REPORT NOS. 208-CAL-88-04
212-CAL-88-04
301-CAL-88-04

VEHICLE SAFETY COMPLIANCE TESTING FOR OCCUPANT CRASH PROTECTION, WINDSHIELD MOUNTING, WINDSHIELD ZONE INTRUSION (PARTIAL) AND FUEL SYSTEM INTEGRITY

ISUZU MOTORS LIMITED

1988 ISUZU IMPULSE

2-DOOR HATCHBACK

NHTSA NO. CJ5701

CALSPAN TEST NO. 7669-5

AUGUST 16, 1988

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
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BUFFALO, NEW YORK 14225

FINAL REPORT

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF VEHICLE SAFETY COMPLIANCE
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15. Supplementary Notes

16. Abstract

A 30 mph vehicle safety compliance test was conducted on a 1988 Isuzu Impulse 2-Door Hatchback. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on August 16, 1988.

The purpose of this test was to determine compliance with the performance requirements of the following Federal Motor Vehicle Safety Standards (FMVSS):

1. FMVSS No. 208, "Occupant Crash Protection"
2. FMVSS No. 212, "Windshield Mounting"
3. FMVSS No. 219 (partial), "Windshield Zone Intrusion"
4. FMVSS No. 301, "Fuel System Integrity"

The test mode was perpendicular (0°) and the impact velocity was 29.4 mph. The ambient temperature at the impact face was 79°F.

The subject test vehicle appears to comply with the requirements of FMVSS Nos. 208, 212, 219 (partial) and 301.

Type of Restraint System: The test vehicle was equipped with a 2-point automatic torso restraint in both the driver and passenger positions.

17. Key Words	18. Distribution Statement
30 mph Vehicle Safety Compliance Testing FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Mounting" FMVSS 219, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity" Frontal Impact	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 30 mph frontal barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208, 212, 219 (partial) and 301 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by Calspan Advanced Technology Center under Contract No. DTNH22-88-C-01038. The purpose of this test was to determine if the subject vehicle, a 1988 Isuzu Impulse 2-Door Hatchback, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS No. 212, "Windshield Mounting"; FMVSS No. 219 (partial), "Windshield Zone Intrusion"; and FMVSS No. 301, "Fuel System Integrity". This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-208-07.

Section 2

SUMMARY OF FRONTAL BARRIER IMPACT TEST CJ5701

A frontal barrier was impacted by a 1988 Isuzu Impulse 2-Door Hatchback at a velocity of 29.4 mph. The test was performed at the Calspan Corportion Advanced Technology Center on August 16, 1988. 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 14 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 Test Procedure.

Both ATDs were fully instrumented with head and chest triaxial accelerometers and right/left femur load cells. These ATDs had been certified prior to the test. The test vehicle was equipped with 4 restraint systems.

The 23 channels of data were recorded on two 14-channel FM tape recorders. Appendix B contains the vehicle and dummy response data traces.

The driver's HIC was 336. The maximum chest deceleration over 3 milliseconds was 37 g's and femur loads were 1066 and 1258 pounds.

The right-front passenger's HIC was 243. The maximum chest deceleration over 3 milliseconds was 32 g's and femur loads were 788 and 880 pounds.

TABLE 1

CRASH TEST SUMMARY

VEHICLE NHTSA NO.: CJ5701 TEST MODE: 30 mph Frontal Barrier

TEST DATE: 8/16/88 TIME: 11:35 TEMP: 79° F

VEHICLE MAKE/MODEL/BODY STYLE: 1988 Isuzu Impulse 2-Door Hatchback

VEHICLE TEST WEIGHT: 3350 lbs

VEHICLE/BARRIER IMPACT ANGLE: 0°

IMPACT VELOCITY: 29.4 mph

MAXIMUM STATIC CRUSH: 19.3"

VEHICLE REBOUND: 7.6"

DUMMIES:	DRIVER	PASSENGER
TYPE	Part 572 (S/N 1021)	Part 572 (S/N 1022)
RESTRAINT SYSTEM	2-Point Automatic Torso Belt	2-Point Automatic Torso Belt

NUMBER OF DATA CHANNELS: 23

NUMBER OF CAMERAS: 1 Real Time

14 High Speed

DOOR OPENING DATA: operable - Left Front

operable - Right Front

FRONT SEAT(S) DATA:	DRIVER	PASSENGER
Seat Track Failure -	None inches of shift	None
Seat Back Failure -	None	None

VISIBLE DUMMY CONTACT POINTS:	DRIVER	PASSENGER
Head	No contact	No contact
Chest	No contact	No contact
Knees	Dash & steering column	Dash

TABLE 2

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1988 Isuzu Impulse 2-Door Hatchback

NHTSA No. CJ5701 ; VIN JABBR07L5J7304077 ; Color: Brittany Blue

Engine Data: 4 cylinders; 138 CID; 2.3 Litres; 2300 cc

Placement X Longitudinal or In-Line; - Transverse or lateral

Transmission Data: 5 speeds; X Manual; - Automatic; - Overdrive

Final Drive: X Rear Wheel Drive; - Front Wheel Drive; - Four Wheel Drive

Major Options: X A/C; X Pwr Strg. X Pwr. Brakes X Pwr Windows

X Power Door Locks; Cruise Control

Date Received: 6-22-88 ; Odometer Reading - 199.6 miles

Selling Dealer: Dorschel Marketplace

& address 3399 West Henrietta Rd., Rochester, NY 14623

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Isuzu Motors Limited

Data of Manufacture: 9/87 ; VIN JABBR07L5J7304077

GVWR: 3723 lbs; GAWR: 1878 lbs FRONT

1867 lbs REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load 29 psi Front

29 psi Rear

Recommended Tire Size 205/60R14 87H Load Range Standard

Recommended Cold Tire Pressure 29 psi Front 29 psi Rear

Size of Tires on Test Vehicle 205/60R14 87H

Type of Spare Tire: X Space Saver; - Regular

Vehicle Capacity Data:

Type of Front Seats - Bench X Bucket - Split Bench

Number of Occupants 2 Front 2 Rear 4 Total

Vehicle Capacity Weight (VCW) = 725 lbs.

No. of Occupants x 150 lbs = 600 lbs.

Rated Cargo/Luggage Weight (RCLW)= 125 lbs. (Difference)

WEIGHT OF TEST VEHICLE AS RECEIVED AT LABORATORY (with maximum fluids):

Right Front =	810	lbs	Right Rear =	620	lbs
Left Front =	830	lbs	Left Rear =	650	lbs
TOTAL FRONT =	1640	lbs	TOTAL REAR =	1270	lbs
% of Total Weight =	56 %		% of Total Weight =	44 %	

TOTAL DELIVERED WEIGHT = 2910 lbs.

TABLE 2

GENERAL TEST & VEHICLE PARAMETER DATA (cont.)

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight	=	2910	lbs.
Rated Cargo/Luggage Weight (RCLW)	=	125	lbs.
Weight of 2 P.572 Dummies @ 164 ea.	=	328	lbs.
TARGET TEST WEIGHT	=	3363	lbs. (sum)

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 112 LBS OF CARGO WEIGHT:

Right Front = 880 lbs. Right Rear = 810 lbs.

Left Front = 870 lbs. Left Rear = 790 lbs.

TOTAL FRONT = 1750 lbs. TOTAL REAR = 1600 lbs.

% of Total Weight = 52 % % of Total Weight = 48 %

TOTAL TEST WEIGHT = 3350 lbs.

Weight of Ballast secured in vehicle's cargo area = 0 lbs.

Vehicle Components Removed for Weight Reduction None

TEST VEHICLE ATTITUDE: (all dimensions in inches)

AS DELIVERED RF 25.4 ; LF 25.2 ; RR 25.5 ; LR 25.9

FULLY LOADED RF 24.9 ; LF 24.6 ; RR 23.8 ; LR 24.2

AS TESTED RF 25.4 ; LF 25.2 ; RR 24.2 ; LR 24.2

Vehicle's Wheelbase = 96.1 inches

Location of Vehicle's C.G. = 45.9 inches rearward of front wheel centerline (if required)

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 15.1 gallons

Usable Capacity Figure Furnished by COTR = 14.5 gallons

Test Volume Range (92 to 94% of Usable Capacity) = 13.6 to 13.3 gallons

ACTUAL TEST VOLUME = 13.5 gallons (with entire fuel system filled)

Test Fluid Type: Stoddard Solution ; Spec. Grav. 0.764

Kinematic Viscosity = 0.96 centistokes; Color = Purple

Type of Fuel Pump: X Electric; - Manual/Mechanical

Does Electric Pump operate with ign. sw. "ON" & engine "OFF"? No (yes/no)

TABLE 3

POST-IMPACT DATA

TYPE OF TEST: X Frontal (0°) Impact; - Oblique (30°) Impact- - Left/ - Right

- Rear; - Lateral/Side - - Left/ - Right

TEST DATE: August 16, 1988 TIME: 11:35 TEMP: 79 °F

VEHICLE NHTSA NO.: CJ5701 ; VIN JABBRO7L5J7304077

REQUIRED IMPACT VELOCITY RANGE: 28.9 to 29.9 mph

BARRIER IMPACT VELOCITY: (speed traps within 5 feet of impact plane)

Trap No. 1 = 29.4 mph; Trap No. 2 = 29.4 mph

Distance from vehicle to barrier (1) entering trap = 52 inches

(2) exiting trap = 12 inches

VEHICLE STATIC CRUSH: (for Frontal and Rear Impacts Only)

Vehicle Length: Pre-Test Right = 170.1 "; C/L= 172.5 "; Left = 169.9 "

Post-Test Right = 153.0 "; C/L = 153.2 "; Left = 153.6 "

CRUSH Right = 17.1 "; C/L = 19.3 "; Left = 16.3 "

AVERAGE = 17.6 inches

VEHICLE REBOUND: (from rigid barrier only)

Distance from front of test vehicle to impact point:

Right = 7.6 "; C/L = 7.6 "; Left = 7.5 "

AVERAGE = 7.6 inches

DOOR OPENING:	Left	Right
Front	operable	operable
SEAT MOVEMENT:	**Seat Back Failure**	**Seat Shift**
Front	None	None

TABLE 3

POST-IMPACT DATA (cont)

GLAZING DAMAGE: Windshield remained intact

Section 3

OCCUPANT AND VEHICLE DATA

Figure 1

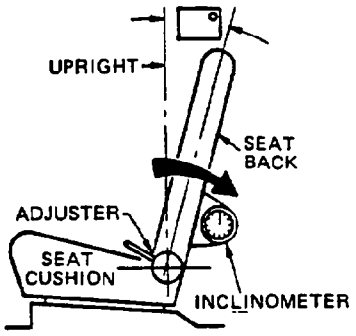
TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model year: 1988 Vehicle Model: Isuzu Impulse Body Style: 2-Dr Hatchback

1. Nominal Design Riding Position for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.

   Seat back is measured along the frame of net on the rear seat back.



LEFT SIDE VIEW

Seat back angle for driver's seat 24°

Measurement instructions: Position can also be located at 2 and a half rotations of the adjuster knob in the rearward direction from the upright position

Seat back angle for passenger's seat 24°

Measurement instructions: Same as driver's seat.

2. Seat Fore and Aft Positioning

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat: Seat was placed in mid-position

Positioning of the passenger's seat (if applicable): Seat was placed in mid position

3. Fuel Tank Capacity Data

   A. "Usable Capacity" of the standard equipment fuel tank is 14.5 gallons.

   B. "Usable Capacity" of the optional equipment fuel tank is N/A gallons.

Additional Instructions: Adjustable steering wheel was placed in mid-position

Figure 2

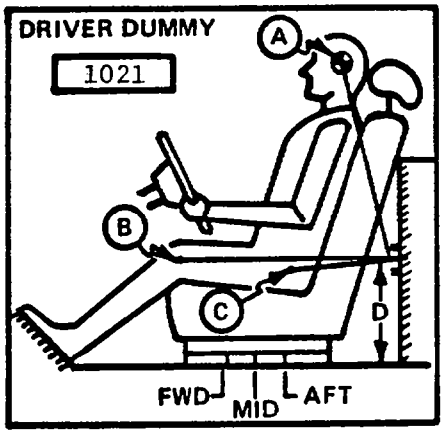
PART 572 DUMMY IN-VEHICLE POSITION

TEST NO.: CJ5701 VEHICLE: 1988 Isuzu Impulse

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

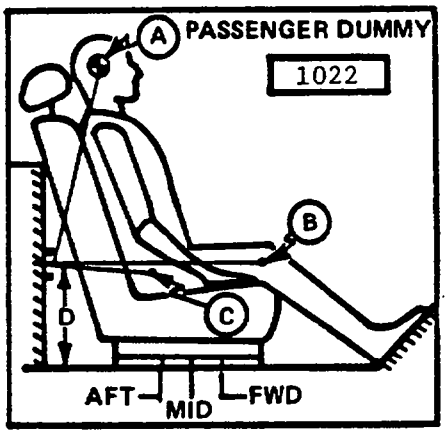
ADJUSTER TYPE:
- X Manual
- ____ Power

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

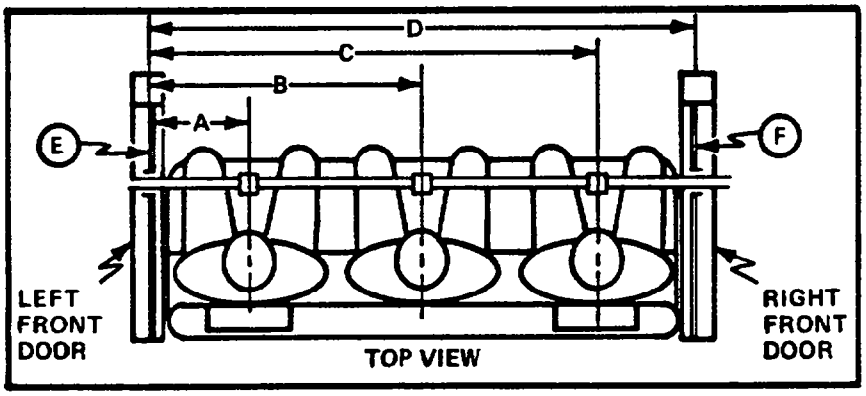


MEASUREMENT LOCATION

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



A =	19.3	in.	20	Degrees	A =	19.3	in.	19	Degrees
B =	31.0	in.	98	Degrees	B =	30.8	in.	98	Degrees
C =	17.9	in.	120	Degrees	C =	16.7	in.	123	Degrees
D =	15.1	in.			D =	15.1	in.		

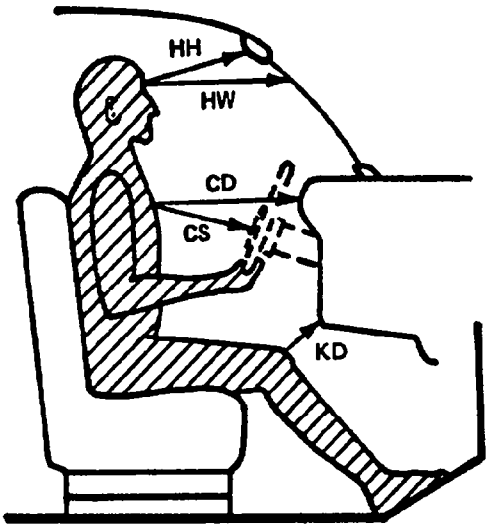


DUMMY ID	1021	1022
A = Left Door to Driver Centerline	12.1 in.	
B = Left Door to Center Passenger Centerline	-- in.	
C = Left Door to Right Passenger Centerline	37.0 in.	
D = Left Door to Right Door	48.7 in.	
E, F = Window Glass Height (Right and Left Must Be Equal)	12.0 in.	

Figure 3

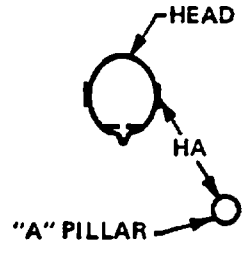
OCCUPANT CLEARANCE DIMENSIONS

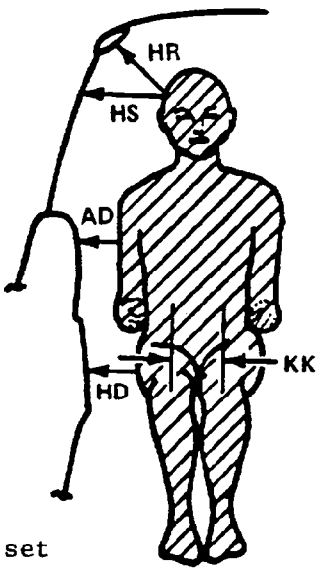
	DRIVER	PASSENGER
HH	18.2	18.0
HW	22.0	22.5
CD	21.7	28.0
CS	14.7	--
KDL	4.2	4.3
KDR	5.0	4.6
SA	See Note	See Note
TA	25°	25°



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

HA = Head Target to "A" Pillar
HR = Head to Side Roof
HS = Head to Side Window
AD = Arm to Door
HD = Hip to Door
KK = Knee to Knee



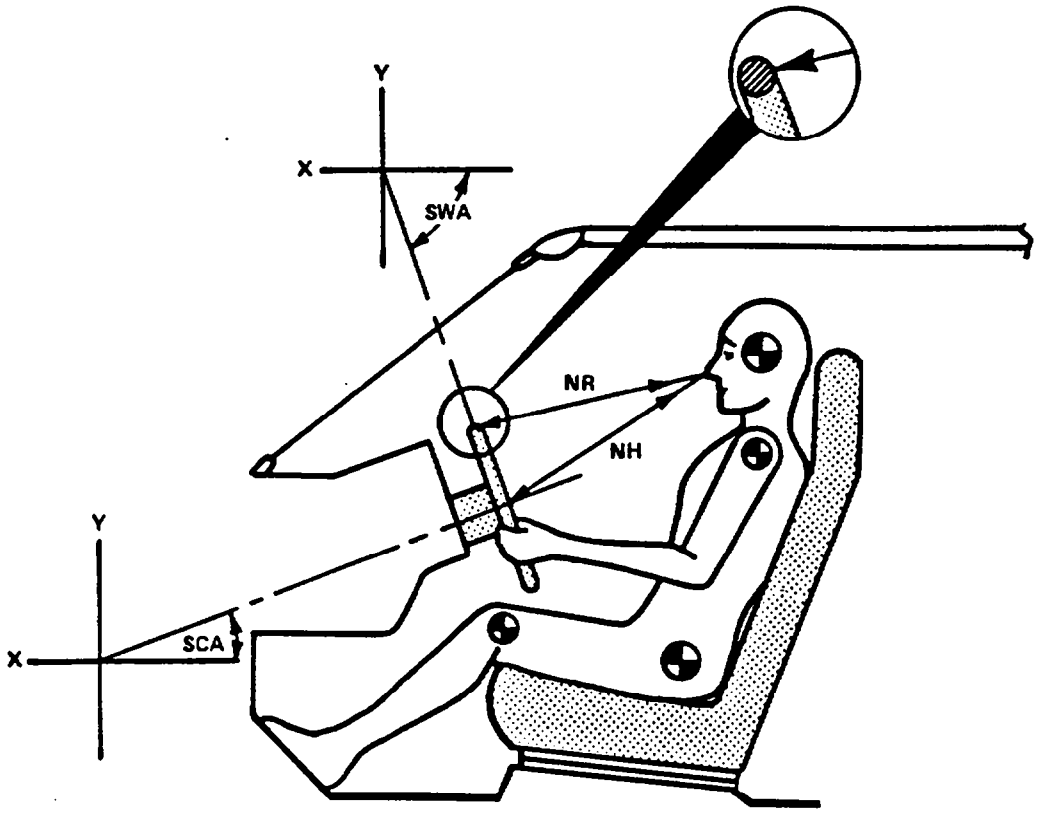


	DRIVER	PASSENGER
HR	4.2	4.3
HS	8.4	8.6
AD	4.3	5.7
HD	5.5	5.5
KK	8.0	8.0
HA	23.3	23.5

NOTE: Seat Angle was set as specified by manufacturer. See Figure 1.

Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS

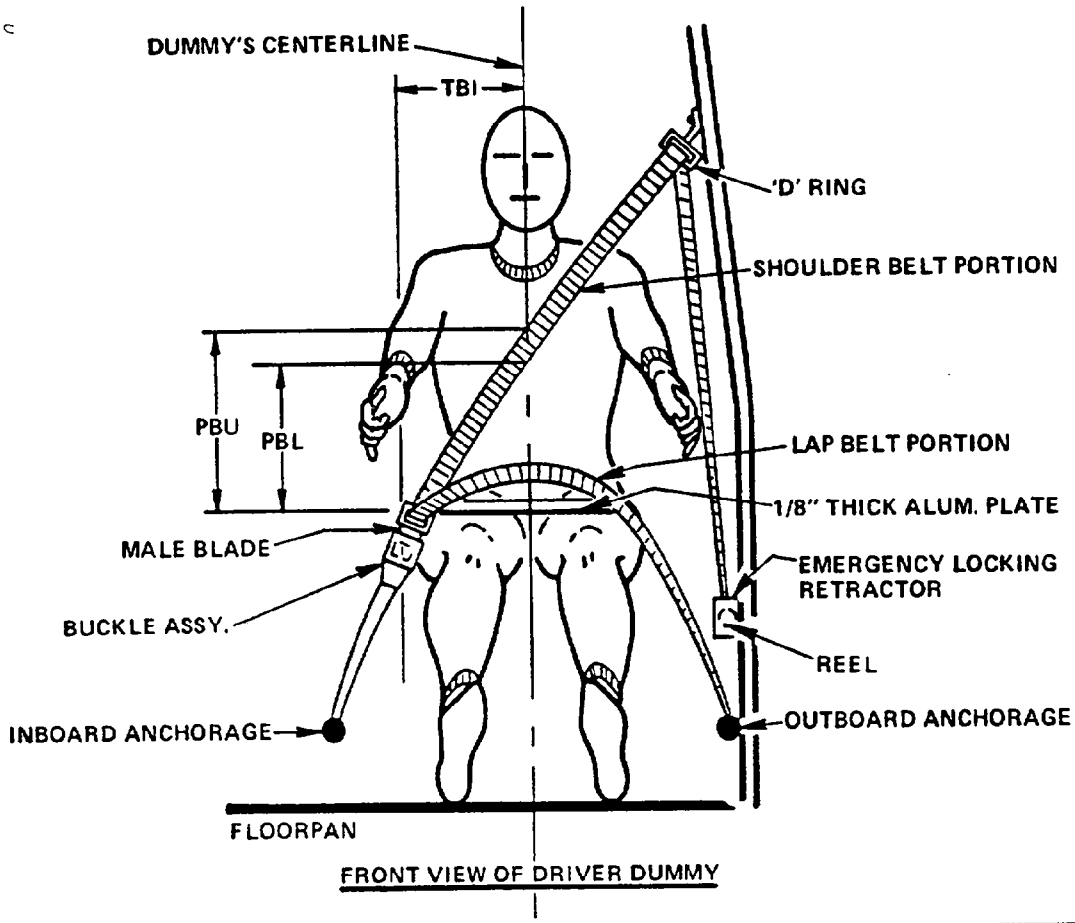


LEFT SIDE VIEW

	MEASUREMENTS	
NR -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	19.3	Inches
NH -- Distance from tip of dummy's nose to center of steering column hub	21.2	Inches
SCA -- Angle of steering column relative to the horizontal X axis	23	Degrees
SWA -- Angle of steering wheel relative to the horizontal X axis	-67	Degrees

Figure 5

SEAT BELT POSITIONING DATA

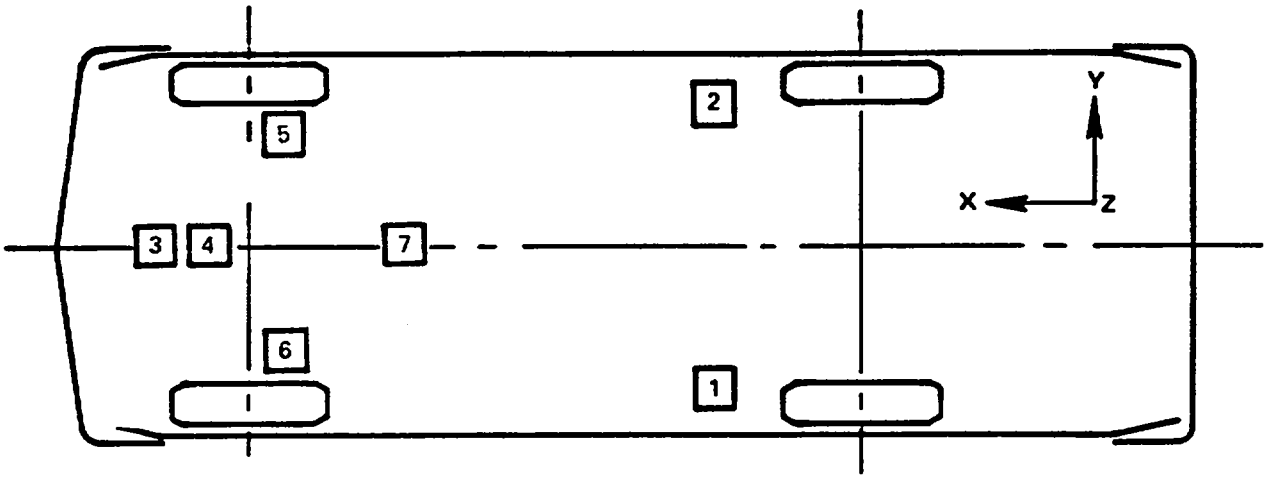


	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
PBU -- Top surface of alum. plate to upper edge	14.0	14.0
PBL -- Top surface of alum. plate to belt lower edge	11.25	11.0
TBI -- distance from Torso centerline to buckle	N/A	N/A

Figure 6

VEHICLE ACCELEROMETER LOCATIONS

TOP VIEW



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	Left Disc Brake Caliper	x		
7	Instrument Panel	x		

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

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION** MAX (g)	POSITIVE DIRECTION** TIME (msec)	NEGATIVE DIRECTION** MAX (g)	NEGATIVE DIRECTION** TIME (msec)
1	REAR SEAT X-MEMBER AT LEFT SIDE PRE:	63.5	17.5	14.0				
	POST:	63.0	17.8	13.0				
	LONGITUDINAL FORCE				2	131	-35	62
2	REAR SEAT X-MEMBER AT RIGHT SIDE PRE:	63.5	-17.5	14.0				
	POST:	63.5	-17.8	13.0				
	LONGITUDINAL FORCE				1	133	-30	66
3	TOP OF ENGINE BLOCK PRE:	137.0	0.0	32.0				
	POST:	132.0	0.0	32.3				
	LONGITUDINAL FORCE				49	62	-68	46
4	BOTTOM OF ENGINE BLOCK PRE:	130.0	6.0	10.0				
	POST:	126.0	4.3	14.0				
	LONGITUDINAL FORCE				34	61	-49	48
5	BRAKE CALIPER AT RIGHT SIDE PRE:	131.0	-21.0	21.0				
	POST:	128.5	-19.5	21.5				
	LONGITUDINAL FORCE				9	98	-57	56
6	BRAKE CALIPER AT LEFT SIDE PRE:	131.0	21.0	21.0				
	POST:	128.4	20.0	22.0				
	LONGITUDINAL FORCE				41	39	-66	31
7	DASH PANEL PRE:	101.0	0.0	24.0				
	POST:	101.0	0.0	22.6				
	LONGITUDINAL FORCE				15	38	-44	68

**	POSITIVE	NEGATIVE
LONGITUDINAL:	FORWARD	REARWARD
LATERAL:	LEFTWARD	RIGHTWARD
VERTICAL:	UPWARD	DOWNWARD

*X + Forward from rear bumper
Y + Left from vehicle centerline
Z + Up from ground

DISTANCE MEASUREMENTS IN INCHES

Figure 7

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 5

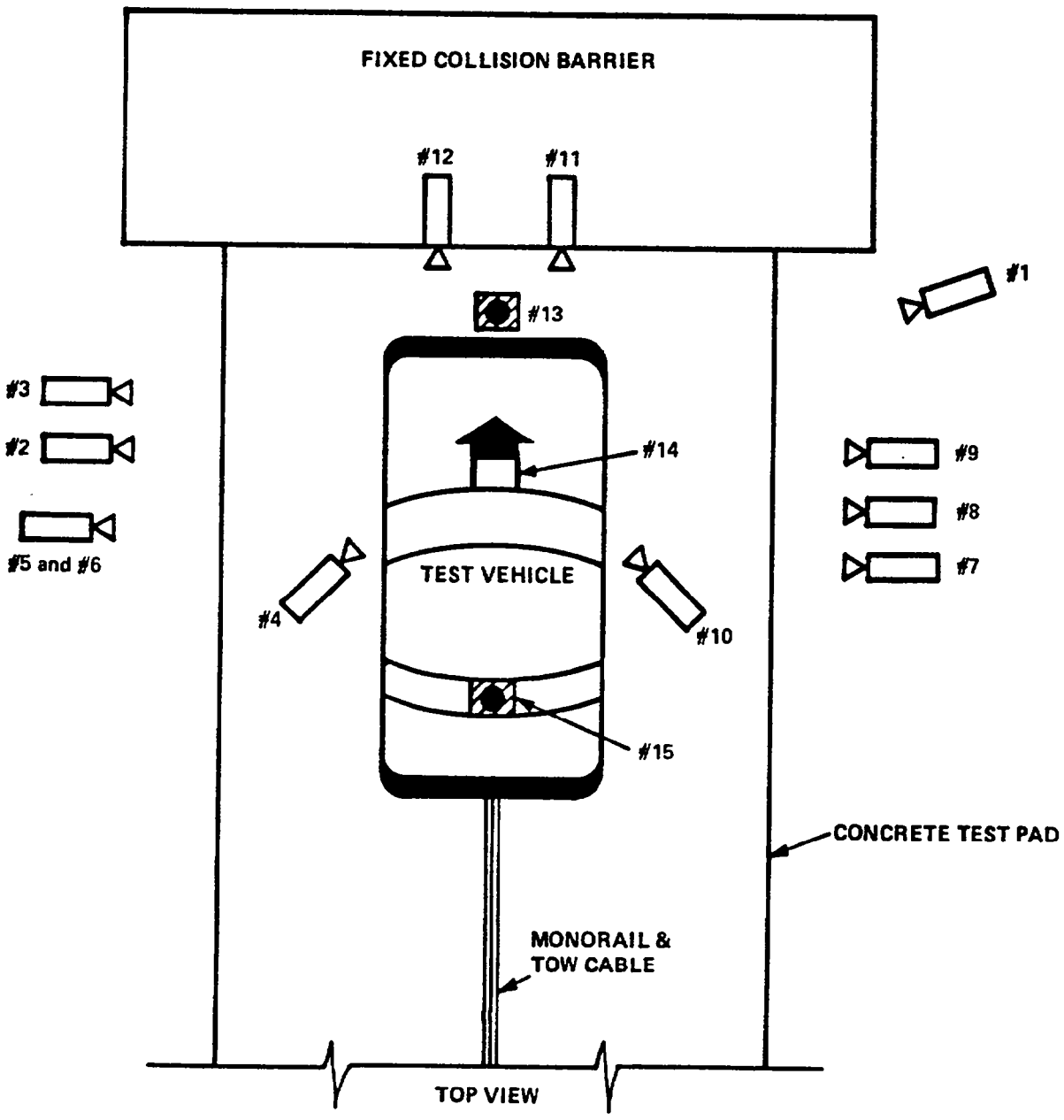


TABLE 5
HIGH-SPEED CAMERA LOCATIONS

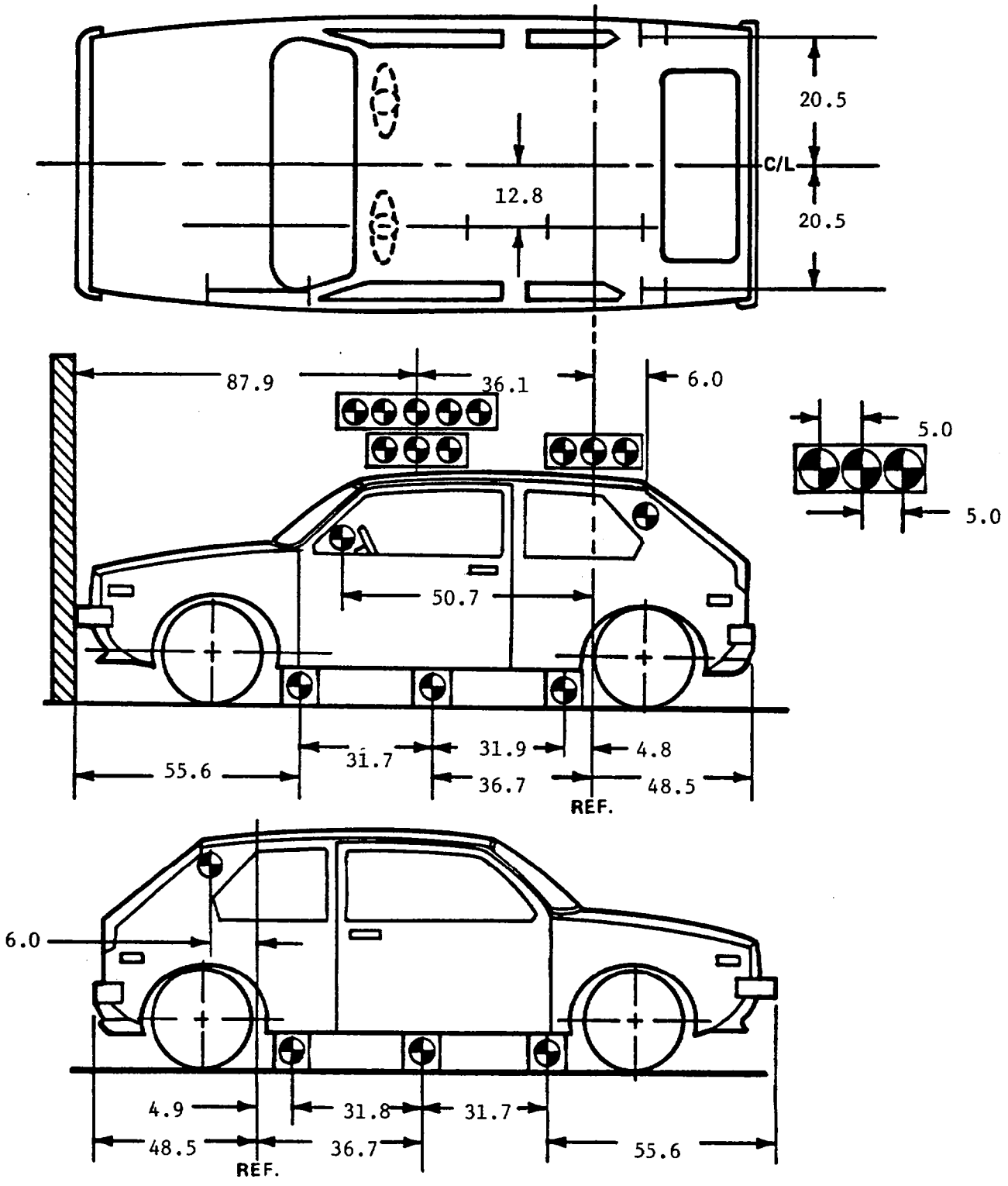
Test No. CJ5701 Vehicle 1988 Isuzu Impulse 2-Door Hatchback

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	230	65	40	-4	214	13	540
3	Left Side View	301	43	41	-4	285	25	530
4	Driver and Interior View	96	110	71	-17	-	13	750
5	Steering Column (bottom)	320	92	45	-4	304	25	540
6	Steering Column (top)	320	92	69	-9	304	25	550
7	Overall Right Side	241	79	41	-3	225	13	800
8	Right Side View	291	71	58	-4	275	25	800
9	Right Passenger View	262	57	40	-1	246	35	765
10	Passenger and Interior View	88	118	72	-21	-	25	600
11	Passenger Front View	22	18	75	-49	-	13	550
12	Driver Front View	22	18	75	-45	-	13	540
13	Windshield View	0	0	120	-60	-	13	540
14	Pit View of Engine	0	24	85	90	-	13	840
15	Pit View of Fuel Tank	0	93	86	90	-	13	800

* X = Film plane to monorail centerline
Y = Film plane to impact location
Z = Film Plane to ground
** = Referenced to horizontal plane

Figure 8

VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

7669-5

Figure 9

TEST VEHICLE MEASUREMENTS

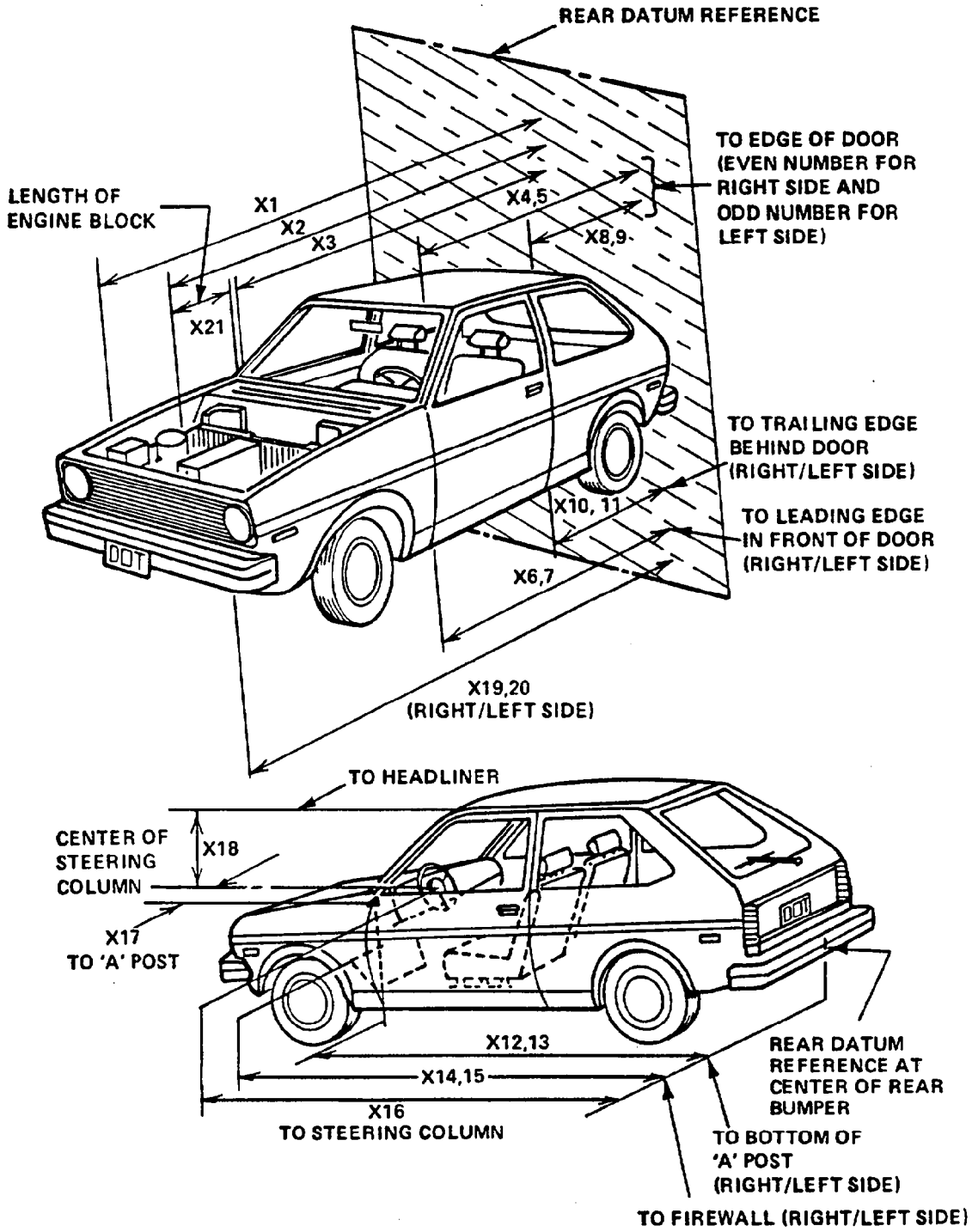


TABLE 6

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	172.5	153.2	19.3
X2	Rear Surface of Vehicle to Front of Engine	144.8	139.9	4.9
X3	Rear Surface of Vehicle to Firewall	121.5	119.9	1.6
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	112.4	111.9	0.5
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	112.3	111.5	0.8
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	111.3	111.9	-0.6
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	111.2	110.5	0.7
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	63.8	63.4	0.4
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	63.8	63.2	0.6
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	67.9	67.6	0.3
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	68.0	67.3	0.7
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	111.5	111.7	-2.0
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	111.6	111.0	0.6
X14	Rear Surface of Vehicle to Firewall, Right Side	123.3	121.6	1.7
X15	Rear Surface of Vehicle to Firewall, Left Side	123.7	121.6	2.1
X16	Rear Surface of Vehicle to Steering Column	95.0	93.7	1.3
X17	Center of Steering Column to "A" Post	16.0	15.7	0.3
X18	Center of Steering Column to Headliner	15.0	17.0	-0.2
X19	Rear Surface of Vehicle to Right Side of Front Bumper	170.1	153.0	17.1
X20	Rear Surface of Vehicle to Left Side of Front Bumper	169.9	153.6	16.3
X21	Length of Engine Block	20.0	20.0	0.0

Section 4

SUMMARY OF RESULTS OF FMVSS NOS. 208, 212, 219(P) AND 301-75

- "Occupant Crash Protection," FMVSS No. 208 Data
- "Windshield Mounting," FMVSS No. 212 Data
- "Windshield Zone Intrusion," FMVSS No. 219 (Partial) Data
- "Fuel System Integrity," FMVSS No. 301-75

TABLE 7

DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-26	9	47	49	-38	12	-13	37
DUMMY (2)	-17	11	43	44	-33	11	17	32

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	Right Femur	Left Femur
DUMMY (1)	1066	1258
DUMMY (2)	788	880

	HEAD INJURY CRITERIA **			
		36 millisecond Maximum		AVE. ACC. (g)
	HIC	t_1 (SEC)	t_2 (SEC)	t_1 TO t_2
DUMMY (1)	336	.06210	.09810	38.7
DUMMY (2)	243	.06225	.09825	34.0

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

TABLE 8

FMVSS NO. 208 - SEAT BELT WARNING SYSTEM CHECK

With occupant in driver's position, the lap belt in stowed position, and ignition switch placed in "Start/On" position:

Log time duration of audible warning signal = 6.0 sec.

Log time duration of reminder light operation = 6.0 sec.

With occupant in driver's position, lap belt in use, and the ignition switch placed in "Start/On" position:

Log time duration of audible warning signal = 2.5 sec.
(audible warning should not operate)

Log time duration of reminder light operation = 3.5 sec.

Note wording of visual warning:

Fasten seat belt _____

Fasten Belt _____

Symbol 101-80 X

TABLE 9

FMVSS NO. 208 - LABELING AND DRIVER'S MANUAL INFORMATION

Locate label which describes manufacturers maintenance or replacement schedule for crash-deployed occupant protection system.

Describe location: Not Applicable

TABLE 10
FMVSS NO 208 - READINESS INDICATOR

An occupant restraint system that deploys in the event of a crash shall have a monitoring system with a readiness indicator. A totally mechanical system is exempt from this requirement.

Is the system totally mechanical? YES __X__ NO _____

TABLE 11
FMVSS NO. 208 - COMFORT AND CONVENIENCE TEST SUMMARY

Test Vehicle NHTSA No.:	CJ5701
Make/Model:	1988 Isuzu Impulse
Date of Comfort/Convenience Check:	7-29-88
Technician Performing Check:	RFH, Jr.
GVWR:	3723

Seat belt comfort and convenience requirements cover vehicles manufactured on or after September 1, 1986, which have a gross vehicle weight rating of 10,000 pounds or less. Exemptions to this rule are belts installed in a walk-in, van-type vehicle and manual Type 2 belt systems installed in the front outboard seating positions of passenger automobiles. On or after September 1, 1989, the exemption of the Type 2 manual seat belts installed in the front outboard seating positions of passenger automobiles will change depending on the states' enactment of mandatory usage laws.

Was vehicle built after or on September 1, 1986, and is it equipped with:

1. Automatic seat belts YES X NO _____

If yes, go to requirements D1, D2 and D3

TABLE 11 (continued)

D1
CONVENIENCE HOOKS

A convenience hook or other device is provided to stow seat belt webbing to facilitate entering or exiting the vehicle.

YES _____ NO X

D2
WEBBING TENSION - RELIEVING DEVICE

The seat belt assembly installed in the outboard designated seating position has either manual or automatic tension relieving devices permitting the introduction of slack in the webbing of the should belt ("comfort clips" or "window shade" devices).

YES _____ NO X

D3
BELT CONTACT FORCE

1. Do not measure the belt contact force if the manual or automatic seat belt assemblies in this vehicle incorporate a webbing tension relieving device.

   YES _____ NO X

2. Seats are adjusted according to instructions in Appendix B.

   YES X NO _____

3. The test dummies are positioned according to dummy position placement instructions in Appendix B and Appendix C.

   YES X NO _____

4. Close the vehicle's adjacent door, pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest. Then fasten the latch. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. Measure the contact force exerted by the belt webbing on the dummy's chest. The contact force is .25 pounds. Contact the COTR if the contact force exceeds 0.7 pounds.

Figure 10

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA SHEET

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

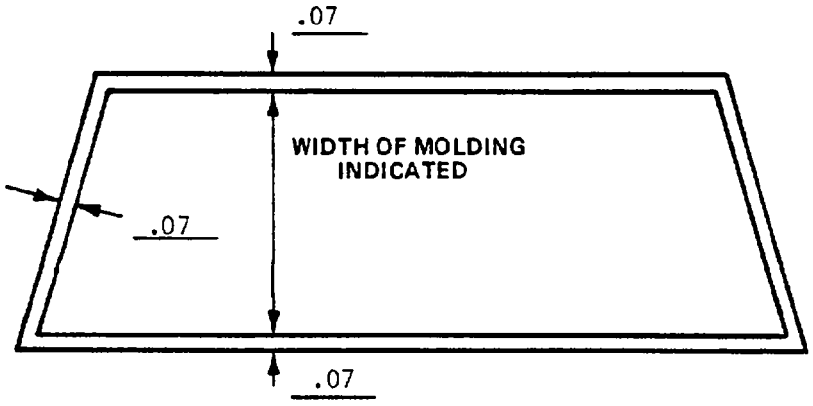
Windshield is bonded in place and covered with 0.7 inch molding.

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	71.0	71.0	100%
LEFT SIDE	71.0	71.0	100%
TOTAL	142.0	142.0	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

NONE

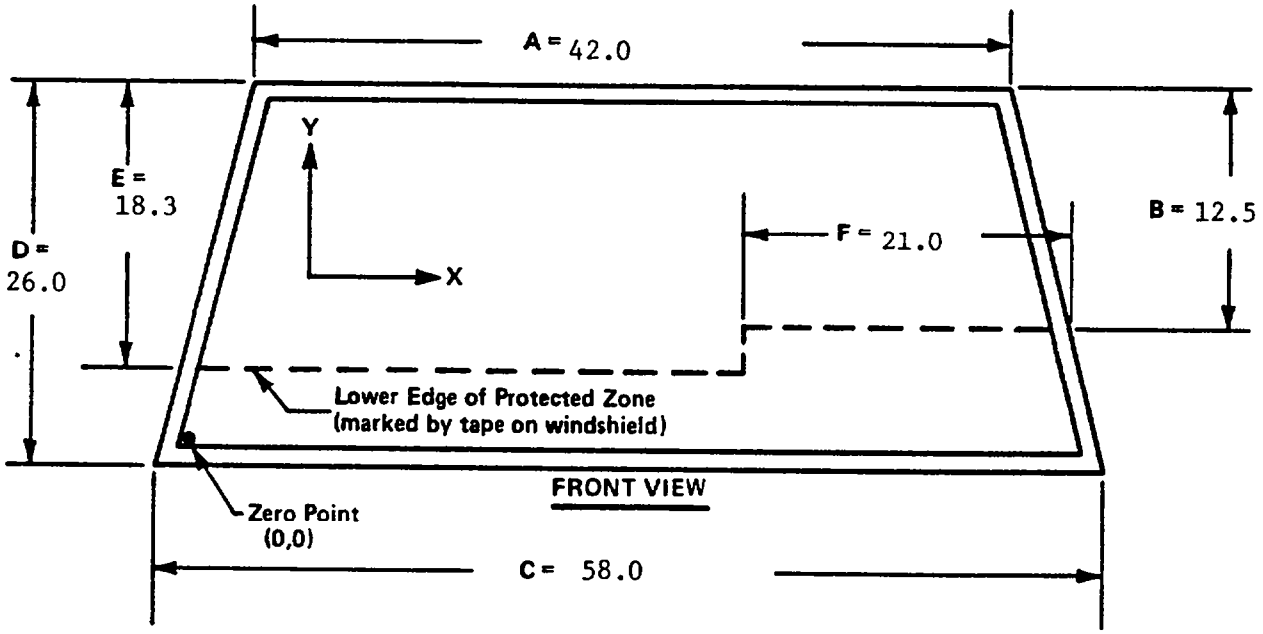
Figure 11

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.		

TABLE 12

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: | C | J | 5 | 7 | 0 | 1 | TEST DATE: August 16, 1988

Vehicle Mfr/Make/Model: 1988 Isuzu Impulse 2-Door Hatchback

Test vehicle fuel tank filled to 92% to 94% of manufacturer's "useable" capacity 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

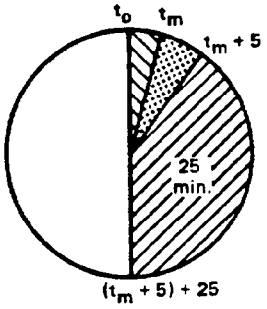
X Frontal (30 mph)

\- Oblique (30 mph) with ___° barrier face first contacting _____ (driver/passenger) side

\- Rear Moving Barrier (30 mph)

\- Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT



	ACTUAL	MAX ALLOWED
1. From impact until vehicle motion ceases	0	1 oz
2. For 5 minute period after vehicle motion ceases	0	5 oz
3. For next 25 minutes	0	1 oz/1 min

SOLVENT SPILLAGE DETAILS

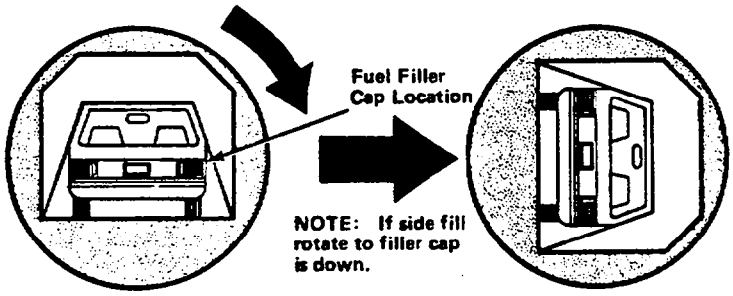
NONE.

TABLE 13

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.:
CJ5701

TEST PHASE: 0° 90°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	3 minutes	00 seconds
FMVSS 301 Position Hold Time +	05 minutes	00 seconds
TOTAL	8 minutes	00 seconds
Next whole minute interval	8 minutes	

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATION(S):

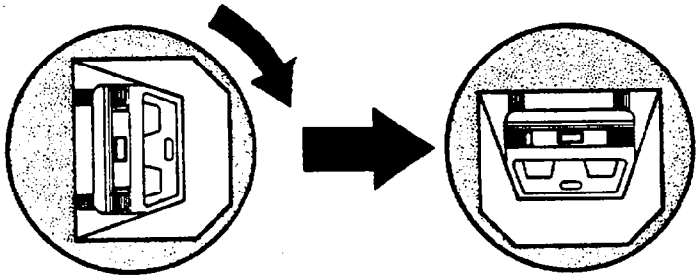
NONE.

TABLE 13 (continued)

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.: CJ5701

TEST PHASE: 90° 180°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	3 minutes	00 seconds
FMVSS 301 Position Hold Time +	05 minutes	00 seconds
TOTAL	8 minutes	00 seconds
Next whole minute interval	8 minutes	

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATION(S):

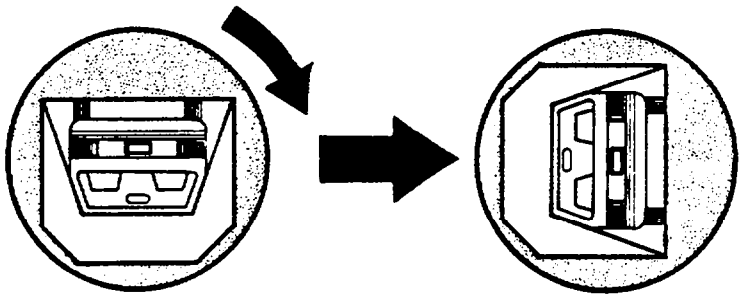
NONE.

TABLE 13 (continued)

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.: CJ5701

TEST PHASE: 180° 270°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	3 minutes	00 seconds
FMVSS 301 Position Hold Time +	05 minutes	00 seconds
TOTAL	8 minutes	00 seconds
Next whole minute interval	8 minutes	

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATION(S):

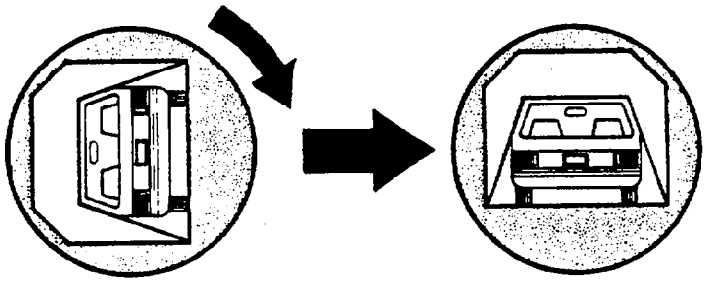
NONE.

TABLE 13 (continued)

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.: CJ5701

TEST PHASE: 270° 360°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	3 minutes	00 seconds
FMVSS 301 Position Hold Time +	05 minutes	00 seconds
TOTAL	8 minutes	00 seconds
Next whole minute interval	8 minutes	

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

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

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATION(S):

NONE.

TABLE 14

TEST VEHICLE NONCOMPLIANCE NOTICE

NHTSA CONTRACT LAB: Calspan Advanced Technology Center

LAB. PROJECT MANAGER & TELEPHONE NO.: Walter E. Levan (716) 632-7500

DATE OF TEST: August 16, 1988 VEH. NHTSA No. CJ5701

VEHICLE MANUFACTURER: Isuzu Motors Ltd.

Model Year 1988 VIN: JABBR07L5J7304077

Body Style: Impulse Build Date: 9/87

DUMMY STABILIZED TEMPERATURE AT TIME OF TEST: 68 °F (Spec. = 66-78°F)

IMPACT VELOCITY: 29.4 mph TIME OF TEST: 11:35

TYPE OF AUTOMATIC RESTRAINT SYSTEM: 2-point automatic torso belt

FAILURE DETAILS: The vehicle appears to comply with the requirements of FMVSS Nos 208, 212, 219 (partial) and 301.

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

A-5

7669-5

Figure A-4 POST-TEST LEFT SIDE VIEW

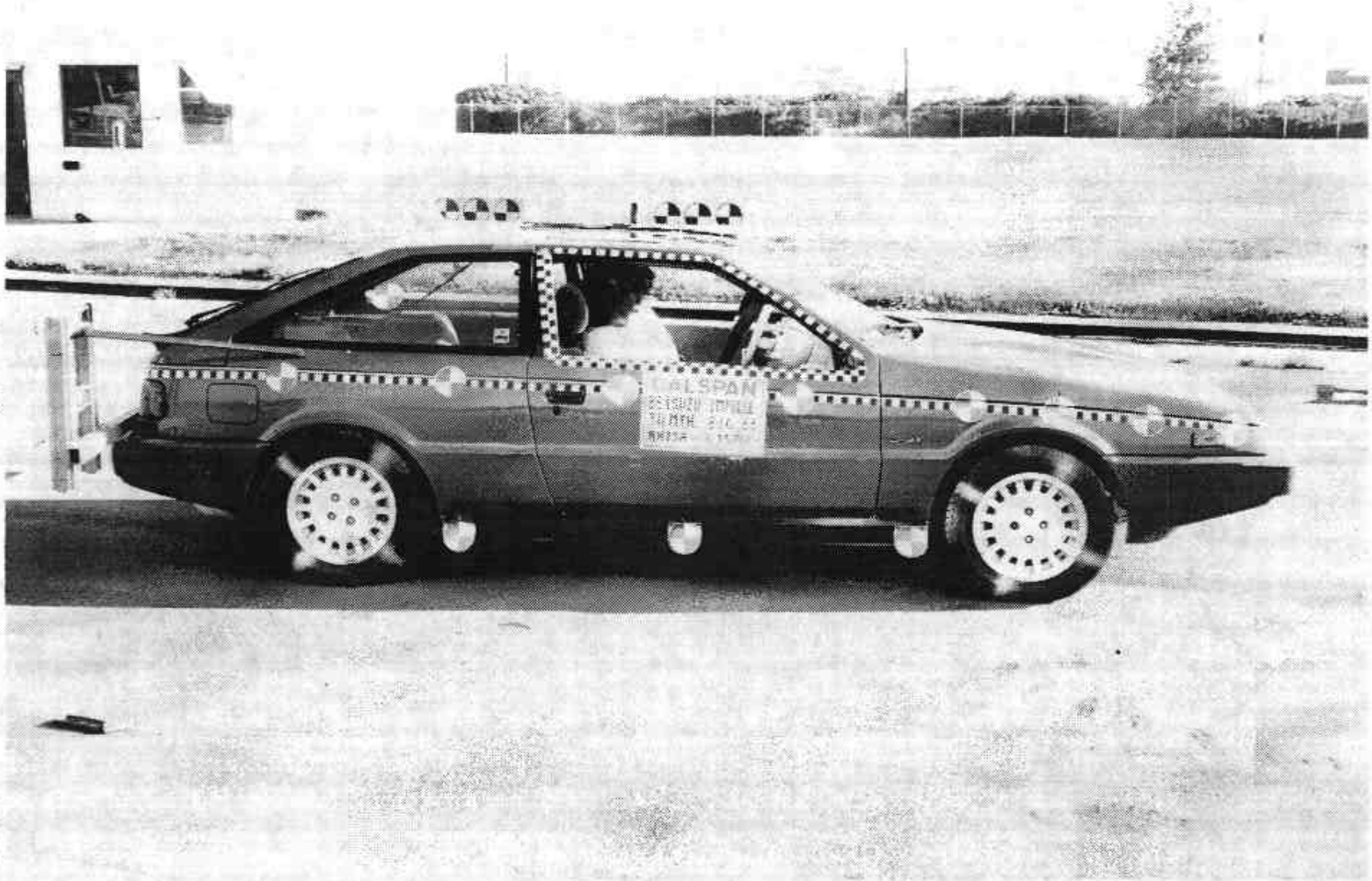
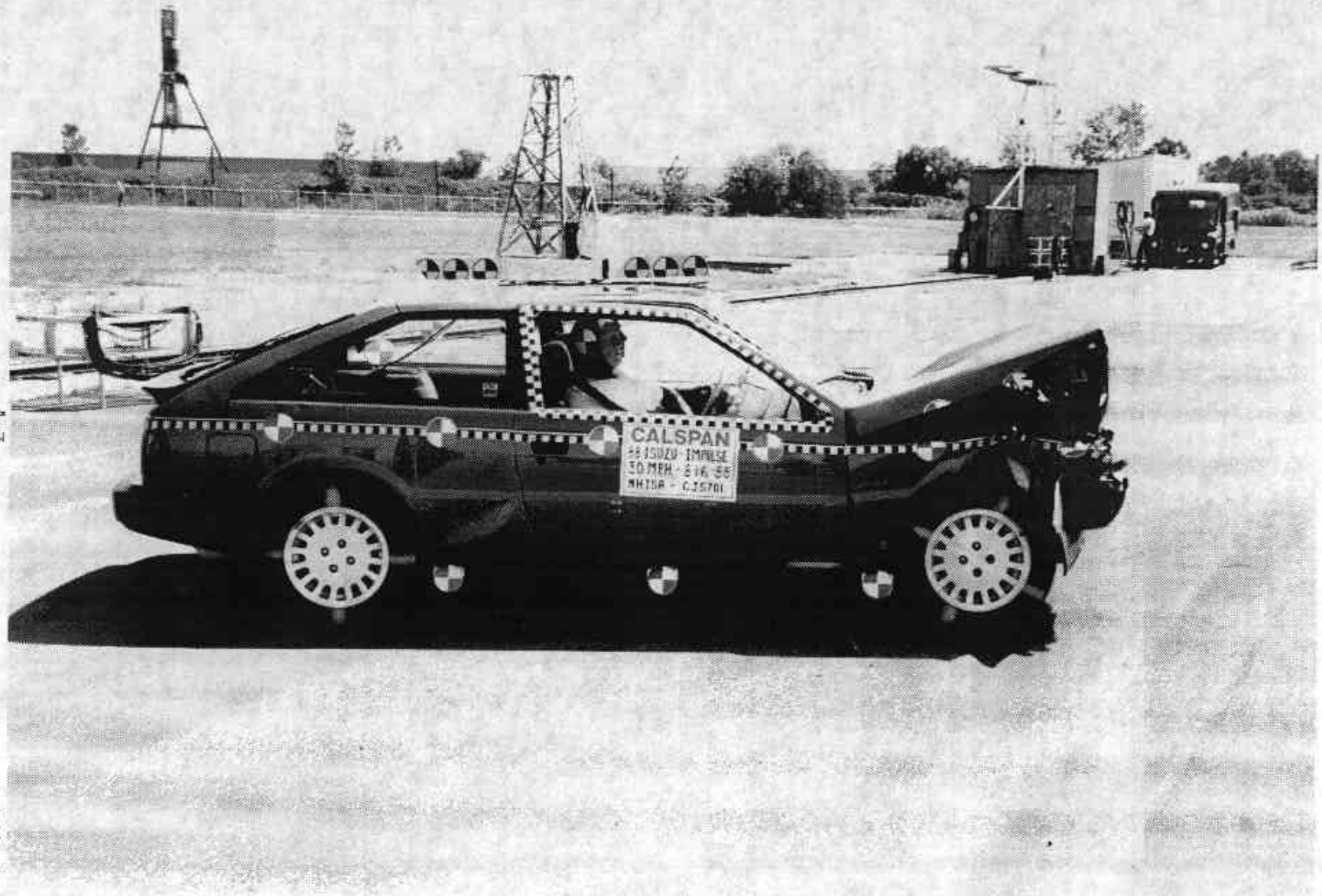


Figure A-5 PRE-TEST RIGHT SIDE VIEW



A-7

5-6994

Figure A-6 POST-TEST RIGHT SIDE VIEW

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

A-9

7669-5

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

A-19

7669-5

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

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

7669-5

Figure A-11 POST-TEST TOP VIEW

7669-5

Figure A-12 PRE-TEST WINDSHIELD VIEW

7669-5

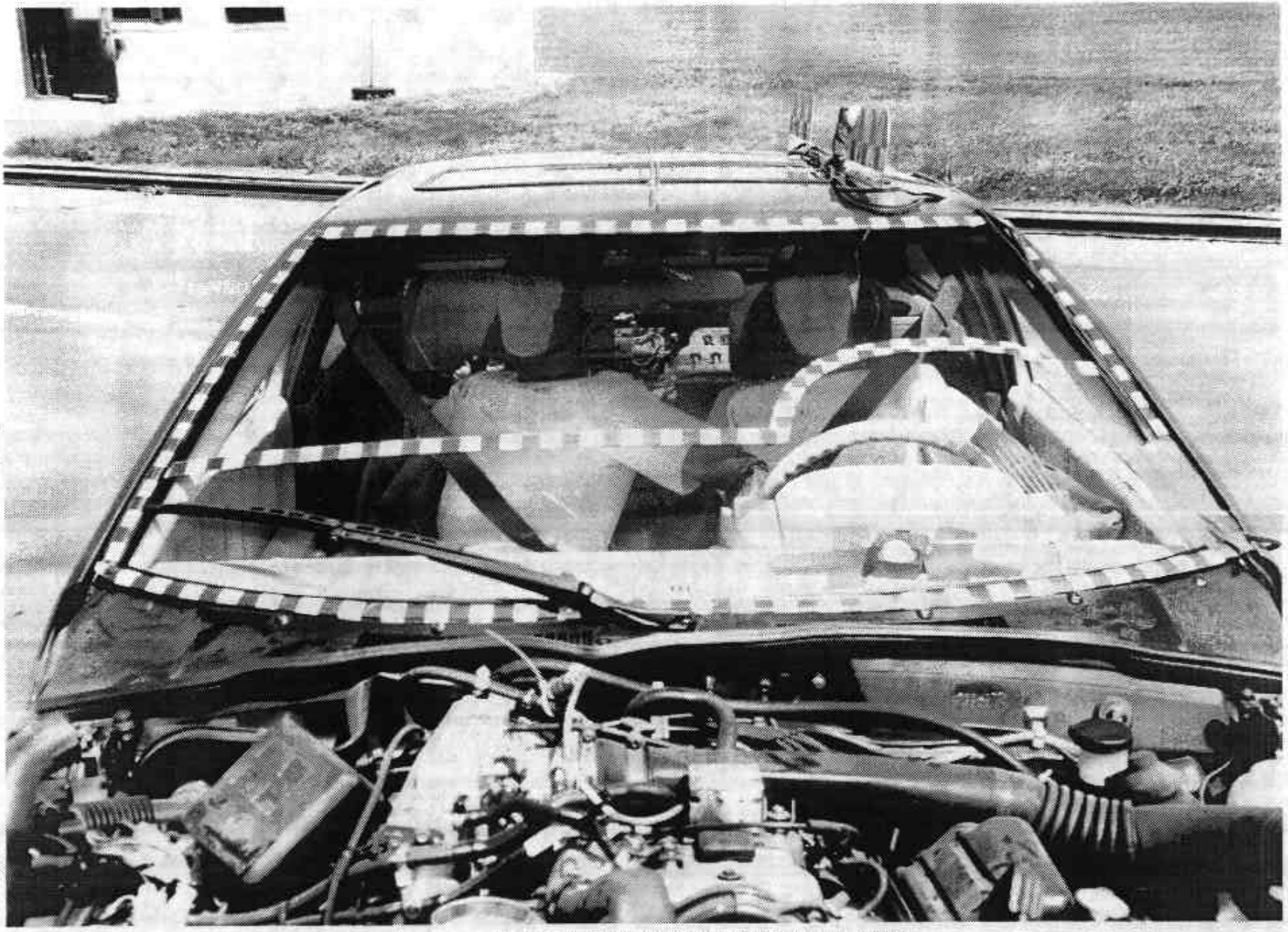


Figure A-13 POST-TEST WINDSHIELD VIEW

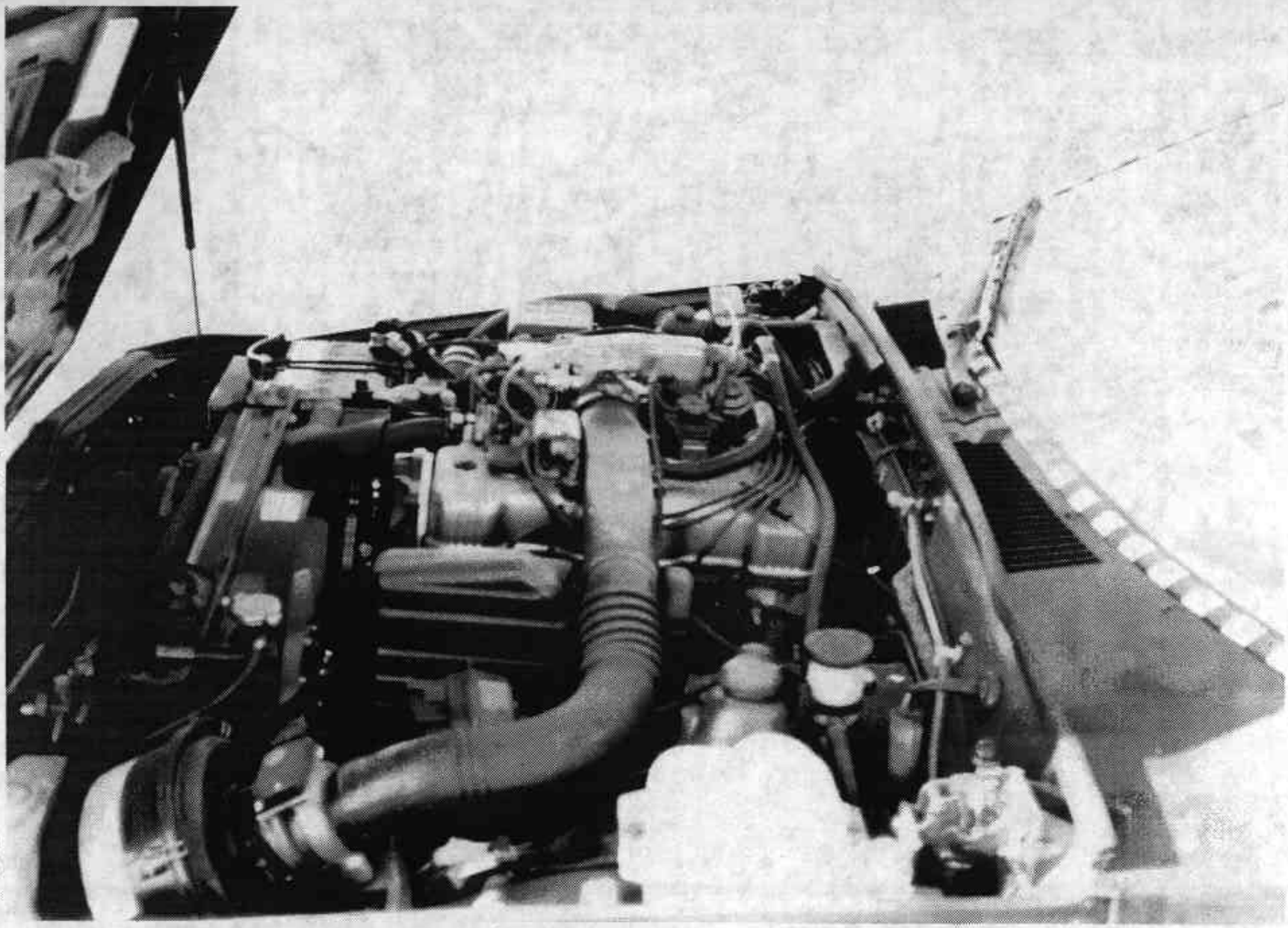


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

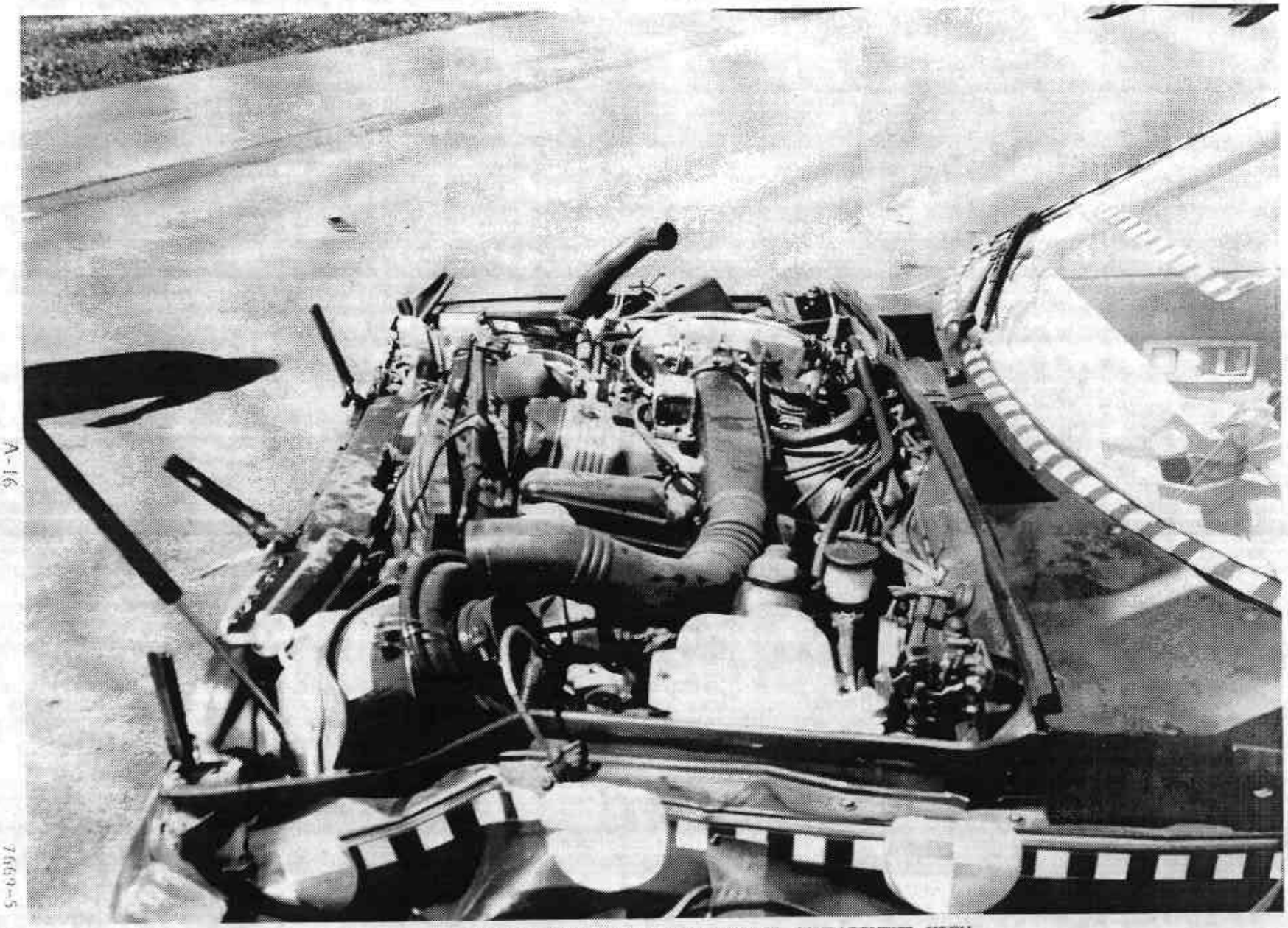


Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

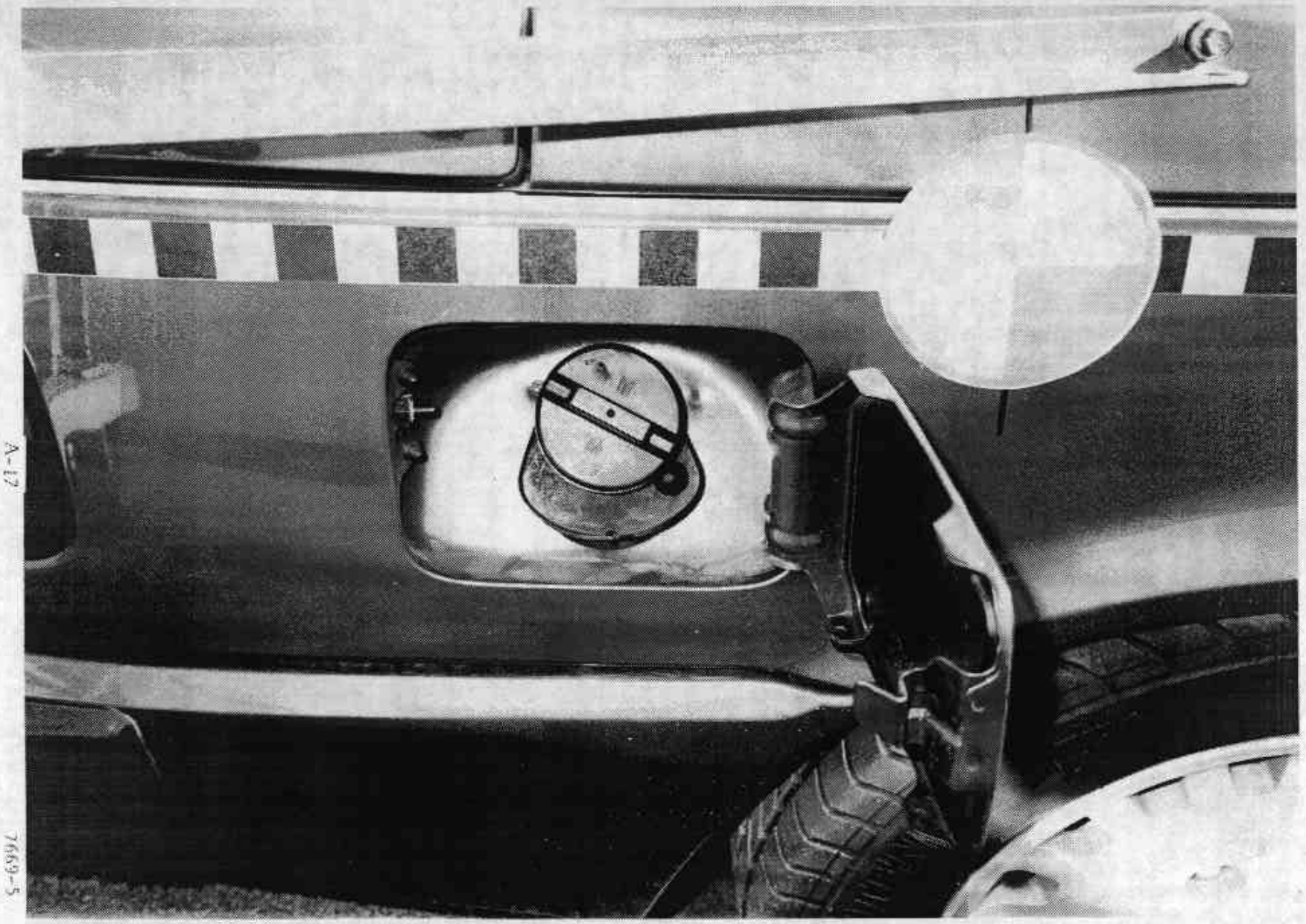
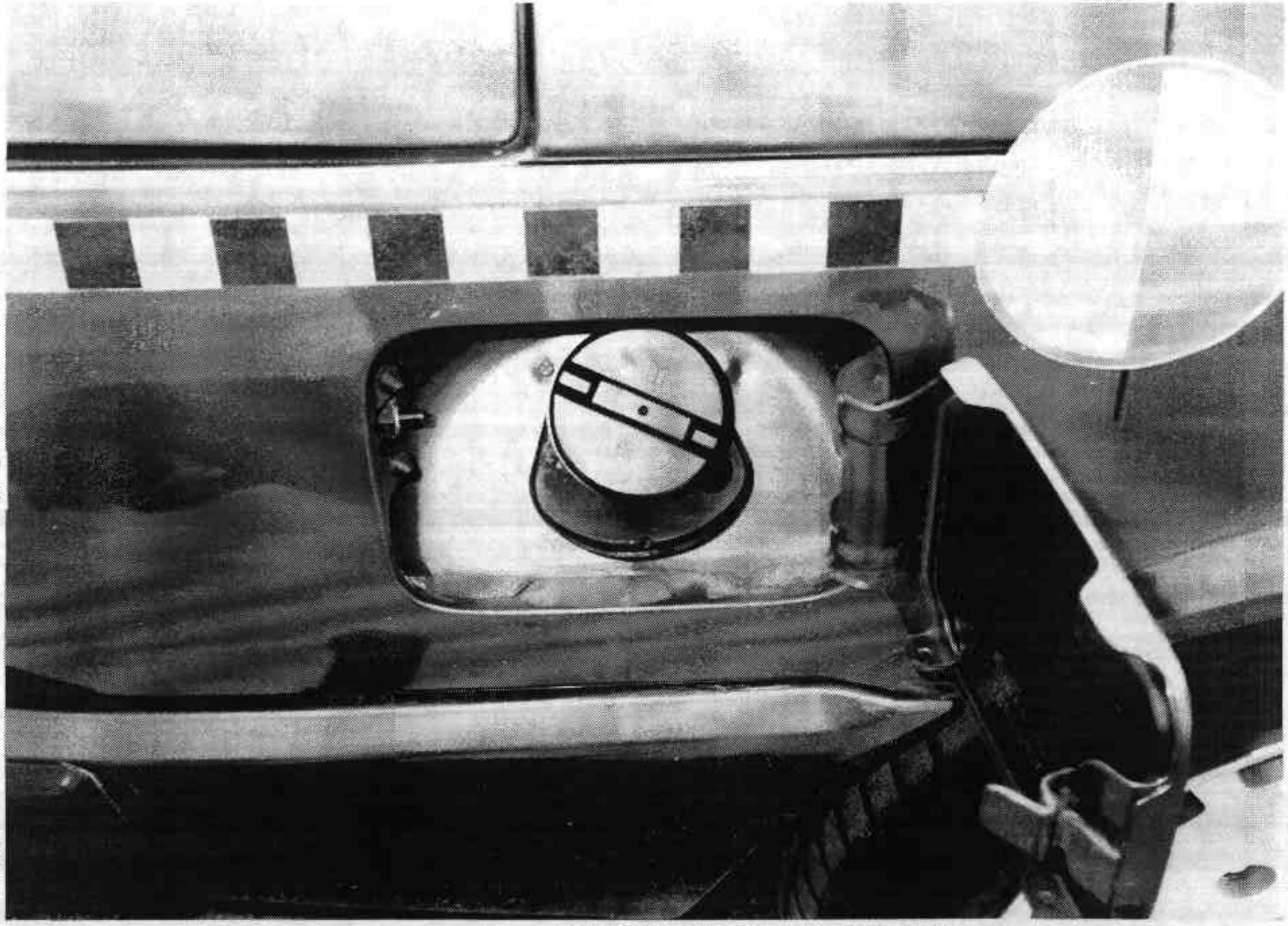


Figure A-16 PRE-TEST FUEL FILLER CAP VIEW



A-18

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Figure A-17 POST-TEST FUEL FILLER CAP VIEW

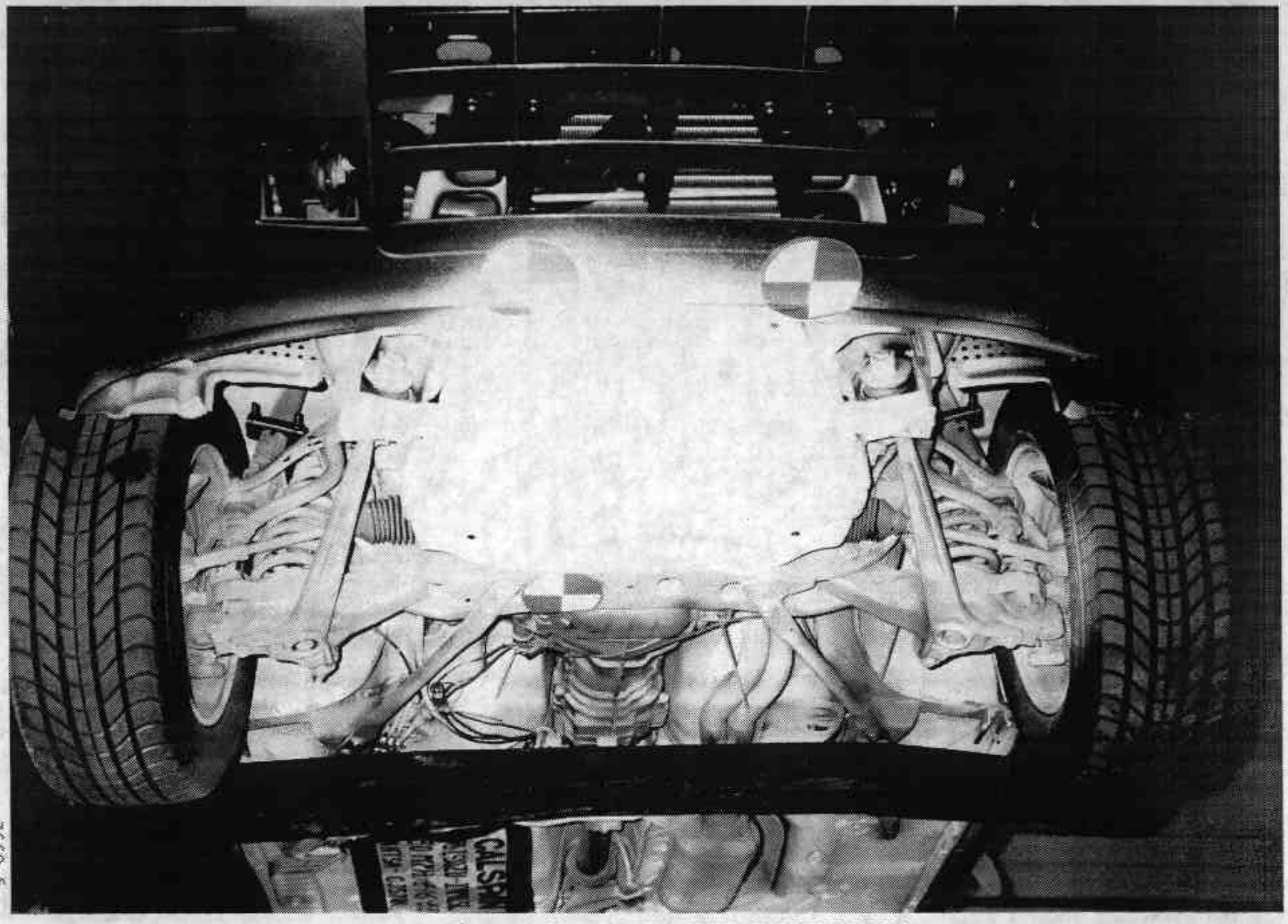

Figure A-18 PRE-TEST FRONT UNDERBODY VIEW

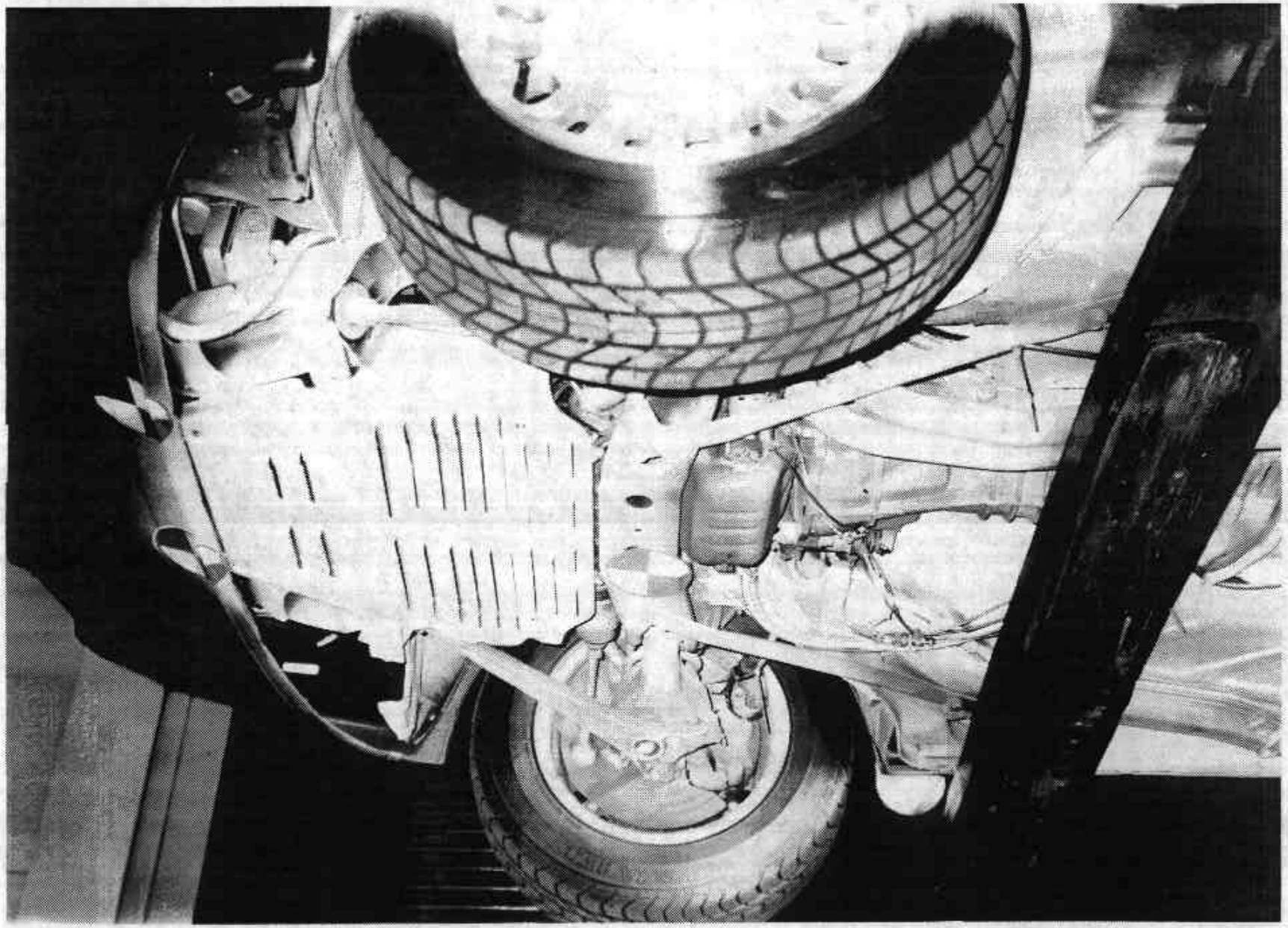

Figure A-19 PRE-TEST FRONT SIDE UNDERBODY VIEW

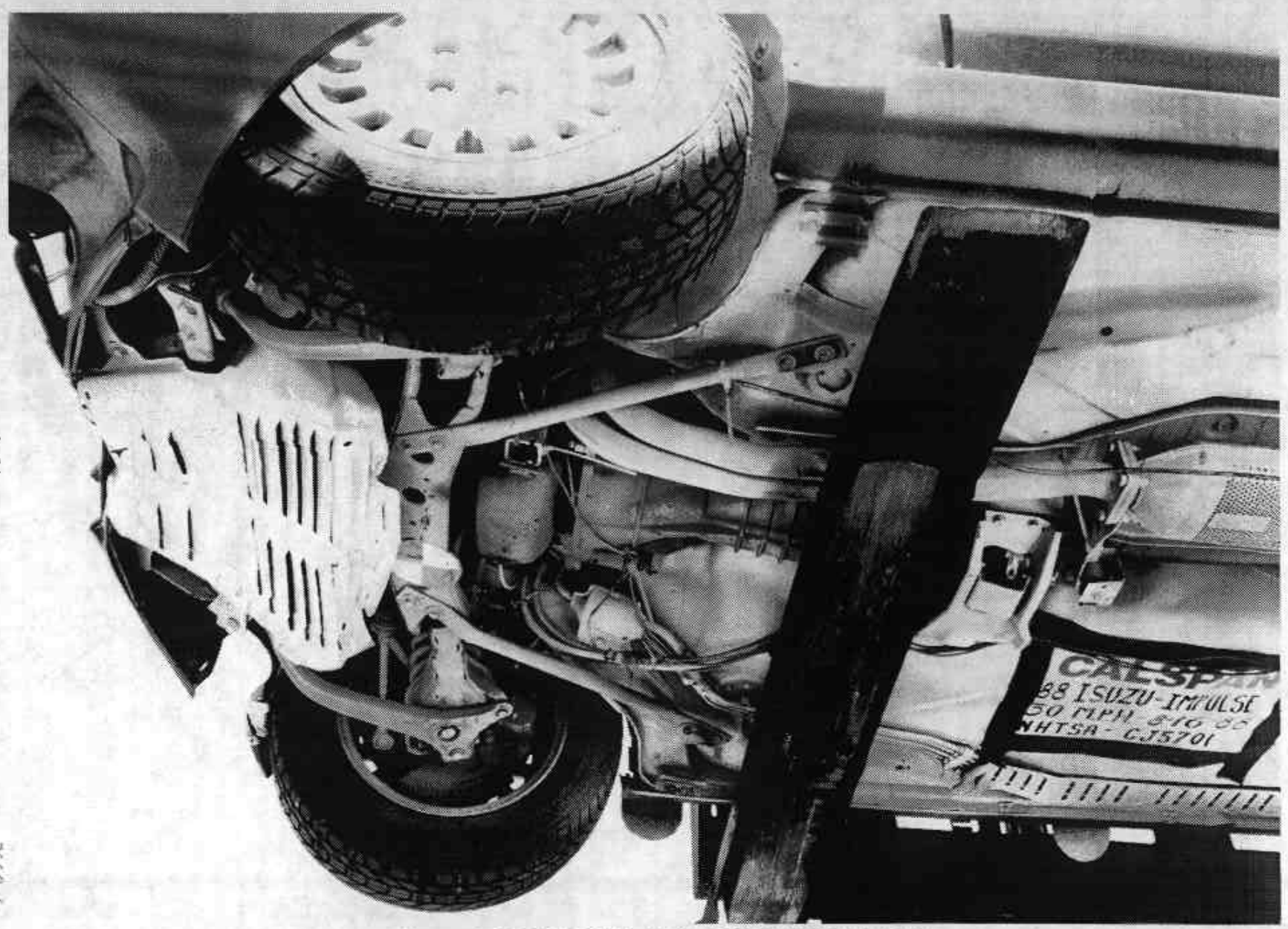

Figure A-20 POST-TEST FRONT SIDE UNDERBODY VIEW

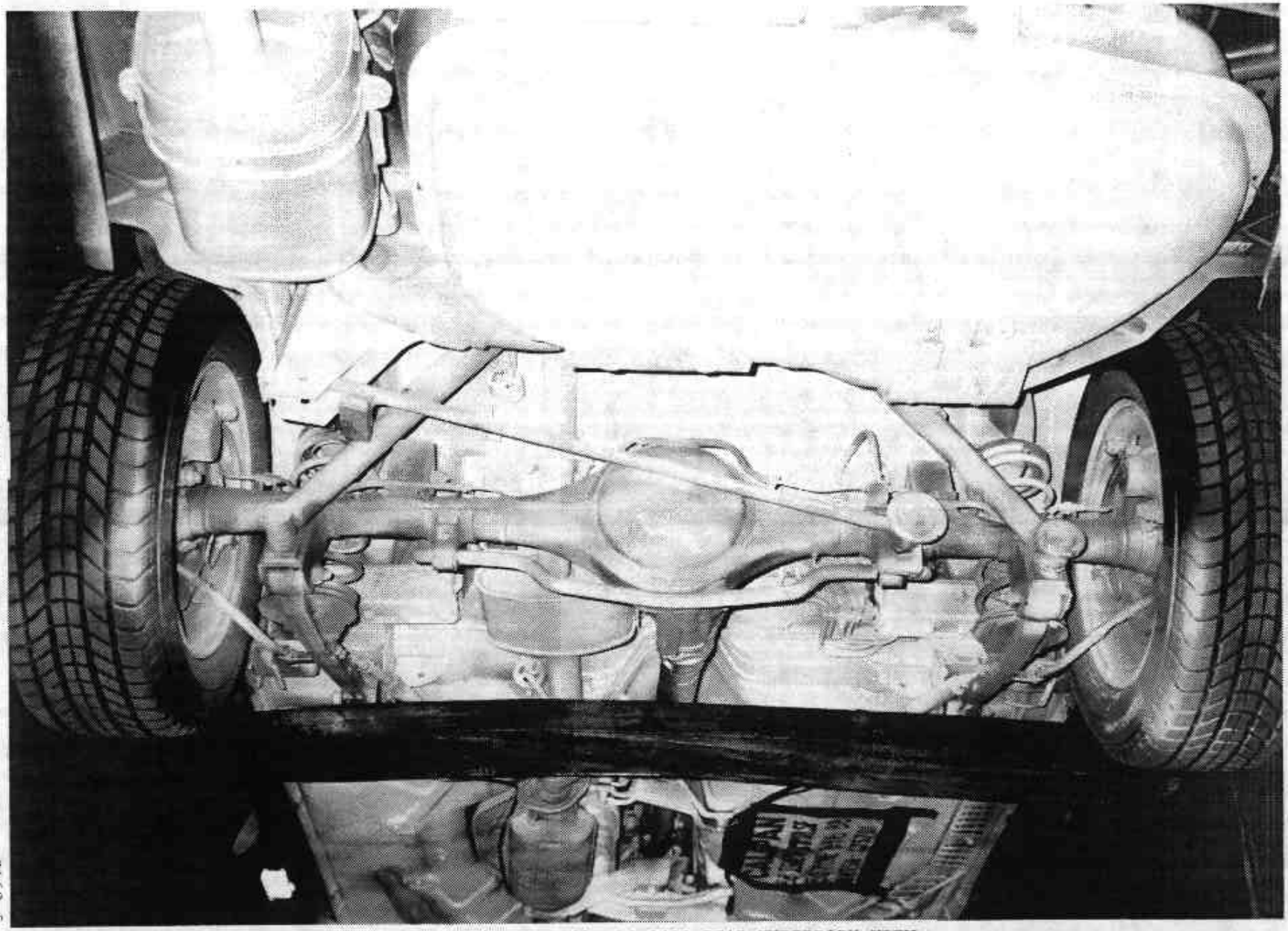

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Figure A-21 PRE-TEST REAR UNDERBODY VIEW

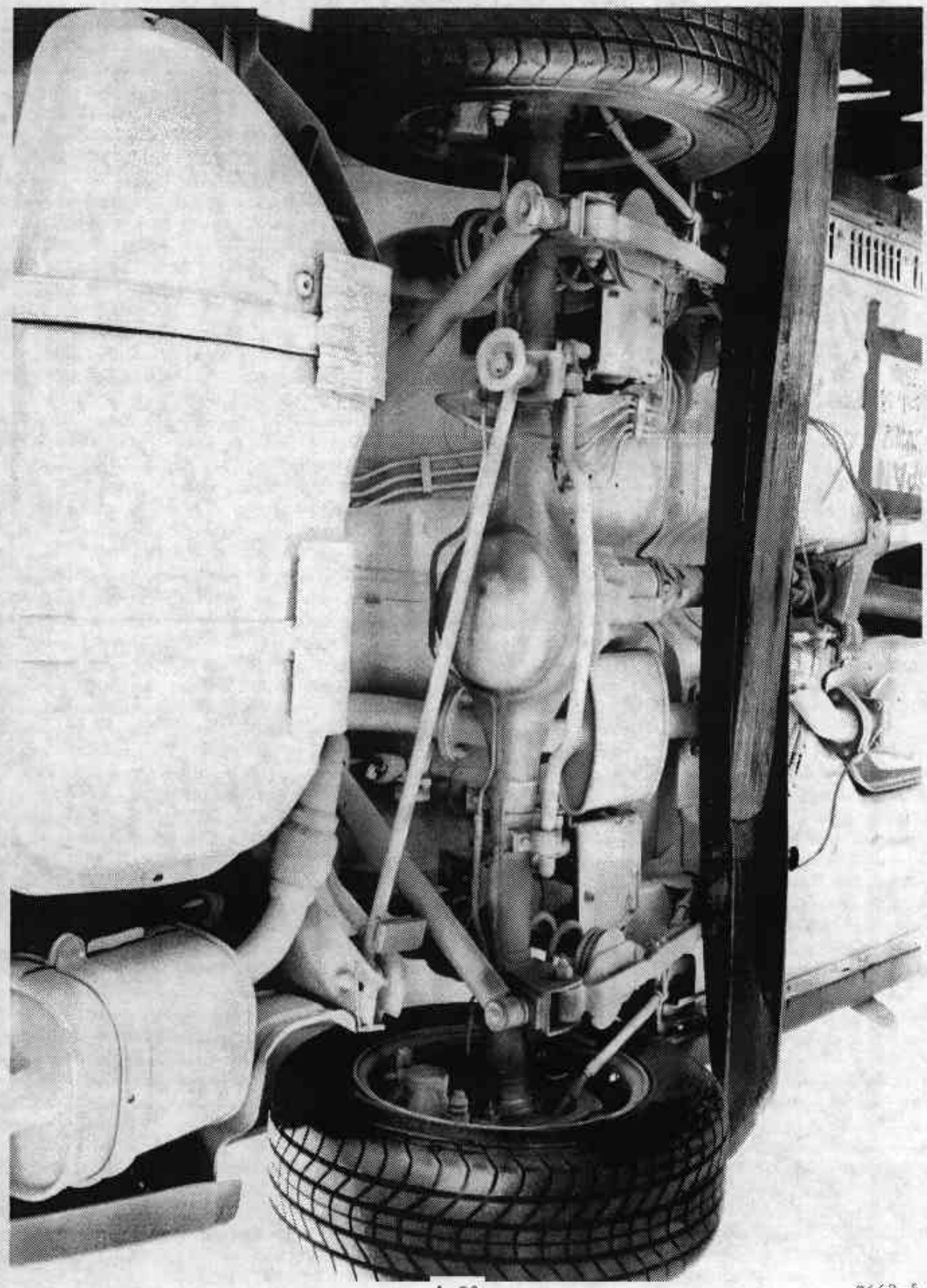


Figure A-22 POST-TEST REAR UNDERBODY VIEW

Figure A-23 CERTIFICATION LABEL AND TIRE PLACARD

Figure A-24 PRE-TEST DRIVER DUMMY POSITION

7669-5

Figure A-25 POST-TEST DRIVER DUMMY POSITION

7669-5

Figure A-26 PRE-TEST PASSENGER DUMMY POSITION

7669-5

Figure A-27 POST-TEST PASSENGER DUMMY POSITION

7669-S

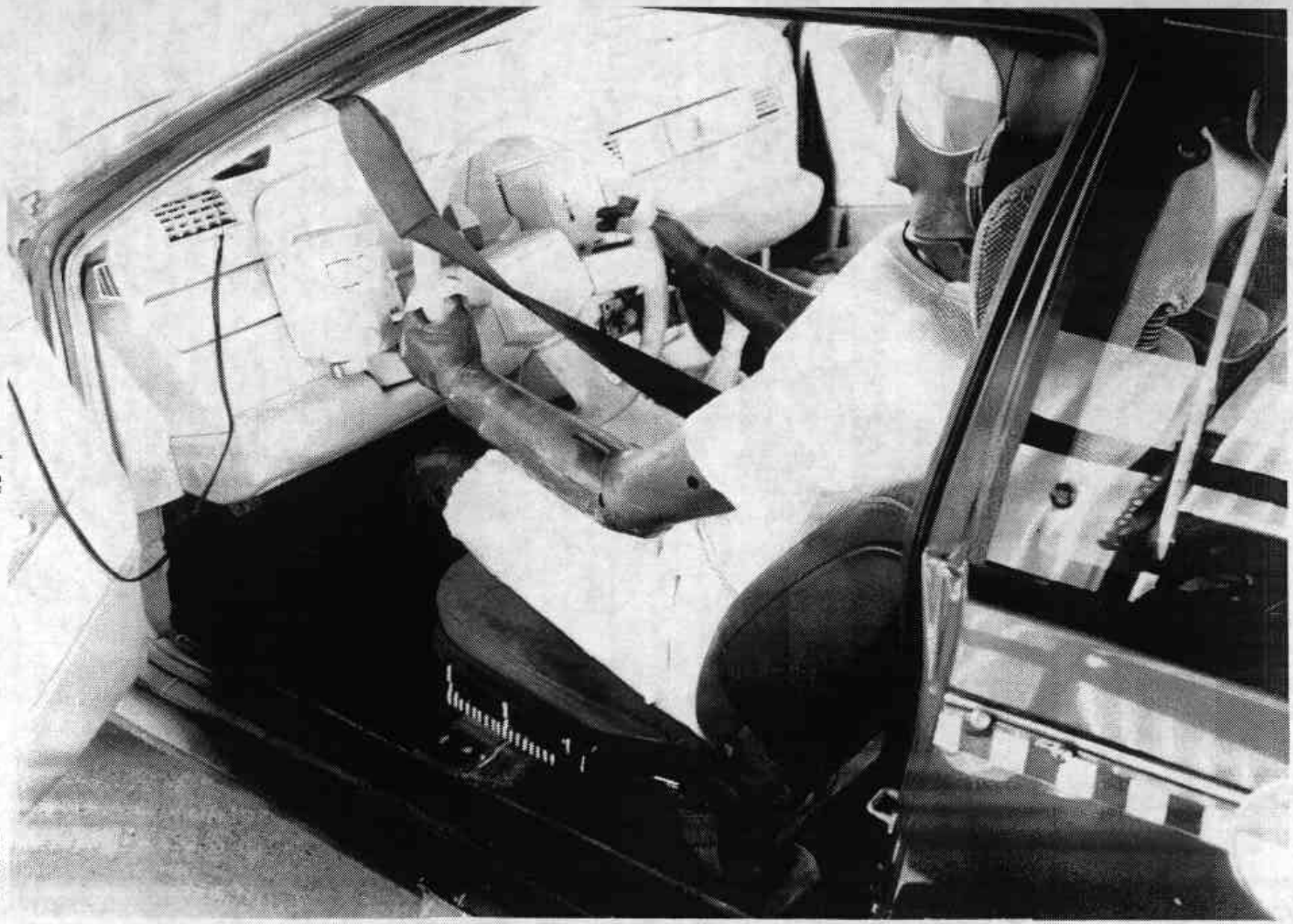


Figure A-28 PRE-TEST DRIVER DUMMY AND INTERIOR VIEW

Figure A-29 POST-TEST DRIVER DUMMY AND INTERIOR VIEW

7669-3

Figure A-30 PRE-TEST PASSENGER DUMMY AND INTERIOR VIEW

Figure A-31 POST-TEST PASSENGER DUMMY AND INTERIOR VIEW

7669-5

Appendix B

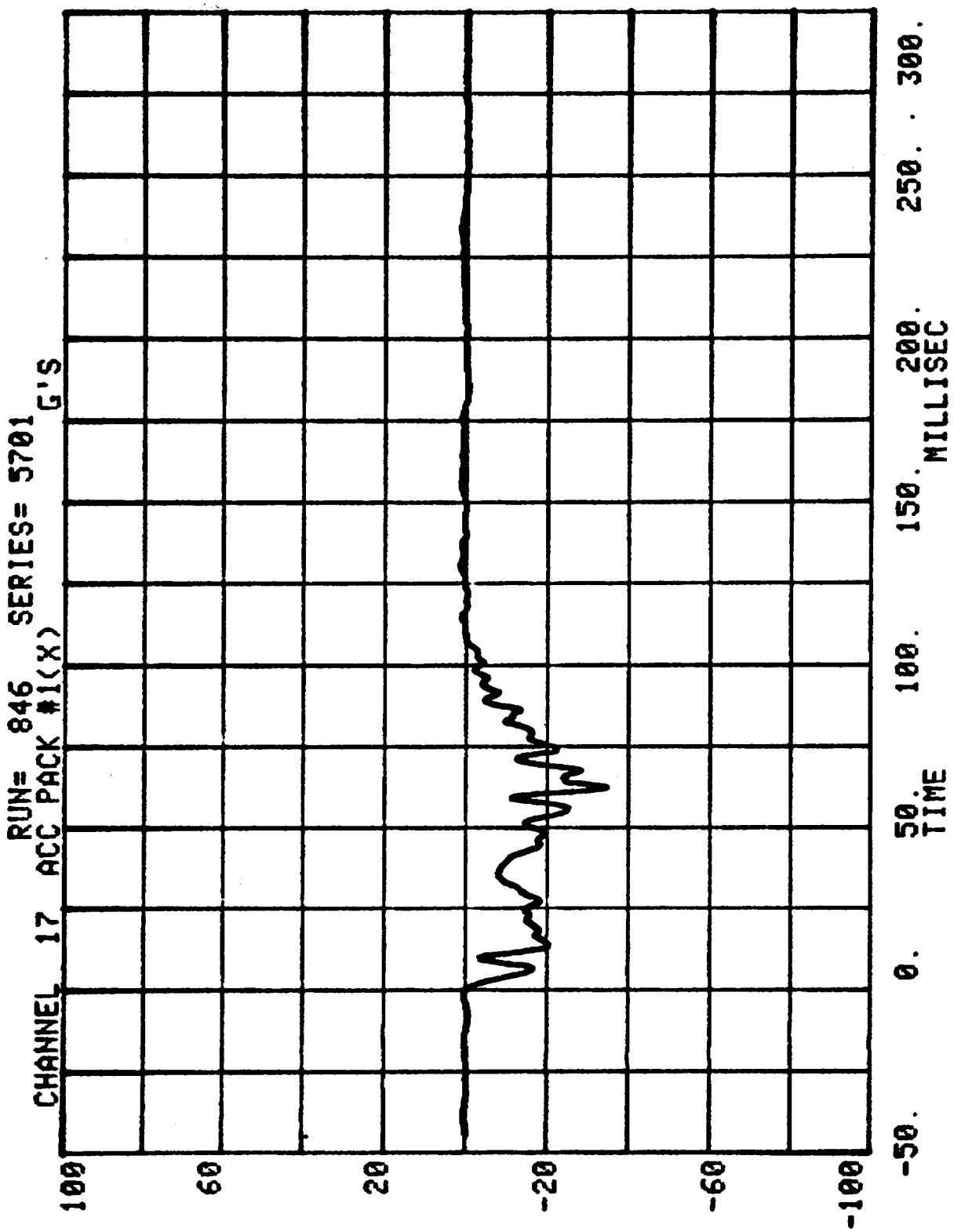
VEHICLE AND DUMMY RESPONSE DATA

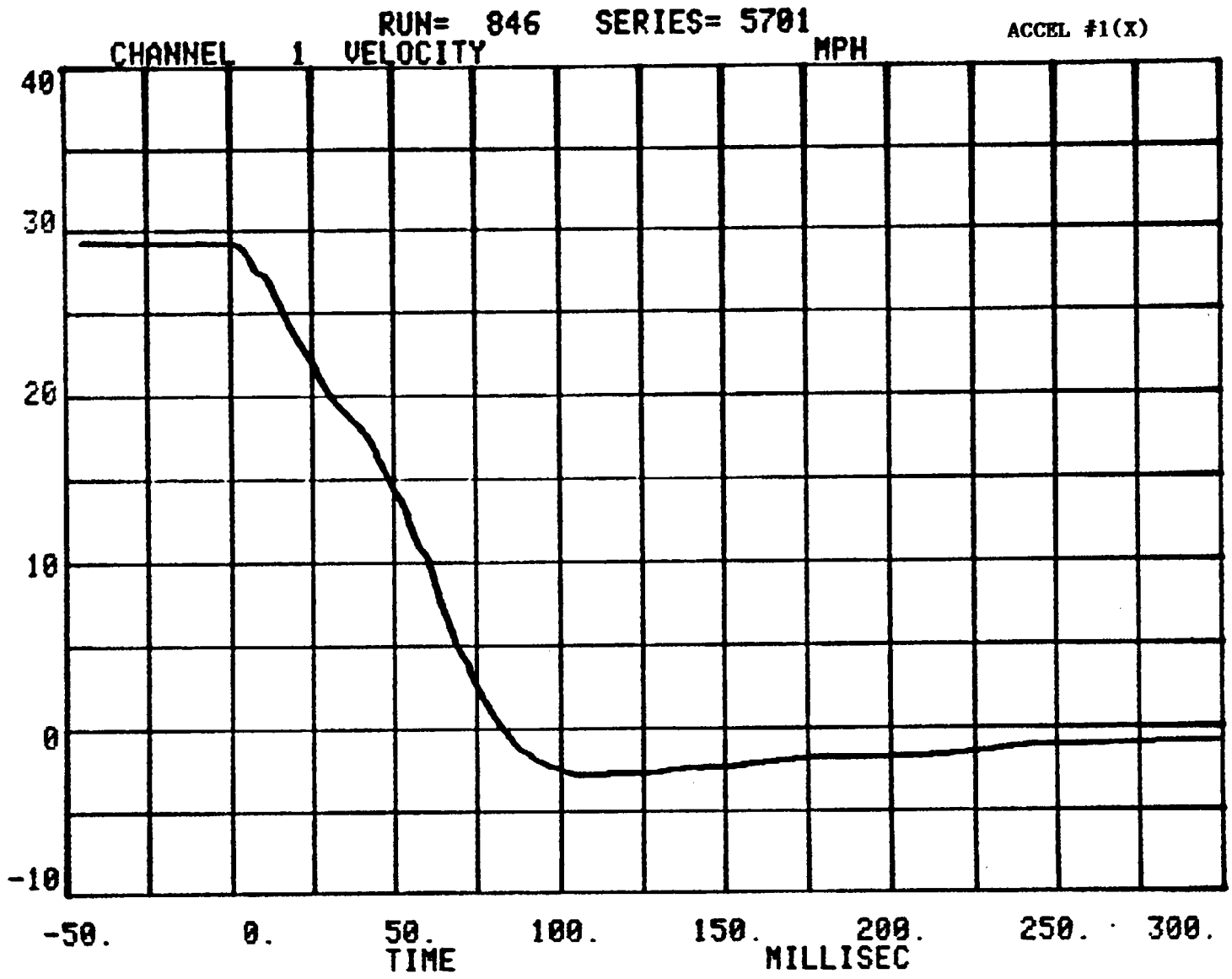
TEST NO. CJ5701

VEHICLE DATA

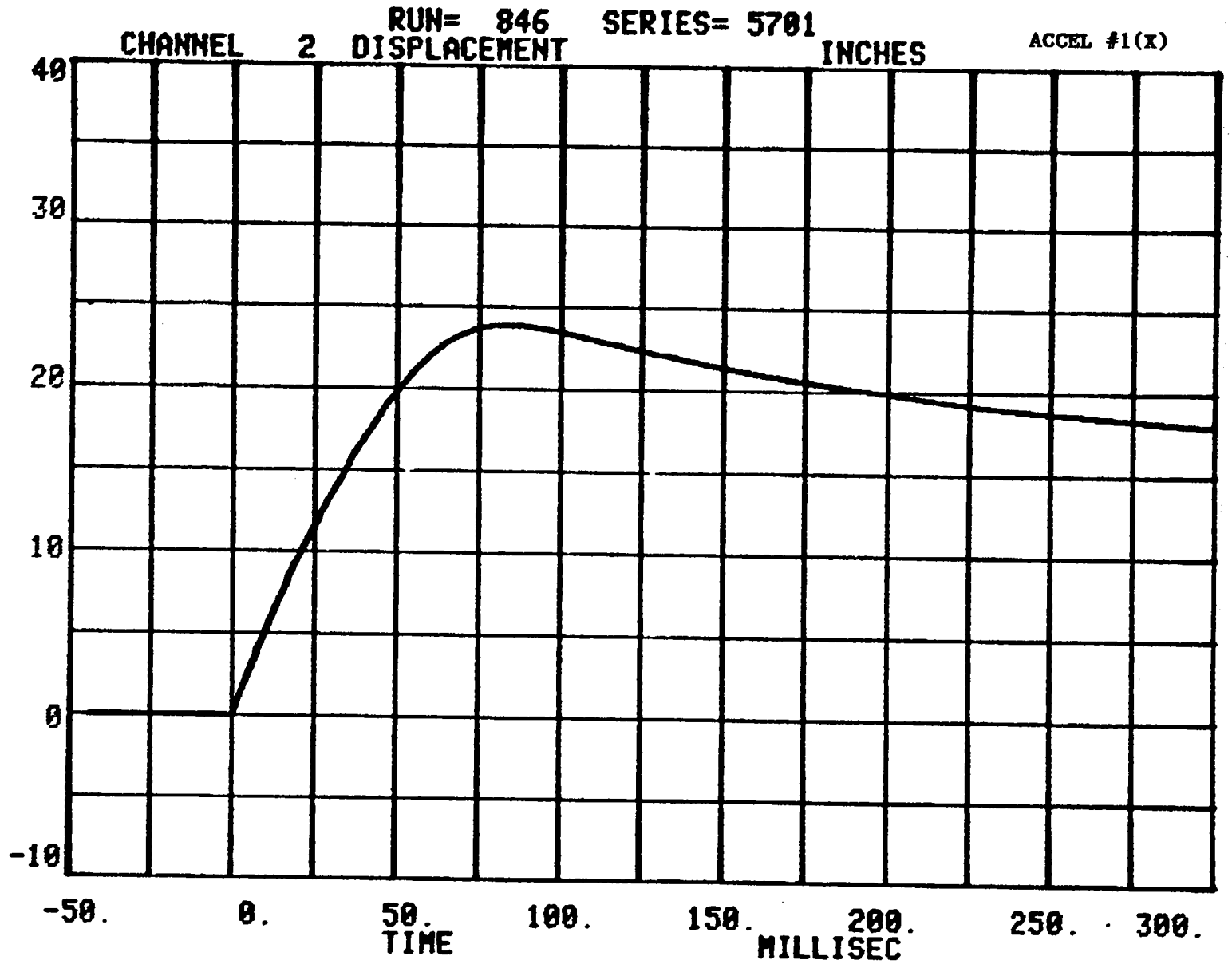
FILTER CHANNEL CLASS

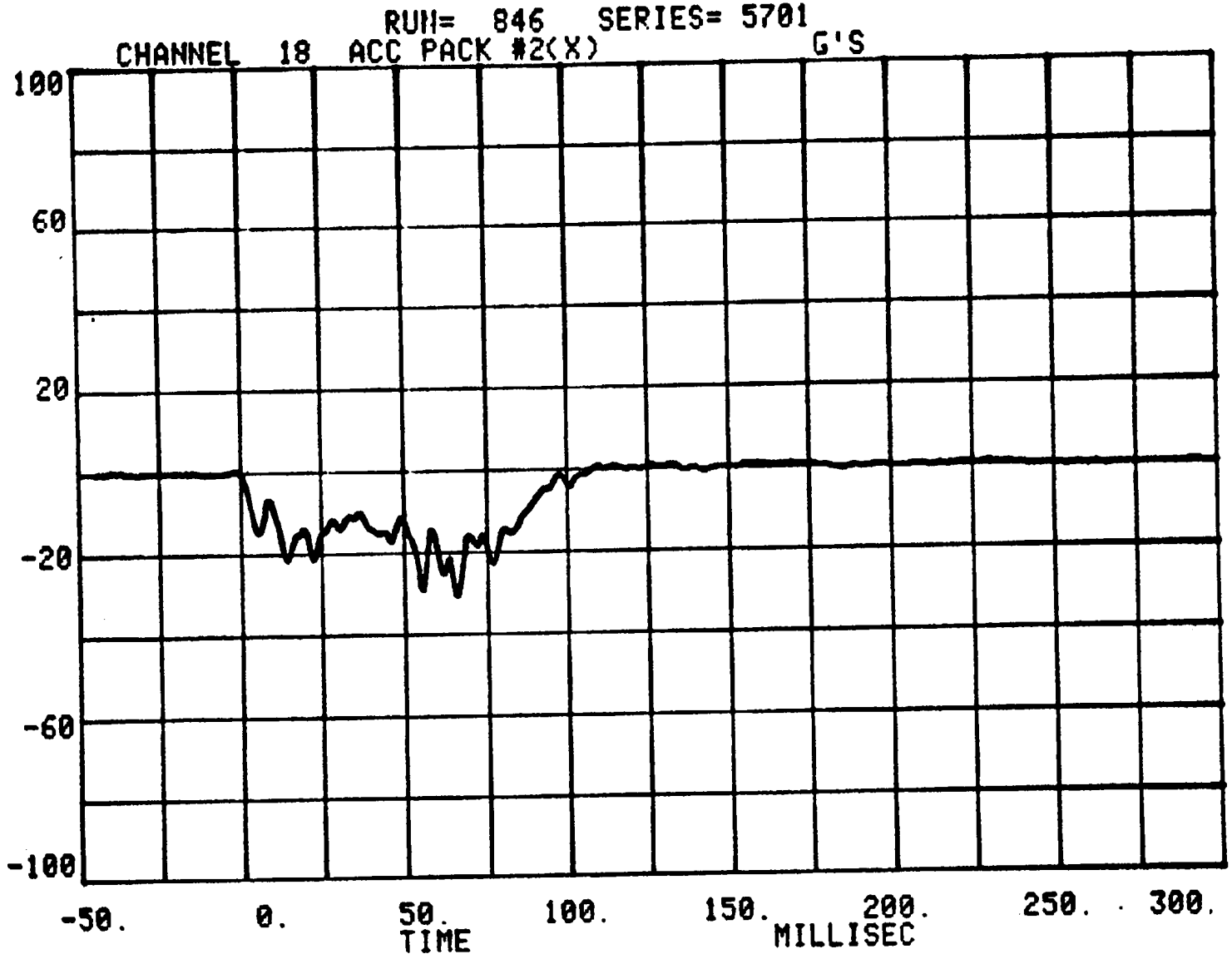
60


CHANNEL 17 ACC PACK #1(X)
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

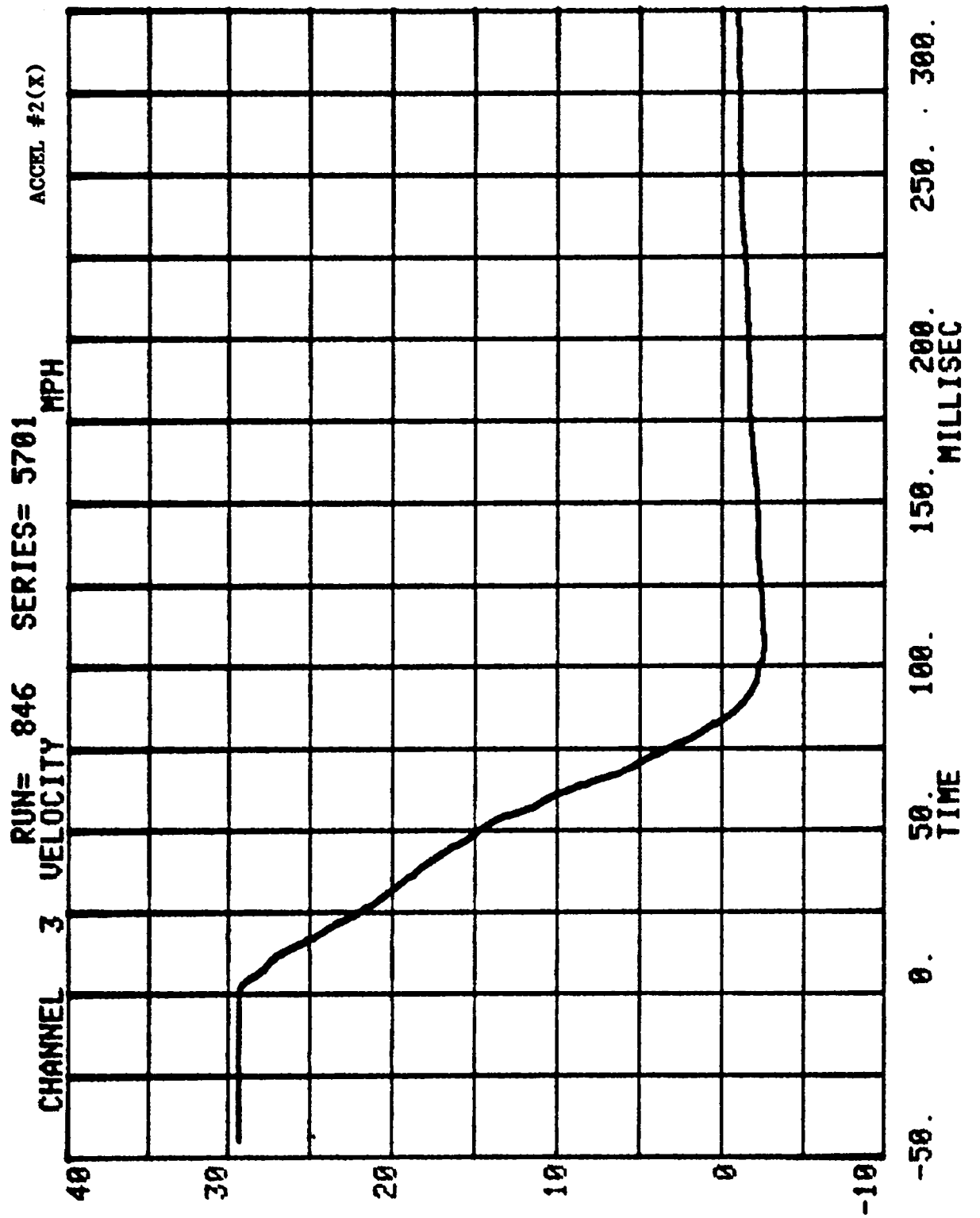

RUN= 846 SERIES= 5701
ACCEL #1(X)
CHANNEL 1 VELOCITY
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7669-5

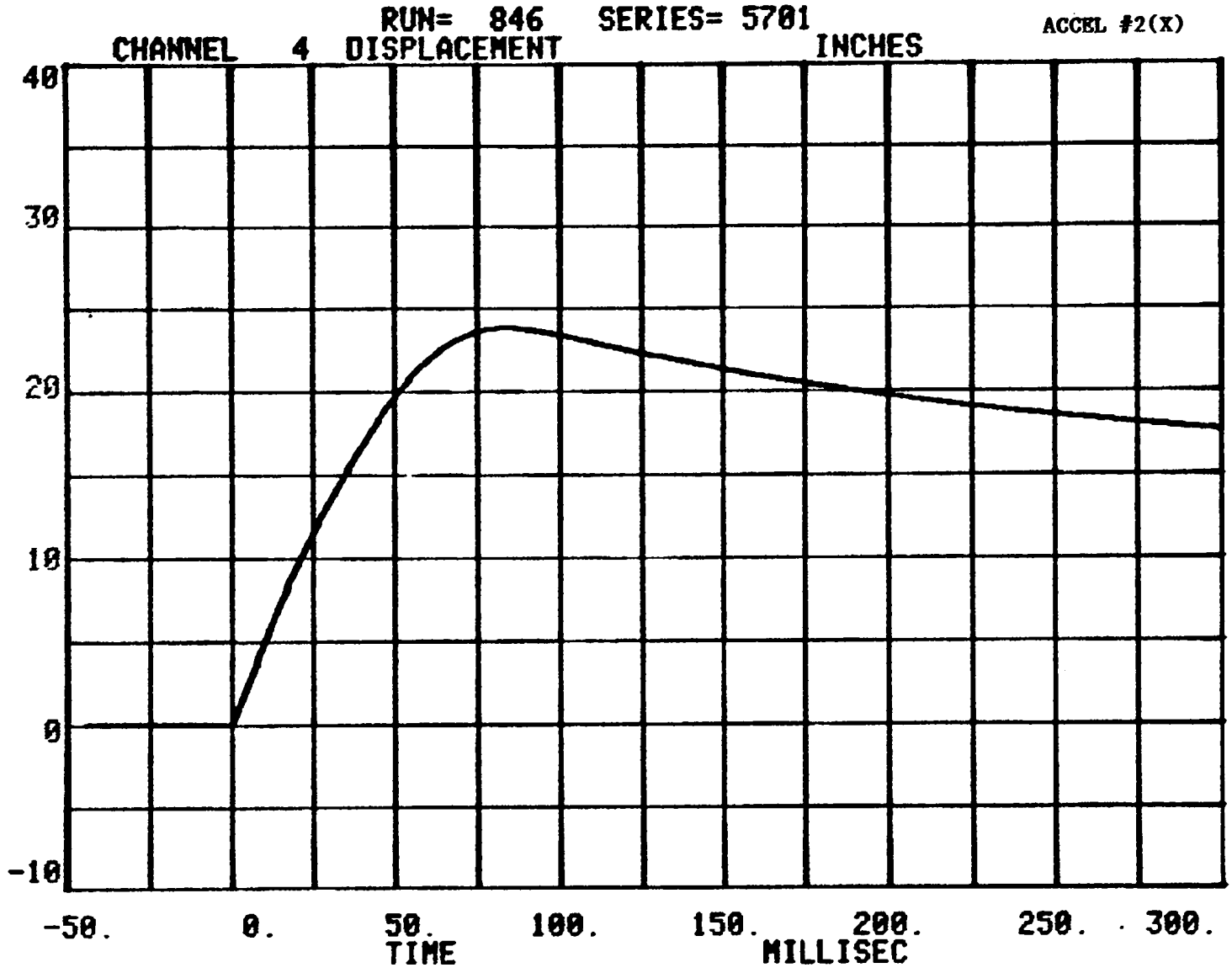

RUN= 846 SERIES= 5701
CHANNEL 2 DISPLACEMENT
INCHES
ACCEL #1(X)
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 846 SERIES= 5701
CHANNEL 18 ACC PACK #2(X)
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

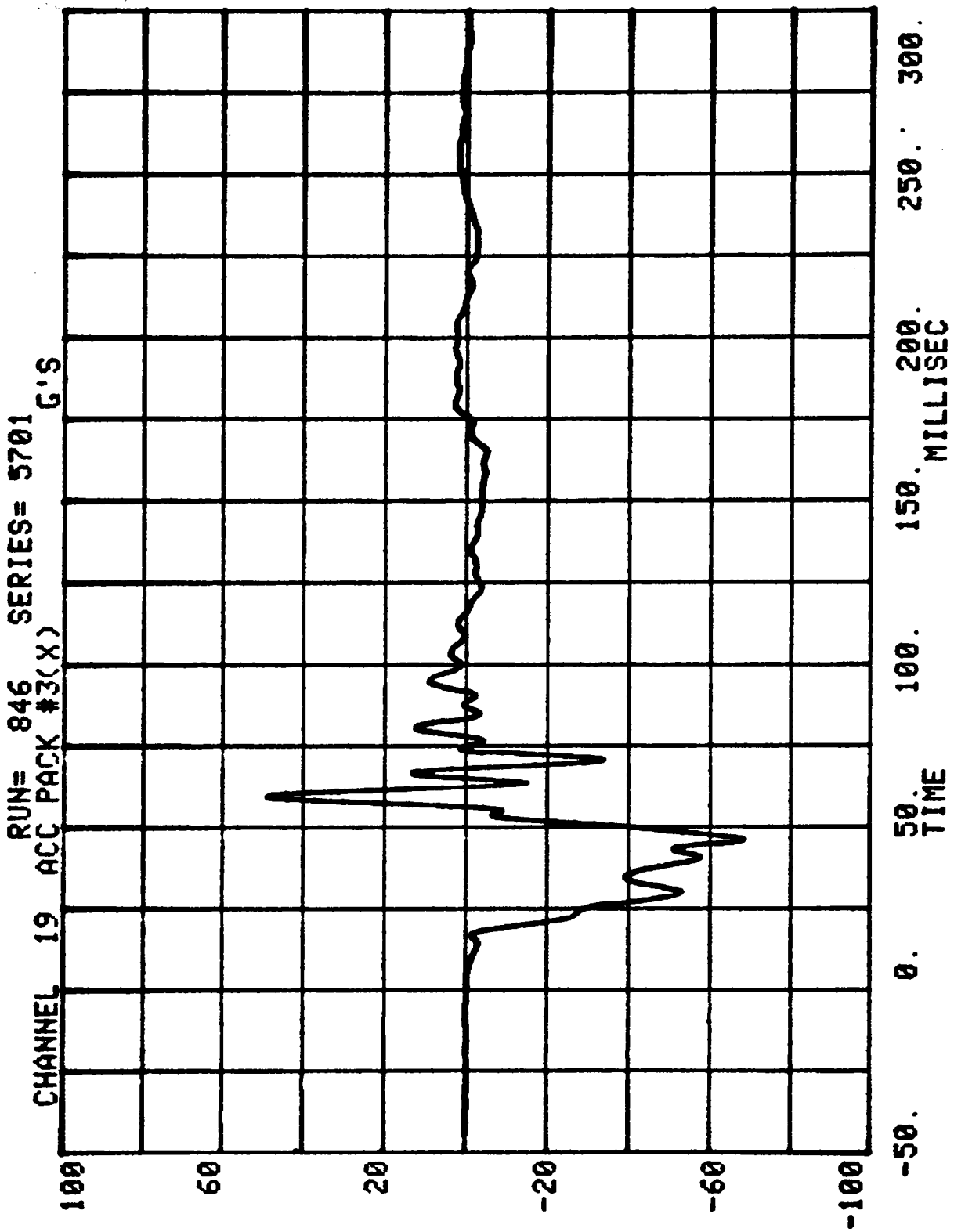
7669-5


ACCEL #2(X)
CHANNEL 3 VELOCITY
RUN= 846 SERIES= 5701
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

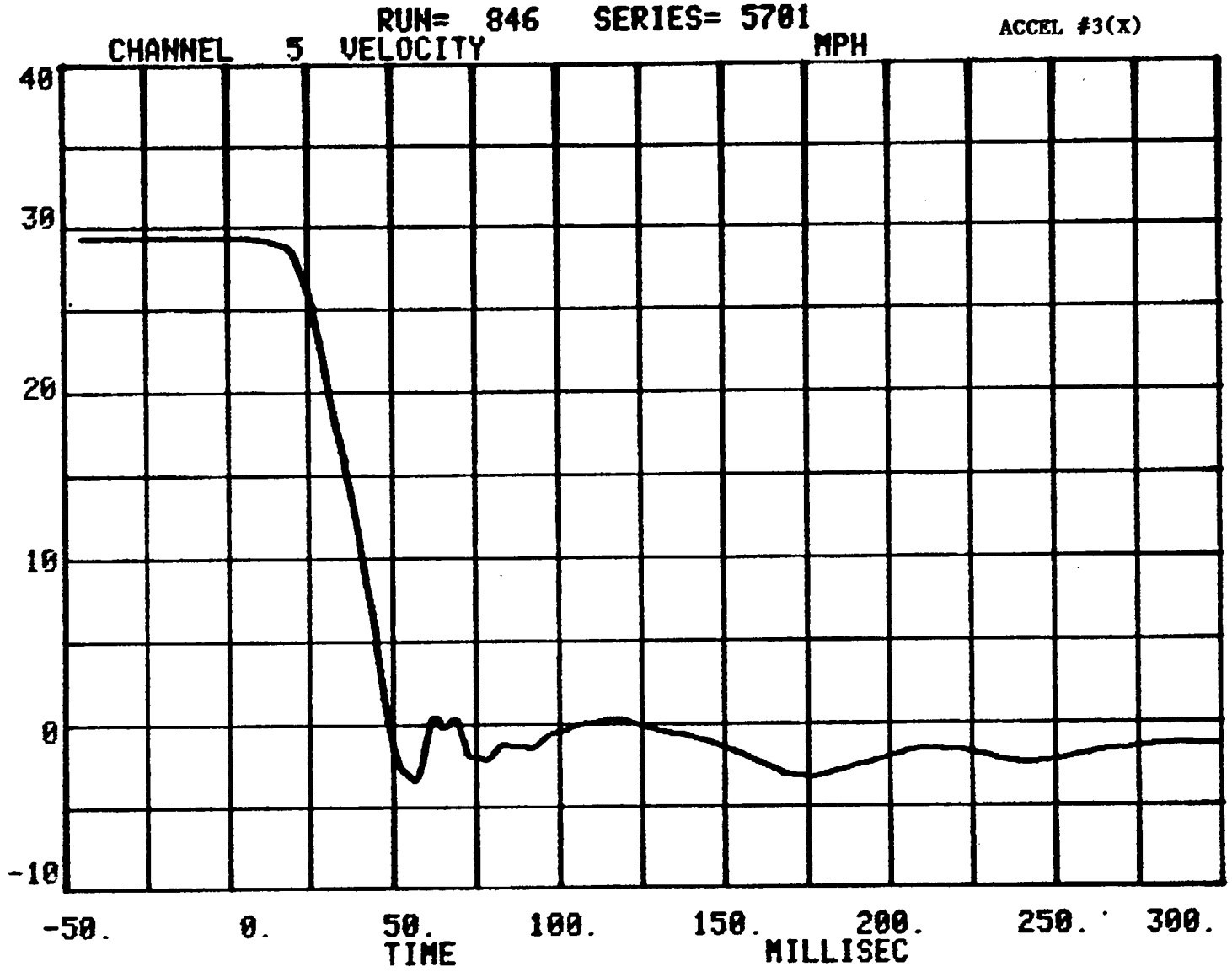
7669-5

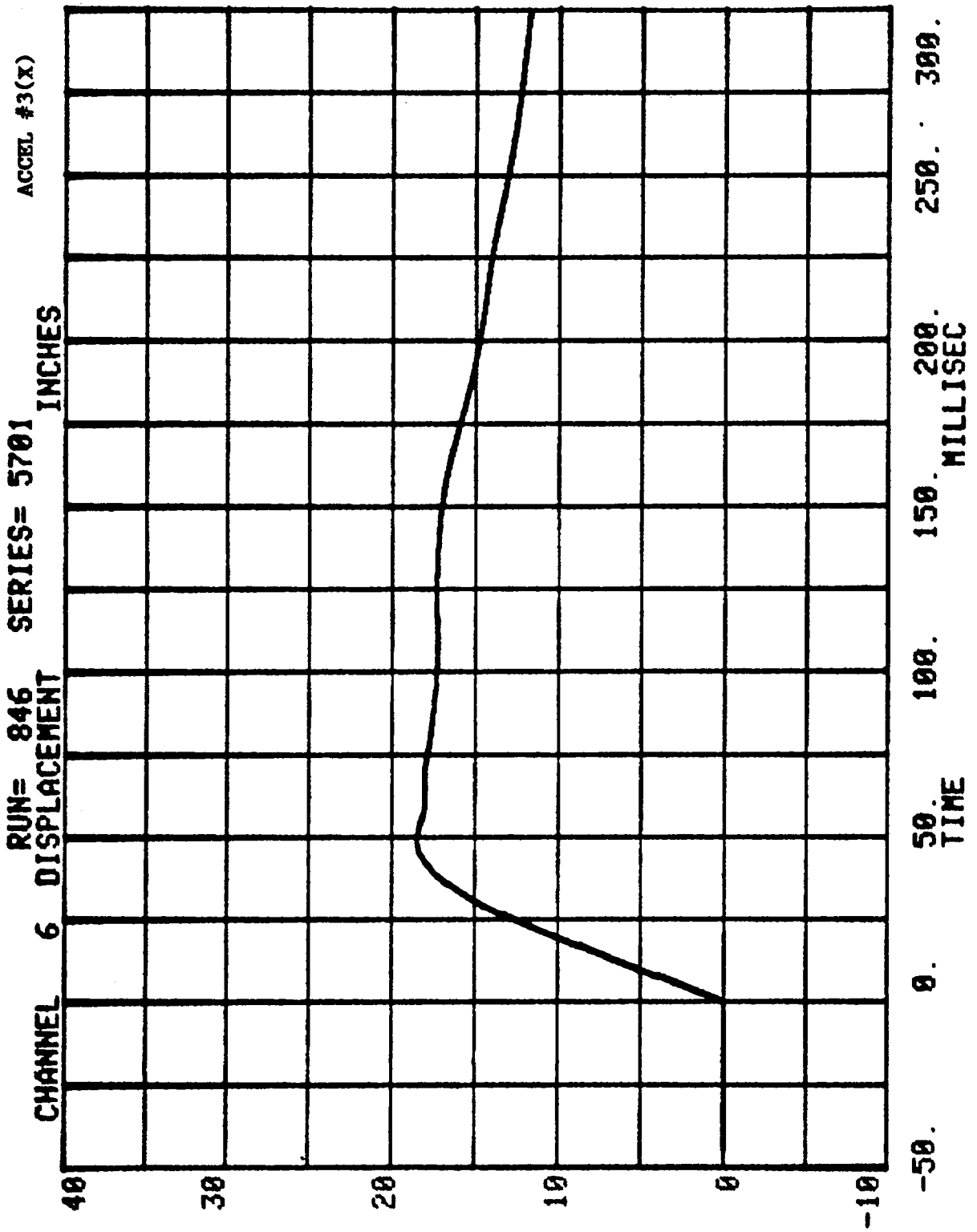

RUN= 846 SERIES= 5701
ACCEL #2(X)
CHANNEL 4 DISPLACEMENT INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC

7669-5

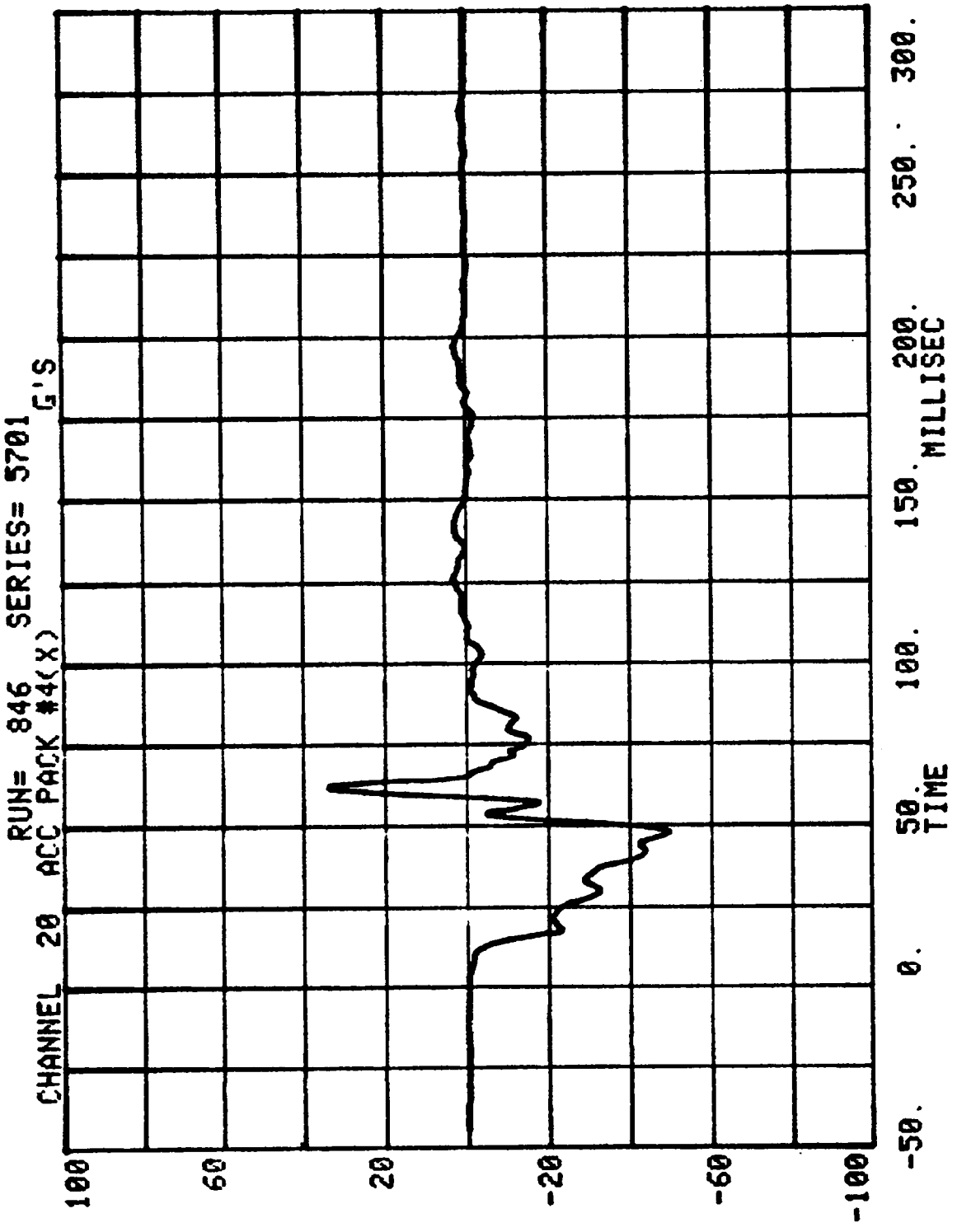

CHANNEL 19 ACC PACK #3(X)
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7669-5

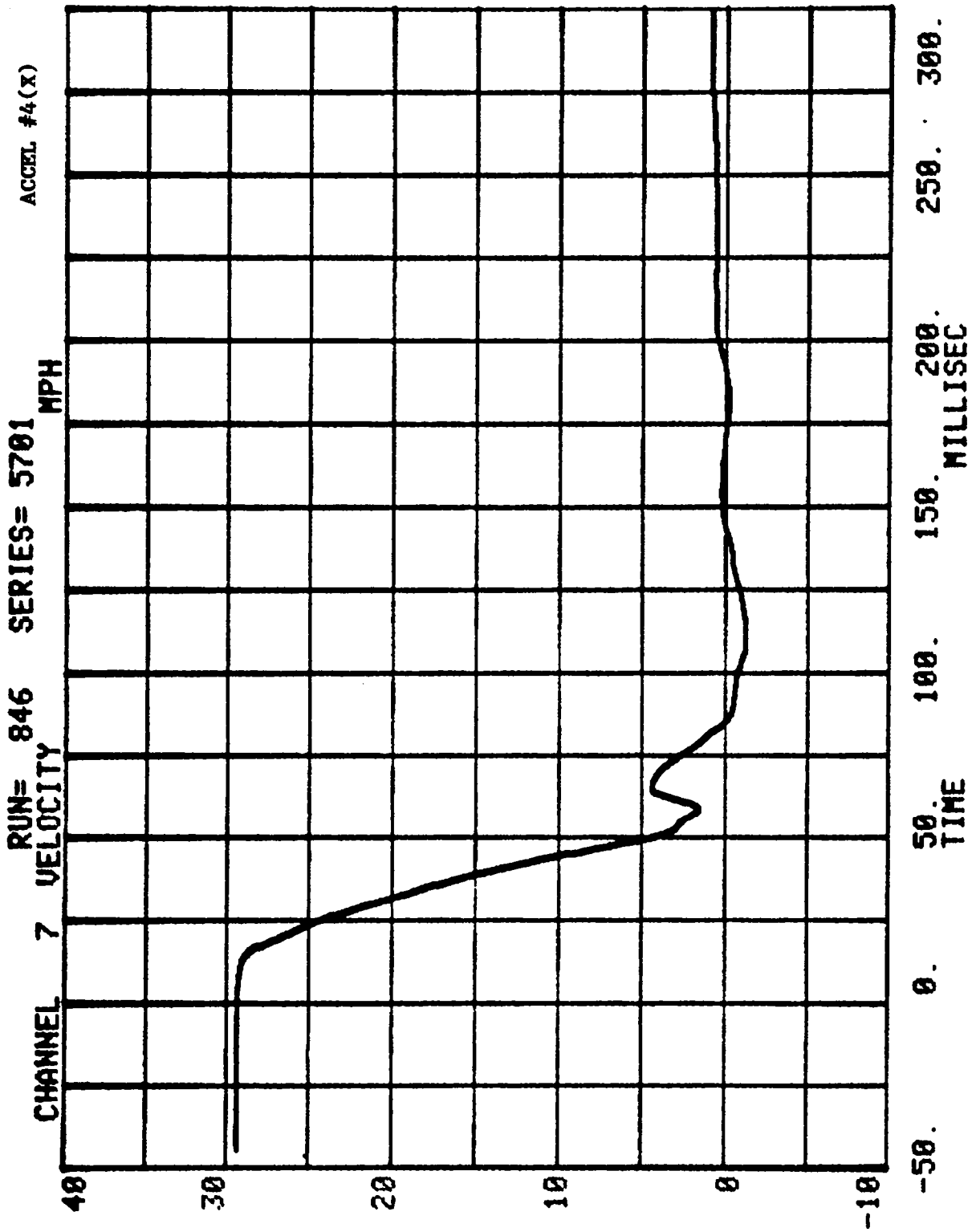

RUN= 846 SERIES= 5701
ACCEL #3(X)
CHANNEL 5 VELOCITY
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


ACCEL #3(X)
CHANNEL 6 DISPLACEMENT
RUN= 846 SERIES= 5701
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

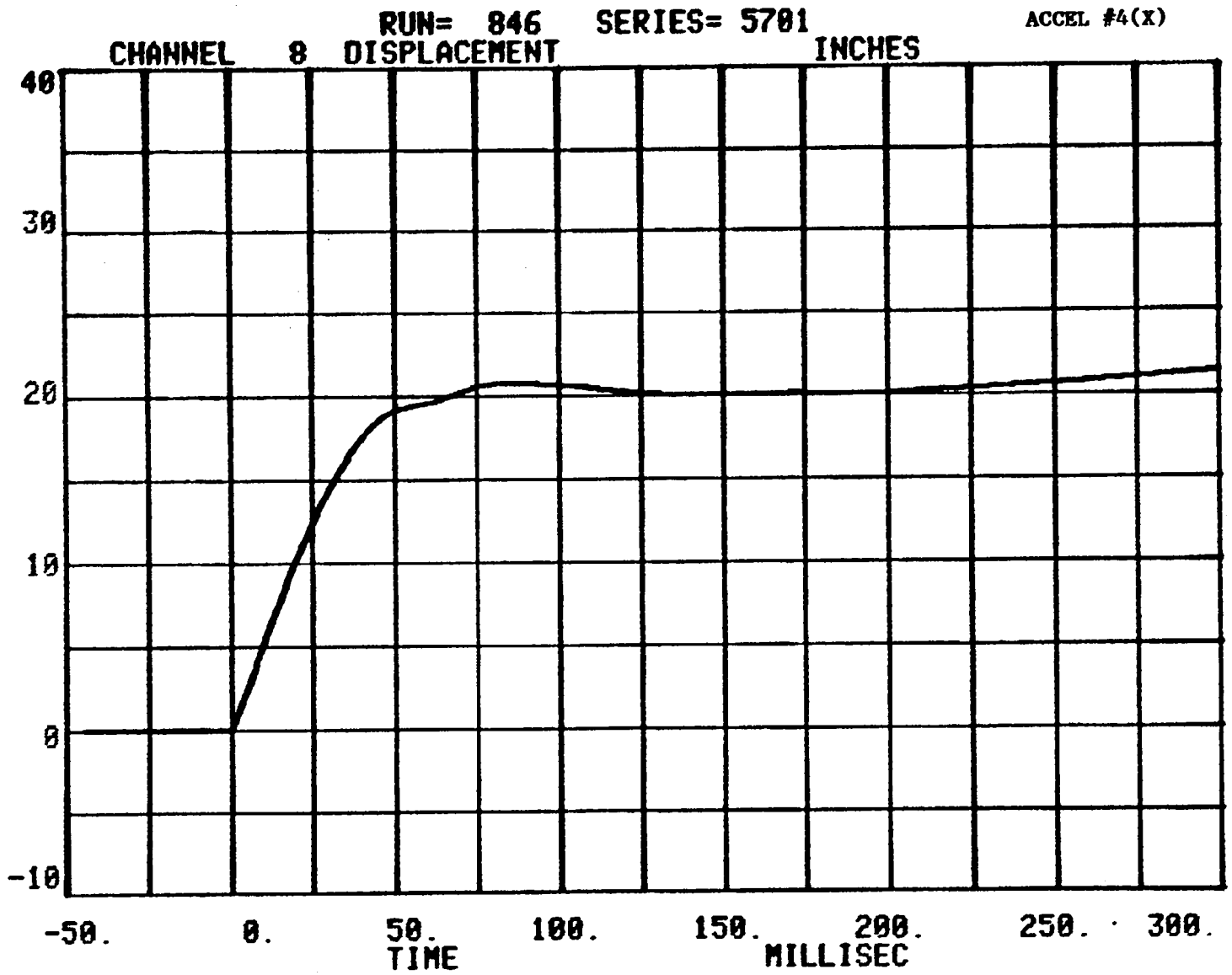
7669-5

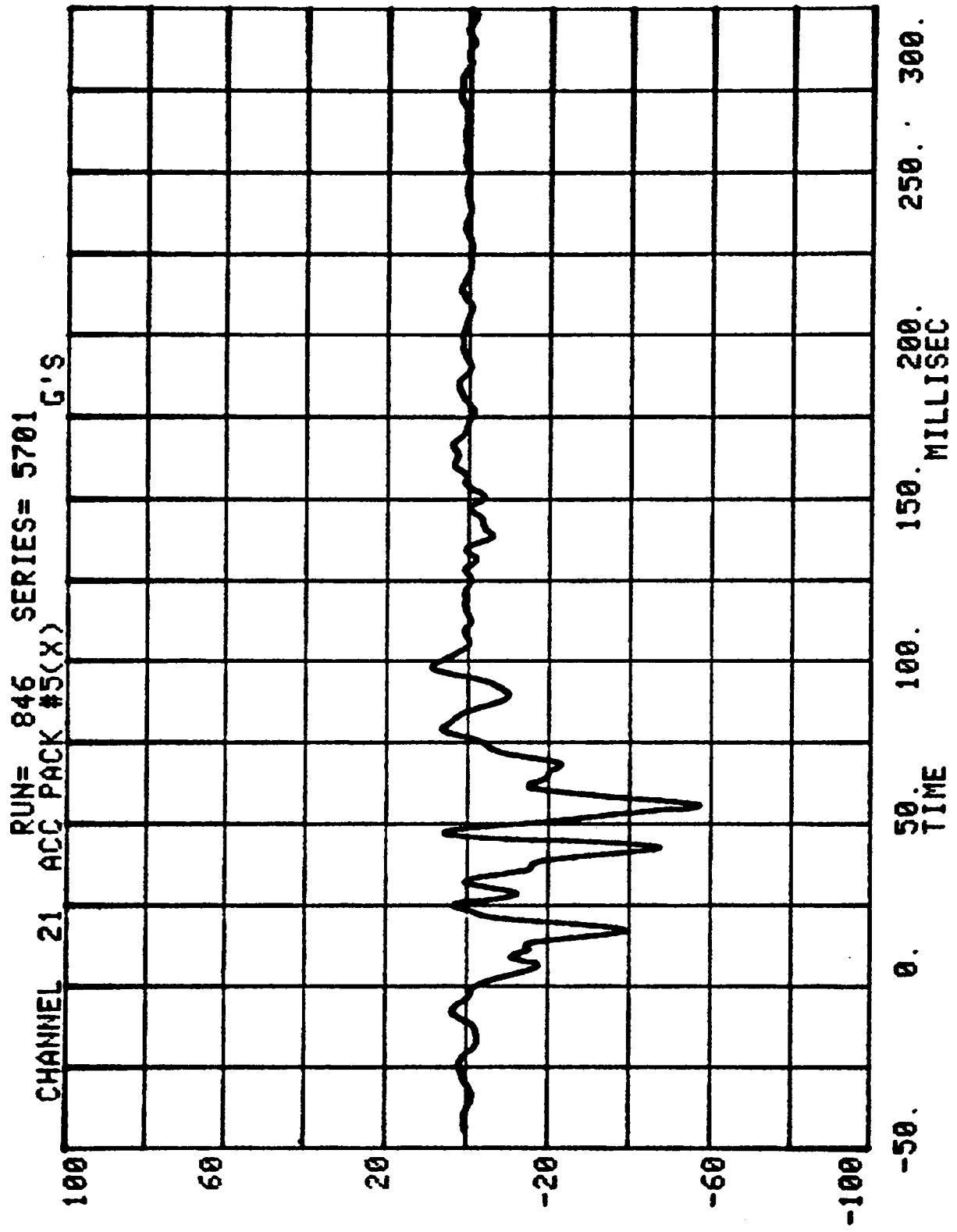

CHANNEL 20 ACC PACK #4(X)
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7669-5

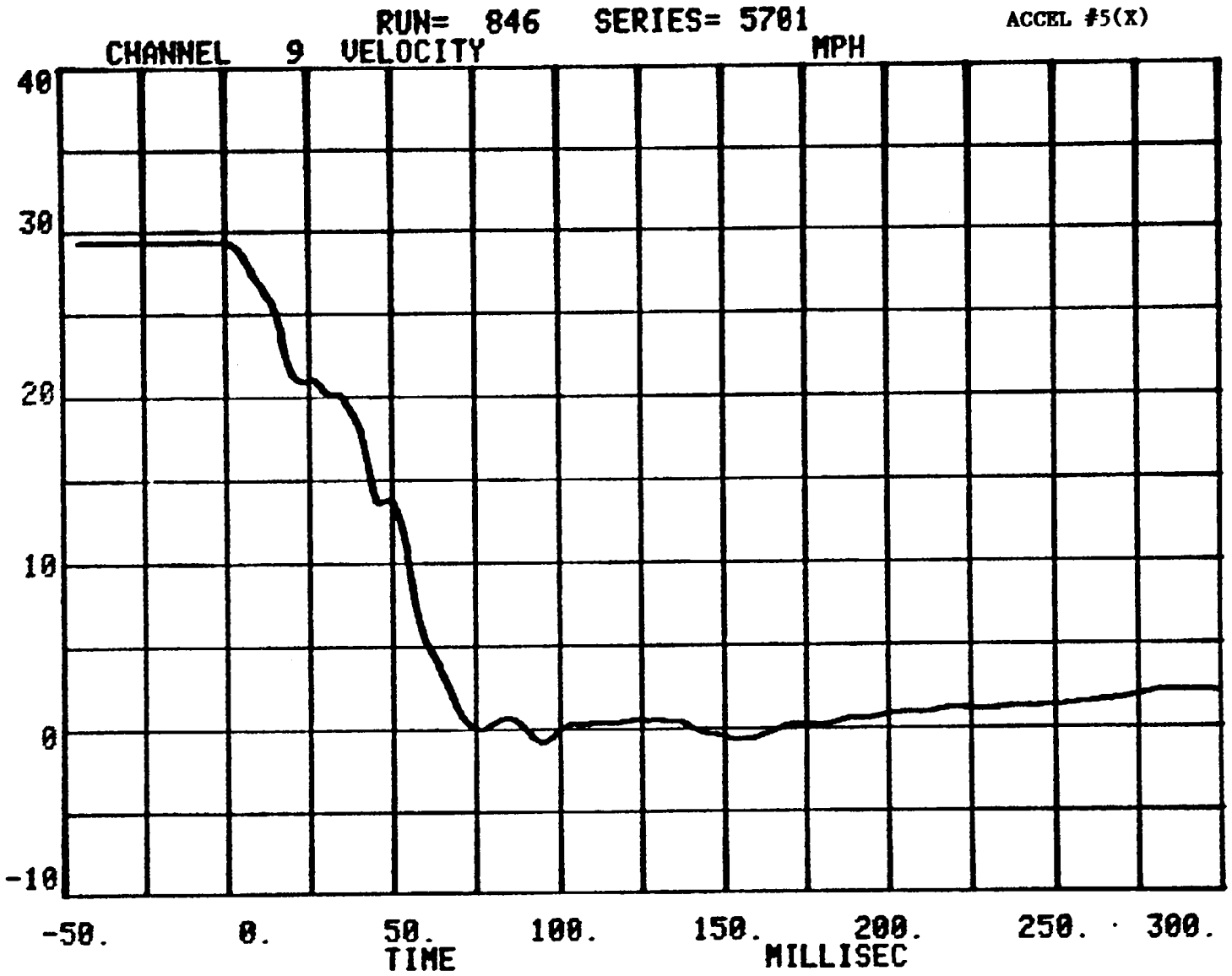

ACCEL #4(x)
CHANNEL 7 VELOCITY
RUN= 846 SERIES= 5701
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

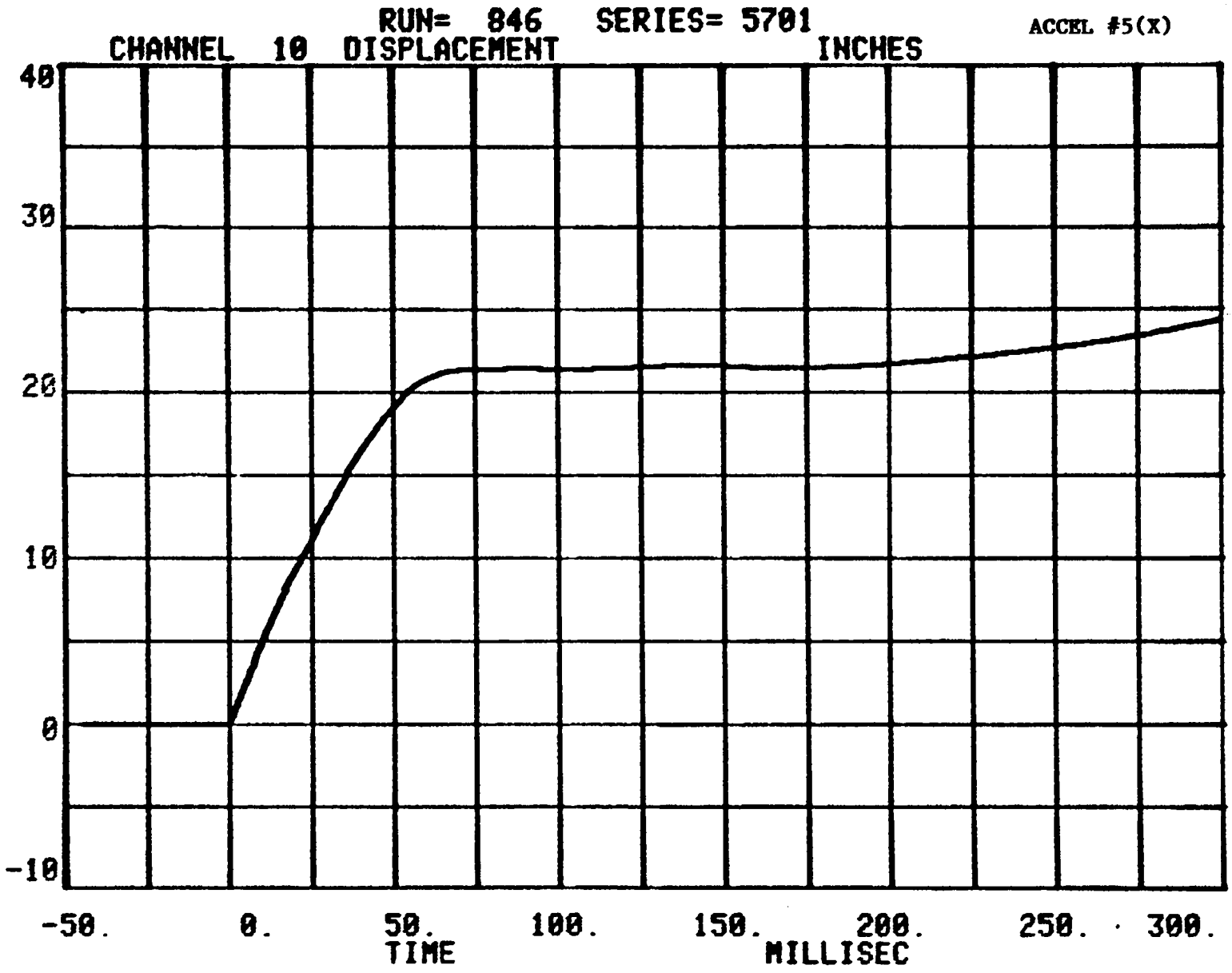
7669-5

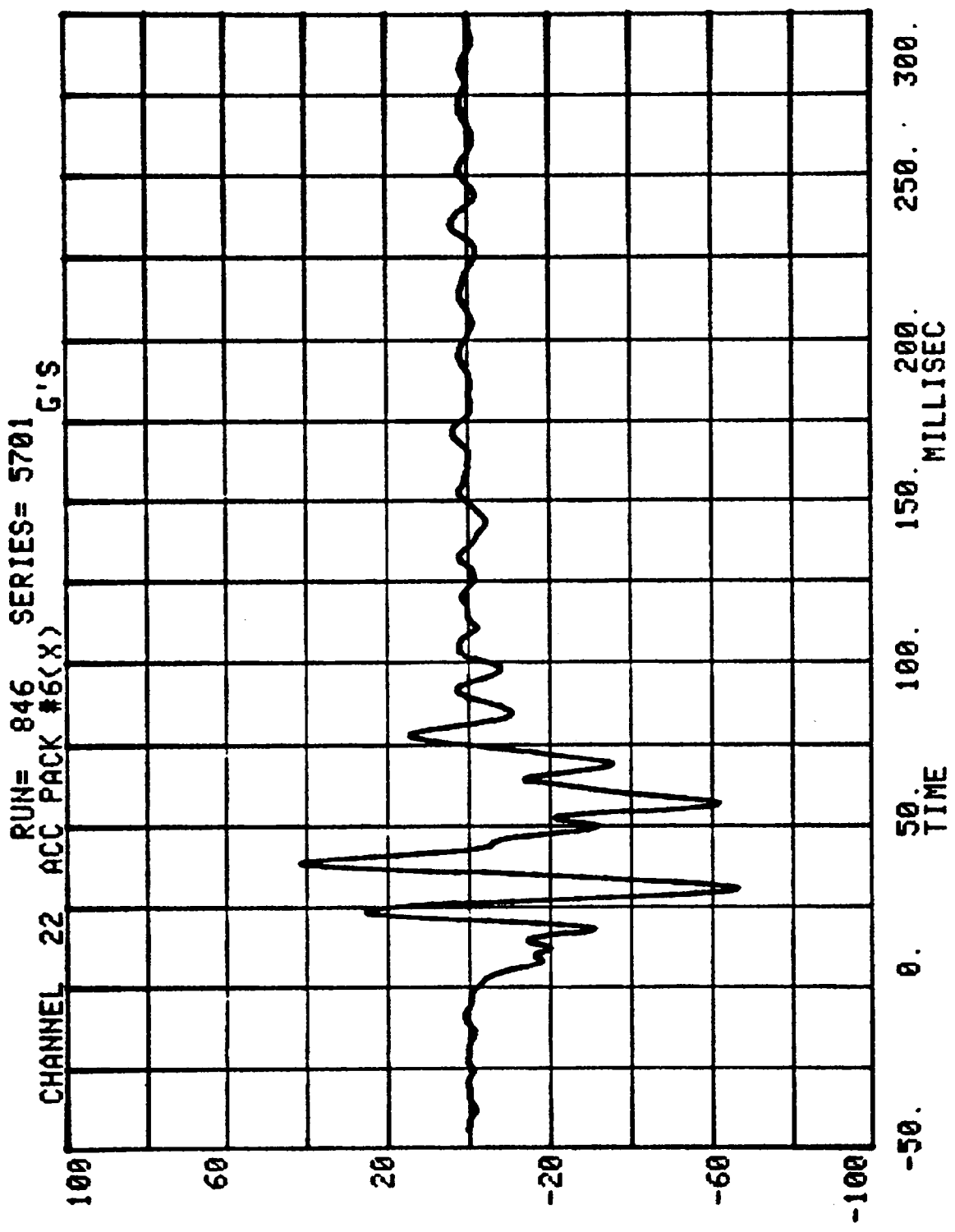

RUN= 846 SERIES= 5701
ACCEL #4(X)
CHANNEL 8 DISPLACEMENT
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 21 ACC PACK #5(X)
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

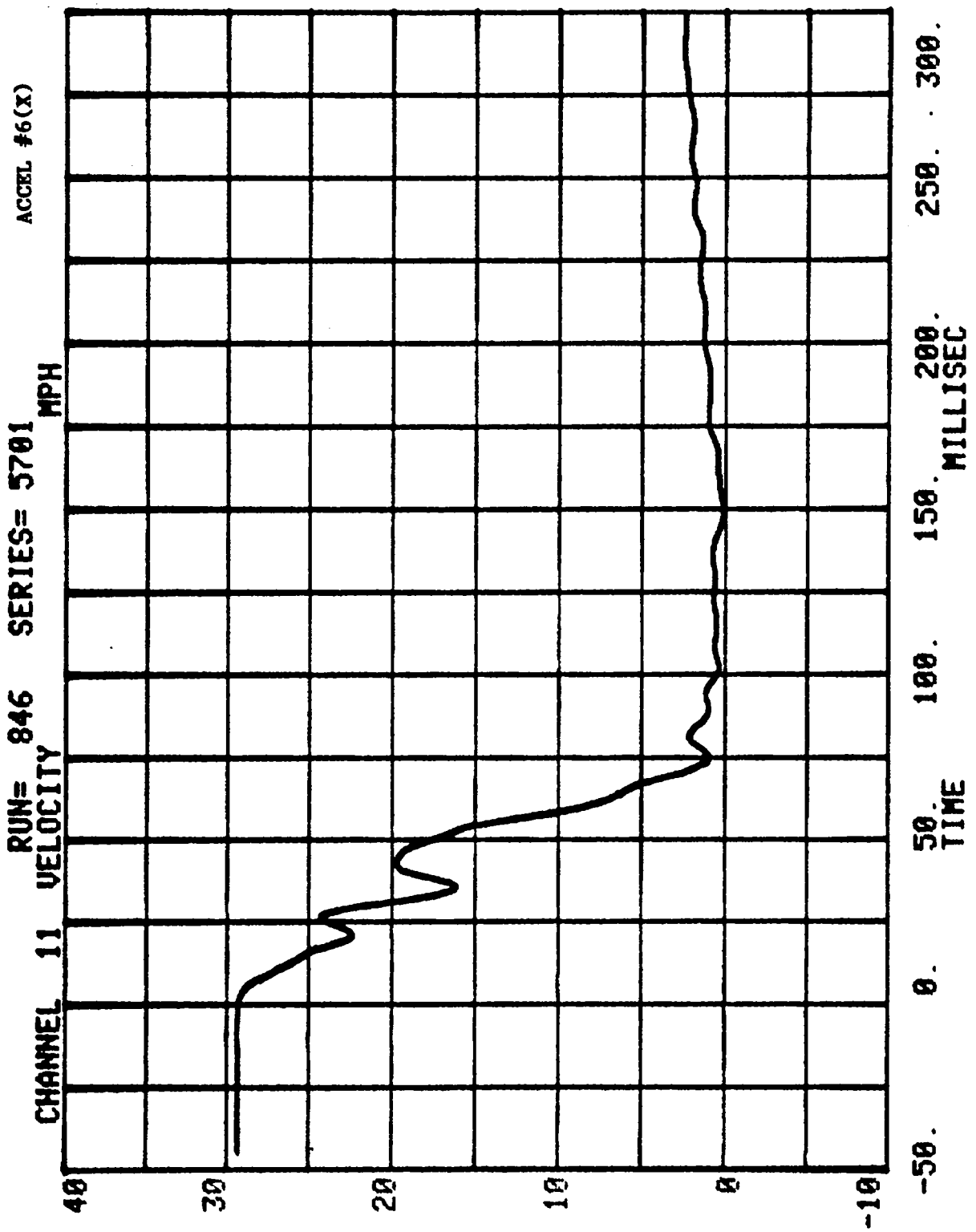
7669-5

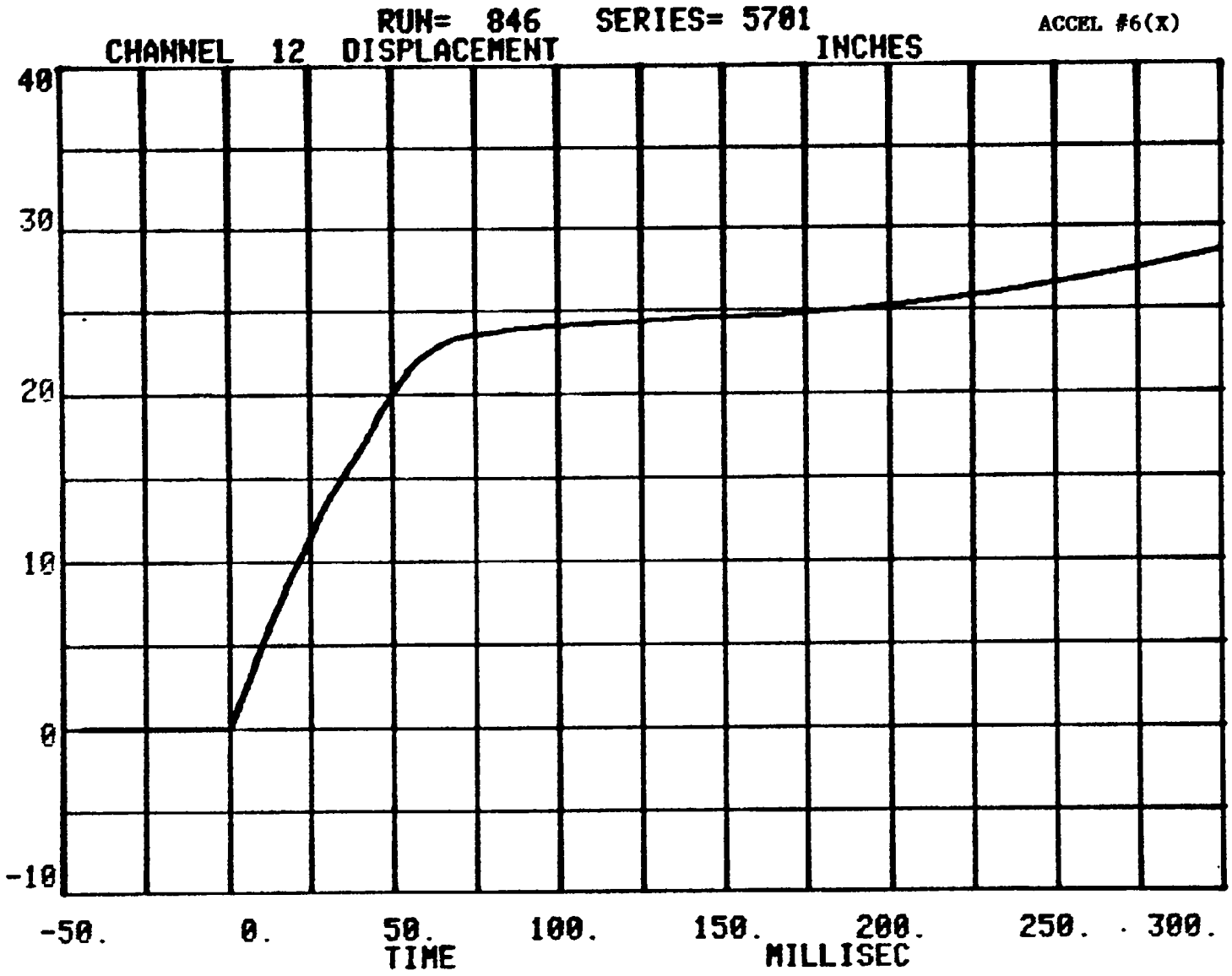

RUN= 846 SERIES= 5701
ACCEL #5(X)
CHANNEL 9 VELOCITY
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

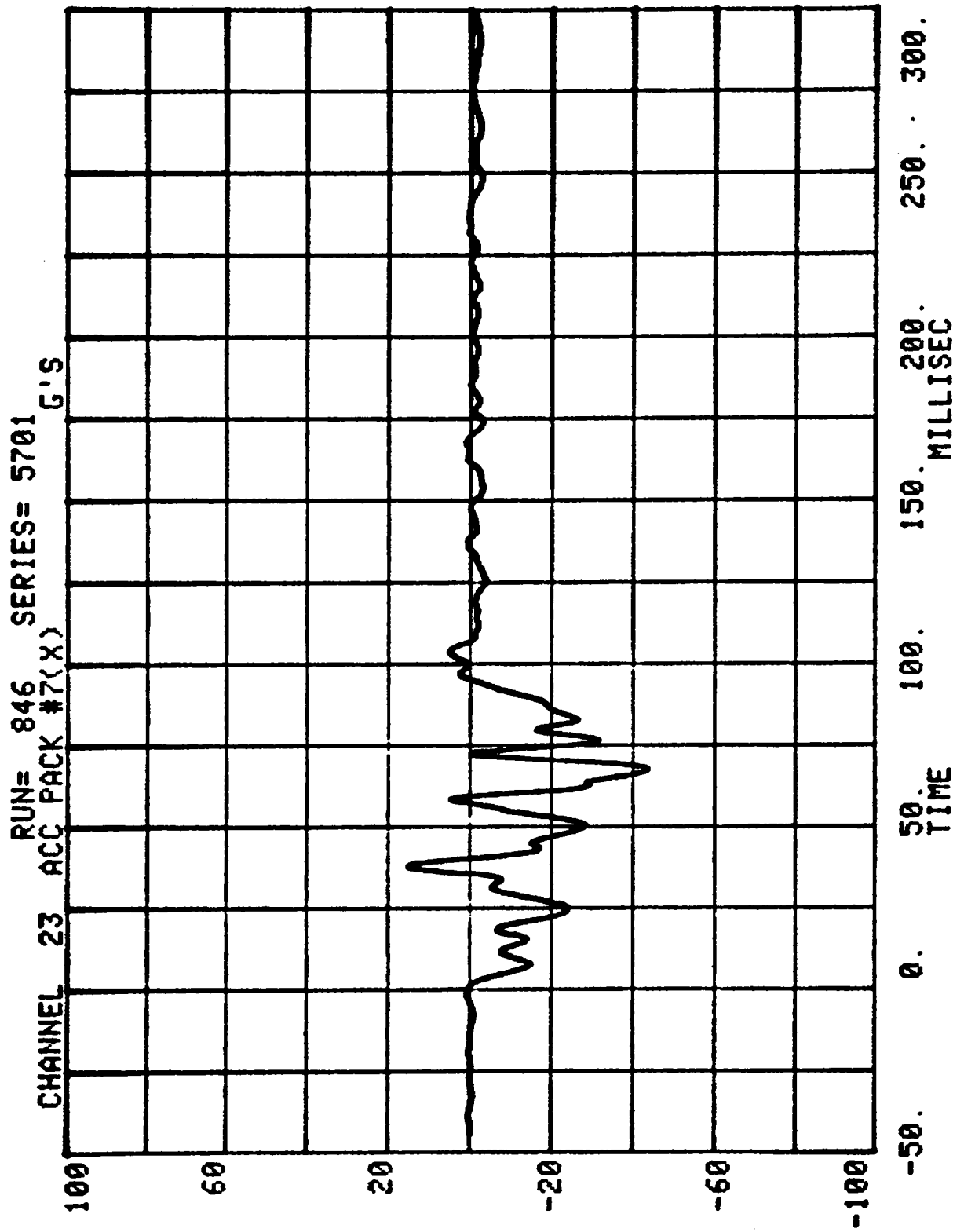

RUN= 846 SERIES= 5701
ACCEL #5(X)
CHANNEL 10 DISPLACEMENT INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC

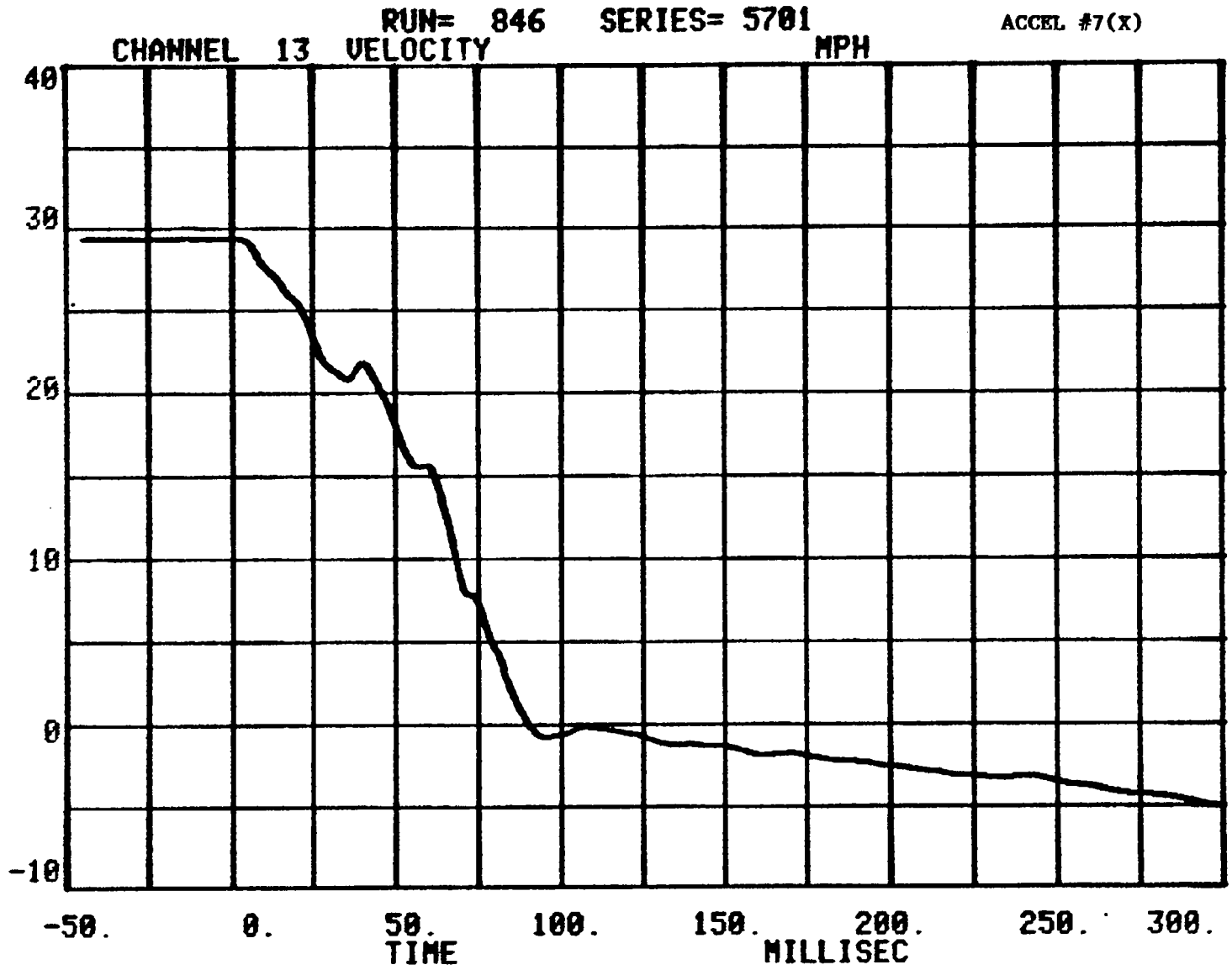

CHANNEL 22 ACC PACK #6(X)
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7669-5

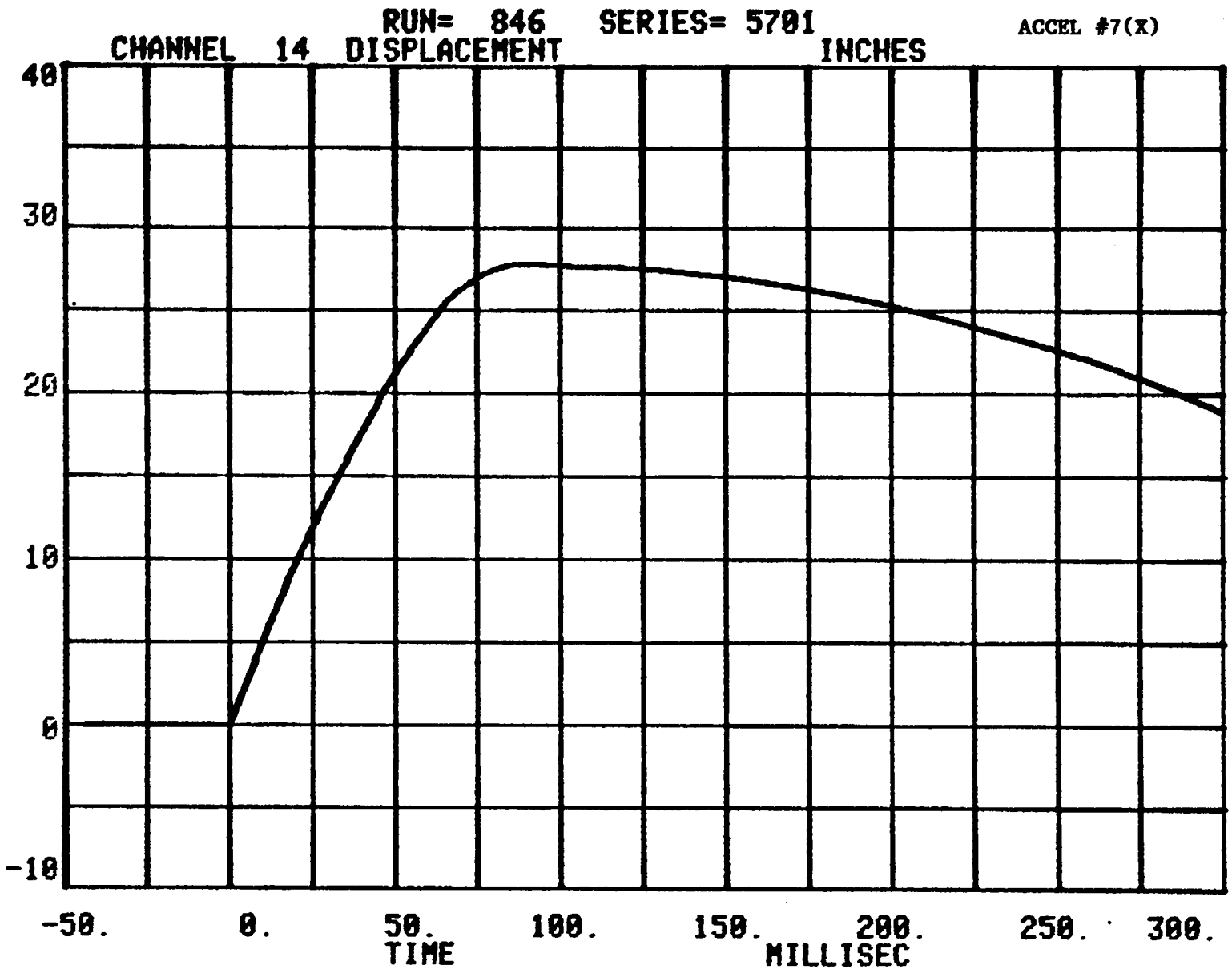

ACCEL #6(X)
CHANNEL 11 VELOCITY
RUN= 846 SERIES= 5701
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 846 SERIES= 5701
ACCEL #6(X)
CHANNEL 12 DISPLACEMENT
INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 23 ACC PACK #7(X)
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


RUN= 846 SERIES= 5701
ACCEL #7(X)
CHANNEL 13 VELOCITY
MPH
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7669-5


RUN= 846 SERIES= 5701
ACCEL #7(X)
CHANNEL 14 DISPLACEMENT INCHES
40
30
20
10
0
-10
-50.
0.
50.
100.
150.
200.
250.
300.
TIME MILLISEC

TEST NO. CJ5701

DUMMY DATA

	FILTER CHANNEL CLASS
HEAD ACCELERATIONS	1000
CHEST ACCELERATIONS	180
FEMUR FORCES	600
BELT LOADS	60

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NHTSA CRASH TEST - PROC.208

RUN= 846

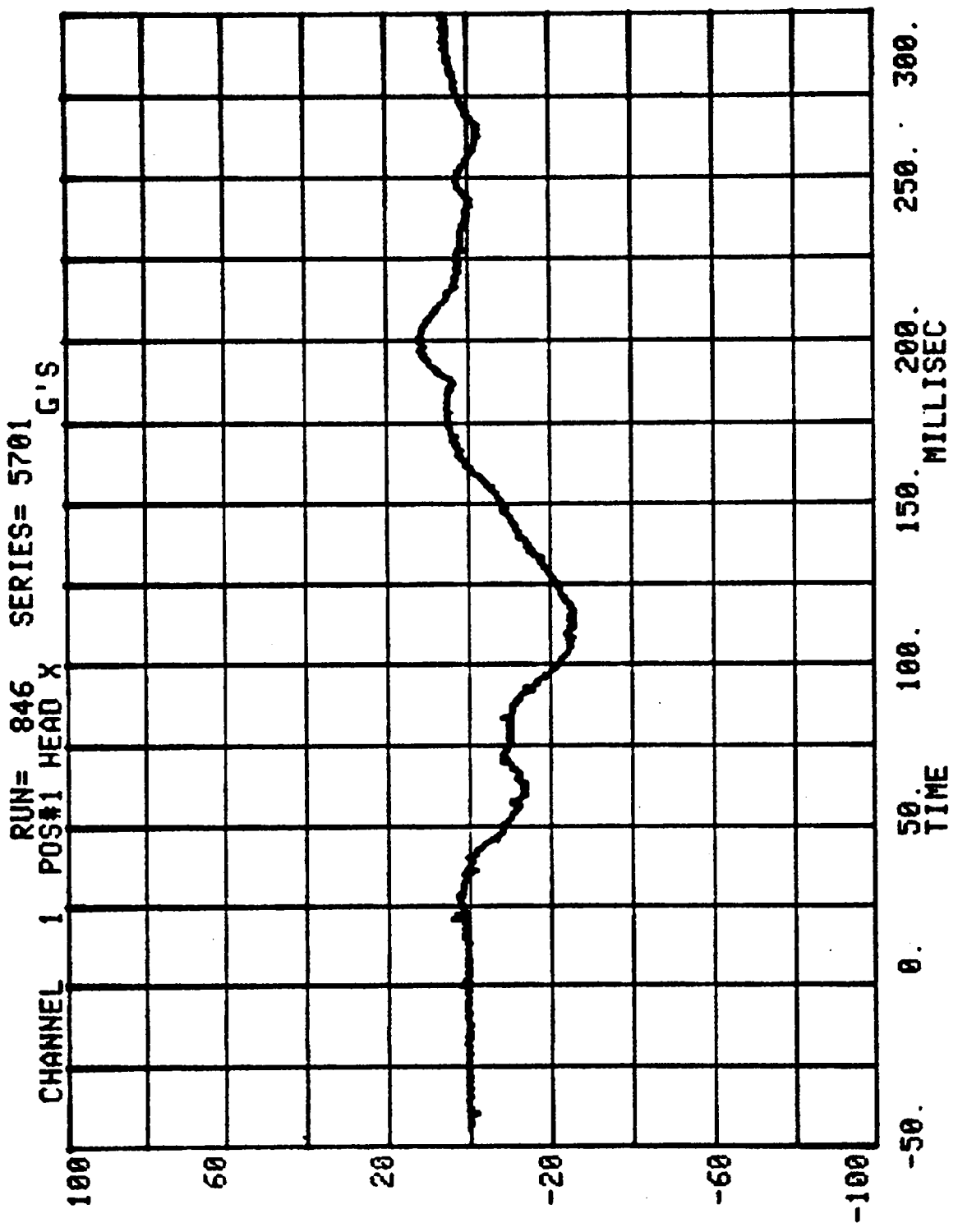
POS#1 HEAD R

HIC= 336.0 FROM T1= .06210 TO T2= .09810

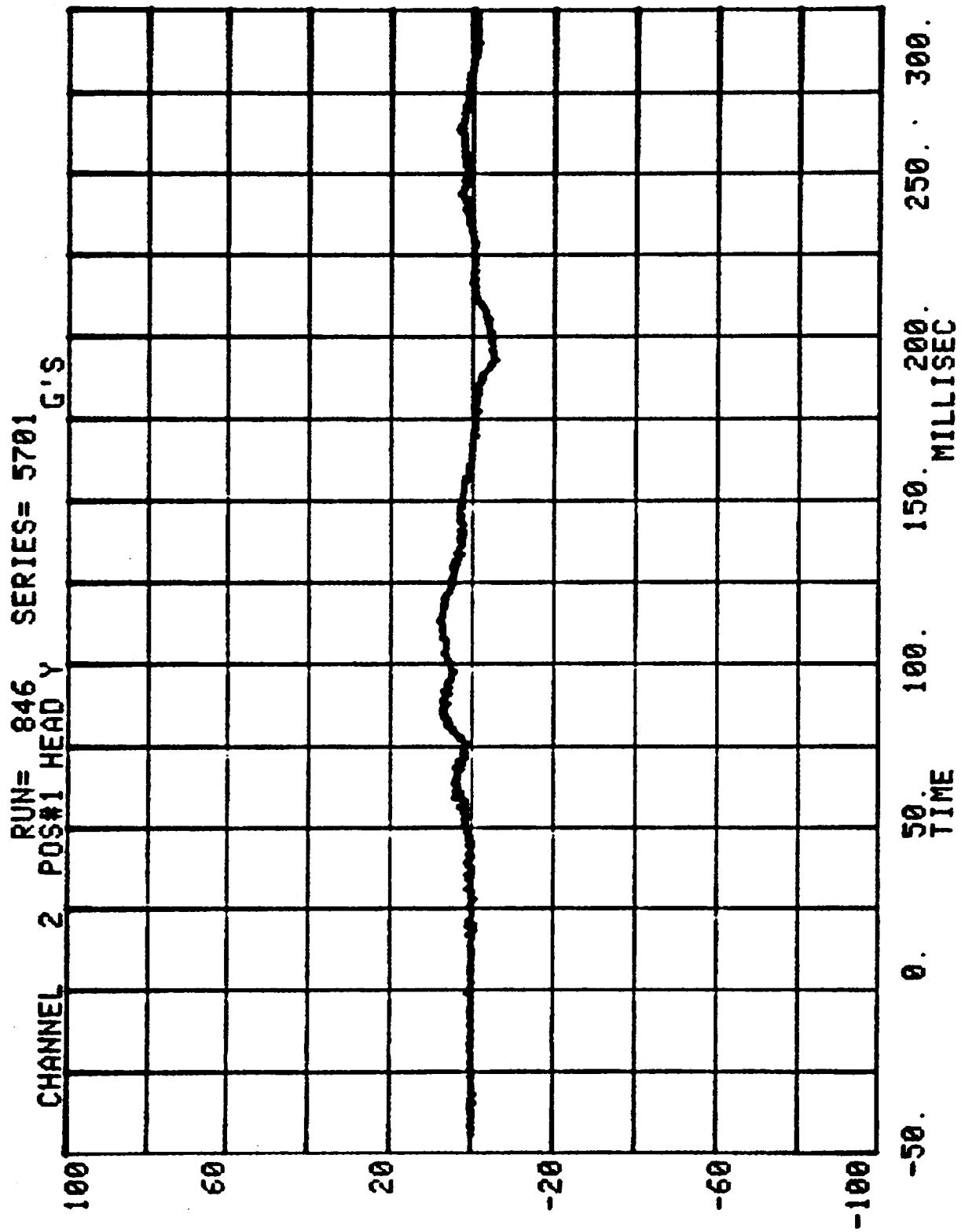
AVERAGE ACCELERATION BETWEEN T1 AND T2= 38.7G'S

EVENT TIME= 300.0 MSEC

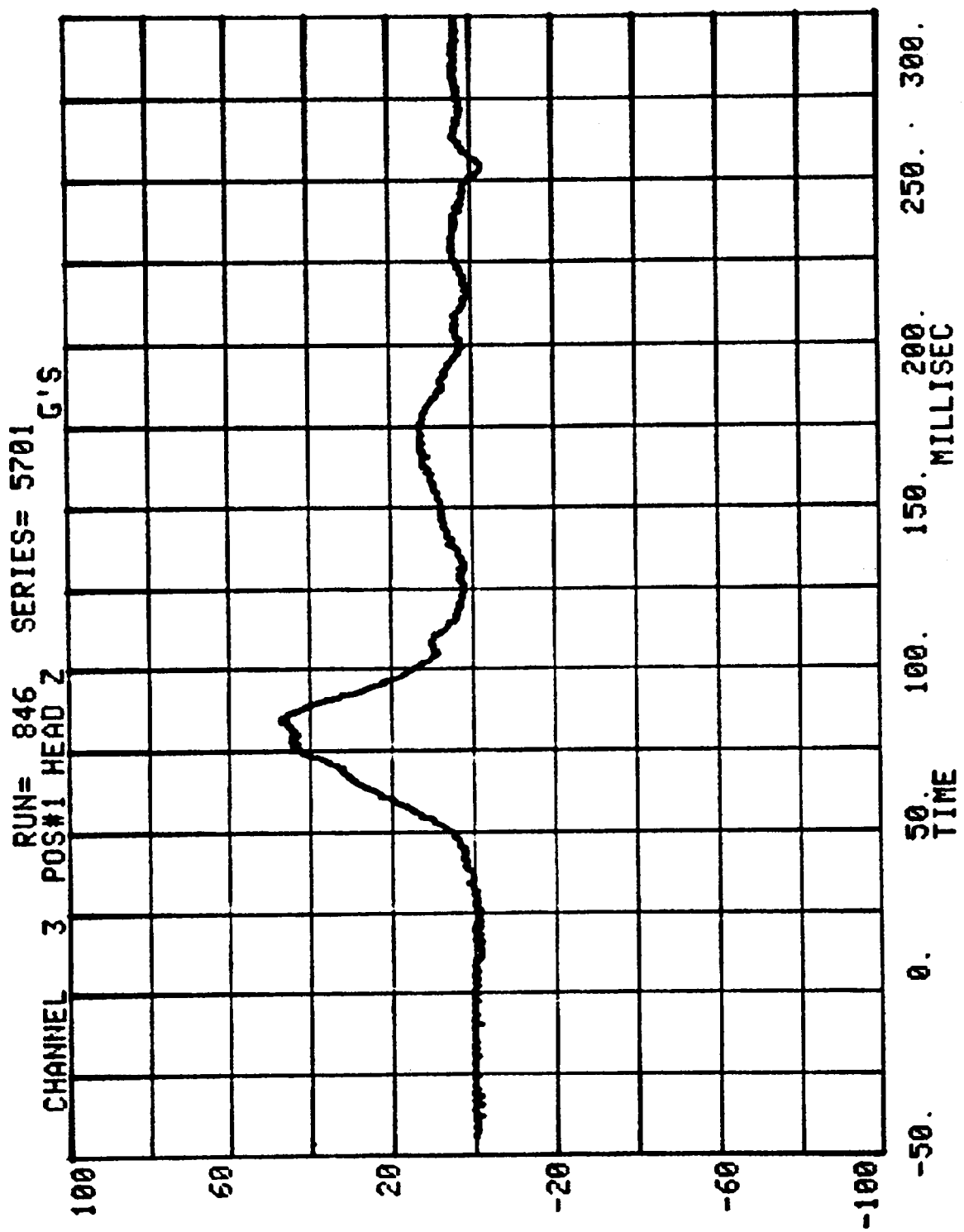
SEVERITY INDEX= 540.8


CHANNEL 1 POS#1 HEAD X
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

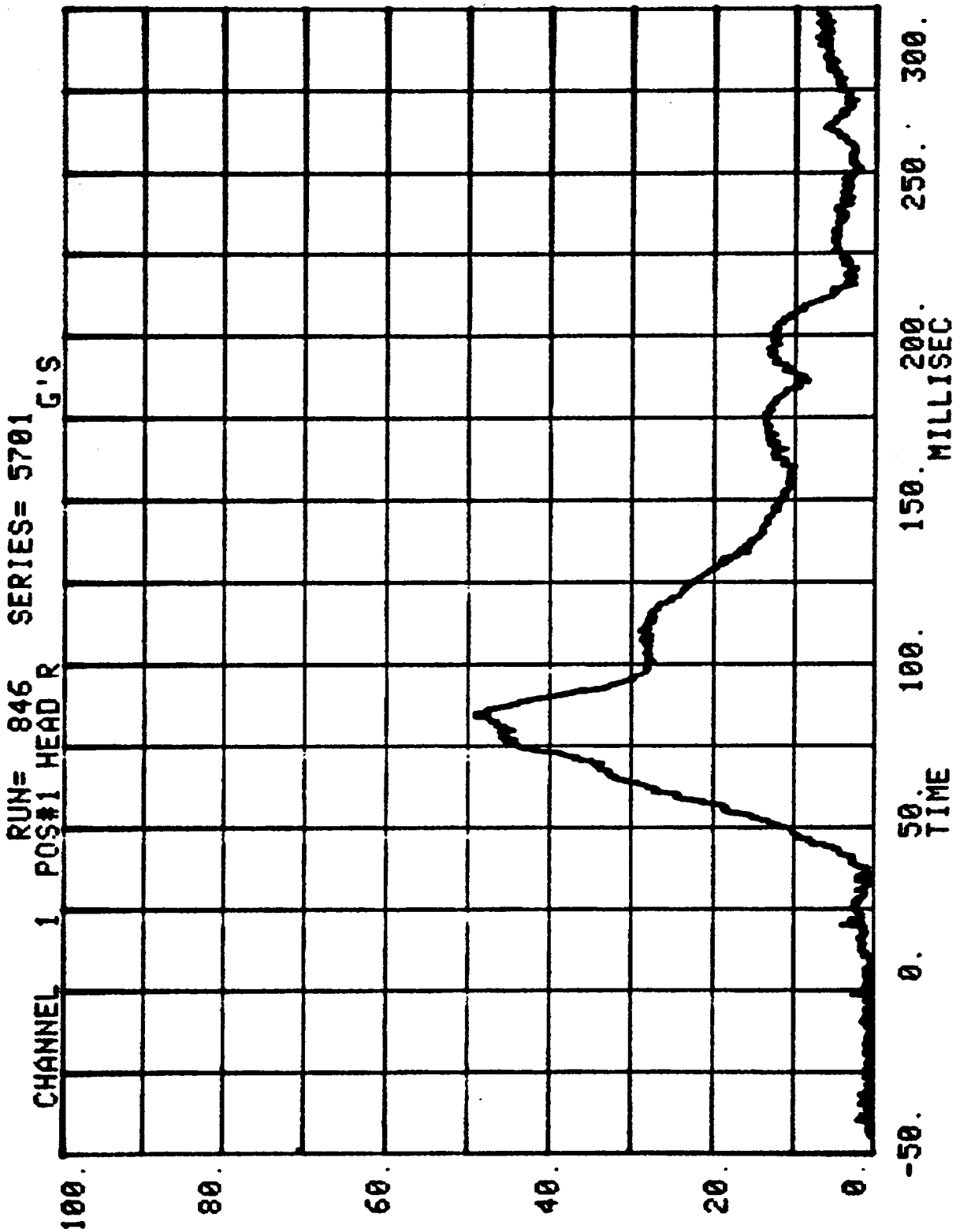
7669-5


CHANNEL 2 POS#1 HEAD Y
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

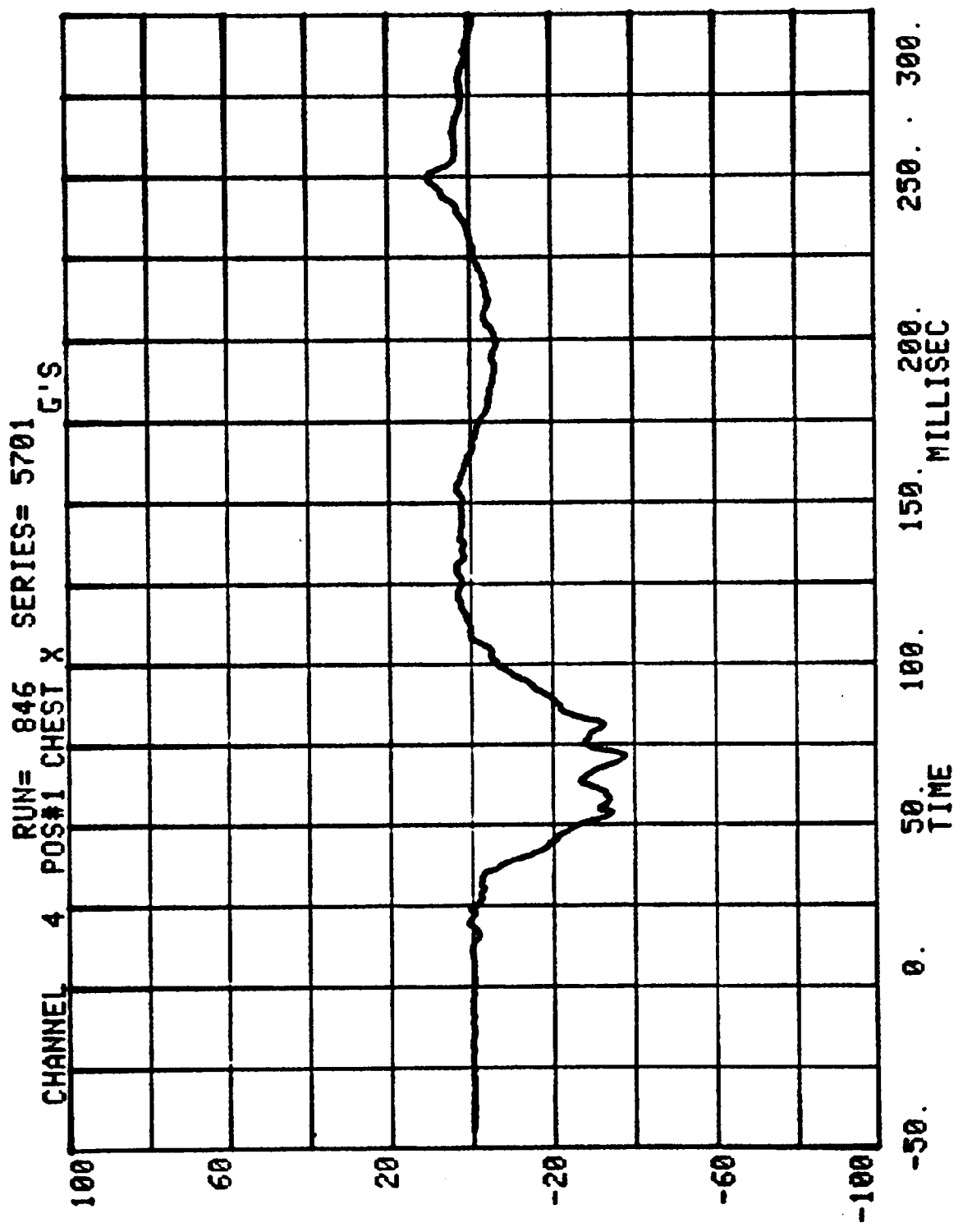
7669-5


CHANNEL 3 POS#1 HEAD Z
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

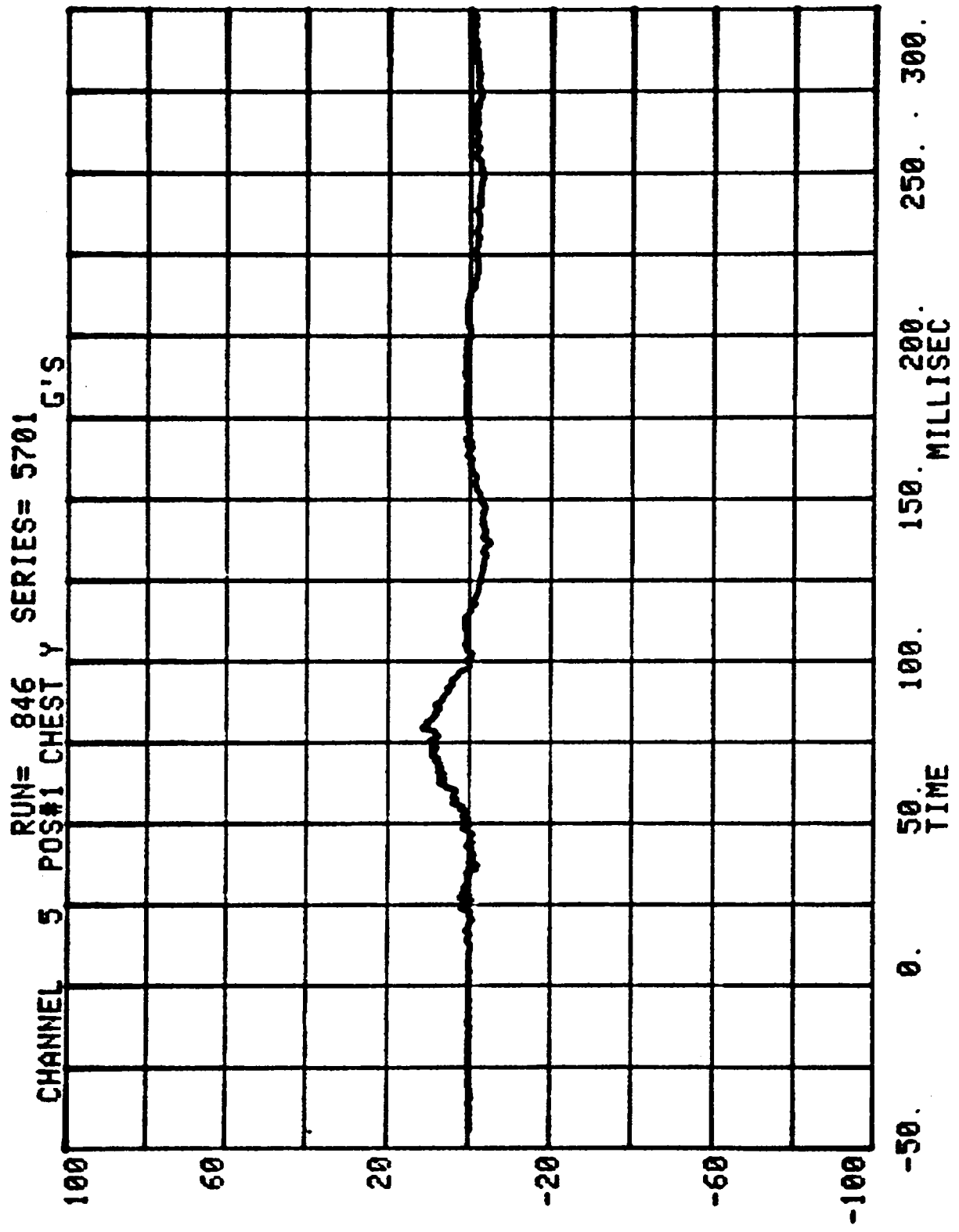
7669-5


CHANNEL 1 POS#1 HEAD R
RUN= 846 SERIES= 5701
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

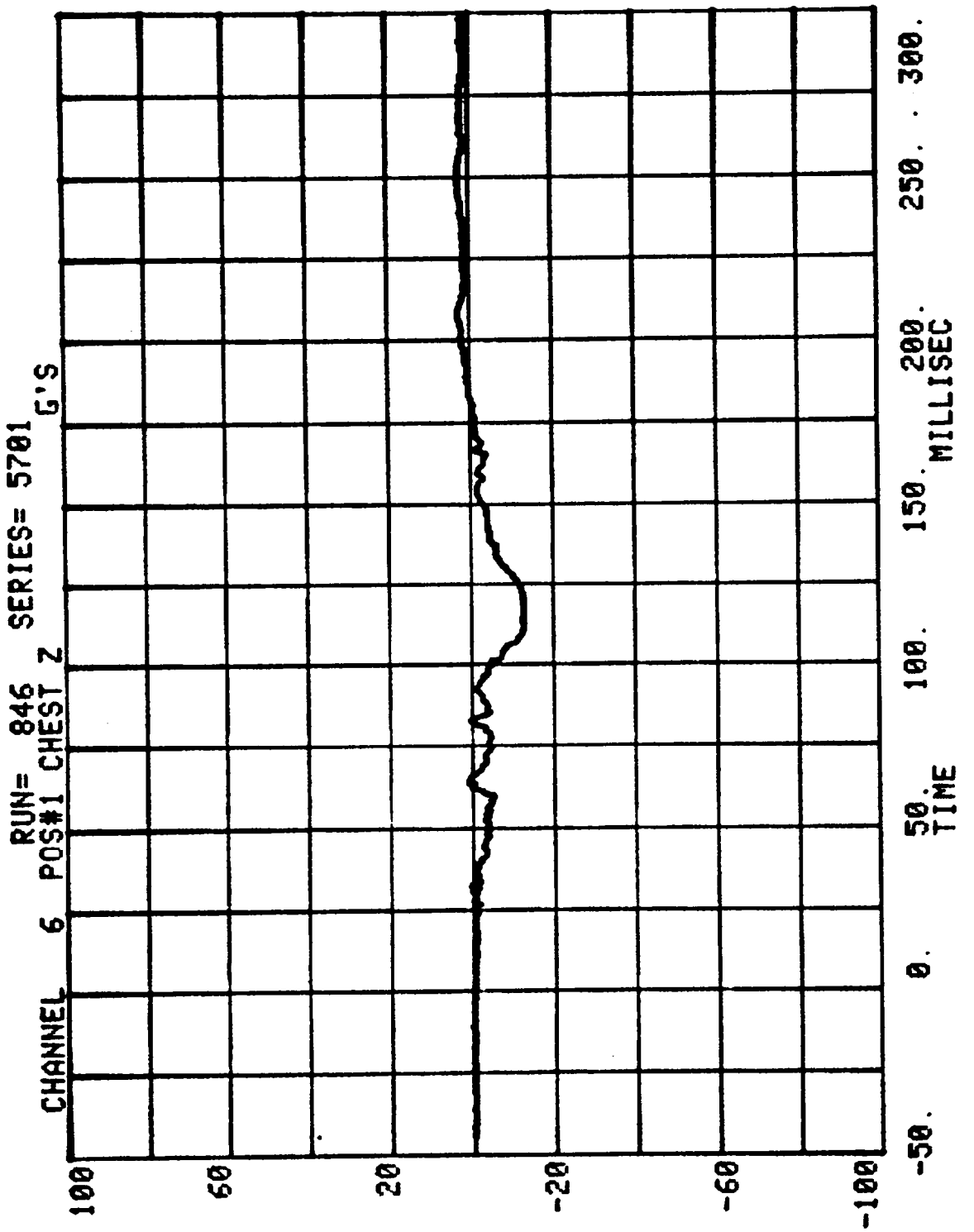
7669-5


CHANNEL 4 POS#1 CHEST X
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

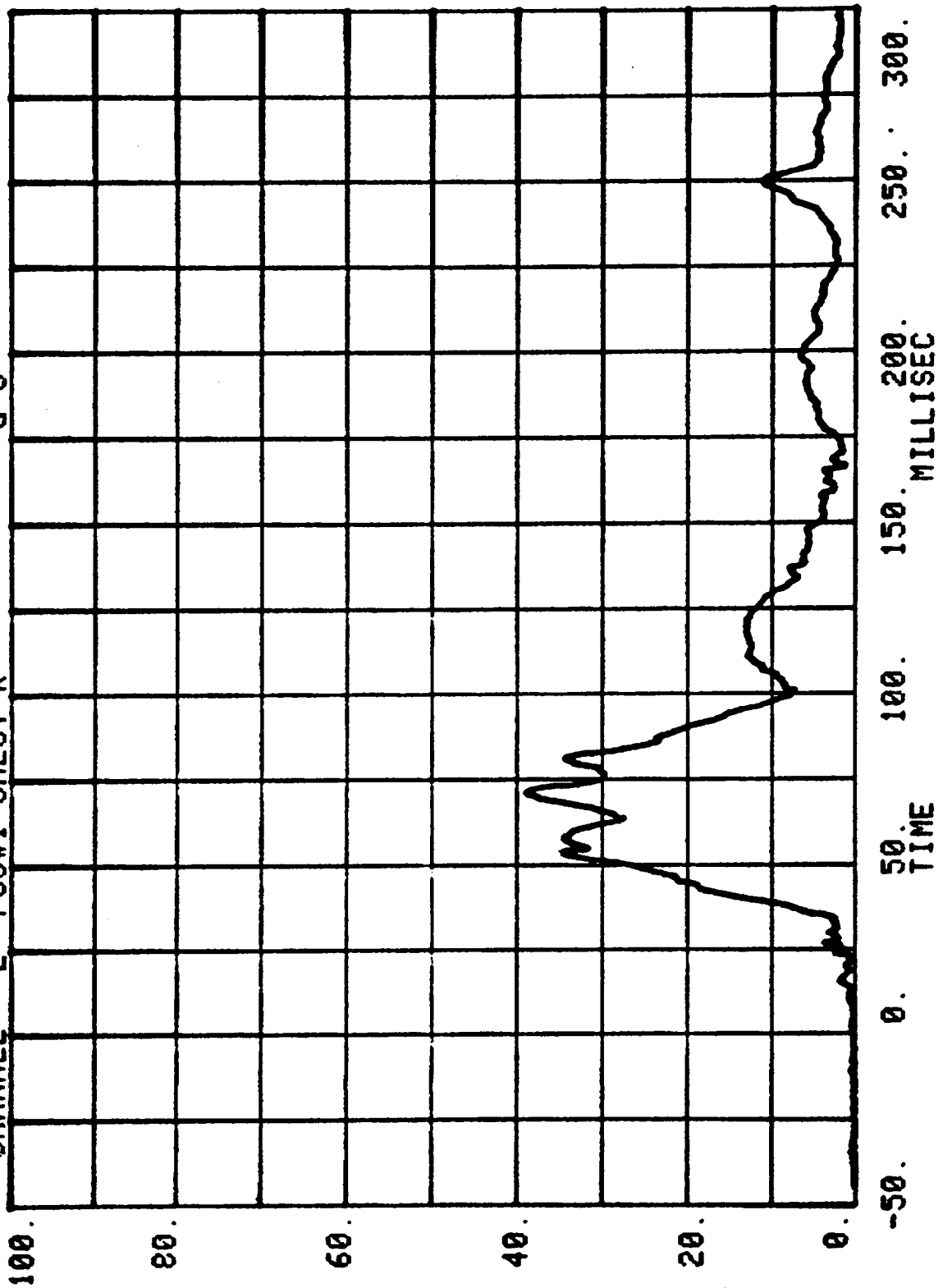
7669-5

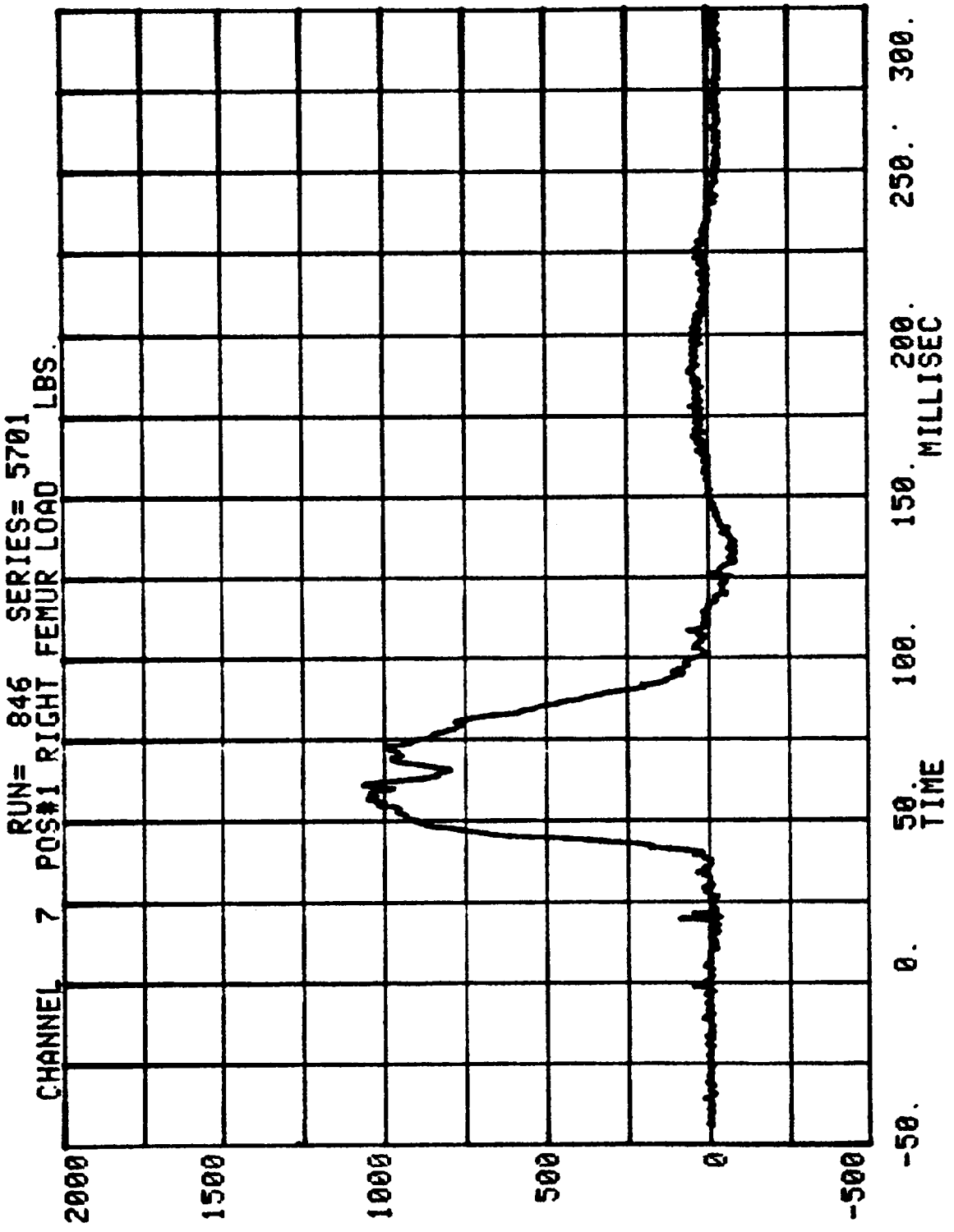

CHANNEL 5 POS#1 CHEST Y
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

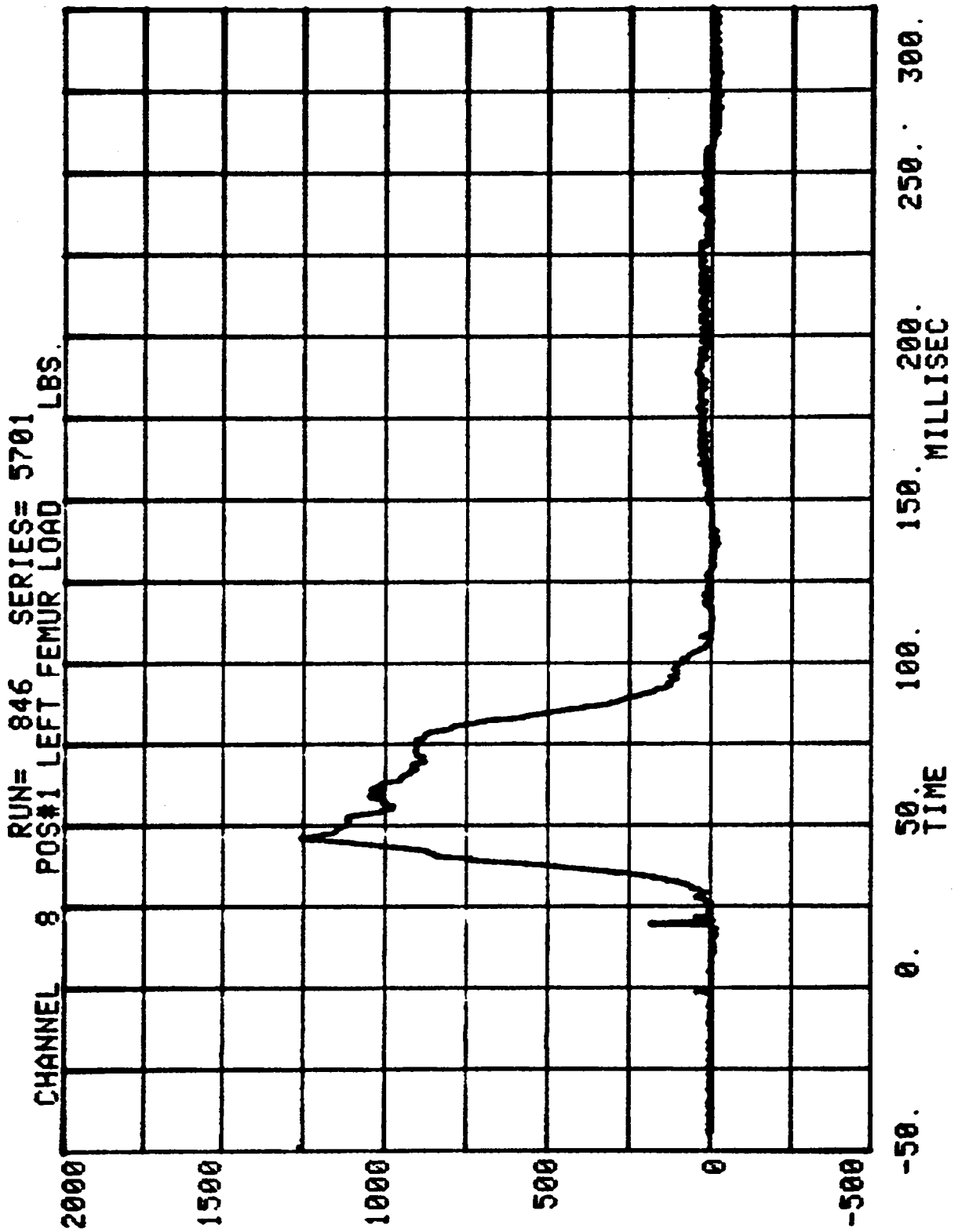
7669-5


CHANNEL 6 POS#1 CHEST Z
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7669-5


CHANNEL 2 RUN= 846 SERIES= 5701
POS#1 CHEST R
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 7 POS#1 RIGHT FEMUR LOAD
RUN= 846 SERIES= 5701 LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 8 POS#1 LEFT FEMUR LOAD
RUN= 846 SERIES= 5701
LBS.
2000
1500
1000
500
0
-500
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7669-5

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NHTSA CRASH TEST - PROC.208

RUN= 846

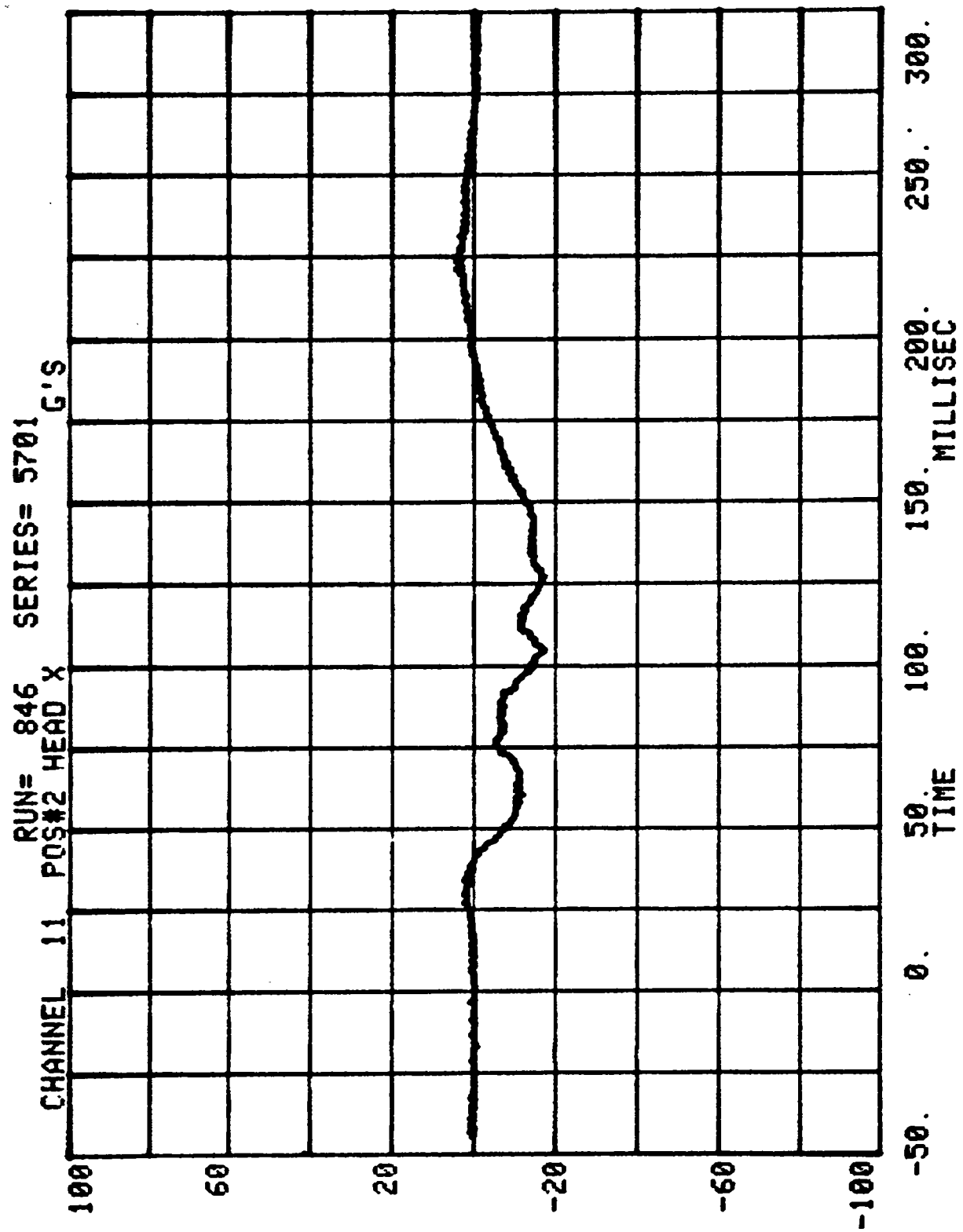
POS#2 HEAD R

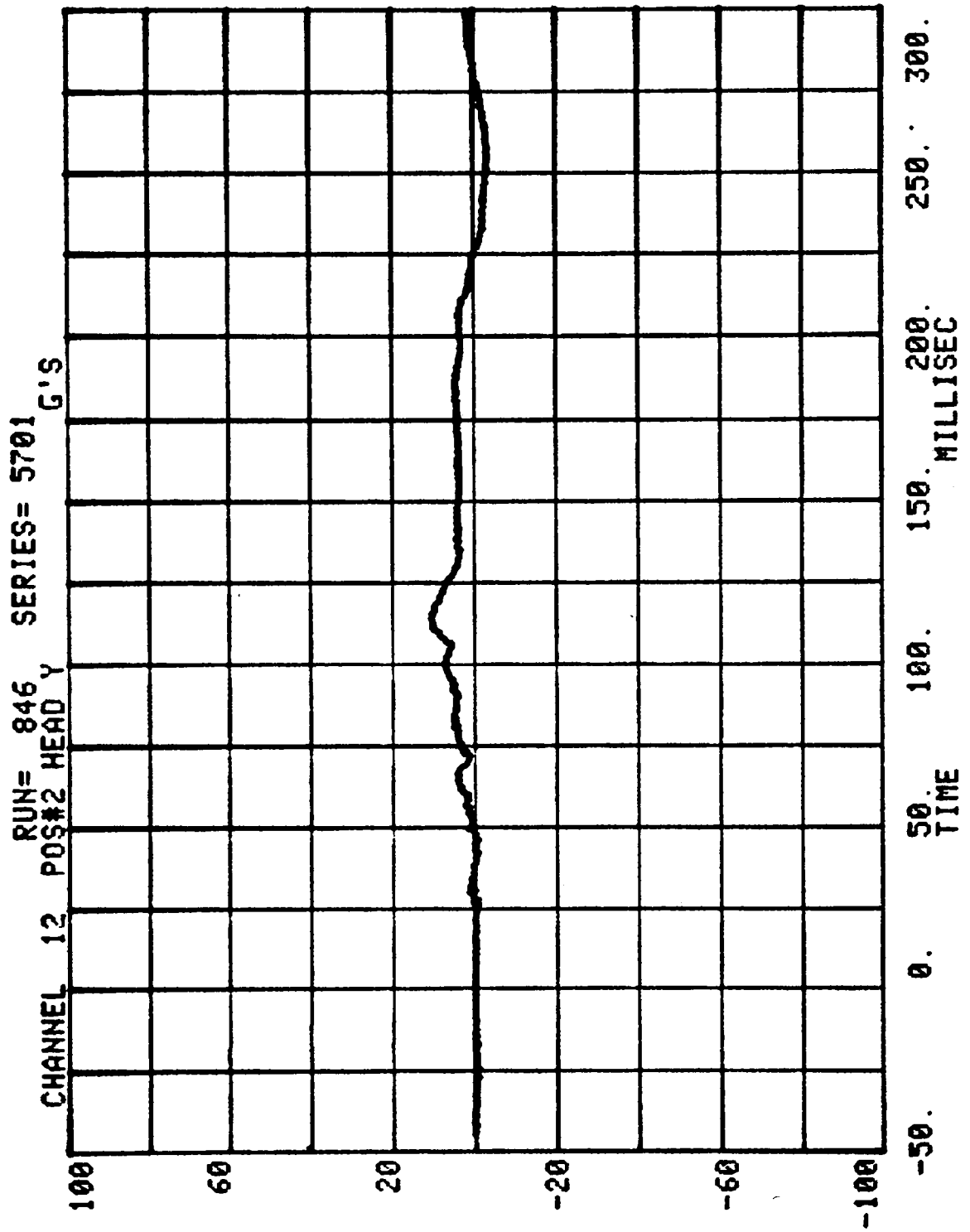
HIC= 242.7 FROM T1= .06225 TO T2= .09825

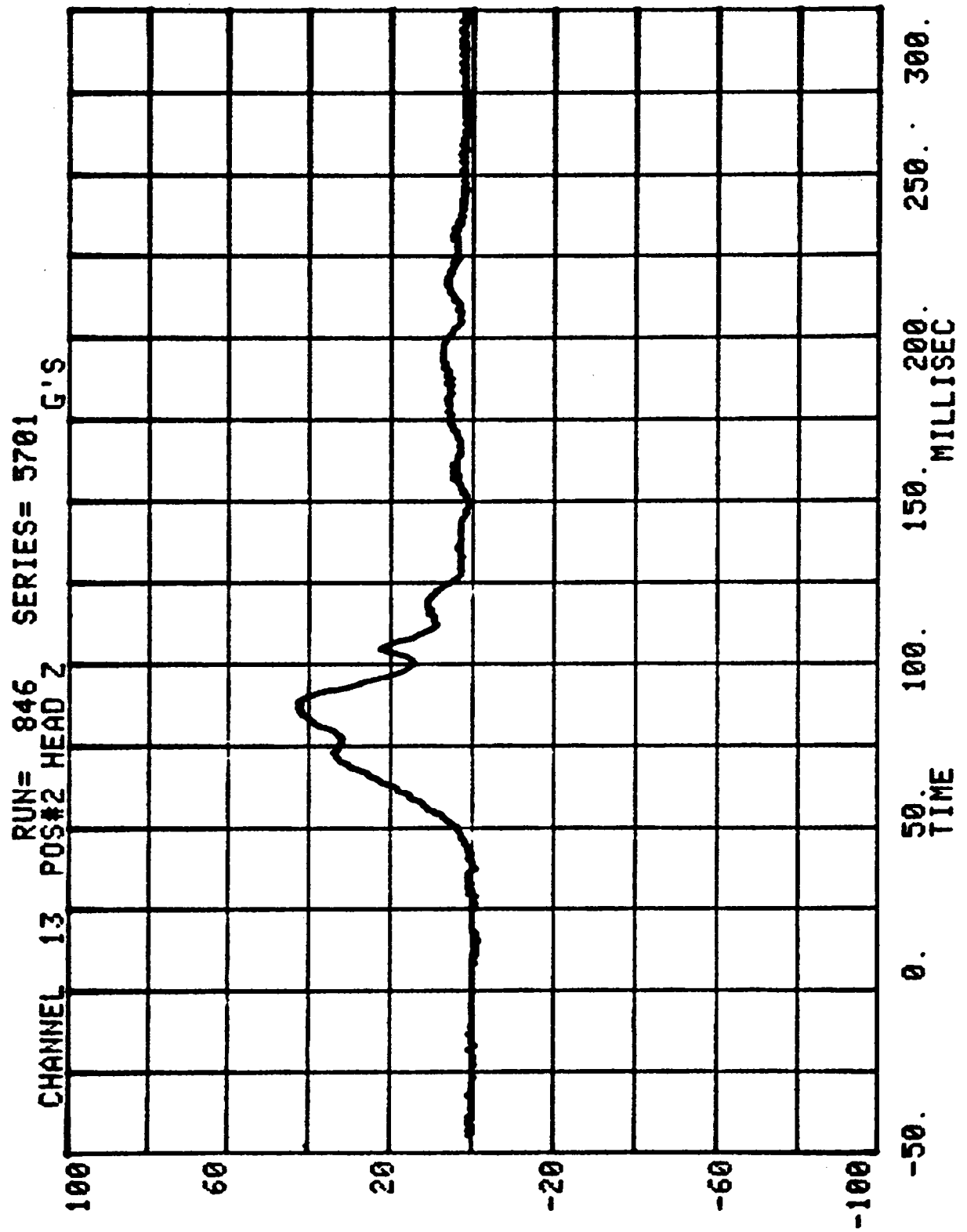
AVERAGE ACCELERATION BETWEEN T1 AND T2= 34.0G'S

EVENT TIME= 300.0 MSEC

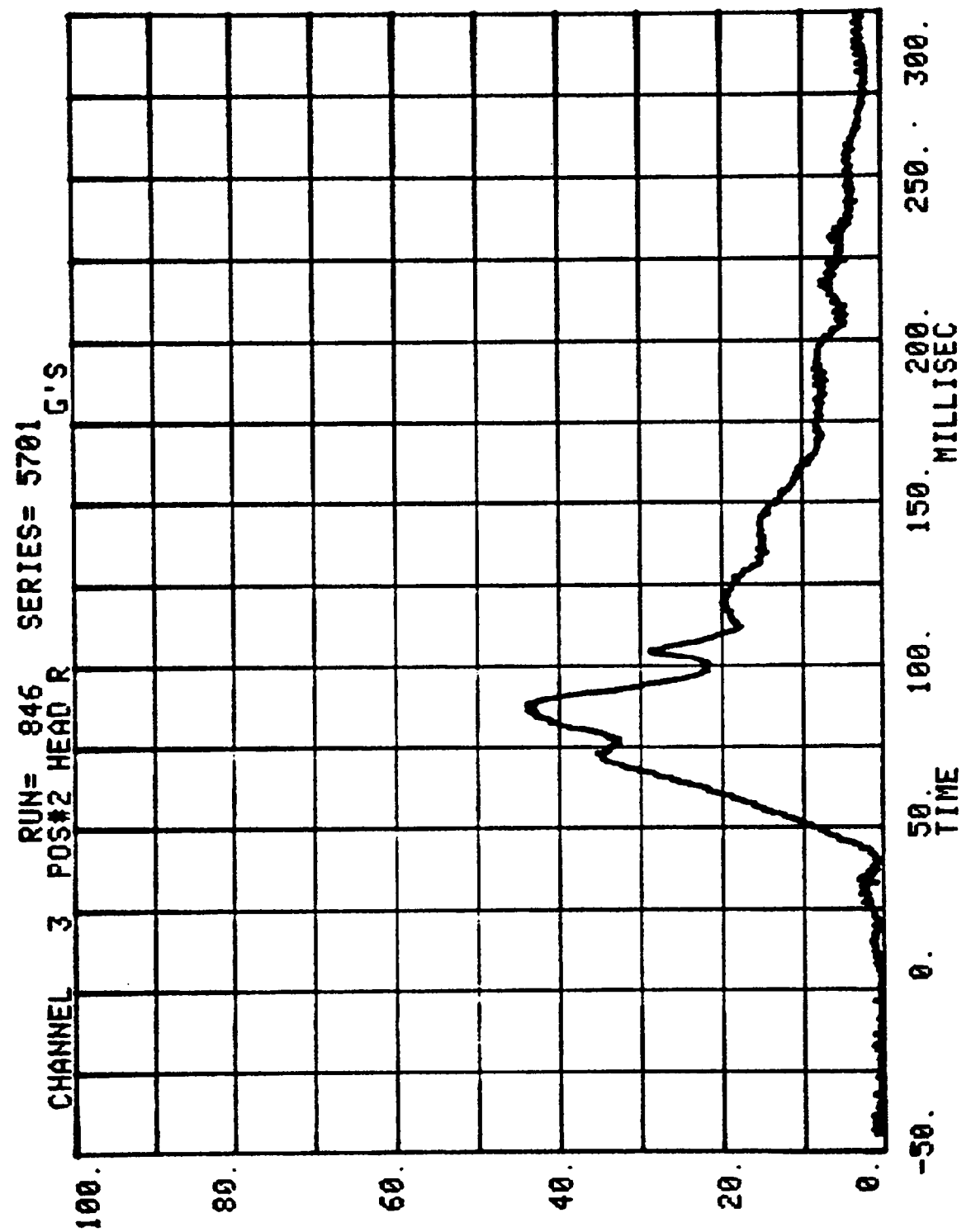
SEVERITY INDEX= 368.5


CHANNEL 11 POS#2 HEAD X
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

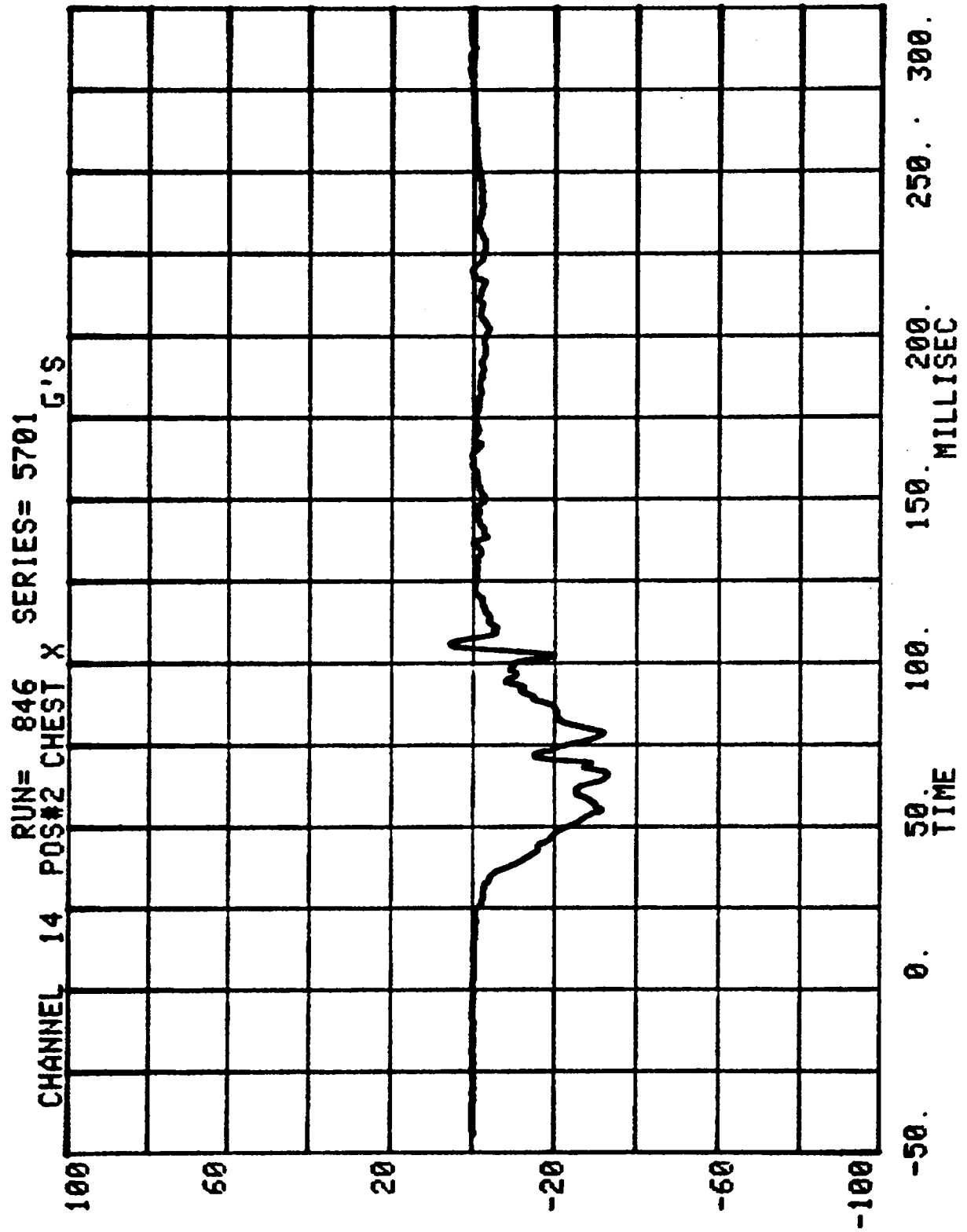

CHANNEL 12 POS#2 HEAD Y
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 13 POS#2 HEAD 2
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

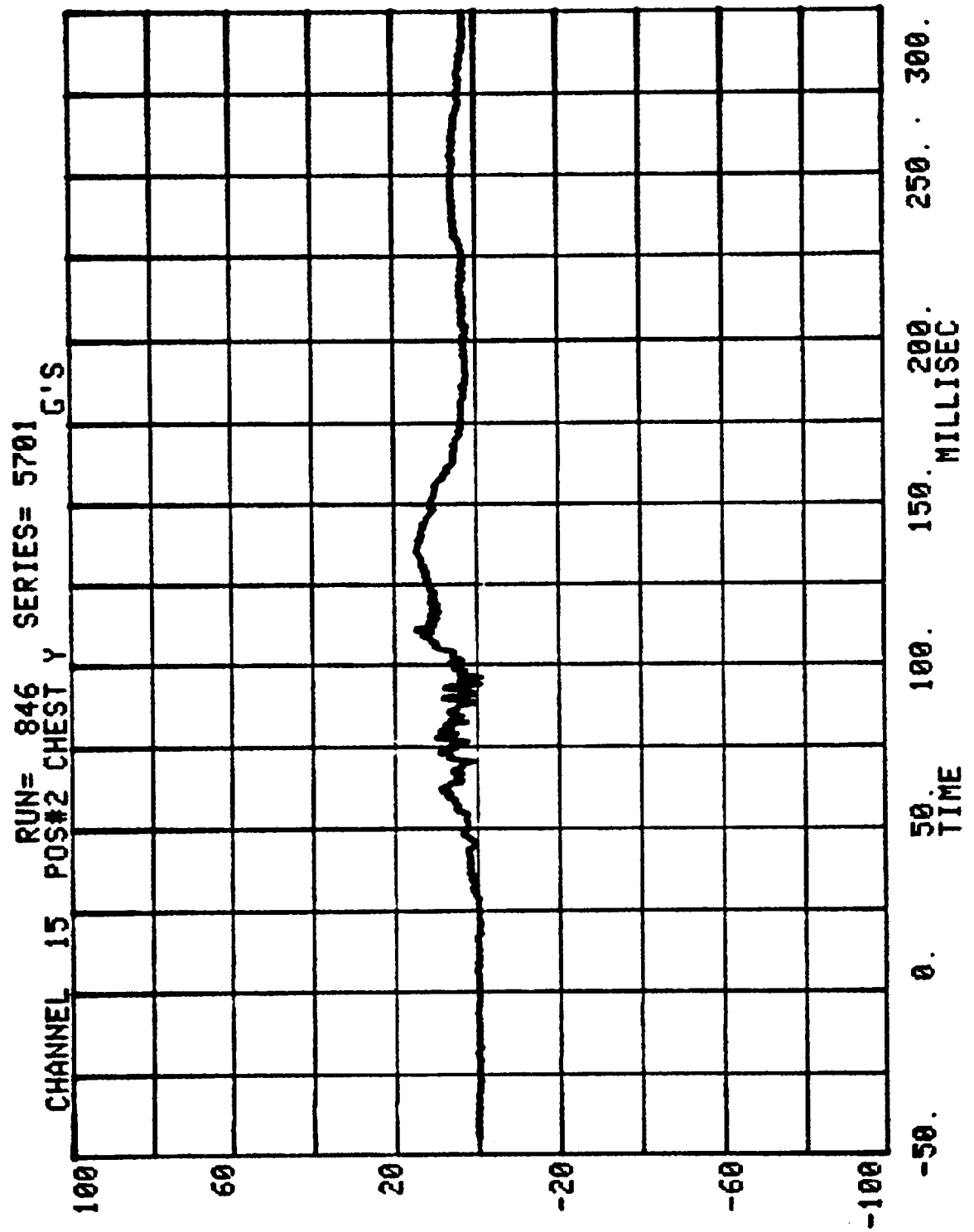
7669-5

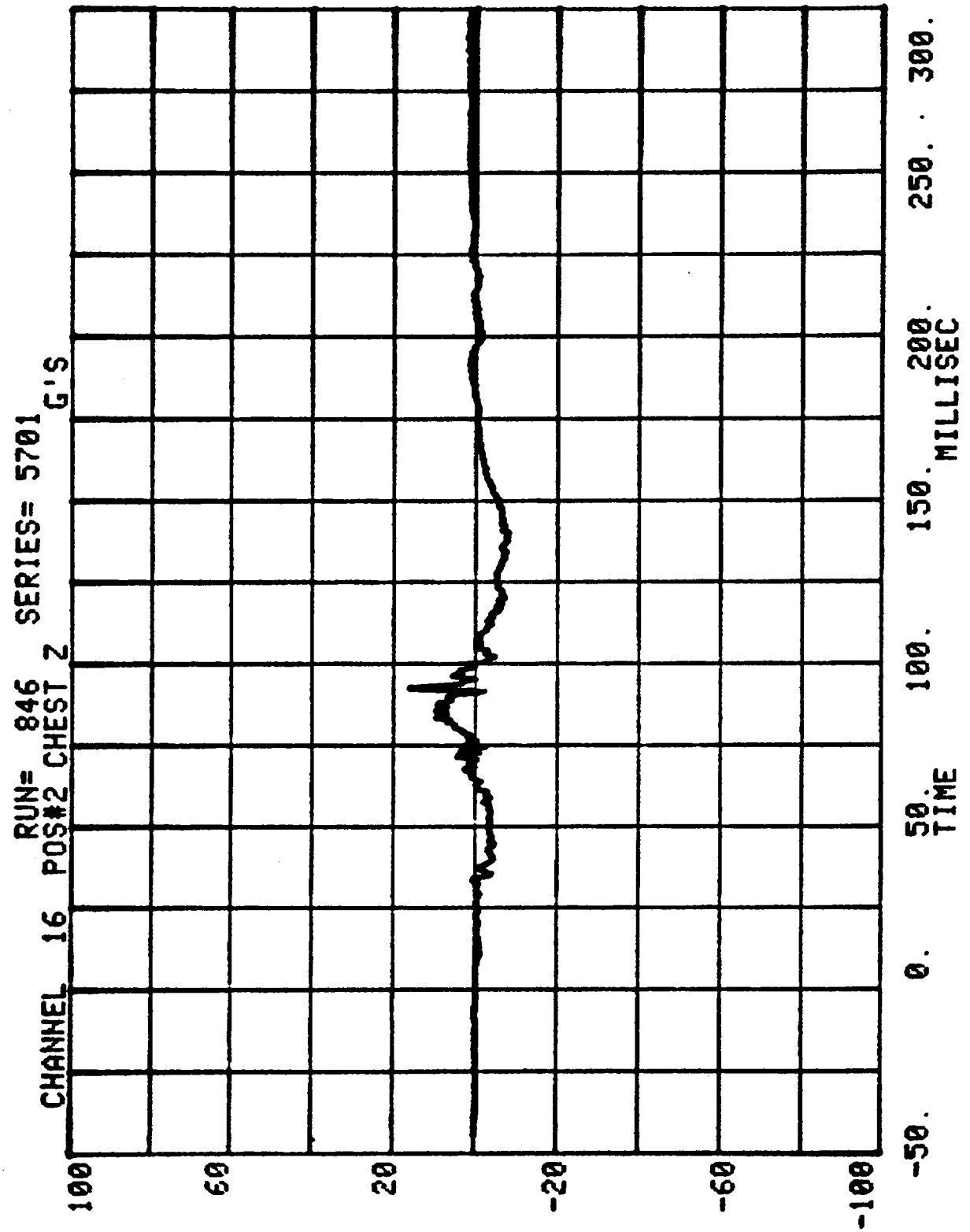

CHANNEL 3 POS#2 HEAD R
RUN= 846 SERIES= 5701
G'S
100.
80.
60.
40.
20.
0.
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

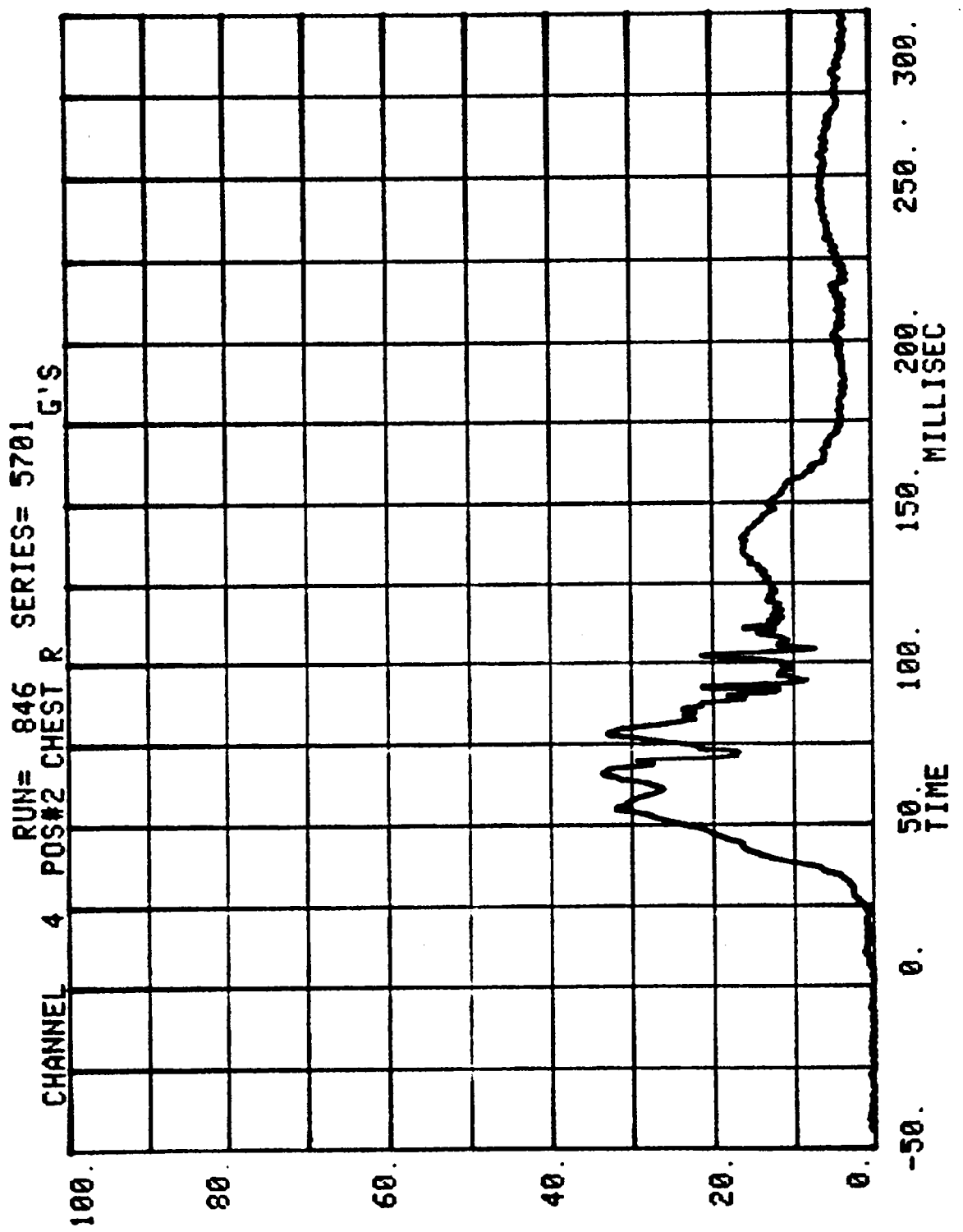
7669-5


CHANNEL 14 POS#2 CHEST X
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC

7669-5


CHANNEL 15 POS#2 CHEST Y
RUN= 846 SERIES= 5701
G'S
100
60
20
-20
-60
-100
-50.
0.
50.
100.
150.
200.
250.
300.
TIME
MILLISEC


CHANNEL 16 POS#2 CHEST Z
RUN= 846 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 R
RUN= 846 SERIES= 5701
G'S
100.
80.
60.
40.
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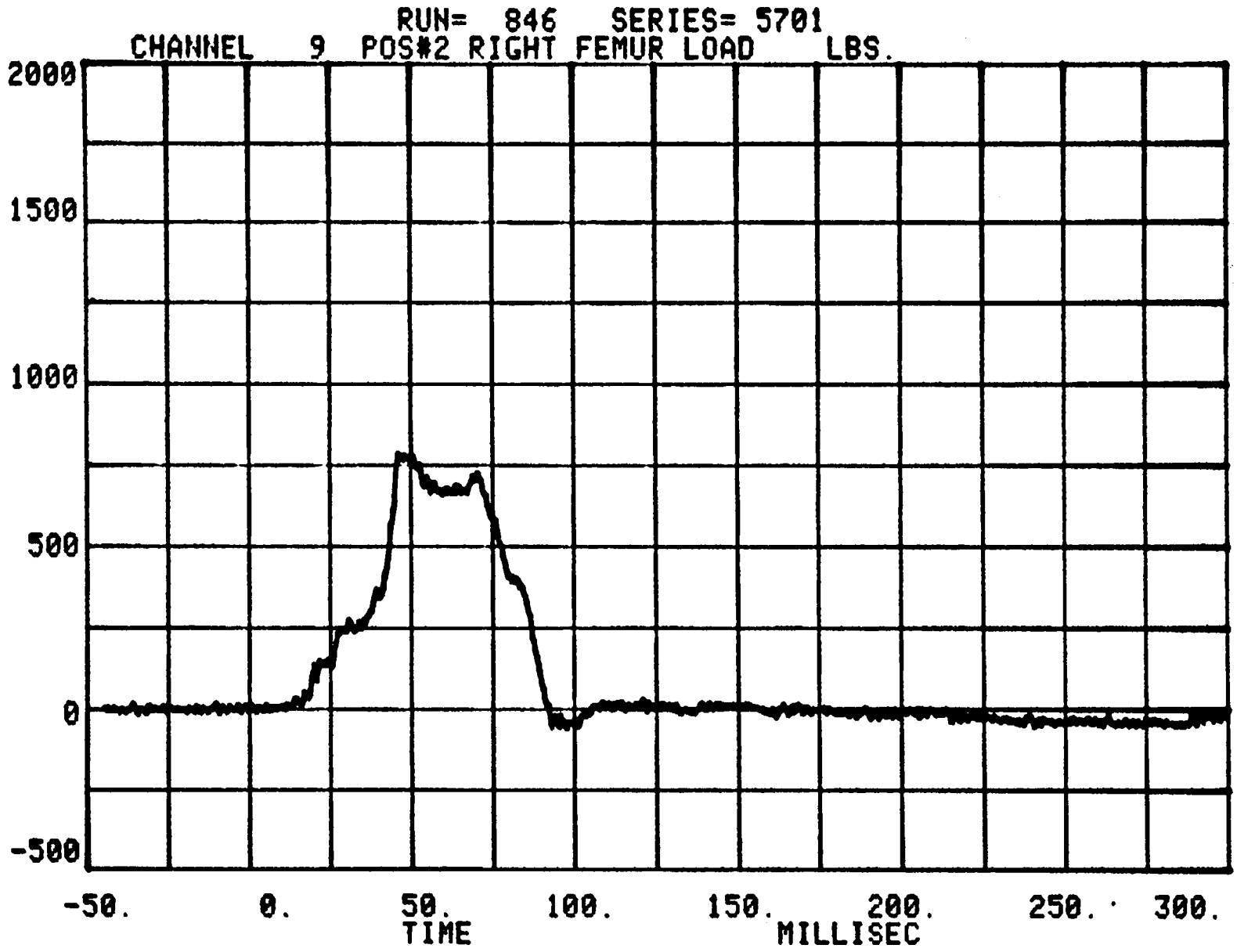
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CHANNEL 9 POS#2 RIGHT FEMUR LOAD LBS.
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1500
1000
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TIME
MILLISEC

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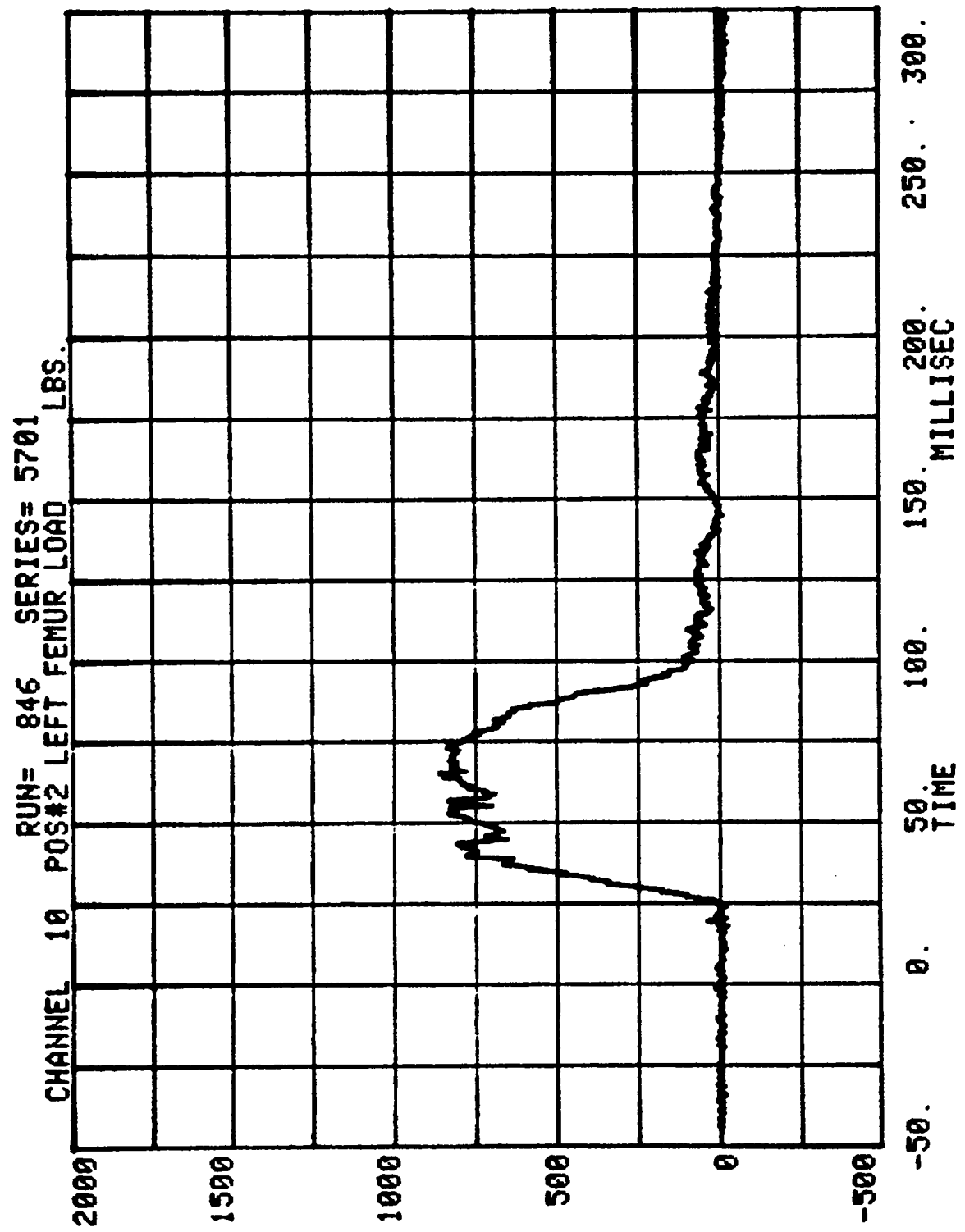
CHANNEL 10 POS#2 LEFT FEMUR LOAD
RUN= 846 SERIES= 5701
LBS.
2000
1500
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500
0
-500
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MILLISEC

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Appendix C

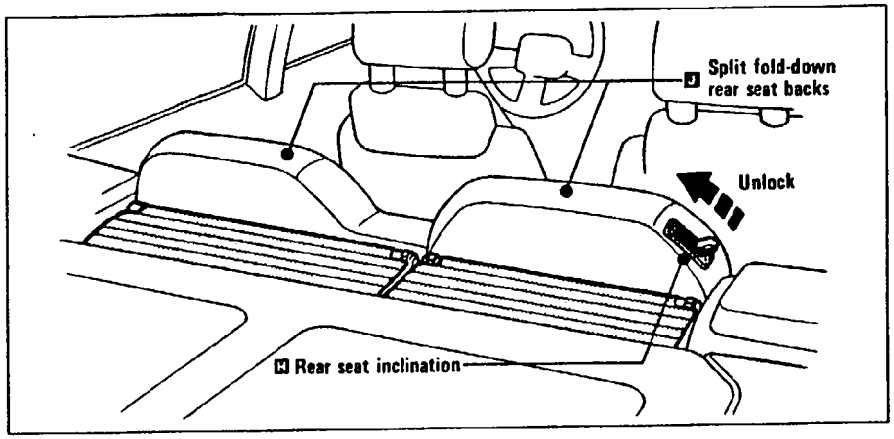
VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

G SIDE SUPPORTS

(For model with turbocharger)
Rotating the dial clockwise will close the side supports.
Rotating the dial counter clockwise will open the side supports.

H REAR SEAT INCLINATION

Adjust seatback inclination as desired by raising the reclining lever at the side of the seatback.
Release the reclining lever when the desired seatback position is reached.
The seatback inclination angle can be adjusted in 4 steps.
After adjustment, rock the seatback fore and aft gently to make certain it is locked securely. The rear seatback is split into two sections to permit individual adjustment.



I FRONT SEAT LAP/ SHOULDER BELT

The automatic shoulder belts and the manual lap belts are provided for each front seat.
The automatic shoulder belt system consists of a shoulder belt for upper body restraint and knee pads on the lower instrument panel for lower body protection.
However, for full restraint, the manual lap belt must always be fastened in addition to the automatic shoulder belt.

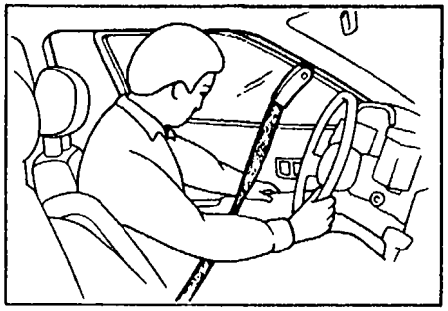
The automatic shoulder belt moves automatically when opening or closing each front door and turning the ignition key to the "ON" position.
The system is protected by a circuit breaker (See section 9).

To help lessen the chance of injury in accidents or sudden stops we urge that people riding in the car 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.

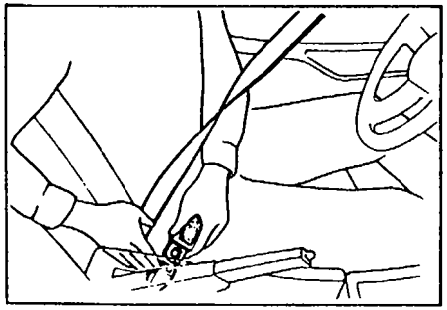
To Fasten the Front Seat Lap/Shoulder Belt

1. Get in the car, close the door and adjust the front seat as needed. Sit up straight and well back in the seat.
   The front passenger's seat should be adjusted so that the passenger's shoe soles touch the foot board when he or she sits

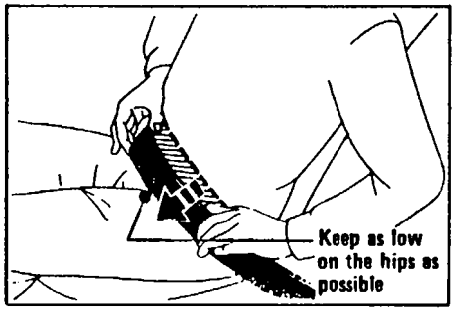
straight up and well back in the seat.



2. Take hold of the lap belt latch plate and pull the lap belt webbing across the lap.



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 pulling the belt firmly across the lap toward the lap belt retractor. This will allow the retractor to take up slack.

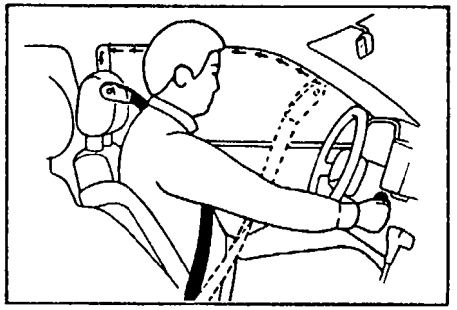
3. Turn the key to the "ON" position. The shoulder belt anchor moves automatically to the fastened position.

WARNING

- *Keep your hands, hair and clothing out of the way of the shoulder belt anchor while it is moving.*

NOTE

- *The shoulder belt length automatically adjusts to your body and seat position.*



4. Pull up on the shoulder belt and lap belt to be sure that there is no excess slack in the belts.
If a belt is too tight, pull up slightly and let it return.

WARNING

- *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.*
- *Never use the same seat belt for more than*

one person at a time. A seat belt worn by more than one person will not provide adequate protection in the event of a collision.

- *Never wear twisted seat belts.*
- *Be very careful not to damage seat belts or seat belt buckles by pinching them in the seat or the door.*
- *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 and restrained with a lap belt.*
  If the child is sitting in the front seat, he should be restrained with the lap and shoulder belt.
  It is dangerous to restrain the child in the front seat if the shoulder belt falls across the child's neck or face.
  Seat the child in the rear seat and restrain it with the lap belt.

NOTE

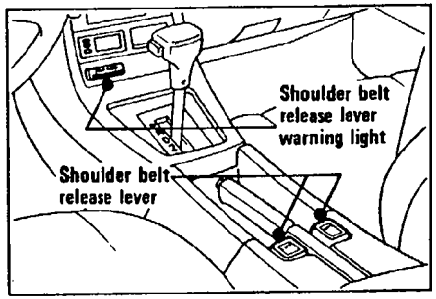
- *The retractor will lock the belt only during a sudden stop or on impact.*
- *At other times you can move around freely.*

To Release the Front Seat Lap/Shoulder Belt When Leaving the Car

1. To release the lap belt, push in the button on the top of the buckle and allow the belt to retract.
2. To release the shoulder belt, open the door. The shoulder belt anchor moves forward automatically.

To Release the Shoulder Belt in an Emergency

If the shoulder belt is locked in an emergency, lift the shoulder belt release lever to release the shoulder belt locking mechanism.



Use this feature only when the shoulder belt keeps you from leaving the car in an emergency.

Always keep the shoulder belt release lever down, or you will not obtain needed shoulder belt restraint.

If it is accidentally pulled up, both the seat belt reminder light (in the instrument cluster) and the shoulder belt release lever warning light (in the front console) will flash, and the buzzer will operate to remind you.

It will be necessary to push down the release lever before driving.

WARNING

- *Always keep the shoulder belt release lever down in order to maintain the normal shoulder belt restraint.*

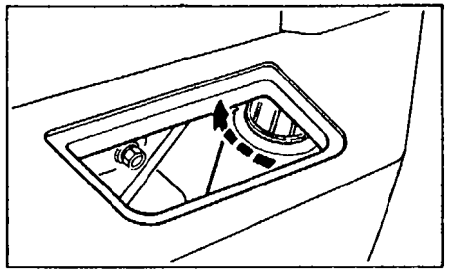
To Operate the Shoulder Belt Manually

If the shoulder belt anchor stops before completion of the full stroke, it may be necessary to operate the shoulder belt manually.

1. Remove the rear ashtray from the arm rest of rear quarter trim pad.
2. Turn the knob clockwise to retract the belt manually through the opening of the rear ashtray.

Before driving, be sure the seat belts are properly fastened.

Have the automatic shoulder belt system checked by your Isuzu dealer as soon as possible.



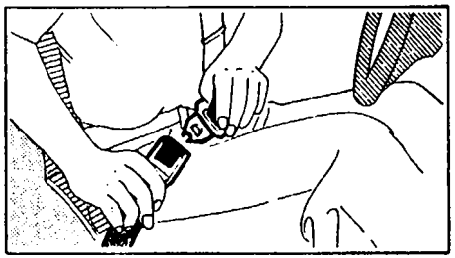
SEAT BELT REMINDER/ SHOULDER BELT RELEASE LEVER WARNING

The reminder light/warning light and buzzer have the following functions.

1. To remind you to fasten your seat belt.
2. To warn you that the shoulder belt release lever is pulled up.
3. To warn you of a failure in the automatic shoulder belt system.
   (See section 2)

REAR SEAT LAP BELT

- Rear seat lap belts have retractors which are designed to take up extra webbing automatically.
- In the rear seat hold the latch plate and pull out the webbing 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.
- Check that the belt is SNUG by pulling the belt firmly across the lap toward the lap belt retractor. This will allow the retractor to take up slack.
- To release the lap belt, press the buckle-release button and allow the belt to retract. If the belt does not fully retract, pull it out and check for kinks or twists. Then make sure that it remains untwisted as it retracts.



Installation Instructions of Rear Seat Shoulder Belt

Your car is provided with anchors for securing the rear shoulder belt.
The anchor nuts are welded inside the sheet metal to permit installation of a rear shoulder belt.
To install a rear shoulder belt, make an 0.78 in. dia hole on the rear pillar trim as shown in the illustration and use an 7/16 in. dia. -20UNF-1.10 in. length U.S. Standard Thread bolt.