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REPORT NOS. 212-CAL-84-025
301-CAL-34-025

NHTSA NEW VEHICLE ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS 212 AND 301-75

ISUZU MOTORS LTD.
1984 ISUZU IMPULSE
2-DOOR HATCHBACK

NHTSA NO. ME5701
CALSPAN TEST NO. 7103-V-26

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

AUGUST 1984

FINAL REPORT

Prepared for:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE VEHICLE SAFETY COMPLIANCE
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WASHINGTON, DC 20590

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_____

Contract Technical Manager

_____

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16. Abstract

A frontal load cell barrier test of a 1984 Isuzu Impulse 2-door hatchback was performed at Calspan Corporation, Advanced Technology Center, Transportation Research/Physical Sciences Department facility for the New Car Assessment and Standards Enforcement Testing of FMVSS 212, "Windshield Mounting" and FMVSS 301-75, "Fuel System Integrity" for the Office of Vehicle Safety Compliance, the Office of Market Incentives (OMI) and for Research and Development.

Impact speed was 34.58 mph. Ambient temperature on the test date was 72°F. The post-test vehicle crush was 22.5 inches and intrusion of the firewall into compartment was 3.8 inches.

The test vehicle appeared to comply with the following vehicle performance standards:

FMVSS 212 - Windshield Retention
FMVSS 301-75 - Fuel System Integrity

17. Key Words	18. Distribution Statement
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SECTION 1
PURPOSE AND TEST PROCEDURE

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

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

SECTION 2
SUMMARY OF TEST NUMBER ME5701

A load cell barrier consisting of 36 load cells (Figure 4) was impacted by a 1984 Isuzu Impulse 2-door hatchback at a velocity of 34.58 mph. The test was performed at the Calspan Corporation Advanced Technology Center on June 20, 1984. Pre- and post-test photographs of the vehicle and occupants can be found in Appendix A. Table 1 presents pertinent crash test information.

Two Part 572, 50th percentile male anthropomorphic test devices (ATD's) were placed in the driver and right-front passenger seating positions, according to dummy placement procedures specified in Laboratory Procedure for Vehicle Assessment IP-212-02.

The occupant dummies were instrumented with head and chest triaxial accelerometers and femur load cells. Load cells were also placed on the lap and shoulder belts to measure dummy torso and lap loading. The driver ATD (Serial) 1021) had been used in a previous test (ME0201). The FMVSS Injury Criteria Values were not exceeded in that test. The right-front passenger ATD (Serial 320) was certified prior to the test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The crash event was recorded on one real-time camera and 17 high-speed cameras. Camera locations and other pertinent camera information are found in Section 4 of this report.

The 67 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle and dummy response data traces. The Injury Criteria Values are presented in summary form in Table 10. All data channels checked out prior to the test. The following are data losses experienced during impact.

1. Position #2 (Right Femur) zero shift after 70 milliseconds. (reason unknown)
2. Accelerometer #2 (C. G.) zero shift after 170 milliseconds. (cut wire)

Table 1

CRASH TEST SUMMARY

TEST NO. ME5701

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

DATE: 6/20/84

TIME: 1430 hrs. TEMP: 72°F.

VEHICLE	1984 Isuzu Impulse 2-door hatchback
TEST WEIGHT (lbs)	3230
IMPACT ANGLE (deg)*	0
IMPACT VELOCITY (mph)**	34.58
MAX. CRUSH (in) static	22.5
MAX. INTRUSION (in)	3.8

DUMMIES

TYPE	Hybrid II Part 572	Hybrid II Part 572
LOCATION	LF (1) Serial 1021	RF (2) Serial 320
RESTRAINT	Production 3-point belt system	Production 3-point belt system

NUMBER OF DATA CHANNELS 67

NUMBER OF HIGH SPEED CAMERAS 17 + 1 real time

*With respect to tow track Centerline

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

GENERAL COMMENTS

The 1984 Isuzu Impulse 2-door hatchback was equipped with a 119 cubic inch, 4-cylinder engine, five speed manual transmission, power brakes, power steering and air conditioner. The total test weight with two 50th percentile male dummies, instrumentation and two on-board cameras was 3230 pounds.

The 1984 Isuzu Impulse 2-door hatchback which was involved in a frontal load cell barrier crash at a velocity of 34.58 mph appeared to comply with FMVSS Nos. 212, "Windshield Mounting" and 301-75, "Fuel System Integrity." There was 100 percent windshield retention, no intrusion into the protected or unprotected zone, and no fuel leakage after impact or during any phase of the rollover test.

The vehicle sustained 22.5 inches of static crush and approximately 27.4 inches of dynamic crush. Maximum firewall intrusion into the occupant compartment was 3.8 inches. The maximum load cell barrier force measured by the 36 load cells was 92,000 pounds at 41.2 milliseconds.

The driver's head struck the upper steering wheel rim and center hub. The driver's HIC was 1769.2. The maximum chest deceleration over 3 milliseconds was 45.5 g's, and the femur loads were 1530 (right) and 850 pounds (left). On rebound the driver rolled in-board and it appears his right arm struck the belt buckle release button, releasing his lap and shoulder belt.

The right-front passenger's head struck his right knee and both femurs contacted the glove compartment door. The right femur load cell experienced a zero shift at 70 milliseconds. Chalk marks left on the glove compartment door by both femurs (Figure A-31), would indicate that the right femur loading would be similar to that experienced by the left femur. The right-front passenger HIC was 2453.9 and maximum chest deceleration over 3 milliseconds was 48.7 g's. The left femur load was 470 pounds.

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

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION

Make/Model Isuzu Impulse Body Style 2-door hatchback
Model Year 1984 NHTSA No. ME5701 Color light brown
Engine Data: 4 cylinders, 119 cubic inches
Transmission Data: 5 speed, (X) manual ( ) automatic
Date Rec'd 6/84 Air Cond. yes Pw. Str. yes Pw. Brks. yes
Dealer's Name & Address Holman Isuzu, Stratford, NJ 08084
Odometer Reading 557

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

Vehicle Manufactured by: Isuzu Motors Ltd.
Date of Manufacture 2/84 VIN JABAR07A4E0904968
GVRW 3527 lbs., GAWR: front 1797 lbs., rear 1757 lbs.

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

Vehicle Load (up to capacity): front 26 psi
rear 26 psi
Recommended Tire Size P195/60R14 Load Range X B ___ C ___ D
Recommended Cold Tire Pressure: front 26 psi, rear 26 psi
Tires on Vehicle P195/60R14
Is Spare Tire a "Space Saver?" X yes ___ no
Is Spare Tire Standard Equipment? X yes ___ no
Vehicle Capacity: Types of Seats: ___ bench, X bucket, ___ split bench
Number of Occupants (Designated Seating Capacity): 2 front
2 rear
4 TOTAL

RCLW Cargo Load: 125 lbs.
VCW TOTAL = 725 lbs.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 770 lbs. Right Rear = 620 lbs.

Left Front = 770 lbs. Left Rear = 600 lbs.

TOTAL FRONT WEIGHT = 1540 lbs. (55.8 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1220 lbs. (44.2 % of Total Vehicle Weight)

TOTAL DELIVERY WEIGHT = 2760 lbs.

CALCULATION FOR TARGET TEST WEIGHT

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (2760 lbs.)

VCW = Vehicle Capacity Weight (725 lbs.)

DSC = Designated Seating Capacity (4)

RCLW = VCW - 150 (DSC) = 125 lbs.

Target Test Weight = UDW + RCLW + (2 dummies X 164 lbs./dummy)

Target Test Weight = 3213 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 142 POUNDS CARGO

Right Front = 870 lbs. Right Rear = 760 lbs.

Left Front = 850 lbs. Left Rear = 750 lbs.

TOTAL FRONT WEIGHT = 1720 lbs. (53.3 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1510 lbs. (46.7 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 3230 lbs.

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

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitude: RF 26.5 LF 26.5 RR 26.0 LR 25.8

Test Attitude: RF 26.1 LF 25.9 RR 24.6 LR 24.5

Remarks: Wheelbase = 96 inches

CG = 44.9 inches rearward of front wheel C/L

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA

Type of Test Frontal Barrier Impact Angle 0 °

Date of Test 6/20/84 Time of Test 1430 hrs.

Ambient Temperature 72 °F at impact area

Temperature in Occupant Compartment 72 °F

Windshield Molding Temperature 70 °F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: primary = 34.58 mph, secondary 34.56 mph

VEHICLE REBOUND AND CRUSH (inches)

		R	℄	L
Vehicle Length:	Pre-test =	170.4	173.2	170.3
	Post-test =	149.3	150.7	149.1
	Crush =	21.1	22.5	21.2

Distance from front of test vehicle to point of impact:

R 4.0 C/L 3.2 L 4.4

VISIBLE DUMMY CONTACT POINTS

	Driver	Passenger
Head	Rim and hub	Head struck right knee
Chest	None	None
Abdomen	None	None
Left Knee	Dash panel	Glove compartment door
Right Knee	Dash panel	Glove compartment door

	Front	
	Left	Right
Door Opening	Not operable	Operable

Table 2 (cont'd)

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	Front	
Seat Movement	Left	Right
Seat Back Failure	Intact	Intact
Seat Shift (in.)	.5 forward	.7 forward

Glazing Damage

Backlight/Windshield Windshield cracked

Other notable impact effects: On rebound the driver's arm appeared to have struck his belt buckle release button, releasing his lap and shoulder belt.

SECTION 3

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

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

Table 3

SUMMARY OF FMVSS 212 AND 301 DATA

PRE-IMPACT DATA

Make/Model: Isuzu Impulse

Body Style: 2-door hatchback Model Year: 1984

NHTSA No.: ME5701 Color: Light Brown

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Isuzu Motor Ltd.

Date of Manufacture: 2/84 VIN: JABAR07A4E0904968

GVWR: 3527 lbs., GAWR: Front 1797 lbs., Rear 1757 lbs.

POST-IMPACT DATA

Type of Test: Frontal load cell barrier impact

Date of Test: 6/20/84 Time: 1430 hrs. Temp.: 72 °F

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: Primary = 34.58 mph, Secondary = 34.56 mph

Test Weight 3230 lbs., Static Crush Max. 22.5 in., Rebound 4.4 in.

FUEL SYSTEM DATA

Test Fluid Type: Red Stoddard Solvent #2 , Spec. Grav.: 0.764

Kinematic Viscosity 0.96 Centistokes

EPA Capacity* 14.5 gal.

Test Volume 13.4 gal. (93% of EPA Capacity)

Fuel System Capacity (data from Owner's Manual) -- gal.

Electric Fuel Pump? X yes ____ no, Fuel Injection? X yes ____ no

Does electric fuel pump operate with ignition switch "on" and the engine not operating? ____ yes X no

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

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

Table 3
SUMMARY OF FMVSS 212 AND 301 DATA (cont'd)

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

Table 4

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

DATA SHEET

TYPE OF TEST _X_ Frontal (0°) Impact

_____ Oblique (____ °) Impact on _____ Left (Driver's) Side

_____ Right Side

_____ Lateral or Side Impact on _____ Left (Driver's) Side

_____ Right Side

_____ Rear Impact

DATE OF TEST 6/20/84 TIME 1430 hrs. TEMP 72 °F

VEHICLE NHTSA NO. ME5701 VIN JABAR07A4E0904968

REQUIRED VEHICLE VELOCITY RANGE 34.5 to 35.5 mph

IMPACT VELOCITY (traps within 5 feet of impact event)

Trap No. 1 = 34.58 mph Trap No. 2 = 34.56 mph

Distance from the vehicle's front bumper to the barrier face entering the vehicle velocity measurement device = 58

exiting the vehicle velocity measurement device = 18

VEHICLE STATIC CRUSH (for frontal and rear impacts only)

Driver's Side = 21.2 in Passenger's Side = 21.1 in

C/L = 22.5 in. Average = 21.6 in.

Crush Details:

VEHICLE STATIC CRUSH (for side impacts only)

Amount of Crush = -- inches on -- side

Crush Details:

VEHICLE REBOUND (from rigid barrier only)

Driver's Side = 4.4 in Passenger's Side = 4.0 in

C/L = 3.2 in. Average = 3.9 in.

REMARKS

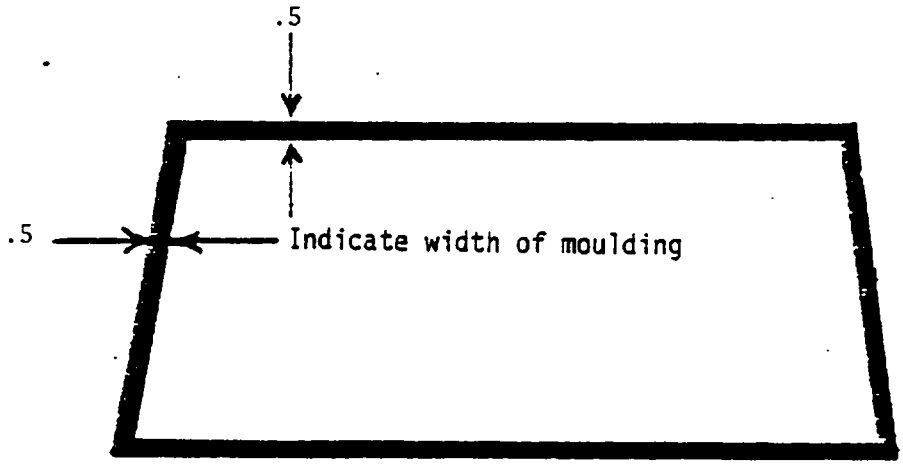
Details of windshield mounting (method of retention, type of trim, etc.):

Windshield is bonded in place.

	Windshield Periphery		
	Pre-Test (in.)	Post-Test (in.)	Retention %
Right Side	76.05	76.05	100%
Left Side	76.05	76.05	100%
TOTAL	152.1	152.1	100%

The standard requires that Post-Test be a minimum of 75 percent of the Pre-Test total periphery measurement for vehicle not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles which are equipped with occupant passive restraints.

AREA OF RETENTION FAILURE



FRONT VIEW

Figure 1 WINDSHIELD RETENTION, FMVSS NO. 212 DATA

Table 5

"FUEL SYSTEM INTEGRITY" POST-IMPACT TEST DATA

FMVSS No. 301-75

TEST VEHICLE NHTSA NO. ME5701 Test Date 6/20/84

Vehicle Manufacture/Make/Model Isuzu Impulse 2-door hatchback

Test vehicle fuel tank filled to 92-94% of capacity with Stoddard Solvent and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE

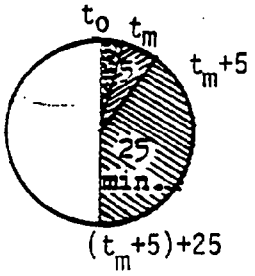
X Frontal (35 mph)

_____ Oblique (30 mph) with _____° barrier face first contacting _____ driver _____ passenger side

_____ Rear Moving Barrier (35 mph)

_____ Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT



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

SOLVENT SPILLAGE DETAILS

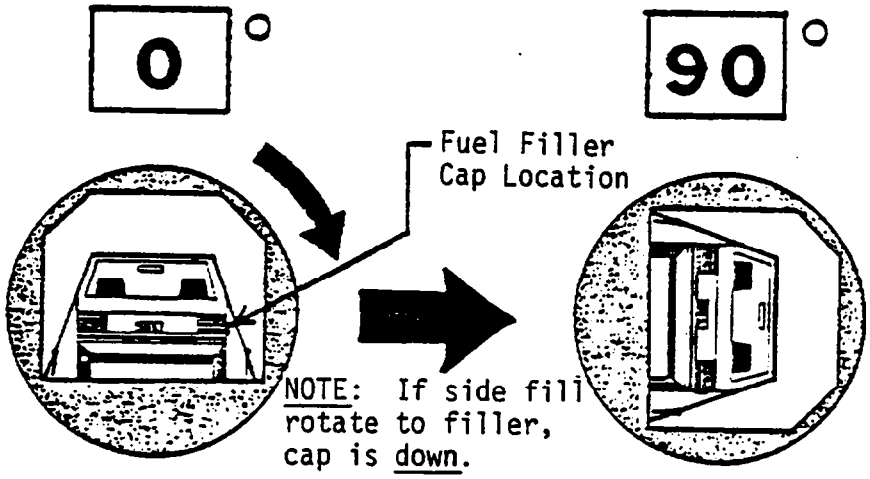
None

VEHICLE NHTSA ID NO. ME5701

Table 6

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 min.)	=	2	minutes	49 seconds
FMVSS 301-75 Position Hold Time	=	5	minutes	00 seconds
TOTAL	=	7	minutes	49 seconds
Next Whole Minute Interval	=	8	minutes	

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. from onset of rotation	6th min.	7th min.	8th min. if reqd.

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0

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

SOLVENT SPILLAGE LOCATION(S)

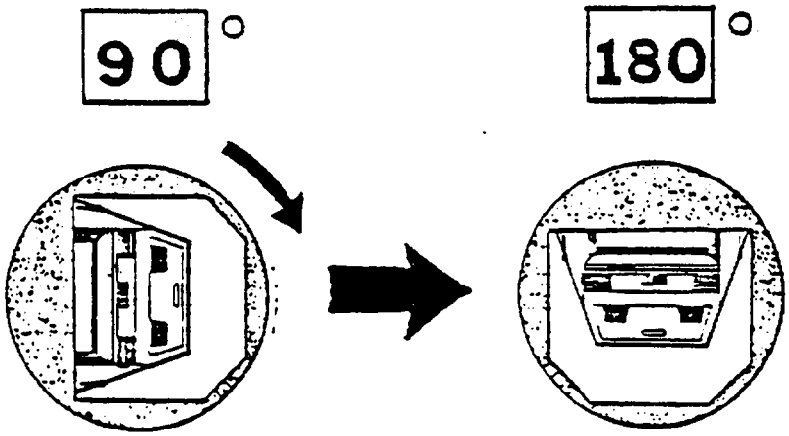
None

VEHICLE NHTSA ID NO. ME5701

Table 6 (cont'd)

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 min.)	=	2 minutes	53	seconds
FMVSS 301-75 Position Hold Time	=	5 minutes	00	seconds
TOTAL	=	7 minutes	53	seconds
Next Whole Minute Interval	=	8 minutes		

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. from onset of rotation	6th min.	7th min.	8th min. if reqd.

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0

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

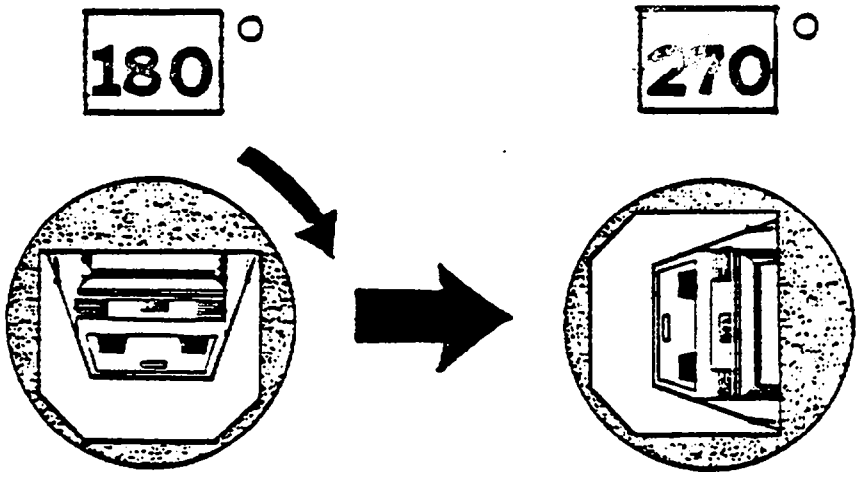
SOLVENT SPILLAGE LOCATION(S)

None

Table 6 (cont'd)

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 min.)	=	2 minutes	52 seconds
FMVSS 301-75 Position Hold Time	=	5 minutes	00 seconds
TOTAL	=	7 minutes	52 seconds
Next Whole Minute Interval	=	8 minutes	

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. from onset of rotation	6th min.	7th min.	8th min. if reqd.

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0

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

SOLVENT SPILLAGE LOCATION(S)

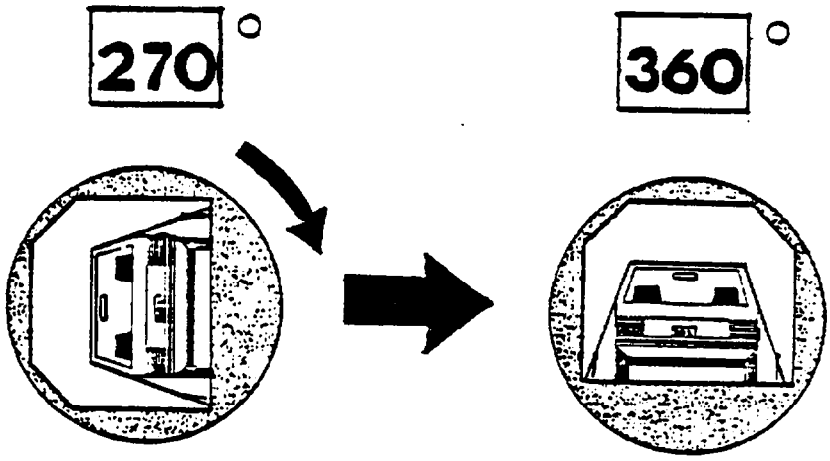
None

VEHICLE NHTSA ID NO. ME5701

Table 6 (cont'd)

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 min.)	=	2	minutes	58 seconds
FMVSS 301-75 Position Hold Time	=	5	minutes	00 seconds
TOTAL	=	7	minutes	58 seconds
Next Whole Minute Interval	=	8	minutes	

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. from onset of rotation	6th min.	7th min.	8th min. if reqd.

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0

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

SOLVENT SPILLAGE LOCATION(S)

None

SECTION 4

OCCUPANT AND VEHICLE INFORMATION (OMI AND AID DATA)

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

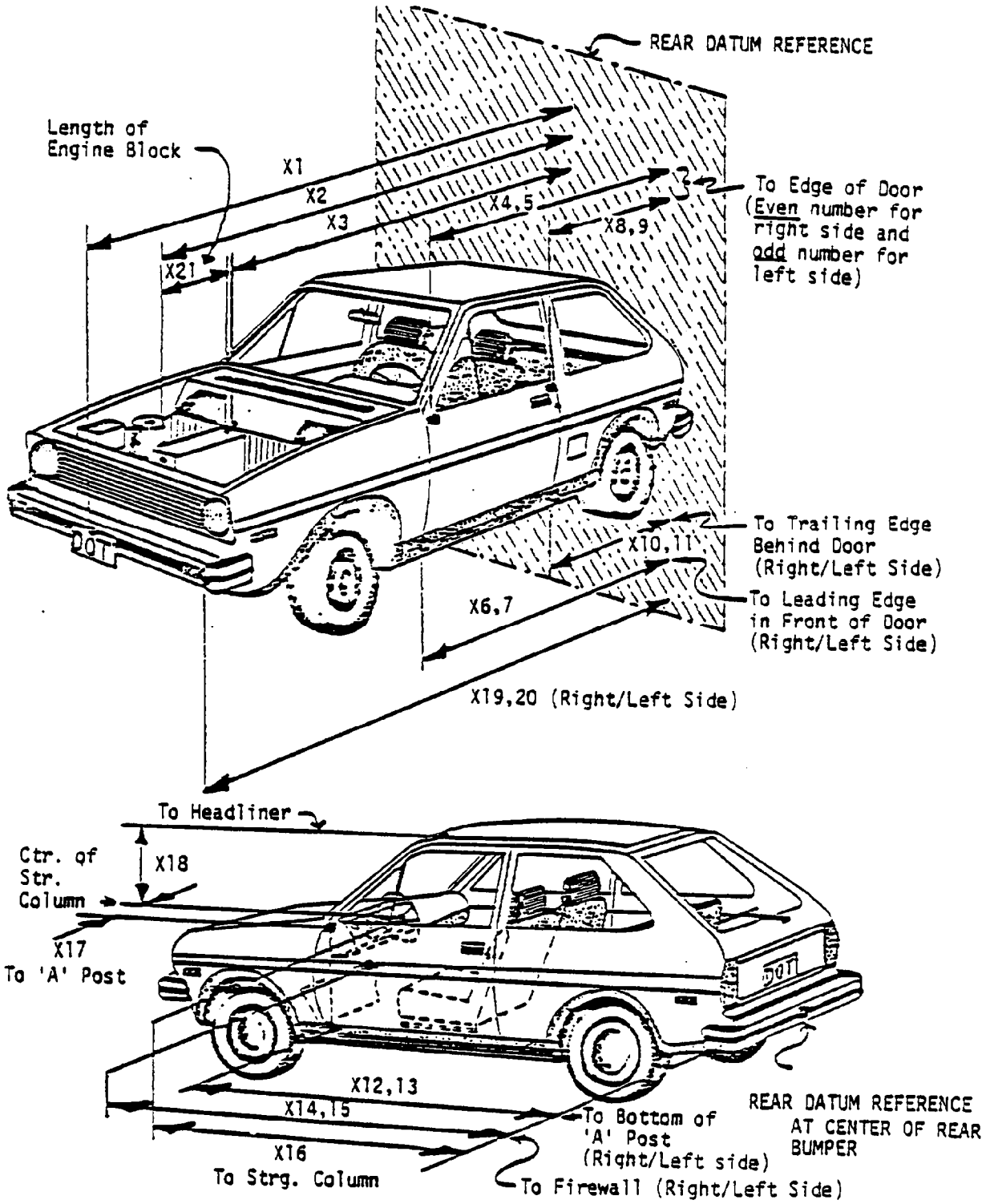


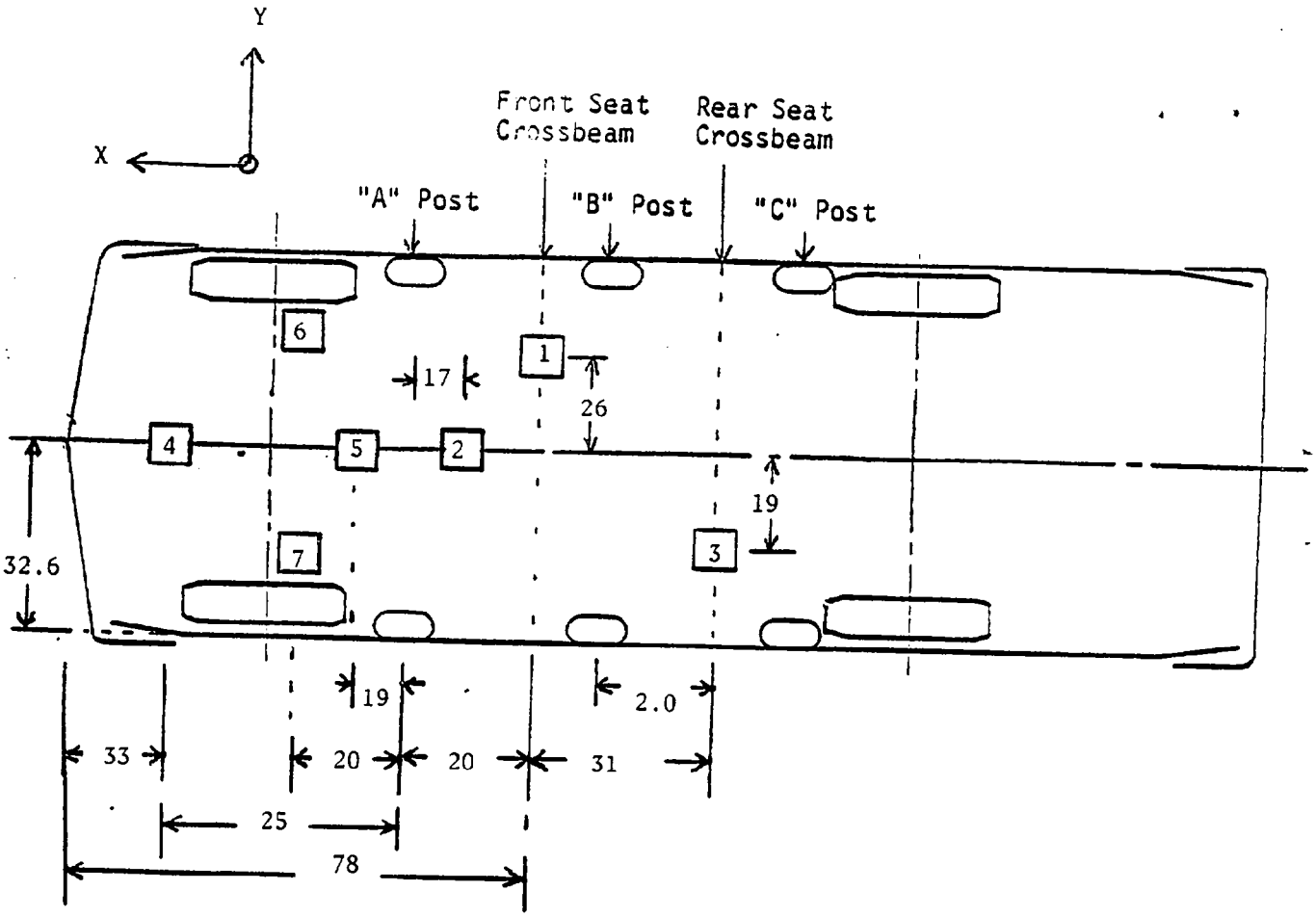
Figure 2 PRE- AND POST-TEST MEASUREMENT POINTS

Table 7

VEHICLE MEASUREMENTS

All Dimensions in Inches

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	173.2	150.7	22.5
X2	Rear Surface of Vehicle to Front of Engine	143.2	138.6	4.6
X3	Rear Surface of Vehicle to Firewall	121.6	120.1	1.5
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	111.5	111.2	.3
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	111.5	111.6	-.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	111.3	111.2	.1
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	111.3	111.5	-.2
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	63.1	62.8	.3
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	63.1	63.2	-.1
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	68.0	67.9	.1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	68.0	68.1	-.1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	110.1	110.1	0
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	110.1	110.1	0
X14	Rear Surface of Vehicle to Firewall, Right Side	120.1	116.3	3.8
X15	Rear Surface of Vehicle to Firewall, Left Side	120.5	118.0	2.5
X16	Rear Surface of Vehicle to Steering Column	95.3	94.5	.8
X17	Center of Steering Column to "A" Post	15.7	15.3	.4
X18	Center of Steering Column to Headliner	17.8	17.5	.3
X19	Rear Surface of Vehicle to Right Side of Front Bumper	170.4	149.3	21.1
X20	Rear Surface of Vehicle to Left Side of Front Bumper	170.3	149.1	21.2
X21	Length of Engine Block	18.5	18.5	0



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

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

FIGURE 3 VEHICLE ACCELEROMETER LOCATIONS

36 LOAD CELLS
4 ROWS
9 COLUMNS

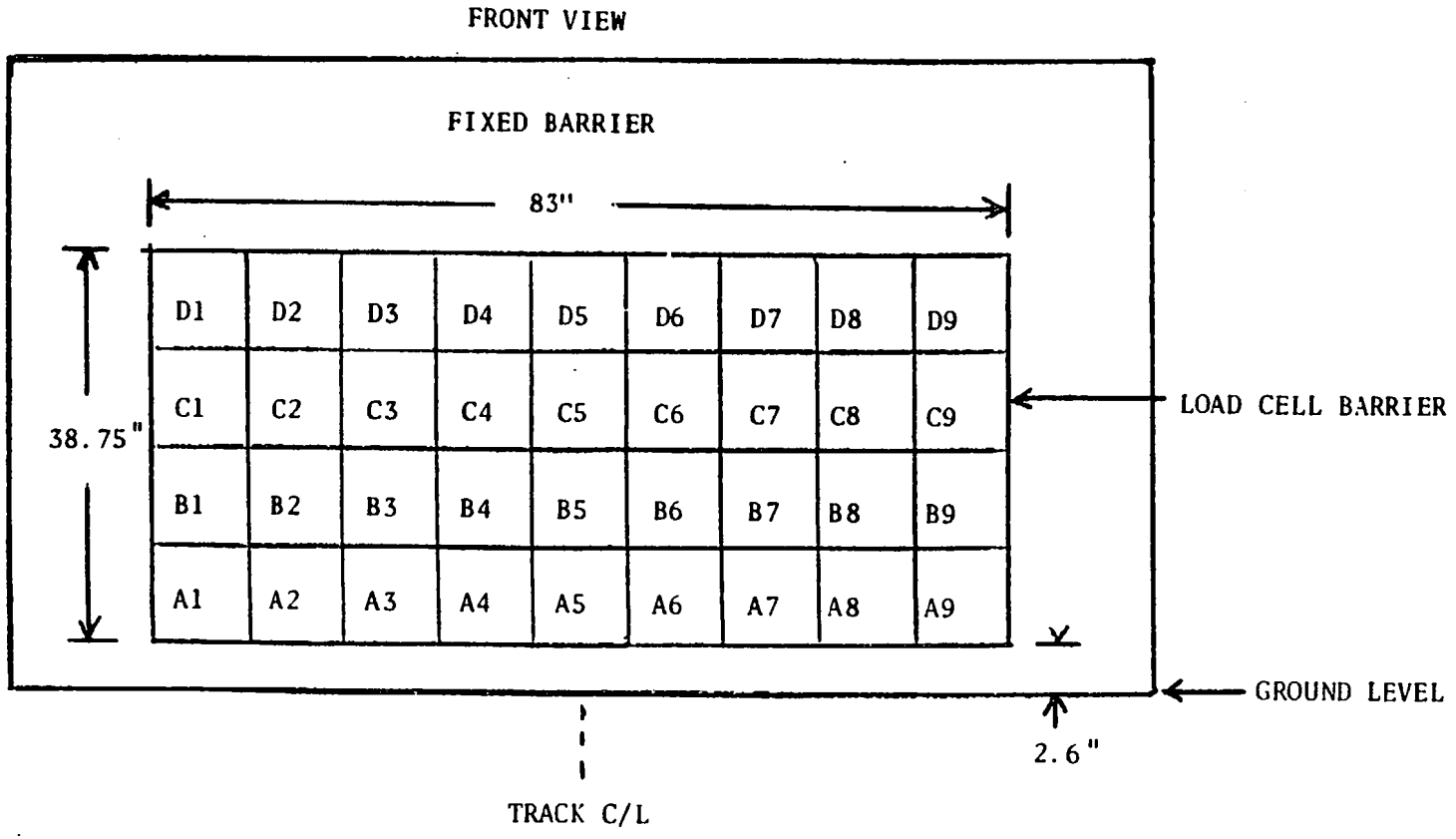


Figure 4 FIXED LOAD CELL BARRIER-LOAD CELL LOCATIONS

Table 8

ACCIDENT INVESTIGATION DIVISION

Data Summary

Test No. ME5701

Date 6/20/84

		Vehicle No. 1
Impact Description		Frontal load cell barrier
Make		Isuzu Impulse
Model		2-door hatchback
Year		1984
Size Category		Compact
Test Weight (lb.)		3230
Wheelbase (in.)		96.0
Front Overhang (in.)		39.4
Overall Width (in.)		65.2
Accelerometer Location		37 in. aft of front wheel C/L (Acc. #1)
Calibration Procedure		Shaker table/least squares
Accelerometer Linearity		± 0.75%
Integration Algorithm		Hybrid Simpson-Newton 3/8
Impact Speed (mph)		34.58
Time of Separation (msec)		over 300 milliseconds
Velocity Change (mph)		--
CDC		12FDEW3
Damage Length (in.)	L:	53.5
Crush Dimensions (in.)	C1:	21.5
	C2:	21.9
	C3:	22.4
	C4:	22.4
	C5:	22.0
	C6:	21.75
Midpoint of Damage	D:	0

National Accident Sampling System — Continuous Sampling Subsystem: Vehicle Data

FIELD MEASUREMENTS

1984 ISUZU IMPULSE JAEAR07A4E0904968

Complete When Applicable	
End Damage	**Side Damage**
Undeformed end width 53.5 /10.7 zones	Bowing: B1 _____ X1 _____
Corner shift: A1 _____	B2 _____ X2 _____
A2 _____	Bowing constant
End shift at frame (CDC) (check one)	$\frac{X1 + X2}{2}$ = _____
< 4 inches _____	
≥ 4 inches _____	

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 Width** (CDC)	Direct Damage Max*** Crush	Field L**	C_1	C_2	C_3	C_4	C_5	C_6	±D
1	Bumper	53.5	Clue 22.5	53.5	25.25	22.9	22.5	22.5	23.0	25.0	Ø
	Free/space		-Ø		-3.75	-1.0	-.1	-.1	-1.0	-3.25	
1	Actual Crush	53.5	22.5	53.5	21.5	21.9	22.4	22.4	22.0	21.75	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.

US Department of Transportation
National Highway Traffic Safety Administration

NATIONAL ACCIDENT SAMPLING SYSTEM—CONTINUOUS SAMPLING SUBSYSTEM
VEHICLE

DAMAGE DESCRIPTION

Tire—Wheel Damage

	a. Rotation physically restricted	b. Tire deflated
RF	1	2
LF	1	2
RR	2	2
LR	2	2

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

TYPE OF TRANSMISSION

✓ Manual ___ Automatic

Average Track: N/A

Maximum Width: N/A

~~Curb~~ Test Weight:

Measured Overall Length: 173.2

Engine Size: cyl. 4

displ.

WHEEL STEER ANGLES

(For locked front wheels or displaced rear axles only)

RF ± 0 0 °

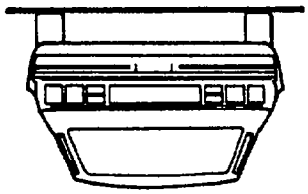
LF ± 0 0 °

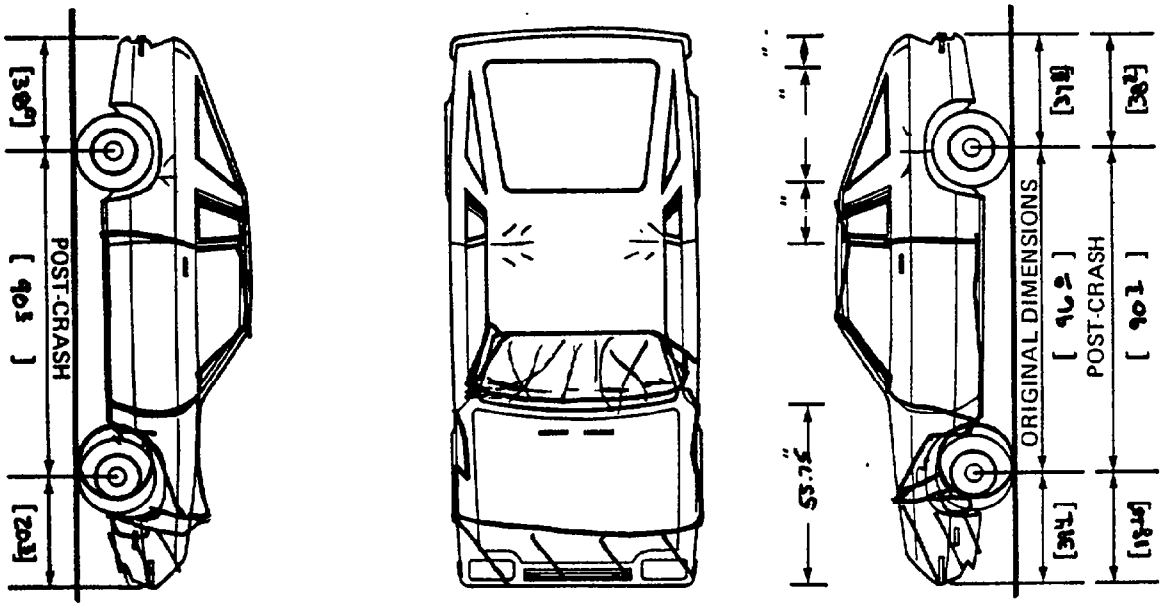
RR ± N/A °

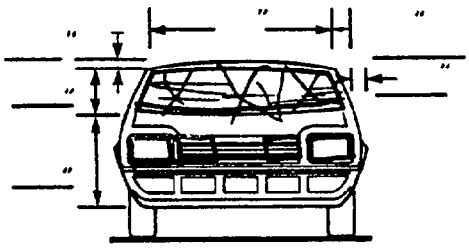
LR ± N/A °

Within ± 5 degrees

Vehicle No.: 1984 Isuzu Impulse







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

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

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

Figure 5 TEST VEHICLE DAMAGE DETAILS

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NOTE: Camera information shown on Table 9

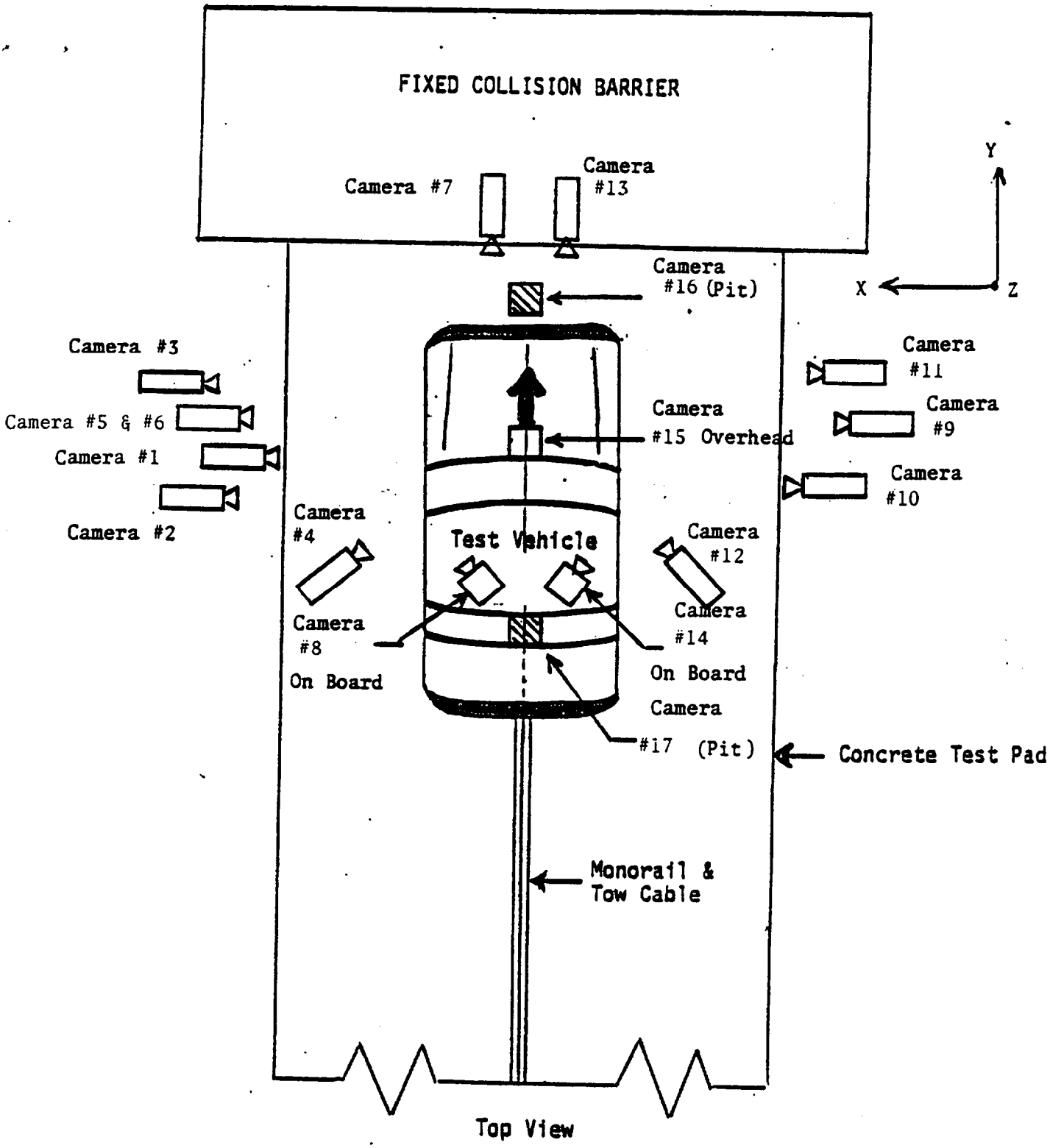


Figure 6 -- CAMERA POSITION FOR FRONTAL IMPACTS

Table 9
HIGH-SPEED CAMERA LOCATIONS

Test No. ME5701 Vehicle 1984 Isuzu Impulse 2-door hatchback

CAMERA NO.	VIEW	CAMERA POSITIONS (in)* X	Y	Z	ANGLE ** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Vehicle Left Side	198	41	42	-2	--	13	890
2	Driver	245	60	40	-4	228	35	880
3	Driver	305	25	55	-3	288	50	880
4	Driver	170	94	73	-10	--	25	870
5	Driver (Top)	138	80	70	-10	121	13	880
6	Driver (Bottom)	138	80	46	-21	121	13	1150
7	Driver (Barrier)	21	0	69	-28	--	13	990
8	Left Belt Retractor	--	--	--	--	--	8	1240
9	Vehicle Right Side	285	41	47	-7	--	13	NO TIMING
10	Passenger	270	65	44	-2	253	35	1030
11	Passenger	230	24	46	-3	213	50	830
12	Passenger	149	121	75	-14	--	25	1050
13	Passenger (Barrier)	21	0	69	-28	--	8	NO TIMING
14	Right Belt Retractor	--	--	--	--	--	13	1080
15	Overhead	0	40	216	-90	--	25	890
16	Engine (Pit)		36	-120	90	--	25	720
17	Fuel Tank (Pit)	0	137	-120	90	--	25	720

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

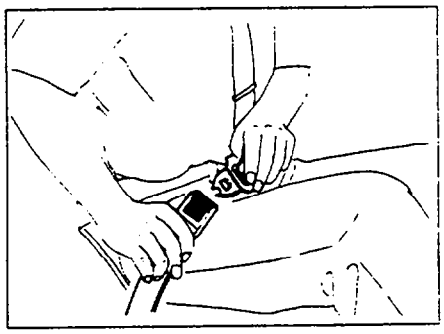
SEAT BELTS

To help lessen the chance of injury in accidents or sudden stops we urge that people riding in the vehicle be properly restrained at all times, using the seat belts provided. This includes women who are pregnant and children. See the following pages for use of restraints by children and pregnant women.

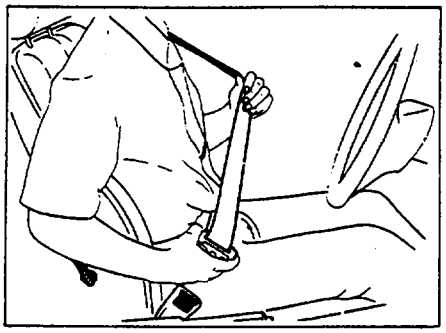
CAUTION:

- *For maximum protection keep the seatbelts fastened while driving.*

Front Seat Lap/Shoulder Belt



- Adjust the front seat as needed and sit up straight and well back in the seat.
- Take hold of the seat belt latch plate and pull the lap/shoulder belt webbing across the body. At the same time, slide the latch plate along the belt until it reaches the buckle. Push the latch plate into the buckle until it clicks.



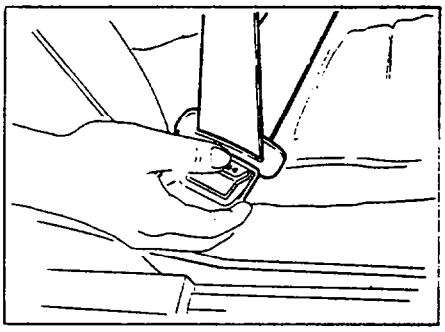
- Position the "lap" portion of the belt across the lap as LOW ON THE HIPS as possible. Then, adjust to a SNUG FIT by holding the "shoulder" portion of the front seat belt and pulling it UPWARD through the latch plate until the lap portion is snug across the lap. This reduces the risk of sliding under the belt during an accident. Adjust the rear seat lap belt to a SNUG FIT by letting the retractor fully take up the slack.

CAUTION:

- *A snug fit with the lap belt positioned low on the hips is necessary to lessen the chance of injury and/or the degree of injury in an accident. This spreads the force of the lap belt over the hip bone instead of across the abdomen. To help lessen the chance of injury and/or the degree of injury in the event of an accident: never use the same belt for more than one person at a time; do not wear twisted belts; and do not damage belts or belt buckles by pinching them in the seat or door.*

CAUTION:

- *Too much slack could increase the amount of injury because the belt would not be able to properly restrain you in an accident. DO NOT wear shoulder belt under the arm or out of position. Such use could increase the chance of injury and/or the degree of injury in an accident.*
- *It is advisable to have children seated in the rear seat.*



- To unfasten the belts push in the button in the top of the buckle.
- When no longer in use seat belts can be stowed by letting them rewind into their retractors.

Figure 7 OWNER'S MANUAL SEAT BELT INSTRUCTIONS

Figure 8

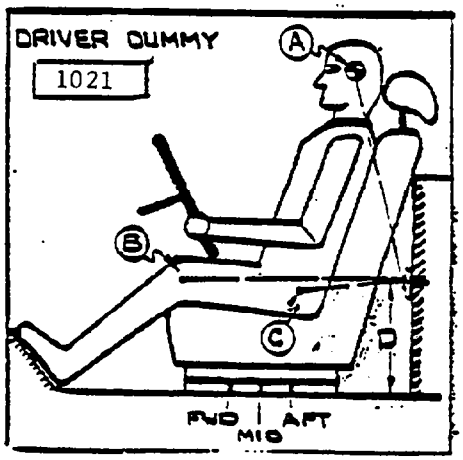
PART 572 DUMMY IN-VEHICLE POSITION

Test No. ME5701 Vehicle 1984 Isuzu Impulse 2-door hatchback

SEAT TYPE:
- ____ Bench
- X Bucket
- ____ Split Bench

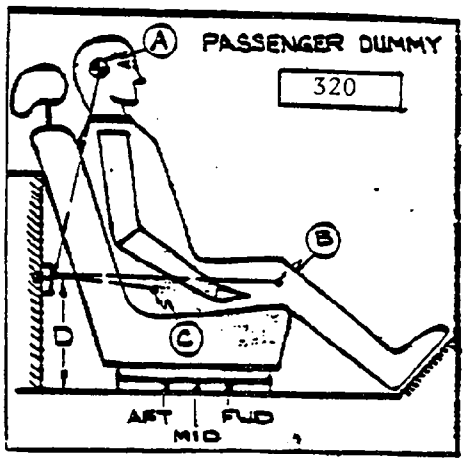
ADJUSTER TYPE:
- X Manual
- ____ Power

BUCKET SEAT BACK TYPE:
- ____ Fixed
- X Adjustable Reclining



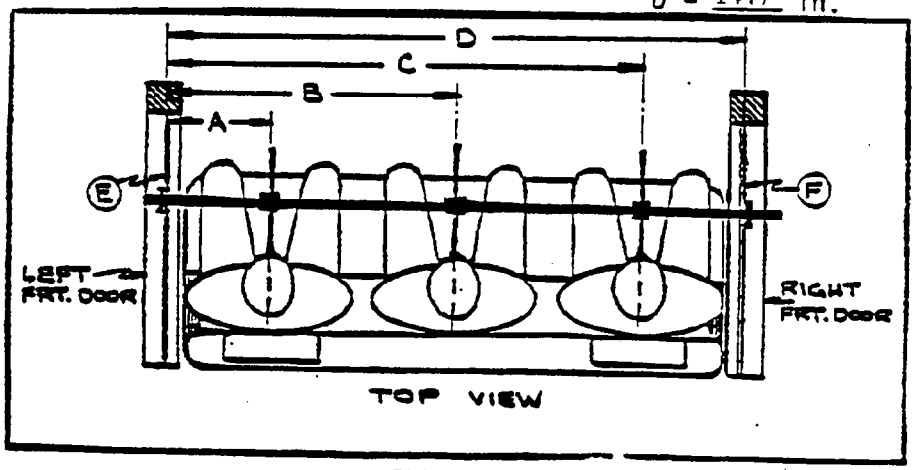
MEASUREMENT LOCATION

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



A = 19.7 in. 21 Degrees
B = 30.7 in. 98 Degrees
C = 17.8 in. 124 Degrees
D = 14.7 in.

A = 19 in. 23 Degrees
B = 32 in. 100 Degrees
C = 17.8 in. 121 Degrees
D = 14.7 in.

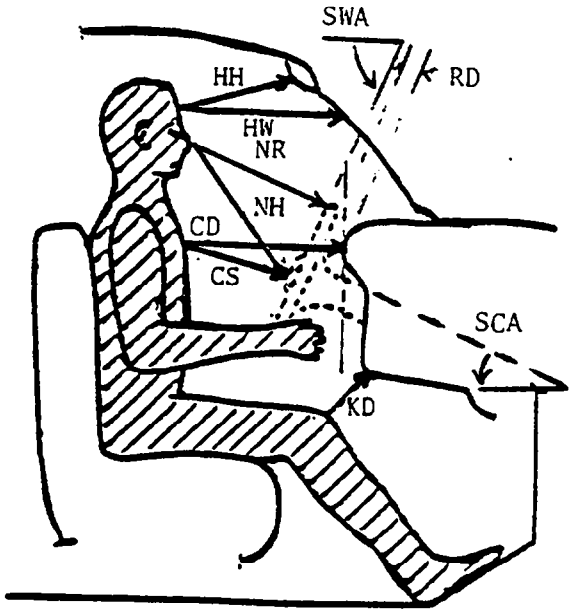


DUMMY ID

	1021	--	320	
A =	Left Door to Driver Centerline			12.0 in.
B =	Left Door to Center Passenger Centerline			-- in.
C =	Left Door to Right Passenger Centerline			38.7 in.
D =	Left Door to Right Door			50.7 in.
E, F =	Window Glass Height (Right and Left Must be Equal)			11 in.

NR	18.2	
NH	20.8	
SCA	17.0°	
SWA	69°	
RD	3	
		Passenger
HH	15.5	15.7
HW	22.5	22.5
CD	21.0	27.5
CS	16	--
KDL	6.7	7.5
KDR	6.6	7.5
SA	--	--
TA	25°	25°

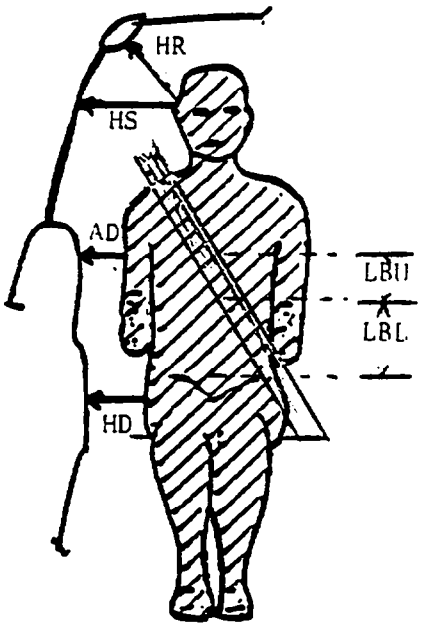
NR = Nose to Rim
NH = Nose to Hub
SCA = Steering Column Angle
SWA = Steering Wheel Rim Angle
RD = Rim to Dash



HH = Head to Windshield Header
HW = Head to Windshield
CD = Chest to Dash
CS = Chest to Steering Wheel
KD = Knee to Dash
SA = Seat Back Angle
TA = Torso Angle

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

	Driver	Passenger
LBU	13.5	13.5
LBL	10.5	10.5
LBT	N.A.	N.A.
SBT	N.A.	N.A.
HR	5.2	5.5
HS	8.2	8.0
AD	4.0	5.2
HD	4.3	5.0



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

Figure 9 OCCUPANT CLEARANCE DIMENSIONS

Table 10

DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R *
DUMMY (1)	-234	-78	114	249	-47	-20	11	45.5
DUMMY (2)	-243	237	174	381	-58	24	37	48.7
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	1530	850
DUMMY (2)	Zero Shift	470
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)	1320	--	1300
DUMMY (2)	1835	1525	--
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**				SEVERITY INDEX
	HIC	t_1 (SEC)	t_2 (SEC)	AVE. ACC. (g) t_1 TO t_2	HEAD
DUMMY (1)	1769.2	.08400	.08700	203.4	2915.2
DUMMY (2)	2453.9	.08865	.09000	319.0	3499.6
DUMMY (3)					
DUMMY (4)					

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Table 11

BELT RELATED DATA

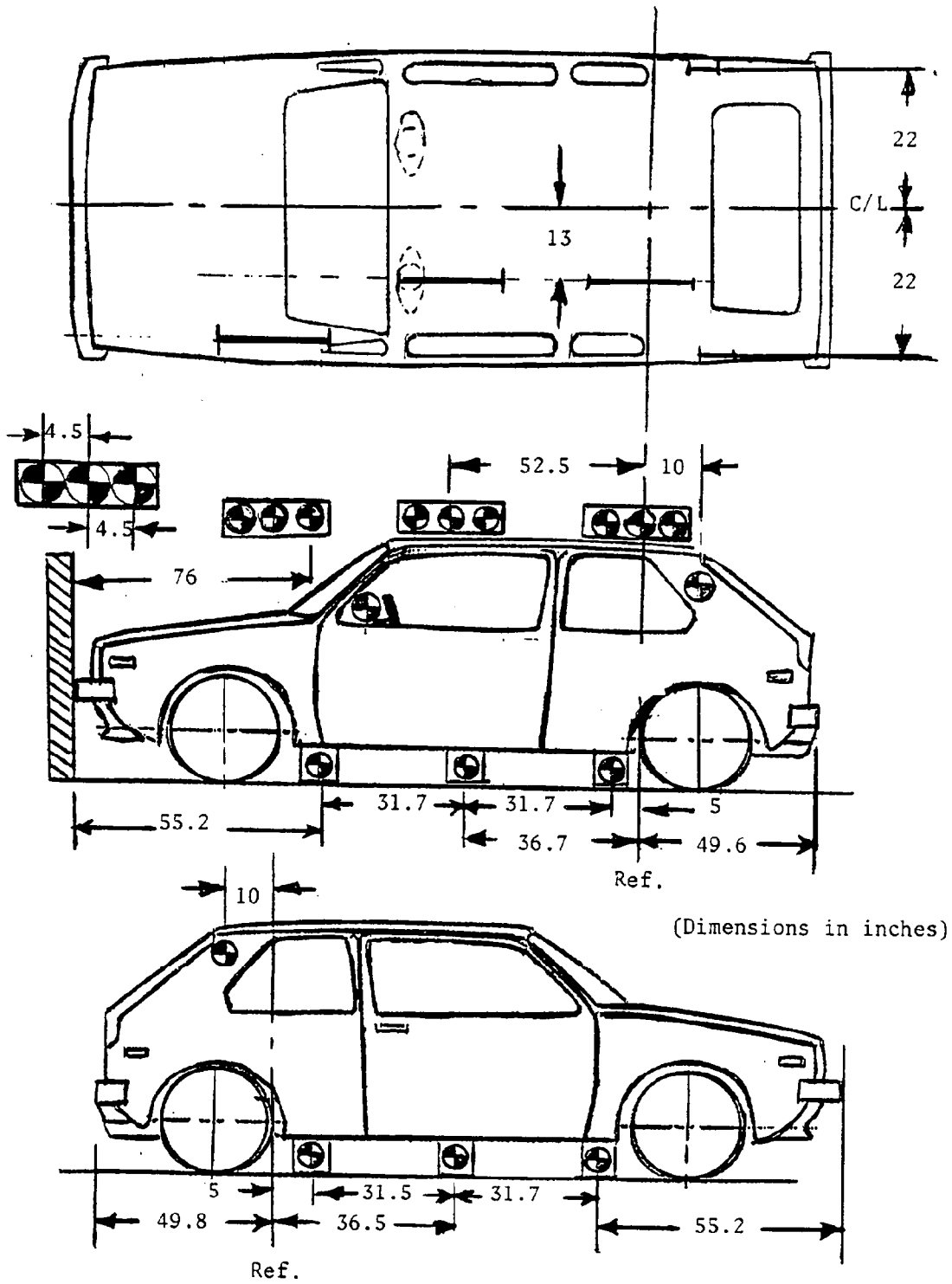
	Driver	Passenger
Belt Spool-off (in.)		
film	3.5	4.8
electronic	3.5	4.3
Belt Strain[1]	.7" per ft.	1.0" per ft.
Belt Length Data (in.)		
total length [2]	--	--
retractor to "D" ring [2]	covered	covered
torso belt [3]	34.5 to "D" ring	34.5 to "D" ring
lap belt [3]	29.25	29.25
remainder on spool	--	--

---

[1] as measured between retractor and "D" ring

[2] retractor spool to bolt hole anchor point for unibelts

[3] as measured on Part 572 dummy



(Dimensions in inches)

Figure 10 VEHICLE TARGET LOCATIONS

APPENDIX A

PHOTOGRAPHS

Figure A-1 PRE-TEST FRONT VIEW

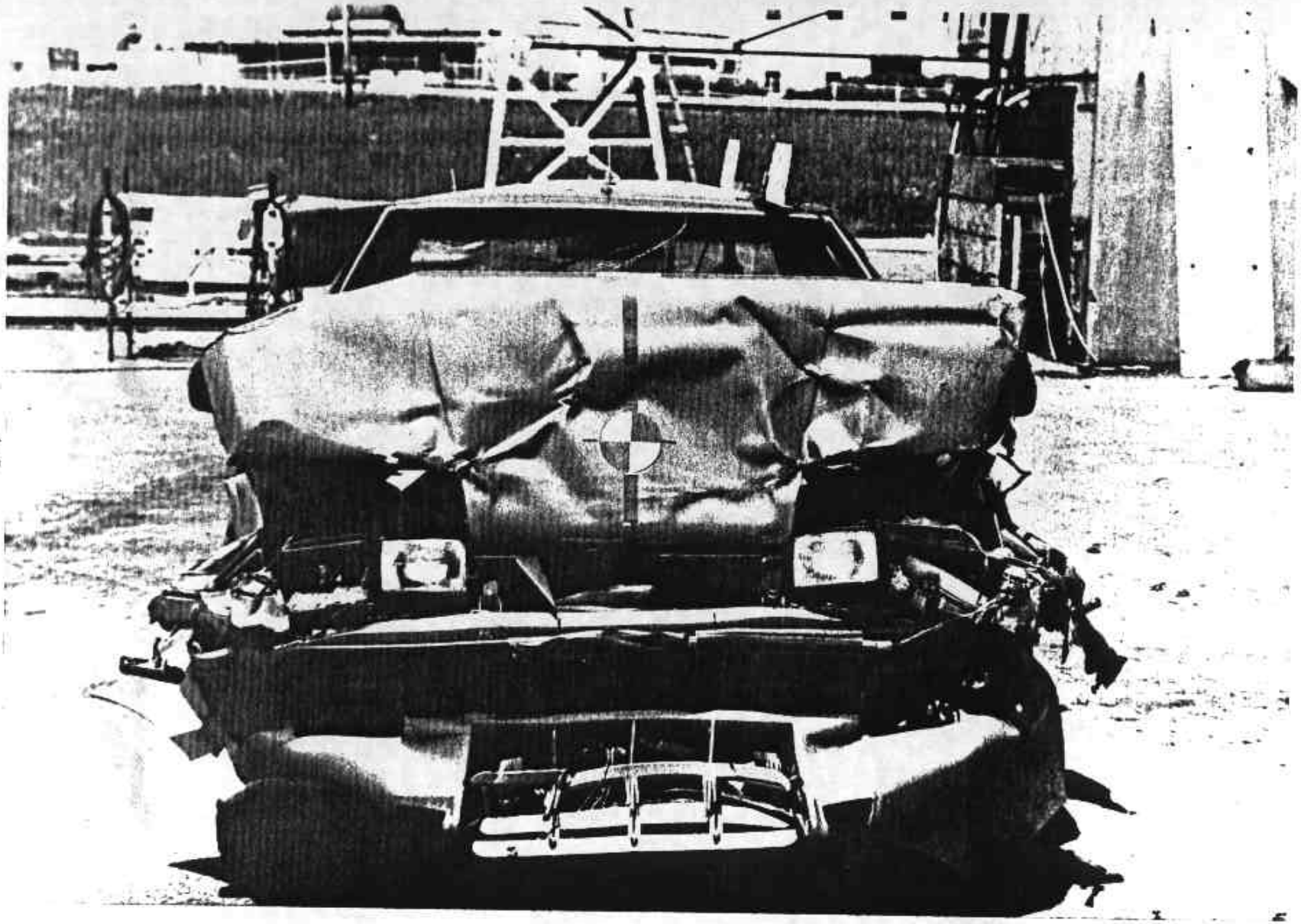


Figure A-2 POST-TEST FRONT VIEW

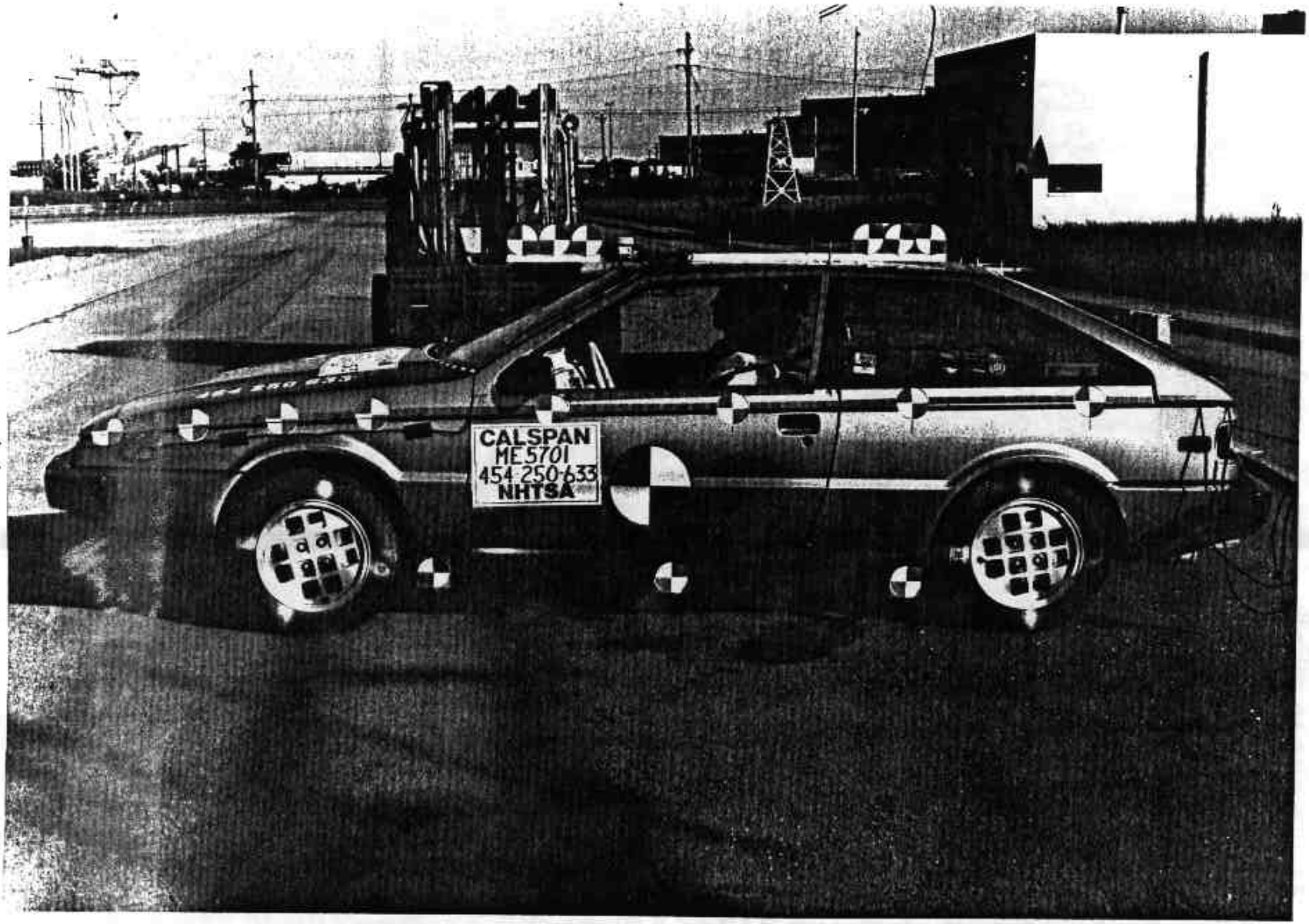


Figure A-3 PRE-TEST LEFT SIDE VIEW

Figure A-4 POST-TEST LEFT SIDE VIEW

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Figure A-5 PRE-TEST RIGHT SIDE VIEW

Figure A-6 POST-TEST RIGHT SIDE VIEW

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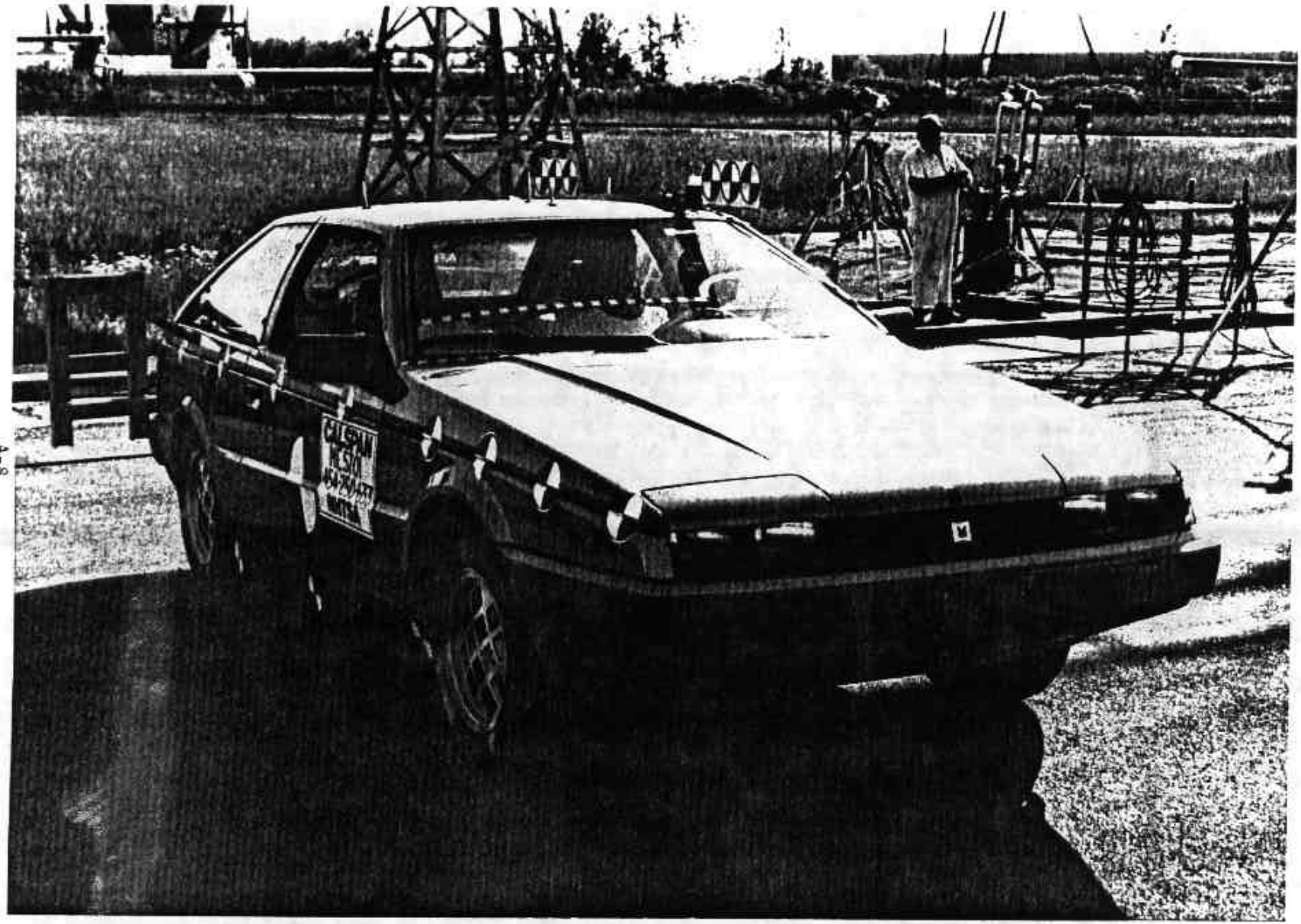

Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

7103-V-26

7103-V-26

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

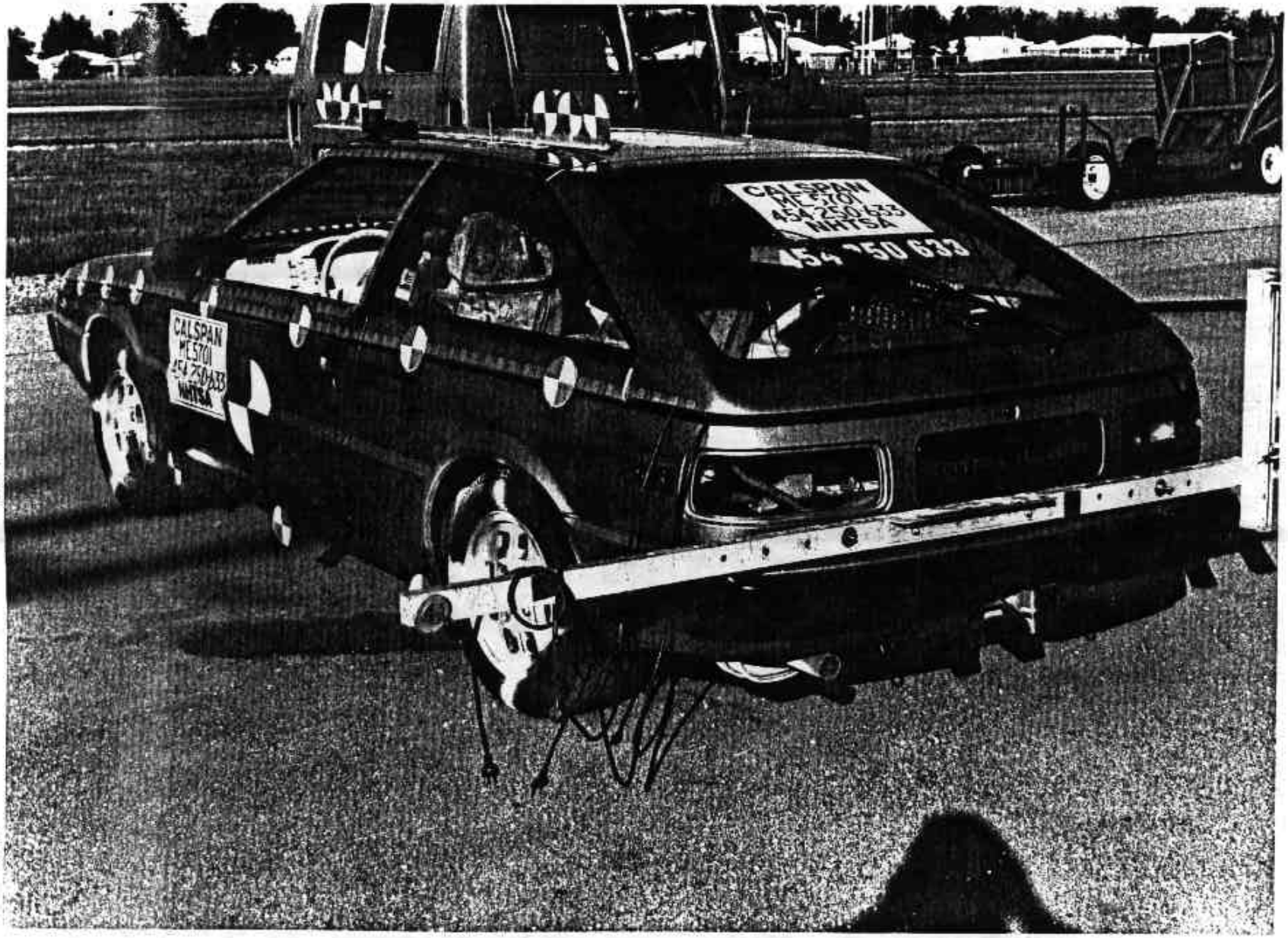

Figure A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW

7103-V-26

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

7103-V-26

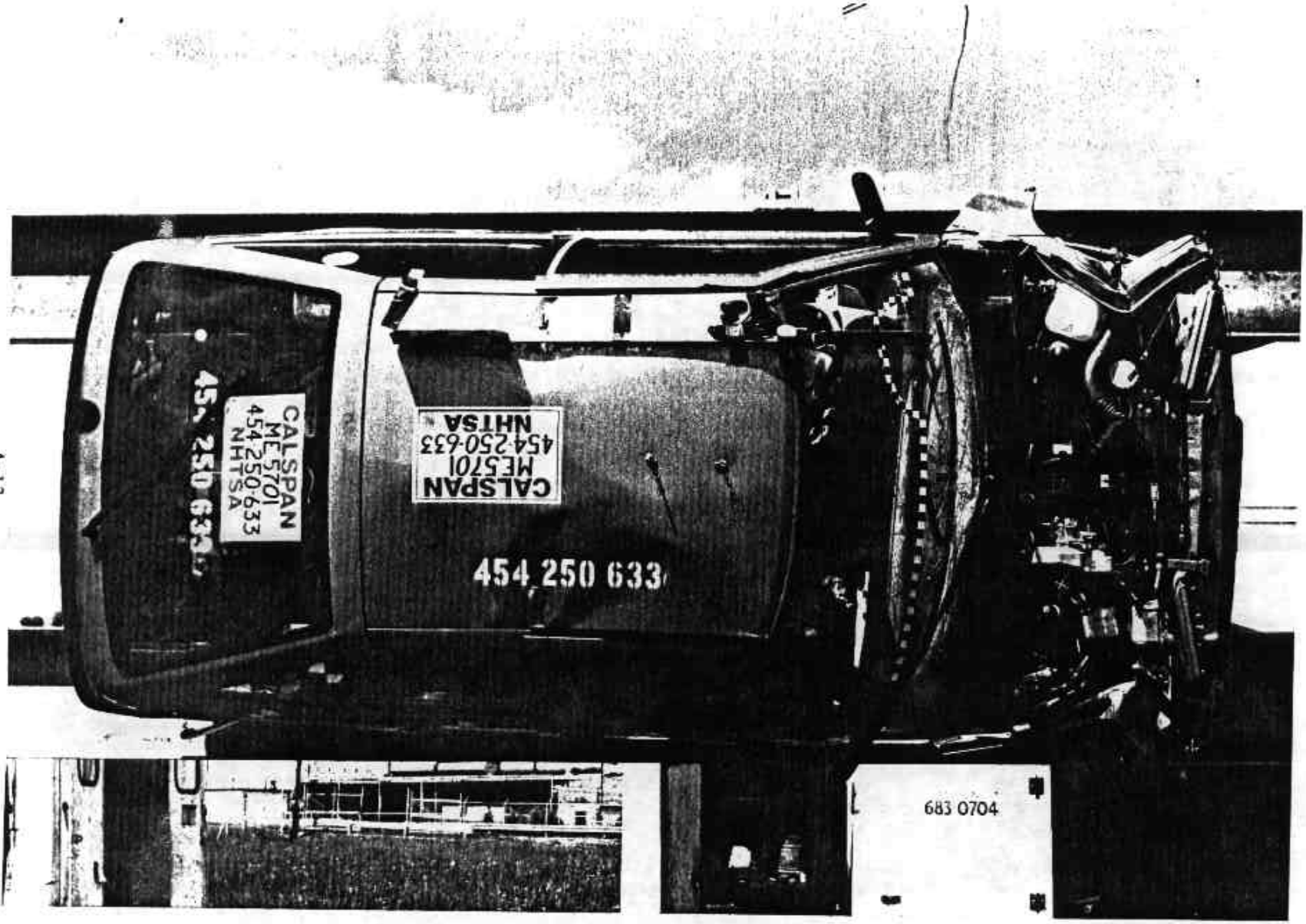

Figure A-11 POST-TEST TOP VIEW

7103-V-26

7103-V-26

Figure A-12 PRE-TEST WINDSHIELD VIEW

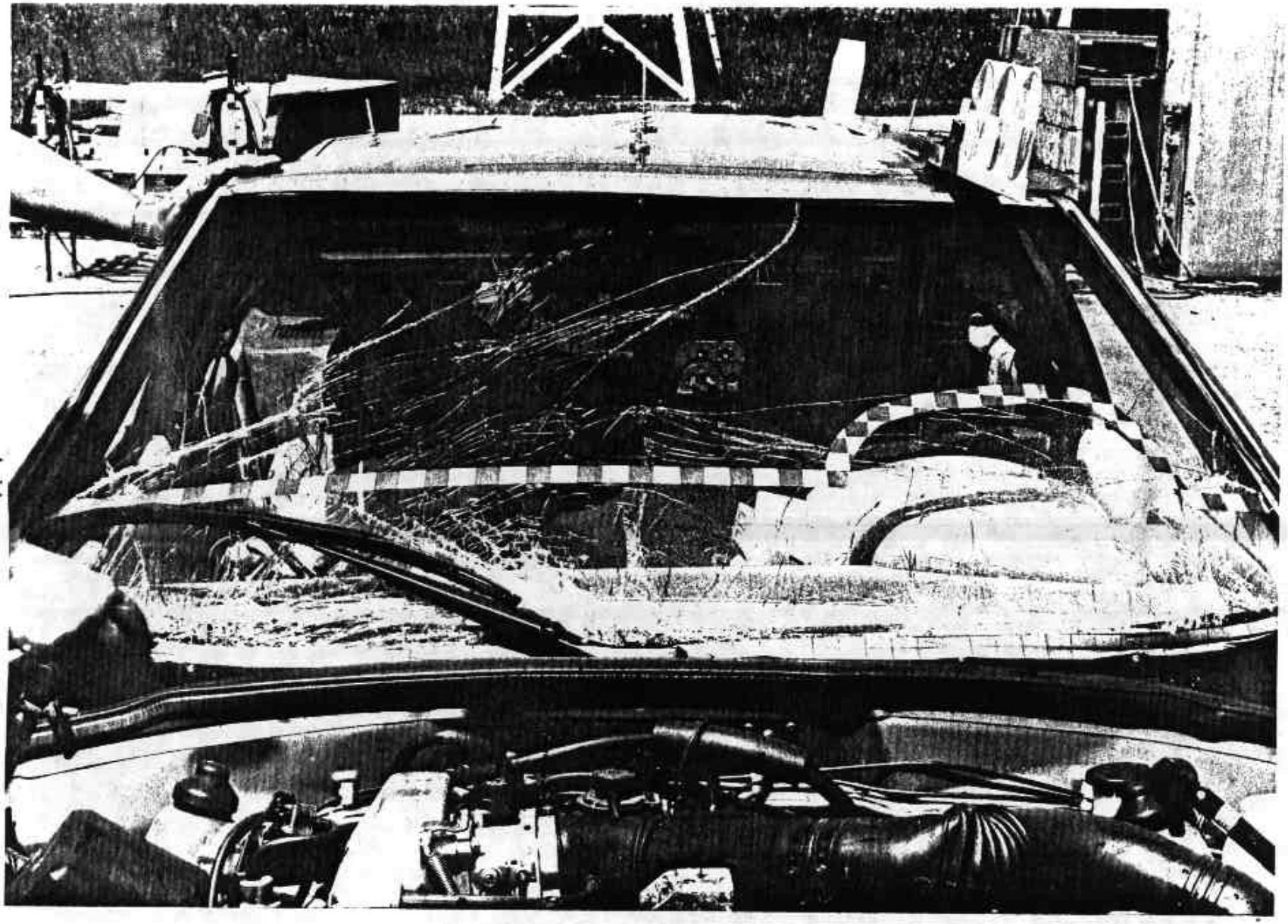

Figure A-13 POST-TEST WINDSHIELD VIEW

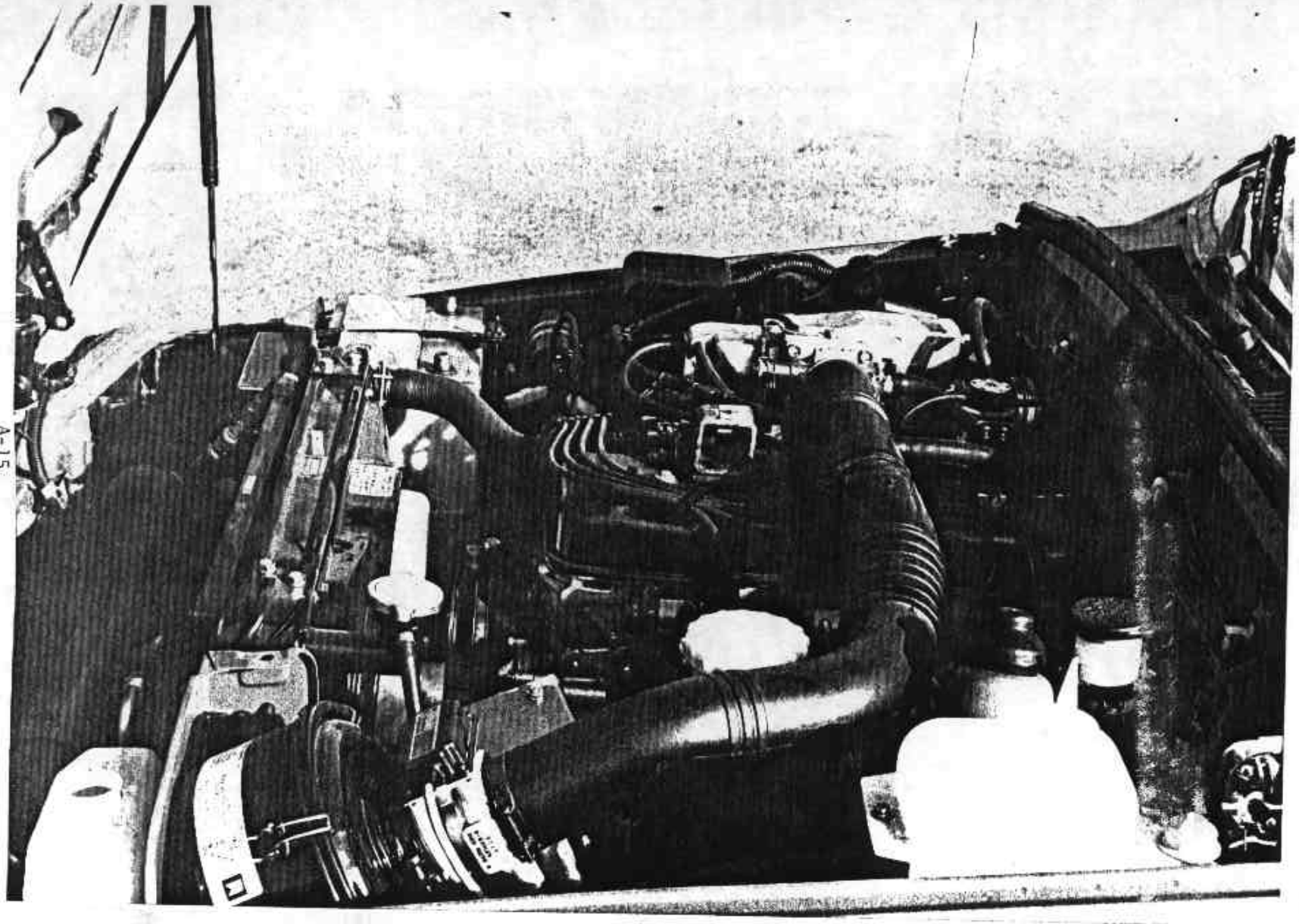

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Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

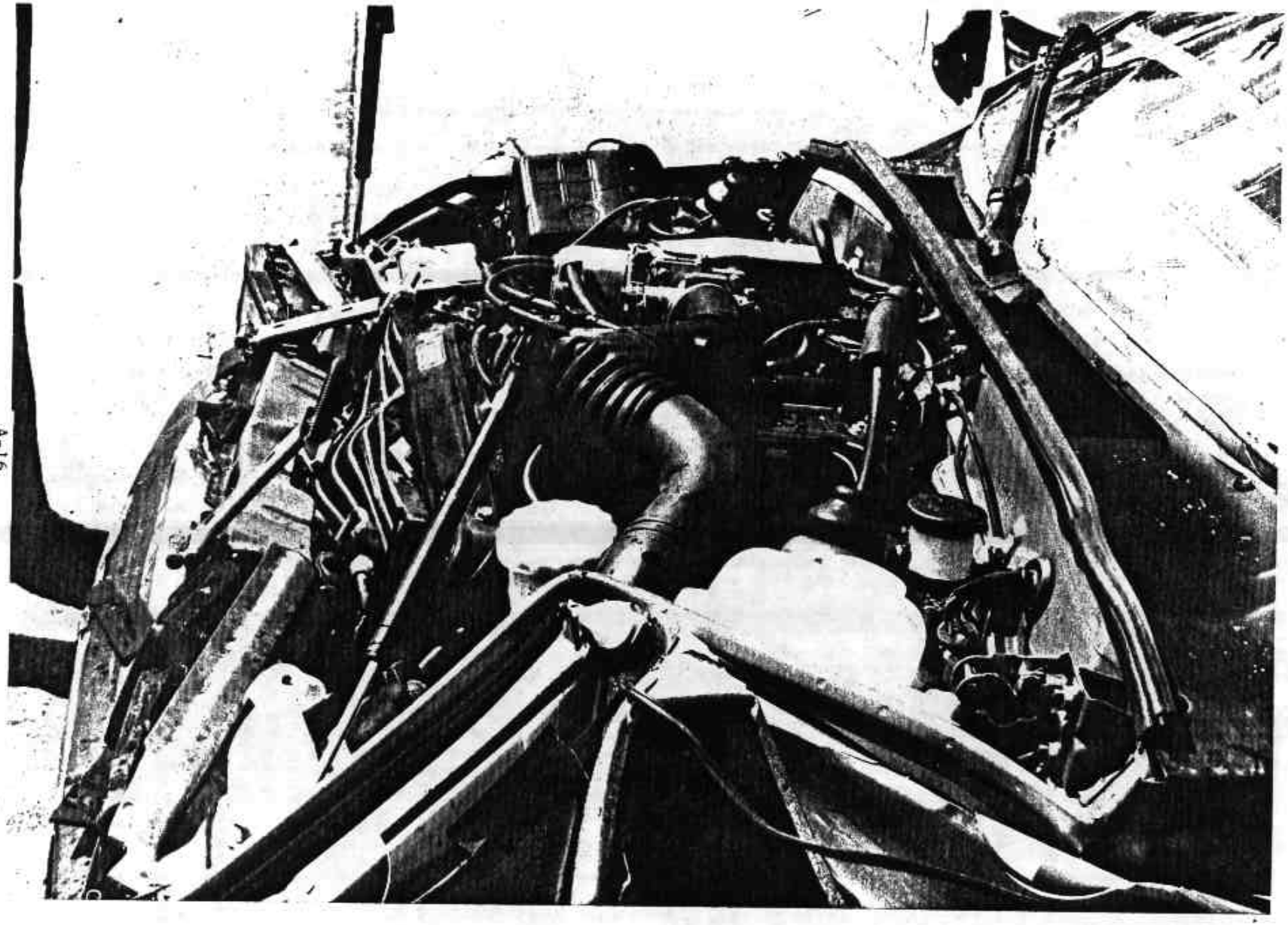

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Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

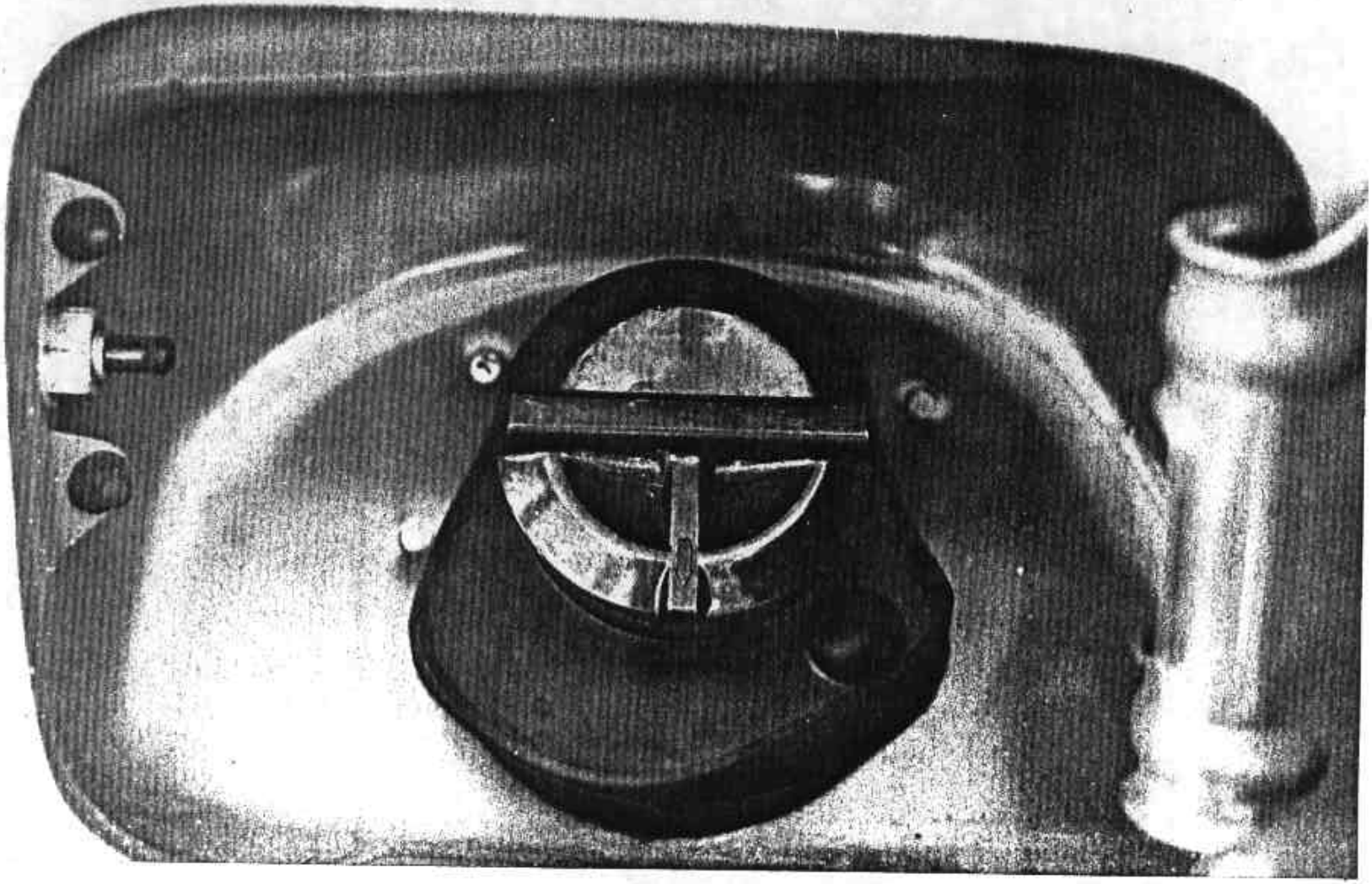


Figure A-16 PRE-TEST FILLER CAP VIEW

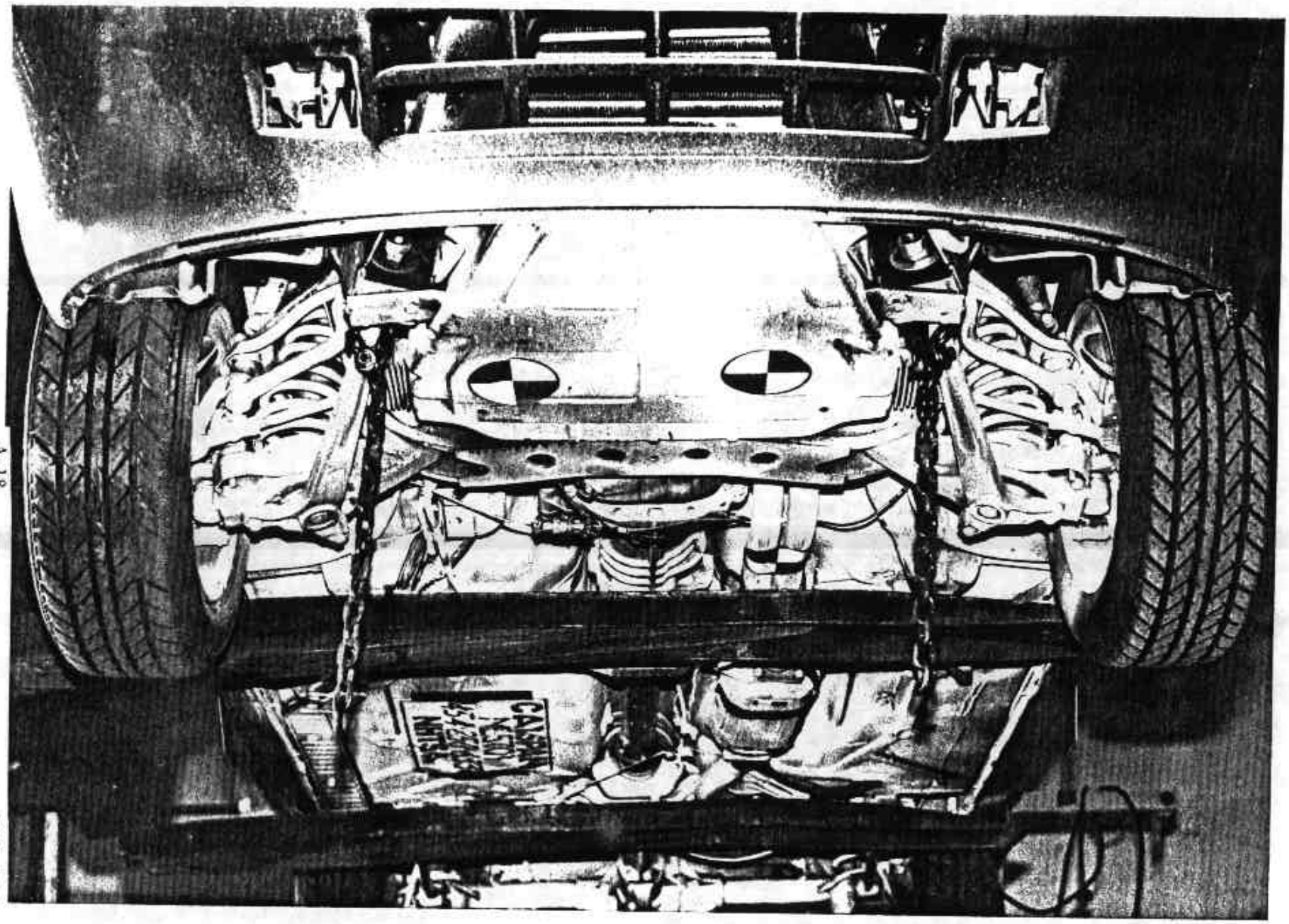
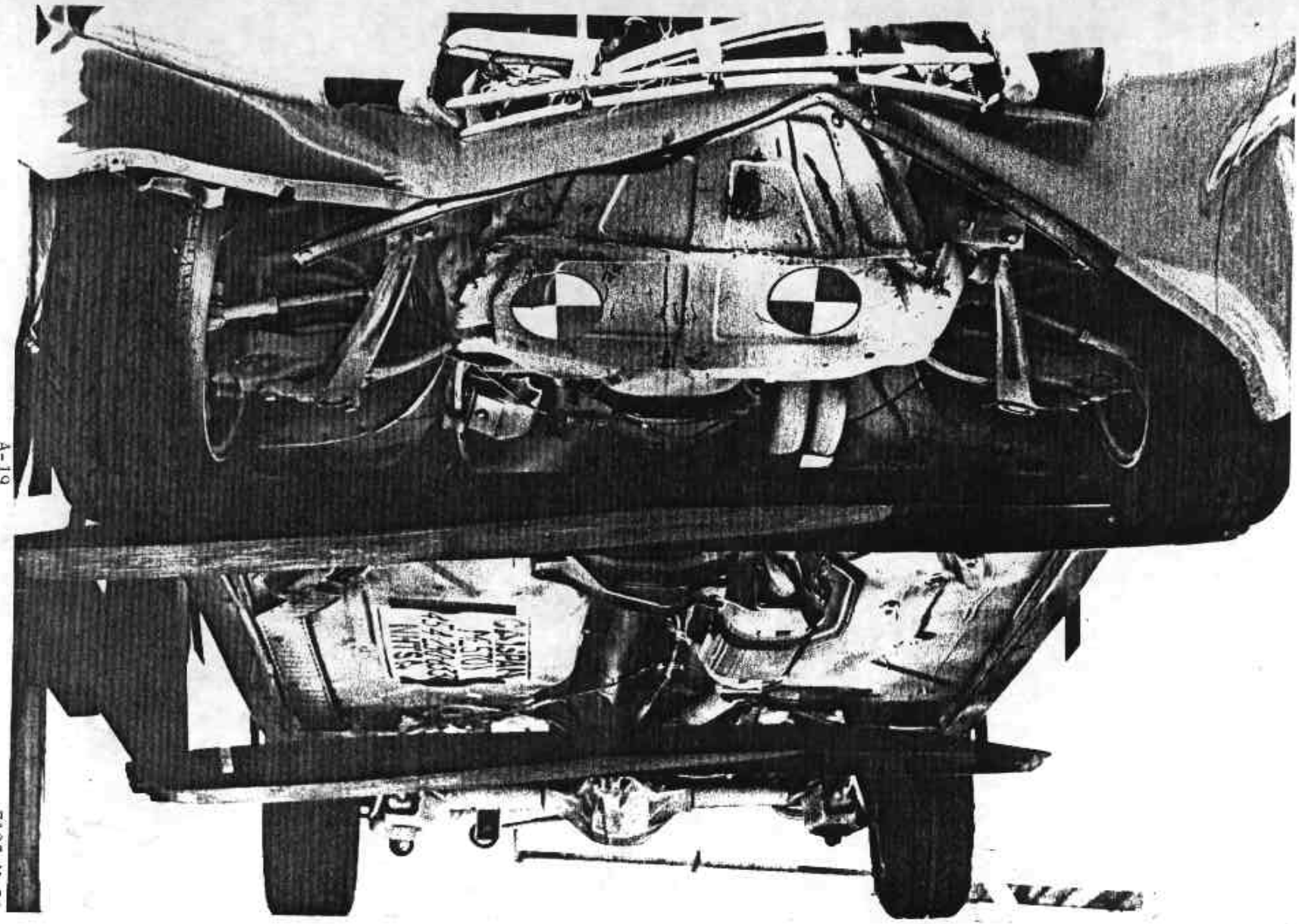


Figure A-17 PRE-TEST FRONT UNDERBODY VIEW



A-19

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Figure A-18 POST-TEST FRONT UNDERBODY VIEW

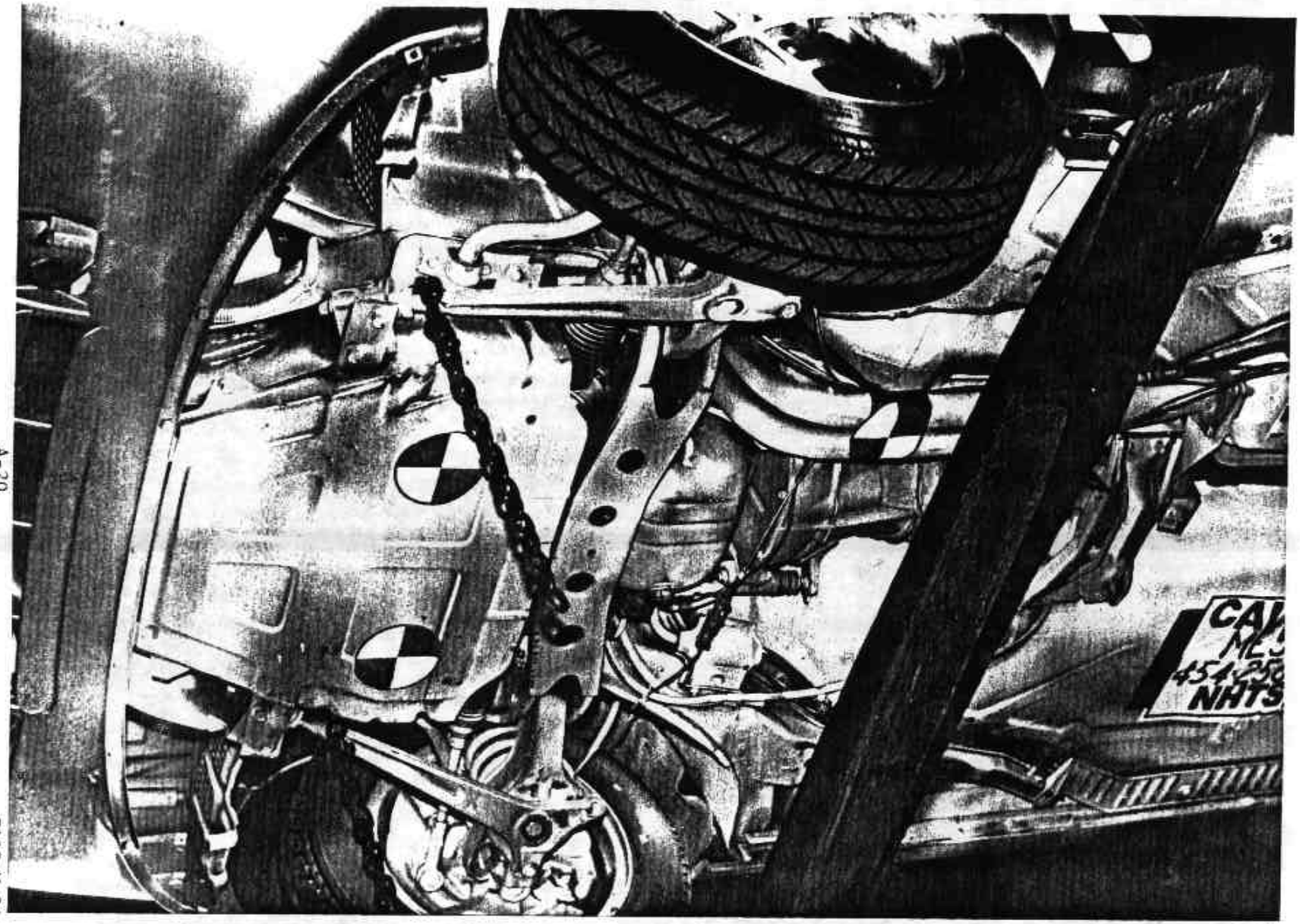

Figure A-19 PRE-TEST FRONT SIDE UNDERBODY VIEW

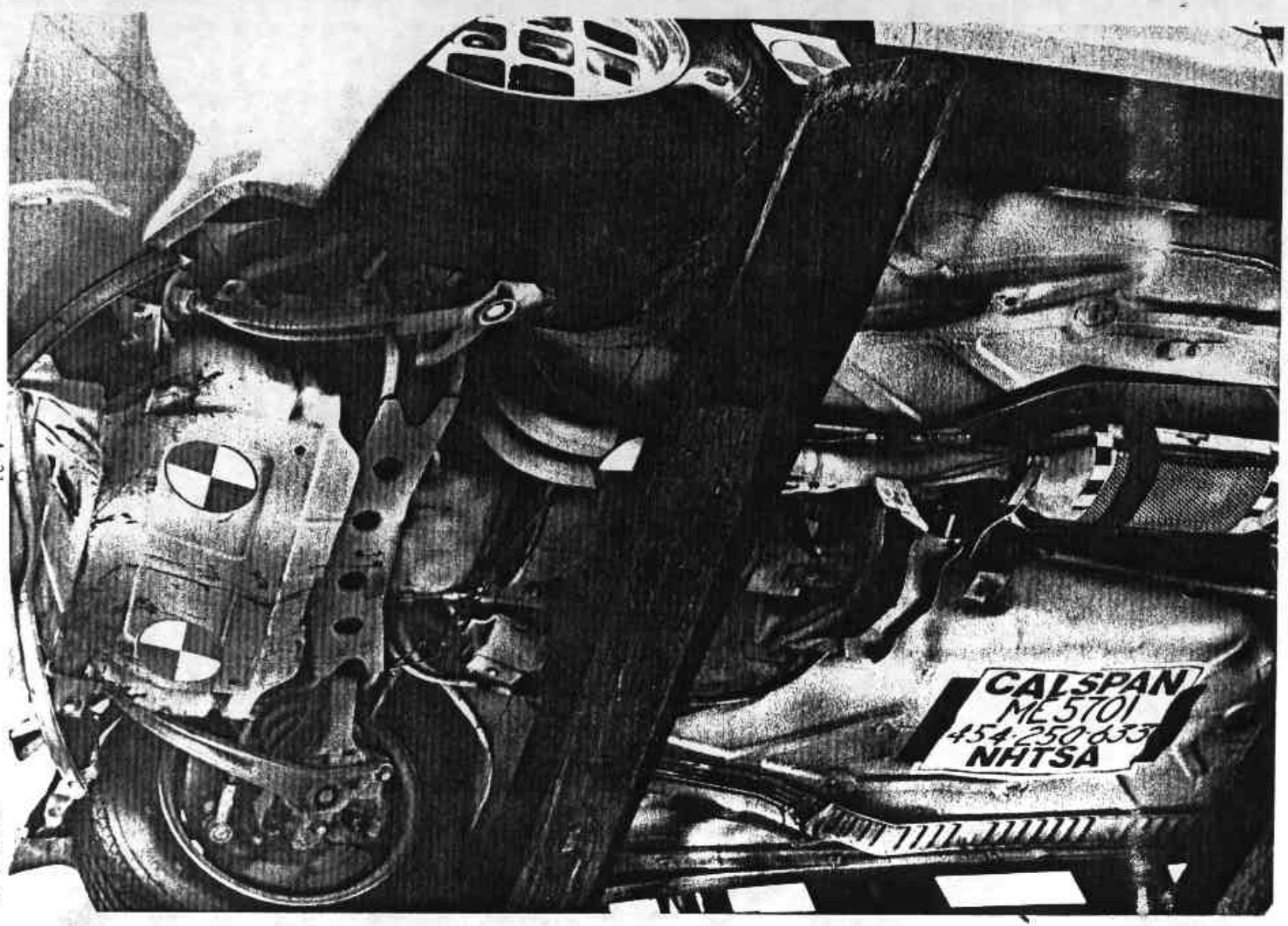

Figure A-20 POST-TEST FRONT SIDE UNDERBODY VIEW

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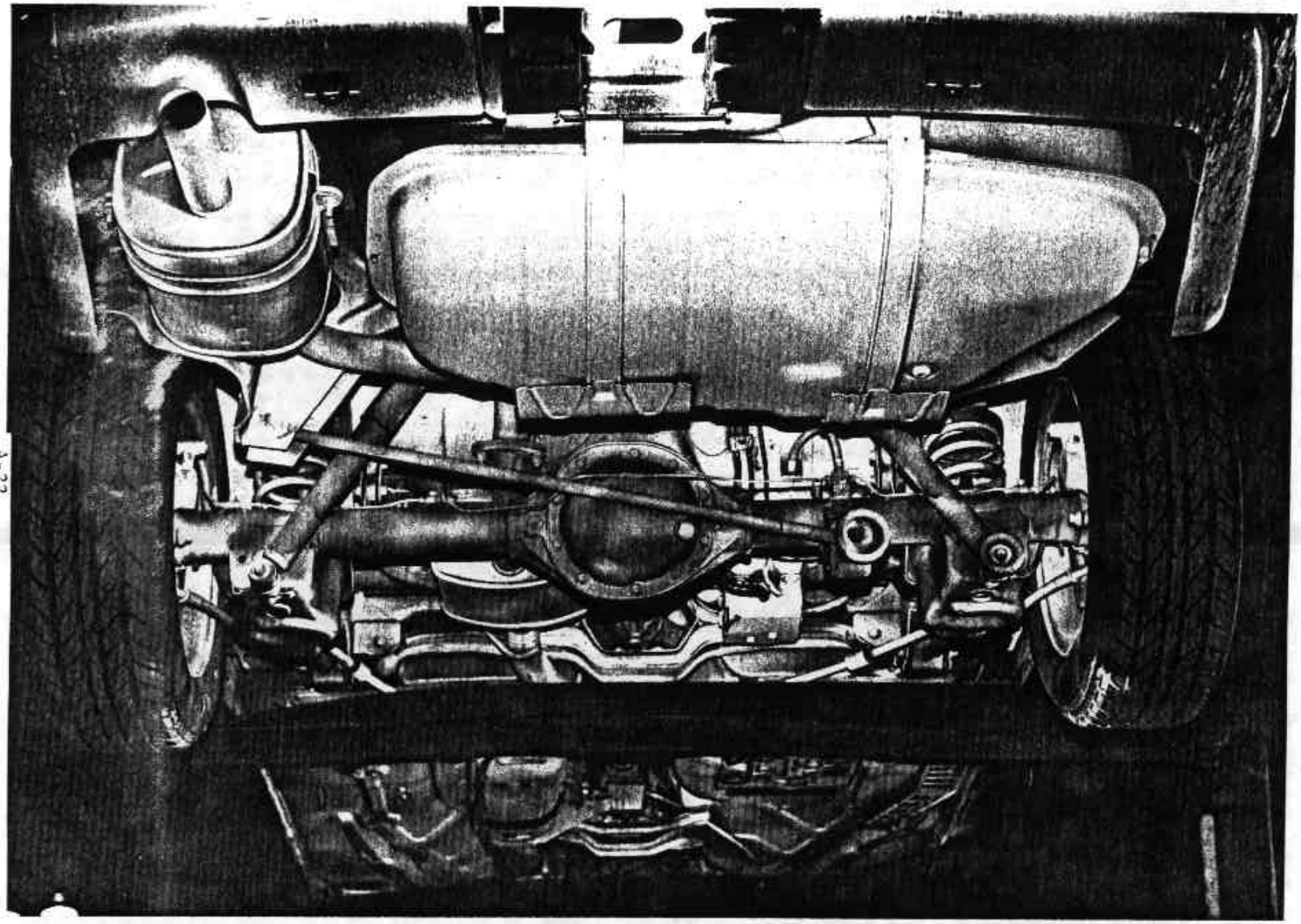

A-22

7103-V-26

Figure A-21 PRE-TEST REAR UNDERBODY VIEW

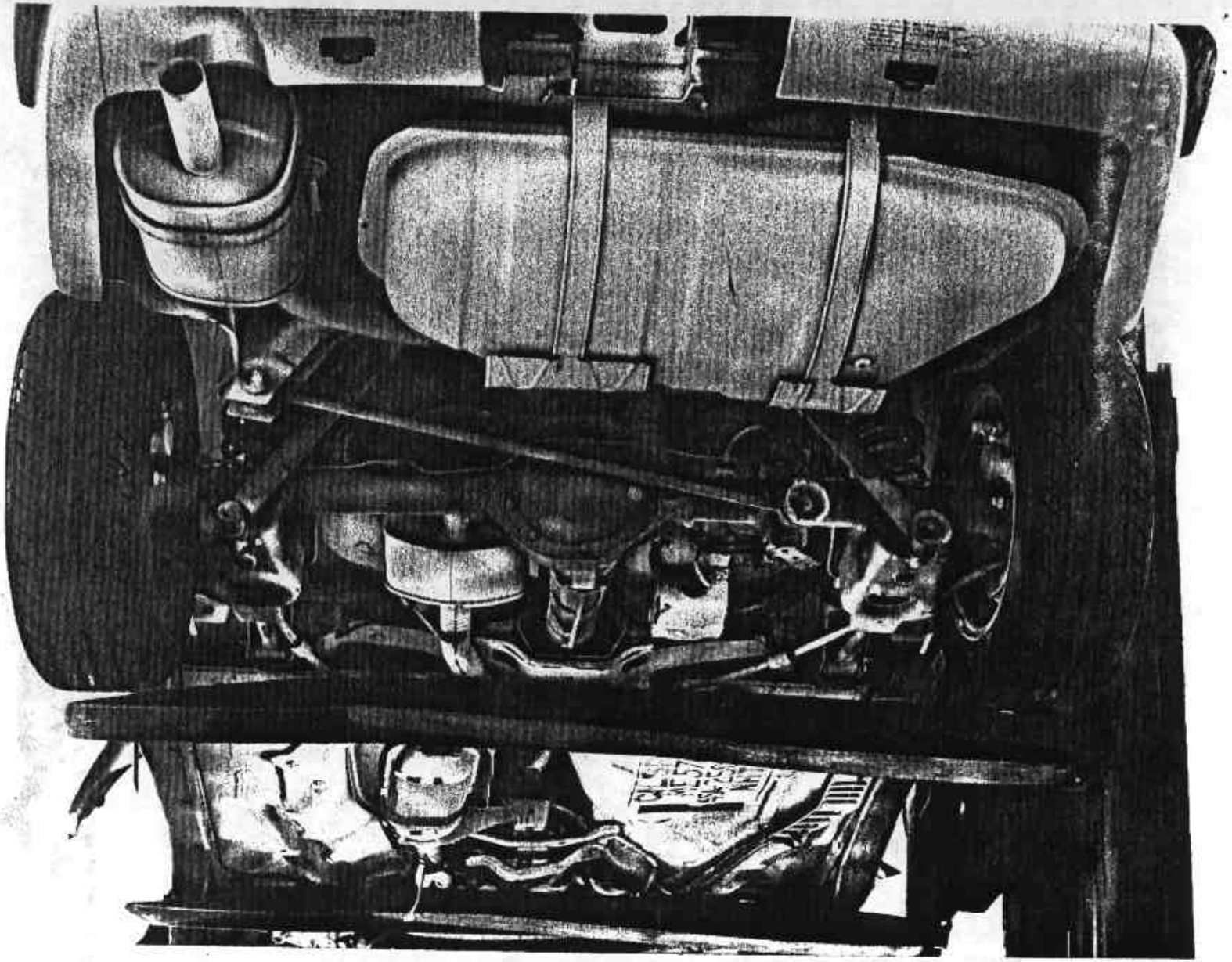

Figure A-22 POST-TEST REAR UNDERBODY VIEW

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Figure A-23 PRE-TEST DRIVER POSITION VIEW

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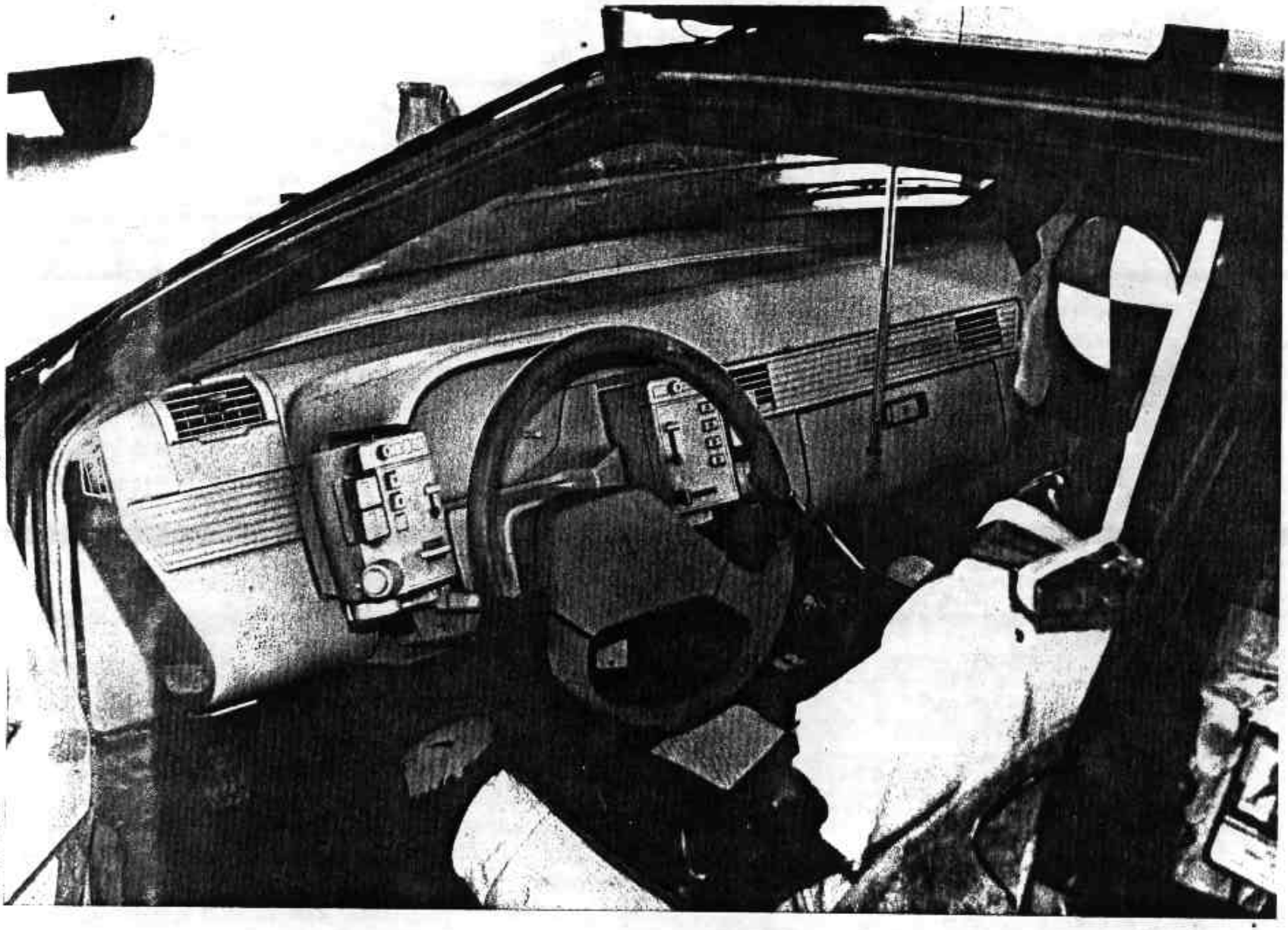
Figure A-24 POST-TEST DRIVER POSITION VIEW



A-26

7103-V-26

Figure A-25 PRE-TEST DRIVER AND INTERIOR VIEW

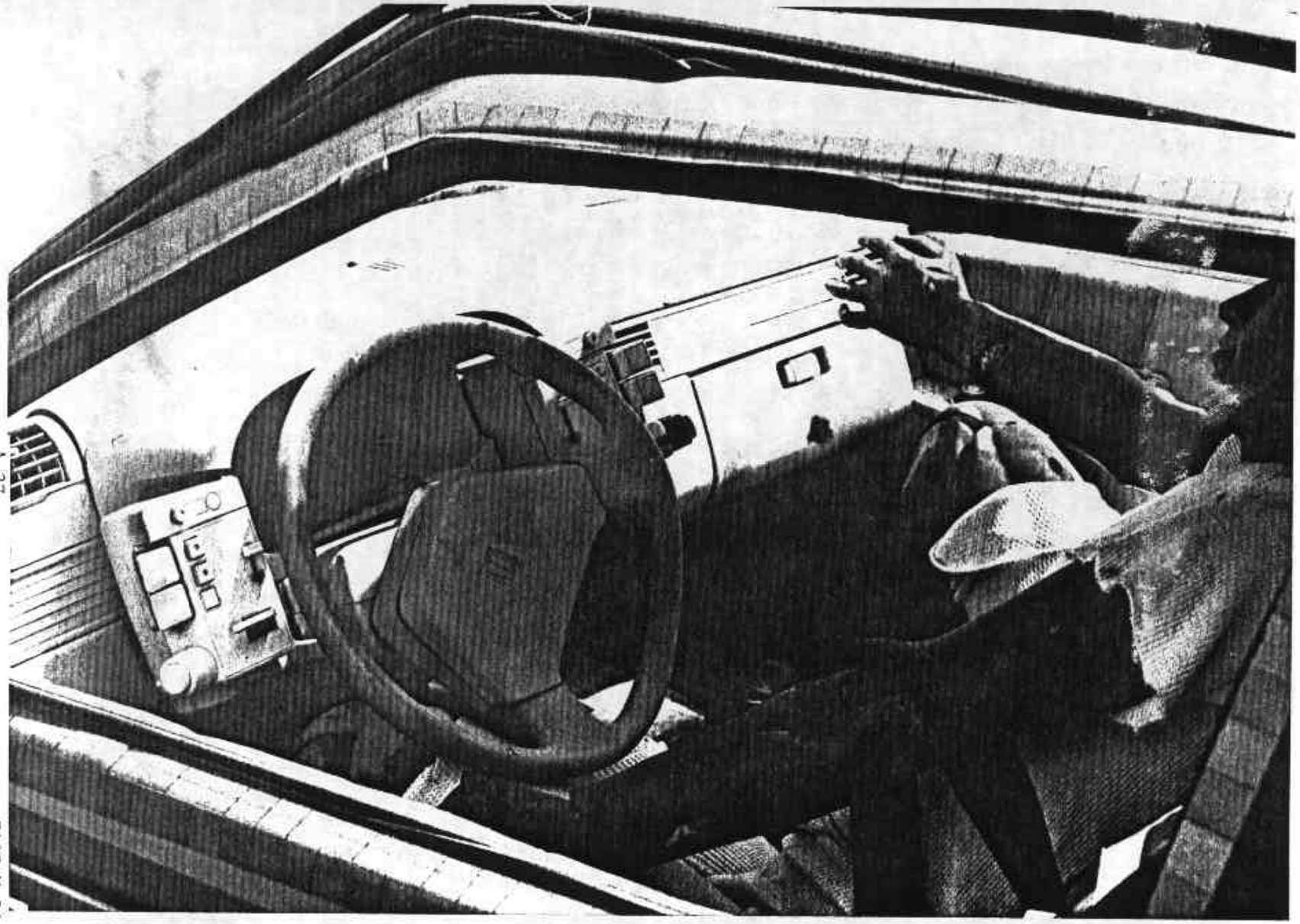


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Figure A-26 POST-TEST DRIVER AND INTERIOR VIEW

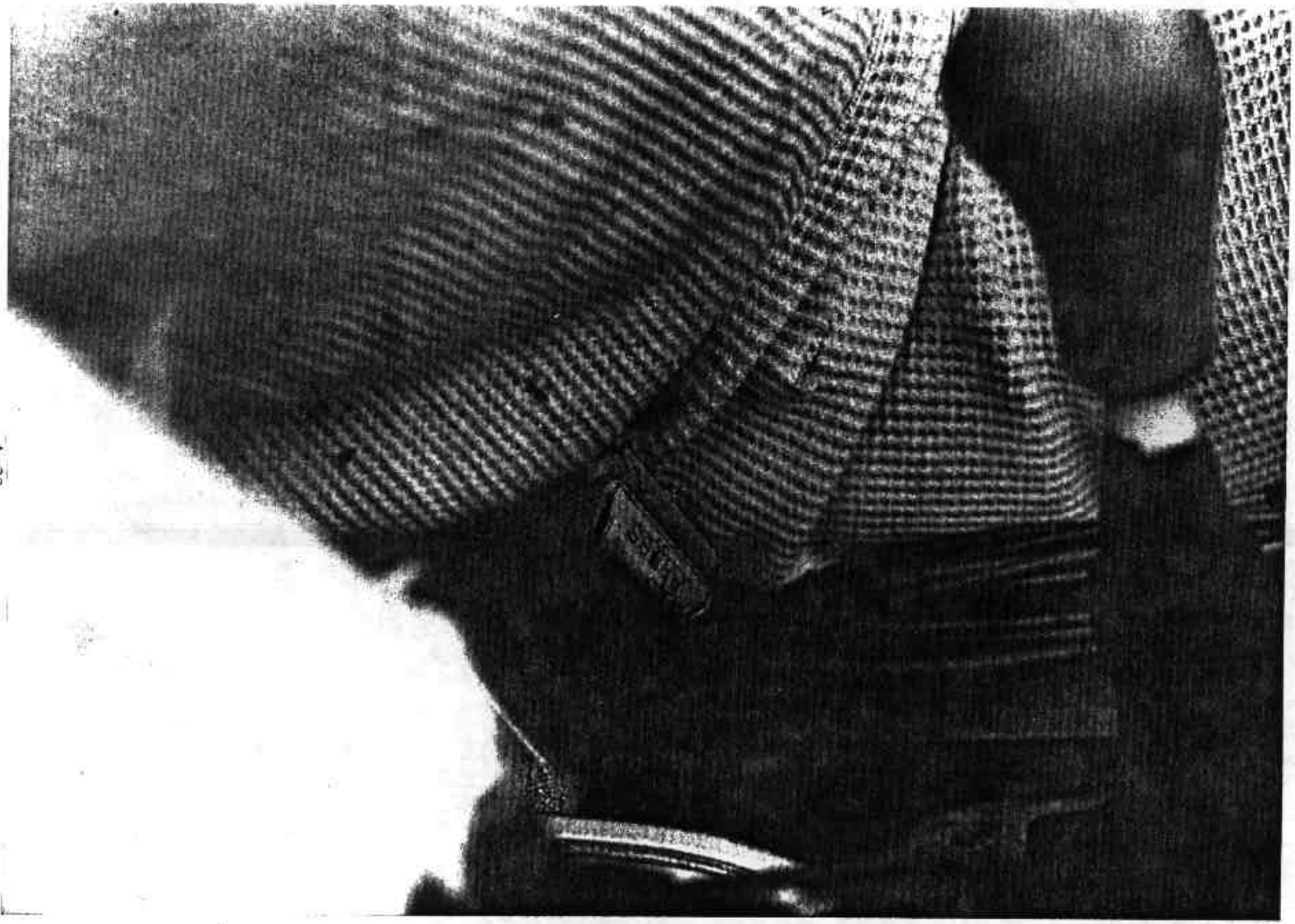

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Figure A-27 POST-TEST DRIVER BELT BUCKLE RELEASE VIEW

A-29

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Figure A-28 PRE-TEST PASSENGER POSITION VIEW

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Figure A-29 POST-TEST PASSENGER POSITION VIEW

A-31

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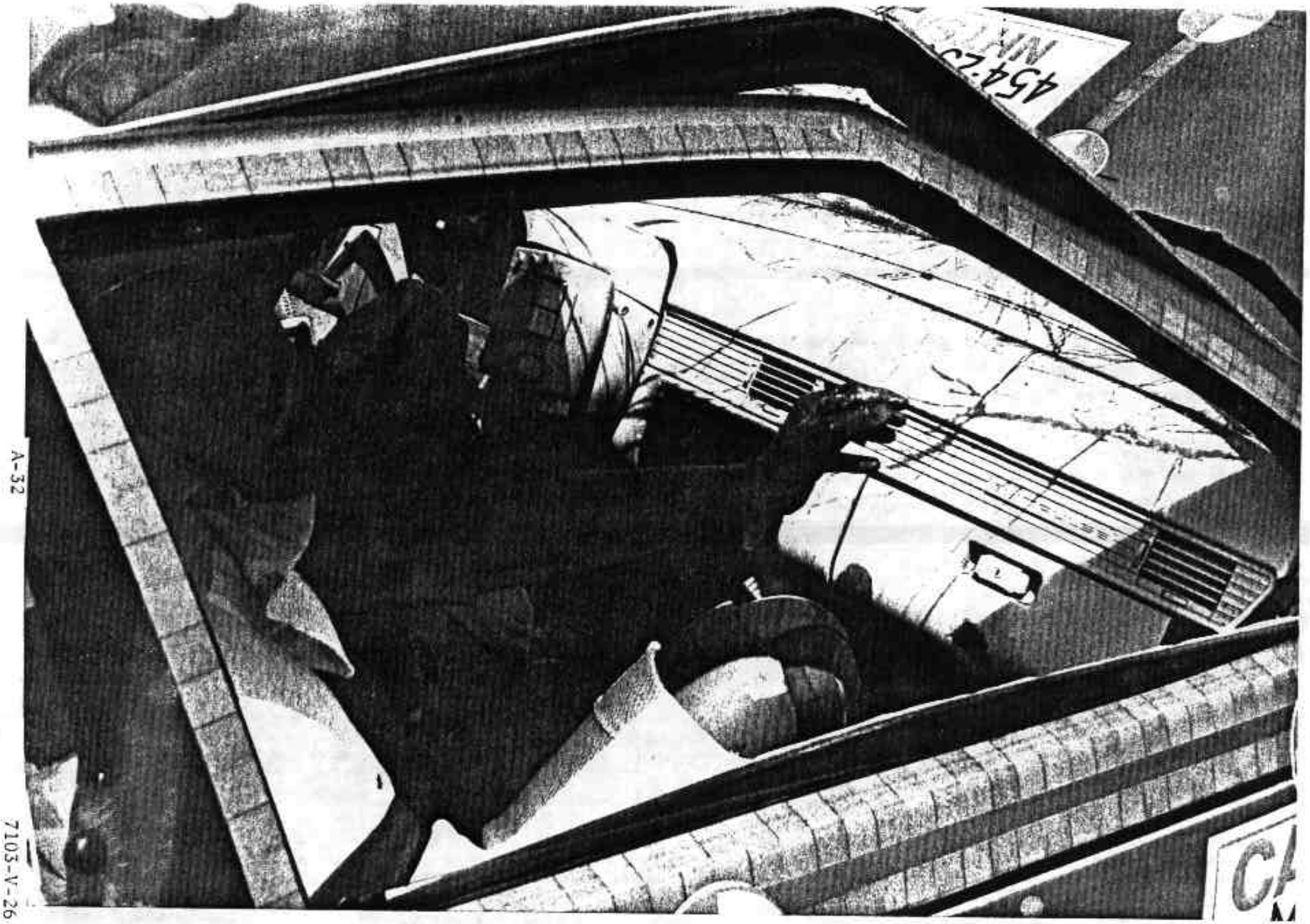
Figure A-30 PRE-TEST PASSENGER AND INTERIOR VIEW



A-32

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Figure A-31 POST-TEST PASSENGER AND INTERIOR VIEW

APPENDIX B

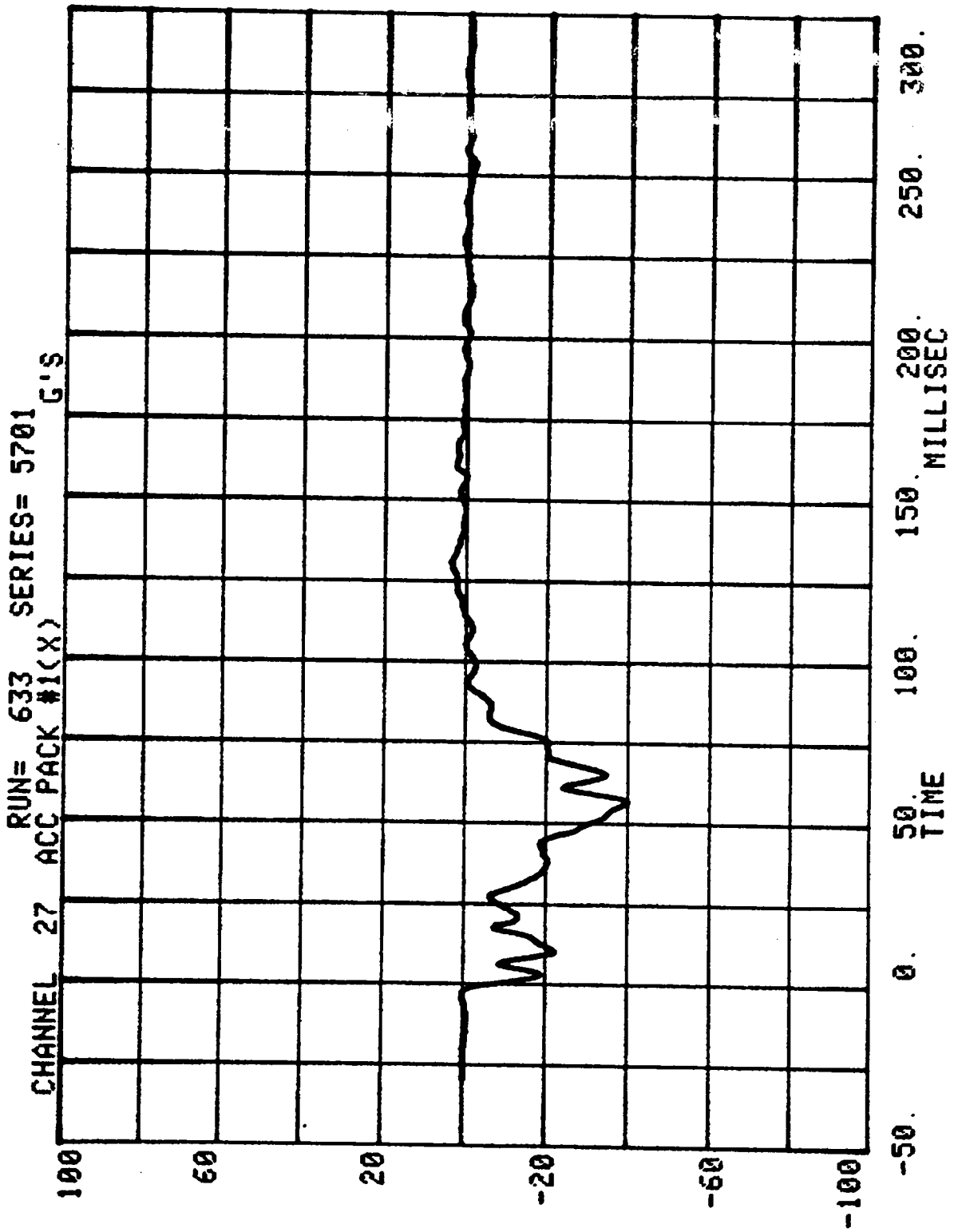
VEHICLE AND DUMMY RESPONSE DATA

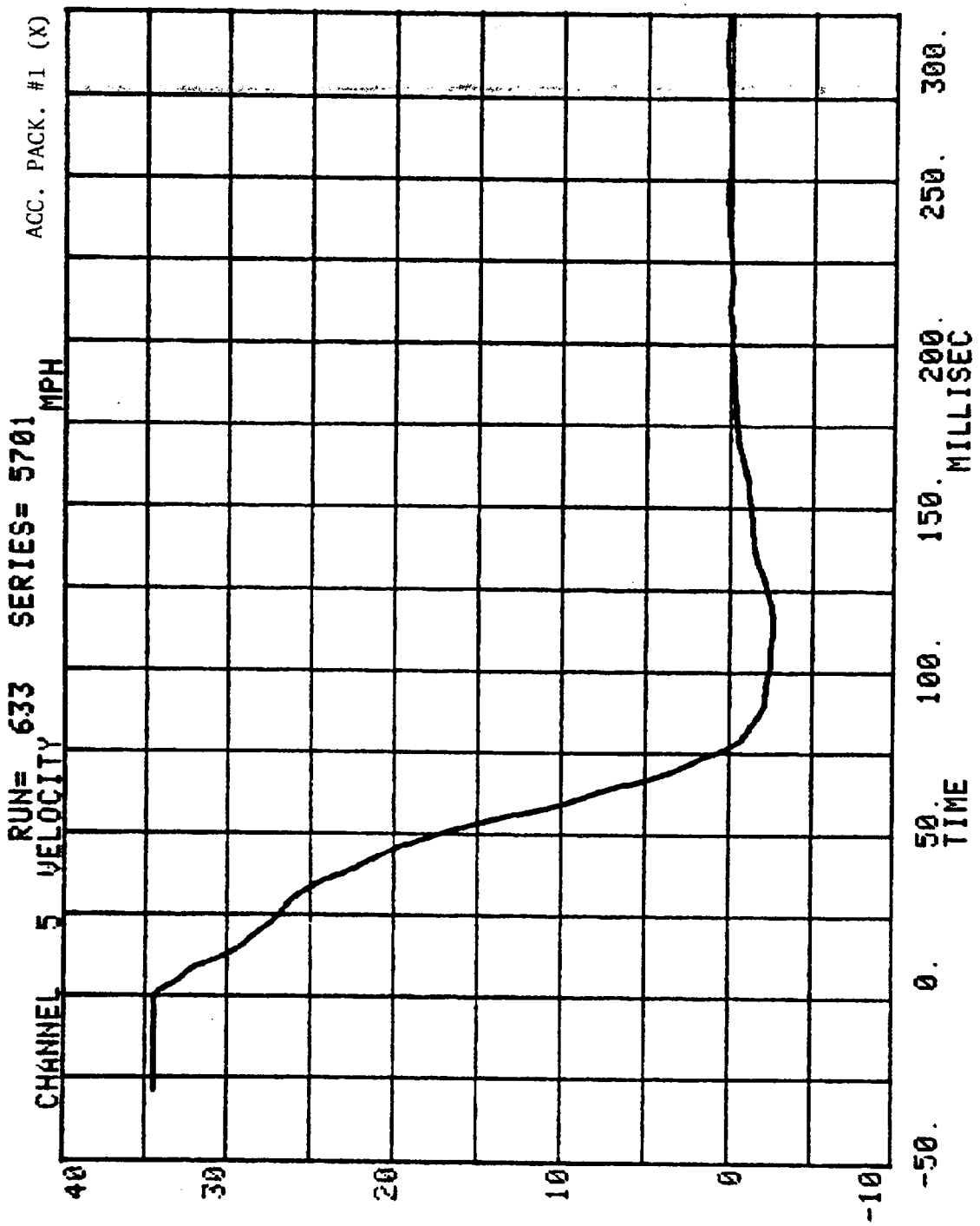
TEST NO. ME5701

VEHICLE DATA

FILTER CHANNEL CLASS

60


CHANNEL 27 ACC PACK #1(X)
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC. PACK. #1 (X)
CHANNEL 5 VELOCITY
RUN= 633 SERIES= 5701
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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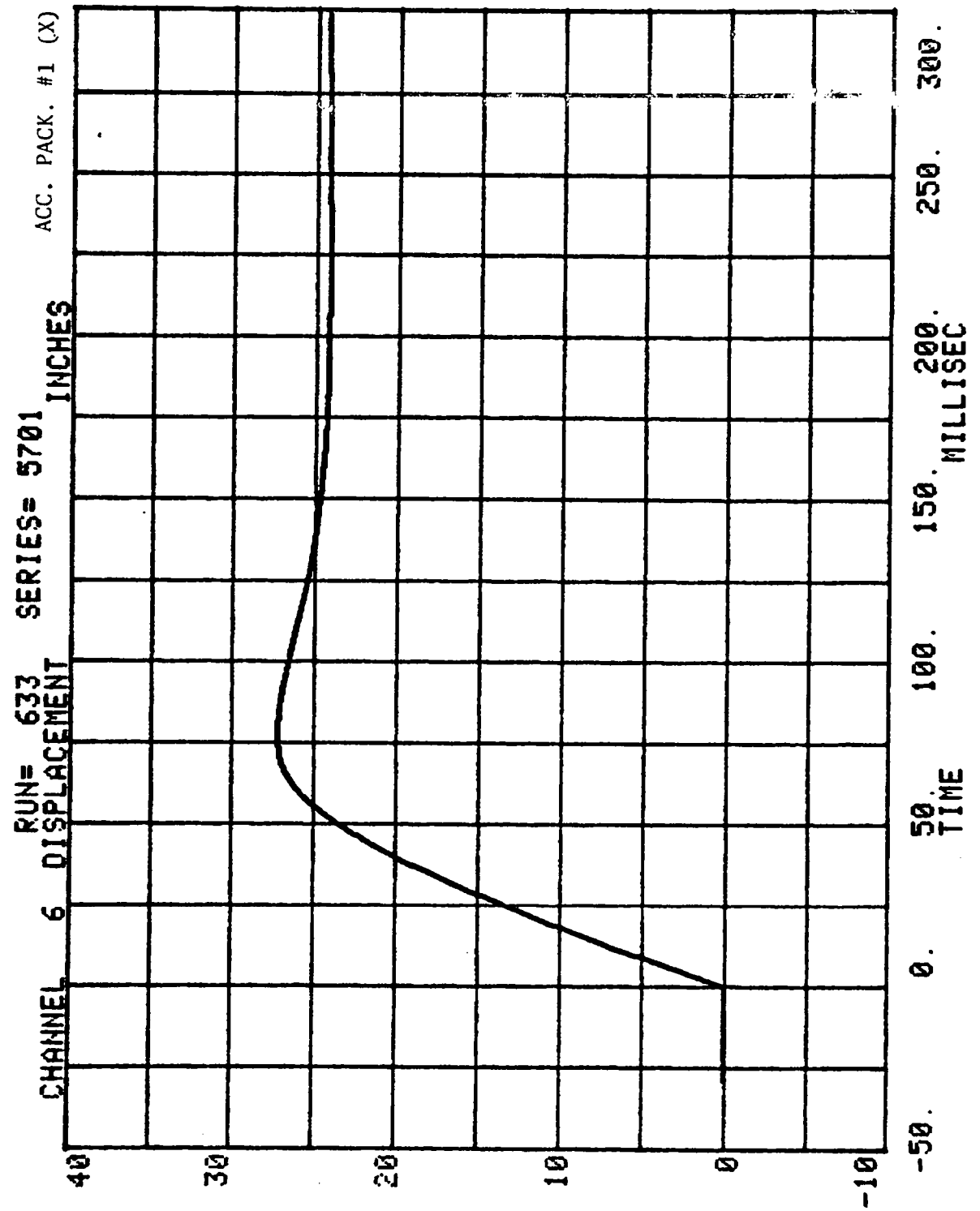
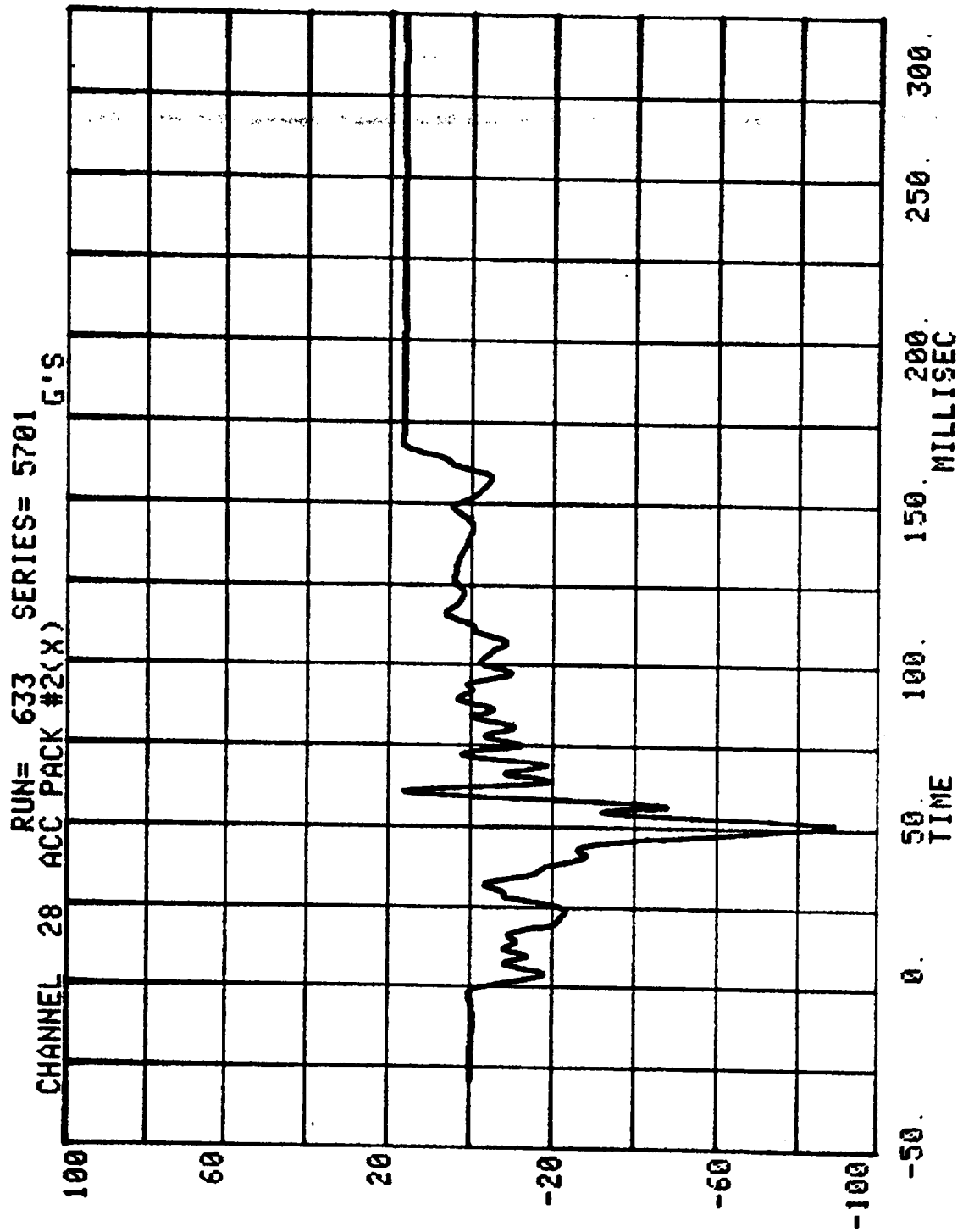
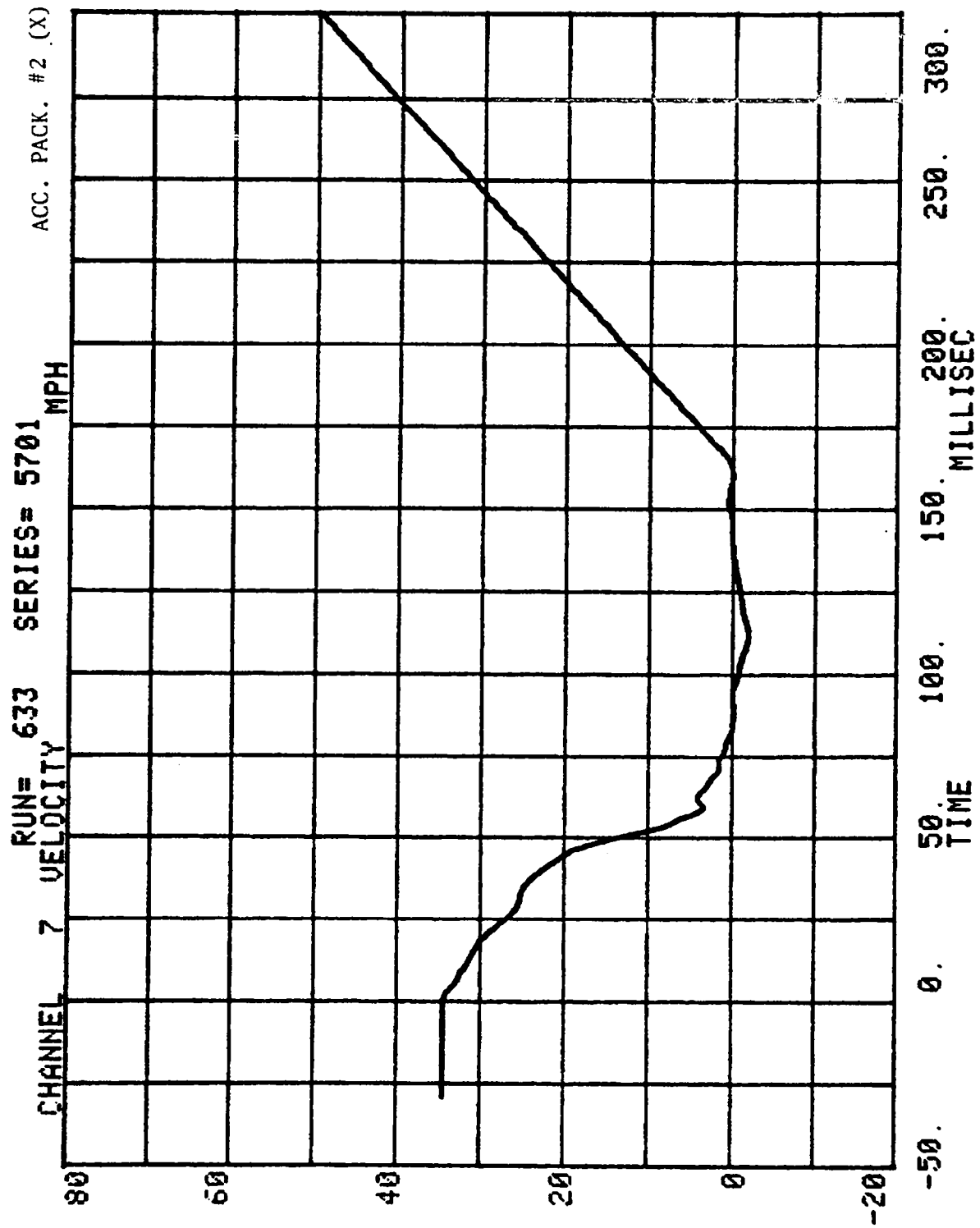
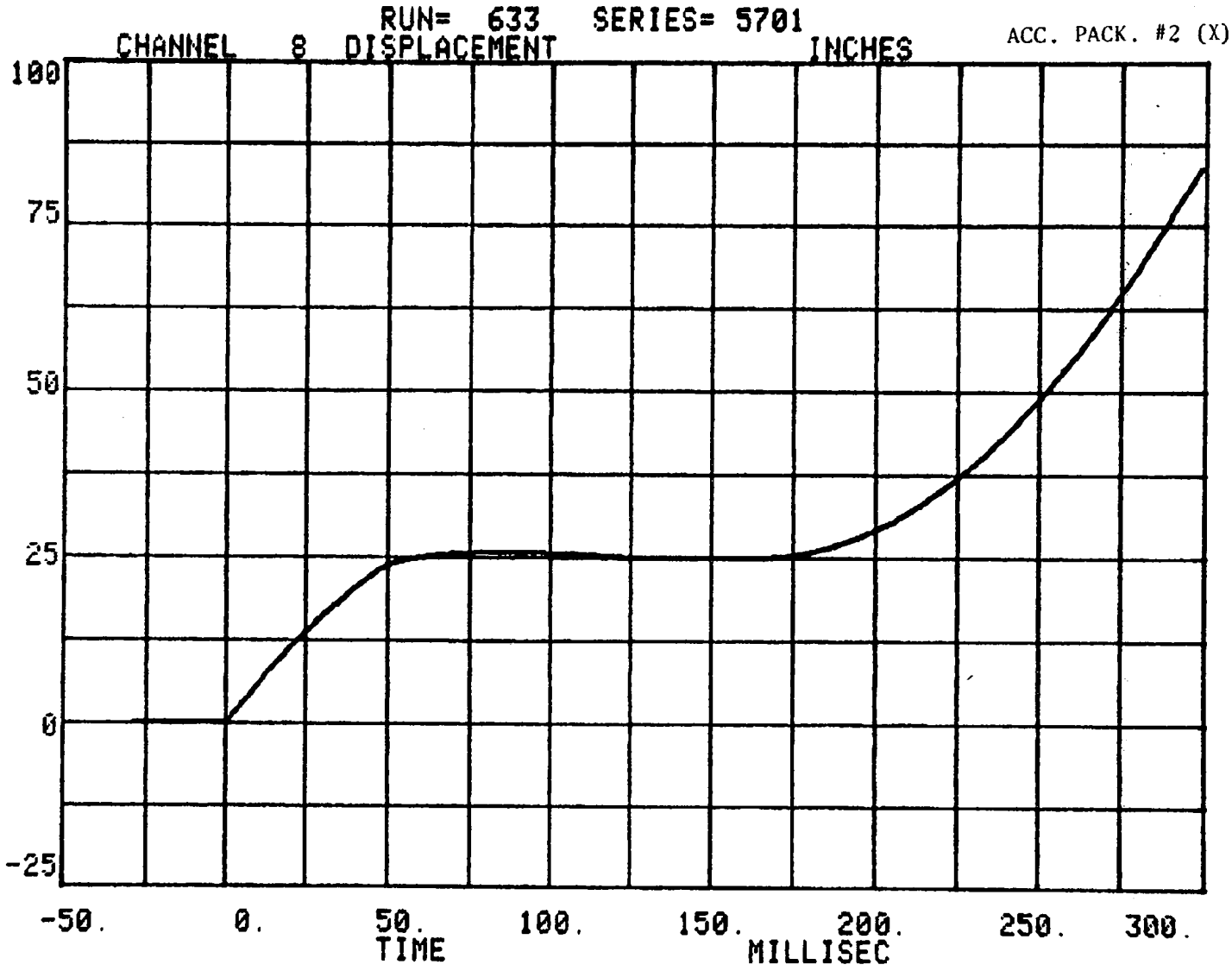

ACC. PACK. #1 (X)
CHANNEL 6 DISPLACEMENT
RUN= 633 SERIES= 5701
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

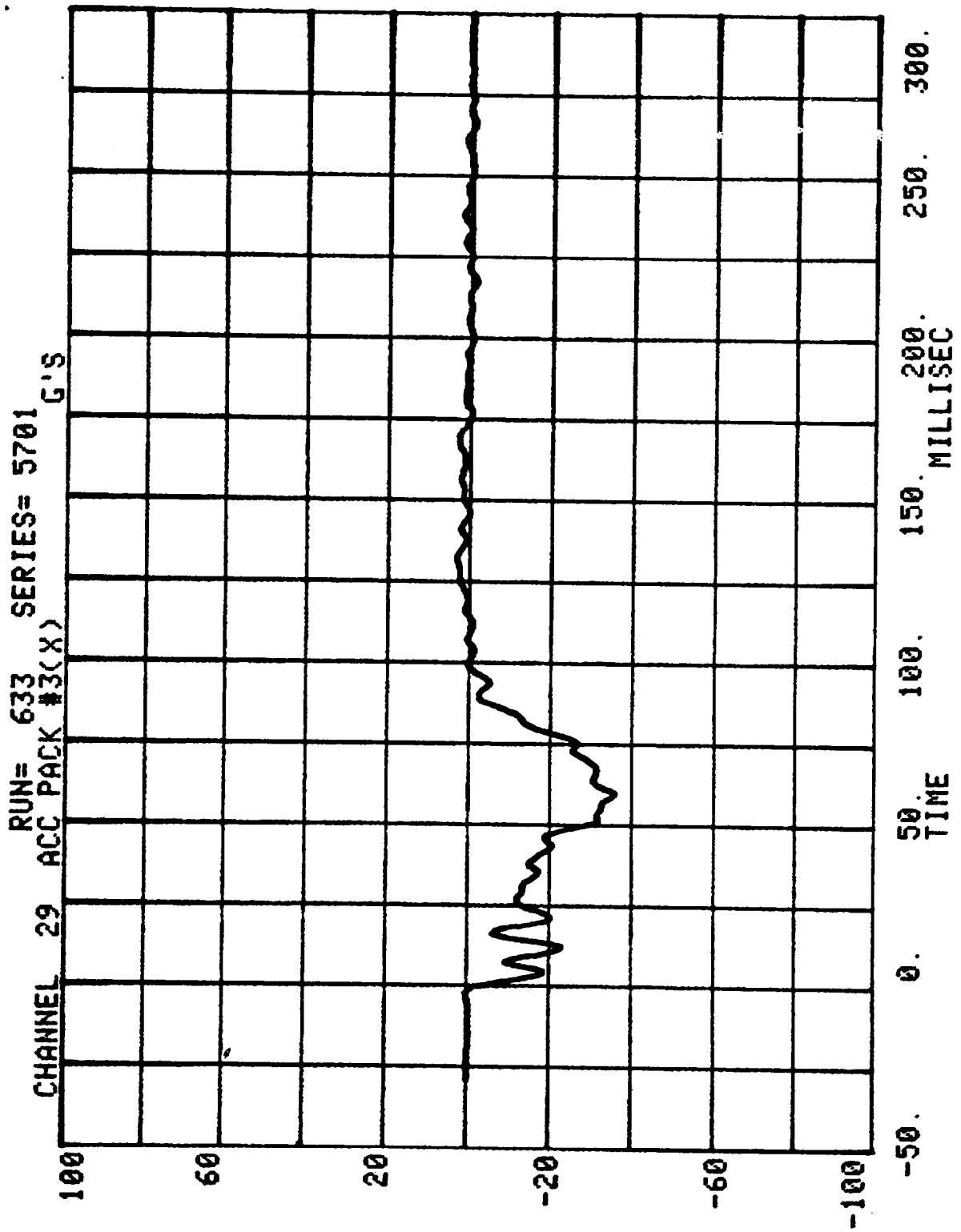
7103-V-26

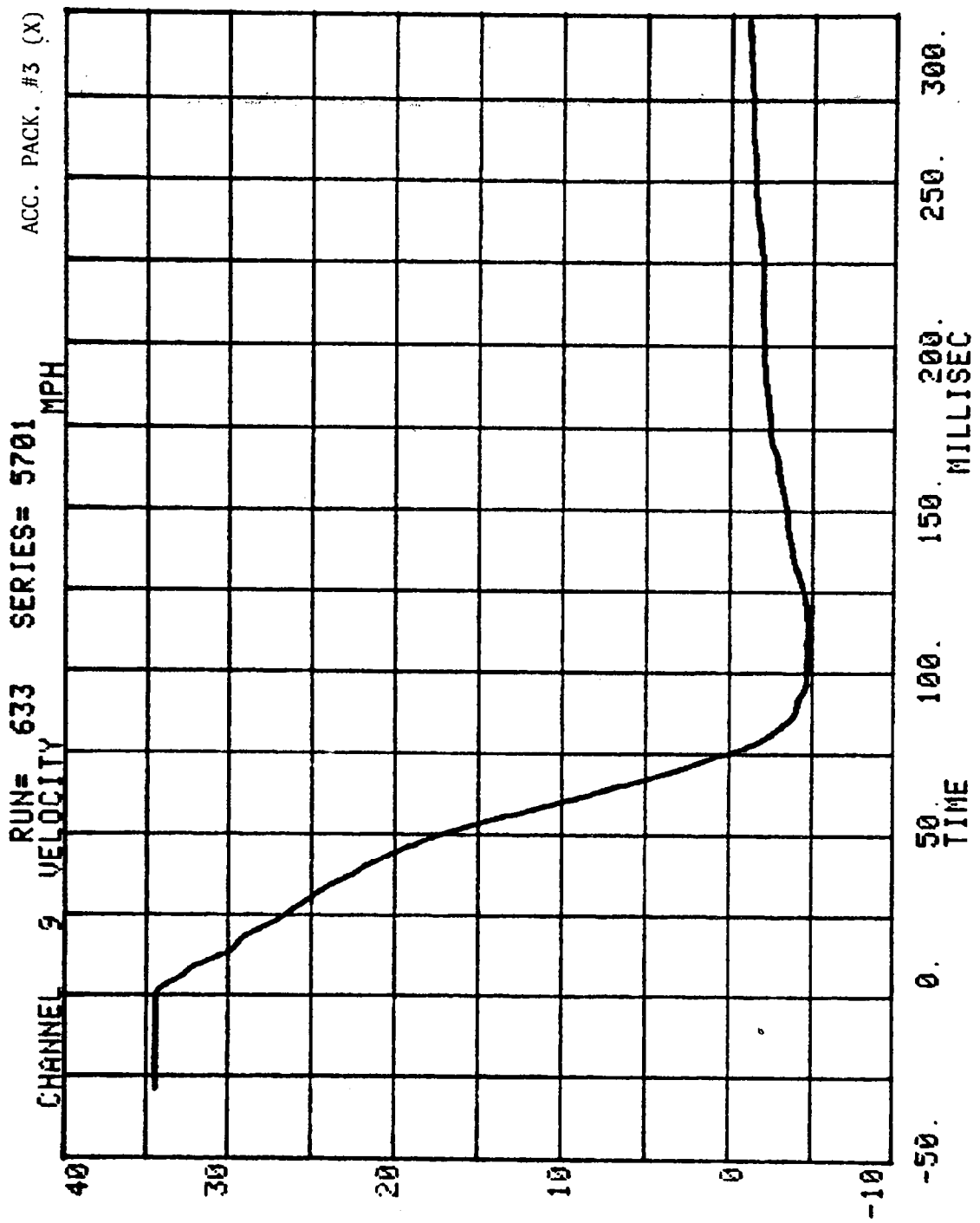

CHANNEL 28 ACC PACK #2(X)
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7103-V-26


ACC. PACK. #2 (X)
CHANNEL 7 VELOCITY
RUN= 633 SERIES= 5701
MPH
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 8 DISPLACEMENT INCHES
ACC. PACK. #2 (X)
100
75
50
25
0
-25
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC


CHANNEL 29 ACC PACK #3(X)
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC. PACK. #3 (X)
CHANNEL 2 VELOCITY
RUN= 633 SERIES= 5701
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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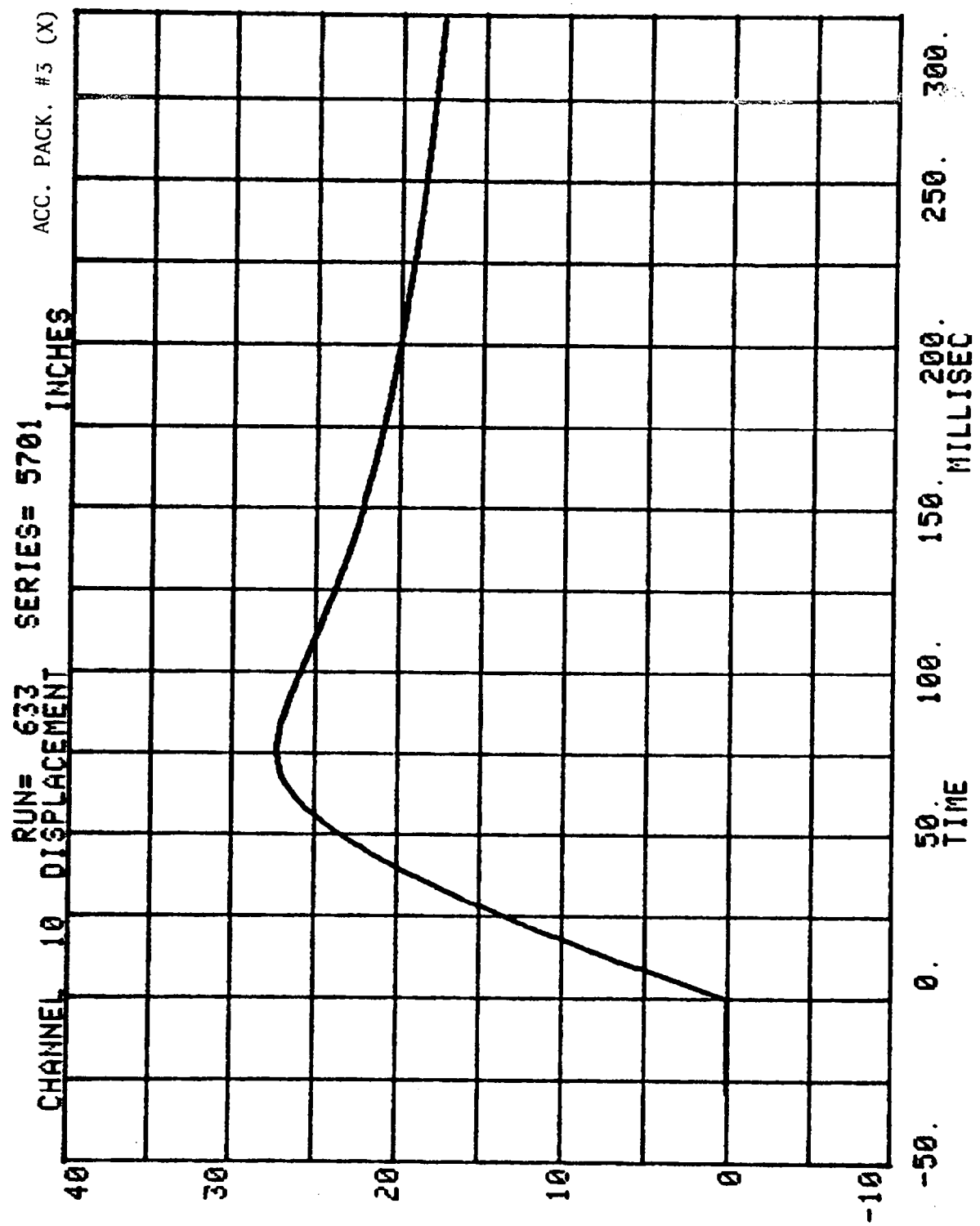
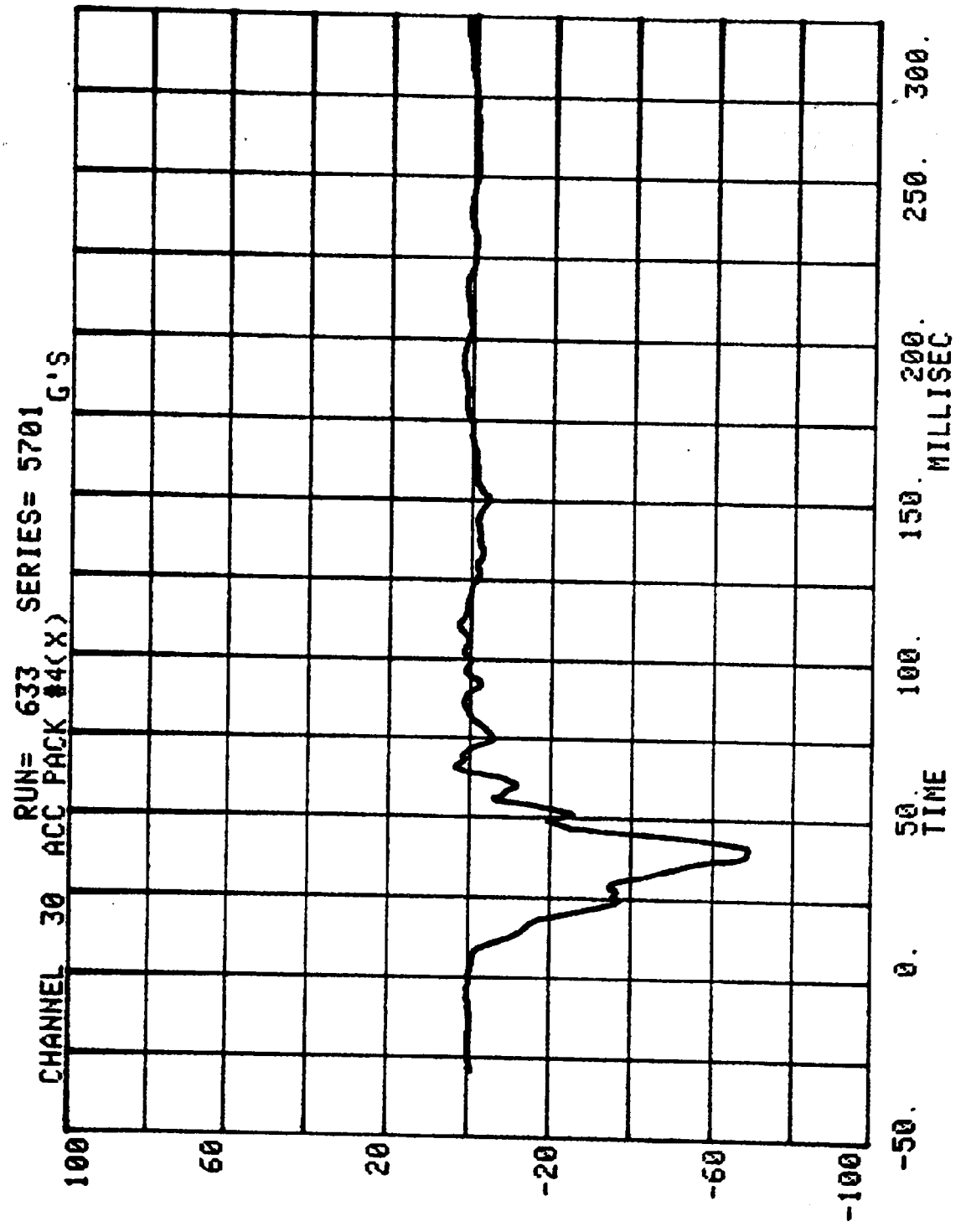

ACC. PACK. #5 (X)
CHANNEL 10 DISPLACEMENT
RUN= 633 SERIES= 5701
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 30 ACC PACK #4(X)
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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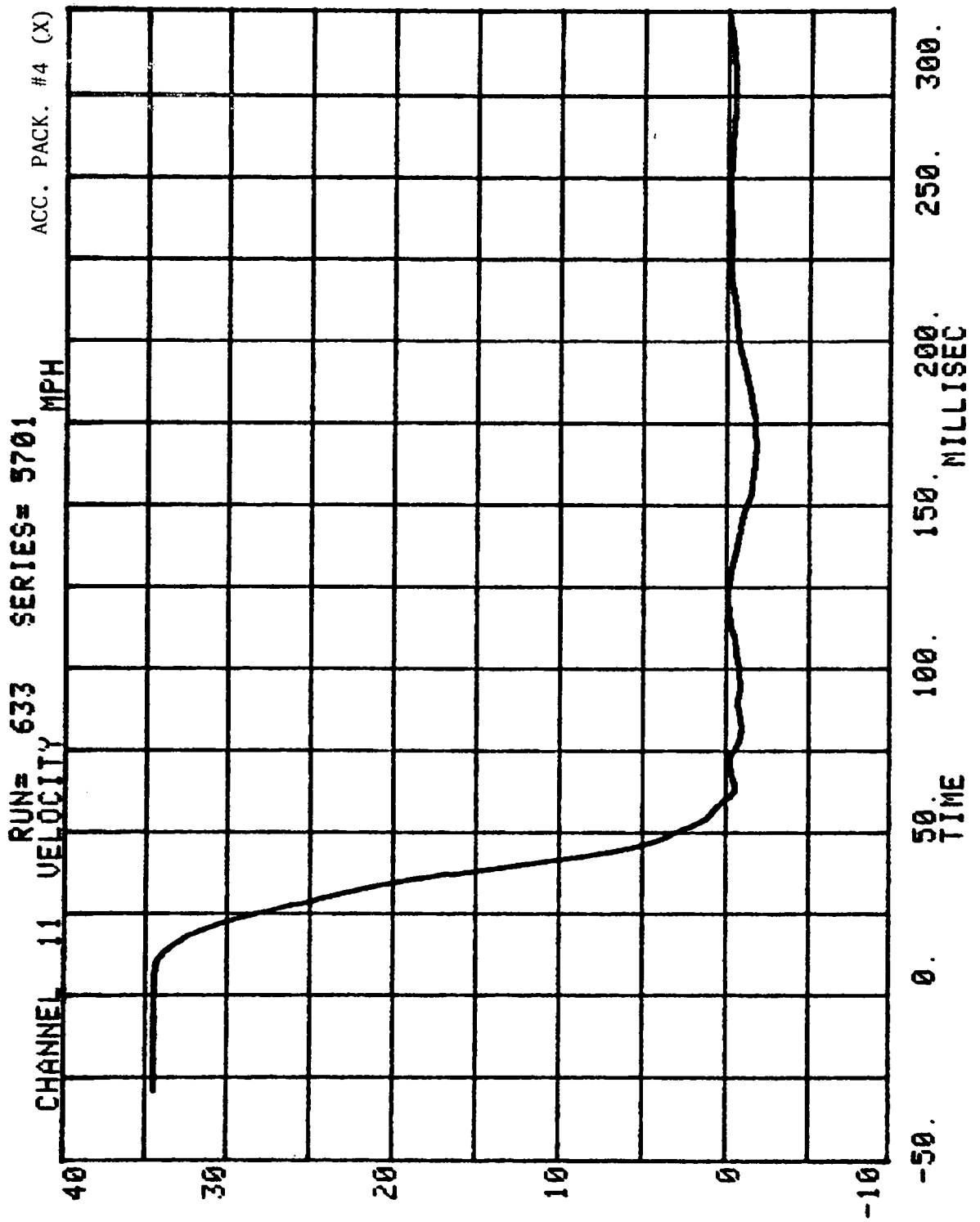
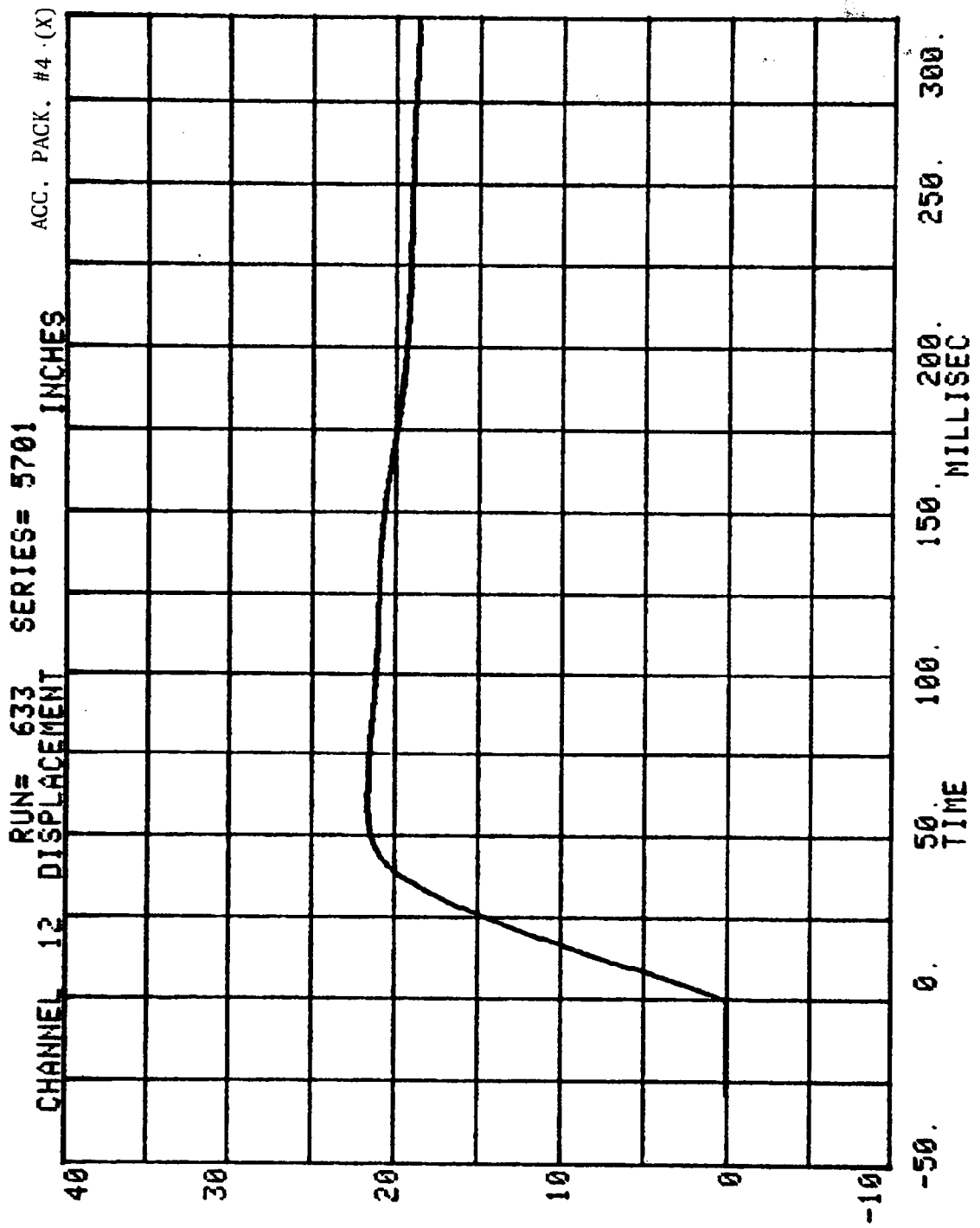
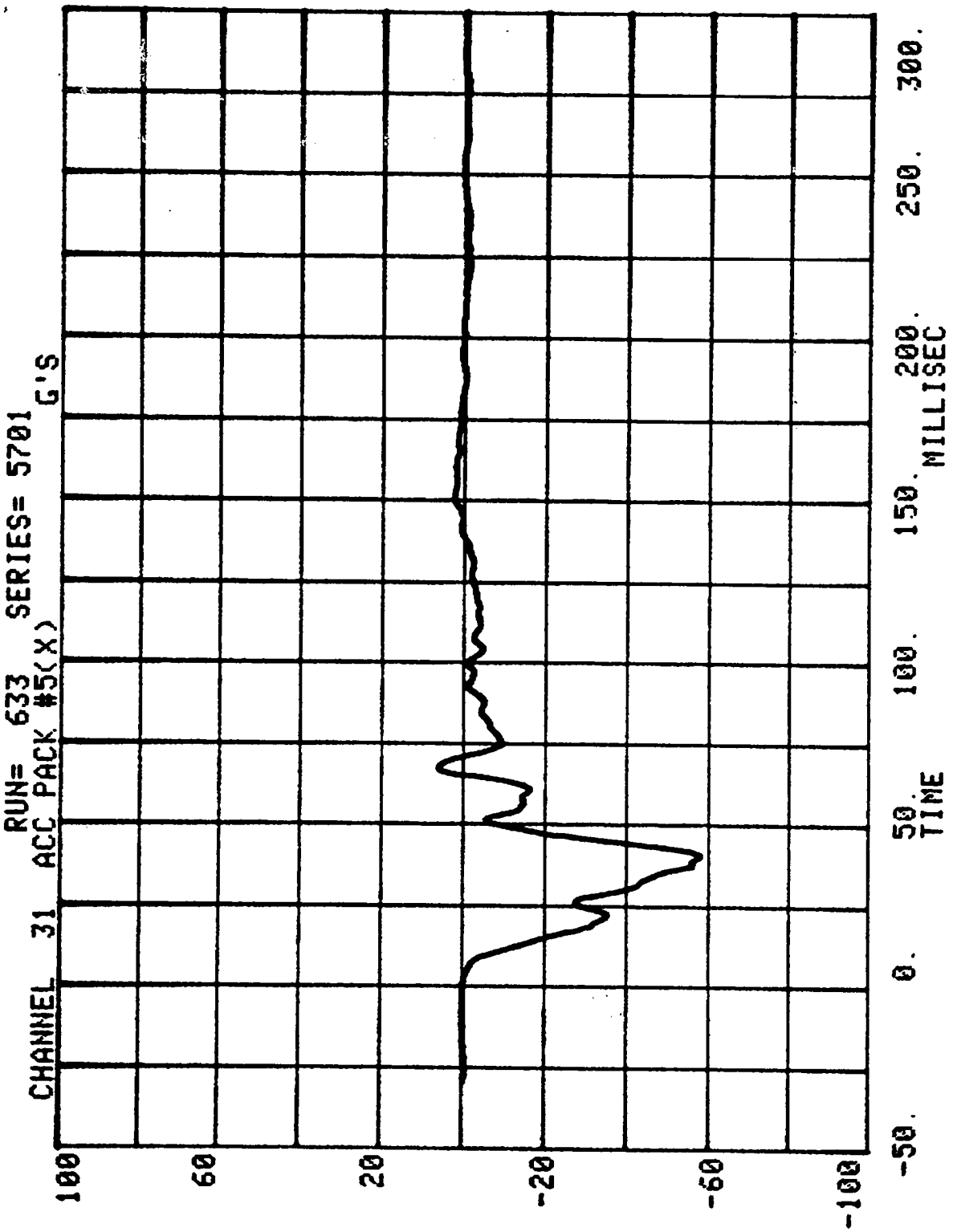
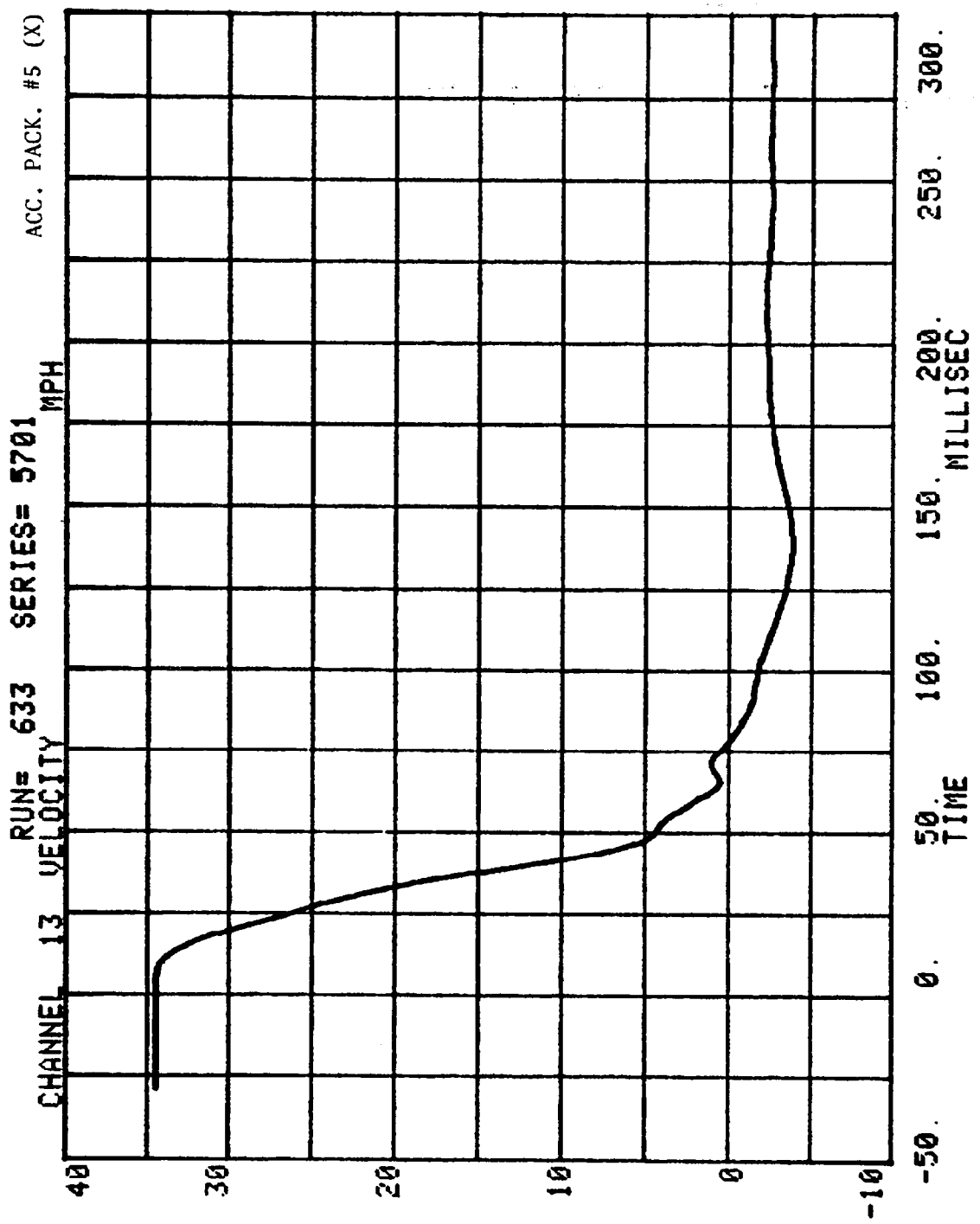
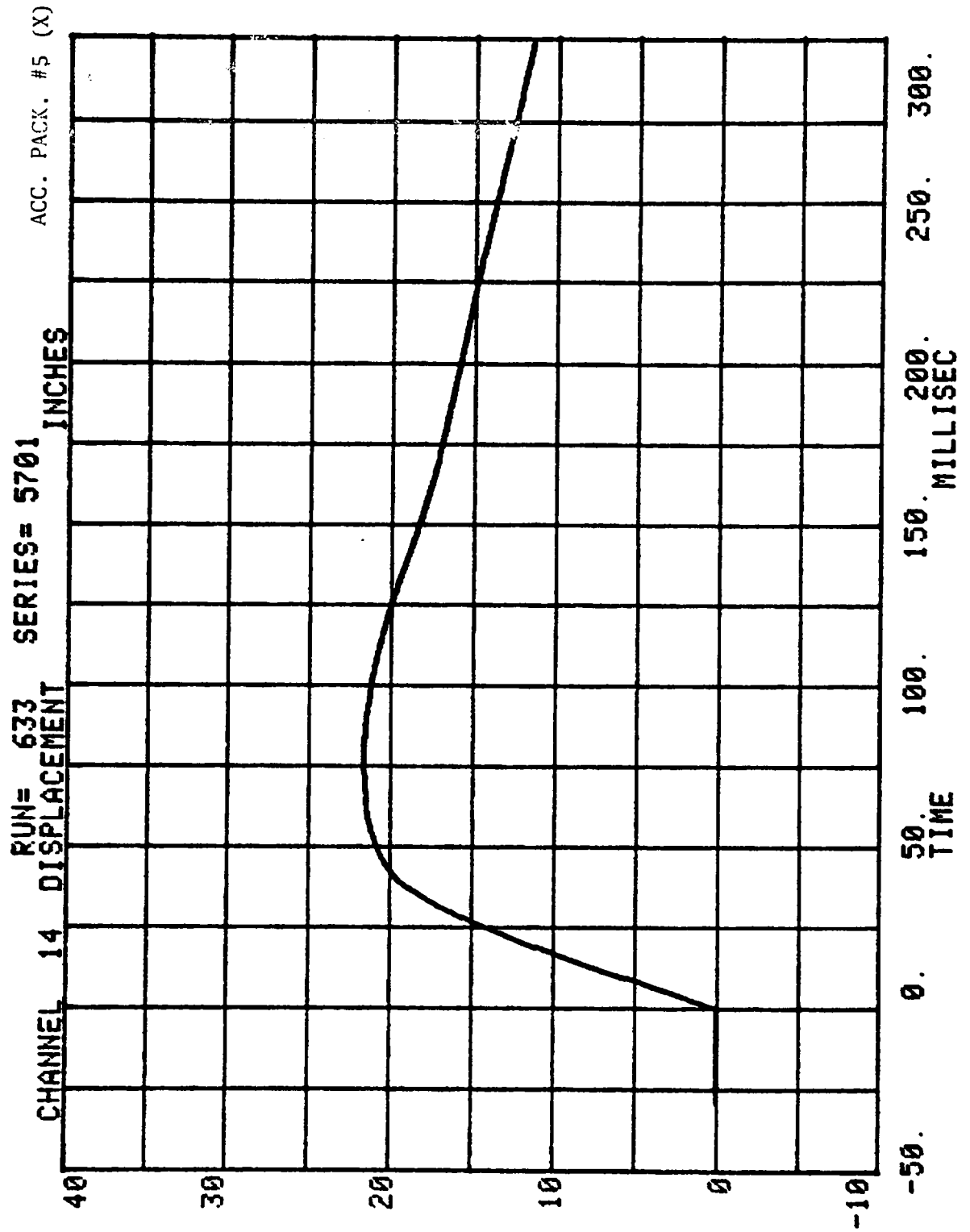

ACC. PACK. #4 (X)
RUN= 633 SERIES= 5701
CHANNEL 11 VELOCITY
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

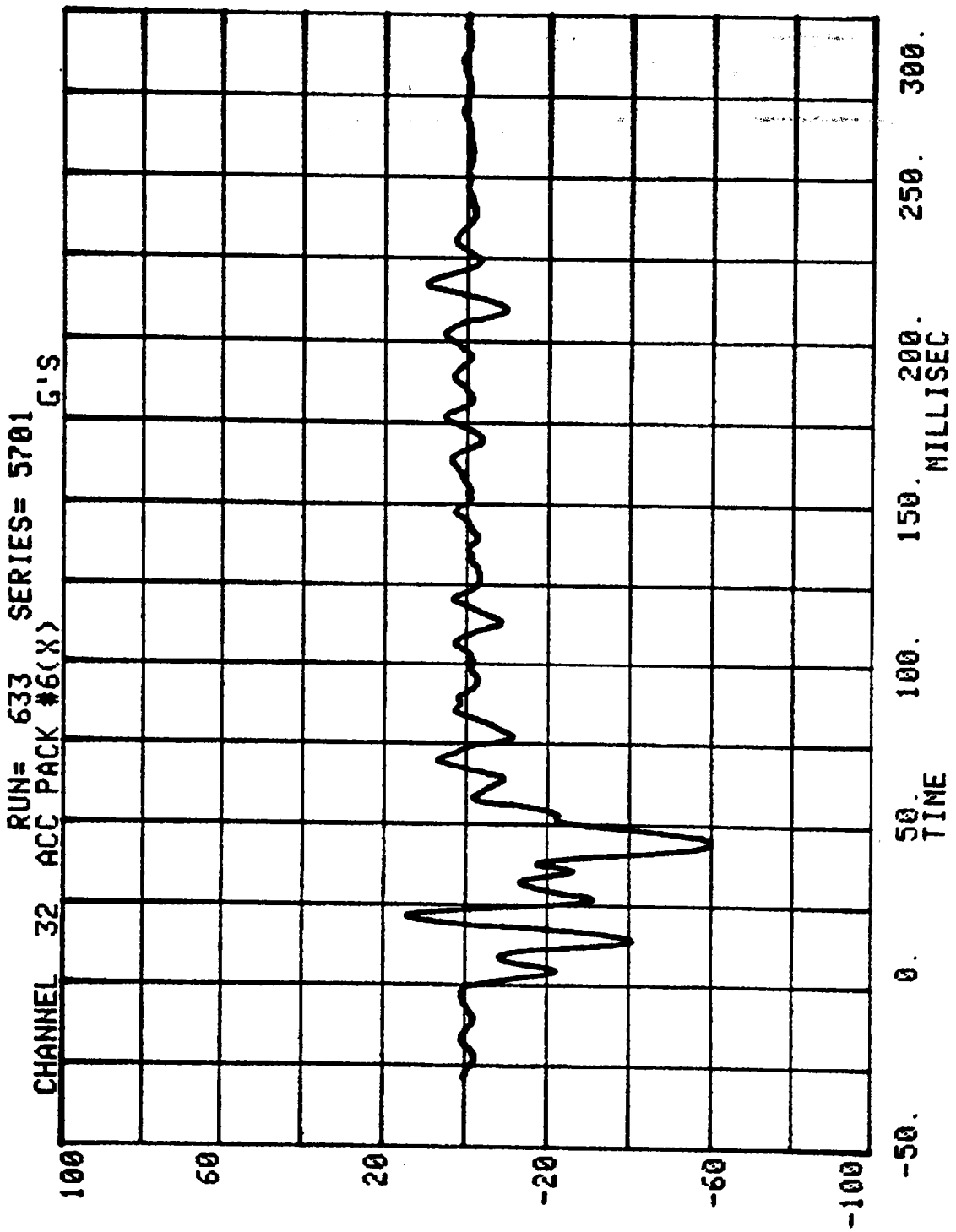

CHANNEL 12 DISPLACEMENT
RUN= 633 SERIES= 5701
INCHES
ACC. PACK. #4 (X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7103-V-26


CHANNEL 31 ACC PACK #5(X)
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC. PACK. #5 (X)
CHANNEL 13 VELOCITY
RUN= 633 SERIES= 5701
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC. PACK. #5 (X)
CHANNEL 14 DISPLACEMENT
RUN= 633 SERIES= 5701
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 32 ACC PACK #6(X)
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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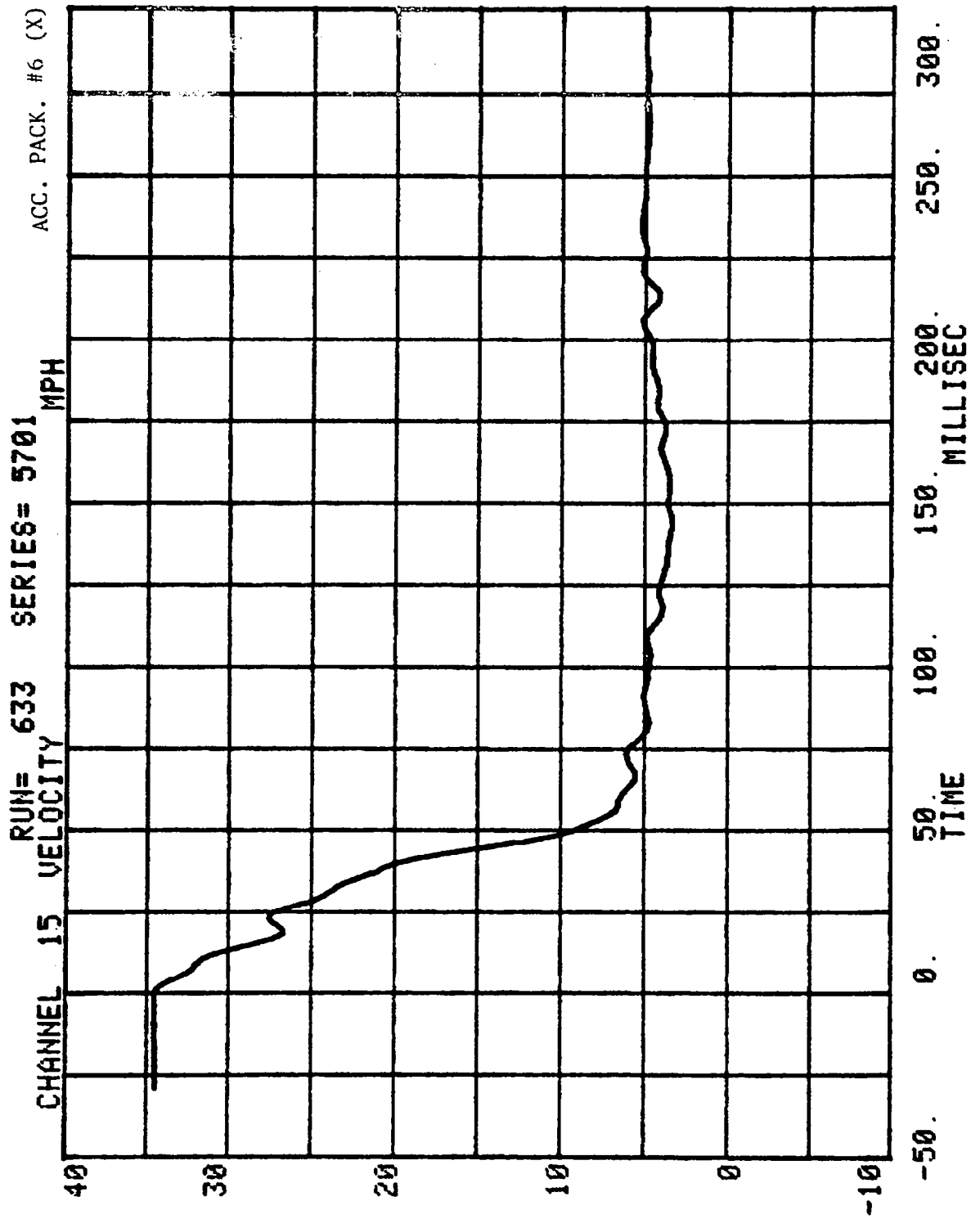
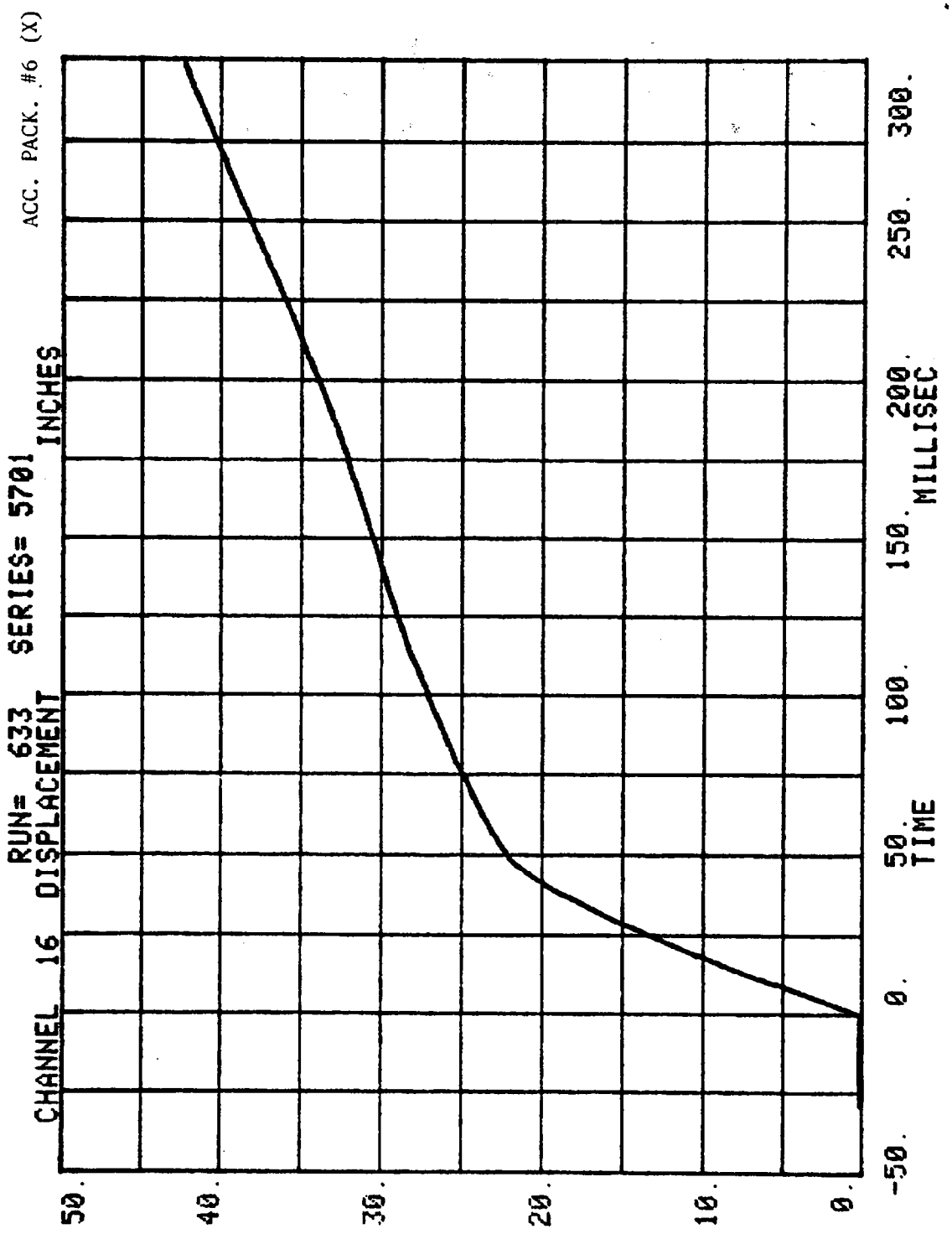
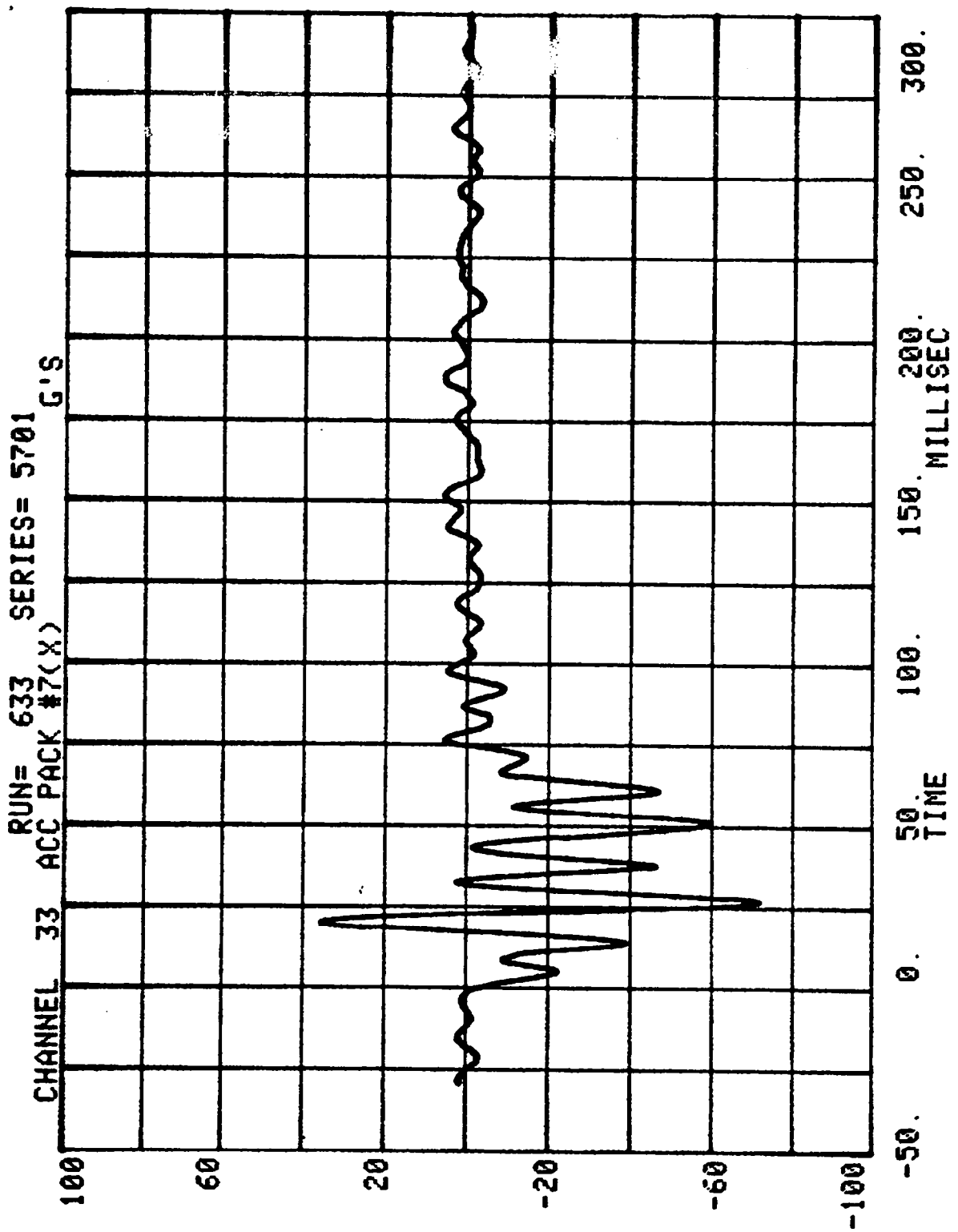
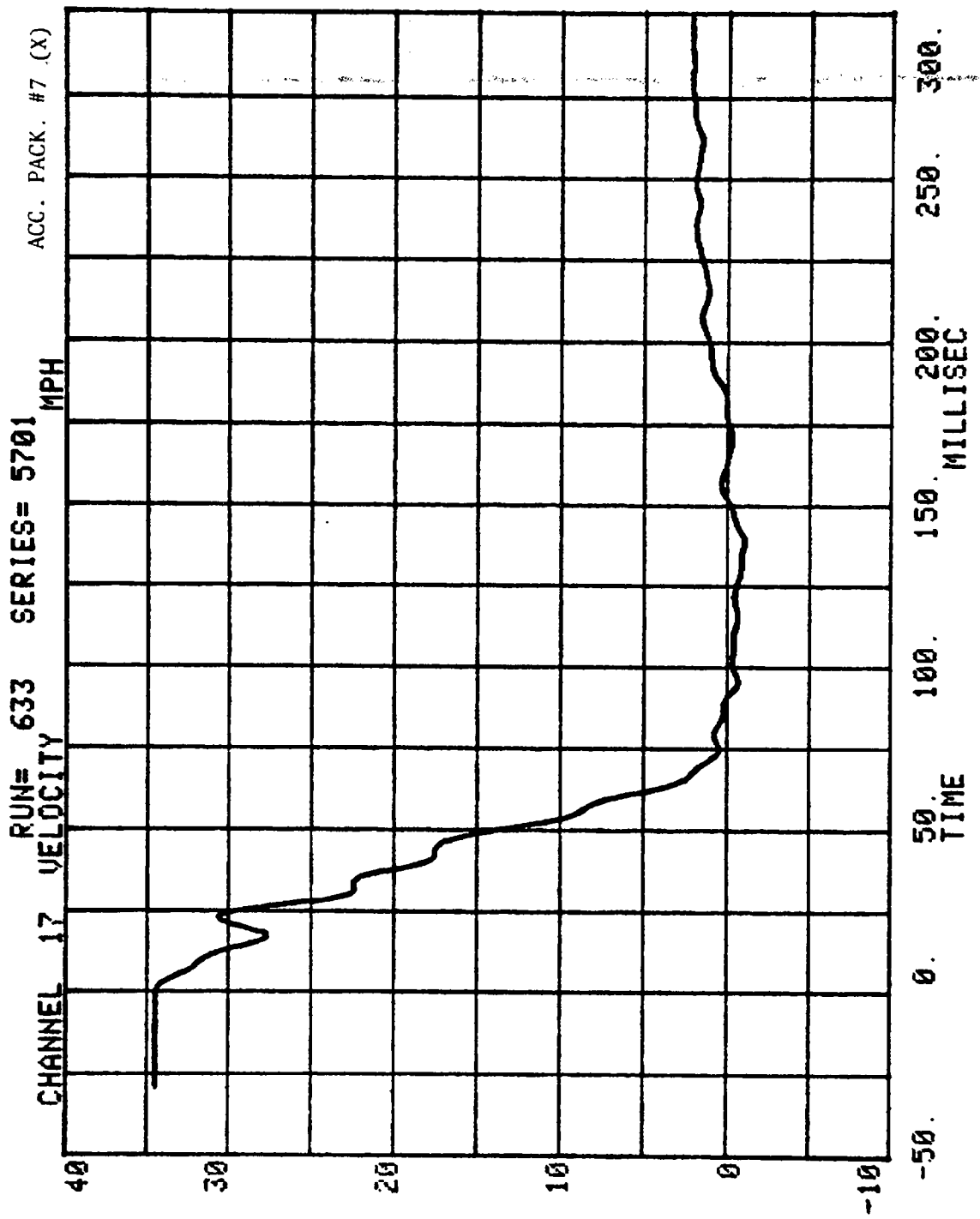
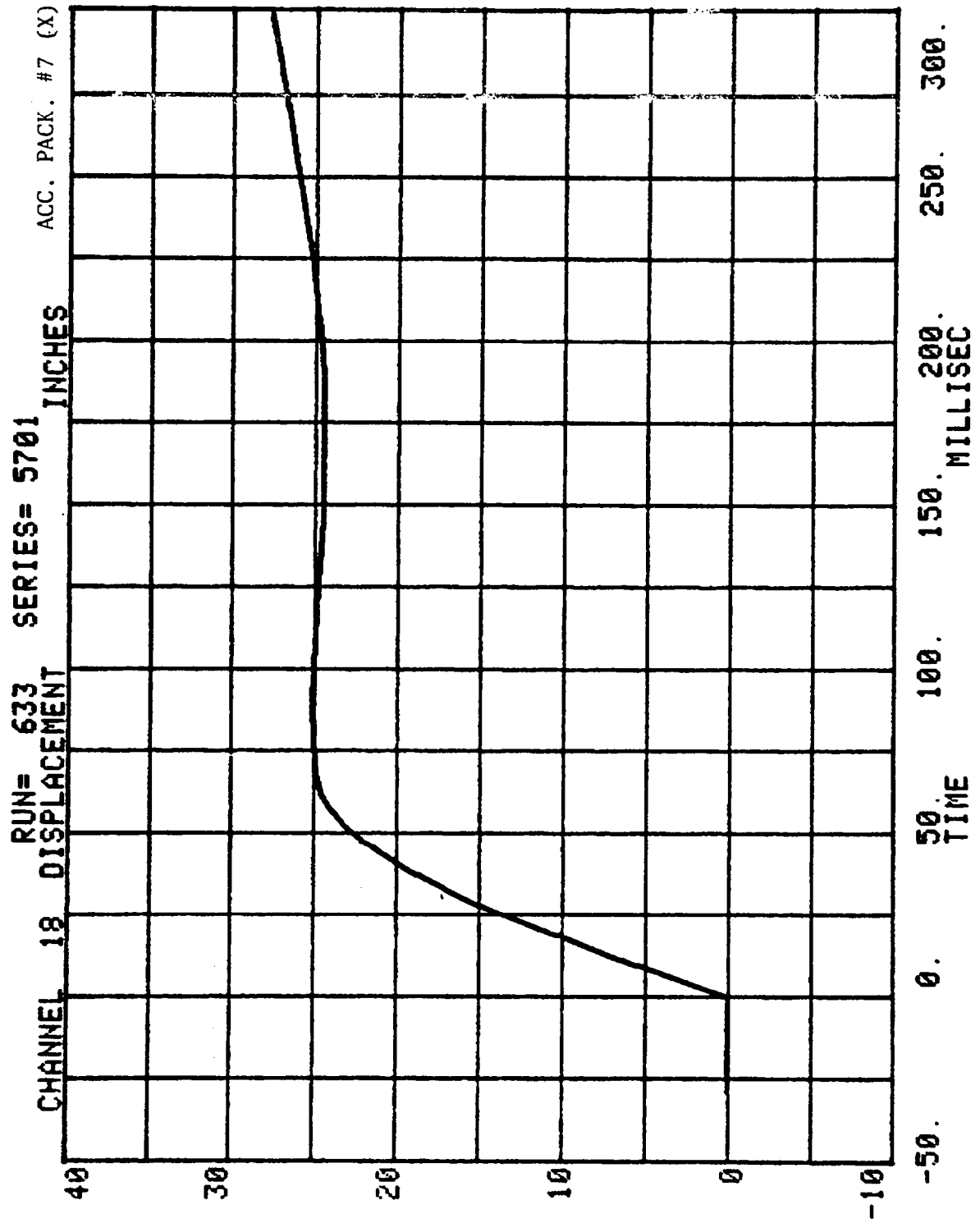

ACC. PACK. #6 (X)
CHANNEL 15 VELOCITY
RUN= 633 SERIES= 5701
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC. PACK. #6 (X)
CHANNEL 16 DISPLACEMENT
RUN= 633 SERIES= 5701
INCHES
50.
40.
30.
20.
10.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 33 ACC PACK #7(X)
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

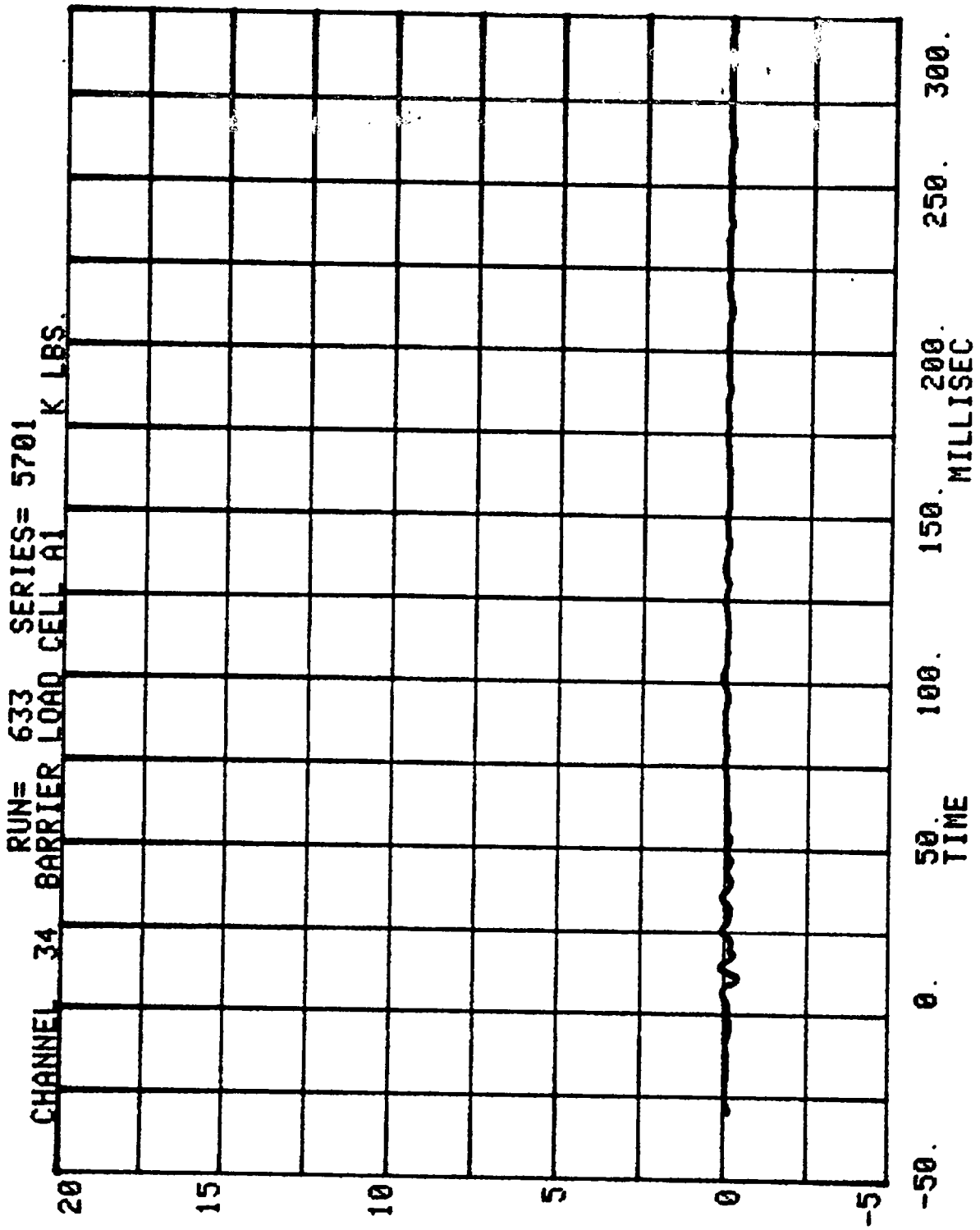

CHANNEL 17 VELOCITY
RUN= 633 SERIES= 5701
ACC. PACK. #7 (X)
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

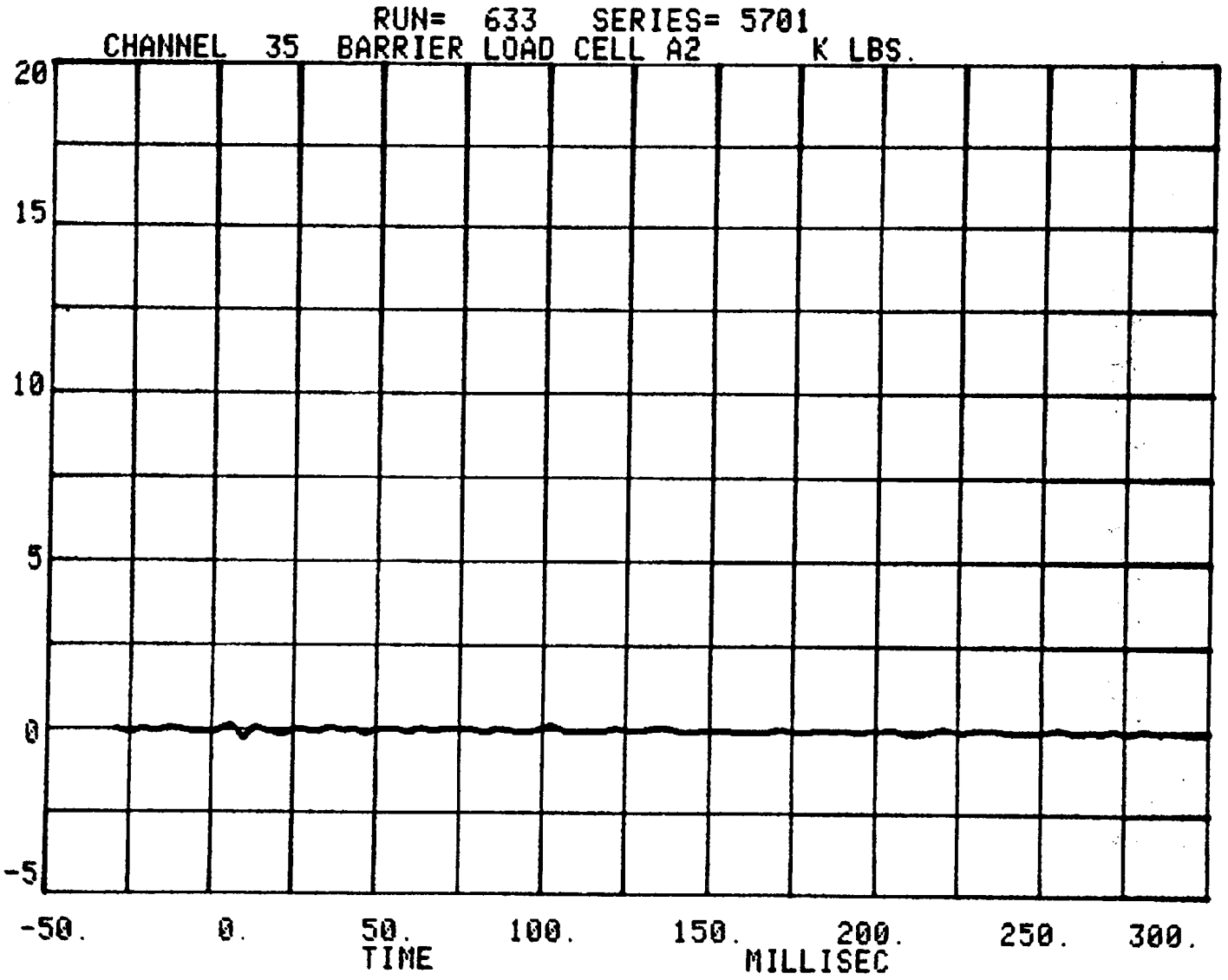

CHANNEL 18 DISPLACEMENT
RUN= 633 SERIES= 5701
INCHES
ACC. PACK. #7 (X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

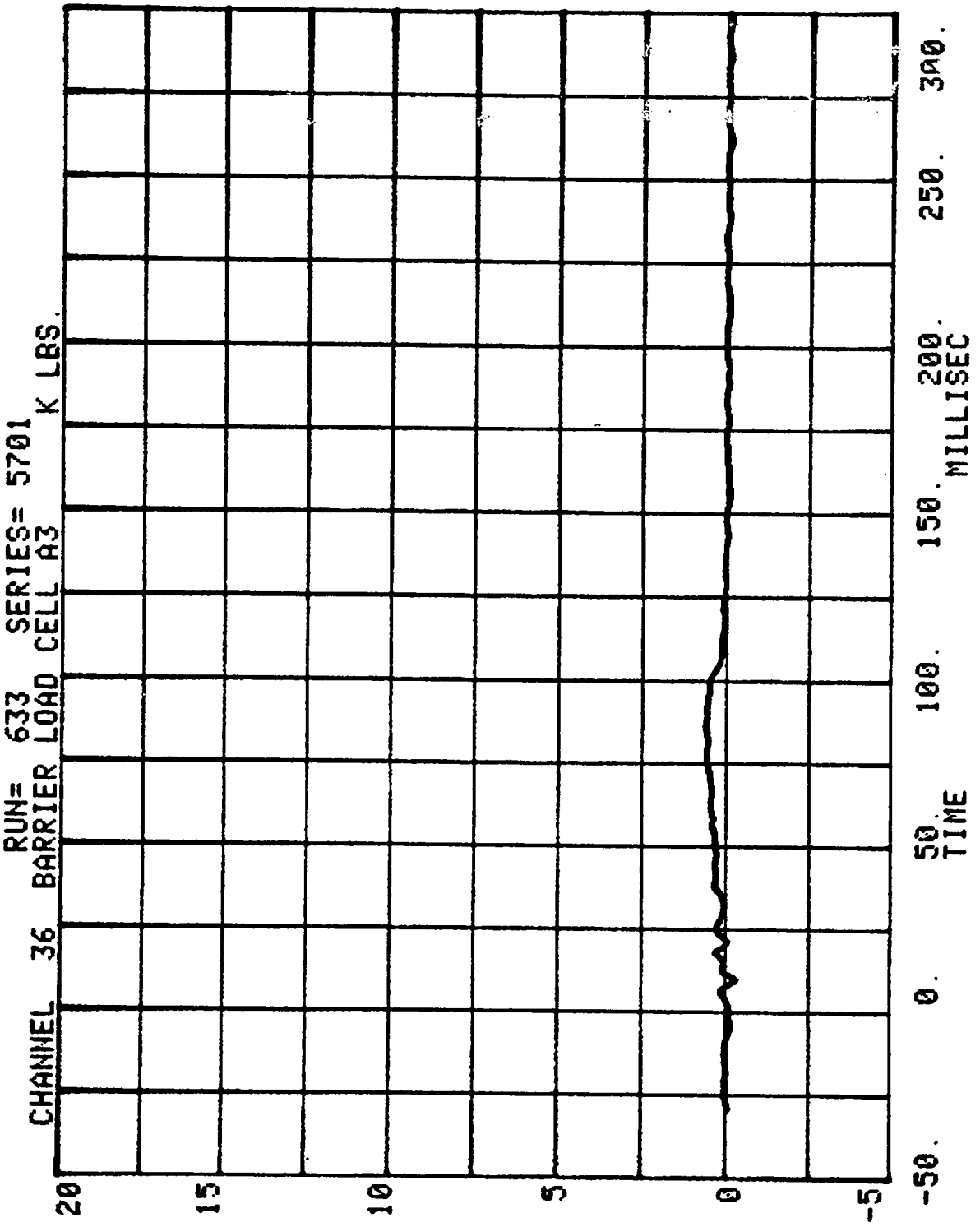
TEST NO. ME5701

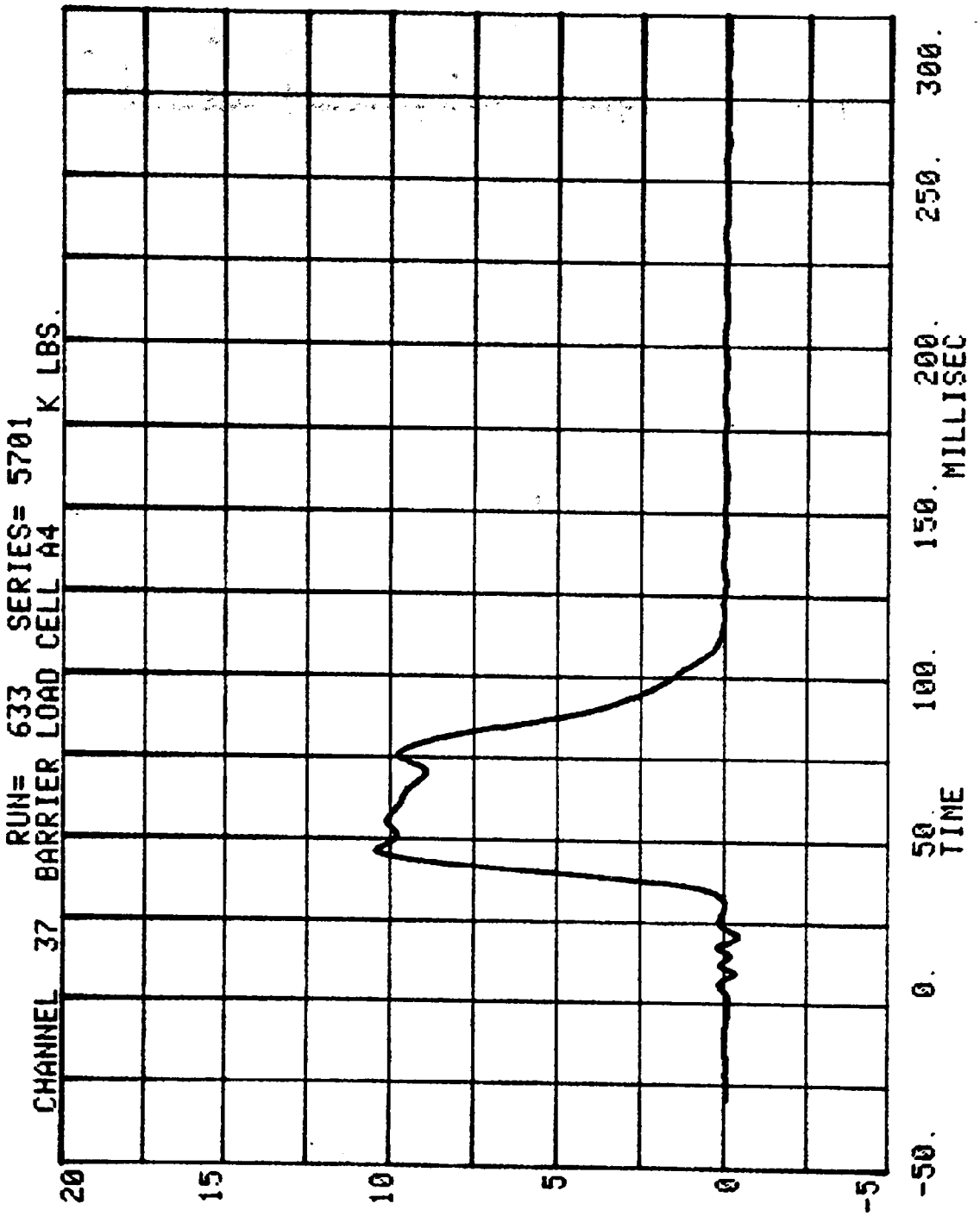
LOAD CELL BARRIER DATA
FILTER CHANNEL CLASS

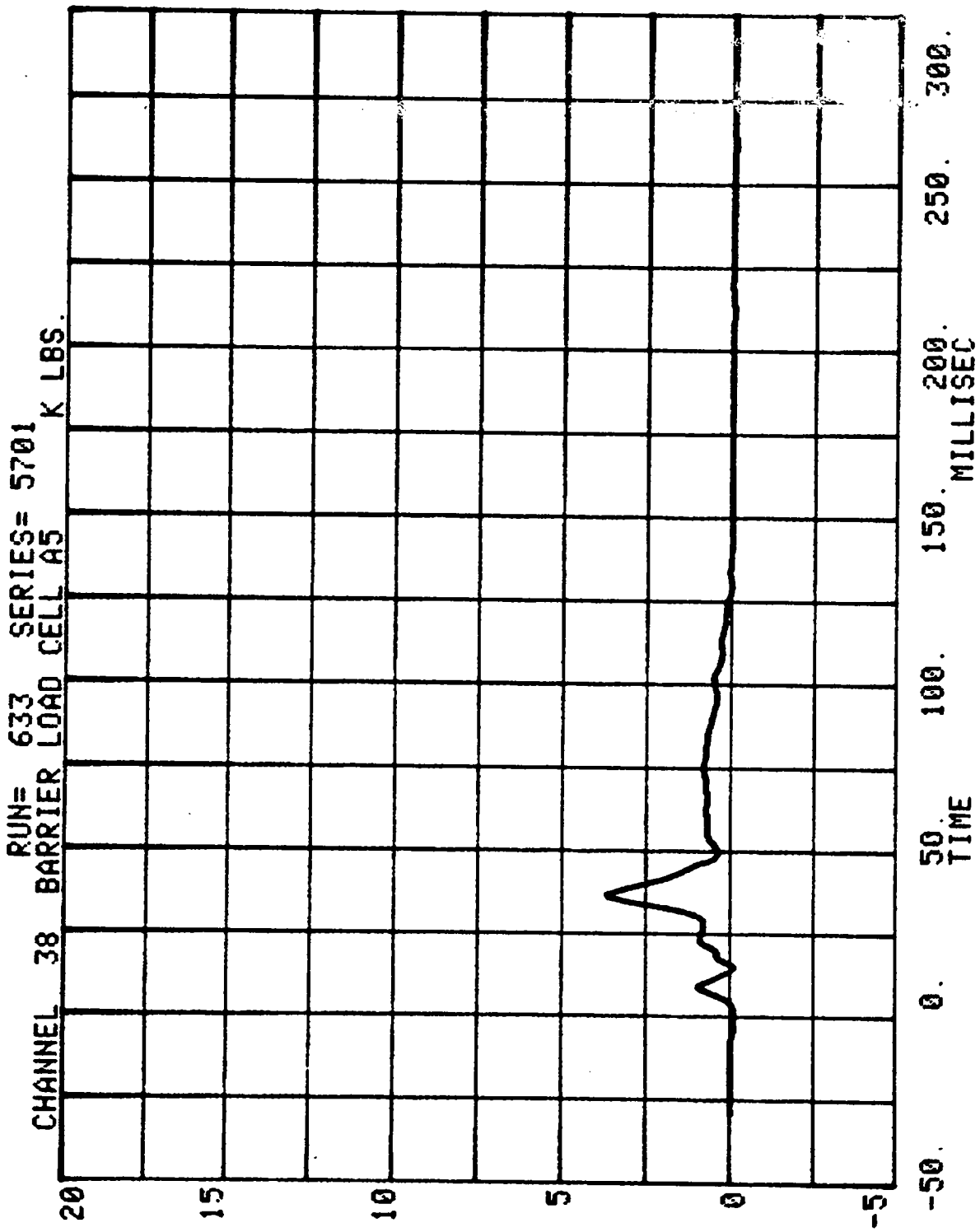
60

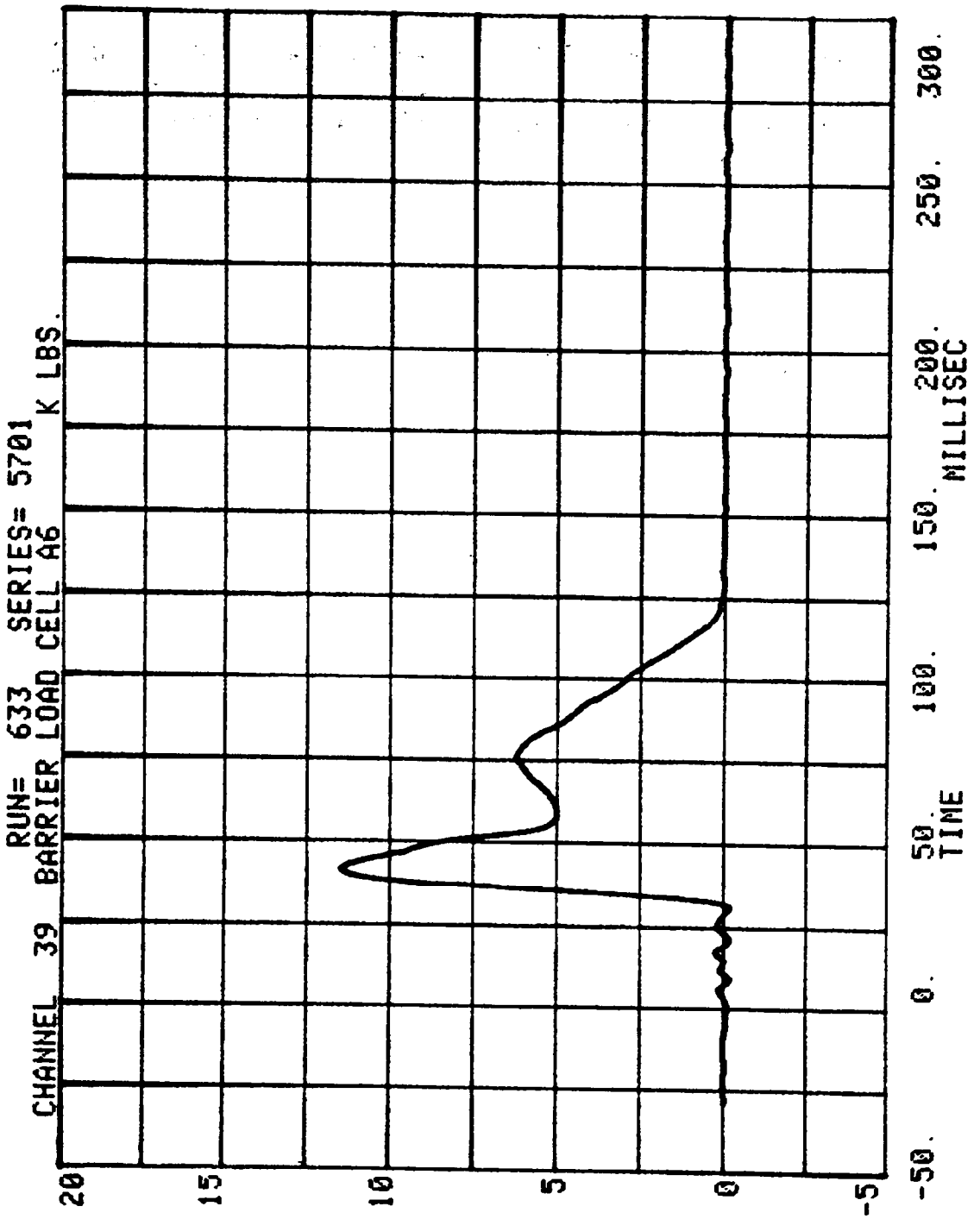

CHANNEL 34 RUN= 633 SERIES= 5701
BARRIER LOAD CELL A1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

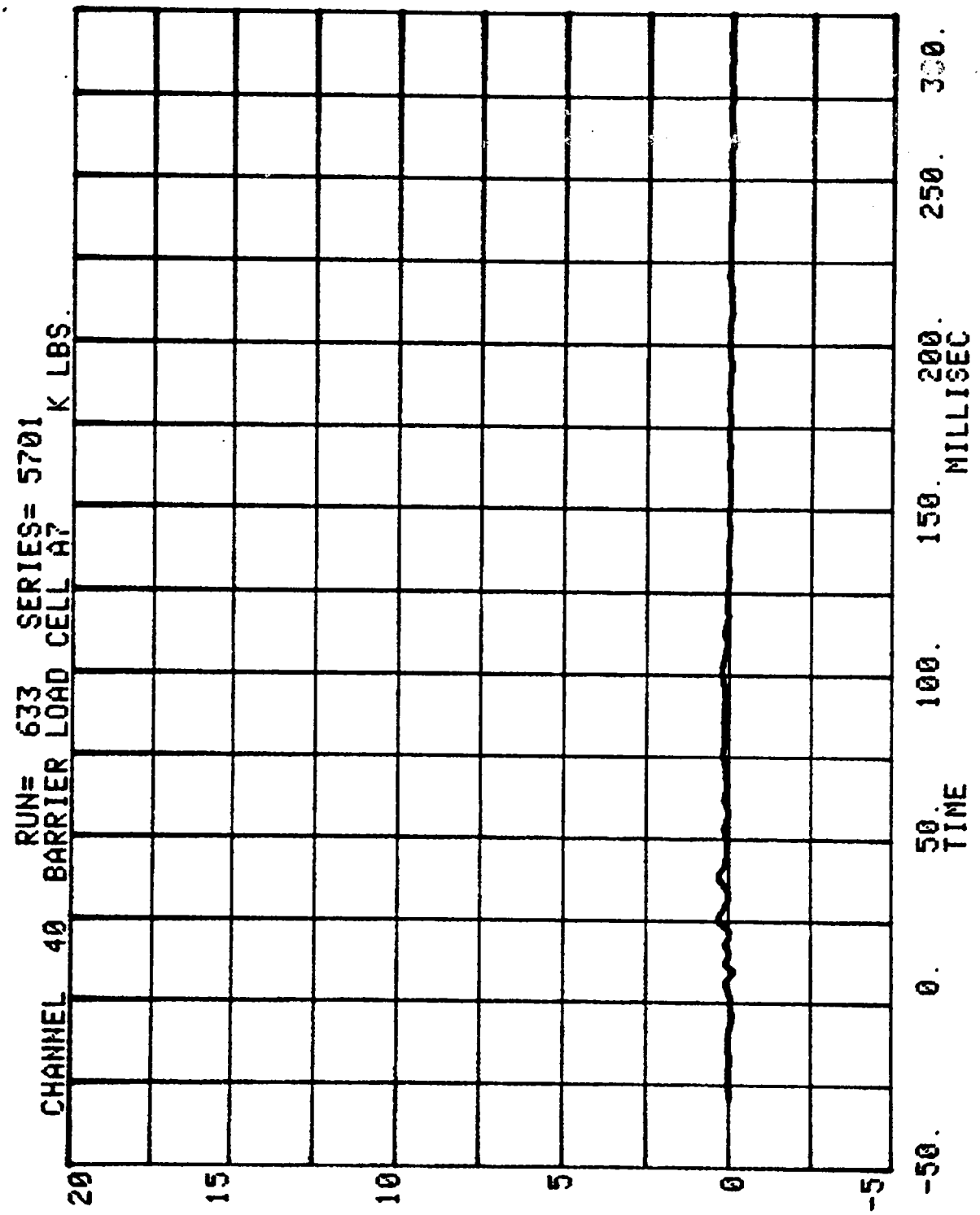

RUN= 633 SERIES= 5701
CHANNEL 35 BARRIER LOAD CELL A2 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

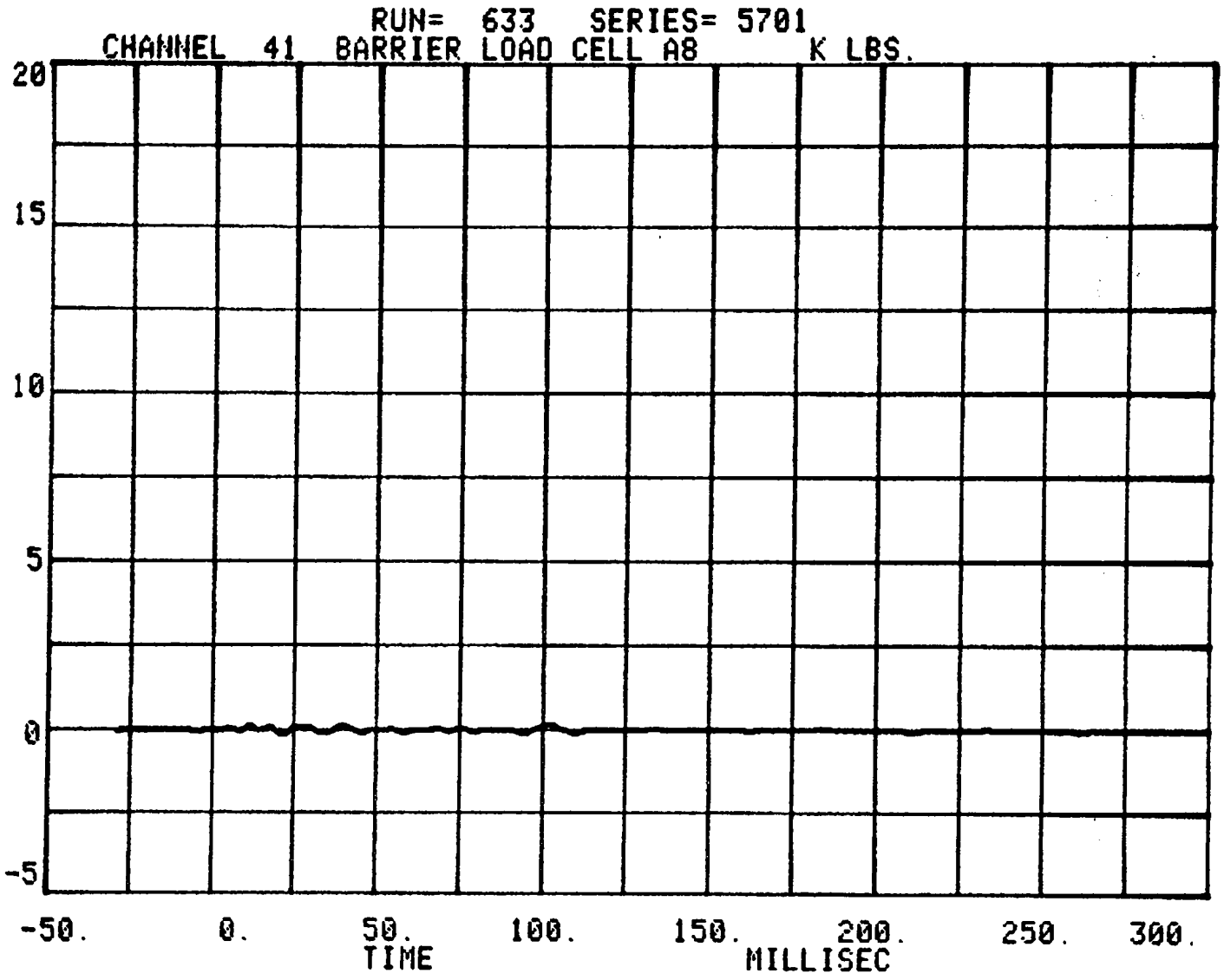

CHANNEL 36 BARRIER LOAD CELL A3
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

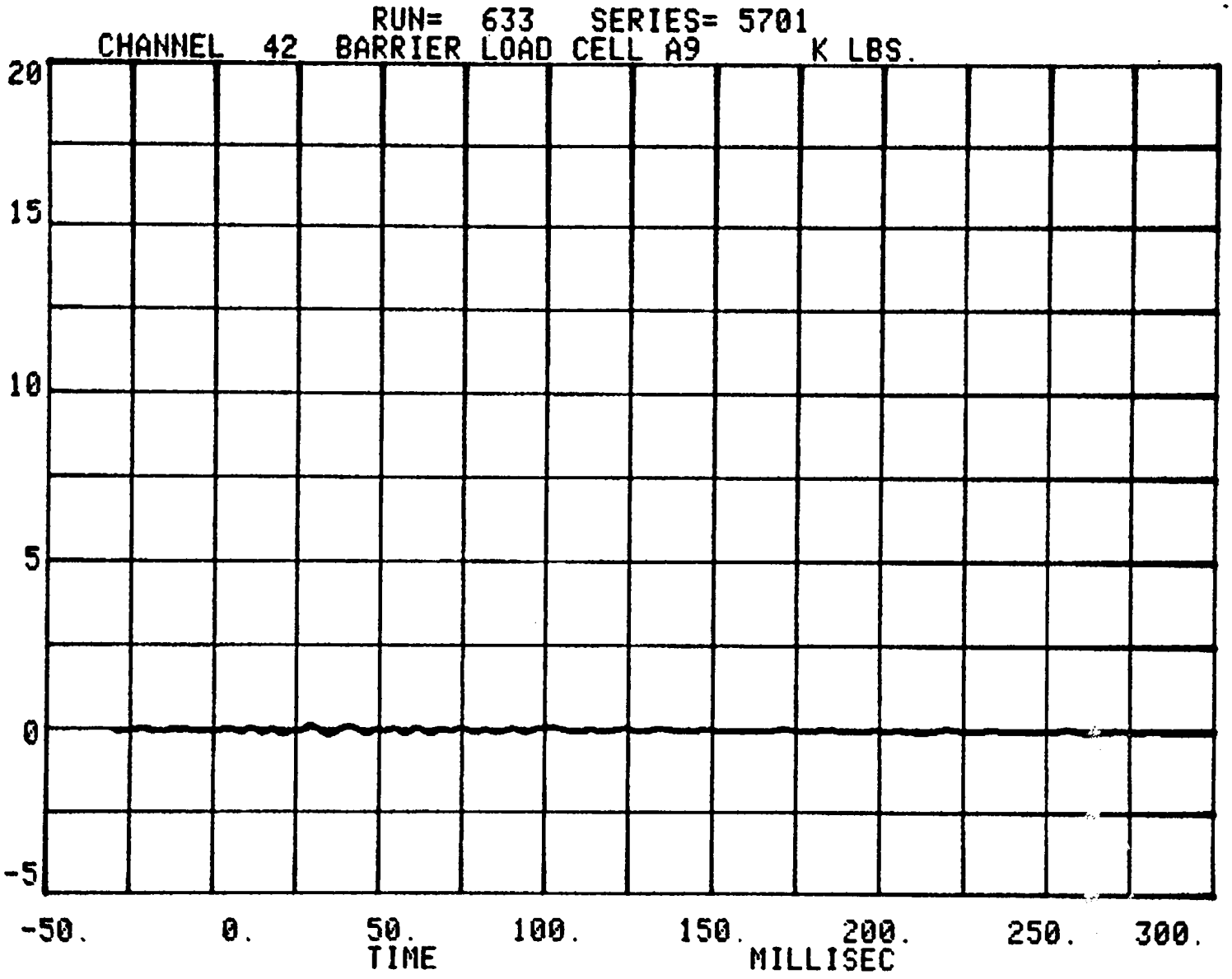

CHANNEL 37
RUN= 633 SERIES= 5701
BARRIER LOAD CELL A4
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

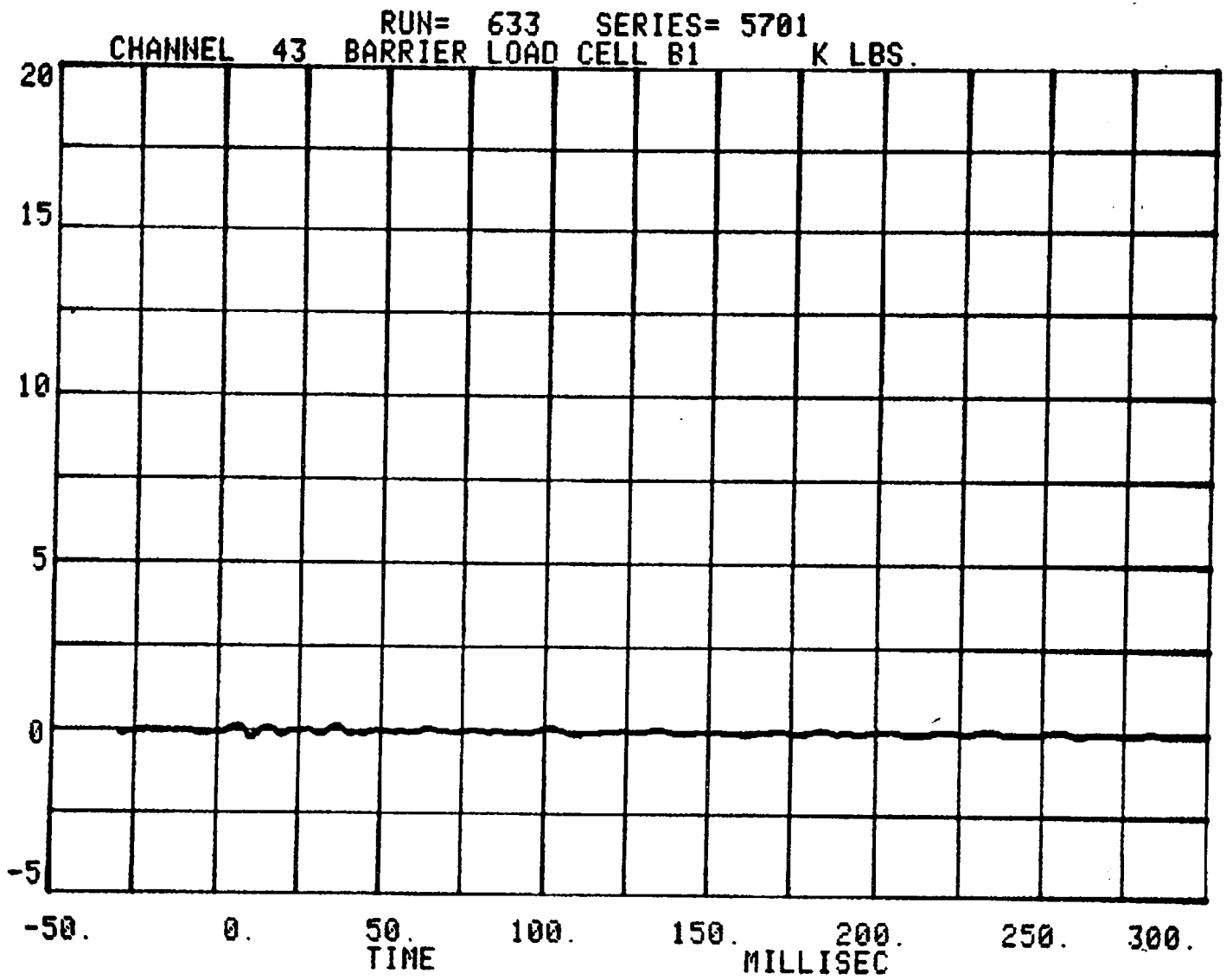

CHANNEL 38 BARRIER LOAD CELL A5
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

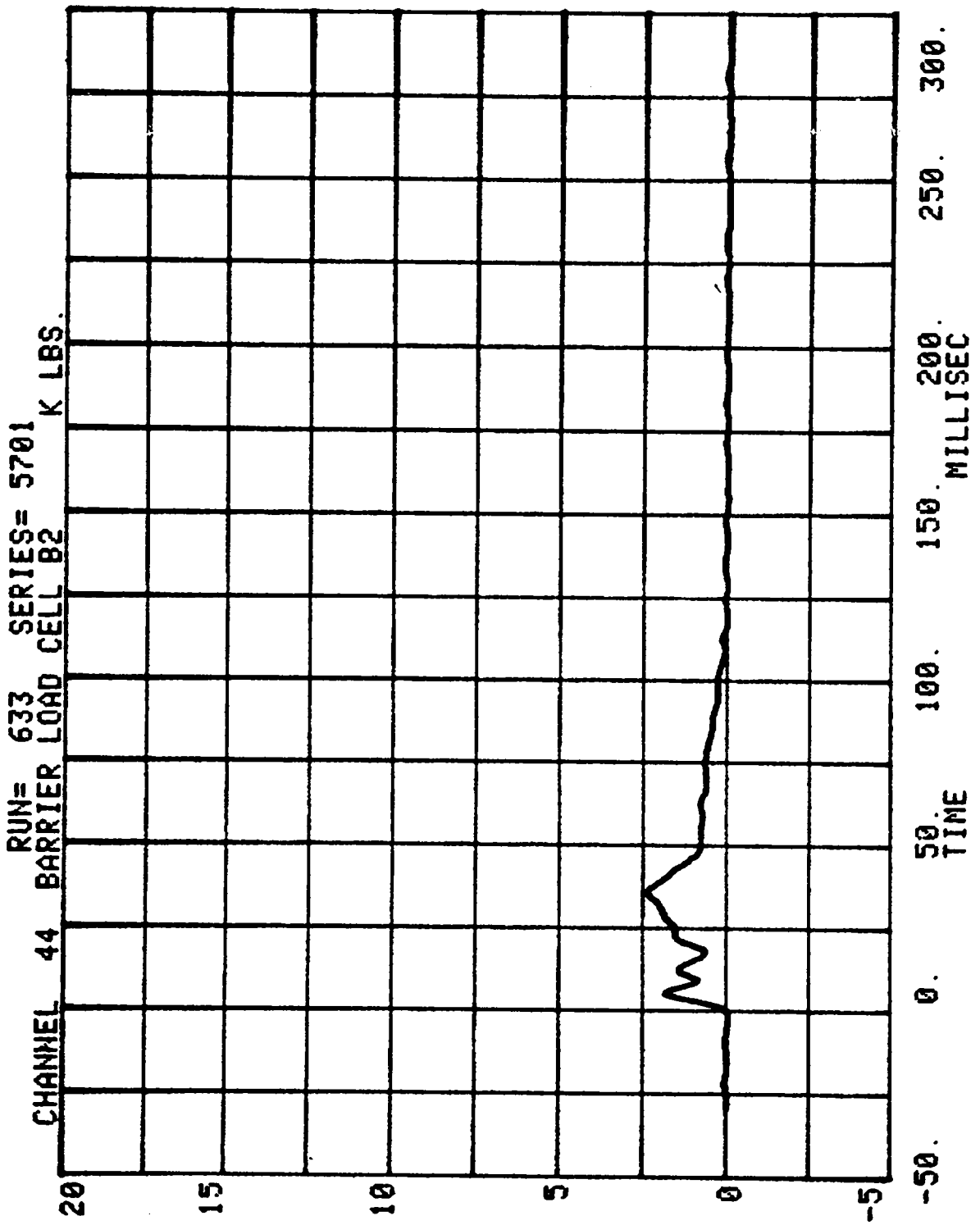

CHANNEL 39 BARRIER LOAD CELL A6
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

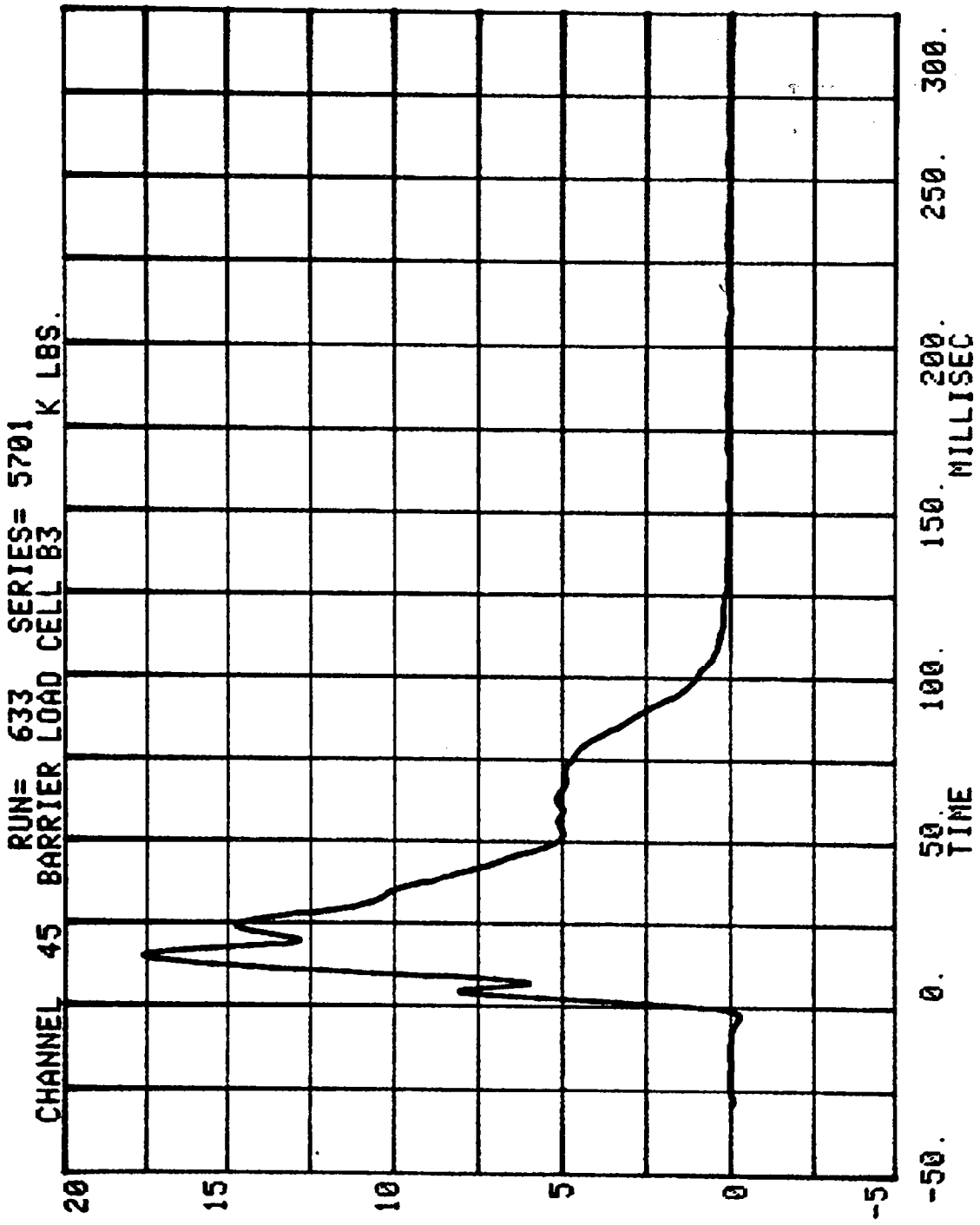

CHANNEL 40 BARRIER LOAD CELL A7
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 41 BARRIER LOAD CELL A8 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 42 BARRIER LOAD CELL A9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 43 BARRIER LOAD CELL B1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 44 BARRIER LOAD CELL B2
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 45 BARRIER LOAD CELL B3
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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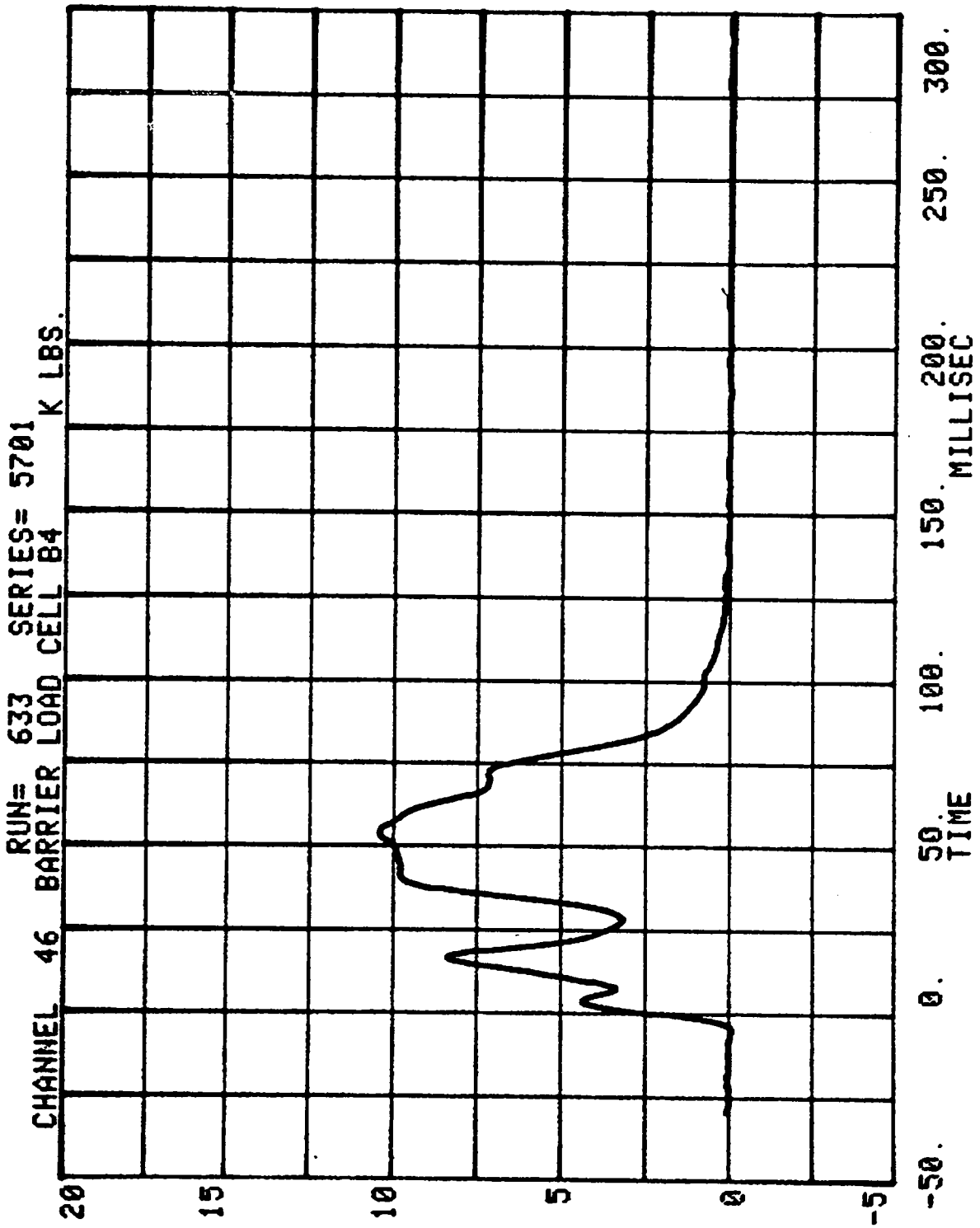
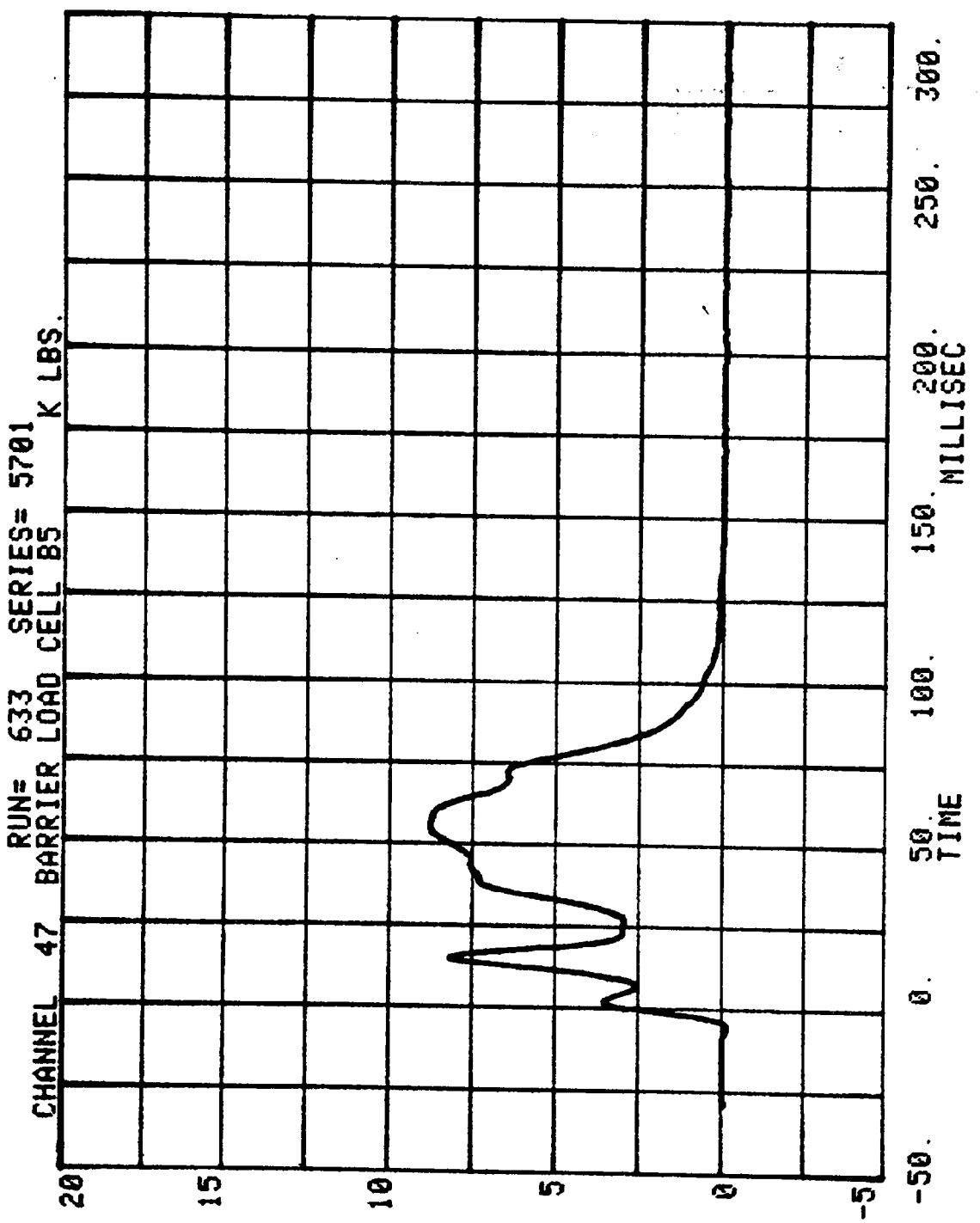
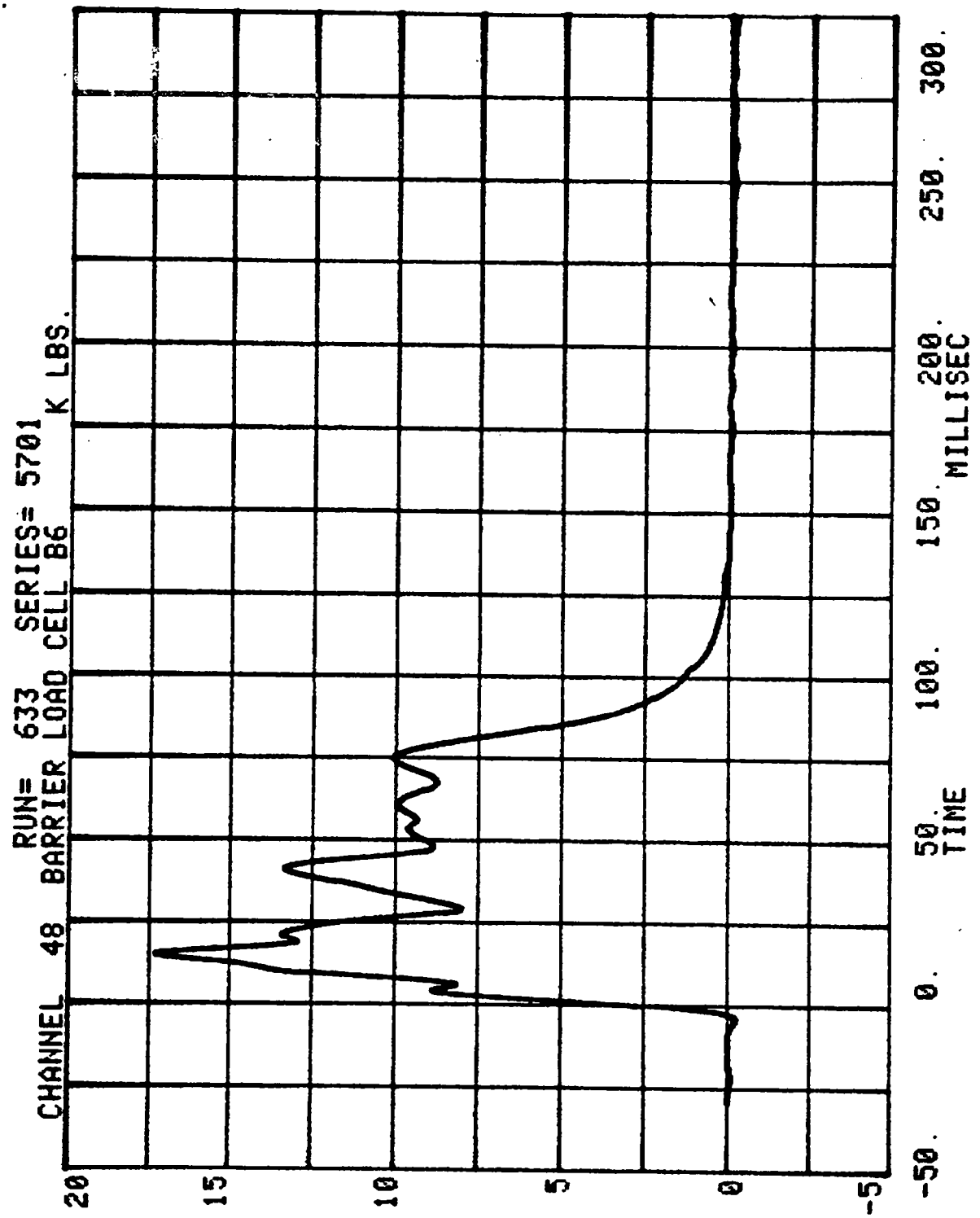
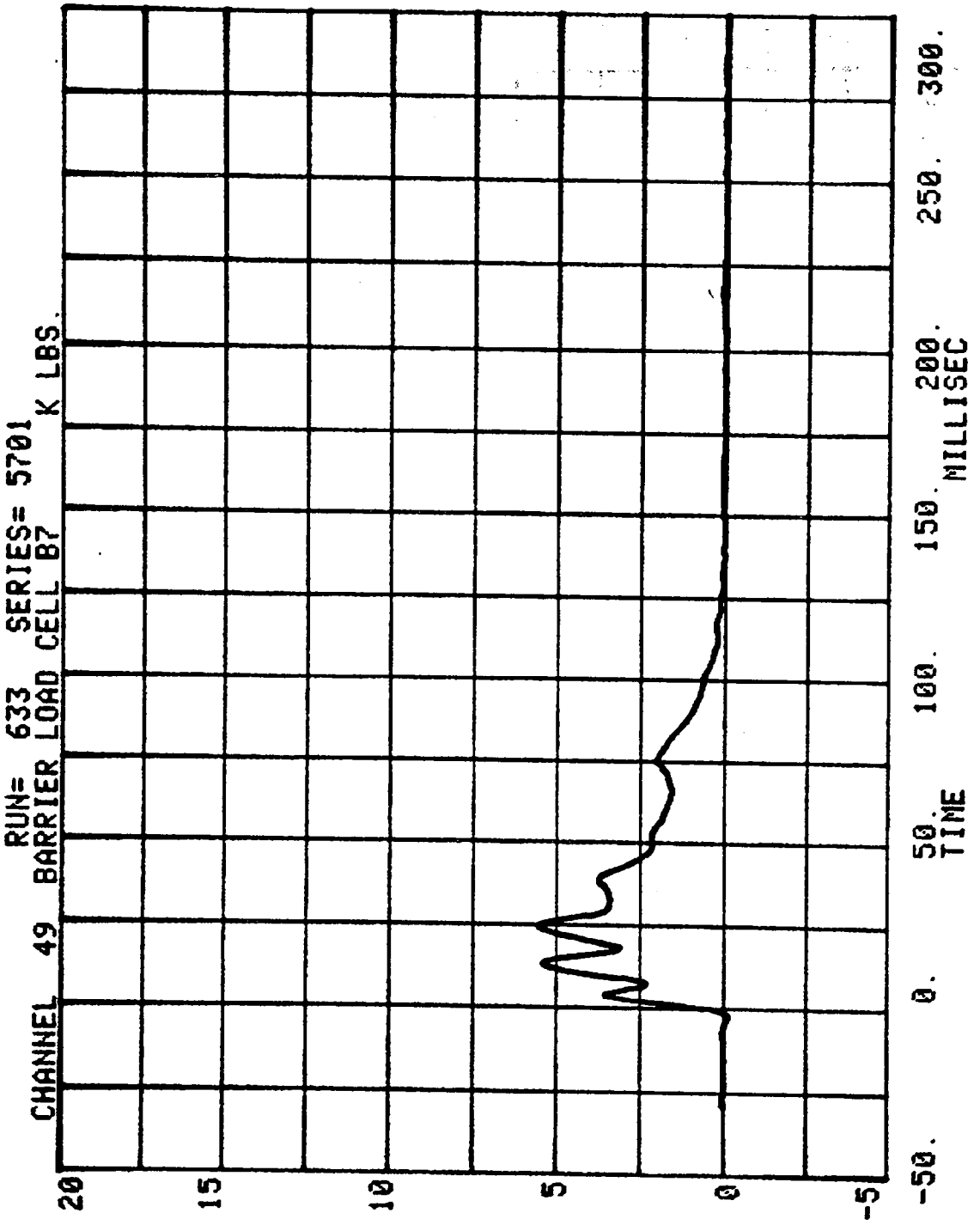
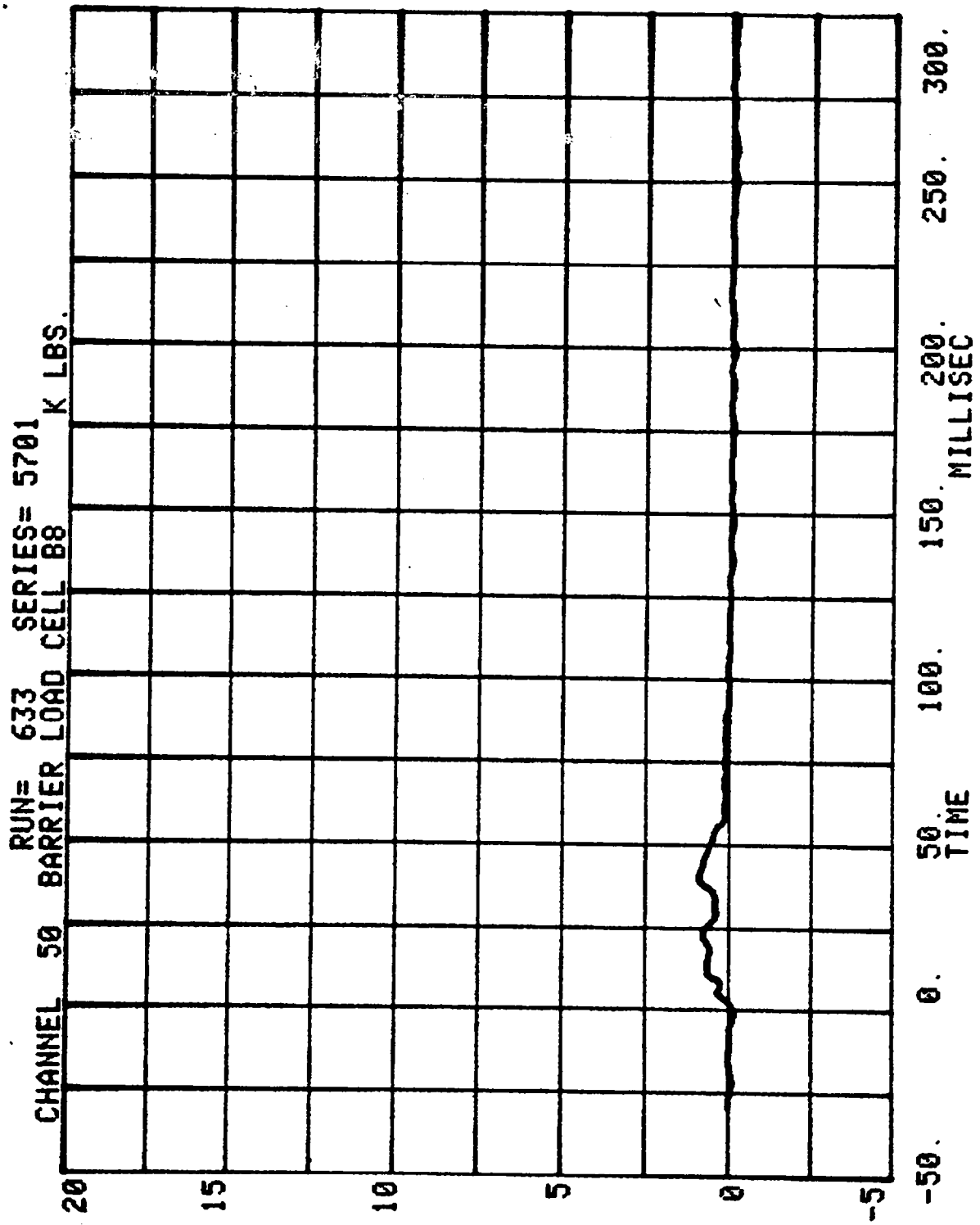
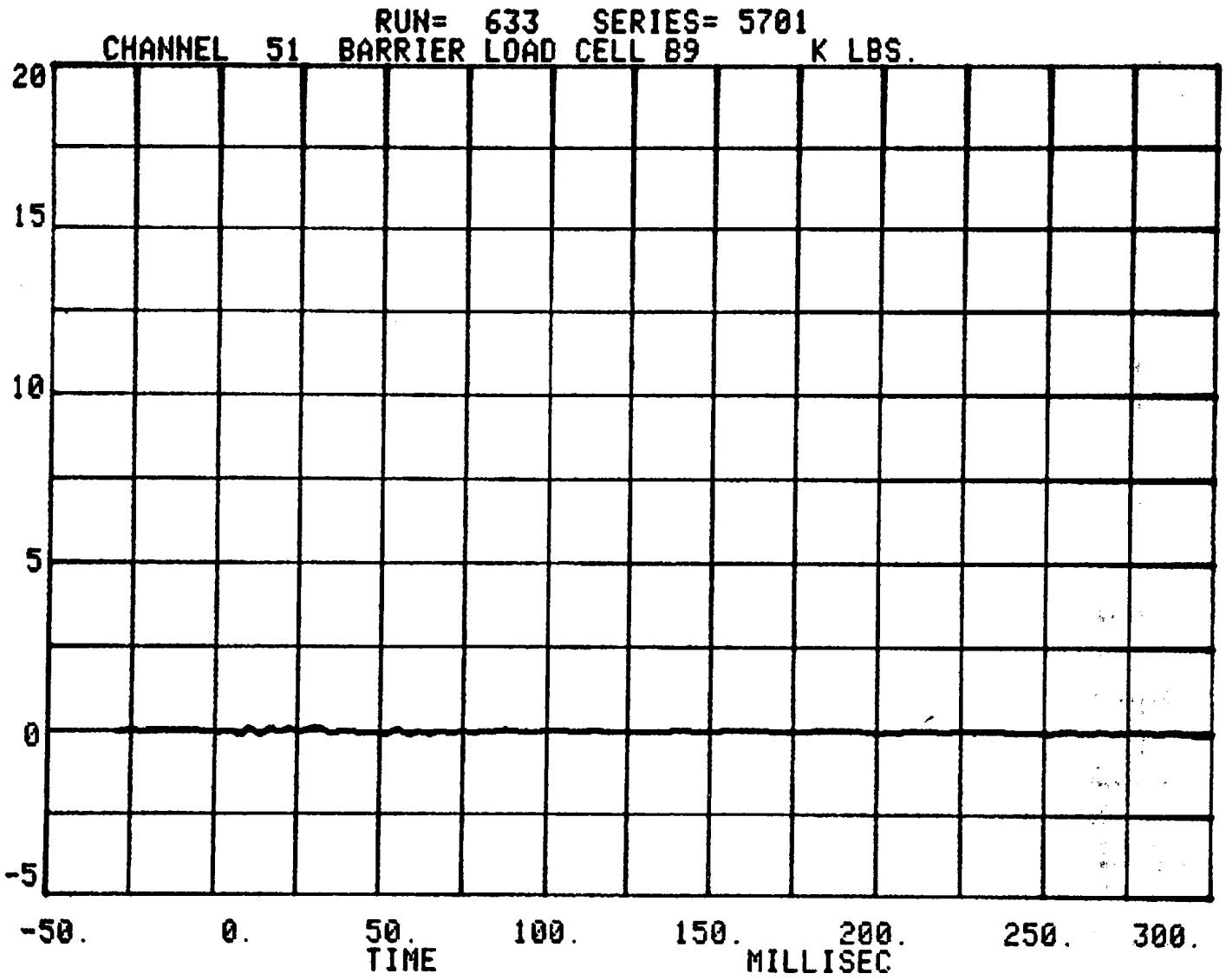

CHANNEL 46 BARRIER LOAD CELL B4
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

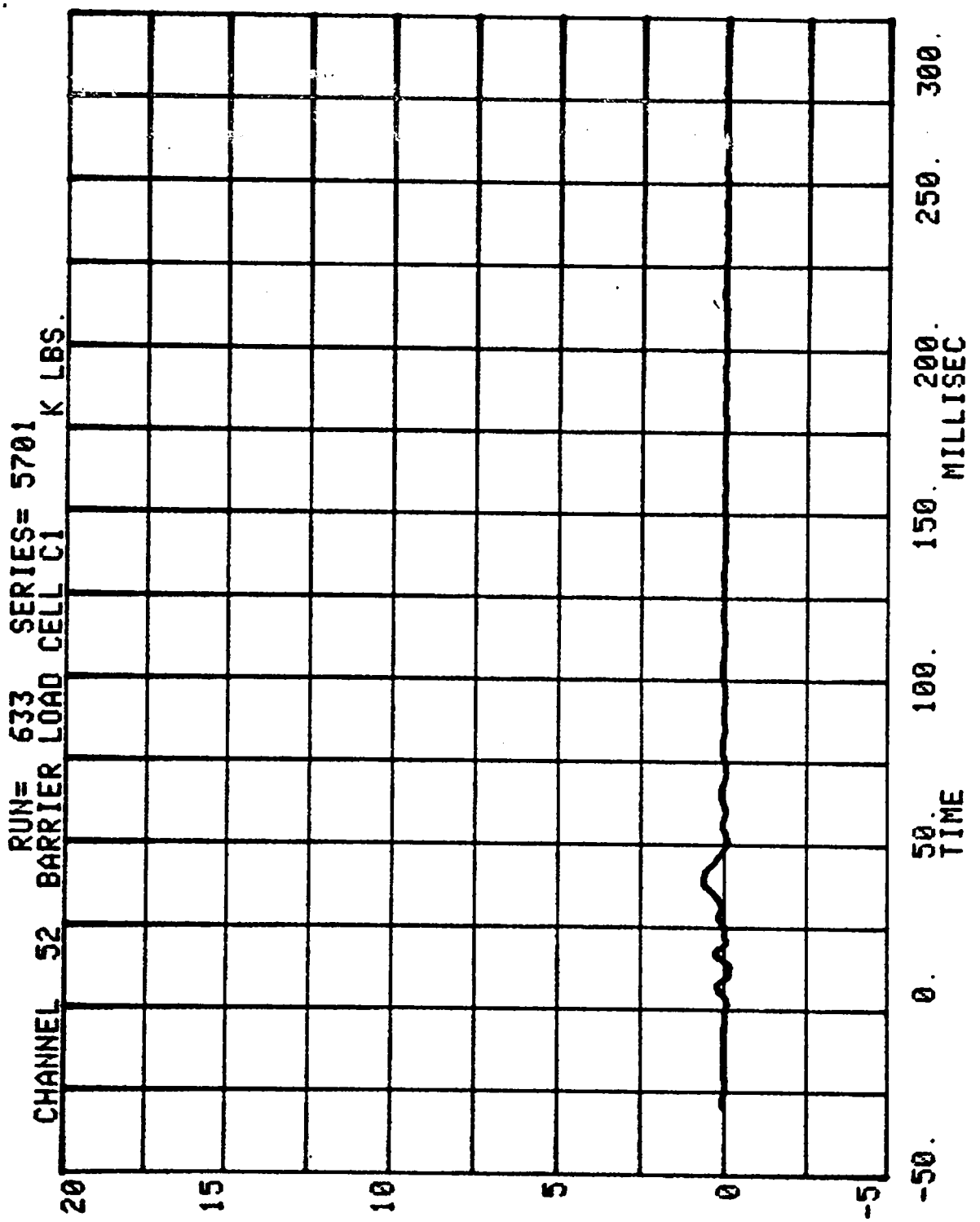

CHANNEL 47 BARRIER LOAD CELL 85
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

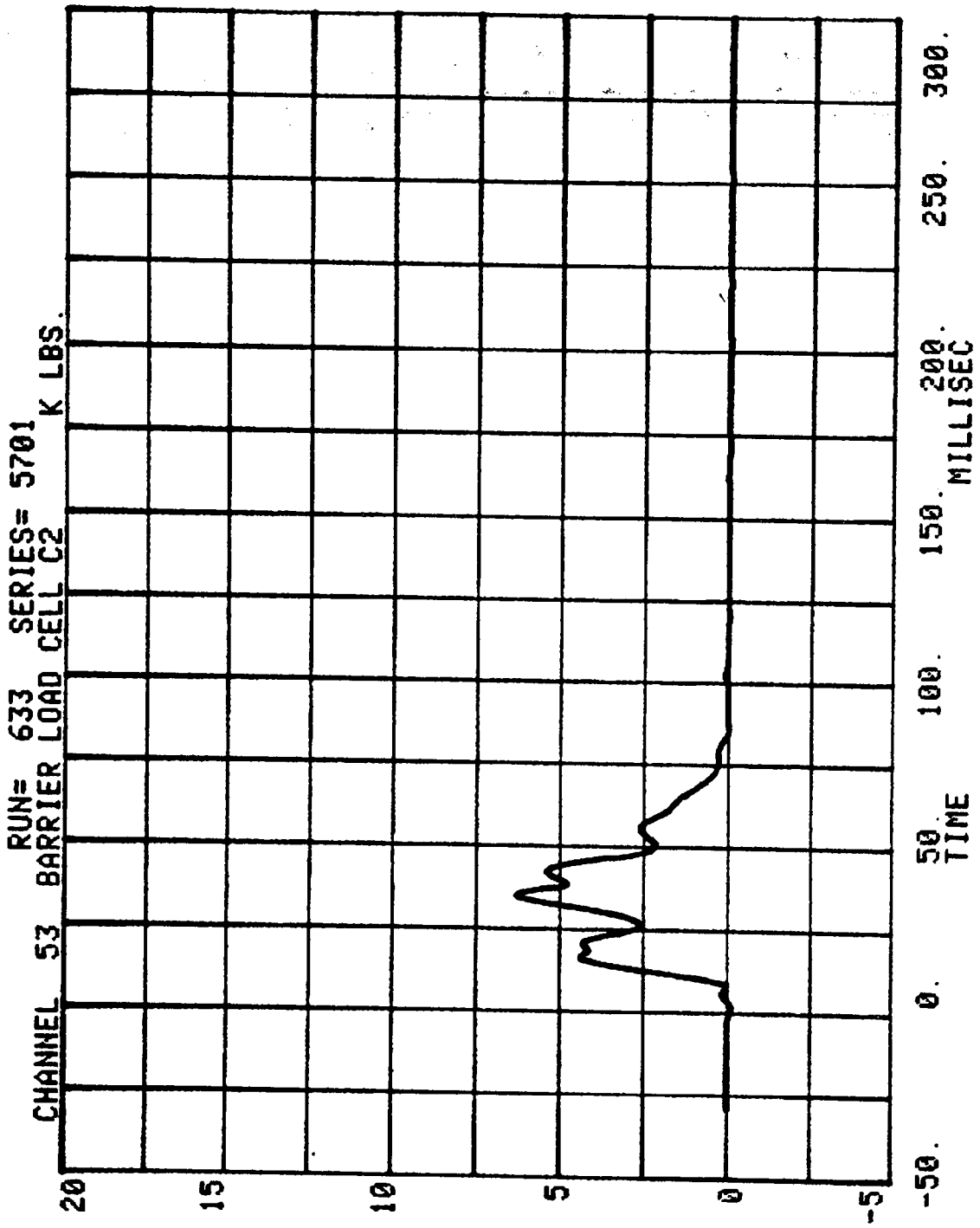

CHANNEL 48 BARRIER LOAD CELL 86
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 49 RUN= 633 SERIES= 5701
BARRIER LOAD CELL B7
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 50 BARRIER LOAD CELL B8
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 51 BARRIER LOAD CELL B9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 52 BARRIER LOAD CELL C1
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 53 BARRIER LOAD CELL C2
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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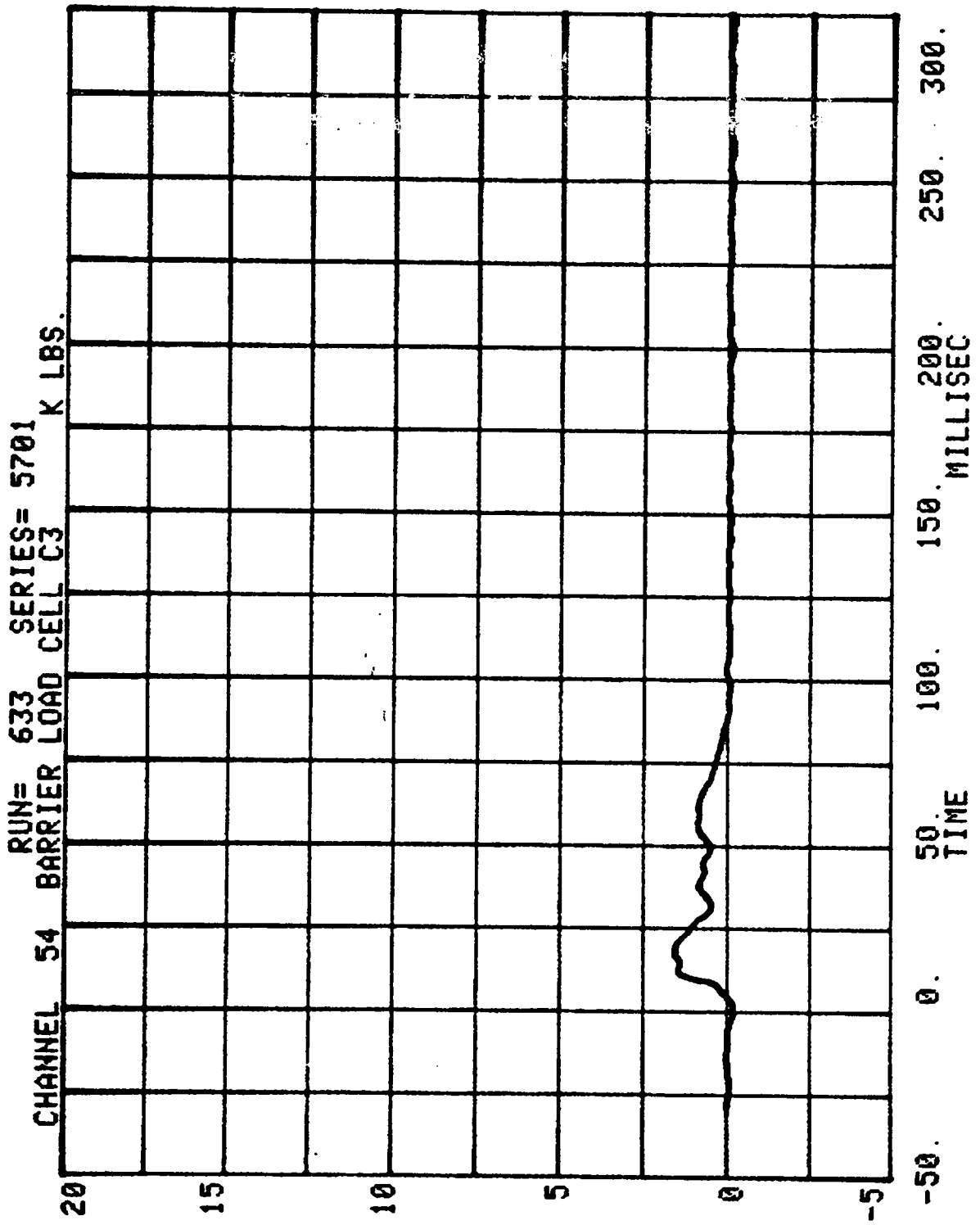
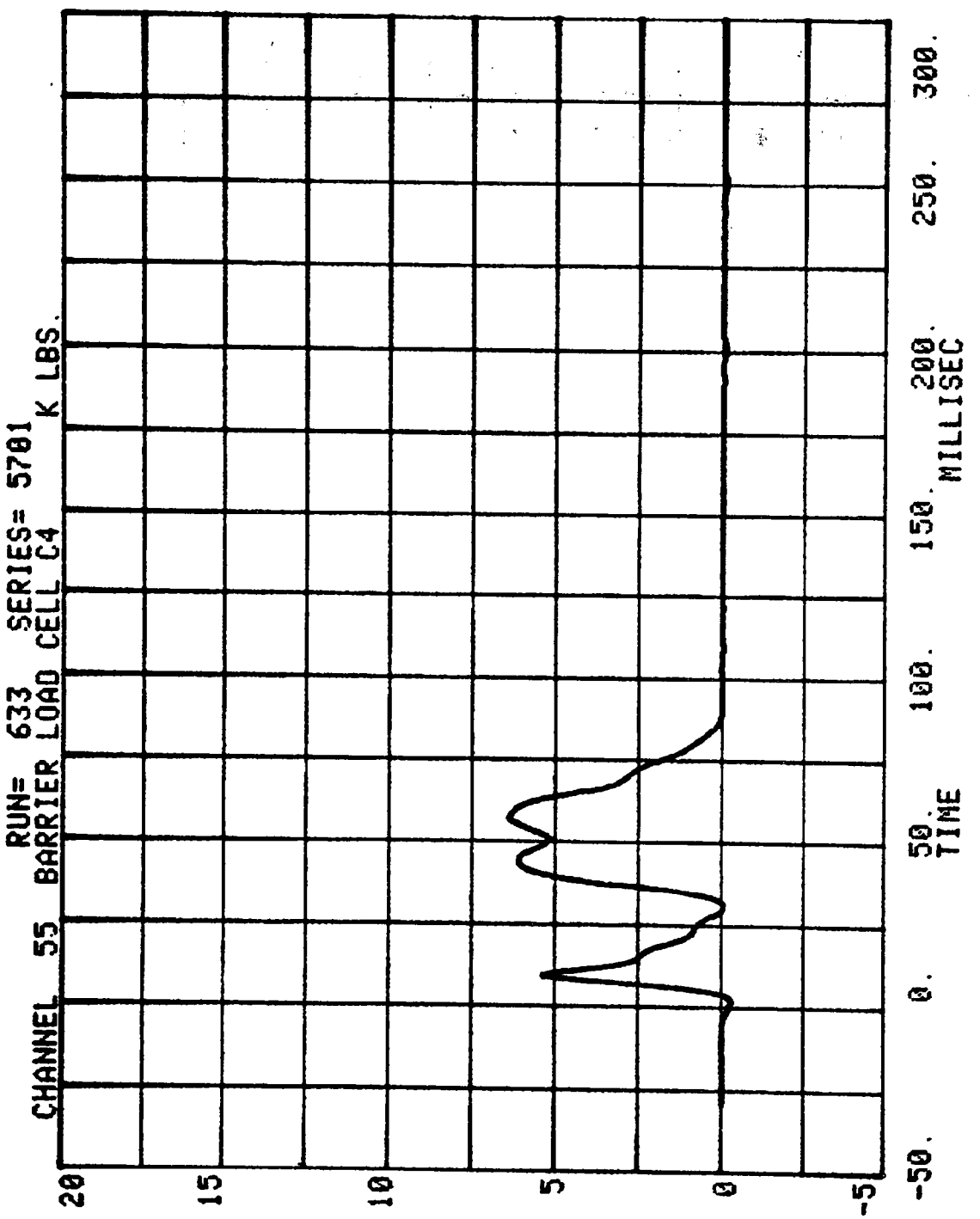
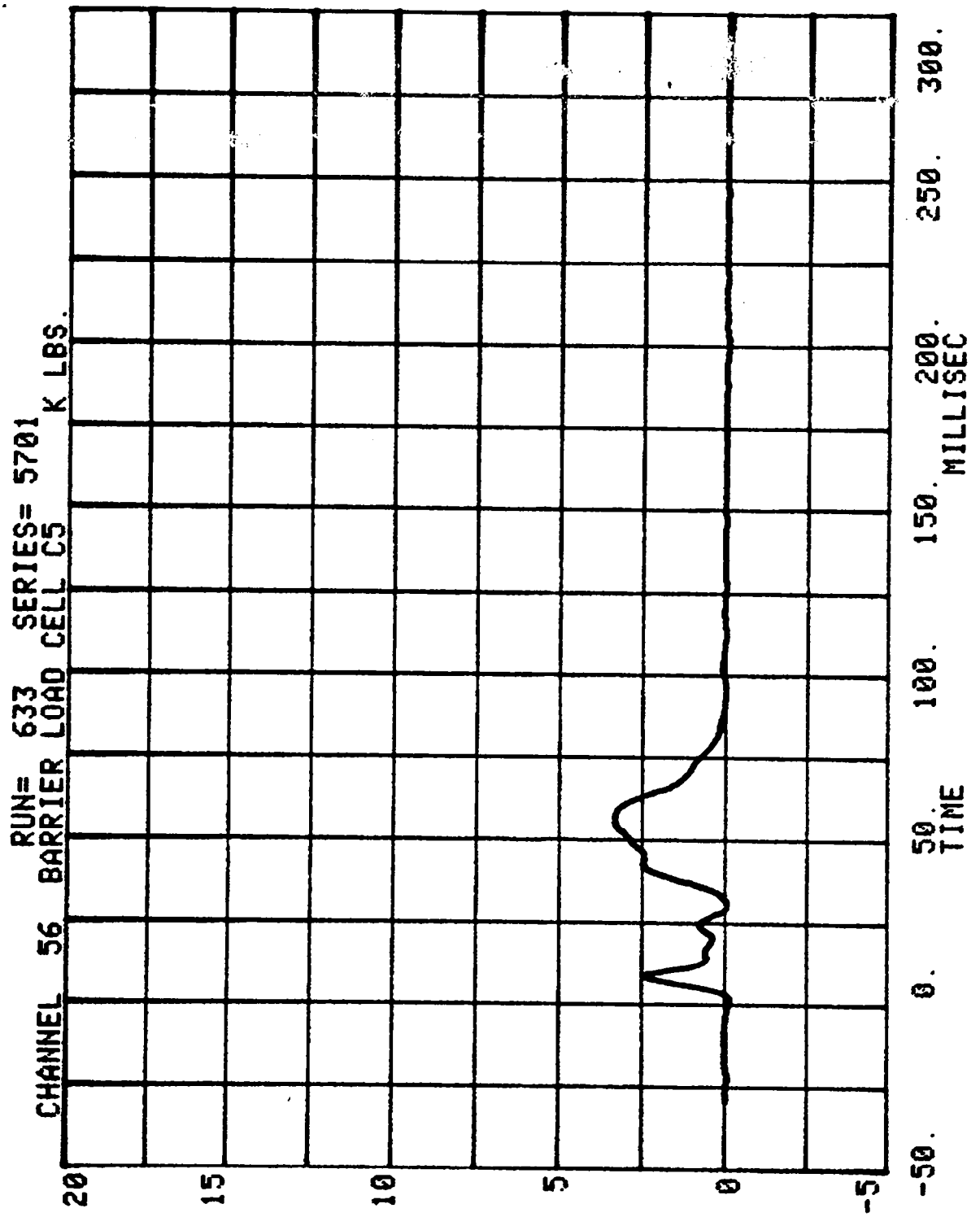
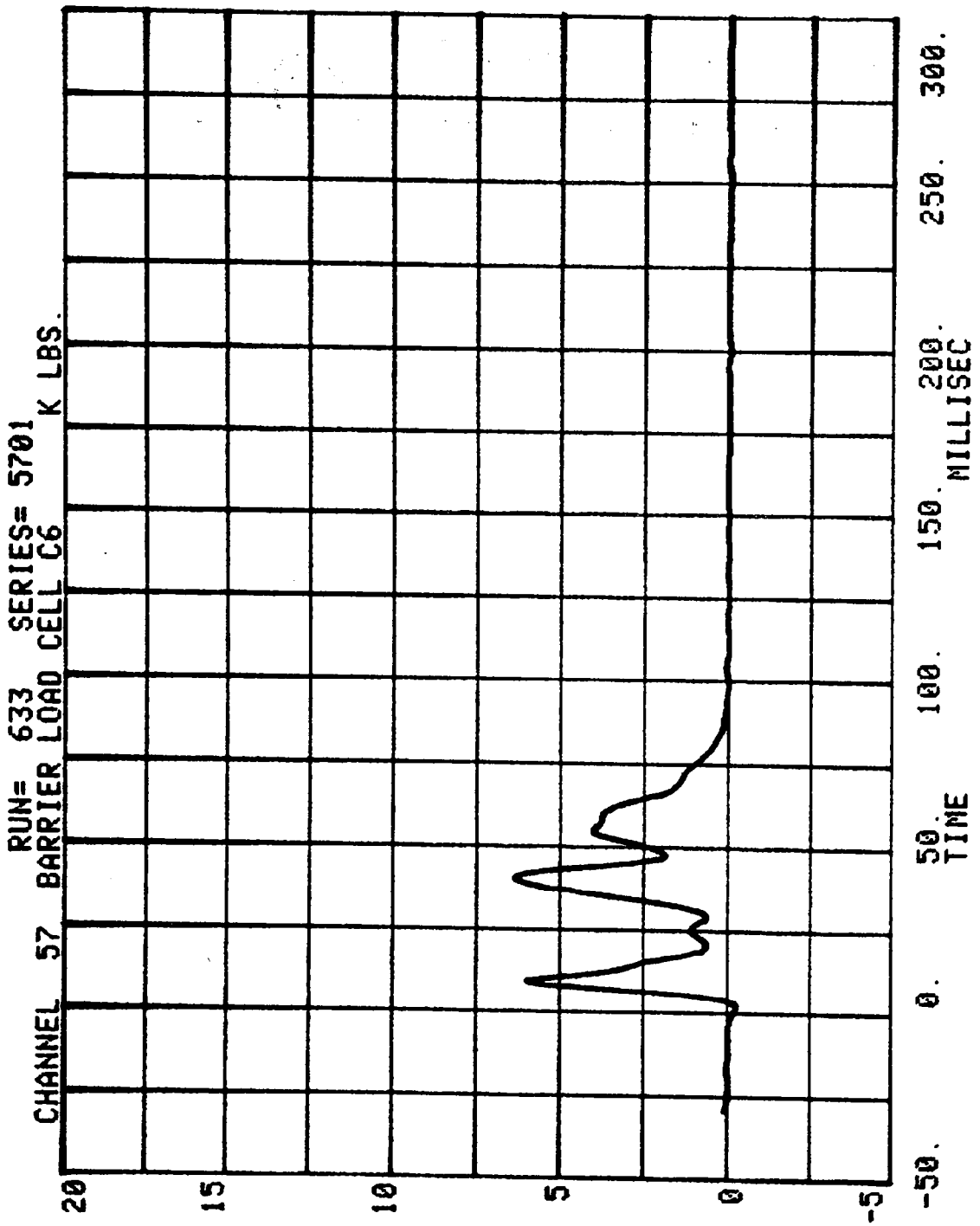
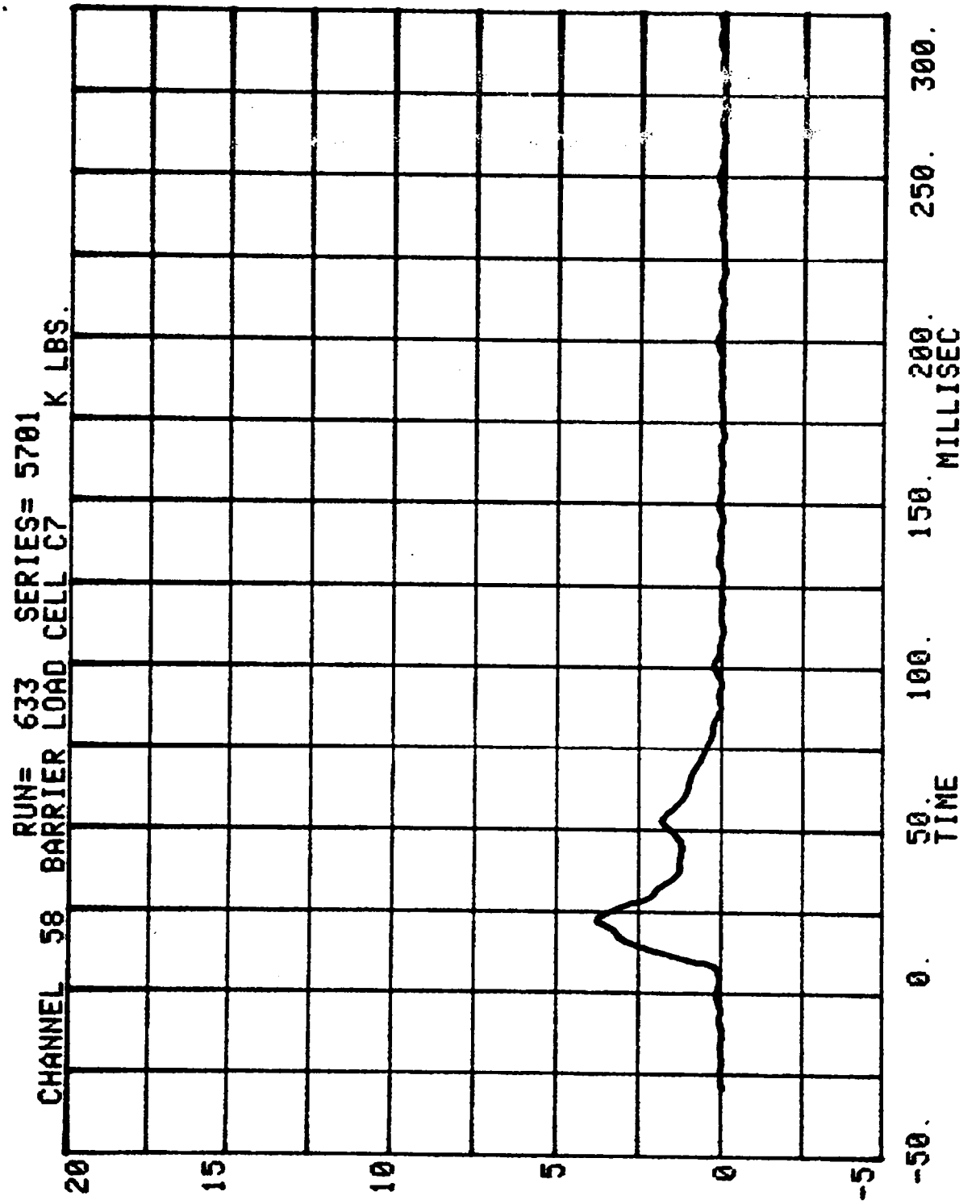

CHANNEL 54 BARRIER LOAD CELL C3
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 55 BARRIER LOAD CELL C4
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 56 BARRIER LOAD CELL C5
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 57 BARRIER LOAD CELL C6
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 58 BARRIER LOAD CELL C7
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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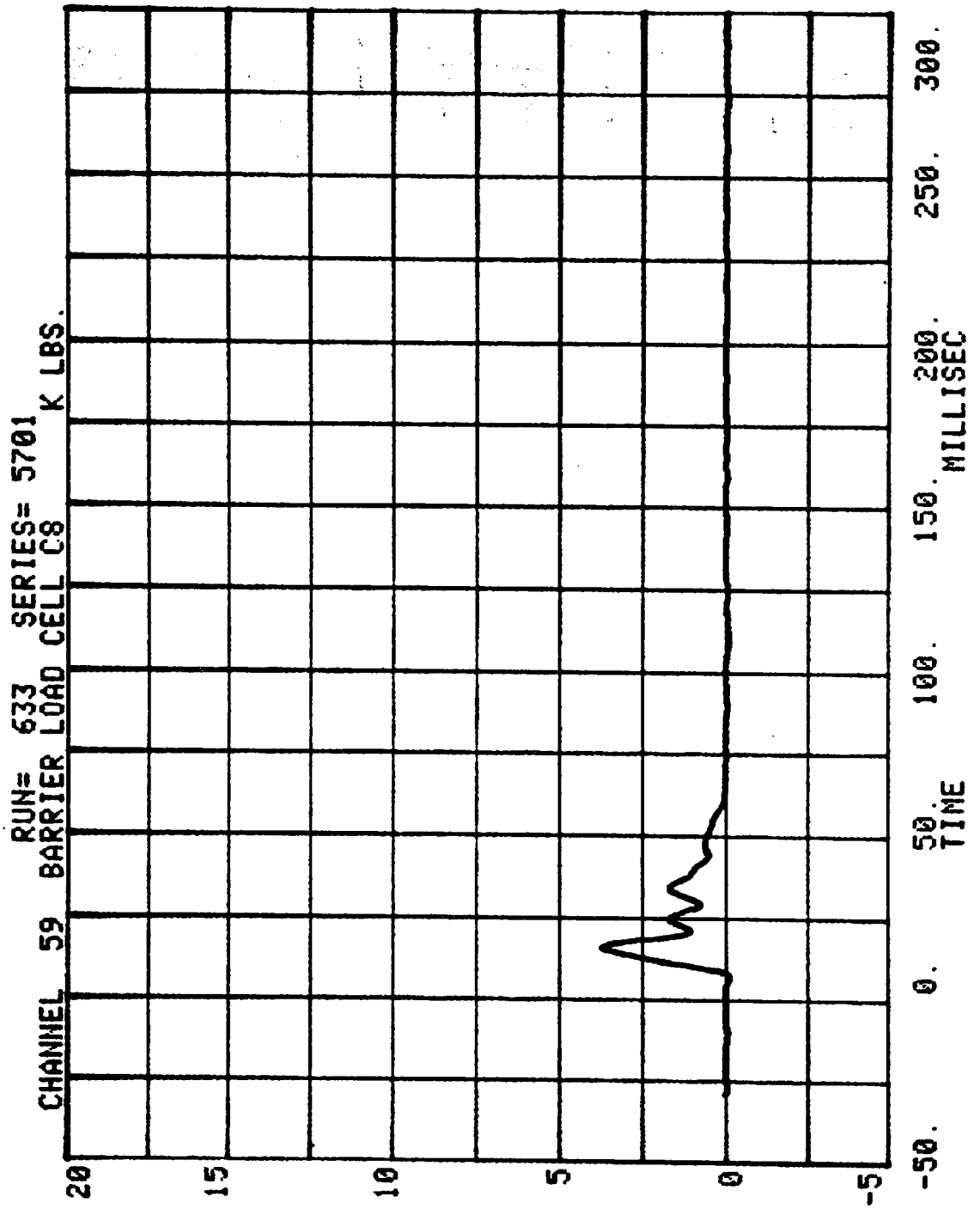
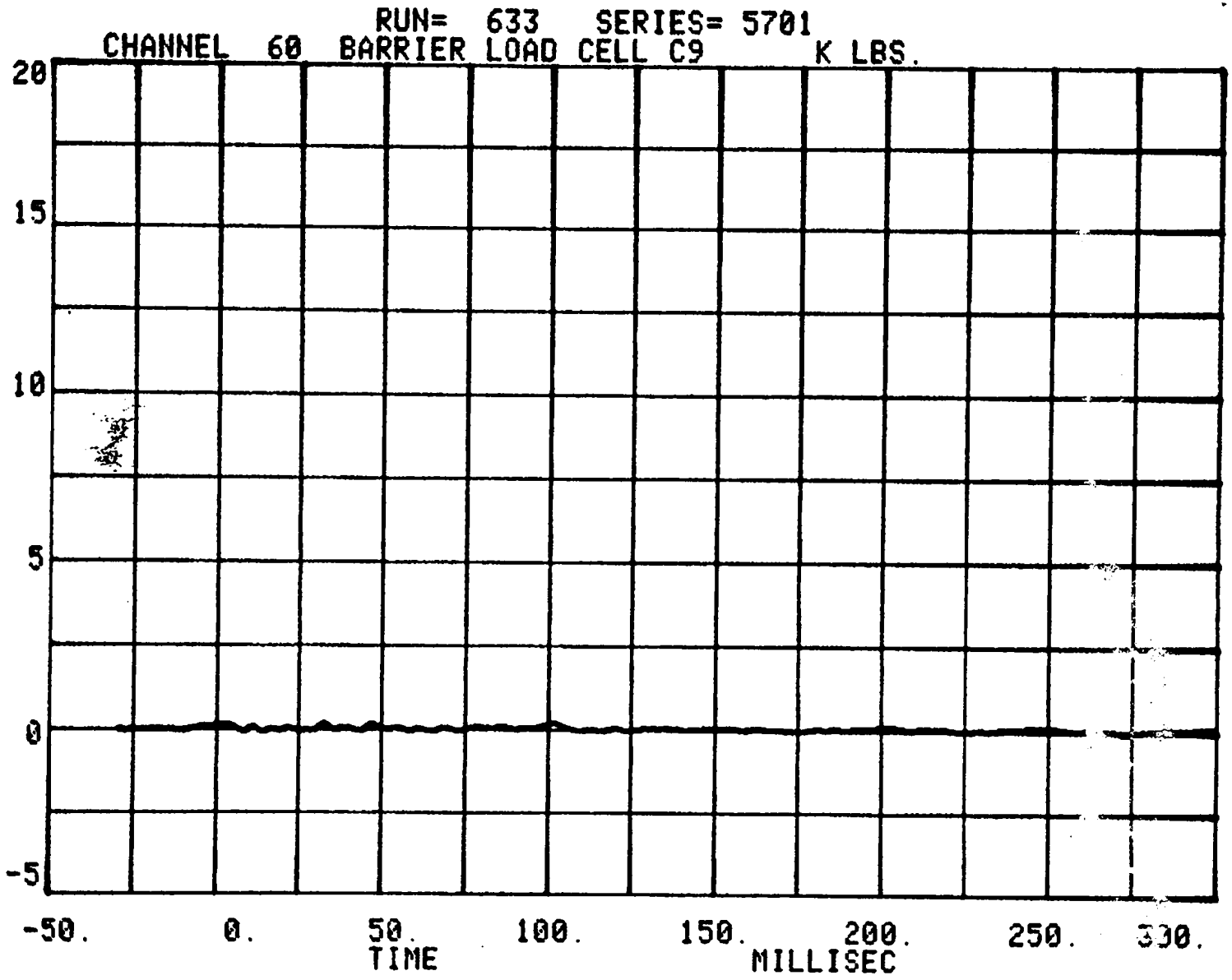
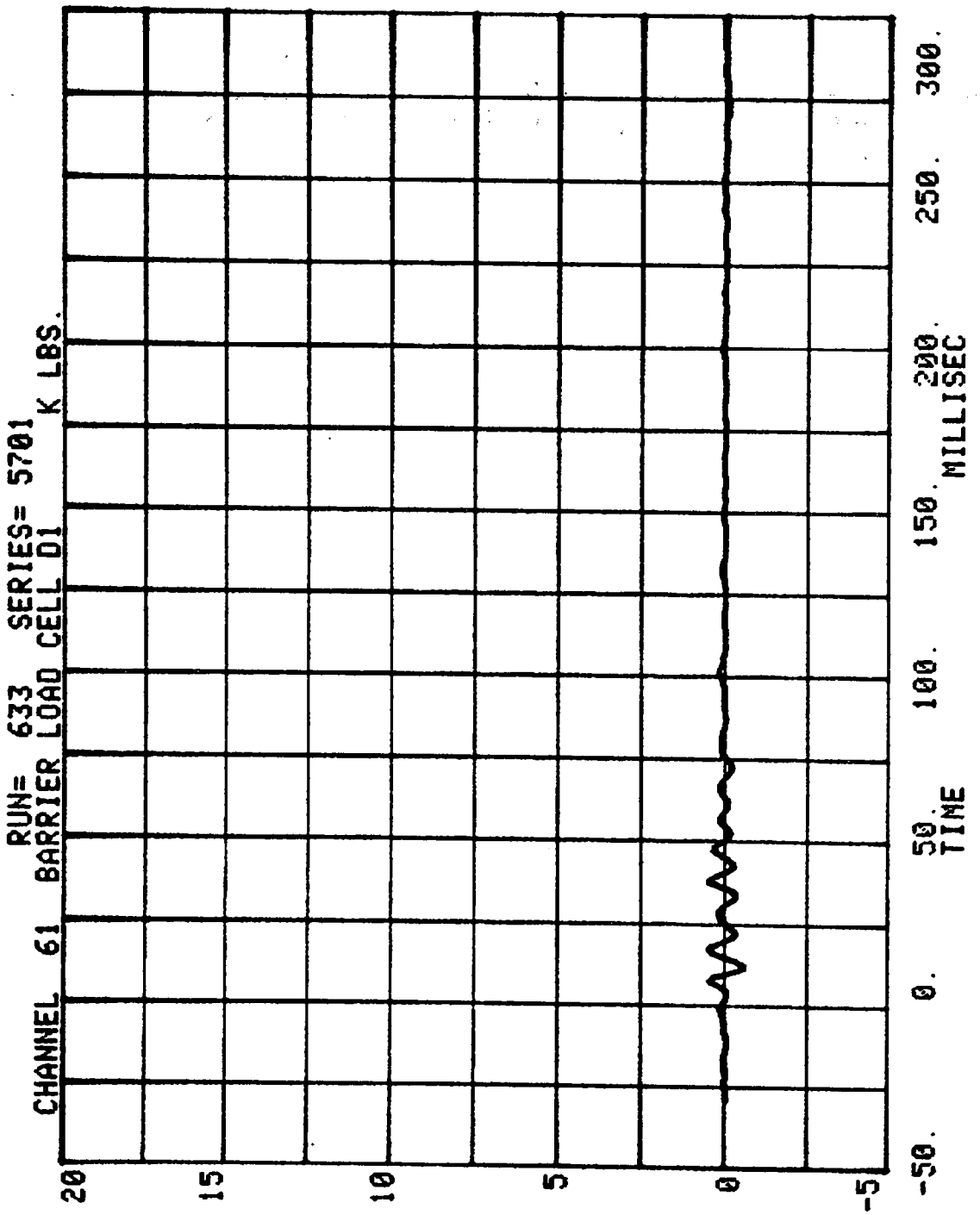
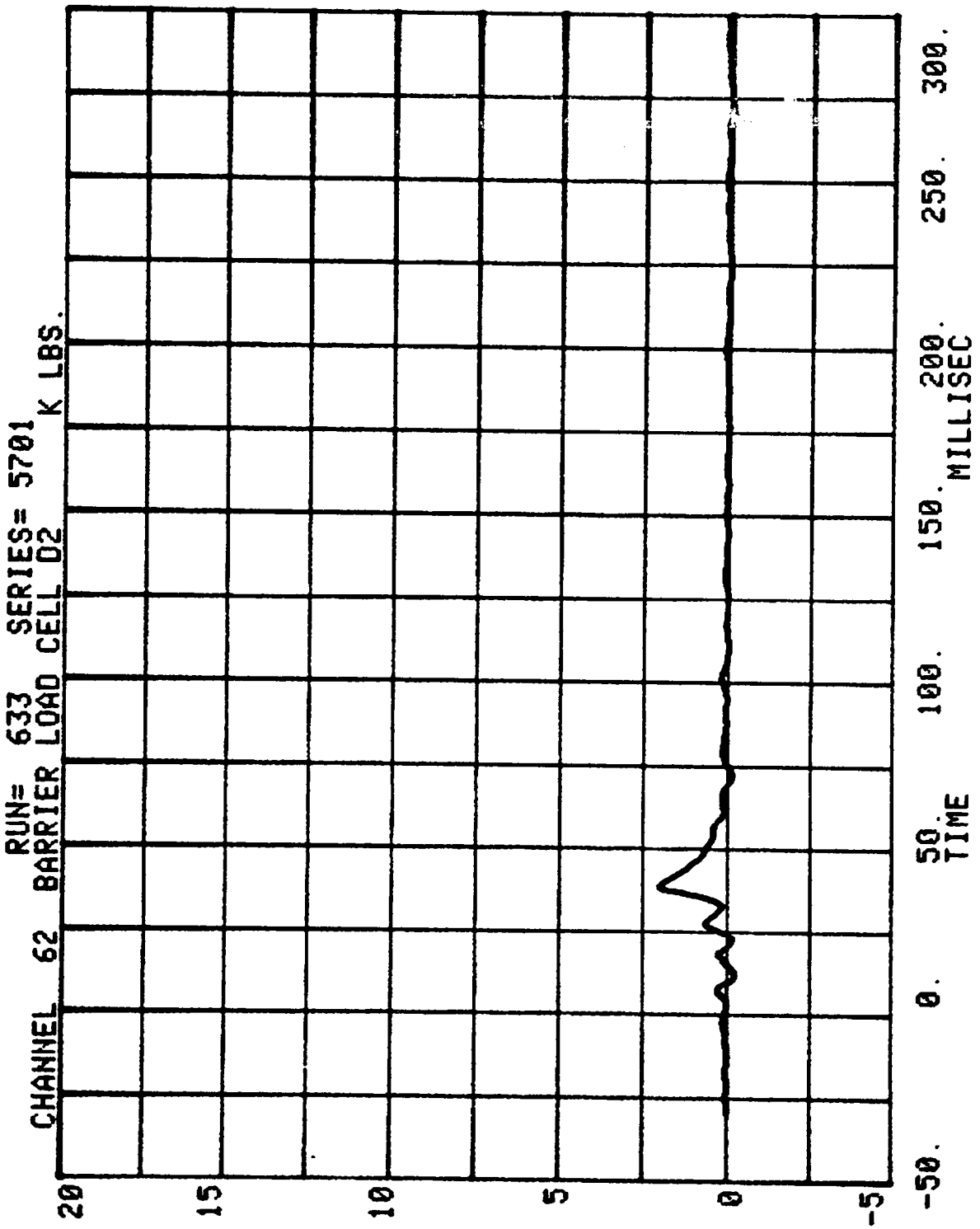
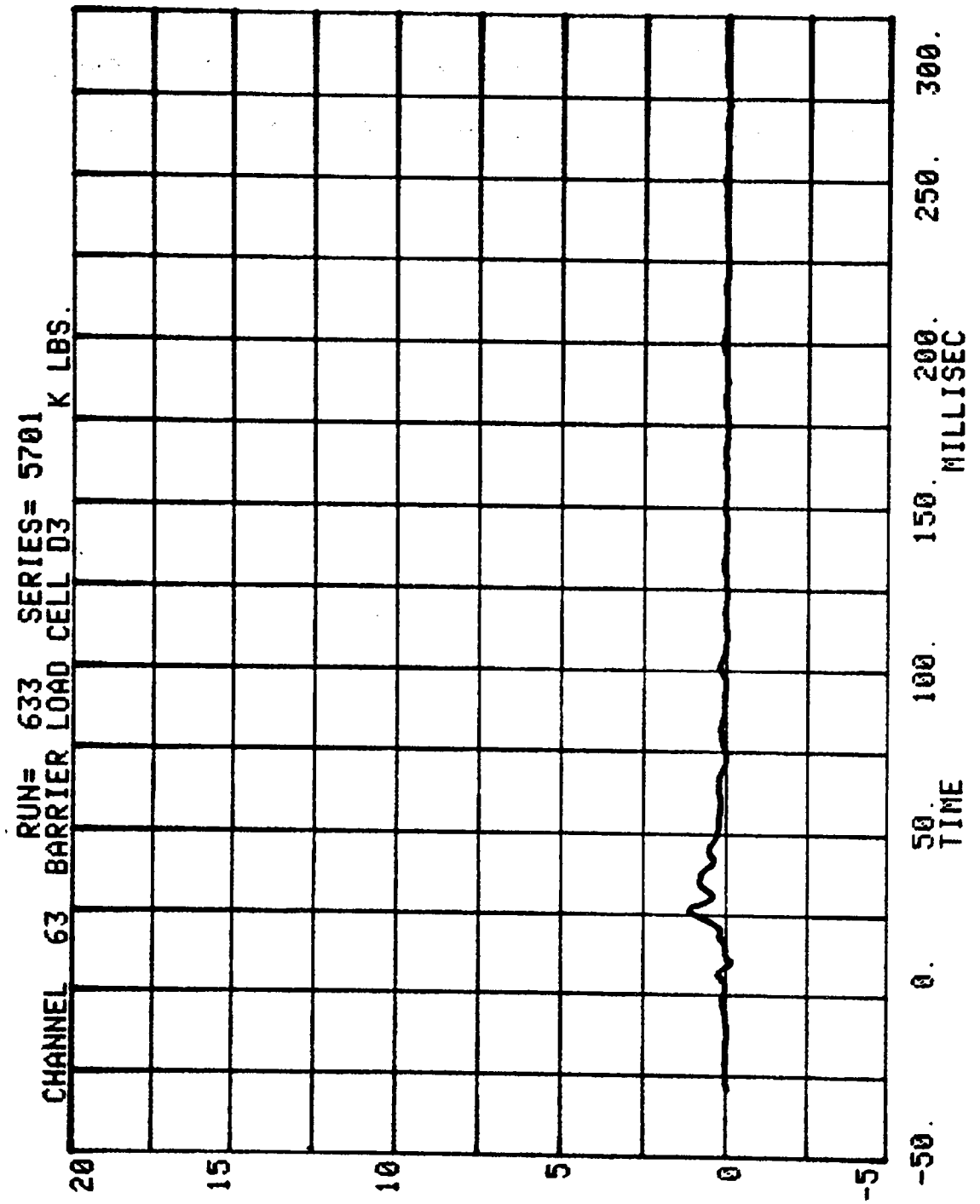
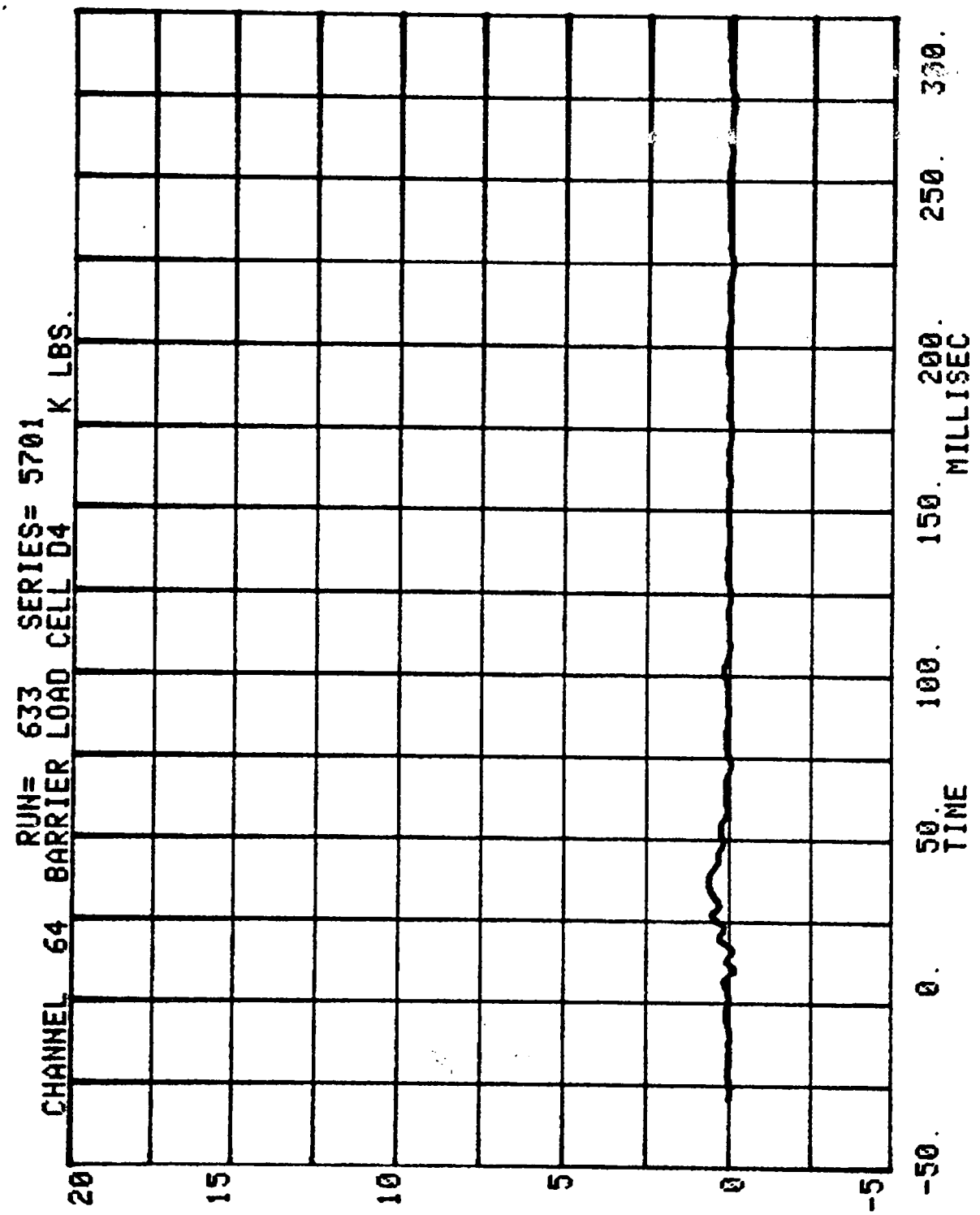

CHANNEL 59 BARRIER LOAD CELL C8
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

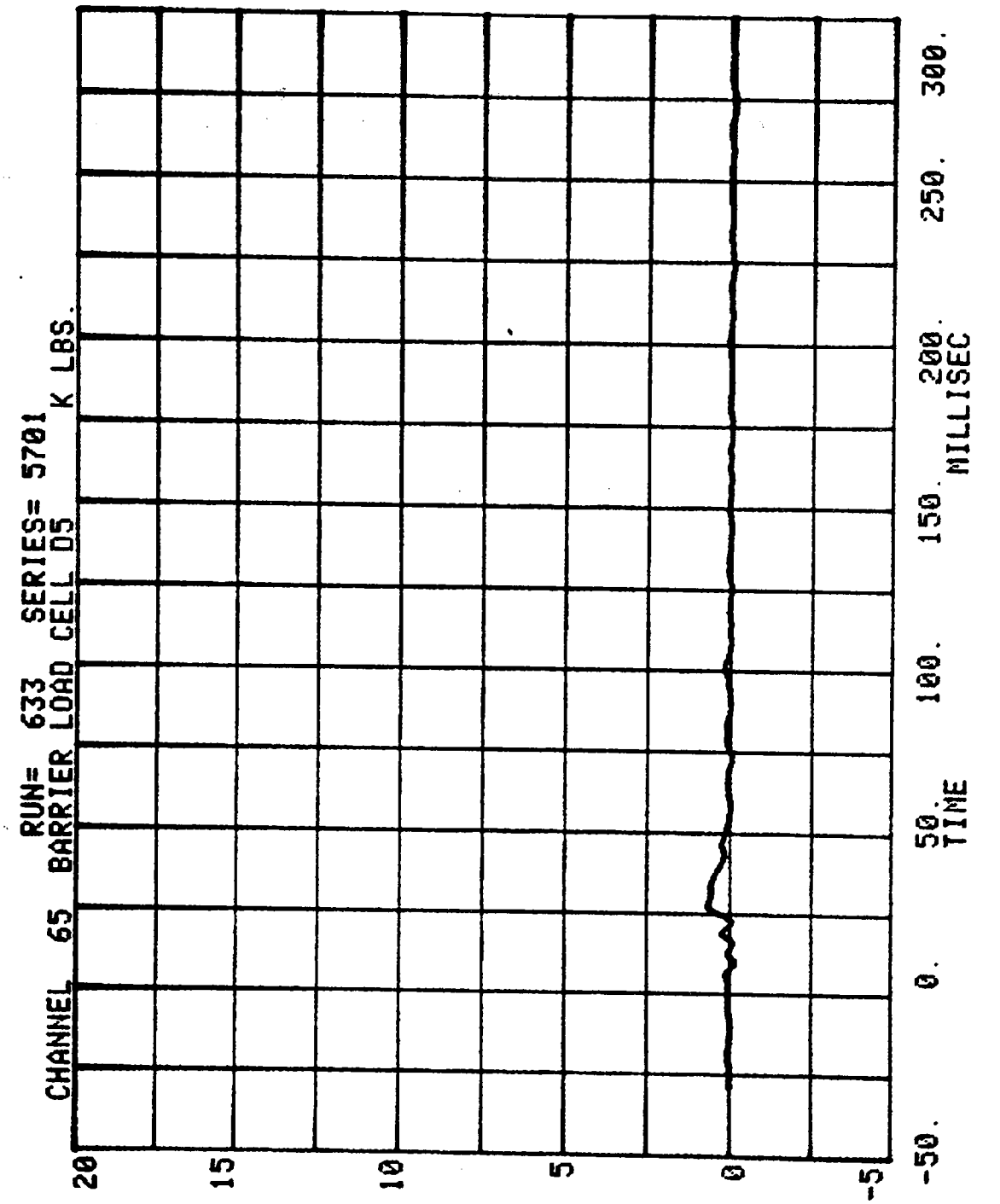

RUN= 633 SERIES= 5701
CHANNEL 60 BARRIER LOAD CELL C9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

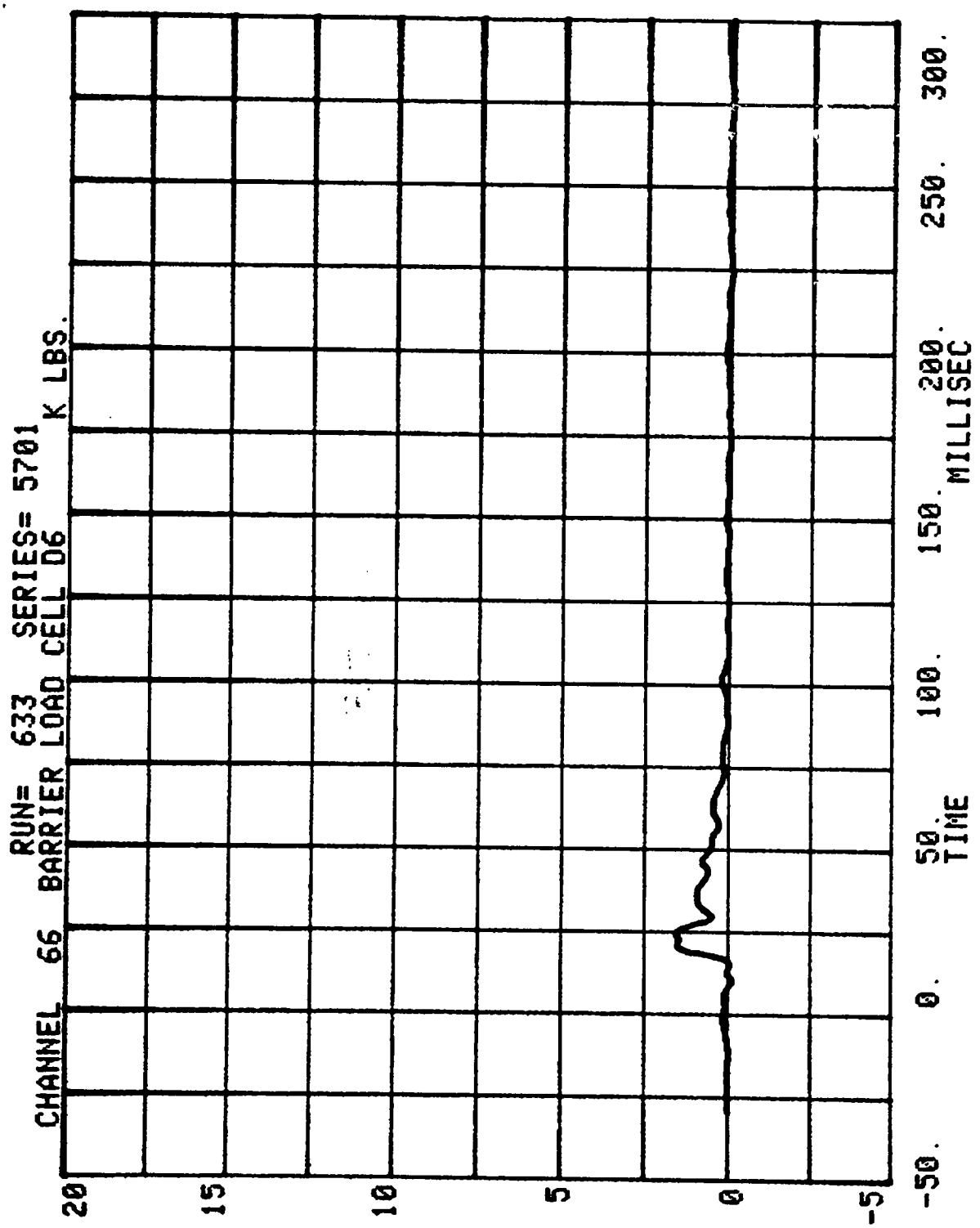

RUN= 633 SERIES= 5701
CHANNEL 61 BARRIER LOAD CELL D1
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

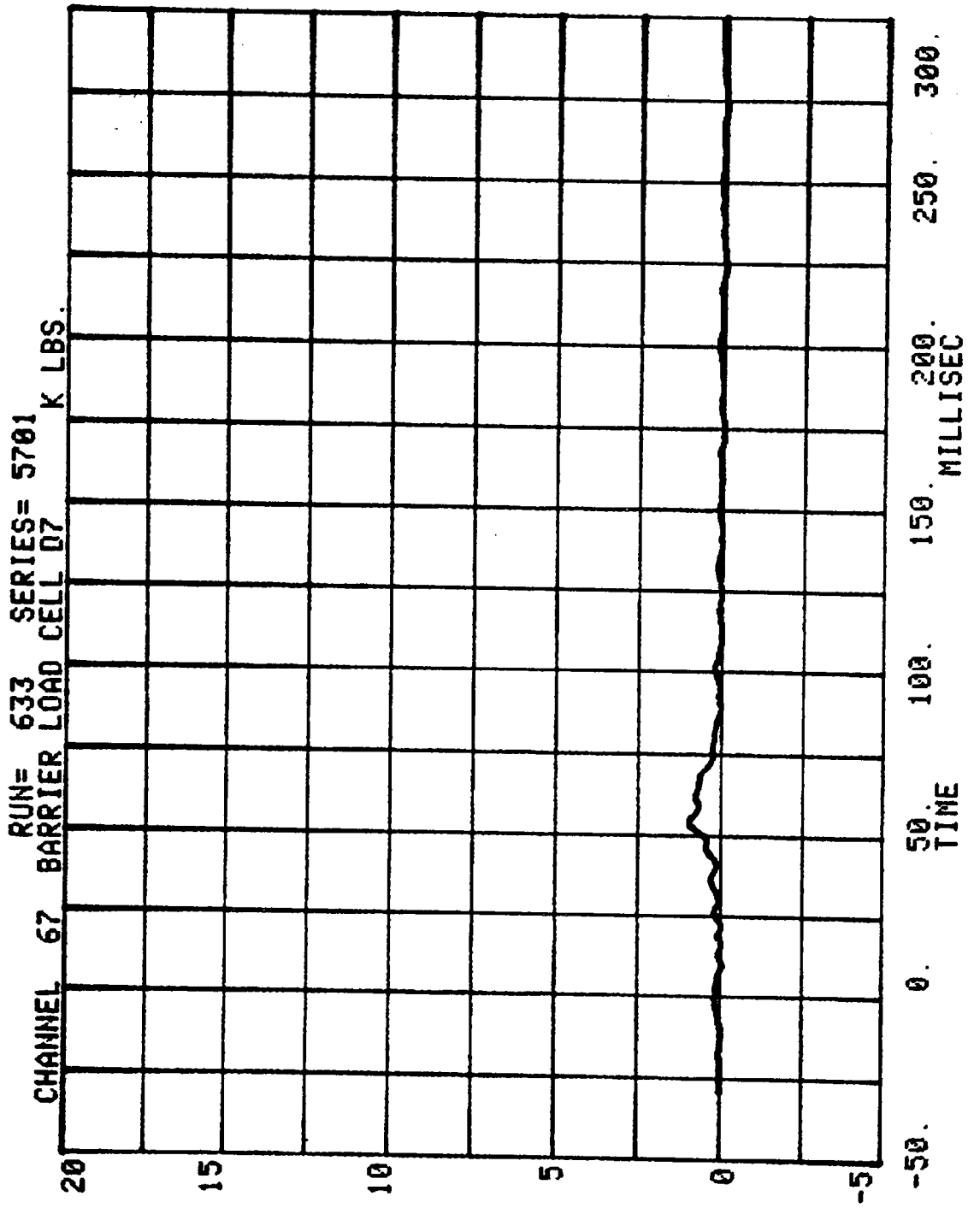

CHANNEL 62 BARRIER LOAD CELL D2
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 63 BARRIER LOAD CELL D3
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 64 BARRIER LOAD CELL D4
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
330.
TIME
MILLISEC


CHANNEL 65 BARRIER LOAD CELL D5
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 66 BARRIER LOAD CELL D6
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 67 BARRIER LOAD CELL 07
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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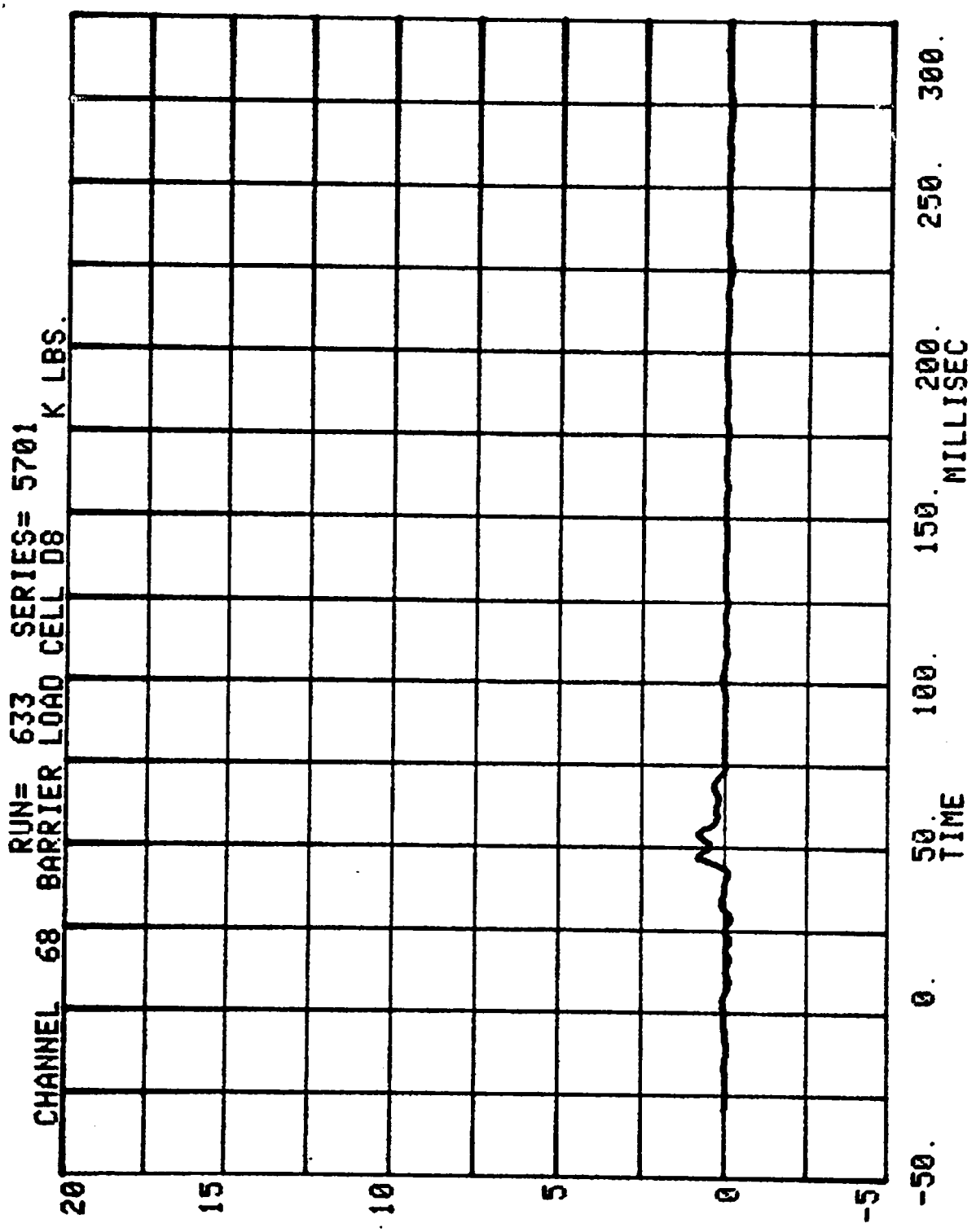
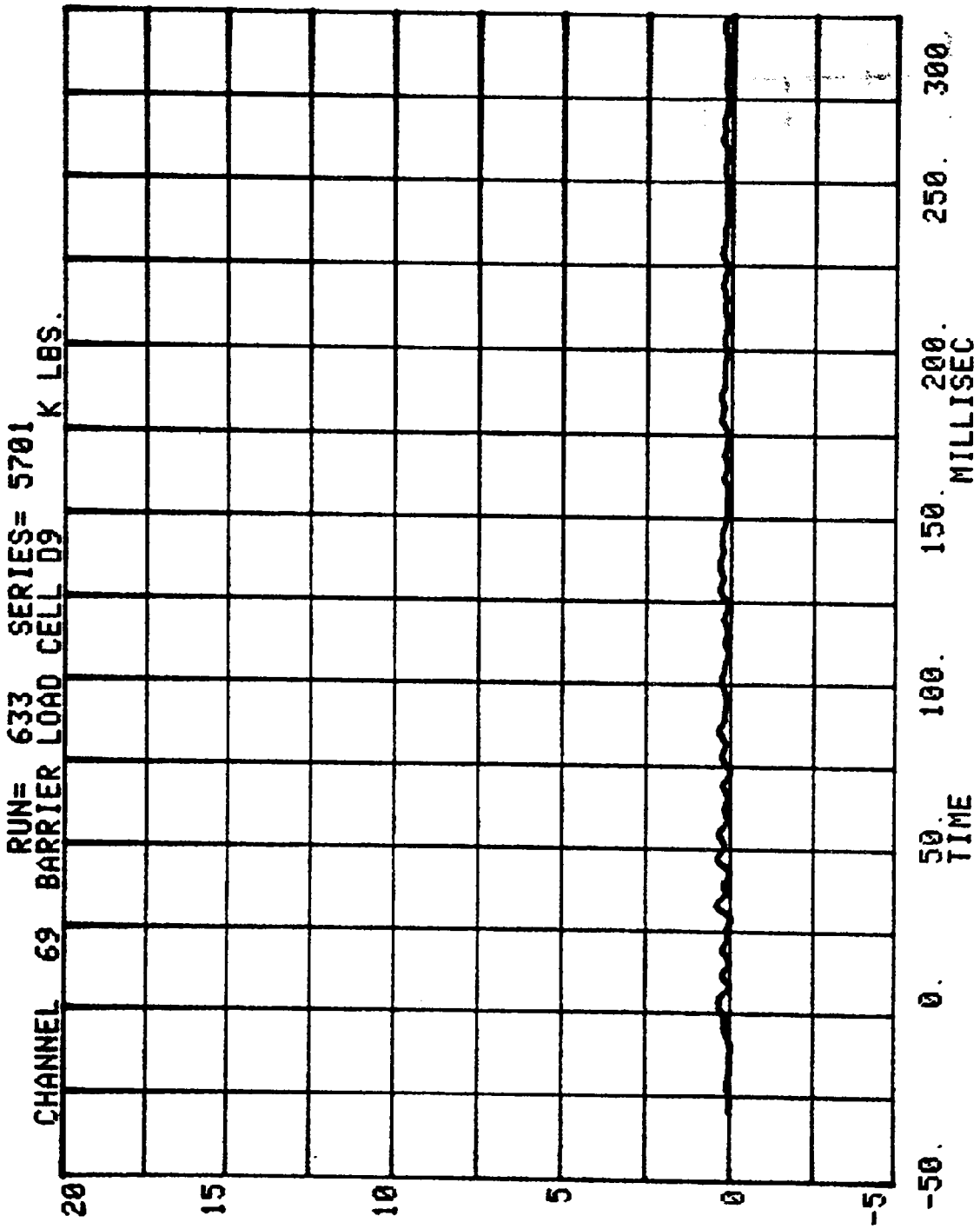
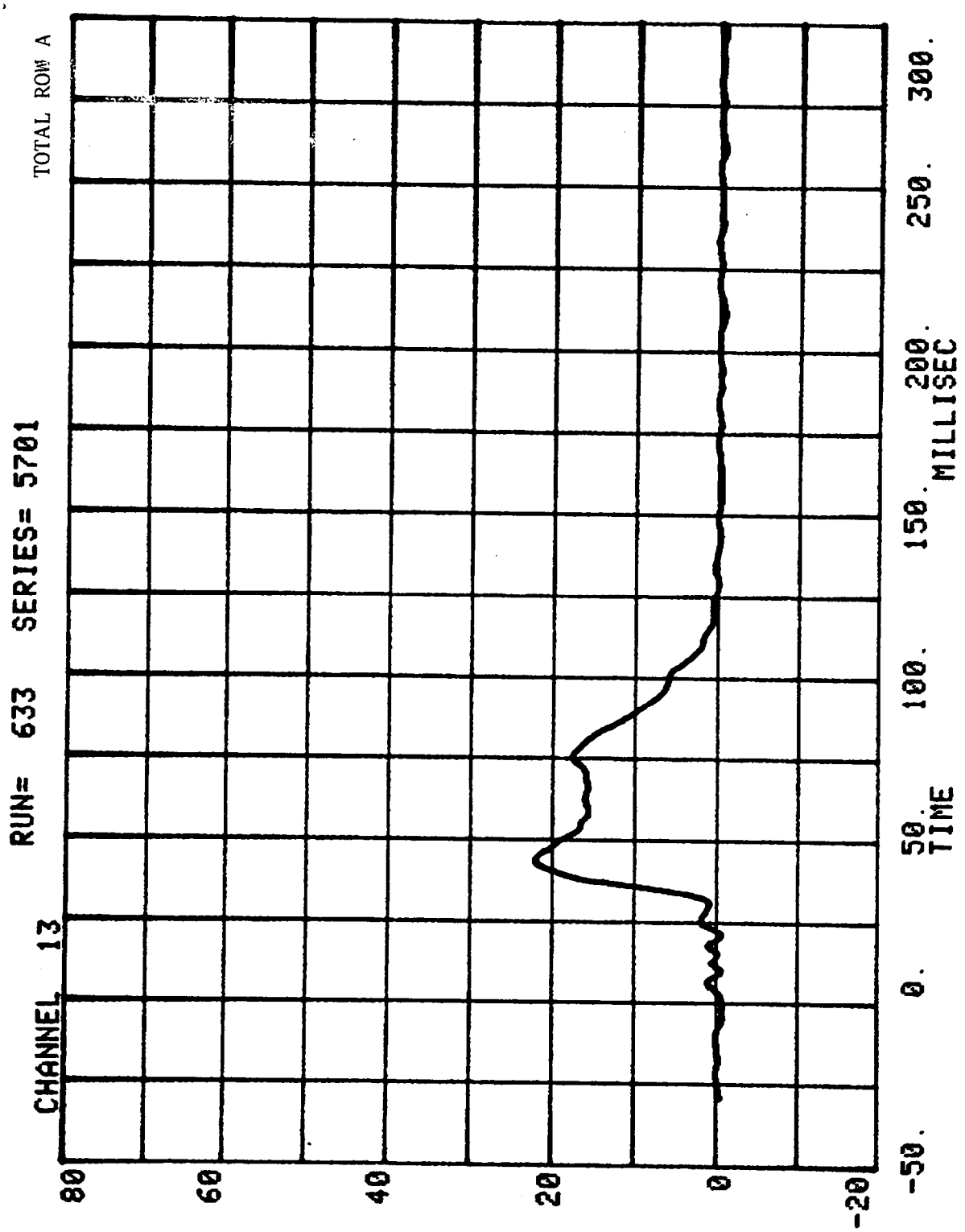

CHANNEL 68 BARRIER LOAD CELL D8
RUN= 633 SERIES= 5701
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 69 BARRIER LOAD CELL 09
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


TOTAL ROW A
RUN= 633 SERIES= 5701
CHANNEL 13
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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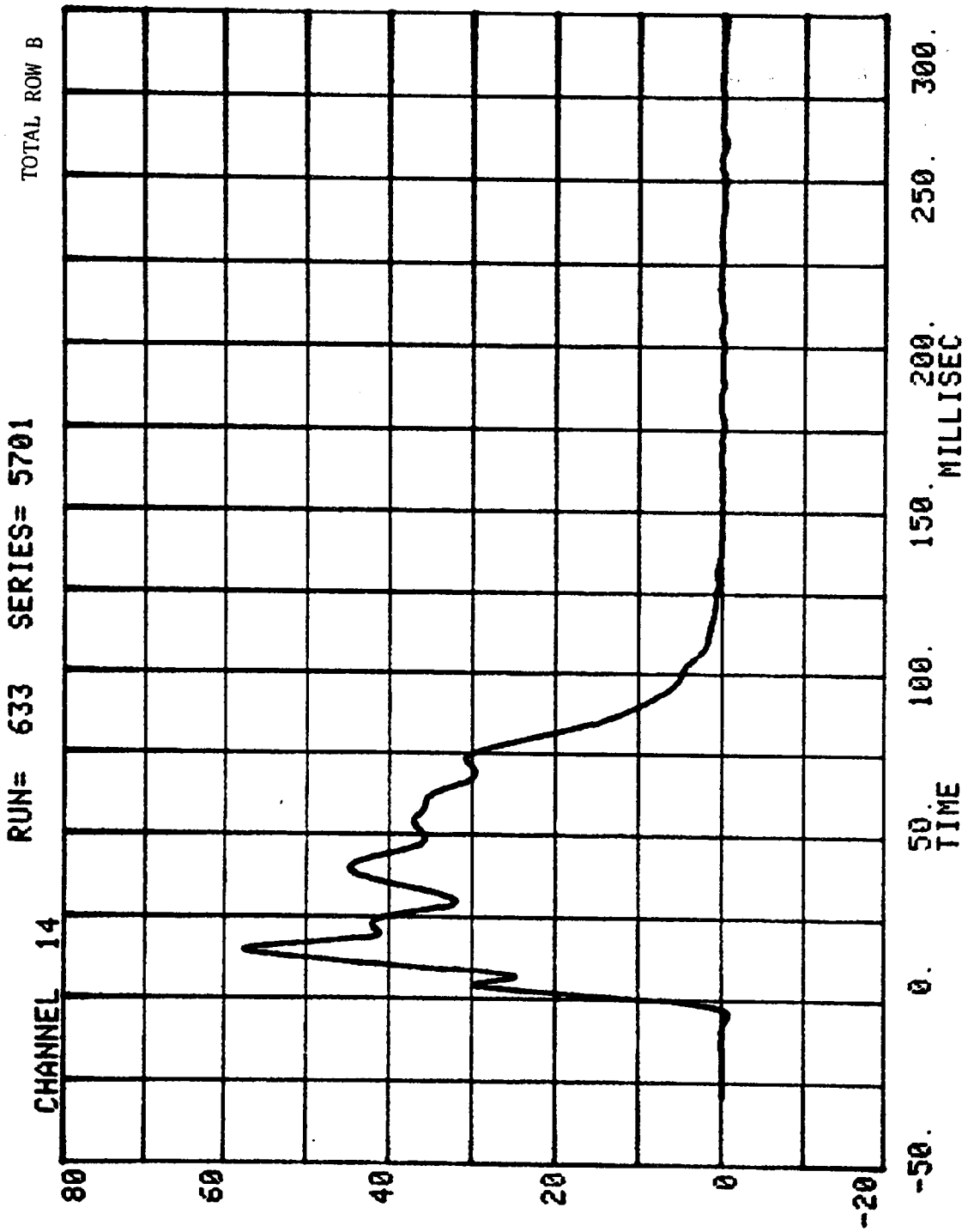
TOTAL ROW B
RUN= 633 SERIES= 5701
CHANNEL 14
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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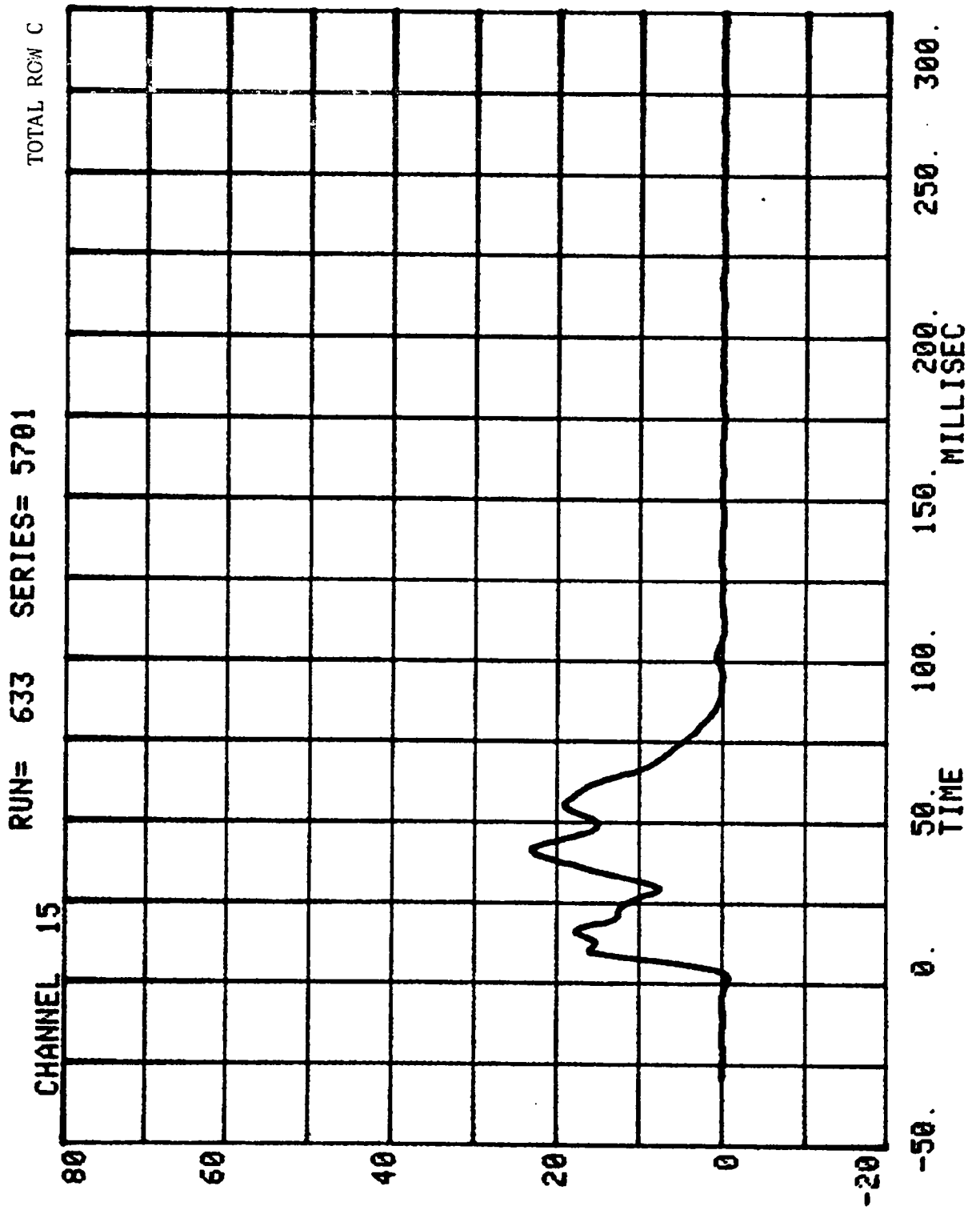
TOTAL ROW C
RUN= 633 SERIES= 5701
CHANNEL 15
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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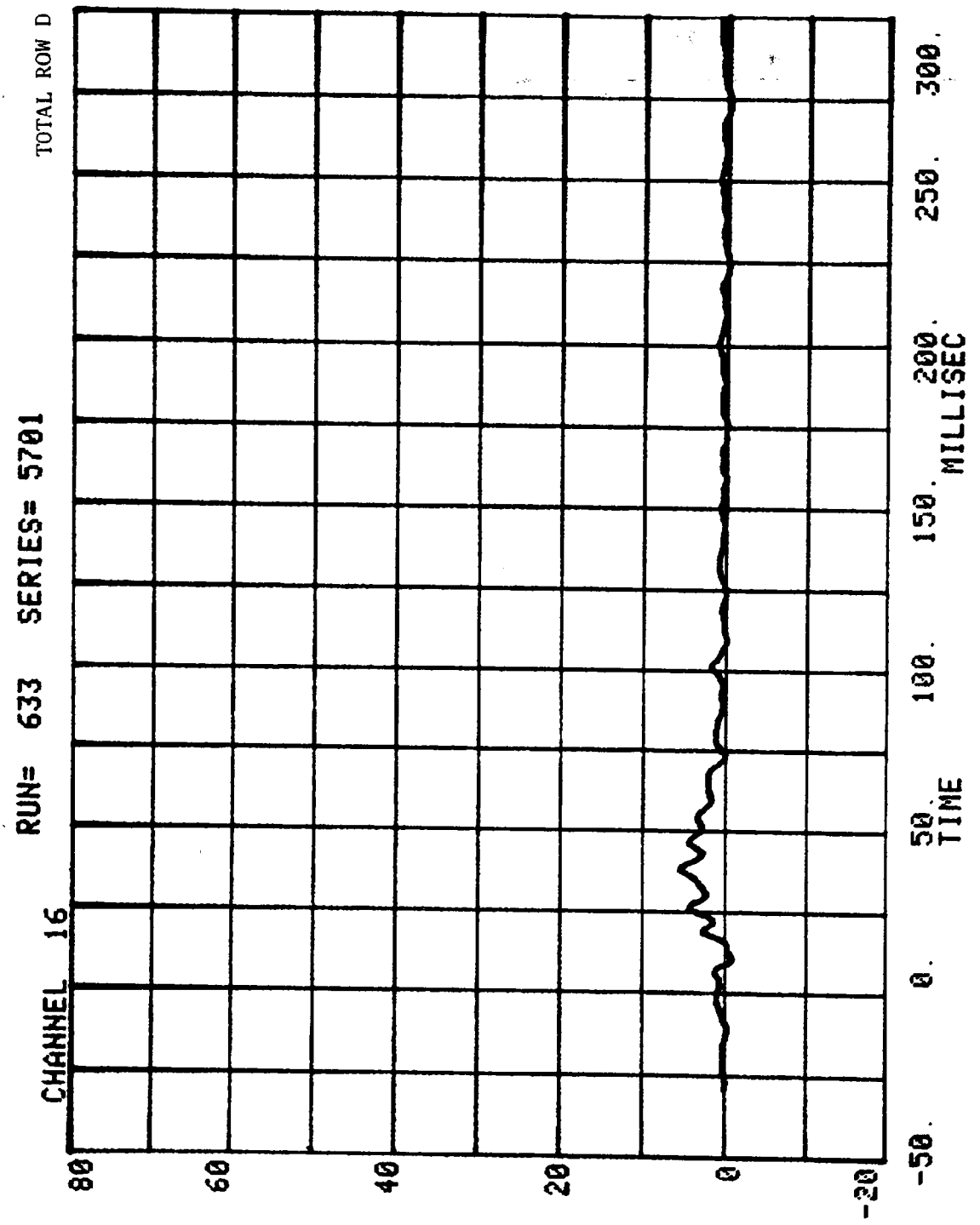
TOTAL ROW D
CHANNEL 16
RUN= 633 SERIES= 5701
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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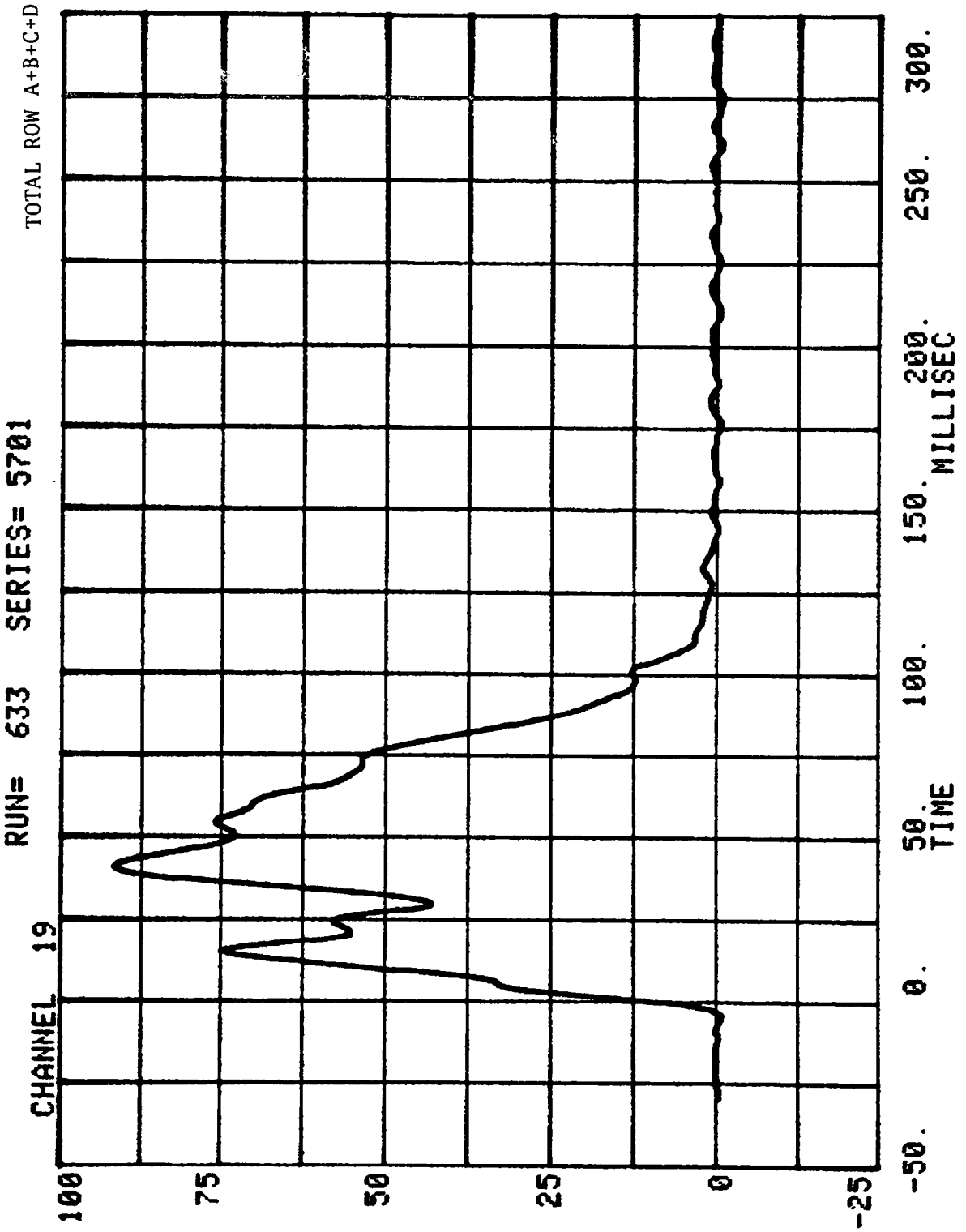
TOTAL ROW A+B+C+D
RUN= 633 SERIES= 5701
CHANNEL 19
100
75
50
25
0
-25
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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TEST NO. ME5701

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= 633

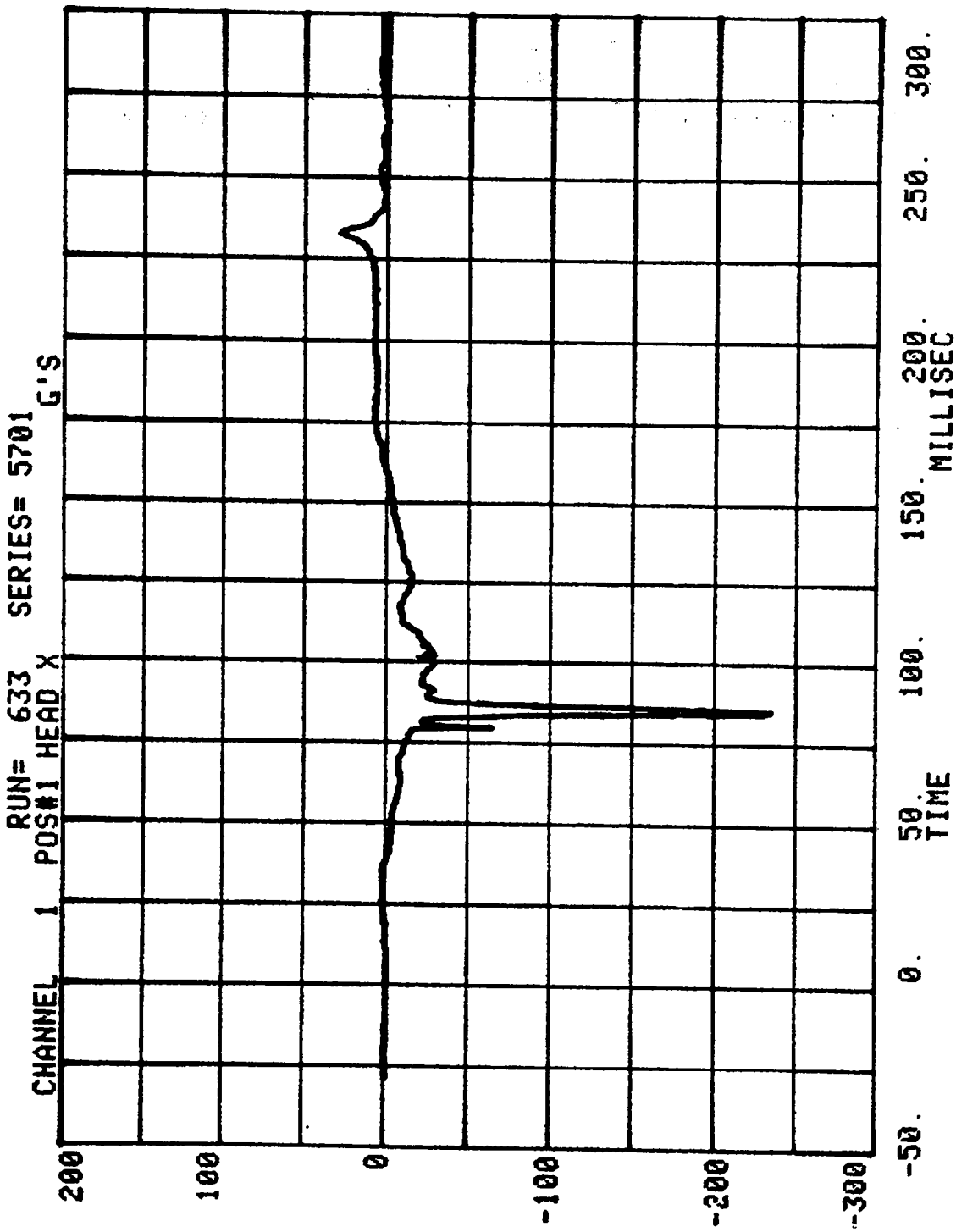
POS#1 HEAD RESULTANT

HIC=1769.2 FROM T1= .08400 TO T2= .08700

AVERAGE ACCELERATION BETWEEN T1 AND T2= 203.4G'S

EVENT TIME= 300.0 MSEC

SEVERITY INDEX=2915.2


CHANNEL 1 POS#1 HEAD X
RUN= 633 SERIES= 5701
G'S
200
100
0
-100
-200
-300
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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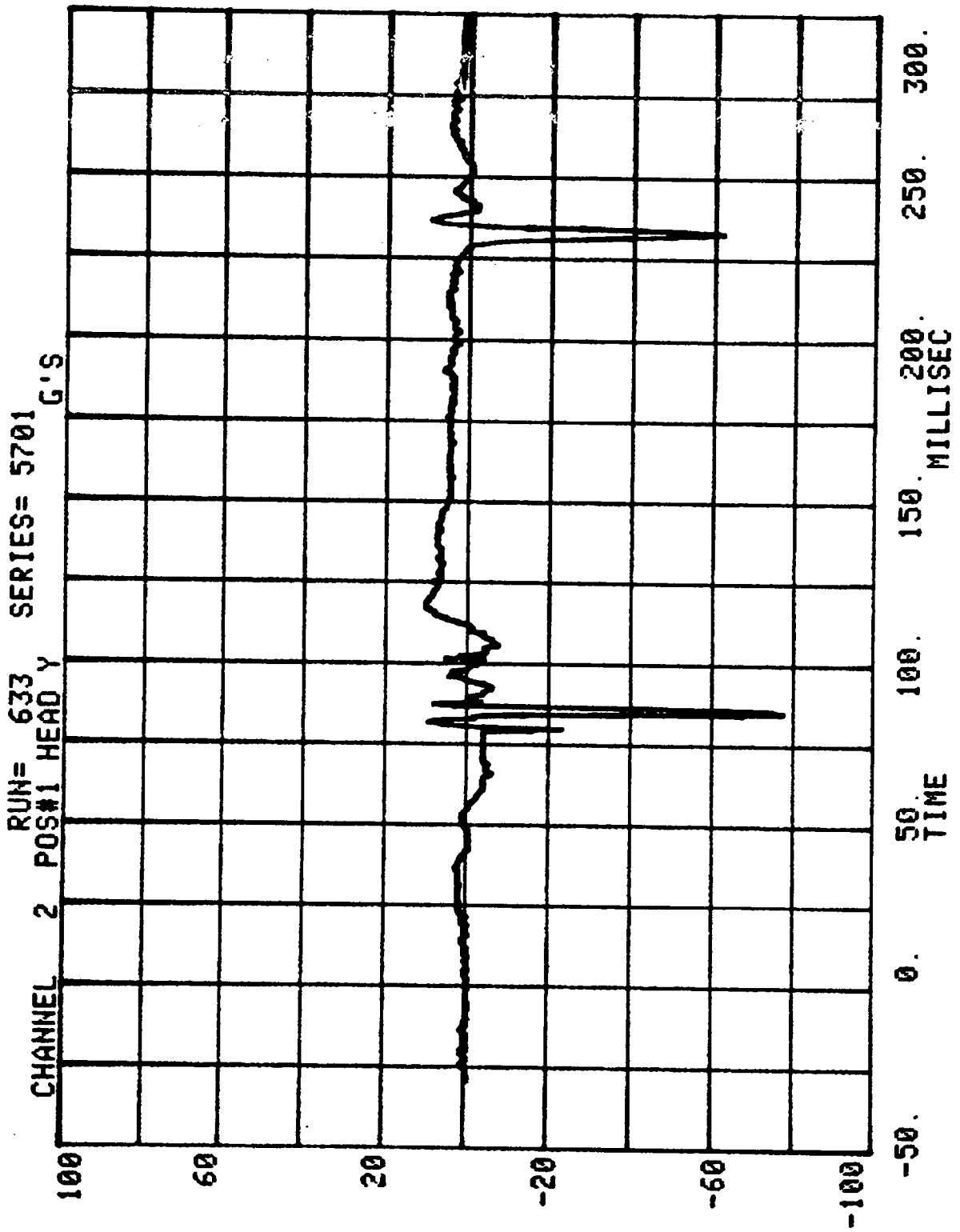
CHANNEL 2 POS#1 HEAD Y
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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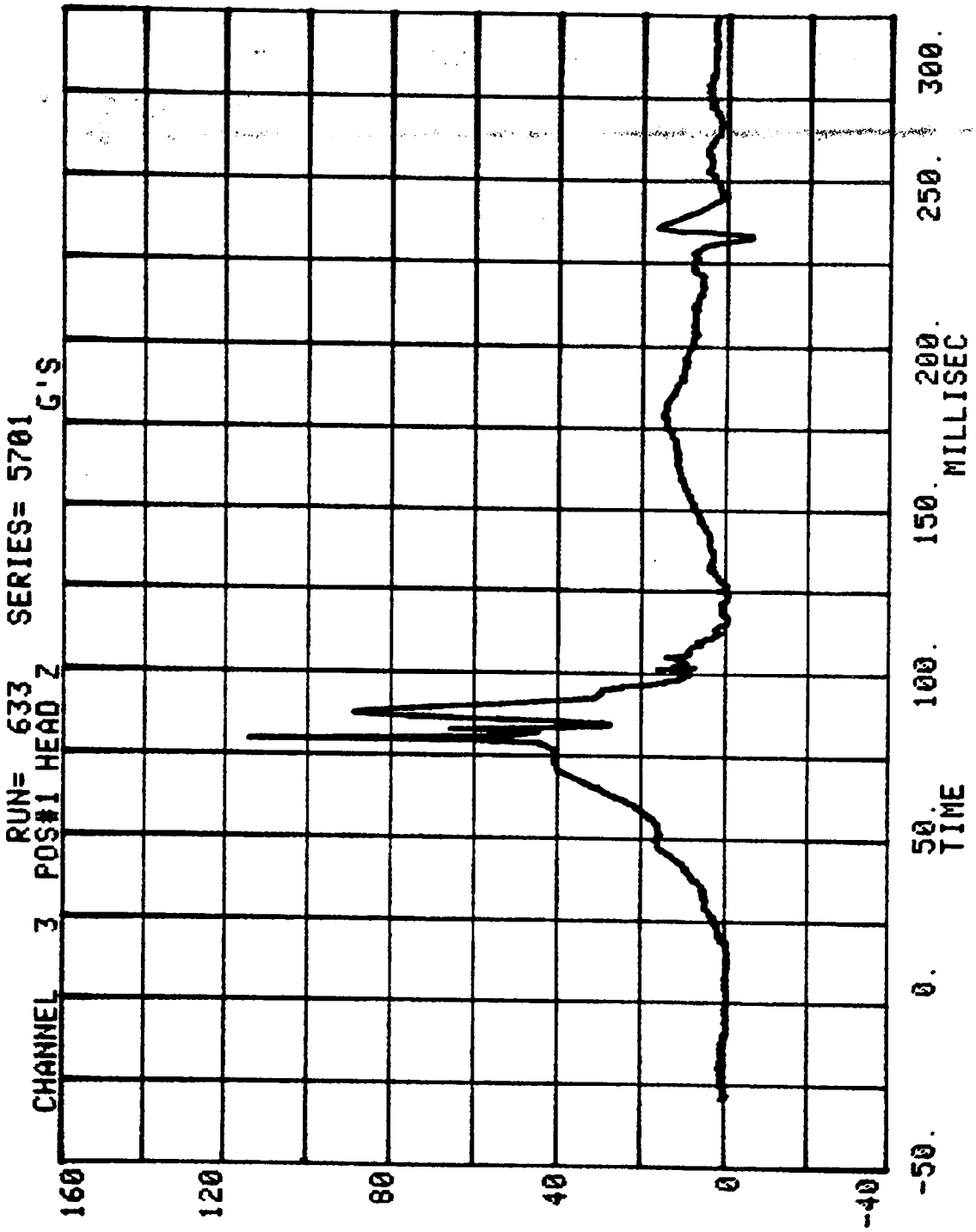
CHANNEL 3 POS#1 HEAD Z
RUN= 633 SERIES= 5701
G'S
160
120
80
40
0
-40
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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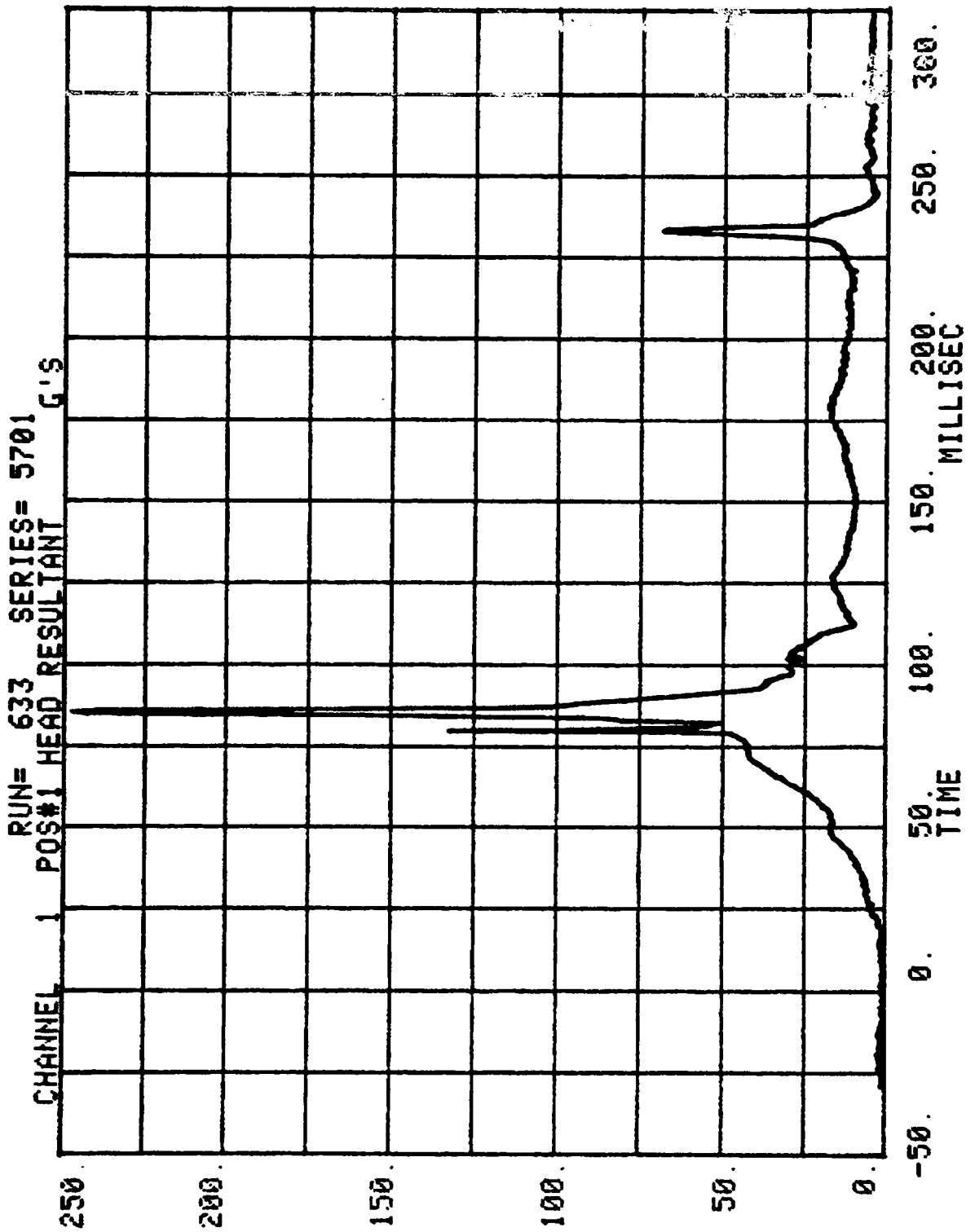
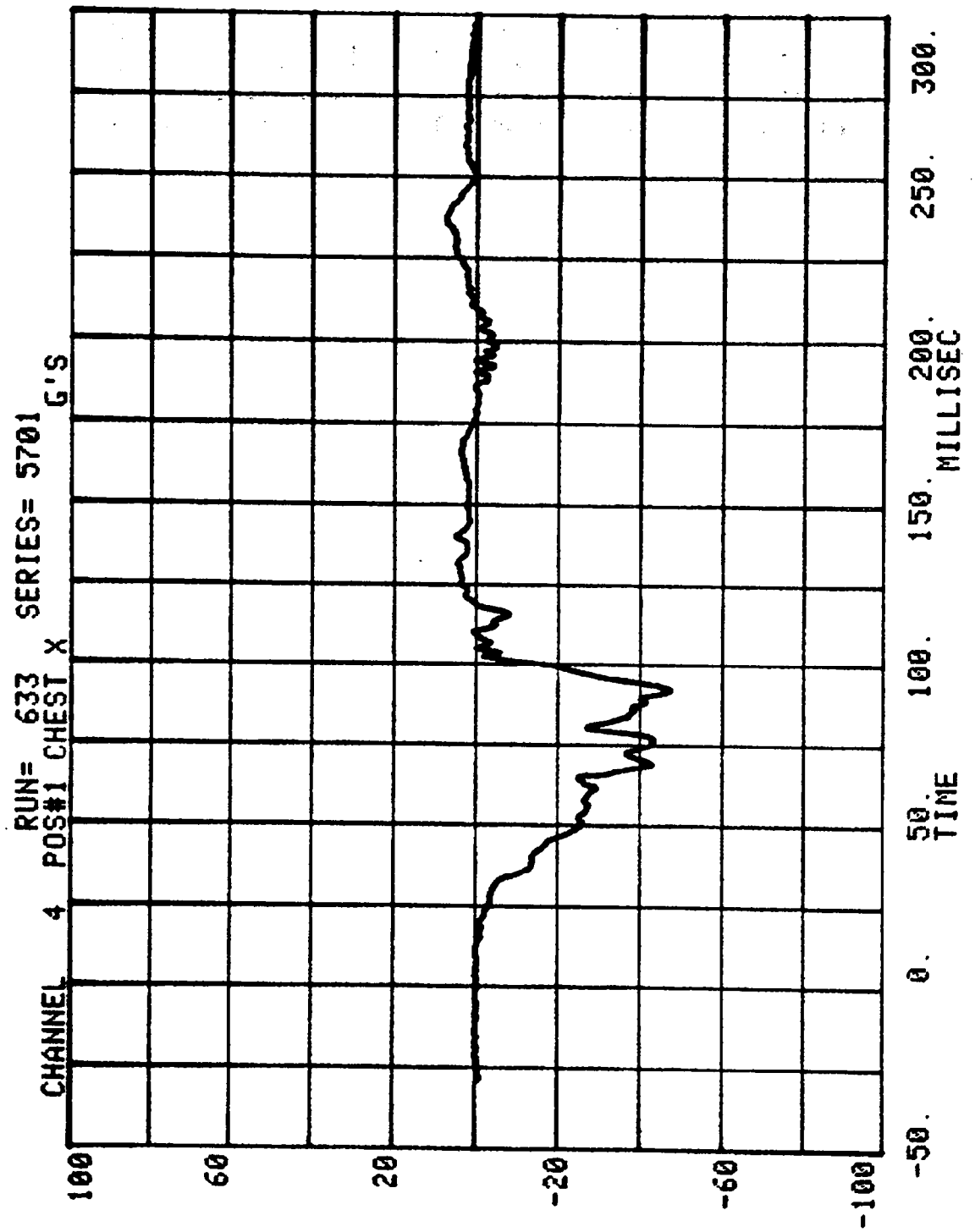
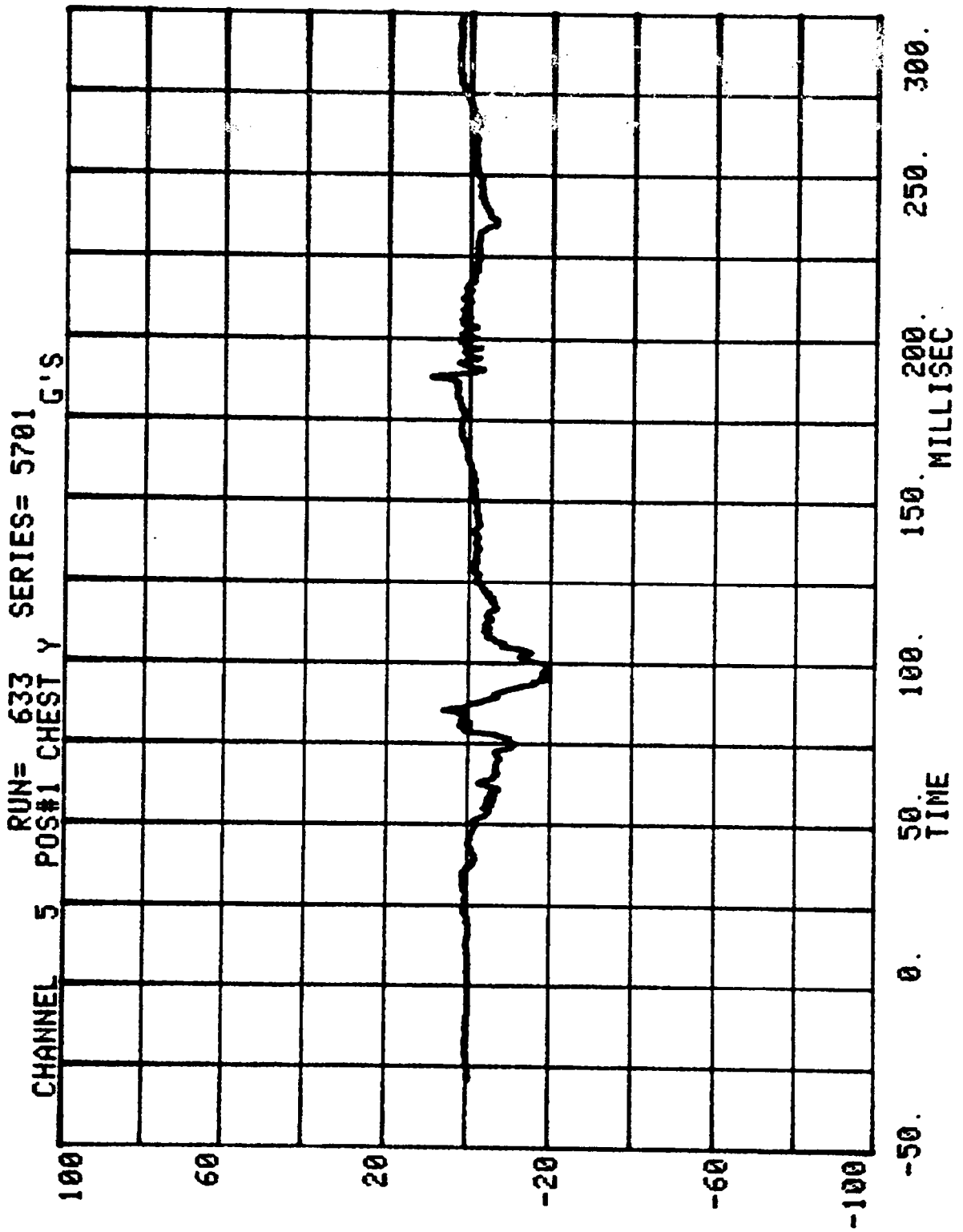
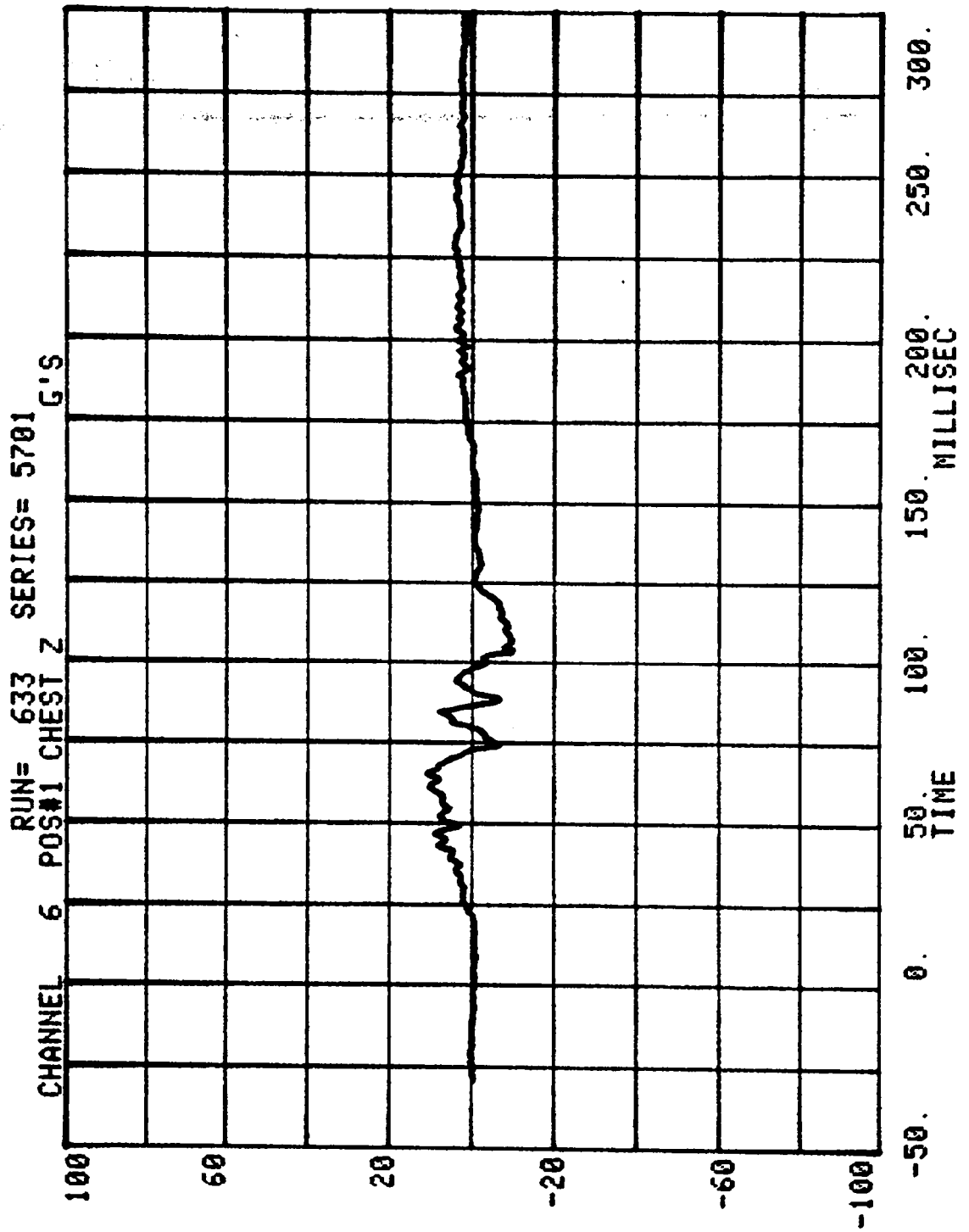
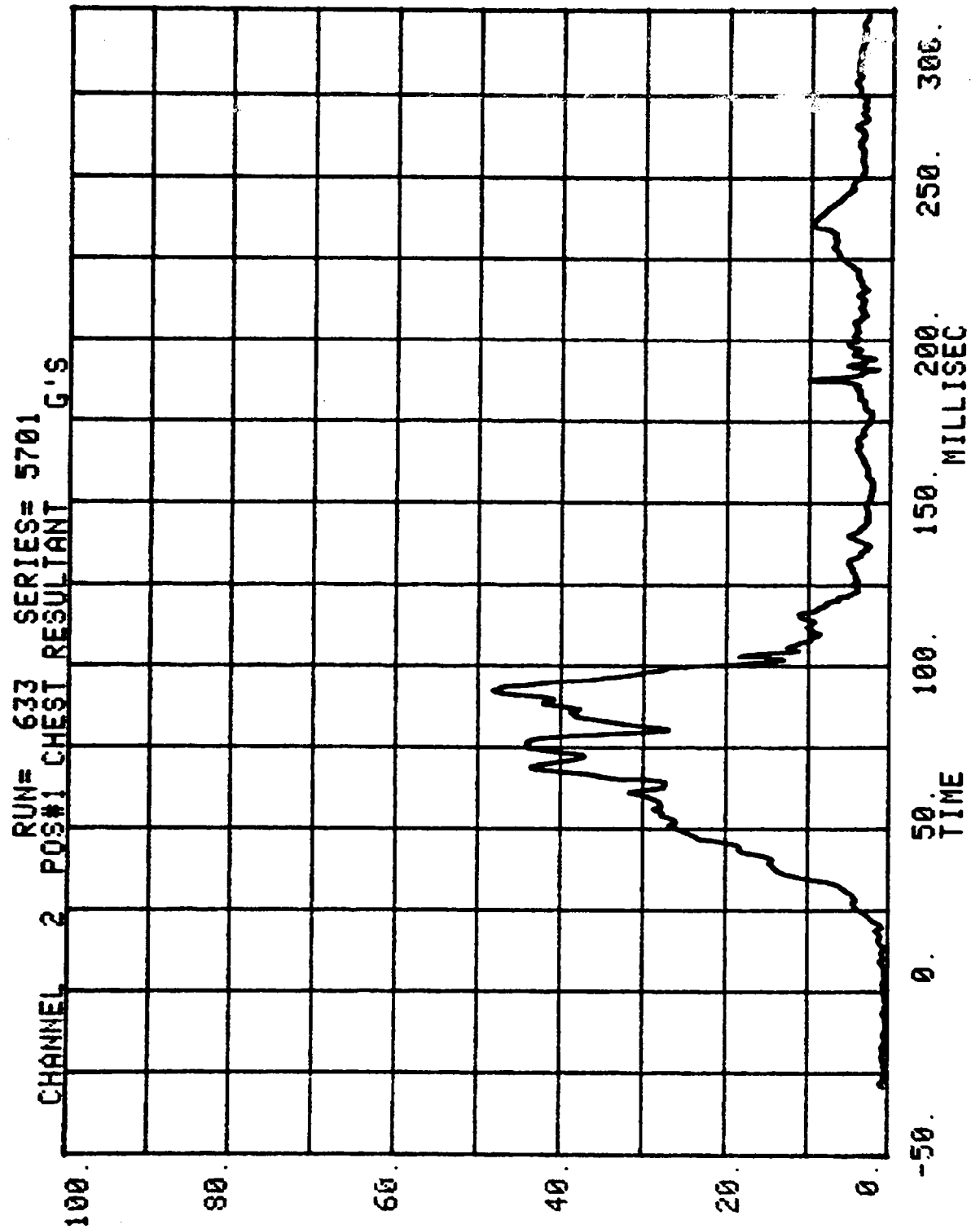

CHANNEL 1 POS#1 HEAD RESULTANT
RUN= 633 SERIES= 5701
G'S
250.
200.
150.
100.
50.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 4 RUN= 633 SERIES= 5701
POS#1 CHEST X
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 5 POS#1 CHEST Y
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 6 POS#1 CHEST Z
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 2 POS#1 CHEST RESULTANT
RUN= 633 SERIES= 5701
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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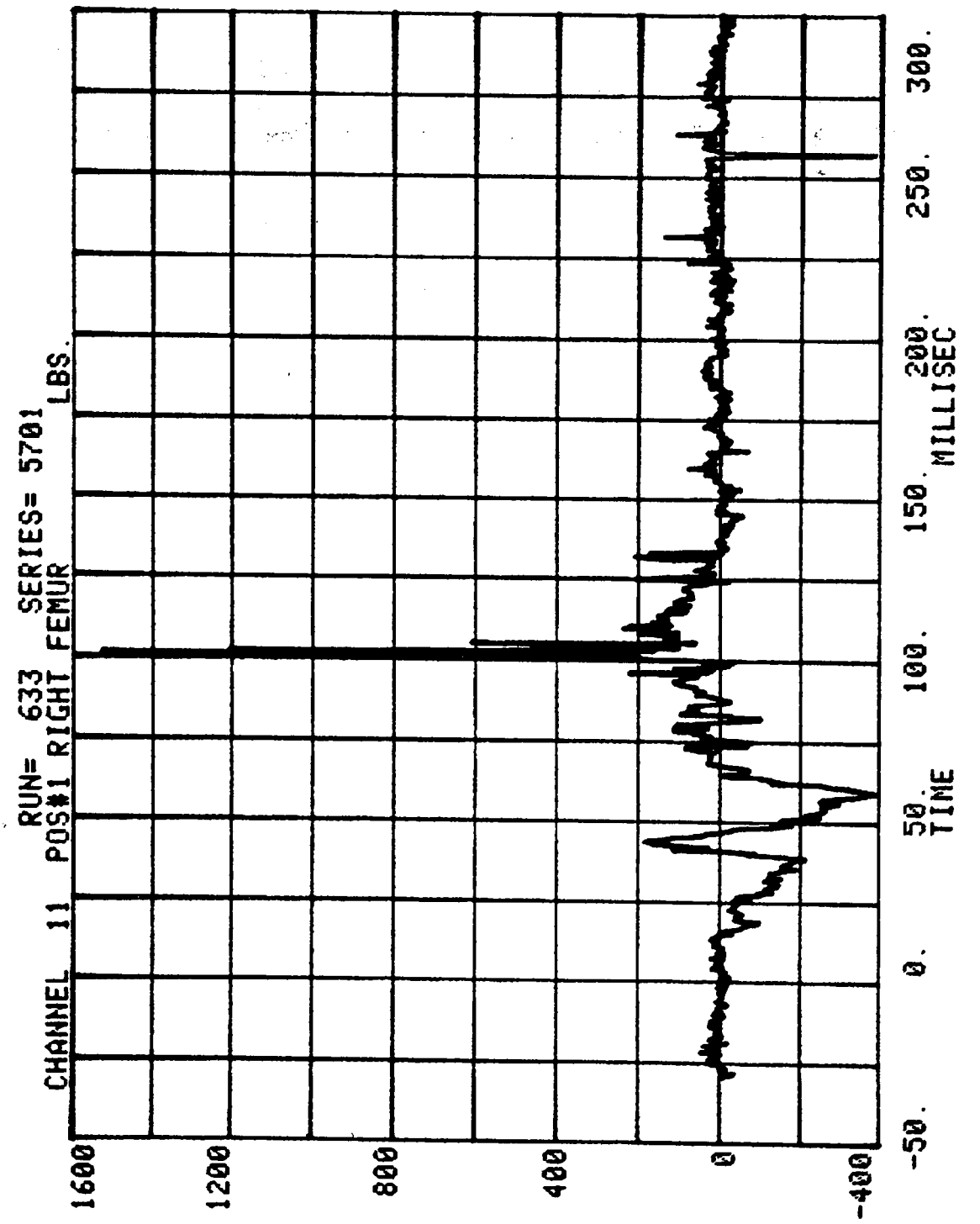
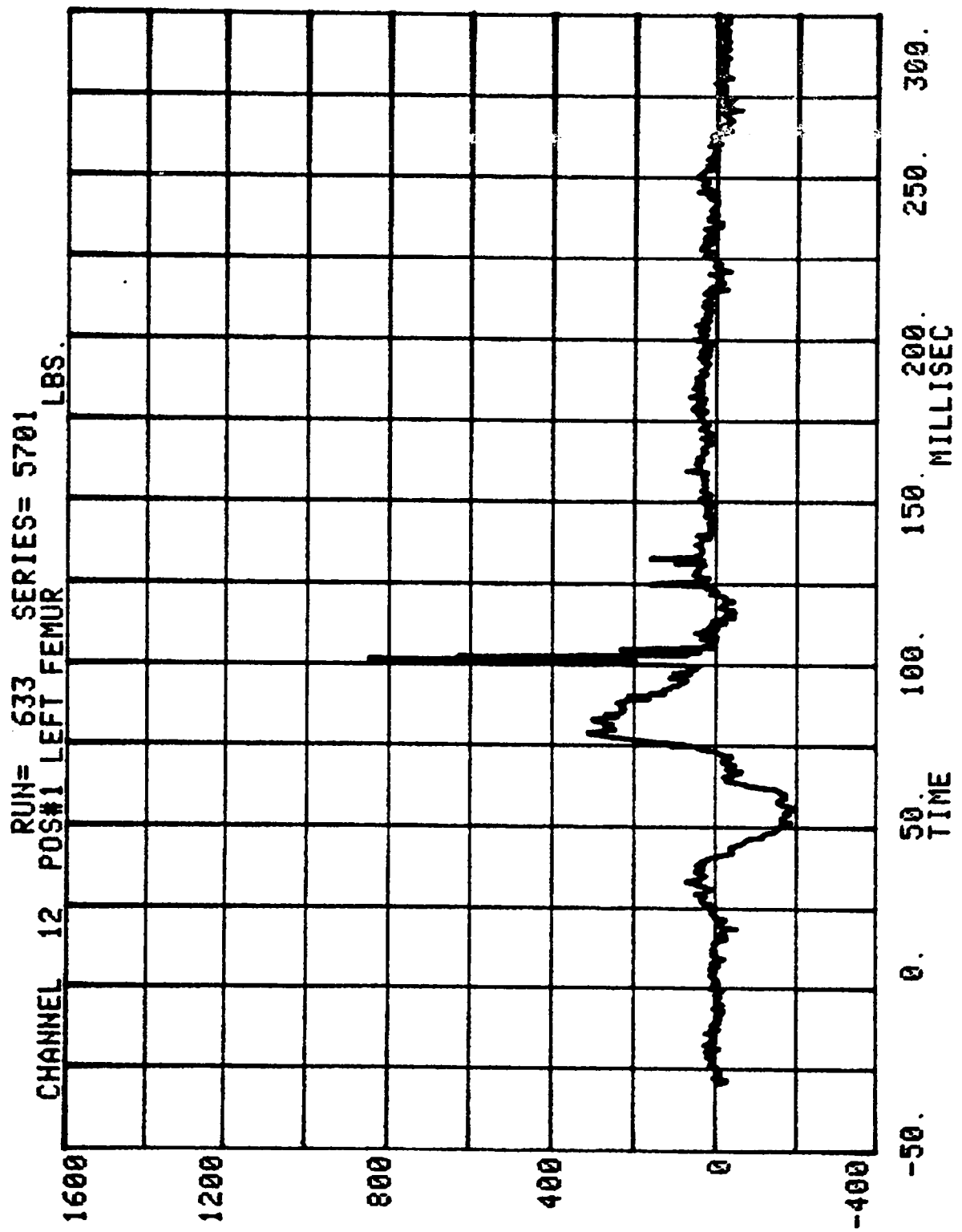
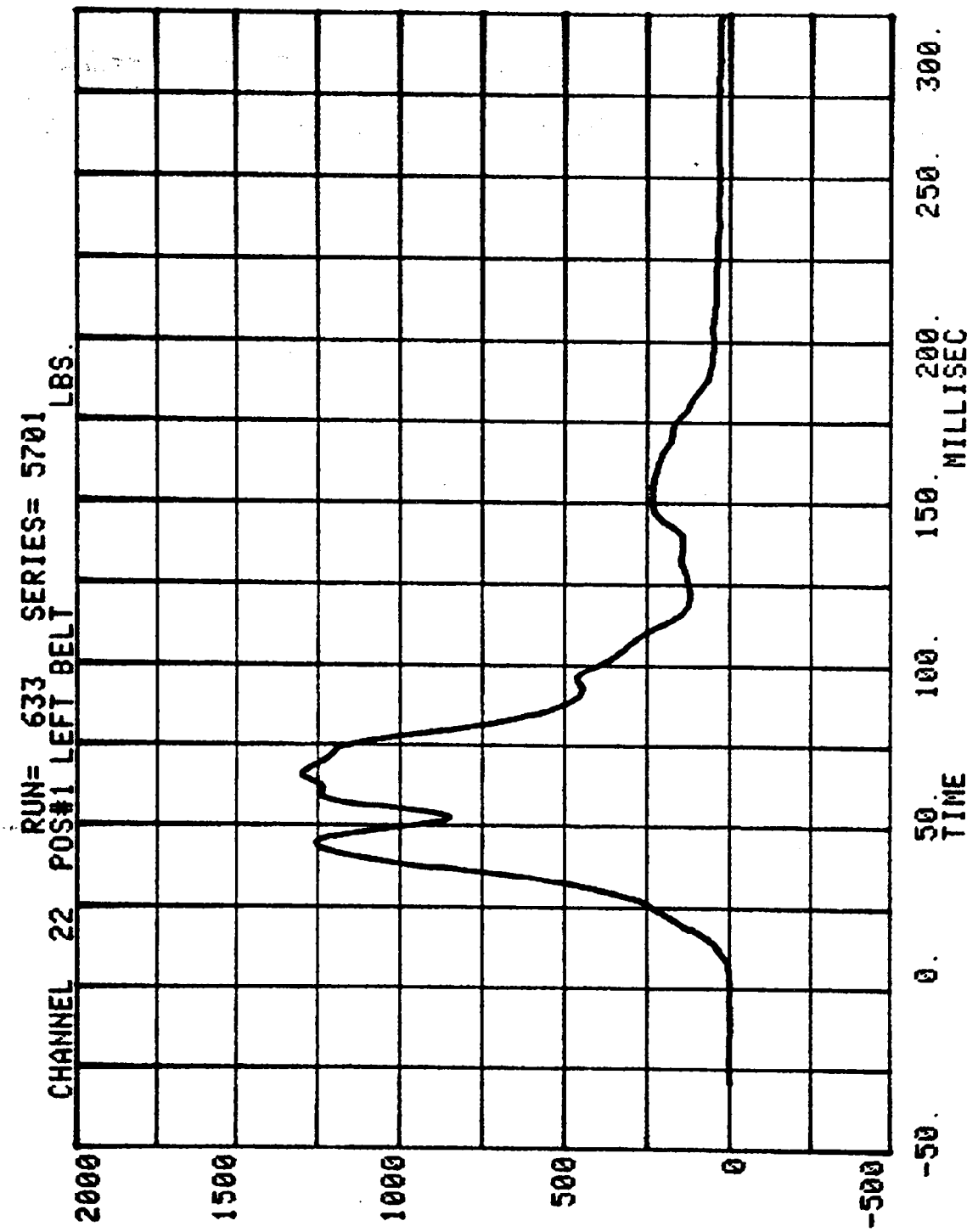
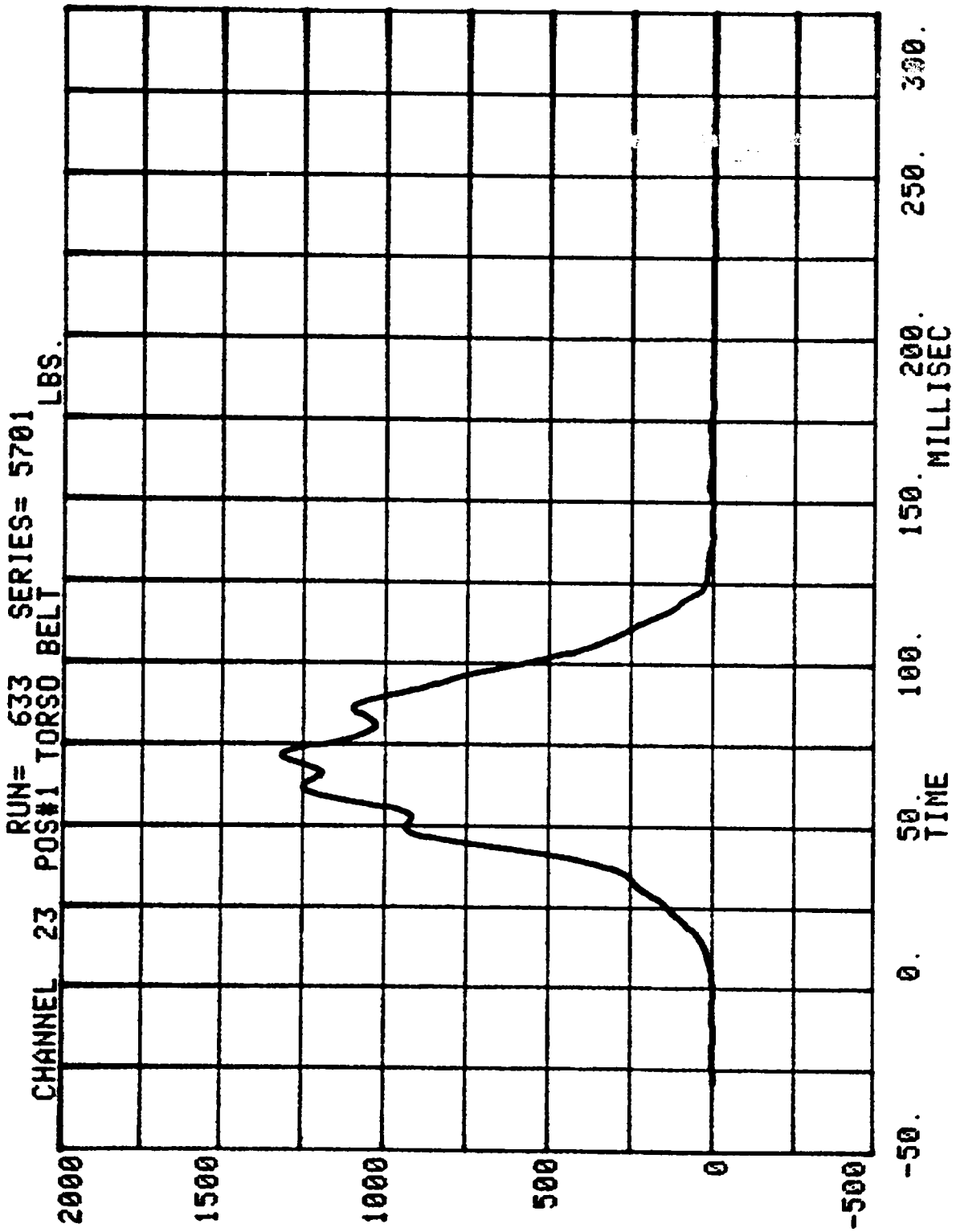

CHANNEL 11 POS#1 RIGHT FEMUR
RUN= 633 SERIES= 5701
LBS.
1600
1200
800
400
0
-400
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

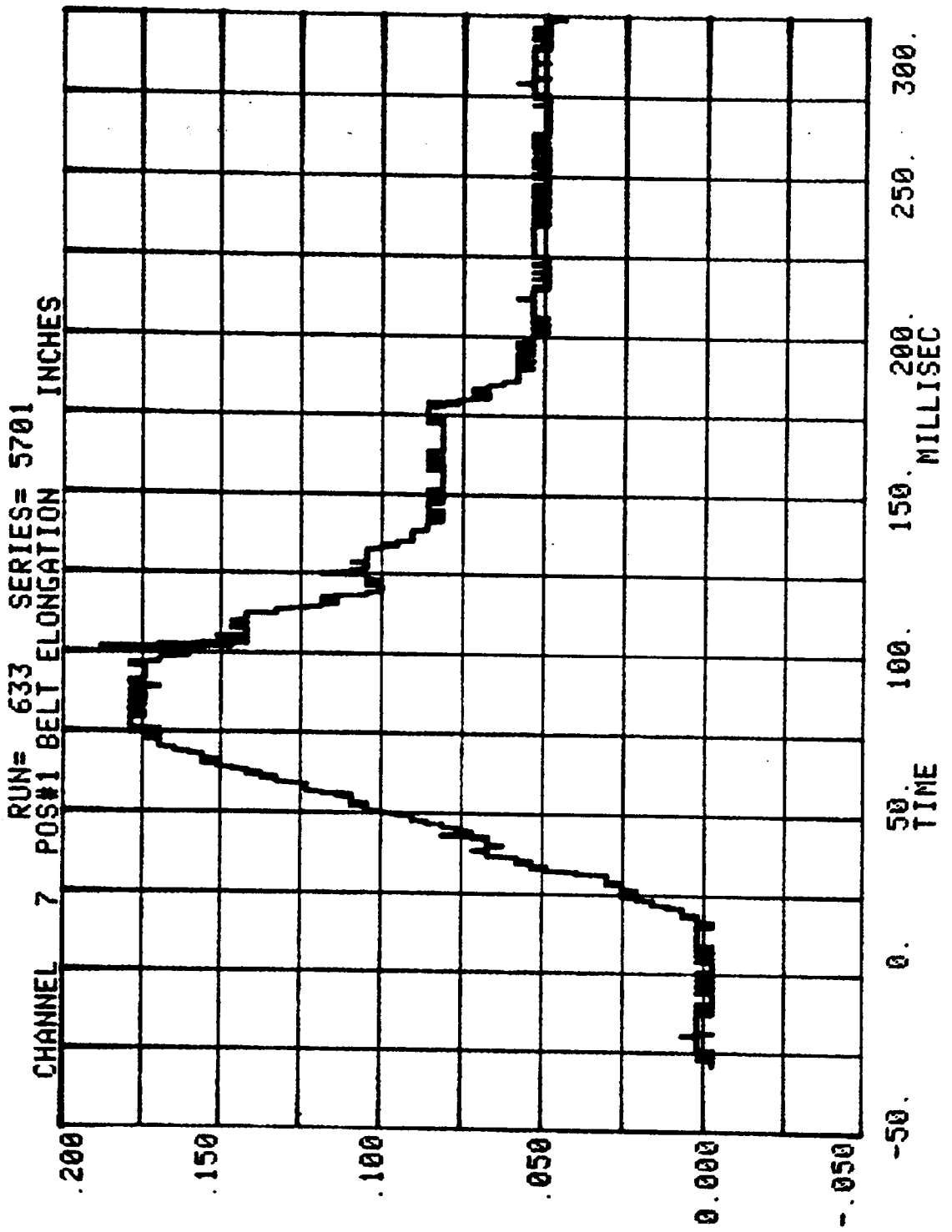
7103-V-26

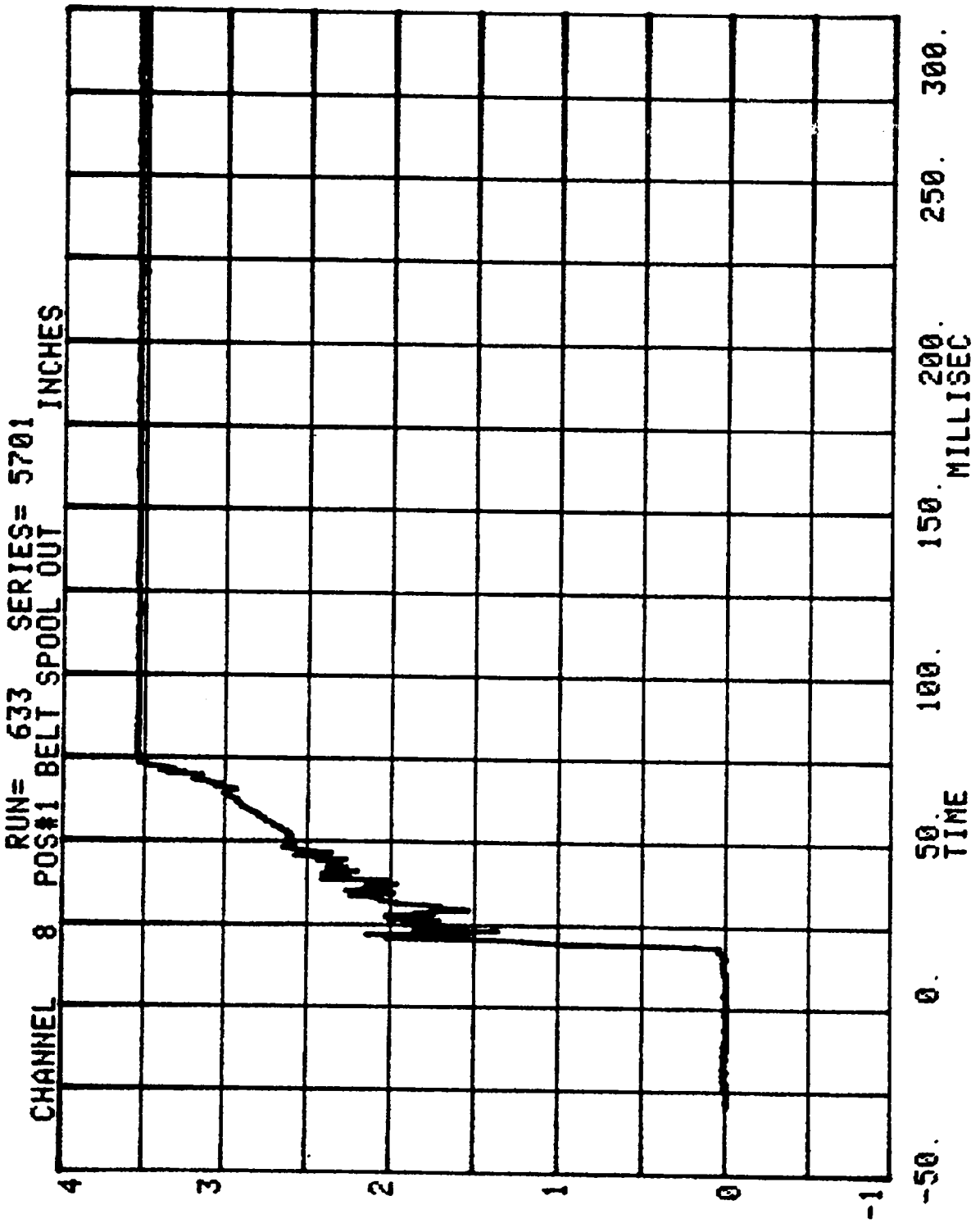

CHANNEL 12 POS#1 LEFT FEMUR
RUN= 633 SERIES= 5701
LBS.
1600
1200
800
400
0
-400
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 22 POS#1 LEFT BELT
RUN= 633 SERIES= 5701
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7103-V-26


CHANNEL 23 RUN= 633 SERIES= 5701
POS#1 TORSO BELT
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 7 POS#1 BELT ELONGATION
RUN= 633 SERIES= 5701 INCHES
.200
.150
.100
.050
0.000
-.050
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 8 POS#1 BELT SPOOL OUT
RUN= 633 SERIES= 5701
INCHES
4
3
2
1
0
-1
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

HEAD INJURY CRITERION
HEAD SEVERITY INDEX

CAR TO LOAD CELL BARRIER

RUN= 633

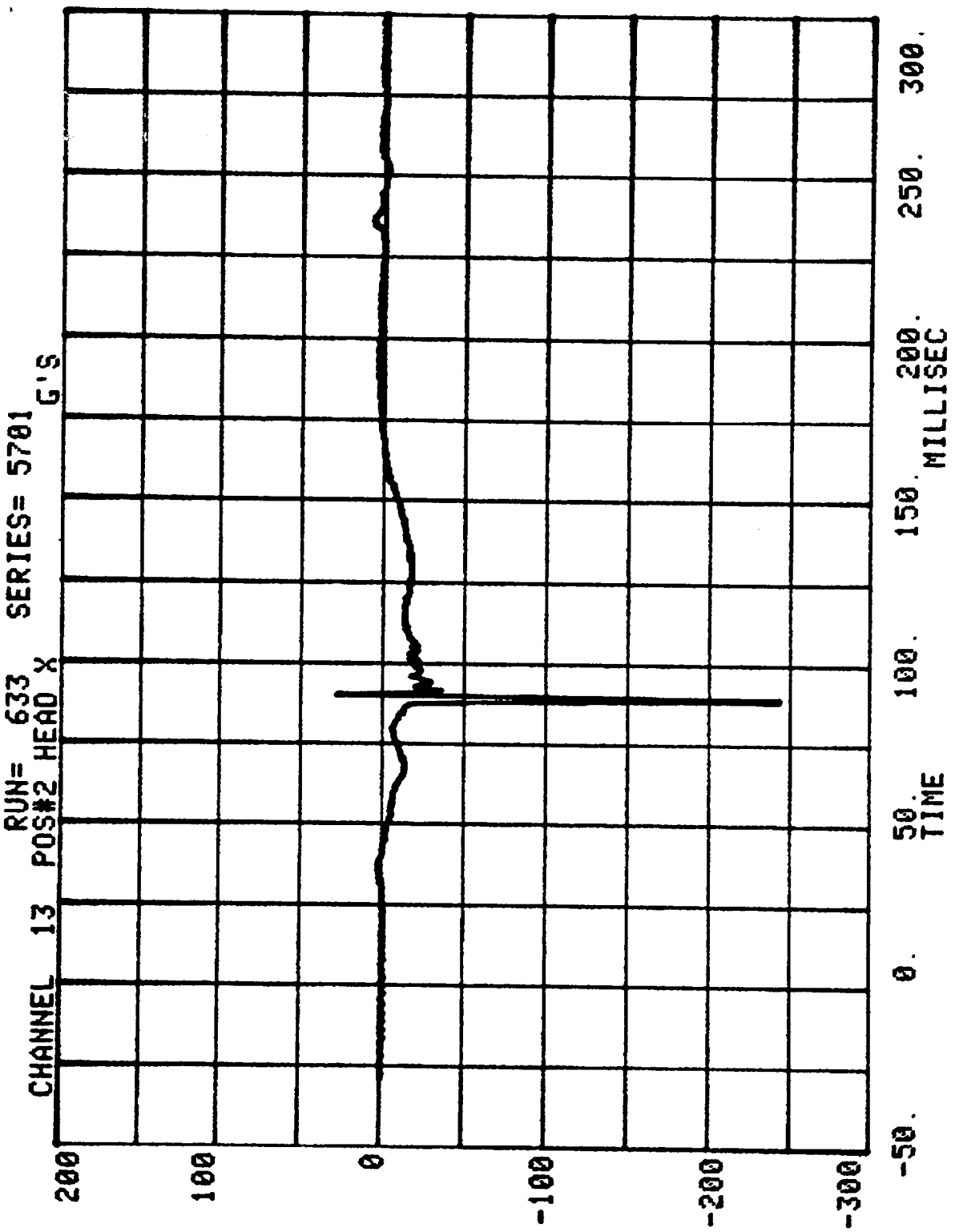
POS#2 HEAD RESULTANT

HIC=2453.9 FROM T1= .08865 TO T2= .09000

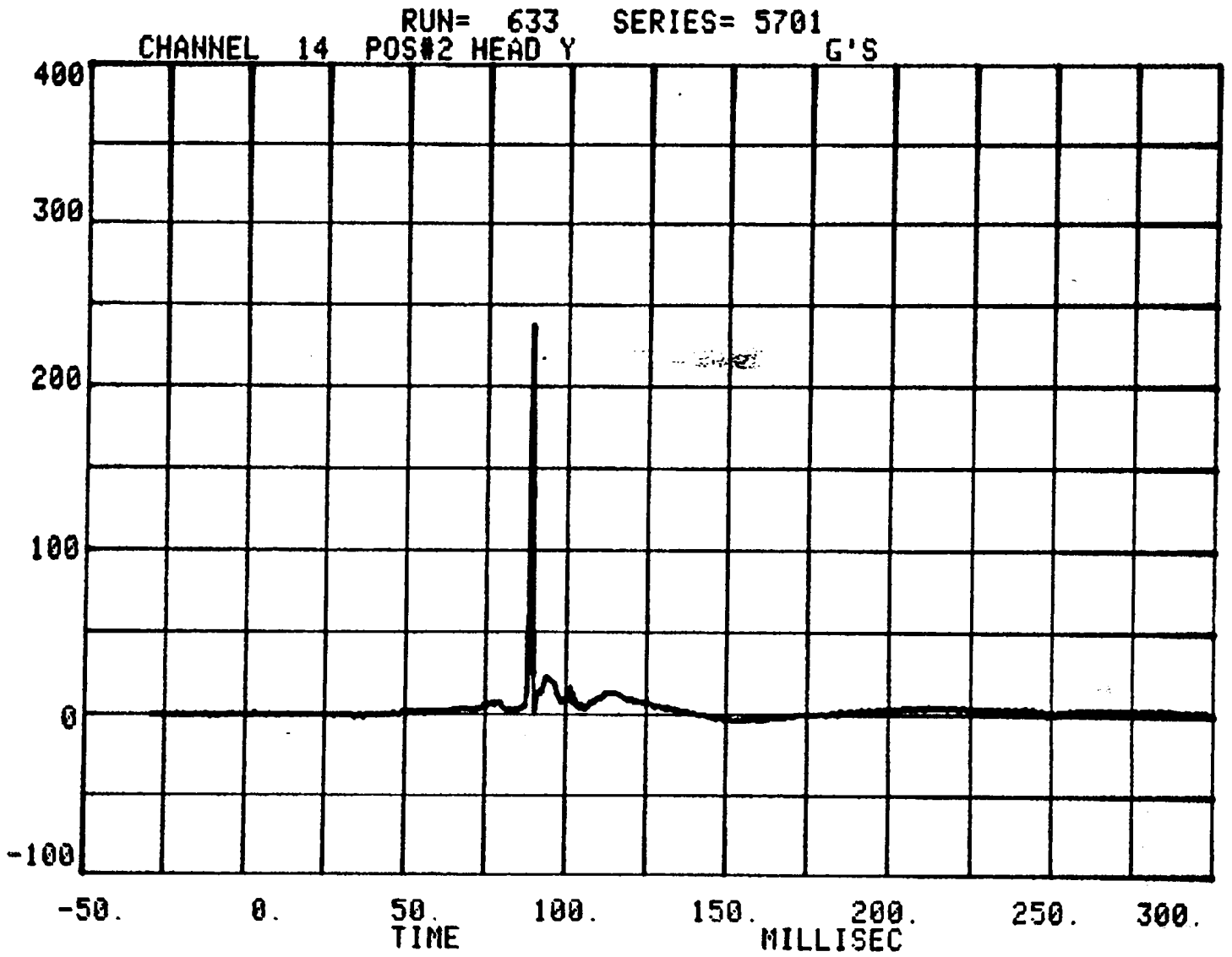
AVERAGE ACCELERATION BETWEEN T1 AND T2= 319.0G'S

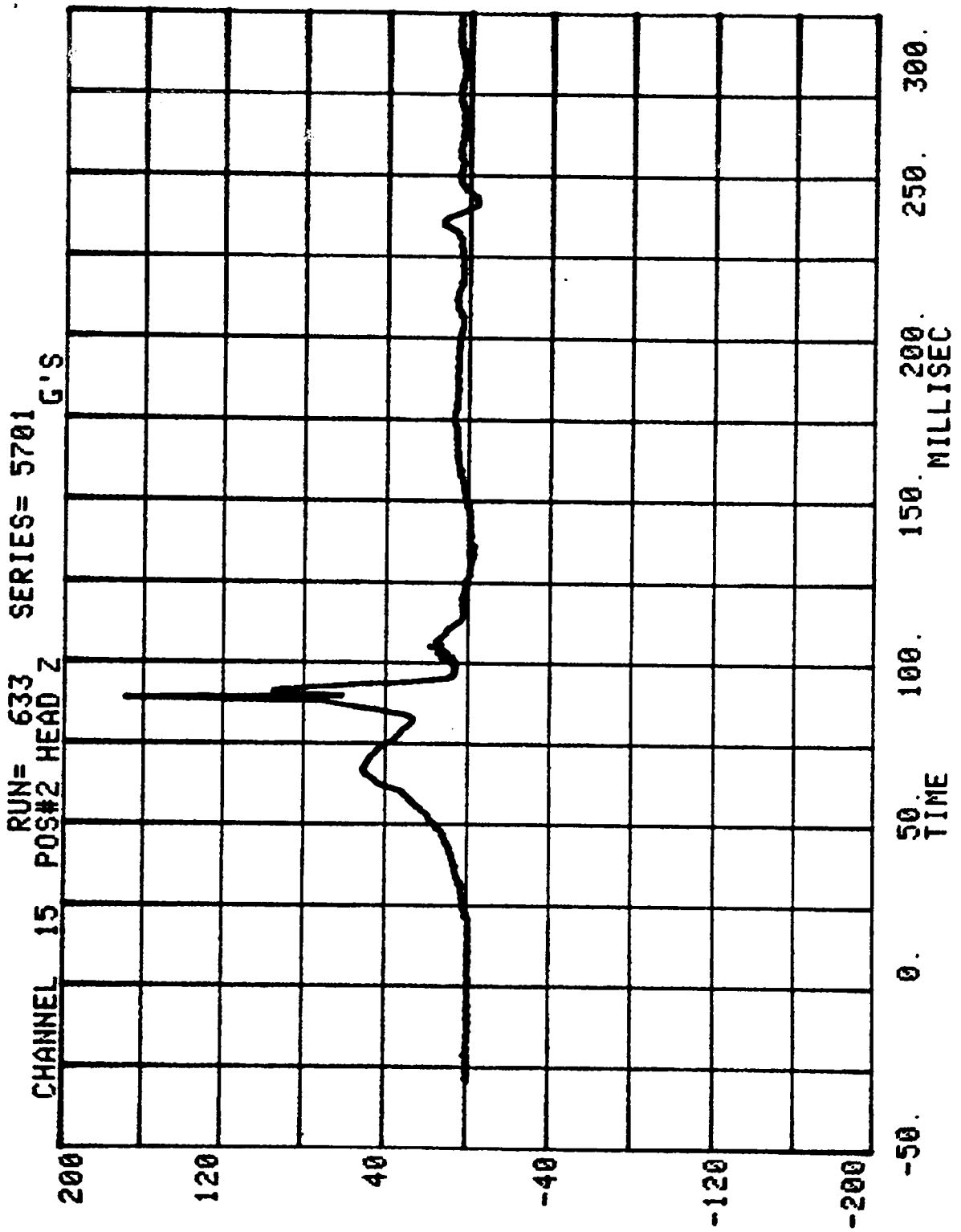
EVENT TIME= 300.0 MSEC

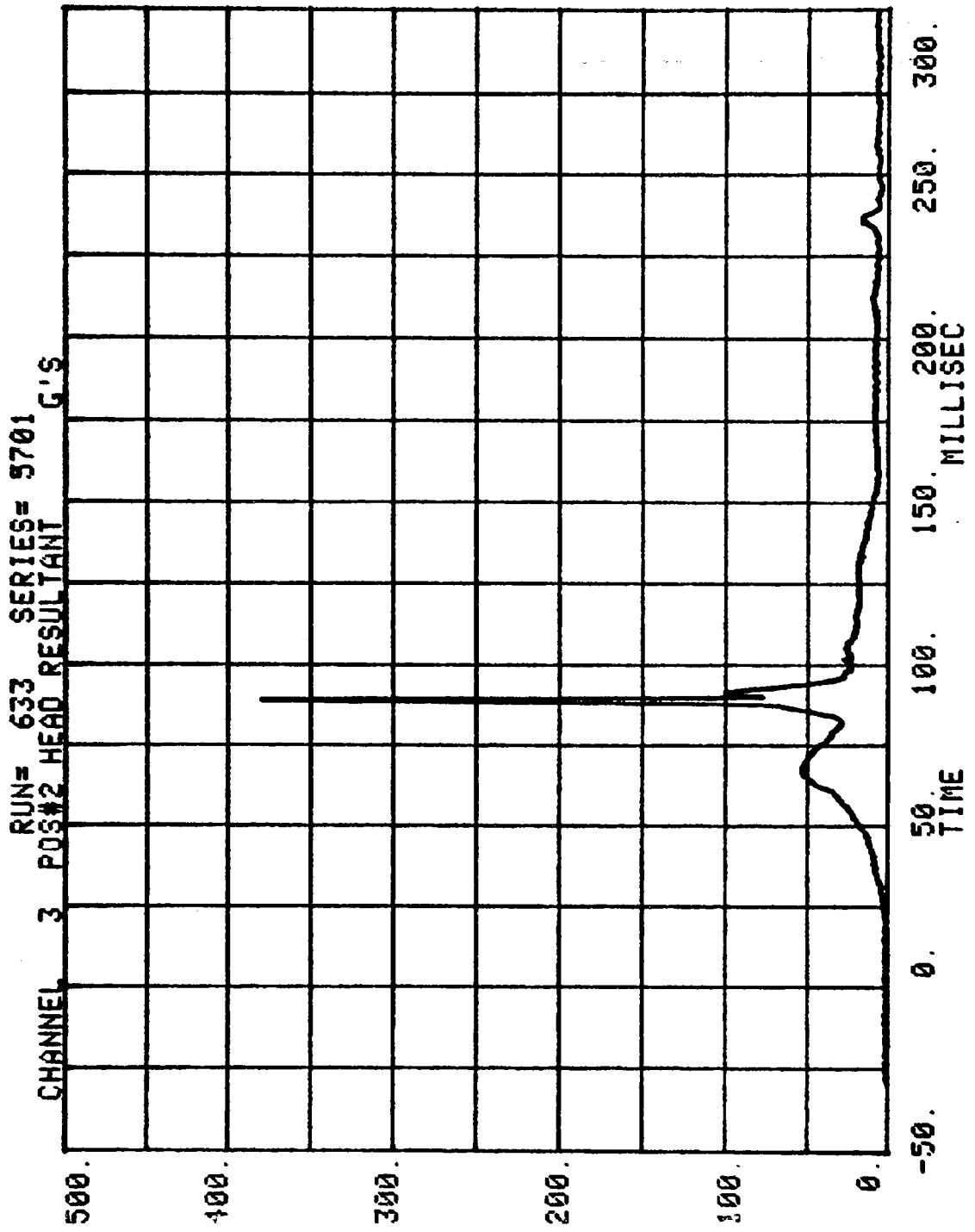
SEVERITY INDEX=3499.6


CHANNEL 13 POS#2 HEAD X
RUN= 633 SERIES= 5701
G'S
200
100
0
-100
-200
-300
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

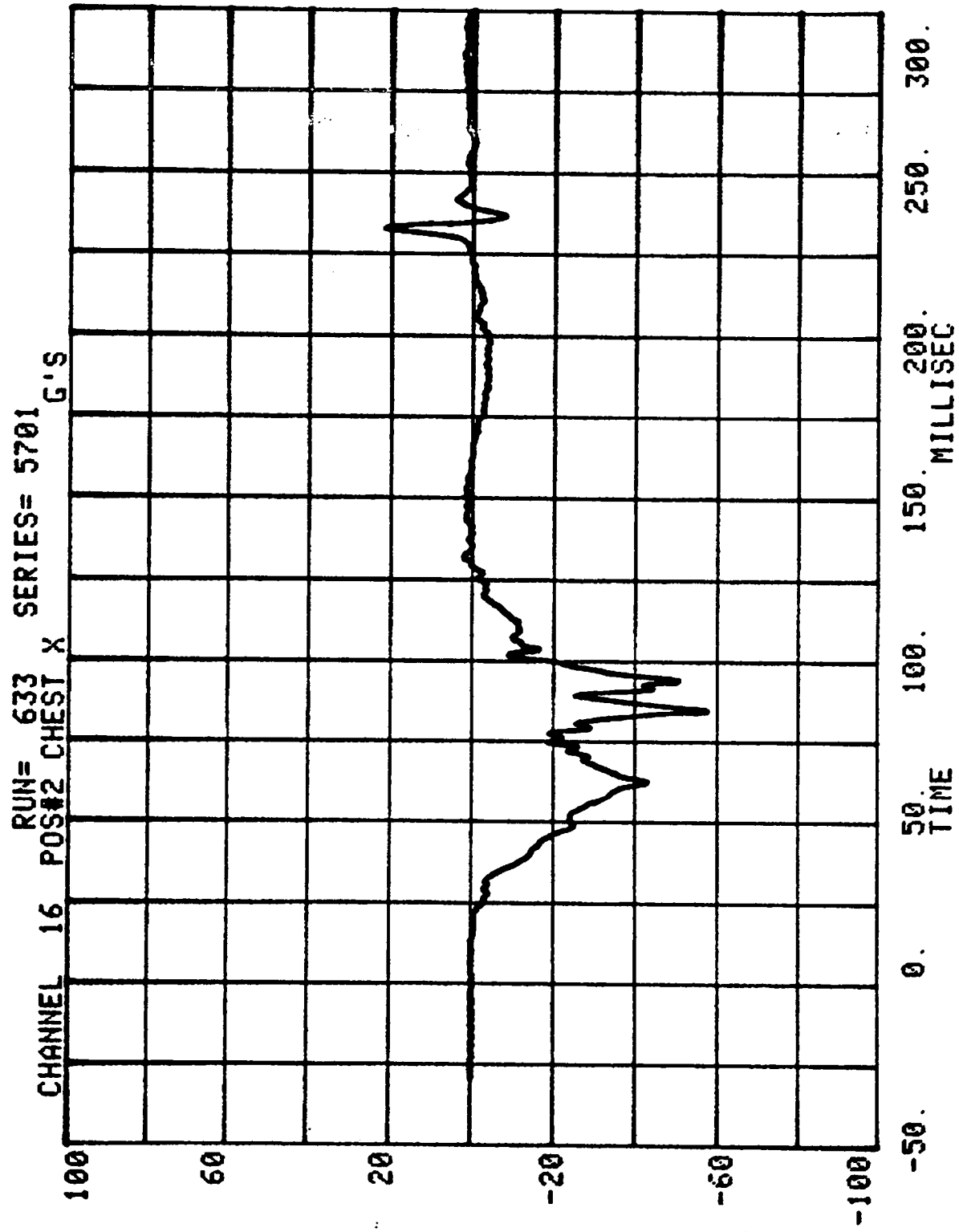
7103-V-26

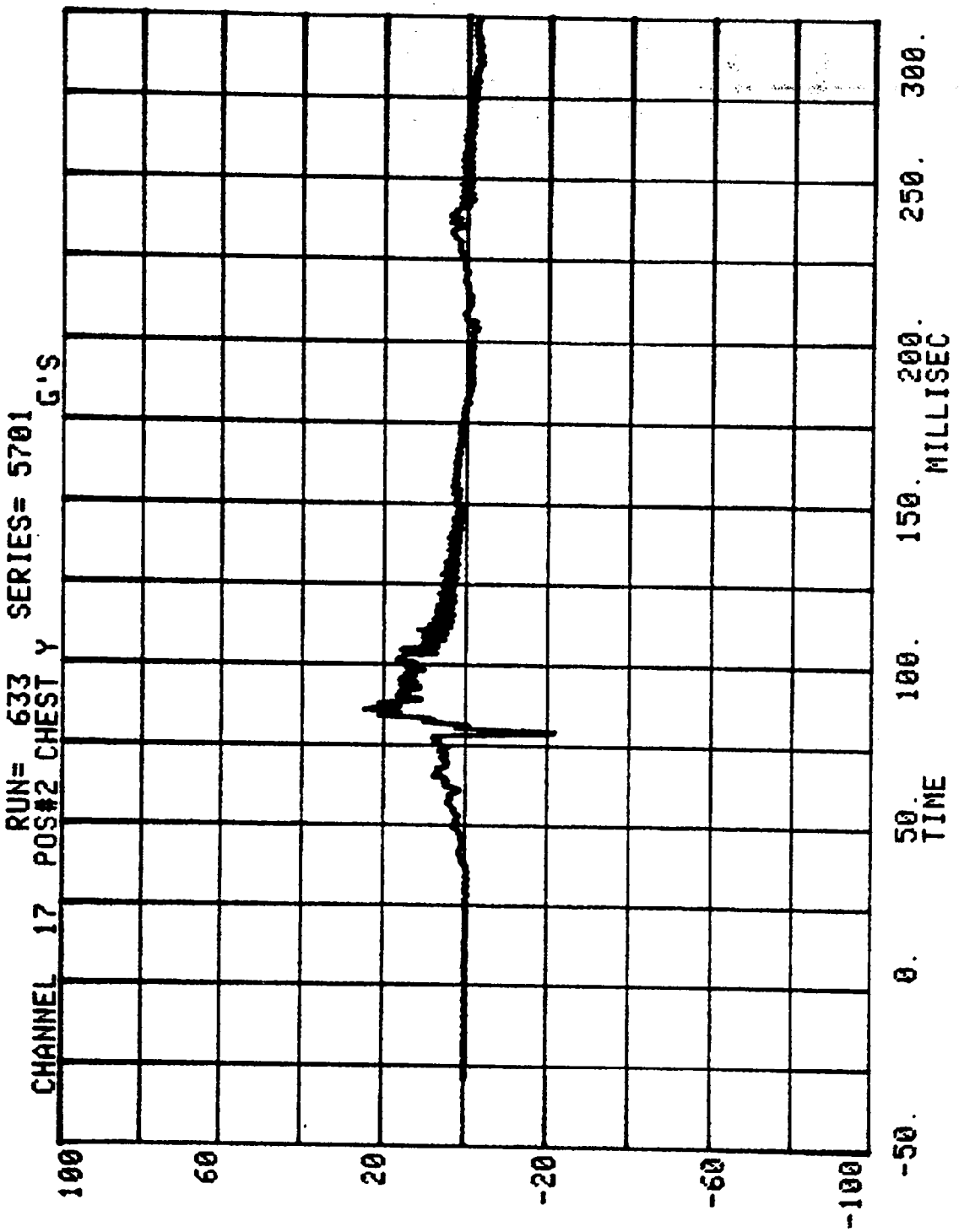

RUN= 633 SERIES= 5701
CHANNEL 14 POS#2 HEAD Y
G'S
400
300
200
100
0
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

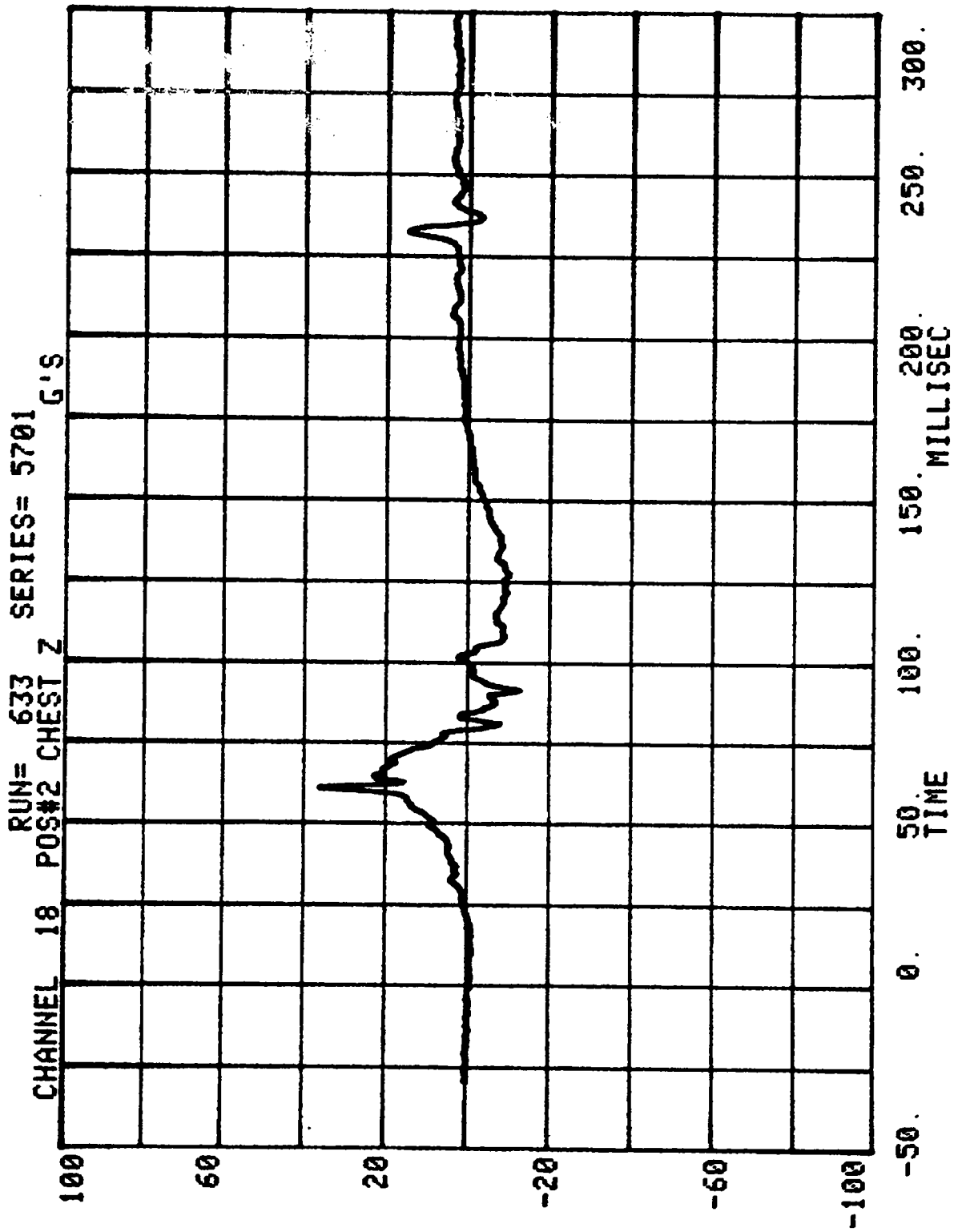

CHANNEL 15 POS#2 HEAD Z
RUN= 633 SERIES= 5701
G'S
200
120
40
-40
-120
-200
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

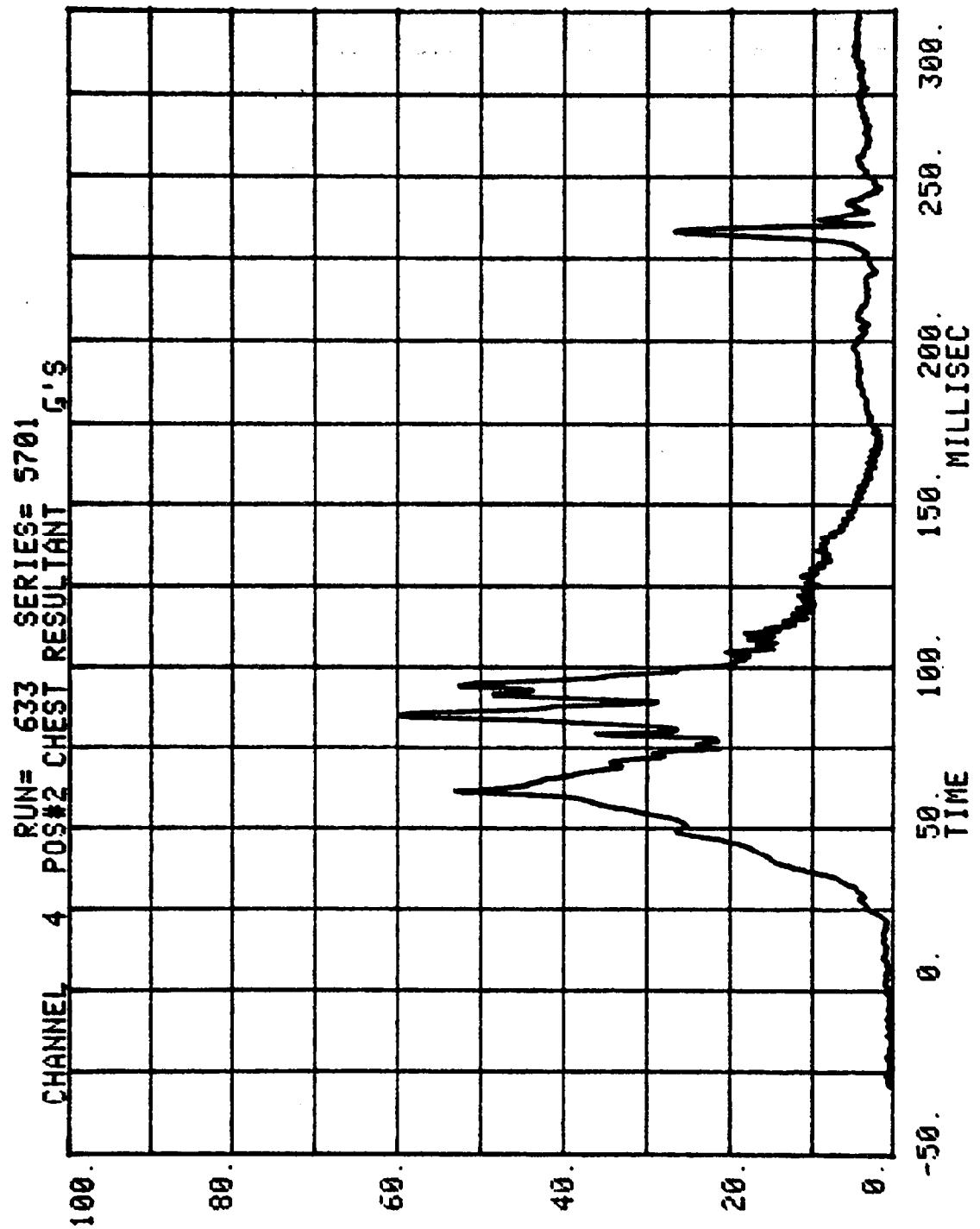

CHANNEL 3 RUN= 633 SERIES= 9701
POS#2 HEAD RESULTANT G'S
500.
400.
300.
200.
100.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

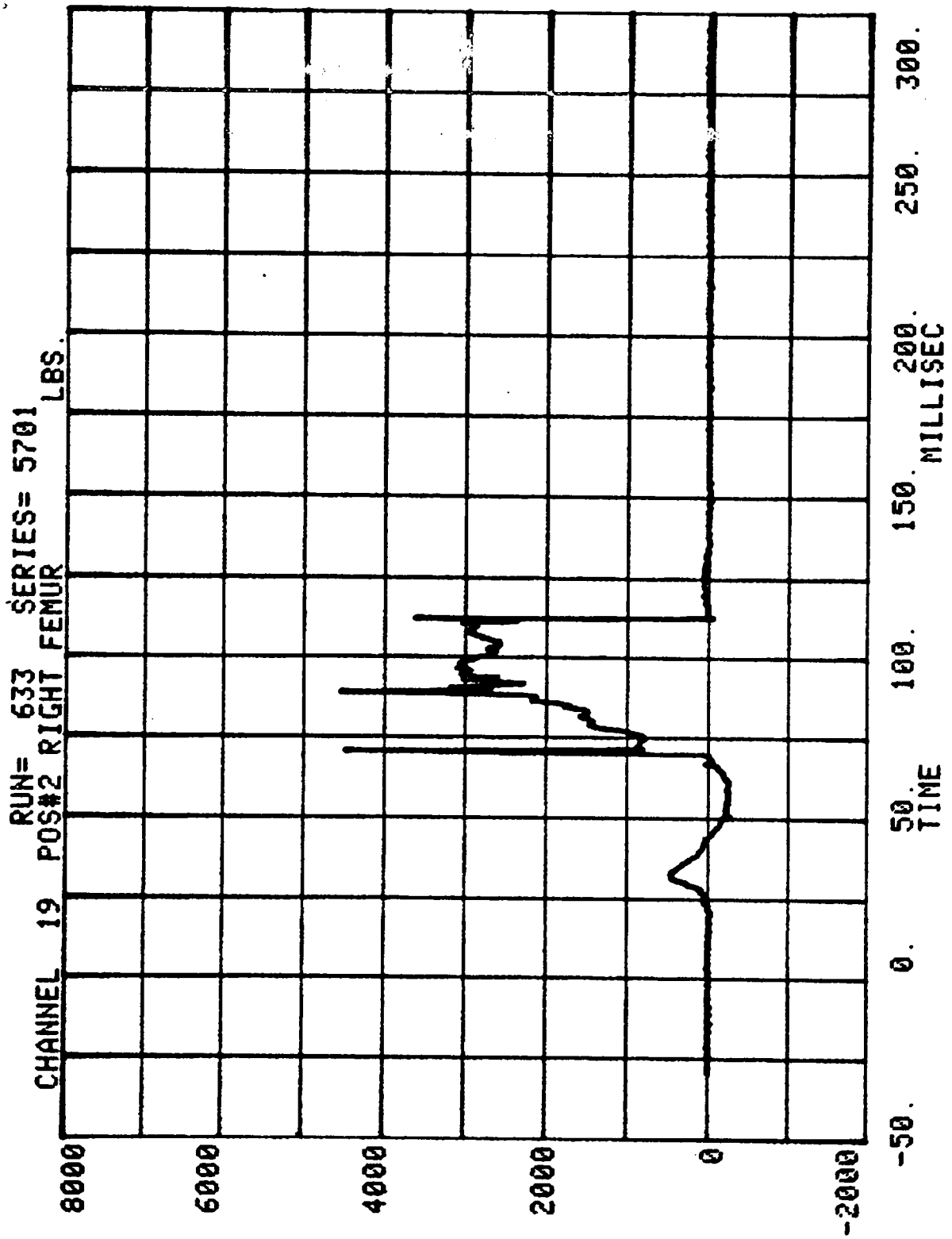
7103-V-26


CHANNEL 16 POS#2 CHEST X
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

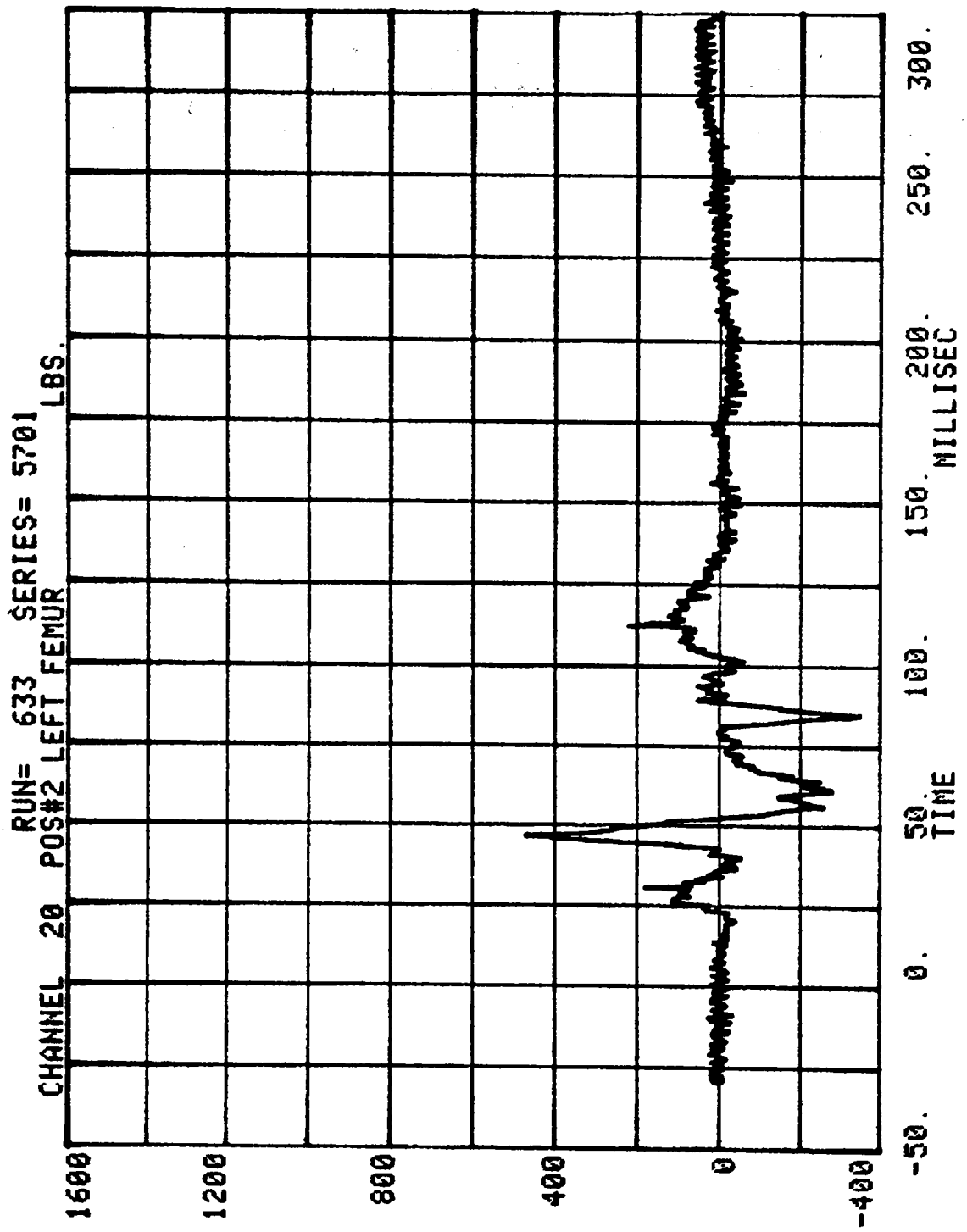

CHANNEL 17 POS#2 CHEST Y
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 18 POS#2 CHEST Z
RUN= 633 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

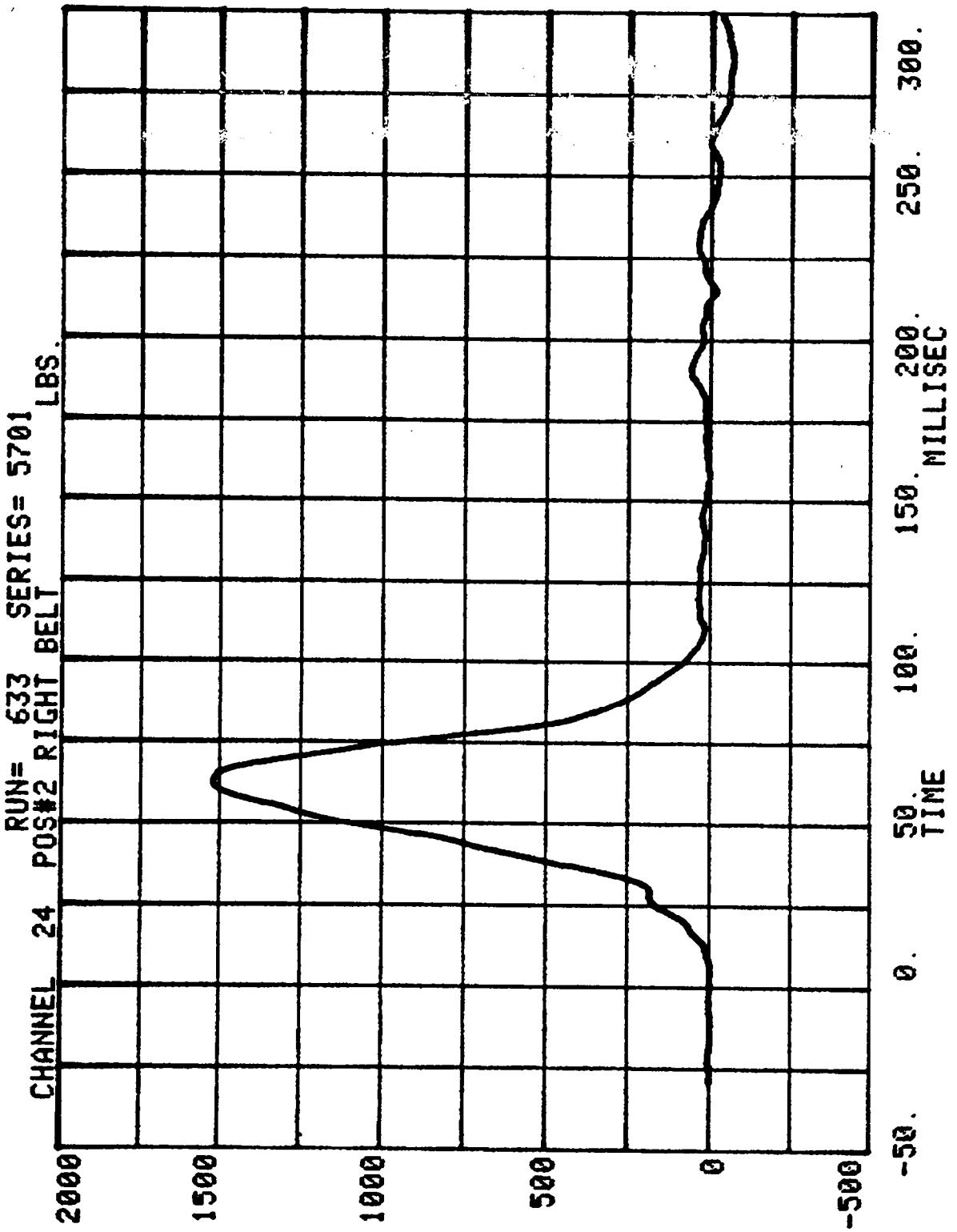

CHANNEL 4 POS#2 CHEST RESULTANT
RUN= 633 SERIES= 5701
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

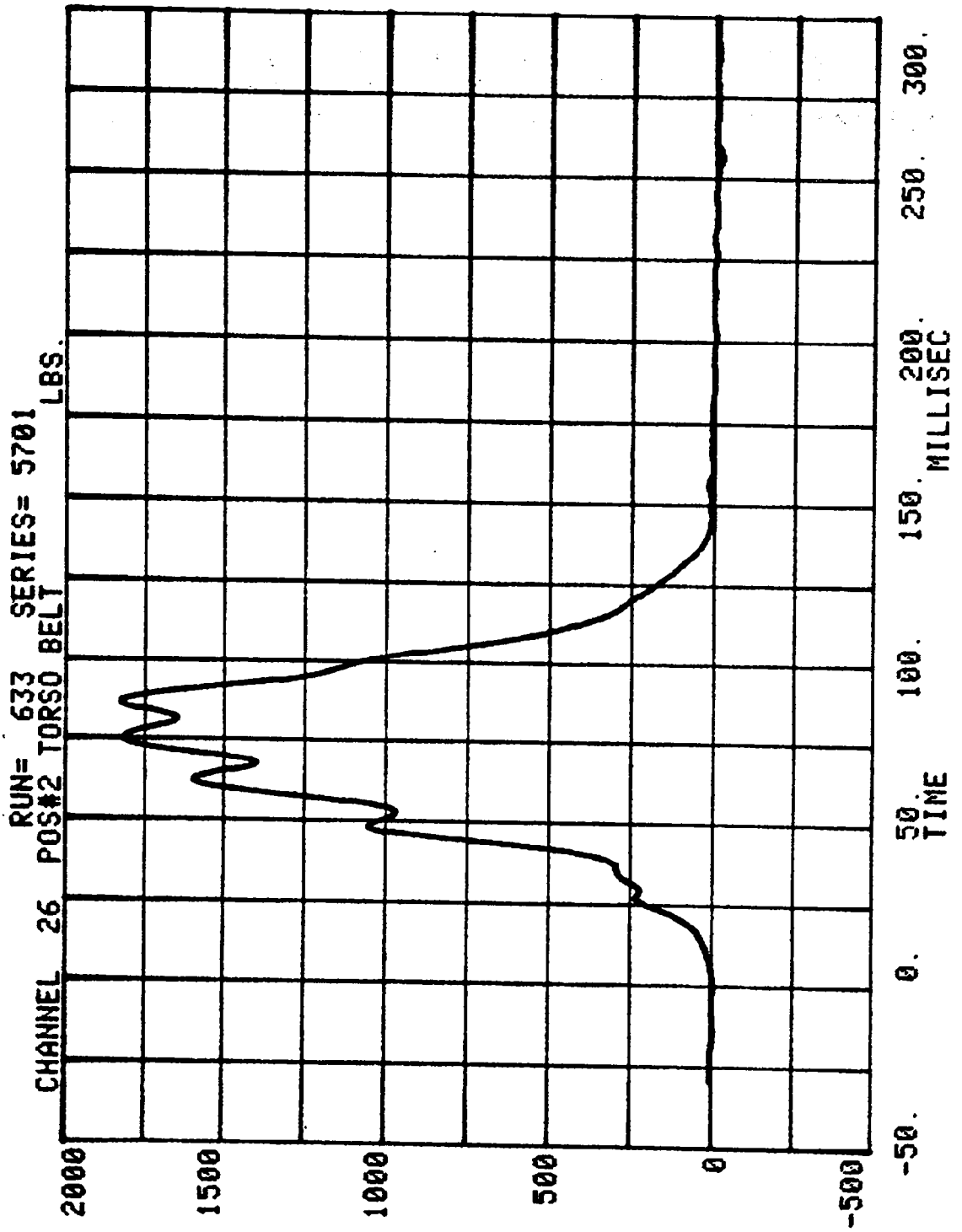

CHANNEL 19 POS#2 RIGHT FEMUR
RUN= 633 SERIES= 5701
LBS.
8000
6000
4000
2000
0
-2000
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

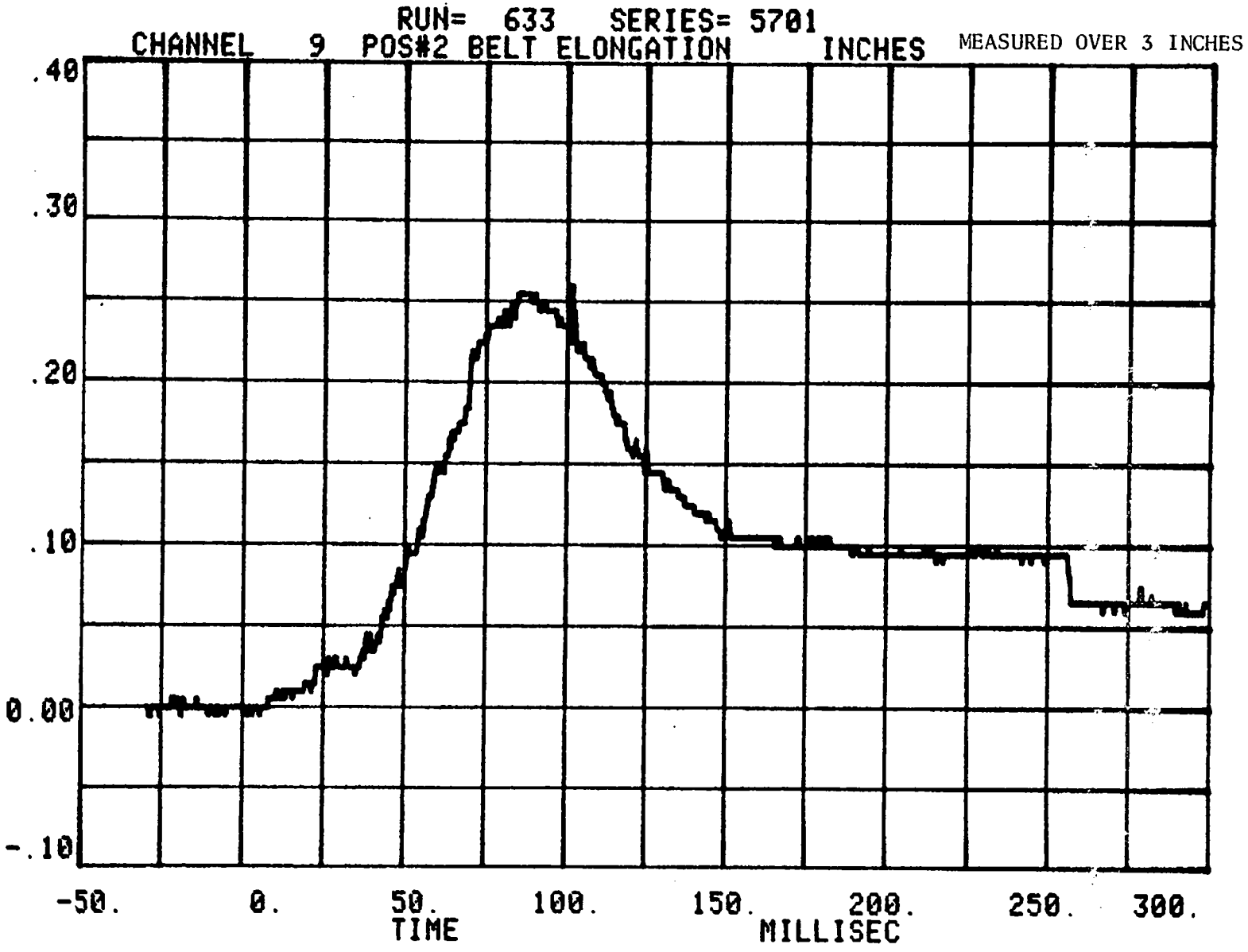
7103-V-26

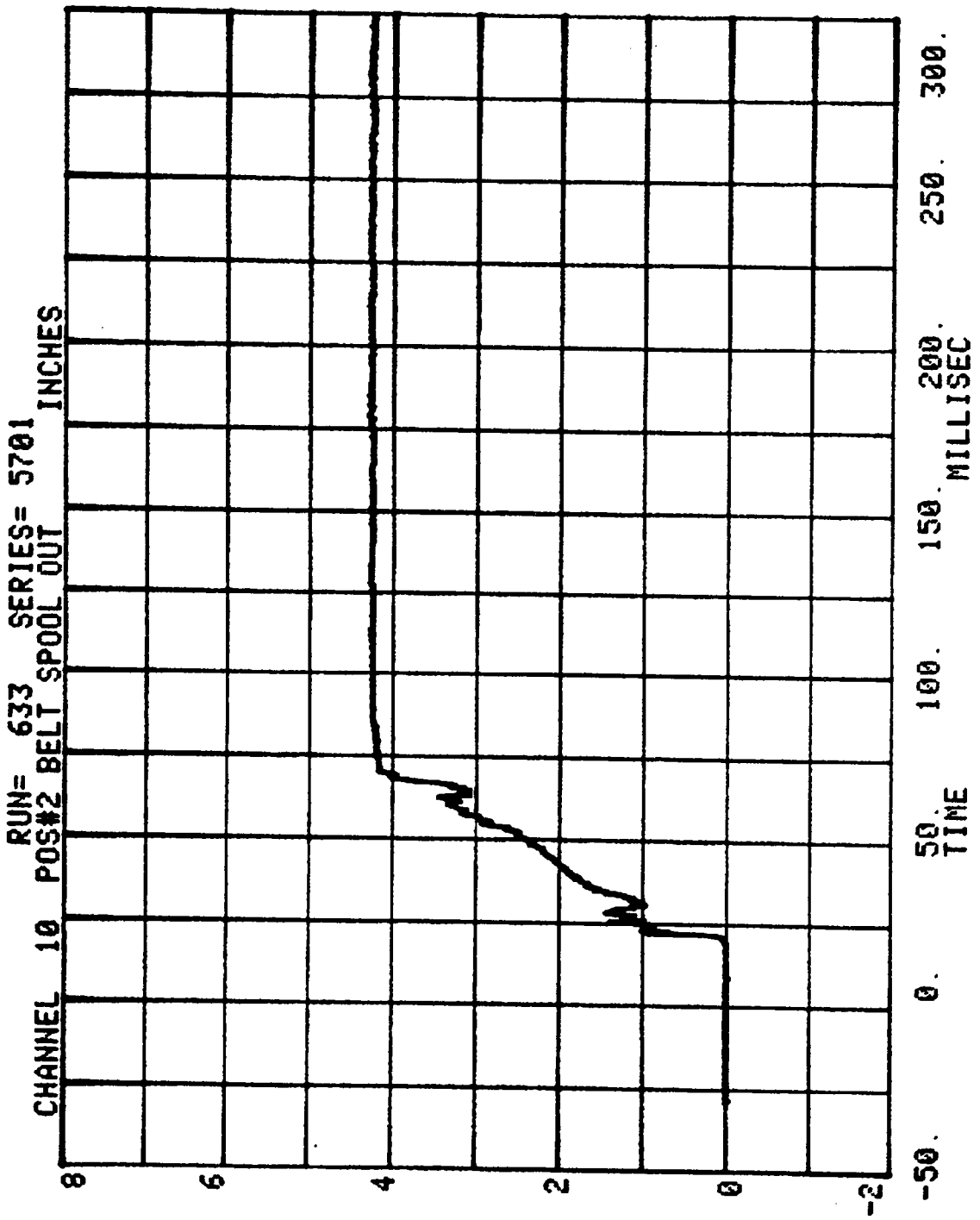

CHANNEL 20 POS#2 LEFT FEMUR
RUN= 633 SERIES= 5701
LBS.
1600
1200
800
400
0
-400
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7103-V-26


CHANNEL 24 POS#2 RIGHT BELT
RUN= 633 SERIES= 5701
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 26 POS#2 TORSO BELT
RUN= 633 SERIES= 5701
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 633 SERIES= 5701
CHANNEL 9 POS#2 BELT ELONGATION INCHES
MEASURED OVER 3 INCHES
.40
.30
.20
.10
0.00
-.10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 10 POS#2 BELT SPOOL OUT
RUN= 633 SERIES= 5701
INCHES
8
6
4
2
0
-2
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

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:

Serial No.	Completion Date

Electronic Test Equipment

The complement of signal conditioning recording and display equipment in conjunction with dummy certification testing can be found in New Car Assessment and Standards Indicant Testing Final Report, Report No. 6525-V-1.

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 320

LABORATORY TECHNICIAN: G. R. Gestwick

APPROVED BY: S. Prafield

	Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - - - - - - - - -	6/4/84-6/6/84	
Calibration Sequential Number for Dummy - - - -	19	
Temperature in Lab. (Spec. = 66 to 78°F)- - - -	70 to 76°F	
Relative Humidity in Lab. (Spec. = 10 to 70%) -	45 to 48%	

TEST PARAMETER		SPECIFICATION		
1. HEAD DROP TEST:				
a. Peak Resultant Accel. -		210 to 260G	260 g	
b. Peak Lateral Accel. - -		≤10G	8 g	
c. Time above 100G - - - -		0.9 to 1.5 ms	1.3 ms.	
2. NECK BENDING TEST:				
a. Pendulum Speed - - - -		21.5 to 25.5 fps	22.8 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -		20 to 24G	23.5 g	
c. Peak Resultant Head Acceleration - - - -		26G maximum	26 g	
d. Pendulum Decel. (t_2-t_1)		≤3 ms	2.5 ms.	
e. Pendulum Decel. (t_3-t_2)		25 to 30 ms	27 ms.	
f. Pendulum Decel. (t_4-t_3)		≤10 ms	4.5 ms.	
g. Pendulum Direction Reversal Time - - - -			110 ms.	
h. Max. Head Rotation - -		63 to 73°	70°	
i. Chordal Displacement:				
Head Rotation Angle - -				
0°	Time	-2 to 2 ms	0 ms.	
	Displ.	-.5 to .5 in	0.0 in.	
30°	Time	25.6 to 34.4 ms	28 ms.	
	Displ.	2.1 to 3.1 in.	2.6 in.	
60°	Time	40.3 to 51.7 ms	43 ms.	
	Displ.	4.3 to 5.3 in.	4.7 in.	
Maximum (70 °)	Time	53.2 to 66.8 ms	60 ms.	
	Displ.	5.0 to 6.0 in.	5.4 in.	

Continued

P. 572 DUMMY CALIBRATION TEST DATA .... Continued:

NHTSA DUMMY ID NO. 320

TEST PARAMETER		SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. NECK BENDING TEST .... Continued				
i. Chordal Displacement:				
Head Rotation Angle --				
60°	Time	67.0 to 83.0 ms	73 ms.	
	Displ.	4.3 to 5.3 in.	4.7 in.	
30°	Time	85.4 to 104.6 ms	92 ms.	
	Displ.	2.1 to 3.1 in.	2.4 in.	
0°	Time	101.0 to 123.0 ms	107 ms.	
	Displ.	-.5 to 0.5 in.	0.0 in.	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ 1" - - - - -		50 to 63 lbs.	58 lbs.	
b. Force @ 1.3" - - - -		73 to 88 lbs.	88 lbs.	
4. LUMBAR FLEXION TEST:				
a. Force @ 20° - - - -		22 to 34 lbs.	30.5 lbs.	
b. Force @ 30° - - - -		34 to 46 lbs.	40.5 lbs.	
c. Force @ 40° - - - -		46 to 58 lbs.	50.5 lbs.	
d. Return Angle - - -		12° maximum	5°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed - -		21.78-22.22 fps	22.10 fps	
(2) Peak Delfection -		1.7" maximum	1.68 in.	
(3) Peak Resistive Force - - - - - -		2250 lbs. maximum	1940 lbs.	
(4) Internal Hysteresis - - - -		50 to 70%	55.1%	
b. Low Speed				
(1) Probe Speed - - -		13.86-14.14 fps	13.92 fps	
(2) Peak Deflection -		1.1" maximum	.85 in.	
(3) Peak Resistive Force - - - - - -		1450 lbs. maximum	1295 lbs.	
(4) Internal Hysteresis- - - -		50 to 70%	57.1%	

P.572 DUMMY CALIBRATION TEST DATA .....Continued:

NHTSA DUMMY ID NO. 320

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. KNEE IMPACT TESTS:			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.98 fps	
(2) Maximum Force - -	1850 to 2500 lbs	1850 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.1 ms.	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.02 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2100 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.9 ms.	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 320 CALIB. SEQ. NOS. FOR DUMMY: 19 & _____

	MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
A. DUMMY INSTRUMENTS:				
1. Head Accelerometers--				
a. Triaxial unit - - - - -				
b. Uniaxial units				
(1) Longitudinal (A_x) -	ENDEVCO	DB47	1/84	7/84
(2) Lateral (A_y) - - -	ENDEVCO	CX05	1/84	7/84
(3) Vertical (A_z) - - -	ENDEVCO	CJ54	1/84	7/84
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 - - - - - -	GSE	312	1/84	7/84
b. Left Side	GSE	311	1/84	7/84
B. CALIB. LAB. INSTRUMENTS:				
1. Pendulum Accelerometer - -	CEC	22707	1/84	7/84
2. Test Probe Accelerometer -	CEC	22958	1/84	7/84
3. Lumbar Flexion Test Push Force Gauge - - - - - - -	TRANSDUCER INC	20051	1/84	7/84
4. Abdominal Compression Test Force Gauge - - - - - - -	BLH	72952	1/84	7/84
5. Abdominal Compression Test Displacement Gauge - - - -	CIC	567-11	1/84	7/84

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 1021

LABORATORY TECHNICIAN: G. R. Gestwick

APPROVED BY: S. Rupp

			Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - - - - - - - - -			6/4/84-6/6/84	
Calibration Sequential Number for Dummy - - - -			5	
Temperature in Lab. (Spec. = 66 to 78°F)- - - -			70 to 76°F	
Relative Humidity in Lab. (Spec. = 10 to 70%) -			45 to 48%	
TEST PARAMETER		SPECIFICATION		
1. HEAD DROP TEST:				
a. Peak Resultant Accel. -		210 to 260G	235 g	
b. Peak Lateral Accel. - -		≤10G	7 g	
c. Time above 100G - - - -		0.9 to 1.5 ms	1.1 ms.	
2. NECK BENDING TEST:				
a. Pendulum Speed - - - -		21.5 to 25.5 fps	23.0 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -		20 to 24G	23 g	
c. Peak Resultant Head Acceleration - - - -		26G maximum	24 g	
d. Pendulum Decel. (t_2-t_1)		≤3 ms	3.0 ms.	
e. Pendulum Decel. (t_3-t_2)		25 to 30 ms	25 ms.	
f. Pendulum Decel. (t_4-t_3)		≤10 ms	6 ms.	
g. Pendulum Direction Reversal Time - - - -			115 ms.	
h. Max. Head Rotation - -		63 to 73°	72°	
i. Chordal Displacement:				
Head Rotation Angle - -				
0°	Time	-2 to 2 ms	0 ms.	
	Displ.	-.5 to .5 in	0.0 in.	
30°	Time	25.6 to 34.4 ms	29 ms.	
	Displ.	2.1 to 3.1 in.	2.6 in.	
60°	Time	40.3 to 51.7 ms	44 ms.	
	Displ.	4.3 to 5.3 in.	4.8 in.	
Maximum (72°)	Time	53.2 to 66.8 ms	60 ms.	
	Displ.	5.0 to 6.0 in.	5.6 in.	

Continued

P, 572 DUMMY CALIBRATION TEST DATA .... Continued:

NHTSA DUMMY ID NO. 1021

TEST PARAMETER		SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. NECK BENDING TEST .... Continued				
i. Chordal Displacement:				
Head Rotation Angle --				
60°	Time	67.0 to 83.0 ms	79 ms.	
	Displ.	4.3 to 5.3 in.	4.7 in.	
30°	Time	85.4 to 104.6 ms	95 ms.	
	Displ.	2.1 to 3.1 in.	2.5 in.	
0°	Time	101.0 to 123.0 ms	109 ms.	
	Displ.	-.5 to 0.5 in.	0.2 in.	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ 1" - - - - -		50 to 63 lbs.	57 lbs.	
b. Force @ 1.3" - - - -		73 to 88 lbs.	88 lbs.	
4. LUMBAR FLEXION TEST:				
a. Force @ 20° - - - -		22 to 34 lbs.	32.5 lbs.	
b. Force @ 30° - - - -		34 to 46 lbs.	42.0 lbs.	
c. Force @ 40° - - - -		46 to 58 lbs.	55.5 lbs.	
d. Return Angle - - -		12° maximum	2°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed - -		21.78-22.22 fps	22.02 fps	
(2) Peak Delfection -		1.7" maximum	1.68 in.	
(3) Peak Resistive Force - - - - - -		2250 lbs. maximum	1940 lbs.	
(4) Internal Hysteresis - - - -		50 to 70%	57.2%	
b. Low Speed				
(1) Probe Speed - - -		13-86-14.14 fps	14.07 fps	
(2) Peak Deflection -		1.1" maximum	1.06 in.	
(3) Peak Resistive Force - - - - - -		1450 lbs. maximum	1220 lbs.	
(4) Internal Hysteresis- - - -		50 to 70%	52.7%	

P.572 DUMMY CALIBRATION TEST DATA .....Continued:

NHTSA DUMMY ID NO. 1021

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. KNEE IMPACT TESTS:			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.96 fps	
(2) Maximum Force - -	1850 to 2500 lbs	2050 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.0 ms.	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.92 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2000 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.15 ms.	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1021 CALIB. SEQ. NOS. FOR DUMMY: 5 & _____

	MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
A. DUMMY INSTRUMENTS:				
1. Head Accelerometers--				
a. Triaxial unit - - - - -				
b. Uniaxial units				
(1) Longitudinal (A_x) -	ENDEVCO	DB47	1/84	7/84
(2) Lateral (A_y) - - -	ENDEVCO	CX05	1/84	7/84
(3) Vertical (A_z) - - -	ENDEVCO	CJ54	1/84	7/84
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 - - - - - -	GSE	312	1/84	7/84
b. Left Side	GSE	311	1/84	7/84
B. CALIB. LAB. INSTRUMENTS:				
1. Pendulum Accelerometer - -	CEC	22707	1/84	7/84
2. Test Probe Accelerometer -	CEC	22958	1/84	7/84
3. Lumbar Flexion Test Push Force Gauge - - - - - - -	TRANSDUCER INC	20051	1/84	7/84
4. Abdominal Compression Test Force Gauge - - - - - - -	BLH	72952	1/84	7/84
5. Abdominal Compression Test Displacement Gauge - - - -	CIC	567-11	1/84	7/84