3014756

REPORT NO. CAL-86-N10

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

SAAB-SCANIA OF AMERICA, INC.

1986 Saab 9000 4-Door
Hatchback Sedan

NHTSA NO. MG 0502

CALSPAN TEST NO. 7457-10

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

March 12, 1986

FINAL REPORT

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
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_____
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NHTSA New Car Assessment Program (NCAP) Frontal Barrier Impact Test on 1986 Saab 9000 4-door Hatchback Sedan to Indicant Requirements of FMVSS 212, 219 (Partial), and 301-75.	March 12, 1986
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16. Abstract

A frontal load cell barrier test of a 1986 Saab 9000 4-door hatchback sedan was performed at the Calspan Corporation, Advanced Technology Center crash test facility in Buffalo, New York, on March 12, 1986.

Impact speed was 34.9 mph, and the ambient temperature at the barrier face at the time of impact was 43°F. The maximum post-test vehicle crush was 21.5 inches.

The test vehicle appeared to comply with the indicant requirements of the following Federal Motor Vehicle Safety Standard.

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

Type of Restraint System 3-point continuous webbing manual system at each front outboard seating position.

17. Key Words	18. Distribution Statement
35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP) FMVSS 212 Indicant Testing FMVSS 219 (Partial) Indicant Testing FMVSS 301-75 Indicant Testing	Copies of this report are available from: Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 400 Seventh St., S.W., Washington, DC 20590

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Section 1

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 86 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 crashworthiness 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 CF

A load cell barrier consisting of 36 load cells was impacted by a 1986 Saab 9000 4-door Hatchback Sedan at a velocity of 34.9 mph. The test was performed at the Calspan Corporation Advanced Technology Center on March 12, 1986. 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 No. 1021) and the right-front passenger ATD (Serial 1022) were certified prior to the test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 59 channels of data were recorded in six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Belt load data and belt elongation data were not recorded as requested by CTM.

The driver's head struck the steering wheel rim and hub; the HIC was 773. The maximum chest deceleration over 3 milliseconds was 71 g's.

Data regarding the driver's right femur was lost. The driver's left femur load was 484 pounds. The right front passenger's HIC was 1443 and maximum chest deceleration over 3 milliseconds was 46 g's. Femur loads were 421 and 541 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1986 Saab 9000 4-door Hatchback Sedan

NHTSA NO.: MG0502 VIN.: YS3CD55L8G1004473

BODY COLOR: Slate Blue DATE OF MANUFACTURE: 10-85

Engine: 4 cylinders; -- C.I.D.; 2 Liters; -- CC
X Gas; -- Diesel; X Turbocharged
- Longitudinal; X Transverse

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

Date Received: 1-16 Odometer Reading: 281
X A/C; X P/S; X P/B; X P/wdo.; X Adj Wheel
X P/seats; X Cruise Control

Type of Occupant Restraint: 3-Point Continuous Belt System

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 38 psi, Rear 38 psi

Recommended Tire Size: 195/60'VR15

Recommended Cold Tire Pressure: Front 32 psi, Rear 32 psi

Tires on Vehicle: 195/60 VR15 ; Manufacturer: Pirelli

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 -- Lever X Rot. Knot

Vehicle Capacity Weight (VCW) = 970 lbs. (A)

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

Rated Cargo and Luggage Weight (RCLW) A-B = 220 lbs.

GVWR 4010 lbs. GAWR: Front 2200 lbs. Rear 2030 lbs.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 910 lbs. Right Rear = 590 lbs.

Left Front = 900 lbs. Left Rear = 580 lbs.

TOTAL FRONT WEIGHT = 1810 lbs. (60.7 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1170 lbs. (39.3 % of Total Vehicle Weight)

TOTAL DELIVERY WEIGHT = 2980 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (2980 lbs.)

VCW = Vehicle Capacity Weight (970 lbs.)

DSC = Designated Seating Capacity (5)

RCLW = VCW - 150 (DSC) = 220 lbs.

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

Target Test Weight = 3528 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND POUNDS CARGO:

Right Front = 980 lbs. Right Rear = 740 lbs.

Left Front = 970 lbs. Left Rear = 700 lbs.

TOTAL FRONT WEIGHT = 1950 lbs. (57.5 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1440 lbs. (42.5 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 3390 lbs.

Weight of ballast secured in vehicle trunk area = 0.0 lbs.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 26.8 LF 26.8 RR 26.4 LR 26.4

Test Attitude: RF 26.6 LF 26.5 RR 25.5 LR 25.5

Wheel Base: 105 in.; C.G. = 44.6 in. rearward of front wheel C/L

Remarks: _____

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0 °

Date of Test: 3-12-86 Time of Test: 11:50

Ambient Temperature: 43 °F at impact area

Temperature in Occupant Compartment: 70 °F.

Windshield Molding Temperature: 70 °F.

Required Impact Velocity Range: 34.5 to 35.5 mph

Impact Velocity: primary = 34.9 mph, secondary = 34.8 mph

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

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length:							
Pre-test	= R	179.3	C_L	181.5	L	179.4
Post-test	= R	160.8	C_L	160.0	L	160.3
Crush	= R	18.5	C_L	21.5	L	19.1

Distance from front of test vehicle to point of impact:

R 17.5 C/L 18.0 L 17.3

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	Rim & Hub	Dash
Chest	No Contact	No Contact
Abdomen	No Contact	No Contact
Left Knee	Dash	Glove Box
Right Knee	Dash	Glove Box

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	Front		Rear	
	Left	Right	Left	Right
Door Opening	not operable	not operable	operable	operable

	Front	
Seat Movement	Left	Right
Seat Back Failure	Yes	Yes
Seat Shift (in.)	See below	None

Other notable impact effects: Driver's seat came off inboard seat tracks (see Figure A-31).

Section 3

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

- "Windshield Mounting," FMVSS No. 212 Data
- "Windshield Zone Intrusion," FMVSS No. 219 (Partial) Data
- "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.:

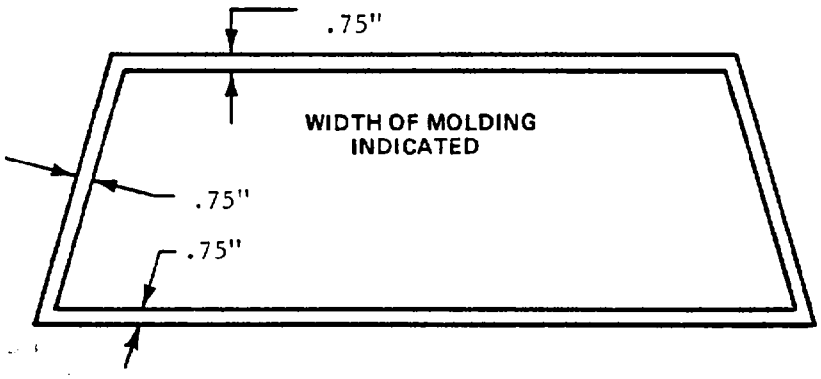
Windshield is bonded in place and has a .75 inch molding on side, top and bottom.

FMVSS 212 REQUIREMENTS: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery mesurement 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 PREIPHERY		
	PRE-TEST (in.)	POST-TEST (in.)	PERCENT RETENTION
RIGHT SIDE	79.25	79.25	100%
LEFT SIDE	79.25	79.25	100%
TOTAL	158.5	158.5	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

None.

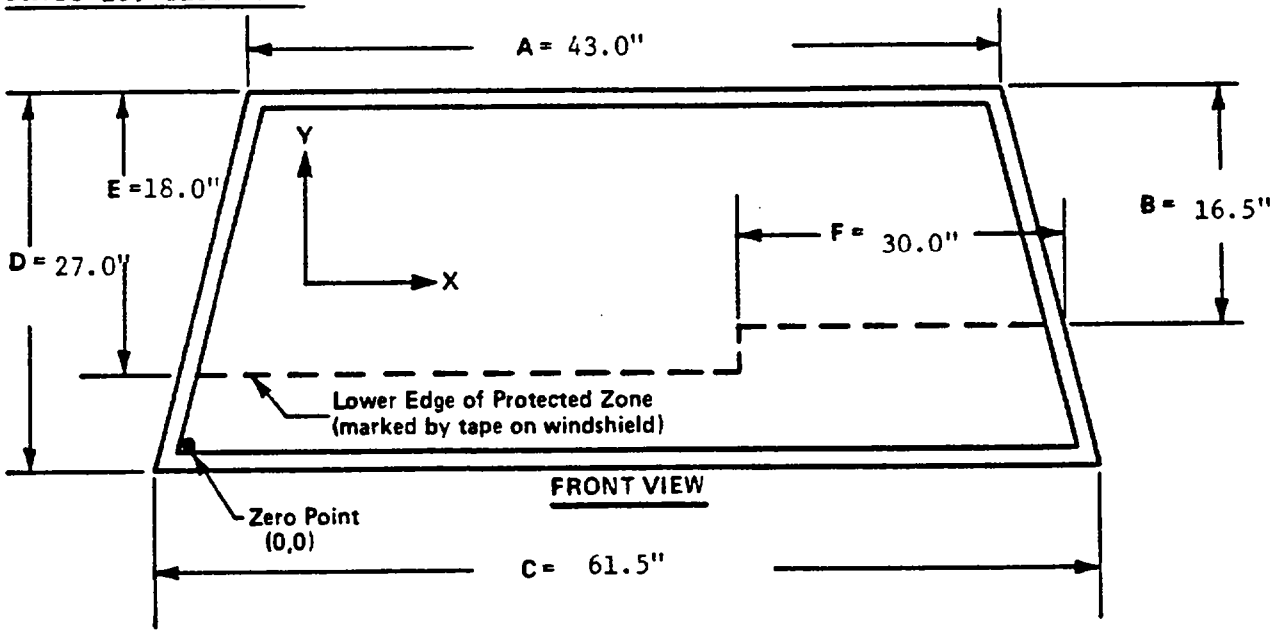
Figure 2

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

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. The locus of points is drawn on the inner surface of the windshield contacted 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 of this line onto the outer surface of the windshield.

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.		

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Figure 3

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

TEST VEHICLE NHTSA NO.: MG0502 ; TEST DATE: March 12, 1986

VEHICLE MAKE/MODEL/BODY STYLE: 1986 Saab 9000 4-door Hatchback Sedan

USABLE CAPACITY OF VEHICLE'S FUEL TANK: 17.9 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:

16.64 Gallons which is 93 % of the Stated USABLE CAPACITY.

SOLVENT SPILLAGE MEASUREMENT AFTER 35 MPH FRONTAL BARRIER IMPACT TEST:

	Actual	Maximum Allowable
From impact until vehicle motion ceases	0	1 oz.
For 5 min. period after vehicle motion ceases.	0	5 oz.
For next 25 minutes at barrier face.....	0	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, 58	seconds
FMVSS 301-75 Position Hold Time	=	5	minutes, 0	seconds
TOTAL	=	7	minutes, 58	seconds
Next Whole Minute Interval....	=	8	minutes	

Figure 3

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

VEHICLE STATIC ROLLOVER DATA:

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

SOLVENT SPILLAGE LOCATION(S):

None.

Section 4

OMI FINAL DATA

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)	-144	-36	82	168	-58	-51	-18	71
DUMMY (2)	-164	92	99	206	-35	54	25	46
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	See note 1	484
DUMMY (2)	421	541
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)	See Note 2		See Note 2
DUMMY (2)	See Note 2	See Note 2	
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**			
	HIC	t_1 (SEC)	t_2 (SEC)	AVE. ACC. (g) t_1 TO t_2
DUMMY (1)	773	.07785	.10515	60.4
DUMMY (2)	1443	.09217	.09742	149.8
DUMMY (3)				
DUMMY (4)				

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Note 1: Data regarding the driver's right femur load was lost.
Note 2: Belt loads were not measured as requested by CTM.

Figure 4

PART 572 DUMMY IN-VEHICLE POSITION

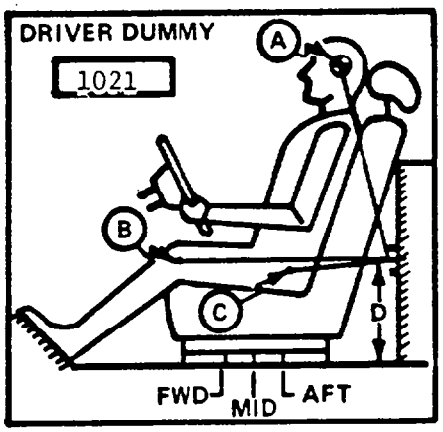
TEST NO.: 716-100-718

VEHICLE: 1986 Saab 9000 4-door hatchback sedan

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

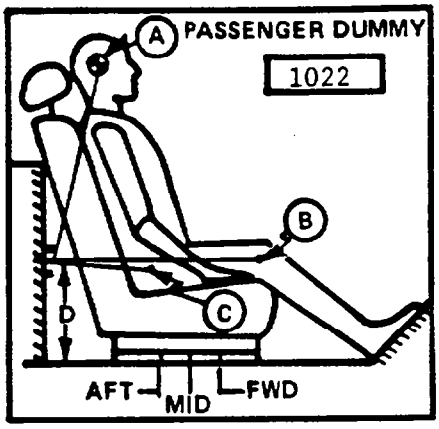
ADJUSTER TYPE:
- X Manual
- - Power

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



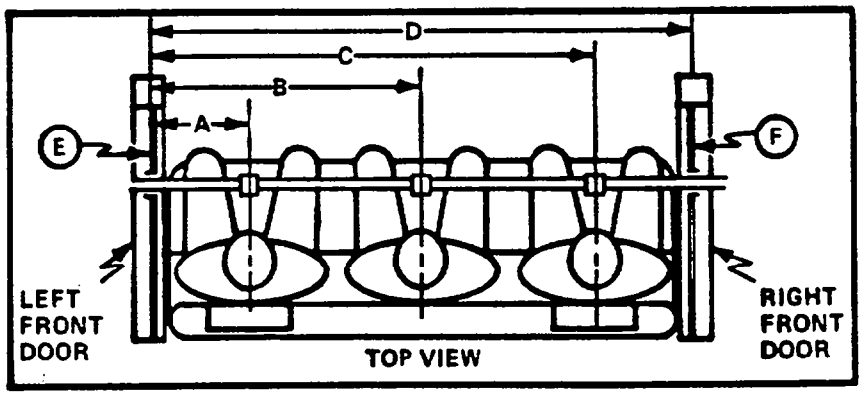
MEASUREMENT LOCATION

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



A =	17.0	in.	7.0	Degrees	
B =	24.6	in.	107	Degrees	
C =	12.5	in.	127	Degrees	
D =	18.7	in.			

A =	17.8	in.	9.0	Degrees	
B =	25.4	in.	107	Degrees	
C =	13.3	in.	139	Degrees	
D =	18.7	in.			



DUMMY ID

		1021	1022
A	=	Left Door to Driver Centerline	14.5 in.
B	=	Left Door to Center Passenger Centerline	-- in.
C	=	Left Door to Right Passenger Centerline	41.2 in.
D	=	Left Door to Right Door	55 in.
E, F	=	Window Glass Height (Right and Left Must Be Equal)	11 in.

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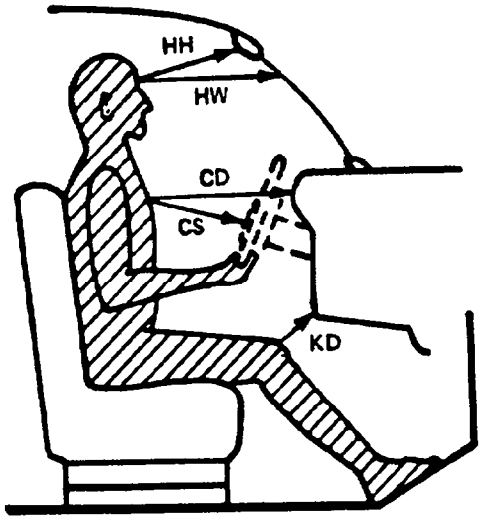
Figure 5

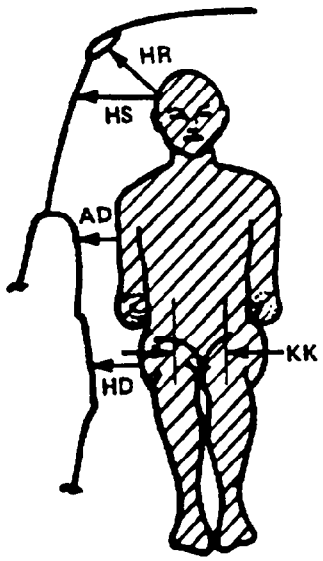
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	15.2	14.5
HW	22.0	21.1
CD	24.2	23.8
CS	16.0	--
KDL	4.6	5.5
KDR	4.6	6.0
SA	24°	24°
TA	21°	21°



HH = Head to Windshield Header
HW = Head to Windshield
CD = Chest to Dash
CS = Chest to Steering Wheel
KD(L/R)= Knee to Dash (Left/Right)
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
KK = Knee to Knee



	DRIVER	PASSENGER
HR	6.5	6.2
HS	10.0	9.5
AD	5.0	6.0
HD	6.7	7.5
KK	9.9	8.0

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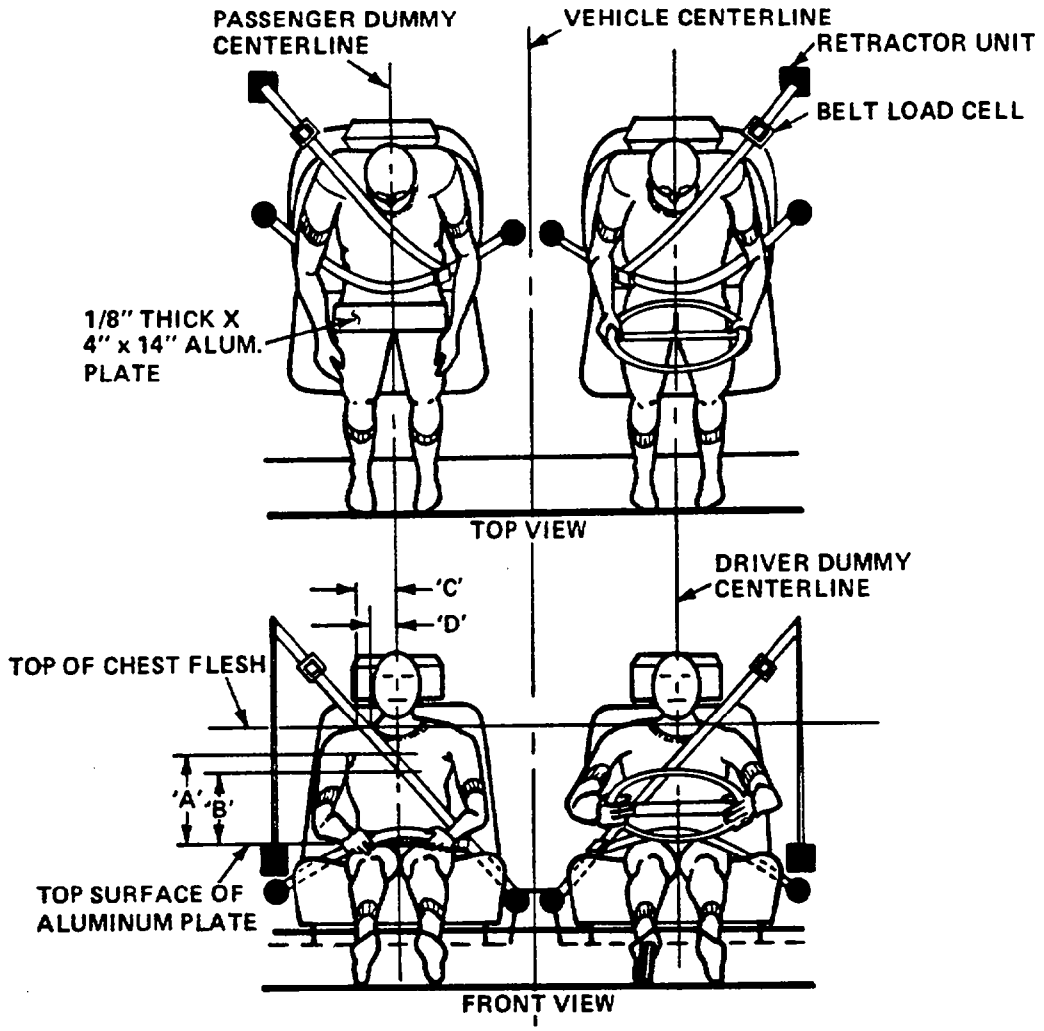
Figure 6

SEAT BELT POSITIONING DATA



		DRIVER DUMMY (in.)	PASS. DUMMY (in.)
1.	Dimension 'A'--alum. plate to belt upper edge on dummy centerline.	12.2	12.2
2.	Dimension 'B'--alum. plate to belt lower edge on dummy centerline.	9.3	9.3
3.	Dimension 'C'--dummy centerline to outer edge at chest flesh top	6.2	6.9
4.	Dimension 'D'--dummy centerline to inner edge at chest flesh top	4.1	4.3
5.	Lap belt tension (lbs.)	NA	NA
6.	Shoulder belt tension (lbs.)	2.0	2.5

Table 3

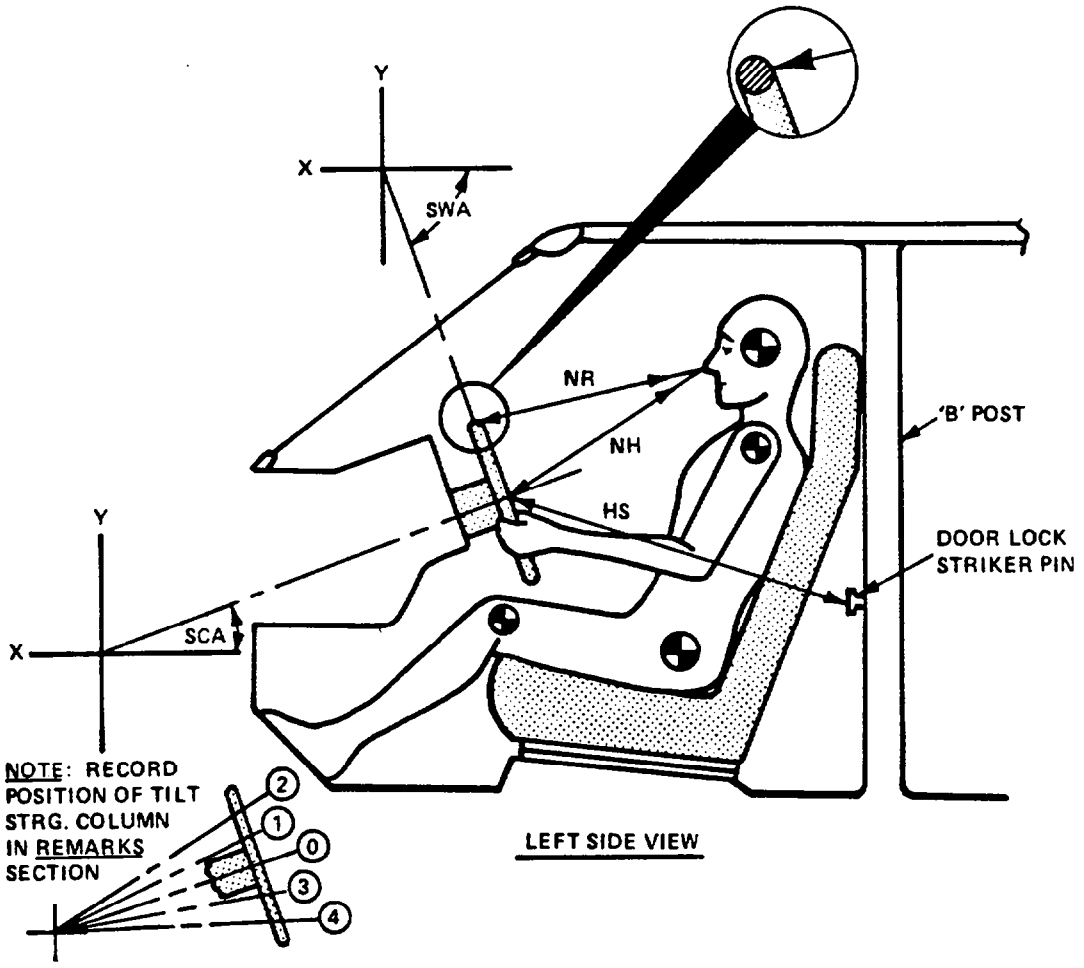
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	63.5	64.5
Should belt length as measured on Part 572 Dummy.	39.5	40.5
Lap belt length as measured on Part 572 Dummy.	24.0	24.0
BELT SPOOL-OFF DATA:		
As determined by film analysis.	3.0	2.0
As determined mechanically.	1.0	1.0
As determined electronically.	see note	see note
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	see note	see note
Measured Mechanically	0.0	0.0

Note: Belt stretch and belt spool off were not measured electrically as requested by CTM.

Figure 7

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



	MEASUREMENTS	
NR--Distance from tip of dummy's nose to top rear surface to steering wheel rim	19.6	Inches
NH--Distance from tip of dummy's nose to center of steering column hub	20.3	Inches
HS--Distance from center of steering column hub to the forward surface of the door lock striker pin	Y = 16 X = 22	Inches
SCA--Angle of steering column relative to the horizontal X axis	31	Degrees
SWA--Angle of steering wheel relative to the horizontal X axis	-59	Degrees

REMARKS CONCERNING ADJUSTABLE OR TILT STEERING COLUMN IF VEHICLE IS SO EQUIPPED:
Steering column has an in/out adjustment. Column is set in center position.
There is no angle adjustment.

Figure 8

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

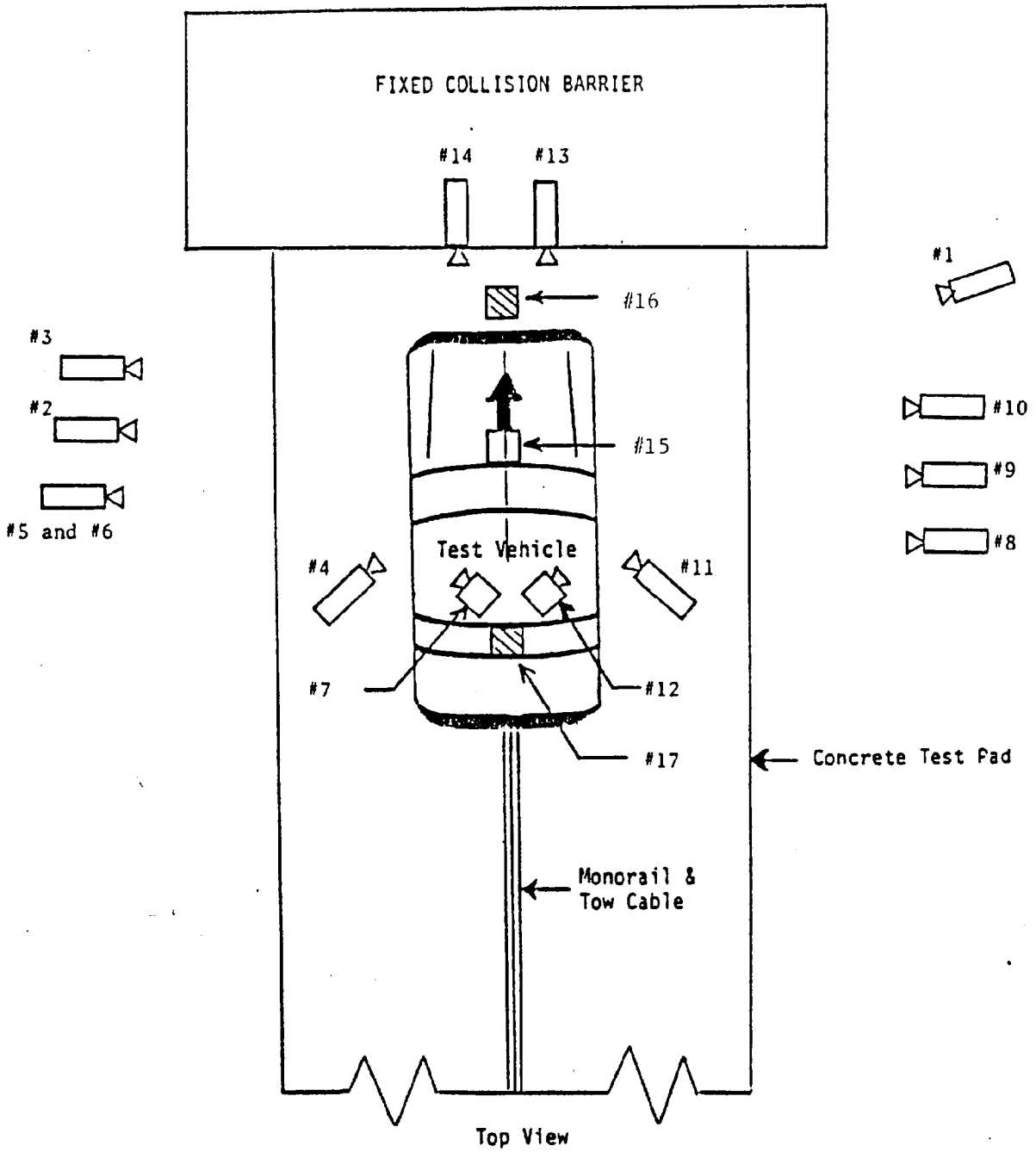


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Table 4

HIGH-SPEED CAMERA LOCATIONS

Test No. MG0502 Vehicle 1986 Saab 9000 Turbo 5-Door Hatchback Sedan

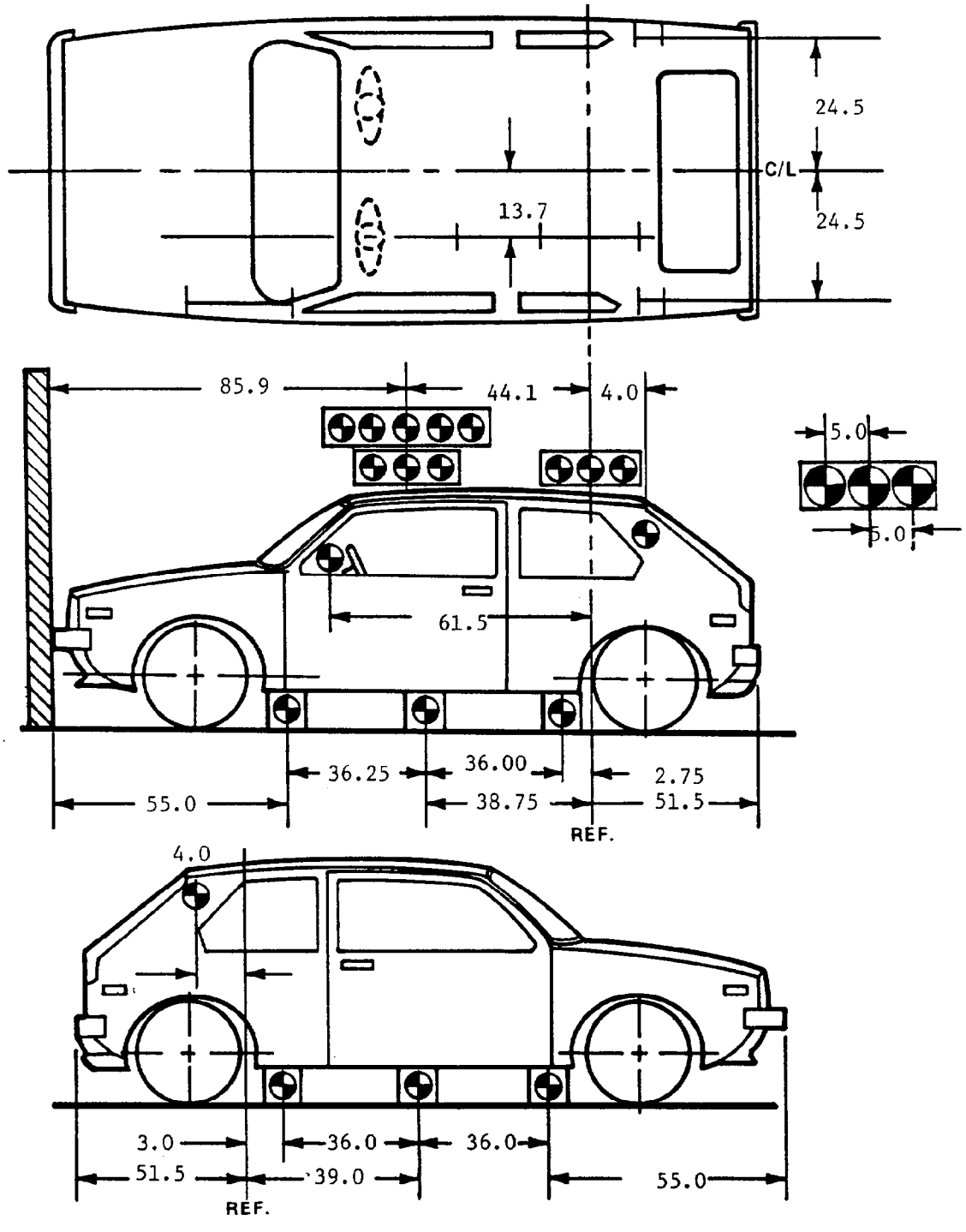
CAMERA NO.	VIEW	CAMERA POSITIONS (in)* X	Y	Z	ANGLE ** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	--	--	--	--	--	--	24
2	Overall Left Side	215	57	41	-5	--	13	-540
3	Left Side View	205	37	50	-6	--	25	-540
4	Driver and Interior View	101	124	70	-15	--	13	-690
5	Steering Column (Bottom)	230	80	46	-5	212	25	550
6	Steering Column (Top)	230	80	70	-10	212	25	540(1)
7	Left Belt	--	--	--	--	--	8	650
8	Overall Right Side	280	91	48	-6	--	13	800
9	Right Side View	270	79	47	-5	--	25	800
10	Right Passenger View	282	67	51	-4	265	35	790
11	Passenger and Interior View	101	124	72	-15	--	25	-600
12	Right Belt	--	--	--	--	--	8	840
13	Passenger Front View	21	0	72	-38	103	13	550
14	Driver Front View	21	0	72	-38	103	13	570
15	Windshield View	0	0	126	-53	--	13	530
16	Pit View of Engine	0	36	-120	90	--	13	880
17	Pit View of Fuel Tank	0	130	-120	90	--	13	830

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

(1) Timing does not appear on film. Values given are nominal values.

Figure 9

VEHICLE TARGET LOCATIONS

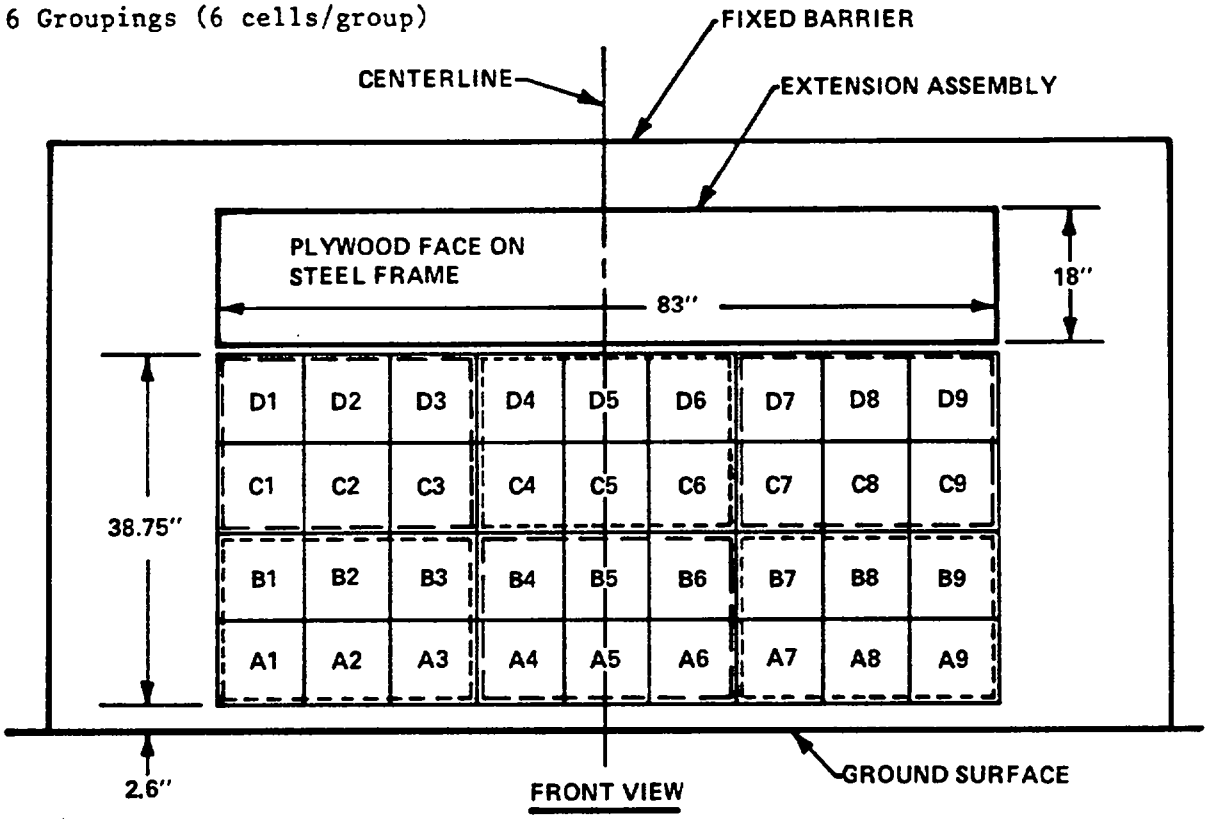


(DIMENSIONS IN INCHES)

Figure 10

LOAD CELL LOCATIONS ON FIXED BARRIER

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



6 GROUPS 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)

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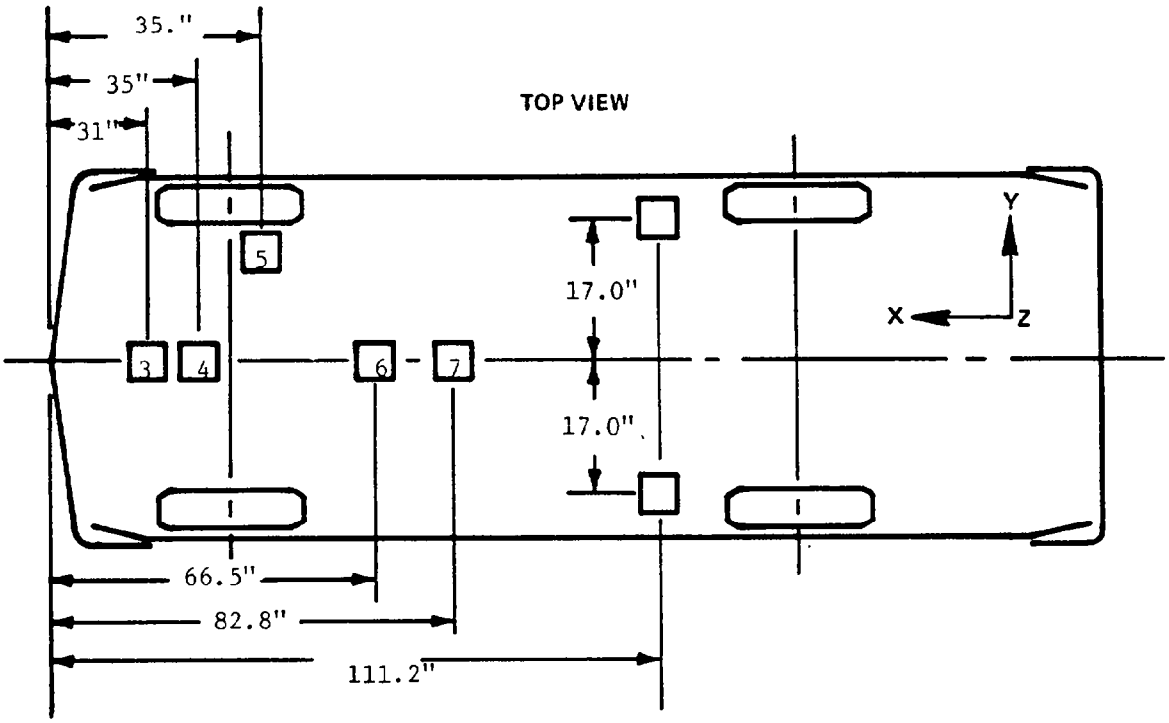
Figure 11

VEHICLE ACCELEROMETER LOCATIONS



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 12

TEST VEHICLE MEASUREMENTS

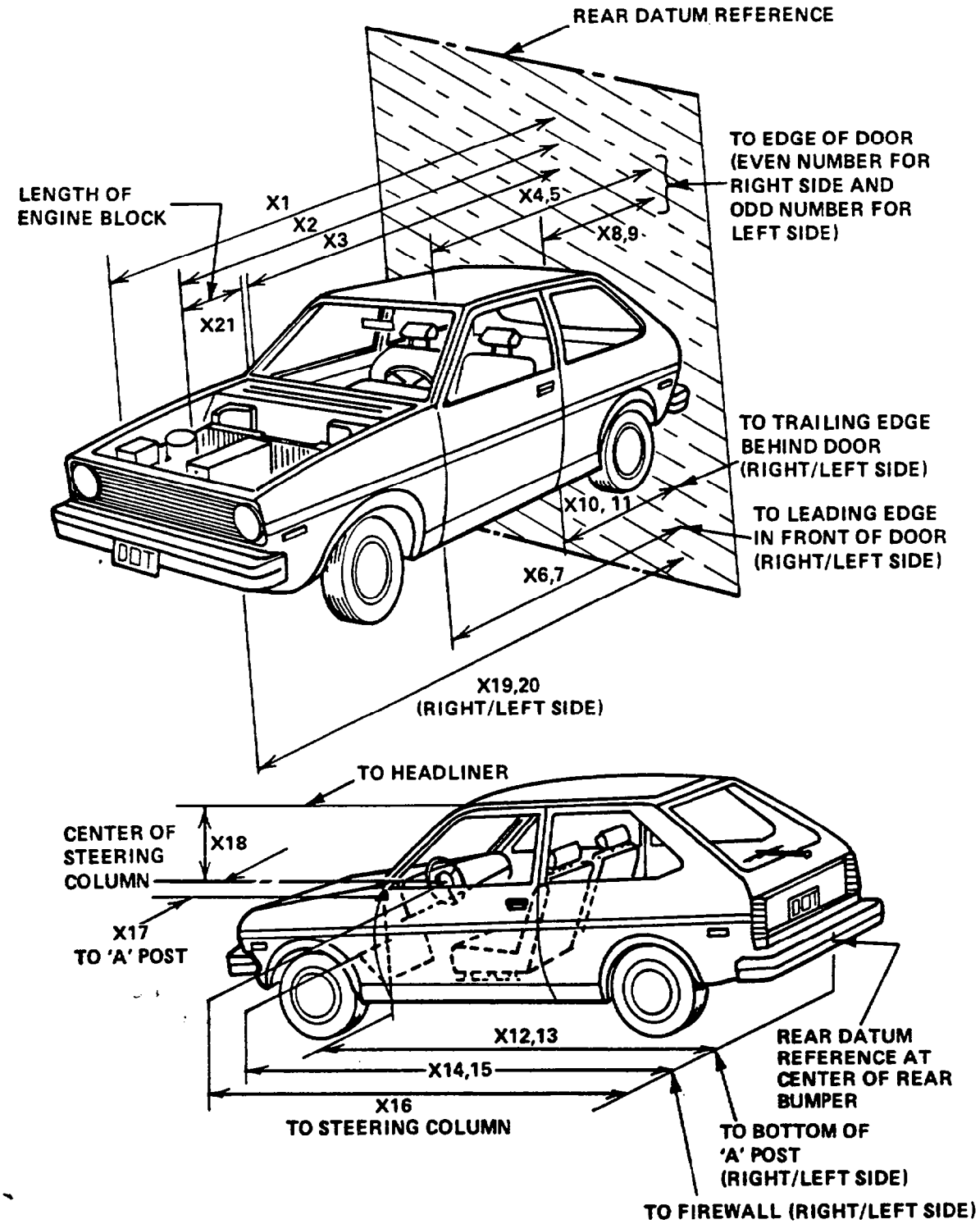


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Table 5

VEHICLE MEASUREMENTS

All Dimensions in Inches

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	181.5	160.0	21.5
X2	Rear Surface of Vehicle to Front of Engine	160.3	149.9	10.4
X3	Rear Surface of Vehicle to Firewall	139.6	130.5	9.1
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	124.0	123.0	1.0
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	124.0	122.8	1.2
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	123.9	122.9	1.0
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	123.8	122.6	1.2
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	82.0	81.1	.9
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	82.0	81.0	1.0
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	83.0	81.9	1.1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	83.0	82.1	.9
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	123.0	122.1	.9
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	123.0	122.0	1.0
X14	Rear Surface of Vehicle to Firewall, Right Side	132.5	127.2	5.3
X15	Rear Surface of Vehicle to Firewall, Left Side	133.5	128.5	5.0
X16	Rear Surface of Vehicle to Steering Column	107.5	105.1	2.4
X17	Center of Steering Column to "A" Post	15.5	16.9	-1.4
X18	Center of Steering Column to Headliner	18.8	17.0	1.8
X19	Rear Surface of Vehicle to Right Side of Front Bumper	179.3	160.8	18.5
X20	Rear Surface of Vehicle to Left Side of Front Bumper	179.4	160.3	19.1
X21	Length of Engine Block	21.5	21.5	0

Note: Measurements are not done in the same location as Accident Investigation measurements. Therefore, measurements may not be equal.

Table 6

ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Saab 9000 Turbo 4-door Hatchback Sedan

VEH. NHTSA NO.: MG0502 ; VIN: YS3CD55L8G1004473

MODEL YEAR: 1986 ; BUILD DATE: 10-85 ; TEST DATE: 3-12-86

VEH. SIZE CATEGORY: Mid-size ; TEST WEIGHT: 3390

VEH. WHEELBASE: 105 ; FRONT OVERHANG: 38.2 ; OVERALL WIDTH: 69.4

ACCELEROMETER DATA:

LOCATION: 44.6 inches rearward of front wheel CL

CALIBRATION PROCEDURE: ShakerTable/Least Square

LINEARITY: +0.75% ; INTEGRATION ALGORITHM: Hybrid Simpson-Newton 3/8

VEH. IMPACT SPEED: 34.9 mph ; TIME OF SEPARATION: 243 msec

VELOCITY CHANGE: 36.0 mph

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

F (Frontal) 12FEW3

CRUSH DEPTH DIMENSIONS:

C1 = 19.1 inches

C2 = 20.4 inches

C3 = 21.4 inches

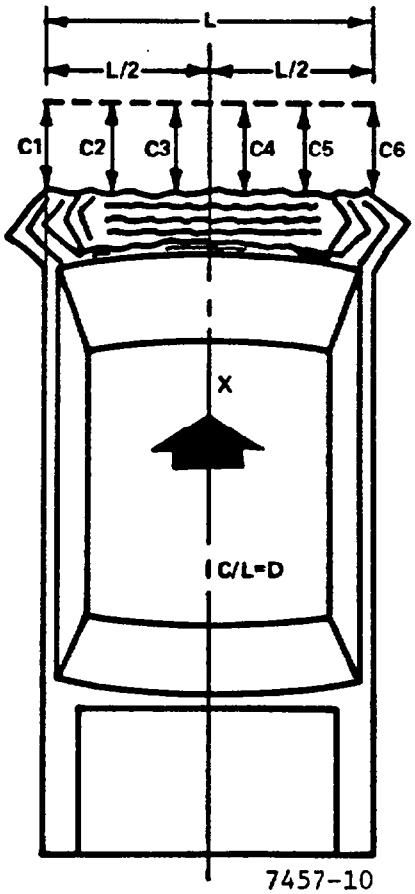
C4 = 21.1 inches

C5 = 19.7 inches

C6 = 18.5 inches

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

LENGTH OF DAMAGED REGION: L = 59.3 inches



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National Accident Sampling System — Continuous Sampling Subsystem: Vehicle Data

FIELD MEASUREMENTS

NCI 1986 SAAB 9000 YS3CD55L8G1004473 4DOOR HATCHBACK

Complete When Applicable

End Damage	Side Damage
Undeformed end width 59.3	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		Field L**	C_1	C_2	C_3	C_4	C_5	C_6	±D
		Width** (CDC)	Max*** Crush								
1	Bumper	59.3	℄ 21.5	59.3	23.6	21.2	21.5	21.2	20.5	23.0	Ø
			Ø		4.5	.8	.1	.1	.8	4.5	
1	ACTUAL CRUSH	59.3	21.5	59.3	19.1	20.4	21.4	21.1	19.7	18.5	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.

NCI

DAMAGE DESCRIPTION

Tire—Wheel Damage

a. Rotation physically restricted

RF 2
LF 2
RR 2
LR 2

b. Tire deflated

RF 2
LF 2
RR 2
LR 2

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

TYPE OF TRANSMISSION

___Manual ___Automatic

Average Track: —
Maximum Width: —
~~Curb~~ TEST Weight: 3390
Overall Length: 181.5
Wheel Base: 105.2
Engine Size: cyl. N/A
displ. "

WHEEL STEER ANGLES

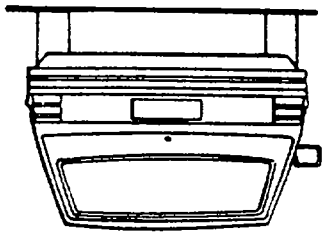
(For locked front wheels or displaced rear axles only)

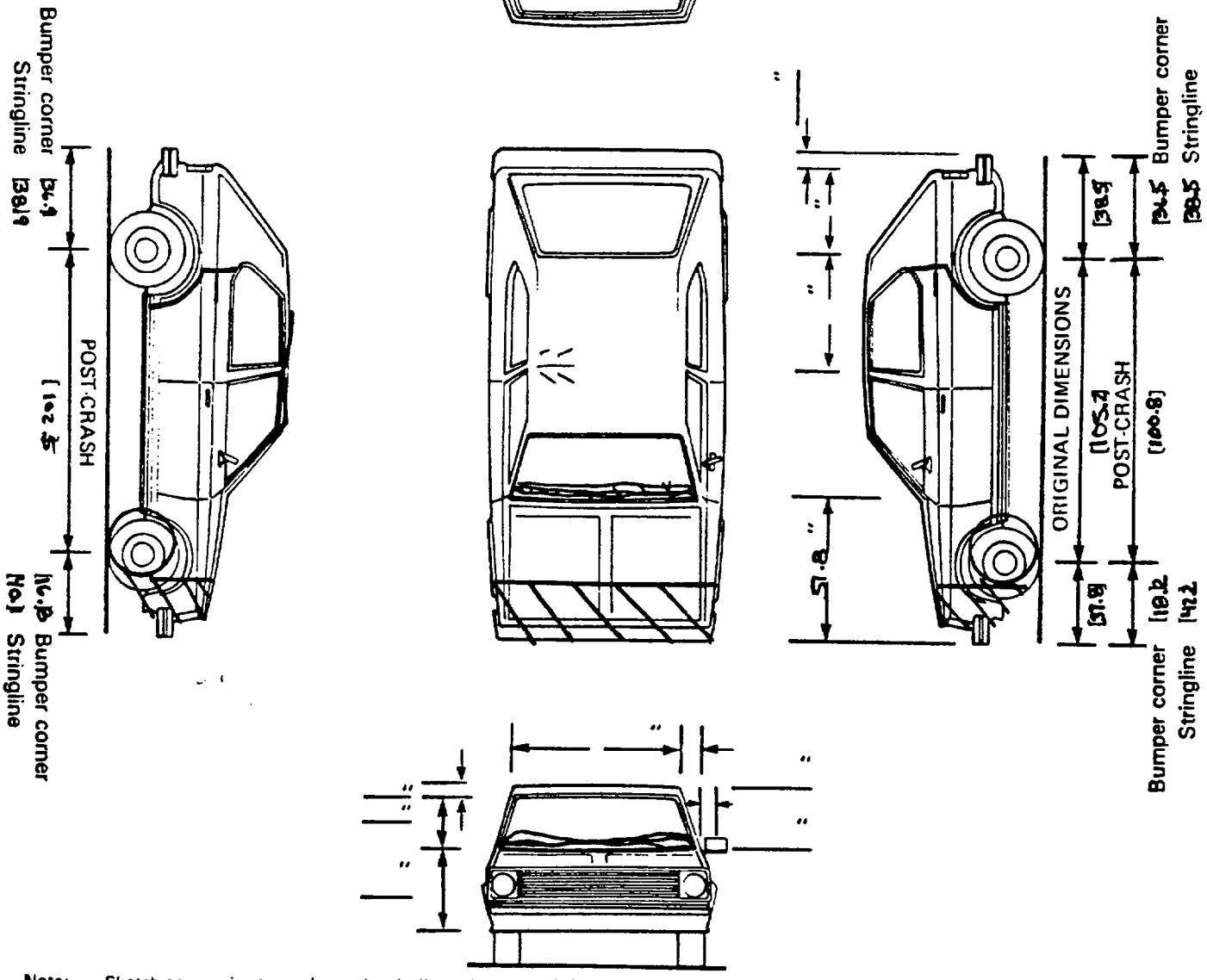
RF ± N/A °
LF ± ___ °
RR ± ___ °
LR ± ___ °

Within ± 5 degrees

1986 SAAB 9000 Turbo Sedan

YS3CD55L8G1004473





Note: Sketch new perimeter and cross hatch direct damage and single hatch induced damage on all views. Annotate observations which might be useful in reconstructing the accident (e.g., grass in tire bead, direction of striations, scuff on sidewall, etc.)
If pulling trailer sketch type of trailer and damage received on the back of this page
Annotate any damage caused by extrication such as component removal by torching, prying or hydraulic shears.
If the vehicle contacted a pedestrian, complete page 6R.

Figure 13 TEST VEHICLE DAMAGE DETAILS

APPENDIX A

PHOTOGRAPHS

Figure A-1 PRE-TEST FRONT VIEW

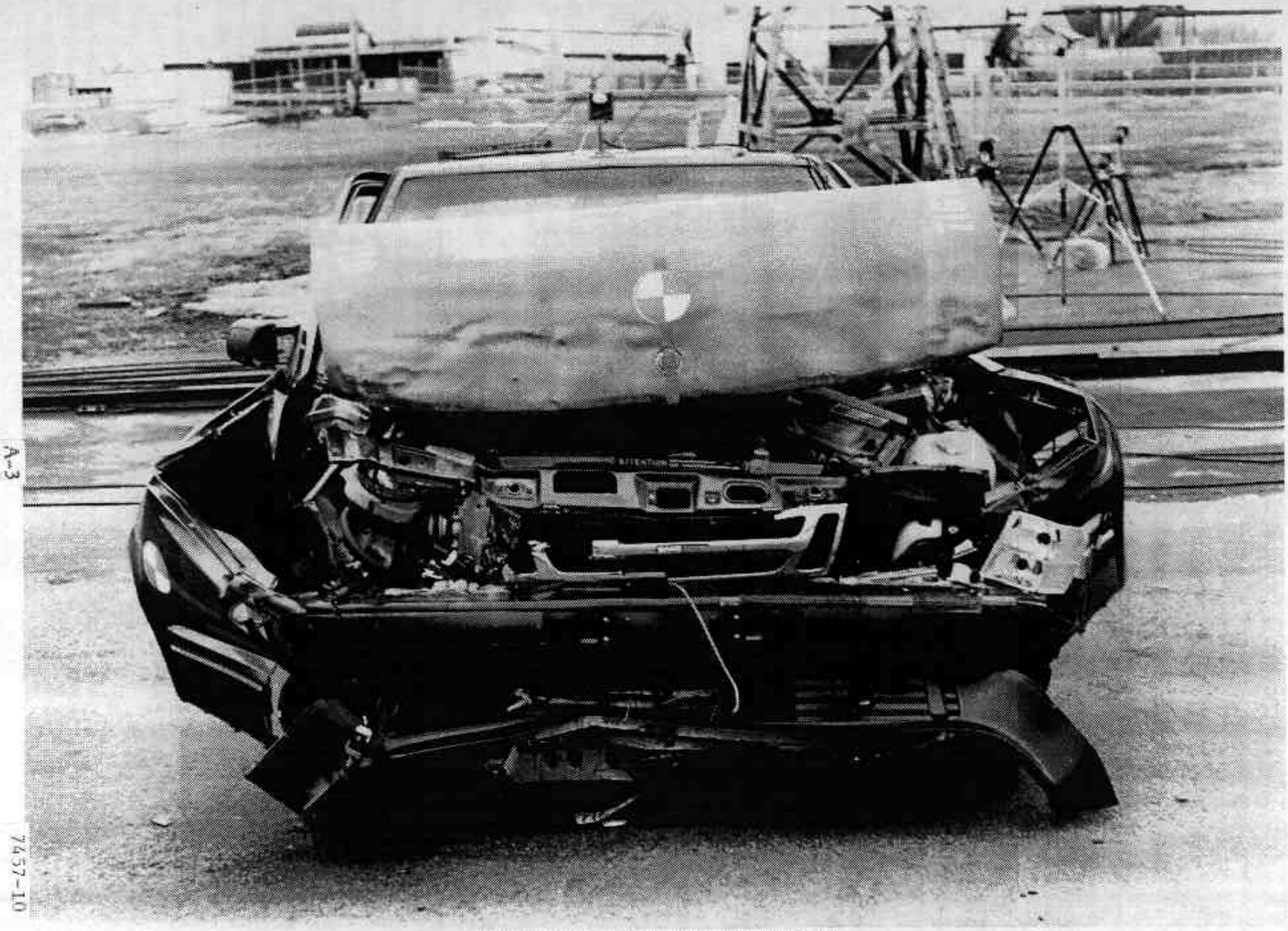


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Figure A-2 POST-TEST FRONT VIEW

Figure A-3 PRE-TEST LEFT SIDE VIEW

Figure A-4 POST-TEST LEFT SIDE VIEW

Figure A-5 PRE-TEST RIGHT SIDE VIEW

Figure A-6 POST-TEST RIGHT SIDE VIEW

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

7457-10

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

7457-10

A-10

7437-10

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

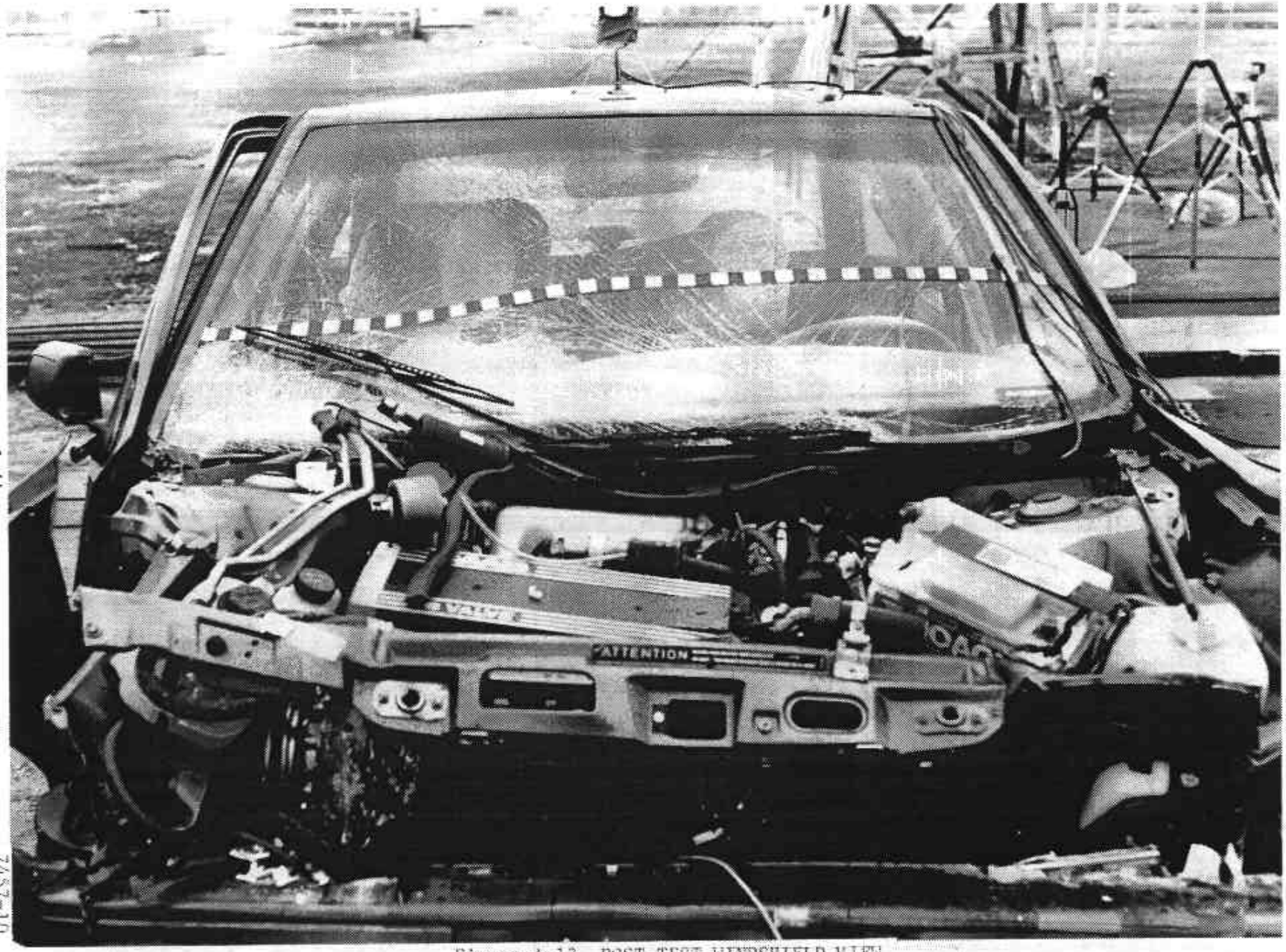

Figure A-13 POST-TEST WINDSHIELD VIEW

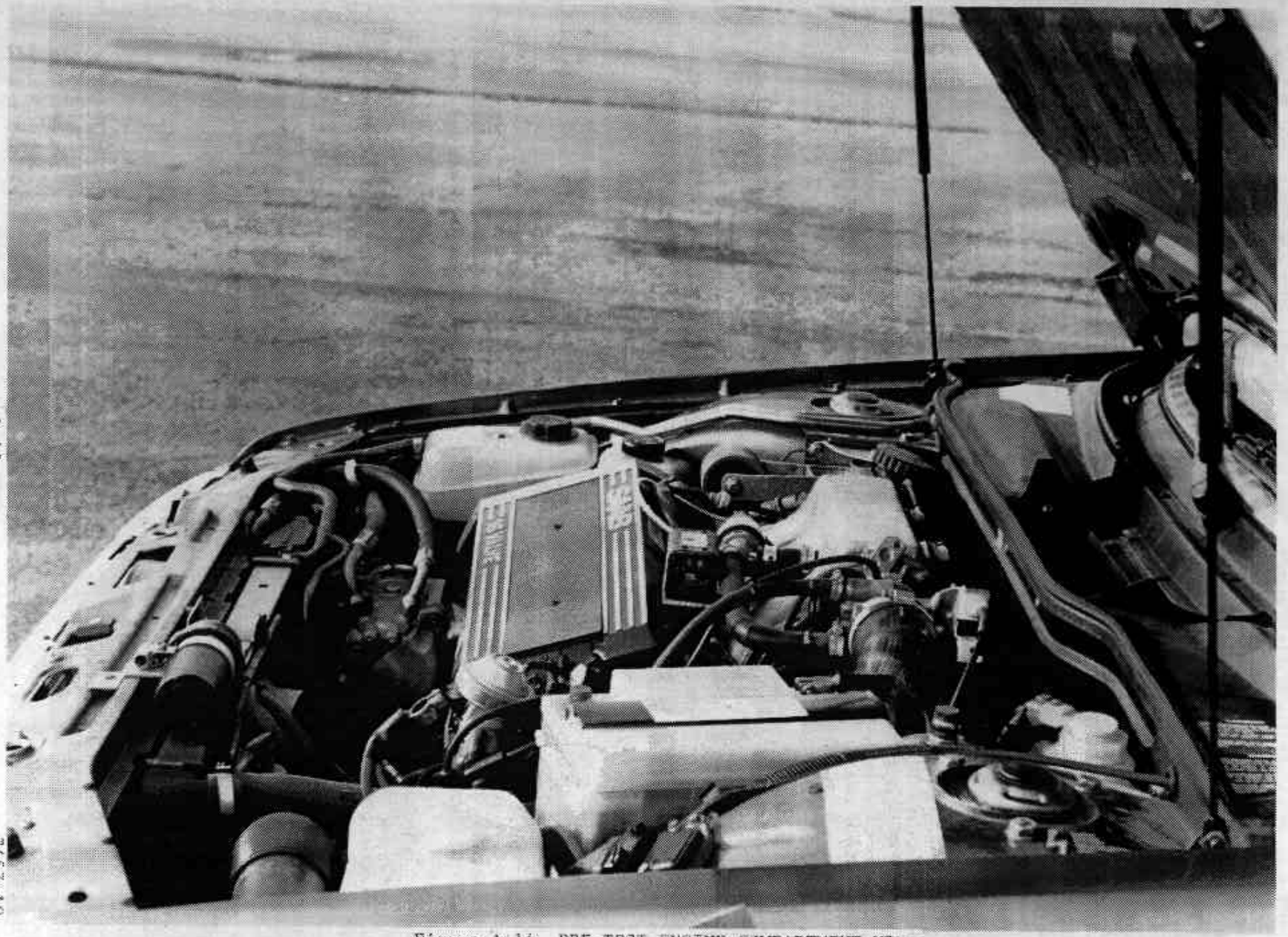

Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

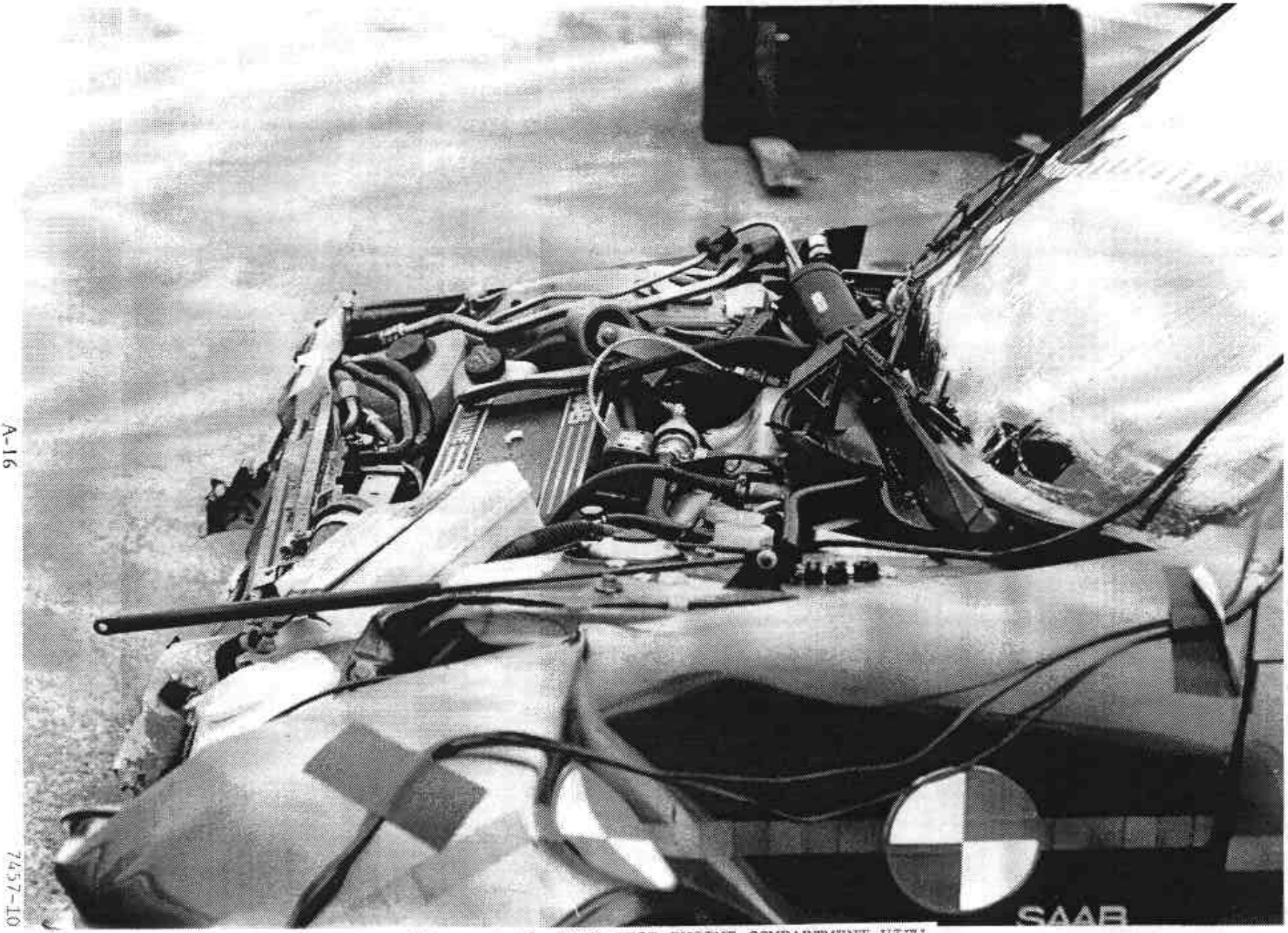

Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

7457-10

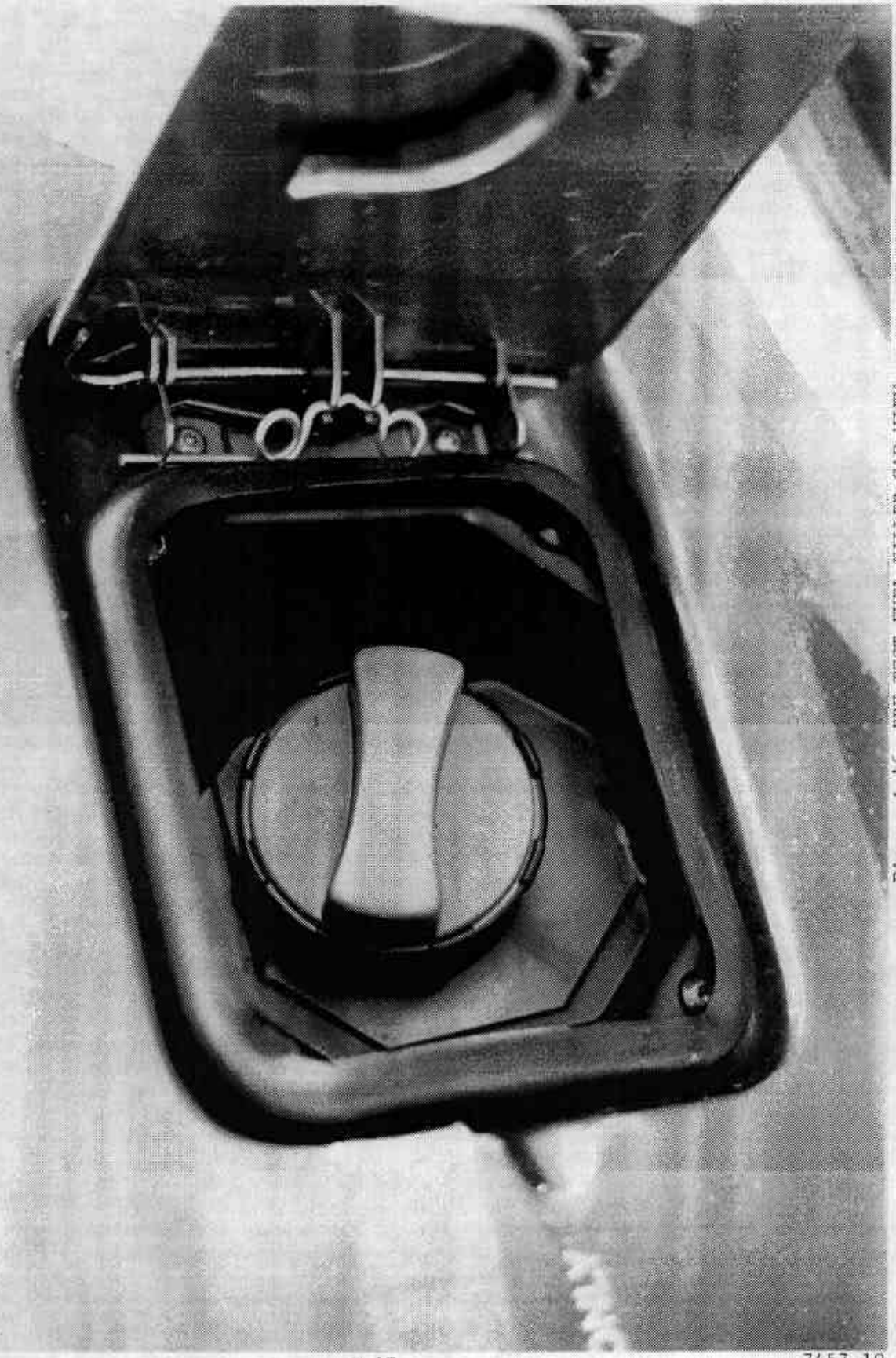

Figure A-16 PRE-TEST FUEL FILLER CAP VIEW

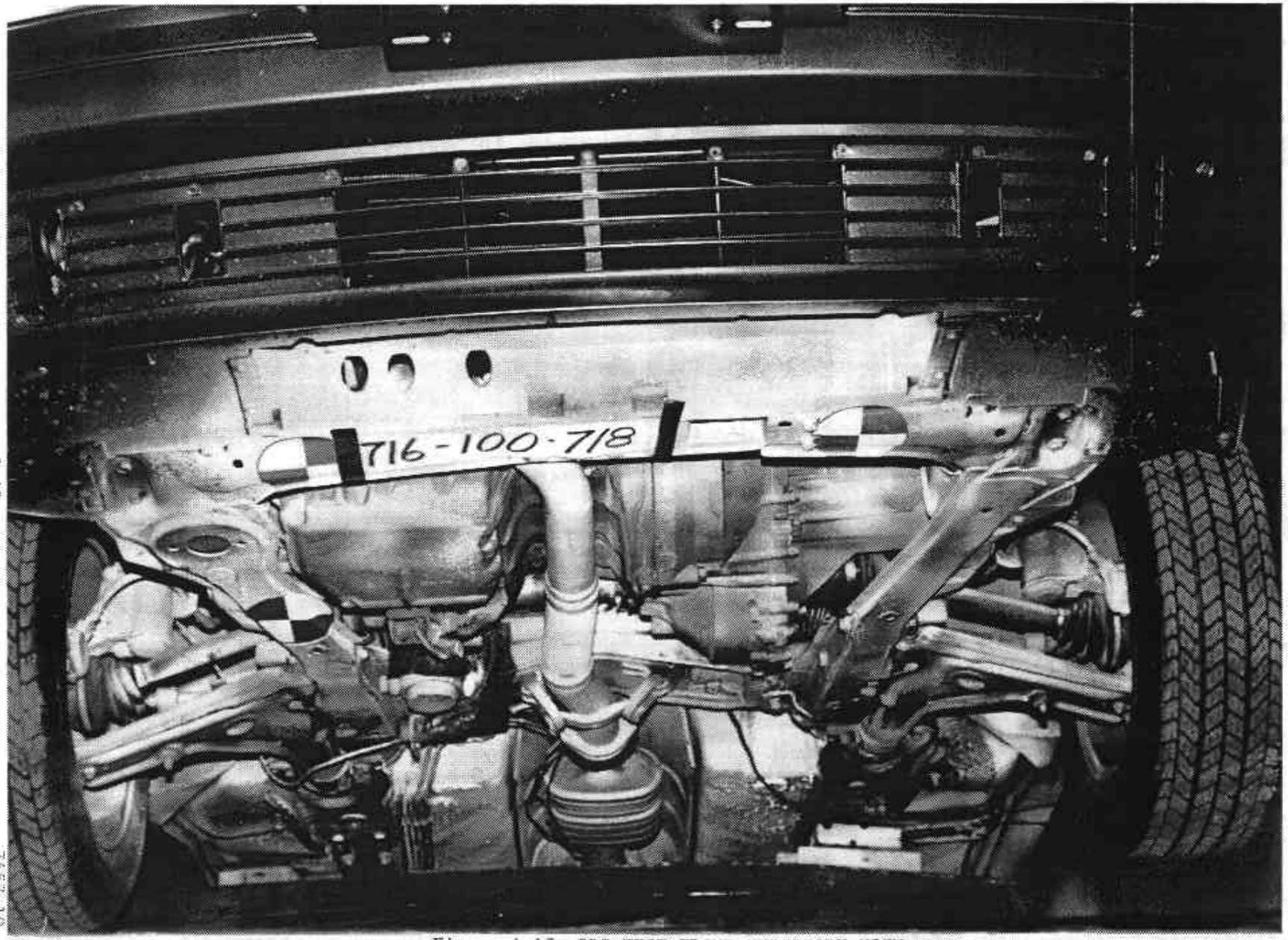

Figure A-17 PRE-TEST FRONT UNDERBODY VIEW

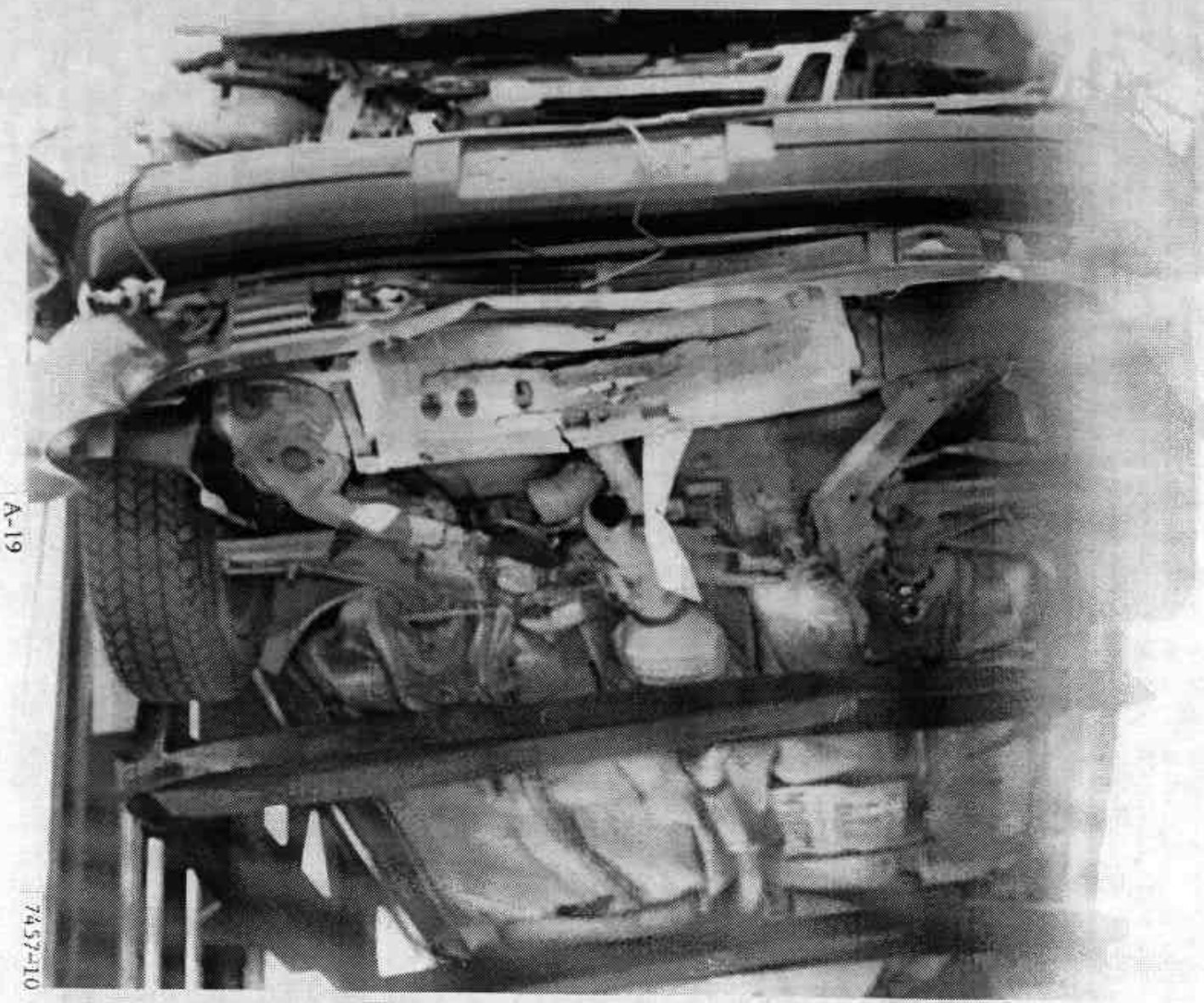

Figure A-18 POST-TEST FRONT UNDERBODY VIEW

745210

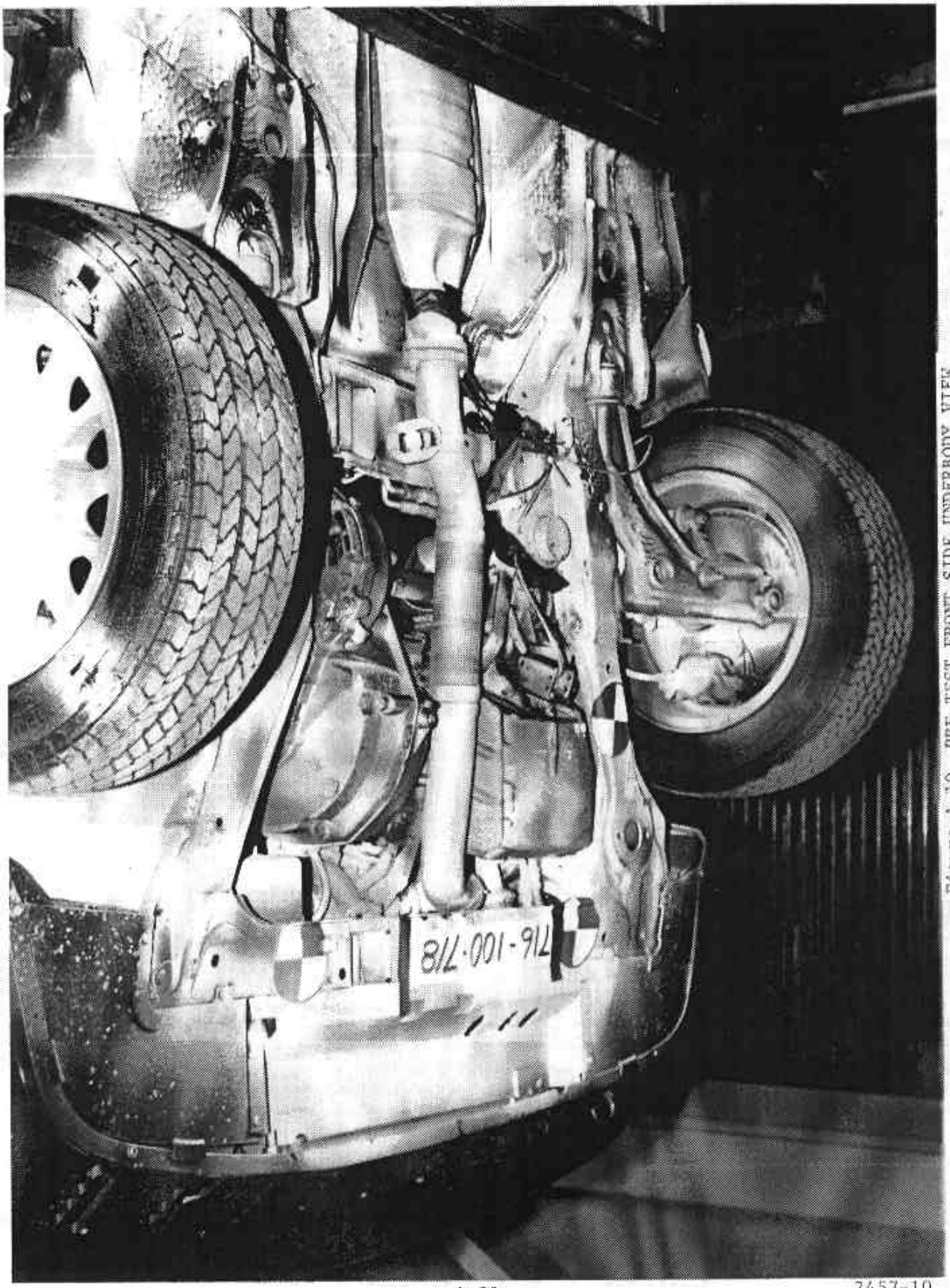

Figure A-19 PRE-TEST FRONT SIDE UNDERBODY VIEW

Figure A-20 POST-TEST FRONT SIDE UNDERBODY VIEW

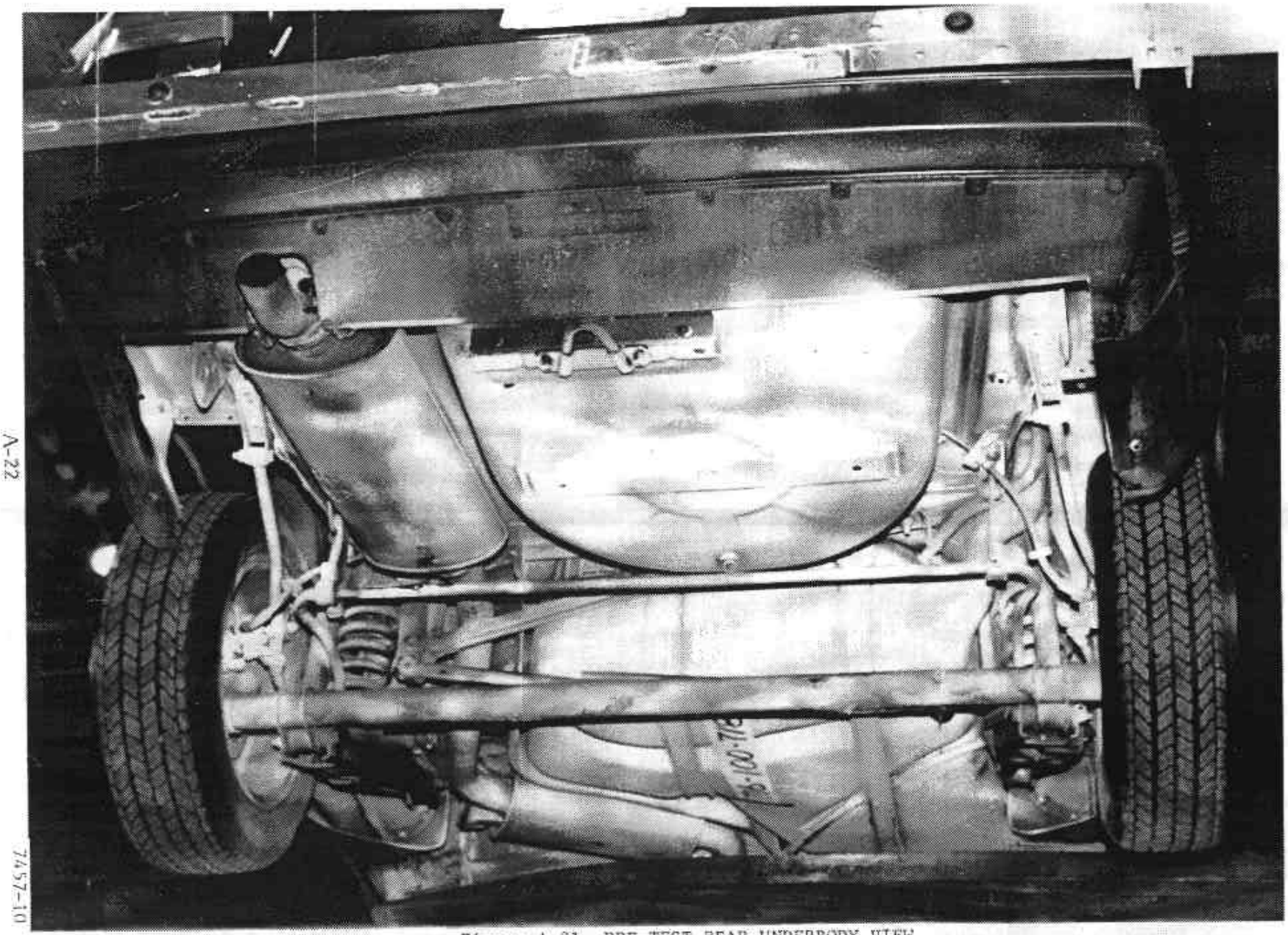

Figure A-21 PRE-TEST REAR UNDERBODY VIEW

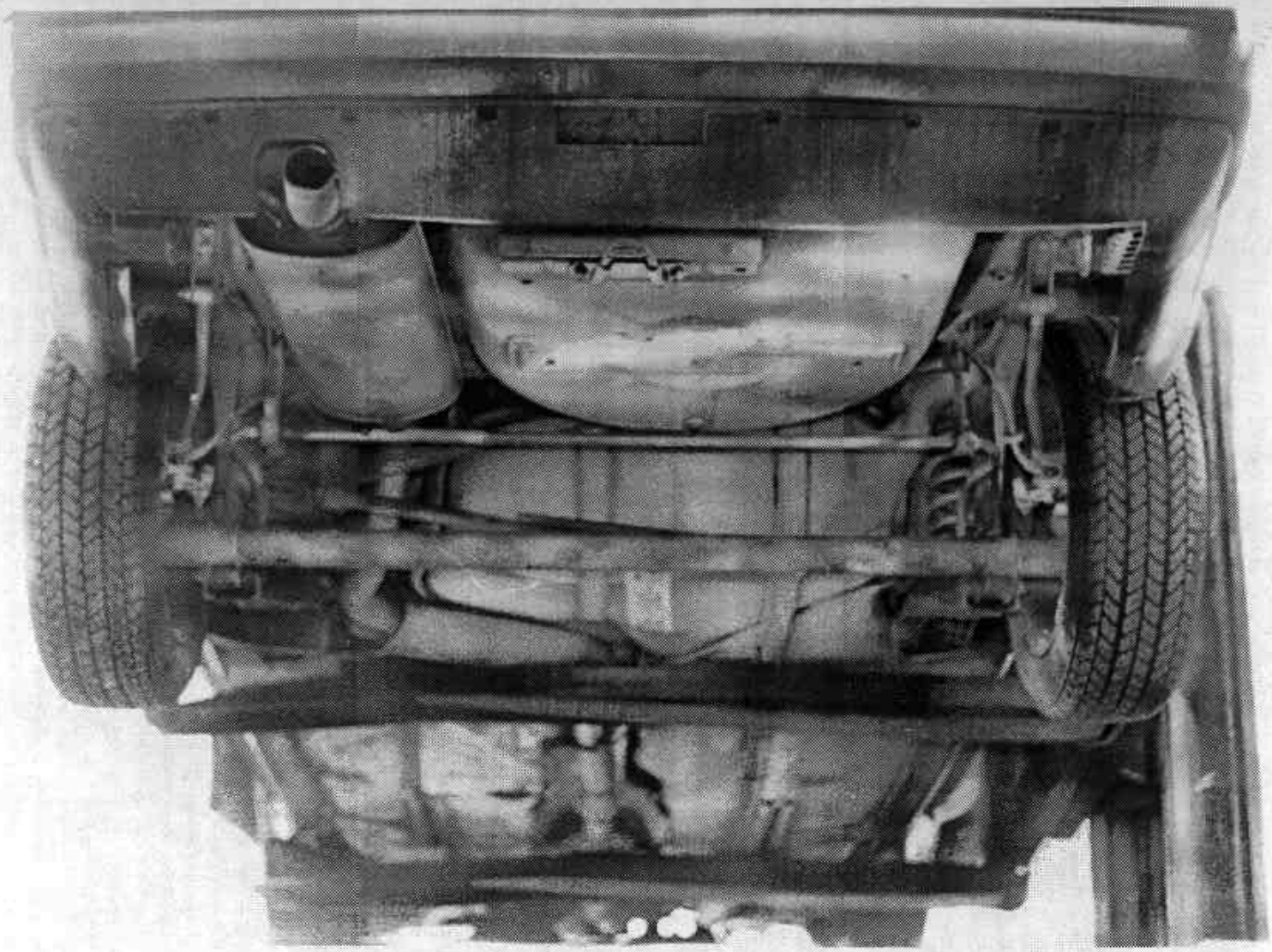

Figure A-22 POST-TEST REAR UNDERBODY VIEW

7457-10

Figure A-23 PRE-TEST DRIVER POSITION VIEW

Figure A-24 POST-TEST DRIVER POSITION VIEW

Figure A-25 PRE-TEST PASSENGER POSITION VIEW

7457-10

A-27

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Figure A-26 POST-TEST PASSENGER POSITION VIEW

Figure A-27 PRE-TEST DRIVER AND INTERIOR VIEW

7457-10

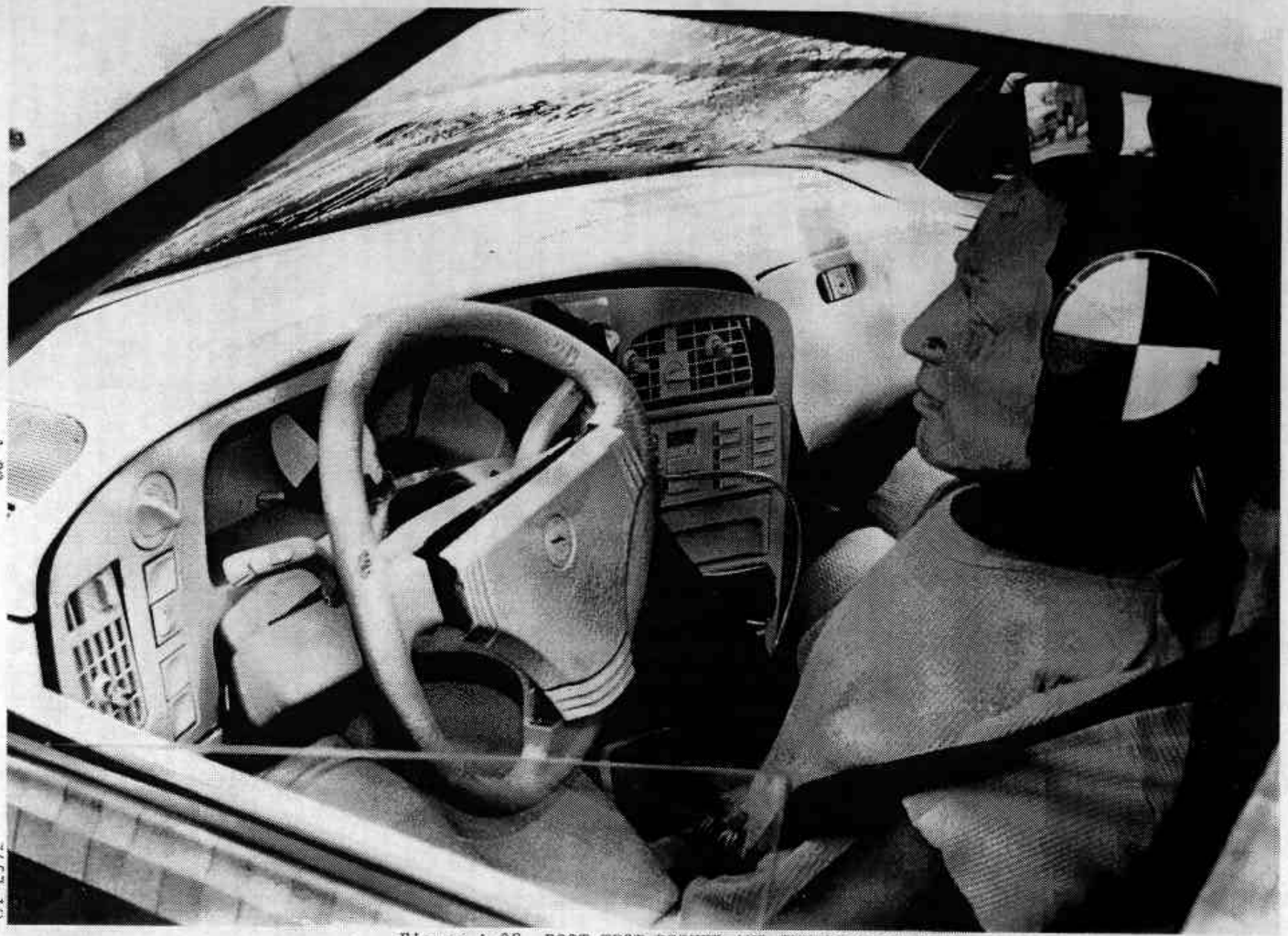


Figure A-28 POST-TEST DRIVER AND INTERIOR VIEW

Figure A-29 PRE-TEST PASSENGER AND INTERIOR VIEW

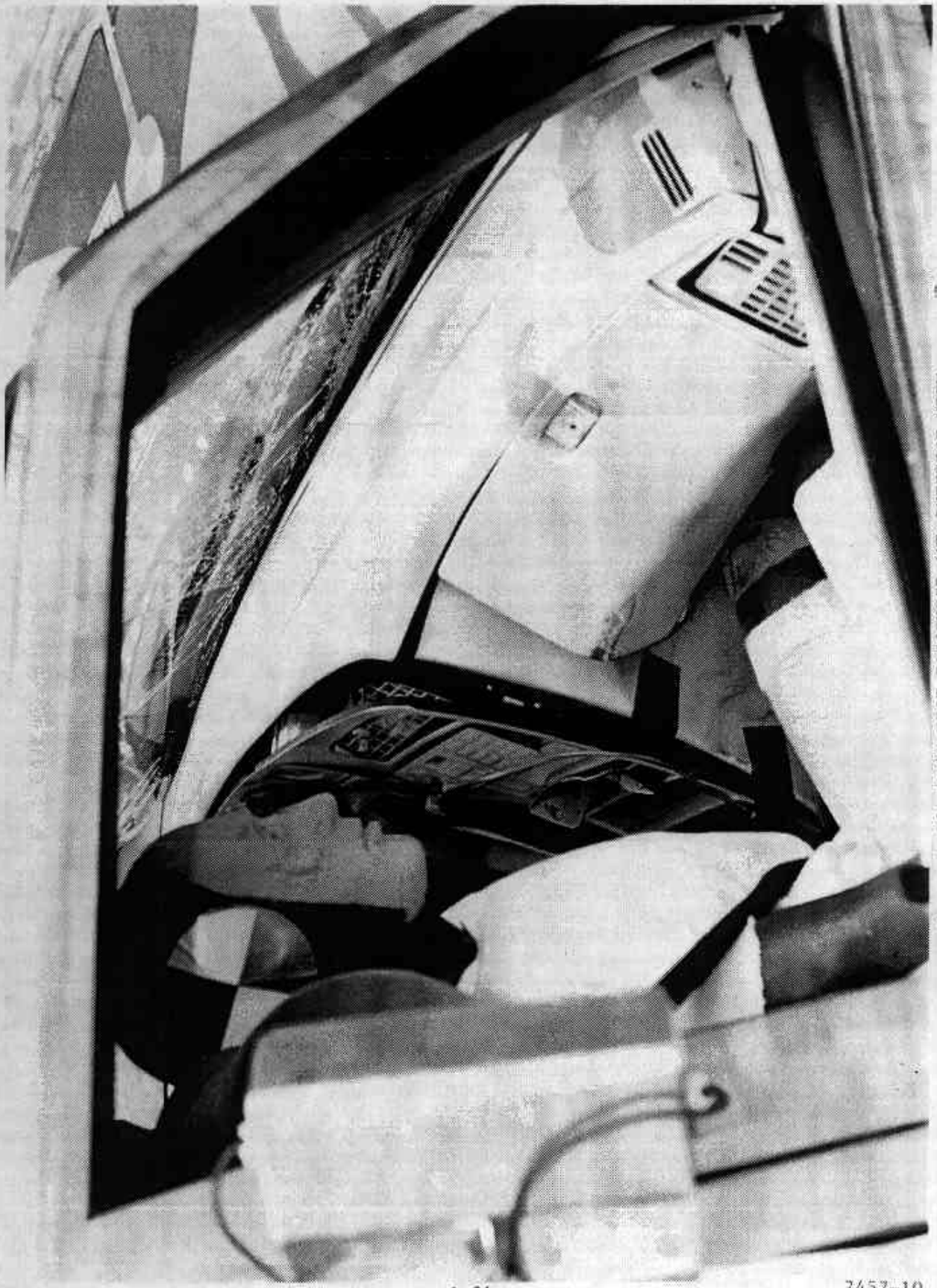


Figure A-30 POST-TEST PASSENGER AND INTERIOR VIEW

7457-10

Figure A-31 POST-TEST REAR INTERIOR VIEW

APPENDIX B

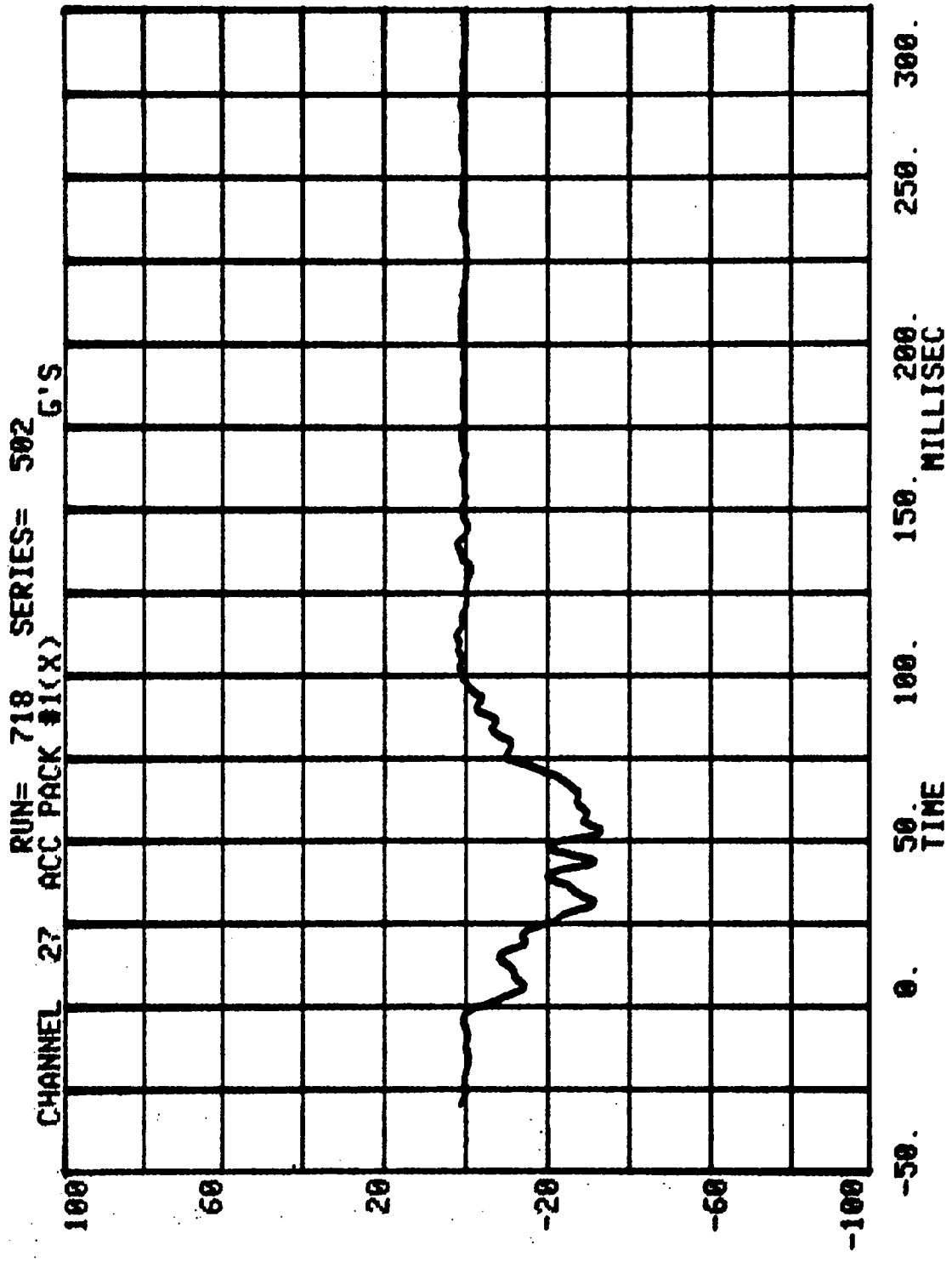
VEHICLE, DUMMY RESPONSE DATA AND LOAD CELL BARRIER DATA

Test No. MG0502

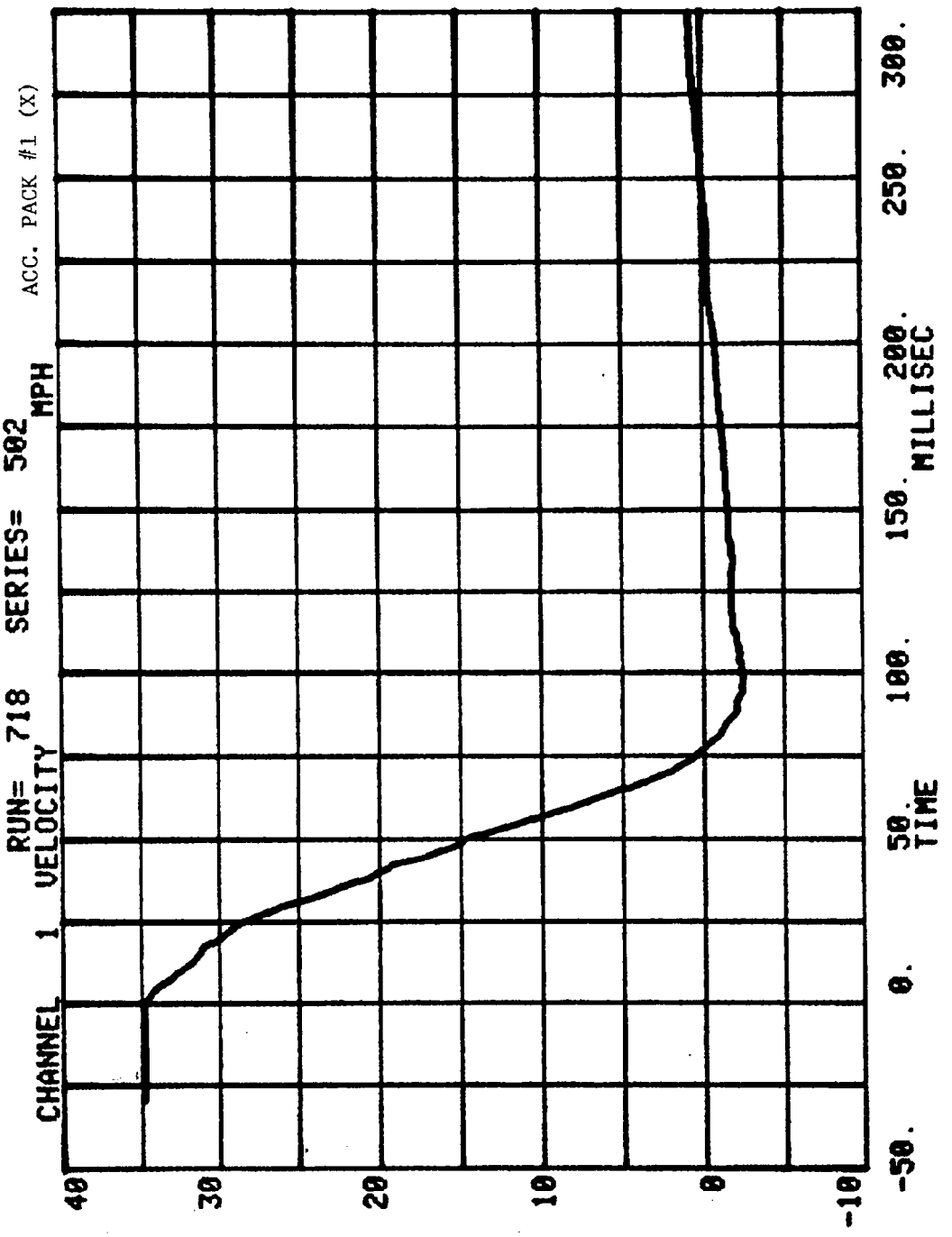
Vehicle Data

Filter Channel Class

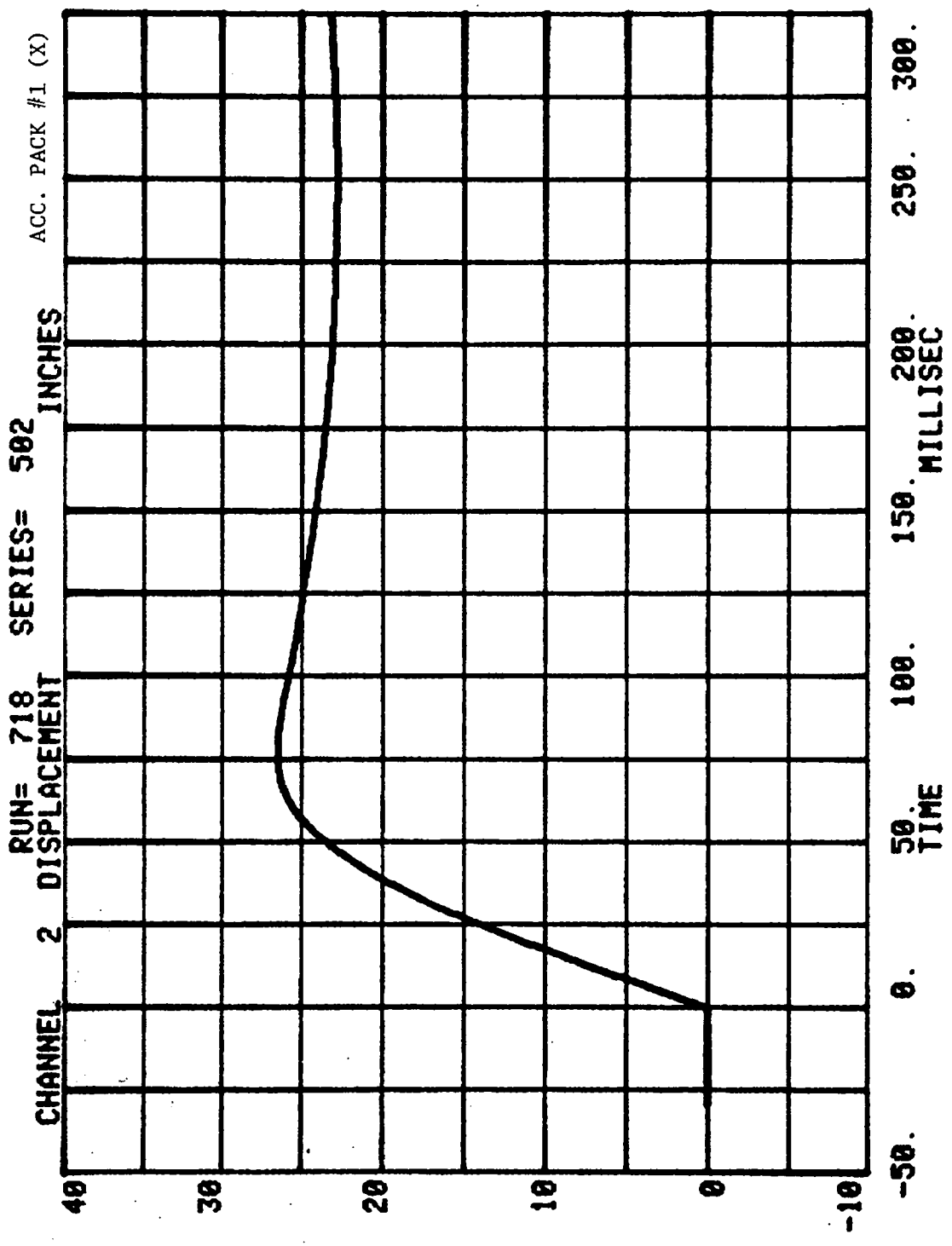
60

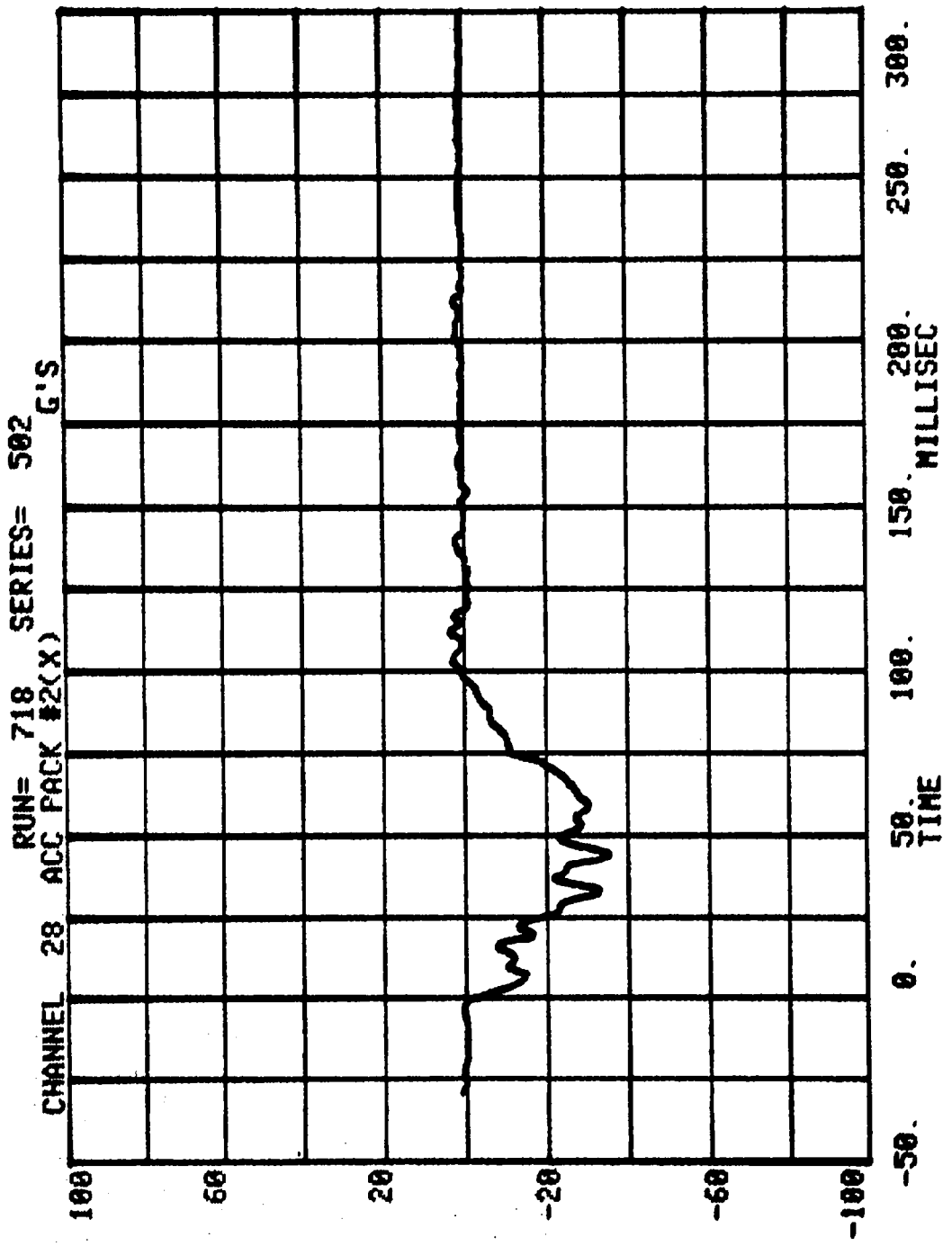

CHANNEL 27 ACC PACK #1(X)
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

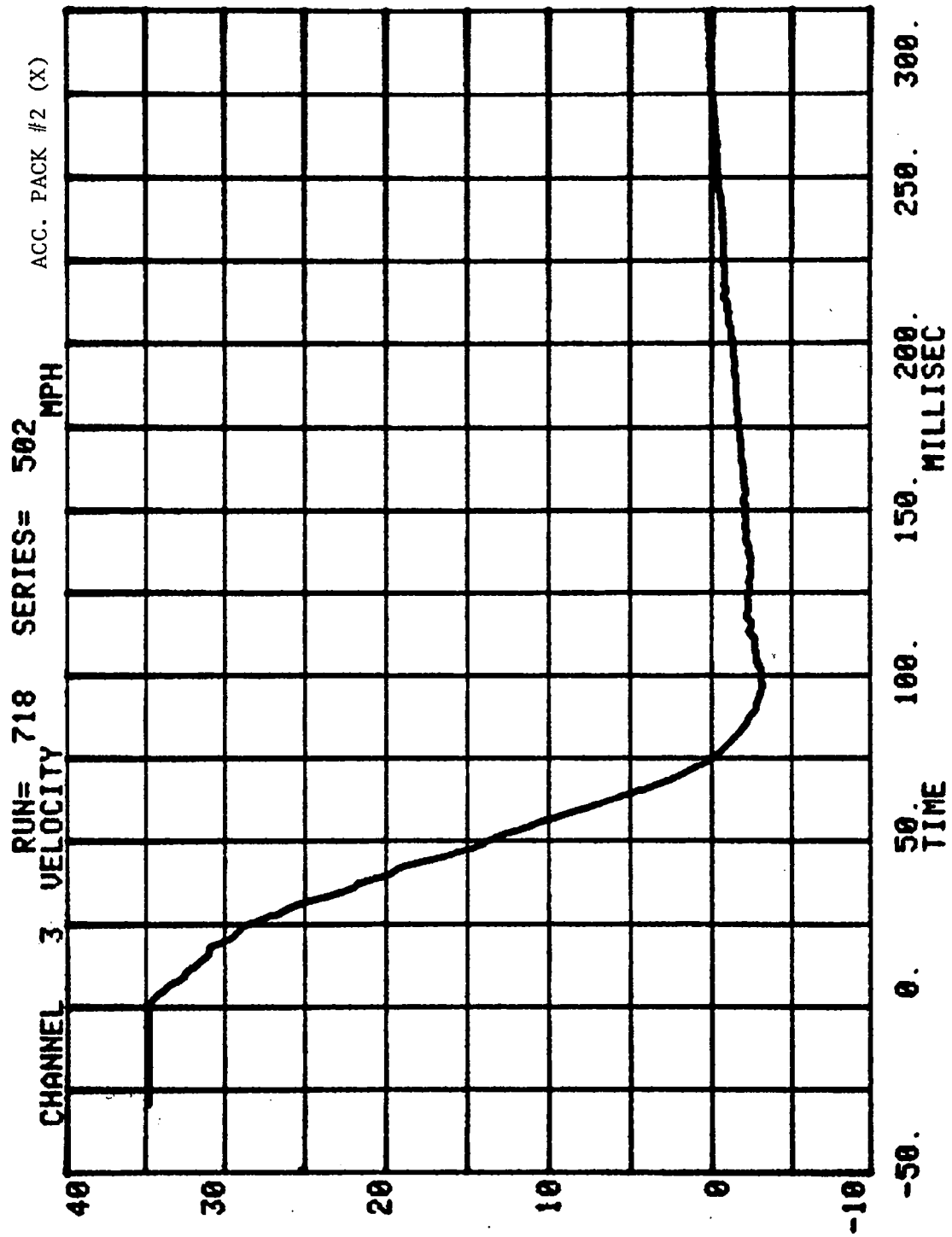
7457-10


CHANNEL 1 VELOCITY
RUN= 718 SERIES= 502
ACC. PACK #1 (X)
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

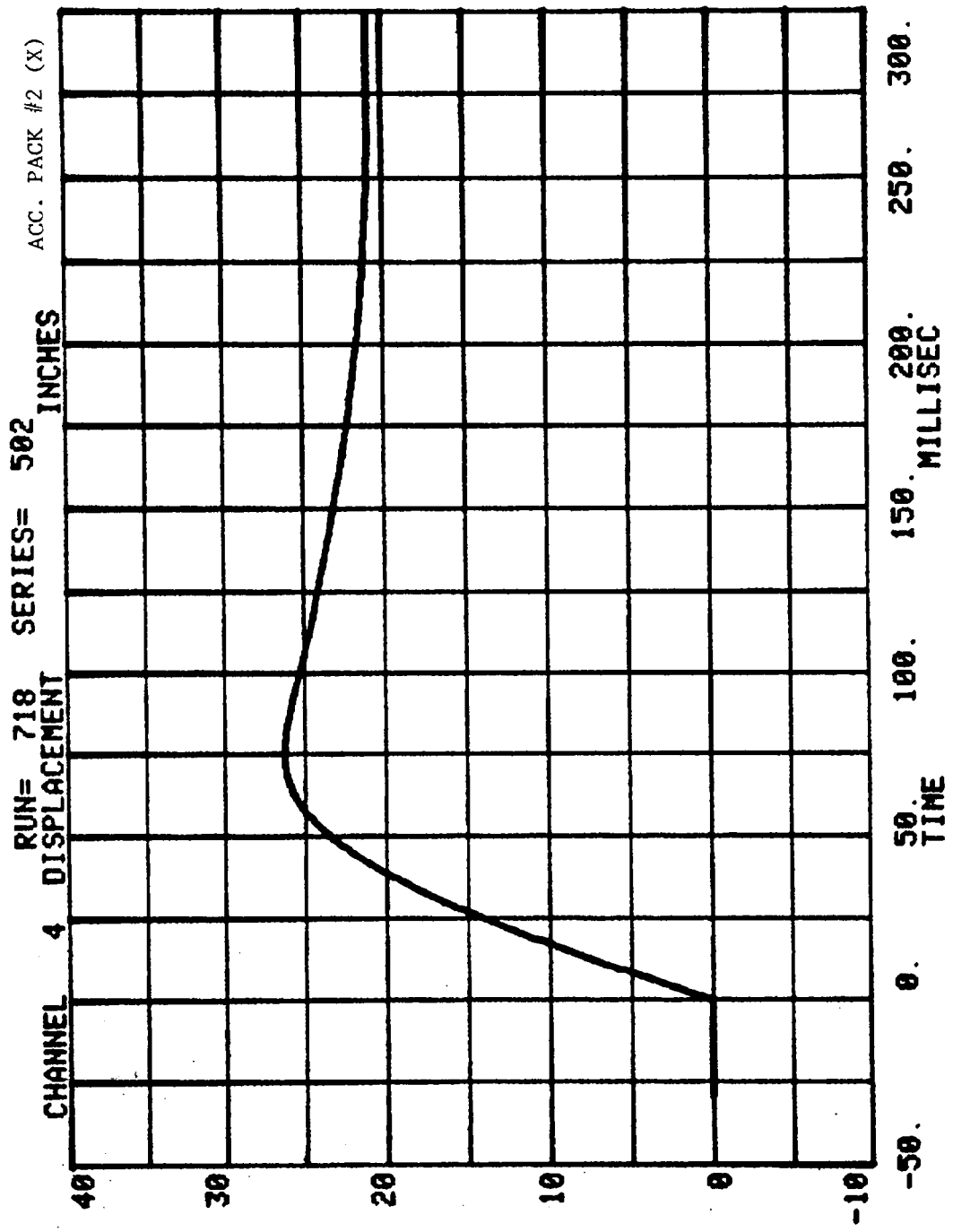
7457-10


ACC. PACK #1 (X)
CHANNEL 2 DISPLACEMENT
RUN= 718 SERIES= 502
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

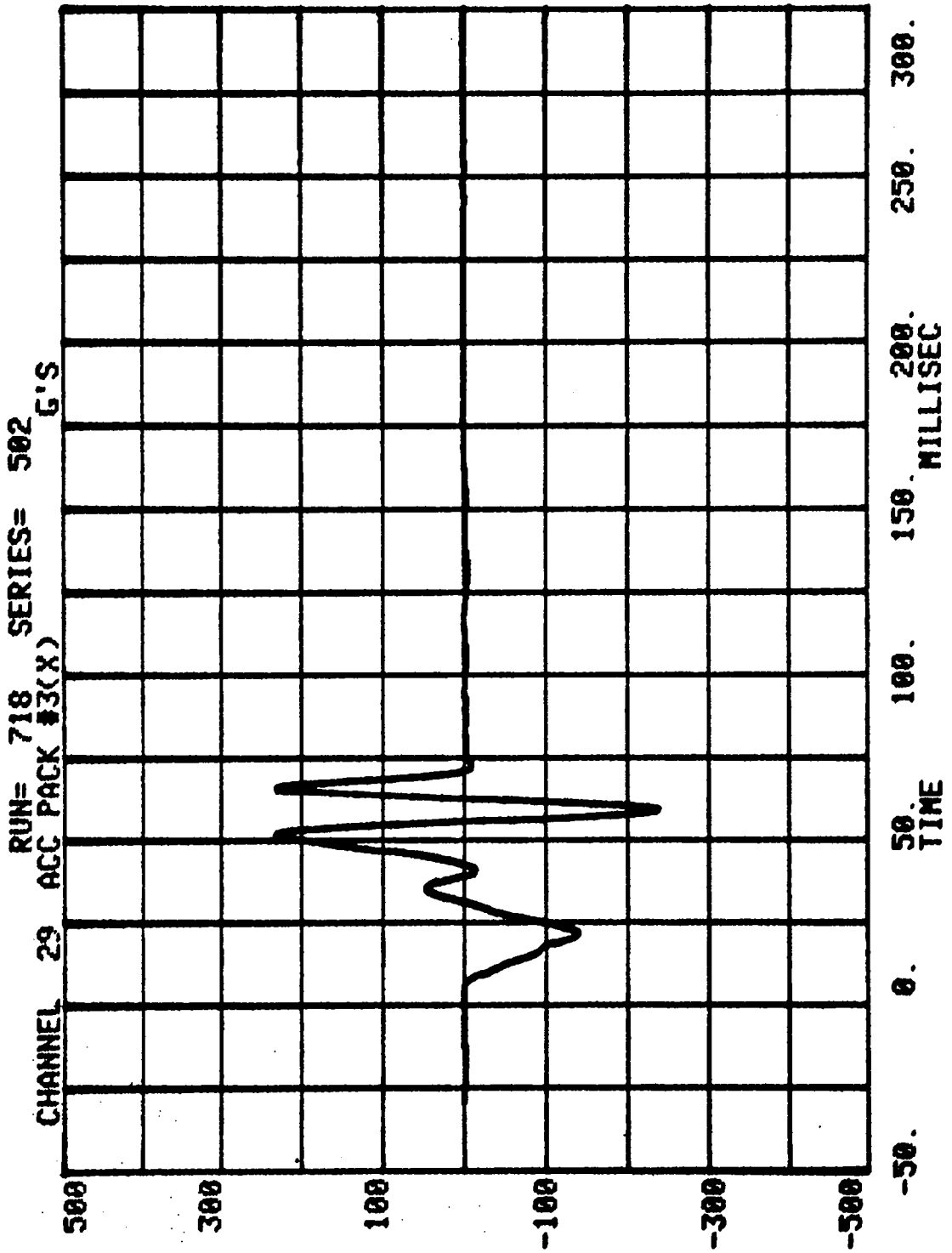

RUN= 718 SERIES= 502
CHANNEL 28 ACC PACK #2(X)
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACC. PACK #2 (X)
CHANNEL 3 VELOCITY
RUN= 718 SERIES= 502 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

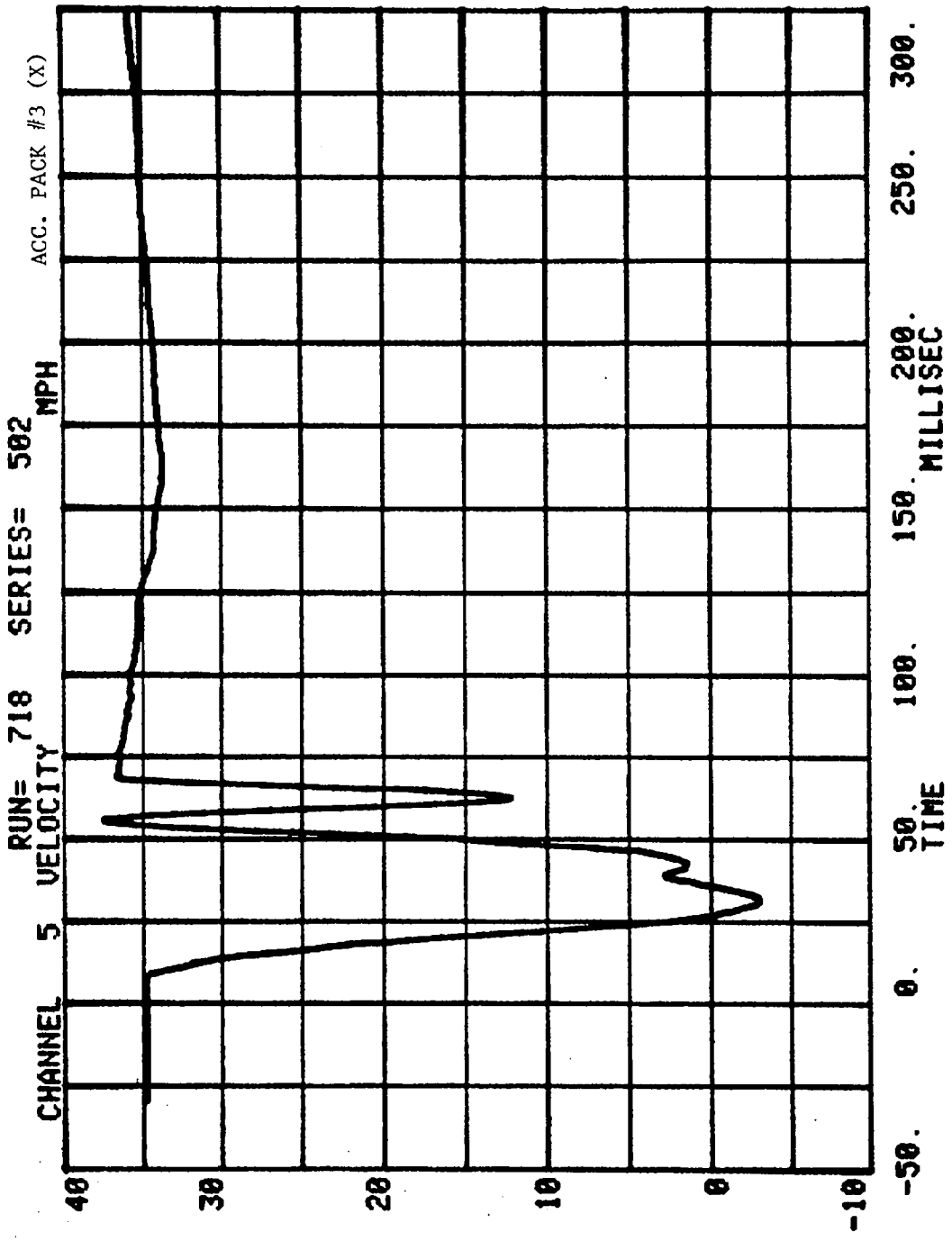
7457-10

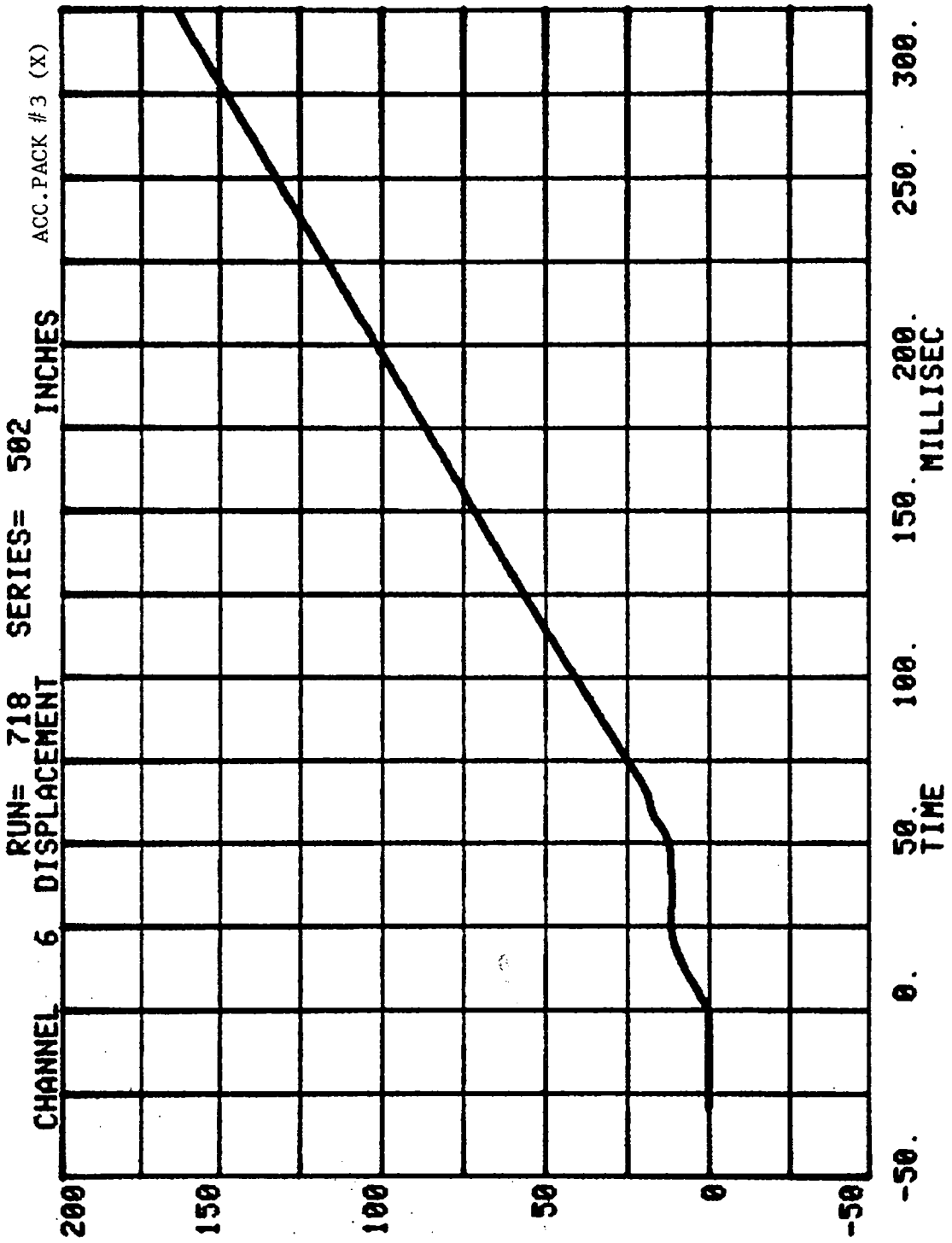

ACC. PACK #2 (X)
RUN= 718 SERIES= 502
CHANNEL 4 DISPLACEMENT INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC

7457-10

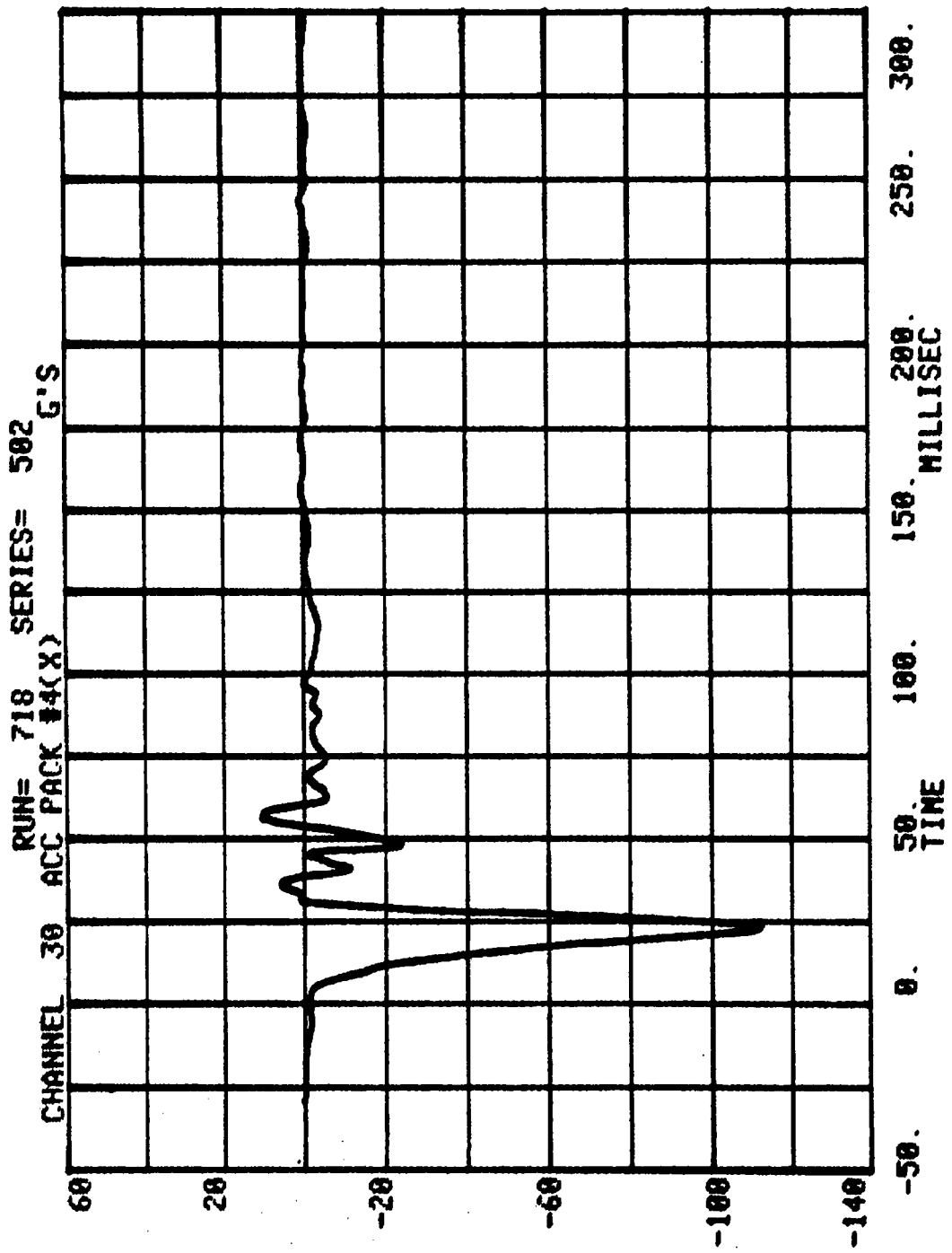

CHANNEL 29 ACC PACK #3(X)
RUN= 718 SERIES= 502
G'S
500
300
100
-100
-300
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

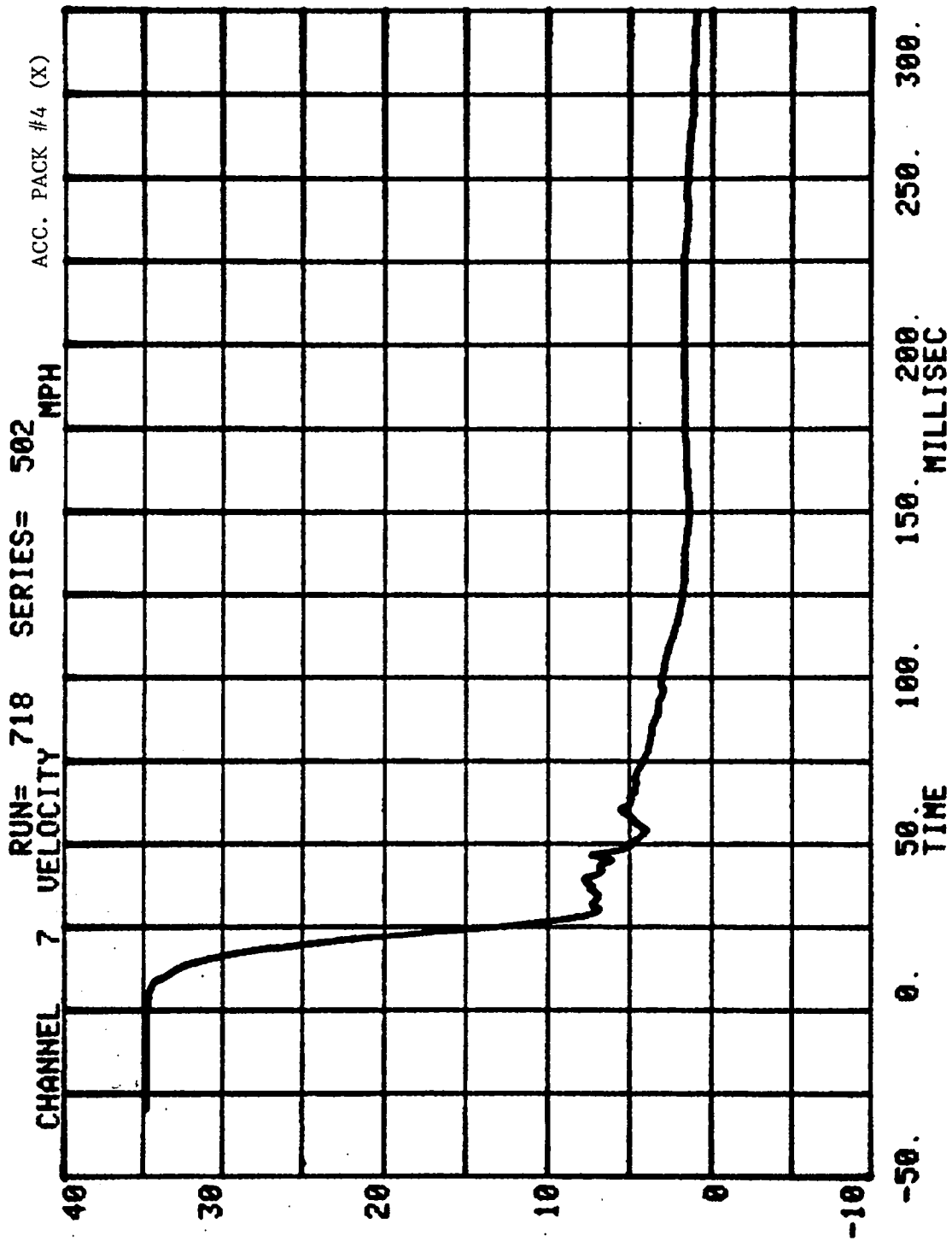
7457-10


ACC. PACK #3 (X)
CHANNEL 5 VELOCITY
RUN= 718 SERIES= 502 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

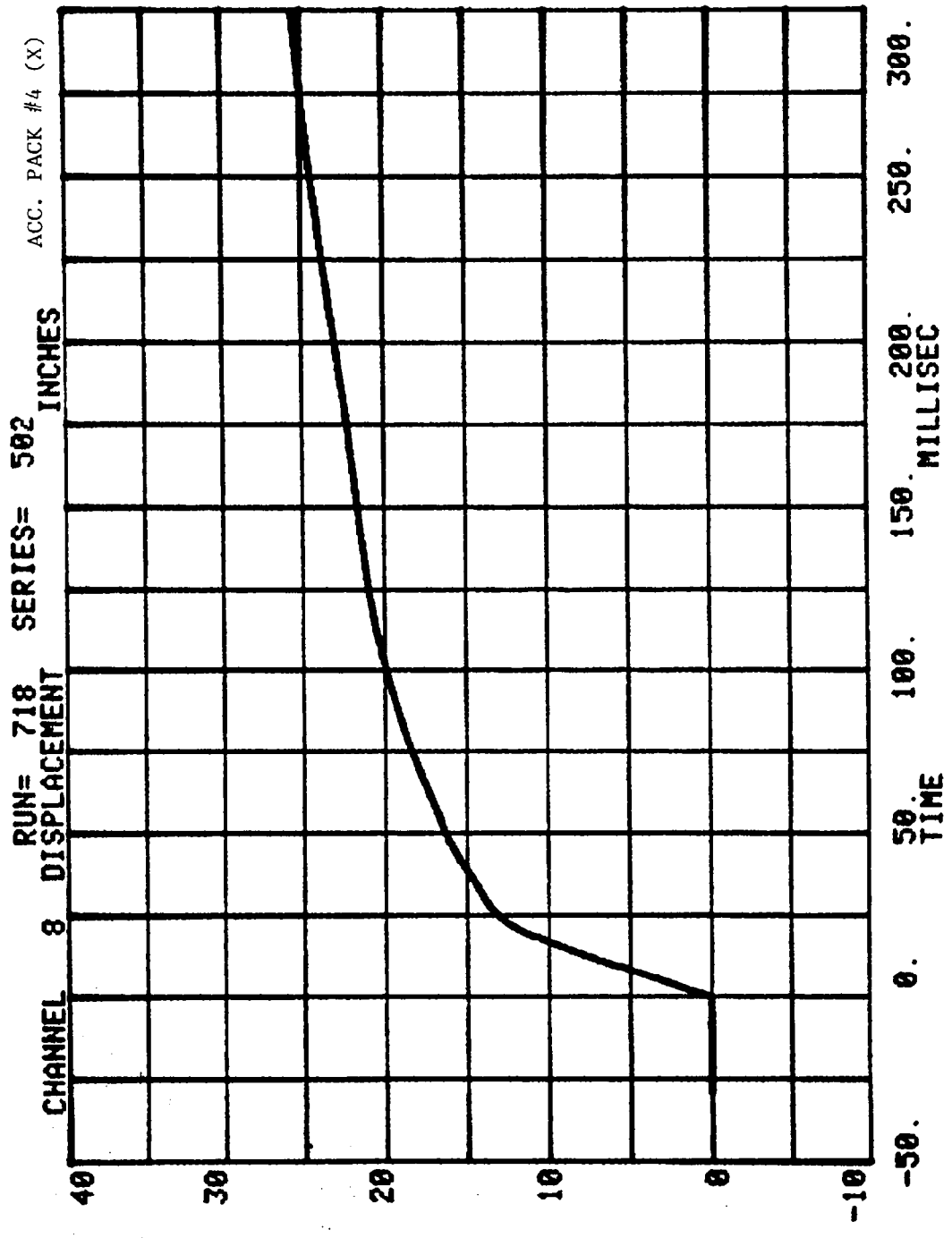

CHANNEL 6 DISPLACEMENT
RUN= 718 SERIES= 502
ACC.PACK #3 (X)
INCHES
200
150
100
50
0
-50
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

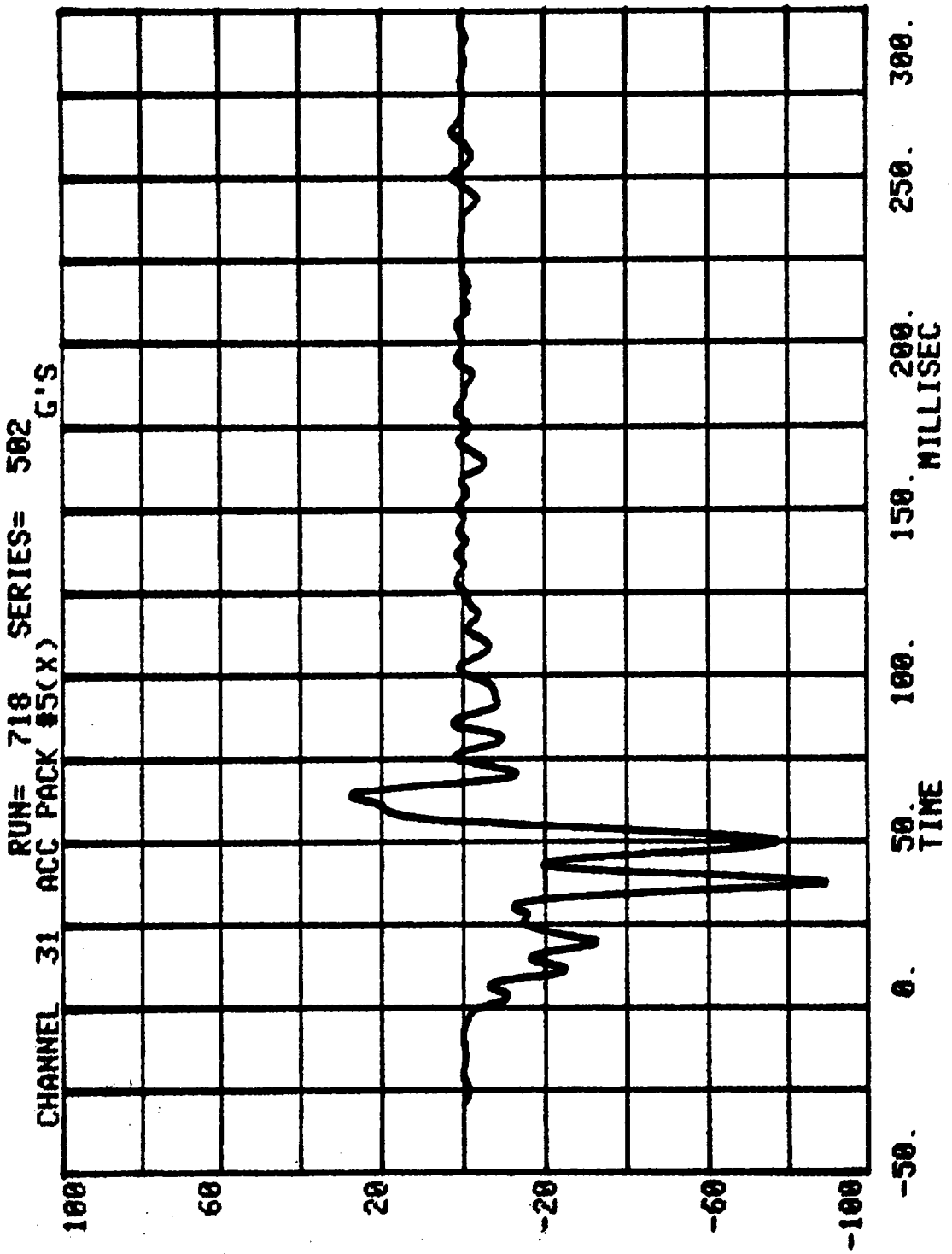

CHANNEL 30 ACC PACK #4(X)
RUN= 718 SERIES= 502
G'S
60
20
-20
-60
-100
-140
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 7 VELOCITY
RUN= 718 SERIES= 502 MPH
ACC. PACK #4 (X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

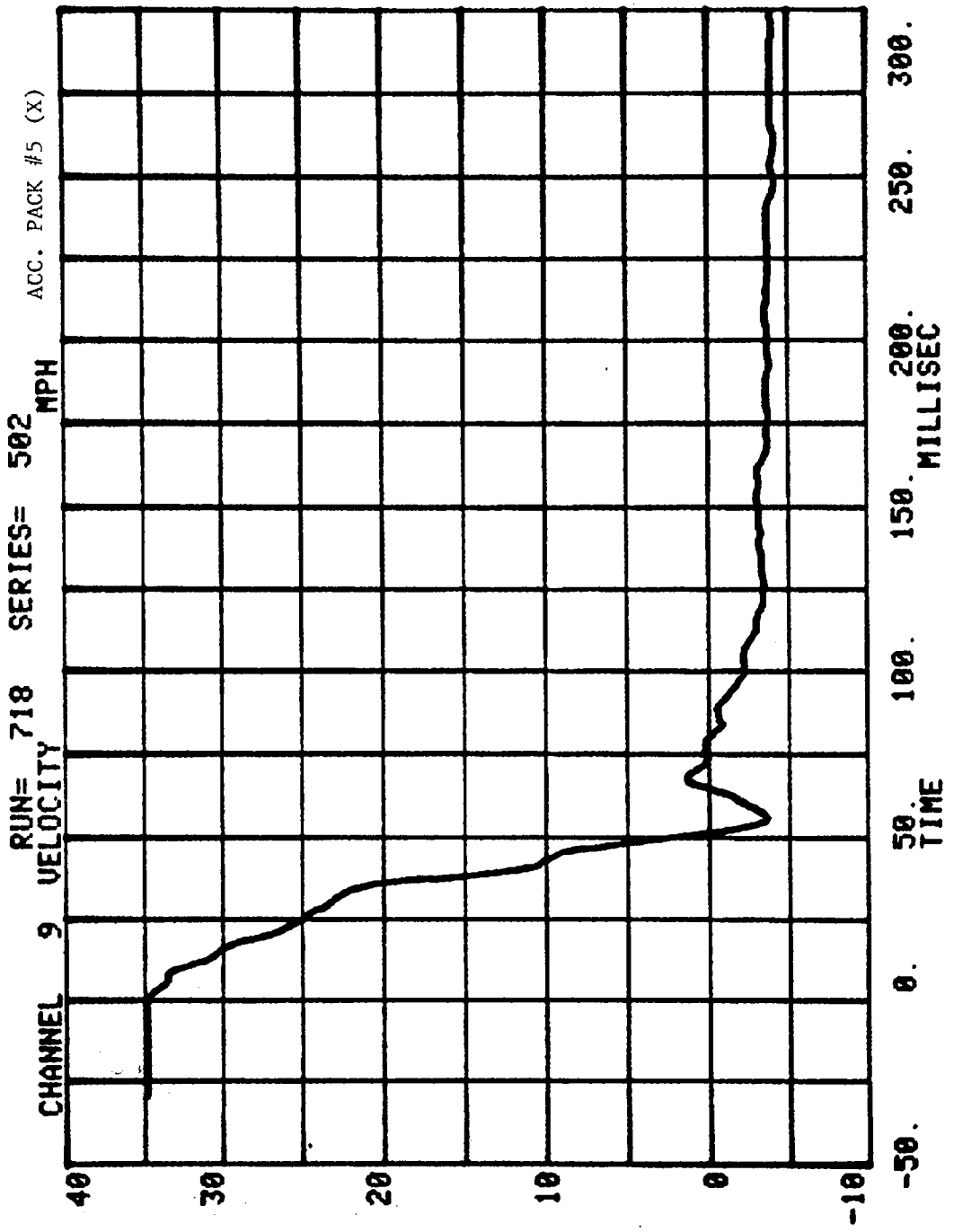
7457-10

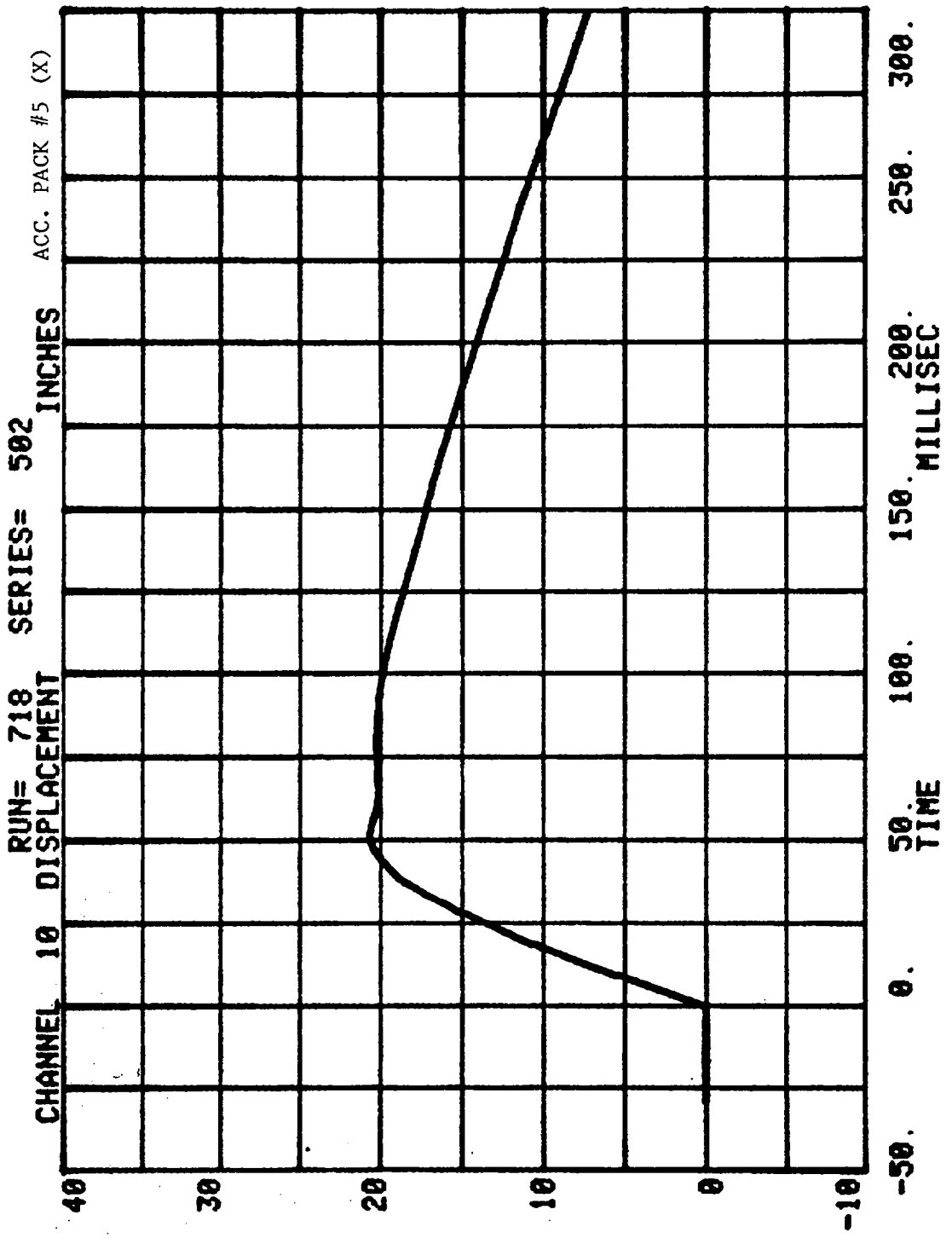

ACC. PACK #4 (X)
CHANNEL 8 DISPLACEMENT
RUN= 718 SERIES= 502
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

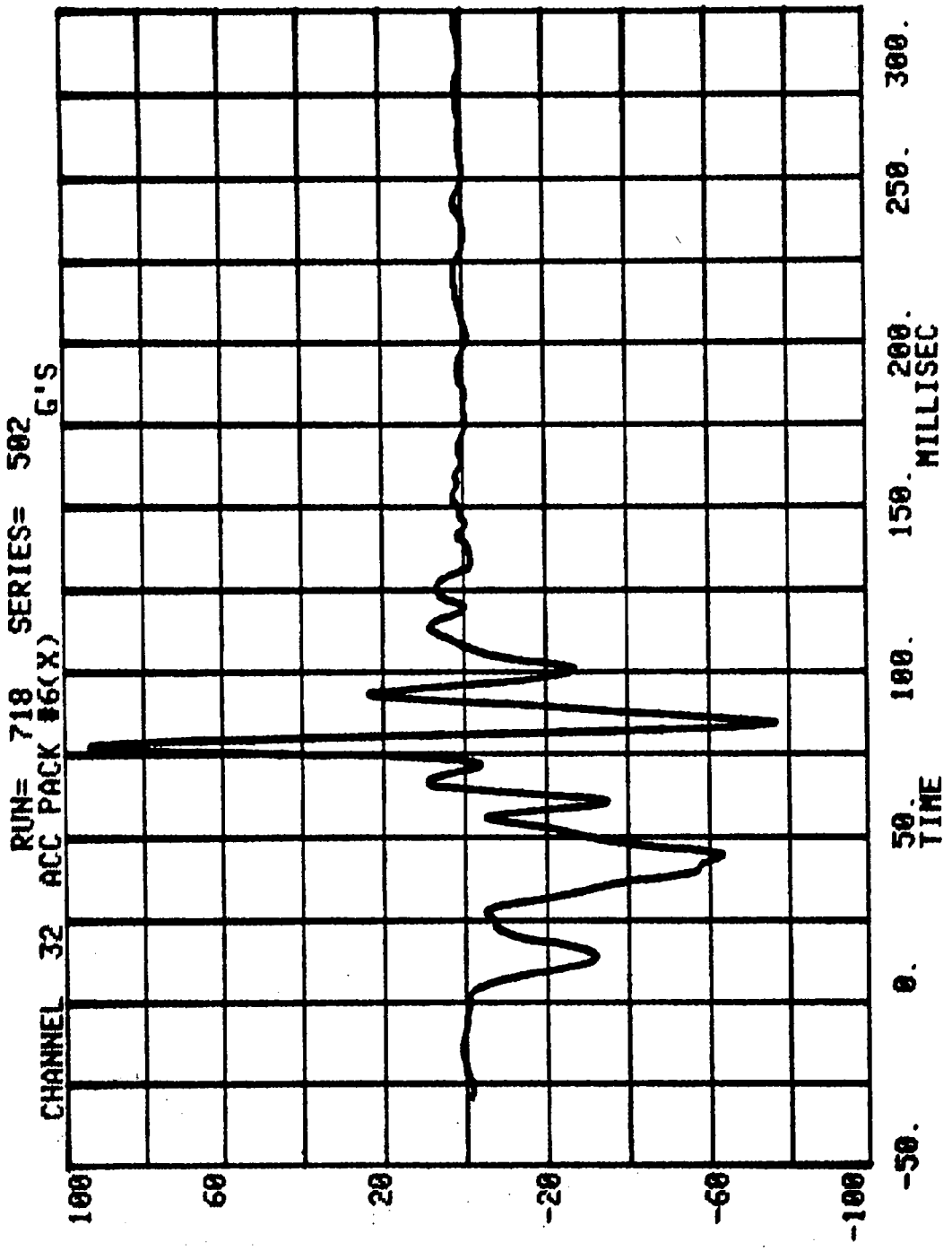

CHANNEL 31 ACC PACK #5(X)
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

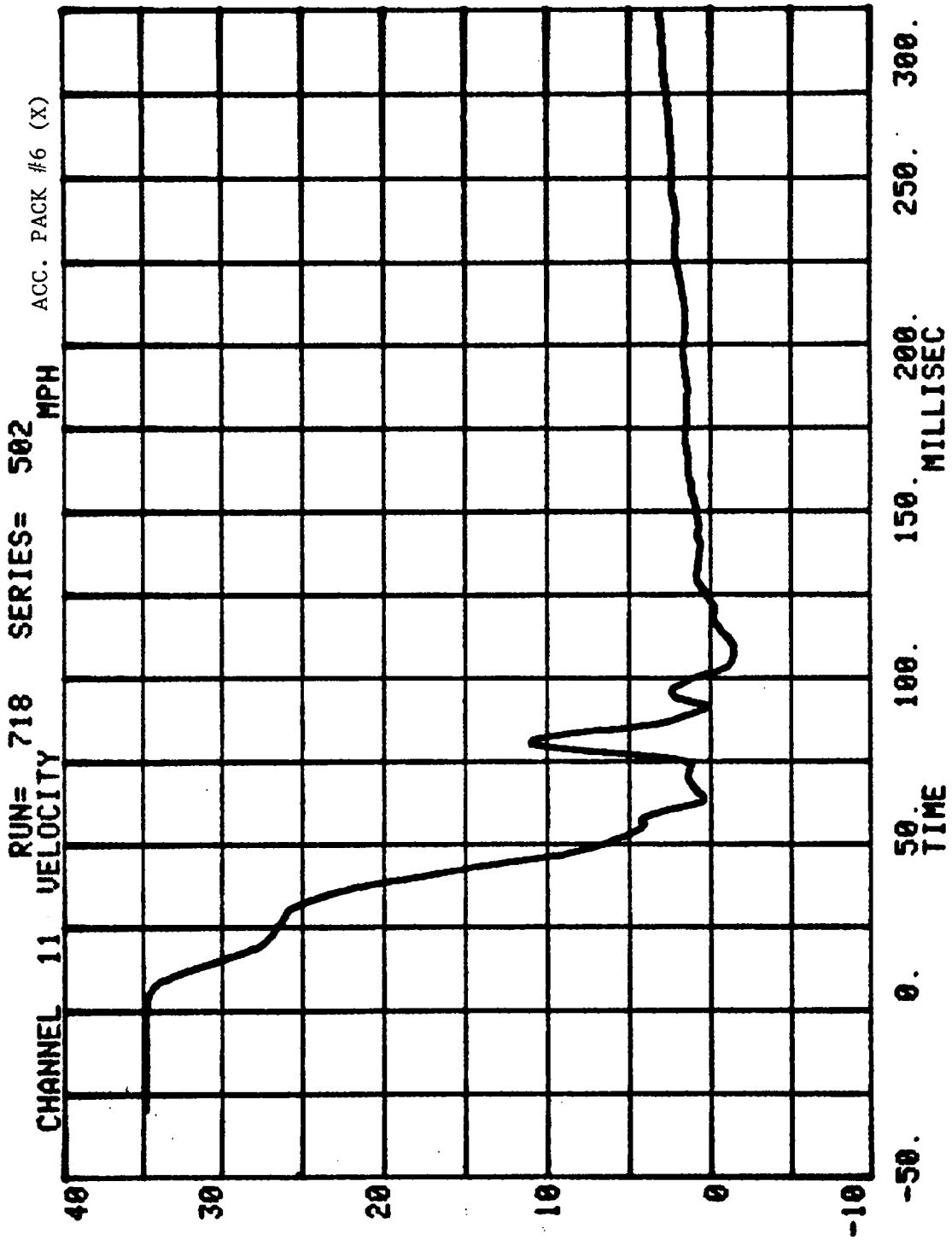

CHANNEL 9 VELOCITY
RUN= 718 SERIES= 502 MPH
ACC. PACK #5 (X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 10 DISPLACEMENT
RUN= 718 SERIES= 502
INCHES
ACC. PACK #5 (X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

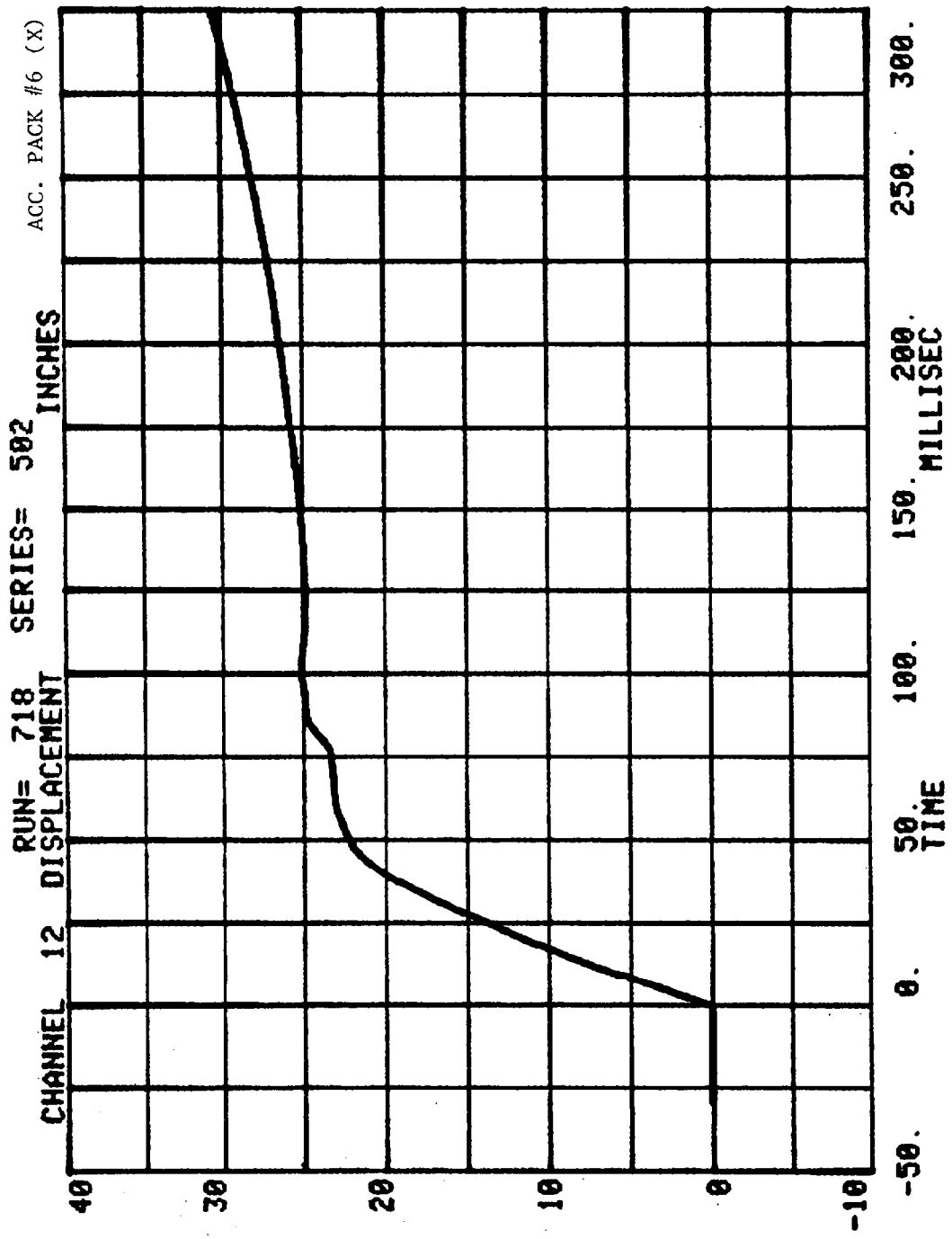
7457-10


CHANNEL 32 ACC PACK #6(X)
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


CHANNEL 11 VELOCITY
RUN= 718 SERIES= 502
MPH
ACC. PACK #6 (X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


ACC. PACK #6 (X)
CHANNEL 12 DISPLACEMENT
RUN= 718 SERIES= 502 INCHES
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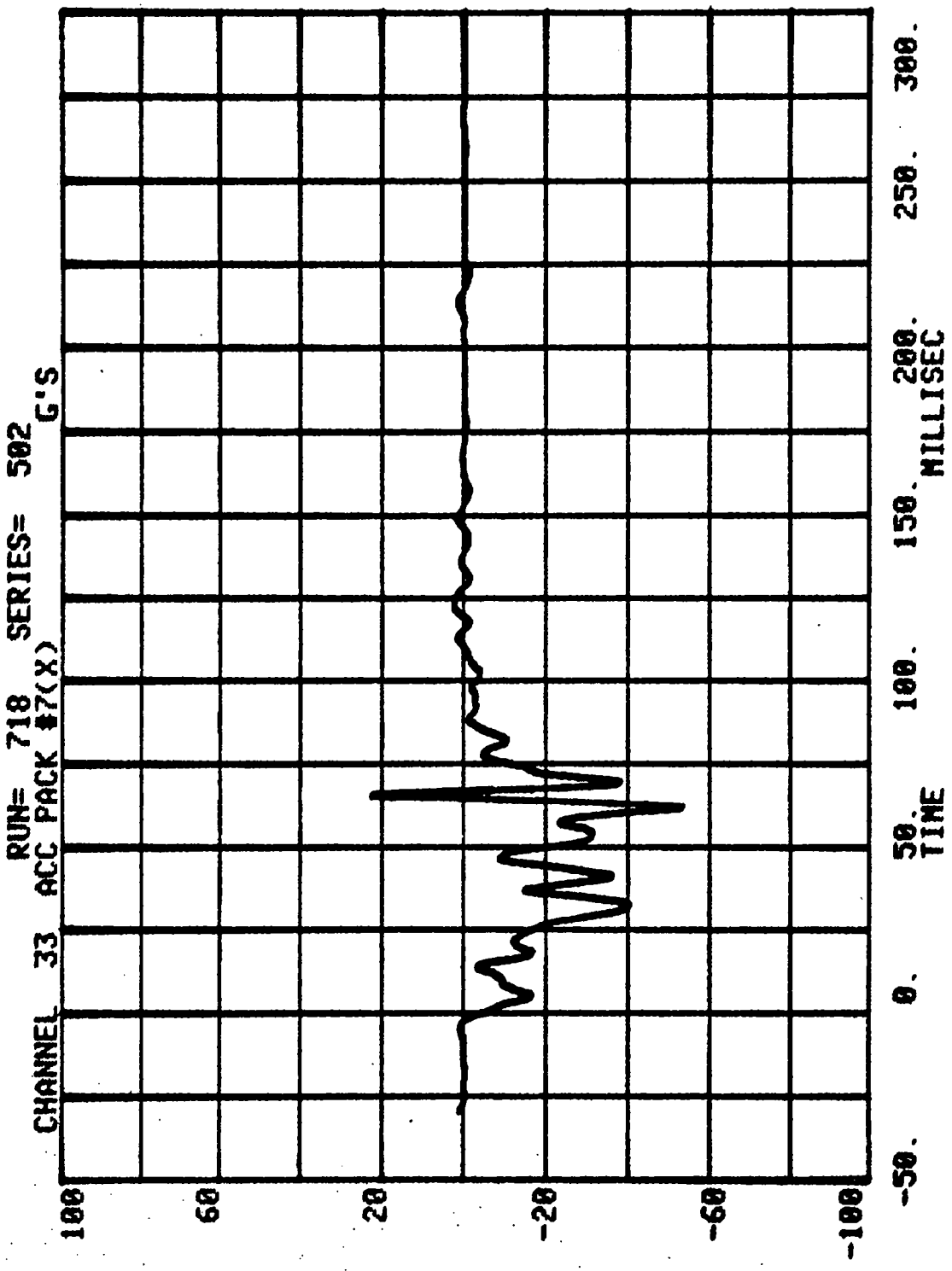
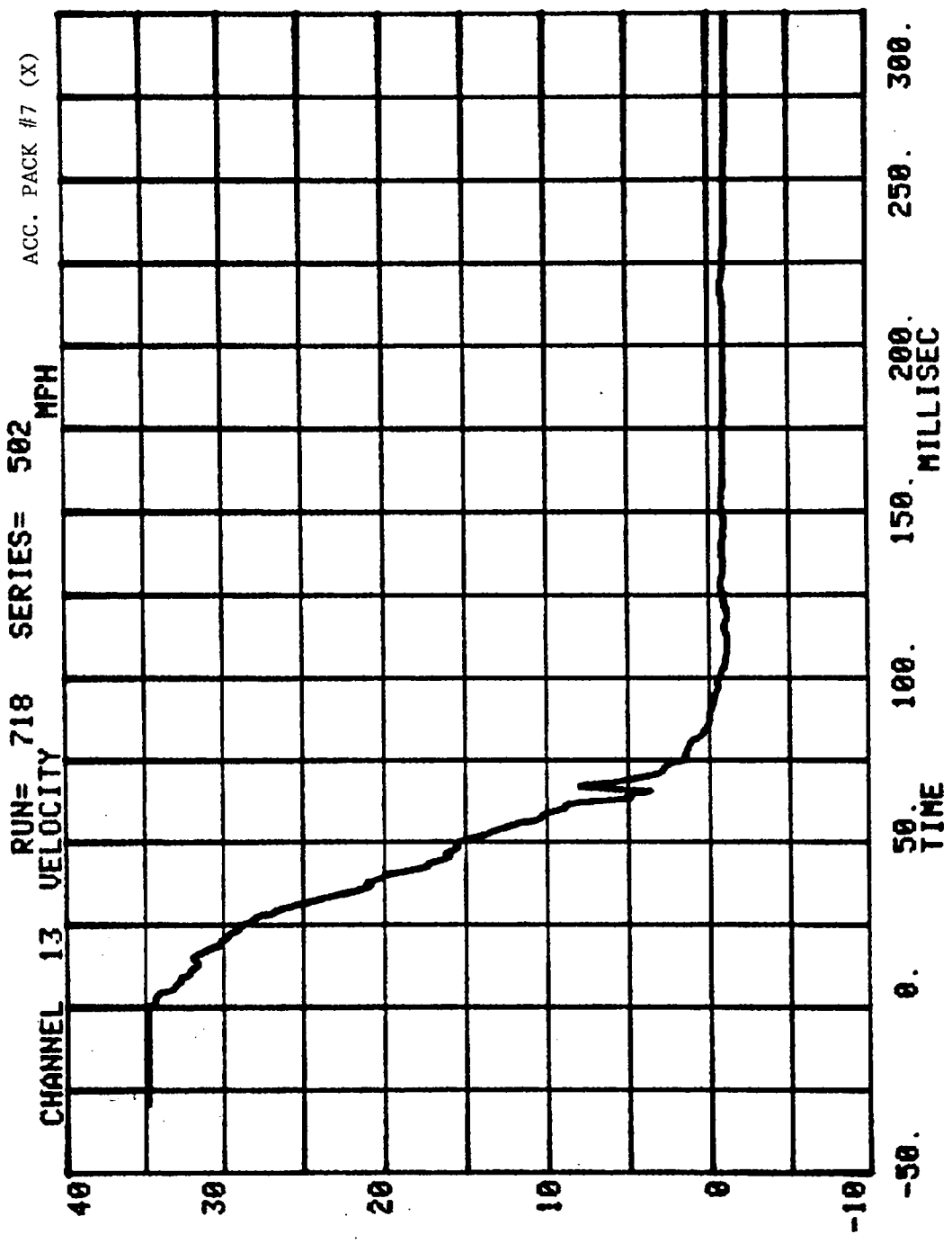
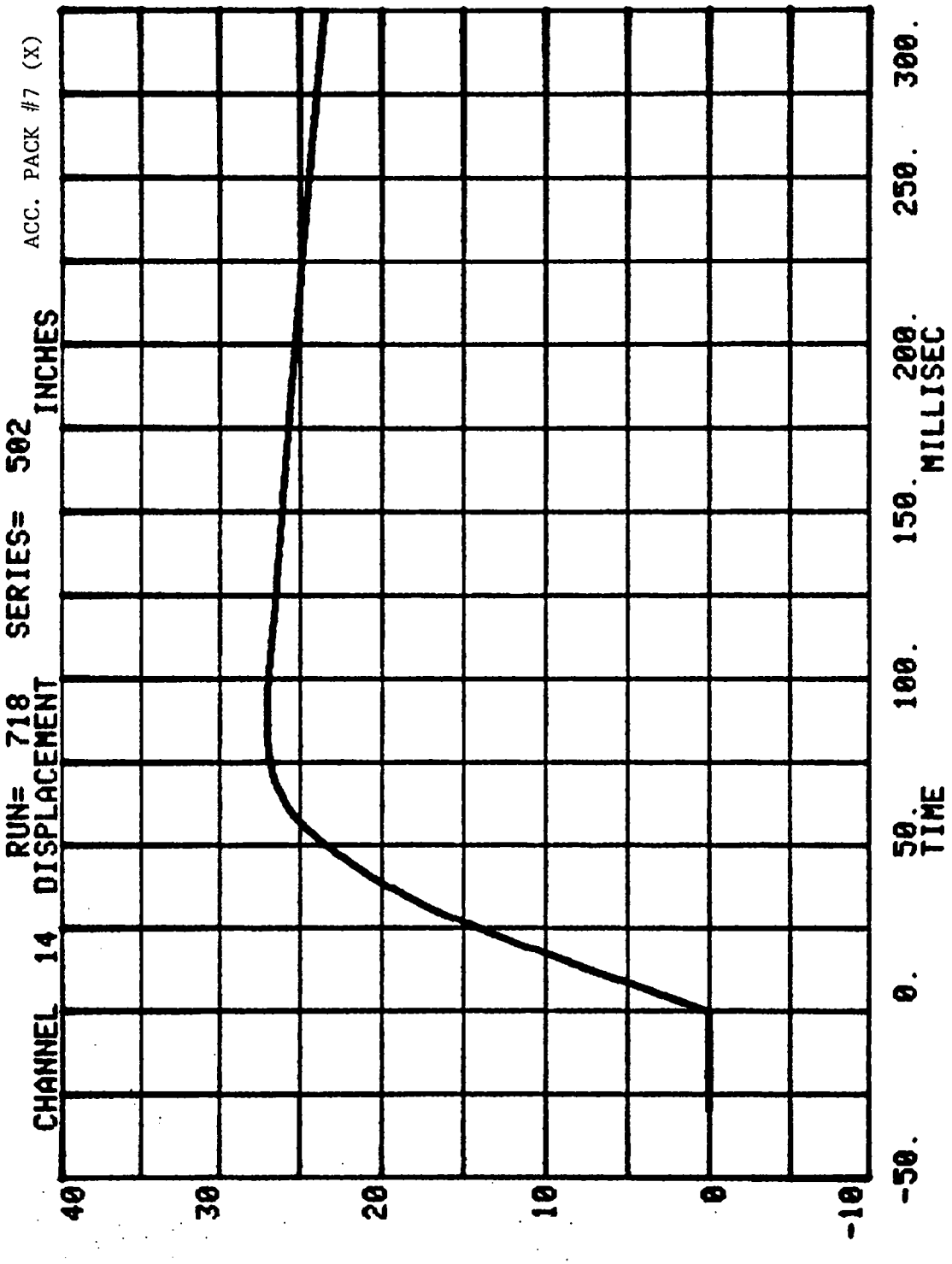
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 33 ACC PACK #7(X)
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


ACC. PACK #7 (X)
CHANNEL 13 VELOCITY
RUN= 718 SERIES= 502 MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


ACC. PACK #7 (X)
CHANNEL 14 DISPLACEMENT
RUN= 718 SERIES= 502
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

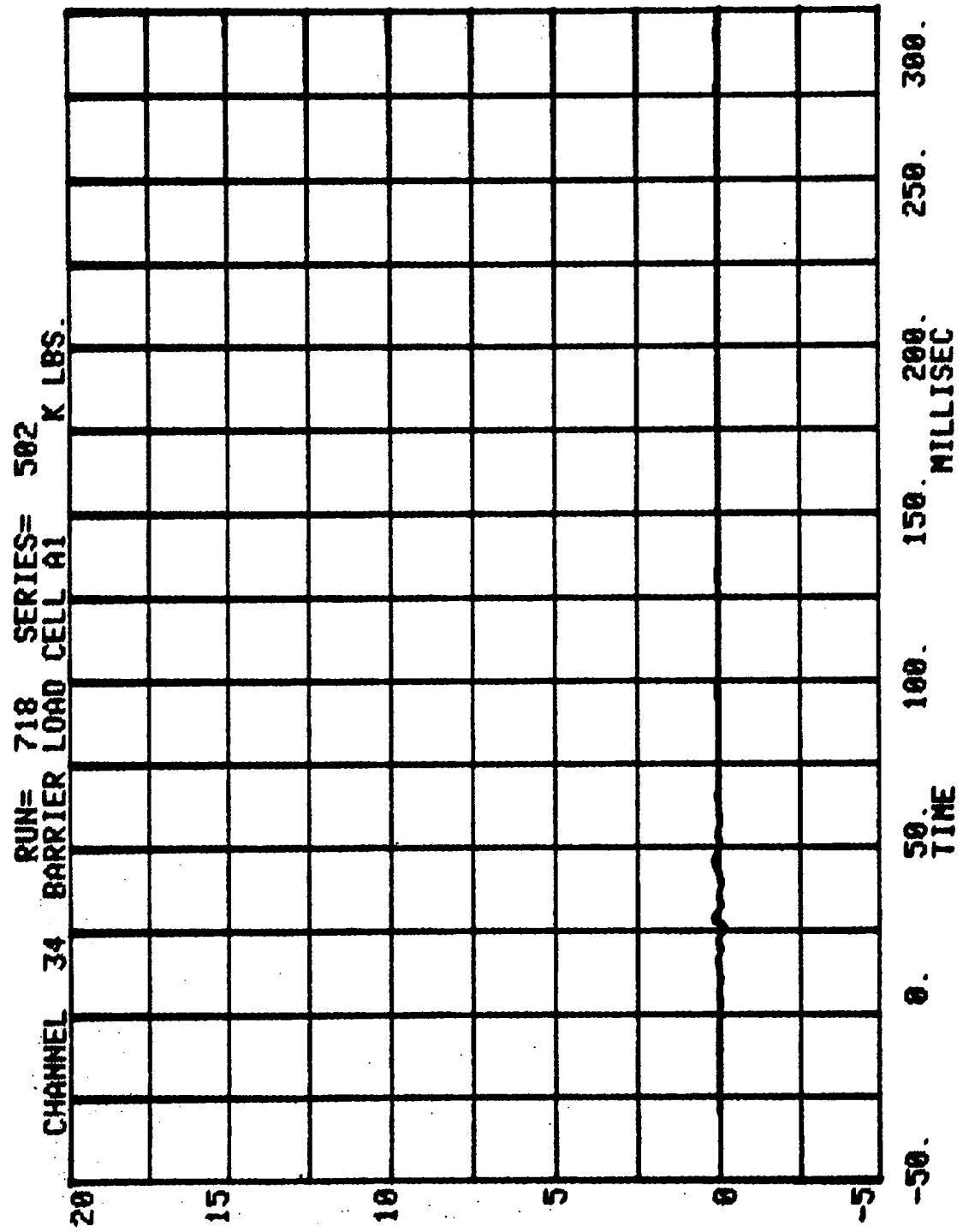
7457-10

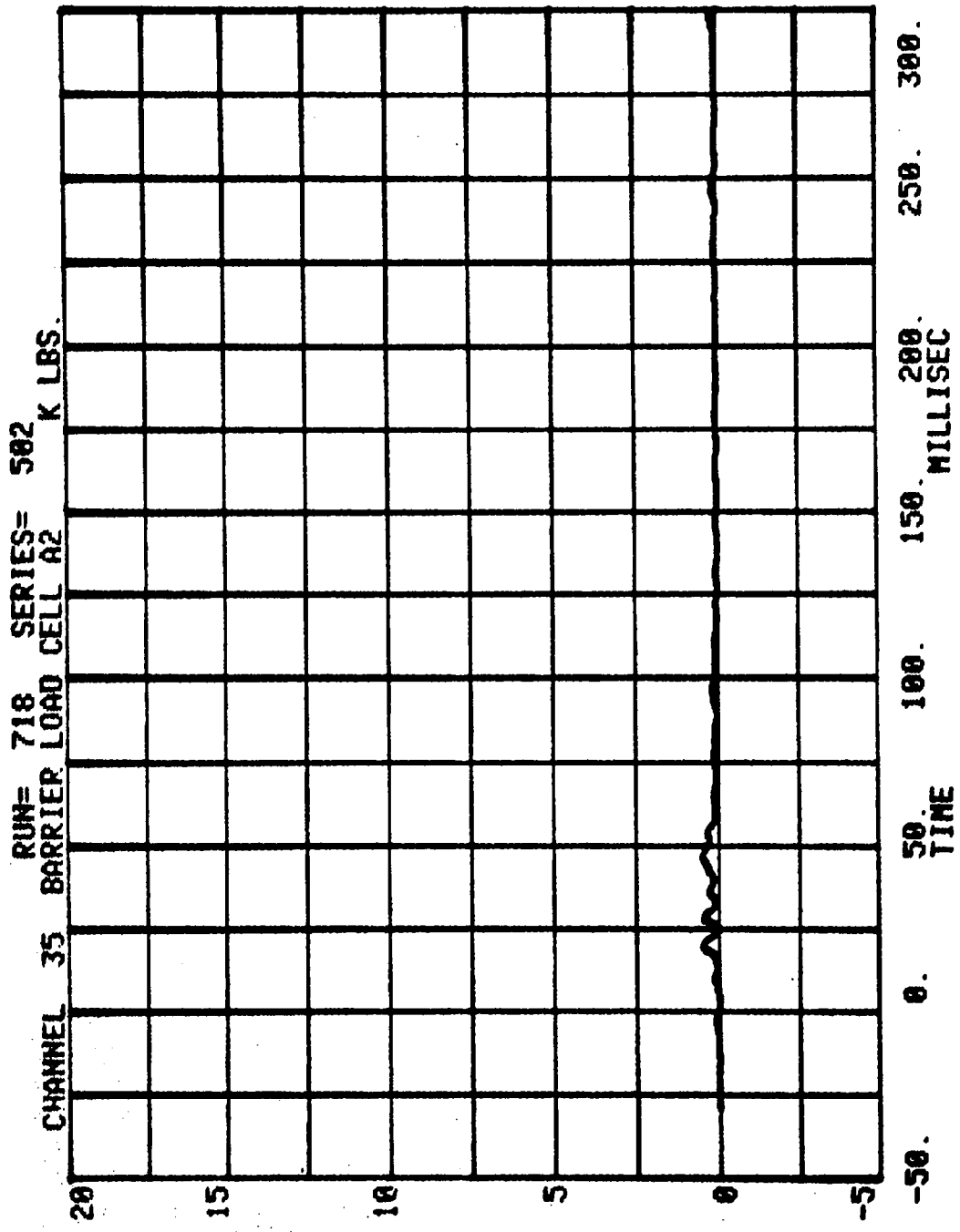
Test No. MG0502

Load Cell Barrier Data

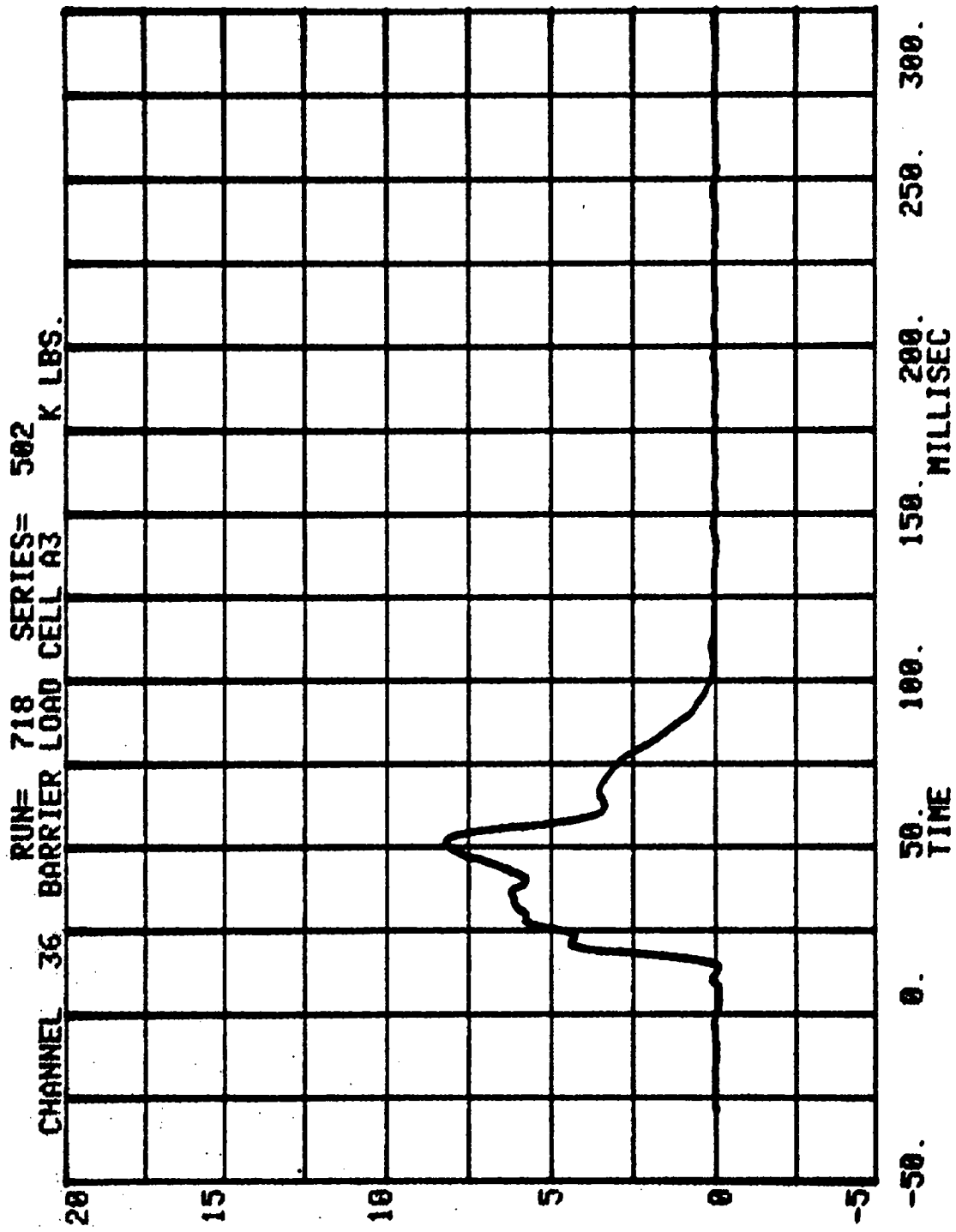
Filter Channel Class

60

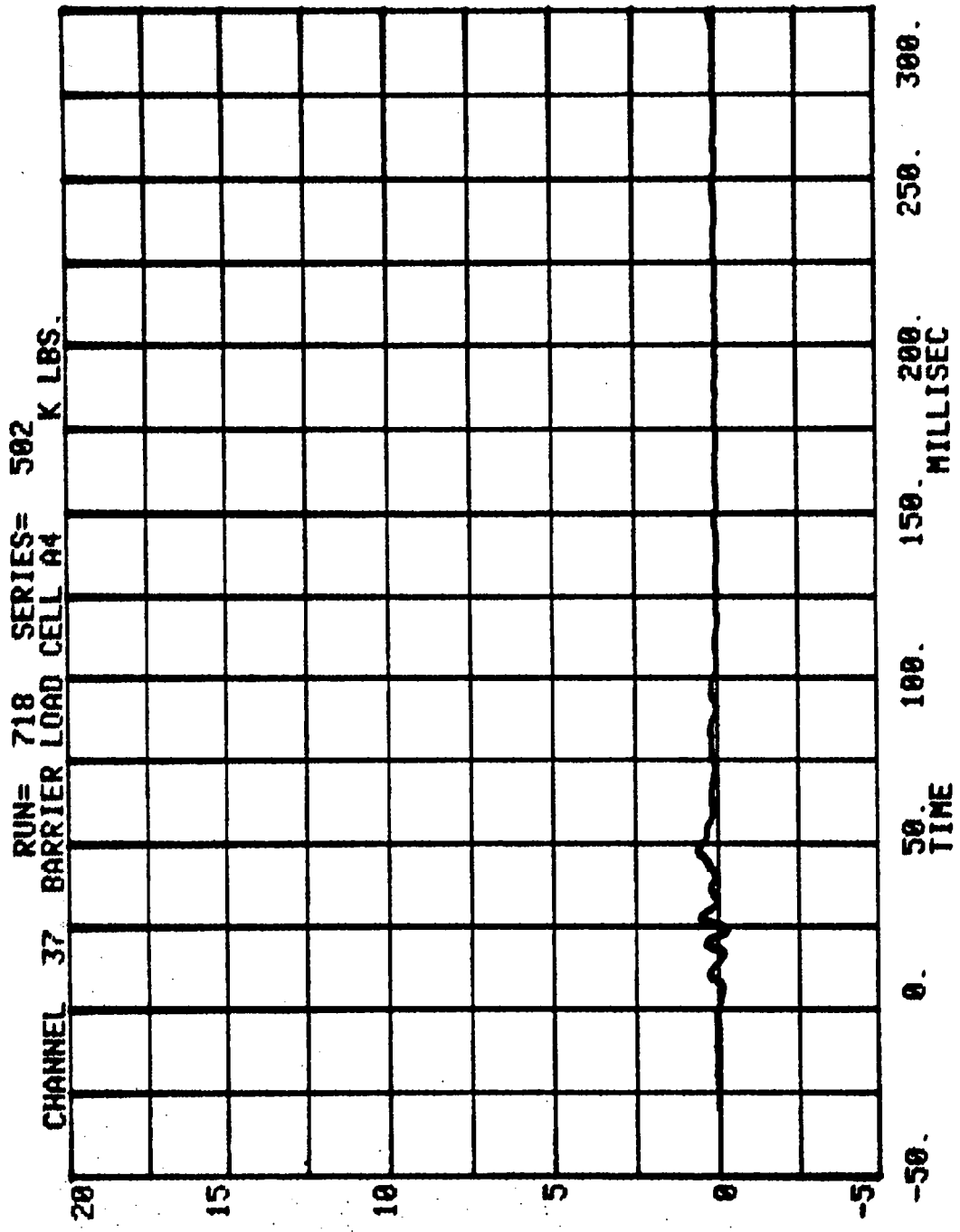

RUN= 718 SERIES= 502
BARRIER LOAD CELL A1
CHANNEL 34
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 35 BARRIER LOAD CELL A2
RUN= 718 SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

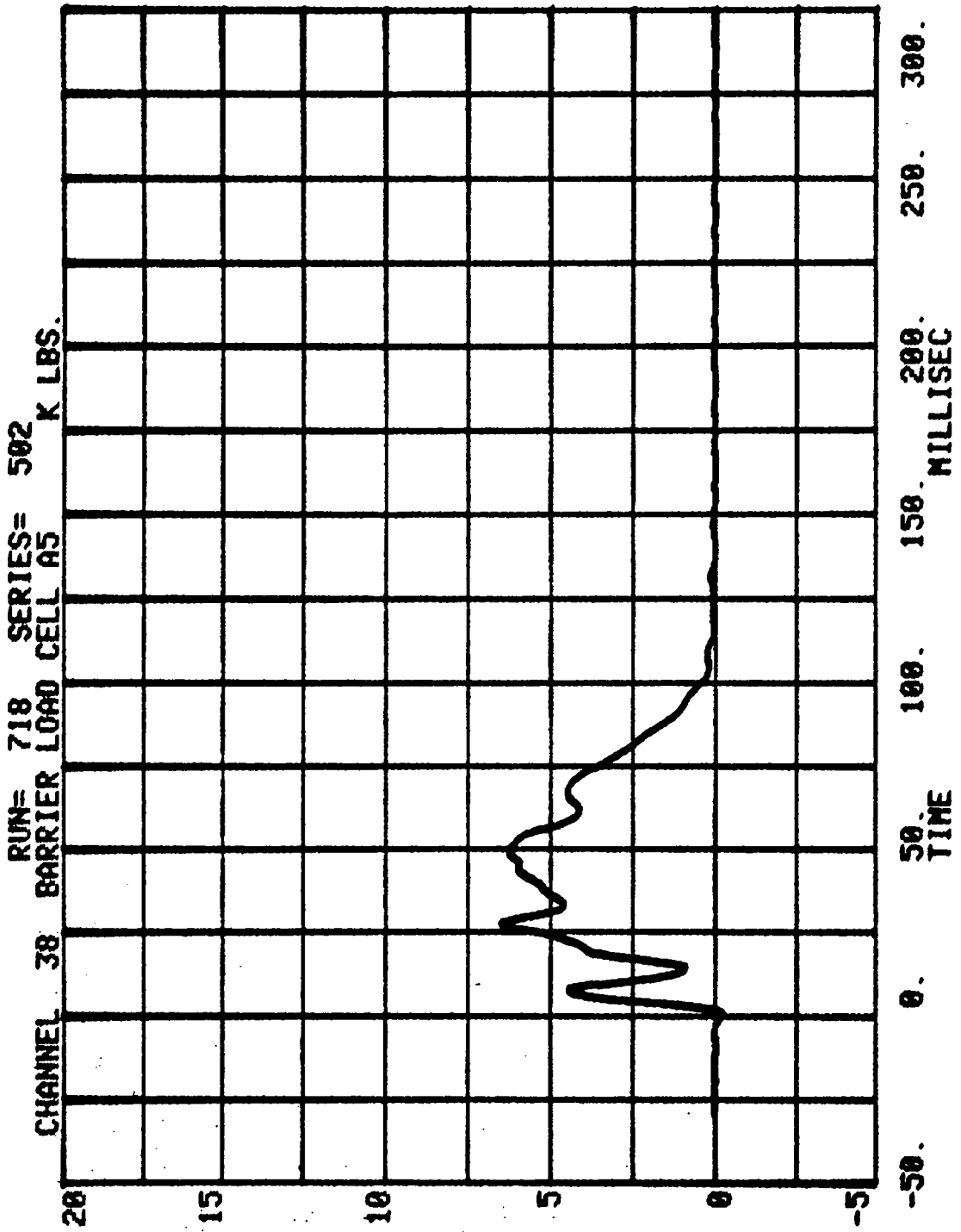
7457-10


RUN= 718 SERIES= 502
BARRIER LOAD CELL A3
CHANNEL 36
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

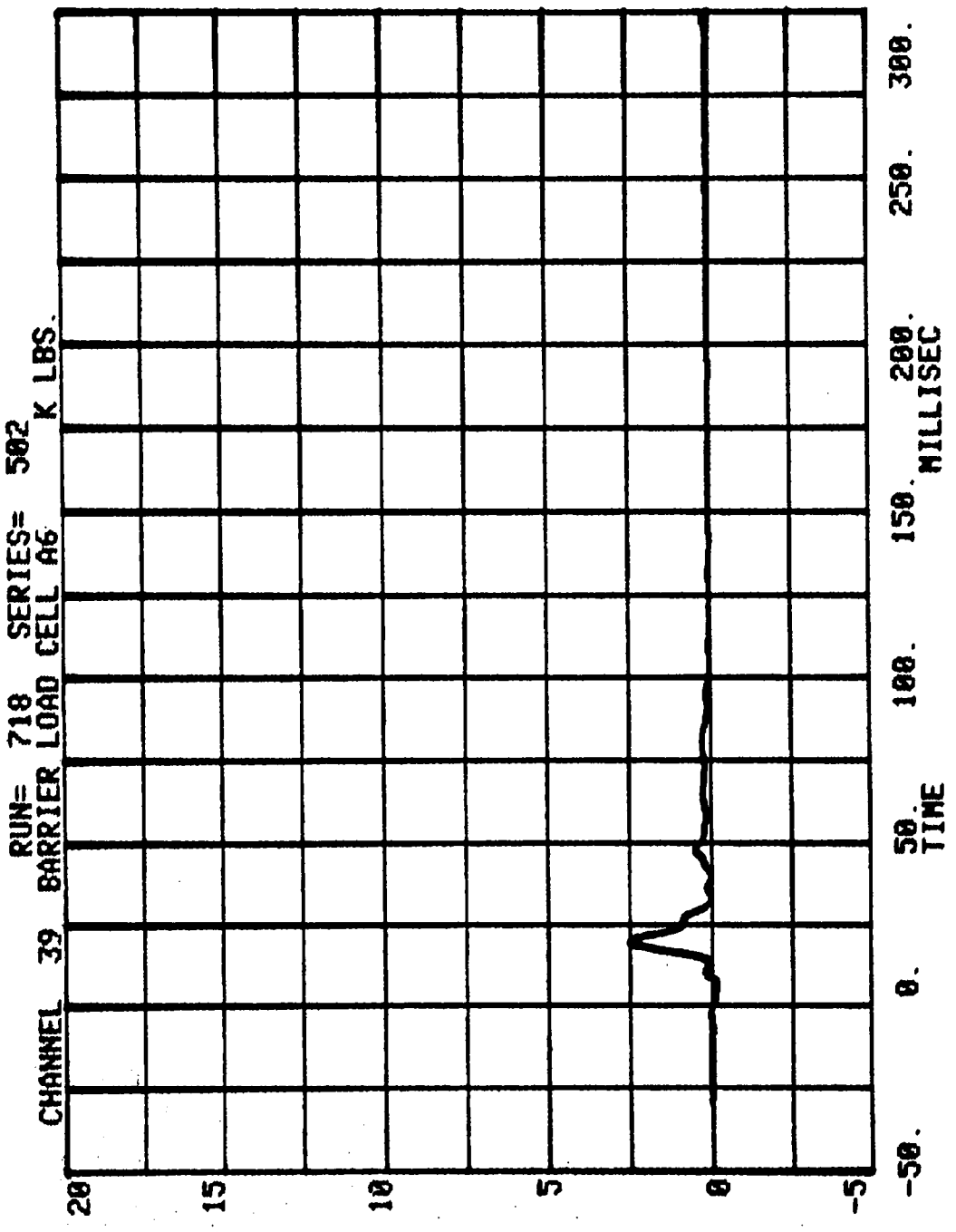
7457-10


CHANNEL 37
RUN= 718 SERIES= 502
BARRIER LOAD CELL A4
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

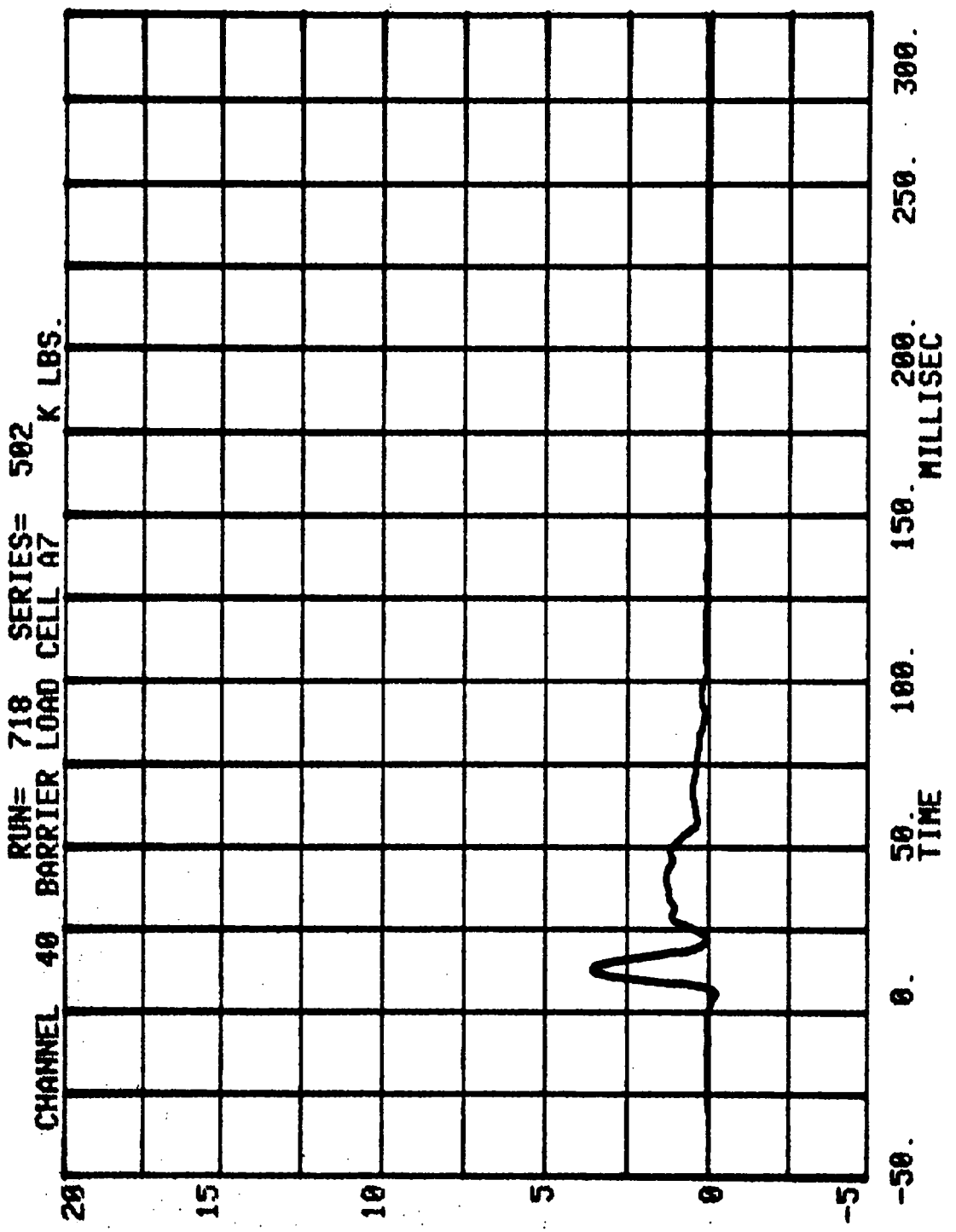
7457-10


CHANNEL 38 BARRIER LOAD CELL A5
RUN= 718 SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

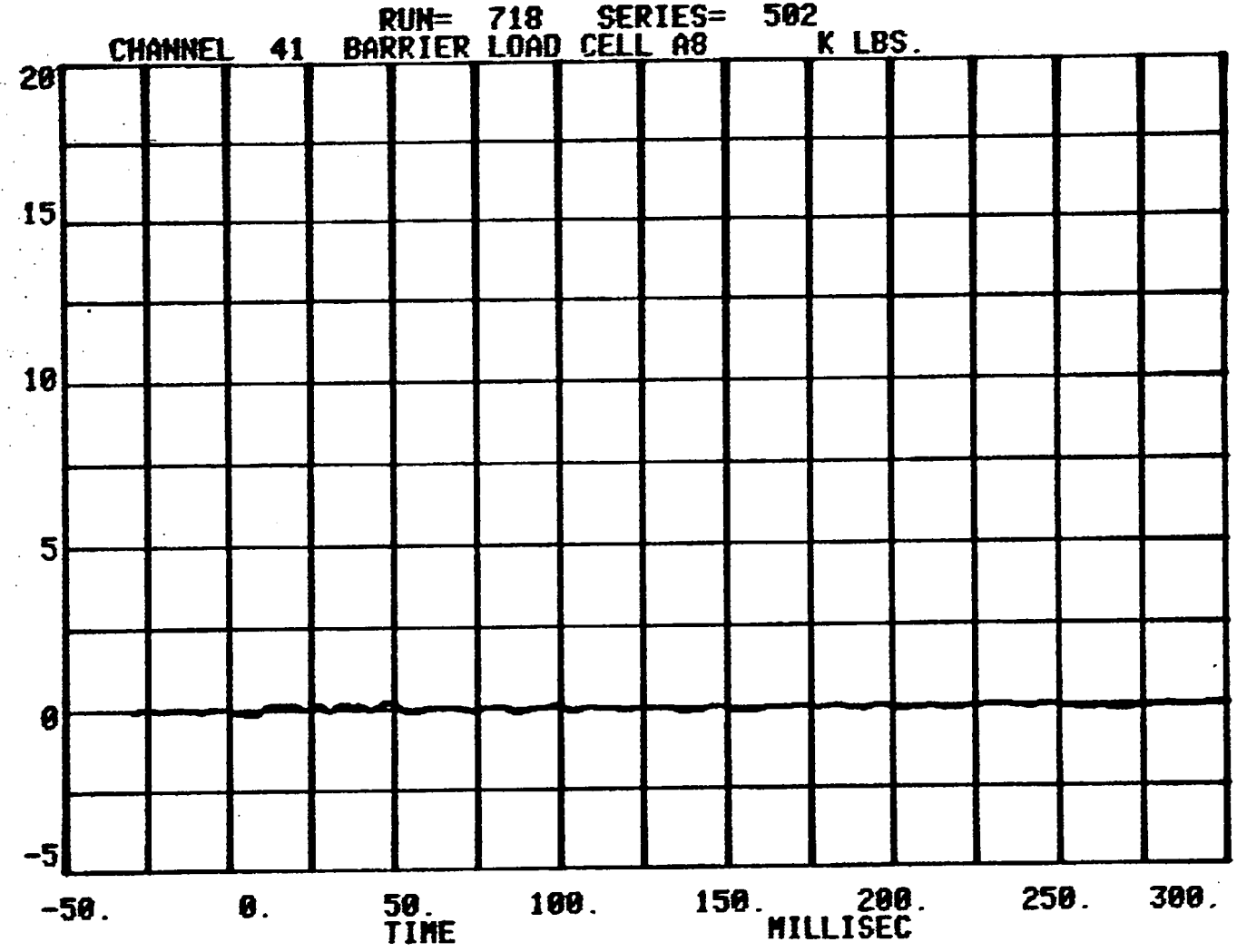
7457-10

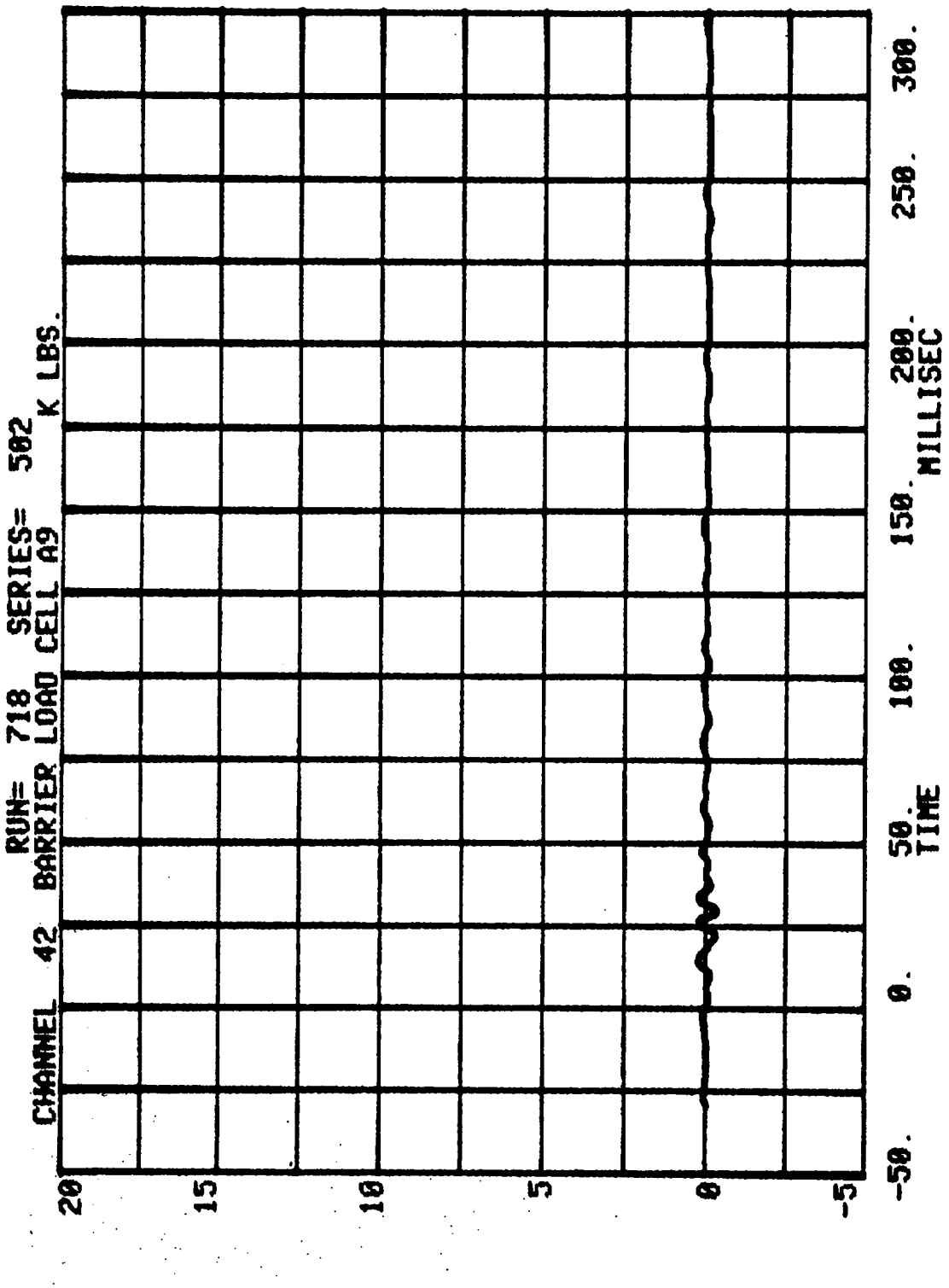

CHANNEL 39 BARRIER LOAD CELL A6
RUN= 718 SERIES= 502 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

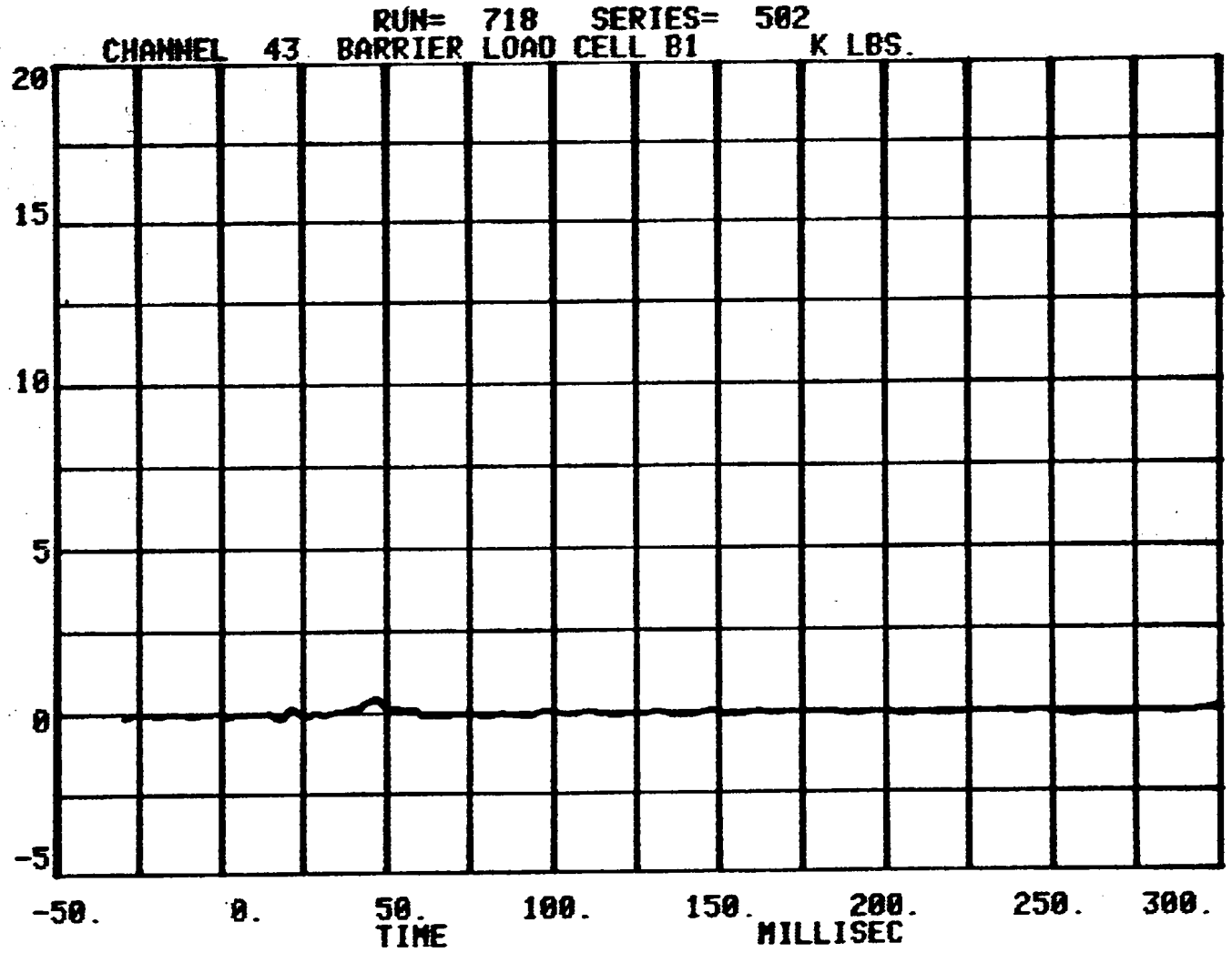
7457-10


CHANNEL 40 BARRIER LOAD CELL A7
RUN= 718 SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

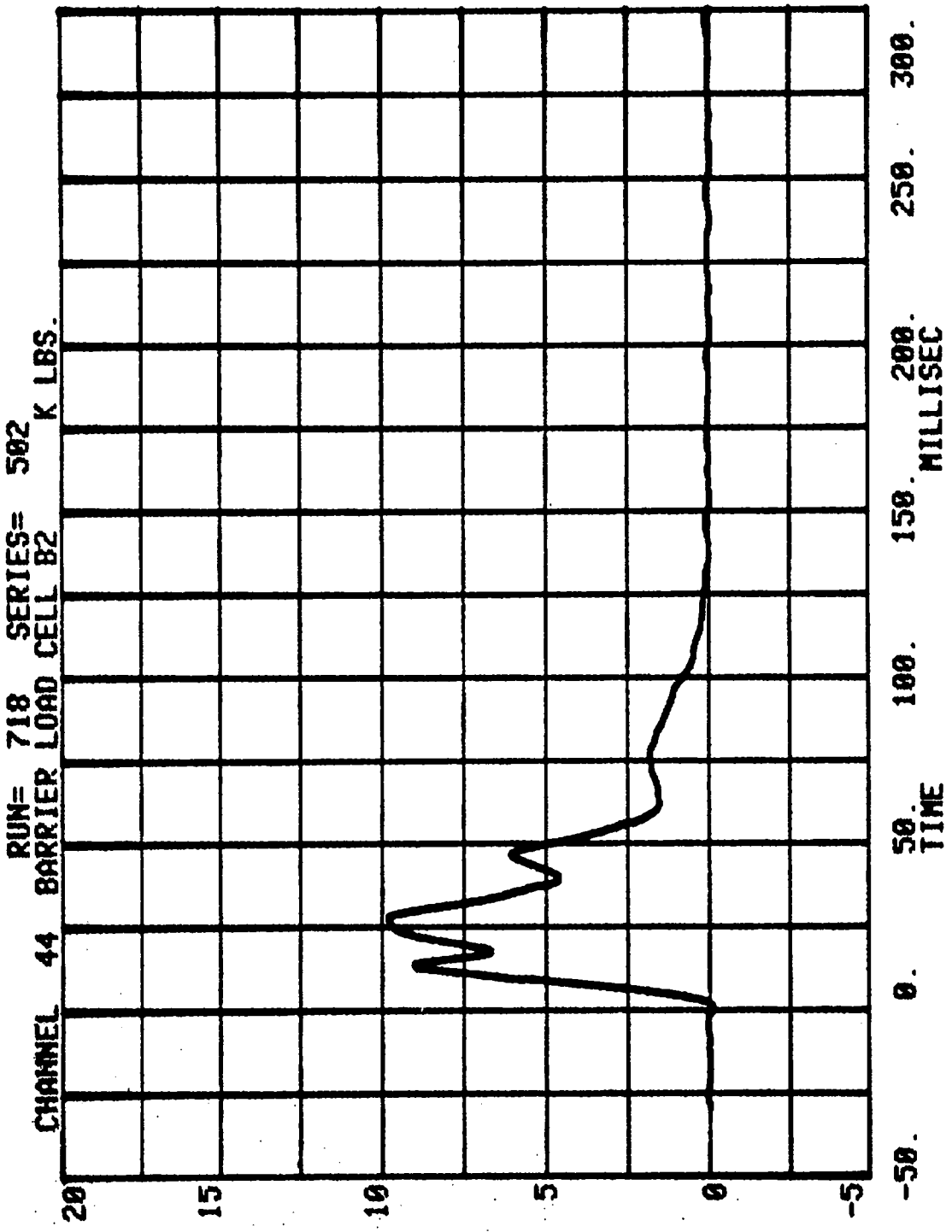
7457-10


RUN= 718 SERIES= 502
CHANNEL 41 BARRIER LOAD CELL A8 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

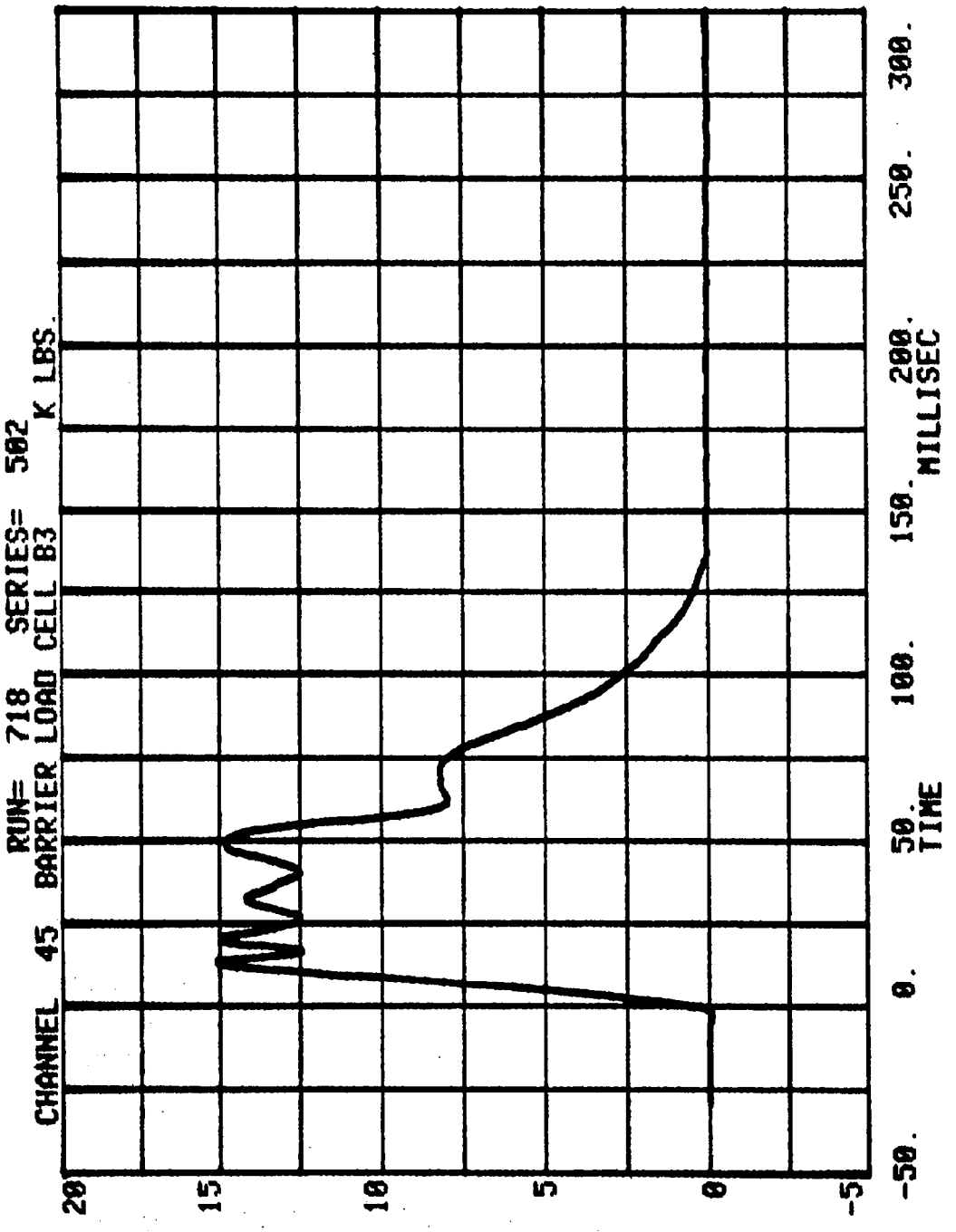

RUN= 718 SERIES= 502
BARRIER LOAD CELL A9
CHANNEL 42
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

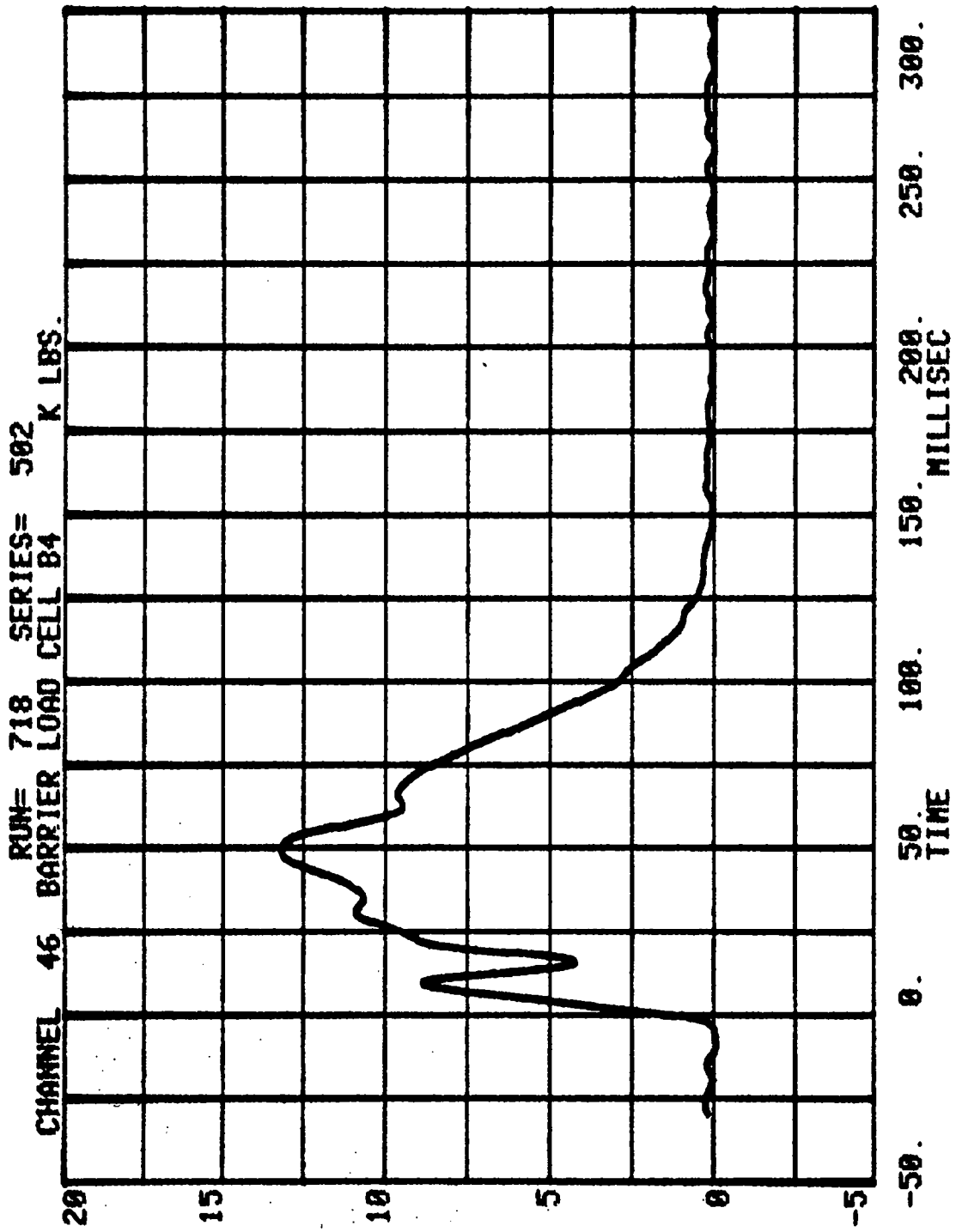

RUN= 718 SERIES= 502
CHANNEL 43 BARRIER LOAD CELL B1 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

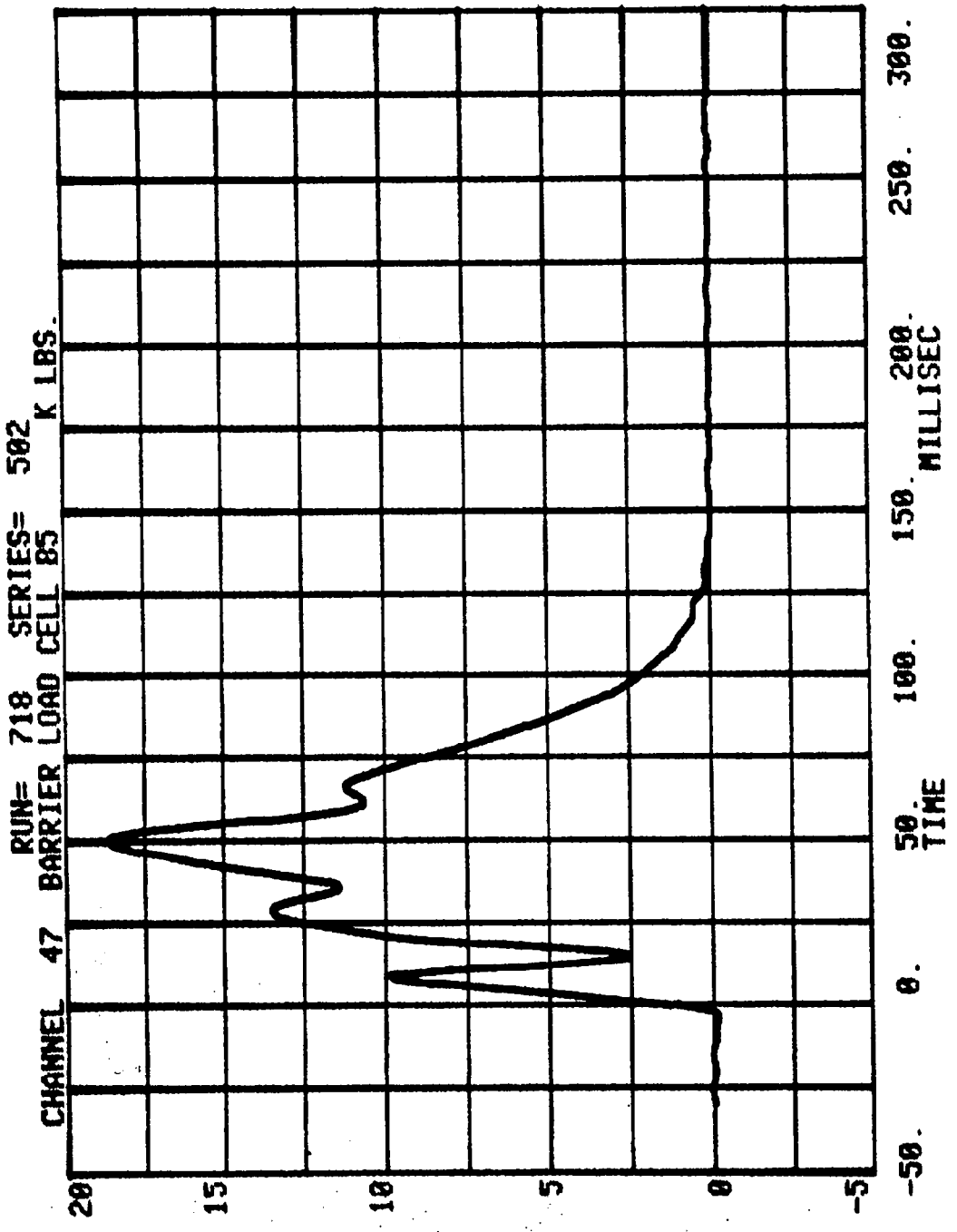

CHANNEL 44
RUN= 718 SERIES= 502
BARRIER LOAD CELL B2
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

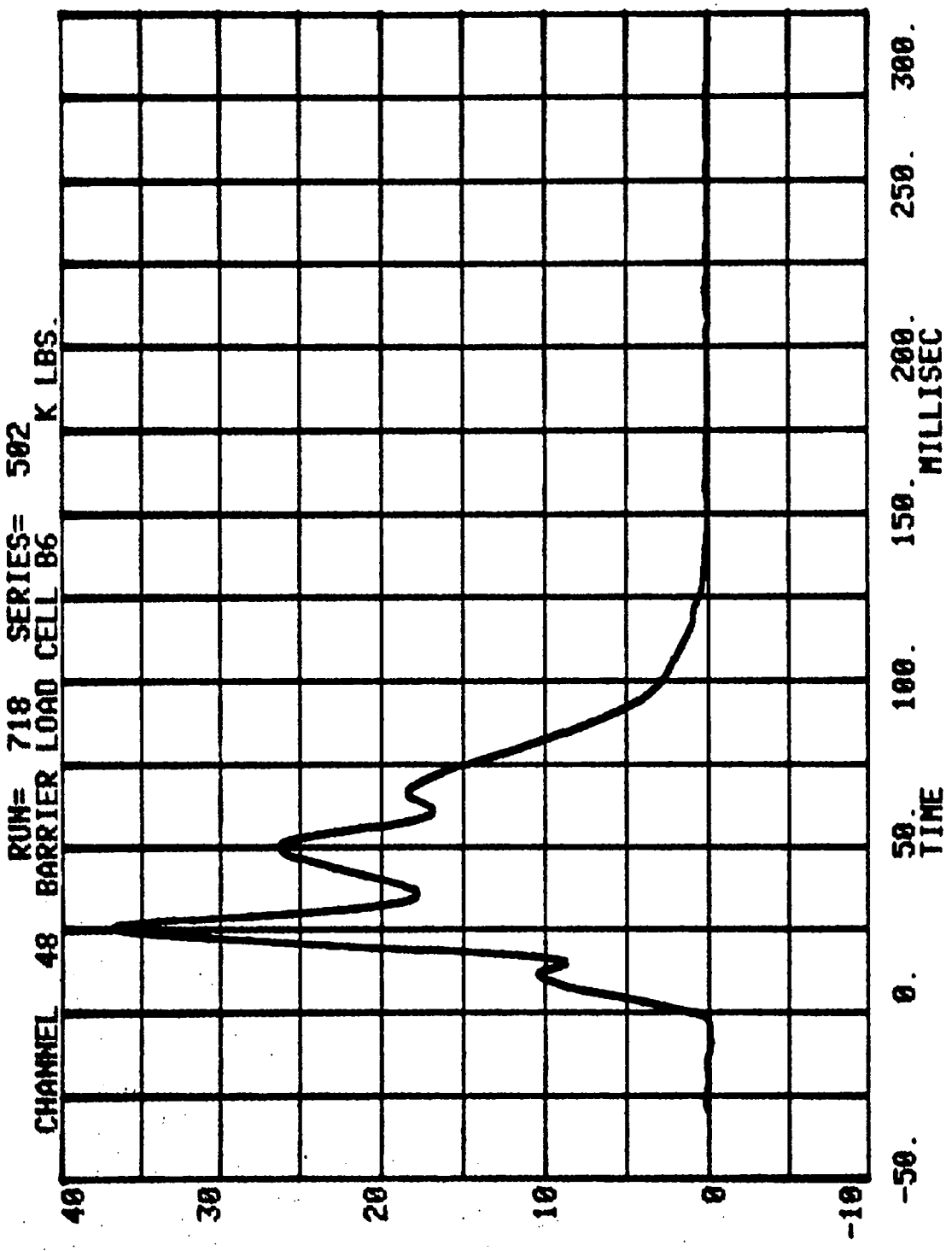

CHANNEL 45 BARRIER LOAD CELL B3
RUN= 718 SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

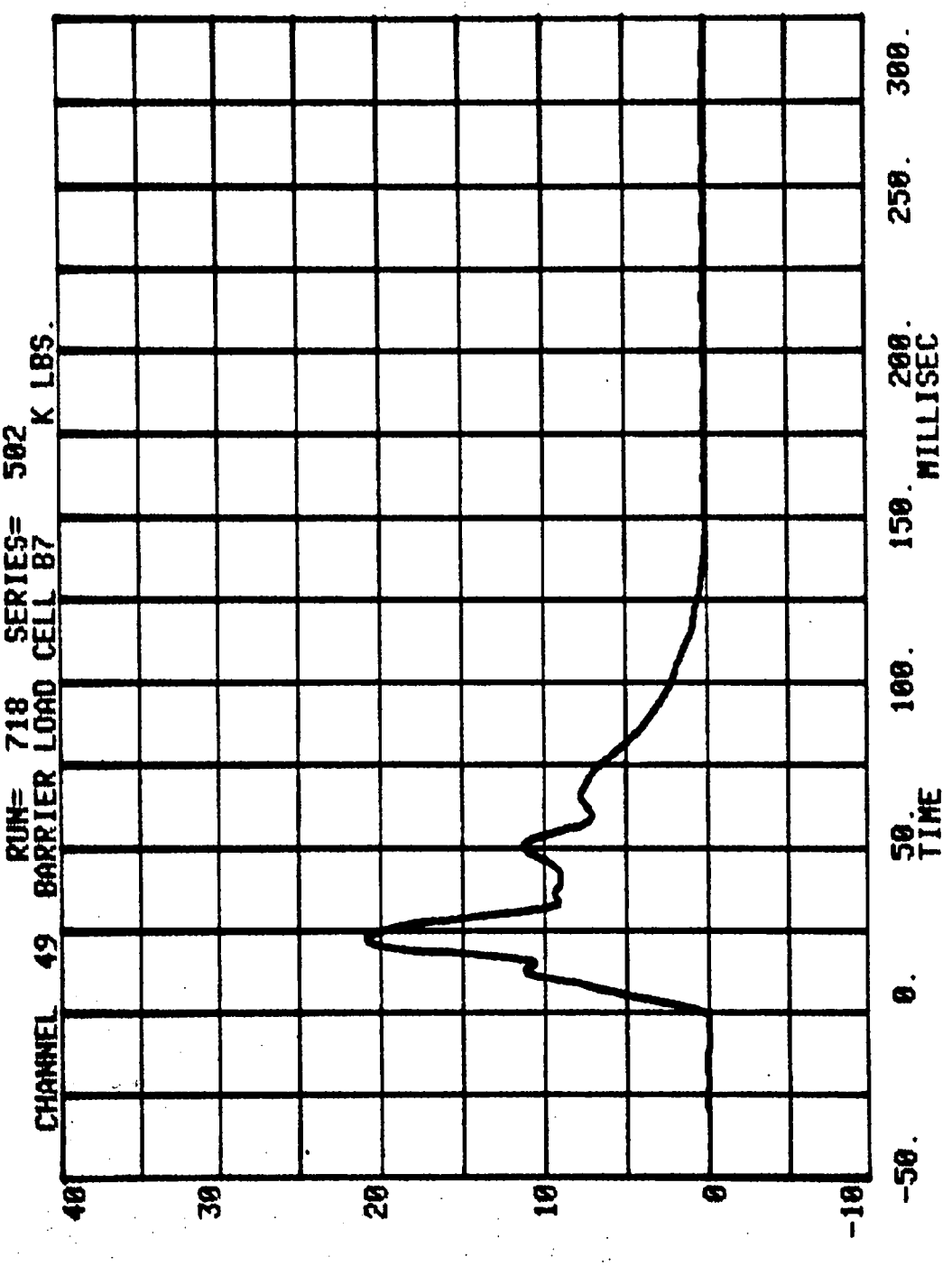

CHANNEL 46 BARRIER LOAD CELL B4
RUN= 718 SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

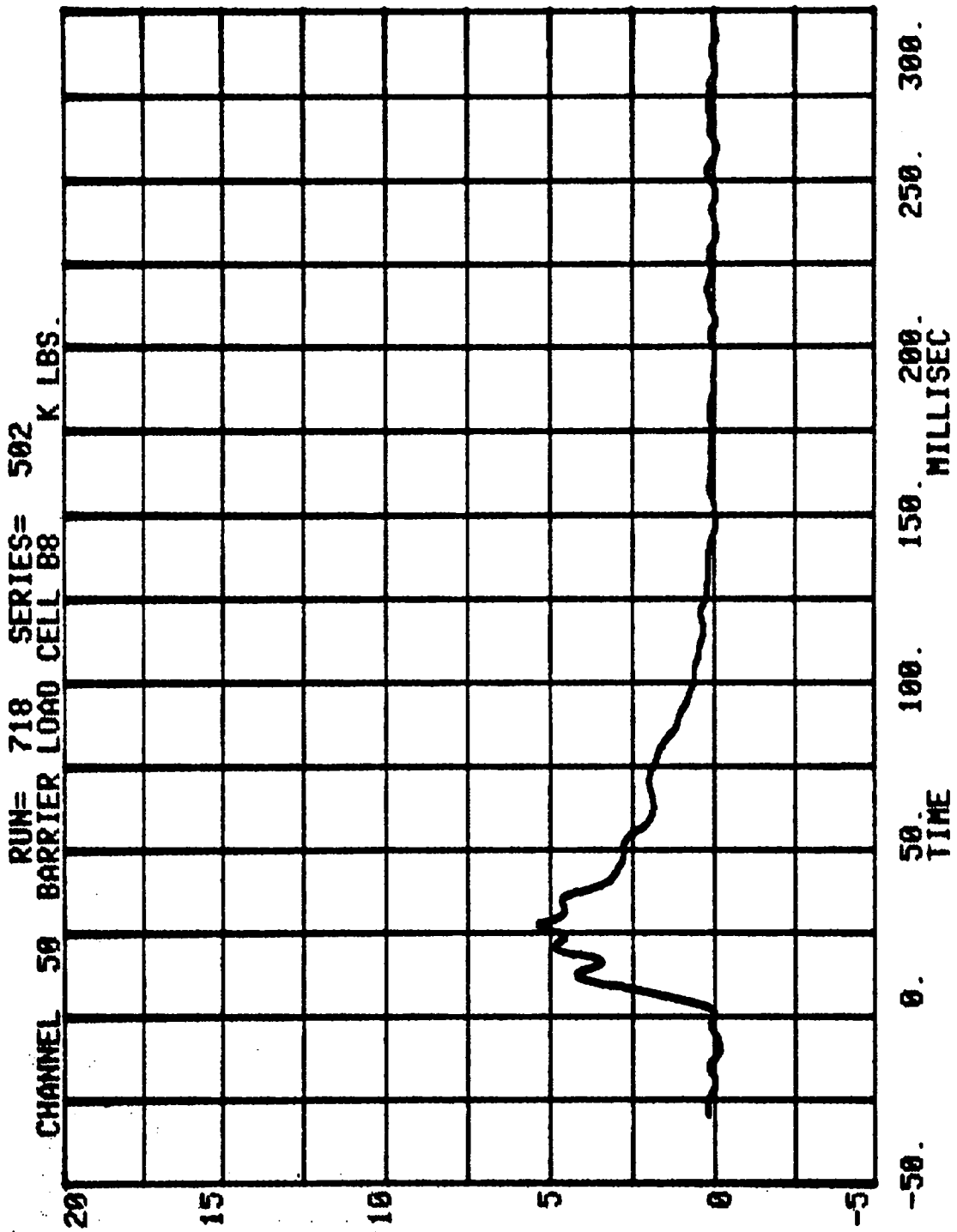
7457-10


CHANNEL 47 BARRIER LOAD CELL 85
RUN= 718 SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


CHANNEL 48 RUN= 718 SERIES= 502
BARRIER LOAD CELL B6
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 718 SERIES= 502
BARRIER LOAD CELL B7
CHANNEL 49
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 718 SERIES= 502
BARRIER LOAD CELL B8
CHANNEL 50
K LBS.
20
15
10
5
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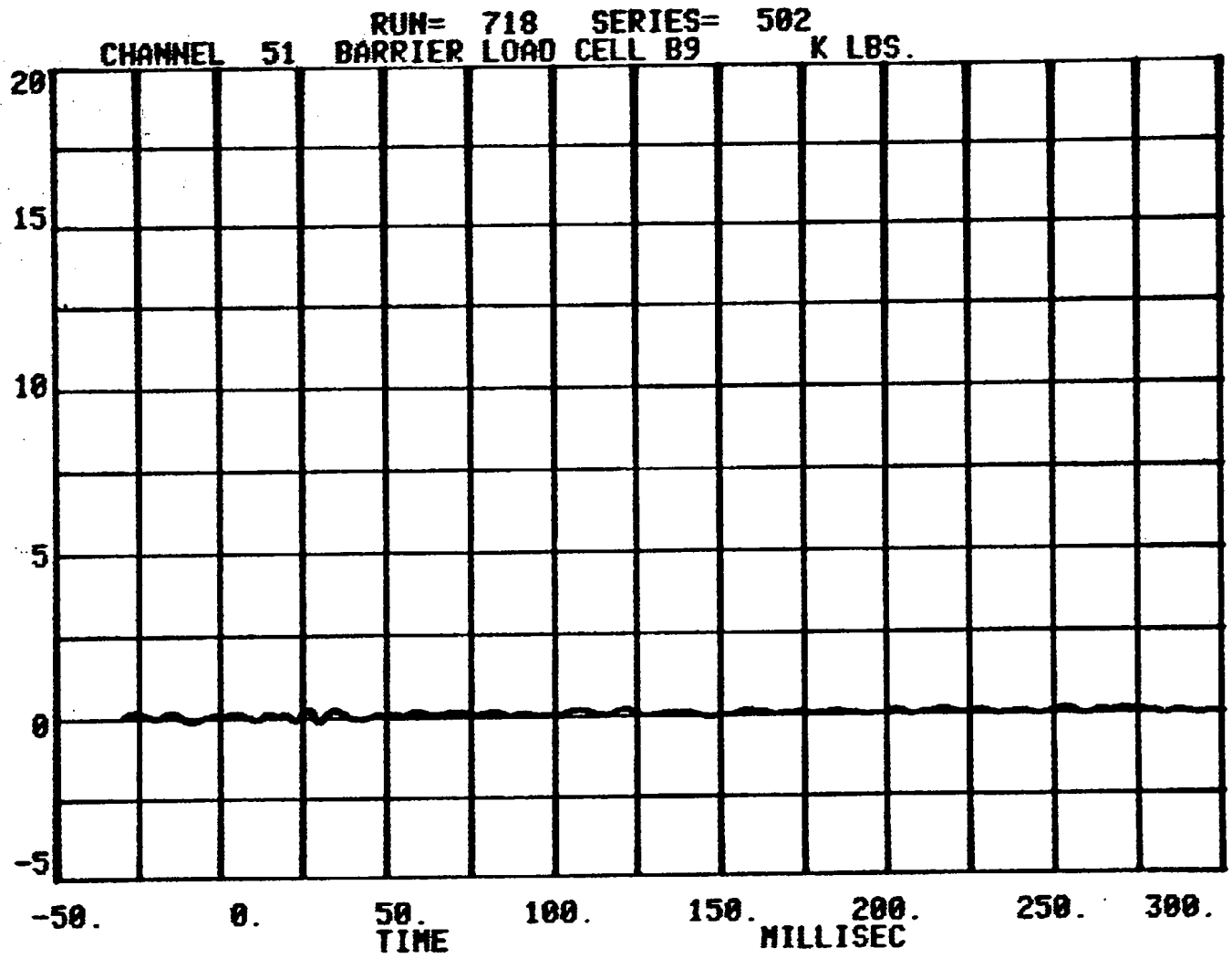
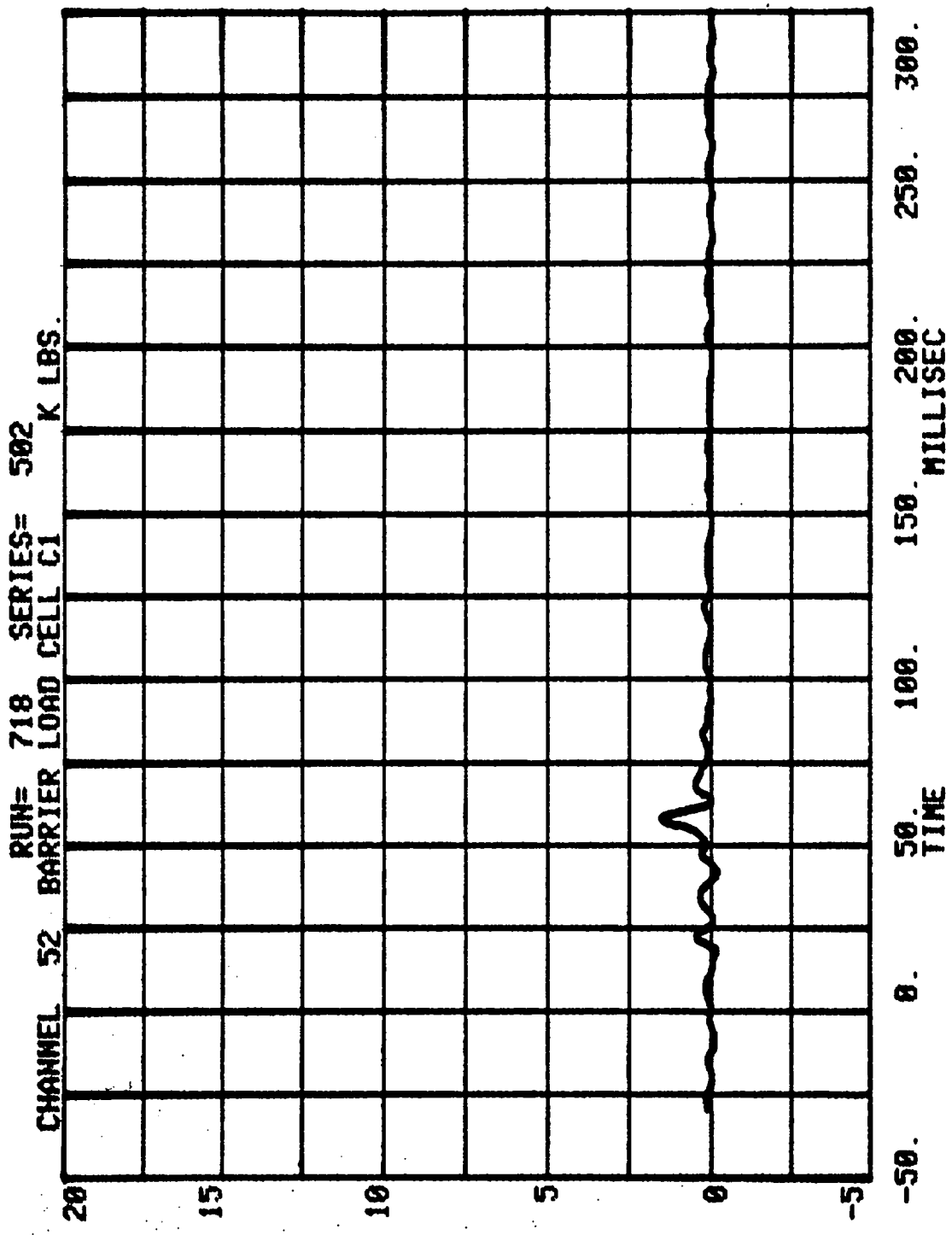
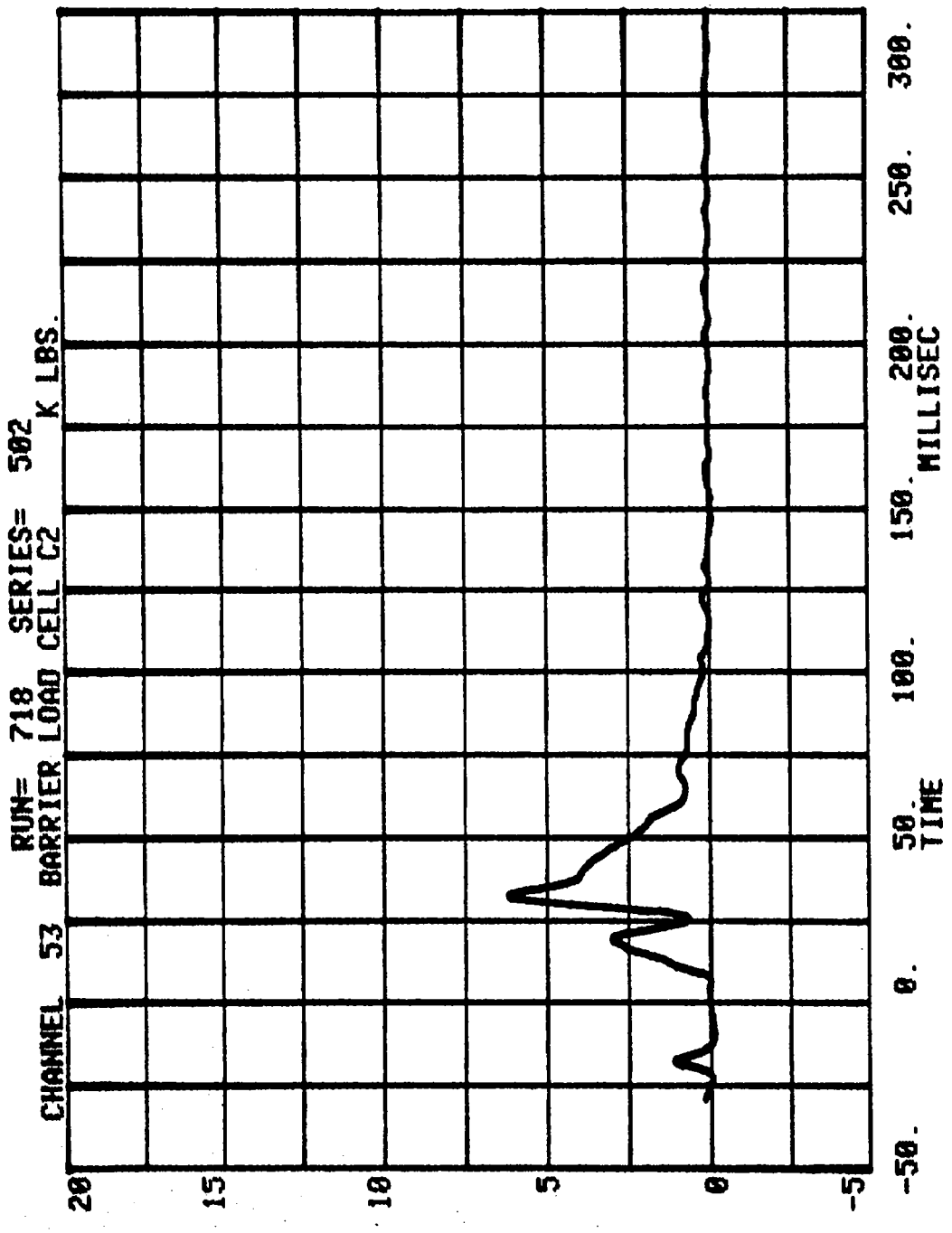
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

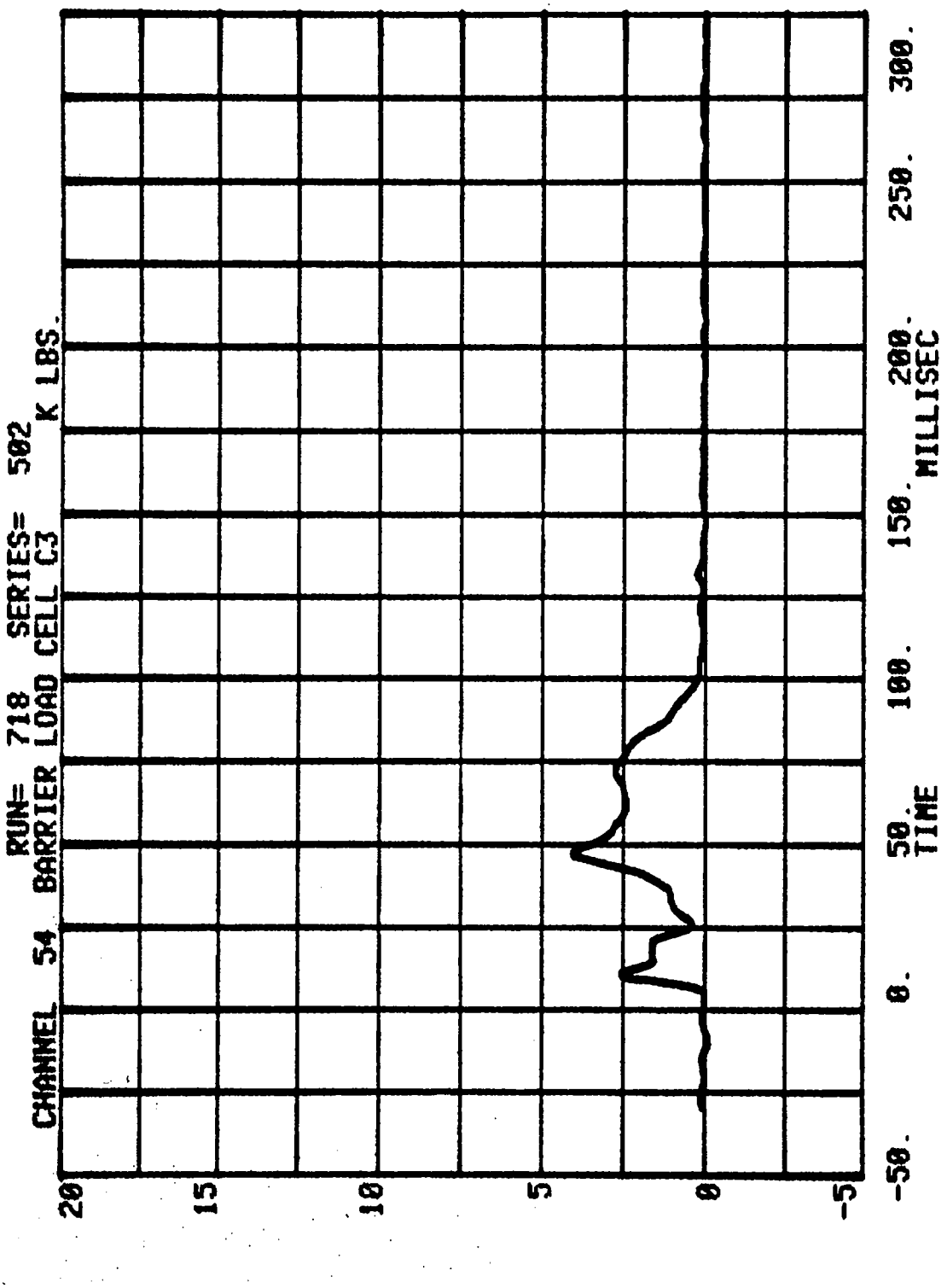

RUN= 718 SERIES= 502
CHANNEL 51 BARRIER LOAD CELL B9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 52 BARRIER LOAD CELL C1
RUN= 718 SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

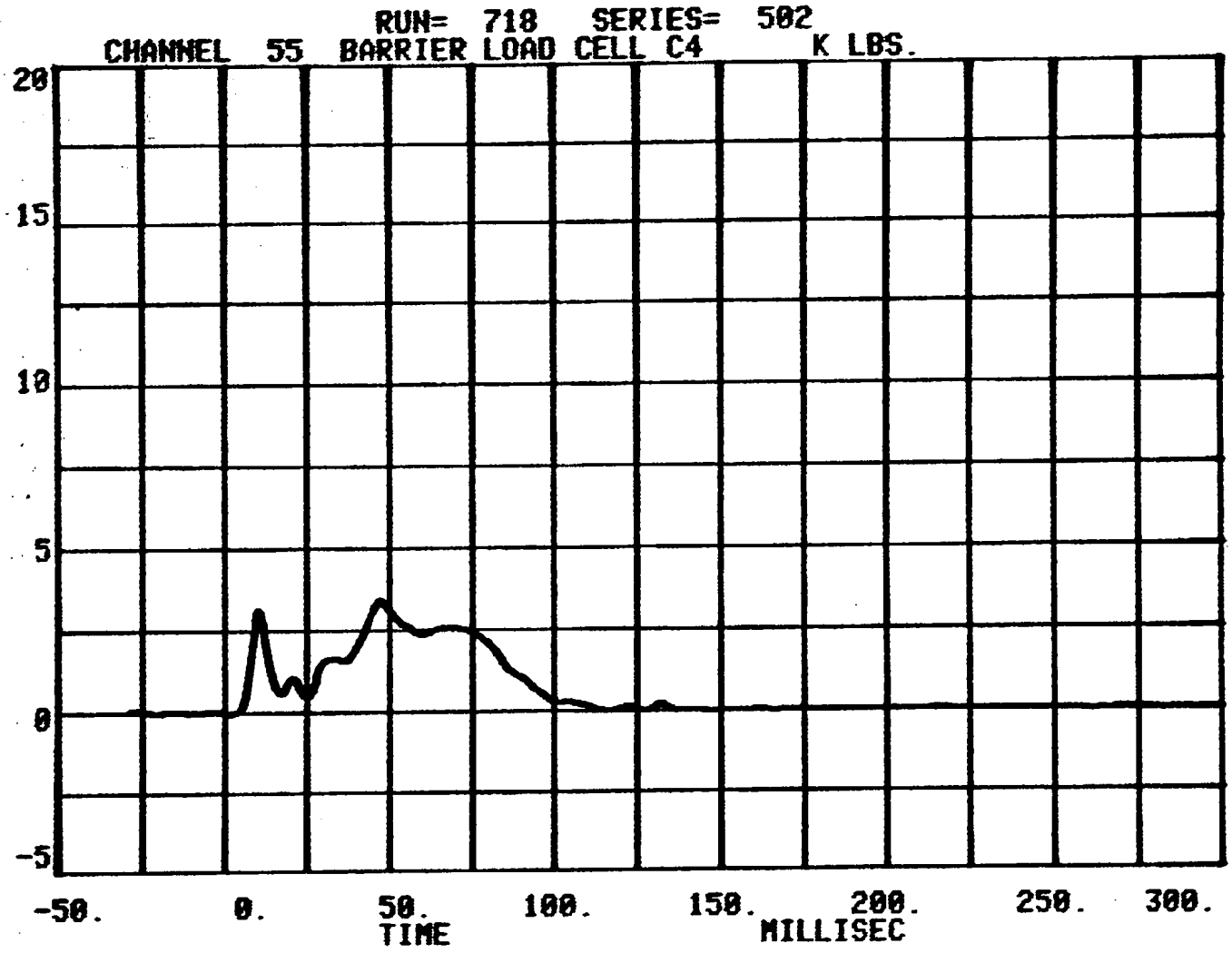
7457-10


CHANNEL 53 RUN= 718 SERIES= 502
BARRIER LOAD CELL C2 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


CHANNEL 54
RUN= 718
BARRIER LOAD CELL C3
SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


RUN= 718 SERIES= 502
CHANNEL 55 BARRIER LOAD CELL C4 K LBS.
20
15
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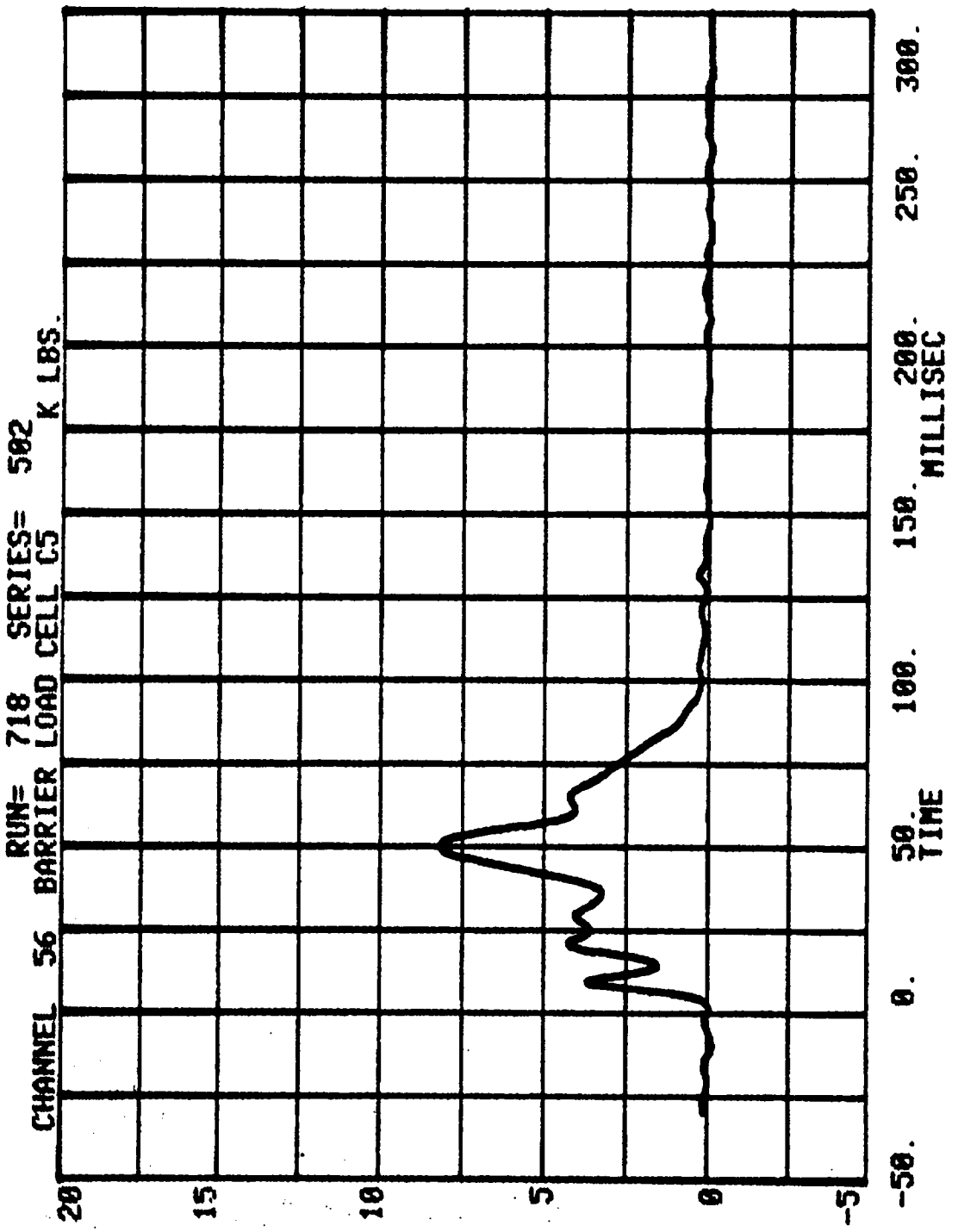
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 56 BARRIER LOAD CELL C5
RUN= 718 SERIES= 502
K LBS.
20
15
10
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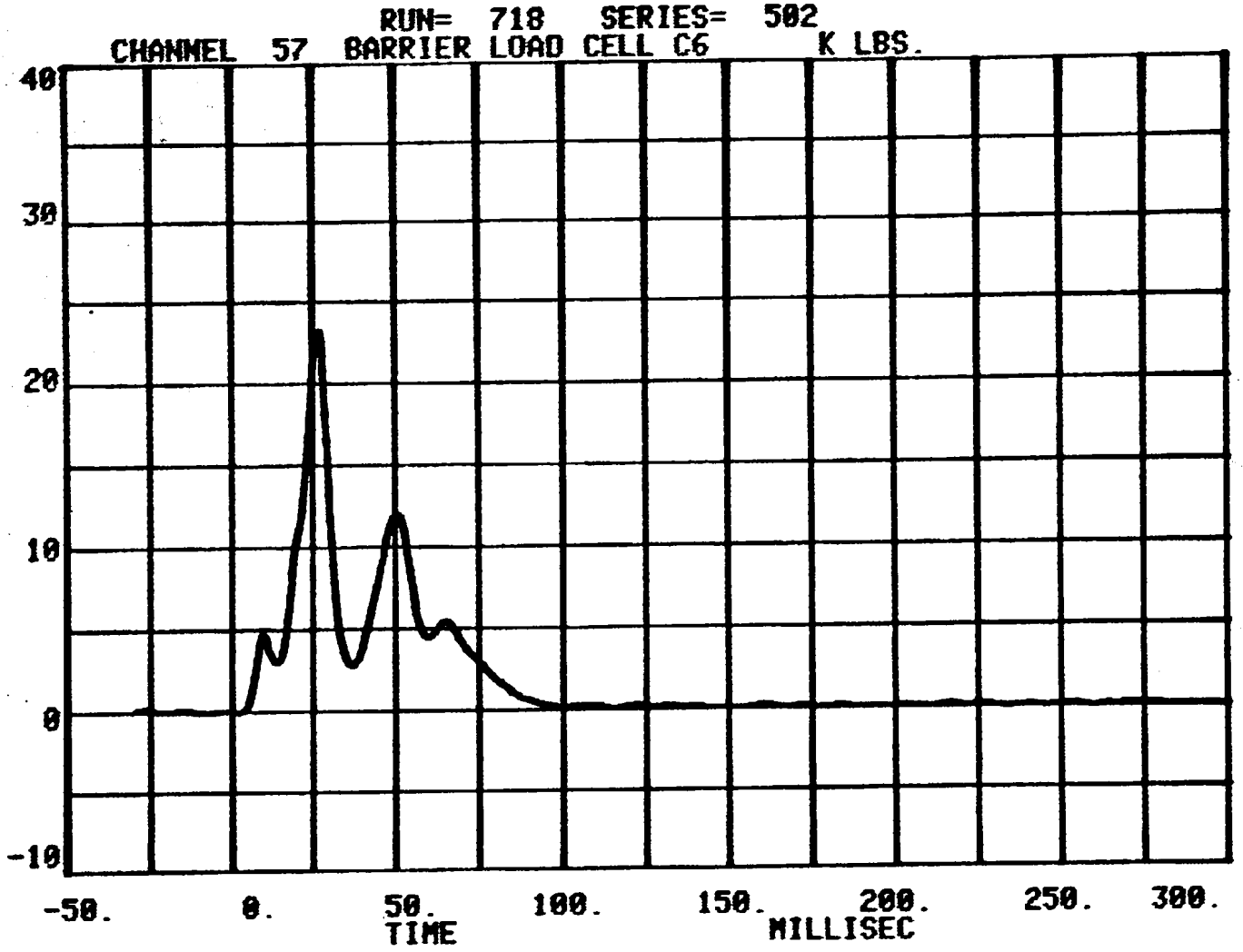
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 718 SERIES= 502
CHANNEL 57 BARRIER LOAD CELL C6 K LBS.
40
30
20
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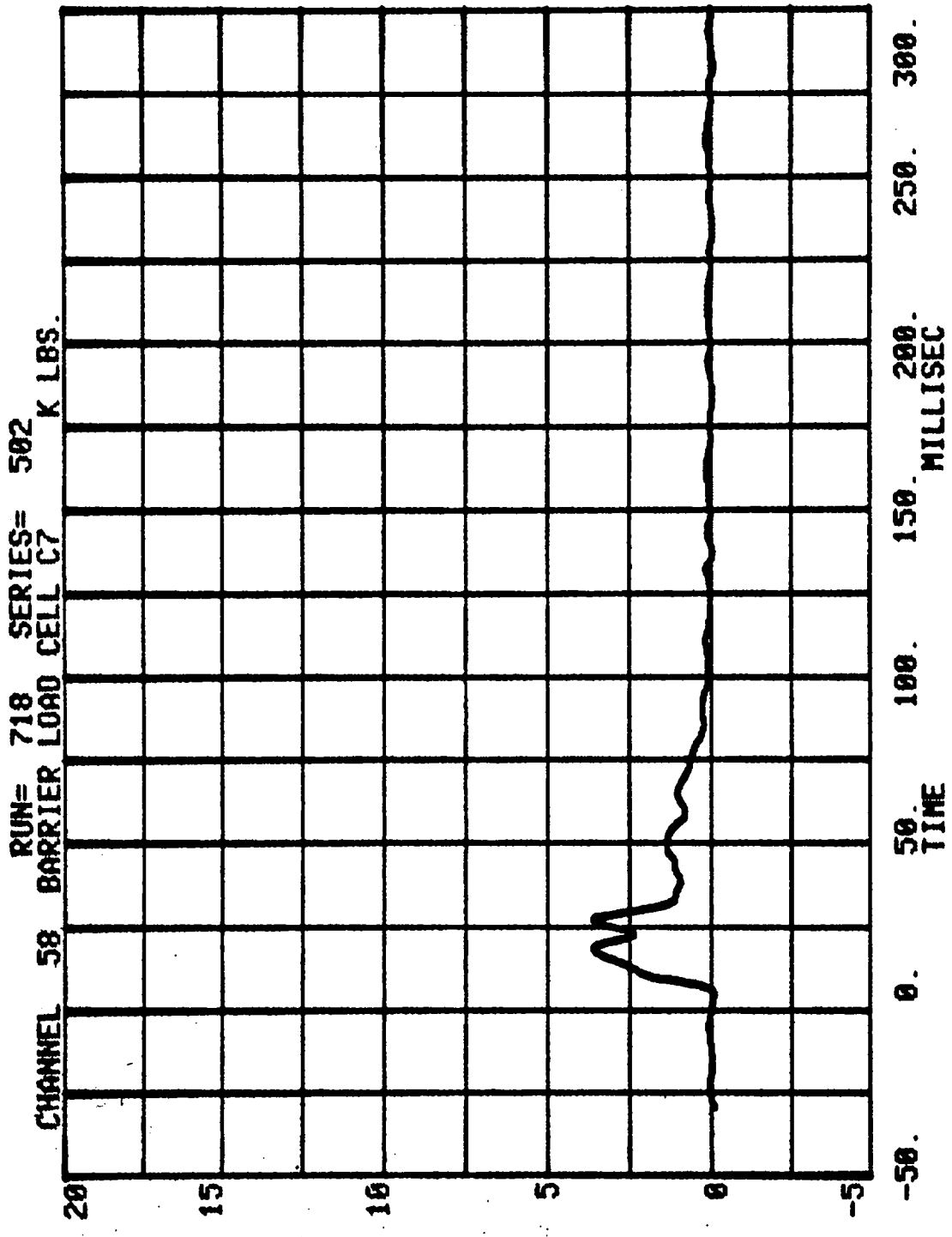
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


CHANNEL 58 RUN= 718 SERIES= 502
BARRIER LOAD CELL C7
K LBS.
20
15
10
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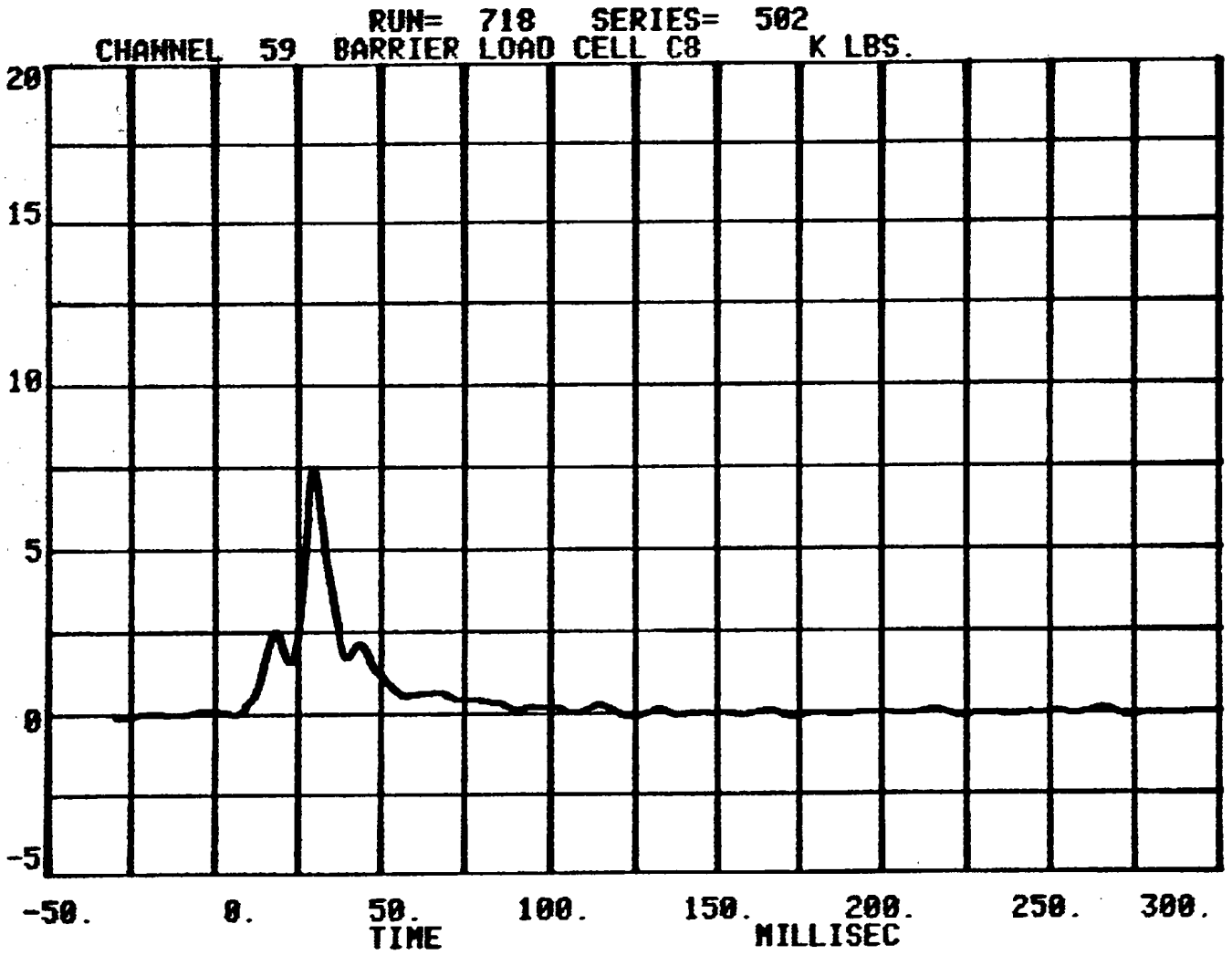
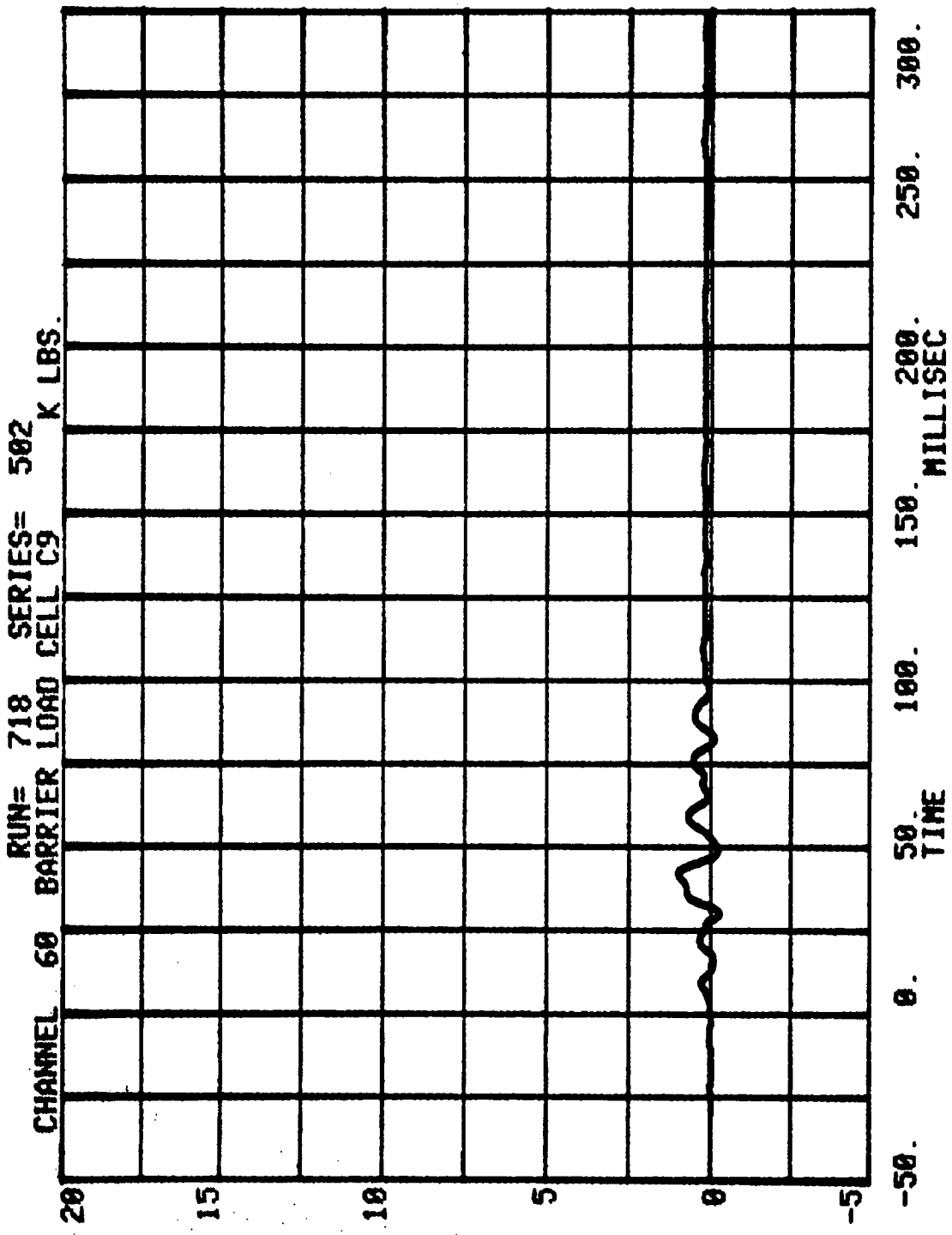
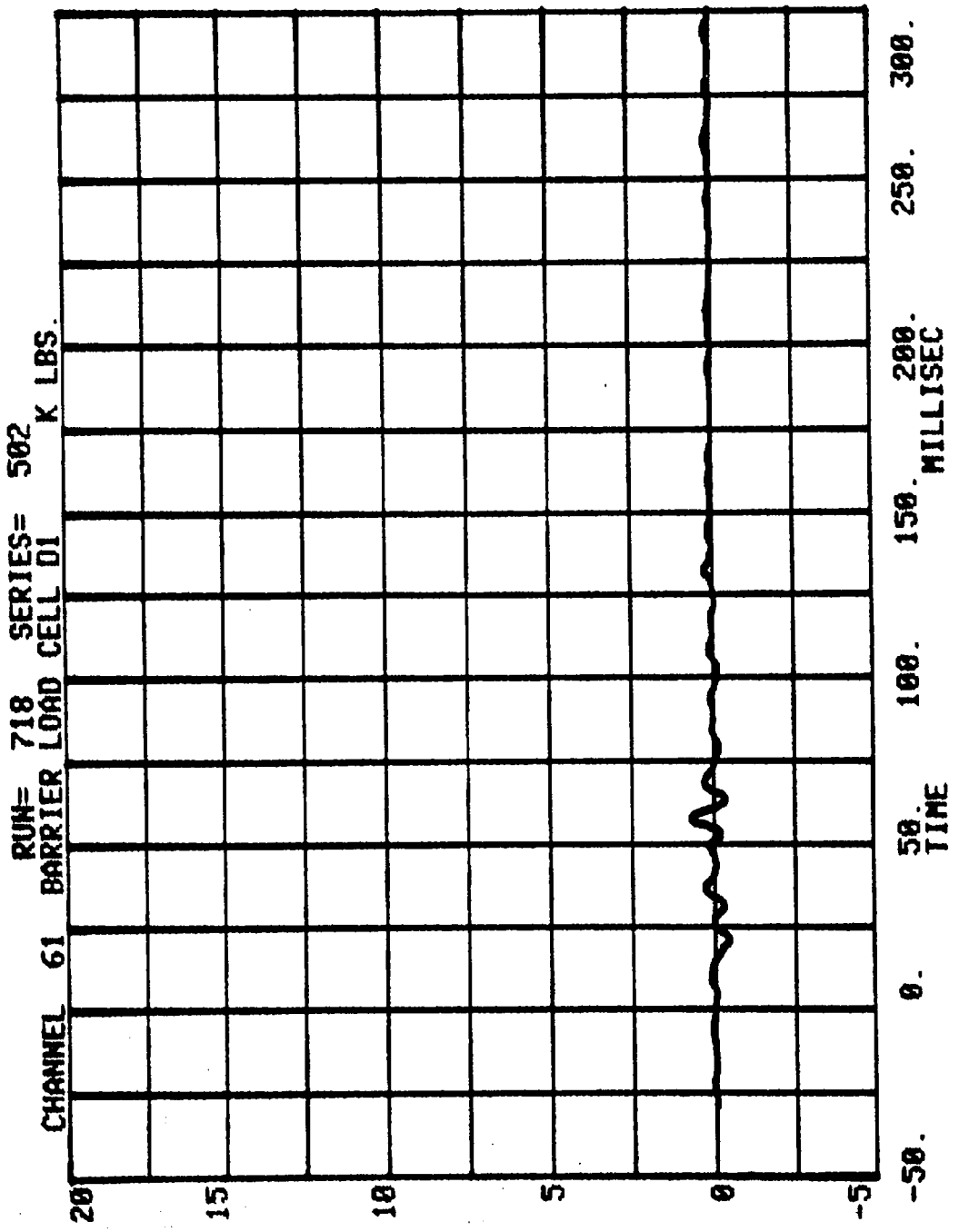
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

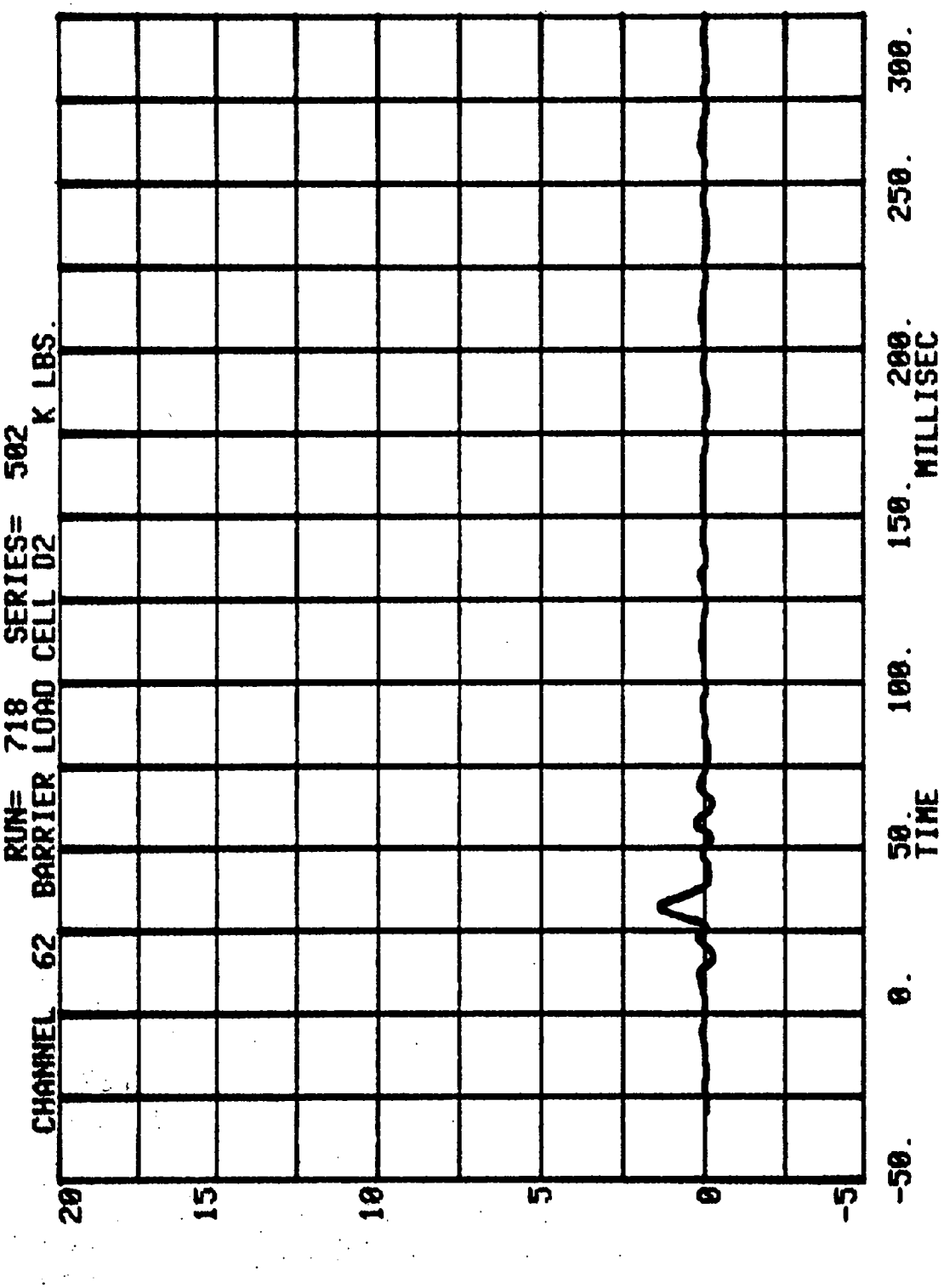
7457-10


RUN= 718 SERIES= 502
CHANNEL 59 BARRIER LOAD CELL C8 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

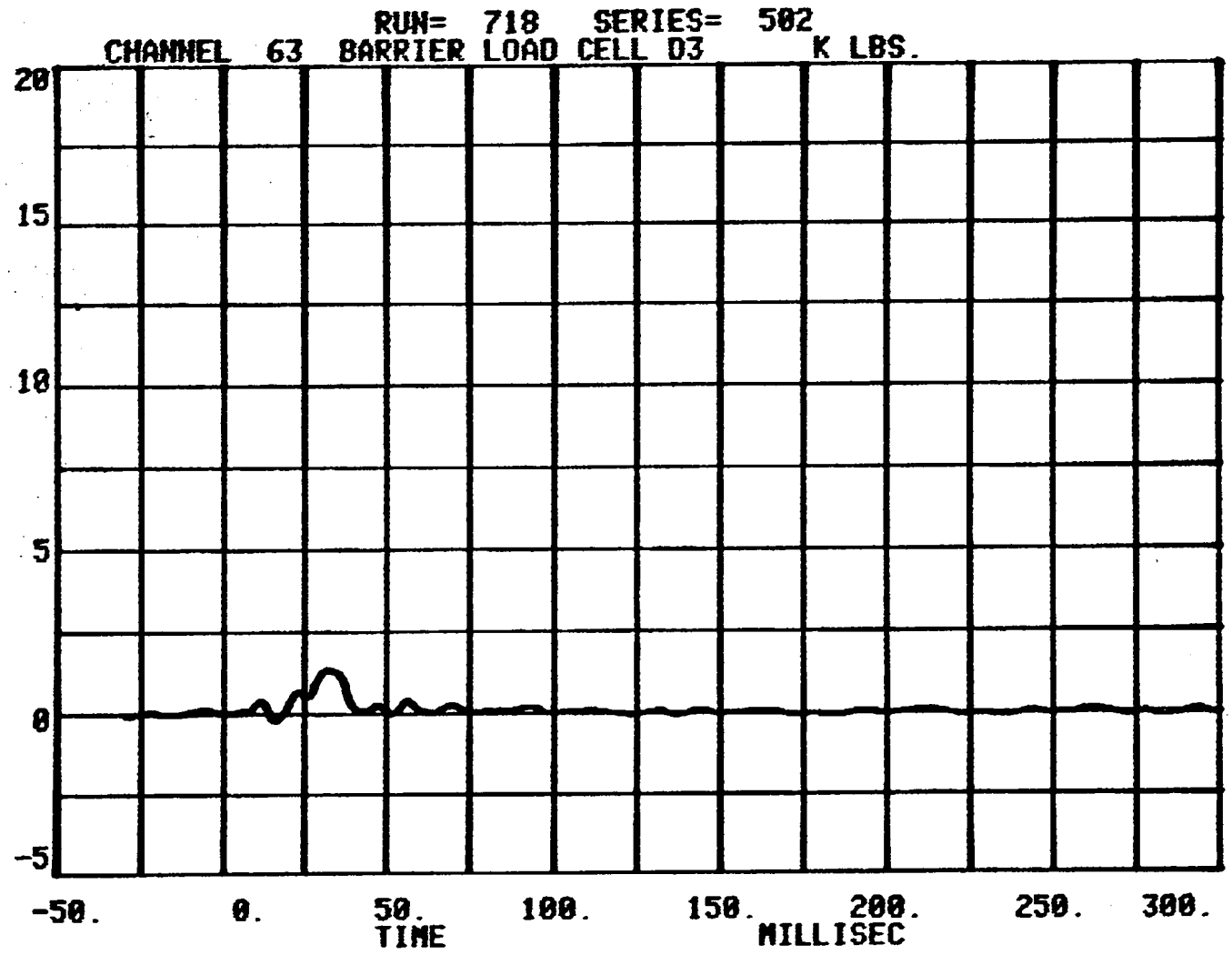

CHANNEL 60 RUN= 718 SERIES= 502
BARRIER LOAD CELL C9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

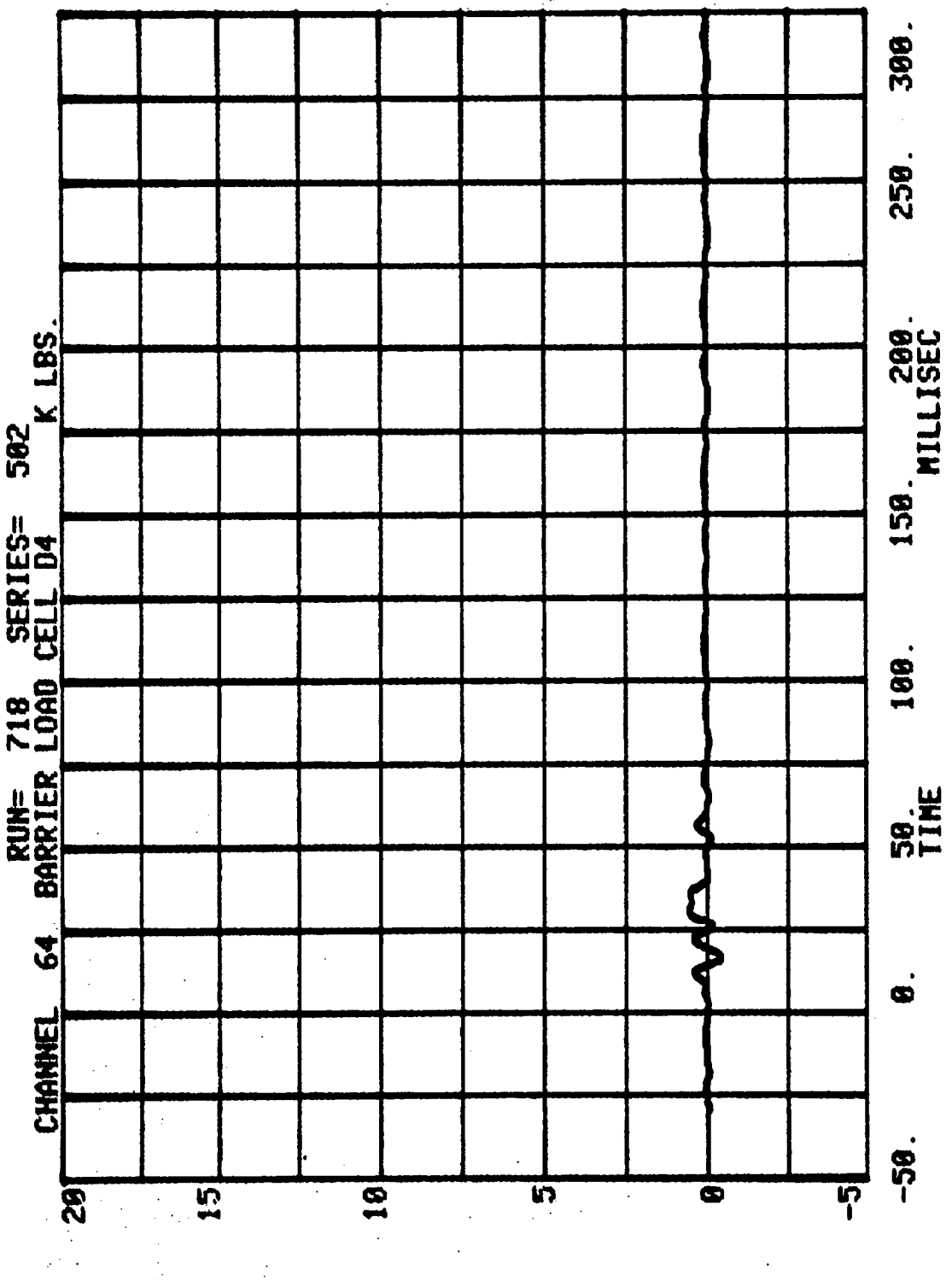

CHANNEL 61 RUN= 718 SERIES= 502
BARRIER LOAD CELL 01
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

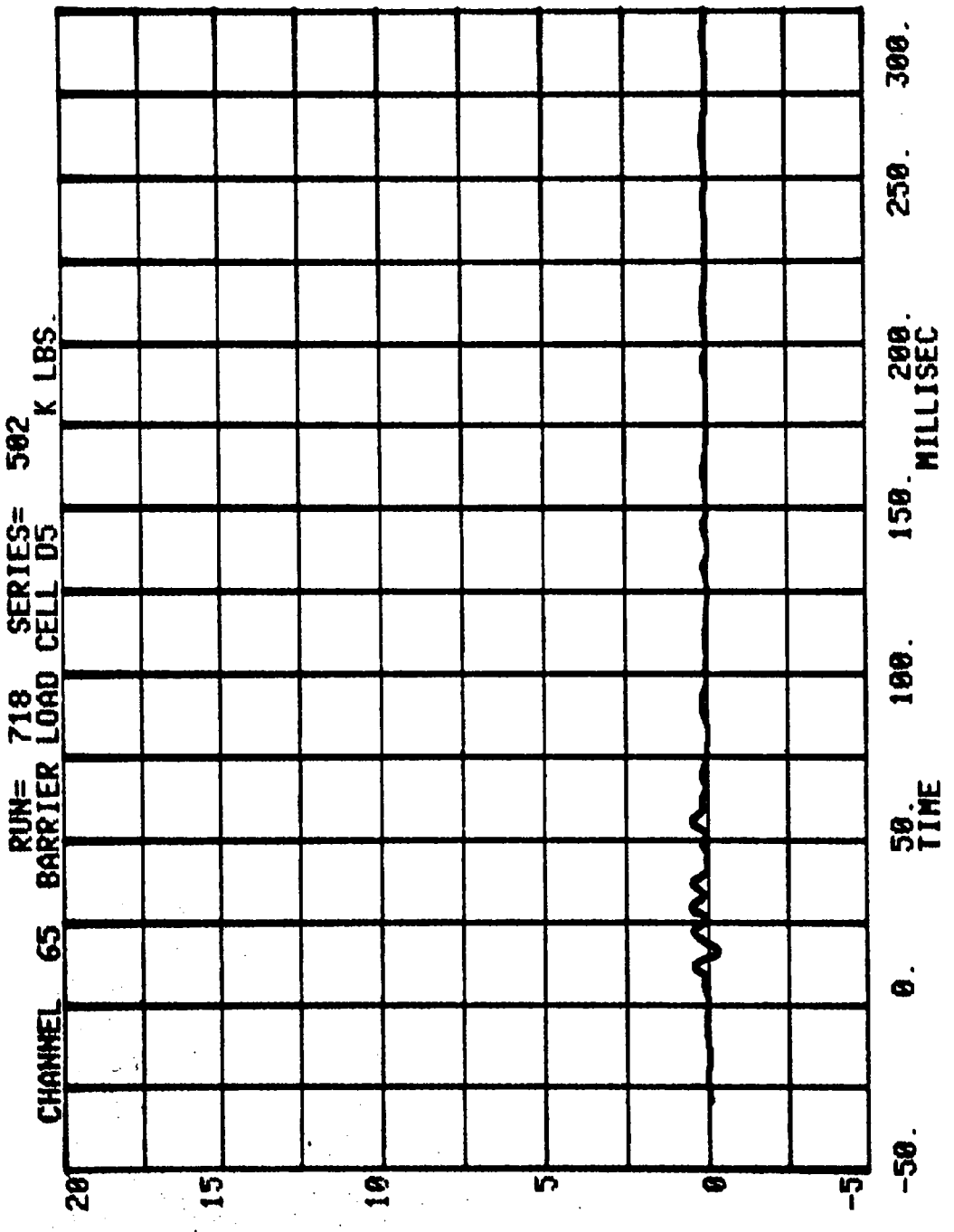

CHANNEL 62
RUN= 718
BARRIER LOAD CELL D2
SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

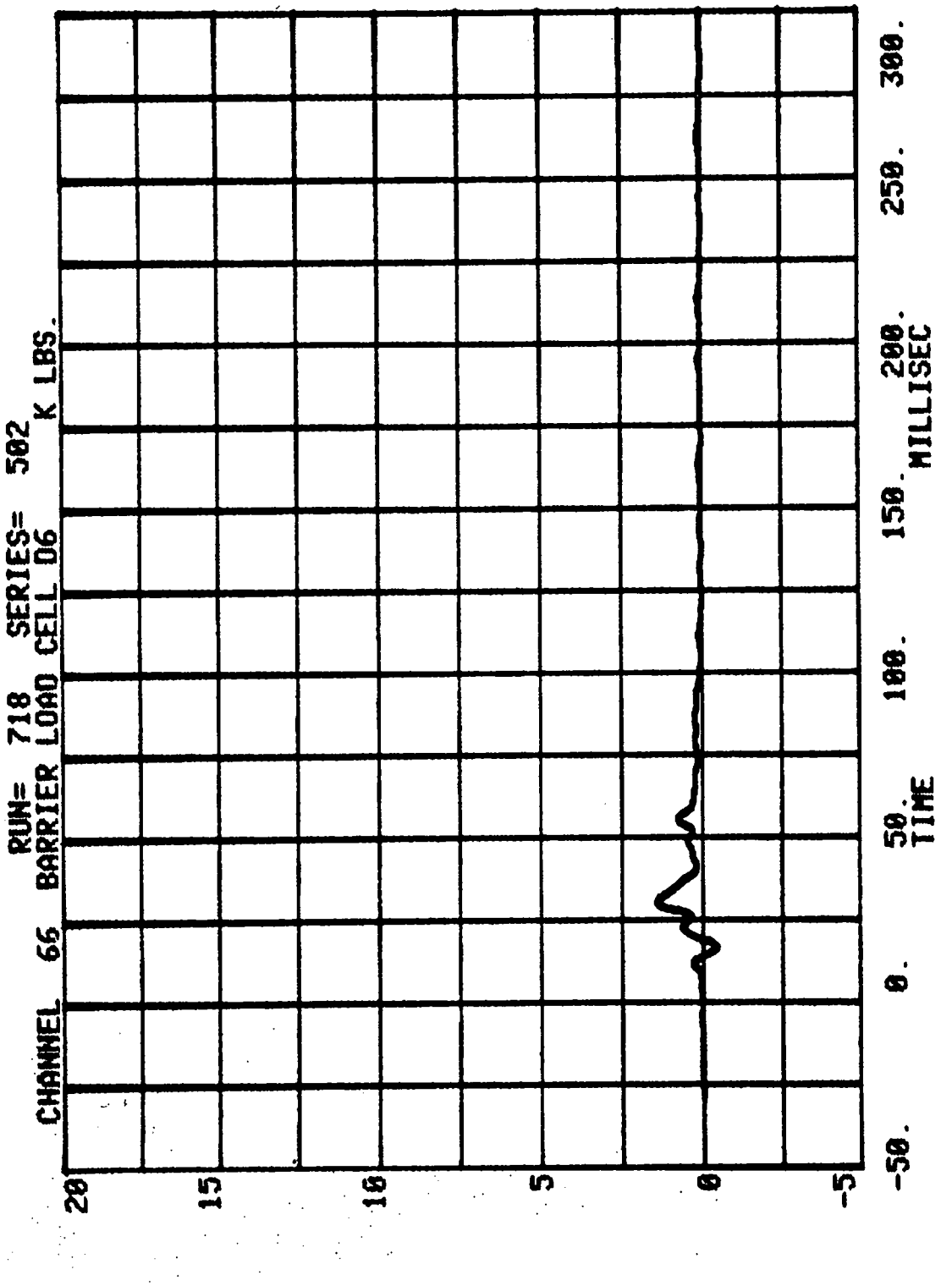
7457-10


RUN= 718 SERIES= 502
CHANNEL 63 BARRIER LOAD CELL D3 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

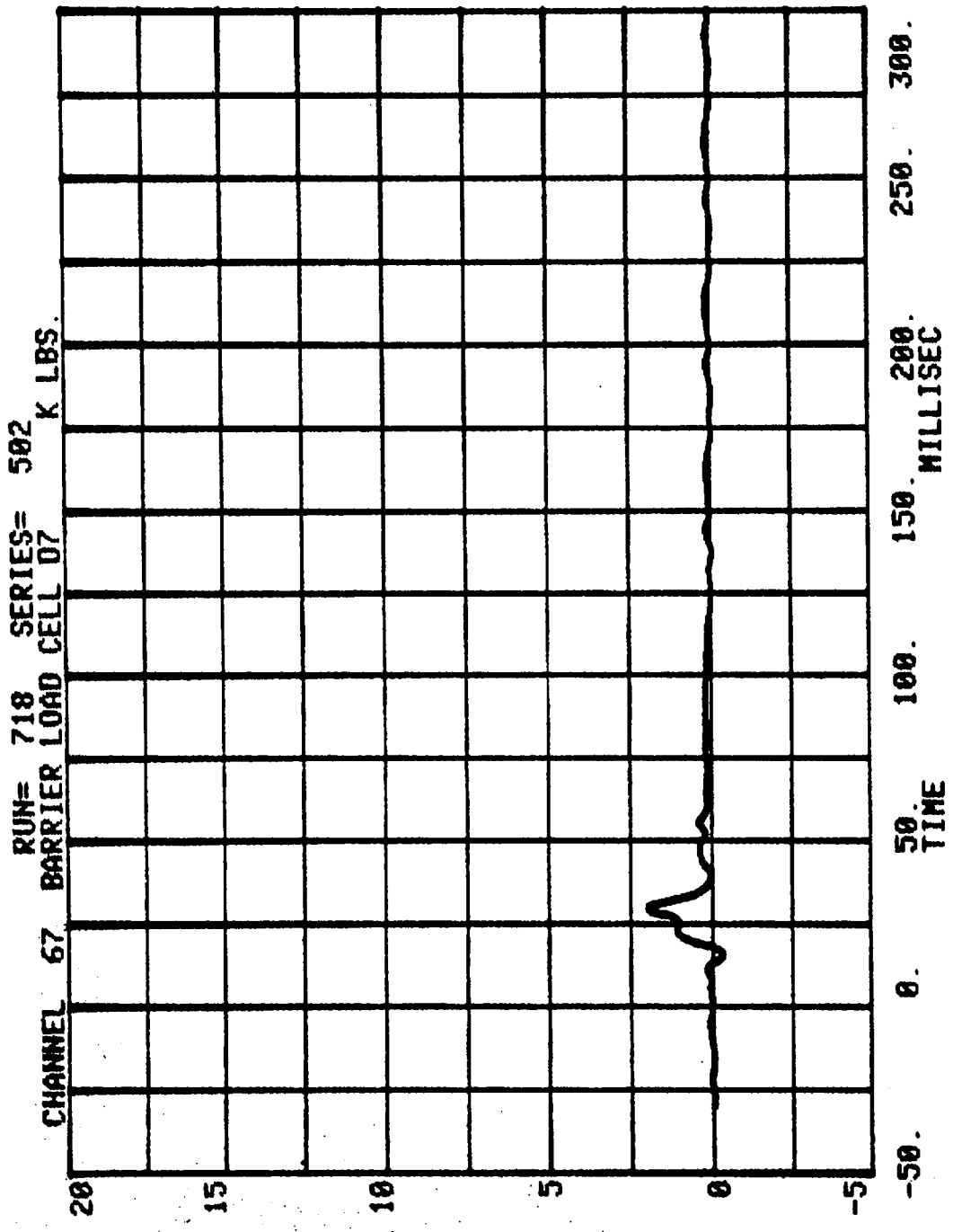

RUN= 718 SERIES= 502
BARRIER LOAD CELL D4
CHANNEL 64
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

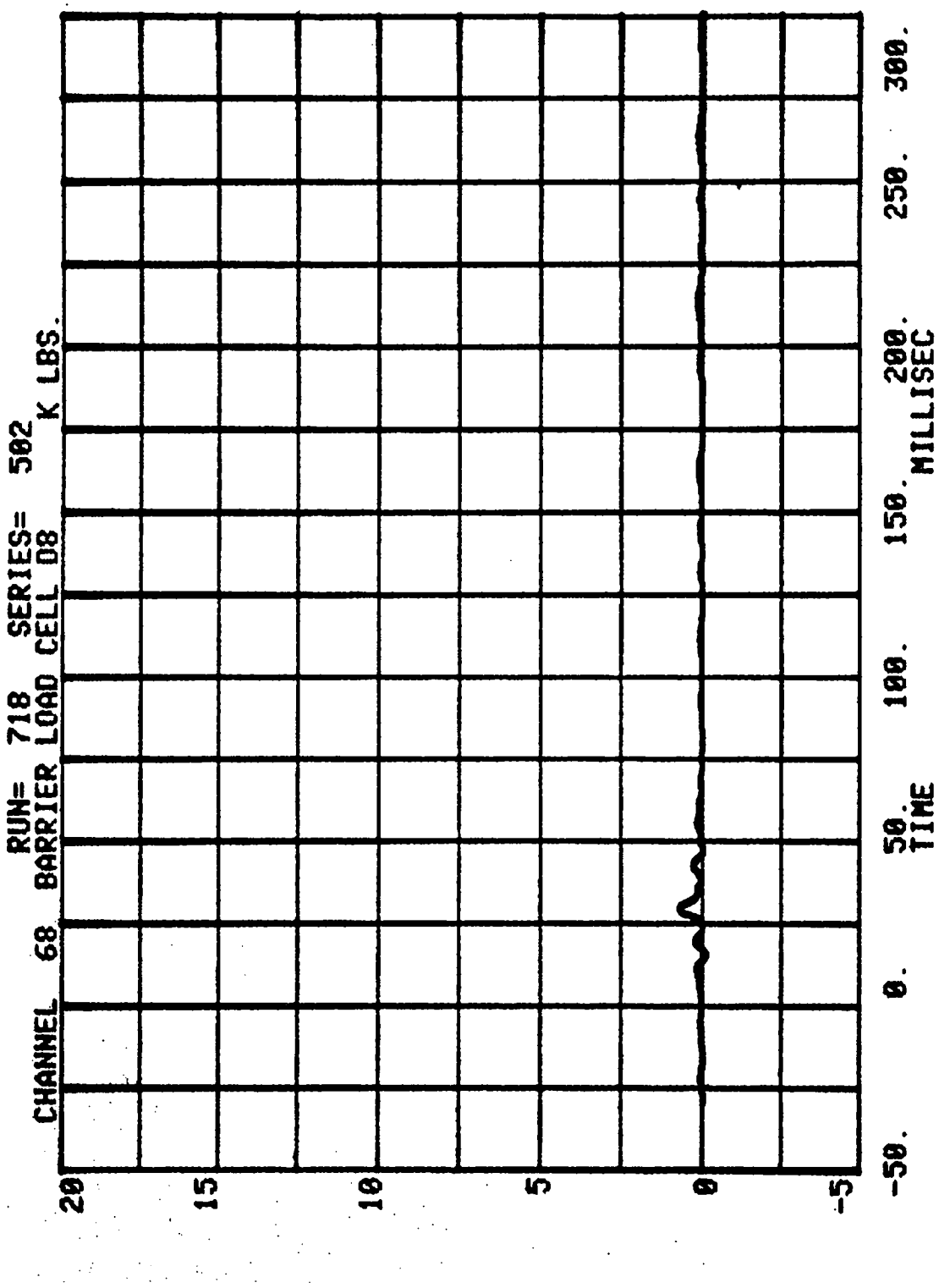

CHANNEL 65 BARRIER LOAD CELL D5
RUN= 718 SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

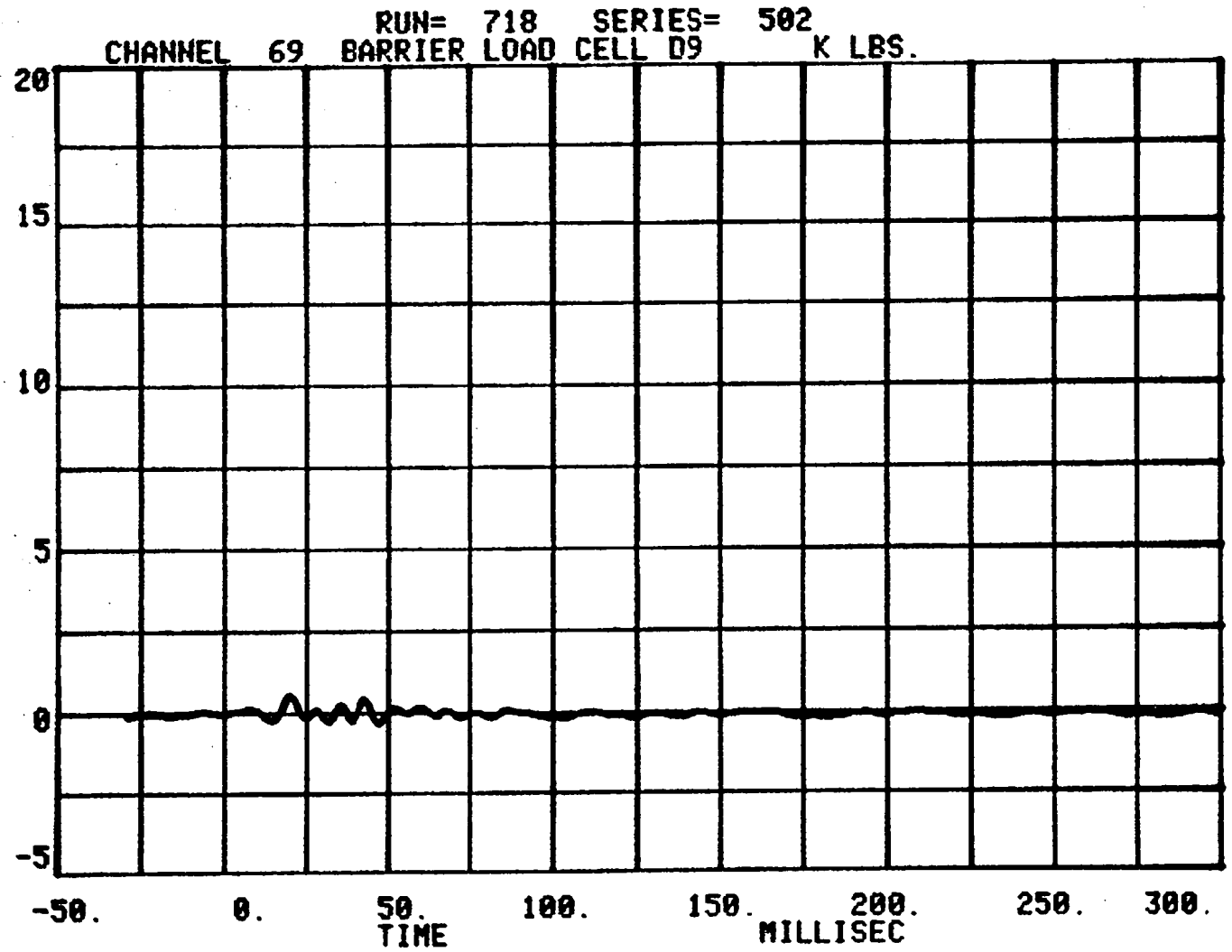

CHANNEL 66 BARRIER LOAD CELL D6
RUN= 718 SERIES= 502
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


CHANNEL 67
RUN= 718 SERIES= 502
BARRIER LOAD CELL 07
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

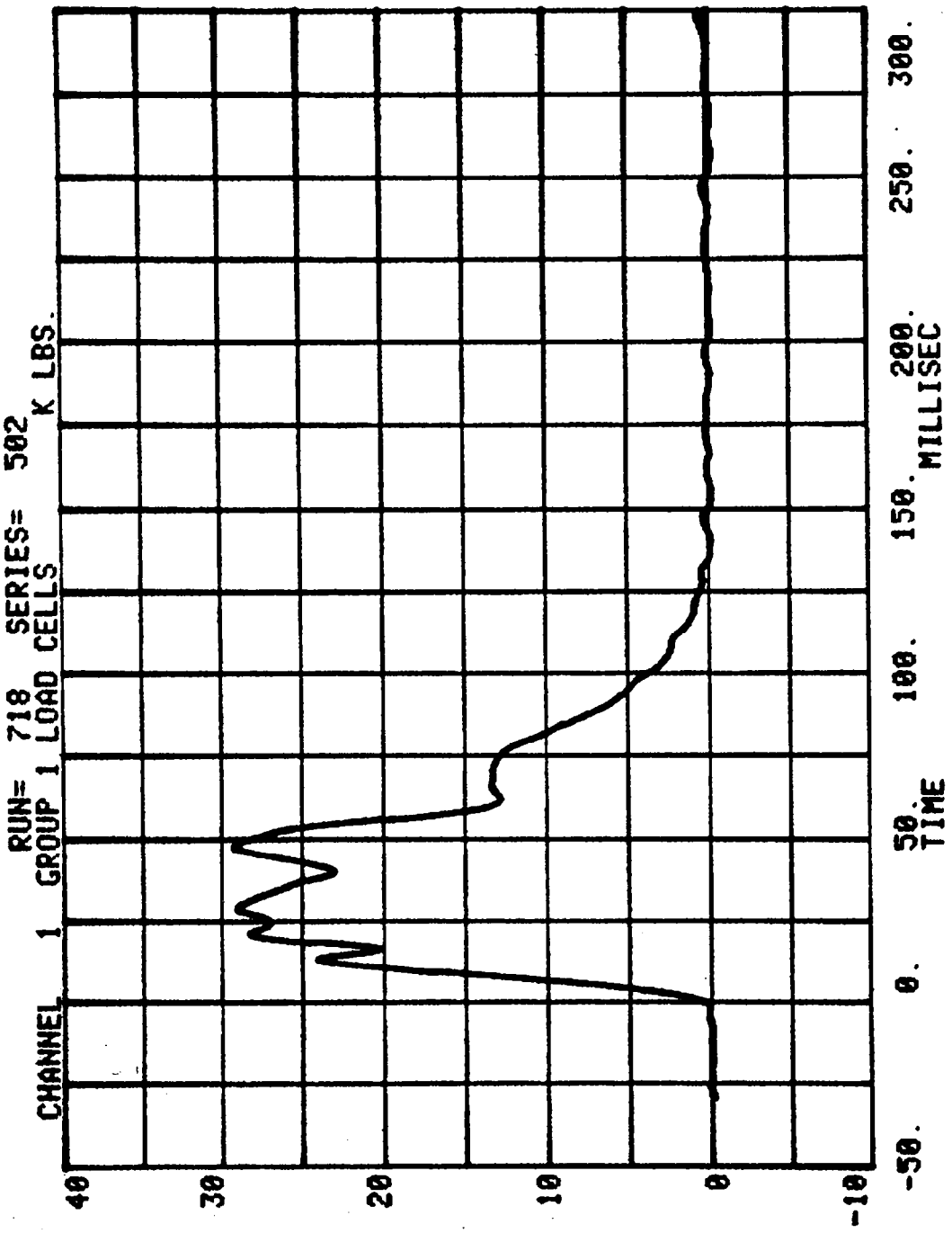

RUN= 718 SERIES= 502
CHANNEL 68 BARRIER LOAD CELL 08
K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

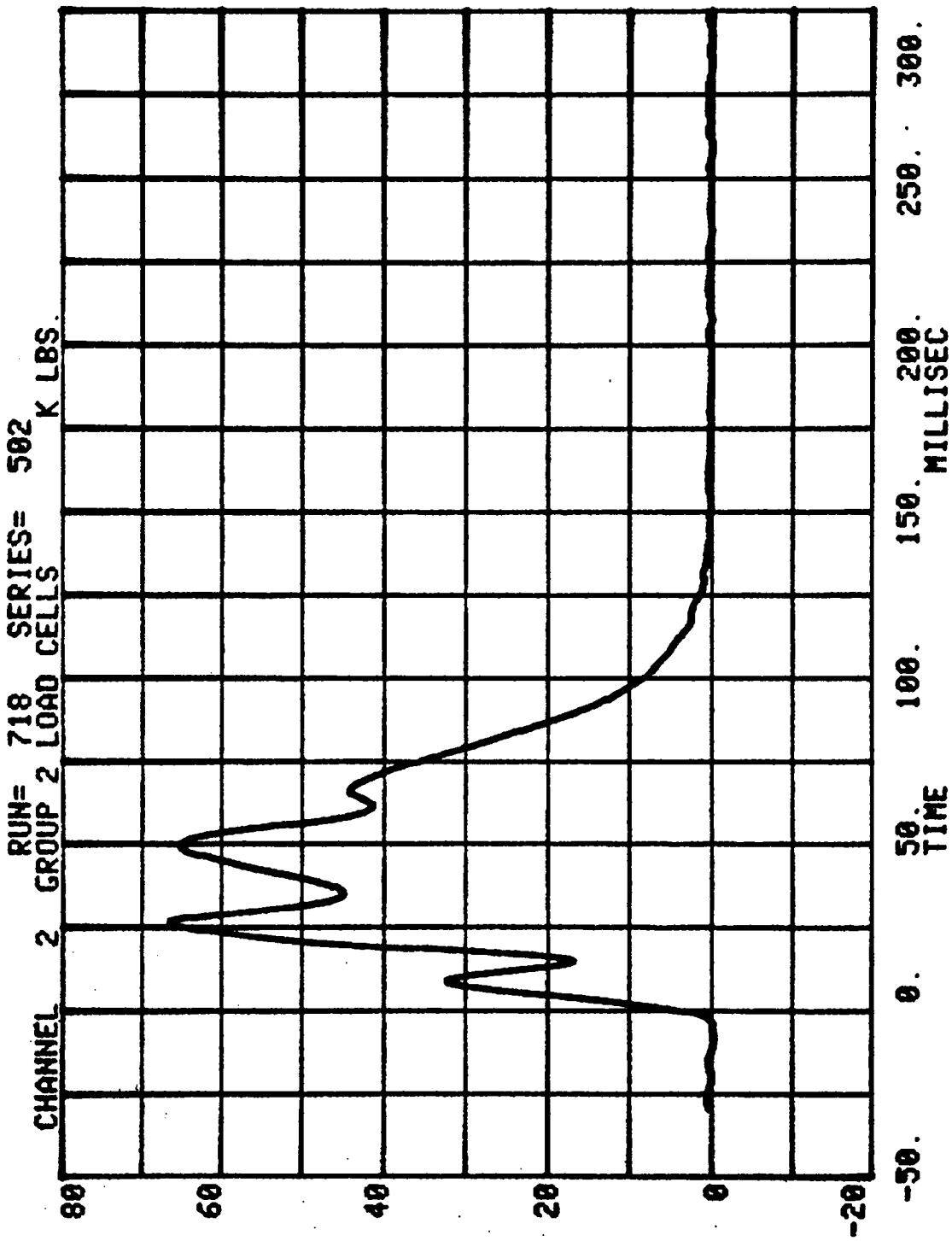

RUN= 718 SERIES= 502
CHANNEL 69 BARRIER LOAD CELL D9 K LBS.
20
15
10
5
0
-5
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

NEW CAR ASSESSMENT BARRIER TESTS - 1986

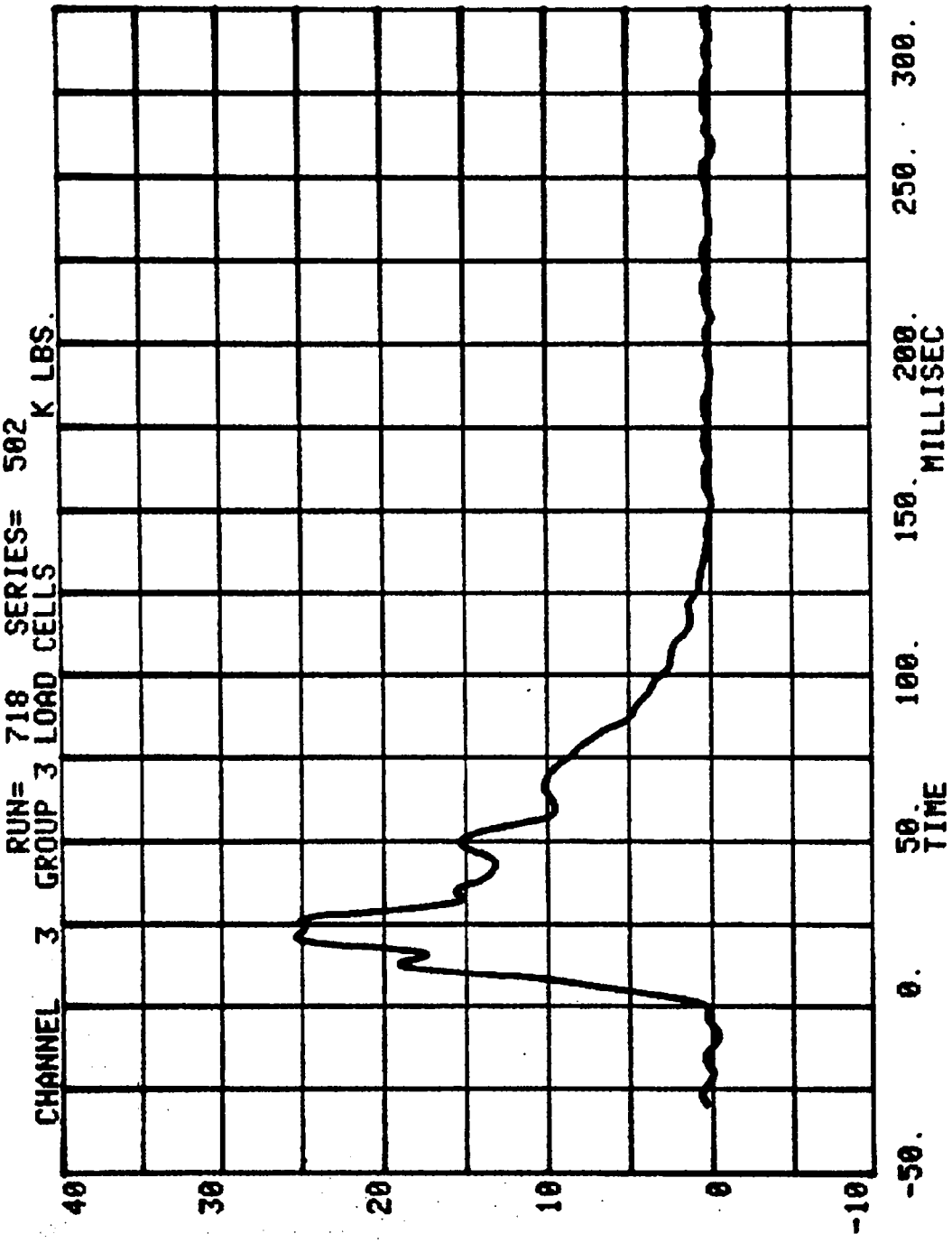
RUN # 718 SERIES # 502

CHAN	TITLE	MINIMUM	MAXIMUM
1	GROUP 1 LOAD CELLS	-.256	29.369 K LBS.
2	GROUP 2 LOAD CELLS	-.286	66.711 K LBS.
3	GROUP 3 LOAD CELLS	-.375	25.428 K LBS.
4	GROUP 4 LOAD CELLS	-.256	9.948 K LBS.
5	GROUP 5 LOAD CELLS	-.168	28.294 K LBS.
6	GROUP 6 LOAD CELLS	-.389	12.622 K LBS.
7	TOTAL LOAD CELL SUM	-.833	159.789 K LBS.

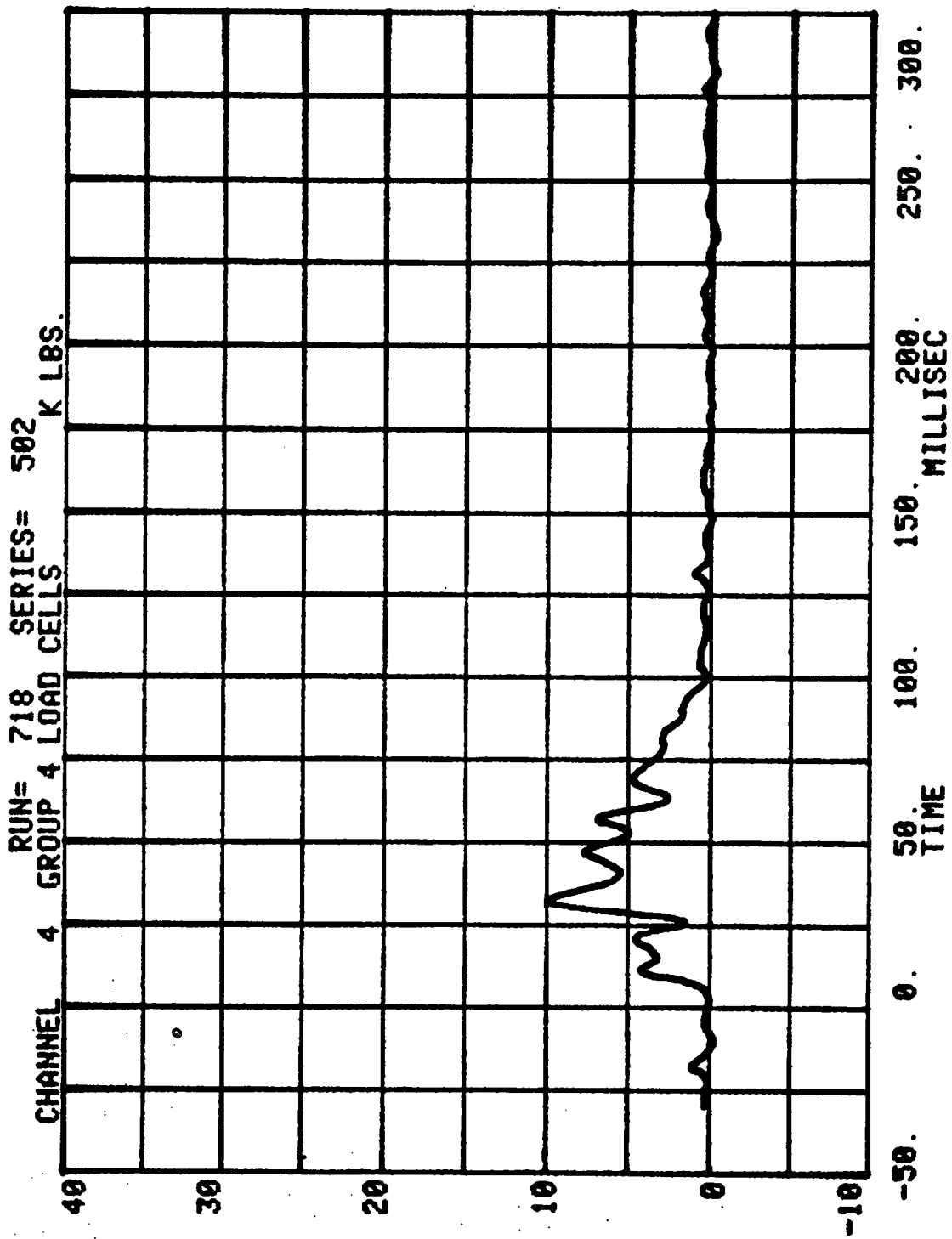

CHANNEL 1 GROUP 1 LOAD CELLS
RUN= 718 SERIES= 502
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

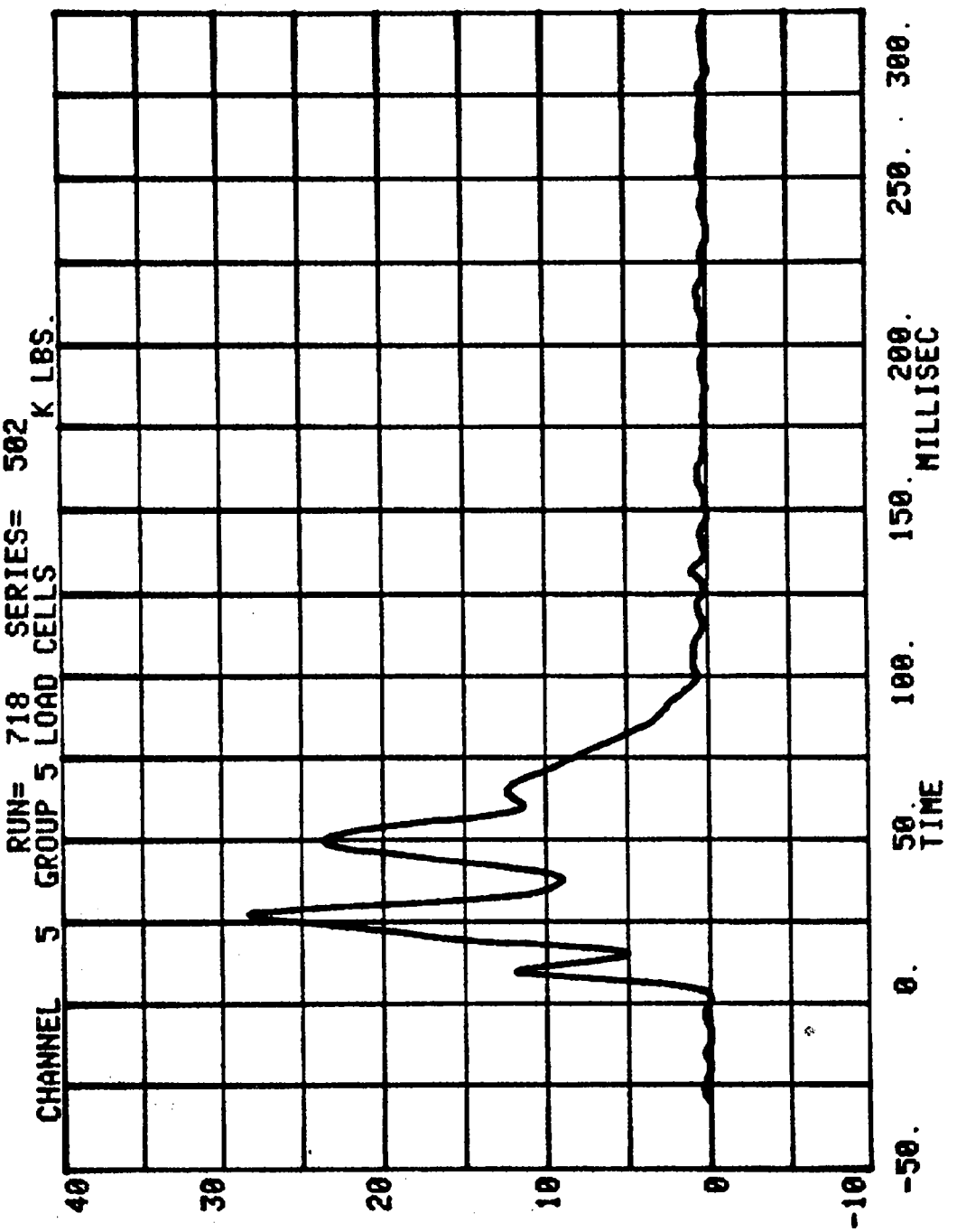

CHANNEL 2
RUN= 718 SERIES= 502
GROUP 2 LOAD CELLS
K LBS.
80
60
40
20
0
-20
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

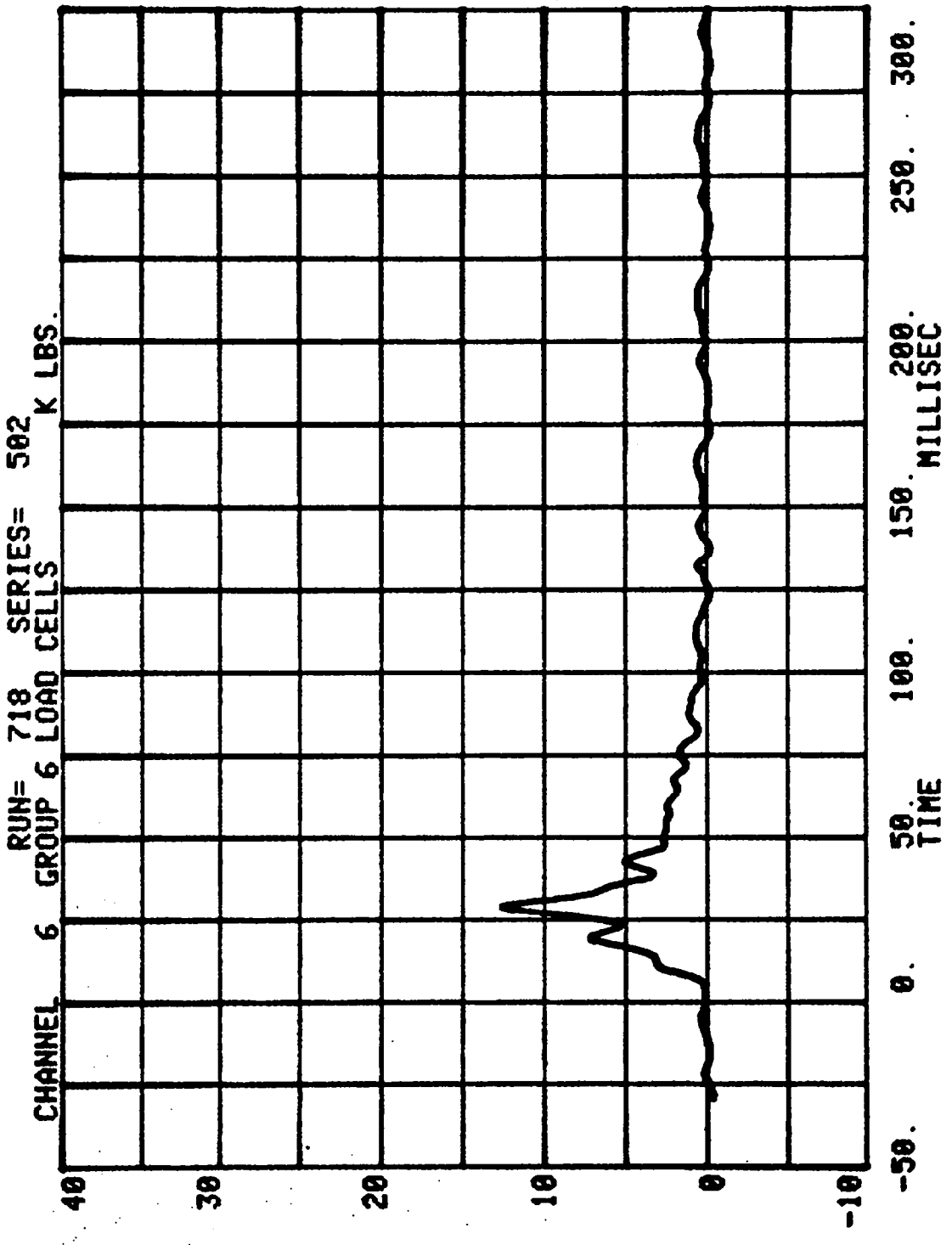

CHANNEL 3 GROUP 3 LOAD CELLS
RUN= 718 SERIES= 502
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

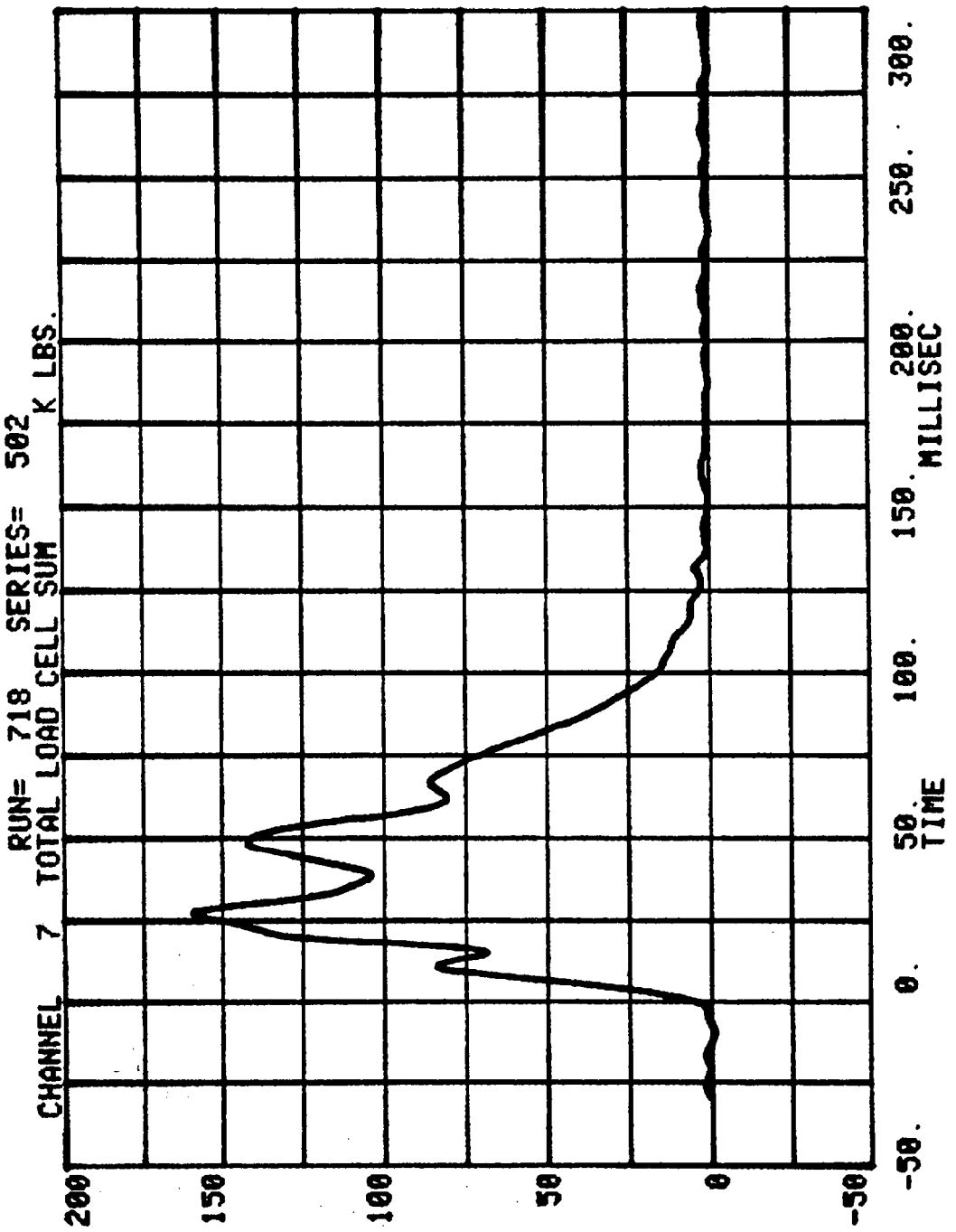
7457-10


CHANNEL 4 GROUP 4 LOAD CELLS
RUN= 718 SERIES= 502
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 5 GROUP 5 LOAD CELLS
RUN= 718 SERIES= 502
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


CHANNEL 6 GROUP 6 LOAD CELLS
RUN= 718 SERIES= 502
K LBS.
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 7 TOTAL LOAD CELL SUM
RUN= 718 SERIES= 502
K LBS.
200
150
100
50
0
-50
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

Test No. MG0502

Dummy Data

	Filter Channel Class
Head Accleration	1000
Chest Acceleration	180
Femur Forces	600
Belt Loads	60

HEAD INJURY CRITERION
HEAD SEVERITY INDEX

NEW CAR ASSESSMENT BARRIER TESTS - 1986

RUN= 718

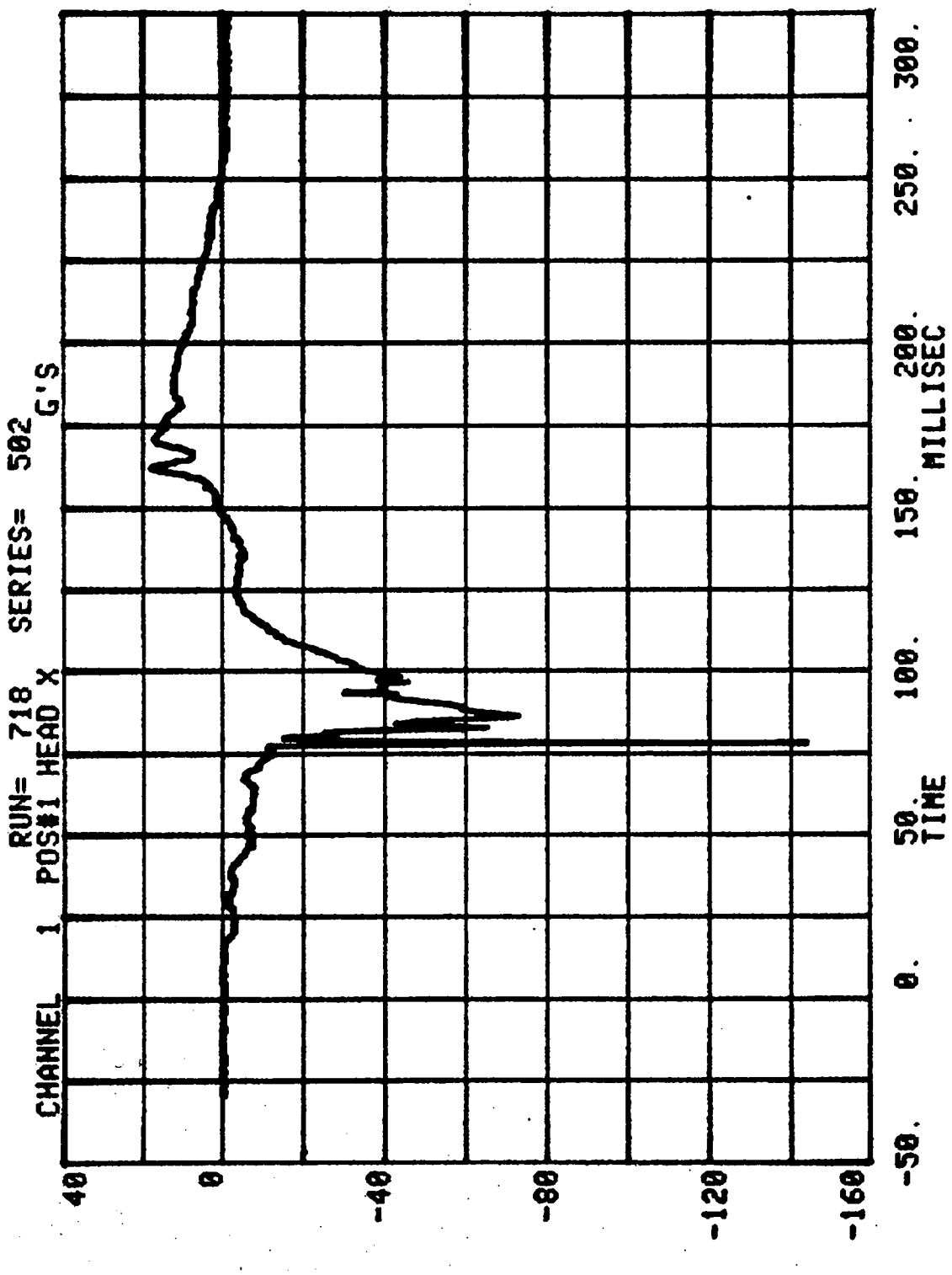
POS#1 HEAD R

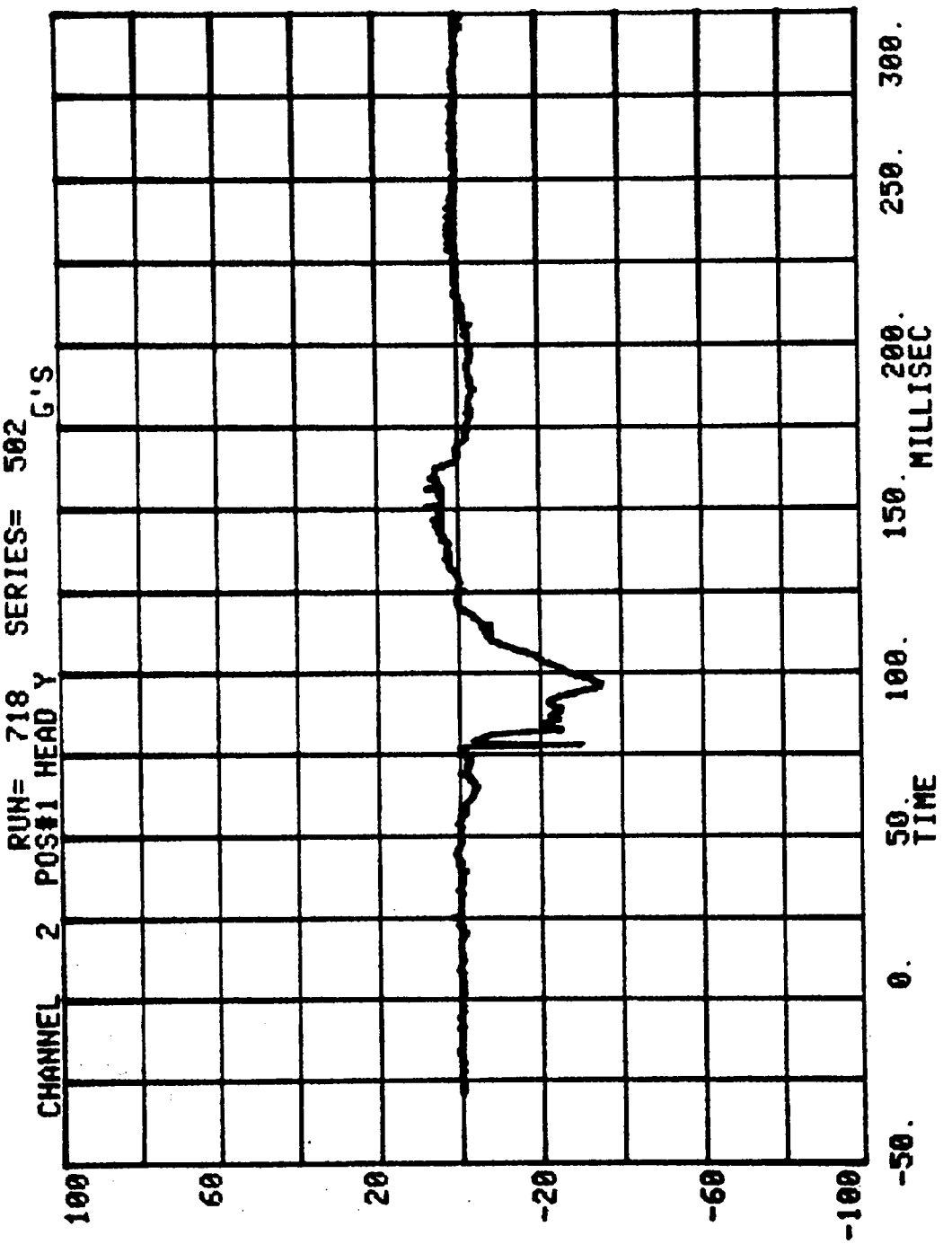
HIC= 773.4 FROM T1= .07785 TO T2= .10515

AVERAGE ACCELERATION BETWEEN T1 AND T2= 60.4G'S

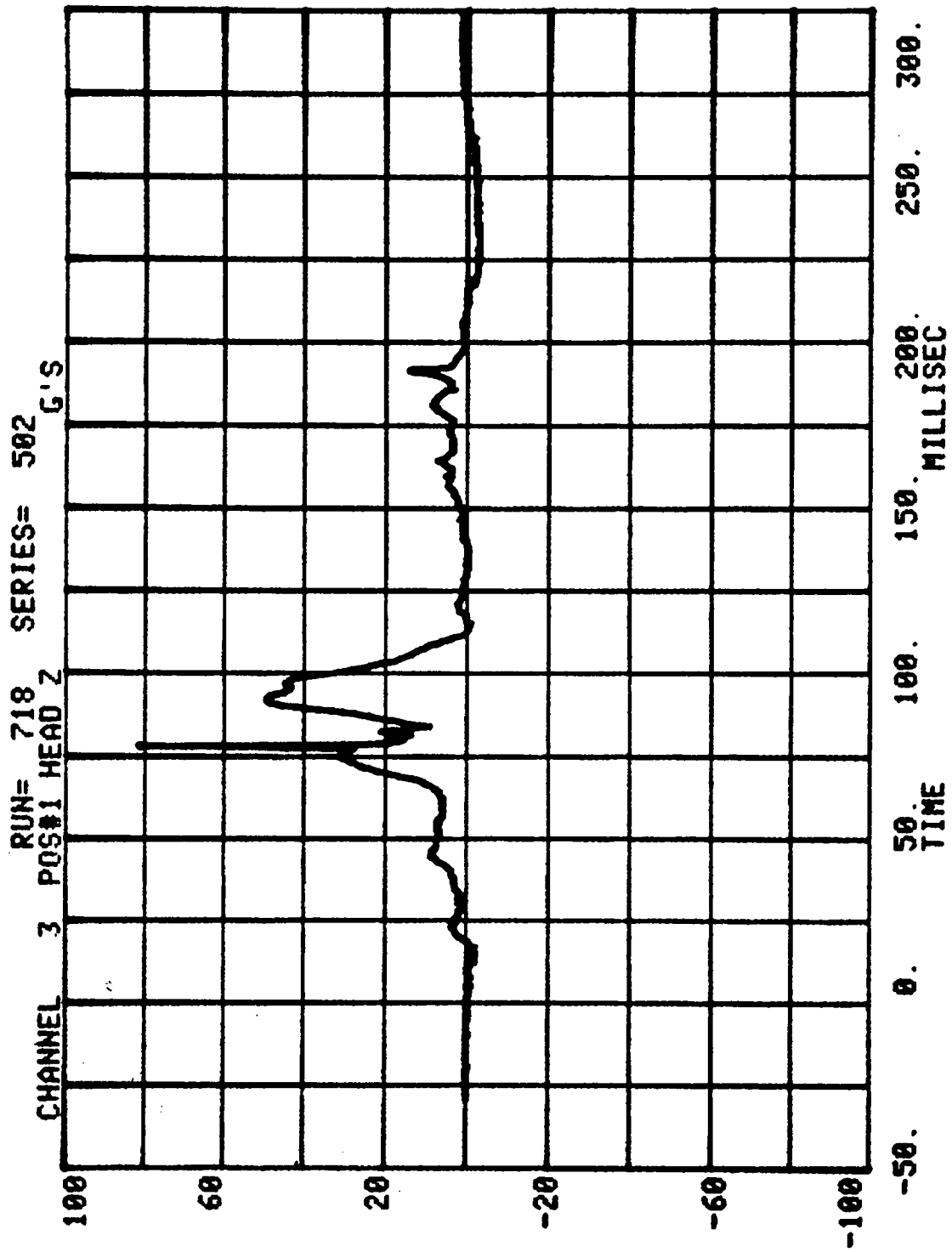
EVENT TIME= 300.0 MSEC

SEVERITY INDEX=1043.5

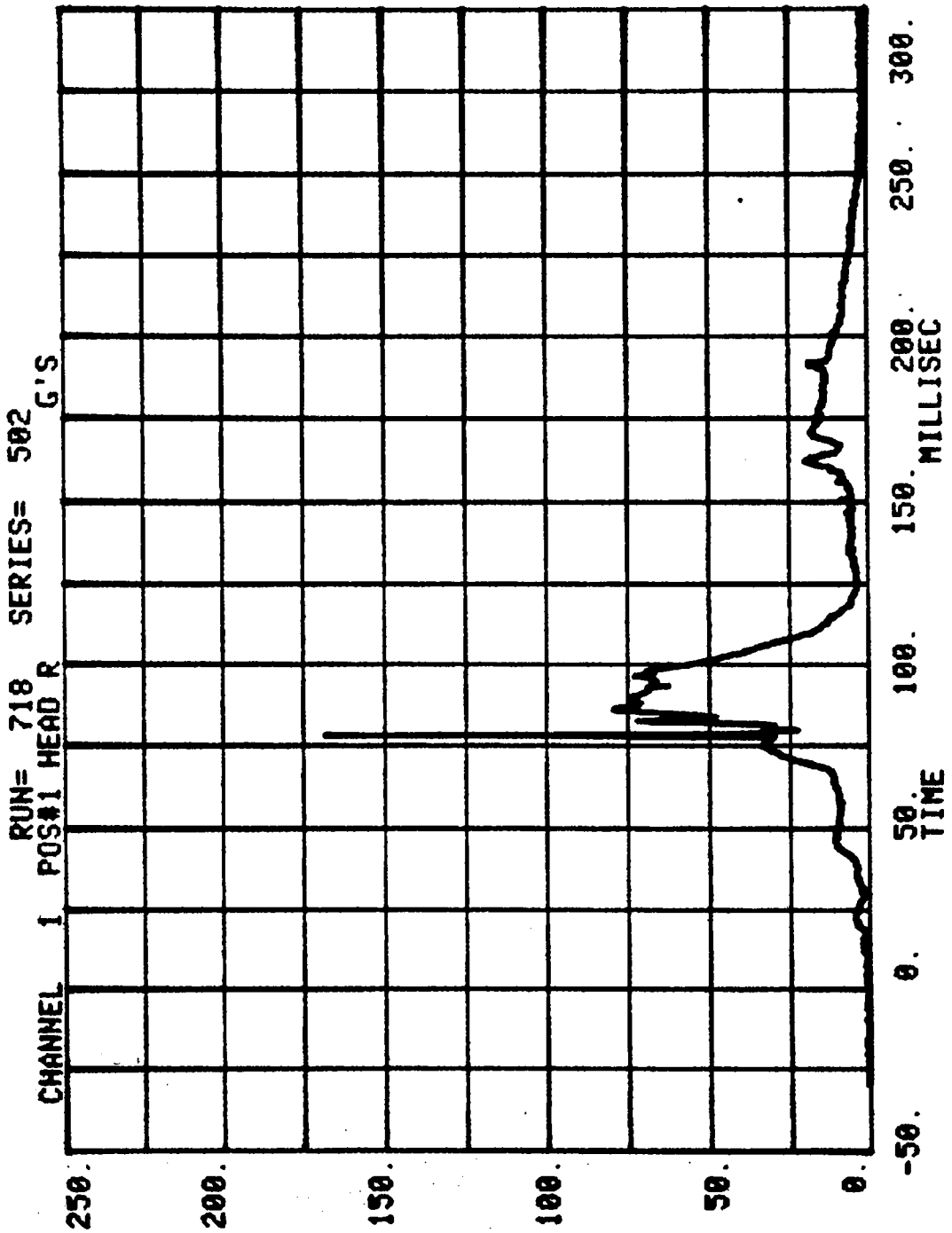

CHANNEL 1 POS#1 HEAD X
RUN= 718 SERIES= 502
G'S
40
0
-40
-80
-120
-160
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 2 POS#1 HEAD Y
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

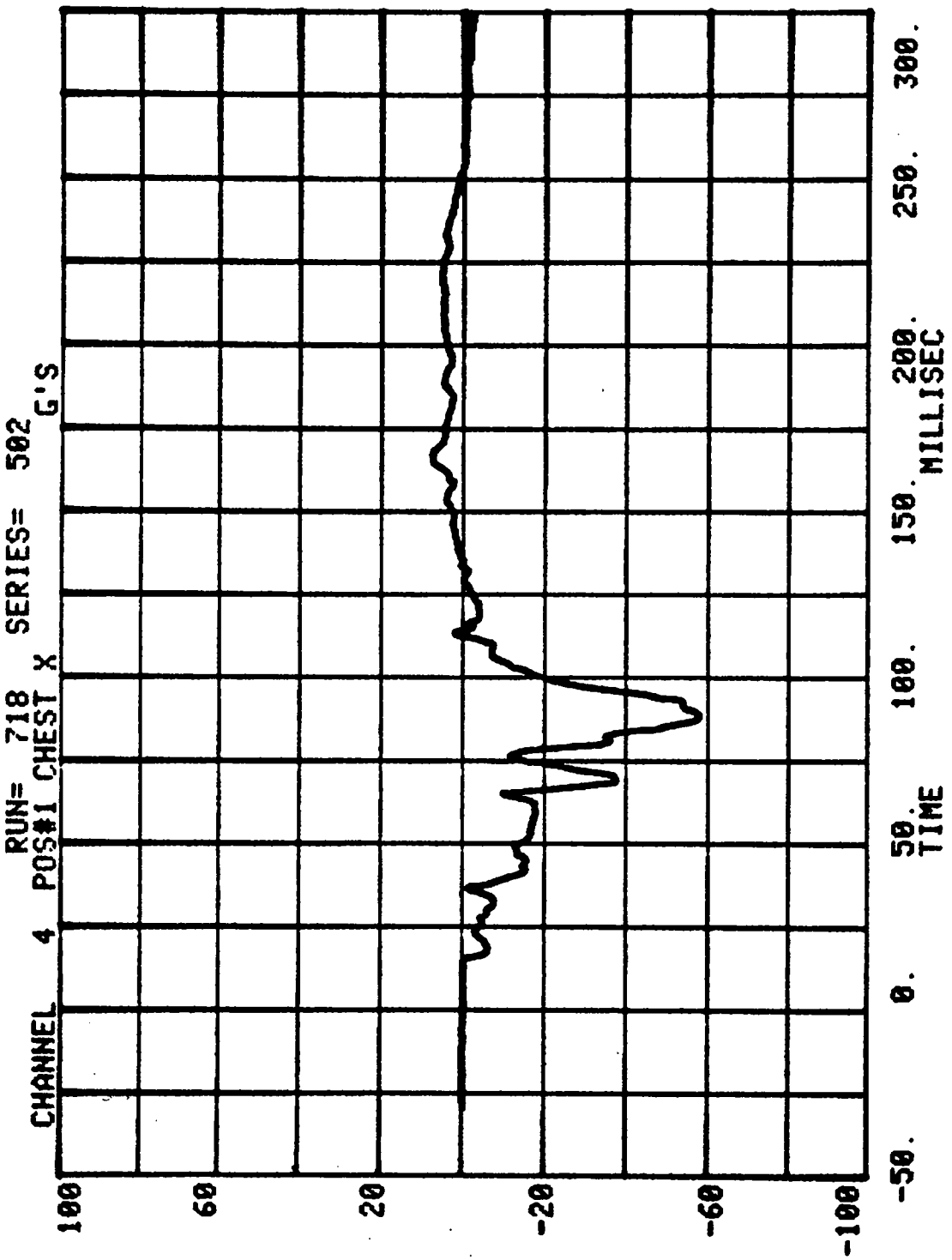
7457-10


CHANNEL 3 POS#1 HEAD Z
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

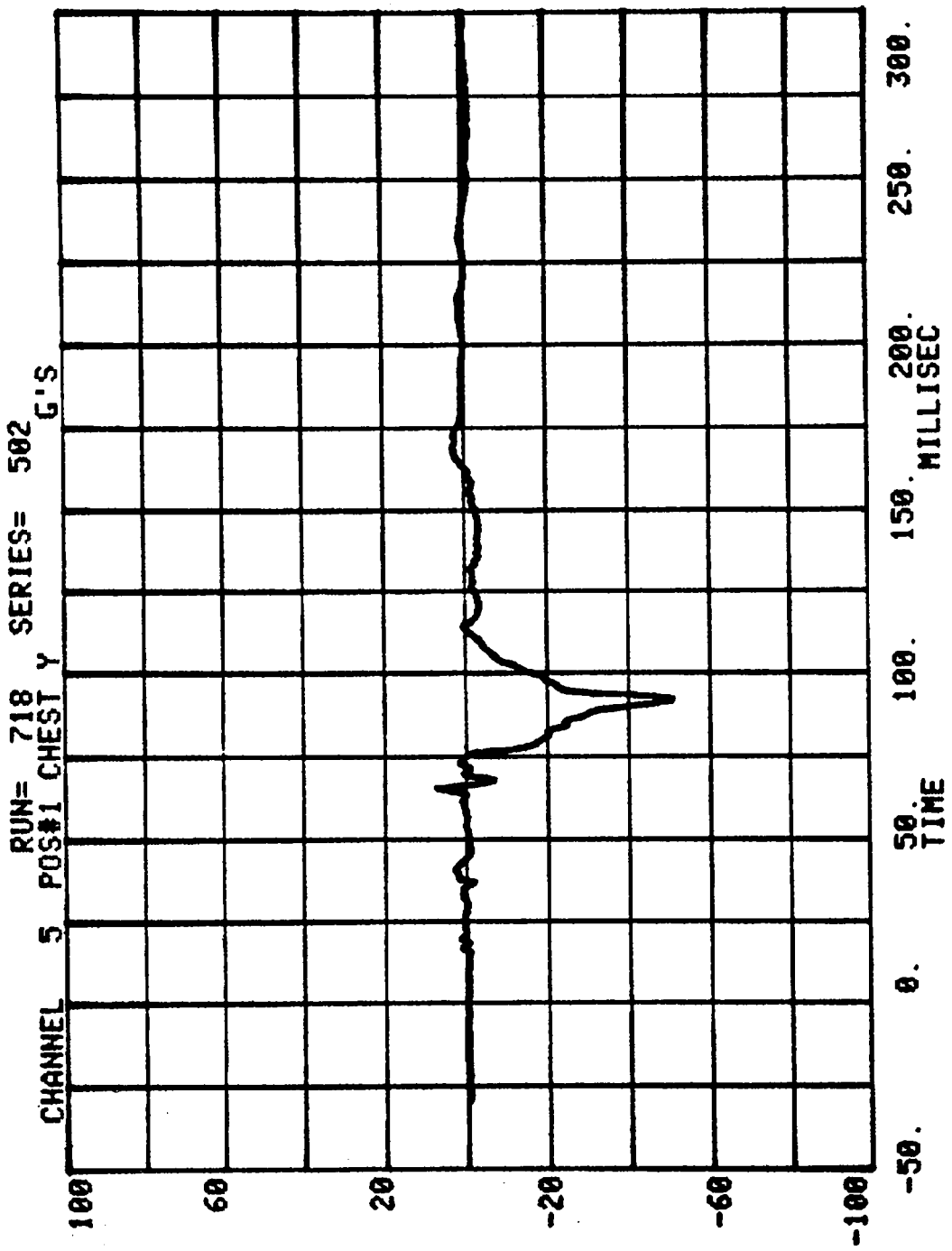
7457-10


CHANNEL 1 POS#1 HEAD R
RUN= 718 SERIES= 502
G'S
250.
200.
150.
100.
50.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

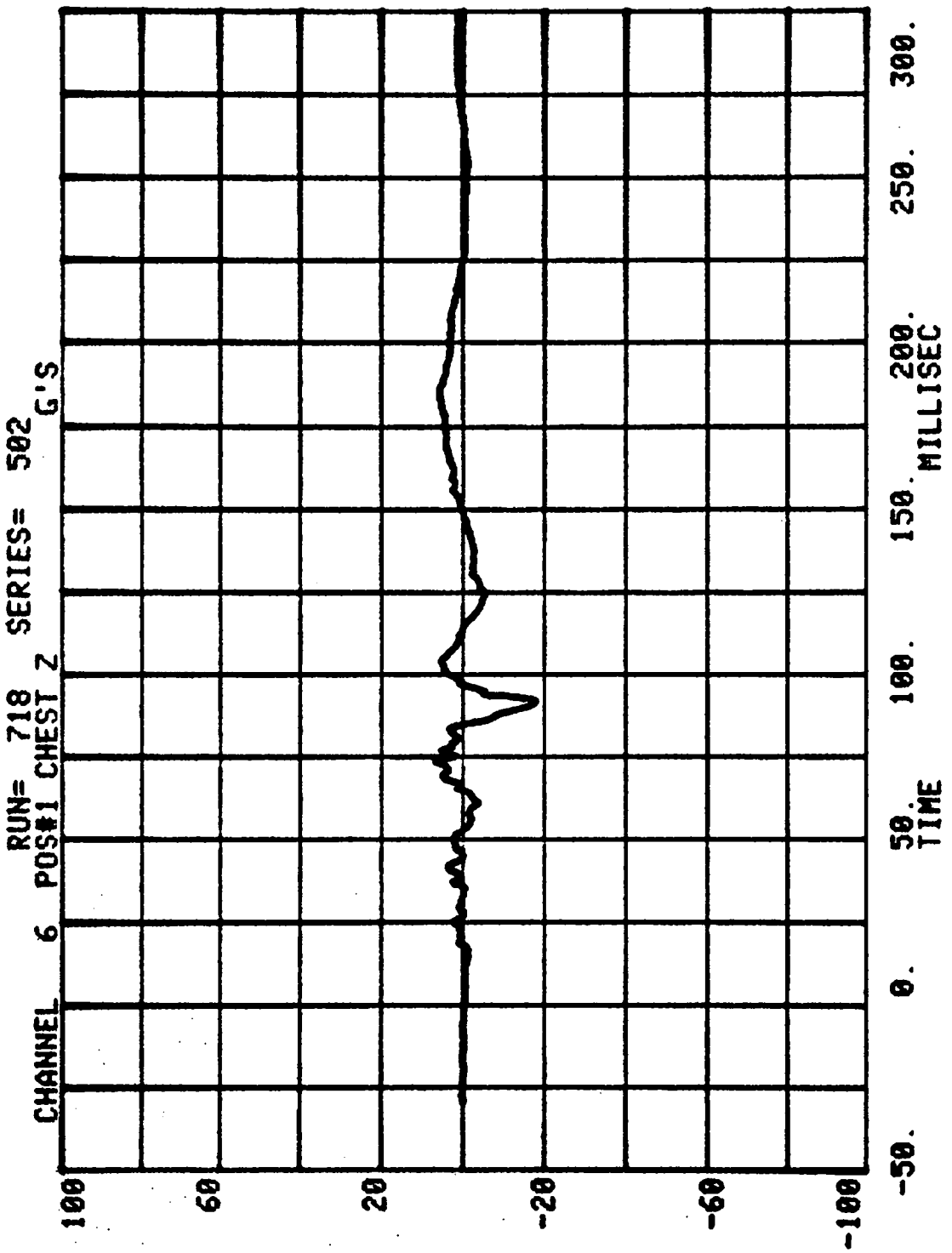
7457-10


CHANNEL 4 POS#1 CHEST X
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

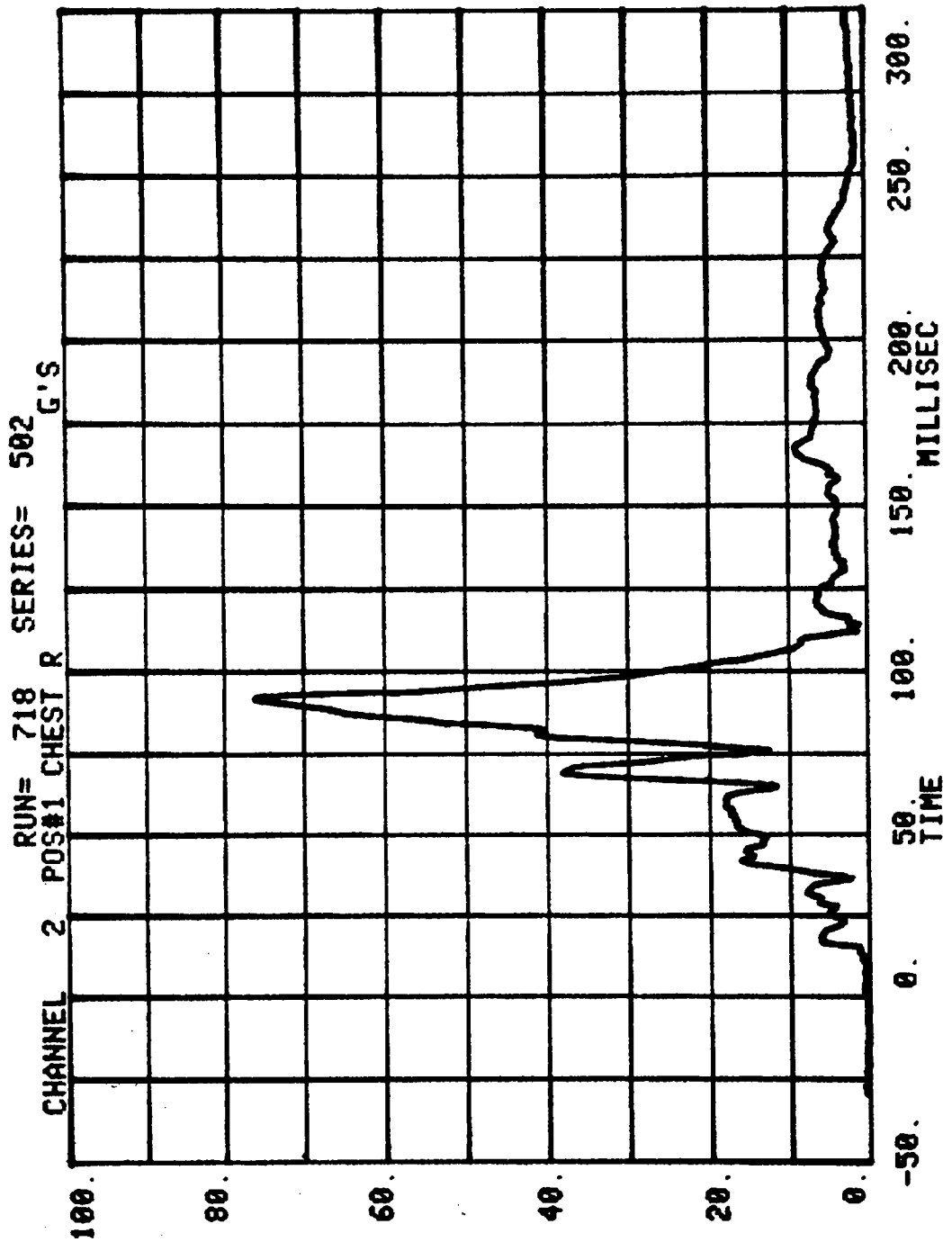
7457-10


CHANNEL 5 POS#1 CHEST Y
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

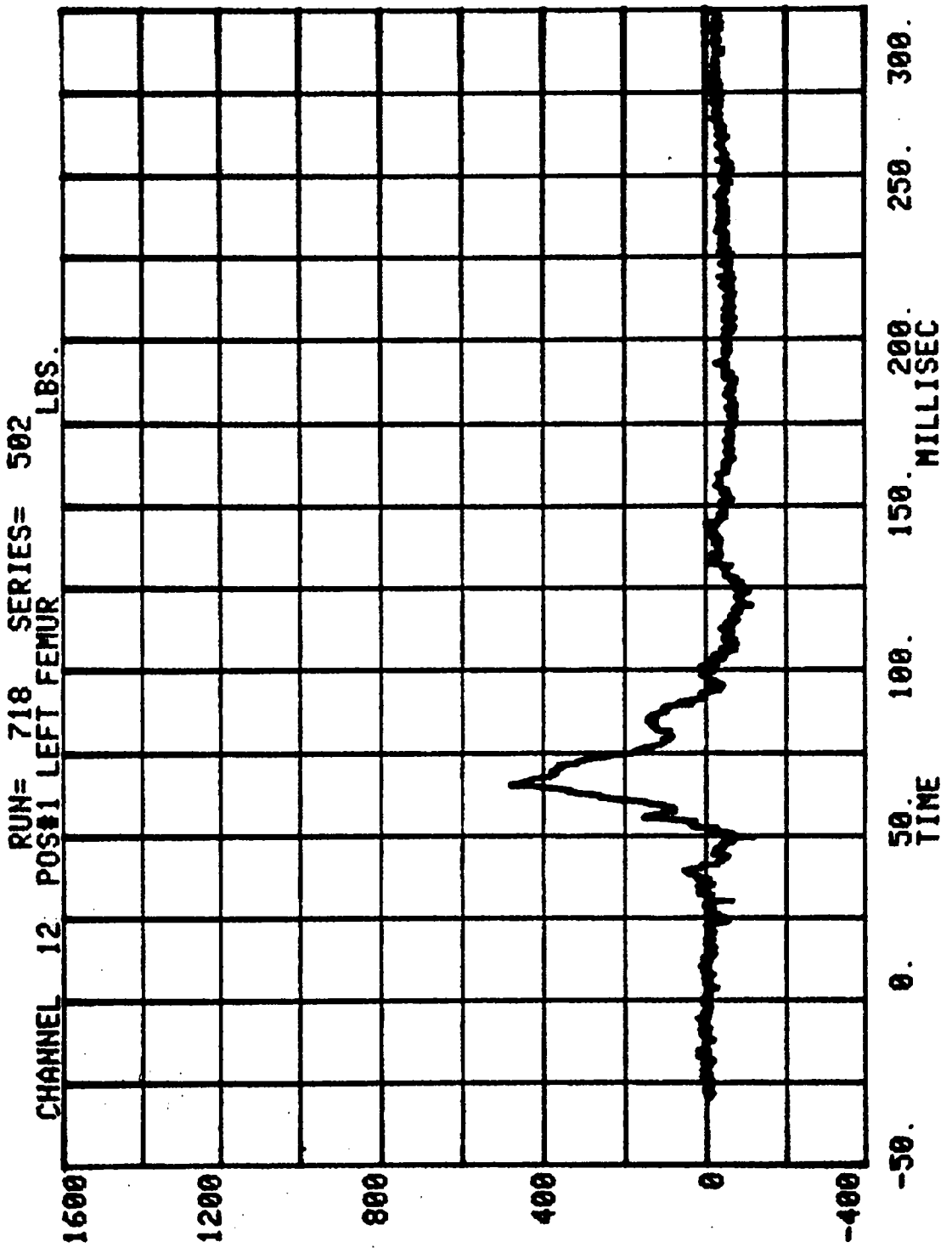
7457-10


CHANNEL 6 POS#1 CHEST Z
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


CHANNEL 2 POS#1 CHEST R
RUN= 718 SERIES= 502
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10


CHANNEL 12 POS#1 LEFT FEMUR
RUN= 718 SERIES= 502
LBS.
1600
1200
800
400
0
-400
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

HEAD INJURY CRITERION
HEAD SEVERITY INDEX

NEW CAR ASSESSMENT BARRIER TESTS - 1986

RUN= 718

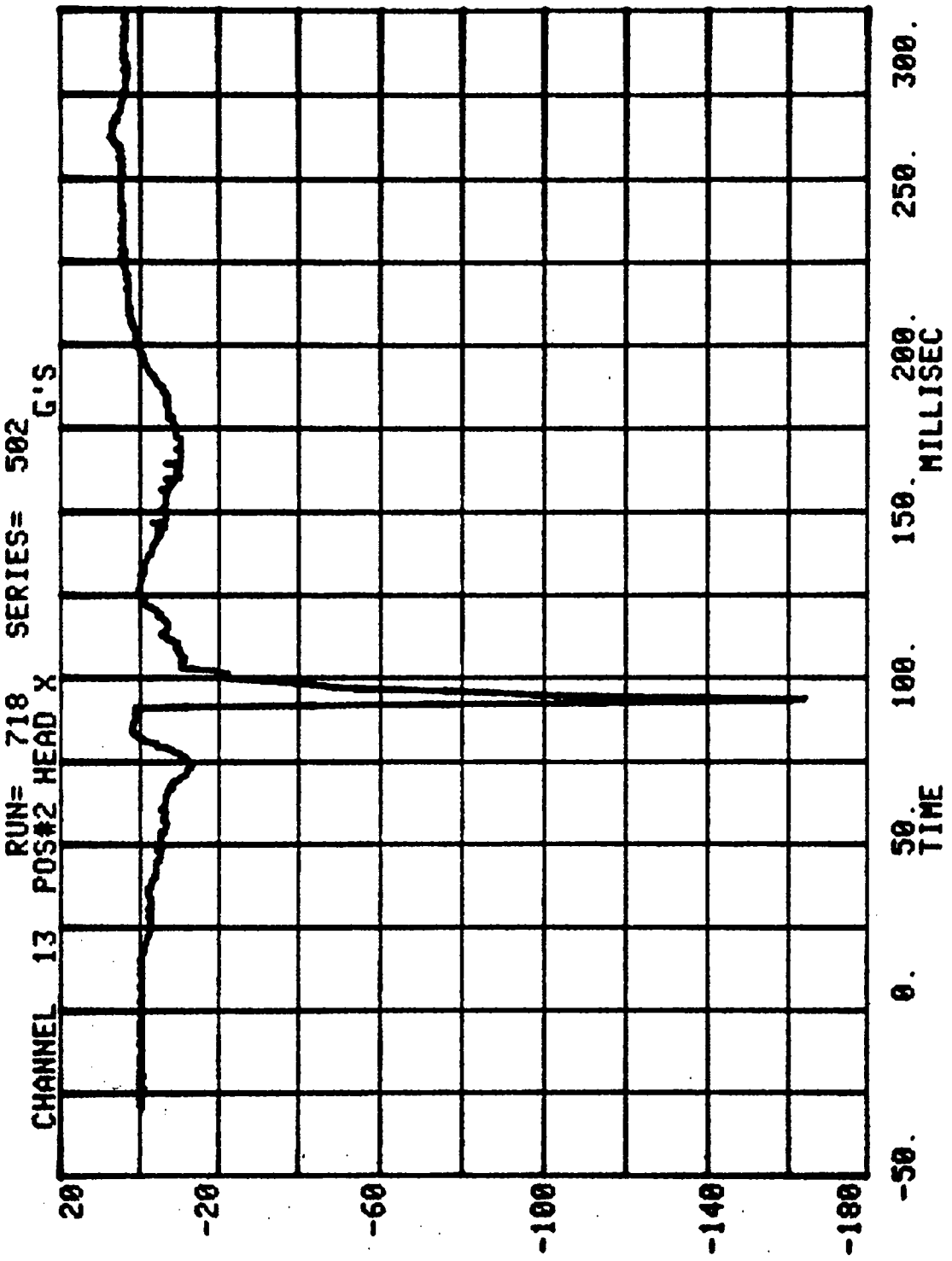
POS#2 HEAD R

HIC=1442.7 FROM T1= .09217 TO T2= .09742

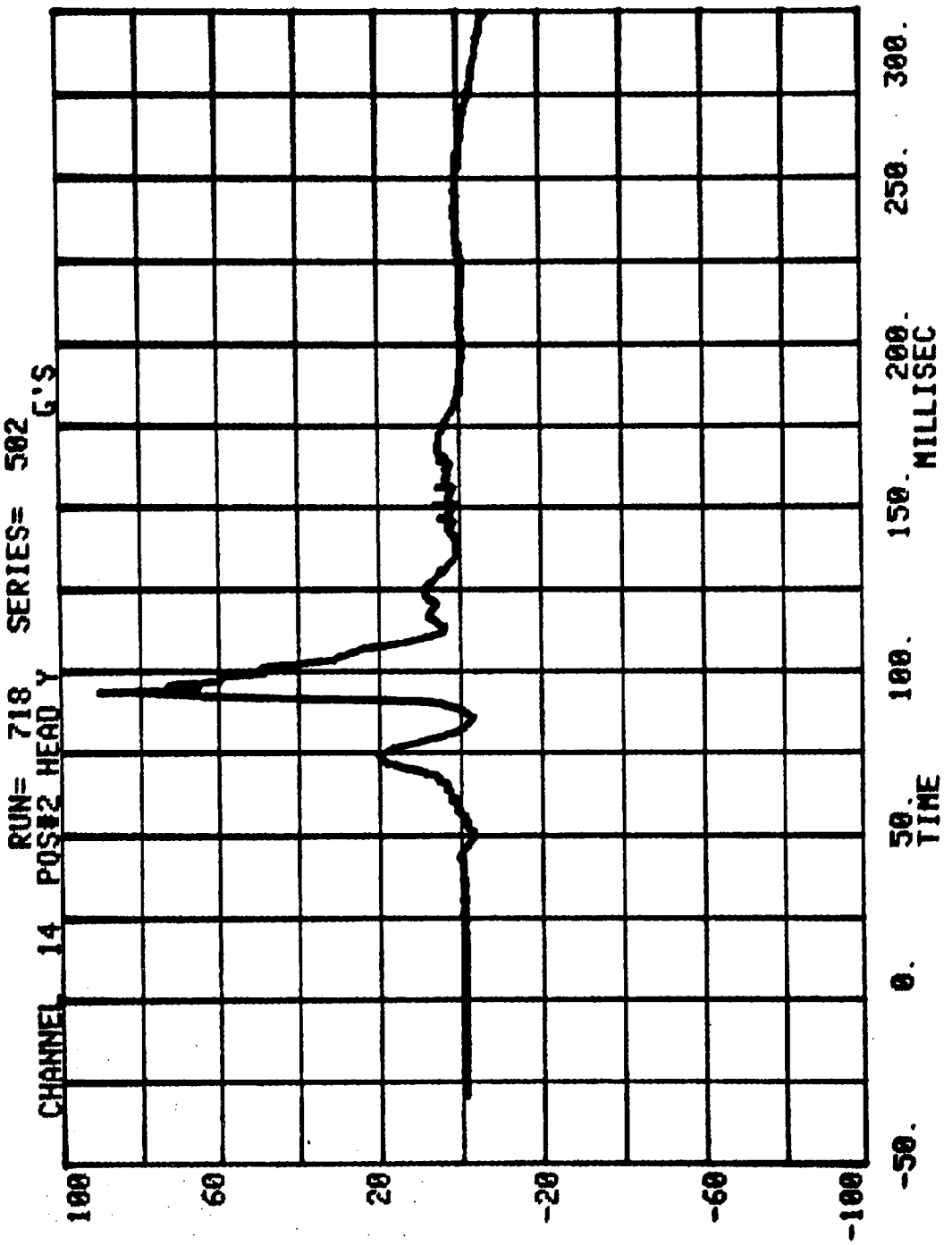
AVERAGE ACCELERATION BETWEEN T1 AND T2= 149.8G'S

EVENT TIME= 300.0 MSEC

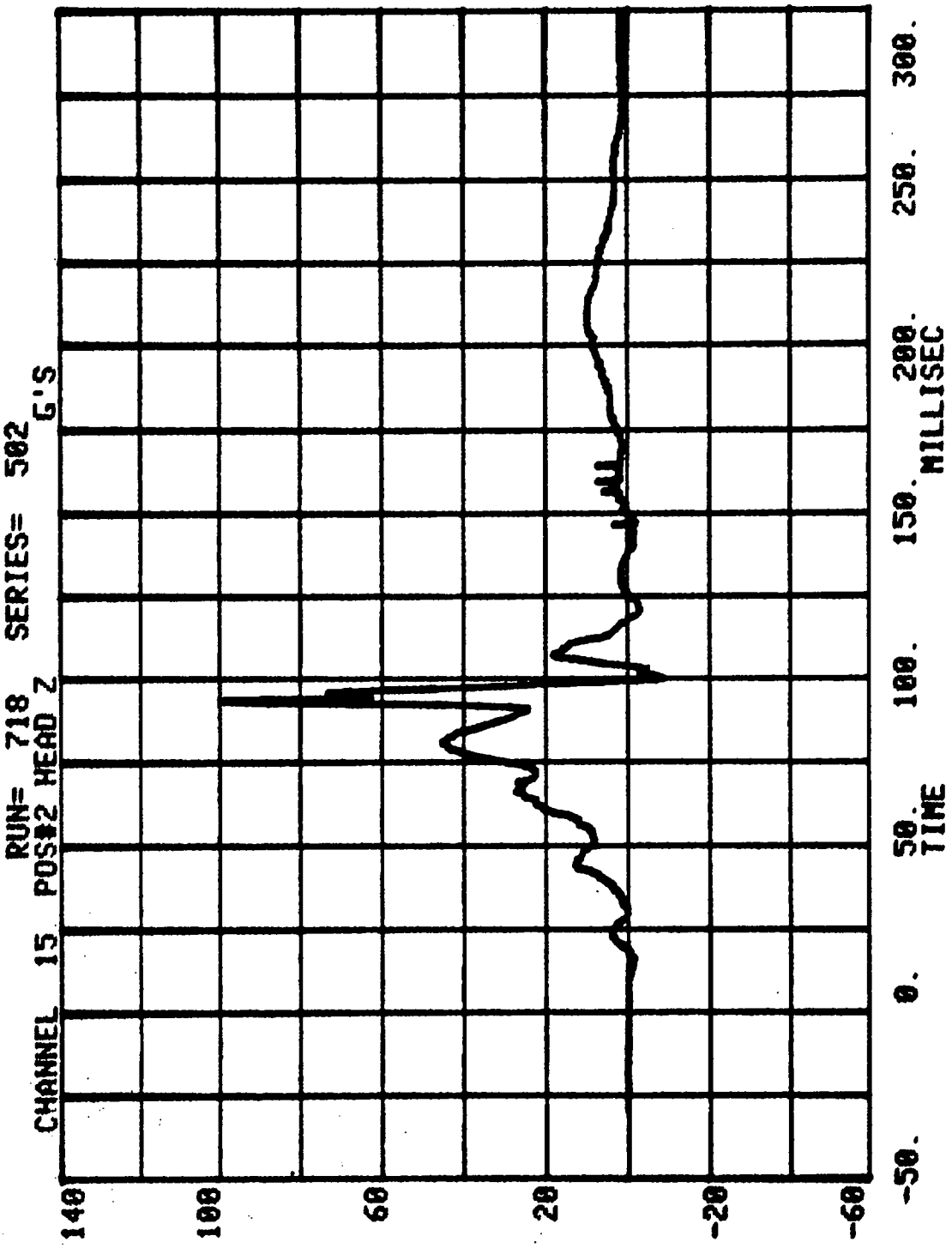
SEVERITY INDEX=2090.2


CHANNEL 13 POS#2 HEAD X
RUN= 718 SERIES= 502
G'S
20
-20
-60
-100
-140
-180
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

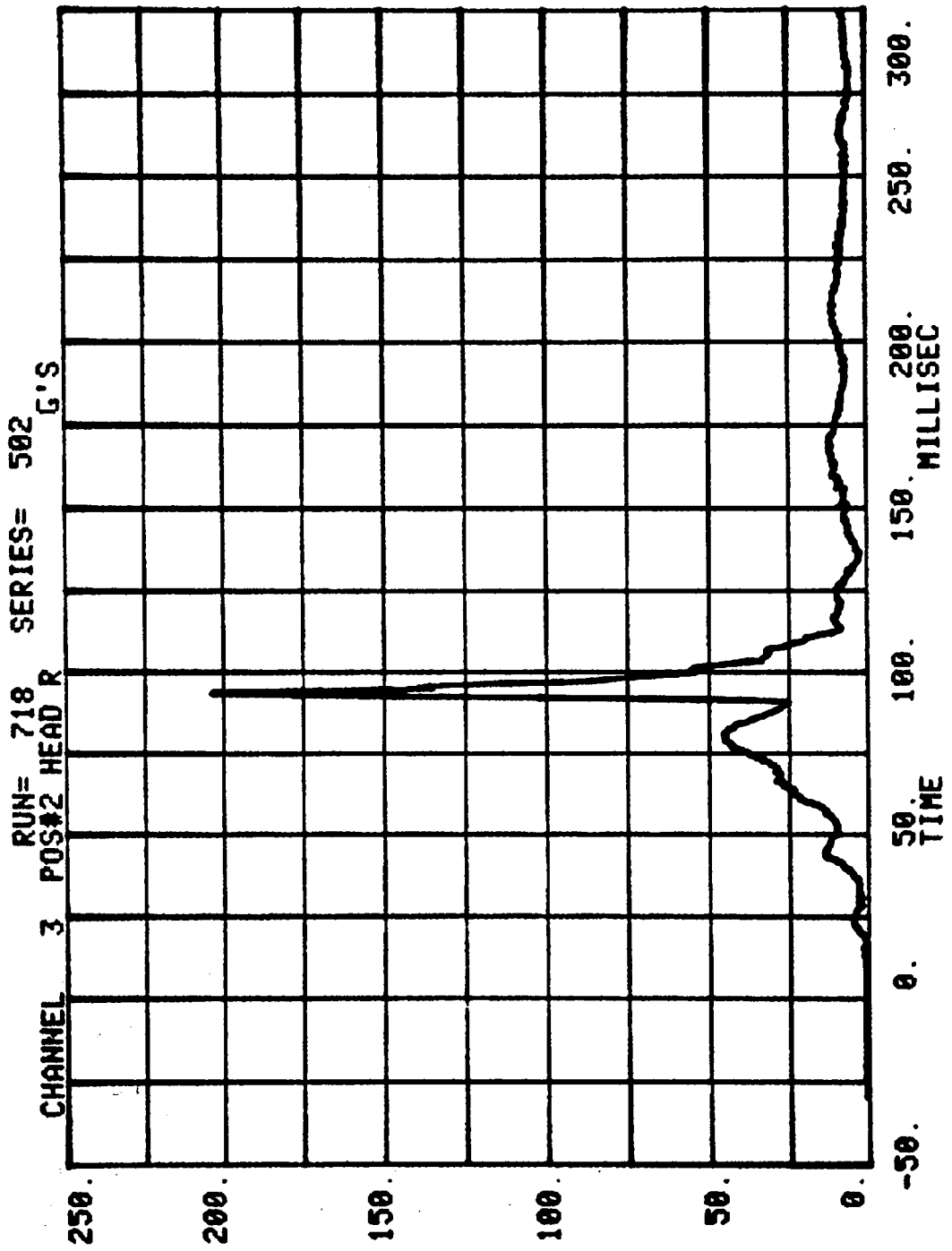
7457-10


CHANNEL 14 POS#2 HEAD Y
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

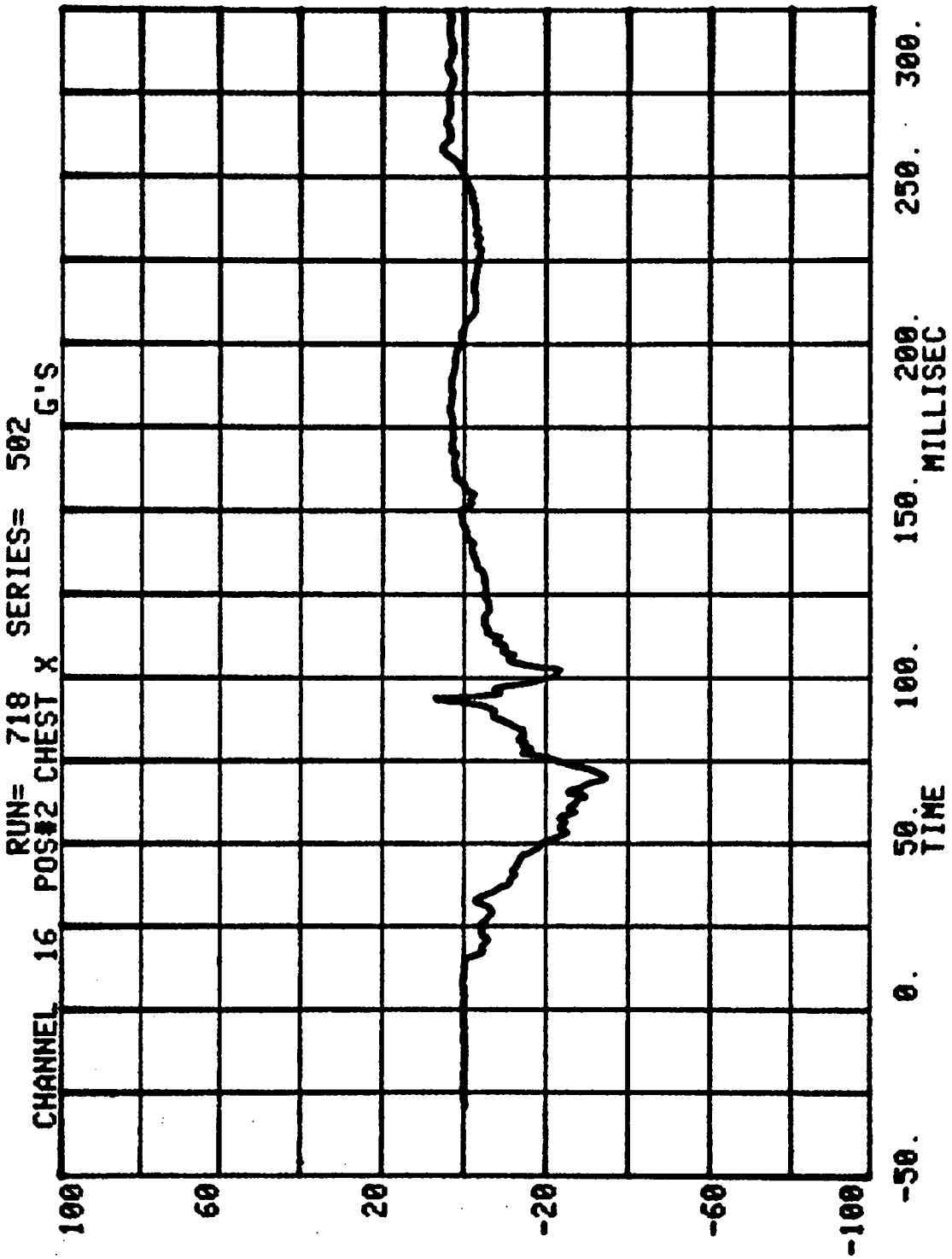
7457-10


CHANNEL 15 POS#2 HEAD Z
RUN= 718 SERIES= 502
G'S
140
100
60
20
-20
-60
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

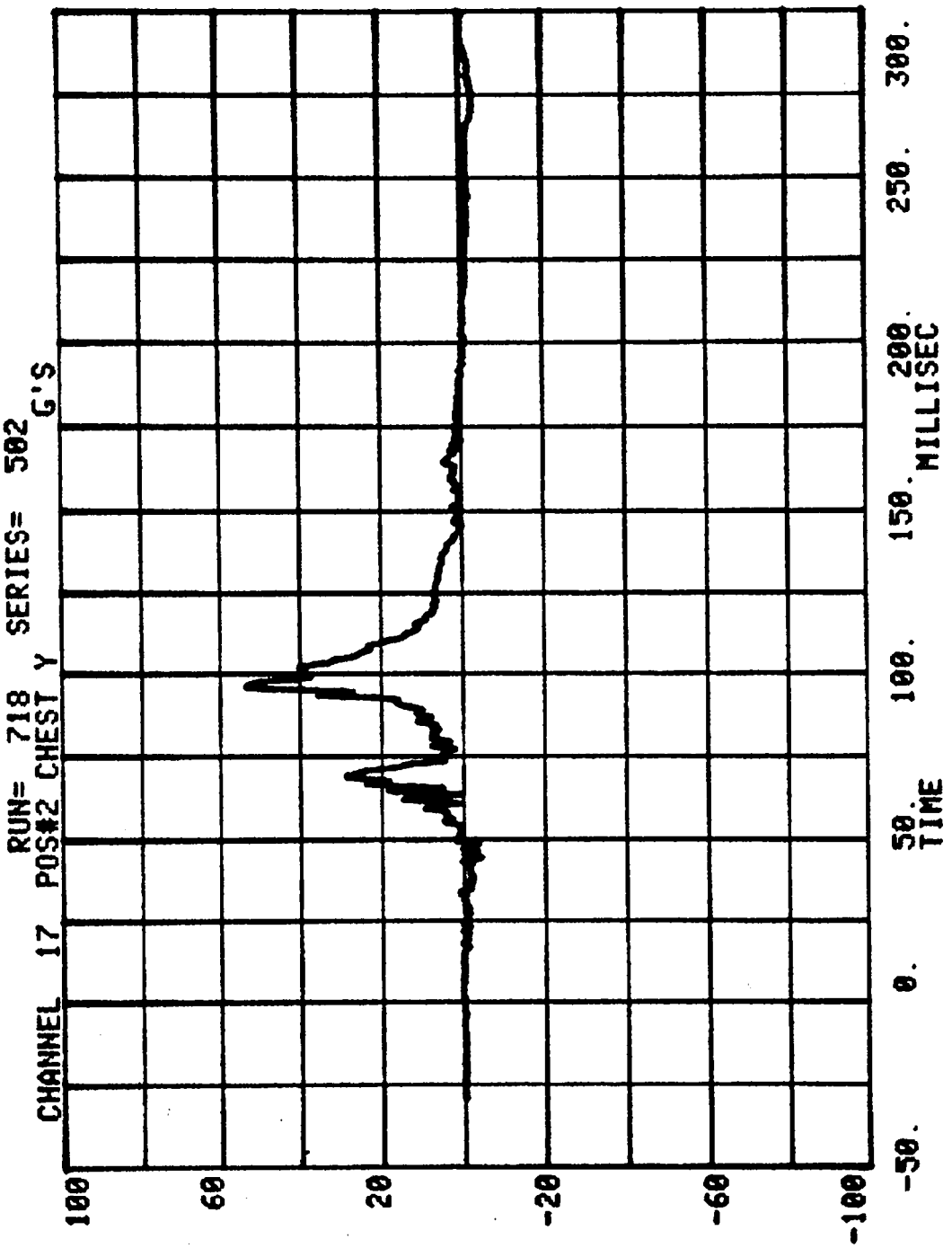
7457-10

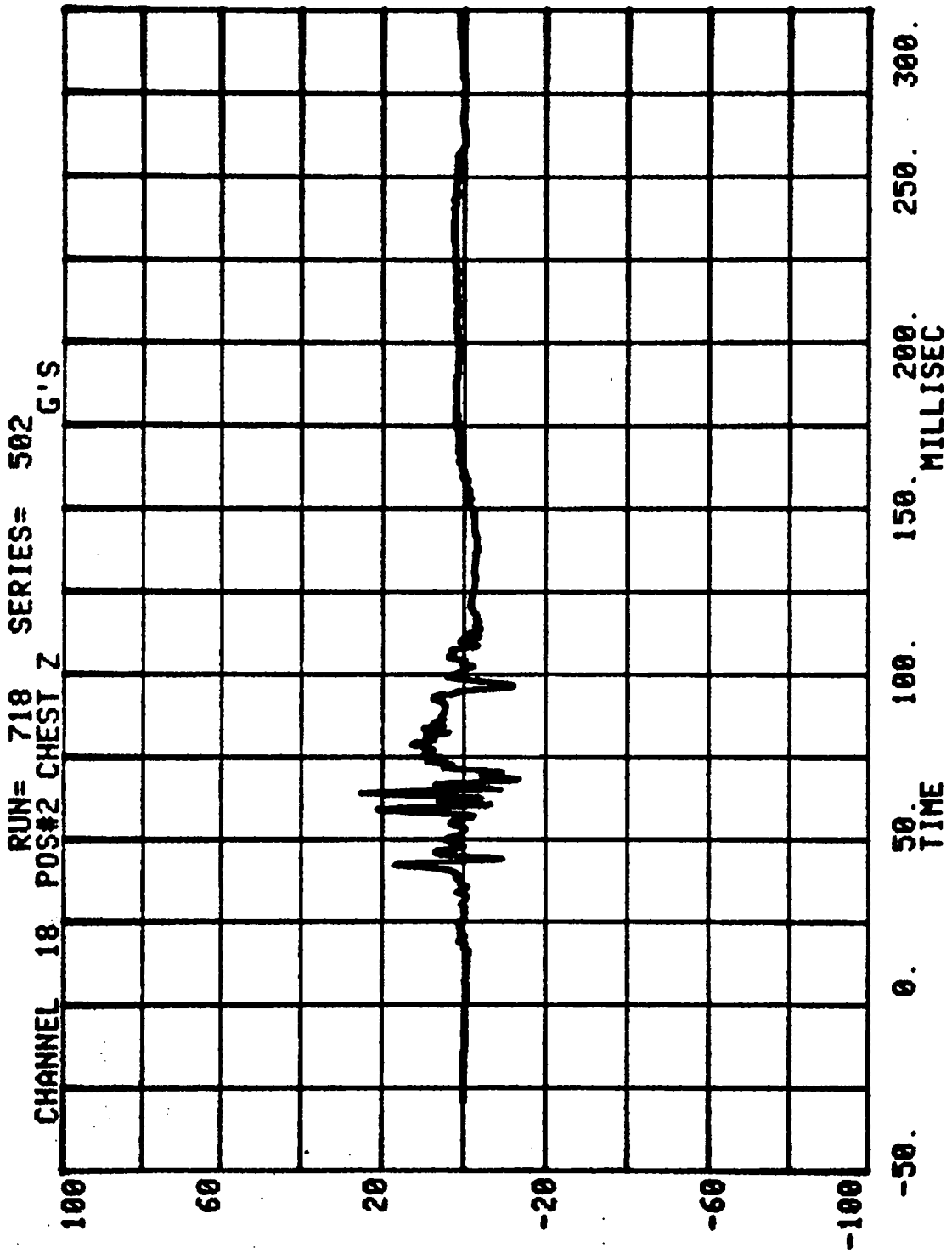

CHANNEL 3 RUN= 718 SERIES= 502
POS#2 HEAD R G'S
250.
200.
150.
100.
50.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

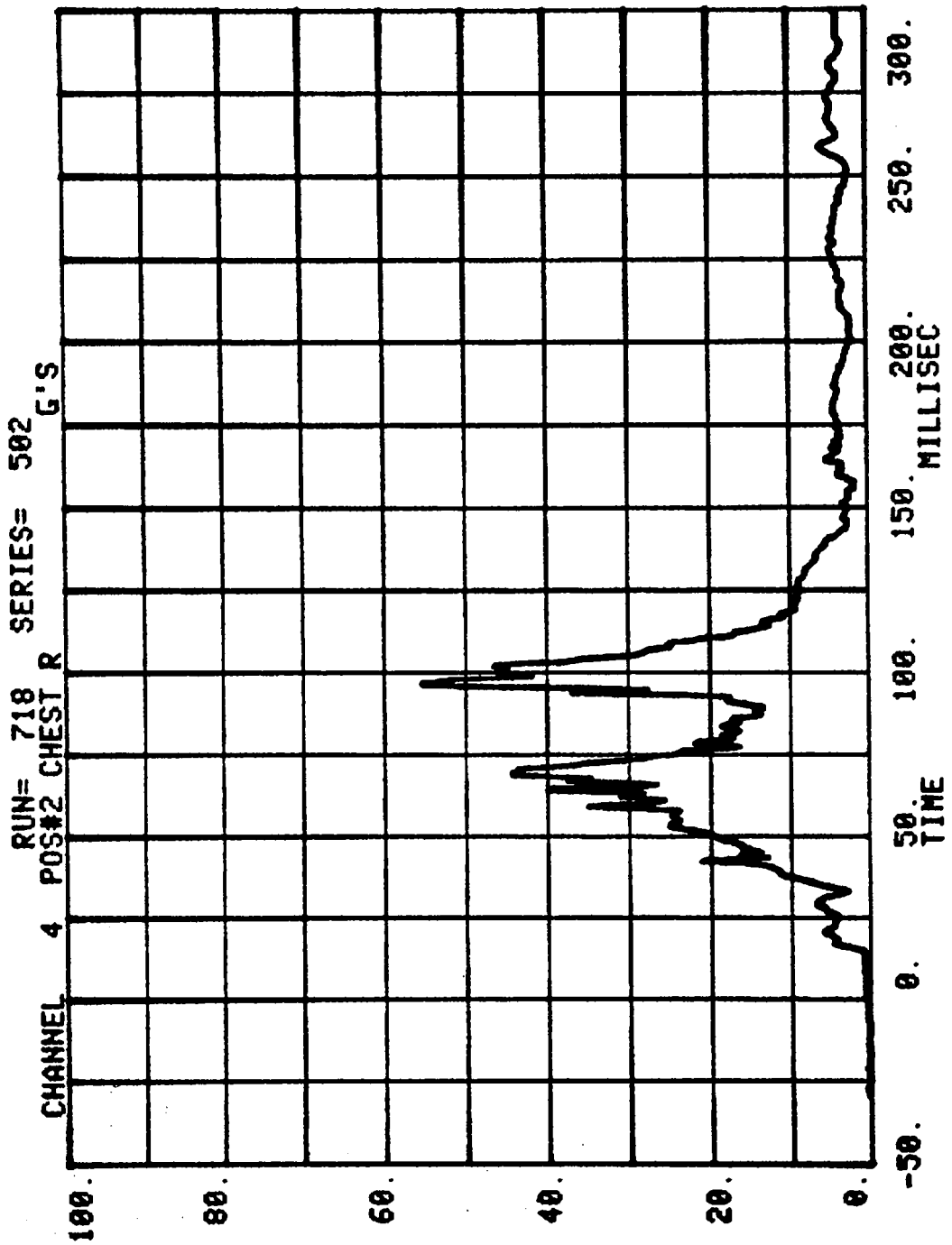
7457-10

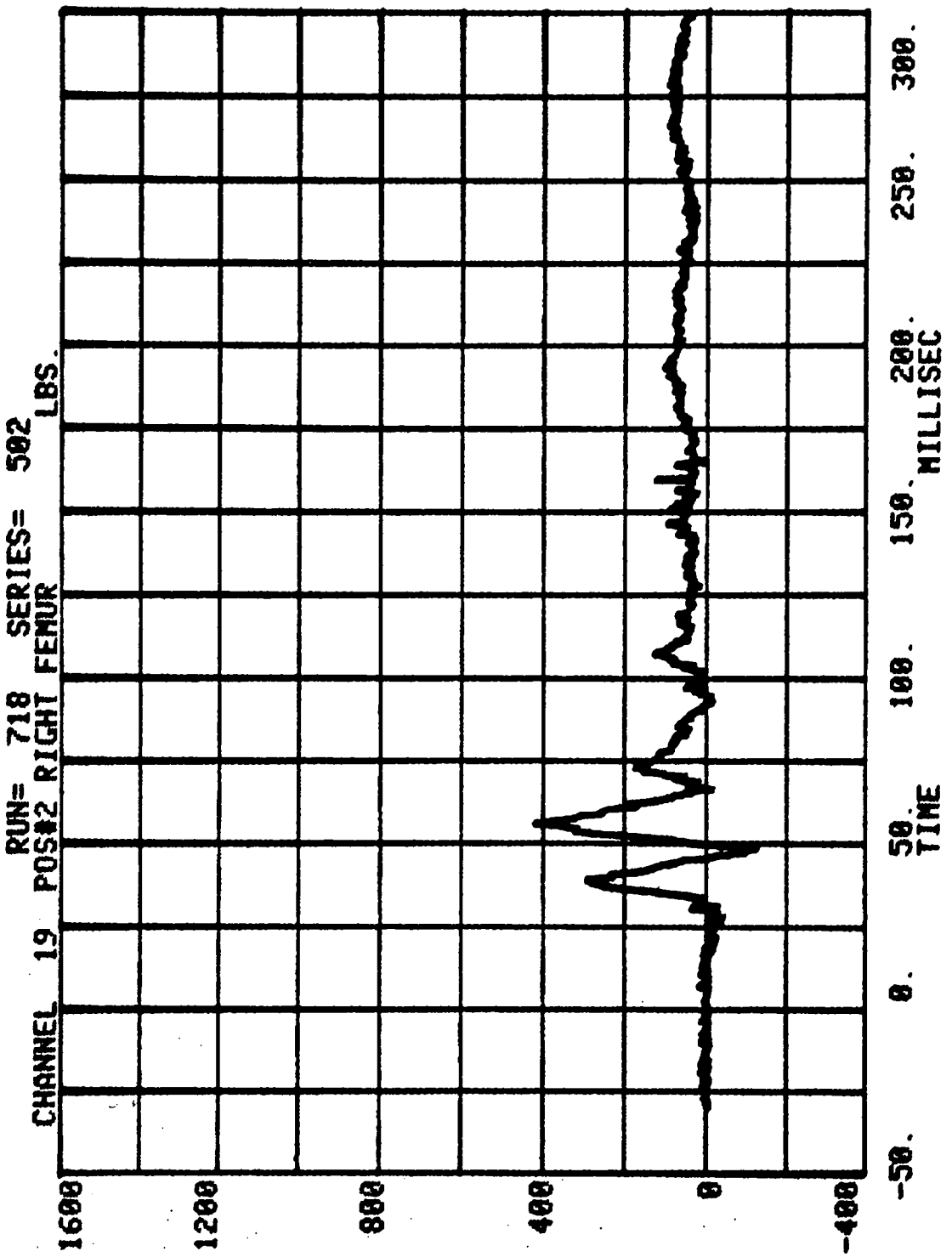

CHANNEL 16 POS#2 CHEST X
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

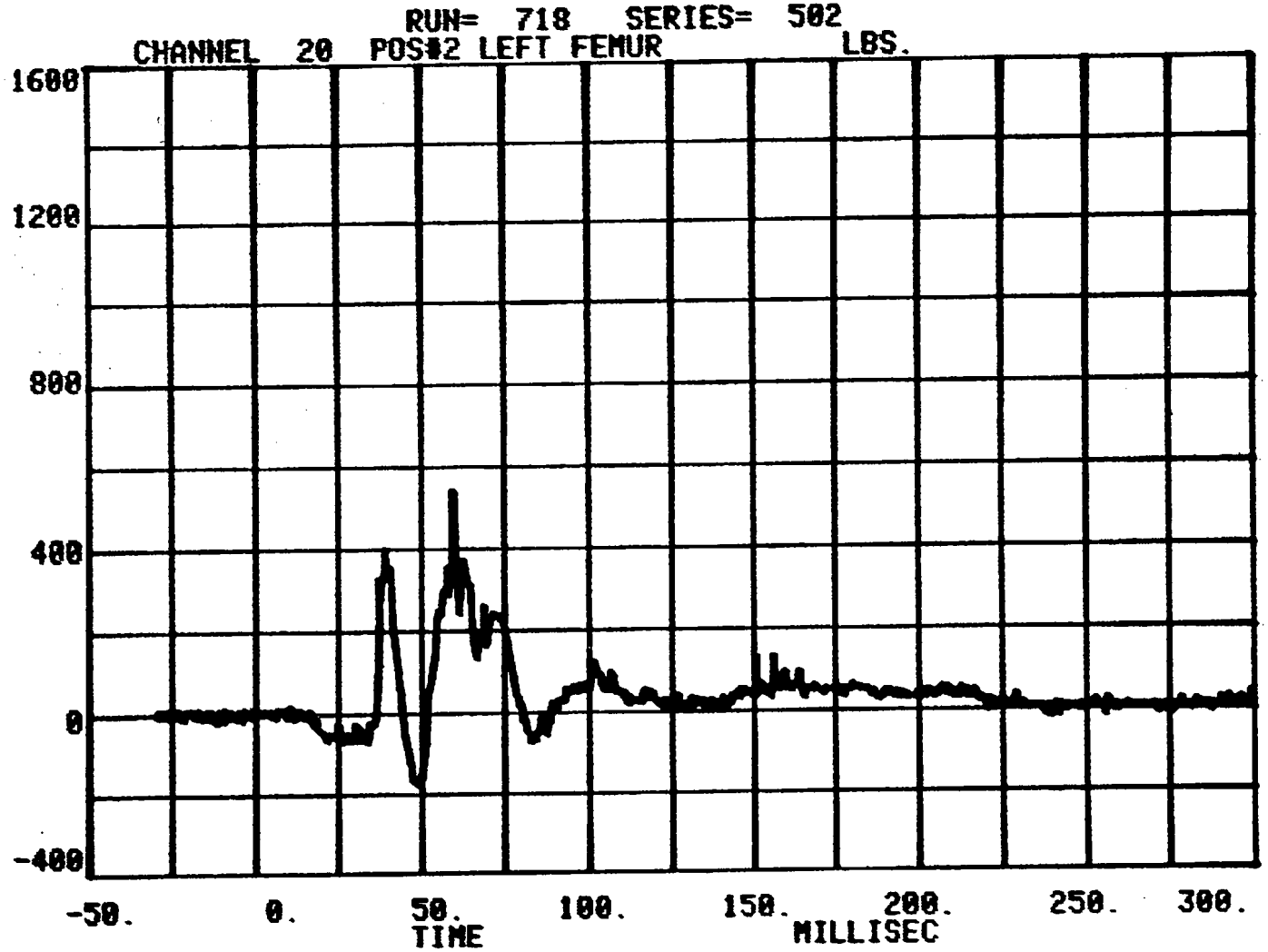
7457-10


CHANNEL 17 POS#2 CHEST Y
RUN= 718 SERIES= 502
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 18 RUN= 718 SERIES= 502
POS#2 CHEST Z G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC


CHANNEL 4 RUN= 718 SERIES= 502
POS#2 CHEST R
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= 718 SERIES= 502
LBS.
1600
1200
800
400
0
-400
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 718 SERIES= 502
CHANNEL 20 POS#2 LEFT FEMUR
LBS.
1600
1200
800
400
0
-400
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7457-10

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
1021	2-27-86
1022	2-27-86

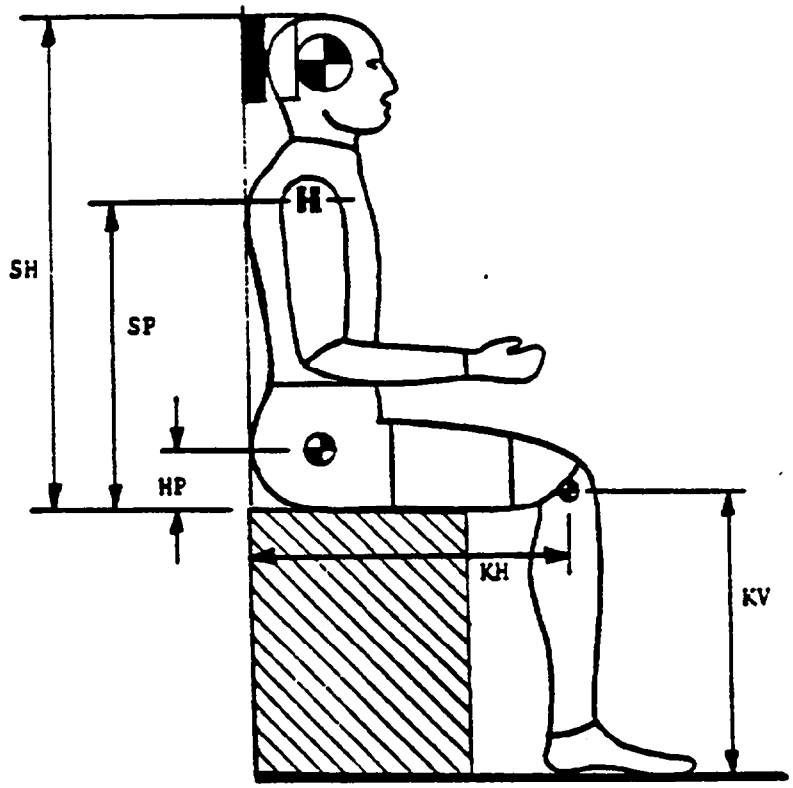
Electronic Test Equipment

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.: 1021

I. CONFIGURATION VERIFICATION DATA:



	P.572 SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
DATE OF CONFIGURATION VERIFICATION		2-27-86	
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"	20.6 "	
KV - Knee Pivot from floor- - - -	19.3 to 19.9"	19.7 "	
SW - Shoulder Width - - - - - - -	17.8 to 18.4"	17.9 "	
HW - Hip Width- - - - - - - - - -	14.0 to 15.4"	15.1 "	

TECHNICIAN'S NAME: DWH

* 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: DWH

			PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION----------			2-25-86	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY*------			1	
VERIF. LAB. TEMPERATURE (66 to 78°F Range)-----			68-70 °F.	°F.
VERIF. LAB. HUMIDITY (10 to 70% Range)			18-30 %	%
TEST PARAMETER		SPECIFICATION		
1. HEAD DROP TEST--				
a. Peak Resultant Accel.-		210 to 260G	210g	
b. Peak Lateral Accel.- -		≤ - 10G	4.8g	
c. Time above 100G- - - -		0.9 to 1.5ms	1.15 ms	
2. NECK BENDING TEST--				
a. Pendulum Speed - - - -		21.5 to 25.5 fps	22.9 fps	
b. Pend. Avg. Decel. over $t_3 - t_2$		20 to 24G	24.0g	
c. Peak Resultant Head Acceleration - - - - -		26G max.	25.1 g	
d. Pendulum Decel.(t_2-t_1)		≤ - 3ms	3.0 ms	
e. Pendulum Decel.(t_3-t_2)		25 to 30 ms	25.4 ms	
f. Pendulum Decel.(t_4-t_3)		≤ - 10ms	3.5 ms	
g. Max. Head Rotation - -		63 to 73°	66°	
h. Chordal Displacement-- Head Rotation Angle-				
0°	Time- -	-2 to 2 ms	0.0 ms	
	Displ.-	-.5 to .5"	0.0"	
30°	Time- -	25.6 to 34.4ms	28.7 ms	
	Displ.-	2.1 to 3.1"	3.0"	
60°	Time- -	40.3 to 51.7ms	44 ms	
	Displ.-	4.3 to 5.3"	4.9"	
Maximum (66 °)	Time- -	53.2 to 66.8ms	58 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: DWH

TEST PARAMETER		SPECIFICATION	Pre-Test (if required)	Post-Test (if required)
2. NECK BENDING TEST.... Continued:				
b. Chordal Displacement:				
Head Rotation Angle--				
60°	Time	67.0 to 83.0 ms	69 ms	
	Displ.	4.3 to 5.3 in.	4.9"	
30°	Time	85.4 to 104.6 ms	83.2 ms	
	Displ.	2.1 to 3.1 in.	3.1"	
0°	Time	101.0 to 123.0 ms	104.6 ms	
	Displ.	-.5 to 0.5 in.	0.0"	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ .5" - - - - -		23 to 36 lbs.	25#	
b. Force @ .75" - - - - -		36 to 50 lbs.	38.5#	
c. Force @ 1.0" - - - - -		50 to 63 lbs.	56#	
d. Force @ 1.3" - - - - -		73 to 88 lbs.	80.5#	
4. LUMBAR FLEXION TEST:				
a. Force @ 20°- - - - - -		22 to 34 lbs.	30.5#	
b. Force @ 30°- - - - - -		34 to 46 lbs.	39#	
c. Force @ 40°- - - - - -		46 to 58 lbs.	49.5#	
d. Return Angle - - - - -		12° maximum	9°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed- - -		21.78-22.22 fps	22.19 fps	
(2) Peak Deflection-		1.7" maximum	1.69"	
(3) Peak Resistive Force- - - - - -		2250 lbs. maximum	2132#	
(4) Internal Hysteresis - - -		50 to 70%	53.5%	
b. Low Speed				
(1) Probe Speed- - -		13.86-14.14 fps	13.98 fps	
(2) Peak Deflection-		1.1" maximum	.82"	
(3) Peak Resistive Force- - - - - -		1450 lbs. maximum	1170#	
(4) Internal Hyster.		50 to 70%	56.3%	

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

II. PERFORMANCE VERIFICATION DATA (Continued) NHTSA DUMMY I.D. NO.: 1021

TECHNICIAN'S NAME: DWH

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	7.03 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2420#	
(3) Time Above 1000#-	1.7 ms minimum	1.88 ms	
b. Left Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.00 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2190#	
(3) Time Above 1000#-	1.7 ms minimum	1.76 ms	

REMARKS:

INSTRUMENT CALIBRATION INFORMATION

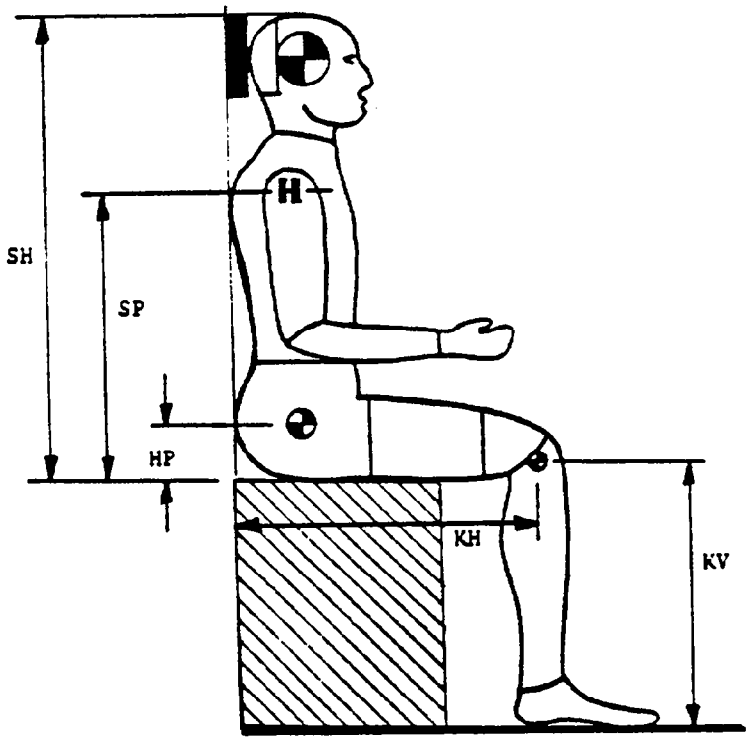
IHTSA DUMMY ID NO. 1021 CALIB. SEQ. NOS. FOR DUMMY: 1

	MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
A. DUMMY INSTRUMENTS:				
1. Head Accelerometers --				
a. Triaxial unit - - - - -	NA	--	--	--
b. Uniaxial units				
(1) Longitudinal (A_x) -	Endevco	CH83	10-85	4-86
(2) Lateral (A_y) - - -	Endevco	CU62	10-85	4-86
(3) Vertical (A_z) - - -	Endevco	CM86	10-85	4-86
2. Chest Accelerometers -- (Vehicle Crash Test Usage)				
a. Triaxial unit - - - - -	NA	--	--	--
b. Uniaxial units				
(1) Longitudinal (A_x) -	CEC	A91	10-85	4-86
(2) Lateral (A_y) - - -	Endevco	CE76	10-85	4-86
(3) Vertical (A_z) - - -	CEC	A72	10-85	4-86
3. Chest Potentiometer - - -				
4. Femur Load Cells --				
a. Right Side - - - - - -	GSE	306	11-85	5-86
b. Left Side - - - - - -	GSE	310	12-85	6-86
B. CALIB. LAB. INSTRUMENTS:				
1. Pendulum Accelerometer - - -	CEC	18259	3-86	9-86
2. Test Probe Accelerometer - - -	CEC	17815	3-86	9-86
3. Lumbar Flexion Test Push Force Gauge - - - - - - - - -	Transducer Inc.	20051	11-85	5-86
4. Abdominal Compression Test Force Gauge - - - - - - - - -	CLH	72952	11-85	5-86
5. Abdominal Compression Test Displacement Gauge - - - - -	CIC	567-11	11-85	5-86

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NO.: 10 2 2

I. CONFIGURATION VERIFICATION DATA:



	P.572 SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
DATE OF CONFIGURATION VERIFICATION		2-27-86	
VERIFICATION NUMBER FOR DUMMY*		1	
SH - Seated Height- - - - - - - -	35.6 to 35.8"	35.7"	
SP - Shoulder Pivot Height- - - -	21.8 to 22.4"	22.2"	
HP - Hip Pivot Height - - - - - -	3.9" ref.	3.9"ref.	
KH - Knee Pivot from back line- -	20.1 to 20.7"	20.5"	
KV - Knee Pivot from floor- - - -	19.3 to 19.9"	19.7"	
SW - Shoulder Width - - - - - - -	17.8 to 18.4"	18.1"	
HW - Hip Width- - - - - - - - - -	14.0 to 15.4"	15.2"	

TECHNICIAN'S NAME: DWH

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

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

II. PERFORMANCE VERIFICATION DATA:

NHTSA DUMMY I.D. NO.: 1022

TECHNICIAN'S NAME: DWH

			PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION----------			2-25-86	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY*------			1	
VERIF. LAB. TEMPERATURE (66 to 78°F Range)-----			68-70 °F.	°F.
VERIF. LAB. HUMIDITY (10 to 70% Range)			18-29 %	%
TEST PARAMETER		SPECIFICATION		
1. HEAD DROP TEST--				
a. Peak Resultant Accel.-		210 to 260G	255g	
b. Peak Lateral Accel.- -		≤ - 10G	4g	
c. Time above 100G- - - -		0.9 to 1.5ms	1.12 ms	
2. NECK BENDING TEST--				
a. Pendulum Speed - - - -		21.5 to 25.5 fps	23.1 fps	
b. Pend. Avg. Decel. over $t_3 - t_2$		20 to 24G	24g	
c. Peak Resultant Head Acceleration - - - - -		26G max.	25.0 g	
d. Pendulum Decel.(t_2-t_1)		≤ - 3ms	3 ms	
e. Pendulum Decel.(t_3-t_2)		25 to 30 ms	26 ms	
f. Pendulum Decel.(t_4-t_3)		≤ - 10ms	3.7 ms	
g. Max. Head Rotation - -		63 to 73°	68°	
h. Chordal Displacement-- Head Rotation Angle-				
0°	Time- -	-2 to 2 ms	0.0 ms	
	Displ.-	-.5 to .5"	0.0"	
30°	Time- -	25.6 to 34.4ms	28.1 ms	
	Displ.-	2.1 to 3.1"	3.1"	
60°	Time- -	40.3 to 51.7ms	43.3 ms	
	Displ.-	4.3 to 5.3"	5.2"	
Maximum (68 °)	Time- -	53.2 to 66.8ms	57.4 ms	
	Displ.-	5.0 to 6.0"	5.7"	

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

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

II. PERFORMANCE VERIFICATION DATA (Continued) NHTSA DUMMY I.D. NO.: 1022

TECHNICIAN'S NAME: DWH

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	70 ms	
	Displ.	4.3 to 5.3 in.	5.0"	
30°	Time	85.4 to 104.6 ms	88.9 ms	
	Displ.	2.1 to 3.1 in.	2.6"	
0°	Time	101.0 to 123.0 ms	104.7 ms	
	Displ.	-.5 to 0.5 in.	0.0"	
3. ABDOMINAL COMPRESSION TEST: (Preload = 10 pounds)				
a. Force @ .5" - - - - -		23 to 36 lbs.	25.5#	
b. Force @ .75" - - - - -		36 to 50 lbs.	38.5#	
c. Force @ 1.0" - - - - -		50 to 63 lbs.	54.5#	
d. Force @ 1.3" - - - - -		73 to 88 lbs.	84#	
4. LUMBAR FLEXION TEST:				
a. Force @ 20°- - - - -		22 to 34 lbs.	28#	
b. Force @ 30°- - - - -		34 to 46 lbs.	38.5#	
c. Force @ 40°- - - - -		46 to 58 lbs.	47#	
d. Return Angle - - - -		12° maximum	8°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed- - -		21.78-22.22 fps	21.9 fps	
(2) Peak Deflection-		1.7" maximum	1.63"	
(3) Peak Resistive Force- - - - - -		2250 lbs. maximum	2080#	
(4) Internal Hysteresis - - -		50 to 70%	70%	
b. Low Speed				
(1) Probe Speed- - -		13.86-14.14 fps	13.9 fps	
(2) Peak Deflection-		1.1" maximum	1.08	
(3) Peak Resistive Force- - - - - -		1450 lbs. maximum	806#	
(4) Internal Hyster.		50 to 70%	53.0	

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

II. PERFORMANCE VERIFICATION DATA (Continued) NHTSA DUMMY I.D. NO.: 1022

TECHNICIAN'S NAME: DWH

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	7.04 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2450#	
(3) Time Above 1000#-	1.7 ms minimum	1.84 ms	
b. Left Side--			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.91 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2190#	
(3) Time Above 1000#-	1.7 ms minimum	1.8 ms	

REMARKS:

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1022 CALIB. SEQ. NOS. FOR DUMMY: 1

	MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
A. DUMMY INSTRUMENTS:				
1. Head Accelerometers --				
a. Triaxial unit - - - - -	NA	--	--	--
b. Uniaxial units				
(1) Longitudinal (A_x) -	Endevco	DB47	10-85	4-86
(2) Lateral (A_y) - - -	Endevco	CX05	10-85	4-86
(3) Vertical (A_z) - - -	Endevco	CJ54	10-85	4-86
2. Chest Accelerometers -- (Vehicle Crash Test Usage)				
a. Triaxial unit - - - - -	NA	--	--	--
b. Uniaxial units				
(1) Longitudinal (A_x) -	CEC	A115	9-85	3-86
(2) Lateral (A_y) - - -	Endevco	CS09	10-85	4-86
(3) Vertical (A_z) - - -	CEC	A29	9-85	3-86
3. Chest Potentiometer - - -	NA	--	--	--
4. Femur Load Cells --				
a. Right Side - - - - - -	GSE	75	11-85	5-86
b. Left Side - - - - - -	GSE	74	11-85	5-86
B. CALIB. LAB. INSTRUMENTS:				
1. Pendulum Accelerometer - - -	CEC	18259	3-86	9-86
2. Test Probe Accelerometer - - -	CEC	17815	3-86	9-86
3. Lumbar Flexion Test Push Force Gauge - - - - - - - - -	Transducer Inc.	20051	11-85	5-86
4. Abdominal Compression Test Force Gauge - - - - - - - - -	BLH	72952	11-85	5-86
5. Abdominal Compression Test Displacement Gauge - - - - -	CIC	567-11	11-85	5-86

APPENDIX D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

Seat belts

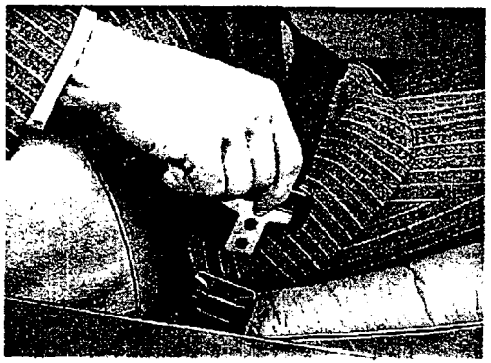
Seat belts should be worn at all times. Contrary to popular belief, research has established that it is equally dangerous for rear-seat passengers not to wear seat belts. In the event of a collision, unrestrained rear-seat passengers are thrown violently forward against the front-seat backrests. This doubles the force put on the front-seat occupants and seat belts, frequently resulting in injury to all the occupants. Each belt may only be worn by one person at a time. The front-seat belts are equipped with automatic belt tensioners which will tension the belt in a head-on collision. Side and rear collisions, overturning and minor indentation will normally not activate the seat belt pretensioner. The device contains a small explosive charge which is fired by a signal from a sensor. The belt tensioner must be replaced by your Saab dealer after the explosive charge has been fired or if the device has been damaged. The belt tensioner must be inspected by an authorized Saab dealer during the year specified on the label located at the bottom of the door pillar.

WARNING!
All service and repair work on the seat belt pretensioner system must be performed by an authorized Saab dealer. In case of change of ownership or scrapping of the car, the new owner or the scrapping firm respectively must pay attention to the safety instructions regarding seat belt pretensioners, which are classified as pyrotechnical goods. The safety instructions are available at your Saab dealer.

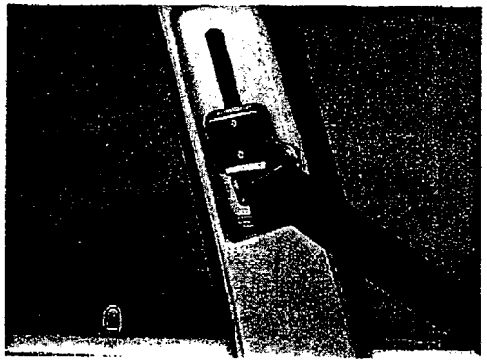
NOTE! Seat belts, properly worn, reduce the risk of serious occupant injury in an accident or emergency maneuver. Belt type restraints are provided at all seating positions. Use them for your comfort and protection.

Apart from the belt for the middle rear-seat passenger, the seat belts are of the inertia reel type. To fasten a seat belt, pull the strap gently out of the retractor and insert the buckle in the lock. Make sure that the buckle is properly secured. The bottom anchorage points for the front seat belts are fitted to the seats and therefore move with the seat when the legroom is being adjusted.

Front seat belt



Belt guide on door pillar



The height of the belt guide on the door pillar is adjustable. The guide should be as high as possible but not so high that the belt comes too close to the neck. To alter the height of the guide, squeeze the sliding piece as indicated by the arrows and move it to the desired position. Make sure that the guide is securely locked in the new position.

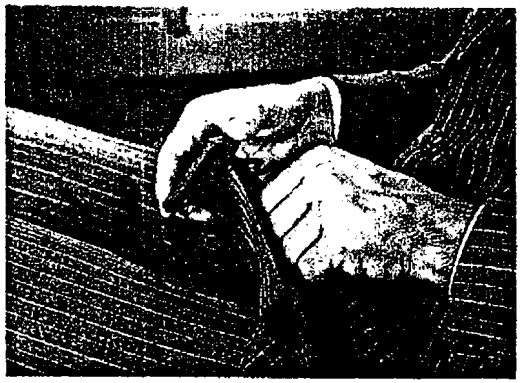
For maximum protection, the seat belt should be worn with the lap portion low across the hips and the top strap across the middle of the shoulder. Make sure that the belt is not twisted nor rubbing against any sharp edges. To release the buckle, press the red button marked PRESS.

NOTE! Expectant mothers should take care to fit the belt such that it does not apply pressure to the stomach. The lap portion should be as low as possible across the hips.

Most of the time when the belt is being worn the retractor will not be locked, thus allowing freedom of movement. However, the retractor will lock if the strap is jerked or withdrawn sharply, if the car is tilted at a steep angle, or if the car brakes hard or is involved in a collision.

The belt for the middle rear-seat passenger is of the lap-belt type and can be adjusted manually. If required, lengthen the belt before fastening it by holding the buckle at right angles to the strap and pulling the strap out. Tighten the belt by pulling the free end until the belt fits snugly against the body. To release the belt, press the red button on the buckle lock.

Lengthening the lap belt



Seat Belt Reminder System

This vehicle is equipped with a seat belt reminder system as required by Federal Motor Vehicle Safety Standard 208, Occupant Crash Protection. The purpose of this standard is to reduce the number and severity of traffic accident injuries by promoting increased usage of seat belt systems. The vehicle may be started whether or not the seat belts are fastened. A seat belt warning light on the overhead panel will glow for about 8 seconds. The audible buzzer will sound until this light goes out or until the front occupants' seat belts are fastened, whichever occurs first.

NOTE! Make sure that the belts do not become trapped when the rear-seat cushion is tipped forward or folded back.

Child safety

Holding your small child is not safe. Children under 5 years old and weighing less than 40 lbs. should be restrained in a suitable safety seat/restraint designed for that purpose. Follow seat manufacturer's instructions which are based on the size and weight of the child. If the child safety seat is designed to be restrained by a lap belt, use it in the center rear seating position. Restraining a child safety seat with a 3-point belt may require a special clip (contact the seat manufacturer) to restrict belt movement and prevent the seat from tipping over. Refer to the instructions to determine clip necessity and availability. Child seats with top tether straps are not recommended. For further information on child restraint systems for your car write to: U.S. Dept. of Transportation, Washington, D.C. 20590.

WARNING!

1. No alterations or additions should be made to this belt system.
2. The webbing must not be bleached or redyed.
3. Each belt is meant for one person only. The belts at outboard seating positions must be used as a lap/shoulder restraint only.
4. Fully reclining the seat back increases the risk of sliding under the seat belts in the event of a frontal collision.
5. If in doubt on any matter concerning restraints or their use, please consult your dealer.