2250 lbs. maximum	2175 lbs.		
(4) Internal Hysteresis - - -	50 to 70%	51.1%		
b. Low Speed				
(1) Probe Speed- - -	13.86-14.14 fps	13.87 fps		
(2) Peak Deflection-	1.1" maximum	.9"		
(3) Peak Resistive Force- - - - -	1450 lbs. maximum	1290 lbs.		
(4) Internal Hyster. -	50 to 70%	51.6%		

DUMMY CONFIG. & PERF. VERIF. DATA....Continued:

II. PERFORMANCE VERIFICATION DATA (Continued)

NHTSA DUMMY I.D. NO.: 1020

TECHNICIAN'S NAME: G. Gestwick

TEST PARAMETER	SPECIFICATION	Pre-Test (if required)	Post-Test (if required)
6. KNEE IMPACT TESTS:			
a. Right Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.97 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2350 lbs.	
(3) Time Above 1000g-	1.7 ms minimum	1.75 ms	
b. Left Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.92 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2050 lbs.	
(3) Time Above 1000g-	1.7 ms minimum	2.0 ms	

REMARKS:

INSTRUMENT CALIBRATION INFORMATION

HTSA DUMMY ID NO. 1020

CALIB. SEQ. NOS. FOR DUMMY: 2

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 - - - - -

CALIB. LAB. INSTRUMENTS:

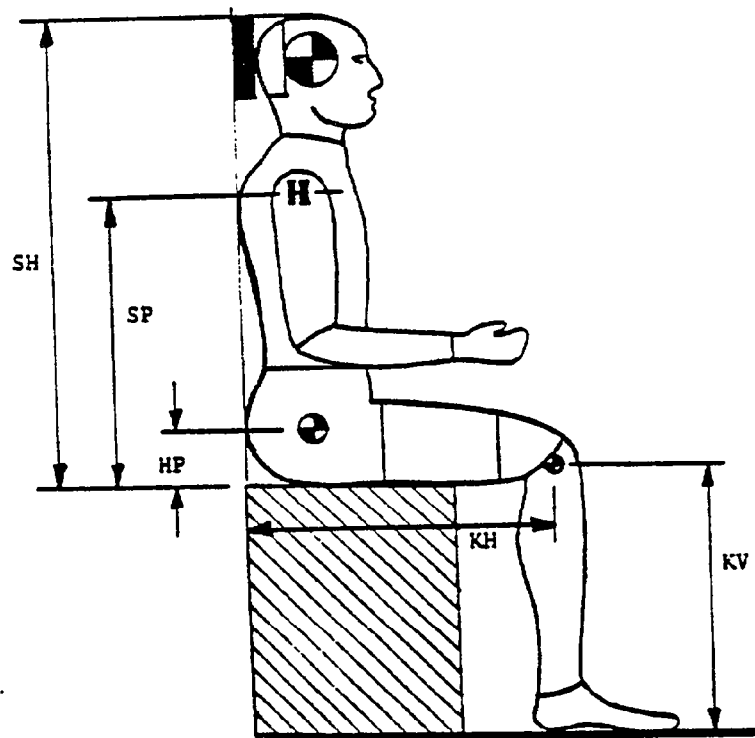
- 1. Pendulum Accelerometer - - -
- 2. Test Probe Accelerometer - - -
- 3. Lumbar Flexion Test Push
Force Gauge - - - - -
- 4. Abdominal Compression Test
Force Gauge - - - - -
- 5. Abdominal Compression Test
Displacement Gauge - - - - -

<u>MANUFACTURER</u>	<u>SERIAL NUMBER</u>	<u>DATE LAST CALIBRATED</u>	<u>DATE OF NEXT CALIBRATION</u>
Endevco	CJ22	10-84	4-85
Endevco	CS41	10-84	4-85
Endevco	CH21	10-84	4-85
CEC	22960	10-84	4-85
Endevco	CE06	10-84	4-85
CEC	22703	10-84	4-85
Ohmite	7915	1-85	7-85
GSE	76	10-84	4-85
GSE	77	10-84	4-85
CEC	19965	1-85	7-85
CEC	25184	1-85	7-85
Transducer Inc.	20051	1-85	7-85
BLH	72952	1-85	7-85
CIC	567-11	1-85	7-85

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NO.: 1022

I. CONFIGURATION VERIFICATION DATA:



	P.572 SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
DATE OF CONFIGURATION VERIFICATION		2/21/85	
VERIFICATION NUMBER FOR DUMMY*		3	
SH - Seated Height- - - - -	35.6 to 35.8"	35.7"	
SP - Shoulder Pivot Height- - -	21.8 to 22.4"	22.0"	
HP - Hip Pivot Height - - - - -	3.9" ref.	3.9"	
KH - Knee Pivot from back line- -	20.1 to 20.7"	20.6"	
KV - Knee Pivot from floor- - -	19.3 to 19.9"	19.7"	
SW - Shoulder Width - - - - -	17.8 to 18.4"	17.9"	
HW - Hip Width- - - - -	14.0 to 15.4"	14.8"	

TECHNICIAN'S NAME: G. Gestwick

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

DUMMY CONFIG. & PERF. VERIF. DATA....Continued:

II. PERFORMANCE VERIFICATION DATA:

NHTSA DUMMY I.D. NO.: 1022

TECHNICIAN'S NAME: G. Gestwick

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION-----		2/25/85	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY*-----		3	
VERIF. LAB. TEMPERATURE (66 to 78°F Range)-----		68° - 70° °F.	°F.
VERIF. LAB. HUMIDITY (10 to 70% Range)		22% - 37% %	%
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 1.5ms	1.2 ms	
2. NECK BENDING TEST--			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	23.1 fps	
b. Pend. Avg. Decel. over t ₃ - t ₂	20 to 24G	24 g	
c. Peak Resultant Head Acceleration - - - - -	26G max.	25 g	
d. Pendulum Decel.(t ₂ -t ₁)	≤ - 3ms	2.2 ms	
e. Pendulum Decel.(t ₃ -t ₂)	25 to 30 ms	28.4 ms	
f. Pendulum Decel.(t ₄ -t ₃)	≤ - 10ms	5.3 ms	
g. Max. Head Rotation - -	63 to 73°	70°	
h. Chordal Displacement--			
Head Rotation Angle-			
0°	Time- -	-2 to 2 ms	0 ms
	Displ.-	-.5 to .5"	0.0"
30°	Time- -	25.6 to 34.4ms	29 ms
	Displ.-	2.1 to 3.1"	3.0"
60°	Time- -	40.3 to 51.7ms	44 ms
	Displ.-	4.3 to 5.3"	5.1"
Maximum (70 °)	Time- -	53.2 to 66.8ms	58 ms
	Displ.-	5.0 to 6.0"	5.8"

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

DUMMY CONFIG. & PERF. VERIF. DATA....Continued:

II. PERFORMANCE VERIFICATION DATA (Continued)

NHTSA DUMMY I.D. NO.: 1022

TECHNICIAN'S NAME: G. Gestwick

TEST PARAMETER		SPECIFICATION	Pre-Test (if required)	Post-Test (if required)
2. NECK BENDING TEST....				
<u>Continued:</u>				
h. Chordal Displacement:				
Head Rotation Angle--				
60°	Time	67.0 to 83.0 ms	73.5 ms	
	Displ.	4.3 to 5.3 in.	5.0"	
30°	Time	85.4 to 104.6 ms	91 ms	
	Displ.	2.1 to 3.1 in.	2.6"	
0°	Time	101.0 to 123.0 ms	106 ms	
	Displ.	-.5 to 0.5 in.	0.0"	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ .5" - - - -		23 to 36 lbs.	26 lbs.	
b. Force @ .75" - - - -		36 to 50 lbs.	41 lbs.	
c. Force @ 1.0" - - - -		50 to 63 lbs.	57 lbs.	
d. Force @ 1.5" - - - -		73 to 88 lbs.	80 lbs.	
4. LUMBAR FLEXION TEST:				
a. Force @ 20° - - - -		22 to 34 lbs.	29.5 lbs.	
b. Force @ 30° - - - -		34 to 46 lbs.	37.5 lbs.	
c. Force @ 40° - - - -		46 to 58 lbs.	47.5 lbs.	
d. Return Angle - - - -		12° maximum	7°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed- - -		21.78-22.22 fps	22.18 fps	
(2) Peak Deflection-		1.7" maximum	1.62"	
(3) Peak Resistive Force- - - - -		2250 lbs. maximum	2175 lbs	
(4) Internal Hysteresis - - -		50 to 70%	53.6%	
b. Low Speed				
(1) Probe Speed- - -		13.86-14.14 fps	14.02 fps	
(2) Peak Deflection-		1.1" maximum	.98"	
(3) Peak Resistive Force- - - - -		1450 lbs. maximum	1295 lbs	
(4) Internal Hyster.-		50 to 70%	55.4%	

DUMMY CONFIG. & PERF. VERIF. DATA....Continued:

II. PERFORMANCE VERIFICATION DATA (Continued)

NHTSA DUMMY I.D. NO.: 1022

TECHNICIAN'S NAME: G. Gestwick

TEST PARAMETER	SPECIFICATION	Pre-Test (if required)	Post-Test (if required)
6. <u>KNEE IMPACT TESTS:</u>			
a. Right Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.03 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2400 lbs.	
(3) Time Above 1000g--	1.7 ms minimum	1.9 ms	
b. Left Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.89 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2075 lbs.	
(3) Time Above 1000g--	1.7 ms minimum	2.0 ms	

REMARKS:

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
NA			
Endevco	CL60	10-84	4-85
	CG34	10-84	4-85
	CN24	10-84	4-85
NA			
CEC	18341	10-84	4-85
Endevco	CN64	10-84	4-85
CEC	22705	10-84	4-85
Ohmite	7915	1-85	7-85
GSE	548	10-84	4-85
GSE	549	10-84	4-85
CEC	19965	1-85	7-85
CEC	25184	1-85	7-85
Transducer	20051	1-85	7-85
BLH	72952	1-85	7-85
CIC	567-11	1-85	7-85

APPENDIX D

VEHICLE ' OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

BEFORE DRIVING YOUR VEHICLE

OCCUPANT RESTRAINT SYSTEMS

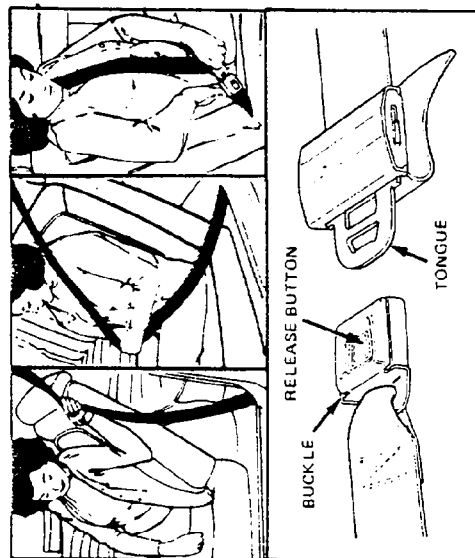
Ford Motor Company recommends that you always "buckle up". In some areas seat belt use is required by law.

WARNING — All vehicle occupants should wear their seat belts for maximum protection 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.



BEFORE DRIVING YOUR VEHICLE

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 comfort regulator 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 regulator feature.

Adjustment Procedure

To set the comfort regulator, the shoulder belt initially should be positioned against the chest. If the belt is not snug, the comfort regulator 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.

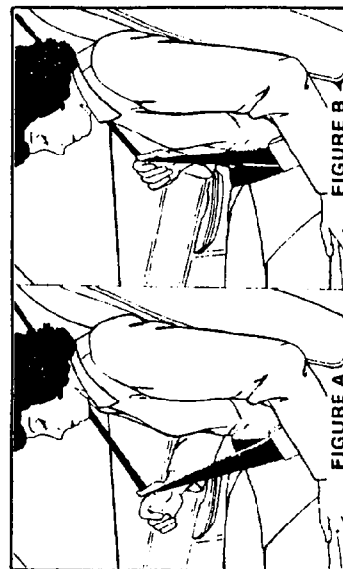


Figure B — Now the belt tension may be adjusted by pulling down slightly on the shoulder belt and releasing. The least amount of slack needed to relieve tension, but not more than 1½ inches (3.8 cm), should be chosen when using the comfort regulator system.

BEFORE DRIVING YOUR VEHICLE

- 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 comfort regulator will release automatically, 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.

Rear Seat Entry (2-Door Models)

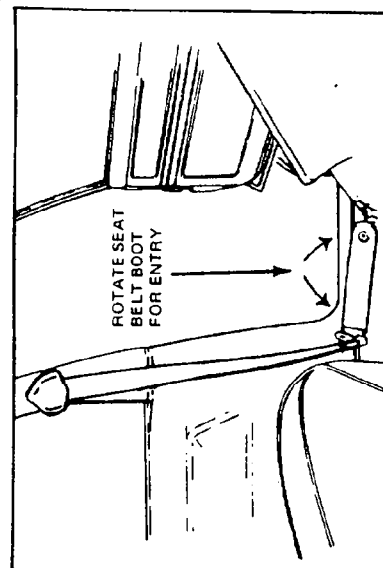


Figure 14 VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS