

REPORT NOS. 208-CAL-89-04
212-CAL-89-04
301-CAL-89-04

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

FORD MOTOR COMPANY
1989 FORD TEMPO GL
4-DOOR SEDAN

NHTSA NO. CK0203
CALSPAN TEST NO. 7715-4
APRIL 7, 1989

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FINAL REPORT

Prepared for:

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16. Abstract A 30 mph vehicle safety compliance test was conducted on a 1989 Ford Tempo GL 4-Door Sedan. This test was performed at the Calspan Advanced Technology Center in Buffalo, New York on April 7, 1989 The purpose of this test was to determine compliance with the performance requirements of the following Federal Motor Vehicle Safety Standards (FMVSS 213): 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 29.3 mph. The ambient temperature at the impact face was 36°F. The subject test vehicle appears to comply with the requirements of FMVSS Nos. 208, 212, 219 (partial) and 301. <u>Type of Restraint System:</u> The test vehicle was equipped with driver air bag and 3-point manual belt with single retractor on driver side (only air bag restraint used for test.) Passenger side equipped with 3-point manual belt with single retractor.					
17. Key Words 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			18. Distribution Statement 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 1989 Ford Tempo GL 4-Door Sedan, 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 TEST NUMBER CK0203

A frontal barrier was impacted by a 1989 Ford Tempo GL 4-Door Sedan at a velocity of 29.3 mph. The test was performed at the Calspan Corporation Advanced Technology Center on April 7, 1989. 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 left/right femur load cells. These ATDs had been certified prior to the test.

The 27 channels of data were recorded on three 14-channel FM tape recorders. Appendix B contains the vehicle and dummy response data traces.

The driver's head struck the windshield and airbag and his HIC was 435. The maximum chest deceleration over 3 milliseconds was 45.3 g's.

The maximum force on the driver's left femur was 1636 lbs and 1077 lbs was recorded on the right femur.

The right-front passenger's HIC was 390. The maximum chest deceleration over 3 milliseconds was 41.3 g's and femur loads were 749 and 616 pounds on the left and right femurs, respectively.

TABLE 1

CRASH TEST SUMMARYVEHICLE NHTSA NO.: CK0203 TEST MODE: 30 mph Frontal BarrierTEST DATE: 4/7/89 TIME: 11:55 AM TEMP: 36° FVEHICLE MAKE/MODEL/BODY STYLE: 1989 Ford Tempo GL 4-Door SedanVEHICLE TEST WEIGHT: 3210 lbsVEHICLE/BARRIER IMPACT ANGLE: 0°IMPACT VELOCITY: 29.3 mphMAXIMUM STATIC CRUSH: 14.4"VEHICLE REBOUND: 13.7"

<u>DUMMIES:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
TYPE	<u>Part 572</u>	<u>Part 572</u>
RESTRAINT SYSTEM	<u>driver airbag</u>	<u>3-point manual</u>
		<u>belt with single re-</u>
		<u>tractor on torso belt</u>

NUMBER OF DATA CHANNELS: 27NUMBER OF CAMERAS: 1 Real Time14 High SpeedDOOR OPENING DATA: closed-operable - Left Frontclosed-operable - Right Front

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

<u>VISIBLE DUMMY CONTACT POINTS:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
Head	<u>windshield,airbag</u>	<u>chin with chest</u>
Chest	<u>airbag</u>	<u>-</u>
Knees	<u>dash panel</u>	<u>dash panel</u>

TABLE 2

GENERAL TEST AND VEHICLE PARAMETER DATATEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1989 Ford Tempo GL 4 Door Sedan
 NHTSA No. CK0203 ; VIN 1FACP36X6KK158953 ; Color: Red
 Engine Data: 4 cylinders; - CID; 2.3 Litres; - cc
 Placement - Longitudinal or In-Line; X Transverse or lateral
 Transmission Data: 3 speeds; - Manual; X Automatic; - Overdrive
 Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive
 Major Options: X A/C; X Pwr Strg. X Pwr. Brakes - Pwr Windows
X Power Door Locks
 Date Received: 2/9/89 ; Odometer Reading - 52 miles
 Selling Dealer: Basil Ford Inc.
 & address 3484 Main Street Buffalo, NY

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Ford Motor Co.
 Data of Manufacture: 12/88 ; VIN 1FACP36X6KK158953
 GVWR: 3682 lbs; GAWR: 1999 lbs FRONT
1812 lbs REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load 30 psi Front
30 psi Rear
 Recommended Tire Size P185/70R14
 Recommended Cold Tire Pressure 30 psi Front 30 psi Rear
 Size of Tires on Test Vehicle P185/70R14 Manufacturer: Michelin
 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 3 Rear 5 Total
 Vehicle Capacity Weight (VCW) = 850 lbs.
 No. of Occupants x 150 lbs = 750 lbs.
 Rated Cargo/Luggage Weight (RCLW)= 100 lbs. (Difference)

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

Right Front = 820 lbs Right Rear = 480 lbs
 Left Front = 900 lbs Left Rear = 500 lbs
 TOTAL FRONT = 1720 lbs TOTAL REAR = 980 lbs
 % of Total Weight = 63.7 % % of Total Weight = 36.3 %
 TOTAL DELIVERED WEIGHT = 2700 lbs.

TABLE 2
GENERAL TEST & VEHICLE PARAMETER DATA (cont.)

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight	=	<u>2700</u>	lbs.
Rated Cargo/Luggage Weight (RCLW)	=	<u>100</u>	lbs.
Weight of 2 P.572 Dummies @ 164 ea.	=	<u>328</u>	lbs.
TARGET TEST WEIGHT	=	<u>3128</u>	lbs. (sum)

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 0 LBS OF CARGO WEIGHT:

Right Front =	<u>920</u>	lbs.	Right Rear =	<u>660</u>	lbs.
Left Front =	<u>950</u>	lbs.	Left Rear =	<u>680</u>	lbs.
TOTAL FRONT =	<u>1870</u>	lbs.	TOTAL REAR =	<u>1340</u>	lbs.
% of Total Weight =	<u>58</u>	%	% of Total Weight =	<u>42</u>	%
TOTAL TEST WEIGHT =	<u>3210</u>	lbs.			
Weight of Ballast secured in vehicle's cargo area =	<u>0.0</u>	lbs.			
Vehicle Components Removed for Weight Reduction				<u>None</u>	

TEST VEHICLE ATTITUDE: (all dimensions in inches)

AS DELIVERED	RF	<u>26.3</u>	;	LF	<u>26.1</u>	;	RR	<u>26.0</u>	;	LR	<u>25.6</u>
FULLY LOADED	RF	<u>25.5</u>	;	LF	<u>25.5</u>	;	RR	<u>23.0</u>	;	LR	<u>22.7</u>
AS TESTED	RF	<u>25.5</u>	;	LF	<u>25.5</u>	;	RR	<u>24.4</u>	;	LR	<u>24.3</u>
Vehicle's Wheelbase =	<u>99.9</u>	inches									
Location of Vehicle's C.G. =	<u>41.7 inches from front wheel center</u>										
(if required)											

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>15.4</u>	gallons
Usable Capacity Figure Furnished by COTR =	<u>15.4</u>	gallons
Test Volume Range (92 to 94% of Usable Capacity) =	<u>14.2</u>	to <u>14.5</u> gallons
ACTUAL TEST VOLUME =	<u>14.3</u>	gallons (with entire fuel system filled)

TABLE 3
POST-IMPACT DATA

TYPE OF TEST: Frontal (0°) Impact IMPACT ANGLE: 0°

TEST DATE: April 7, 1989 TIME: 11:55 AM TEMP: 36 °F

VEHICLE NHTSA NO.: CK0203 ; VIN 1FACP36X6KK158953

REQUIRED IMPACT VELOCITY RANGE: 28.9 to 29.9 mph

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

Trap No. 1 = 29.3 mph; Trap No. 2 = 29.3 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 = 174.5 "; C/L = 176.5 "; Left = 174.5 "

Post-Test Right = 160.1 "; C/L = 162.8 "; Left = 161.7 "

CRUSH Right = 14.4 "; C/L = 13.7 "; Left = 12.8 "

AVERAGE = 13.6 inches

VEHICLE REBOUND: (from rigid barrier only)

Distance from front of test vehicle to impact point:

Right = 14.0 "; C/L = 12.5 "; Left = 14.5 "

AVERAGE = 13.7 inches

DOOR OPENING:

Left

Right

Front

operable

operable

Rear

operable

operable

SEAT MOVEMENT:

Seat Back Failure

Seat Shift

Front

None

None

Rear

None

None

TABLE 3
POST-IMPACT DATA (cont)

GLAZING DAMAGE: windshield cracked by driver head

OTHER NOTABLE IMPACT FEATURES: Steering column stroked

Section 3
OCCUPANT AND VEHICLE DATA

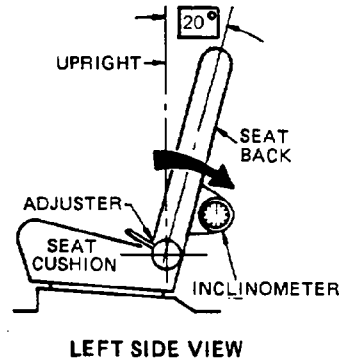
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model year: 1989 Vehicle Model: Ford Tempo GL Body Style: 4-Door Sedan

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 angle for driver's seat 20.0°

Measurement instructions: measure 13 inches up from seat hinge point on metal frame located on outboard seatback

Seat back angle for passenger's seat 20°

Measurement instructions: See above.

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: located in midpoint (8th detent) of 15 total detents

Positioning of the passenger's seat (if applicable): Located in midpoint (7th detent) of 13 total detents

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 15.4 gallons.

B. "Usable Capacity" of the optional equipment fuel tank is None gallons.

Additional Instructions: None

Figure 2

PART 572 DUMMY IN-VEHICLE POSITION

TEST NO.: CK0203

VEHICLE: 1989 Ford Tempo GL 4-Door Sedan

SEAT TYPE:

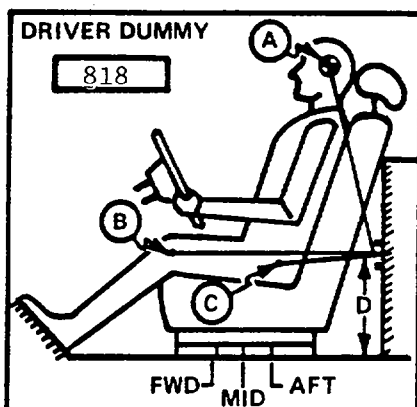
- Bench
X Bucket
- Split Bench

ADJUSTER TYPE:

X Manual
- Power

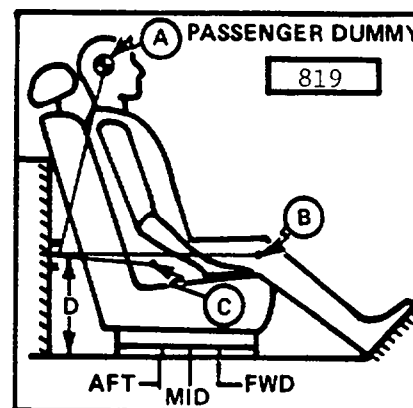
BUCKET SEAT BACK TYPE:

- Fixed
X Adjustable Reclining



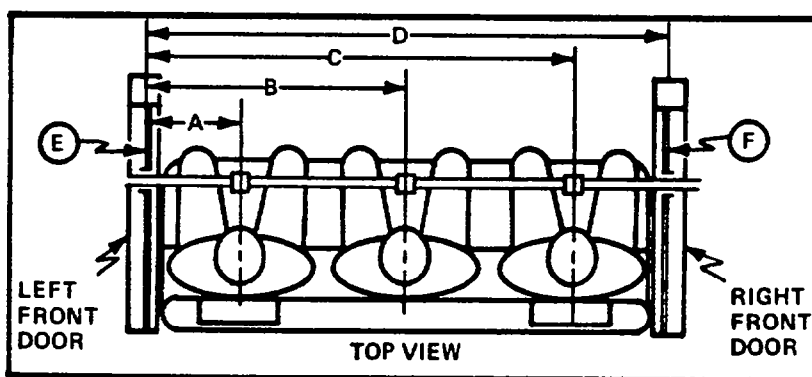
MEASUREMENT LOCATION

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



A = 21.9 in. 3 Degrees
B = 21.0 in. 98 Degrees
C = 7.0 in. 142 Degrees
D = 14.8 in.

A = 22.2 in. 1 Degrees
B = 20.7 in. 98 Degrees
C = 6.8 in. 140 Degrees
D = 14.8 in.



DUMMY ID

818

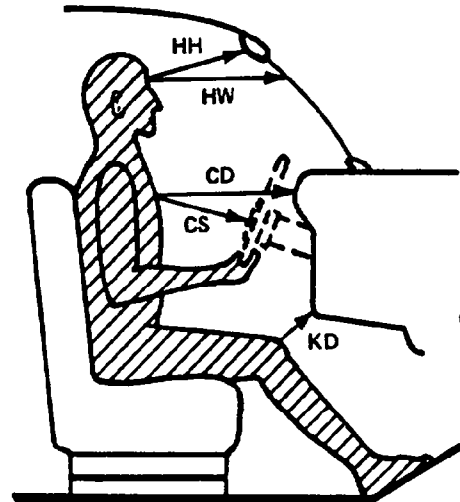
819

A = Left Door to Driver Centerline 11.0 in.
B = Left Door to Center Passenger Centerline - in.
C = Left Door to Right Passenger Centerline 37.7 in.
D = Left Door to Right Door 48.0 in.
E, F = Window Glass Height (Right and Left Must Be Equal) 13.5 in.

Figure 3

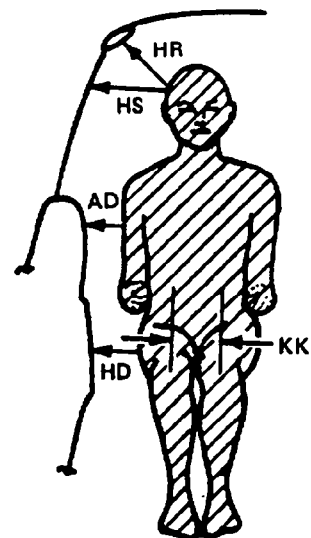
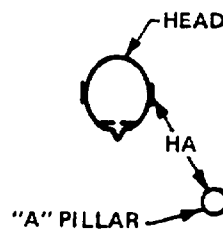
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	11.0	11.3
HW	14.5	14.5
CD	20.8	21.3
CS	11.3	-
KDL	3.3	4.0
KDR	3.8	4.2
SA	20°	20°
TA	15°	16°



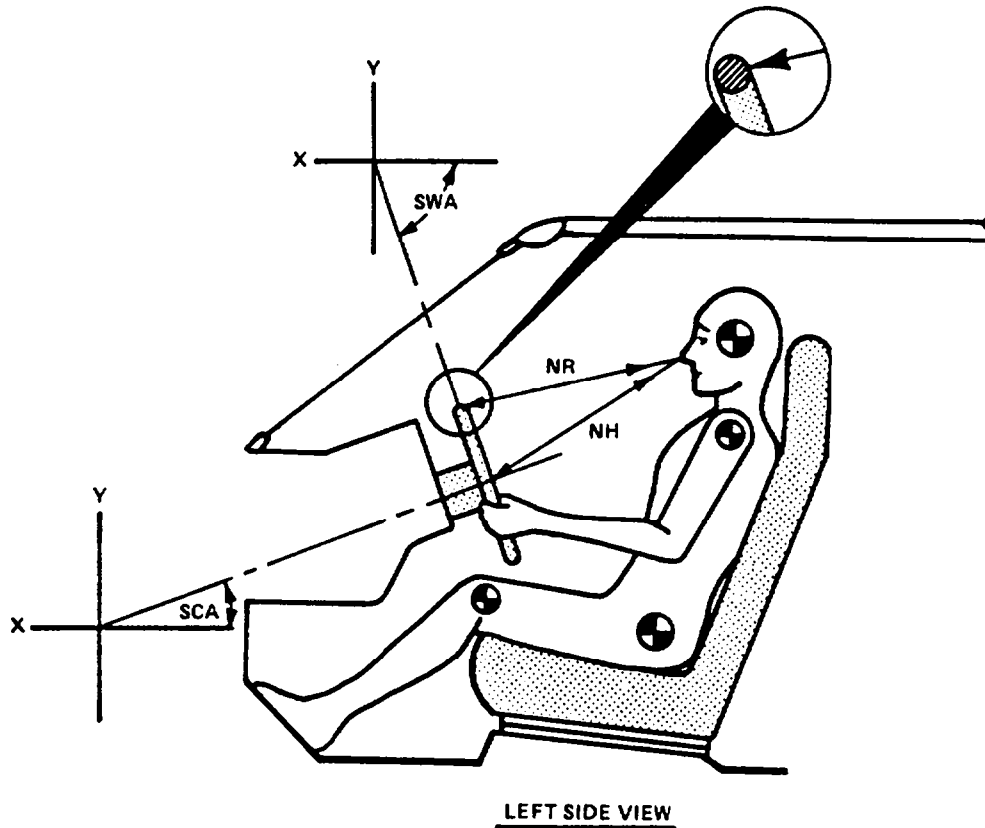
HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD(L/R)= Knee to Dash (Left/Right)
 SA = Seat Back Angle
 TA = Torso Angle

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



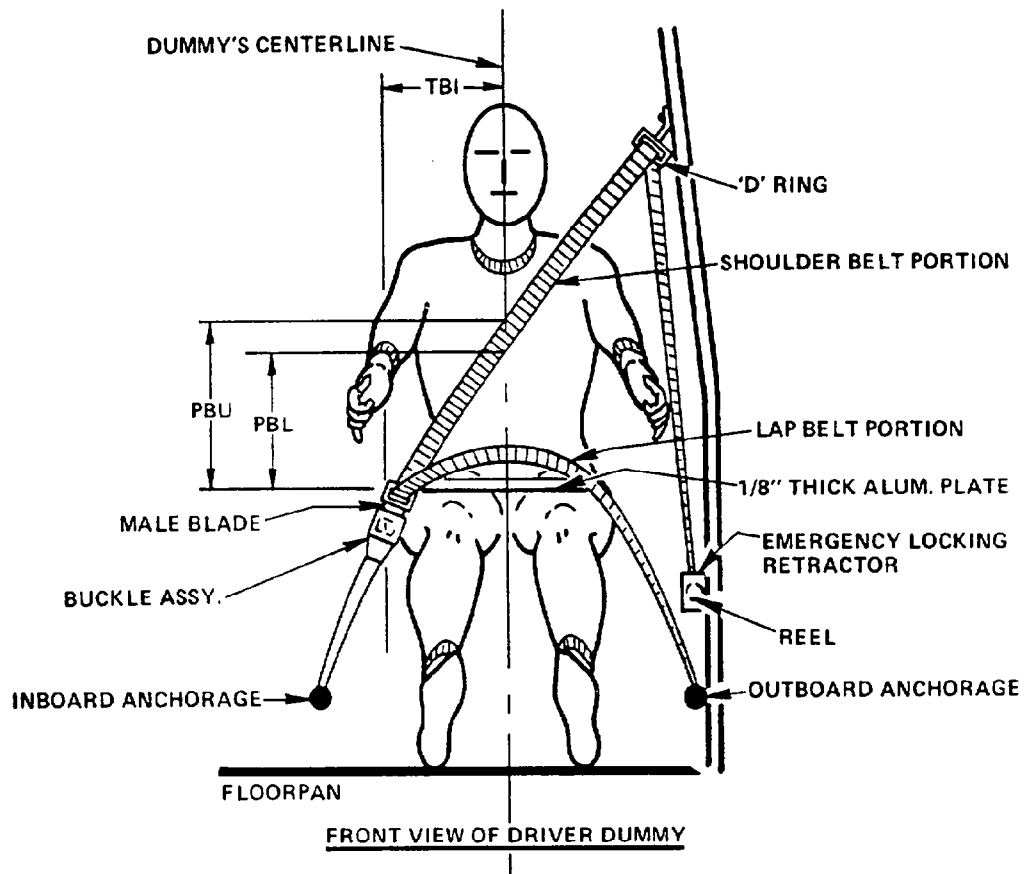
	DRIVER	PASSENGER
HR	3.8	3.9
HS	7.9	7.9
AD	3.1	4.0
HD	4.2	4.6
KK	10.0	8.9
HA	12.0	12.7

Figure 4
DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



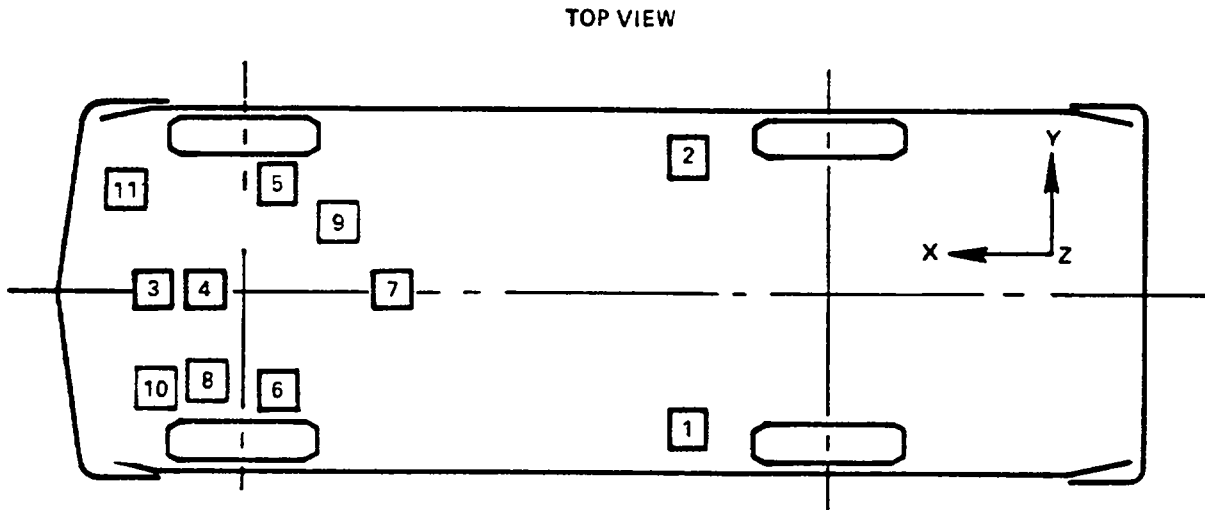
		MEASUREMENTS
<u>NR</u> -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	15.7	Inches
<u>NH</u> -- Distance from tip of dummy's nose to center of steering column hub	16.5	Inches
<u>SCA</u> -- Angle of steering column relative to the horizontal X axis	25.0	Degrees
<u>SWA</u> -- Angle of steering wheel relative to the horizontal X axis	-65.0	Degrees

Figure 5
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	N/A	13.6
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	N/A	10.5
<u>TBI</u> -- distance from Torso centerline to buckle	N/A	7.7

Figure 6
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	Left Disc Brake Caliper	x		
7	Instrument Panel	x		
8	Front Shock Tower	x		
9	Firewall	x		
10	Cradle Frame	x		
11	Radiator Support	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**		NEGATIVE DIRECTION**	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	REAR SEAT X-MEMBER AT LEFT SIDE	68.7	22.4	15.7				
	PRE: POST:	70.4	22.0	14.7				
	LONGITUDINAL ACCELERATION				2	133	-42	39
2	REAR SEAT X-MEMBER AT RIGHT SIDE	69.7	-22.4	15.7				
	PRE: POST:	70.4	-23.0	15.6				
	LONGITUDINAL ACCELERATION				2	148	-44	40
3	TOP OF ENGINE BLOCK	150.9	-7.0	34.6				
	PRE: POST:	144.8	-5.9	33.1				
	LONGITUDINAL ACCELERATION				67	45	-101	30
4	BOTTOM OF ENGINE BLOCK	143.4	5.3	10.5				
	PRE: POST:	138.3	7.3	10.0				
	LONGITUDINAL ACCELERATION				40	41	-122	33
5	BRAKE CALIPER AT RIGHT SIDE	139.4	-22.7	16.8				
	PRE: POST:	137.8	-17.9	18.2				
	LONGITUDINAL ACCELERATION				23	60	-73	42
6	BRAKE CALIPER AT LEFT SIDE	139.3	22.7	18.5				
	PRE: POST:	140.0	17.2	17.5				
	LONGITUDINAL ACCELERATION				33	60	-73	43
7	DASH PANEL	116.2	-2.1	30.6				
	PRE: POST:	116.4	-2.0	32.1				
	LONGITUDINAL ACCELERATION				43	63	-47	70

**

POSITIVENEGATIVE

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

LONGITUDINAL: FORWARD
 LATERAL: LEFTWARD
 VERTICAL: UPWARD

REARWARD
 RIGHTWARD
 DOWNWARD

DISTANCE MEASUREMENTS IN INCHES

TABLE 4 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION**		NEGATIVE DIRECTION**	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
8	FRONT SHOCK TOWER	144.3	18.7	35.2				
	PRE:							
	POST:	141.9	17.8	33.5				
	LONGITUDINAL ACCELERATION				35	26	-75	45
9	FIREWALL							
	PRE:	133.7	-3.2	36.2				
	POST:	132.0	-3.5	32.6				
	LONGITUDINAL ACCELERATION				105	21	-62	43
10	CRADLE FRAME							
	PRE:	156.1	9.1	12.0				
	POST:	150.3	10.3	9.5				
	LONGITUDINAL ACCELERATION				222	40	-403	48
11	RADIATOR SUPPORT							
	PRE:	160.6	-20.0	32.0				
	POST:	151.5	-20.8	31.5				
	LONGITUDINAL ACCELERATION				30	41	-110	35

**

POSITIVENEGATIVE

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

LONGITUDINAL: FORWARD
 LATERAL: LEFTWARD
 VERTICAL: UPWARD

REARWARD
 RIGHTWARD
 DOWNWARD

DISTANCE MEASUREMENTS IN INCHES

Figure 7

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 5

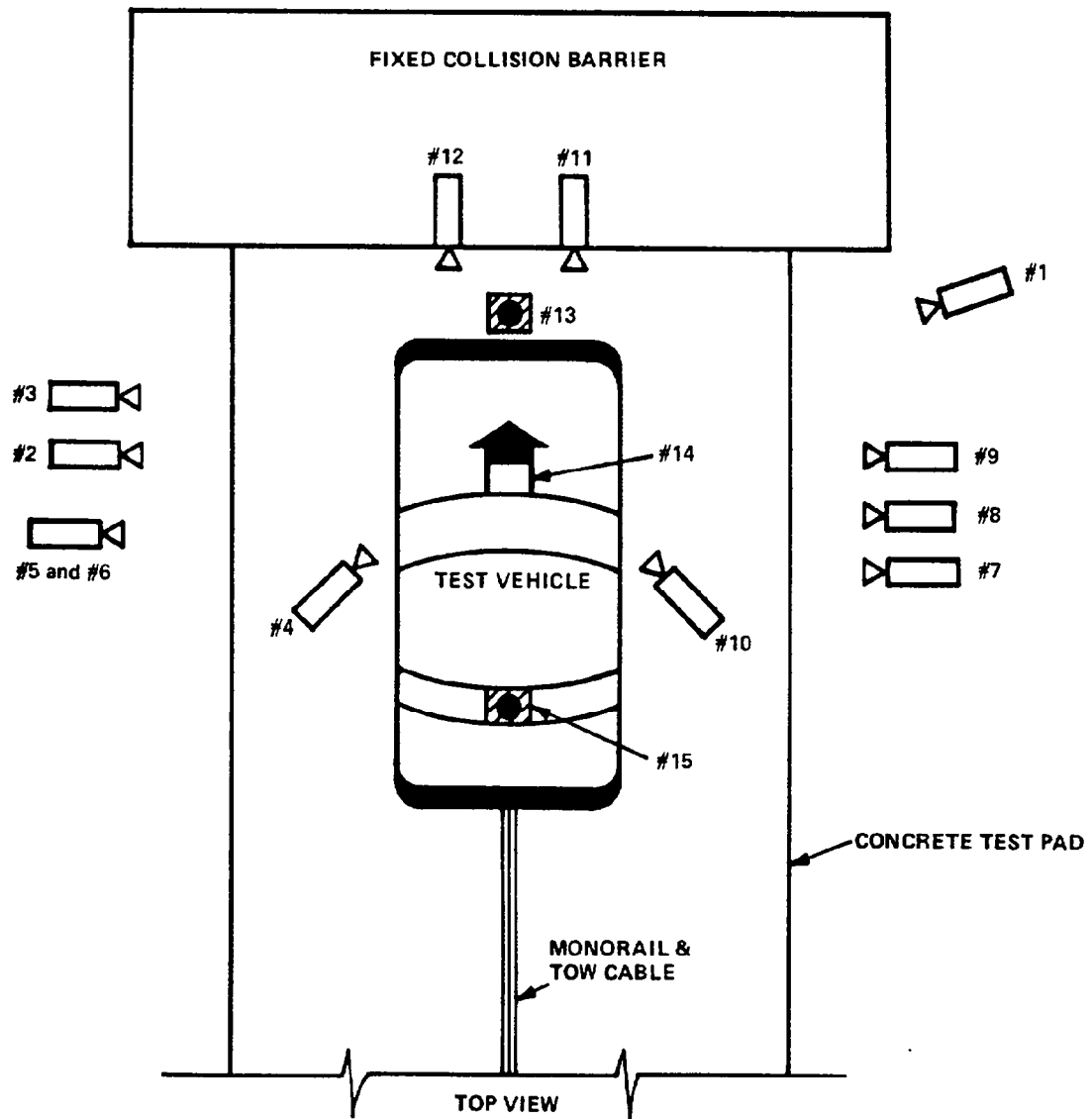


TABLE 5
HIGH-SPEED CAMERA LOCATIONS

Test No. CK0203		Vehicle 1989 Ford Tempo GL 4-Door Sedan						
CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	220	59	4.15	-3	204	13	540
3	Left Side View	294	35	41.0	-3	278	25	540
4	Driver and Interior View	101	105	69.0	-18	-	13	775
5	Steering Column (bottom)	295	81	46.0	-4	279	25	545
6	Steering Column (top)	295	81	70.0	-9	279	25	555
7	Overall Right Side	237	69	41.5	-4	221	13	555
8	Right Side View	293	45	41.0	-2	277	25	800
9	Right Passenger View	295	69	57.0	-3	279	35	730
10	Passenger and Interior View	90	106	67.0	-20	-	13	600
11	Passenger Front View	46	13	73.0	-43	-	13	550
12	Driver Front View	56	16	66.0	-44	-	13	530
13	Windshield View	0	0	126.0	-52	-	13	545
14	Pit View of Engine	0	36	-120.0	90	-	13	N/A
15	Pit View of Fuel Tank	0	130	-120.0	90	-	13	N/A

N/A - Not Available

- * 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

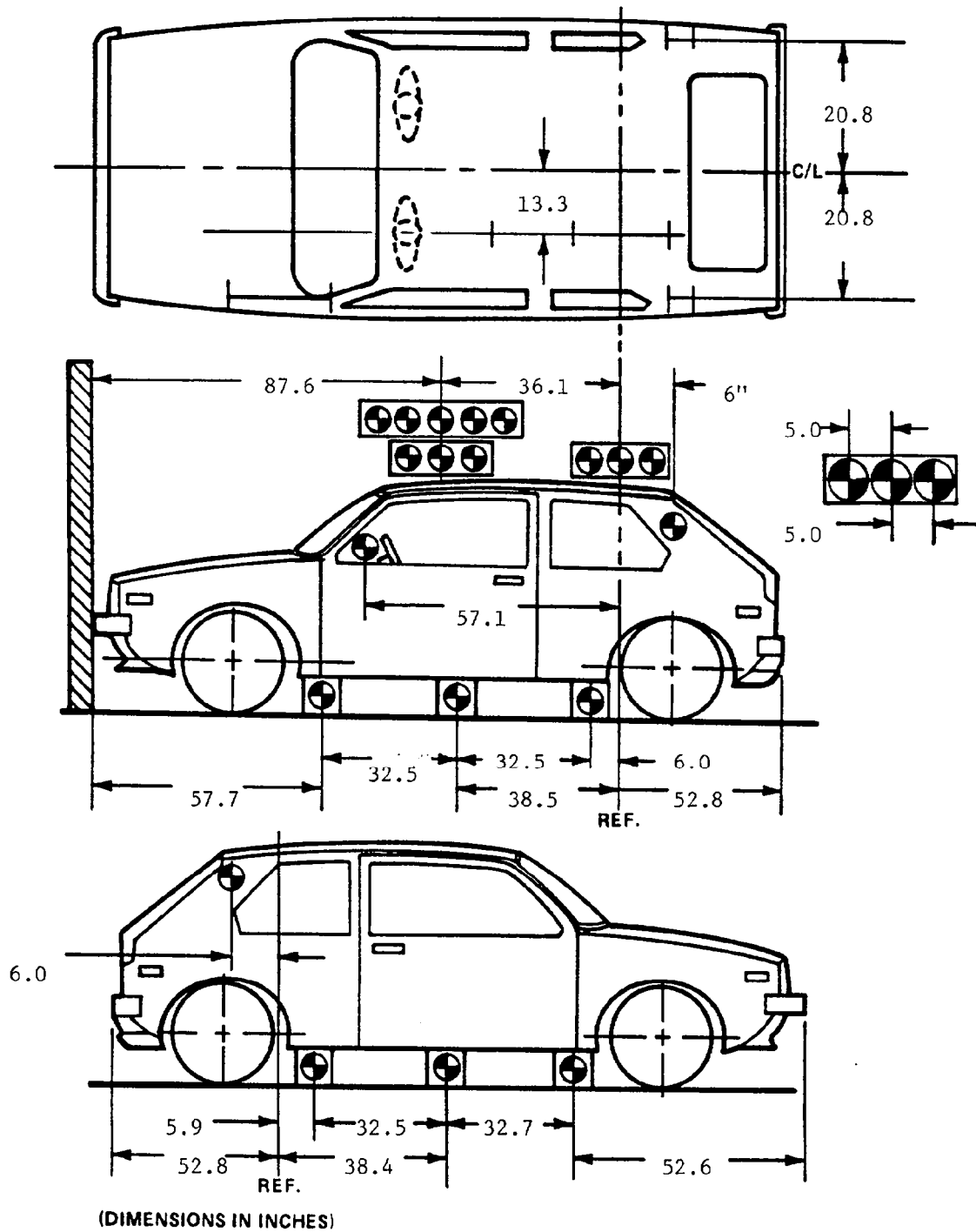


Figure 9

TEST VEHICLE MEASUREMENTS

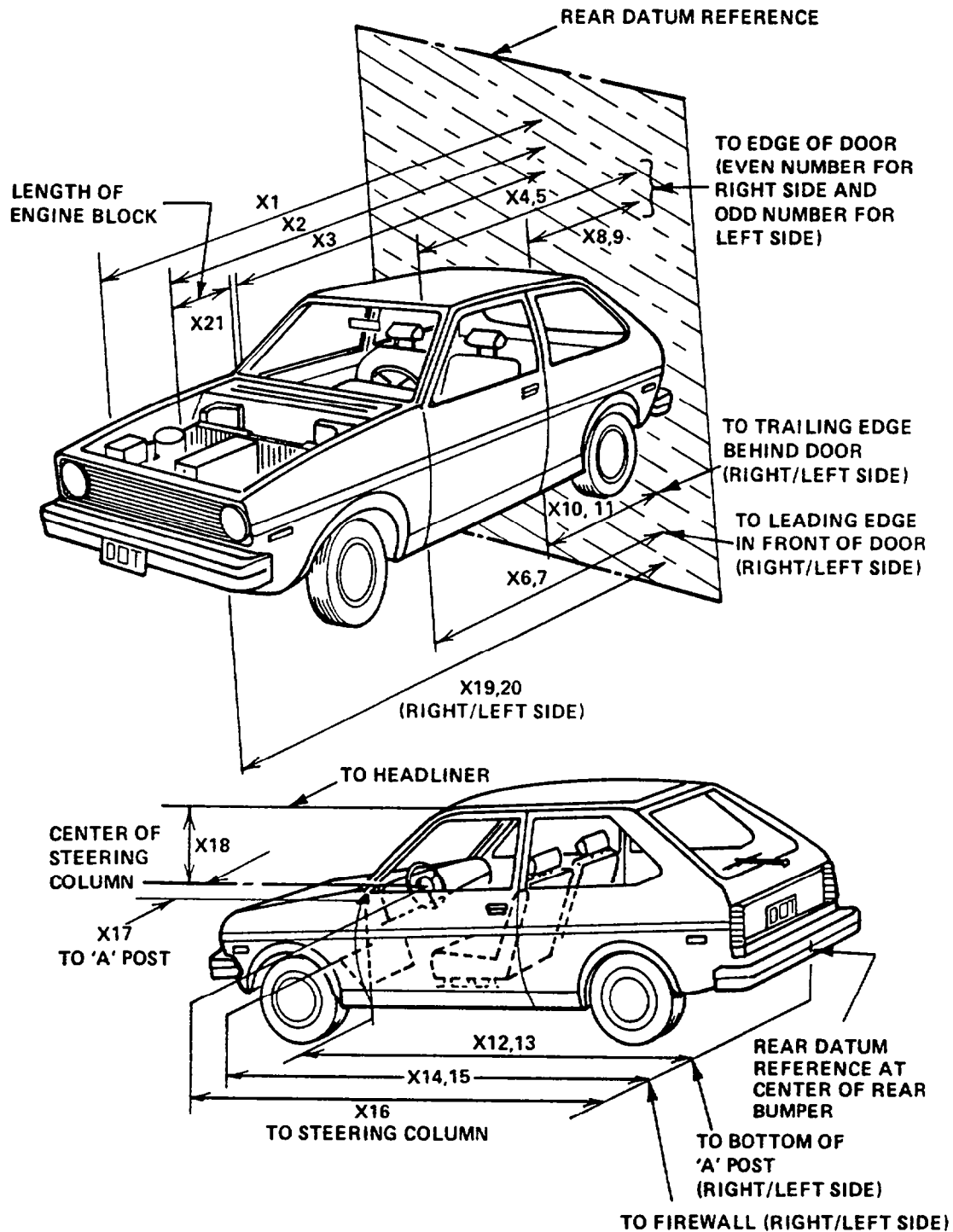


TABLE 6
VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	176.5	162.8	13.7
X2	Rear Surface of Vehicle to Front of Engine	151.7	147.7	4.0
X3	Rear Surface of Vehicle to Firewall	135.7	133.9	1.8
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	123.1	122.3	0.8
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	123.4	123.2	0.2
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	121.3	120.4	0.9
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	120.9	121.0	-0.1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	83.0	82.3	0.7
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	83.5	82.9	0.6
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	83.5	82.9	0.6
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	83.5	83.4	0.1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	122.6	122.4	0.2
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	122.9	123.2	-0.3
X14	Rear Surface of Vehicle to Firewall, Right Side	137.1	135.3	1.8
X15	Rear Surface of Vehicle to Firewall, Left Side	137.3	135.8	1.5
X16	Rear Surface of Vehicle to Steering Column	104.1	105.8	-1.7
X17	Center of Steering Column to "A" Post	15.8	16.0	-0.2
X18	Center of Steering Column to Headliner	15.9	16.0	-0.1
X19	Rear Surface of Vehicle to Right Side of Front Bumper	174.5	160.1	14.4
X20	Rear Surface of Vehicle to Left Side of Front Bumper	174.5	161.7	12.8
X21	Length of Engine Block	12.0	12.0	0.0

Section 4

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

- o "Occupant Crash Protection," FMVSS No. 208 Data
- o "Windshield Mounting," FMVSS No. 212 Data
- o "Windshield Zone Intrusion," FMVSS No. 219 (Partial) Data
- o "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)	-125	33	-93	143	-48	-7	-10	45.3
DUMMY (2)	-23	15	43	46	-42	-20	-9	41.3

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	Left Femur	Right Femur
DUMMY (1)	1636	1077
DUMMY (2)	749	616

	HEAD INJURY CRITERIA **			
	HIC	36 millisecond Maximum		AVE. ACC. (g) t ₁ TO t ₂
		t ₁ (SEC)	t ₂ (SEC)	
DUMMY (1)	435	0.05610	0.09015	43.9
DUMMY (2)	390	0.06465	0.10065	41.1

*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 = 5.7 sec.

Log time duration of reminder light operation = 5.7 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 = 0.0 sec.
(audible warning should not operate)

Log time duration of reminder light operation = 5.7 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: Inside glove box

The manufacturer states no regular maintenance required unless:

1. Airbag lamp does not light as described.
2. Airbag lamp flashes intermittently
3. A tone sound intermittently with no "airbag" lamp.
4. The supplemental airbag has deployed.

Were appropriate instructions concerning maintenance and/or replacement of this system provided?

YES X NO

Was a description of the functional operation of the system provided?

YES X NO

Is there a reference to the instructions and description of the system on the label?

YES X NO

Was an owner's manual provided?

YES X NO

Did the owner's manual contain appropriate information concerning maintenance and/or replacement and a description of the functional operation of the system?

YES X NO

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 ☐ NO ☒

Describe the location of the readiness indicator:

Lower right side of instrument cluster

Is the readiness indicator clearly visible to the driver?

YES ☒ NO ☐

Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided?

YES ☒ NO ☐

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

Test Vehicle NHTSA No.:	<u>CK0203</u>
Make/Model:	<u>1989 Ford Tempo GL</u>
Date of Comfort/Convenience Check:	<u>4-6-89</u>
Technician Performing Check:	<u>DJT</u>
GVWR:	<u>3682</u>

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 NO X

If yes, go to requirements D1, D2 and D3

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

TABLE 11 (continued)

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 shoulder belt ("comfort clips" or "window shade" devices).

YES X NO

Check the owner's manual and determine the maximum amount of slack recommended by the manufacturer in inches. The recommended slack is 1.0 inches*. Introduce this slack into the shoulder belt before testing the vehicle to comply with the requirements of FMVSS 208 S5.1. A warning is included in the owner's manual that introducing slack beyond the amount specified can significantly reduce the effectiveness of the shoulder belt.

YES X NO

*Note: No slack introduced as instructed by COTR.

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 X NO

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 0.5 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.:

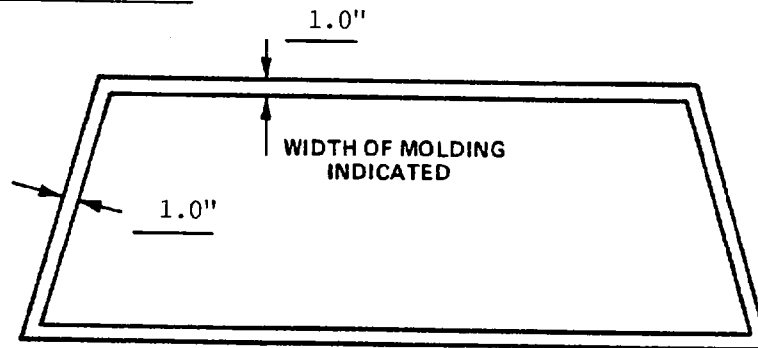
Windshield is bonded in place with a 1" plastic trim over the top and side edges. Lower edge is covered with a plastic shroud.

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

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		
	PRE-TEST (in.)	POST-TEST (in.)	PERCENT RETENTION
RIGHT SIDE	77.1	77.1	100%
LEFT SIDE	77.1	77.1	100%
TOTAL	154.2	154.2	100%

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

NONE

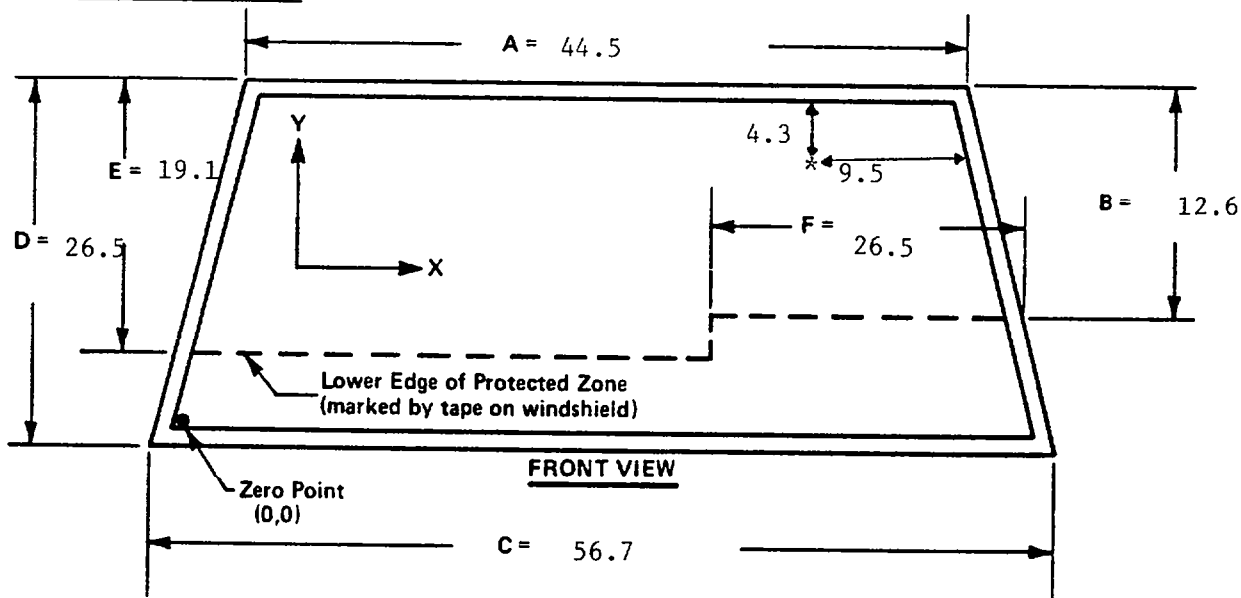
Figure 11

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)

*Windshield contacted by driver's head

	COORDINATES	
	X	Y
1.	40.1	21.2
2.		
3.		
4.		

TABLE 12

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATAFMVSS NO. 301TEST VEHICLE NHTSA NO.:

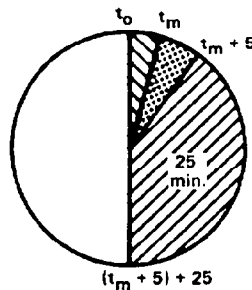
C	K	0	2	0	3
---	---	---	---	---	---

 TEST DATE: April 7, 1989Vehicle Mfr/Make/Model: 1989 Ford Tempo GL 4-Door Sedan

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

1. From impact until vehicle motion ceases
2. For 5 minute period after vehicle motion ceases
3. For next 25 minutes

ACTUAL	MAX ALLOWED
0	1 oz
0	5 oz
0	1 oz/1 min

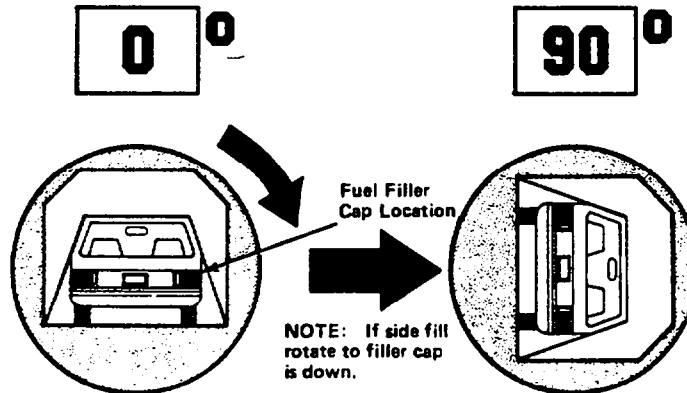
SOLVENT SPILLAGE DETAILS

NONE

TABLE 13
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.:
 CK0203

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 3 minutes 0 seconds
 (Spec. Range = 1 to 3 minutes)

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.

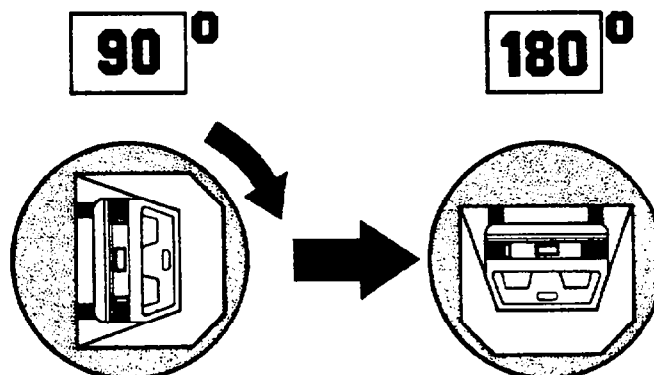
IV. SOLVENT SPILLAGE LOCATION(S):

NONE

TABLE 13 (continued)
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.:
 CK0203

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 55 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL 7 minutes 55 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.

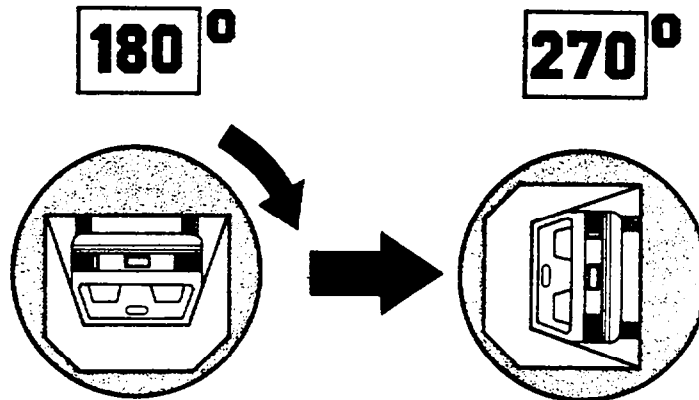
IV. SOLVENT SPILLAGE LOCATION(S):

NONE

TABLE 13 (CONTINUED)
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.:
 CK0203

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 58 seconds
 (Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 05 minutes 00 seconds

TOTAL 7 minutes 58 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):

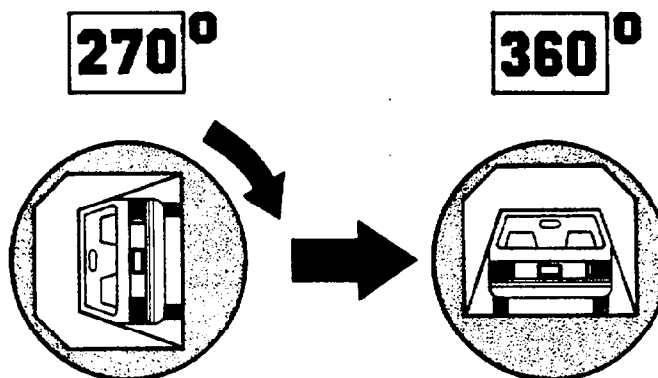
NONE

TABLE 13 (continued)
FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Veh. NHTSA ID No.:

CK0203

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 3 minutes 0 seconds
 (Spec. Range = 1 to 3 minutes)

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: April 7, 1989 VEH. NHTSA No. CK0203

VEHICLE MANUFACTURER: Ford Motor Company

Model Year 1989 VIN: 1FACP36X6KK158953

Body Style: 4-door Sedan Build Date: 12/88

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

IMPACT VELOCITY: 29.3 mph TIME OF TEST: 11:55 AM

TYPE OF AUTOMATIC RESTRAINT SYSTEM: driver airbag, passenger 3-point manual belt with single retractor.

FAILURE DETAILS: Vehicle appears to comply with the requirement of

FMVSS Nos 208, 212, 219 (partial) and 301.

Appendix A

PHOTOGRAPHS



Figure A-1 PRE-TEST FRONT VIEW

A-2

7715-4

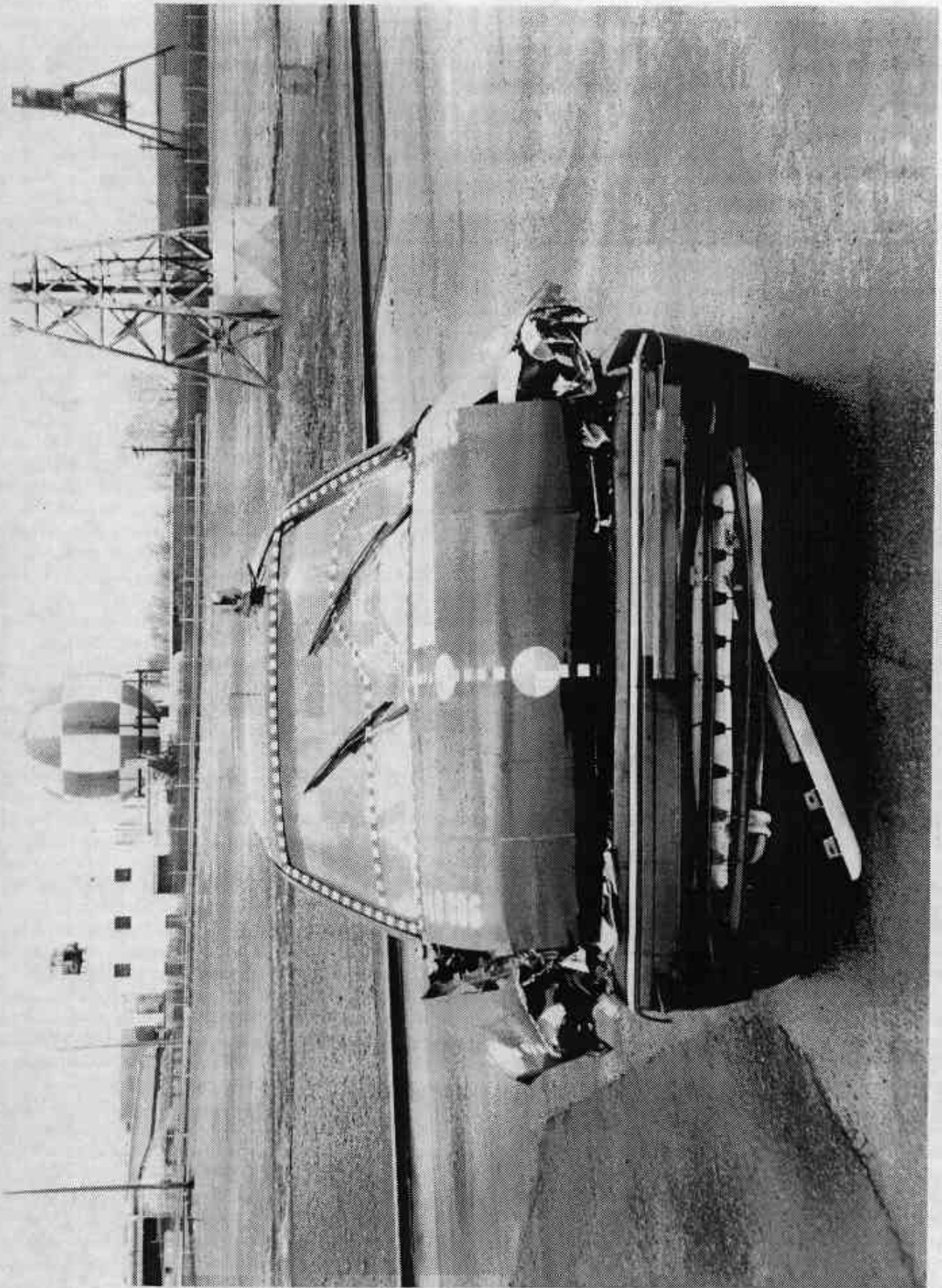


Figure A-2 POST-TEST FRONT VIEW

A-3

7715-4

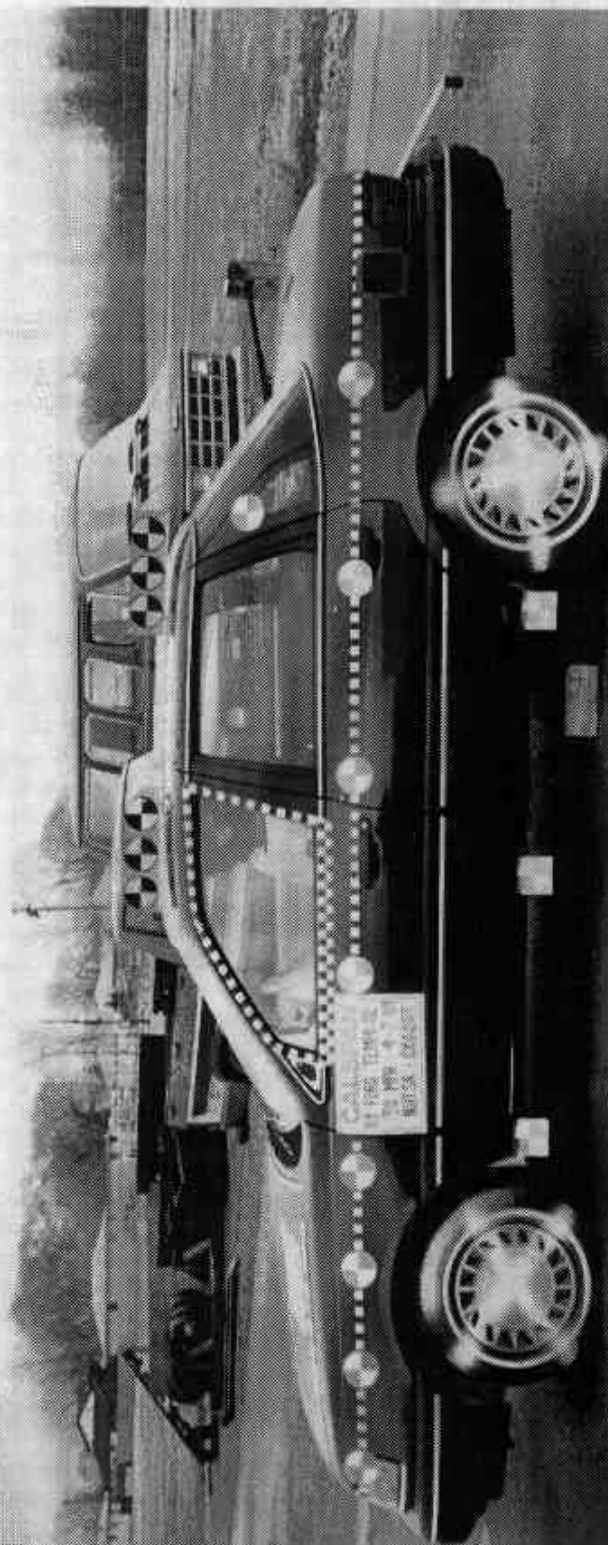


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-4

7715-4

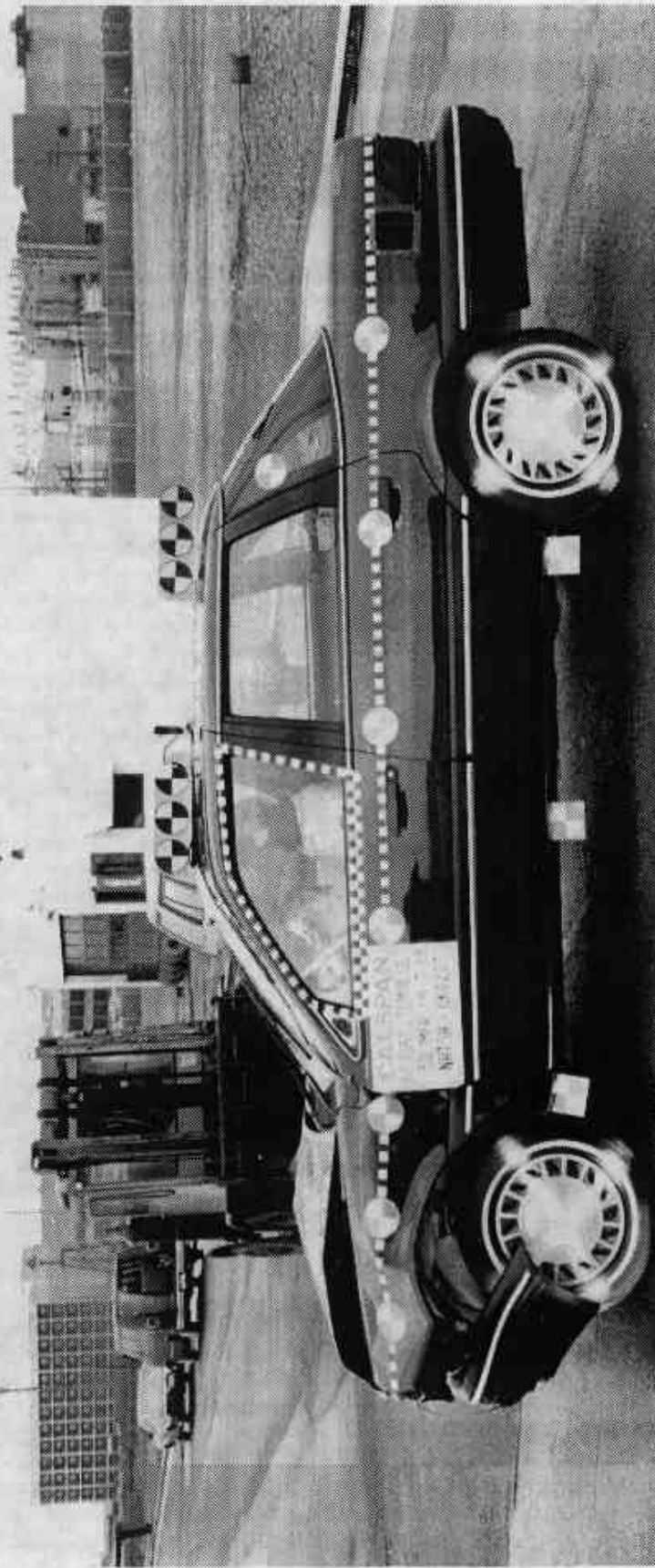


Figure A-4 POST-TEST LEFT SIDE VIEW

A-5

7715-4

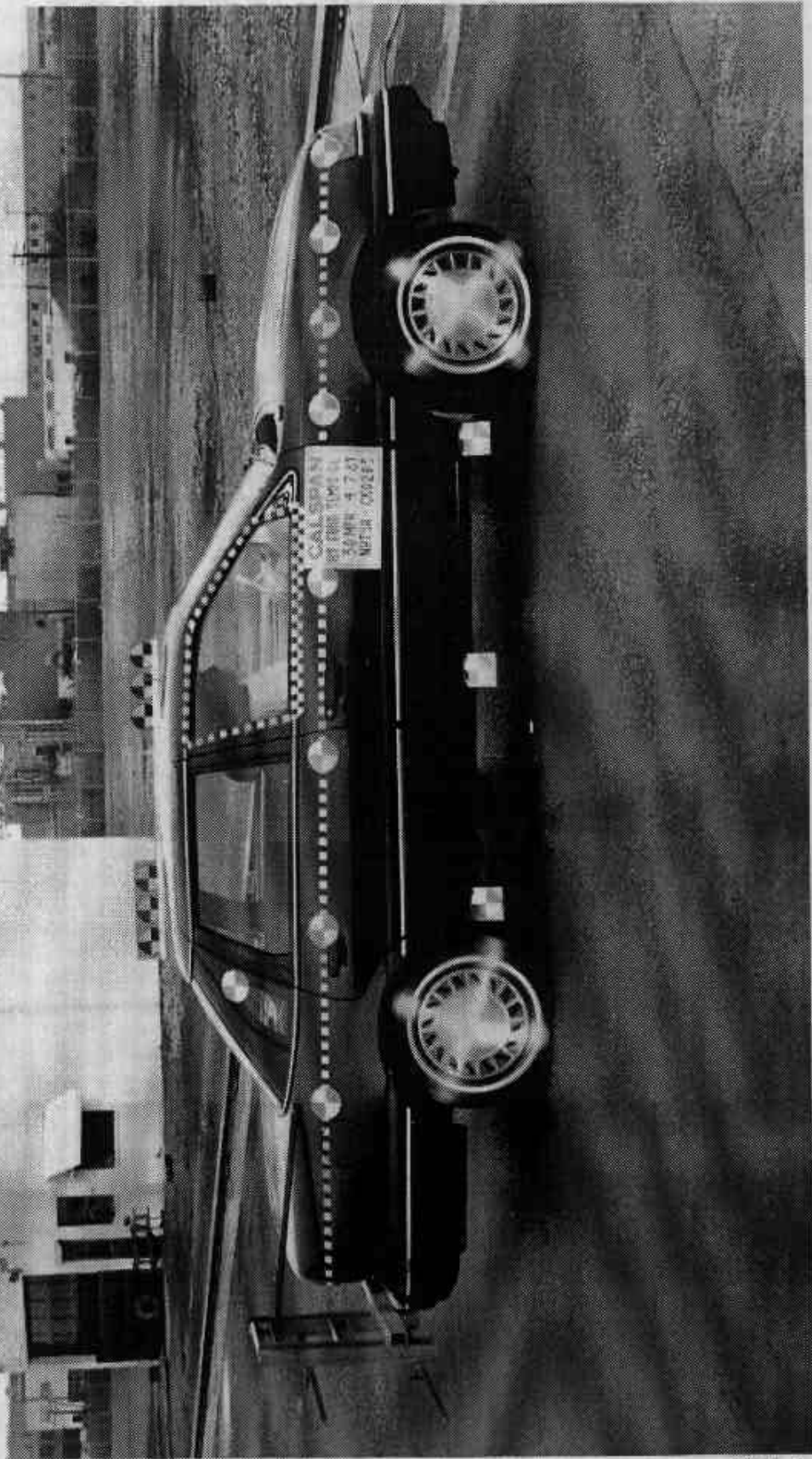


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-6

7715-4

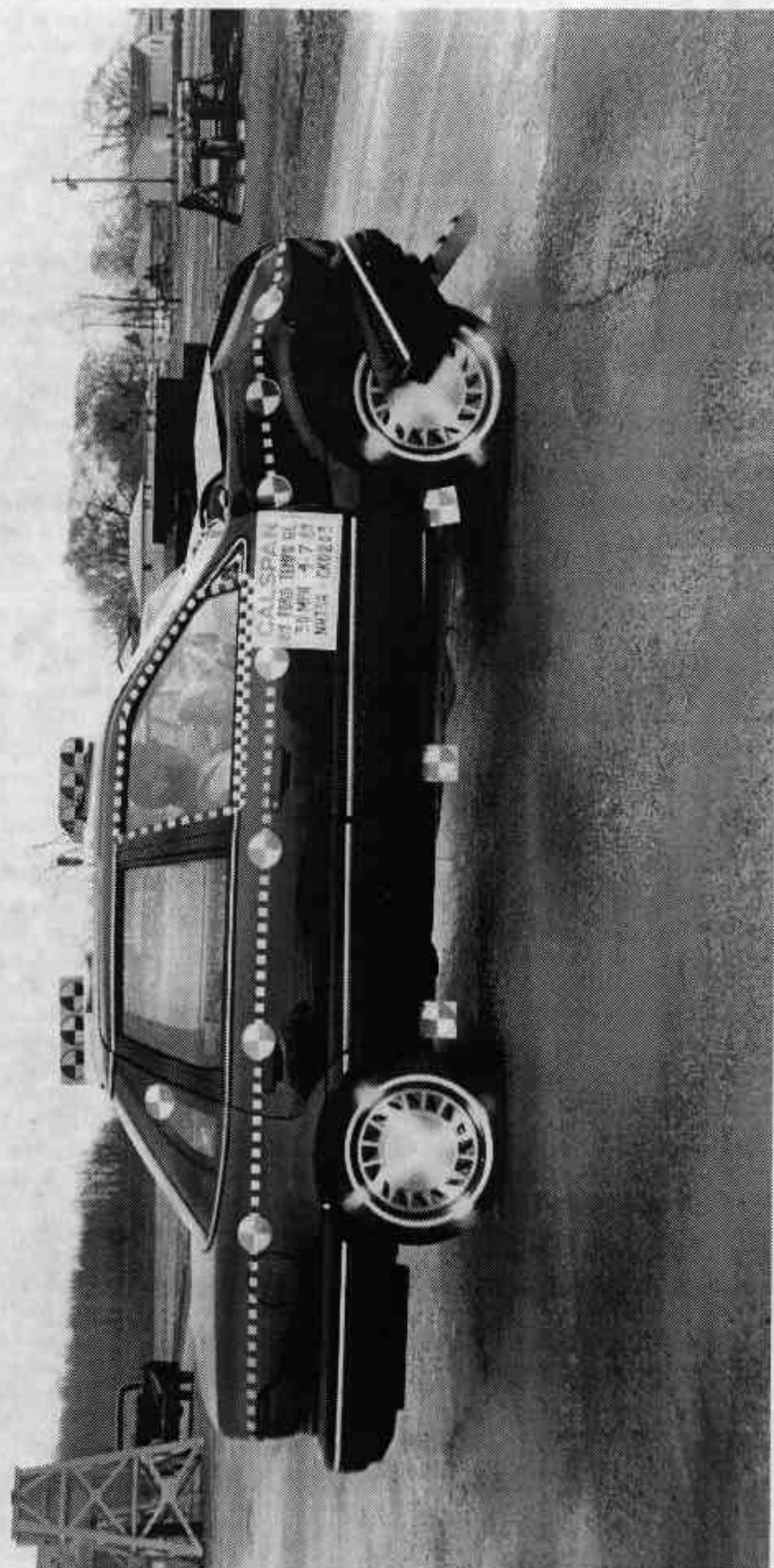


Figure A-6. POST-TEST RIGHT SIDE VIEW

A-7

7715-4



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

A-8

7715-4



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

A-9

7715-4



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

A-10

7715-4



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

A-11

7715-4



Figure A-11 POST-TEST TOP VIEW

A-12

7715-4

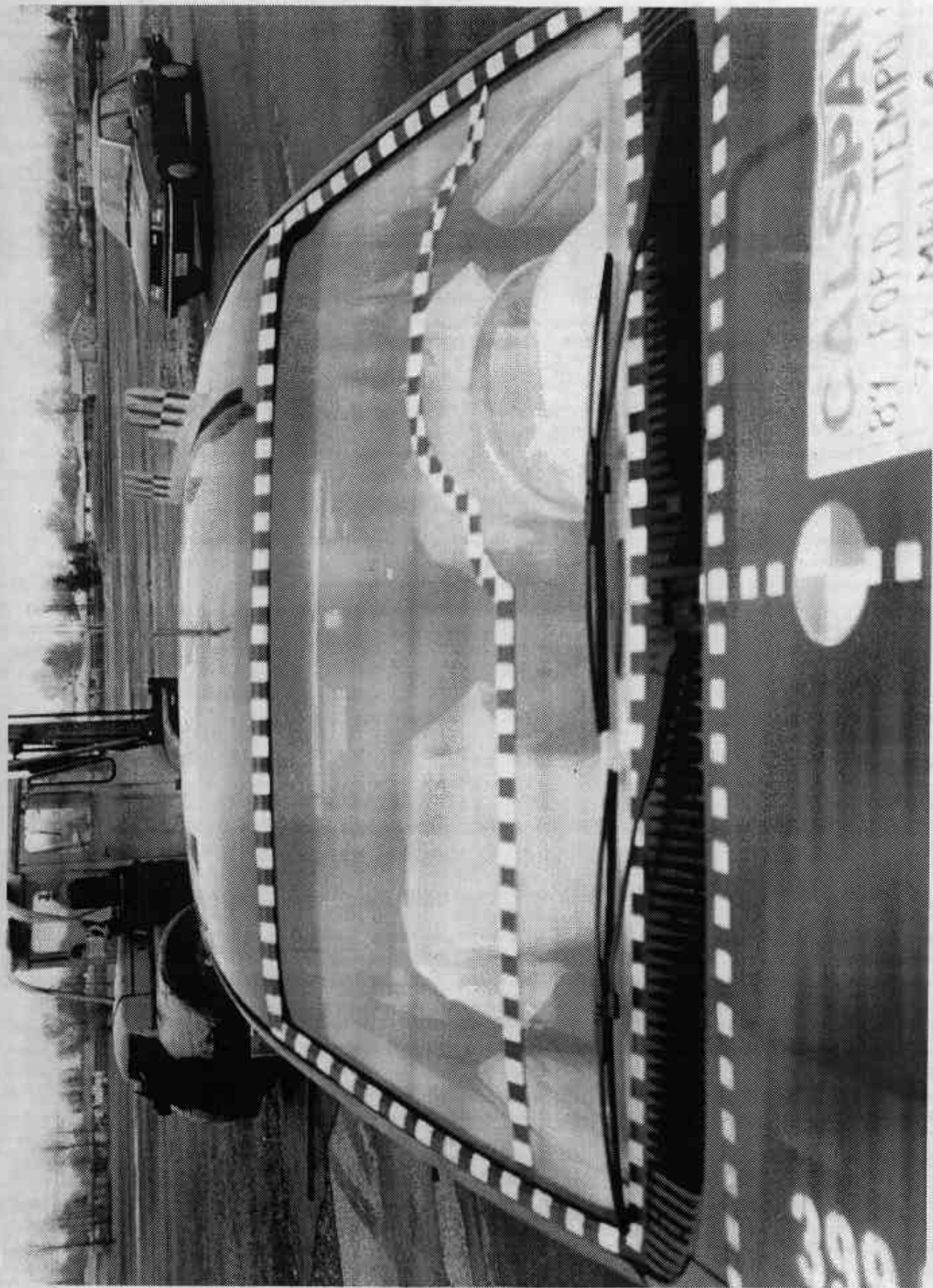


Figure A-12 PRE-TEST WINDSHIELD VIEW

A-13

7715-4

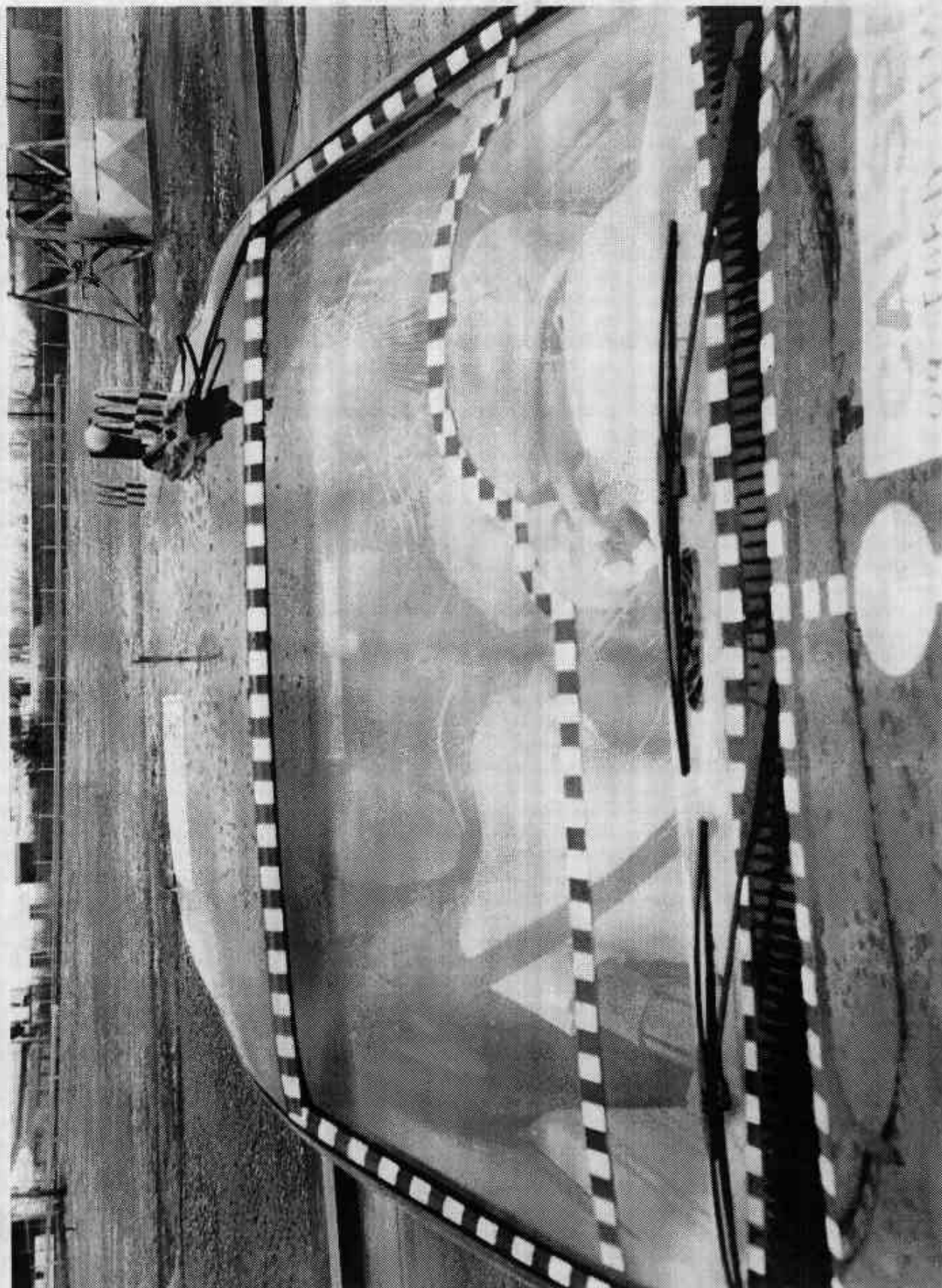


Figure A-13 POST-TEST WINDSHIELD VIEW

A-14

7715-4

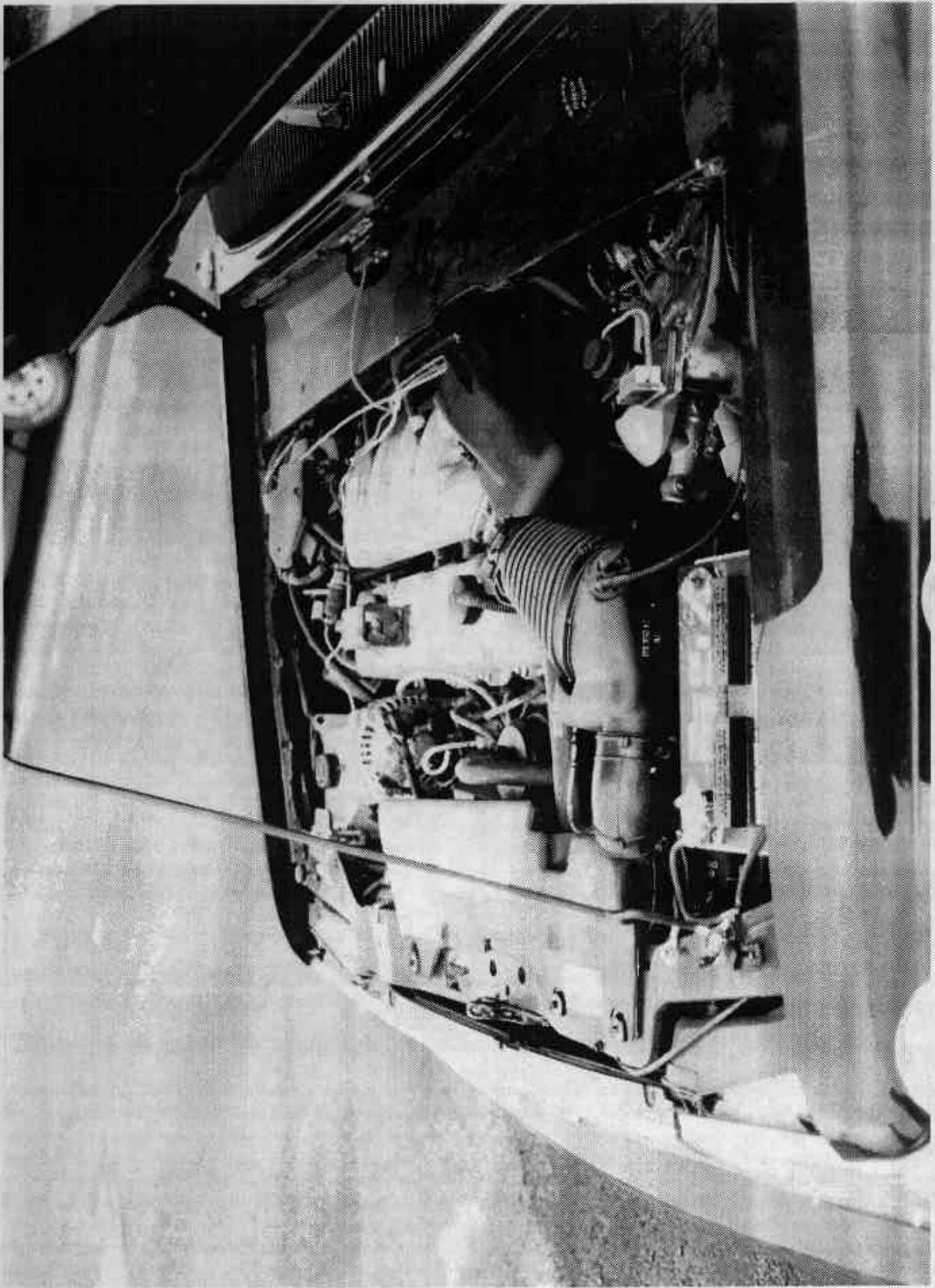


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

A-15

7715-4

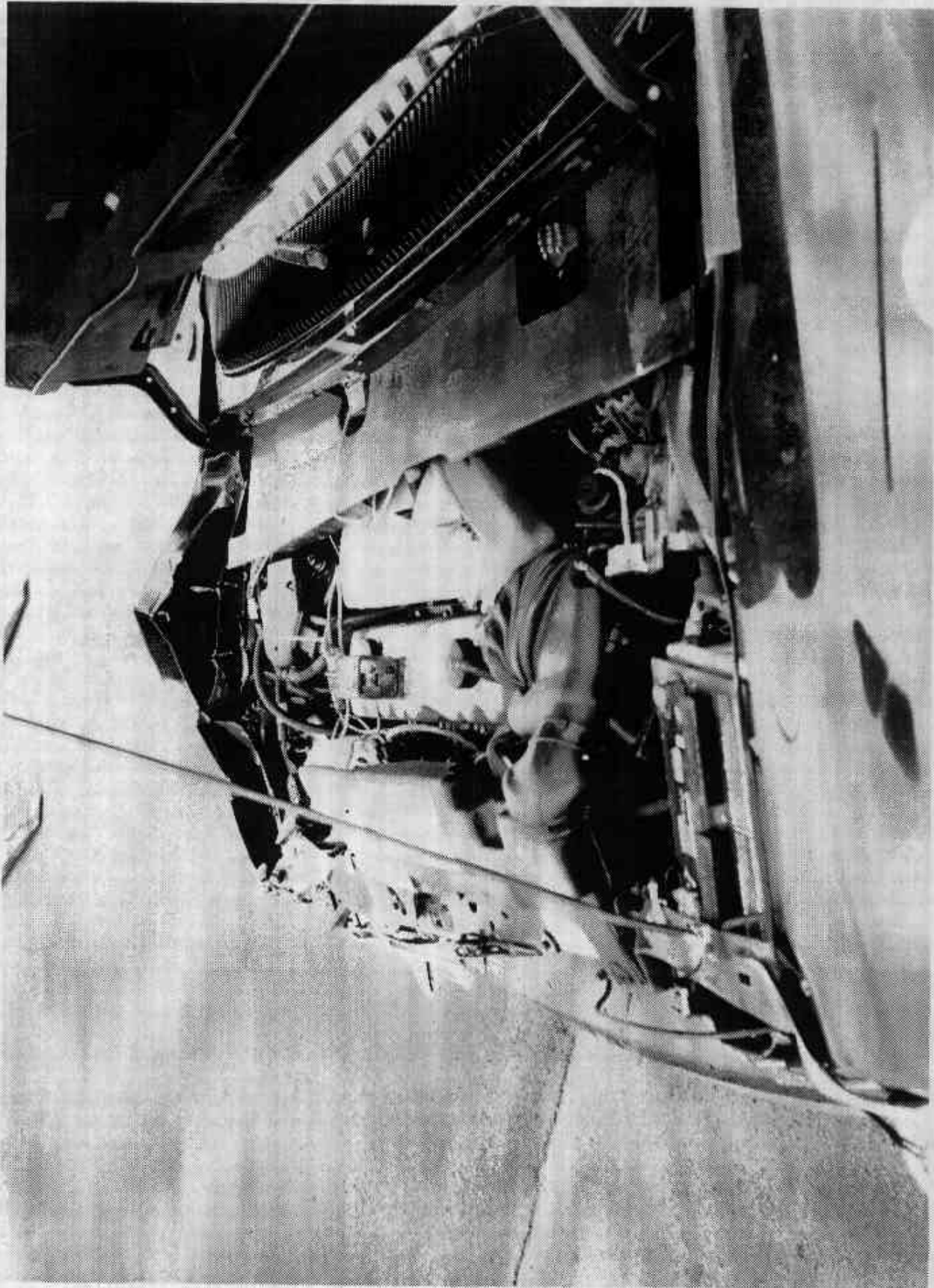


Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

A-16

7715-4

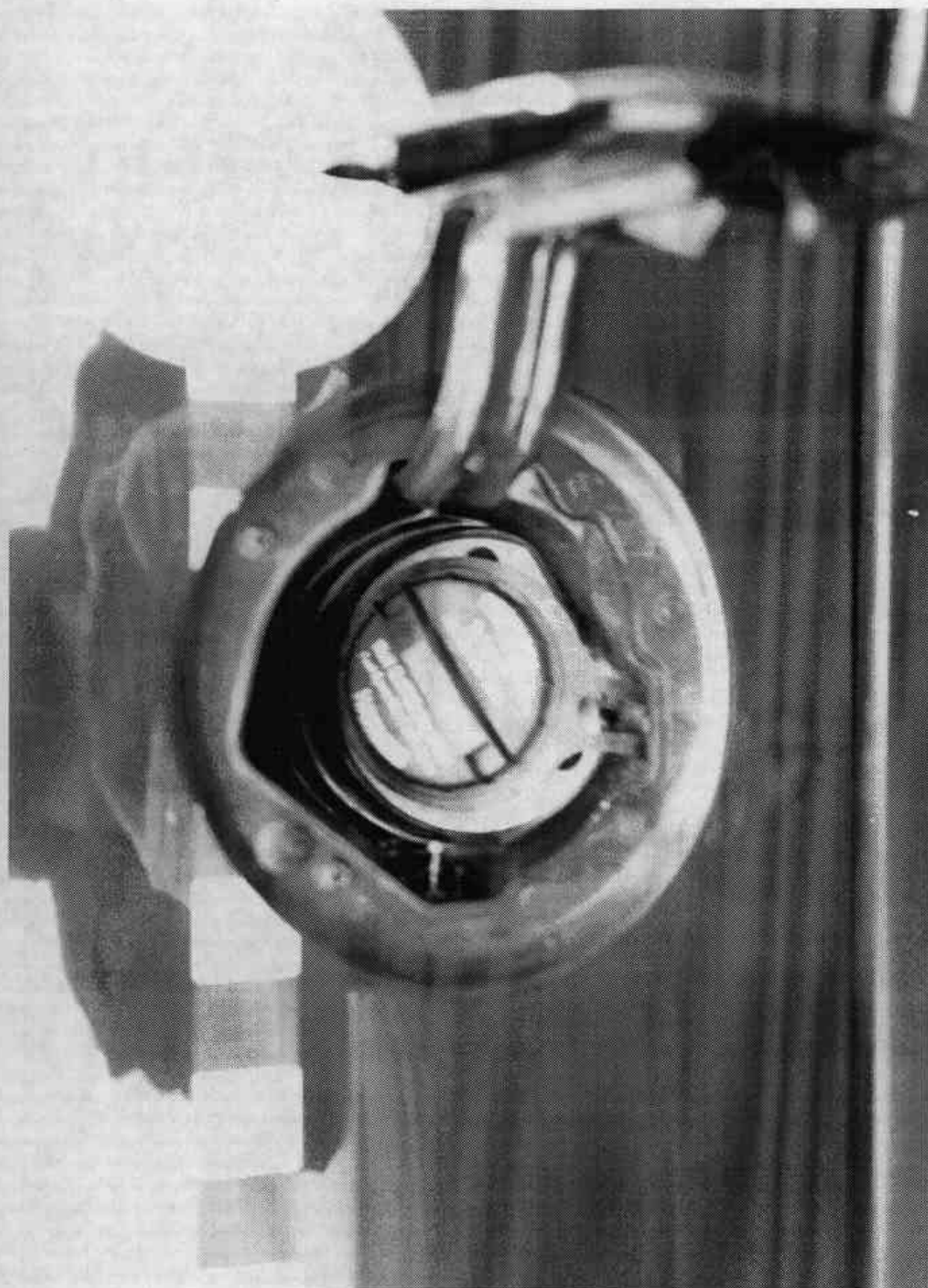


Figure A-16 PRE-TEST FUEL FILLER CAP VIEW



Figure A-17 POST-TEST FUEL FILLER CAP VIEW

A-18

7715-4

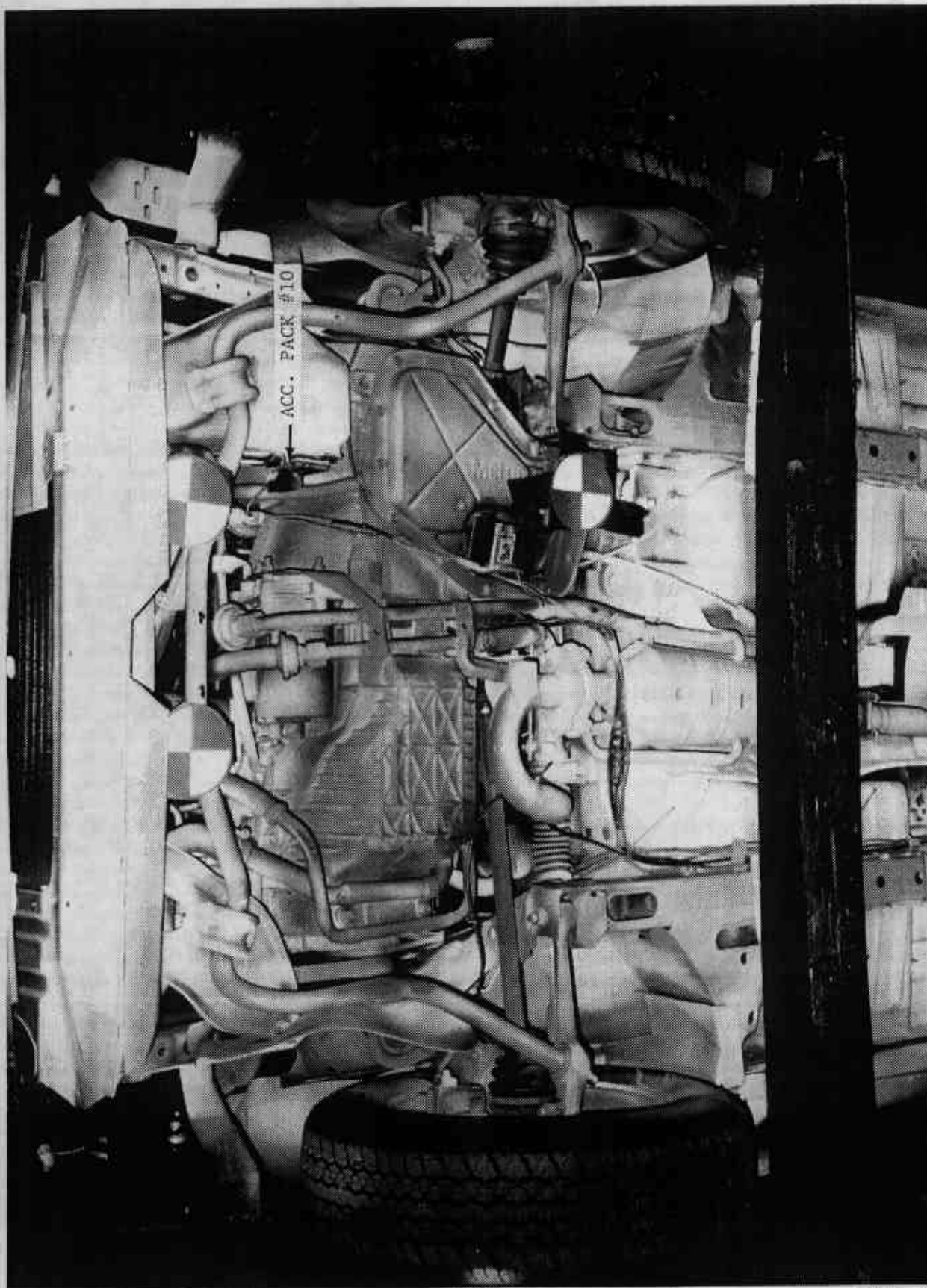


Figure A-18 PRE-TEST FRONT UNDERBODY VIEW

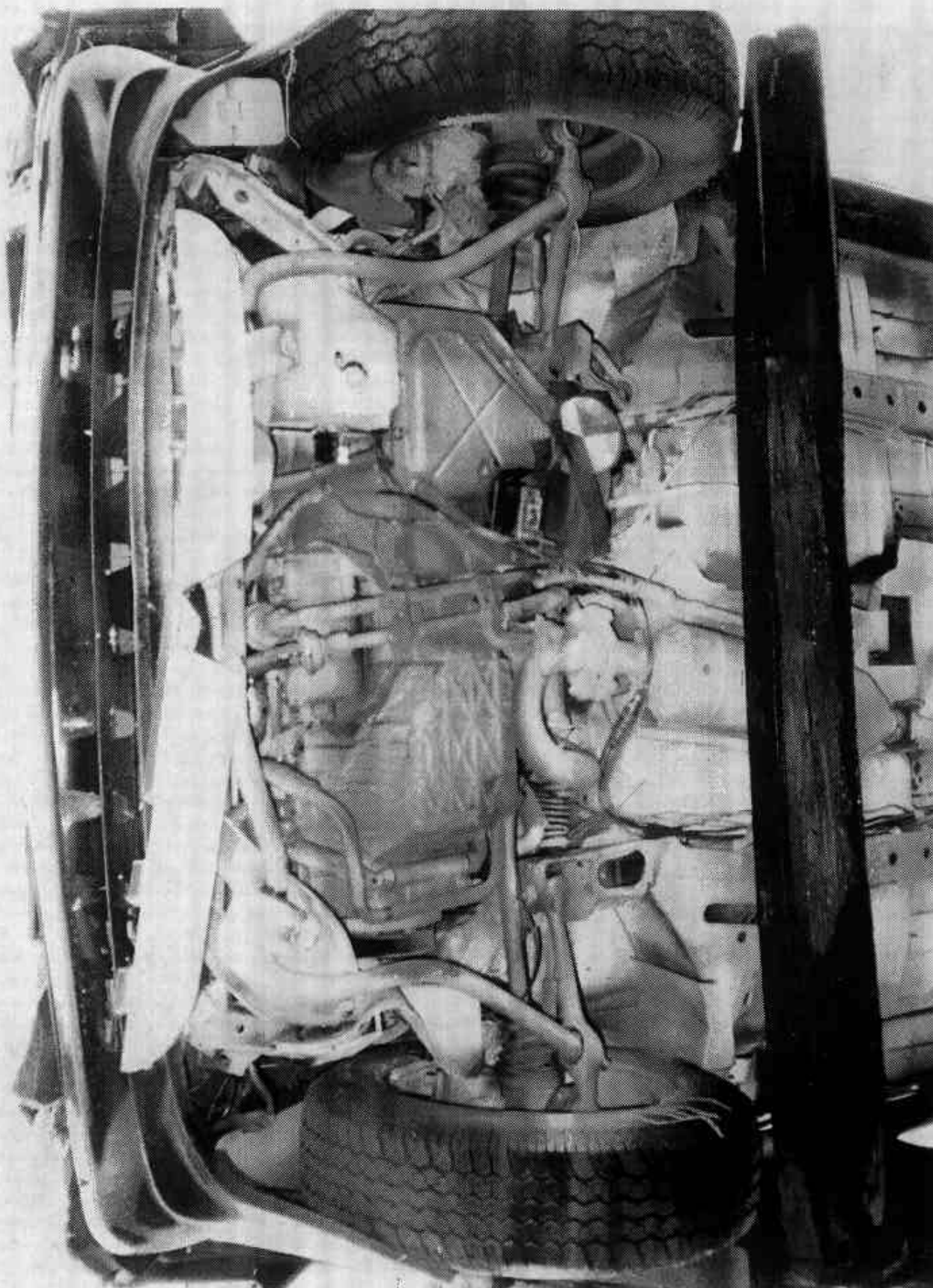


Figure A-19 POST-TEST FRONT UNDERBODY VIEW

A-20

7715-4

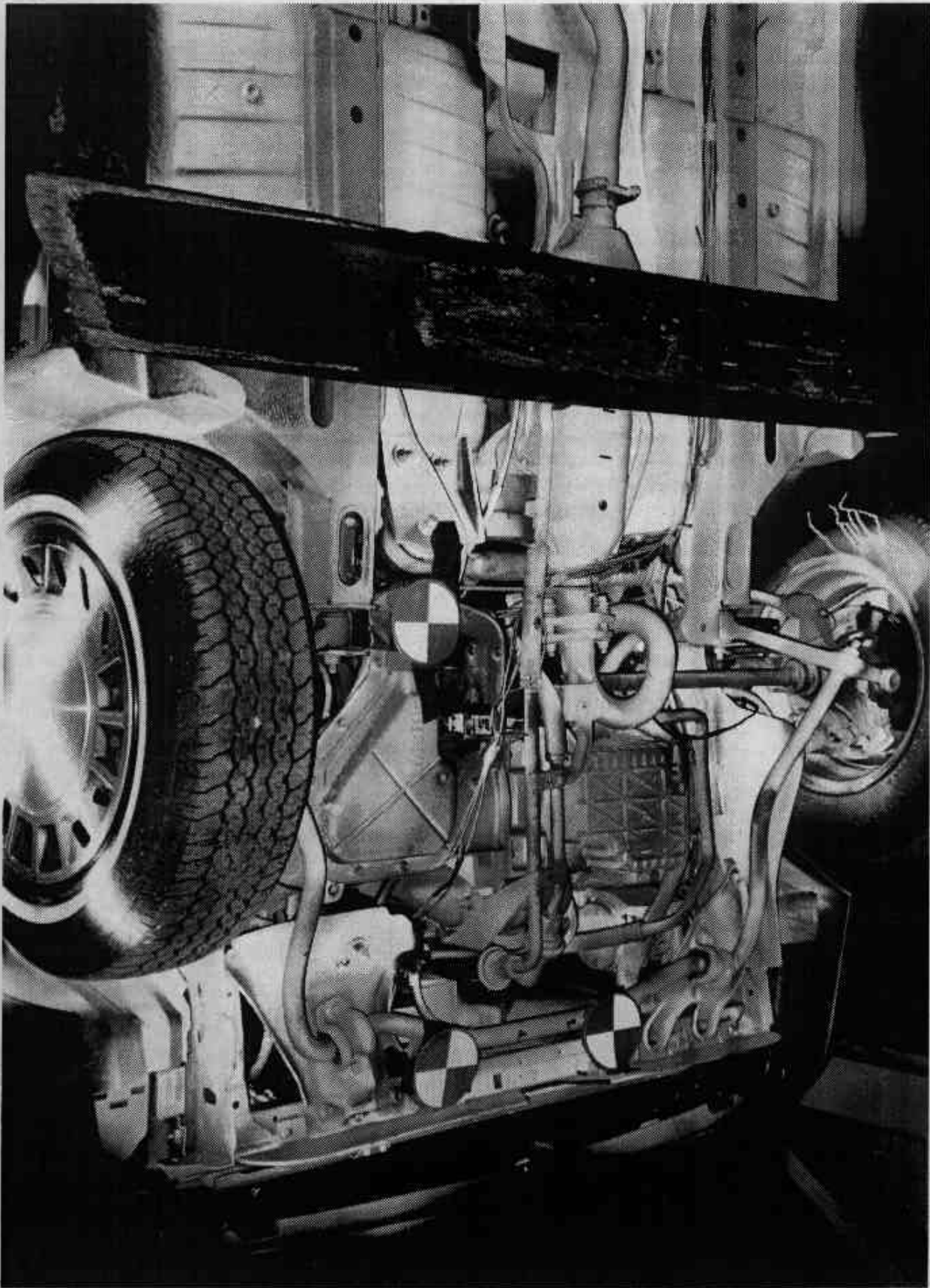


Figure A-20 PRE-TEST FRONT SIDE UNDERBODY VIEW

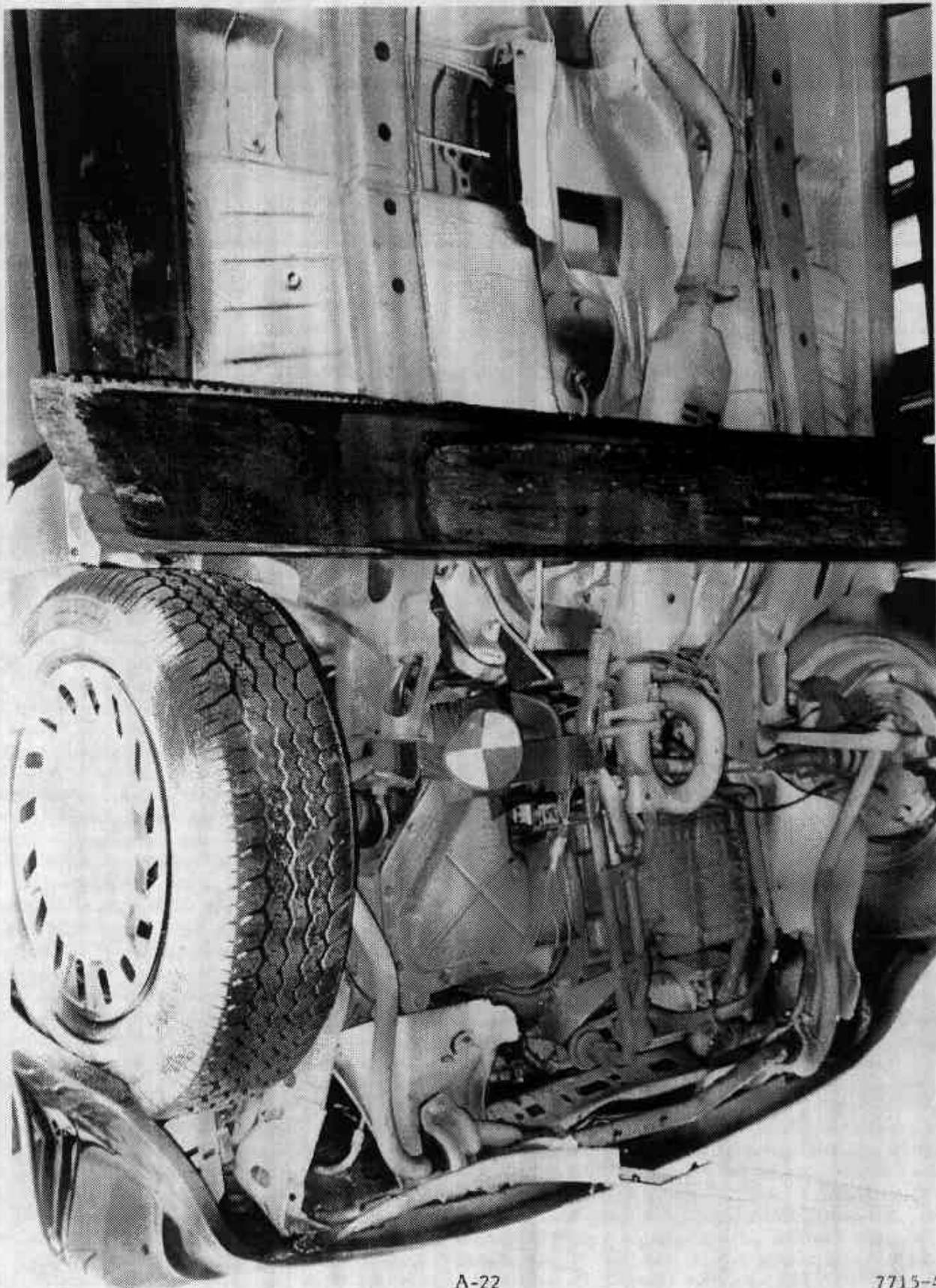


Figure A-21 POST-TEST FRONT SIDE UNDERBODY VIEW

A-22

7715-4

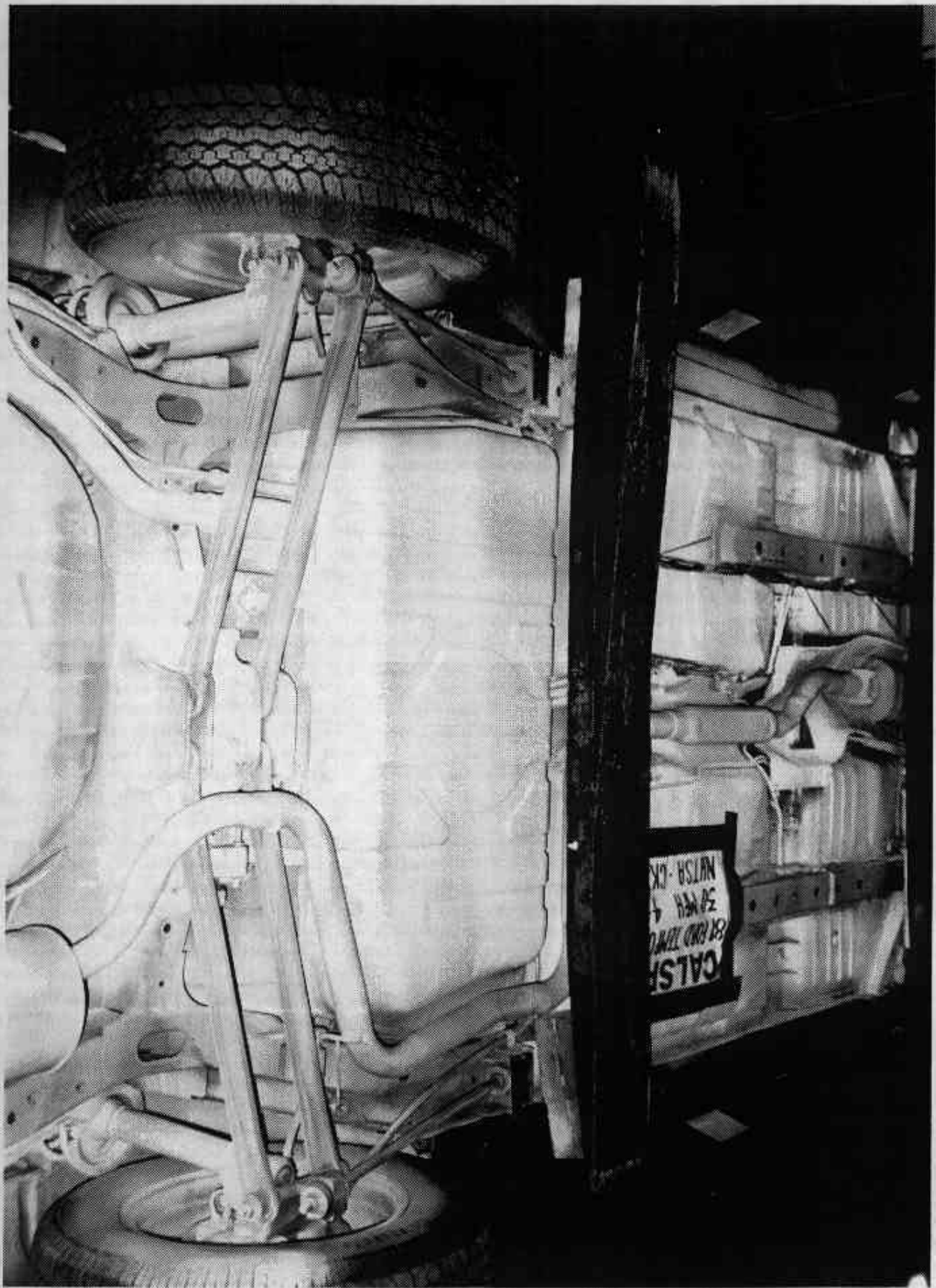


Figure A-22 PRE-TEST REAR UNDERBODY VIEW

A-23

7715-4

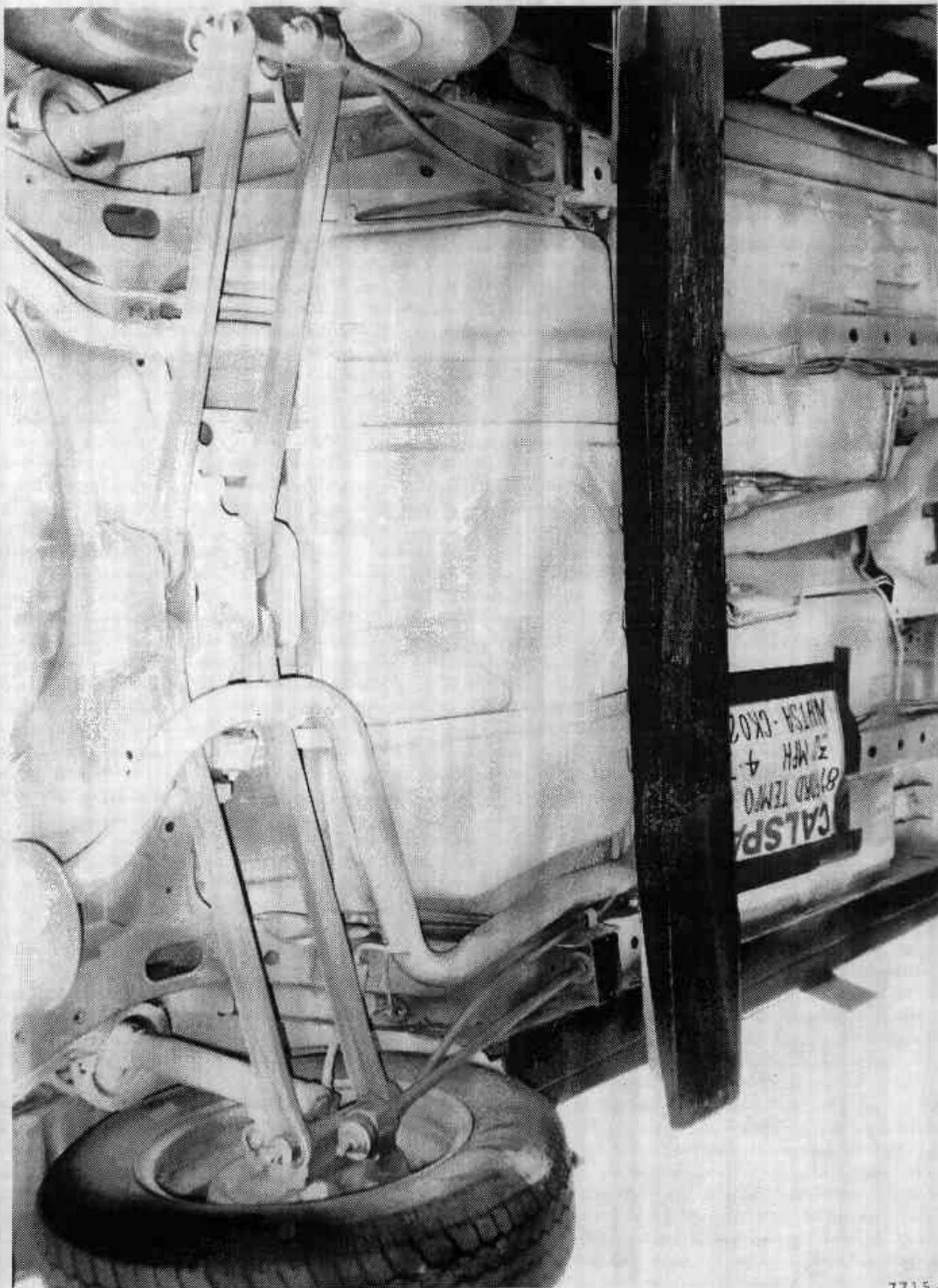


Figure A-23 POST-TEST REAR UNDERBODY VIEW

A-24

7715-4

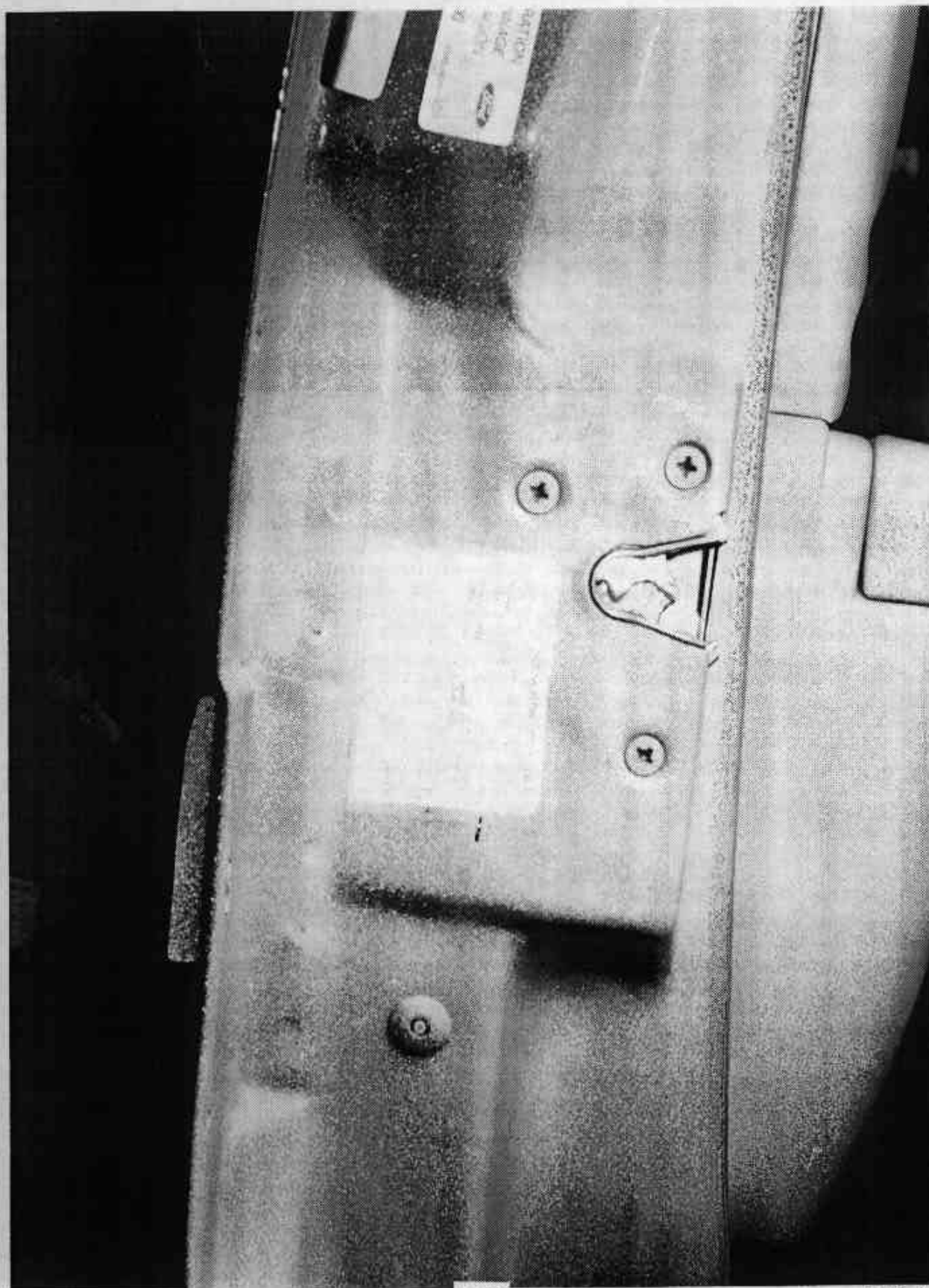


Figure A-24 CERTIFICATION LABEL



Figure A-25 TIRE PLACARD

A-26

7715-4



Figure A-26 PRE-TEST DRIVER DUMMY POSITION

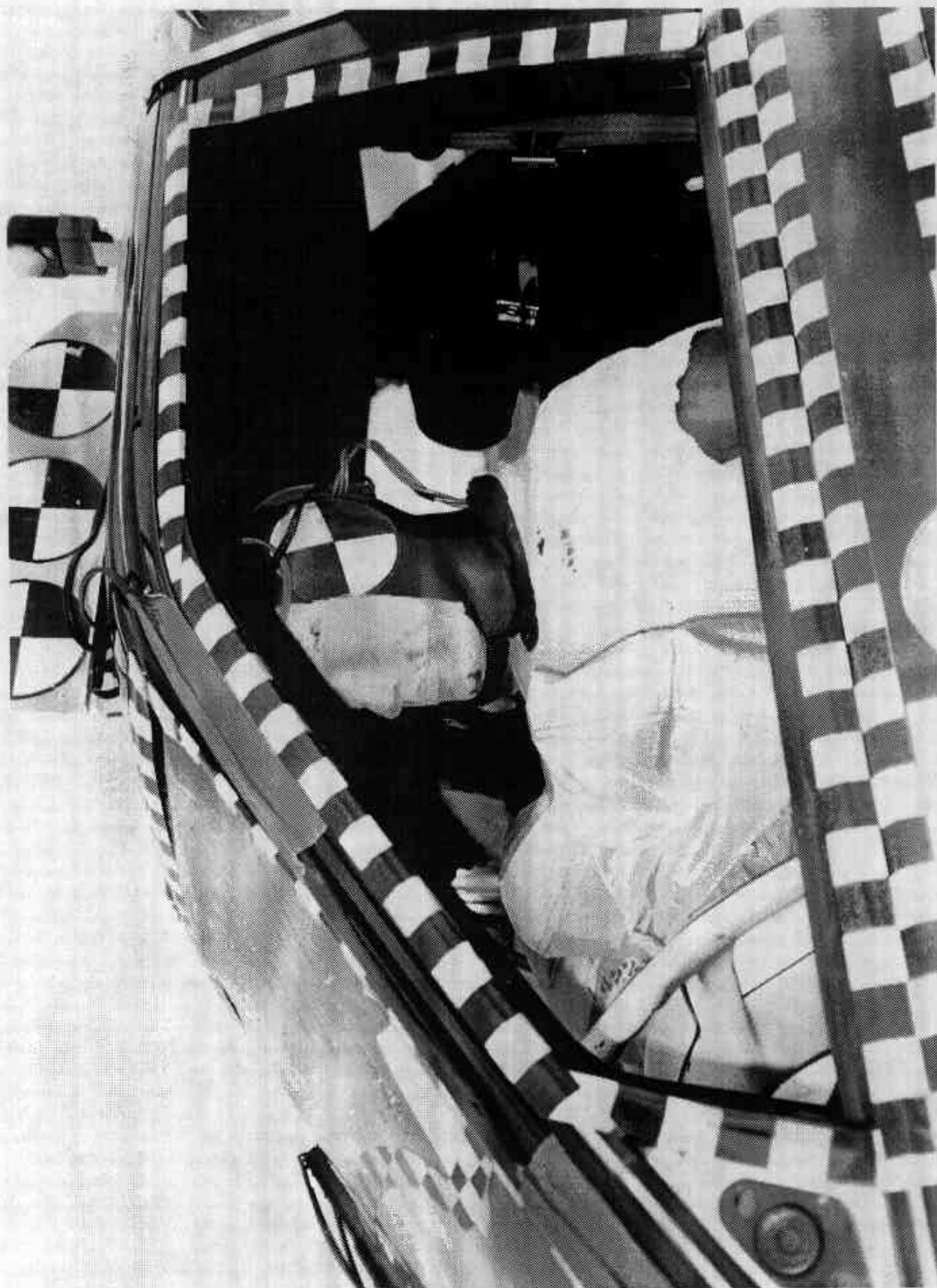


Figure A-27 POST-TEST DRIVER DUMMY POSITION

A-28

7715-4



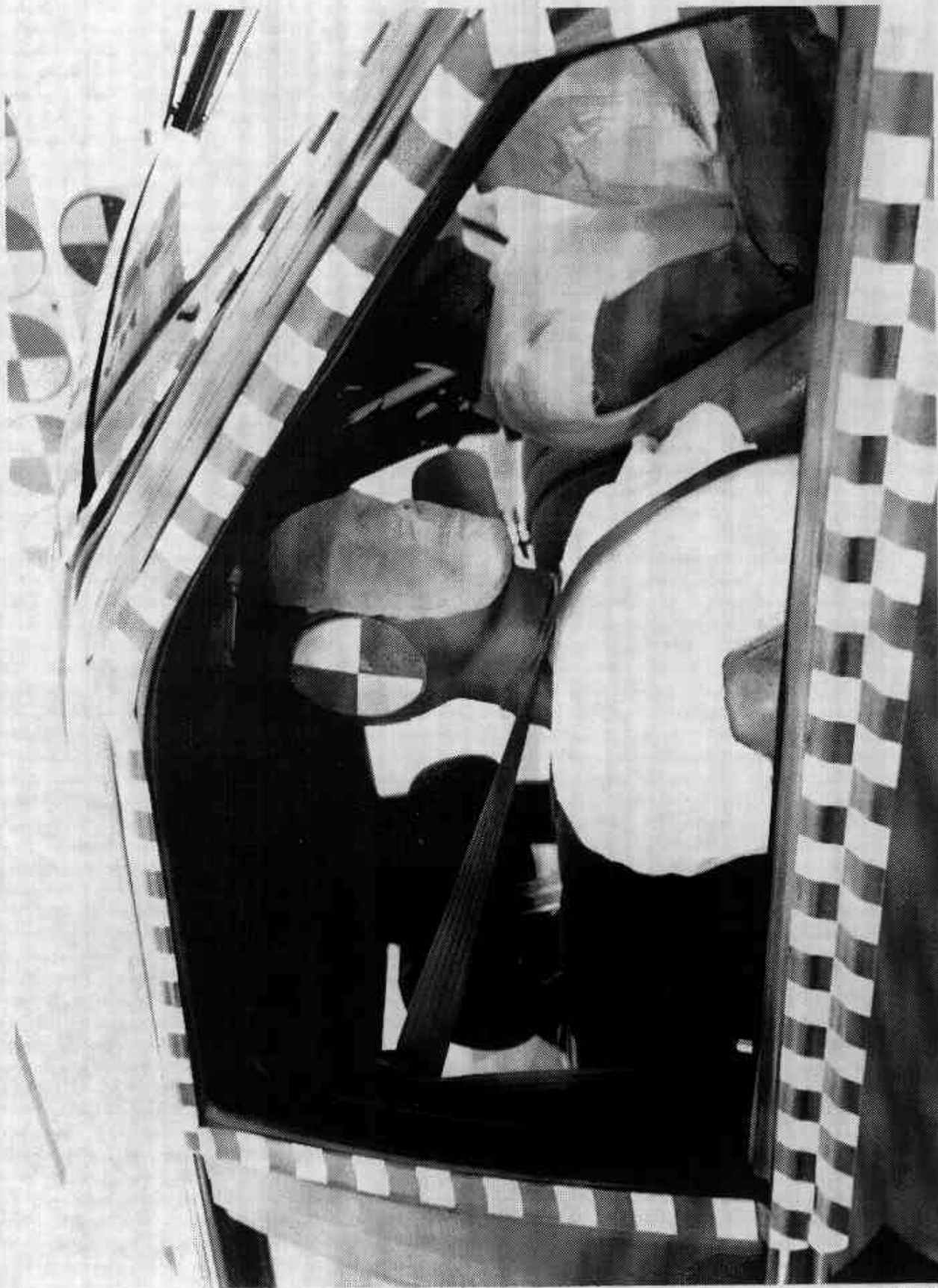


Figure A-29 POST-TEST PASSENGER DUMMY POSITION

A-30

7715-4



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

A-31

7715-4



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

A-32

7715-4



Figure A-32 PRE-TEST PASSENGER DUMMY AND INTERIOR VIEW

A-33

7715-4



Figure A-33 POST-TEST PASSENGER DUMMY AND INTERIOR VIEW

A-34

7715-4

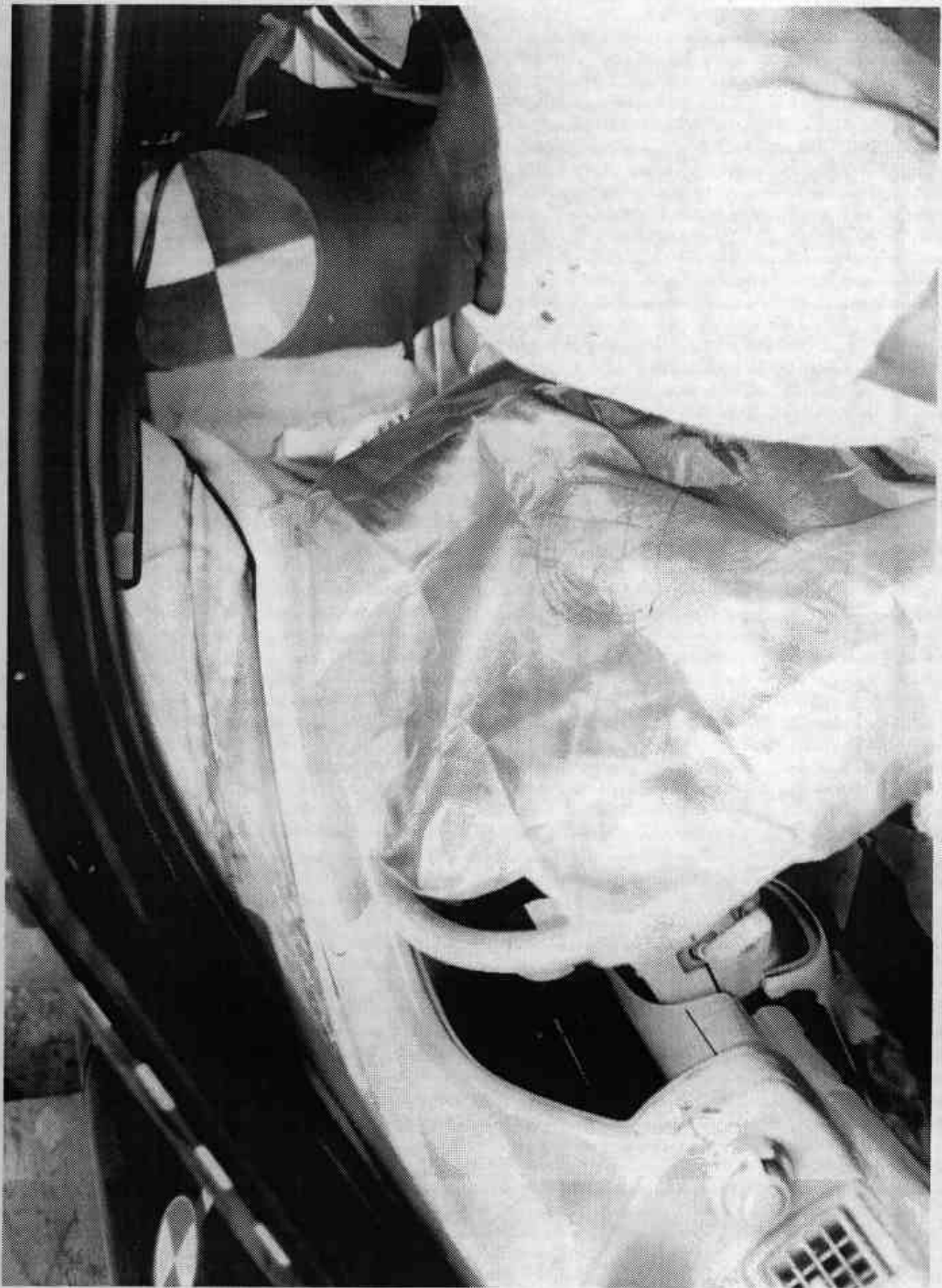


Figure A-34 POST-TEST AIRRAG VIEW

A-35

7715-4

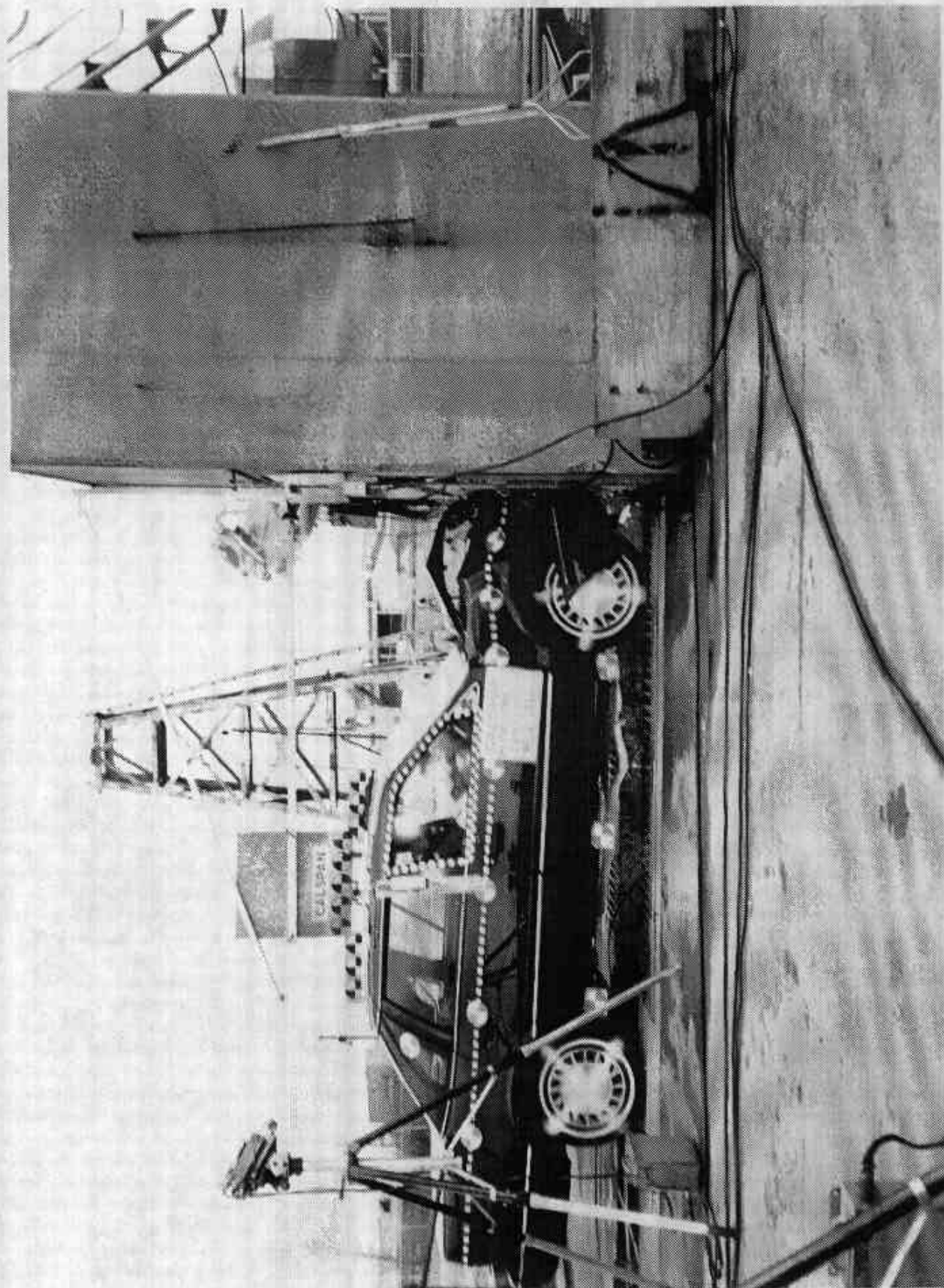


Figure A-35 VEHICLE IMPACT

A-36

7715-4

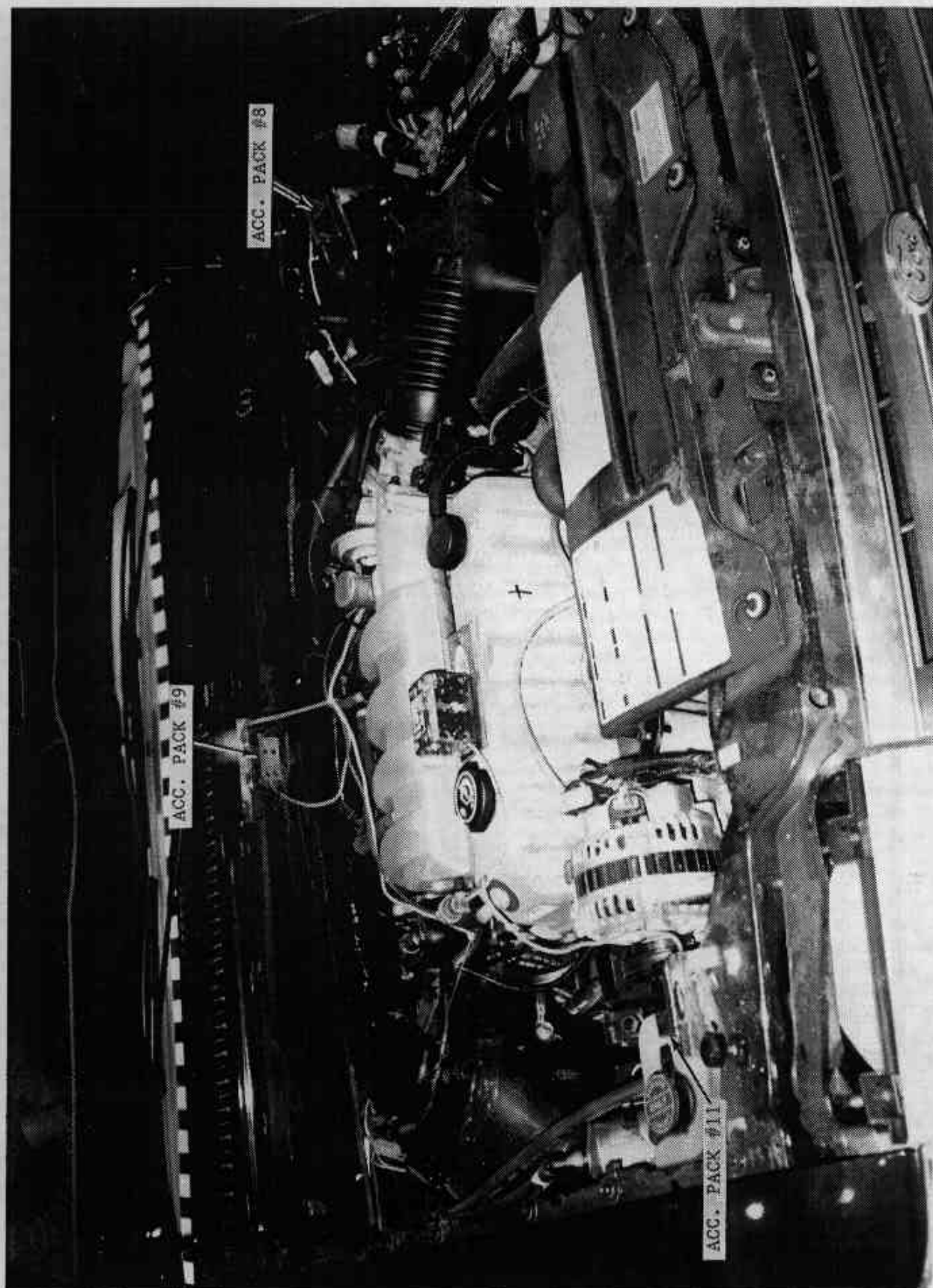


Figure A-36 ADDITIONAL ACCELEROMETERS IN ENGINE COMPARTMENT

Appendix B
VEHICLE AND DUMMY RESPONSE DATA

TEST NO. CK0203

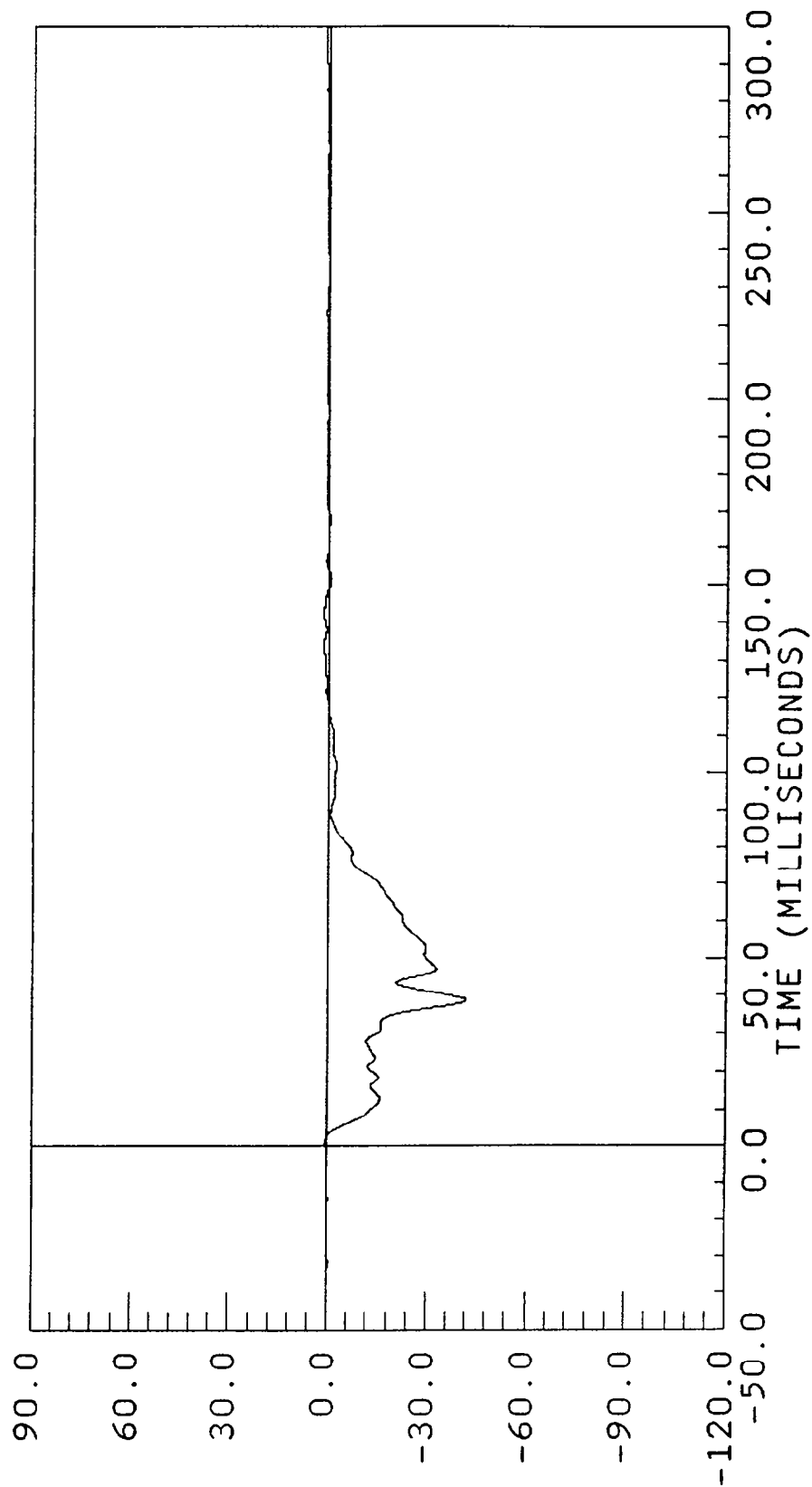
VEHICLE DATA

FILTER CHANNEL CLASS

60

29.30 mph

ACC PACK #1(X)
 FILTERED
 FILTER CUTOFF: 100HZ
 XL AXIS
 YMIN = -42.17014 at 38.70000
 YMAX = 1.663165 at 133.2750

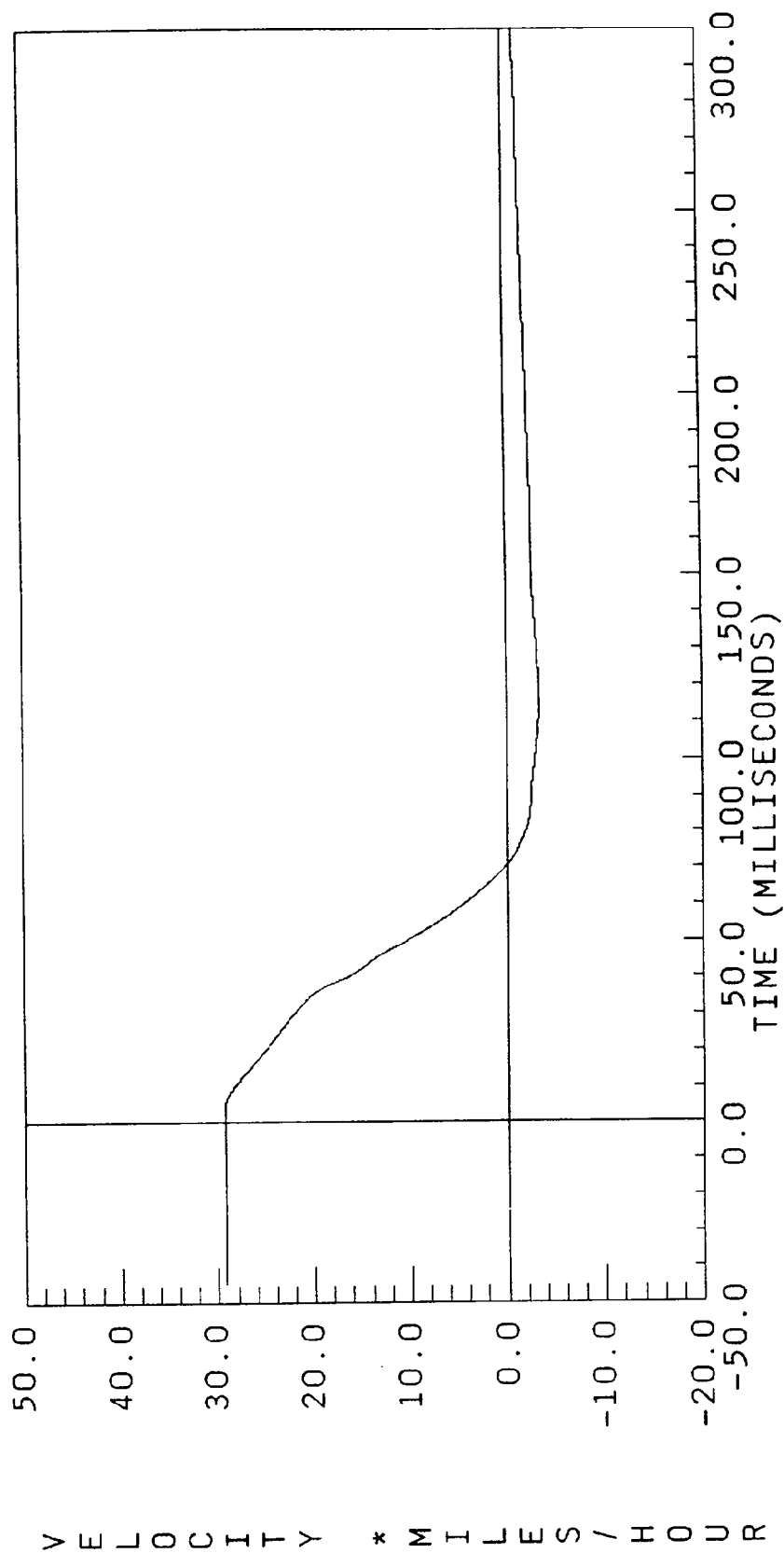


ACCELERATION * G, S *

V886-17.DAT

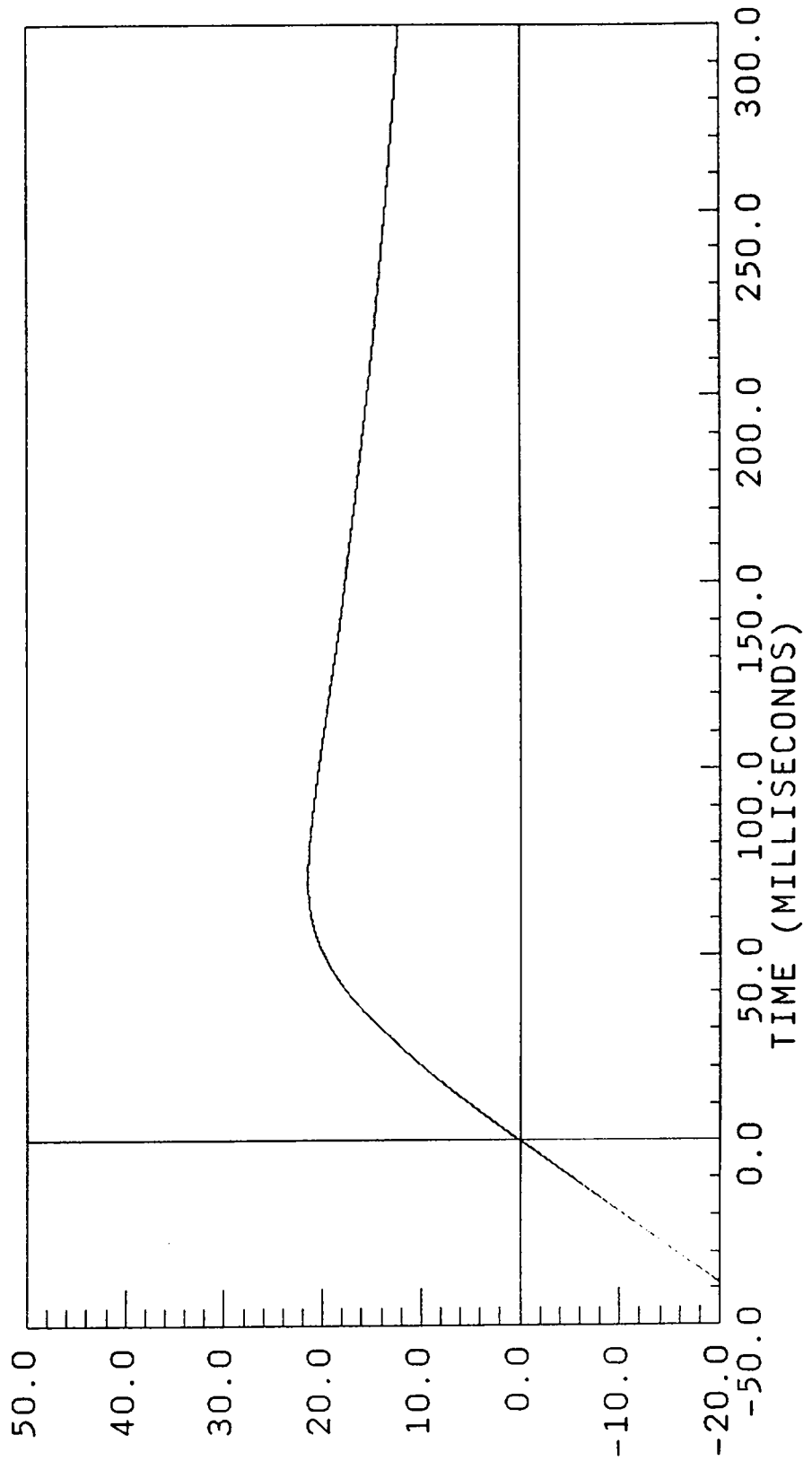
29.30 mph

ACC PACK #1(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -3.373412 at 115.3500
YMAX = 29.32093 at 2.775000



29.30 mph

ACC PACK #1(X)
 COMPUTED
 FILTER CUTOFF: 100HZ
 XL AXIS
 YMIN = -23.16647 at 115.3500
 YMAX = 21.47572 at 70.42500

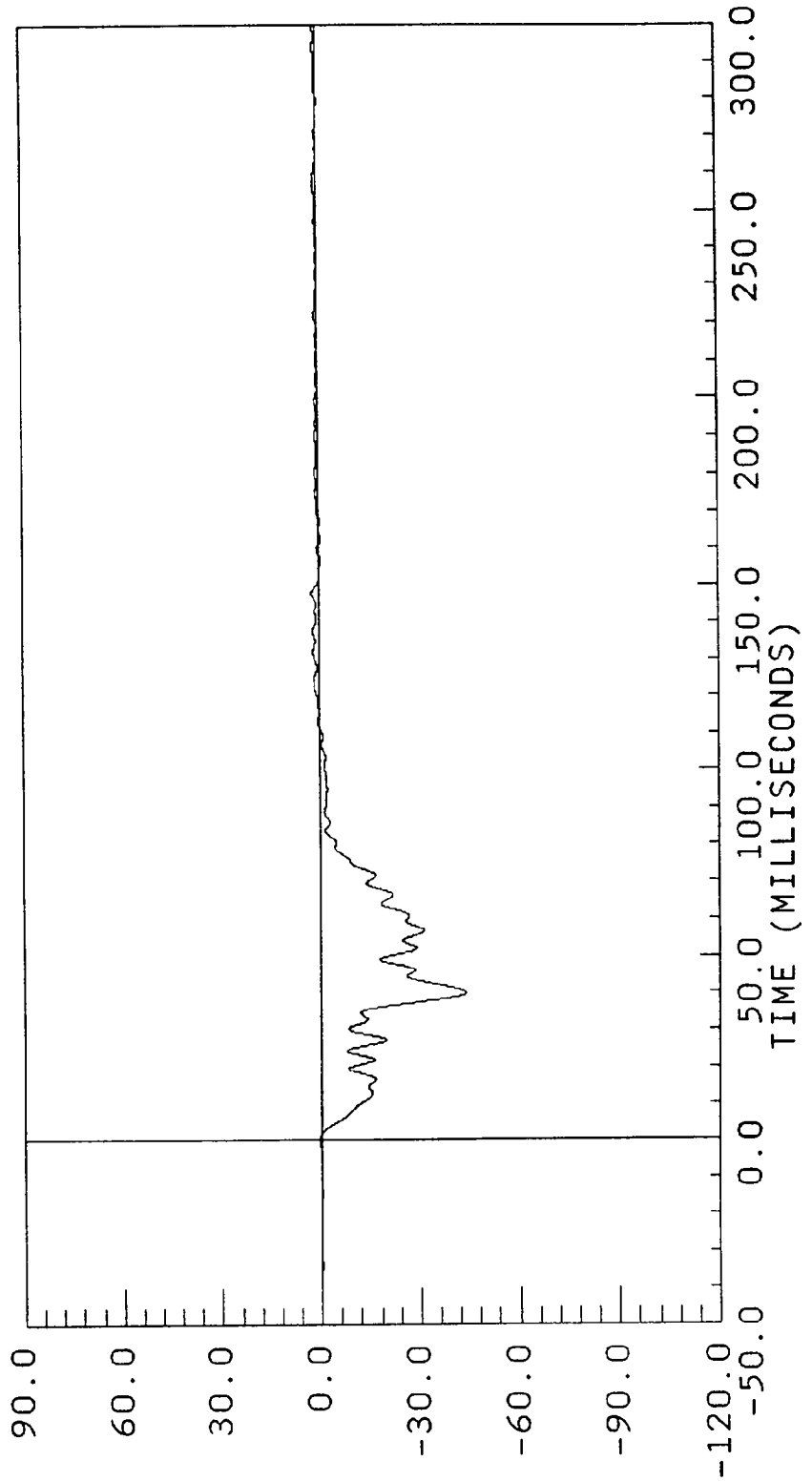


D I S P L A C E M E N T * I N C H E S

BW886-18.DAT

29.30 mph

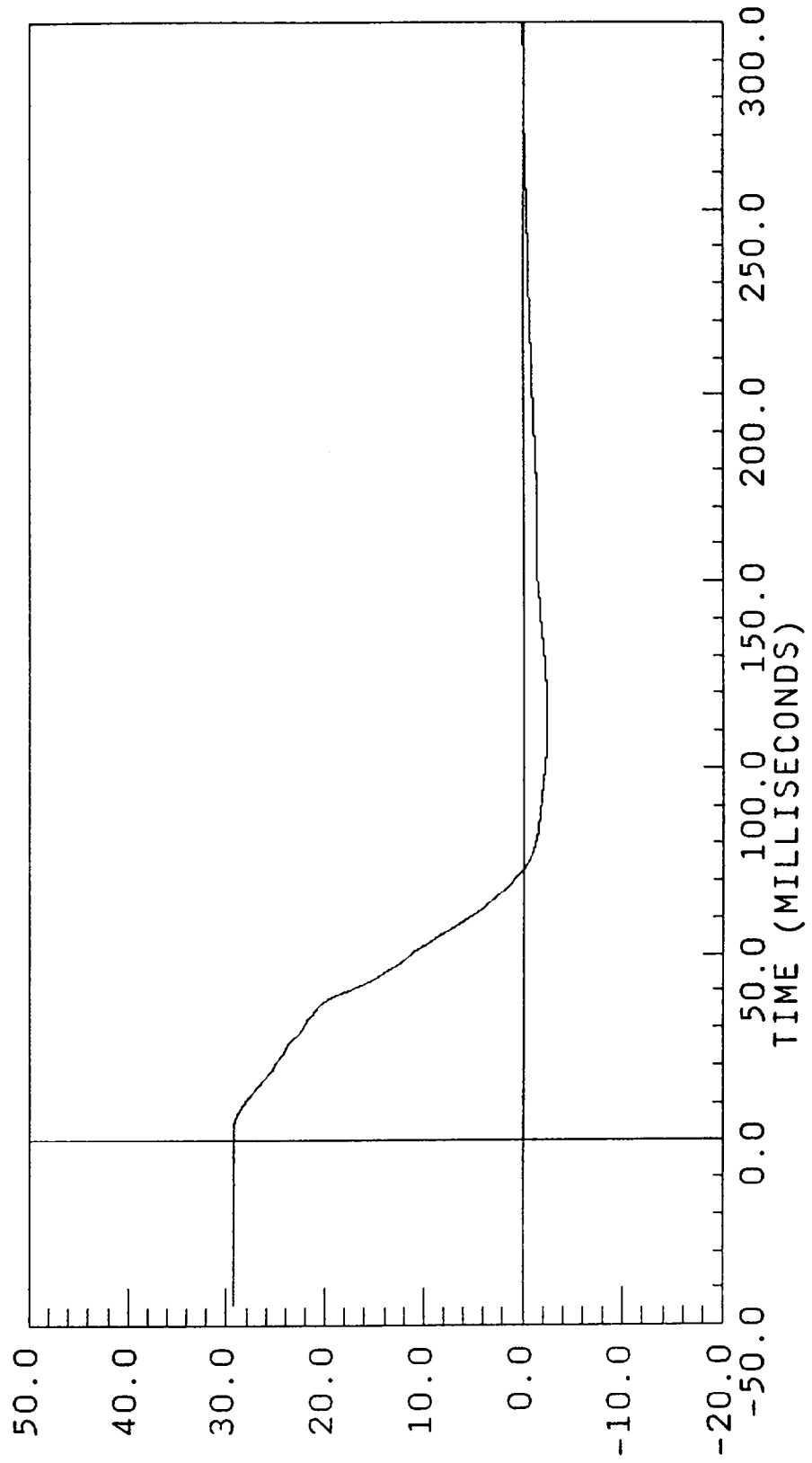
ACC PACK #2(X) XL AXIS
FILTERED YMIN = -43.82842 at 39.90000
FILTER CUTOFF: 100HZ YMAX = 2.406154 at 147.9750



ACCELERATION * G, S *
B-6 7715-4

29.30 mph

ACC PACK #2(X) XL AXIS
 COMPUTED YMIN = -2.448886 at 111.4500
 FILTER CUTOFF: 100Hz YMAX = 29.31307 at 1.575000

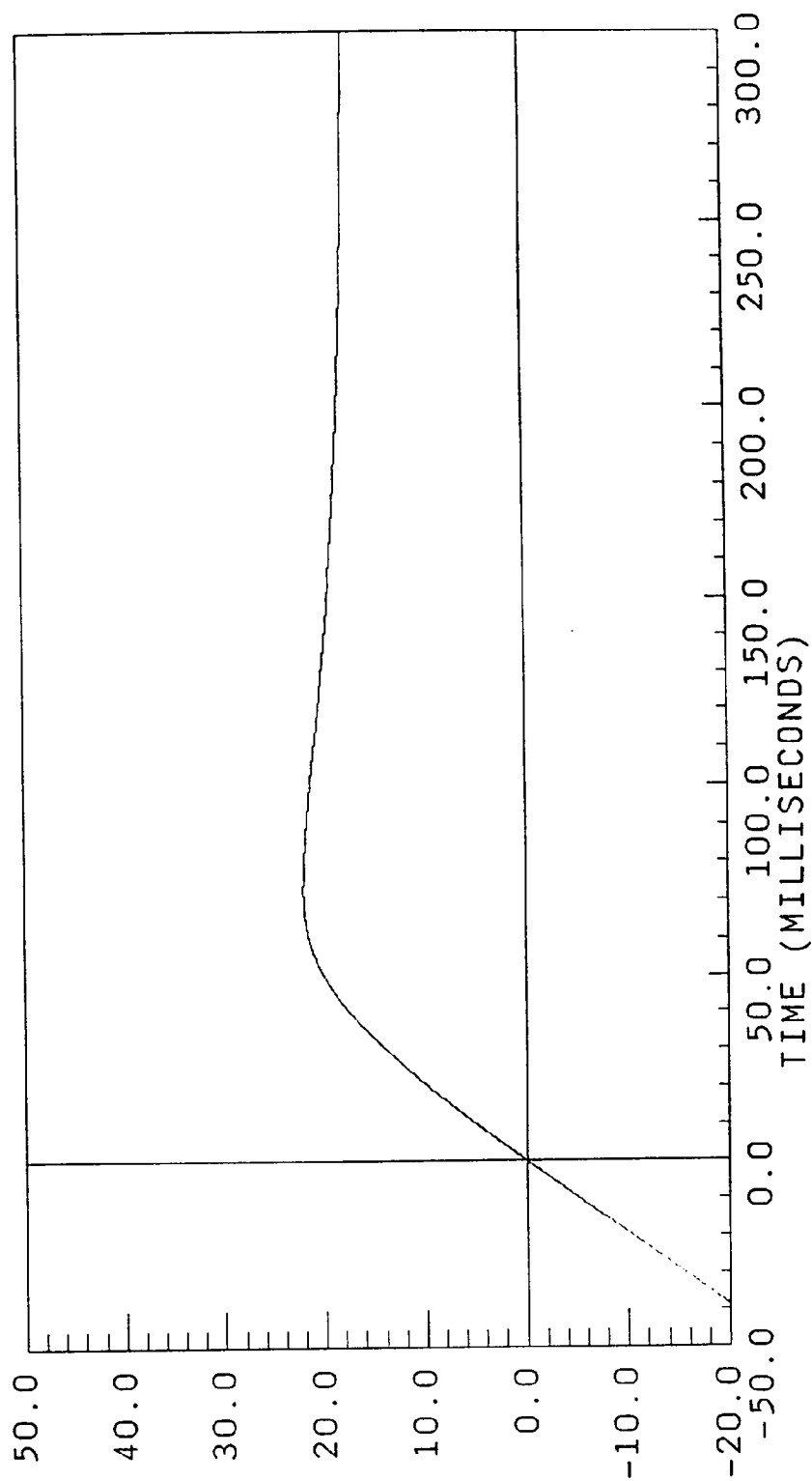


VELOCITY * MILES / HOUR

D886-18.DAT

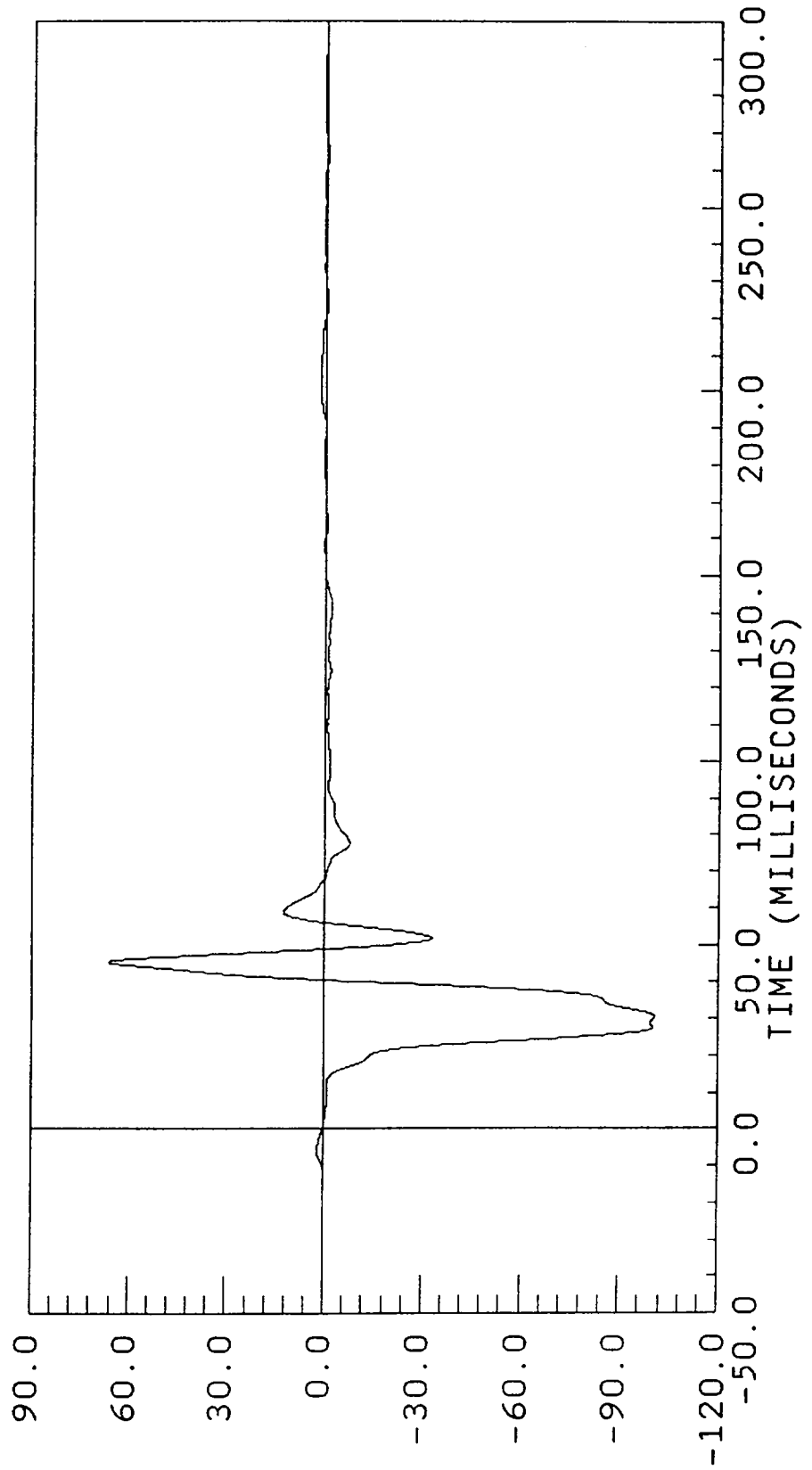
29.30 mph

ACC PACK #2(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -23.15876 at 111.4500
YMAX = 22.08676 at 72.67500



29.30 mph

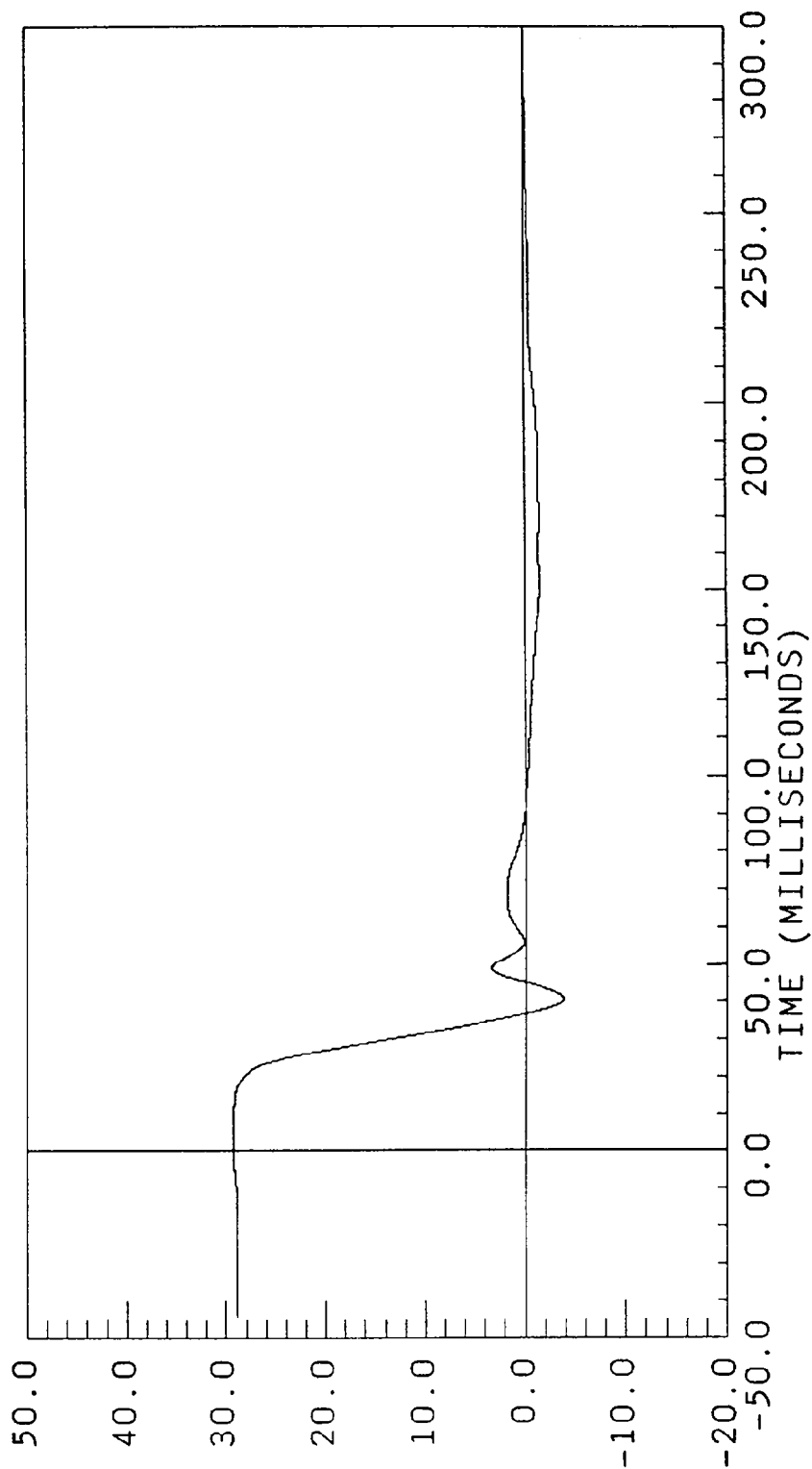
ACC PACK #3(X) XL AXIS
 FILTERED YMIN = -100.7285 at 30.45000
 FILTER CUTOFF: 100Hz YMAX = 66.52010 at 45.37500



V886-19.DAT

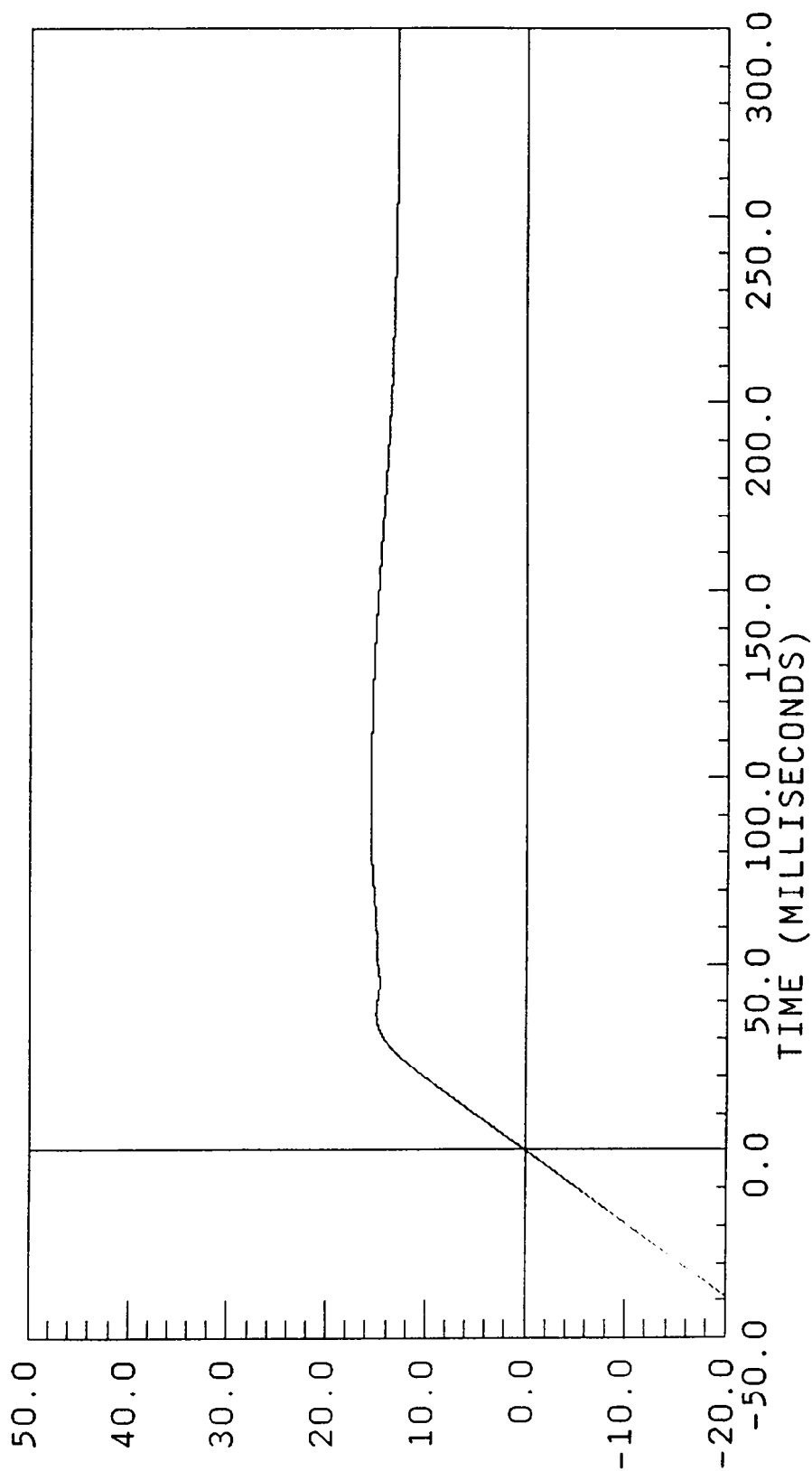
29.30 mph

ACC PACK #3(X) XL AXIS
COMPUTED YMIN = -3.836717 at 40.57500
FILTER CUTOFF: 100HZ YMAX = 29.30718 at 2.400000



29.30 mph

ACC PACK #3(X)
 COMPUTED
 FILTER CUTOFF: 100HZ
 XL AXIS
 YMIN = -22.95154 at 40.57500
 YMAX = 15.60399 at 90.45000



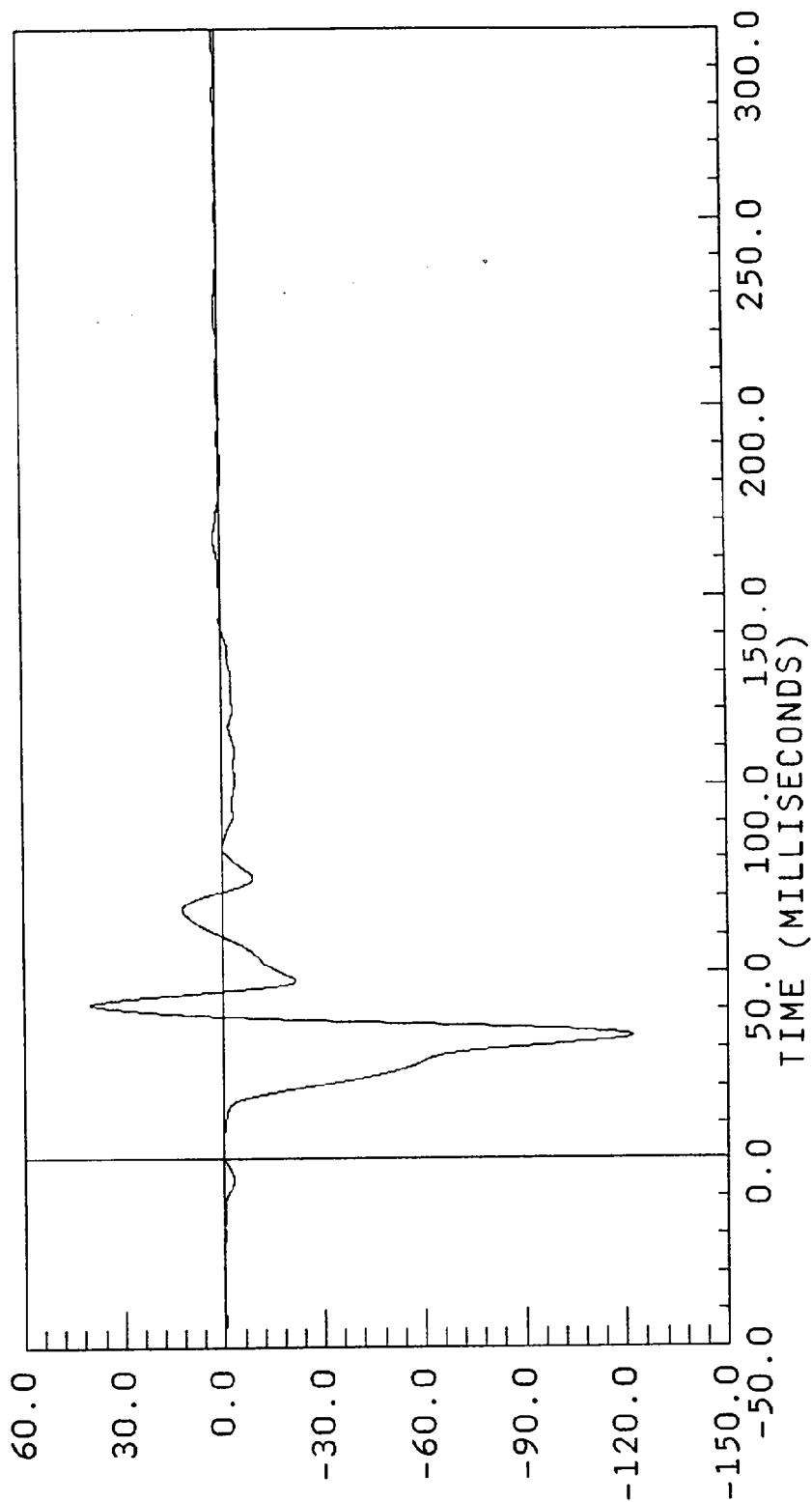
DISPLACEMENT * INCHES

BW886-20.DAT

29.30 mph

ACC PACK #4(X)
FILTERED
FILTER CUTOFF: 100HZ

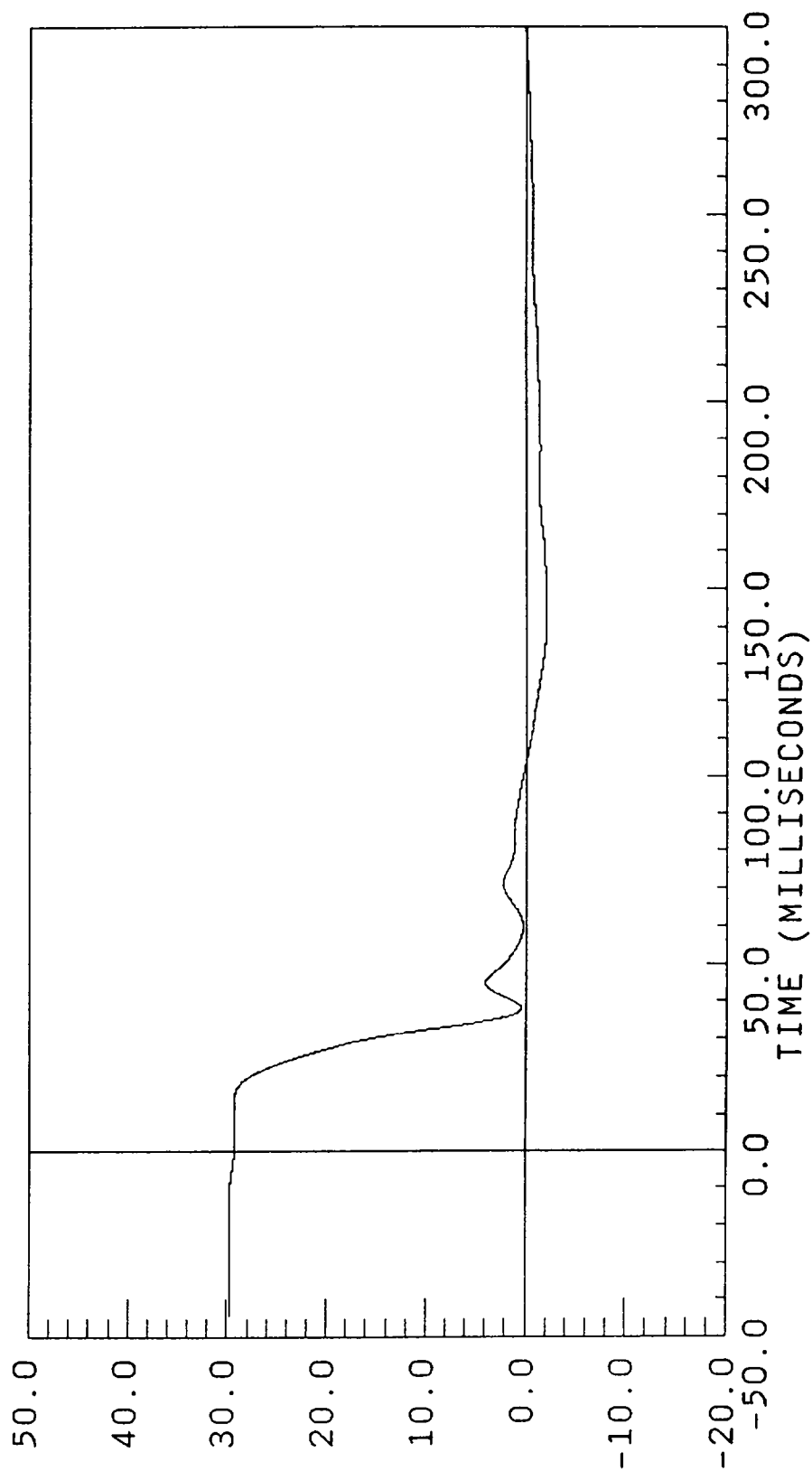
XL AXIS
YMIN = -122.0943 at 32.92500
YMAX = 40.27322 at 41.25000



V886-20.DAT

29.30 mph

ACC PACK #4(X) XL AXIS
COMPUTED YMIN = -2.102166 at 140.9250
FILTER CUTOFF: 100Hz YMAX = 29.69880 at -24.97500



VELOCITY * MILES / HOUR

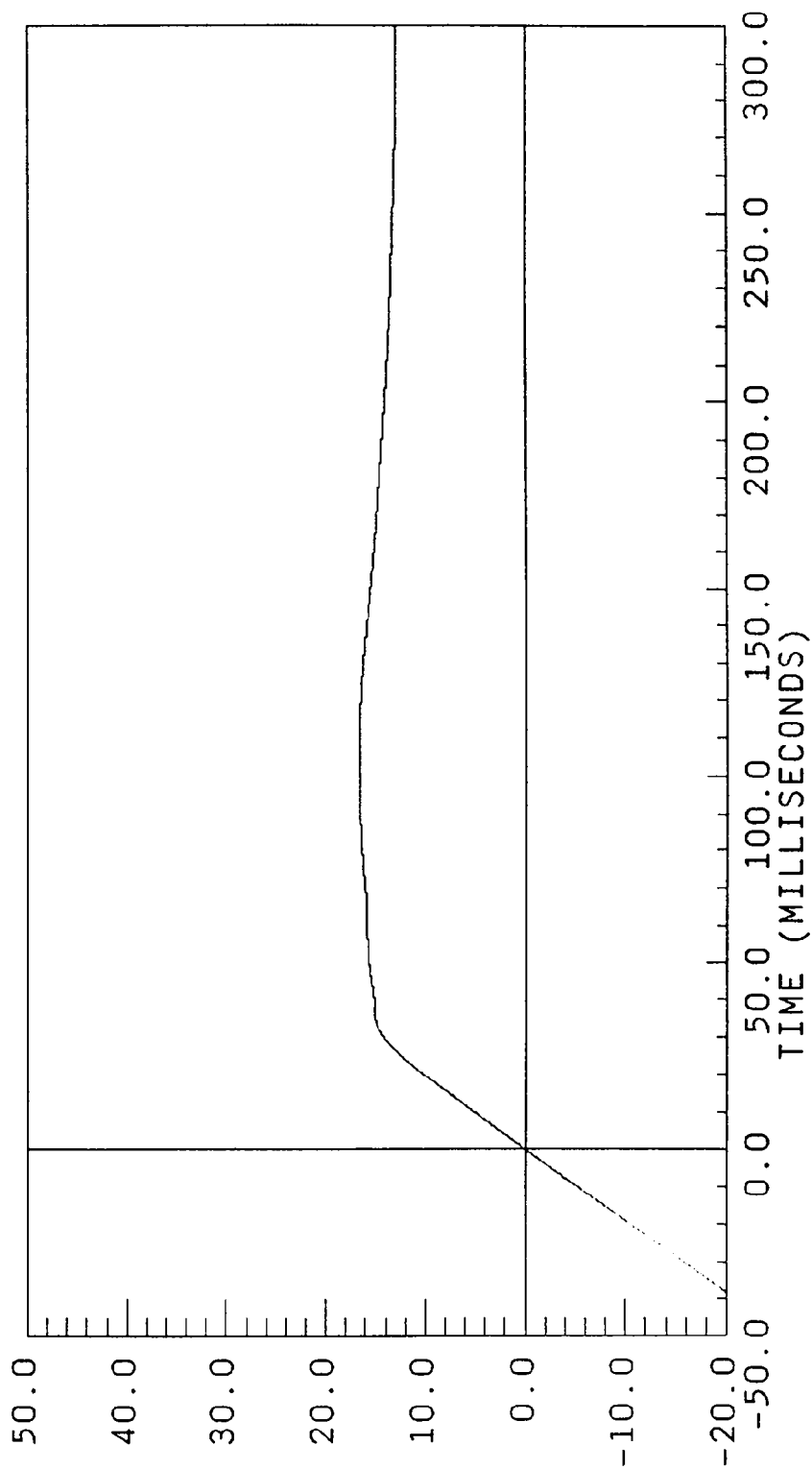
B-13

7715-4

D886-20.DAT

29.30 mph

ACC PACK #4(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -23.45924 at 140.9250
YMAX = 16.64147 at 103.2000



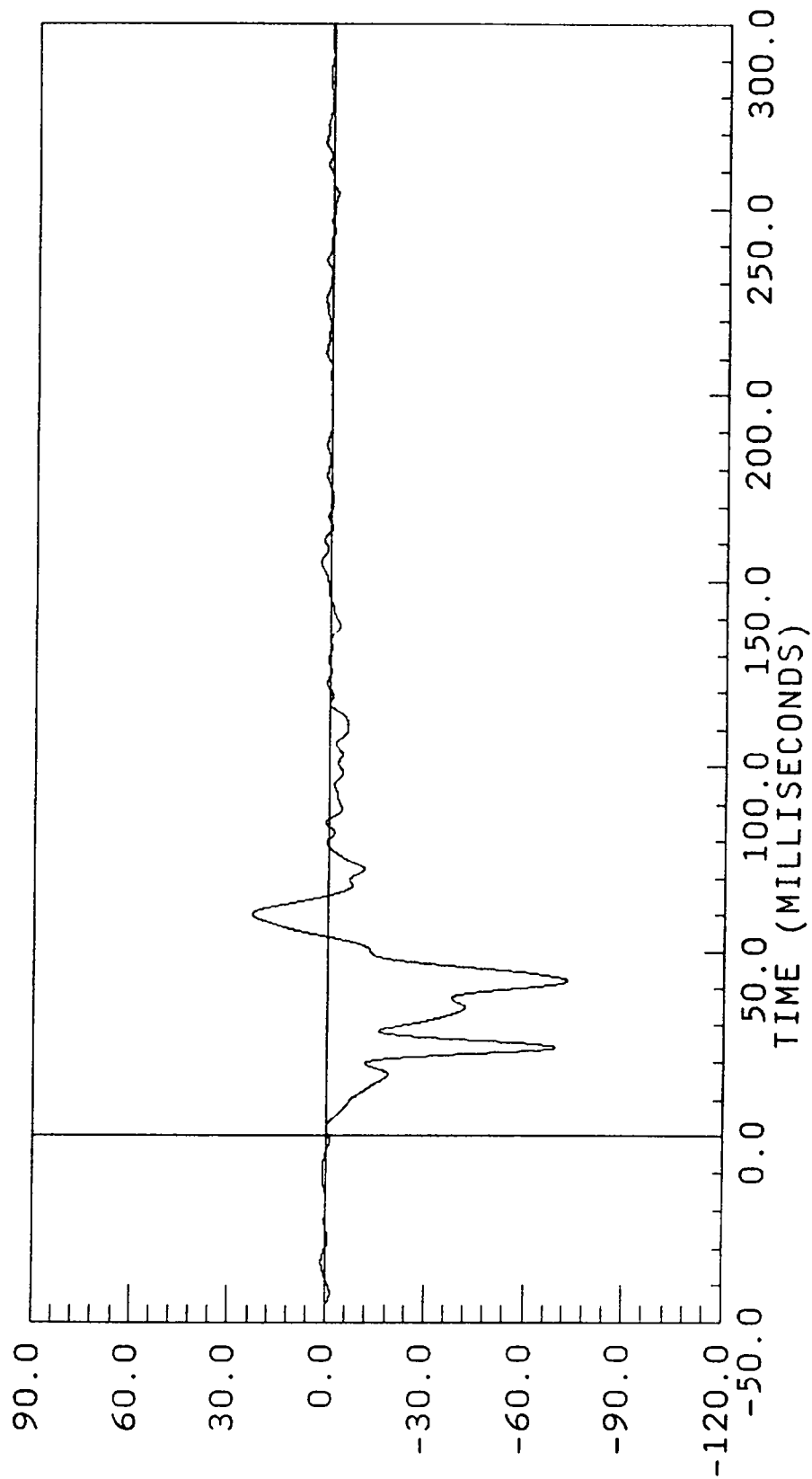
BW886-21.DAT

29.30 mph

ACC PACK #5(X)
FILTERED
FILTER CUTOFF: 100Hz

XL AXIS

YMIN = -73.06519 at 42.15000
YMAX = 23.39404 at 60.00000



ACCELERATION * G, S *

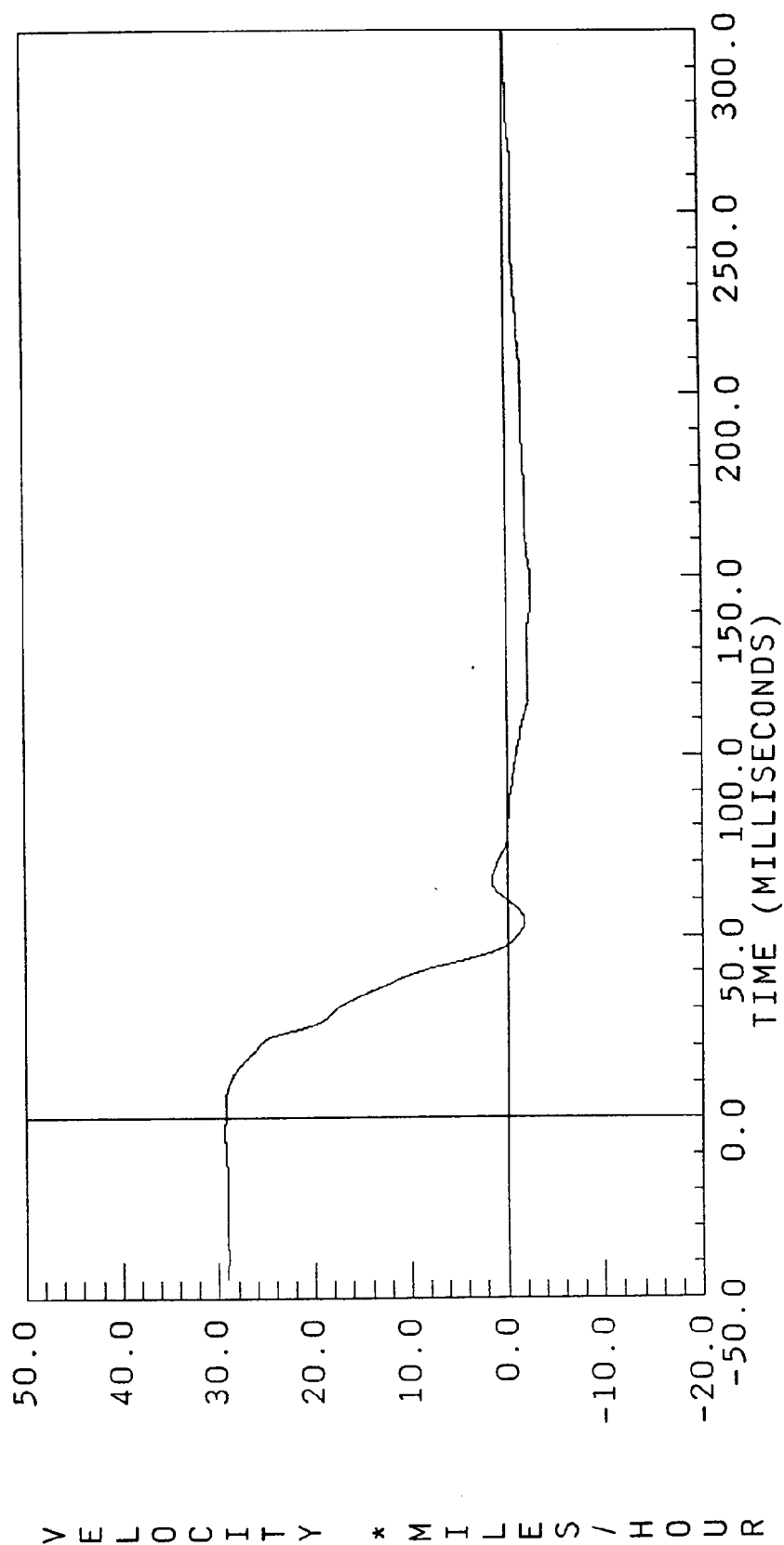
B-15

7715-4

V886-21.DAT

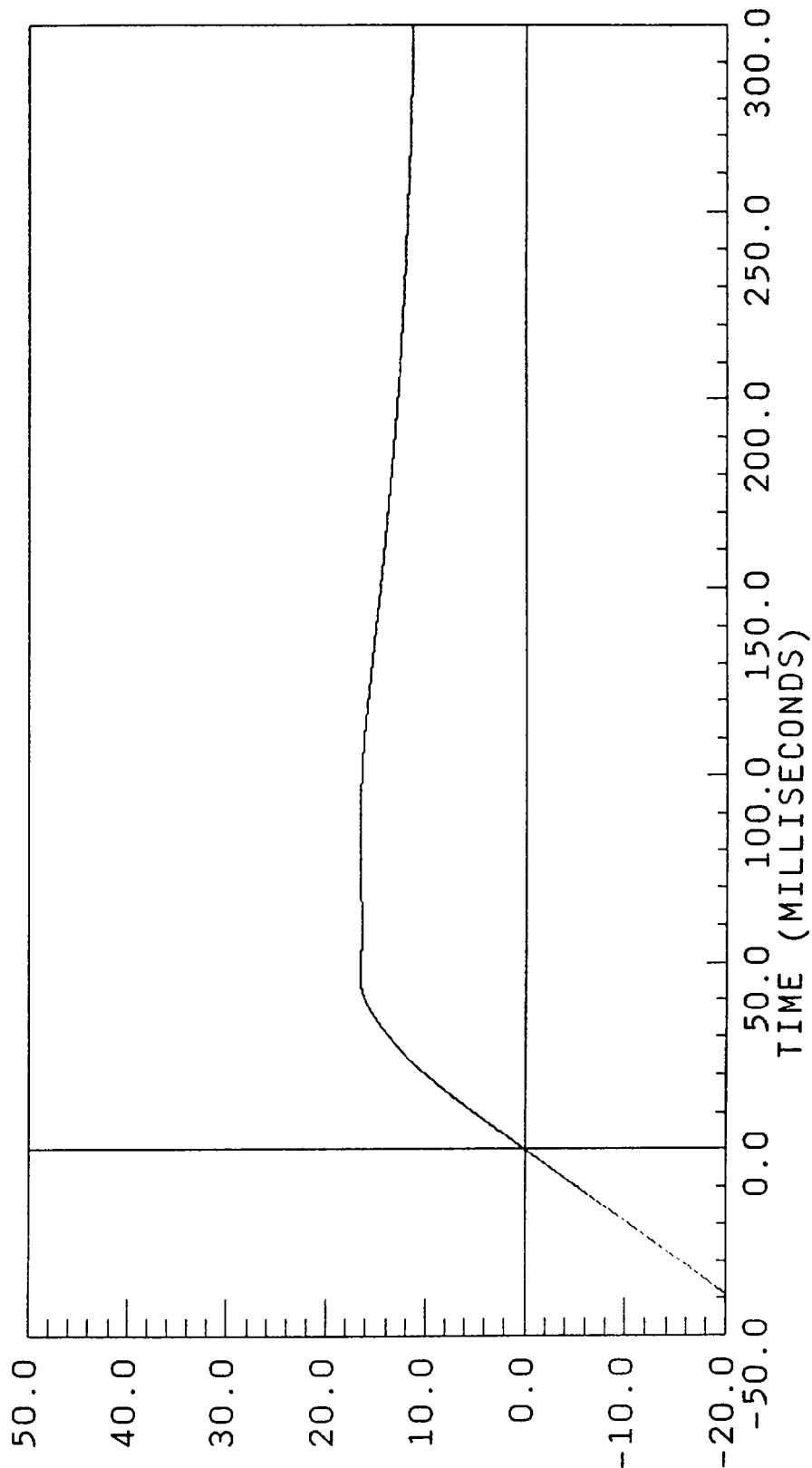
29.30 mph

ACC PACK #5(X)
COMPUTED
FILTER CUTOFF: 100Hz
XL AXIS
YMIN = -2.561605 at 144.9750
YMAX = 29.09774 at -3.900000



29.30 mph

ACC PACK #5(X) XL AXIS
 COMPUTED YMIN = -23.04811 at 144.9750
 FILTER CUTOFF: 100Hz YMAX = 16.61040 at 75.45000

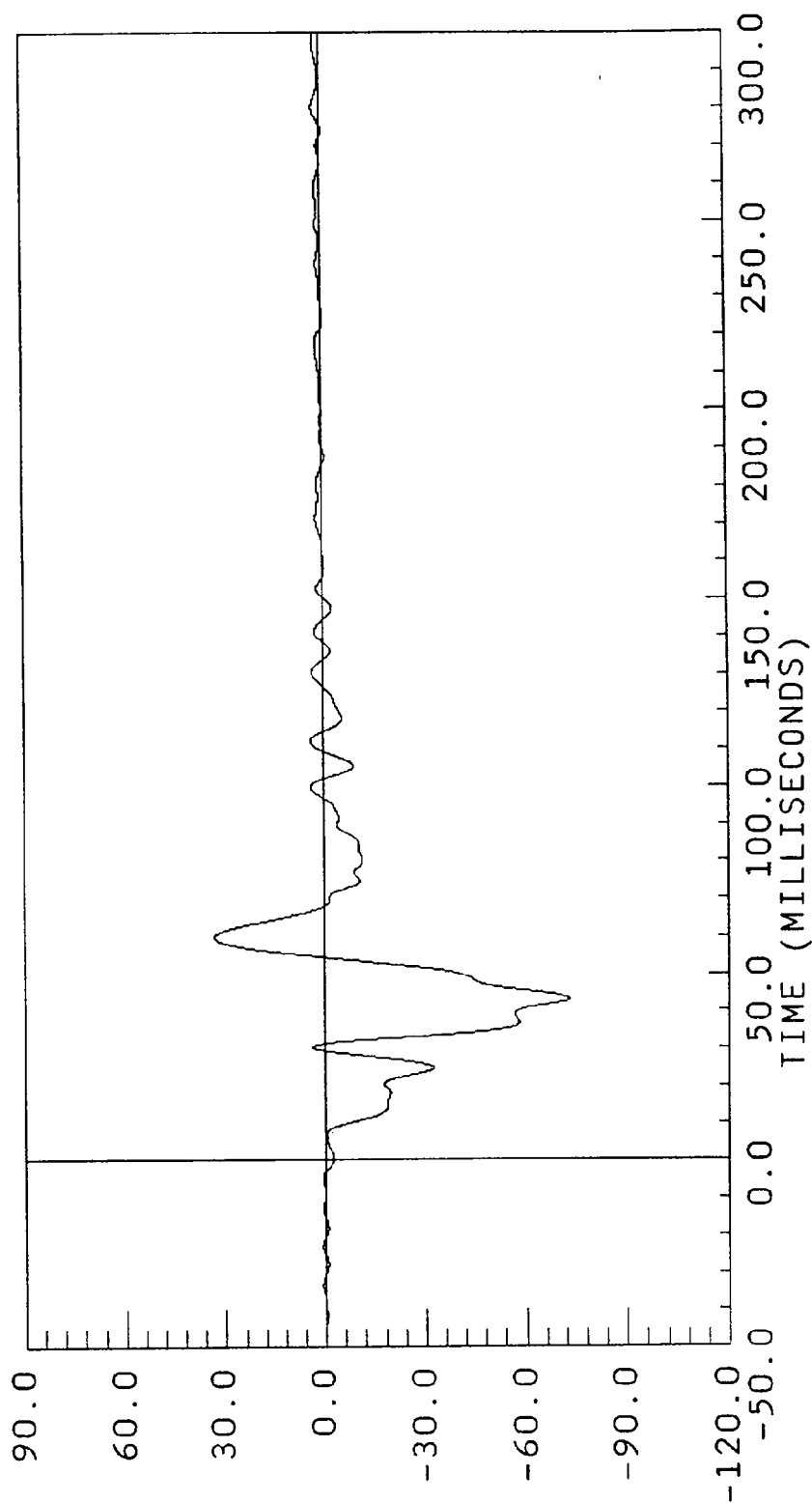


DISPLACEMENT * INCHES
 B-17 7715-4

BW886-22.DAT

29.30 mph

ACC PACK #6(X)
FILTERED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -73.28931 at 43.05000
YMAX = 33.08167 at 59.85000



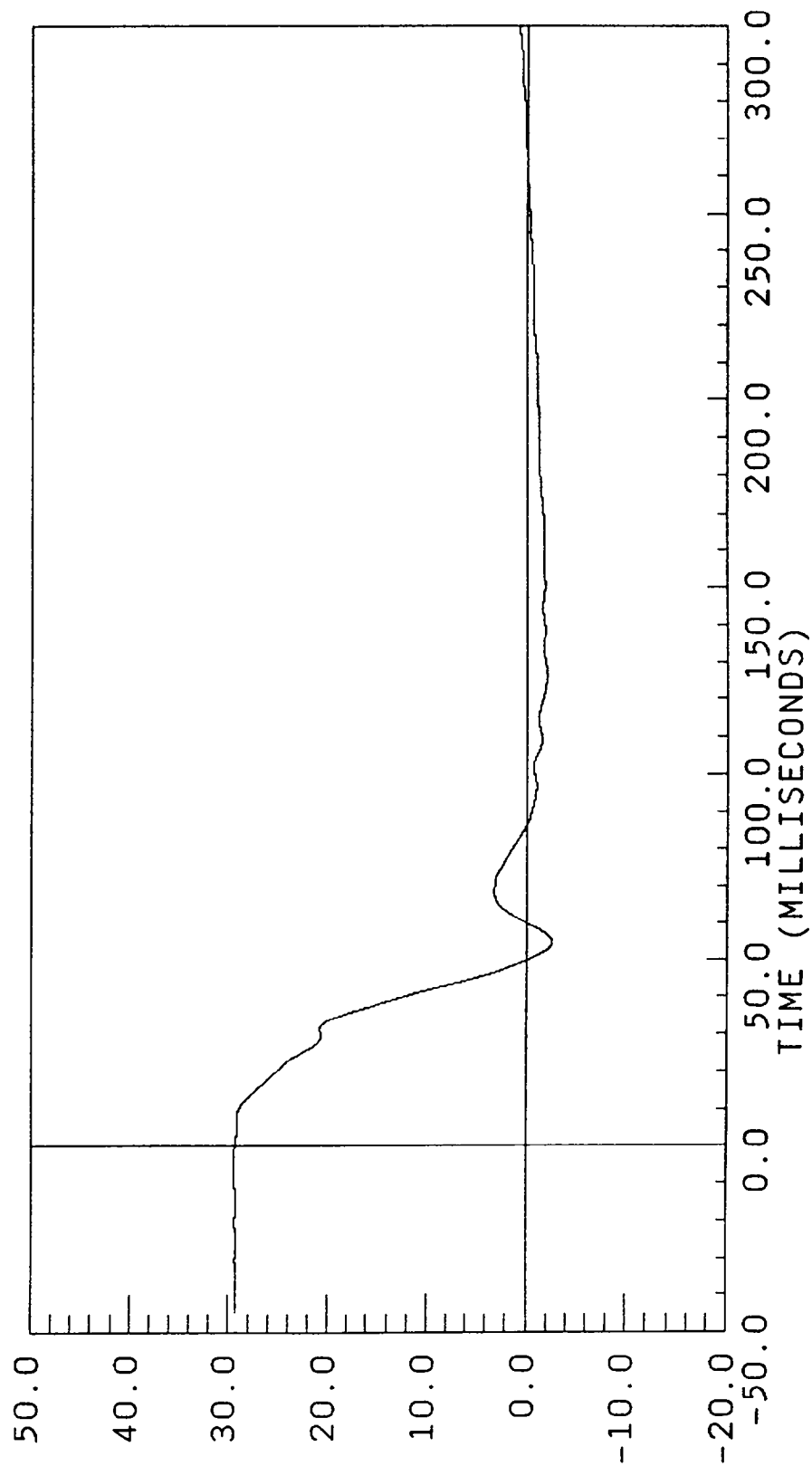
ACCELERATION * G, S *
B-18 7715-4

29.30 mph

ACC PACK #6(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS

YMIN = -2.572503 at 54.45000
YMAX = 29.28234 at -3.150000

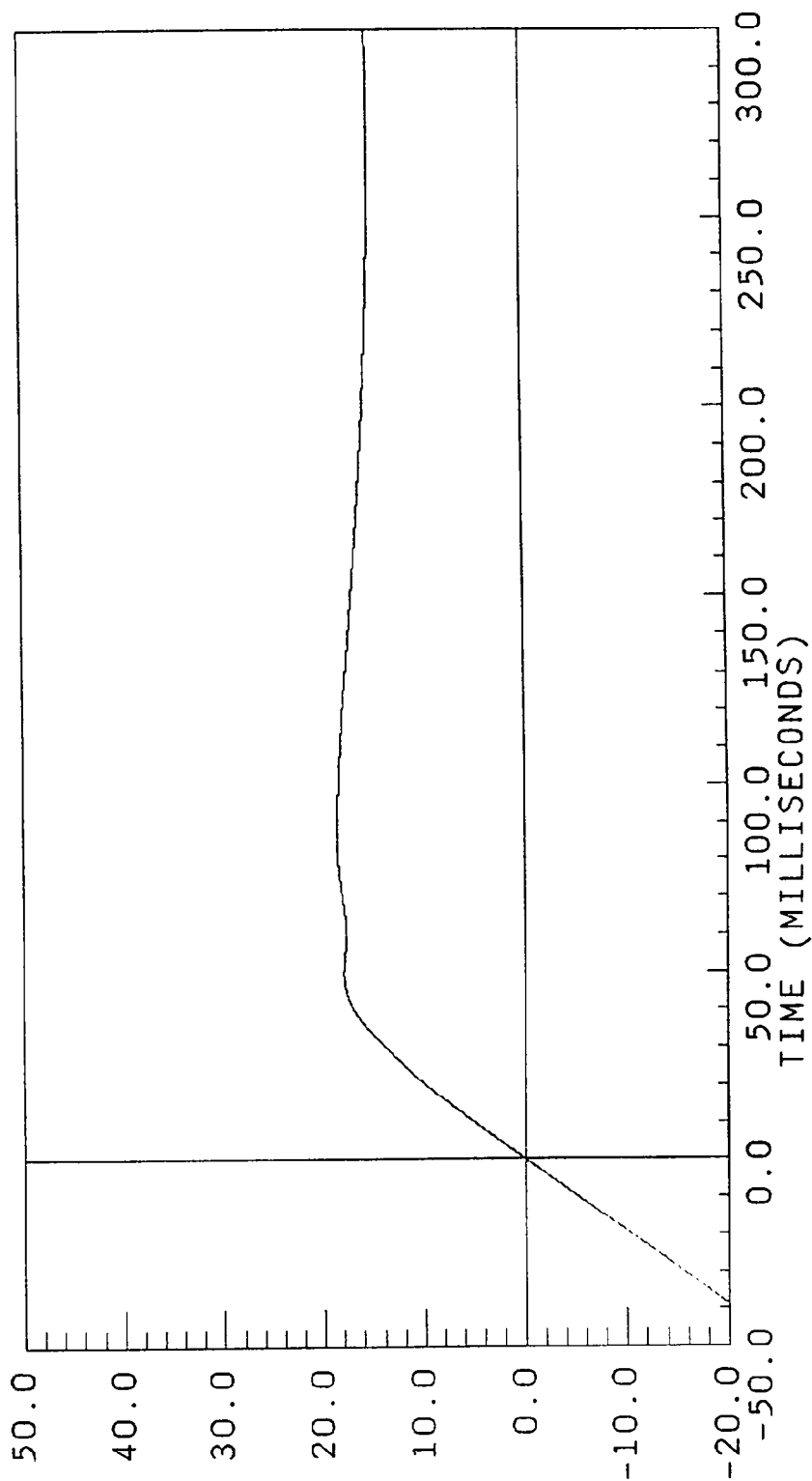


VELOCITY * MILES / HOUR
B-19 7715-4

D886-22.DAT

29.30 mph

ACC PACK #6(X)
COMPUTED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -23.17615 at 54.45000
YMAX = 18.59213 at 85.95000



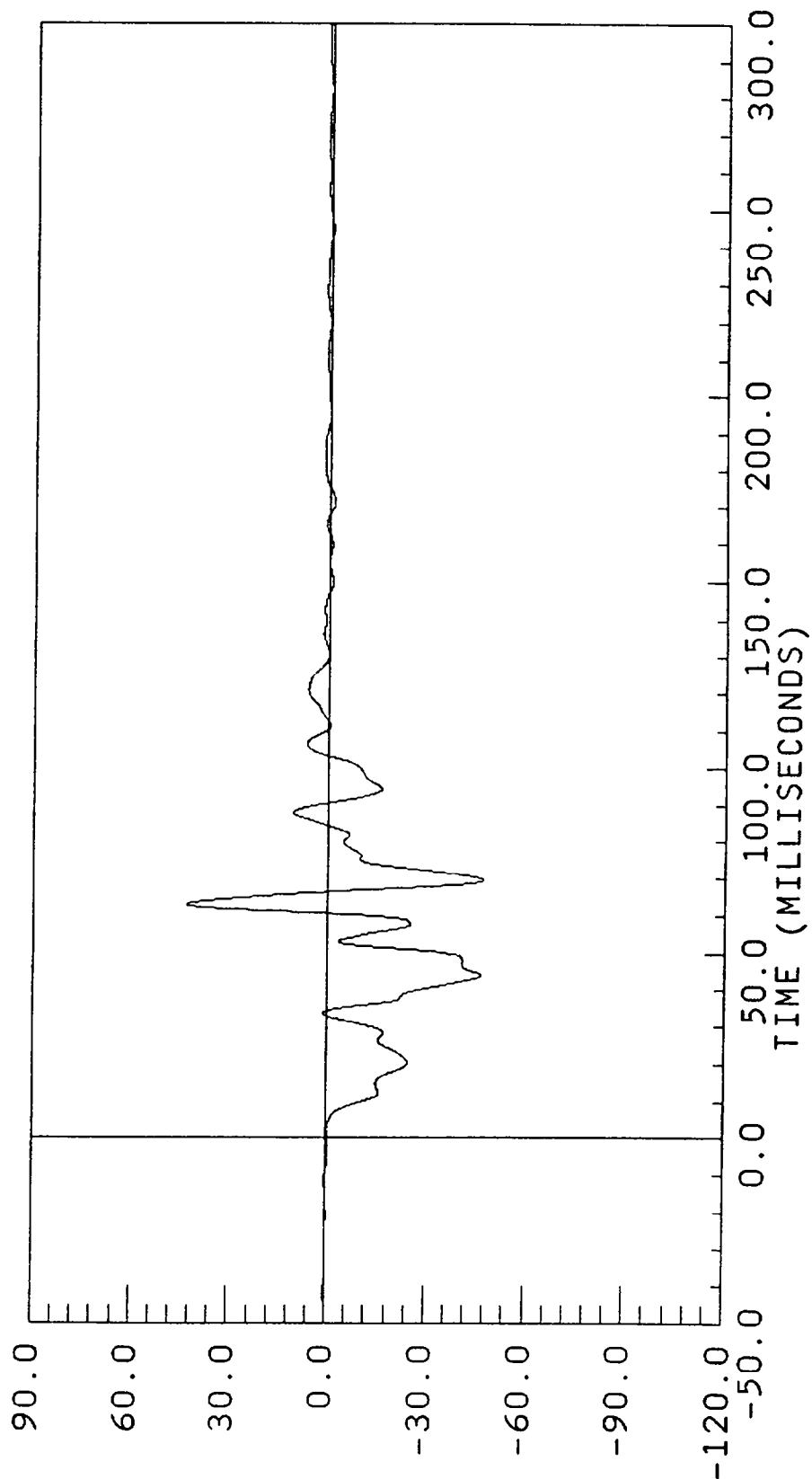
DISPLACEMENT * INCHES

B-20

7715-4

29.30 mph

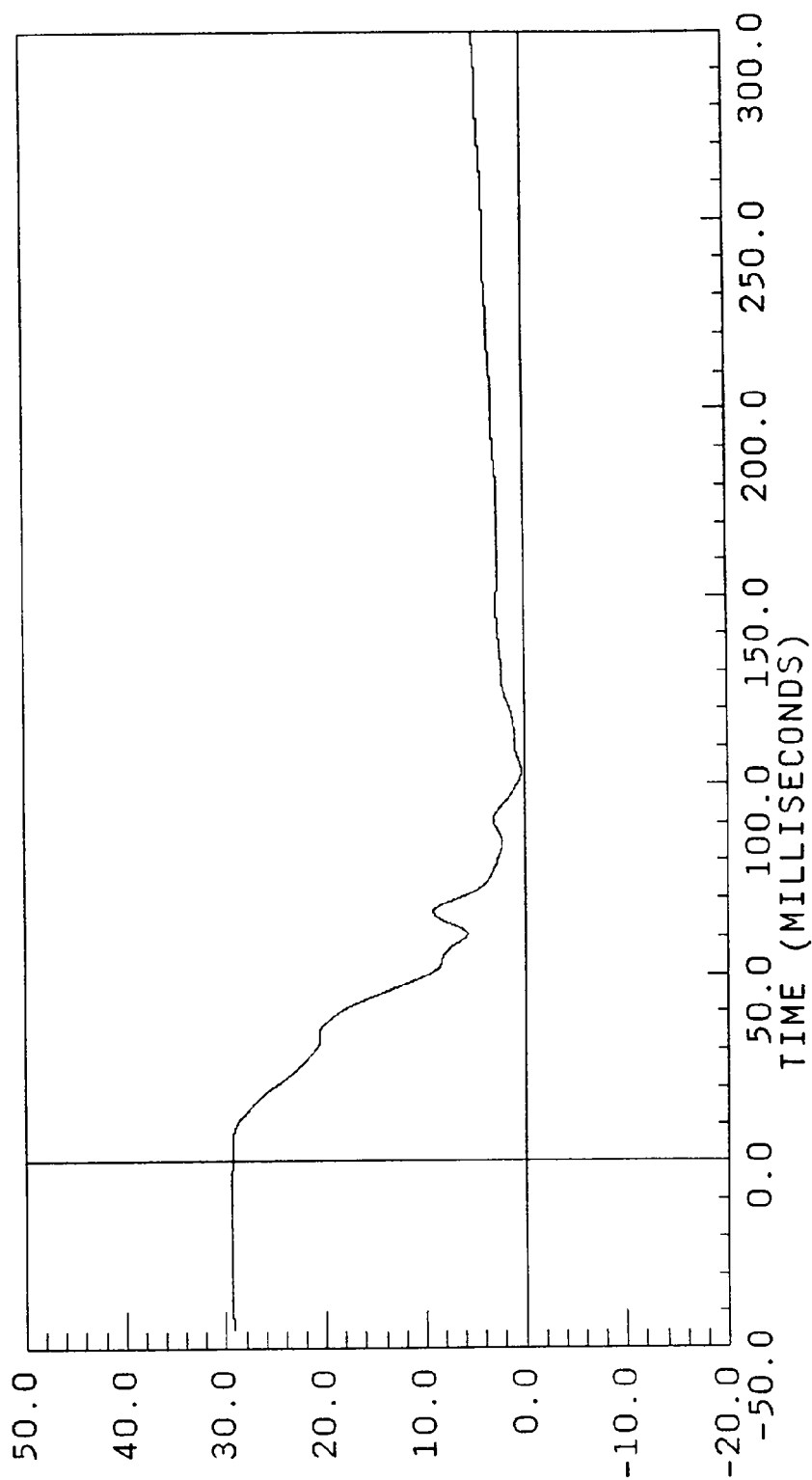
ACC PACK #7(X)
 FILTERED
 FILTER CUTOFF: 100Hz
 XL AXIS
 YMIN = -47.29630 at 69.60001
 YMAX = 43.07616 at 62.92500



V886-23.DAT

29.30 mph

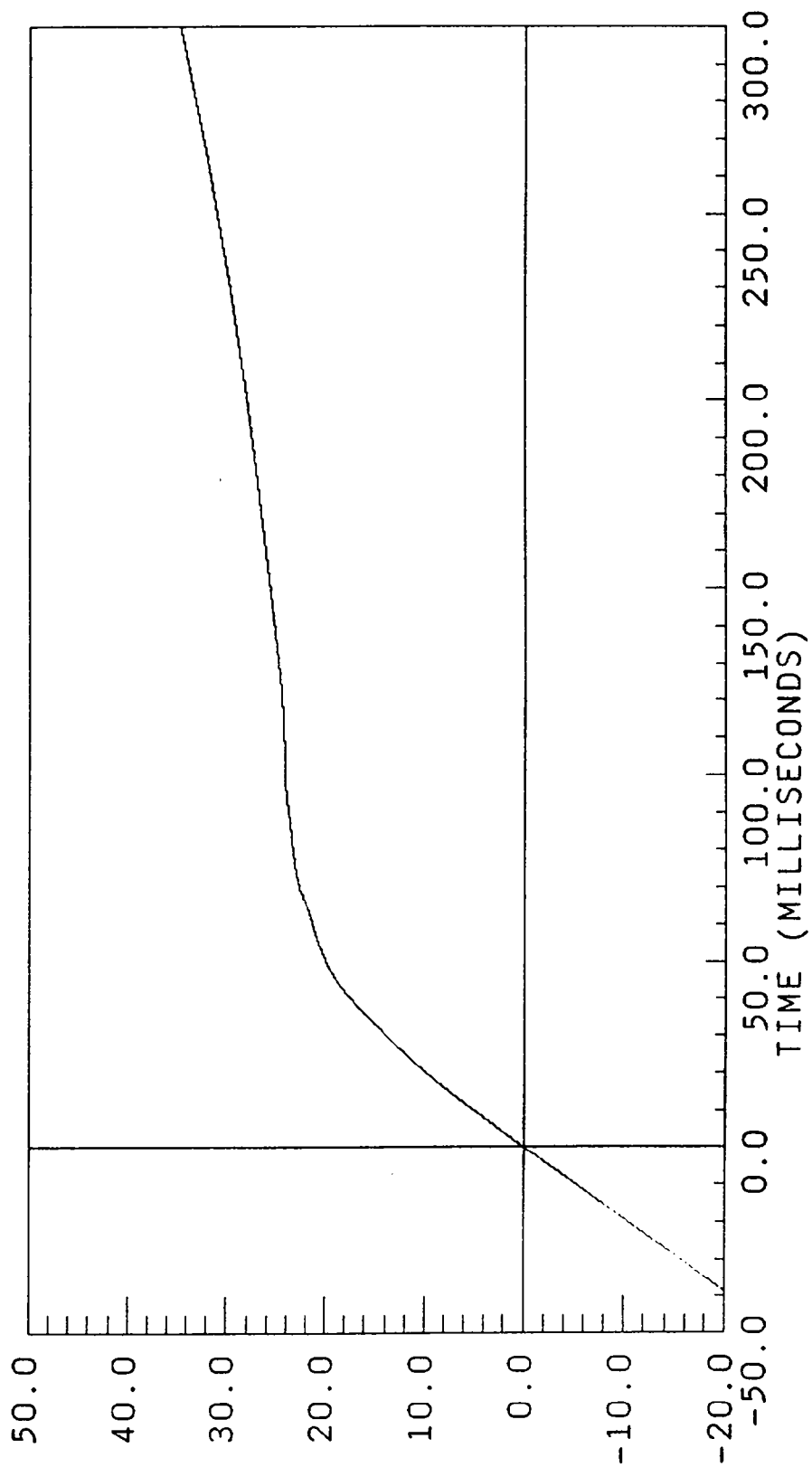
ACC PACK #7(X) XL AXIS
COMPUTED YMIN = 0.271394 at 103.2000
FILTER CUTOFF: 100Hz YMAX = 29.30680 at -8.250000



29.30 mph

ACC PACK #7(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -23.20786 at 103.2000
YMAX = 34.77250 at 300.0000

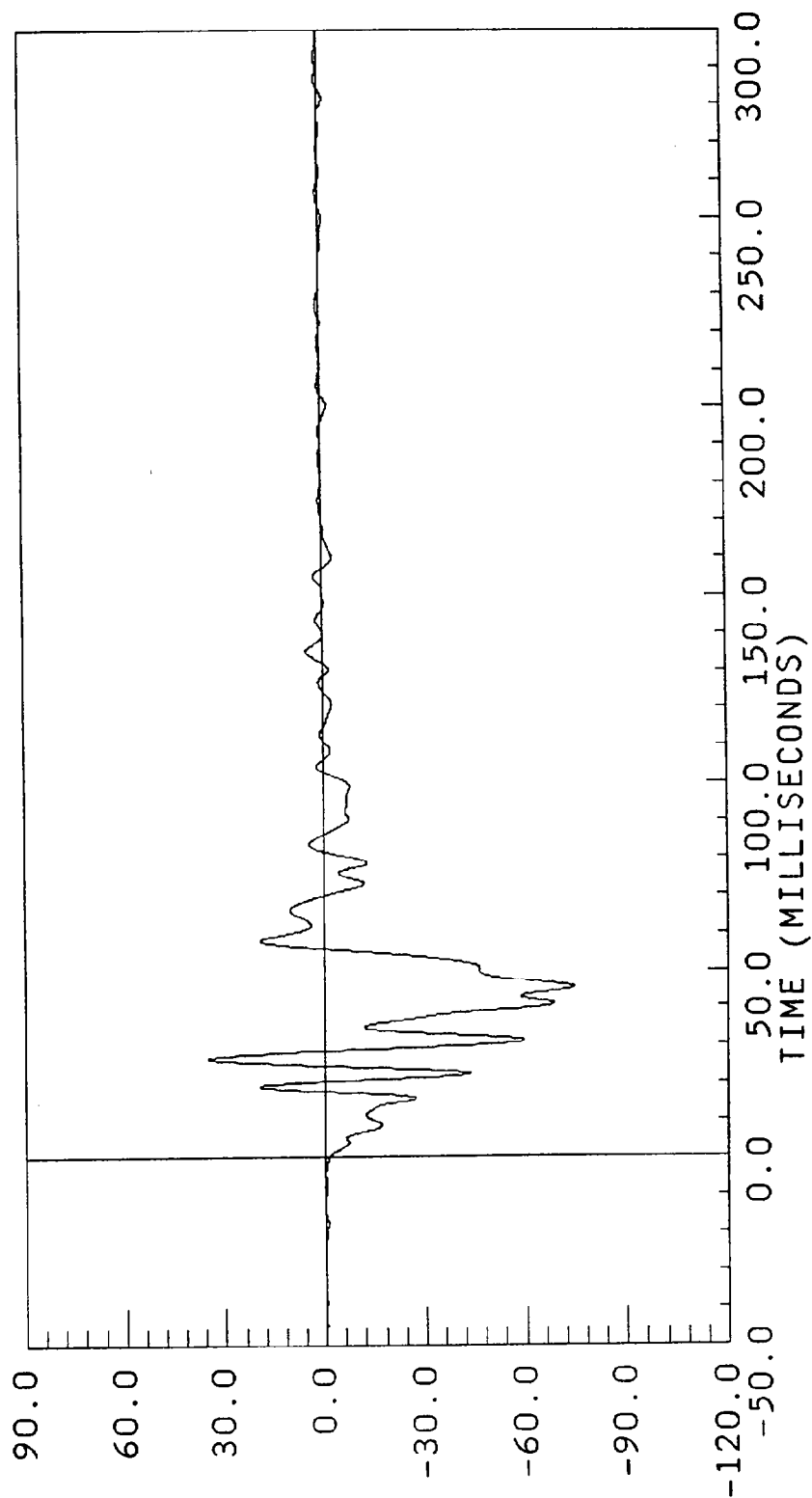


DISPLACEMENT * INCHES
B-23 7715-4

BW886-24.DAT

29.30 mph

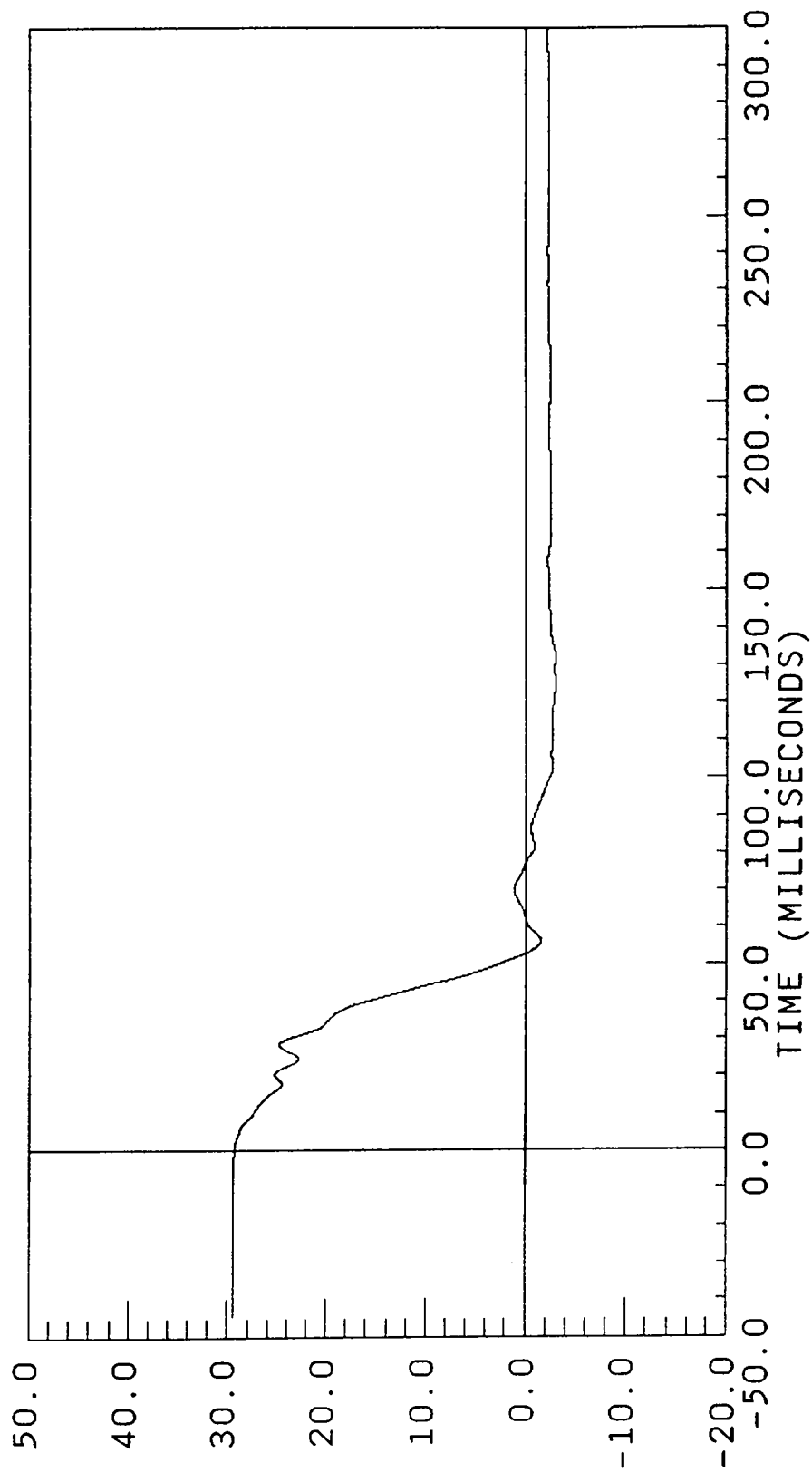
ACC PACK #8(X) XL AXIS
FILTERED YMIN = -74.67730 at 45.07500
FILTER CUTOFF: 100Hz YMAX = 35.15584 at 26.25000



29.30 mph

ACC PACK #8(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -3.012238 at 124.4250
YMAX = 29.44733 at -30.45000

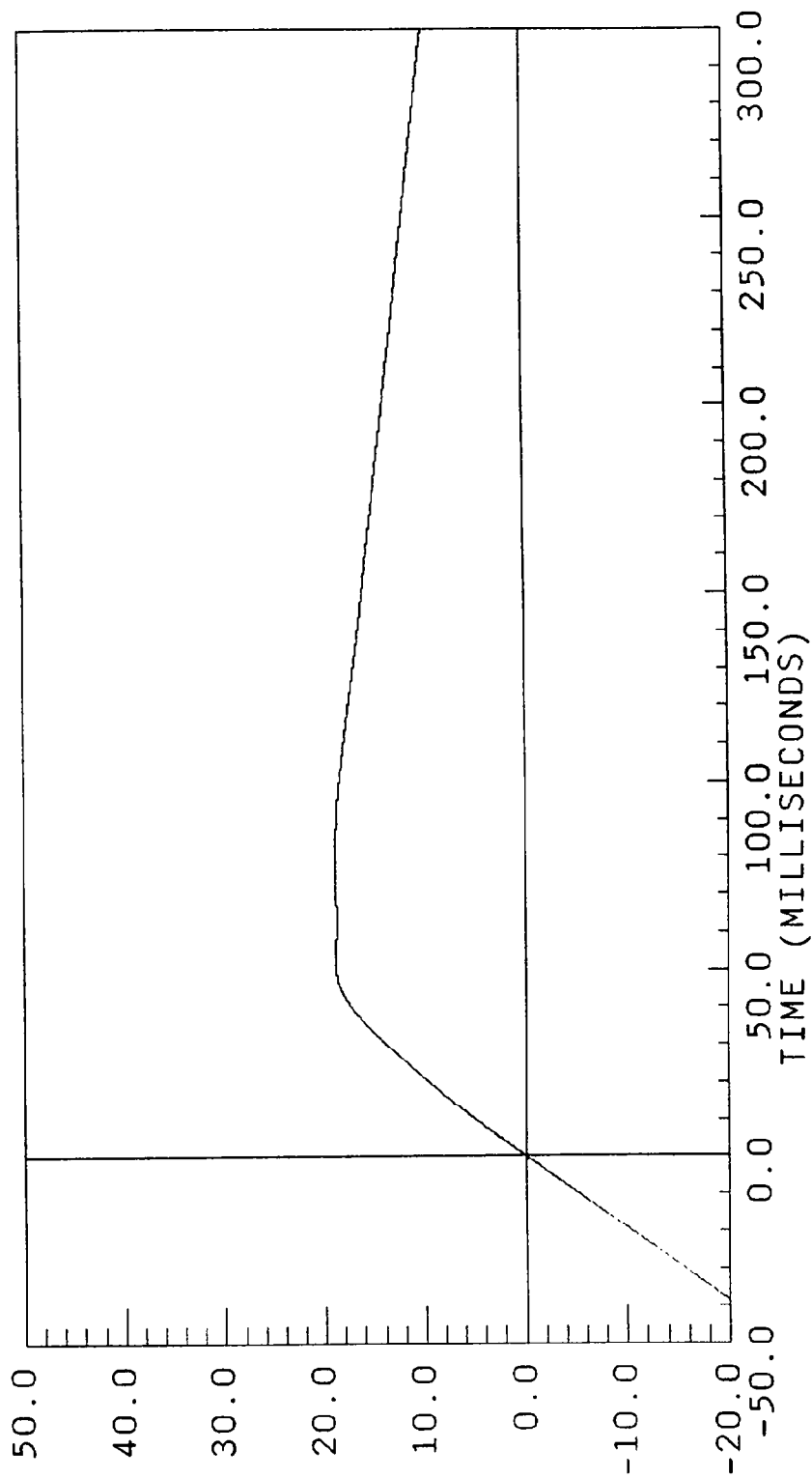


VELOCITY * MILES / HOUR

D886-24.DAT

29.30 mph

ACC PACK #8(X)
COMPUTED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -23.25843 at 124.4250
YMAX = 18.90615 at 76.87500



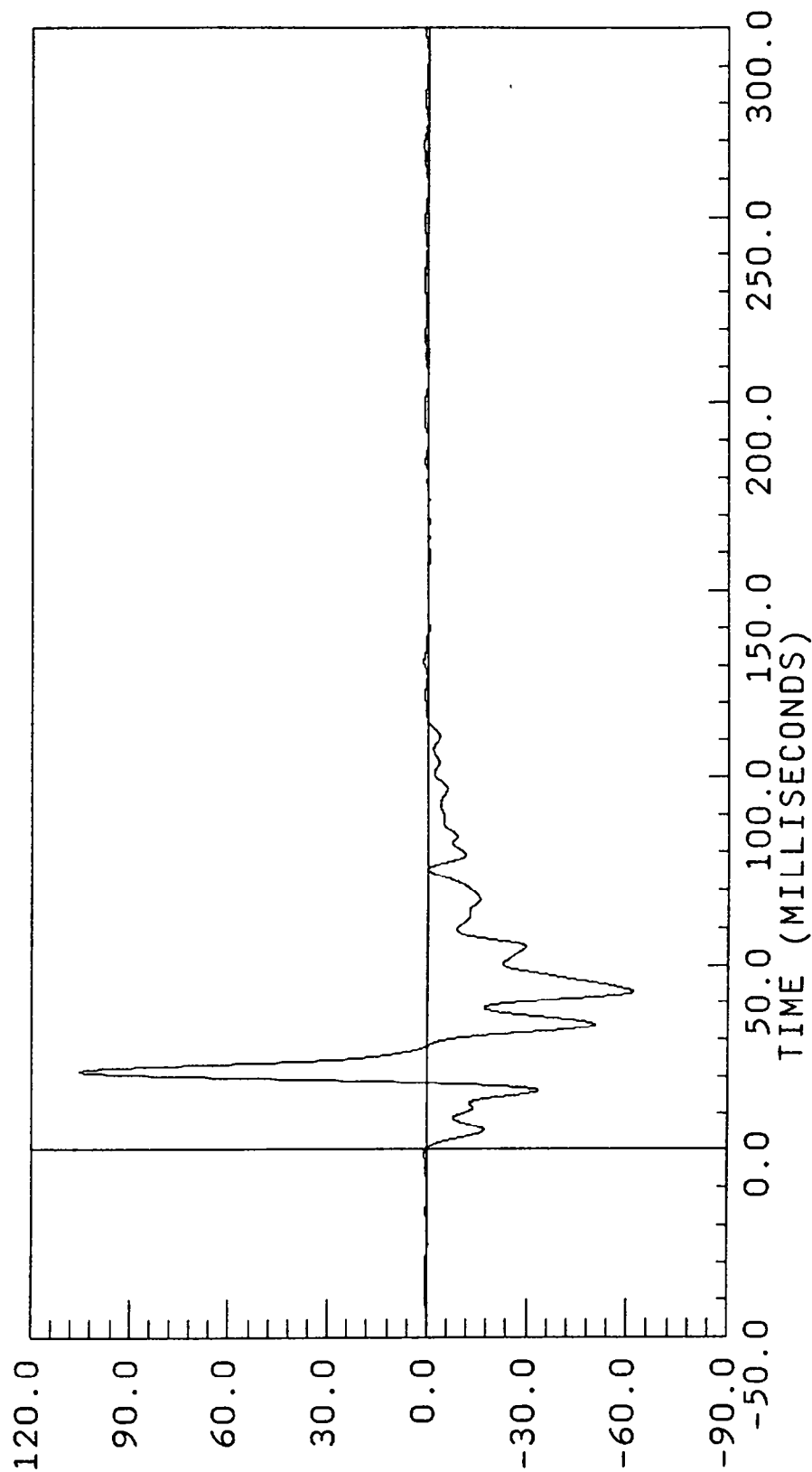
DISPLACEMENT * INCHES
B-26 7715-4

BW886-25.DAT

29.30 mph

ACC PACK #9(X)
FILTERED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -61.95352 at 42.90000
YMAX = 105.4437 at 21.22500



ACCELERATION * G'S *

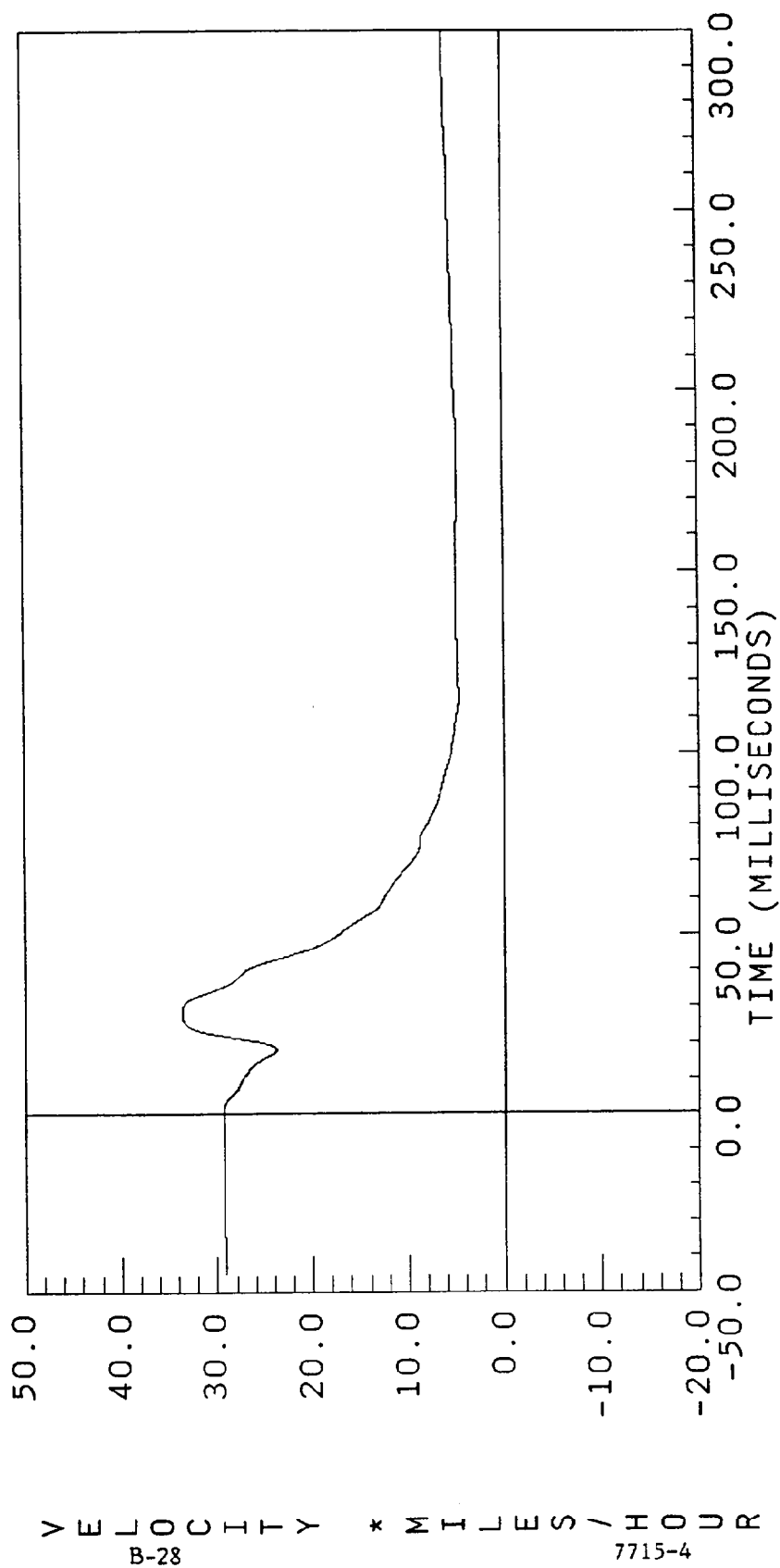
B-27

7715-4

V886-25.DAT

29.30 mph

ACC PACK #9(X)
COMPUTED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = 4.607069 at 115.4250
YMAX = 33.60946 at 28.12500



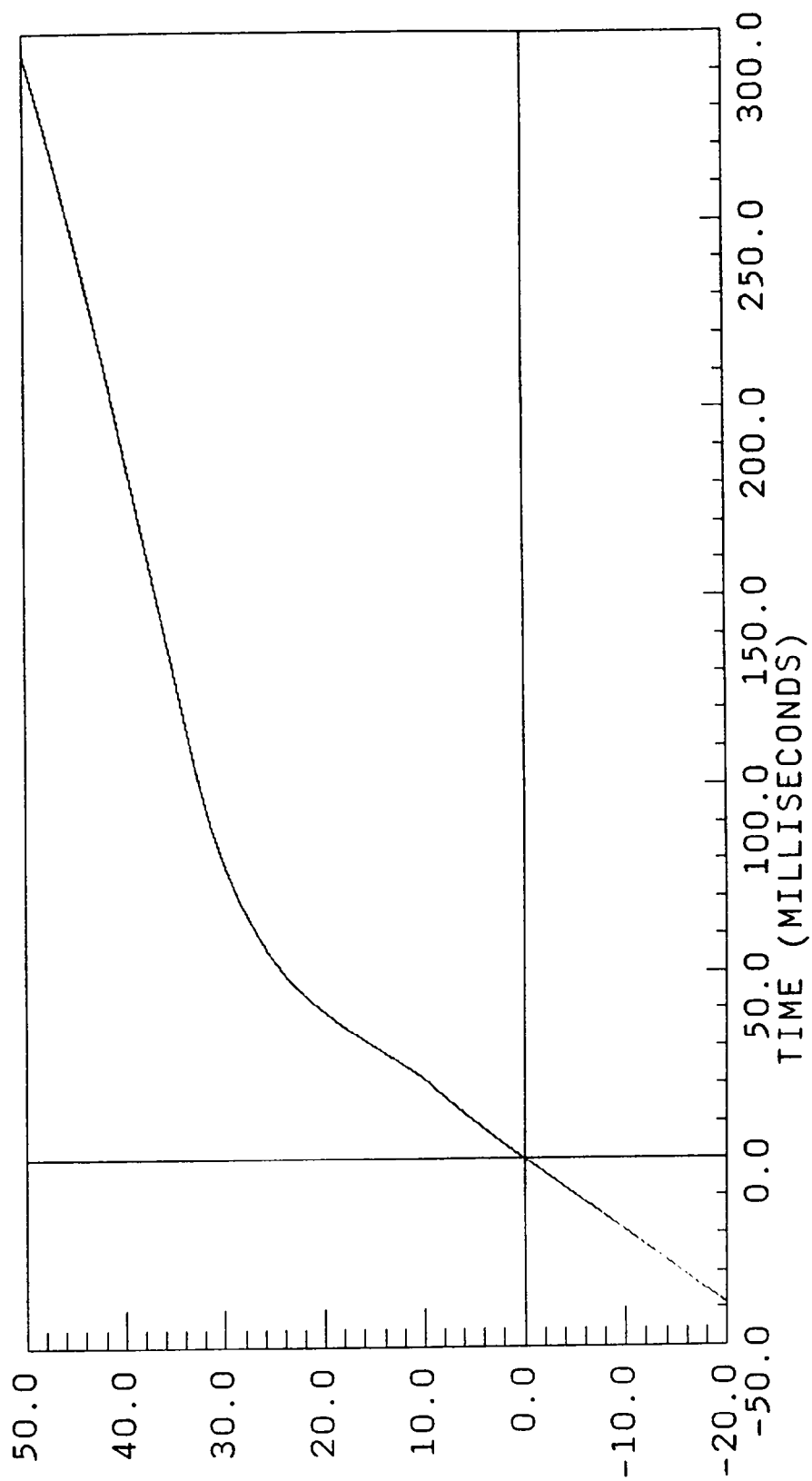
D886-25.DAT

29.30 mph

ACC PACK #9(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS

YMIN = -23.09101 at 115.4250
YMAX = 50.56926 at 300.0000

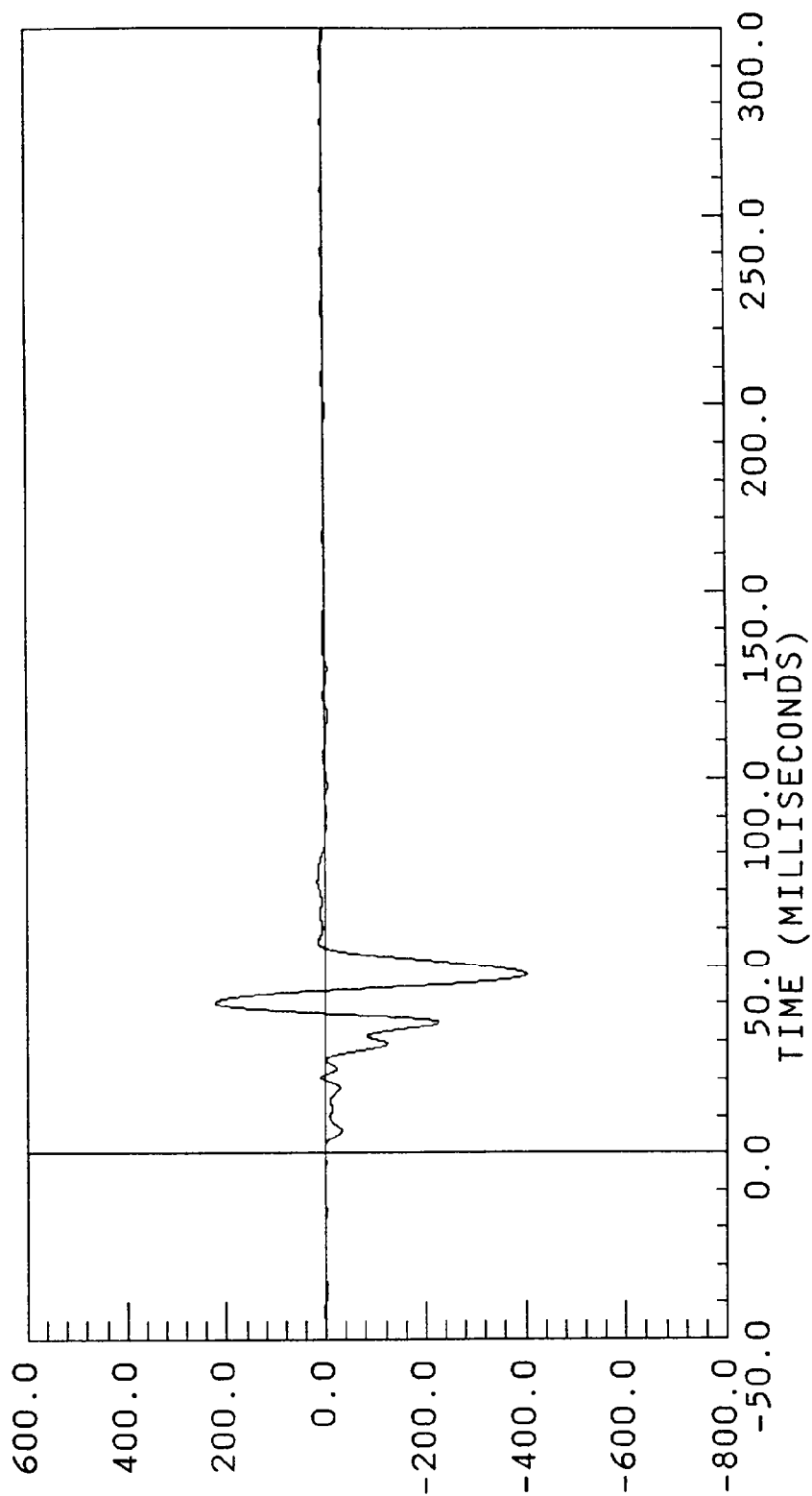


DISPLACEMENT * INCHES

BW886-26.DAT

29.30 mph

ACC PACK #10(X) XL AXIS
FILTERED YMIN = -403.3424 at 47.70000
FILTER CUTOFF: 100HZ YMAX = 222.0188 at 40.05000



ACCELERATION * G *

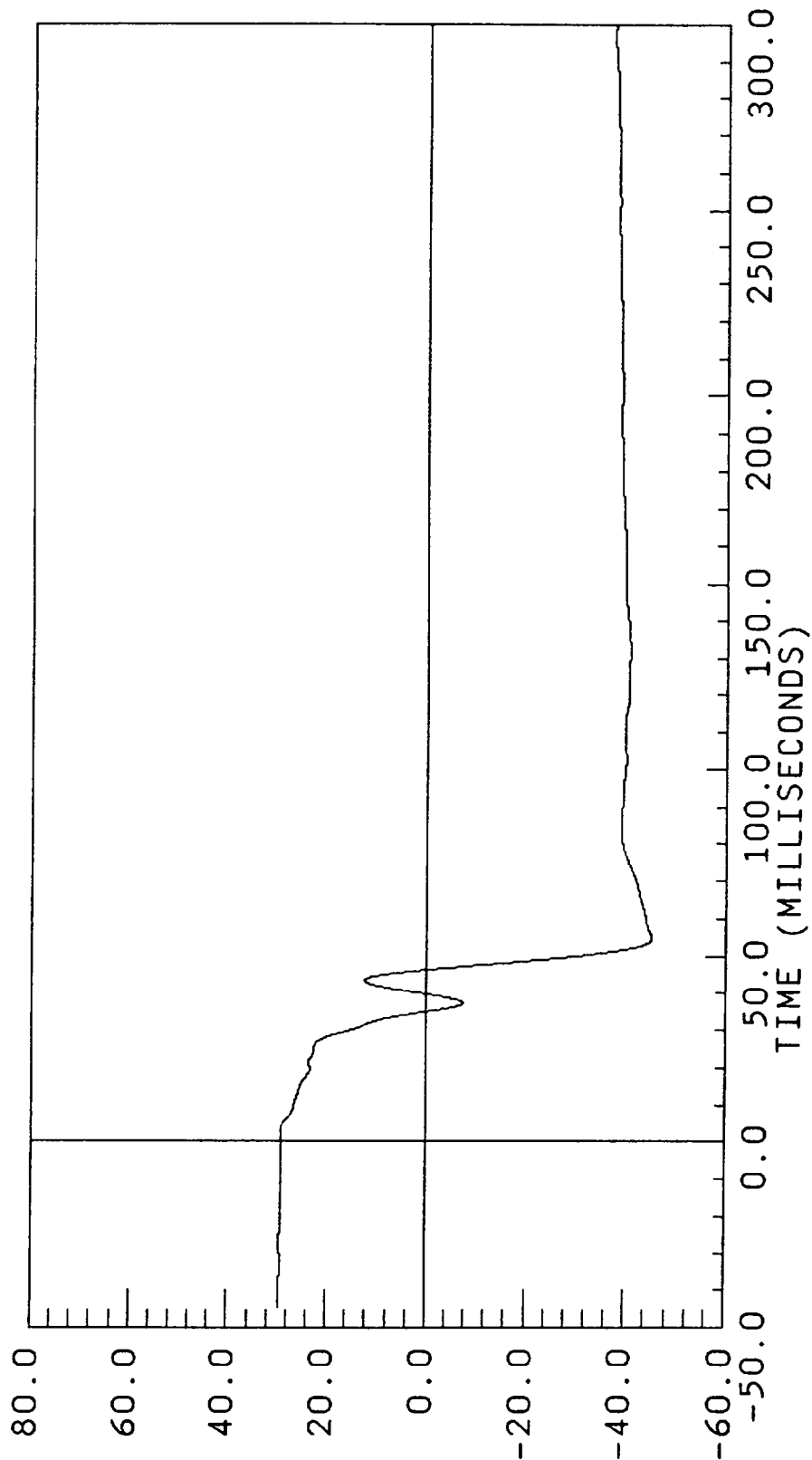
B-30

7715-4

29.30 mph

ACC PACK #10(X)
COMPUTED
FILTER CUTOFF: 100Hz

XL AXIS
YMIN = -45.26185 at 54.67500
YMAX = 29.44772 at -39.90000

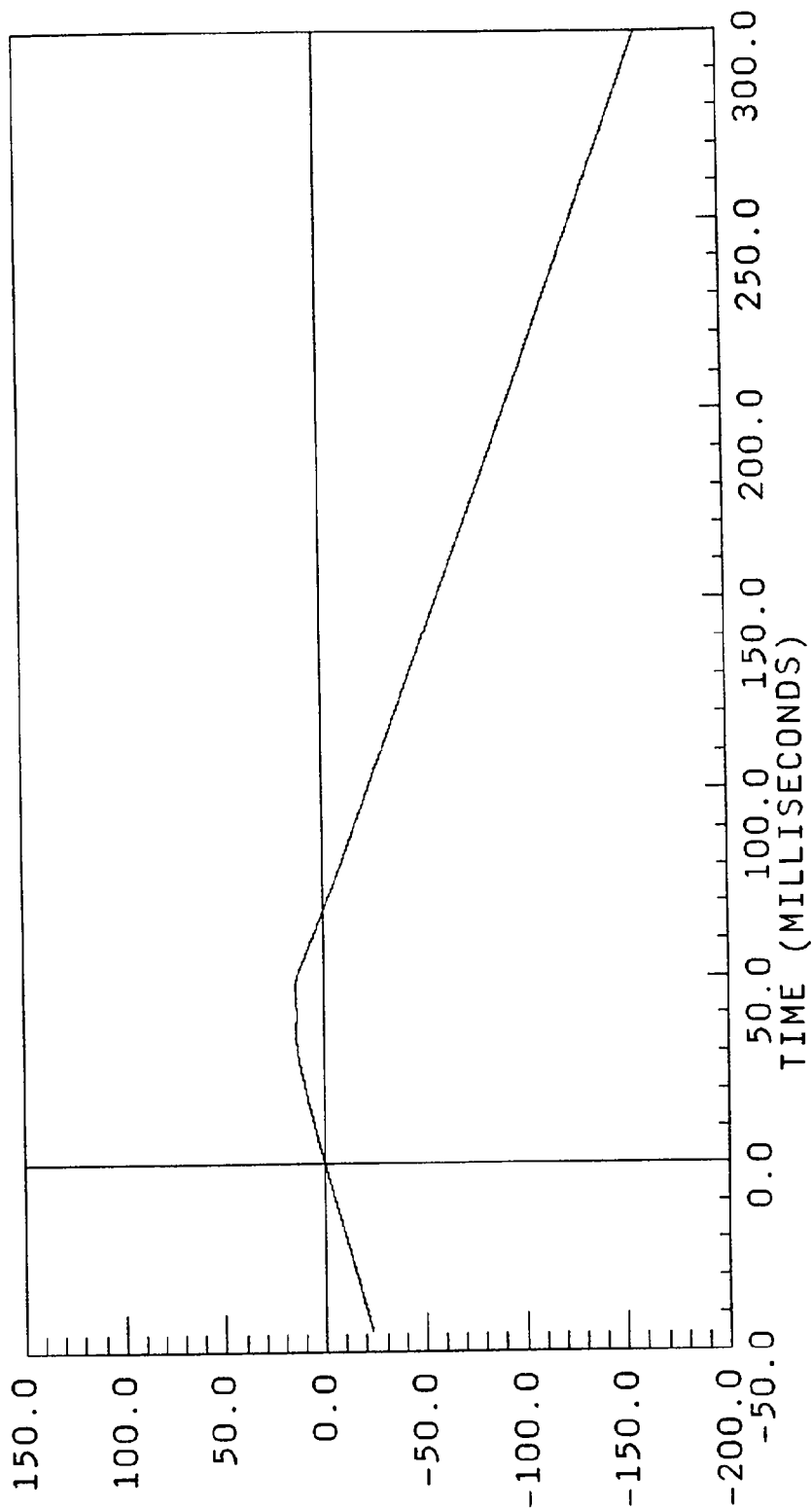


VELOCITY * MILES / HOUR
B-31 7715-4

D886-26.DAT

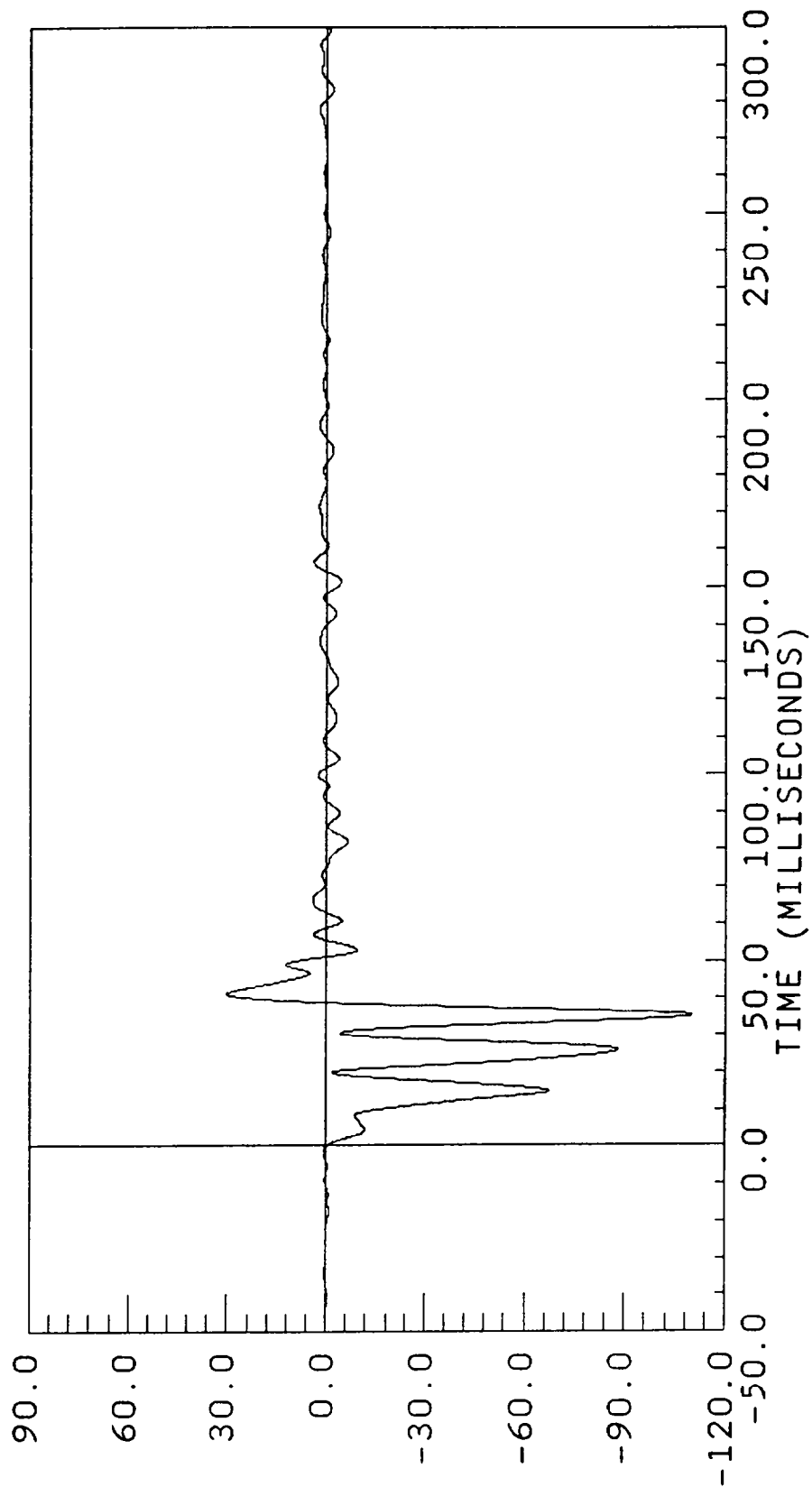
29.30 mph

ACC PACK #10(X) XL AXIS
COMPUTED YMIN = -160.4937 at 300.0000
FILTER CUTOFF: 100HZ YMAX = 14.47368 at 46.20000



29.30 mph

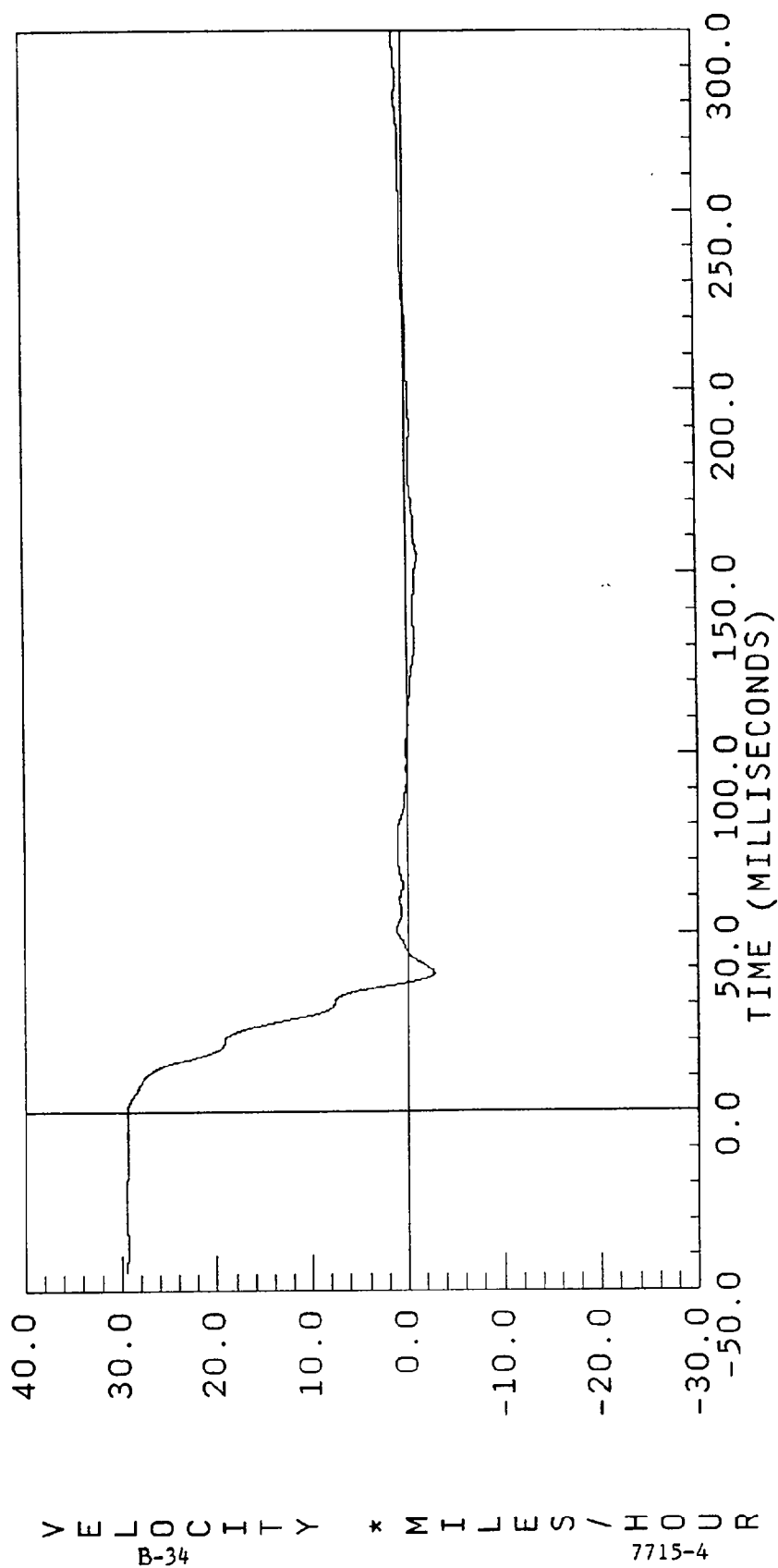
ACC PACK #11(X) XL AXIS
 FILTERED YMIN = -110.0668 at 35.17500
 FILTER CUTOFF: 100Hz YMAX = 30.27913 at 41.10000



V886-27.DAT

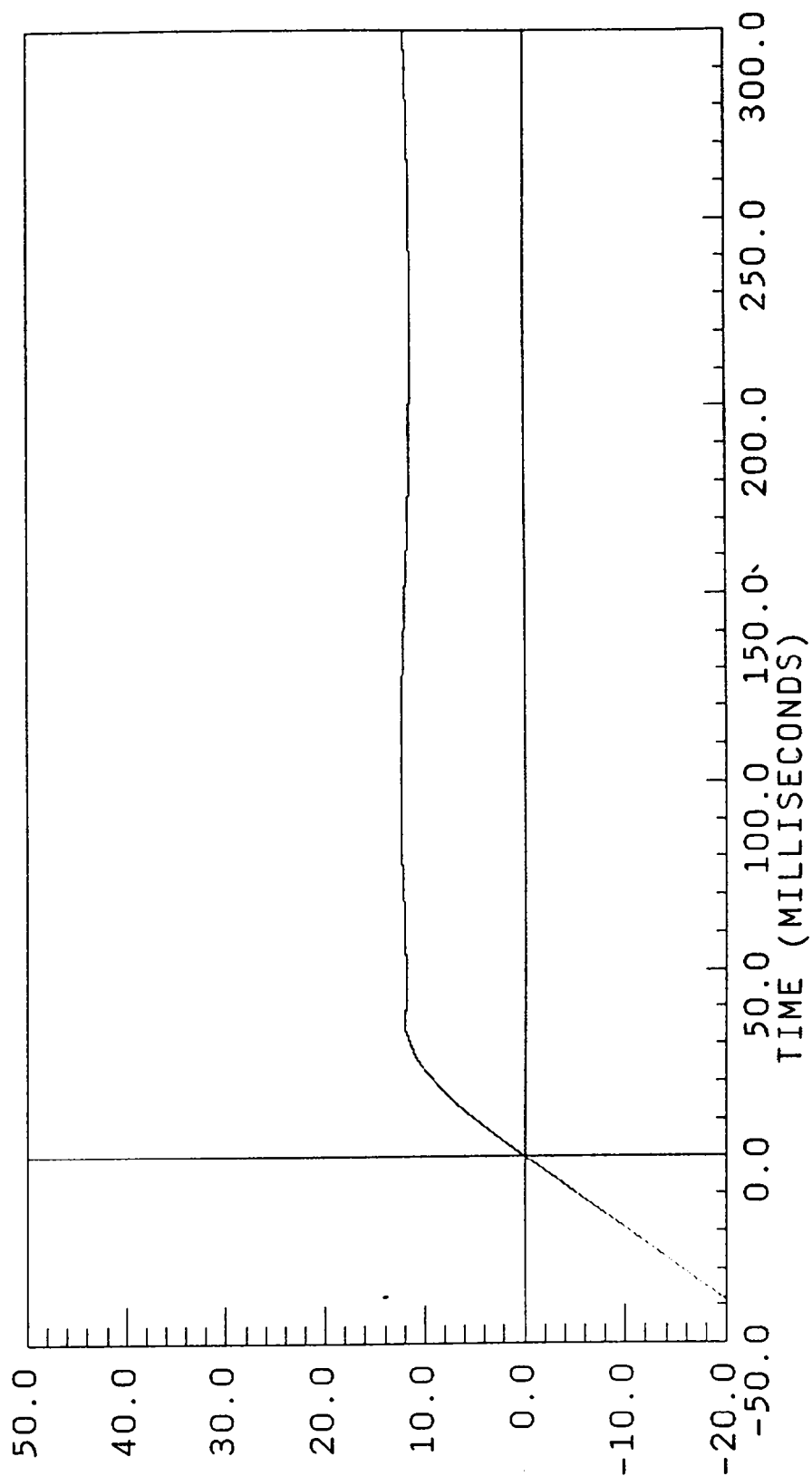
29.30 mph

ACC PACK #11(X)
COMPUTED
FILTER CUTOFF: 100HZ
XL AXIS
YMIN = -2.759298 at 38.70000
YMAX = 29.39017 at -25.42500



29.30 mph

ACC PACK #11(X) XL AXIS
 COMPUTED YMIN = -23.20149 at 38.70000
 FILTER CUTOFF: 100Hz YMAX = 12.33135 at 104.8500



DISPLACEMENT * INCHES
 B-35 7715-4

TEST NO. CK0203

DUMMY DATA

	FILTER CHANNEL CLASS
HEAD ACCELERATIONS	1000
CHEST ACCELERATIONS	180
FEMUR FORCES	600

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NHTSA CRASH TEST - PROC. 208

RUN= 386

POS#1 HEAD R

HIC= 435.4 FROM T1= .05610 TO T2= .09015

AVERAGE ACCELERATION BETWEEN T1 AND T2= 43.9G'S

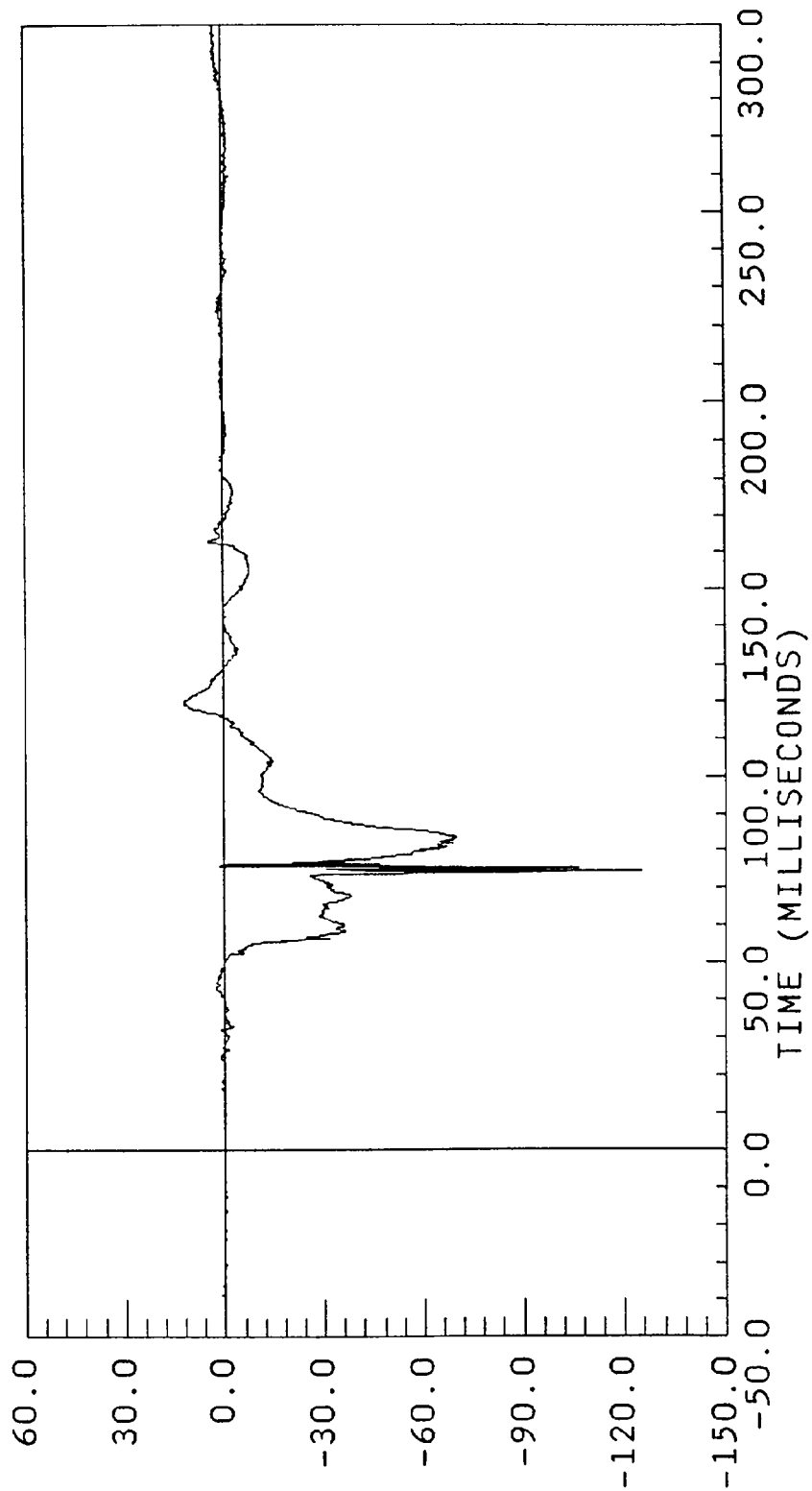
EVENT TIME= 300.0 MSEC

SEVERITY INDEX= 614.9

UDS\$886-1.DAT

0.00 mph

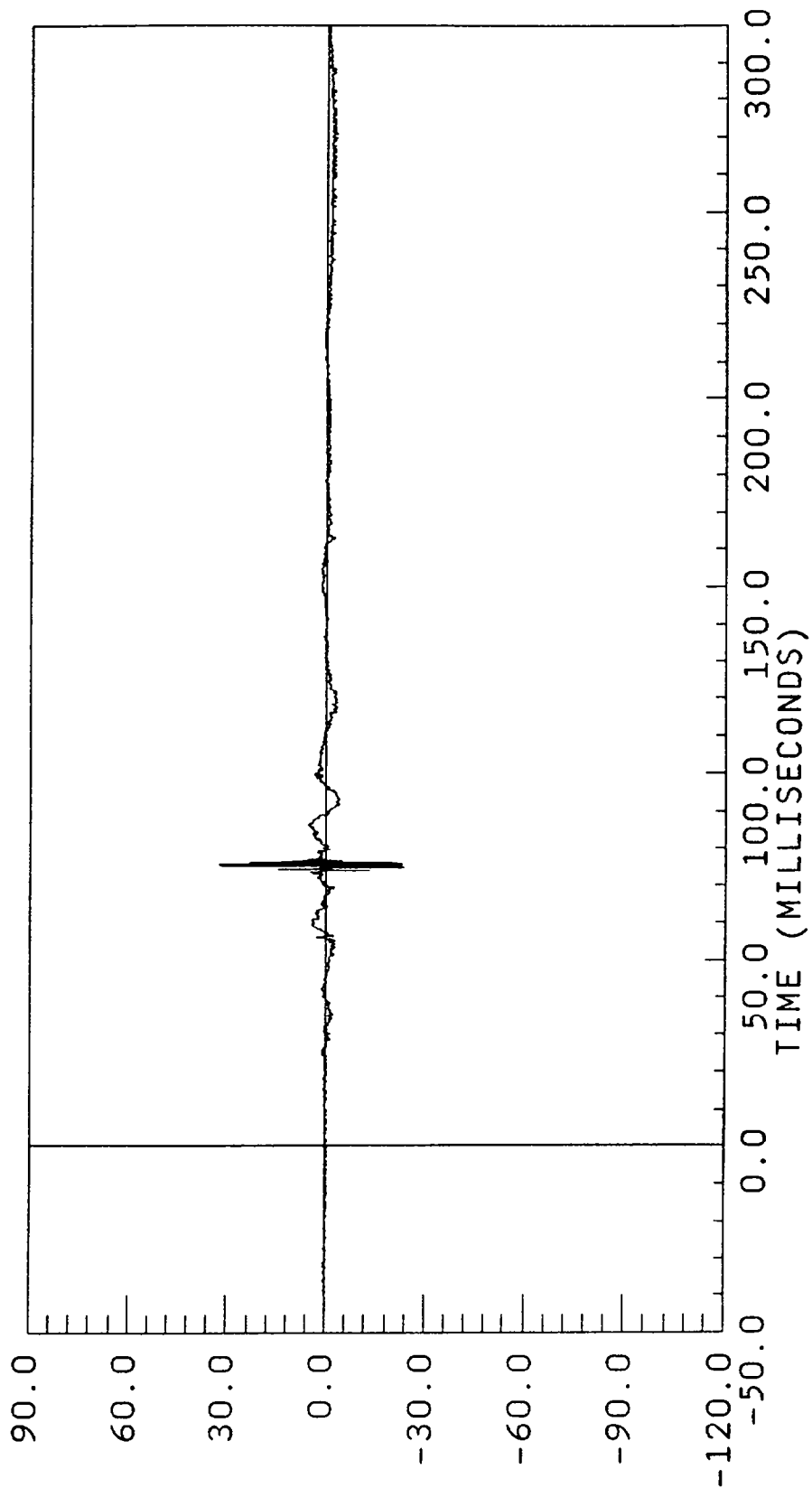
POS#1 HEAD X
XL AXIS
YMIN = -125.2900 at 74.32500
YMAX = 11.91800 at 119.4750
FILTER CUTOFF: OHZ



ACCELERATION * G, S *
B-38 7715-4

0.00 mph

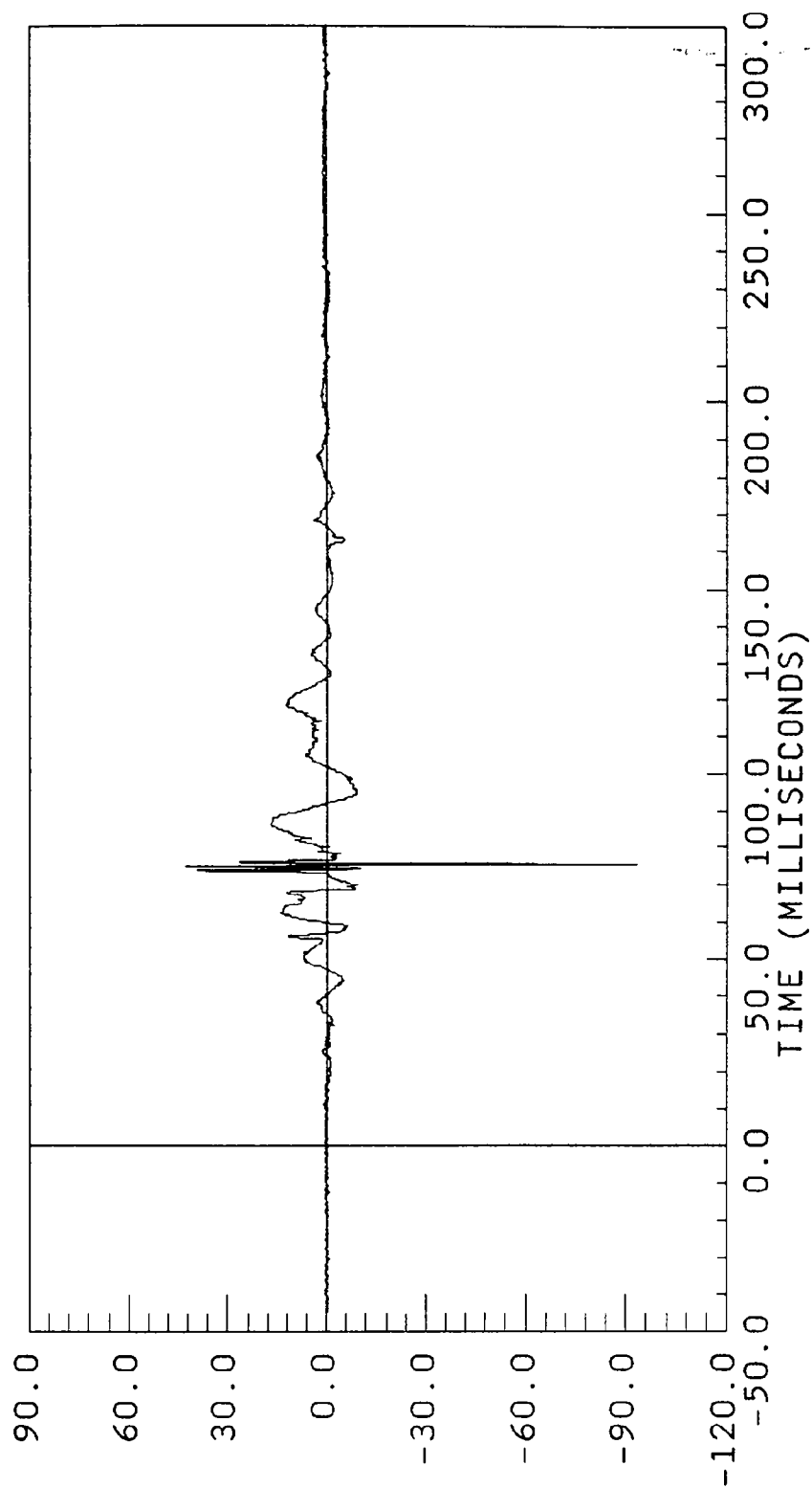
POS#1 HEAD Y
 FILTER CUTOFF: OHZ
 YL AXIS
 YMIN = -23.79600 at 75.07500
 YMAX = 32.81500 at 75.60001



UDS\$886-3.DAT

0.00 mph

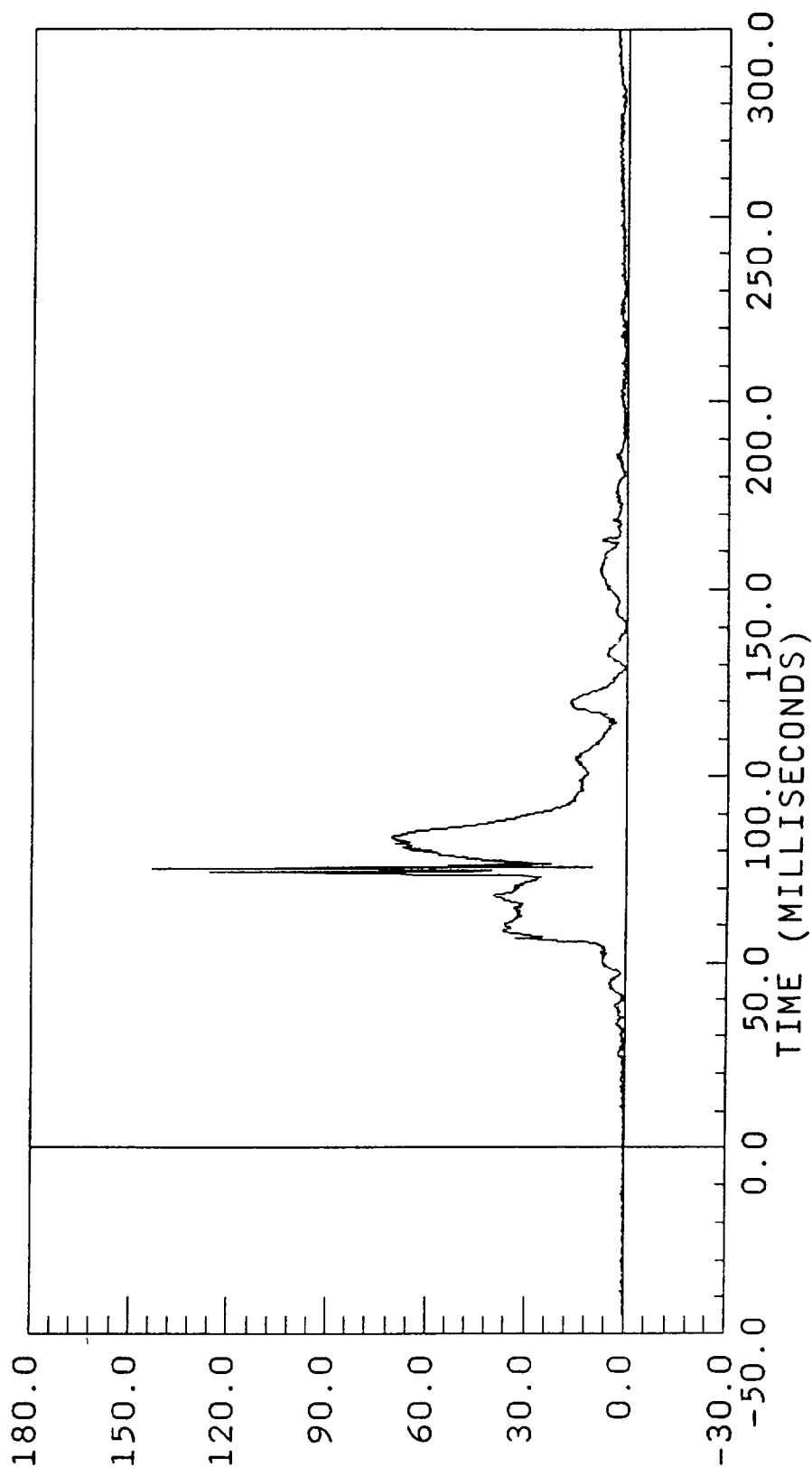
POS#1 HEAD Z
ZL AXIS
YMIN = -93.09600 at 75.37500
YMAX = 43.22000 at 74.92500
FILTER CUTOFF: 0Hz



HRES886-1.DAT

0.00 mph

POS#1 HEAD RS AXIS
NONSTANDARD YMIN = 0.345341 at -31.72500
FILTER CUTOFF: OHZ YMAX = 143.2249 at 75.37500



ACCELERATION * G, S *

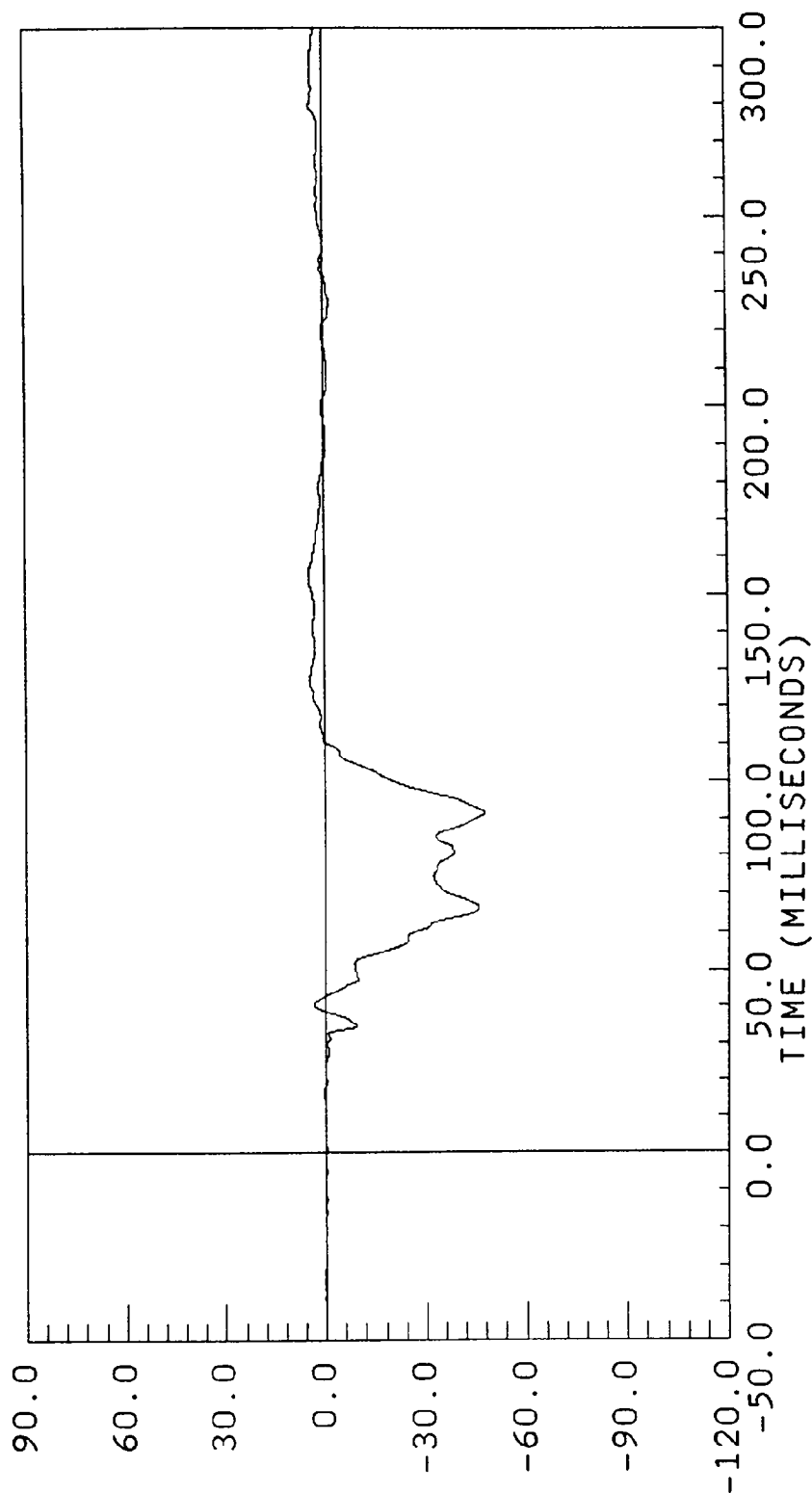
B-41

7715-4

BW886-4.DAT

0.00 mph

POS#1 CHEST X
FILTERED
FILTER CUTOFF: 300HZ
XL AXIS
YMIN = -47.77782 at 91.42500
YMAX = 4.655797 at 126.6000

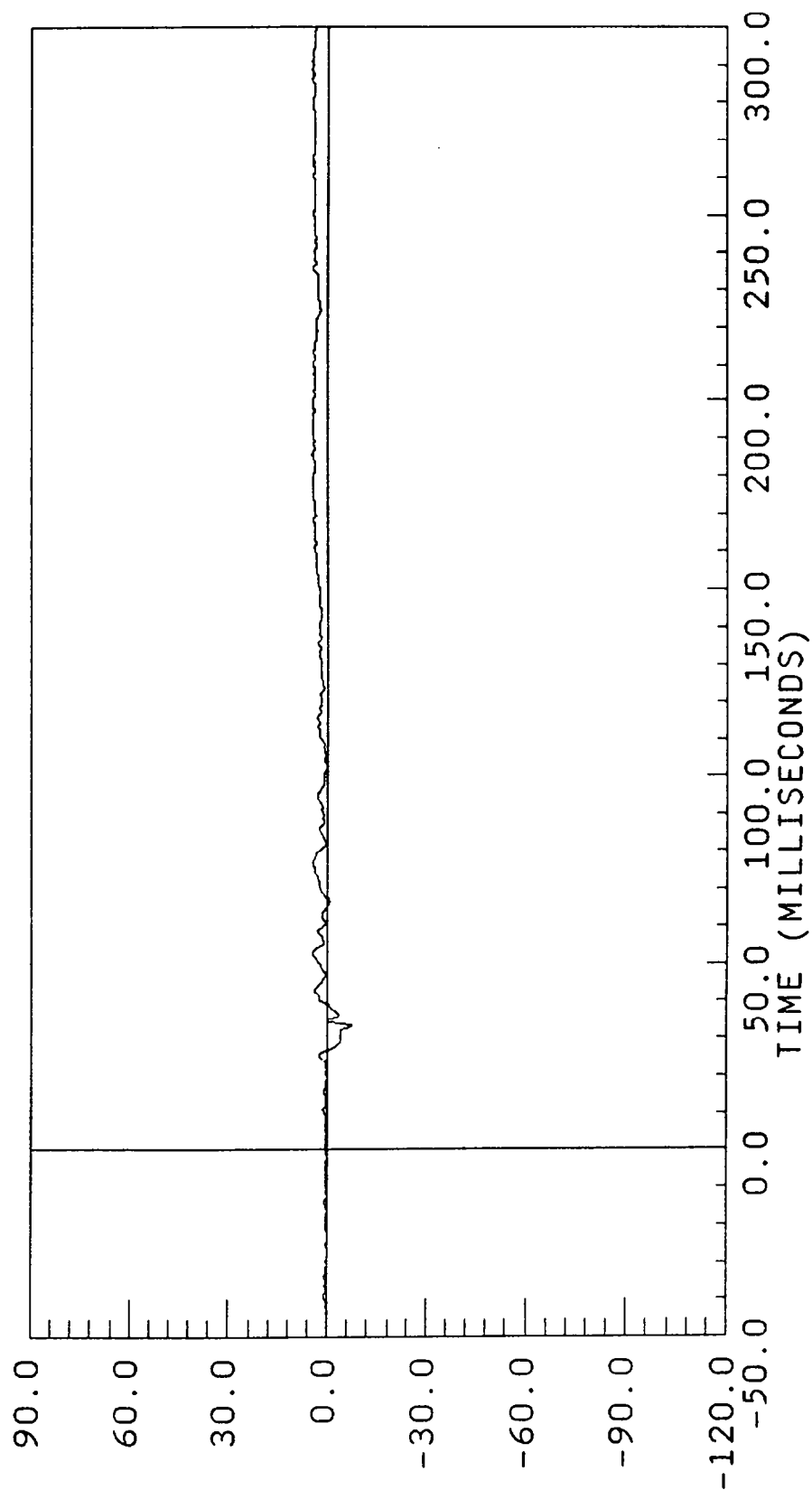


ACCELERATION * G * S
B-42 7715-4

BW886-5.DAT

0.00 mph

POS#1 CHEST Y
FILTERED
FILTER CUTOFF: 300Hz
YL AXIS
YMIN = -7.397024 at 33.30000
YMAX = 4.847411 at 286.1250

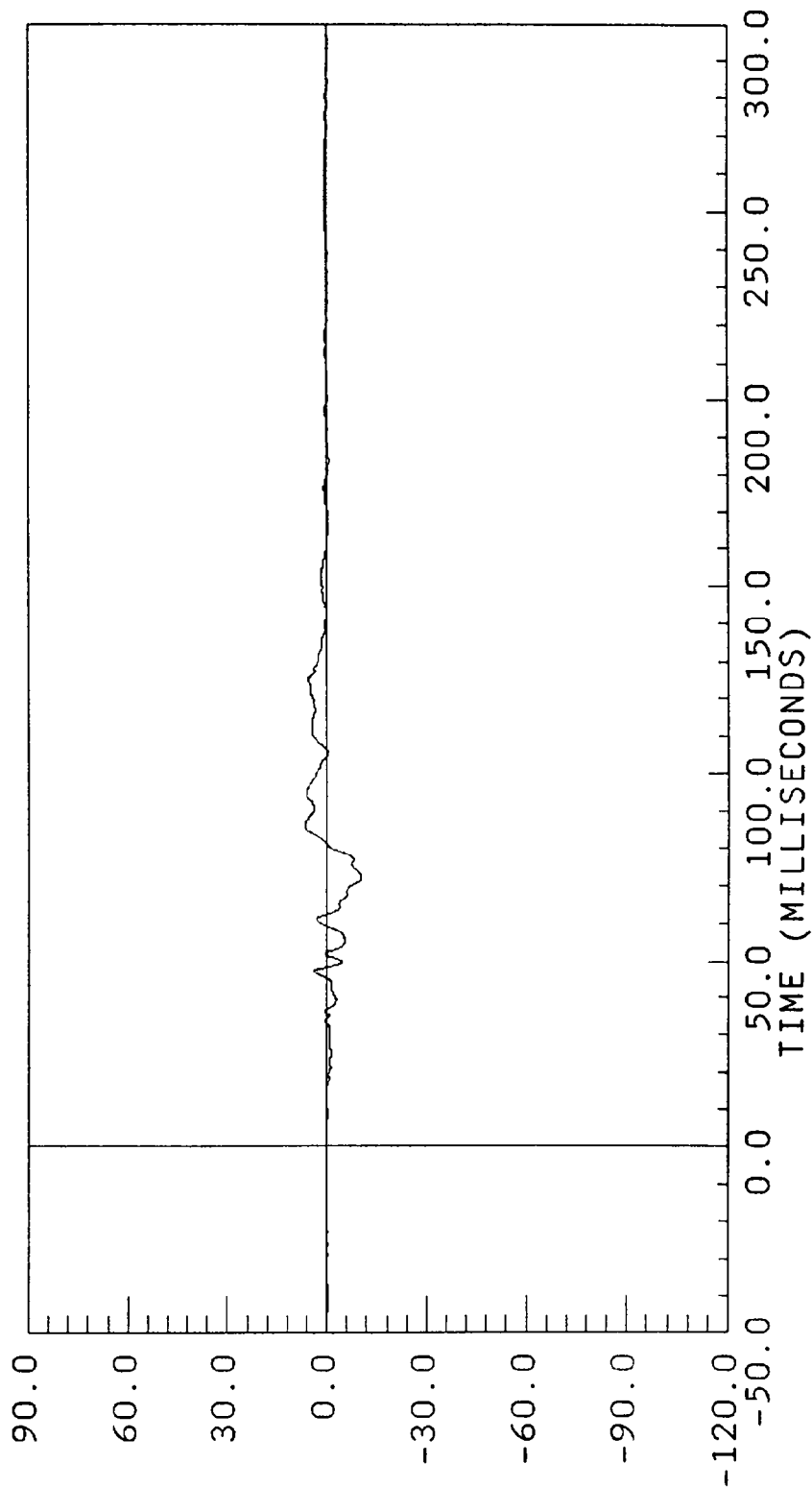


ACCELERATION * G *
B-43 7715-4

BW886-6.DAT

0.00 mph

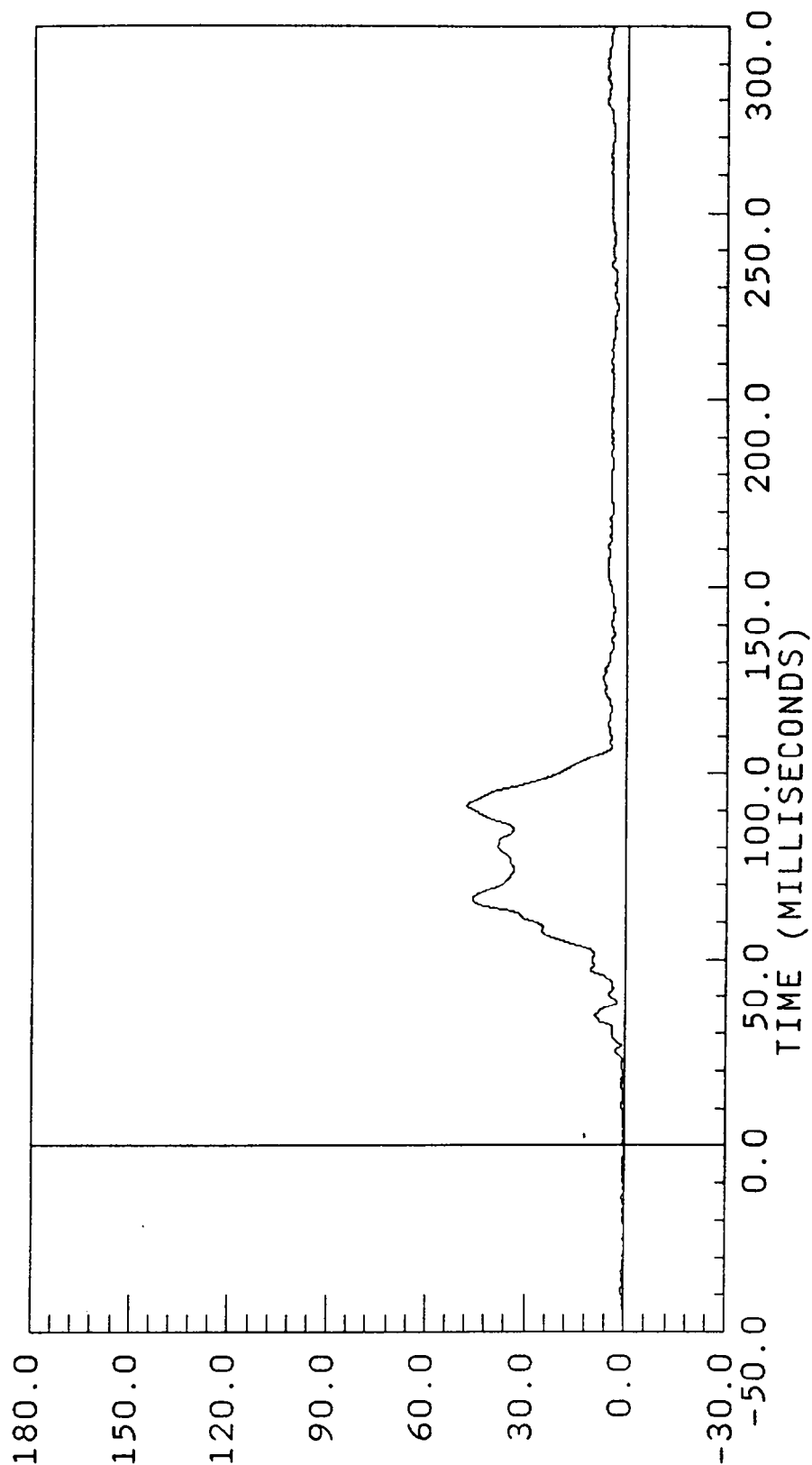
POS#1 CHEST Z
FILTERED
FILTER CUTOFF: 300HZ
ZL AXIS
YMIN = -10.37939 at 71.92500
YMAX = 6.690872 at 86.02500



ACCELERATION * G * S *
B-44 7715-4

0.00 mph

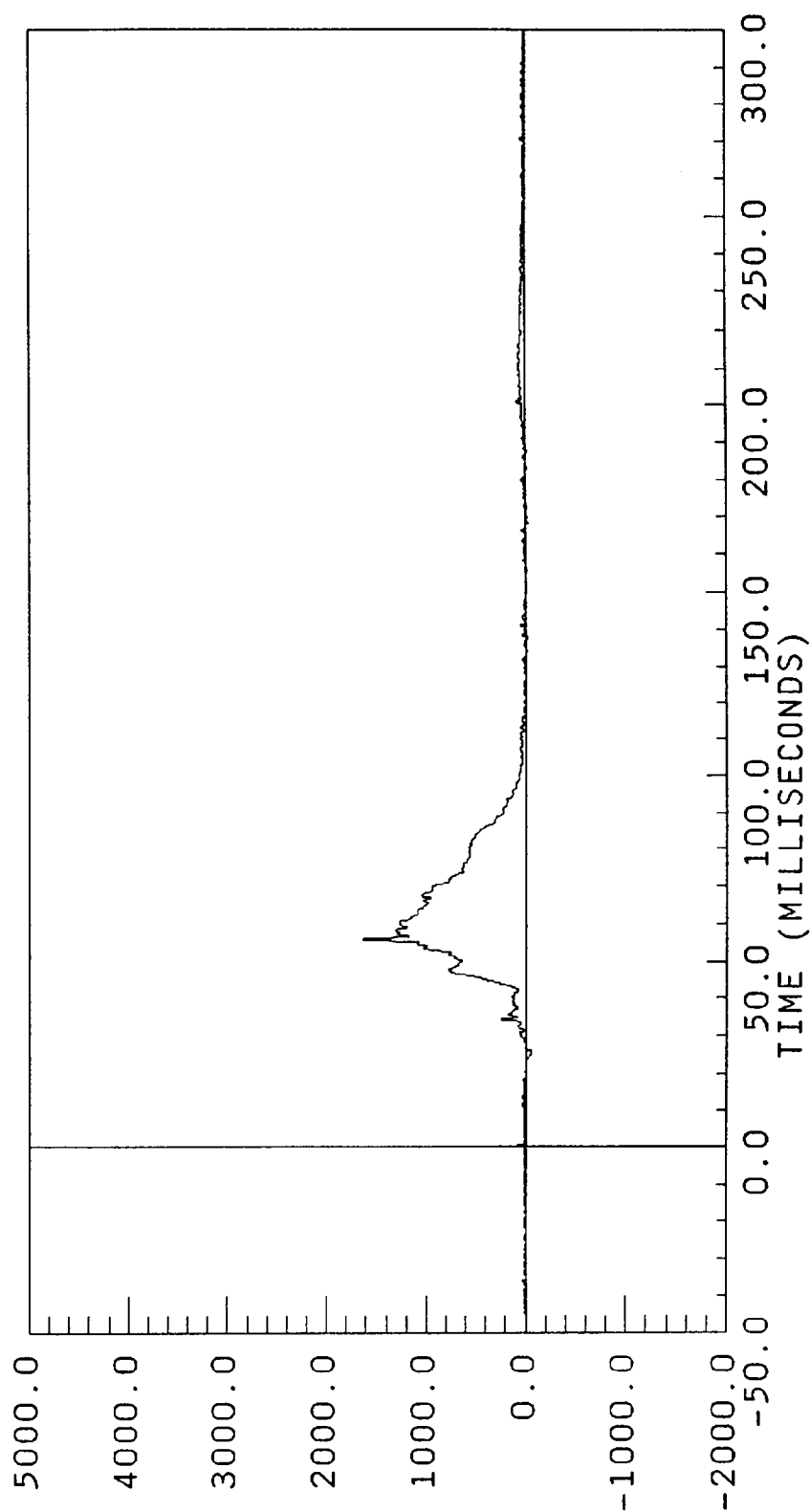
POS#1 CHEST
COMPUTED
FILTER CUTOFF: 300HZ
RS AXIS
YMIN = 0.0265652 at -44.47500
YMAX = 47.98648 at 91.42500



BW886-7.DAT

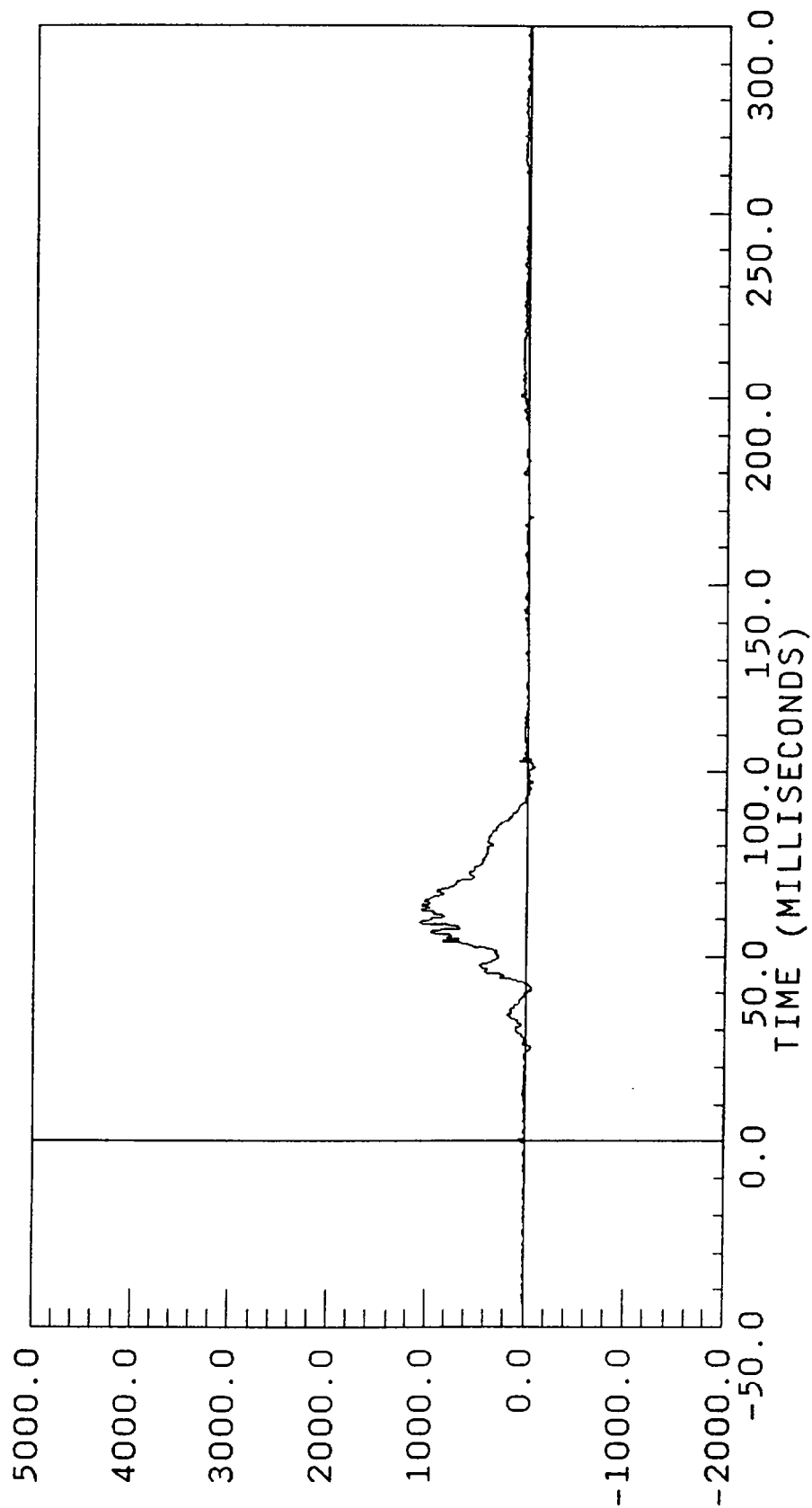
0.00 mph

POS#1 LEFT FEMUR
FILTERED
FILTER CUTOFF: 1000HZ
NA AXIS
YMIN = -62.67228 at 25.12500
YMAX = 1635.672 at 55.72500



0.00 mph

POS#1 RIGHT FEMUR
 FILTERED
 FILTER CUTOFF: 1000Hz
 NA AXIS
 YMIN = -66.01279 at 101.0250
 YMAX = 1077.053 at 59.02500



HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

NHTSA CRASH TEST - PROC. 208

RUN= 886

POS#2 HEAD R

HIC= 389.8 FROM T1= .06465 TO T2= .10065

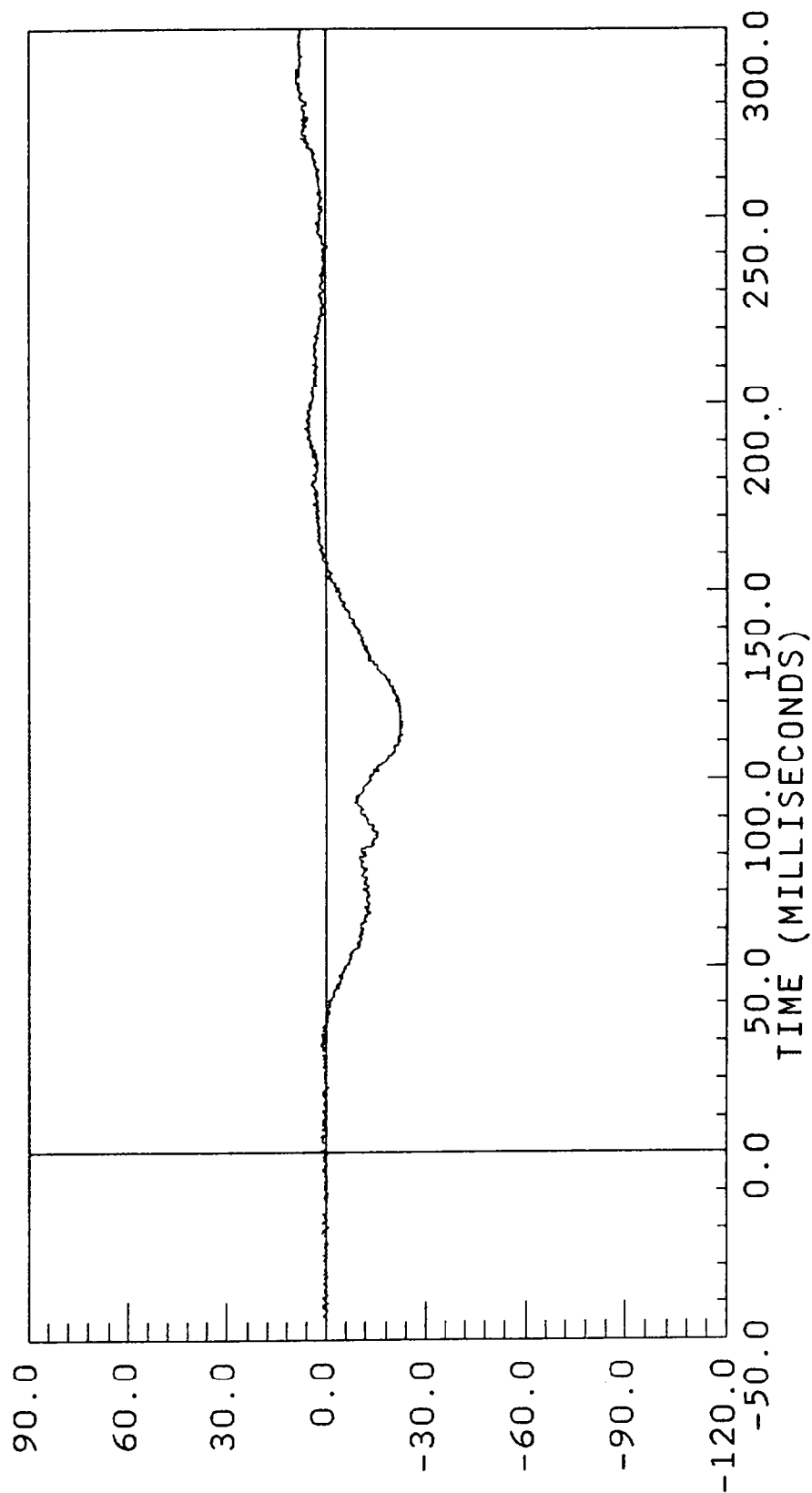
AVERAGE ACCELERATION BETWEEN T1 AND T2= 41.1G'S

EVENT TIME= 300.0 MSEC

SEVERITY INDEX= 606.9

0.00 mph

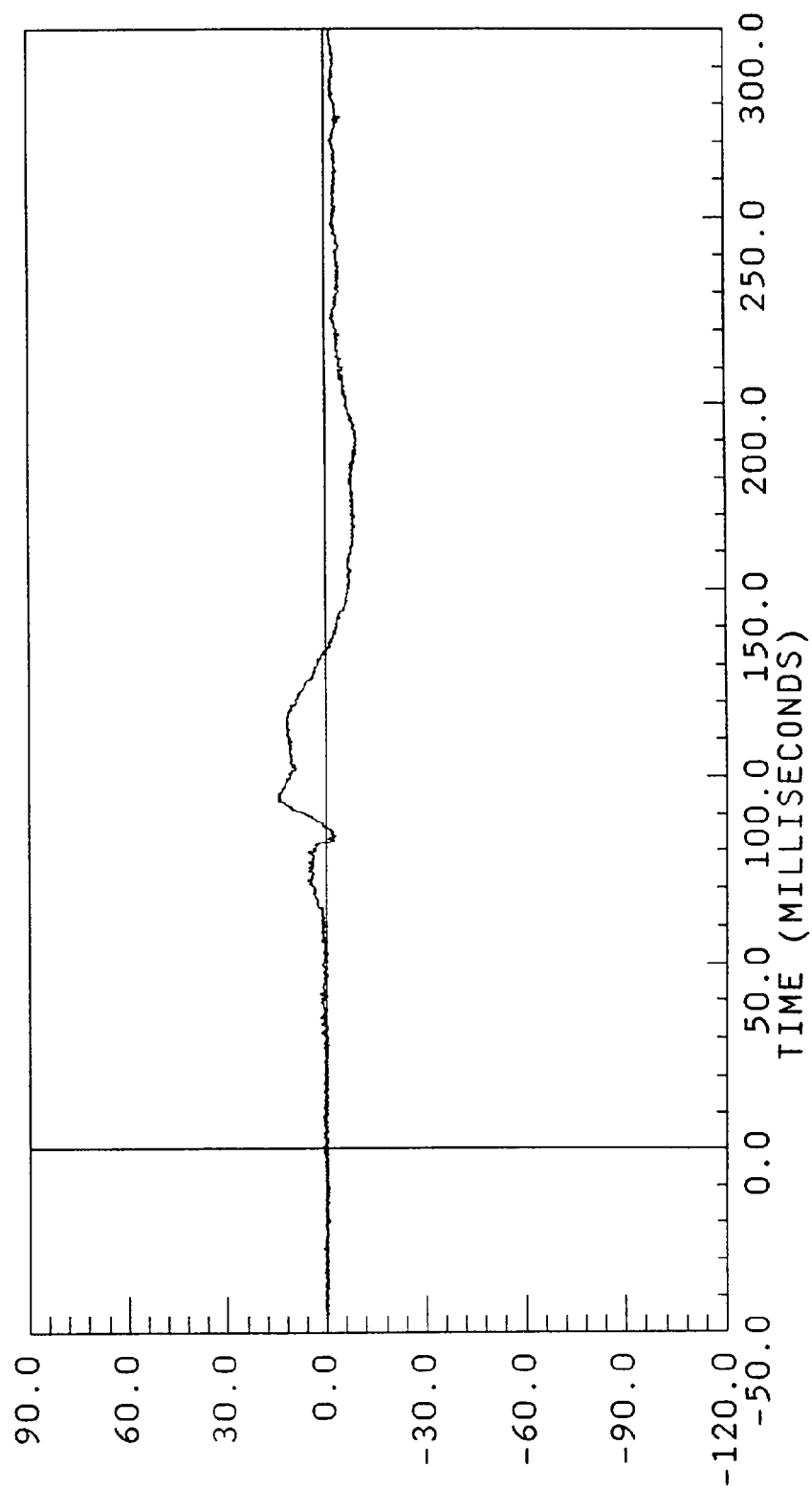
POS#2 HEAD X
 FILTER CUTOFF: OHZ
 XL AXIS
 YMIN = -23.27400 at 111.8250
 YMAX = 8.946200 at 285.6750



UDS\$886-12.DA

0.00 mph

POS#2 HEAD Y YL AXIS
YMIN = -9.553200 at 186.7500
YMAX = 14.61800 at 93.45000
FILTER CUTOFF: 0HZ



ACCELERATION * G, S *
B-50 7715-4

UDS\$886-13.DA

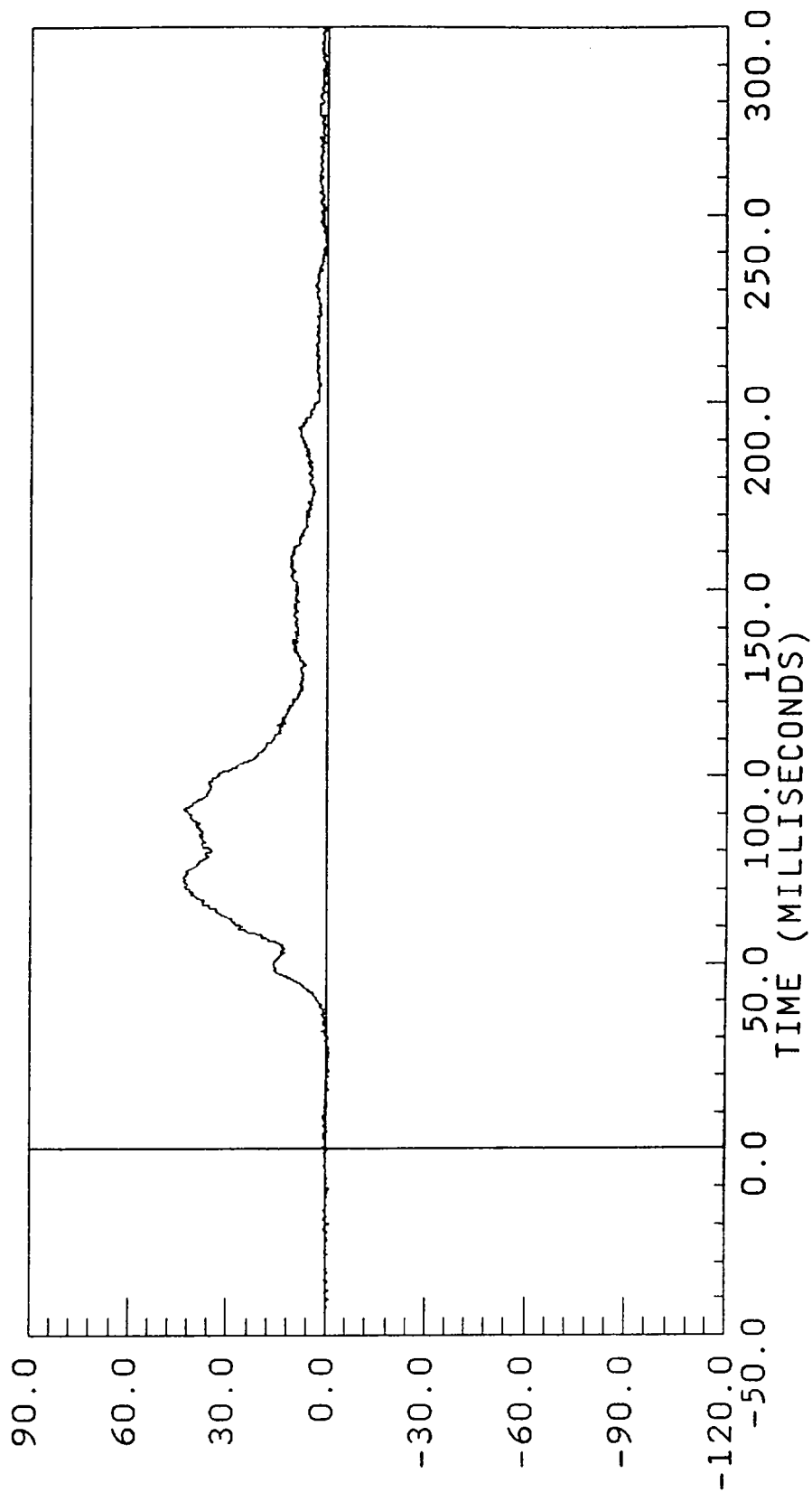
0.00 mph

POS#2 HEAD Z

ZL AXIS

```
YMIN = -0.444230 at -40.35000
YMAX = 43.48500 at 72.22501
```

FILTER CUTOFF: 0HZ

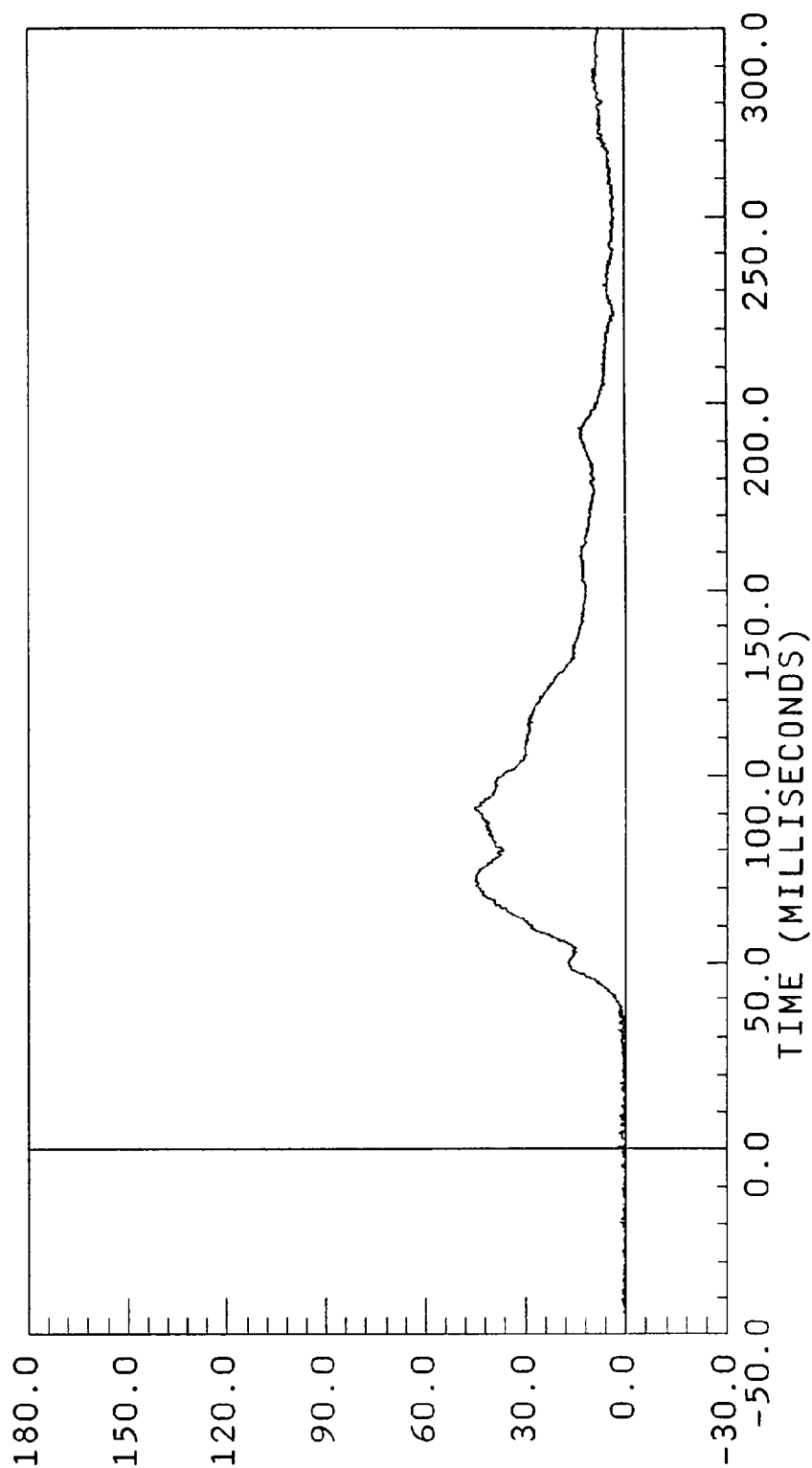


ACCELERATION * G - S *
B-51 7715-4

HRES886-2.DAT

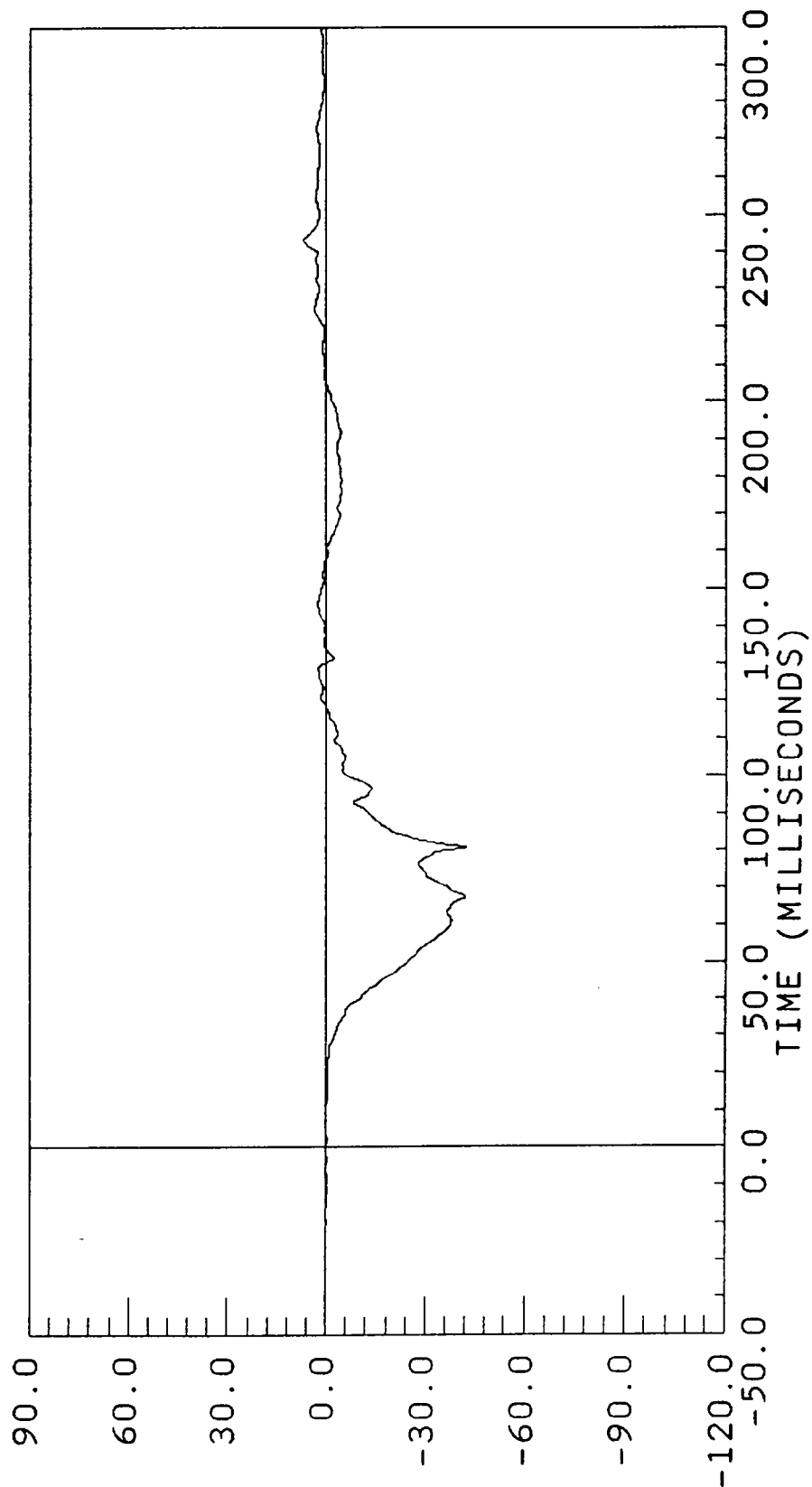
0.00 mph

POS#2 HEAD RS AXIS
NONSTANDARD YMIN = 0.791621 at -44.47500
FILTER CUTOFF: 0Hz YMAX = 45.69757 at 91.05000



0.00 mph

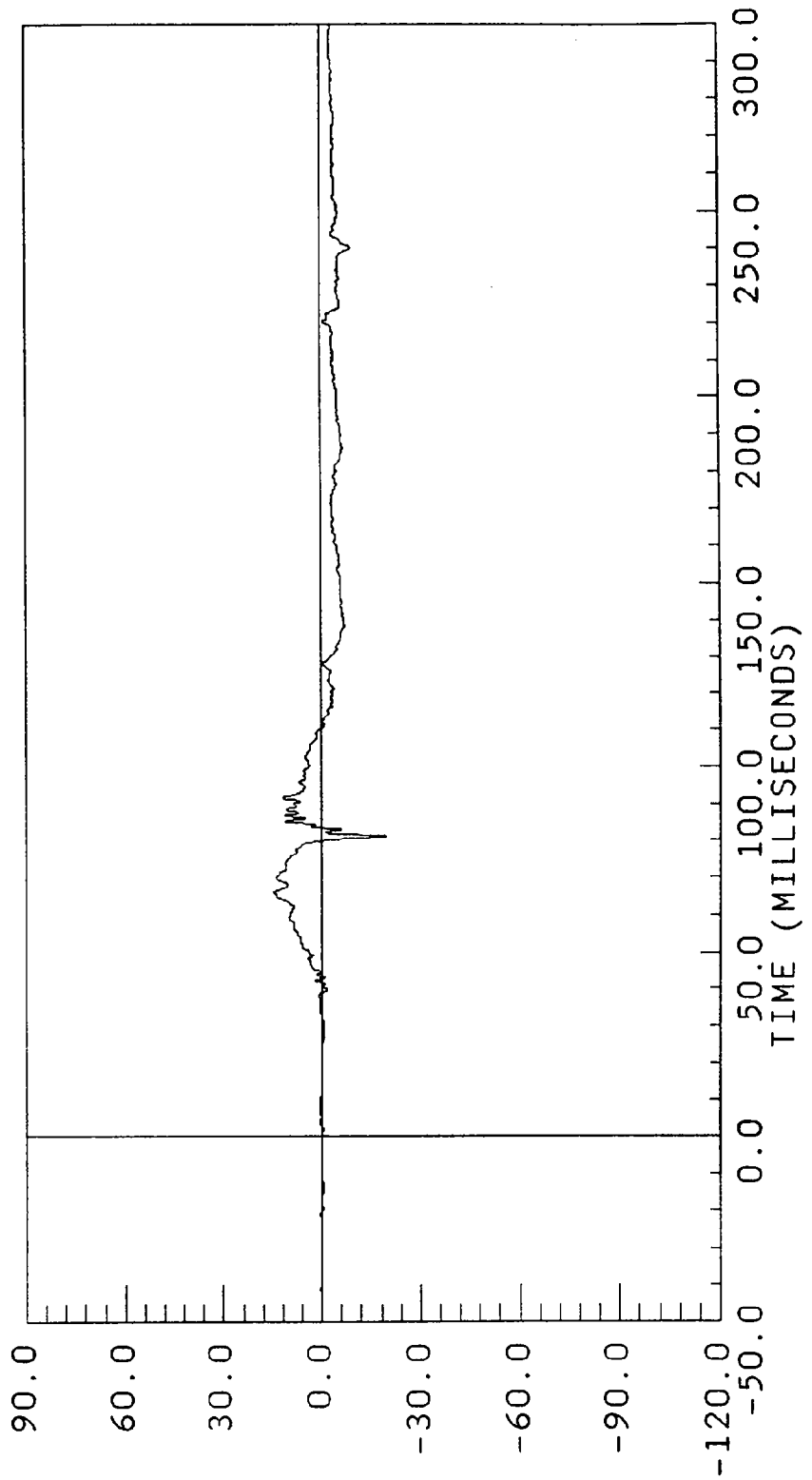
POS#2 CHEST X
 FILTERED
 FILTER CUTOFF: 300HZ
 XL AXIS
 YMIN = -42.32446 at 80.85001
 YMAX = 6.921933 at 243.5250



BW886-15.DAT

0.00 mph

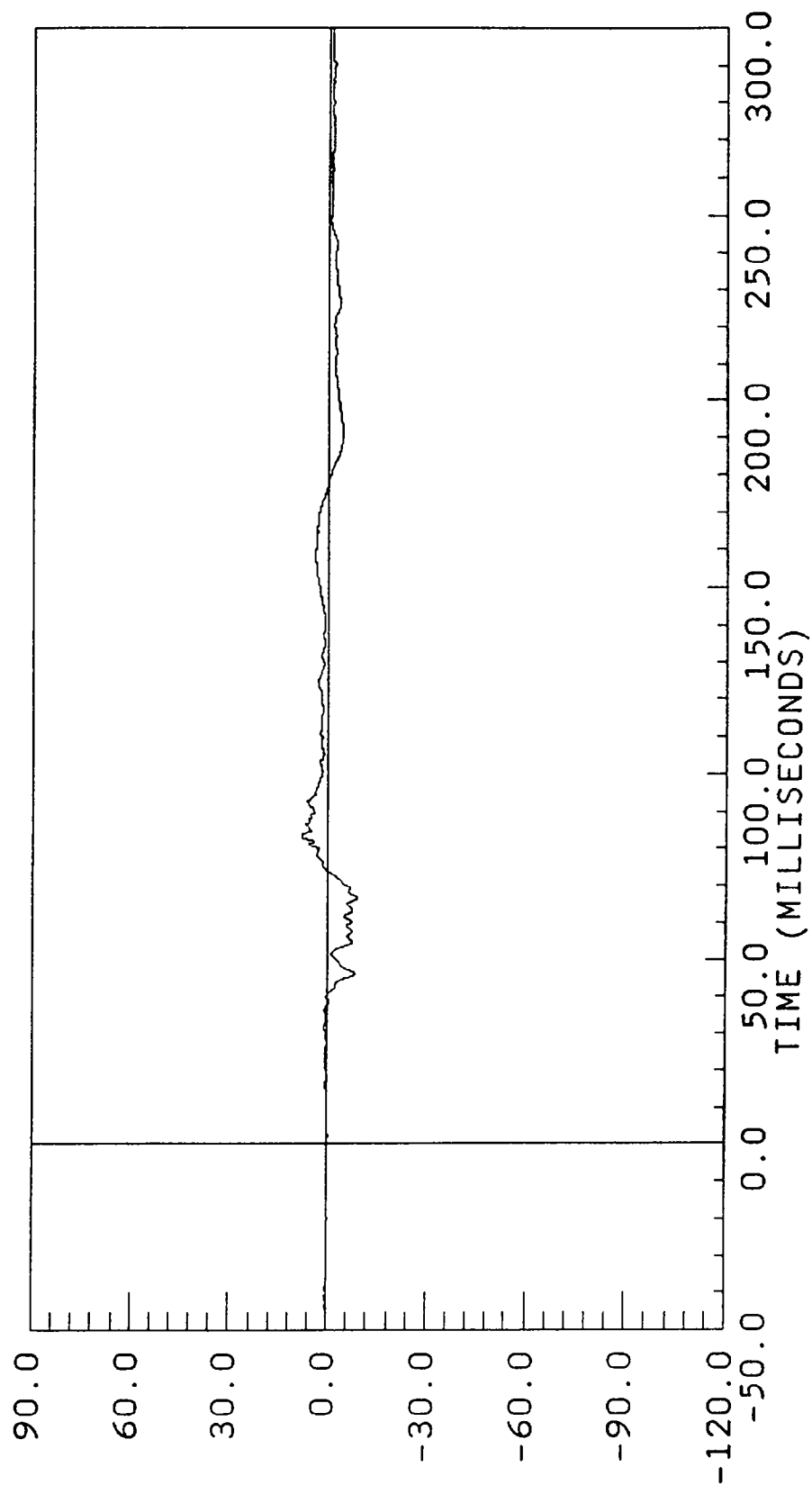
POS#2 CHEST Y
FILTERED
FILTER CUTOFF: 300Hz
YL AXIS
YMIN = -19.59878 at 81.22501
YMAX = 14.67001 at 66.00000



ACCELERATION * G * S *
B-54 7715-4

0.00 mph

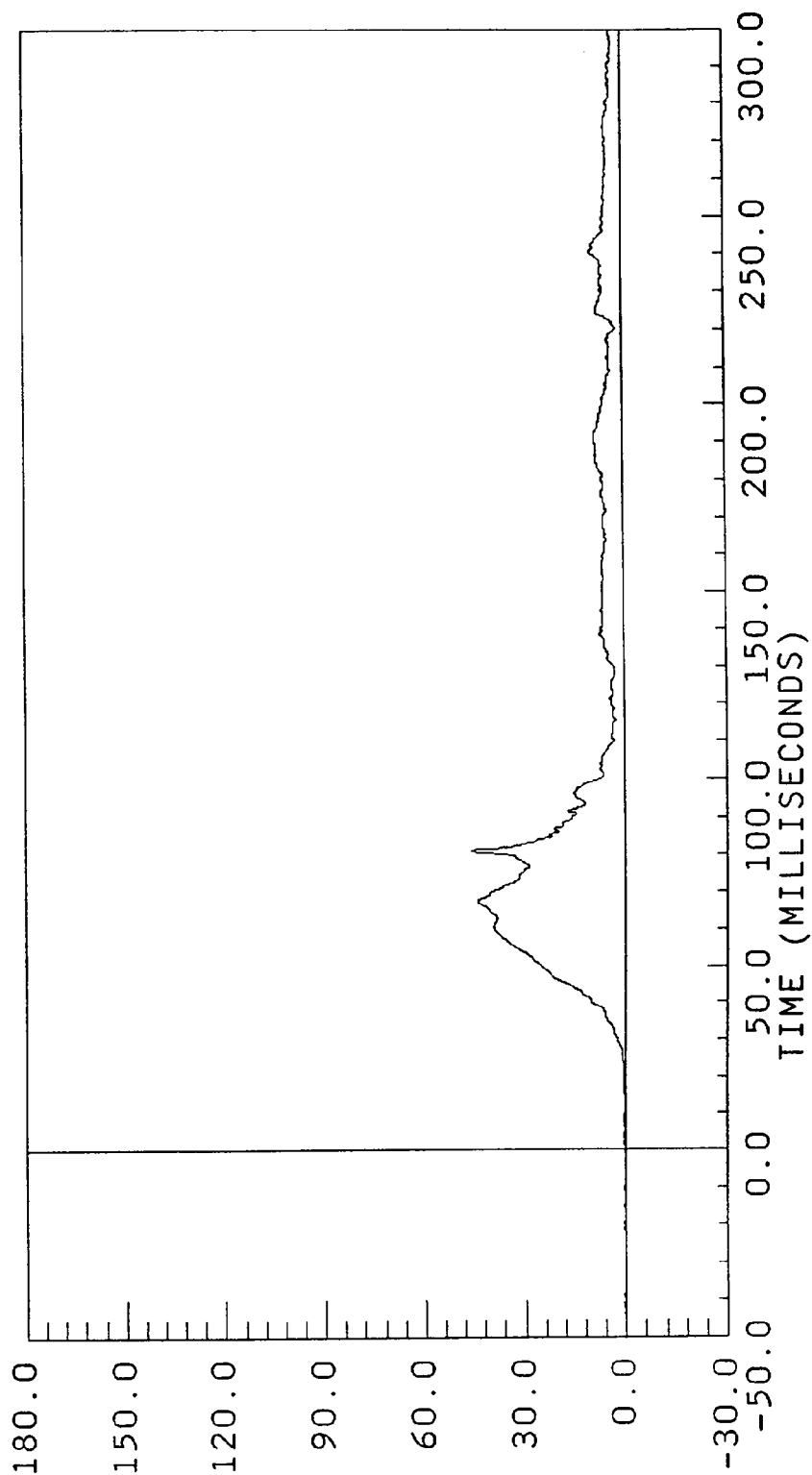
POS#2 CHEST Z
 FILTERED
 FILTER CUTOFF: 300HZ
 ZL AXIS
 YMIN = -8.871671 at 66.60001
 YMAX = 8.212399 at 83.77500



CHST886-2.DAT

0.00 mph

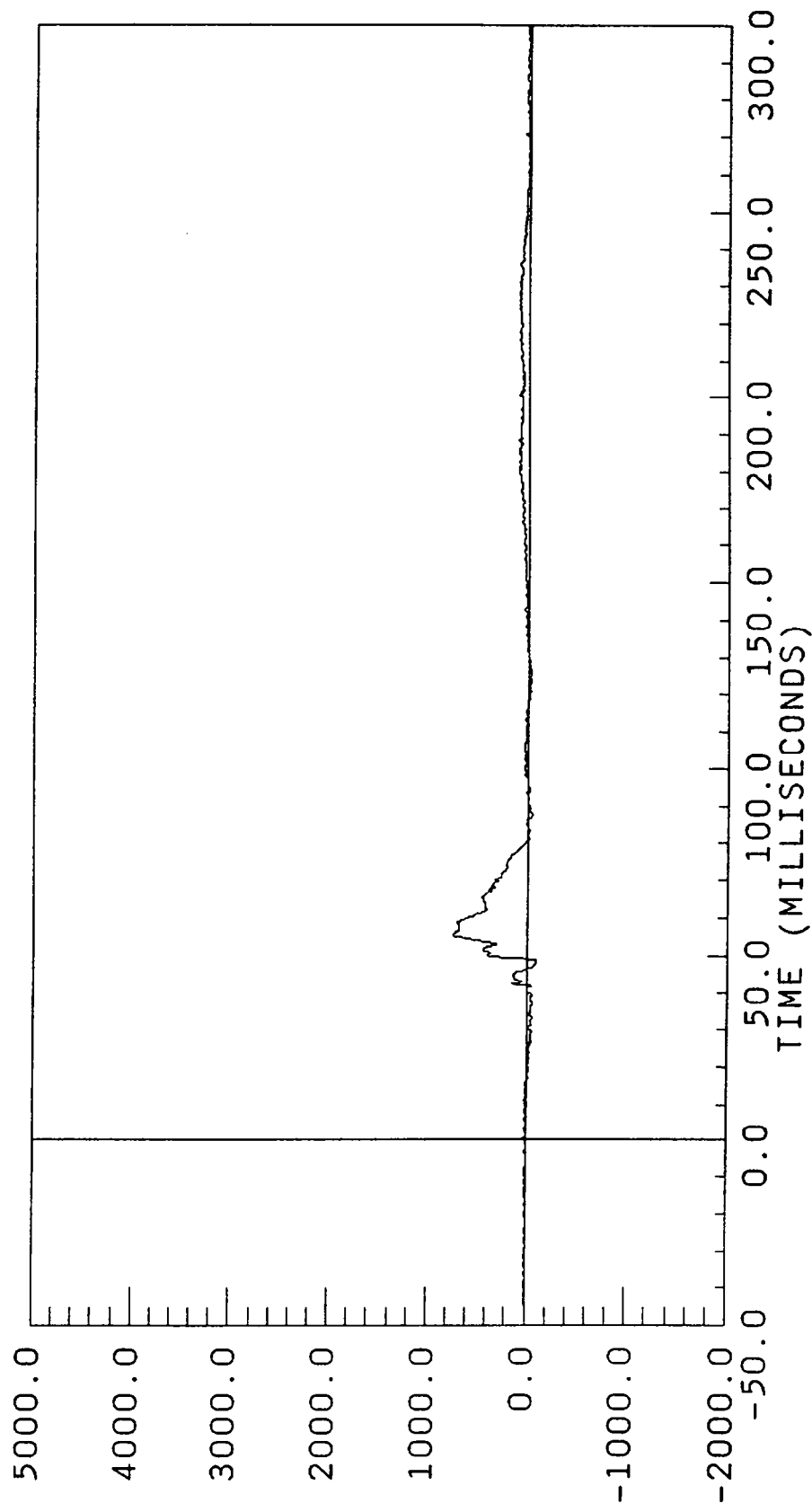
POS#2 CHEST
COMPUTED
FILTER CUTOFF: 300Hz
RS AXIS
YMIN = 0.0373817 at -44.47500
YMAX = 46.05115 at 81.07500



ACCELERATION * G * S *
B-56 7715-4

0.00 mph

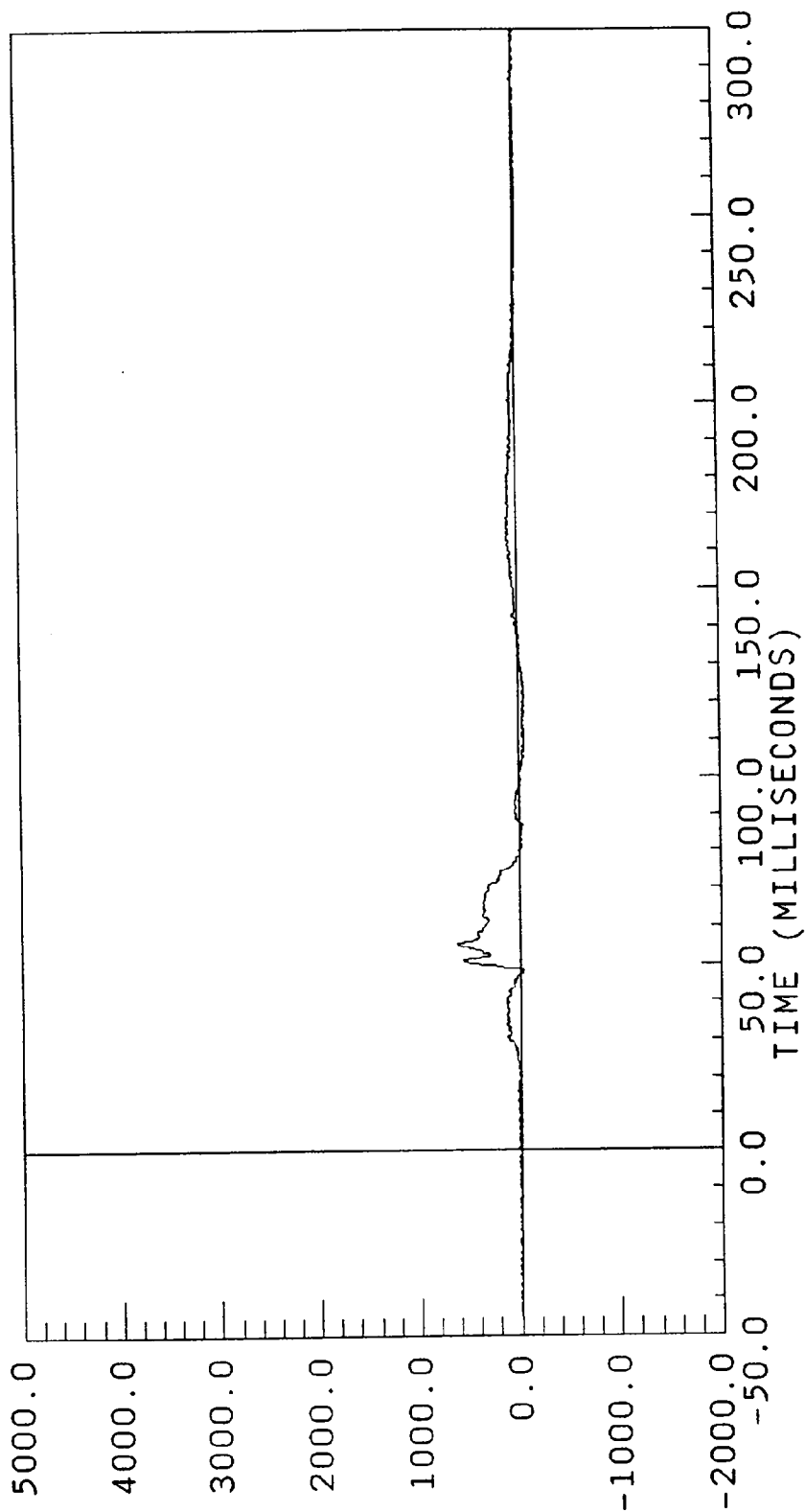
POS#2 LEFT FEMUR
 FILTERED
 FILTER CUTOFF: 1000HZ
 NA AXIS
 YMIN = -90.42162 at 48.07500
 YMAX = 749.0377 at 55.50000



BW886-10.DAT

0.00 mph

POS#2 RIGHT FEMUR
FILTERED
FILTER CUTOFF: 1000HZ
NA AXIS
YMIN = -60.13236 at 121.0500
YMAX = 616.1094 at 55.20000



B-58
F O R C E * L B S *

7715-4

Appendix C
VEHICLE OWNERS MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

BEFORE DRIVING YOUR VEHICLE

OCCUPANT RESTRAINT SYSTEMS

WARNING – Be sure to **LOCK ALL DOORS** before driving away. Locking the doors, along with using the safety belts provided, will minimize the risk of injury or ejection in an accident.

Ford Motor Company recommends that you always **BUCKLE UP**. In some areas restraint system use is required by law.

WARNING – All vehicle occupants, including pregnant women, should wear their safety belts for maximum protection in the event of a collision. All vehicle occupants, including pregnant women, should be sure the lap belt, or lap belt portion of the lap-shoulder belt, is fitted snugly and as low as possible around the hips, not the waist. Shoulder belts should also be properly adjusted for minimum slack. Failure to properly utilize the safety belts may increase the chance and/or severity of injury in the event of a collision.

According to accident statistics, properly restrained children are safer in the rear seat than in the front seat.

For young children, infant and child restraints should be obtained and used in accordance with the instructions provided by the manufacturer of the infant and child restraint. See Infant and Child Restraints. Child restraint use is required by law in most states and provinces.

SUPPLEMENTAL DRIVER AIR BAG RESTRAINT SYSTEM (DRIVER SIDE)

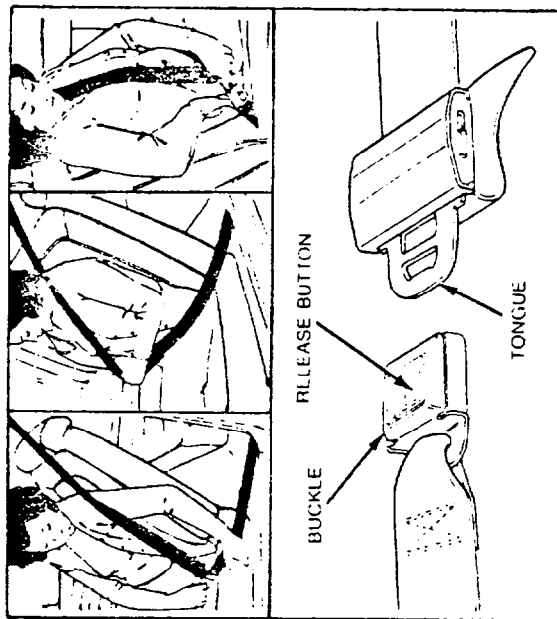
For owner of vehicles equipped with the **SUPPLEMENTAL DRIVER AIR BAG RESTRAINT SYSTEM**, be sure to read the Owner Guide Air Bag Supplement for information on the system.

BEFORE DRIVING YOUR VEHICLE

MANUAL FRONT LAP-SHOULDER BELTS (Available Only on Canadian Vehicles and Vehicles Equipped with Supplemental Driver Air Bag Restraint System)

The belt system allows freedom of movement, locking tight only on hard braking or impacts of approximately 5 mph (8 km/h) or more. The system cannot be made to lock by jerking on the belt.

After entering your vehicle, close the door and adjust the front seat to obtain the best position for your driving comfort, access to controls, and visibility. Then pull the lap-shoulder belt from the retractor so the shoulder portion of the belt crosses your shoulder and chest and insert the belt tongue into the proper buckle until you hear a snap and feel it latch.



Pull up on the shoulder portion of the belt to tighten the lap portion to a snug fit. Be sure the belt is as low on your hips as possible. If the shoulder belt is

BEFORE DRIVING YOUR VEHICLE

uncomfortably tight, a comfort regulator is provided in the shoulder belt retractor to reduce belt pressure against your chest. The shoulder belt can be adjusted much like a window shade to maintain a small amount of slack in the belt. The adjacent door must be closed to use this comfort regulator feature.

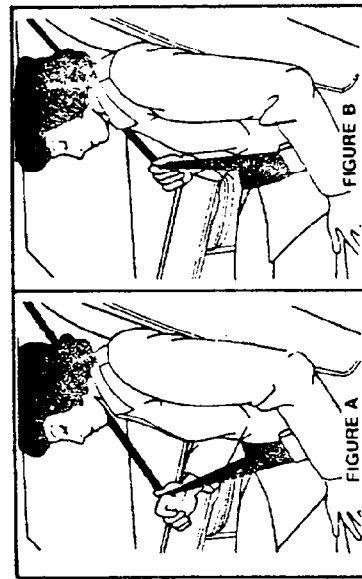
Adjustment Procedure

To set the comfort regulator, the shoulder belt initially should be positioned snugly against the chest. If the belt is not positioned snugly, the comfort regulator may already be engaged. Disengagement is accomplished by the following procedure:

Figure A — Pull the shoulder belt outward 4 or 5 inches (10 to 13 cm), then release it and allow belt to fully retract. Repeat procedure if belt is not snug to the chest.

Figure B — Now the belt tension may be adjusted by pulling down **slightly** on the shoulder belt and releasing. The **least amount of slack** needed to relieve tension, but not more than 1 inch (2.5 cm), should be pulled out when using the comfort regulator system.

- If the desired setting is not achieved or excess slack develops as you change seat position, repeat the above procedure.

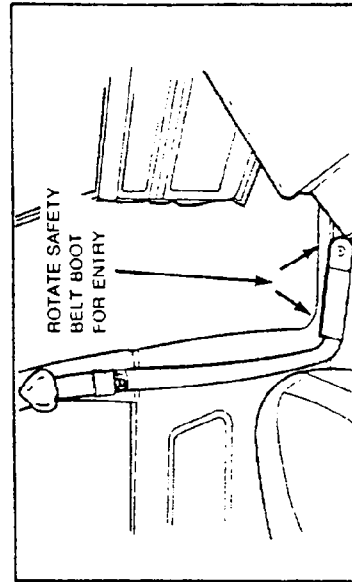


BEFORE DRIVING YOUR VEHICLE

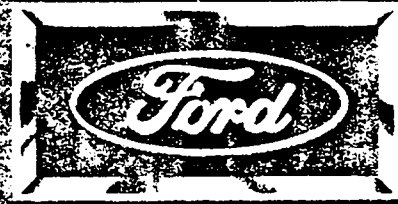
- When the door is opened, the comfort regulator will release automatically, permitting the lap-shoulder belt to retract. After unbuckling the belt it is recommended that you guide the tongue during retraction to prevent it from striking you or the vehicle.

WARNING — Never allow more than 1 inch (2.5 cm) of slack to be introduced into your safety belt system because the belt locks upon impact where it is positioned. Wearing the belt too loosely will negate any real safety protection. Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Be sure the lap portion of the belt is fitted snugly and as low as possible around the hips, not on the waist. Failure to follow these precautions could increase the chance and/or severity of injury in an accident.

Rear Seat Entry (2-Door Models)



The rotating boot on the lap belt system is designed to facilitate both rear seat entry/exit and access to front seat passengers. To enter rear seat:



Tempo/Topaz

1 · 9 · 8 · 9

**FOR VEHICLES EQUIPPED
WITH THE SUPPLEMENTAL
AIR BAG RESTRAINT SYSTEM**



INTRODUCTION

ABOUT THIS SUPPLEMENT

This booklet supplements your 1989 Tempo or Topaz Owner Guide and is part of the owner's package. Some of the information in this booklet replaces certain instructions in the Owner Guide. Please read this booklet carefully and completely. It describes the operation of the Supplemental Driver Air Bag Restraint System. After reading this supplement, review the 1989 Owner Guide for information which applies to your particular vehicle and vehicle equipment.

CAUTIONS AND WARNING

Throughout this guide, you will find CAUTIONS and WARNINGS. WARNINGS remind you to be especially careful to avoid personal injury. CAUTIONS are given to prevent you from making an error which could damage the vehicle and possibly cause personal injury.

SUPPLEMENTAL DRIVER AIR BAG RESTRAINT SYSTEM

SUPPLEMENTAL DRIVER AIR BAG RESTRAINT SYSTEM

The Supplemental Driver Air Bag Restraint System is designed to provide protection for the driver in a frontal accident in addition to that provided to the driver by the three point safety belt system. However, the Supplemental Driver Air Bag Restraint System is not designed to deploy in any accident except a moderate to severe frontal collision, and is not designed to assist the driver in a side impact, rear impact or roll-over accident. Safety belts, which are designed to assist the driver in all kinds of collisions, must be used to obtain the best occupant protection of which the vehicle is capable. FORD RECOMMENDS THE USE OF SAFETY BELTS BY ALL VEHICLE OCCUPANTS TO REDUCE THE RISK OF INJURY IN AN ACCIDENT. Use of a safety belt by the driver is particularly important to keep the driver in the proper position for maximum air bag protection.

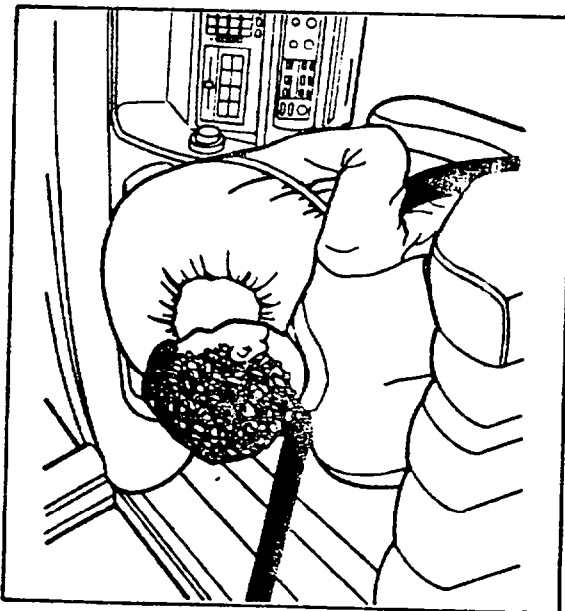
System Features

The Supplemental Driver Air Bag Restraint System can give the driver added facial and chest protection (when the driver has fastened his or her safety belt), in certain accident situations, without detracting from the vehicle's interior appearance, or requiring additional action on the part of the driver. The Supplemental Driver Air Bag Restraint System is designed to stay out of sight until activated by a moderate to severe frontal collision.

SUPPLEMENTAL DRIVER AIR BAG RESTRAINT SYSTEM

System Function

The Supplemental Driver Air Bag Restraint System is activated in a moderate to severe frontal collision. In such a collision, the driver is thrown forward against the safety belt and the air bag, which has automatically inflated. The driver's forward motion is thereby slowed by both restraints.

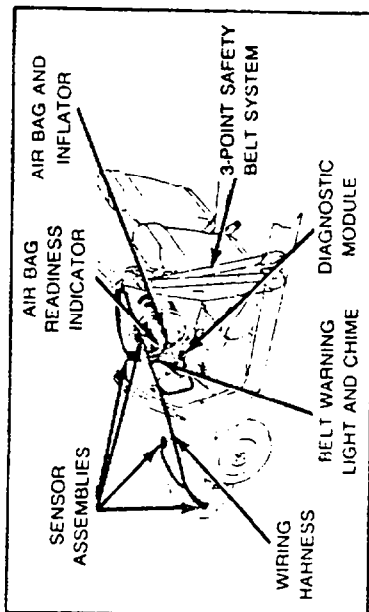


System Description

The Supplemental Driver Air Bag Restraint System consists of two basic sub-systems: the driver air bag system, with the inflator and air bag; and the electrical system, including impact sensors and diagnostic module. The driver air bag is mounted in the center of the steering wheel. The air bag is designed to inflate in about four one-hundredths of a second after receiving a signal from the crash sensors. Upon inflation, the rubber coated nylon bag helps cushion the impact forces to the driver's face and chest, supplementing the restraint provided by the safety belts. The bag then rapidly deflates.

4

SUPPLEMENTAL DRIVER AIR BAG RESTRAINT SYSTEM



Five crash sensors are mounted in the vehicle, a dual sensor at the radiator, one at the right and left front fenders, and one under the instrument panel. In a frontal impact of sufficient severity, the sensors close the triggering circuit, initiating inflation of the air bag. For example, it is designed to deploy in an accident equivalent to or greater than hitting a parked vehicle of similar size at approximately 25 mph. The diagnostic module monitors the air bag electrical system readiness by checking the driver air bag, air bag crash and safety sensors, the power circuit, its own internal circuits and the air bag readiness light. The air bag readiness light will indicate normal system operation by lighting for 6-8 seconds, then turning off, when the ignition key is first turned to the ON position. A system malfunction is indicated by the flashing or continuous illumination of the readiness light, failure of the light to turn on, or a periodic tone (see Warning Tone). If the air bag indicator fails to light, flashes or stays on continuously after the initial system prove out, or if a periodic tone is heard (see Warning Tone), the Supplemental Driver Air Bag Restraint System is in need of service. See your Ford or Lincoln-Mercury dealer as soon as possible. Unless serviced, the Supplemental Driver Air Bag Restraint System may not function properly in the event of an accident.

The air bag is designed to function on a one time only basis. In the event that the air bag is deployed, THE AIR BAG MODULE WILL NOT FUNCTION AGAIN AND MUST BE REPLACED.

5

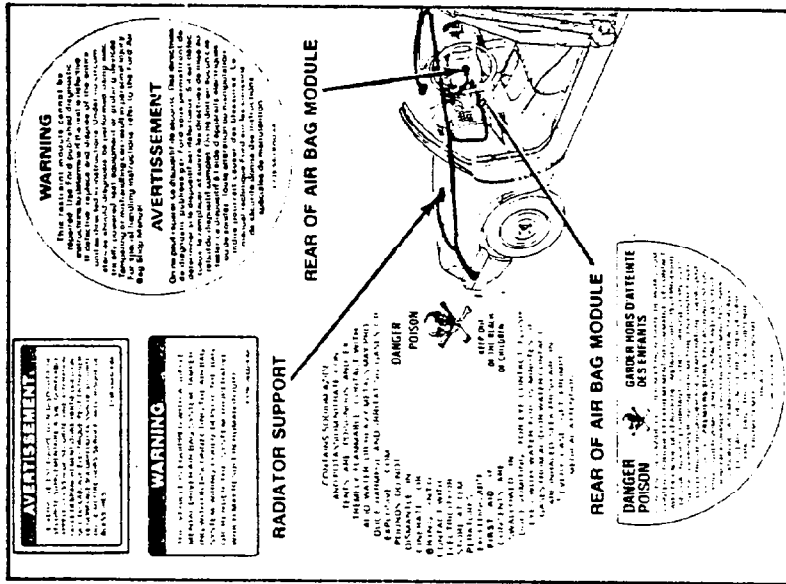
**SUPPLEMENTAL DRIVER
AIR BAG RESTRAINT SYSTEM**

WARNING—Do not attempt any servicing of the Supplemental Driver Air Bag Restraint System; tampering could cause activation of the system and the risk of personal injury. For servicing of the Supplemental Driver Air Bag Restraint System, see your Ford or Lincoln-Mercury dealer.

No modifications of any kind should be made to any components or wiring of the Supplemental Driver Air Bag Restraint System. This includes the installation of additional trim material, badges, etc. over the steering wheel hub and installation of additional electrical/electronic equipment on or near air bag components.

**SUPPLEMENTAL DRIVER
AIR BAG RESTRAINT SYSTEM**

Service Information Labels



WARNING—Refer to the 1989 Shop Manual available at an authorized Ford or Lincoln-Mercury dealer, for proper disposal/scraping procedures. Failure to follow the procedure set forth in the 1989 Shop Manual could result in personal injury.

SUPPLEMENTAL DRIVER AIR BAG RESTRAINT SYSTEM

Driver Information Features

AIR BAG READINESS LIGHT

NOTICE
The Supplemental Driver Air Bag is a safety device that is designed to protect the driver in the event of a collision. It is important to understand the proper use and limitations of this system. For more information, please refer to the Owner's Manual.

AVIS
Le coussin de sécurité à air supplémentaire est un dispositif de sécurité conçu pour protéger le conducteur en cas de collision. Il est important de comprendre l'utilisation et les limites de ce système. Pour plus d'informations, veuillez consulter le manuel du propriétaire.

AIR BAG IDENTIFICATION LABEL

DRIVER AIR BAG INFORMATION

This vehicle is equipped with a supplemental driver air bag system. The system is designed to protect the driver in the event of a collision. It is important to understand the proper use and limitations of this system. For more information, please refer to the Owner's Manual.

COUSSIN DE SÉCURITÉ DU CONDUCTEUR

Ce véhicule est équipé d'un coussin de sécurité à air supplémentaire. Le système est conçu pour protéger le conducteur en cas de collision. Il est important de comprendre l'utilisation et les limites de ce système. Pour plus d'informations, veuillez consulter le manuel du propriétaire.

AIR BAG INFORMATION LABEL

SUPPLEMENTAL DRIVER AIR BAG RESTRAINT SYSTEM

Air Bag Readiness Light

The air bag readiness light will indicate normal system operation by lighting for 6-8 seconds, then turning off, when the ignition key is first turned to the ON position. A system malfunction is indicated by the flashing or continuous illumination of the readiness light or failure of the light to turn on. If the air bag indicator fails to light, or stays on continuously or flashes, the Supplemental Driver Air Bag Restraint System is in need of service and should be taken to your nearest Ford or Lincoln-Mercury dealer as soon as possible. Unless serviced, the Supplemental Driver Air Bag Restraint System may not function properly in the event of an accident.

Warning Tone

The air bag readiness light is the prime means of determining the air bag system condition. However, a series of five sets of five tones will be heard if the readiness lamp is out and a fault occurs in the system. This also means that the Supplemental Driver Air Bag Restraint System is in need of service. See your Ford or Lincoln-Mercury dealer as soon as possible. The tone pattern will repeat periodically until the fault and lamp outage are serviced. Unless serviced, the Supplemental Driver Air Bag Restraint System may not function properly in the event of an accident.