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REPORT NO. CAL-85-N02

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

MITSUBISHI MOTOR CORPORATION
1985 DODGE COLT
4-DOOR HATCHBACK

NHTSA NO. CF0301
CALSPAN TEST NO. 7333-3

CALSPAN CORPORATION
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FINAL REPORT

Prepared for:

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16. Abstract A frontal load cell barrier test of a 1985 Dodge Colt 4-door hatchback was performed at the Calspan Corporation, Advanced Technology Center crash test facility in Buffalo, New York, on January 16, 1985. Impact speed was 34.82 mph, and the ambient temperature at the barrier face at the time of impact was 22°F. The maximum post-test vehicle crush was 21.3 inches. The test vehicle appeared to comply with the indicant requirements of the following Federal Motor Vehicle Safety Standards. 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> Three-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 CF0301

A load cell barrier consisting of 36 load cells was impacted by a 1985 Dodge Colt 4-door hatchback at a velocity of 34.82 mph. The test was performed at the Calspan Corporation Advanced Technology Center on January 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 1021) had been used in a previous test (CF0105) and the Injury Criteria were not exceeded in that test. The passenger ATD (Serial 1019) was certified prior to the test. Certification details, along with instrumentation calibration data are found in Appendix C.

The 65 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the steering wheel rim and his HIC was 787.2. The maximum chest deceleration over 3 milliseconds was 42.1 g's and femur loads were 460 and 480 pounds.

The right front passenger HIC was 740.7 and maximum chest deceleration over 3 milliseconds was 31.9 g's. Femur loads were 370 and 1090 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

Vehicle Year/Make/Model/Body Style 1985 Dodge Colt 4-door hatchback

NHTSA No. CF0301 VIN. JP3BA28K2FU400490

Body Color Gray Date of Manufacture 6-84

Engine: 4 cylinders; 89.6 C.I.D.; -- Liters; -- CC
X Gas; -- Diesel; -- Turbocharged
-- Longitudinal; X Transverse

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

Date Received 11/26/84 Odometer Reading; 45 miles
-- 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 31 psi, Rear 31 psi

Recommended Tire Size: P145/80R13

Recommended Cold Tire Pressure: Front 31 psi, Rear 31 psi

Tires on Vehicle: P145/80R13; Manufacture: B. F. Goodrich

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) = 827 lbs. (A)

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

Rated Cargo and Luggage Weight (RCLW) A-B = 77 lbs.

GVWR 3053 lbs. GAWR: Front 1598 lbs. Rear 1455 lbs.

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

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

Right Front = 610 lbs. Right Rear = 430 lbs.
Left Front = 680 lbs. Left Rear = 380 lbs.
TOTAL FRONT WEIGHT = 1290 lbs. (61.4 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 810 lbs. (38.6 % of Total Vehicle Weight)
TOTAL DELIVERY WEIGHT = 2100 lbs.

CALCULATION FOR TARGET TEST WEIGHT

UDW = Unloaded Delivered Weight (2100 lbs.)
VCW = Vehicle Capacity Weight (827 lbs.)
DSC = Designated Seating Capacity (5)
RCLW = VW - 150 (DSC) = 77 lbs.
Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)
Target Test Weight = 2505 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND POUNDS CARGO

Right Front = 720 lbs. Right Rear = 580 lbs.
Left Front = 715 lbs. Left Rear = 600 lbs.
TOTAL FRONT WEIGHT = 1435 lbs. (54.9 % of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1180 lbs. (45.1 % of Total Vehicle Weight)
TOTAL TEST WEIGHT = 2615 lbs.

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

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitude: RF 25.5 LF 25.5 RR 23.2 LR 23.1
Test Attitude: RF 25.7 LF 25.5 RR 21.4 LR 21.0

Wheel Base: 94 in.; C.G. = 42.4 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 1/16/85 Time of Test 1410
 Ambient Temperature 22 °F. at impact area
 Temperature in Occupant Compartment 72 °F.
 Windshield Molding Temperature 69 °F.
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 34.82 mph, secondary 34.80 mph
 Distance From Front Bumper to Barrier Face When Entering Speed Trap 52.0
 inches; Exiting Speed Trap 12.0 inches

VEHICLE REBOUND AND CRUSH (inches)

Vehicle Length: Pre-test = R 154.7 C 158.3 L 154.7
 Post-test = R 135.8 C 137.0 L 134.8
 Crush = R 18.9 C 21.3 L 19.9

Distance from front of test vehicle to point of impact:

R 13.5 C/L 12.2 L 13.2

VISIBLE DUMMY CONTACT POINTS

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Steering wheel rim</u>	<u>Dash Panel</u>
Chest	<u>None</u>	<u>None</u>
Abdomen	<u>None</u>	<u>None</u>
Left Knee	<u>Dash Panel</u>	<u>Glove Box Door</u>
Right Knee	<u>Dash Panel</u>	<u>Glove Box 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 Operable</u>	<u>Not Operable</u>	<u>Operable</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>.3 in. Forward</u>	<u>2.4 in. forward</u>

Glazing Damage

Backlight/Windshield Windshield shattered

Other notable impact effects: Windshield retention loss of 2.5 inches
on the lower left corner.

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.:

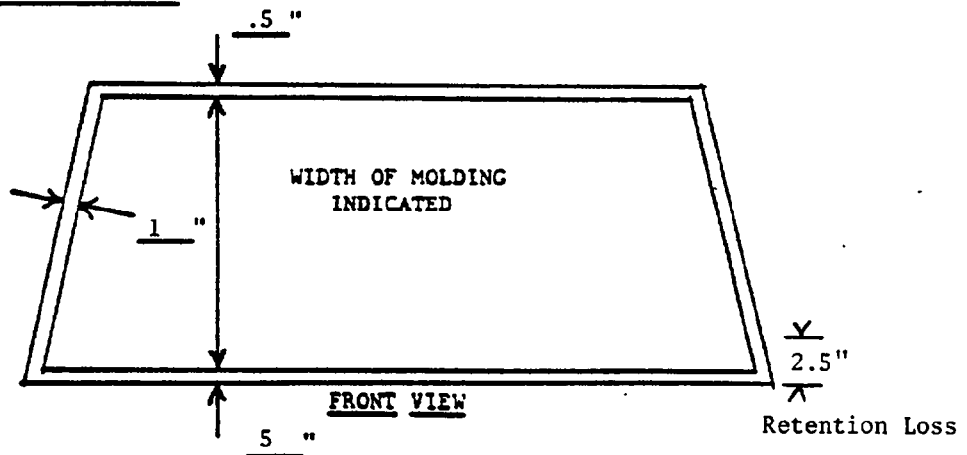
Windshield is bonded in place and has a plastic molding around the perimeter.

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	75.75	75.75	100%
LEFT SIDE	75.75	73.25	96.7%
TOTAL	151.5	149.0	98.35%

AREA OF RETENTION FAILURE:



FAILURE DETAILS:

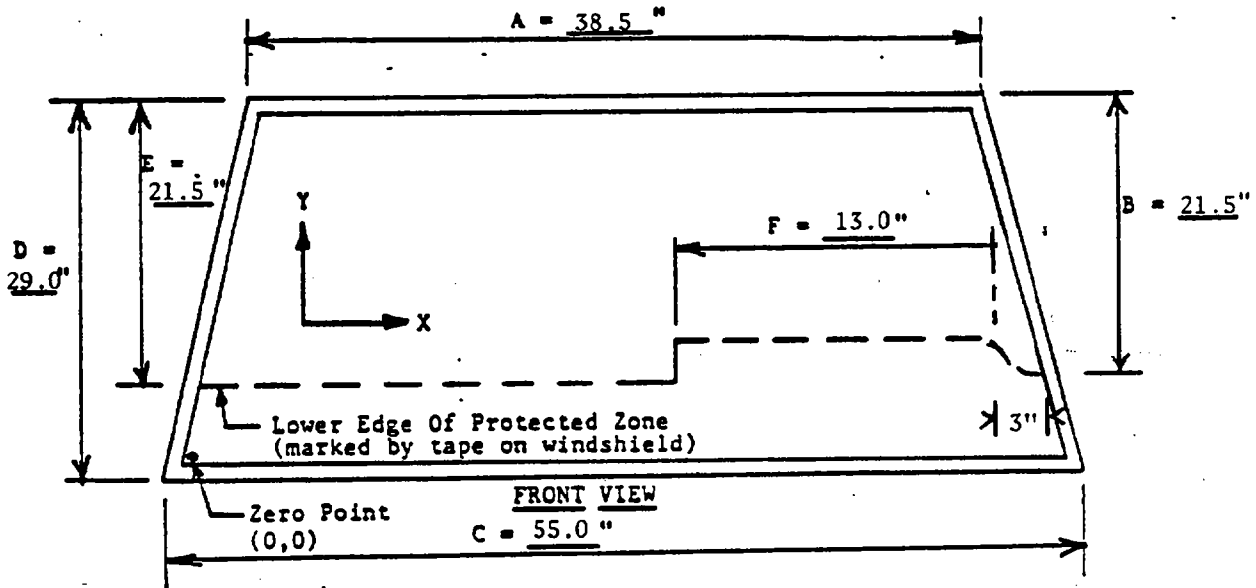
Figure 2

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.: CF0301 ; TEST DATE: 1/16/85

VEHICLE MAKE/MODEL/BODY STYLE: 1985 Dodge Colt 4-door hatchback

USABLE CAPACITY OF VEHICLE'S FUEL TANK: 11.9 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:

11.0 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

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

VEHICLE STATIC ROLLOVER DATA:

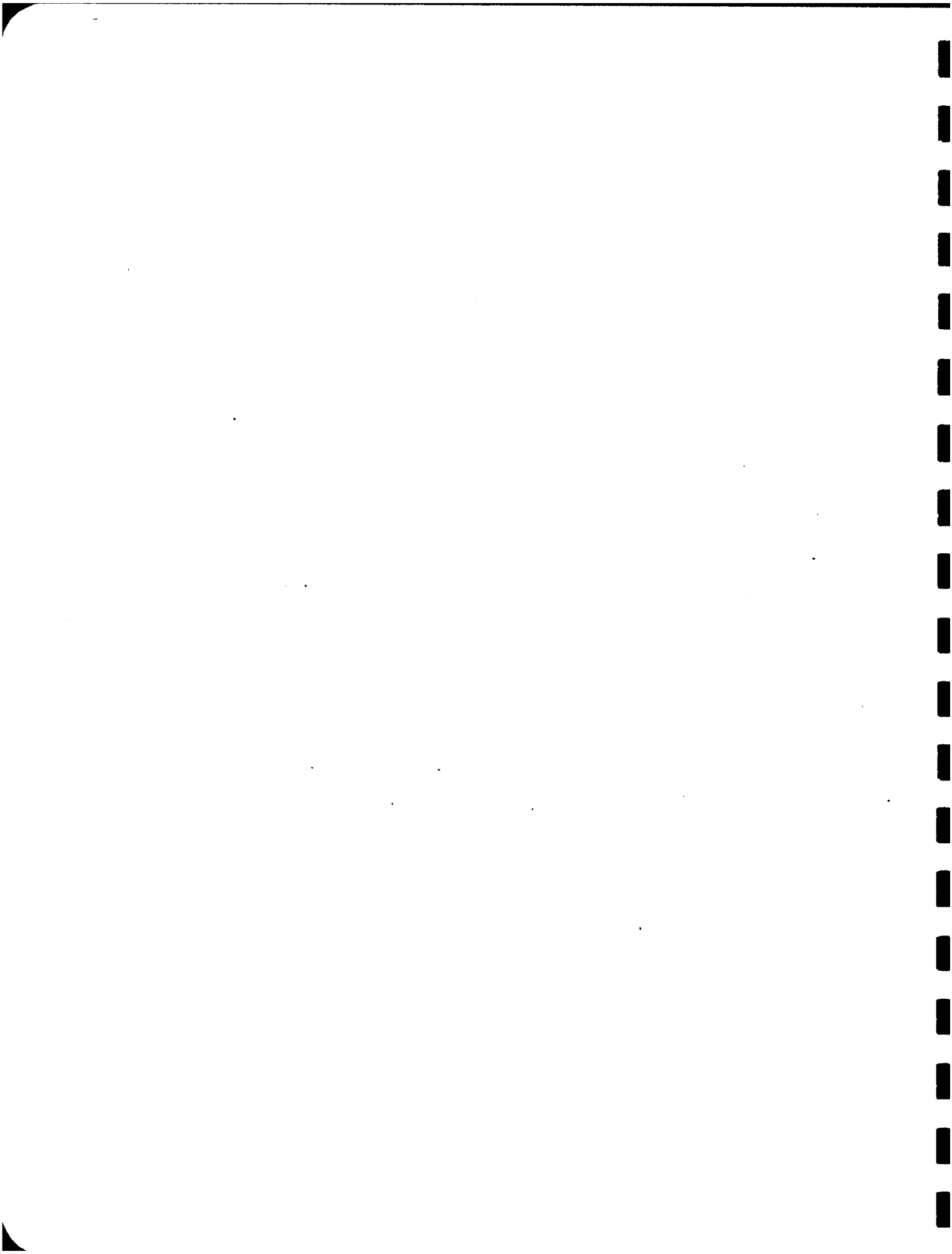
	First 5 Minutes FROM ONSET OF ROTATION	6th. Minute	7th. Minute	8th. Minute
Maximum Allowable Solvent Spillage - -	5 oz.	1 oz.	1 oz.	1 oz.
0 to 90° (filler cap down) - - - - -	0	0	0	0
90 to 180° - - - - -	0	0	0	0
180 to 270° - - - - -	0	0	0	0
270 to 360° - - - - -	0	0	0	0

Solvent Spillage Location(s):

None

Remarks

At impact the exhaust pipe struck and dented the fuel tank (Figure A-27).



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)	-150	-27	43	152	-42	-20	-13	42.1
DUMMY (2)	-42	46	73	89.6	32	23	16	31.9
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	460	480
DUMMY (2)	370	1090
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)	1500	--	Intermittent Data
DUMMY (2)	1650	1300	--
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**			
	HIC	t ₁ (SEC)	t ₂ (SEC)	AVE. ACC. (g) t ₁ TO t ₂
DUMMY (1)	787.2	.06690	.10380	53.9
DUMMY (2)	740.7	.08242	.11070	58.5
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. CE0301

Vehicle 1985 Dodge Colt 4-door hatchback

SEAT TYPE:

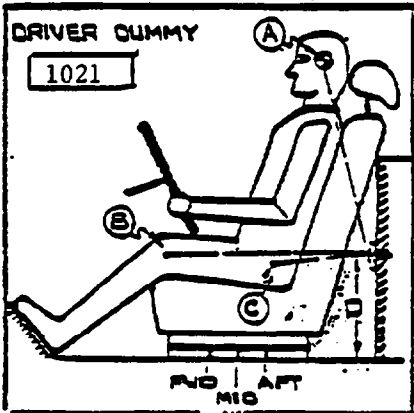
- Bench
- Bucket
- Split Bench

ADJUSTER TYPE:

- Manual
- Power

BUCKET SEAT BACK TYPE:

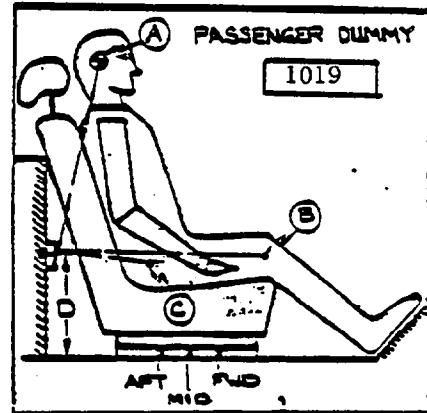
- Fixed
- Adjustable Reclining



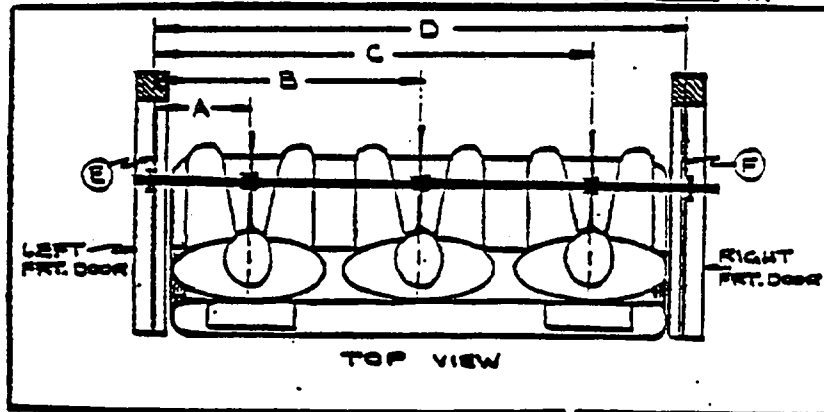
- A = 21.2 in. 0 Degrees
- B = 23.7 in. 98 Degrees
- C = 9.5 in. 128 Degrees
- D = 13.5 in.

MEASUREMENT LOCATION

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



- A = 21.5 in. 0 Degrees
- B = 23.4 in. 98 Degrees
- C = 8.5 in. 129 Degrees
- D = 13.5 in.



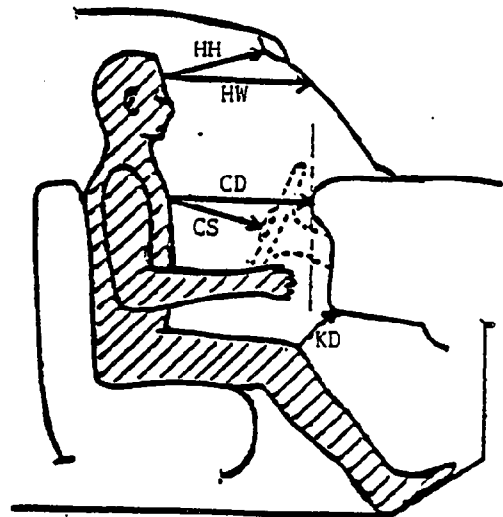
DUMMY ID

1021

1019

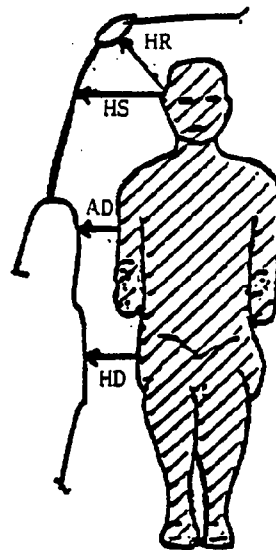
- A = Left Door to Driver Centerline 11.7 in.
- B = Left Door to Center Passenger Centerline -- in.
- C = Left Door to Right Passenger Centerline 36 in.
- D = Left Door to Right Door 47.5 in.
- E, F = Window Glass Height (Right and Left Must be Equal) 12.0 in.

	DRIVER	PASSENGER
HH	14.2"	13.8"
HW	20.2"	20.0"
CD	24.0"	25.5"
CS	15.7"	--
KDL	7.2"	8.0"
KDR	8.2"	7.7"
SA	22°	22°
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



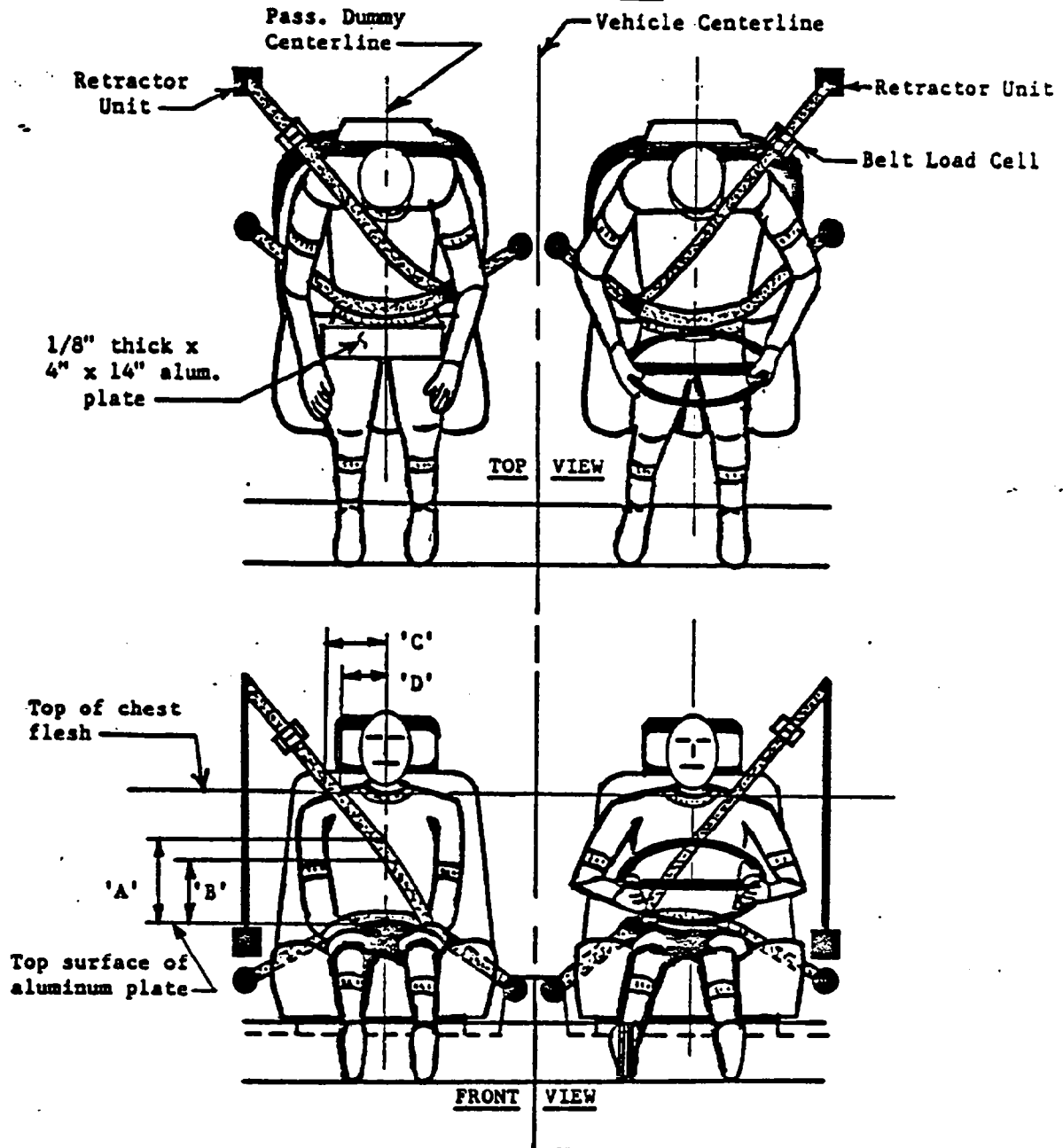
	DRIVER	PASSENGER
HR	4.2"	4.7"
HS	7.3"	8.0"
AD	3.5"	4.7"
HD	6.6"	6.2"

Figure 5

OCCUPANT CLEARANCE DIMENSIONS

Figure 6

SEAT BELT POSITIONING DATA



	DRIVER DUMMY (in.)	PASS. DUMMY (in.)
1. Dimension 'A'--alum. plate to belt upper edge on dummy centerline	13.3	13.2
2. Dimension 'B'--alum. plate to belt lower edge on dummy centerline	10.3	10.2
3. Dimension 'C'--dummy centerline to outer edge at chest flesh top	7.2	7.2
4. Dimension 'D'--dummy centerline to inner edge at chest flesh top	5.2	5.2
5. Lap belt tension (lbs.)	Retractor Pull	Retractor Pull
6. Shoulder belt tension (lbs.)	3 lbs.	3 lbs.

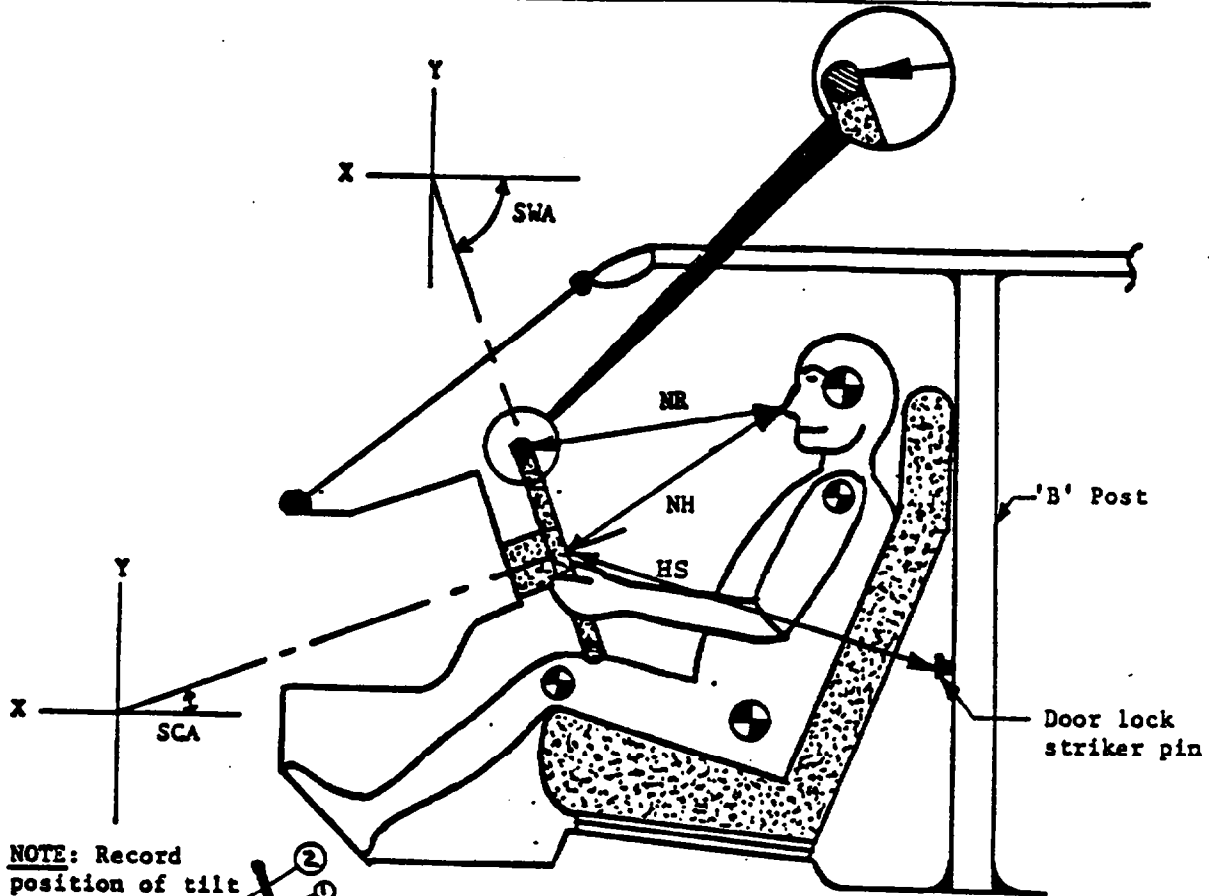
Table 3

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>60.5"</u>	<u>60.7"</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>30.5"</u>	<u>30.7"</u>
Lap belt length as measured on Part 572 Dummy.	<u>30.0"</u>	<u>30.0"</u>
<u>Belt Spool-Off Data:</u>		
As determined by film analysis.	<u>1.5"</u>	<u>1.6"</u>
As determined mechanically.	<u>2.5"</u>	<u>3.1"</u>
As determined electronically.	<u>--</u>	<u>--</u>
<u>Belt Stretch Data:</u>		
Measured electronically between shoulder belt load cell and the "D" ring.	<u>.72" per ft.</u>	<u>.42" per ft.</u>
Measured between one foot reference marks on belt.	<u>--</u>	<u>--</u>

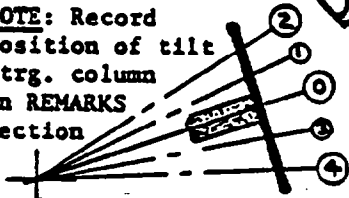
Figure 7

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



LEFT SIDE VIEW

NOTE: Record position of tilt strg. column in REMARKS section



		MEASUREMENTS	
<u>NR</u>	--Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	20	Inches
<u>NH</u>	--Distance from tip of dummy's nose to center of steering column hub	21.3	Inches
<u>HS</u>	--Distance from center of steering column hub to the forward surface of the door lock striker pin.	23X 15Y	Inches
<u>SCA</u>	--Angle of steering column relative to the horizontal X axis	67	Degrees
<u>SWA</u>	--Angle of steering wheel relative to the horizontal X axis.	21	Degrees

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

Not adjustable

NOTE: Camera Information Shown on Table 4

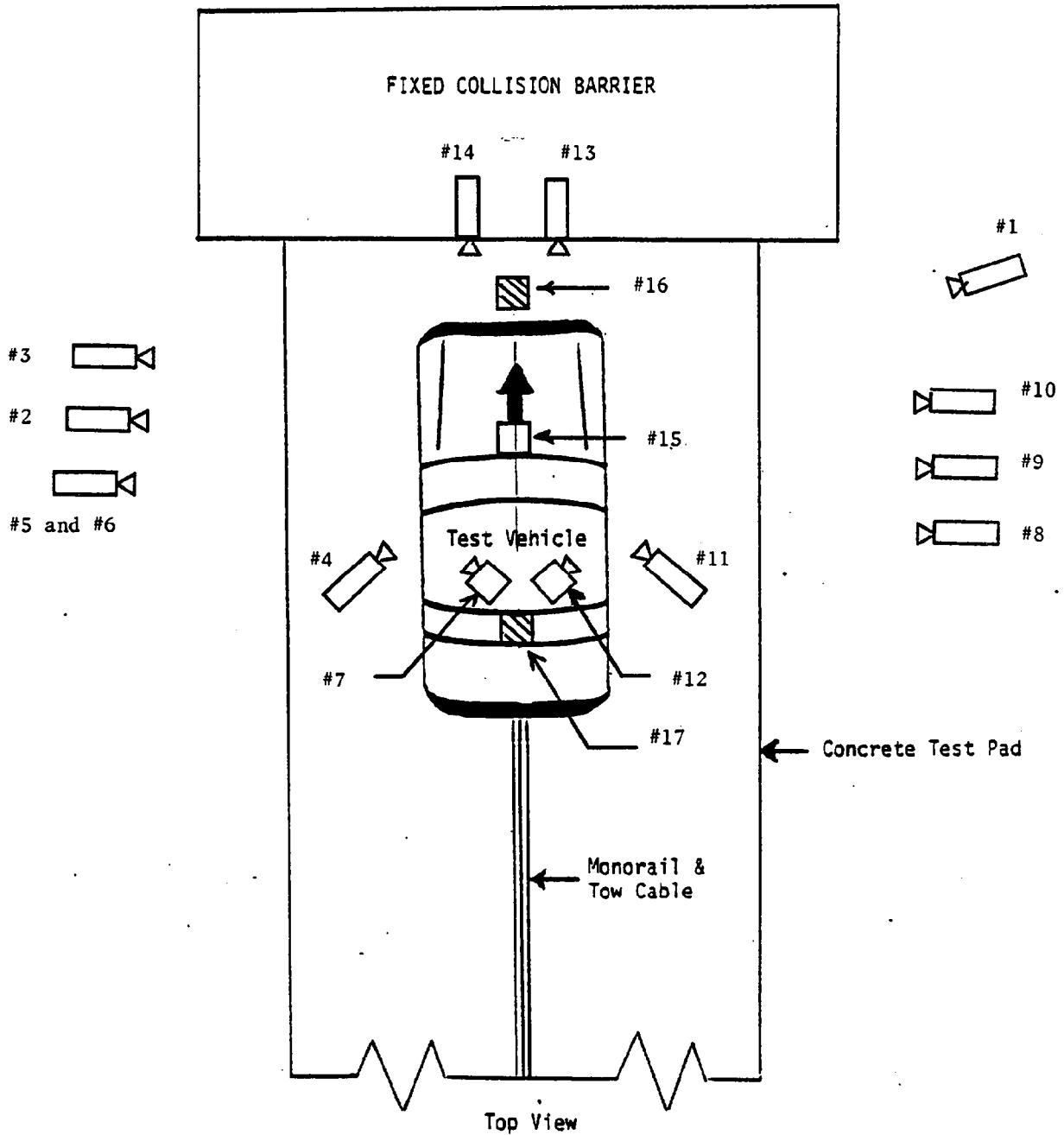


Figure 8 CAMERA POSITION FOR FRONTAL IMPACTS

Table 4
HIGH-SPEED CAMERA LOCATIONS

Test No. CPO301 Vehicle 1985 Dodge Colt 4-Door Hatchback

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	205	63	50	-5	--	550	
3	Left Side View	211	40	51	-8	--	550	
4	Driver and Interior View	96	108	67	-18	80	550	
5	Steering Column (Bottom)	222	81	46	-6	206	550	
6	Steering Column (Top)	222	81	60	-12	206	540	
7	Left Belt	--	--	--	--	8	1520	
8	Overall Right Side	282	106	46	-4	13	NO TIMING	
9	Right Side View	280	82	48	-2	25	870	
10	Right Passenger View	282	70	52	-3	35	770	
11	Passenger and Interior View	99	108	63	-16	25	600	
12	Right Belt	--	--	--	--	8	1490	
13	Passenger Front View	21	0	72	-31	13	540	
14	Driver Front View	21	0	72	-31	13	620	
15	Windshield View	0	0	126	-47	13	540	
16	Pit View of Engine	0	38	-120	90	13	740	
17	Pit View of Fuel Tank	0	115	-120	90	13	760	

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

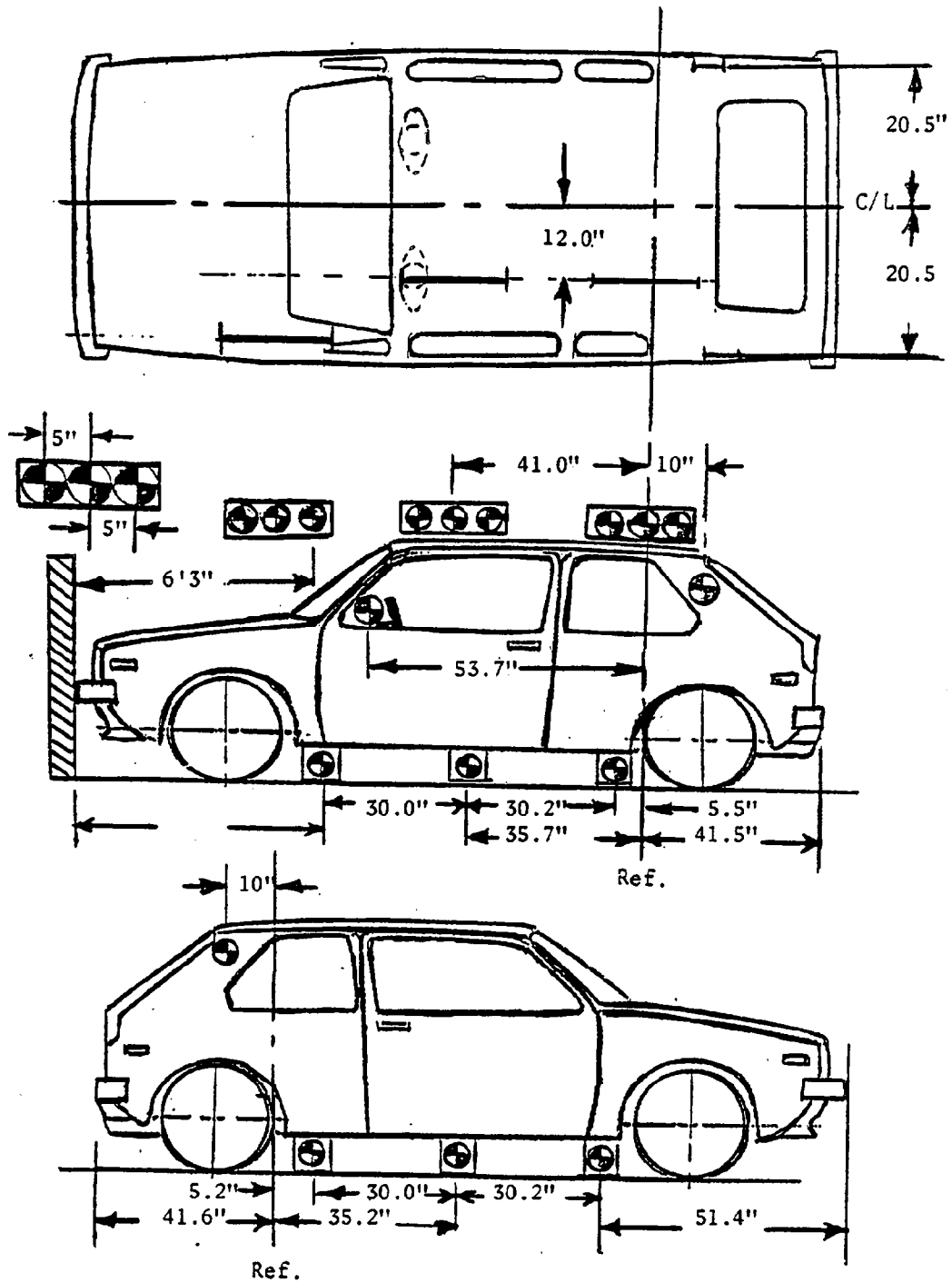
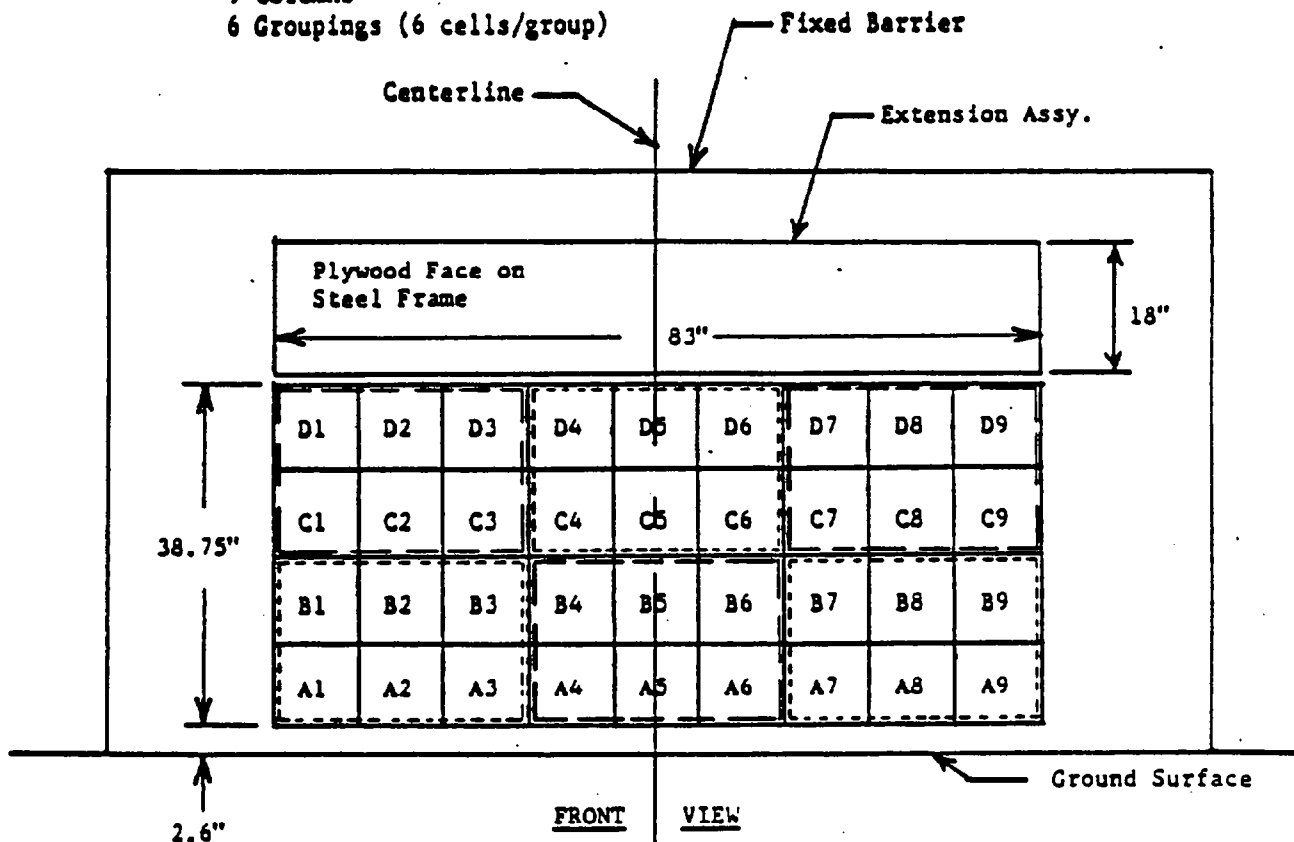


Figure 9 VEHICLE TARGET LOCATIONS

Figure 10

LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells
 4 Rows
 9 Columns
 6 Groupings (6 cells/group)

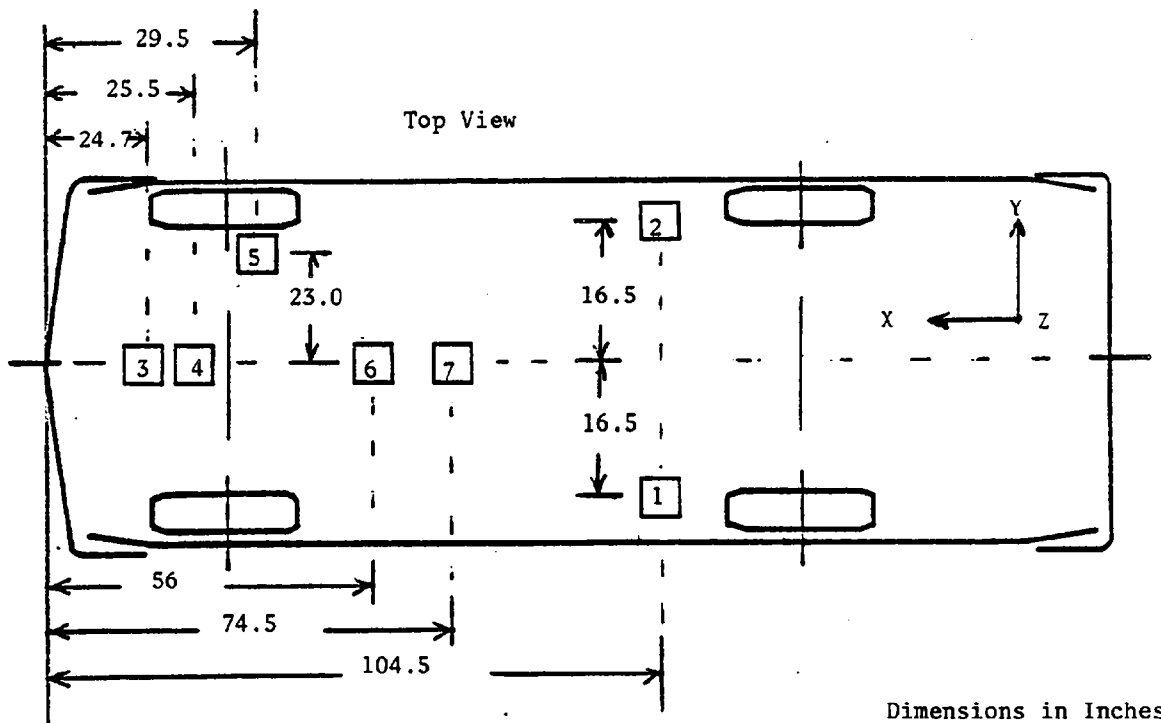


FRONT VIEW

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

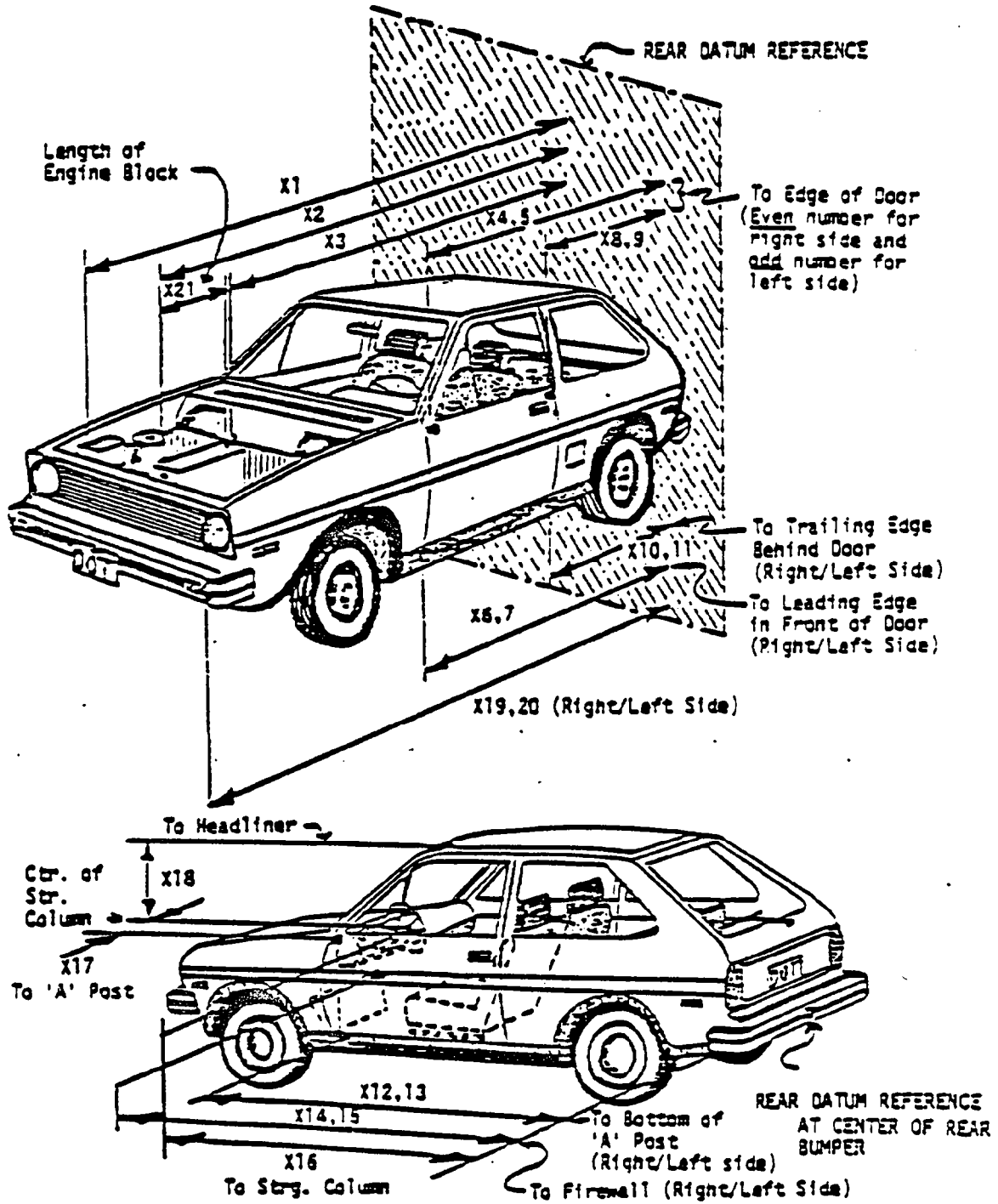


Table 5

VEHICLE MEASUREMENTS

No.	All Dimensions in Inches	Pre-Test Post-Test		Difference
		Pre-Test	Post-Test	
X1	Total Length of Vehicle at Centerline	158.3	137.0	21.3
X2	Rear Surface of Vehicle to Front of Engine	134.6	123.9	10.7
X3	Rear Surface of Vehicle to Firewall	116.2	111.1	5.1
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	106.3	105.9	.4
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	106.4	105.6	.8
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	105.1	104.7	.4
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	105.2	105.0	.2
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	66.3	66.1	.2
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	66.5	65.9	.6
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	66.2	66.2	0
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	66.3	65.9	.4
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	105.0	104.9	.1
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	105.0	104.5	.5
X14	Rear Surface of Vehicle to Firewall, Right Side	114.6	108.1	6.5
X15	Rear Surface of Vehicle to Firewall, Left Side	115.2	108.5	6.7
X16	Rear Surface of Vehicle to Steering Column	89.9	85.5	4.4
X17	Center of Steering Column to "A" Post	15.1	19.0	-3.9
X18	Center of Steering Column to Headliner	17.9	19.5	-1.6
X19	Rear Surface of Vehicle to Right Side of Front Bumper	154.7	135.8	18.9
X20	Rear Surface of Vehicle to Left Side of Front Bumper	154.7	134.8	19.9
X21	Length of Engine Block	18.5	18.5	0

Table 6

ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1985 Dodge Colt 4-door hatchback
 VEH. NHTSA NO.: CF0301; VIN: JP3BA28K2FU400490
 MODEL YEAR: 1983; BUILD DATE: 6-84; TEST DATE: 1/16/85
 VEH. SIZE CATEGORY: Compact; TEST WEIGHT: 2615
 VEH. WHEELBASE: 94.0; FRONT OVERHANG: 33.5; OVERALL WIDTH: 64.0

ACCELEROMETER DATA:

LOCATION: 42.4 inches rearward
 CALIBRATION PROCEDURE: shaker table/least squares
 LINEARITY: + 0.75%; INTEGRATION ALGORITHM: Hybrid Simpson-Newton 3/8

VEH. IMPACT SPEED: 34.82; TIME OF SEPARATION: 202.8 milliseconds
 VELOCITY CHANGE: 37.74

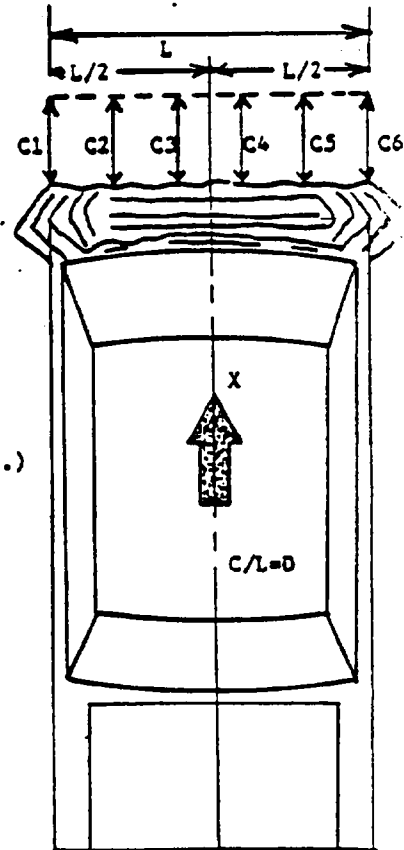
■ COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

P (Frontal) 12FDEW3

CRUSH DEPTH DIMENSIONS:	C1=	<u>21.7</u>	<u>inches</u>
	C2=	<u>22.0</u>	<u>inches</u>
	C3=	<u>22.9</u>	<u>inches</u>
	C4=	<u>23.1</u>	<u>inches</u>
	C5=	<u>22.2</u>	<u>inches</u>
	C6=	<u>21.5</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 Dodge Colt 4Door Hatchback

NCI

Complete When Applicable	
End Damage	Side Damage
Undeformed end width <u>55"</u>	Bowing: B1 <u> </u> X1 <u> </u>
Corner shift: A1 <u> </u>	B2 <u> </u> X2 <u> </u>
A2 <u> </u>	Bowing constant
End shift at frame (CDC) (check one)	$\frac{X1 + X2}{2} = \underline{\quad}$
<4 inches <u> </u>	
≥4 inches <u> </u>	

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"	23.1	55"	25.3	23.0	22.9	23.1	24.0	25.1	
	Free/Space		∅		3.6	1.8	∅	∅	1.8	3.6	
	ACTUAL CRUSH		23.1		21.7	23.0	22.9	23.1	22.2	21.5	

*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.)

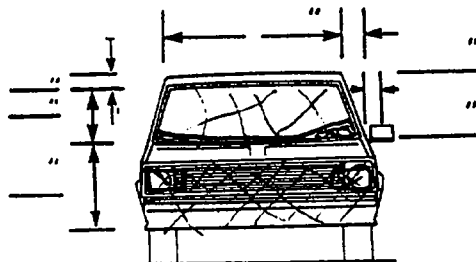
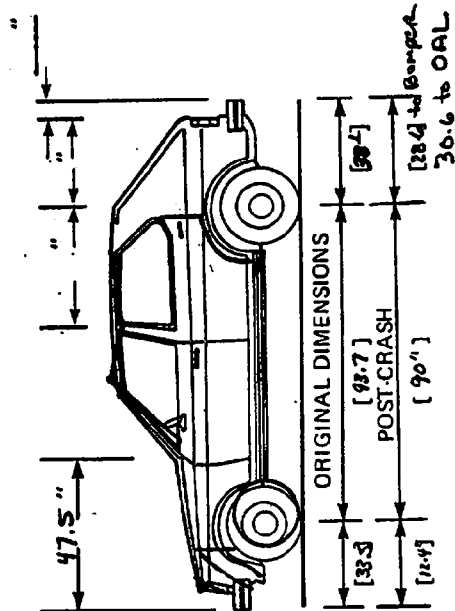
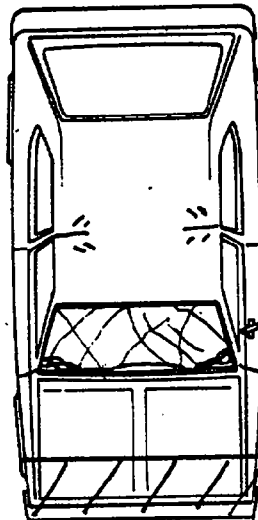
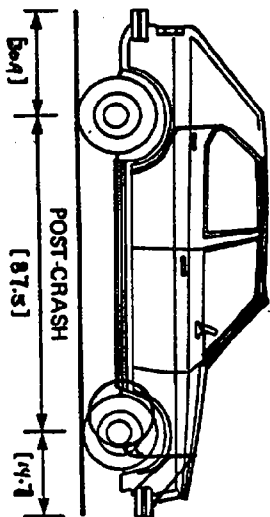
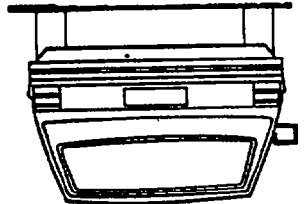
***Measure and document on the vehicle diagram the location of the maximum crush.

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

DAMAGE DESCRIPTION Tire—Wheel Damage a. Rotation physically restricted RF _____ LF _____ RR <u>2</u> LR <u>2</u> b. Tire deflated RF <u>2</u> LF <u>2</u> RR <u>2</u> LR <u>2</u> (1) Yes, (2) No, (3) NA, (4) Unk.	TYPE OF TRANSMISSION <input checked="" type="checkbox"/> Manual <input type="checkbox"/> Automatic Average Track: <u>N/A</u> Maximum Width: <u>N/A</u> Gross Weight: _____ Overall Length: <u>158.3</u> Engine Size: cyl. <u>4</u>	WHEEL STEER ANGLES (For locked front wheels or displaced rear axles only) RF ± <u>02</u> ° LF ± <u>00</u> ° RR ± <u>N/A</u> ° LR ± <u>N/A</u> ° Within ± 5 degrees
--	---	---

Vehicle No.: 1985 Dodge Colt
4Dr Hatchback

displ. _____



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.

APPENDIX A
PHOTOGRAPHS

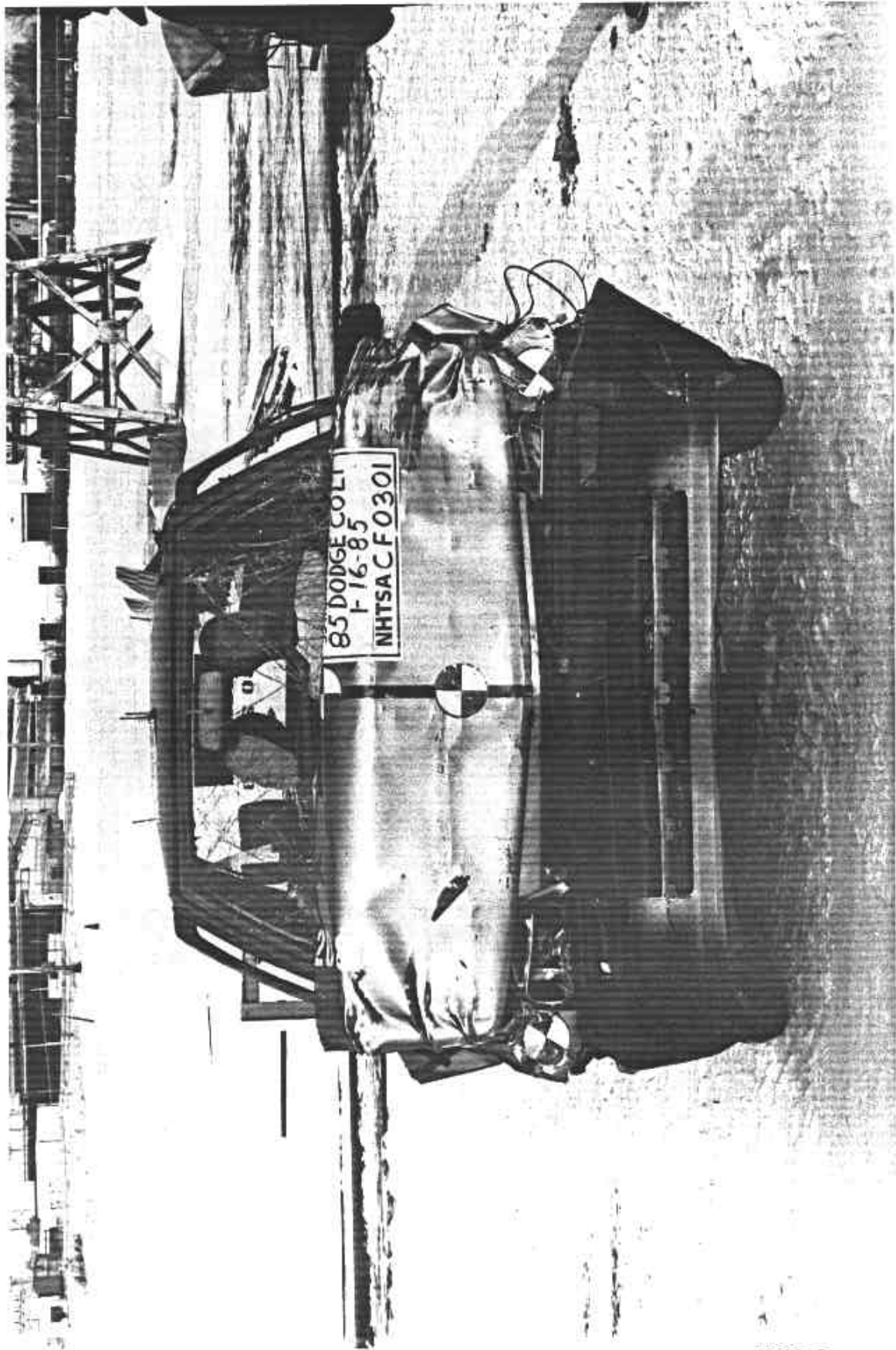


Figure A-2 POST-TEST FRONT VIEW

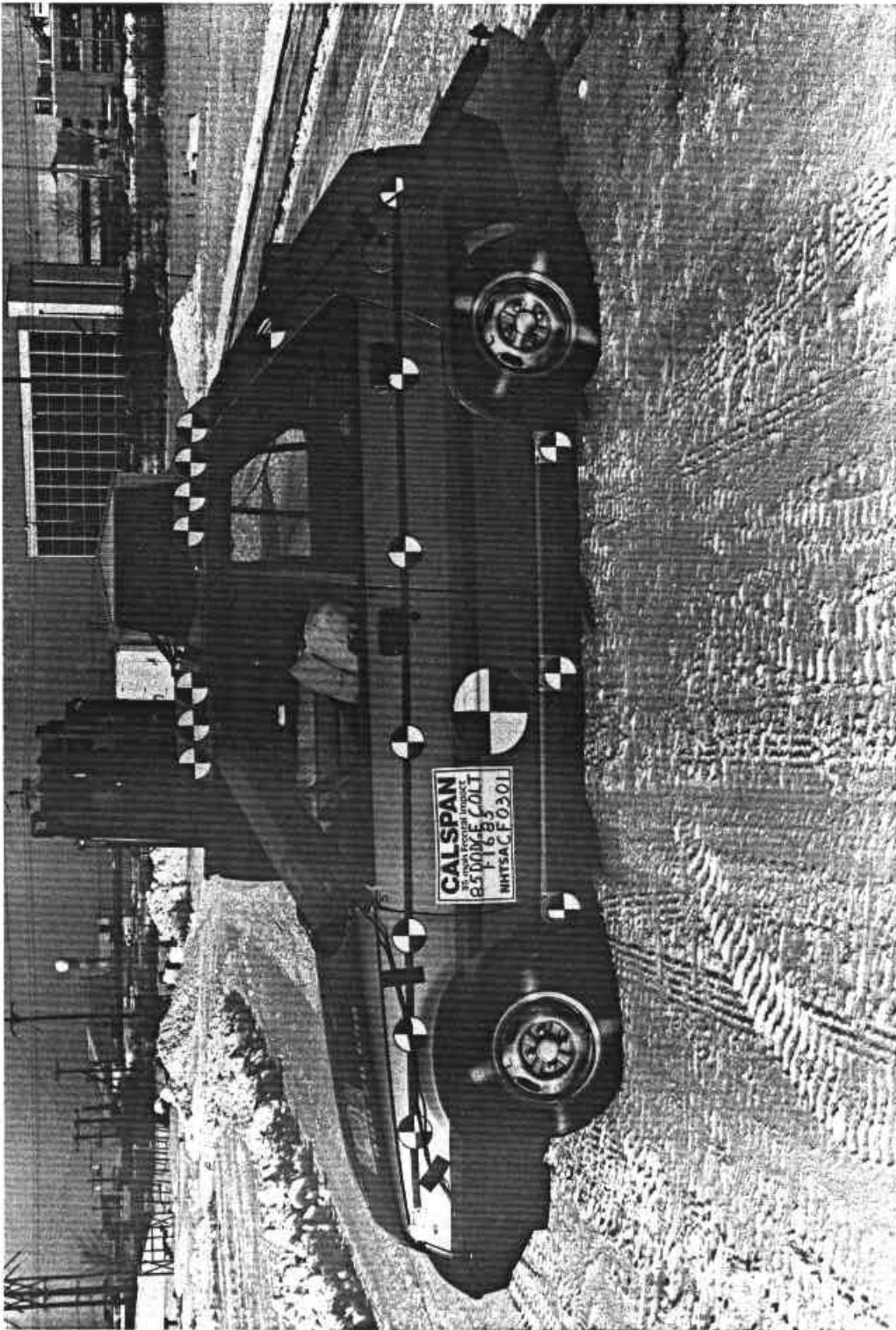


Figure A-3 PRE-TEST LEFT SIDE VIEW

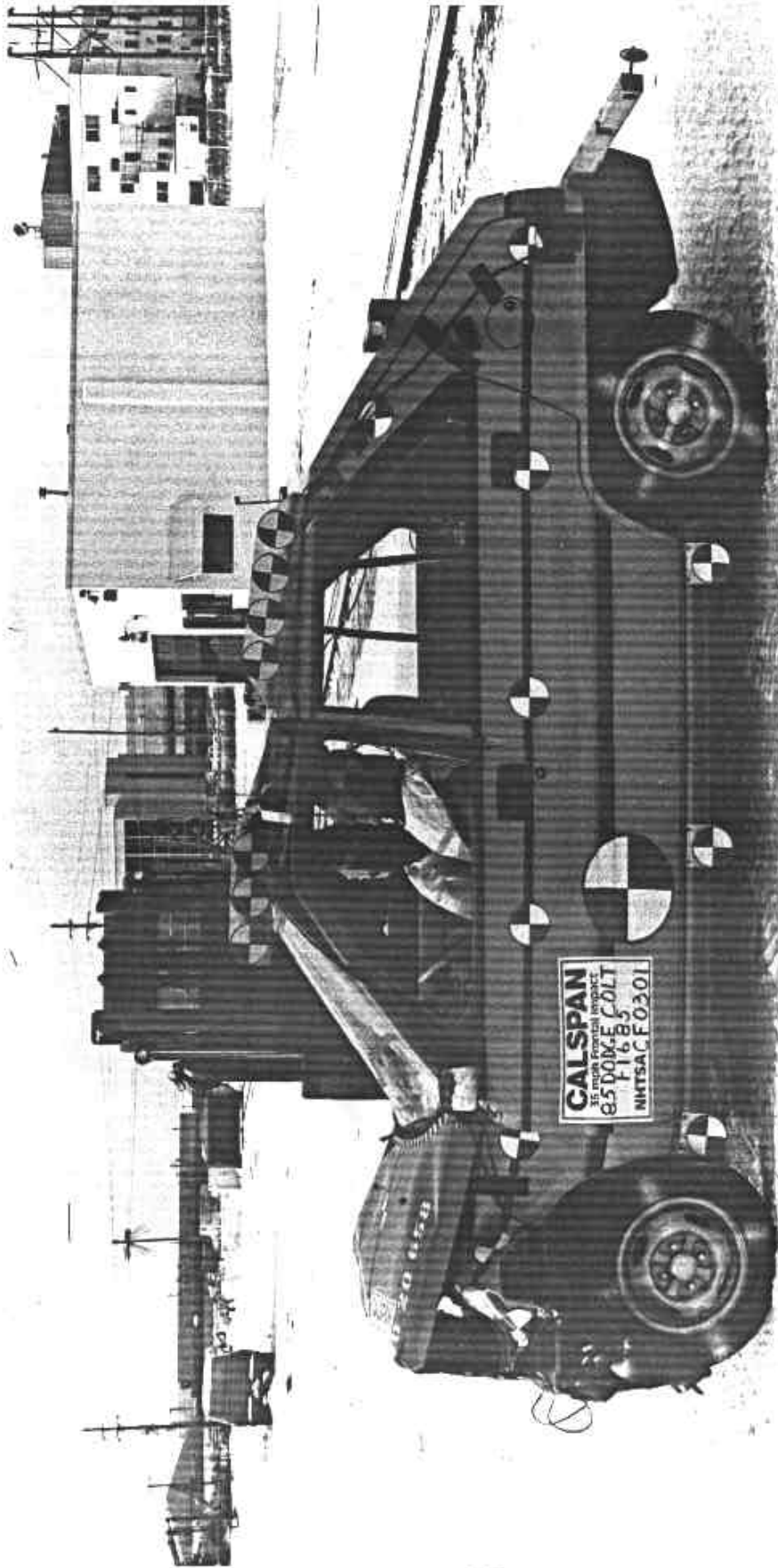


Figure A-4 POST-TEST LEFT SIDE VIEW

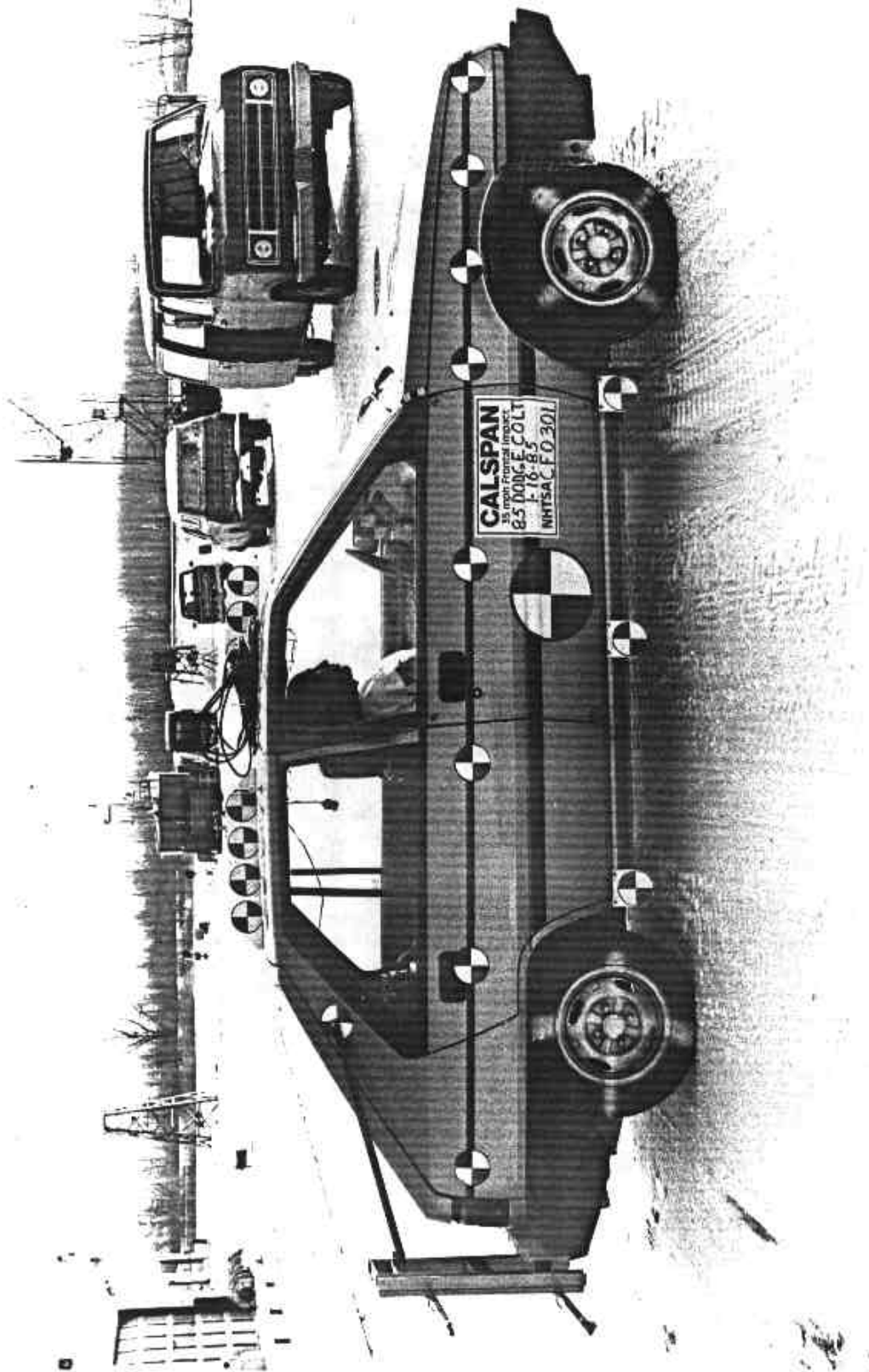
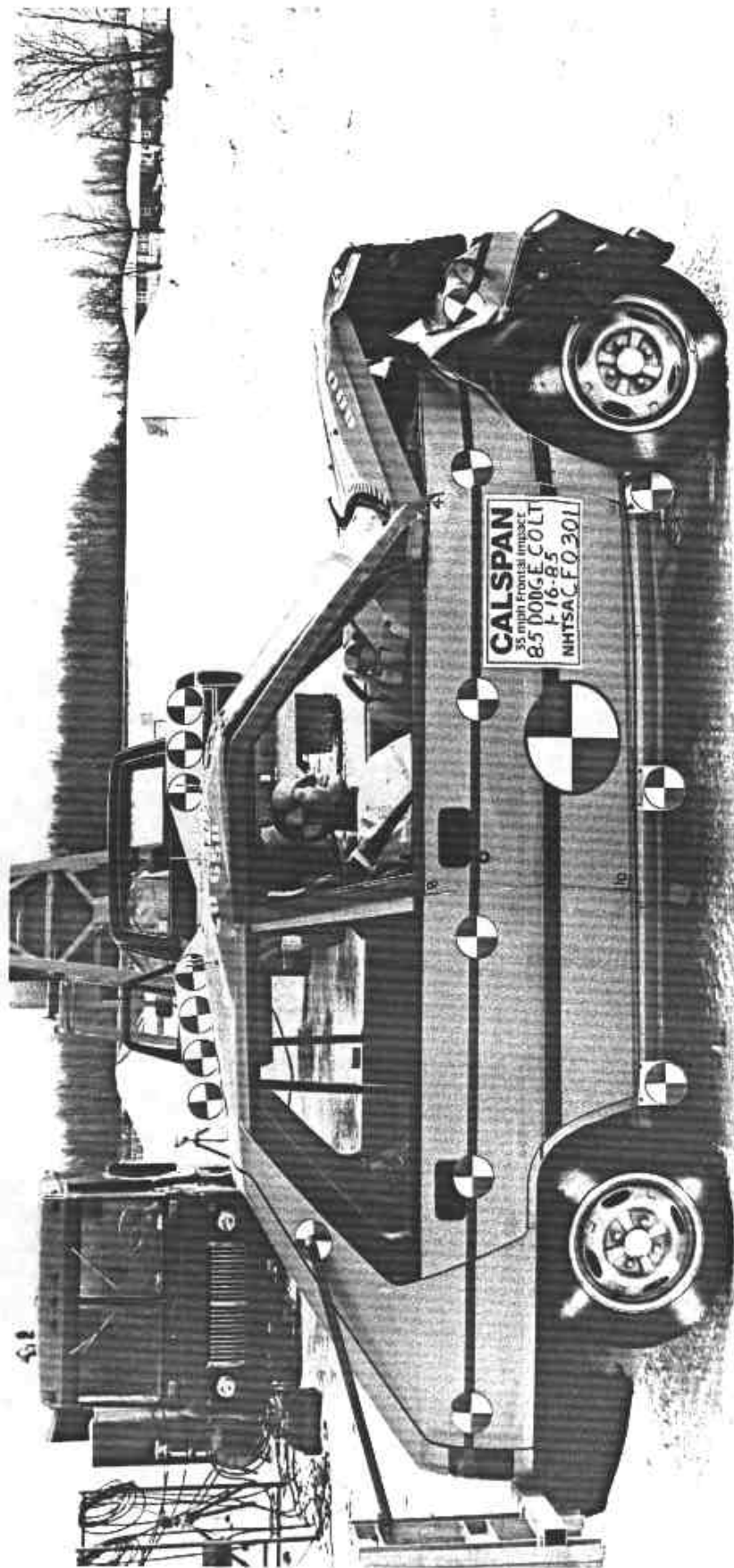


Figure A-5 PRE-TEST RIGHT SIDE VIEW



A-7

Figure A-6 POST-TEST RIGHT SIDE VIEW

7333-3



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

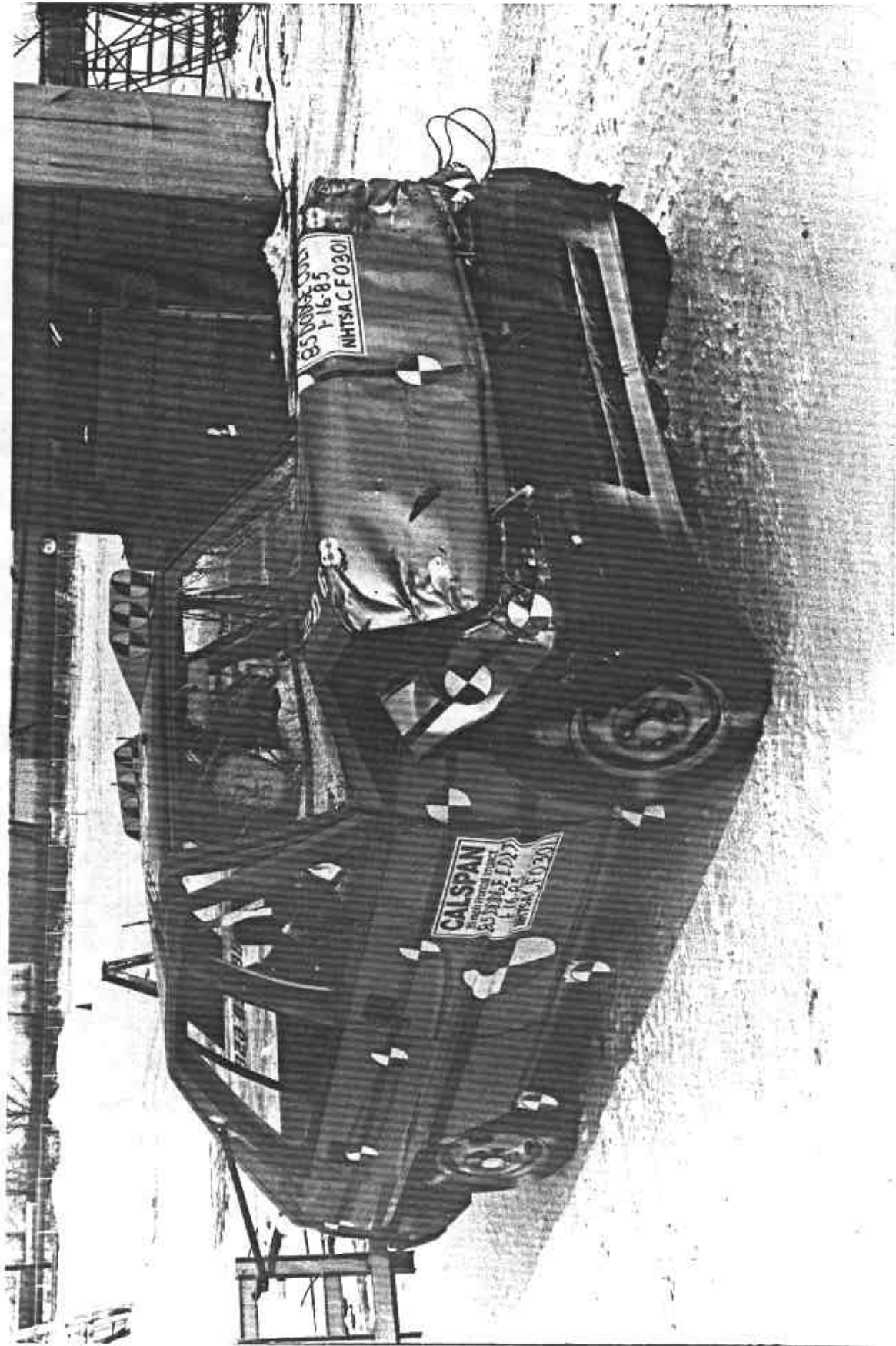


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW



A-10

7333-3

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

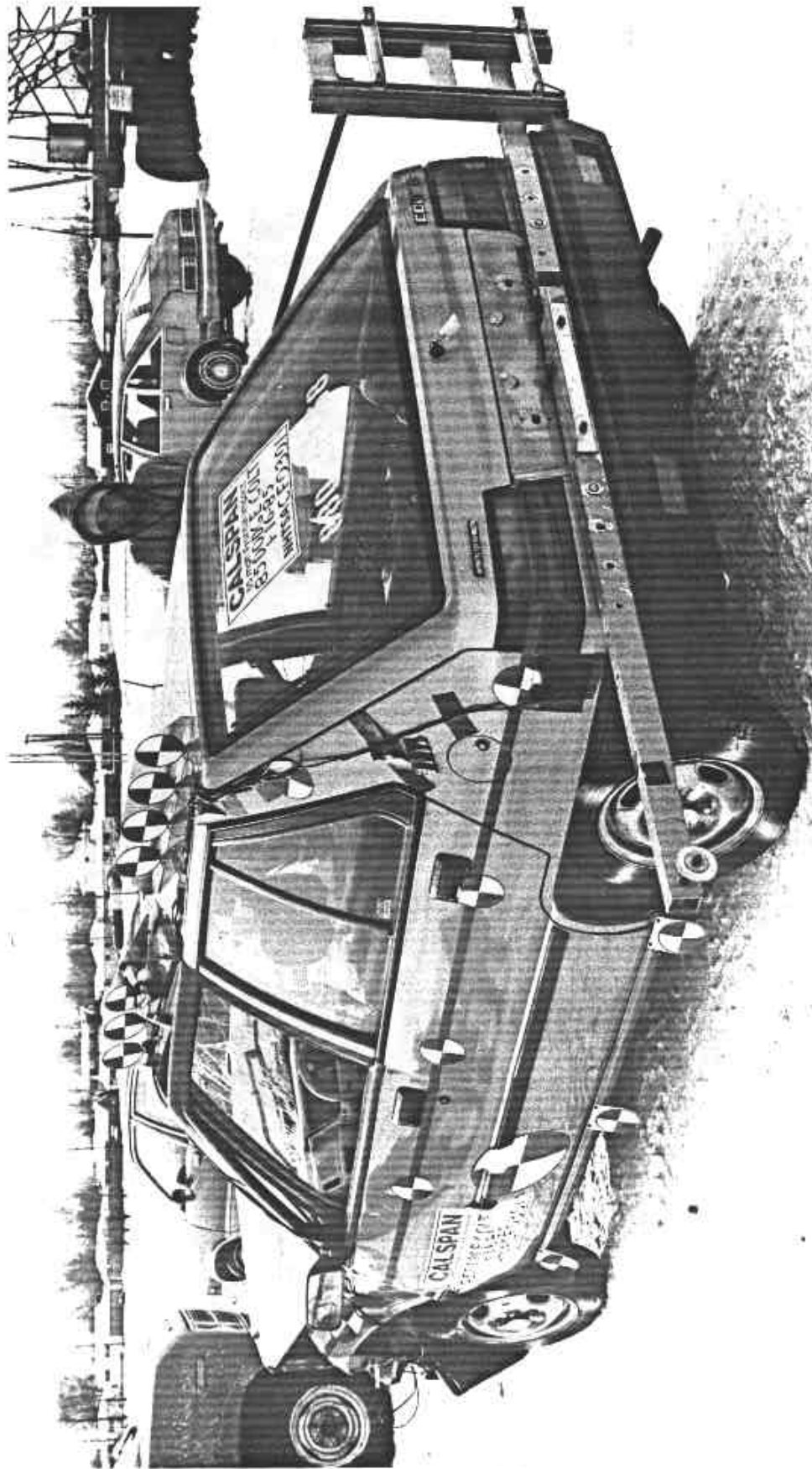


Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

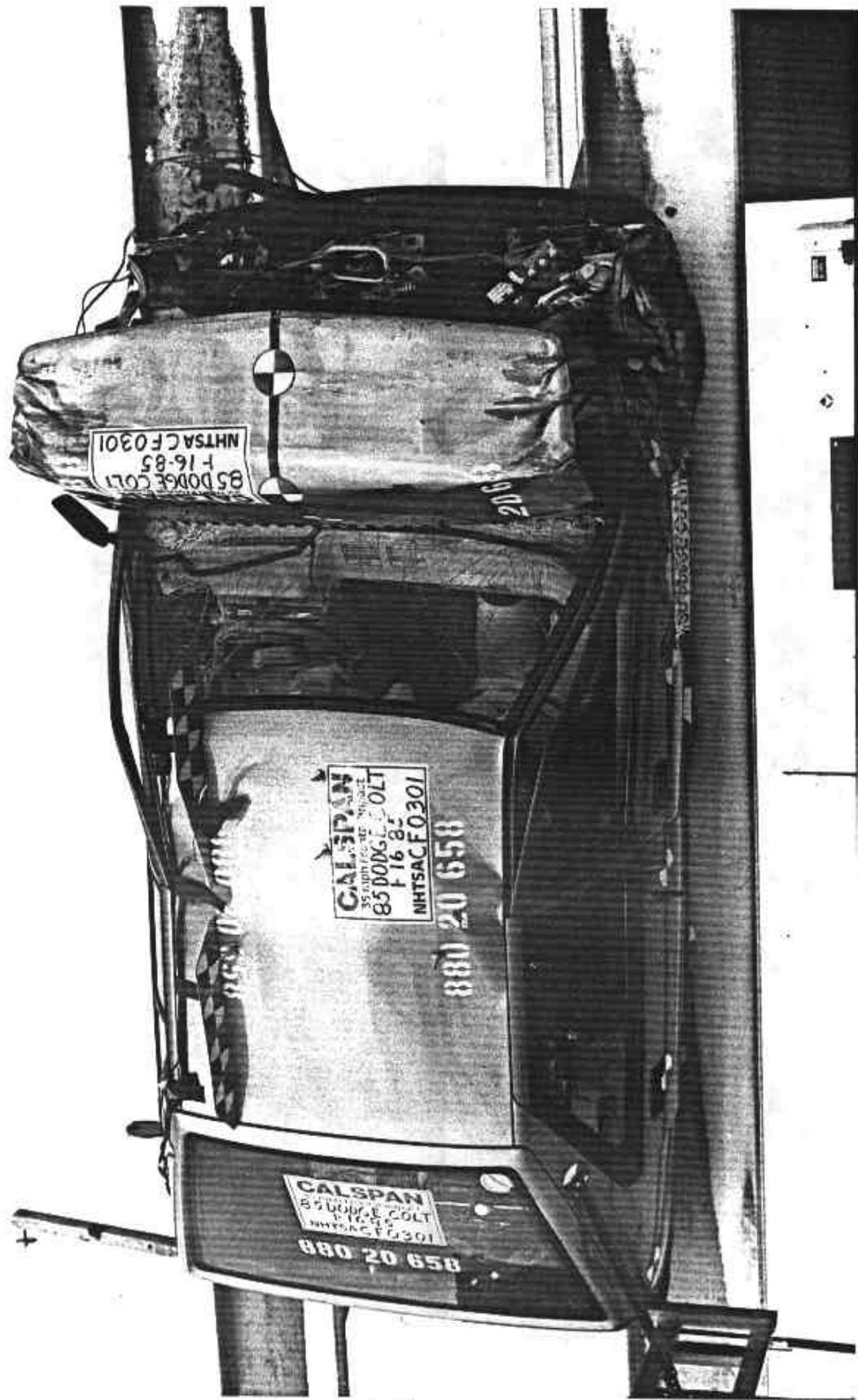


Figure A-11 POST-TEST TOP VIEW

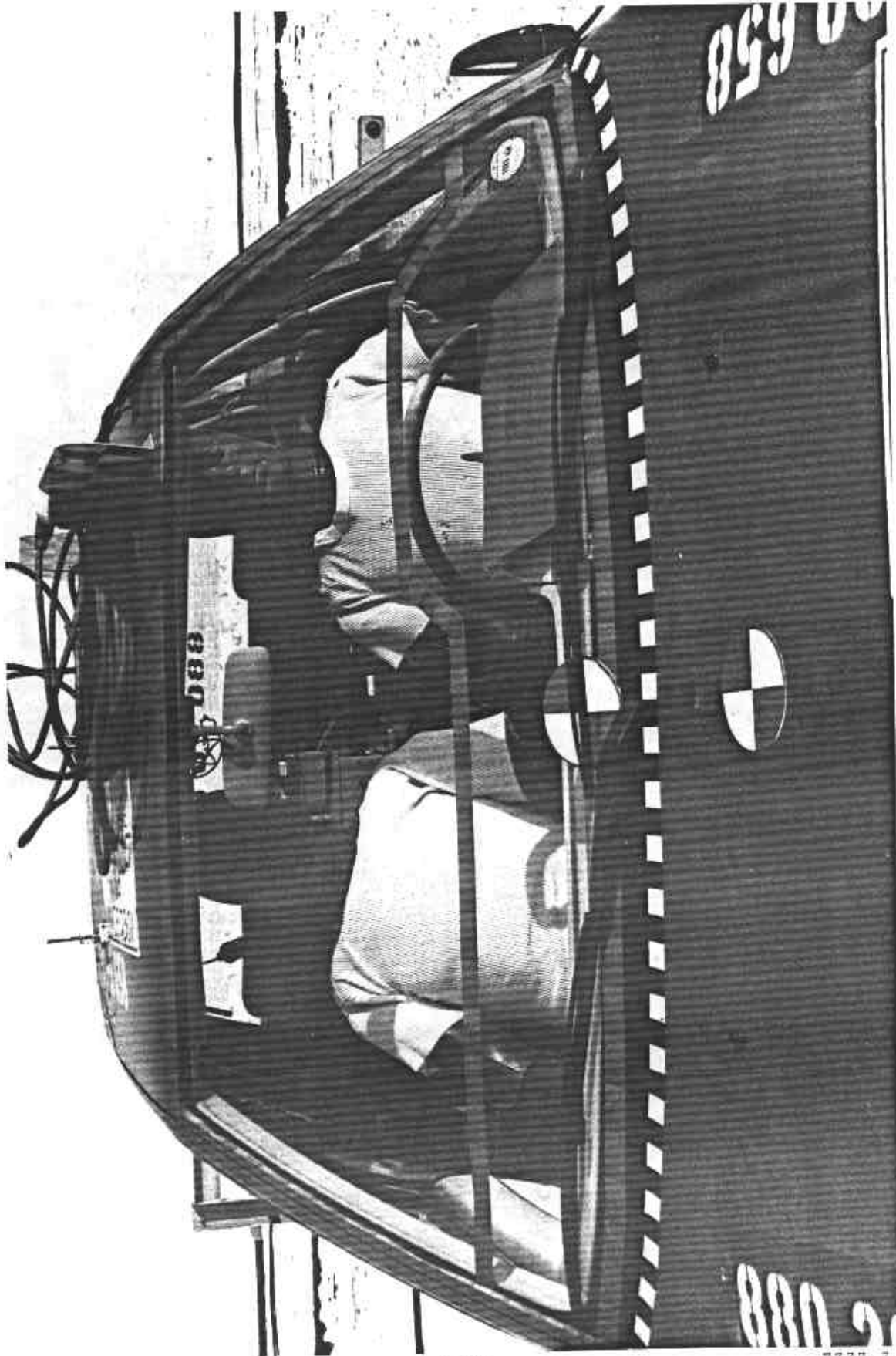


Figure A-12 PRE-TEST WINDSHIELD VIEW



A-14

7333-5

Figure A-13 POST-TEST WINDSHIELD VIEW

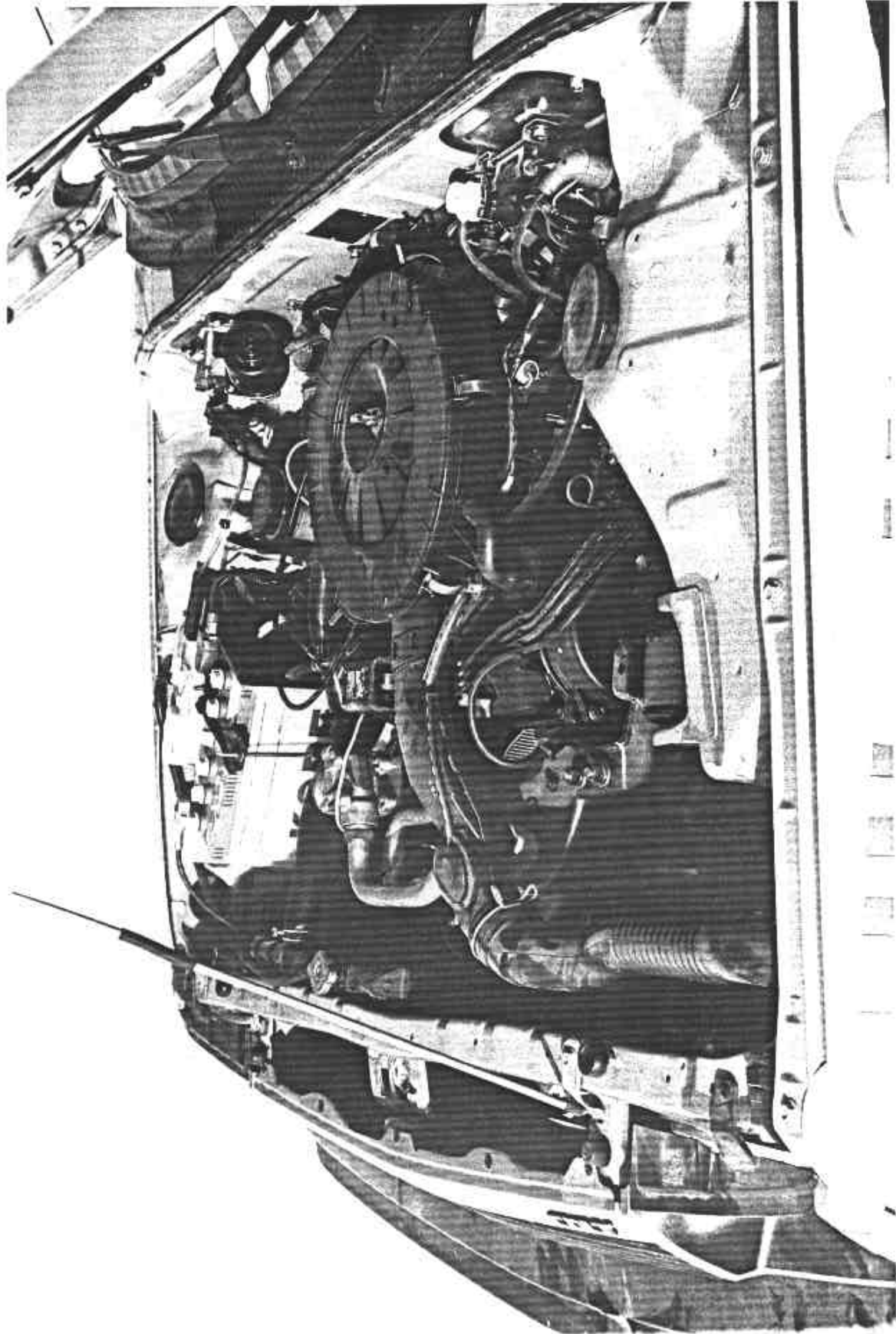


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

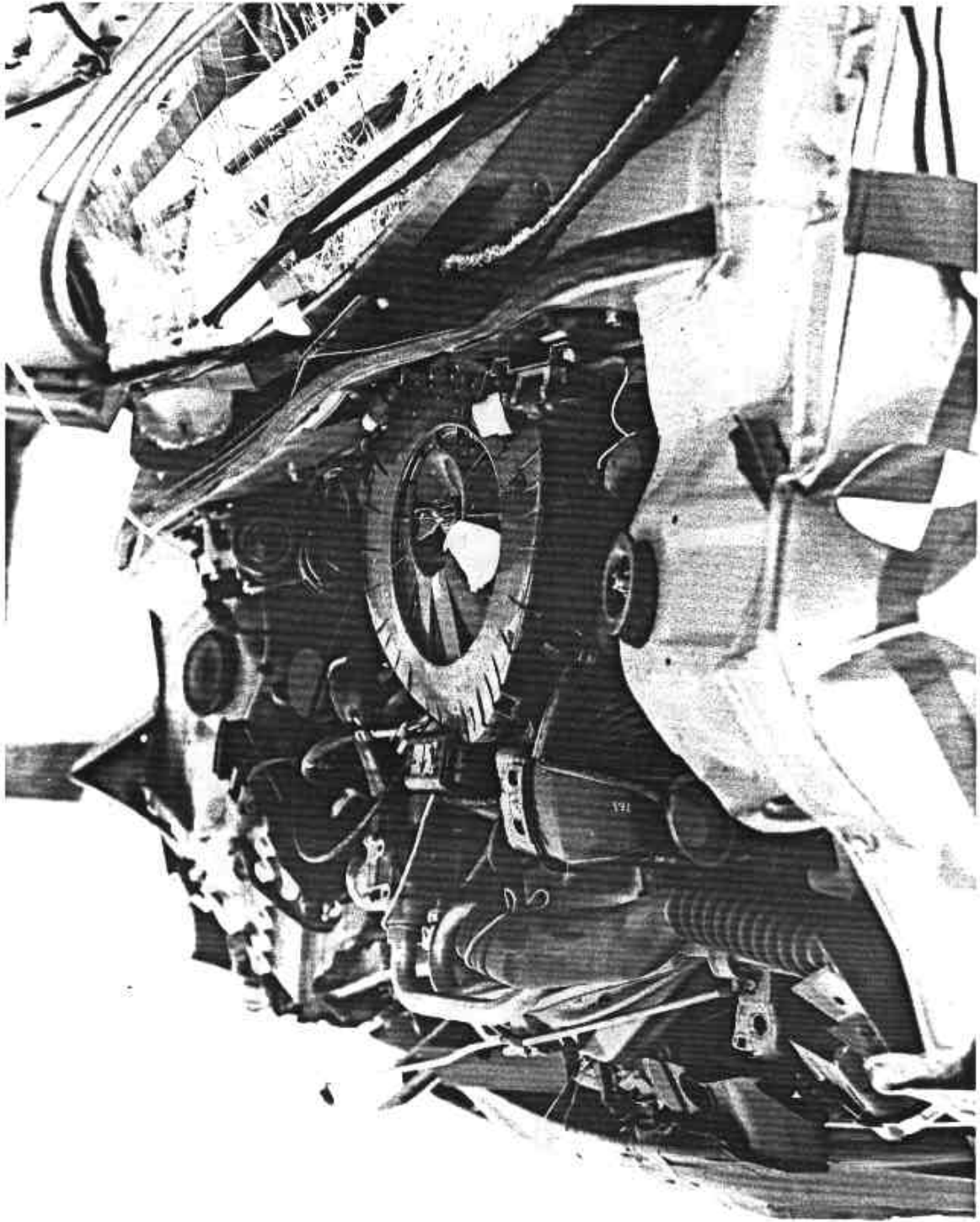


Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

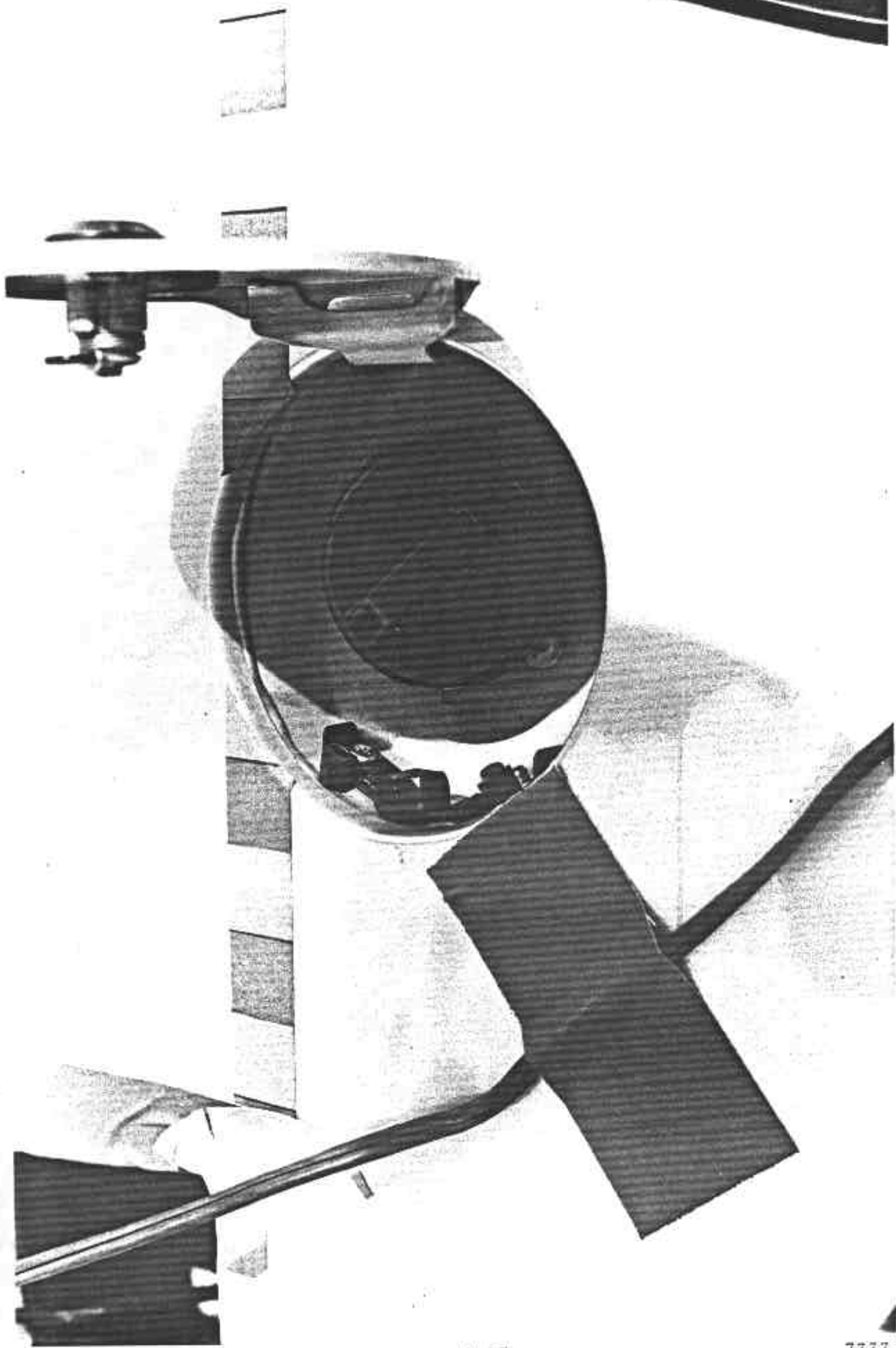


Figure A-16 PRE-TEST FUEL FILLER CAP VIEW

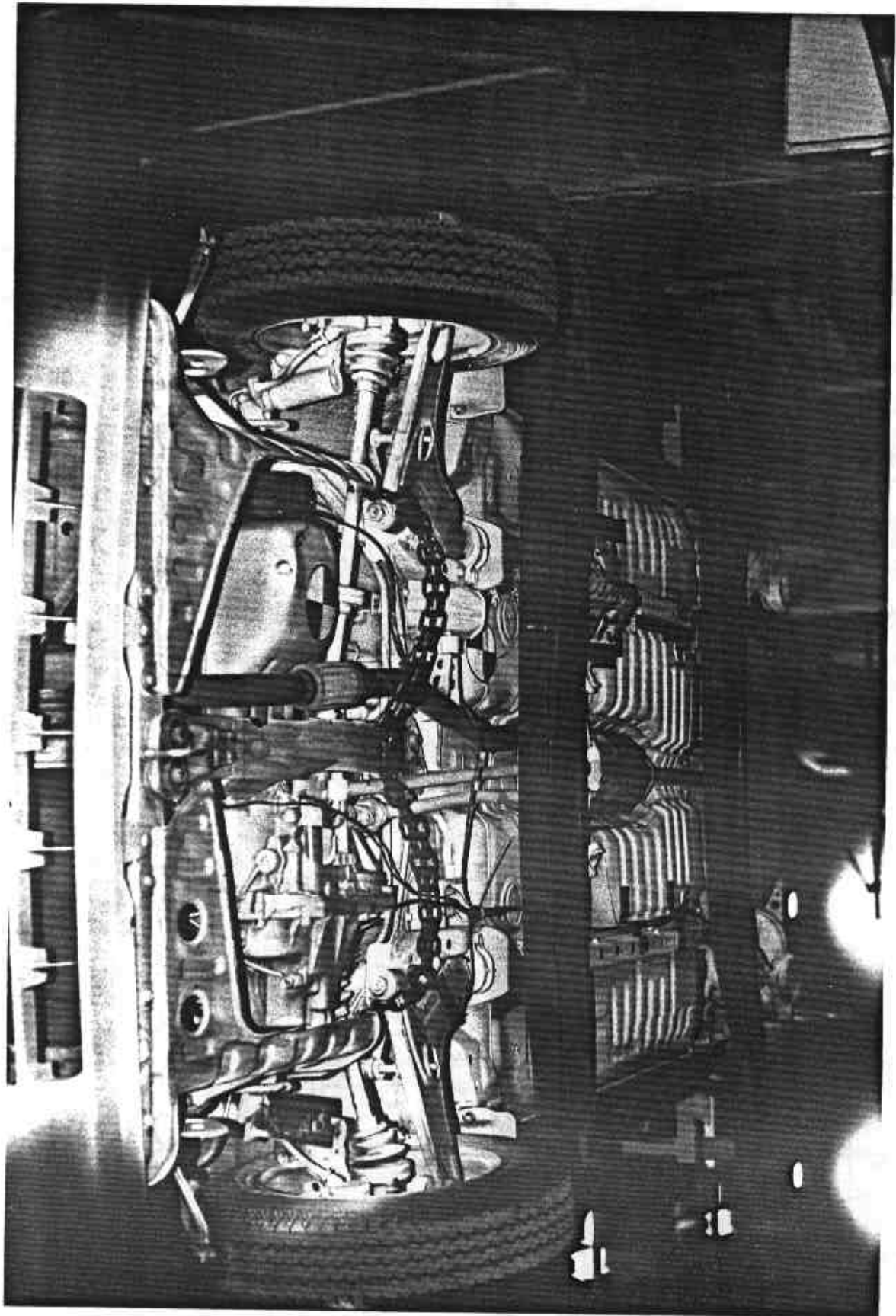


Figure A-17 PRE-TEST FRONT UNDERBODY VIEW

A-18

7353-3

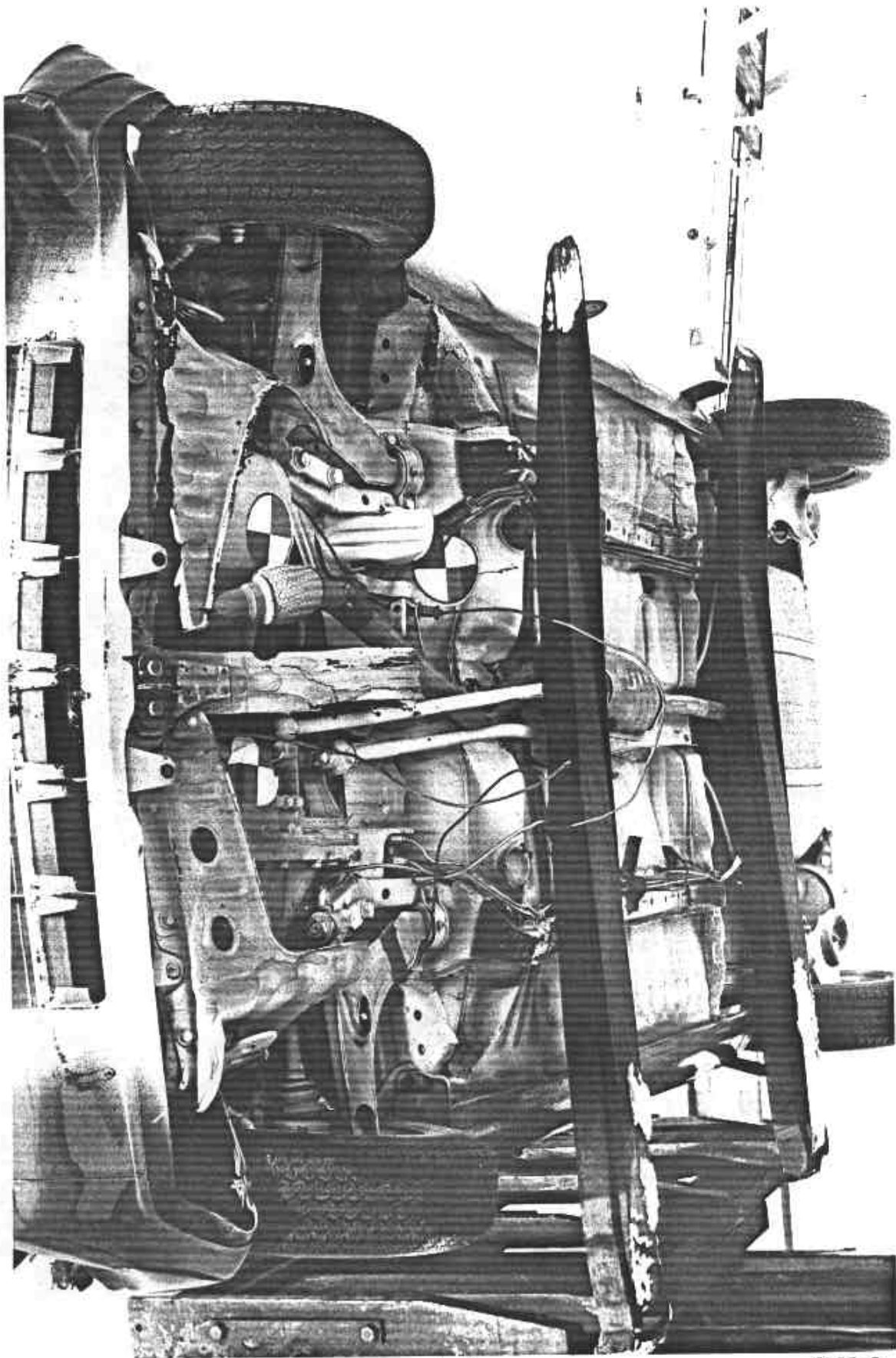


Figure A-18 POST-TEST FRONT UNDERBODY VIEW

A-19

7333-3

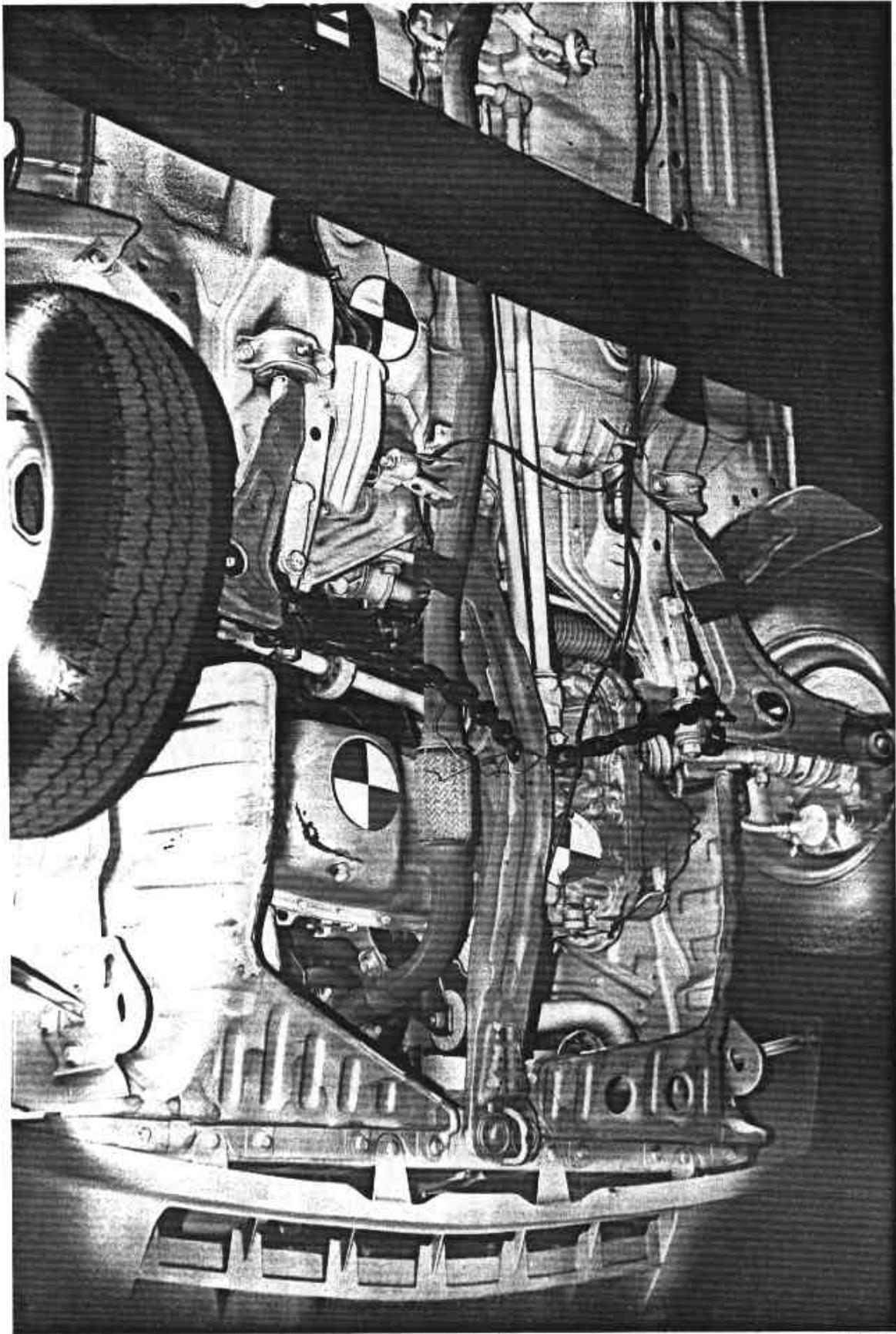


Figure A-19 PRE-TEST FRONT-SIDE UNDERBODY VIEW

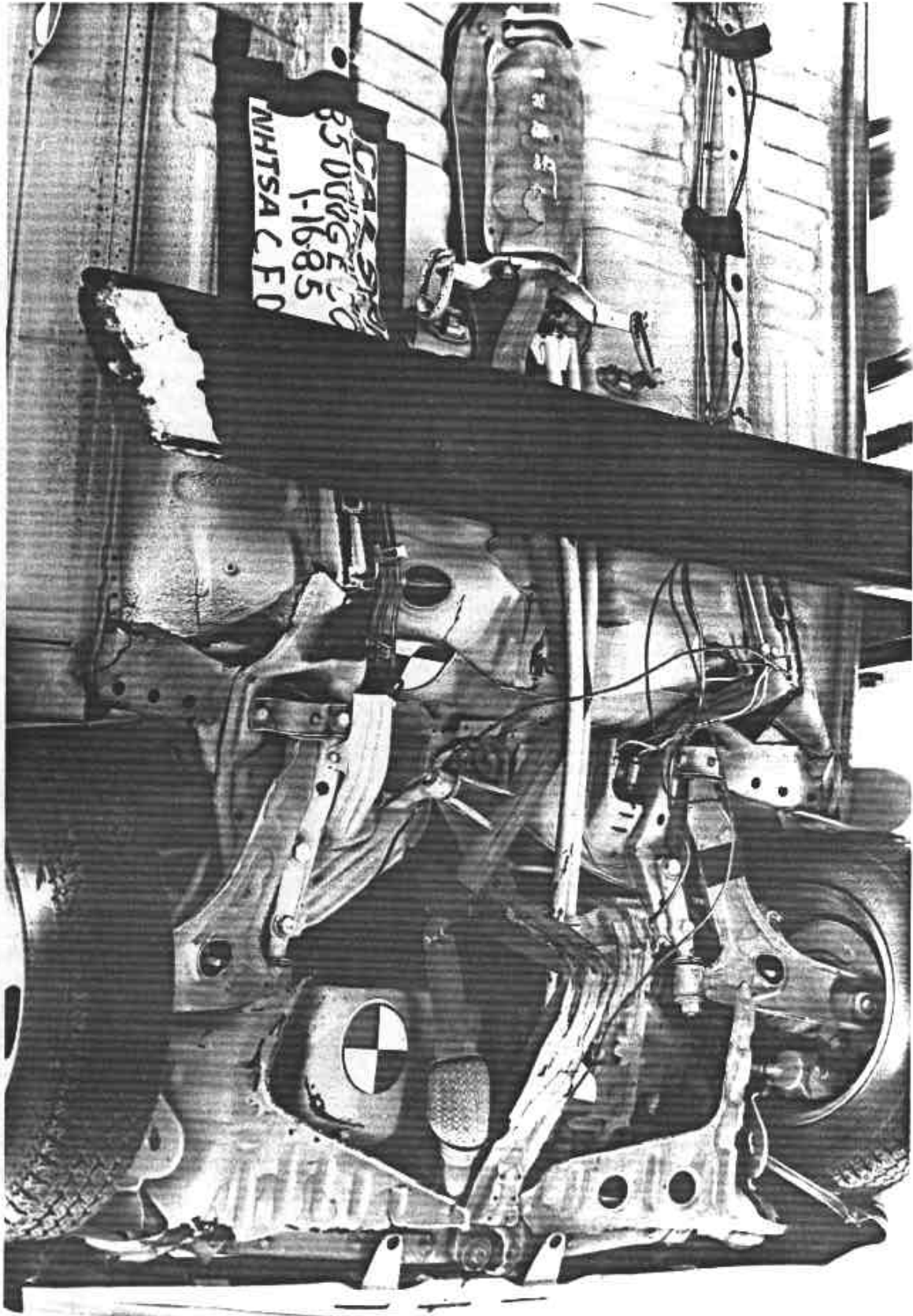


Figure A-20 POST-TEST FRONT-SIDE UNDERBODY VIEW

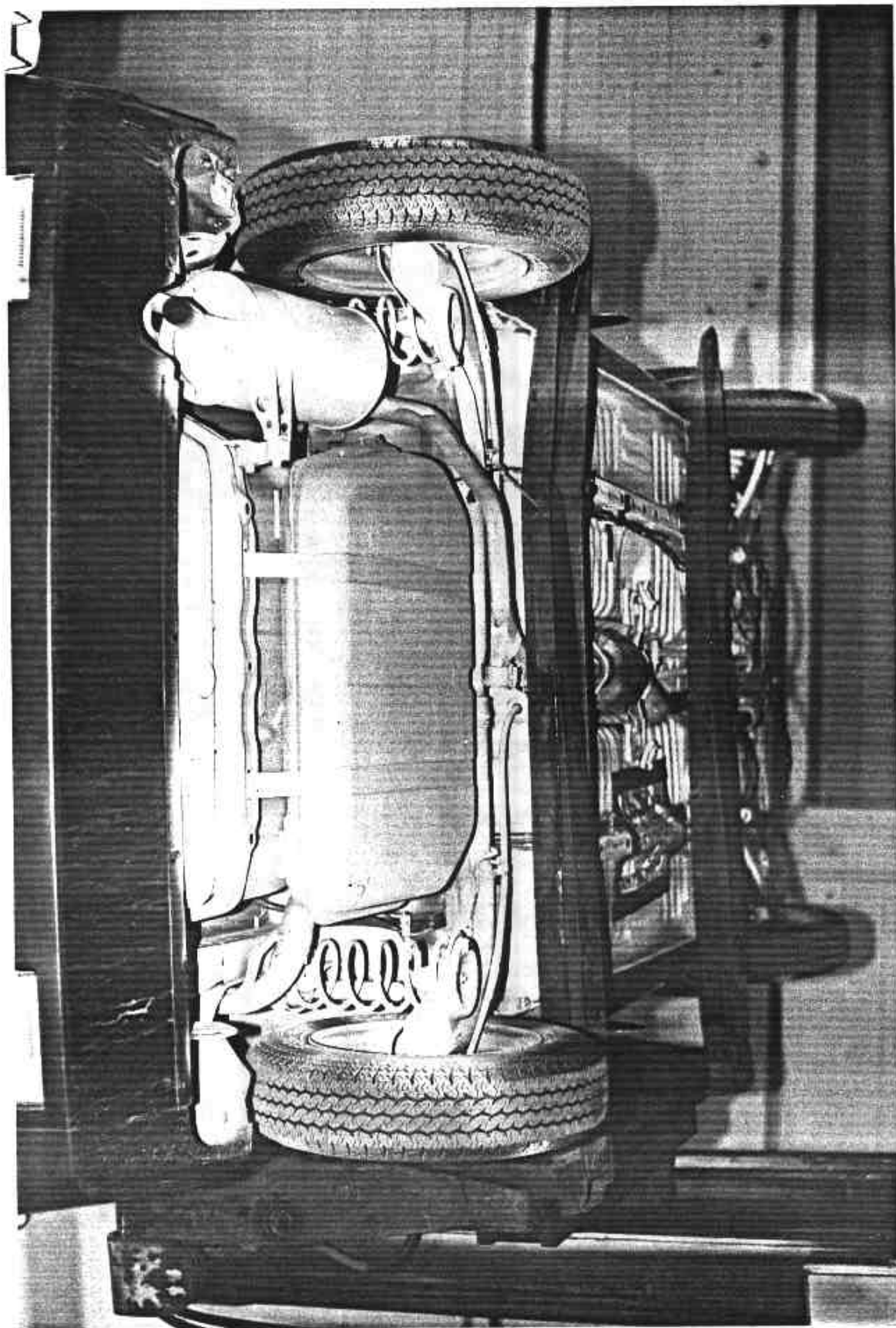


Figure A-21 PRE-TEST REAR UNDERBODY VIEW

A-22

7333-3

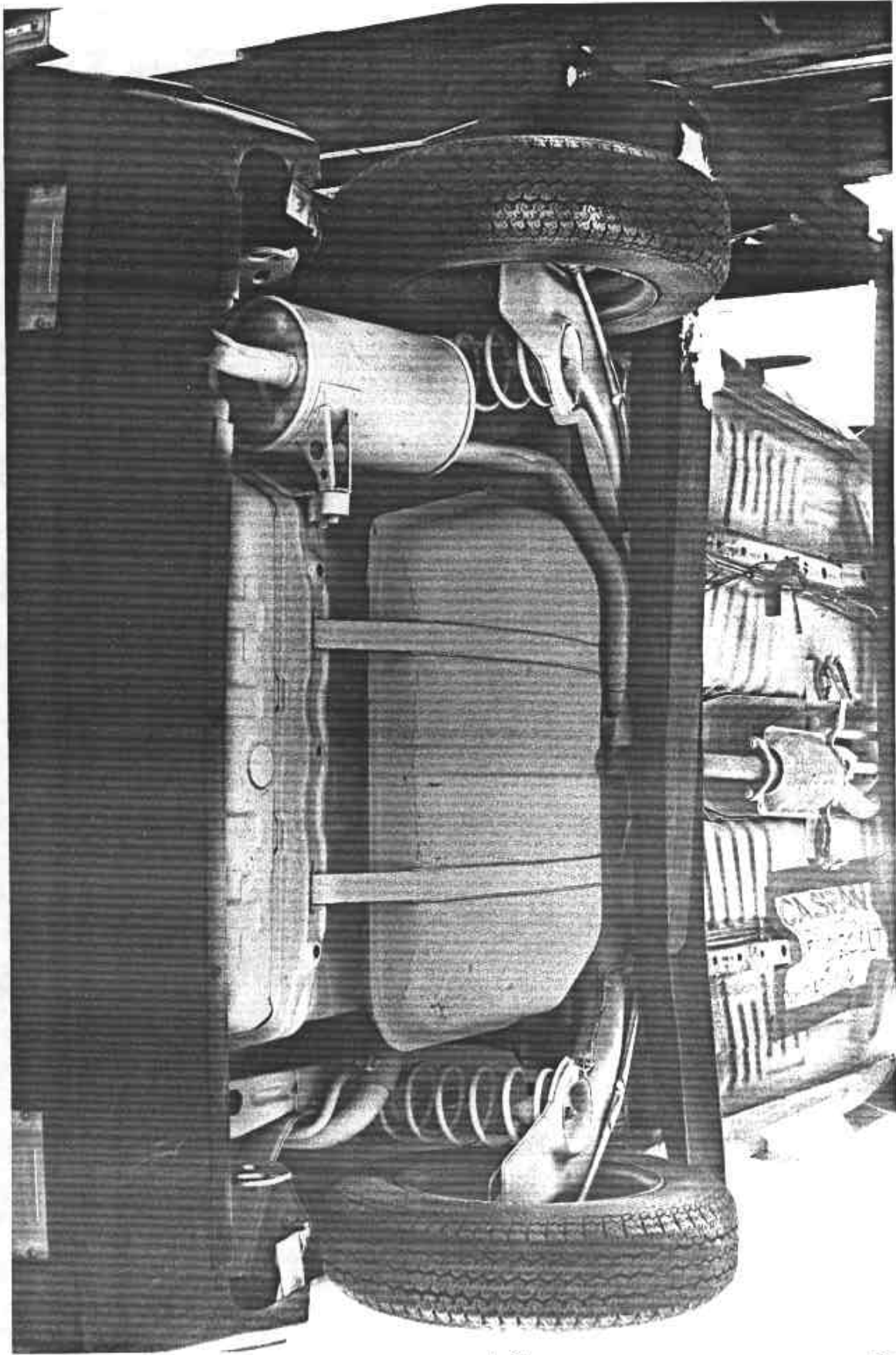


Figure A-22 POST-TEST REAR UNDERBODY VIEW



Figure A-23 PRE-TEST DRIVER POSITION VIEW

A-24

7333-3

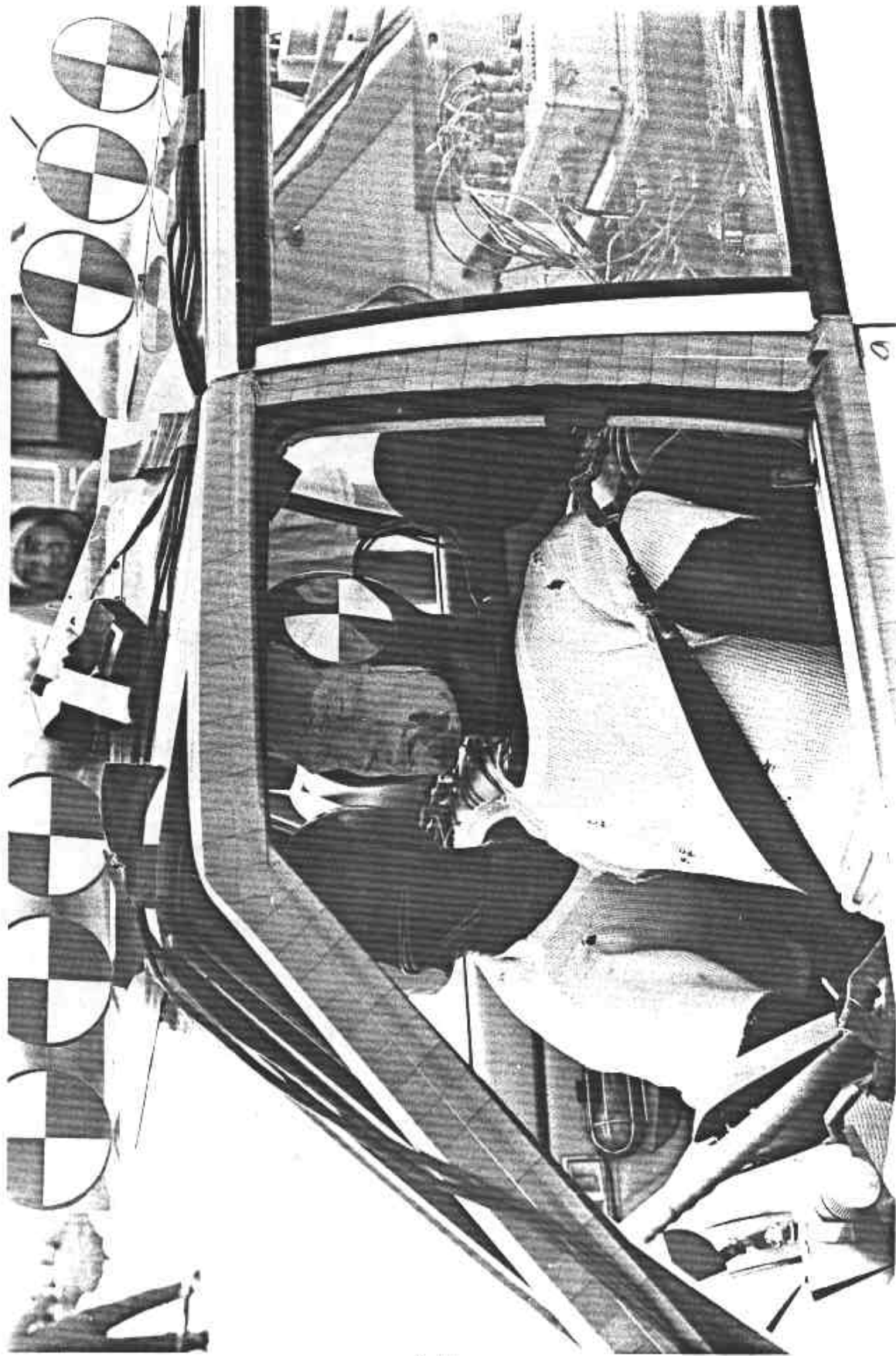


Figure A-24 POST-TEST DRIVER POSITION VIEW



Figure A-25 PRE-TEST PASSENGER POSITION VIEW

A-26

7333-3

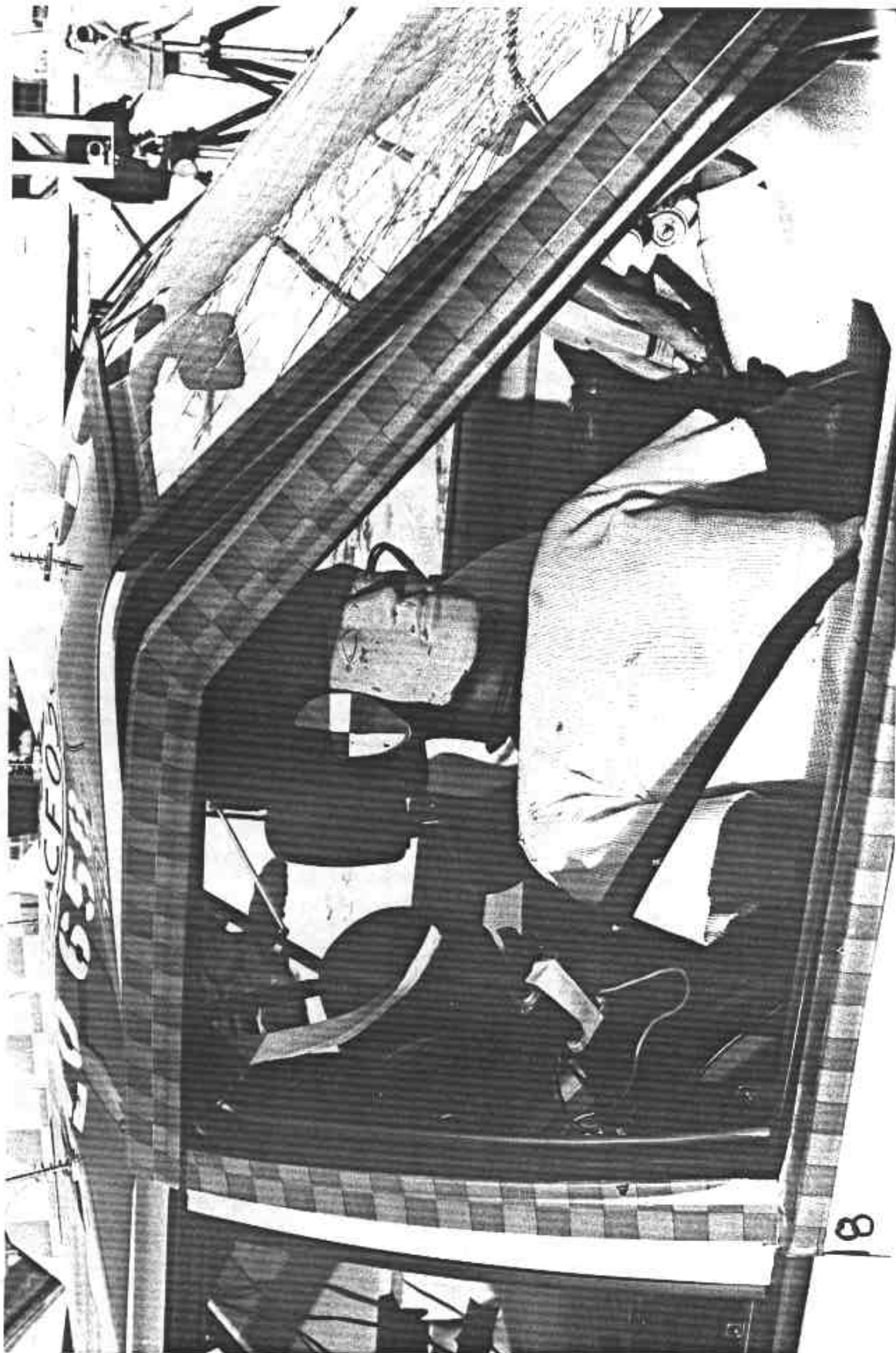


Figure A-26 POST-TEST PASSENGER POSITION VIEW

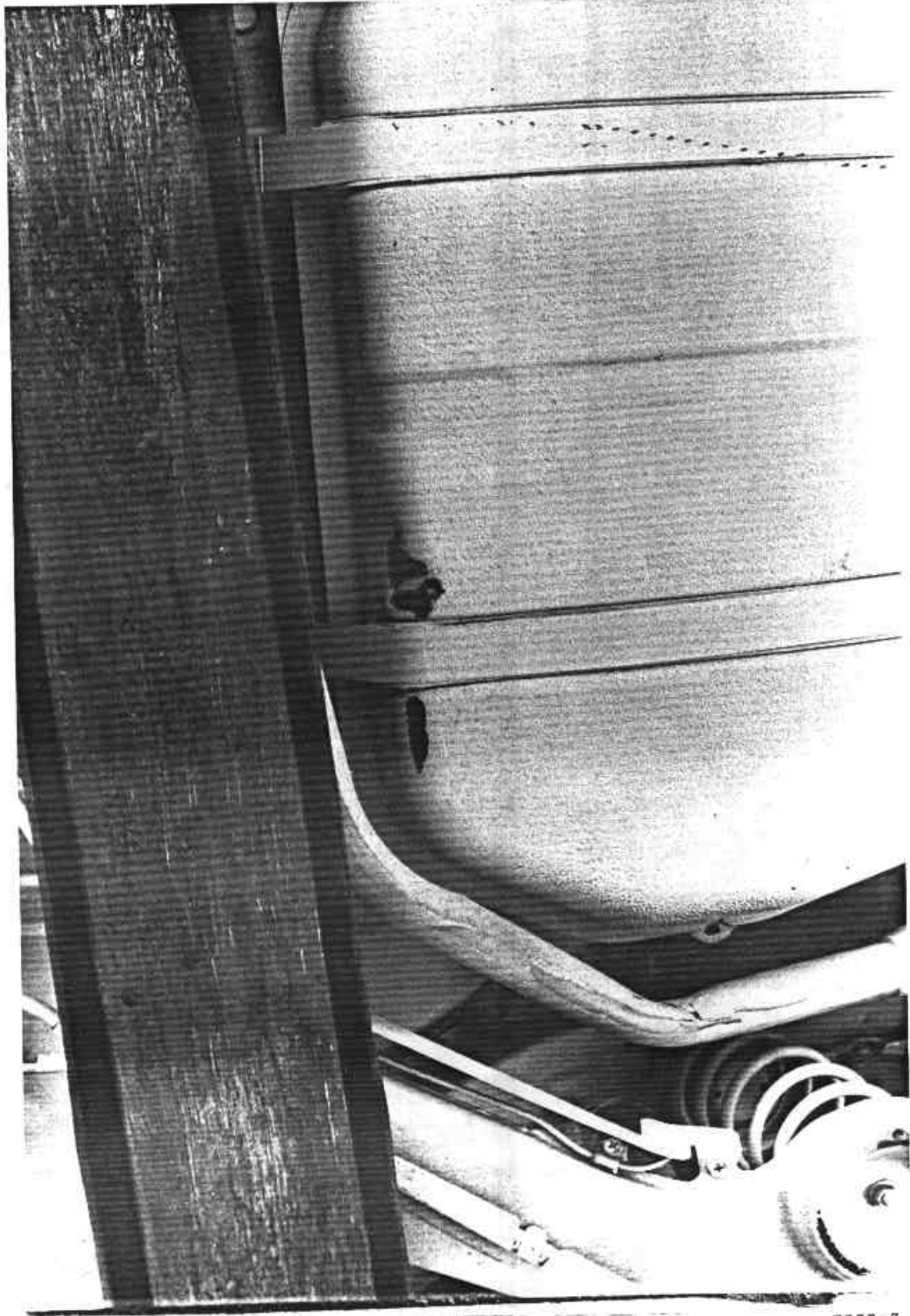


Figure A-27 POST-TEST FUEL TANK DENT VIEW

A-28

7333-3



Figure A-28 PRE-TEST DRIVER AND INTERIOR VIEW



A-30

7333-3

Figure A-29 POST-TEST DRIVER AND INTERIOR VIEW

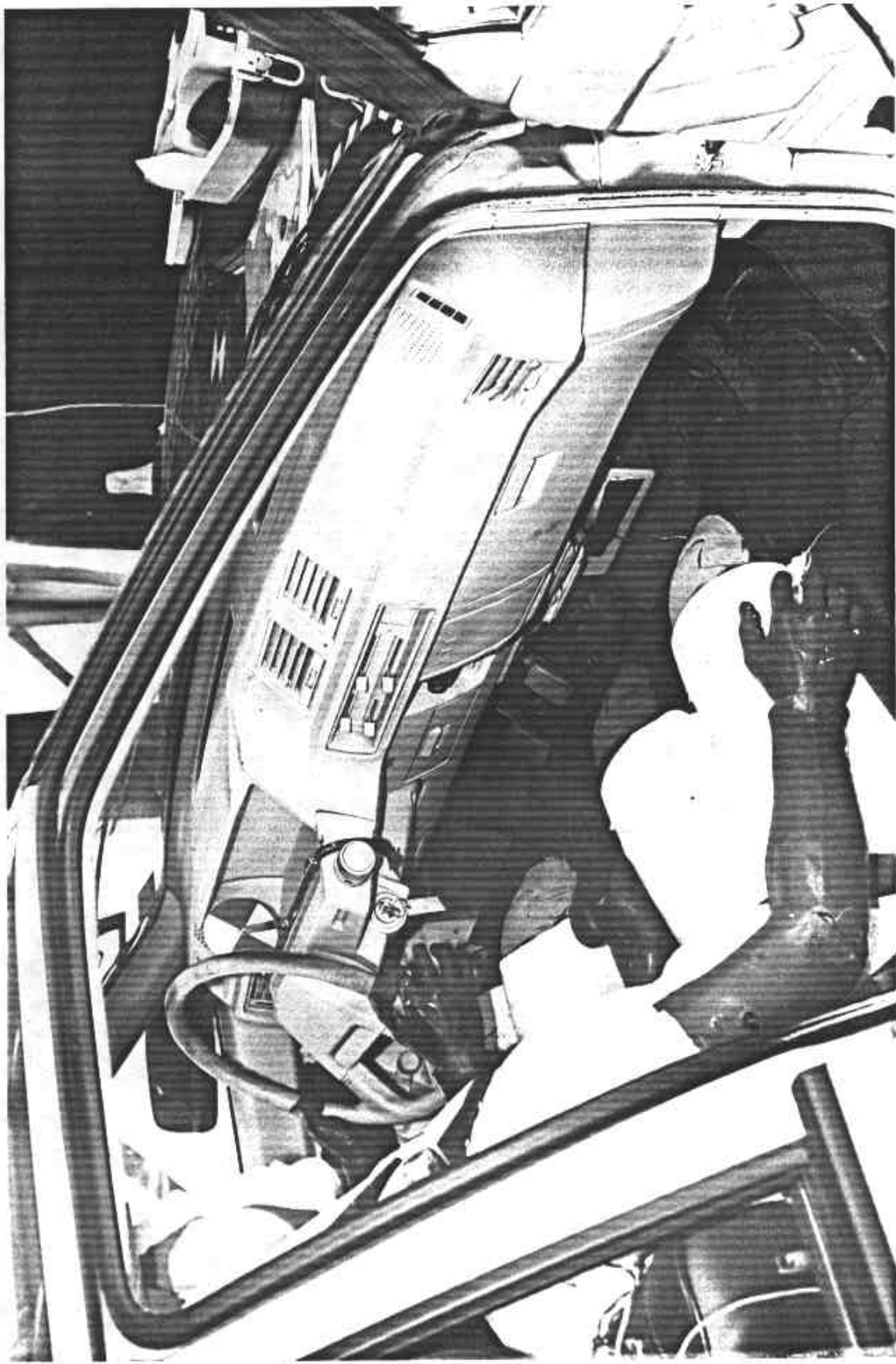


Figure A-30 PRE-TEST PASSENGER AND INTERIOR VIEW

A-31

7333-3



Figure A-31 POST-TEST PASSENGER AND INTERIOR VIEW

A-32

7333-3

APPENDIX B

VEHICLE, DUMMY AND LOAD CELL BARRIER DATA

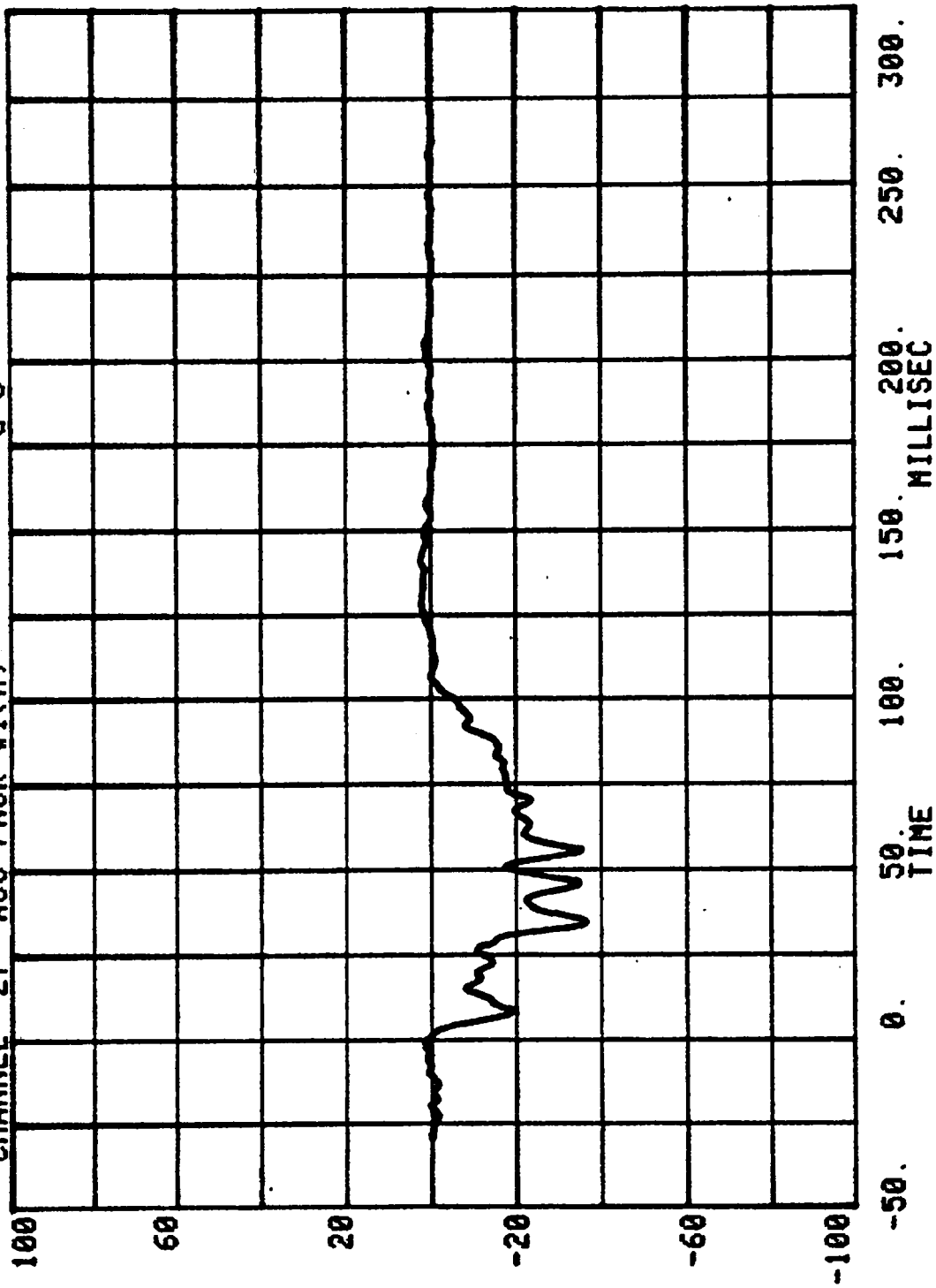
TEST NO. CF0301

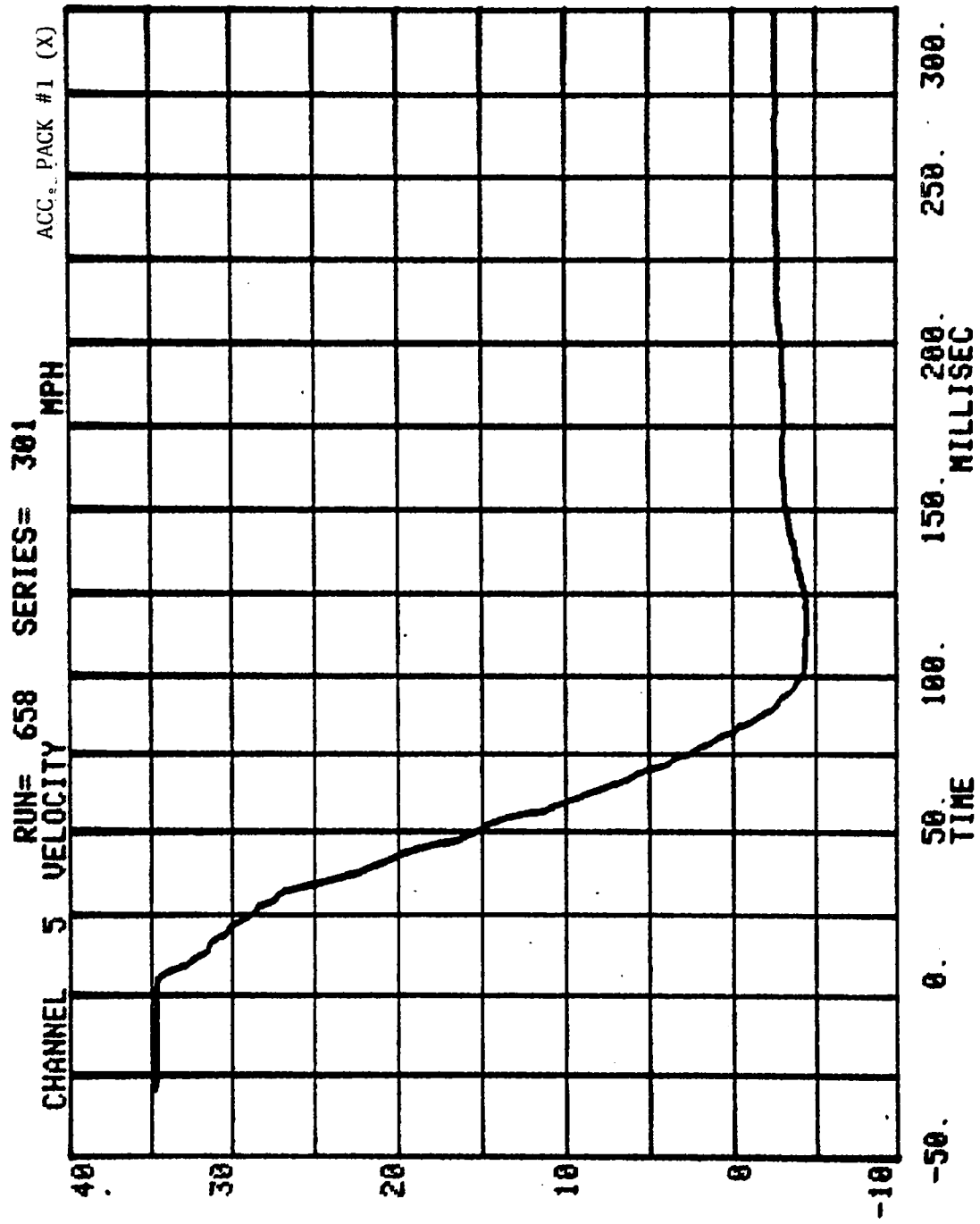
VEHICLE DATA

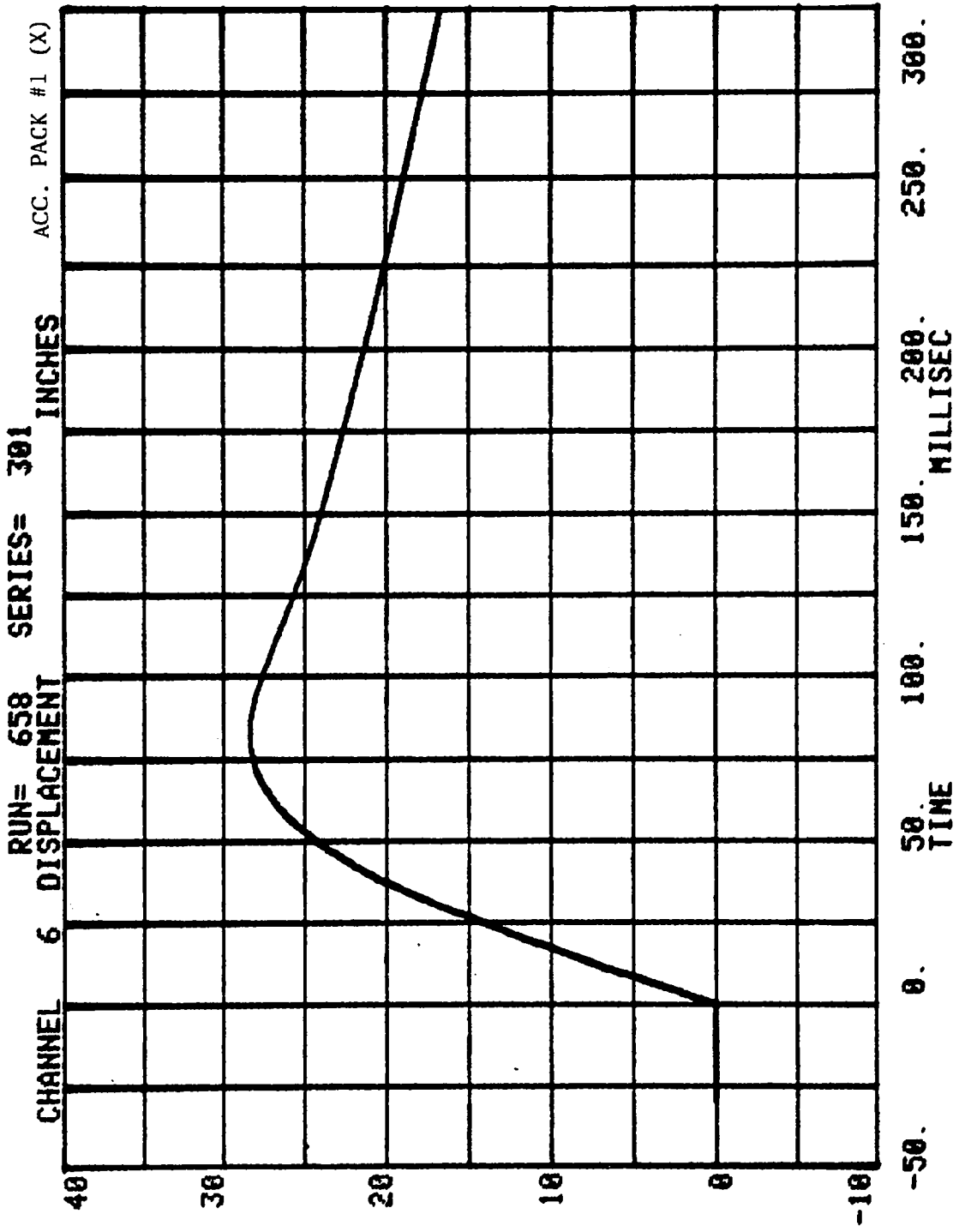
FILTER CHANNEL CLASS

60

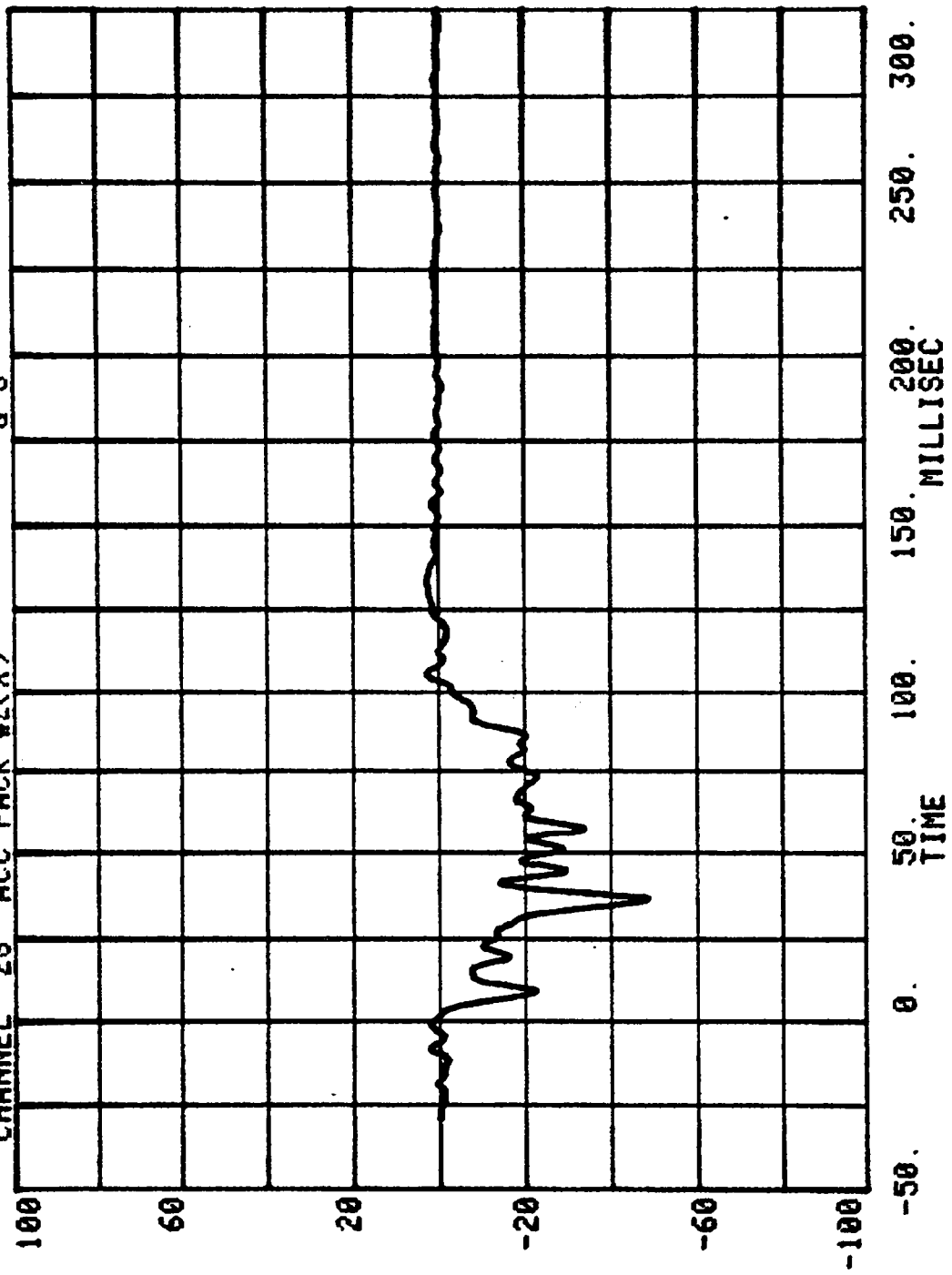
CHANNEL 27 ACC PACK #1(X) RUN= 658 SERIES= 301 G'S



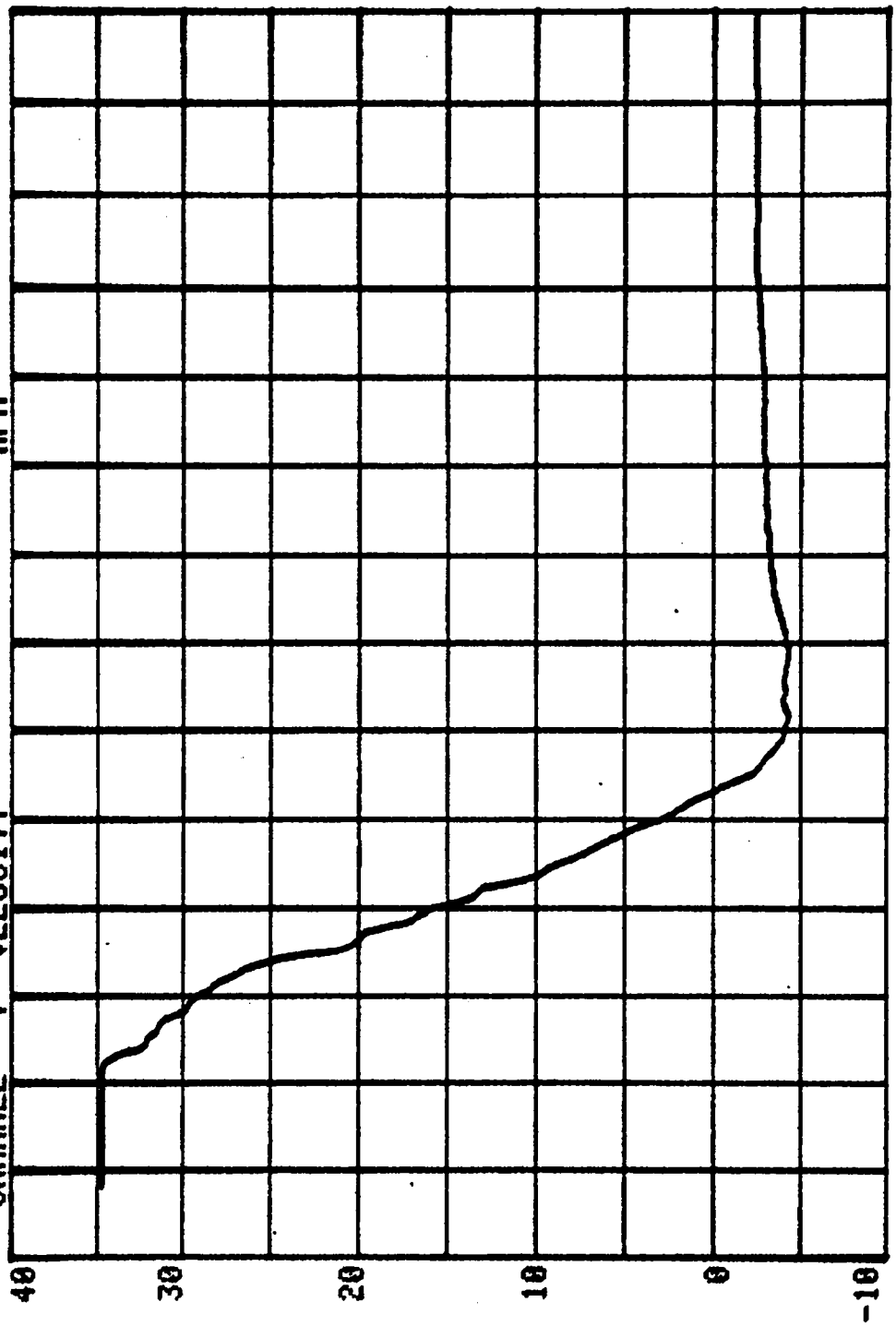




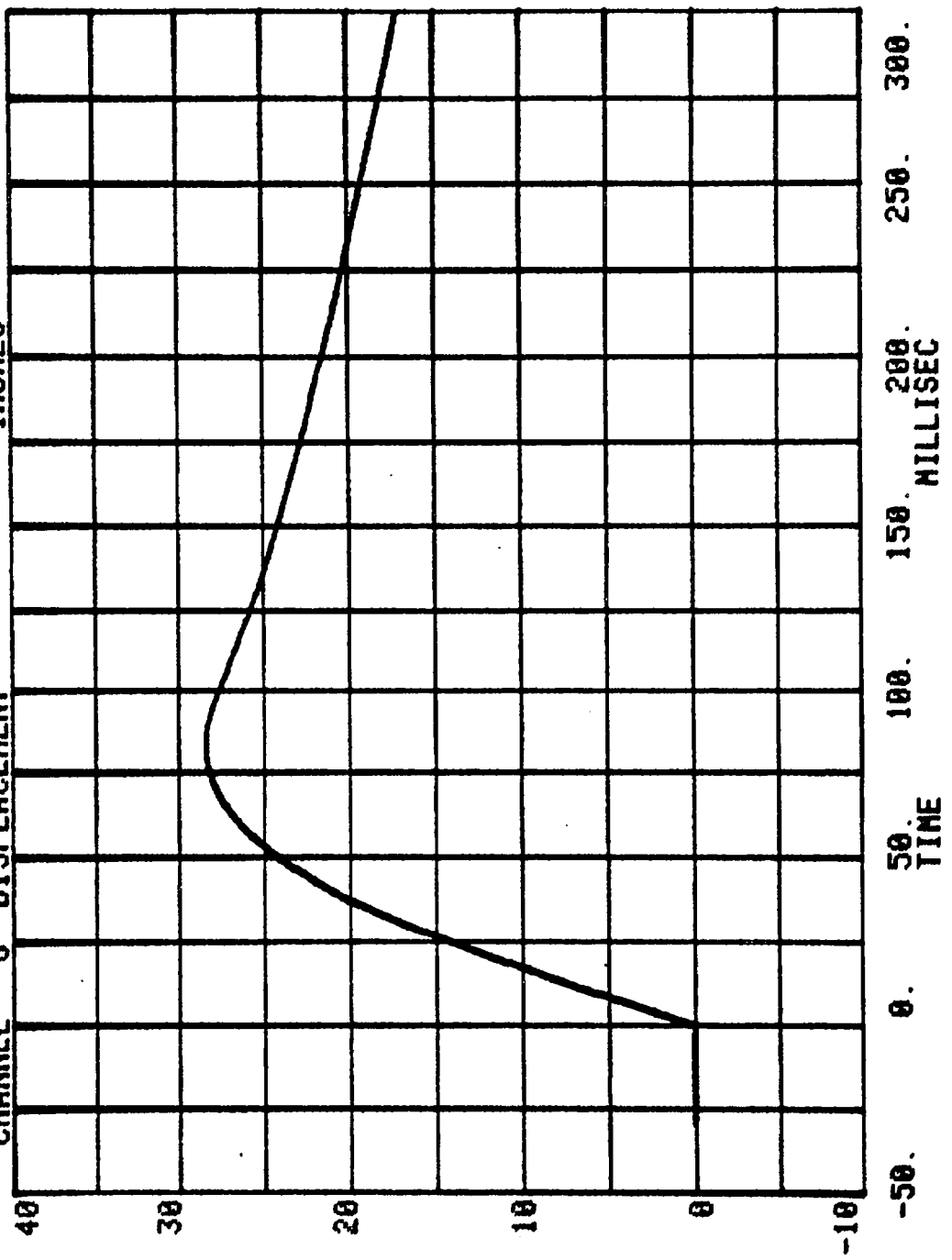
CHANNEL 28 ACC PACK #2(X) RUN= 658 SERIES= 301 G'S

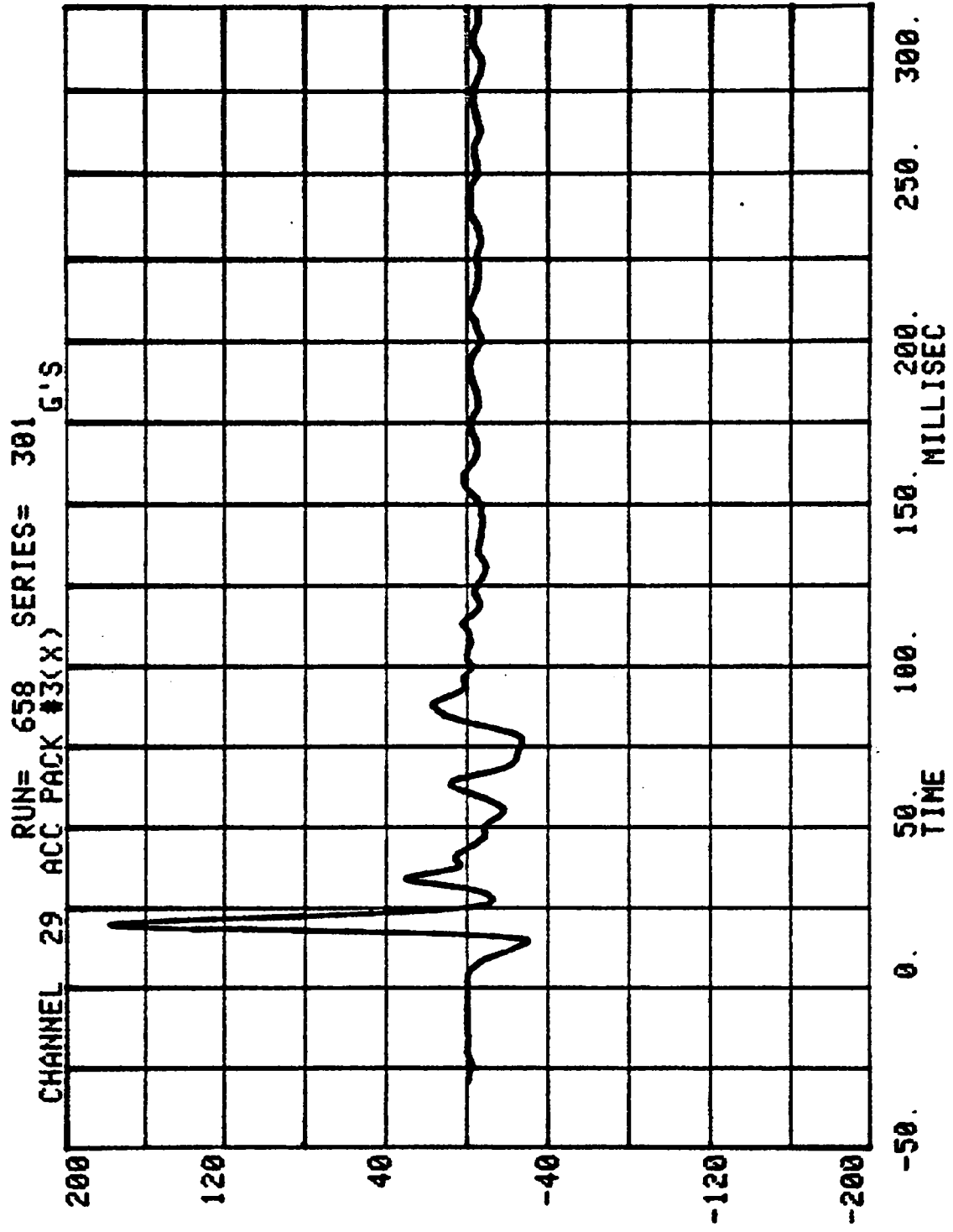


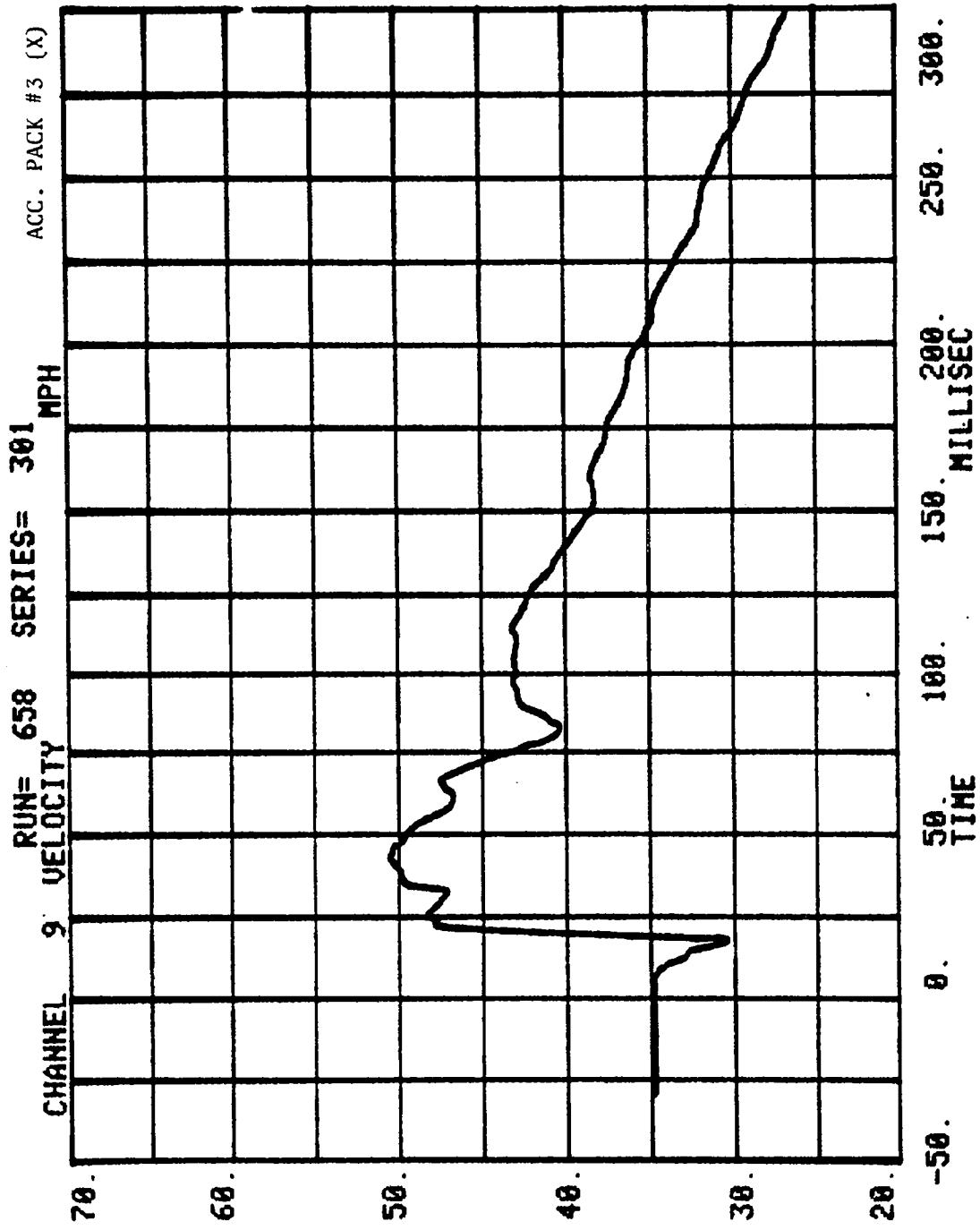
CHANNEL 7 VELOCITY
RUN= 658 SERIES= 301 MPH
ACC. PACK #2 (X)

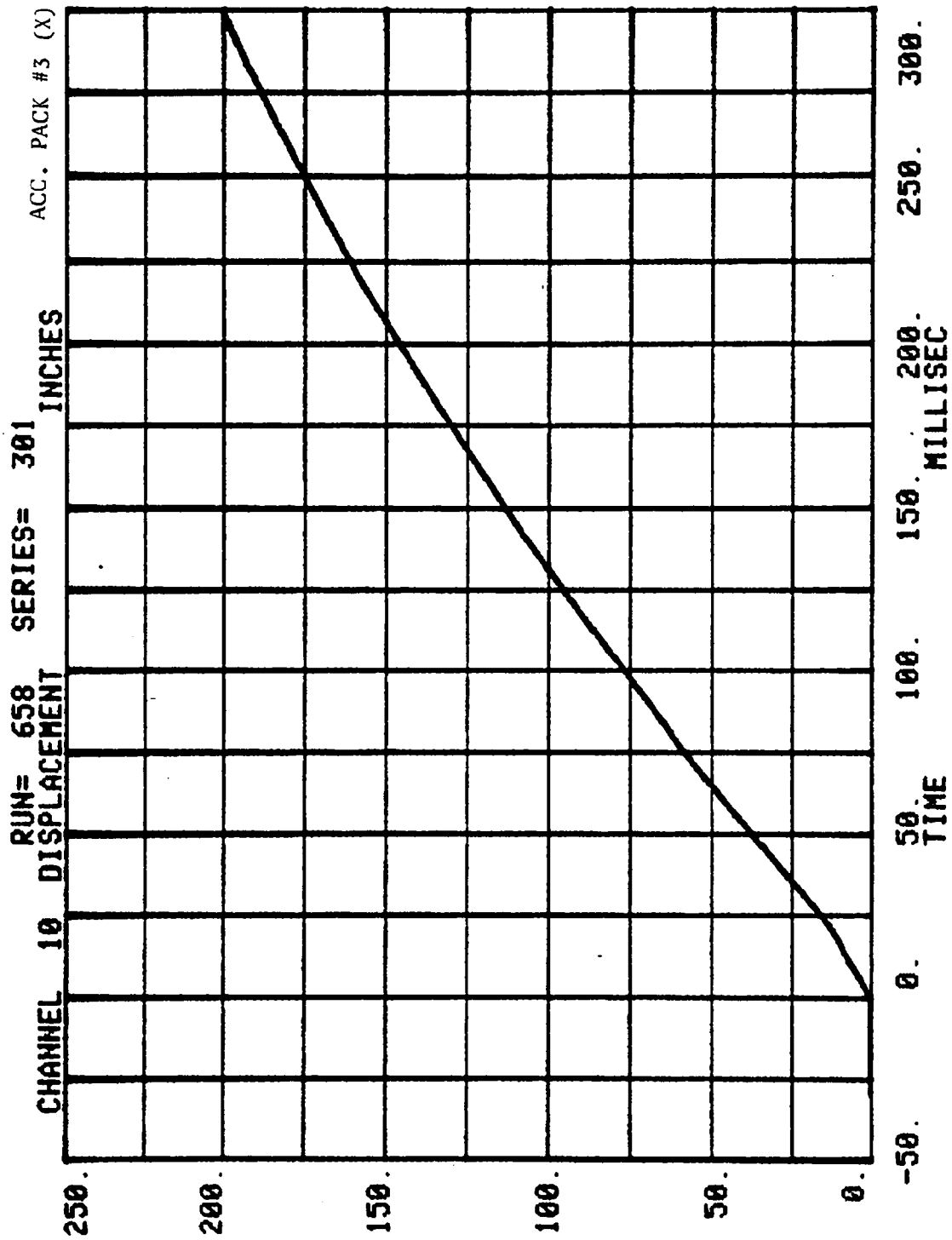


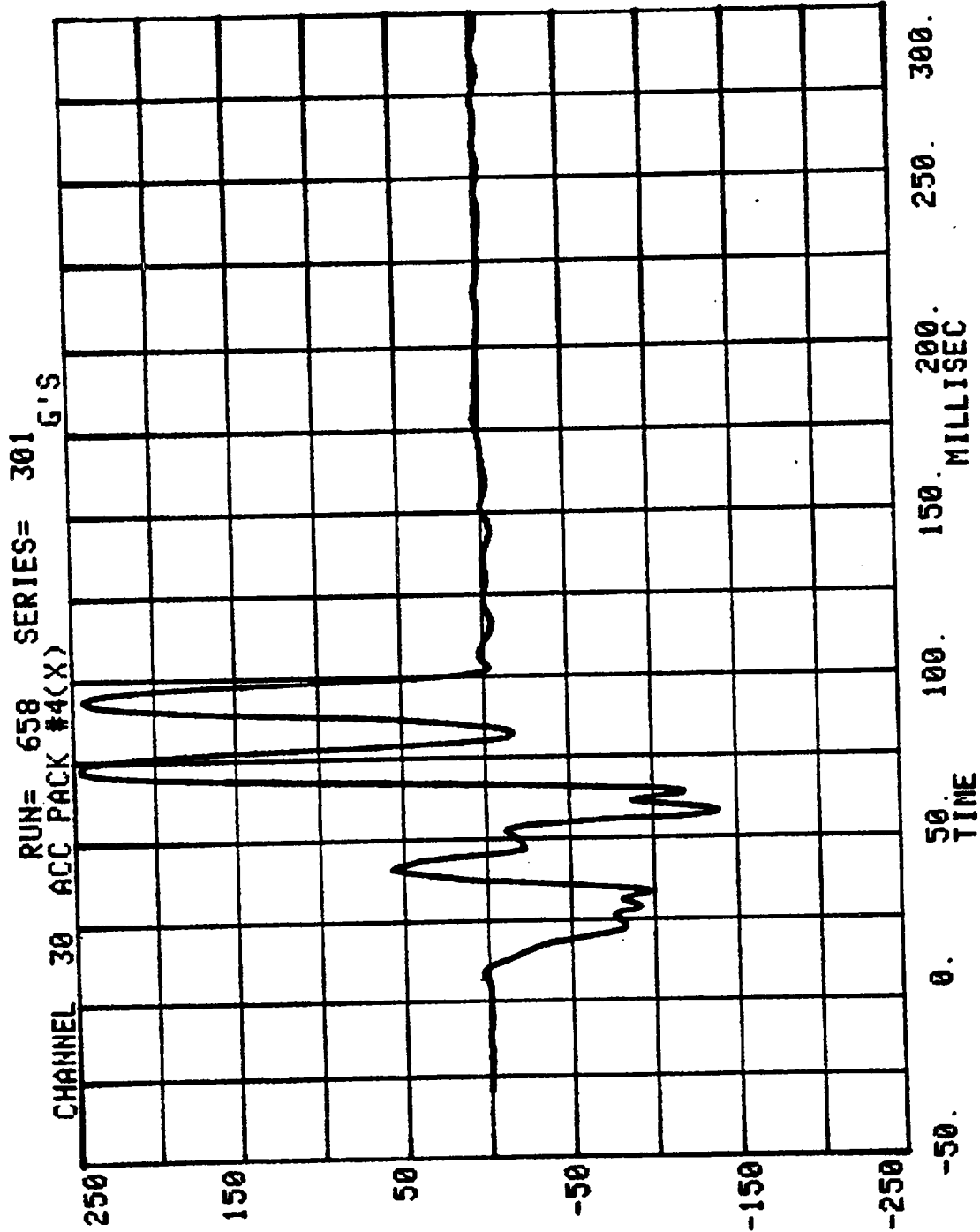
CHANNEL 8 DISPLACEMENT RUN= 658 SERIES= 301 INCHES ACC. PACK #2 (X)

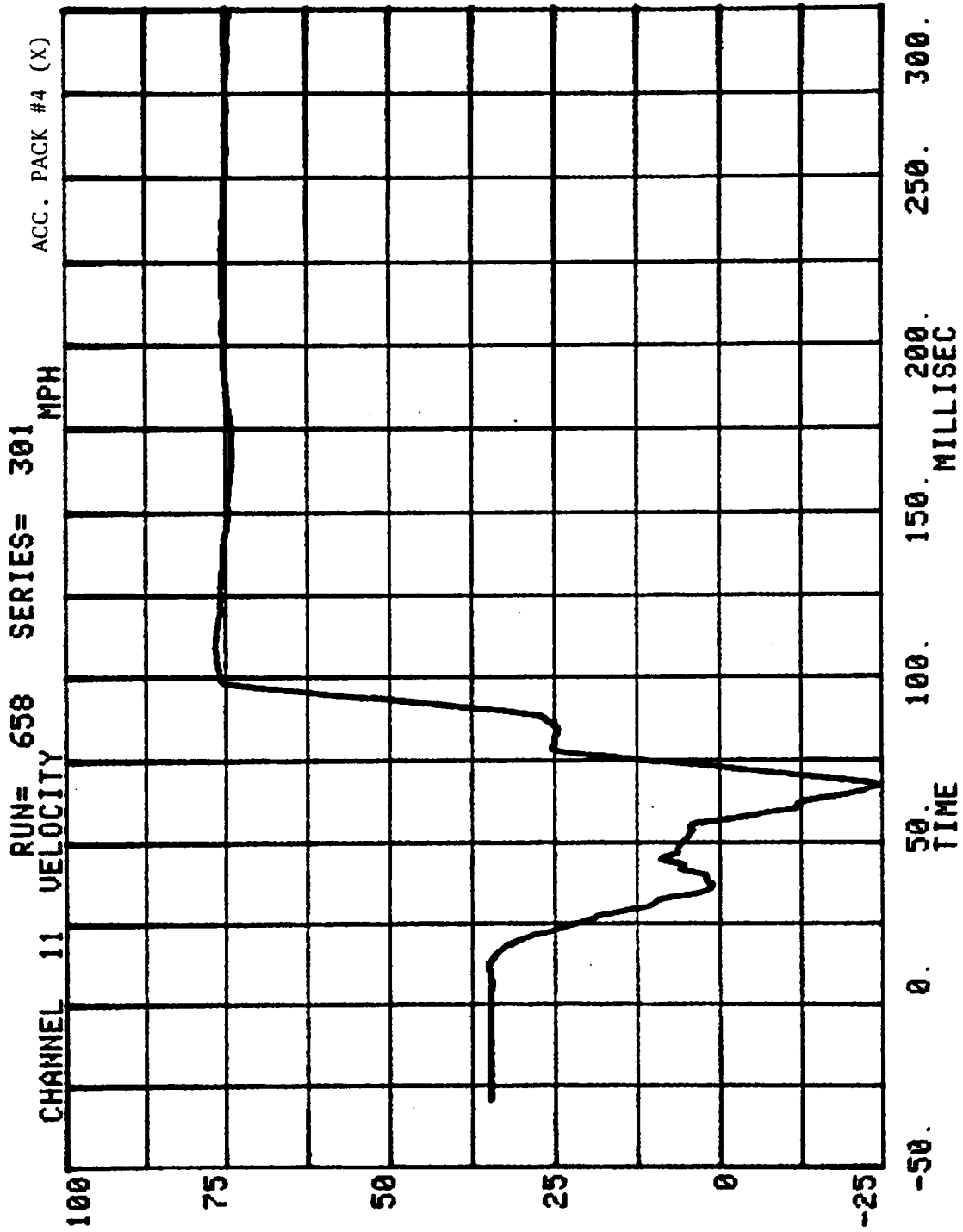


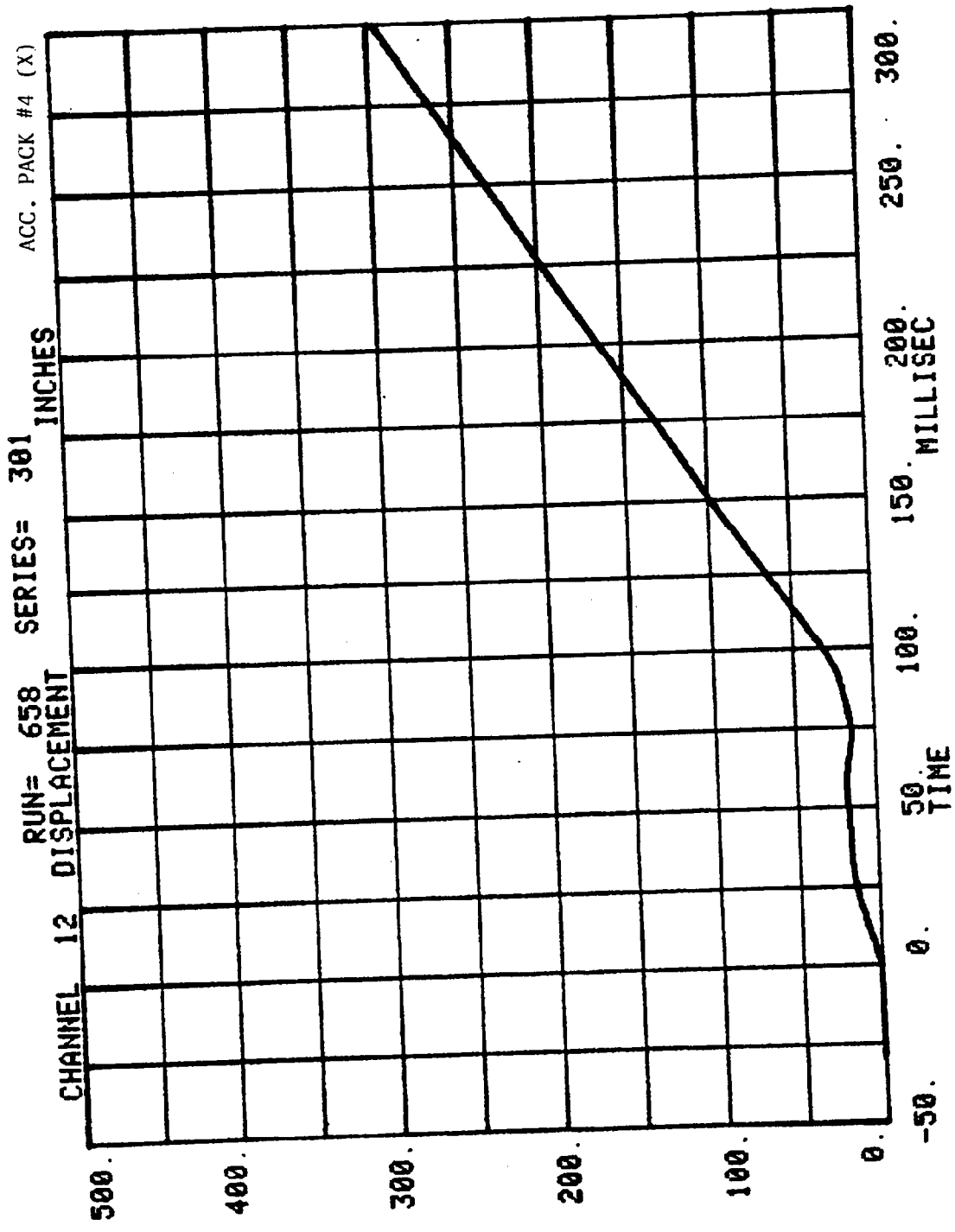




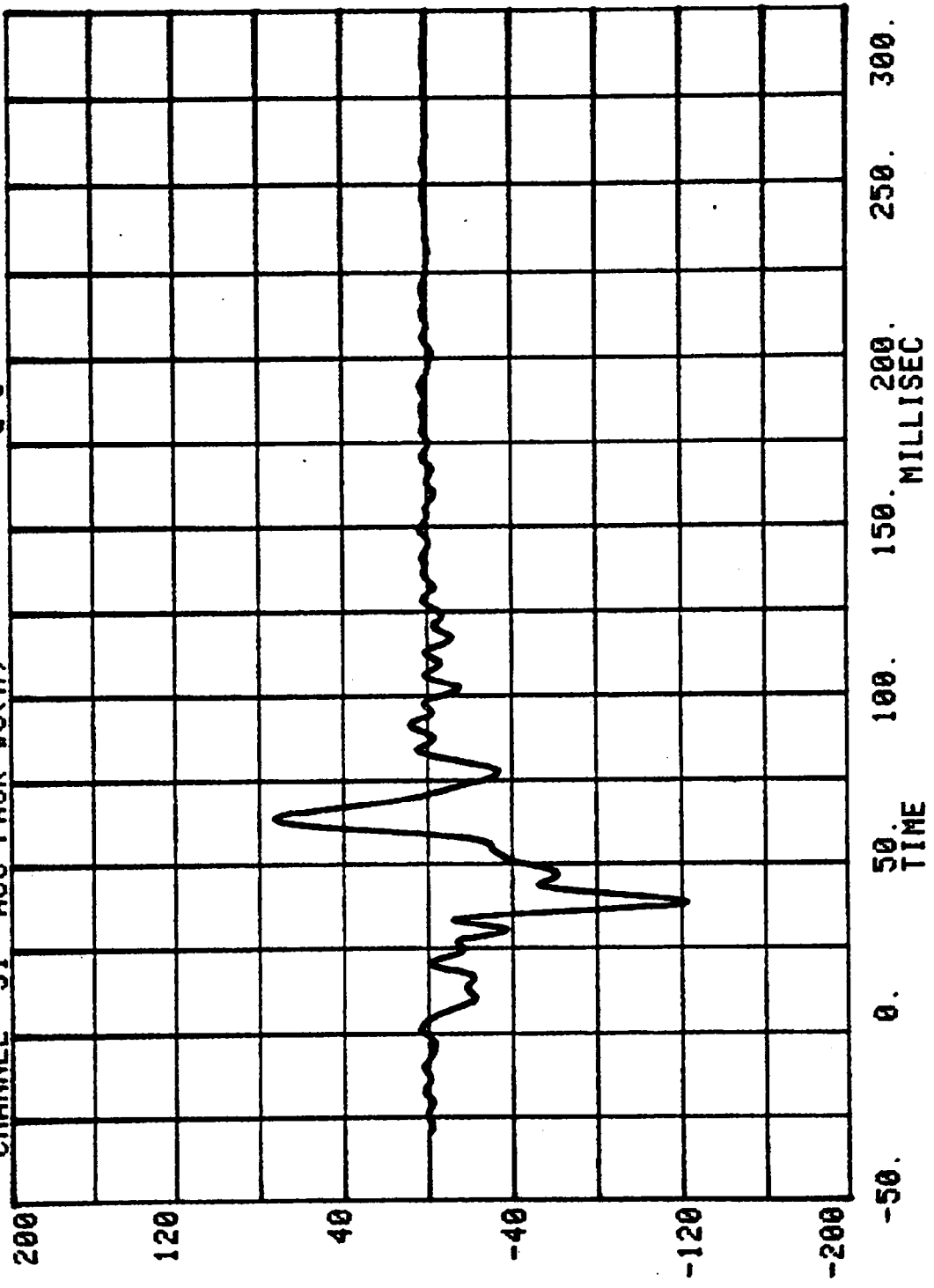


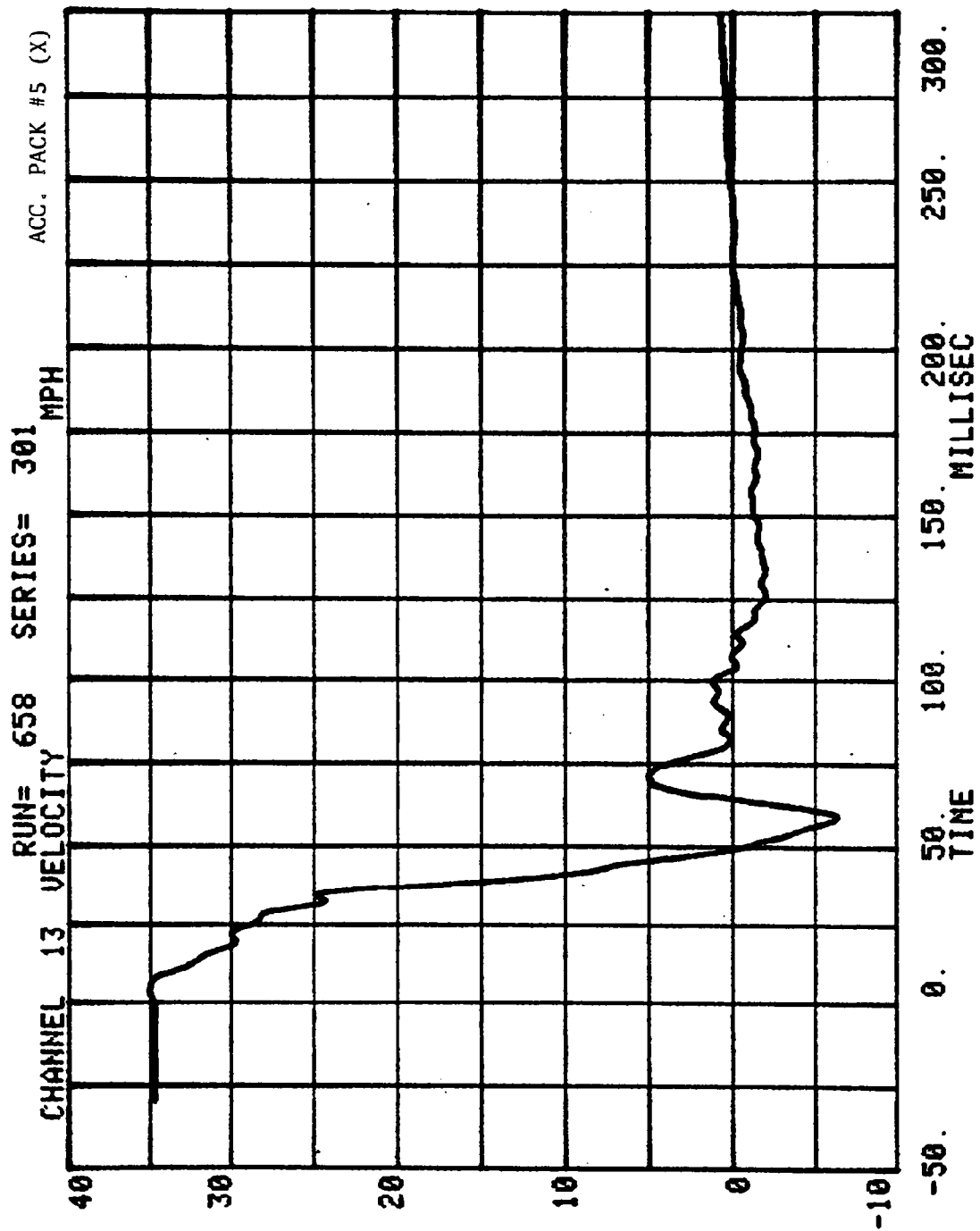


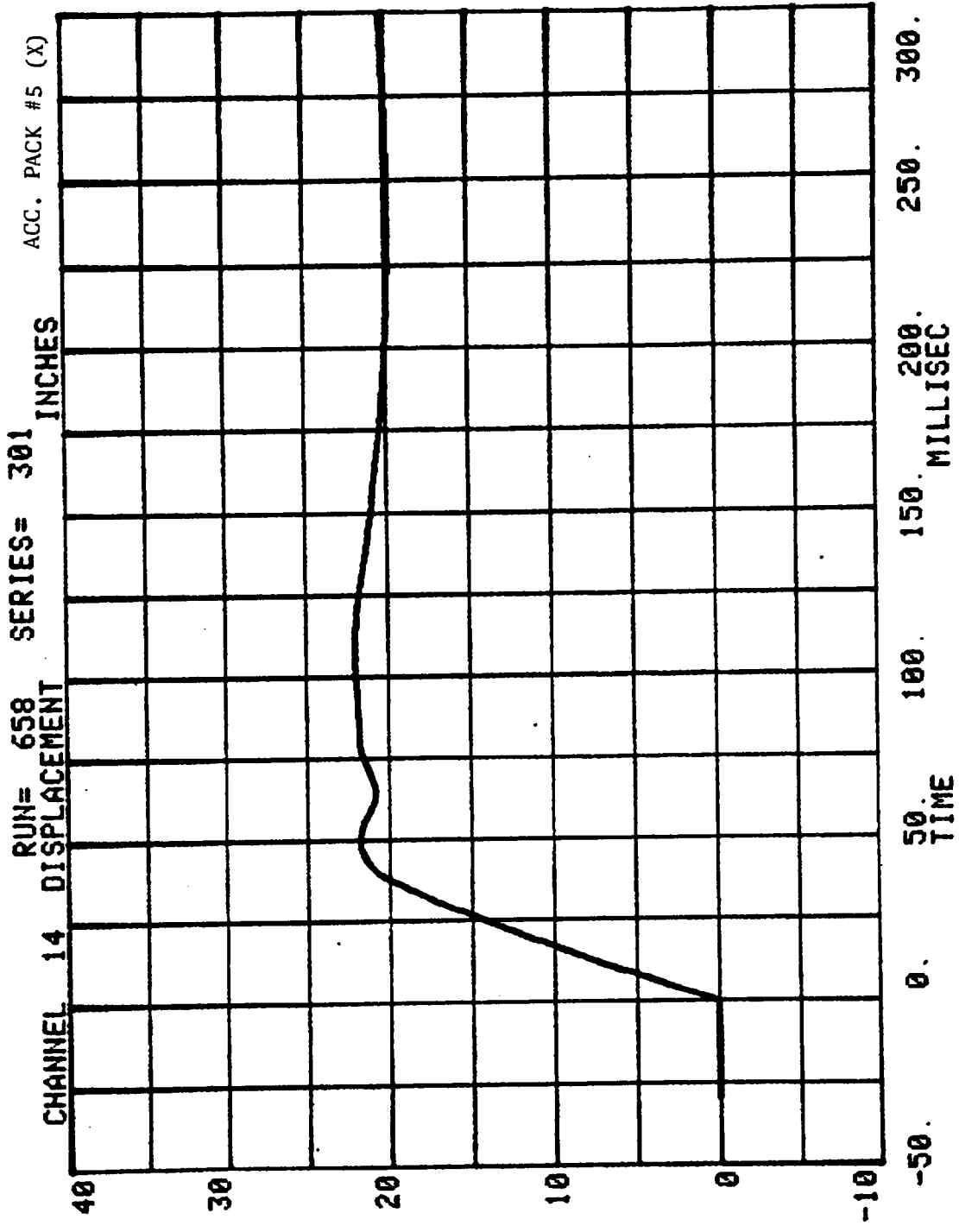


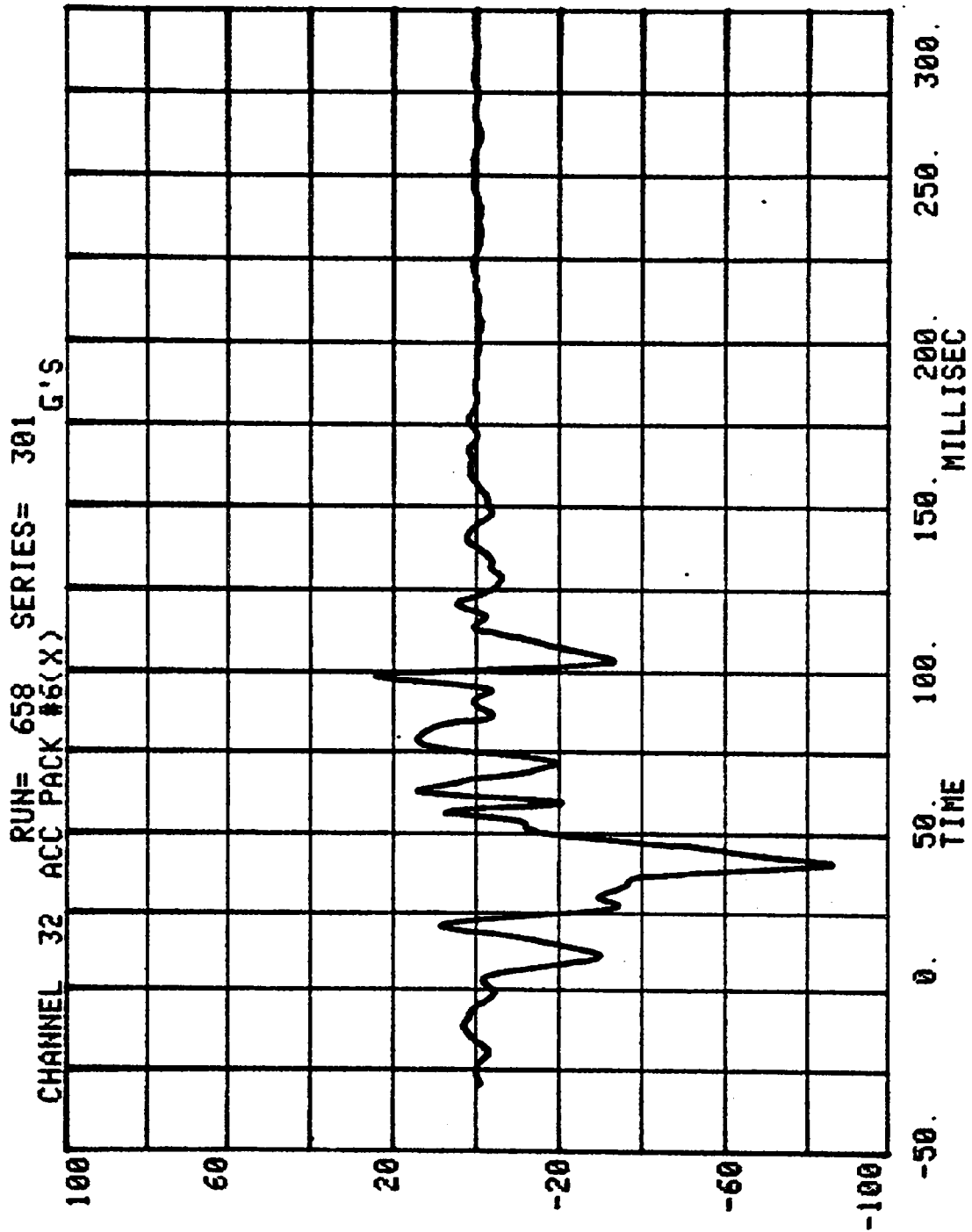


CHANNEL 31 ACC PACK #5(X) RUN= 658 SERIES= 301 G'S

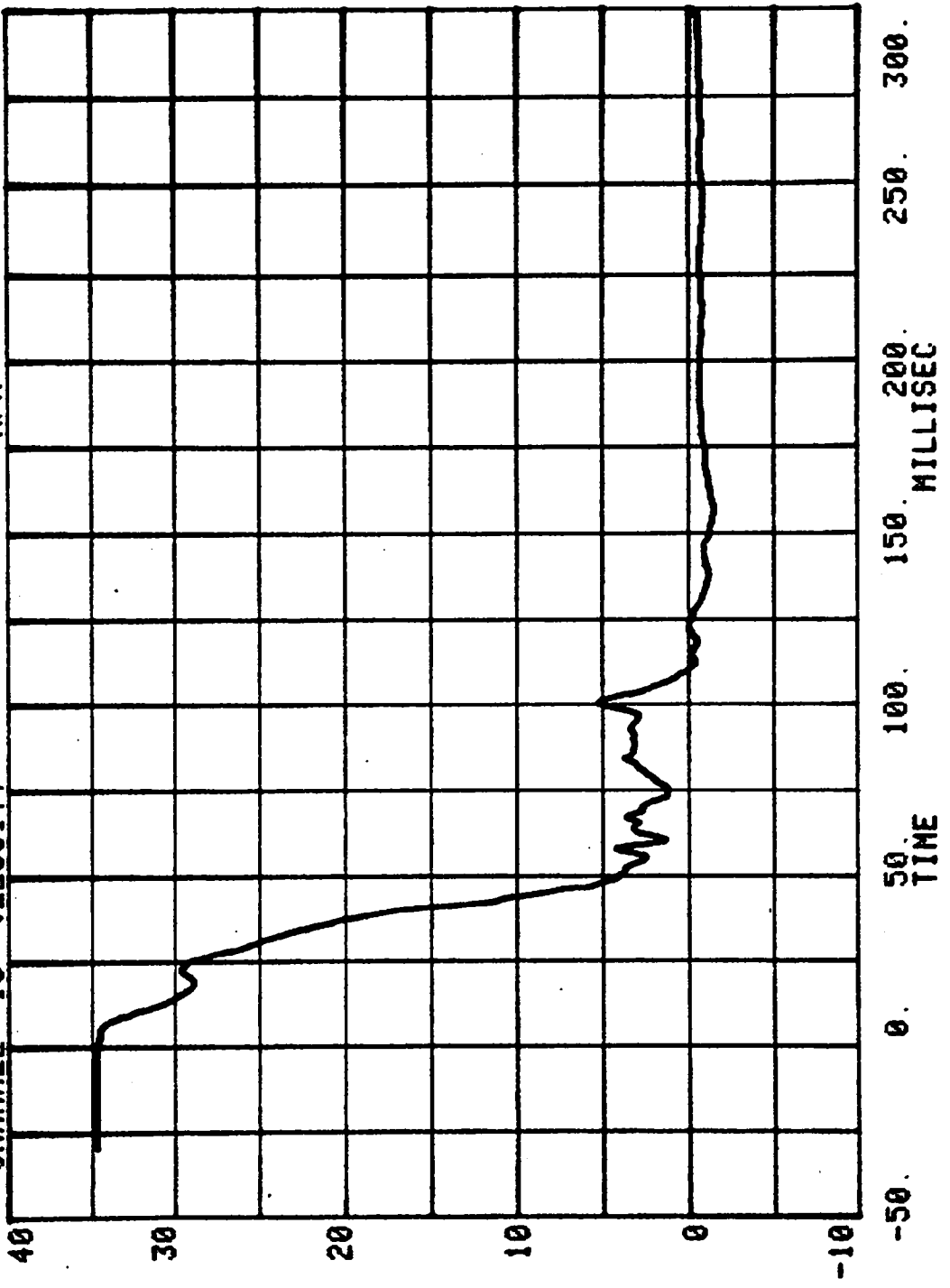


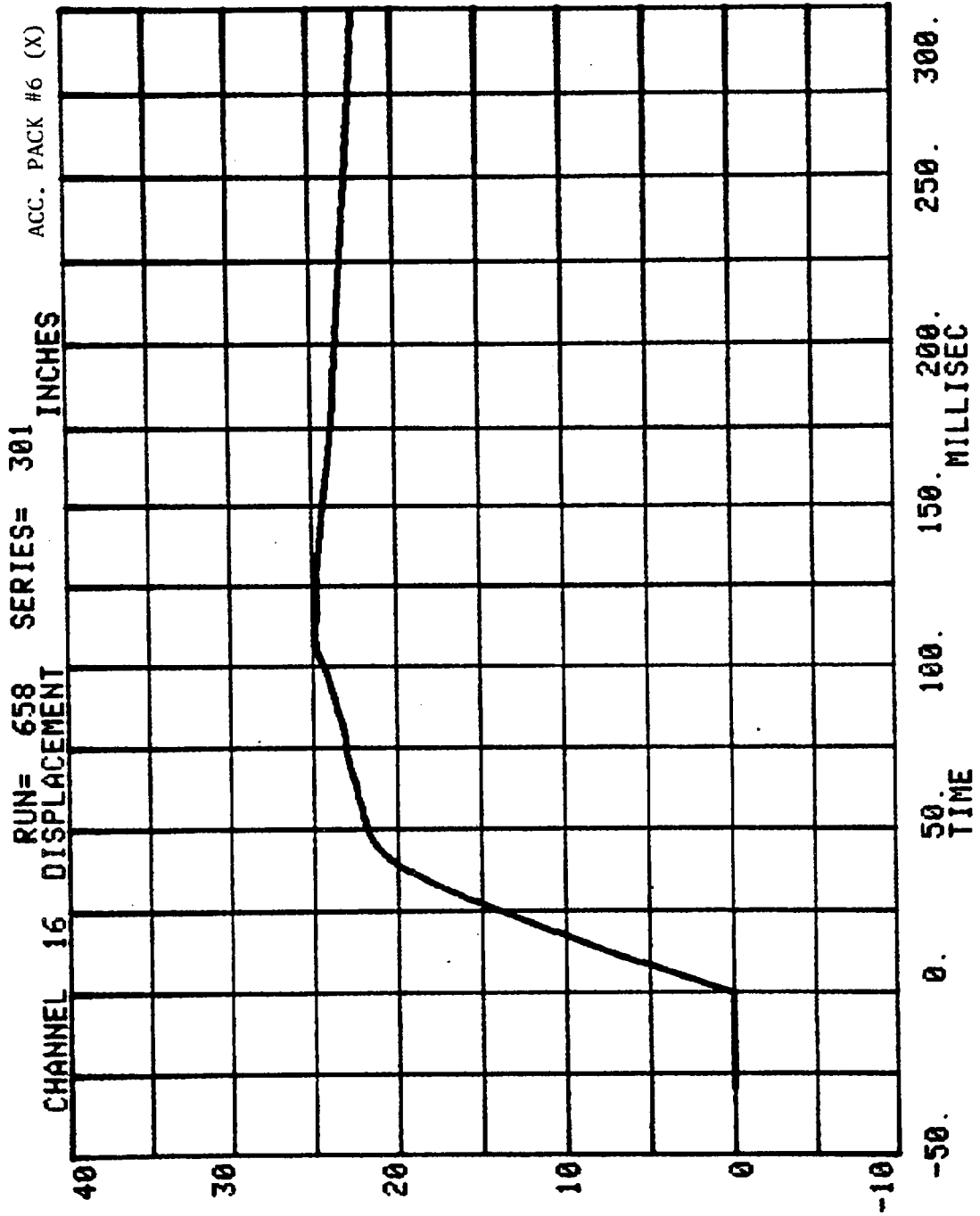




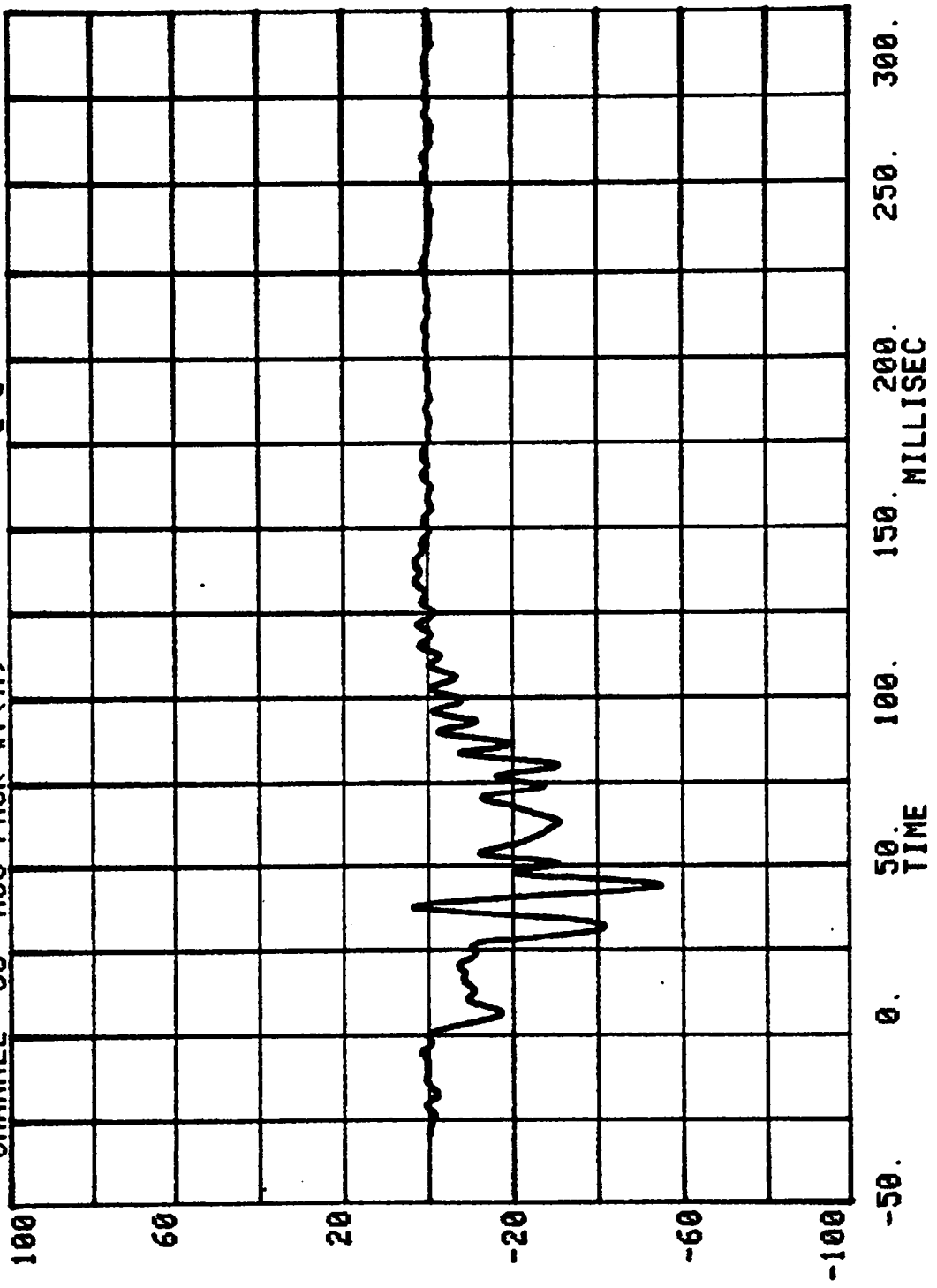


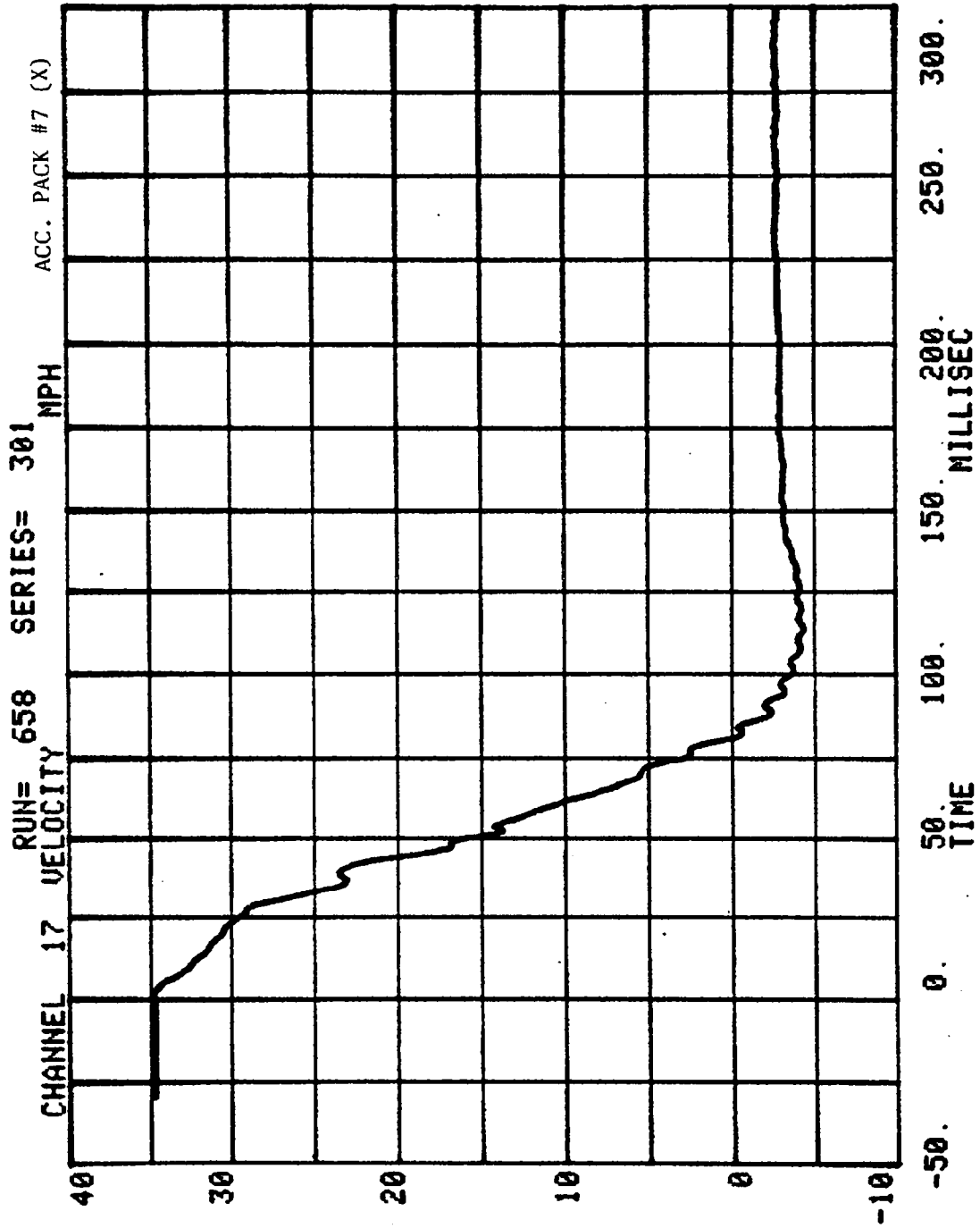
CHANNEL 15 VELOCITY
RUN= 658 SERIES= 301 MPH
ACC. PACK #6 (X)





CHANNEL 33 ACC PACK #7(X) RUN= 658 SERIES= 301 G'S





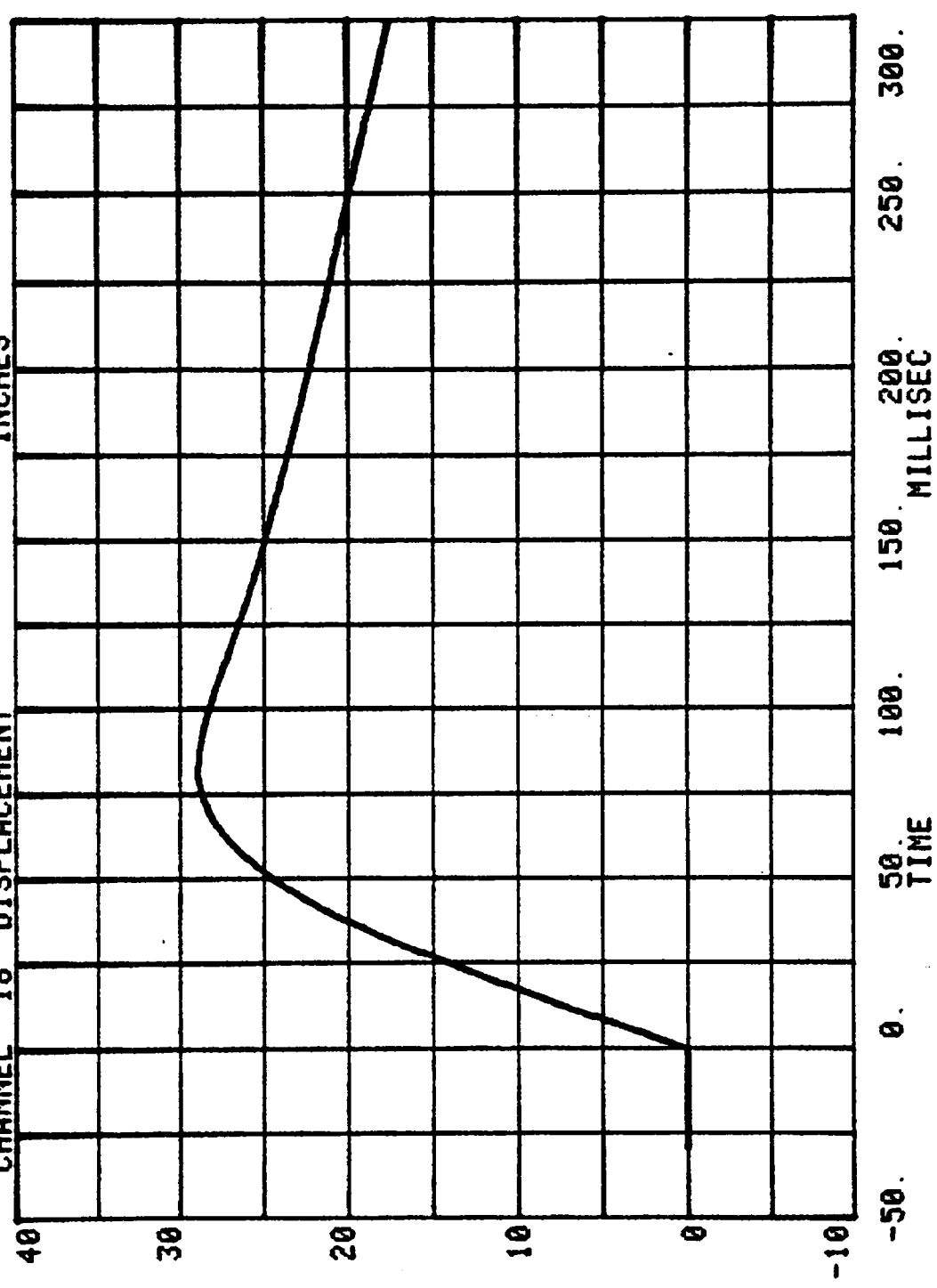
ACC. PACK #7 (X)

CHANNEL 18 DISPLACEMENT

RUN= 658

SERIES= 301

INCHES

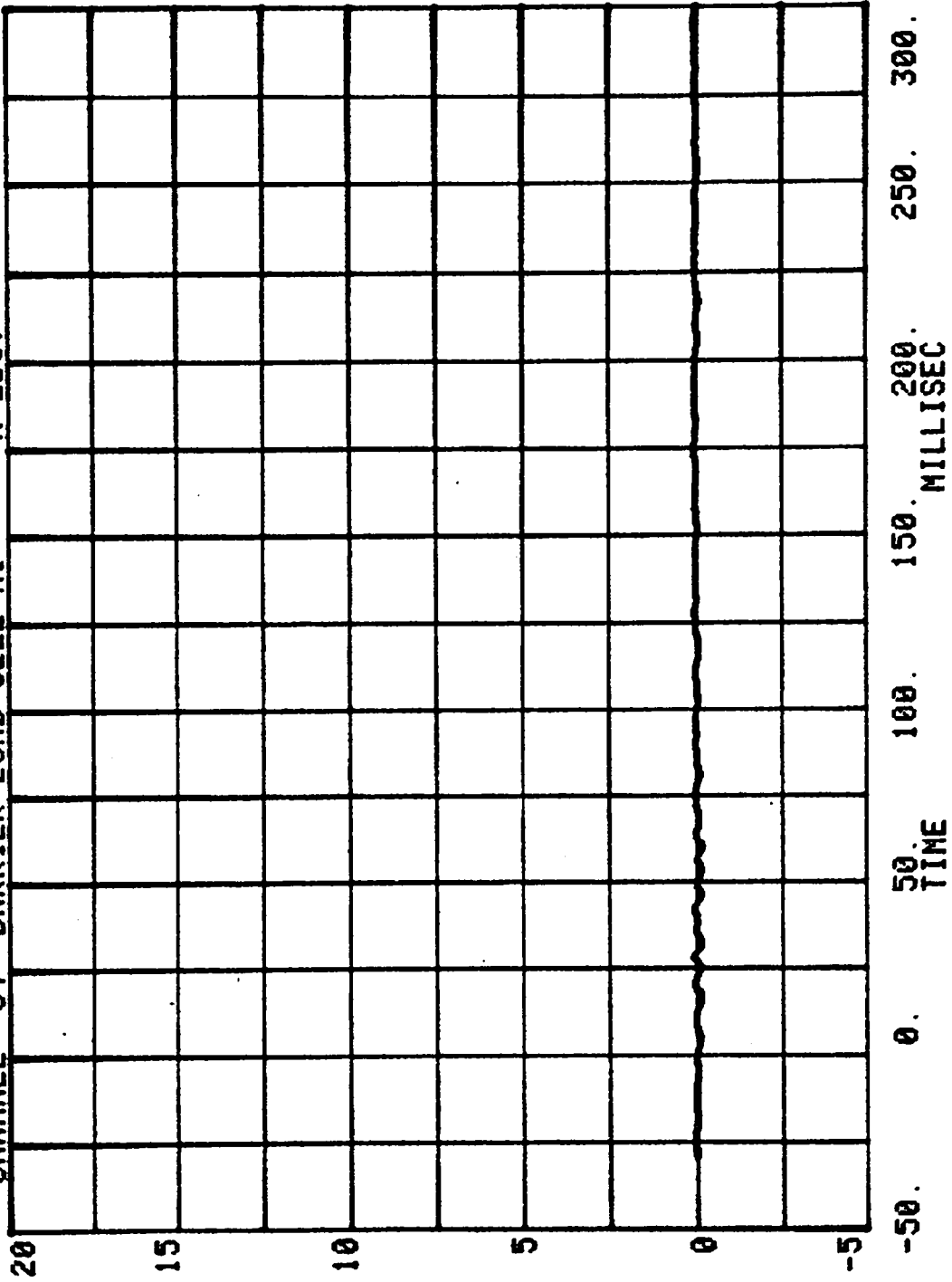


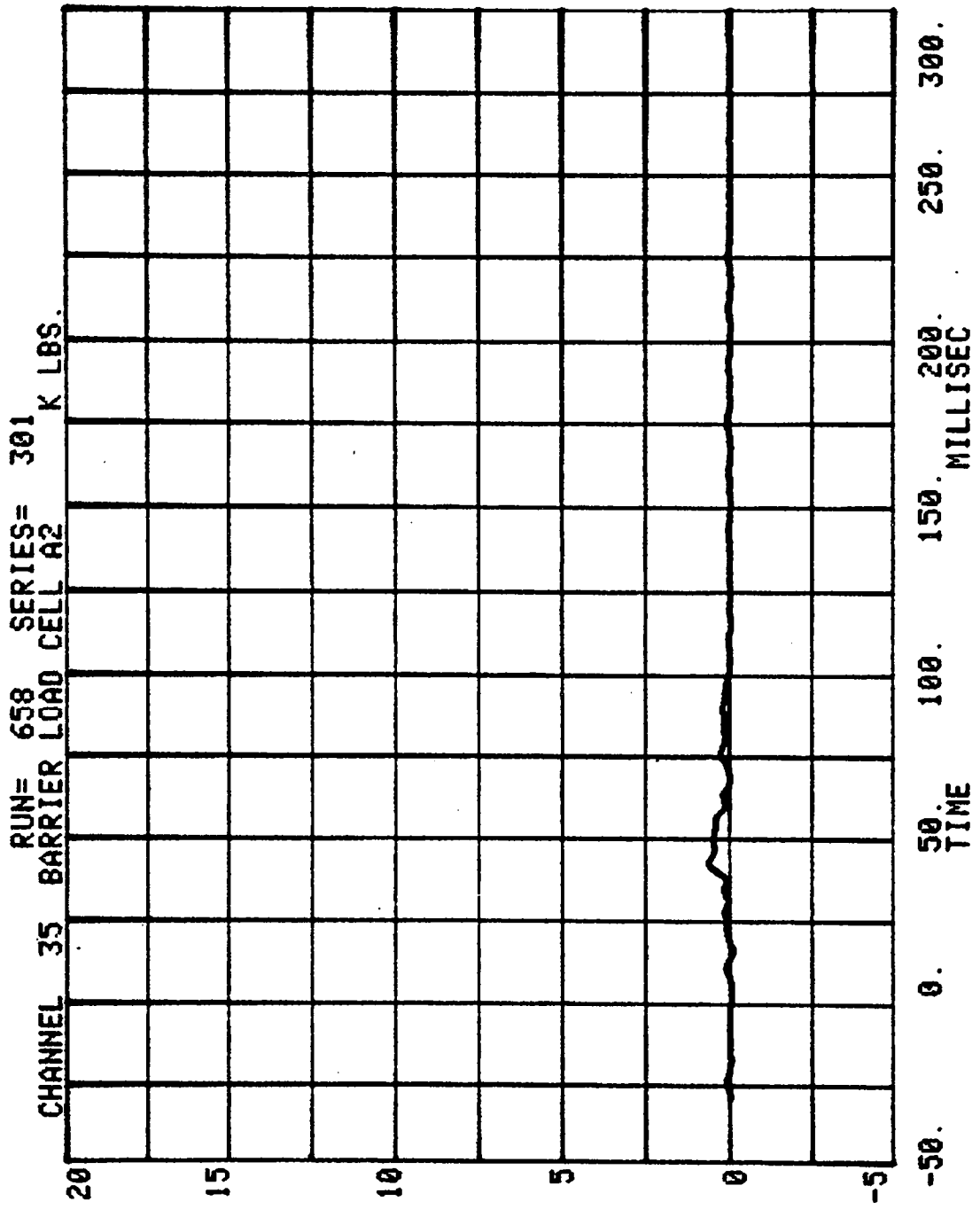
TEST NO. CF0301

LOAD CELL BARRIER DATA
FILTER CHANNEL CLASS

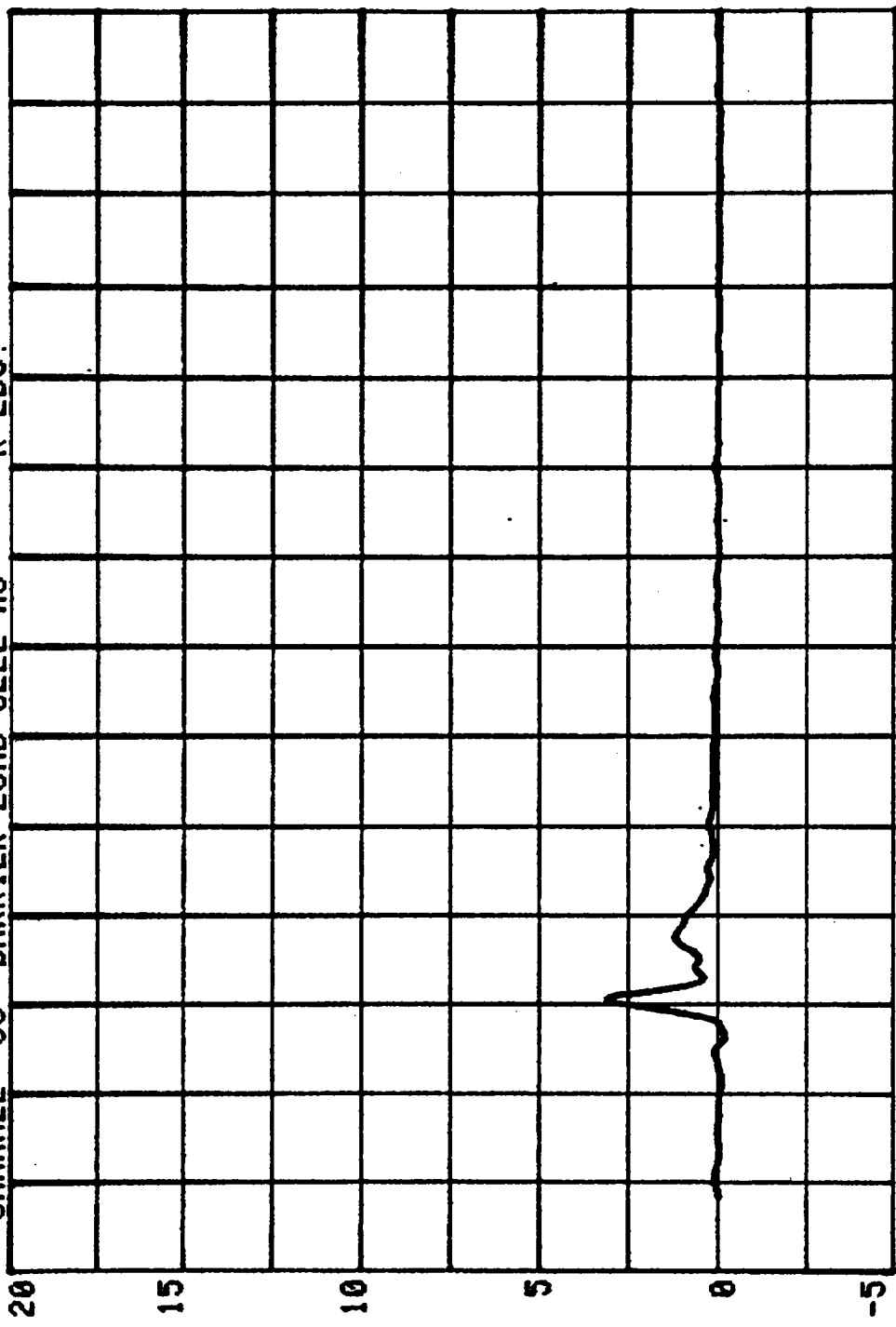
60

CHANNEL 34 BARRIER LOAD CELL A1 SERIES= 301 K LBS.



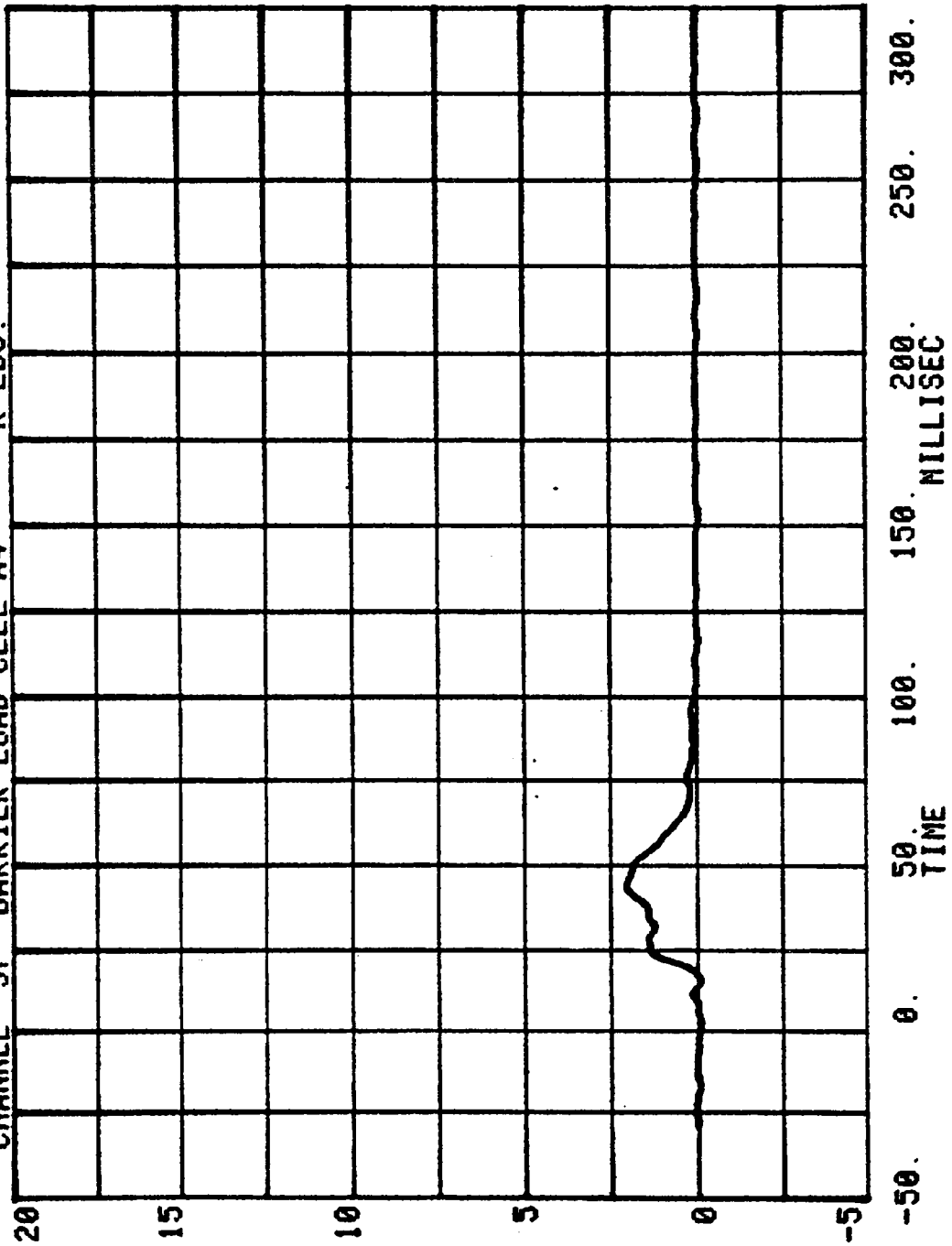


CHANNEL 36 BARRIER LOAD CELL A3
RUN= 658 SERIES= 301 K LBS.

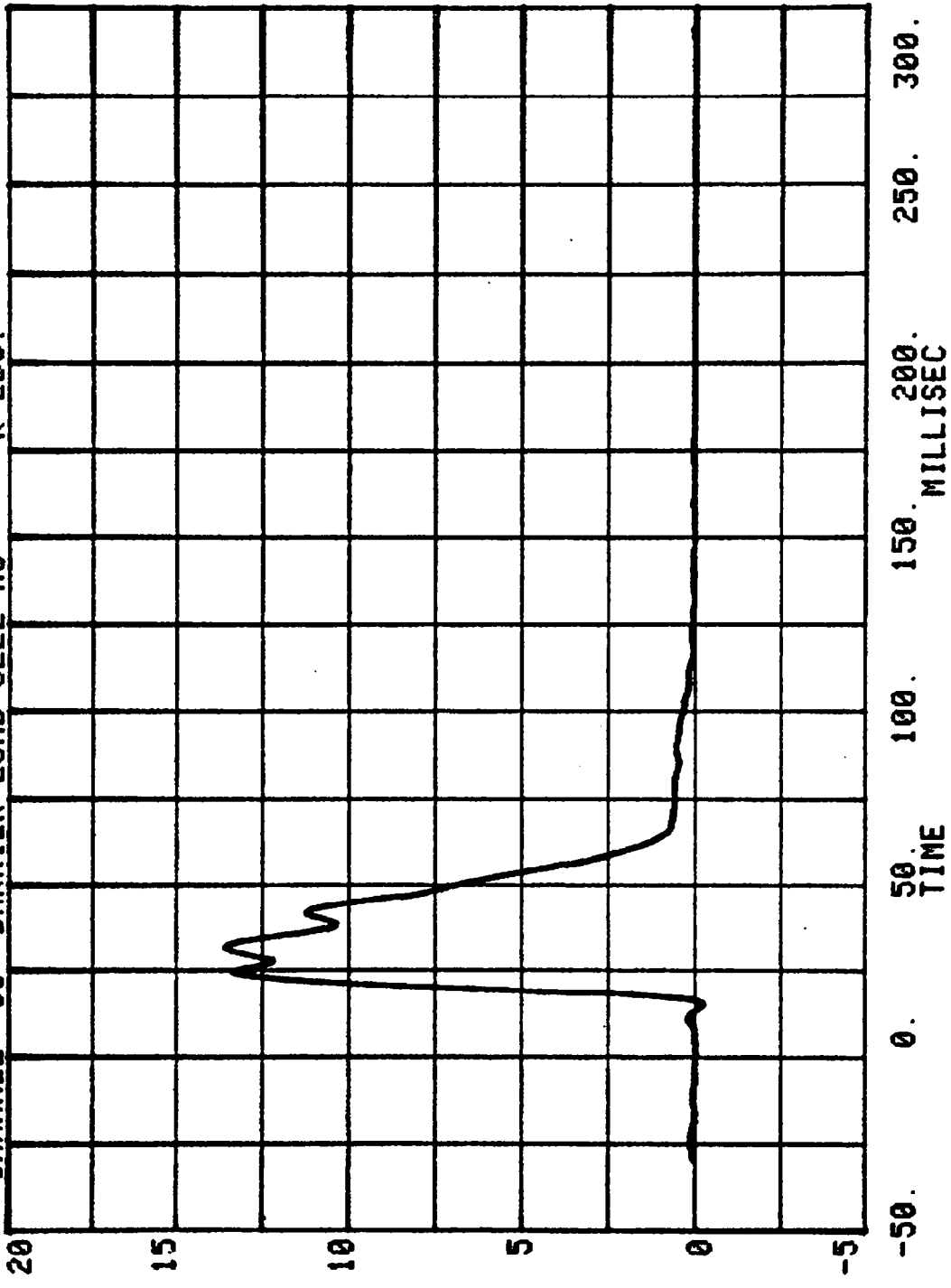


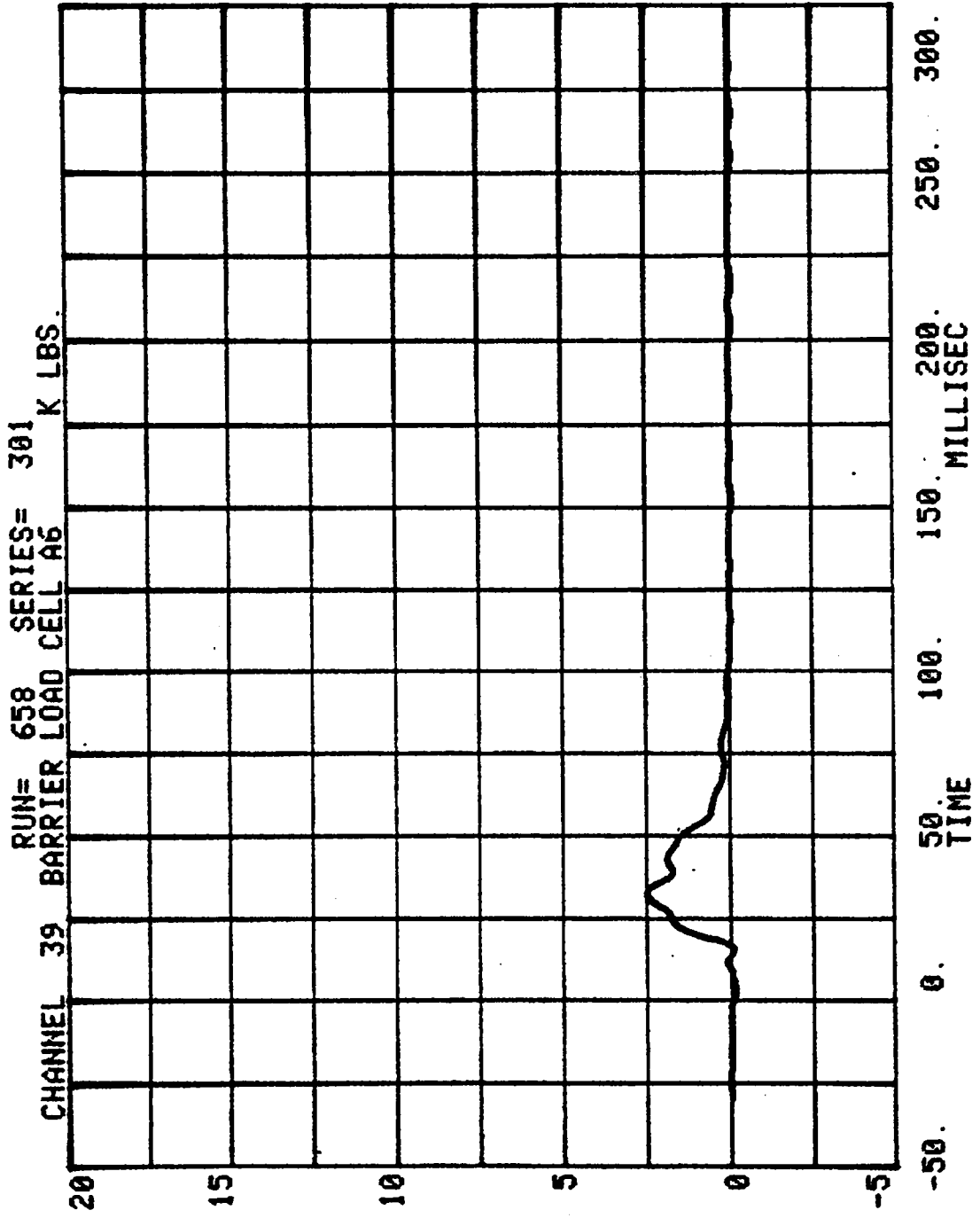
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 37 BARRIER LOAD CELL A4
RUN= 658 SERIES= 301 K LBS.

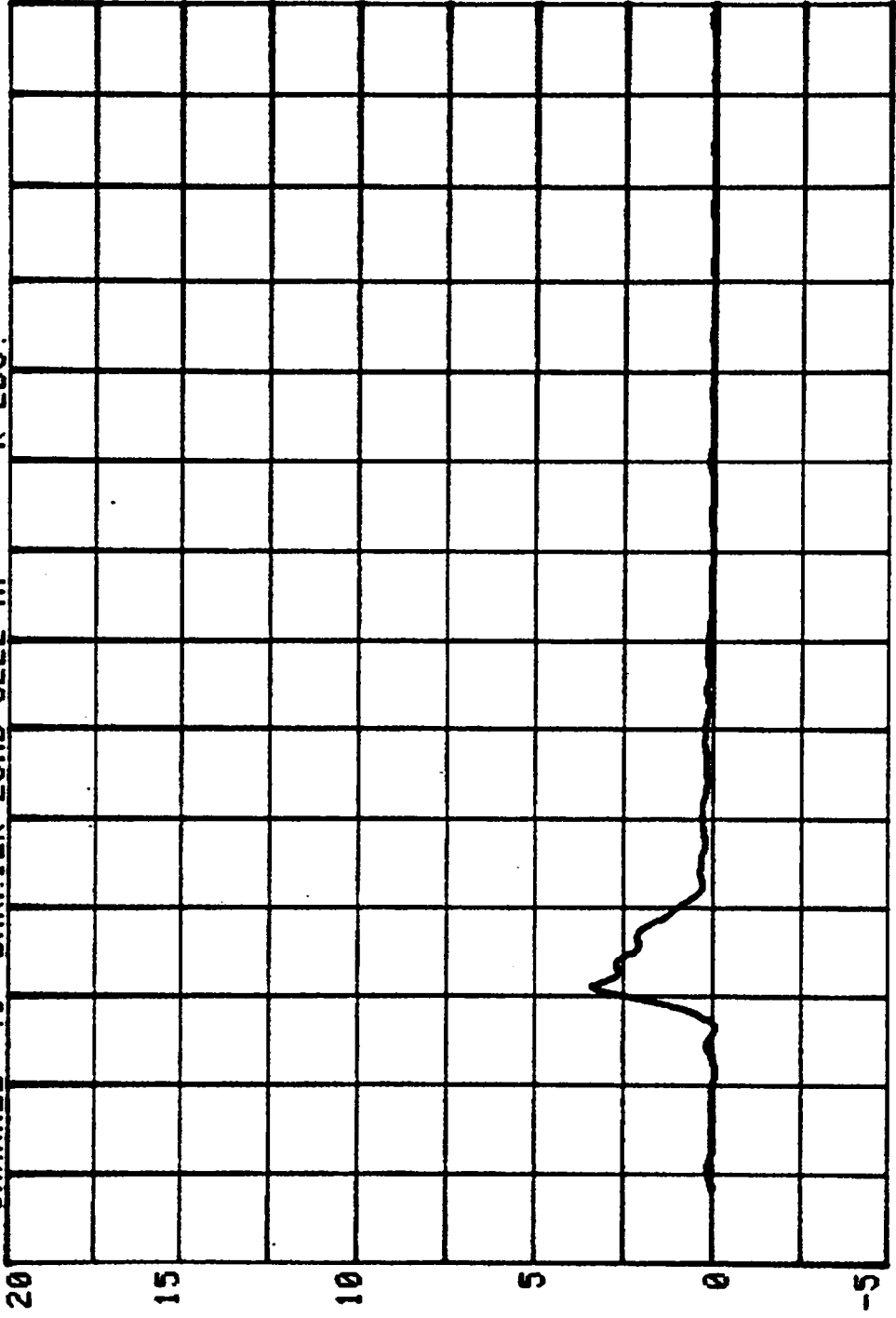


CHANNEL 38 BARRIER LOAD CELL A5
RUN= 658 SERIES= 301 K LBS.

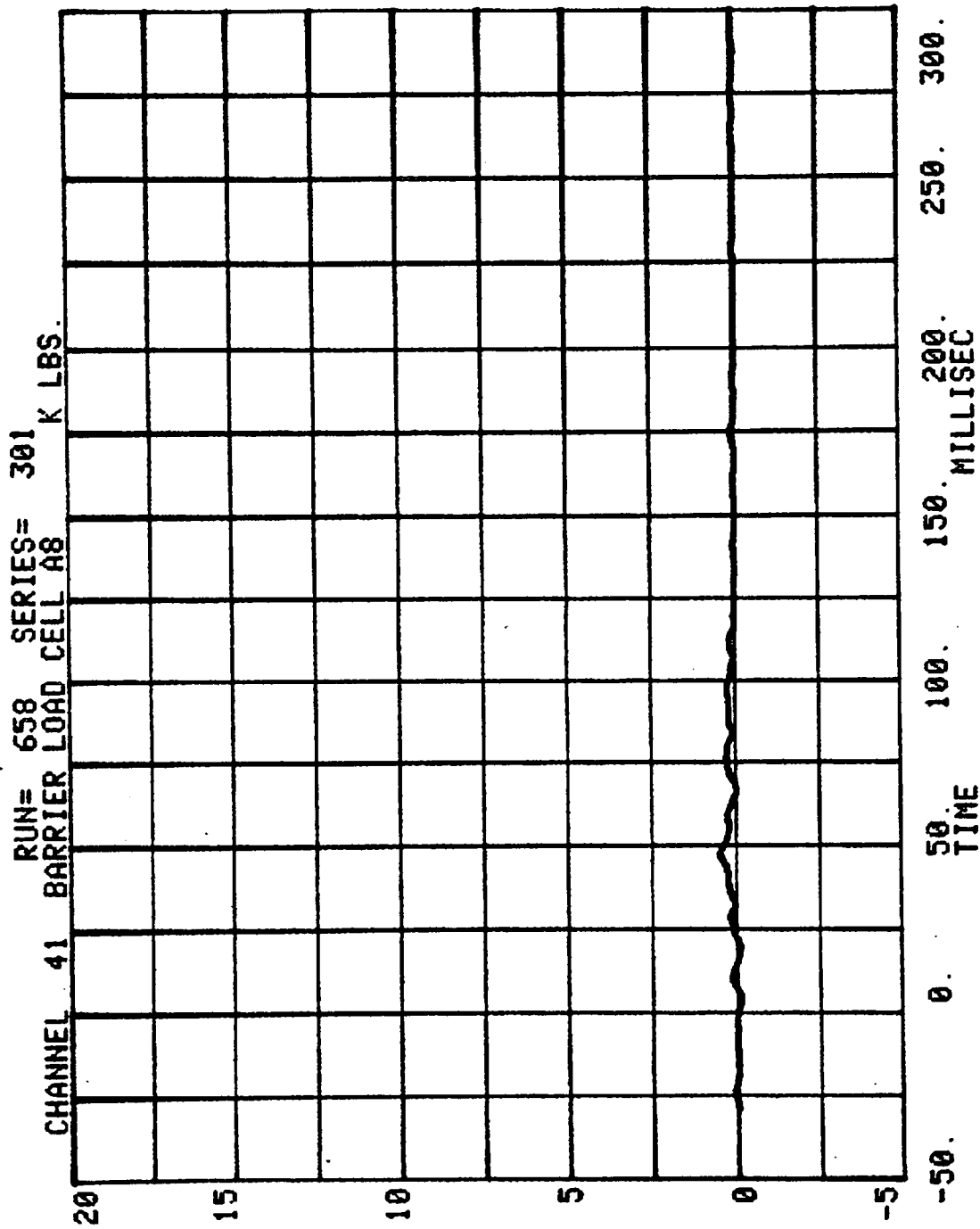




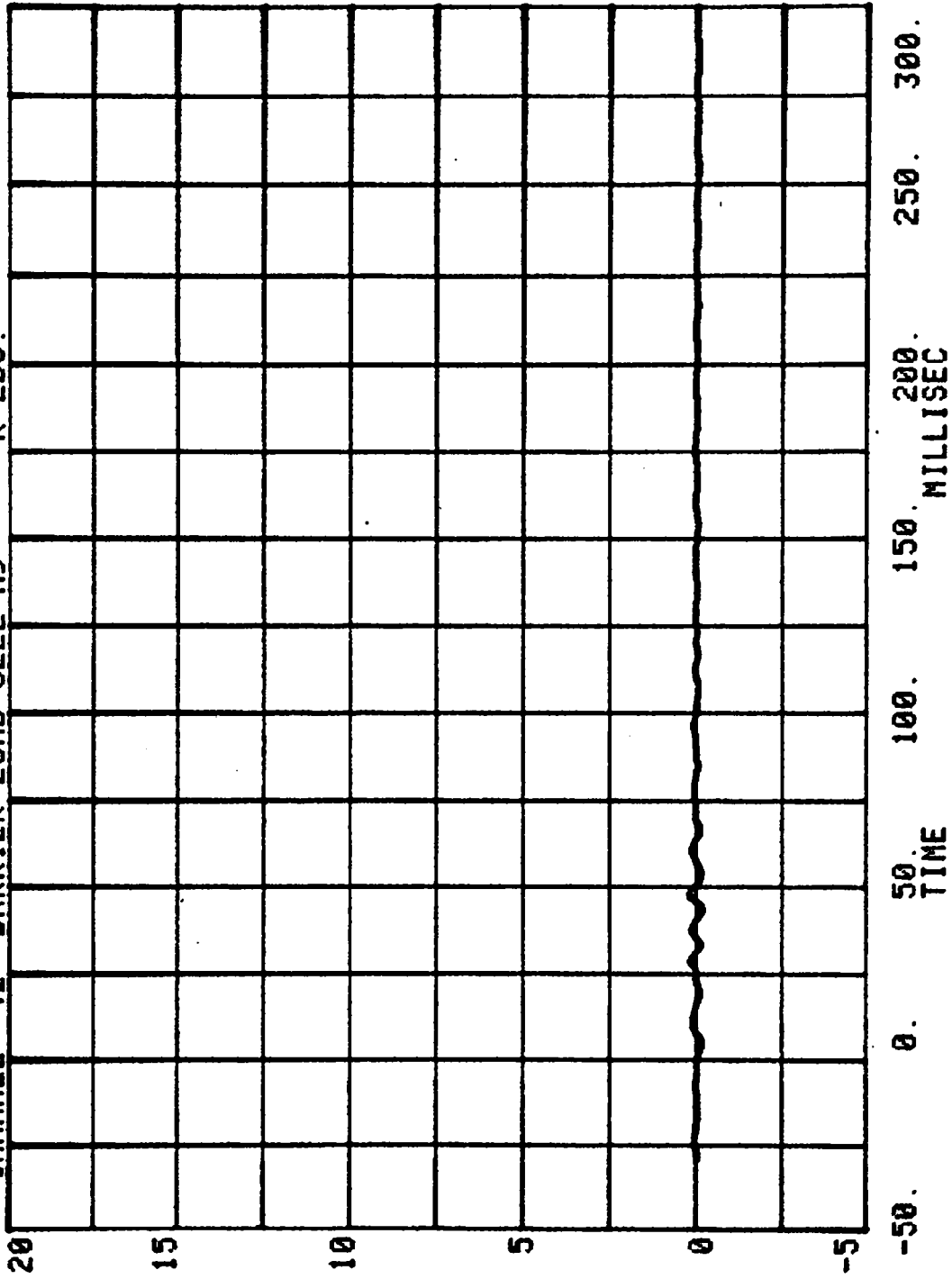
CHANNEL 40 BARRIER LOAD CELL A7
RUN= 658 SERIES= 301 K LBS.



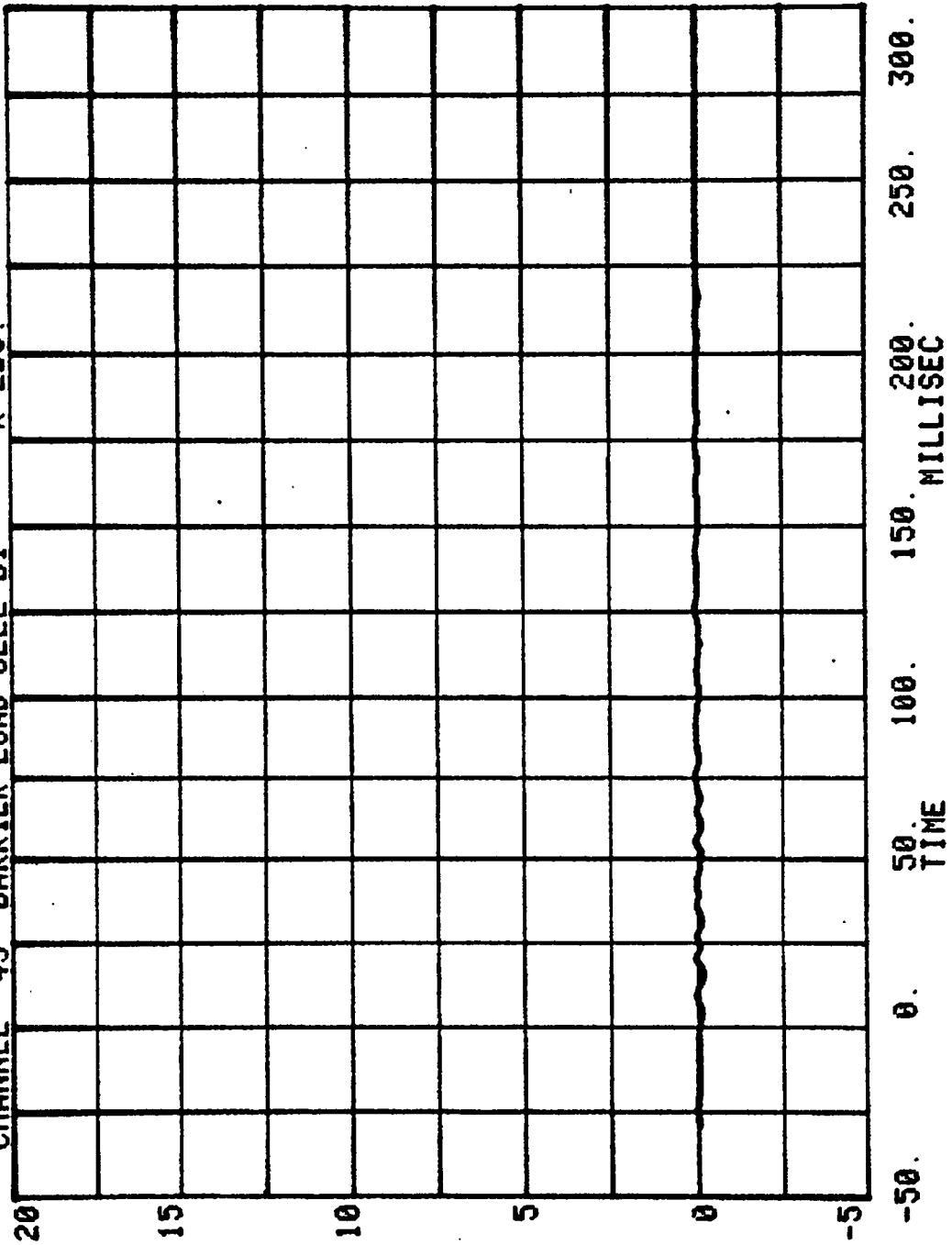
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC



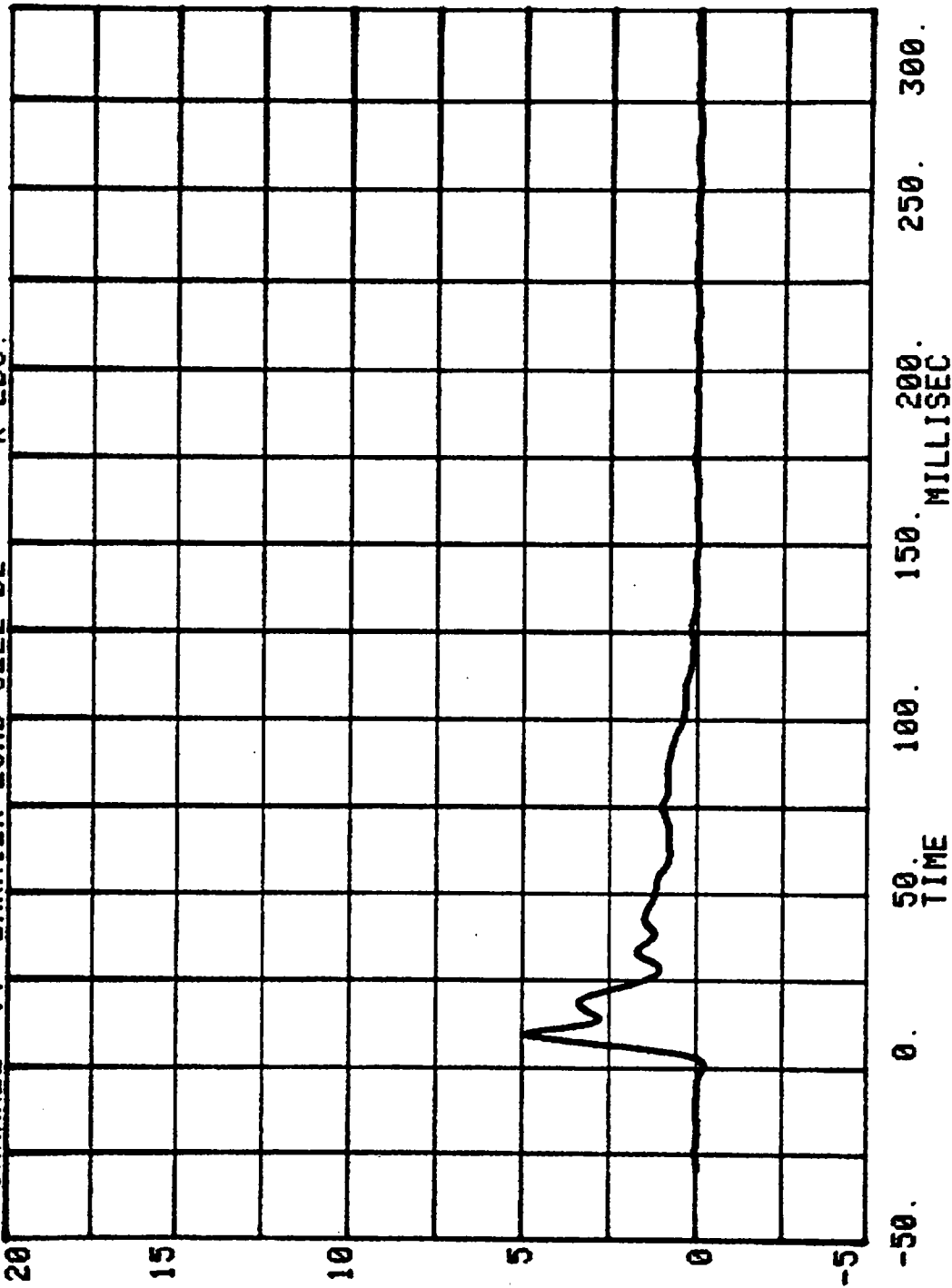
CHANNEL 42 BARRIER LOAD CELL A9
RUN= 658 SERIES= 301 K LBS.

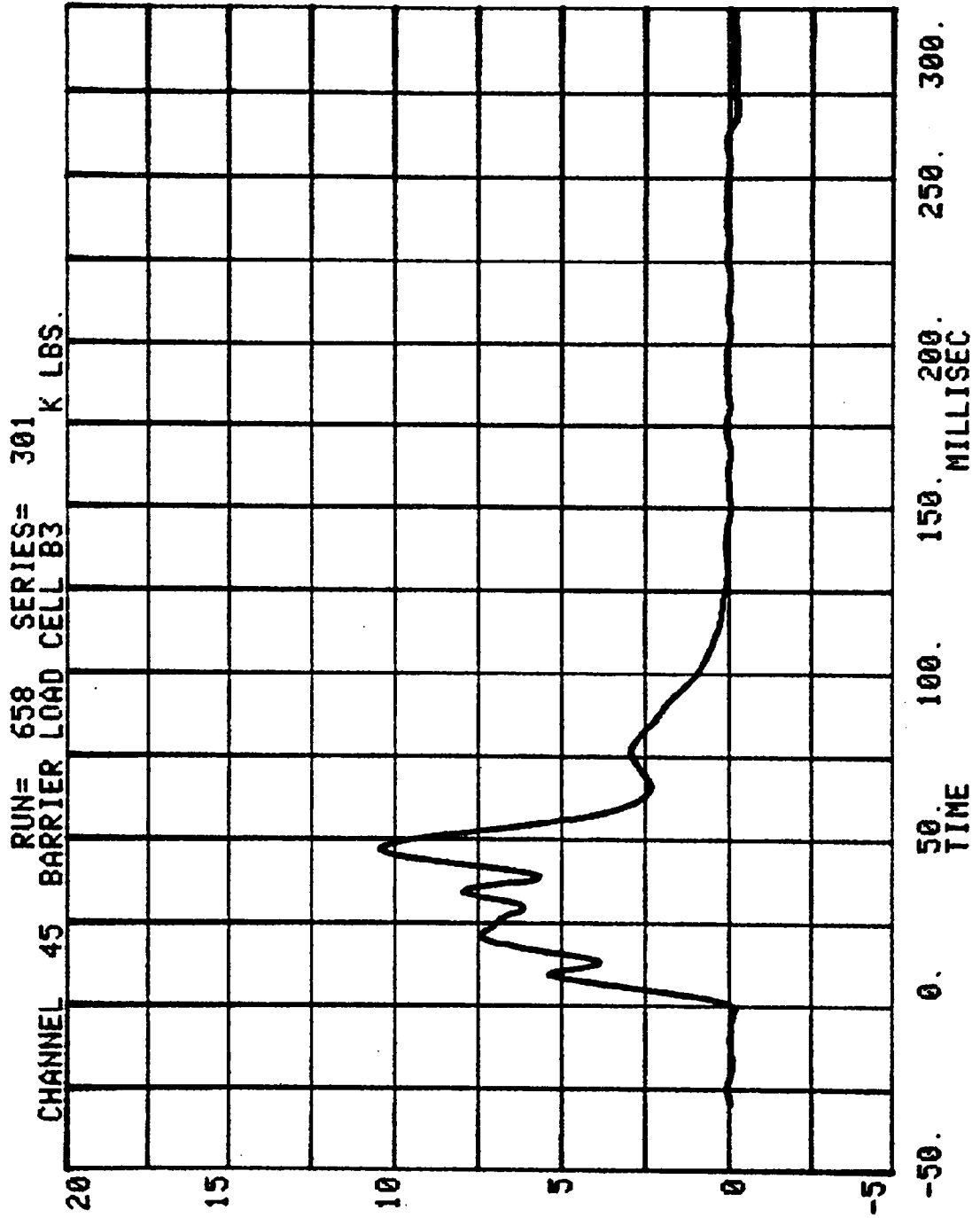


CHANNEL 43 BARRIER LOAD CELL B1
RUN= 658 SERIES= 301 K LBS.

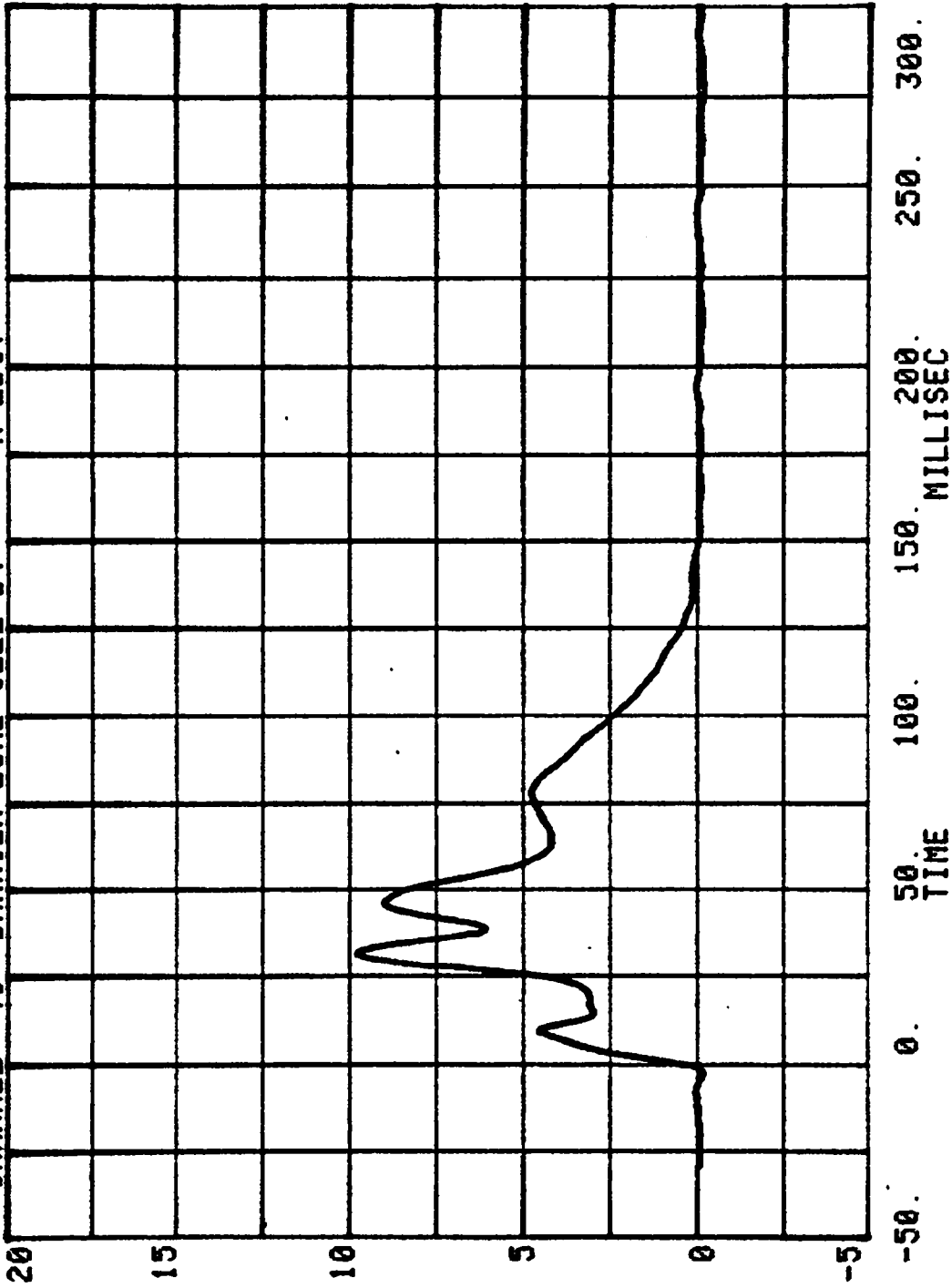


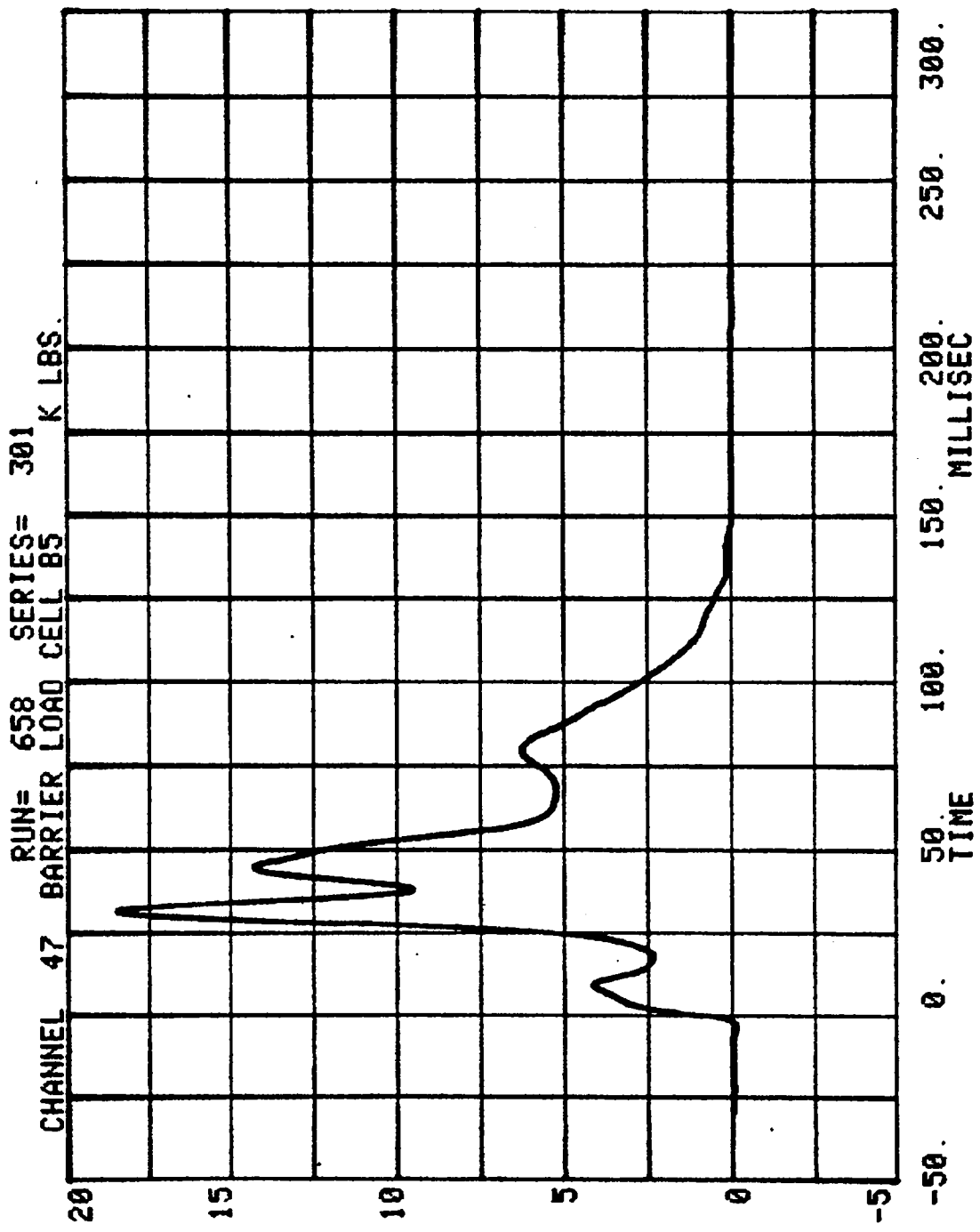
CHANNEL 44 BARRIER LOAD CELL B2
RUN= 658 SERIES= 301
K LBS.



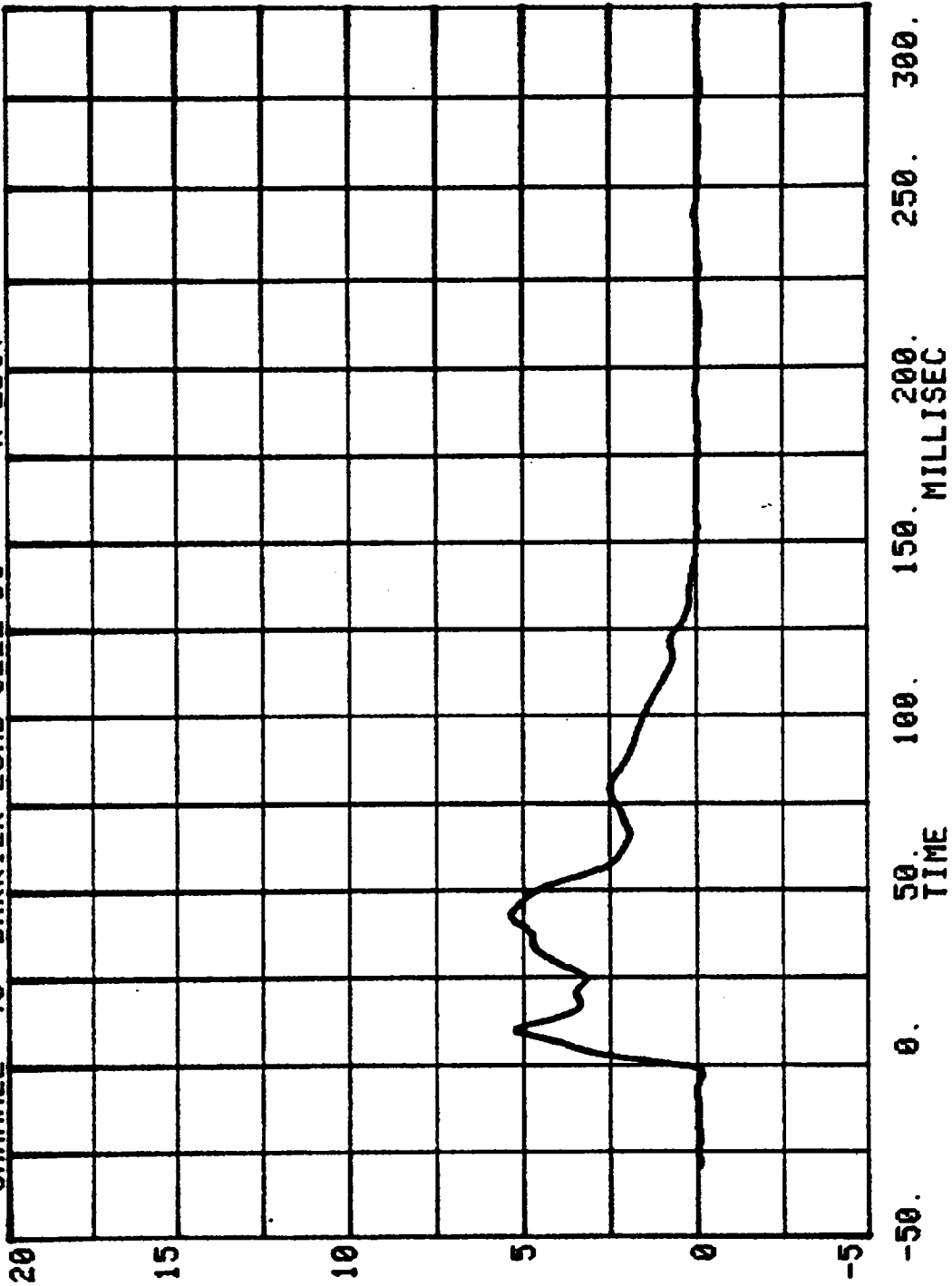


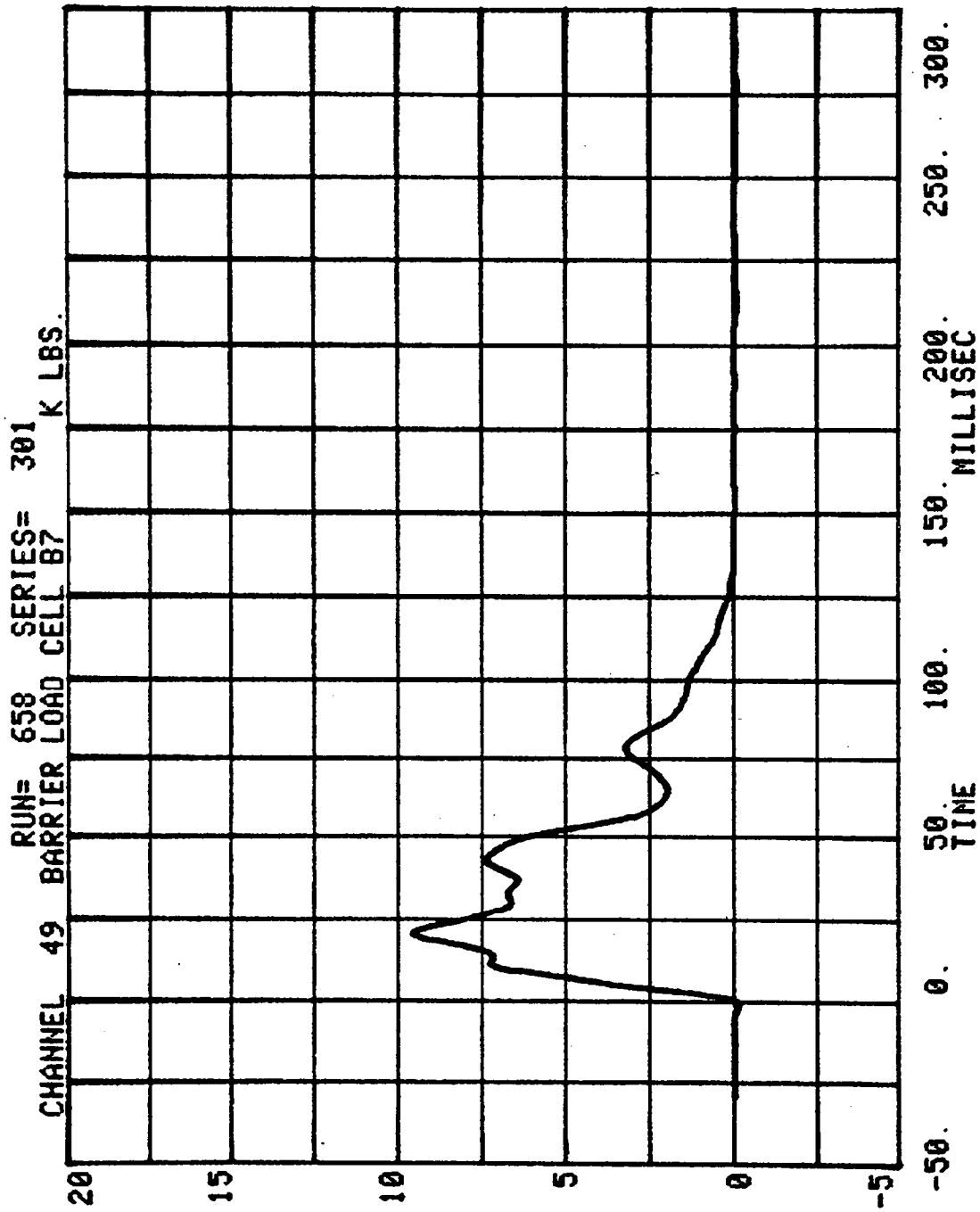
CHANNEL 46 BARRIER LOAD CELL B4
RUN= 658 SERIES= 301 K LBS.



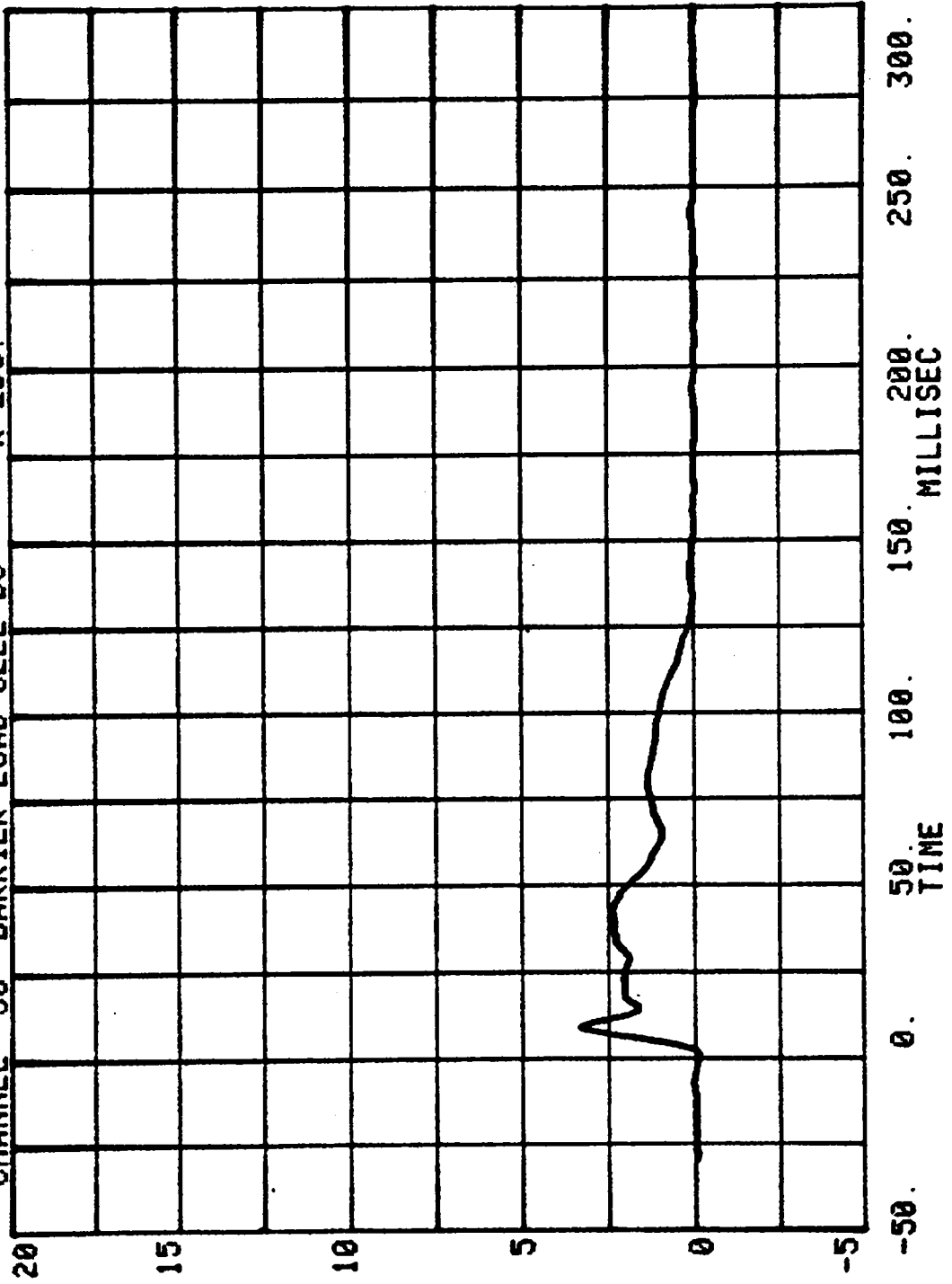


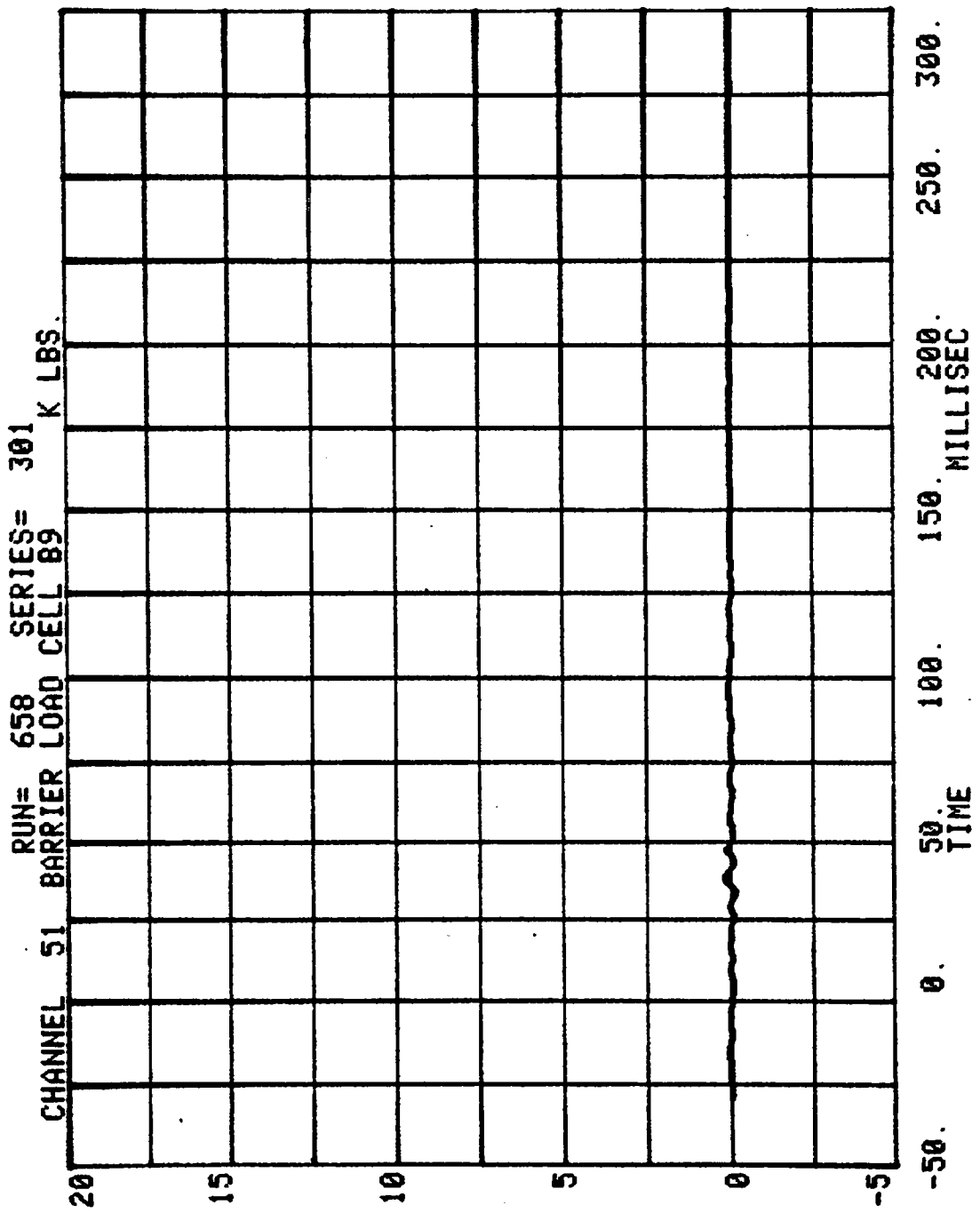
CHANNEL 48 BARRIER LOAD CELL B6
RUN= 658 SERIES= 301 K LBS.



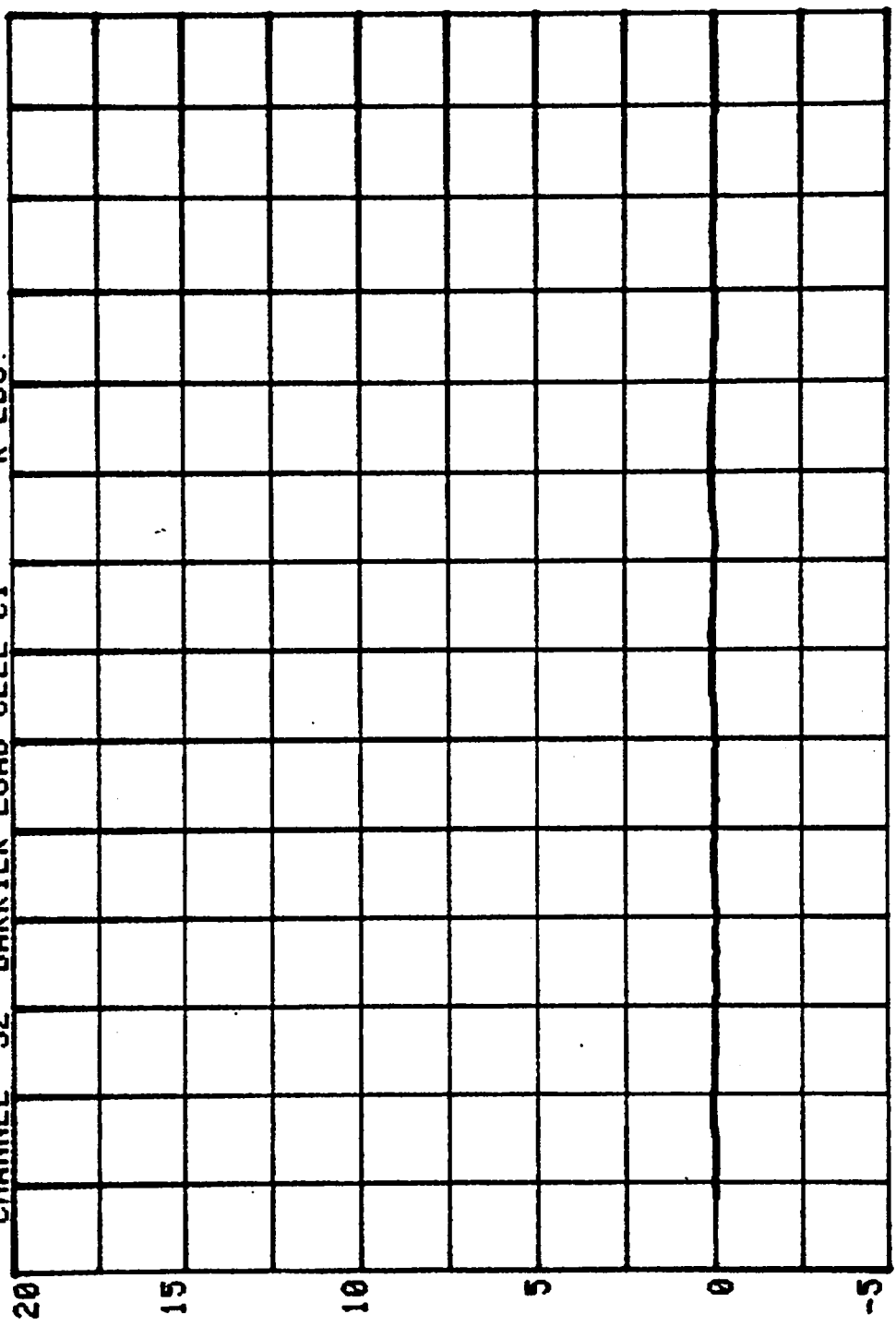


CHANNEL 50 BARRIER LOAD CELL B8 RUN= 658 SERIES= 301 K LBS.



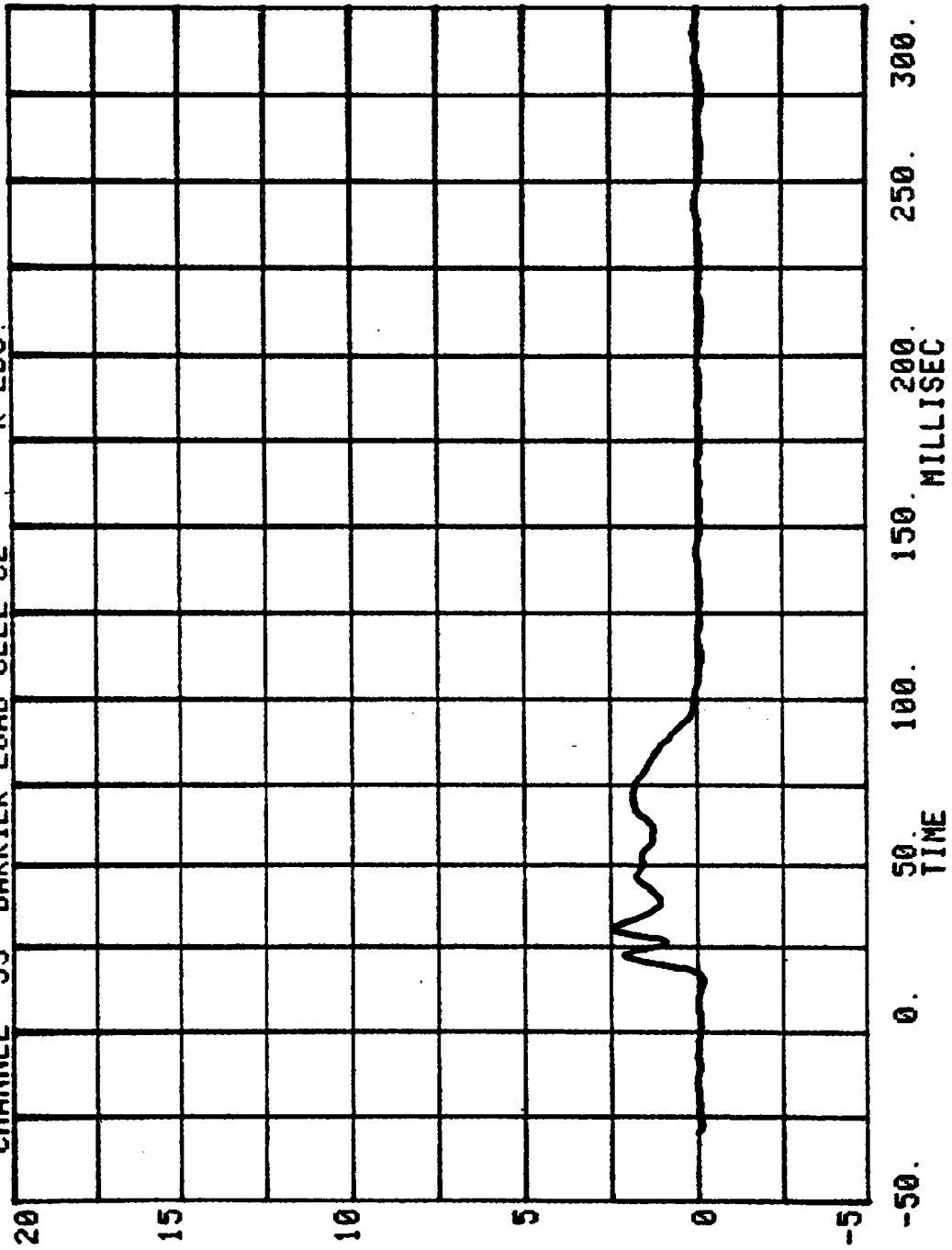


CHANNEL 52 BARRIER LOAD CELL C1
RUN= 658 SERIES= 301 K LBS.

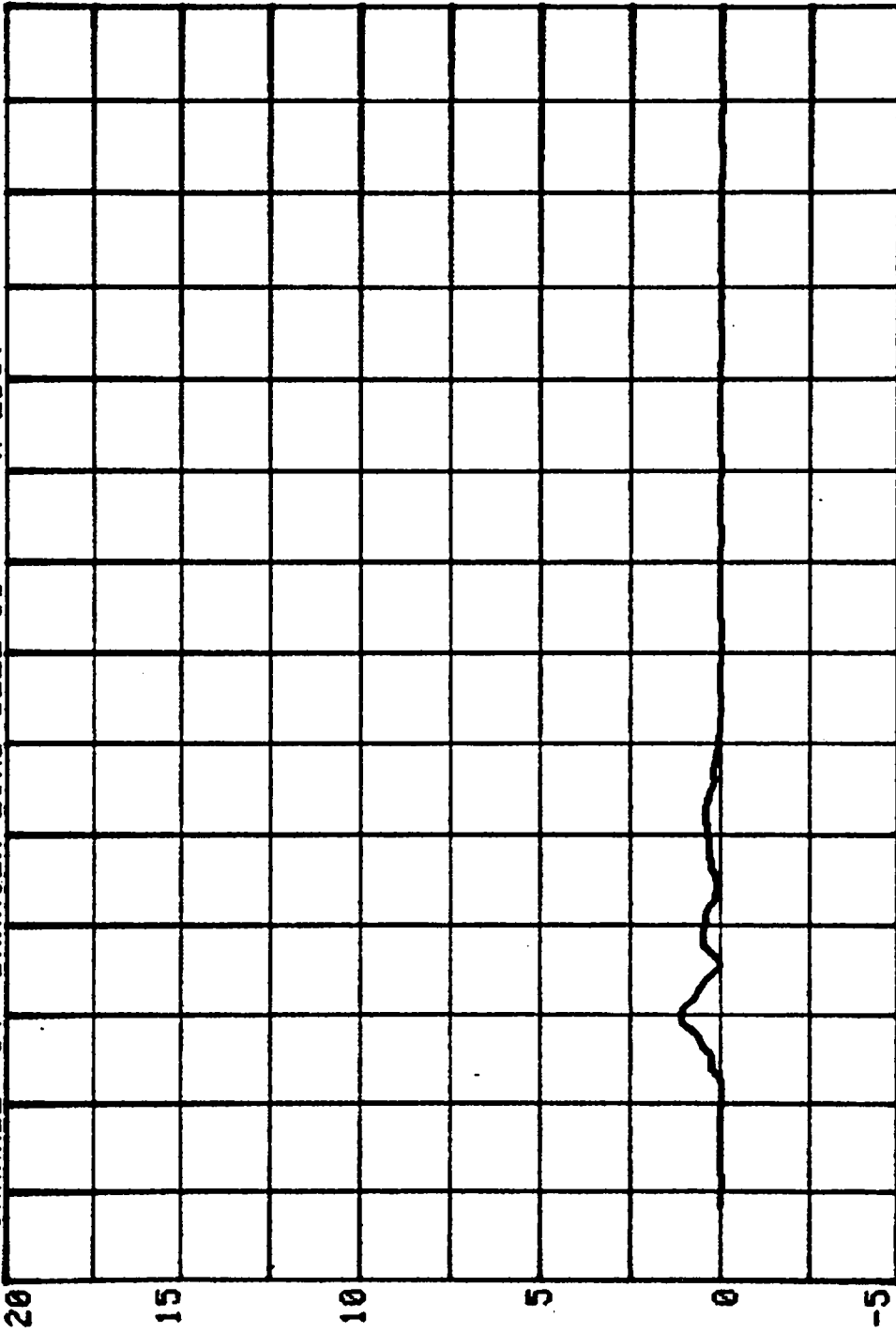


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

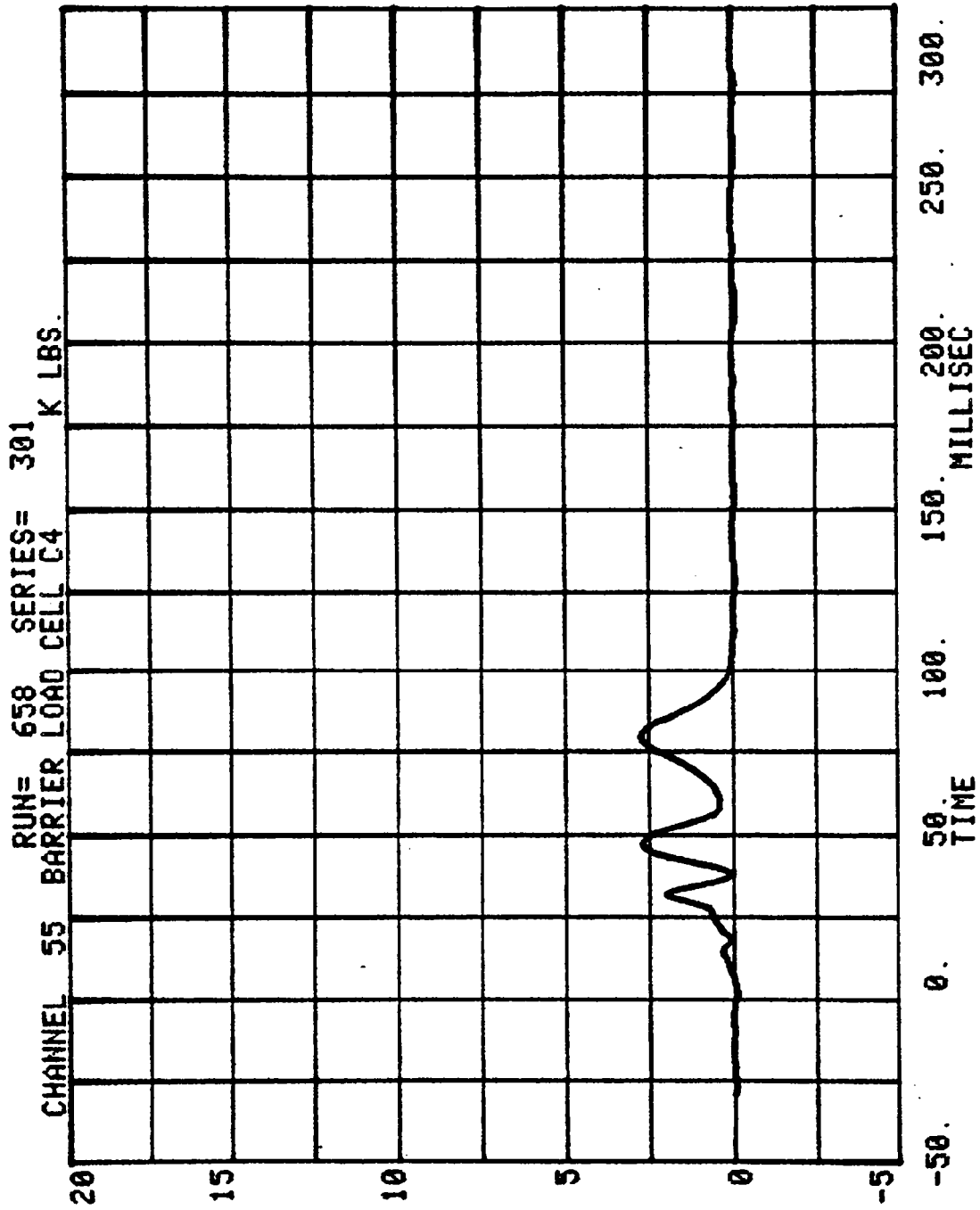
CHANNEL 53 BARRIER LOAD CELL C2
RUN= 658 SERIES= 301
K LBS.



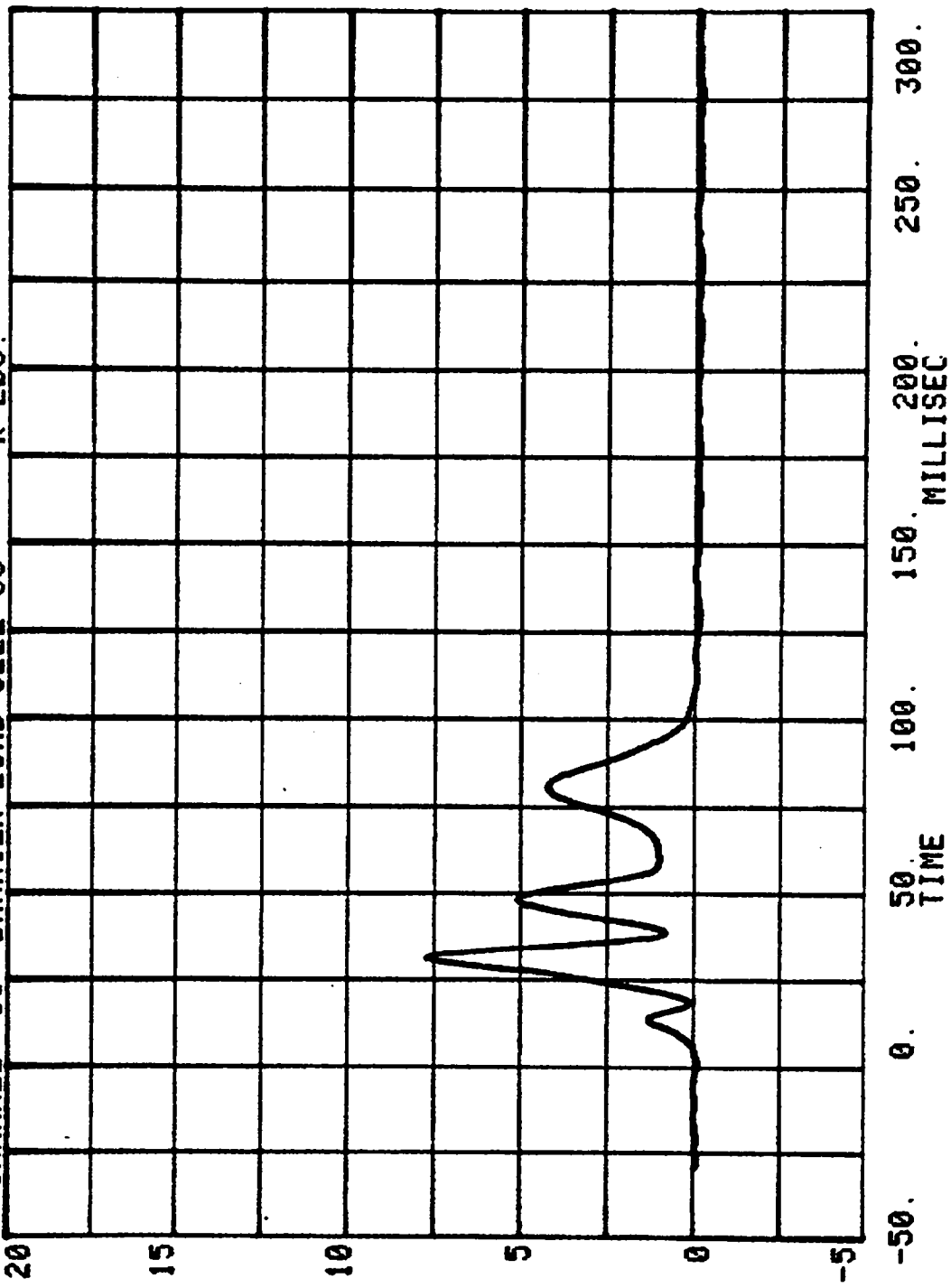
CHANNEL 54 BARRIER LOAD CELL C3
RUN= 658 SERIES= 301 K LBS.

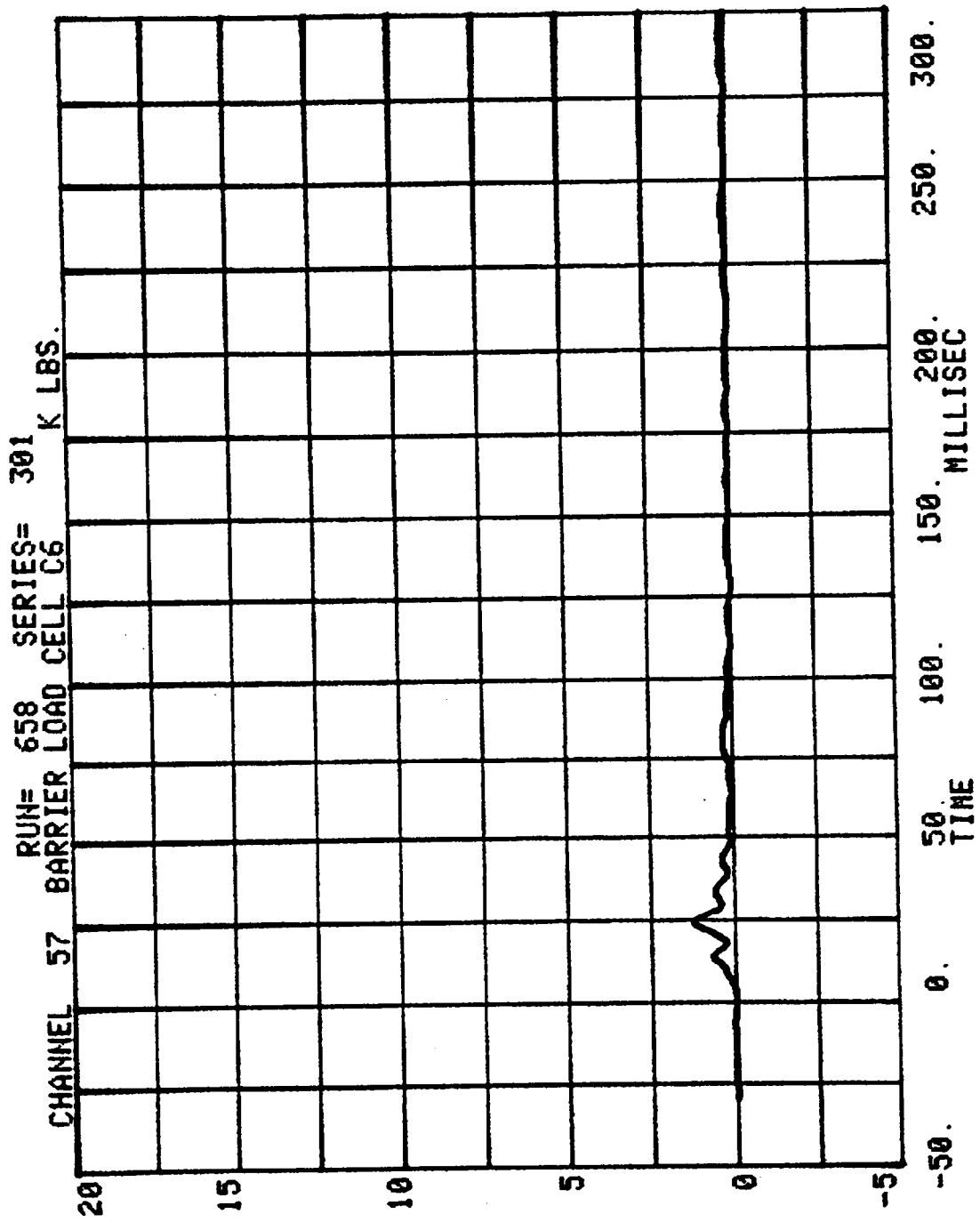


-50. 0. 50. 100. 150. 200. 250. 300.
MILLISEC
TIME

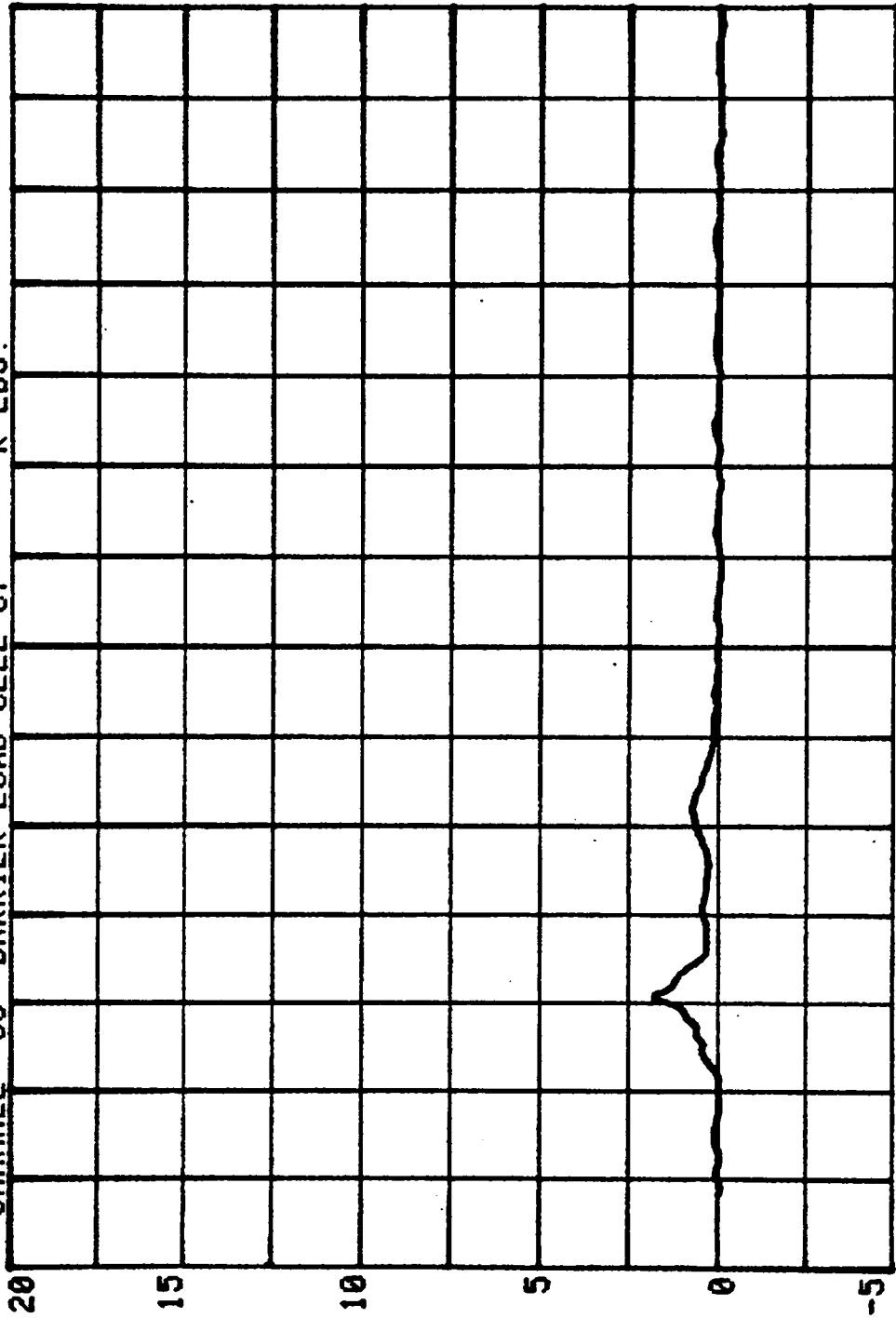


CHANNEL 56 BARRIER LOAD CELL C5
RUN= 658 SERIES= 301 K LBS.

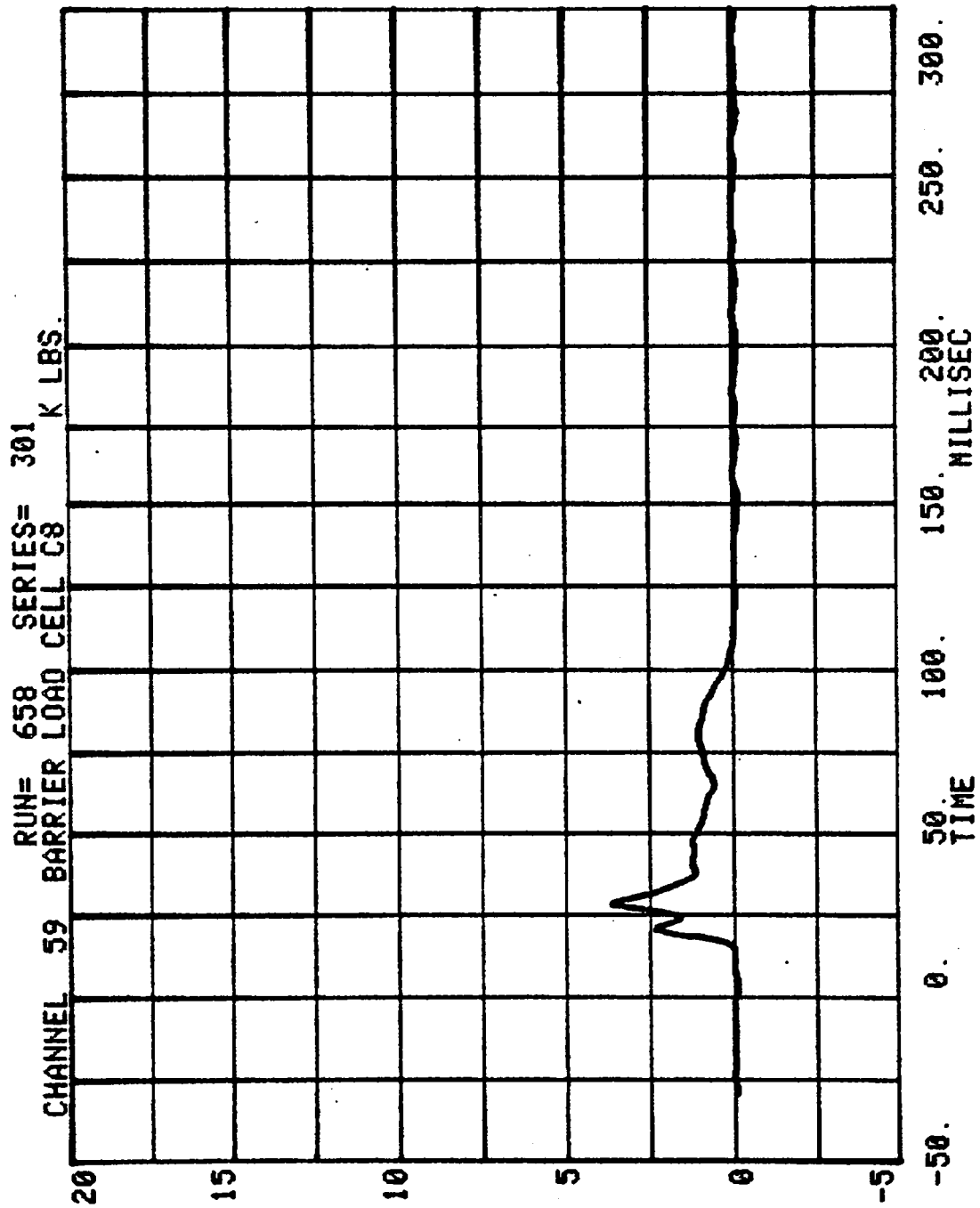




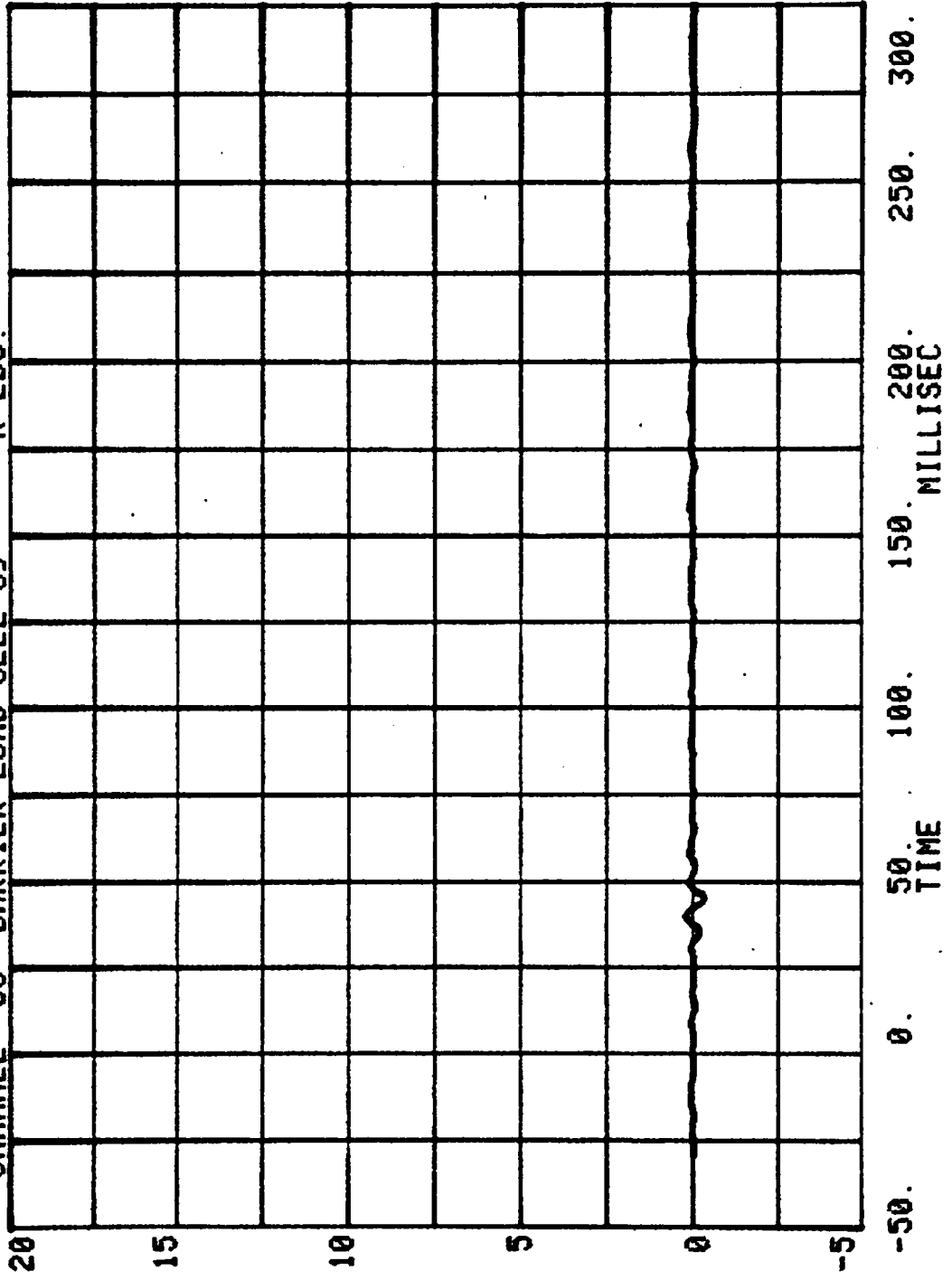
CHANNEL 58 BARRIER LOAD CELL C7
RUN= 658 SERIES= 301 K LBS.

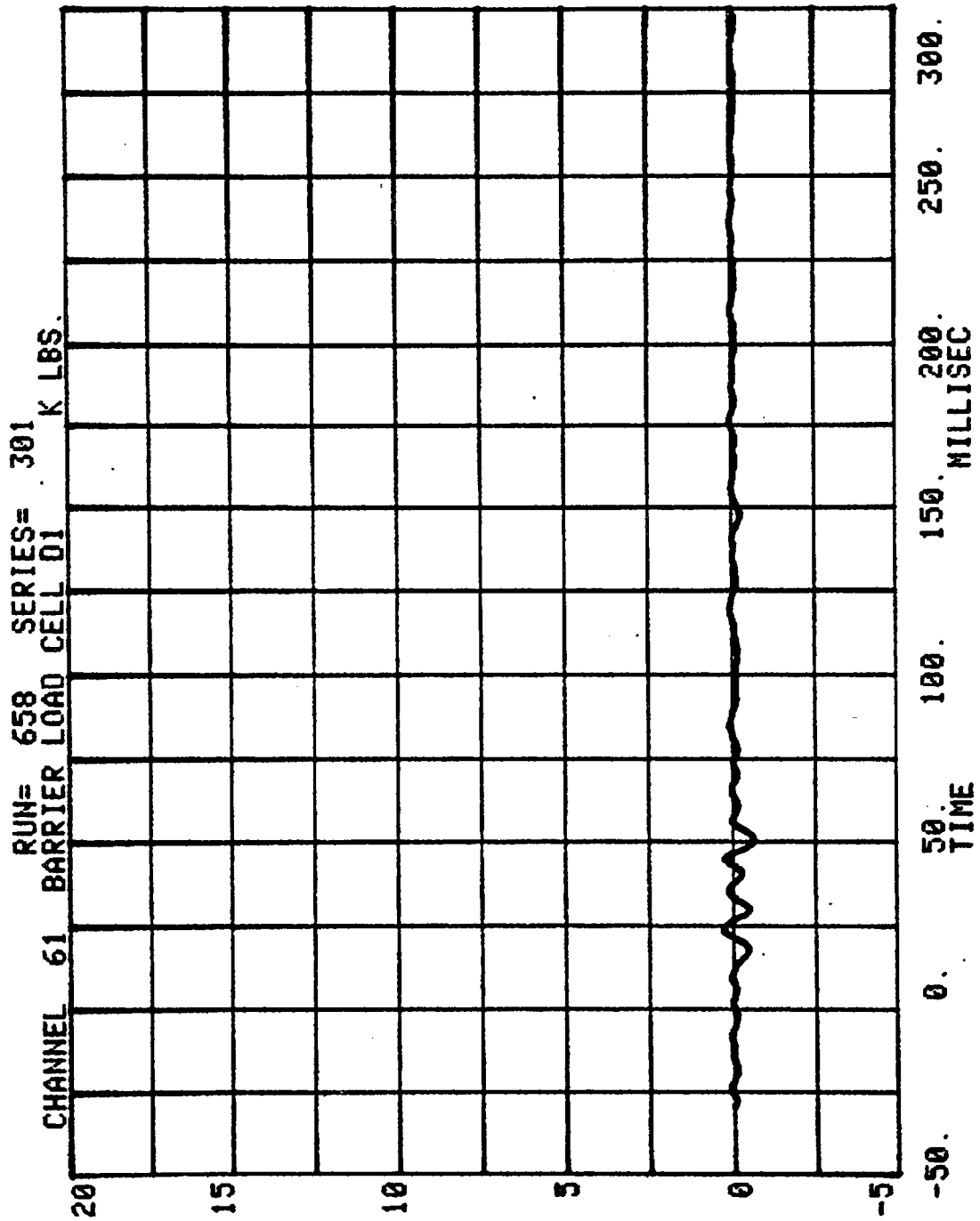


-50. 0. 50. 100. 150. 200. 250. 300.
TIME
MILLISEC

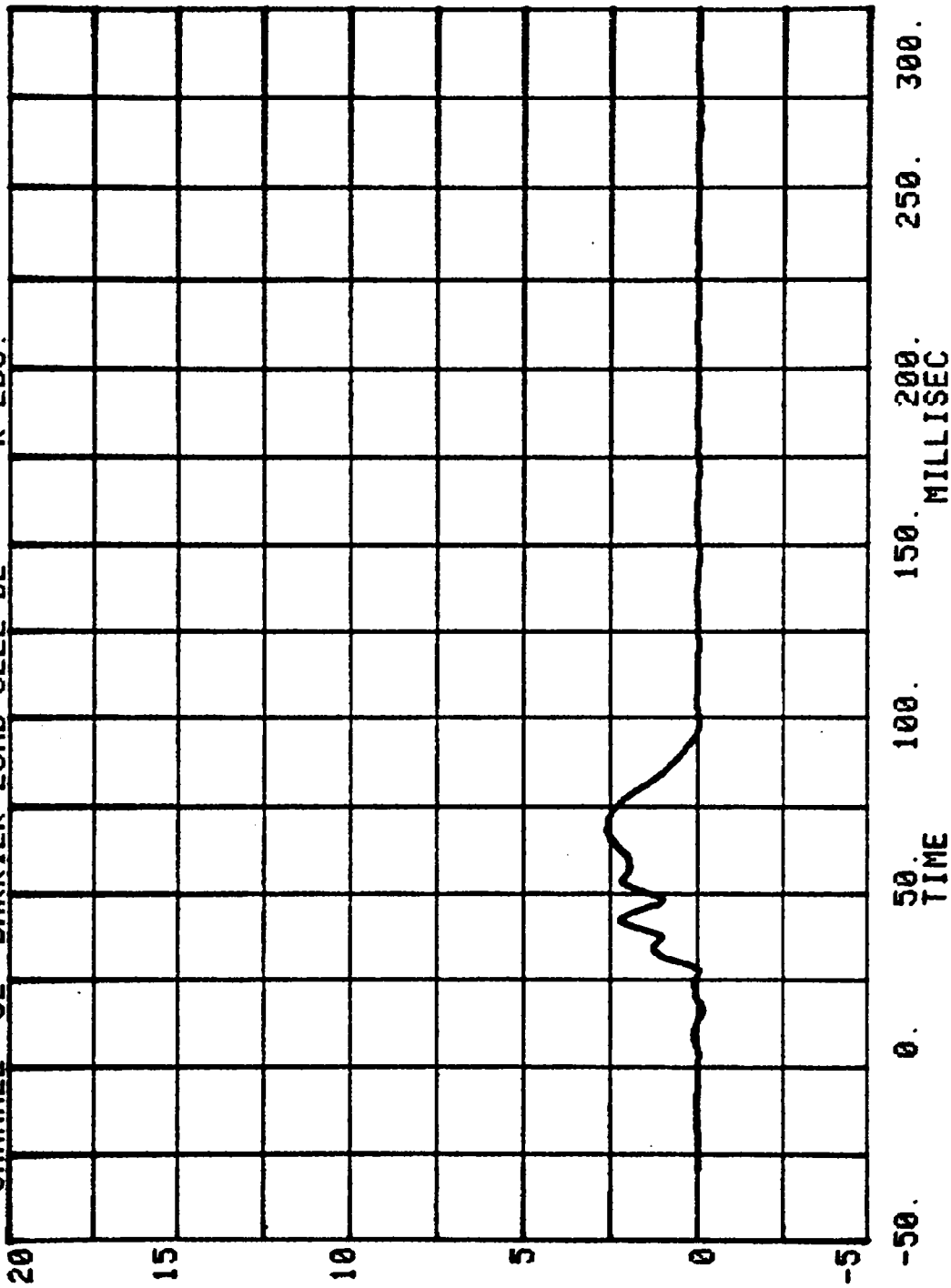


CHANNEL 60 BARRIER LOAD CELL C9 RUN= 658 SERIES= 301 K LBS.

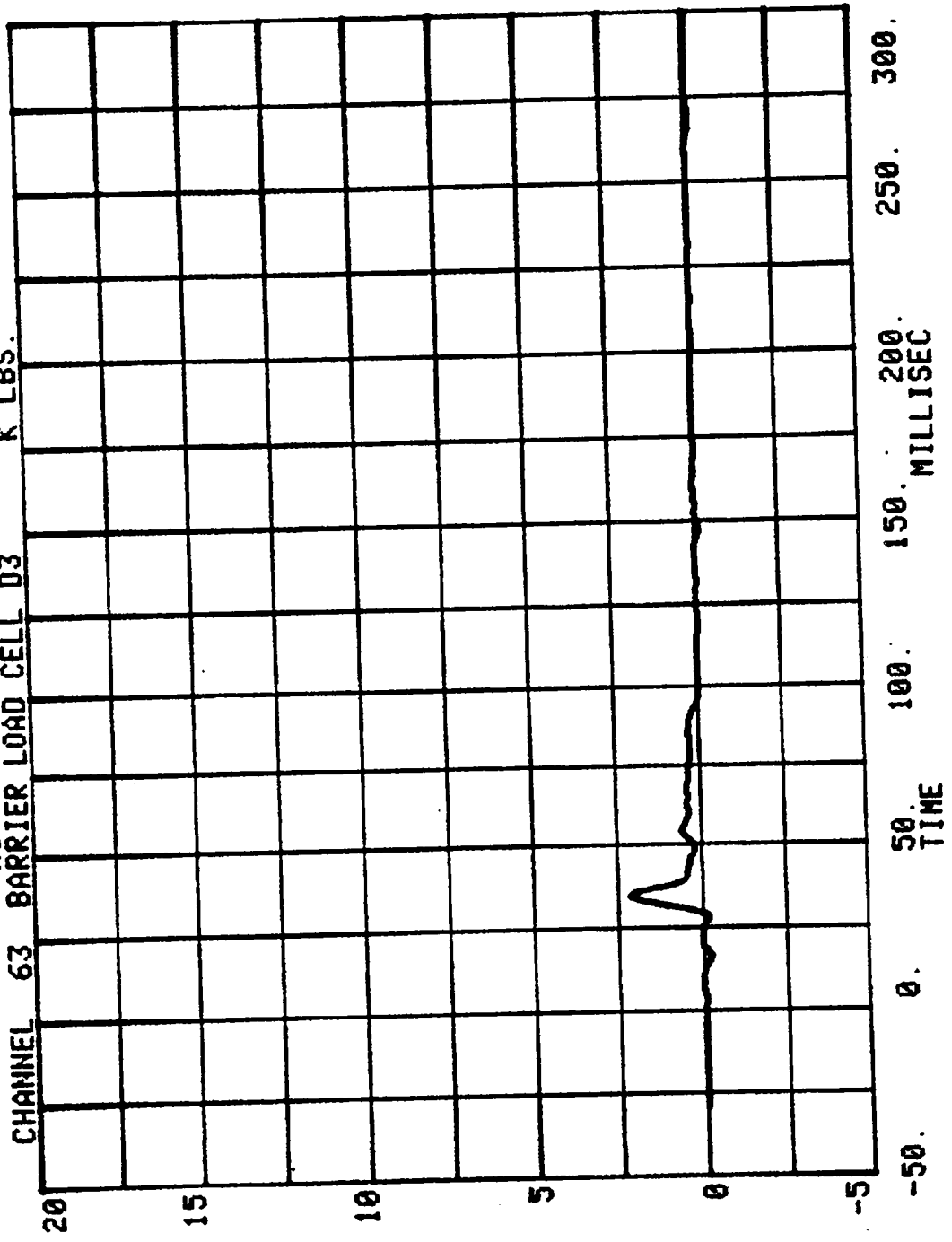




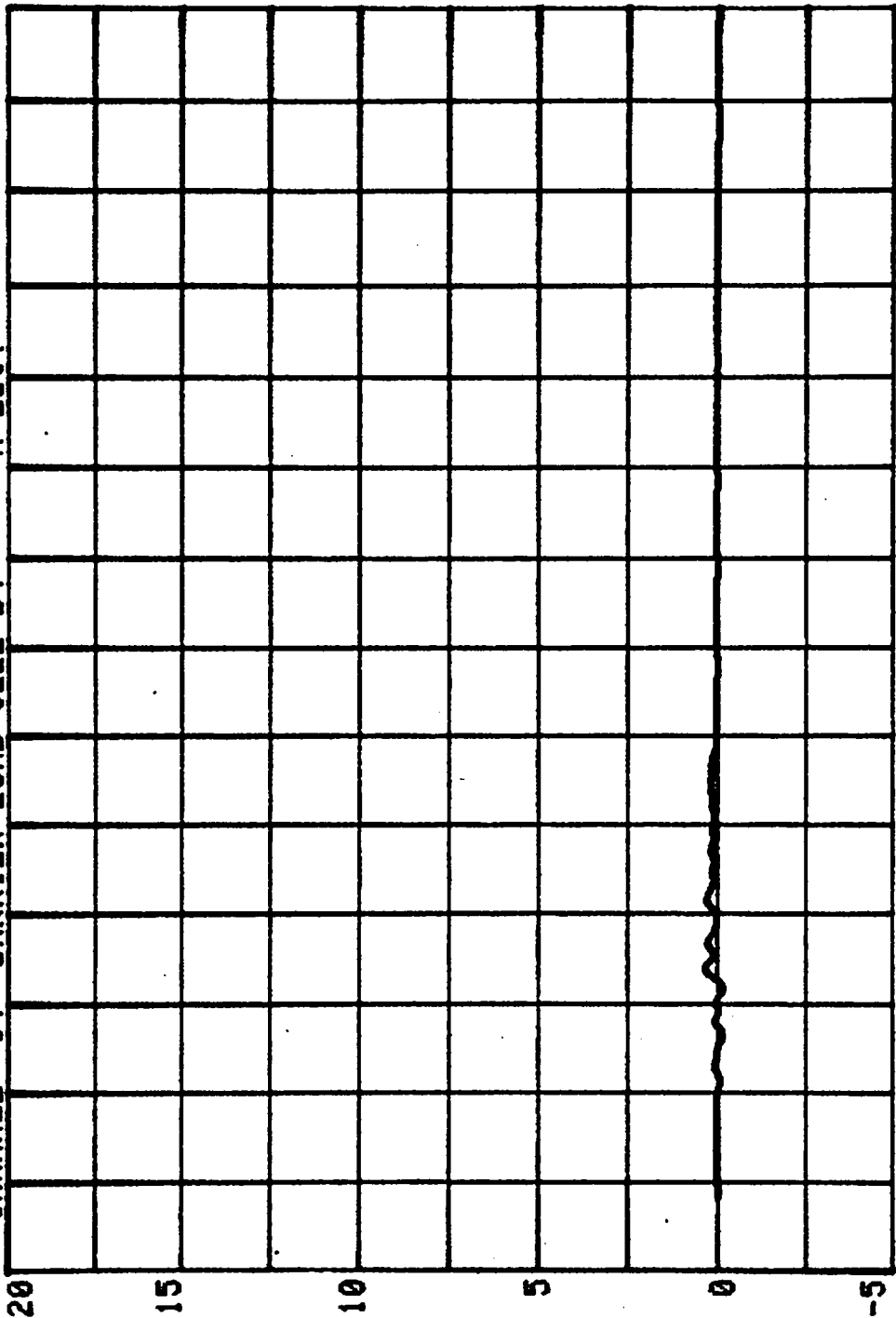
CHANNEL 62 BARRIER LOAD CELL D2
RUH= 658 SERIES= 301 K LBS.



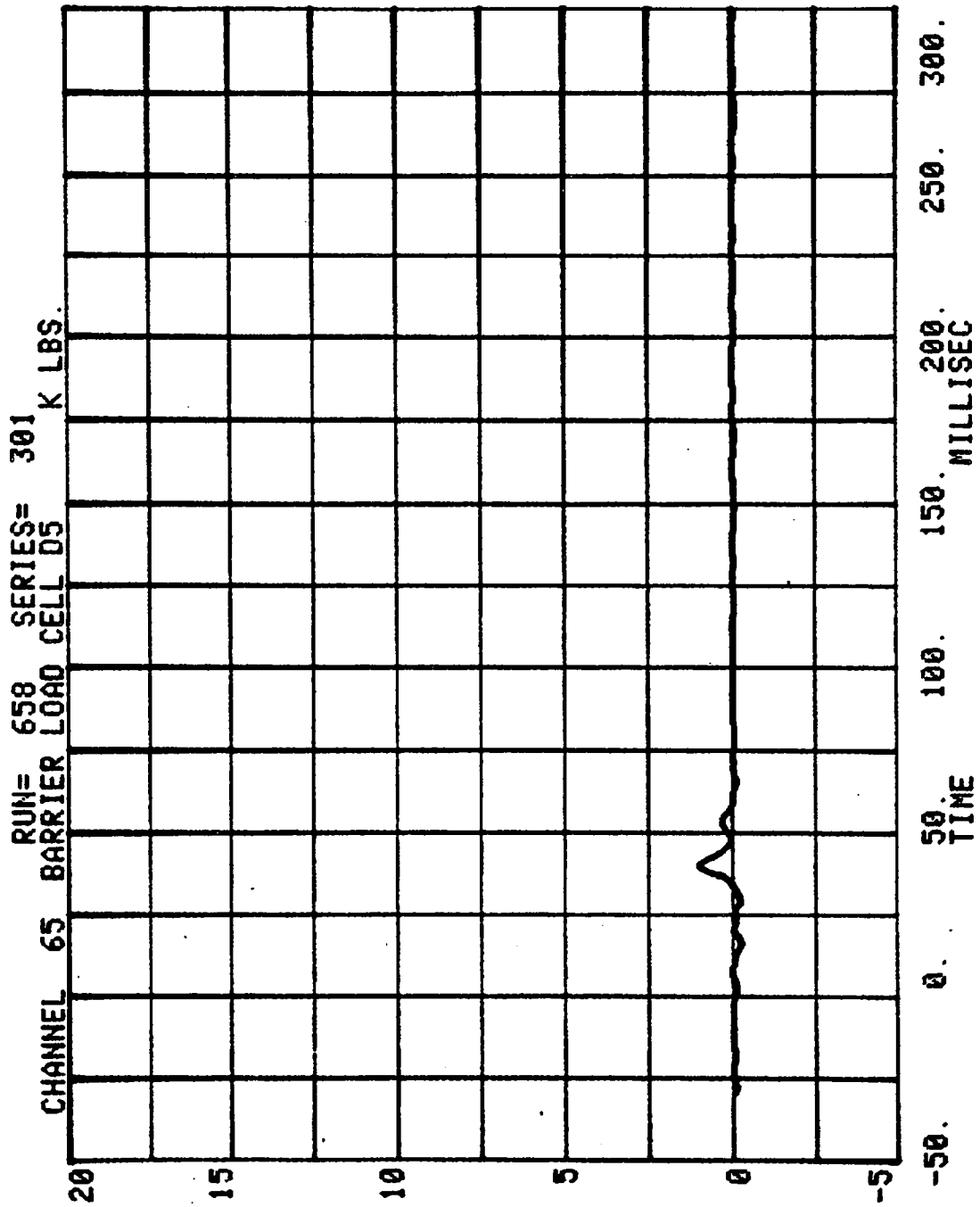
CHANNEL 63 BARRIER LOAD CELL D3
RUN= 658 SERIES= 301 K LBS.



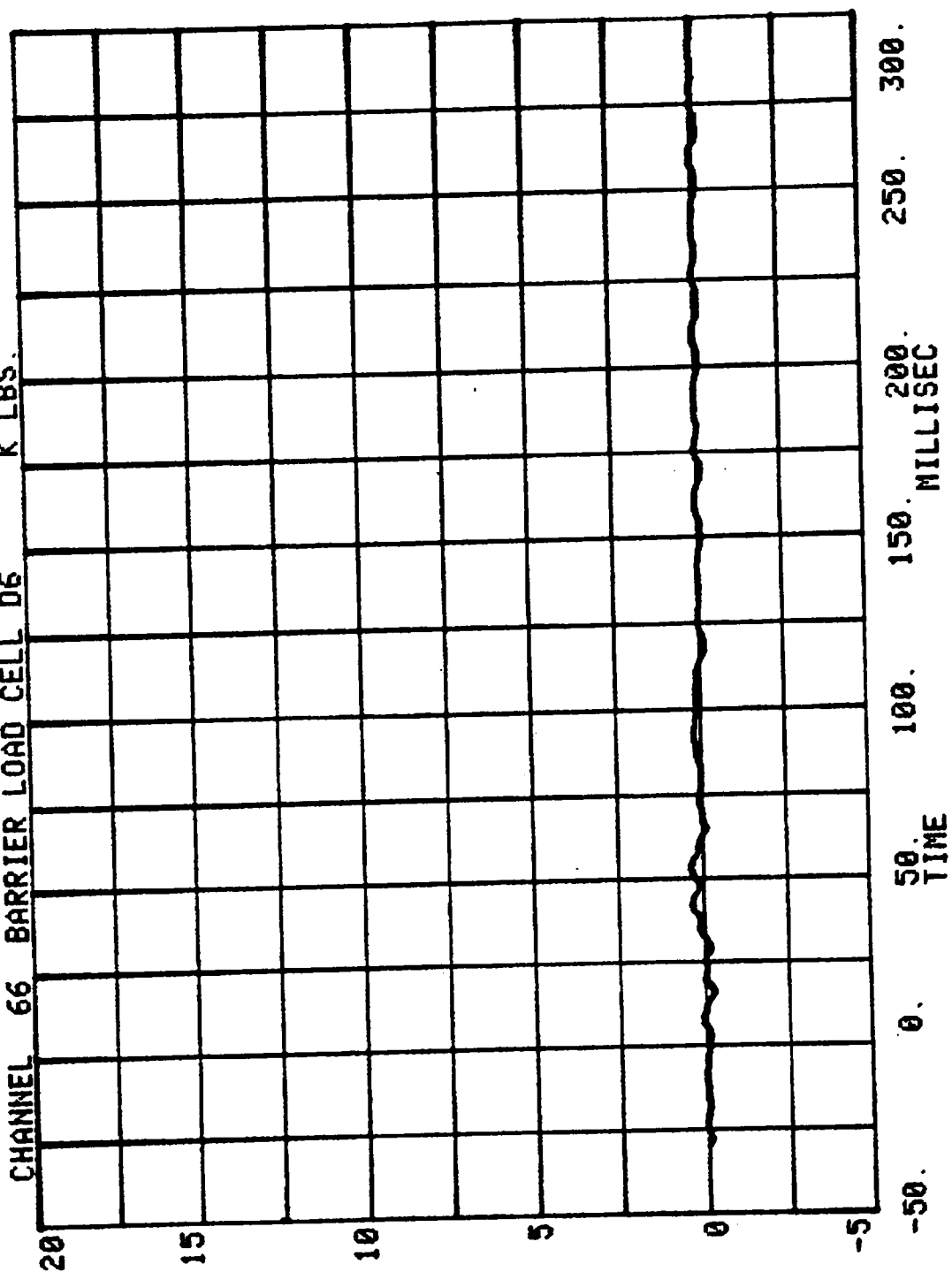
CHANNEL 64 BARRIER LOAD CELL D4
RUN= 658 SERIES= 301 K LBS.



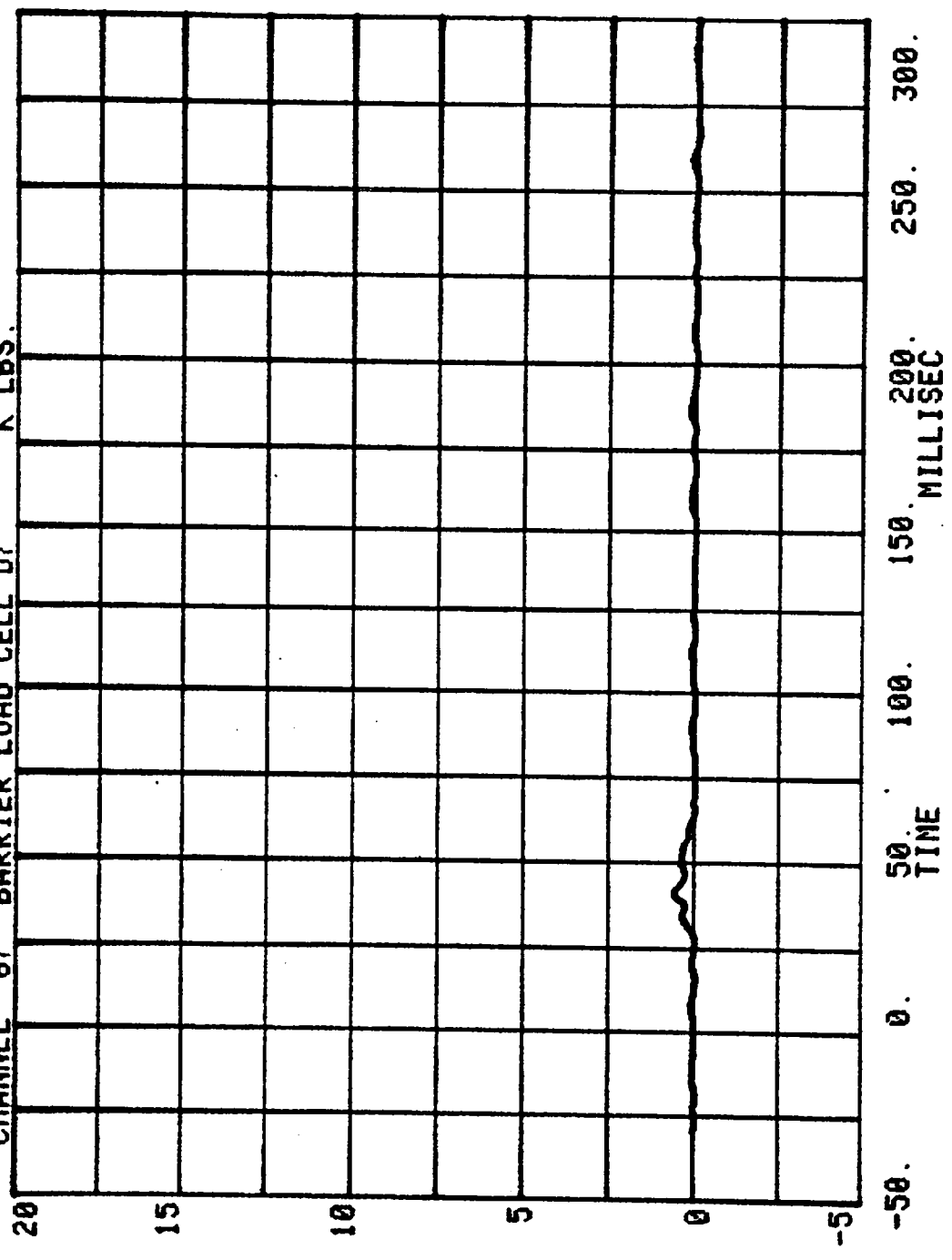
-50. 0. 50. 100. 150. 200. 250. 300.
TIME
MILLISEC



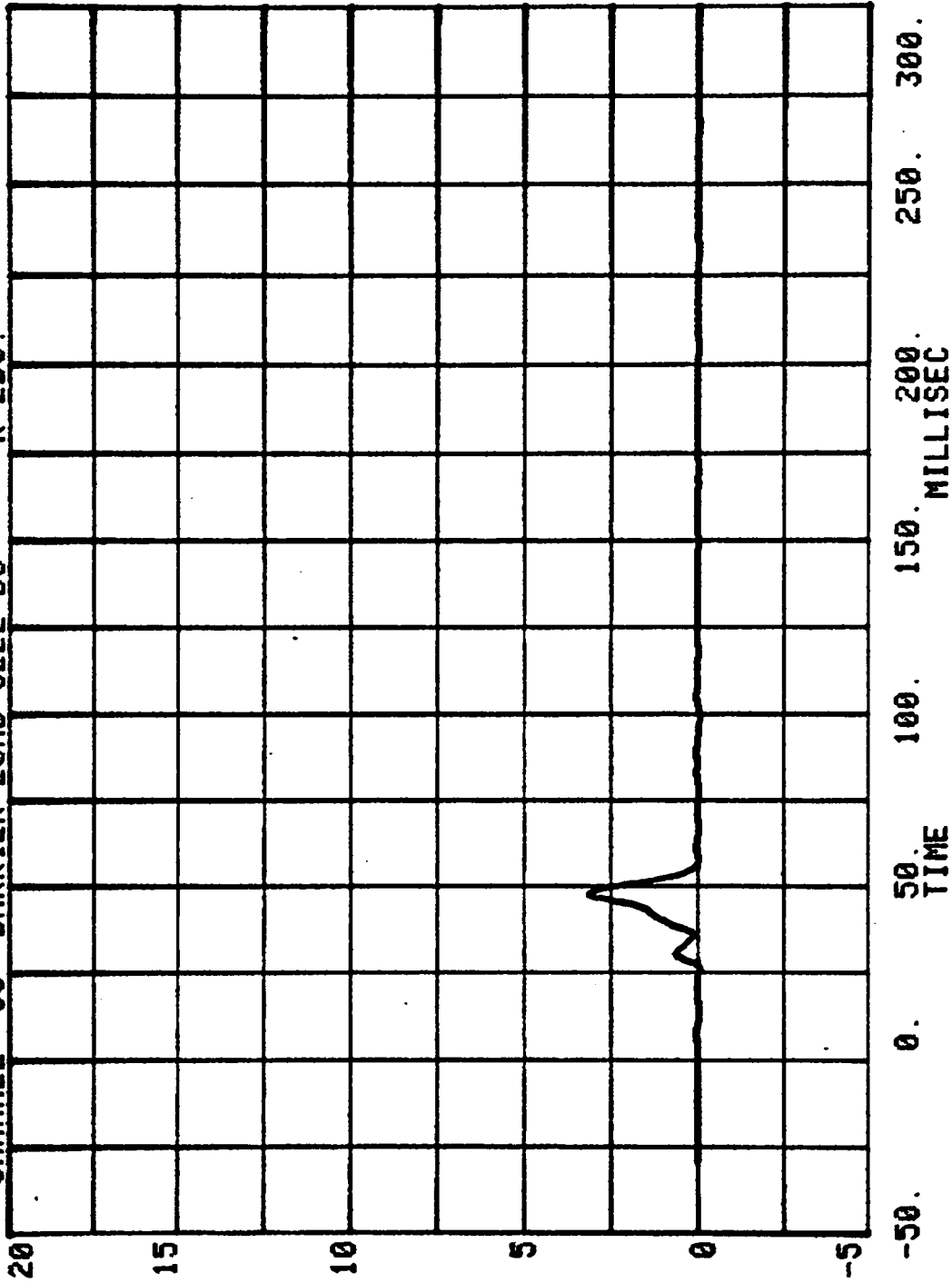
CHANNEL 66 BARRIER LOAD CELL D6 301 K LBS. SERIES= 658 RUN=



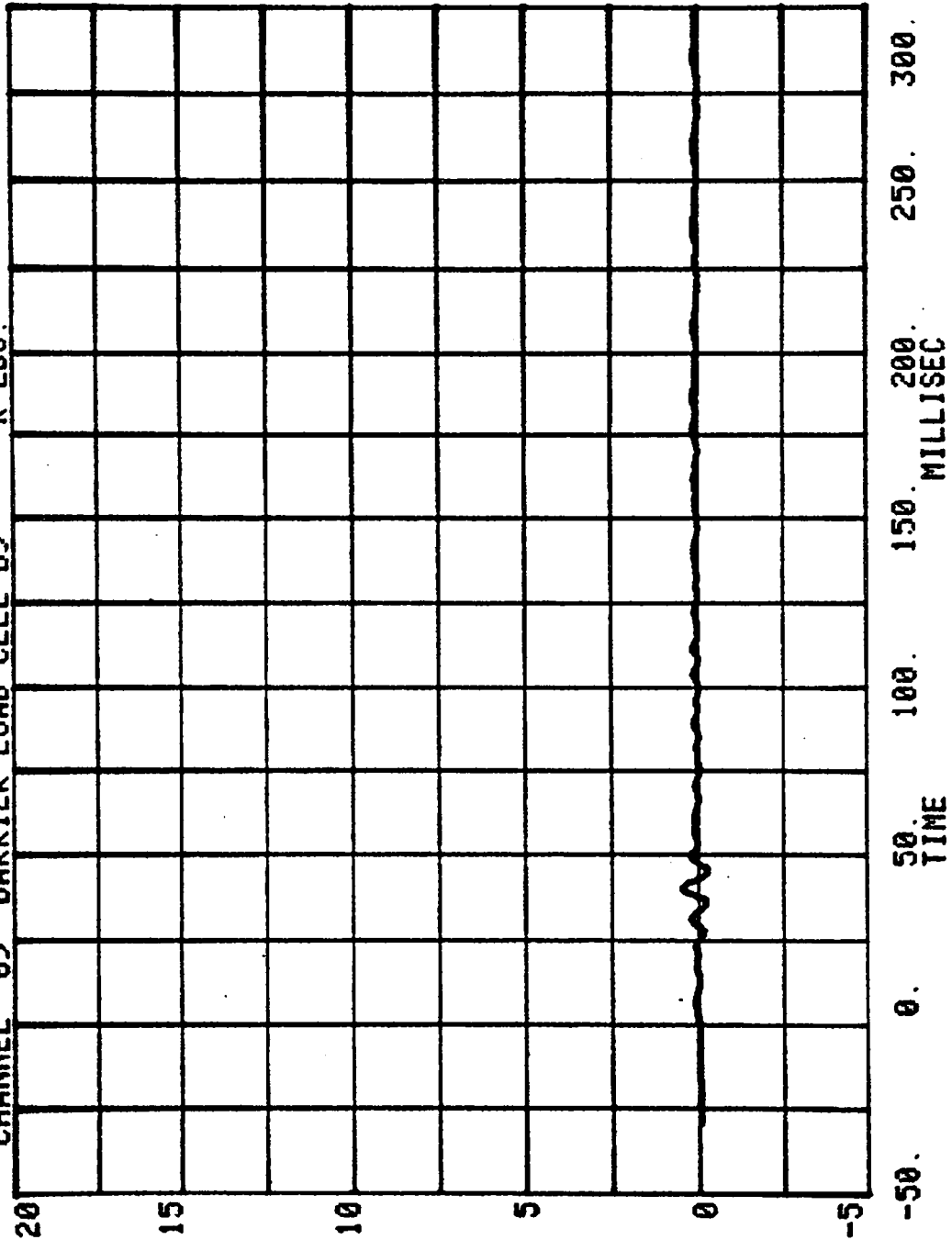
CHANNEL 67 BARRIER LOAD CELL D7
RUN= 658 SERIES= 301
K LBS.

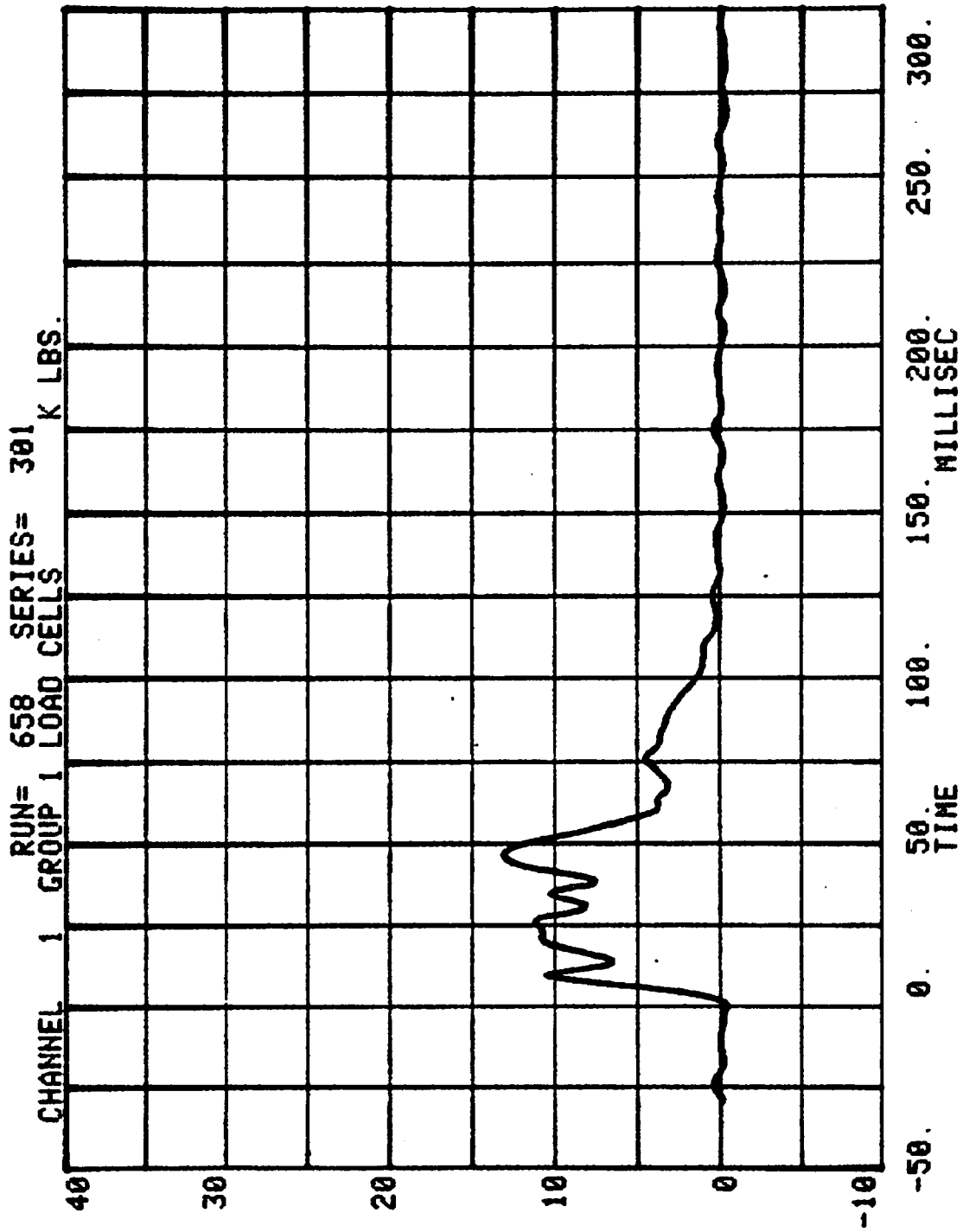


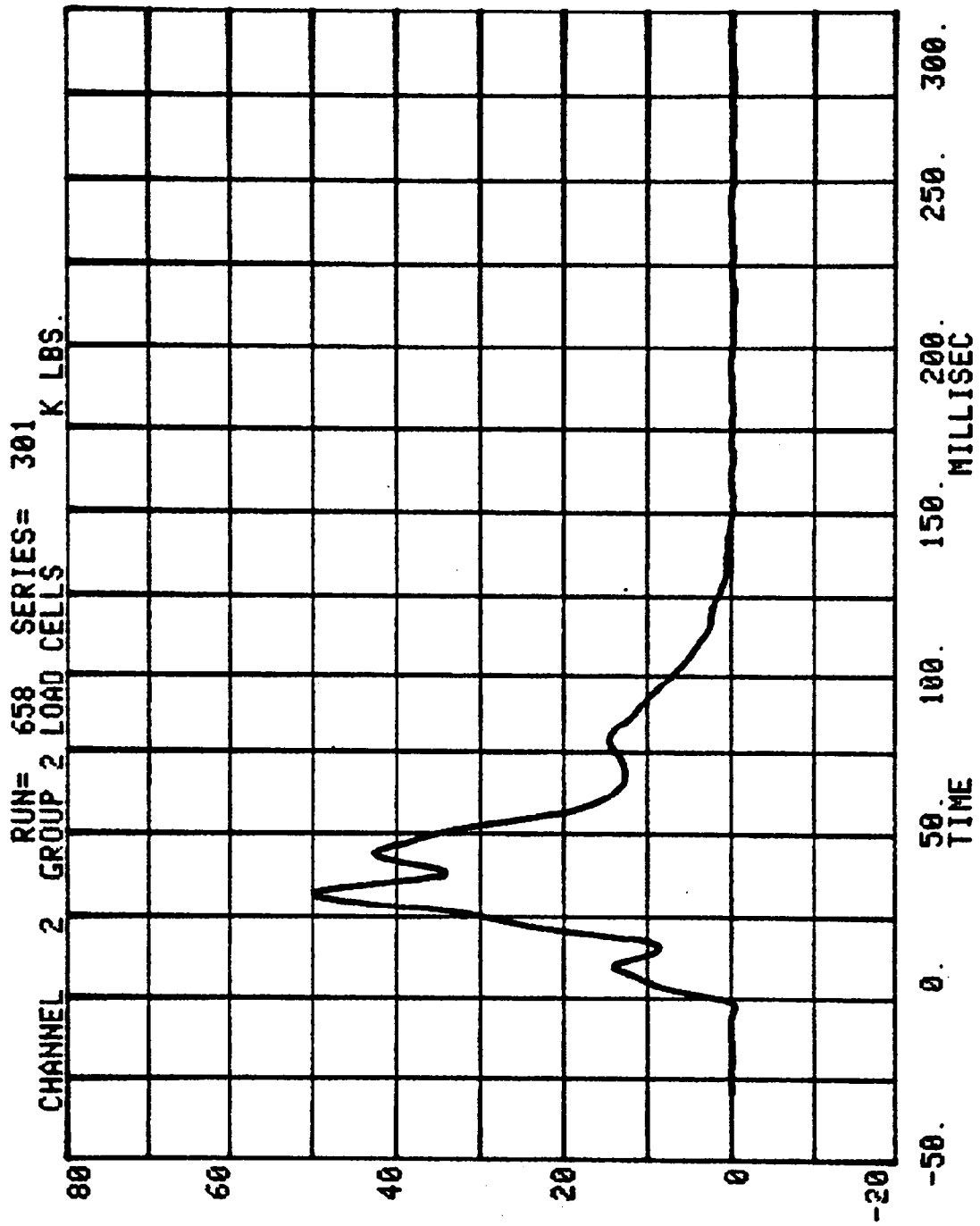
CHANNEL 68 BARRIER LOAD CELL 08
RUN= 658 SERIES= 301 K LBS.



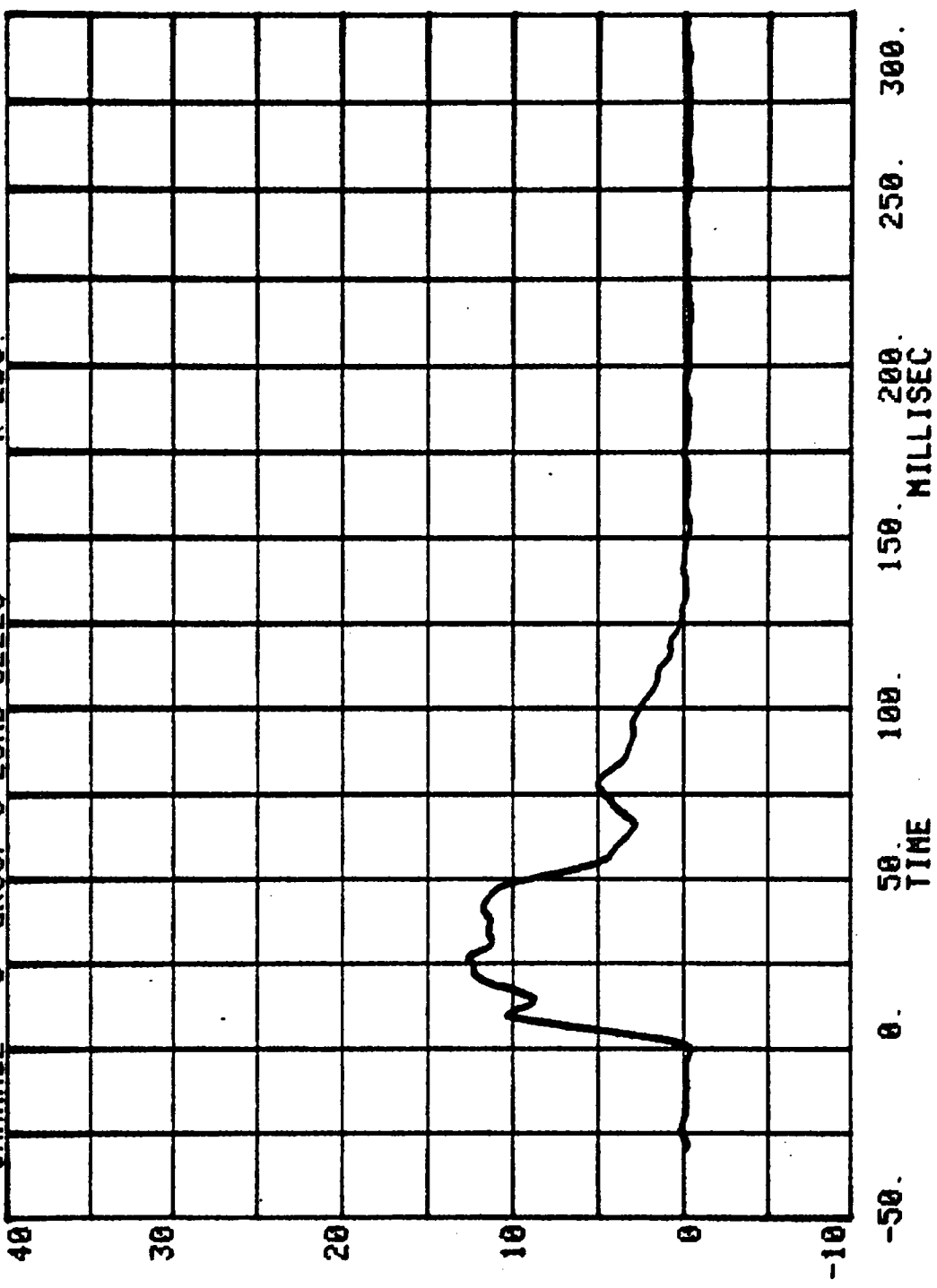
CHANNEL 69 BARRIER LOAD CELL D9
RUN= 658 SERIES= 301 K LBS.

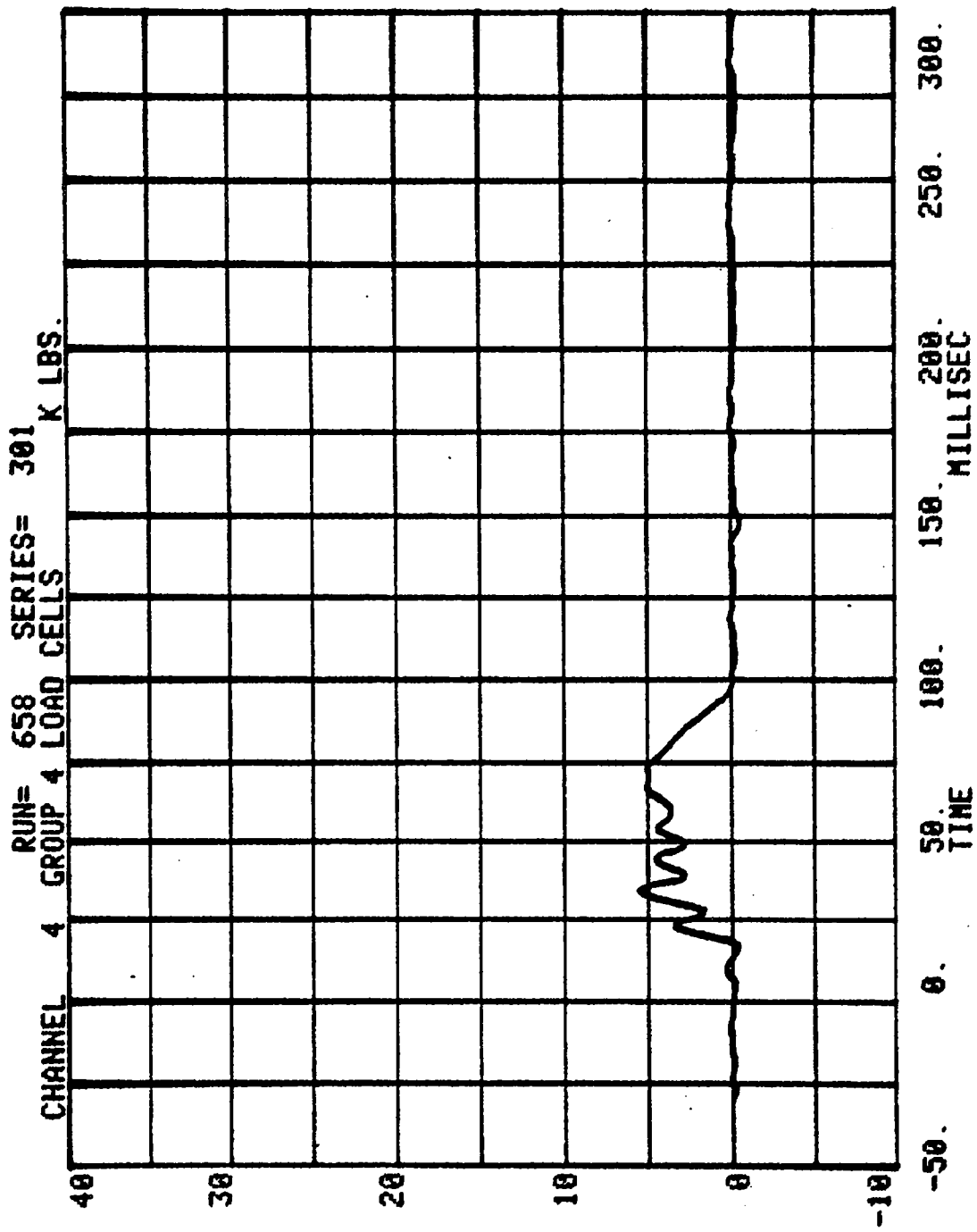




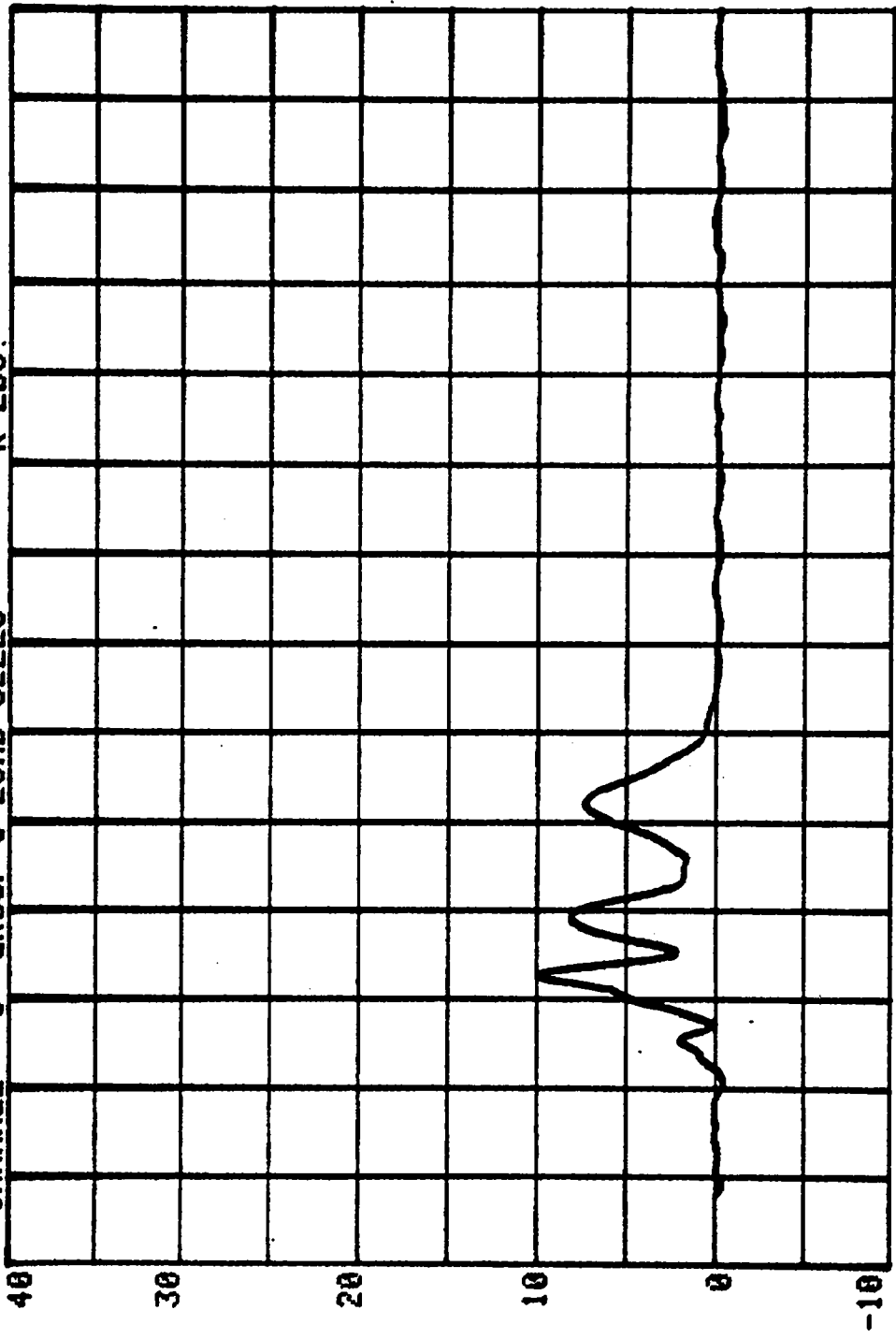


CHANNEL 3 GROUP 3 LOAD CELLS
RUN= 658 SERIES= 301 K LBS.

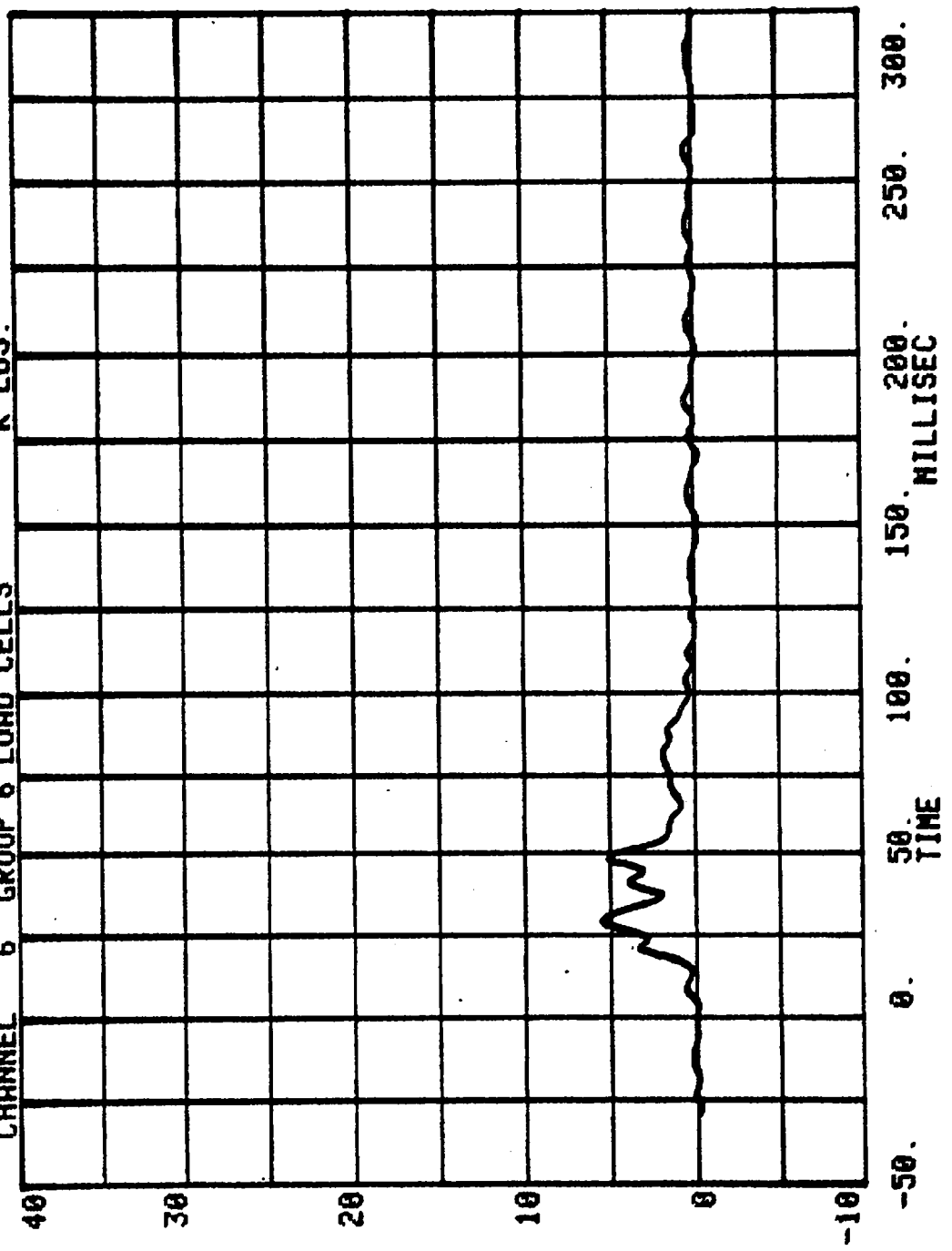




CHANNEL 5 GROUP 5 LOAD CELLS
RUN= 658 SERIES= 301 K LBS.

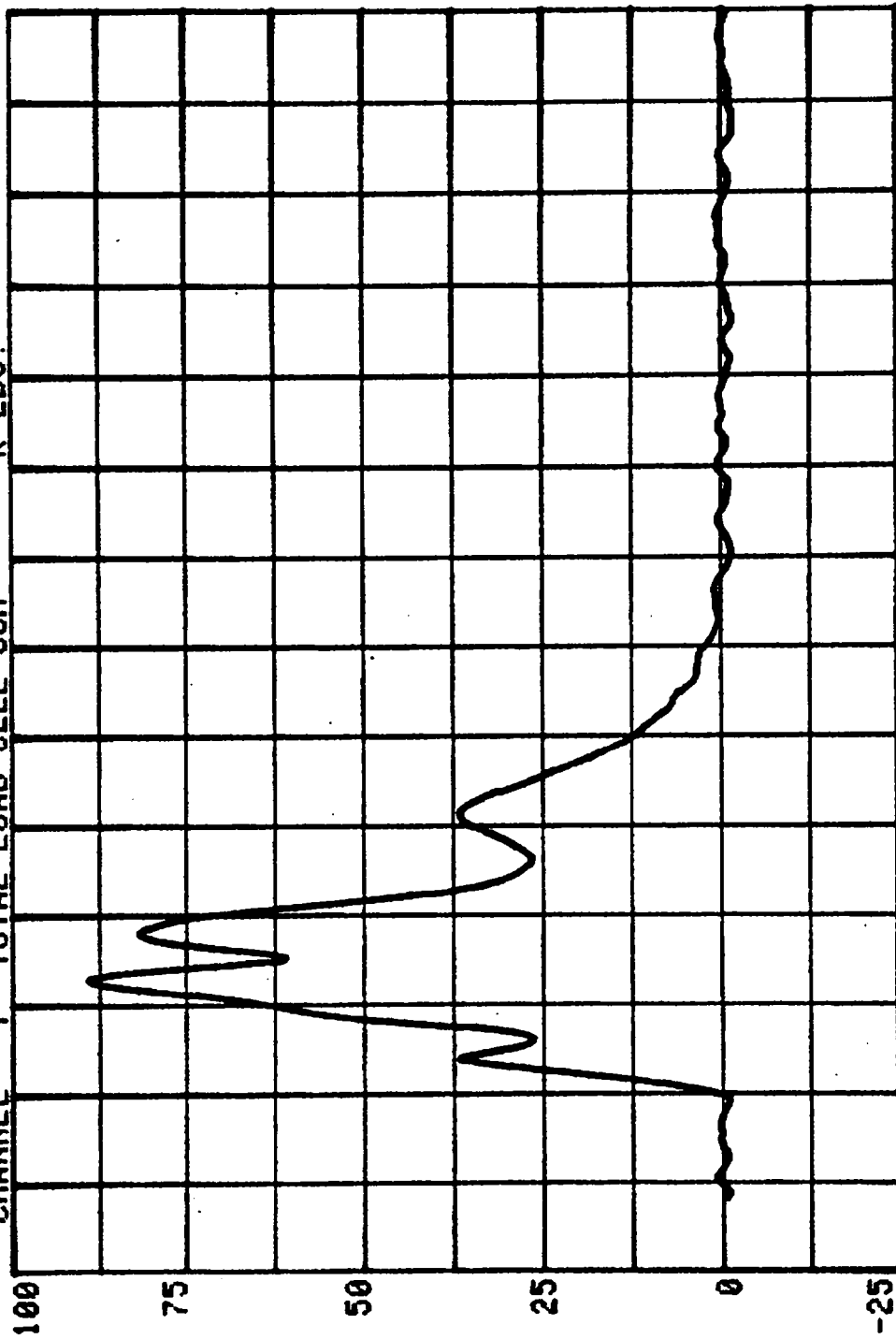


CHANNEL 6 GROUP 6 LOAD CELLS
RUN= 658 SERIES= 301 K LBS.



CHANNEL 7 TOTAL LOAD CELL SUM K LBS.

RUN= 658 SERIES= 301



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

TEST NO. CF0301

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= 658

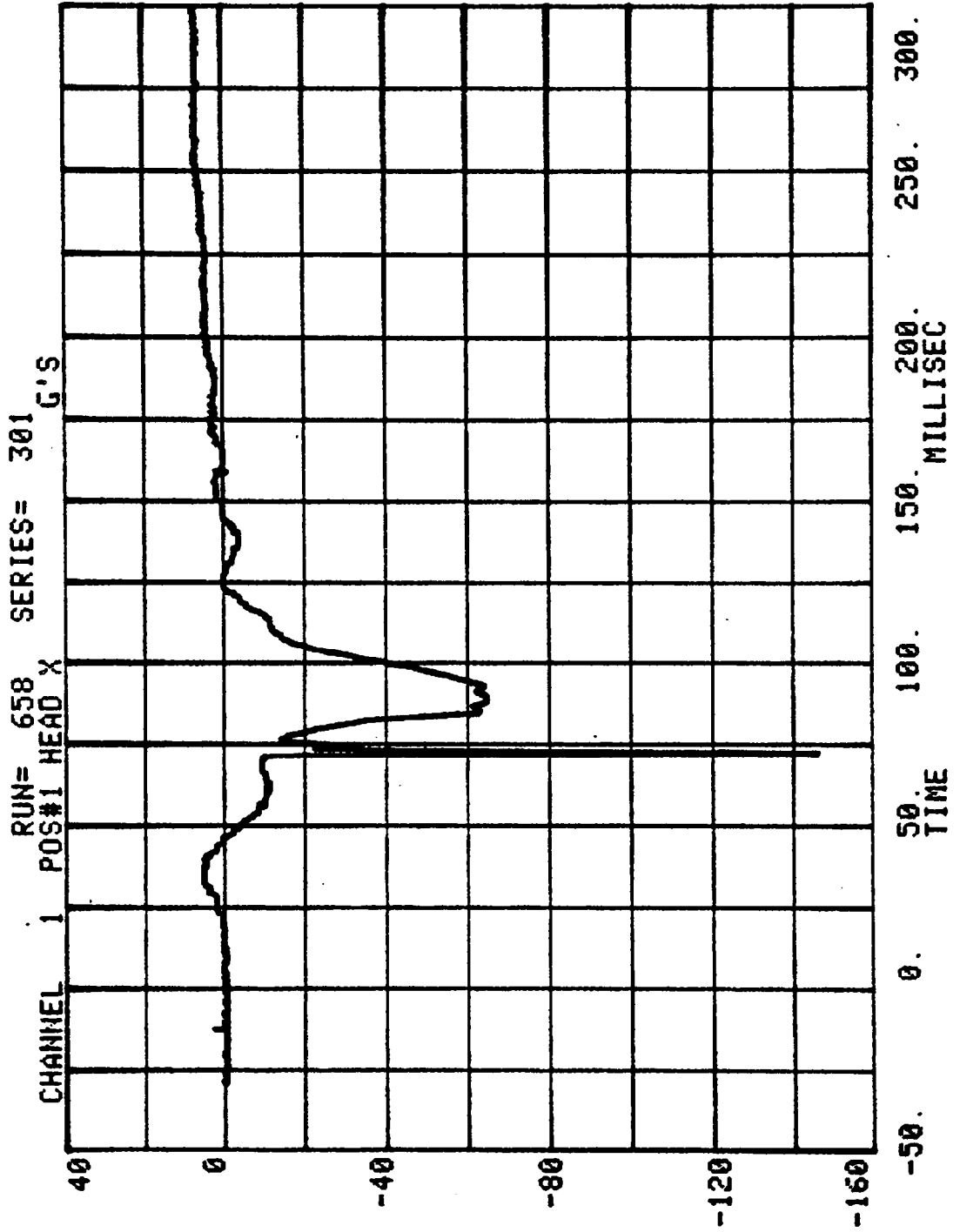
POS#1 HEAD RESULTANT

HIC= 787.2 FROM T1= .06690 TO T2= .10380

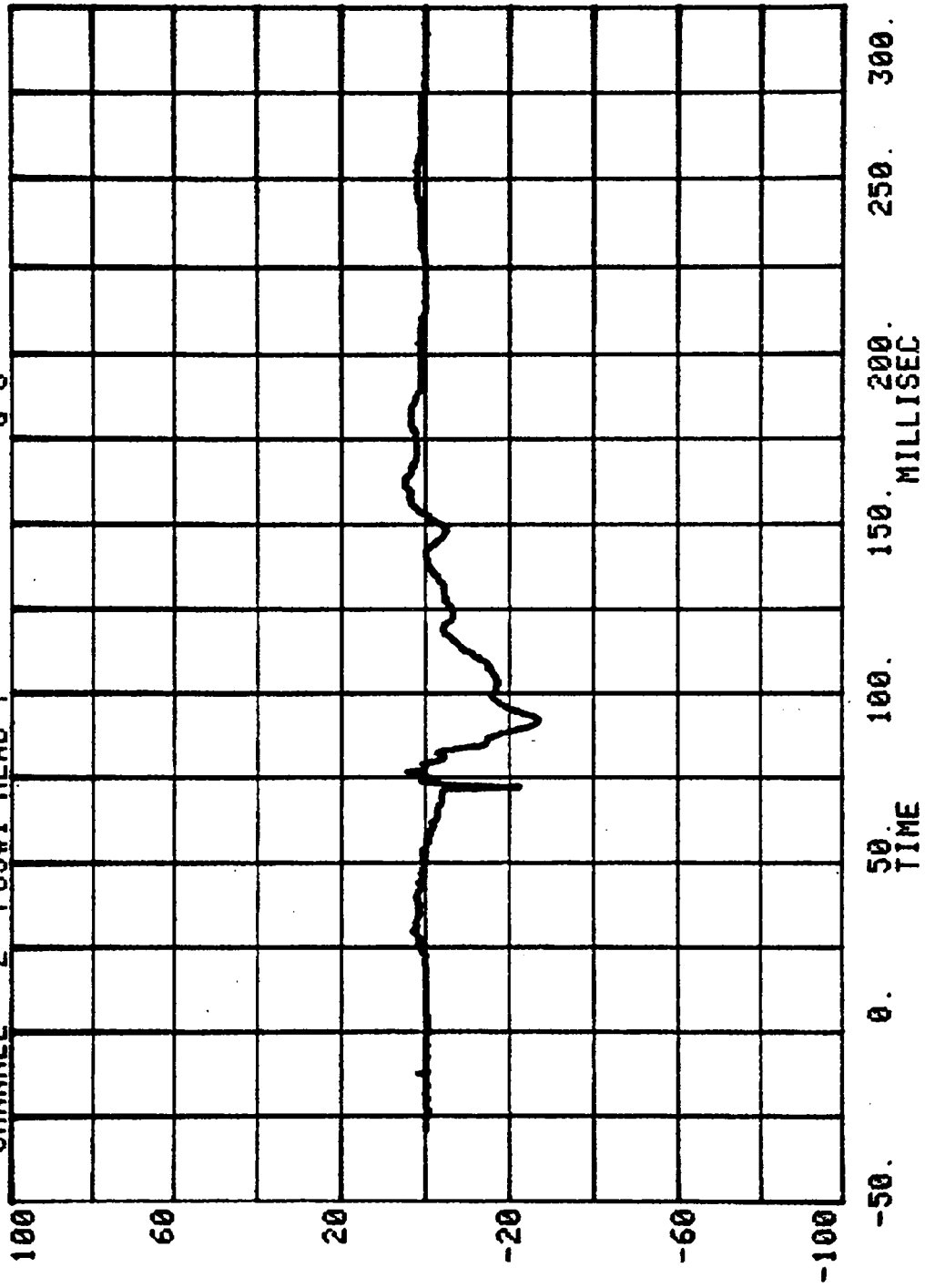
AVERAGE ACCELERATION BETWEEN T1 AND T2= 53.9G'S

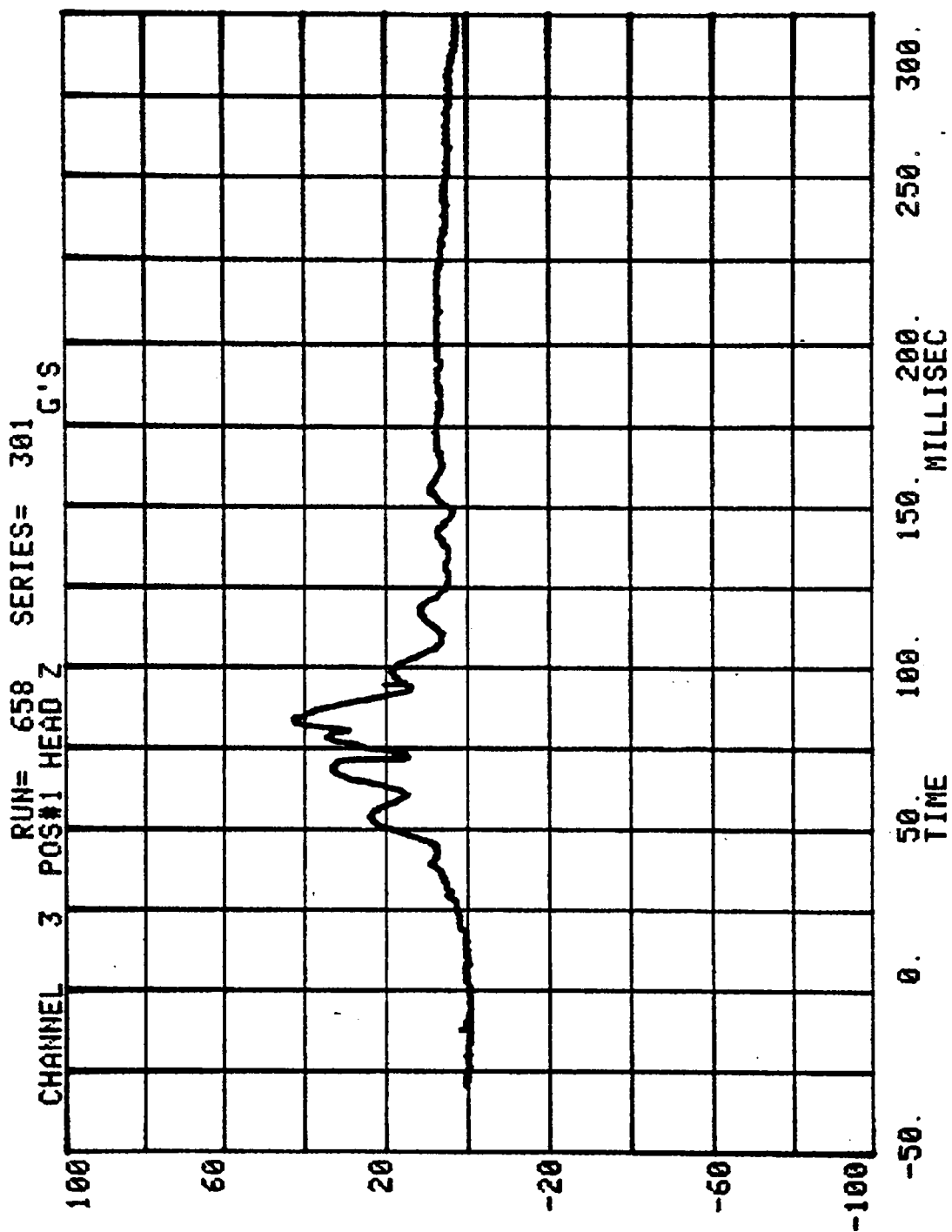
EVENT TIME= 300.0 MSEC

SEVERITY INDEX=1132.6

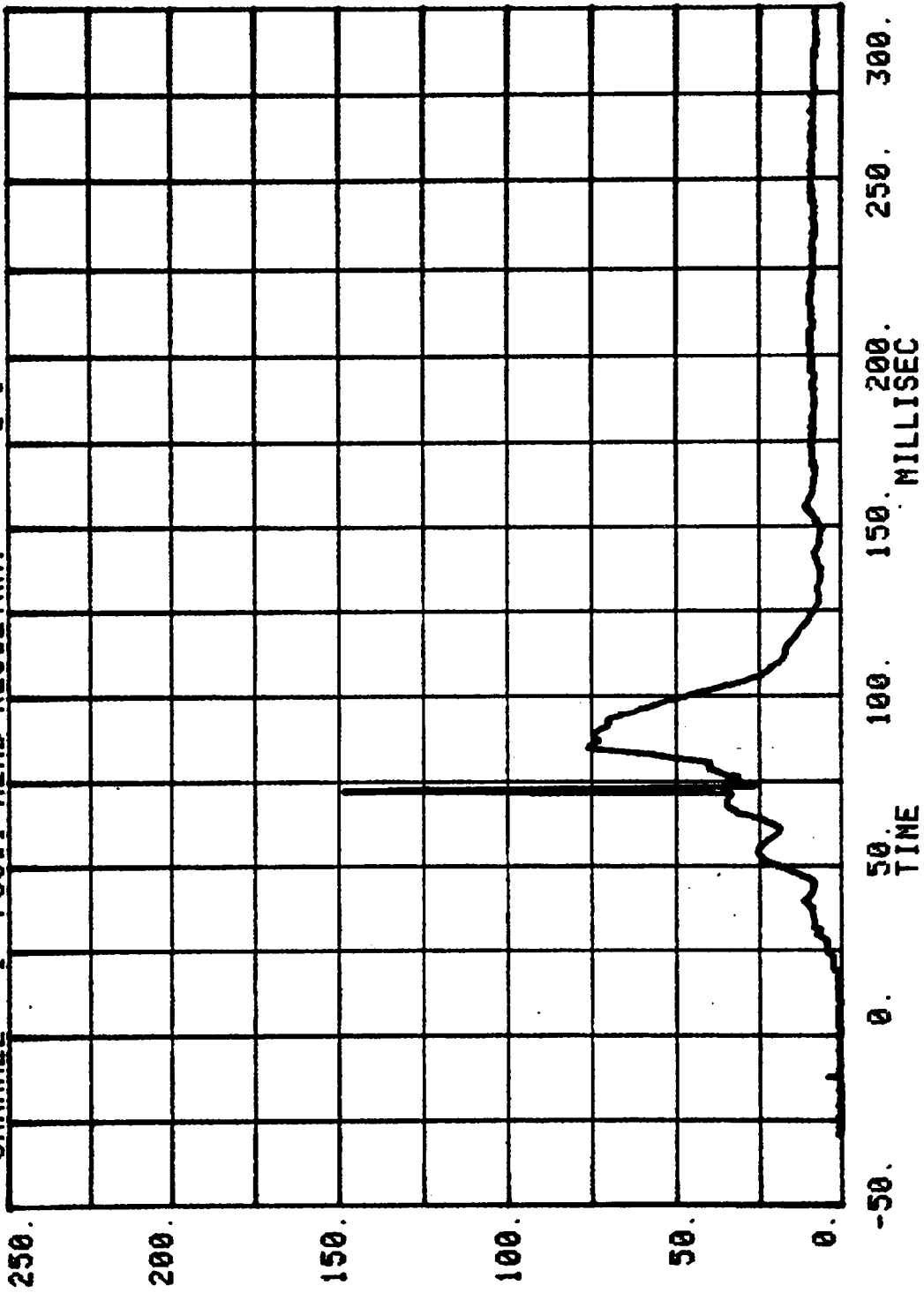


CHANNEL 2 POS#1 HEAD Y
RUN= 658 SERIES= 301 G'S

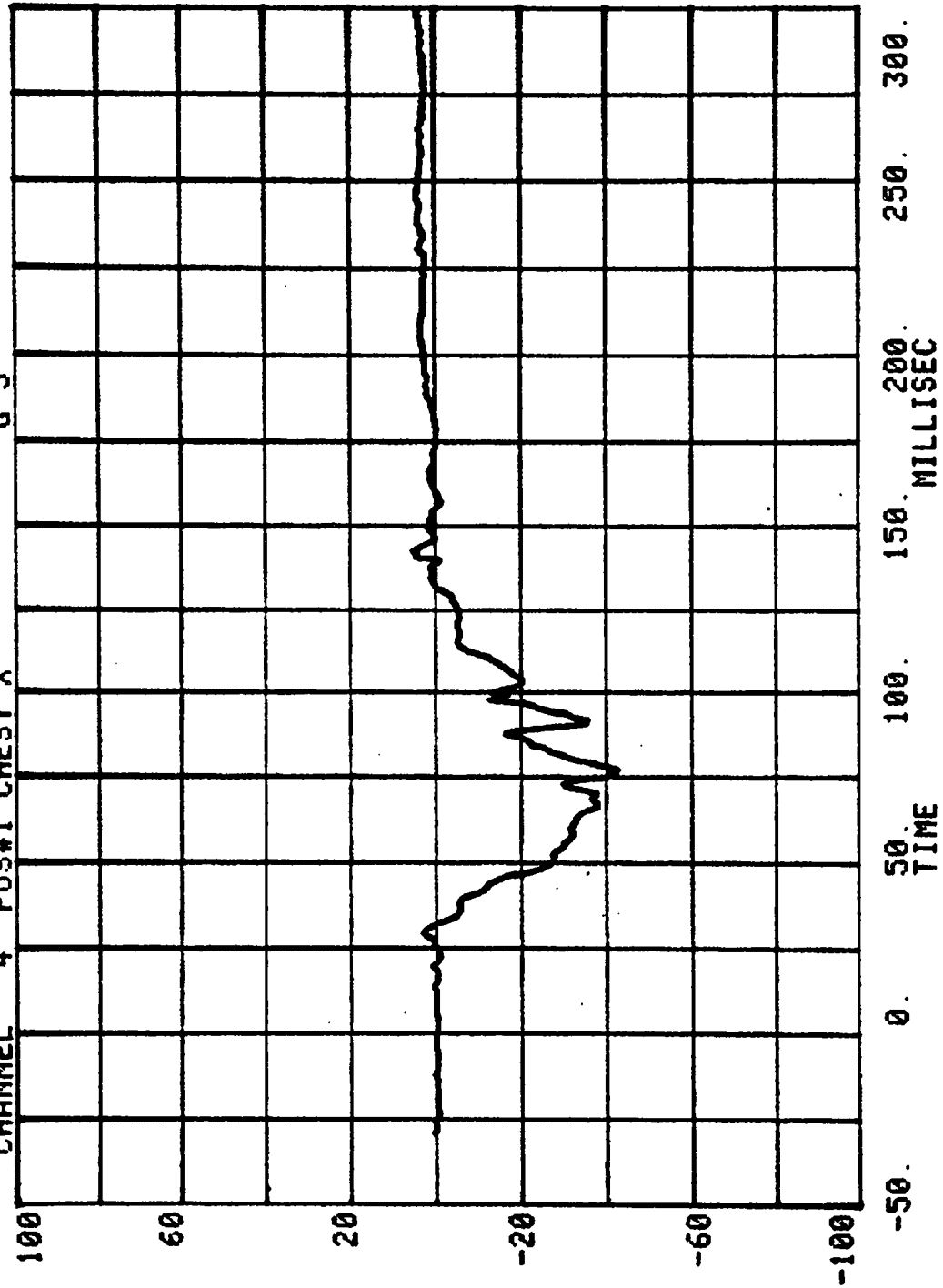




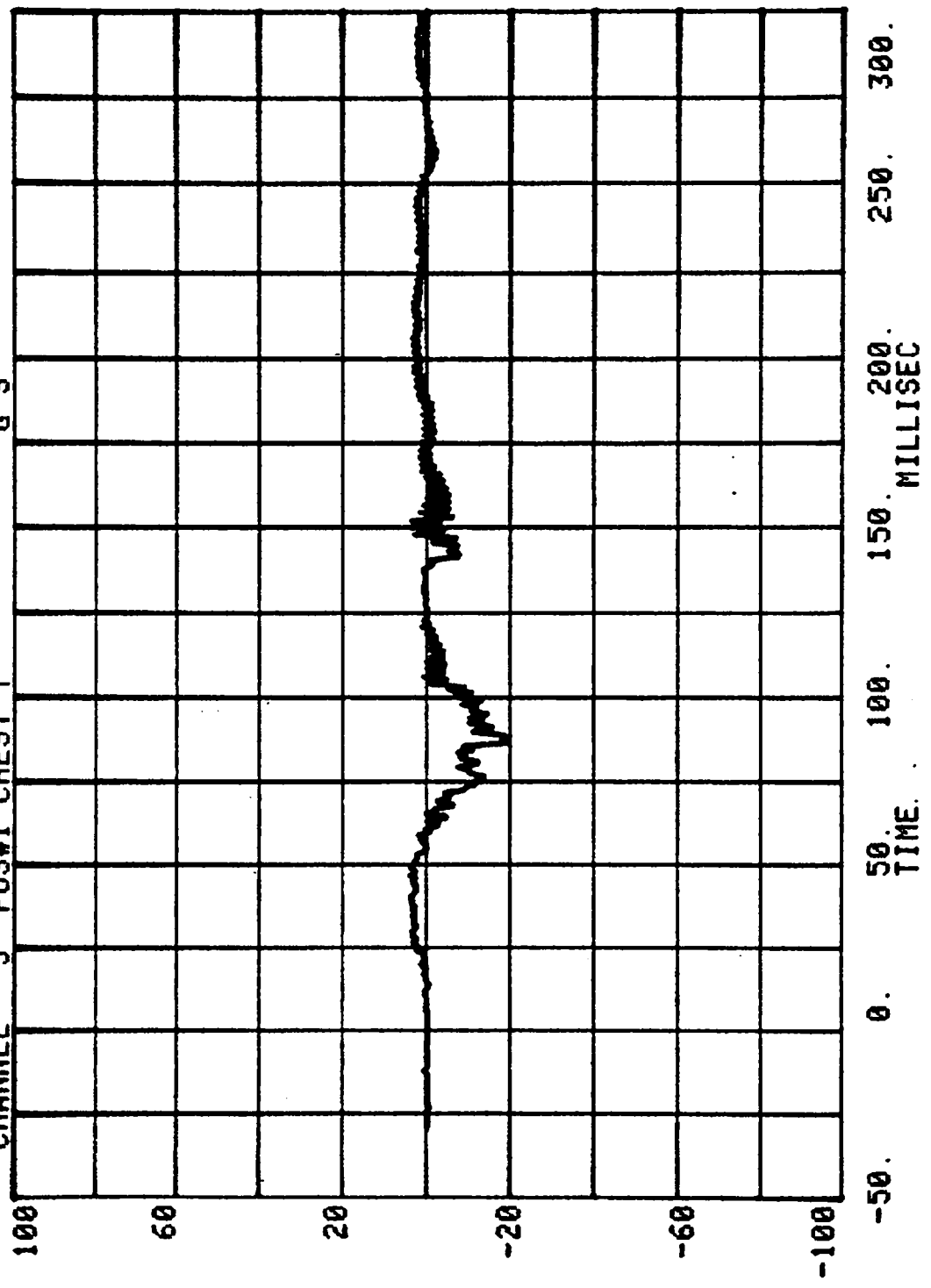
CHANNEL 1 POS#1 HEAD RESULTANT 301 G'S

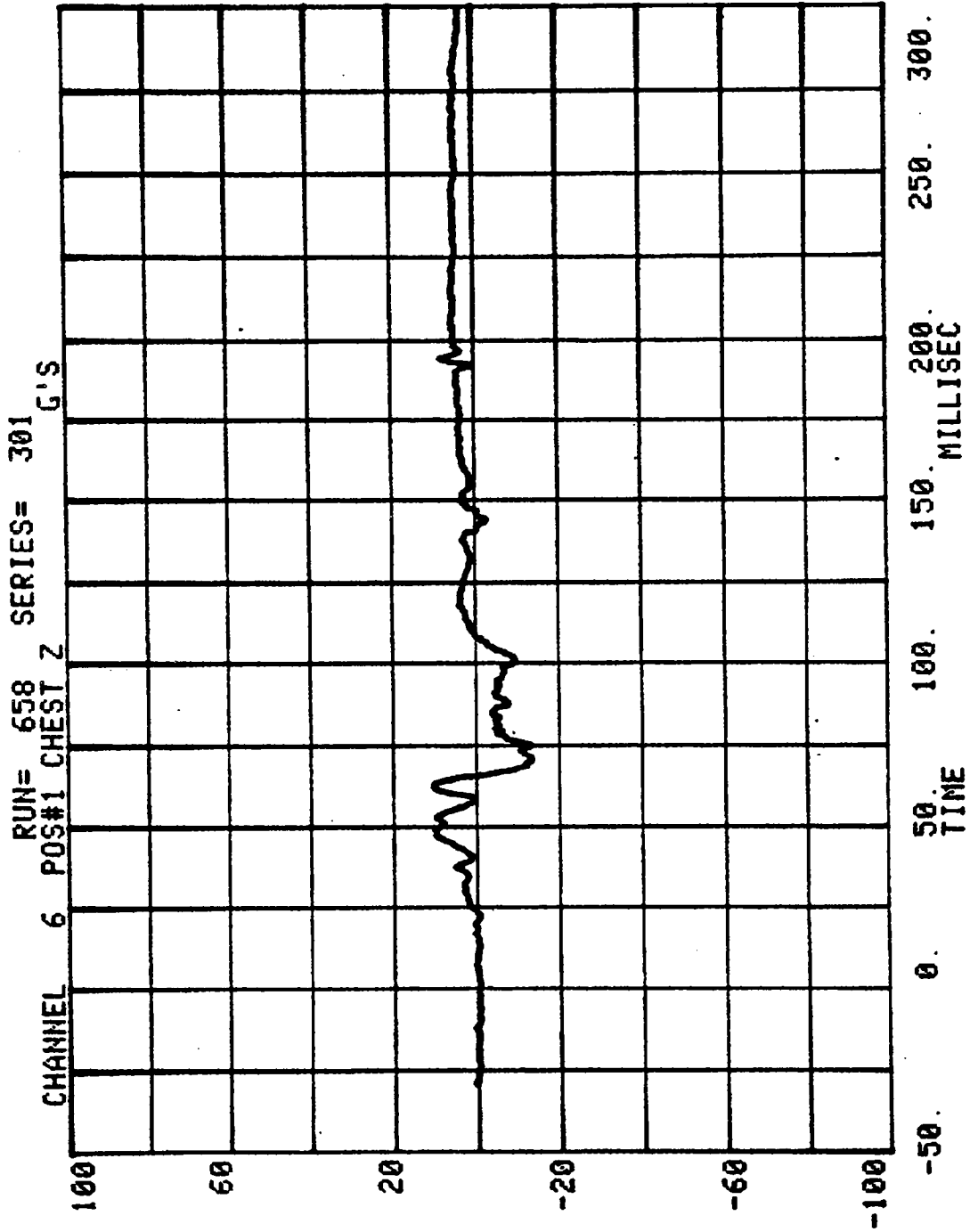


CHANNEL 4 POS#1 CHEST X
RUN= 658 SERIES= 301 G'S

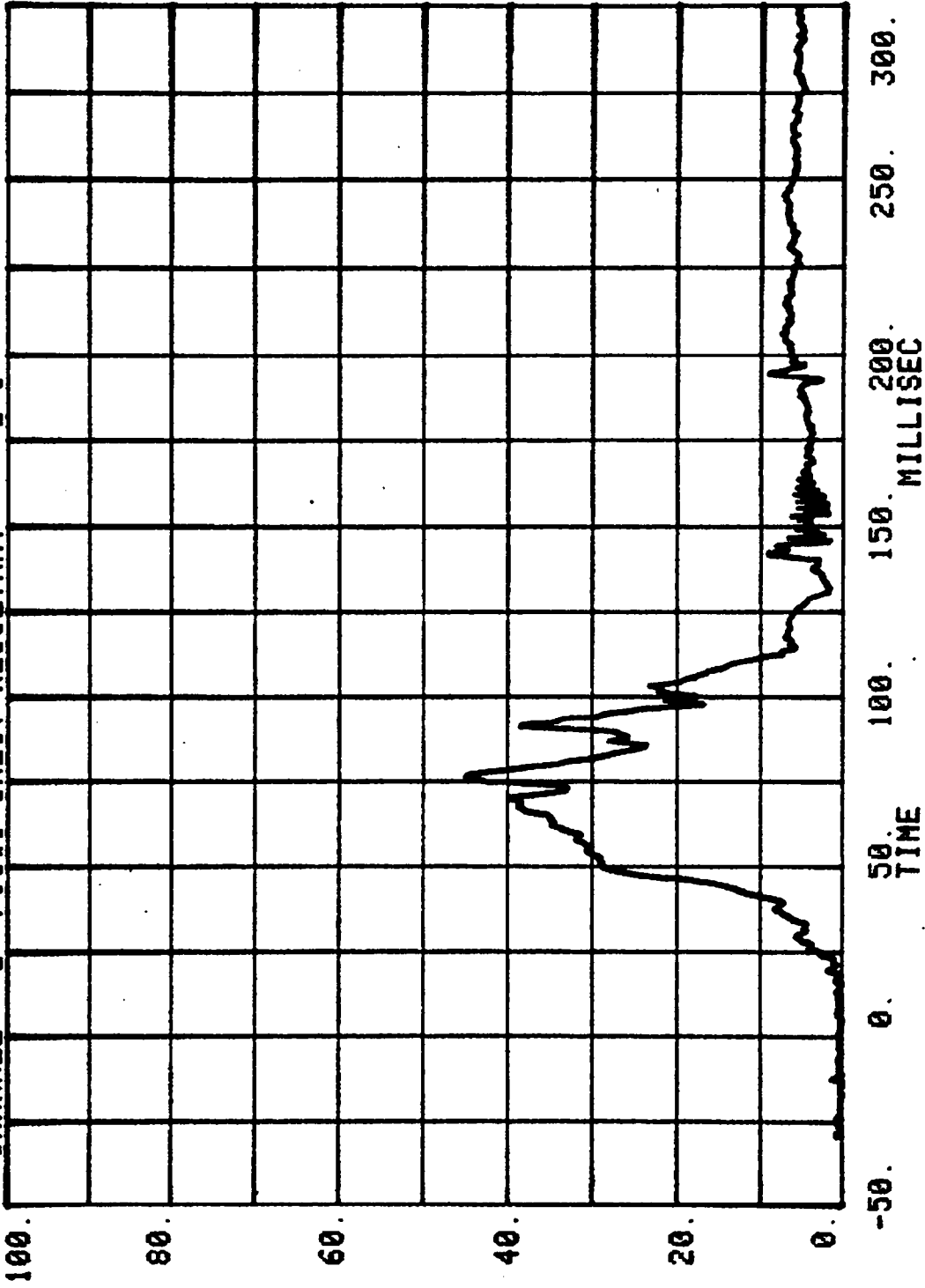


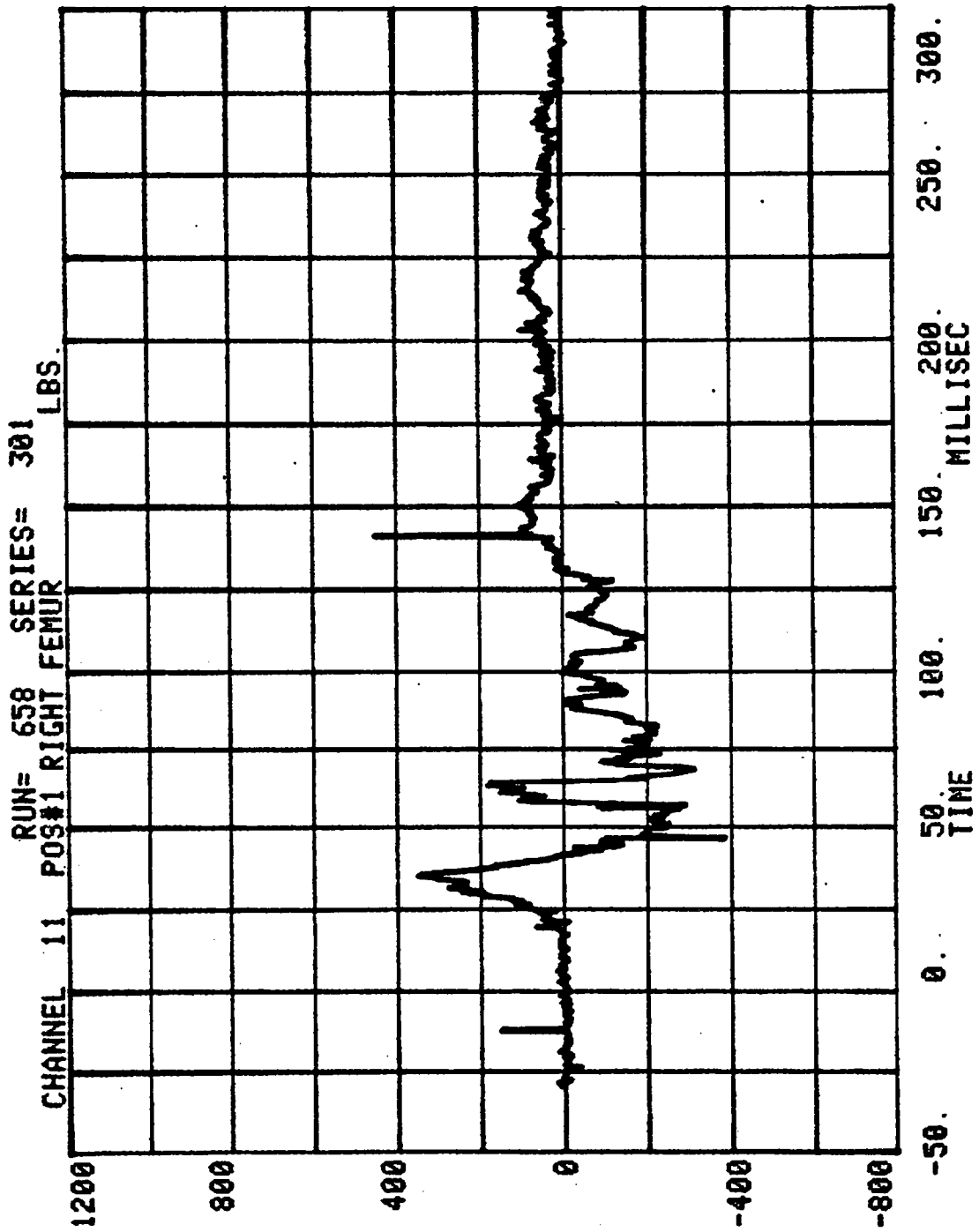
CHANNEL 5 POS#1 CHEST Y SERIES= 301 G'S



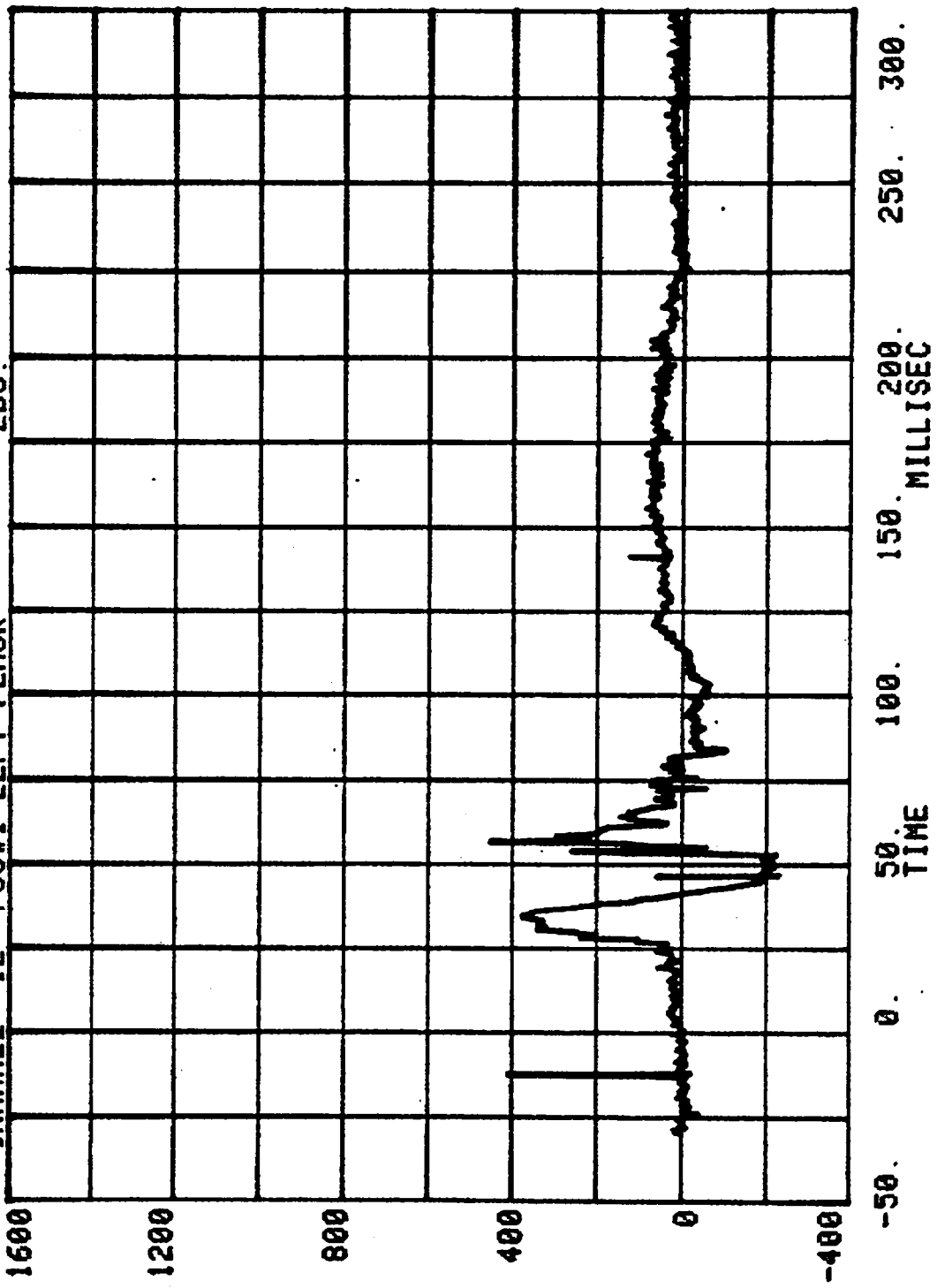


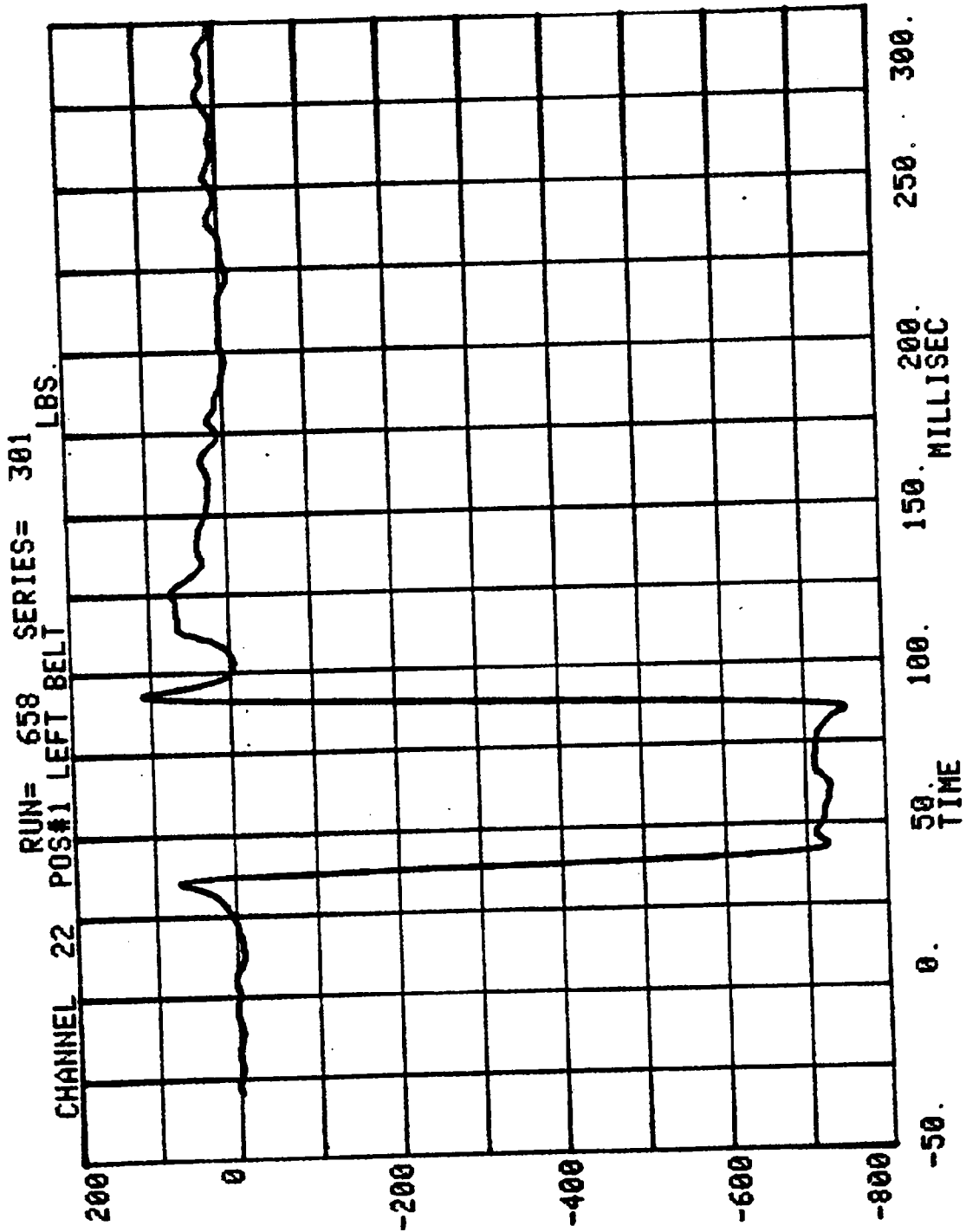
CHANNEL 2 POS#1 CHEST RESULTANT SERIES= 301 G'S



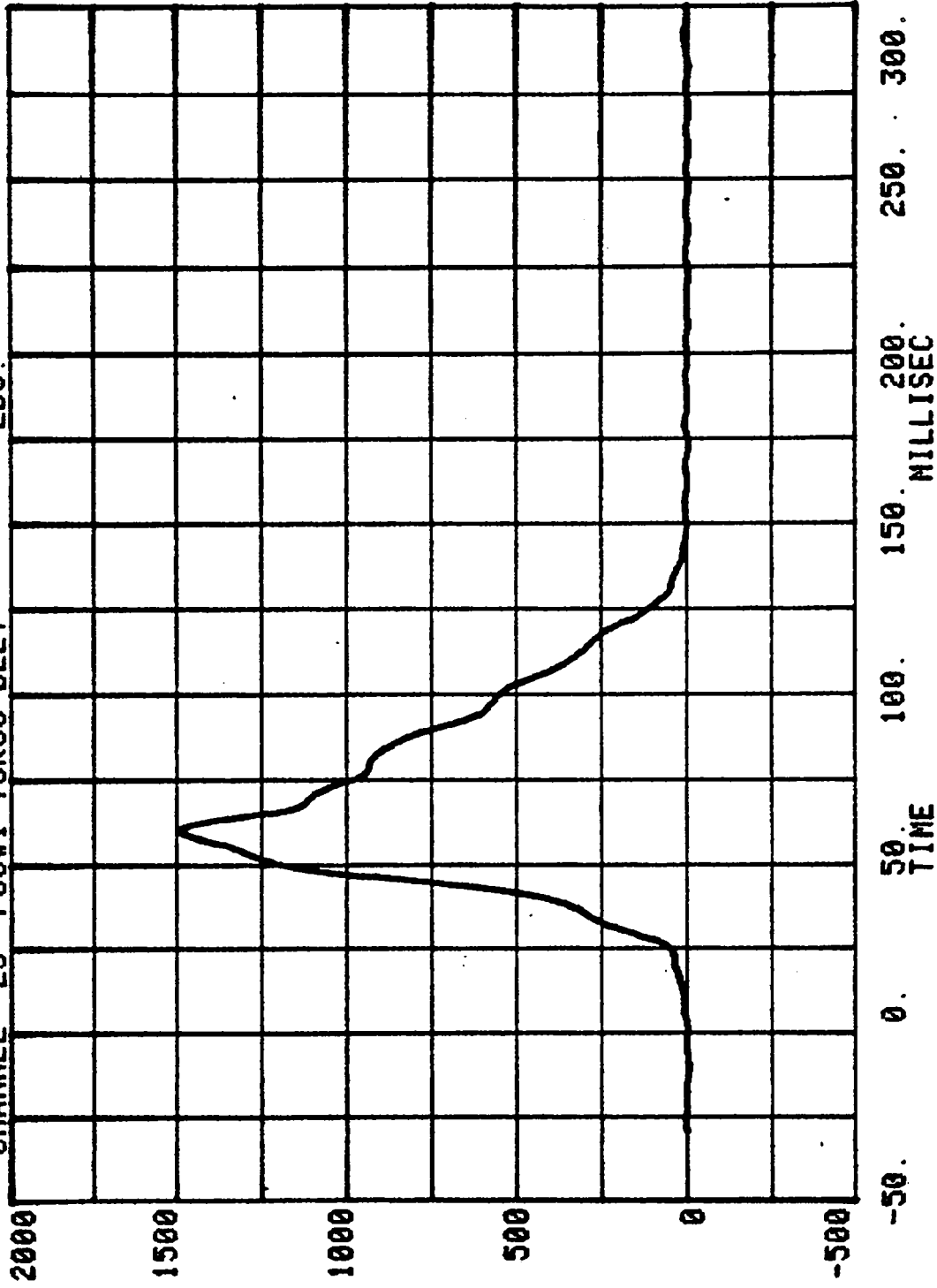


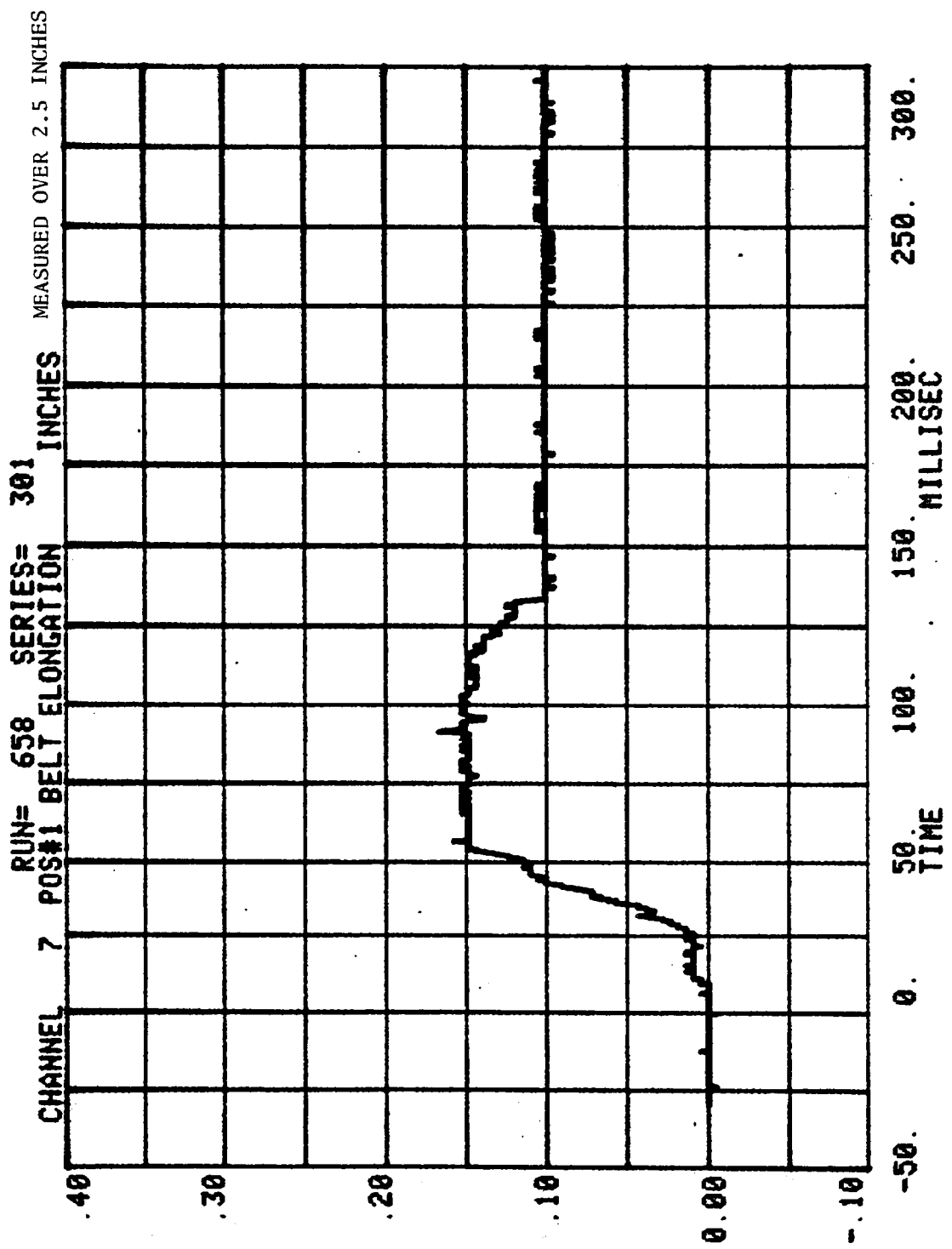
CHANNEL 12 POS#1 LEFT FEMUR
RUN= 658 SERIES= 301 LBS.





CHANNEL 23 POS#1 TORSO BELT
RUN= 658 SERIES= 301 LBS.





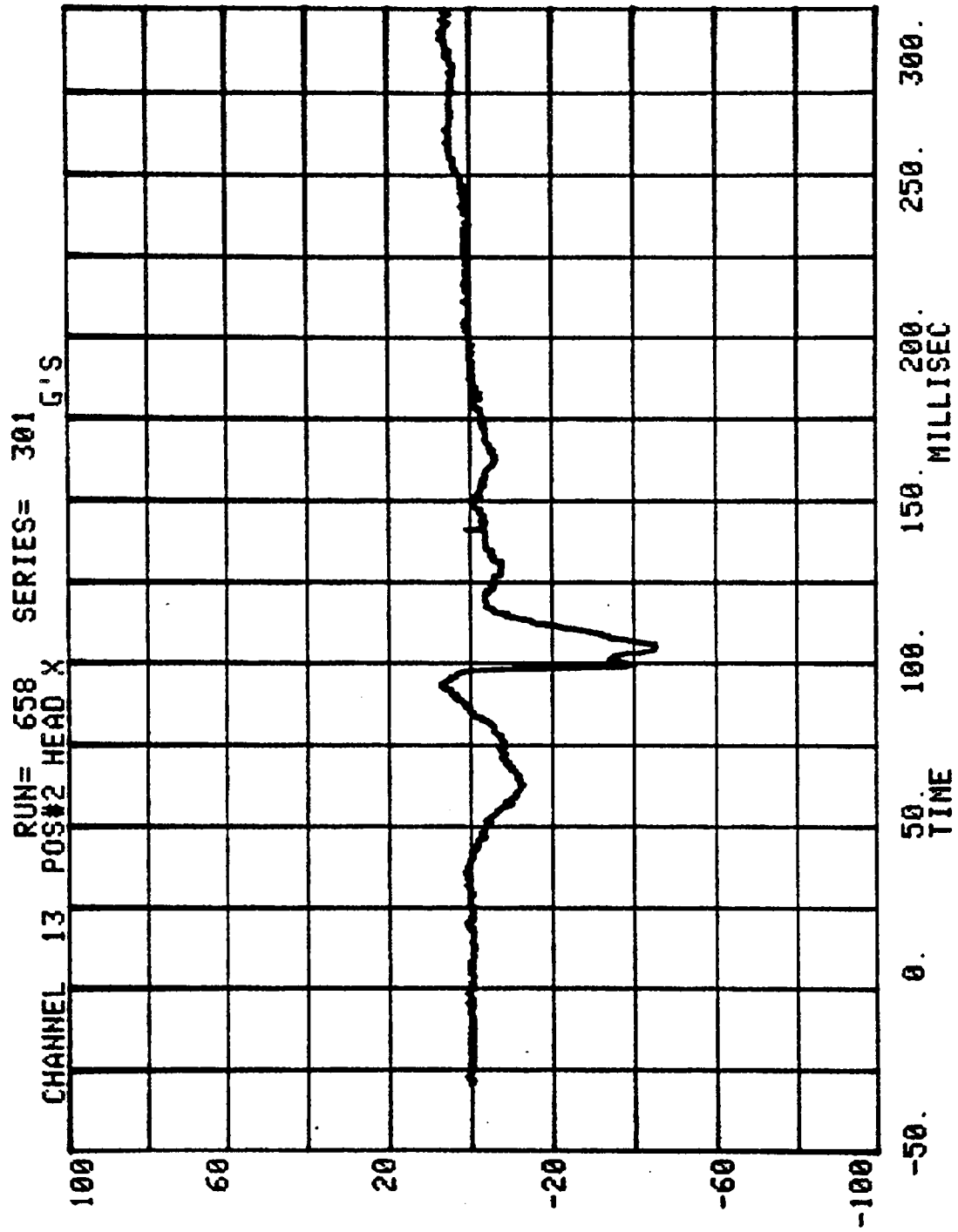
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

CAR TO LOAD CELL BARRIER

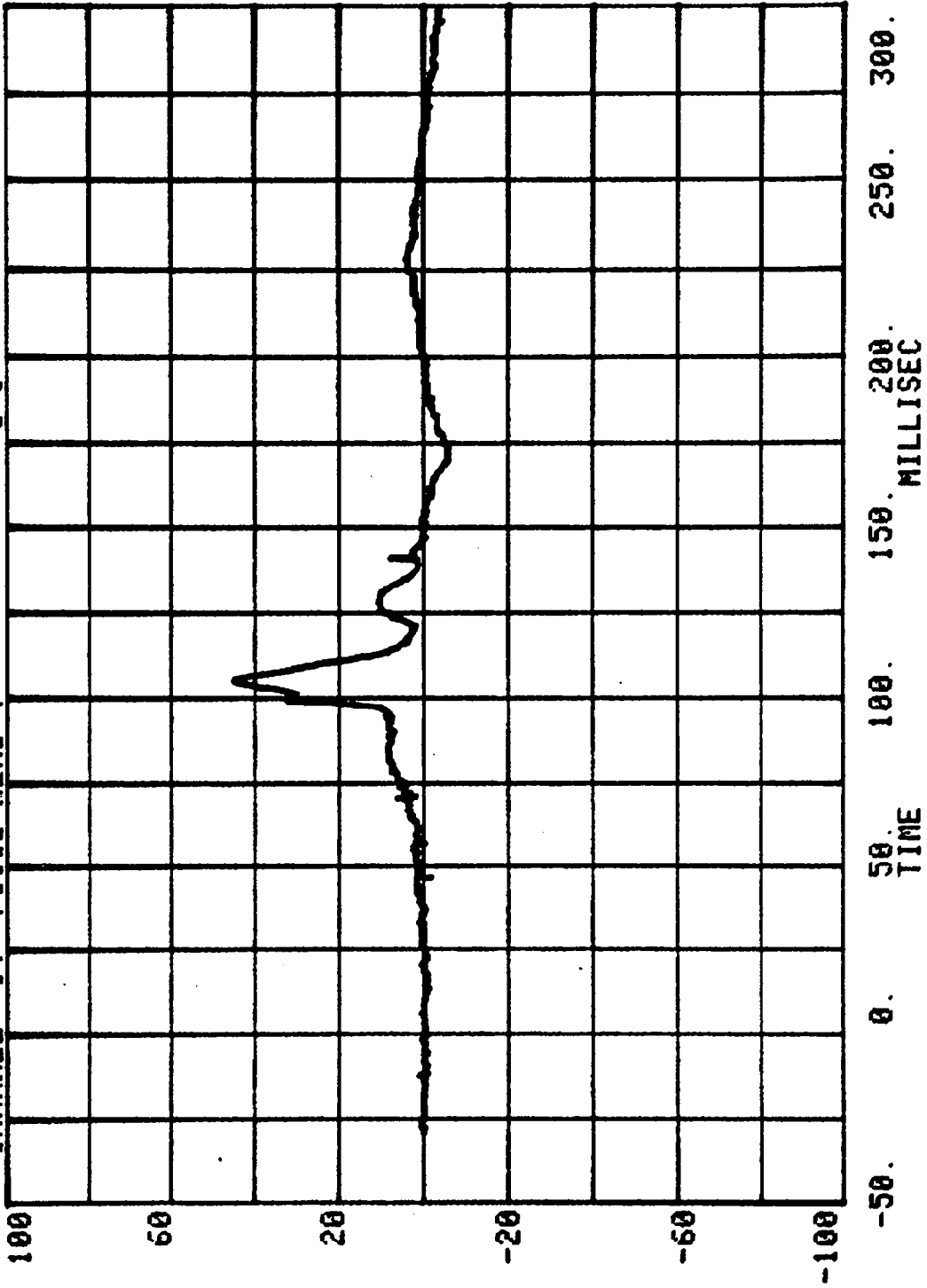
RUN= 658

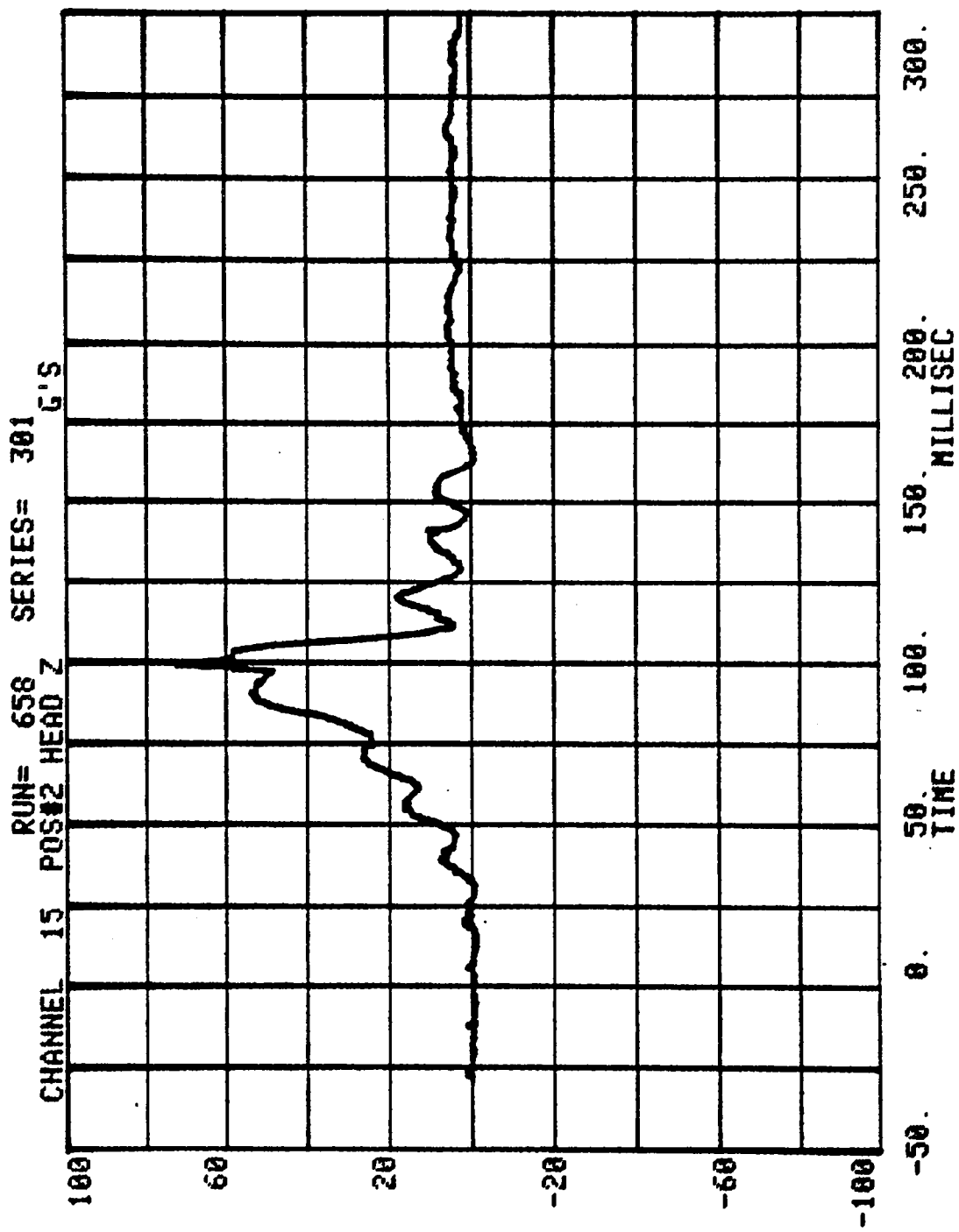
POS#2 HEAD RESULTANT

HIC= 740.7 FROM T1= .08242 TO T2= .11070
AVERAGE ACCELERATION BETWEEN T1 AND T2= 58.5G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 966.0



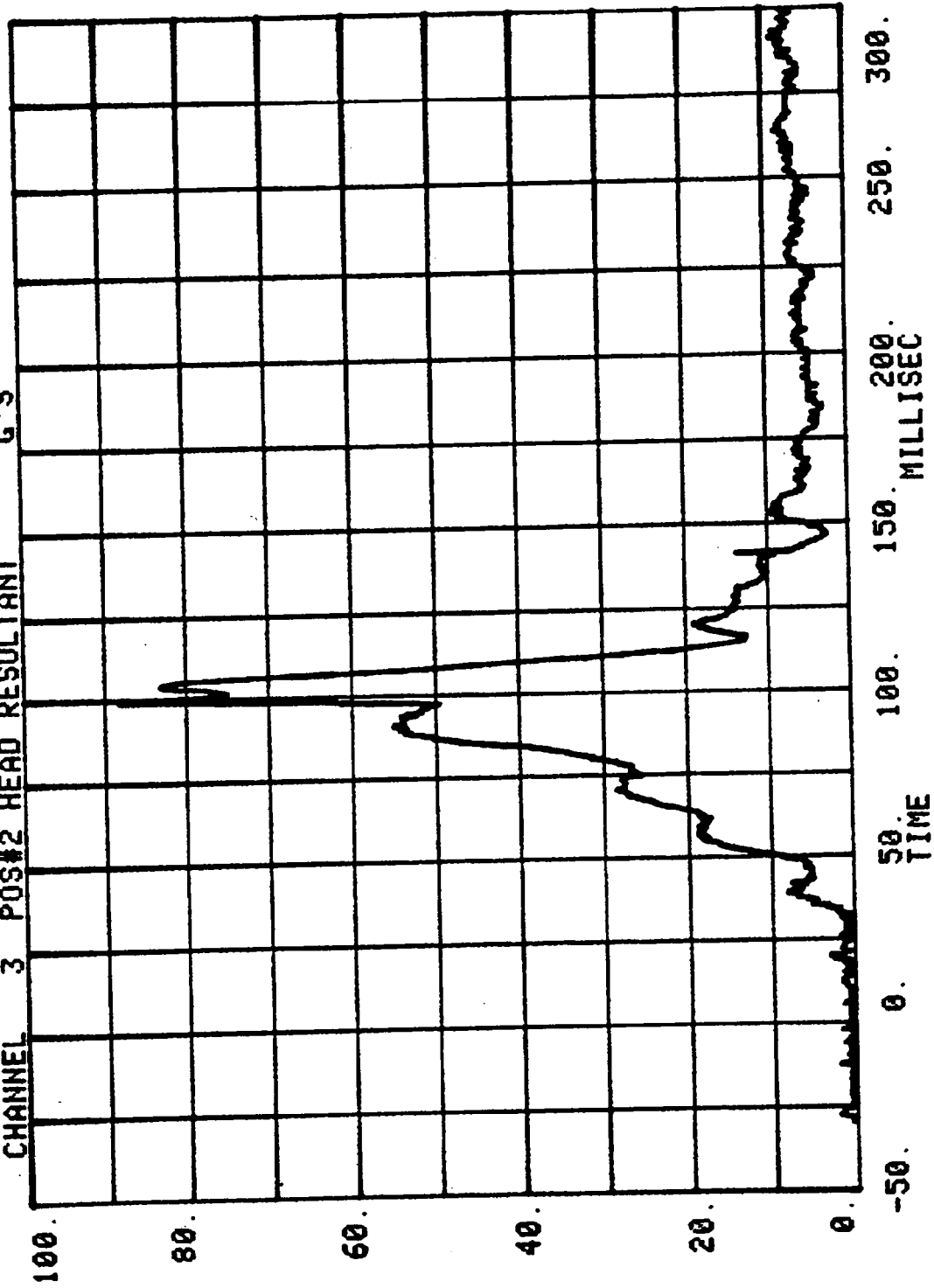
CHANNEL 14 POS#2 HEAD Y
RUN= 658 SERIES= 301 G'S

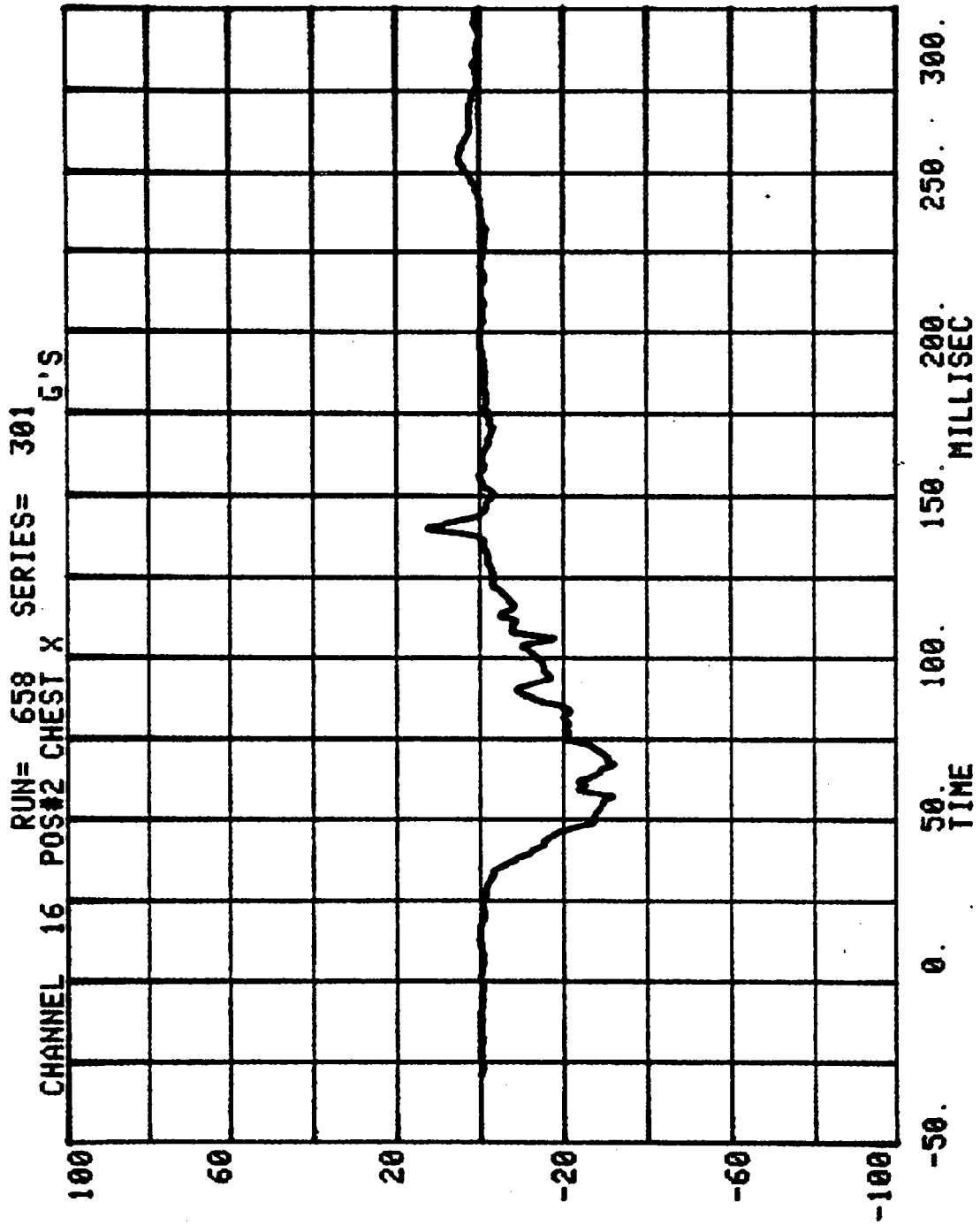




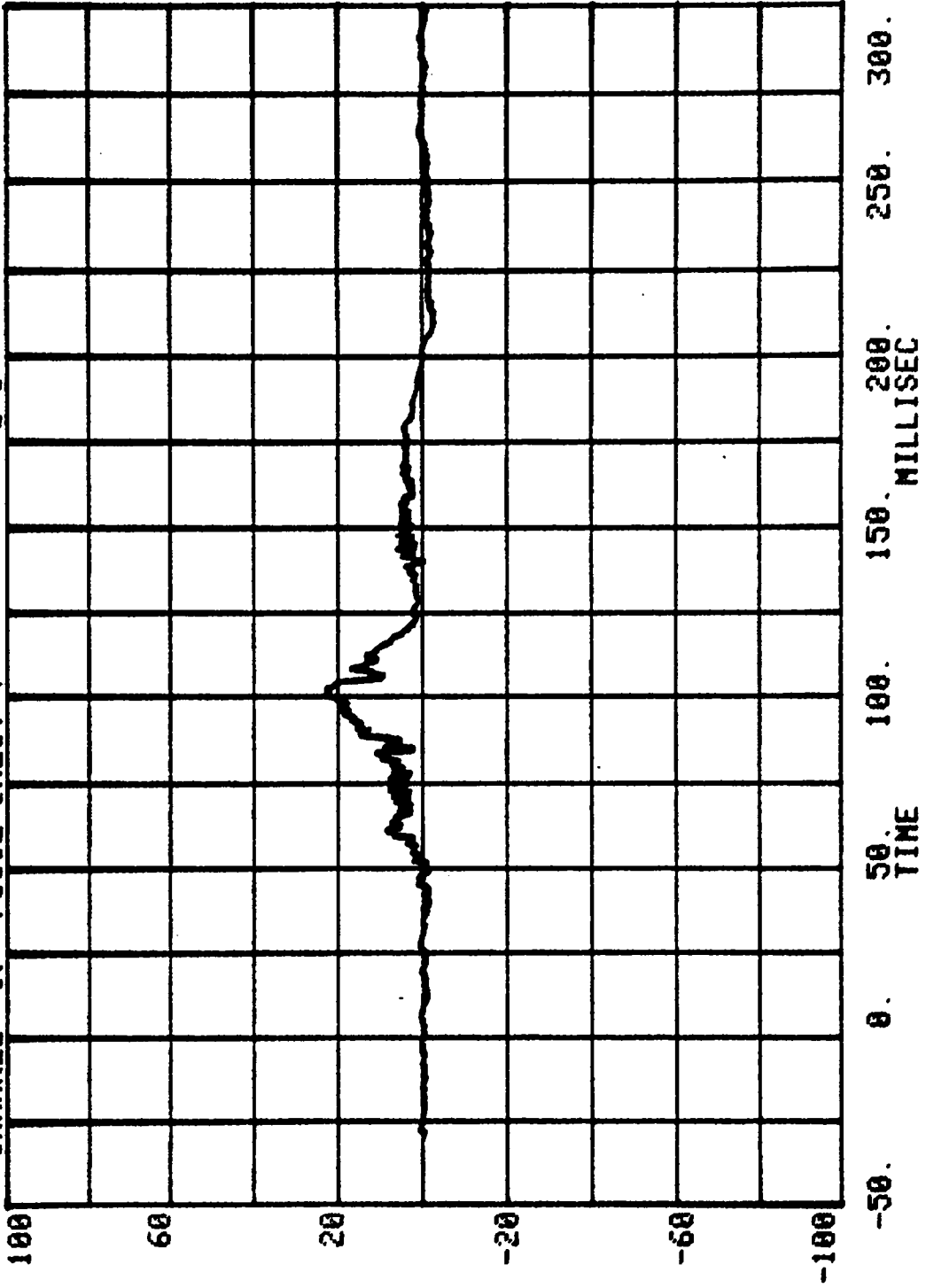
CHANNEL 3 POS#2 HEAD RESULTANT

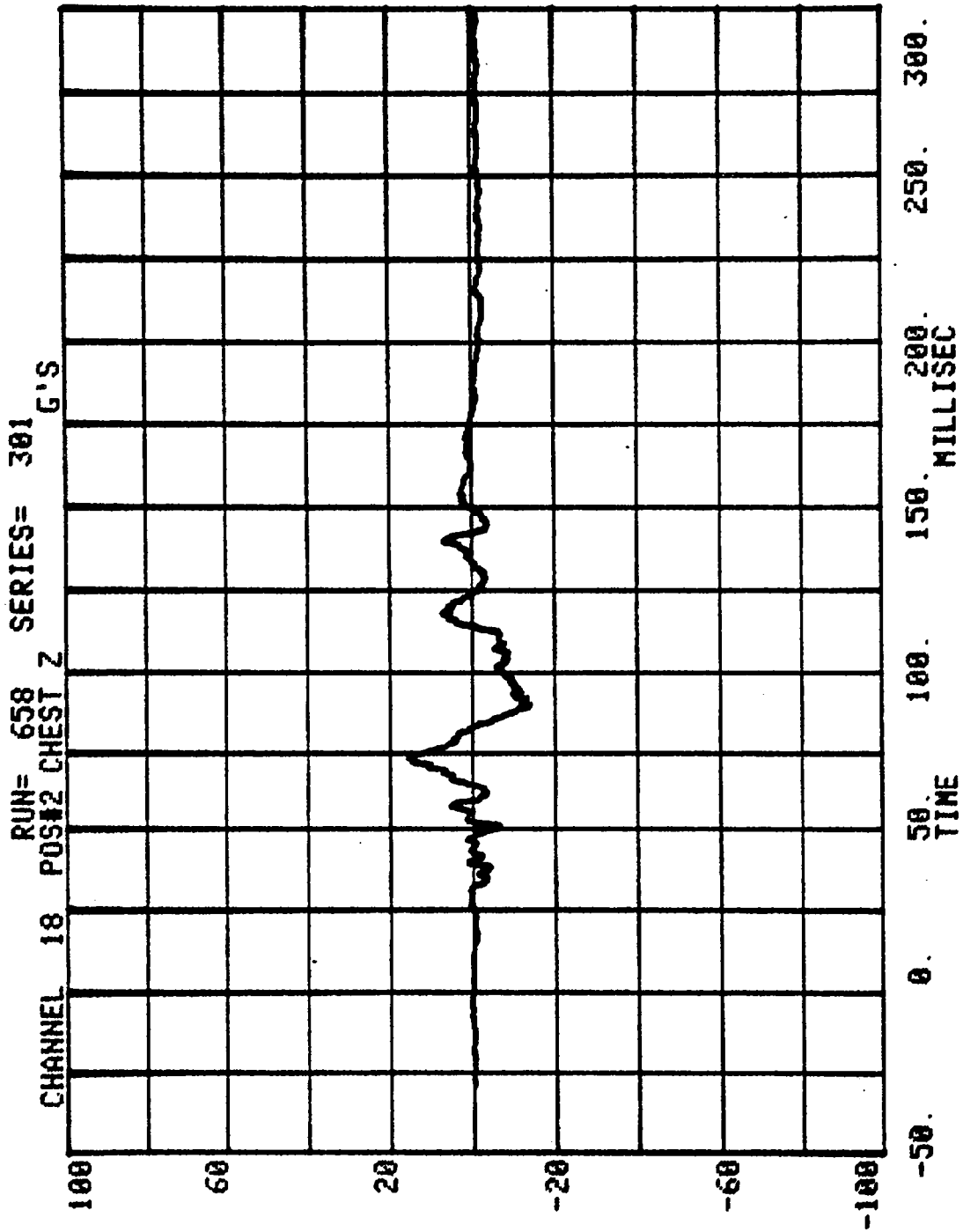
RUN= 658 SERIES= 301 G'S





CHANNEL 17 POS#2 CHEST Y
RUN= 658 SERIES= 301 G'S



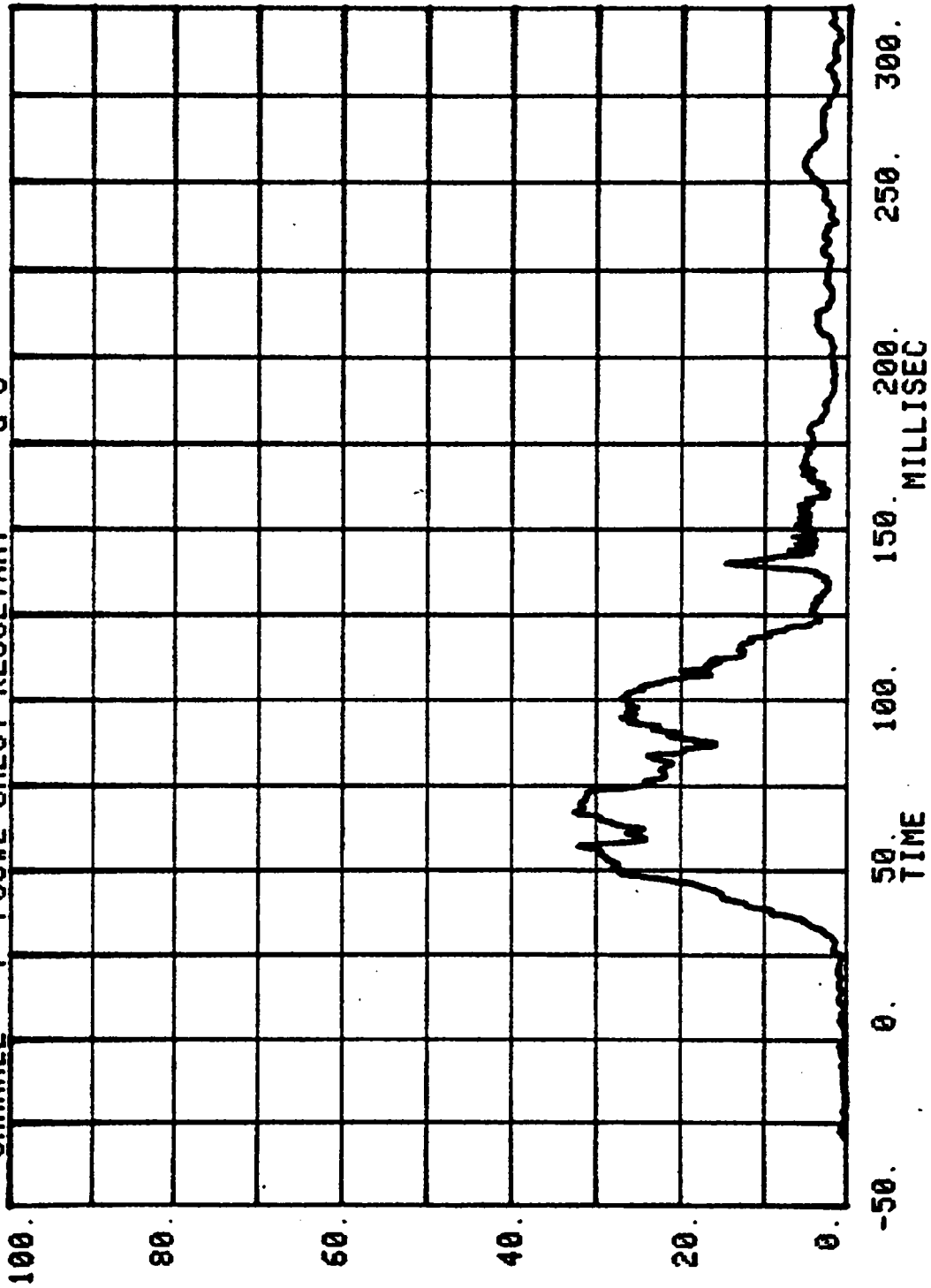


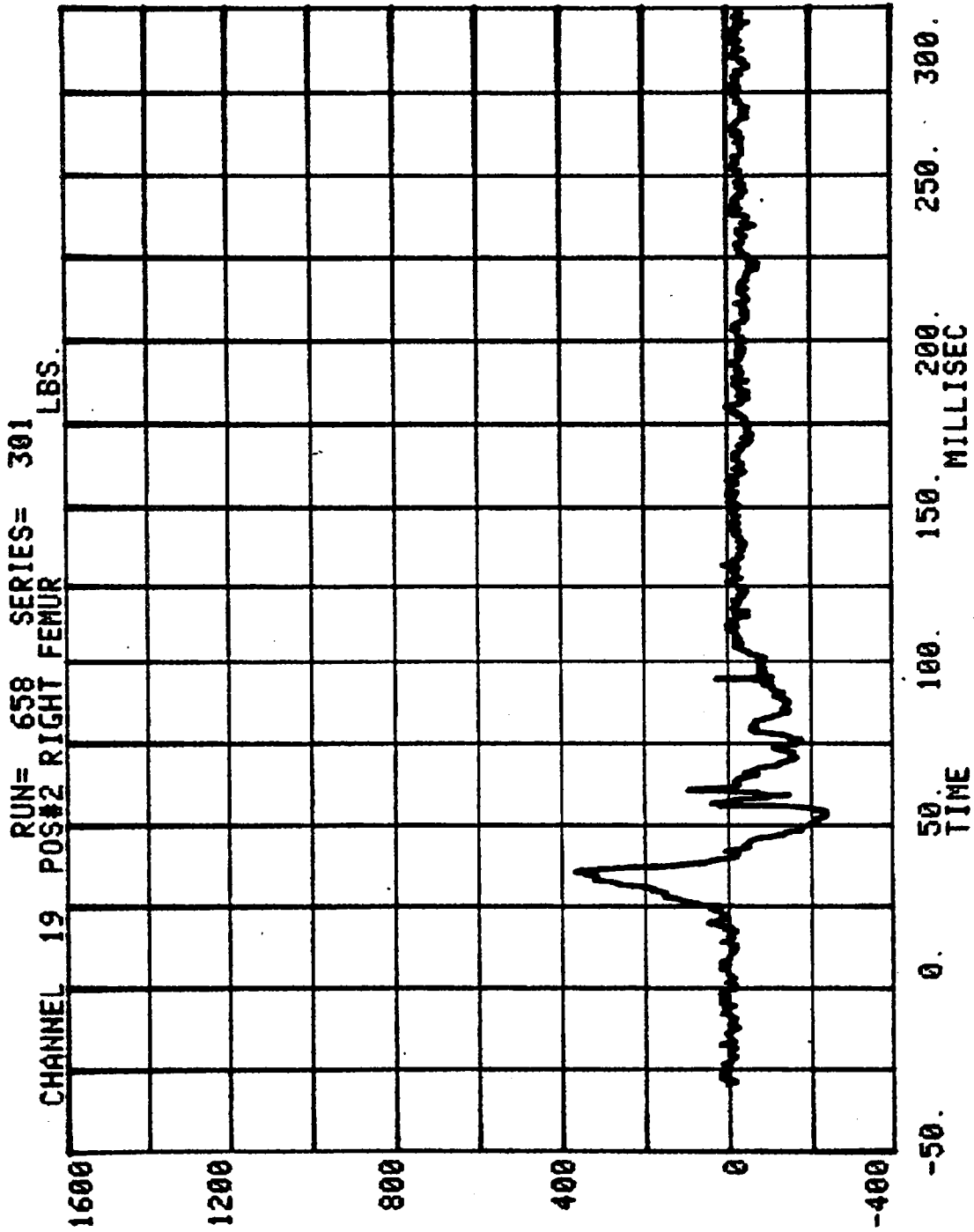
B-90

7333-3

CHANNEL 4 POS#2 CHEST RESULTANT G'S

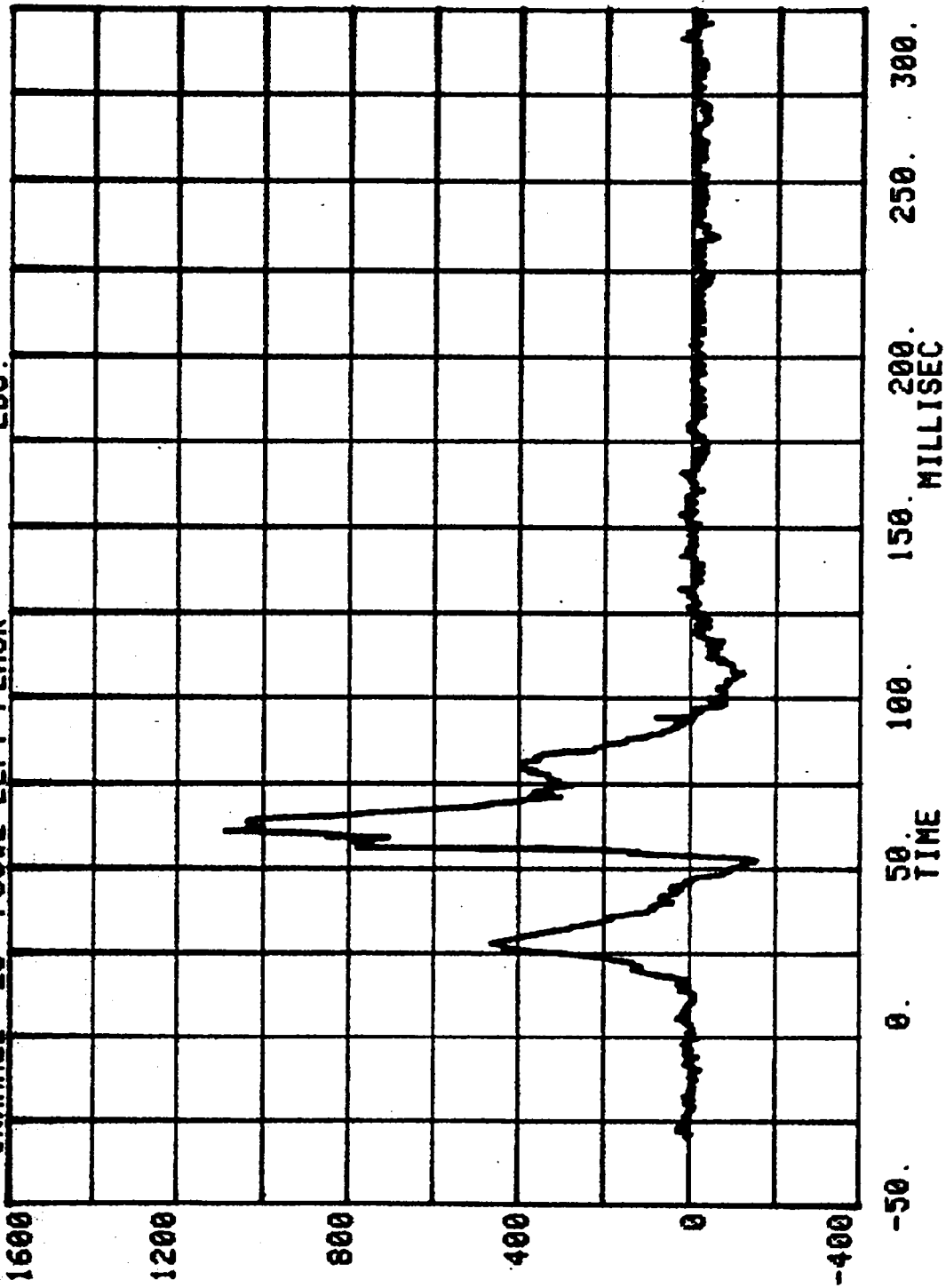
RUN= 658 SERIES= 301

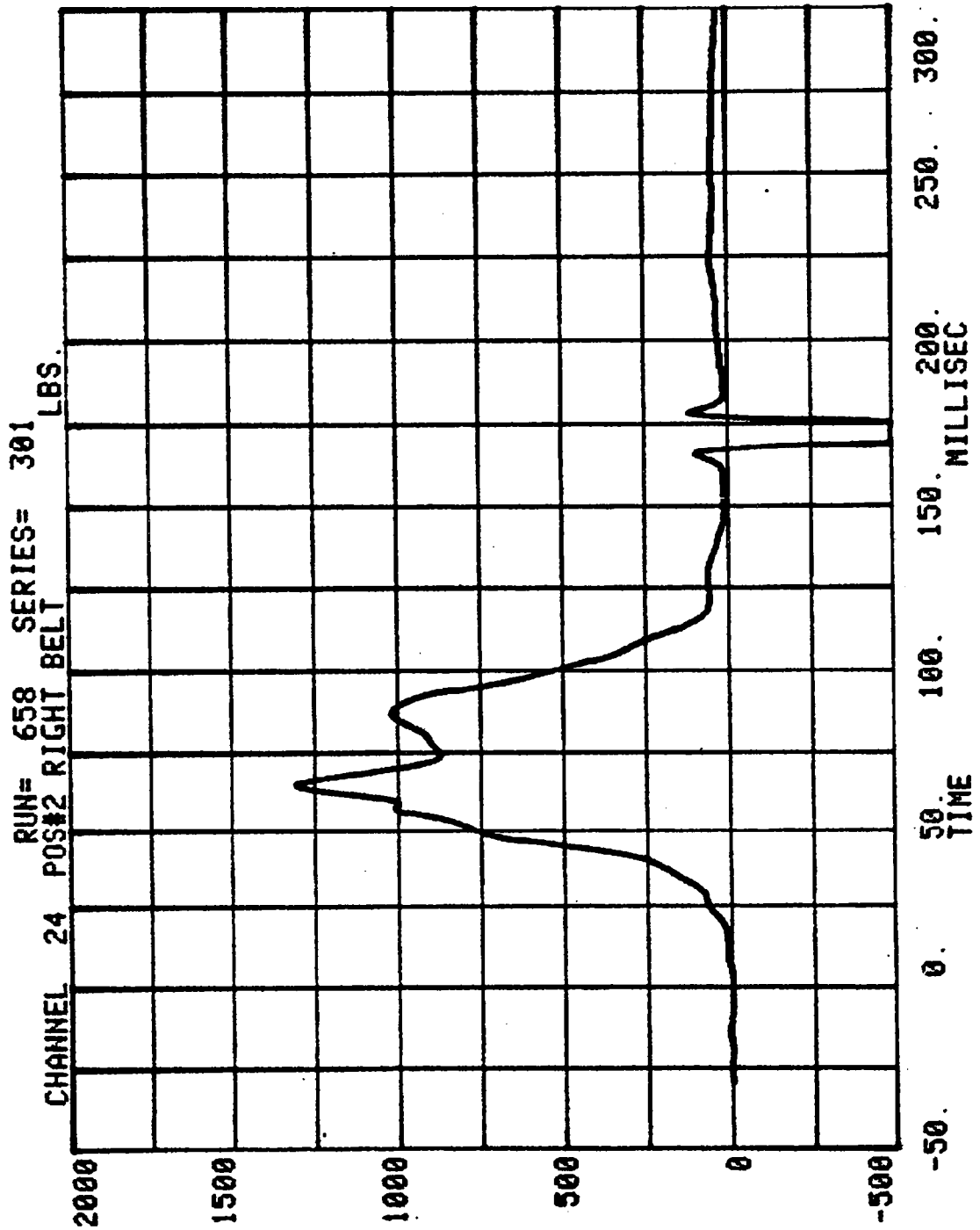




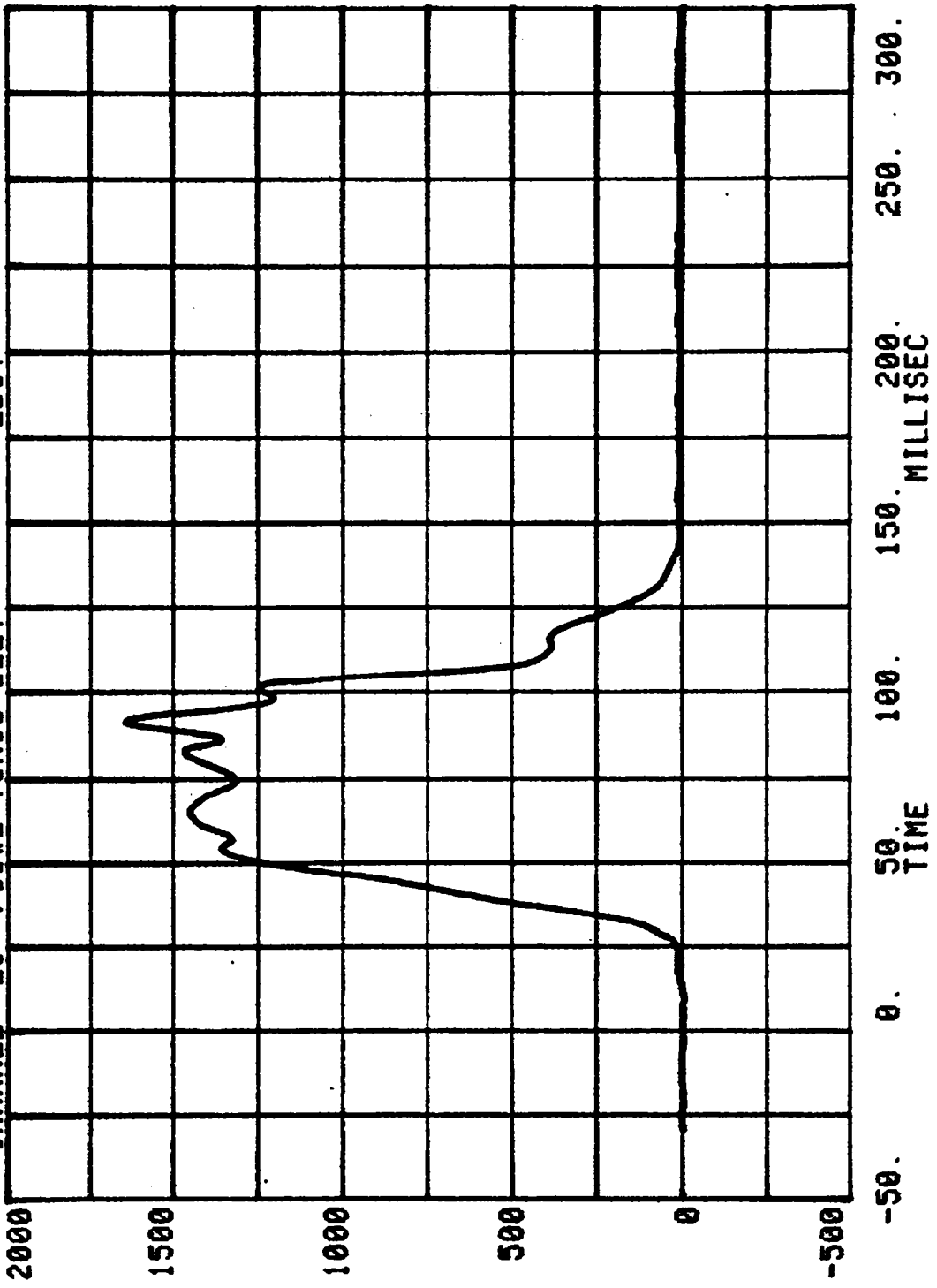
CHANNEL 20 POS#2 LEFT FEMUR LBS.

RUN= 658 SERIES= 301

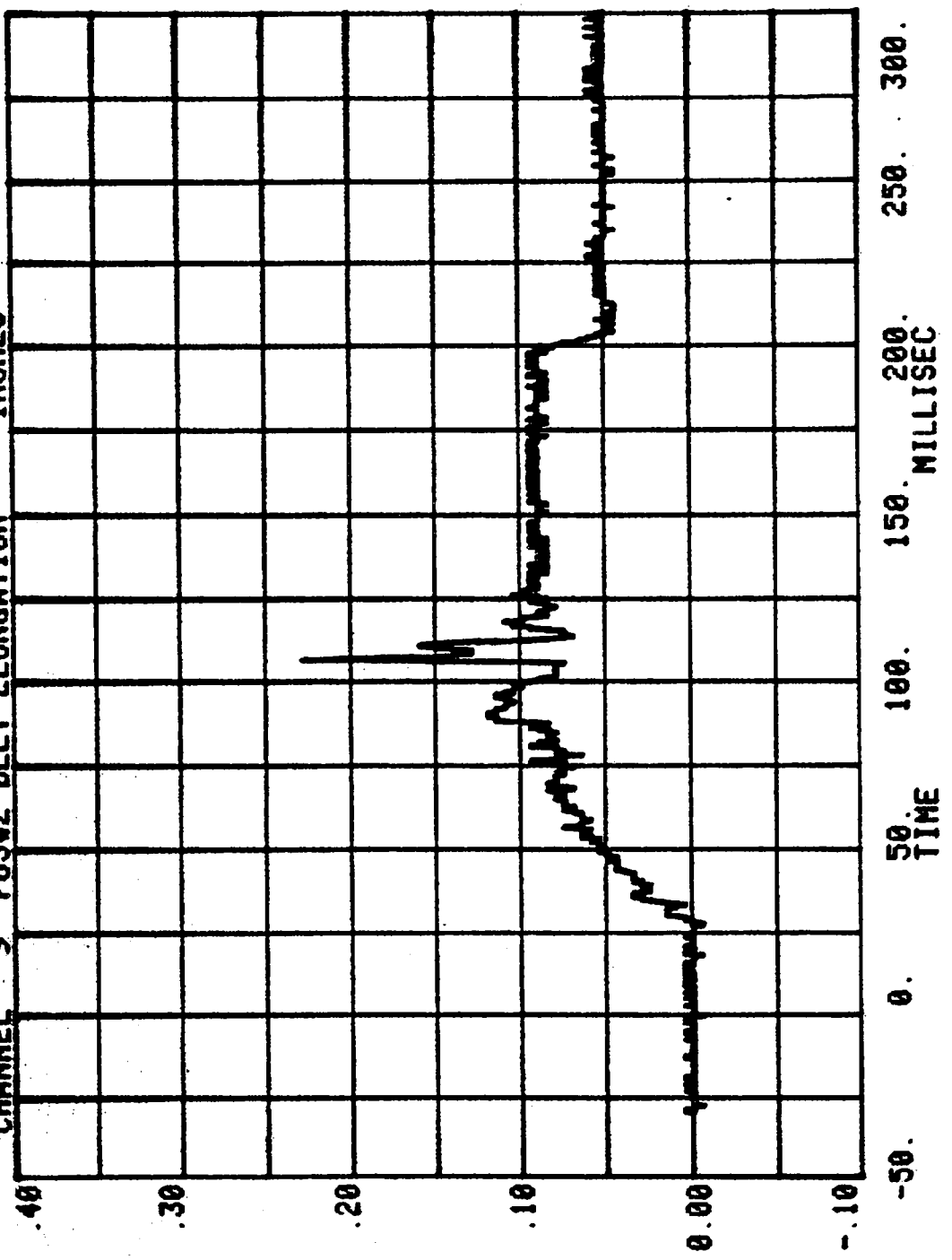




CHANNEL 26 POS#2 TORSO BELT
RUN= 658 SERIES= 301 LBS.



CHANNEL 9 POS#2 BELT ELONGATION SERIES= 301 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>
1021	1/3/85
1019	1/3/85

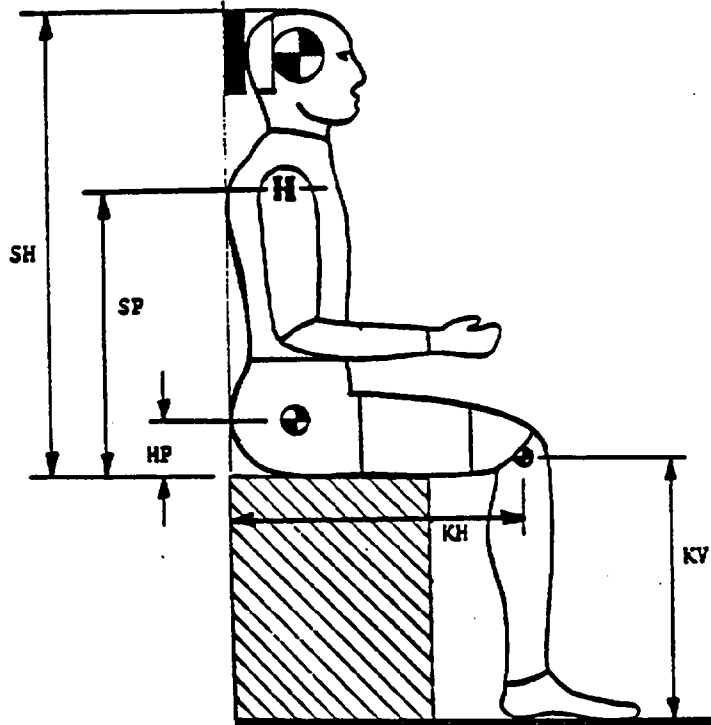
Electronic Test Equipment

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.: 1019

1. CONFIGURATION VERIFICATION DATA:



	P. 572 SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
DATE OF CONFIGURATION VERIFICATION		1/3/85	
VERIFICATION NUMBER FOR DUMMY*		1	
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"	20.7"	
KV - Knee Pivot from floor- - - -	19.3 to 19.9"	19.6"	
SW - Shoulder Width - - - - -	17.8 to 18.4"	18.0"	
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.: 1019

TECHNICIAN'S NAME: G. Gestwick

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION-----		1/3/85-1/8/85	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY*-----		1	
VERIF. LAB. TEMPERATURE (66 to 78°F Range)-----		70 - 74 °F.	°F.
VERIF. LAB. HUMIDITY (10 to 70% Range)		21 - 30 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST--			
a. Peak Resultant Accel.-	210 to 260G	255 g.	
b. Peak Lateral Accel.- -	≤ - 10G	3 g.	
c. Time above 100G- - - -	0.9 to 1.5ms	1.1 ms.	
2. NECK BENDING TEST--			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	23.0 fps	
b. Pend. Avg. Decel. over t ₃ - t ₂	20 to 24G	23 g.	
c. Peak Resultant Head Acceleration - - - - -	26G max.	21 g.	
d. Pendulum Decel.(t ₂ -t ₁)	≤ - 3ms	2.6 ms.	
e. Pendulum Decel.(t ₃ -t ₂)	25 to 30 ms	26.3 ms.	
f. Pendulum Decel.(t ₄ -t ₃)	≤ - 10ms	8.0 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"	3.1"
60°	Time- -	40.3 to 51.7ms	45 ms.
	Displ.-	4.3 to 5.3"	5.0"
Maximum (70 °)	Time- -	53.2 to 66.8ms	61 ms.
	Displ.-	5.0 to 6.0"	5.6"

*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.: 1019

TECHNICIAN'S NAME: G. Gestwick

TEST PARAMETER	SPECIFICATION	Pre-Test (if required)	Post-Test (if required)
2. NECK BENDING TEST....			
Continued:			
h. Chordal Displacement:			
Head Rotation Angle--			
60°	Time	67.0 to 83.0 ms	76.5 ms.
	Displ.	4.3 to 5.3 in.	4.9 ms.
30°	Time	85.4 to 104.6 ms	94.5 ms.
	Displ.	2.1 to 3.1 in.	2.9 in.
0°	Time	101.0 to 123.0 ms	109.5 ms.
	Displ.	-.5 to 0.5 in.	0.0 in.
3. ABDOMINAL COMPRESSION TEST:			
(Preload = 10 pounds)			
a. Force @ .5" - - - - -	23 to 36 lbs.	24.0 lbs.	
b. Force @ .75" - - - - -	36 to 50 lbs.	40.0 lbs.	
c. Force @ 1.0" - - - - -	50 to 63 lbs.	55.5 lbs.	
d. Force @ 1.3" - - - - -	73 to 88 lbs.	79.0 lbs.	
4. LUMBAR FLEXION TEST:			
a. Force @ 20° - - - - -	22 to 34 lbs.	25.0 lbs.	
b. Force @ 30° - - - - -	34 to 46 lbs.	34.5 lbs.	
c. Force @ 40° - - - - -	46 to 58 lbs.	52.5 lbs.	
d. Return Angle - - - - -	12° maximum	3°	
5. CHEST IMPACT TESTS:			
a. High Speed			
(1) Probe Speed - - - - -	21.78-22.22 fps	21.85 fps	
(2) Peak Deflection - - - - -	1.7" maximum	1.6 in.	
(3) Peak Resistive Force - - - - -	2250 lbs. maximum	2080 lbs.	
(4) Internal Hysteresis - - - - -	50 to 70%	51.2%	
b. Low Speed			
(1) Probe Speed - - - - -	13.86-14.74 fps	13.92 fps	
(2) Peak Deflection - - - - -	1.1" maximum	.9 in.	
(3) Peak Resistive Force - - - - -	1450 lbs. maximum	1220 lbs.	
(4) Internal Hyster. - - - - -	50 to 70%	52.2%	

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

II. PERFORMANCE VERIFICATION DATA (Continued)

NHTSA DUMMY I.D. NO.: 1019

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	6.95 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2375 lbs.	
(3) Time Above 1000g-	1.7 ms minimum	1.7 ms.	
b. Left Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.99 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2375 lbs.	
(3) Time Above 1000g-	1.7 ms minimum	1.75 ms.	

REMARKS:

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1019 CALIB. SEQ. NOS. FOR DUMMY: 1 &

A. DUMMY INSTRUMENTS:

1. Head Accelerometers --

- a. Triaxial unit - - - - -
- b. Uniaxial units
 - (1) Longitudinal (A_x) -
 - (2) Lateral (A_y) - - -
 - (3) Vertical (A_z) - - -

MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
Endevco	CS70	10-84	4-85
--	CH35	10-84	4-85
--	CU88	10-84	4-85
CEC	25189	10-84	4-85
Endevco	CY71	10-84	4-85
CEC	25188	10-84	4-85
Ohmite	7915	1-85	7-85
GSE	74	10-84	4-85
GSE	75	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

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 - - - - -

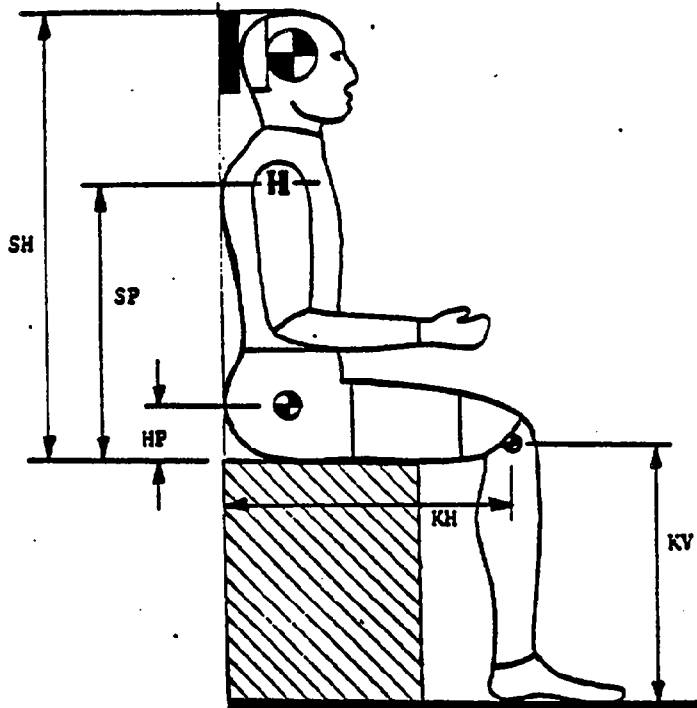
B. CALIB. LAB. INSTRUMENTS:

- 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 - - - - -

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NO.: 1021

I. CONFIGURATION VERIFICATION DATA:



	P.572 SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
DATE OF CONFIGURATION VERIFICATION		1/3/85	
VERIFICATION NUMBER FOR DUMMY*		1	
SH - Seated Height- - - - -	35.6 to 35.8"	35.6"	
SP - Shoulder Pivot Height- - -	21.8 to 22.4"	21.9"	
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"	14.7"	

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.: 1021

TECHNICIAN'S NAME: G. Gestwick

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION-----		1/3/85-1/8/85	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY*-----		1	
VERIF. LAB. TEMPERATURE (66 to 78°F Range)-----		70 - 74 °F.	°F.
VERIF. LAB. HUMIDITY (10 to 70% Range)		21 - 30 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST--			
a. Peak Resultant Accel.-	210 to 260G	235 g.	
b. Peak Lateral Accel.-	≤ - 10G	9 g.	
c. Time above 100G- - -	0.9 to 1.5ms	1.1 ms.	
2. NECK BENDING TEST--			
a. Pendulum Speed - - -	21.5 to 25.5 fps	23.1 ms.	
b. Pend. Avg. Decel. over t ₃ - t ₂	20 to 24G	23.5 g.	
c. Peak Resultant Head Acceleration - - - -	26G max.	22 g.	
d. Pendulum Decel.(t ₂ -t ₁)	≤ - 3ms	2.3 ms.	
e. Pendulum Decel.(t ₃ -t ₂)	25 to 30 ms	27 ms.	
f. Pendulum Decel.(t ₄ -t ₃)	≤ - 10ms	8.8 ms.	
g. Max. Head Rotation - -	63 to 73°	66°	
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"	2.7"
60°	Time- -	40.3 to 51.7ms	46 ms.
	Displ.-	4.3 to 5.3"	4.9"
Maximum (66 °)	Time- -	53.2 to 66.8ms	56 ms.
	Displ.-	5.0 to 6.0"	5.4"

*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.: 1021

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	68 ms.
	Displ.	4.3 to 5.3 in.	4.9"
30°	Time	85.4 to 104.6 ms	86 ms.
	Displ.	2.1 to 3.1 in.	2.5"
0°	Time	101.0 to 123.0 ms	101 ms.
	Displ.	-.5 to 0.5 in.	0.0"
3. ABDOMINAL COMPRESSION TEST:			
(Preload = 10 pounds)			
a. Force @ .5" - - - -	23 to 36 lbs.	23.5 lbs.	
b. Force @ .75" - - - -	36 to 50 lbs.	40.0 lbs.	
c. Force @ 1.0" - - - -	50 to 63 lbs.	59.0 lbs.	
d. Force @ 1.5" - - - -	73 to 88 lbs.	87.5 lbs.	
4. LUMBAR FLEXION TEST:			
a. Force @ 20° - - - -	22 to 34 lbs.	32.0 lbs.	
b. Force @ 30° - - - -	34 to 46 lbs.	41.5 lbs.	
c. Force @ 40° - - - -	46 to 58 lbs.	53.0 lbs.	
d. Return Angle - - - -	12° maximum	7°	
5. CHEST IMPACT TESTS:			
a. High Speed			
(1) Probe Speed - - -	21.78-22.22 fps	21.85 fps	
(2) Peak Deflection -	1.7" maximum	1.58"	
(3) Peak Resistive Force - - - - -	2250 lbs. maximum	2000 lbs.	
(4) Internal Hysteresis - - -	50 to 70%	55.2%	
b. Low Speed			
(1) Probe Speed - - -	13.86-14.14 fps	13.99 fps	
(2) Peak Deflection -	1.1" maximum	.92"	
(3) Peak Resistive Force - - - - -	1450 lbs. maximum	1250 lbs.	
(4) Internal Hyster. -	50 to 70%	55.5%	

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

II. PERFORMANCE VERIFICATION DATA (Continued)

NHTSA DUMMY I.D. NO.: 1021

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	6.91 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2275 lbs.	
(3) Time Above 1000f-	1.7 ms minimum	1.75 ms.	
b. Left Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.8 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	1950 lbs.	
(3) Time Above 1000f-	1.7 ms minimum	1.88 ms.	

REMARKS:

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1021 CALIB. SEQ. NO. FOR DUMMY: 1

A. <u>DUMMY INSTRUMENTS:</u>	<u>MANUFACTURER</u>	<u>SERIAL NUMBER</u>	<u>DATE LAST CALIBRATED</u>	<u>DATE OF NEXT CALIBRATION</u>
1. Head Accelerometers --				
a. Triaxial unit - - - - -	NA			
b. Uniaxial units				
(1) Longitudinal (A_x) -	Endevco	CL79	10-84	4-85
(2) Lateral (A_y) - - -		CU75	10-84	4-85
(3) Vertical (A_z) - - -		CX42	10-84	4-85
2. Chest Accelerometers -- (Vehicle Crash Test Usage)				
a. Triaxial unit - - - - -	NA			
b. Uniaxial units				
(1) Longitudinal (A_x) -	CEC	22292	10-84	4-85
(2) Lateral (A_y) - - -	Endevco	DA87	10-84	4-85
(3) Vertical (A_z) - - -	CEC	22959	10-84	4-85
3. Chest Potentiometer - - -	Ohmite	7915	1-85	7-85
4. Femur Load Cells --				
a. Right Side - - - - -	GSE	80	10-84	4-85
b. Left Side - - - - -	GSE	81	10-84	4-85
B. <u>CALIB. LAB. INSTRUMENTS:</u>				
1. Pendulum Accelerometer - - -	CEC	19965	1-85	7-85
2. Test Probe Accelerometer - - -	CEC	25184	1-85	7-85
3. Lumbar Flexion Test Push Force Gauge - - - - -	Transducer Inc.	20051	1-85	7-85
4. Abdominal Compression Test Force Gauge - - - - -	BLH	72952	1-85	7-85
5. Abdominal Compression Test Displacement Gauge - - - - -	CIC	567-11	1-85	7-85

APPENDIX D

VEHICLE' OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS



Fold Down Rear Seatback

Bench Type Seat

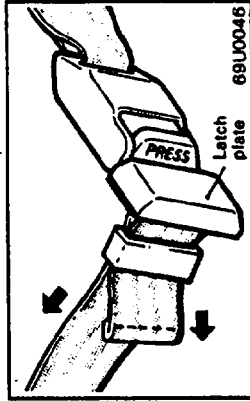
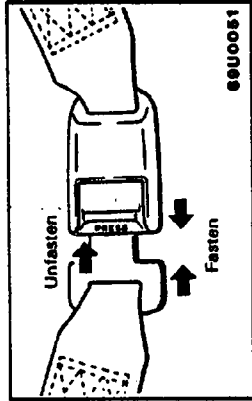
The rear seatback can be folded forward to provide additional cargo area. Pull the release knob up, and fold the rear seatback forward.

Split Type Seat

Pull the left and/or right release levers upward, and fold the rear seatback forward.

CAUTION

This cargo area in the rear of the car should not be used as a play area by children when the car is in motion. Children should be seated and seat belts fastened.



Front Seat Unibelt Restraint System

Both front seats are equipped with a UNIBELT system which uses a single belt and an emergency locking retractor.

This system is designed to provide comfort and safety by permitting full extension and automatic retraction of the belts during normal vehicle operation. A sensing device inside the belt retractor is designed to lock the retractor in the event of an abrupt change in vehicle motion or if the seat belt is pulled out suddenly. When buckling the seat belts, pull the belt slowly out of the retractor.

Rear Seat Lap Belts

The rear seat lap belts (except center belt) are fitted with an automatic locking retractor. Holding the latch plate by hand, pull it out until the webbing is fully extended and insert the latch plate into the buckle. Then release the belt. The webbing with the latch plate is automatically retracted until the belt fits the wearer snugly and is locked in place. To release, unfasten the belt, and a light tug to the webbing with the latch plate will cause the retractor to work automatically.

CENTER BELT

The center belt should be adjusted by holding the belt and latch plate at right angles to each other, and then pulling the belt as illustrated above to a snug fit around the occupant.

NEVER USE THE SAME LAP BELT ON MORE THAN ONE PERSON AT A TIME.

Seat Belts

Seat belts are installed in your car for the protection of the driver and passengers. Use the seat belts. In the event of an accident, injury to the driver and passengers may be reduced if seat belts are properly used.

The following pages contain the recommended procedure for fastening, adjusting, and wearing the belts for comfort and safety.

Figure 14 OWNER'S MANUAL SEAT BELT INSTRUCTIONS