

V 3496

Report Number: 208S-TRC-01-003

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

Hyundai Motor Company
2001 Hyundai Elantra
NHTSA Number: C10501
TRC Test Number: S001208

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



Test Date: December 8, 2000

Report Date: January 4, 2001

Final Report

Prepared For:

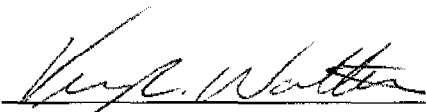
U. S. Department of Transportation
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Office of Vehicle Safety Compliance (NSA-30)
400 Seventh Street, S.W., Room No. 6115
Washington, DC 20590

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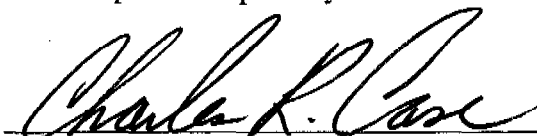
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Technical Report

Documentation Page

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16. Abstract An FMVSS 208 Section 13 compliance sled test was conducted on a 2001 Hyundai Elantra 4-door sedan, NHTSA No. C10501, 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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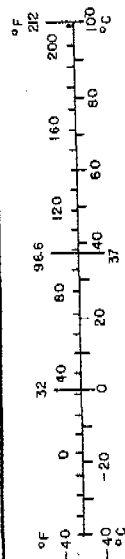
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	meters	m
yd	yards	0.9	kilometers	km
mi	miles	1.6		
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	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
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 in. = 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 Hyundai Elantra 4-door sedan, NHTSA No.C10501, 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 Hyge sled was instrumented with two (2) accelerometers to measure longitudinal accelerations and one (1) light trap velocity channel. The sled test vehicle was instrumented with six (6) accelerometers to measure longitudinal axis accelerations and two (2) airbag event channels to monitor driver and passenger airbag triggers.

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) 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 December 8, 2000.

The test vehicle, a 2001 Hyundai Elantra 4-door sedan, NHTSA No. C10501, 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	179	134
Chest g	60 g	40.1	39.6
Chest Displacement	3 inches	1.4	0.4
Left Femur	2250 lb	1273	1290
Right Femur	2250 lb	1059	979
Neck Extension	57 Nm	7.9	21.6
Neck Flexion	190 Nm	34.1	57.5
Neck Tension	3300 N	1062	589
Neck Compression	4000 N	137	1197
Neck Shear	3100 N	719	1211

The subject vehicle, a 2001 Hyundai Elantra, NHTSA No. C10501, 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 17.3 g with an integrated velocity change of 29.2 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 acceleration signal to Channel Class 60, the air bag event trigger signal was 21.6 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, has recorded an anomalous spike at approximately 220 milliseconds.

Sled Test Summary

NHTSA number: C10501
Test type: FMVSS 208 Compliance Sled Test
Test date: 12/08/00
Test time: 1508
Ambient temperature at impact area: 70° F
Vehicle year/make/ model/body style: 2001/Hyundai/Elantra/Sedan

Dummy Info:

Driver #230

Passenger #314

Type: Part 572E
Location: Left front
Restraint: Supplemental
airbag system
Number of data channels: 15

Part 572E
Right front
Supplemental
airbag system
15

Number of Cameras:

Real-time: 1
High-speed: 6

Door Opening Data:

Left Front: Normal
Right Front: Normal

Front Seat Data:

Seat track failure:	No apparent failure	No apparent failure
Seat back failure	No apparent failure	No apparent failure

Visible Dummy Contact Points:

Head:	Airbag, sun visor, headliner	Airbag
Chest:	Airbag	Airbag
Left knee:	Knee bolster	Knee bolster/glove box
Right knee:	Knee bolster	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/Hyundai /Elantra /Sedan

Color: Cranberry

VIN: KMHDN45D21U031343

NHTSA number: C10501

Engine data:

Placement: transverse

Cylinders: 4

Displacement: 2.0 liters

Transmission data: 5 speed, X manual, ___ automatic, ___ overdrive

Final drive: X fwd, ___ rwd, ___ 4wd

Date vehicle received: 11/09/2000

Odometer reading:

Dealer's name Ricart Hyundai
and address: 4255 S. Hamilton Road
Groveport, Ohio 43227

Major Options:

Power steering	Yes	Other: Tilt steering column, front side airbags,
Power brakes	Yes	center console with arm rest, rear child seat
Power windows	Yes	anchors.
Air conditioning	Yes	
Power door locks	Yes	

Remarks:

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

Data from Vehicle's Certification Label:

Vehicle manufactured by: Hyundai Motor Company
Date of manufacture: August 9, 2000
VIN: KMHDN45D21U031343
GVWR: 3835 lbs
GAWR: Front: 2070 lbs
Rear: 1850 lbs

Data from Vehicle's Tire Placard:

Tire pressure with maximum capacity vehicle load:

Front: 30 psi
Rear: 30 psi
Recommended tire size: P185/65R15, P195/60R15
Load range: N/A
Recommended cold tire pressure:
Front: 210 kPa (30 psi)
Rear: 210 kPa (30 psi)
Size of tires on vehicle: P195/60R15
Spare tire: T125/70R15

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	867.0 lbs	Right rear	529.0 lbs
Left front	874.0 lbs	Left rear	533.0 lbs
Total front weight	1741.0 lbs	(62.1% of total vehicle weight)	
Total rear weight	1062.0 lbs	(37.9% of total vehicle weight)	
Total delivered weight	2803.0 lbs		

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (2803 lbs)

DSC = Designated Seating Capacity (5)

RCLW = 100 lbs (from tire pressure label)

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

Target test weight = 2803 + 100 + 334 = 3237 lbs

Weight of test vehicle with two dummies and 284 lbs of cargo weight:

Right front	939.5 lbs	Right rear	771.0 lbs
Left front	935.5 lbs	Left rear	775.0 lbs
Total front weight	1875.0 lbs	(54.8% of total vehicle weight)	
Total rear weight	1546.0 lbs	(45.2% of total vehicle weight)	
Total test weight	3421.0 lbs ¹		

Remarks:

Weight of ballast secured in vehicle cargo area: None

Components removed to meet target test weight: None

¹ The total test weight is high because the target weight had originally been incorrectly calculated by using the NHTSA formula for vehicles with no vehicle capacity weight on the label.

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

Test Vehicle Attitude:

As delivered door sill angle: 0.7° Nose down

As tested door sill angle: 0.6° Nose down

Fully loaded door sill angle:¹ 0.2° Nose down

Vehicle Wheelbase: 102.8 inches

Fuel System Data:

Fuel system capacity from owner's manual: 14.5 gallons

Useable capacity figure furnished by COTR: 14.5 gallons

Remarks: The roll angle measurement was within 1 inch. The left and right side measurements were 29.9 inches.

¹ Vehicle loaded with 284 lbs cargo weight.

Post-Impact Data

Test number: S001208
NHTSA number: C10501
Test date: 12/08/00
Test time: 1508
Test type: FMVSS 208 Compliance Sled Test
Impact angle: 0°
Ambient temperature
at impact area: 70° F
Temperature in
occupant compartment: 70° F

Sled carriage velocity:

Integrated velocity from the integration of the entire sled acceleration:	29.2 mph
Measured velocity from the light trap device attached to the sled (backup):	28.3 mph
Specified integrated velocity range:	28 to 30 mph

Sled carriage acceleration:

Acceleration:	17.3 g
Specified acceleration range:	16.0 g - 18.2 g

Sled carriage acceleration duration:

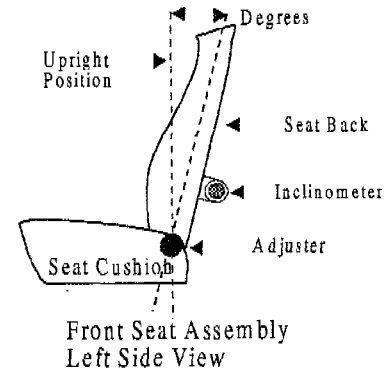
Time from T-0 (-0.5 g) to 0.0 g:	125.8 msec
Specified acceleration duration:	120.0 - 130.0 msec

The sled acceleration curve was within the specified corridor.

Seat and Steering Column Positioning Data

Vehicle: 2001/Hyundai/Elantra/Sedan

NHTSA No.: C10501



Nominal Design Riding Position:

- Driver Seat: Seat Back Angle = 22.5° The manually adjustable seat back was located with the back adjusted to the ninth latch position from the initial lock position. The angle was measured on the seat frame.
- Passenger Seat: Seat Back Angle = 22.4° The manually adjustable seat back was located with the back adjusted to the ninth latch position from the initial lock position. The angle was measured on the seat frame.

Seat Fore and Aft Positions:

- Driver Seat: The seat was set in the 12th lock position from the 1st forward lock position.
- Passenger: The seat was set in the 12th lock position from the 1st forward lock position.

Steering Column Adjustments:

The steering column was adjustable. The steering wheel was positioned half way between the highest and lowest adjustable positions with a measured angle of 22.6° .

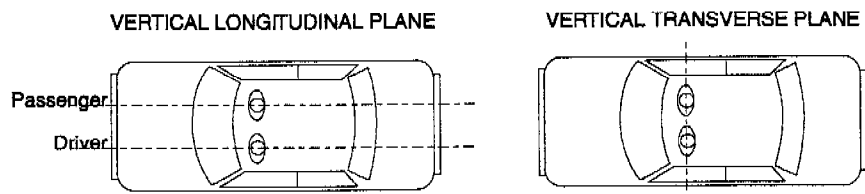
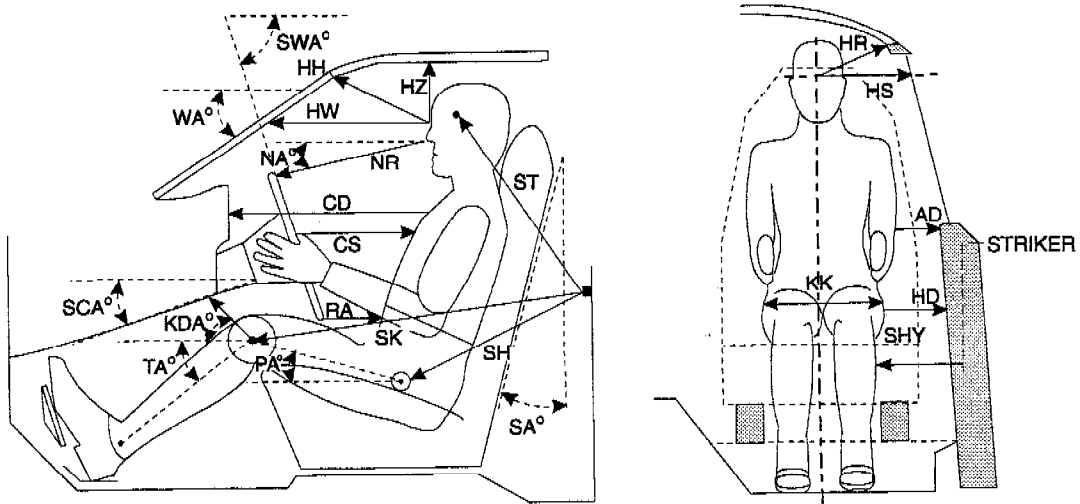
Dummy Measurement Data for Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #230)	Passenger (Serial #314)
WA	Windshield angle	32.1°	N/A
SWA	Steering wheel angle	22.6°	N/A
SCA	Steering column angle	21.3°	N/A
SA	Seat back angle	22.5°	22.4°
HZ	Head to roof	7.5 in	7.5 in
HH	Head to header	12.5 in	12.0 in
HW	Head to windshield	21.2 in	20.8 in
HR	Head to side header	8.0 in	8.5 in
NR	Nose to rim	16.4 in	N/A
NA	Nose to rim angle	12.1°	N/A
CD	Chest to dash	21.3 in	21.4 in
CS	Steering wheel to chest	12.0 in	N/A
RA	Rim to abdomen	7.7 in	N/A
KDL	Left knee to dash	6.4 in	7.0 in
KDR	Right knee to dash	6.6 in	6.5 in
KDA	Outboard knee to dash angle	30.0°	27.0°
PA	Pelvic angle	23.3°	23.3°
TA	Tibial angle	39.0°	39.6°
KK	Knee to knee	14.5 in	10.6 in
ST ¹	Striker to head	20.0 in	20.0 in
	Striker to head angle	85.3°	79.1°
SK ¹	Striker to knee	22.8 in	24.7 in
	Striker to knee angle	-0.7°	-2.3°
SH ¹	Striker to H-point	10.2 in	10.5 in
	Striker to H-point angle	-32.7°	-30.7°
SHY	Striker to H-point (Y dir.)	8.5 in	8.5 in
HS	Head to side window	12.8 in	12.8 in
HD	H-point to door	5.4 in	5.1 in
AD	Arm to door	3.8 in	4.7 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 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
SK, plane measured from the forward most center point on the striker to the center of
ST the H-point, outer knee bolt, and head target. When taking this measurement a
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.

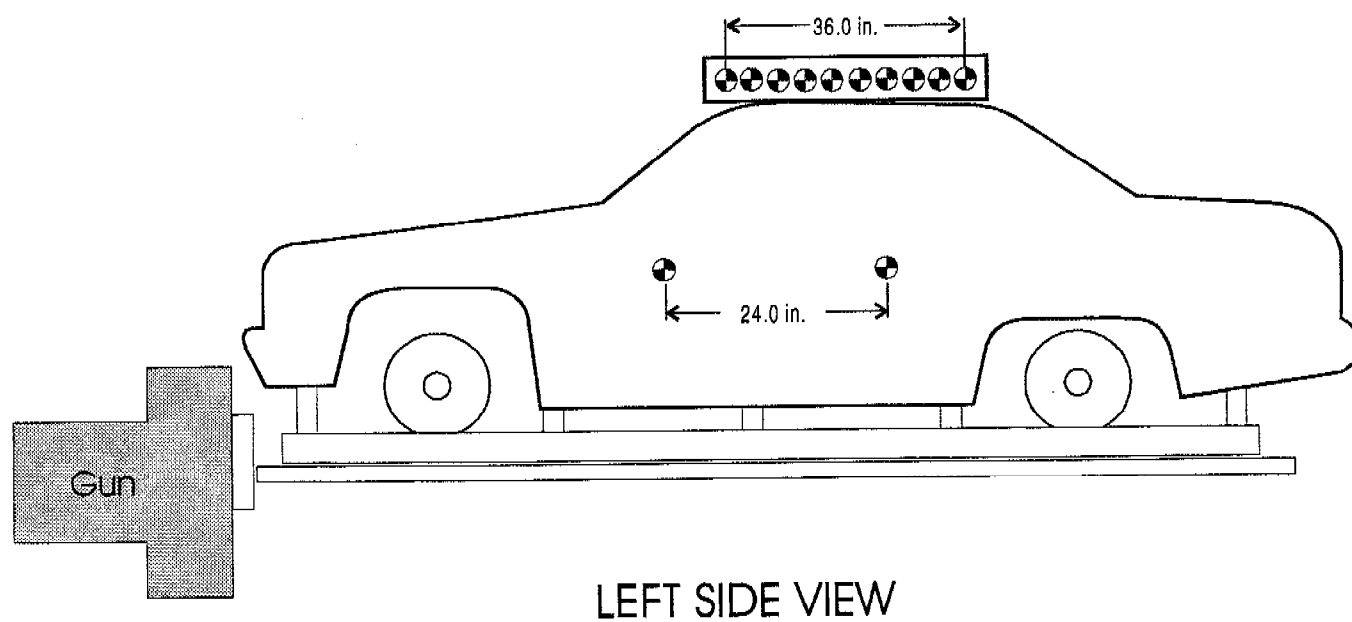
* Measurement used in Data Tape Reference Guide

Descriptions of Dummy Measurements, Cont'd.

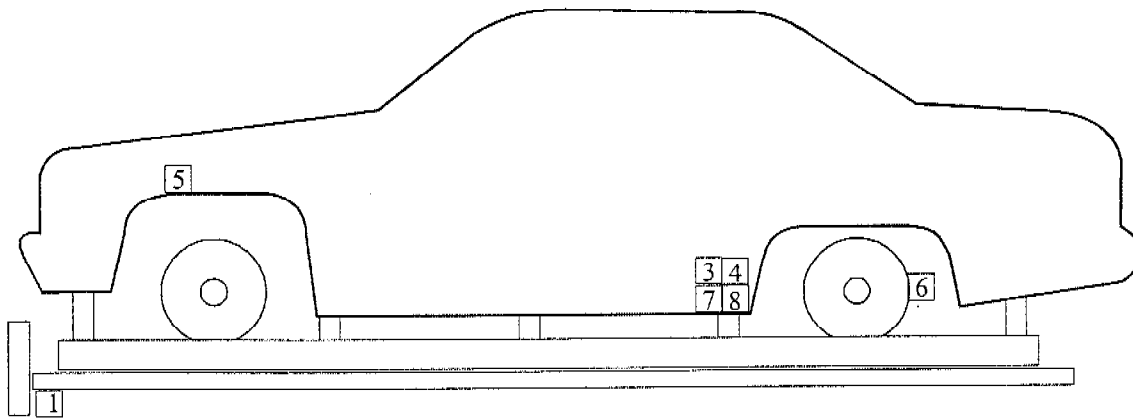
- PA Pelvic or Femur Angle, taken by inserting the pelvic angle gauge into the H-point gauging hole on the SID or the Hybrid III dummies and taking this angle with respect to the horizontal. Measure the angle of the line connecting the H-point hole and the outer knee pivot bolt hole on a Hybrid II dummy 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 Targeting Measurements

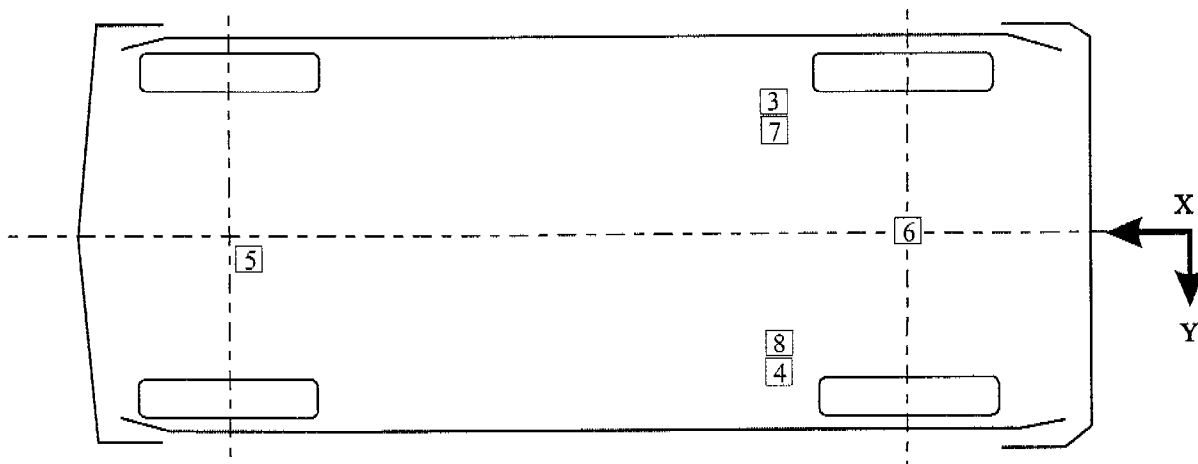
REFERENCE PHOTO TARGETS



Vehicle Accelerometer Placement



Side View



Bottom View

Vehicle Data Summary and Accelerometer Locations

TEST NUMBER: S001208							
TEST NUMBER: S001208	No. LOCATION	X	Y	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 SLED ACCELERATION	PRIMARY	165.6 in	-1.0 in	0.5 g	@ 184.9 ms	17.3 g	@ 58.9 ms
	REDUNDANT			0.8 g	@ 147.3 ms	18.4 g	@ 55.8 ms
2 SLED VELOCITY	MEASURED			0.1 mph	@ 5.9 ms	28.3 mph	@ 137.1 ms
	INTEGRATED ¹			---	---	29.2 mph	@ 140.9 ms
3 LEFT REAR SEAT	CROSSMEMBER	65.1 in	-24.0 in				
	LONGITUDINAL			1.3 g	@ 130.0 ms	17.7 g	@ 59.1 ms
4 RIGHT REAR SEAT	CROSSMEMBER	63.4 in	23.0 in				
	LONGITUDINAL			1.2 g	@ 130.6 ms	17.5 g	@ 50.1 ms
5 TOP ENGINE	CROSSMEMBER	148.3 in	0.3 in				
	LONGITUDINAL			5.9 g	@ 134.1 ms	19.2 g	@ 55.0 ms
6 REAR AXLE	CROSSMEMBER	33.2 in	0.0 in				
	LONGITUDINAL			1.3 g	@ 130.9 ms	18.5 g	@ 61.7 ms
7 LEFT VEHICLE FRAME	CROSSMEMBER	62.9 in	-26.5 in				
	LONGITUDINAL			1.2 g	@ 130.1 ms	17.6 g	@ 59.4 ms

Vehicle Data Summary and Accelerometer Locations, Cont'd.

TEST NUMBER: S001208
No. LOCATION

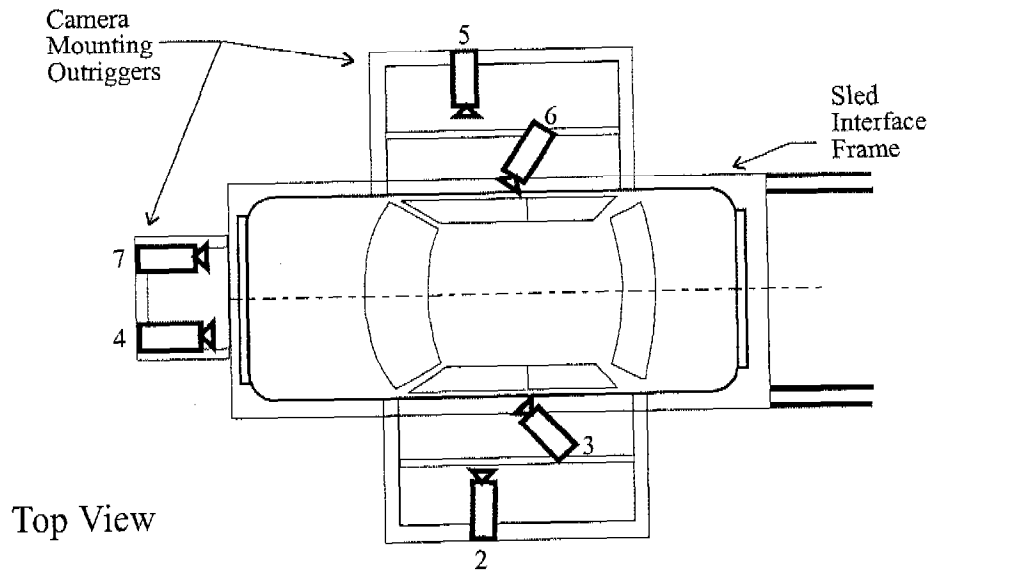
	X	Y		POSITIVE DIRECTION		NEGATIVE DIRECTION
8 RIGHT VEHICLE FRAME LONGITUDINAL	62.4 in	25.5 in	1.2 g	@ 130.4 ms	17.3 g	@ 58.8 ms
9 DRIVER AIRBAG EVENT			1.0 volt	@ 21.6 ms		
10 PASSENGER AIRBAG EVENT			1.0 volt	@ 21.6 ms		

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

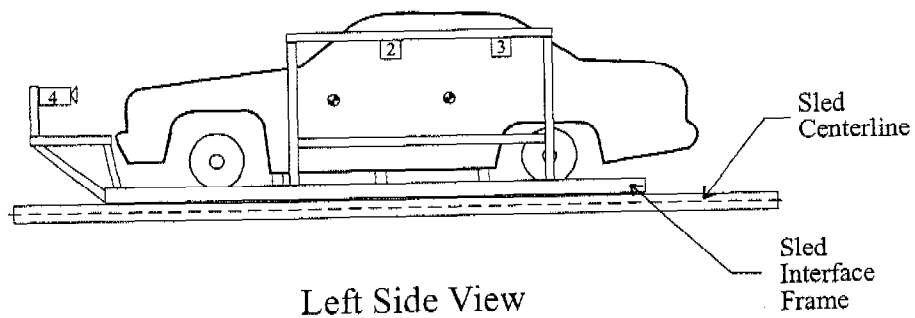
No positive data in time frame of interest.

Sign Convention per J211, MAR 1995

Camera Positions



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



Motion Picture Camera Locations

Vehicle year/make/model/body style: 2001/Hyundai/Elantra/Sedan NHTSA No. C10501 Test Number: S001208

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	93.0 in	301.7 in	57.8 in	0°	295.0 in	10 mm	24 frames/s
2	Left side view wide	70.5 in	72.2 in	49.3 in	8.2°	57.0 in	8 mm	1000 frames/s
3	Left side view over shoulder	98.8 in	50.0 in	55.2 in	13.3°	38.2 in	8 mm	1022 frames/s
4	Front view - driver	27.3 in	12.6 in	49.8 in	5.4°	54.5 in	8 mm	1002 frames/s
5	Right side view wide	78.0 in	91.3 in	51.2 in	5.7°	75.0 in	13 mm	1062 frames/s
6	Right side view over shoulder	100.0 in	48.5 in	52.0 in	11.6°	38.5 in	8 mm	997 frames/s
7	Front view - passenger	26.9 in	15.8 in	49.7 in	6.4°	52.8 in	8 mm	1000 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/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Date: 12/08/00

Maximum Acceleration Values: (g's) ¹	Driver Dummy #230	Passenger Dummy #314
Head Channel X	-43.0	-25.8
Head Channel Y	-5.3	-15.4
Head Channel Z	23.4	25.9
HEAD RESULTANT	45.7	36.6
Chest Channel X	-39.3	-36.2
Chest Channel Y	2.7	-7.7
Chest Channel Z	11.6	21.1
CHEST RESULTANT	40.7	40.0

Head Injury Criteria (HIC) Values:

HIC	179	134
t ₁ = (msec)	95.440	90.640
t ₂ = (msec)	131.440	122.320

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

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

CLIP	40.1	39.6
t ¹ = (msec)	99.840	100.720
t ² = (msec)	102.880	103.680
Chest Deflection (in)	1.4	0.4

¹ Sign Convention per SAE J211, March 1995.

FMVSS 208 Occupant Injury Data, Cont'd.

Vehicle: 2001/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Date: 12/08/00

Units (lbs)

Max. Compressive Femur Forces:	Driver Dummy #230	Passenger Dummy #314
Left Side (lbs)	1273	1290
Right Side (lbs)	1059	979

Neck Injury Criteria:	Driver Dummy #230	Passenger Dummy #314
Peak Flexion Bending Moment (N-m)	34.1	57.5
Peak Extension Bending Moment (N-m)	7.9	21.6
Peak Axial Tension (N)	1062	589
Peak Axial Compression (N)	137	1197
Peak Positive X-Axis Shear (N)	719	1211
Peak Negative X-Axis Shear (N)	133	499

FMVSS 208 SEAT BELT WARNING SYSTEM CHECK

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Stoner

Date: 11/28/00

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 = seconds
(4 to 8 seconds) (see 49 USCS @ 30124)

Time duration of reminder light operation = 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 = seconds
(audible warning should not operate)

Time duration of reminder light operation = 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/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Stoner

Date: 11/28/00

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: Bottom middle 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/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Stoner

Date: 11/28/00

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?
☐ 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 place 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?

Driver side ☐ Yes-Pass ☒ N/A ☐ 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.

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

Air Bag Labels, Cont'd.

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

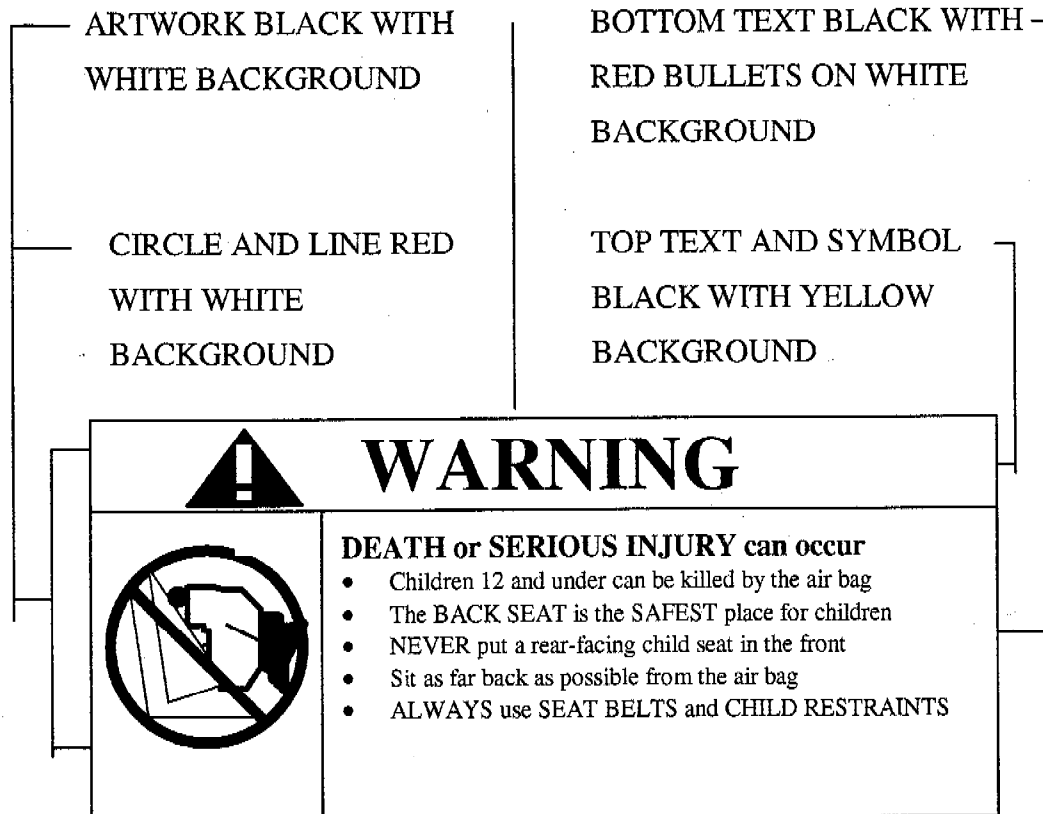


Figure 6a
(S4.5.1(b)(2))

Air Bag Labels, Cont'd.

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

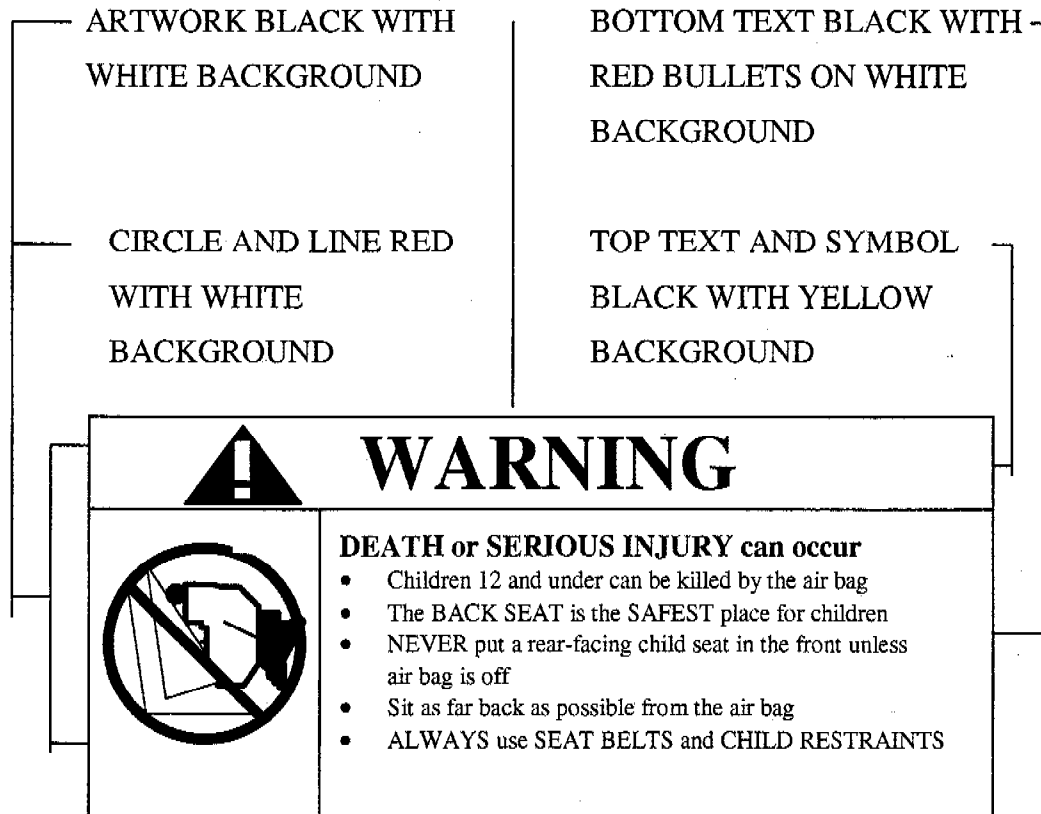


Figure 6b
(S4.5.1(b)(2))

- 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 33.5 cm²

Actual message area, passenger side 33.5 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 30.0 mm

Actual diameter, passenger side 30.0 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

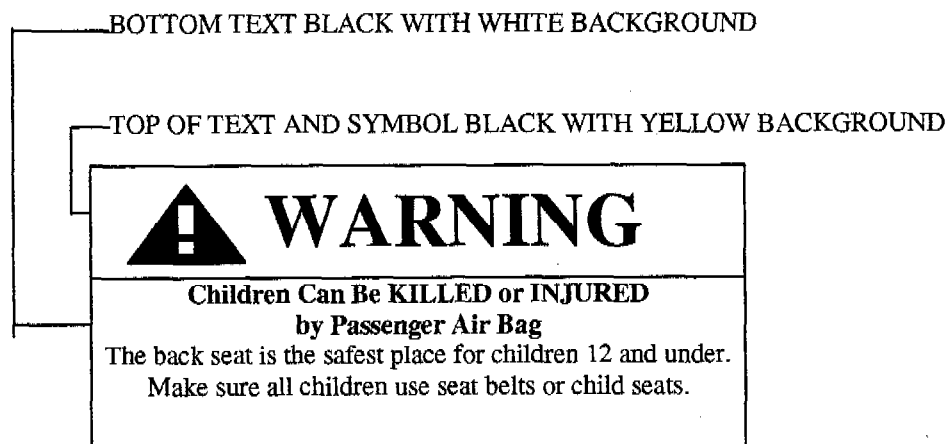
Figure 6c
(S4.5.1(c)(2))



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)) ☒ Yes-Pass ☐ No-Fail
Actual message area 30 cm²

FMVSS 208 REAR OUTBOARD SEATING POSITION SEAT BELTS

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Stoner

Date: 11/28/00

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/Hyundai/Elantra/Sedan

NHTSA No: C10501

Technician: R. Waldeck

Date: 02/02/01

DESIGNATED SEATING POSITION: Right Front Seat

- ☒ 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/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Waldeck

Date: 02/02/01

DESIGNATED SEATING POSITION: Right Front Seat

- ☒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 69.5 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 26.0 inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Waldeck

Date: 02/02/01

DESIGNATED SEATING POSITION: Right Front Seat

- ☒ 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 26.3 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))

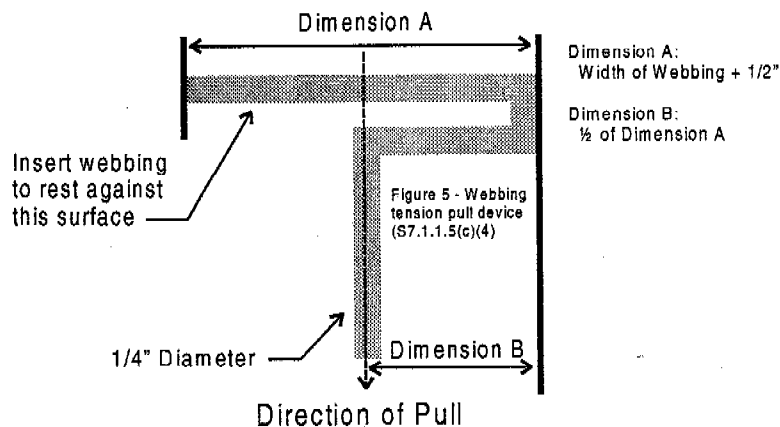
14-13= 0.3 inches

☒ 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= 43.2 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/Hyundai/Elantra/Sedan

NHTSA No: C10501

Technician: R. Stoner, B. Bautsch

Date: 11/28/00

DESIGNATED SEATING POSITION: Left Rear Seat

- ☒ 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/Hyundai/Elantra/Sedan

NIITSA No.: C10501

Technician: R. Stoner, B. Bautsch

Date: 11/28/00

DESIGNATED SEATING POSITION: Left Rear Seat

- ☒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 64.0 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 36.4 inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Stoner

Date: 11/28/00

DESIGNATED SEATING POSITION: Left Rear Seat

- ☒ 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 36.9 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))

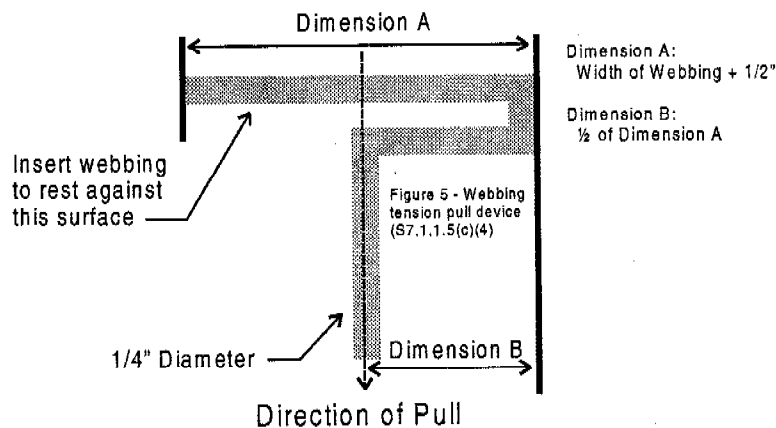
14-13= 0.5 inches

☒ 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= 27.1 inches.

☒ Yes-Pass ☐ No-Fail



FMVSS 208 Lap Belt Lockability, Cont'd.

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/Hyundai/Elantra/Sedan

NHTSA No: C10501

Technician: R. Stoner, B. Bautsch

Date: 11/28/00

DESIGNATED SEATING POSITION: Center Rear Seat

- ☒ 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/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Stoner

Date: 11/28/00

DESIGNATED SEATING POSITION: Center Rear Seat

- ☒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 65.0 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 31.0 inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Stoner

Date: 11/28/00

DESIGNATED SEATING POSITION: Center Rear Seat

- ☒ 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 32.0 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))

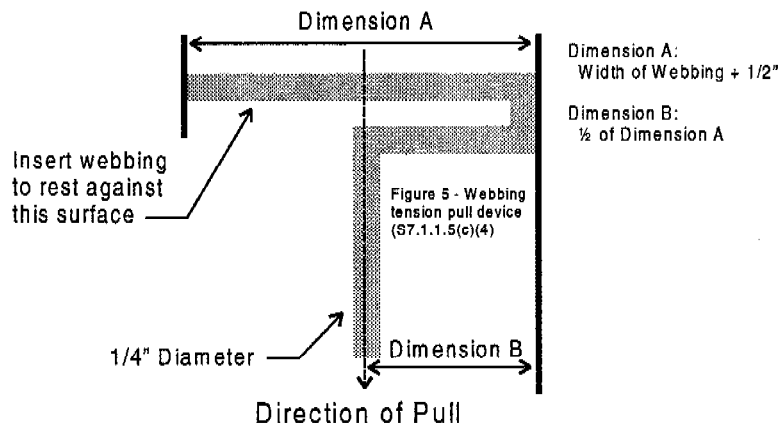
14-13= 1.0 inches

☒ 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= 33.0 inches.

☒ Yes-Pass ☐ No-Fail



FMVSS 208 Lap Belt Lockability, Cont'd.

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/Hyundai/Elantra/Sedan
NHTSA No: C10501 Technician: R. Stoner, B. Bautsch Date: 11/28/00

DESIGNATED SEATING POSITION: Right Rear Seat

- ☒ 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/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Stoner

Date: 11/28/00

DESIGNATED SEATING POSITION: Right Rear Seat

- ☒ 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 64.9 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 29.0 inches.

FMVSS 208 Lap Belt Lockability, Cont'd.

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

NHTSA No.: C10501

Technician: R. Stoner

Date: 11/28/00

DESIGNATED SEATING POSITION: Right Rear Seat

- ☒ 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 30.0 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))

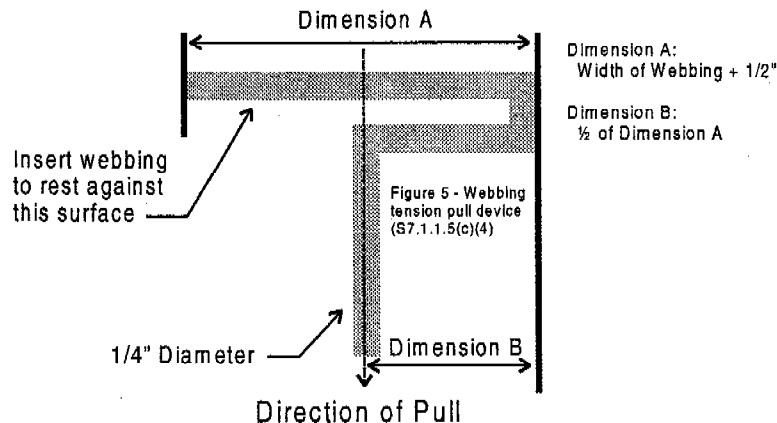
14-13= 1.0 inches

☒ 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= 34.9 inches.

☒ Yes-Pass ☐ No-Fail



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

Test Vehicle NHTSA No.: C10501

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

Designated Seating Position Tested: Left Rear Passenger

Date of Comfort and Convenience Check: 11/28/00

Technician Performing Check: R. Stoner

GVWR: 3835 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 0.45 pounds.

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

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

Test Vehicle NHTSA No.: C10501

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

Designated Seating Position Tested: Middle Rear Passenger

Date of Comfort and Convenience Check: 11/28/00

Technician Performing Check: R. Stoner

GVWR: 3835 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 0.42 pounds.

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

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

Test Vehicle NHTSA No.: C10501

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

Designated Seating Position Tested: Right Rear Passenger

Date of Comfort and Convenience Check: 11/28/00

Technician Performing Check: R. Stoner

GVWR: 3835 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 Summary, Cont'd.
Latchplate Access (S7.4.4)

Test Vehicle NHTSA No.: C10501

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

Designated Seating Position Tested: N/A

Date of Comfort and Convenience Check: 11/28/00

Technician Performing Check: R. Stoner

GVWR: 3835 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.
Retraction (S7.4.5)

Test Vehicle NHTSA No.: C10501

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

Designated Seating Position Tested: N/A

Date of Comfort and Convenience Check: 11/28/00

Technician Performing Check: R. Stoner

GVWR: 3835 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.: C10501

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

Designated Seating Position Tested: Left Rear Passenger

Date of Comfort and Convenience Check: 11/28/00

Technician Performing Check: R. Stoner

GVWR: 3835 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.: C10501

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

Designated Seating Position Tested: Middle Rear Passenger

Date of Comfort and Convenience Check: 11/28/00

Technician Performing Check: R. Stoner

GVWR: 3835 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.: C10501

Vehicle Model Year/Make/Model/Body Style: 2001/Hyundai/Elantra/Sedan

Designated Seating Position Tested: Right Rear Passenger

Date of Comfort and Convenience Check: 11/28/00

Technician Performing Check: R. Stoner

GVWR: 3835 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

Appendix A

Photographs

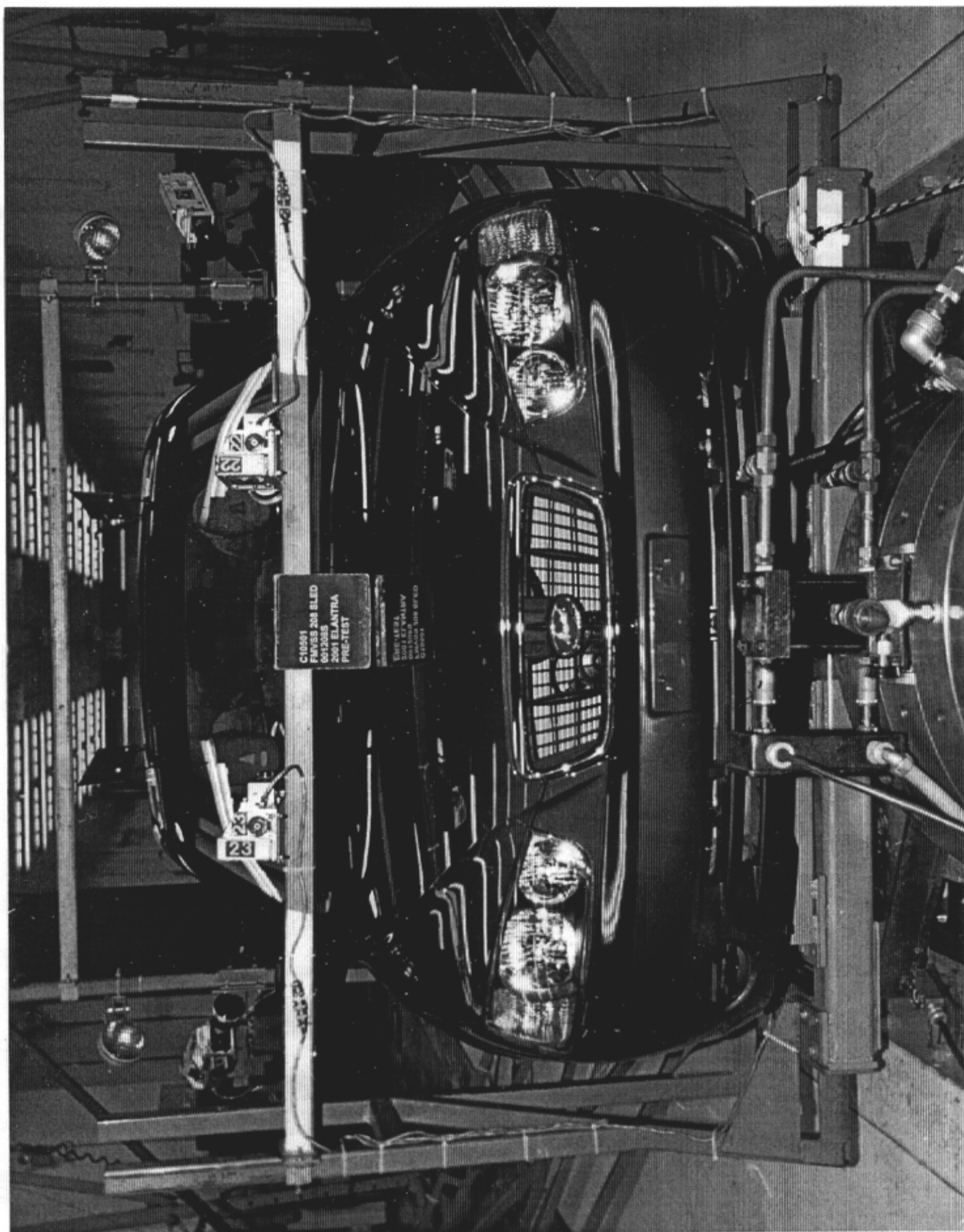


Figure A-1 Pre-Test Front View of Test Vehicle Mounted to Sled

A-2

S001208

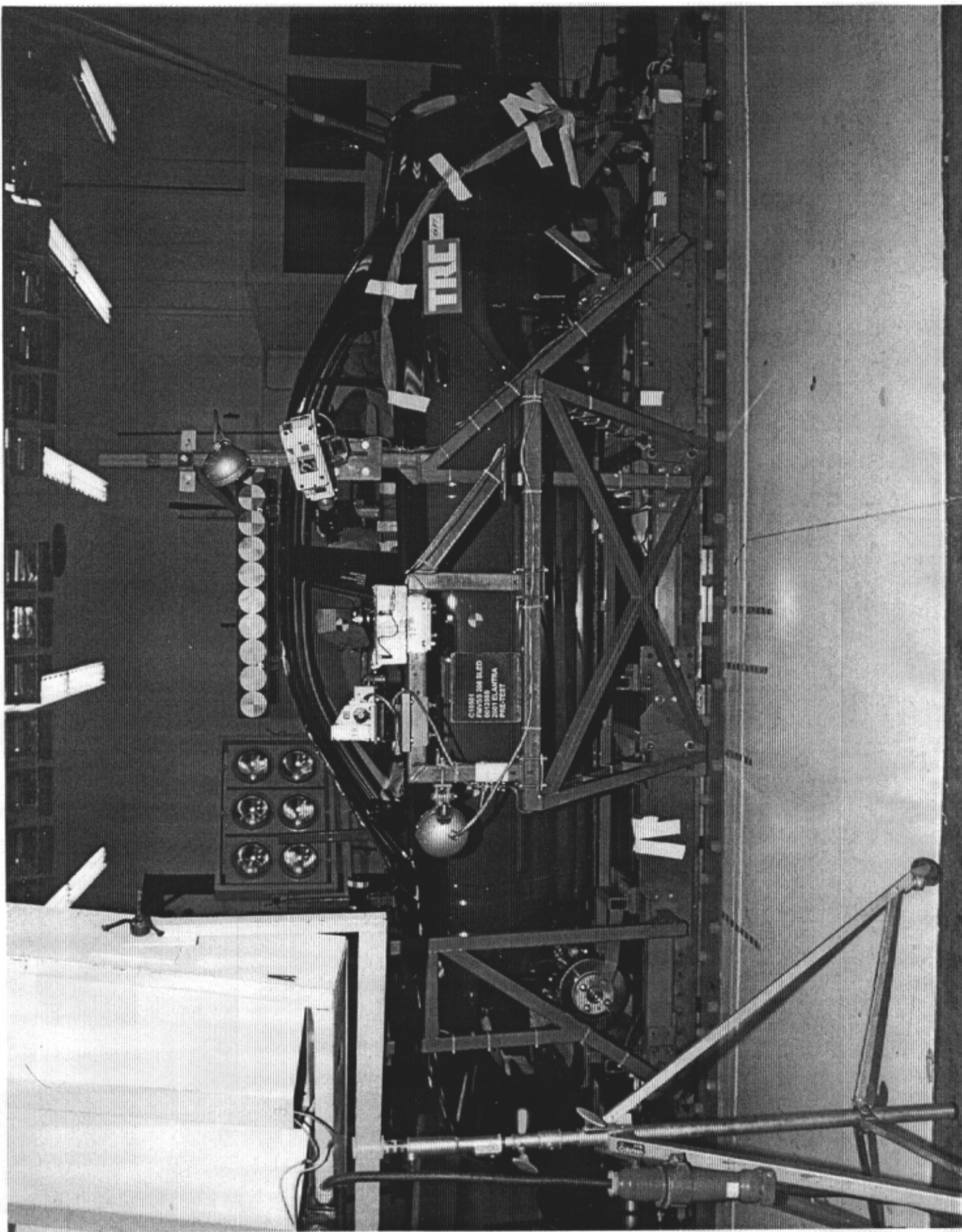


Figure A-2 Pre-Test Left Side View of Test Vehicle Mounted to Sled

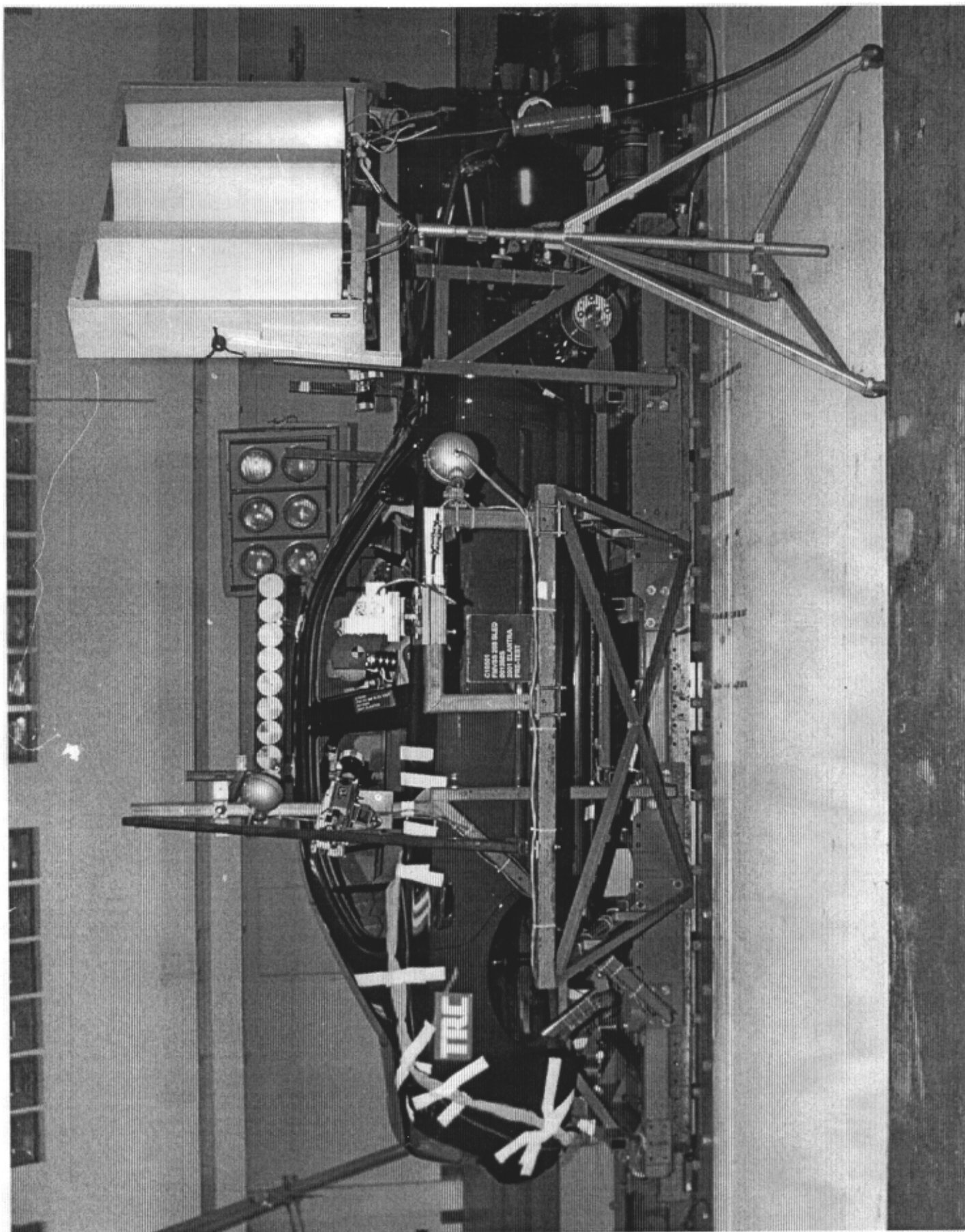


Figure A-3 Pre-Test Right Side View of Test Vehicle Mounted to Sled

A-4

S001208

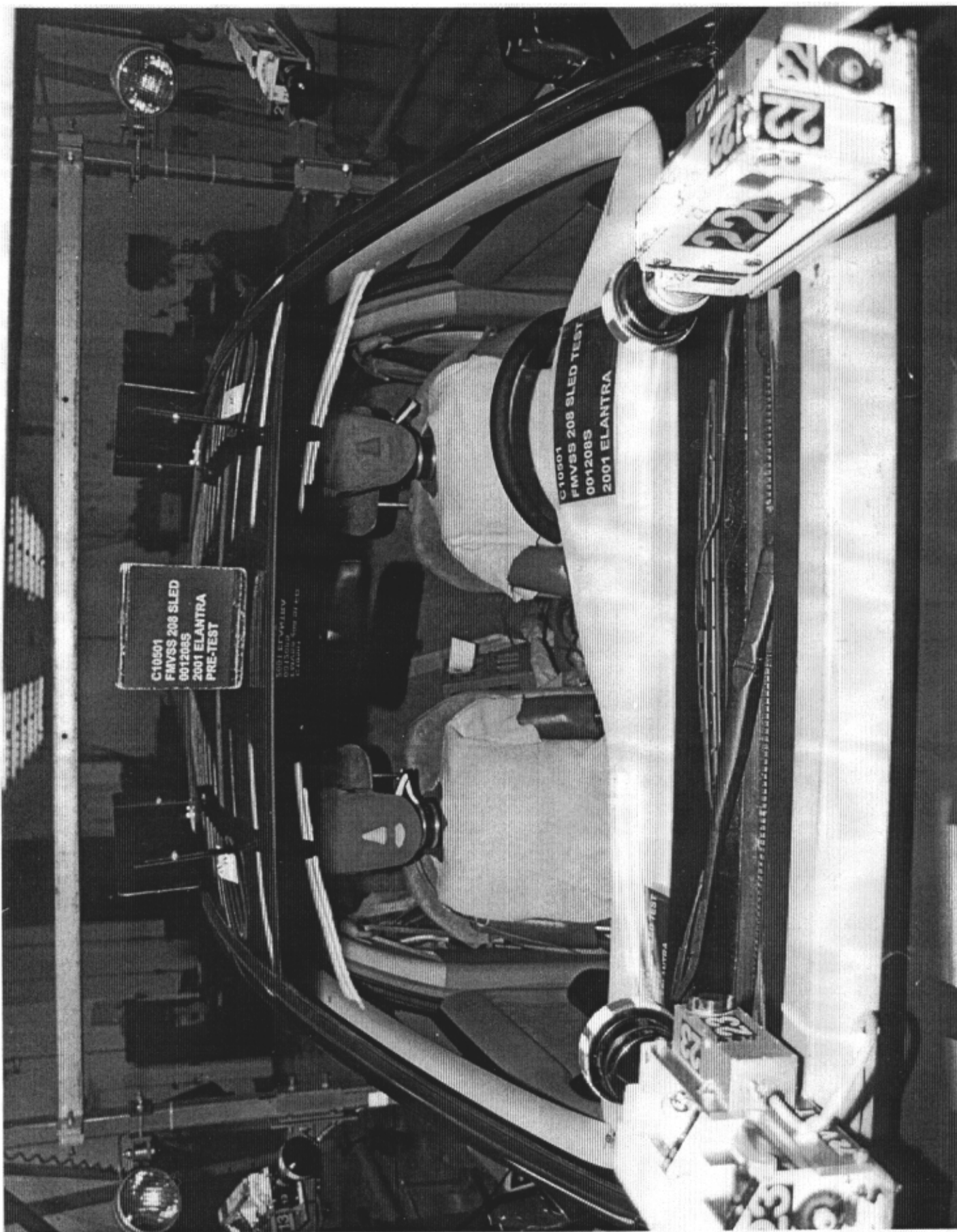


Figure A-4 Pre-Test Windshield View
A-5

S001208

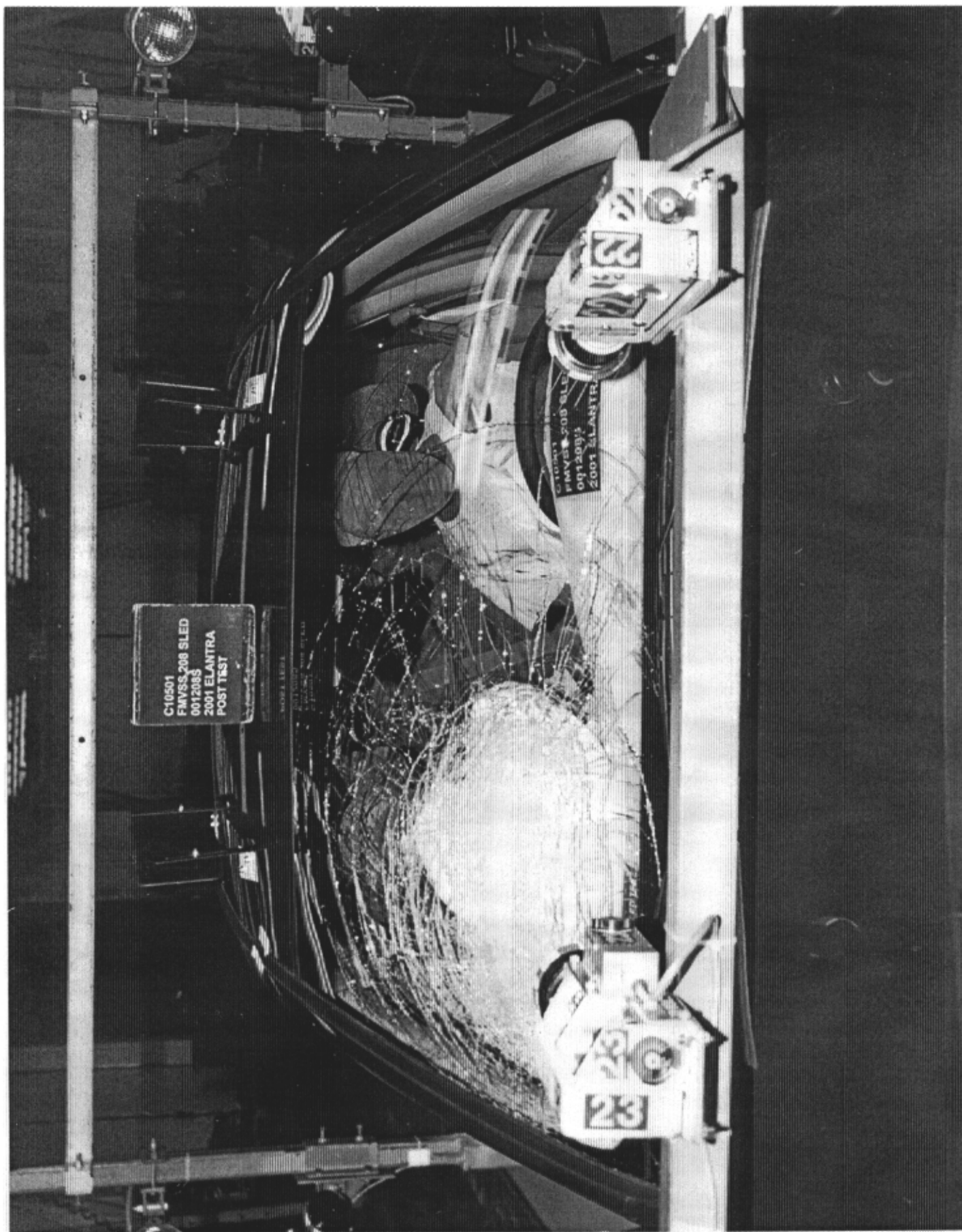


Figure A-5 Post-Test Windshield View
A-6

S001208



Figure A-6 Pre-Test Driver Dummy Position View with Door Open



Figure A-7 Post-Test Driver Dummy Position View with Door Open

A-8

S001208

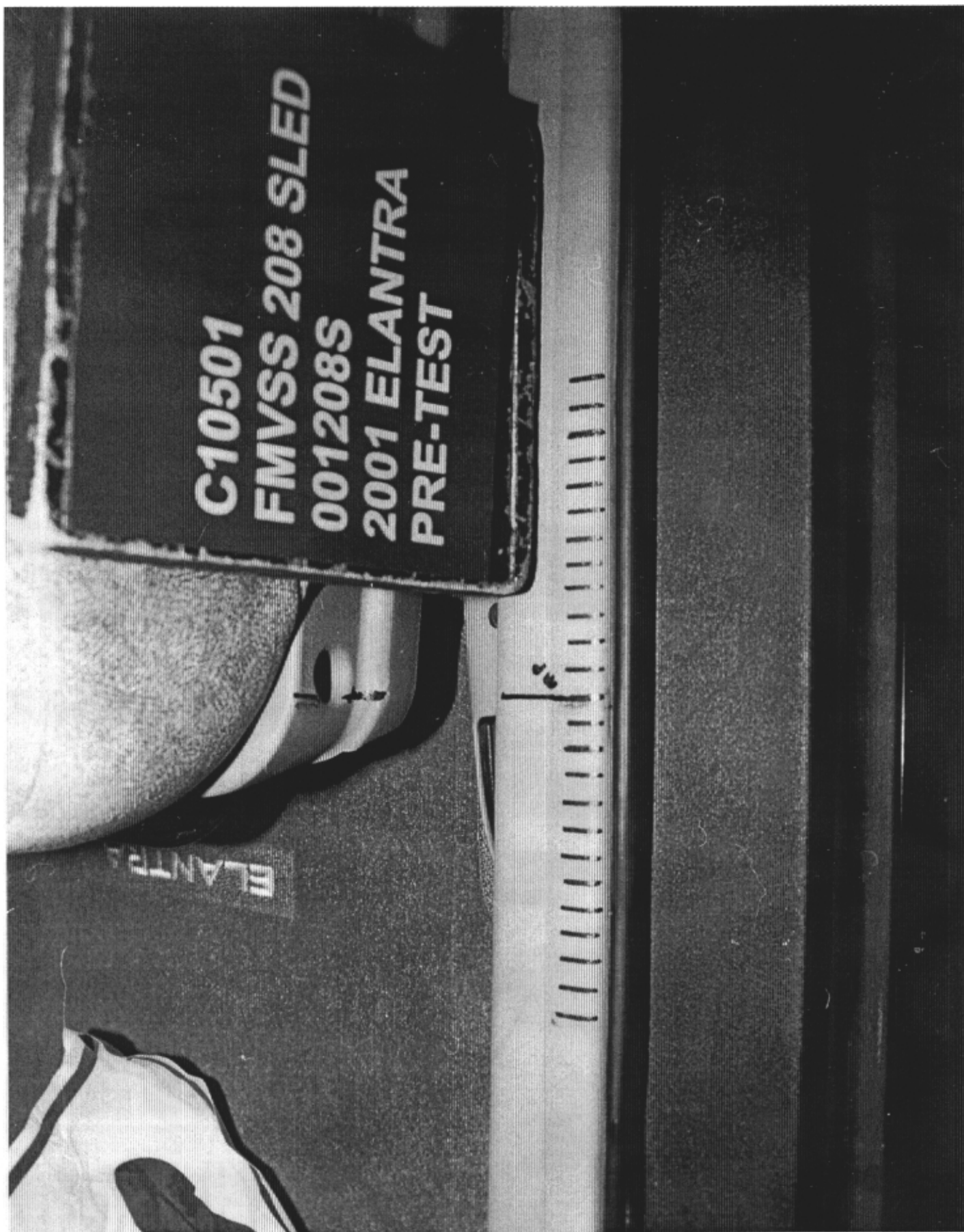


Figure A-8 Pre-Test Driver Seat Track Position View



Figure A-9 Post-Test Driver Seat Track Position View

A-10

S001208

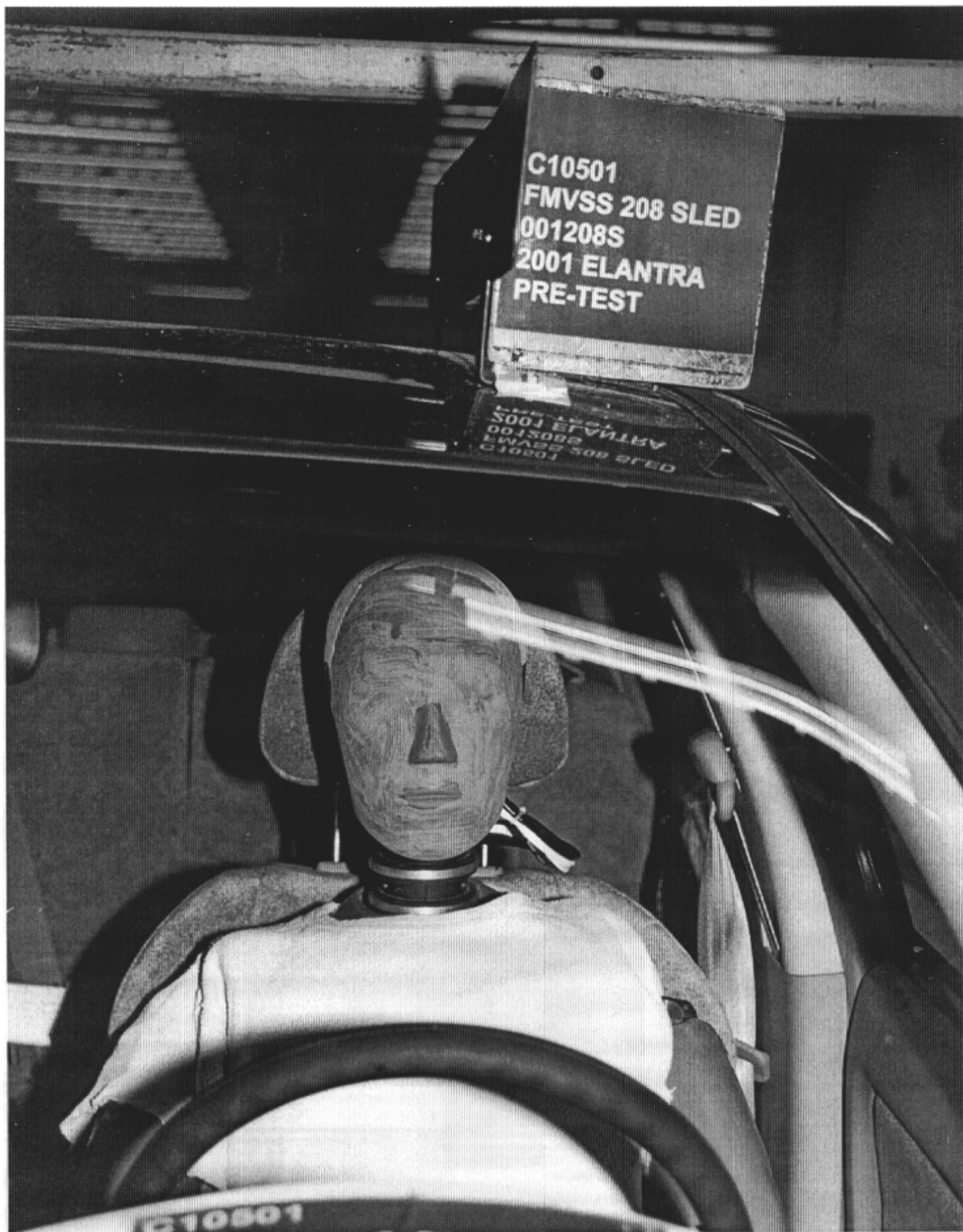


Figure A-10 Pre-Test Driver Dummy Position Front View

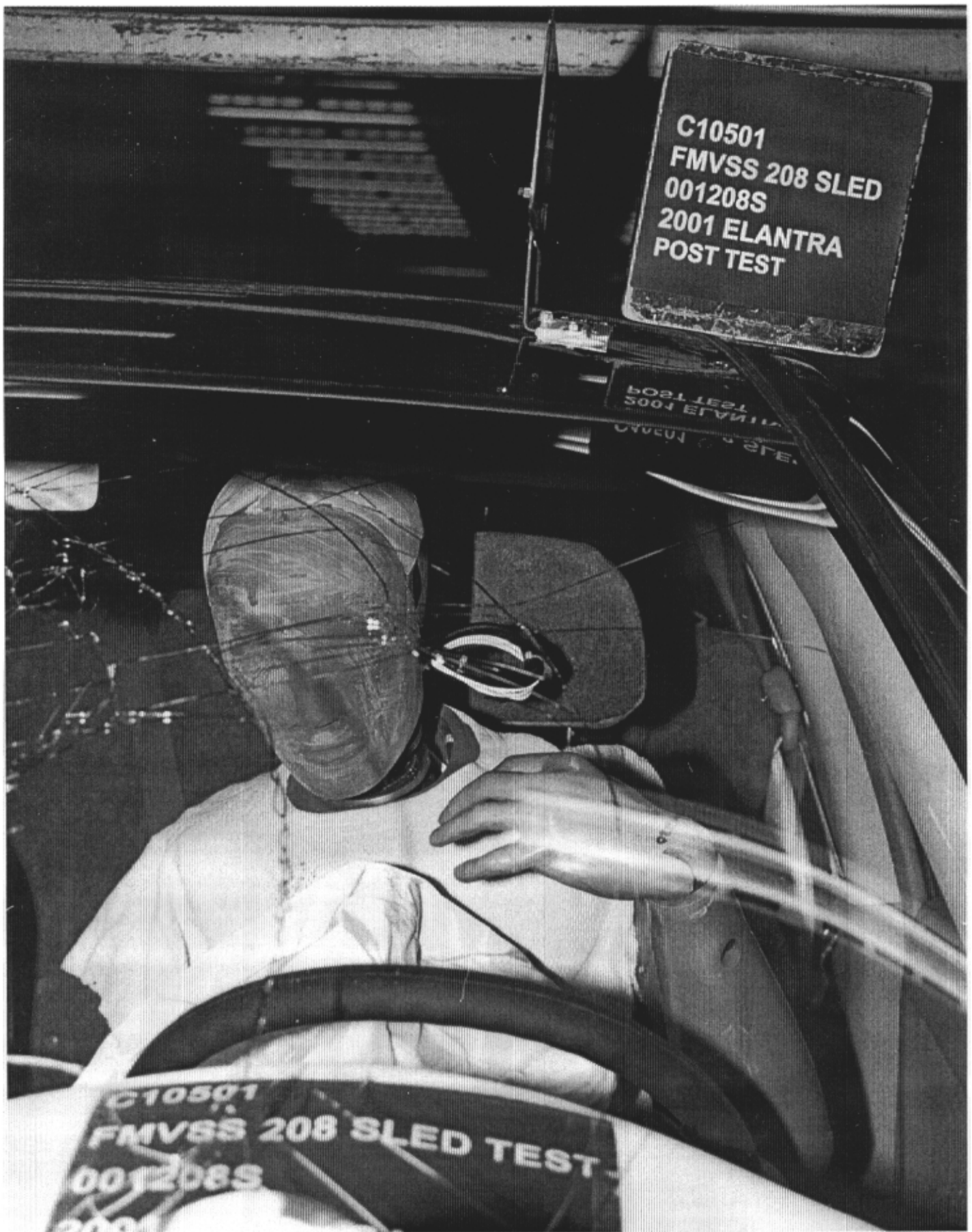


Figure A-11 Post-Test Driver Dummy Position Front View

A-12

S001208



Figure A-12 Pre-Test Passenger Dummy Position View with Door Open
A-13 S001208

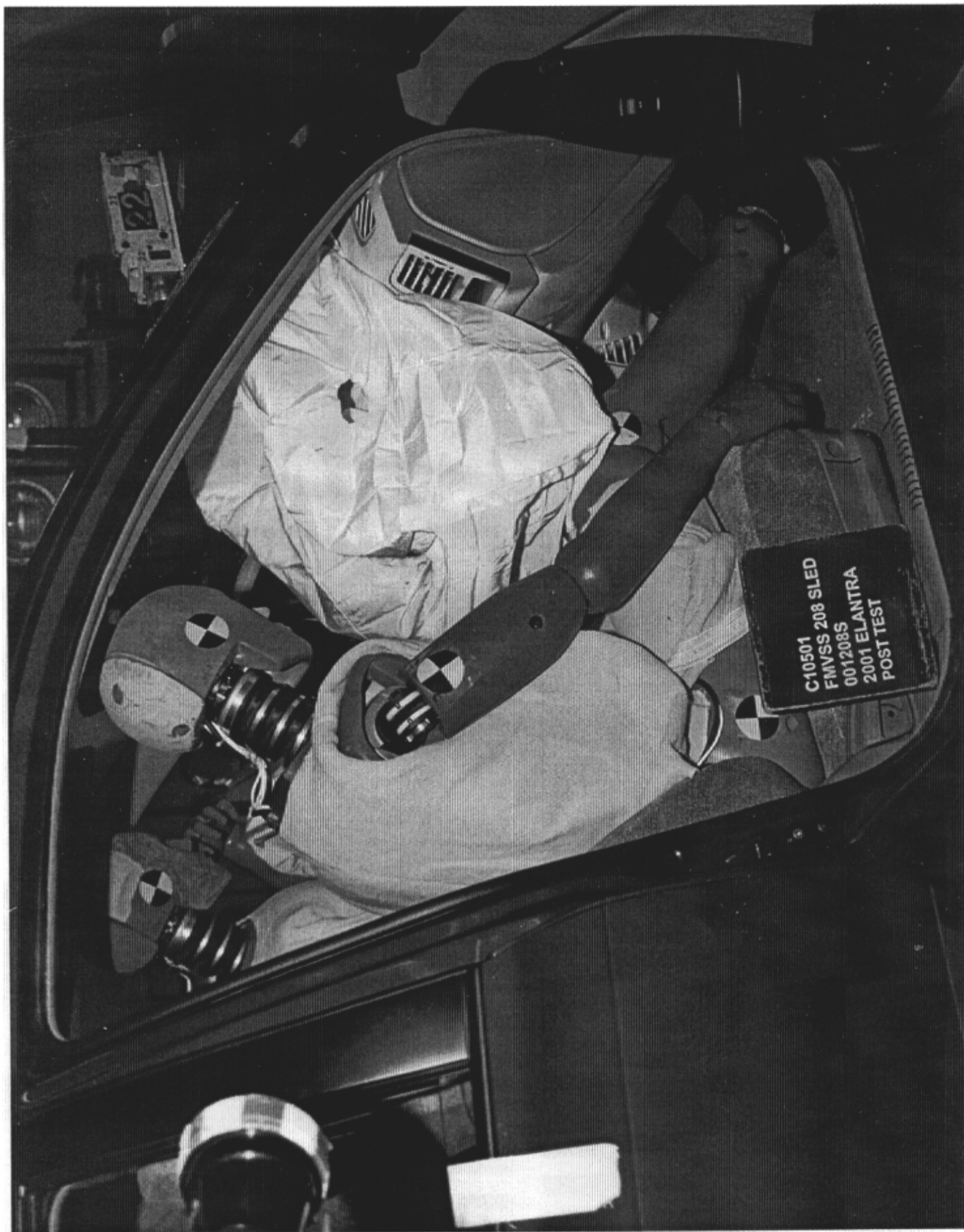


Figure A-13 Post-Test Passenger Dummy Position View with Door Open
A-14 S001208



Figure A-14 Pre-Test Passenger Seat Track Position View
A-15

S001208

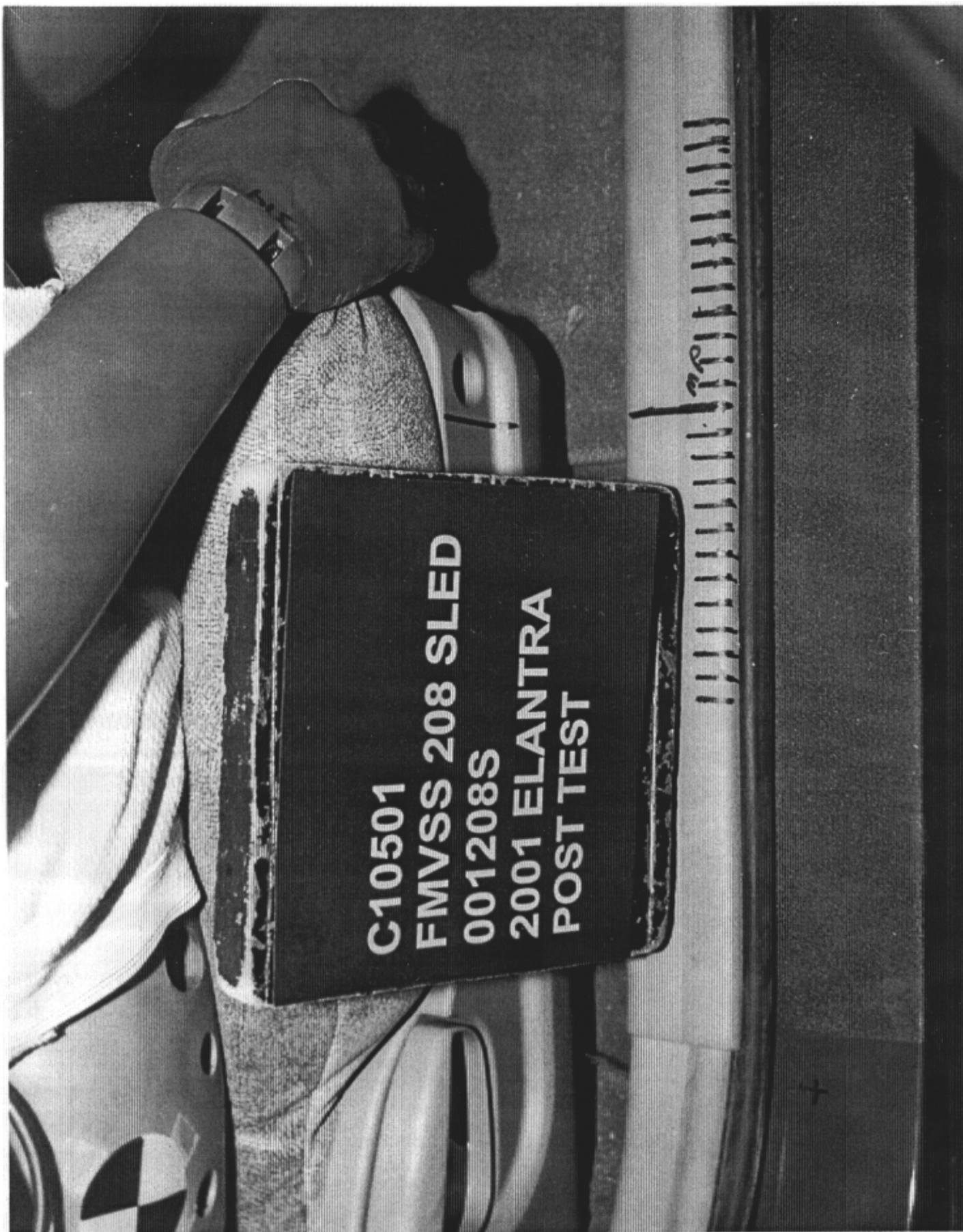


Figure A-15 Post-Test Passenger Seat Track Position View

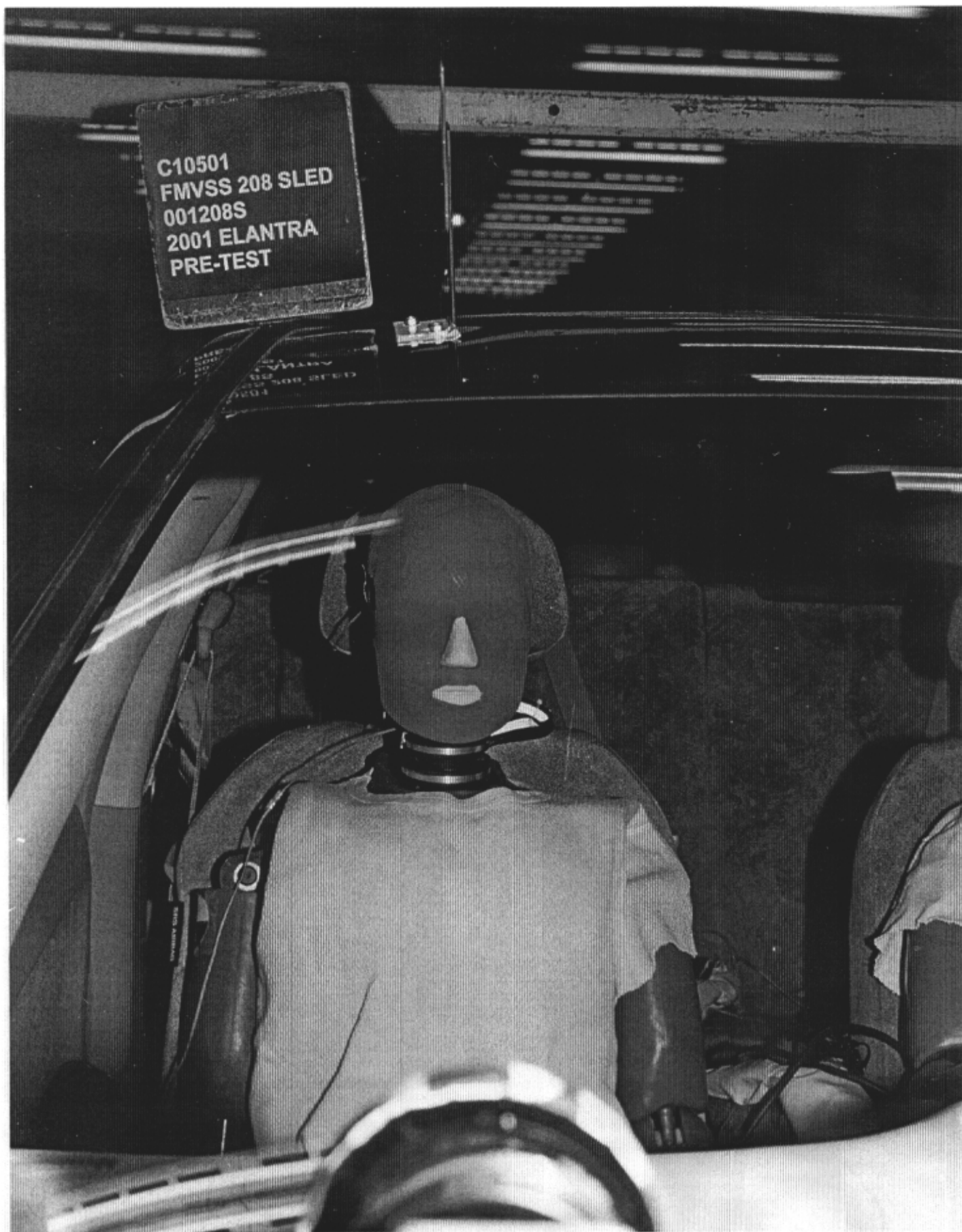


Figure A-16 Pre-Test Passenger Dummy Position Front View

A-17

S001208

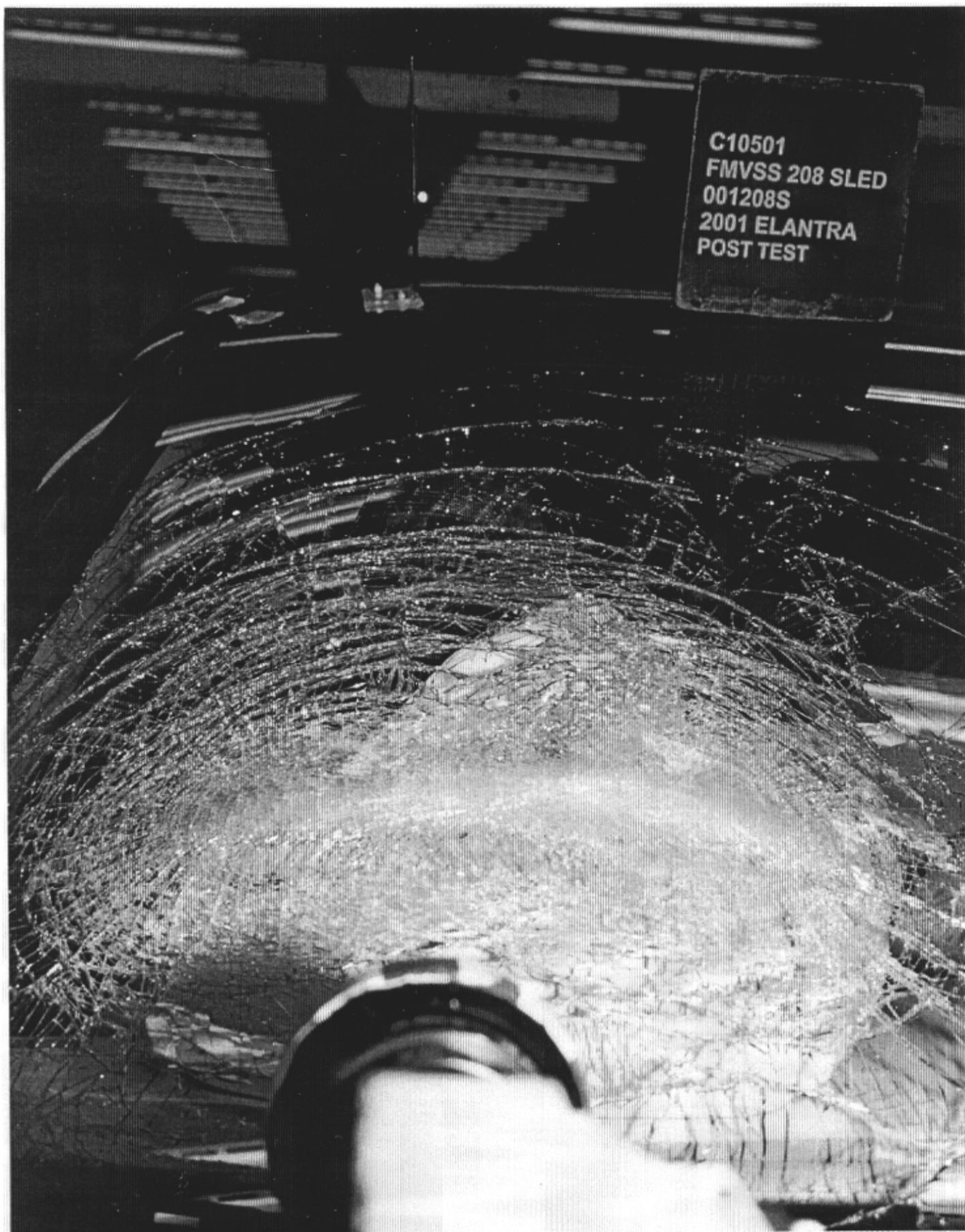


Figure A-17 Post-Test Passenger Dummy Position Front View



Figure A-18 Post-Test Driver Dummy Removed from Vehicle Overall View

A-19

S001208



Figure A-19 Post-Test Driver Airbag - View 1
A-20

S001208



Figure A-20 Post-Test Driver Airbag - View 2
A-21

S001208



C10501
FMVSS 208 SLED
001208S
2001 ELANTRA
POST TEST

Figure A-21 Post-Test Driver Head Contact View
A-22

S001208

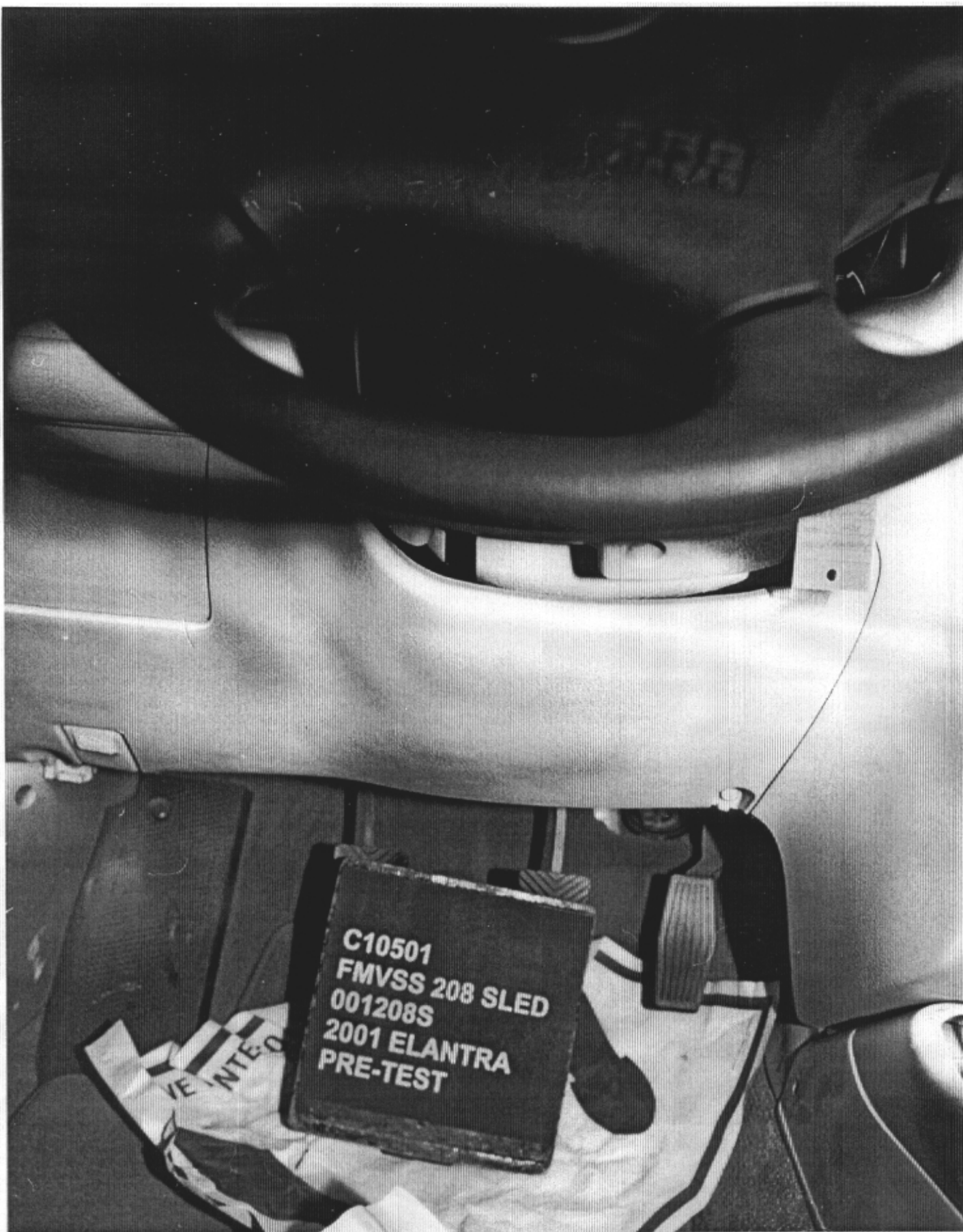


Figure A-22 Pre-Test Driver Knee Bolster View
A-23

S001208

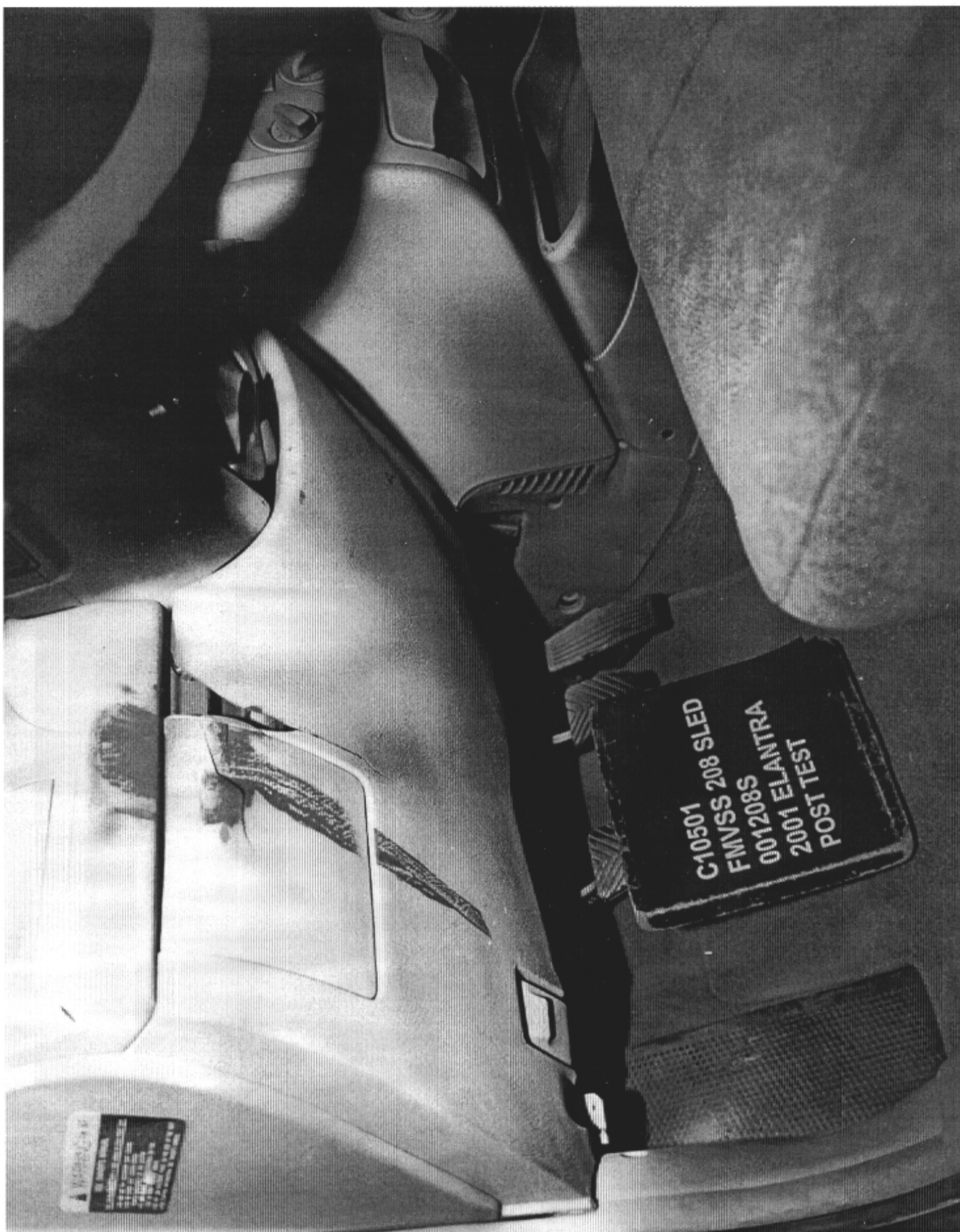


Figure A-23 Post-Test Driver Knee Bolster - View 1
A-24

S001208



Figure A-24 Post-Test Driver Knee Bolster - View 2
A-25

S001208



Figure A-25 Post-Test Passenger Dummy Removed from Vehicle Overall View
A-26 S001208



Figure A-26 Post-Test Passenger Airbag - View 1
A-27

S001208



Figure A-27 Post-Test Passenger Airbag - View 2
A-28

S001208



Figure A-28 Pre-Test Passenger Glove Box View



Figure A-29 Post-Test Passenger Glove Box View
A-30

S001208

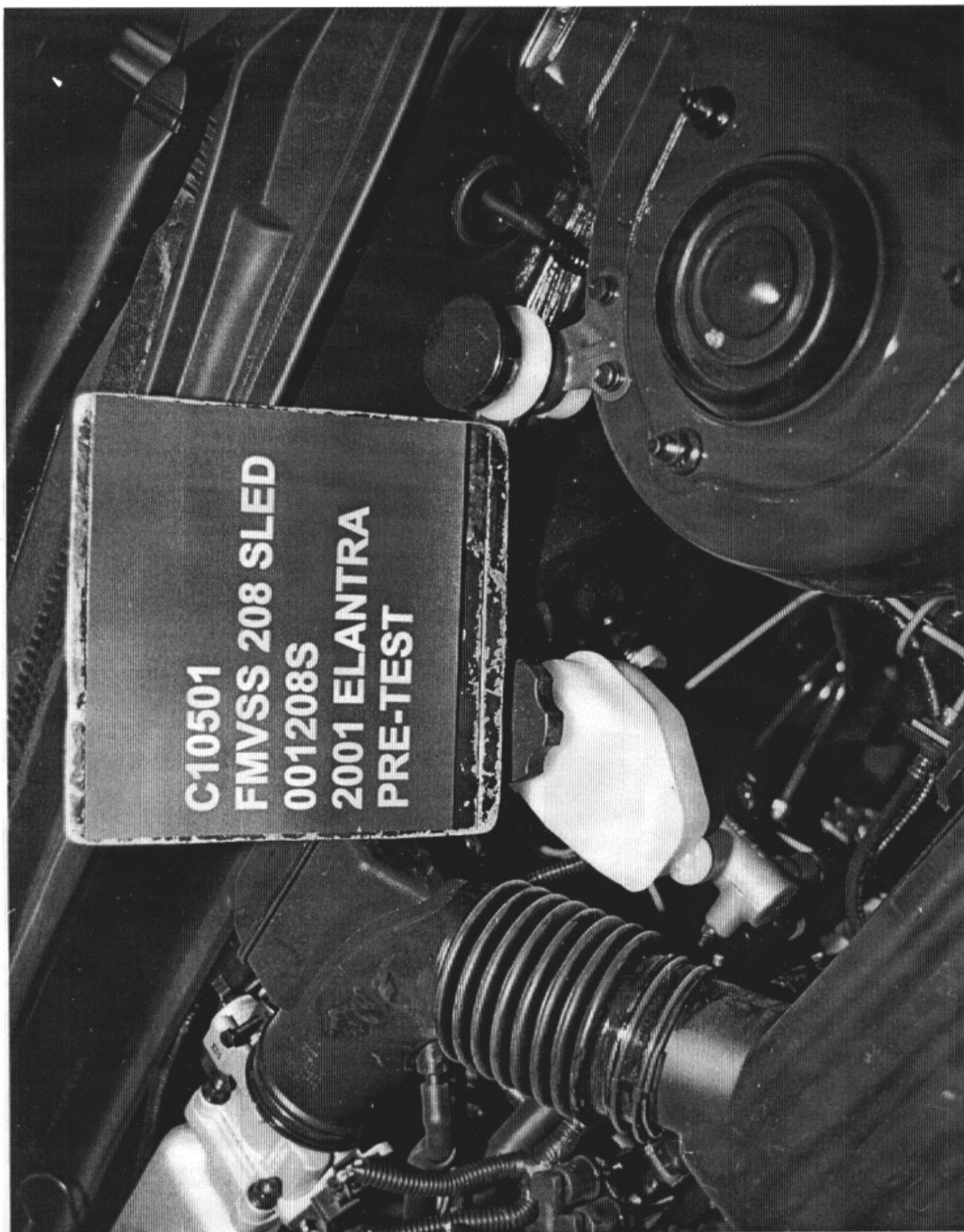


Figure A-30 Pre-Test Steering Column Linkage in Engine Compartment View

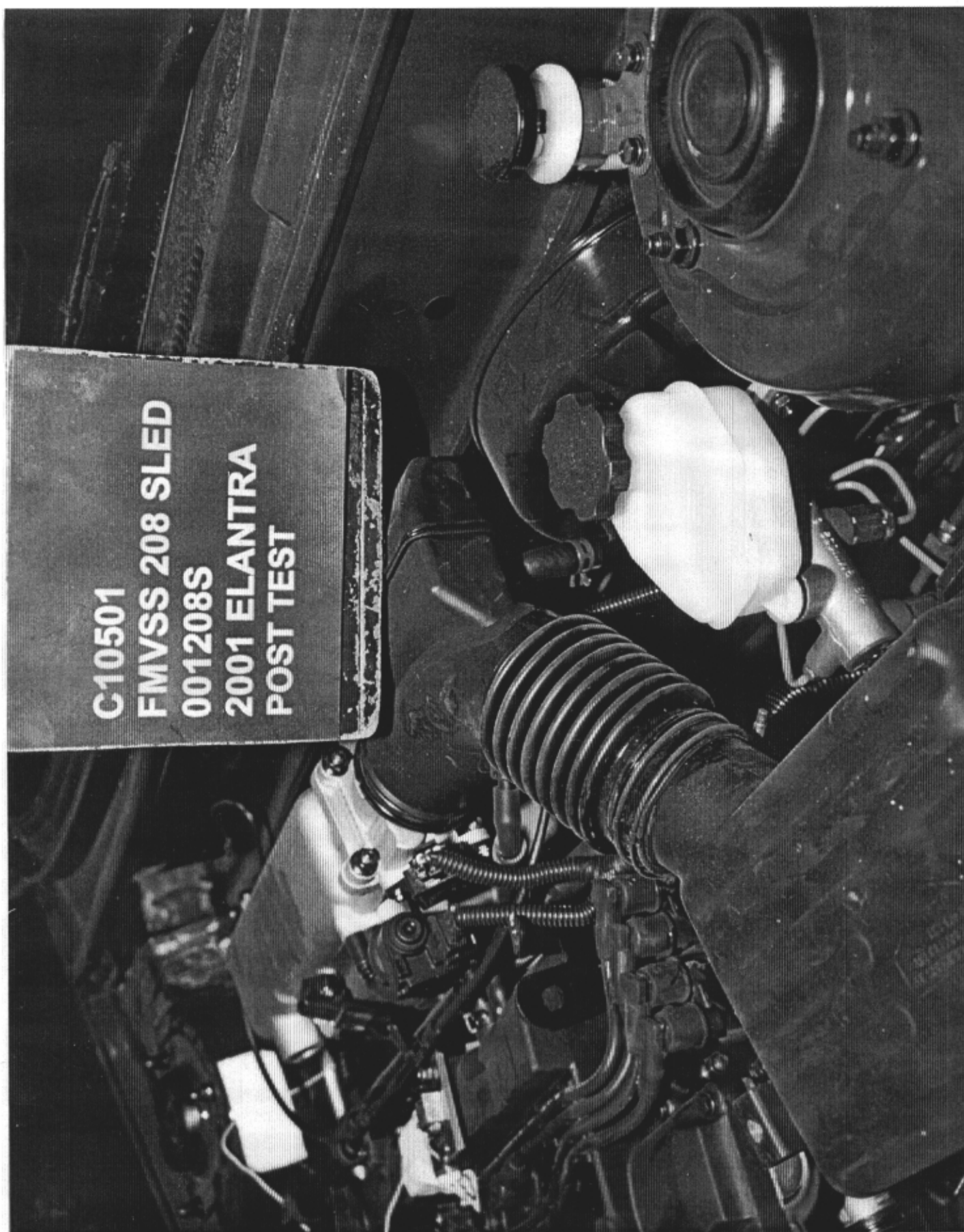


Figure A-31 Post-Test Steering Column Linkage in Engine Compartment View
A-32 S001208

HYUNDAI MOTOR COMPANY
AUG/9/00 GWR 3835 LBS PAINTAL
GAWR 2070 LBS TRIMZE
REAR 1850 LBS
THIS VEHICLE CONFORMS TO ALL APPLICABLE USA FEDERAL
MOTOR VEHICLE SAFETY BUMPER AND THEFT PREVENTION STANDARDS
IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE
V.I.N. KMHDN45D21UD31343
PASSENGER CAR

Figure A-32 Pre-Test Vehicle Certification Label View
A-33

S001208

1	TIRE INFLATION PRESSURE (COLD)	
STANDARD INFLATION PRESSURE FOR ALL LOAD		
1ST SEAT	2 PASS.	
2ND SEAT	3 PASS.	
TOTAL	5 PASS.	
LUGGAGE	45kg (100LBS)	
VEHICLE CAPACITY WT.	365kg (850LBS)	
TIRE	P185/65R15 86T	
SIZE	P195/60R15 87H	
FRONT	REAR	
210kPa (30psi)	210kPa (30psi)	
TIRE SIZE T125/70D15 T125/70R15 TEMPORARY USE ONLY		
420kPa (60psi)		

Figure A-33 Pre-Test Vehicle Tire Load Label View
A-34

S001208

Appendix B

Data Plots

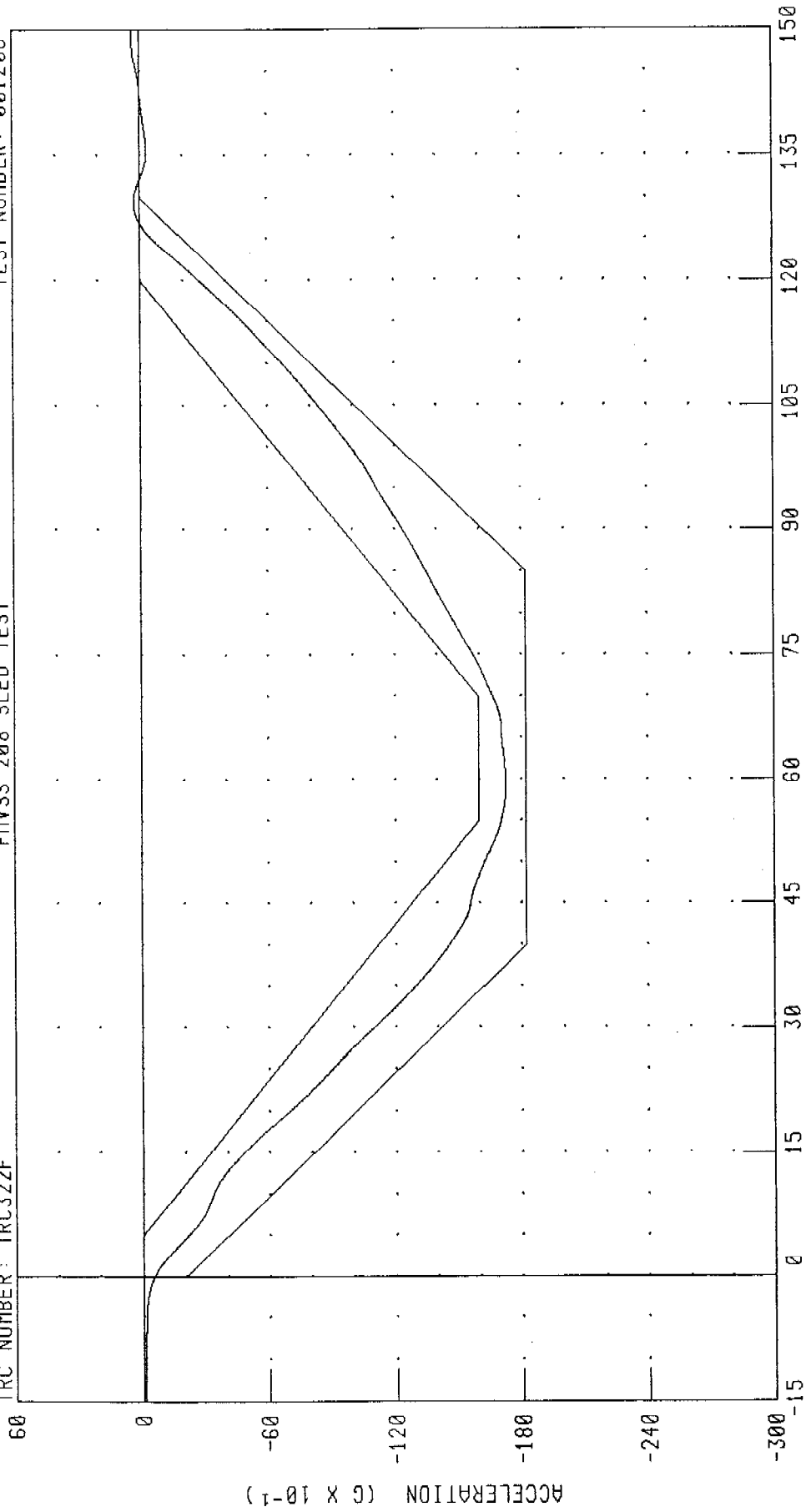
C10501 / 2001 HYUNDAI ELANTRA

SLED ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



CHANNEL: SLDXC FILTER: CH. CLASS 60

PEAK DATA: 0.36 G @ 148.64 MS; -17.26 G @ 58.88 MS

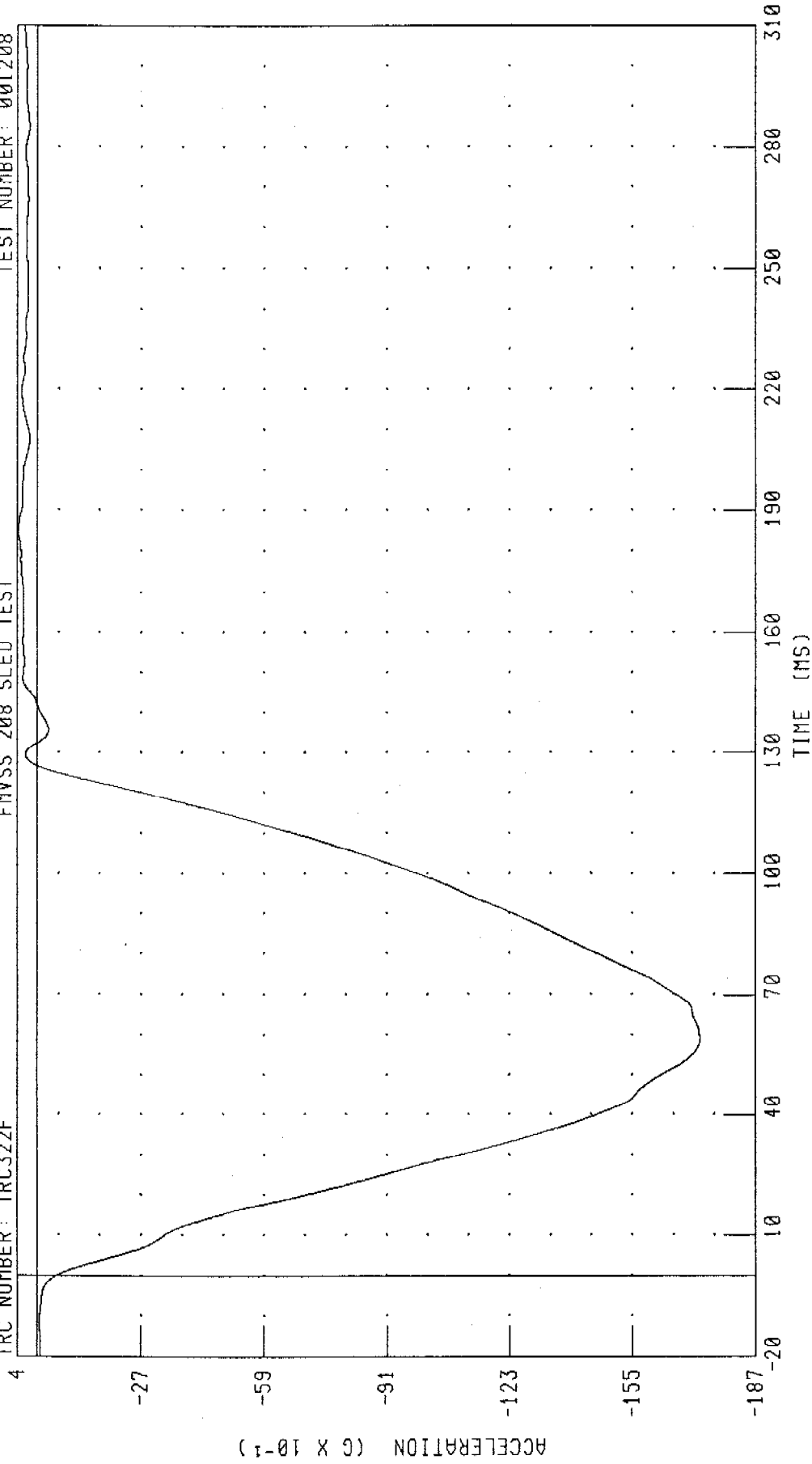
C10501 / 2001 HYUNDAI ELANTRA

SLED ACCELERATION

FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



PEAK DATA: 0.48 G @ 184.88 MS; -17.26 G @ 58.88 MS

CHANNEL: SLDXC FILTER: CH. CLASS 60

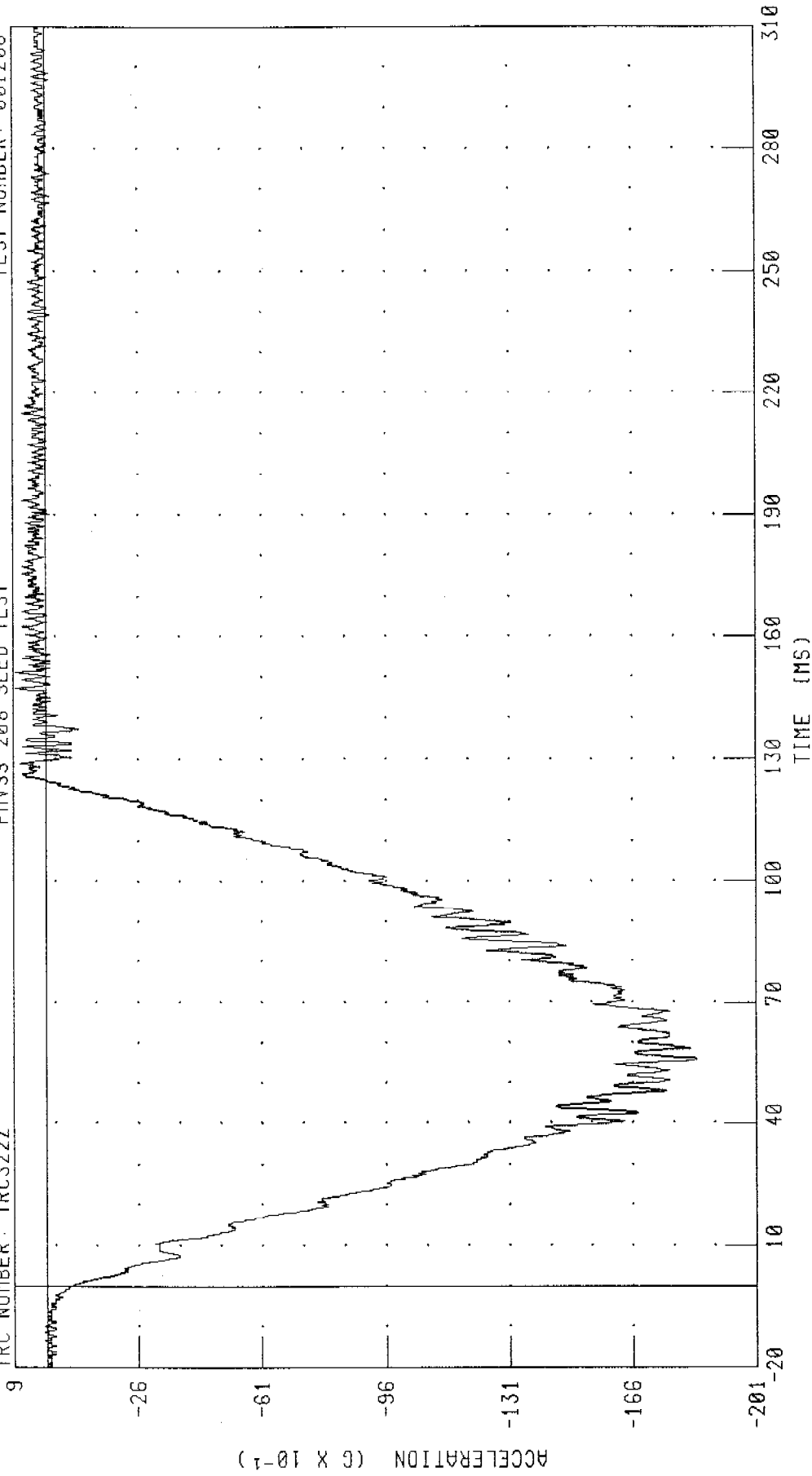
C10501 / 2001 HYUNDAI ELANTRA

SLED ACCELERATION PRE-FILTERED AT 200 HZ TO DETERMINE HALF G

TEST NUMBER: 001208

TRC NUMBER: TRC322Z

FNVS 208 SLED TEST



PEAK DATA: 0.84 G @ 147.28 MS; -18.43 G @ 55.84 MS

CHANNEL: SLDXGA FILTER: CH. CLASS 1000

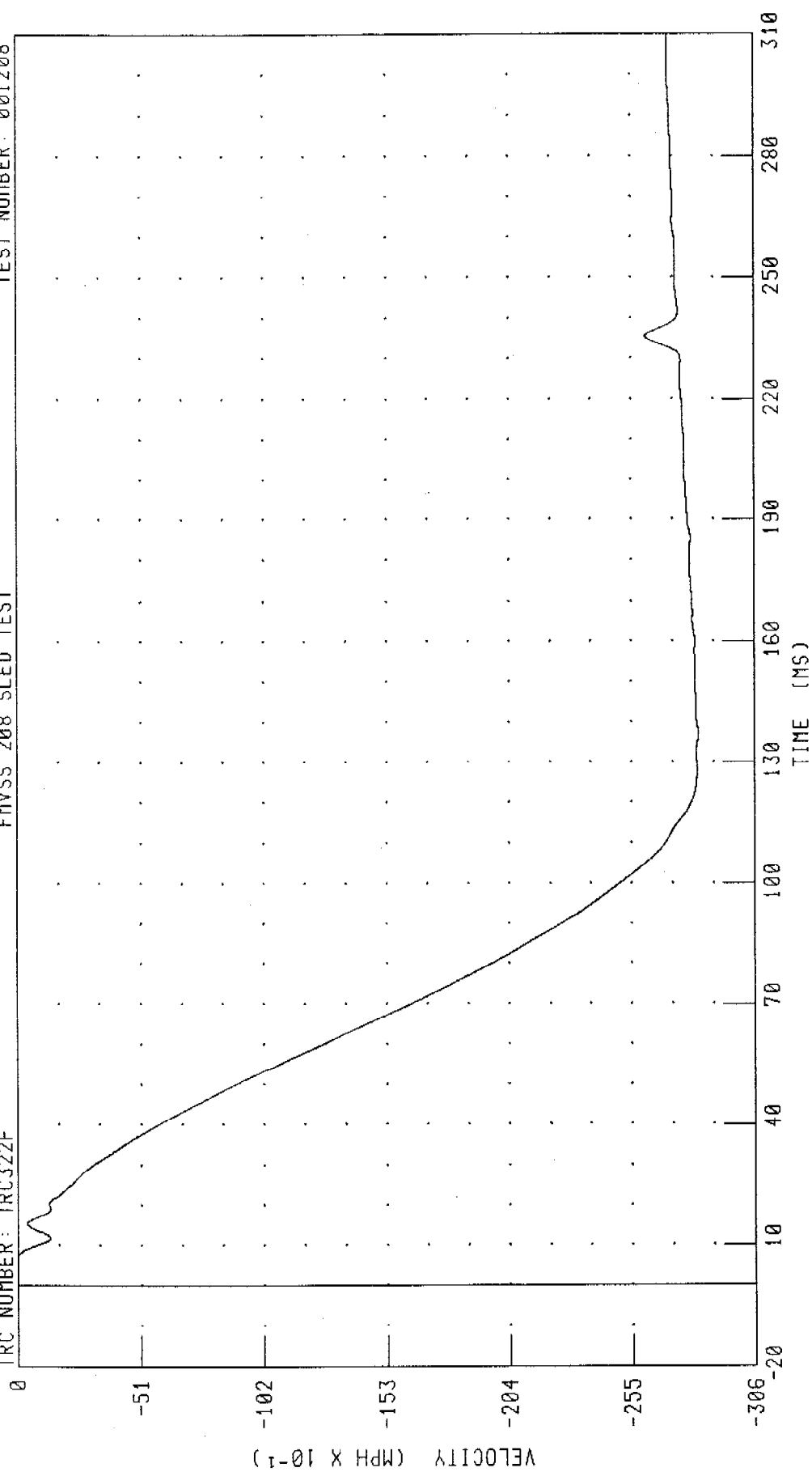
C10501 / 2001 HYUNDAI ELANTRA

MEASURED VELOCITY TRAP

FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



CHANNEL: SLDXV

FILTER: CH. CLASS 60

PEAK DATA: 0.06 MPH @ 5.92 MS; -28.28 MPH @ 137.12 MS

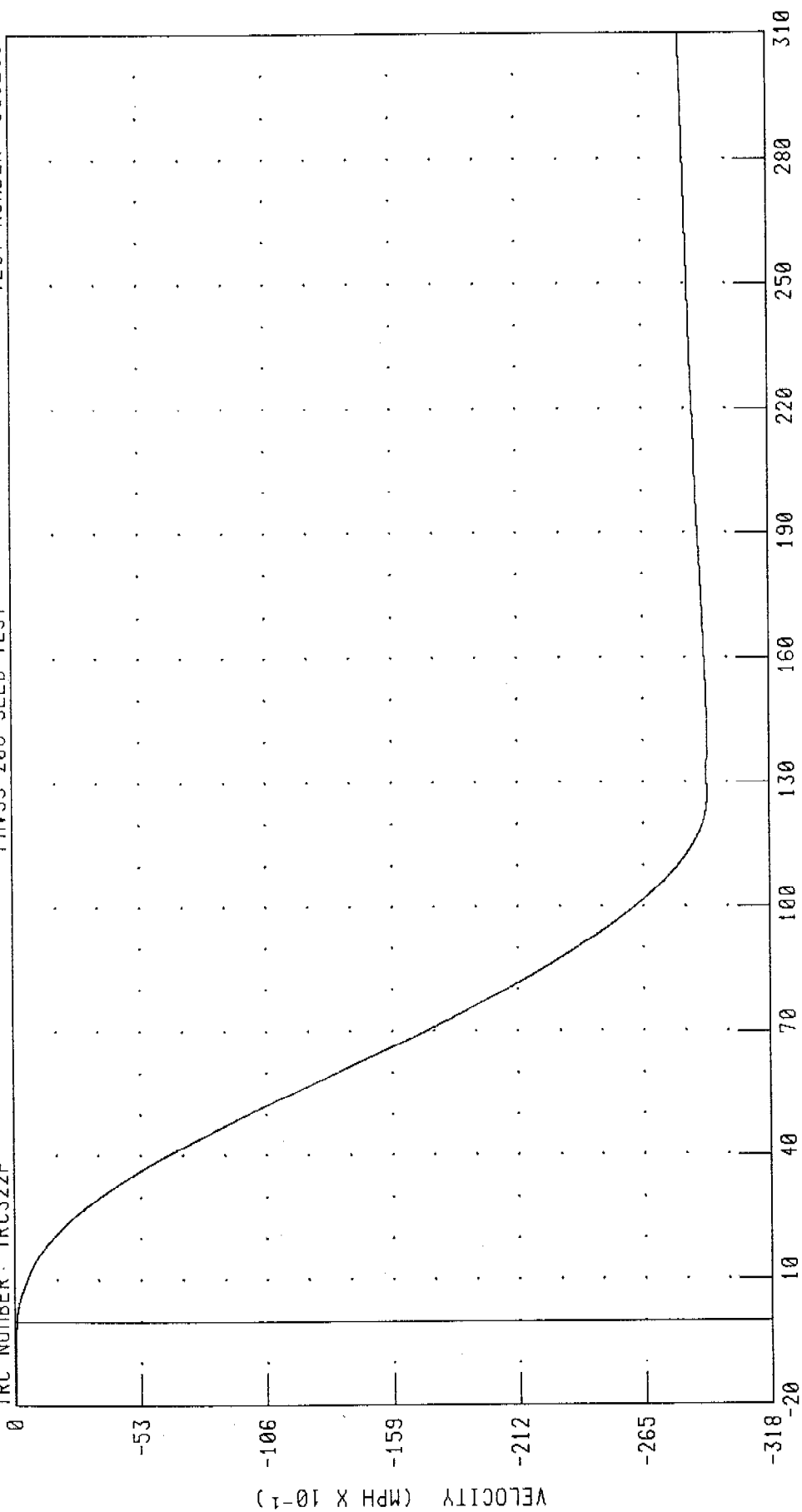
C10501 / 2001 HYUNDAI ELANTRA

SLED VELOCITY (INTEGRATED)

TEST NUMBER: 001208

FMVSS 208 SLED TEST

TRC NUMBER: TRC322F



TIME (MS)

PEAK DATA: -0.01 MPH @ -20.00 MS; -29.20 MPH @ 140.88 MS

CHANNEL: SLDXVI FILTER: CH. CLASS 180

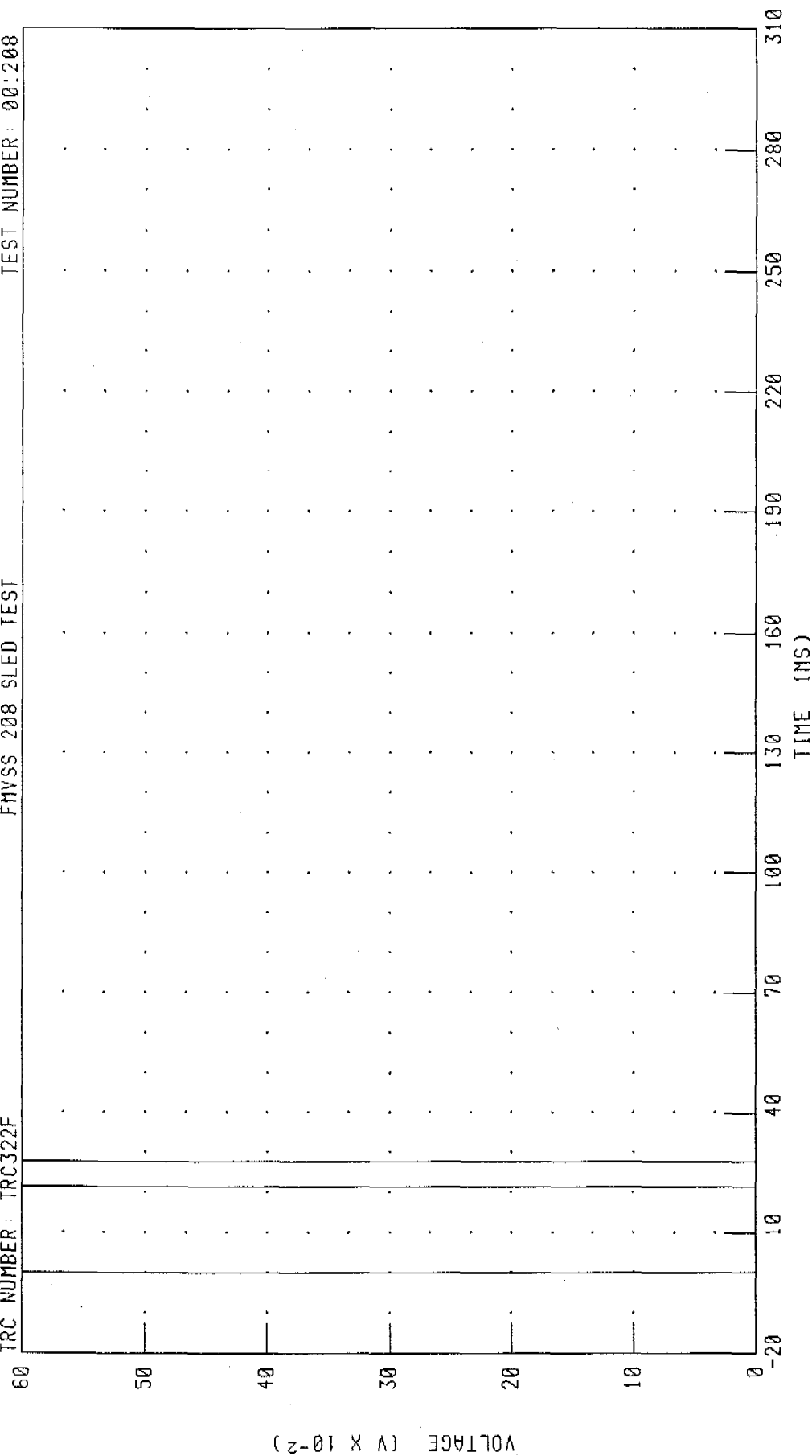
C10501 / 2001 HYUNDAI ELANTRA

DRIVER AIRBAG EVENT

FMVSS 208 SLED TEST

TRC NUMBER: TRC322F

TEST NUMBER: 001208



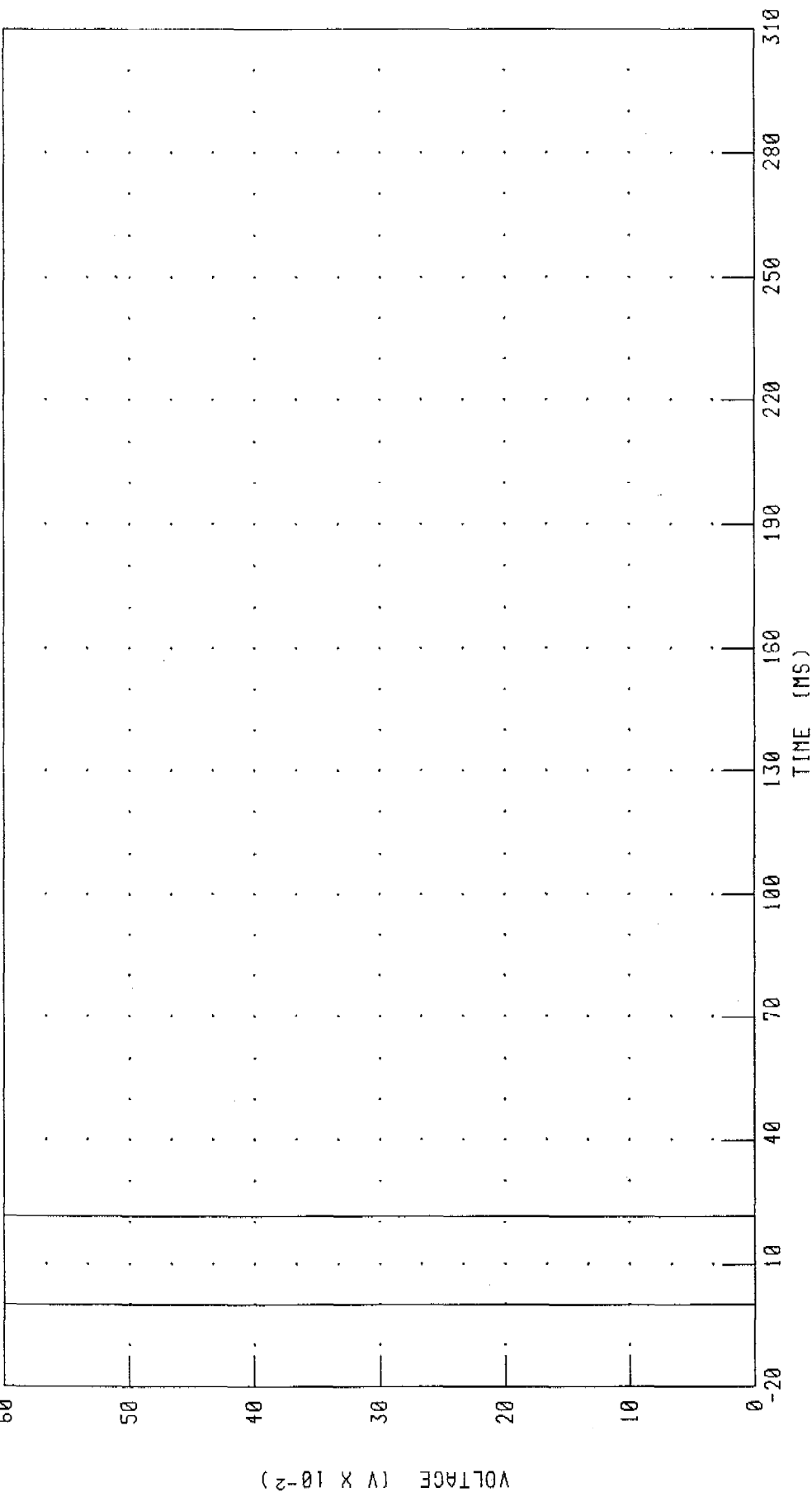
CHANNEL: ABEVT1 FILTER: CH. CLASS 1000

PEAK DATA: 1.00 V @ 21.60 MS, 0.00 V @ -20.00 MS

C10501 / 2001 HYUNDAI ELANTRA
PASSENGER AIRBAG EVENT
FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



CHANNEL: ABEVT2 FILTER: CH. CLASS 1000

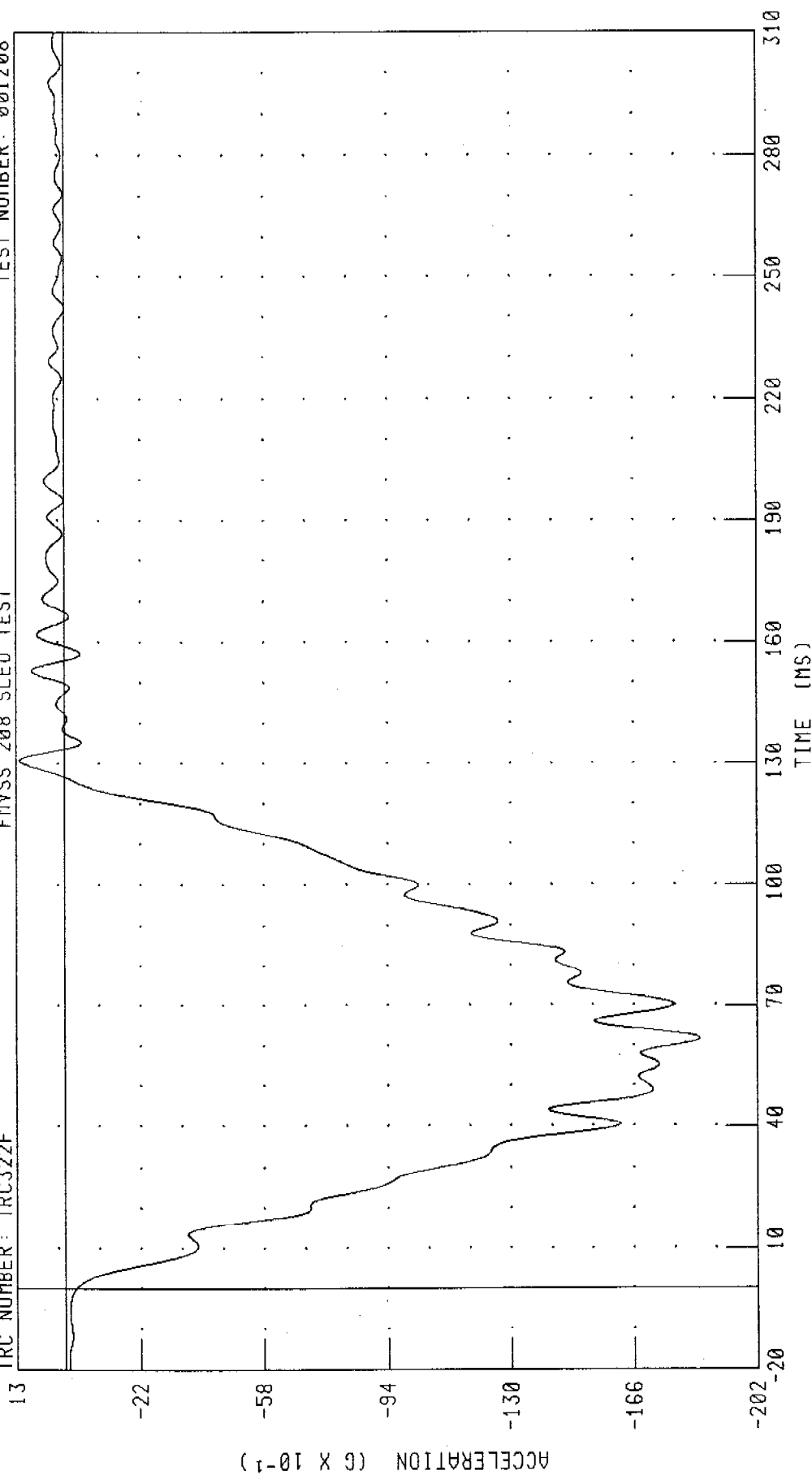
PEAK DATA: 1.00 V @ 21.60 MS; 0.00 V @ -20.00 MS

C10501 / 2001 HYUNDAI ELANTRA
REAR AXLE X-AXIS ACCELERATION

FHVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



PEAK DATA: 1.32 G @ 130.88 MS; -18.54 G @ 61.68 MS

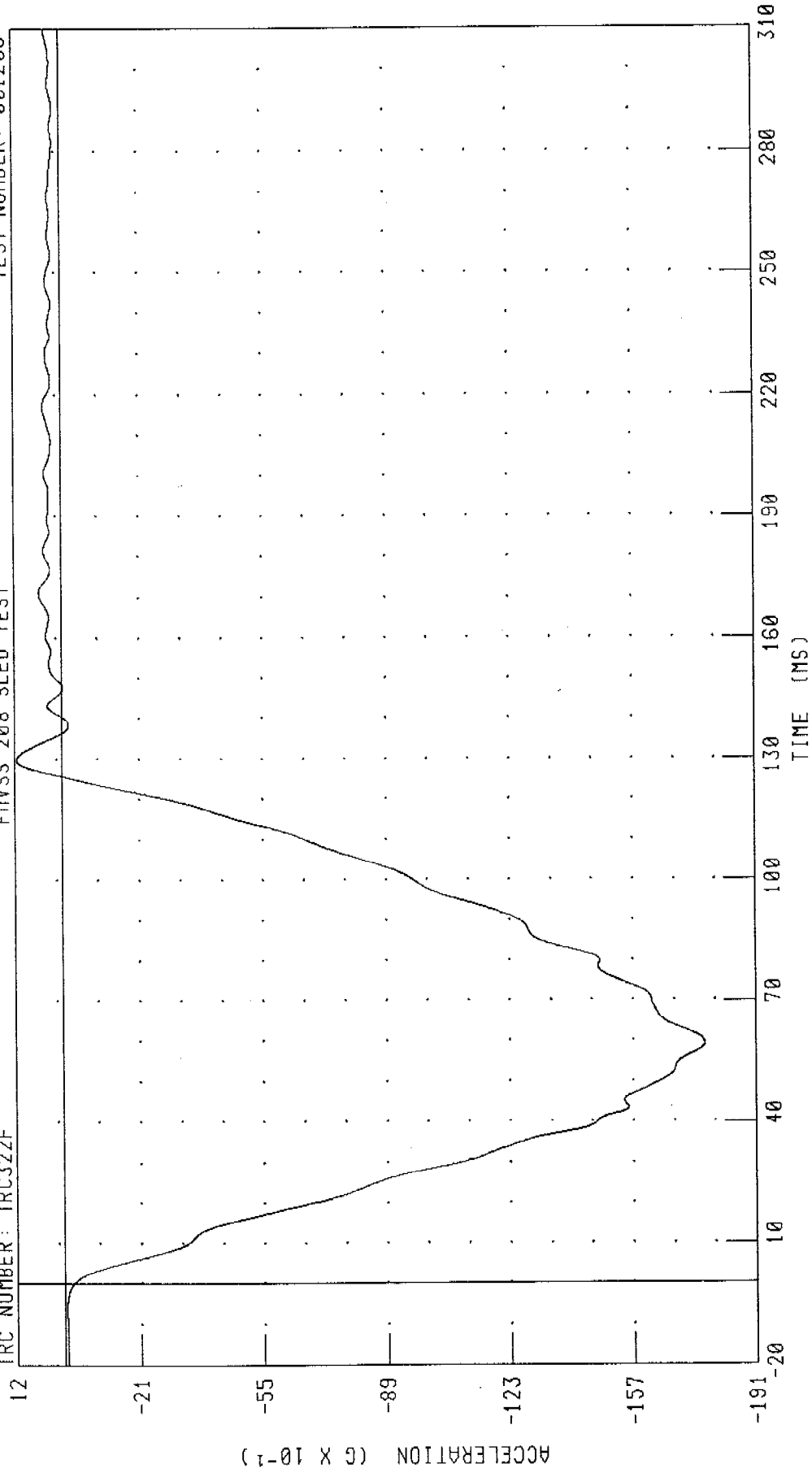
FILTER: CH. CLASS 60

CHANNEL: RAXC

C10501 / 2001 HYUNDAI ELANTRA
LEFT BODY X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



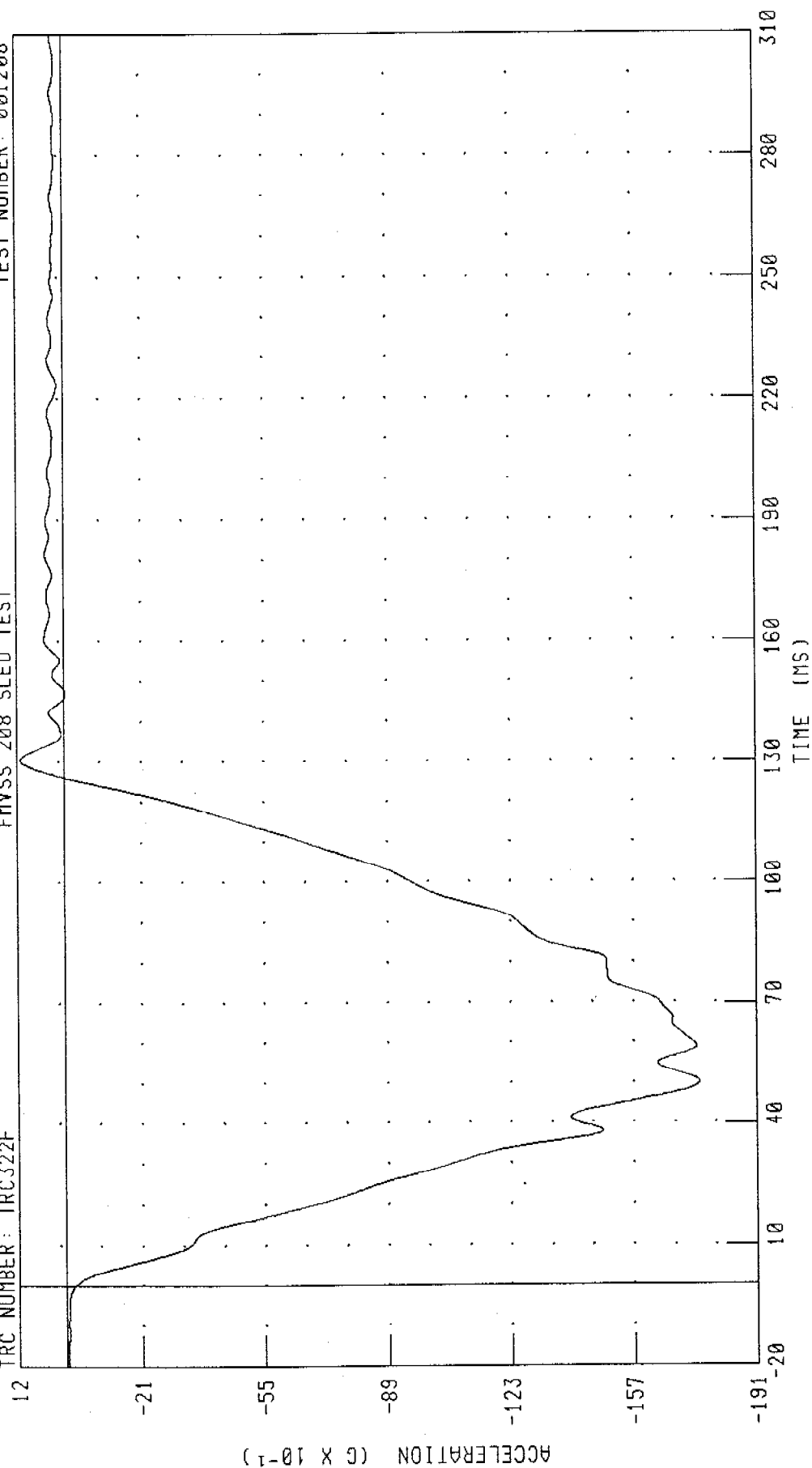
PEAK DATA: 1.26 G @ 130.00 MS; -17.69 G @ 59.12 MS

CHANNEL: LBXG FILTER: CH. CLASS 60

C10501 / 2001 HYUNDAI ELANTRA
RIGHT BODY X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



PEAK DATA: 1.22 G @ 130.56 MS, -17.52 G @ 50.08 MS

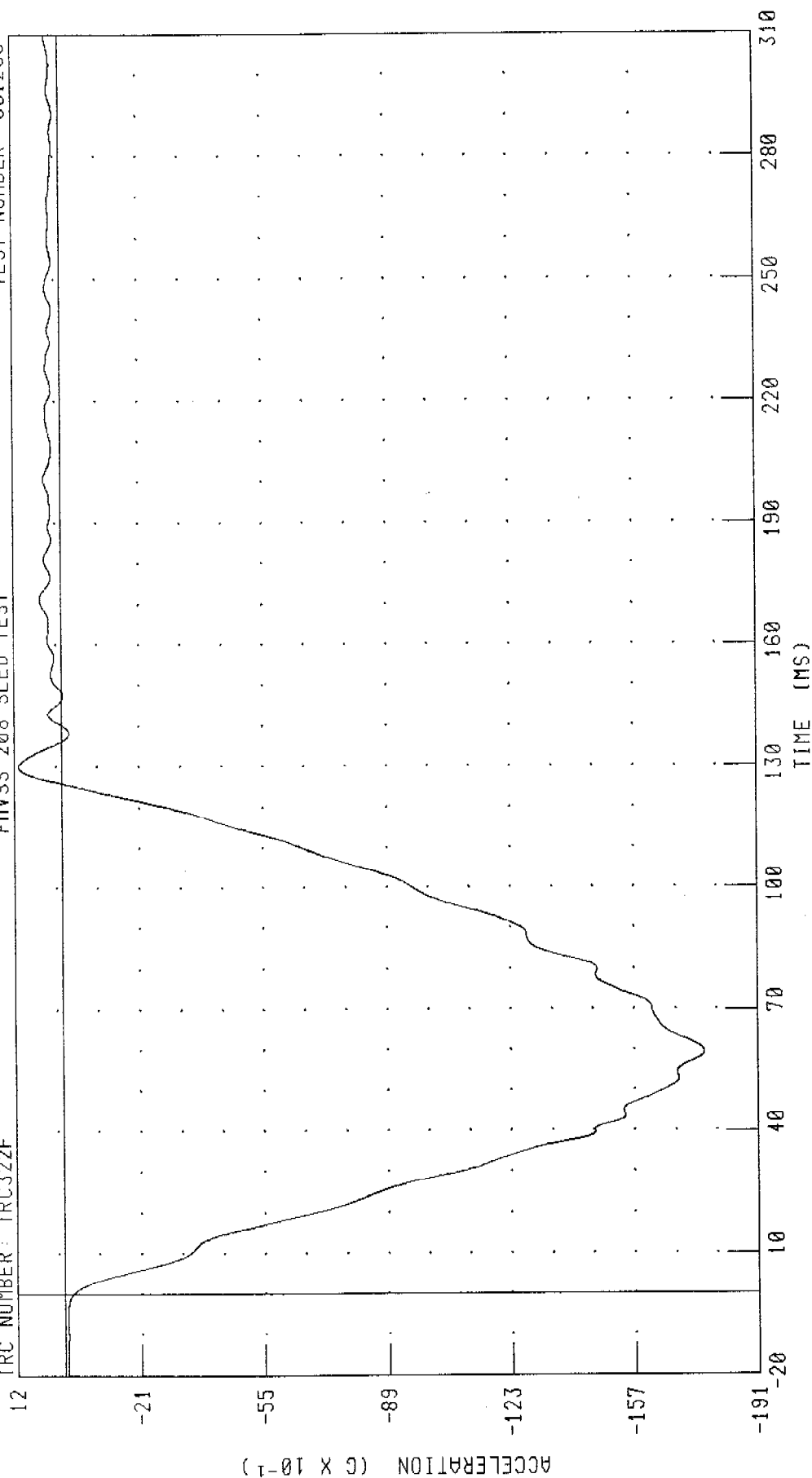
CHANNEL: RBXC FILTER: CH. CLASS 60

C10501 / 2001 HYUNDAI ELANTRA
SILL - LEFT REAR X-AXIS ACCELERATION

TEST NUMBER: 001208

FMVSS 208 SLED TEST

TRC NUMBER: TRC322F



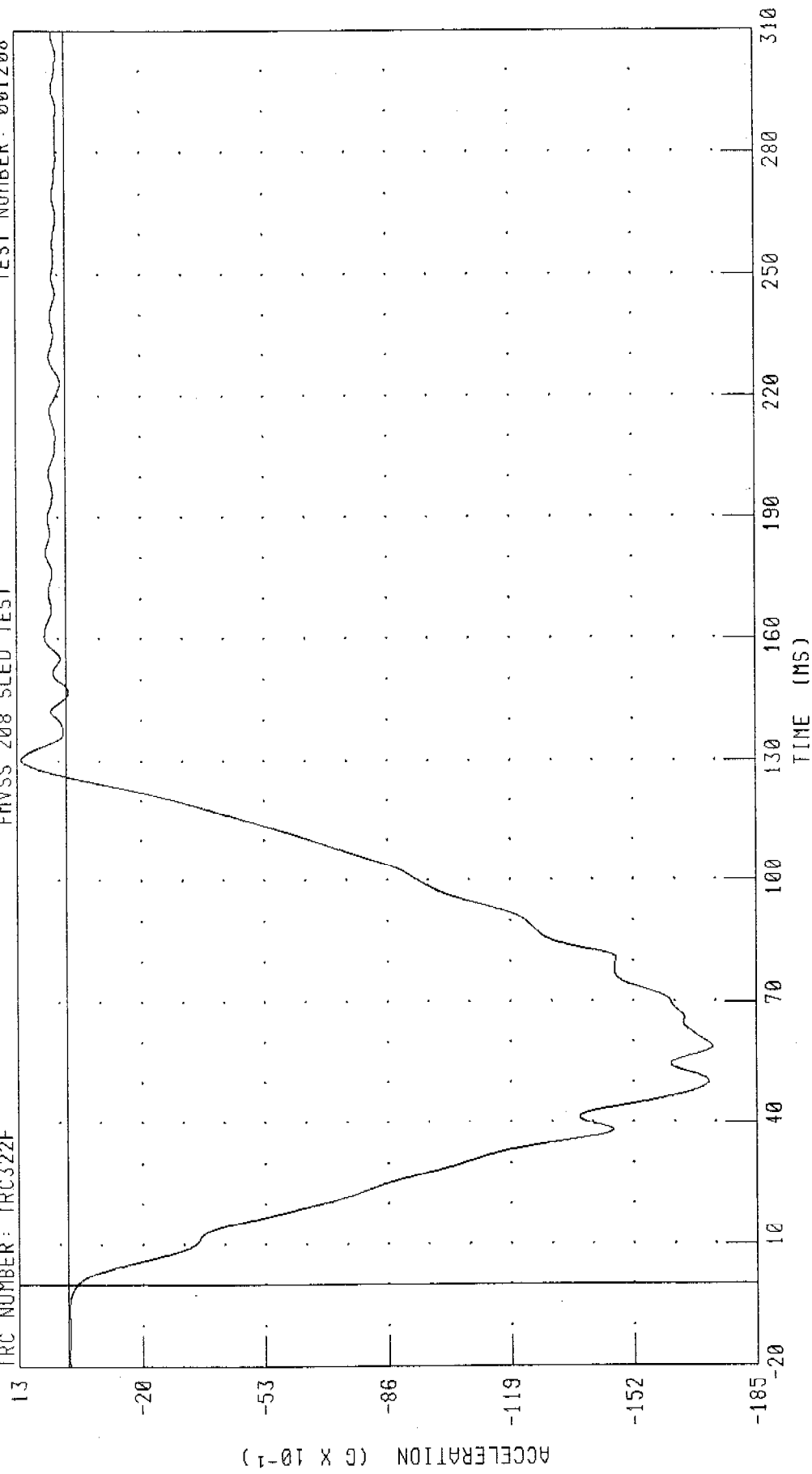
PEAK DATA: 1.19 G @ 130.08 MS; -17.64 G @ 59.44 MS

CHANNEL: LFXG FILTER: CH. CLASS 60

C10501 / 2001 HYUNDAI ELANTRA
SILL - RIGHT REAR X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



PEAK DATA: 1.19 G @ 130.40 MS; -17.33 G @ 58.80 MS

FILTER: CH. CLASS 60

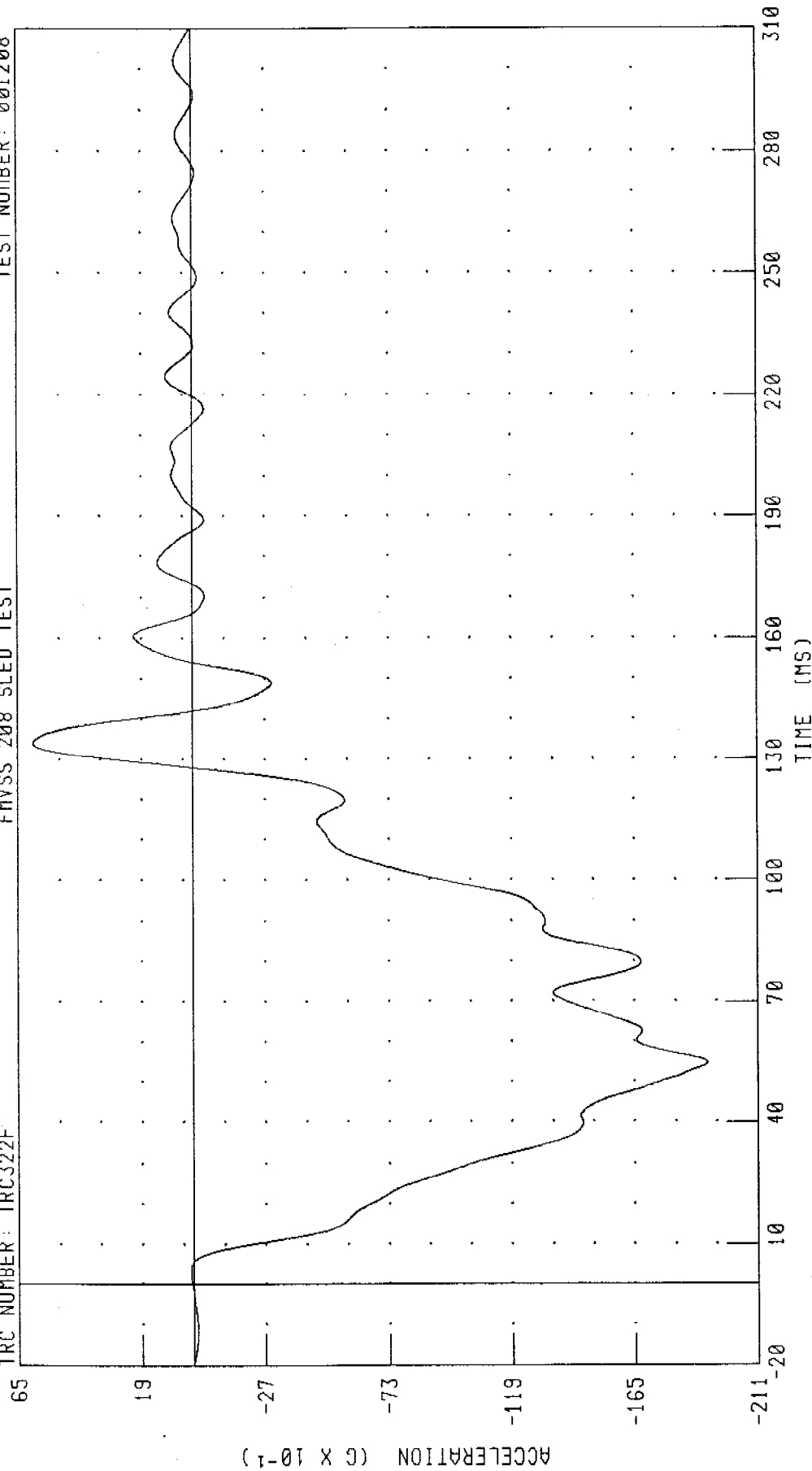
CHANNEL: RFXG

C10501 / 2001 HYUNDAI ELANTRA
TOP ENGINE X-AXIS ACCELERATION

TEST NUMBER: 001208

FMVSS 208 SLED TEST

TRC NUMBER: TRC322F



PEAK DATA: 5.94 G @ 134.08 MS; -19.23 G @ 54.96 MS

FILTER: CH. CLASS 60

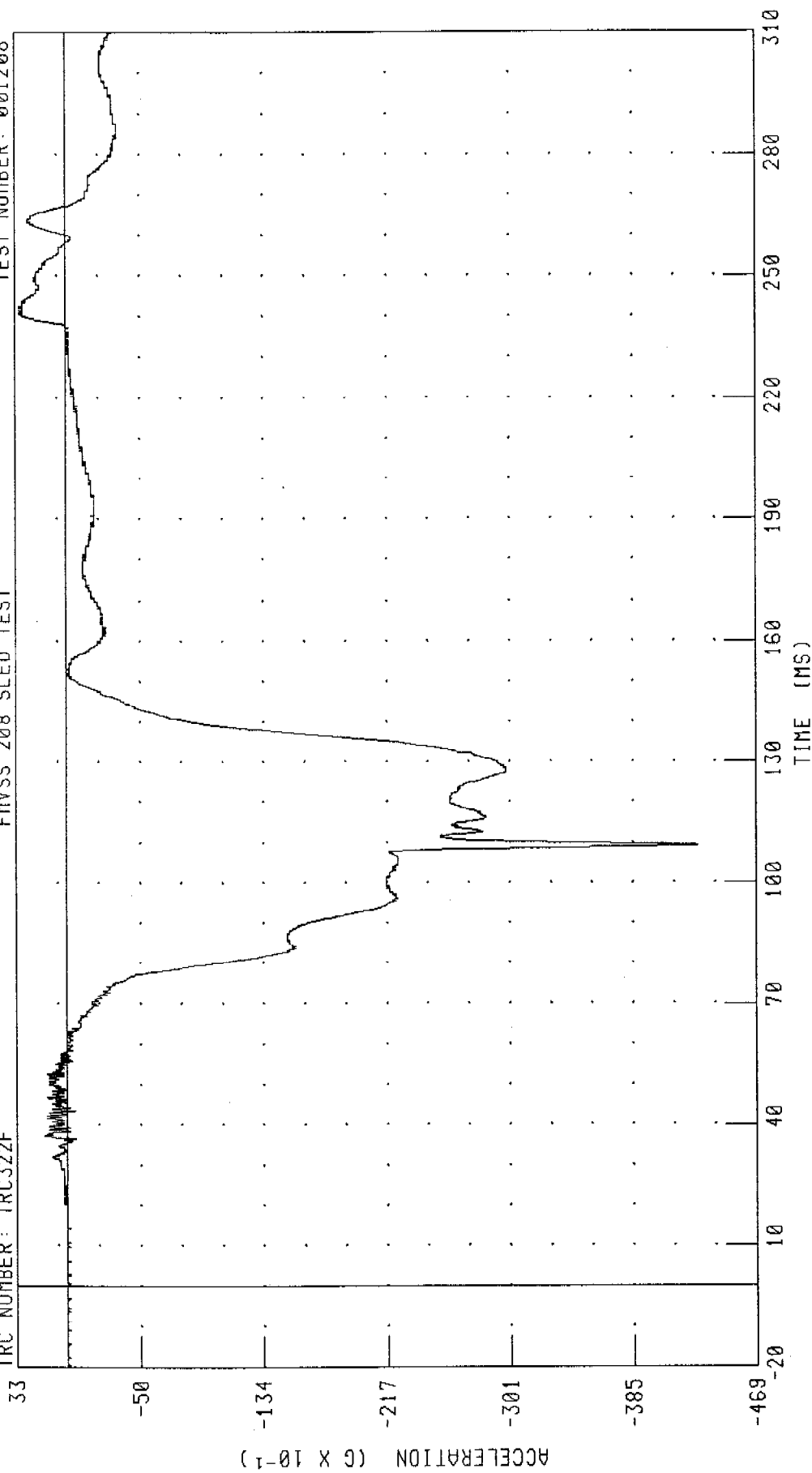
CHANNEL: TEXT

C10501 / 2001 HYUNDAI ELANTRA
DRIVER HEAD X-AXIS ACCELERATION

TRC NUMBER: TRC322F

FMVSS 208 SLED TEST

TEST NUMBER: 001208



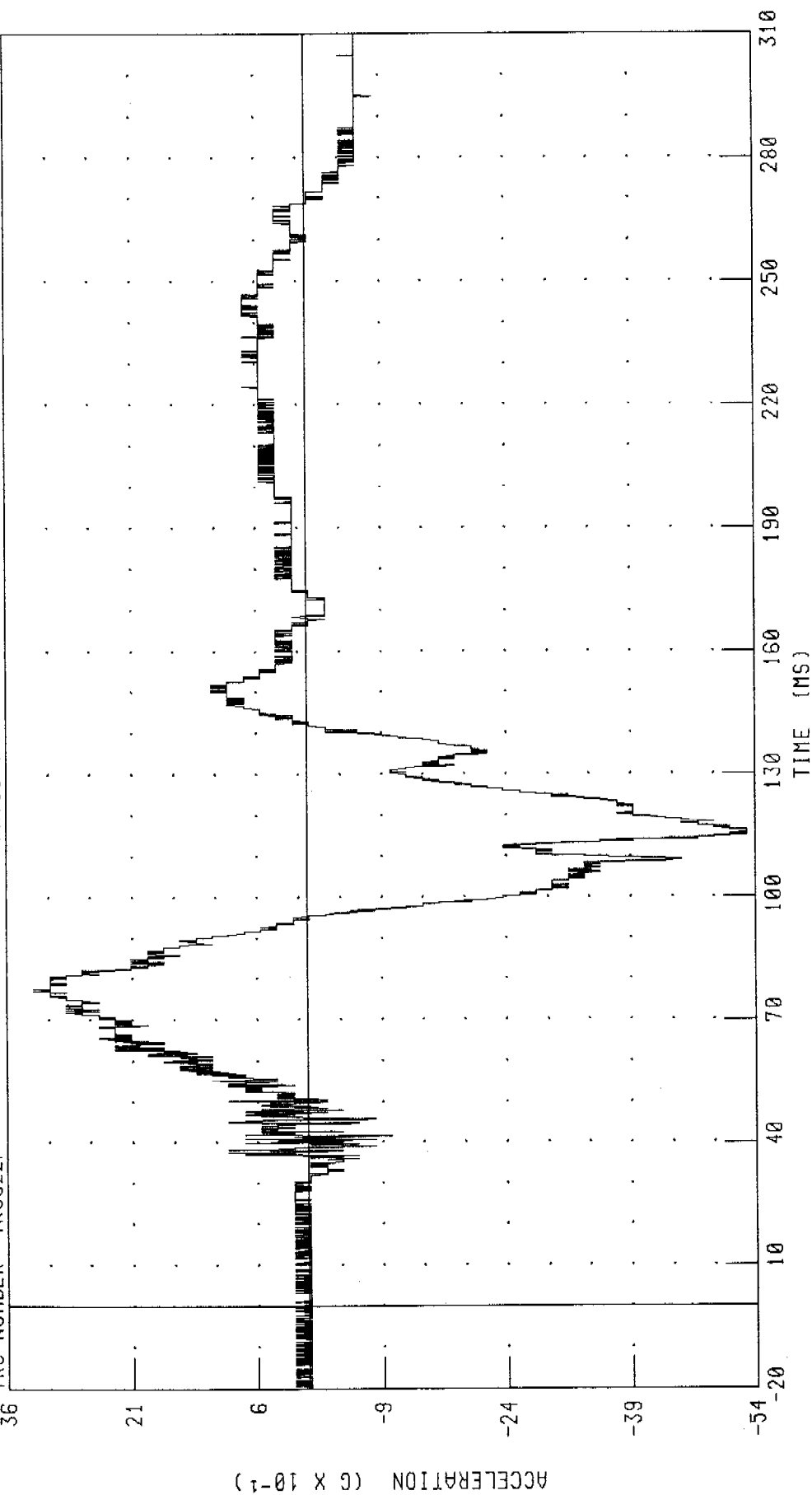
CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

PEAK DATA: 3.13 G @ 240.48 MS; -43.00 G @ 109.36 MS

C10501 / 2001 HYUNDAI ELANTRA
DRIVER HEAD Y-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



PEAK DATA: 3.28 G @ 77.04 MS; -5.30 G @ 115.20 MS

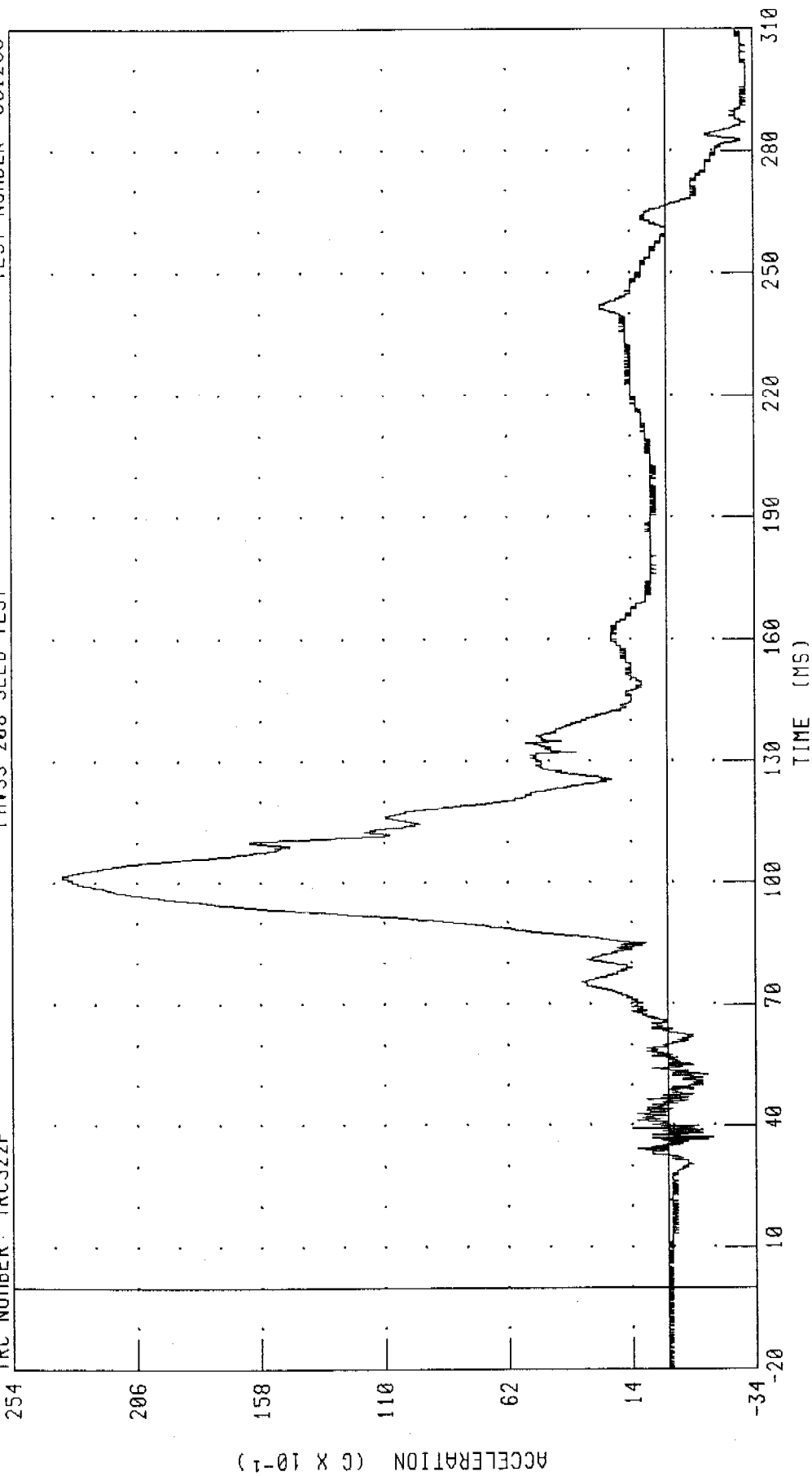
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

C10501 / 2001 HYUNDAI ELANTRA
DRIVER HEAD Z-AXIS ACCELERATION

TRC NUMBER: TRC322F

FMVSS 208 SLED TEST

TEST NUMBER: 001208



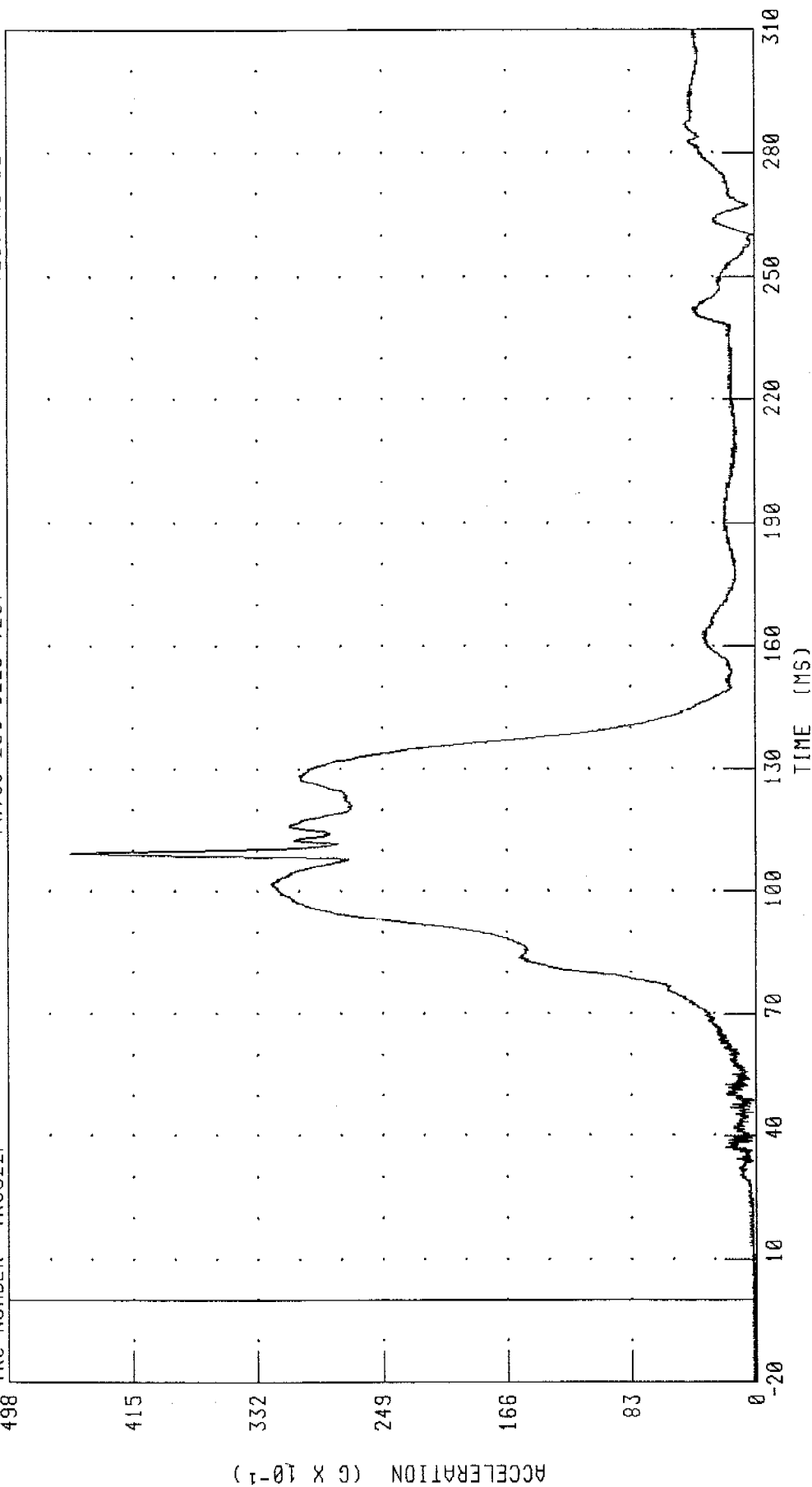
CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

PEAK DATA: 23.47 G @ 101.20 MS, -3.10 G @ 287.12 MS

C10501 / 2001 HYUNDAI ELANTRA
 DRIVER HEAD RESULTANT ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



PEAK DATA: 45.70 G @ 109.36 MS; 0.04 G @ -19.92 MS

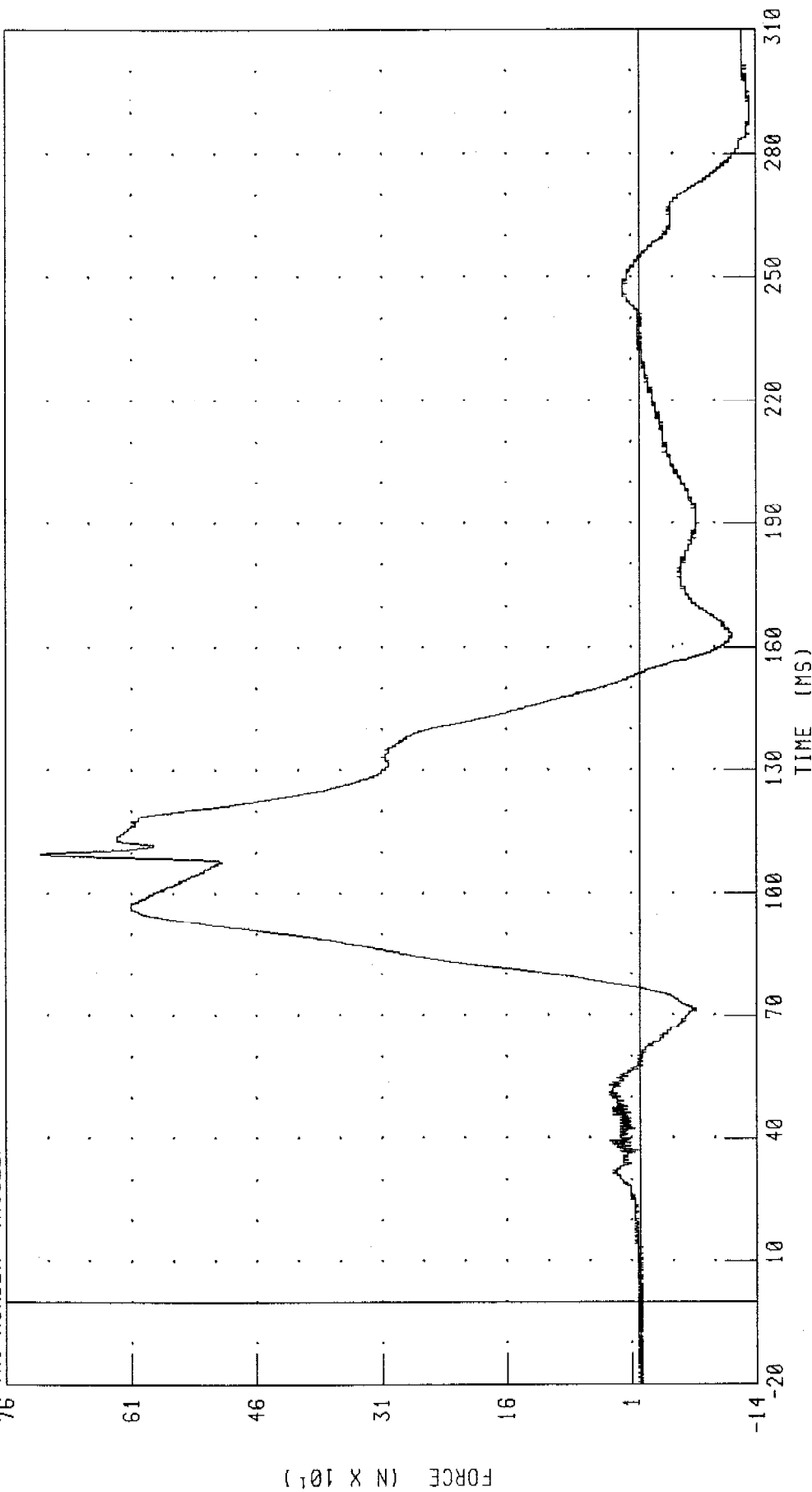
CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

C10501 / 2001 HYUNDAI ELANTRA
DRIVER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 001208

TRC NUMBER: TRC322F

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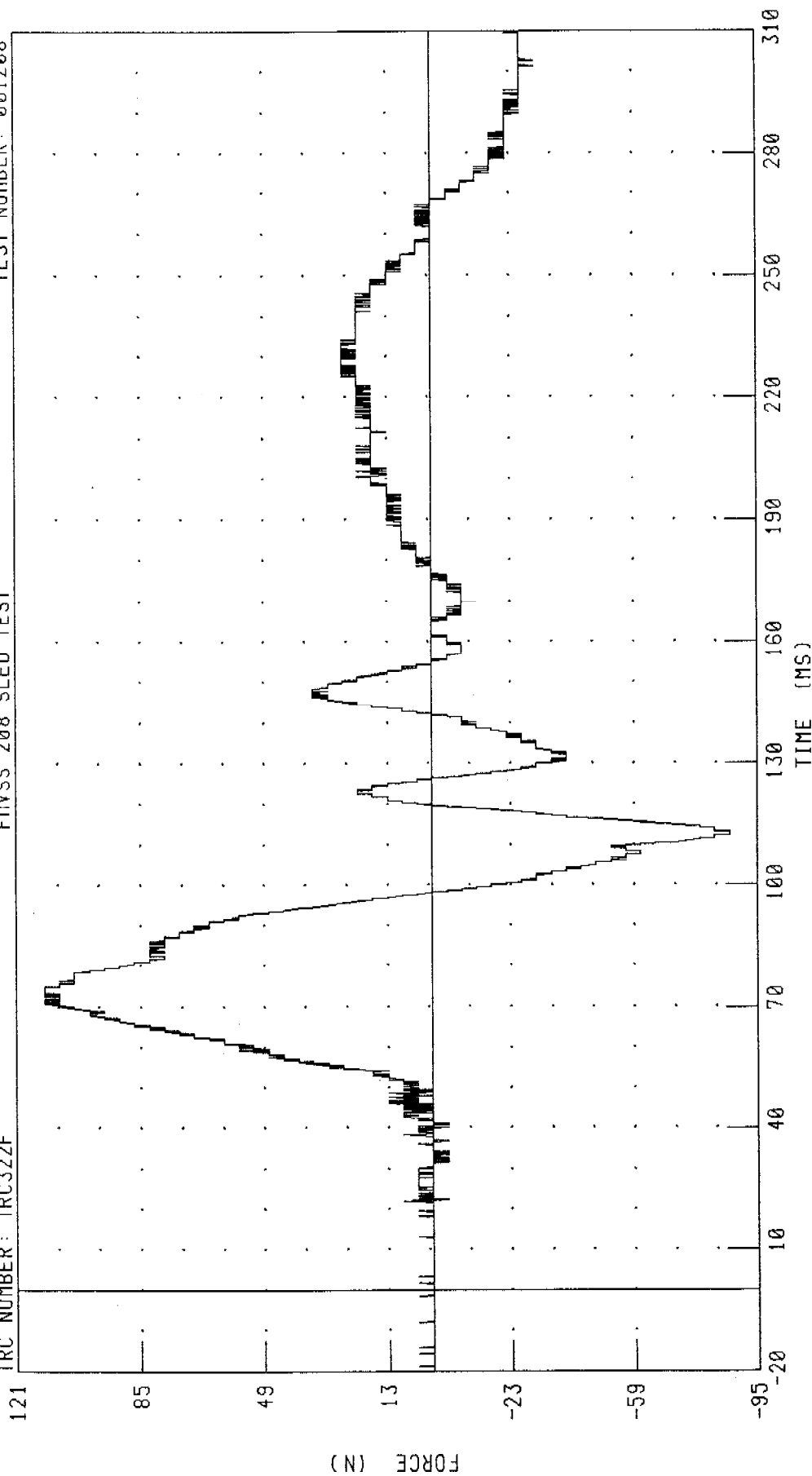
CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

PEAK DATA: 718.75 N @ 109.52 MS; -132.77 N @ 284.72 MS

C10501 / 2001 HYUNDAI ELANTRA
DRIVER NECK Y-AXIS SHEAR FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



PEAK DATA: 112.89 N @ 70.80 MS, -86.97 N @ 112.32 MS

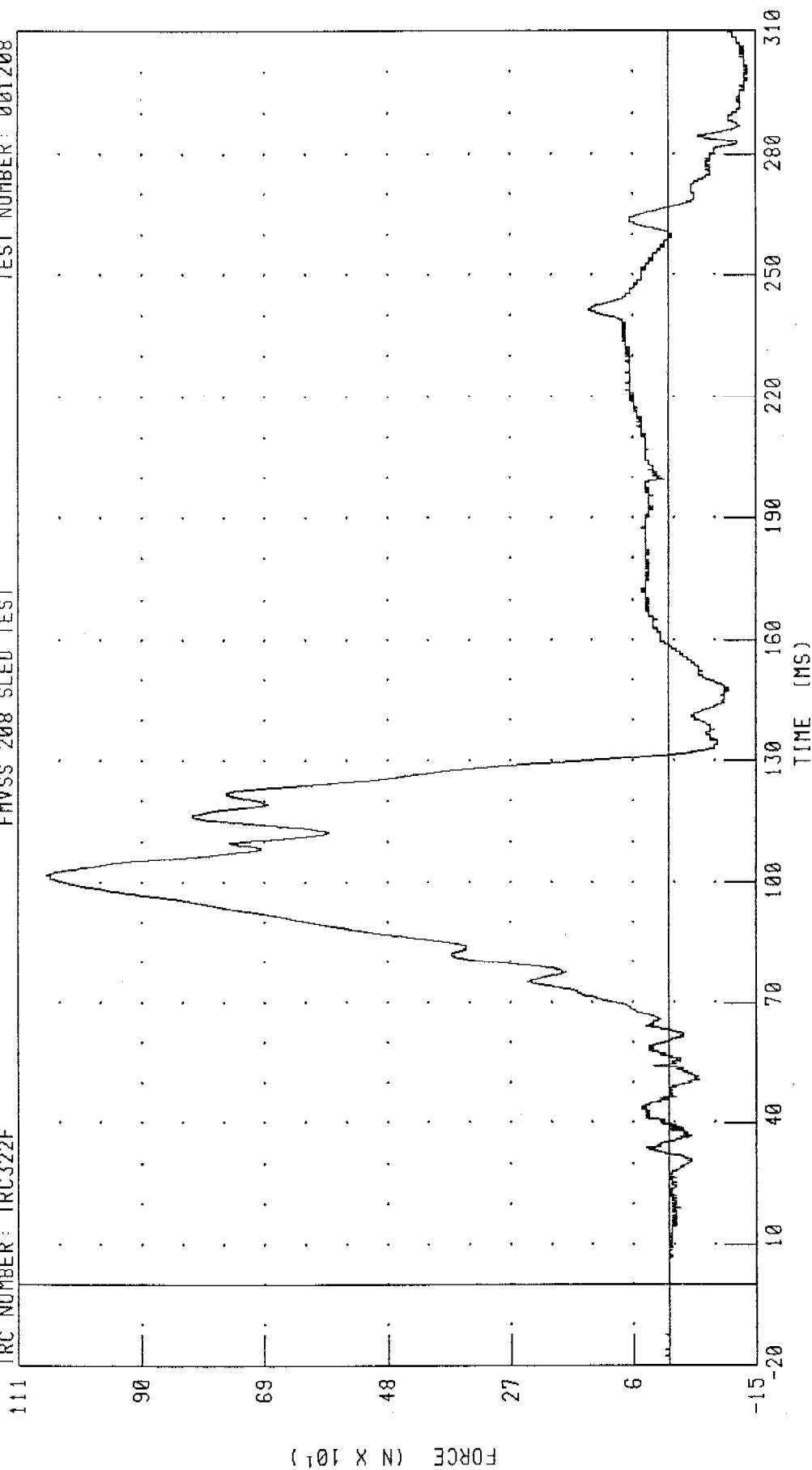
CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

C10501 / 2001 HYUNDAI ELANTRA
DRIVER NECK Z-AXIS AXIAL FORCE

TRC NUMBER: TRC322F

FMVSS 208 SLED TEST

TEST NUMBER: 001208



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

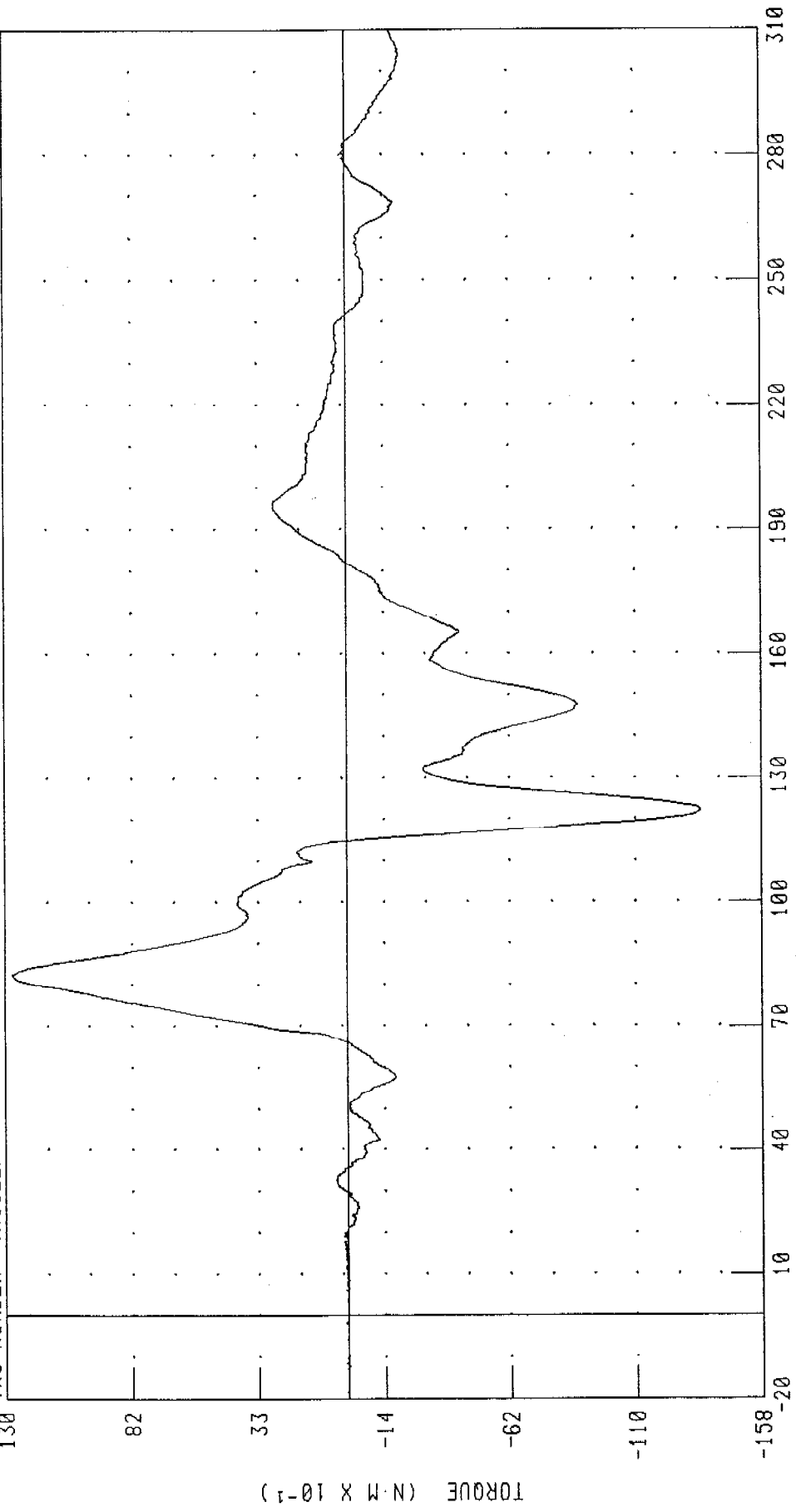
PEAK DATA: 1061.75 N @ 101.60 MS, -136.83 N @ 297.92 MS

C10501 / 2001 HYUNDAI ELANTRA
DRIVER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 001208

TRC NUMBER: TRC322F

FMVSS 208 SLED TEST



TIME (MS)

PEAK DATA: 12.72 N-M @ 82.40 MS; -13.48 N-M @ 122.32 MS

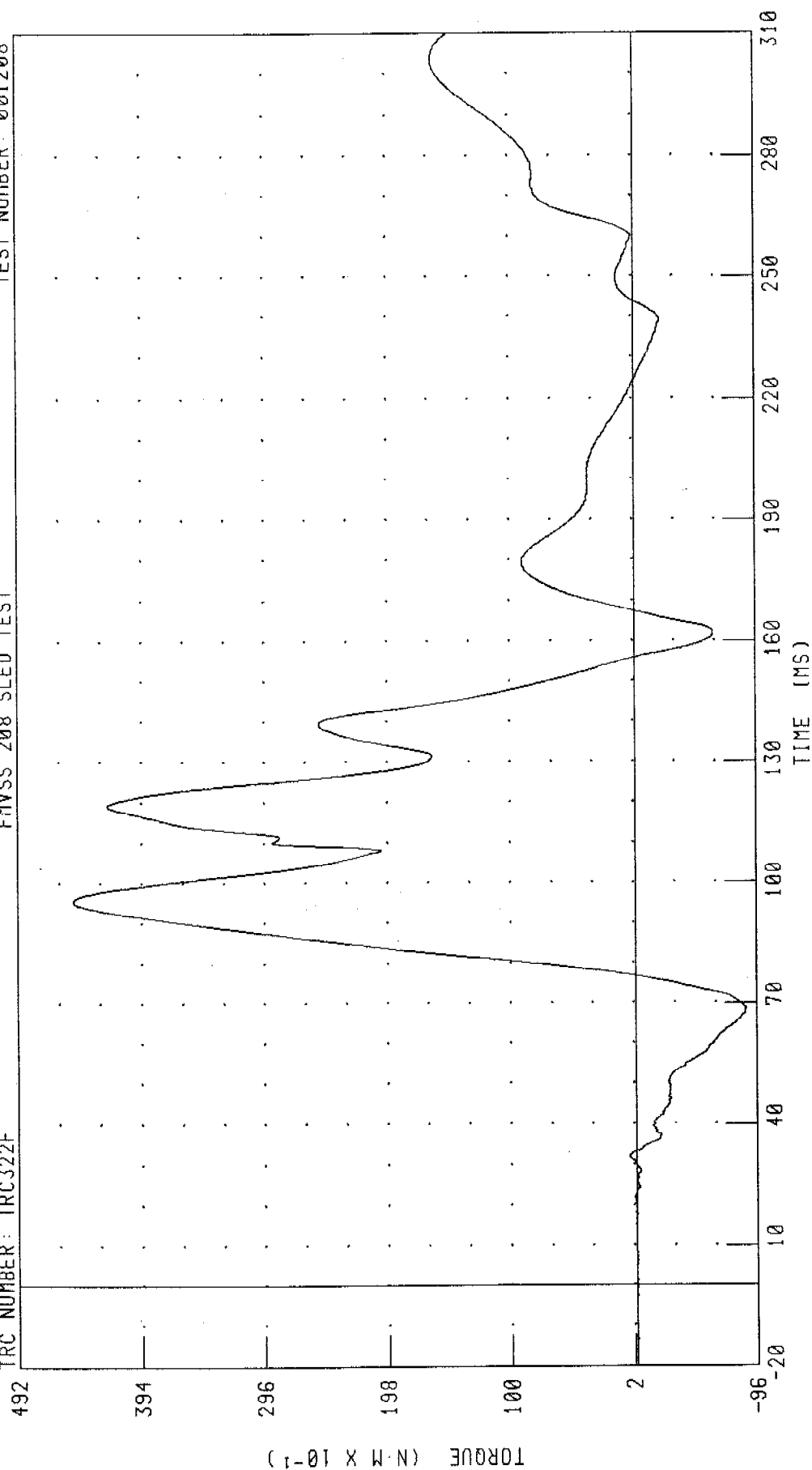
CHANNEL: NEKXM1 FILTER: CH. CLASS 600

C10501 / 2001 HYUNDAI ELANTRA
DRIVER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 001208

TRC NUMBER: TRC322F

FIVSS 208 SLED TEST



PEAK DATA: 44.78 N·m @ 95.60 ms; -8.79 N·m @ 68.64 ms

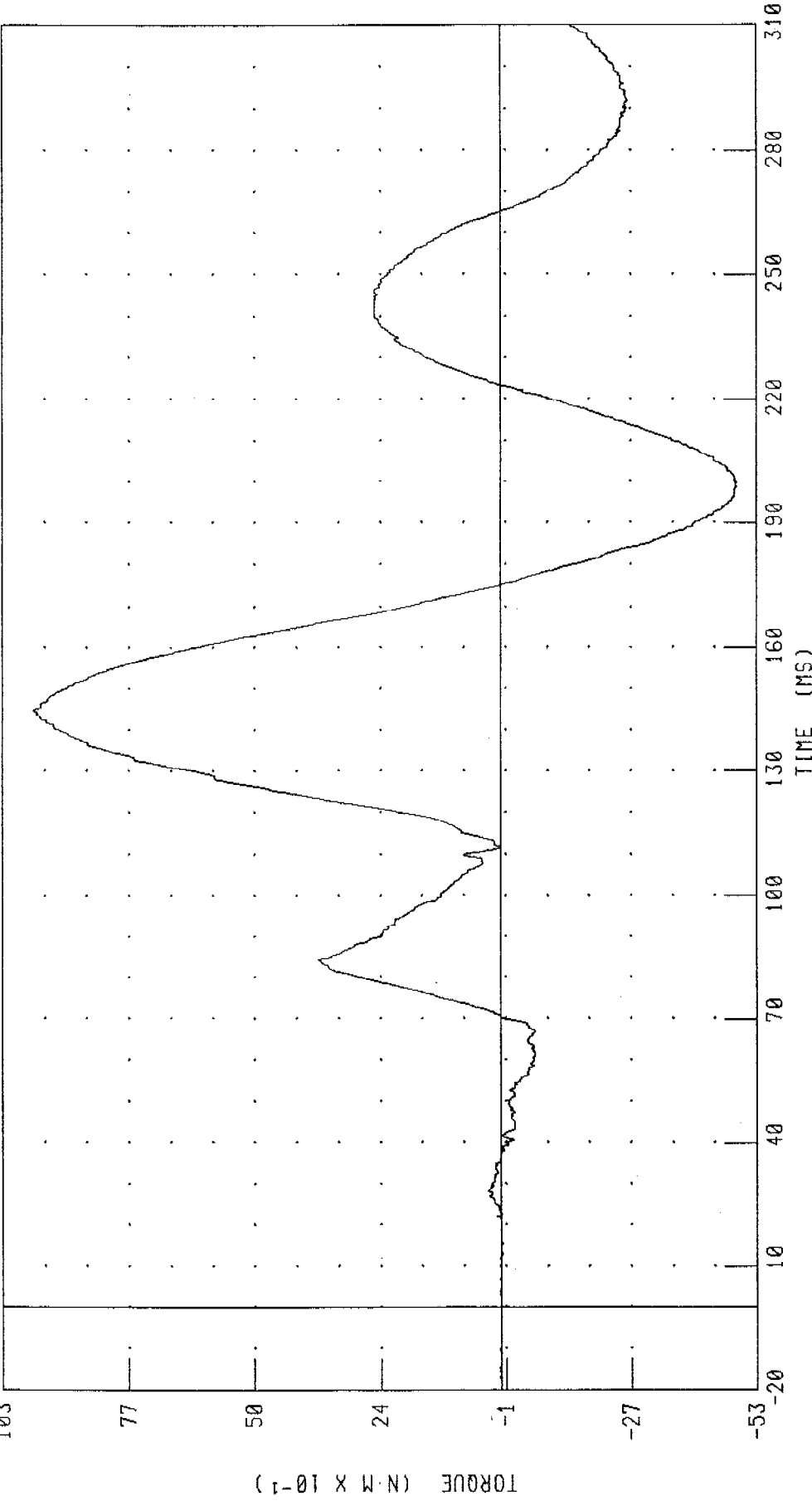
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

C10501 / 2001 HYUNDAI ELANTRA
DRIVER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 001208

FMVSS 208 SLED TEST

TRC NUMBER: TRC322F



TIME (MS)

FILTER: CH. CLASS 600

CHANNEL: NEKZM1

PEAK DATA: 9.67 N·m @ 144.88 ms; -4.89 N·m @ 198.72 ms

TORQUE ($\text{N}\cdot\text{m} \times 10^{-1}$)

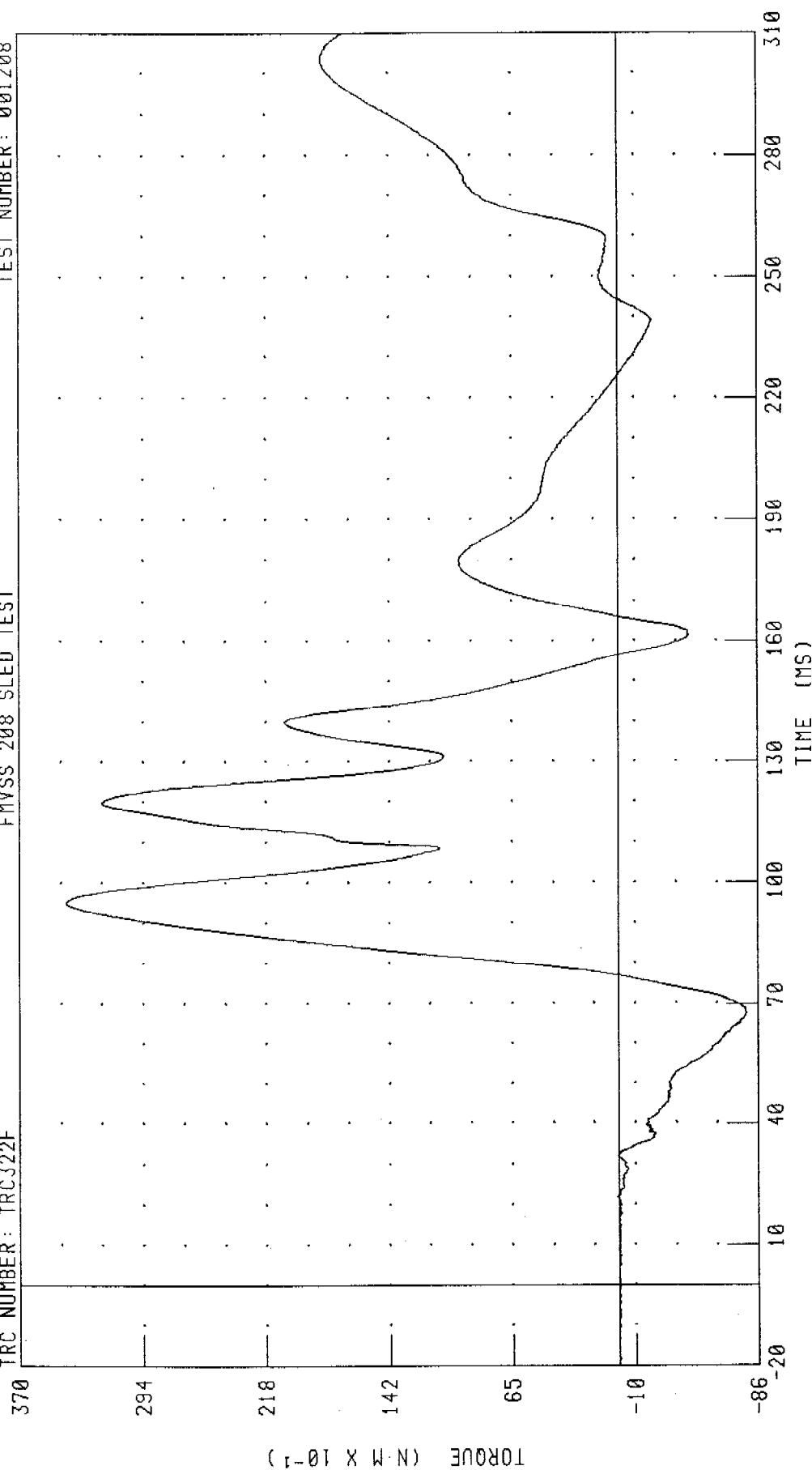
C10501 / 2001 HYUNDAI ELANTRA

DRIVER NECK MOMENT ABOUT Y AXIS OCCIPITAL CONDYLE

TEST NUMBER: 001208

TRC NUMBER: TRC322F

FMVSS 208 SLED TEST



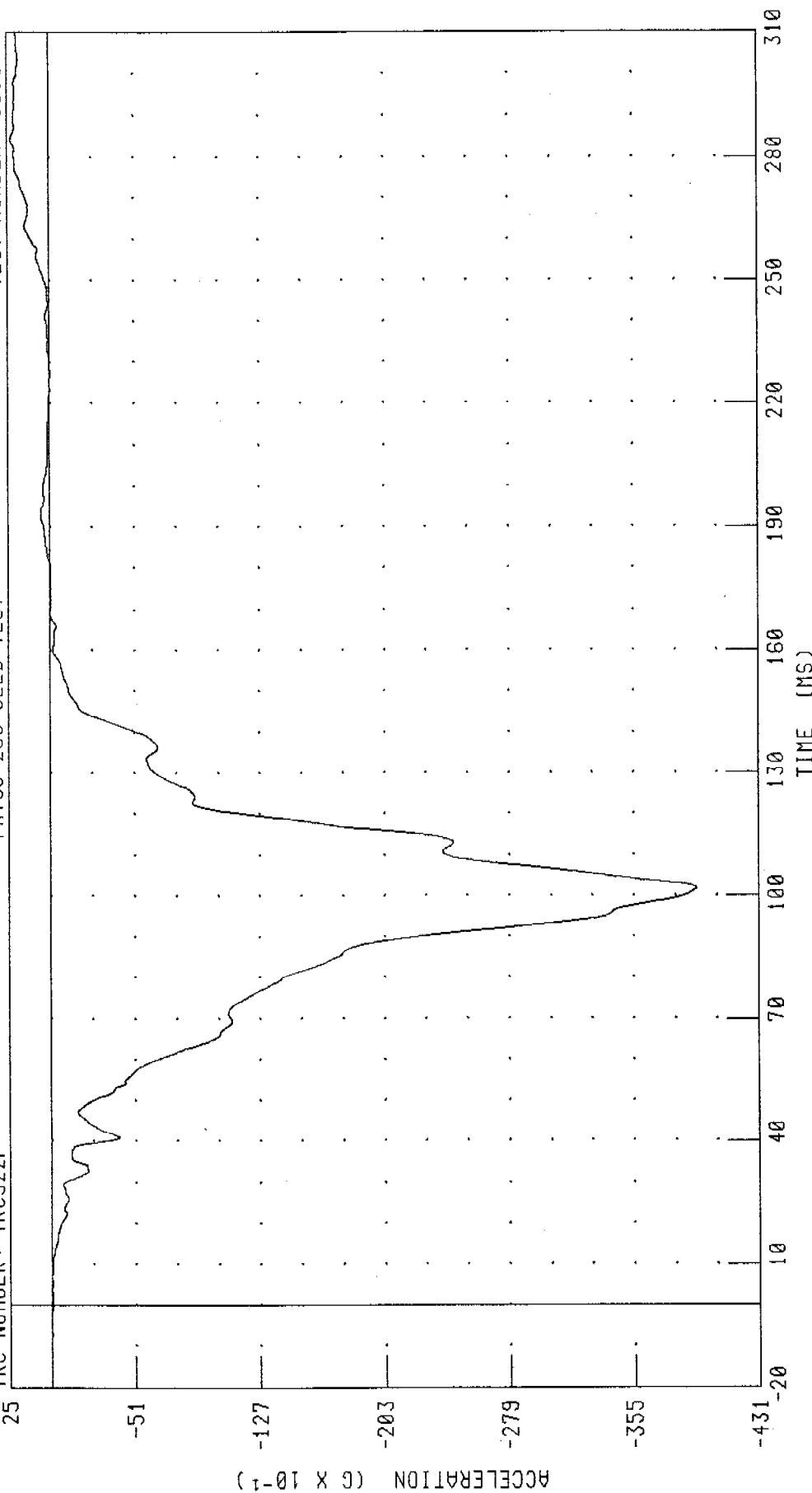
PEAK DATA: 34.13 N·m @ 95.12 ms, -7.87 N·m @ 67.60 ms

CHANNEL: NEKOM1 FILTER: CH. CLASS 600

C10501 / 2001 HYUNDAI ELANTRA
DRIVER CHEST X-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 001208

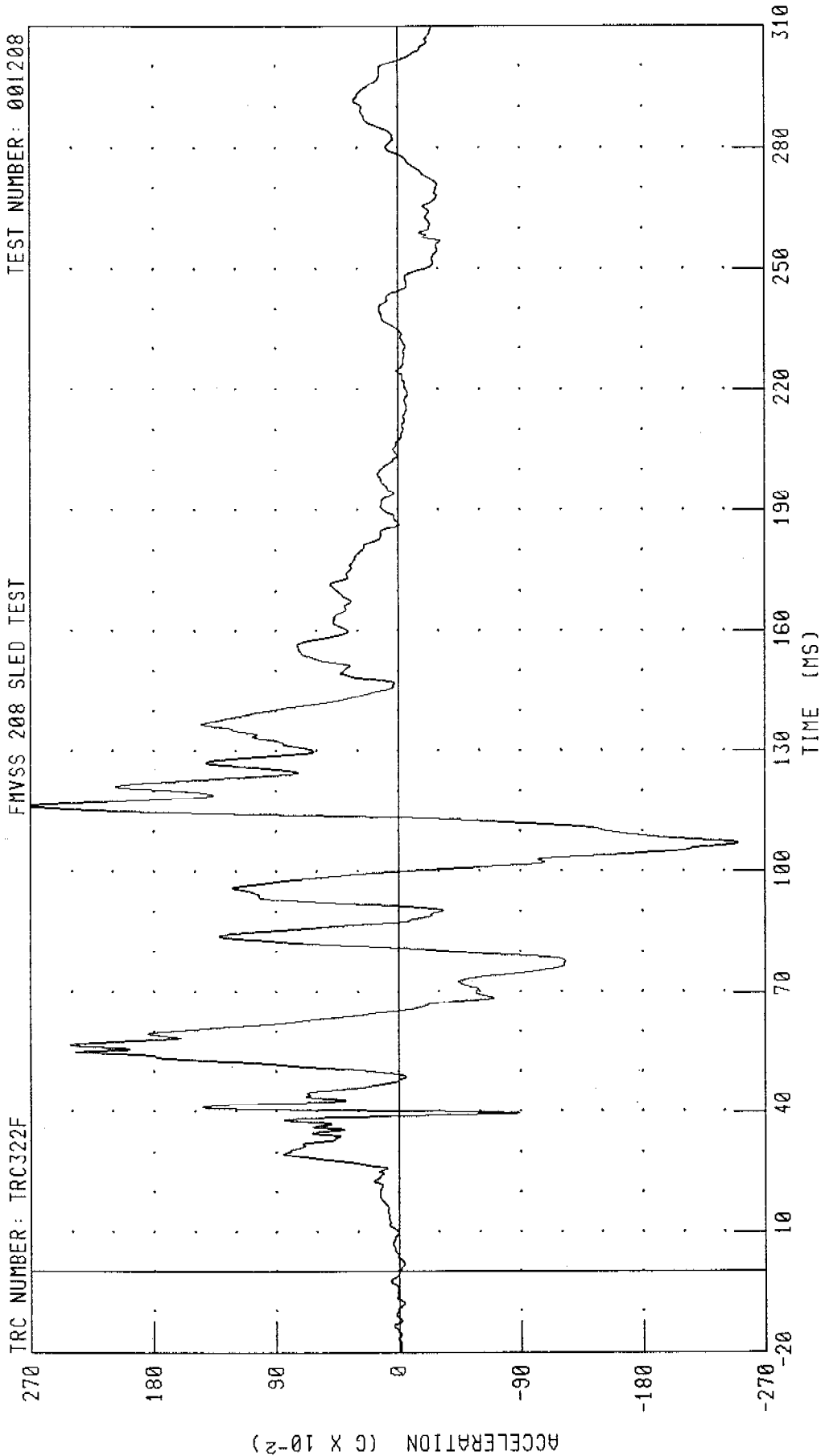
TRC NUMBER: TRC322F



PEAK DATA: 2.30 G @ 284.40 MS, -39.30 G @ 102.00 MS

CHANNEL: CSTXG1 FILTER: CH. CLASS 180

C10501 / 2001 HYUNDAI ELANTRA
DRIVER CHEST Y-AXIS ACCELERATION

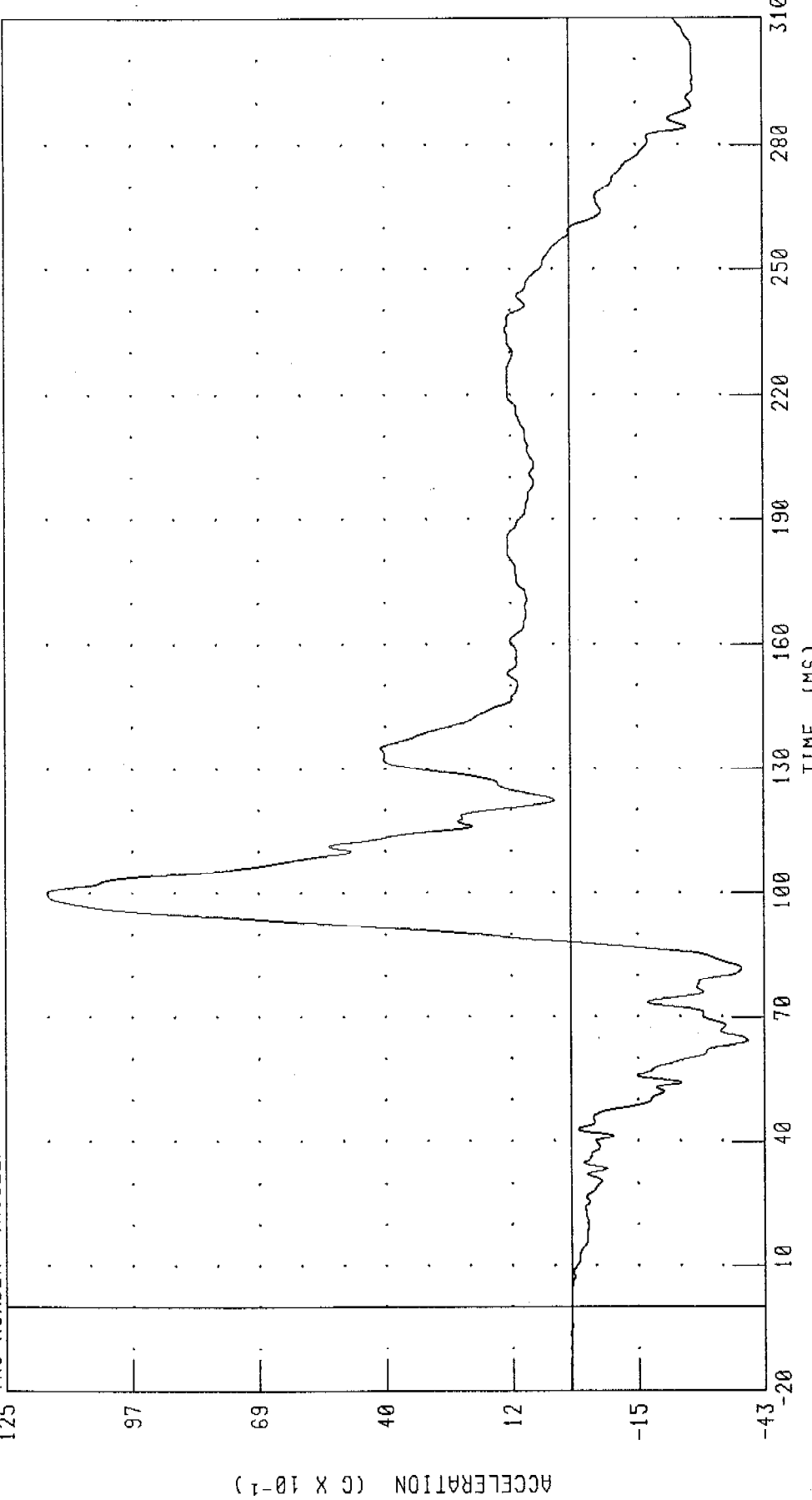


C10501 / 2001 HYUNDAI ELANTRA
DRIVER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 001208

FMVSS 208 SLED TEST

TRC NUMBER: TRC322F



PEAK DATA: 11.58 G @ 100.16 MS; -3.94 G @ 64.24 MS

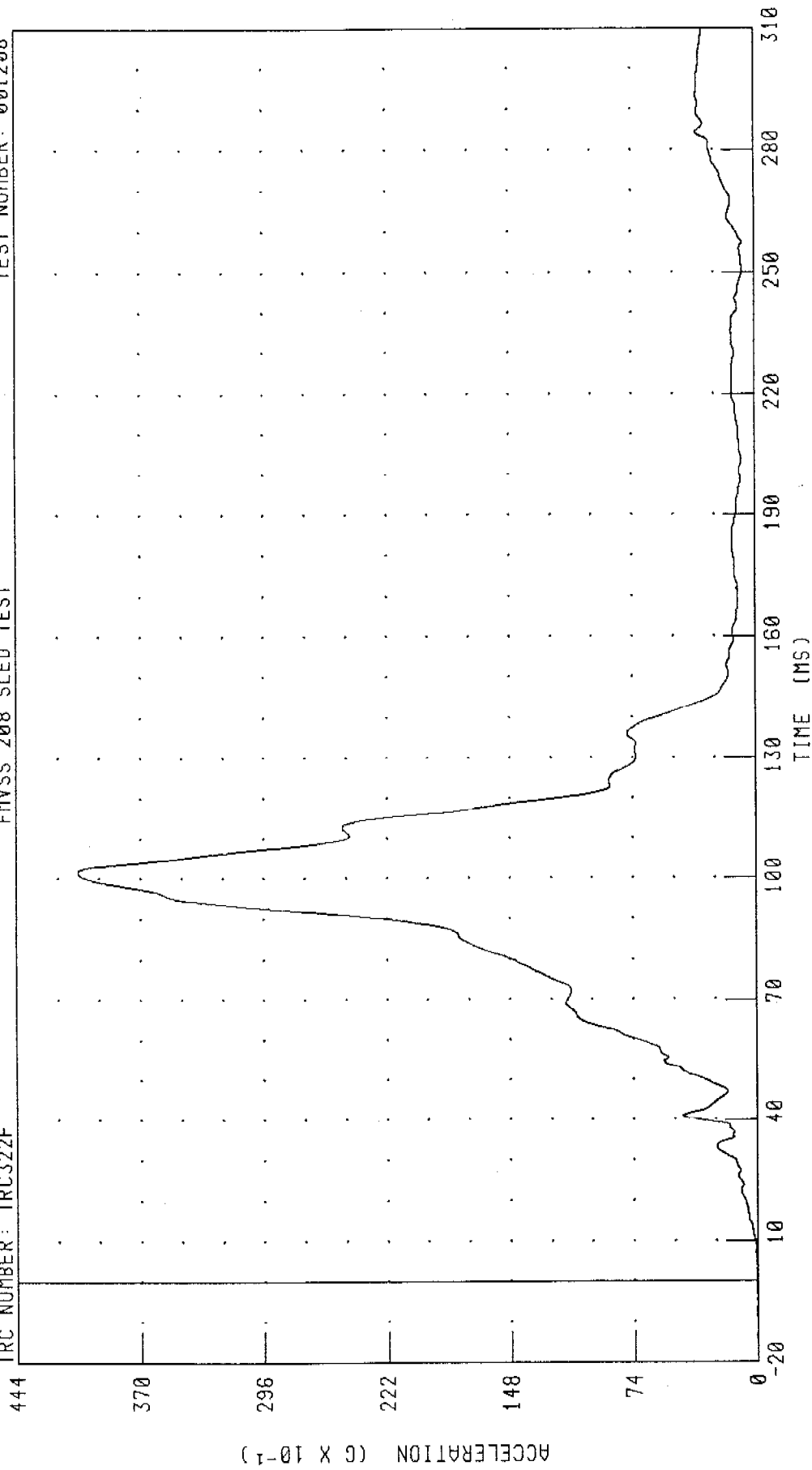
CHANNEL: CSTZG1 FILTER: CH. CLASS 180

C10501 / 2001 HYUNDAI ELANTRA
DRIVER CHEST RESULTANT ACCELERATION

TEST NUMBER: 001208

TRC NUMBER: TRC322F

FMVSS 208 SLED TEST



PEAK DATA: 40.75 G @ 101.76 MS; 0.00 G @ -17.12 MS

CHANNEL: CSTRG1 FILTER: CH. CLASS 180

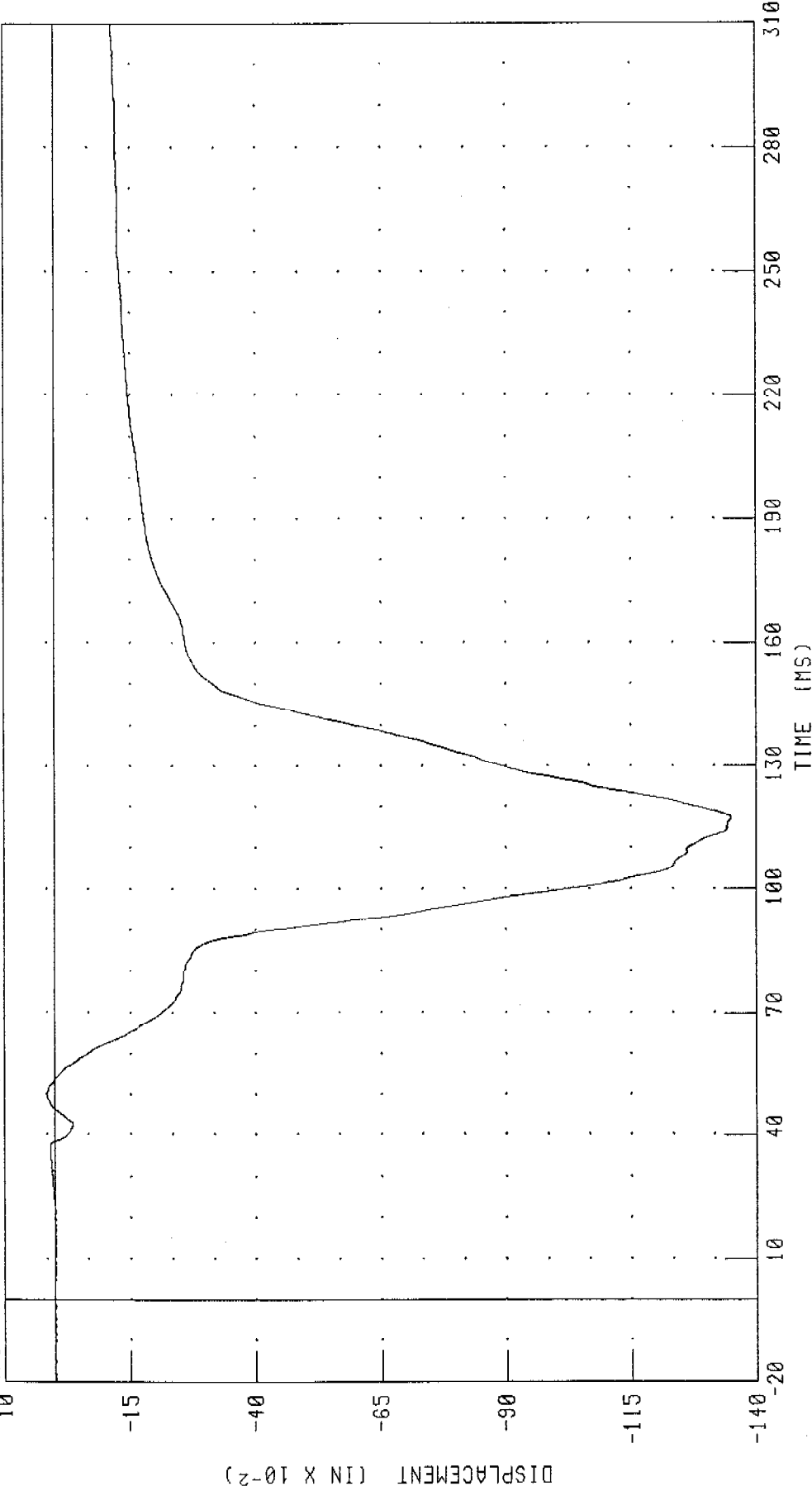
C10501 / 2001 HYUNDAI ELANTRA

DRIVER CHEST DEFLECTION

FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



CHANNEL: CSTXD1 FILTER: CH. CLASS 600

PEAK DATA: 0.02 IN @ 50.16 MS, -1.35 IN @ 117.28 MS

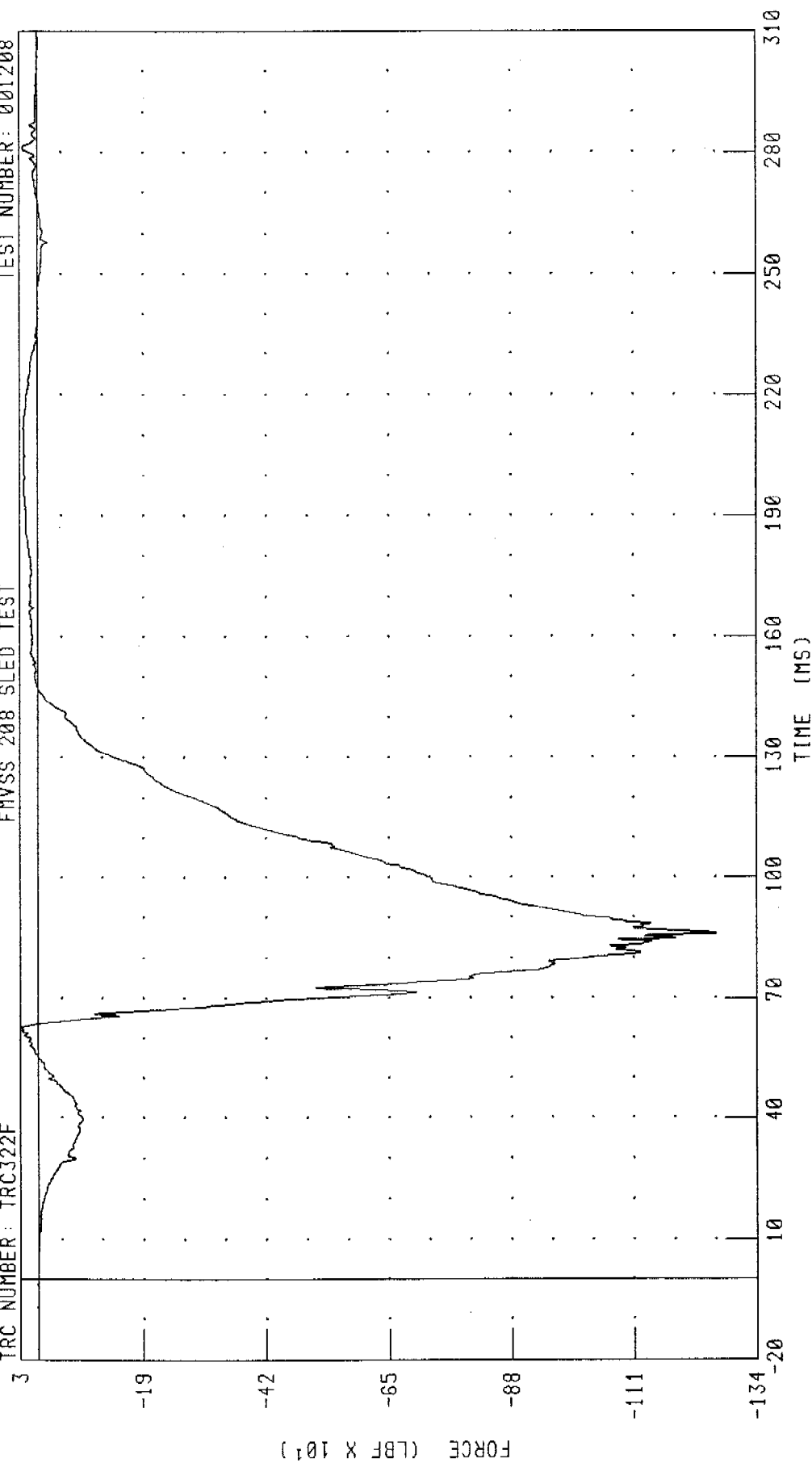
C10501 / 2001 HYUNDAI ELANTRA

DRIVER LEFT FEMUR FORCE

FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



CHANNEL: LFNZF1 FILTER: CH. CLASS 600

PEAK DATA: 29.76 LBF @ 62.64 MS, -1273.27 LBF @ 86.08 MS

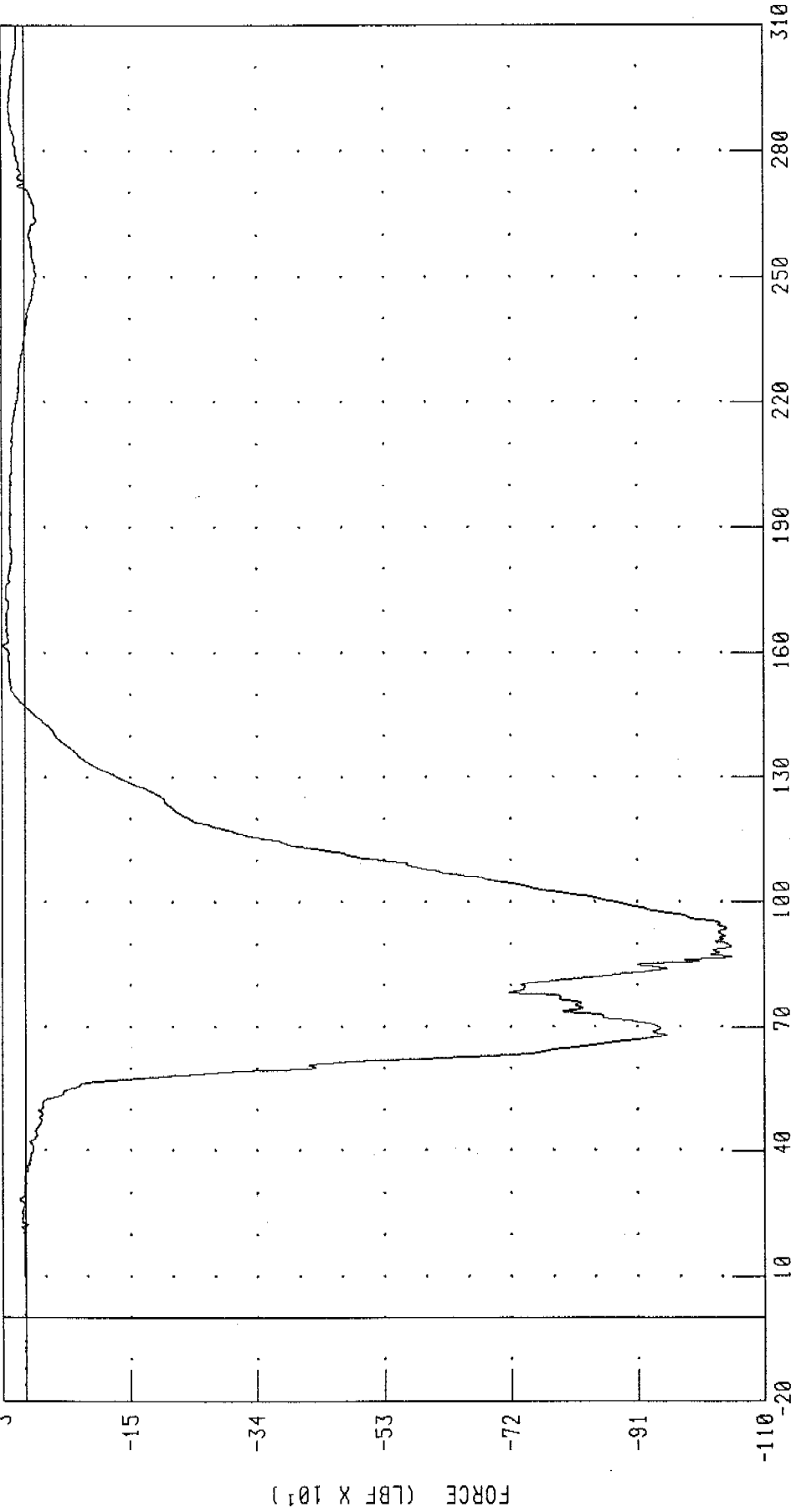
C10501 / 2001 HYUNDAI ELANTRA

DRIVER RIGHT FEMUR FORCE

FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



TIME (MS)

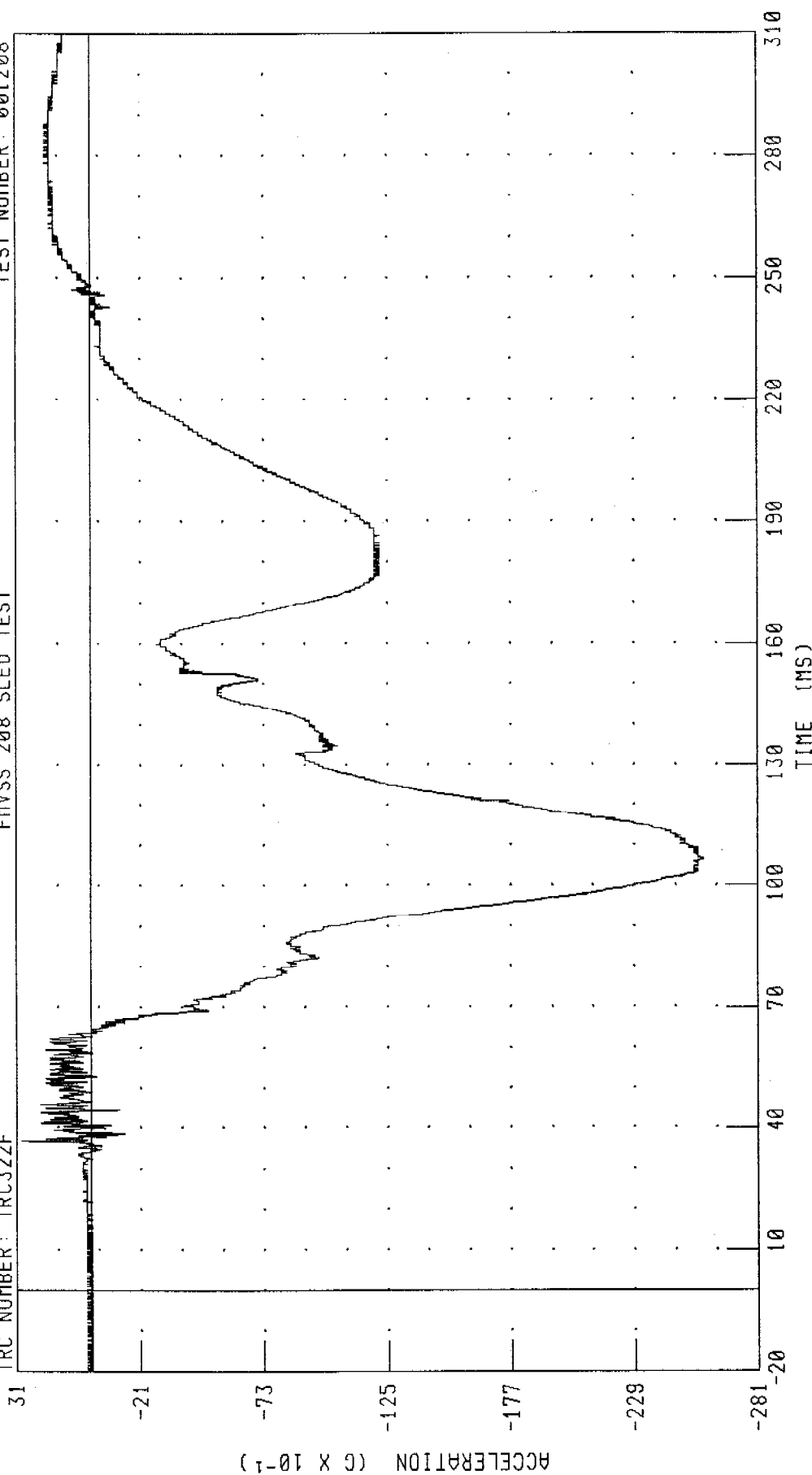
PEAK DATA: 30.46 LBF @ 161.84 MS; -1058.61 LBF @ 86.96 MS

CHANNEL: RFMZFI FILTER: CH. CLASS 600

C10501 / 2001 HYUNDAI ELANTRA
 RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



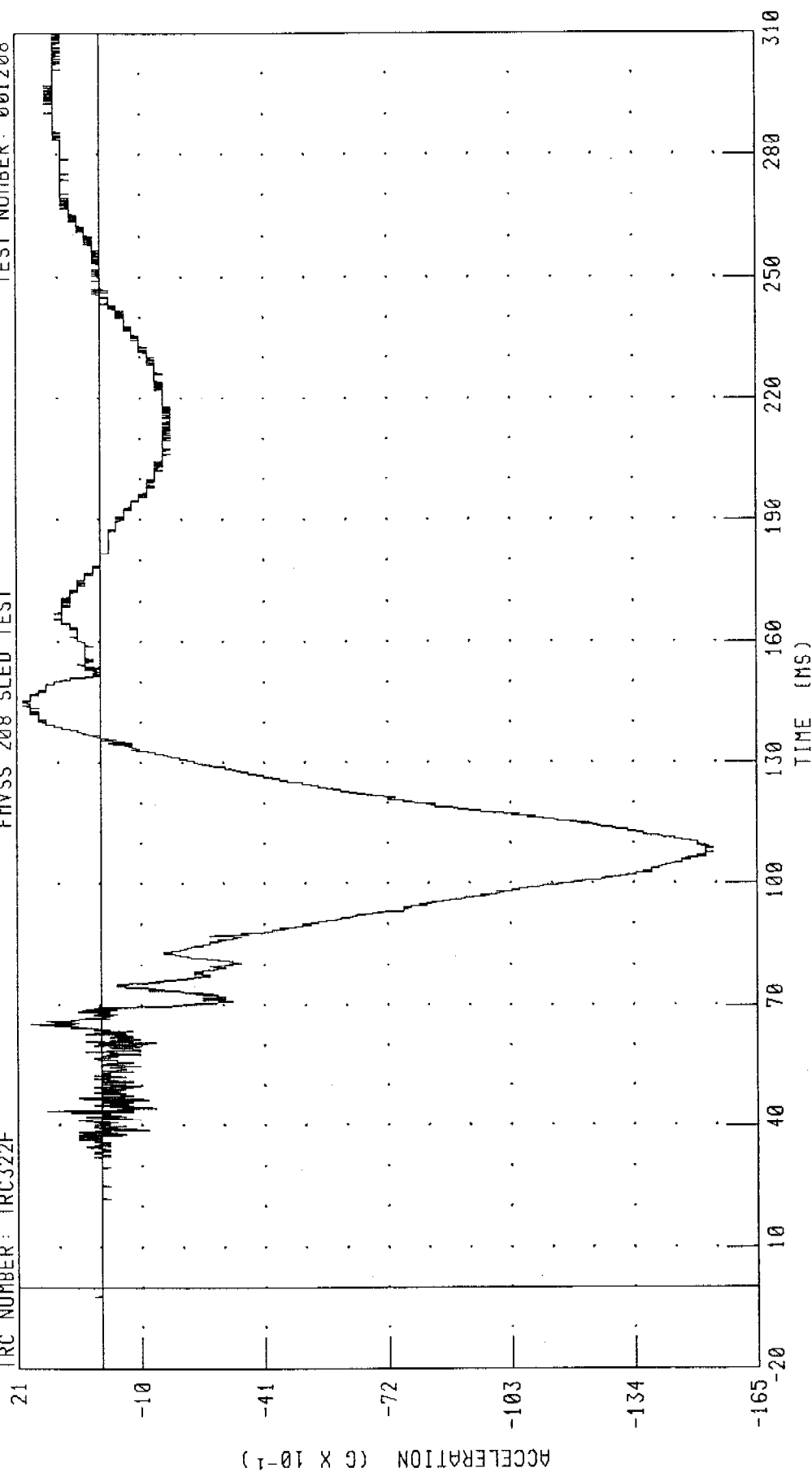
PEAK DATA: 2.87 G @ 36.80 MS; -25.80 G @ 106.40 MS

CHANNEL: HEDXG2 FILTER: CH. CLASS 1000

C10501 / 2001 HYUNDAI ELANTRA
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



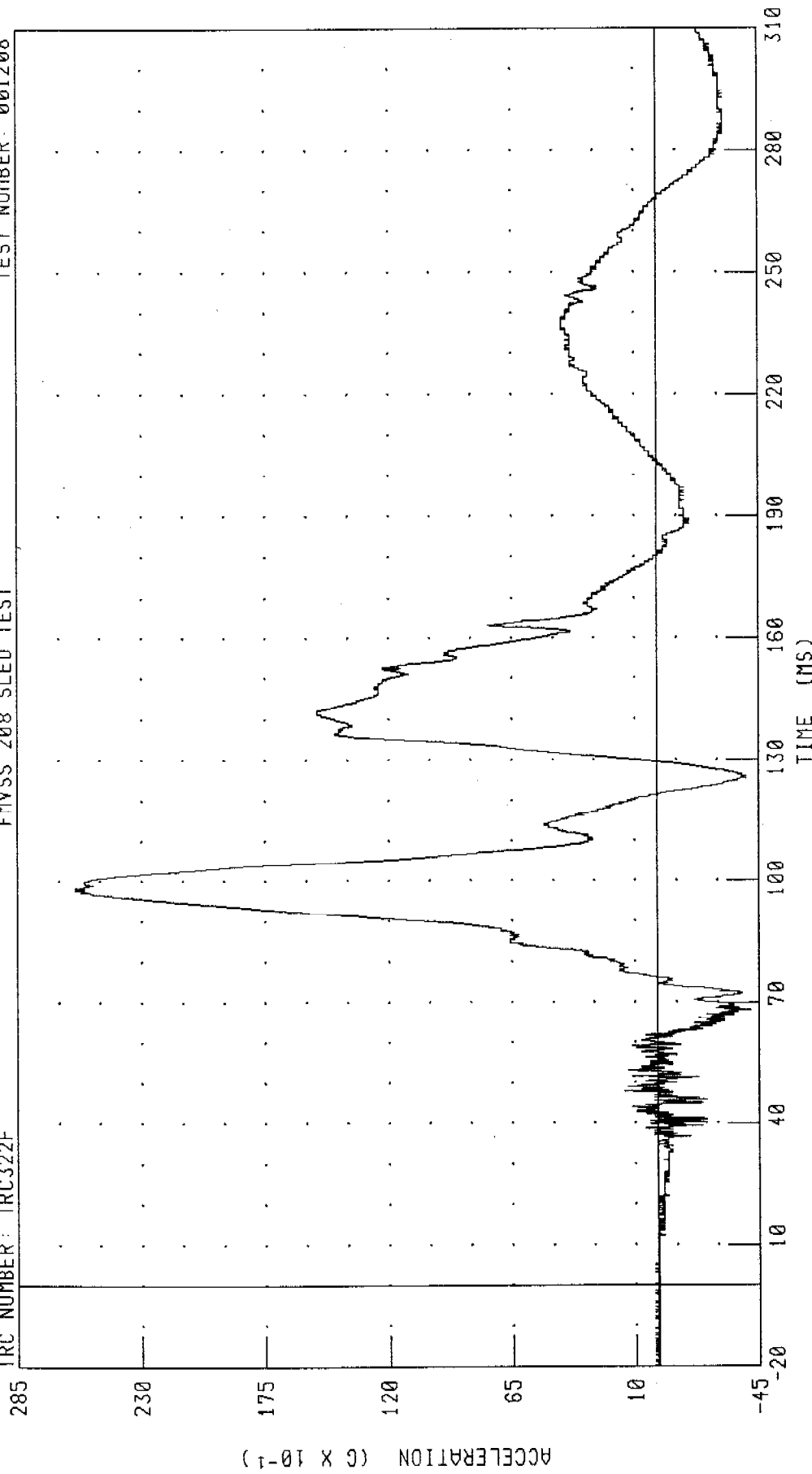
CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

PEAK DATA: 1.95 G @ 144.24 MS; -15.40 G @ 107.68 MS

C10501 / 2001 HYUNDAI ELANTRA
 RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 001208

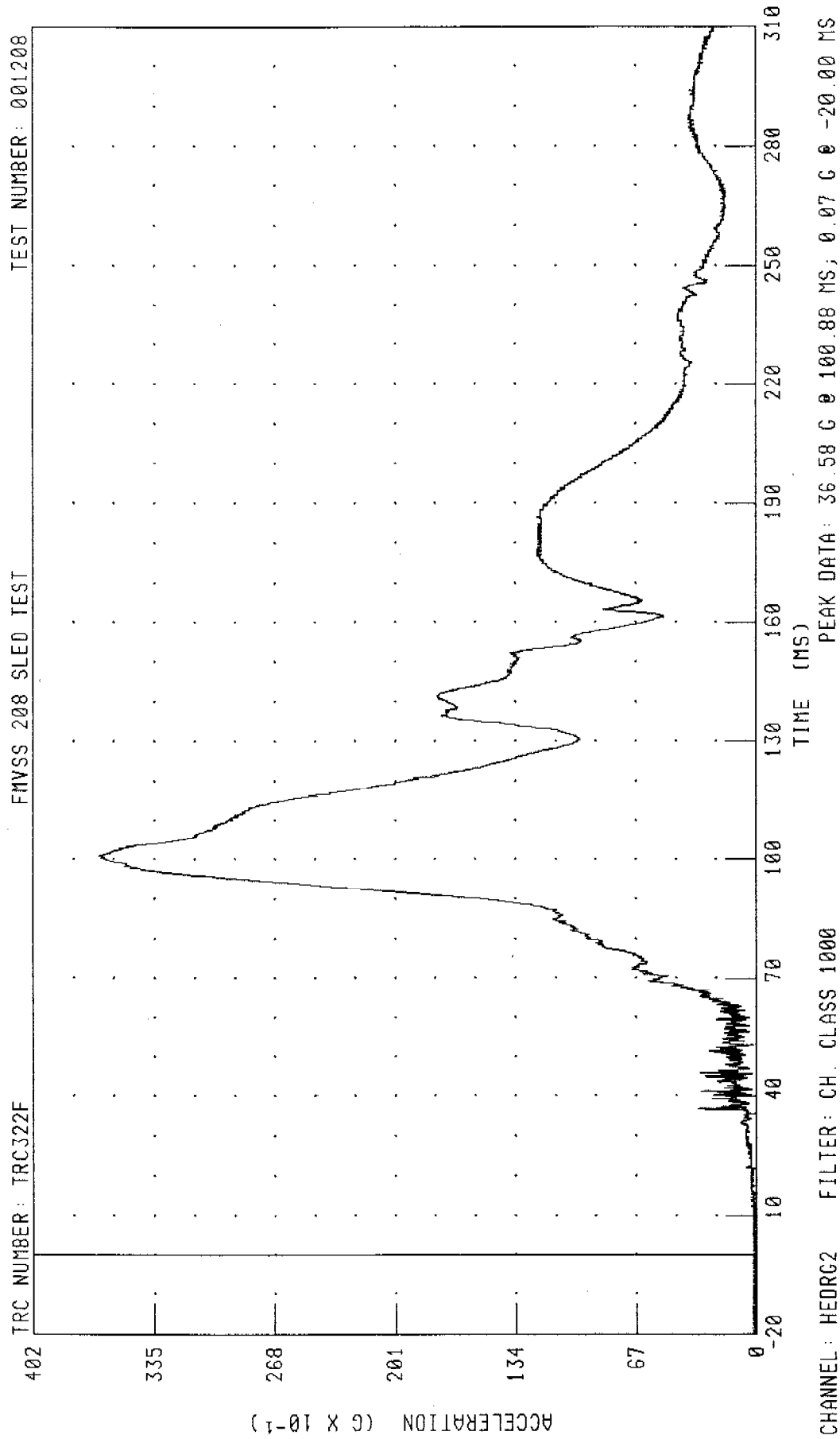
TRC NUMBER: TRC322F



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

PEAK DATA: 25.93 G @ 97.84 MS; -4.15 G @ 68.08 MS

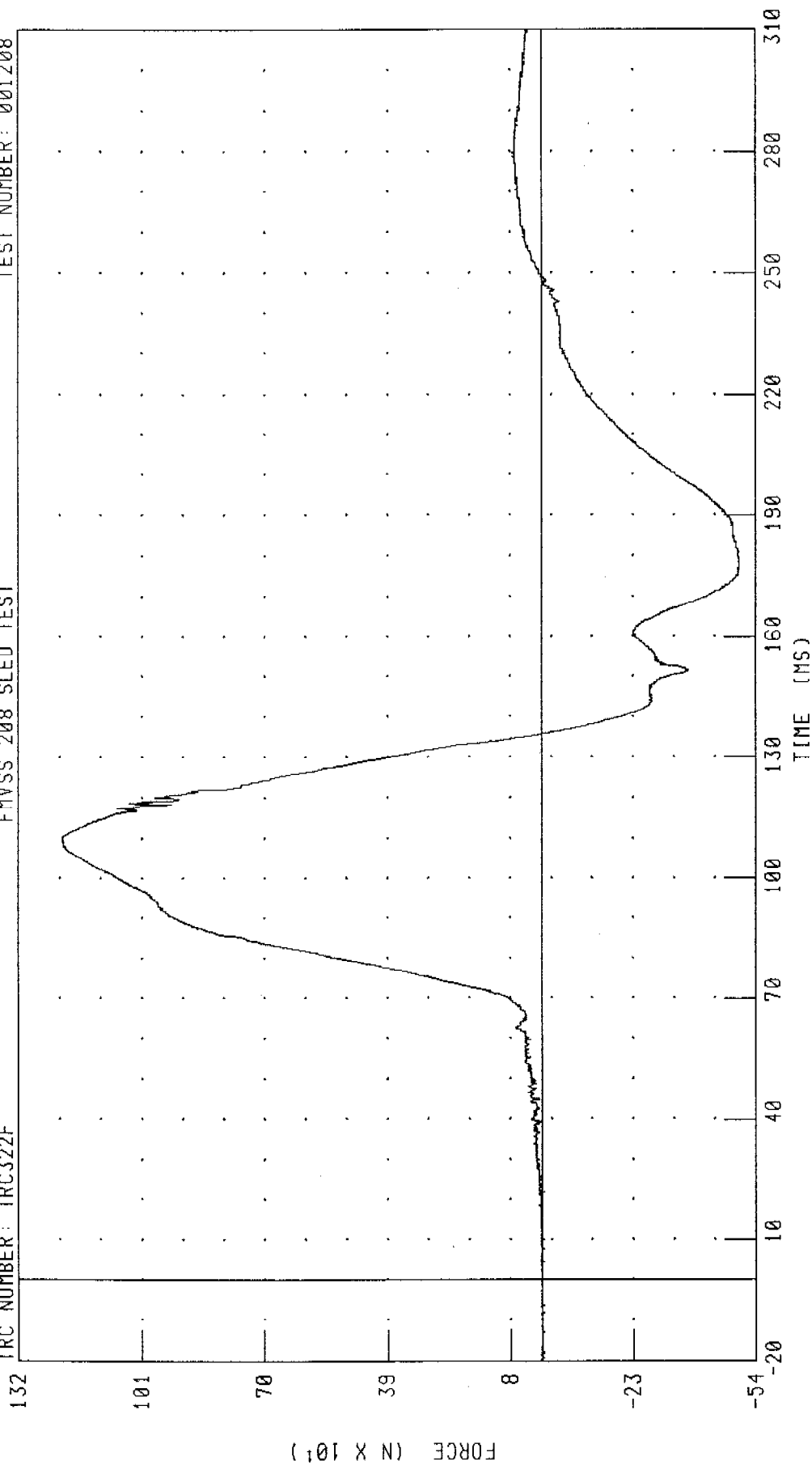
C10501 / 2001 HYUNDAI ELANTRA
 RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION



C10501 / 2001 HYUNDAI ELANTRA
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE
FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



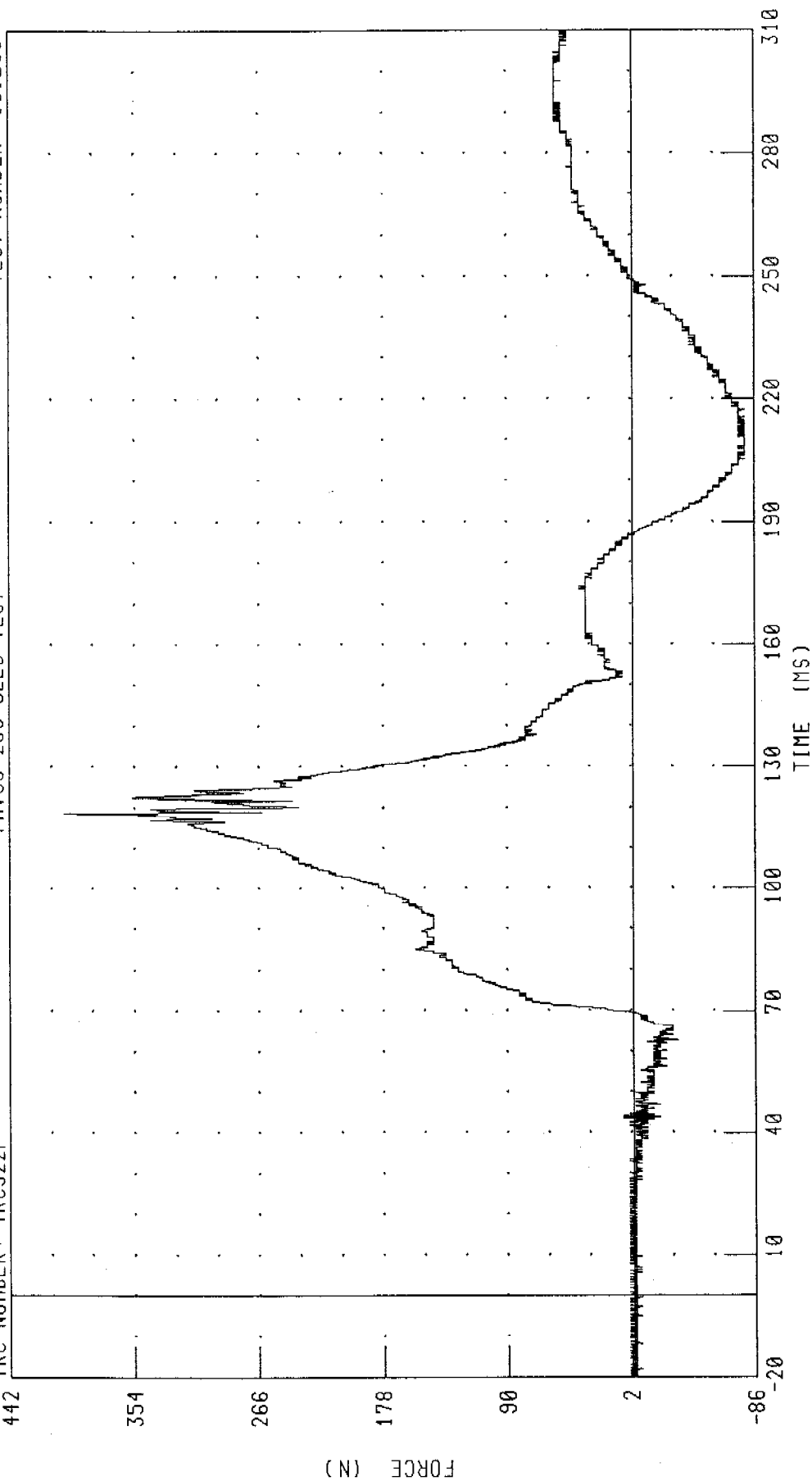
PEAK DATA: 1211.26 N @ 109.28 MS, -499.47 N @ 176.56 MS

CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

C10501 / 2001 HYUNDAI ELANTRA
 RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE
 FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



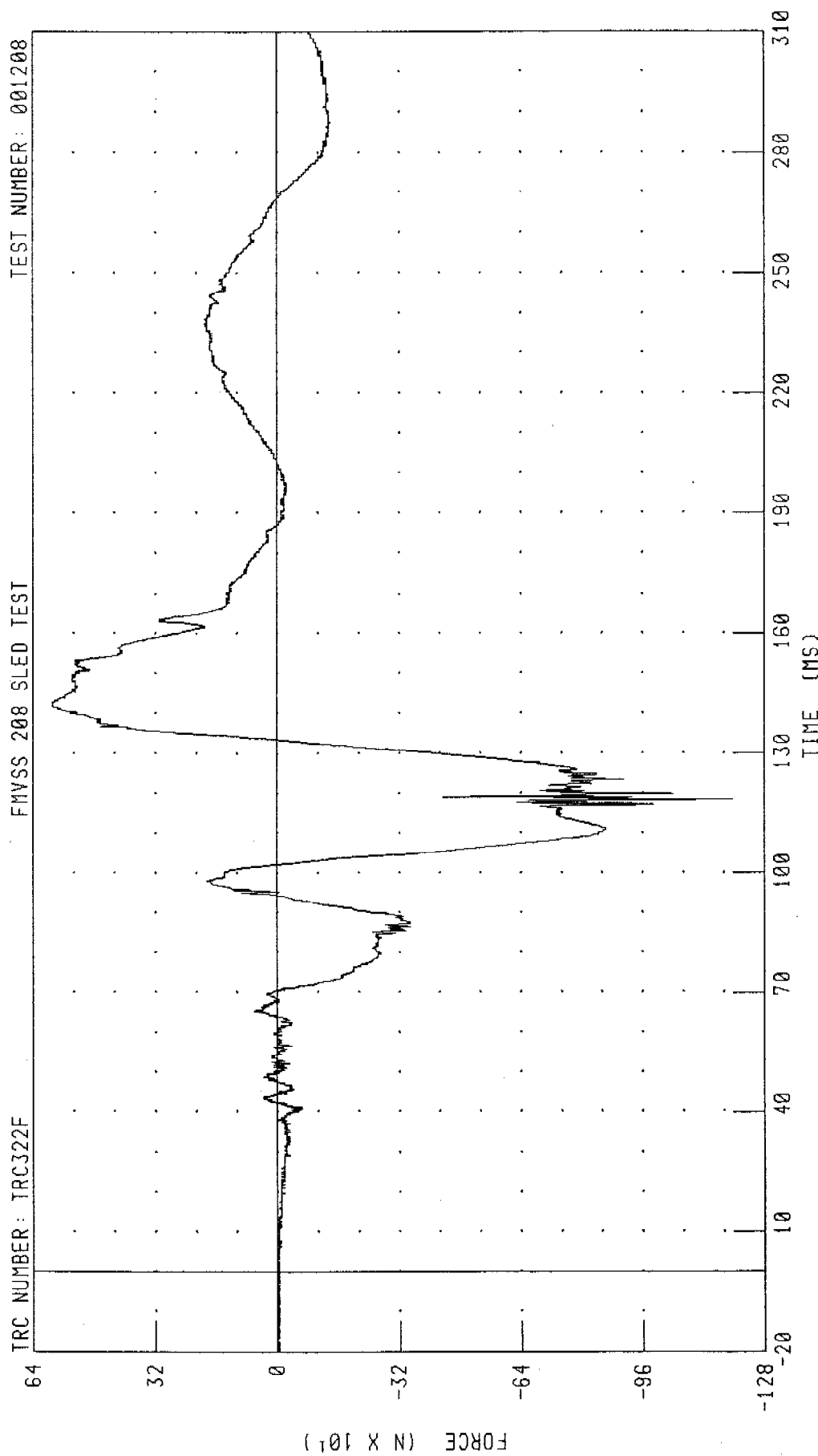
PEAK DATA: 403.08 N @ 118.80 MS; -79.09 N @ 205.12 MS

CHANNEL: NEKYF2 FILTER: CH CLASS 1000

C10501 / 2001 HYUNDAI ELANTRA
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE

TRC NUMBER: TRC322F

TEST NUMBER: 001208



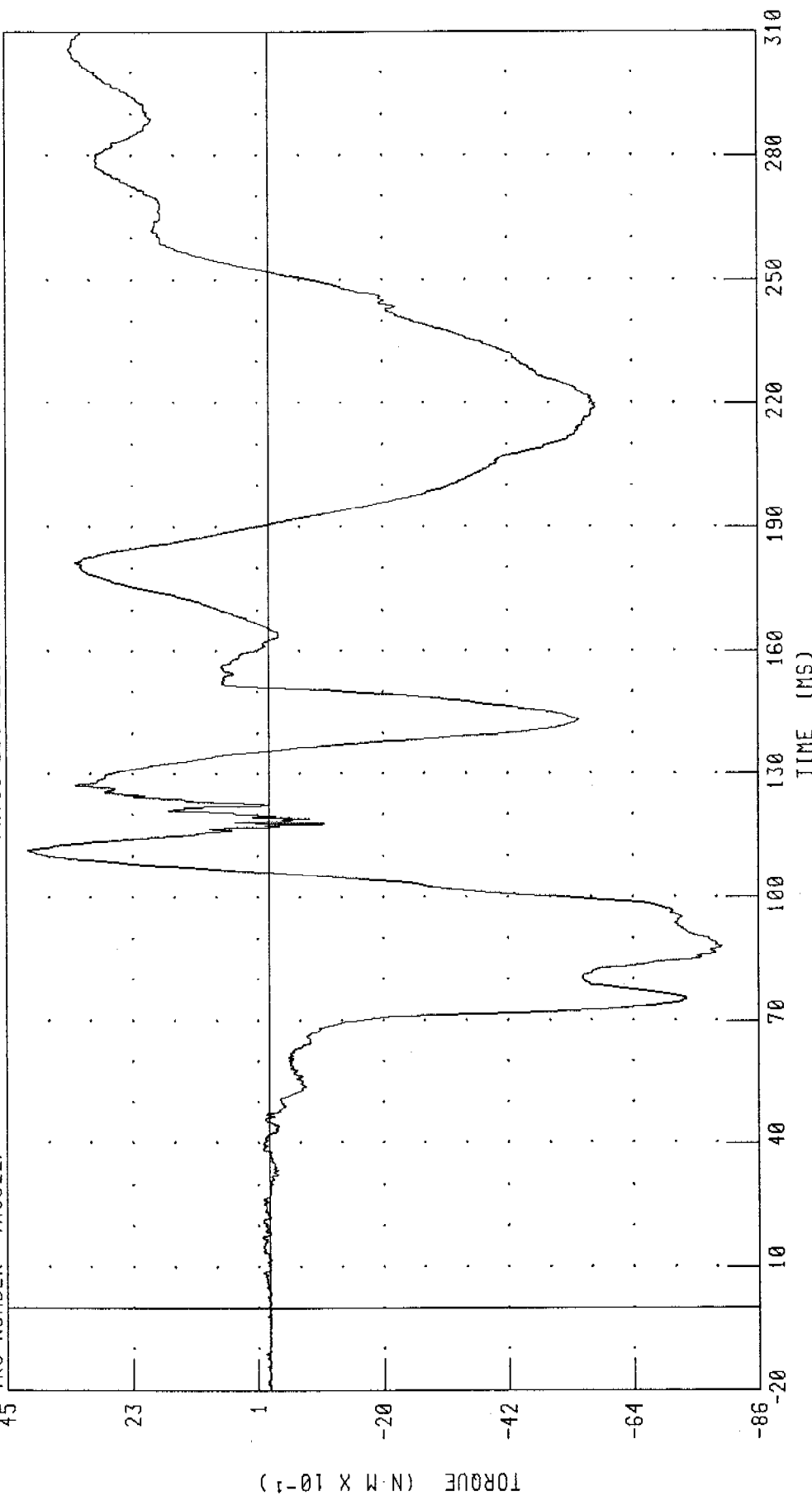
CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

PEAK DATA: 589.28 N @ 141.68 MS, -1196.79 N @ 118.56 MS

C10501 / 2001 HYUNDAI ELANTRA
 RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS
 FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



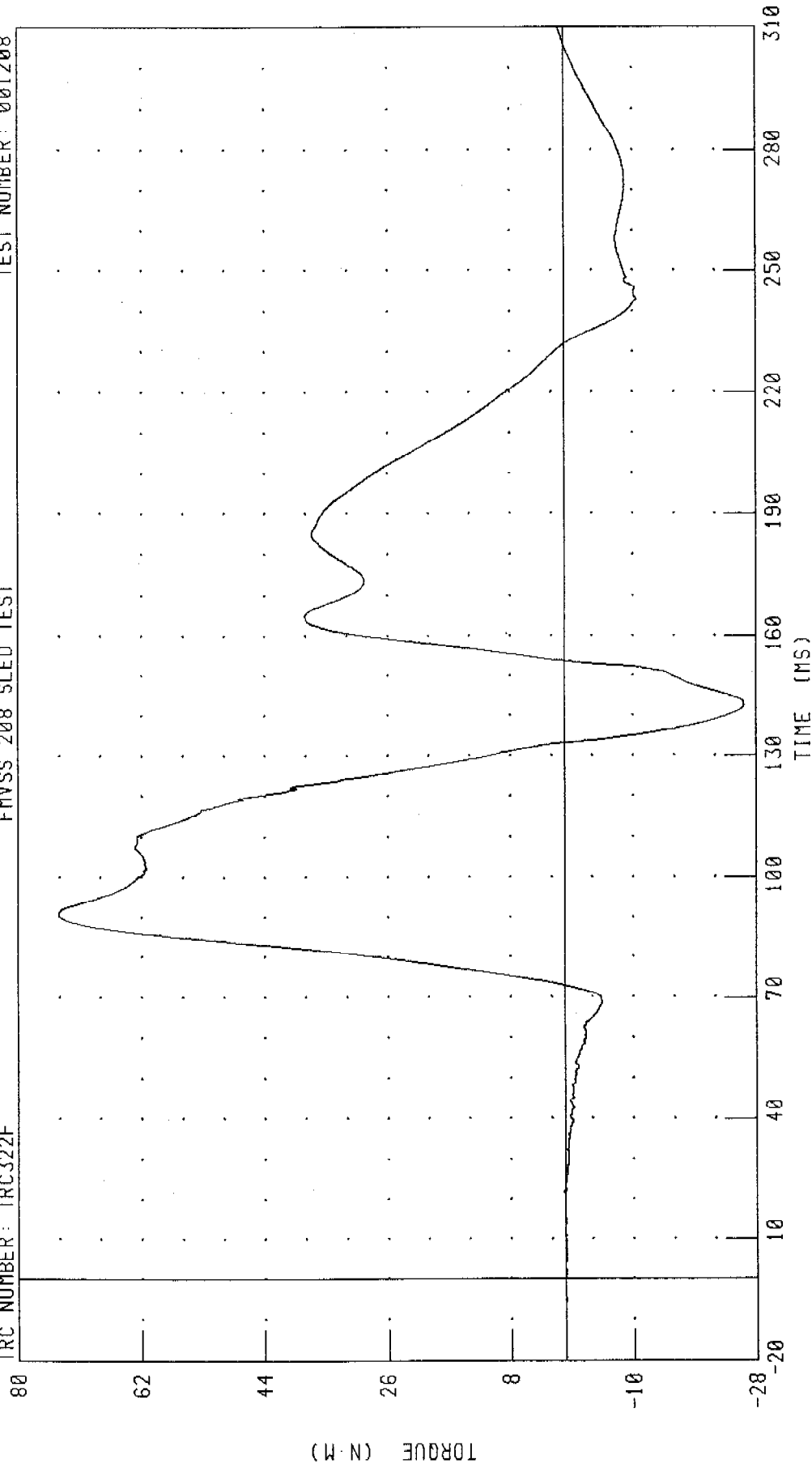
PEAK DATA: 4.24 N·m @ 111.36 ms; -7.96 N·m @ 88.08 ms

CHANNEL: NEKX12 FILTER: CH. CLASS 600

C10501 / 2001 HYUNDAI ELANTRA
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS
FMVSS 208 SLED TEST

TRC NUMBER: TRC322F

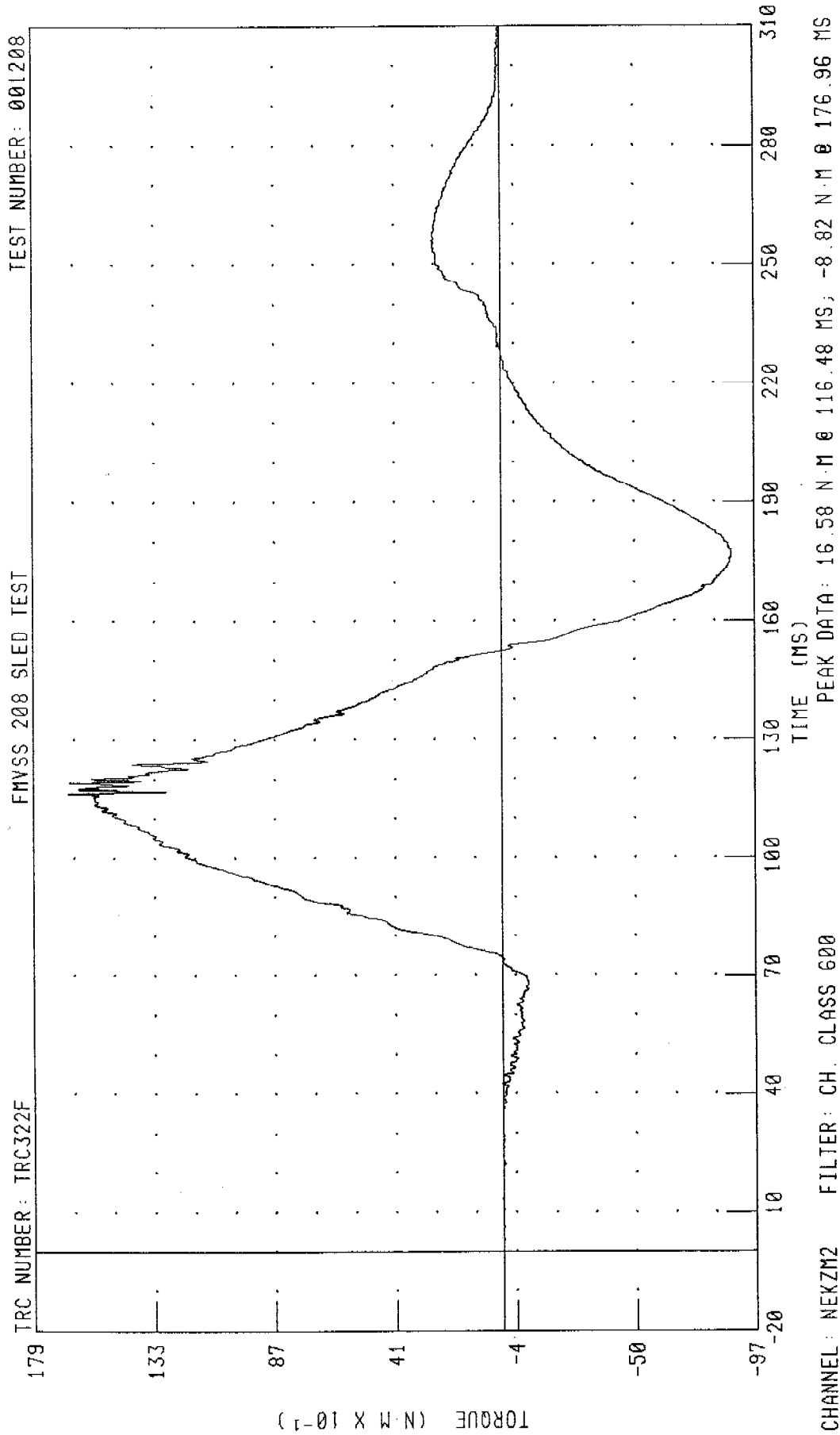
TEST NUMBER: 001208



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

PEAK DATA: 74.14 N-M @ 91.12 MS, -26.27 N-M @ 142.56 MS

C10501 / 2001 HYUNDAI ELANTRA
 RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS
 FMVSS 208 SLED TEST



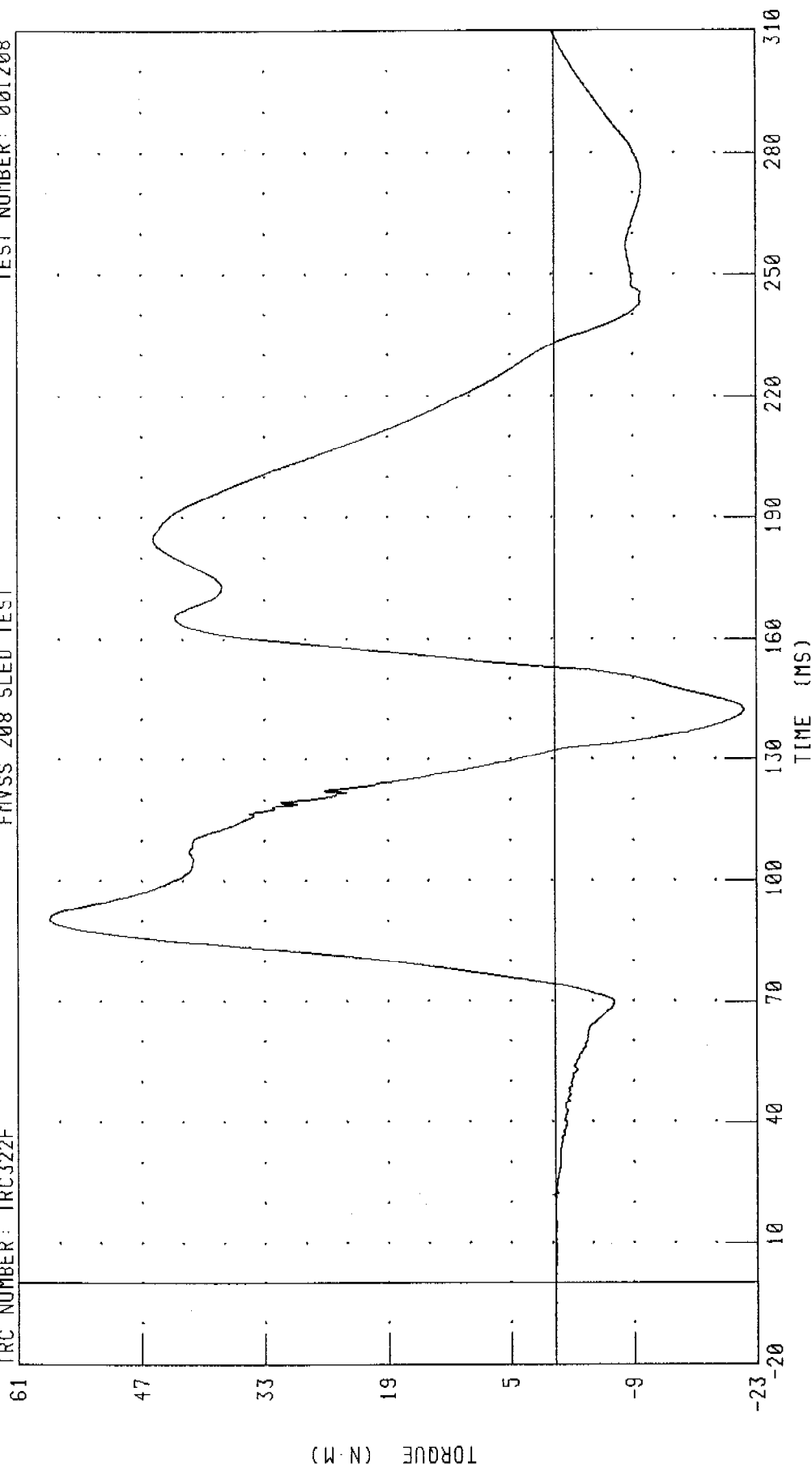
C10501 / 2001 HYUNDAI ELANTRA

RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS OCCIPITAL CONDYLE

TRC NUMBER: TRC322F

FMVSS 208 SLED TEST

TEST NUMBER: 001208



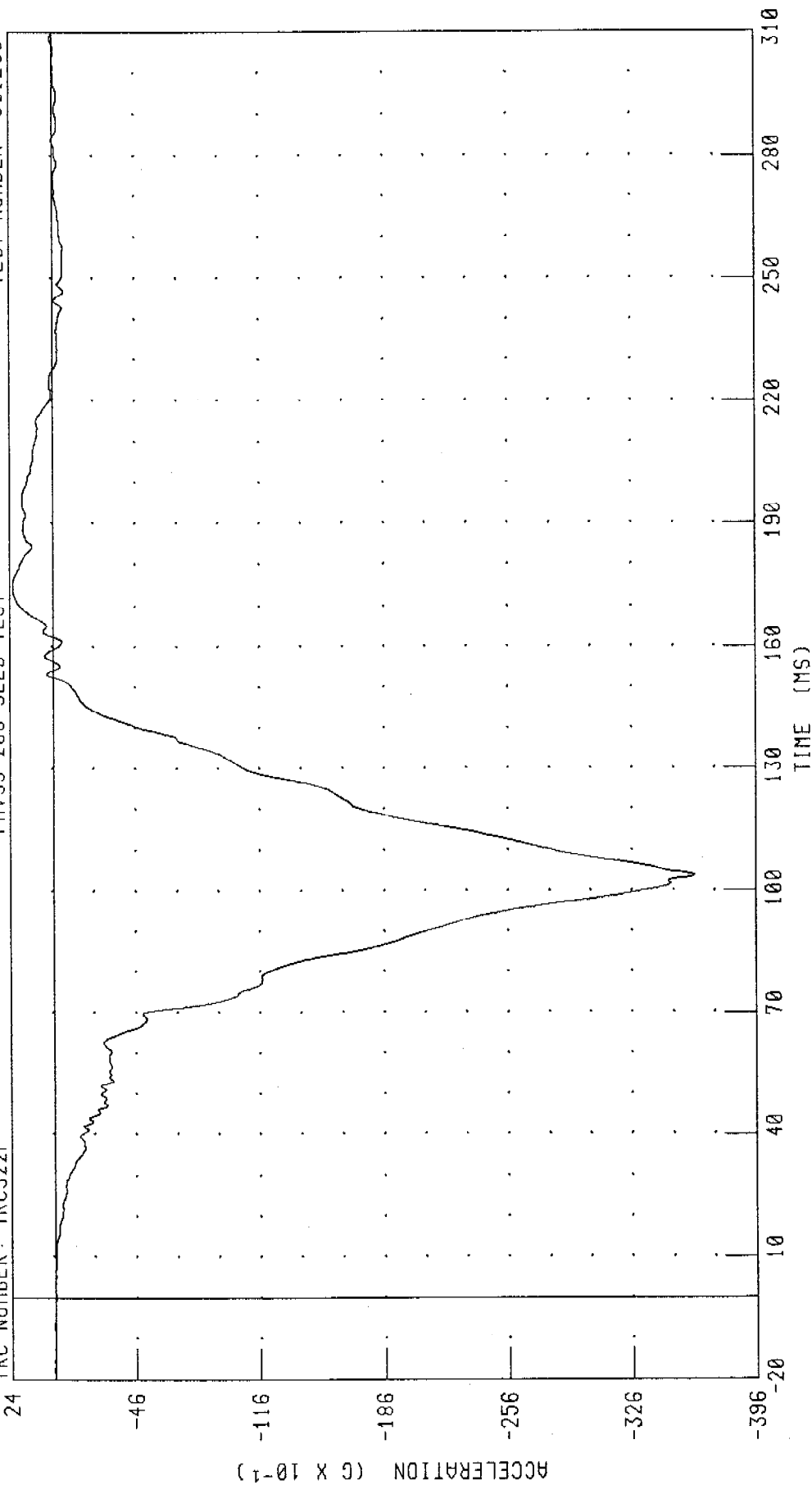
CHANNEL: NEKOM2 FILTER: CH. CLASS 600

PEAK DATA: 57.47 N-M @ 90.40 MS; -21.56 N-M @ 142.24 MS

C10501 / 2001 HYUNDAI ELANTRA
 RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



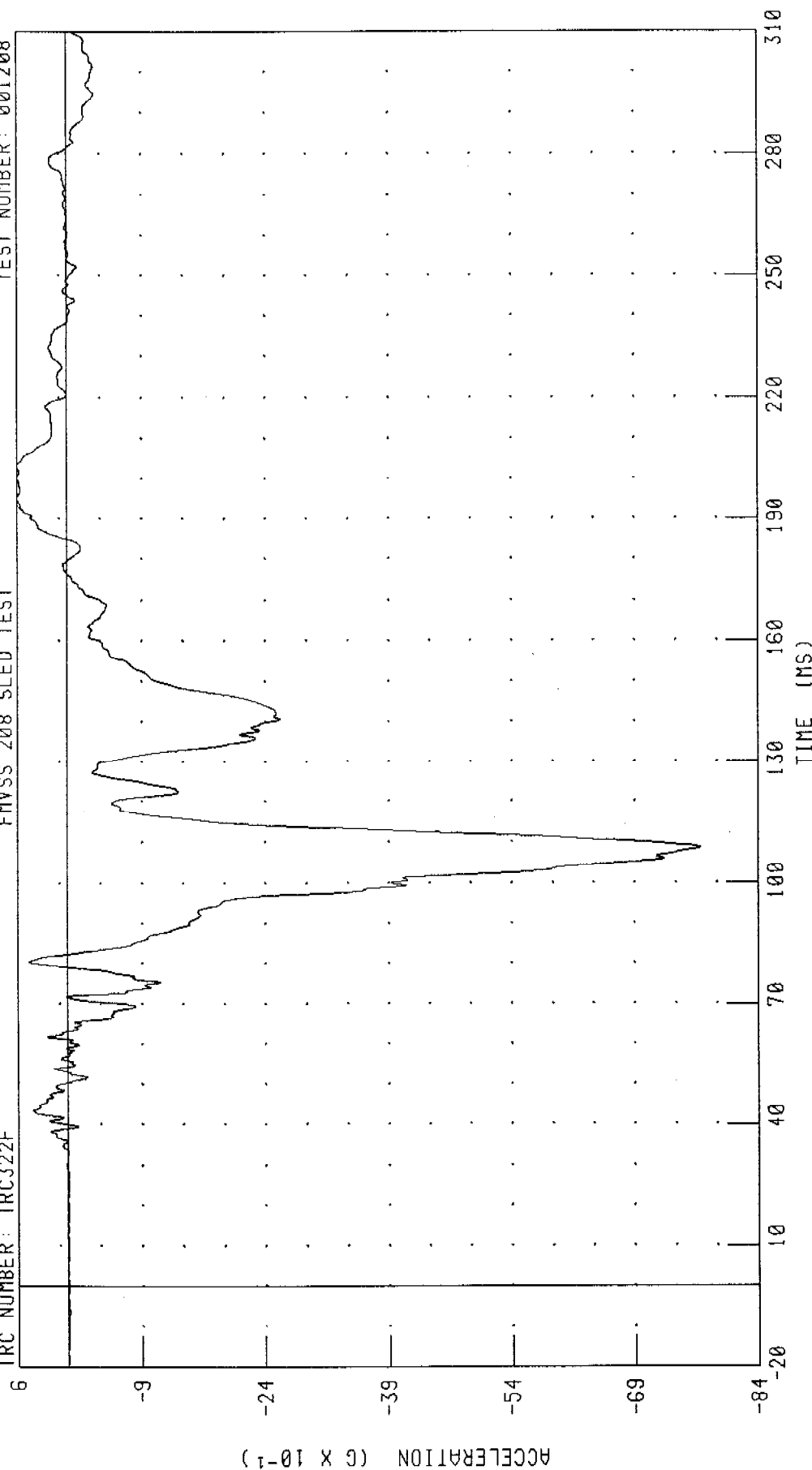
PEAK DATA: 2.25 G @ 175.12 MS; -36.15 G @ 103.84 MS

CHANNEL: CSTXG2 FILTER: CH. CLASS 180

C10501 / 2001 HYUNDAI ELANTRA
 RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 001208

TRC NUMBER: TRC322F



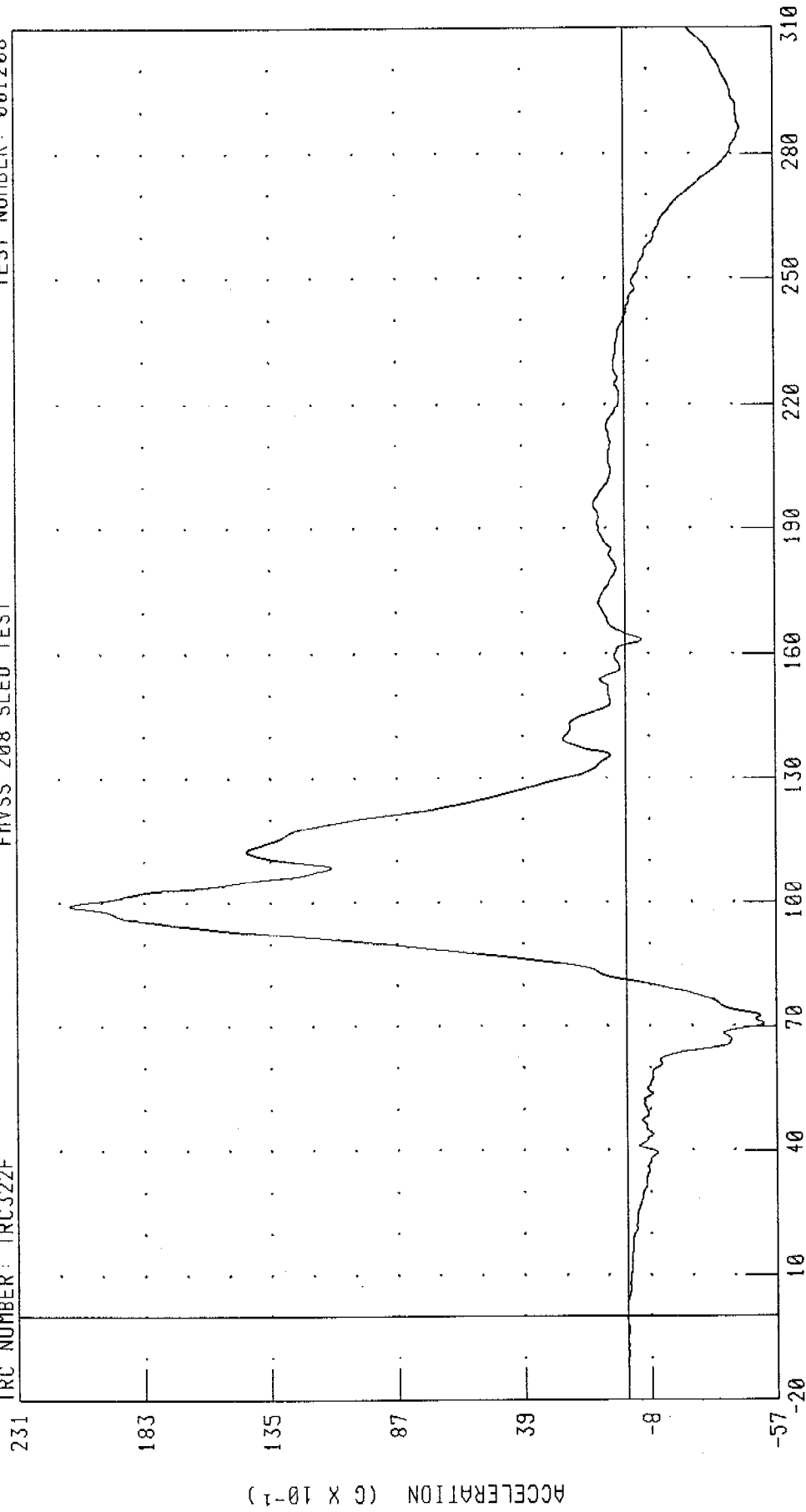
PEAK DATA: 0.62 G @ 195.28 MS, -7.70 G @ 108.72 MS

CHANNEL: CSTYC2 FILTER: CH. CLASS 180

C10501 / 2001 HYUNDAI ELANTRA
 RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION
 FMVSS 208 SLED TEST

TEST NUMBER: 001208

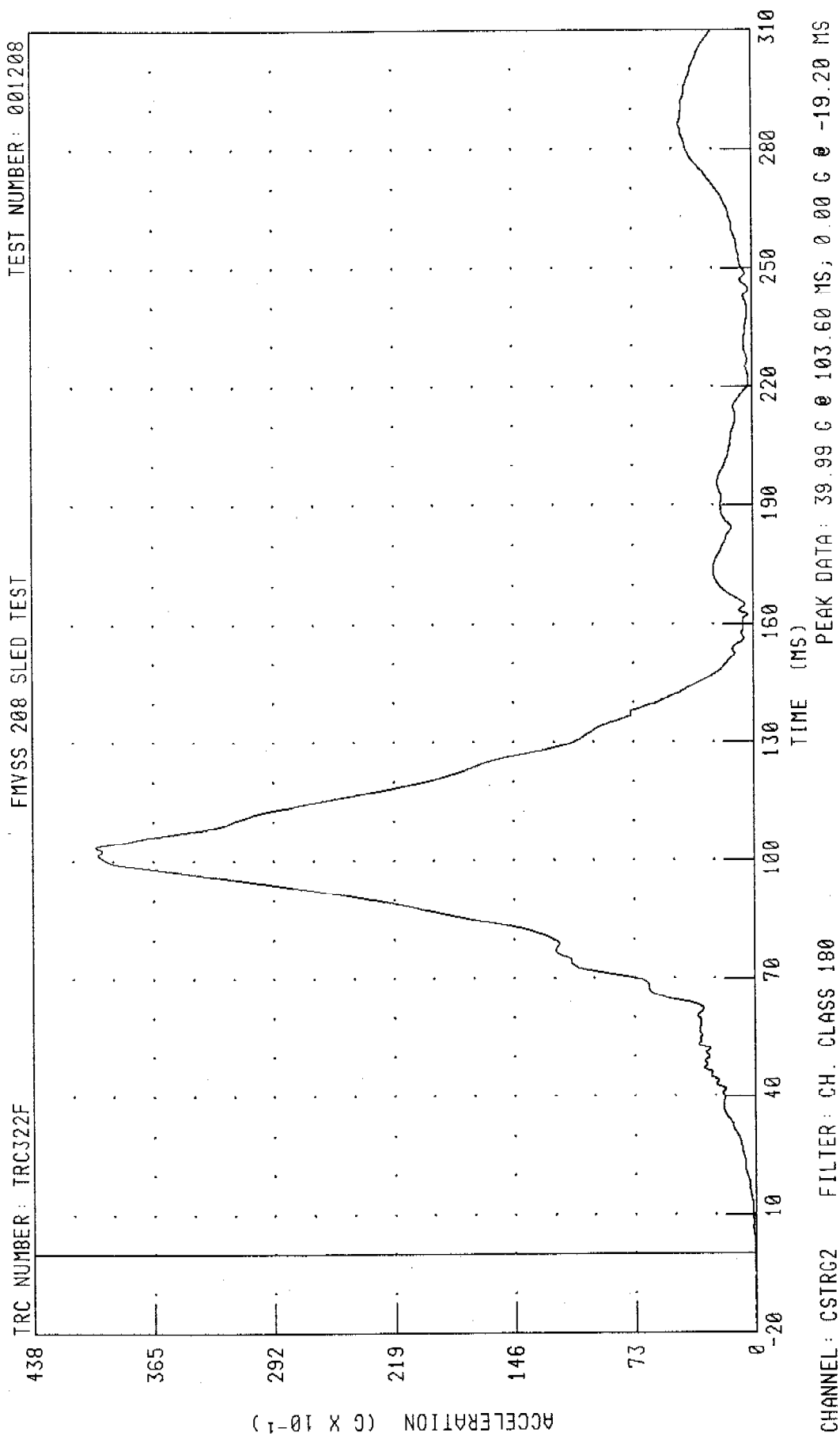
TRC NUMBER: TRC322F



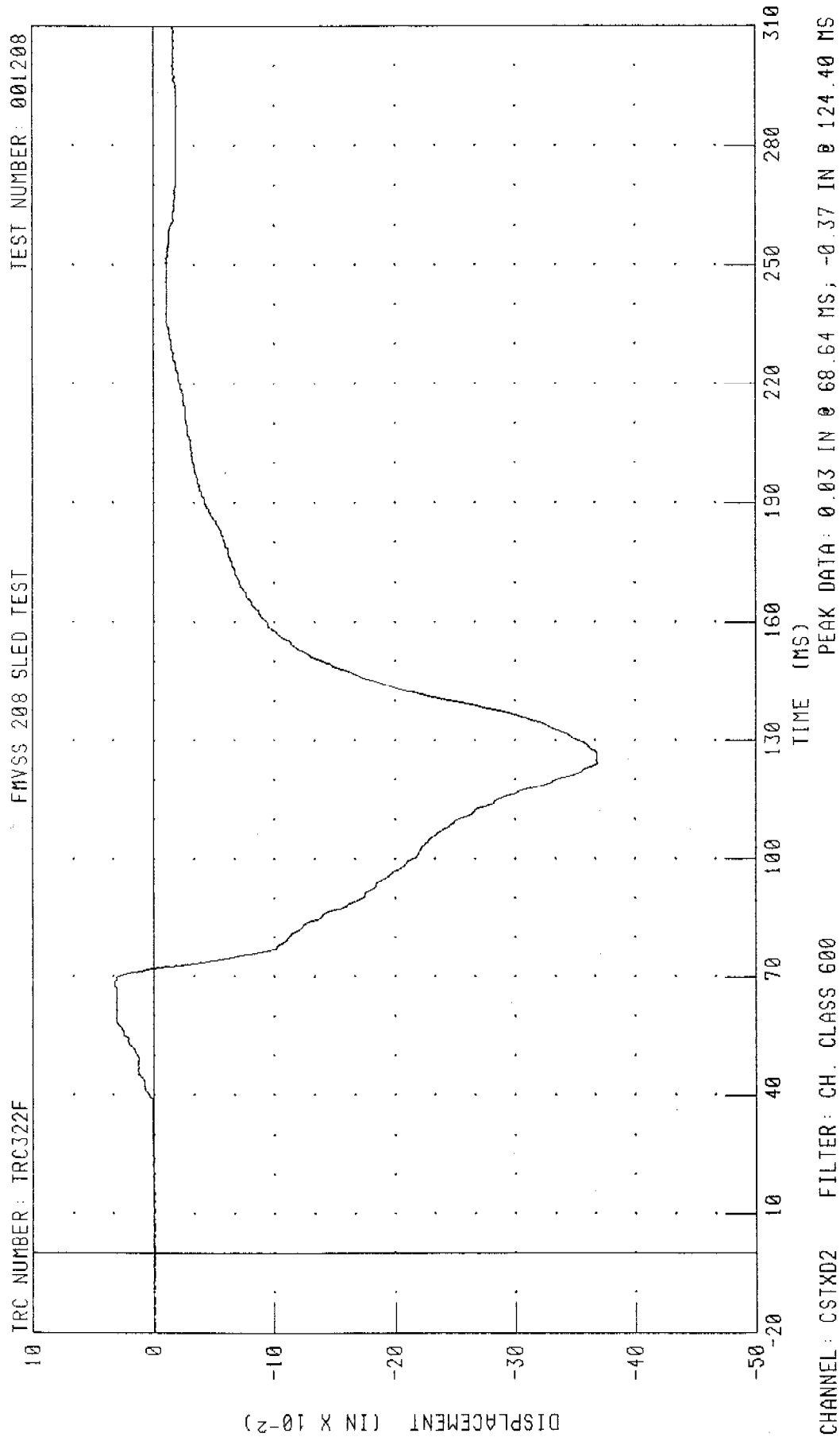
PEAK DATA: 21.11 G @ 99.36 MS, -5.22 G @ 70.64 MS

CHANNEL: CSTZG2 FILTER: CH. CLASS 180

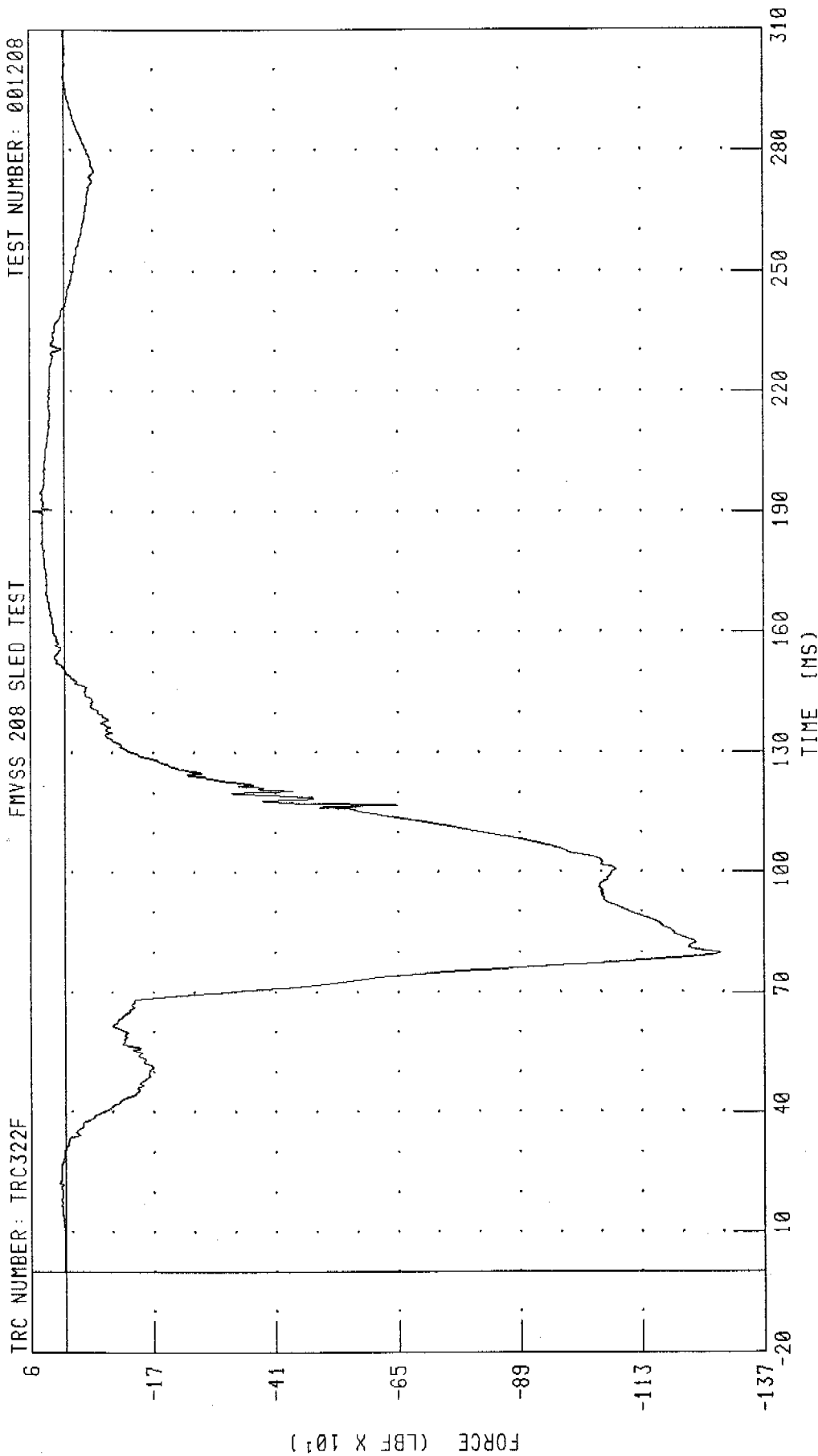
C10501 / 2001 HYUNDAI ELANTRA
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION



C10501 / 2001 HYUNDAI ELANTRA
RIGHT FRONT PASSENGER CHEST DEFLECTION



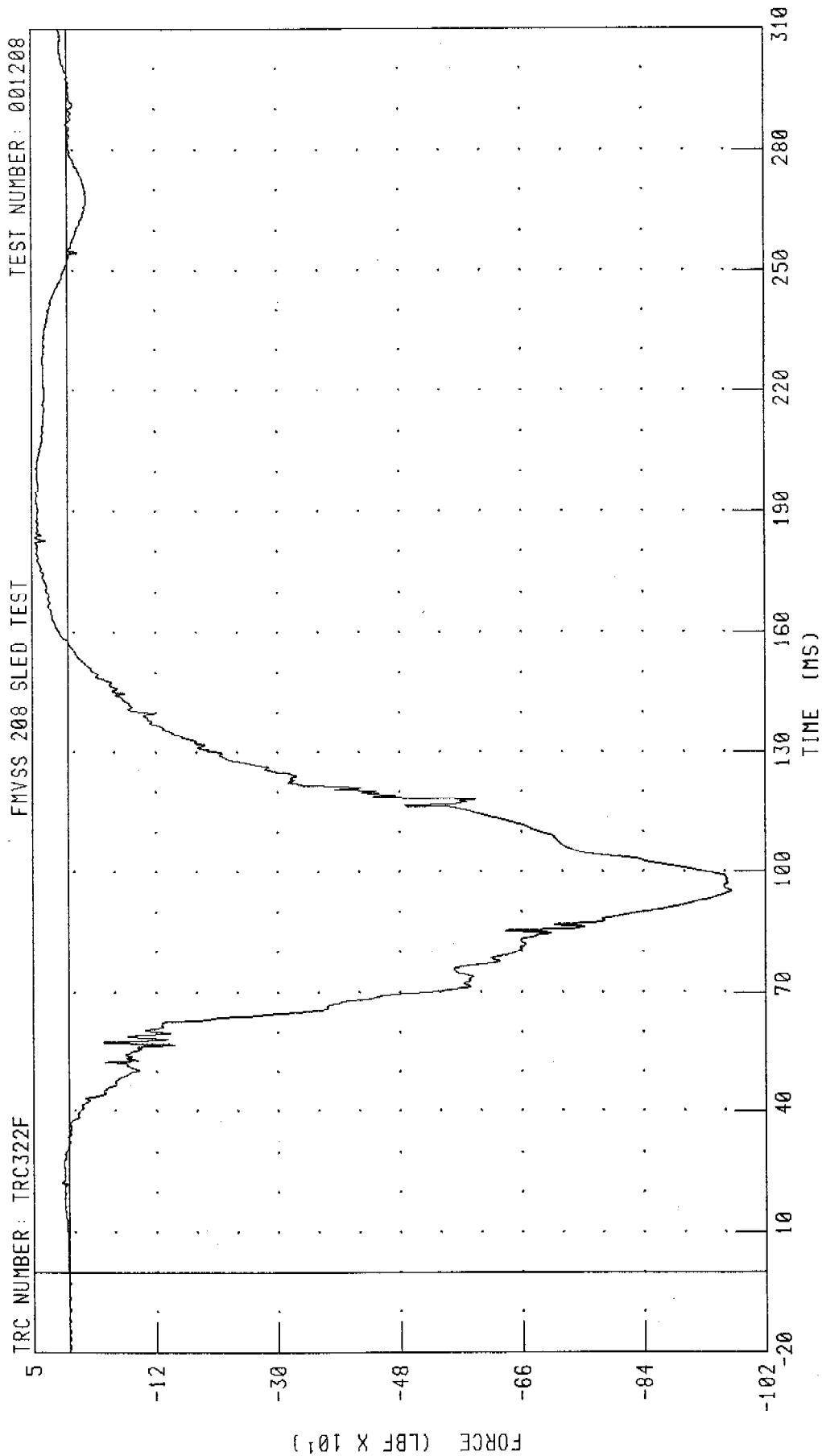
C10501 / 2001 HYUNDAI ELANTRA
RIGHT FRONT PASSENGER LEFT FEMUR FORCE



CHANNEL: LFNZF2 FILTER: CH. CLASS 600

PEAK DATA: 60.44 LBF @ 190.08 MS; -1289.65 LBF @ 80.00 MS

C10501 / 2001 HYUNDAI ELANTRA
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE



PEAK DATA: 47.00 LBF @ 183.60 MS; -979.45 LBF @ 95.36 MS

CHANNEL: RFNZF2 FILTER: CH. CLASS 600

Appendix C

Manufacturer's Vehicle Information

TEST VEHICLE INFORMATION

Vehicle Model Year and Make: 2001 MY / Hyundai Motor Company
 Vehicle Model and Body Style: Elantra / Sedan

1. NOMINAL DESIGN RIDING POSITION –

For adjustable driver and passenger seat backs, describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent if applicable.

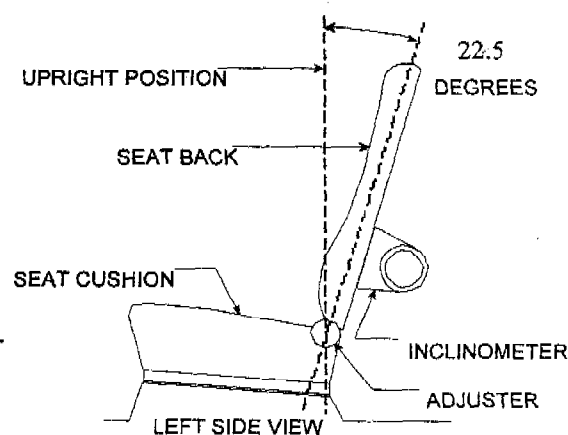
Seat back angle for driver's seat = 22.5°.

Measurement Instructions: Seat back angle
is measured along rear edge of metal seat back
frame from the vertical line as shown in attached
drawing #5-2. Position can also be located with back
adjusted to the 9th latch position from the initial lock
position.

Seat back angle for passenger's seat = 22.5°.

Measurement Instructions:

Same as driver's data.



2. SEAT FORE AND AFT POSITIONS –

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

Position of the driver's seat:

Adjustable driver's seat position is the 12th lock position from the fore 1st lock position as shown in attached
drawing #5-3.

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

Same as driver data

3. ADJUSTABLE UPPER ANCHORAGE POSITION(Note application –)

Adjustable upper anchorage position is 2nd lock position from the top 1st lock position as shown in attached
drawing #6.

4. STEERING COLUMN ADJUSTMENTS -

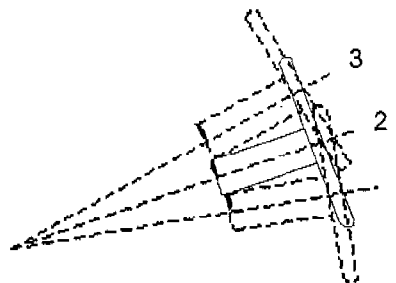
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions.

If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions:

Steering wheel can be located at midpoint. The angles for full range of driving position between position 1 and position 3 divided by two makes midpoint position 2 angles. Steering wheel angle is 67° and Steering column angle is 23° from the horizontal line.

STEERING COLUMN ASSEMBLY



LEFT SIDE VIEW

5. FUEL TANK CAPACITY DATA -

- 5.1 A. "Usable Capacity" of standard equipment fuel tank = 14.5 gallons.
 B. "Usable Capacity" of optional equipment fuel tank = N/A gallons.
 C. Capacity used when certification testing to requirements of FMVSS 301 = 13.5 gallons.

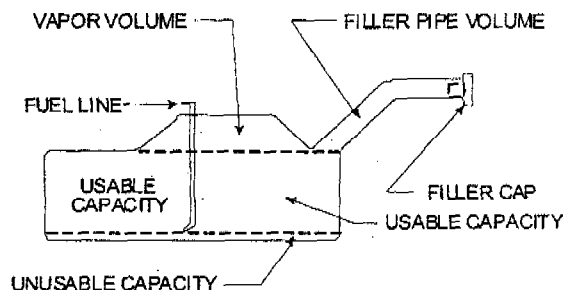
Operational Instructions:

Operate vehicle engine to "Run Dry" condition.

Add 93% of the stoddard solvent of usable capacity

To vehicle fuel tank.

VEHICLE FUEL TANK ASSEMBLY



- 5.2 Amount of Stoddard solvent added to vehicle for certification test = 13.5 gallons.

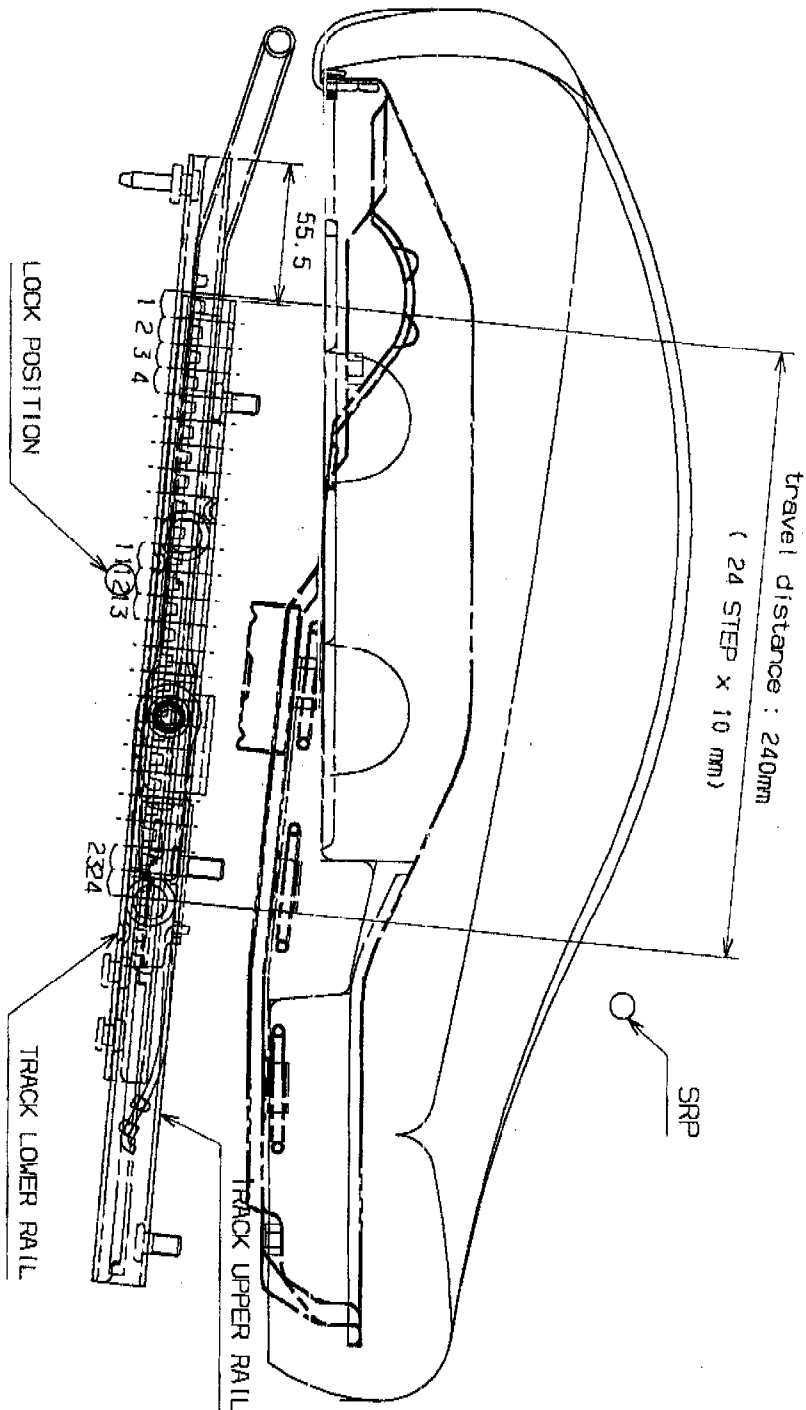
- 5.3 Is vehicle equipped with electric fuel pump? ☒ YES ☐ NO

If YES, does pump normally operate when vehicle's electrical system is activated?

☒ YES ☐ NO

JOB NO

CK	DR	REVISIONS	DATE	NO	CK	DR	REVISIONS	DATE	NO

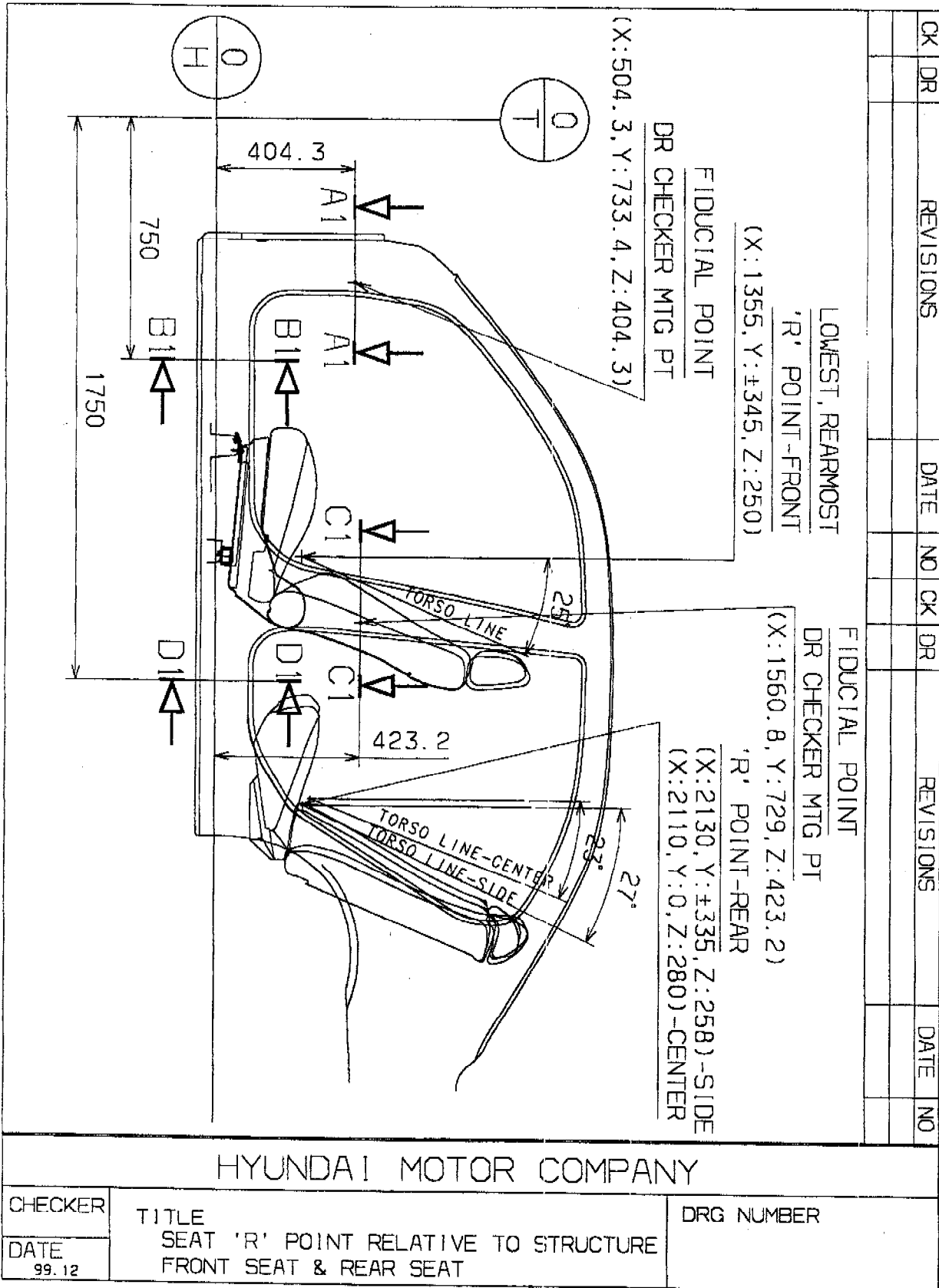


NOTES) Seat should be positioned at the 12th lock position from the fore 1st lock position, then the distance between the end of track upper rail and track lower rail is to be 55.5mm

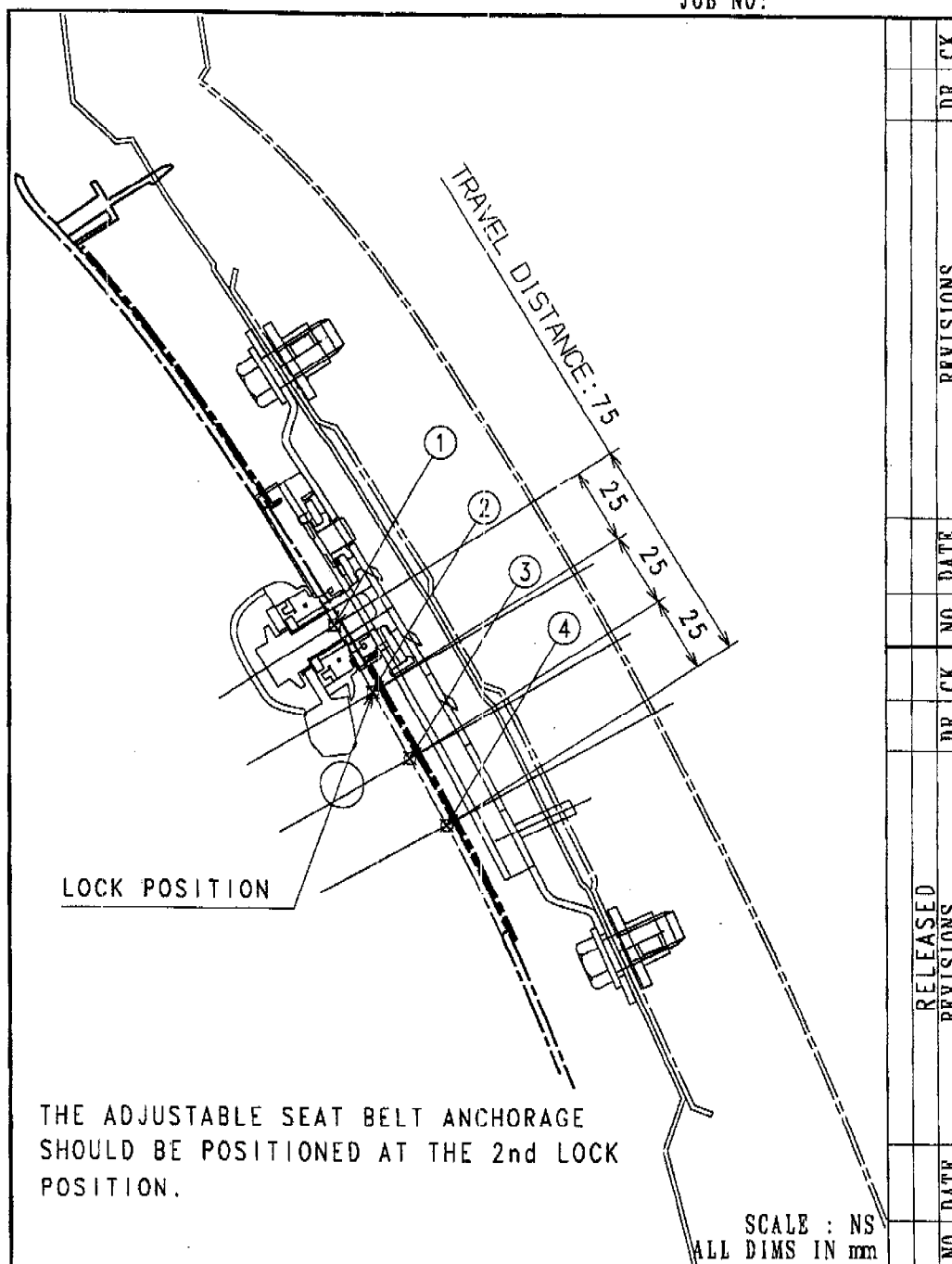
HYUNDAI MOTOR COMPANY

CHECKER	TITLE	DRG NUMBER
DATE	SEAT MIDDLE POSITION	
99.12		

JOB NO



JOB NO:



HYUNDAI MOTOR COMPANY

CHECKER	TITLE	DRG NUMBER
DATE 00.10.16	NOMINAL DESIGN POSITION FOR A 50TH PERCENTILE ADULT MALE OCCUPANT	'00/XD 4DR /

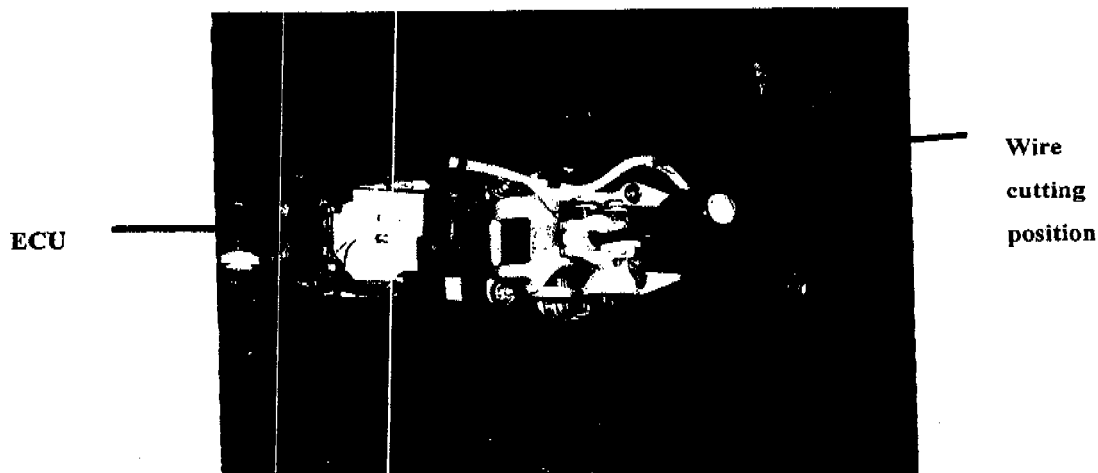
Question and answer

Q1. How to disconnect the air bags from the vehicle sensors.

A1. Air bag ECU and wires are on the center floor. So there needs to disassemble the console. First remove the knob of transmission handle to pull out the consol. (2 screws at the front side of the knob) Then unscrew the center console mounting screws in the left and right side of it while moving the seats.(6 screws) Then the console can be removed by hand. The air bag ECU and wires (covered yellow tube) connected from the ECU to the air bags can be seen. Cut the wires. (See Picture. 2) Connect the DAB and PAB wires to the air bag triggering system. (See wire color code)



Picture #1, Before disassembling the console.



Picture #2, After disassembling the console. (Center floor)

Wire color code:

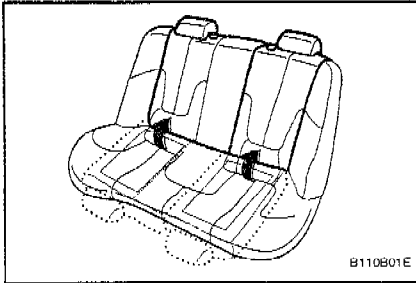
DAH (+)	: Yellow
DAB (-)	: Blue
PAB (+)	: White with black SOLID line
PAB (-)	: Green with black SOLID line

- **Caution : Do not use white and green wire with DASHED black line.**

Q2. Describe the method used in certification to determine when to trigger the air bag and the system used to trigger the air bag.

We used KYOWA (Japan) air bag ignition system to trigger air bags. It consists of signal input feature (receiving time zero signal), time delaying feature (to trigger the air bags at expected time), and current output feature (to trigger the air bags). The time zero signal comes from control panel connected to Hydraulic catapult test rig which generates the sled pulses. The time of time zero signal can be selected at 0.5 G's and the signal initializes both the data acquisition system and the air bag trigger system simultaneously. So if the delaying time set at 20ms then the output current triggers the air bags 20ms after the time zero. We set the current by 4 ampere and the current duration by 100 millisecond.

FEATURES OF YOUR HYUNDAI



WARNING:

The purpose of the fold-down rear seatbacks is to allow you to carry longer objects than could otherwise be accommodated. Do not allow passengers to sit on top of the folded down seat back while the car is moving as this is not a proper seating position and no seat belts are available for use. This could result in serious injury or death in case of an accident or sudden stop. Objects carried on the folded down seatback should not extend higher than the top of the front seats. This could allow cargo to slide forward and cause injury or damage during sudden stops.

B160A01S-AAT

SEAT BELT PRECAUTIONS

WARNING:

All occupants of the vehicle must wear their seat belts at all times. Note that this vehicle is equipped with a Supplemental Restraint (Airbag) System as discussed beginning on page 1-18. The seat belts must be used in conjunction with the supplemental airbag system. State laws may require that some or all occupants of the vehicle use seat belts. The possibility of increased injury or severity of injury in an accident will be increased if this elementary safety precaution is not observed. In addition, the following recommendations are made:

B160B01S-AAT

Infant or Small Child

All states require small children to use proper restraints. The child restraint seat or infant restraint system must be placed in the rear seat and used for infants or small children weighing less than 40 pounds. Information about the use of such restraints begins on page 1-14. Such restraints must only be used in the rear seat.

WARNING:

Every person in your vehicle needs to be buckled up at all times, including infants and children. In a collision, an unrestrained child can become a "missile" inside the car.

The force required to hold a child on your lap could be so great that you could not hold the child. Any child riding in the vehicle should always be in a proper restraint in the rear seat of the vehicle.

NOTE:

Small children are best protected in an accident when properly restrained in the rear seat by a child restraint system that meets the requirements of the Federal Motor Vehicle Safety Standards. Before buying any child restraint system, make sure that it has a label certifying that it meets Motor Vehicle Safety Standard 213. The restraint must be appropriate for your child's height and weight. Check the label on the child restraint for this information. See page 1-14.

B160C01A-AAT

Larger Children

Children who are too large for child restraint systems should occupy the rear seat and use the available lap/shoulder belts. The lap portion should be fastened snug on the hips and as low as possible. Check belt fit periodically. A child's squirming could move the belt out of position. If the larger child (over age 13) is in the front seat, the child should be securely restrained by the seat belt. Under no circumstances should the child be allowed to stand or kneel on the seat. Children are afforded the most safety in the event of an accident when they are restrained by a proper restraint system in the rear seat.

1-9

FEATURES OF YOUR HYUNDAI

Never allow children to ride in the front passenger seat.

B150D01S-AAT

Pregnant Women

The use of a seat belt is recommended for pregnant women to lessen the chance of injury in an accident. When a seat belt is used, it should be placed as low and snugly as possible on the hips, not across the abdomen. For specific recommendations, consult a physician.

B150E01A-AAT

Injured Person

A seat belt should be used when an injured person is being transported. When this is necessary, you should consult a physician for recommendations.

B150F01A-AAT

One Person Per Belt

Two people (including children) should never attempt to use a single seat belt. This could increase the severity of injuries in case of an accident.

B150G01A-AAT

Do Not Lie Down

To reduce the chance of injuries in the event of an accident, and to achieve maximum effectiveness of the restraint system, all passengers should be sitting up and the front seats should be in an upright position when the car is moving.

A seat belt cannot provide proper protection if the person is lying down in the rear seat or if the front seat is in a reclined position.

WARNING:

Sitting in a reclined position or lying down when your vehicle is in motion can be dangerous. Even if you buckle up, your safety belts can't do their job when you're reclined. The shoulder belt can't do its job because it won't be against your body. Instead, it will be in front of you. In a crash you could go into it with great force, receiving serious neck or other injuries. The lap belt can't do its job either. In a crash the belt could go up over your abdomen. The belt forces would be there, not at your pelvic bones. This could cause serious internal injuries. For proper protection when the vehicle is in motion, have the seatback upright. Then sit back in the seat and wear your safety belt properly. See page 1-11.

B160A01A-AAT

CARE OF SEAT BELTS

Seat belt systems should never be disassembled or modified. In addition, care should be taken to assure that seat belts and belt hardware are not damaged by seat hinges, doors or other abuse.

WARNING:

When you return the rear seatback to its upright position after the rear seatback was folded down, be careful not to damage the seat belt webbing or buckle. Be sure that the webbing or buckle does not get caught or pinched in the rear seat.

B160B01A-AAT

Periodic Inspection

It is recommended that all seat belts be inspected periodically for wear or damage of any kind. Parts of the system that are damaged should be replaced as soon as possible.

B160C01A-AAT

Keep Belts Clean and Dry

Seat belts should be kept clean and dry. If belts become dirty, they can be cleaned by using a mild soap solution and warm water. Bleach, dye, strong detergents or abrasives should not be used because they may damage and weaken the fabric.

B160D01A-AAT

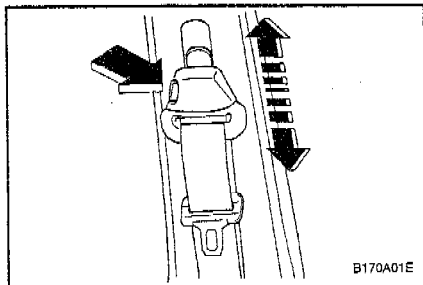
When to Replace Seat Belts

Entire in-use seat belt assembly or assemblies should be replaced if the vehicle has been involved in an accident. This should be done even if no damage is visible. Additional questions concerning seat belt operation should be directed to your Hyundai Dealer.

FEATURES OF YOUR HYUNDAI

B170A03A-AAT

HEIGHT ADJUSTABLE FRONT SEAT SHOULDER BELT (If Installed)



You can adjust the height of the shoulder belt anchor to one of the 4 positions.

If the height of the adjusting seat belt is too near your neck, you will not be getting the most effective protection. The shoulder portion should be adjusted so that it lies across your chest and midway over your shoulder nearest the door and not your neck.

To adjust the height of the seat belt anchor, lower or raise the height adjuster into an appropriate position when the height adjuster button is pushed.

Release the button to lock the anchor into position. Try sliding the release button to make sure that it has locked into the position.

WARNING:

- o The height adjuster must be in the locked position when the vehicle is moving.
- o The misadjustment of height of the shoulder belt could reduce the effectiveness of the seat belt in a crash.

B180A01S-AAT

SEAT BELT-Driver's 3-Point System with Emergency Locking Retractor To Fasten Your Belt

To fasten your seat belt, pull it out of the retractor and insert the metal tab into the buckle. There will be an audible "click" when the tab locks into the buckle.

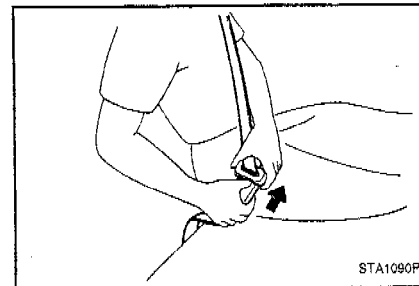
The seat belt automatically adjusts to the proper length only after the lap belt portion is adjusted manually so that it fits snugly around your hips. If you lean forward in a slow, easy motion, the belt will extend and let you move around. If there is a sudden stop or impact, the belt will lock into position. It will also lock if you try to lean forward too quickly. Check to make sure that the belt is properly locked and that the belt is not twisted.

NOTE:

If the driver's seat belt is not fastened when the Ignition key is in the "ON" position, the seat belt warning light will flash and the warning chime will sound for approximately six seconds.

B190A01Y-AAT

SEAT BELTS-Front Passenger and Rear Seat 3-Point System with Combination Locking Retractor To Fasten Your Belt



Combination retractor type seat belts are installed in the rear seat outboard positions to help accommodate the installation of child restraint systems. Although a combination retractor is also installed in the front passenger seat position, Hyundai strongly recommends that children always be seated in the rear seat. NEVER place any infant restraint system in the front seat of the vehicle.

This type of seat belt combines the features of both an emergency locking retractor seat belt and an automatic locking retractor seat belt. To fasten your seat belt, pull it out of the retractor and insert the metal tab into the buckle. There will be an audible "click" when the tab locks into

1- 11

FEATURES OF YOUR HYUNDAI

the buckle. When not securing a child restraint, the seat belt operates in the same way as the driver's seat belt (Emergency Locking Retractor Type). It automatically adjusts to the proper length only after the lap belt portion of the seat belt is adjusted manually so that it fits snugly around your hips. When the seat belt is fully extended from the retractor to allow the installation of a child restraint system, the seat belt operation changes to allow the belt to retract, but not to extend. (Automatic Locking Retractor Type). See page 1-14.

NOTE:

Although the combination retractor provides the same level of protection for seated passengers in either emergency or automatic locking modes, it is recommended that seated passengers use the emergency locking feature for improved convenience. The automatic locking function is intended to facilitate child restraint installation. To convert from the automatic locking feature to the emergency locking operation mode, allow the unbuckled seat belt to fully retract.

WARNING:

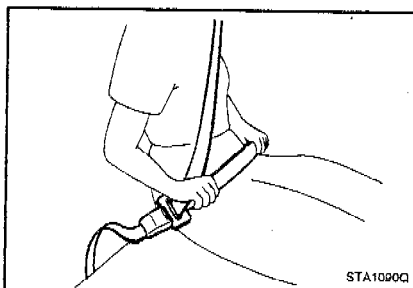
- o For maximum restraint system protection, seat belts must always be used whenever the car is moving.
- o Seat belts are most effective when seatbacks are in the upright position.
- o Children must always be seatbelted in the rear seats. Never allow children to ride in the front passenger seat.

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- o The shoulder belt should be positioned midway over the shoulder nearest the door for the most effective protection. Never wear the seat belt under the arm nearest the door. Wearing the belt under the arm nearest the door could cause serious or fatal injuries in an accident.
- o Avoid wearing twisted seat belts. A twisted belt can't do its job as well. In a collision, it could even cut into you. Be sure the belt is straight and not twisted.
- o Be careful not to damage the belt webbing or hardware. If the belt webbing or hardware is damaged, replace it.

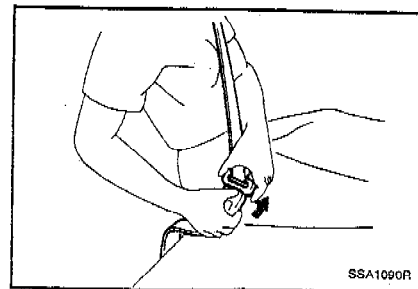
B200A01A-AAT

Adjusting Your Seat Belt



B210A01A-AAT

To Release the Seat Belt



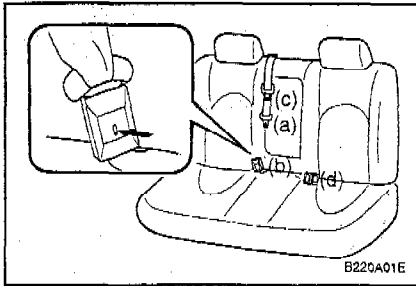
The seat belt is released by pressing the release button in the locking buckle. When it is released, the belt should automatically draw back into the retractor.

If this does not happen, check the belt to be sure it is not twisted, then try again.

FEATURES OF YOUR HYUNDAI

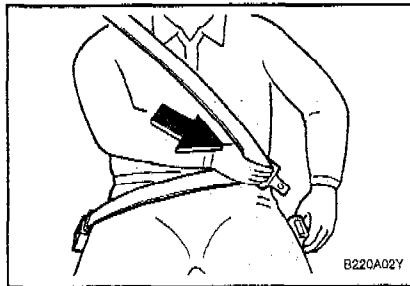
B220A01E-AAT

SEAT BELTS - Rear Seat Center's 3-Point System With Combination Locking Retractor



1. Before fastening the rear seat center belt, confirm the metal tab (a) and buckle (b) are latched together.
2. After confirming that (a) and (b) are latched, pull the seat belt out of the retractor and insert the metal tab (c) into the buckle (d).

There will be an audible "click" when the tab locks in the buckle. The seat belt automatically adjusts to the proper length only after the lap belt is adjusted manually so that it fits snugly around your hips. If you lean forward in a slow, easy motion, the belt will extend and let you move around. If there is a sudden stop or impact, the belt will lock into position. It will also lock if you try to lean forward too quickly.

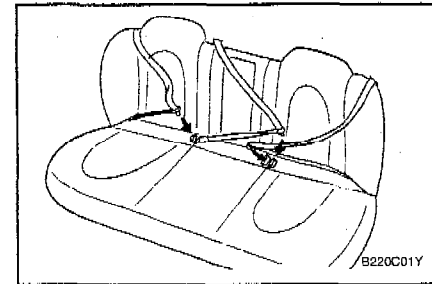


WARNING:

- o When using the rear seat center belt, you must lock all metal tabs and buckles. If any metal tab or buckle is not locked, it will increase the chance of injury in the event of collision.
- o Never unlock the metal tab (a) and the buckle (b) with the following exceptions.
 - 1) In case of folding rear seatbacks down.
 - 2) If transporting an object on the rear seat may cause damage to the rear seat center belt.
- o Lock the metal tab (a) and the buckle (b) immediately after folding rear seatbacks up.
- o To disconnect the metal tab (a) from the buckle (b), insert a sharp-ended tool into the groove located on the buckle (b).

B220C01Y-AAT

To Release the Seat Belt



When you want to release the seat belt, press the button in the locking buckle.

WARNING:

The rear seat center belt latching mechanism is different from those for the outboard rear seat shoulder belts. When fastening the outboard rear seat shoulder belts or the rear seat center belt, make sure they are inserted into the correct buckles to obtain maximum protection from the seat belt system and assure proper operation.

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B230A01A-AAT

CHILD RESTRAINT SYSTEM

Children riding in the car should sit in the rear seat and must always be restrained to minimize the risk of injury in an accident, sudden stop or sudden maneuver. According to accident statistics provided by the National Highway Traffic Safety Administration (NHTSA), children are safer when properly restrained in the rear seats than in the front seat. Larger children should use one of the seat belts provided.

You are required by law to use safety restraints for children. If small children ride in your vehicle (generally children younger than four years and/or weighing less than 40 Lbs.) you must put them in a child restraint system (safety seat). You must use a commercially available child restraint system that meets the requirements of the Federal Motor Vehicle Safety Standards (FMVSS).

Children could be injured or killed in a crash if their restraints are not properly secured. For small children and babies, a child seat or infant seat must be used. Before buying a particular child restraint system, make sure it fits your car seat and seat belts, and fits your child. Follow all the instructions provided by the manufacturer when installing the child restraint system.

WARNING:

- o A child restraint system must be placed in the rear seat. Never install a child or infant seat on the front passenger's seat. Should an accident occur and cause the passenger side airbag to deploy, it could severely injure or kill an infant or child seated in an infant or child seat. Thus, only use a child restraint in the rear seat of your vehicle.
- o Since a safety belt or child restraint system can become very hot if it is left in a closed vehicle, be sure to check the seat cover and buckles before placing a child there.
- o When the child restraint system is not in use, store it in the trunk or fasten it with a safety belt so that it will not be thrown forward in the case of a sudden stop or an accident.
- o Children who are too large to be in a child restraint should sit in the rear seat and be restrained with the available lap/shoulder belts. Never allow children to ride in the front passenger seat.
- o Always make sure that the shoulder belt portion of the lap/shoulder belt is positioned midway over the shoulder, never across the neck. Moving the child closer to the center of the vehicle may help provide a good shoulder belt fit. The lap belt portion of the lap/shoulder belt or

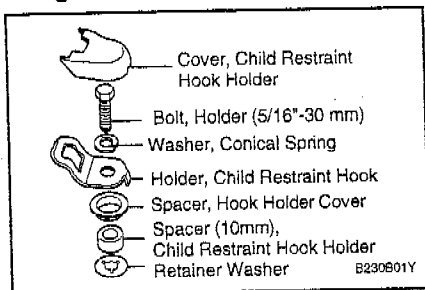
the center seat lap belt must always be positioned as low as possible on the child's hips and as snug as possible.

- o If the seat belt will not properly fit the child, we recommend the use of an approved booster seat in the rear seat in order to raise the child's seating height so that the seat belt will properly fit the child. Before purchasing a booster seat, make sure that it meets applicable Federal Motor Vehicle Safety Standards (FMVSS) and that it is satisfactory for use with this vehicle.
- o Never allow a child to stand up or kneel on the seat.
- o Never use an infant carrier or child safety seat that "hooks" over a seatback; it may not provide adequate security in an accident.
- o Never allow a child to be held in a person's arms while they are in a moving vehicle, as this could result in serious injury to the child in the event of an accident or a sudden stop. Holding a child in a moving vehicle does not provide the child with any means of protection during an accident, even if the person holding the child is wearing a seat belt.

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B230B01E-GAT

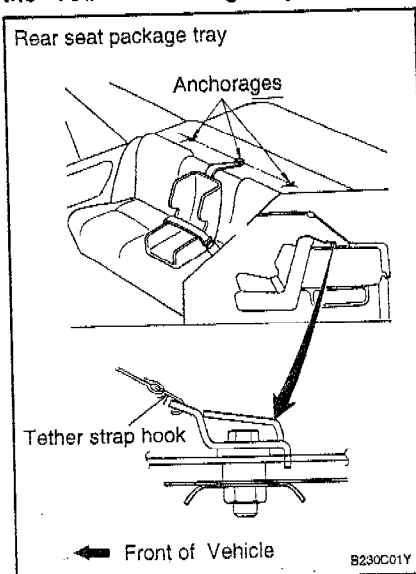
Using a Child Restraint System



For small children and babies, the use of a child seat or infant seat is strongly recommended. This child seat or infant seat should be of appropriate size for the child and should be installed in accordance with the manufacturer's instructions. It is further recommended that the seat be placed in the vehicle's rear seat since this can make an important contribution to safety. Your vehicle is provided with three child restraint hook holders for installing the child seat or infant seat.

B230C01E-AAT

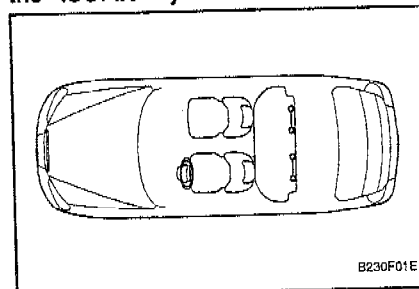
Installing a Child Restraint Seat with the "Tether Anchorage" System



Three child restraint hook holders are located on the rear seat package tray. To install the child restraint seat, connect the child restraint tether strap hook to the child restraint hook holder and tighten to secure the seat.

B230D01E-AAT

Securing the Child Restraint Seat with the "ISOFIX" System



Some child seat manufacturers make safety seats that are labeled as ISOFIX or ISOFIX-compatible child seats. These seats include two rigid or webbing mounted attachments that connect to two ISOFIX anchors at specific seating positions in your vehicle. This type of child seat eliminates the need to use seat belts to attach the child seat for forward-facing child seats.

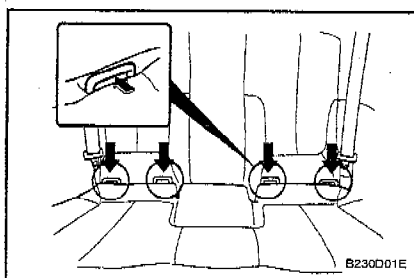
ISOFIX anchors have been provided in your vehicle. The ISOFIX anchors are located in the left and right outboard rear seating positions. There is no ISOFIX anchor provided for the center rear seating position. Their locations are shown in the illustration.

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WARNING:

- o Do not install a child safety seat at the rear center seating position using the vehicle's ISOFIX anchors. The ISOFIX anchors are only provided for the left and right outboard rear seating positions. Do not misuse the ISOFIX anchors by attempting to attach a child safety seat in the middle rear seating to the ISOFIX anchors. In a crash, the child seat ISOFIX attachments may not be strong enough to secure the child safety seat in the rear center seating position and may break, causing serious injury or death.
- o Do not mount more than one child restraint to a single tether or to a child lower anchorage point. The improper increased load may cause the anchorage points or tether anchor to break, causing serious injury or death.
- o Attach the ISOFIX or ISOFIX-compatible child seat only to the appropriate locations shown.
- o Always follow the installation and use instructions provided by the manufacturer of the child restraint.



The ISOFIX anchors are located between the seatback and the seat cushion of the rear seat left and right outboard seating positions. Follow the child seat manufacturer's instructions to properly install safety seats with ISOFIX or ISOFIX-compatible attachments.

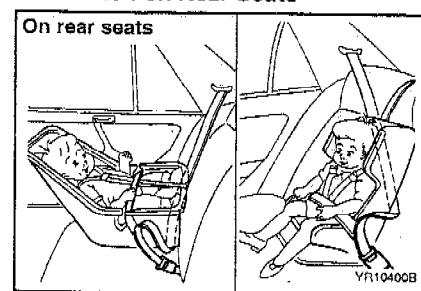
Once you have installed the ISOFIX safety seat, assure that the seat is properly attached to the ISOFIX and tether anchors. Also, test the safety seat before you place the child in it. Tilt the seat from side to side. Also try to tug the seat forward. Check to see if the anchors hold the seat in place.

WARNING:

If the safety seat is not anchored properly, the risk of a child being seriously injured or killed in a collision greatly increases.

B230G01A-AAT

Installation on Rear Seats



To install a child restraint system in the rear seats, extend the shoulder/lap belt entirely from its retractor until a "click" is felt. This will engage the seat belt retractor automatic locking feature, which allows the seat belt to retract but not extend. Install the child restraint system, buckle the seat belt and allow the seat belt 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 cannot interfere with the child's head or neck. Also, double check to be sure that the retractor has engaged the automatic locking feature by trying to extend webbing out of the retractor. If the retractor is in the automatic locking mode, the belt will be locked. After installation of the child restraint system, try to move it in all directions to be sure the child restraint system is securely installed.

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If you need to tighten the belt, pull more webbing toward the retractor. When you unbuckle the seat belt and allow it to retract, the retractor will automatically revert back to its normal seated passenger emergency locking usage condition.

NOTE:

- o Before installing the child restraint system, read the instructions supplied by the child restraint system manufacturer.
- o If the seat belt does not operate as described, have the system checked immediately by your authorized Hyundai dealer.

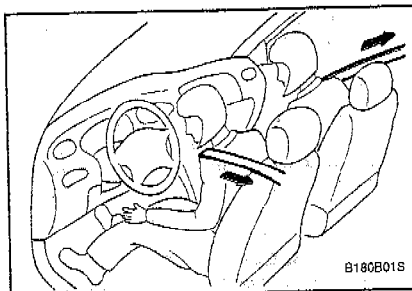
WARNING:

- o If the retractor is not in the Automatic Locking mode, the child restraint system can move when your vehicle turns or stops abruptly.
- o Do not install any child restraint system in the front passenger seat. Should an accident occur and cause the passenger side airbag to deploy, it could severely injure or kill an infant or child seated in an infant or child seat. Therefore, only use a child restraint system in the rear seat of your vehicle.

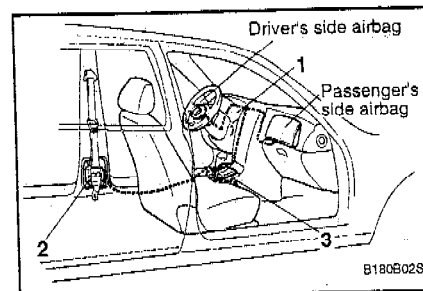
B180B04S-AAT

Pre-tensioner Seat Belt

Your Hyundai vehicle is equipped with driver's and front passenger's pre-tensioner seat belts. The purpose of the pre-tensioner is to make sure that the seat belts fit tightly against the occupant's body in certain frontal collisions. The pre-tensioner seat belts can be activated alone or, where the frontal collision is severe enough, together with the airbags.



The pre-tensioner seat belt operates in the same way as an Emergency Locking Retractor (ELR) type of seat belt. When the vehicle stops suddenly, or if the occupant tries to lean forward too quickly, the seat belt retractor will lock into position. However, in certain frontal collisions, the pre-tensioner will activate and pull the seat belt into tighter contact against the occupant's body.



The seat belt pre-tensioner system consists mainly of the following components. Their locations are shown in the illustration.

1. SRS airbag warning light
2. Seat belt pre-tensioner assembly
3. SRS control module

WARNING:

To obtain maximum benefit from a pre-tensioner seat belt:

1. The seat belt must be worn correctly.
2. The seat belt must be adjusted to the correct position.

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NOTE:

- o Both the driver's and front passenger's pre-tensioner seat belts will be activated in certain frontal collisions. The pre-tensioner seat belts can be activated alone or, where the frontal collision is severe enough, together with the airbags. The pre-tensioners will be activated under these conditions even if the seat belts are not being worn at the time of the collision.
- o When the pre-tensioner seat belts are activated, a loud noise may be heard and fine dust, which may appear to be smoke, may be visible in the passenger compartment. These are normal operating conditions and are not hazardous.
- o Although it is harmless, the fine dust may cause skin irritation and should not be breathed for prolonged periods. Wash your hands and face thoroughly after an accident in which the pre-tensioner seat belts were activated.

CAUTION:

- o Because the sensor that activates the SRS airbag is connected with the pre-tensioner seat belt, the SRS airbag warning light  on the instrument panel will blink for approximately 6 seconds after the ignition key has been turned to the "ON" or "ACC" positions, and then it should turn off.

- o If the pre-tensioner seat belt is not working properly, this warning light will illuminate even if there is no malfunction of the SRS airbag system. If the SRS airbag warning light does not illuminate when the ignition key is turned to "ON" or "ACC", or if it remains illuminated after blinking for approximately 6 seconds, or if it illuminates while the vehicle is being driven, please have an authorized Hyundai dealer inspect the pre-tensioner seat belt or SRS airbag system as soon as possible.

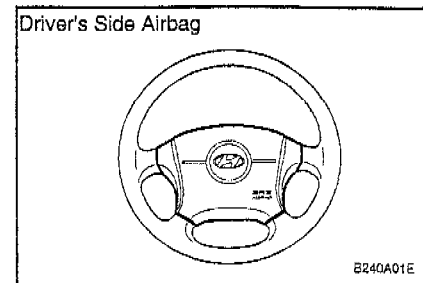
WARNING:

- o Pre-tensioners are designed to operate only one time. After activation, pre-tensioner seat belts must be replaced. All seat belts, of any type, should always be replaced after they have been worn during a collision.
- o The pre-tensioner seat belt assembly mechanisms become hot during activation. Do not touch the pre-tensioner seat belt assemblies for several minutes after they have been activated.
- o Do not attempt to inspect or replace the pre-tensioner seat belts yourself. This must be done by an authorized Hyundai dealer.
- o Do not strike the pre-tensioner seat belt assemblies.
- o Do not attempt to service or repair the pre-tensioner seat belt system in any manner.

- o Improper handling of the pre-tensioner seat belt assemblies, and failure to heed the warnings to not strike, modify, inspect, replace, service or repair the pre-tensioner seat belt assemblies may lead to improper operation or inadvertent activation and serious injury.
- o Always wear the seat belts when driving or riding in a motor vehicle.

B240A01F-AAT

SUPPLEMENTAL RESTRAINT (AIRBAG) SYSTEM "SRS"



Your Hyundai is equipped with a Supplemental Restraint (Airbag) System. The indications of the system's presence are the letters "SRS AIR BAG" embossed on the airbag pad cover in the steering wheel and the passenger's side front panel pad above the glove box.

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C-13

S001208

FEATURES OF YOUR HYUNDAI

The Hyundai SRS consists of airbags installed under the pad covers in the center of the steering wheel and the passenger's side front panel above the glove box. The purpose of the SRS is to provide the vehicle's driver and the front passenger with additional protection when used together with the seat belt, in case of a frontal impact.

NOTE:

Be sure to read information about the SRS on the labels provided on the backside of the sun visor and in the glove box.

WARNING:

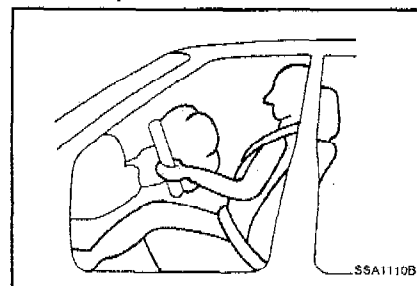
- o As its name implies, the SRS is designed to work with, and be supplemental to, the driver's and the passenger's three point seat belt systems and is not a substitute for them. Therefore your seat belts must be worn at all times while the vehicle is in motion. In addition, the airbags deploy only in certain frontal impact conditions severe enough to cause significant injury to the vehicle occupants.
- o The SRS is designed to deploy the airbags only when an impact is sufficiently severe and when the impact angle is less than 30° from the forward longitudinal axis of the vehicle and will not deploy in side, rear or rollover impacts. Additionally, the airbags will only deploy once. Thus, seat belts must be worn at all times.

- o The driver should sit back as far as possible while still maintaining control of the vehicle. If you are sitting too close to the airbag, it can cause death or serious injury when it inflates.
- o No objects should be placed over or near the airbag modules on the steering wheel, instrument panel, and the front passenger's panel above the glove box, because any such object could cause harm if the vehicle is in a crash severe enough to cause the airbags to inflate.
- o If the airbags inflate, they must be replaced by an authorized Hyundai dealer.
- o Do not tamper with or disconnect SRS wiring, or other components of the SRS system. Doing so could result in injury, due to accidental firing of the airbags or by rendering the SRS inoperative.
- o Do not install a child restraint system in the front passenger seat position. A child restraint system must never be placed in the front seat. The infant or child could be severely injured or killed by an airbag deployment in case of an accident.
- o Do not allow children to ride in the front passenger seat. If older children (teenages and older) must ride in the front seat, make sure they are always properly belted and that the seat is moved back as far as possible.
- o For maximum safety protection in all types of crashes, all occupants including the driver should always wear their

- seat belts whether or not an airbag is also provided at their seating position to minimize the risk of severe injury or death in the event of a crash. Do not sit or lean unnecessarily close to the airbag while the vehicle is in motion.
- o The SRS airbag system must deploy very rapidly to provide protection in a crash. If an occupant is out of position because of not wearing a seat belt, the airbag may forcefully contact the occupant causing serious or fatal injuries.

B240B02A-AAT

SRS Components and Functions



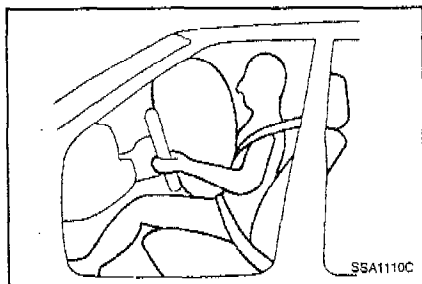
The SRS consists of the following components:

- Driver's Side Airbag Module
- Passenger's Side Airbag Module
- Knee Bolster
- SRS Service Reminder Indicator (SRI)
- SRS Control Module (SRSCM)

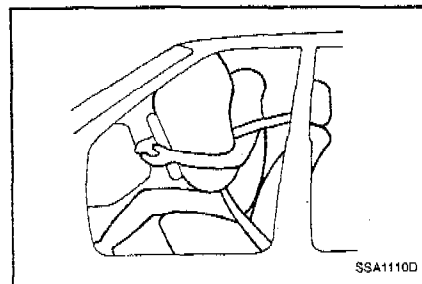
1-19

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The SRSCM continually monitors all elements while the ignition is "ON" to determine if a frontal or near-frontal impact is severe enough to require airbag deployment.

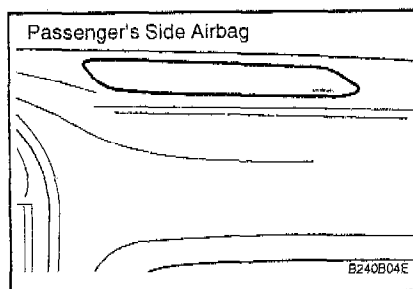


The SRS service reminder indicator (SRI) on the instrument panel will blink for about 6 seconds after the ignition key is turned to the "ON" position or after the engine is started, after which the SRI should go out.



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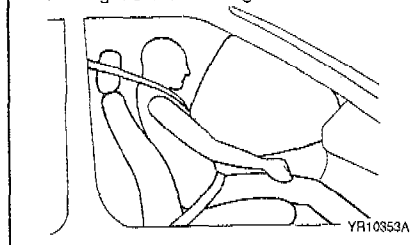
The airbag modules are located both in the center of the steering wheel and in the front passenger's panel above the glove box. When the SRSCM detects a considerable impact to the front of the vehicle, it will automatically deploy the airbags.



Upon deployment, tear seams molded directly into the pad covers will separate under pressure from the expansion of the airbags. Further opening of the covers then allows full inflation of the airbags.

A fully inflated airbag in combination with a properly worn seat belt slows the driver's or the passenger's forward motion, thus reducing the risk of head or chest injury.

Passenger's Side Airbag



After complete inflation, the airbag immediately starts deflating, enabling the driver to maintain forward visibility.

CAUTION:

When installing a container of liquid air freshener inside a vehicle, do not place it near the instrument cluster nor on the instrument panel pad surface. If there is any leakage from the air freshener onto these areas (instrument cluster, instrument panel pad or air ventilator), it may damage these parts. If the liquid from the air freshener does leak onto these areas, wash them with water immediately.

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WARNING:

- When the SRS is activated, there may be a loud noise and fine dust will be released throughout the vehicle. These conditions are normal and are not hazardous. However, the fine dust generated during airbag deployment may cause skin irritation. Be sure to wash your hands and face thoroughly with lukewarm water and a mild soap after an accident in which the airbags were deployed.
- The SRS can function only when the ignition key is in the "ON" position. If the SRS SRI does not come on, or continuously remains on, after flashing for about 6 seconds when the ignition key is turned to the "ON" position, or after the engine is started, or comes on while driving, the SRS is not working properly. If this occurs, have your vehicle immediately inspected by your Hyundai dealer.
- Before you replace a fuse or disconnect a battery terminal, turn the ignition key to the "LOCK" position or remove the ignition key. Never remove or replace the air bag related fuse(s) when the ignition key is in the "ON" position. Failure to heed this warning will cause the SRS SRI to illuminate.

B990A03Y-AAT

PASSENGER PRESENCE DETECTION

The passenger presence detection system detects the presence of a passenger in the front seat. If no passenger is recognized on the front passenger seat, the deployment of the front passenger and/or side air bag will be prevented. This system is designed to prevent the replacement of airbag components that deploy needlessly in an accident.

NOTE:

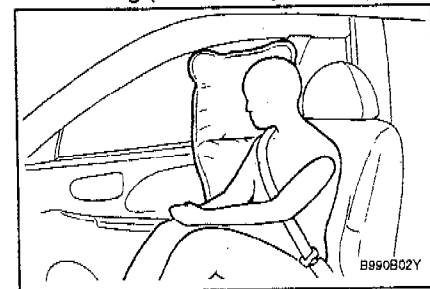
Luggage or other cargo heavier than 33 lbs should not be placed on the passenger front seat. This can allow the deployment of the front passenger and/or side air bag in the case of an accident.

WARNING:

The Passenger Presence Detection system is not intended to prevent airbag deployment while a child is in the front passenger's seat. It is intended only as a means to reduce unnecessary collision damage repair expense by preventing airbag and seat belt pretensioner deployment when the right front passenger seat is unoccupied. Deployment is still possible if only a few pounds are placed upon the seat. Therefore, children must not be transported in the front seat. All children must be seated in the rear seat and properly restrained with the vehicle's restraint system or a child restraint system appropriate for the child's size and weight.

B990B02Y-GAT

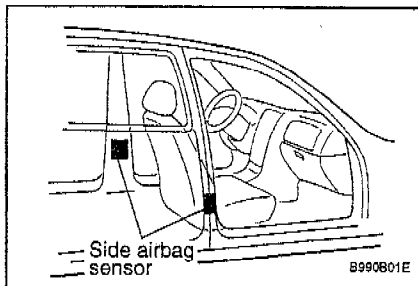
Side Airbag (If Installed)



Your Hyundai is equipped with a side airbag in each front seat. The purpose of the airbag is to provide the vehicle's driver and/or the front passenger with additional protection than that offered by the seatbelt alone. The side impact airbags are designed to deploy only during certain side impact collisions, depending on the crash severity, angle, speed and point of impact. The air bags are not designed to deploy in all side impact situations.

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FEATURES OF YOUR HYUNDAI



WARNING:

- For best protection from the side airbag system and to avoid being injured by the deploying side airbag, both front seat occupants should sit in an upright position with the seat belt properly fastened. The driver's hands should be placed on the steering wheel at the 9:00 and 3:00 o'clock positions. The passenger's arms and hands should be placed in their laps.
- Do not use any accessory seat covers.
- Use of seat covers could reduce or prevent the effectiveness of the system.
- Do not install any accessories on the side or near the side airbag.
- Do not use excessive force on the side of the seat.
- Do not place any objects over the airbag or between the airbag and yourself.

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SRS Care

- The SRS is virtually maintenance free and there are no parts you can safely service by yourself. The entire SRS system must be inspected by an authorized Hyundai dealer 10 years after the date that the vehicle was manufactured.
- Any work on the SRS system, such as removing, installing, repairing, or any work on the steering wheel must be performed by a qualified Hyundai technician. Improper handling of the airbag system may result in serious personal injury.



WARNING:

- Do not install a child restraint system in the front passenger seat position. A child restraint system must never be placed in the front seat. The infant or child could be severely injured or killed by an airbag deployment in case of an accident.
- Modification to SRS components or wiring, including the addition of any kind of badges to the pad covers or modifications to the body structure, can adversely affect SRS performance and lead to possible injury.
- For cleaning the airbag pad covers, use only a soft, dry cloth or one which has been moistened with plain water. Solvents or cleaners could adversely affect the airbag covers and proper deployment of the system.

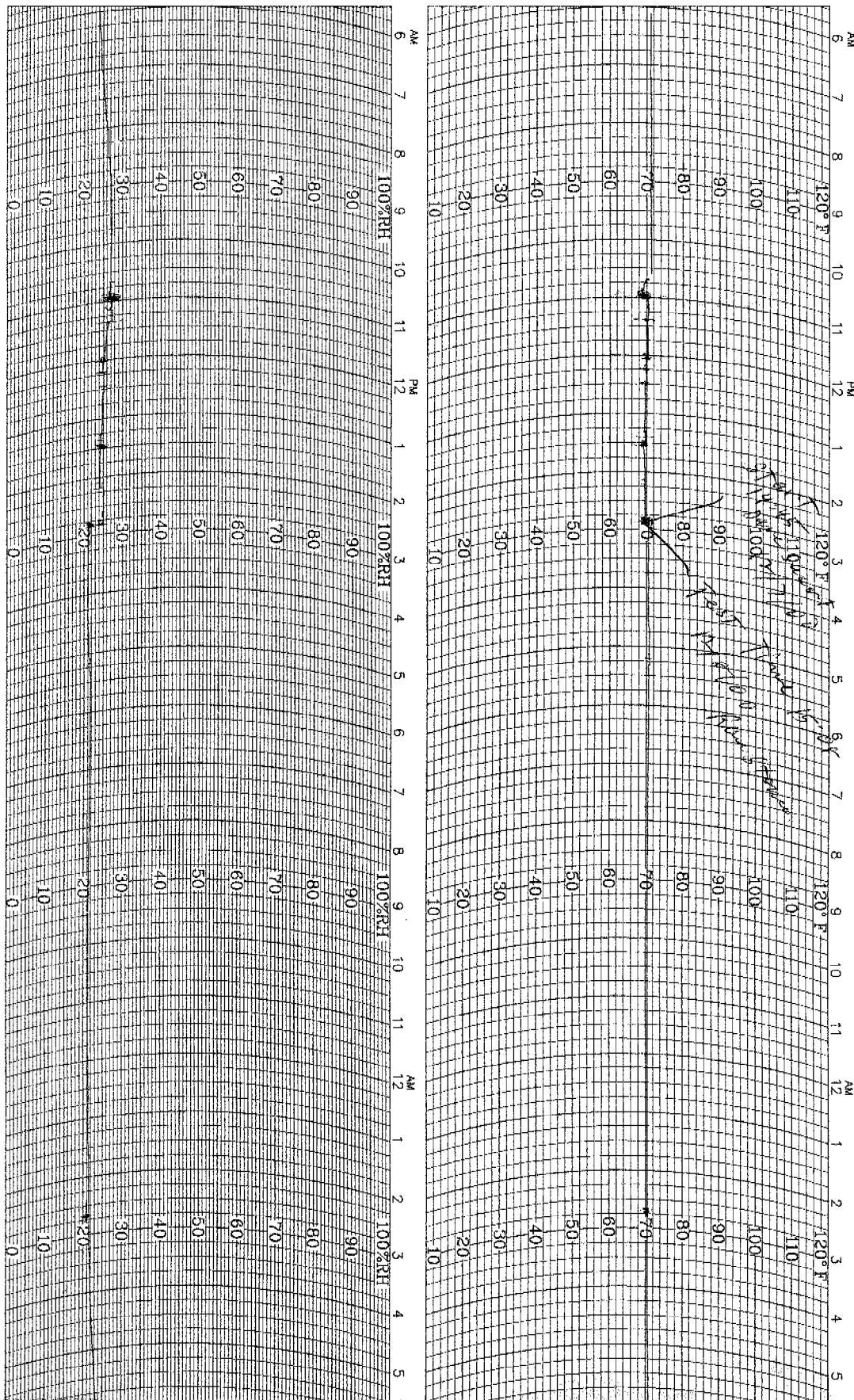
FEATURES OF YOUR HYUNDAI

- o No objects should be placed over or near the airbag modules on the steering wheel, instrument panel, and the front passenger's panel above the glove box, because any such object could cause harm if the vehicle is in a crash severe enough to cause the airbags to inflate.
- o If the airbags inflate, they must be replaced by an authorized Hyundai dealer.
- o Do not tamper with or disconnect SRS wiring, or other components of the SRS system. Doing so could result in injury, due to accidental firing of the airbags or by rendering the SRS inoperative.
- o If components of the airbag system must be discarded, or if the vehicle must be scrapped, certain safety precautions must be observed. Your Hyundai dealer knows these precautions and can give you the necessary information. Failure to follow these precautions and procedures could increase the risk of personal injury.
- o If you sell your vehicle, be sure to inform the new owner of these important points and make certain that this manual is transferred to the new owner.
- o If your car was flooded and has soaked carpeting or water on the floor, you shouldn't try to start the engine; have the car towed to an authorized Hyundai dealer.

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Appendix D

Miscellaneous Test Information



Weather Measure
WEATHERtronics
 Division of QUALMETRICS, Inc.
 P.O. BOX 41039
 SACRAMENTO, CA 95841
 PHONE: (916) 923-0055

HYGROtherMOGRAPH
 1 DAY
STEWART

CHART NO. M699123
 C311-D-HF
 ECN 2717
 6-9-87

STATION Quincy LAB DATE ON 12-7-00 DATE OFF 12-8-00