

REPORT NOS. 208-TRC-93-002
212-TRC-93-002
301-TRC-93-002

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

NISSAN MOTOR CORPORATION
1993 NISSAN SENTRA
2-DOOR COUPE
NHTSA NO. CP5201
TRC TEST NO. 921013

TRANSPORTATION RESEARCH CENTER INC.
10820 STATE ROUTE 347
EAST LIBERTY, OHIO 43319



OCTOBER 29, 1992

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF VEHICLE SAFETY COMPLIANCE (NEF-31)
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*Rec'd
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16. Abstract A 30 mph flat frontal barrier impact test was conducted on a 1993 Nissan Sentra 2-door coupe, NHTSA No. CP5201, at the Transportation Research Center Inc. on October 13, 1992. This test was conducted to determine compliance with Federal Motor Vehicle Safety Standards: FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; FMVSS 301, "Fuel System Integrity." The barrier impact velocity was 29.3 mph. The vehicle's maximum static crush was 16.5 inches. The ambient temperature was 72° F. The driver's head injury criteria (HIC) was 413. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.9 g. The driver's left and right femur maximum axial forces were 1641 pounds and 1753 pounds, respectively. The passenger's head injury criteria (HIC) was 462. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.3 g. The passenger's left and right femur maximum axial forces were 644 pounds and 1133 pounds, respectively. The vehicle appears to comply with the applicable requirements of FMVSS 208, 212, 219 (partial), and 301.					
17. Key Words Frontal Impact 30 mph Vehicle Safety Compliance Testing: FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Mounting" FMVSS 219P, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"			18. Distribution Statement Available from: NHTSA Technical Reference Division Room 5108, (NAD-52) 400 Seventh Street, SW Washington, DC 20590 Attn: Mr. Robert Hornick		
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

TEMPERATURE (exact)

°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F
-40	-40		-40	-40
-20	-20		-4	-40
0	0		32	-40
20	20		68	-40
32	32		90	-40
40	40		104	-40
60	60		140	-40
80	80		176	-40
98.6	98.6		200	-40
100	100		212	-40
120	120		248	-40
180	180		356	-40
200	200		392	-40
212	212		404	-40

TABLE OF CONTENTS

<u>SECTION</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1.0	PURPOSE & TEST PROCEDURE	1-1
2.0	FRONTAL BARRIER IMPACT TEST SUMMARY	2-1
3.0	FMVSS 208, 212, 219 (PARTIAL), & 301 DATA	3-1
4.0	VEHICLE, OCCUPANT, & CAMERA MEASUREMENTS	4-1
APPENDIX A	PHOTOGRAPHS	A-1
APPENDIX B	DATA PLOTS	B-1

LIST OF TABLES

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1	CRASH TEST SUMMARY	2-4
2	TEST VEHICLE INFORMATION	2-5
3	POST-IMPACT DATA	2-8
4	VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY	2-12
5	DUMMY INJURY CRITERIA	3-2
6	POST-IMPACT DUMMY/VEHICLE DATA	3-3
7	FMVSS 208 COMFORT AND CONVENIENCE DATA FOR AUTOMATIC SEAT BELTS	3-5
8	FMVSS 208 SEAT BELT WARNING SYSTEM DATA	3-6
9	FMVSS 208 LABELING AND DRIVER'S MANUAL DATA	3-7
10	FMVSS 208 READINESS INDICATOR DATA	3-8
11	FUEL SYSTEM DATA	3-11
12	FMVSS 301 POST-IMPACT TEST DATA	3-12
13	IMPACTED VEHICLE MEASUREMENTS	4-3
14	DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS	4-6
15	MOTION PICTURE CAMERA LOCATIONS	4-10

LIST OF FIGURES

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1	IMPACT VELOCITY MEASUREMENT SYSTEM	2-9
2	ACCIDENT INVESTIGATION DIVISION DATA FOR 30 MPH FRONTAL BARRIER IMPACT	2-10
3	VEHICLE ACCELEROMETER PLACEMENT	2-11
4	FMVSS 212 TEST DATA	3-9
5	FMVSS 219 TEST DATA	3-10
6	FMVSS 301 STATIC ROLLOVER TEST DATA	3-13
7	PRE-TEST AND POST-TEST MEASUREMENT POINTS	4-2
8	VEHICLE TARGET LOCATIONS	4-4
9	DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS	4-5
10	SEAT BELT POSITIONING DATA	4-7
11	CAMERA POSITIONS	4-8

LIST OF PHOTOGRAPHS

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
A-1.	PRE-TEST FRONT VIEW	A-2
A-2.	POST-TEST FRONT VIEW	A-3
A-3.	PRE-TEST LEFT SIDE VIEW	A-4
A-4.	POST-TEST LEFT SIDE VIEW	A-5
A-5.	PRE-TEST REAR VIEW	A-6
A-6.	POST-TEST REAR VIEW	A-7
A-7.	PRE-TEST RIGHT SIDE VIEW	A-8
A-8.	POST-TEST RIGHT SIDE VIEW	A-9
A-9.	PRE-TEST RIGHT FRONT THREE-QUARTER VIEW	A-10
A-10.	POST-TEST RIGHT FRONT THREE-QUARTER VIEW	A-11
A-11.	PRE-TEST LEFT REAR THREE-QUARTER VIEW	A-12
A-12.	POST-TEST LEFT REAR THREE-QUARTER VIEW	A-13
A-13.	PRE-TEST WINDSHIELD VIEW	A-14
A-14.	POST-TEST WINDSHIELD VIEW	A-15
A-15.	PRE-TEST ENGINE COMPARTMENT VIEW	A-16
A-16.	POST-TEST ENGINE COMPARTMENT VIEW	A-17
A-17.	PRE-TEST FUEL FILLER CAP VIEW	A-18
A-18.	POST-TEST FUEL FILLER CAP VIEW	A-19
A-19.	PRE-TEST FUEL FILLER NECK VIEW	A-20
A-20.	PRE-TEST FUEL TANK VIEW	A-21
A-21.	POST-TEST FUEL TANK VIEW	A-22
A-22.	PRE-TEST FRONT UNDERBODY VIEW	A-23
A-23.	POST-TEST FRONT UNDERBODY VIEW	A-24
A-24.	PRE-TEST REAR UNDERBODY VIEW	A-25
A-25.	POST-TEST REAR UNDERBODY VIEW	A-26
A-26.	PRE-TEST DRIVER DUMMY POSITION VIEW	A-27
A-27.	POST-TEST DRIVER DUMMY POSITION VIEW	A-28
A-28.	PRE-TEST PASSENGER DUMMY POSITION VIEW	A-29
A-29.	POST-TEST PASSENGER DUMMY POSITION VIEW	A-30
A-30.	PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR VIEW	A-31
A-31.	POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1	A-32
A-32.	POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2	A-33

LIST OF PHOTOGRAPHS, CONT'D.

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
A-33.	POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 3	A-34
A-34.	PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW	A-35
A-35.	POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1	A-36
A-36.	POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2	A-37
A-37.	POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 3	A-38
A-38.	POST-TEST DRIVER DUMMY HEAD CONTACT VIEW	A-39
A-39.	POST-TEST DRIVER DUMMY KNEE CONTACT VIEW	A-40
A-40.	POST-TEST DRIVER DUMMY HEAD AND KNEE CONTACT VIEW	A-41
A-41.	POST-TEST PASSENGER DUMMY HEAD CONTACT VIEW	A-42
A-42.	POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1	A-43
A-43.	POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2	A-44
A-44.	PRE-TEST VEHICLE CERTIFICATION LABEL VIEW	A-45
A-45.	PRE-TEST VEHICLE RECOMMENDED TIRE PRESSURE LABEL VIEW	A-46
A-46.	POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW	A-47

SECTION 1.0

PURPOSE & TEST PROCEDURE

PURPOSE

This 30 mph flat 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 the Transportation Research Center Inc. (TRC) under Contract No. DTNH22-90-C-21003. The purpose of this test was to determine if the subject vehicle, a 1993 Nissan Sentra 2-door coupe, NHTSA No. CP5201, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," in the flat frontal barrier impact mode.

TEST PROCEDURE

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208-08. Data was obtained relative to FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," performance.

The test vehicle was instrumented with seven (7) accelerometers to measure longitudinal axis accelerations. The vehicle's specified impact velocity range was 28.9 to 29.9 mph. The vehicle impacted a flat frontal barrier.

The test vehicle contained two (2) Part 572 B 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedure specified in Appendices B and C of the Laboratory Test Procedure.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations, and with left and right femur load cells to measure axial forces.

The twenty-three (23) data channels were multiplexed and recorded on a 14-track tape drive. The data was digitally sampled at 8000 samples per second and processed per sections 12.8 and 12.9 of the Laboratory Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and fourteen (14) high-speed motion picture cameras. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 208, 212, 219 (partial) and 301 data are presented in Section 3.0. The vehicle, occupant, and camera measurements are presented in Section 4.0. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots.

SECTION 2.0

FRONTAL BARRIER IMPACT TEST SUMMARY

TEST RESULTS SUMMARY

This flat frontal barrier test was conducted at TRC on October 13, 1992.

The test vehicle, a 1993 Nissan Sentra 2-door coupe, NHTSA No. CP5201, appeared to comply with the performance requirements of FMVSS 208, 212, 219 (partial), and 301 in the flat frontal barrier impact mode. The Head Injury Criteria (HIC) calculations were less than 1000, the chest resultant accelerations did not exceed 60 g's, and the axial forces transmitted through the upper legs did not exceed 2,250 pounds as measured by Part 572 B dummies seated in the front outboard designated seating positions. The vehicle's restraint system met the applicable comfort and convenience requirements. The windshield periphery retention was 100 percent. There was no penetration into any portion of the windshield. No fluid spilled from the vehicle's fuel system following the impact or during the static rollover test.

The test vehicle was equipped with a 1.6 liter, transverse engine, manual transmission, power steering, and power brakes. The vehicle's test weight was 2743 pounds. The vehicle's impact speed was 29.3 mph. The vehicle's maximum static crush was 16.5 inches.

The driver's head injury criteria (HIC) was 413. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.9 g. The driver's left and right femur maximum axial forces were 1641 pounds and 1753 pounds, respectively.

The right front passenger's HIC was 462. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.3 g. The right front passenger's left and right femur maximum axial forces were 644 pounds and 1133 pounds, respectively.

There was no loss of windshield periphery retention.

There was no penetration through the windshield.

Following the impact, no fluid spilled from the vehicle's fuel system prior to the static rollover test or during any portion of the static rollover test.

DATA ACQUISITION EXPLANATIONS

The engine bottom X-axis accelerometer, ENGXB2, lost data at 55 milliseconds due to the vehicle's crush damaging the accelerometer on impact.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: CP5201 TEST TYPE: Frontal Barrier Impact

TEST DATE: 10/13/92 TEST TIME: 1600 AMBIENT TEMP. (°F): 72

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Nissan/Sentra/2-door coupe

VEHICLE TEST WEIGHT (LBS): 2743

IMPACT ANGLE (DEG)*: 0

IMPACT VELOCITY (MPH)**: PRIMARY = 29.3 SECONDARY = 29.3

MAXIMUM STATIC CRUSH (IN): 16.5

AVERAGE REBOUND (IN): 42.7

DUMMIES: Driver #353 Passenger #354

TYPE: Part 572 B Part 572 B

LOCATION: Left front Right front

RESTRAINT: Passive 3-point belt Passive 3-point belt

NUMBER OF DATA CHANNELS: 23

NUMBER OF CAMERAS: HIGH-SPEED 14 REAL-TIME 2

*With respect to tow track centerline.
**Speed trap measurement ($\pm$.05 mph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Nissan Motor Co., Ltd.

MAKE/MODEL: Nissan/Sentra

VIN: 1N4EB32A0PC705001

BODY STYLE: 2-door coupe

MODEL YEAR: 1993

NHTSA NO.: CP5201

COLOR: Blue

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT: 1.6 liter

TRANSMISSION DATA: 5 SPEED, X MANUAL, AUTOMATIC, X FWD, RWD, 4WD

DATE VEHICLE RECEIVED: 09/14/92

ODOMETER READING: 52

DEALER'S NAME AND ADDRESS: Buckeye Nissan, Inc.
3820 Parkway Lane
Hilliard, OH 43026

ACCESSORIES:

POWER STEERING Yes
POWER BRAKES Yes
POWER SEATS No
POWER WINDOWS No
TINTED GLASS Yes
RADIO Yes
CLOCK Yes
OTHER None

AUTOMATIC TRANSMISSION No
AUTOMATIC SPEED CONTROL Yes
TILTING STEERING WHEEL Yes
TELESCOPING STEERING WHEEL No
AIR CONDITIONING Yes
ANTI-SKID BRAKE No
REAR WINDOW DEFROSTER Yes

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Nissan Motor Co., Ltd.

DATE OF MANUFACTURE: 08/92

VIN: 1N4EB32A0PC705001

GVWR: 3318 LBS

GAWR: FRONT: 1918 LBS., REAR: 1653 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Michelin, XGT4, 175/70R13

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 35 PSI
REAR: 35 PSI

SPARE TIRE (MFR., LINE, SIZE): Uniroyal, Hideaway, T115/70D14

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually adjustable

MAXIMUM WIDTH: 65.8 INCHES

WHEELBASE: 95.6 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA:

The label was located on the driver's side B-pillar.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P175/70R13

RECOMMENDED COLD TIRE PRESSURE: FRONT: 32 PSI; REAR: 29 PSI

DESIGNATED SEATING CAPACITY: 2 FRONT 3 REAR 5 TOTAL

VEHICLE CAPACITY WEIGHT: 783 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 26.4; RF 26.1; LR 26.2; RR 25.8

FULLY LOADED ATTITUDE: LF 25.8; RF 25.5; LR 25.0; RR 24.6

PRE-TEST ATTITUDE: LF 25.1; RF 24.8; LR 24.3; RR 23.7

POST-TEST ATTITUDE: LF 25.7; RF 24.6; LR 24.2; RR 23.0

TABLE 2 TEST VEHICLE INFORMATION CONT'D

WEIGHT OF TEST VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS):

RIGHT FRONT	737 LBS.	RIGHT REAR	462 LBS.
LEFT FRONT	756 LBS.	LEFT REAR	439 LBS.
TOTAL FRONT WEIGHT	1493 LBS.	(62.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	901 LBS.	(37.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 2394 LBS.			

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (2394 LBS)

VCW = VEHICLE CAPACITY WEIGHT (783 LBS)

DSC = DESIGNATED SEATING CAPACITY (5)

$RCLW* = VCW - 150 (DSC) = 783 - 150 (5) = 33 \text{ LBS.}$

TARGET TEST WEIGHT = $UDW + RCLW* + (\text{NO. OF HYBRID II DUMMIES} \times 164 \text{ LBS/DUMMY})$

TARGET TEST WEIGHT = $2394 + 33 + 328$

TARGET TEST WEIGHT = 2755 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 21 LBS. OF CARGO WEIGHT:

RIGHT FRONT	803 LBS.	RIGHT REAR	564 LBS.
LEFT FRONT	838 LBS.	LEFT REAR	538 LBS.
TOTAL FRONT WEIGHT	1641 LBS.	(59.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1102 LBS.	(40.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	2743 LBS.	(0.4% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 0 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: Rear bumper, muffler, rear seat belts, rear shelf trim

CG = 38.4 INCHES REARWARD OF FRONT WHEEL CENTERLINE

*Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's calculated cargo and luggage weight or 300 pounds, whichever is less.

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 921013 NHTSA NO.: CP5201
TEST DATE: 10/13/92 TEST TIME: 1600
TEST TYPE: Frontal Barrier Impact IMPACT ANGLE: 0
AMBIENT TEMPERATURE AT IMPACT AREA: 72° F
TEMPERATURE IN OCCUPANT COMPARTMENT: 71° F
IMPACT VELOCITY: PRIMARY = 29.3 MPH SECONDARY = 29.3 MPH
(SPECIFIED RANGE = 28.9 TO 29.9 MPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 26.0 IN.

EXITING VELOCITY TRAP = 2.0 IN.

TEST VEHICLE STATIC CRUSH (ALL MEASUREMENTS ARE IN INCHES):

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 167.6; C 170.4; R 167.0

POST-TEST: L 153.8; C 154.6; R 151.9

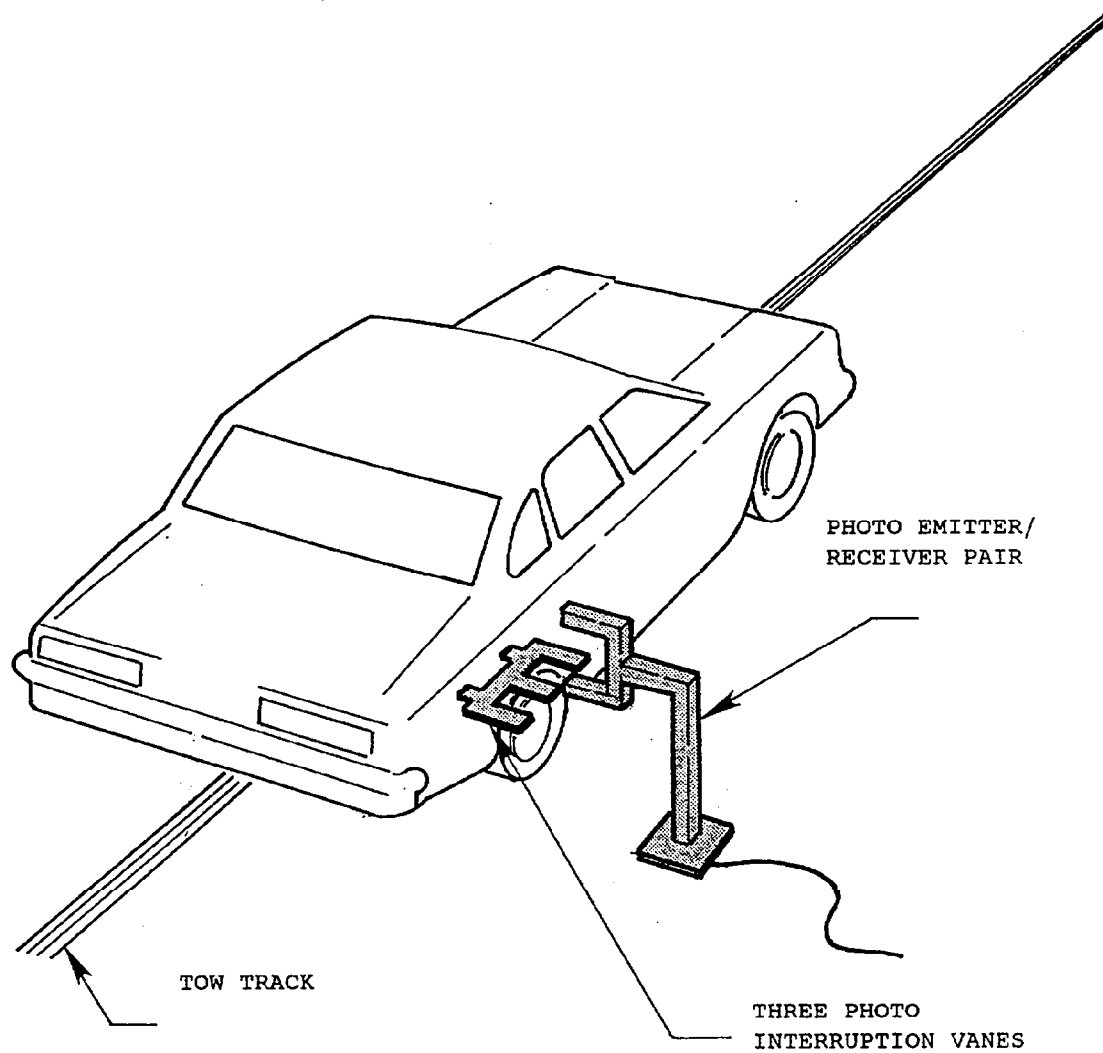
TOTAL CRUSH: L 13.8; C 15.8; R 15.1

AVERAGE CRUSH: 14.9

TEST VEHICLE REBOUND FROM FLAT BARRIER (ALL MEASUREMENTS ARE IN INCHES):

DISTANCE FROM TEST VEHICLE TO BARRIER: L 42.1; C 41.6; R 44.3; AVG. 42.7

FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears the final emitter/receiver pair two inches before impact.

The vanes have one foot spacing.

FIGURE 2 ACCIDENT INVESTIGATION DIVISION DATA
FOR 30 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Nissan/Sentra/2-door coupe

VEHICLE NHTSA NO.: CP5201; VIN: 1N4EB32A0PC705001

MODEL YEAR: 1993; BUILD DATE: 08/92; TEST DATE: 10/13/92

VEHICLE SIZE CATEGORY: Subcompact; TEST WEIGHT: 2743 LBS.

VEHICLE WHEELBASE: 95.6 INCHES

MAXIMUM WIDTH: 65.8 INCHES

FRONT OVERHANG: 35.0 INCHES

COLLISION DEFORMATION
CLASSIFICATION (CDC) CODE: 12FDEW2

CRUSH DEPTH
MEASUREMENTS:

C1 = 13.8 INCHES

C2 = 14.7 INCHES

C3 = 15.7 INCHES

C4 = 15.7 INCHES

C5 = 16.5 INCHES

C6 = 15.1 INCHES

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE
(LONGITUDINAL)

LENGTH OF DAMAGED
REGION: L = 50.0 INCHES

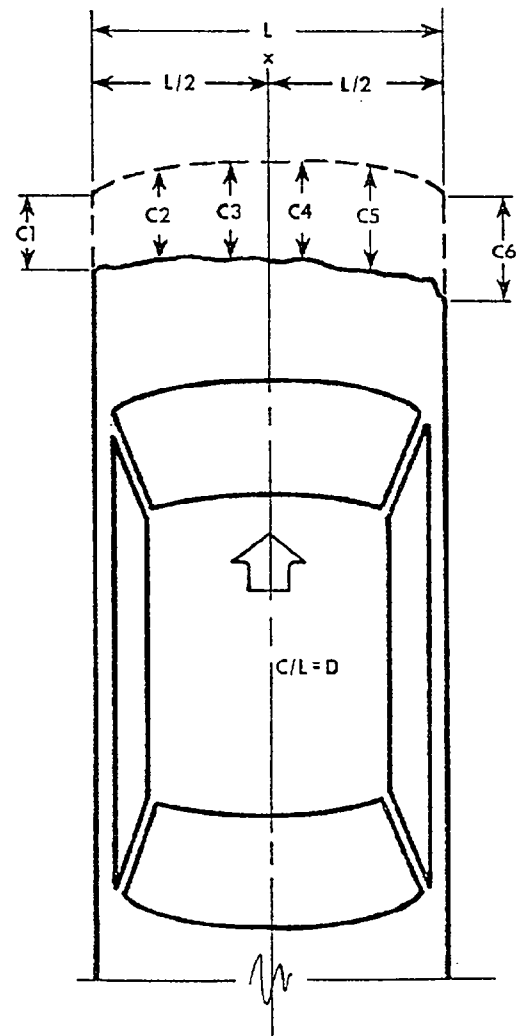
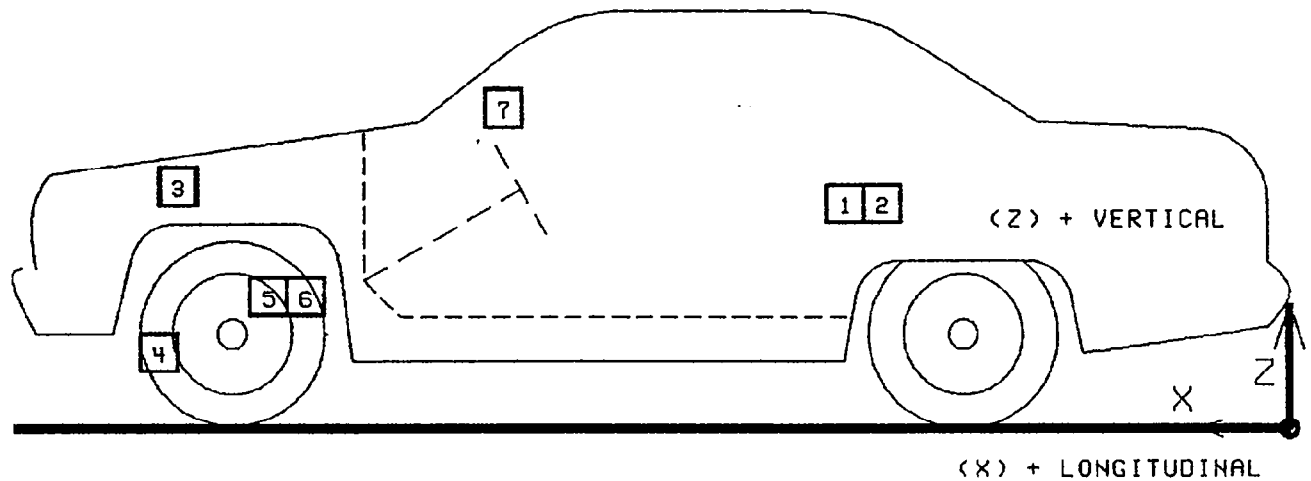
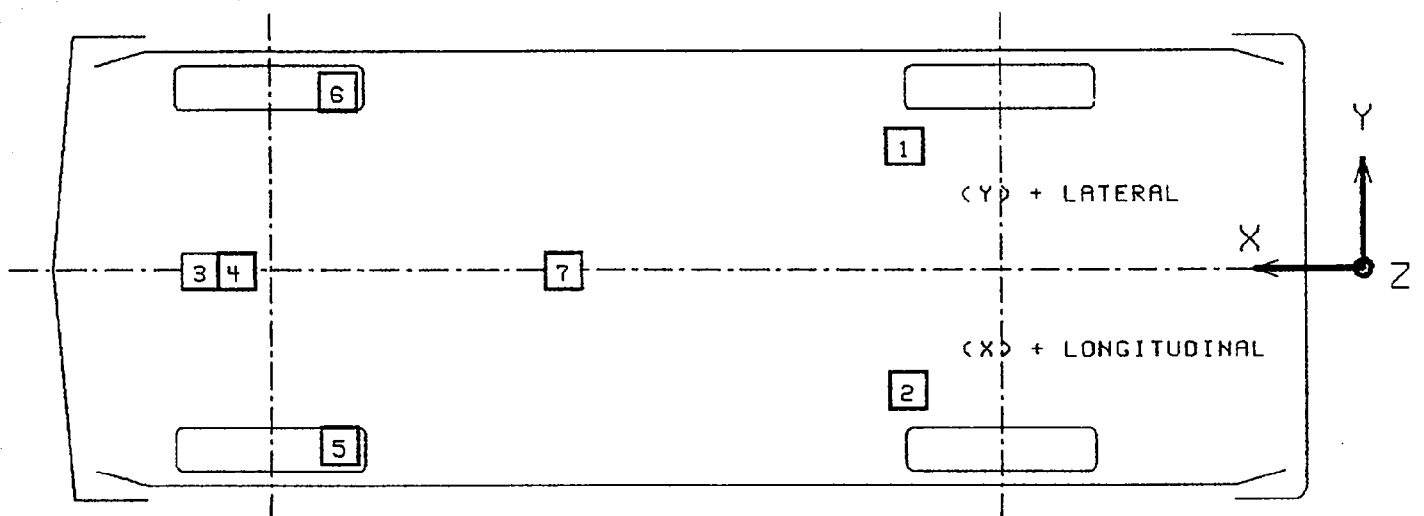


FIGURE 3

VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 921013

No.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
						MAX @ MSEC		MAX @ MSEC	
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	PRE	64.5	24.2	11.9				
		POST	64.5	24.2	12.9				
						1.8	140.1	37.9	55.8
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	PRE	64.6	-24.2	11.6				
		POST	64.6	-24.2	12.4				
						2.3	103.8	37.4	46.3
3	ENGINE TOP LONGITUDINAL	PRE	153.2	-4.0	29.4				
		POST	138.4	-1.4	30.6				
						70.9	45.4	110.4	33.6
4	ENGINE BOTTOM LONGITUDINAL	PRE	140.5	11.5	8.8				
		POST	136.2	8.9	9.7				
						---	---	Y	84.2 32.6 Y
5	RIGHT BRAKE CALIPER LONGITUDINAL	PRE	139.4	-24.8	10.4				
		POST	139.2	-25.1	10.0				
						8.0	89.3	61.8	51.0
6	LEFT BRAKE CALIPER LONGITUDINAL	PRE	139.9	24.8	9.9				
		POST	137.5	25.3	10.4				
						7.8	70.9	48.2	46.1
7	INSTRUMENT PANEL CENTER LONGITUDINAL	PRE	115.1	-2.0	35.2				
		POST	115.0	-5.0	35.8				
						59.6	61.9	53.3	46.5

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM REAR BUMPER
Y: + LEFTWARD FROM VEHICLE CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

Y See DATA ACQUISITION EXPLANATIONS

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

CONTRACT NO.: DTNH22-90-C-21003
FROM: Transportation Research Center Inc.
10820 State Route 347
East Liberty, OH 43319

TO: Mr. Charles Case
COTR
Office of Vehicle Safety Compliance

The following vehicle has been subjected to testing for FMVSS 208. The vehicle was inspected upon arrival at the laboratory for the test and found to contain all of the equipment listed below. All variances have been reported within 2 working days of vehicle arrival, by letter, to the NHTSA Industrial Property Manager/NAD-30, with a carbon copy to the responsible testing office. The vehicle is again inspected, after the above test has been conducted, and all changes are noted below. The final condition of the vehicle is also noted in detail.

NHTSA NO.: CP5201
MAKE/MODEL/BODY STYLE: Nissan/Sentra/2-door coupe
MODEL YEAR: 1993 BODY COLOR: Blue
VIN: 1N4EB32A0PC705001
ODOMETER (ARRIVAL): 52 DATE: 09/14/92
ODOMETER (COMPLETION): 53 DATE: 10/13/92
COST: \$11,160.00

☒ AIR CONDITIONER	☐ CONSOLE	BRAKES: ☒ POWER
☒ TINTED GLASS	☐ TACHOMETER	FRONT: Disc
☒ POWER STEERING	☒ SPEED CONTROL	REAR: Drum
☐ POWER WINDOWS	☒ REAR WINDOW DEF.	
☐ POWER DOOR LOCKS	☐ SUN/MOON ROOF	FRONT SEATS: ☐ POWER
☒ RADIO	☐ T-TOP	SEAT TYPE: Bucket
☒ CLOCK	☒ TILT STEERING WHEEL	NO. OF SEATS: 5
☐ ROOF RACK	☐ OTHER OPTIONS: _____	

ENGINE: 4 CYLINDERS; 1.6 LITERS
TRANSMISSION: 5-speed manual; DRIVE TYPE: Front wheel drive
TIRE SIZE: 175/70R13
GASOLINE TYPE: Unleaded

EQUIPMENT THAT IS NO LONGER ON THE VEHICLE AS NOTED ABOVE: None

EXPLANATION: NA

VEHICLE CONDITION: Vehicle has been subjected to a 30 mph frontal
barrier crash test.

SECTION 3.0

FMVSS 208, 212, 219 (partial), & 301 DATA

TABLE 5 DUMMY INJURY CRITERIA

MAXIMUM ACCELERATION (G)

	HEAD				CHEST		
	X	Y	Z	R	X	Y	Z
DRIVER	-23.8	22.6	-58.6	59.2	-40.9	17.7	10.3
PASSENGER	-26.8	-28.4	-47.2	57.2	-41.8	-23.6	14.7

MAXIMUM FEMUR COMPRESSIVE FORCE (LBS)

	LEFT FEMUR	RIGHT FEMUR
DRIVER	1641	1753
PASSENGER	644	1133

HEAD INJURY CRITERIA**

	HIC	TIME t_1 (MSEC)	TIME t_2 (MSEC)
DRIVER	413	69.0	105.0
PASSENGER	462	64.9	100.9

CHEST MAXIMUM RESULTANT ACCELERATION*

	ACCEL. (G)	TIME t_1 (MSEC)	TIME t_2 (MSEC)
DRIVER	40.9	73.5	76.6
PASSENGER	40.3	62.5	65.5

*Defined as equal to or exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

TABLE 6 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #353	PASSENGER #354
HEAD	<u>Upper steering wheel rim & hub</u>	<u>Dummy's chest</u>
CHEST	<u>None</u>	<u>None</u>
	<u>Lower</u>	
ABDOMEN	<u>steering wheel rim</u>	<u>None</u>
LEFT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>
RIGHT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>Easy</u>	<u>Easy</u>
REAR	<u>None</u>	<u>None</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	<u>None</u>	<u>None</u>
REAR	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE:

The entire windshield cracked upon impact.

OTHER NOTABLE IMPACT EFFECTS:

None

DUMMY KINEMATIC SUMMARY

Driver Dummy

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head rotated downward impacting the dummy's chest as the dummy translated forward rotating slightly to the left, impacting the dummy's abdomen into the lower steering wheel rim. The dummy's head then impacted the upper steering wheel rim and hub. The driver dummy was restrained by the three-point passive belt. The dummy then rebounded rearward into the seat back as the dummy's head rotated rearward into the head restraint. The driver dummy came to rest in the driver's seat restrained by the three-point passive belt.

Right Front Passenger Dummy

Upon impact, the dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head then rotated downward impacting the dummy's chest as the dummy's upper torso rotated slightly to the right. The right front passenger dummy was restrained by the three-point passive belt. The dummy then rebounded rearward into the seat back as the dummy's head rotated rearward into the head restraint. The right front passenger dummy came to rest in the right front passenger's seat, restrained by the three-point passive belt, and rotated slightly to the right.

TABLE 7 FMVSS 208 COMFORT & CONVENIENCE DATA FOR AUTOMATIC SEAT BELTS

MAKE/MODEL: Nissan/Sentra

VIN: 1N4EB32A0PC705001

BODY STYLE: 2-door coupe

NHTSA NO.: CP5201

DATE OF MANUFACTURE: 08/92

CONVENIENCE HOOKS:

DEVICE TO STOW SEAT BELT WEBBING TO FACILITATE ENTERING OR EXITING THE VEHICLE AUTOMATICALLY RELEASES THE WEBBING WHEN THE IGNITION IS TURNED TO THE "ON" OR "START" POSITION AND (check one):

- ☐ The vehicle's drivetrain is engaged
- ☐ The vehicle's parking brake is in the released mode
- ☒ Not applicable, the vehicle's restraint system does not include convenience hooks or devices to stow seat belt webbing.

WEBBING TENSION - RELIEVING DEVICE:

DO OUTBOARD SEATING POSITION SEAT BELTS HAVE WEBBING TENSION - RELIEVING DEVICES? (check one): ☐ YES ☒ NO
IF YES:

BELT CONTACT FORCE:

BELT CONTACT FORCE ON CHEST OF TEST DUMMY: 0.2 POUNDS

☐ NOT APPLICABLE, THE VEHICLE'S SEAT BELT SYSTEM INCLUDED A WEBBING TENSION - RELIEVING DEVICE.

TABLE 8 FMVSS 208 SEAT BELT WARNING SYSTEM DATA

WITH OCCUPANT IN DRIVER'S POSITION AND UNIBELT IN STOWED POSITION AND
IGNITION SWITCH PLACED IN "START/ON" POSITION:

Duration of audible warning signal = 6 sec.

Duration of reminder light operation = continuous sec.

WITH OCCUPANT IN DRIVER'S POSITION AND UNIBELT IN USE AND THE IGNITION
SWITCH PLACED IN "START/ON" POSITION:

Duration of audible warning signal = 0 sec.

(NOTE: audible warning should not operate)

Duration of reminder light operation = 6 sec.

WORDING OF VISUAL WARNING:

 Fasten Seat Belt

 Fasten Belt

 X Symbol 101-80

 Other:

TABLE 9 FMVSS 208 LABELING AND DRIVER'S MANUAL DATA

DESCRIBE LOCATION OF LABEL WHICH DESCRIBES MANUFACTURER'S MAINTENANCE OR
REPLACEMENT SCHEDULE FOR CRASH-DEPLOYED OCCUPANT PROTECTION SYSTEM:

Not applicable, vehicle did not contain a crash-deployed occupant protection
system.

TABLE 10 FMVSS 208 READINESS INDICATOR DATA

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.

Not applicable, vehicle did not contain a crash-deployed occupant protection system.

FIGURE 4 FMVSS 212 TEST DATA

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

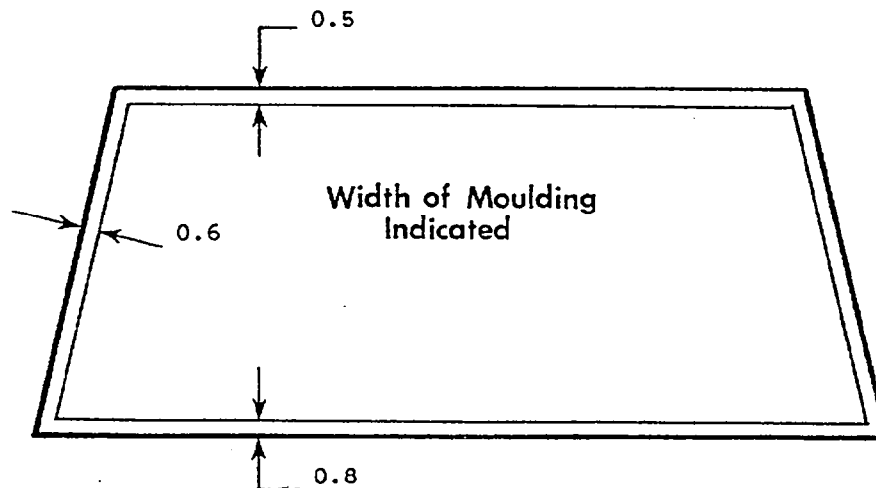
Plastic trim around outer perimeter, adhesive around inner perimeter.

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

WINDSHIELD PERIPHERY MEASUREMENTS:

	PRE-TEST	POST-TEST	PERCENT RETENTION
RIGHT SIDE	77.0	77.0	100
LEFT SIDE	77.0	77.0	100
TOTAL	154.0	154.0	100

PRE-TEST WINDSHIELD MOUNTING MATERIAL TEMPERATURE: 70° F



FRONT VIEW OF WINDSHIELD*

LOSS OF WINDSHIELD RETENTION LENGTHS: None

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

*INDICATE AREAS OF LOSS OF RETENTION, IF ANY, ON WINDSHIELD DIAGRAM.

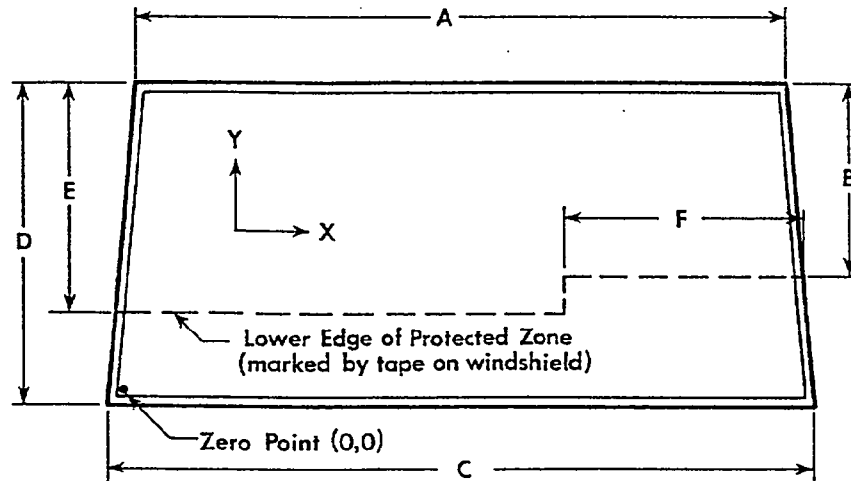
FIGURE 5 FMVSS 219 TEST DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5 inch diameter rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 0.5 inch from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

WINDSHIELD MEASUREMENTS:

A = 43.5
 B = 20.8
 C = 58.0
 D = 28.8
 E = 20.8
 F = 23.5



FRONT VIEW

METHOD OF ADHERING PROTECTED ZONE TEMPLATE TO WINDSHIELD: NA

AREAS OF WINDSHIELD TEMPLATE PENETRATION
GREATER THAN 0.25 IN.: NA

COORDINATES
 X Y
 1.
 2.
 3.

AREAS OF WINDSHIELD PENETRATION, BELOW THE PROTECTED ZONE,
THROUGH THE INNER SURFACE OF THE WINDSHIELD: None

1.
 2.
 3.

ALL MEASUREMENTS ARE IN INCHES.

TABLE 11 FUEL SYSTEM DATA

MAKE/MODEL: Nissan/Sentra

NHTSA NO.: CP5201

FUEL SYSTEM CAPACITY: 13.2 GALLONS (FROM OWNER'S MANUAL)

USABLE CAPACITY: 13.2 GALLONS (FURNISHED BY COTR)

TEST VOLUME RANGE: 12.1 GALLONS TO 12.4 GALLONS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 12.3 GALLONS (WITH ENTIRE FUEL SYSTEM FILLED)

TEST FLUID TYPE: STODDARD SOLVENT

SPECIFIC GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

TEST FLUID COLOR: PURPLE

DETAILS OF FUEL SYSTEM: The fuel tank is in front of the rear axle.

The fuel lines run along the left side to the front. The fuel filler

is located on the left side.

ELECTRIC FUEL PUMP: Yes FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? No

TABLE 12 FMVSS 301 POST-IMPACT TEST DATA

TEST VEHICLE NHTSA NO.: CP5201; TEST DATE: 10/13/92
VEHICLE MAKE/MODEL/BODY STYLE: Nissan/Sentra/2-door coupe

TEST REQUIREMENTS:

Test vehicle fuel tank filled to 92 to 94% of manufacturer's usable 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/PASS.) SIDE.
 REAR MOVING BARRIER (30 MPH)
 LATERAL MOVING BARRIER (20 MPH)

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

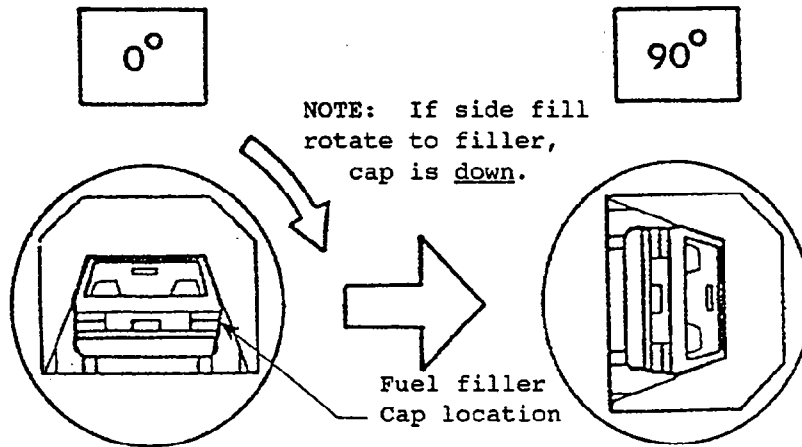
	<u>TEST</u> <u>RESULTS</u>	<u>MAXIMUM</u> <u>ALLOWABLE</u>
1. FROM IMPACT UNTIL VEHICLE MOTION CEASES - - -	0 OZ.	1 OZ.
2. 5 MINUTE PERIOD AFTER VEHICLE MOTION CEASES -	0 OZ.	5 OZ.
3. NEXT 25 MINUTES AFTER 5 MINUTE PERIOD - - - -	0 OZ.	1 OZ./1 MIN.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA

NHTSA NO.: CP5201
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds
FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds
TOTAL - - - - - = 7 minutes, 00 seconds
NEXT WHOLE MINUTE INTERVAL - - - - - = 7 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

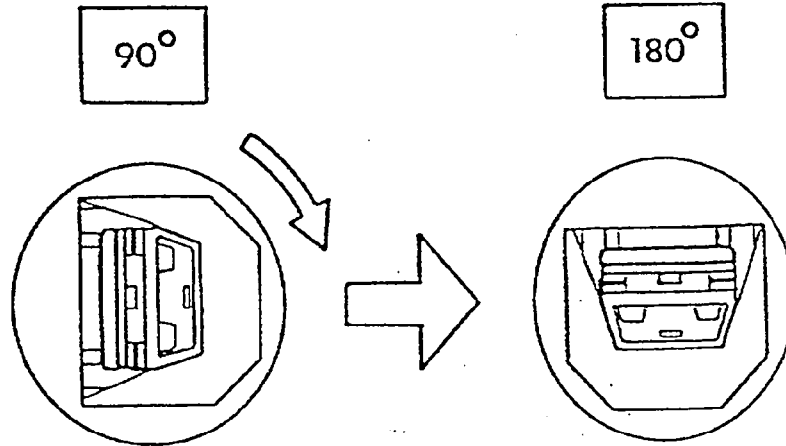
<u>0° TO 90° ROTATION (FUEL FILLER CAP DOWN)</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: CP5201
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - - = 14 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

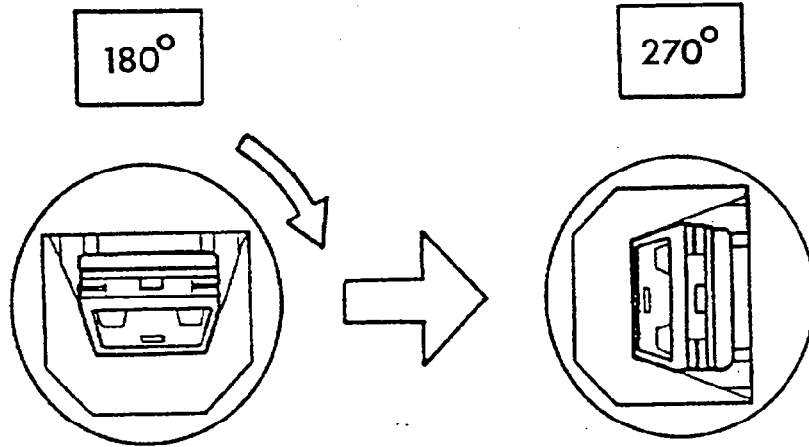
<u>90° TO 180° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: CP5201
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 21 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

<u>180° TO 270° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

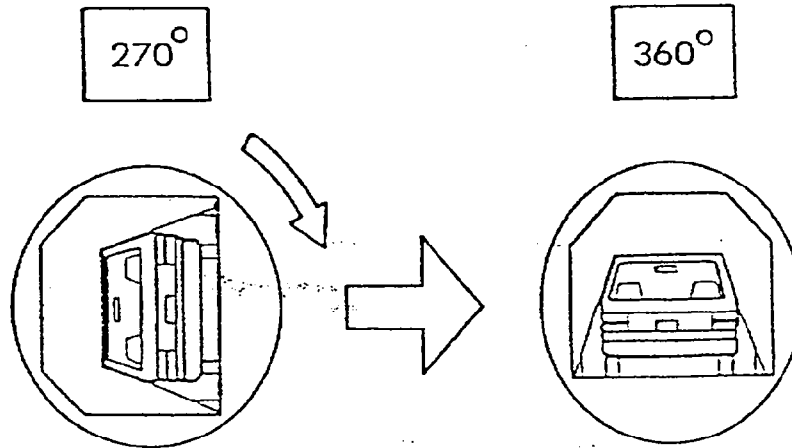
FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: CP5201

TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 28 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

<u>270° TO 360° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

SECTION 4.0

VEHICLE, OCCUPANT, AND CAMERA MEASUREMENTS

FIGURE 7

PRE-TEST AND POST-TEST MEASUREMENT POINTS

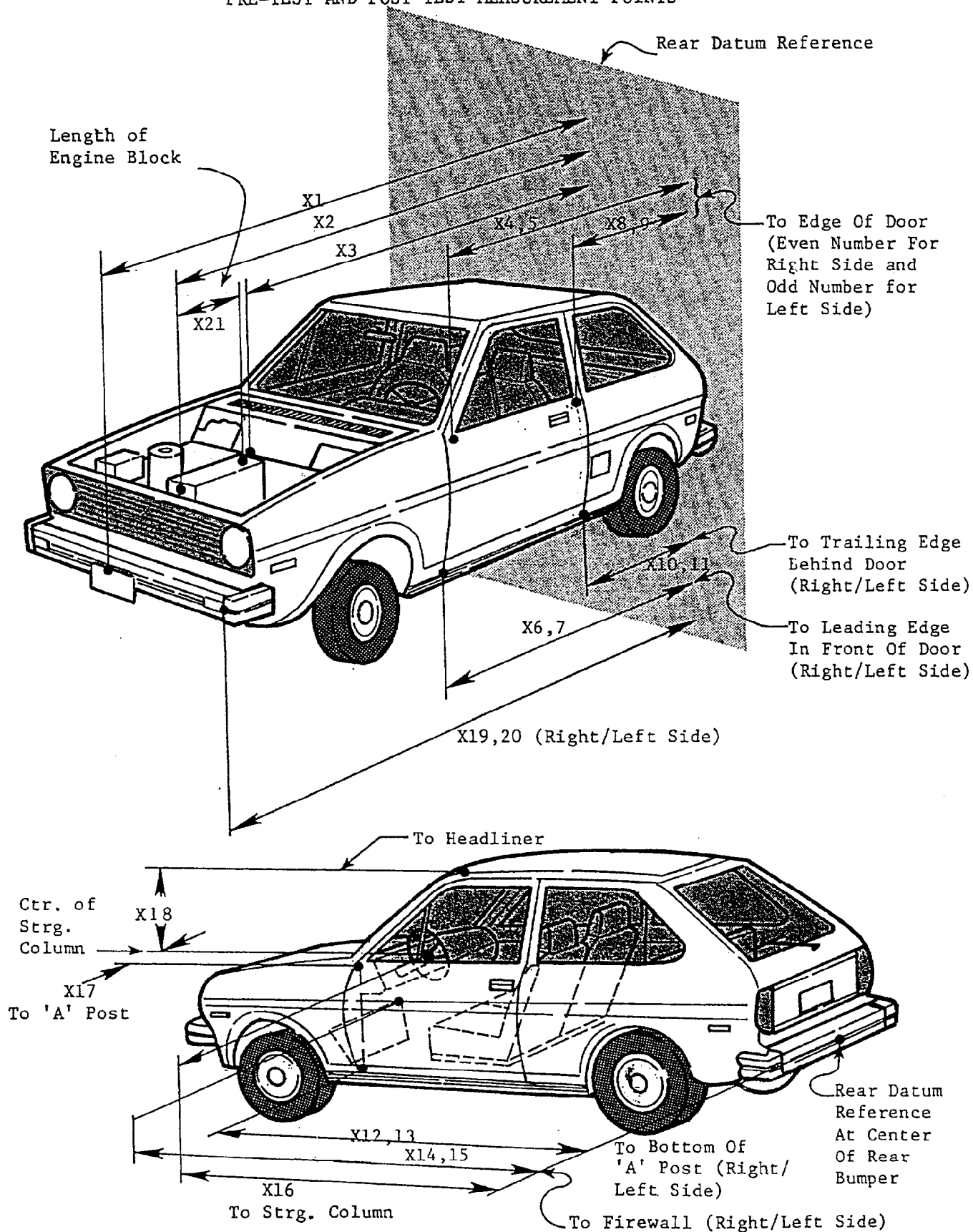
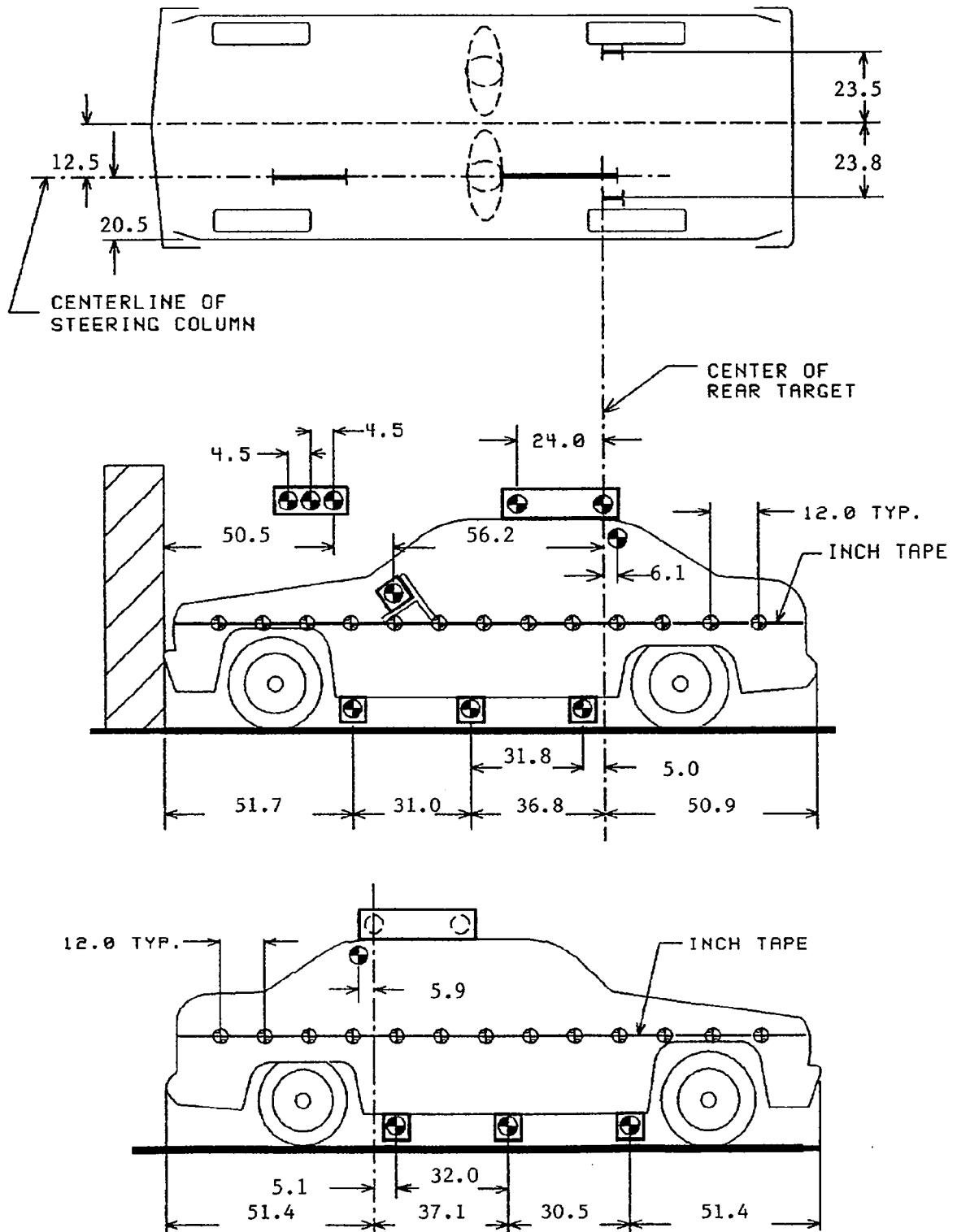


TABLE 13 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Nissan/Sentra		TEST NUMBER: 921013		ALL MEASUREMENTS ARE IN INCHES		
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.		
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	170.4	154.6	15.8		
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	148.5	144.1	4.4		
X3	REAR SURFACE OF VEHICLE TO FIREWALL	128.9	127.4	1.5		
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	116.3	116.4	-0.1		
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	116.5	116.4	0.1		
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	116.1	115.9	0.2		
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	116.4	115.9	0.5		
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	68.9	69.0	-0.1		
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	68.9	68.4	0.5		
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	71.4	71.3	0.1		
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	72.0	71.5	0.5		
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	115.6	115.5	0.1		
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	115.7	115.2	0.5		
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	127.2	127.1	0.1		
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	128.9	126.5	2.4		
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	99.8	99.5	0.3		
X17	CENTER OF STEERING COLUMN TO "A" POST	12.6	11.4	1.2		
X18	CENTER OF STEERING COLUMN TO HEADLINER	18.2	17.6	0.6		
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	167.0	151.9	15.1		
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	167.6	153.8	13.8		
X21	LENGTH OF ENGINE BLOCK	20.0	20.0	0.0		

FIGURE 8

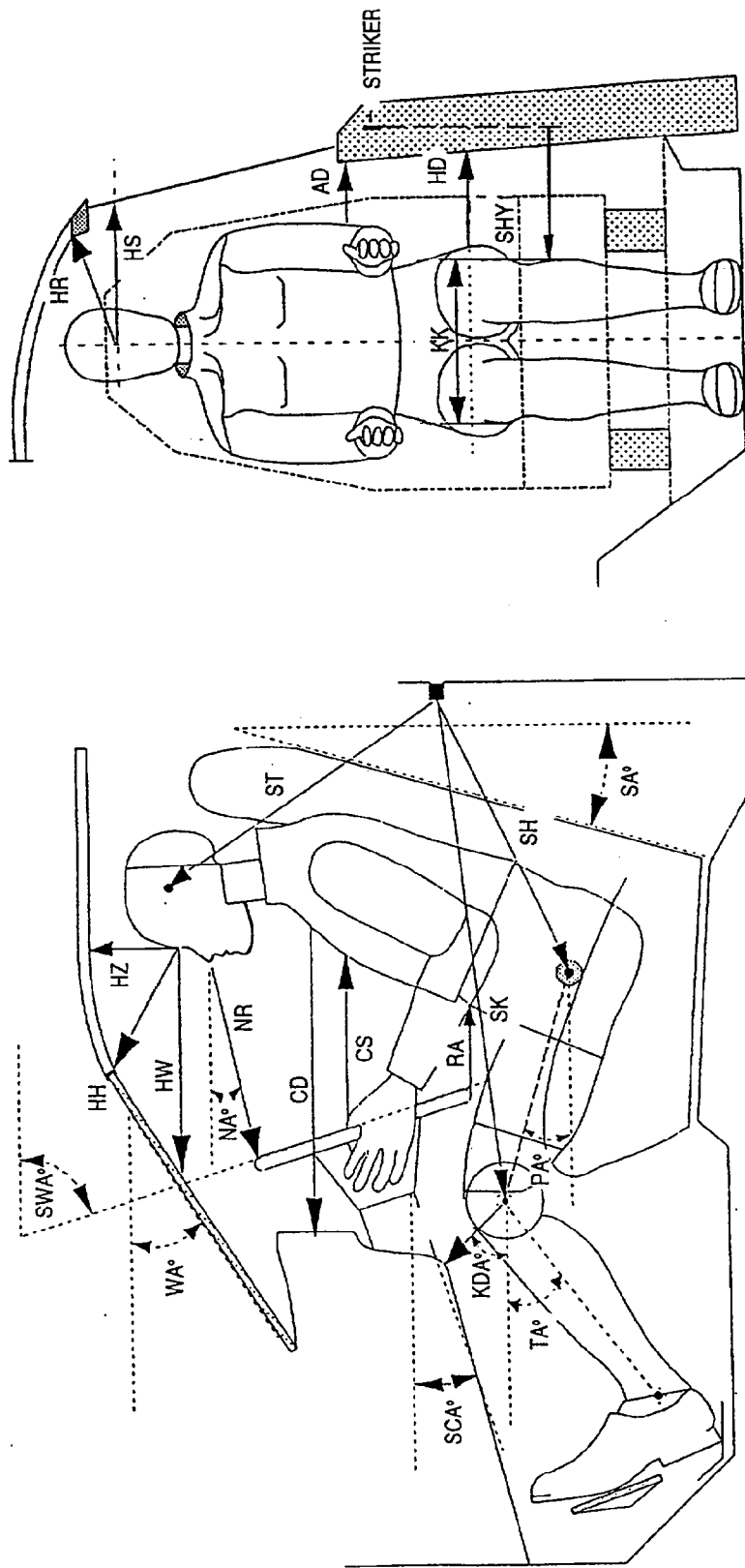
VEHICLE TARGET LOCATIONS



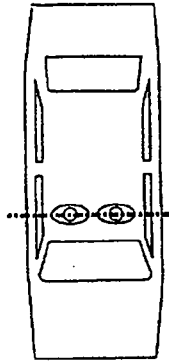
ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 9

DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS



VERTICAL TRANSVERSE PLANE



VERTICAL LONGITUDINAL PLANE

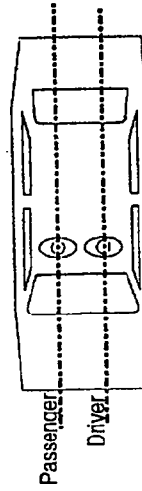


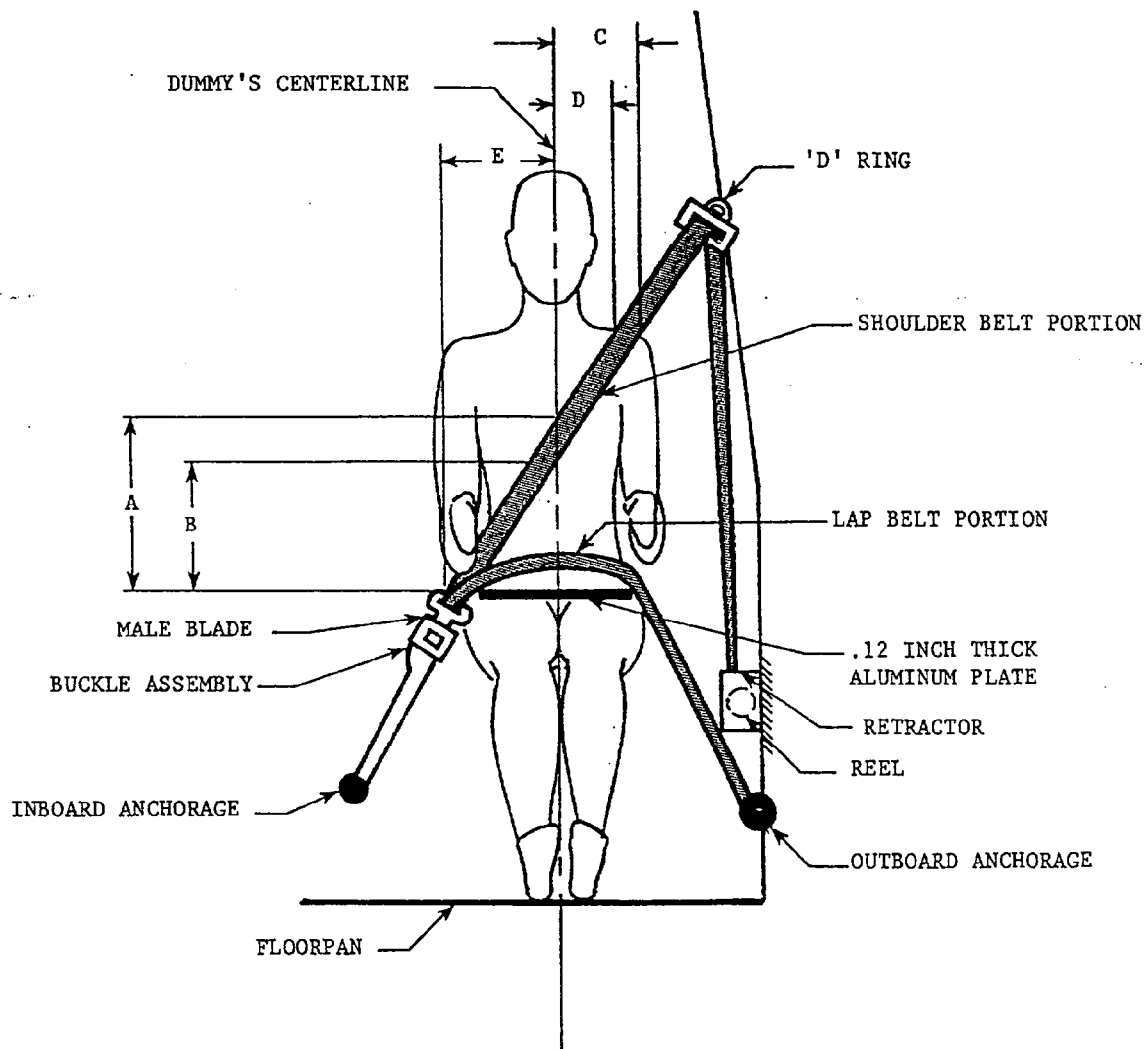
TABLE 14 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

DESIGNATION	TYPE OF MEASUREMENT	DRIVER (SERIAL #353)	PASSENGER (SERIAL #354)
WA°	WINDSHIELD ANGLE	30°	NA
SWA°	STEERING WHEEL ANGLE	66°	NA
SCA°	STEERING COLUMN ANGLE	25°	NA
SA°	SEAT BACK ANGLE	24°	24°
HZ	HEAD TO ROOF	5.7	5.4
HH	HEAD TO HEADER	14.8	14.4
HW	HEAD TO WINDSHIELD	21.6	21.6
HR	HEAD TO SIDE HEADER	7.6	6.9
NR	NOSE TO RIM	19.7	NA
NA	NOSE TO RIM ANGLE	NA	NA
CD	CHEST TO DASH	23.6	21.5
CS	STEERING WHEEL TO CHEST	14.8	NA
RA	RIM TO ABDOMEN	9.3	NA
KDL	LEFT KNEE TO DASH	9.8	8.9
KDR	RIGHT KNEE TO DASH	9.5	9.7
KDA	OUTBOARD KNEE TO DASH ANGLE	17°	12°
PA°	PELVIC ANGLE	17°	12°
TA°	TIBIAL ANGLE	37°	32°
KK	KNEE TO KNEE	14.1	11.9
ST	STRIKER TO HEAD	20.4	20.3
	STRIKER TO HEAD ANGLE	80°	75°
SK	STRIKER TO KNEE	27.7	28.5
	STRIKER TO KNEE ANGLE	3°	5°
SH	STRIKER TO H-POINT	13.9	13.8
	STRIKER TO H-POINT ANGLE	27°	25°
SHY	STRIKER TO H-POINT (Y DIR.)	8.2	9.2
HS	HEAD TO SIDE WINDOW	12.2	11.4
HD	H-POINT TO DOOR	4.8	5.2
AD	ARM TO DOOR	4.6	4.5

THE SEAT BACK ANGLE (SA°) IS MEASURED RELATIVE TO VERTICAL, ALL OTHER ANGLES ARE MEASURED RELATIVE TO HORIZONTAL.

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 10 SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - TOP SURFACE OF ALUM. PLATE TO BELT UPPER EDGE	14.0	13.8
B - TOP SURFACE OF ALUM. PLATE TO BELT LOWER EDGE	10.8	10.2
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	6.9	6.4
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	4.3	4.0
E - DUMMY CENTERLINE TO INTERSECTION OF UPPER TORSO BELT AND LAP BELT	12.0	11.9

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 11
CAMERA POSITIONS

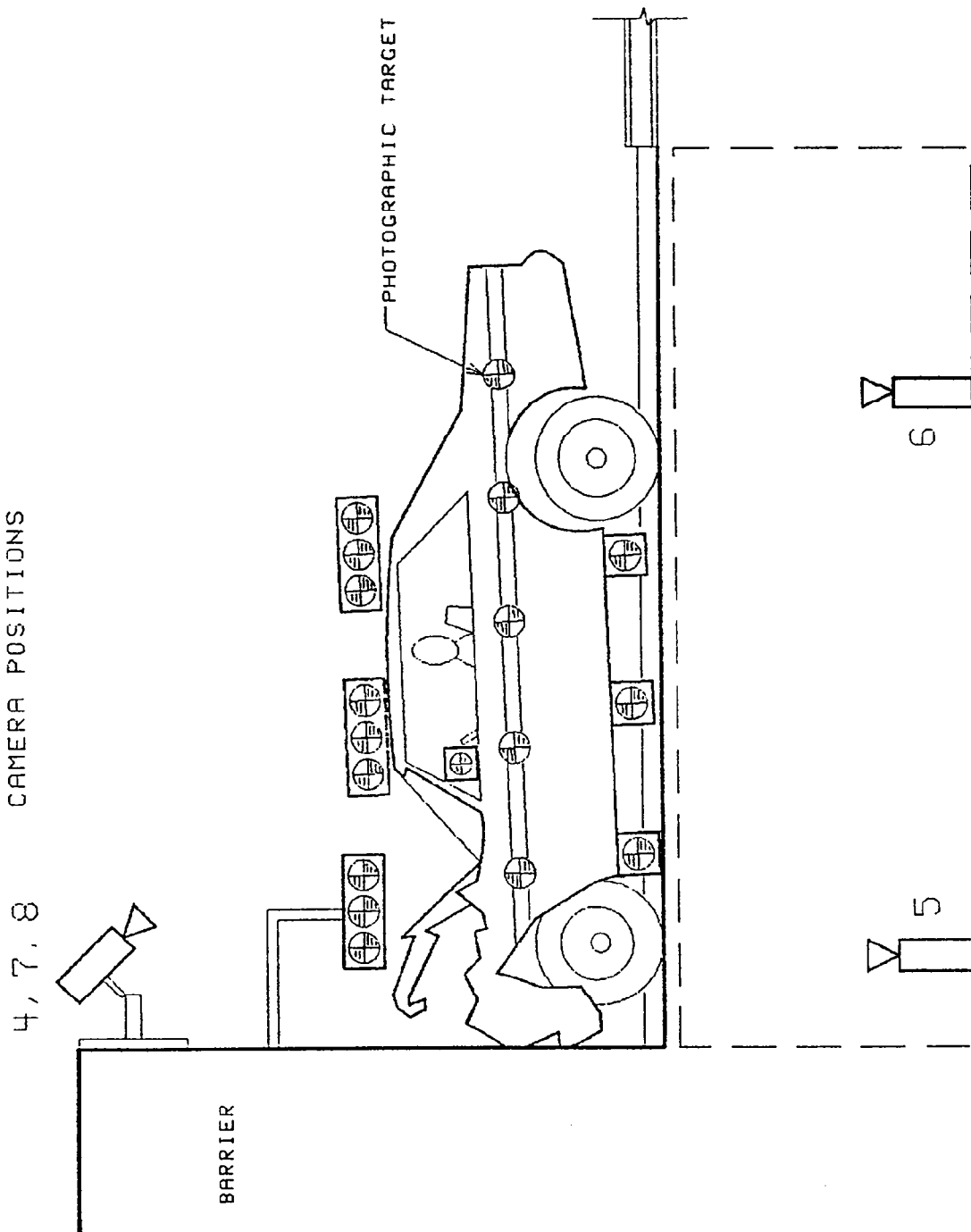


FIGURE 11
CAMERA POSITIONS, CONTINUED

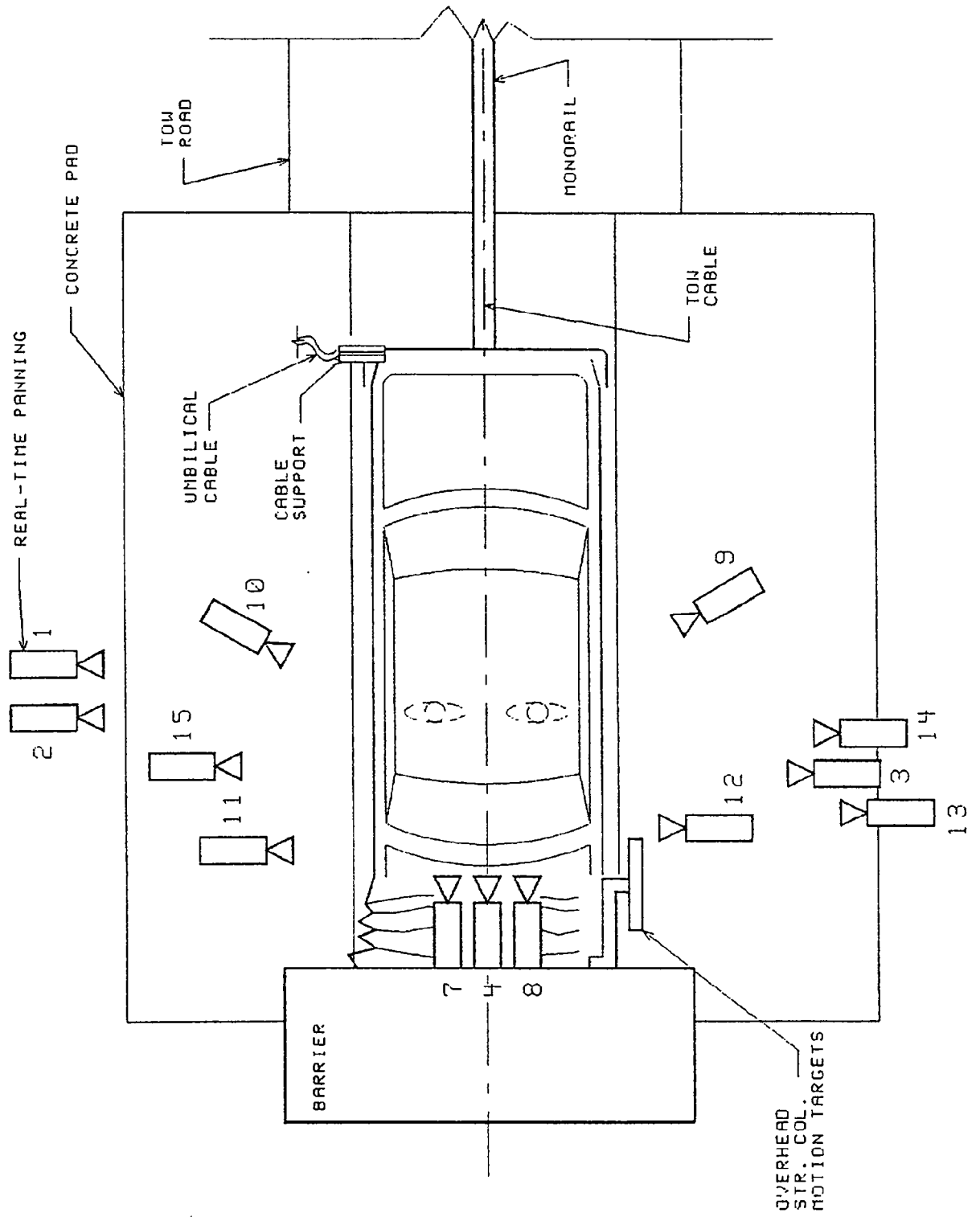


TABLE 15 MOTION PICTURE CAMERA LOCATIONS

TEST NO.: 921013		VEHICLE: Nissan Sentra 2-door coupe					FILM PLANE		FILM
CAMERA NO.	VIEW	CAMERA POSITIONS (IN)*			ANGLE** (DEG)	TO HEAD TARGET(IN)	LENS (MM)	SPEED (FPS)	
		X	Y	Z					
1	Real-time panning	-142.0	-504.0	61.0	NA	NA	16	24	
2	Right overall	-81.3	-266.4	37.1	-2	NA	13	495	
3	Left vehicle crush	-41.5	295.0	44.0	-4	202.0	25	1000	
4	Windshield front view	-6.0	0.0	74.0	-40	NA	13	505	
5	Pit-left subframe sidemember	-8.0	29.0	-16.0	90	NA	13	1000	
6	Pit-right subframe sidemember	-7.0	30.0	-12.0	90	NA	13	1000	
7	Passenger front view	-4.5	-13.8	93.0	-50	NA	17	502	
8	Driver front view	-6.8	14.5	93.0	-50	NA	17	492	
9	Driver kinematics	-157.3	116.0	87.0	-27	103.0	25	505	
10	Passenger kinematics	-152.1	-116.0	87.0	-26	88.0	25	500	
11	Right windshield intrusion	-38.1	-306.1	44.0	0	NA	50	485	
12	Left windshield intrusion	-53.0	309.4	42.3	0	NA	50	510	
13	Steering column motion	-150.0	285.0	103.0	-14	NA	25	495	
14	Steering column motion	-150.0	285.0	75.1	-9	NA	25	495	
15	Passenger kinematics	-38.8	-293.0	45.3	-4	235.0	25	1015	
16	Real-time documentation	NA	NA	NA	NA	NA	12-120	24	

* +X = Film plane forward of barrier face

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

** +Angle = Film plane angled upward from horizontal plane

APPENDIX A

PHOTOGRAPHS

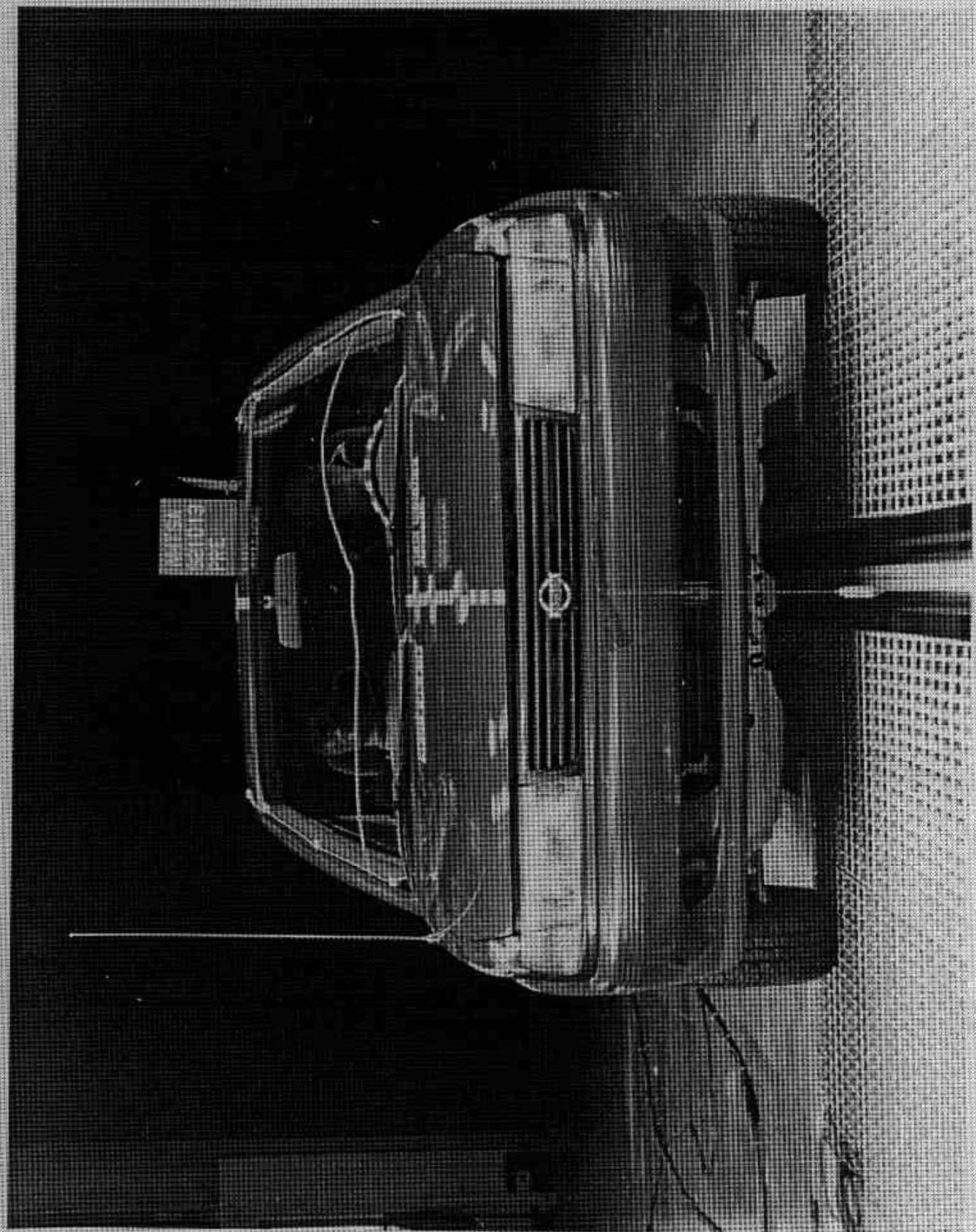


FIGURE A-1. PRE-TEST FRONT VIEW

A-2

921013

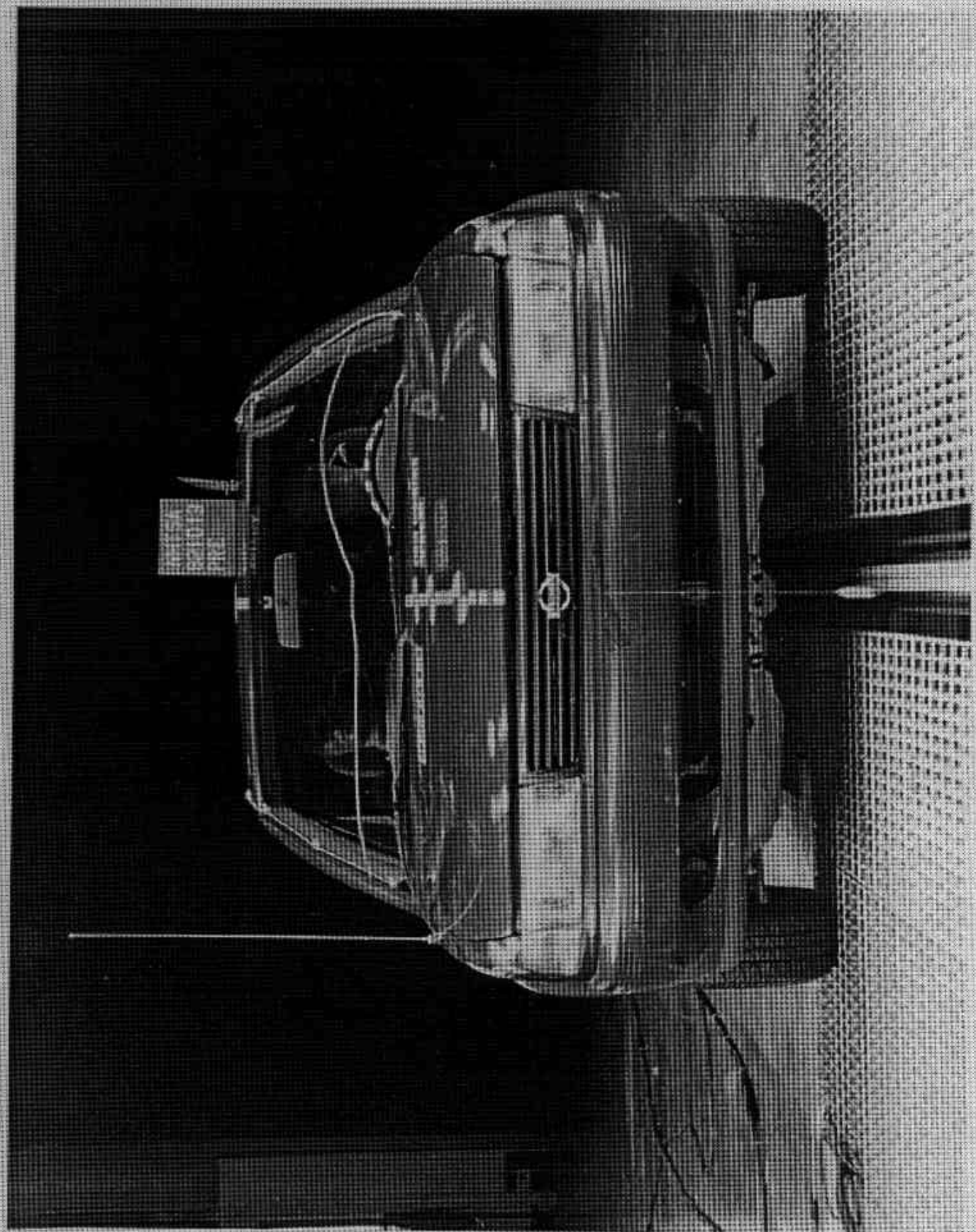


FIGURE A-1. PRE-TEST FRONT VIEW

A-2

921013

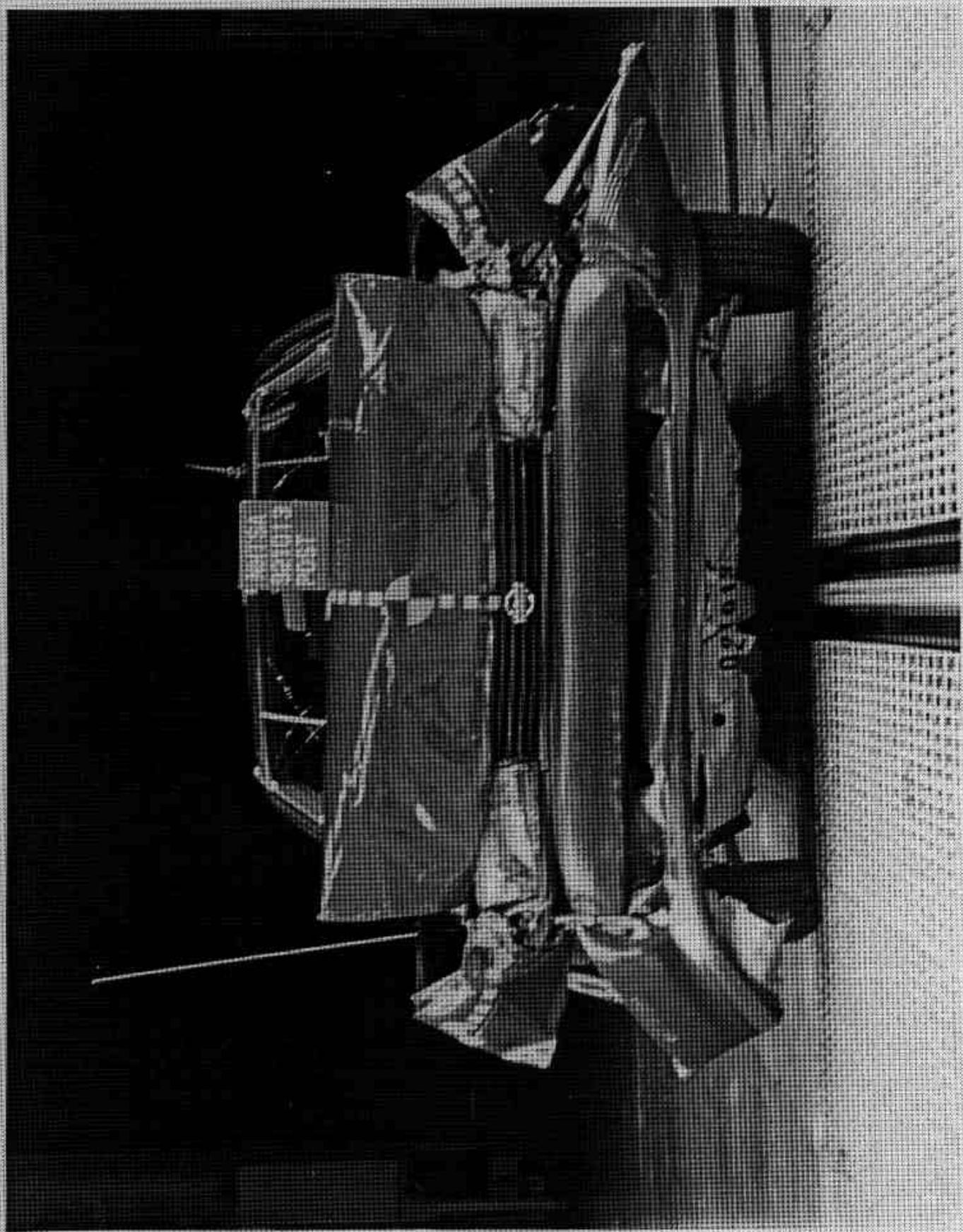


FIGURE A-2. POST-TEST FRONT VIEW

A-3

921013

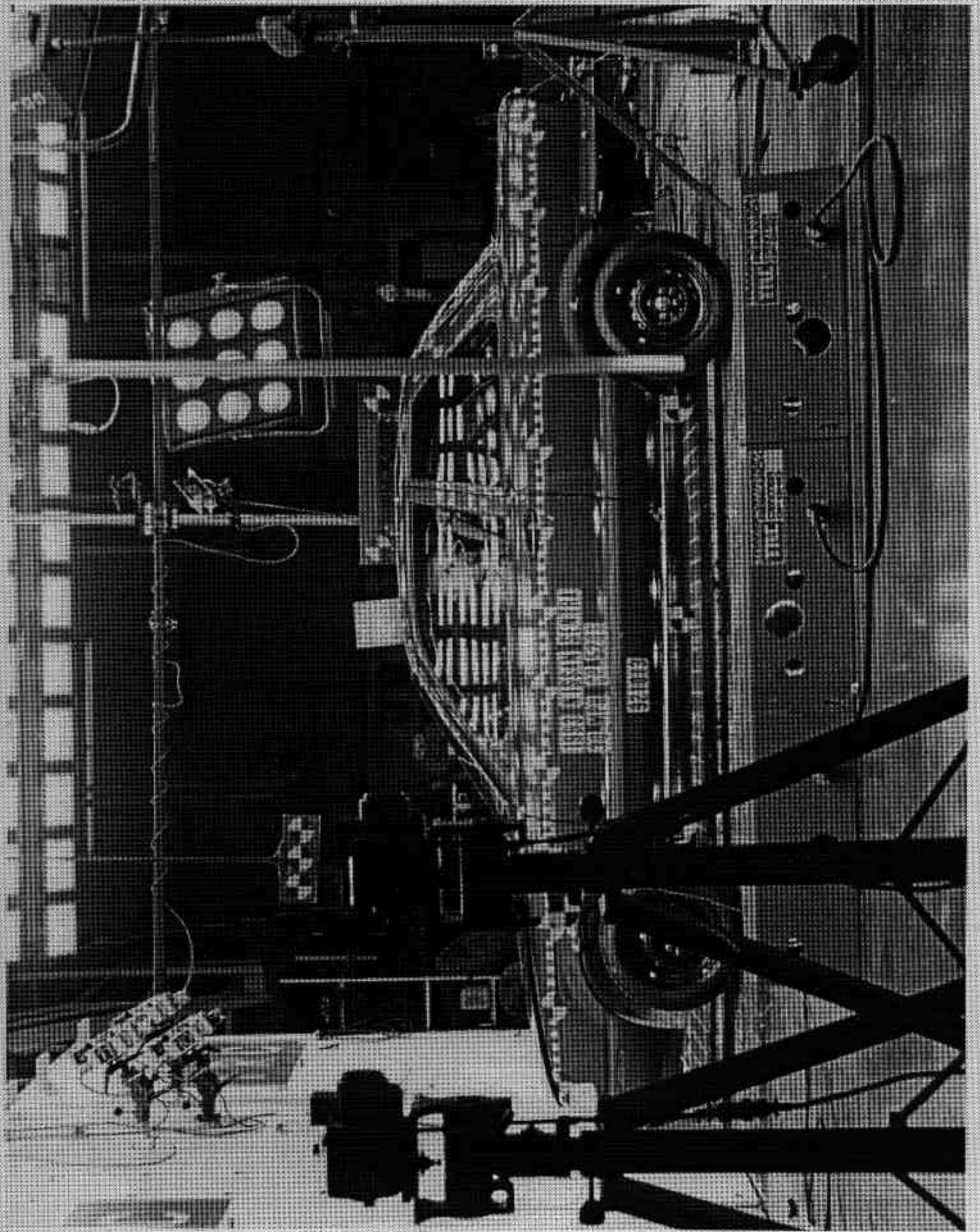


FIGURE A-3. PRE-TEST LEFT SIDE VIEW

A-4

921013

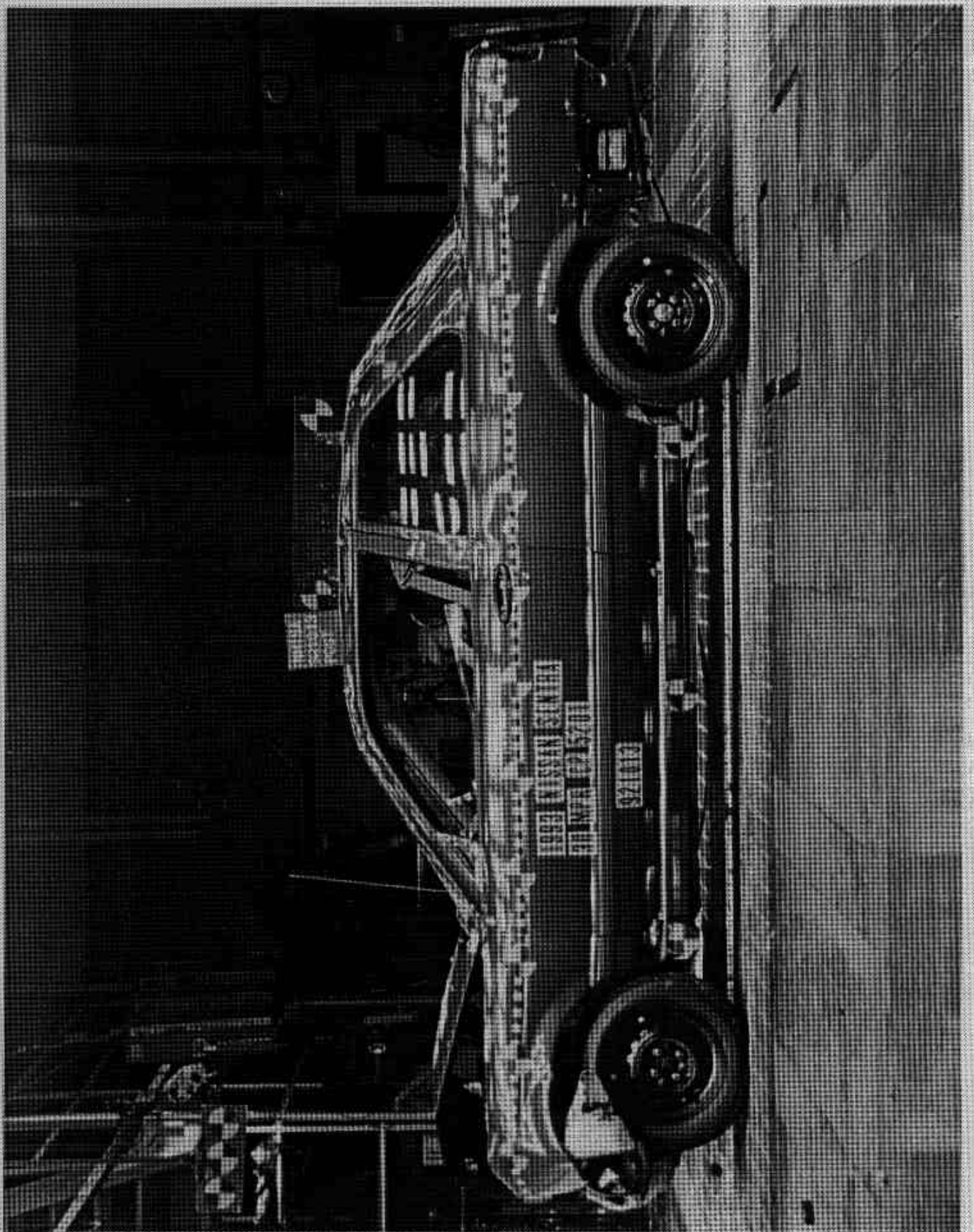


FIGURE A-4. POST-TEST LEFT SIDE VIEW
A-5

921013

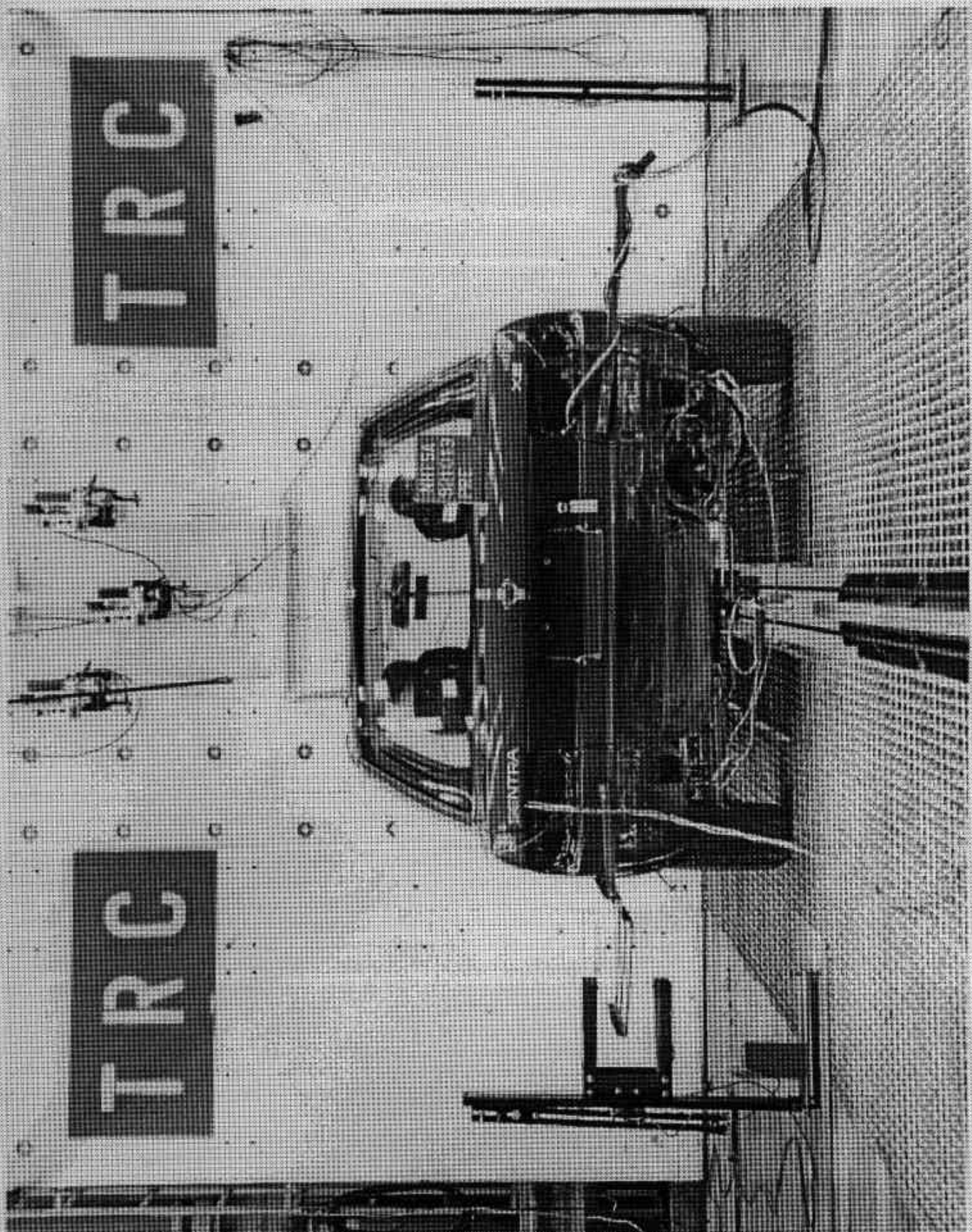


FIGURE A-5. PRE-TEST REAR VIEW

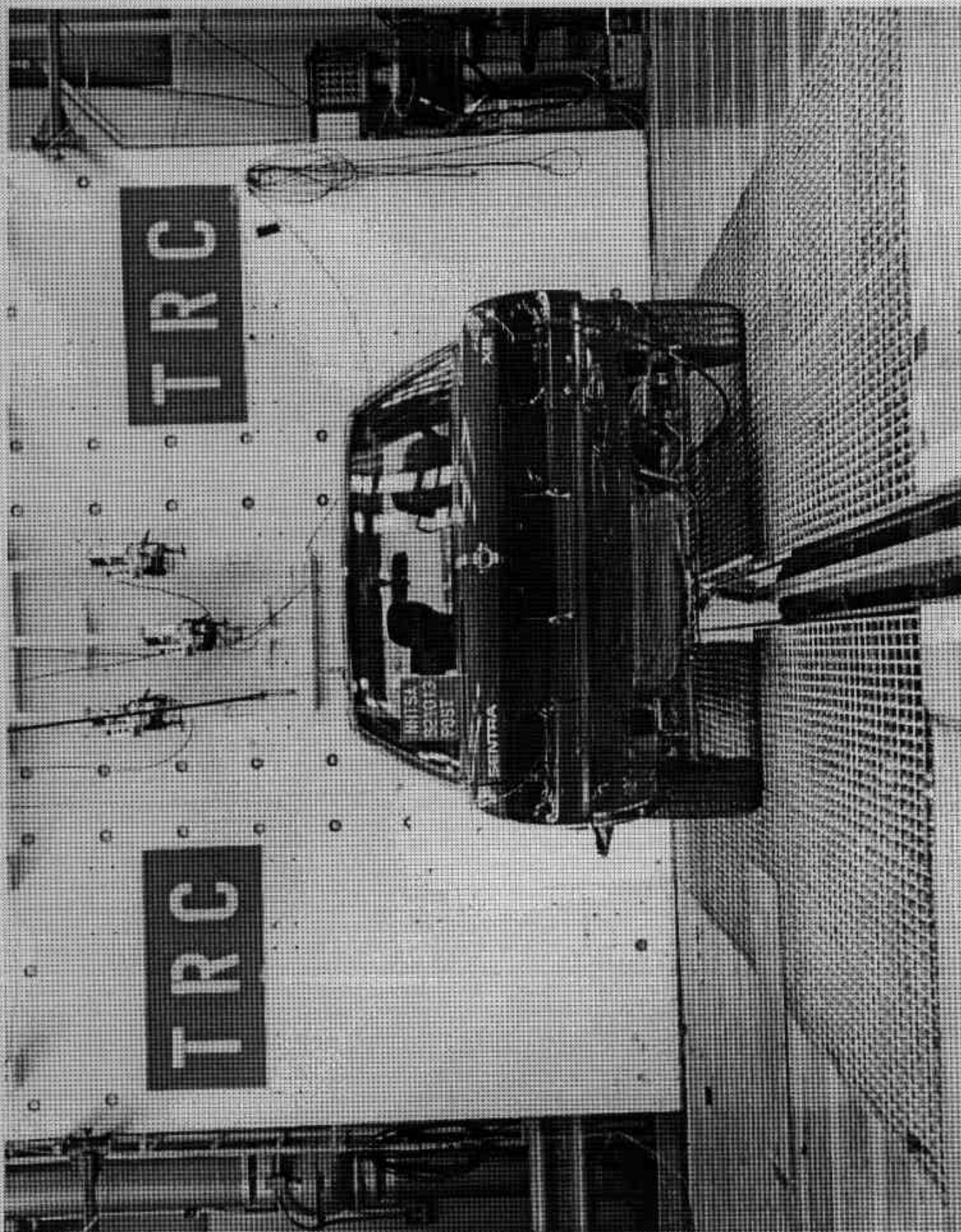


FIGURE A-6. POST-TEST REAR VIEW

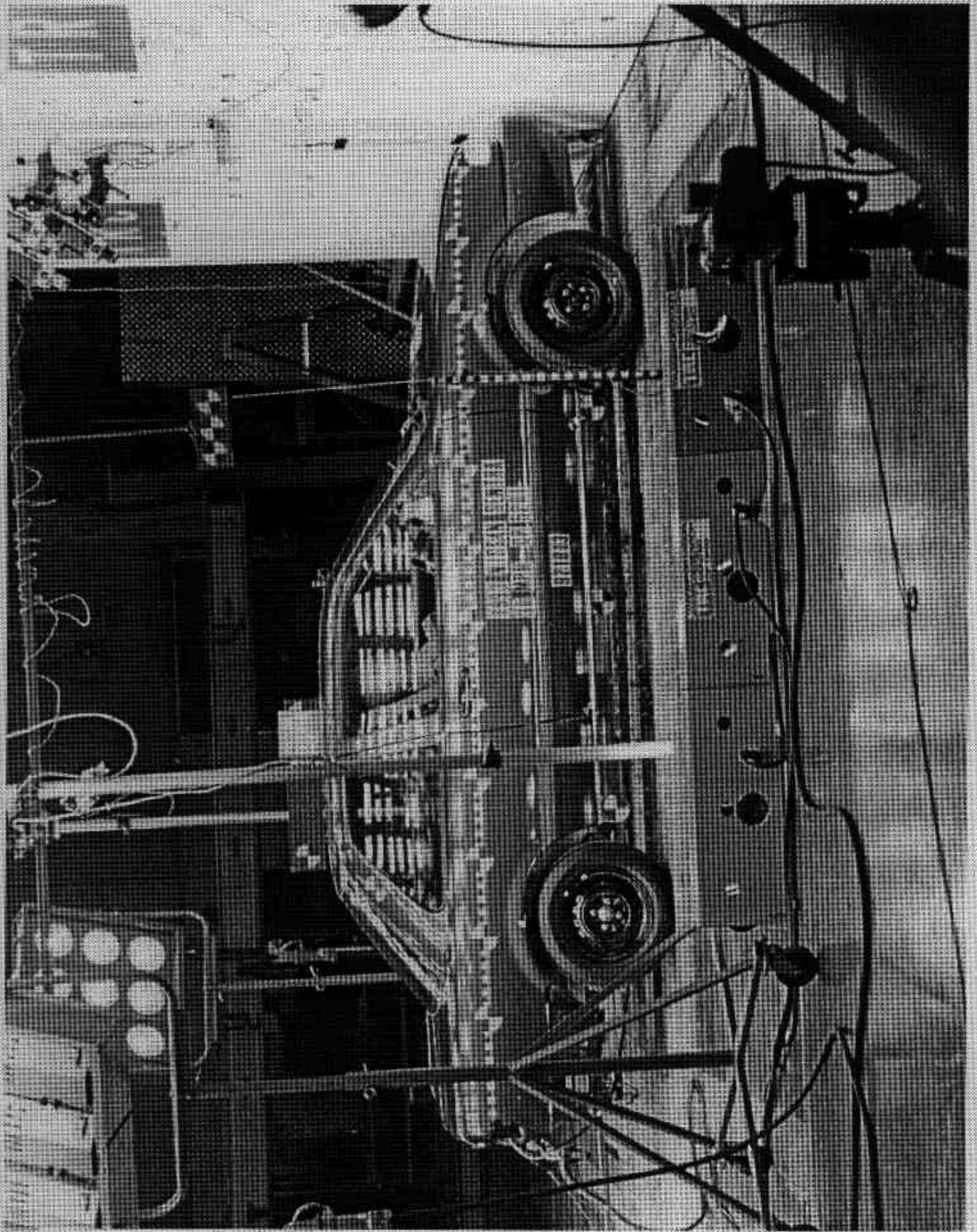


FIGURE A-7. PRE-TEST RIGHT SIDE VIEW

A-8

921013

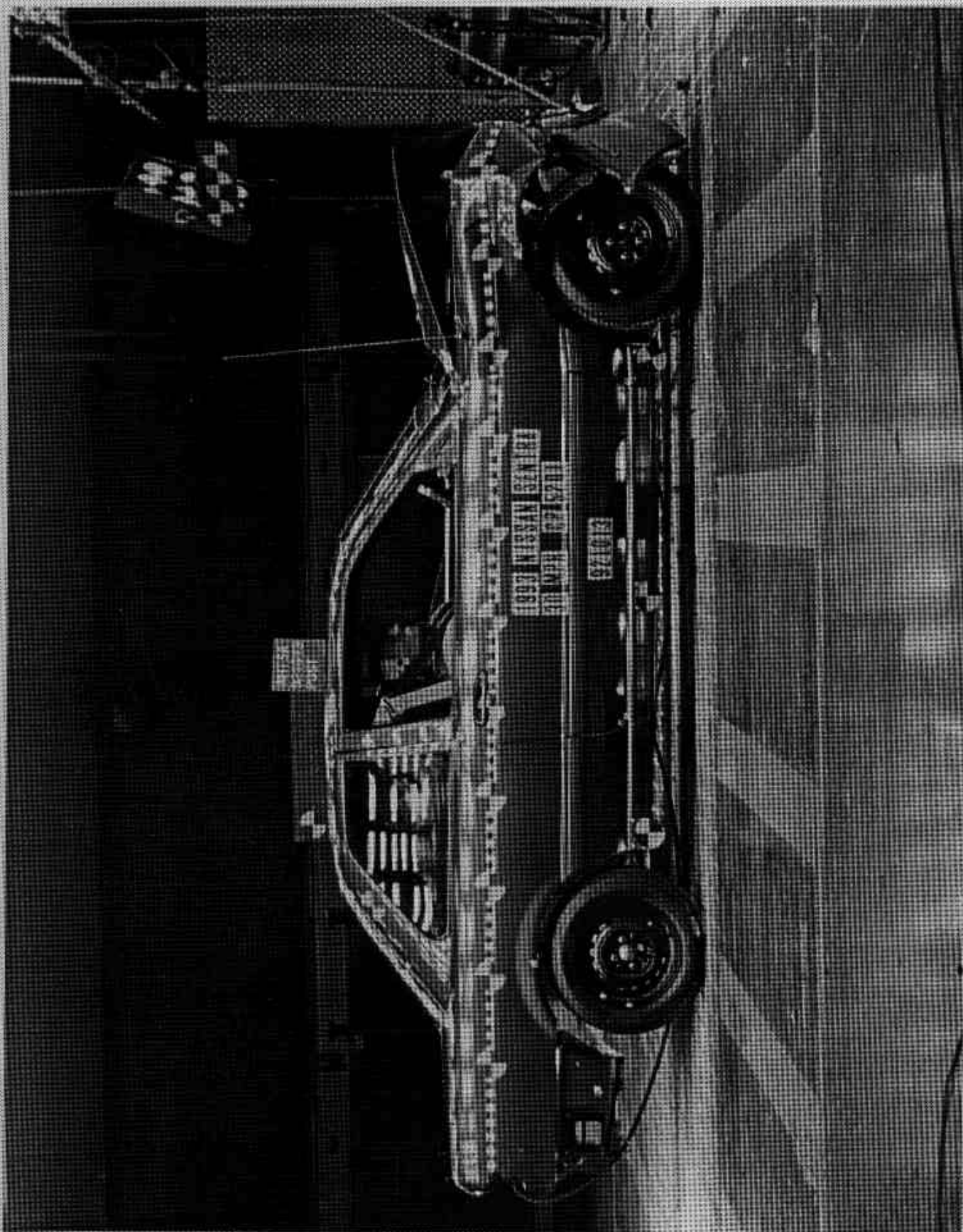


FIGURE A-8. POST-TEST RIGHT SIDE VIEW

A-9

921013



FIGURE A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

921013



FIGURE A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-11

921013

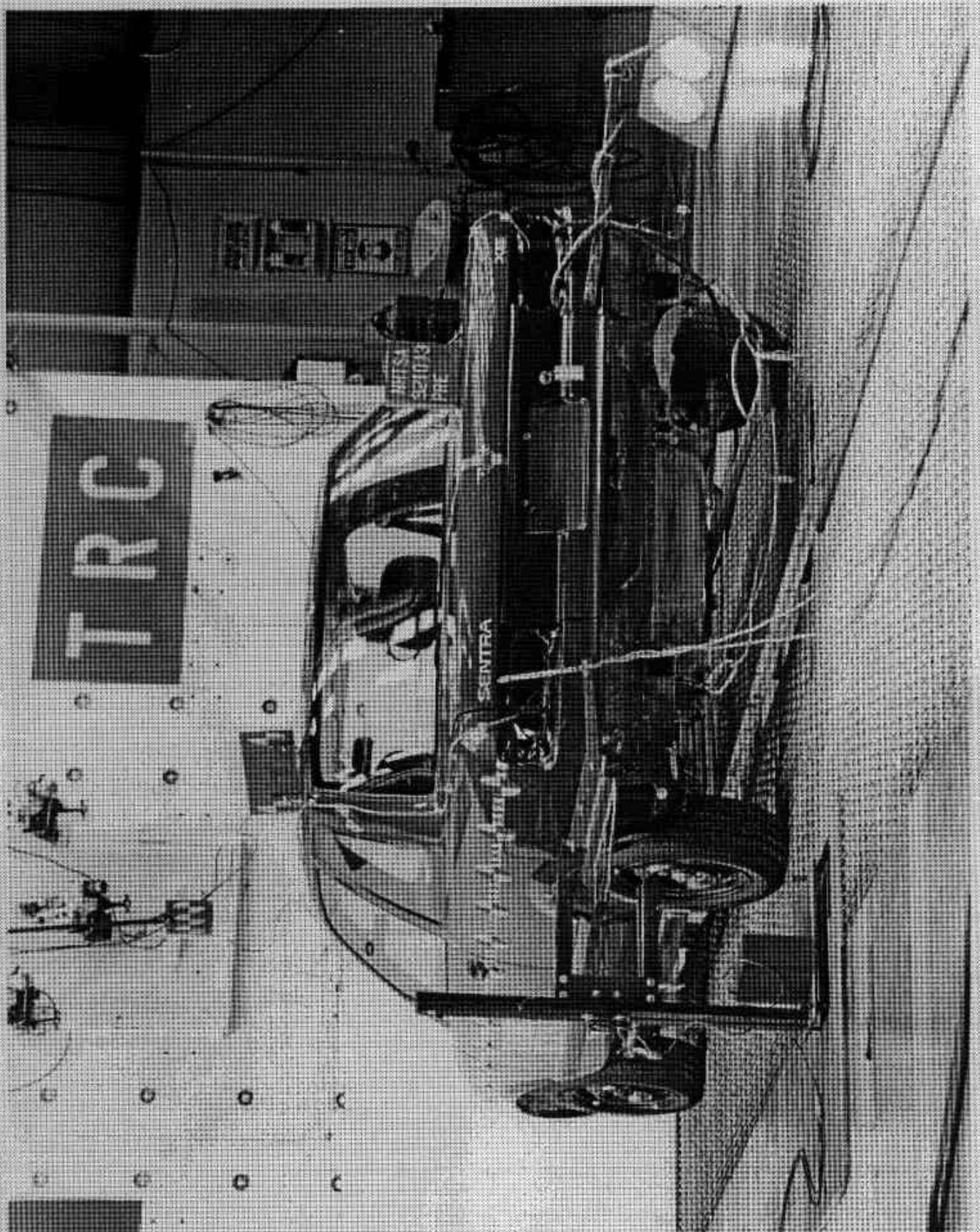


FIGURE A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW
A-12

921013

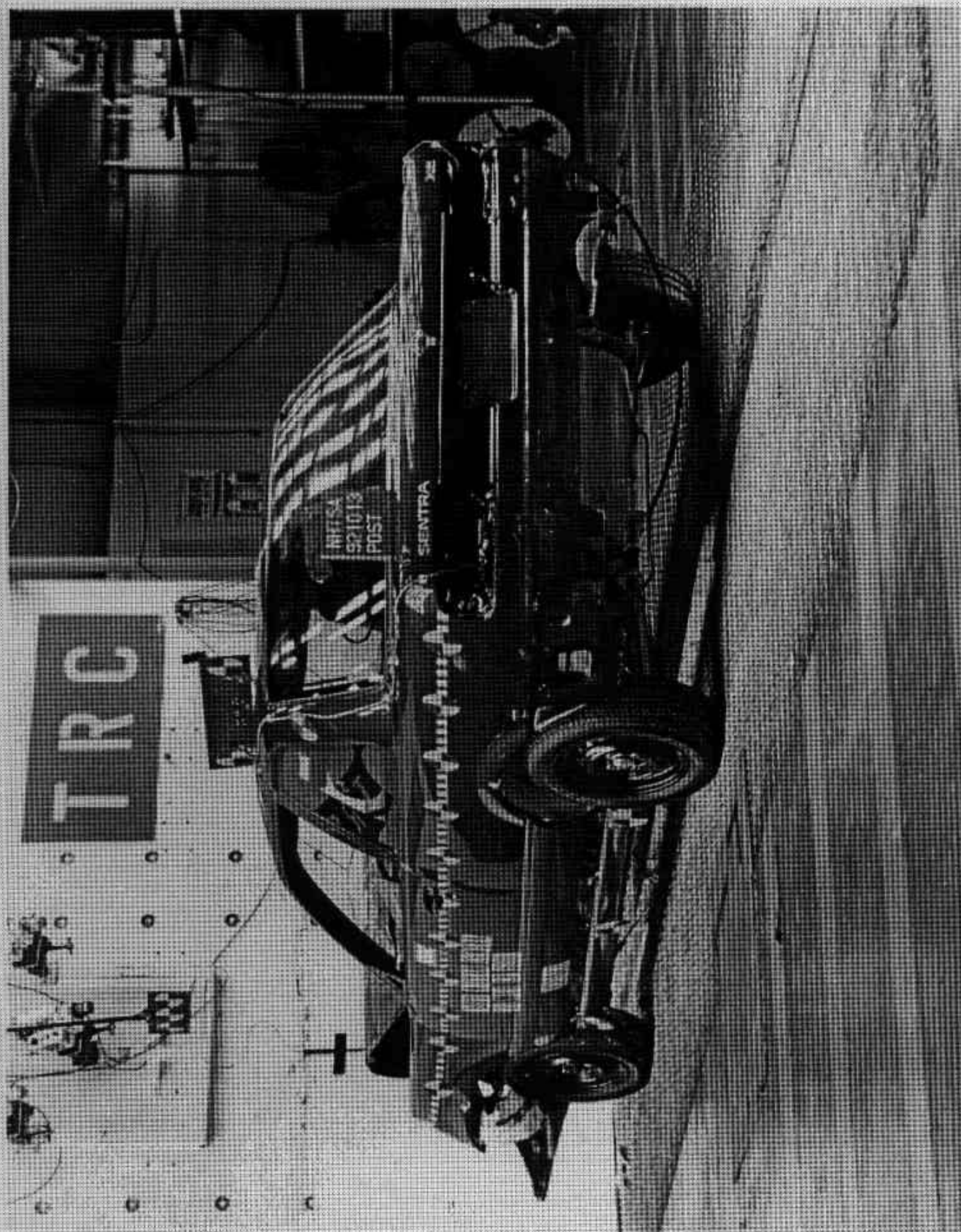


FIGURE A-12, POST-TEST LEFT REAR THREE-QUARTER VIEW



FIGURE A-13. PRE-TEST WINDSHIELD VIEW

A-14

921013

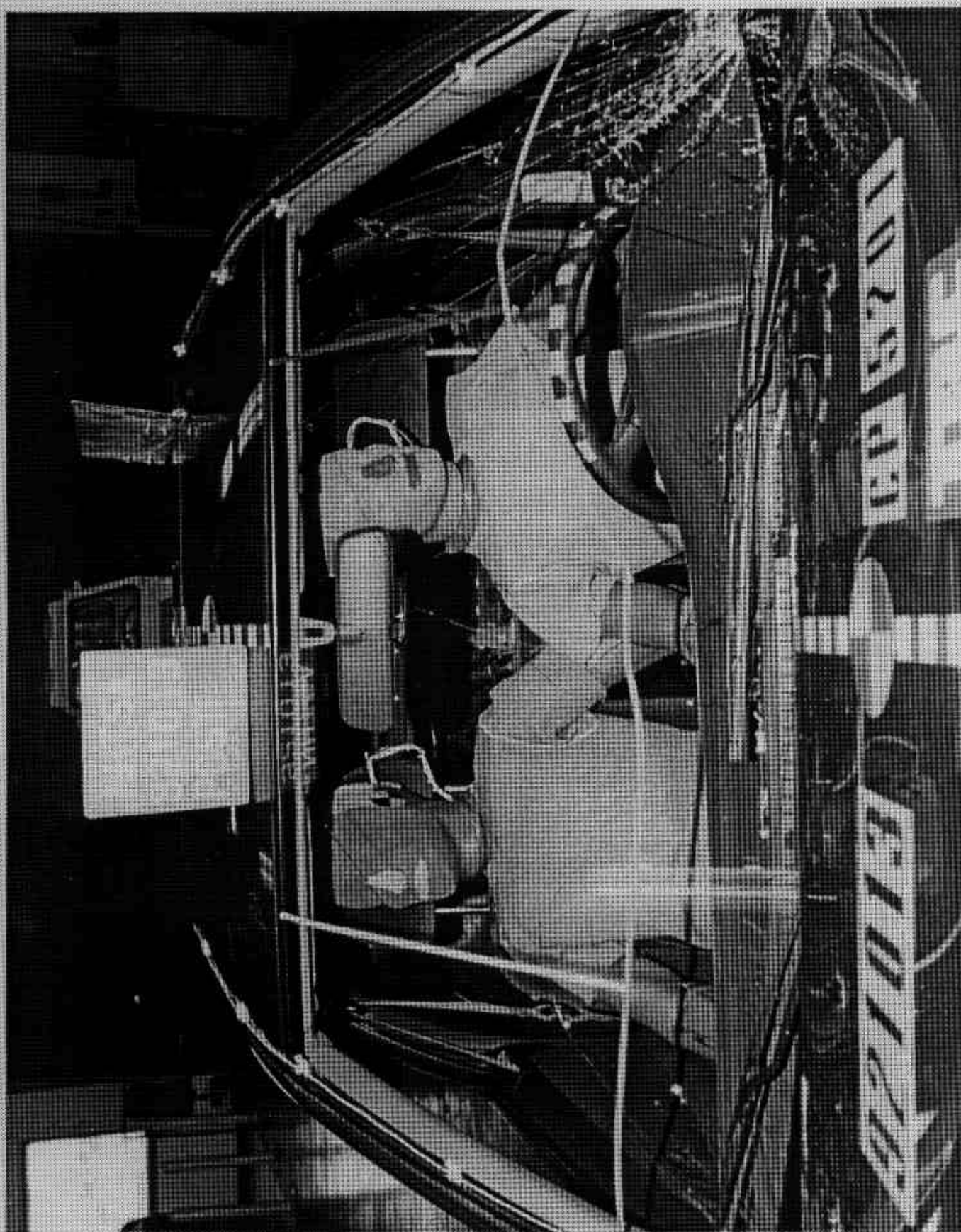


FIGURE A-14. POST-TEST WINDSHIELD VIEW

A-15

921013

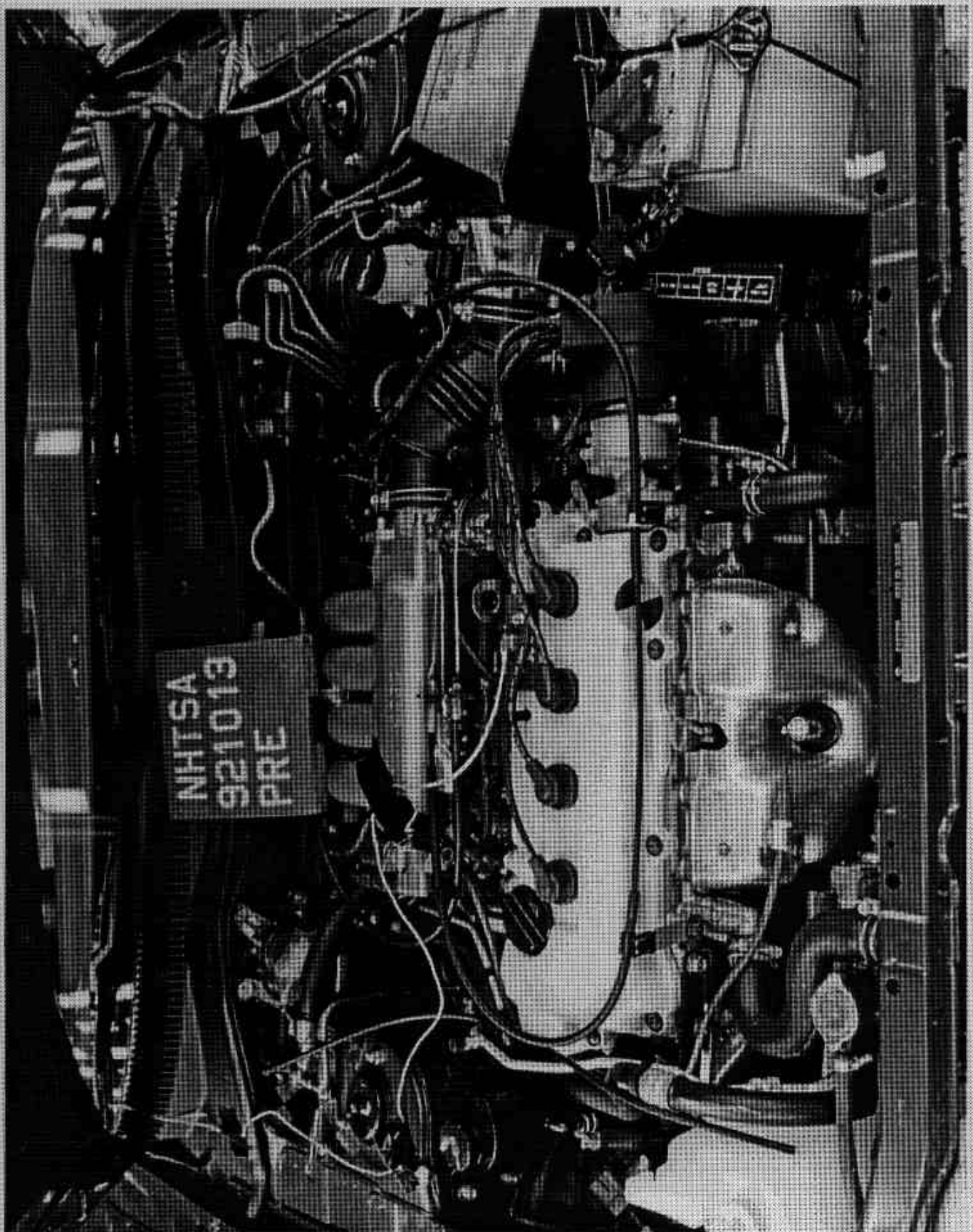


FIGURE A-15. PRE-TEST ENGINE COMPARTMENT VIEW

A-16

921013

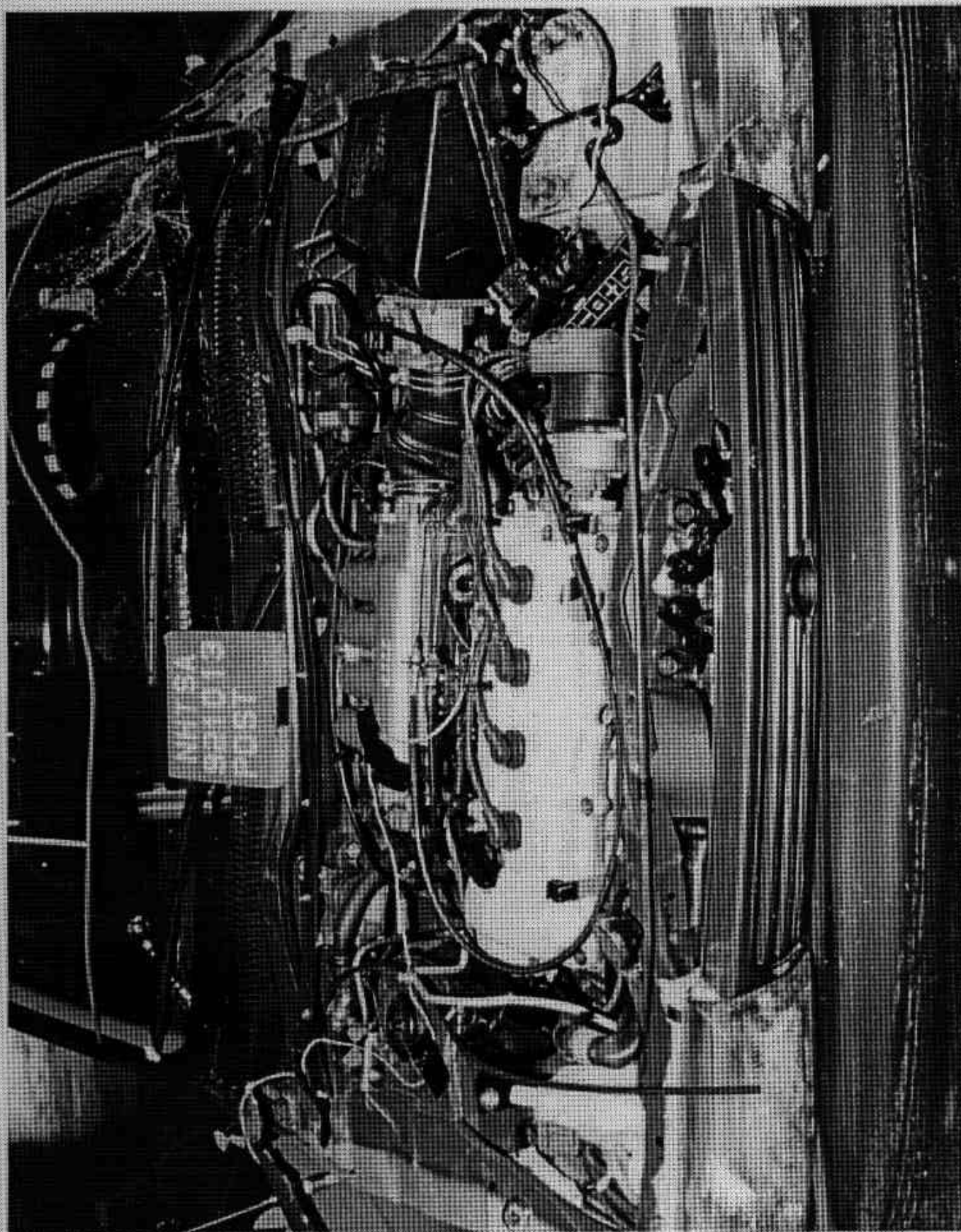


FIGURE A-16. POST-TEST ENGINE COMPARTMENT VIEW

A-17

921013

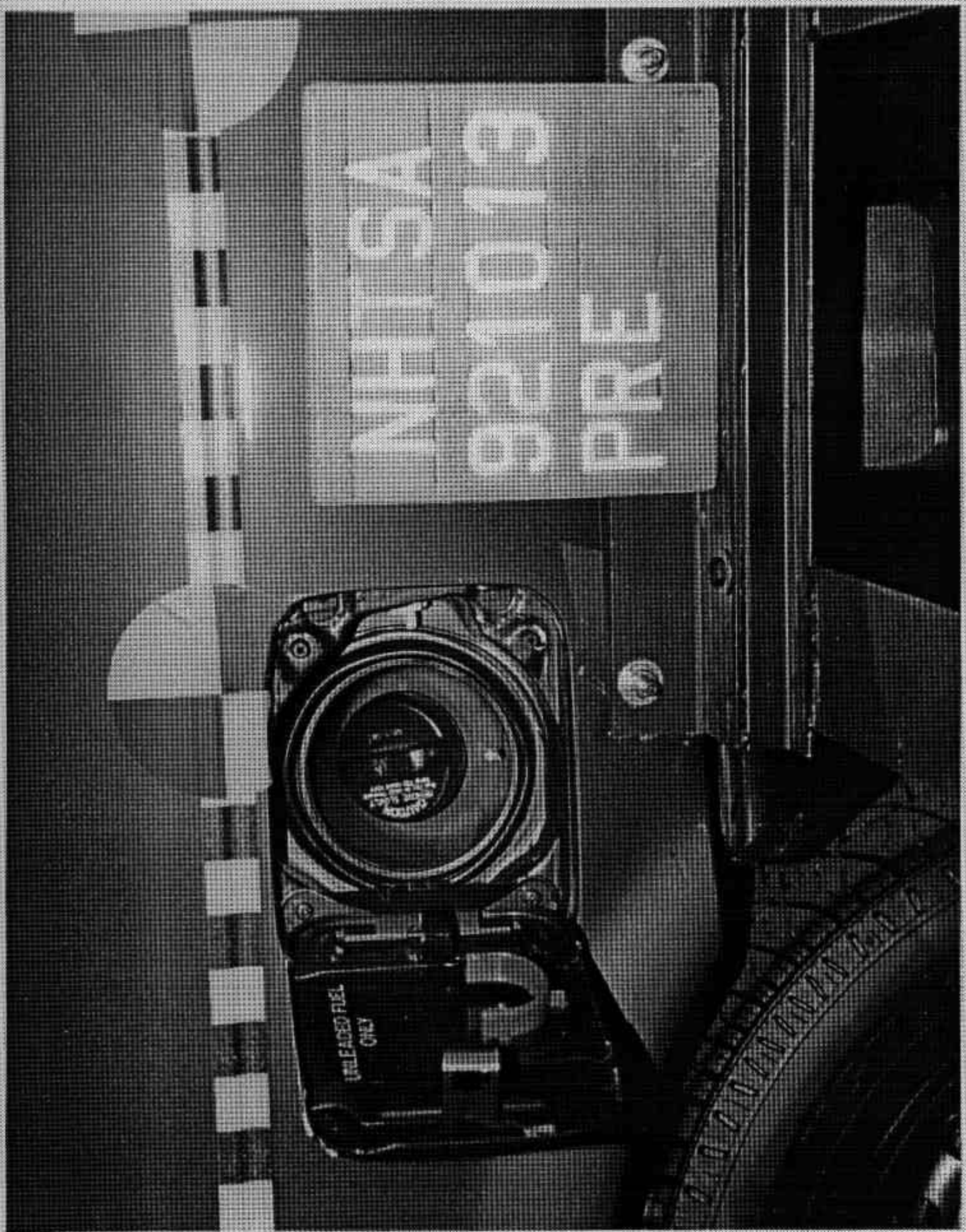


FIGURE A-17. PRE-TEST FUEL FILLER CAP VIEW

A-18

921013

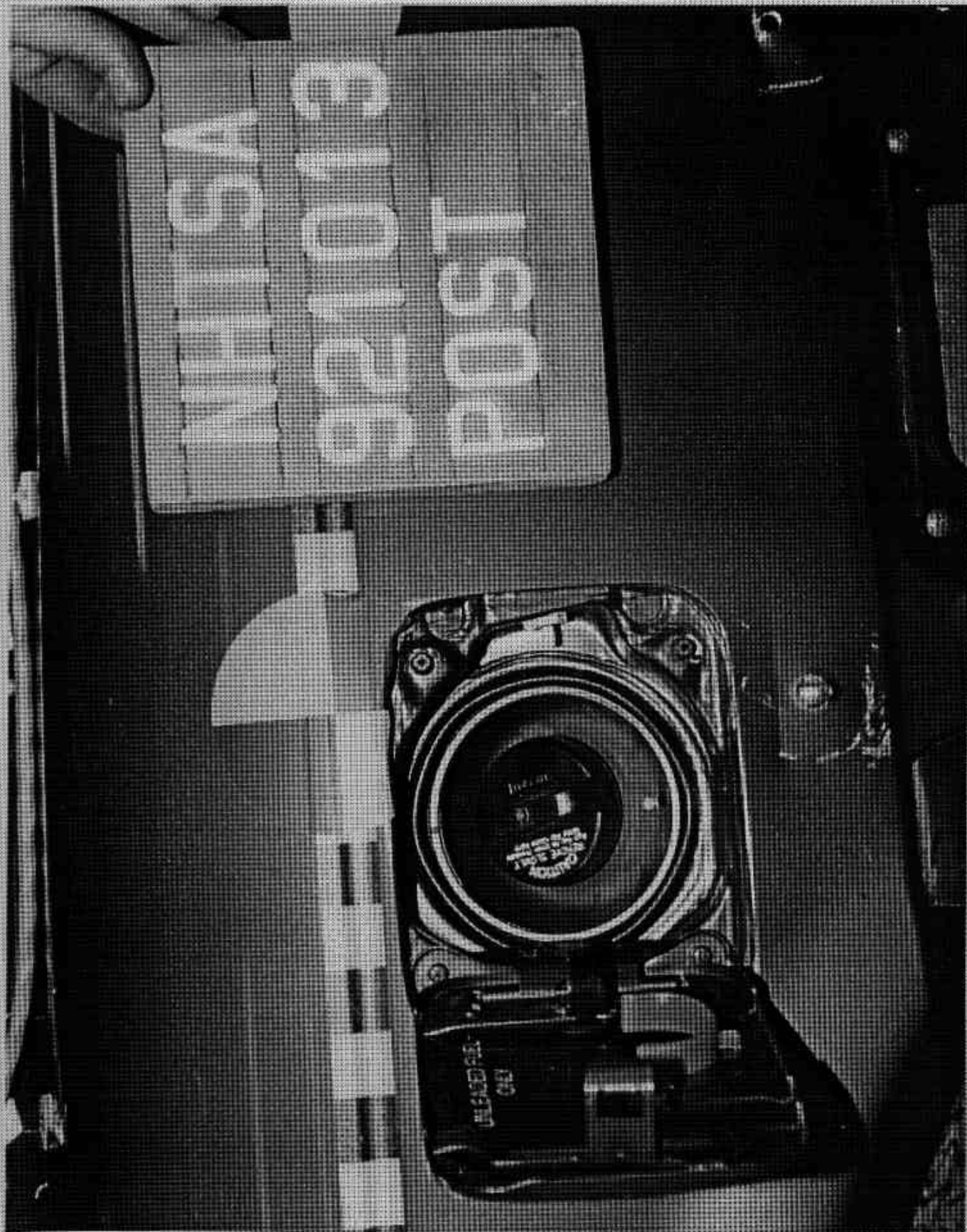


FIGURE A-18. POST-TEST FUEL FILLER CAP VIEW

A-19

921013



FIGURE A-19. PRE-TEST FUEL FILLER NECK VIEW

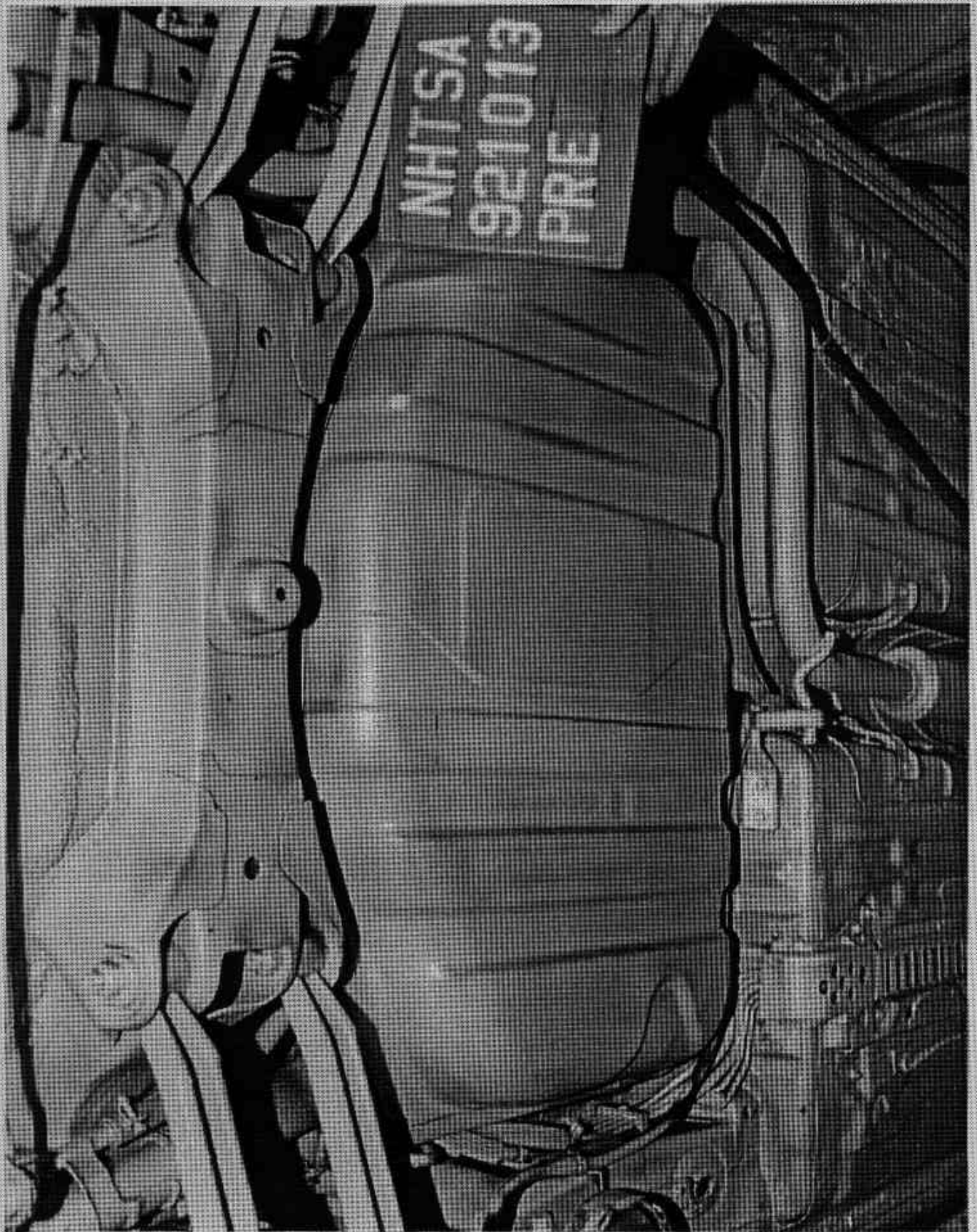


FIGURE A-20. PRE-TEST FUEL TANK VIEW
A-21

921013



FIGURE A-21. POST-TEST FUEL TANK VIEW
A-22

921013



FIGURE A-22. PRE-TEST FRONT UNDERBODY VIEW

A-23

921013

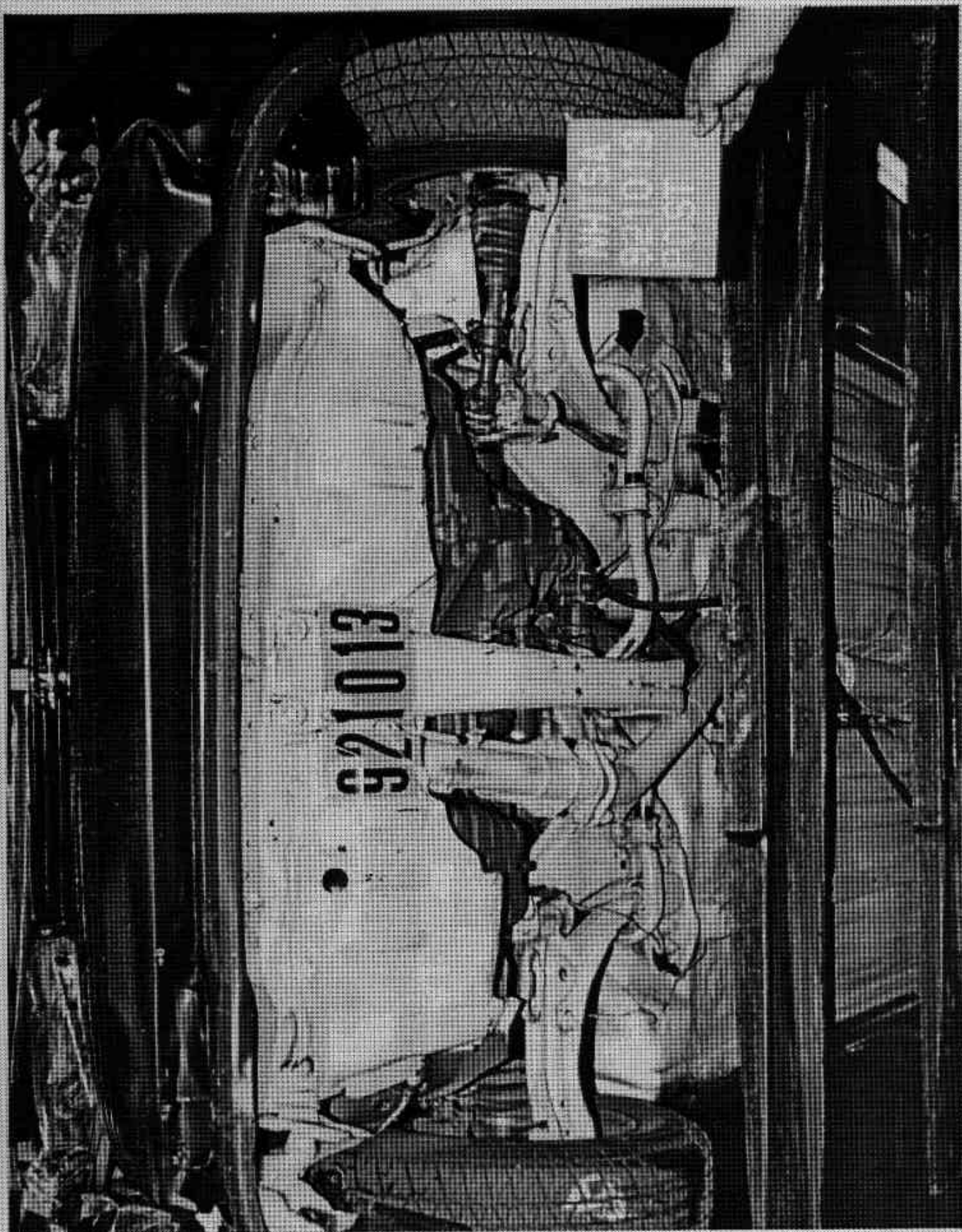


FIGURE A-23. POST-TEST FRONT UNDERBODY VIEW

A-24

921013

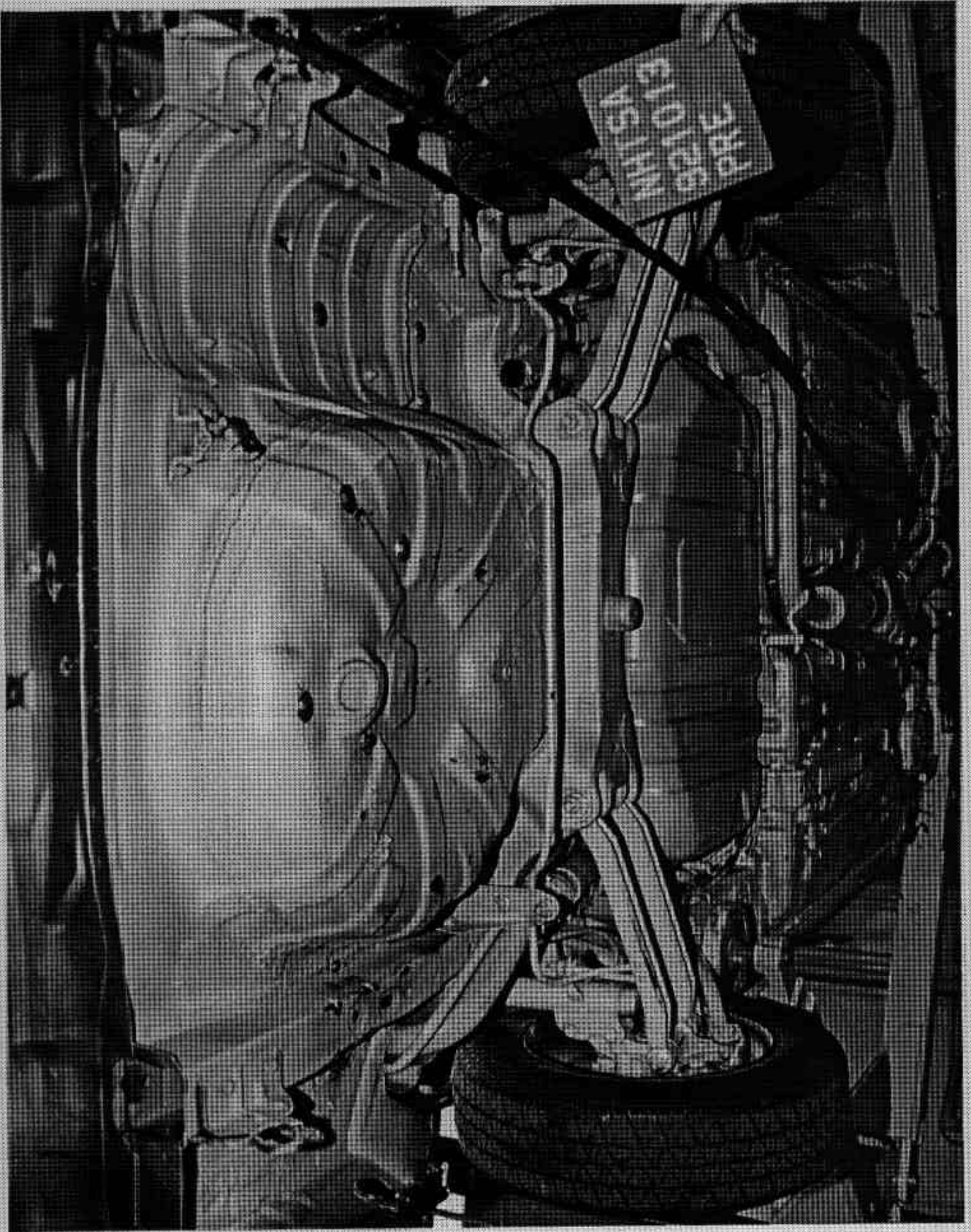


FIGURE A-24. PRE-TEST REAR UNDERBODY VIEW

A-25

921013

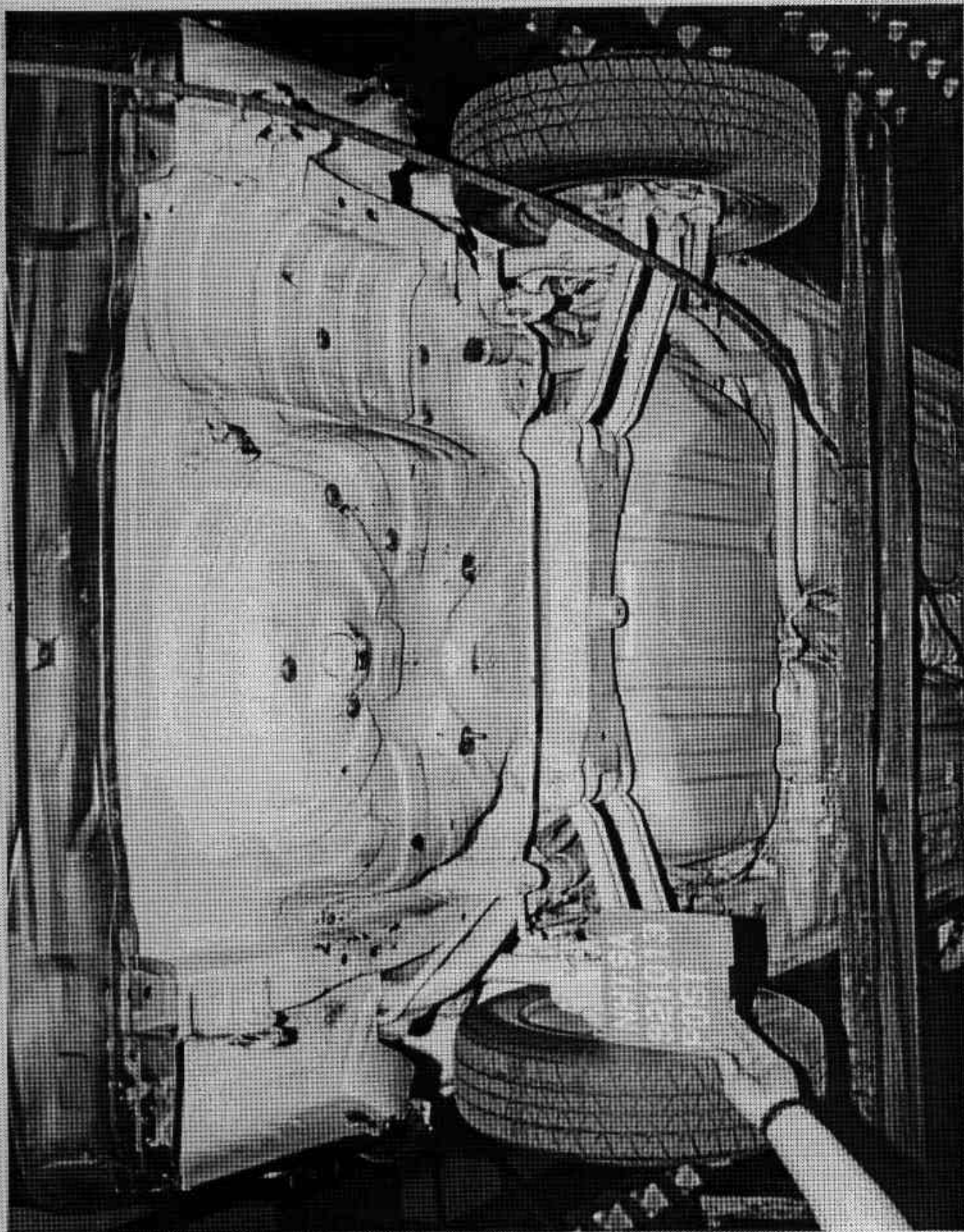


FIGURE A-25. POST-TEST REAR UNDERBODY VIEW

A-26

921013



FIGURE A-26. PRE-TEST DRIVER DUMMY POSITION VIEW

A-27

921013

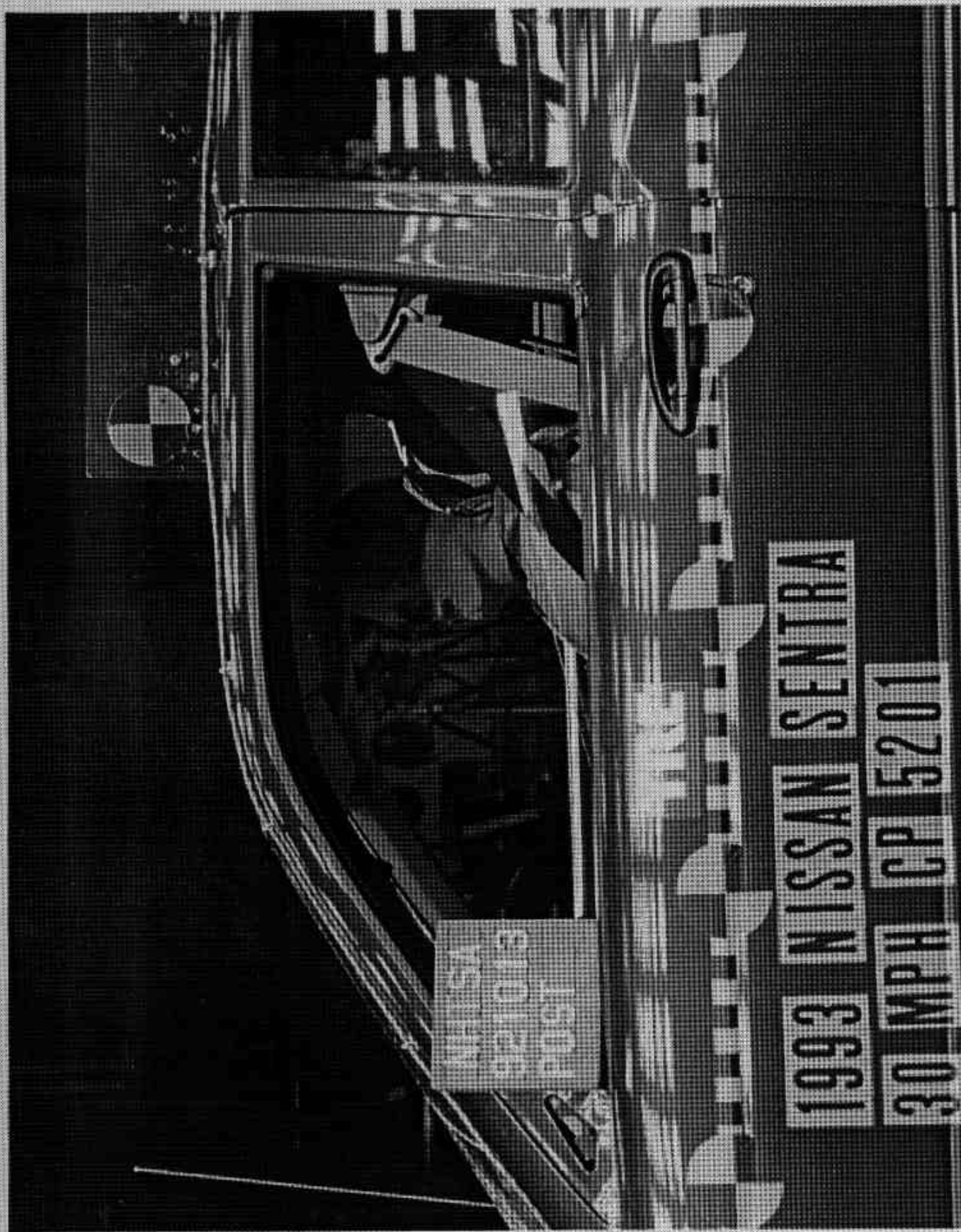


FIGURE A-27. POST-TEST DRIVER DUMMY POSITION VIEW



FIGURE A-28. PRE-TEST PASSENGER DUMMY POSITION VIEW

A-29

921013

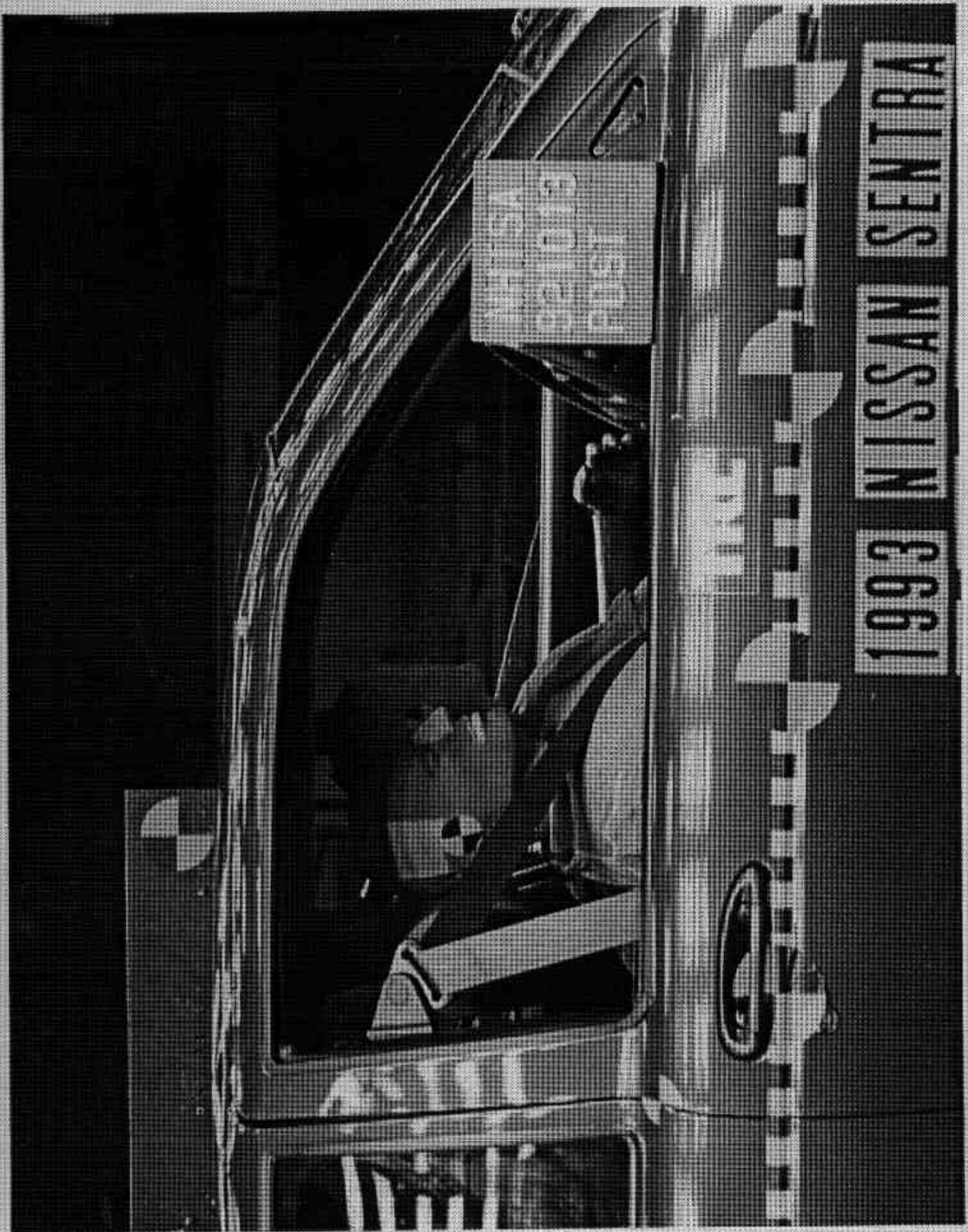


FIGURE A-29. POST-TEST PASSENGER DUMMY POSITION VIEW

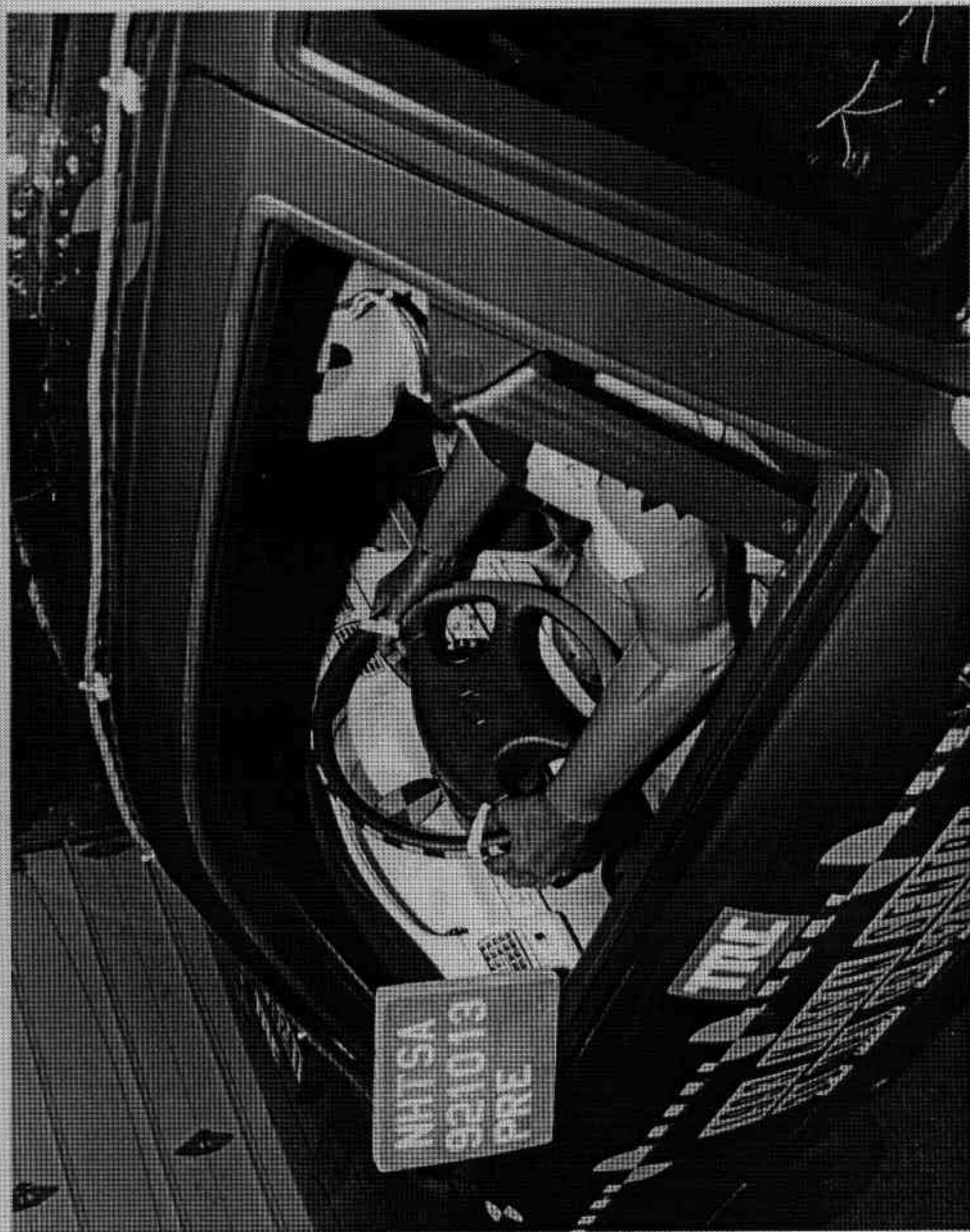


FIGURE A-30. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR VIEW



FIGURE A-31. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1



FIGURE A-32. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

A-33

921013

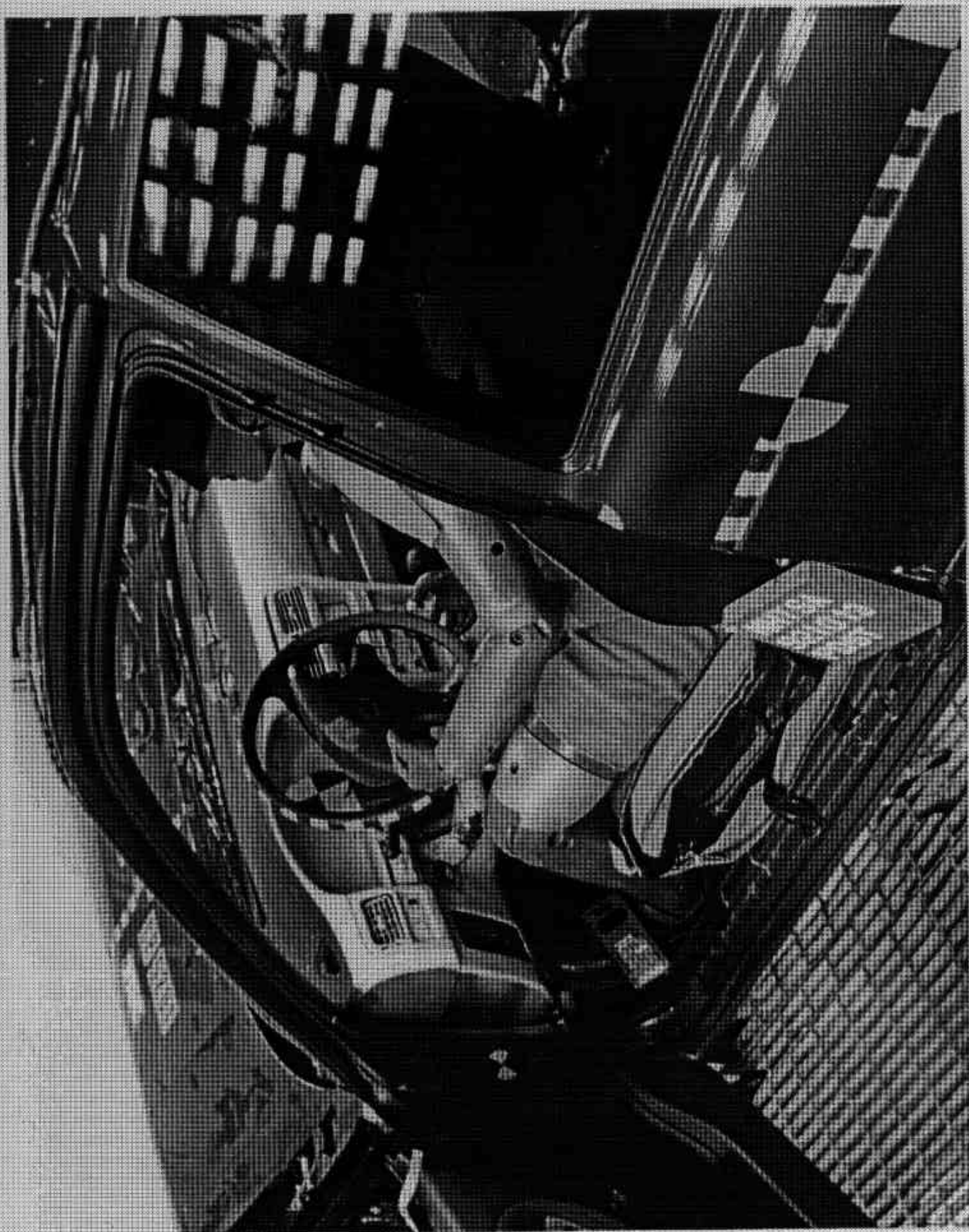


FIGURE A-33. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 3

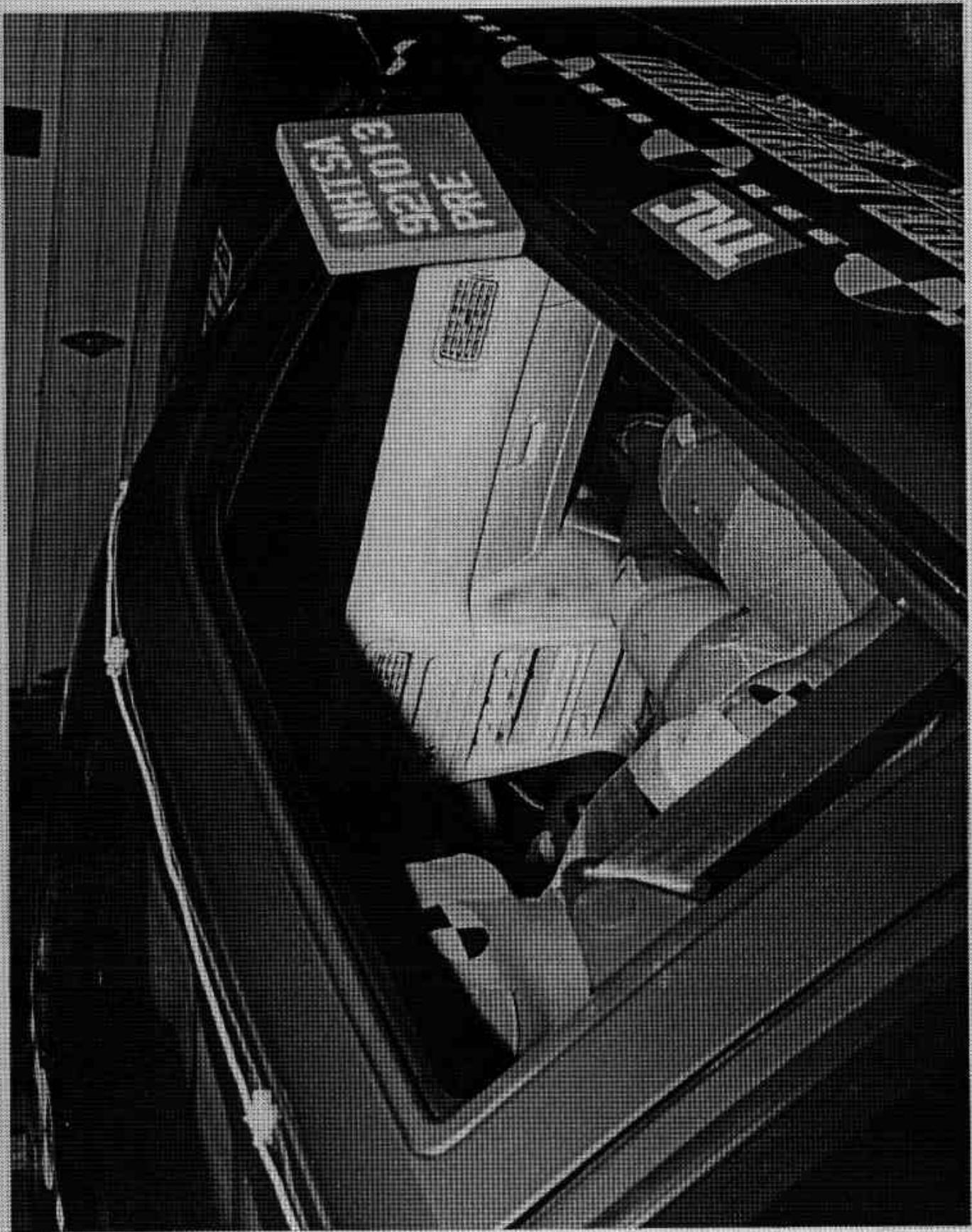


FIGURE A-34. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW

A-35

921013



FIGURE A-35. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1
A-36 921013



FIGURE A-36. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2
A-37 921013



FIGURE A-37. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 3
A-38 921013

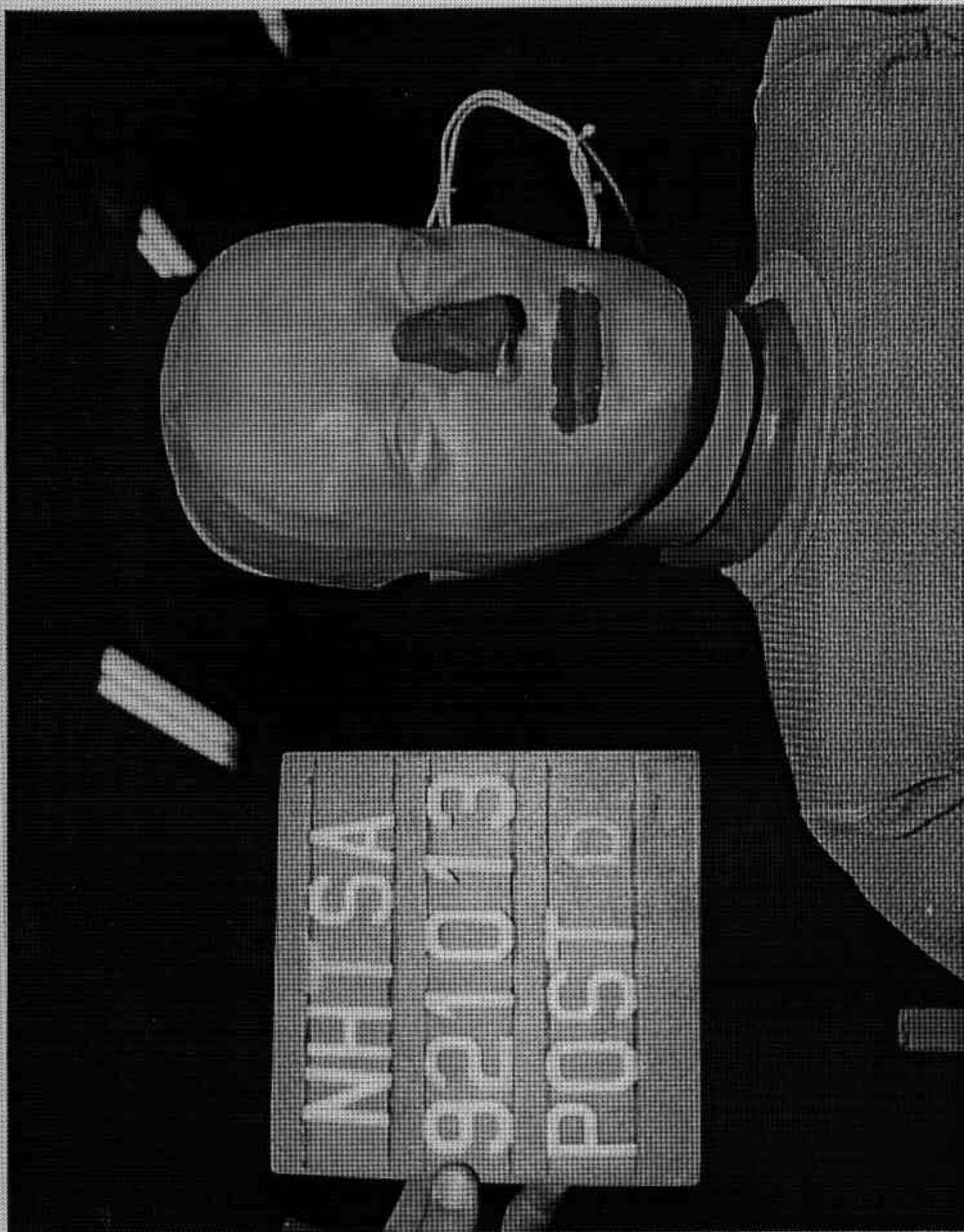


FIGURE A-38. POST-TEST DRIVER DUMMY HEAD CONTACT VIEW

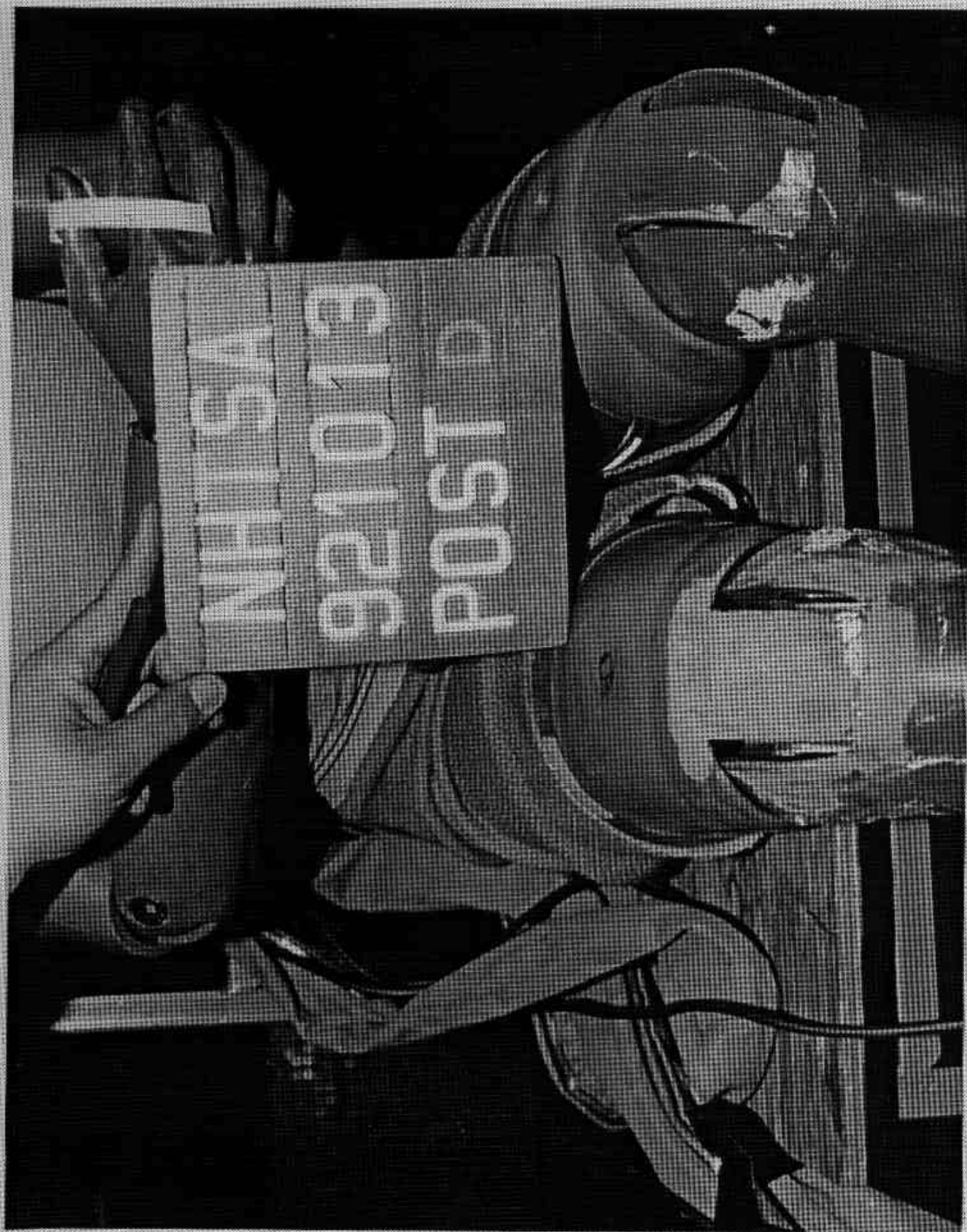


FIGURE A-39. POST-TEST DRIVER DUMMY KNEE CONTACT VIEW

A-40

921013



FIGURE A-40, POST-TEST DRIVER DUMMY HEAD & KNEE CONTACT VIEW

A-41

921013



FIGURE A-41. POST-TEST PASSENGER DUMMY HEAD CONTACT VIEW

A-42

921013



FIGURE A-42. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1

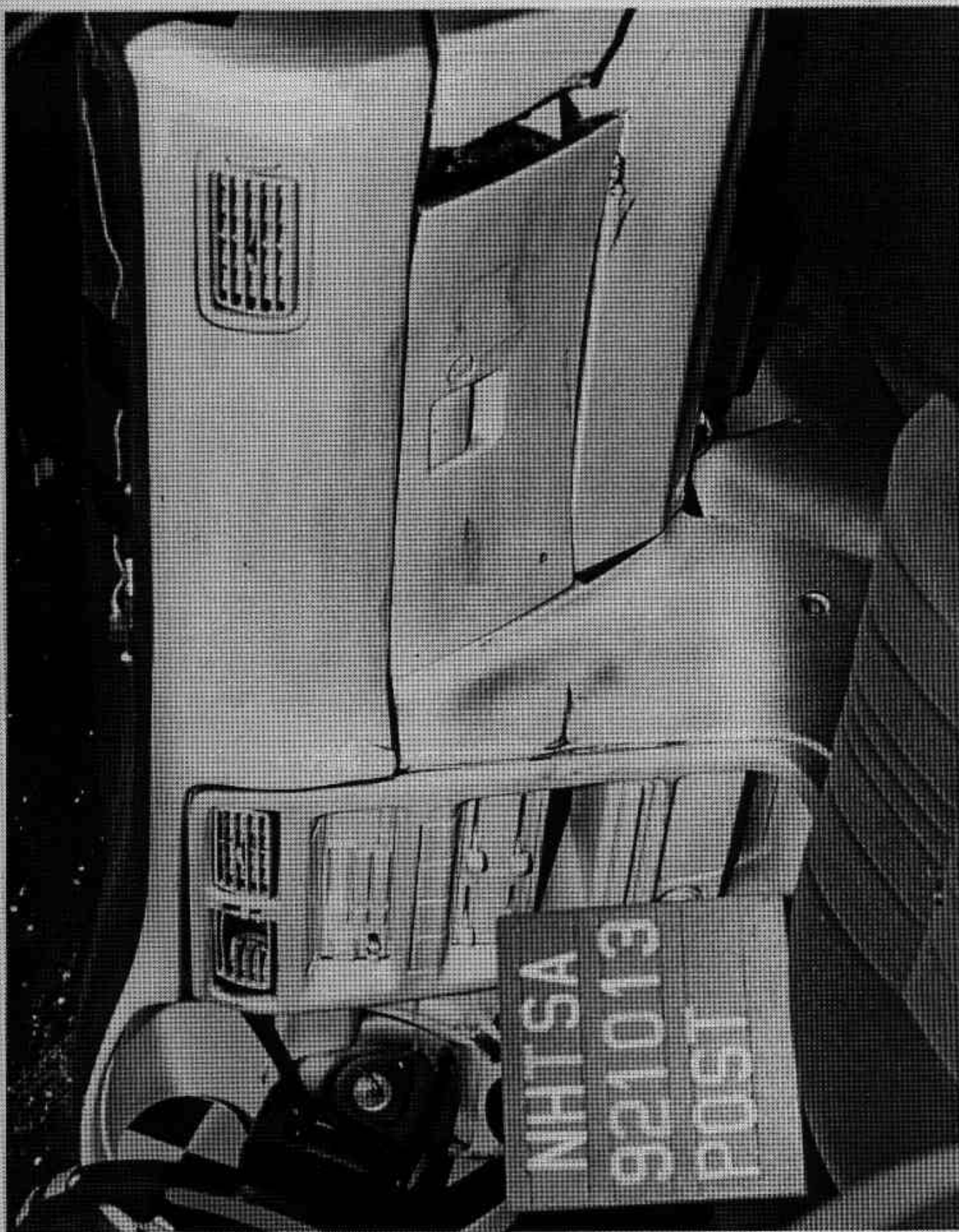


FIGURE A-43. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

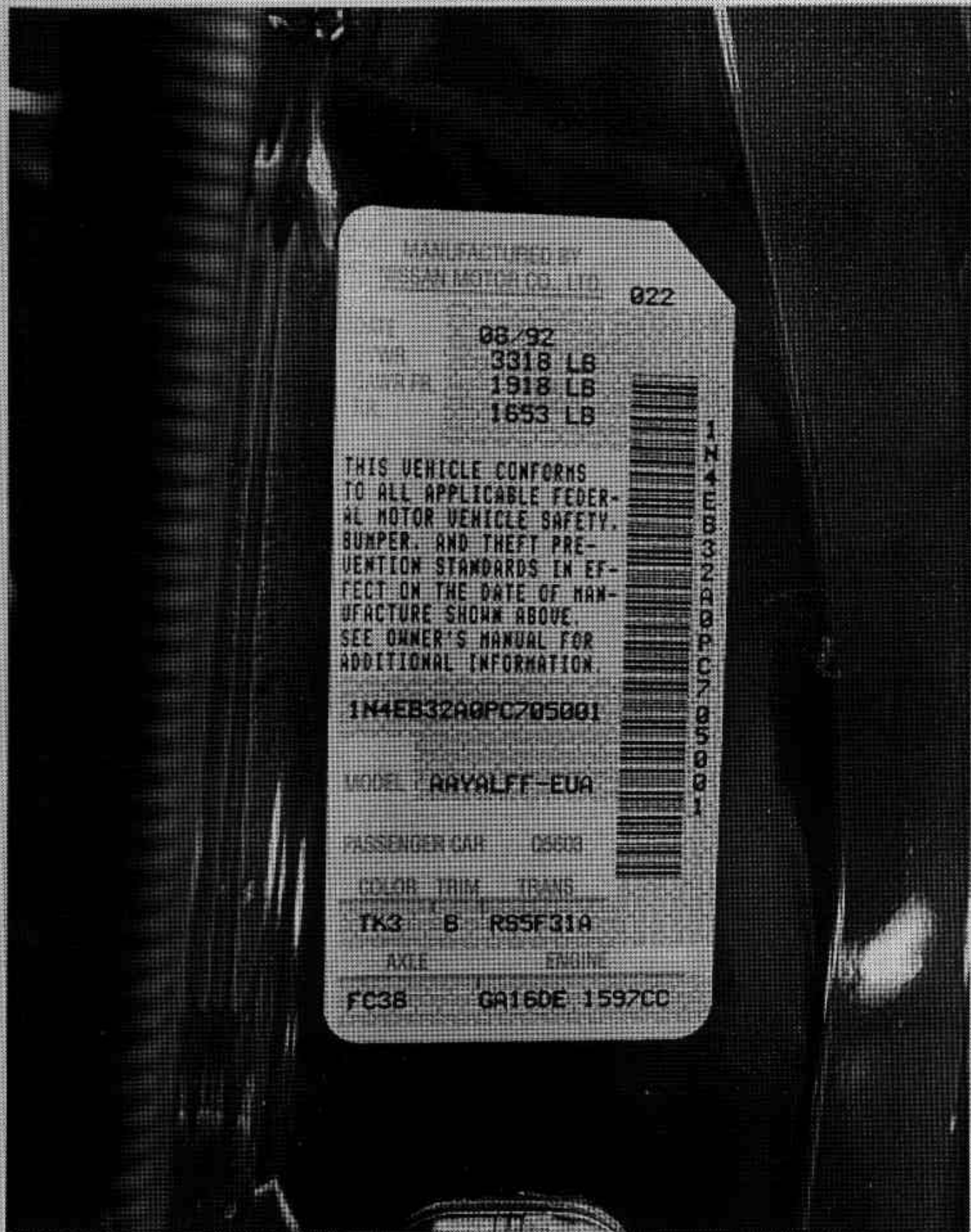


FIGURE A-44. PRE-TEST VEHICLE CERTIFICATION LABEL VIEW



FIGURE A-45. PRE-TEST VEHICLE RECOMMENDED TIRE PRESSURE LABEL VIEW

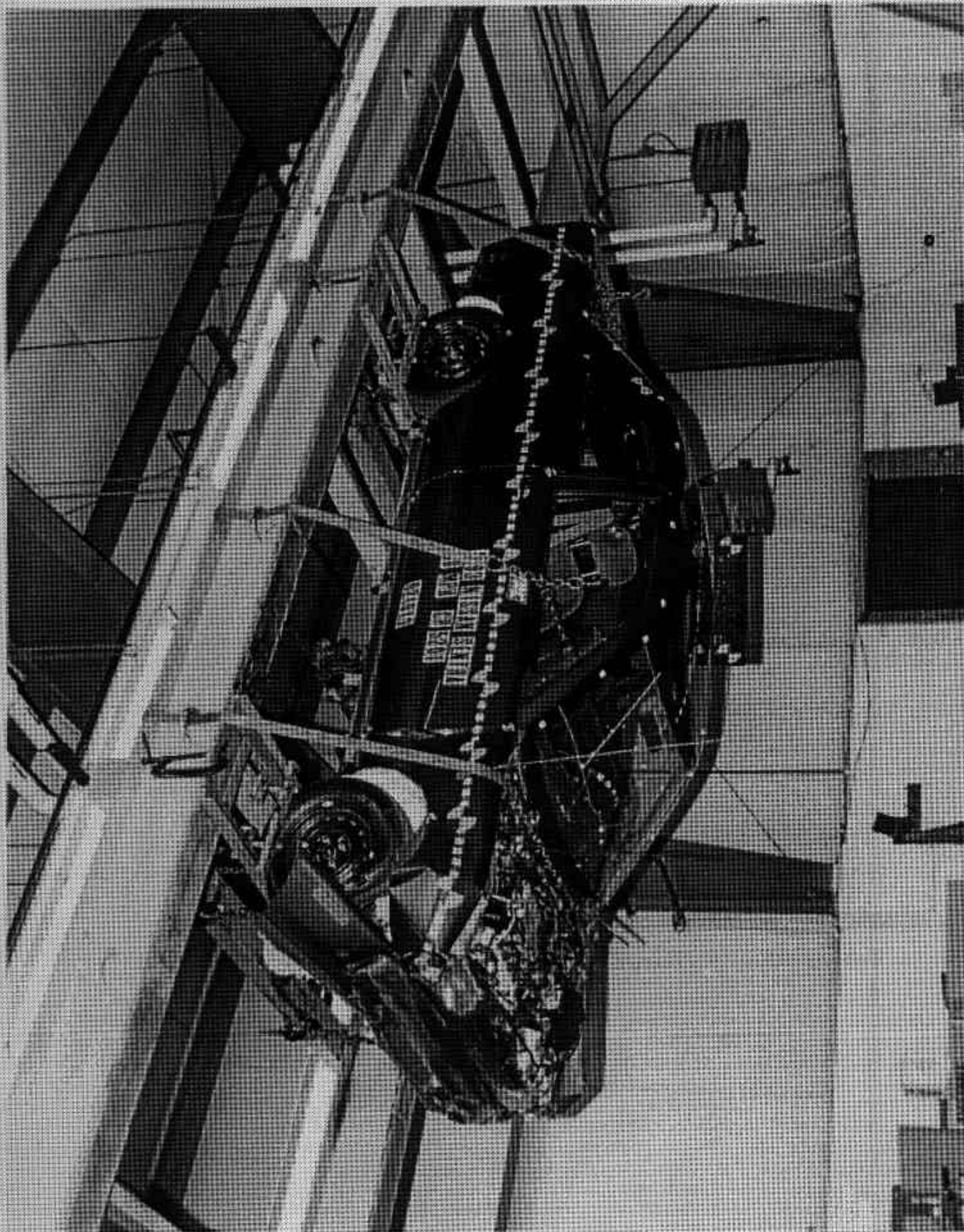


FIGURE A-46. POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW

A-47

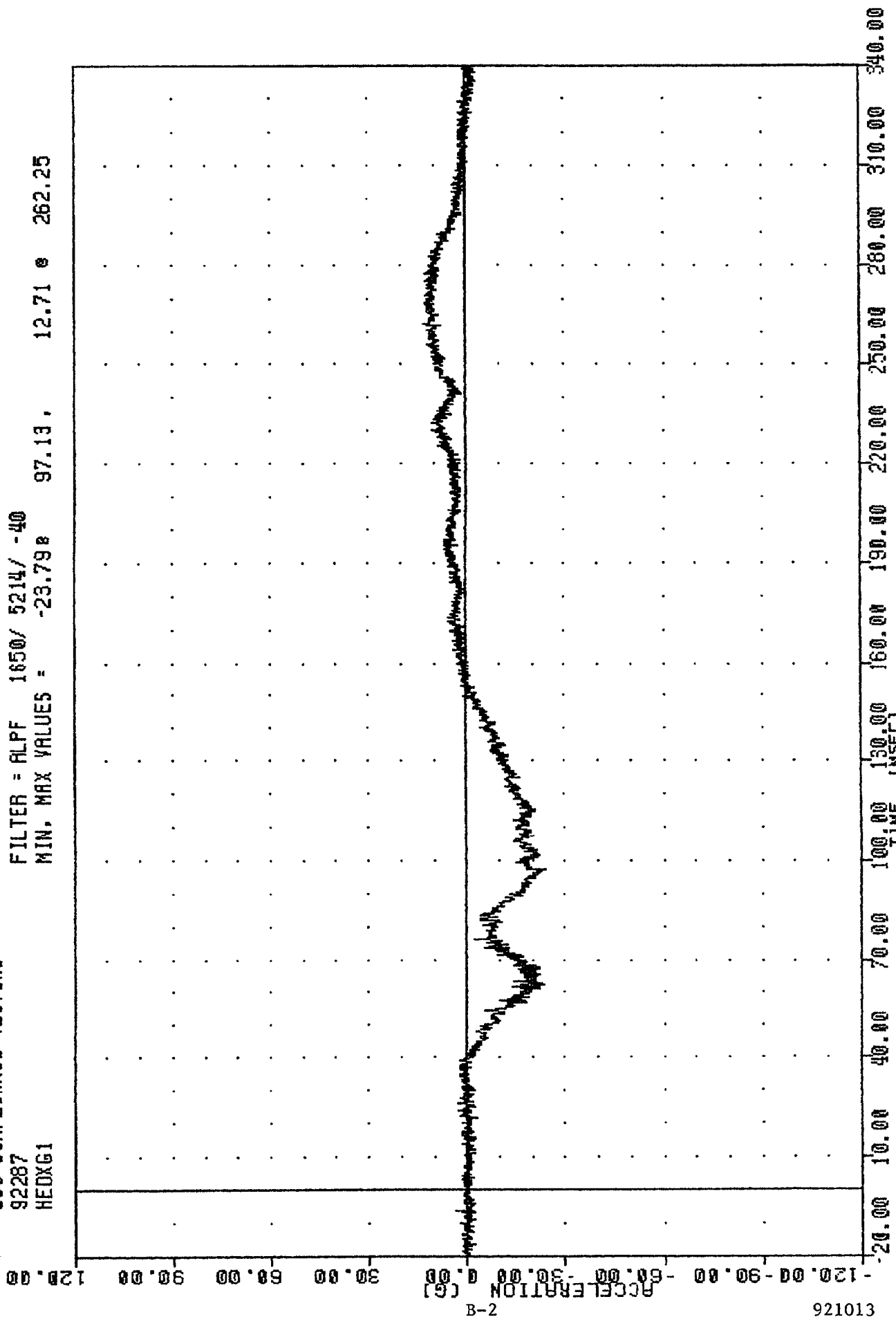
921013

APPENDIX B

DATA PLOTS

TPC , 921013
200 COMPLIANCE TESTING
92287
HEDXG1

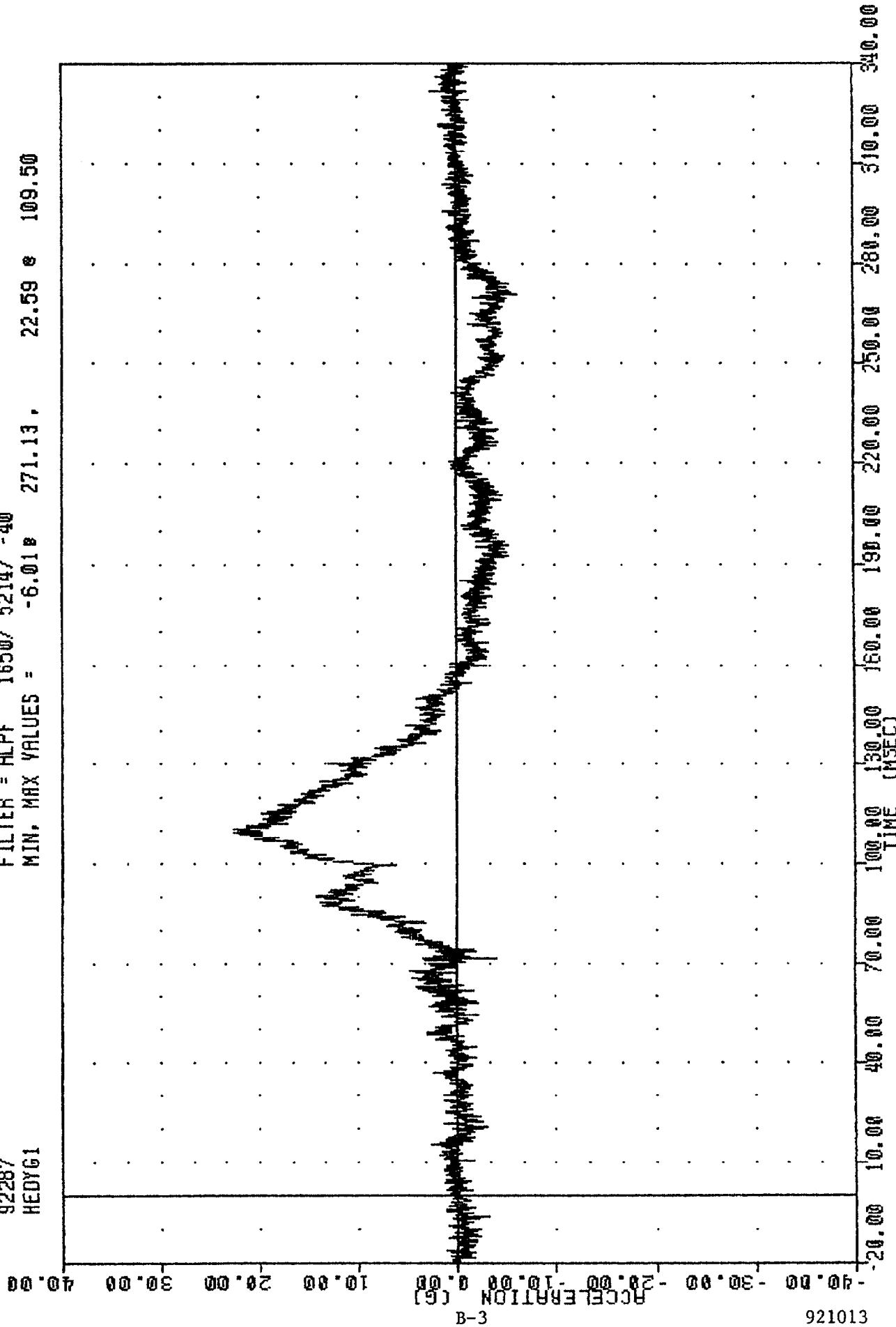
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -23.79 97.13 12.71 262.25



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
DRIVER HEAD X-AXIS ACCELERATION

TRC 921013
200 COMPLIANCE TESTING
92287
HEDY61

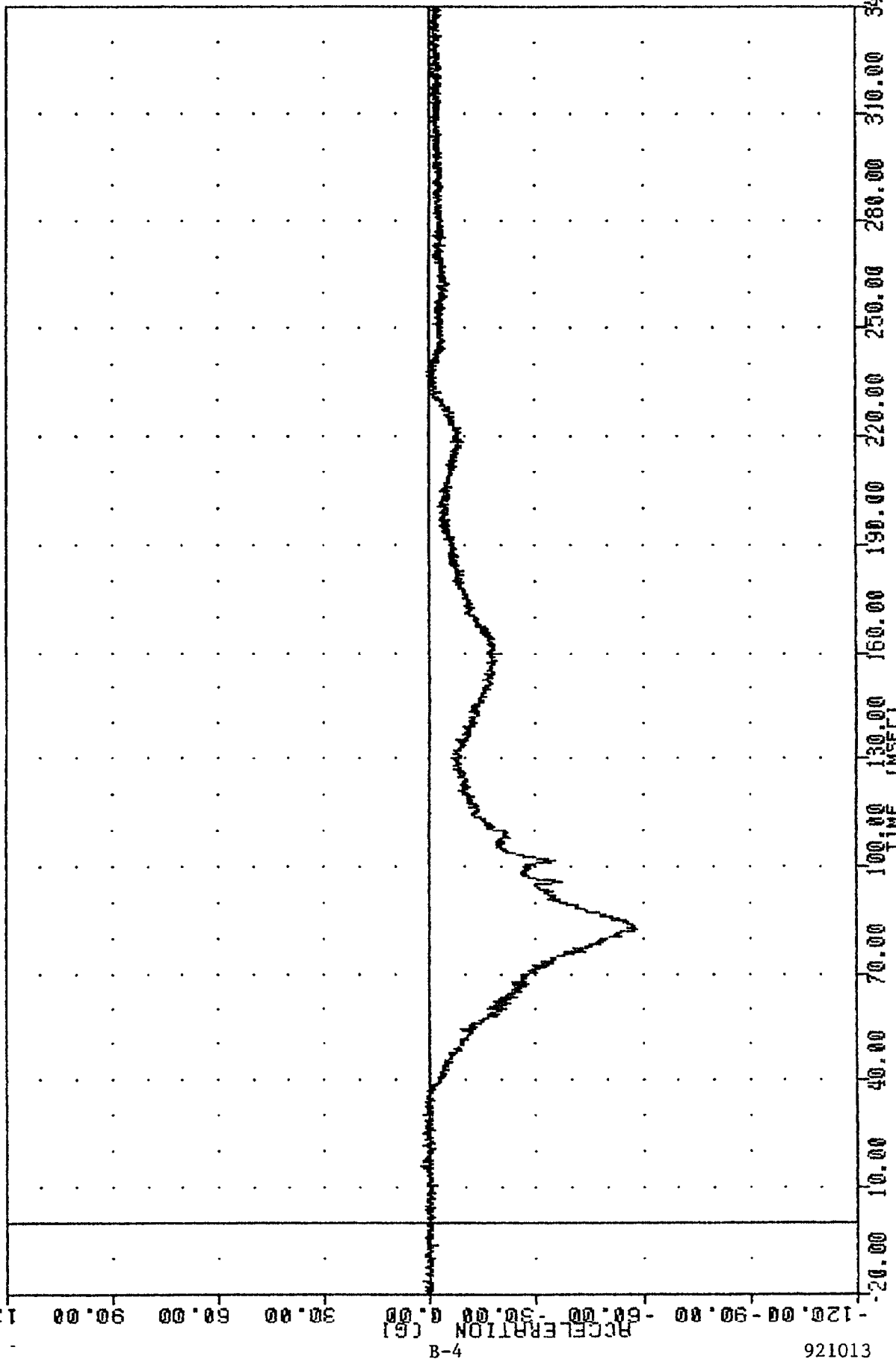
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -6.018 271.13, 22.59 & 109.50



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION

TRC , 921013
 200 COMPLIANCE TESTING
 92287
 HE0261

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -58.628 82.50 , 2.40 e 15.63

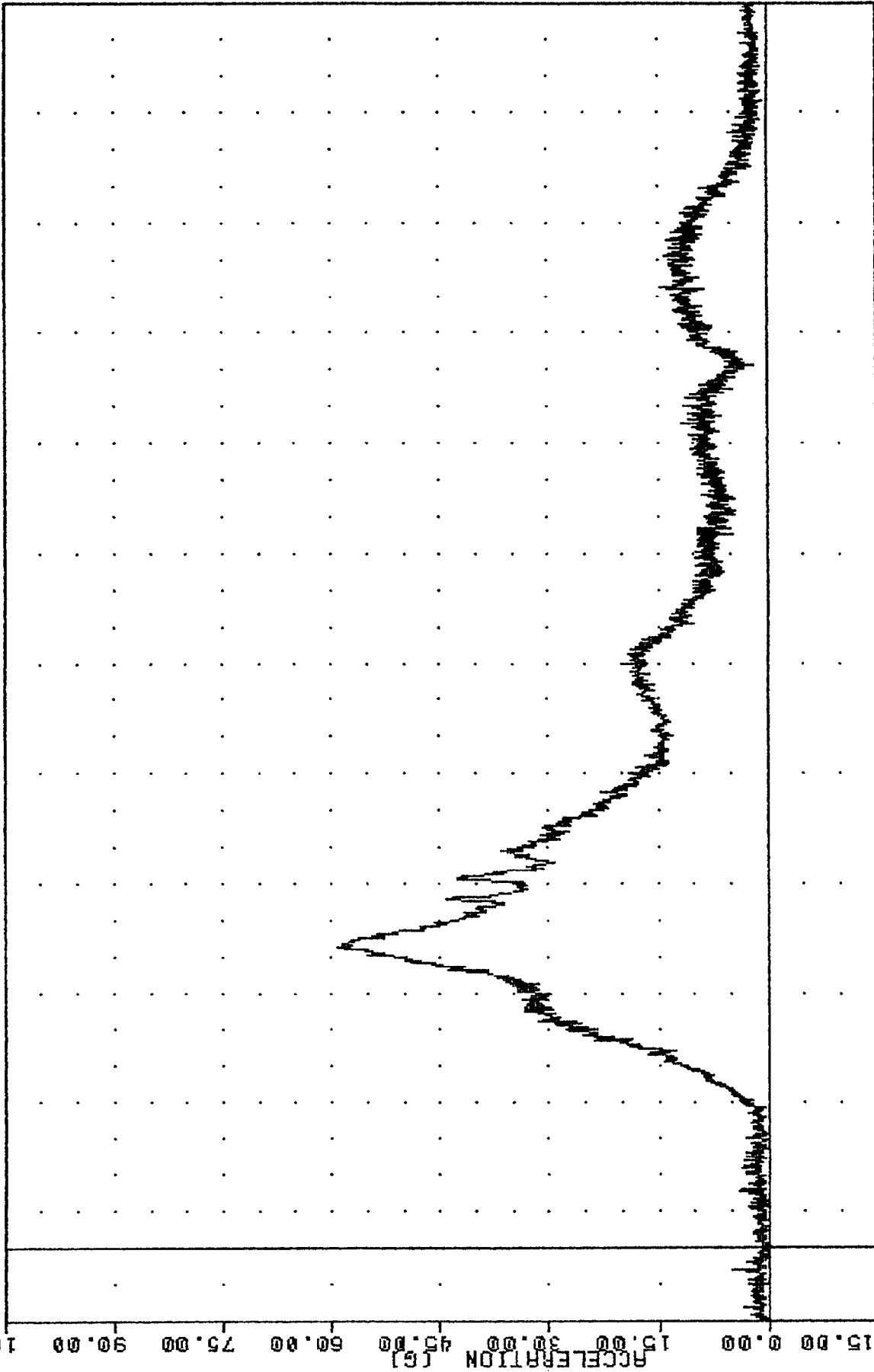


1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
 DRIVER HEAD Z-AXIS ACCELERATION

TRC , 921013
 208 COMPLIANCE TESTING
 92287
 HEDRG1

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.128 11.25, 59.22 @ 82.50

105.00



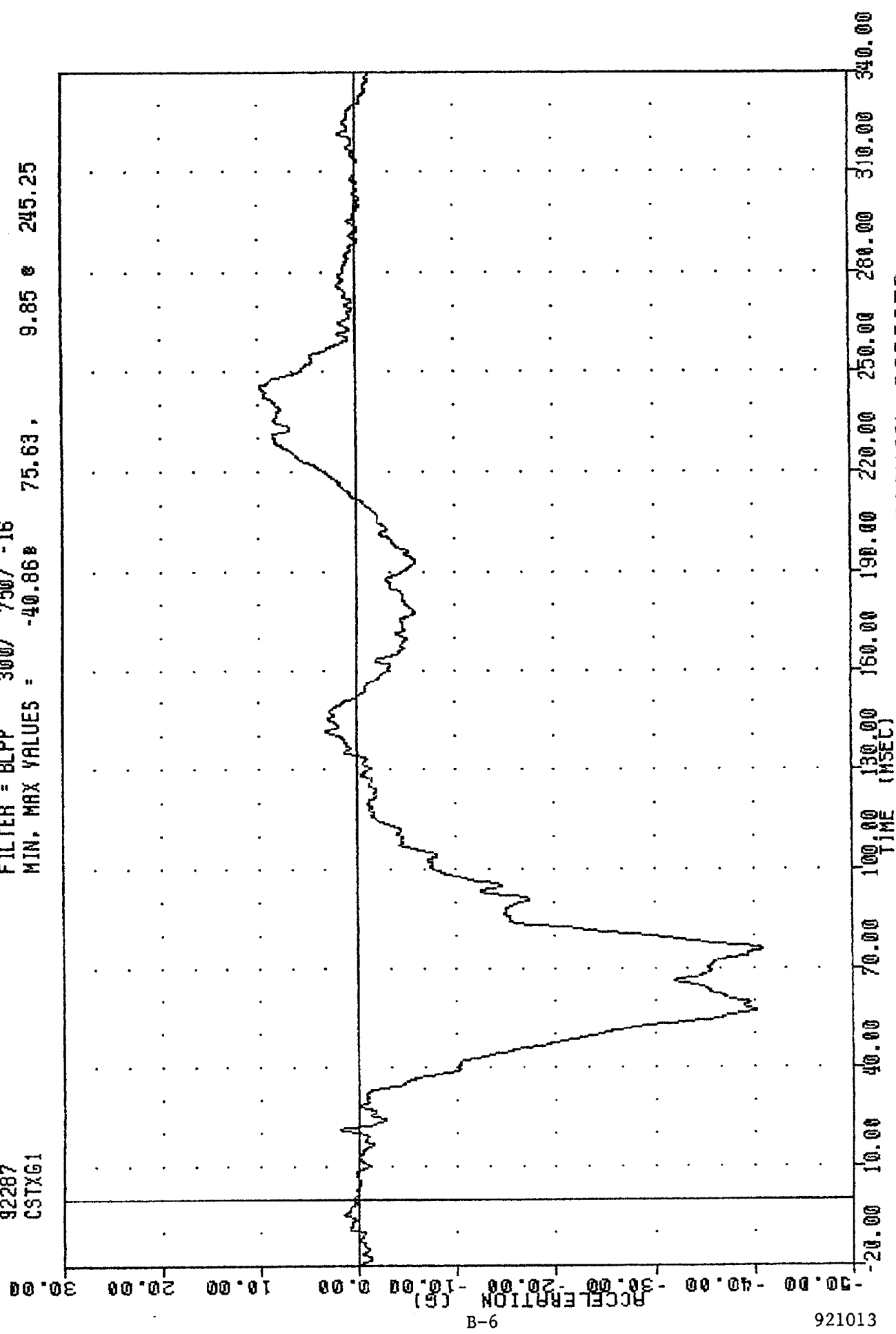
B-5

921013

1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
 DRIVER HEAD RESULTANT ACCELERATION

TRC, 921013
208 COMPLIANCE TESTING
92287
CSTXG1

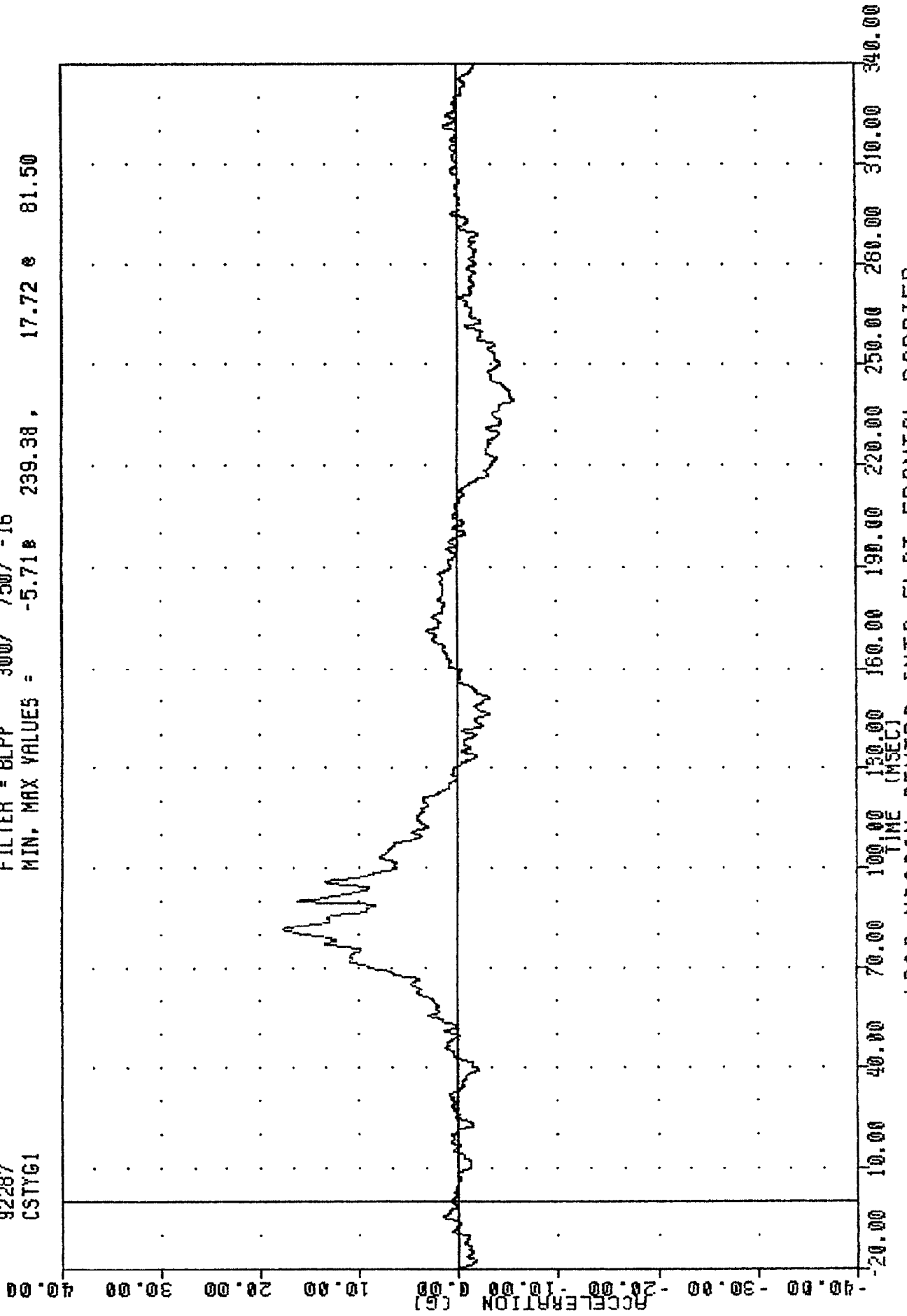
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -40.86e 75.63, 9.85 e 245.25



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
DRIVER CHEST X-AXIS ACCELERATION

TRC , 921013
208 COMPLIANCE TESTING
92287
CSTYG1

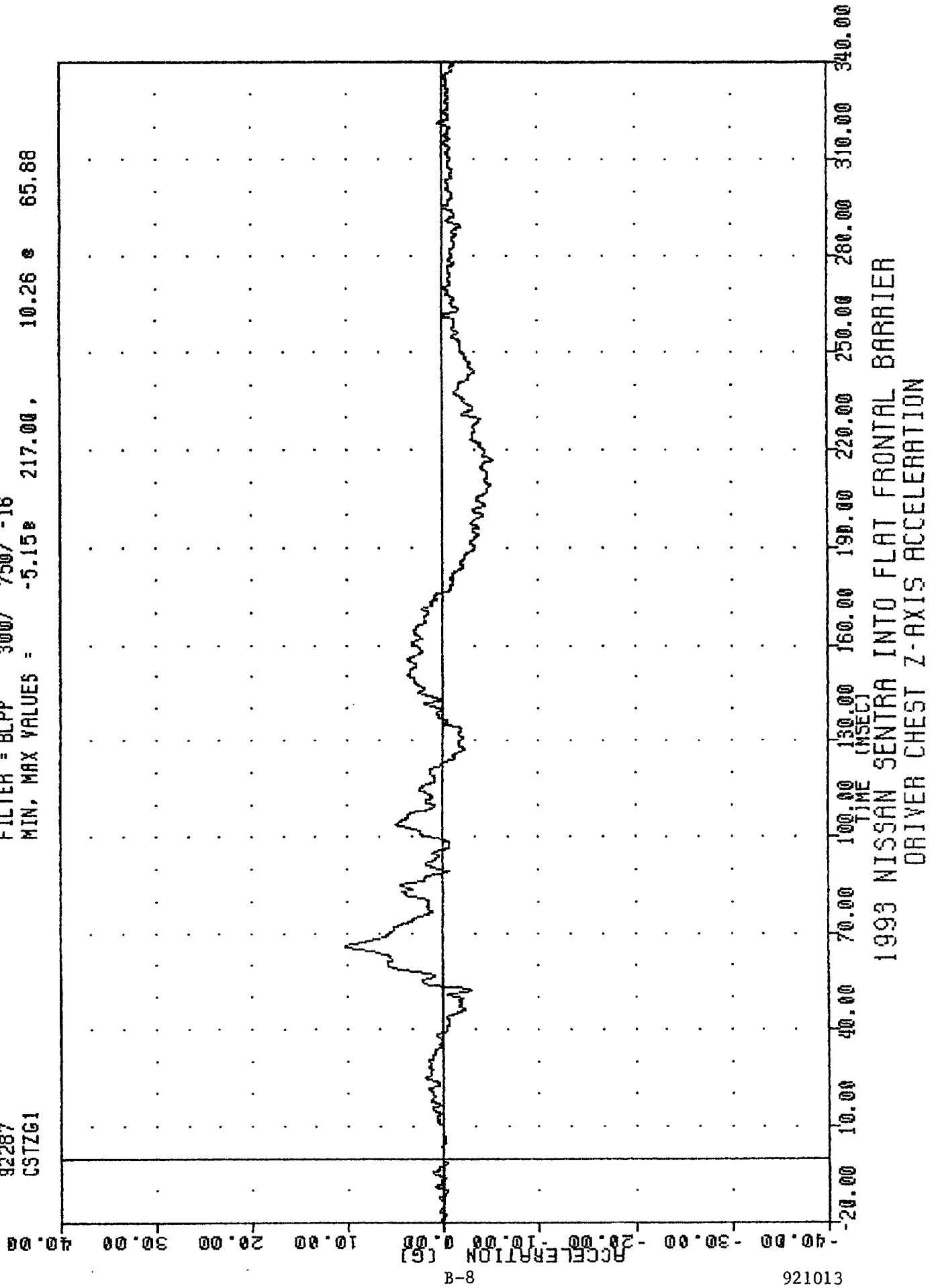
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -5.718 239.38, 17.72 @ 81.50



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION

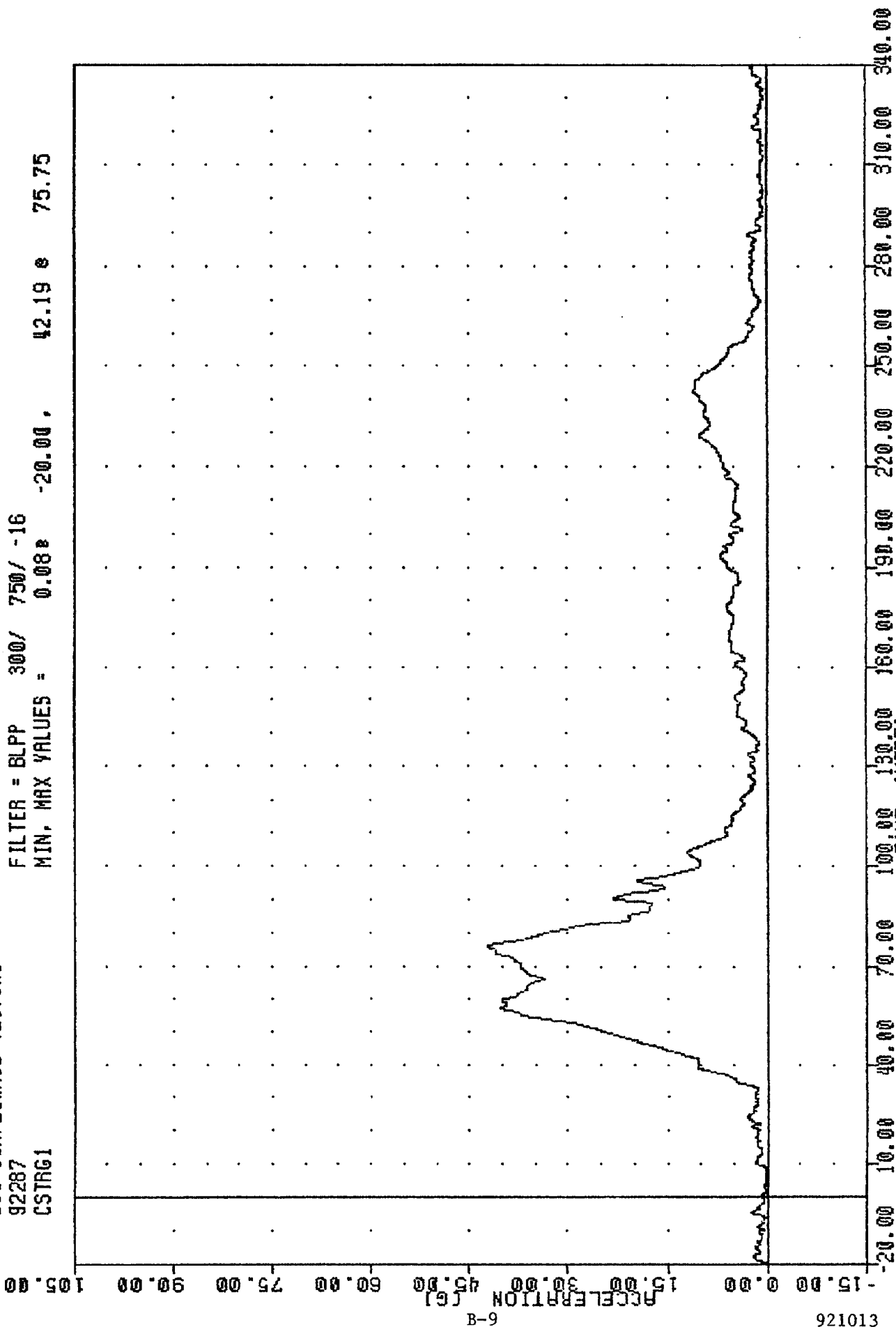
TRC , 921013
208 COMPLIANCE TESTING
92287
CSTZG1

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -5.158 217.00, 10.26 e 65.88



TRC
208 COMPLIANCE TESTING
92287
CSTRG1

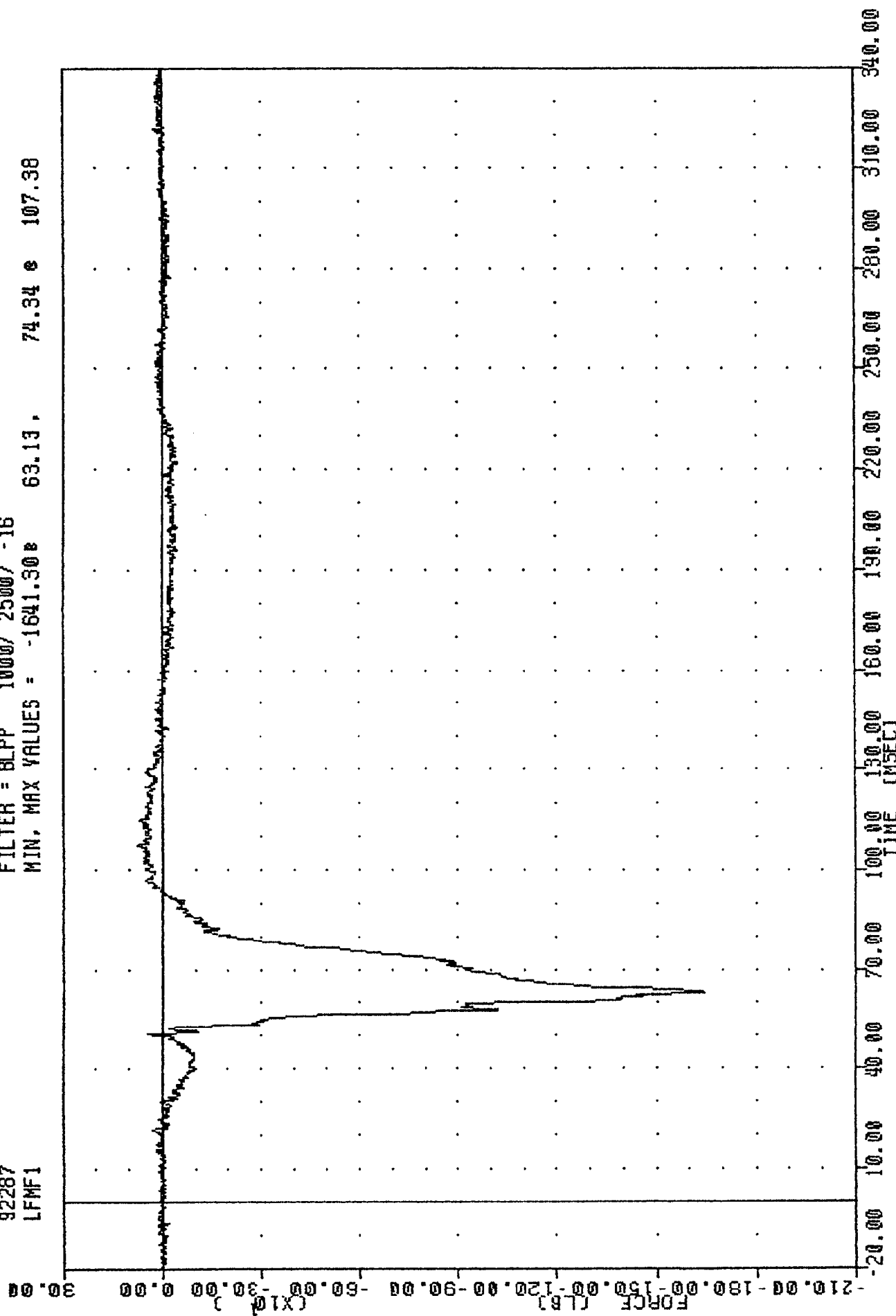
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = 0.088 -20.00, 42.19 & 75.75



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
DRIVER CHEST RESULTANT ACCELERATION

TRC , 921013
 208 COMPLIANCE TESTING
 92287
 LFMF1

FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -1641.30 63.13 74.34 107.38



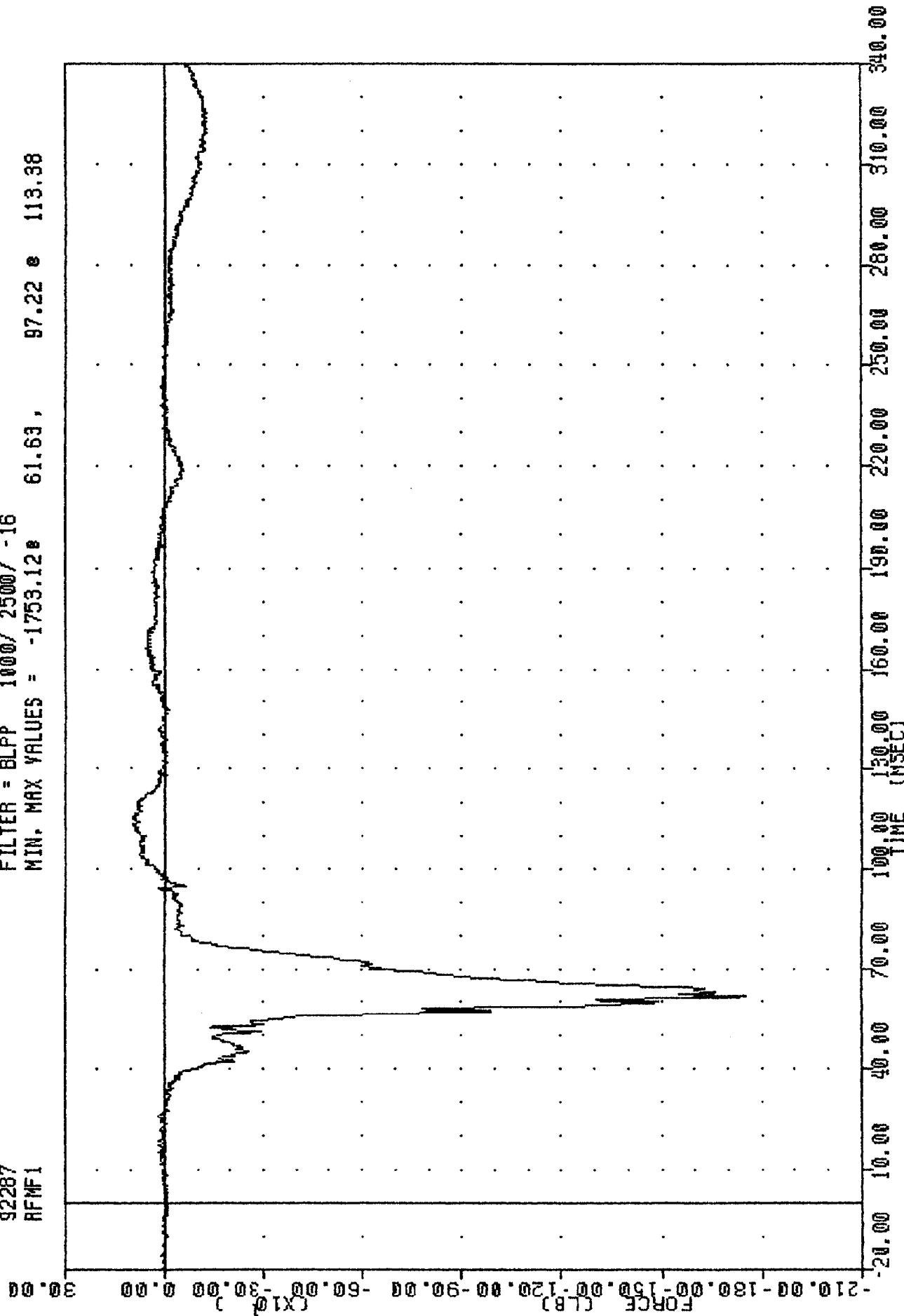
B-10

921013

1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
 DRIVER LEFT FEMUR FORCE

TRC
200 COMPLIANCE TESTING
92287
RFMF1

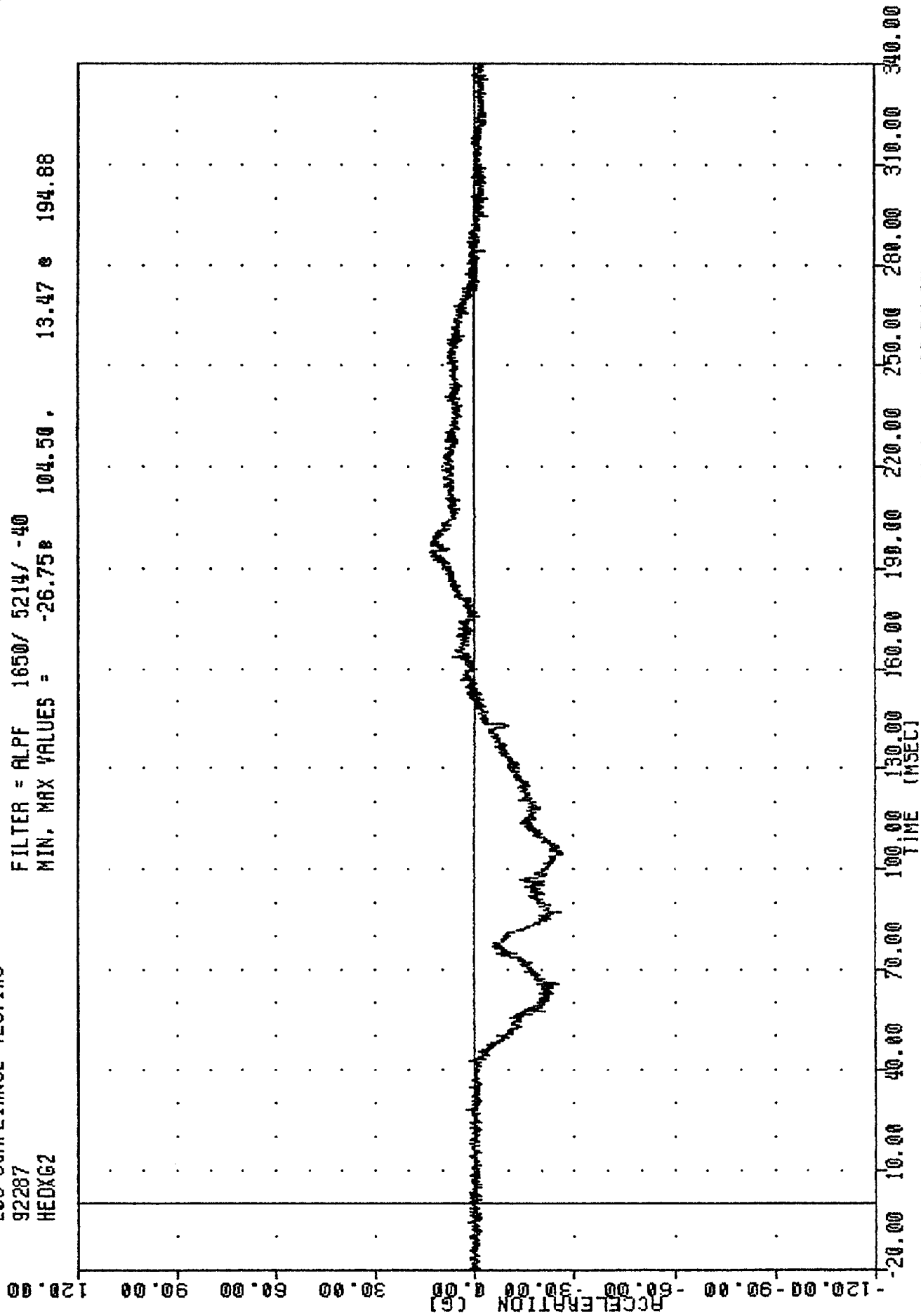
FILTER = BLPP 1000/ 2500/ -16
MIN. MAX VALUES = -1753.12e 61.63, 97.22 e 113.38



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FEMUR FORCE

TRC , 921013
208 COMPLIANCE TESTING
92287
HEDXG2

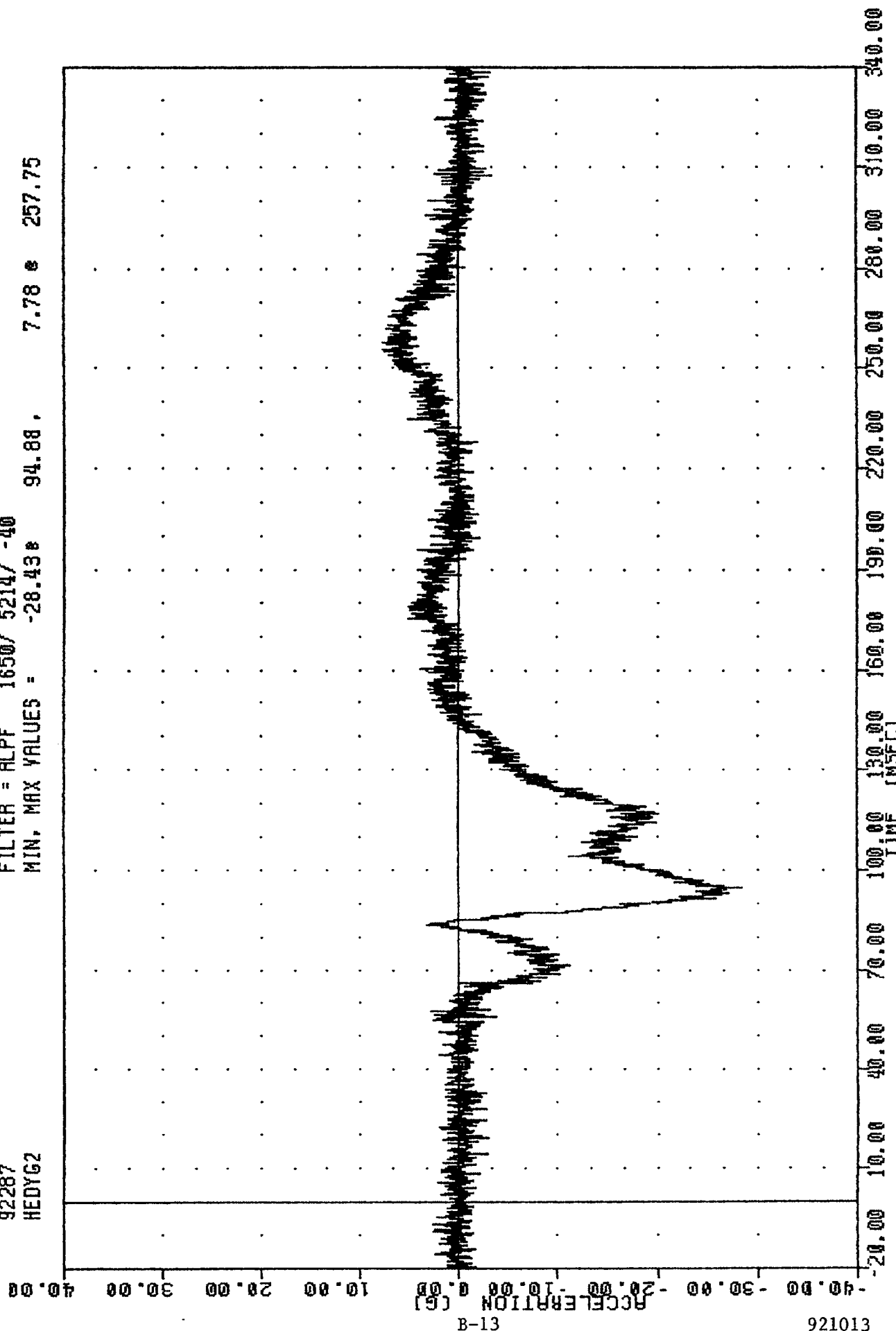
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -26.75 104.50 , 13.47 194.88



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

TRC , 921013
200 COMPLIANCE TESTING
92287
HEDYG2

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -28.43* 94.88, 7.78 * 257.75



B-13

921013

1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

TRC 921013

208 COMPLIANCE TESTING

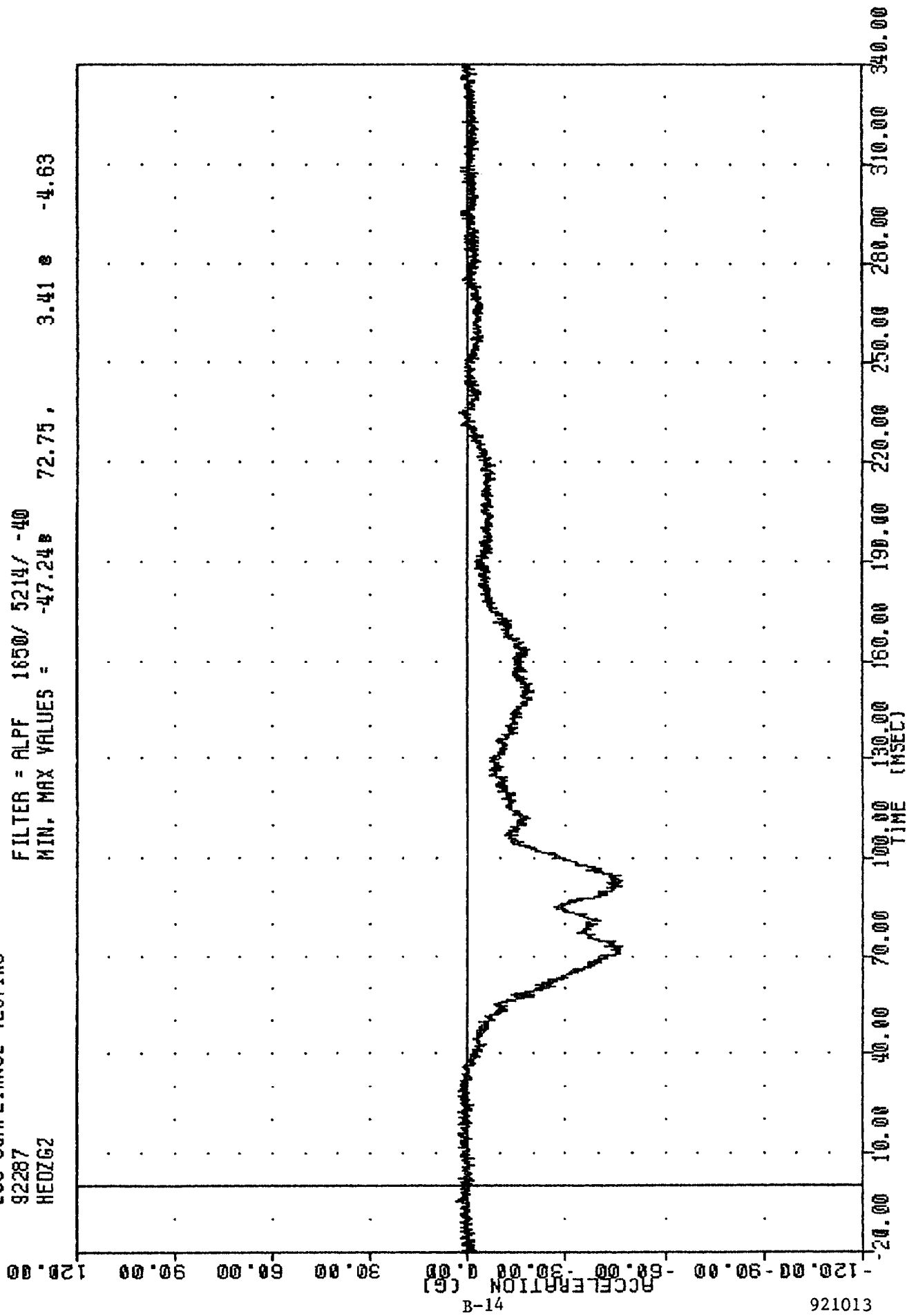
92287

2G703H

FILTER = ALPF 1650/5214/ -40

MIN. MAX VALUES = -57.25-

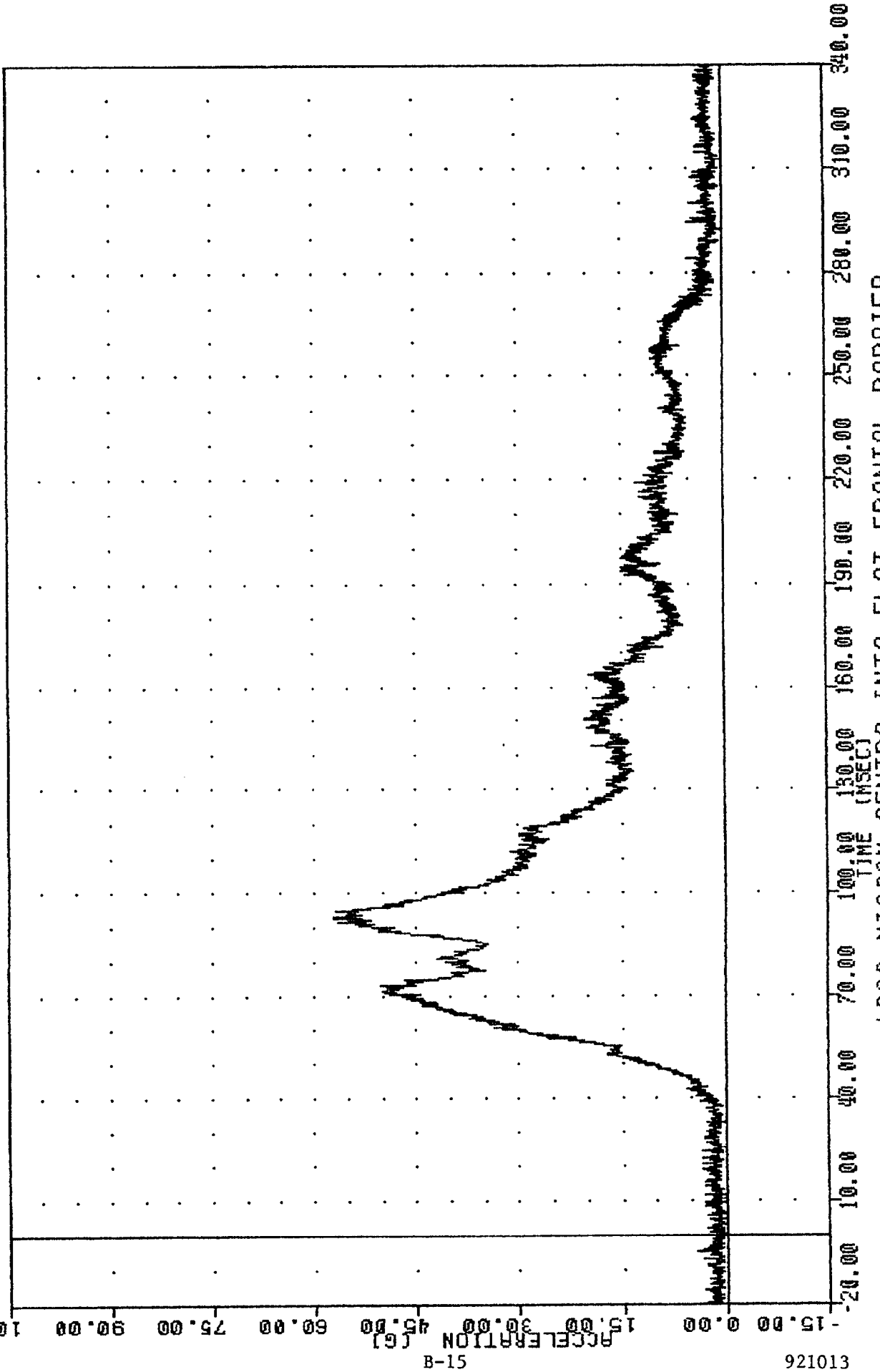
72.75,	3.41	8	-4.63
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1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TRC 921013
 209 COMPLIANCE TESTING
 92287
 HEDRG2

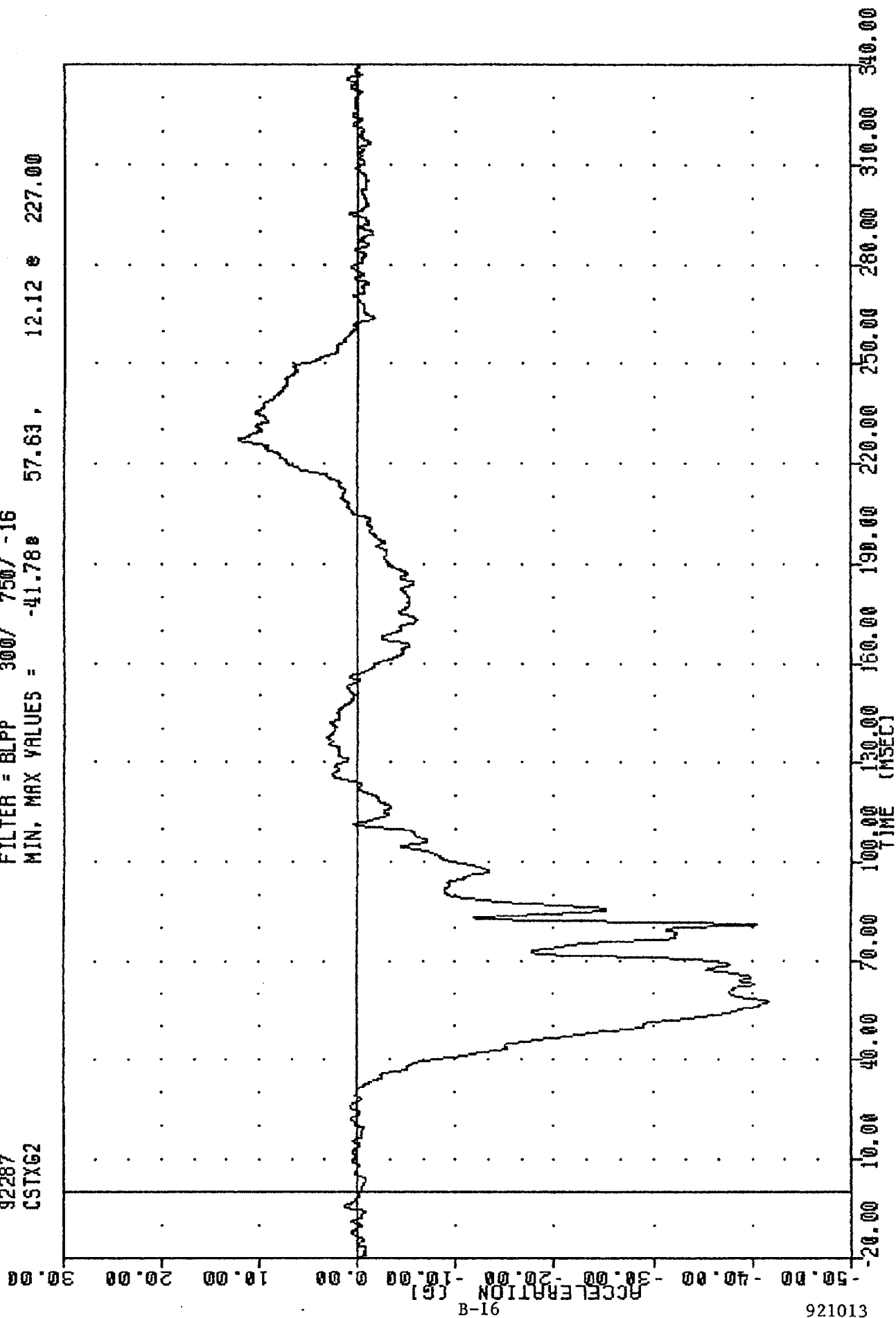
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.08 312.75 57.21 92.88



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
 RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

TRC 921013
208 COMPLIANCE TESTING
92287
CSTXG2

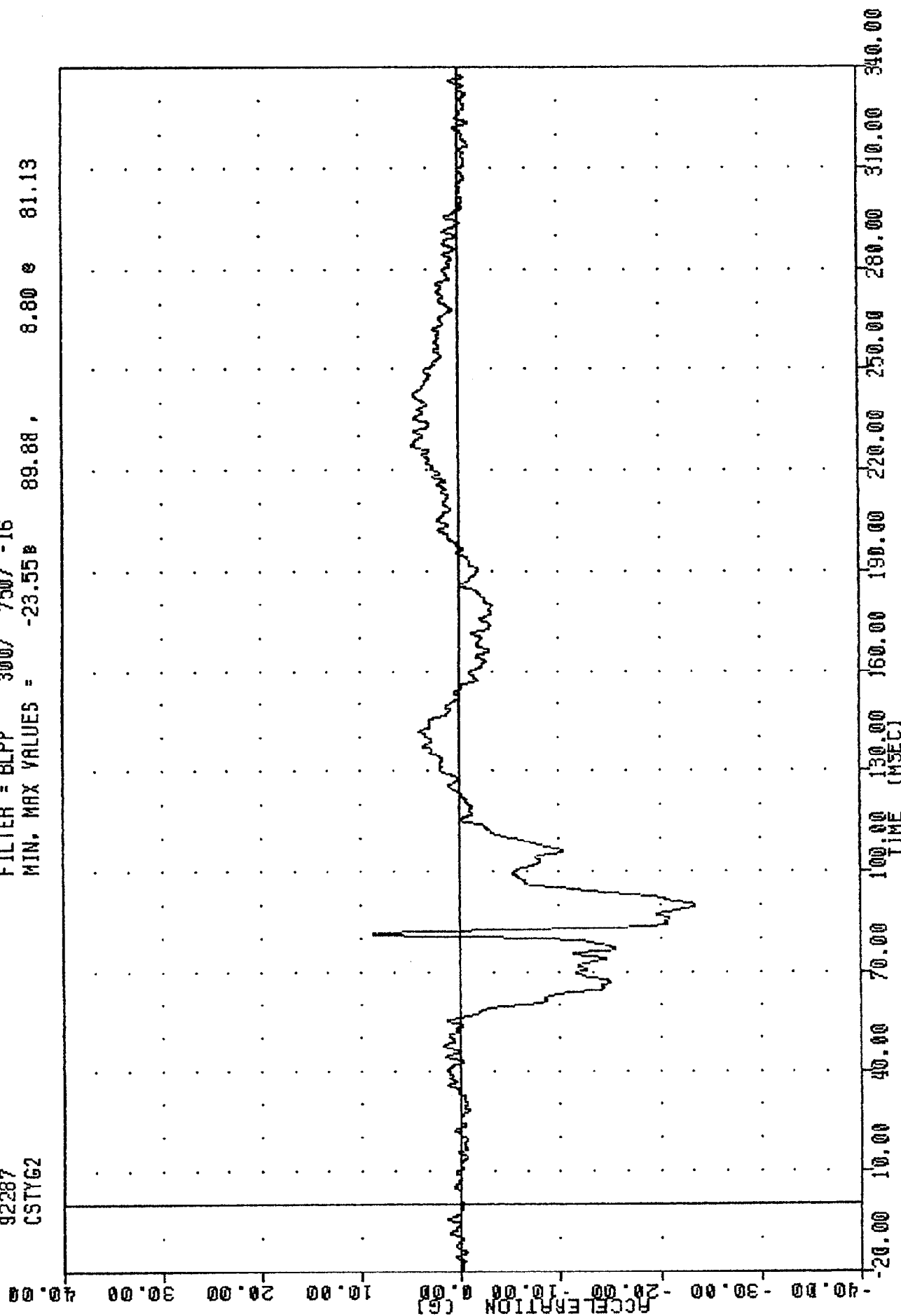
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -41.78 57.63, 12.12 227.00



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TRC , 921013
208 COMPLIANCE TESTING
92287
CSTYG2

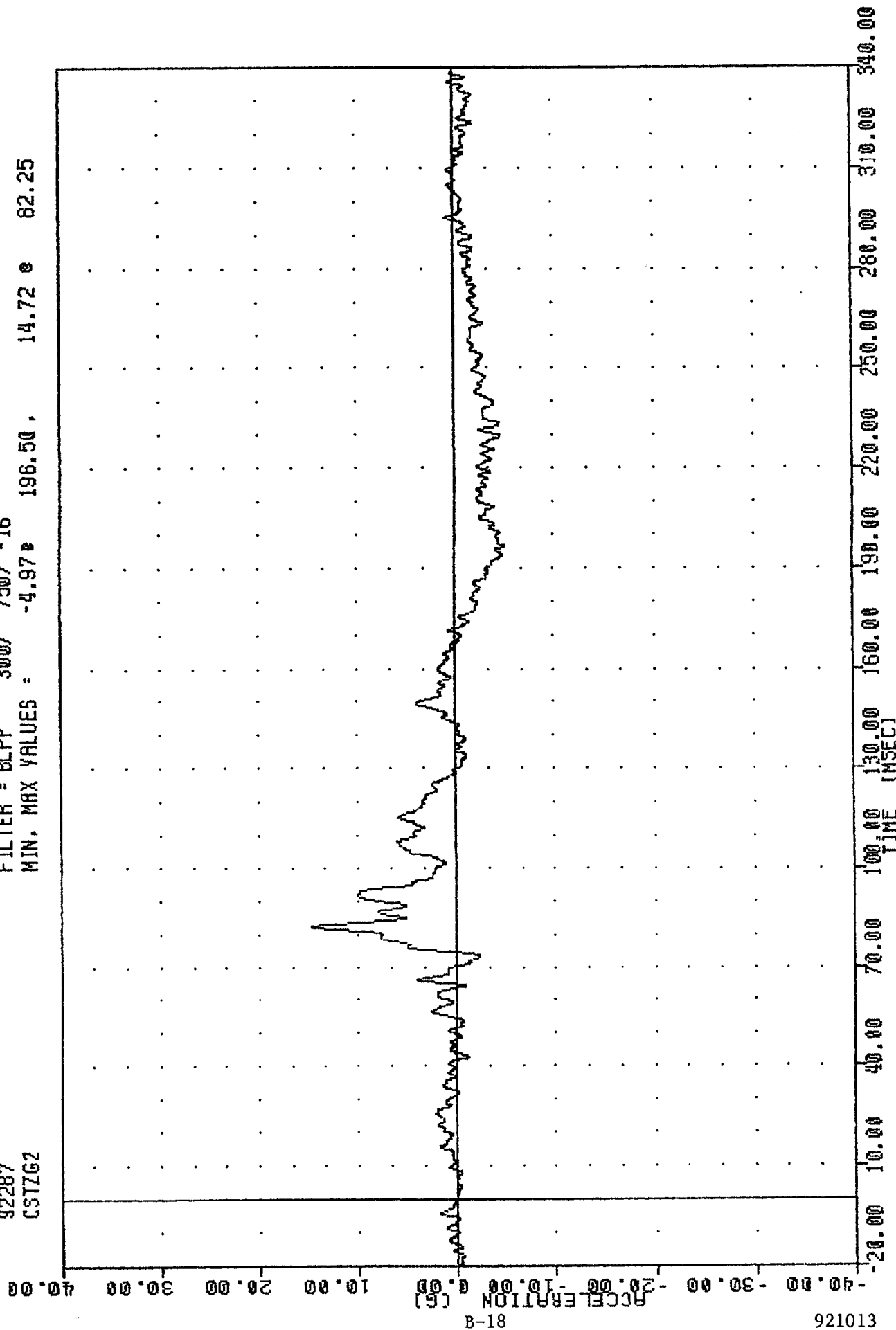
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -23.55 89.88 , 8.80 81.13



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TRC , 921013
200 COMPLIANCE TESTING
92287
CSTZG2

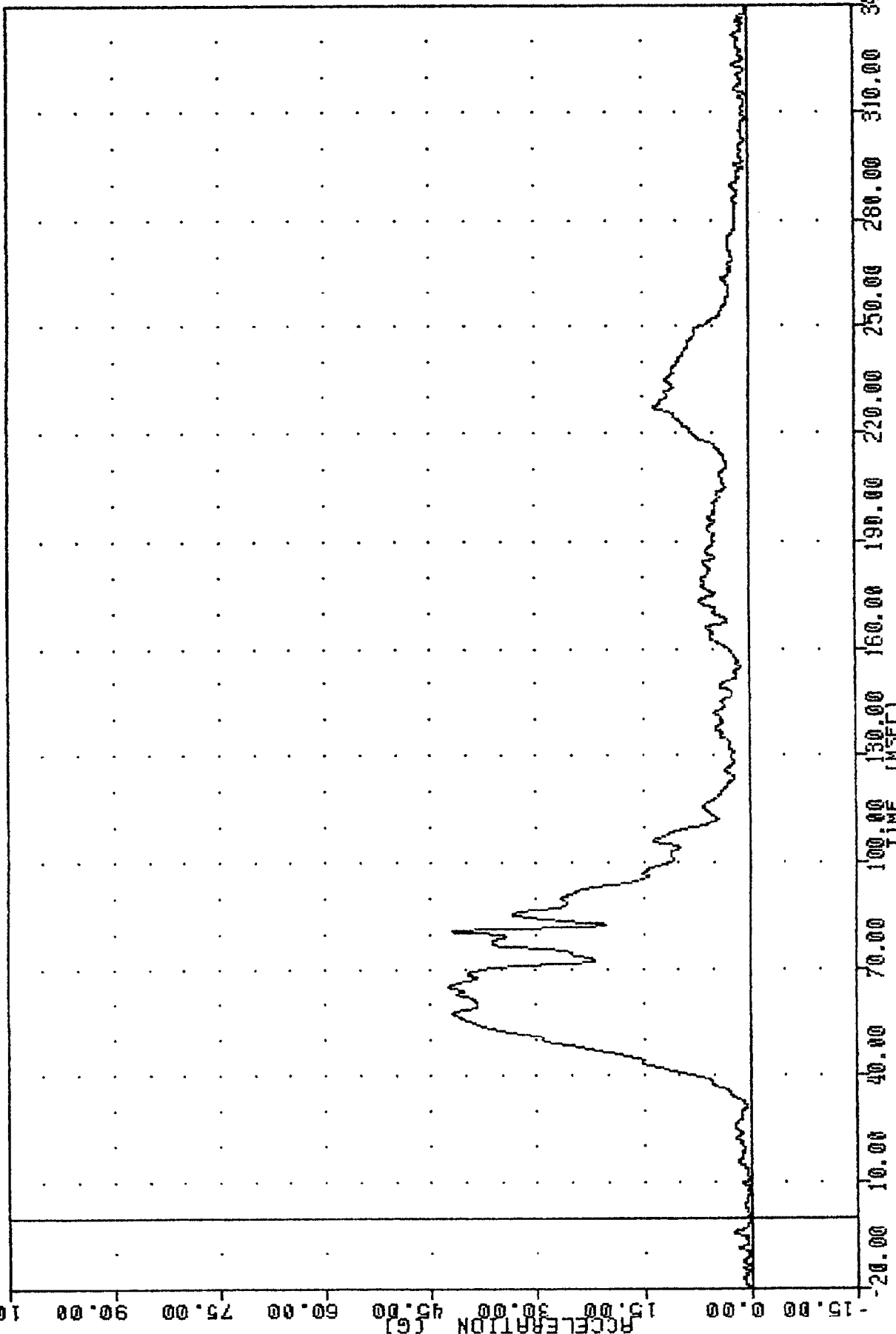
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -4.97e 196.50. 14.72 e 82.25



TRC , 921013
 200 COMPLIANCE TESTING
 92287
 CSTRG2

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.06 e -20.00, 42.43 e 65.00

105.00



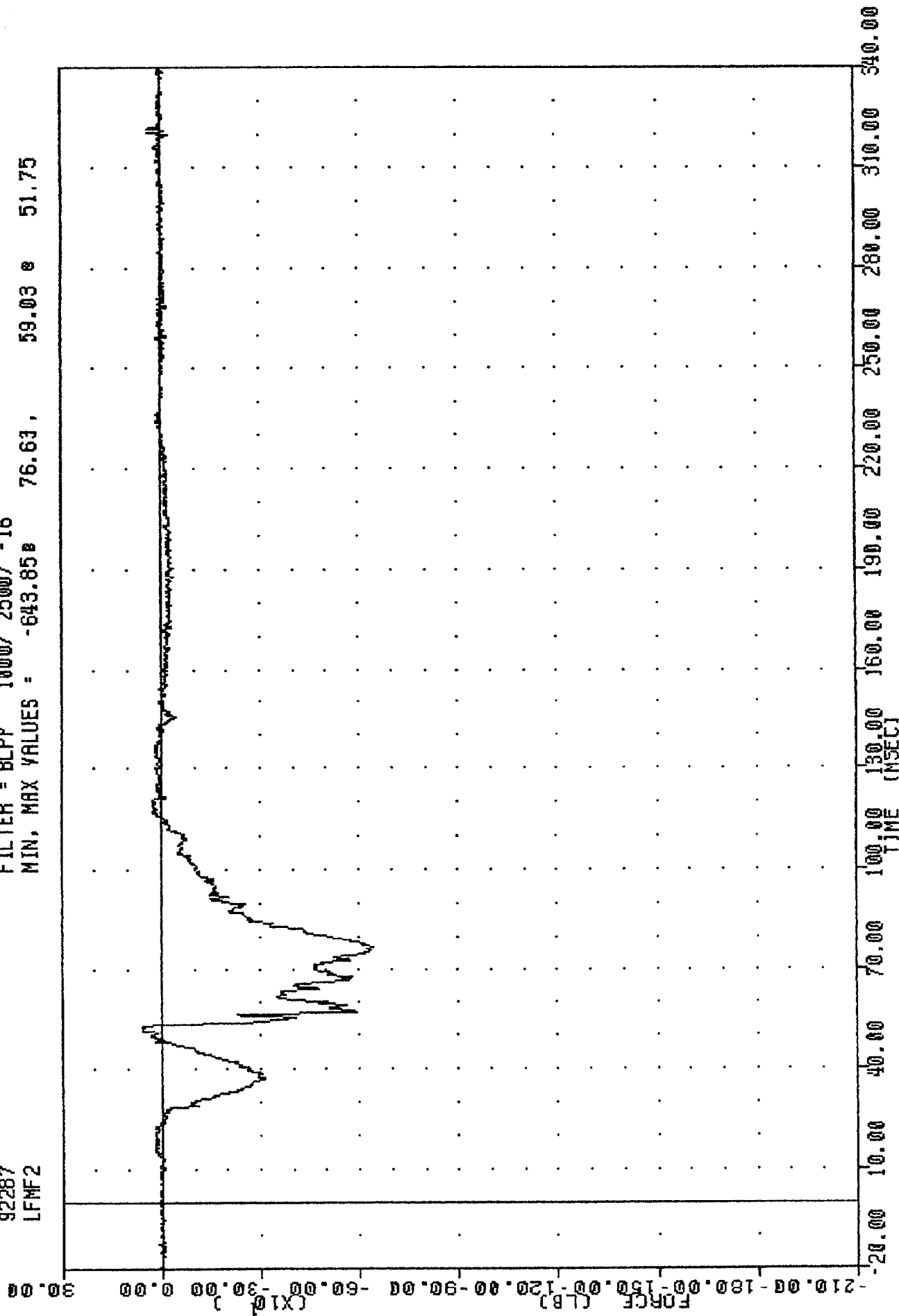
B-19

921013

1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
 RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TRC 921013
 208 COMPLIANCE TESTING
 92287
 LFMF2

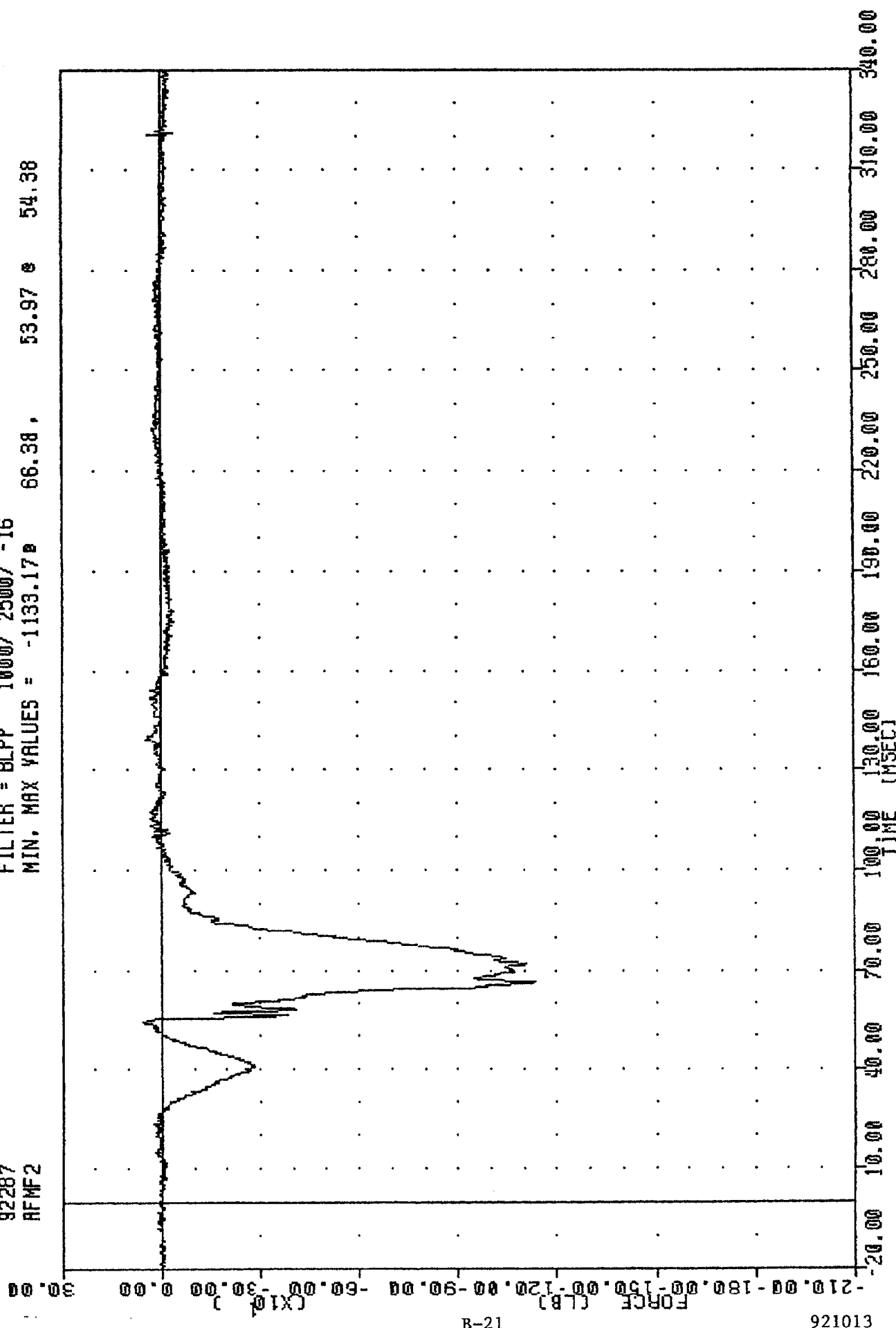
FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -643.85B 76.63, 59.03 e 51.75



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
 RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TRC , 921013
 208 COMPLIANCE TESTING
 92287
 AFMF2

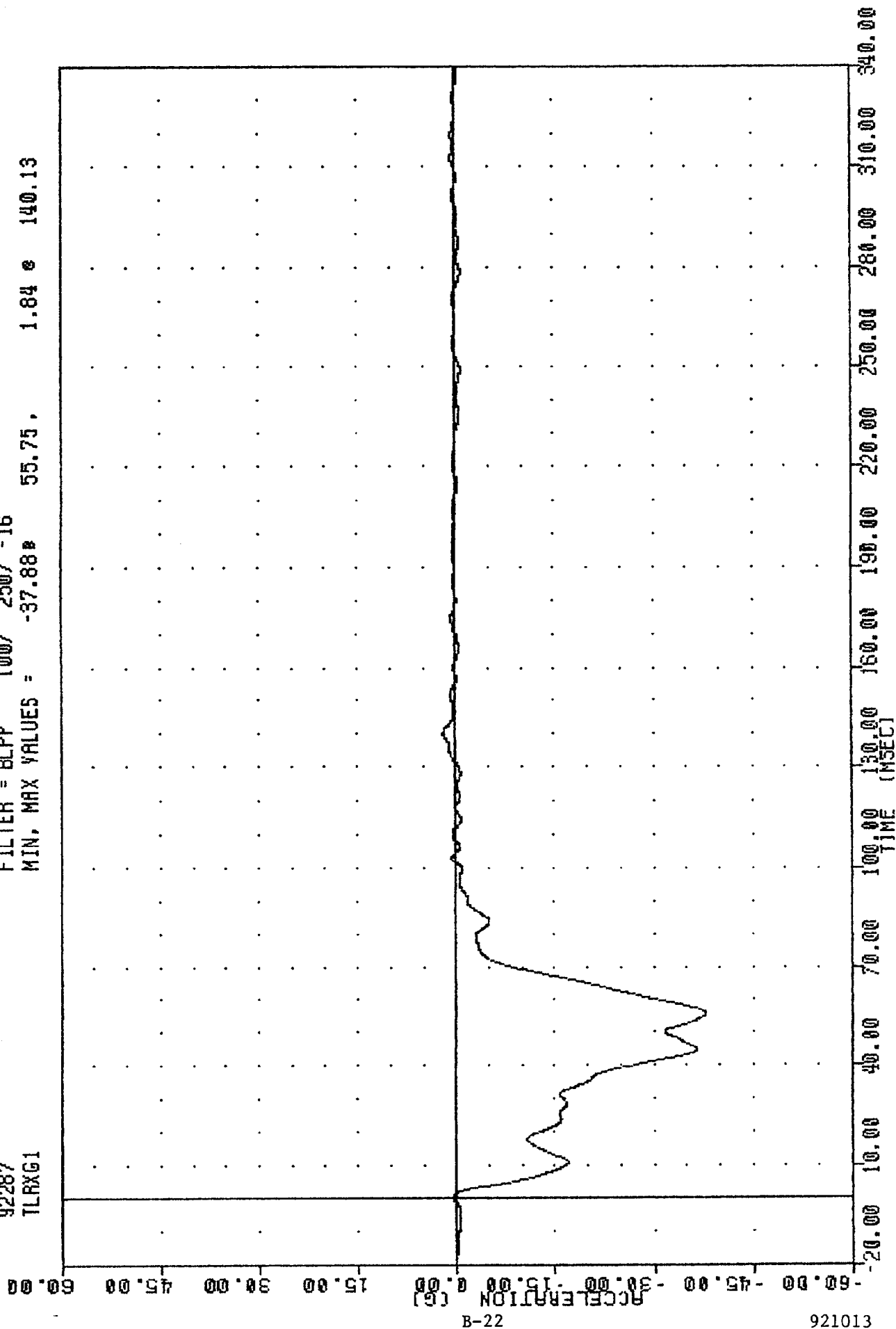
FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -1133.17 66.38 , 53.97 e 54.38



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
 RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

TRC 921013
200 COMPLIANCE TESTING
92287
TLRXG1

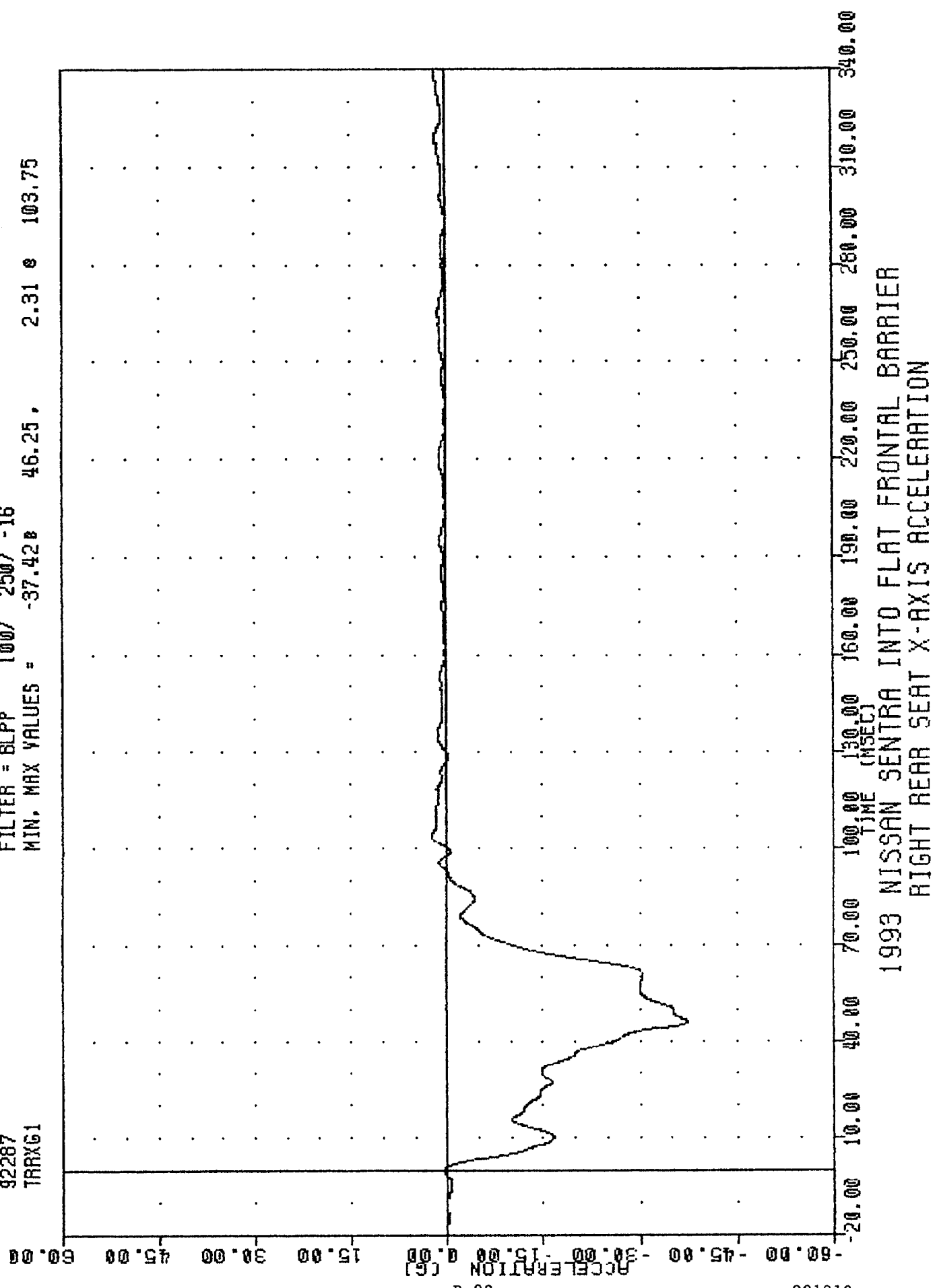
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -37.88 55.75, 1.84 e 140.13



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION

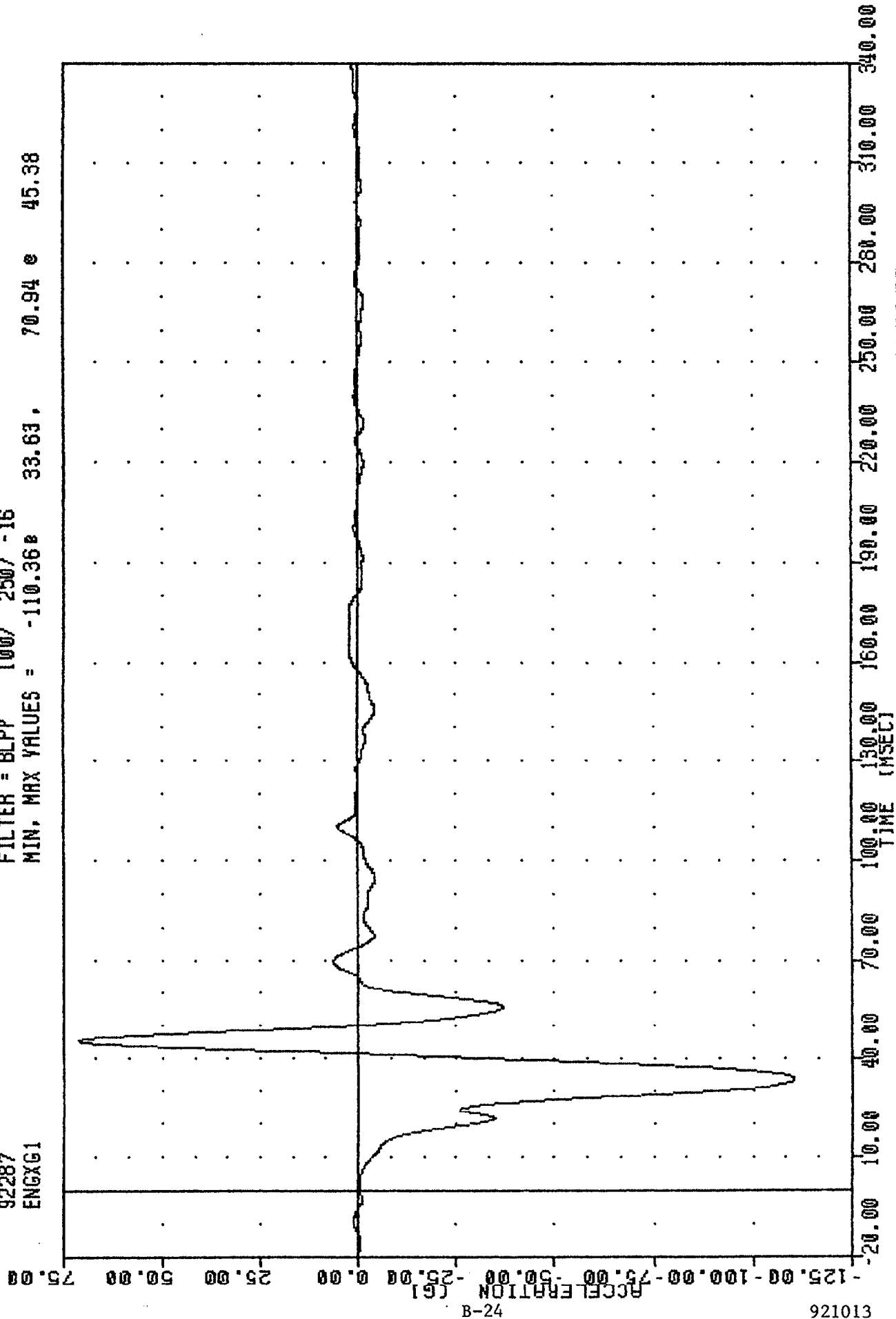
TRC 921013
 208 COMPLIANCE TESTING
 92287
 TRAXG1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -37.428 46.25, 2.31 8 103.75



TRC 921013
206 COMPLIANCE TESTING
92287
ENGXG1

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -110.36 33.63, 70.94 45.38



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
ENGINE TOP X-AXIS ACCELERATION

TRC 921013

200 COMPLIANCE TESTING

92287

ENGXG2

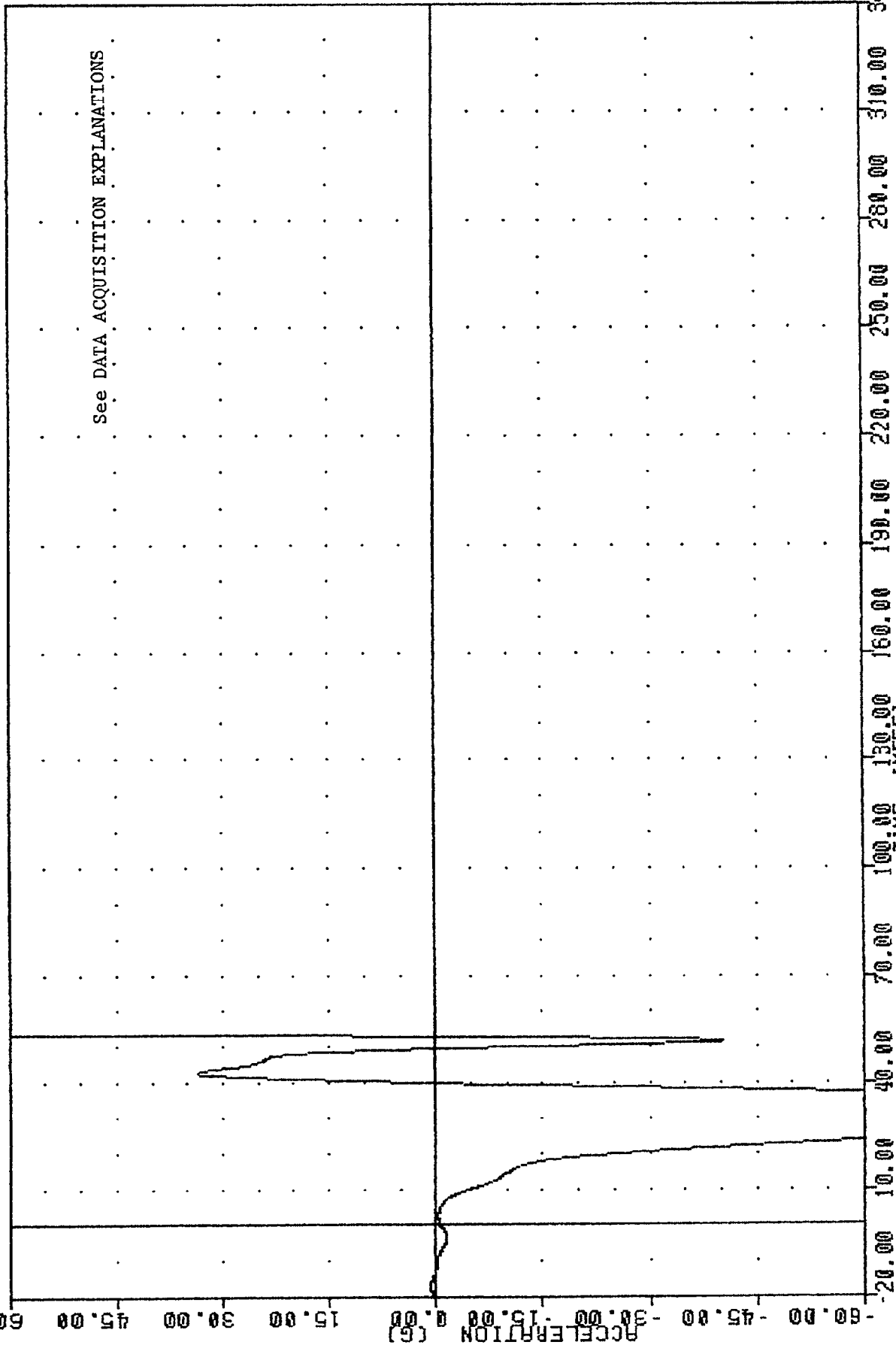
FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -84.24 8

32.63, 1081.02 @ 59.75

ACCELERATION (G)

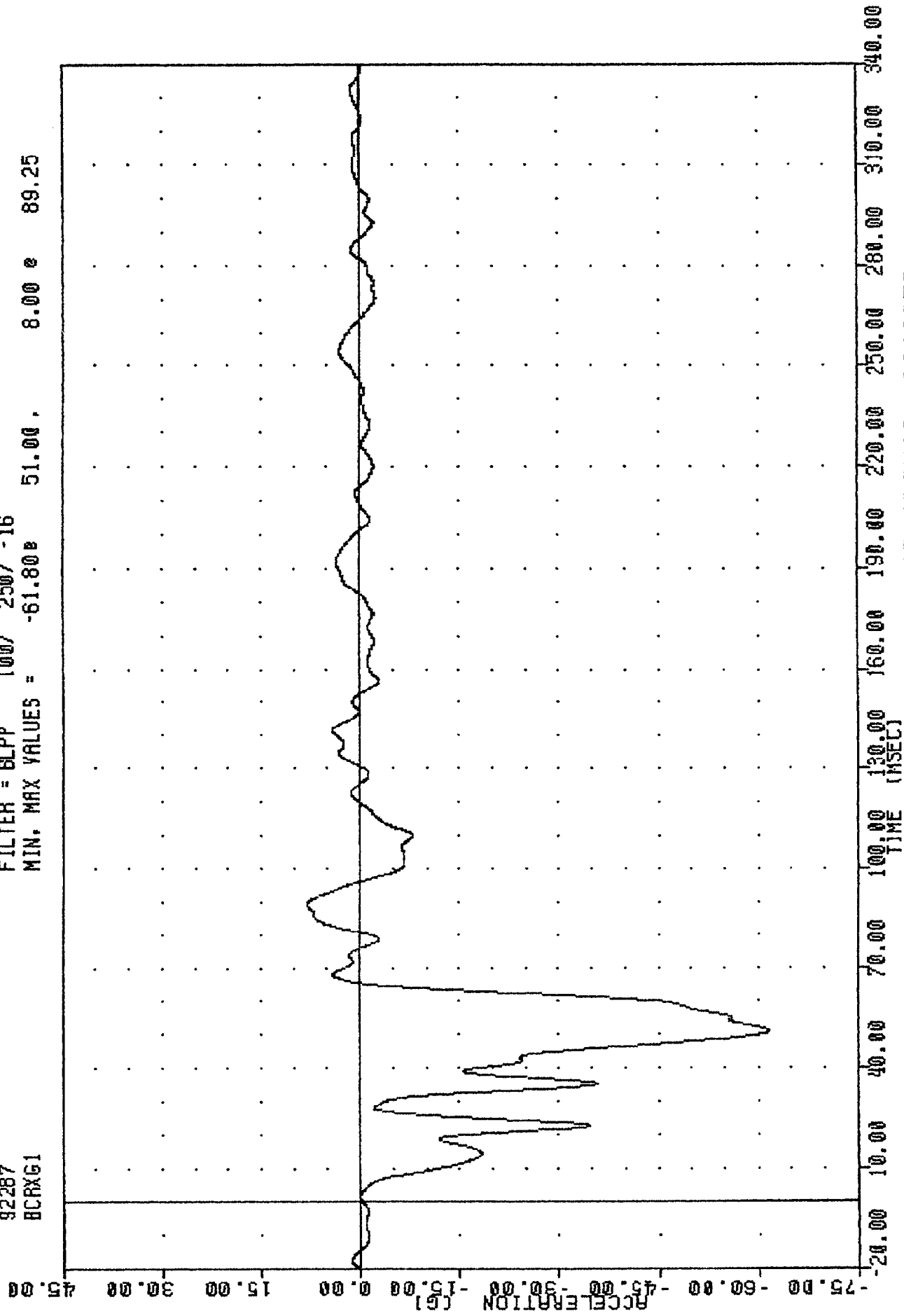
See DATA ACQUISITION EXPLANATIONS



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION

TRC , 921013
208 COMPLIANCE TESTING
92287
BCRXG1

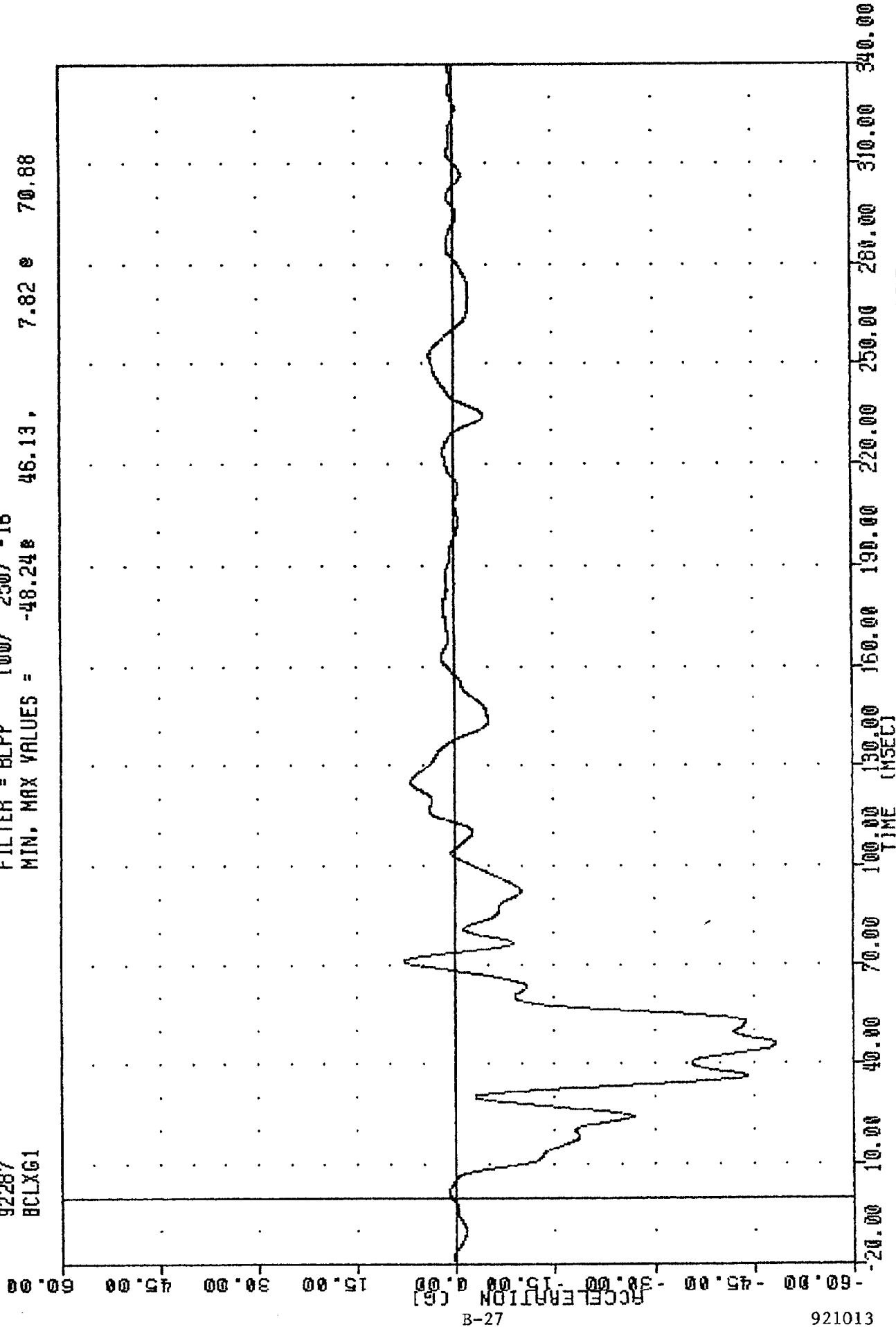
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -61.80 51.00 8.00 e 89.25



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TRC 921013
208 COMPLIANCE TESTING
92287
BCLXG1

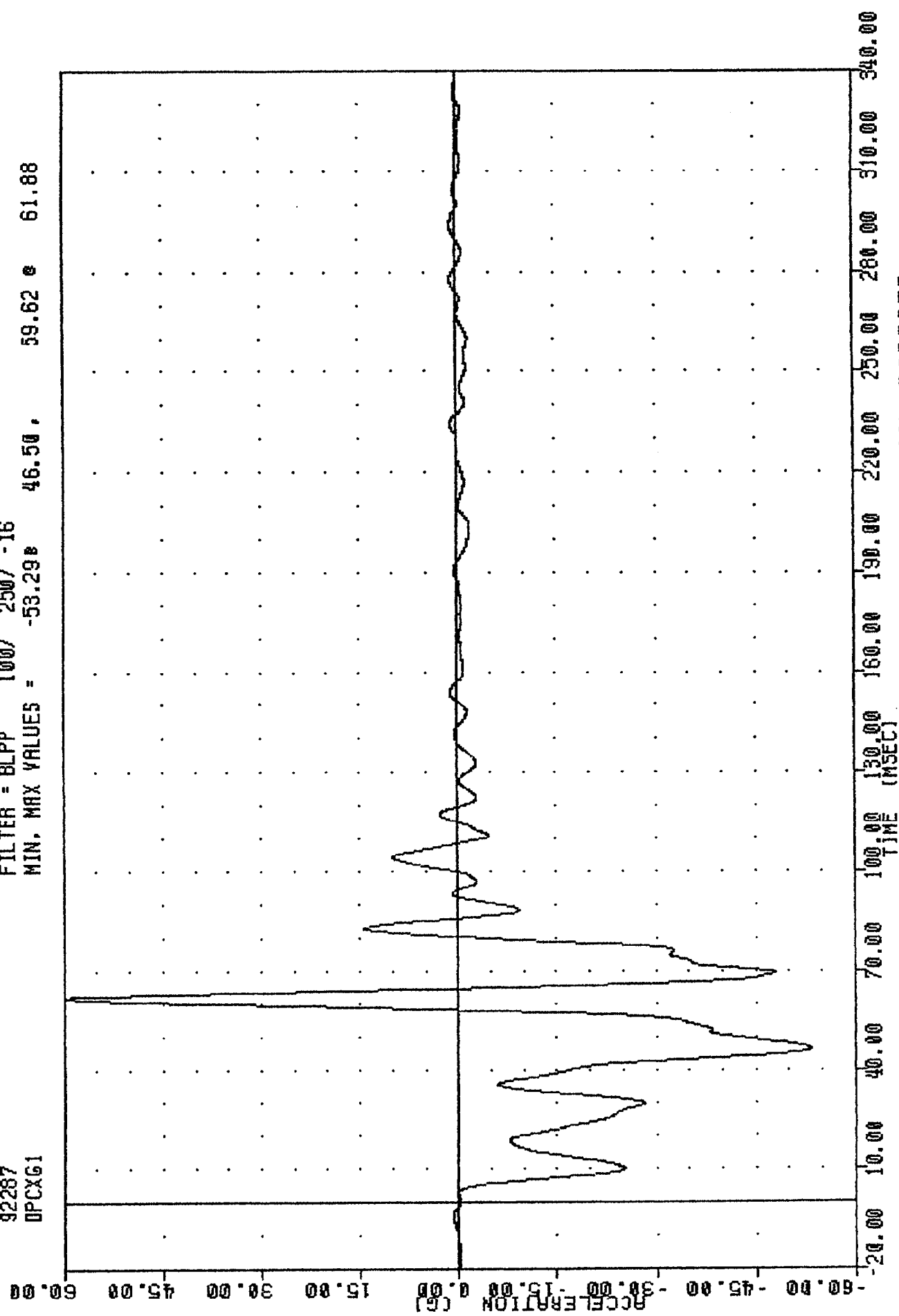
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -48.24 46.13 7.82 e 70.88



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TRC 921013
 200 COMPLIANCE TESTING
 92287
 OPCXG1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -53.29 46.50 59.62 61.88



1993 NISSAN SENTRA INTO FLAT FRONTAL BARRIER
 INSTRUMENT PANEL CENTER X-AXIS ACCELERATION