

V3538

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Report Number: 208S-TRC-01-004

Vehicle Safety Compliance Testing for FMVSS 208
for Occupant Crash Protection
Sled Test

Suzuki Manufacturing
2001 Suzuki Grand Vitara
NHTSA Number: C10503
TRC Test Number: S010116

Transportation Research Center Inc.
10820 State Route 347
East Liberty, OH 43319



Test Date: January 16, 2001
Report Date: February 7, 2001

Final Report

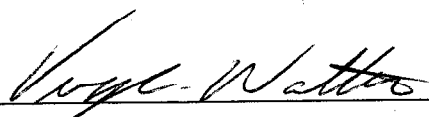
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Test Performed By: Ronald D. Stoner, Engineering Technician

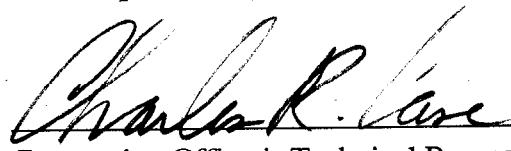
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Contracting Officer's Technical Representative (COTR),
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Technical Report Documentation Page

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16. Abstract An FMVSS 208 Section 13 compliance sled test was conducted on a 2001 Suzuki Grand Vitara SUV, NHTSA No. C10503, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP208S-01 for the determination of FMVSS 208 compliance. Possible test failures identified were as follows: None			
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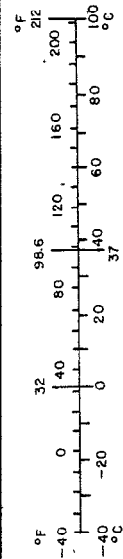
METRIC CONVERSION FACTORS

Approximate Conversions to 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

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	ac
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	st
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



* 1 m = 2.54 (exact). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10-286.

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Purpose

This Federal Motor Vehicle safety Standard (FMVSS) 208 compliance sled test is part of the FMVSS compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by the Transportation Research Center Inc. (TRC) under Contract No. DTNH22-98-D-01055. The purpose of this test was to determine if the subject vehicle, a 2001 Suzuki Grand Vitara SUV, NHTSA No.C10503, meets the performance requirements of FMVSS 208, "Occupant Crash Protection," in the impact simulation sled test mode.

Test Procedure

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208S-01, dated January 15, 1998. Data was obtained relative to FMVSS 208, "Occupant Crash Protection," performance.

The sled test vehicle was instrumented with six (6) accelerometers to measure longitudinal axis accelerations. The sled was instrumented with one (1) longitudinal accelerometer which is prefiltered with an analog filter to 200 Hz as an integral part of the sled firing circuit (this data is not recorded by the TRC data acquisition system), and two (2) additional longitudinal accelerometers: the primary accelerometer for pulse and integrated velocity determination and a backup accelerometer. In addition the sled was instrumented with one (1) light trap to measure velocity, and two (2) airbag firing timing circuits.

The sled test vehicle contained two (2) Part 572 E 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 Appendix B of the Laboratory Test Procedure. The dummies were not restrained by seat belts.

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

The forty-one (41) reported data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.7 through 11.9 of the Laboratory Test Procedure.

The sled test event was recorded by one (1) real-time motion picture camera and six (6) high-speed motion picture cameras. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera.

Test Results Summary

This FMVSS 208 compliance sled test was conducted at TRC on January 16, 2001.

The test vehicle, a 2001 Suzuki Grand Vitara SUV, NHTSA No. C10503, does appear to comply with the performance requirements of FMVSS 208 in the impact simulation sled test mode as measured by Hybrid III 50th percentile male dummies.

	FMVSS 208 Max. Allowable Injury Assessment Values	Driver	Passenger
HIC	1000	99	104
Chest g	60 g	41.7	31.6
Chest Displacement	3 inches	1.7	0.2
Left Femur	2250 lb	960	1341
Right Femur	2250 lb	1355	978
Neck Extension	57 Nm	21.4	16.7
Neck Flexion	190 Nm	28.2	28.7
Neck Tension	3300 N	1095	681
Neck Compression	4000 N	168	439
Neck Shear	3100 N	392	739

The subject vehicle, a 2001 Suzuki Grand Vitara, NHTSA No. C10503, appears to meet the other FMVSS 208 requirements for which it was tested. These results are shown in the data sheets that are included in this report.

The sled test vehicle was equipped with air bags at the driver and passenger seating positions. The dummies were not restrained by seat belts. The sled carriage was accelerated to 16.9 g with an integrated velocity change of 28.9 mph. The air bags were triggered at 20.2 milliseconds after 0.5 g acceleration was measured by the firing circuit. Following subsequent digital data processing and filtering the primary sled acceleration signal to Channel Class 60, the air bag event trigger signal was 21.0 ms after the 0.5 g acceleration level was indicated.

Data Acquisition Explanations

The measured velocity data channel, SLDXV, from the light trap vane attached to the sled, recorded several anomalous spikes between 230 and 260 milliseconds.

Sled Test Summary

NHTSA number: C10503
Test type: FMVSS Alternate 208 Sled Test
Test date: 01/16/01
Test time: 1120
Ambient temperature at impact area: 70.6° F
Vehicle year/make/ model/body style: 2001/Suzuki/Grand Vitara/SUV

Dummy Info:

Driver #339

Passenger #230

Type:

HIII

HIII

Location:

Left Front

Right Front

Restraint:

airbag 2nd generation

Airbag

Number of data channels:

15

15

Number of Cameras:

Real-time:

1

High-speed:

6

Door Opening Data:

Left Front:

Easy

Right Front:

Easy

Front Seat Data:

Seat track failure:

None

Seat back failure

None

Visible Dummy Contact Points:

Head:

Airbag and sun visor

Airbag

Chest:

Airbag and sun visor

Airbag

Left knee:

Bolster

Glove box

Right knee:

Bolster

Glove box

General Test and Vehicle Parameter Data for the Sled Test Vehicle

Test Vehicle Information:

Vehicle year/make/
model/body style: 2001/Suzuki/Grand Vitara/SUV
Color: Black
VIN: JS3TD62V214154282
NHTSA number: C10503
Engine data:
Placement: Inline
Cylinders: 6
Displacement: 2.5 L
Transmission data: 5 speed, X manual, __automatic, __overdrive
Final drive: __fwd, __rwd, X 4wd
Date vehicle received: 01/04/2001
Odometer reading: 101
Dealer's name
and address: Columbus Suzuki
3065 Morse Road
Columbus, OH 43231

Major Options:

Power steering	Yes	Other: None
Power brakes	Yes	
Power windows	Yes	
Air conditioning	Yes	
Power door locks	Yes	

Remarks: None

General Test and Vehicle Parameter Data for the Sled Test Vehicle, Cont'd.

Data from Vehicle's Certification Label:

Vehicle manufactured by:	Suzuki Motor Corp
Date of manufacture:	June-00
VIN:	JS3TD62V214154282
GVWR:	4123 lbs
GAWR: Front:	1985 lbs
Rear:	2337 lbs

Data from Vehicle's Tire Placard:

Tire pressure with maximum capacity vehicle load:

Front:	26 psi
--------	--------

Rear:	26 psi
-------	--------

Recommended tire size:	P235/60 R16
------------------------	-------------

Load range:	N/A lbs
-------------	---------

Recommended cold tire pressure:

Front:	26 psi
--------	--------

Rear:	26 psi
-------	--------

Size of tires on vehicle:	P235/60 R16
---------------------------	-------------

Spare tire:	P235/60 R16
-------------	-------------

Vehicle capacity data:

Type of front seats:	Bucket
----------------------	--------

Number of occupants:

Front	2
-------	---

Rear	3
------	---

Total	5
-------	---

Remarks: None

General Test and Vehicle Parameter Data for the Sled Test Vehicle, Cont'd.

Weight of test vehicle as received (with maximum fluids):

Right front	889.0 lbs	Right rear	748.0 lbs
Left front	848.0 lbs	Left rear	750.0 lbs
Total front weight	1737.0 lbs	(53.7% of total vehicle weight)	
Total rear weight	1498.0 lbs	(46.3% of total vehicle weight)	
Total delivered weight	3235.0 lbs		

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (3235 lbs)

DSC = Designated Seating Capacity (5)

RCLW = GVWR - UDW - DSC (150 lbs) = 4123 - 3235 - 5(150) = 138 lbs

Target test weight = UDW + RCLW + (Number of Hybrid III dummies x 167 lbs per dummy)

Target test weight = 3235 + 138 + 334 = 3707 lbs

Weight of test vehicle with two dummies and 139 lbs of cargo weight:

Right front	926.0 lbs	Right rear	910.0 lbs
Left front	962.0 lbs	Left rear	910.0 lbs
Total front weight	1888.0 lbs	(50.9% of total vehicle weight)	
Total rear weight	1820.0 lbs	(49.1% of total vehicle weight)	
Total test weight	3708.0 lbs		

Remarks:

Weight of ballast secured in vehicle cargo area: None

Components removed to meet target test weight: None

General Test and Vehicle Parameter Data for the Sled Test Vehicle, Cont'd.

Test Vehicle Attitude:

As delivered door sill angle: 1° Nose Down

As tested door sill angle: 0.7° Nose Down

Fully loaded door sill angle: 0.4° Nose Down

Vehicle Wheelbase: 97.6 inches

Fuel System Data:

Fuel system capacity from owner's manual: 17.4 gallons

Useable capacity figure furnished by COTR: 17.4 gallons

Remarks: The roll angle measurement was within 1 inch. The left and right side measurements were 34.9 inches and 34.8 inches, respectively.

Post-Impact Data

Test number: S010116
NHTSA number: C10503
Test date: 01/16/01
Test time: 1120
Test type: FMVSS Alternate 208 Sled Test
Impact angle: 0°
Ambient temperature
at impact area: 70.6° F
Temperature in
occupant compartment: 70.6° F

Sled carriage velocity:

Integrated velocity from the integration of the entire sled acceleration: 28.9 mph
Measured velocity from the light trap device attached to the sled (backup): 28.2 mph
Specified integrated velocity range: 28 to 30 mph

Sled carriage acceleration:

Acceleration: 16.9 g
Specified acceleration range: 16.0 g - 18.2 g

Sled carriage acceleration duration:

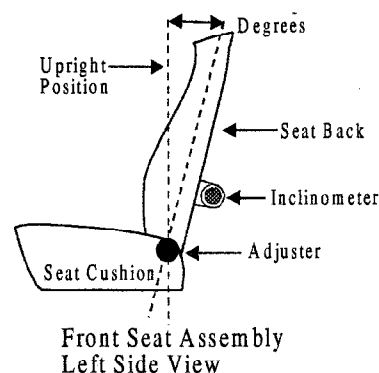
Time from T-0(-0.5 g) to 0.0 g: 125.3 msec
Specified acceleration duration: 120.0 - 130.0 msec

The sled acceleration curve was within the specified corridor.

Seat and Steering Column Positioning Data

Vehicle: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503



Nominal Design Riding Position:

- Driver Seat: Seat Back Angle = 12.4° measured on the headrest post. The manual adjustable seat was positioned in the 6th notched position counting rearward from the forwardmost free position.
- Passenger Seat: Seat Back Angle = 12.9° measured on the headrest post. The manual adjustable seat was positioned in the 6th notched position counting rearward from the forwardmost free position.

Seat Fore and Aft Positions:

- Driver Seat: Closest adjustment to the rear of the mid point position. The seat was positioned by sliding it as far forward as possible and then moving it rearward to the 8th latching position.
- Passenger: Closest adjustment to the rear of the mid point position. The seat was positioned by sliding it as far forward as possible and then moving it rearward to the 8th latching position.

Steering Column Adjustments:

The steering column was adjustable, it was positioned in the fourth notch down from the top for the test.

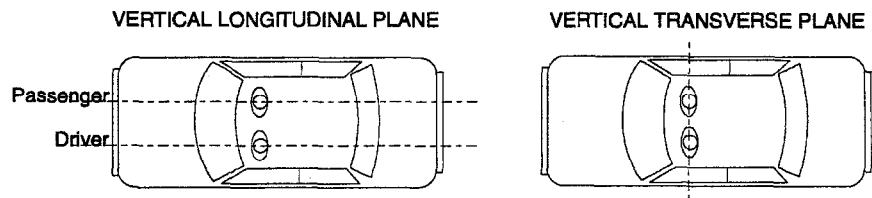
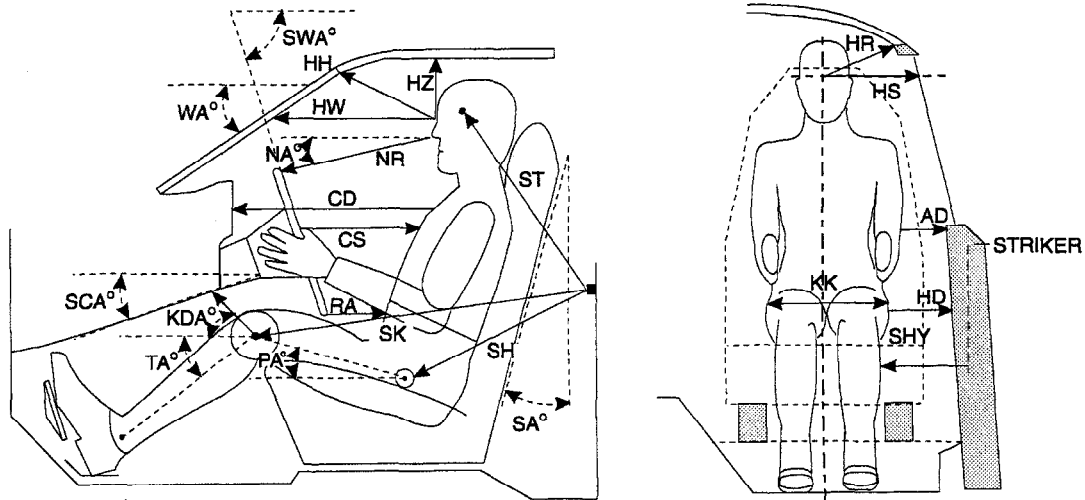
Dummy Measurement Data for Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #314)	Passenger (Serial #230)
WA	Windshield angle	37.3°	N/A
SWA	Steering wheel angle	25°	N/A
SCA	Steering column angle	26.0°	N/A
SA	Seat back angle (measured on the headrest post)	12.4°	12.9°
HZ	Head to roof	9.1 in	9.3 in
HH	Head to header	18.2 in	18.5 in
HW	Head to windshield	25.0 in	24.7 in
HR	Head to side header	8.1 in	8.8 in
NR	Nose to rim	17.5 in	N/A
NA	Nose to rim angle	19°	N/A
CD	Chest to dash	23.3 in	23.5 in
CS	Steering wheel to chest	16.8 in	N/A
RA	Rim to abdomen	8.4 in	N/A
KDL	Left knee to dash	5.7 in	5.9 in
KDR	Right knee to dash	5.5 in	6.2 in
KDA	Outboard knee to dash angle	18°	25°
PA	Pelvic angle	21.8°	24.7°
TA	Tibial angle	51.2°	46°
KK	Knee to knee	13.7 in	11.3 in
ST ¹	Striker to head	23.8 in	24.2 in
	Striker to head angle	-85°	-87.9°
SK ¹	Striker to knee	22.0 in	22.0 in
	Striker to knee angle	-2.5°	-3°
SH ¹	Striker to H-point	7.1 in	6.7 in
	Striker to H-point angle	21°	10.1°
SHY	Striker to H-point (Y dir.)	8.7 in	7.9 in
HS	Head to side window	10.7 in	11.2 in
HD	H-point to door	4.0 in	4.6 in
AD	Arm to door	2.0 in	2.0 in

The seat back angle (SA°) is measured relative to vertical, all other angles are measured relative to horizontal.

¹ A negative angle indicates the measurement point was located below the striker.

Dummy Measurement Locations for Front Seat Occupants



Descriptions of Dummy Measurements

When a level is to be used, it is to ensure that the line containing the two points described is either parallel or perpendicular to the ground. If a measurement to be made is less than 10 inches ignore the directions to use a level and approximate a level measurement. Also, when a measurement is to be taken to or from the center of a bolt on the dummy, take the measurement from the center of the bolt hole if the bolt is recessed.

The following measurements are to be made within a vertical longitudinal plane.

- * HH Head to Header, taken from the point where the dummy's nose meets his forehead (between his eyes) to the furthest point forward on the header.
- * HW Head to Windshield, taken from the point where the dummy's nose meets his forehead (between his eyes) to a point on the windshield. Use a level.
- HZ Head to Roof, taken from the point where the dummy's nose meets his forehead (between his eyes) to the point on the roof directly above it. Use a level.
- * CS Steering Wheel to Chest, taken from the center of the steering wheel hub to the dummy's chest. Use a level.
- * CD Chest to Dash, place a tape measure on the tip of the dummy's chin and rotate five inches of it downward toward the dummy to the point of contact on the transverse center of the dummy's chest. Then measure from this point to the closest point on the dashboard either between the upper part of the steering wheel between the hub and the rim, or measure to the dashboard placing the tape measure above the rim, whichever is a shorter measurement. See diagram.
- RA Steering Wheel Rim to Abdomen, taken from the bottommost point of the steering wheel rim horizontally rearward to the dummy. Use a level.
- NR Nose to Rim, taken from the tip of the dummy's nose to the closest point on the top of the steering wheel rim. Also indicate the angle this line makes with respect to the horizontal (NA).
- *¹ KDL, Left and Right Knees to Dashboard, taken from the center of the knee pivot bolt's
KDR outer surface to the closest point forward acquired by swinging the tape measure in continually larger arcs until it contacts the dashboard. Also reference the angle of this measurement with respect to the horizontal for the outboard knee (KDA). See diagram.

* Measurement used in Data Tape Reference Guide

¹ Only outboard measurement is referenced in Data Tape Reference Guide

Descriptions of Dummy Measurements, Cont'd.

SH, Striker to Hip, Knee, and Head, these measurements are to be taken in the X-Z plane measured from the forward most center point on the striker to the center of SK, the H-point, outer knee bolt, and head target. When taking this measurement a ST firm device that can be rigidly connected to the striker should be used. Use a level. The angles of these measurements with respect to the horizontal should also be recorded. The measurement in the Y (transverse) direction from the striker to the H-point should also be taken (SHY). See diagram.

The following measurements are to be made within a vertical transverse plane.

- HS Head to Side Window, taken from the point where the dummy's nose meets his forehead (between his eyes) to the outside of the side window. In order to make this measurement, roll the window down to the exact height which allows a level measurement. Use a level. See diagram.
- * AD Arm to Door, taken from the outer surface of the elbow pivot bolt on a Hybrid II dummy to the first point it hits on the door. In the case of a Hybrid III dummy, measure from the bolt on the outer biceps. When a SID is used make the measurement from the center of the bottom of the arm segment where it meets the dummy's torso.
- * HD H-point to Door, taken from the H-point on the dummy to the closest point on the door. Use a level.
- * HR Head to Side Header, measure the shortest distance from the point where the dummy's nose meets his forehead (between his eyes) to the side edge of the header just above the window frame, directly adjacent to the dummy.
- SHY Striker to H-point, taken from a rod rigidly connected to the forward most center point on the striker to the H-point. Use a level. See diagram.
- KK Knee to Knee, for Hybrid II dummies measure the distance between knee pivot bolt head outer surfaces. For Hybrid III dummies measure the distance between the outboard knee clevis flange surfaces. (This measurement may not be exactly transverse.)

Angles

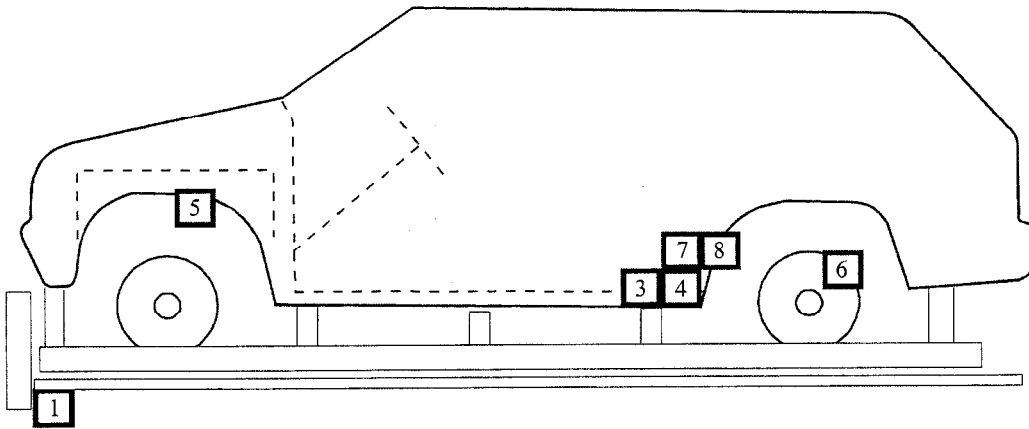
- SA Seat Back Angle, find this angle using the instructions provided by the manufacturer. If the manufacturer doesn't provide clear instructions contact the COTR.

* Measurement used in Data Tape Reference Guide

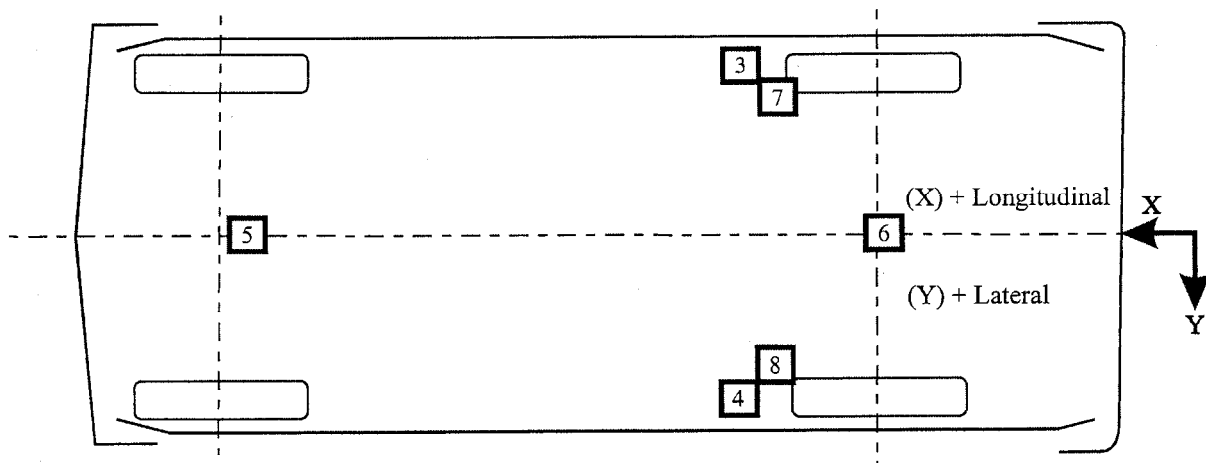
Descriptions of Dummy Measurements, Cont'd.

- PA Pelvic or Femur Angle, taken by inserting the pelvic angle gauge into the H-point gauging hole on the SID or the Hybrid III dummies and taking this angle with respect to the horizontal. Measure the angle of the line connecting the H-point hole and the outer knee pivot bolt hole on a Hybrid II dummy with respect to the horizontal, to find the femur angle.
- SWA Steering Wheel Angle, find this by placing a straight edge against the steering wheel rim along the longitudinal plane. Then measure the acute angle of the straight edge with respect to the horizontal.
- SCA Steering Column Angle, measured with respect to the horizontal by placing an inclinometer on the center of the underside of the steering column.
- NA Measure the angle made when taking the measurement NR with respect to the horizontal.
- KDA Knee to Dash Angle, the angle that the measurement KD is taken at with respect to the horizontal. Only get this angle for the outboard knee. See diagram.
- WA Windshield Angle, place an inclinometer along the transverse center of the windshield exterior (measurement is made with respect to horizontal).
- TA Tibial Angle, use a straight edge to connect the dummy's knee and ankle bolts. Then place an inclinometer on the straight edge and measure the angle with respect to the horizontal.

Vehicle Accelerometer Placement



Side View



Bottom View

Vehicle Data Summary and Accelerometer Locations

TEST NUMBER: S010116			POSITIVE		NEGATIVE	
No. LOCATION	X	Y	DIRECTION		DIRECTION	
1 SLED ACCELERATION	165.6 in	-1.0 in				
PRIMARY	0.8 g	@ 129.8 ms	16.9 g	@ 57.0 ms		
BACKUP	1.3 g	@ 134.8 ms	17.8 g	@ 53.3 ms		
2 SLED VELOCITY						
MEASURED	0.1 mph	@ 4.7 ms	28.2 mph	@ 127.1 ms		
INTEGRATED ¹	---	---	28.9 mph	@ 125.4 ms		
3 LEFT REAR SEAT	45.1 in	-18.5 in				
CROSSMEMBER						
LONGITUDINAL	2.2 g	@ 141.9 ms	21.7 g	@ 59.7 ms		
4 RIGHT REAR SEAT	45.7 in	19.3 in				
CROSSMEMBER						
LONGITUDINAL	2.2 g	@ 144.9 ms	20.9 g	@ 57.9 ms		
5 TOP ENGINE	140.4 in	0 in				
LONGITUDINAL			2.1 g	@ 134.4 ms	17.8 g	@ 62.2 ms
6 REAR AXLE	33.7 in	-0.8 in				
LONGITUDINAL			2.1 g	@ 130.9 ms	17.4 g	@ 57.2 ms
7 LEFT VEHICLE FRAME	44.3 in	-18.0 in				
LONGITUDINAL			1.5 g	@ 130.5 ms	17.6 g	@ 56.8 ms

Vehicle Data Summary and Accelerometer Locations, Cont'd.

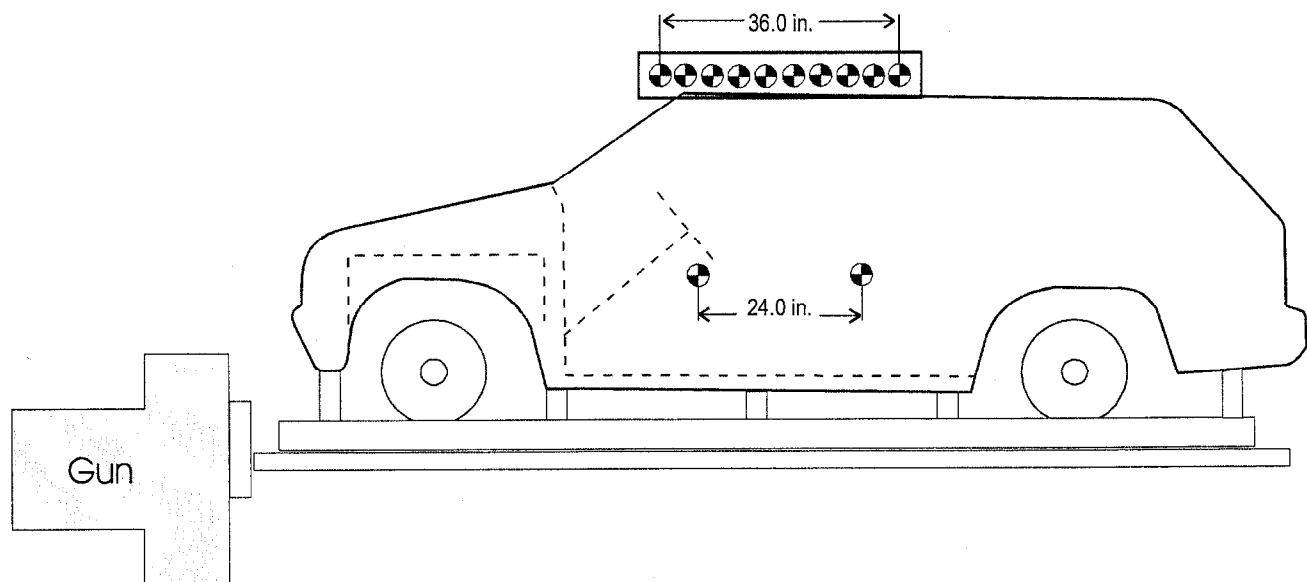
TEST NUMBER: S010116				POSITIVE		NEGATIVE	
No. LOCATION		X	Y	DIRECTION		DIRECTION	
8	RIGHT VEHICLE FRAME LONGITUDINAL	44.5 in	18.7 in	1.3 g	@ 130.2 ms	17.6 g	@ 56.4 ms
9	DRIVER AIRBAG EVENT				21.0 ms		
10	PASSENGER AIRBAG EVENT				21.0 ms		

REFERENCE: X: + FORWARD FROM VEHICLE REAR SURFACE
Y: + RIGHTWARD FROM SLED CARRIAGE CENTERLINE

1 No positive data in time frame of interest.

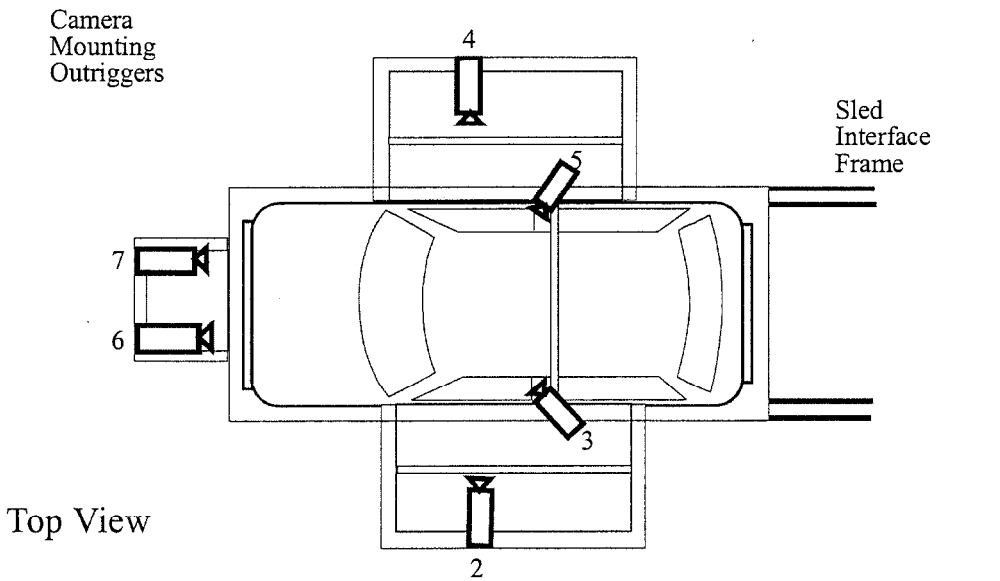
For a channel sign convention list see Report Sign Convention in Appendix D.

REFERENCE PHOTO TARGETS

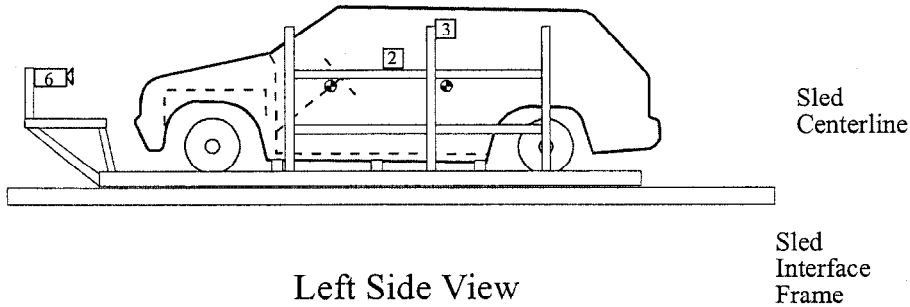


LEFT SIDE VIEW

Camera Positions



Camera Frame Rates:
 #1 = 24 fps
 All Others = 1,000 fps



Motion Picture Camera Locations

Vehicle year/make/model/body style: 2001/Suzuki/Grand Viara/SUV NHTSA No. C10503 Test Number: S010116

Camera Number	View	Camera Positions ¹			Camera Angle ²	Film Plane to Head Target	Camera Lens	Film Speed
		X	Y	Z				
1	Left side view offboard	88.5 in	-303.3 in	56.5 in	5.8°	286.0 in	10 mm	24 frames/s
2	Left side view wide	76.2 in	-72.8 in	50.9 in	2.8°	57.0 in	8 mm	997 frames/s
3	Left side view over shoulder	98.7 in	-49.4 in	60.7 in	13.3°	35.5 in	8 mm	995 frames/s
4	Right side view wide	26.5 in	-12.6 in	57.1 in	5.9°	59.3 in	8 mm	997 frames/s
5	Right side view over shoulder	73.5 in	91.4 in	51.7 in	5.3°	76.0 in	13 mm	1025 frames/s
6	Front view - driver	100.0 in	49.2 in	60.0 in	11.6°	35.5 in	8 mm	1007 frames/s
7	Front view - passenger	26.2 in	52.0 in	57.3 in	7.0°	59.4 in	8 mm	920 frames/s

¹ X: Film plane to front of sled

Y: Film plane to sled centerline

Z: Film plane to top of sled

² Angle: Film plane of camera downward from horizontal plane

FMVSS 208 Occupant Injury Data

Vehicle: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Date: 01/16/01

Maximum Acceleration Values: (g's) ¹	Driver Dummy #339	Passenger Dummy #230
Head Channel X	-31.9	-32.9
Head Channel Y	3.9	-21.0
Head Channel Z	18.6	17.0
HEAD RESULTANT	32.3	34.4
Chest Channel X	-40.3	-30.1
Chest Channel Y	4.5	-6.7
Chest Channel Z	13.4	13.0
CHEST RESULTANT	42.5	32.1

Head Injury Criteria (HIC) Values:

HIC	99	104
t ₁ = (msec)	91.76	92.40
t ₂ = (msec)	127.76	128.40

[The maximum time interval from t₁ to t₂ is 36 milliseconds.]

Chest Injury Criteria (Clip) Values: (g's)

CLIP	41.7	31.6
t ¹ = (msec)	102.96	101.04
t ² = (msec)	106.00	104.08
Chest Deflection (in)	1.7	0.2

¹ Sign Convention per SAE J211, MAR95

FMVSS 208 Occupant Injury Data, Cont'd.

Vehicle: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Date: 01/16/01

Units (lbs)

Max. Compressive Femur Forces:	Driver Dummy #339	Passenger Dummy #230
Left Side (lbs)	960	1341
Right Side (lbs)	1355	978

Neck Injury Criteria:	Driver Dummy #339	Passenger Dummy #230
Peak Flexion Bending Moment (N-m)	28.2	28.7
Peak Extension Bending Moment (N-m)	21.4	16.7
Peak Axial Tension (N)	1095	681
Peak Axial Compression (N)	168	439
Peak Positive X-Axis Shear (N)	392	739
Peak Negative X-Axis Shear (N)	125	317

FMVSS 208 SEAT BELT WARNING SYSTEM CHECK

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

Complete the following to determine which seat belt warning system option (S7.3(a)(1)) or (S7.3(a)(2)) is used. (Manufacturers may use either option.)

- A. With occupant in driver's position and lap belt in stowed position and ignition switch placed in "Start/On" position:

A.1 S7.3(a)(1)

Time duration of audible warning signal = 6 seconds
(4 to 8 seconds)

Time duration of reminder light operation = stays on
(no less than 60 seconds)

A.2 S7.3(a)(2)

Time duration of audible warning signal = N/A seconds
(4 to 8 seconds) (see 49 USCS @ 30124)

Time duration of reminder light operation = N/A seconds
(4 to 8 seconds)

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

B.1 S7.3(a)(1)

Time duration of audible warning signal = 0 seconds
(audible warning should not operate)

Time duration of reminder light operation = 0 seconds
(reminder light does not operate)

B.2 S7.3(a)(2)

Time duration of audible warning signal = N/A seconds
(audible warning should not operate)

Time duration of reminder light operation = N/A seconds
(4 to 8 seconds)

- C. Note wording of visual warning:

Fasten Seat Belt ☐

Fasten Belt ☐

Symbol 101 ☒

FMVSS 208 READINESS INDICATOR

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

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.

(11/8/94 legal interpretation)

Is the system totally mechanical?

Yes-☐; No-☒

Describe the location of the readiness indicator: 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-☐

FMVSS 208 Air Bag Labels

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

1. Air Bag Maintenance Label and Owner's Manual Instructions:

1.1 Does the manufacturer recommend periodic maintenance or replacement of the air bag?

☐ Yes (Go to 1.2)

☒ No (Go to 2)

1.2 Does the Vehicle have a maintenance or replacement label?

☐ Yes-Pass ☐ No-Fail

1.3 Does the label contain one of the following?

☐ Yes-Pass ☐ No-Fail

☐ Schedule on label specifies month and year

☐ Schedule on label specifies vehicle mileage

☐ Schedule on label specifies interval measured from date on certification label

1.4 Is the label permanently affixed within the passenger compartment?

☐ Yes-Pass ☐ No-Fail

1.5 Is the label lettered in English?

☐ Yes-Pass ☐ No-Fail

1.6 Is the label in block capitals and numerals?

☐ Yes-Pass ☐ No-Fail

1.7 Are the letters and numerals at least 3/32 inch high?

☐ Yes-Pass ☐ No-Fail

1.8 Does the owner's manual set forth the recommended schedule for maintenance or replacement?

☐ Yes-Pass ☐ No-Fail

2. Does the owner's manual: (S4.5.1 (f))

2.1 Include a description of the vehicle's air bag system in an easily understandable format?

☒ Yes ☐ No-Fail

2.2 Include a statement that the vehicle is equipped with an air bag and a lap/shoulder belt at the front outboard seating positions?

☒ Yes ☐ No-Fail

Air Bag Labels, Cont'd.

- 2.3 Include a statement that the air bag is a supplemental restraint at the front outboard seating positions? ☒ Yes ☐ No-Fail
- 2.4 Emphasize that all occupants, including the driver, should always wear their seat belts whether or not an air bag is also provided at their seating positions to minimize the risk of severe injury or death in the event of a crash? ☒ Yes ☐ No-Fail
- 2.5 Provide any necessary precautions regarding the proper positioning of occupants, including children, at seating positions equipped with air bags to insure maximum safety protection for those occupants? ☒ Yes ☐ No-Fail
- 2.6 Explain that no objects should be placed over or near the air bag on the steering wheel or on the instrument panel, because any such objects could cause harm if the vehicle is in a crash severe enough to cause the air bag to inflate? ☒ Yes ☐ No-Fail
3. Does the Vehicle:
- 3.1 Provide an automatic means to ensure that the air bag does not deploy when a child seat or child with a total mass of 30 kg or less is present on the front outboard seat? ☐ Yes ☒ No
- 3.2 Incorporate sensors, other than or in addition to weight sensors, which automatically prevent the passenger air bag from deploying in situations in which it might have an adverse effect on infants in rear-facing child seat, and unbelted or improperly belted children? ☐ Yes ☒ No
- 3.3 Have a passenger air bag designed to deploy in a manner that does not create a risk of serious injury to infants in rear-facing child seats, and unbelted or improperly belted children? ☐ Yes ☒ No

If yes to 3.1, or 3.2, or 3.3, the vehicle is not required to have a Sun Visor Warning Label (S4.5.1(b)), an air bag alert label (S4.5.1(c)) or a label on the dash (S4.5.1(e)) and this check sheet is complete. (S4.5.1) If no to 3.1, 3.2, and 3.3, go to 4.

Air Bag Labels, Cont'd.

4. Sun Visor Warning Label

- 4.1 Is the label permanently affixed (may be permanent marking or molding) to either side of the sun visor at each front outboard seating position with an air bag?

Driver side	☒ Yes-Pass	☐ No-Fail
Passenger side	☒ Yes-Pass	☐ No-Fail

- 4.2 Does the label conform in content (vehicles without back seats may omit the statement: "The BACK SEAT is the SAFEST place for children.") (S4.5.1(b)(2)(v)) to the label shown in either Figure 6a or 6b as appropriate at each front outboard seating position with an air bag? (S4.5.1(b)(2))

4.2.1 Dual air bags

Driver side	☒ Yes-Pass	☐ No-Fail
Passenger side	☒ Yes-Pass	☐ No-Fail

- 4.2.2 Vehicles with driver air bag ONLY - either 4.2.1 or 4.2.2 is applicable, not both. (S4.5.1(b)(2)(iv))

- 4.2.2.1 Does the label conform on content to the label shown in either Figure 6a or 6b as appropriate?

	☒ N/A
Driver side	☐ Yes-Pass ☐ No-Fail

- 4.2.2.2 Does the label conform in content to the label shown in Figure 6a where the label can be modified to omit the pictogram and the message may read:

DEATH or SERIOUS INJURY can occur.

- . Sit as far back as possible from the air bag.
- . ALWAYS use SEAT BELTS and CHILD RESTRAINTS.
- . The BACK SEAT is the SAFEST place for children.

	☒ N/A
Driver side	☐ Yes-Pass ☐ No-Fail

Air Bag Labels, Cont'd.

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

ARTWORK BLACK WITH
WHITE BACKGROUND

BOTTOM TEXT BLACK WITH
RED BULLETS ON WHITE
BACKGROUND

CIRCLE AND LINE RED
WITH WHITE
BACKGROUND

TOP TEXT AND SYMBOL
BLACK WITH YELLOW
BACKGROUND

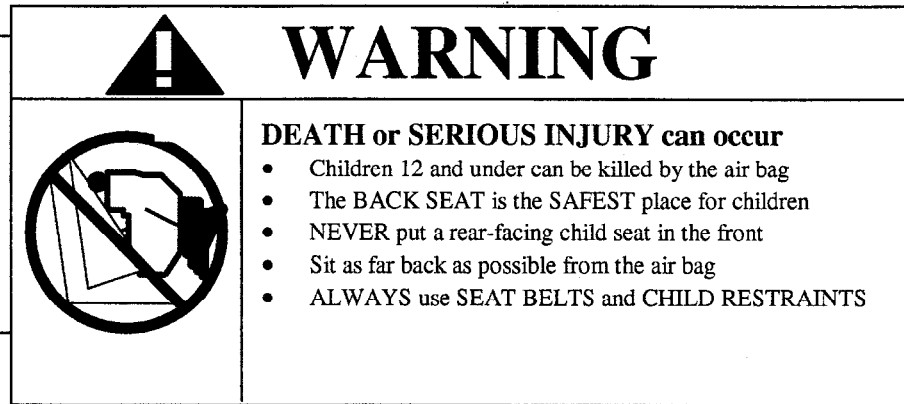


Figure 6a
(S4.5.1(b)(2))

Air Bag Labels, Cont'd.

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

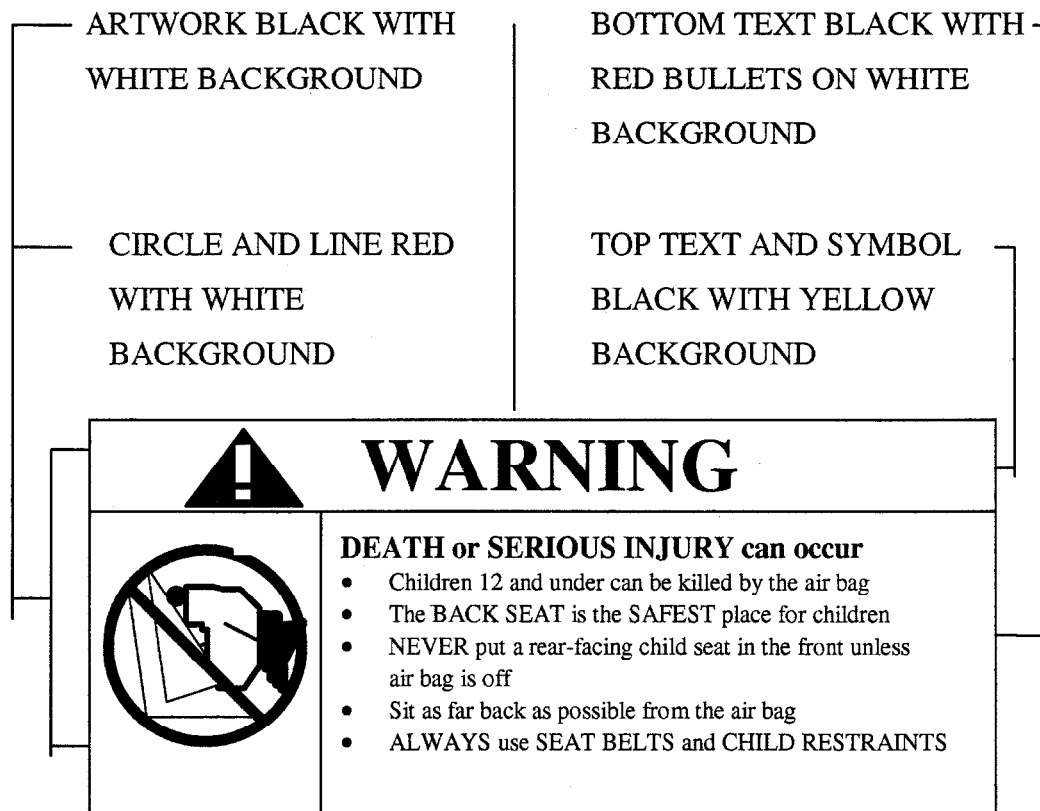


Figure 6b
(S4.5.1(b)(2))

- 4.3 Is the driver side label heading area yellow with the word "warning" and the alert symbol in black? (S4.5.1.(b)(2)(i))

Driver side ☒ Yes-Pass ☐ No-Fail

Passenger side ☒ Yes-Pass ☐ No-Fail

- 4.4 Is the message white with black text? (S4.5.1 (b)(2)(ii))

Driver side ☒ Yes-Pass ☐ No-Fail

Passenger side ☐ No air bag ☒ Yes-Pass ☐ No-Fail

- 4.5 Is the message area at least 30 cm²? (S4.5.1(b)(2)(ii))

Actual message area, driver side 32 cm²

Actual message area, passenger side 32 cm²

Driver side ☒ Yes-Pass ☐ No-Fail

Passenger side ☐ No air bag ☒ Yes-Pass ☐ No-Fail

Air Bag Labels, Cont'd.

- 4.6 Is the pictogram black with a red circle and slash on a white background?
(S4.5.1(b)(2)(iii)) & (S4.5.1(b)(2)(iv))

For vehicles with driver side air bag ONLY ☐ N/A

Driver side ☒ Yes-Pass ☐ No-Fail

Passenger side ☐ No air bag ☒ Yes-Pass ☐ No-Fail

- 4.7 Is the pictogram at least 30 mm in diameter? (S4.5.1(b)(2)(iii))

Actual diameter, driver side 32 mm

Actual diameter, passenger side 32 mm

For vehicles with driver side air bag ONLY ☐ N/A

Driver side ☒ Yes-Pass ☐ No-Fail

Passenger side ☐ No air bag ☒ Yes-Pass ☐ No-Fail

- 4.8 Is the same side of the sun visor to which the sun visor label is affixed free of other information with the exception of an air bag maintenance label?
(S4.5.1(b)(3))

Driver side ☒ Yes-Pass ☐ No-Fail

Passenger side ☐ No air bag ☒ Yes-Pass ☐ No-Fail

- 4.9 Is the sun visor free of other information about air bags or the need to wear seat belts with the exception of the air bag alert label or the utility vehicle label?

Driver side ☒ Yes-Pass ☐ No-Fail

Passenger side ☐ No air bag ☒ Yes-Pass ☐ No-Fail

5. Air Bag Alert Label

- 5.1 Is the Sun Visor Warning Label visible when the sun visor is in the stowed position?

Driver ☒ Yes ☐ No

Passenger ☒ Yes ☐ No

If yes, go to 6

- 5.2 Does the label conform in content to the label shown in Figure 6c?
(S4.5.1(c)(2))

☐ Yes-Pass ☐ No-Fail

Circle and Line Red
with White
Background

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN UP POSITION

Artwork Black with
White Background

Text Yellow with
Black Background

Figure 6c
(S4.5.1(c)(2))



Air Bag Labels, Cont'd.

5.3 Is the message area black with yellow text? (S4.5.1(c)(2)(i))
☐ Yes-Pass ☐ No-Fail

5.4 Is the message area at least 20 cm²? (S4.5.1(c)(2)(i))
Actual message area ____ cm² ☐ Yes-Pass ☐ No-Fail

5.5 Is the pictogram black with a red circle and slash on a white background?
(S4.5.1(c)(2)(ii))

For vehicles with driver side air bag ONLY ☒ N/A

☐ Yes-Pass ☐ No-Fail

5.6 Is the pictogram at least 20 mm in diameter? (S4.5.1(c)(2)(ii))
Actual diameter is ____ mm

For vehicles with driver side air bag ONLY ☒ N/A

☐ Yes-Pass ☐ No-Fail

6. Label On the Dash

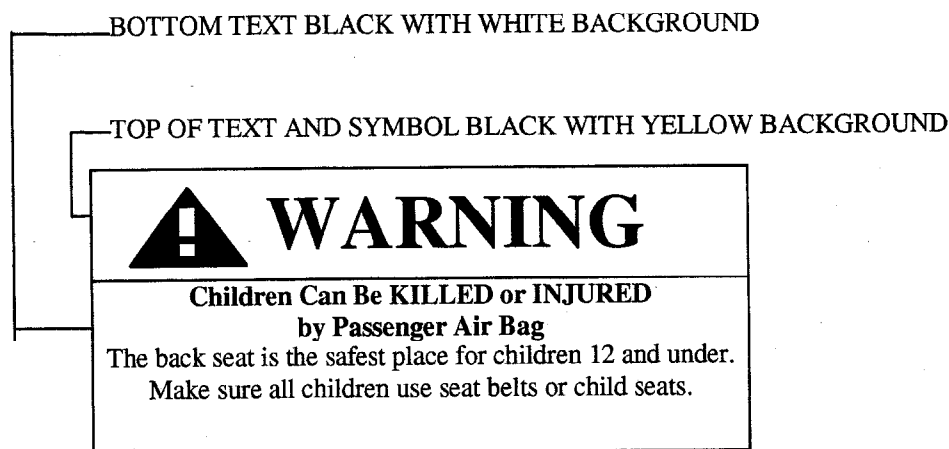
6.1 Does the vehicle have a passenger air bag?
☒ Yes ☐ No

If no, this check list is complete.

6.2 Does the vehicle have a label on the dash or steering wheel hub? (S4.5.1(e))
☒ Yes-Pass ☐ No-Fail

6.3 Does the label conform in content (vehicles without back seats may omit the statement: "The back seat is the safest place for children 12 and under." (S4.5.1(e)(iii)) to the label shown in Figure 7? (S4.5.1(e))
☒ Yes-Pass ☐ No-Fail

Figure 7
(S4.5.1(e))



Air Bag Labels, Cont'd.

- 6.4 Is the heading area yellow with the word "warning" and the alert symbol in black? (S4.5.1(e)(i)) ☒ Yes-Pass ☐ No-Fail
- 6.5 Is the message white with black text? (S4.5.1(e)(ii)) ☒ Yes-Pass ☐ No-Fail
- 6.6 Is the message area at least 30 cm²? (S4.5.1(e)(ii))
Actual message area 40 cm² ☒ Yes-Pass ☐ No-Fail

FMVSS 208 REAR OUTBOARD SEATING POSITION SEAT BELTS

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

Do all rear outboard seating positions have type 2 seat belts?

Yes-☒; No-☐; N/A ☐ (No Back Seat)

If NO, describe the seat belt installed, the seat location, and any other information about the seat that would explain why a type 2 belt was not installed.

FMVSS 208 Lap Belt Lockability

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing **and** that has seat belt retractors that are not automatic retractors. (S7.1.1.5(c))

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

DESIGNATED SEATING POSITION: Right front passenger

- ☒ 1. Record test seat position. Mid
(S7.1.1.5(c)(1)) (Any position is acceptable.)
- ☒ 2. Buckle the seat belt. (S7.1.1.5(c)(1))
- ☒ 3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
- ☒ 4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part to the vehicle?
(S7.1.1.5(a)) ☒ Yes-Pass ☐ No-Fail
- ☒ 5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing? (S7.1.1.5(a)) ☒ Yes-Pass ☐ No-Fail
- ☒ 6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?
If yes, go to 6.1. If no, go to 7. ☒ Yes ☐ No
- 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b)) ☒ Yes-Pass ☐ No-Fail

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

DESIGNATED SEATING POSITION: Right front passenger

- ☒ 7. Locate a reference point a on the seat belt buckle. (S7.1.1.5(c)(2))
- ☒ 8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- ☒ 9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
- ☒ 10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2)) Measured distance between A and B 60.4 inches.
- ☒ 11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
- ☒ 12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4)) Measured force application angle 10 degrees. (Spec. 5~15 degrees)
- ☒ 13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4)) Measured distance between A and B 41.6 inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

DESIGNATED SEATING POSITION: Front right passenger

- ☒ 14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate 25 lbs/sec (spec. 10 ~50 lb/sec)

The measured distance between A and B is 41.7 inches (S7.1.1.5(c)(6))

- ☒ 15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5 (c)(7))

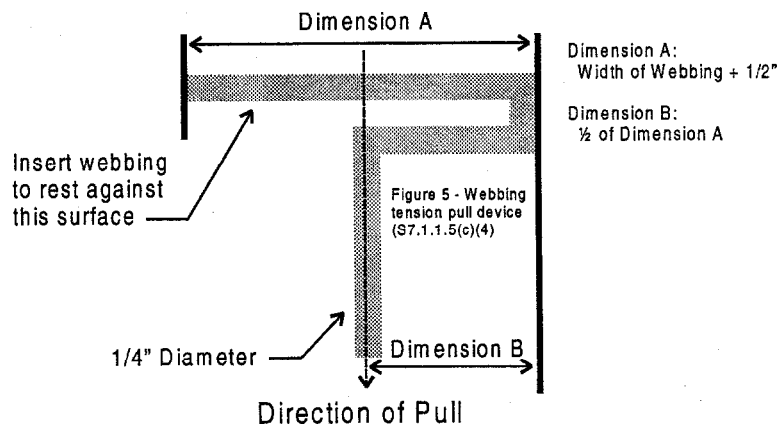
14-13= 0.1 inches

☒ Yes-Pass ☐ No-Fail

- ☒ 16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (S7.1.1.5(c)(8))

10-14= 18.7 inches.

☒ Yes-Pass ☐ No-Fail



FMVSS 208 Lap Belt Lockability

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing **and** that has seat belt retractors that are not automatic retractors. (S7.1.1.5(c))

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

DESIGNATED SEATING POSITION: Right rear passenger

- ☒ 1. Record test seat position. N/A, Not Adjustable
(S7.1.1.5(c)(1)) (Any position is acceptable.)
- ☒ 2. Buckle the seat belt. (S7.1.1.5(c)(1))
- ☒ 3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
- ☒ 4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part to the vehicle?
(S7.1.1.5(a)) ☒ Yes-Pass ☐ No-Fail
- ☒ 5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing? (S7.1.1.5(a)) ☒ Yes-Pass ☐ No-Fail
- ☒ 6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?
If yes, go to 6.1. If no, go to 7. ☒ Yes ☐ No
- 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b)) ☒ Yes-Pass ☐ No-Fail

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

DESIGNATED SEATING POSITION: Right rear passenger

- ☒7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))
- ☒8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- ☒9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
- ☒10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2)) Measured distance between A and B 62.0 inches.
- ☒11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
- ☒12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4)) Measured force application angle 10 degrees. (Spec. 5~15 degrees)
- ☒13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4)) Measured distance between A and B 38.2 inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

DESIGNATED SEATING POSITION: Right rear passenger

- ☒ 14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate 25 lbs/sec (spec. 10 ~50 lb/sec)

The measured distance between A and B is 38.6 inches (S7.1.1.5(c)(6))

- ☒ 15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5 (c)(7))

14-13= 0.4 inches

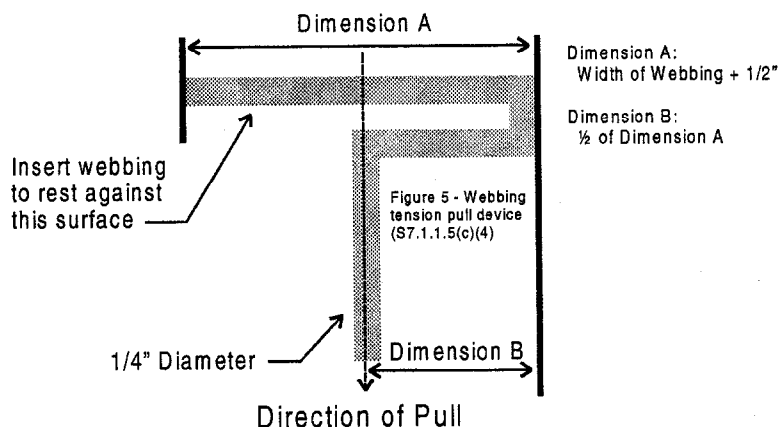
☒ Yes-Pass ☐ No-Fail

- ☒ 16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (S7.1.1.5(c)(8))

10-14= 23.4

inches.

☒ Yes-Pass ☐ No-Fail



FMVSS 208 Lap Belt Lockability

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing **and** that has seat belt retractors that are not automatic retractors. (S7.1.1.5(c))

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

DESIGNATED SEATING POSITION: Left rear passenger

- ☒ 1. Record test seat position. N/A, Not Adjustable
(S7.1.1.5(c)(1)) (Any position is acceptable.)
- ☒ 2. Buckle the seat belt. (S7.1.1.5(c)(1))
- ☒ 3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
- ☒ 4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part to the vehicle?
(S7.1.1.5(a)) ☒ Yes-Pass ☐ No-Fail
- ☒ 5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing? (S7.1.1.5(a)) ☒ Yes-Pass ☐ No-Fail
- ☒ 6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?
If yes, go to 6.1. If no, go to 7. ☒ Yes ☐ No
- 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b)) ☒ Yes-Pass ☐ No-Fail

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

DESIGNATED SEATING POSITION: Left rear passenger

- ☒7. Locate a reference point a on the seat belt buckle. (S7.1.1.5(c)(2))
- ☒8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
- ☒9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
- ☒10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2)) Measured distance between A and B 61.6 inches.
- ☒11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
- ☒12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device in figure 5. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4)) Measured force application angle 10 degrees. (Spec. 5~15 degrees)
- ☒13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4)) Measured distance between A and B 29.5 inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

NHTSA No.: C10503

Technician: R. Stoner

Date: 01/15/01

DESIGNATED SEATING POSITION: Left rear passenger

- ☒ 14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate 25 lbs/sec (spec. 10 ~50 lb/sec)

The measured distance between A and B is 30.6 inches (S7.1.1.5(c)(6))

- ☒ 15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5 (c)(7))

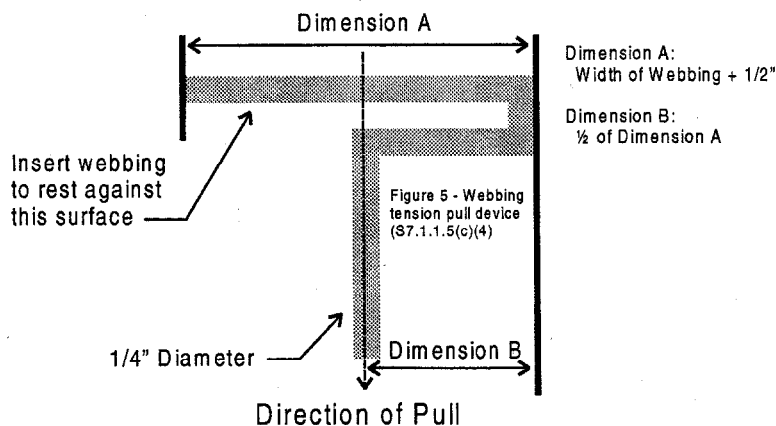
14-13= 1.1 inches

☒ Yes-Pass ☐ No-Fail

- ☒ 16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more? (S7.1.1.5(c)(8))

10-14= 31.0 inches.

☒ Yes-Pass ☐ No-Fail



FMVSS 208 Seat Belt Comfort And Convenience Test
Belt Contact Force (S7.4.3)

Test Vehicle NHTSA No.: C10503

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

Designated Seating Position Tested: Driver

Date of Comfort and Convenience Check: 01/15/01

Technician Performing Check: Ron Stoner

GVWR: 2337 pounds

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

1. Does the vehicle incorporate a webbing tension-relieving device?

☐ Yes-go to latchplate access
☒ No-continue with this check sheet

2. Adjustable seats are in the adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)

☒ Check
☐ N/A

3. If separately adjustable in a vertical direction, the seats are at the lowest position.

☐ Check
☒ N/A

4. Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.

☒ Check
☐ N/A

5. Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.

☒ Check
☐ N/A

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Belt Contact Force (S7.4.3)

6. Place each adjustable head restraint in its highest adjustment position.

☒ Check
☐ N/A

7. Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)

☐ Check
☒ N/A

8. Position the test dummies according to dummy position placement instructions in Appendix B.

☒ Check

9. Fasten the seat belt latch. 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. 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. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds. Contact force is 0.51 pounds.

☒ 0.0 to 0.7 pounds - Pass
☐ greater than 0.7 pounds - FAIL*

FMVSS 208 Seat Belt Comfort And Convenience Test
Belt Contact Force (S7.4.3)

Test Vehicle NHTSA No.: C10503

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

Designated Seating Position Tested: Right front passenger

Date of Comfort and Convenience Check: 01/15/01

Technician Performing Check: Ron Stoner

GVWR: 2337 pounds

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

1. Does the vehicle incorporate a webbing tension-relieving device?

☐ Yes-go to latchplate access
☒ No-continue with this check sheet

2. Adjustable seats are in the adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)

☒ Check
☐ N/A

3. If separately adjustable in a vertical direction, the seats are at the lowest position.

☐ Check
☒ N/A

4. Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.

☒ Check
☐ N/A

5. Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.

☒ Check
☐ N/A

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Belt Contact Force (S7.4.3)

6. Place each adjustable head restraint in its highest adjustment position.

☒ Check
☐ N/A

7. Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)

☐ Check
☒ N/A

8. Position the test dummies according to dummy position placement instructions in Appendix B.

☒ Check

9. Fasten the seat belt latch. 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. 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. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds. Contact force is 0.59 pounds.

☒ 0.0 to 0.7 pounds - Pass
☐ greater than 0.7 pounds - FAIL*

FMVSS 208 Seat Belt Comfort And Convenience Test
Belt Contact Force (S7.4.3)

Test Vehicle NHTSA No.: C10503

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

Designated Seating Position Tested: Left rear passenger

Date of Comfort and Convenience Check: 01/15/01

Technician Performing Check: Ron Stoner

GVWR: 2337 pounds

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

1. Does the vehicle incorporate a webbing tension-relieving device?

☐ Yes-go to latchplate access
☒ No-continue with this check sheet

2. Adjustable seats are in the adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)

☐ Check
☒ N/A

3. If separately adjustable in a vertical direction, the seats are at the lowest position.

☐ Check
☒ N/A

4. Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.

☒ Check
☐ N/A

5. Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.

☐ Check
☒ N/A

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Belt Contact Force (S7.4.3)

6. Place each adjustable head restraint in its highest adjustment position.

☒ Check
☐ N/A

7. Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)

☐ Check
☒ N/A

8. Position the test dummies according to dummy position placement instructions in Appendix B.

☒ Check

9. Fasten the seat belt latch. 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. 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. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds. Contact force is 0.54 pounds.

☒ 0.0 to 0.7 pounds - Pass
☐ greater than 0.7 pounds - FAIL*

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Latchplate Access (S7.4.4)

Test Vehicle NHTSA No.: C10503

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

Designated Seating Position Tested: Driver

Date of Comfort and Convenience Check: 01/15/01

Technician Performing Check: Ron Stoner

GVWR: 2337 pounds

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

1. Position the seat in its forward most adjustment position. ☒ Check
2. Position the test dummy using the procedures in Appendix B. (Some modifications to the positioning procedure may need to be made because the seat is in its forward most position.) ☒ Check
3. Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50th percentile adult male occupant. ☒ Check
4. Attach the inboard and outboard reach string following the instructions on Figure 1C. ☒ Check
5. Place the latch plate in the stowed position. ☒ Check
6. Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. Is the latchplate within the reach envelope?
Yes- ☒ Pass; No- ☐ Fail
7. Using the clearance test block, specified in Figure 2C of the test procedure, determine if there is sufficient clearance between the vehicle seat and the side of vehicle to allow the test block to move unhindered to the latchplate or buckle.
Yes- ☒ Pass; No- ☐ Fail

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Latchplate Access (S7.4.4)

Test Vehicle NHTSA No.: C10503

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

Designated Seating Position Tested: Right front passenger

Date of Comfort and Convenience Check: 01/15/01

Technician Performing Check: Ron Stoner

GVWR: 2337 pounds

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

1. Position the seat in its forward most adjustment position. ☒ Check
2. Position the test dummy using the procedures in Appendix B. (Some modifications to the positioning procedure may need to be made because the seat is in its forward most position.) ☒ Check
3. Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50th percentile adult male occupant. ☒ Check
5. Attach the inboard and outboard reach string following the instructions on Figure 1C. ☒ Check
5. Place the latch plate in the stowed position. ☒ Check
6. Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. Is the latchplate within the reach envelope?
Yes-☒ Pass; No- ☐ Fail
7. Using the clearance test block, specified in Figure 2C of the test procedure, determine if there is sufficient clearance between the vehicle seat and the side of vehicle to allow the test block to move unhindered to the latchplate or buckle.
Yes-☒ Pass; No- ☐ Fail

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Retraction (S7.4.5)

Test Vehicle NHTSA No.: C10503

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

Designated Seating Position Tested: Driver

Date of Comfort and Convenience Check: 01/15/01

Technician Performing Check: Ron Stoner

GVWR: 2337 pounds

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

1. Is the vehicle a passenger car or walk-in van-type vehicle? ☐ Yes
☒ No
If yes, go to seat belt guides and hardware.
2. Adjustable seats are in the adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2) ☒ Check
3. If separately adjustable in a vertical direction, the seats are at the lowest position. ☒ Check
4. Place any adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer. ☒ Check
5. Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR. ☒ Check
6. Place each adjustable head restraint in its highest adjustment position. ☒ Check
7. Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3) ☒ Check
8. Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B. ☒ Check

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Retraction (S7.4.5)

9. Restrain the dummies using the belt systems for the position being tested. ☒ Check
10. Stow outboard armrests that are capable of being stowed. ☒ Check
11. Check the statement that applies to this test vehicle:
- (A) The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latchplate is released. ☐ Pass
- (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latchplate is released. ☒ Pass
- (C) Neither A or B apply. ☐ **FAIL**
12. With the webbing and hardware in the stowed position are the webbing and hardware prevented from being pinched when the door is closed?
- Yes- ☒ Pass; No- ☐ **Fail**
13. If this test vehicle has an open body (without doors) and has a belt system with a tension-relieving device, does the belt system fully retract when the tension-relieving device is deactivated?
- ☒ N/A
Yes- ☐ Pass; No- ☐ **Fail**

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Retraction (S7.4.5)

Test Vehicle NHTSA No.: C10503

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

Designated Seating Position Tested: Right front passenger

Date of Comfort and Convenience Check: 01/15/01

Technician Performing Check: Ron Stoner

GVWR: 2337 pounds

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

1. Is the vehicle a passenger car or walk-in van-type vehicle? ☐ Yes
☒ No
If yes, go to seat belt guides and hardware.
2. Adjustable seats are in the adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2) ☒ Check
3. If separately adjustable in a vertical direction, the seats are at the lowest position. ☒ Check
4. Place any adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer. ☒ Check
5. Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR. ☒ Check
6. Place each adjustable head restraint in its highest adjustment position. ☒ Check
7. Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3) ☒ Check
8. Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B. ☒ Check

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Retraction (S7.4.5)

9. Restrain the dummies using the belt systems for the position being tested. ☒ Check
10. Stow outboard armrests that are capable of being stowed. ☒ Check
11. Check the statement that applies to this test vehicle:
- (A) The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latchplate is released. ☐ Pass
- (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latchplate is released. ☒ Pass
- (C) Neither A or B apply. ☐ **FAIL**
12. With the webbing and hardware in the stowed position are the webbing and hardware prevented from being pinched when the door is closed?
Yes- ☒ Pass; No- ☐ **Fail**
13. If this test vehicle has an open body (without doors) and has a belt system with a tension-relieving device, does the belt system fully retract when the tension-relieving device is deactivated? ☒ N/A
Yes- ☐ Pass; No- ☐ **Fail**

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

Test Vehicle NHTSA No.: C10503

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

Designated Seating Position Tested: Driver

Date of Comfort and Convenience Check: 01/15/01

Technician Performing Check: Ron Stoner

GVWR: 2337 pounds

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b)).
- B. Seats which are removable.
- C. Seats that are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above, determine the following:

1. Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?

☐ Yes: go to 2.
☒ No: this form is complete.
2. Does one of the following three parts, the seat belt latchplate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)?

Yes-☐ Pass; No- ☐ **Fail**
3. Are the remaining two seat belt parts accessible under normal conditions?

Yes-☐ Pass; No- ☐ **Fail**
4. The buckle and latchplate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
 - (A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched.

☐ Check

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

(B) The seat is moved to any position to which it is designed to be adjusted. ☐ Check

(C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check

Yes- ☐ Pass; No- ☐ Fail

5. Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)? Yes- ☐ Pass; No- ☐ Fail

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

Test Vehicle NHTSA No.: C10503

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

Designated Seating Position Tested: Right front passenger

Date of Comfort and Convenience Check: 01/15/01

Technician Performing Check: Ron Stoner

GVWR: 2337 pounds

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b)).
- B. Seats which are removable.
- C. Seats that are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above, determine the following:

1. Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back? ☐ Yes: go to 2.
☒ No: this form is complete.
2. Does one of the following three parts, the seat belt latchplate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)? Yes- ☐ Pass; No- ☐ Fail
3. Are the remaining two seat belt parts accessible under normal conditions? Yes- ☐ Pass; No- ☐ Fail
4. The buckle and latchplate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
(A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. ☐ Check

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

(B) The seat is moved to any position to which it is designed to be adjusted. ☐ Check

(C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check

Yes- ☐ Pass; No- ☐ Fail

5. Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)? Yes- ☐ Pass; No- ☐ Fail

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

Test Vehicle NHTSA No.: C10503

Vehicle Model Year/Make/Model/Body Style: 2001/Suzuki/Grand Vitara/SUV

Designated Seating Position Tested: Not applicable to Left, Center, and Right rear seats
due to item C below.

Date of Comfort and Convenience Check: 01/15/01

Technician Performing Check: Ron Stoner

GVWR: 2337 pounds

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b)).
- B. Seats which are removable.
- C. Seats that are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above, determine the following:

1. Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?

☐ Yes: go to 2.
☐ No: this form is complete.
2. Does one of the following three parts, the seat belt latchplate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)?

Yes-☐ Pass; No- ☐ Fail
3. Are the remaining two seat belt parts accessible under normal conditions?

Yes-☐ Pass; No- ☐ Fail
4. The buckle and latchplate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
 - (A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched.

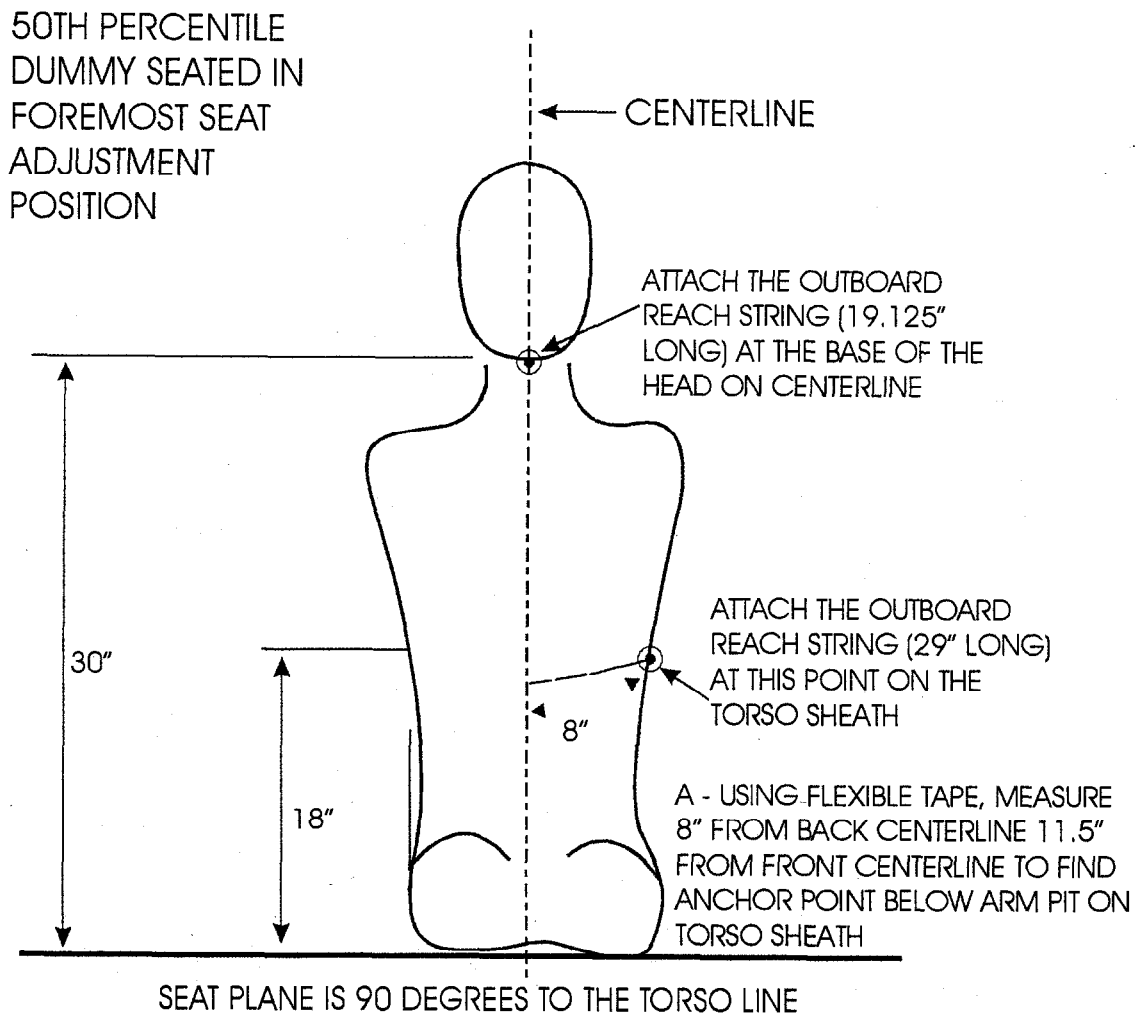
☐ Check

FMVSS 208 Seat Belt Comfort And Convenience Test Summary, Cont'd.
Seat Belt Guides And Hardware (S7.4.6)

- (B) The seat is moved to any position to which it is designed to be adjusted. ☐ Check
- (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check
- Yes- ☐ Pass; No- ☐ Fail
5. Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)? Yes- ☐ Pass; No- ☐ Fail

LOCATION OF ANCHORING POINTS FOR LATCHPLATE REACH LIMITING CHAINS OR STRINGS TO TEST FOR LATCHPLATE ACCESSIBILITY

PART 572E DUMMY



REAR VIEW

Figure 1C

USE OF CLEARANCE TEST BLOCK TO DETERMINE HAND/ARM ACCESS

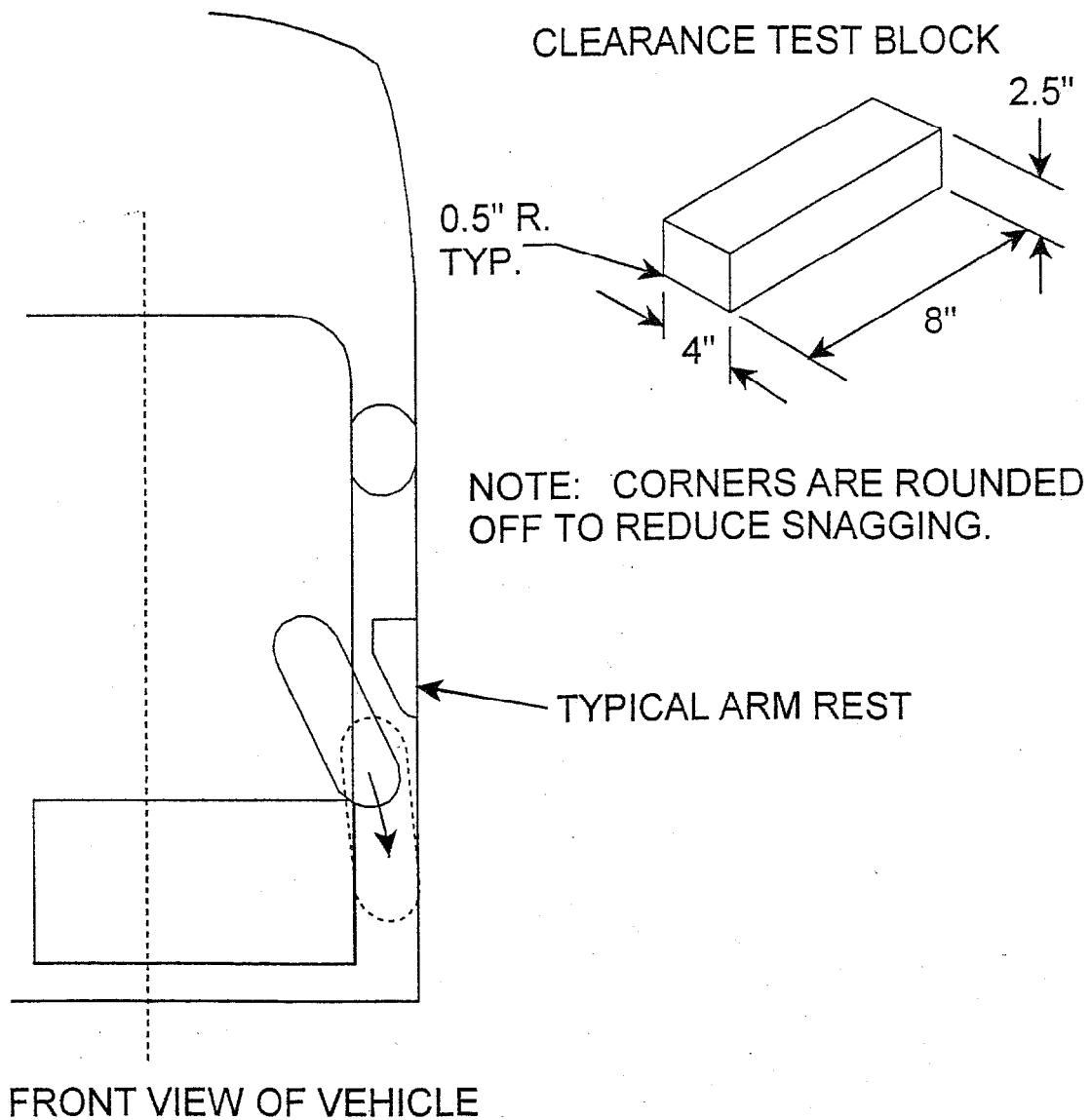


Figure 2C

Appendix A

Photographs

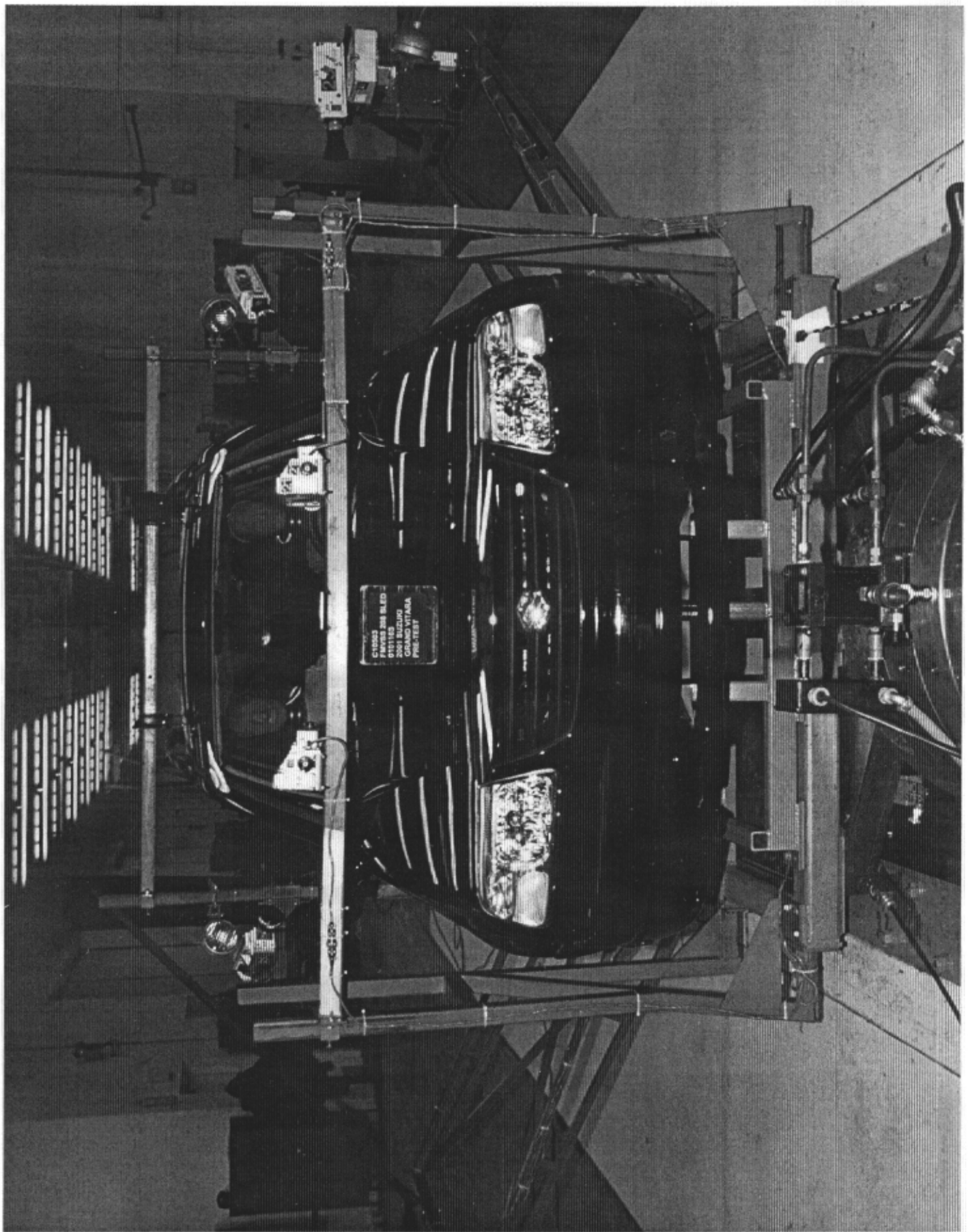


Figure A-1 Pre-Test Front View of Test Vehicle Mounted to Sled

A-2

S010116

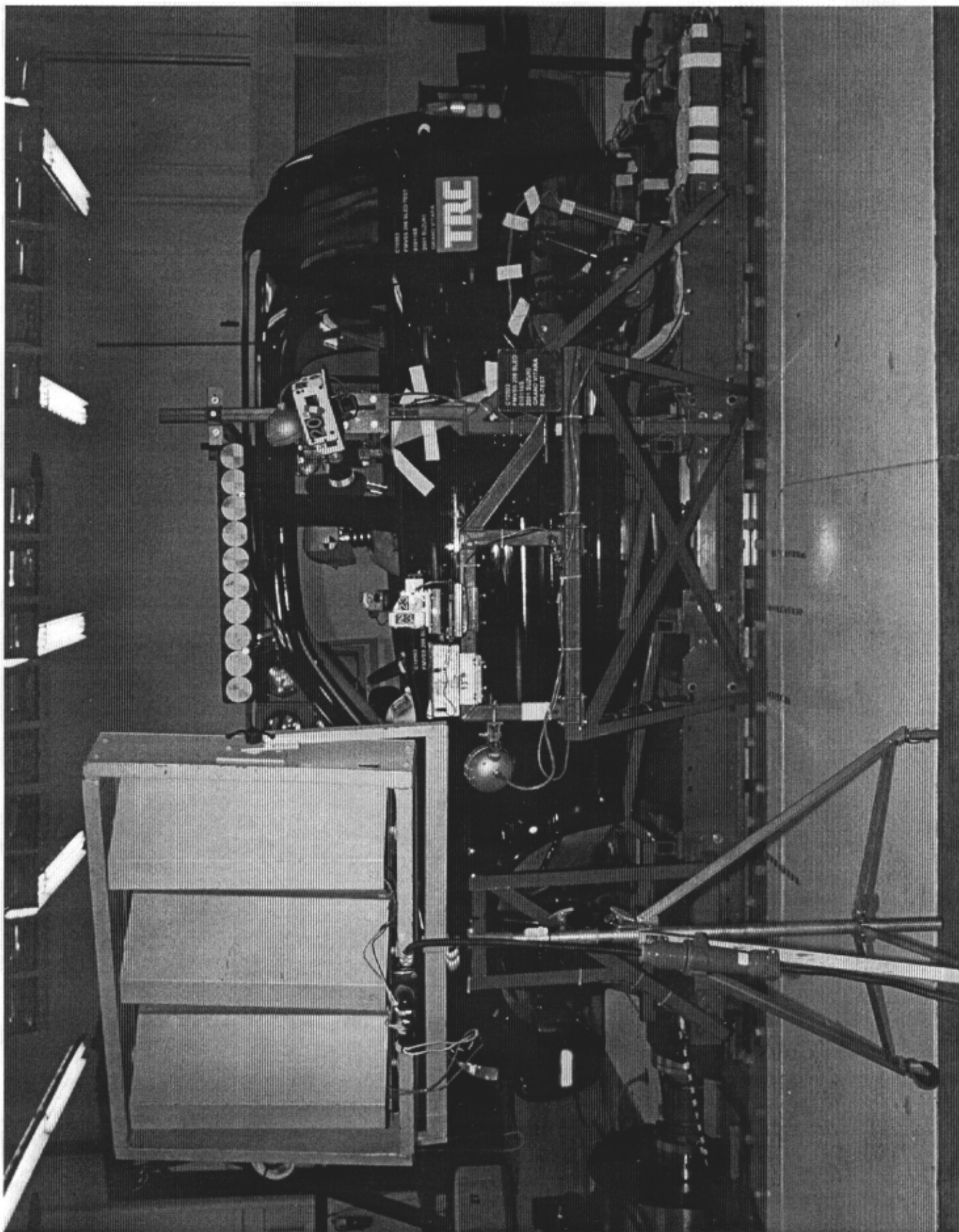


Figure A-2 Pre-Test Left Side View of Test Vehicle Mounted to Sled

A-3

S010116

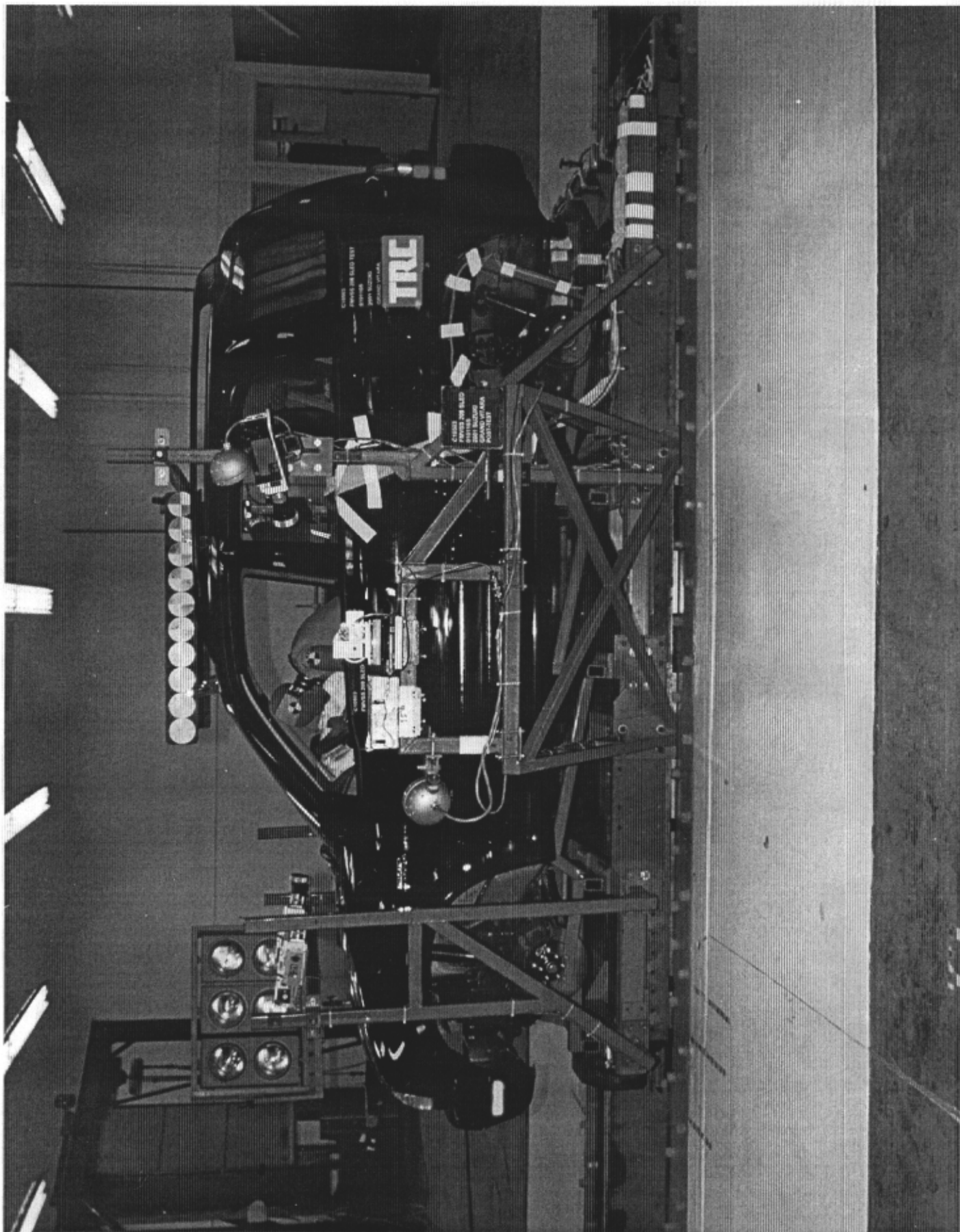


Figure A-3 Post-Test Left Side View of Test Vehicle Mounted to Sled

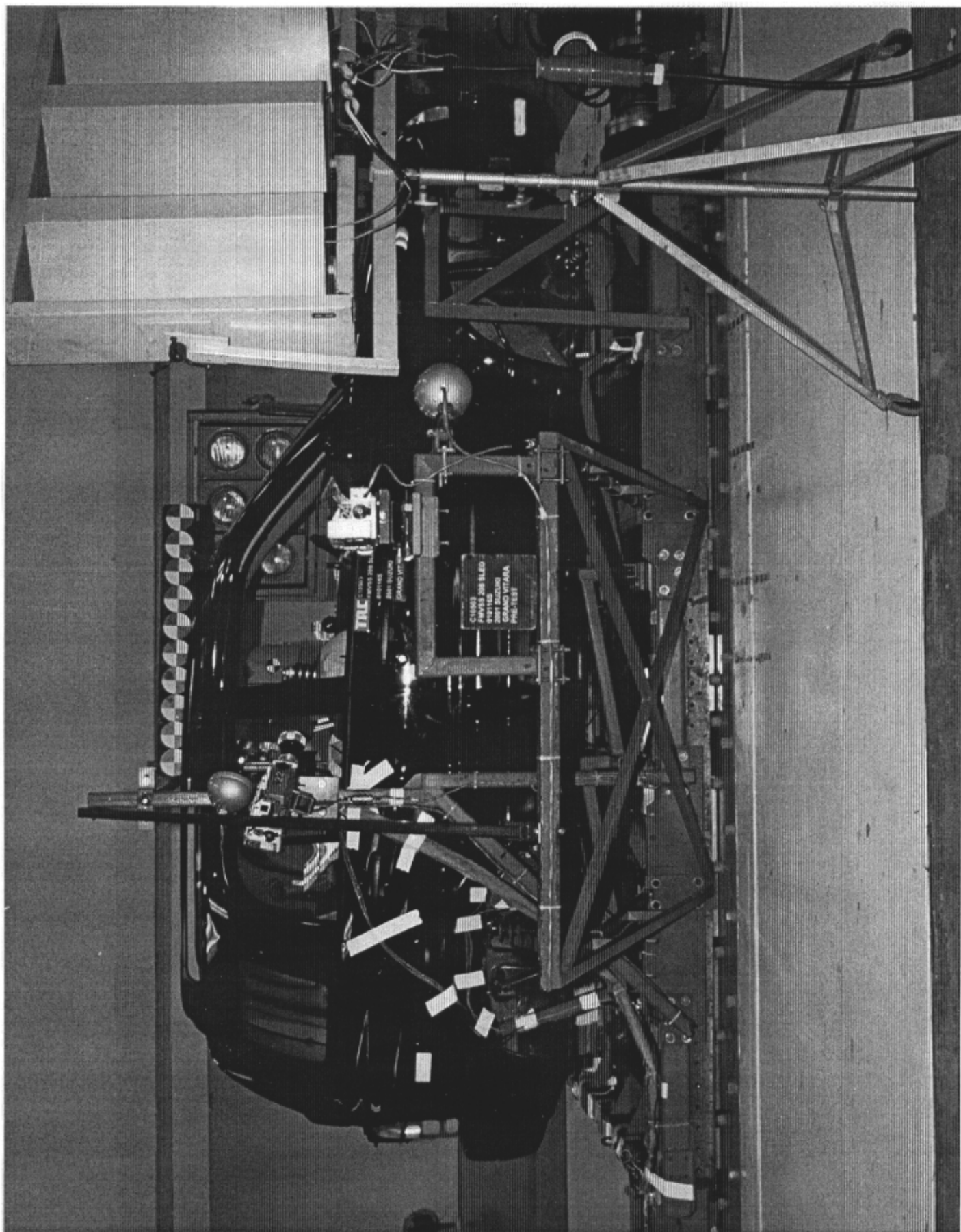


Figure A-4 Pre-Test Right Side View of Test Vehicle Mounted to Sled

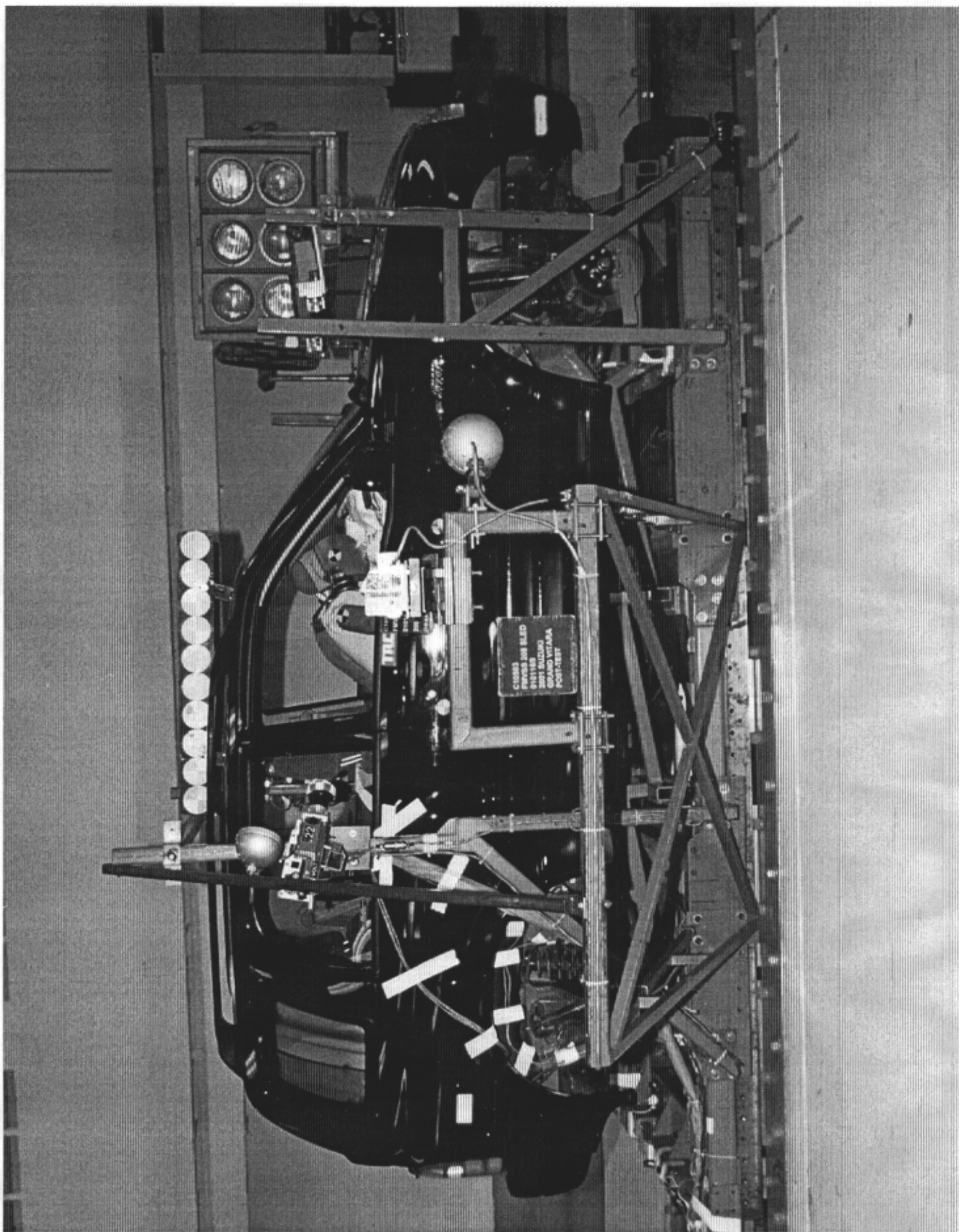


Figure A-5 Post-Test Right Side View of Test Vehicle Mounted to Sled

A-6

S010116

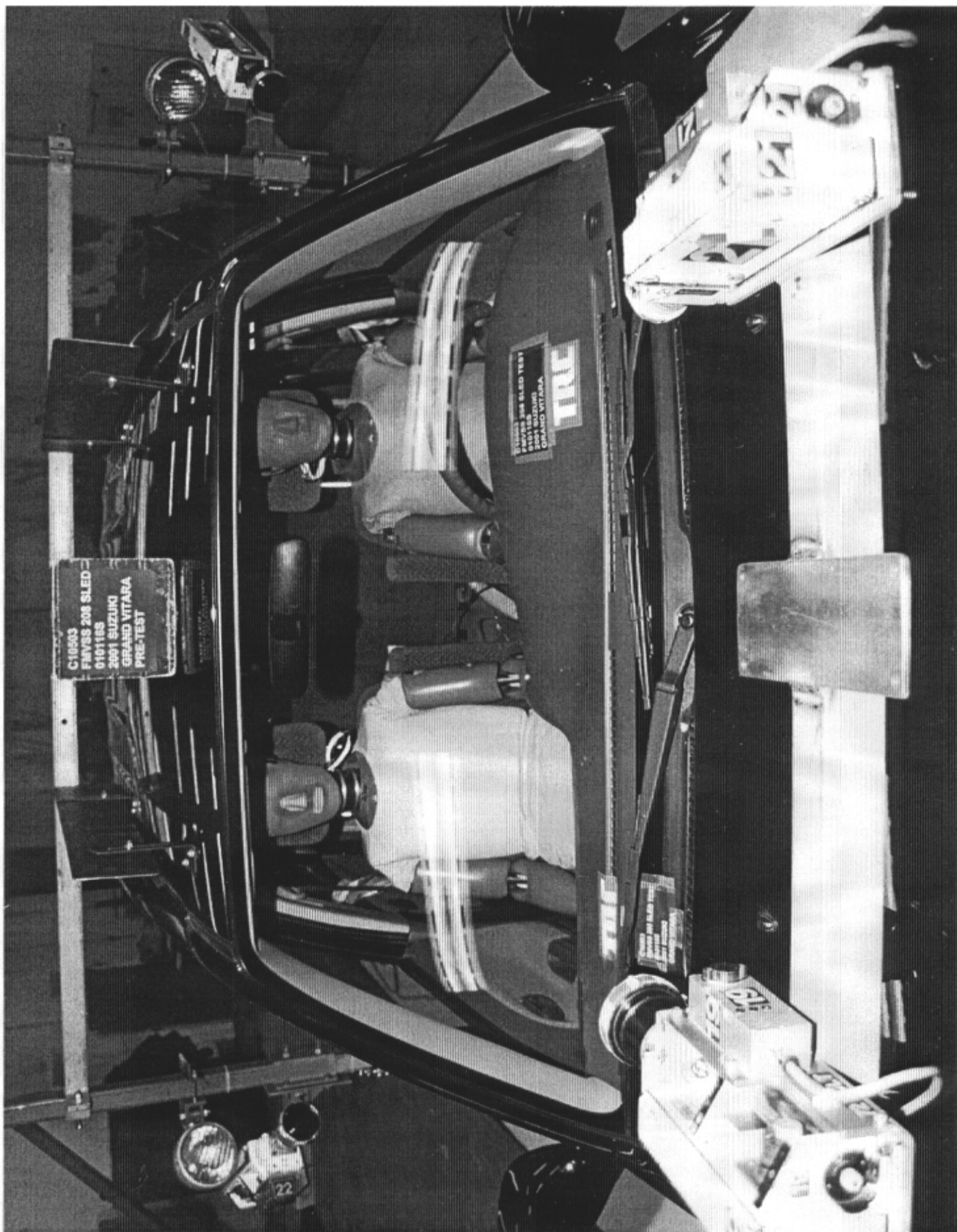


Figure A-6 Pre-Test Windshield View
A-7

S010116



Figure A-7 Post-Test Windshield View
A-8

S010116

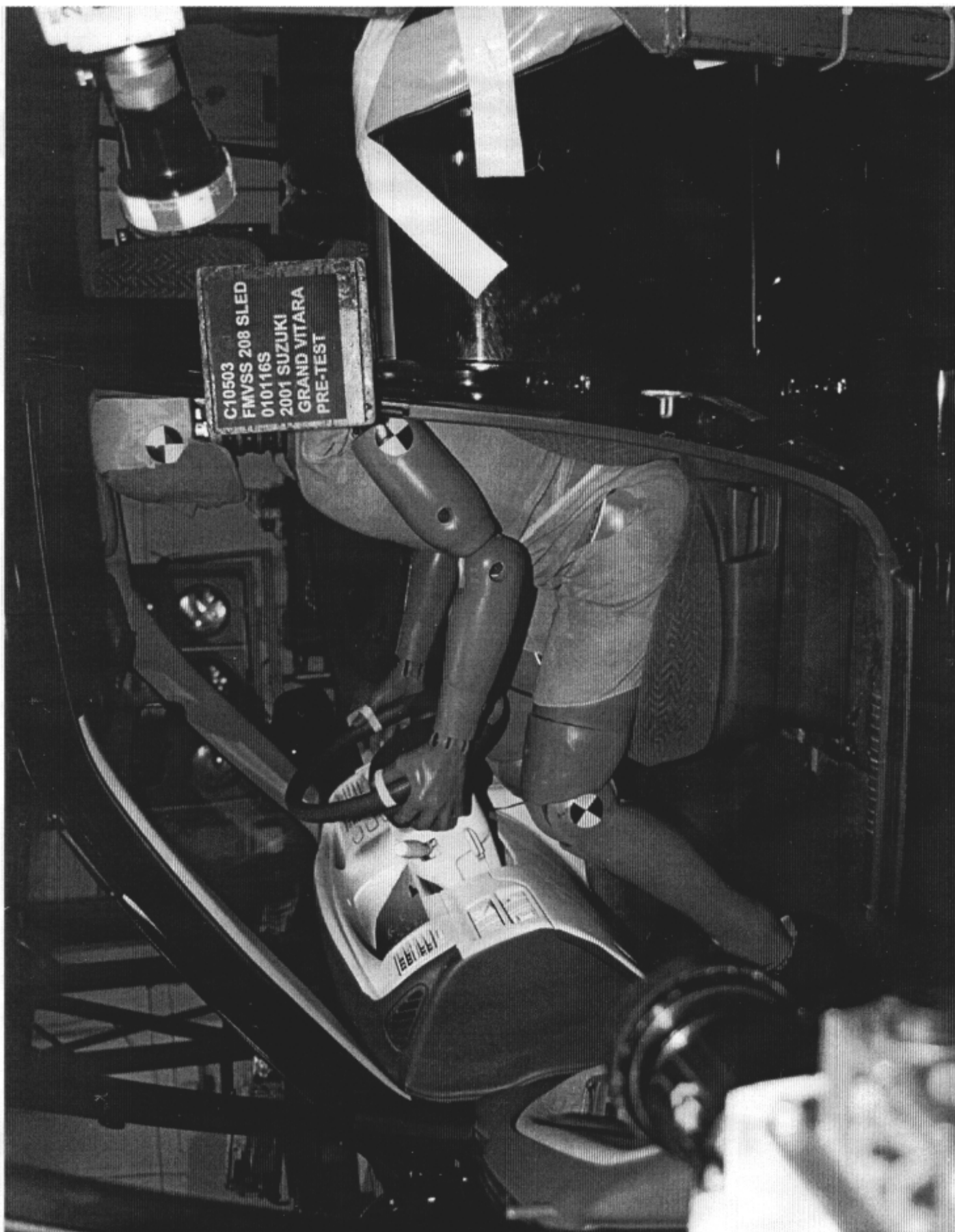


Figure A-8 Pre-Test Driver Dummy Position View with Door Open

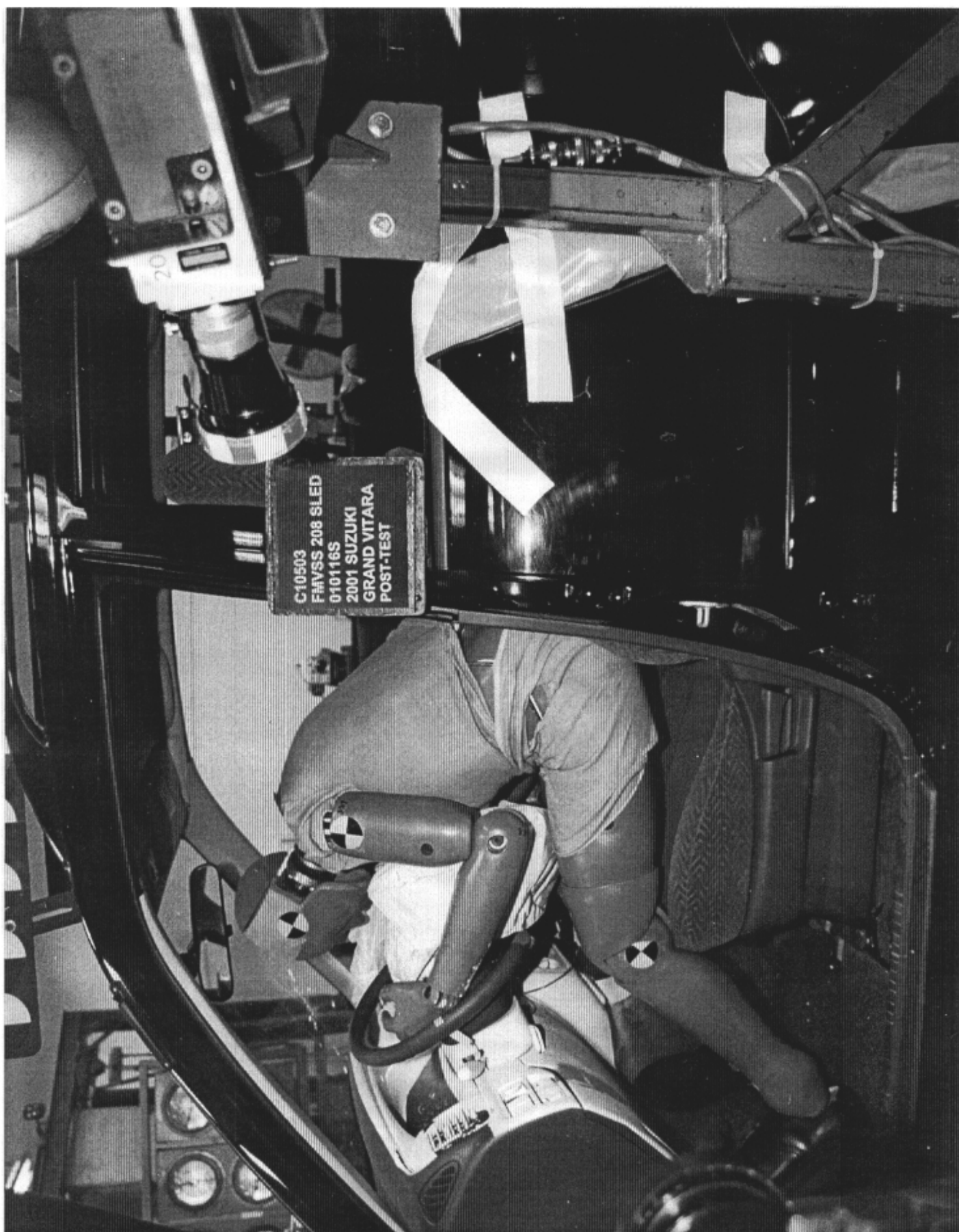


Figure A-9 Post-Test Driver Dummy Position View with Door Open

A-10

S010116

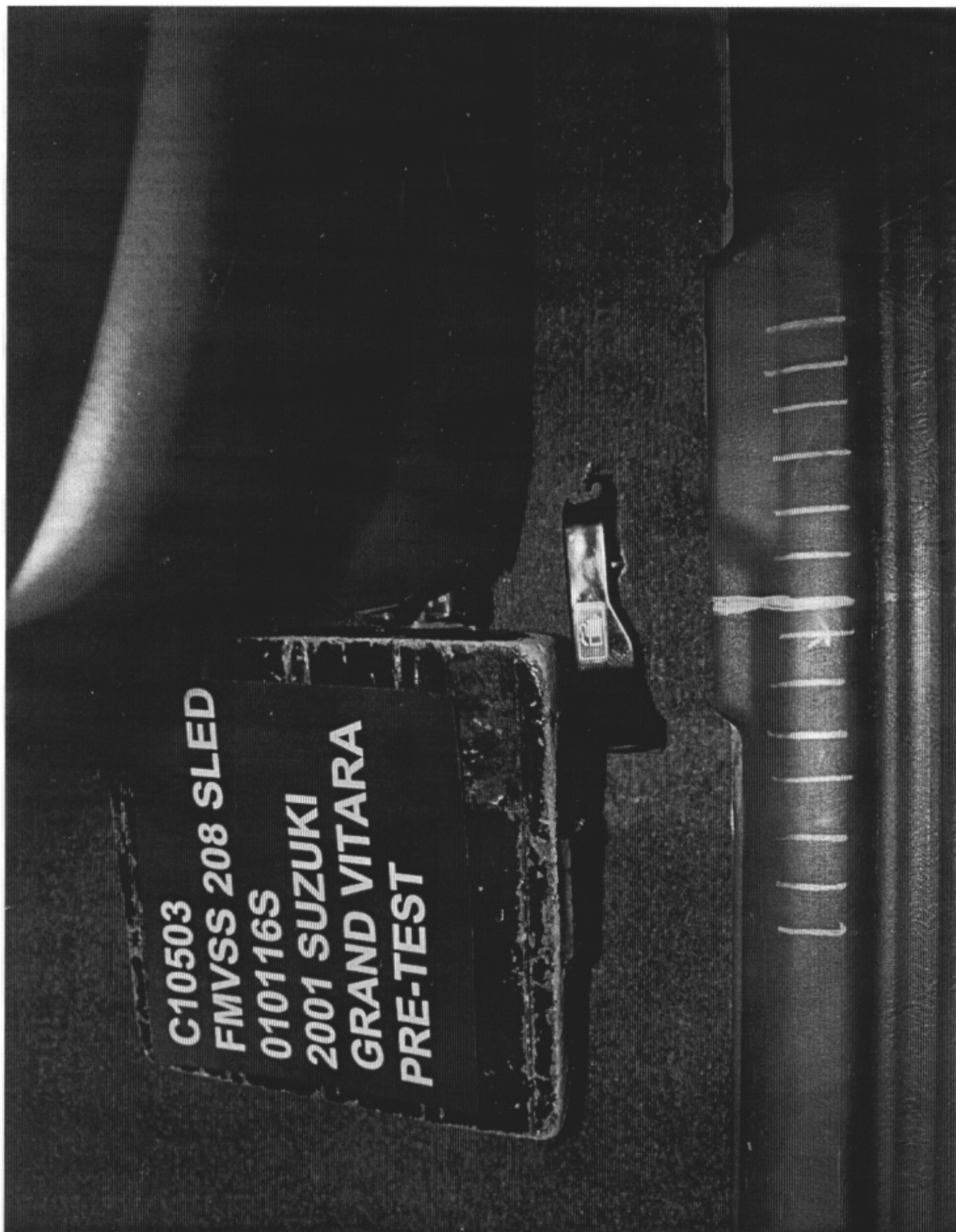


Figure A-10 Pre-Test Driver Seat Track Position View

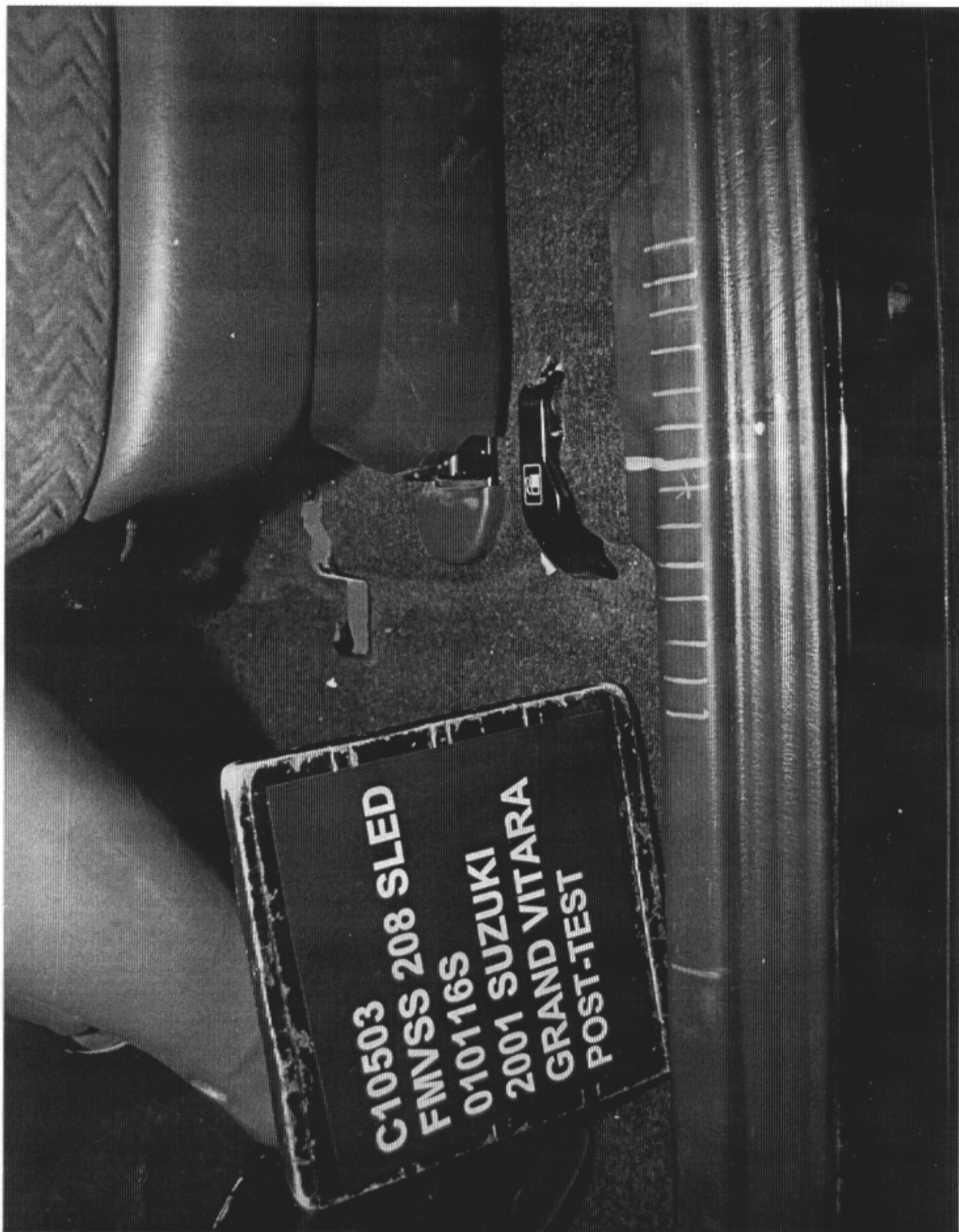


Figure A-11 Post-Test Driver Seat Track Position View
A-12

S010116



Figure A-12 Pre-Test Driver Dummy Position Front View

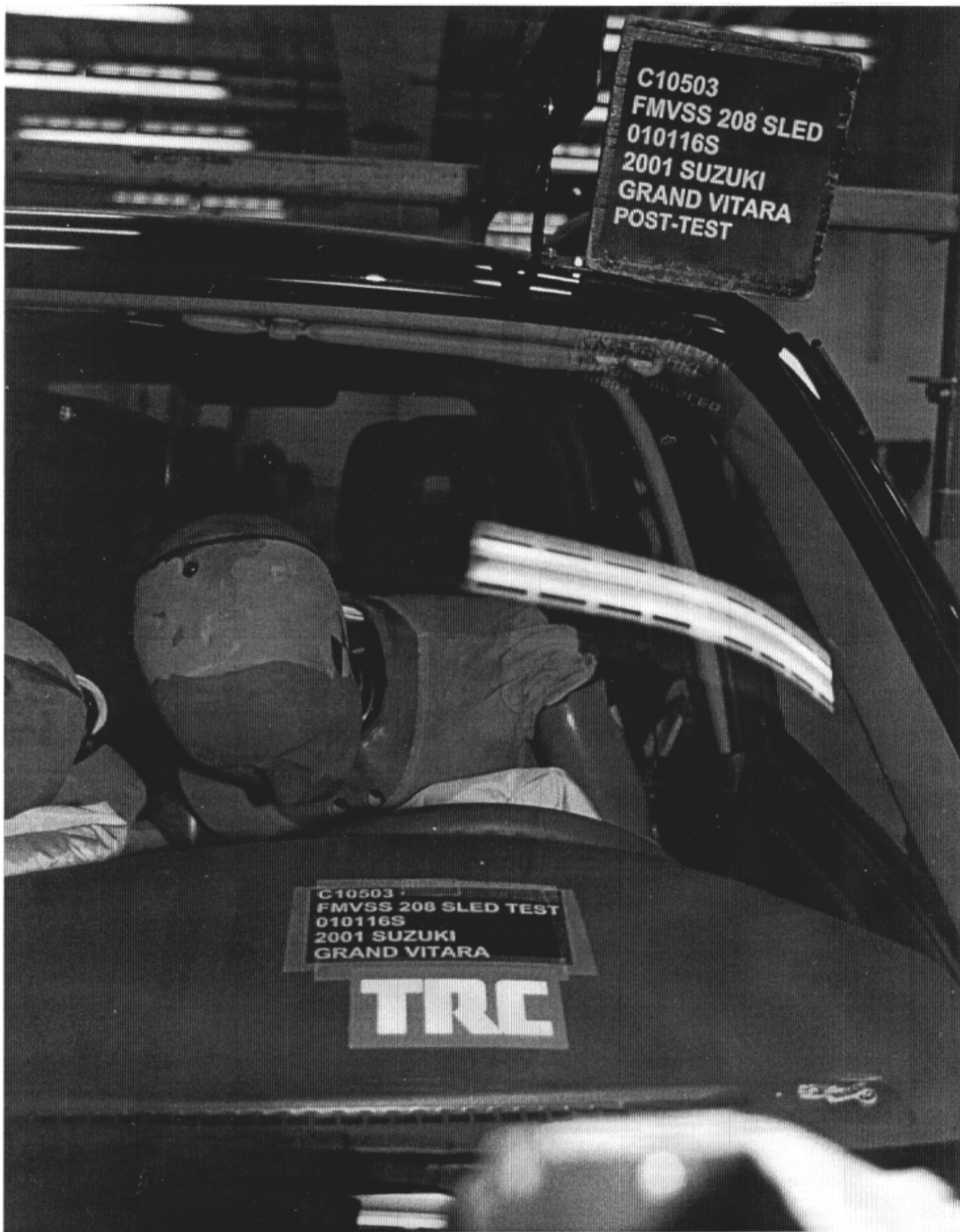


Figure A-13 Post-Test Driver Dummy Position Front View

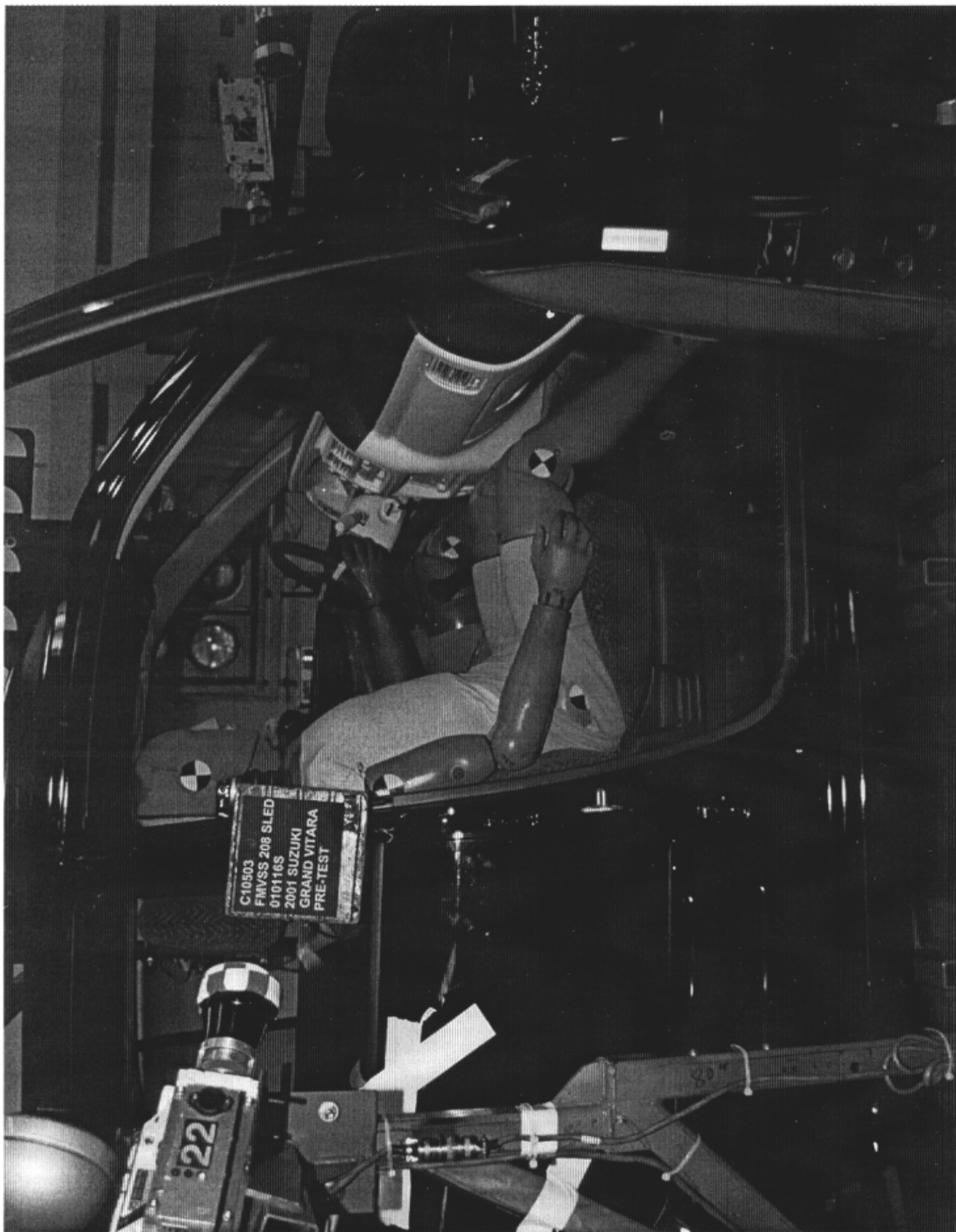


Figure A-14 Pre-Test Passenger Dummy Position View with Door Open
A-15 S010116



Figure A-15 Post-Test Passenger Dummy Position View with Door Open
A-16 S010116



Figure A-16 Pre-Test Passenger Seat Track Position View

A-17

S010116

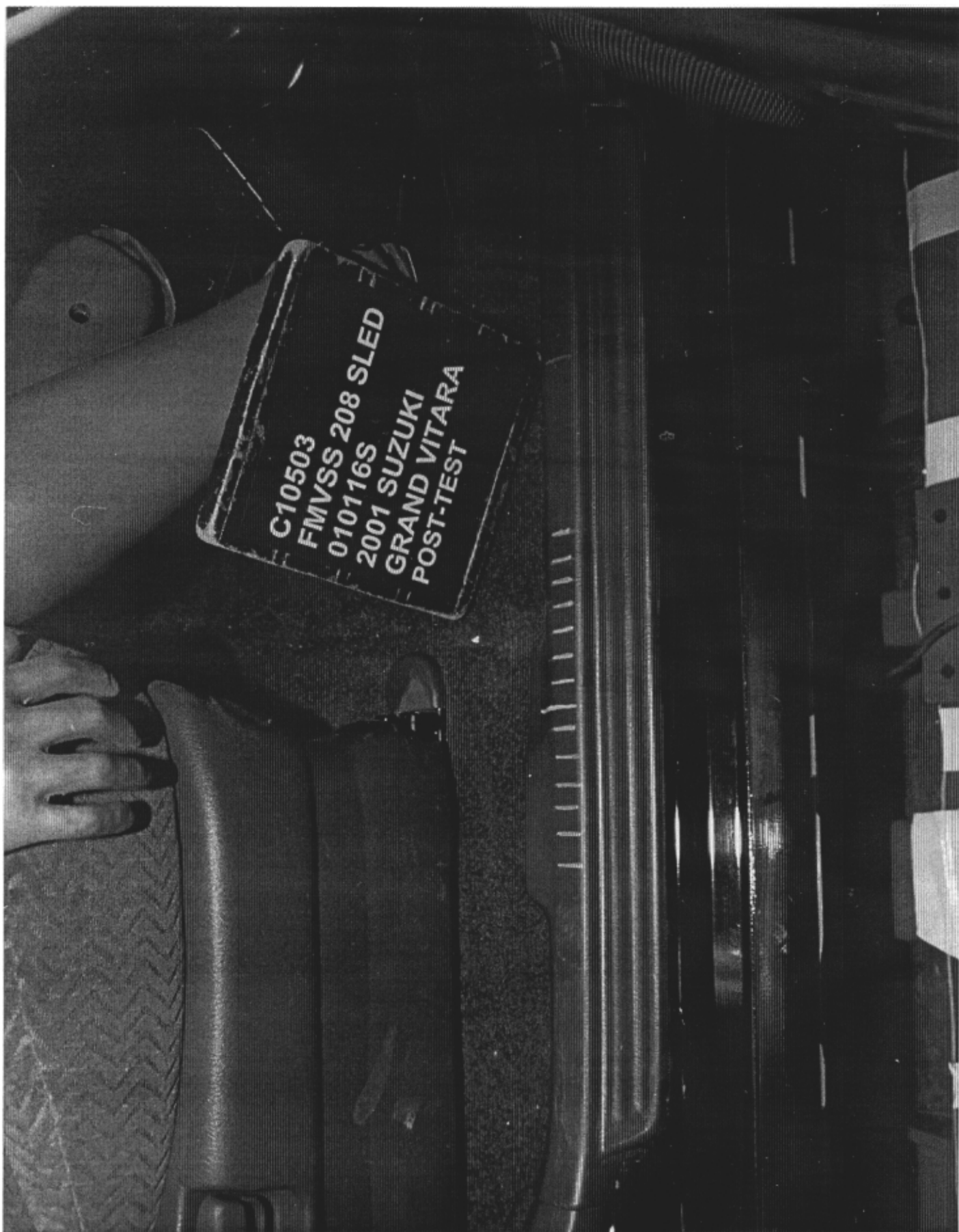


Figure A-17 Post-Test Passenger Seat Track Position View

A-18

S010116

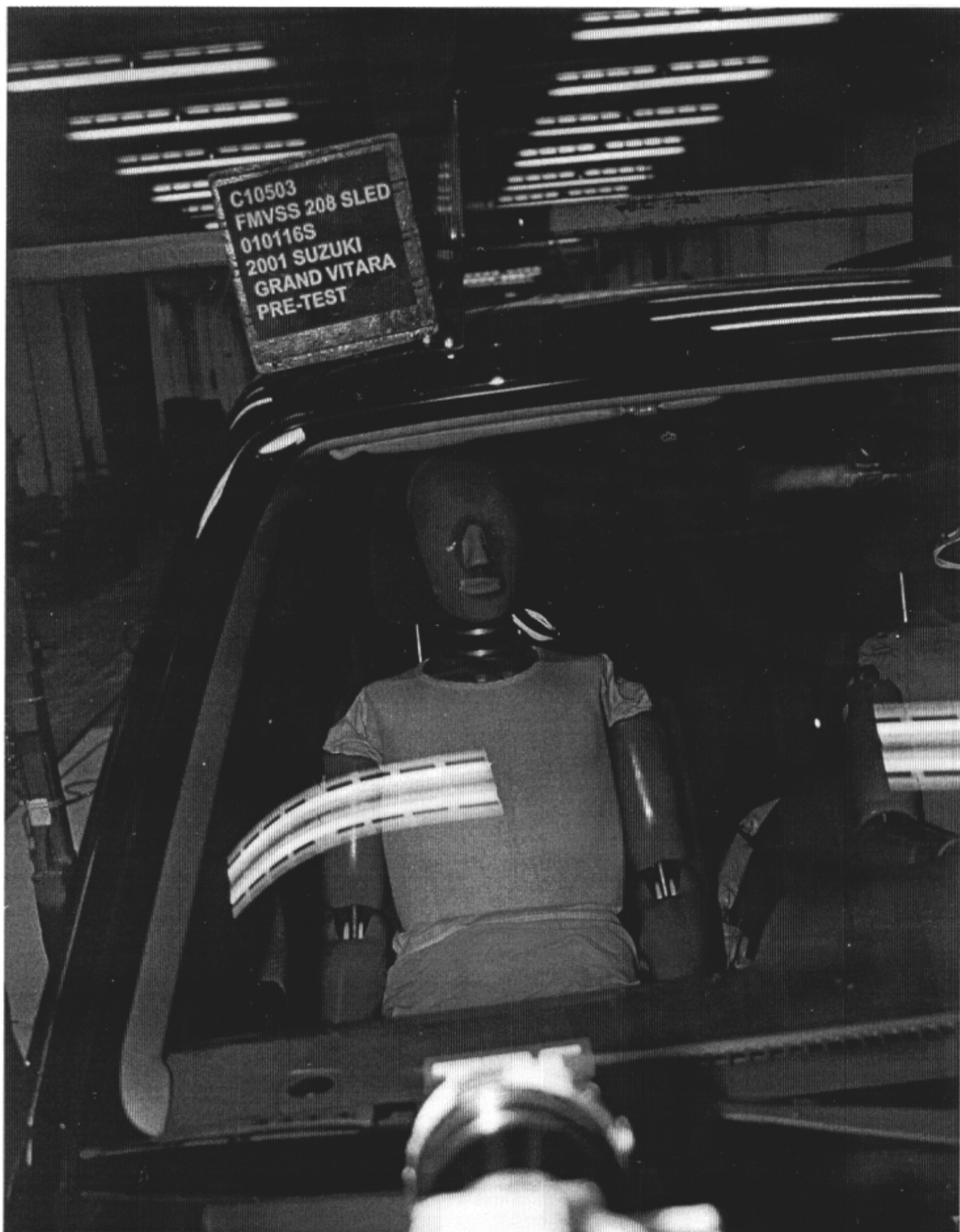


Figure A-18 Pre-Test Passenger Dummy Position Front View

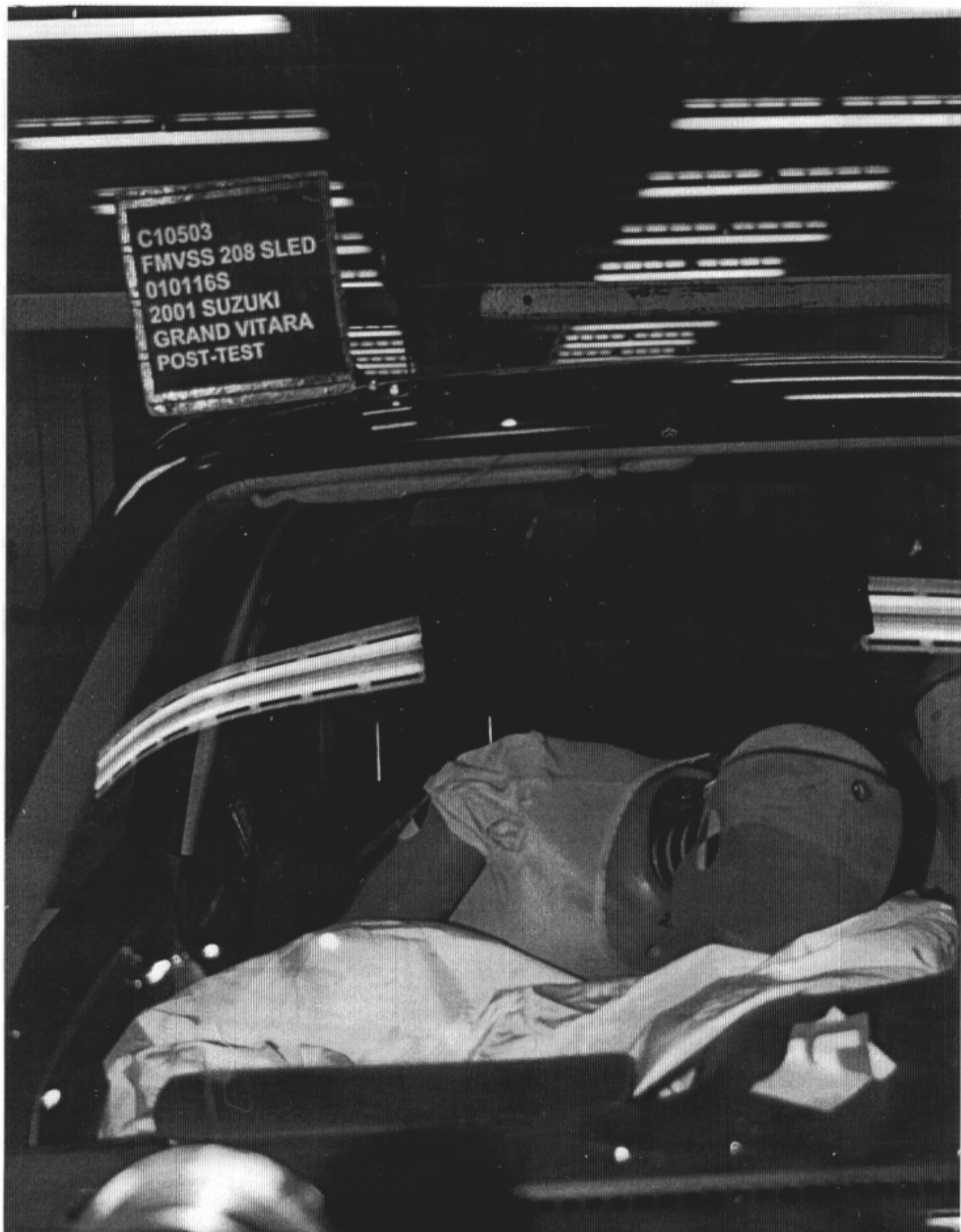


Figure A-19 Post-Test Passenger Dummy Position Front View

A-20

S010116



Figure A-20 Post-Test Driver Airbag View
A-21

S010116

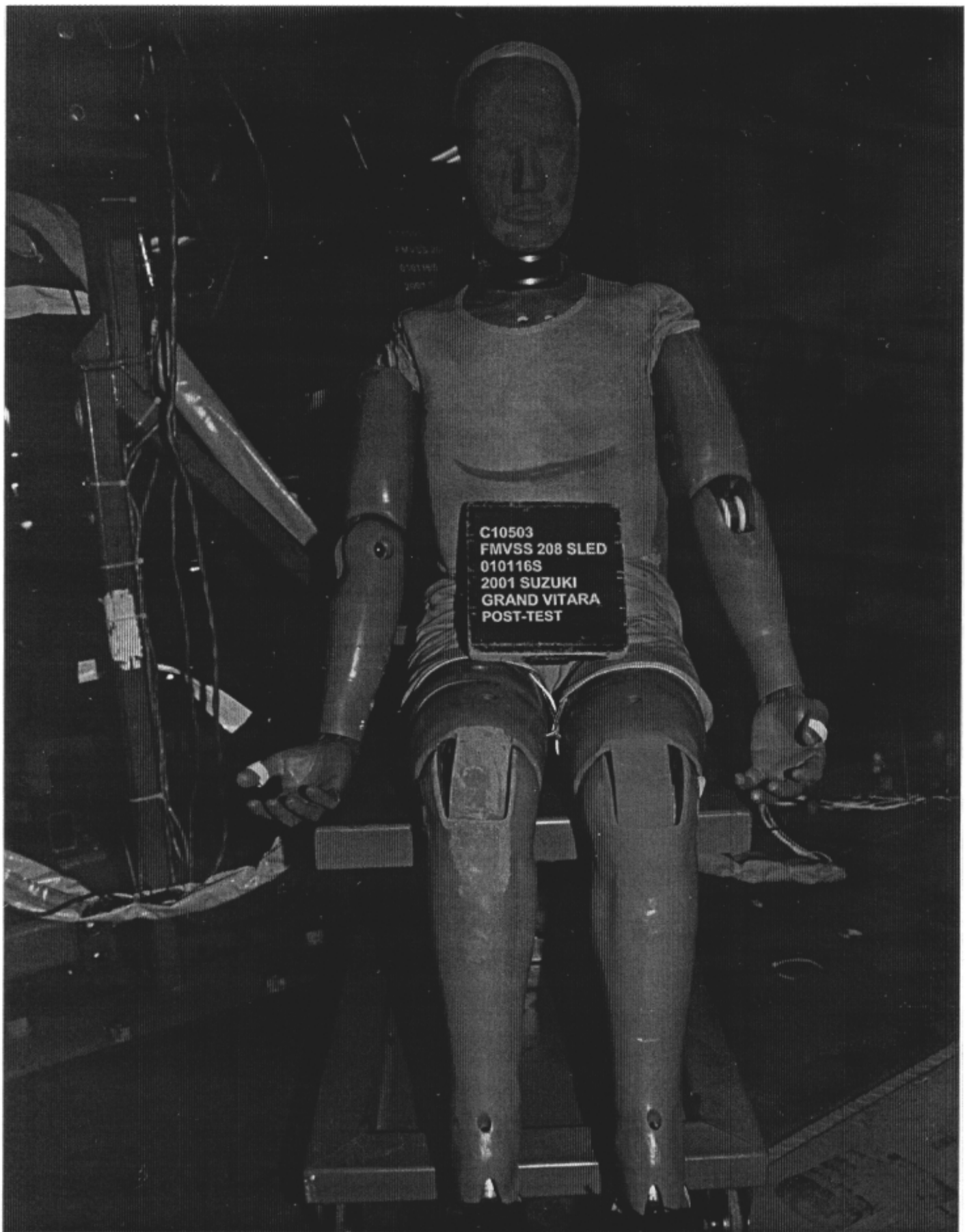


Figure A-21 Post-Test Driver Dummy Removed from Vehicle Overall View

A-22

S010116

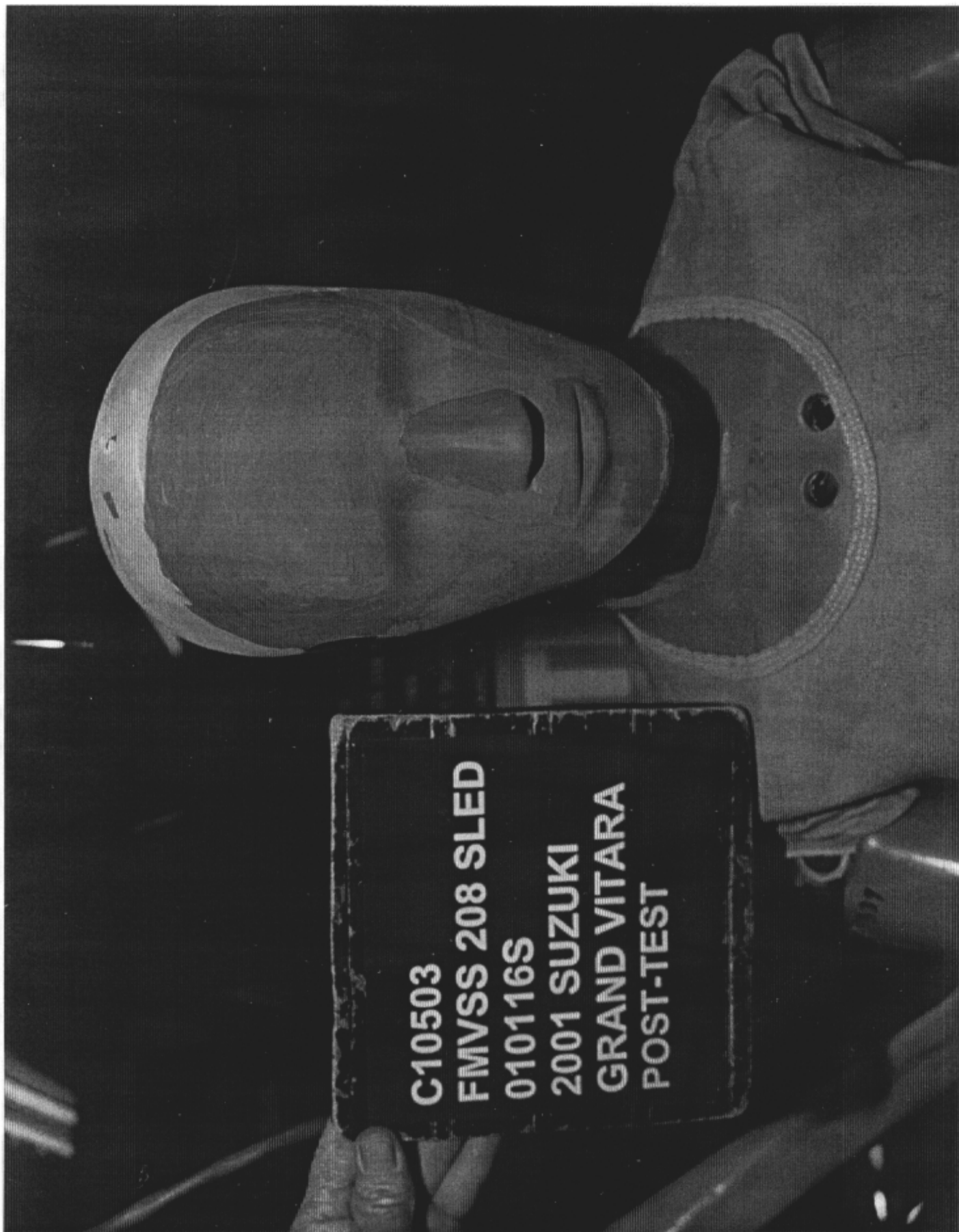


Figure A-22 Post-Test Driver Dummy Head Contact - View 1



Figure A-23 Post-Test Driver Dummy Head Contact - View 2

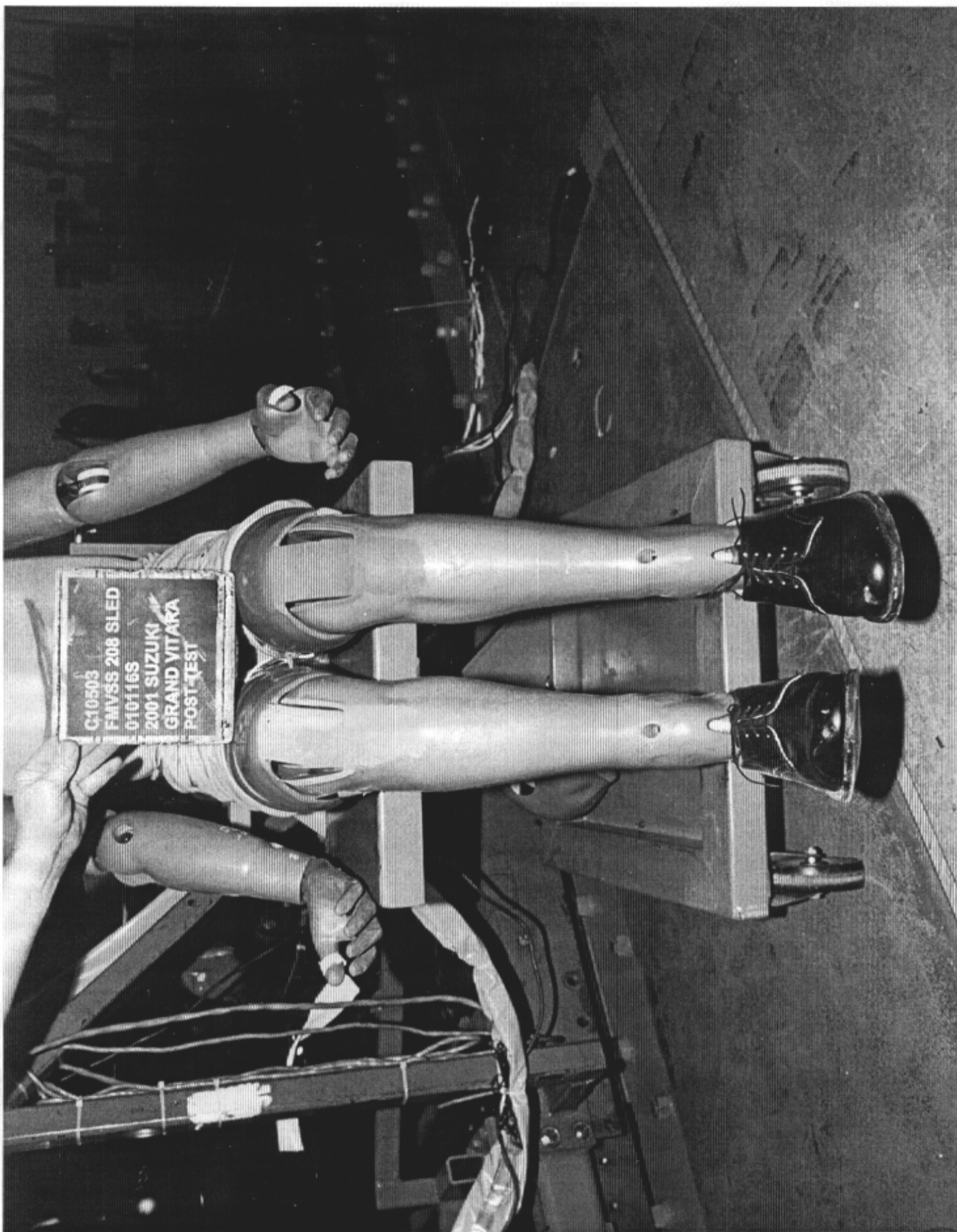


Figure A-24 Post-Test Driver Dummy Knee Contact View
A-25

S010116

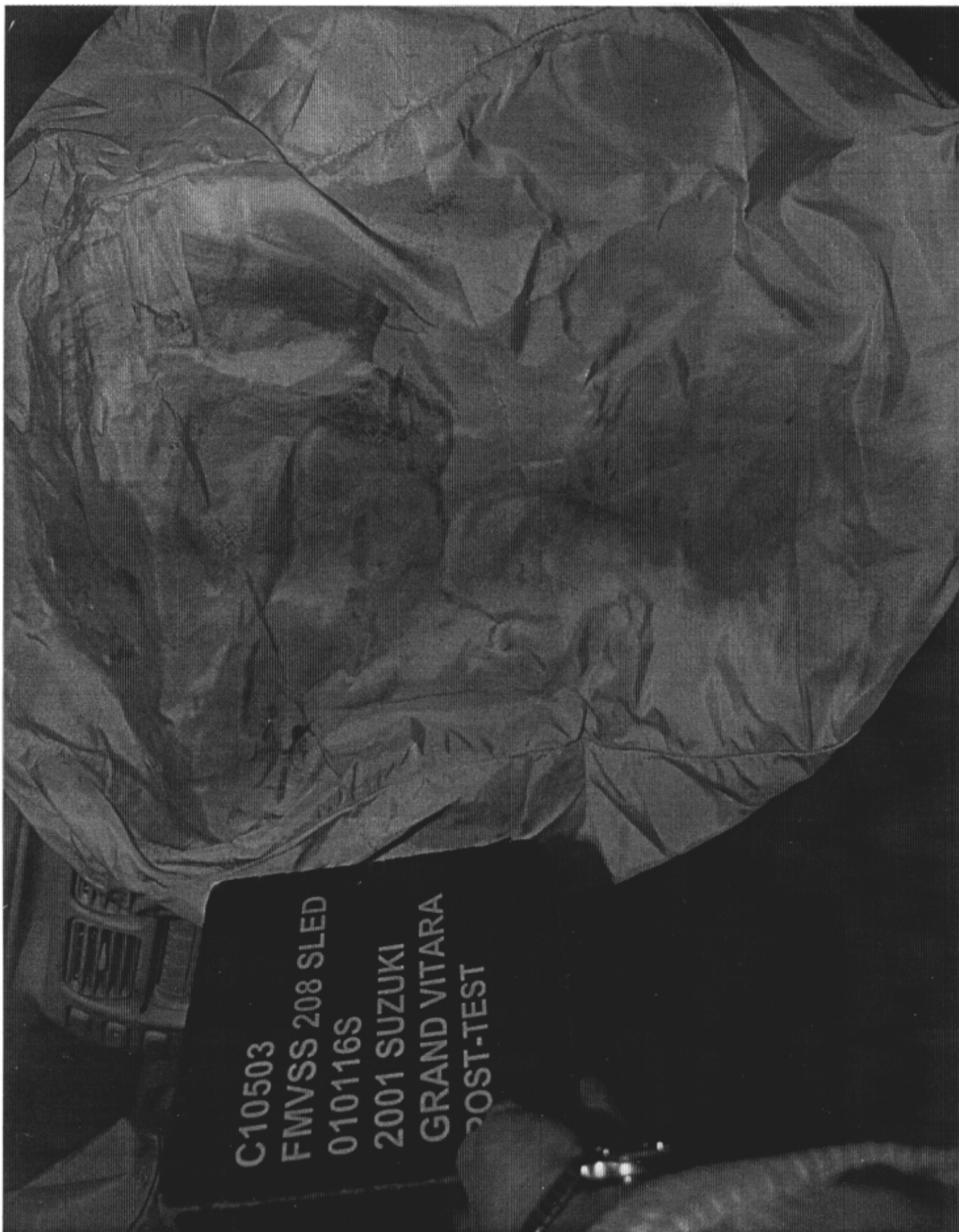


Figure A-25 Post-Test Passenger Airbag View

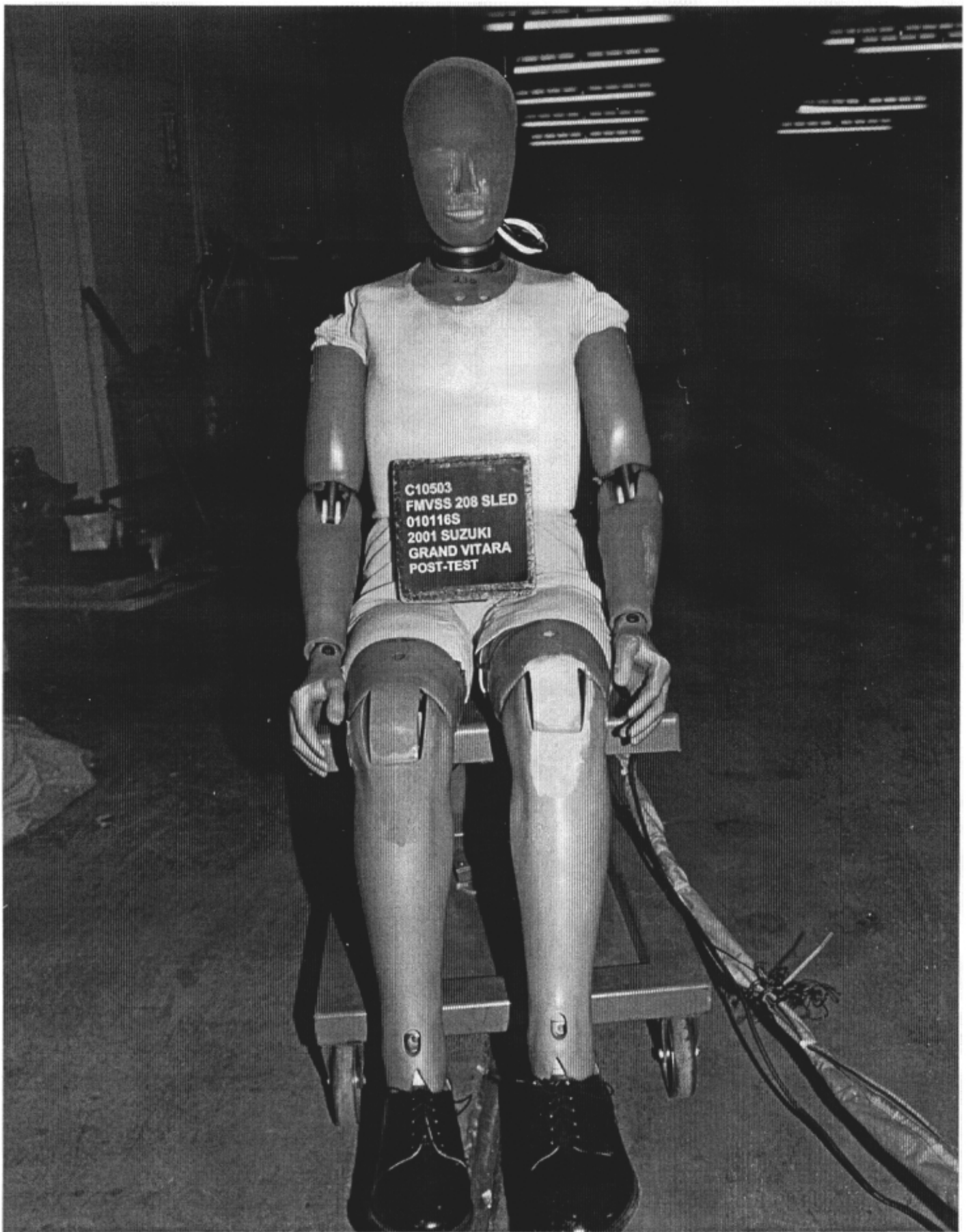


Figure A-26 Post-Test Passenger Dummy Removed from Vehicle Overall View

A-27

S010116

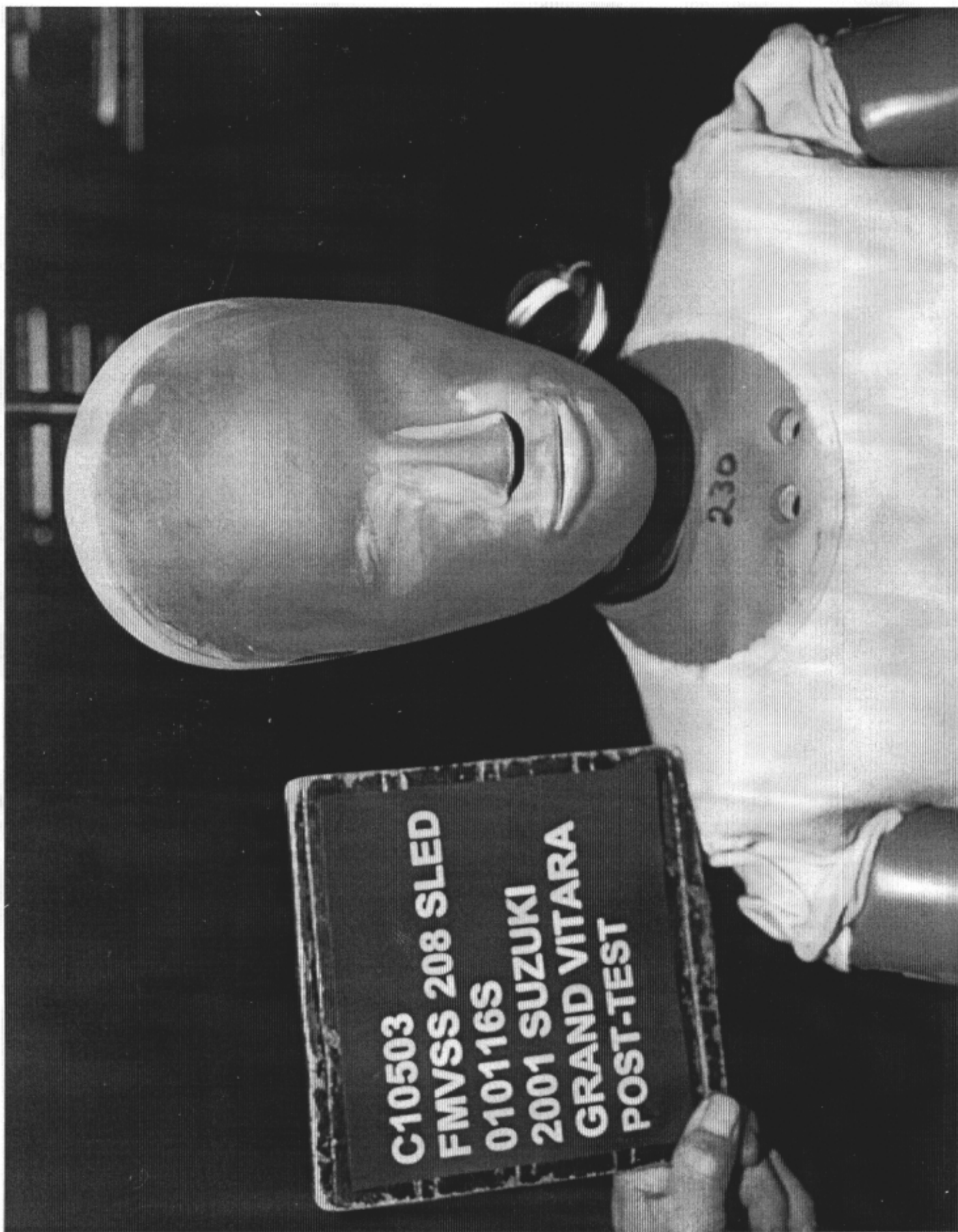


Figure A-27 Post-Test Passenger Dummy Head Contact View
A-28

S010116



Figure A-28 Post-Test Passenger Dummy Knee Contact View

A-29

S010116

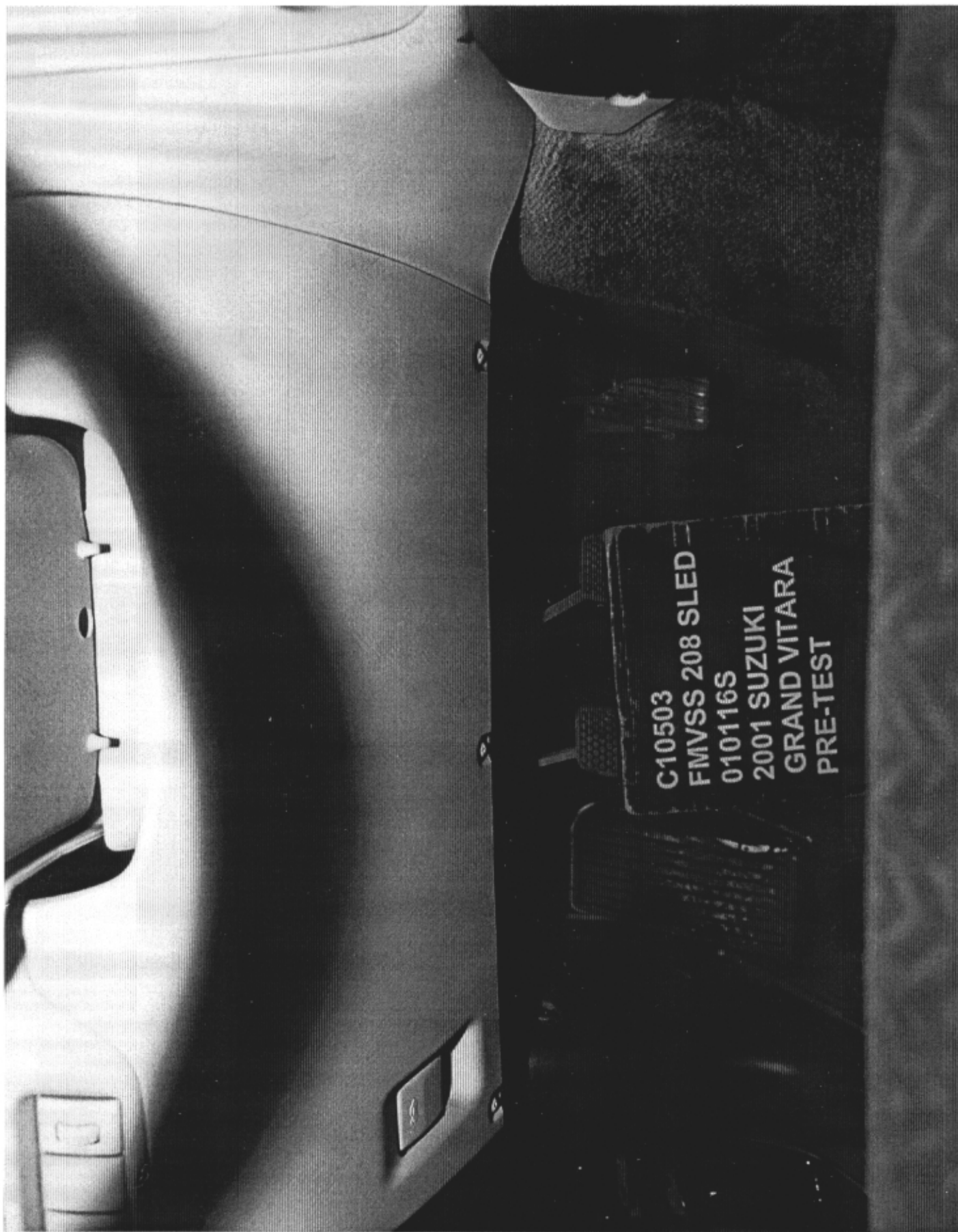


Figure A-29 Pre-Test Driver Knee Bolster View
A-30

S010116

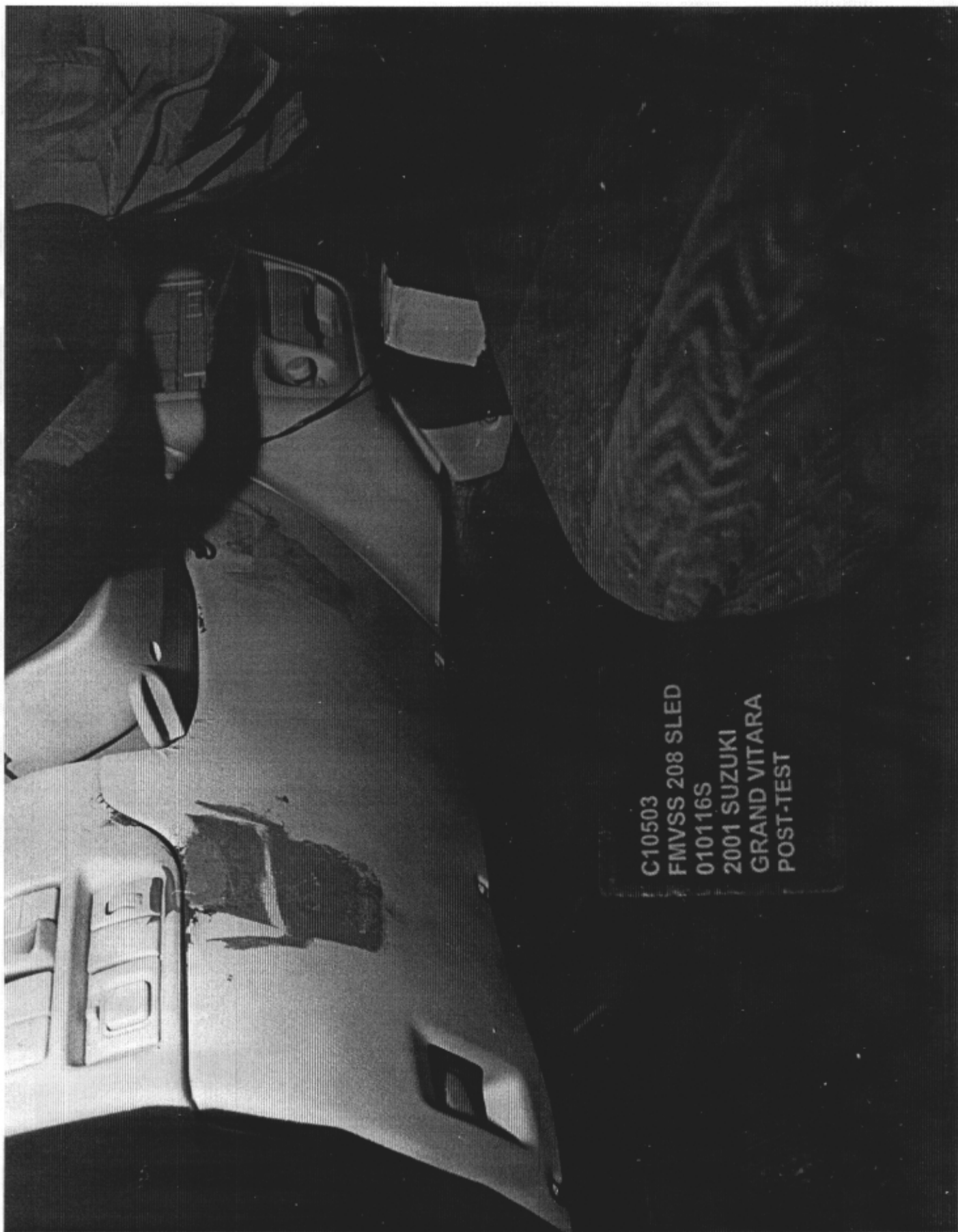


Figure A-30 Post-Test Driver Knee Bolster View
A-31

S010116



Figure A-31 Pre-Test Passenger Glove Box View
A-32

S010116

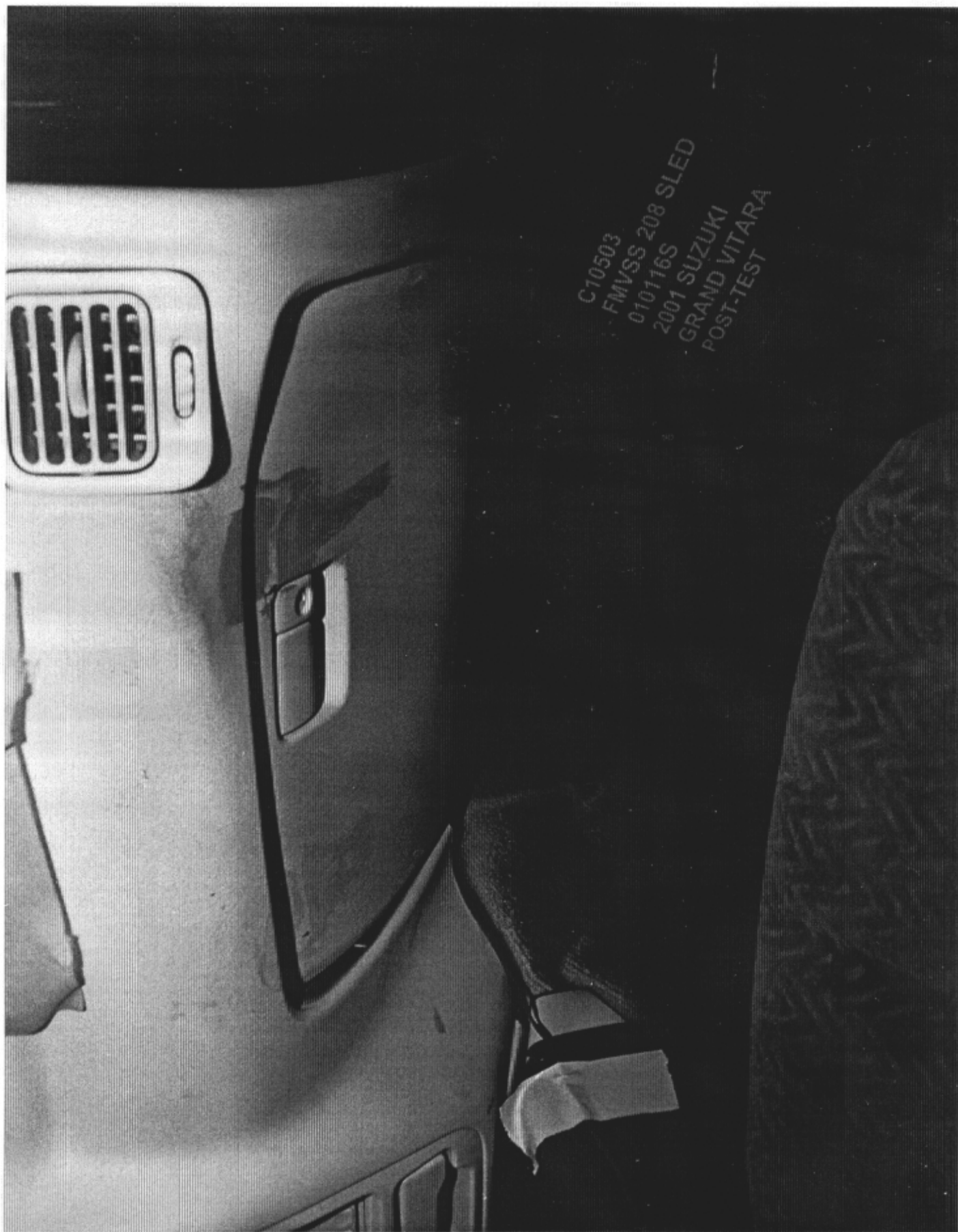


Figure A-32 Post-Test Passenger Glove Box View
A-33

S010116

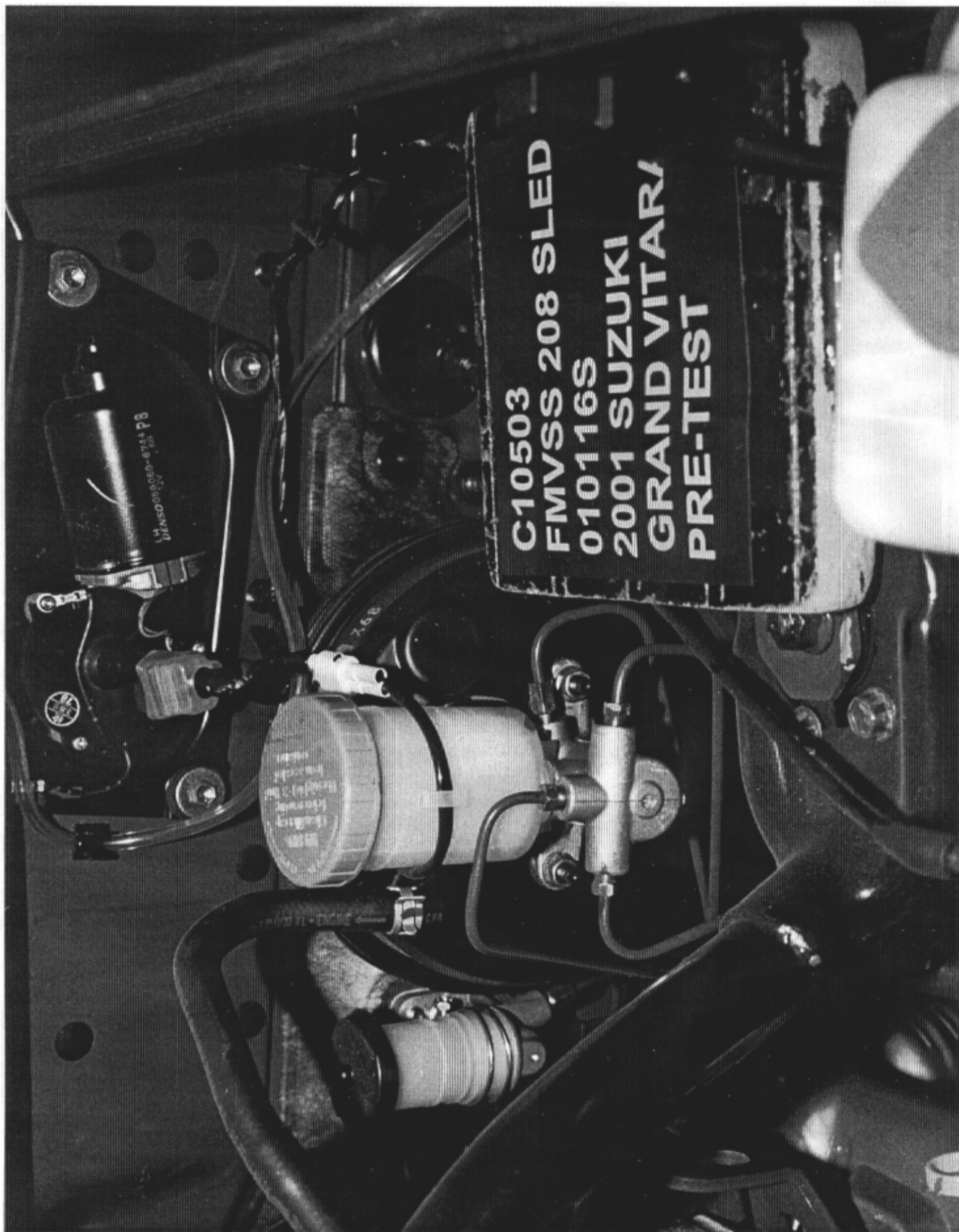


Figure A-33 Pre-Test Steering Column Linkage in Engine Compartment View

A-34

S010116



Figure A-34 Post-Test Steering Column Linkage in Engine Compartment View

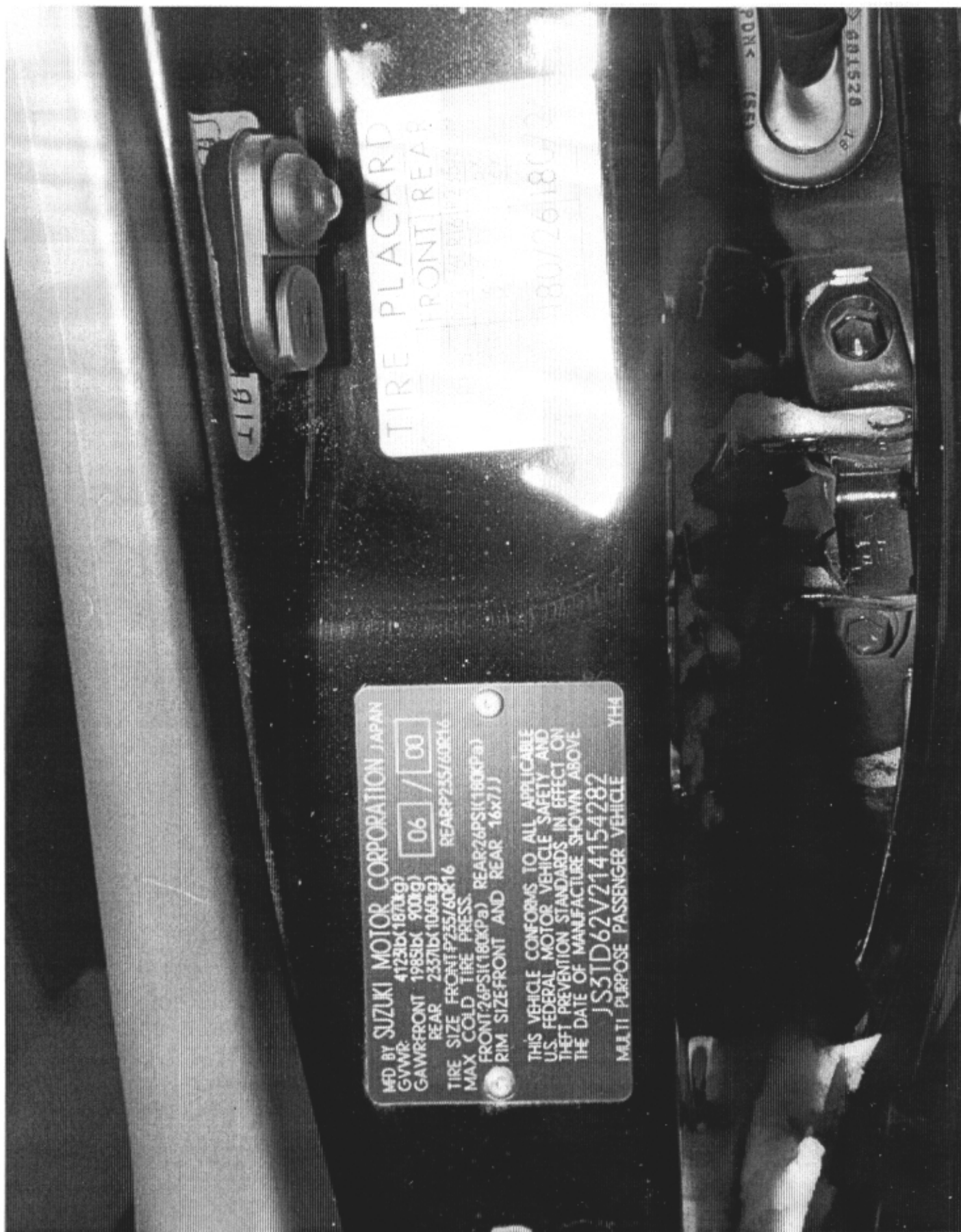


Figure A-35 Pre-Test Vehicle Certification Label View



Figure A-36 Pre-Test Vehicle Tire Pressure Label View

Appendix B

Data Plots

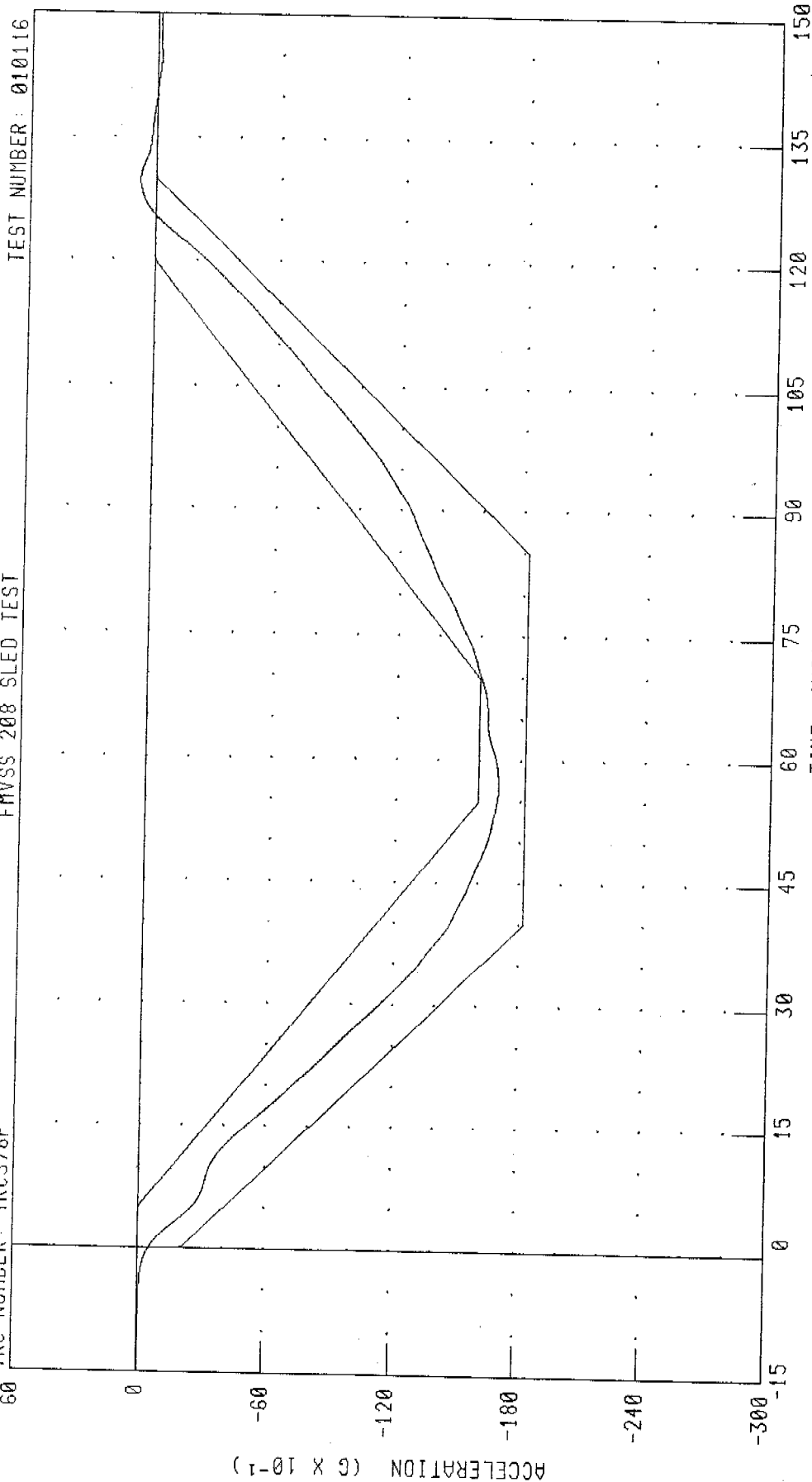
C10503 / 2001 SUZUKI GRAND VITARA

SLED ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



CHANNEL: SLDXG

FILTER: CH. CLASS 60

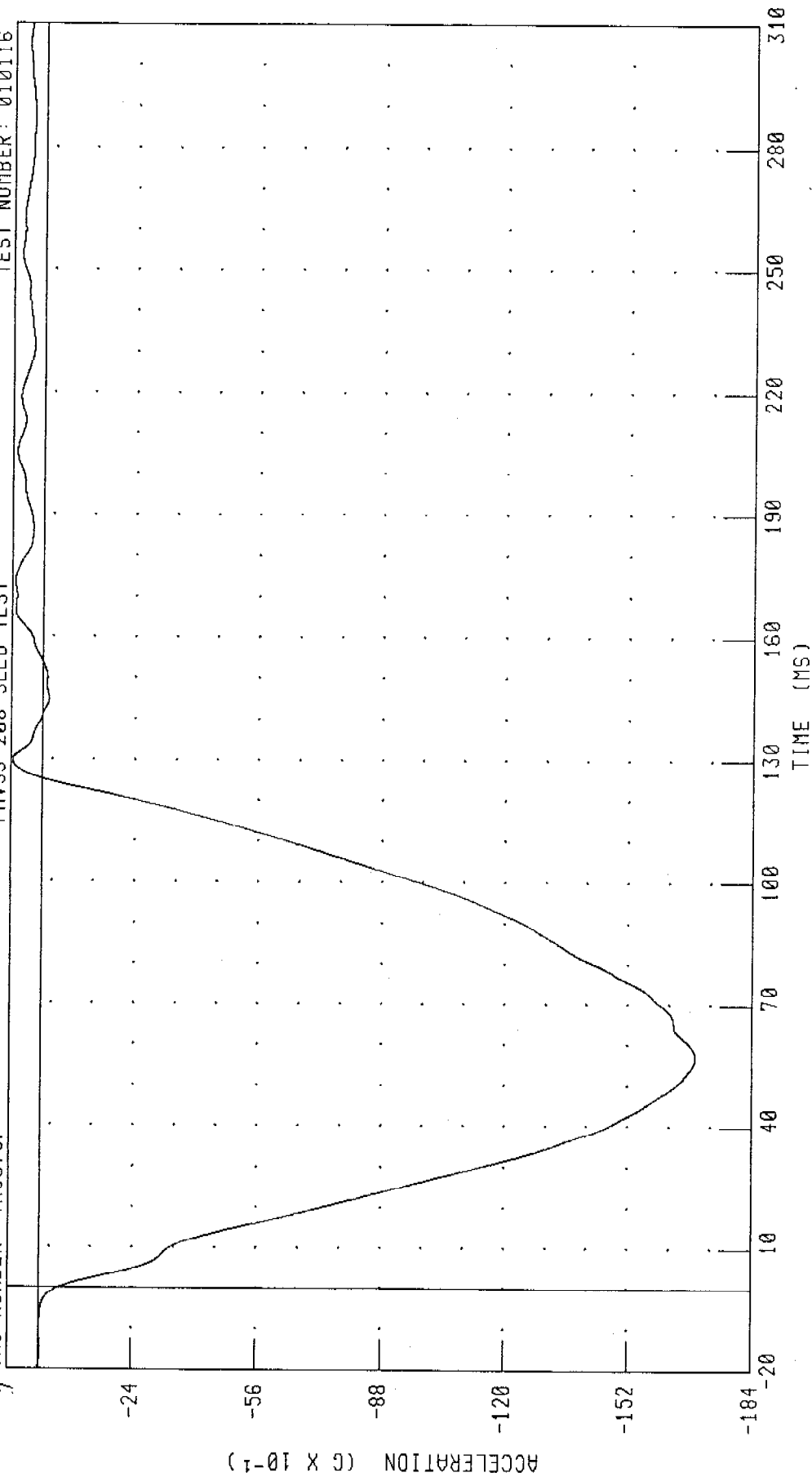
C10503 / 2001 SUZUKI GRAND VITARA

SLED ACCELERATION

FMVSS 208 SLED TEST

TRC NUMBER: TRC378F

TEST NUMBER: 010116



CHANNEL: SLDXC FILTER: CH. CLASS 60

PEAK DATA: 0.76 G @ 129.76 MS; -16.95 G @ 56.96 MS

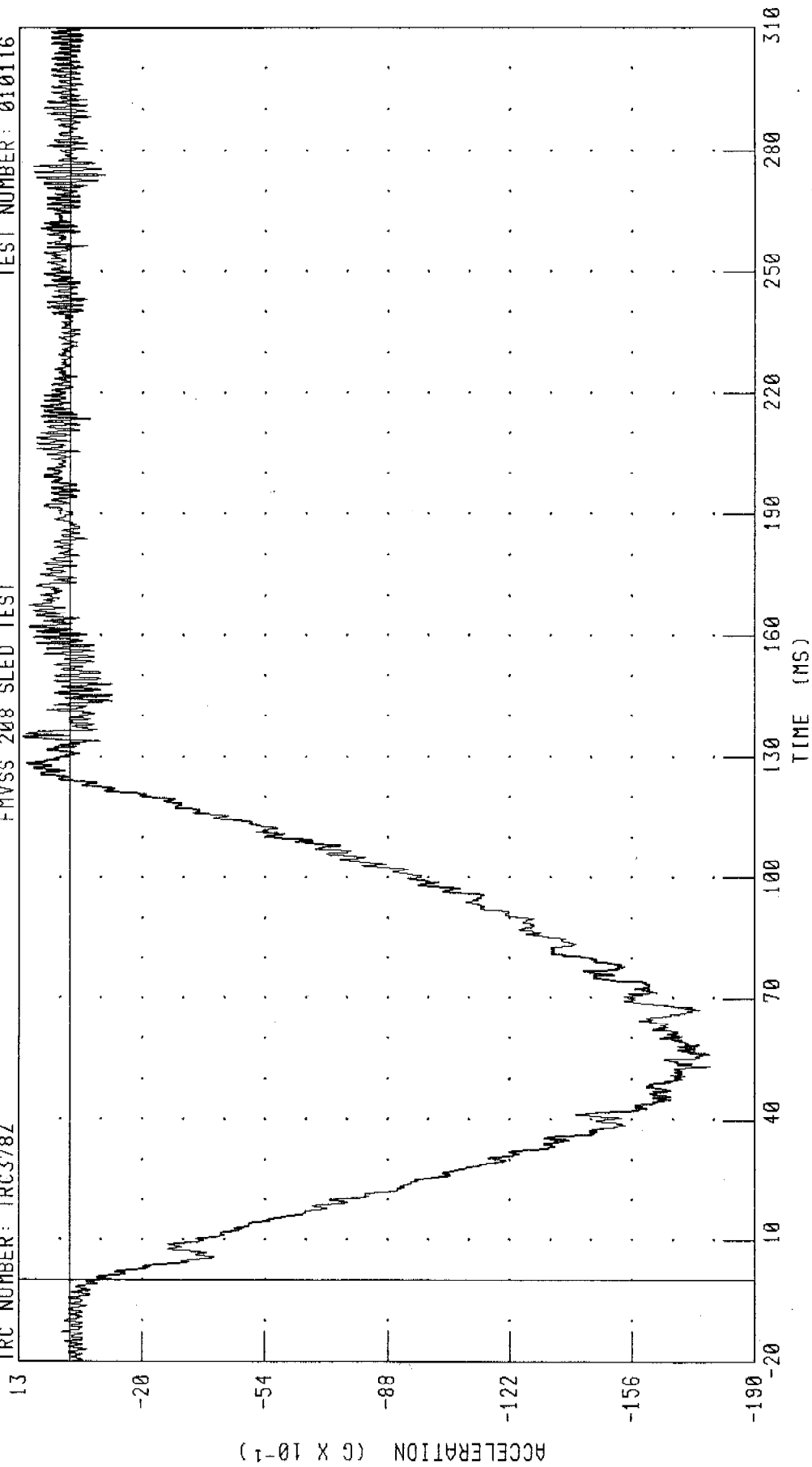
C10503 / 2001 SUZUKI GRAND VITARA

SLED ACCELERATION - BACKUP

TRC NUMBER: TRC378Z

FMVSS 208 SLED TEST

TEST NUMBER: 010116



CHANNEL: SLDXGA FILTER: CH. CLASS 1000

PEAK DATA: 1.30 G @ 134.80 MS; -17.76 G @ 53.28 MS

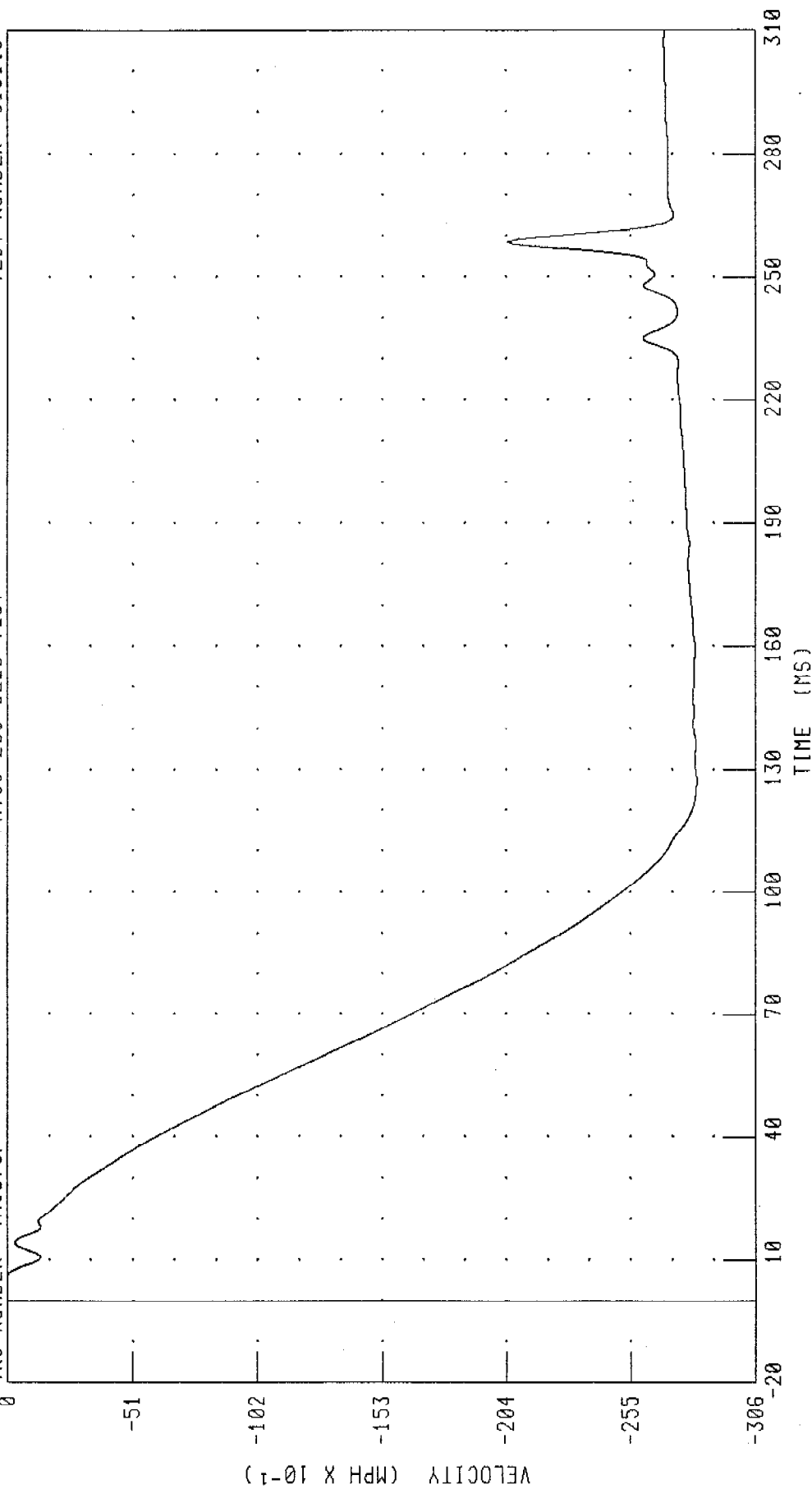
C10503 / 2001 SUZUKI GRAND VITARA

MEASURED VELOCITY TRAP

FMVSS 208 SLED TEST

TRC NUMBER: TRC378F

TEST NUMBER: 010116



CHANNEL: SLDXV FILTER: CH. CLASS 60

PEAK DATA: 0.09 MPH @ 4.72 MS, -28.22 MPH @ 127.12 MS

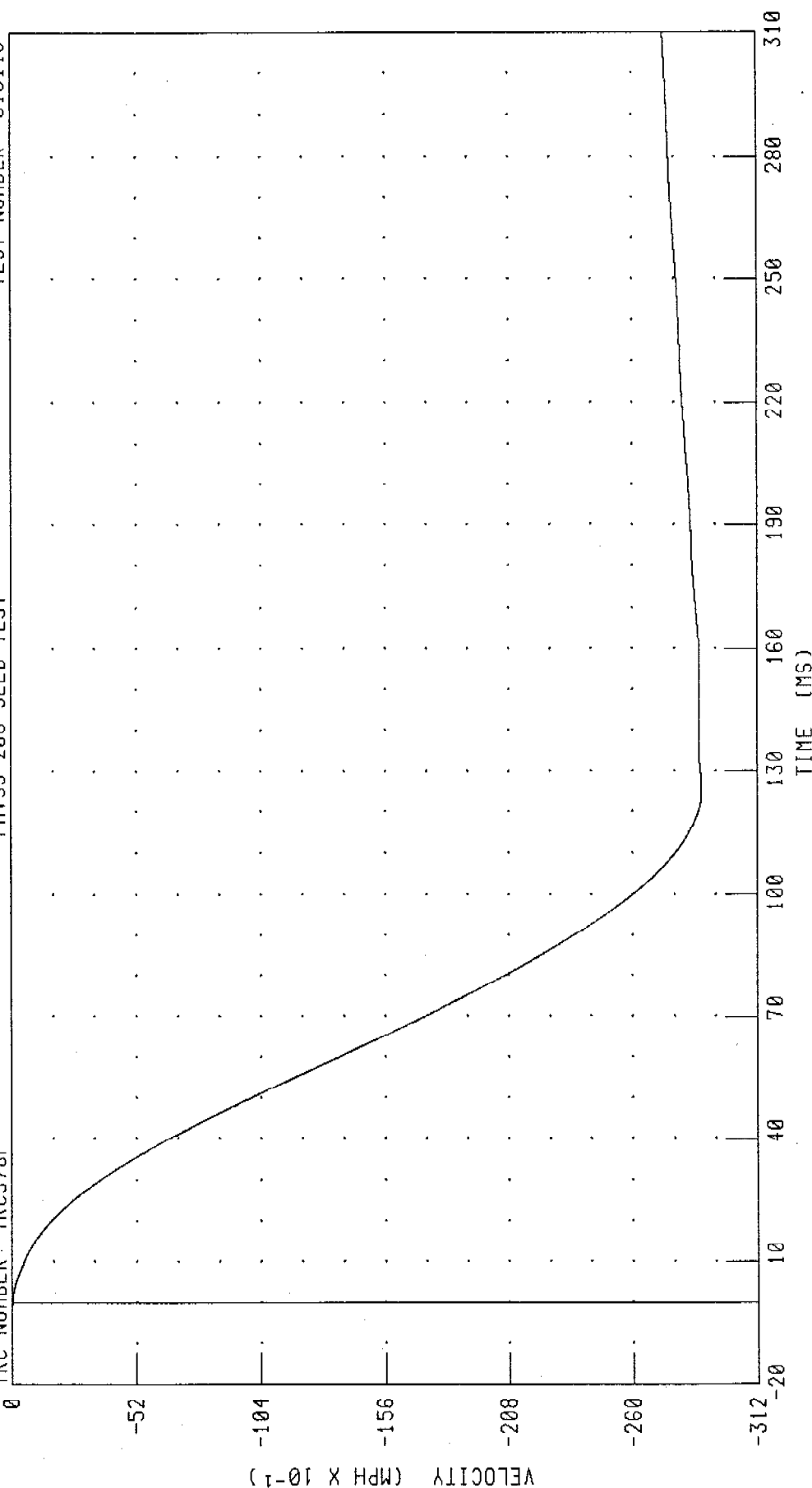
C10503 / 2001 SUZUKI GRAND VITARA

SLED VELOCITY (INTEGRATED)

FMVSS 208 SLED TEST

TRC NUMBER: TRC378F

TEST NUMBER: 010116



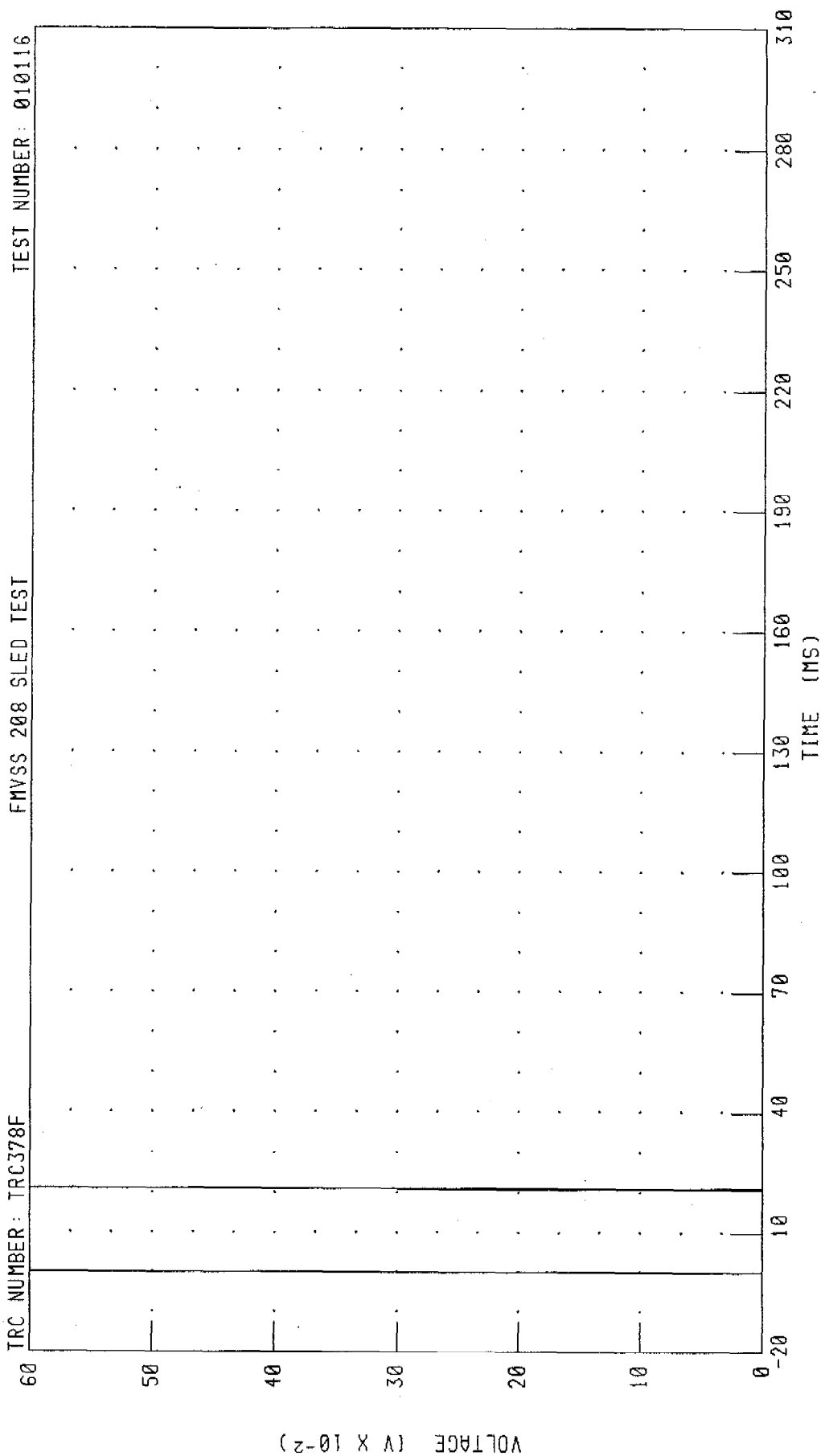
PEAK DATA: 0.01 MPH @ -19.20 MS; -28.89 MPH @ 125.36 MS

CHANNEL: SLDXVI FILTER: CH. CLASS 180

C10503 / 2001 SUZUKI GRAND VITARA
DRIVER AIRBAG EVENT
FMVSS 208 SLED TEST

TRC NUMBER: TRC378F

TEST NUMBER: 010116



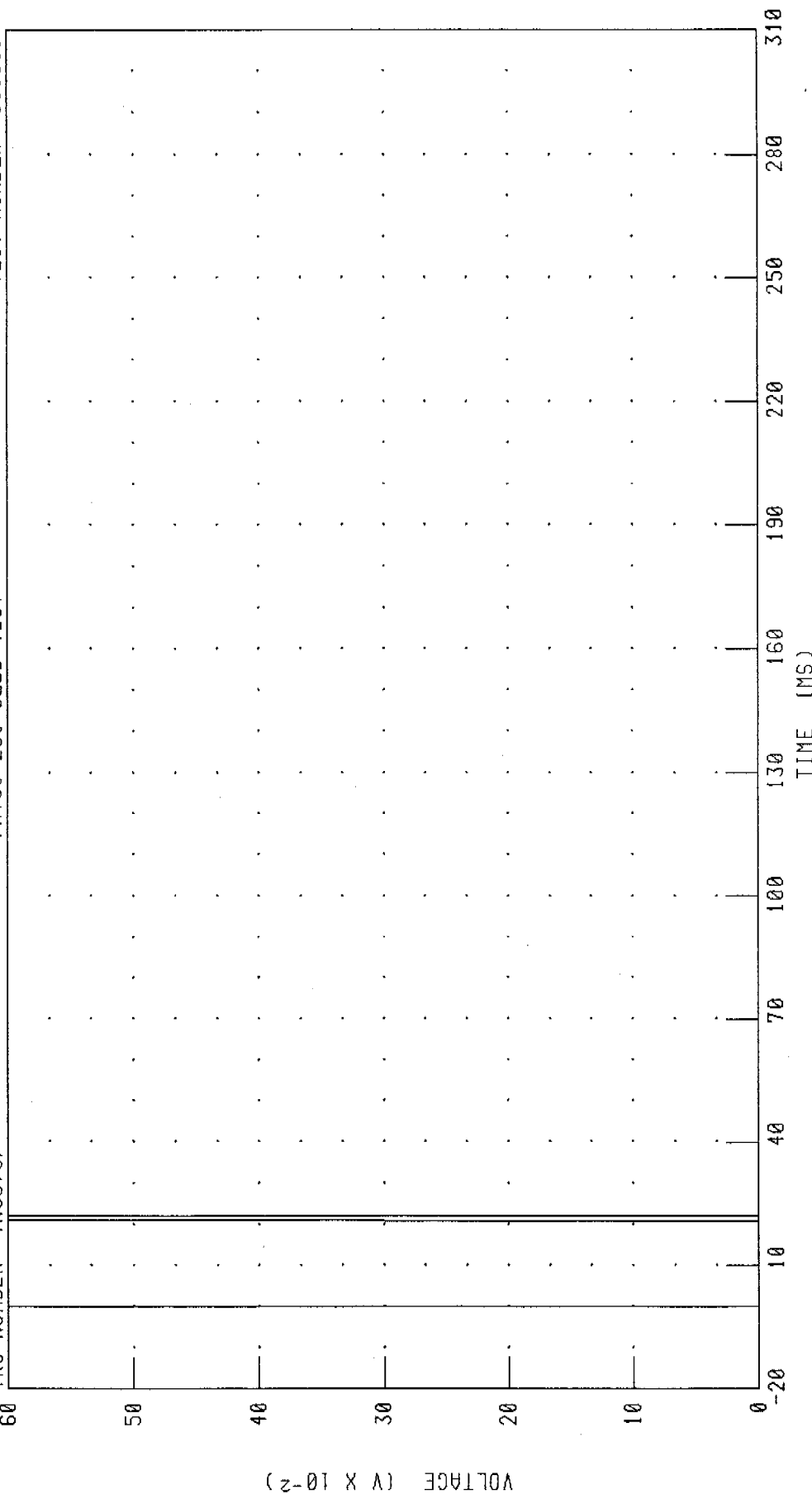
CHANNEL: ABEVT1 FILTER: CH. CLASS 1000

PEAK DATA: 1.00 V @ 21.04 MS; 0.00 V @ -20.00 MS

C10503 / 2001 SUZUKI GRAND VITARA
PASSENGER AIRBAG EVENT
FMVSS 208 SLED TEST

TEST NUMBER: 010116

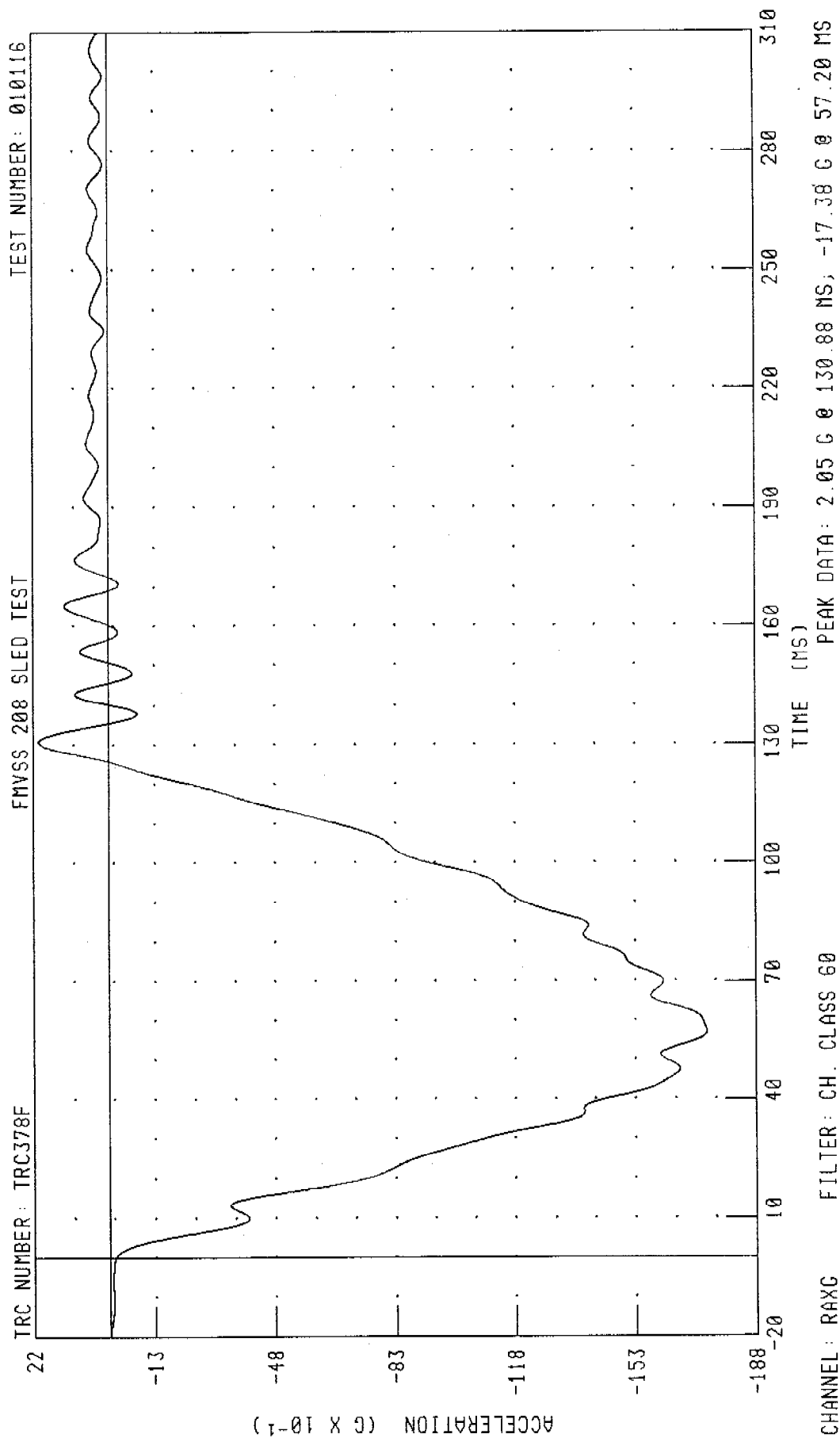
TRC NUMBER: TRC378F



CHANNEL: ABEVT2 FILTER: CH. CLASS 1000

PEAK DATA: 1.00 V @ 21.04 MS; 0.00 V @ -20.00 MS

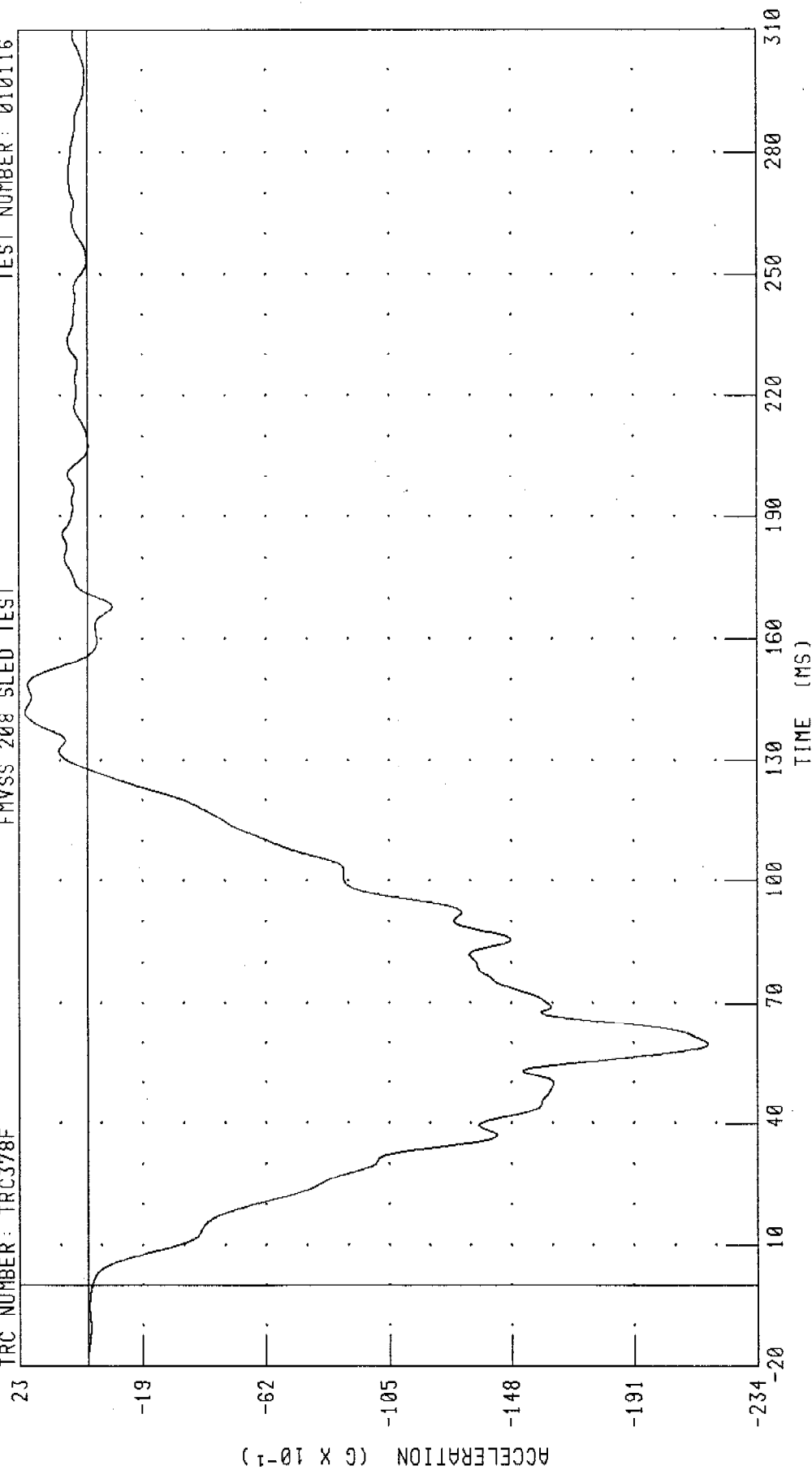
C10503 / 2001 SUZUKI GRAND VITARA
REAR AXLE X-AXIS ACCELERATION
FMVSS 208 SLED TEST



C10503 / 2001 SUZUKI GRAND VITARA
LEFT BODY X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



PEAK DATA: 2.20 G @ 141.92 MS; -21.71 G @ 59.68 MS

FILTER: CH. CLASS 60

CHANNEL: LBXC

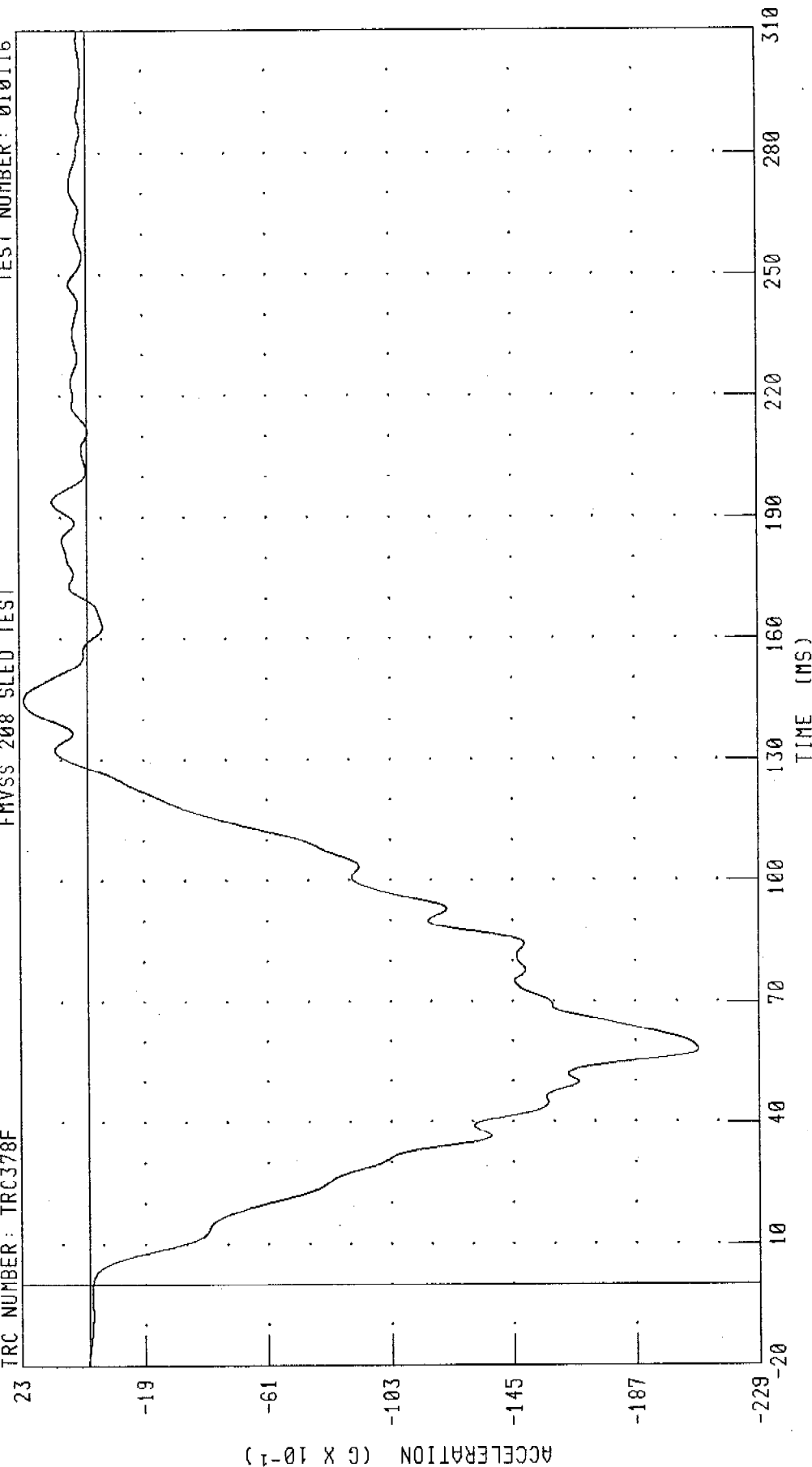
C10503 / 2001 SUZUKI GRAND VITARA

RIGHT BODY X-AXIS ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 010116

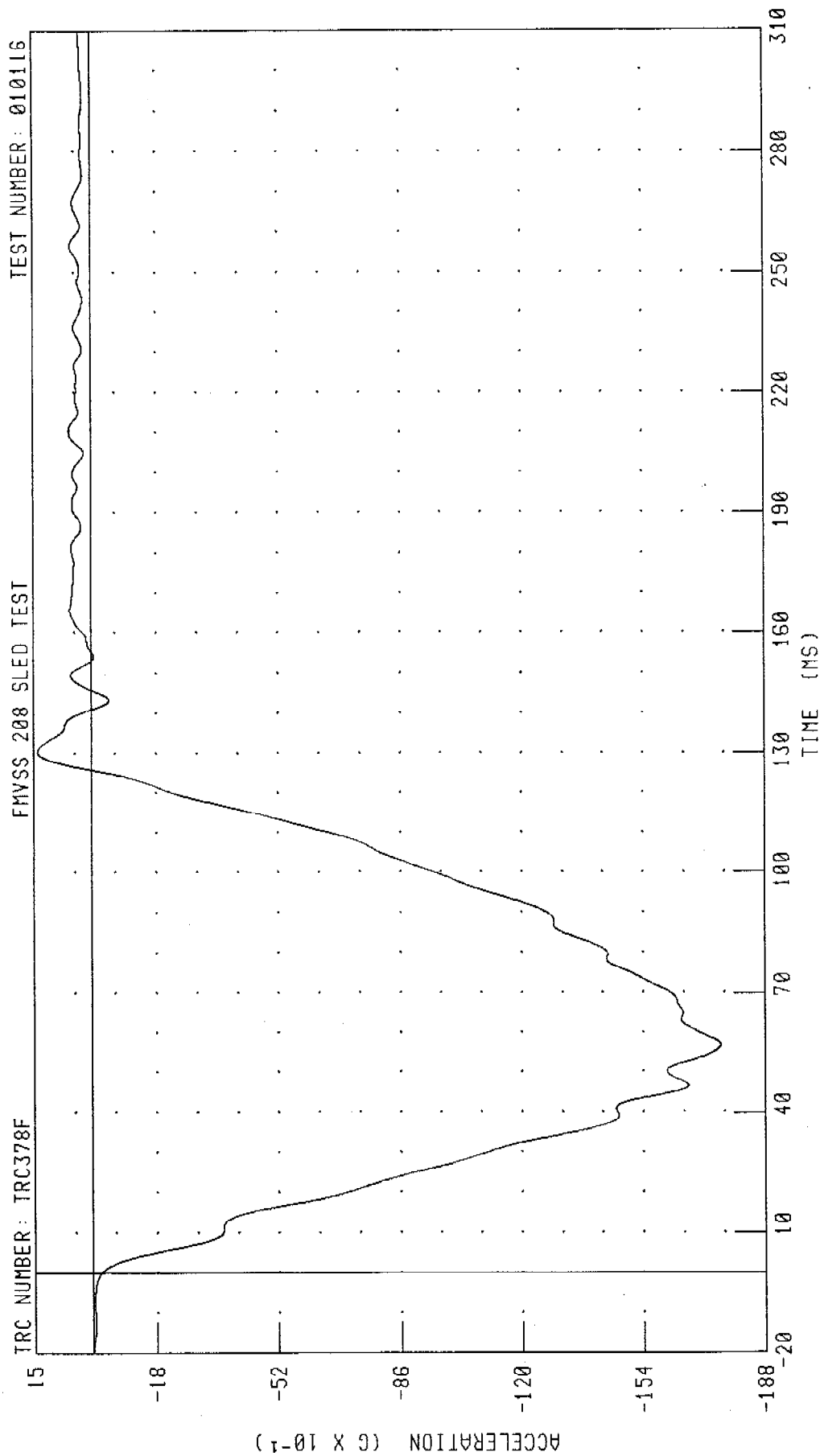
TRC NUMBER: TRC378F



CHANNEL: RBXG FILTER: CH. CLASS 60

PEAK DATA: 2.16 G @ 144.88 MS; -20.86 G @ 57.92 MS

C10503 / 2001 SUZUKI GRAND VITARA
LEFT FRAME X-AXIS ACCELERATION
PHYSS 208 SLED TEST



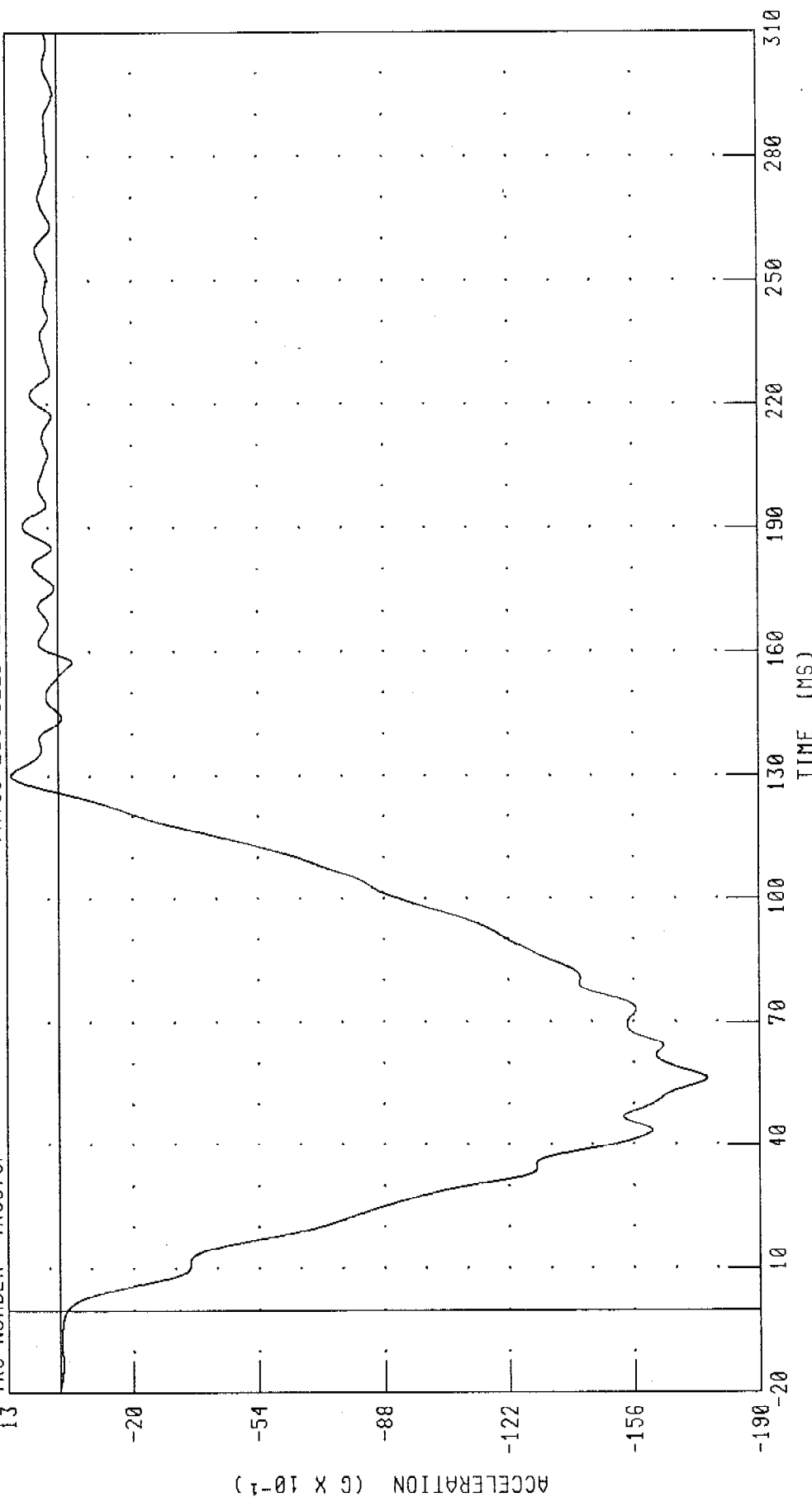
CHANNEL: LFXG FILTER: CH. CLASS 60

PEAK DATA: 1.50 G @ 130.48 MS; -17.57 G @ 56.80 MS

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRAME X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

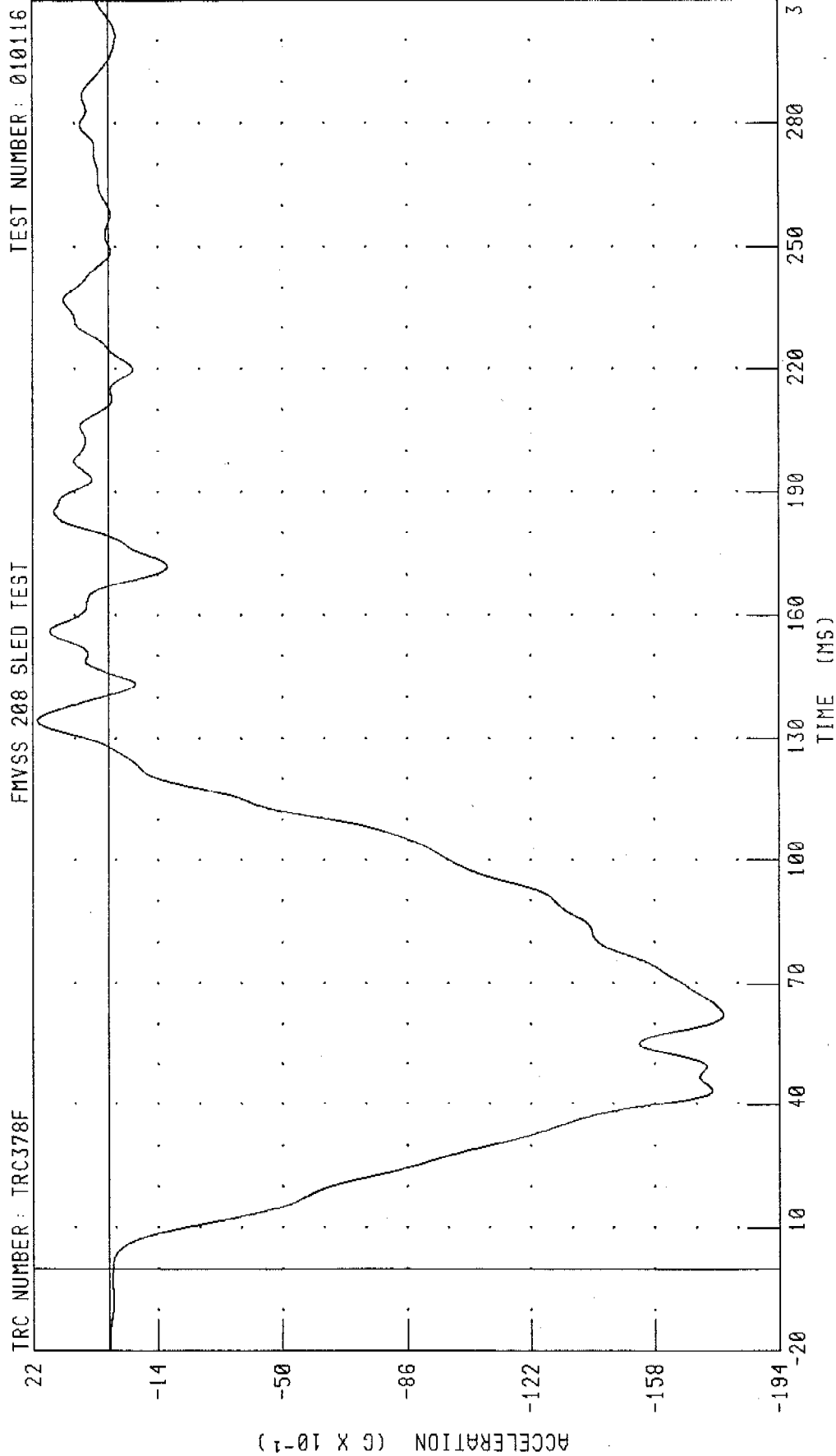
13 TRC NUMBER: TRC378F



PEAK DATA: 1.29 G @ 130.24 MS; -17.59 G @ 56.40 MS

CHANNEL: RFXC FILTER: CH. CLASS 60

C10503 / 2001 SUZUKI GRAND VITARA
 TOP ENGINE X-AXIS ACCELERATION
 FMVSS 208 SLED TEST



PEAK DATA: 2.07 G @ 134.40 MS; -17.79 G @ 62.24 MS

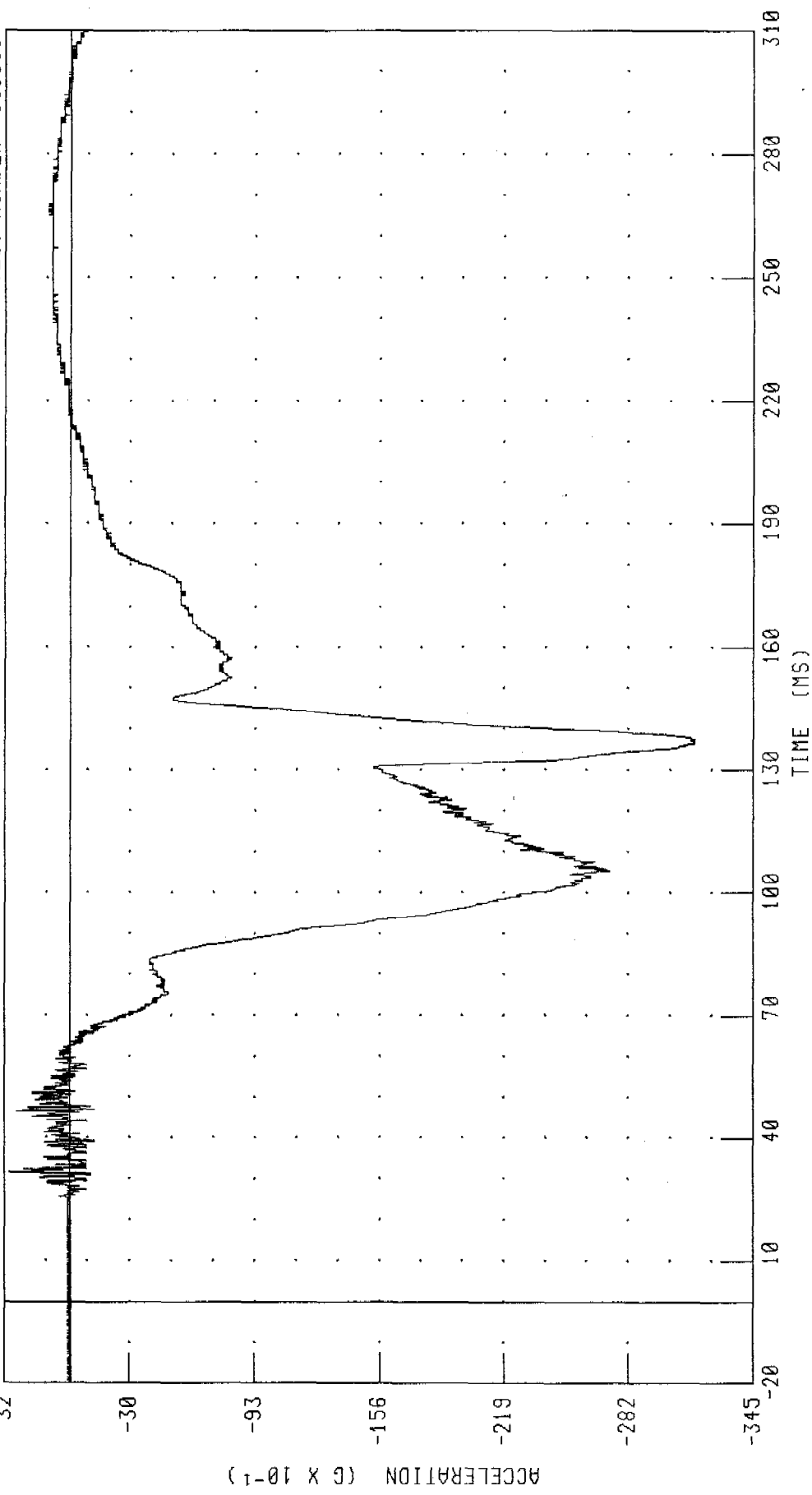
CHANNEL: TEXTG FILTER: CH. CLASS 60

C10503 / 2001 SUZUKI GRAND VITARA
DRIVER HEAD X-AXIS ACCELERATION

TEST NUMBER: 010116

FMVSS 208 SLED TEST

TRC NUMBER: TRC378F



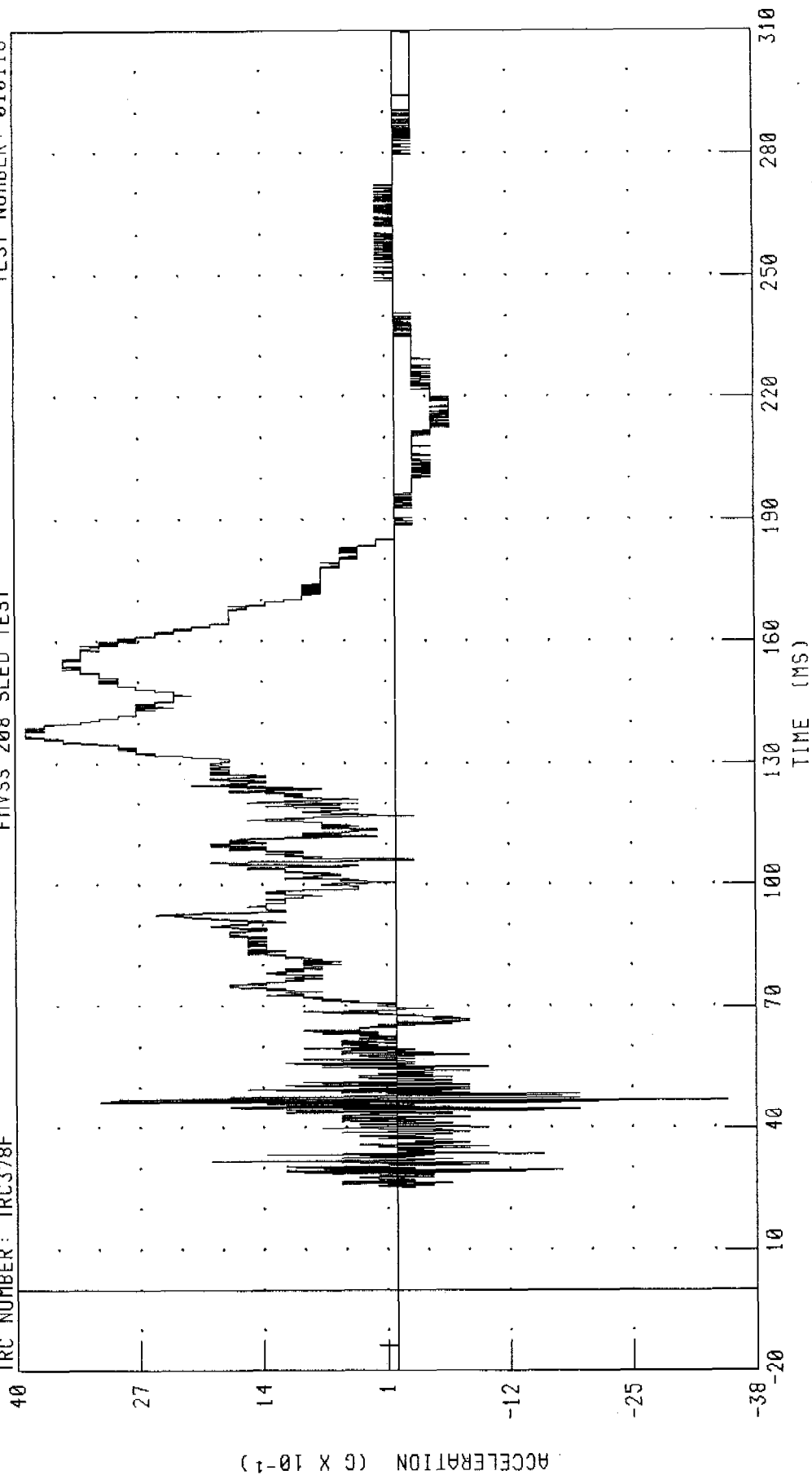
PEAK DATA: 3.06 G @ 31.76 MS, -31.56 G @ 136.48 MS

CHANNEL: HEDXC1 FILTER: CH. CLASS 1000

C10503 / 2001 SUZUKI GRAND VITARA
DRIVER HEAD Y-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



PEAK DATA: 3.89 G @ 136.64 MS; -3.50 G @ 46.96 MS

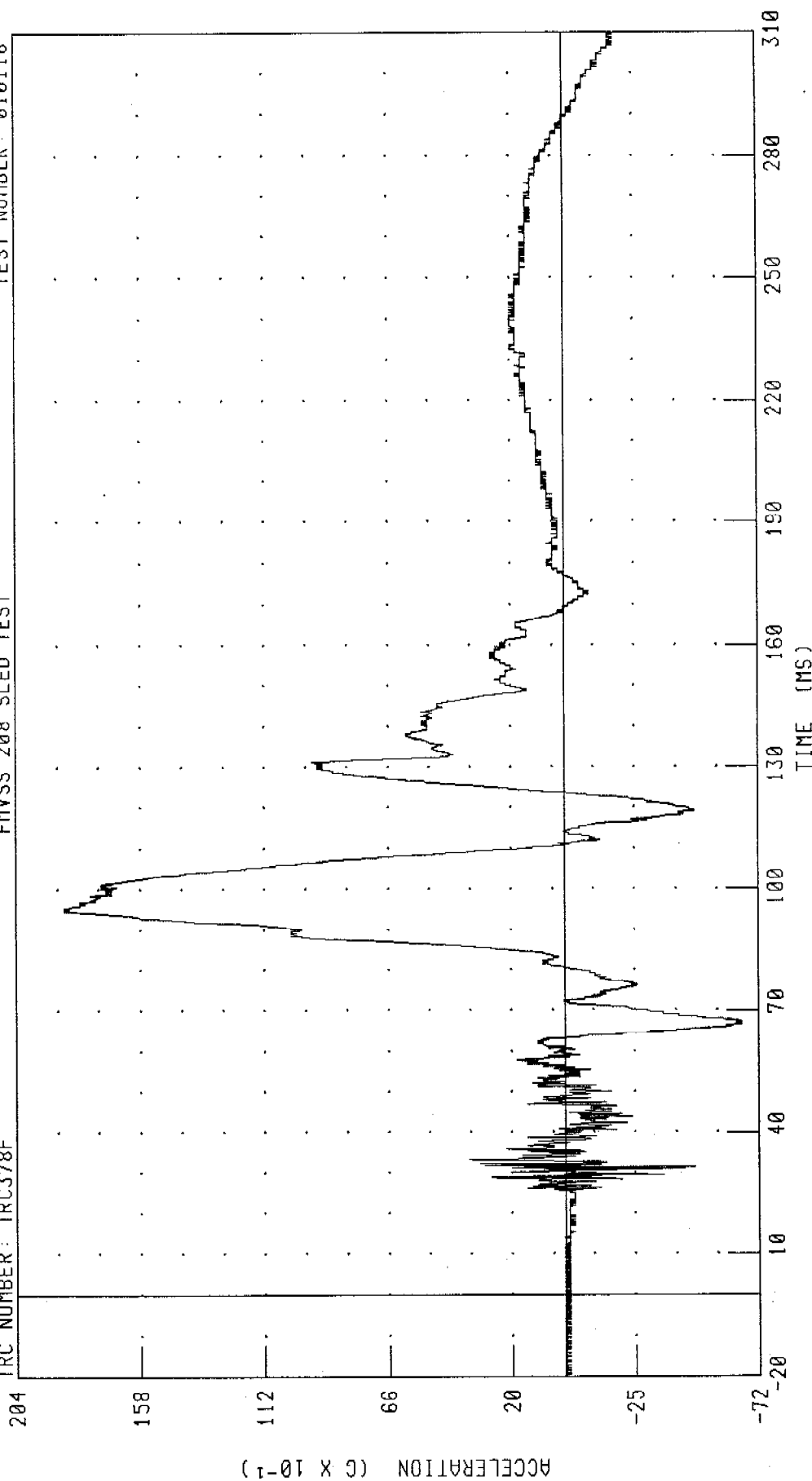
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

C10503 / 2001 SUZUKI GRAND VITARA
DRIVER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 010116

FMVSS 208 SLED TEST

TRC NUMBER: TRC378F



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

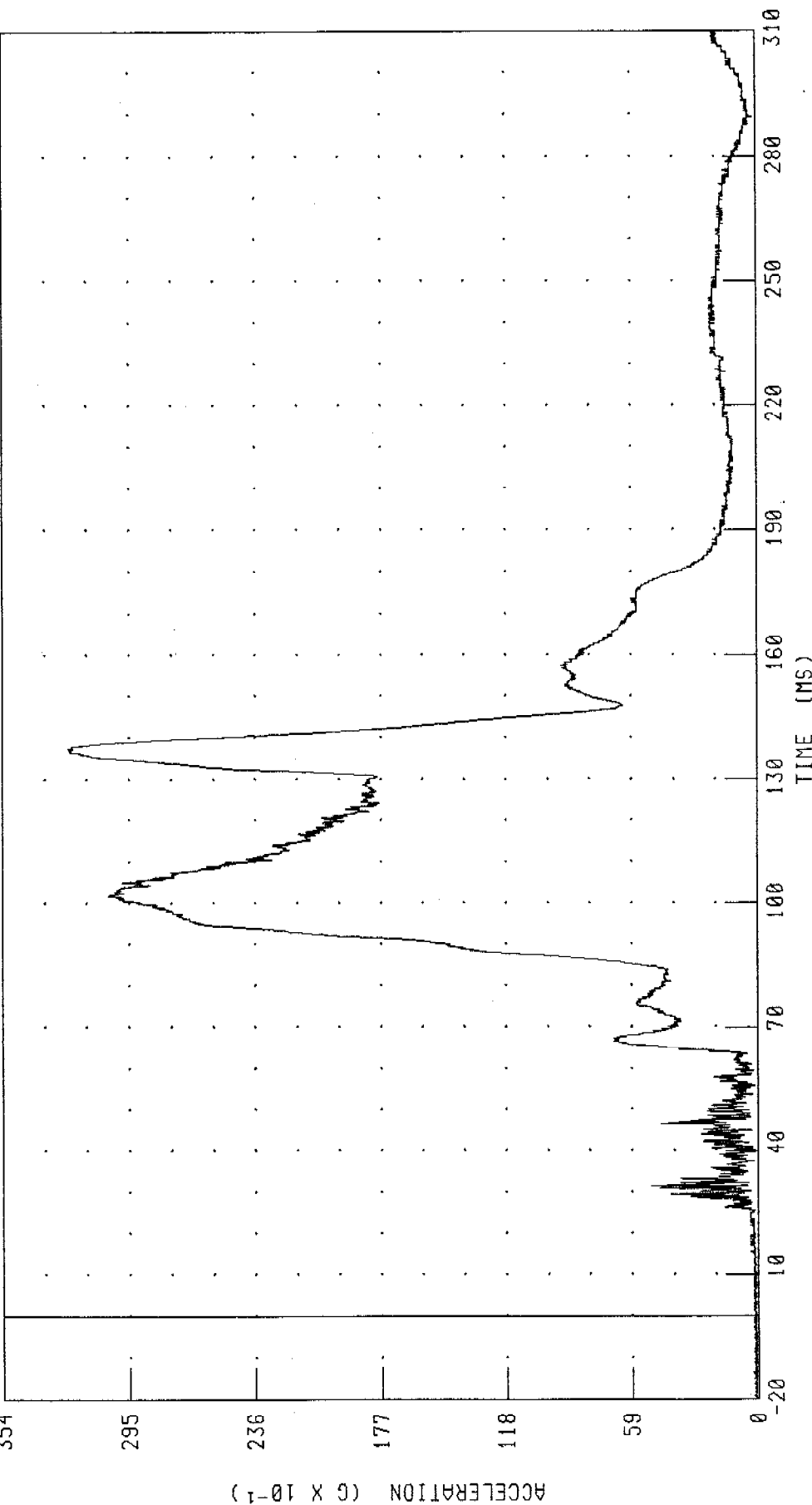
PEAK DATA: 18.61 G @ 94.88 MS; -6.60 G @ 66.56 MS

C10503 / 2001 SUZUKI GRAND VITARA
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 010116

FMVSS 208 SLED TEST

TRC NUMBER: TRC378F



CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

PEAK DATA: 32.31 G @ 137.28 MS; 0.09 G @ -19.84 MS

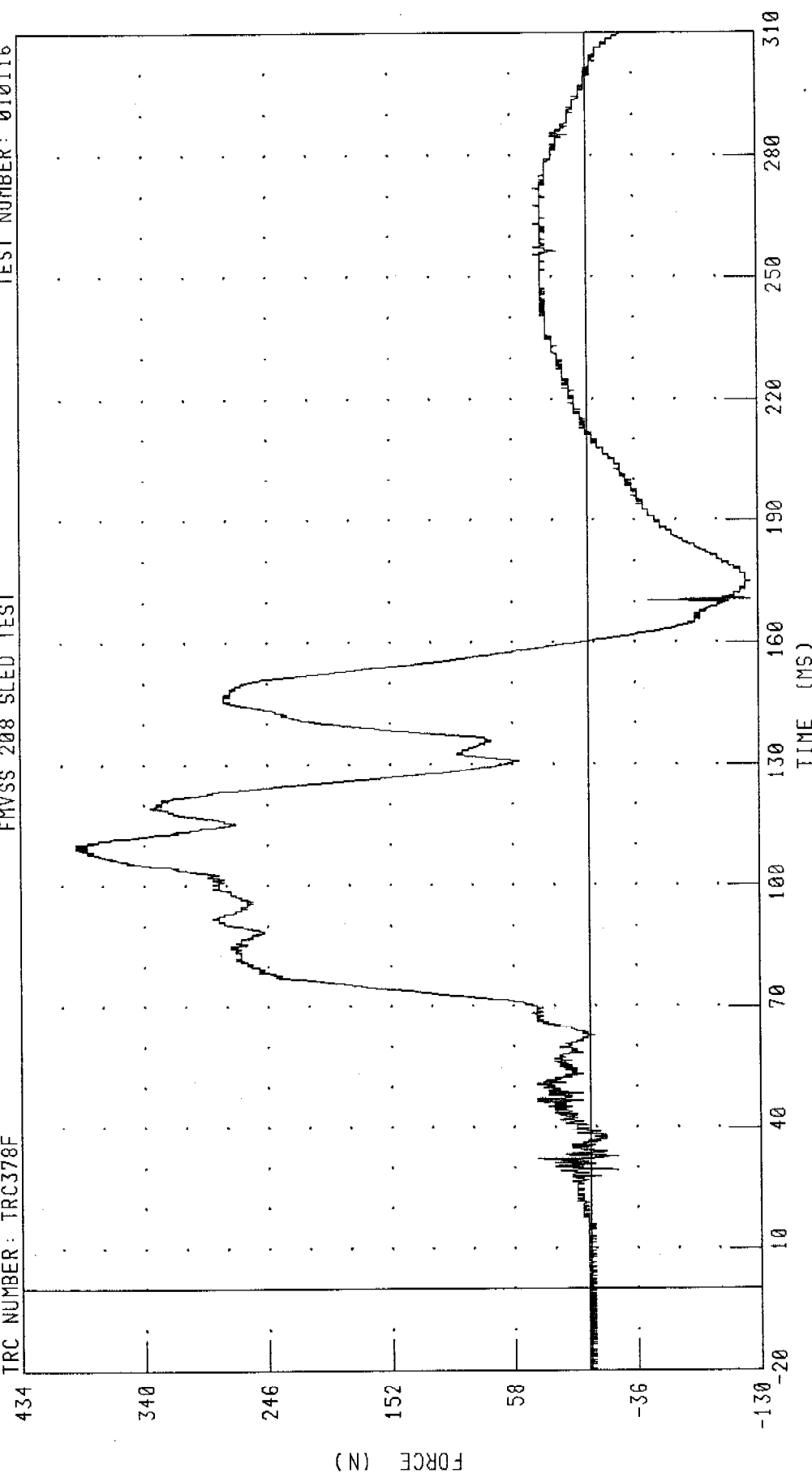
C10503 / 2001 SUZUKI GRAND VITARA

DRIVER NECK X-AXIS SHEAR FORCE

FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

PEAK DATA: 391.78 N @ 109.12 MS; -124.87 N @ 170.80 MS

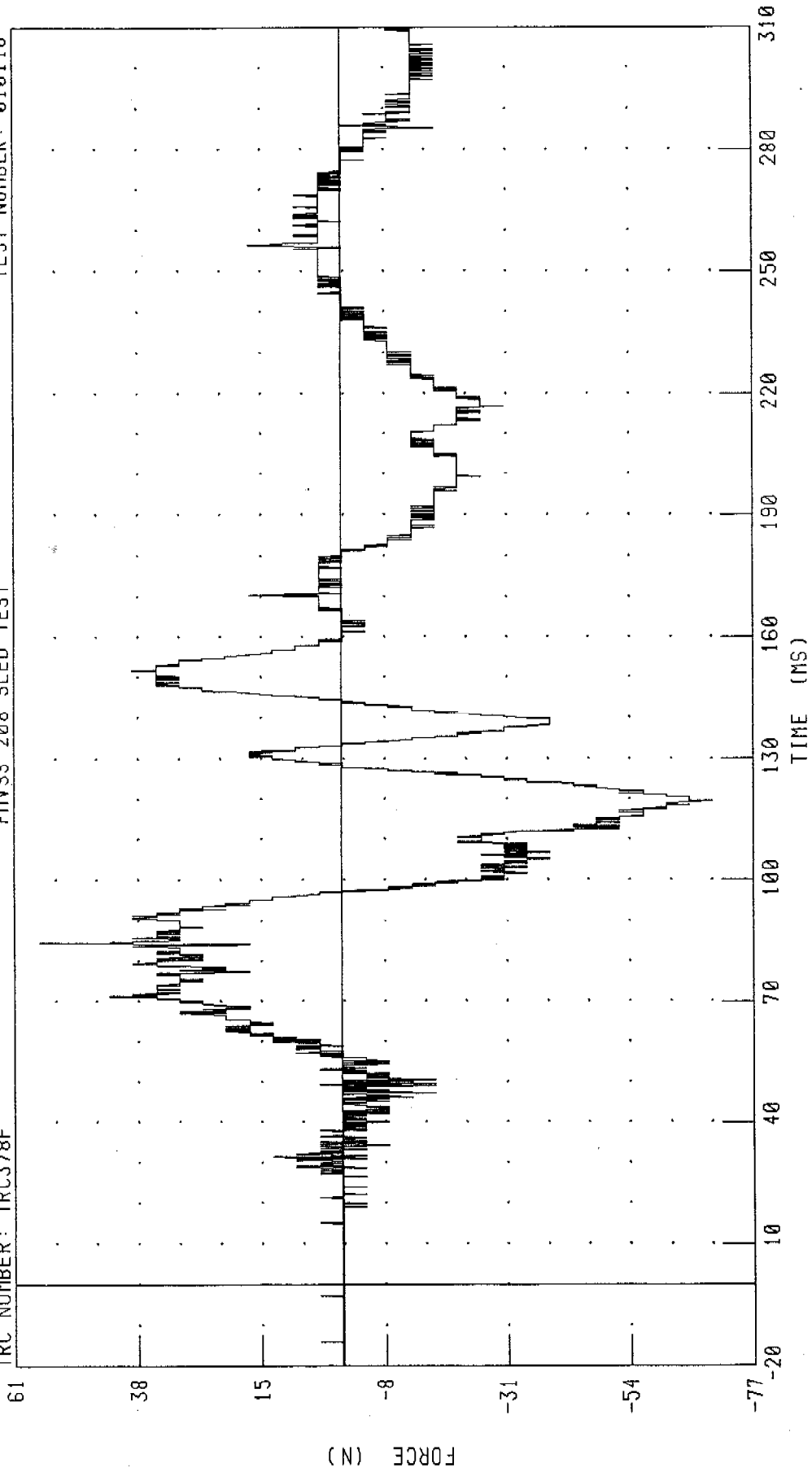
C10503 / 2001 SUZUKI GRAND VITARA

DRIVER NECK Y-AXIS SHEAR FORCE

FMVSS 208 SLED TEST

TRC NUMBER: TRC378F

TEST NUMBER: 010116



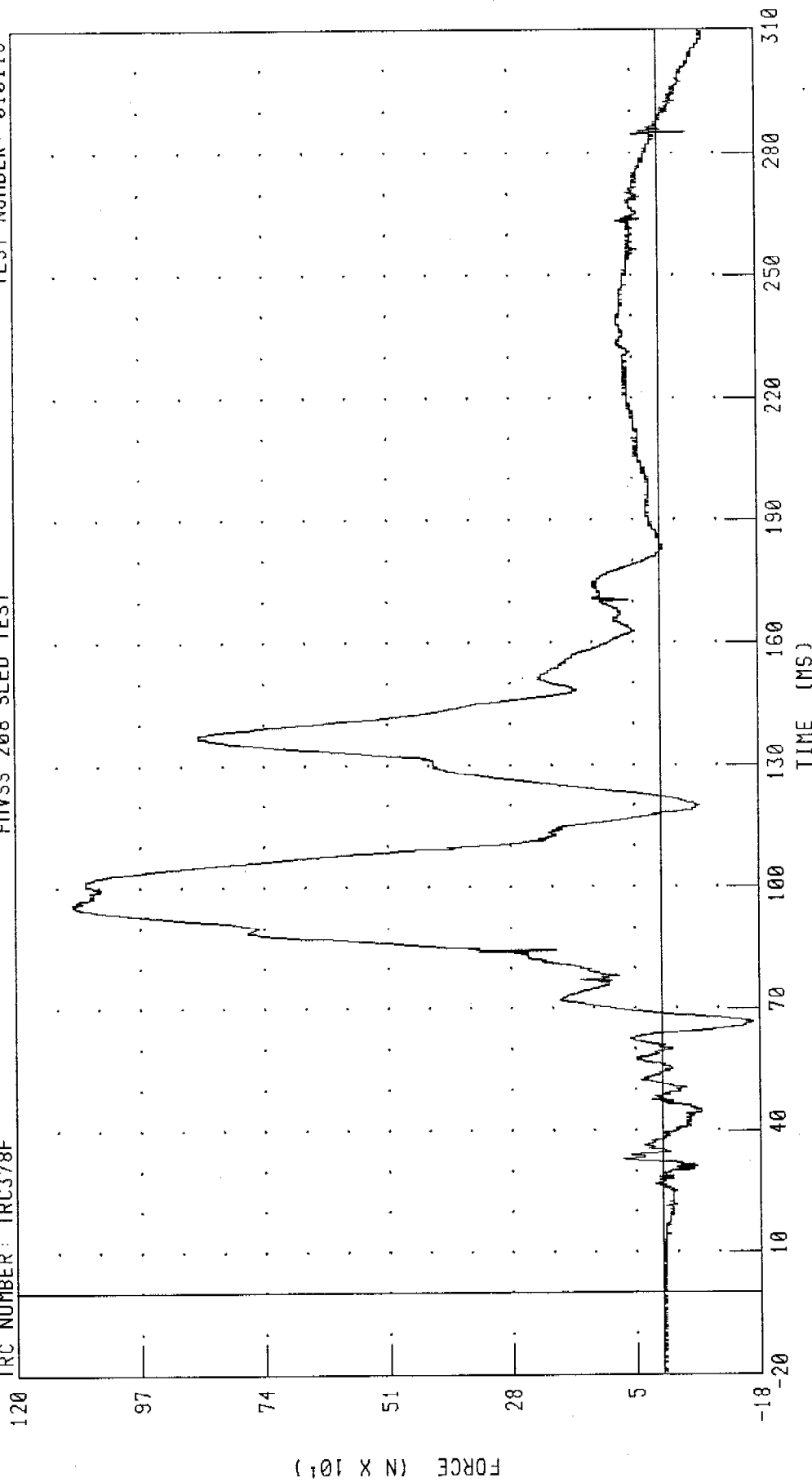
CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

PEAK DATA: 56.36 N @ 84.56 MS; -69.52 N @ 119.60 MS

C10503 / 2001 SUZUKI GRAND VITARA
 DRIVER NECK Z-AXIS AXIAL FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



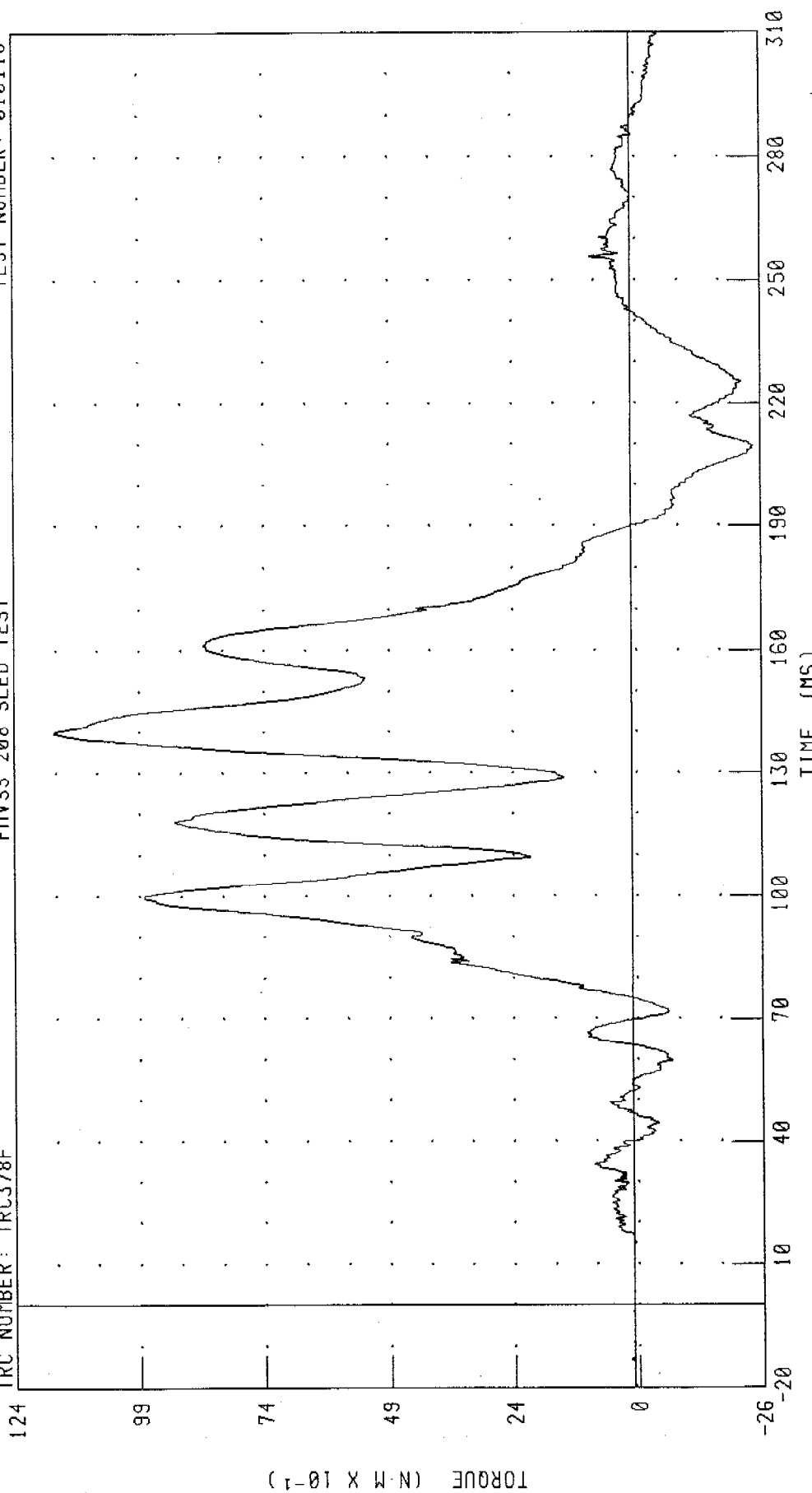
CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

PEAK DATA: 1095.45 N @ 95.44 MS, -168.30 N @ 66.48 MS

C10503 / 2001 SUZUKI GRAND VITARA
DRIVER NECK MOMENT ABOUT X AXIS
FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



CHANNEL: NEKX11 FILTER: CH. CLASS 600

PEAK DATA: 11.60 N·M @ 139.92 MS; -2.44 N·M @ 209.52 MS

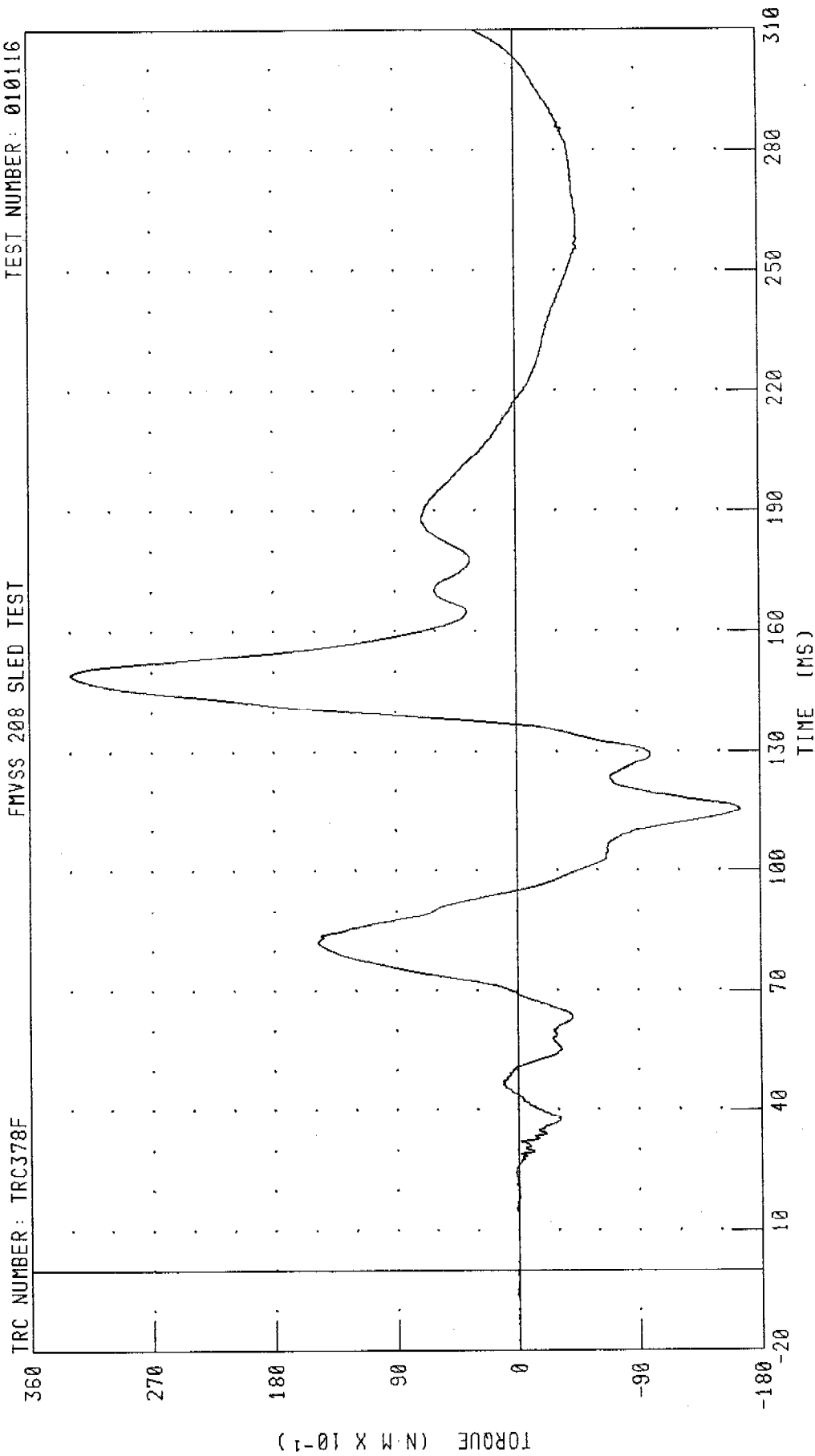
C10503 / 2001 SUZUKI GRAND VITARA

DRIVER NECK MOMENT ABOUT Y AXIS

FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



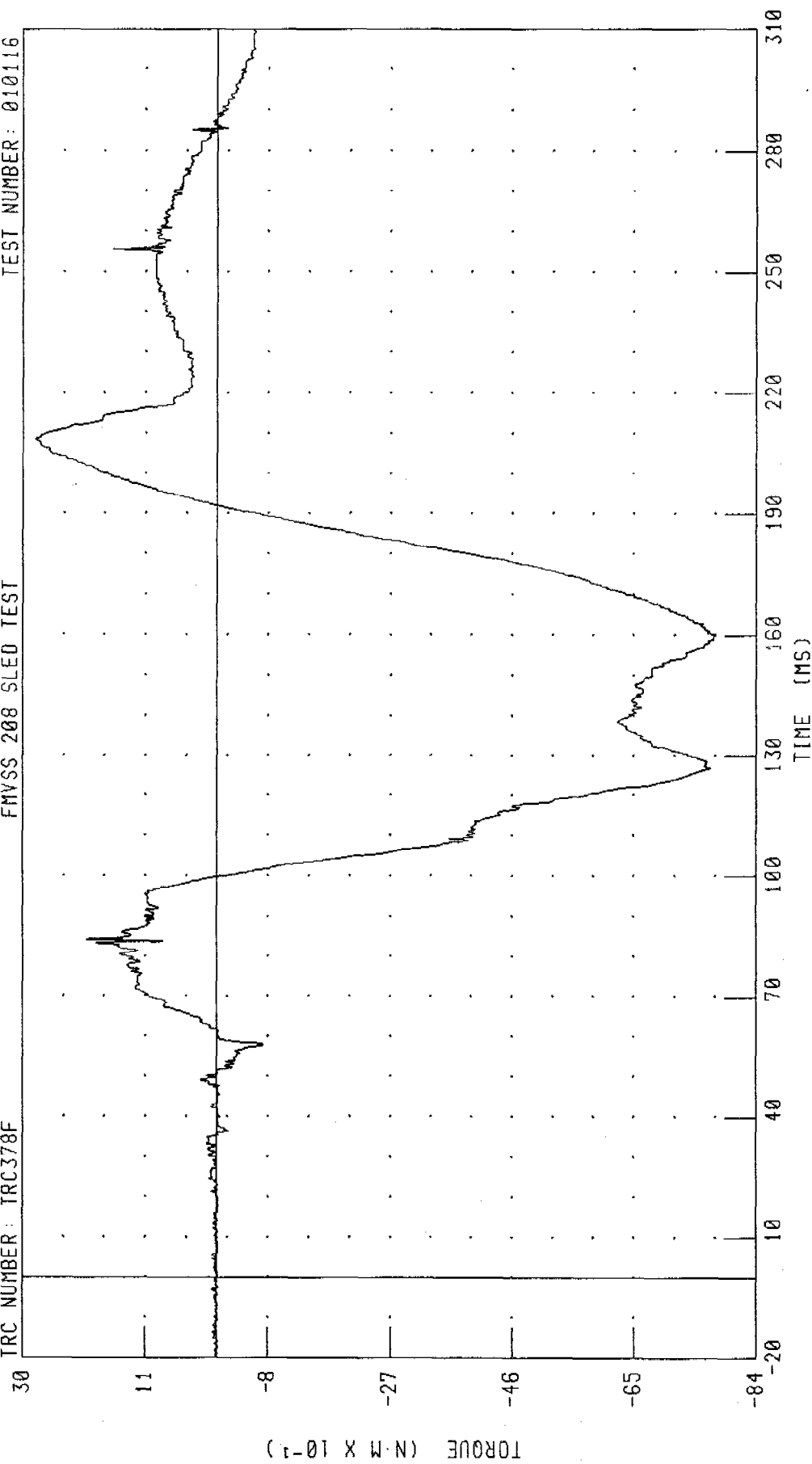
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

PEAK DATA: 32.95 N·m @ 149.44 ms; -16.53 N·m @ 115.20 ms

C10503 / 2001 SUZUKI GRAND VITARA
DRIVER NECK MOMENT ABOUT Z AXIS
FMVSS 208 SLED TEST

TRC NUMBER: TRC378F

TEST NUMBER: 010116



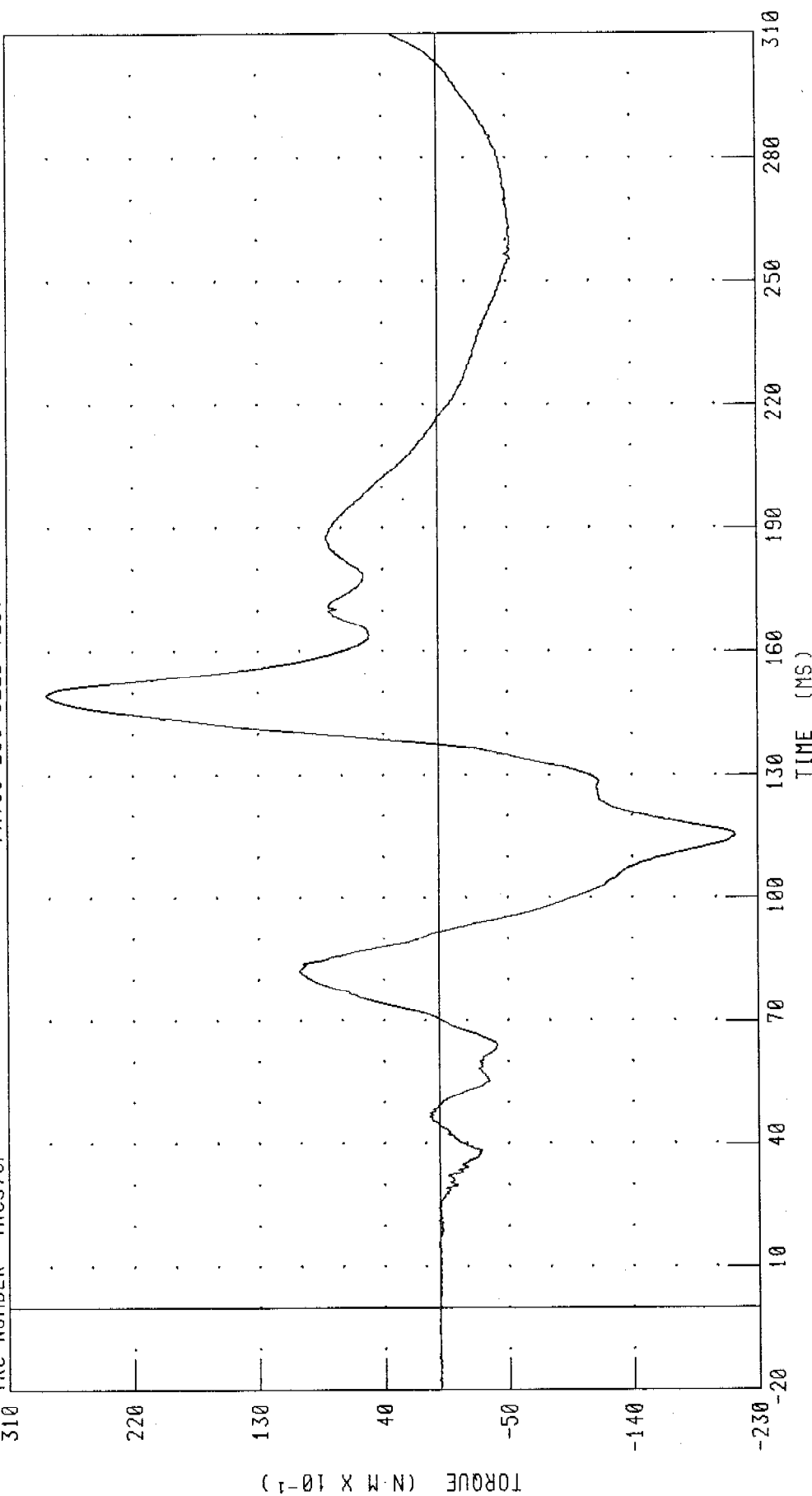
PEAK DATA: 2.81 N-M @ 208.56 MS; -7.75 N-M @ 160.08 MS

CHANNEL: NEKZM1 FILTER: CH. CLASS 600

C10503 / 2001 SUZUKI GRAND VITARA
 DRIVER NECK MOMENT ABOUT Y AXIS OCCIPITAL CONDYLE
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



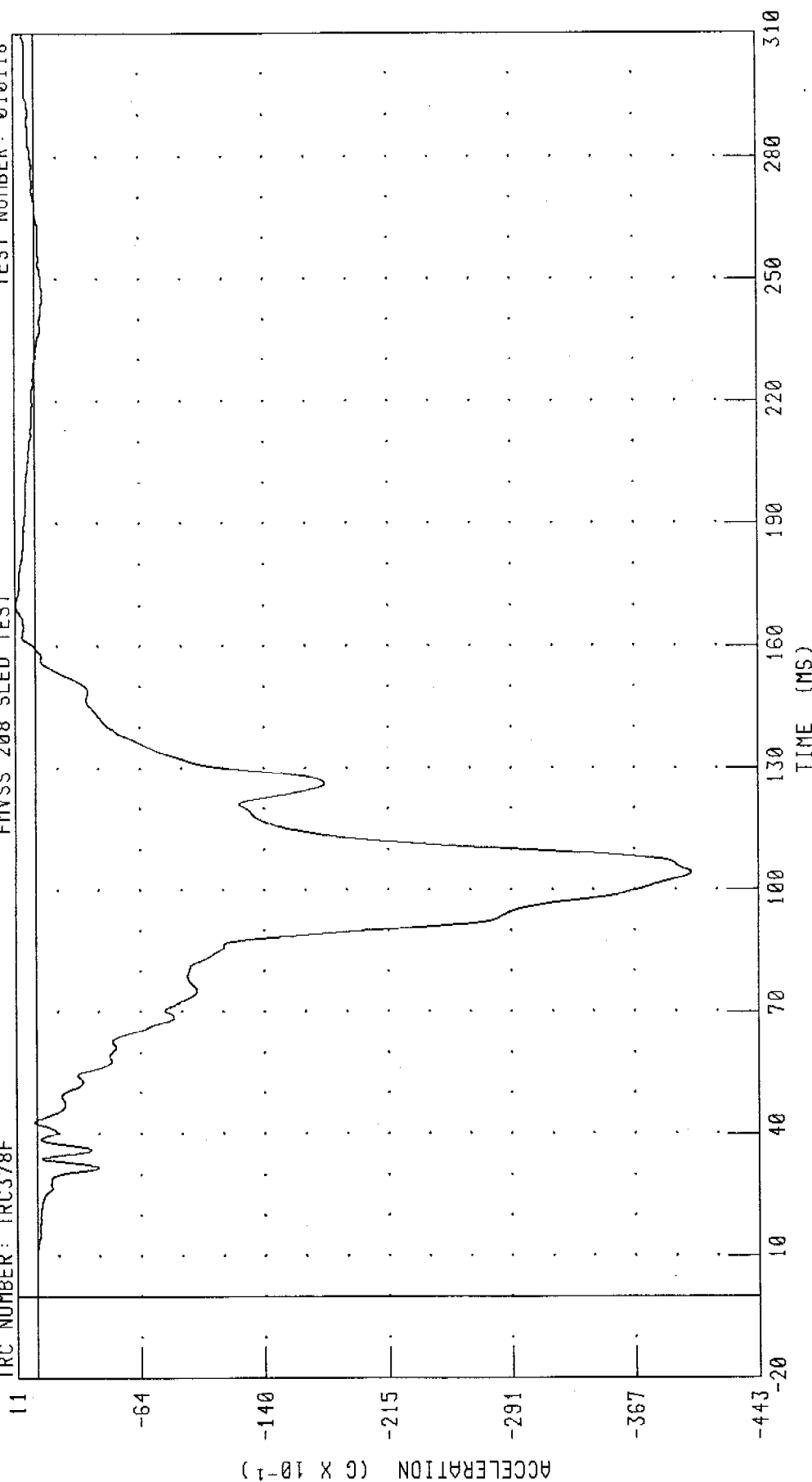
PEAK DATA: 28.18 N-M @ 149.52 MS, -21.38 N-M @ 115.20 MS

CHANNEL: NEKOM1 FILTER: CH. CLASS 600

C10503 / 2001 SUZUKI GRAND VITARA
 DRIVER CHEST X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



PEAK DATA: 1.17 G @ 170.32 MS; -40.32 G @ 104.48 MS

CHANNEL: CSTXG1 FILTER: CH. CLASS 180

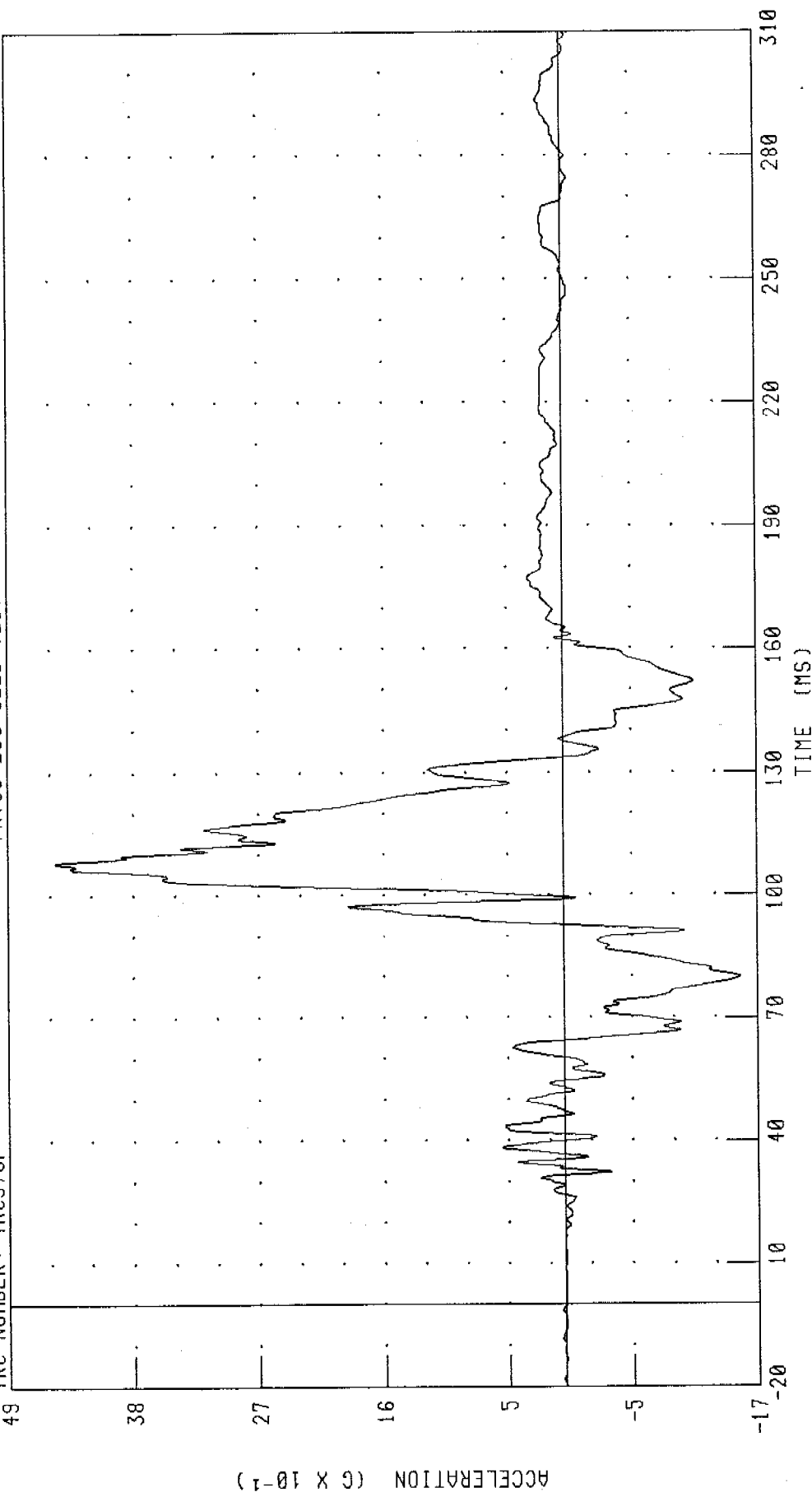
C10503 / 2001 SUZUKI GRAND VITARA

DRIVER CHEST Y-AXIS ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



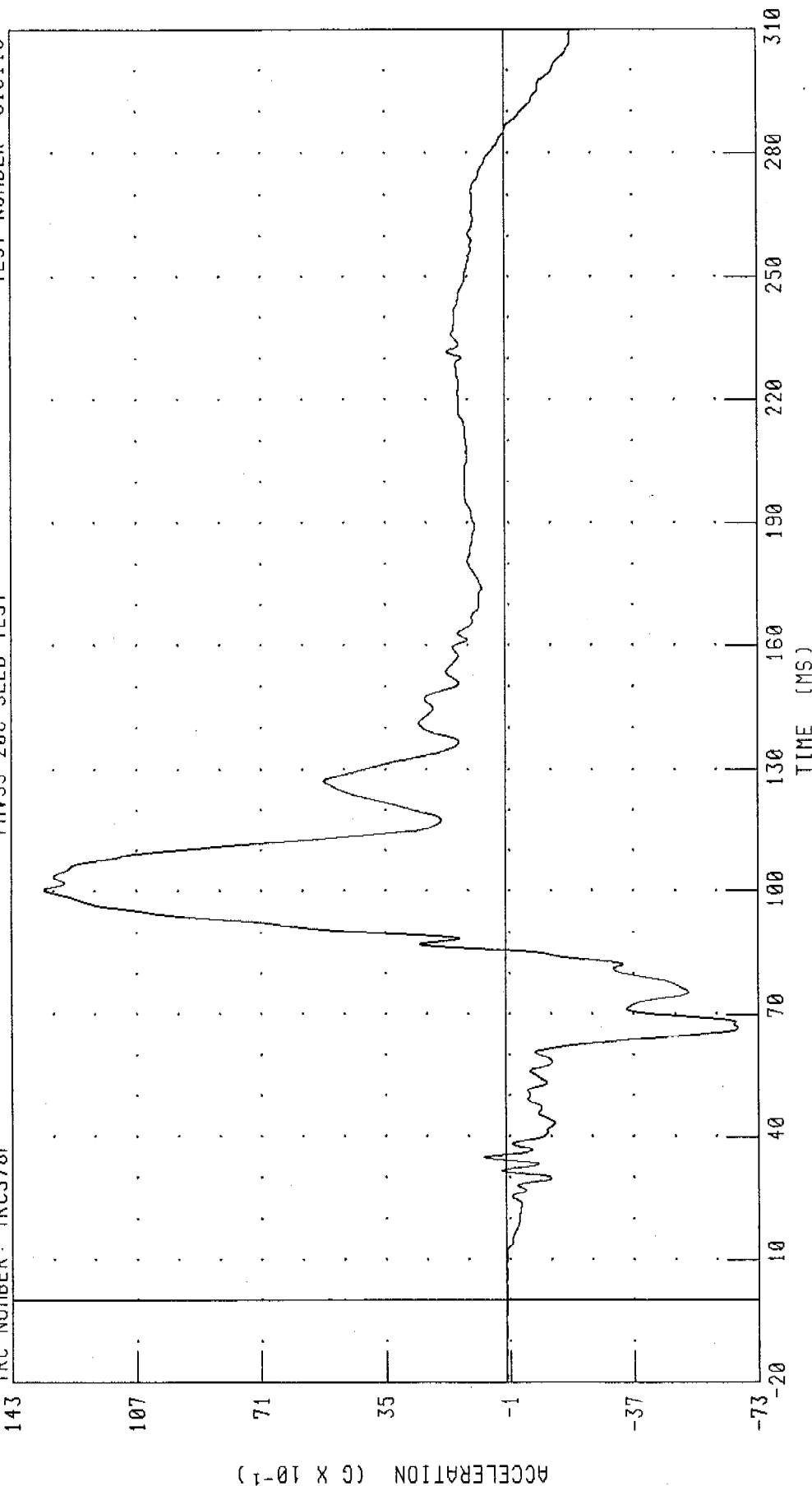
CHANNEL: CSTYG1 FILTER: CH. CLASS 180

PEAK DATA: 4.49 G @ 108.16 MS; -1.55 G @ 79.92 MS

C10503 / 2001 SUZUKI GRAND VITARA
DRIVER CHEST Z-AXIS ACCELERATION
FMVSS 208 SLED TEST

TRC NUMBER: TRC378F

TEST NUMBER: 010116



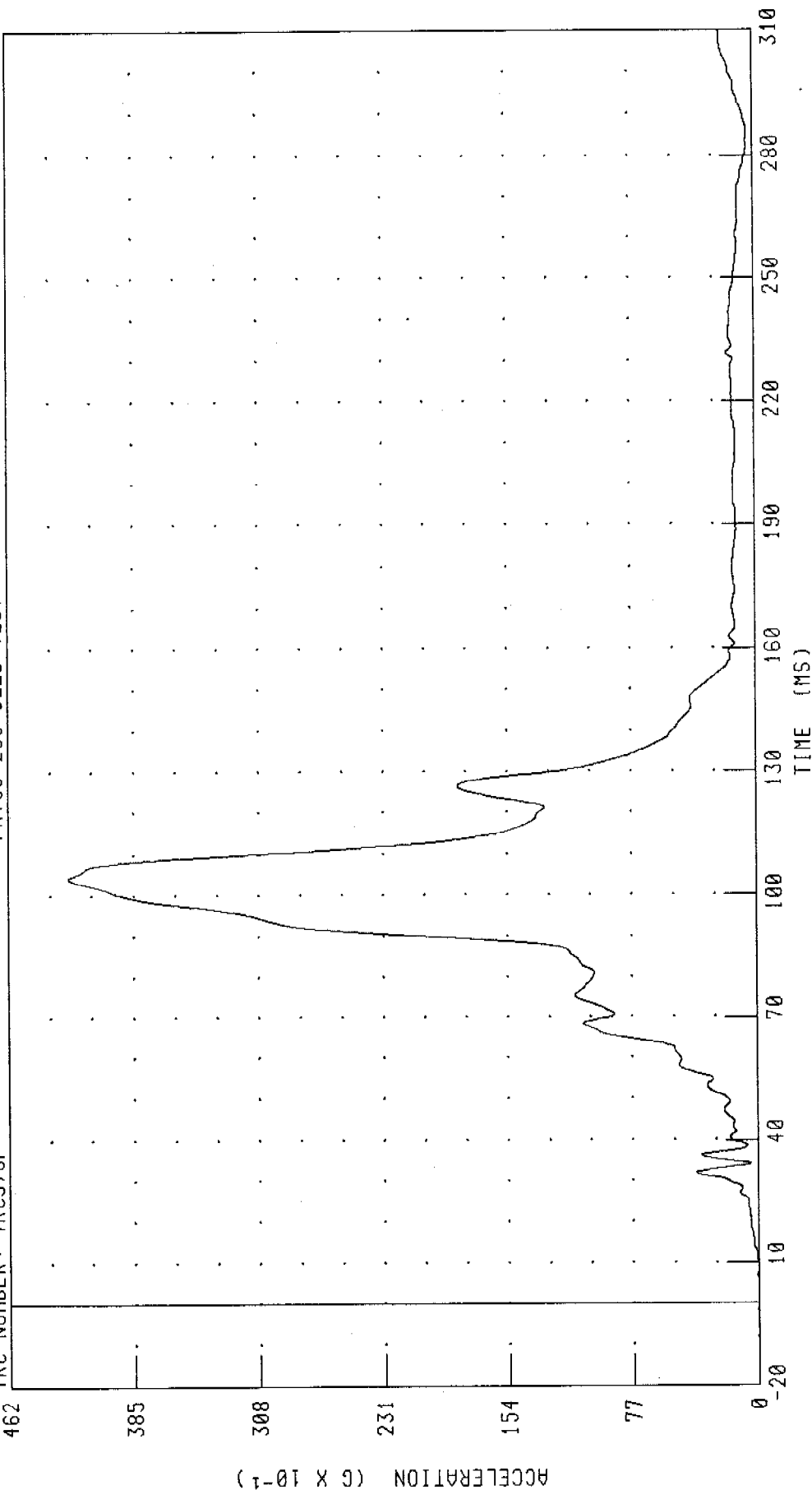
CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 13.38 G @ 100.40 MS, -6.72 G @ 66.64 MS

C10503 / 2001 SUZUKI GRAND VITARA
 DRIVER CHEST RESULTANT ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



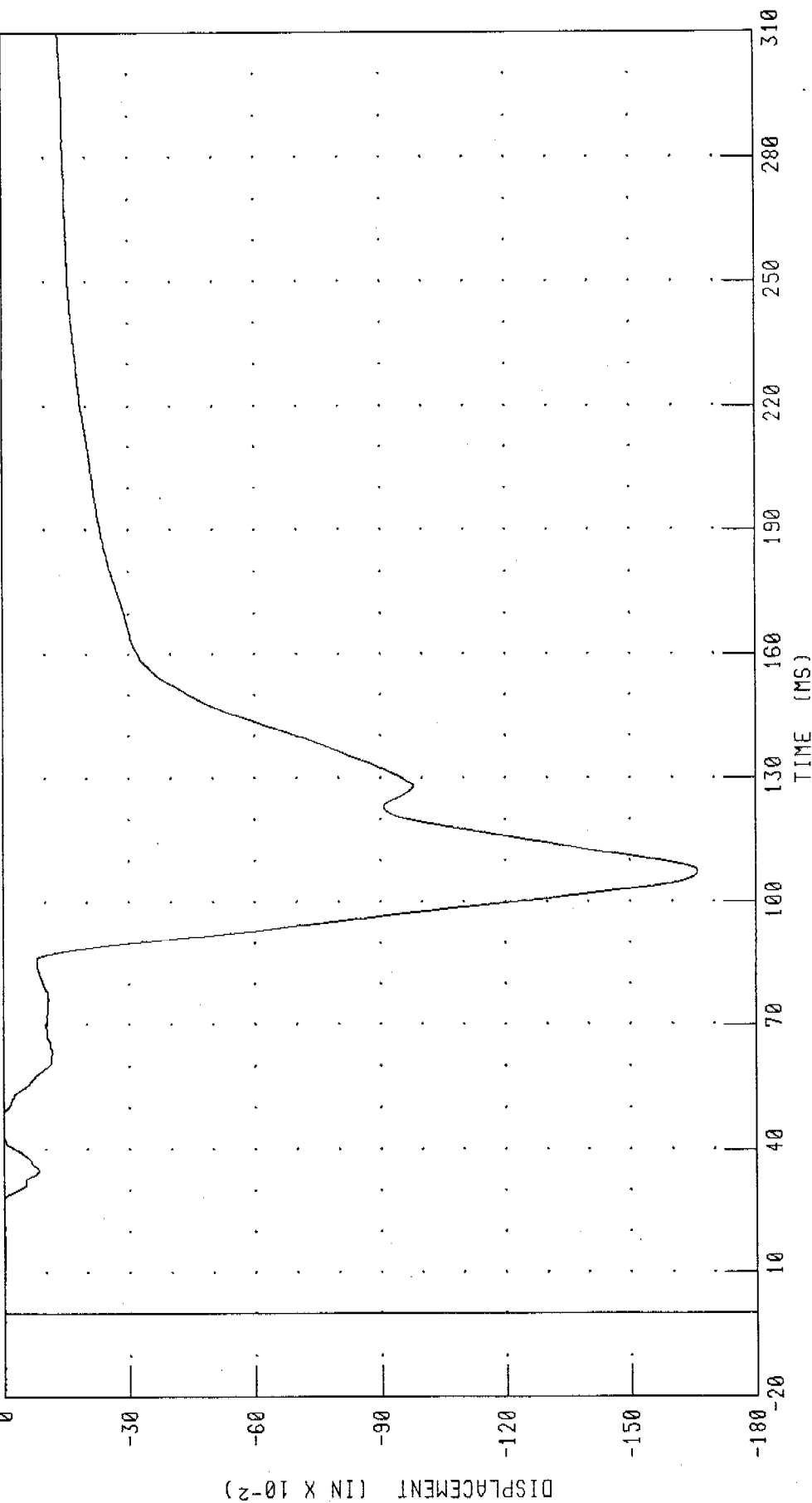
CHANNEL: CSTRG1 FILTER: CH. CLASS 180

PEAK DATA: 42.50 G @ 104.40 MS; 0.00 G @ -14.00 MS

C10503 / 2001 SUZUKI GRAND VITARA
DRIVER CHEST DEFLECTION
FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



CHANNEL: CSTXD1 FILTER: CH. CLASS 600

PEAK DATA: 0.02 IN @ 45.76 MS; -1.66 IN @ 107.44 MS

C10503 / 2001 SUZUKI GRAND VITARA

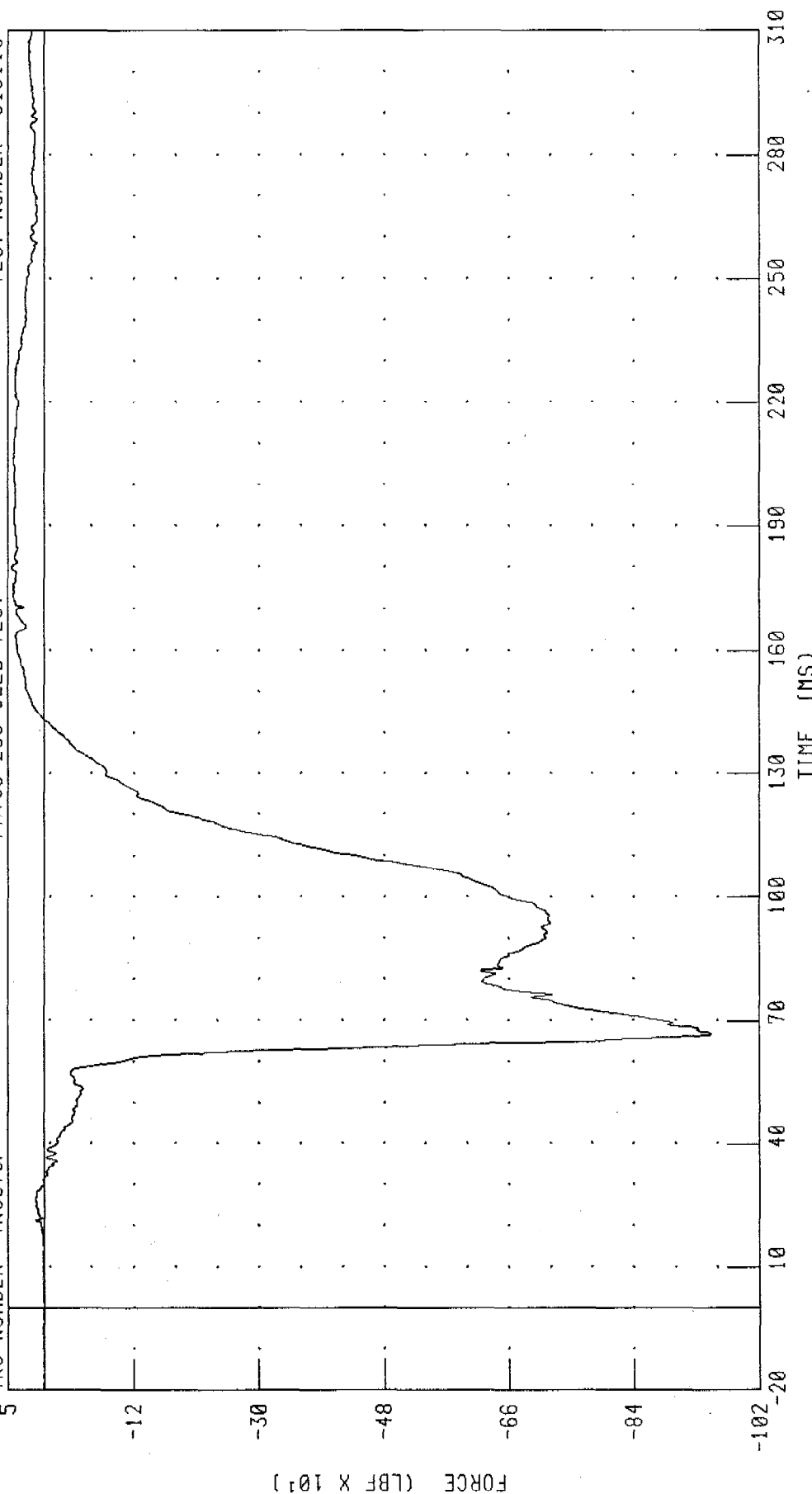
DRIVER LEFT FEMUR FORCE

FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F

5



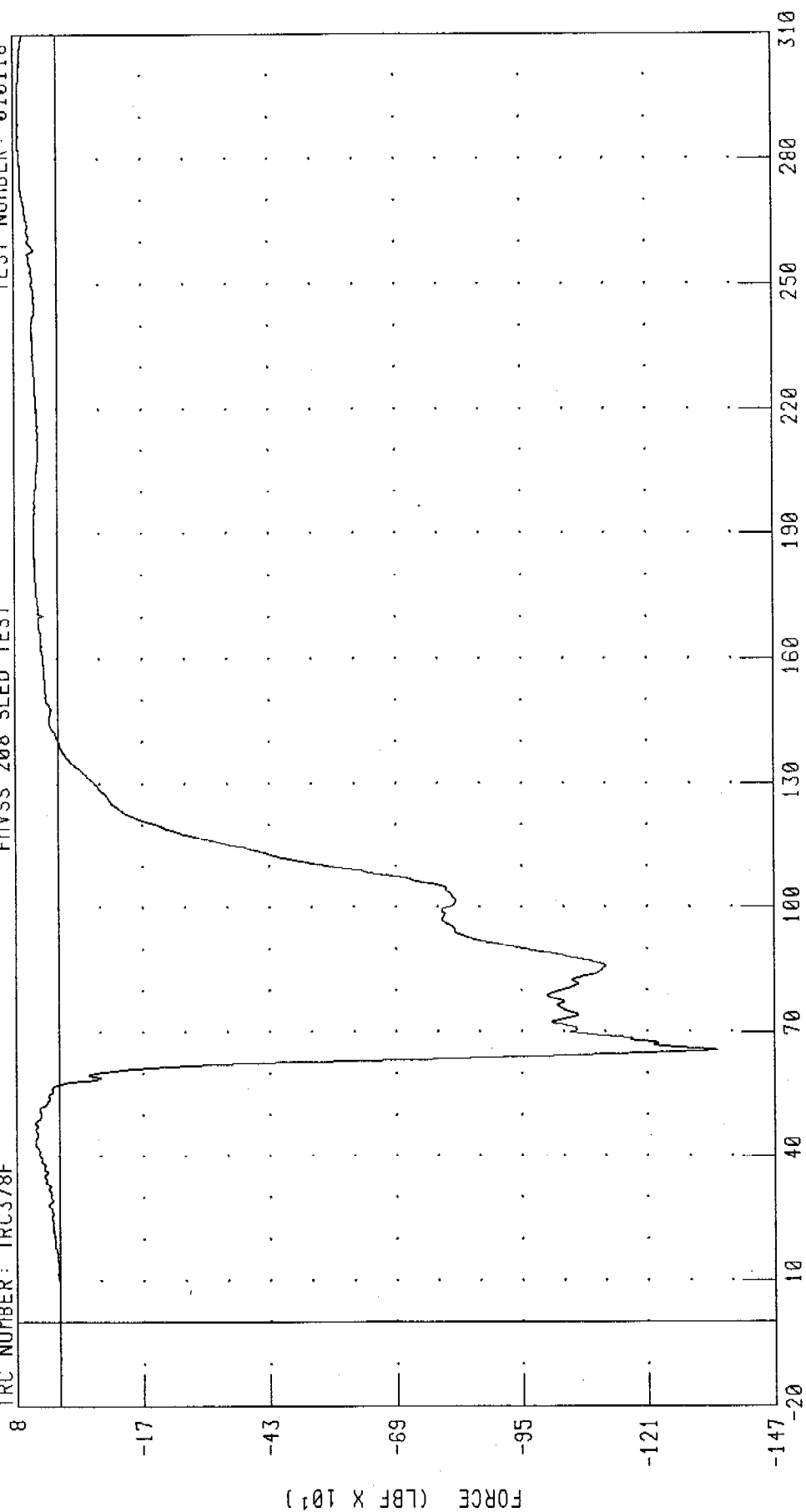
CHANNEL: LFMZF1 FILTER: CH. CLASS 600

PEAK DATA: 46.70 LBF @ 179.92 MS; -960.40 LBF @ 66.56 MS

C10503 / 2001 SUZUKI GRAND VITARA
 DRIVER RIGHT FEMUR FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



TIME (MS)

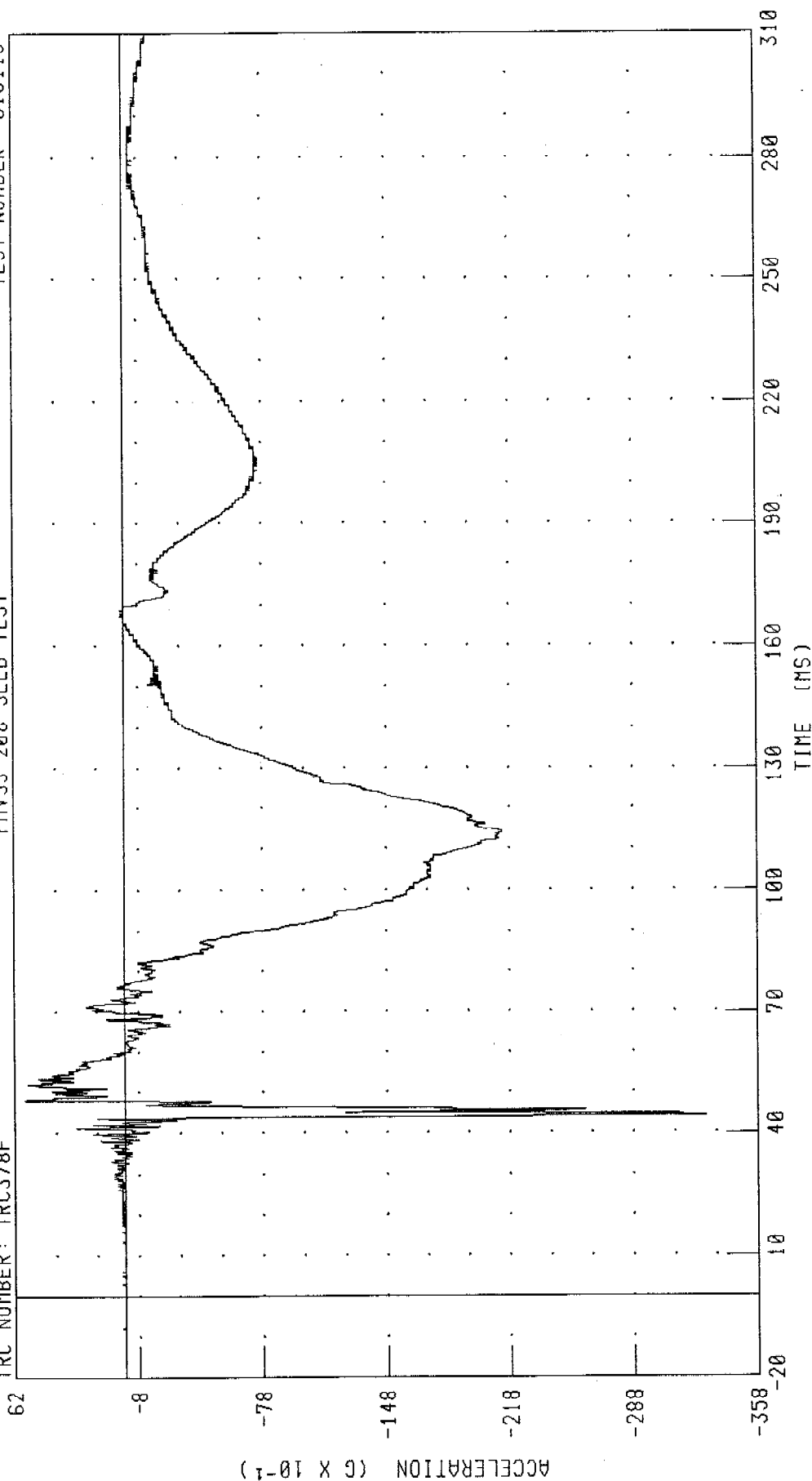
PEAK DATA: 80.31 LBF @ 292.96 MS; -1354.83 LBF @ 65.68 MS

CHANNEL: RFMZFI FILTER: CH. CLASS 600

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



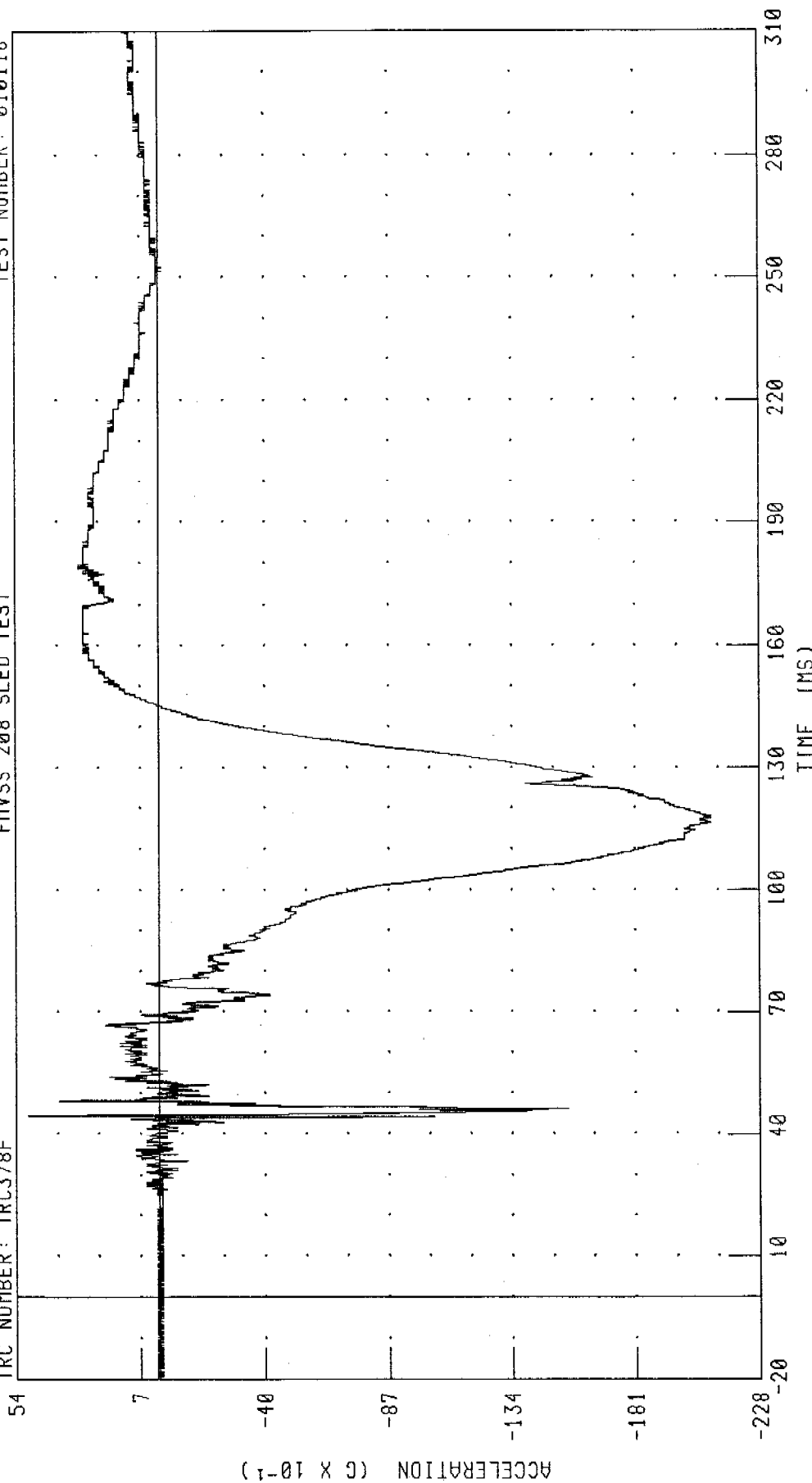
CHANNEL: HEDXC2 FILTER: CH. CLASS 1000

PEAK DATA: 5.64 G @ 48.16 MS; -32.89 G @ 44.32 MS

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



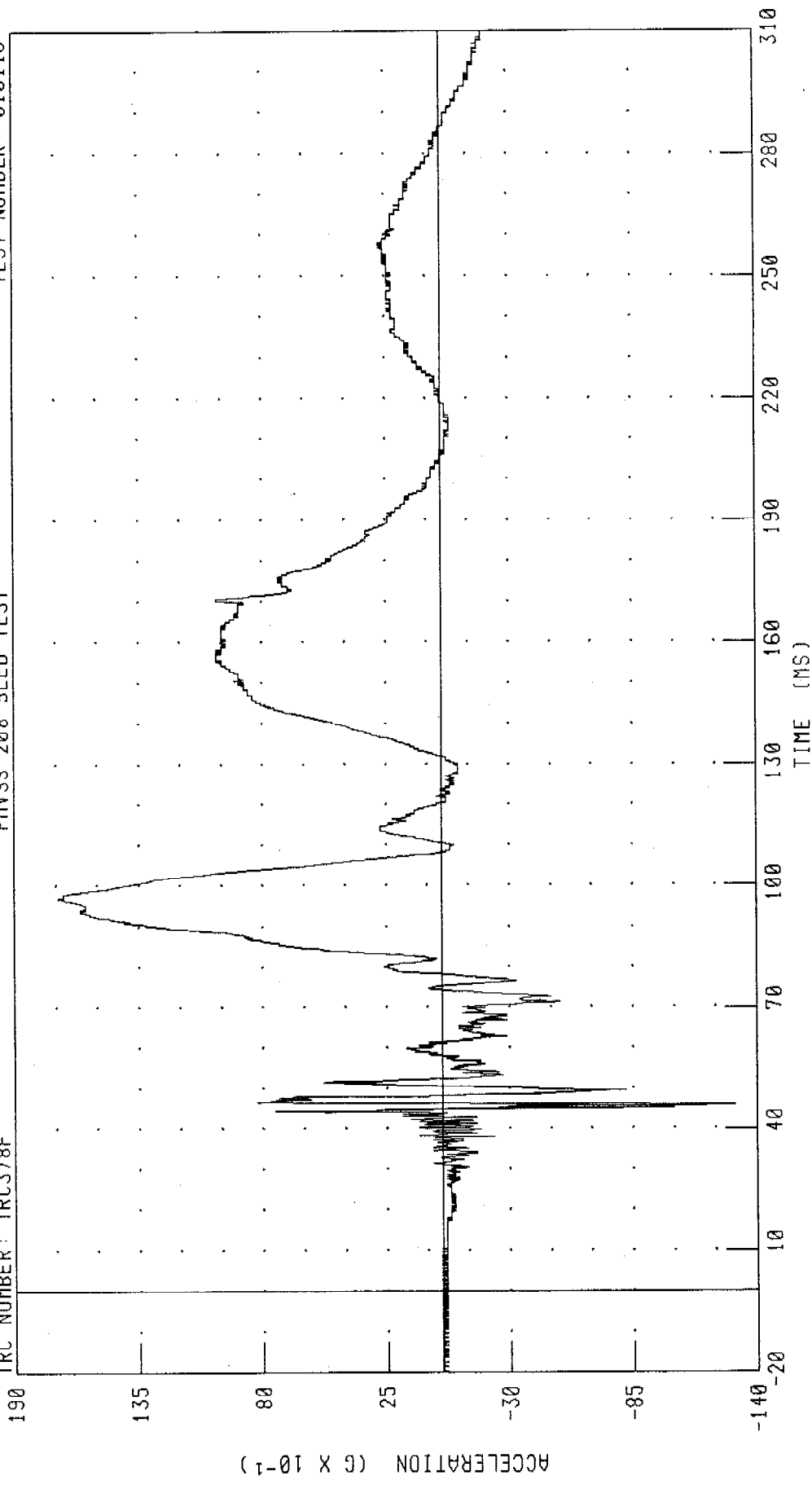
CHANNEL: HEDYC2 FILTER: CH. CLASS 1000

PEAK DATA: 4.97 G @ 44.56 MS, -20.96 G @ 116.56 MS

C10503 / 2001 SUZUKI GRAND VITARA
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



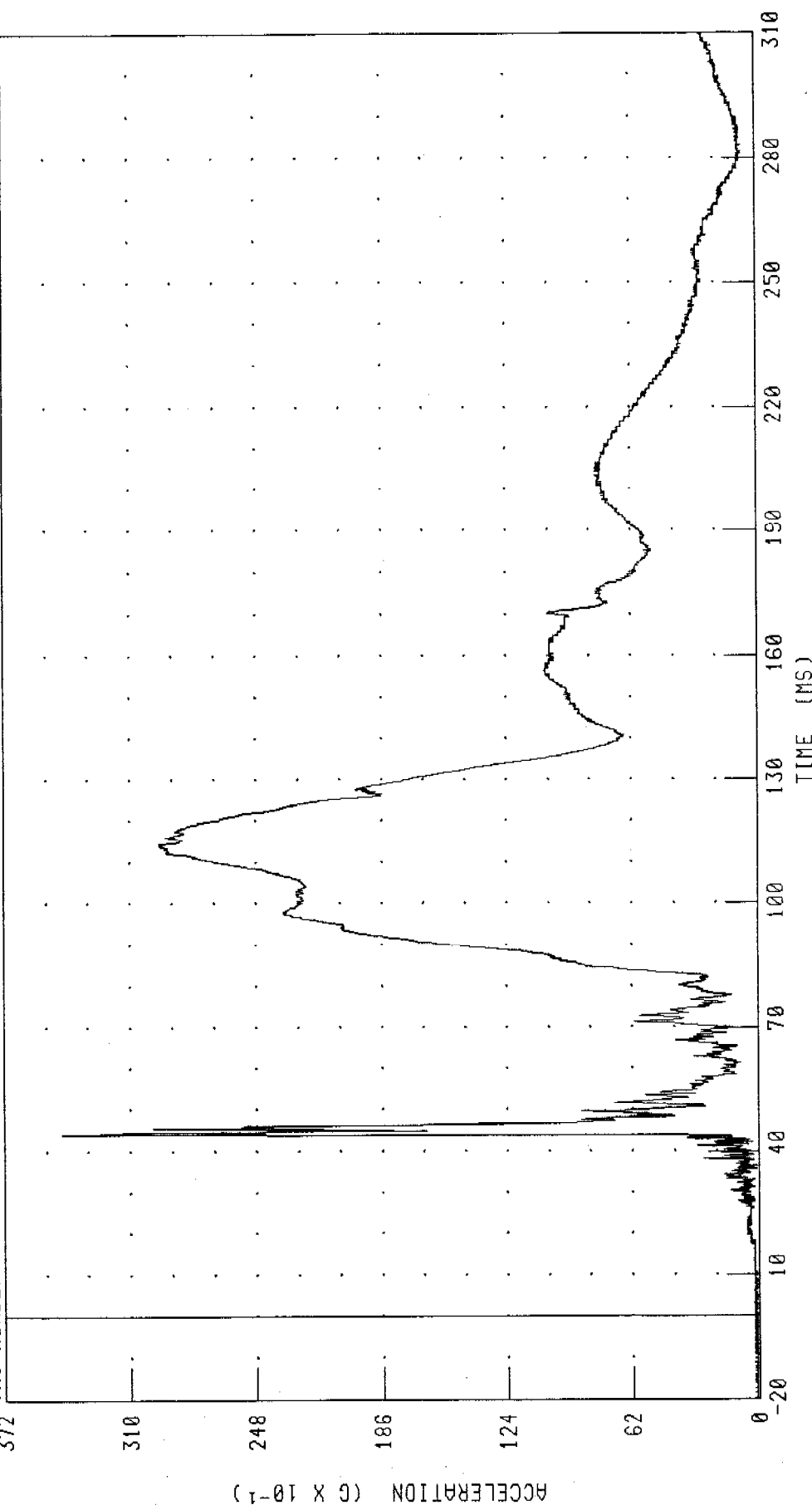
CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

PEAK DATA: 17.04 G @ 96.80 MS, -13.05 G @ 45.92 MS

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



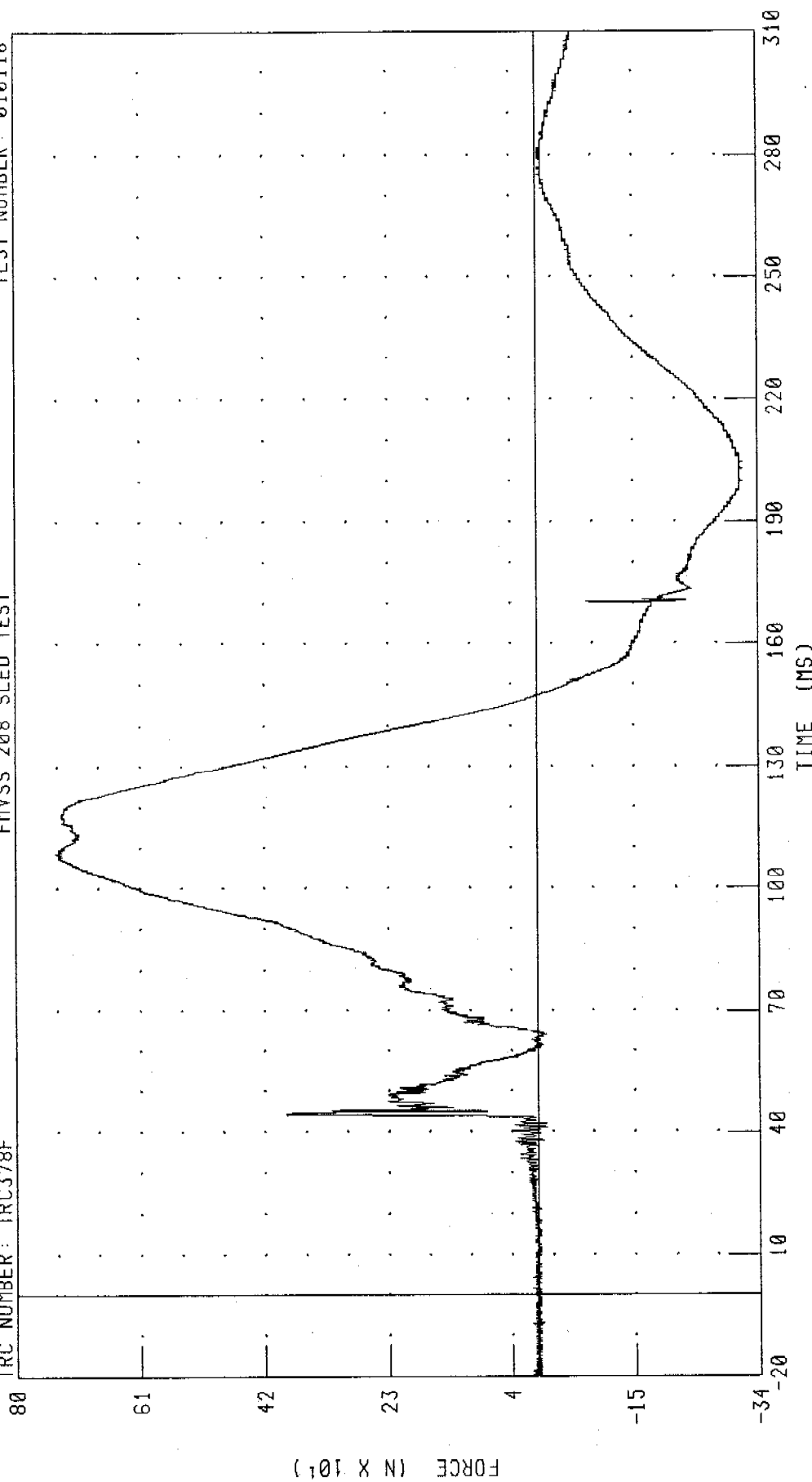
CHANNEL: HEDRC2 FILTER: CH. CLASS 1000

PEAK DATA: 34.35 G @ 44.24 MS; 0.10 G @ -20.00 MS

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



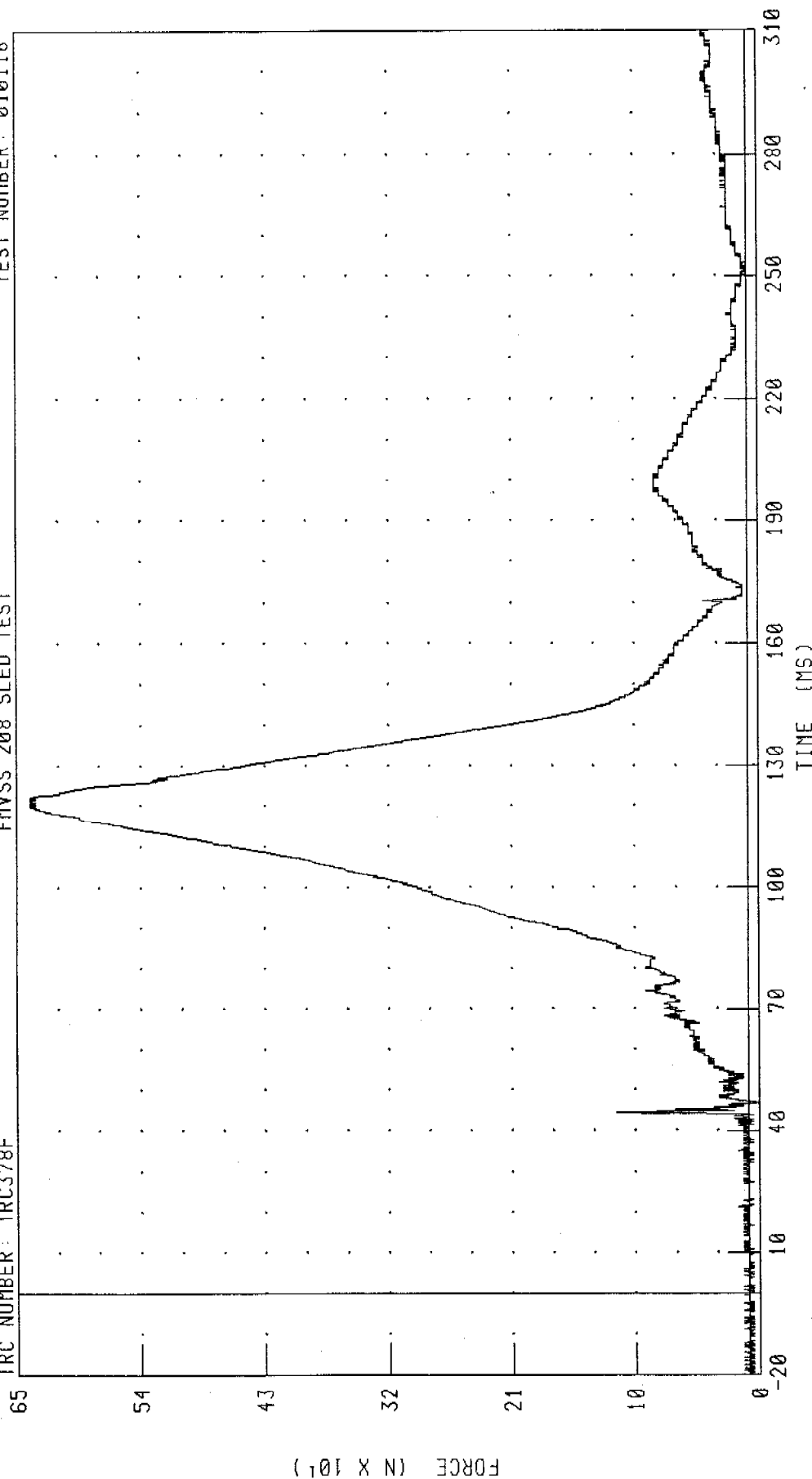
PEAK DATA: 738.78 N @ 108.64 MS, -316.93 N @ 200.00 MS

CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



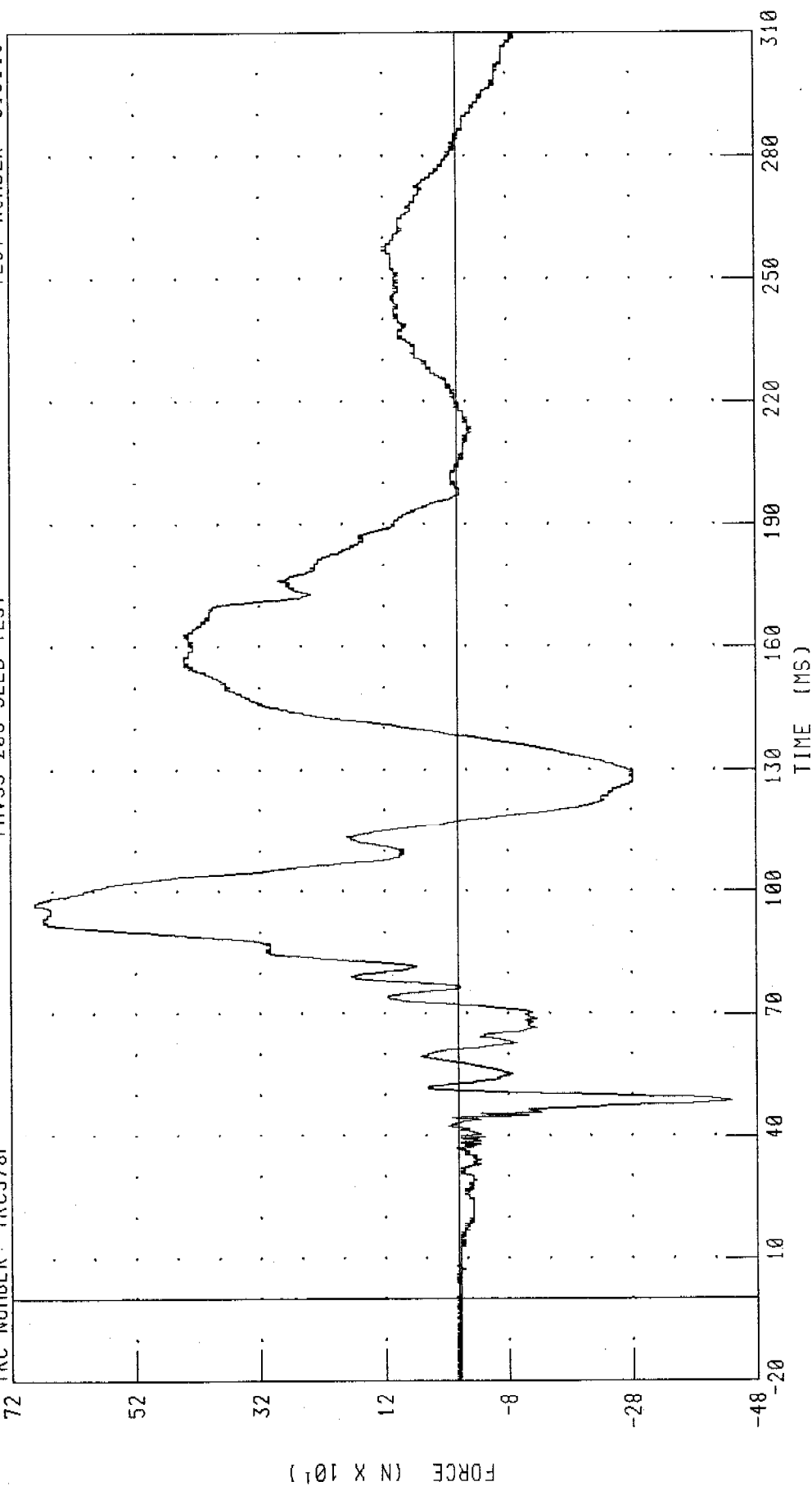
CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

PEAK DATA: 639.30 N @ 119.84 MS; -8.09' N @ 46.72 MS

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



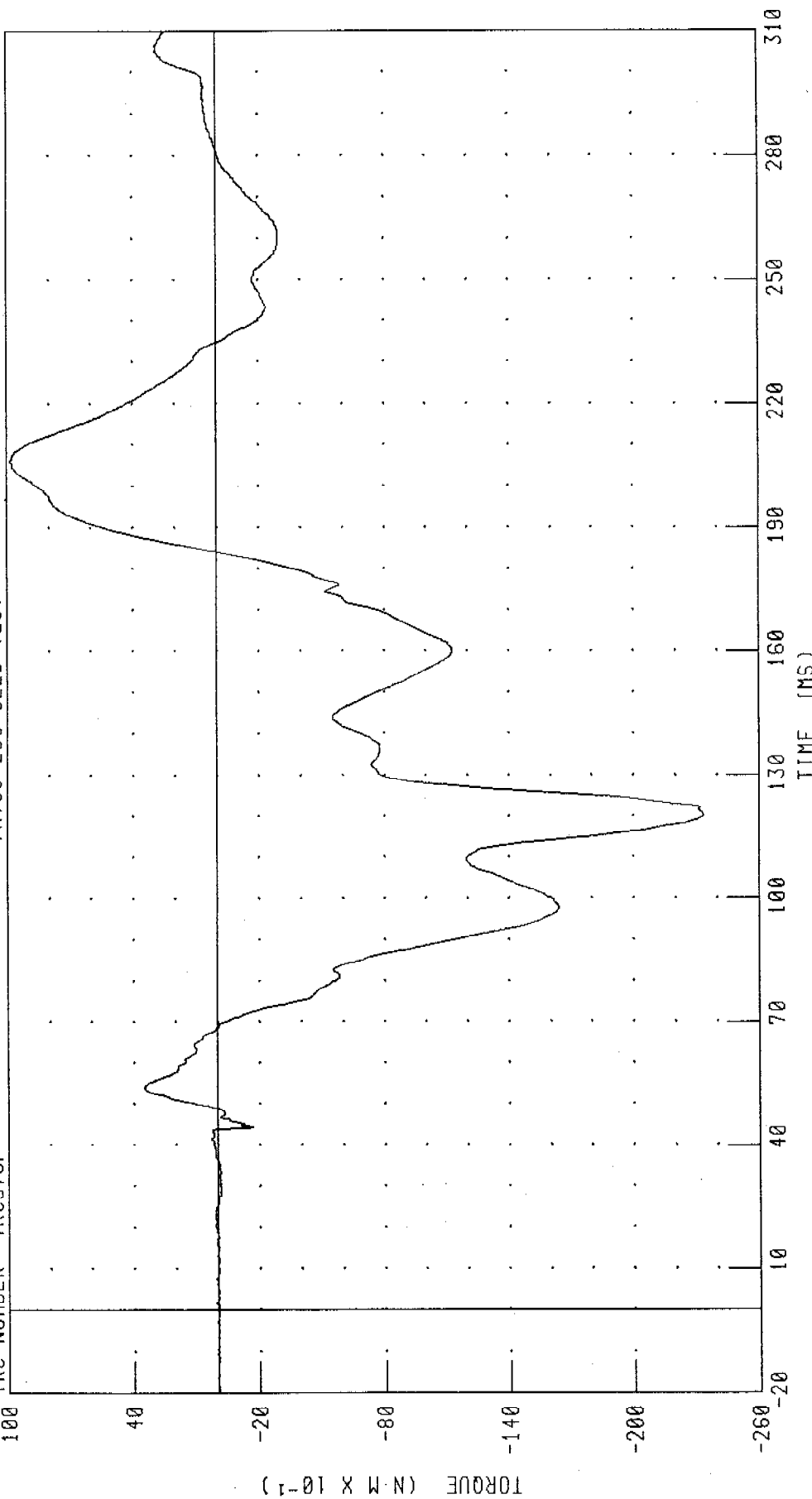
PEAK DATA: 681.33 N @ 96.64 MS; -439.08' N @ 48.56 MS

CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



TIME (MS)

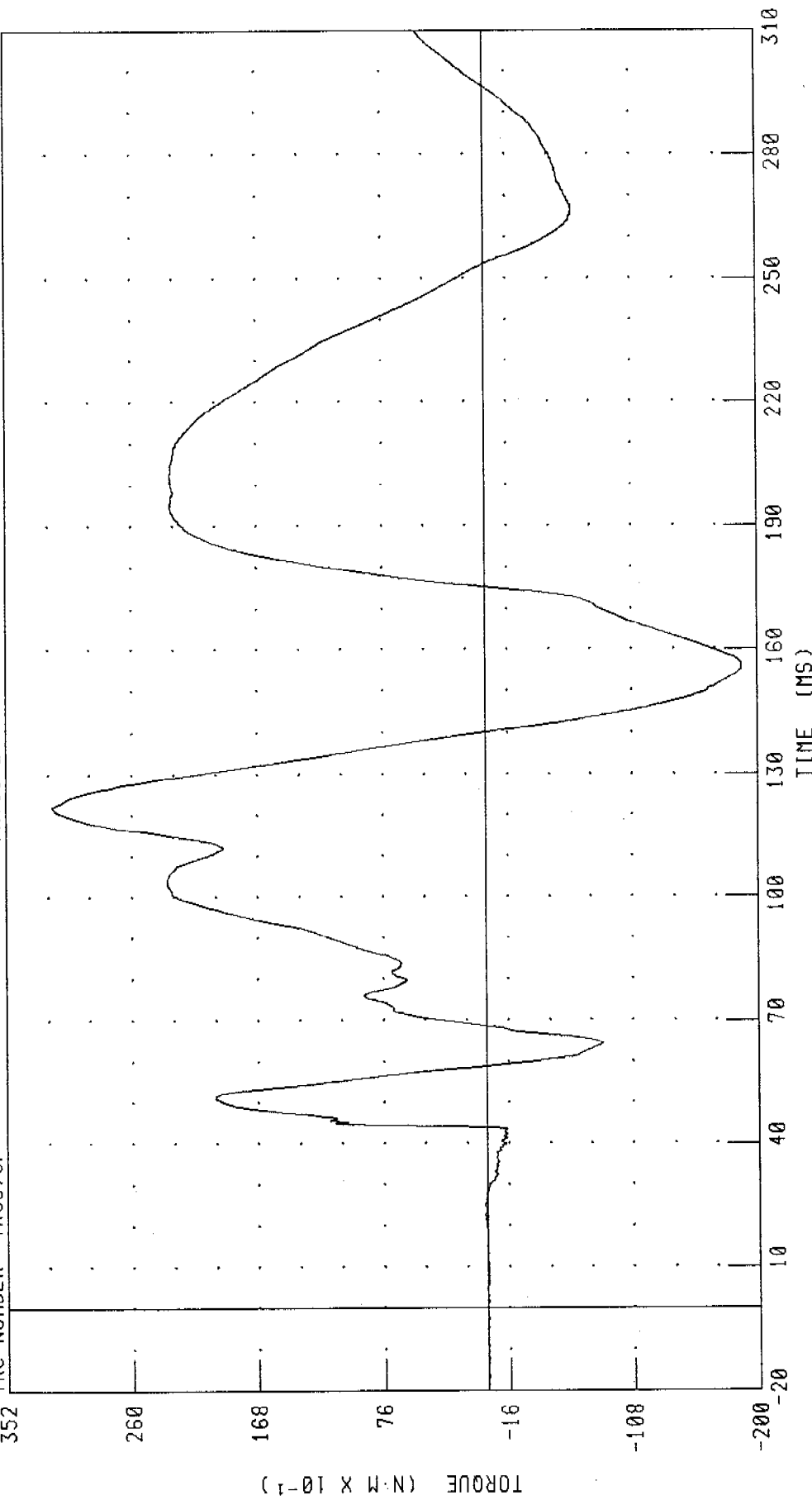
PEAK DATA: 9.86 N·m @ 206.00 MS; -23.36 N·m @ 120.24 MS

CHANNEL: NEKX2 FILTER: CH. CLASS 600

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



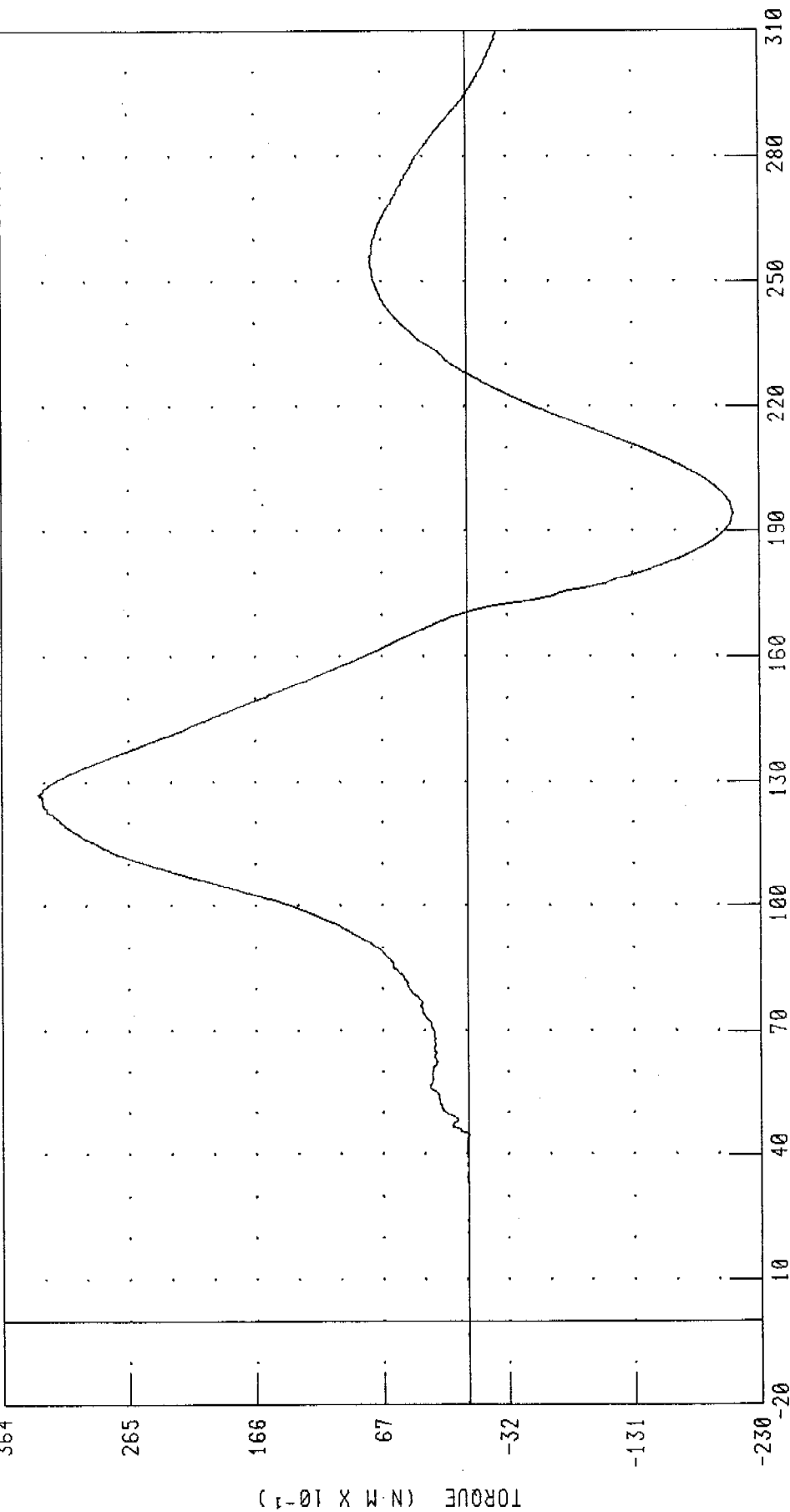
PEAK DATA: 31.85 N·m @ 122.16 ms, -18.86 N·m @ 155.44 ms

CHANNEL: NEKYM2 FILTER: CH. CLASS 600

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS
 FHVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



TIME (ms)

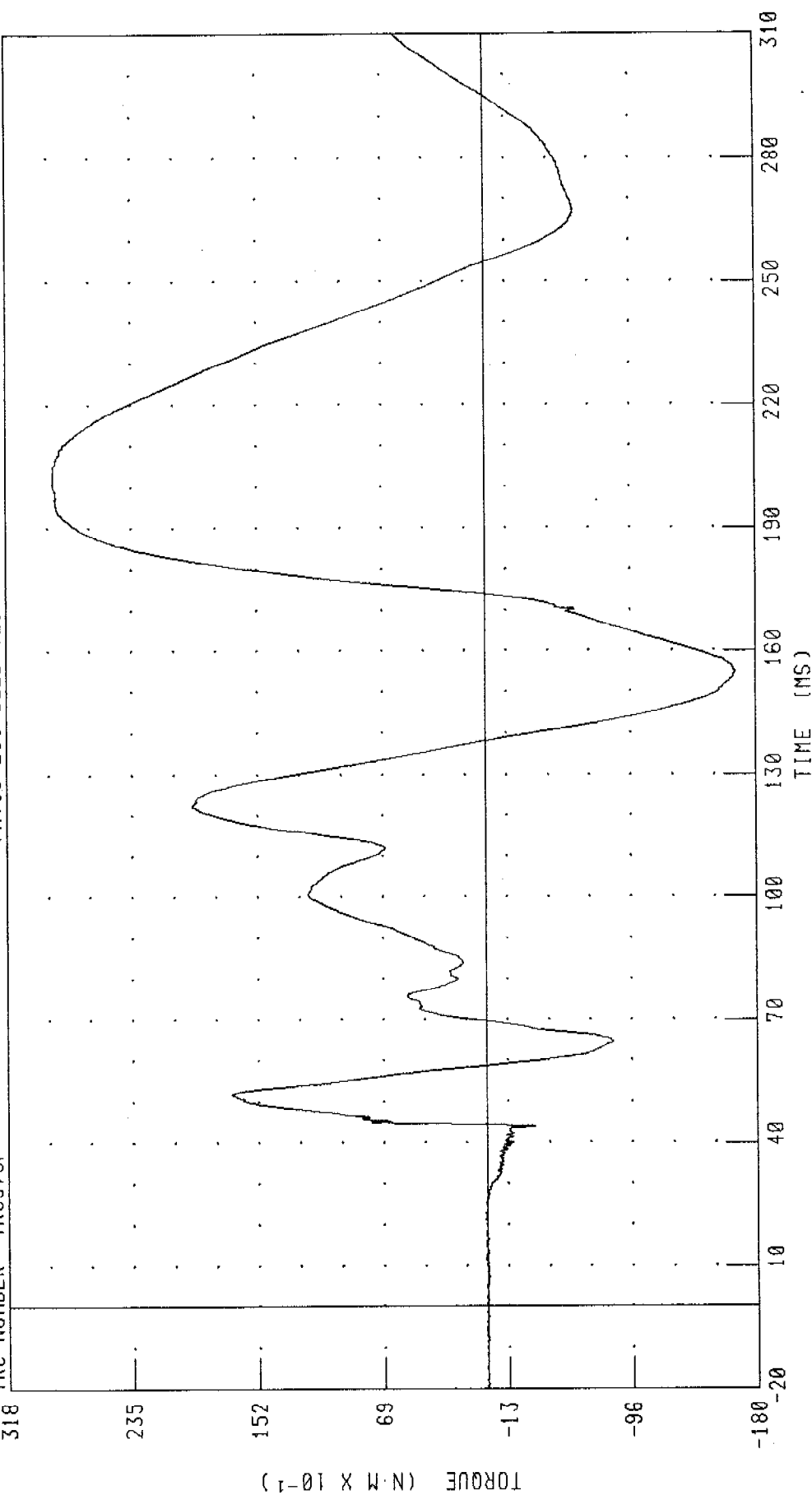
PEAK DATA: 33.54 N·m @ 126.88 ms; -20.98 N·m @ 194.32 ms

CHANNEL: NEKZM2 FILTER: CH. CLASS 600

C10503 / 2001 SUZUKI GRAND VITARA
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS OCCIPITAL CONDYLE
FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



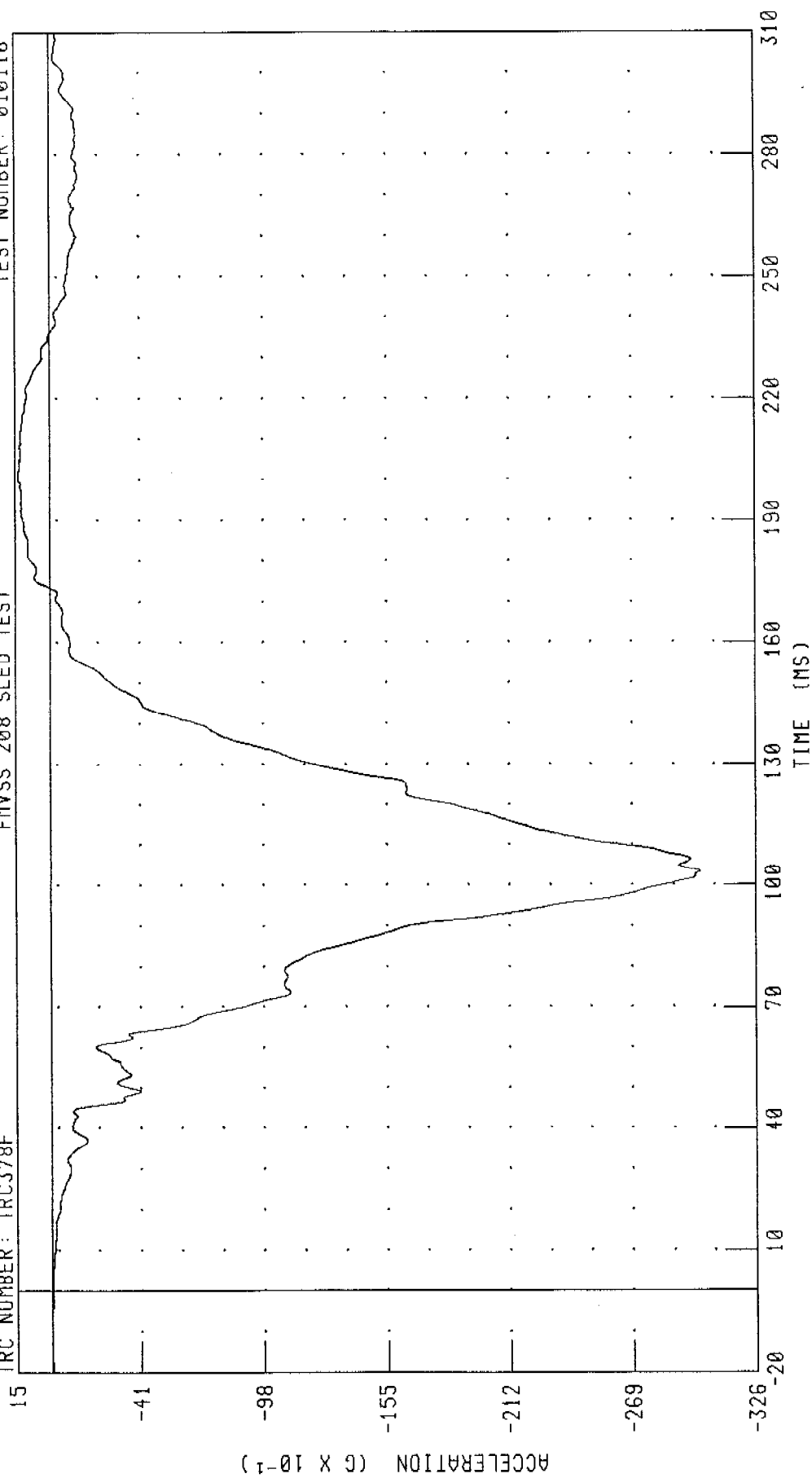
CHANNEL: NEKOM2 FILTER: CH. CLASS 600

PEAK DATA: 28.69 N·m @ 200.96 MS; -16.66 N·m @ 155.12 MS

C10503 / 2001 SUZUKI GRAND VITARA
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



TIME (MS)

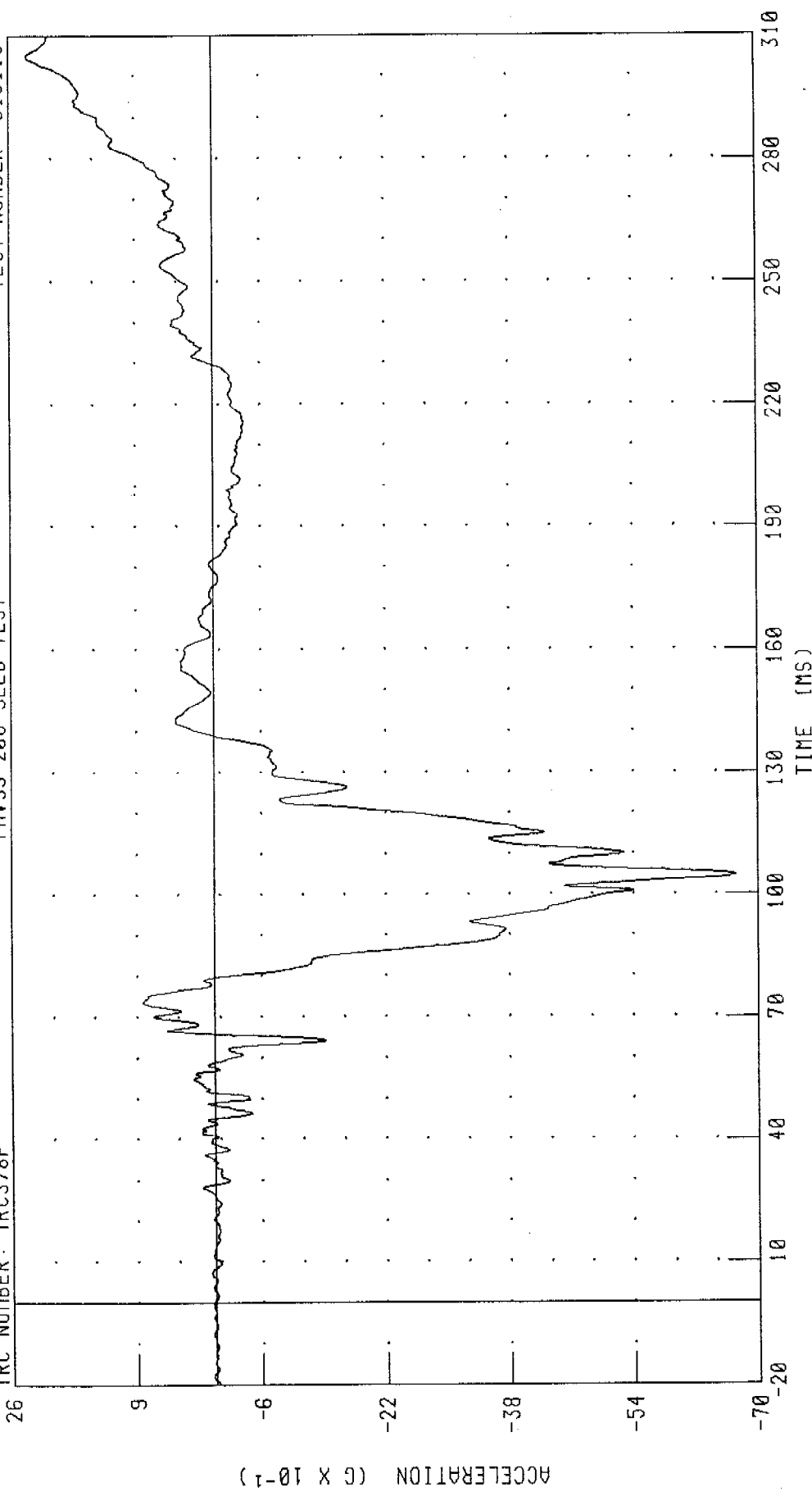
PEAK DATA: 1.46 G @ 199.84 MS; -30.06 G @ 103.36 MS

CHANNEL: CSTXG2 FILTER: CH. CLASS 180

C10503 / 2001 SUZUKI GRAND VITARA
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



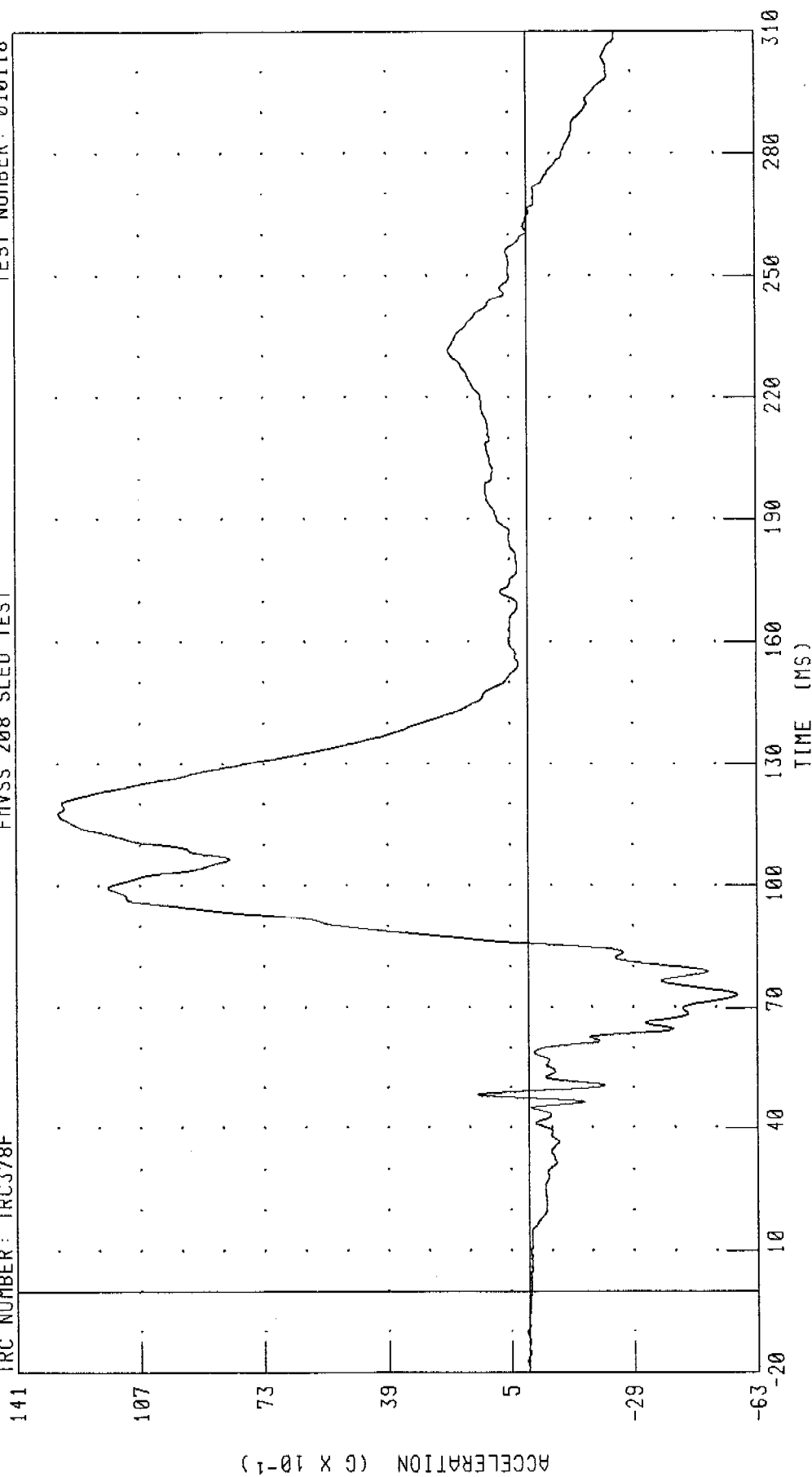
PEAK DATA: 2.37 G @ 304.72 MS; -6.71 G @ 104.88 MS

CHANNEL: CSTYC2 FILTER: CH. CLASS 180

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



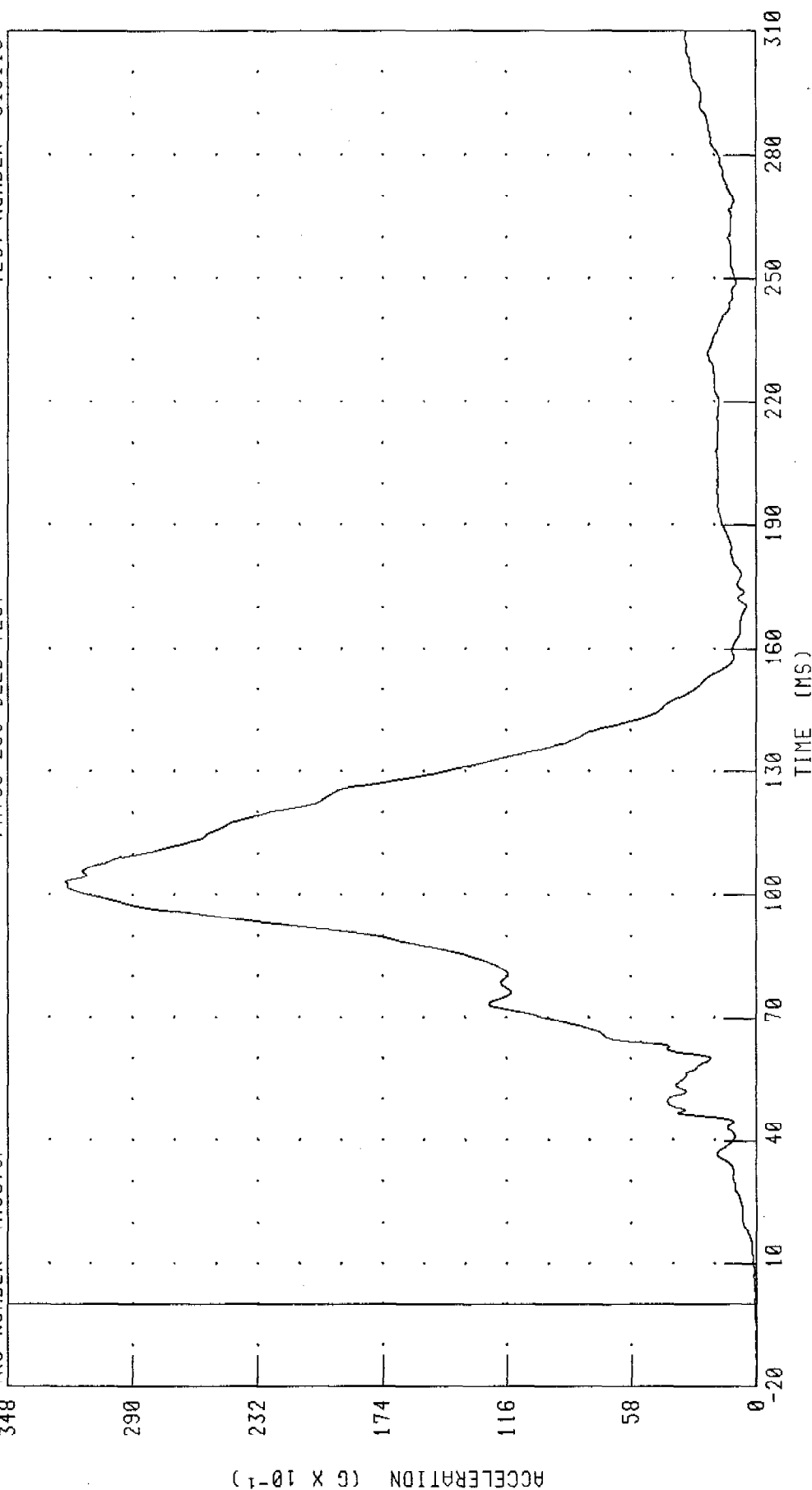
PEAK DATA: 12.96 G @ 117.76 MS; -5.75 G @ 73.12 MS

CHANNEL: CSTZC2 FILTER: CH. CLASS 180

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F



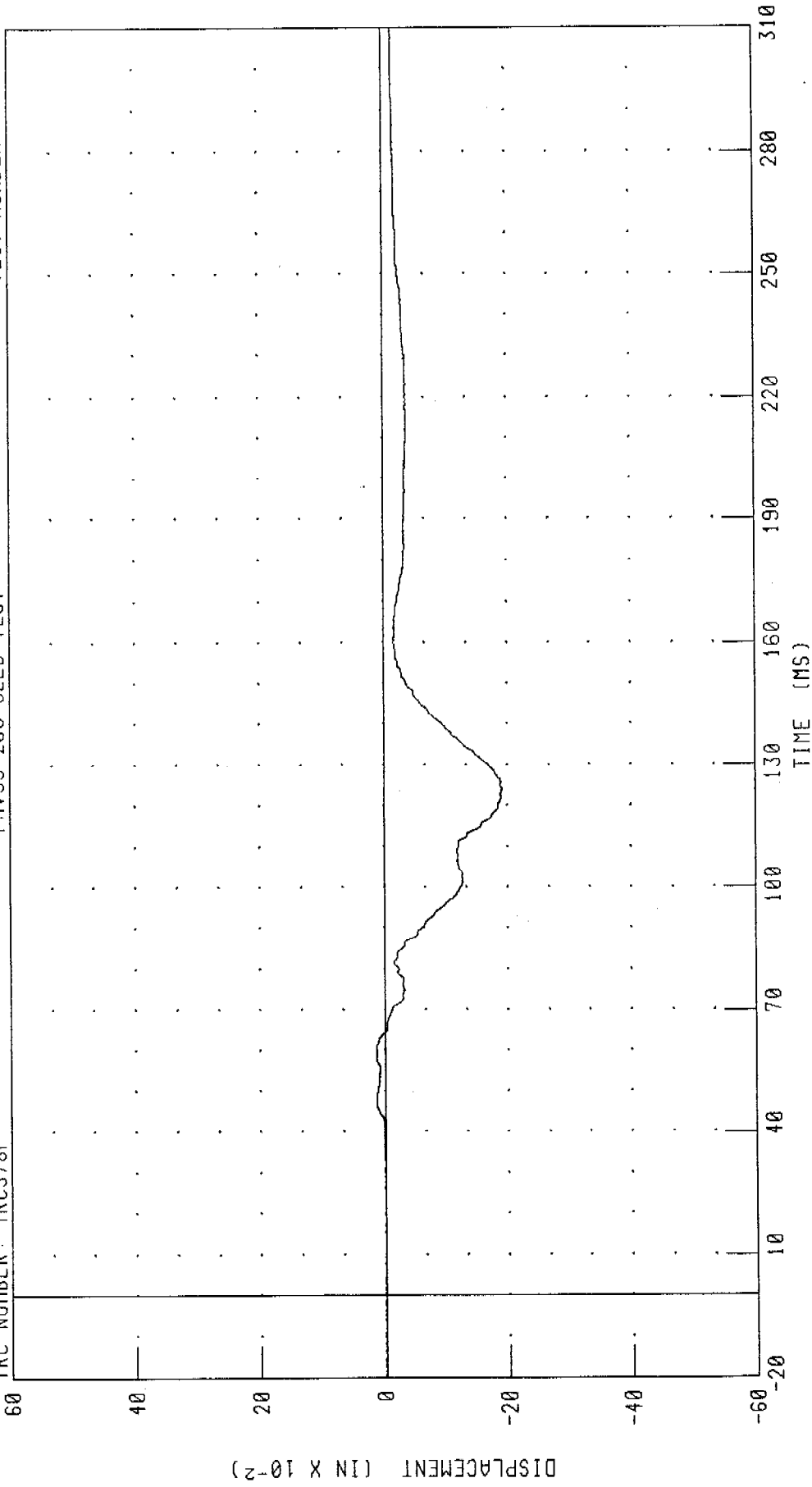
PEAK DATA: 32.12 G @ 103.28 MS; 0.00 G @ -13.76 MS

CHANNEL: CSTR02 FILTER: CH. CLASS 180

C10503 / 2001 SUZUKI GRAND VITARA
 RIGHT FRONT PASSENGER CHEST DEFLECTION
 FMVSS 208 SLED TEST

TEST NUMBER: 010116

TRC NUMBER: TRC378F

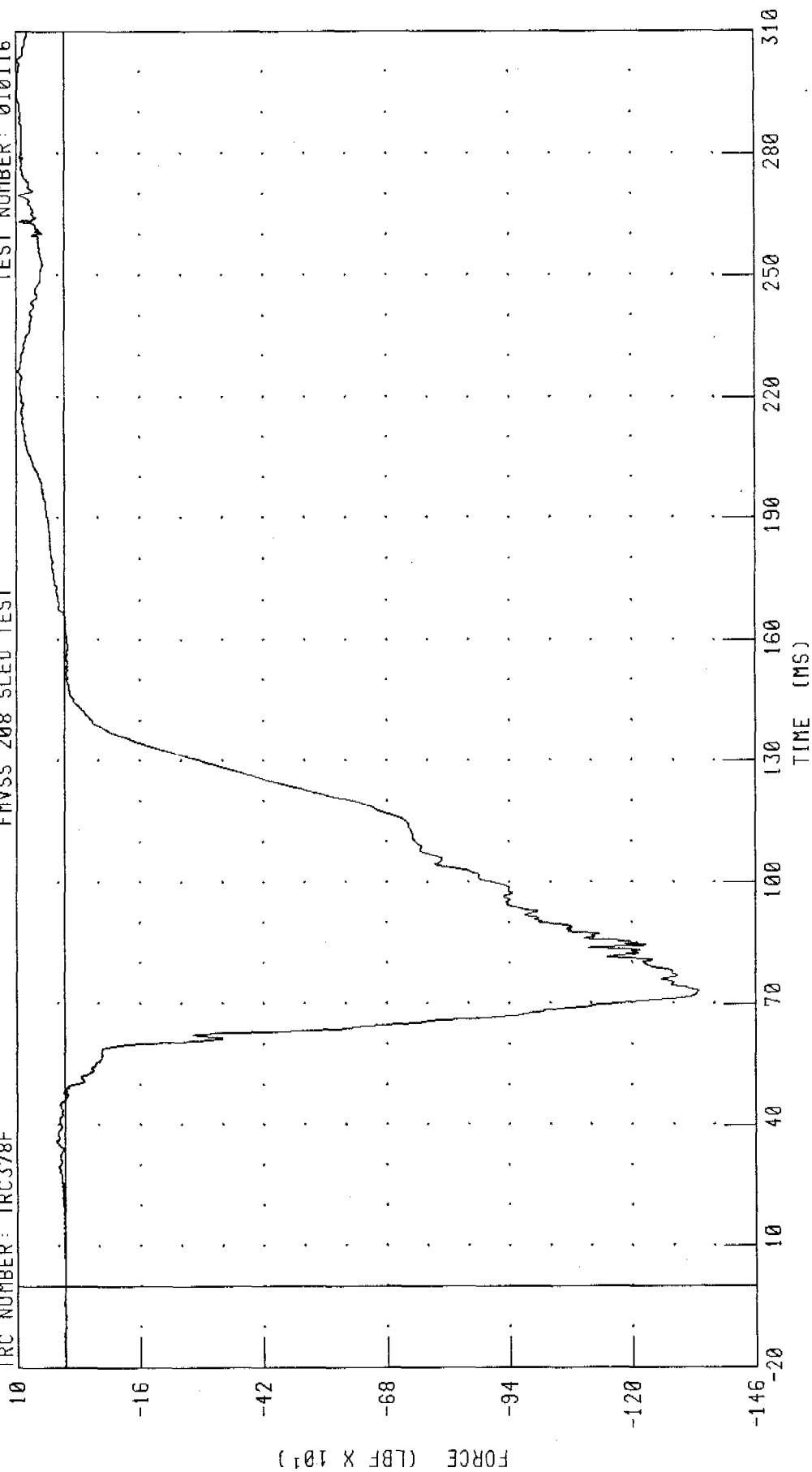


CHANNEL: CSTXD2 FILTER: CH. CLASS 600

C10503 / 2001 SUZUKI GRAND VITARA
RIGHT FRONT PASSENGER LEFT FEMUR FORCE
FMVSS 208 SLED TEST

TRC NUMBER: TRC378F

TEST NUMBER: 010116



CHANNEL: LFMZF2 FILTER: CH. CLASS 600

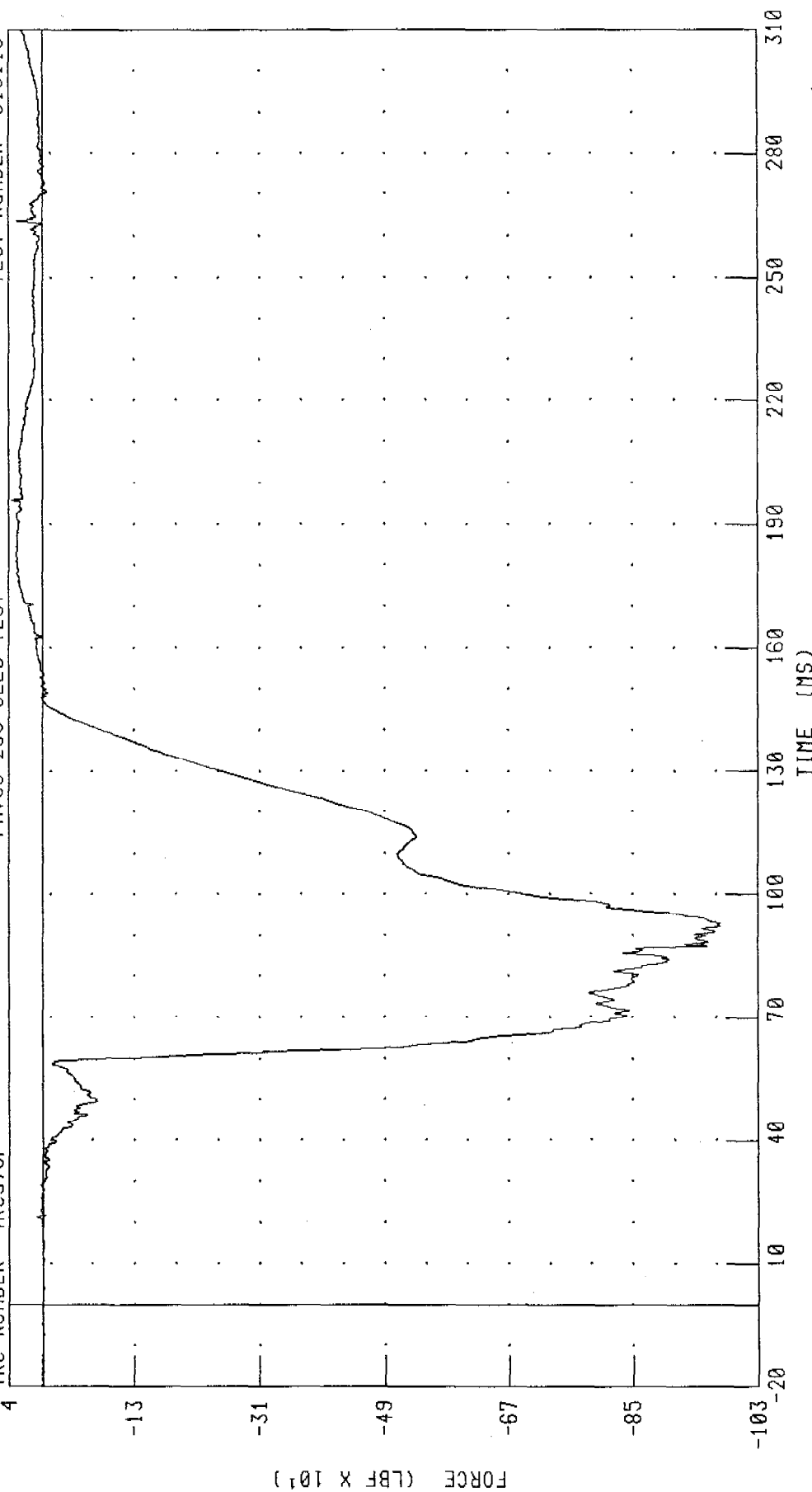
TIME (MS)

PEAK DATA: 99.49 LBF @ 302.64 MS; -1340.59 LBF @ 73.12 MS

C10503 / 2001 SUZUKI GRAND VITARA
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE
FMVSS 208 SLED TEST

TRC NUMBER: TRC378F

TEST NUMBER: 010116



CHANNEL: RFMZF2 FILTER: CH. CLASS 600

PEAK DATA: 44.06 LBF @ 195.84 MS; -977.63 LBF @ 92.96 MS

Appendix C

Manufacturer's Vehicle Information



AMERICAN SUZUKI MOTOR CORPORATION

RECEIVED
BY NSA-11

November 21, 2000

2000 NOV 22 11:13:57

Marilynne Jacobs, Director
Office of Vehicle Safety Compliance
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Re: NSA-31CCa
OA-208-001019D

Dear Ms. Jacobs:

This is in response to your letter dated October 23, 2000, which requests American Suzuki Motor Corporation to provide Federal Motor Vehicle Safety Standard ("FMVSS") No. 208 certification test data for the 2001 Suzuki Grand Vitara. American Suzuki Motor Corporation is submitting this response on behalf of Suzuki Motor Corporation ("Suzuki").

Your requests and our corresponding replies are provided below.

1. Please inform OVSC if the air bag restraint system is certified to meet the requirements of S4.1.5.1(a)(1) or S13.

If the air bags were installed to meet the requirements of S4.1.5.1(a)(1), please provide a copy of the certification test reports for the frontal/angular barrier impact tests of the automatic restraint system with the manual safety belts unfastened and fastened.

If the air bags were installed to meet the requirements of S13, please provide a copy of the certification test reports for the frontal/angular barrier impact tests of the automatic restraint system with the manual safety belts fastened and the certification test reports for the sled test using only the automatic restraint system.

The air bag restraint system in the 2001 Grand Vitara was certified to meet the requirements of S13. Copies of the certification test reports for the frontal/angular barrier impact tests and the sled tests are provided in Attachments A through H, as shown below. Different reports are provided for the driver's and passenger's air bags because Suzuki changed the driver's air bag system for the 2001 model year, but did not change the passenger's air bag system.

Driver's Air Bag

Report Location	Test No.	Test Condition	Comment
Attachment A	D1172	30mph front impact	
Attachment B	S9916	30mph left diagonal impact	Substitute 2Dr
Attachment C	D1111	30mph right diagonal impact	
Attachment D	E424A	Sled test	

Passenger's Air Bag

Report Location	Test No.	Test Condition	Comment
Attachment E	B2203	30mph front impact	
Attachment F	B1072	30mph left diagonal impact	
Attachment G	C5081	30mph right diagonal impact	
Attachment H	C724A	Sled test	

2. Provide the following : (1) describe the difference between the MY 2001 air bag system and the MY 2000 air bag system, (2) explain what other restraint changes have been made, (3) explain what other vehicle changes have been made that might have affected FMVSS 208 performance, and (4) describe any features that might affect performance with respect to children and out of position occupants.

The table below shows the differences between the driver's air bag system in the 2001 model year Grand Vitara and the driver's air bag system in the 2000 model year Grand Vitara. The same passenger's air bag system is used for the 2000 and 2001 model years. No other vehicle changes have been made that might have affected FMVSS 208 performance, and there are no features that might affect performance with respect to children and out of position occupants.

Driver's air bag changes	1999-2000 Model Years	2001 Model Year
Module Supplier	Breed	Breed
Inflator Supplier	Tally	Breed
Inflator Output	215 Kpa	215 Kpa
Cushion Volume	52 liter	52 liter
Denier	630 Denier	420 Denier
Tether Location	3:00 & 9:00	12:00 & 6:00
Vent Size	Dia.30mm*2	Dia.32mm*2

3. *If the vehicle was certified with unrestrained dummies to meet the requirements of S13, describe how to disconnect the air bags from the vehicle sensors and connect them to the triggering mechanism used in the sled test. Describe the method used in certification to determine when to trigger the air bag and the system used to trigger the air bag.*

For air bags with dual stage or multistage inflators describe when the stages are triggered and provide data to show that this is similar to what would occur in a crash of similar severity. (see enclosure 1)

A diagram showing the parts assembly for the driver's and passenger's air bag is provided in Attachment I. To disconnect the driver's air bag: (1) remove the two bolts on the side of the air bag module that secure the air bag module to the steering wheel; and (2) disconnect the yellow connector. To disconnect the passenger's air bag: (1) remove the glove box; (2) look up to find the yellow connector; and (3) disconnect the yellow connector.

Attachment J describes the system used to trigger the air bags for the sled test, and the method used in certification to determine when to trigger the air bags. The 2001 Grand Vitara does not use dual stage or multistage inflators.

4. *State for any safety belt system in this vehicle whether or not it is equipped with a tension-relieving device. Provide a copy of the information furnished in accordance with S7.4.2 if the tension-relieving device is used.*

No tension-relieving devices are used in the safety belt system of the 2001 Grand Vitara.

5. *FMVSS No. 208, S8.1.5 allows the manufacturer the option of having movable vehicle windows and vents placed in the closed position. State whether the vehicle's movable windows and vents were opened or closed for the certification tests.*

Suzuki requests that moveable side windows be placed in the closed position for compliance testing. For certification tests, moveable side windows were opened so that high-speed films could be taken.

6. *Submit dummy placement measurements, including diagrams or photographs which show exactly where each measurement was*

taken. Enclosed is a diagram of some of OVSC's dummy measurements. Where possible, use each dimension shown in the diagram to provide the individual dummy placement measurements.

State whether the vehicle has a foot rest for the driver.

Dummy placement measurements, including photographs which show where the measurements were taken, are provided in Attachment K. The 2001 Grand Vitara does have a foot rest for the driver.

7. Provide the seat positioning, steering column positioning, and fuel tank data on the enclosed form. If more than one front seating, steering column or fuel tank configuration are available on this vehicle, provide separate information for each. In addition, provide the seating reference point for each seat for the lockable seat belt requirement in S7.1.1.5.

Seat positioning, steering column positioning, and fuel tank data are provided in Attachment L. Only one front seating, steering column, and fuel tank configuration is available on the 2001 Grand Vitara. Seating reference point information for each seat for the lockable seat belt requirement in S7.1.1.5 is provided in Attachment M.

8. If the vehicle is equipped with adjustable seat belt anchorages, provide the manufacturer's nominal design position for a 50th percentile adult male occupant.

The seat belt anchorages for the 2001 Grand Vitara are adjustable to four positions. The nominal design position for a 50th percentile adult male occupant is the top adjustment position. The nominal design position is illustrated in Attachment N. It is designated as adjustment position 0.

9. For barrier tests provide the speed at impact, vehicle test weight, and resulting injury criteria (i.e. HIC, chest acceleration, chest compression, and femur loads) recorded for all certification tests conducted to meet the requirements of S4.1.5.1(a)(1). For sled tests, provide the resulting injury criteria (i.e., HIC, chest acceleration, chest compression, femur loads, and neck moments and forces) recorded for all certification tests conducted to meet the requirements of S13.

The requested information is provided in Attachment O.

10. *When vehicle components must be removed to obtain the proper test weight for the barrier test, what components do you recommend for removal and in what priority order do you recommend removal?*

Suzuki does not have any recommendations concerning parts to remove for adjustment of test weight. Suzuki removed the rear seat cushion, rear seat back, and rear carpet to accommodate installation of Suzuki's data acquisition system.

11. *If the vehicle uses a pressure vessel to inflate the air bag, provide a copy of the test reports or engineering analysis to demonstrate that it meets all the requirements of S9.1.*

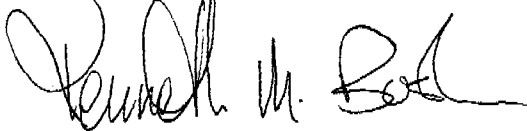
The requested information is provided in Attachment P.

12. *If the vehicle uses an explosive device to inflate the air bag, provide a copy of the test report or engineering analysis to demonstrate that it meets all the requirements of S9.2.*

The requested information is provided in attachment P.

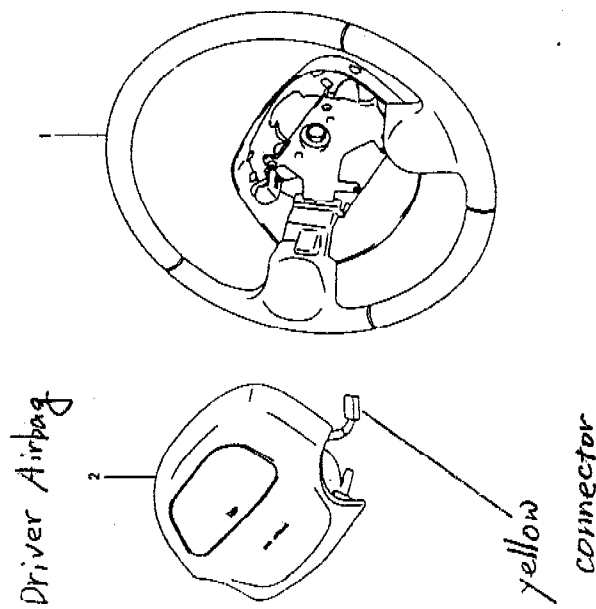
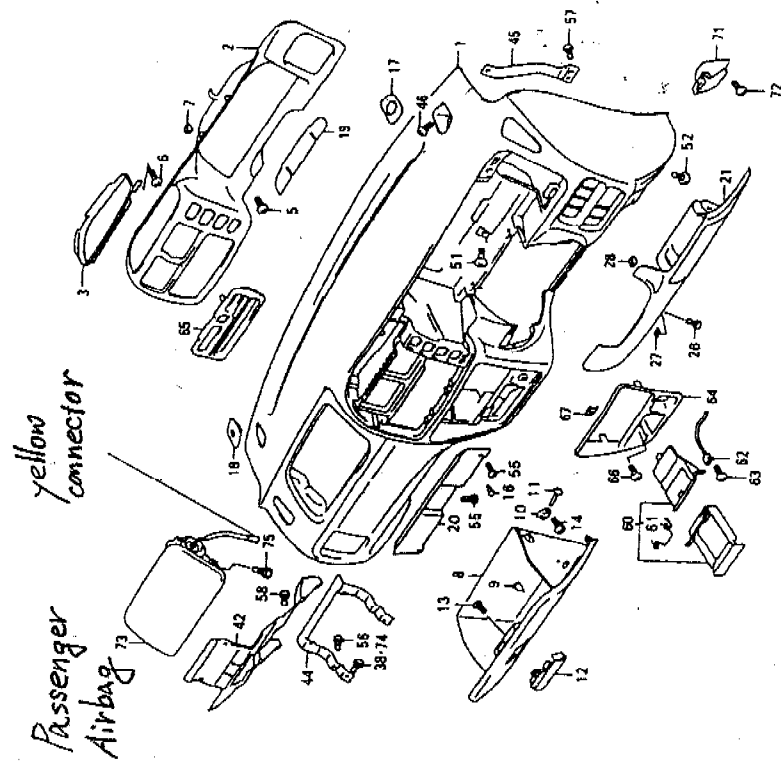
Sincerely,

AMERICAN SUZUKI MOTOR CORPORATION



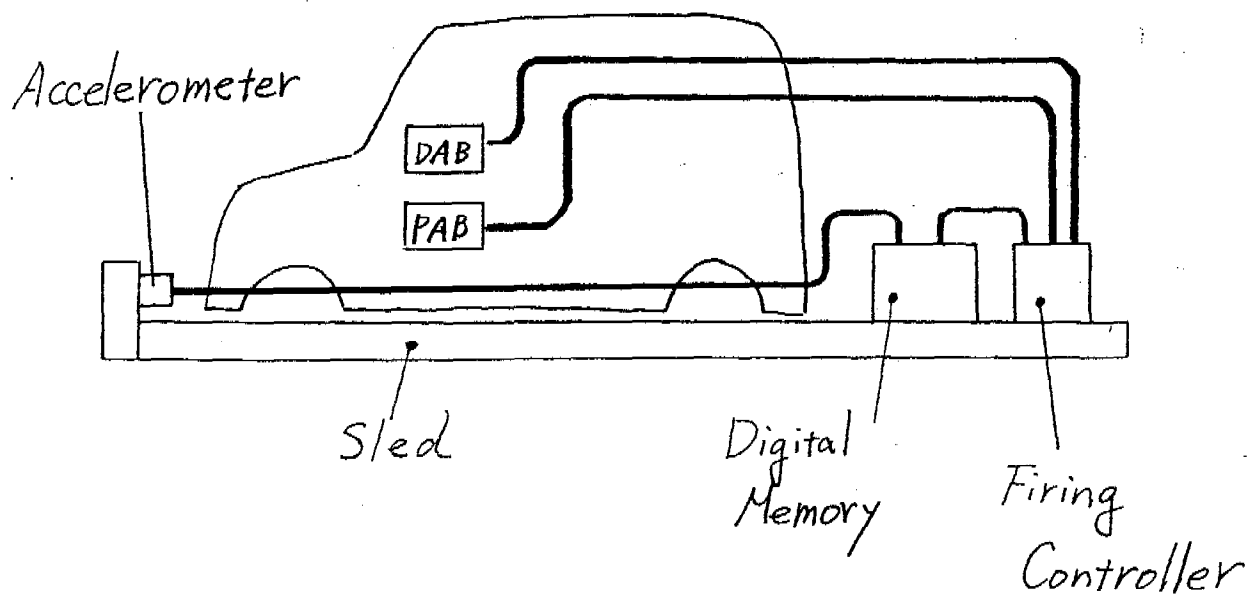
Kenneth M. Bush
Regulations Manager
Government Relations Department

Attachment I



Attachment J

Trigger System of the Airbags



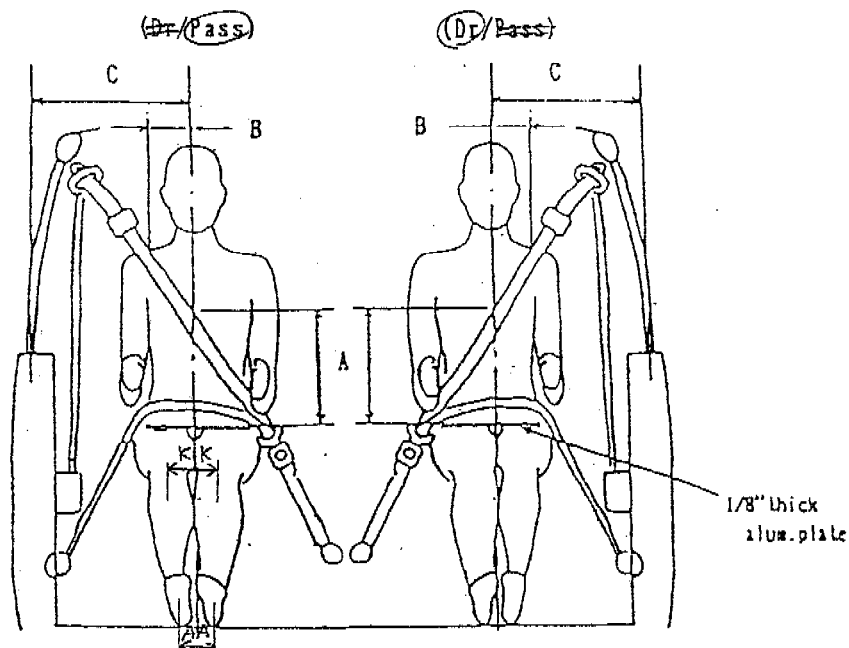
Digital Memory (Data Recorder)	Input	Signal from Accelerometer
	Output	The digital memory send volt to the firing controller when signal from accelerometer reaches 0.5Gs.
Firing Controller	Input	Volt from Digital Memory
	Output	Send currency to Driver Airbag and Passenger Airbag. This apparatus controls firing time.

Attachment K

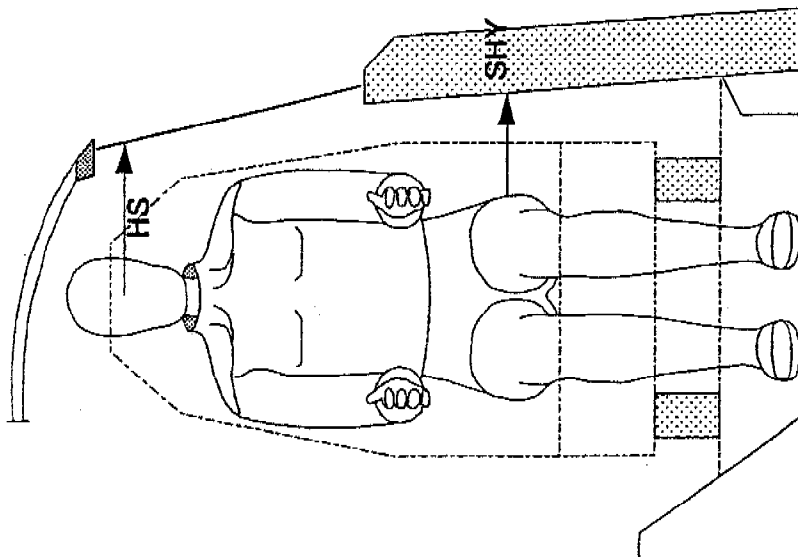
Dummy measurements

Items	Description		Driver	Passenger
HH	Head to Header	(mm)	470	470
NR	Nose to Rim	(mm)	440	NA
NRA	Angle of NR line	(deg)	14	NA
ND*	Nose to Dashboard	(mm)	NA	645
NDA*	Angle of ND line	(deg)	NA	28
CS	Steering Wheel to Chest	(mm)	315	NA
CD*	Chest to Dashboard	(mm)	NA	526
KDL	Left Knee to Dashboard	(mm)	155	145
KDLA	Angle of KDL line	(deg)	23	23
KDR	Right Knee to Dashboard	(mm)	140	148
KDRA	Angle of KDR line	(deg)	12	20
SH	Striker to Hip	(mm)	160	160
HS	Head to Side Window	(mm)	290	290
SHY	Striker to Hip (Y direction)	(mm)	215	205
KK*	Knee to Knee (Center to Center)	(mm)	260	215
AA*	Ankle to Ankle (Center to Center)	(mm)	320	215
A*	Refer to sketch (Seatbelt Position)	(mm)	310	310
B*	Refer to sketch (Seatbelt Position)	(mm)	100	100

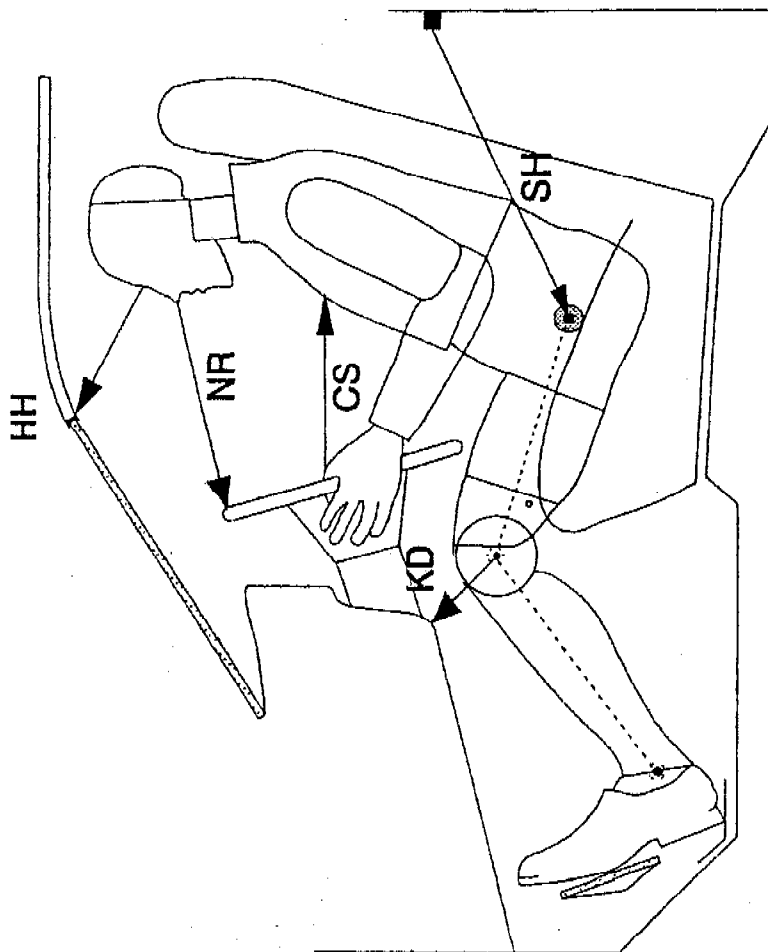
*: References (not listed in the diagram from NHTSA)



DUMMY MEASUREMENTS FOR FRONT SEAT PASSENGERS



SHY - Striker to H-Point (Y Dir.)
HS - Head to Side Window



HH - Head to Header
NR - Nose to Rim
CS - Steering Wheel to Chest
KD/KDR - Knee to Dash
SH - Striker to H-Point

DESCRIPTIONS OF DUMMY MEASUREMENTS

When a level is to be used, it is to ensure that the line containing the two points described is either parallel or perpendicular to the ground. If a measurement to be made is less than 10 inches ignore the directions to use a level and approximate a level measurement. Also, when a measurement is to be taken to or from the center of a bolt on the dummy, take the measurement from the center of the bolt hole if the bolt is recessed.

The following measurements are to be made within a vertical longitudinal plane.

HH - Head to Header, taken from the point where the dummy's nose meets his forehead (between his eyes) to the furthest point forward on the header.

CS - Steering Wheel to Chest, taken from the center of the steering wheel hub to the dummy's chest. Use a level.

NR - Nose to Rim, taken from the tip of the dummy's nose to the closest point on the top of the steering wheel rim. Also indicate the angle this line makes with respect to the horizontal (NA).

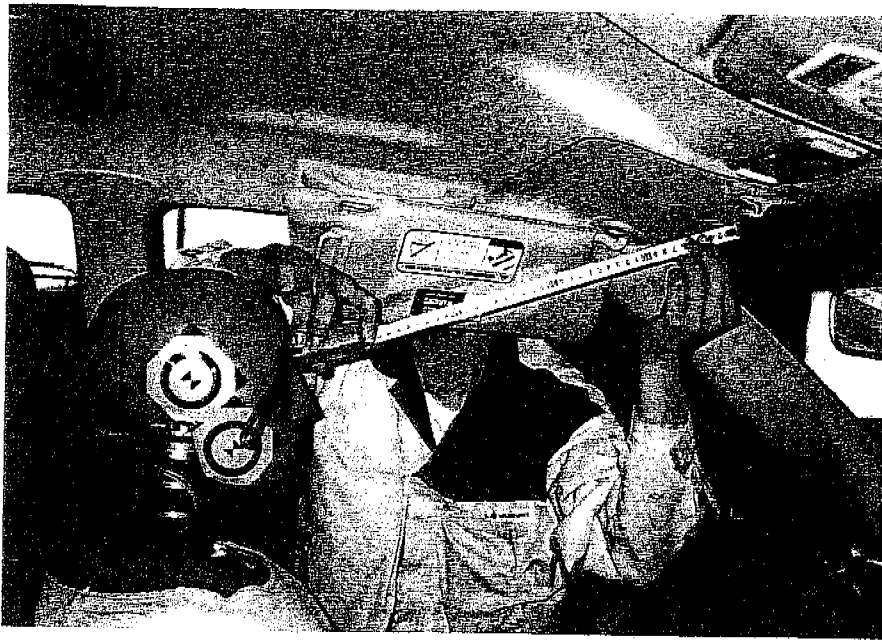
KDL, KDR - Left and Right Knees to Dashboard, taken from the center of the knee pivot bolt's outer surface to the closest point forward acquired by swinging the tape measure in continually larger arcs until it contacts the dashboard. Also reference the angle of this measurement with respect to the horizontal for the outboard knee (KDA).

SH - Striker to Hip, this measurement is to be taken in the X-Z plane measured from the forward most center point on the striker to the center of the H-point. When taking this measurement a firm device that can be rigidly connected to the striker should be used. The measurement in the Y (transverse) direction from the striker to the H-point should also be taken (SHY).

The following measurements are to be made within a vertical transverse plane.

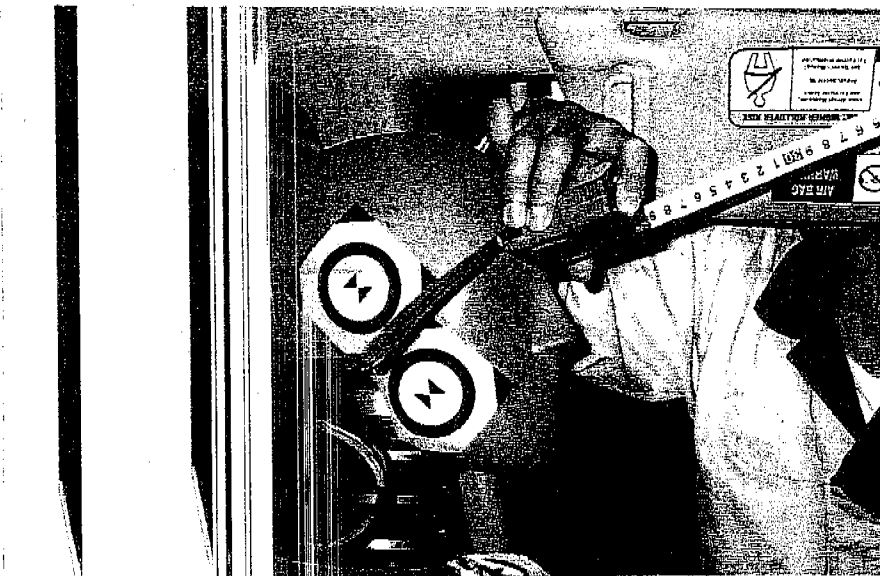
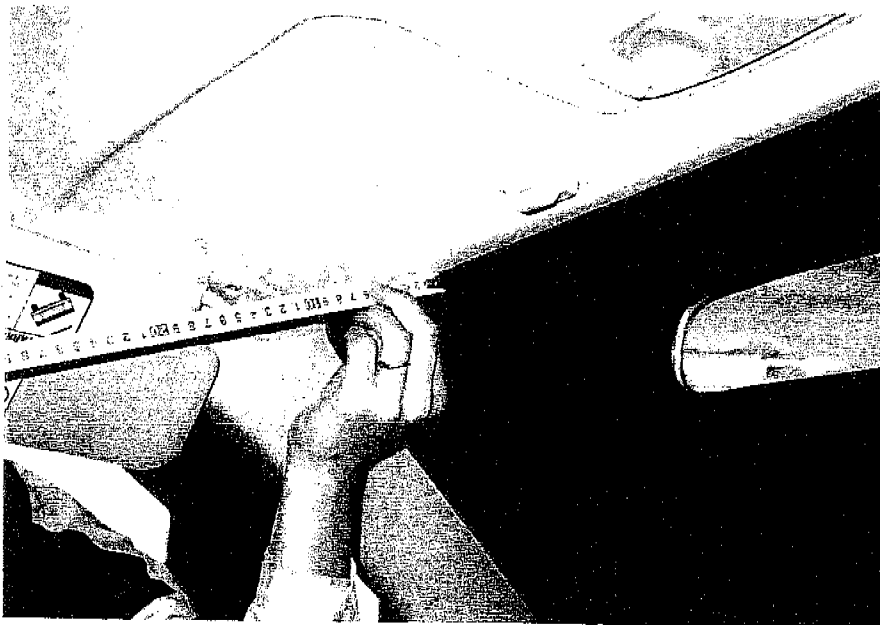
HS - Head to Side Window, taken from the point where the dummy's nose meets his forehead (between his eyes) to the outside of the side window. In order to make this measurement, roll the window down to the exact height which allows a level measurement. Use a level.

SHY - Striker to H-point, taken from a rod rigidly connected to the forward most center point on the striker to the H-point. Use a level.



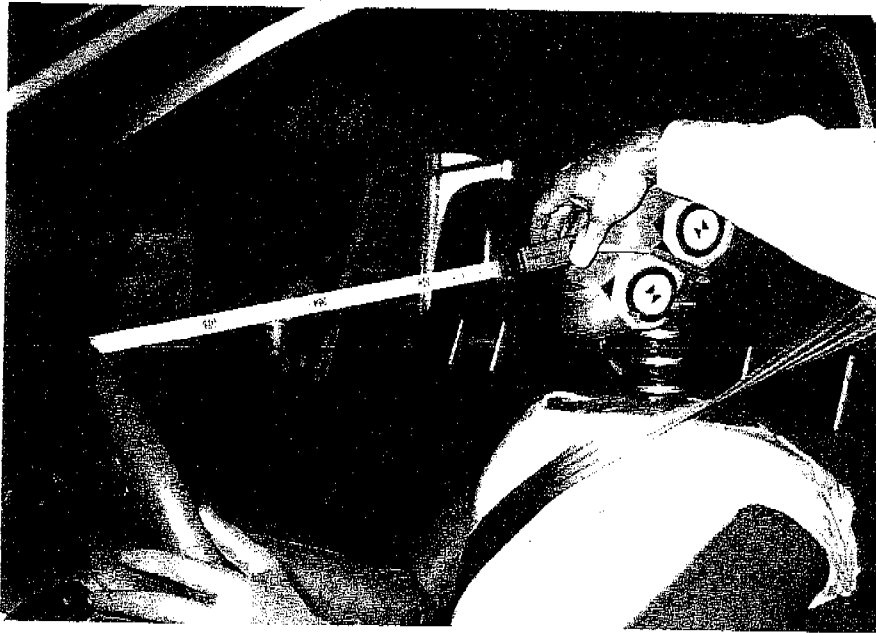
Driver

HH

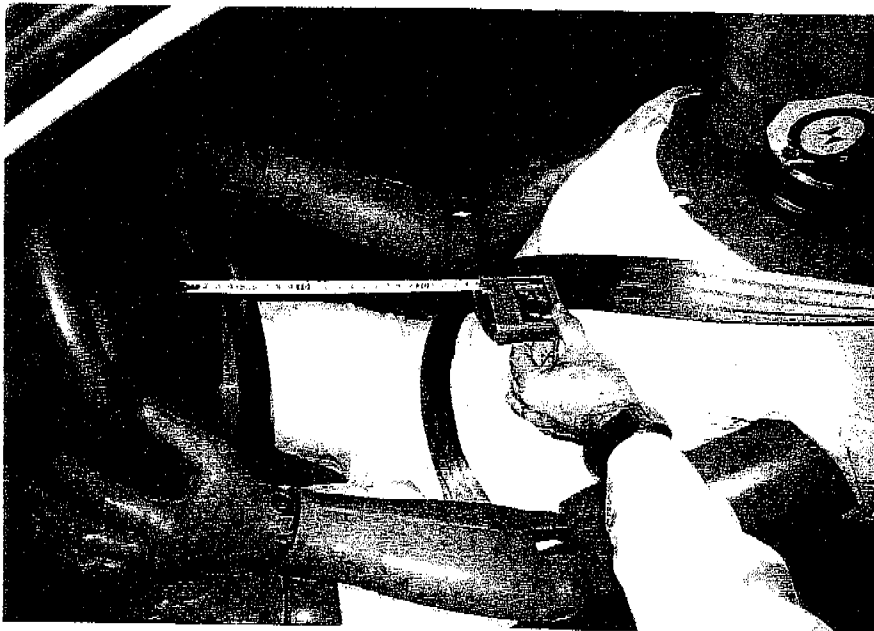


C-15

S010116



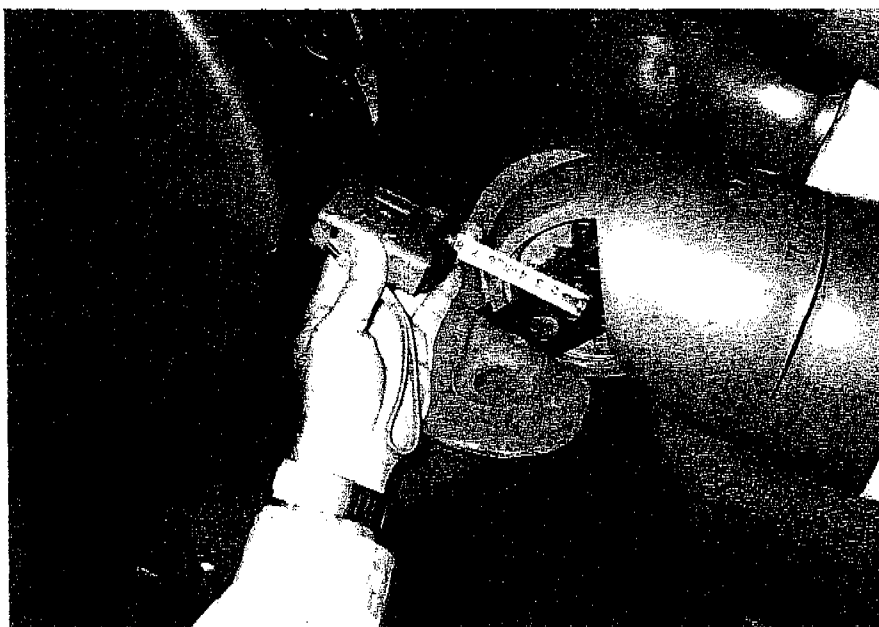
NR



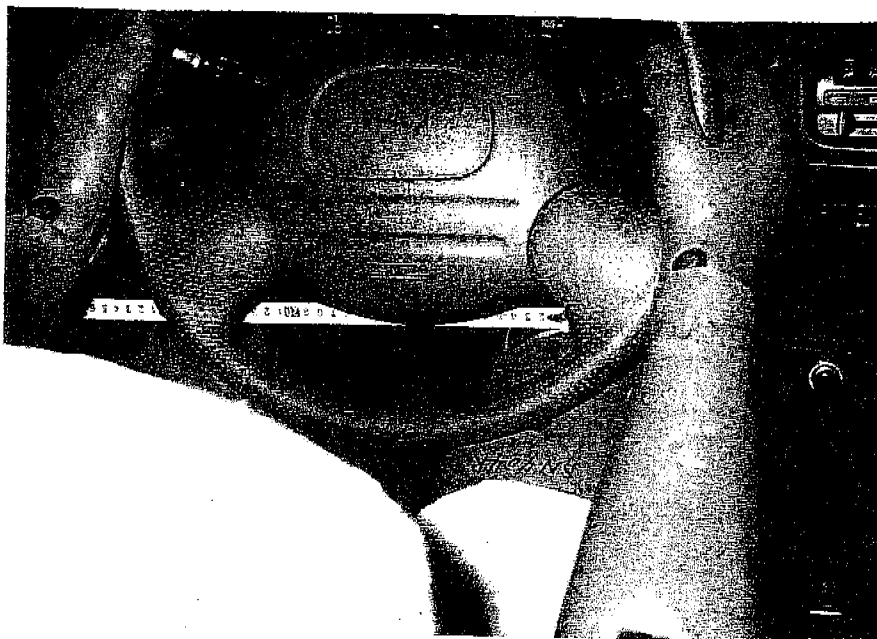
CD



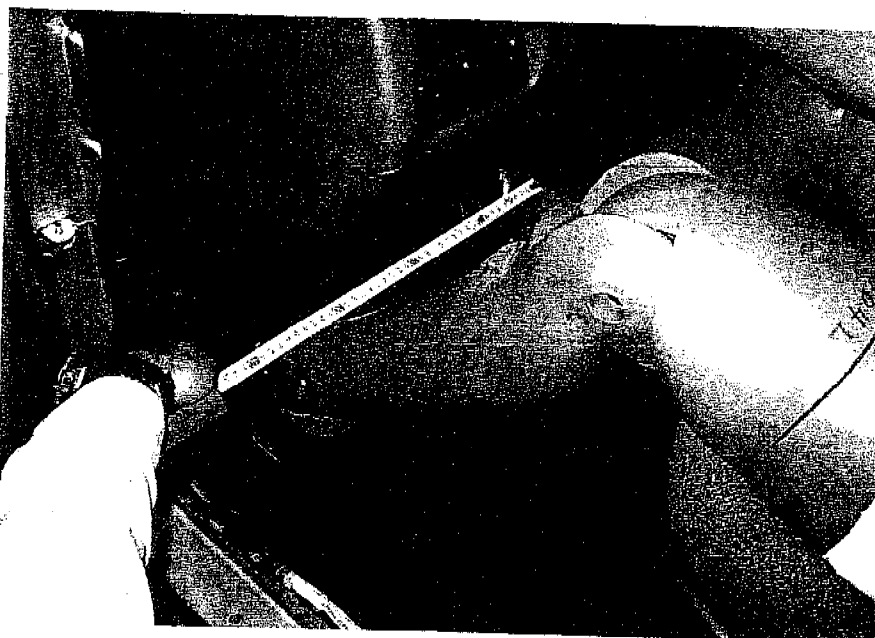
KDR



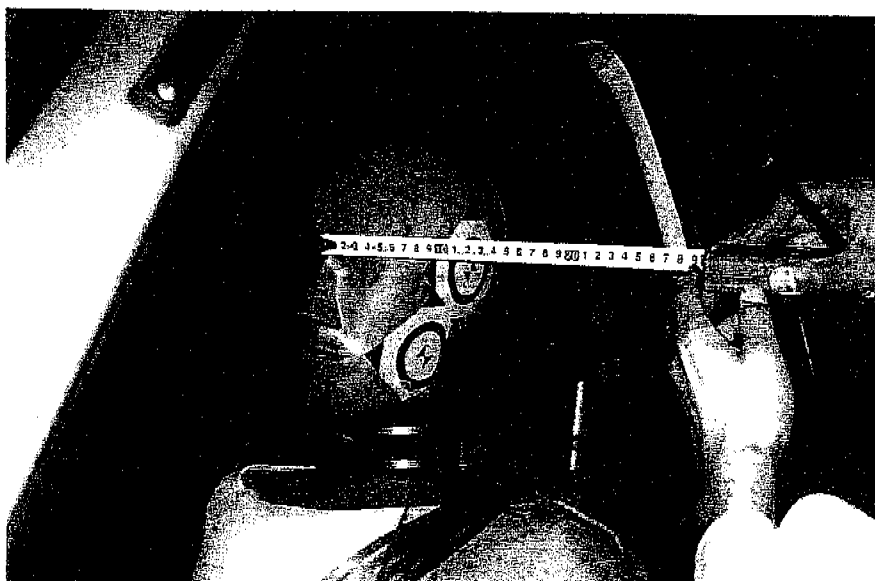
KDL



KK



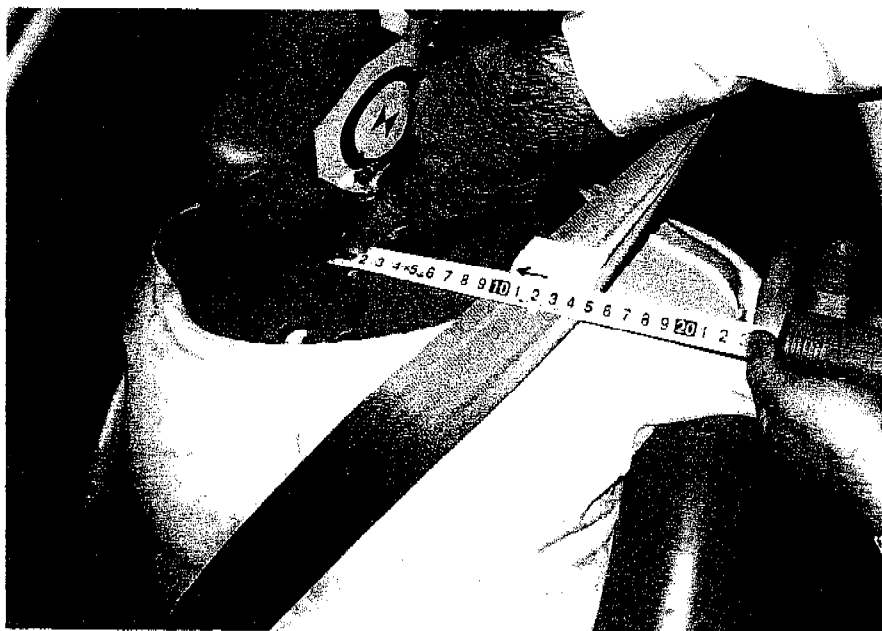
AA



HP



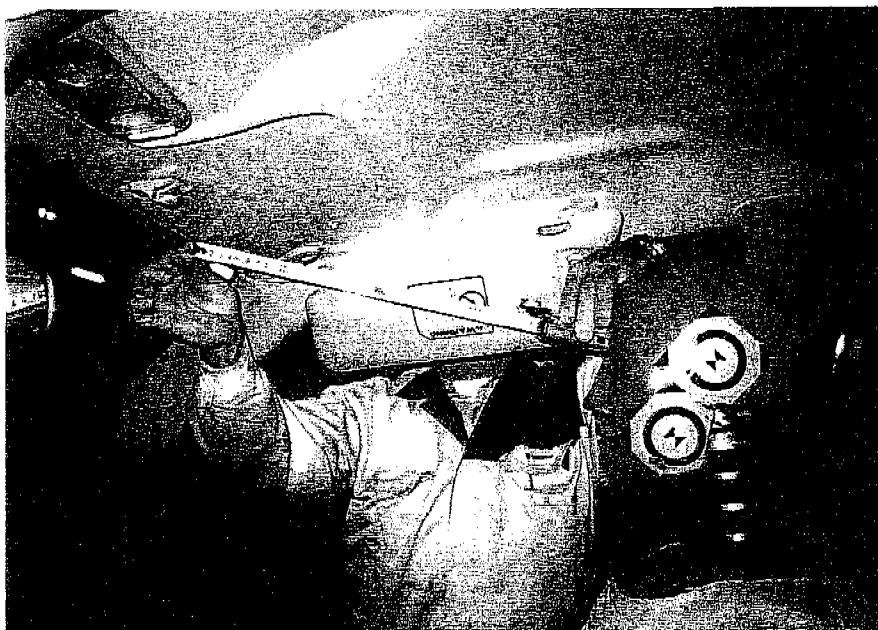
A



B



Point of
dashboard
(Passenger Side)

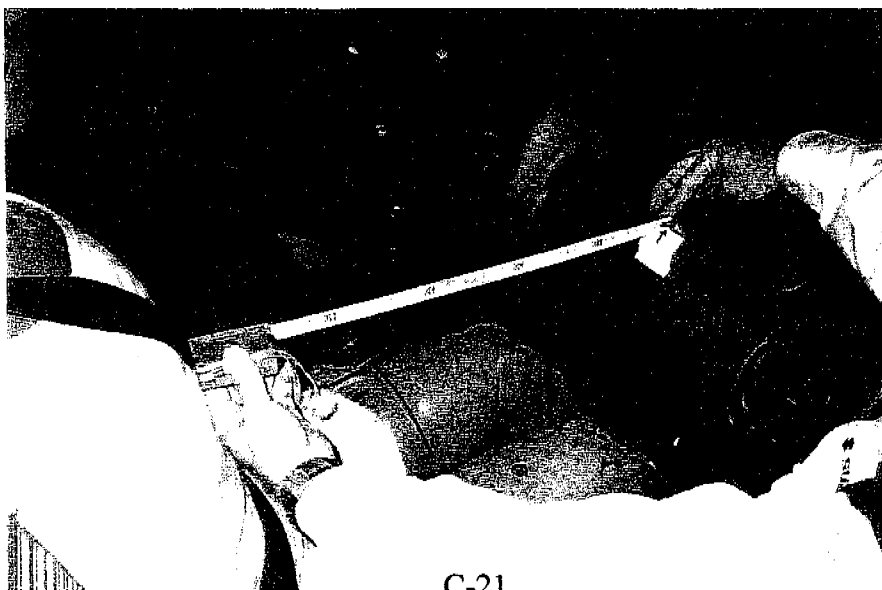


Passenger

HH



ND



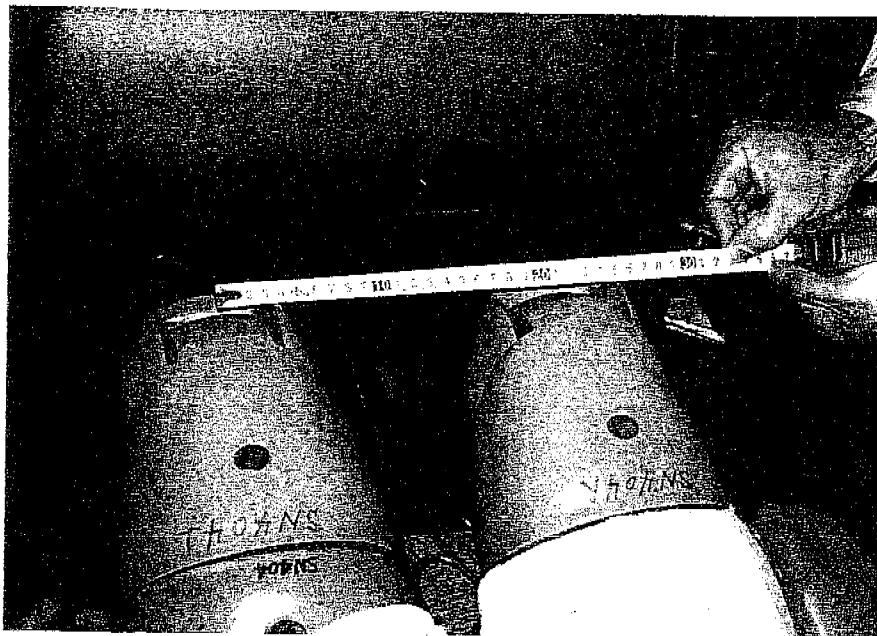
CD



KDL



KDR



KK



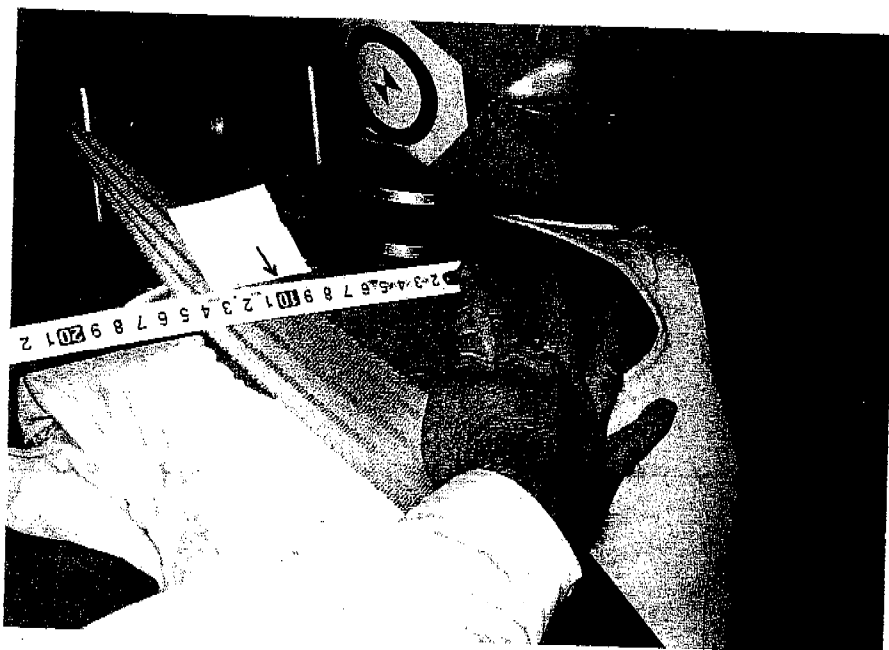
AA



HS



A



B

Attachment L

Enclosure 3

TEST VEHICLE INFORMATION

Vehicle Model Year & Make: 2001 MY Suzuki
 Vehicle Model & Body Style: Grand Vitara 4 Door

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. Indicate, if applicable, how the detents are numbered (Is the first detent "0" or "1"?). Indicate if the seat back angle is measured with the dummy in the seat.

Seat back angle for driver's seat = 22 degrees.

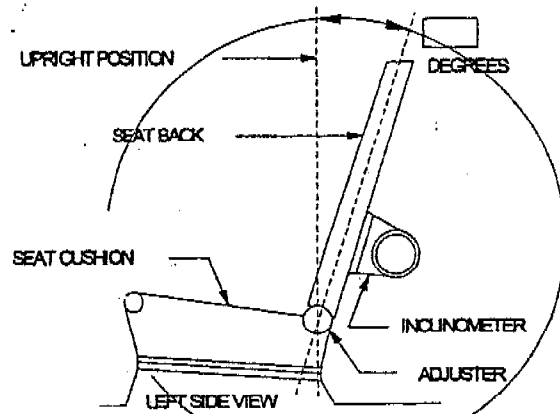
Measurement Instructions:

See 3rd page of this attachment

Seat back angle for passenger's seat = 22 degrees.

Measurement Instructions:

Same as for driver's seat



2. SEAT FORE & AFT POSITIONS - -

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, indicate how the detents are numbered (Is the first detent "0" or "1"?). Provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat:

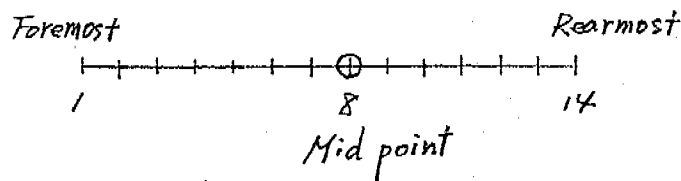
Slide the seat as forward as possible, then slide it back to the first detent.
Continue sliding the seat rearward to detent "8".

Positioning of the passenger's seat (if applicable):

Same as for driver's seat

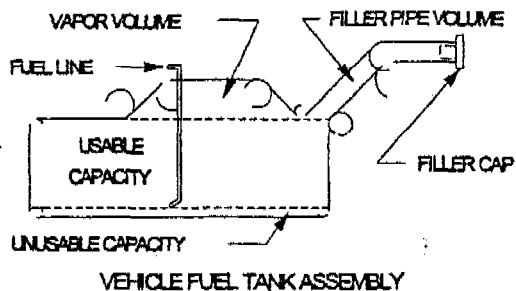
Rev. 7/11/94

Seat Position



3. FUEL TANK CAPACITY DATA --

- 3.1 A. "Usable Capacity" of standard equipment fuel tank = 17.4 gallons.
- B. "Usable Capacity" of optional equipment fuel tank = NA gallons.
- C. "Usable Capacity" of vehicle(s) used for certification testing to requirements of FMVSS 301 = 17.4 gallons.



Operational Instructions:

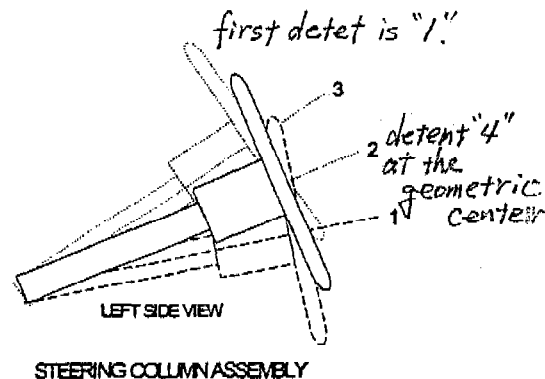
- 3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 16.4 gallons
- 3.3 Is vehicle equipped with electric fuel pump? ☒ YES ☐ NO
 If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.
With the ignition key in the "ON" position, the fuel pump will activate for the first three seconds. When the engine is running, the fuel will pump fuel.

4. STEERING COLUMN ADJUSTMENTS --

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center?

Operational Instructions:

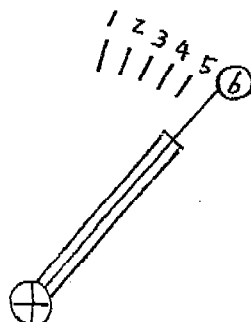
Set column at uppermost detent "1."
And down it at detent "4".



Suzuki Vitara (4Door) Angle of Seat Back

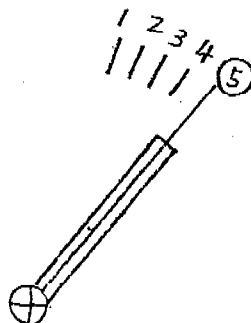
Front Seat: 22°

An inclinometer should be placed lower portion of the seat back surface since the seat back frame is cuved. The seat back angle should be 22 degrees with the seat back locked in the sixth notched position. The first notched position is the first notched position rearward from the forwardmost free position.



Sparate Type Rear Seat: 20°

The seat back angle should be 20 degrees with the seat back locked in the fifth notched position.



Attachment M

Dimensions for "SEATING REFERENCE POINT (SRP) AND
TORSO ANGLE DATA (LEFT SIDE VIEW)

	UNIT	FRONT	REAR	
			OUTBOARD	CENTER
A	mm	308	348	378
B	mm	425	NA	NA
C	mm	NA	1140	1110
D	mm	281	NA	NA
E	degree	22	NA	NA
F	degree	NA	20	20

NA: Not applicable

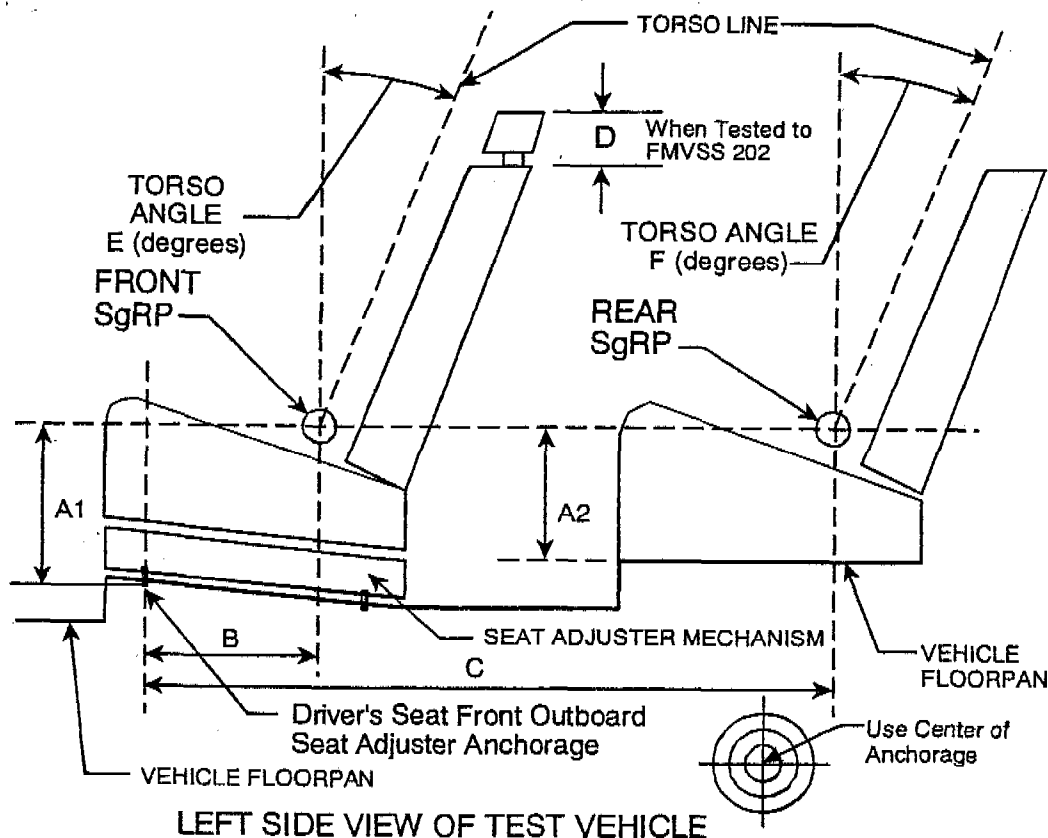
Dimensions for "SEATING REFERENCE POINT (SRP) AND
TORSO ANGLE DATA (PLAIN VIEW)

	UNIT	FRONT	REAR	
			OUTBOARD	CENTER
B	mm	425	NA	NA
C	mm	NA	1140	1110
F	mm	198	223	NA
G	mm	NA	NA	558
H	mm	918	893	NA

NA: Not applicable

SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 201, 202, 203, 207 & 210
(All dimensions in inches)

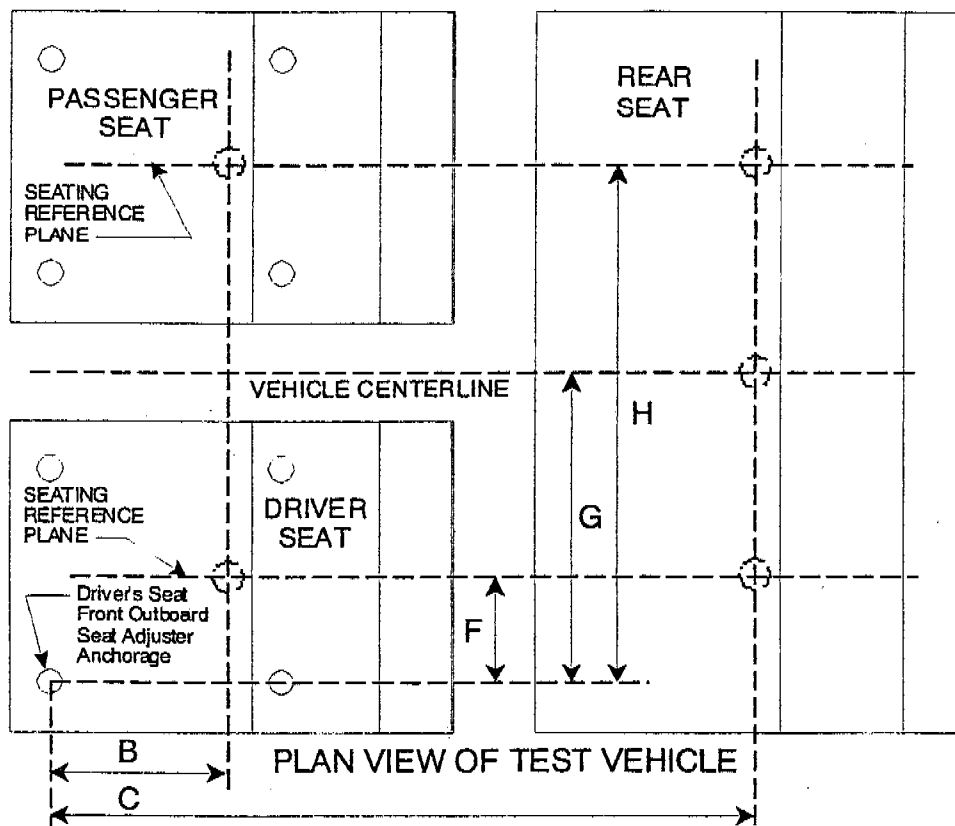
Model Year: 2001; Make: Suzuki; Model: Grand Vitara
Body Style: 4 Door; Seat Style: _____



DIMENSION	FRONT, A1	REAR, A2
A		
B		
C		
D		
E		E

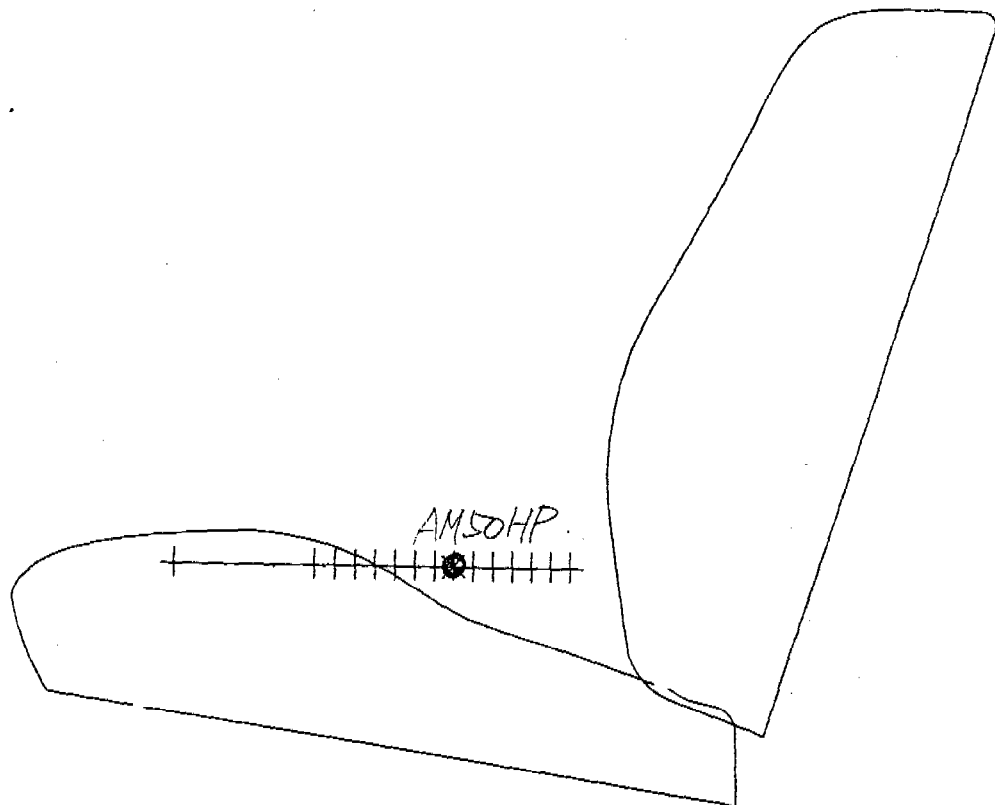
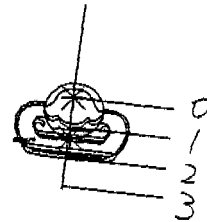
SEATING REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 201, 202, 203, 207 & 210
(All dimensions in inches)

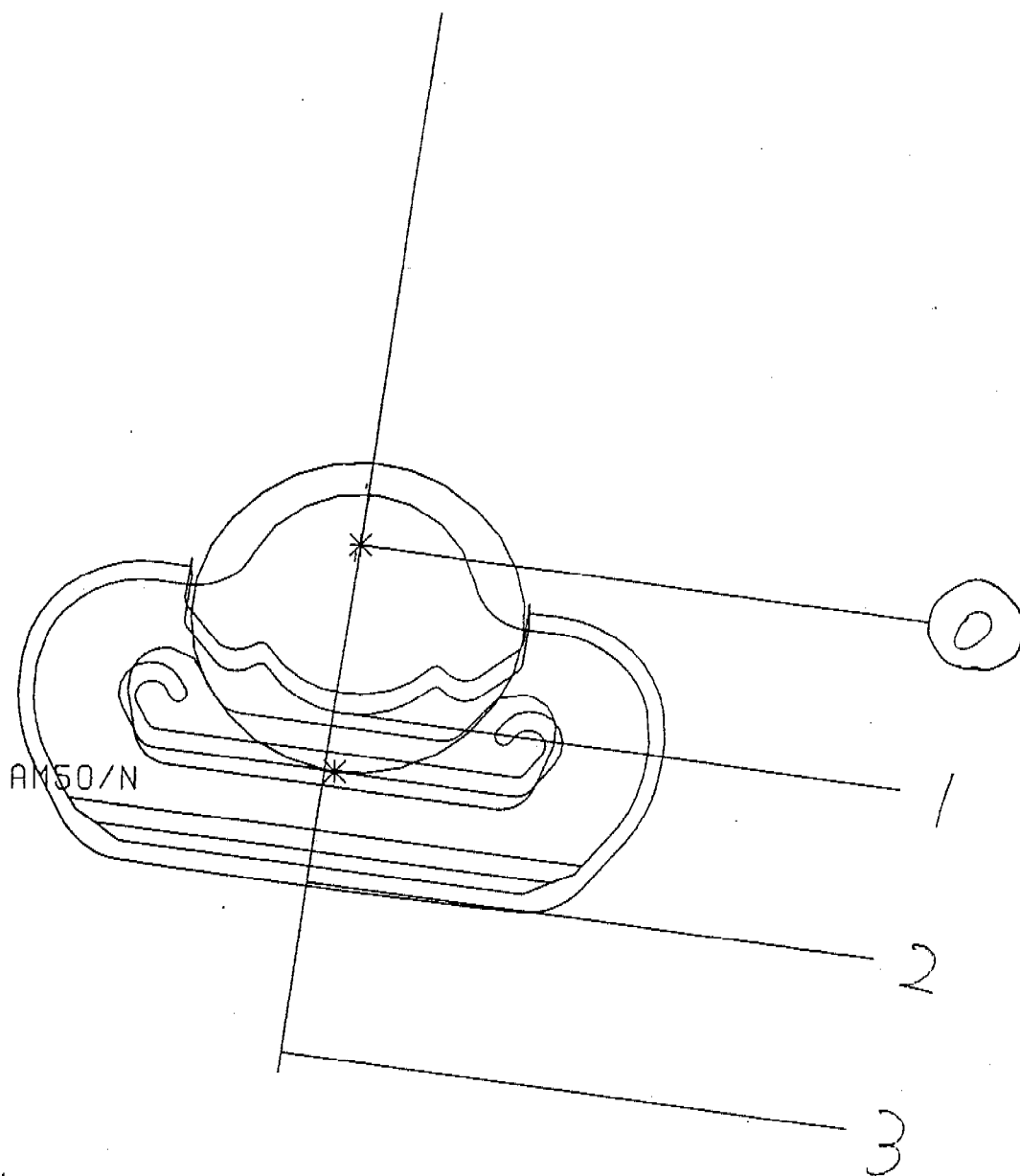
Model Year: 2001 ; Make: Suzuki ; Model: Grand Vitara
Body Style: 4 Door ; Seat Style: _____



B	
C	
F*	
G	
H*	

Attachment N

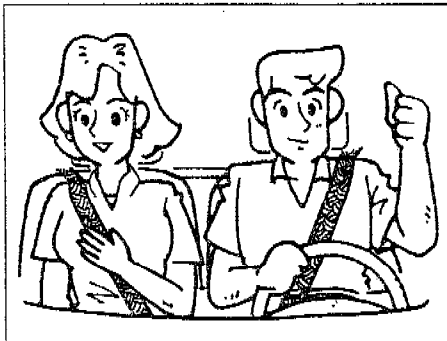




Nominal Design Position : 0

Appendix D

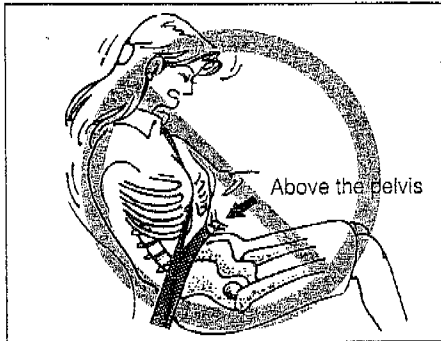
Miscellaneous Test Information

SEAT BELTS AND CHILD
RESTRAINT SYSTEMS

07-65D231A

⚠ WARNING

An air bag supplements, or adds to, the frontal crash protection offered by seat belts. The driver and all passengers must be properly restrained by wearing seat belts at all times, whether or not an air bag is mounted at their seating position, to minimize the risk of severe injury or death in the event of a crash.

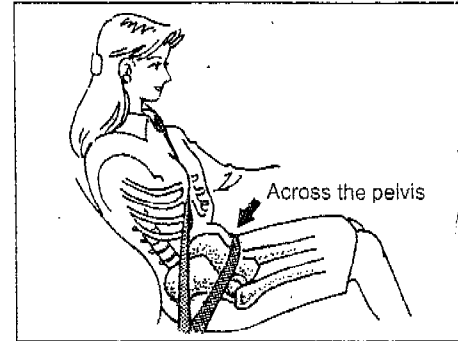


02-65D200A

⚠ WARNING

- * Never allow persons to ride in the cargo area of a vehicle. In the event of an accident, there is a much greater risk of injury for persons who are not riding in a seat with their seat belt securely fastened.
- * Seat belts should always be adjusted so the lap portion of the belt is worn low across the pelvis, not across the waist. Shoulder straps should be worn on the outside shoulder only, and never under the arm. Seat belts should never be worn with the straps twisted and should be adjusted as tightly as is

(Continued)



02-65D201A

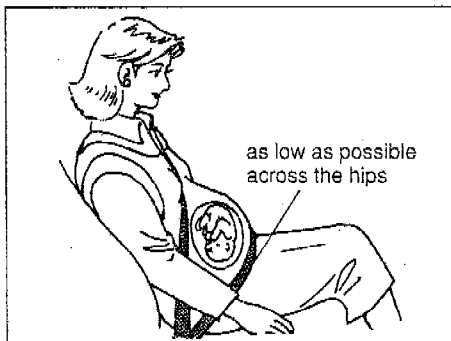
(Continued)

comfortable to provide the protection for which they have been designed. A slack belt will provide less protection than one which is snug.

- * Make sure that each seat belt buckle is inserted into the proper buckle catch. It is possible to cross the buckles in the rear seat.
- * Do not wear your seat belt over hard or breakable objects in your pockets or on your clothing. If an accident occurs, objects such as glasses, pens, etc. under the seat belt can cause injury.

(Continued)

2-12



02-65D199A

⚠ WARNING

(Continued)

- * Never use the same seat belt on more than one occupant and never attach a seat belt over an infant or child being held on an occupant's lap. Such seat belt use could cause serious injury in the event of an accident.
- * Pregnant women should use seat belts, although specific recommendations about driving should be made by the woman's medical advisor. Remember that the lap portion of the belt should be worn as low as possible across the hips,

(Continued)

(Continued)

as shown in the diagram.

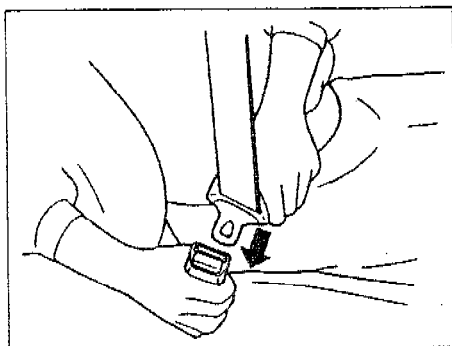
- * Periodically inspect seat belt assemblies for excessive wear and damage. Seat belts should be replaced if webbing becomes frayed, contaminated, or damaged in any way. It is essential to replace the entire seat belt assembly after it has been worn in a severe impact, even if damage to the assembly is not obvious.
- * Children age 12 and under should ride properly restrained in the rear seat, if equipped.
- * Infants and small children should never be transported unless they are properly restrained. Restraint systems for infants and small children can be purchased commercially and should be used. Make sure that the system you purchase meets Federal Motor Vehicle Safety Standards. Read and follow all the directions provided by the manufacturer.
- * Avoid contamination of seat belt webbing by polishes, oils, chemicals, and particularly battery acid. Cleaning may safely be carried out

(Continued)

(Continued)

using mild soap and water.

- * For children, if the shoulder belt irritates the neck or face, move the child closer to the center of the vehicle.
- * All seatbacks should always be in a fairly upright position when driving, or seat belt effectiveness may be reduced. Seat belts are designed to offer maximum protection when seatbacks are in the fully upright position.

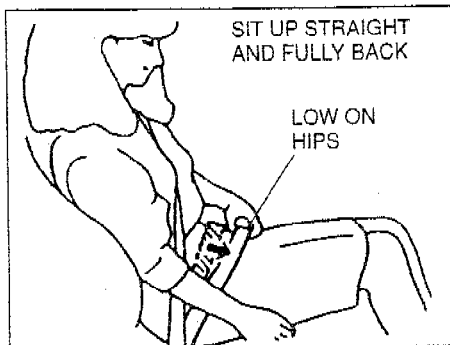


02-60A036A

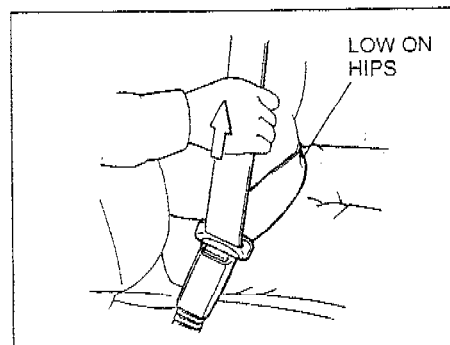
Your vehicle is equipped with a lap-shoulder belt at each outboard seating position and a lap belt at the rear center seating position (if available).

Front and Rear Lap-Shoulder Belts

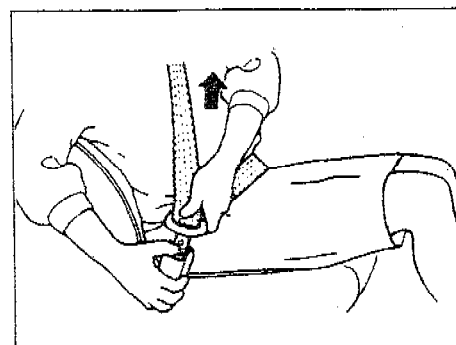
Pull the buckle tongue attached to the seat belt across your body and press it into the buckle catch until you hear a "click". The buckle catch is located at the inboard side of the seat. To reduce the risk of sliding under the belt during a collision, position the lap portion of the belt across your lap as low on your hips as possible and adjust it to a snug fit by pulling the shoulder portion of the belt upward through the latch plate.



02-60A038A



02-60A040A



02-60A039A

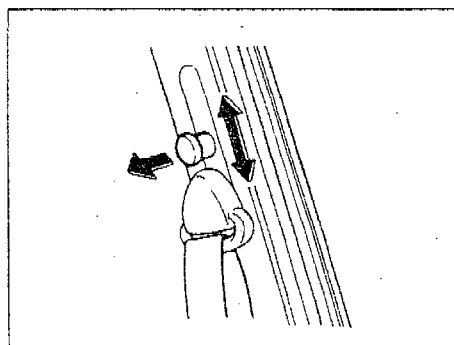
The length of the diagonal shoulder strap adjusts itself to allow freedom of movement. The seat belt has an emergency locking retractor (ELR), which is designed to lock the seat belt only during a sudden stop or impact. To unfasten the belt, press the release button on the buckle catch.

NOTE:

The front passenger's seat belt and the rear seat belts have emergency locking retractors (ELRs) that can be temporarily converted to function as automatic locking retractors (ALRs). The ALR mode should be used if you need to secure a child restraint system in the seat. Refer to the "CHILD RESTRAINT" section for details.

2-14

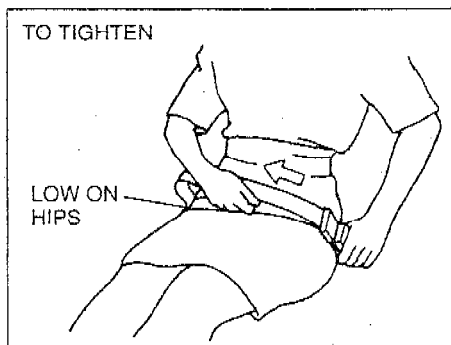
20



02-60G026A

Shoulder anchor height adjuster (if equipped)

Adjust the shoulder anchor height so that the shoulder belt rides on the center of the outboard shoulder. To adjust the shoulder anchor height, slide the anchor up or down while pulling the lock knob out. After adjustment, make sure that the anchor is securely locked.

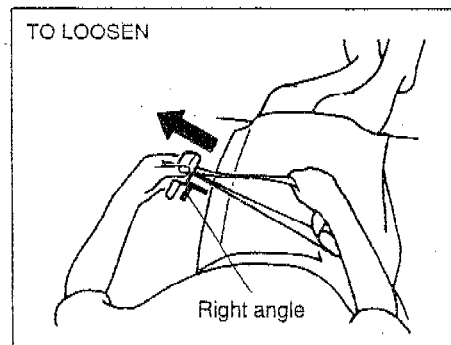


02-60B038A

Lap belt

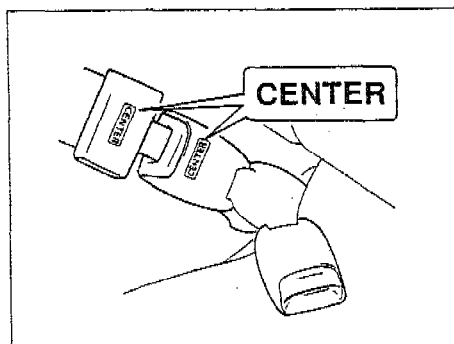
Sit up straight and well back in the seat. Pull the buckle tongue attached to the seat belt across your hips and press it into the buckle catch until you hear a "click". The buckle catch is located at the left side of the seating position. To reduce the risk of sliding under the belt during a collision, position the belt across your lap as low on your hips as possible and adjust it to a snug fit.

To tighten the belt, pull the free end of the belt across alongside the lap strap.



02-60A046A

To lengthen, release the tongue from the buckle catch, pull the tongue (adjuster) in the direction of the arrow, at right angles to the belt. The tongue should then be refitted into the buckle catch and the belt tightened as previously described.

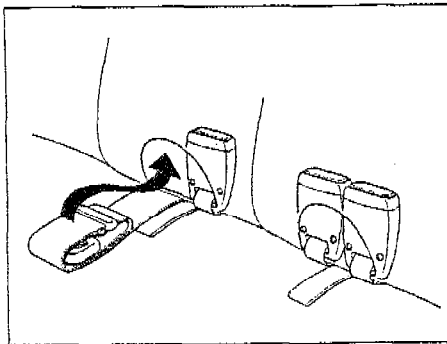


02-60G028A

NOTE:

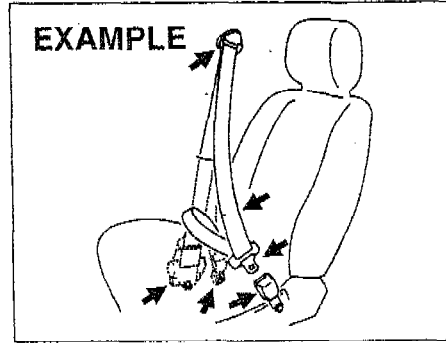
At the left side of the rear center seating position, there are two buckle catches, one for the center lap belt and one for the left lap-shoulder belt.

To identify them, "CENTER" is molded on the buckle catch for the center lap belt. The buckle catches are designed so a buckle tongue can not be inserted into the wrong buckle catch.



02-65D018A

Stow the rear seat belt buckle catches and the center seat belt webbing in the seat back as illustrated when the seatback is folded.



02-65D209A

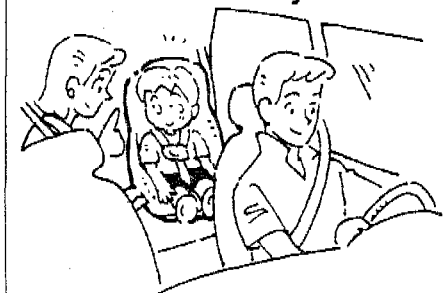
Seat Belt Inspection

Periodically inspect the seat belts to make sure they work properly and are not damaged. Check the webbing, buckles, lap plates, retractors, anchorages, and guide loops. Replace any seat belts which do not work properly or are damaged.

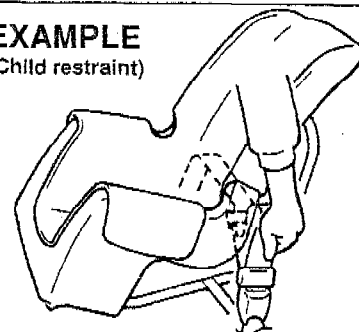
2-16

WARNING

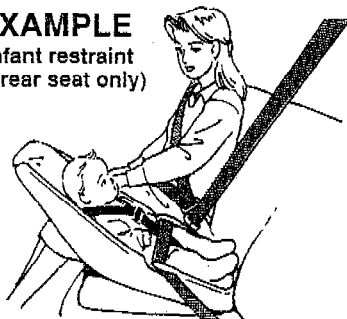
Be sure to inspect all seat belt assemblies after any collision. Any seat belt assembly which was in use during a collision (other than a very minor one) should be replaced, even if damage to the assembly is not obvious. Any seat belt assembly which was not in use during a collision should be replaced if it does not function properly or is damaged in any way.

Child Restraint Systems

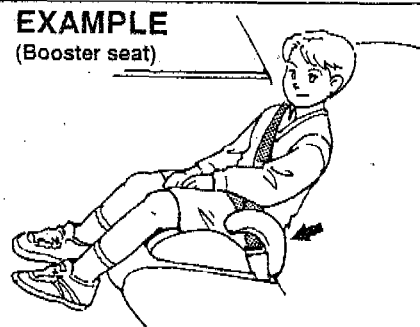
02-60G332A

EXAMPLE
(Child restraint)

02-65D197A

EXAMPLE
(Infant restraint
- rear seat only)

02-65D202A

EXAMPLE
(Booster seat)

02-65D203A

D-4

S010116

Child Restraint Systems

SUZUKI highly recommends that you use a child restraint system to restrain infants and small children. Many different types of child restraint systems are available; make sure that the restraint system you select meets Federal Motor Vehicle Safety Standards.

All child restraint systems are designed to be secured in vehicle seats by lap belts or the lap portion of lap-shoulder belts. Whenever possible, SUZUKI recommends that child restraint systems be installed on the rear seat. According to accident statistics, children are safer when properly restrained in rear seating positions than in front seating positions.

If you must use a front-facing child restraint in the front passenger's seat, be sure to move the front passenger's seat as far back as possible.

WARNING

Do not install a rear-facing child restraint in the front passenger's seat. If the passenger's air bag inflates, a child in a rear-facing child restraint could be seriously injured. The back of a rear-facing child restraint would be too close to the inflating air bag.



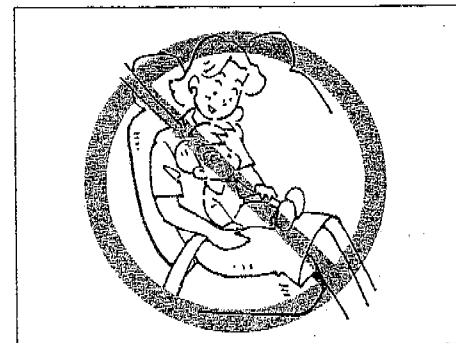
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WARNING

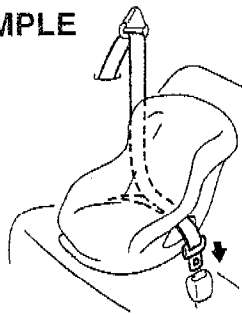
Children could be endangered in a crash if their child restraints are not properly secured in the vehicle. When installing a child restraint system, be sure to follow the instructions below. Be sure to secure the child in the restraint system according to the manufacturer's instructions.



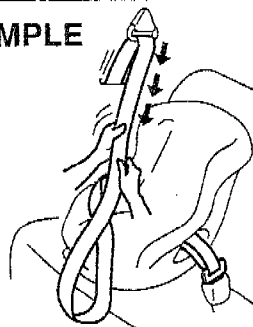
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2-18

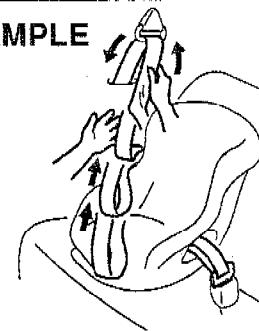
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EXAMPLE

02-83E031A

EXAMPLE

02-83E035A

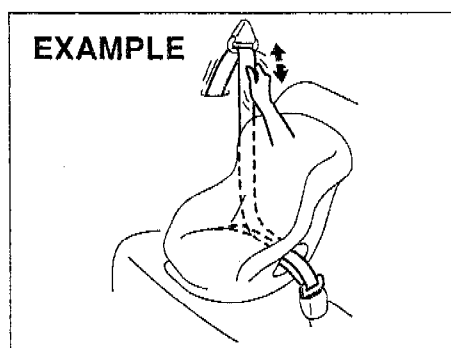
EXAMPLE

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Installation with lap-shoulder seat belts (Child restraint with no Top Strap)

Install your child restraint system according to the instructions provided by the child restraint system manufacturer. If you install the child restraint system in the front seat, be sure to slide the seat to the rearmost position. After making sure that the seat belt is securely latched:

- 1) Pull all of the remaining webbing out of the retractor. You will hear a click, which means that the emergency locking retractor (ELR) has converted to function as an automatic locking retractor (ALR).
- 2) Allow the extra webbing to retract, and pull the webbing toward the retractor to take up any slack. Make sure that the lap portion of the belt is tight around the child restraint system and the shoulder portion of the belt is positioned so that it can not interfere with the child's head or neck.

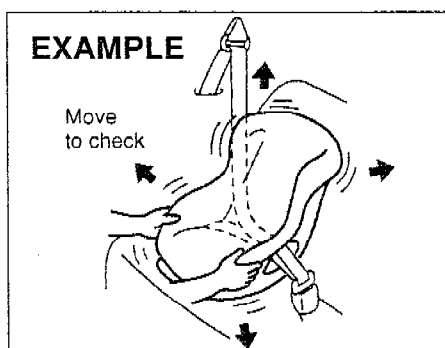


02-63E006A

- 3) Make sure that the retractor has converted to the ALR mode by trying to pull webbing out of the retractor. If the retractor is in the ALR mode, the belt will be locked.

⚠ WARNING

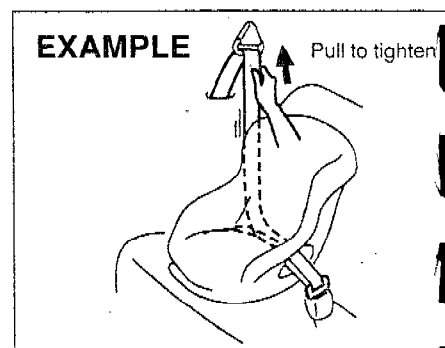
If the retractor is not in the ALR mode, the child restraint system can move or tip over when your vehicle turns or stops abruptly.



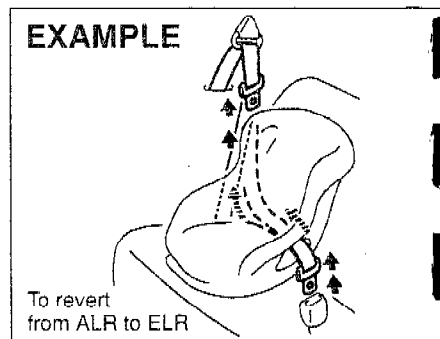
02-65D234A

- 4) Try moving the child restraint system in all directions, to make sure it is securely installed. If you need to tighten the belt, pull more webbing toward the retractor.

When you unbuckle the seat belt and allow it to retract to a certain length, the retractor will automatically revert back to the normal ELR mode.

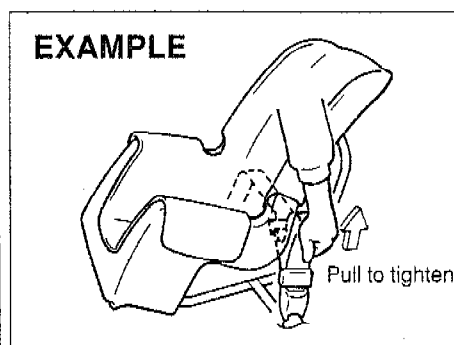


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02-65D26

2-20

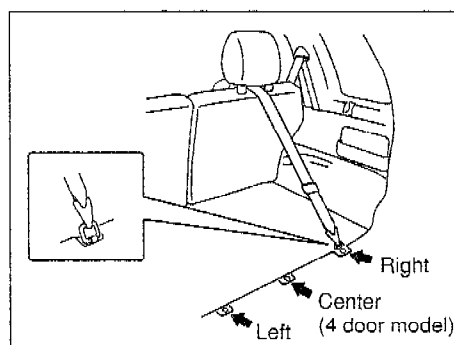


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Installation with a lap belt (Child restraint with no Top Strap)

Install your child restraint system according to the instructions provided by the child restraint system manufacturer.

To lengthen or tighten the belt, refer to the "Lap belt" item in this "SEAT BELTS AND CHILD RESTRAINT SYSTEMS" section. After making sure that the seat belt is securely latched, try moving the child restraint system in all directions, to make sure it is securely installed. If you need to tighten the belt, pull the free end of the webbing.

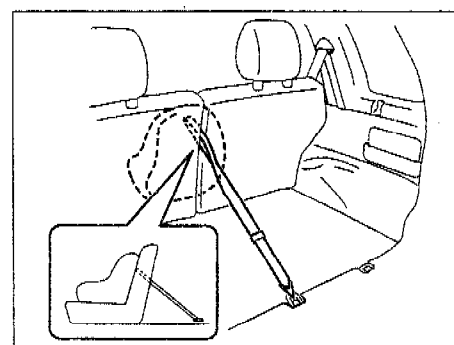


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Installation-Child Restraint with Top Strap

Some child restraint systems require the use of a top strap. Top strap anchor brackets are located on either side (and at the center (for 4 door model)) of the rear of the luggage compartment. Install the child restraint system as follows:

- 1) Remove the luggage compartment cover (if equipped).
- 2) Secure the child restraint on the rear seat using the procedure described above for securing a restraint system that does not require a top strap.
- 3) Lift up the anchor bracket. Hook the top strap to the anchor bracket and tighten the top strap according to the instructions provided by the child restraint system



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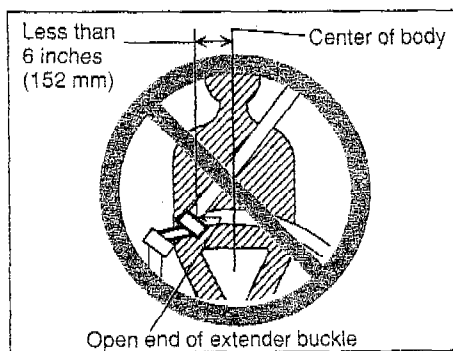
manufacturer. Be sure to attach the top strap to the corresponding anchor located directly behind the child restraint. Do not attach the top strap to the luggage restraint loops (if equipped).

⚠ WARNING

Do not attach the child restraint top strap to the luggage restraint loops (if equipped). Incorrectly attached top strap will reduce the intended effectiveness of the child restraint system.

- 4) When routing the top strap at an outboard seating position, be sure to pass it between the head restraint and the rear seatback as shown.

- 5) When routing the top strap at the center seating position, be sure to pass it between the rear seatbacks as shown, if the top strap connection to the child restraint is below the top of the rear seatback.
- 6) Make sure that cargo does not interfere with routing of the top strap.



Seat Belt Extender

If a front seat belt cannot be fastened securely because it is not long enough, see your authorized SUZUKI dealer. After inspecting the relationship between the seat belt length, the occupant's body size, and the seat adjustment (the driver's seat should always be adjusted as far back as possible while still maintaining control of the vehicle, and the passenger seat should be adjusted as far back as possible), he can select the appropriate seat belt extender for either the driver or passenger seat. The seat belt extender will be supplied to you at no charge.

- A seat belt extender should only be used for the person, vehicle, and seating location it was provided for.
- When using the extender, ensure that both ends are latched securely. Do not use the extender if the open end of the extender's buckle is within 6 inches of the center of the occupant's body (See diagram). Use of the extender when the buckle is too close to the center of the body could increase the risk of abdominal injury in the event of an accident, and could cause the shoulder belt to be positioned incorrectly.
- Seat belt extenders are not intended for use by pregnant women, and should only be used upon approval by their medical advisors.
- Remove and stow the extender when it is not being used.

2-22

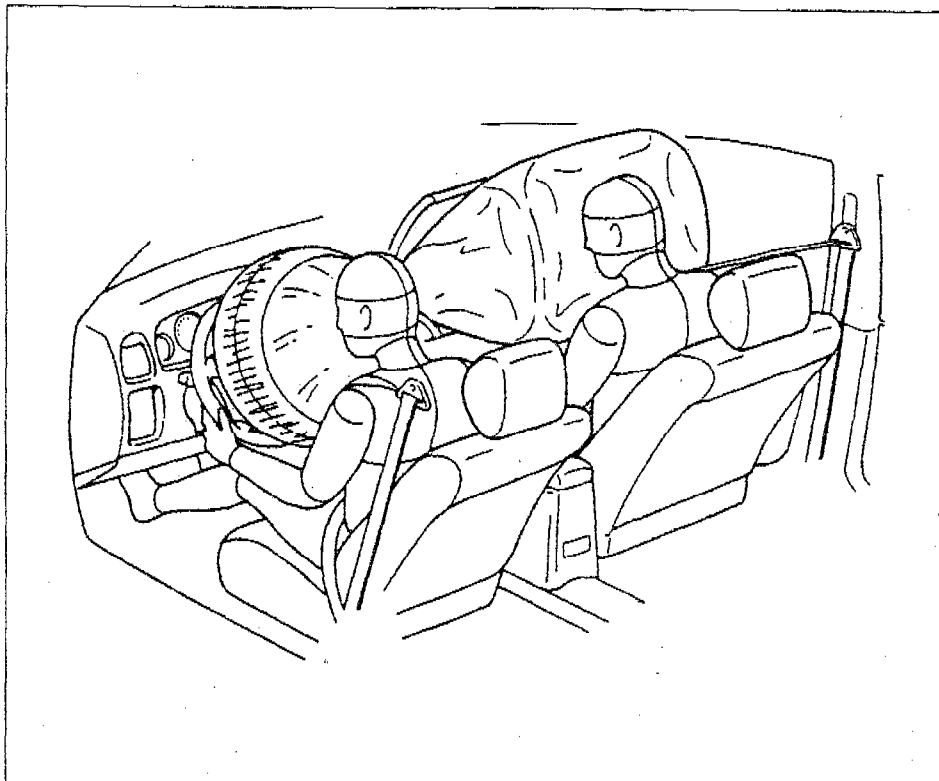
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SUPPLEMENTAL RESTRAINT SYSTEM (Air Bags)

WARNING

Failure to follow these instructions may increase the risk of injury in a crash.

- * Only use an extender for the person, vehicle, and seating position it was provided for.
- * Do not use if open end of extender's buckle is within 6 inches of center of occupant's body (See diagram).



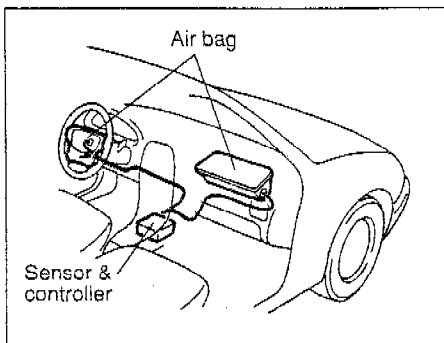
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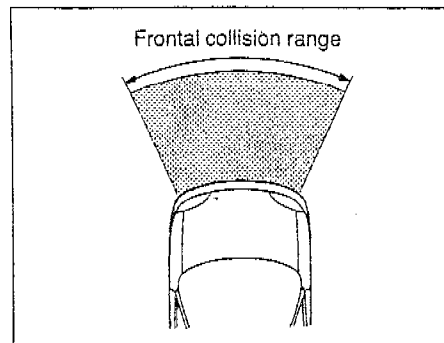
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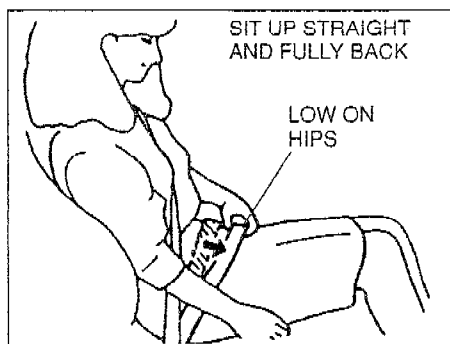
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02-65D168A



02-50G032A



02-60A038A

WARNING

This section of the owner's manual describes the protection provided by your SUZUKI's SUPPLEMENTAL RESTRAINT SYSTEM (Air Bags). Please read and follow ALL these instructions carefully to minimize your risk of severe injury or death in the event of a collision.

Your vehicle is equipped with a Supplemental Restraint System consisting of a driver air bag and a front passenger air bag, crash sensors, an electronic controller, and air bag inflators, in addition to a lap/shoulder belt at each front seating position.

WARNING

An air bag supplements, or adds to, the frontal crash protection offered by seat belts. The driver and all passengers must be properly restrained by wearing seat belts at all times, whether or not an air bag is mounted at their seating position, to minimize the risk of severe injury or death in the event of a crash.

2-24

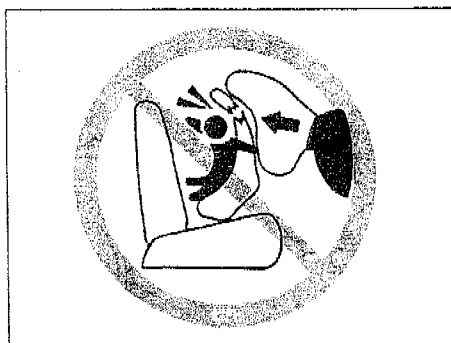
AIR BAG

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Air bags are designed to inflate only in severe frontal collisions. They are not designed to inflate in rear impacts, side impacts, rollovers, or minor frontal collisions, since they would offer no protection in those types of accidents. Also, since an air bag deploys only one time during an accident, seat belts are needed to restrain occupants from further movements during the accident.

Therefore, an airbag is NOT a substitute for seat belts. To maximize your protection, ALWAYS WEAR YOUR SEAT BELTS. Be aware that no system can prevent all possible injuries that may occur in an accident.

If the "AIR BAG" light on the instrument cluster does not blink when the ignition switch is first turned to the "ON" position, or the "AIR BAG" light stays on, or comes on while driving, the air bag system may not work properly. Have the air bag system inspected by an authorized SUZUKI dealer as soon as possible.



02-60A582A

WARNING

Do not install a rear-facing child restraint in the front passenger's seat. If the passenger's air bag inflates, a child in a rear-facing child restraint could be severely injured. The back of a rear-facing child restraint would be too close to the inflating air bag.

If you must use a front-facing child restraint in the front passenger's seat, be sure to move the front passenger's seat as far back as possible. Please refer to the "SEAT BELTS AND CHILD RESTRAINT SYSTEMS" section in the "BEFORE DRIVING" section for details on securing your child.

How the System Works.

In a frontal collision, the crash sensors will detect rapid deceleration and send a signal to the controller. If the controller judges that the deceleration represents a severe frontal crash, the controller will trigger the inflators. The inflators inflate the air bags with nitrogen or argon gas. The inflated air bags provide a cushion for your head and upper body. The air bag inflates and deflates so quickly that you may not even realize that it has activated. The air bag will neither hinder your view nor make it harder to exit the vehicle.

Airbags must inflate quickly and forcefully in order to reduce the chance of serious or fatal injuries. However, an unavoidable consequence of the quick inflation is that the air bag may irritate bare skin, such as the facial area. Also, upon inflation, a loud noise will occur and some powder and smoke will be released. These conditions are not harmful and do not indicate a fire in the car. Be aware, however, that some air bag components may be hot for a while after inflation.

A seat belt helps keep you in the proper position for maximum protection when an airbag inflates. Adjust your seat as far back as possible while still maintaining control of the vehicle. Sit fully back in your seat; sit up straight; do not lean over the steering wheel.

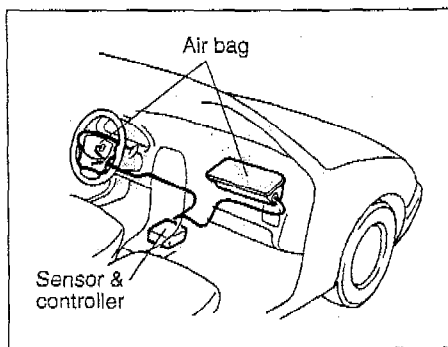
or dashboard. Please refer to the "FRONT SEAT ADJUSTMENT" section and the "SEAT BELTS AND CHILD RESTRAINT SYSTEMS" section in the "BEFORE DRIVING" section for details on proper seat and seat belt adjustments.

WARNING

Do not attach any objects to, or place any objects over, the steering wheel or dashboard. Do not place any objects between the air bag and the driver or front passenger. These objects may interfere with air bag operation or may be propelled by the air bag in the event of a crash. Either of these conditions may cause severe injury.

Note that even though your vehicle may be moderately damaged in a frontal collision, the collision may not have been severe enough to trigger the air bags to inflate. If your car sustains ANY front-end damage, have the air bag system inspected by an authorized SUZUKI dealer to ensure it is in proper working order.

Your vehicle is equipped with a diagnostic module which records information about the air bag system if the air bags deploy in a crash. The module records information about overall system status, which sensors



02-65D168A

activated the deployment, and whether the driver's seat belt was in use.

Servicing the Air Bag System.

If the air bags inflate, have the air bags and related components replaced by an authorized SUZUKI dealer as soon as possible.

If your vehicle ever gets in deep water and the driver's floor is submerged, the air bag controller could be damaged. If it does, have the air bag system inspected by the SUZUKI dealer as soon as possible.

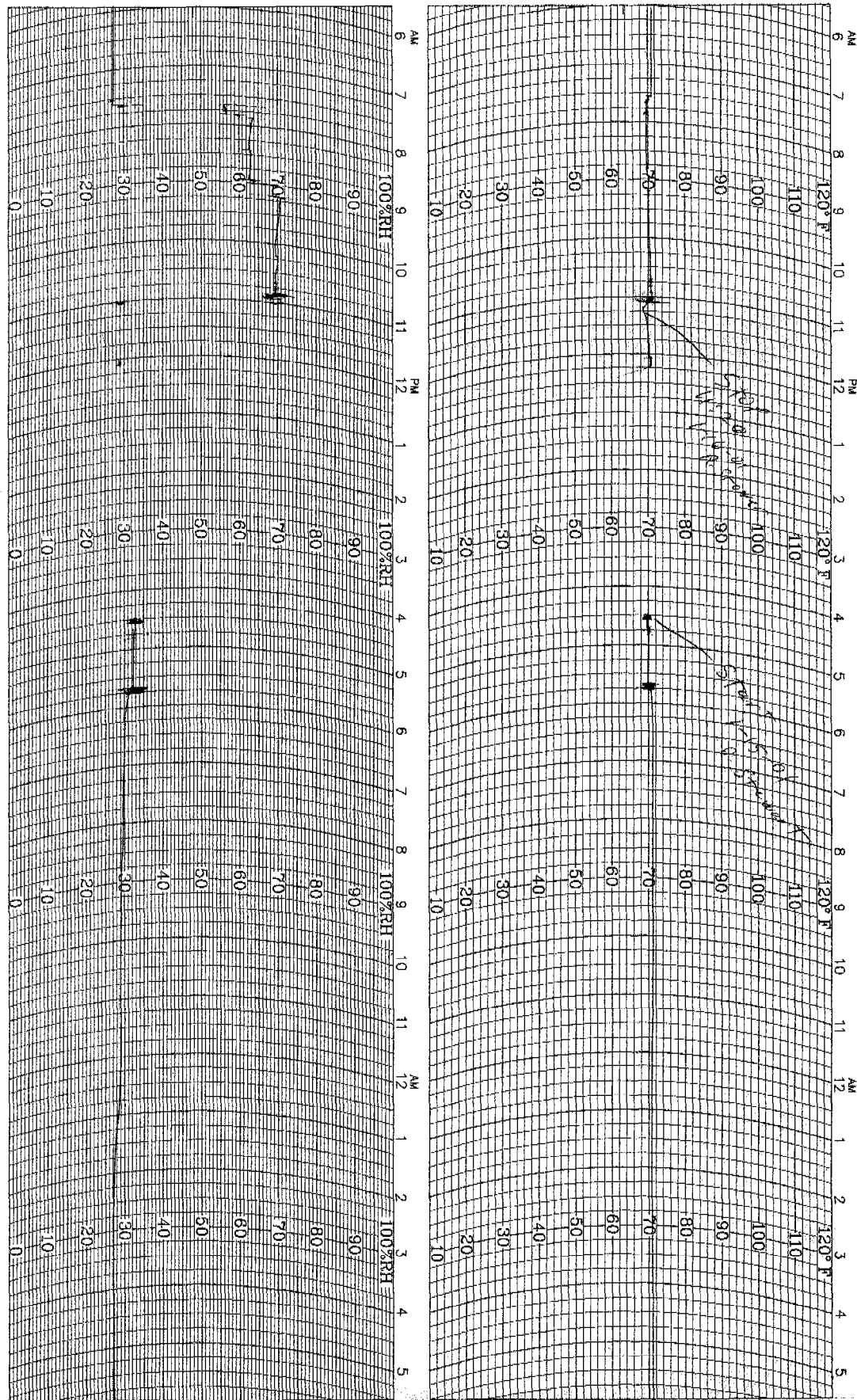
Special procedures are required for servicing or replacing an air bag. For that reason, only an authorized SUZUKI dealer should be allowed to service or replace your air

bags. Please remind anyone who services your SUZUKI that it has air bags.

Service on or around air bag components or wiring must be performed only by an authorized SUZUKI dealer. Improper service could result in unintended air bag deployment or could render the air bag inoperative. Either of these two conditions may result in severe injury.

To prevent damage or unintended inflation of the air bag system, be sure the battery is disconnected and the ignition switch has been in the "LOCK" position for at least 90 seconds before performing any electrical service work on your SUZUKI. Do not touch air bag system components or wires. The wires are wrapped with yellow tape or yellow tubing, and the couplers are yellow for easy identification.

Scrapping a car that has an uninflated air bag can be hazardous. Ask your dealer, body repair shop, or scrap yard for help with disposal.



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Division of QUALIMETRICS, Inc.

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STATION SLED Rm

DATE ON 1-15-01

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