

REPORT NO. TRC-93-N01

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

CHRYSLER CORPORATION
1994 DODGE CARAVAN
SPECIAL PURPOSE VEHICLE
NHTSA NO. MR0301
TRC TEST NO. 930929

PREPARED BY:
TRANSPORTATION RESEARCH CENTER INC.
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OCTOBER 22, 1993

FINAL REPORT

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16. Abstract A 56 kph (35 mph) frontal load cell barrier impact test was conducted on a 1994 Dodge Caravan special purpose vehicle, NHTSA No. MR0301, at Transportation Research Center Inc. on September 29, 1993. This test was conducted to obtain new car assessment and research data indicant of FMVSS 208, 212, 219 (partial), and 301 performance. The barrier impact velocity was 56.5 kph. The vehicle's maximum static crush was 600 millimeters. The ambient temperature was 21° C. The driver's Head Injury Criteria (HIC) was 514. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.3 g. The driver's chest maximum deflection was 33 millimeters. The driver's left and right femur maximum axial forces were 4055 N and 5062 N, respectively. The passenger's HIC was 422. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 45.4 g. The passenger's chest maximum deflection was 39 millimeters. The passenger's left and right femur maximum axial forces were 7275 N and 4460 N, respectively.			
17. Key Words 56.3 KPH (35 MPH) Frontal Barrier Impact Test: New Car Assessment Program (NCAP) FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Retention" FMVSS 219, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division Nassif Building, Room 5108 400 Seventh Street, S.W. Washington, DC 20590	
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.75	cubic meters	m ³

TEMPERATURE (exact)

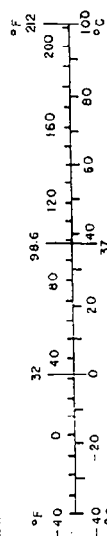
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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Approximate Conversions from Metric Measures

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
mi	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
m ³	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 NPS Manual, Publ. 200, Units of Weights and Measures, Price \$2.25, SO Catalog No. C13.11206.

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SECTION 1.0

PURPOSE AND TEST PROCEDURE

PURPOSE

This 56 kph (35 mph) frontal barrier impact test is part of the New Car Assessment Program (NCAP) conducted for the National Highway Traffic Safety Administration's (NHTSA) Office of Market Incentives by Transportation Research Center Inc. (TRC) under Contract No. DTNH22-90-D-22121.

The purpose of this test was to obtain new car assessment and research data for vehicle crashworthiness and occupant restraint system performance for the subject vehicle, a 1994 Dodge Caravan special purpose vehicle, NHTSA No. MR0301, at an impact speed in excess of the current 48 kph (30 mph) FMVSS 208 requirements.

TEST PROCEDURE

This test was conducted in accordance with NHTSA's Laboratory Indicant Test Procedure, New Car Assessment Program, dated January 1, 1990. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," performance.

The test vehicle was instrumented with nine (9) accelerometers to measure longitudinal axis accelerations. The driver's and passenger's restraint systems were instrumented with four (4) seat belt load cells to measure lap belt tension and shoulder belt tension, two (2) string potentiometers to measure shoulder belt displacement, and two (2) linear potentiometers to measure shoulder belt stretch. The vehicle impacted a frontal load cell barrier instrumented with thirty-six (36) barrier face load cells. The vehicle's specified impact velocity range was 55.5 to 57.1 kph.

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

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations, and with left and right femur load cells to measure axial forces. Each Part 572E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection and a six-axis neck load cell to measure longitudinal, lateral, and vertical forces and moments.

The eighty-three (83) data channels were multiplexed and recorded on two (2) 14-track tape drives. The data was digitally sampled at 8000 samples per second and processed per section IP11 of the Laboratory Indicant Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and sixteen (16) high-speed motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle, occupant, and load cell barrier data are presented in Section 2.0. The occupant, camera, and vehicle measurements are presented in Section 3.0. Appendix A contains the still photographic prints. Appendix B contains the dummy, vehicle, and load cell barrier data plots. Appendix C contains the dummy certification data. Appendix D contains miscellaneous test information. Appendix E contains the restraint system instructions from the owner's manual.

SECTION 2.0

FRONTAL BARRIER IMPACT TEST SUMMARY

TEST RESULTS SUMMARY

This frontal load cell barrier test was conducted at TRC on September 29, 1993.

The test vehicle, a 1994 Dodge Caravan special purpose vehicle, NHTSA No. MR0301, was equipped with a 2.5-liter transverse engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 1739 KG. The vehicle's impact speed was 56.5 kph. The vehicle sustained 600 mm of static crush during the impact.

The driver's Head Injury Criteria (HIC) was 514. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.3 g. The driver's chest maximum deflection was 33 mm. The driver's left and right femur maximum axial forces were 4055 N and 5062 N, respectively.

The passenger's HIC was 422. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 45.4 g. The passenger's chest maximum deflection was 39 mm. The passenger's left and right femur maximum axial forces were 7275 N and 4460 N, respectively.

There was no loss of windshield periphery retention.

There was no penetration through the windshield.

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

DATA ACQUISITION EXPLANATIONS

The right brake caliper accelerometer, BCRXG1, lost data at 60 milliseconds as a result of the accelerometer cable being cut by the vehicle's crush on impact.

The left brake caliper accelerometer, BCLXG1, lost data at 52 milliseconds as a result of the accelerometer cable being cut by the vehicle's crush on impact.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: MR0301 TEST TYPE: Frontal Load Cell Barrier

TEST DATE: 09/29/93 TEST TIME: 1435 AMBIENT TEMP.: 21° C

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1994/Dodge/Caravan/
special purpose vehicle

VEHICLE TEST WEIGHT (KG): 1739

IMPACT ANGLE (DEG)*: 0

IMPACT VELOCITY (KPH)**: PRIMARY = 56.5 SECONDARY = 56.3

MAXIMUM STATIC CRUSH (MM): 600

AVERAGE REBOUND (MM): 537

DUMMIES:	Driver #142	Passenger #192
TYPE:	Part 572 E	Part 572 E
LOCATION:	Left front	Right front
RESTRAINT:	3-point unbelt and airbag	3-point unbelt and airbag

NUMBER OF DATA CHANNELS: 83

NUMBER OF CAMERAS: HIGH-SPEED 16 REAL-TIME 2

*With respect to tow track centerline.

**Speed trap measurement ($\pm$.08 kph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Chrysler Corporation

MAKE/MODEL: Dodge/Caravan

VIN: 2B4GH25K2RR526983

BODY STYLE: special purpose vehicle

MODEL YEAR: 1994

NHTSA NO.: MR0301

COLOR: White

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT: 2.5-liter

TRANSMISSION DATA: 3 SPEED, MANUAL, X AUTOMATIC, X FWD, RWD, 4WD

DATE VEHICLE RECEIVED: 09/13/93

ODOMETER READING: 44.0

DEALER'S NAME AND ADDRESS: Trader Bud's West Side Dodge
4000 W. Broad St.
Columbus, OH 43228

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	Yes
RADIO	Yes	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
OTHER	None		

REMARKS:

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

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Chrysler Corporation

DATE OF MANUFACTURE: 08/93

VIN: 2B4GH25K2RR526983

GVWR: 2287 KG

GAWR: FRONT: 1154 KG, REAR: 1154 KG

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Goodyear, Invicta GA, P195/75R14

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 300 kPa
REAR: 300 kPa

SPARE TIRE (MFR., SIZE): Goodyear, T125/70D15

TYPE OF SEATS: FRONT: Bucket
ROW 2: Bench
ROW 3: Bench

TYPE OF FRONT SEAT BACKS: Electronically-adjustable

MAXIMUM WIDTH: 1810 MM

WHEELBASE: 2850 MM

LOCATION OF LABEL STATING TIRE DATA:

The label was located on the driver's door.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P195/75R14

RECOMMENDED COLD TIRE PRESSURE: FRONT: 35 psi; REAR: 35 psi

DESIGNATED SEATING CAPACITY: 2 FRONT 2 ROW 2 3 ROW 3
7 TOTAL

VEHICLE CAPACITY WEIGHT: 499 KG

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN MILLIMETERS):

DELIVERED ATTITUDE: LF 757; RF 765; LR 753; RR 756

PRE-TEST ATTITUDE: LF 719; RF 732; LR 723; RR 732

POST-TEST ATTITUDE: LF 760; RF 808; LR 720; RR 689

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	460 KG	RIGHT REAR	328 KG
LEFT FRONT	453 KG	LEFT REAR	327 KG
TOTAL FRONT WEIGHT	913 KG	(58.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	655 KG	(41.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 1568 KG			

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW¹ = RATED CARGO AND LUGGAGE WEIGHT

UDW = UNLOADED DELIVERED WEIGHT (1568 KG)

VCW = VEHICLE CAPACITY WEIGHT (499 KG)

DSC = DESIGNATED SEATING CAPACITY (7)

$RCLW^1 = VCW - 150 (DSC) = 499 - 68(7) = 23 \text{ KG}$

TARGET TEST WEIGHT = UDW + RCLW¹ + (NO. OF HYBRID III DUMMIES X 76 KG/DUMMY)

TARGET TEST WEIGHT = 1568 + 23 + 152

TARGET TEST WEIGHT = 1743 KG

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 19 KG OF CARGO WEIGHT:

RIGHT FRONT	502 KG	RIGHT REAR	360 KG
LEFT FRONT	504 KG	LEFT REAR	373 KG
TOTAL FRONT WEIGHT	1006 KG	(57.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	733 KG	(42.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	1739 KG	(0.2% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE: 0 KG

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

CG = 1201 MM REARWARD OF FRONT WHEEL CENTERLINE

¹Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 136 KG, whichever is less.

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 930929 NHTSA NO.: MR0301
TEST DATE: 09/29/93 TEST TIME: 1435
TEST TYPE: Frontal load cell barrier IMPACT ANGLE: 0°
AMBIENT TEMPERATURE AT IMPACT AREA: 21° C
TEMPERATURE IN OCCUPANT COMPARTMENT: 21° C
IMPACT VELOCITY: PRIMARY = 56.5 KPH SECONDARY = 56.3 KPH
(SPECIFIED RANGE = 55.5 TO 57.1 KPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 356 MM
EXITING VELOCITY TRAP = 51 MM

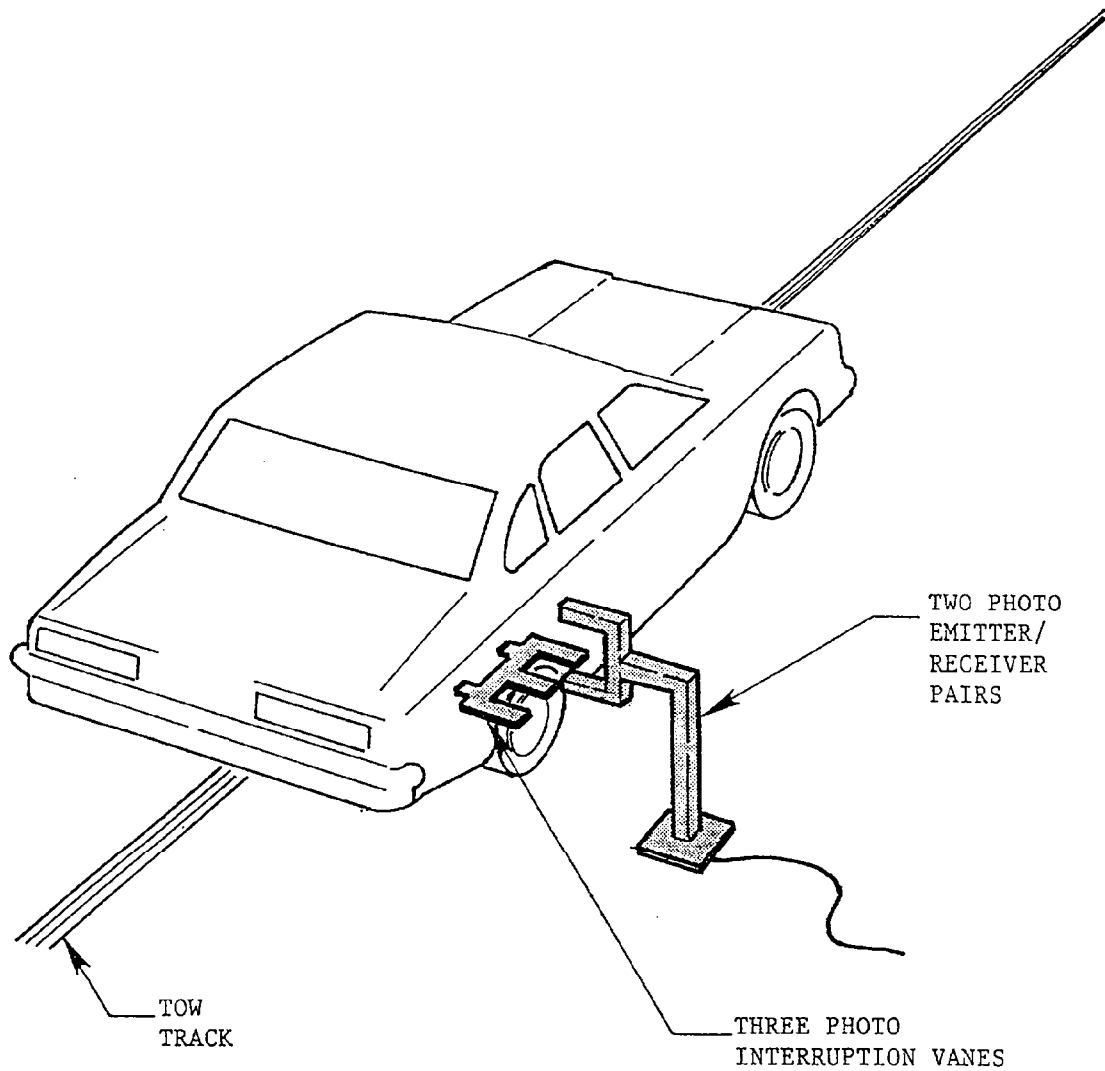
TEST VEHICLE STATIC CRUSH (ALL MEASUREMENTS ARE IN MILLIMETERS):

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 4417; C 4521; R 4415
POST-TEST: L 3890; C 3945; R 3920
TOTAL CRUSH: L 527; C 576; R 495
AVERAGE CRUSH: 533

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

DISTANCE FROM TEST VEHICLE TO BARRIER: L 568; C 552; R 490; AVG. 537

FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver 51 millimeters before impact.

The vanes have 305-millimeter spacing.

FIGURE 2 ACCIDENT INVESTIGATION DIVISION DATA
FOR 56 KPH (35 MPH) FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Dodge/Caravan/special purpose vehicle

VEHICLE NHTSA NO.: MR0301; VIN: 2B4GH25K2RR526983

MODEL YEAR: 1994; BUILD DATE: 08/93; TEST DATE: 09/29/93

VEHICLE SIZE CATEGORY: Special purpose veh.; TEST WEIGHT: 2739 KG

VEHICLE WHEELBASE: 2850 MM

MAXIMUM WIDTH: 1810 MM

FRONT OVERHANG: 854 MM

COLLISION DEFORMATION

CLASSIFICATION (CDC) CODE: 12FDEW4

CRUSH DEPTH
MEASUREMENTS:

C1 = 527 MM

C2 = 583 MM

C3 = 584 MM

C4 = 584 MM

C5 = 600 MM

C6 = 495 MM

VEHICLE CENTERLINE

MIDPOINT OF DAMAGE: D = (LONGITUDINAL)

LENGTH OF DAMAGED
REGION:

L = 1524 MM

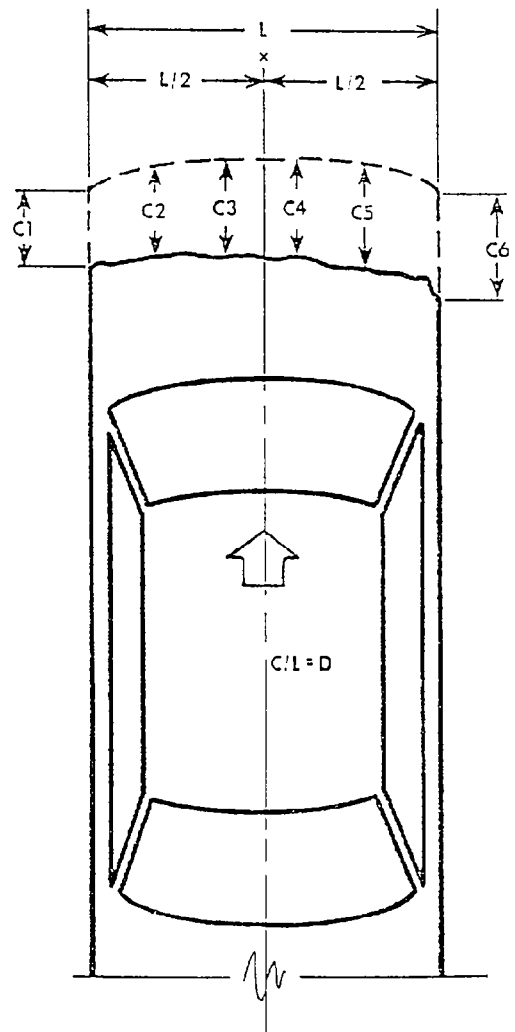
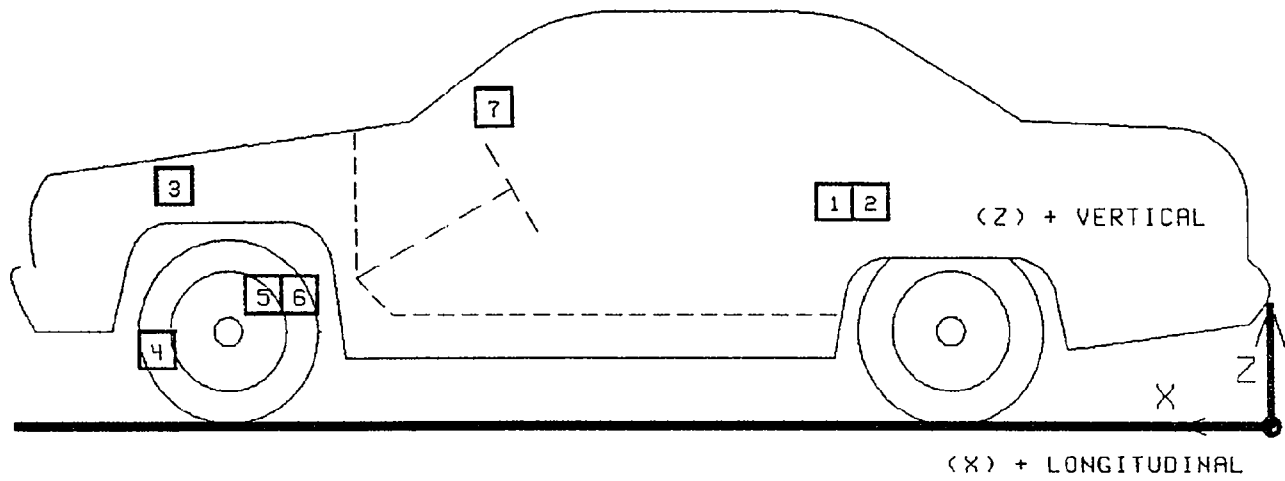
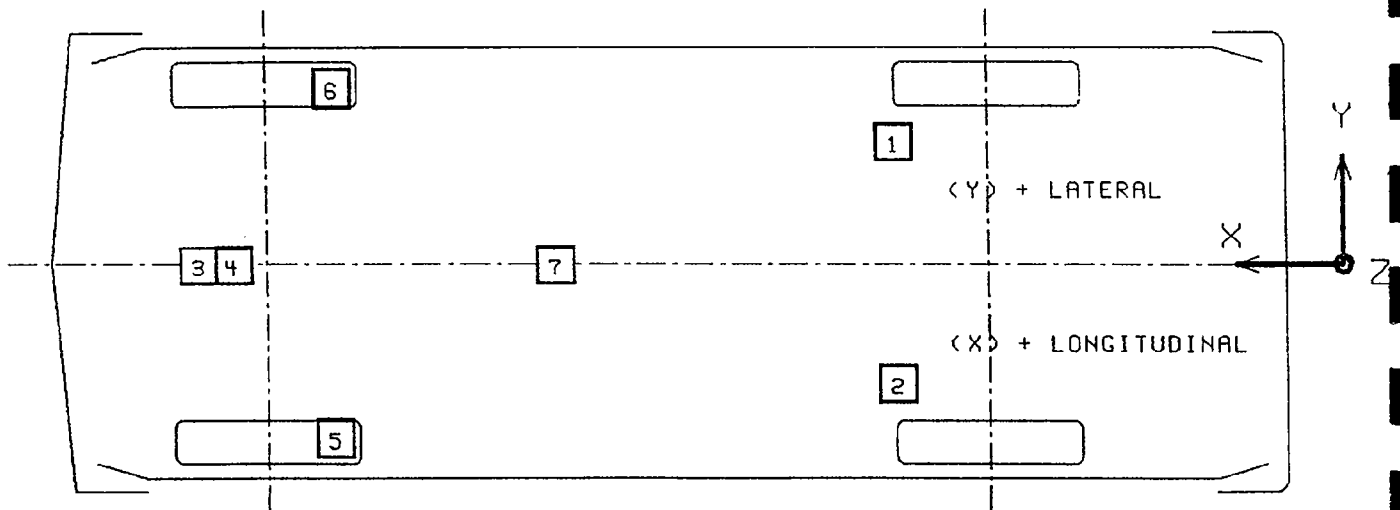


FIGURE 3 VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930929

No. LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
				DIRECTION		DIRECTION	
				MAX G MSEC		MAX G MSEC	
1 LEFT REAR SEAT	2791	600	447				
CROSSMEMBER				3.4	140.6	32.1	49.8
LONGITUDINAL				2.5	140.7	32.3	63.5
REDUNDANT							
2 RIGHT REAR SEAT	2795	-595	447				
CROSSMEMBER				2.4	142.6	38.5	35.2
LONGITUDINAL				2.1	142.5	39.1	35.3
REDUNDANT							
3 ENGINE TOP	681	-45	810				
LONGITUDINAL				52.4	76.2	101.8	28.6
4 ENGINE BOTTOM	727	231	177				
LONGITUDINAL				30.9	35.1	143.3	26.6
5 RIGHT BRAKE CALIPER	741	-666	316				
LONGITUDINAL ¹				---	---	153.5	40.6

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY CONTINUED

TEST NUMBER 930929

No. LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
				DIRECTION	MAX G MSEC	DIRECTION	MAX G MSEC
6 LEFT BRAKE CALIPER LONGITUDINAL ¹	741	666	316	---	---	132.0	35.6
7 INSTRUMENT PANEL CENTER LONGITUDINAL	1243	0	1192	25.2	96.1	86.3	69.3

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN MILLIMETERS. X-AXIS LOCATIONS ARE MEASURED REARWARD FROM THE FRONT BUMPER.

REFERENCE: X: + FORWARD ACCELERATION
Y: + LEFT FROM VEHICLE CENTERLINE
Z: + UP FROM GROUND LEVEL

¹ See DATA ACQUISITION EXPLANATIONS

TABLE 5 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #142	PASSENGER #192
HEAD	<u>Airbag and shoulder belt D-ring</u>	<u>Airbag, sun visor, and shoulder belt D-ring</u>
CHEST	<u>Airbag</u>	<u>Airbag</u>
ABDOMEN	<u>None</u>	<u>None</u>
LEFT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>
RIGHT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>Easy</u>	<u>Easy</u>
REAR	<u>NA</u>	<u>Easy</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT The driver's seat shifted to the most forward position on impact
FRONT	<u>None</u>	<u>on impact</u>
REAR	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE:

None

OTHER NOTABLE IMPACT EFFECTS:

None

TABLE 6 FMVSS 208 DATA SUMMARY

VEH. YR./MAKE/MODEL/BODY STYLE: 1994/Dodge/Caravan/special purpose

VEH. NHTSA NO.: MR0301; TEST DATE: 09/29/93

	DRIVER	PASSENGER
<u>MAXIMUM ACCELERATIONS (G):</u>	<u>DUMMY #142</u>	<u>DUMMY #192</u>
HEAD X-AXIS	-64.8	-56.0
HEAD Y-AXIS	-20.4	22.6
HEAD Z-AXIS	21.8	-25.5
HEAD RESULTANT	66.2	59.2
CHEST X-AXIS	-50.8	-46.5
CHEST Y-AXIS	3.9	6.2
CHEST Z-AXIS	-13.9	6.0
CHEST RESULTANT*	51.3	45.4
CHEST RESULTANT TIME INTERVAL (SEC.) ¹	.003	.003

HEAD INJURY CRITERIA (HIC) VALUES:

HIC ²	514	422
HIC STARTING TIME (SEC.)	.056	.049
HIC ENDING TIME (SEC.)	.092	.085
AVG. HEAD RESULTANT ACCEL. DURING HIC TIME INTERVAL (G)	45.9	42.4

MAXIMUM CHEST DEFLECTIONS (MM):

CHEST X-AXIS	33	39
MAXIMUM CHEST DEFLECTION TIME (SEC)	.088	.063

MAXIMUM COMPRESSIVE FEMUR FORCES (N):

LEFT FEMUR	4055	7275
RIGHT FEMUR	5062	4460

MAXIMUM SEAT BELT FORCES (N):

LAP BELT	5130	3683
SHOULDER BELT	8108	5048

NOTE: ALL VALUES LISTED MUST BE OCCURRING DURING PRIMARY IMPACT EVENT.
(HEAD ACCELERATIONS LISTED MUST BE DURING HIC TIME INTERVAL.)

¹0.003 SEC. MINIMUM DURATION.

²THE MAXIMUM HIC TIME INTERVAL IS 36 MILLISECONDS.

TABLE 7 HYBRID III NECK DATA SUMMARY

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1994/Dodge/Caravan/special purpose

VEHICLE NHTSA NO.: MR0301; TEST DATE: 09/29/93

<u>MAXIMUM VALUES:</u>	<u>DRIVER DUMMY #142</u>	<u>PASSENGER DUMMY #192</u>
NECK X-AXIS FORCE (N)	827	-709
NECK Y-AXIS FORCE (N)	-198	381
NECK Z-AXIS FORCE (N)	2829	1058
NECK MOMENT ABOUT X AXIS (N-M)	17	31
NECK MOMENT ABOUT Y AXIS (N-M)	-69	56
NECK MOMENT ABOUT Z AXIS (N-M)	-27	24

NOTE: ALL VALUES LISTED MUST BE OCCURRING DURING PRIMARY IMPACT EVENT.

DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest impacted the airbag with the dummy's head rotating slightly to the right. The driver dummy was restrained by the three-point unbelt and airbag. The dummy rebounded rearward into the seat back as the dummy's head rotated slightly rearward contacting the shoulder belt D-ring and the seat back. The driver dummy came to rest in the driver's seat restrained by the three-point unbelt.

RIGHT FRONT PASSENGER DUMMY

Upon impact, the right front passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest impacted the airbag. The right front passenger dummy was restrained by the three-point unbelt and airbag. The dummy then rebounded rearward into the seat back as the dummy's head rotated rearward contacting the shoulder belt D-ring and the seat back. The right front passenger dummy came to rest in the right front passenger's seat restrained by the three-point unbelt.

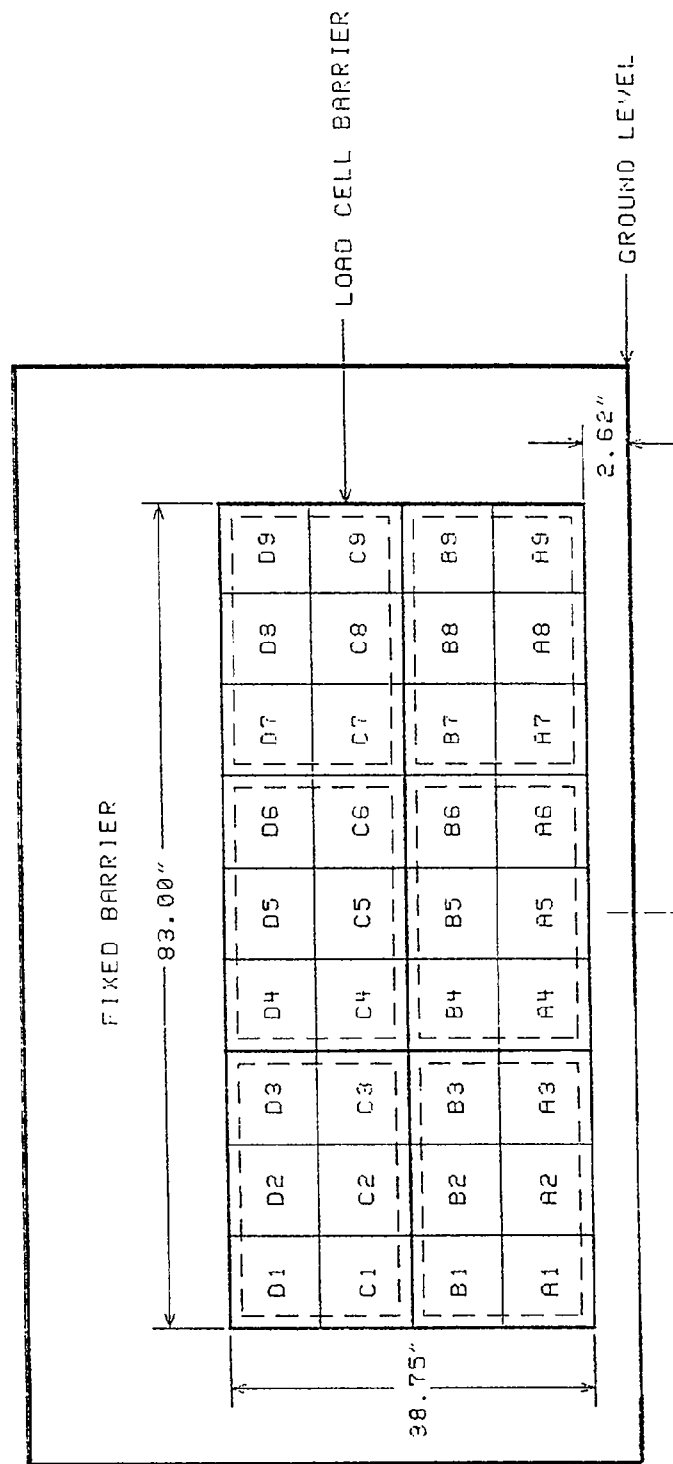
TABLE 8 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

	DRIVER	PASSENGER
<u>BELT LENGTH DATA:</u>		
BELT LENGTH FROM TRIM PANEL EXIT TO BOLT HOLE ANCHOR POINT FOR CONTINUOUS WEBBING SYSTEMS.	2480	2485
SHOULDER BELT LENGTH AS MEASURED ON PART 572 DUMMY.	935	941
LAP BELT LENGTH AS MEASURED ON PART 572 DUMMY.	1042	1035
<u>SHOULDER BELT SPOOL-OFF LENGTH:</u>		
AS DETERMINED BY FILM ANALYSIS	20	25
AS DETERMINED MECHANICALLY	28	26
AS DETERMINED ELECTRONICALLY	64	36
<u>BELT STRETCH LENGTH (MM/M):</u>		
AS MEASURED MECHANICALLY	3	5
AS MEASURED ELECTRONICALLY	0	0
<u>RETRACTOR LOCK-UP TIME (MS):</u>		
AS DETERMINED BY SHOULDER BELT SPOOL-OFF	26	26

ALL MEASUREMENTS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

FIGURE 4
LOAD CELL BARRIER CONFIGURATION
FRONT VIEW

36 LOAD CELLS
4 ROWS
9 COLUMNS



GROUP 1: A1 THRU B3
GROUP 2: A4 THRU B6
GROUP 3: A7 THRU B9
GROUP 4: C1 THRU D3
GROUP 5: C4 THRU D6
GROUP 6: C7 THRU D9

TABLE 9

LOAD CELL BARRIER DATA SUMMARY

TEST NUMBER 930929

LOCATION	POSITIVE DIRECTION KN	MSEC	NEGATIVE DIRECTION KN	MSEC
TOTAL GROUP 1	2.7	167.4	65.7	16.2
TOTAL GROUP 2	3.0	160.2	211.4	29.4
TOTAL GROUP 3	2.0	163.1	93.5	17.2
TOTAL GROUP 4	2.4	163.4	73.6	29.2
TOTAL GROUP 5	1.9	220.1	68.4	60.7
TOTAL GROUP 6	2.4	161.4	107.6	29.6

TABLE 9

LOAD CELL BARRIER DATA SUMMARY CONTINUED

TEST NUMBER 930929

LOCATION	POSITIVE		NEGATIVE	
	DIRECTION	MSEC	DIRECTION	MSEC
	KN		KN	
TOTAL LOAD CELL FORCE	13.8	166.8	558.8	27.3

TENSION IS POSITIVE
COMPRESSION IS NEGATIVE

SECTION 3.0

FMVSS 212, 219 (PARTIAL), AND 301 DATA

FIGURE 5 FMVSS 212 TEST DATA

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

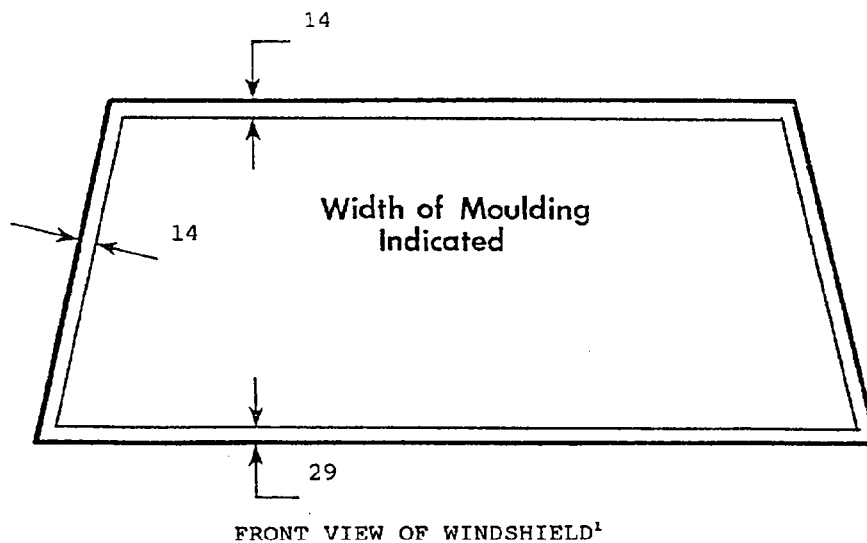
Plastic trim around outer perimeter, adhesive around inner perimeter.

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

WINDSHIELD PERIPHERY MEASUREMENTS:

	PRE-TEST	POST-TEST	PERCENT RETENTION
RIGHT SIDE	2115	2115	100
LEFT SIDE	2115	2115	100
TOTAL	4230	4230	100

PRE-TEST WINDSHIELD MOUNTING MATERIAL TEMPERATURE: 21° C



LOSS OF WINDSHIELD RETENTION LENGTHS: NA

ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

¹INDICATE AREAS OF LOSS OF RETENTION, IF ANY, ON WINDSHIELD DIAGRAM.

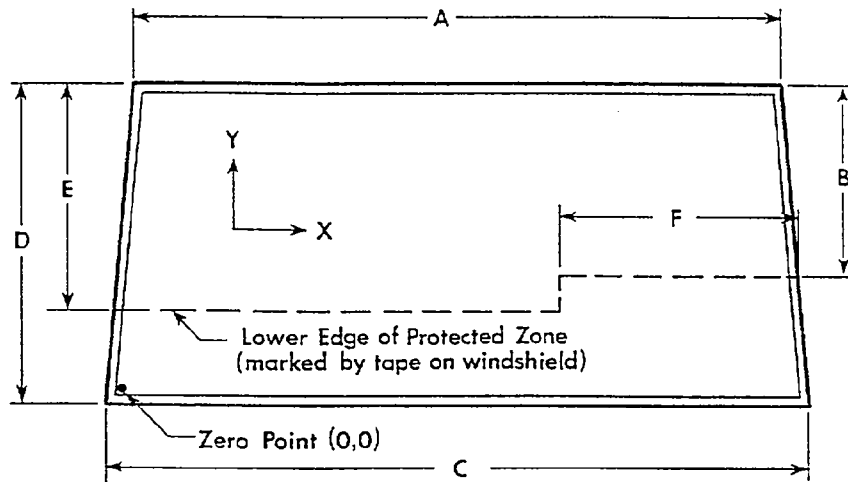
FIGURE 6 FMVSS 219 TEST DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 165-millimeter diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 13 millimeters from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

WINDSHIELD MEASUREMENTS:

A = 1360
 B = 406
 C = 1620
 D = 670
 E = 450
 F = 625



FRONT VIEW

METHOD OF ADHERING PROTECTED ZONE TEMPLATE TO WINDSHIELD: NA

AREAS OF WINDSHIELD TEMPLATE PENETRATION

GREATER THAN 6.0 MM: NA

COORDINATES

	X	Y
1.		
2.		
3.		

AREAS OF WINDSHIELD PENETRATION, BELOW THE PROTECTED ZONE,

THROUGH THE INNER SURFACE OF THE WINDSHIELD: None

1.
2.
3.

ALL MEASUREMENTS ARE IN MILLIMETERS.

TABLE 10 FUEL SYSTEM DATA

MAKE/MODEL: Dodge/Caravan

NHTSA NO.: MR0301

FUEL SYSTEM CAPACITY: 75.8 LITERS (FROM OWNER'S MANUAL)

USABLE CAPACITY: 75.7 LITERS (FURNISHED BY COTR)

TEST VOLUME RANGE: 69.6 LITERS TO 71.2 LITERS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 70.8 LITERS (WITH ENTIRE FUEL SYSTEM FILLED)

TEST FLUID TYPE: STODDARD SOLVENT

SPECIFIC GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

TEST FLUID COLOR: PURPLE

DETAILS OF FUEL SYSTEM: The fuel tank is located in front of the rear
axle. The fuel filler is on the left. The fuel lines run along the
right frame rail to the front.

ELECTRIC FUEL PUMP: Yes

FUEL INJECTION: Yes

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

TABLE 11 FMVSS 301 POST-IMPACT TEST DATA

TEST VEHICLE NHTSA NO.: MRO301; TEST DATE: 09/29/93

VEHICLE MAKE/MODEL/BODY STYLE: Dodge/Caravan/special purpose vehicle

TEST REQUIREMENTS:

Test vehicle fuel tank filled to 92 to 94% of manufacturer's usable capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE:

- ☒ X FRONTAL (56 KPH)
☐ OBLIQUE (48 KPH) WITH ° BARRIER FACE
FIRST CONTACTING (DRIVER/PASS.) SIDE.
☐ REAR MOVING BARRIER (48 KPH)
☐ LATERAL MOVING BARRIER (32 KPH)

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

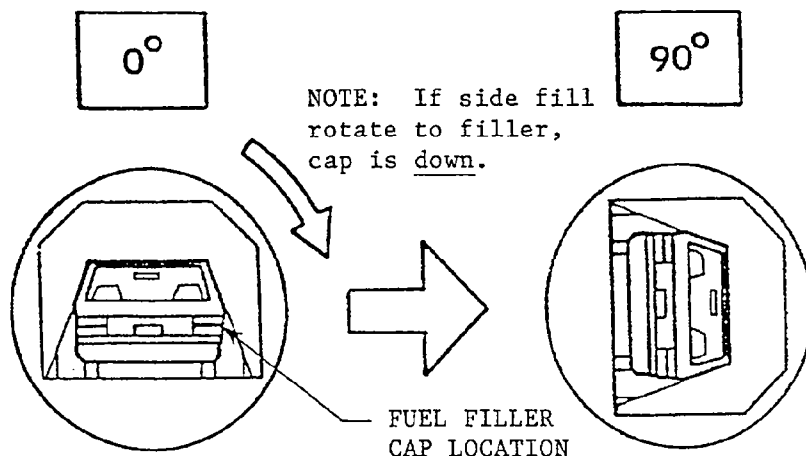
	TEST RESULTS	MAXIMUM ALLOWABLE
1. FROM IMPACT UNTIL VEHICLE MOTION CEASES - - -	0 G	28 G
2. 5 MINUTE PERIOD AFTER VEHICLE MOTION CEASES -	0 G	142 G
3. NEXT 25 MINUTES AFTER 5 MINUTE PERIOD - - - -	0 G	28 G/MN

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA

NHTSA NO.: MR0301
TEST PHASE



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

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

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

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

NEXT WHOLE MINUTE INTERVAL - - - - = 7 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

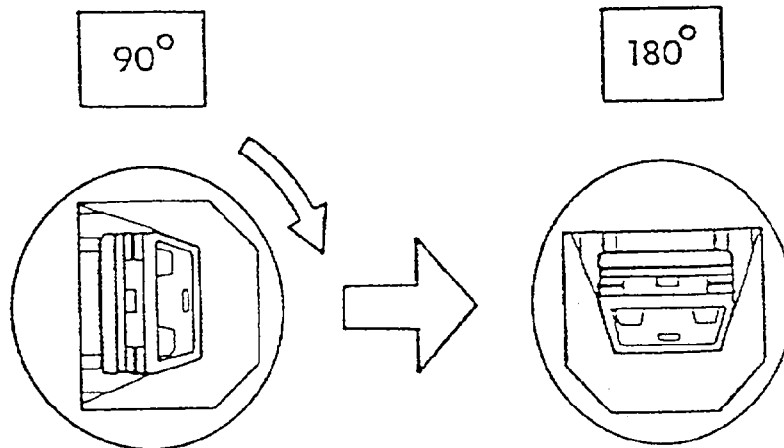
<u>0° TO 90° ROTATION (FUEL FILLER CAP DOWN)</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: MRO301
TEST PHASE



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

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

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

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

NEXT WHOLE MINUTE INTERVAL - - - - = 14 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

90° TO 180° ROTATION

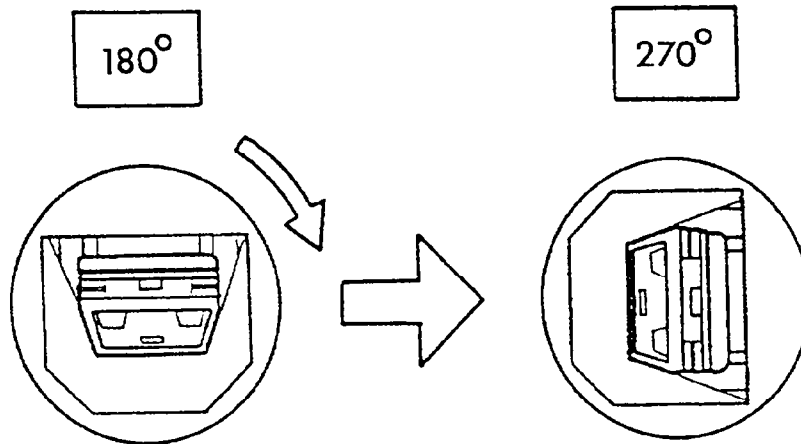
	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: MR0301
TEST PHASE



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

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

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

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

NEXT WHOLE MINUTE INTERVAL - - - - = 21 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

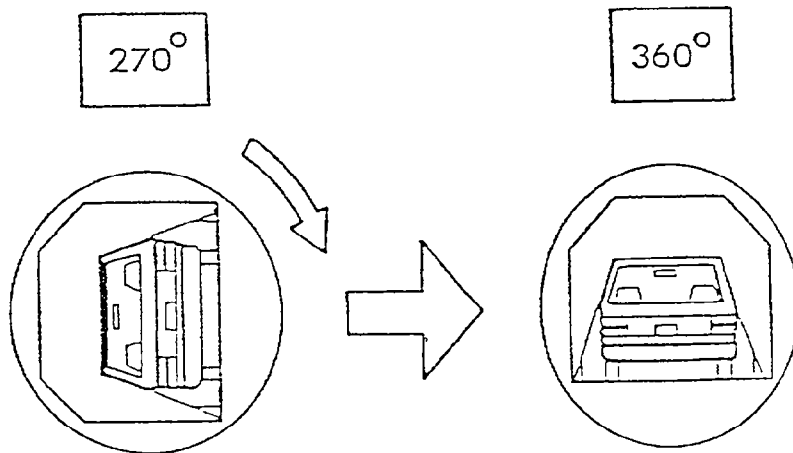
<u>180° TO 270° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: MR0301
TEST PHASE



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

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

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

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

NEXT WHOLE MINUTE INTERVAL - - - - = 28 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

<u>270° TO 360° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 G	28 G

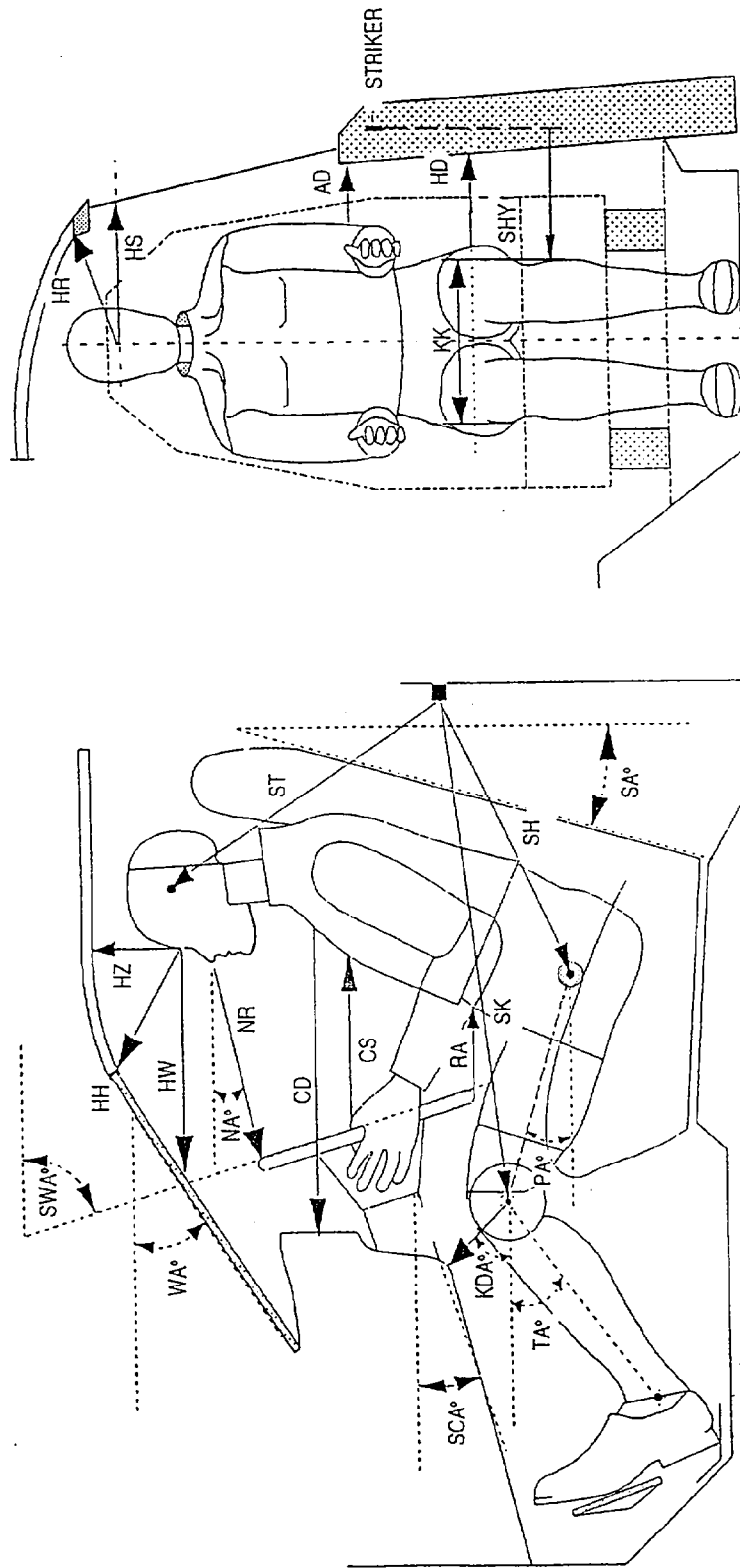
FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

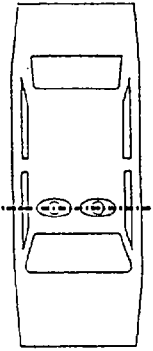
SECTION 4.0

VEHICLE, OCCUPANT, AND CAMERA INFORMATION

FIGURE 8
DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS



VERTICAL TRANSVERSE PLANE



VERTICAL LONGITUDINAL PLANE

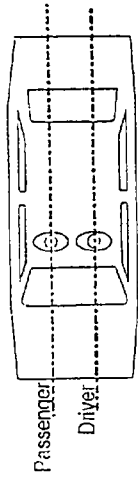
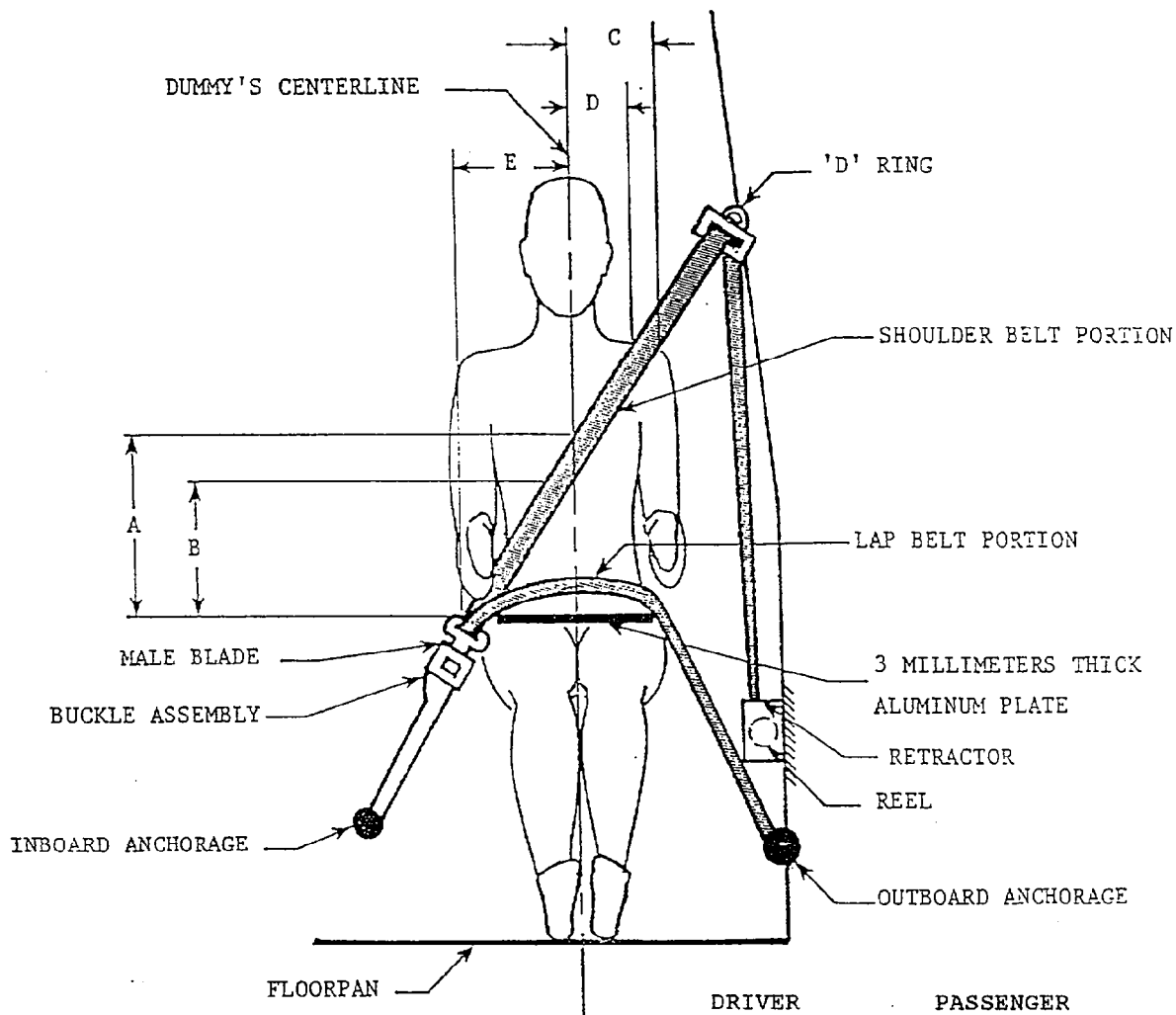


TABLE 12 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

DESIGNATION	TYPE OF MEASUREMENT	DRIVER (SERIAL #142)	PASSENGER (SERIAL #192)
WA°	WINDSHIELD ANGLE	34	NA
SWA°	STEERING WHEEL ANGLE	37	NA
SCA°	STEERING COLUMN ANGLE	53	NA
SA°	SEAT BACK ANGLE	22	22
HZ	HEAD TO ROOF	202	201
HH	HEAD TO HEADER	439	400
HW	HEAD TO WINDSHIELD	603	537
HR	HEAD TO SIDE HEADER	251	239
NR	NOSE TO RIM	433	NA
NA	NOSE TO RIM ANGLE	16	NA
CD	CHEST TO DASH	493	523
CS	STEERING WHEEL TO CHEST	274	NA
RA	RIM TO ABDOMEN	163	NA
KDL	LEFT KNEE TO DASH	177	152
KDR	RIGHT KNEE TO DASH	161	138
KDA	OUTBOARD KNEE TO DASH ANGLE	20	19
PA°	PELVIC ANGLE	24	21
TA°	TIBIAL ANGLE	50	40
KK	KNEE TO KNEE	292	281
ST	STRIKER TO HEAD	636	651
	STRIKER TO HEAD ANGLE	-82	-77
SK	STRIKER TO KNEE	626	690
	STRIKER TO KNEE ANGLE	6	8
SH	STRIKER TO H-POINT	234	280
	STRIKER TO H-POINT ANGLE	-2	-1
SHY	STRIKER TO H-POINT (Y DIR.)	233	190
HS	HEAD TO SIDE WINDOW	338	319
HD	H-POINT TO DOOR	111	138
AD	ARM TO DOOR	85	72

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

FIGURE 9 SEAT BELT POSITIONING DATA



	DRIVER	PASSENGER
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	365	382
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	295	291
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	100	82
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	40	20
LAPBELT TENSION (N)	11	16
SHOULDER BELT TENSION (N)	18	18
SEAT BELT ANCHORAGE POSITION	ONE POSITION DOWN FROM UPPERMOST	ONE POSITION DOWN FROM UPPERMOST

ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 10
CAMERA POSITIONS

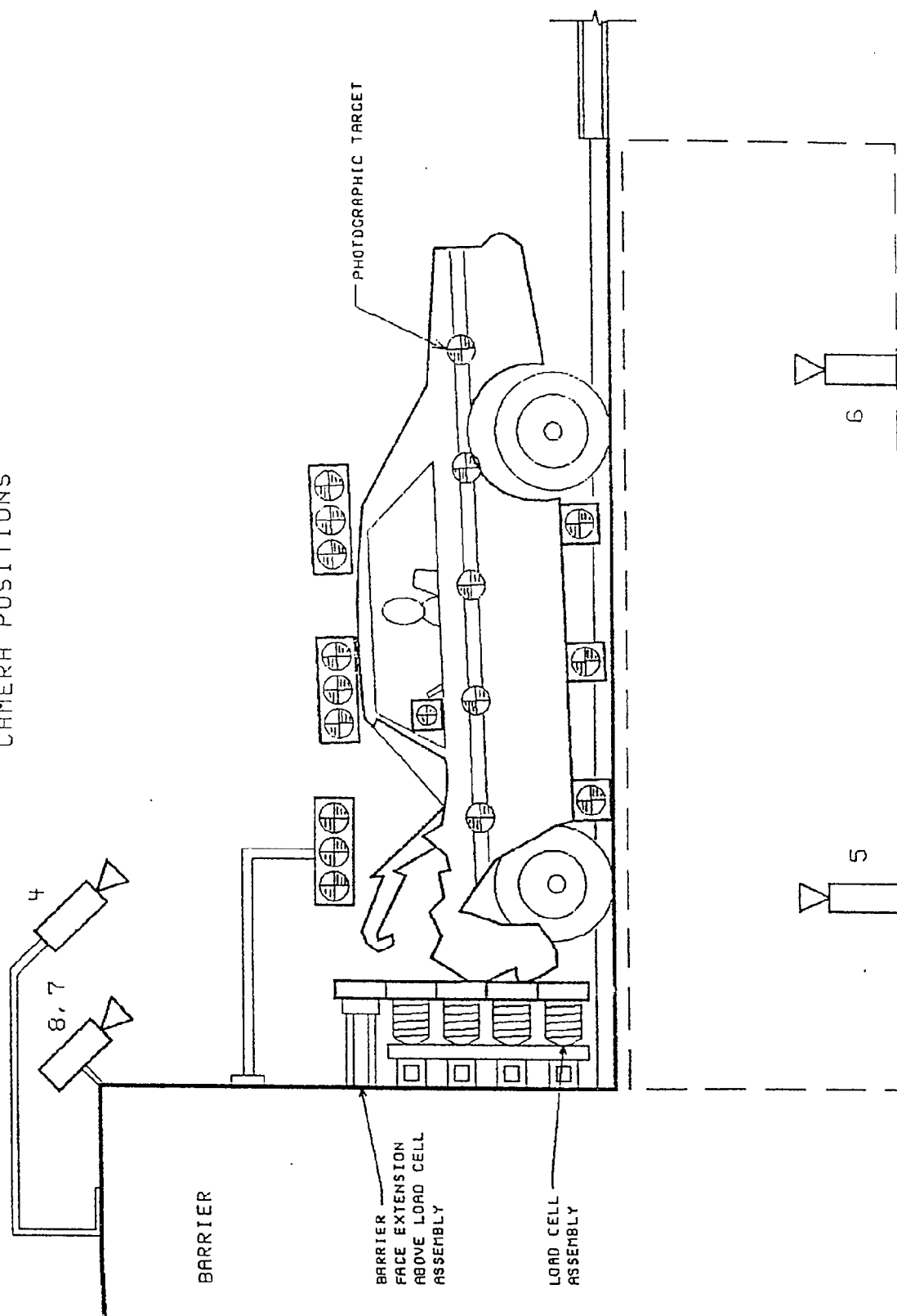


FIGURE 10

CAMERA POSITIONS, CONTINUED

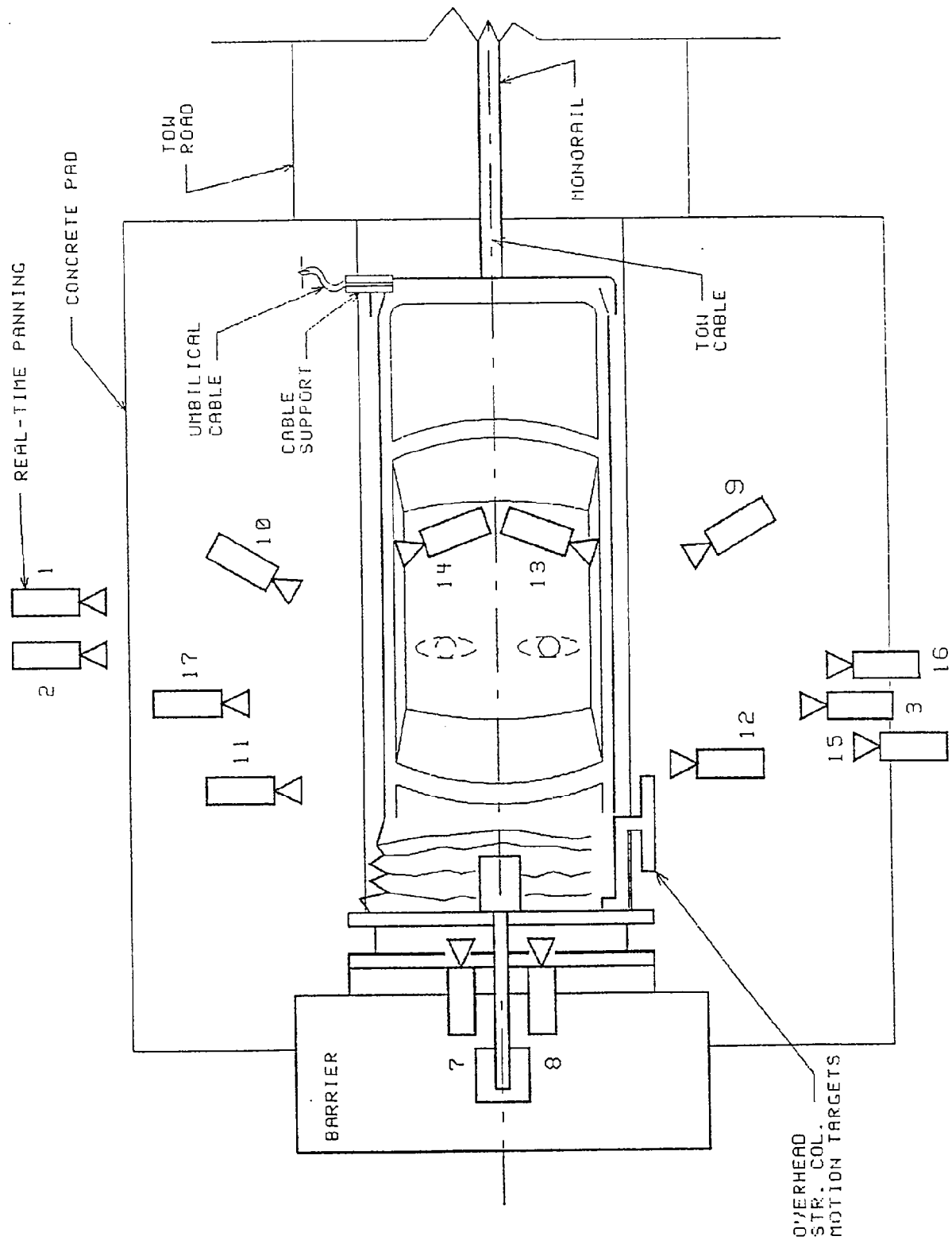


TABLE 13 MOTION PICTURE CAMERA LOCATIONS

TEST NO.: 930929		VEHICLE: 1994 Dodge Caravan special purpose vehicle				FILM PLANE		
CAMERA NO.	VIEW	CAMERA POSITIONS (MM)*			ANGLE** (DEG)	TARGET (MM)	LENS (MM)	FILM SPEED (FPS)
		X	Y	Z				
1	Real-time panning	-3607	-12802	1549	NA	NA	16	24
2	Vehicle crush	-2065	-6767	942	-2	NA	13	502
3	Dummy kinematics	-1054	7493	1118	-12	6248	25	1005
4	Windshield damage	-925	0	2489	-40	NA	13	500
5	Crush & fluid spillage	-1283	0	-2347	90	NA	13	975
6	Fluid spillage	-2522	0	-2515	90	NA	13	1000
7	Passenger kinematics	-114	-351	2159	-40	NA	17	498
8	Driver kinematics	-173	368	2159	-41	NA	17	505
9	Driver kinematics	-4572	1854	2591	-27	2921	25	498
10	Passenger kinematics	-4674	-1880	2540	-26	3099	25	488
11	Windshield intrusion	-968	-7775	1118	0	NA	50	518
12	Windshield intrusion	-1346	7859	1074	0	NA	50	500
13	Driver seatbelt movement	NA	NA	NA	NA	NA	13	490
14	Passenger seatbelt movement	NA	NA	NA	NA	NA	13	490
15	Column movement	-2794	7264	2616	-14	NA	25	505
16	Column movement	-2794	7264	1908	-9	NA	25	498
17	Passenger kinematics	-986	-5354	1151	7	6045	25	1002

**X = Film plane forward of barrier face

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

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

FIGURE 11 VEHICLE TARGET LOCATIONS

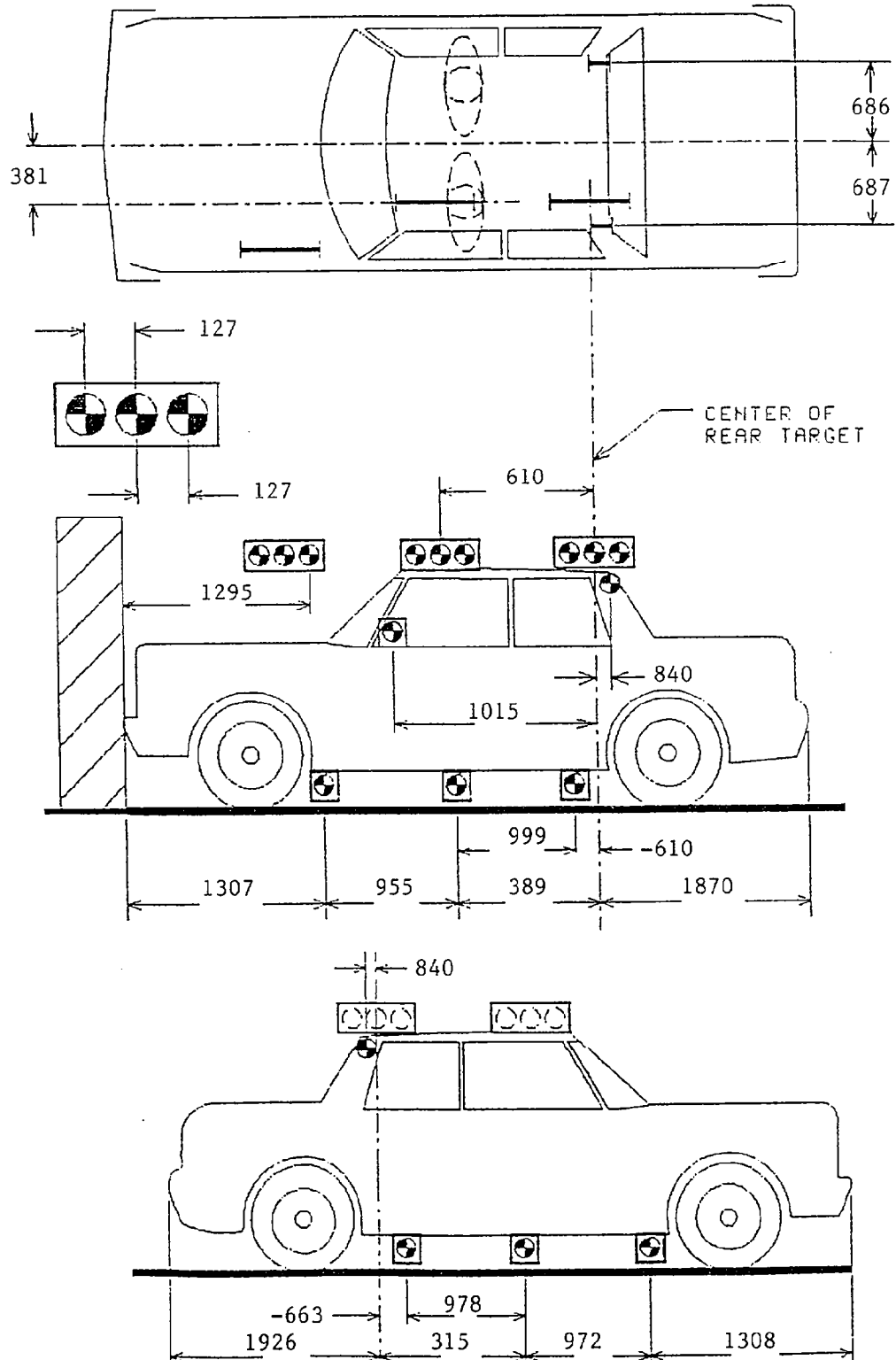


FIGURE 12 PRE-TEST AND POST-TEST MEASUREMENT POINTS

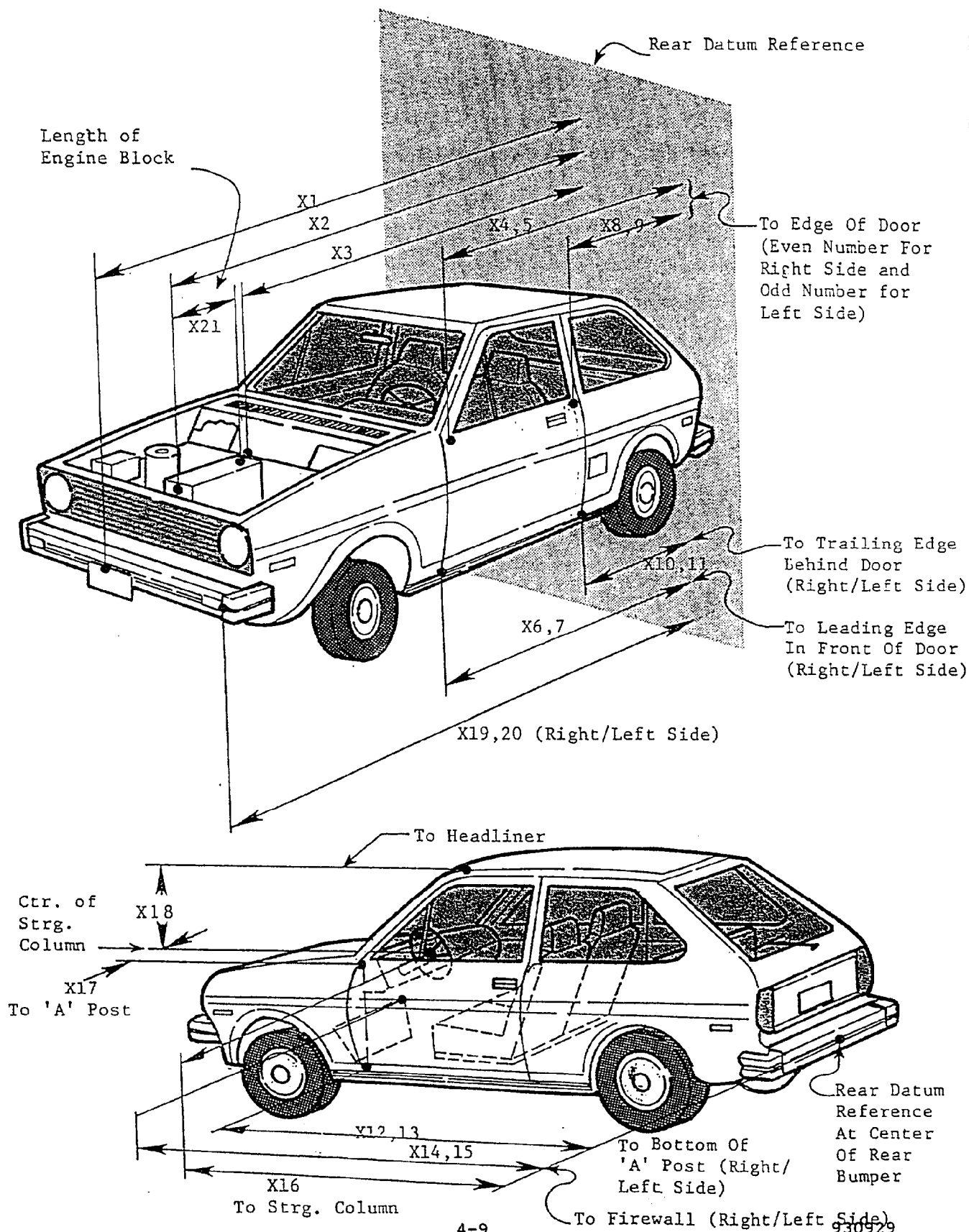


TABLE 14 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Dodge/Caravan TEST NUMBER: 930929

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	4521	3945	576
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	3910	3595	315
X3	REAR SURFACE OF VEHICLE TO FIREWALL	3662	3265	397
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	3272	3277	-5
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	3269	3274	-5
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	3198	3202	-4
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	3202	3198	4
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	2182	2192	-10
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	2184	2190	-6
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	2189	2186	3
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	2186	2180	6
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	3232	3230	2
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	3230	3225	5
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	3580	3400	180
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	3604	3425	179
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	2781	2775	6
X17	CENTER OF STEERING COLUMN TO "A" POST	328	302	26
X18	CENTER OF STEERING COLUMN TO HEADLINER	460	378	82
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	4415	3920	495
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	4417	3890	527
X21	LENGTH OF ENGINE BLOCK	480	480	0

All measurements are in millimeters.

APPENDIX A

PHOTOGRAPHS

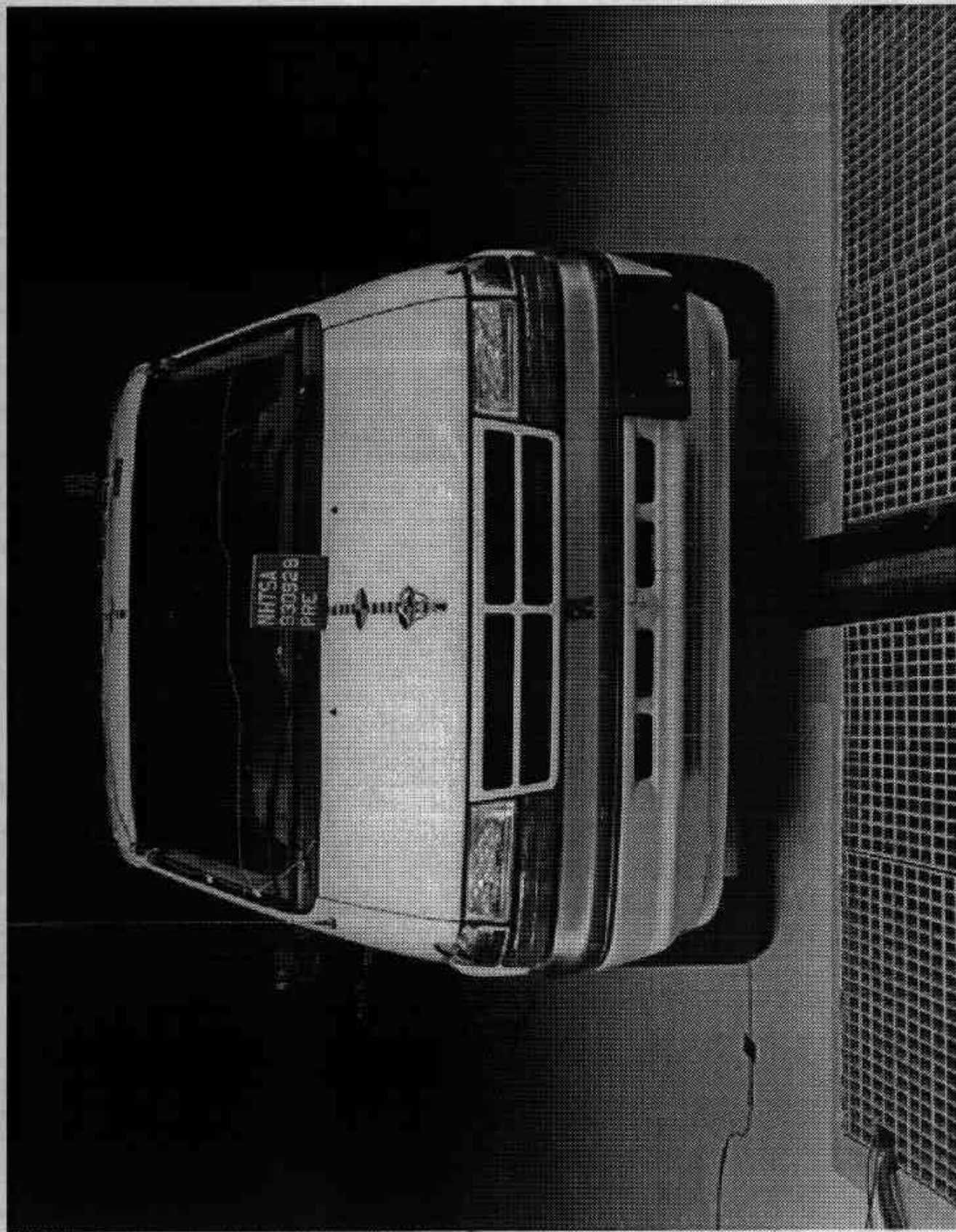


Figure A-1. PRE-TEST FRONT VIEW

A-2

930929

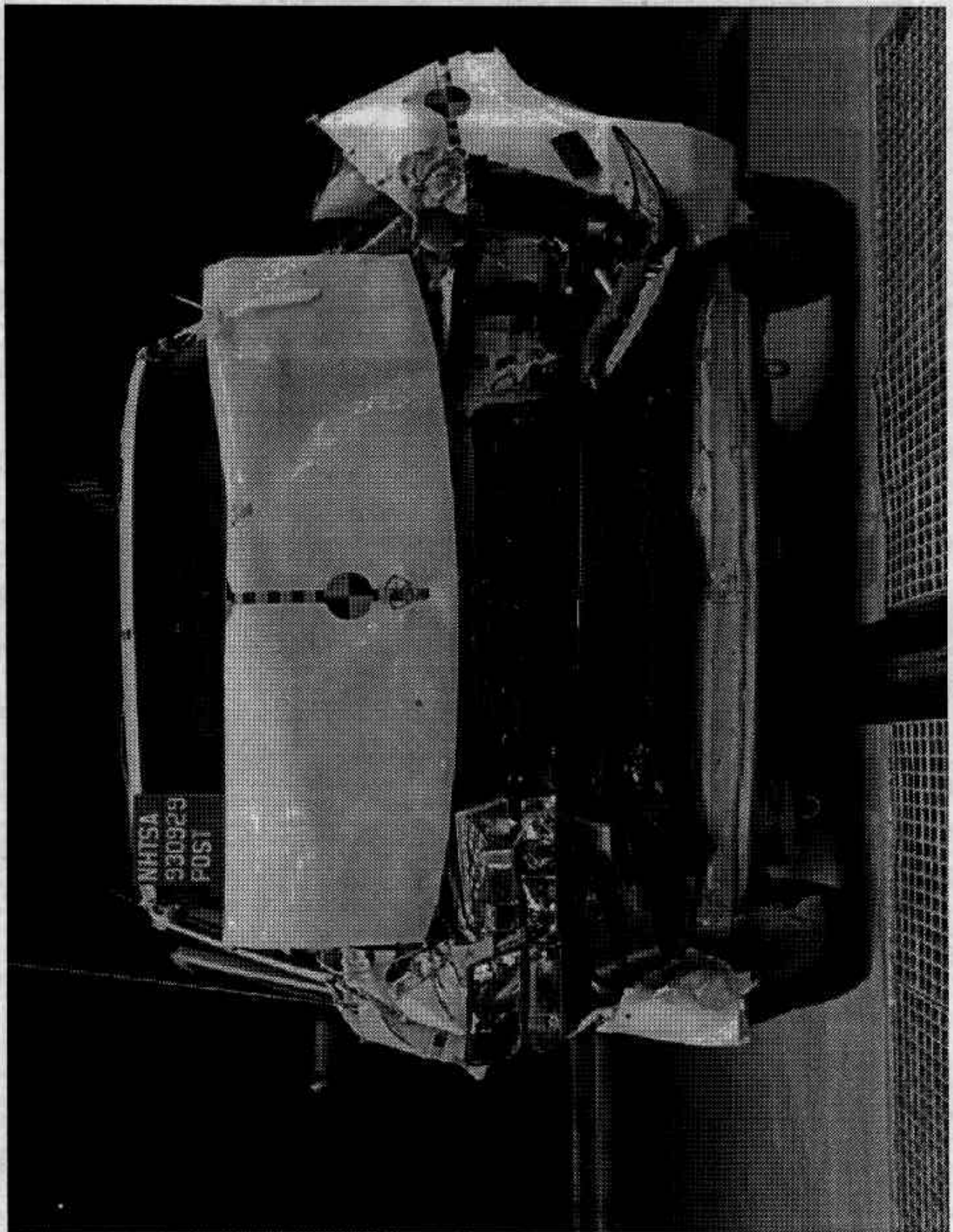


Figure A-2. POST-TEST FRONT VIEW

A-3

930929

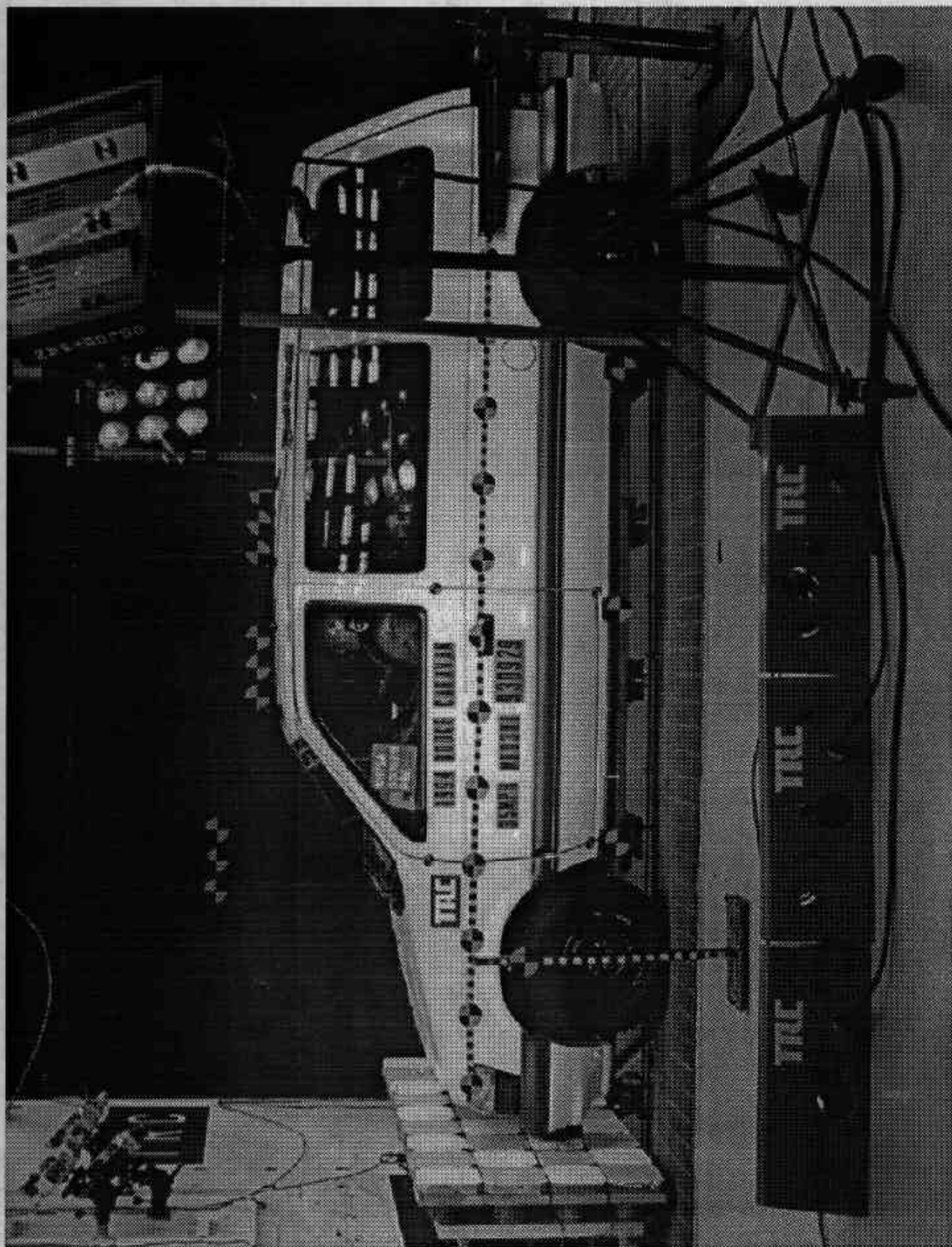


Figure A-3. PRE-TEST LEFT SIDE VIEW

A-4

930929

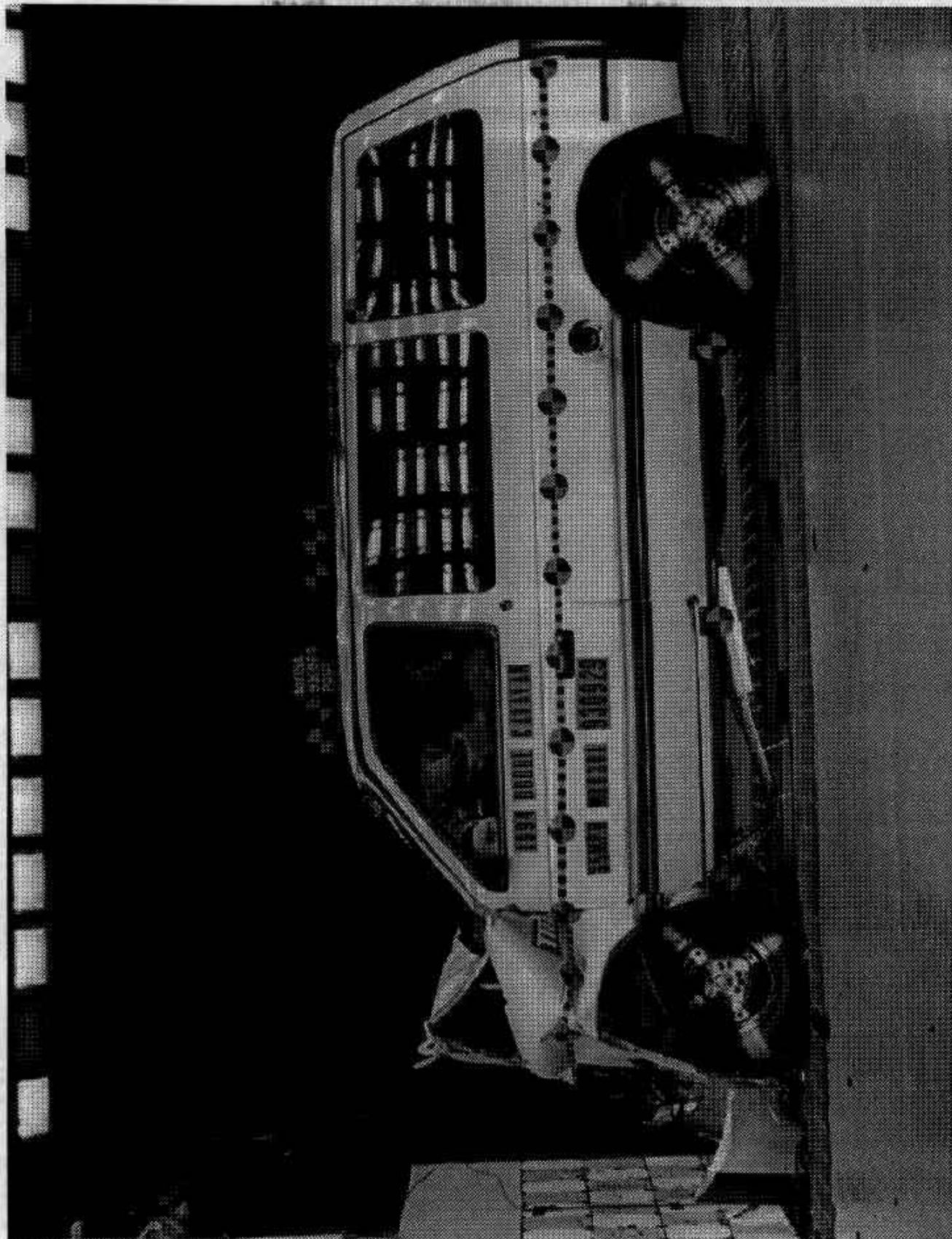


Figure A-4. POST-TEST LEFT SIDE VIEW

A-5

930929

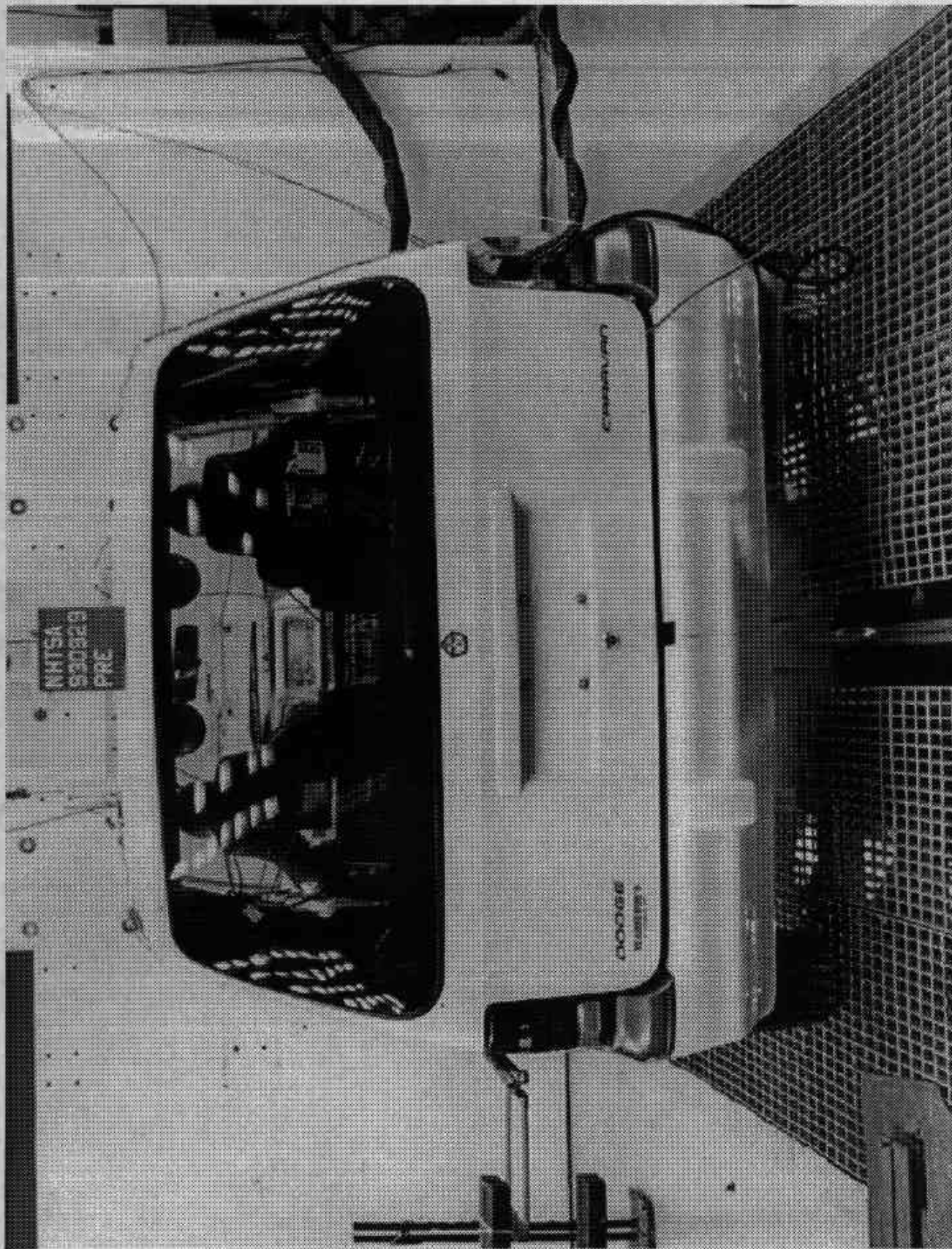


Figure A-5. PRE-TEST REAR VIEW
A-6

930929

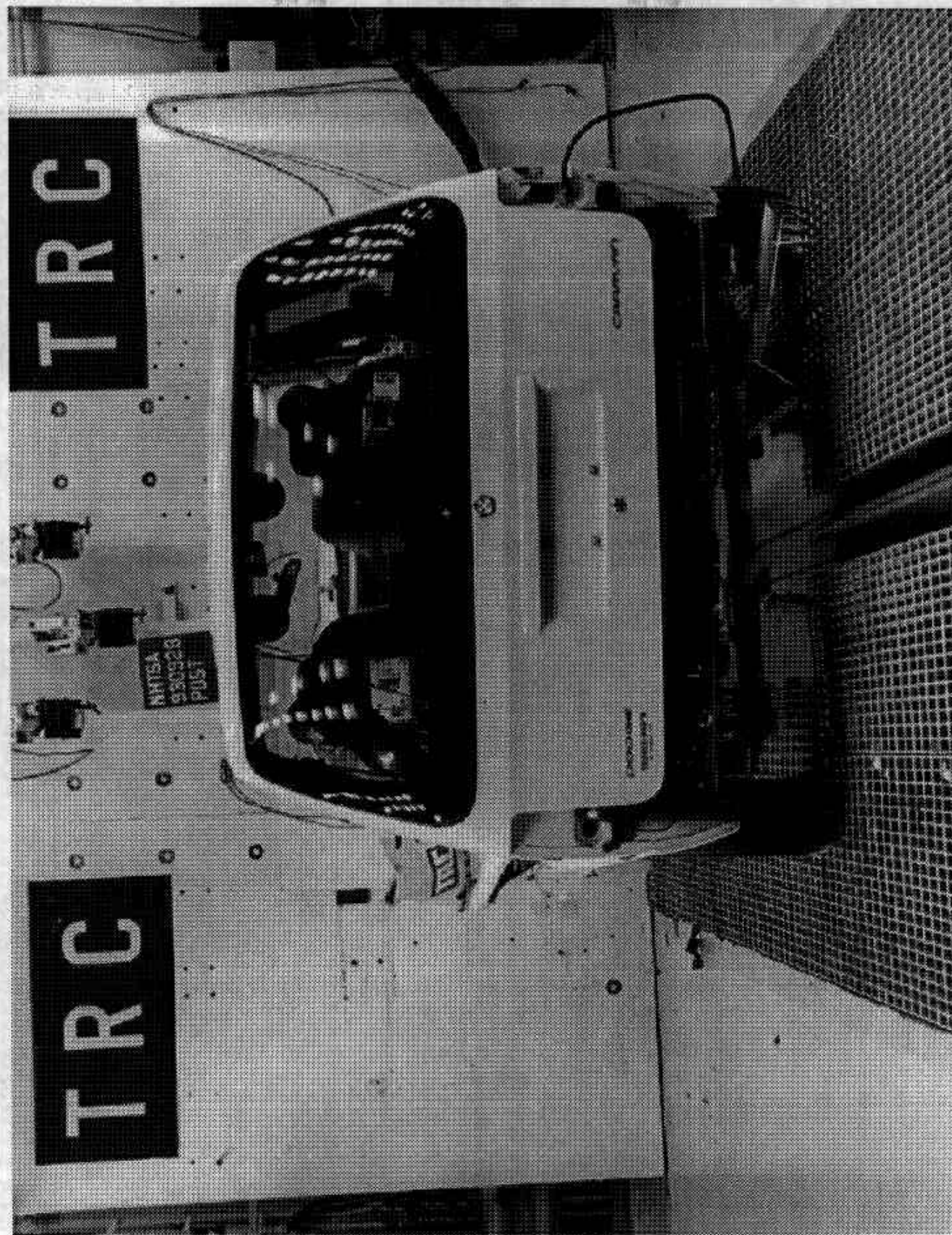


Figure A-6. POST-TEST REAR VIEW
A-7

930929

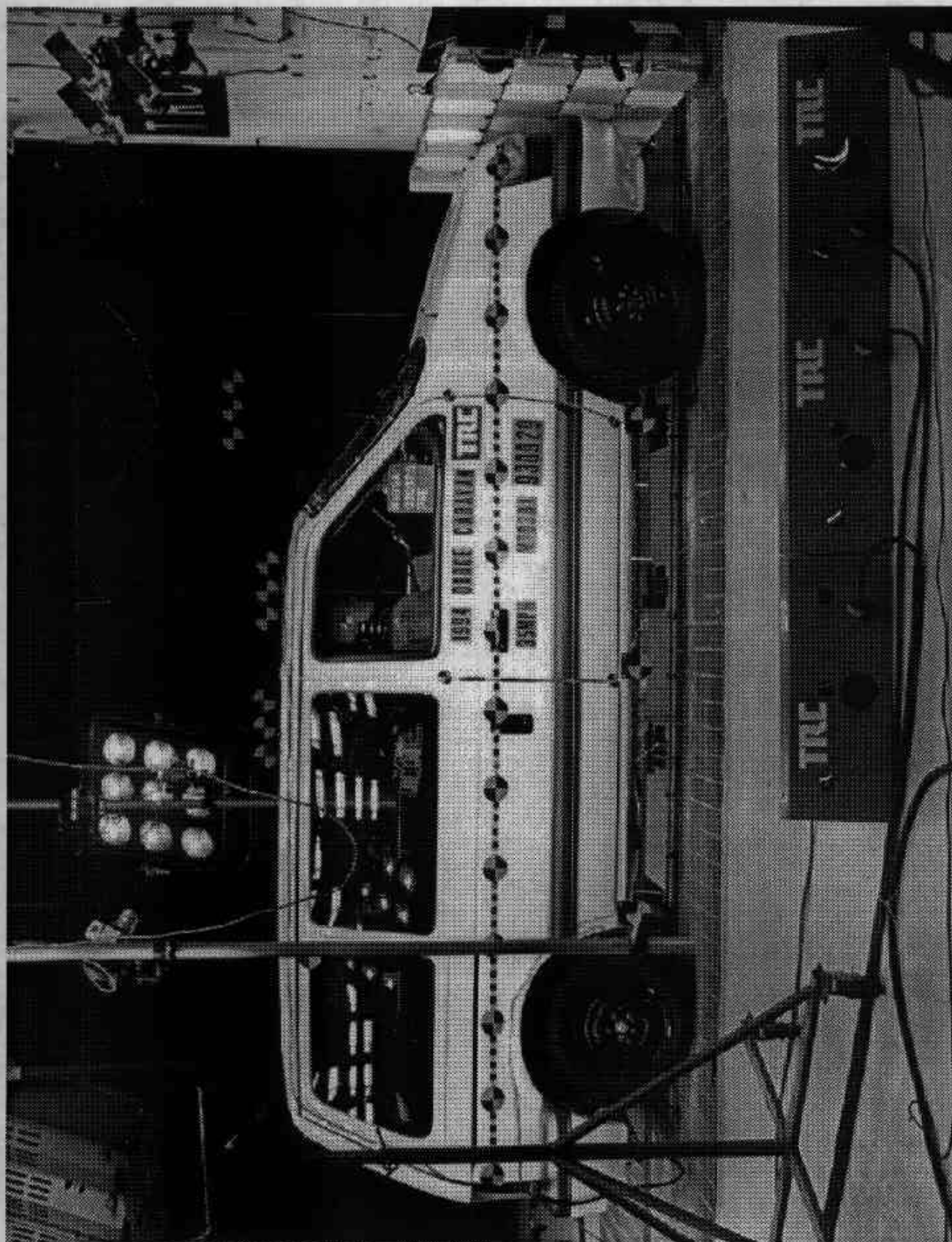


Figure A-7. PRE-TEST RIGHT SIDE VIEW

A-8

930929

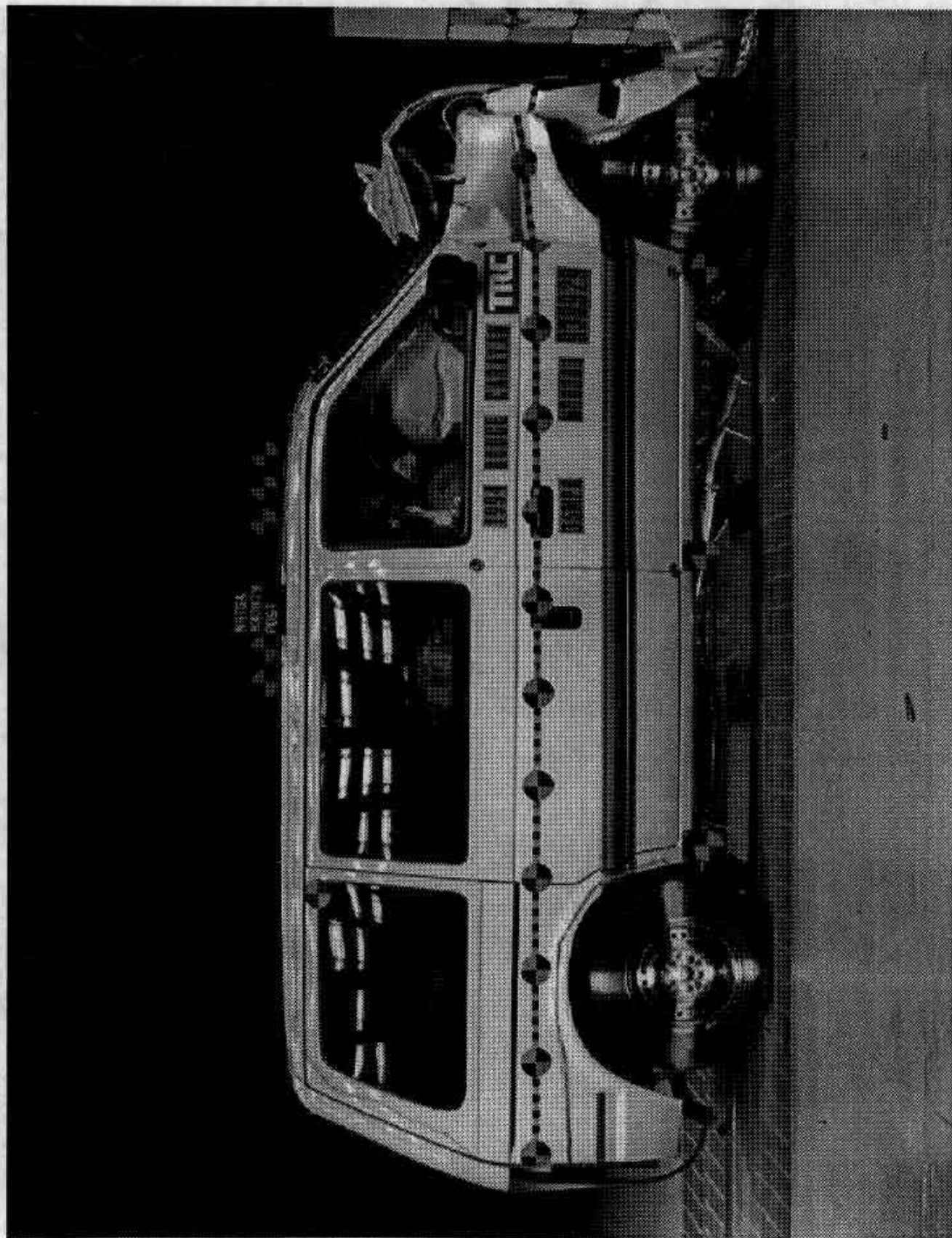


Figure A-8. POST-TEST RIGHT SIDE VIEW
A-9

930929



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

A-10

930929

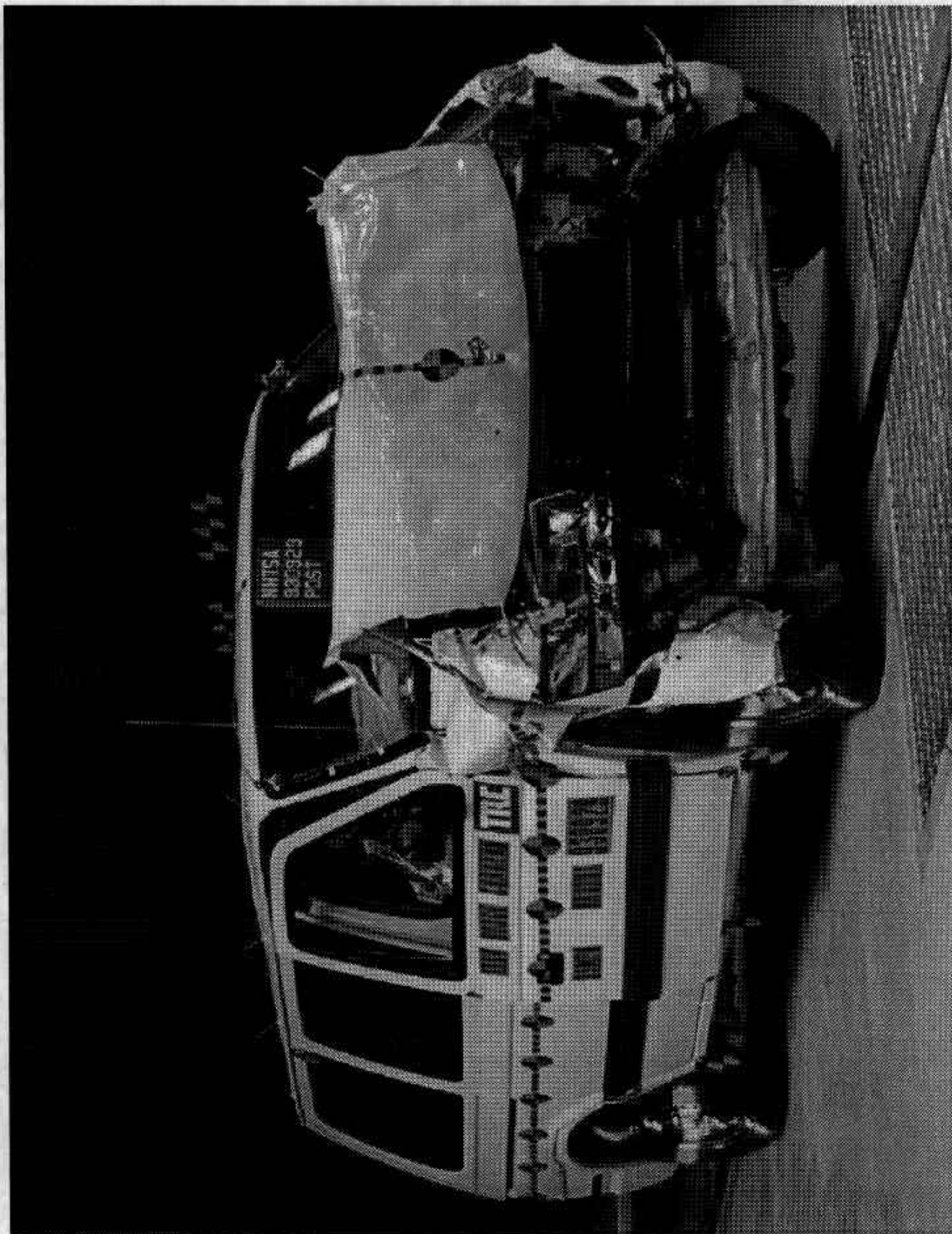


Figure A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-11

930929

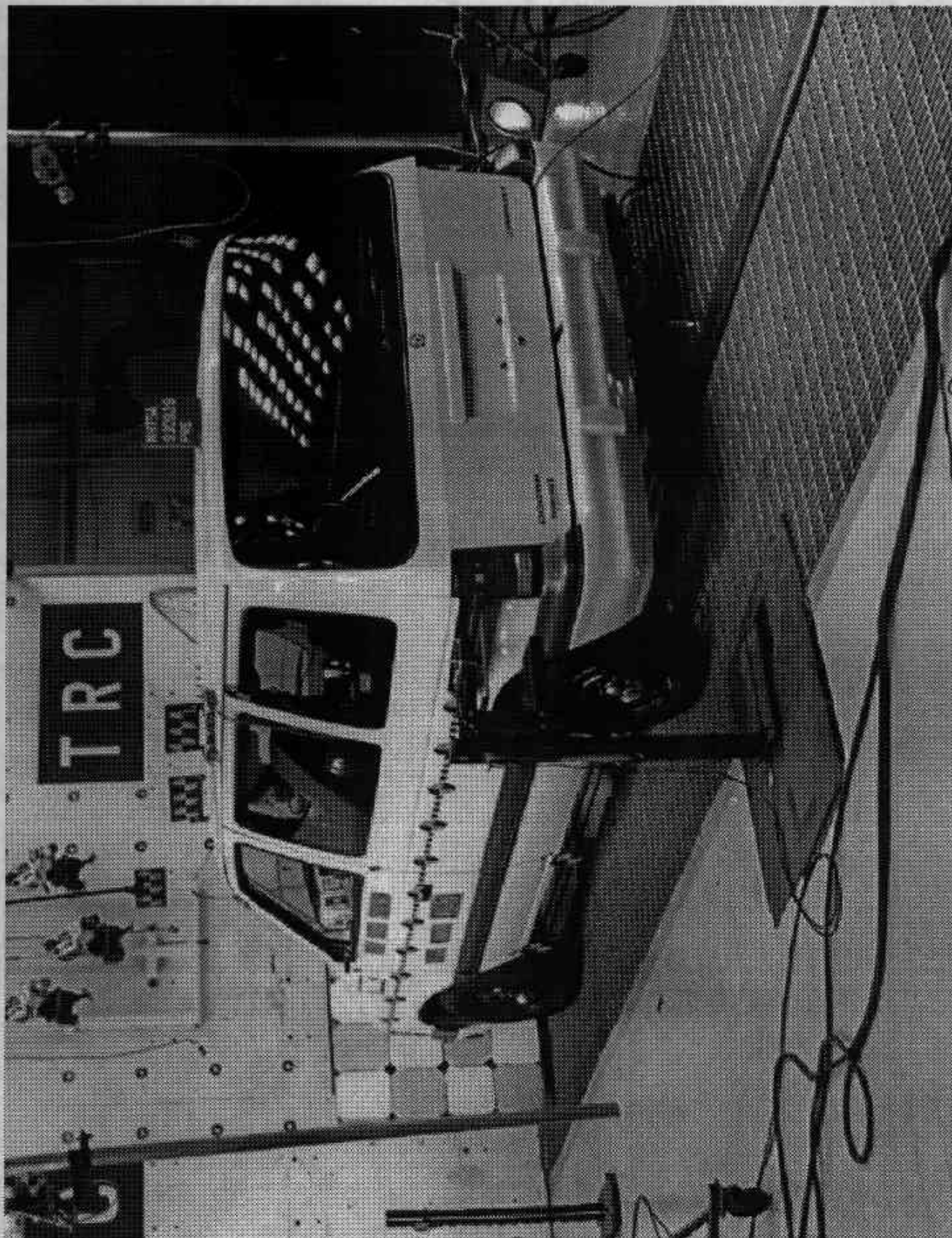


Figure A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW

A-12

930929



Figure A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW

A-13

930929

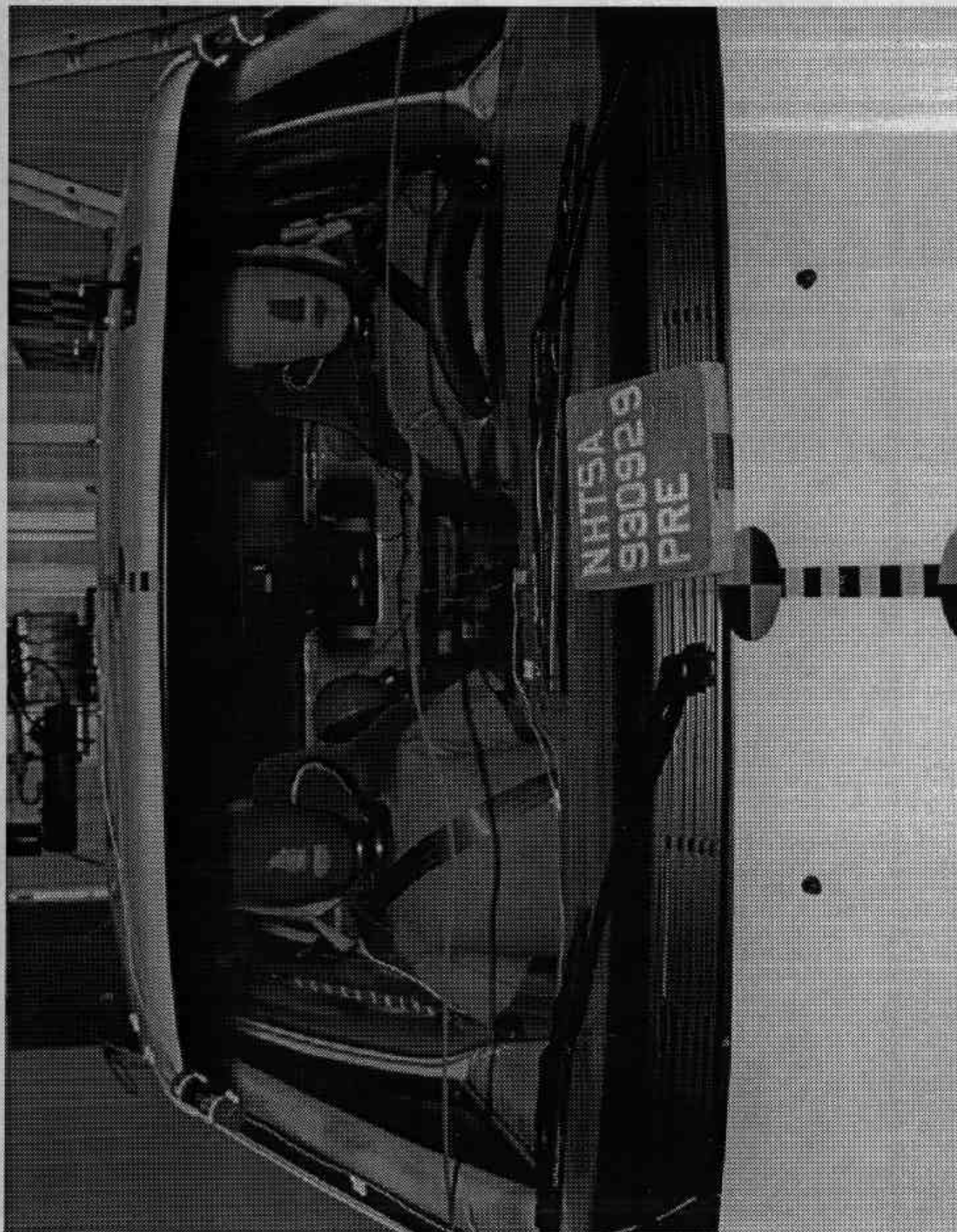


Figure A-13. PRE-TEST WINDSHIELD VIEW

A-14

930929

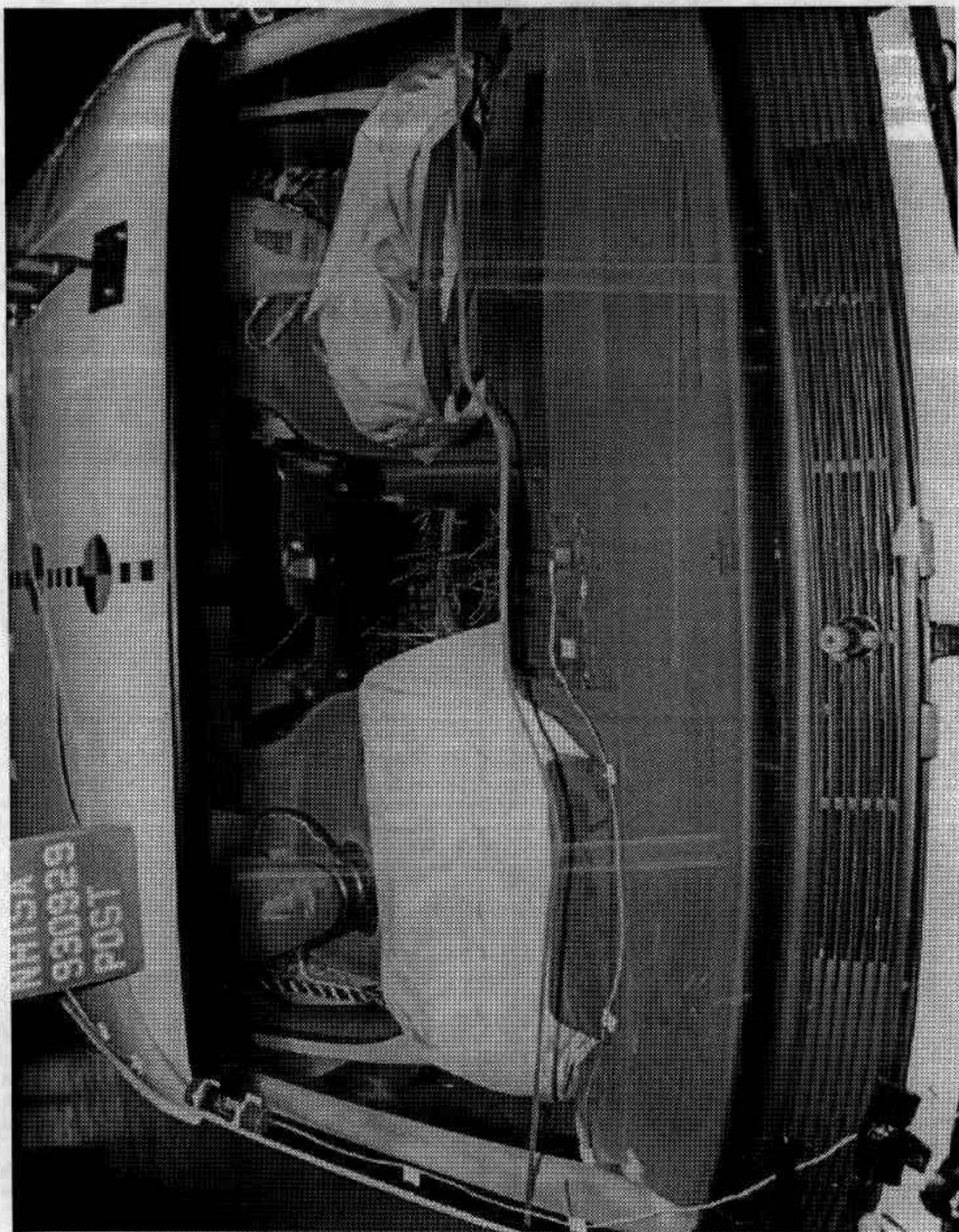


Figure A-14. POST-TEST WINDSHIELD VIEW
A-15

930929

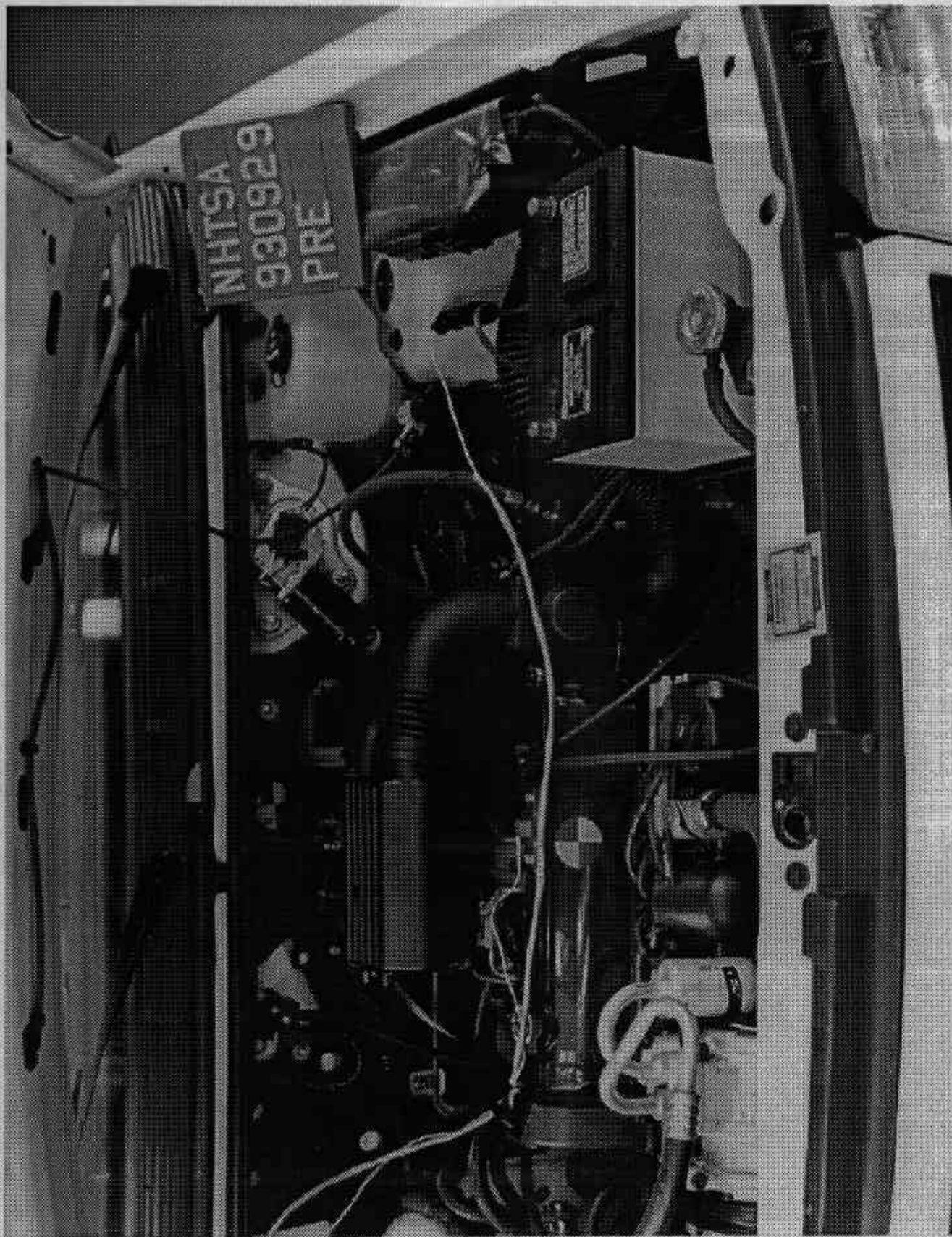


Figure A-15. PRE-TEST ENGINE COMPARTMENT VIEW

A-16

930929



Figure A-16. POST-TEST ENGINE COMPARTMENT VIEW

A-17

930929



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

A-18

930929

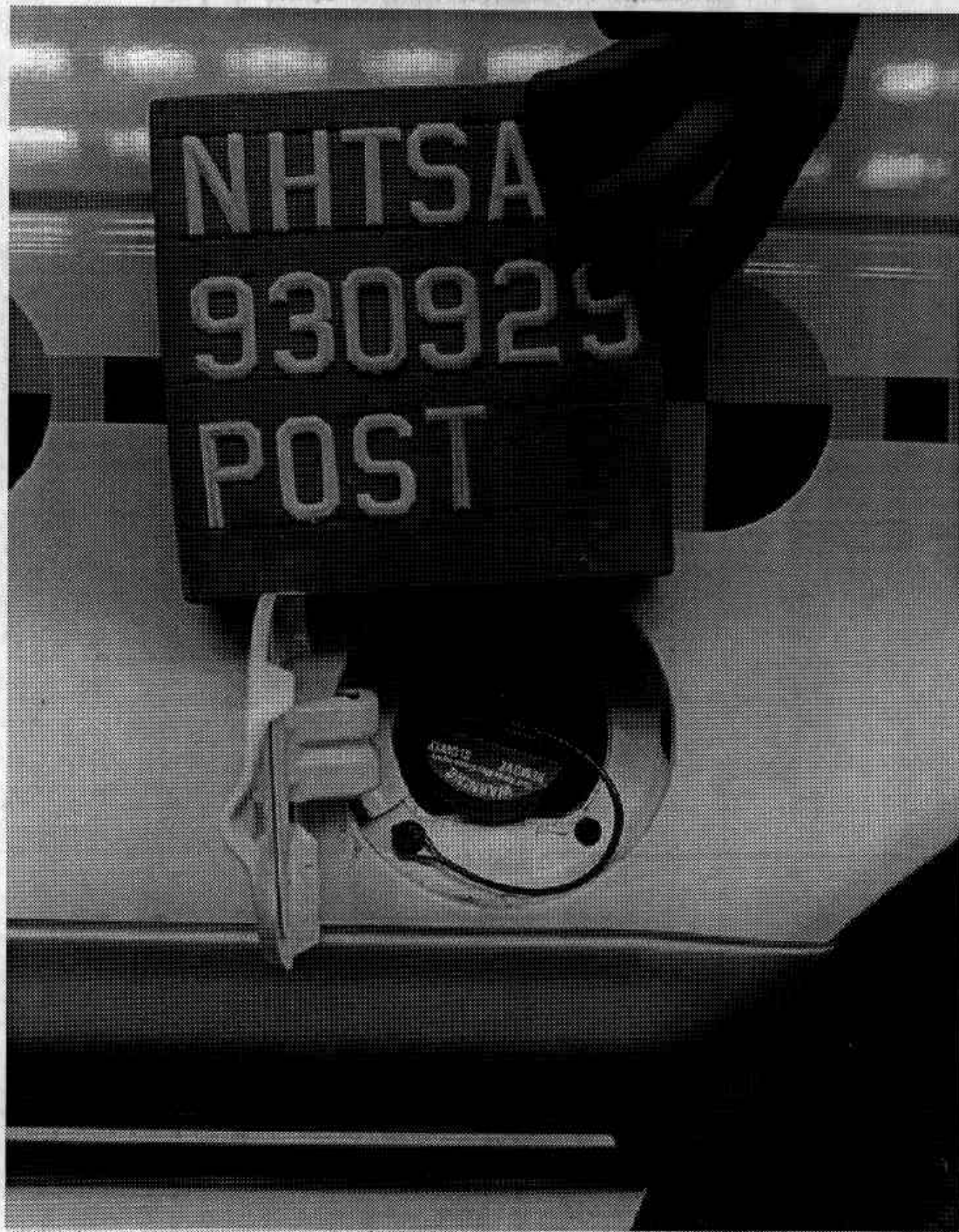


Figure A-18. POST-TEST FUEL FILLER CAP VIEW

A-19

930929

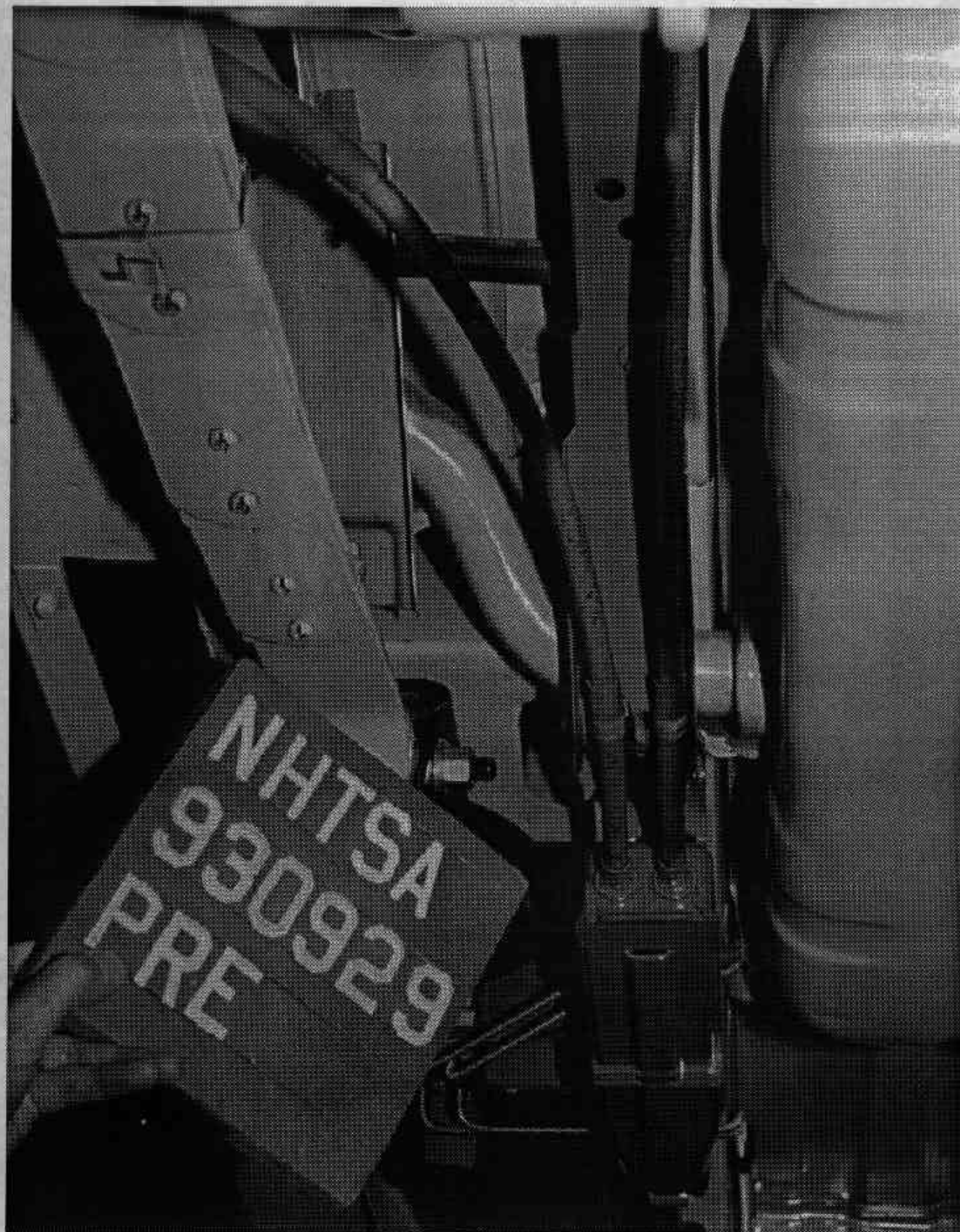


Figure A-19. PRE-TEST FUEL FILLER NECK VIEW
A-20

930929

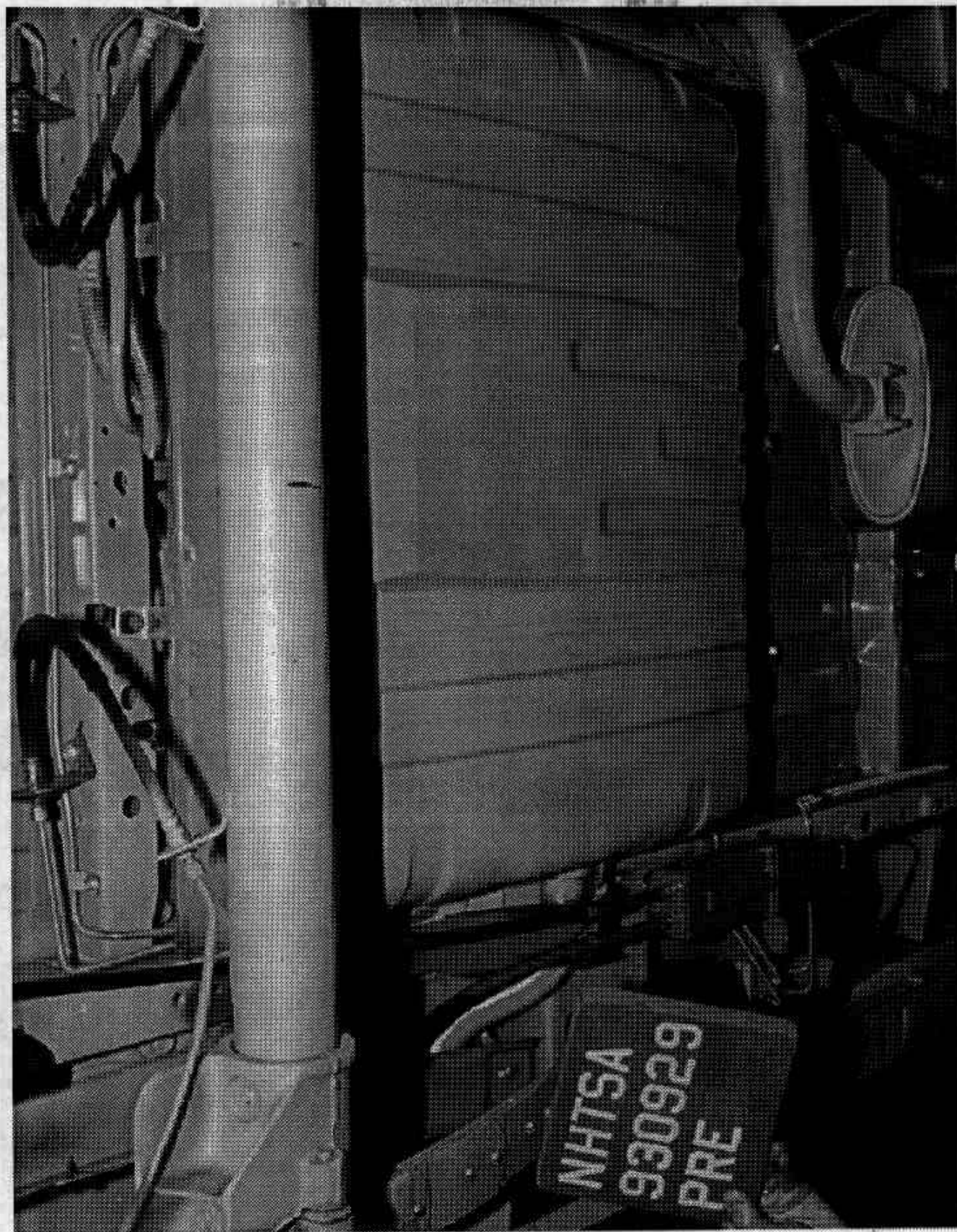


Figure A-20. PRE-TEST FUEL FILLER NECK AND FUEL TANK VIEW
A-21 930929

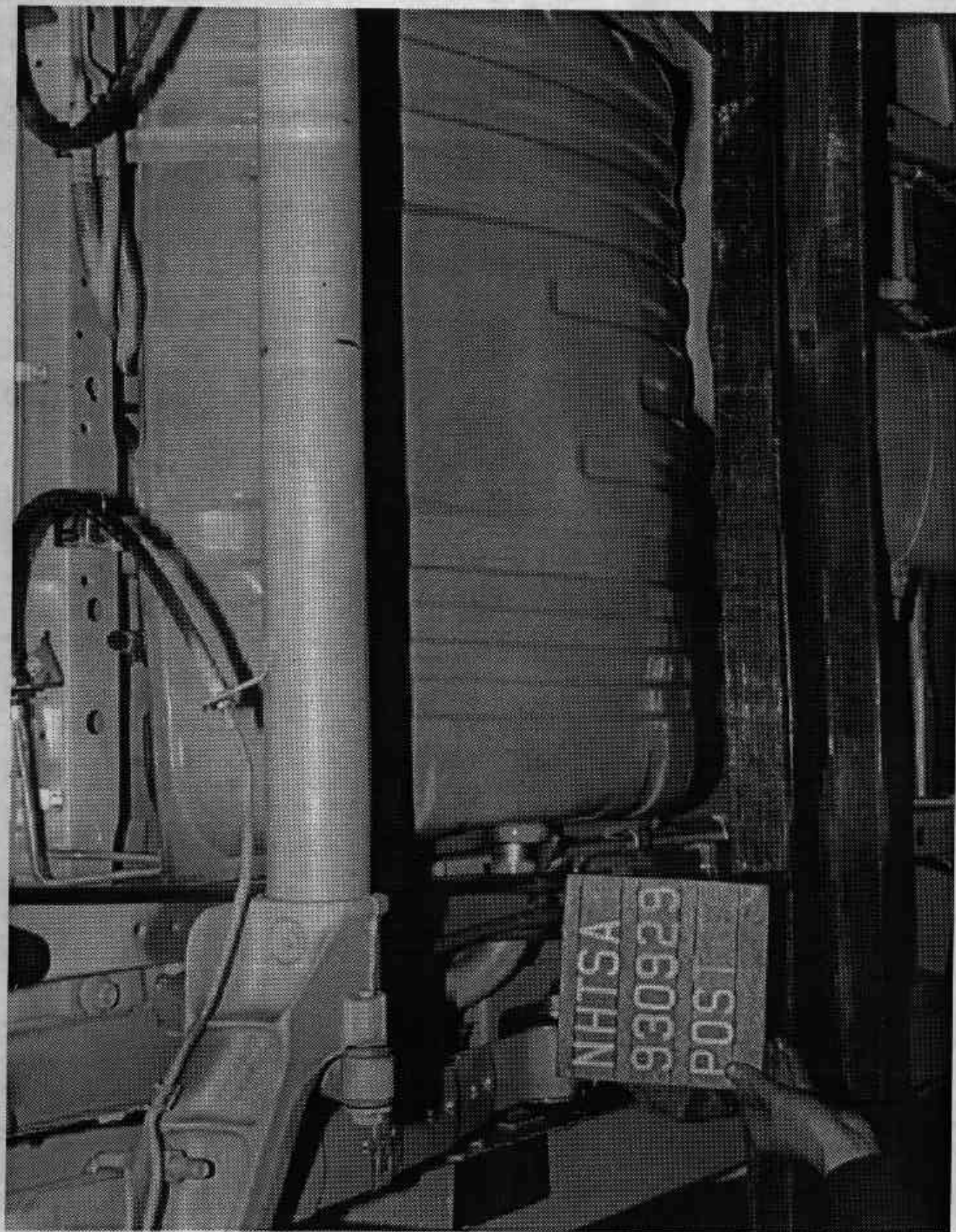


Figure A-21. POST-TEST FUEL FILLER NECK AND FUEL TANK VIEW

A-22

930929

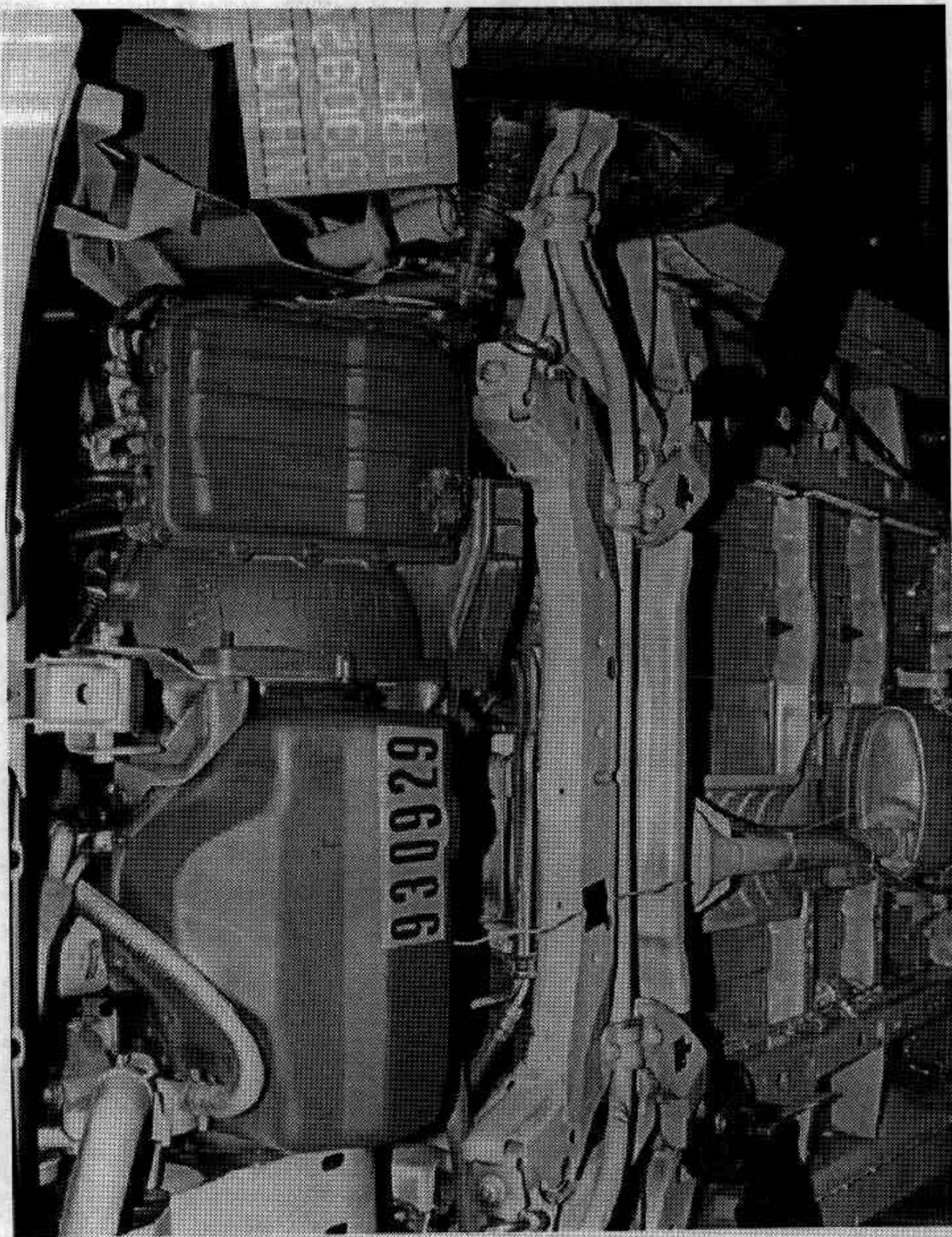


Figure A-22. PRE-TEST FRONT UNDERBODY VIEW

A-23

930929



Figure A-23. POST-TEST FRONT UNDERBODY VIEW

A-24

930929

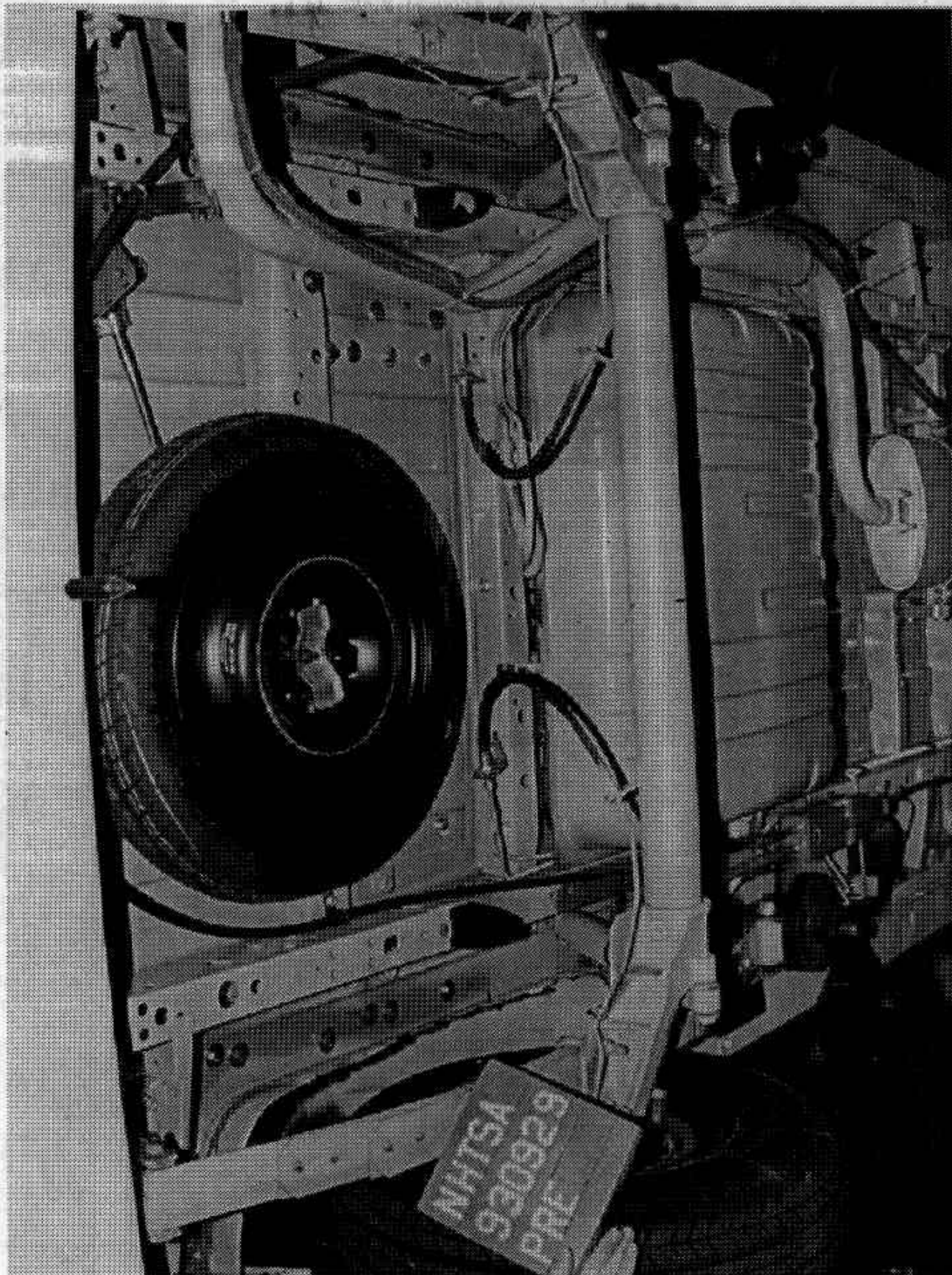


Figure A-24. PRE-TEST REAR UNDERBODY VIEW
A-25

930929

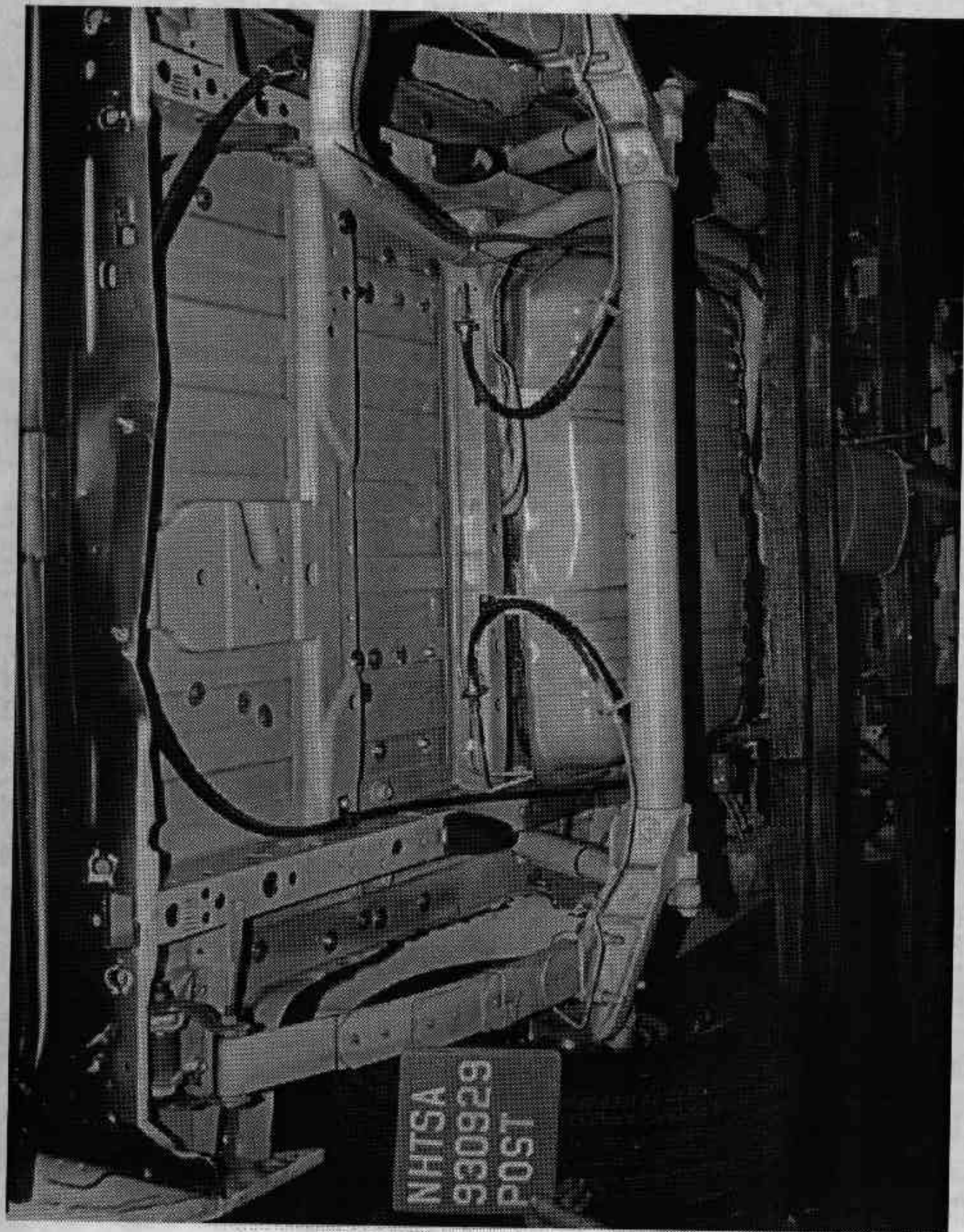


Figure A-25. POST-TEST REAR UNDERBODY VIEW

A-26

930929

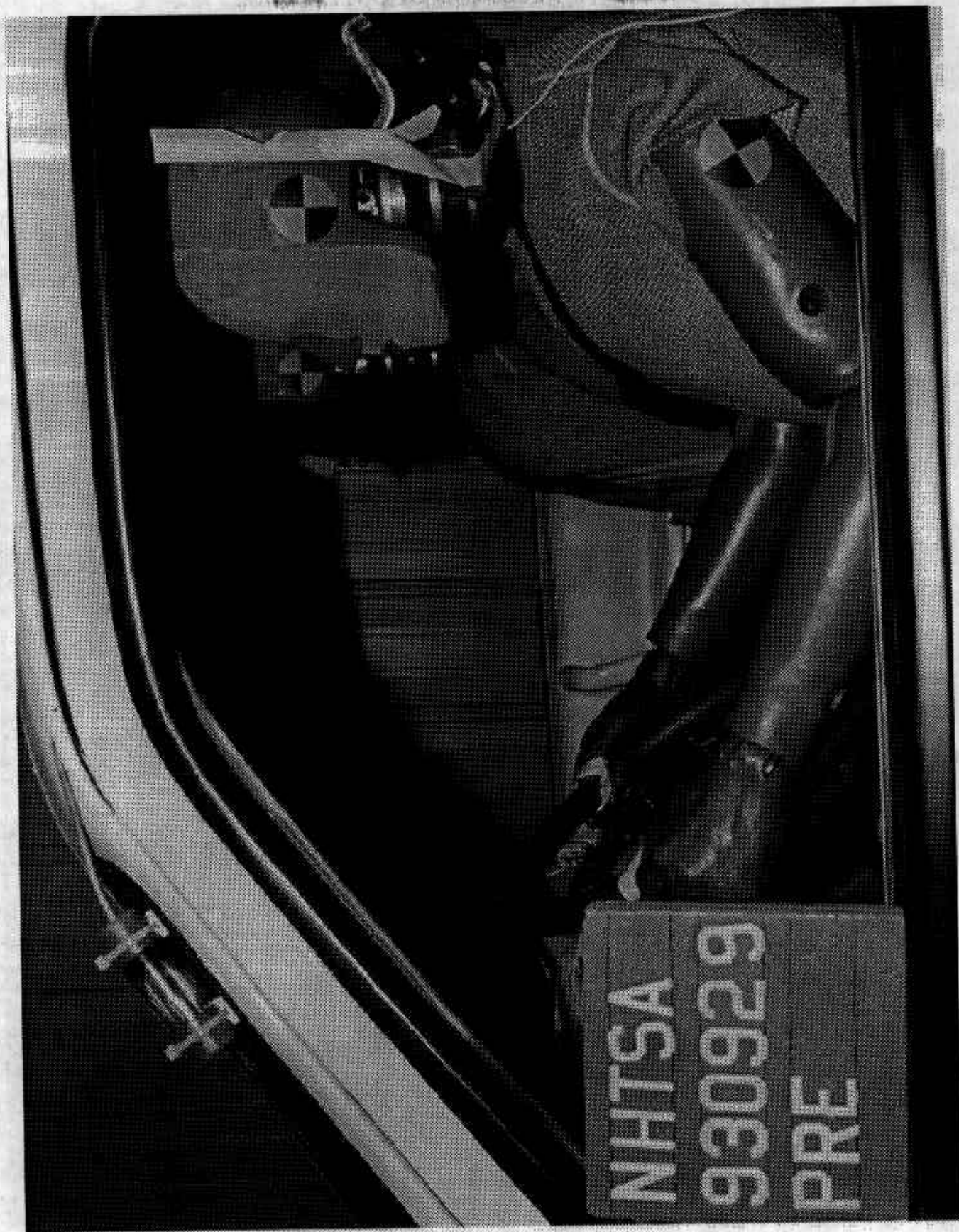


Figure A-26. PRE-TEST DRIVER DUMMY POSITION VIEW

A-27

930929

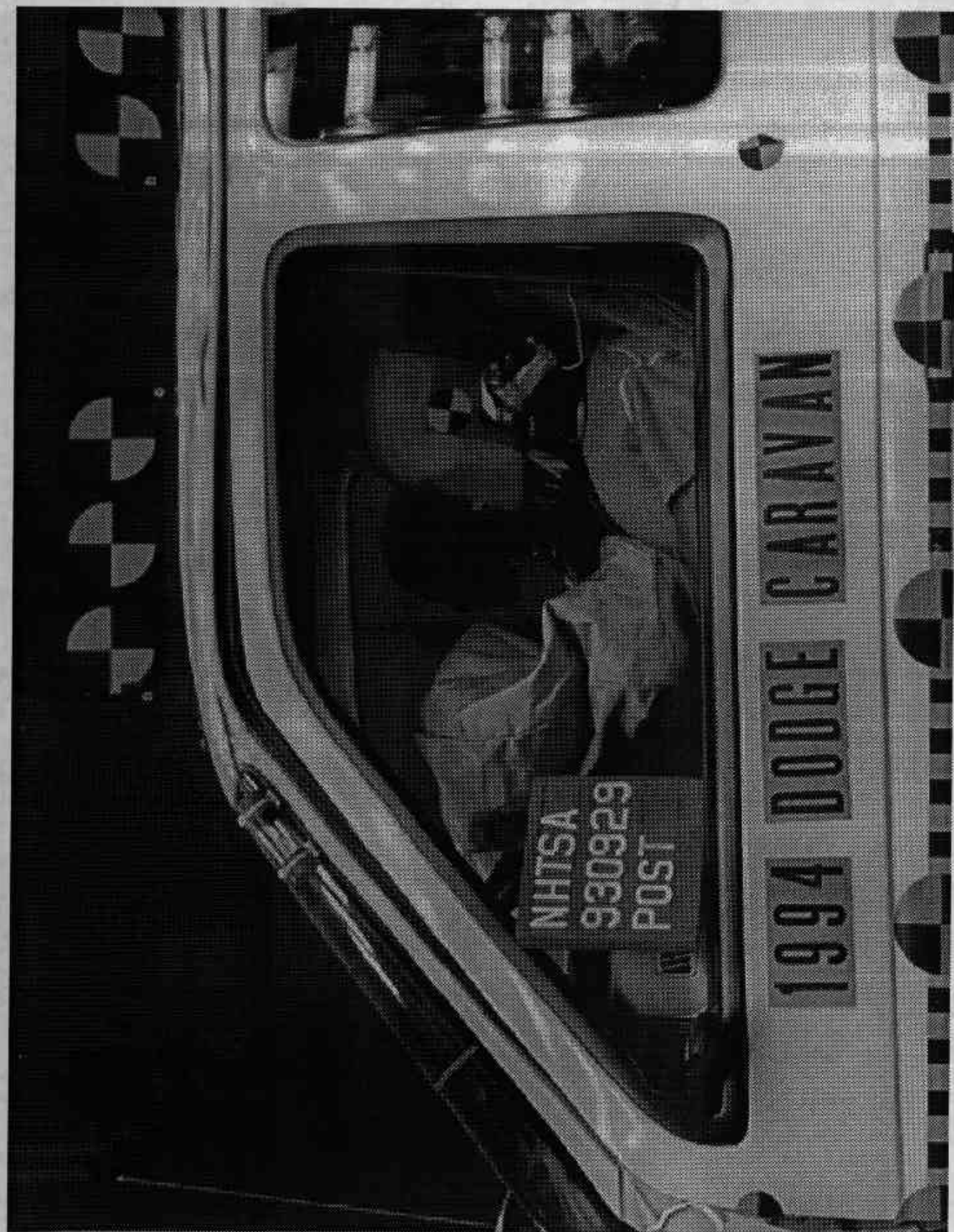


Figure A-27. POST-TEST DRIVER DUMMY POSITION VIEW

A-28

930929

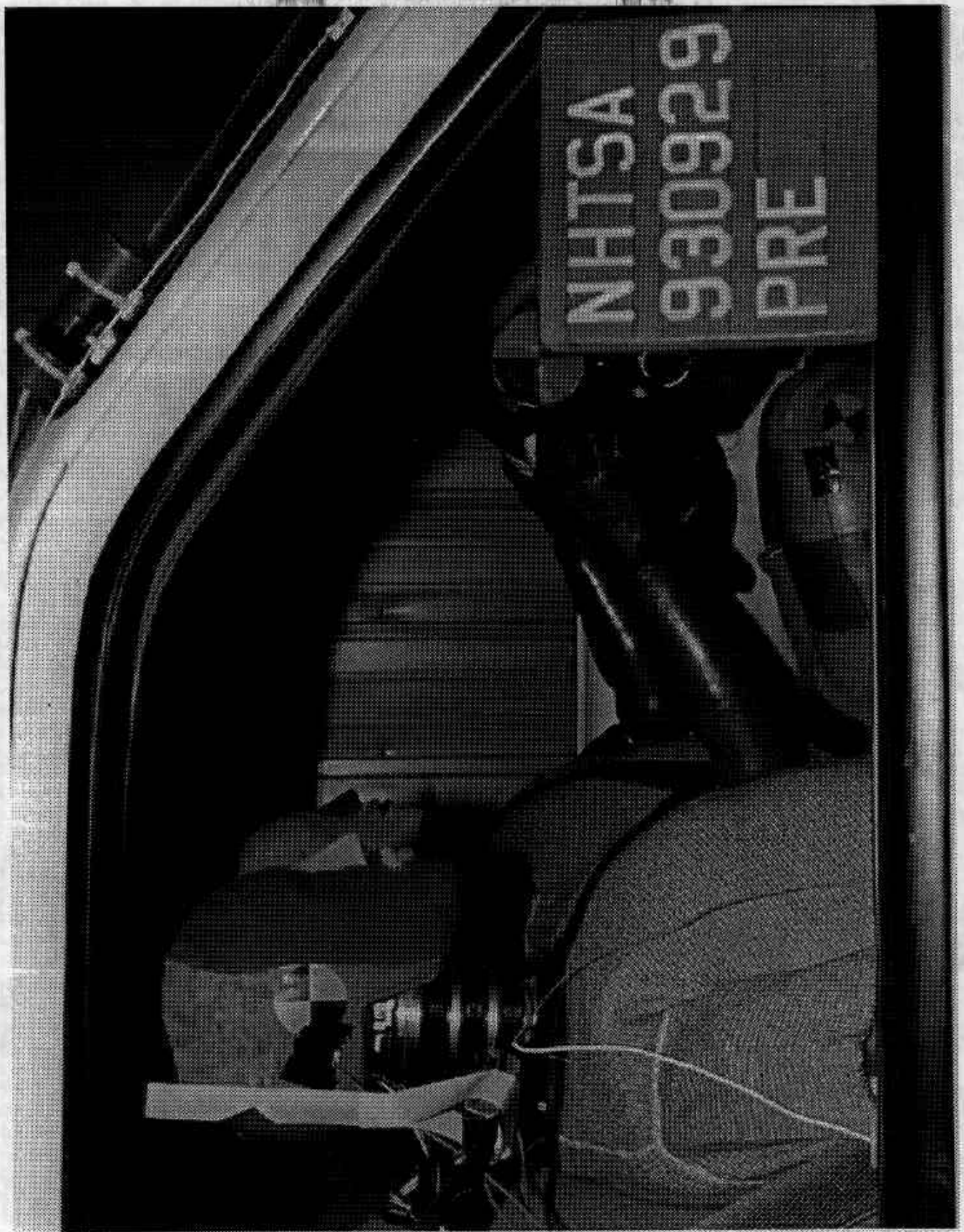


Figure A-28. PRE-TEST PASSENGER DUMMY POSITION VIEW

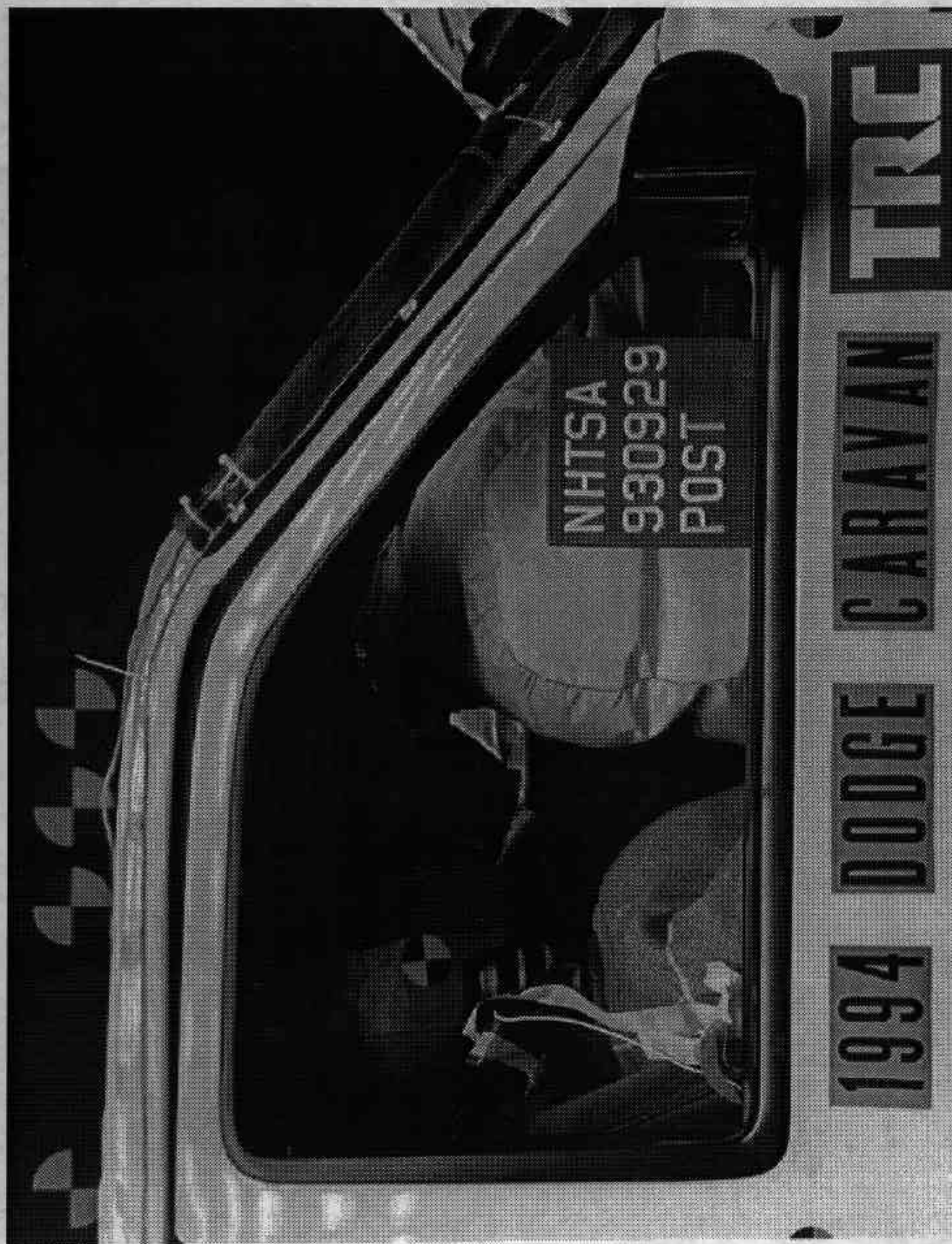


Figure A-29. POST-TEST PASSENGER DUMMY POSITION VIEW

A-30

930929

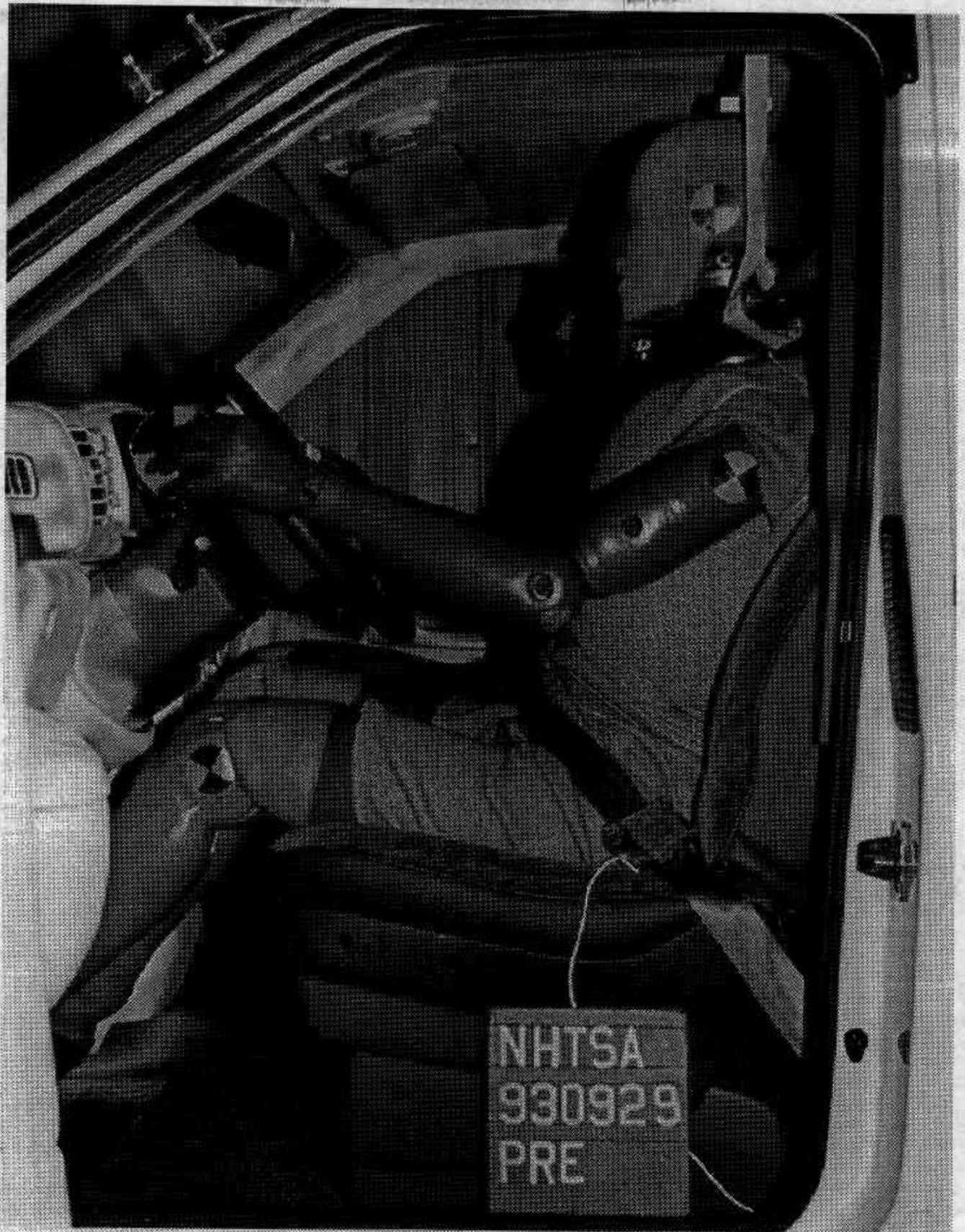


Figure A-30. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
A-31 930929

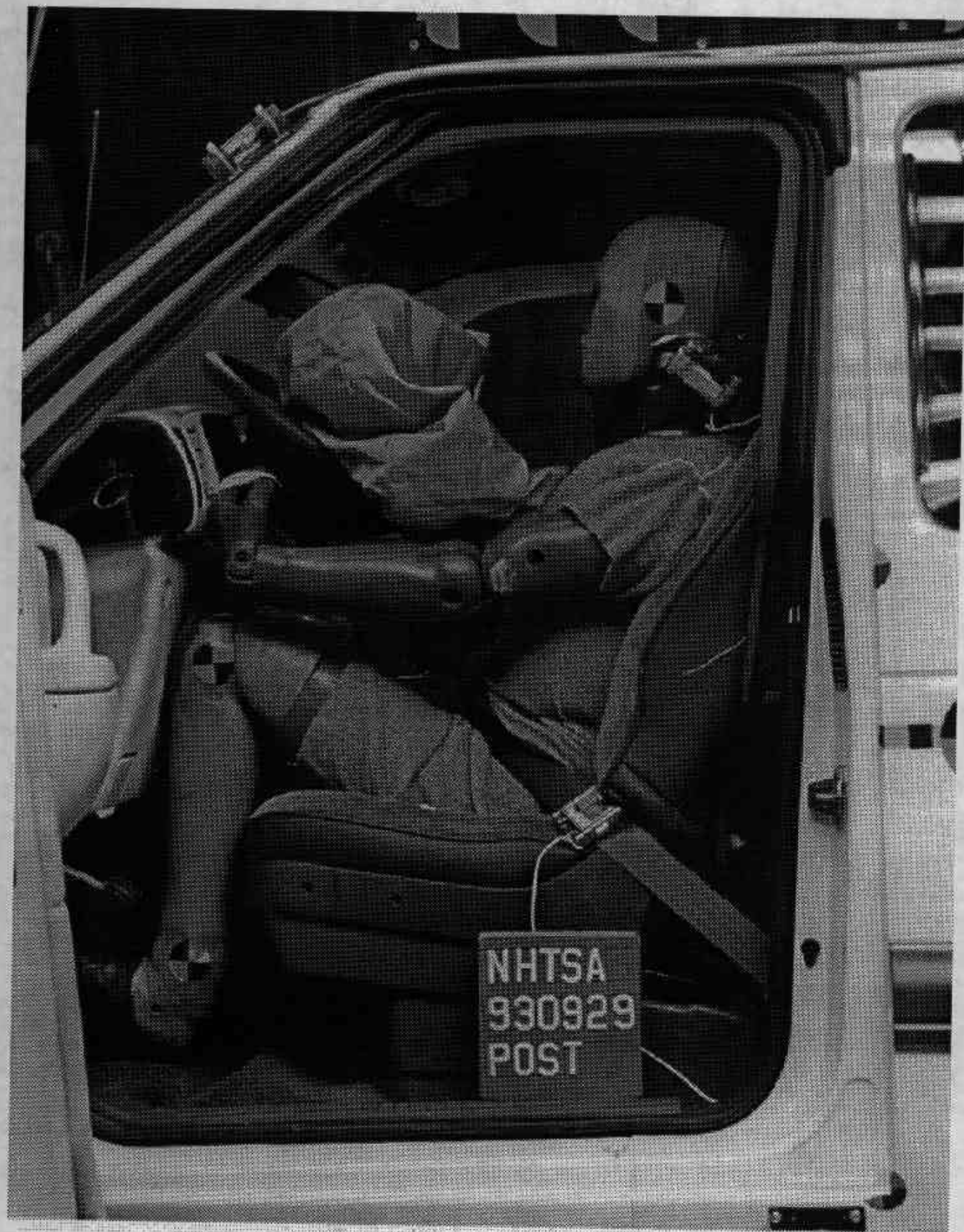


Figure A-31. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

A-32

930929

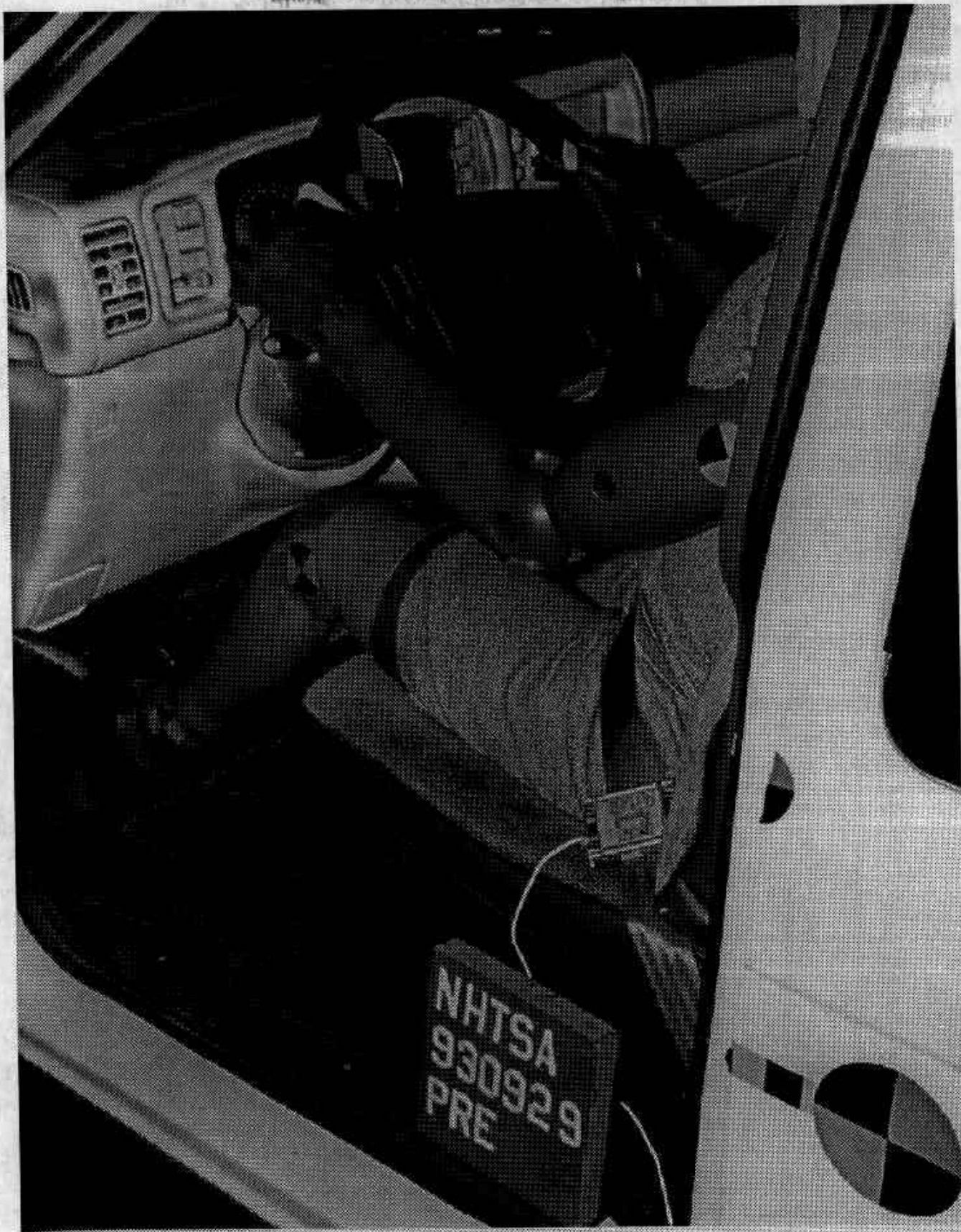


Figure A-32. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2
A-33 930929

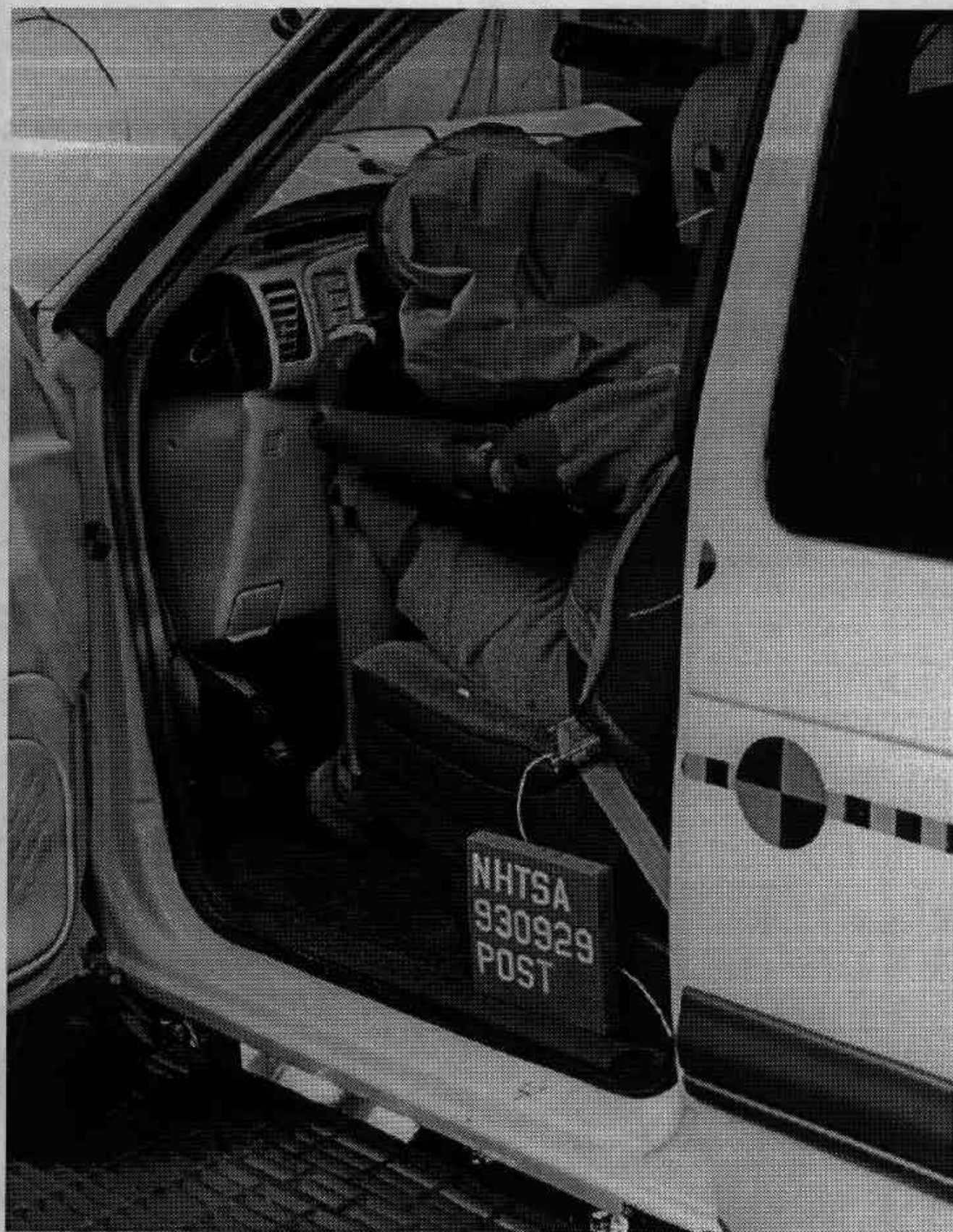


Figure A-33. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

A-34

930929

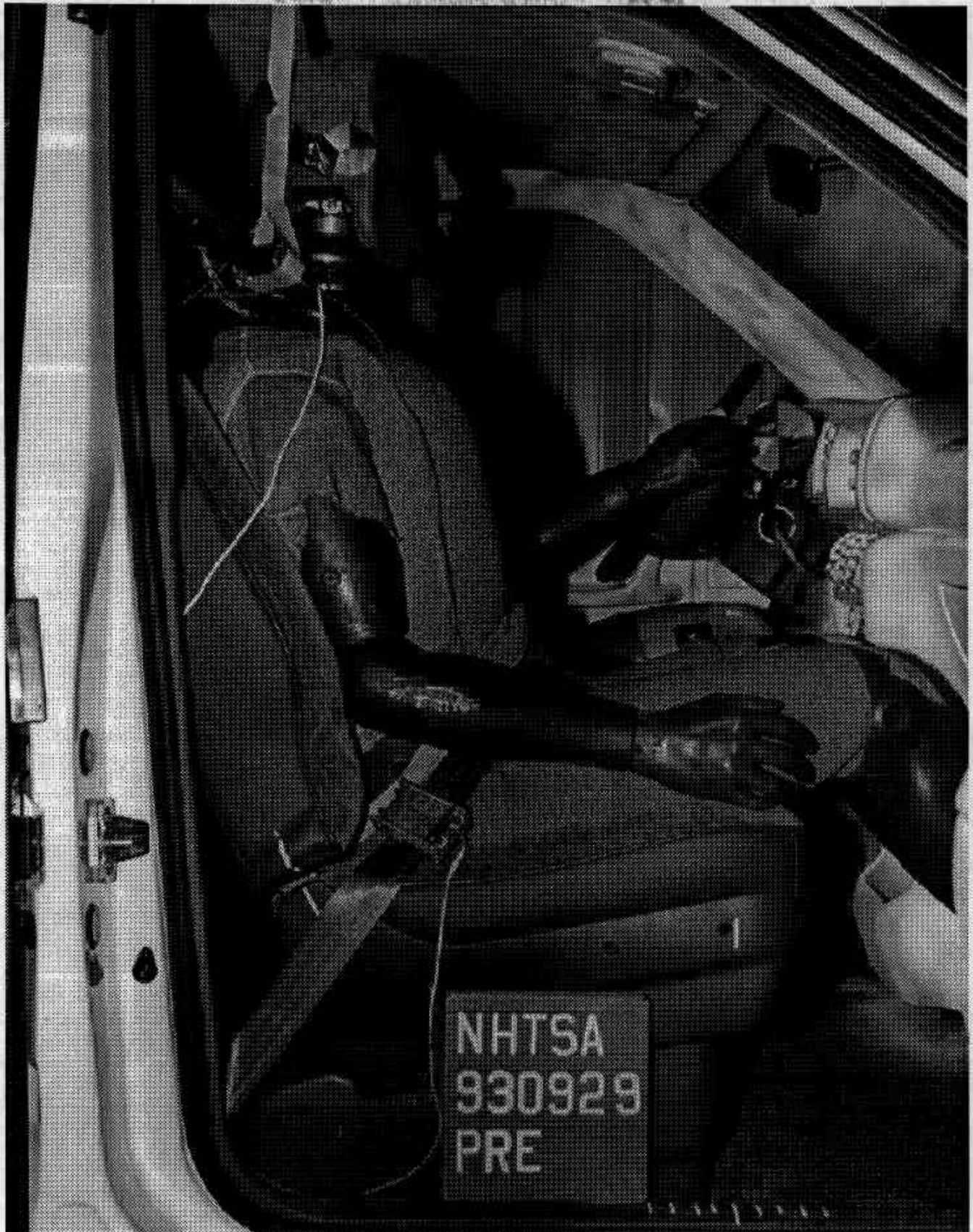


Figure A-34. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

A-35

930929



Figure A-35. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

A-36

930929



Figure A-36. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

A-37

930929



Figure A-37. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

A-38

930929

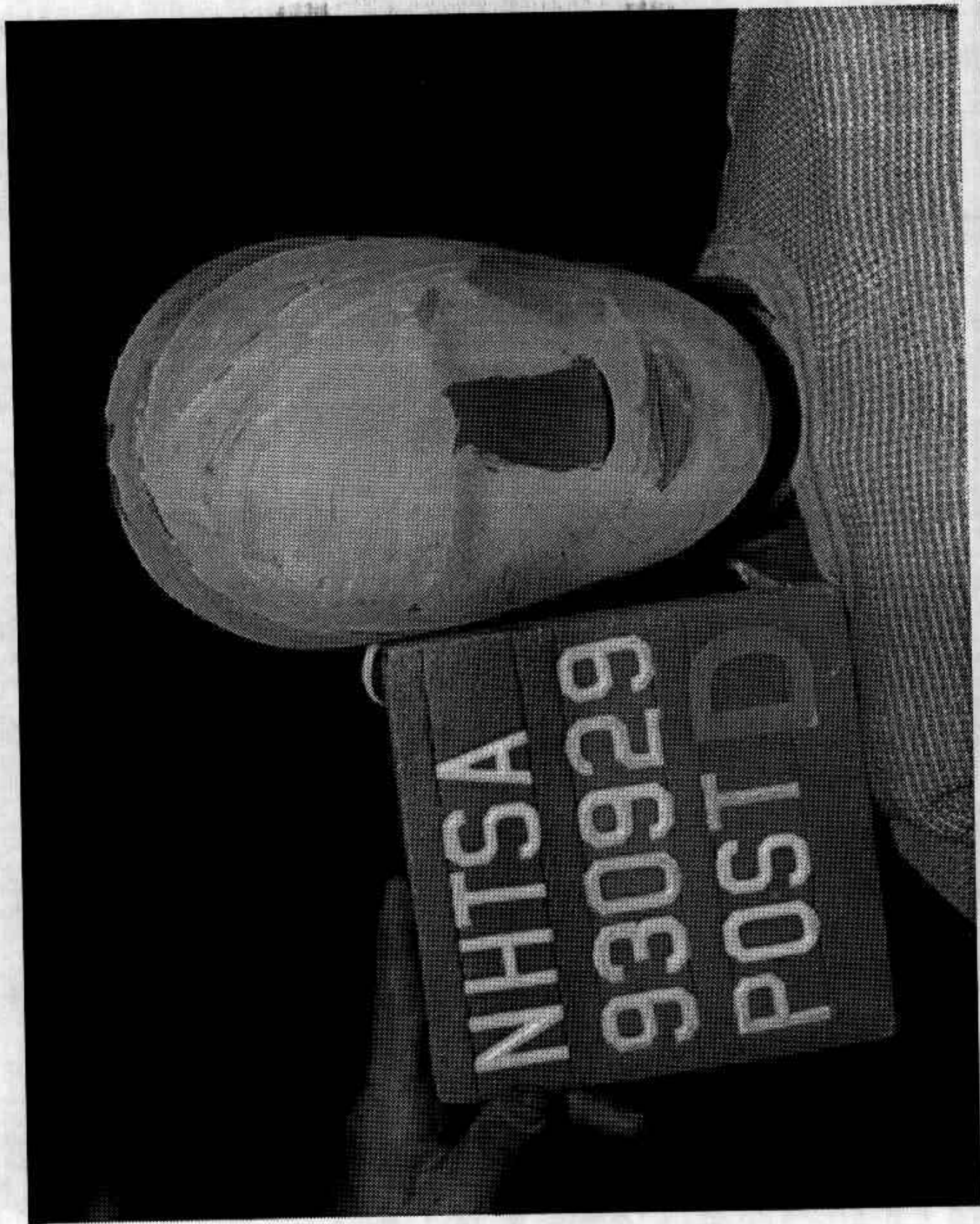


Figure A-38. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1
A-39 930929

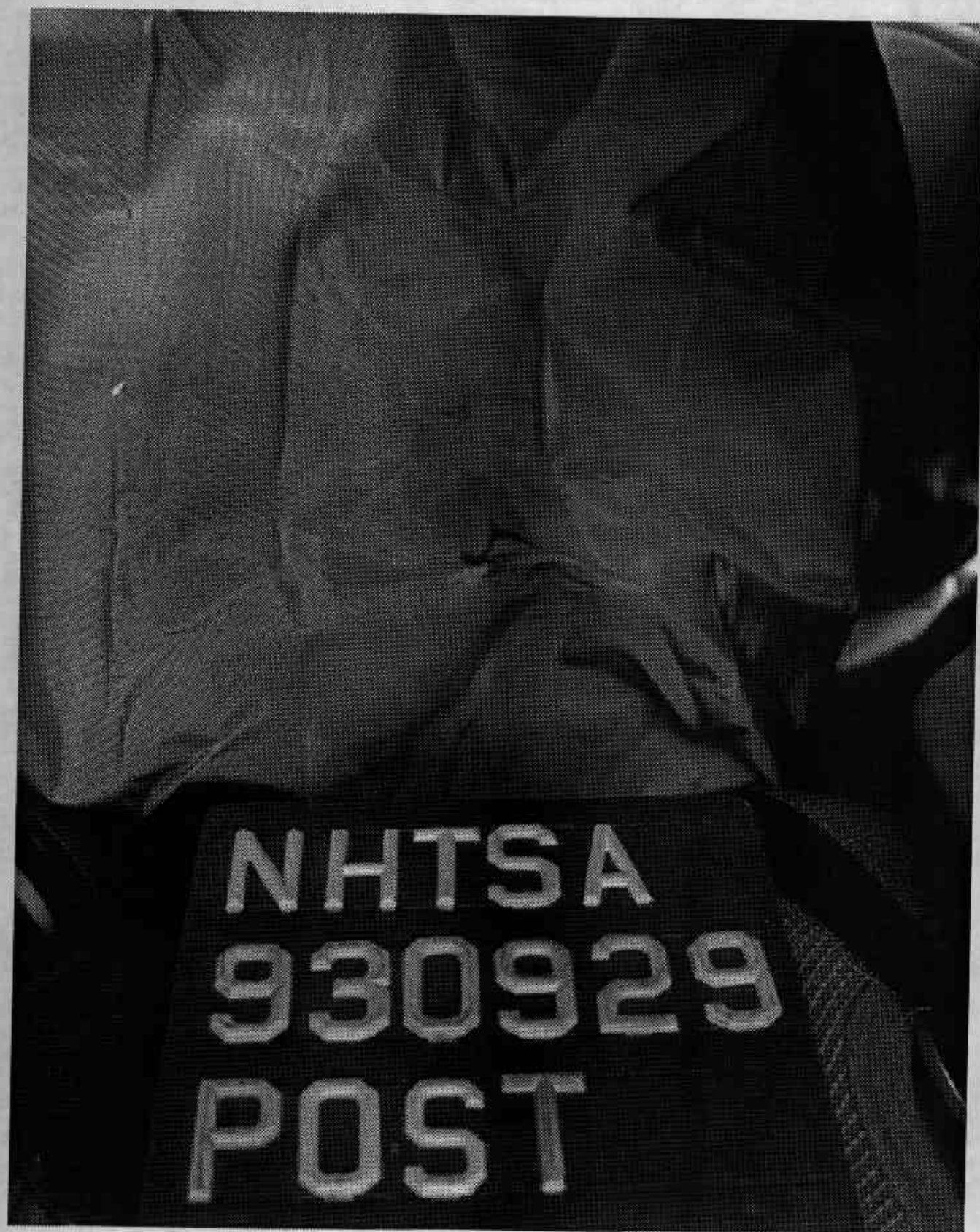


Figure A-39. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2
A-40 930929

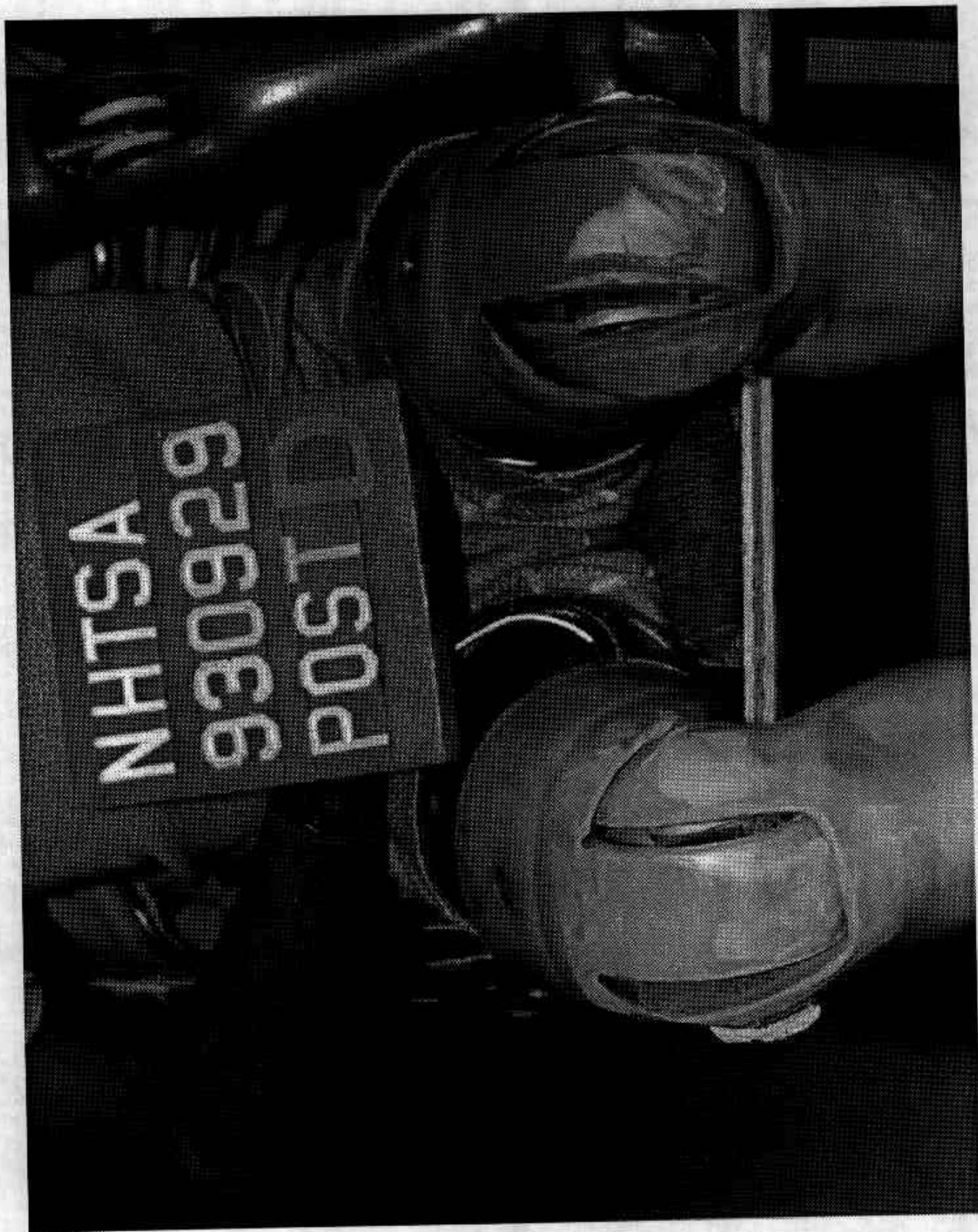


Figure A-40. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1
A-41 930929

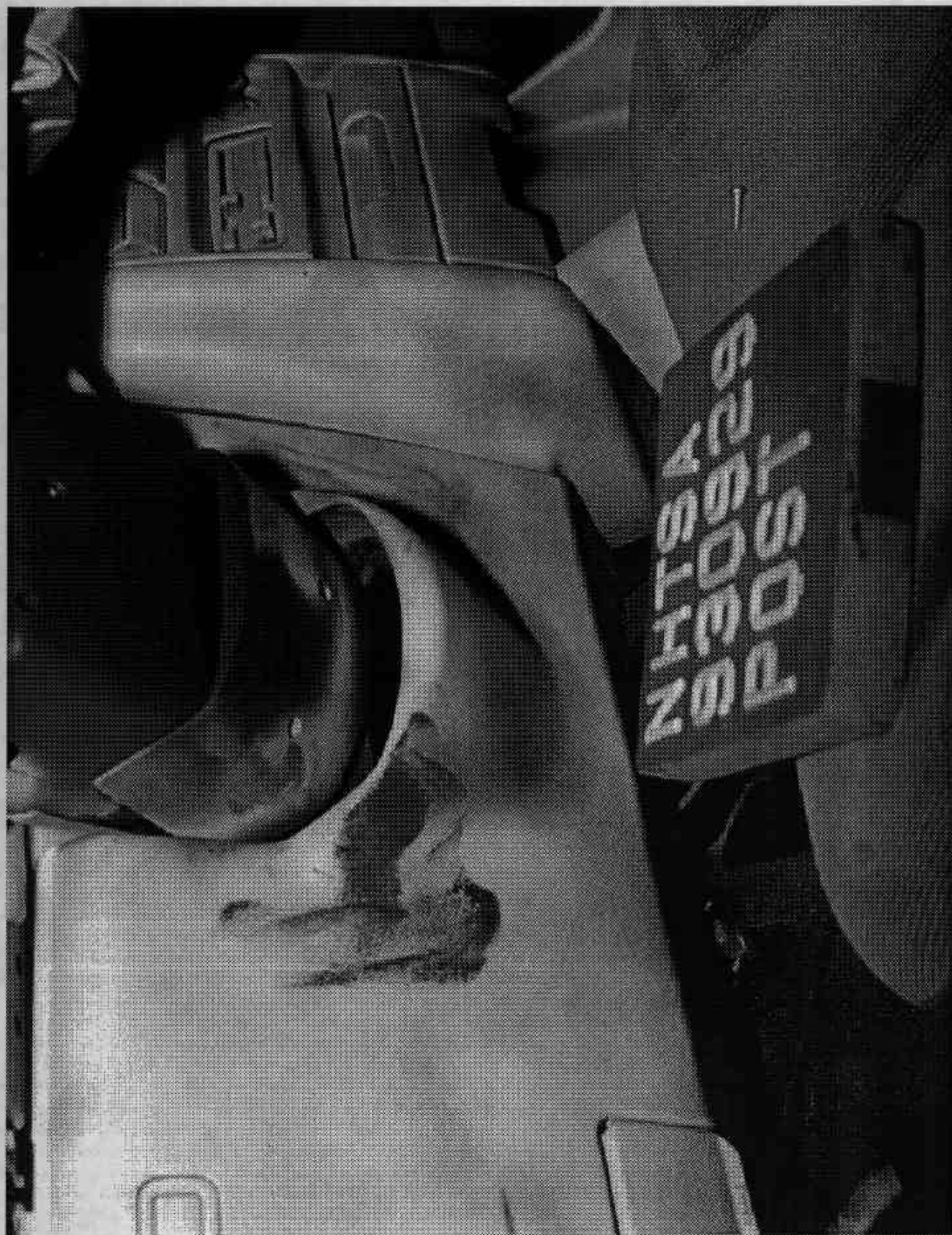


Figure A-41. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2

A-42

930929



Figure A-42. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 1

A-43

930929

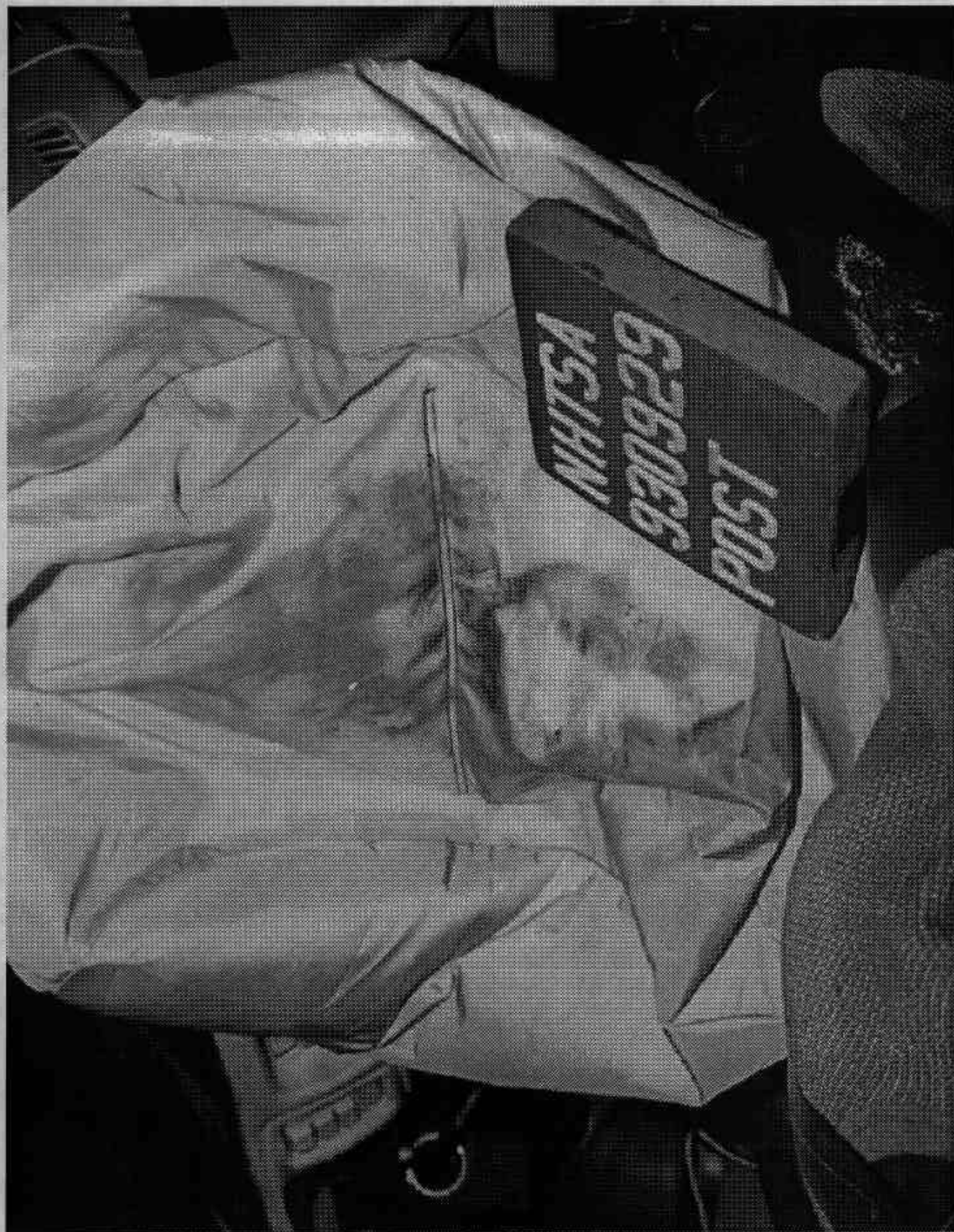


Figure A-43. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 2

A-44

930929



Figure A-44. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 3

A-45

930929



Figure A-45. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1

A-46

930929



Figure A-46. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

A-47

930929

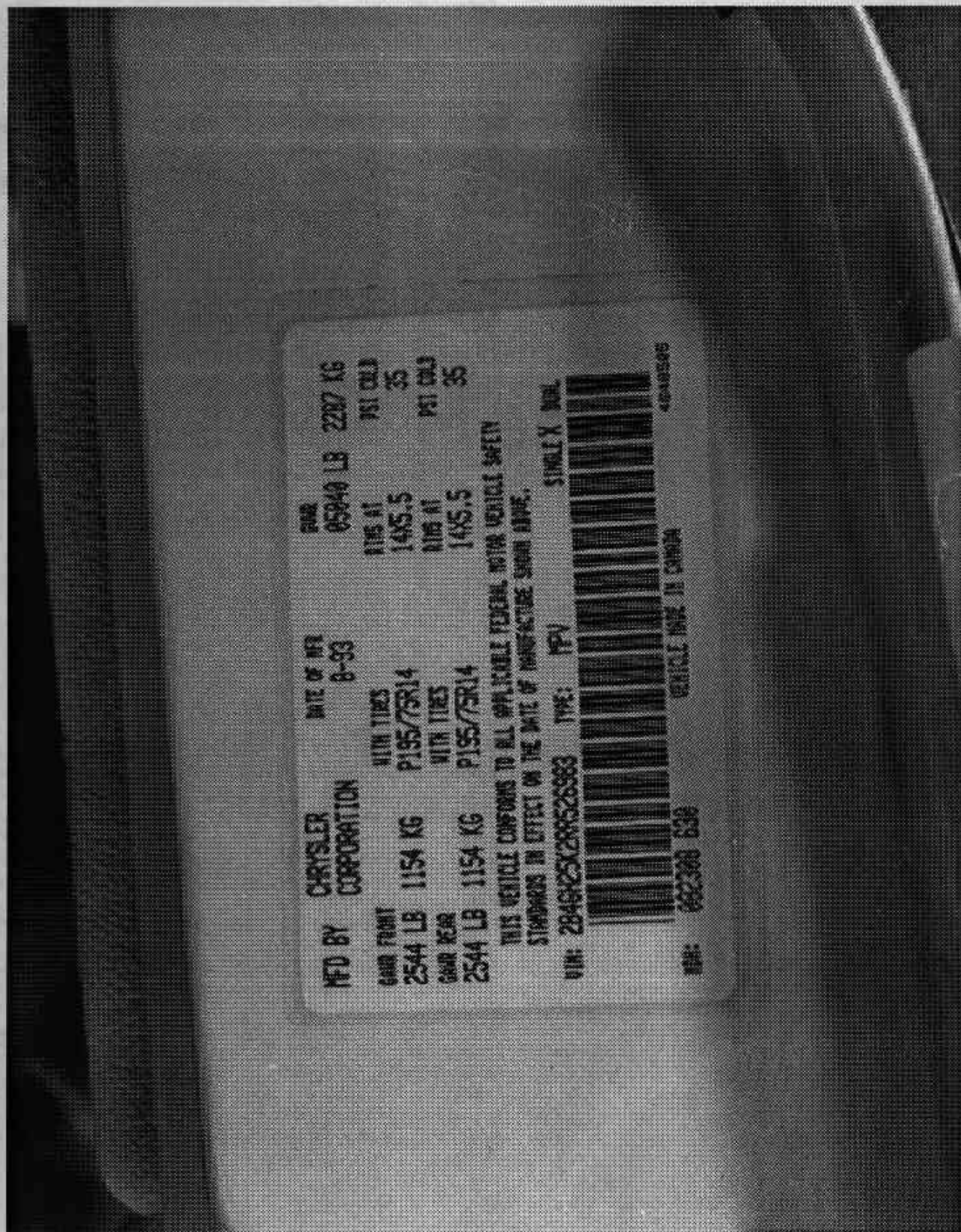


Fig. A-47. PRE-TEST VEHICLE CERT. & RECOMMENDED TIRE PRES. LABEL



Figure A-48. POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW

A-49

930929

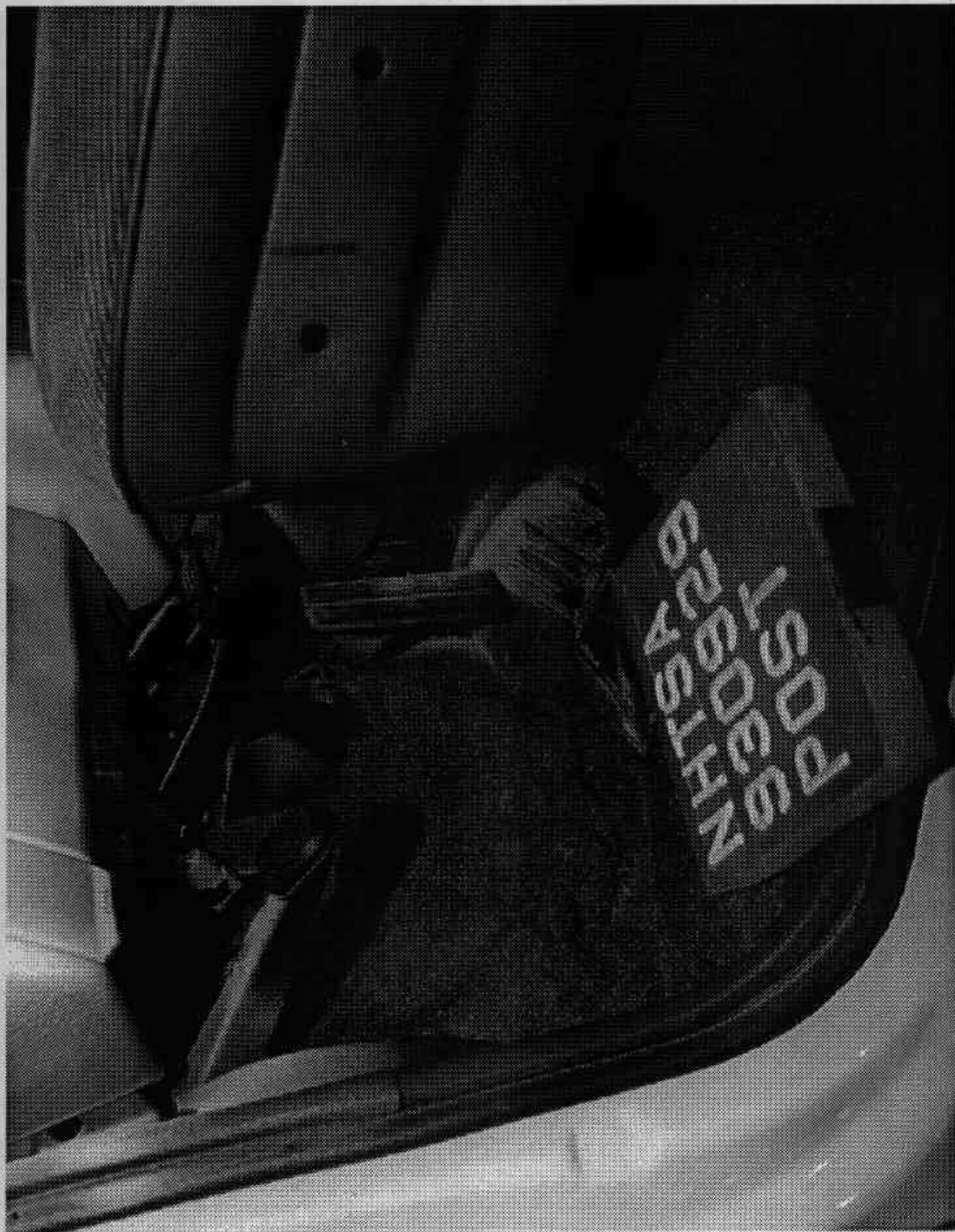


Figure A-49. POST-TEST FLOORPAN DEFORMATION VIEW

A-50

930929

AIRBAG SYSTEMS MAINTENANCE INSTRUCTIONS

THIS VEHICLE IS EQUIPPED WITH A FRONT OCCUPANT SUPPLEMENTAL RESTRAINT SYSTEM (SRS/AIRBAG). PLEASE REFER TO THE OWNER'S MANUAL FOR DETAILS ON SYSTEM OPERATION. **WARNING:** - THE AIR BAG SYSTEM IS DESIGNED TO BE MAINTENANCE FREE HOWEVER IF THE 'AIR BAG' LIGHT DOES NOT COME ON MOMENTARILY WHEN IGNITION IS TURNED ON, OR COMES ON OR FLASHES WHILE DRIVING, THE SYSTEM MUST BE SERVICED PROMPTLY BY AN AUTHORIZED DEALER.

**RECOMMENDED COLD TIRE
INFLATION PRESSURE**

FRONT

35 psi
240 kPa

REAR

35 psi
240 kPa

MINIMUM TIRE SIZE

P195/75R14

STANDARD LOAD

SEE OWNERS MANUAL FOR
OPTIONAL TIRES, HIGH SPEED
OPERATION AND ADDITIONAL
DATA

VEHICLE CAPACITY
1100 LB / 499 kg

SEATING CAPACITY

**SEAT
POSITION**

7 PASS 5 PASS

1ST SEAT

2

2ND SEAT

3

3RD SEAT

3

PRINTED IN USA 4472 542

Fig. A-50. POST-TEST VEHICLE AIRBAG MAINT. INSTRUCTIONS LABEL

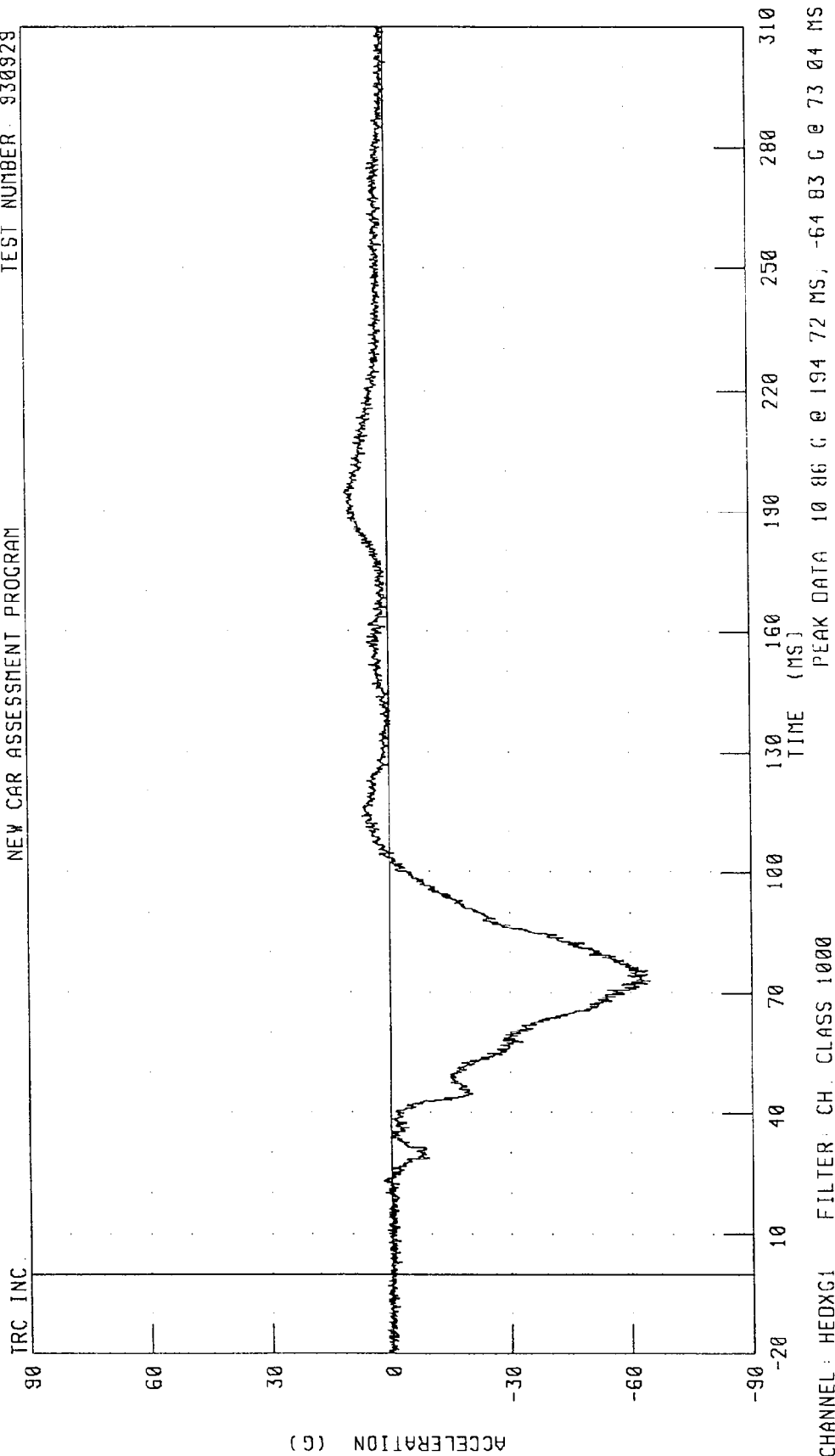
Intentionally Left Blank

APPENDIX B

DATA PLOTS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD X-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER 930929

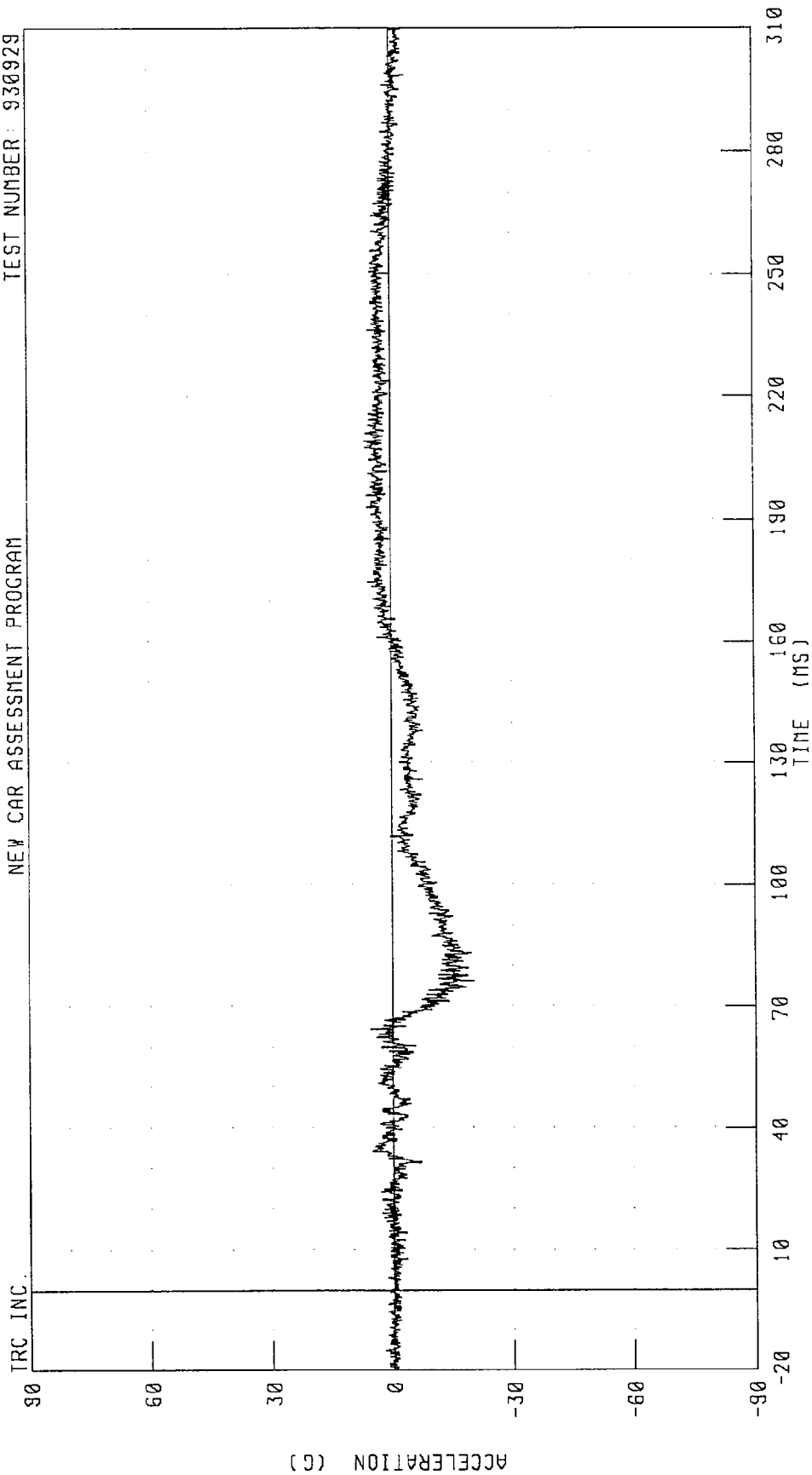


CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

PEAK DATA 10 86 G @ 194 72 MS, -64 83 G @ 73 04 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD Y-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

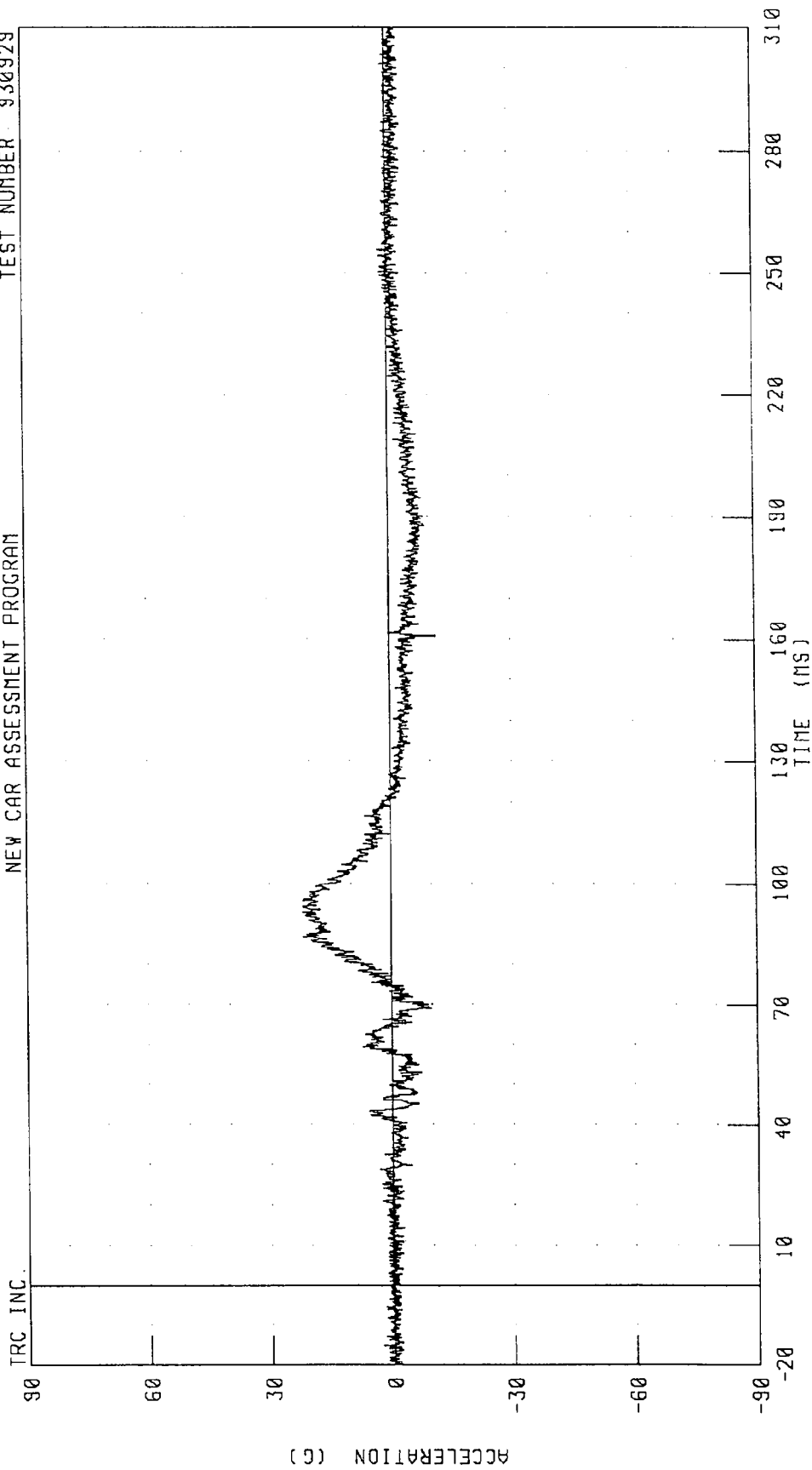


PEAK DATA: 6.52 G @ 208 MS, -20.39 G @ 76.32 MS

CHANNEL: HEDY01 FILTER: CH CLASS 1000

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD Z-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER 930929



PEAK DATA 21 79 G @ 87 04 MS, -11 50 G @ 160 80 MS

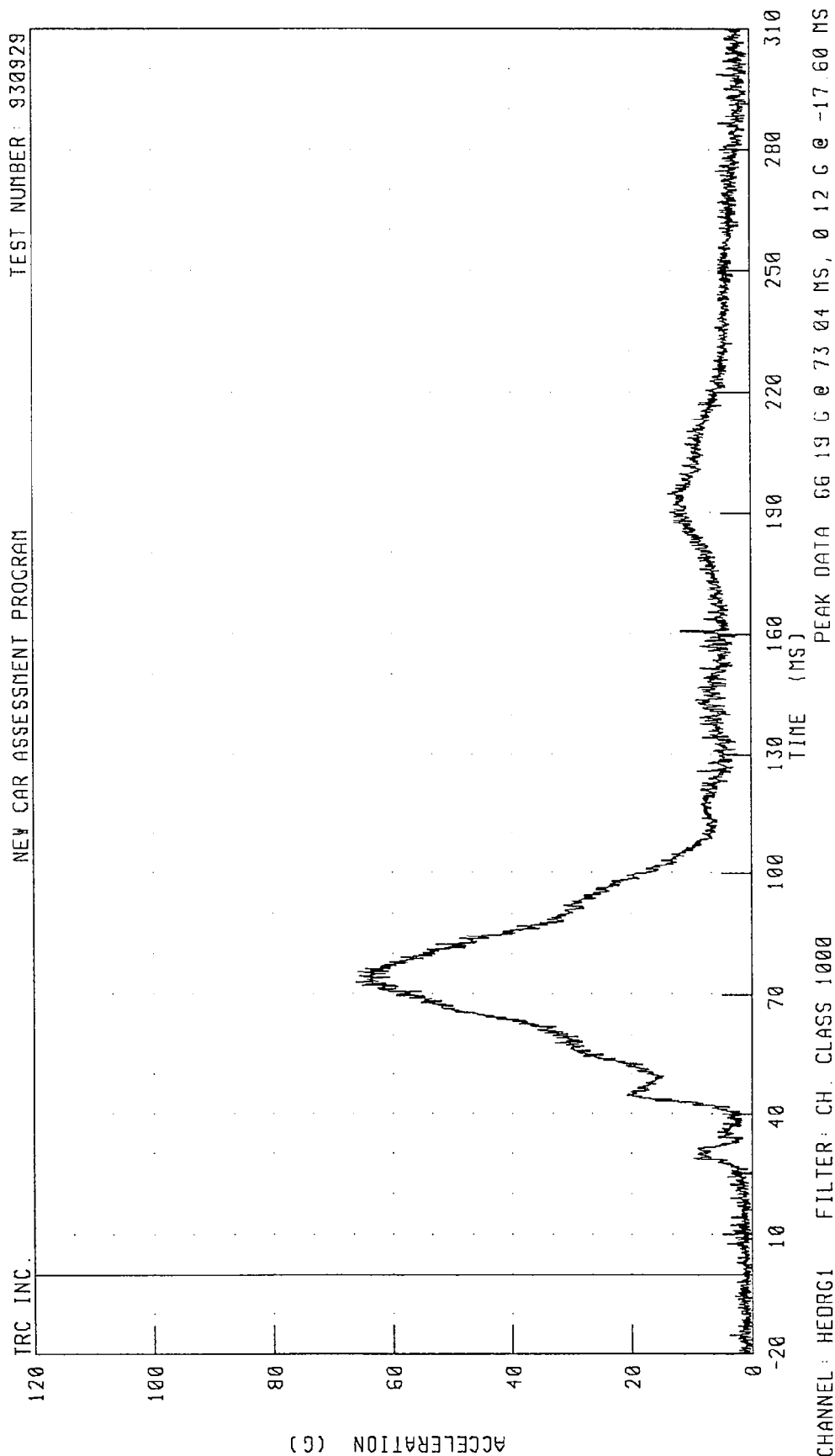
CHANNEL: HEDZG1 FILTER: CH CLASS 1000

TRC INC.

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

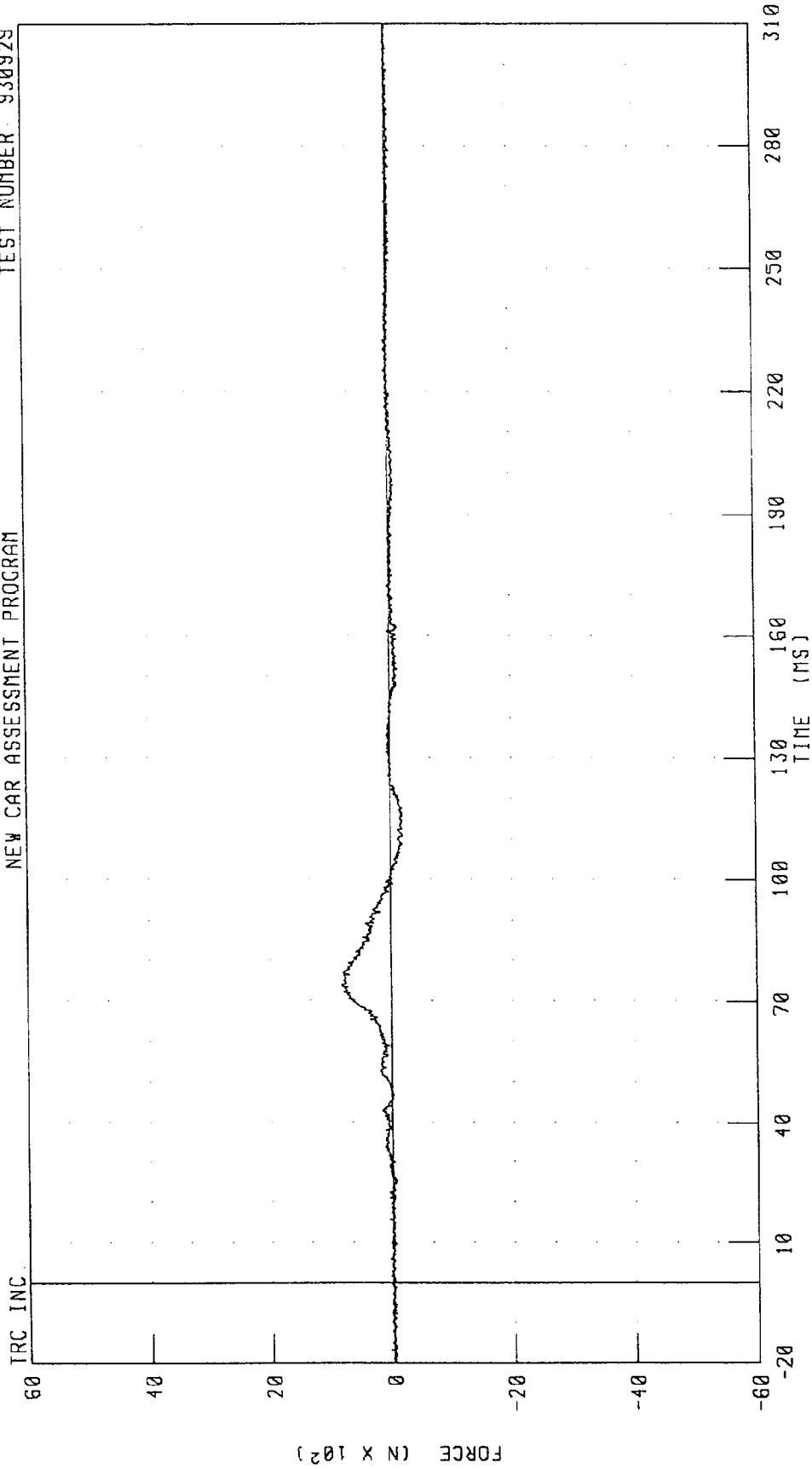


CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

PEAK DATA 66 19 G @ 73 04 MS, 0 12 G @ -17 60 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK X-AXIS SHEAR FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER 930929

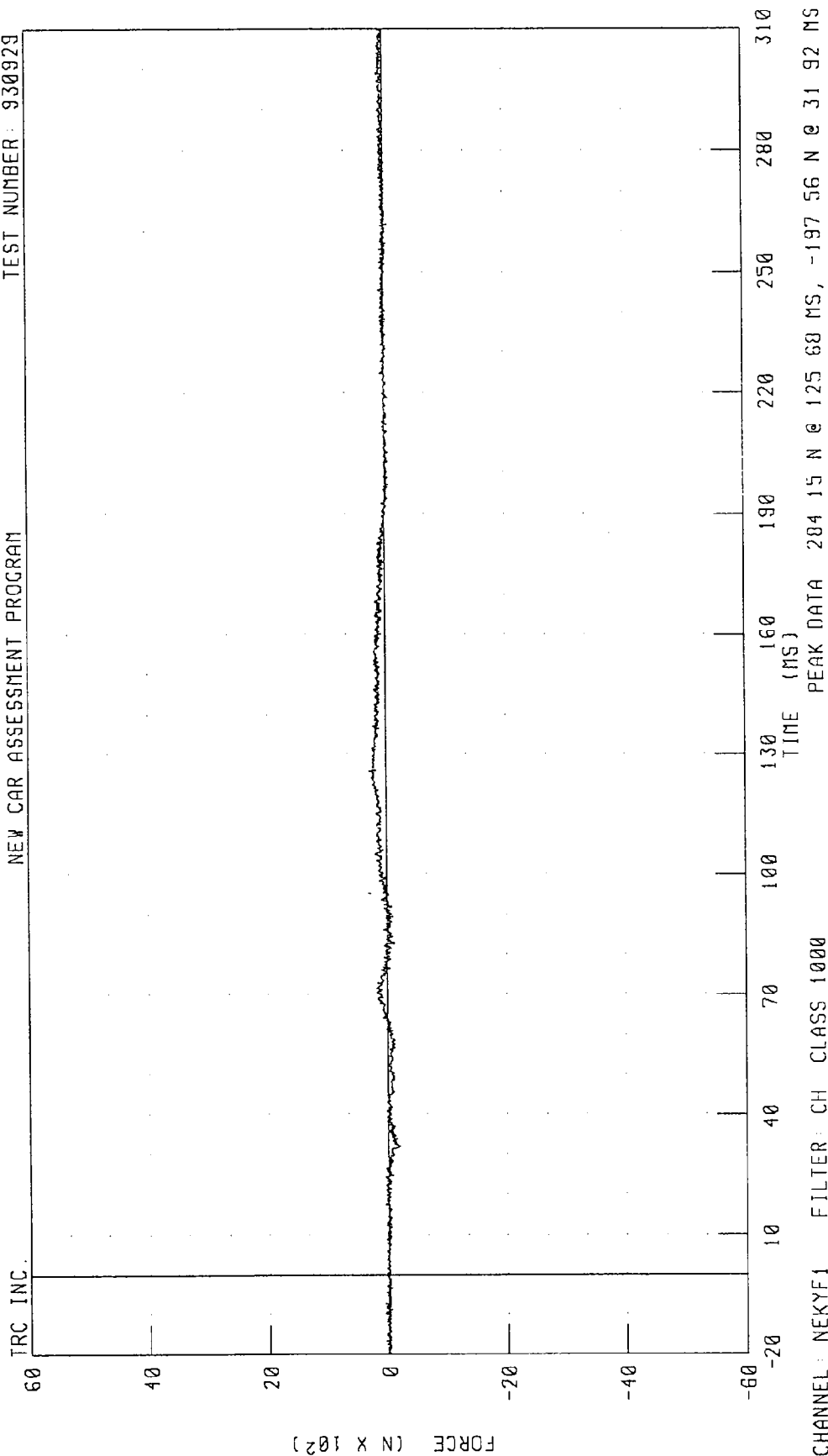


PEAK DATA 826 52 N @ 73 84 MS, -207 15 N @ 116 48 MS

CHANNEL: NEKXF1 FILTER CH. CLASS 1000

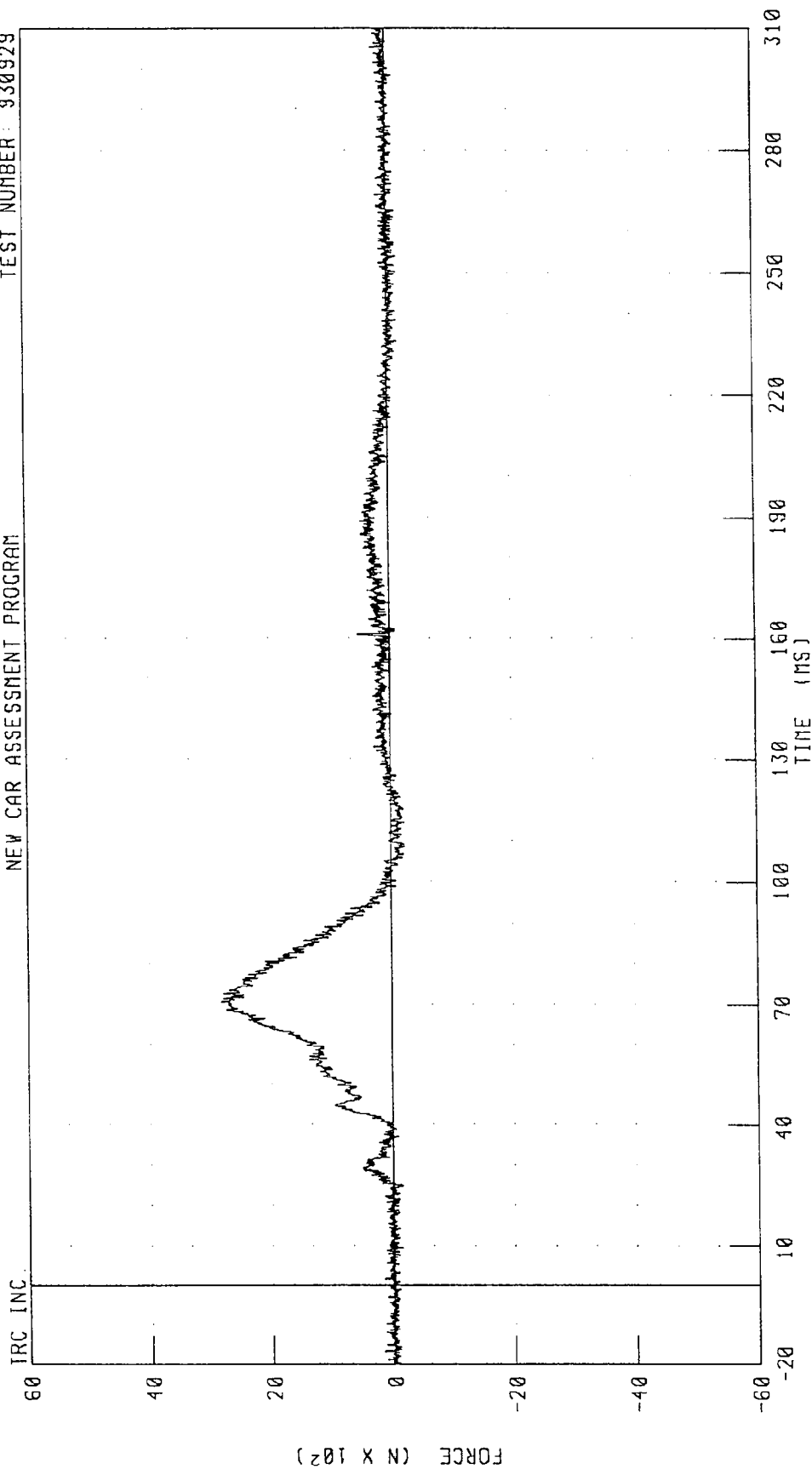
1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK Y-AXIS SHEAR FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK Z-AXIS AXIAL FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



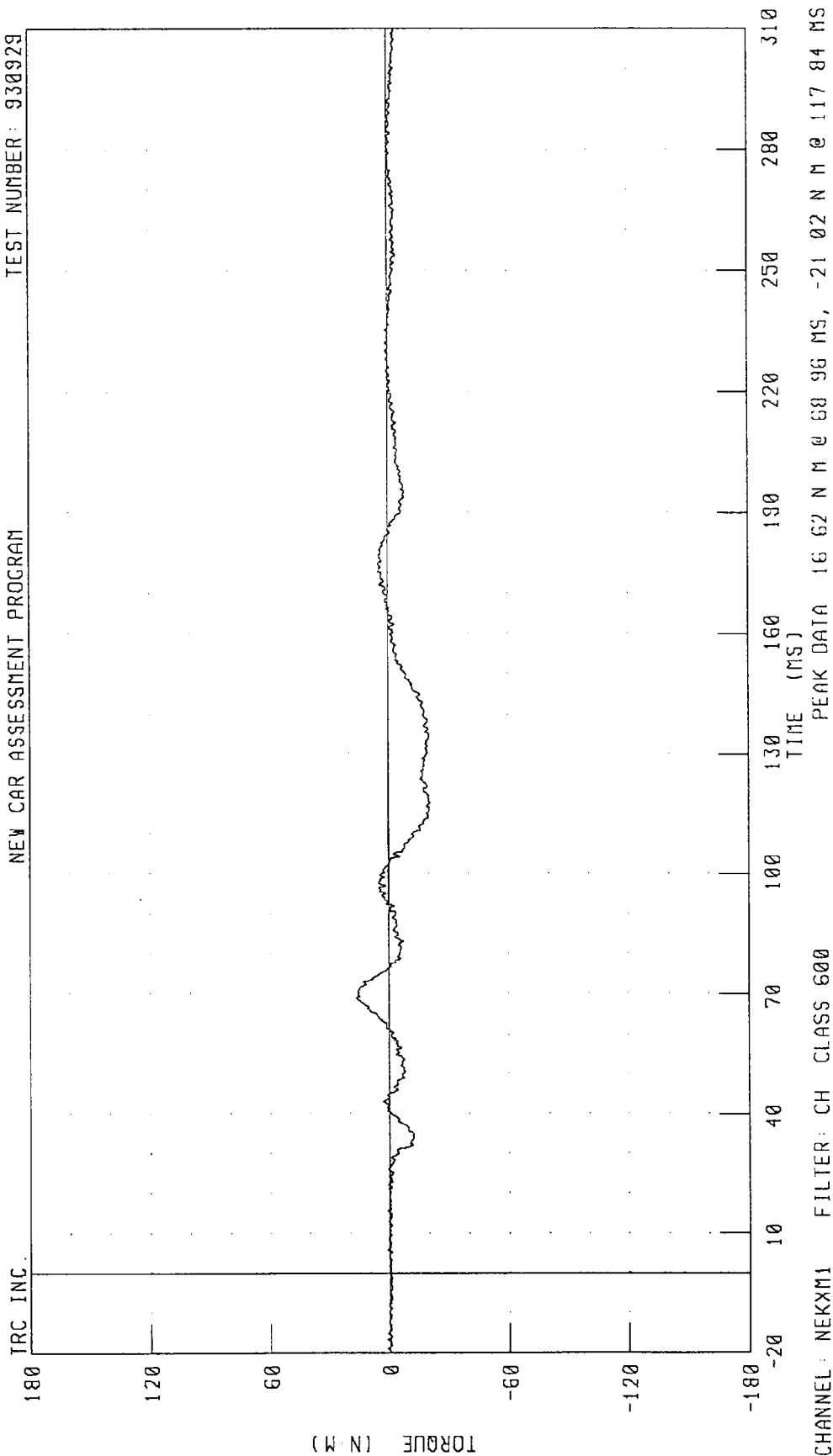
CHANNEL: NEKZF1 FILTER: CH CLASS 1000

PEAK DATA 2829 41 N @ 70 80 MS, -224 51 N @ 108 56 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT X AXIS

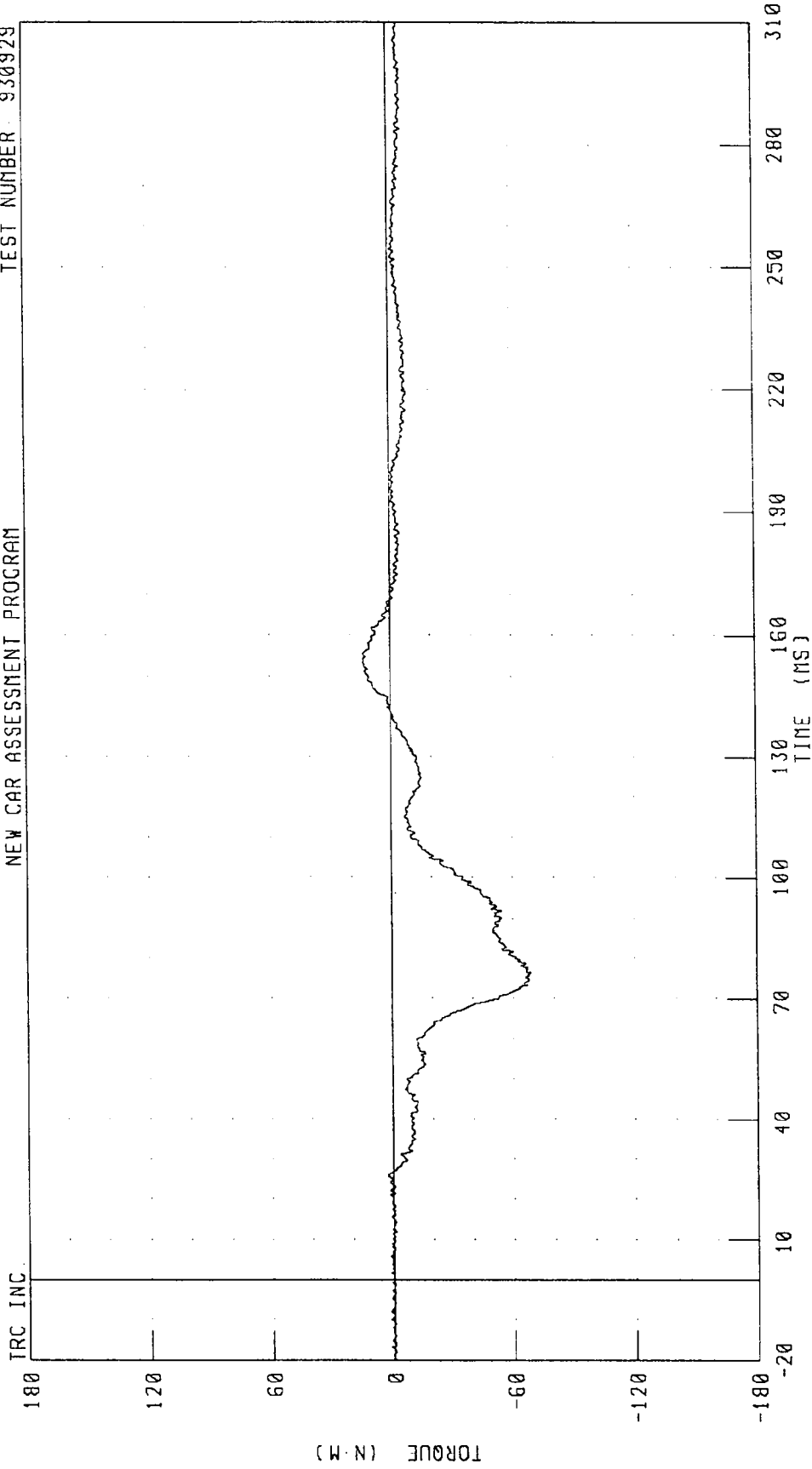
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER 930929

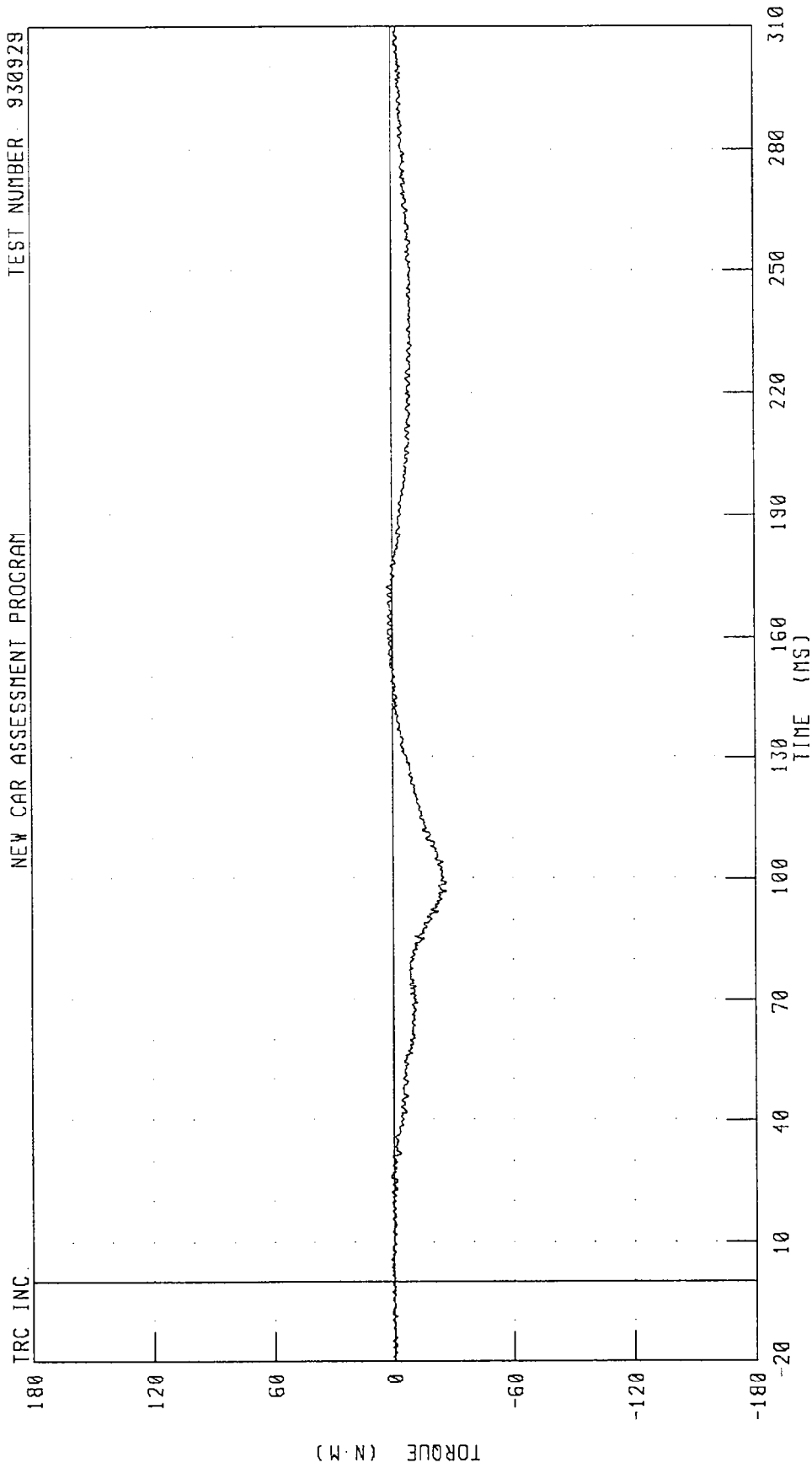


CHANNEL: NEKYM1 FILTER: CH. CLASS 600

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT Z AXIS

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER 930929

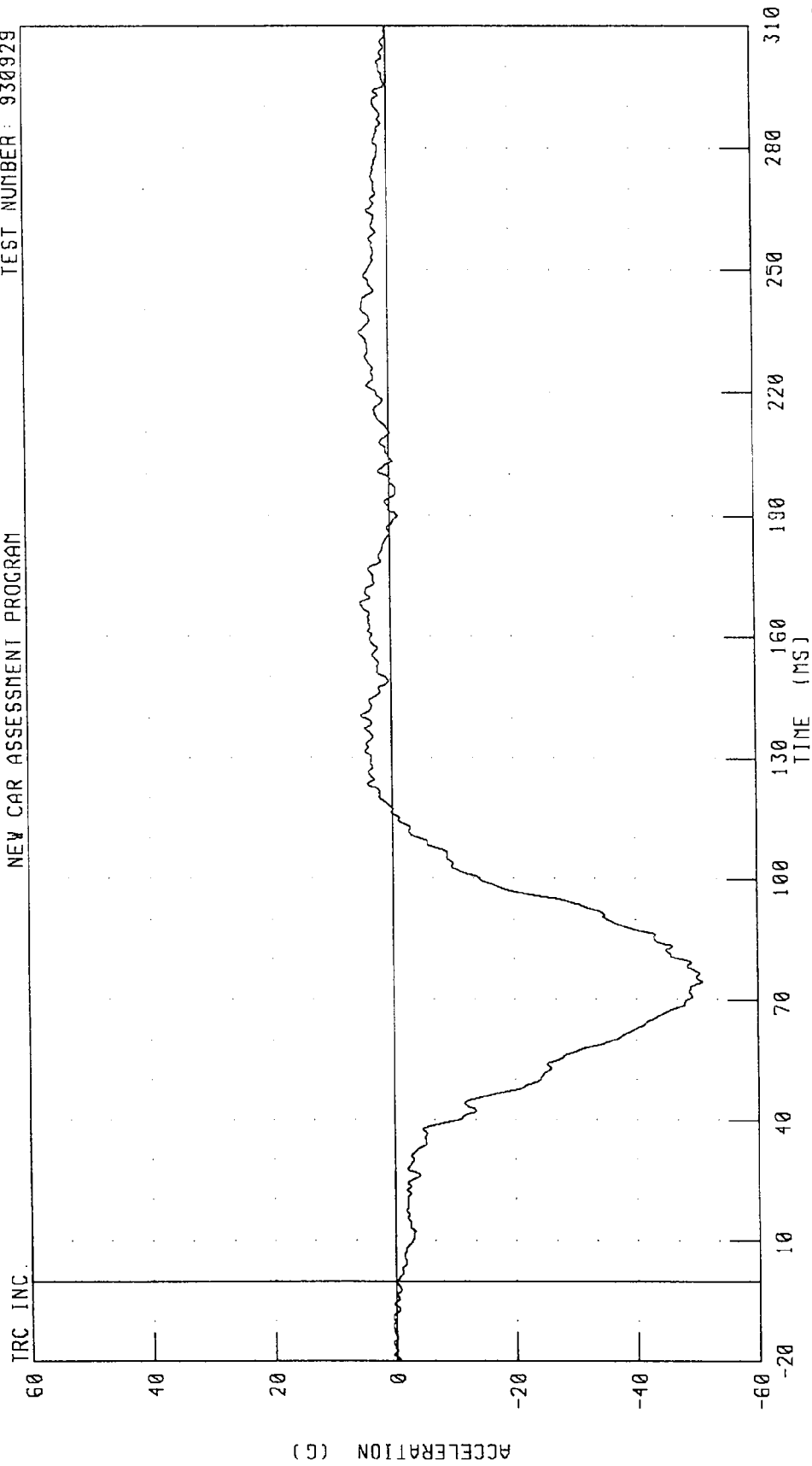


CHANNEL: NEKZM1 FILTER: CH CLASS 600

PEAK DATA: 2 05 N M @ 172 08 MS, -26 55 N M @ 99 04 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST X-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

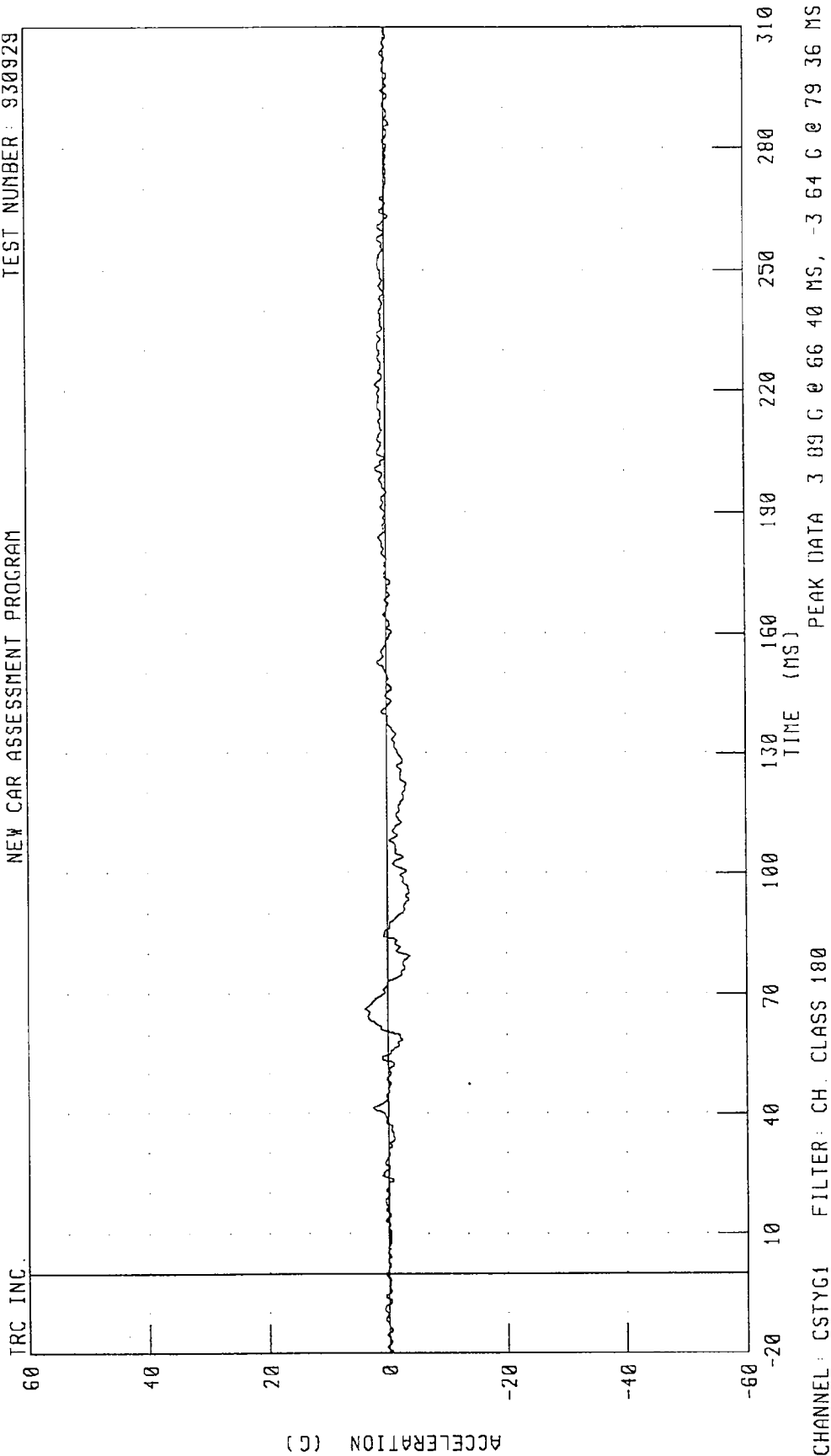


PEAK DATA: 5 13 G @ 168 16 MS, -50 77 G @ 74.56 MS

CHANNEL: CSTXG1 FILTER: CH CLASS 180

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST Y-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

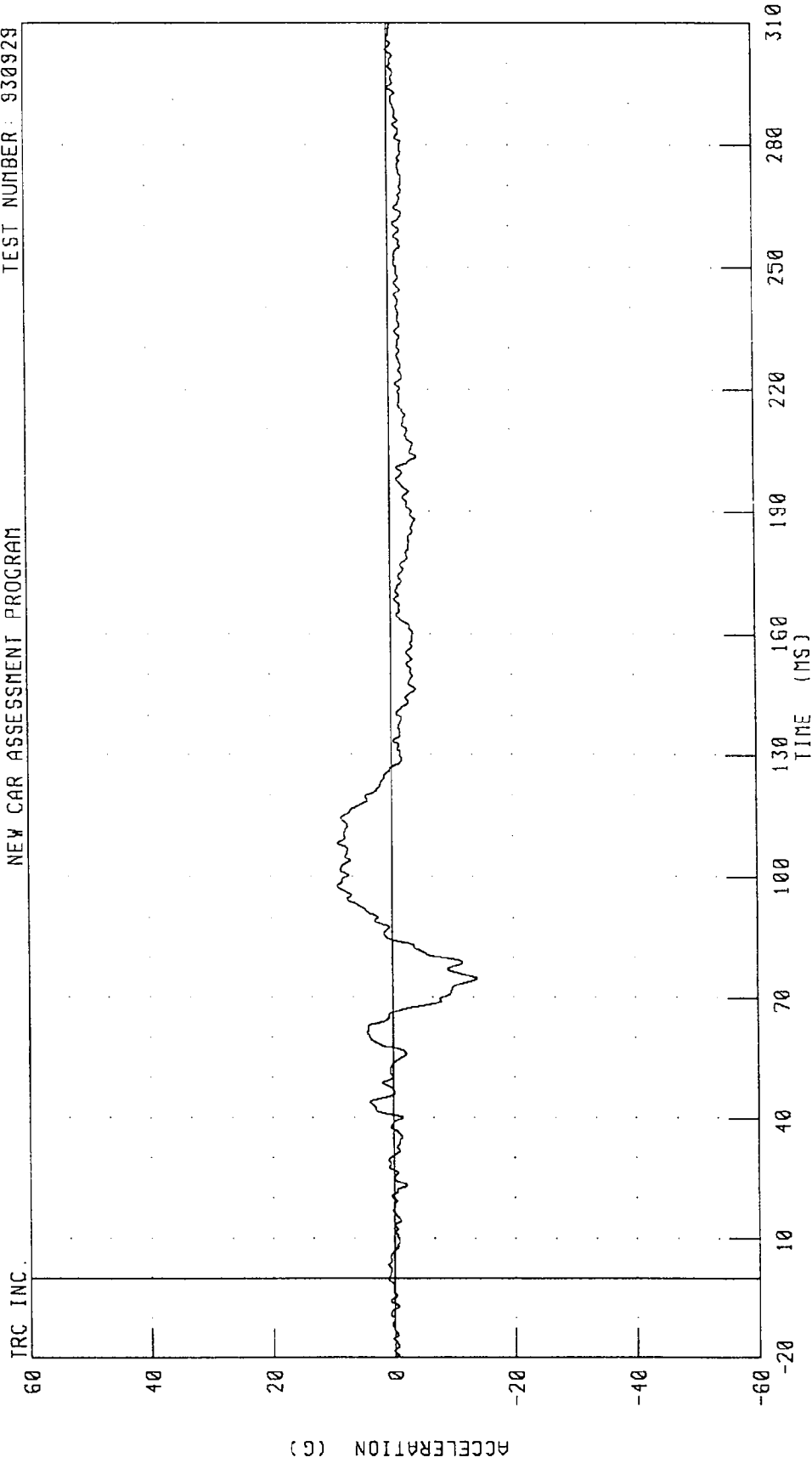
TEST NUMBER: 930929



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST Z-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

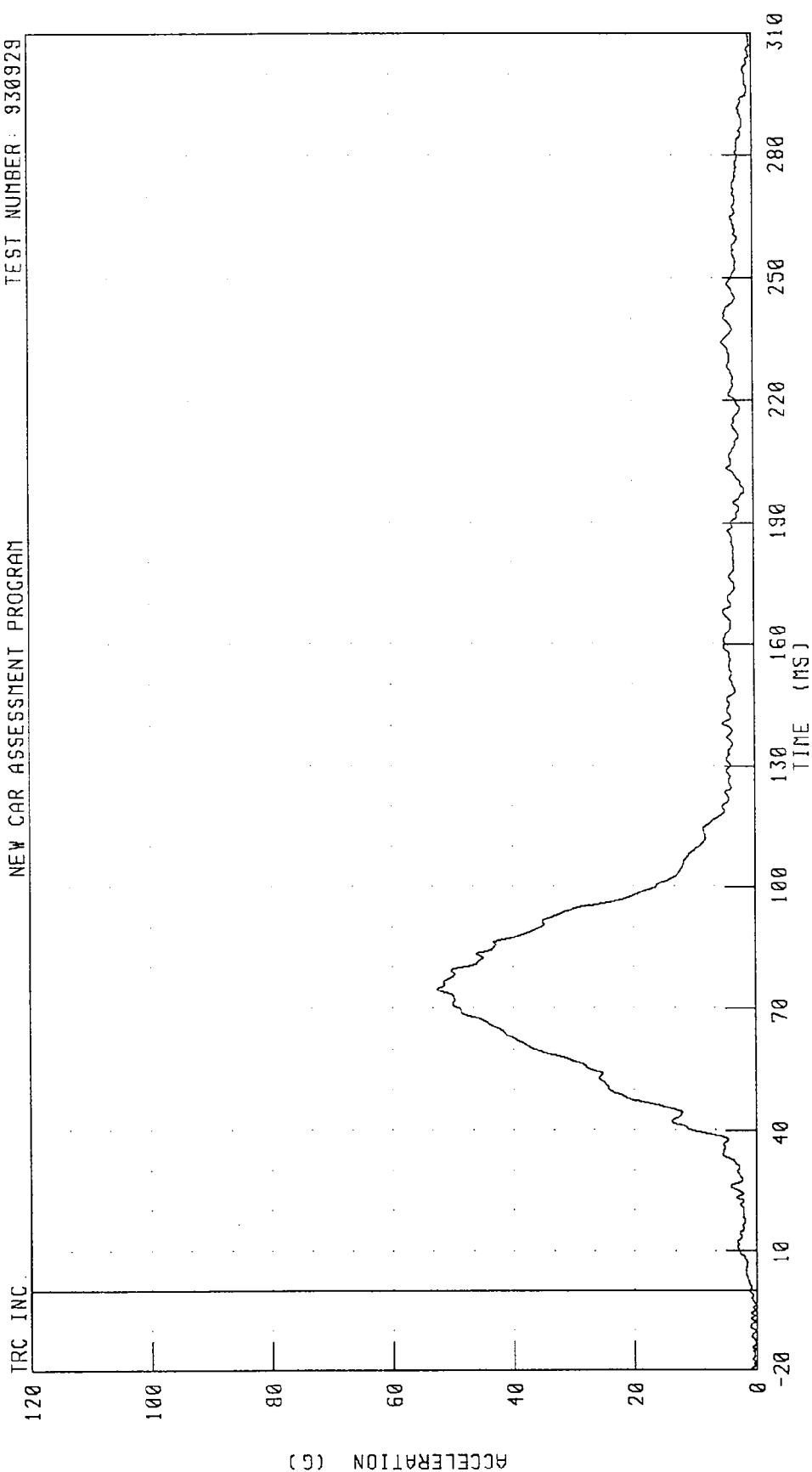
TEST NUMBER: 930929



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

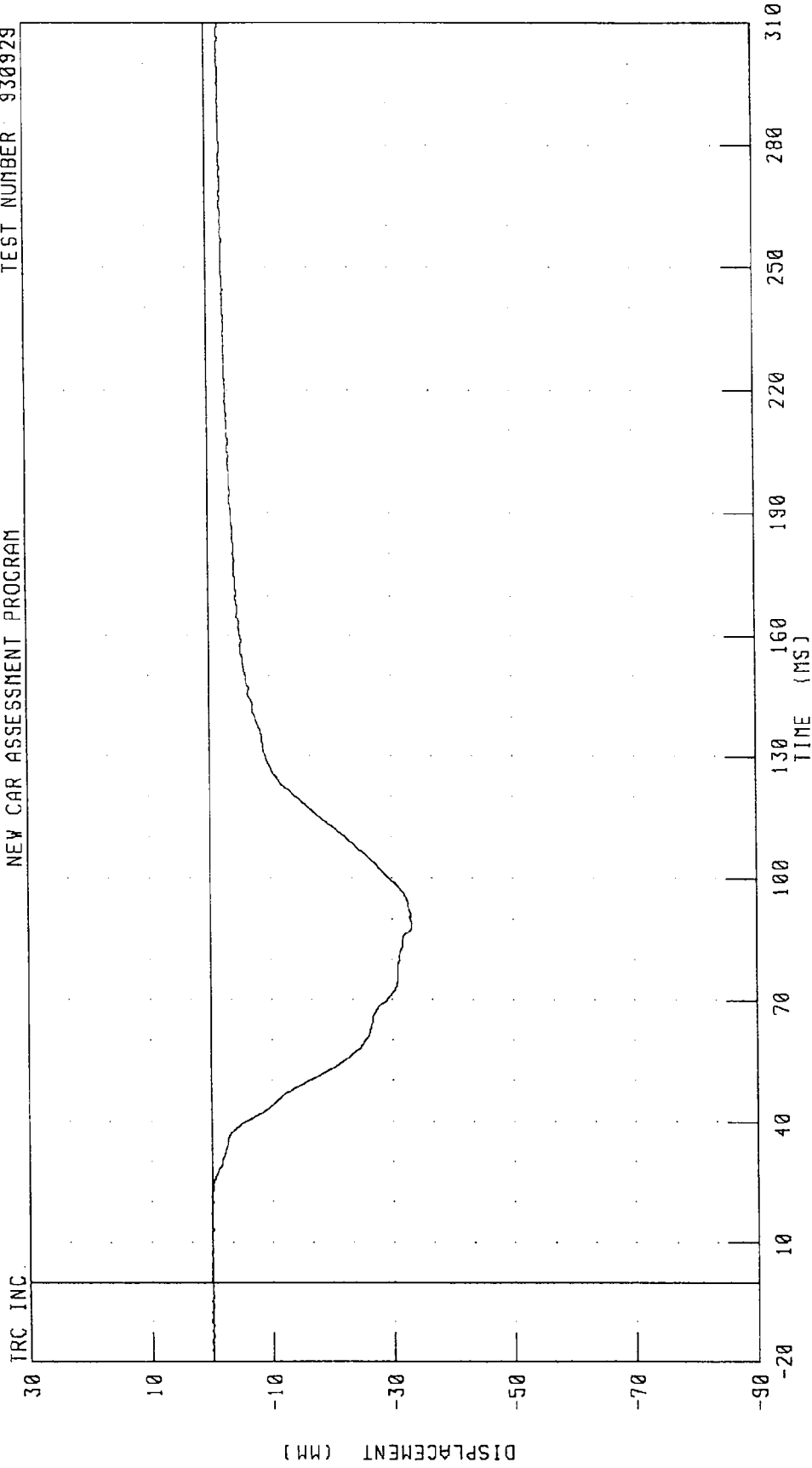


PEAK DATA: 52.65 G @ 74.56 MS, 0.12 G @ -5.04 MS

CHANNEL: CSTRG1 FILTER: CH. CLASS 180

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST DEFLECTION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER 930929

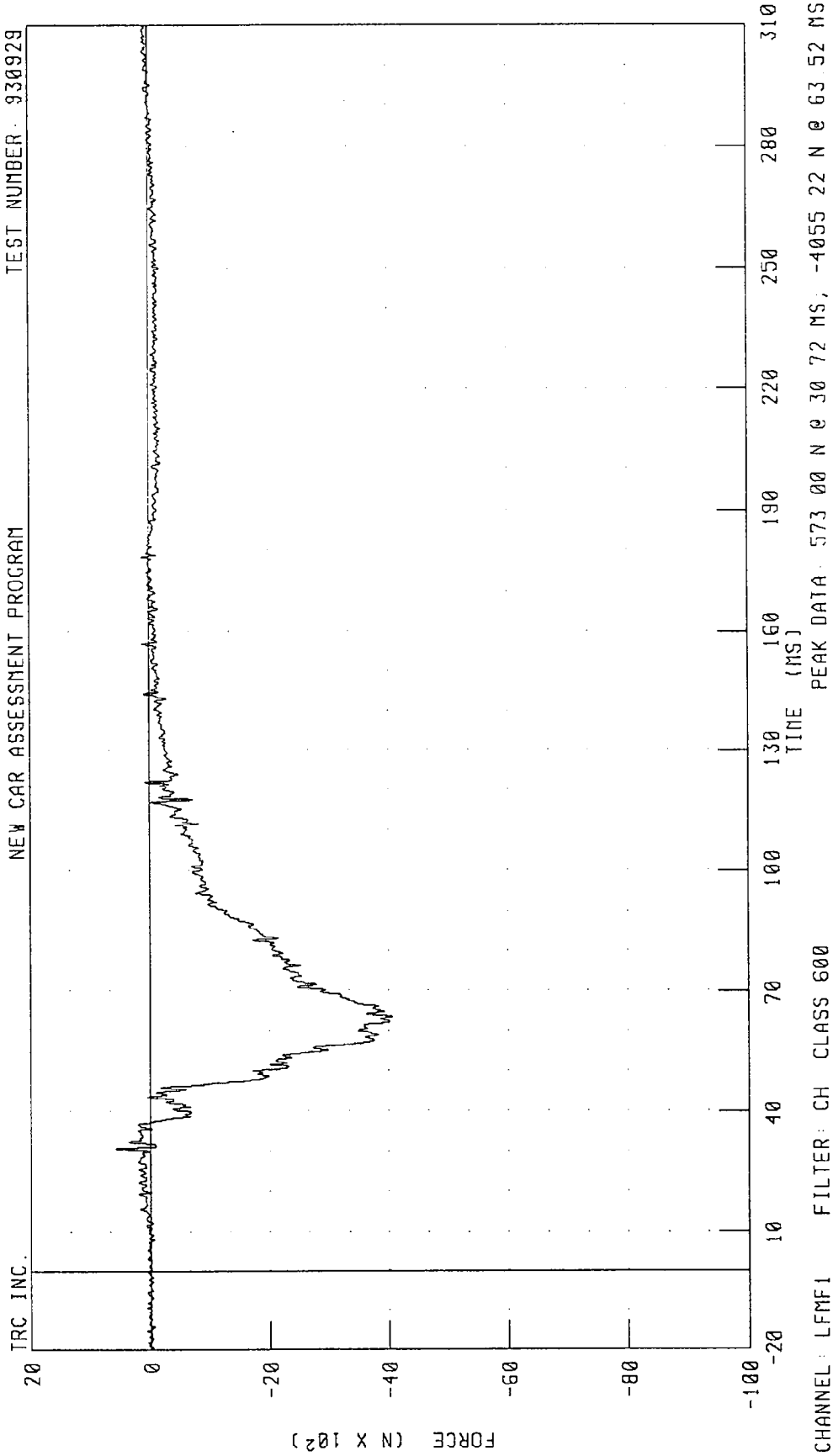


CHANNEL: CSTX01 FILTER: CH. CLASS 180

PEAK DATA: 0 15 MM @ -9 76 MS, -33 20 MM @ 88 16 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER LEFT FEMUR FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

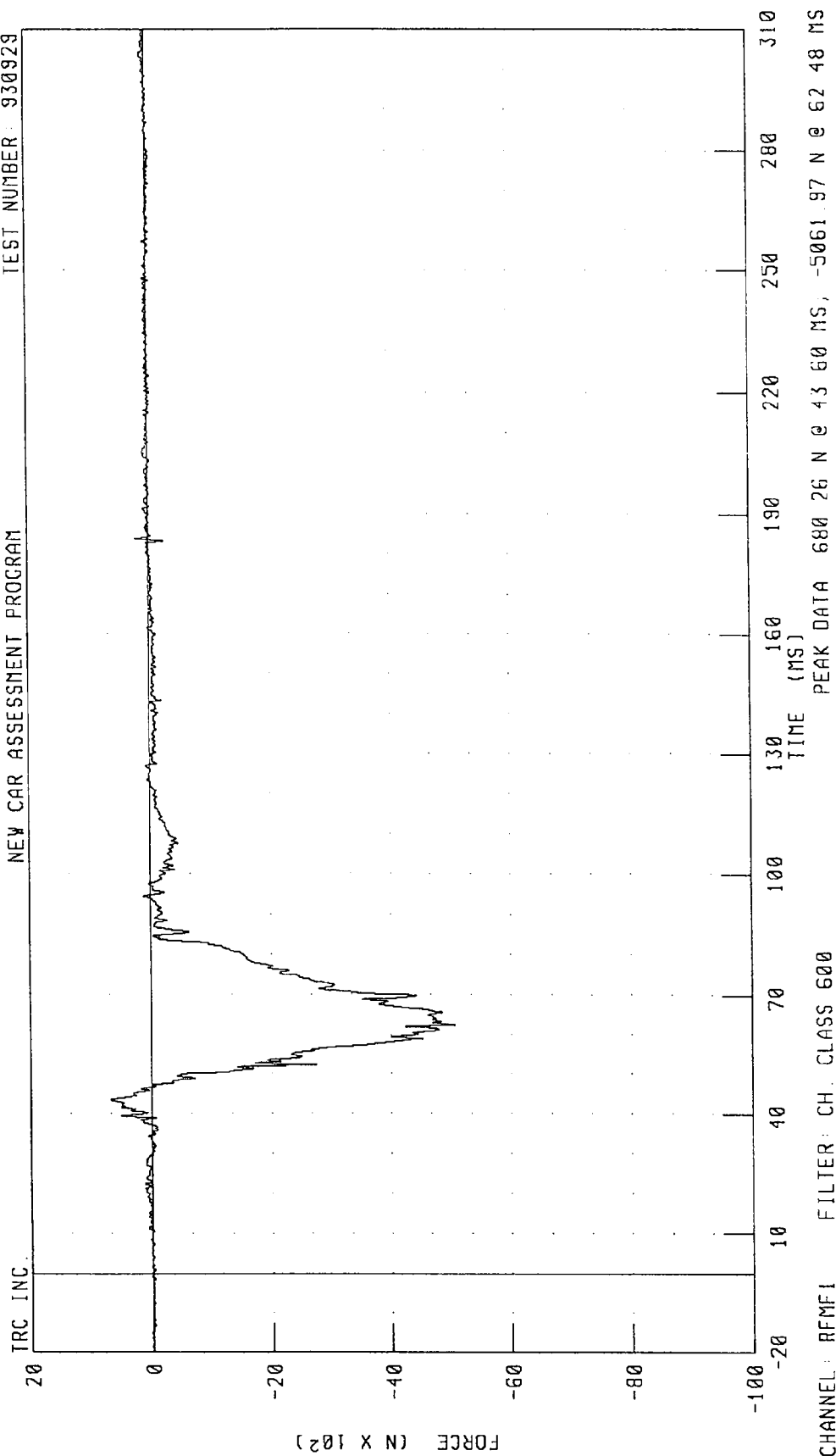


PEAK DATA: 573 00 N @ 30 72 MS, -4055 22 N @ 63 52 MS

CHANNEL: LFMF1 FILTER: CH CLASS 600

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER RIGHT FEMUR FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

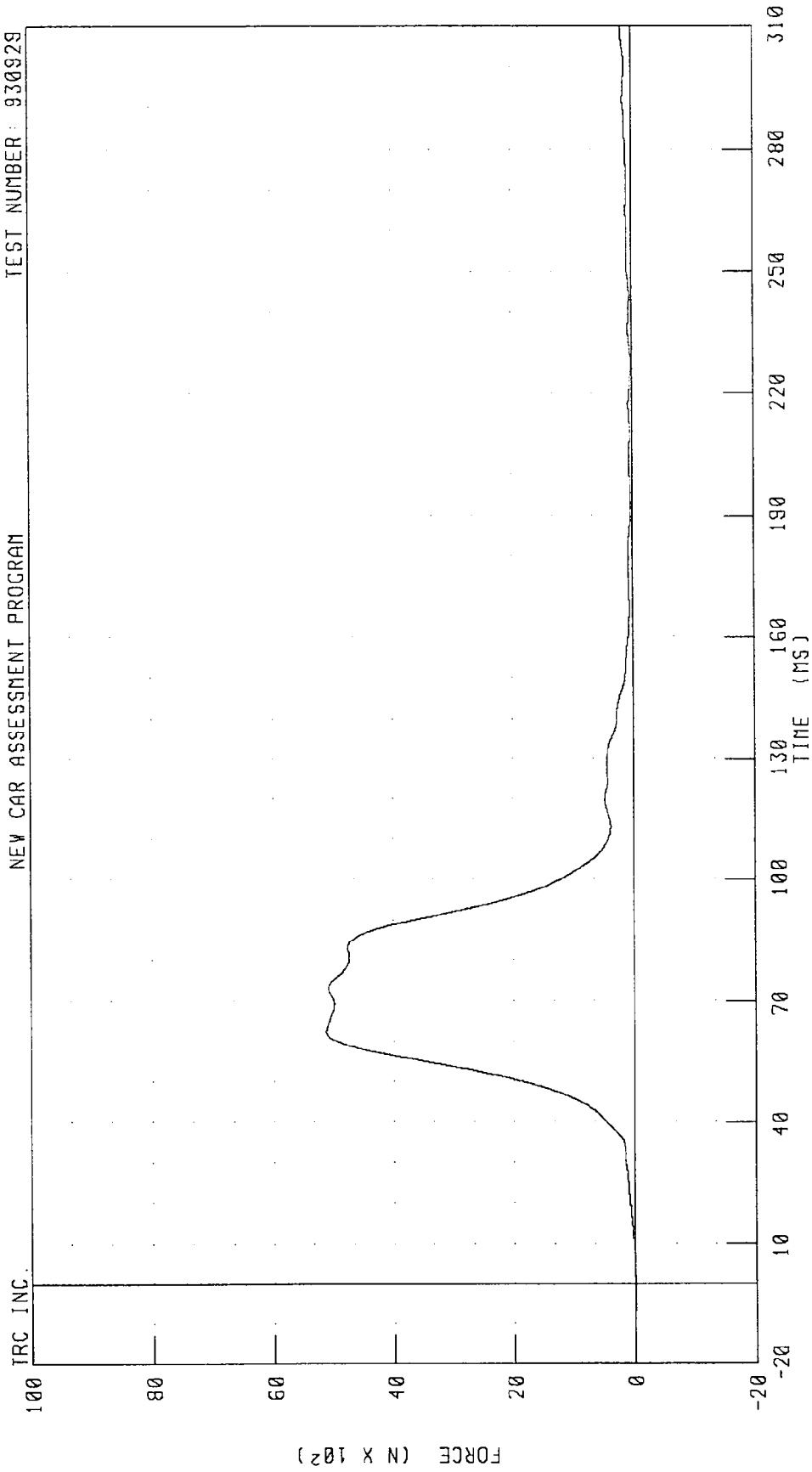


CHANNEL: RFMF1 FILTER: CH. CLASS 600

PEAK DATA 680 26 N @ 43 60 MS, -5061.97 N @ 62 48 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER LAP BELT OUTBOARD FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

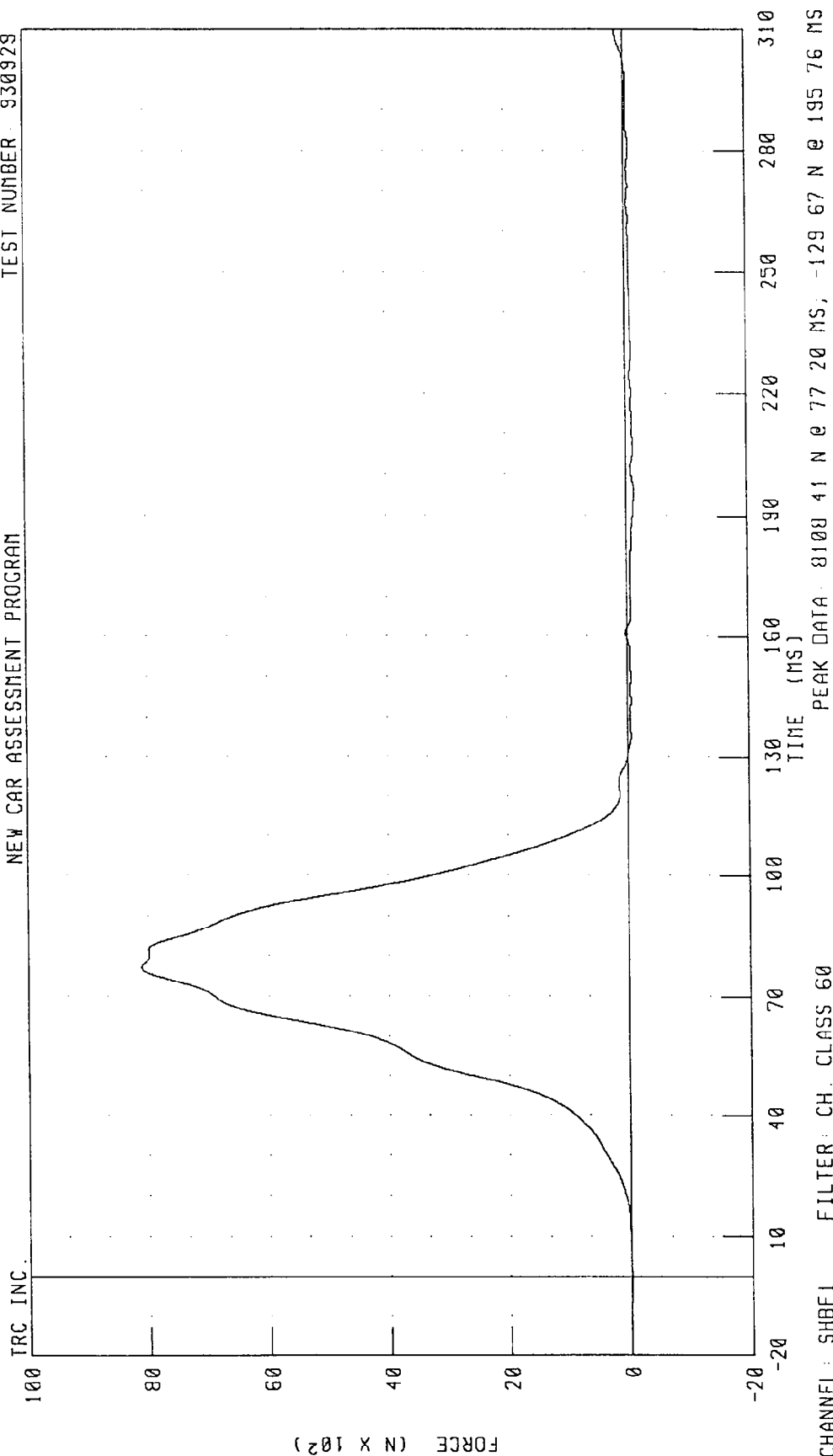


PEAK DATA: 5130 45 N @ 62 48 MS; -10.55 N @ -2 48 MS

CHANNEL: LBOFI FILTER: CH CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER SHOULDER BELT FORCE
 NEW CAR ASSESSMENT PROGRAM

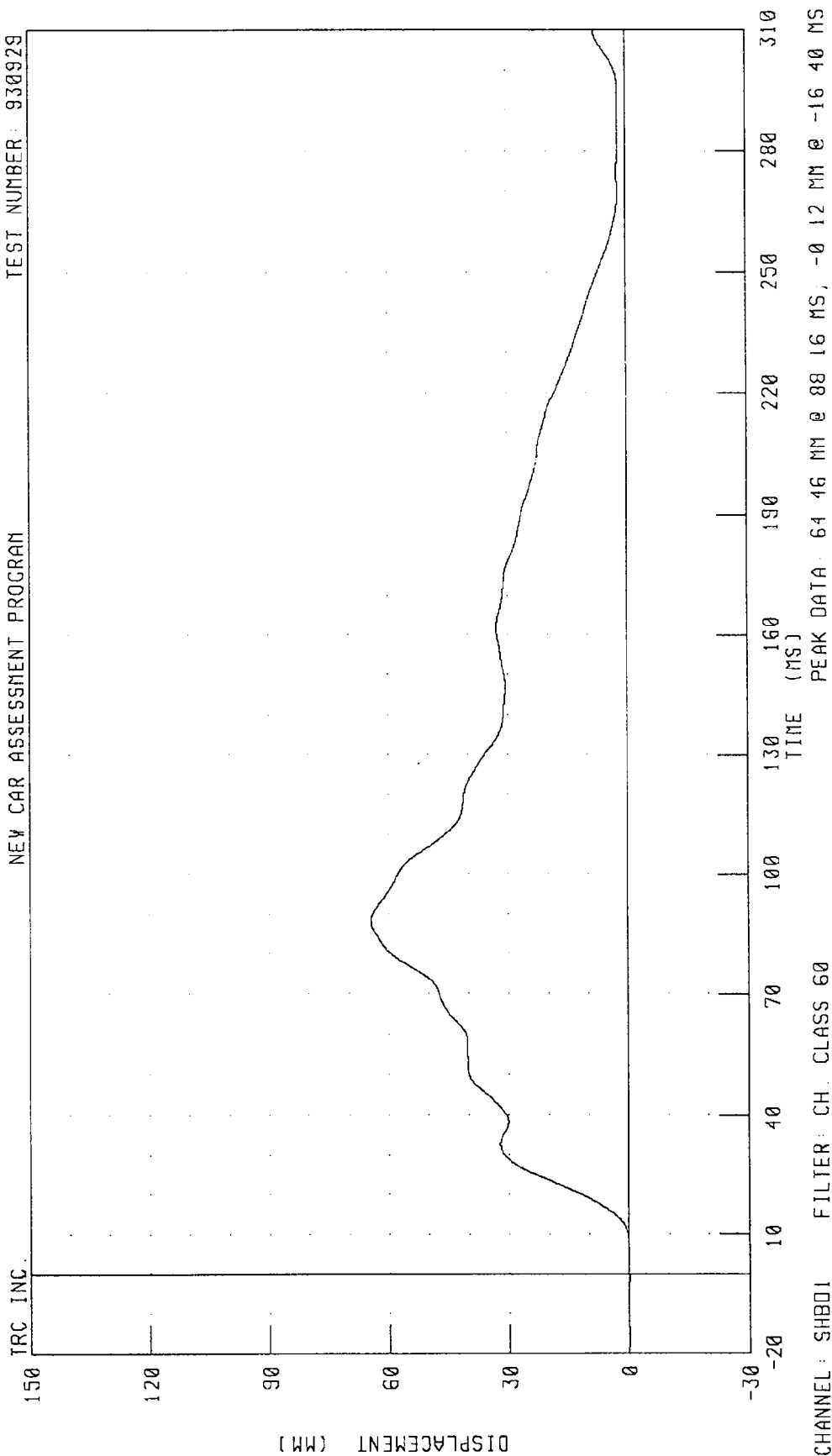
TEST NUMBER 930929



CHANNEL: SHBFI FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER SHOULDER BELT DISPLACEMENT
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

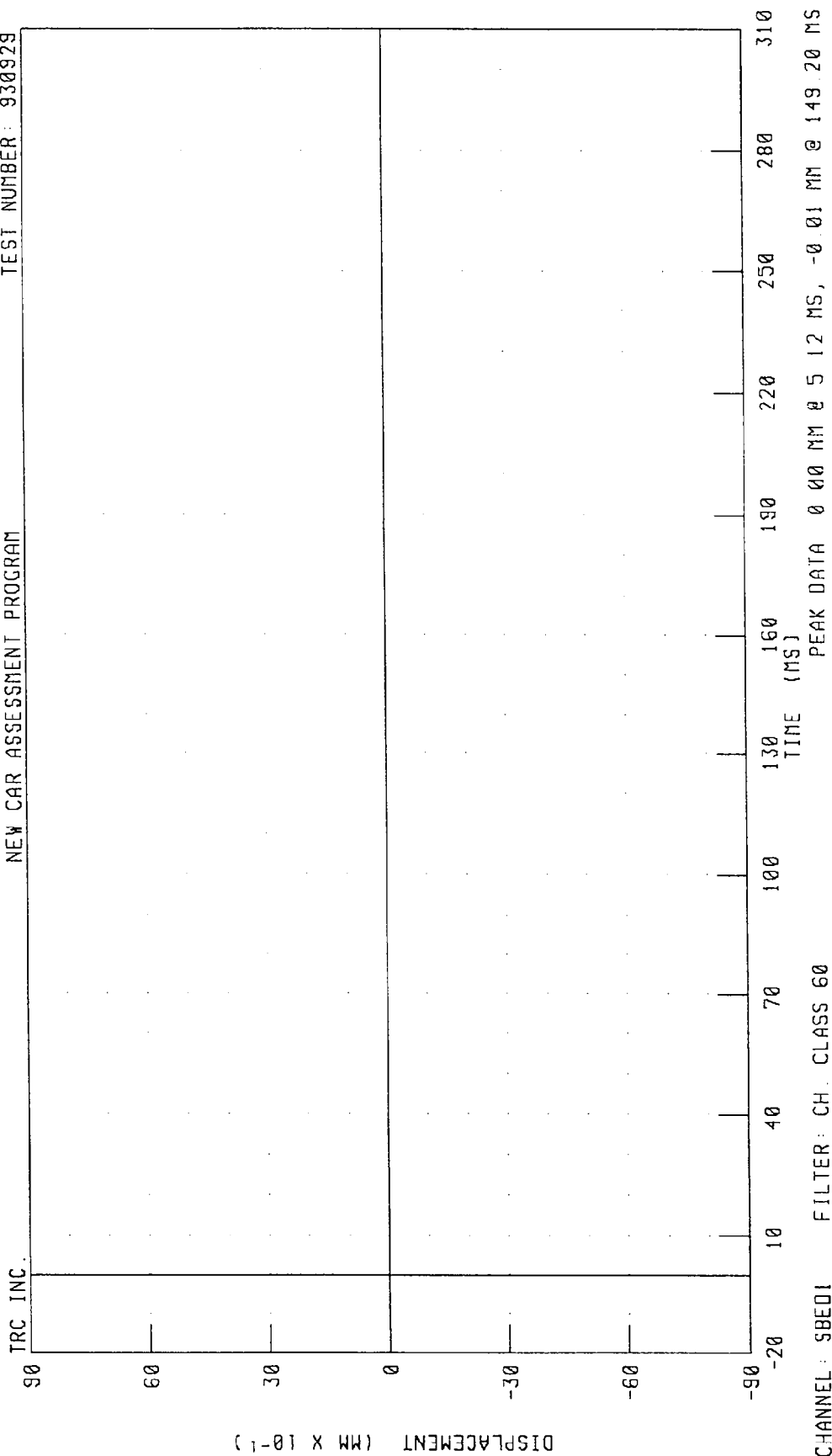


CHANNEL: SHB01 FILTER: CH. CLASS 60

PEAK DATA: 64 16 MM @ 88 16 MS, -0 12 MM @ -16 40 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER SEAT BELT EXTENSION
 NEW CAR ASSESSMENT PROGRAM

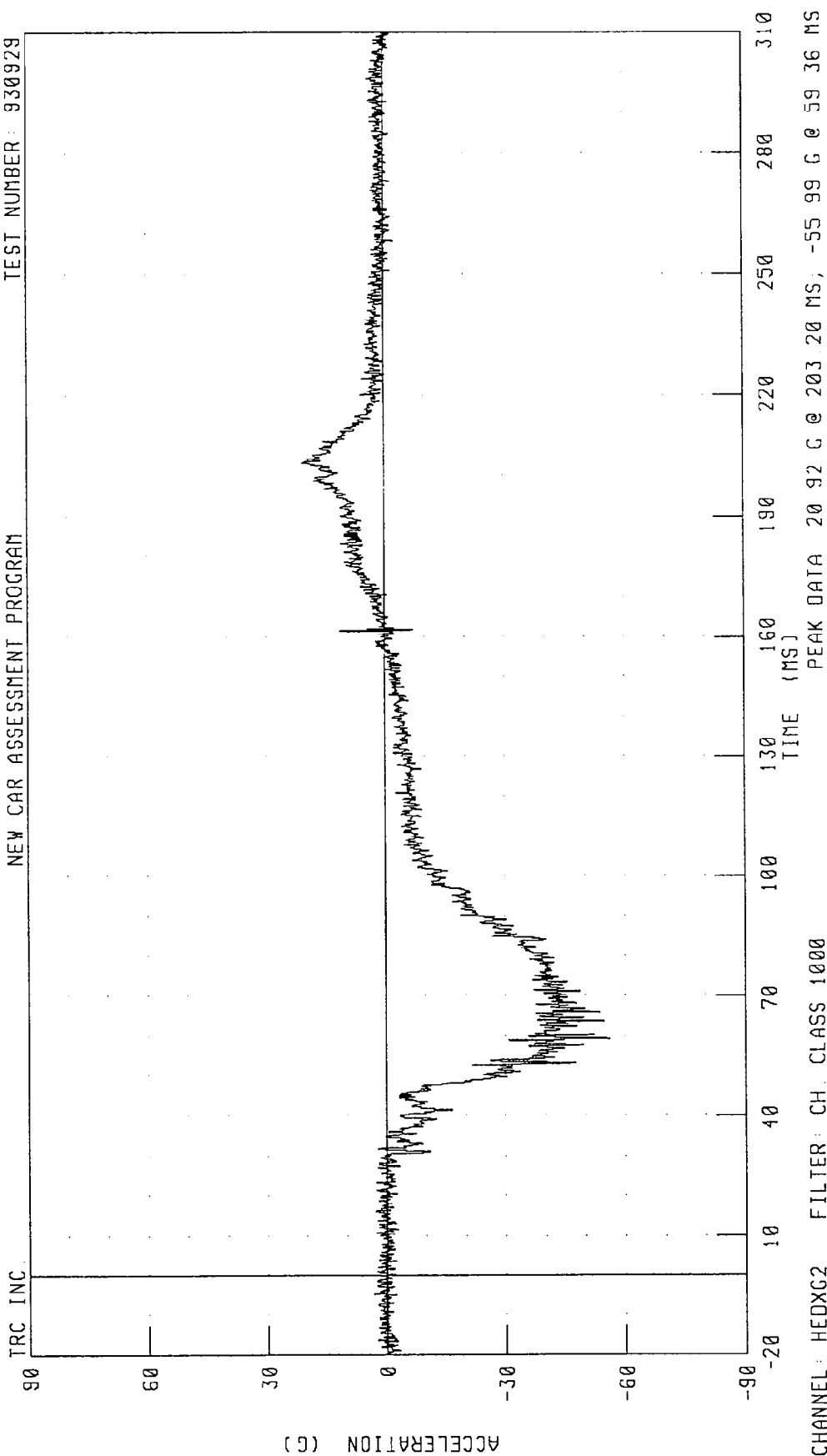
TEST NUMBER: 930929



CHANNEL: SBEDI FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



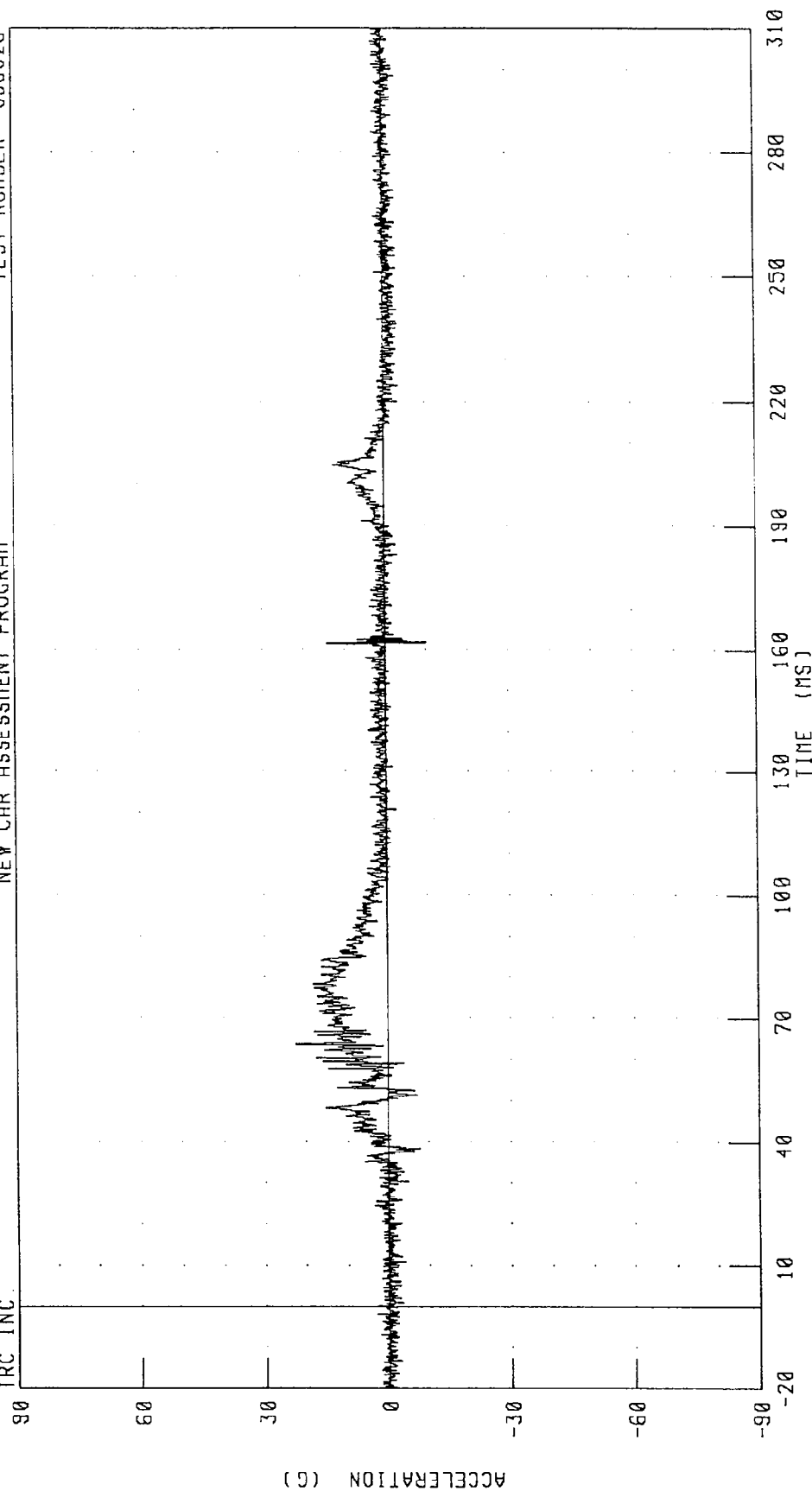
CHANNEL: HEDXC2 FILTER: CH. CLASS 1000

PEAK DATA 20 92 G @ 203 20 MS, -55 99 G @ 59 36 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER 930929

TRC INC.

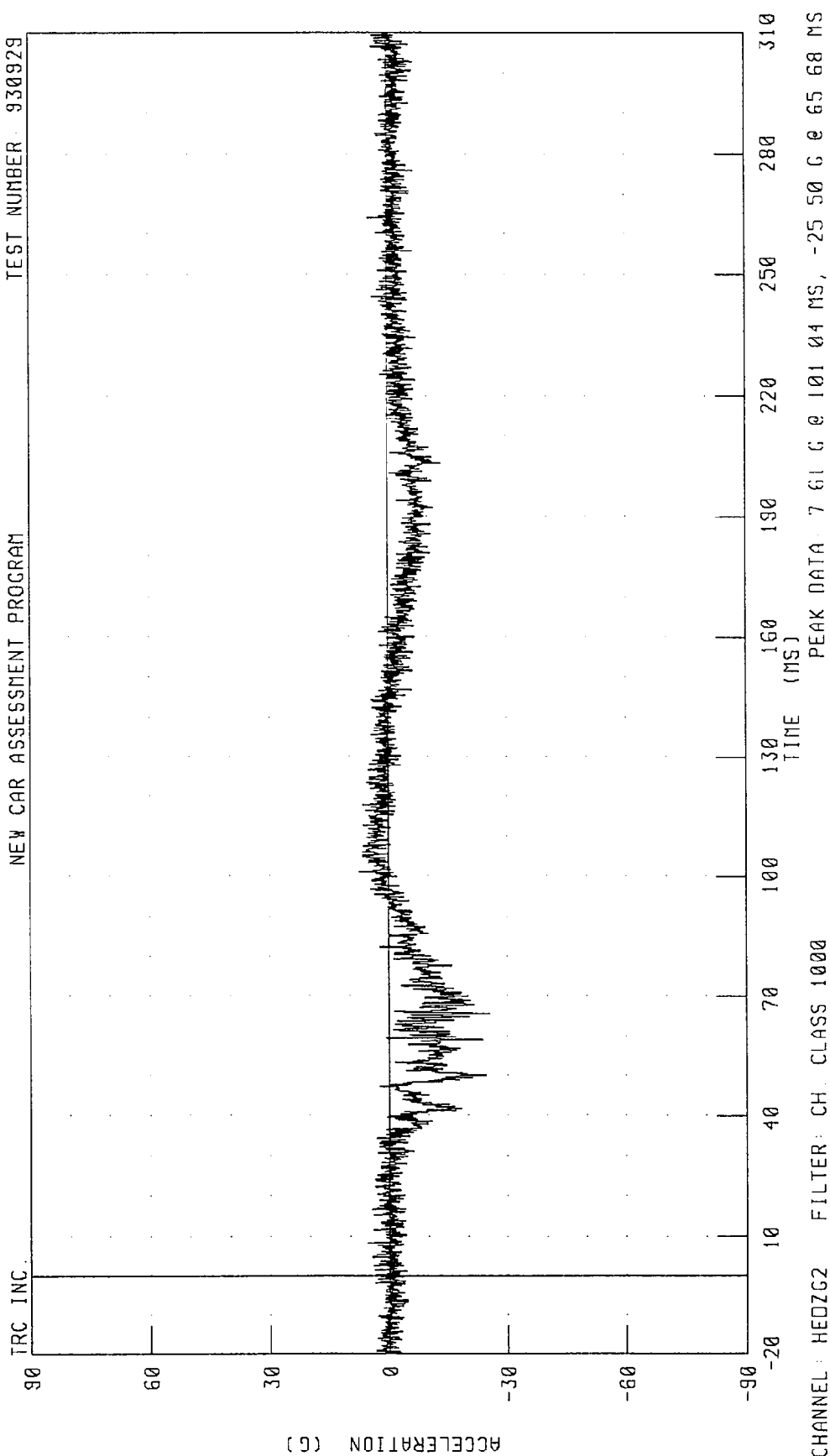


CHANNEL: HEDYG2 FILTER: CH CLASS 1000

PEAK DATA: 22.57 G @ 63.76 MS; -9.92 G @ 161.76 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER HEAD Z-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

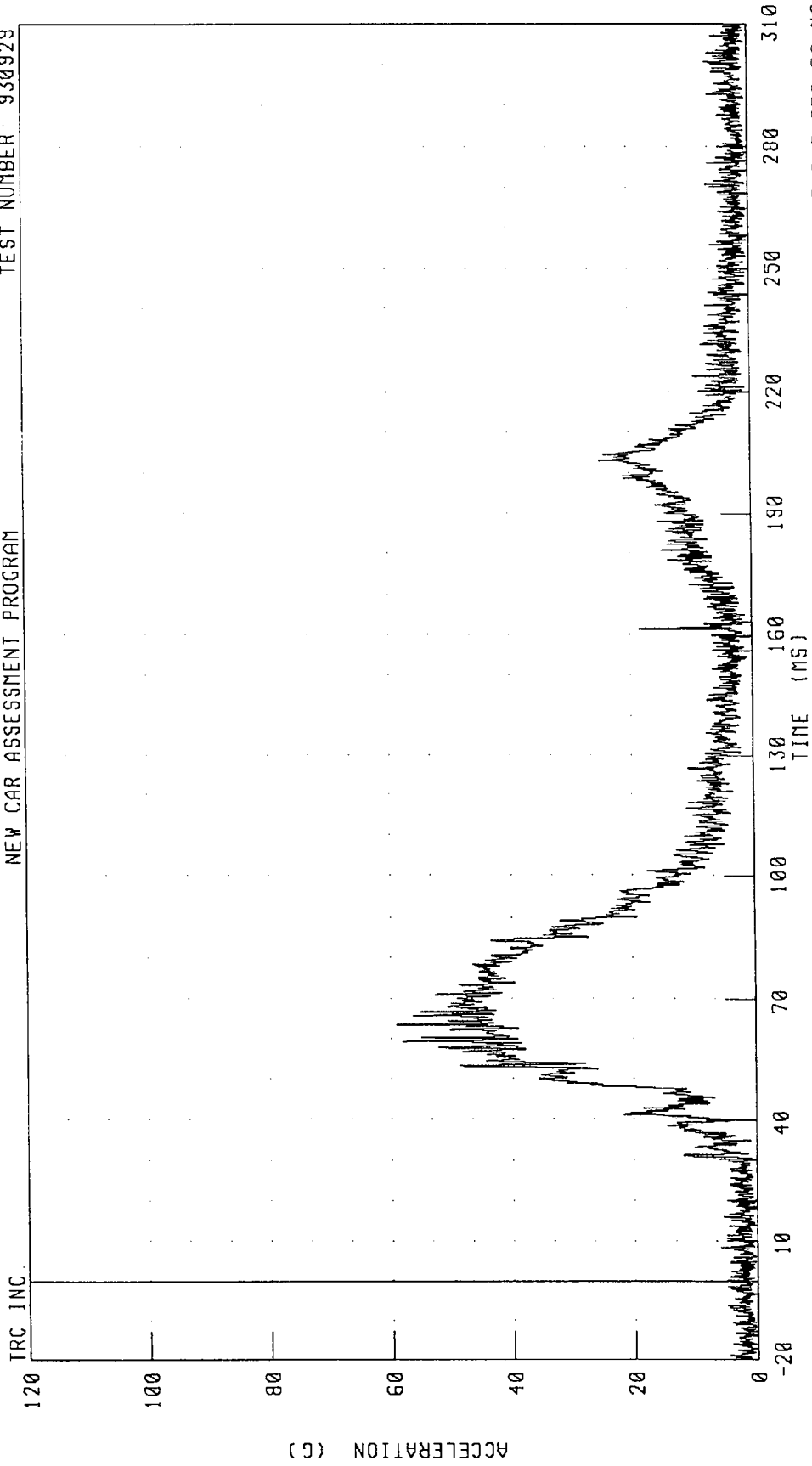
TEST NUMBER 930929



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

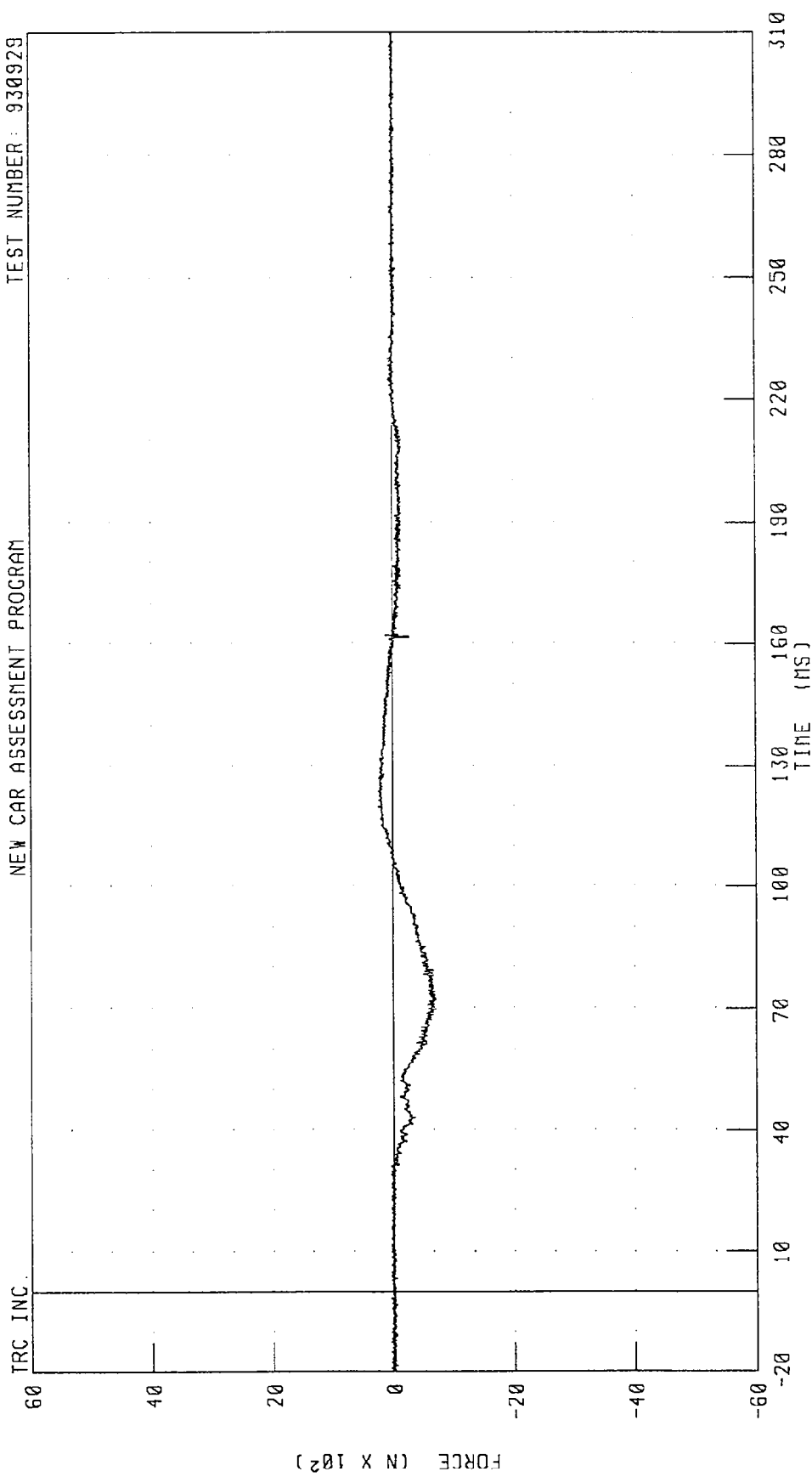


PEAK DATA: 59.22 G @ 63.76 MS, 0.17 G @ 278.72 MS

CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER NECK X-AXIS SHEAR FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

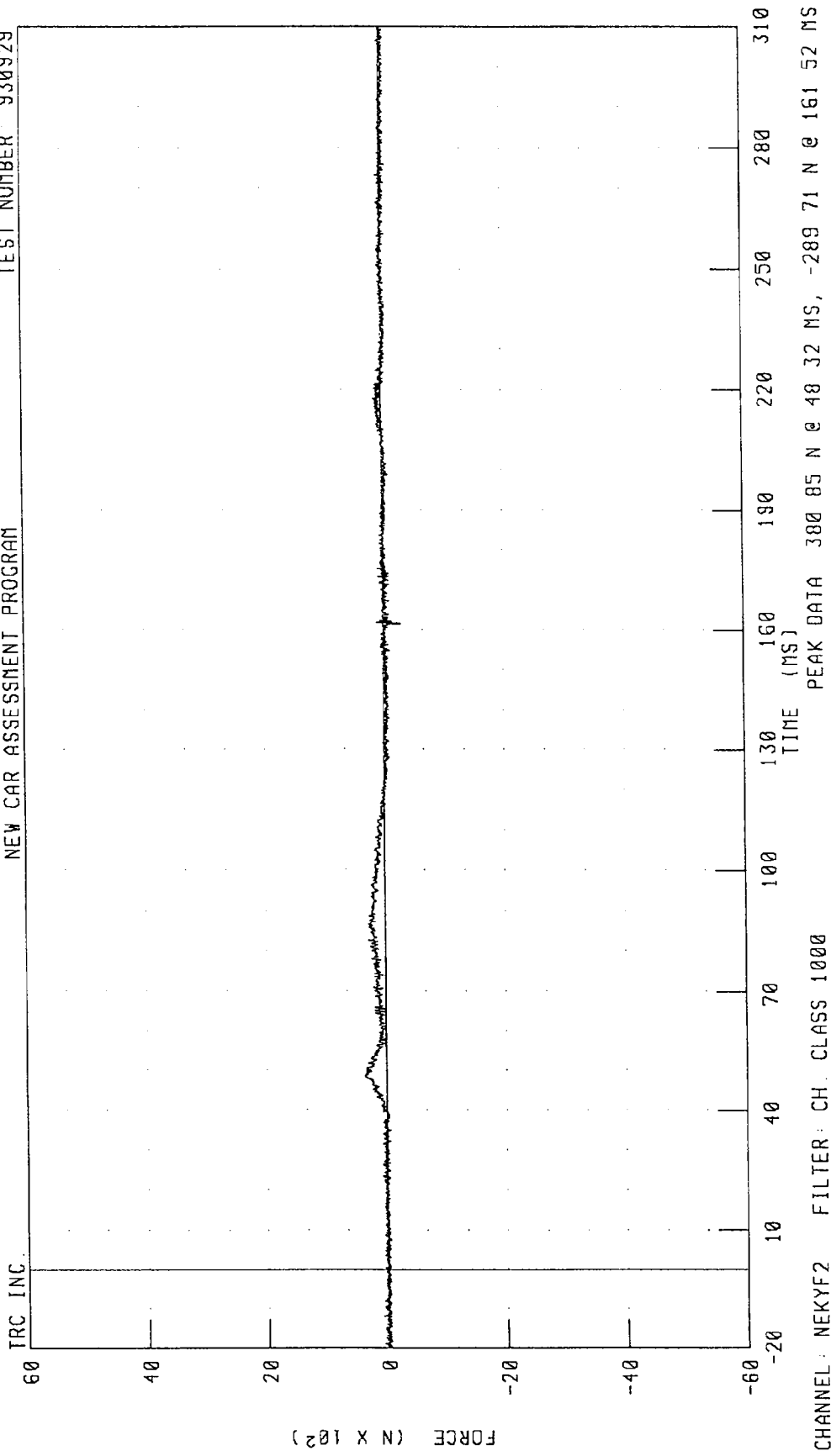


PEAK DATA: 246 84 N @ 123 76 MS; -708 96 N @ 71 92 MS

CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER NECK Y-AXIS SHEAR FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER 930929

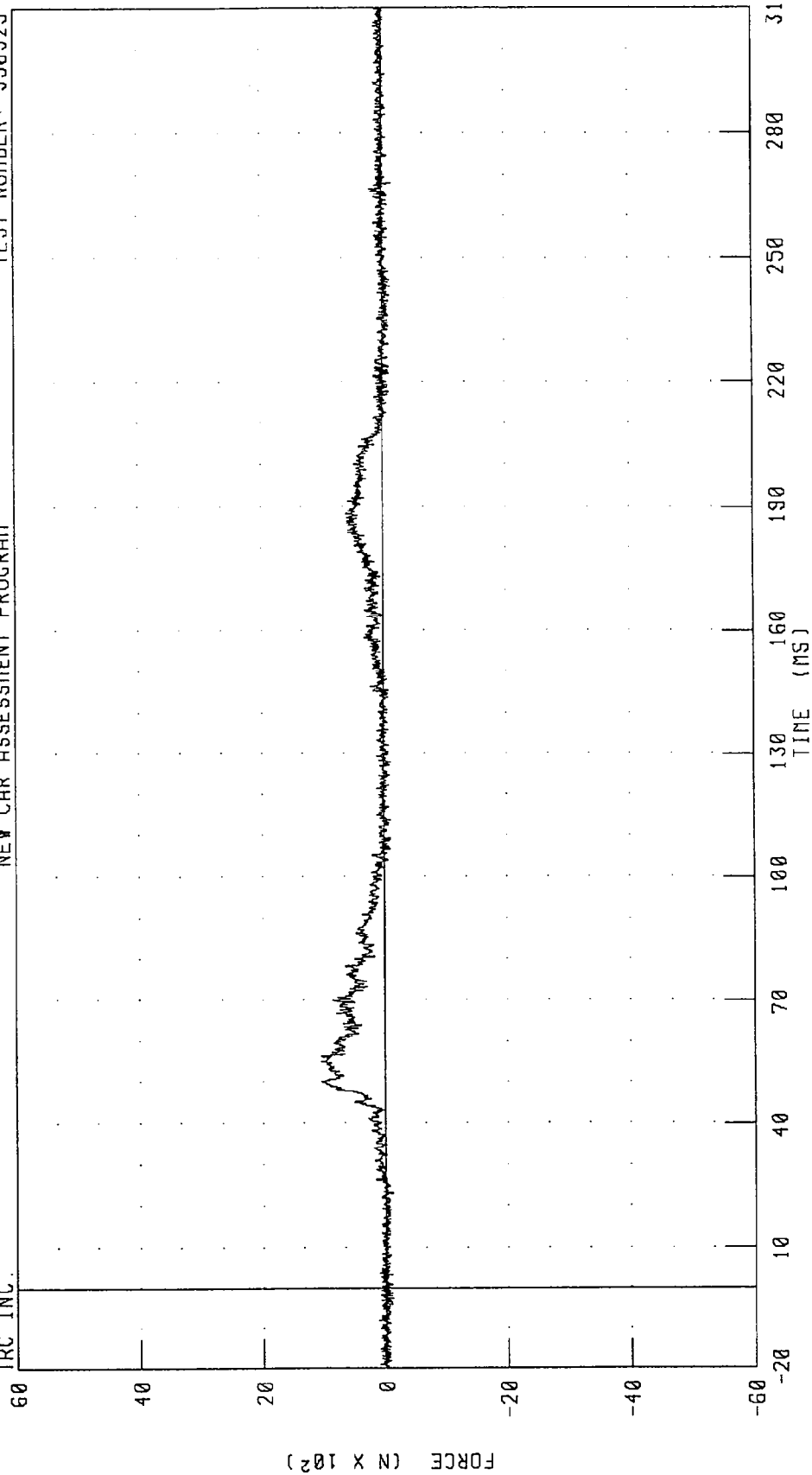


CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Z-AXIS AXIAL FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.

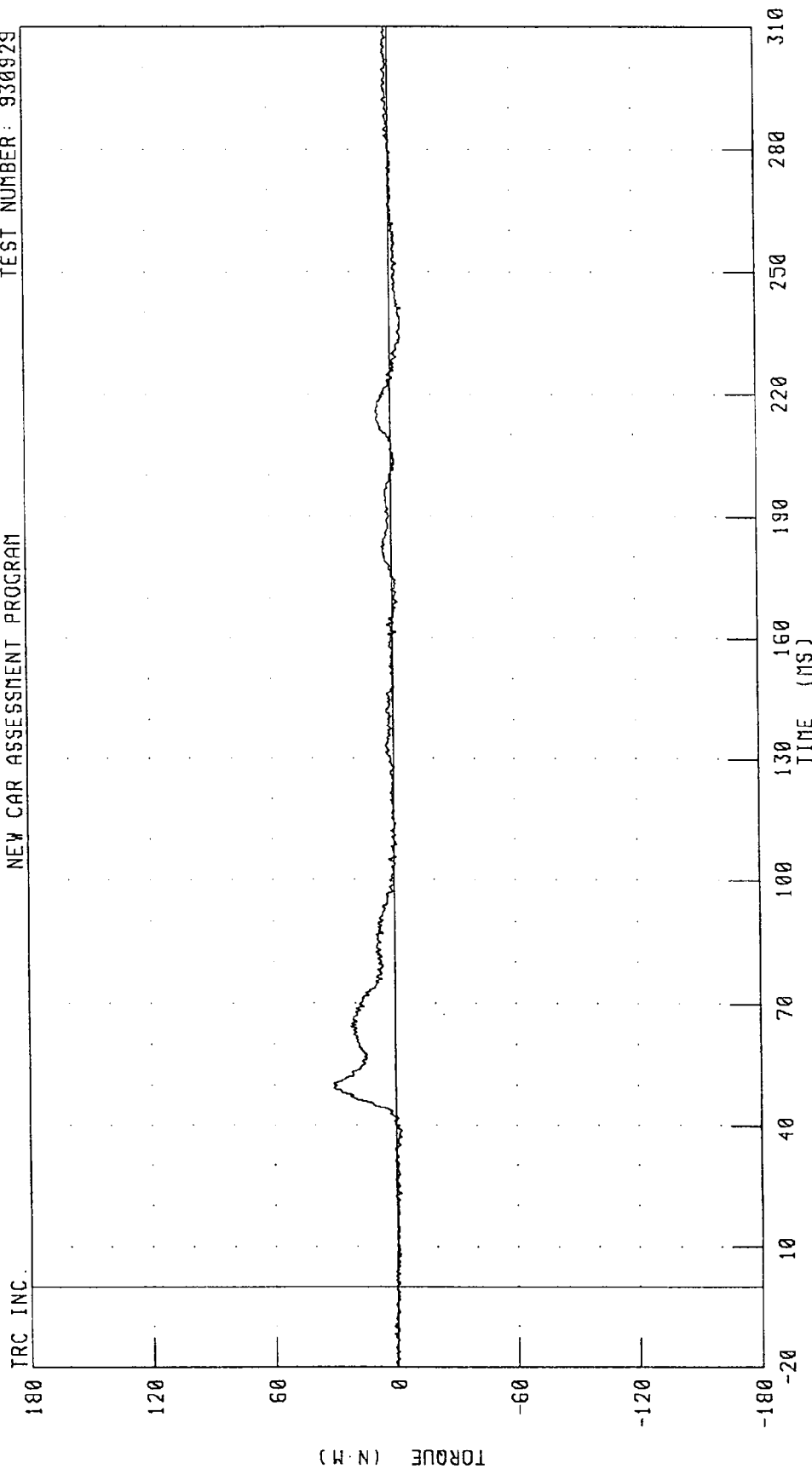


CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

PEAK DATA 1057.53 N @ 54.96 MS; -157.31 N @ 268.08 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT X AXIS
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

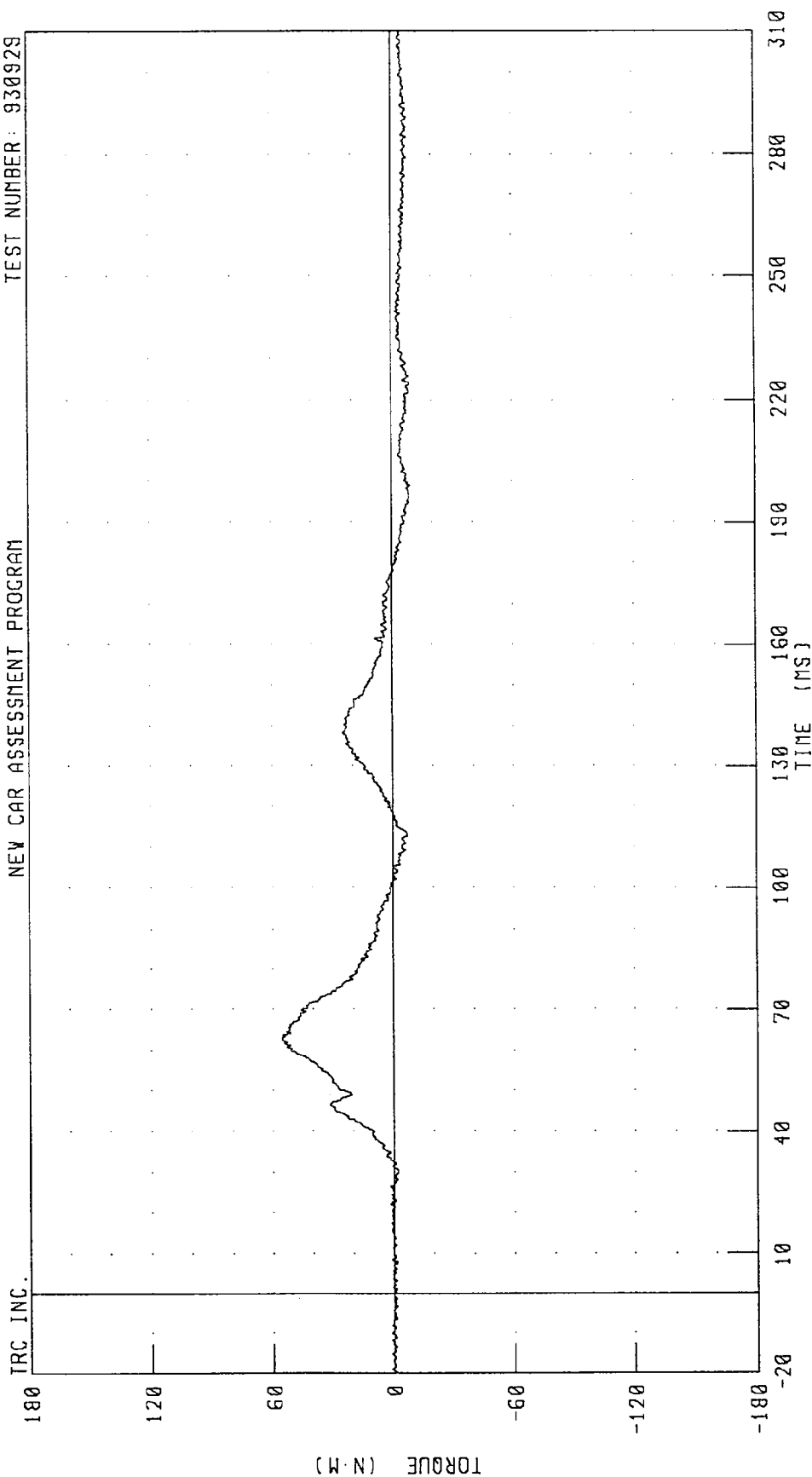


CHANNEL: NEKXM2 FILTER: CH. CLASS 600

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Y AXIS

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

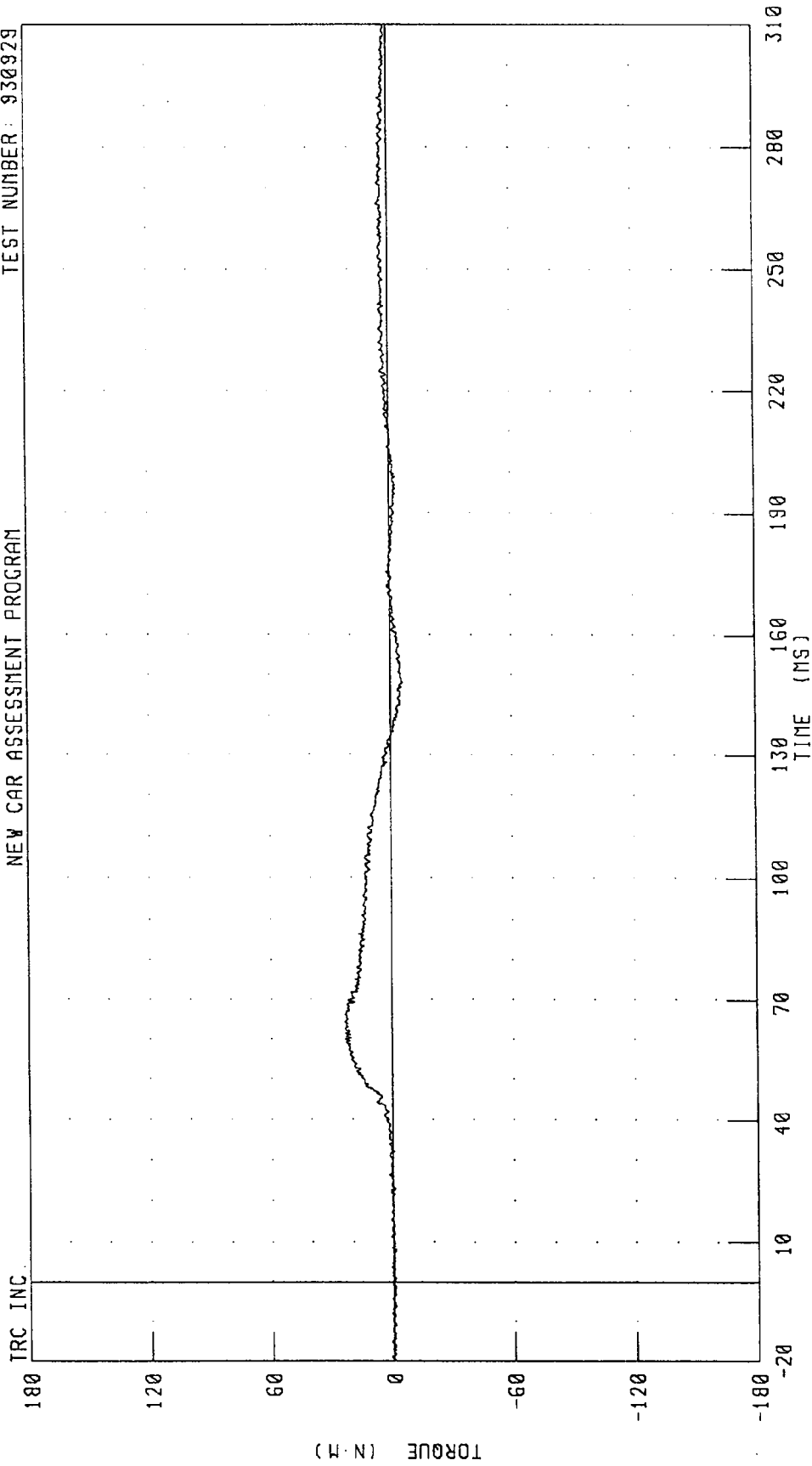


PEAK DATA: 55 53 N·M @ 62.72 MS; -9 01 N·M @ 198 80 MS

CHANNEL: NEKYM2 FILTER: CH. CLASS 600

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Z AXIS
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



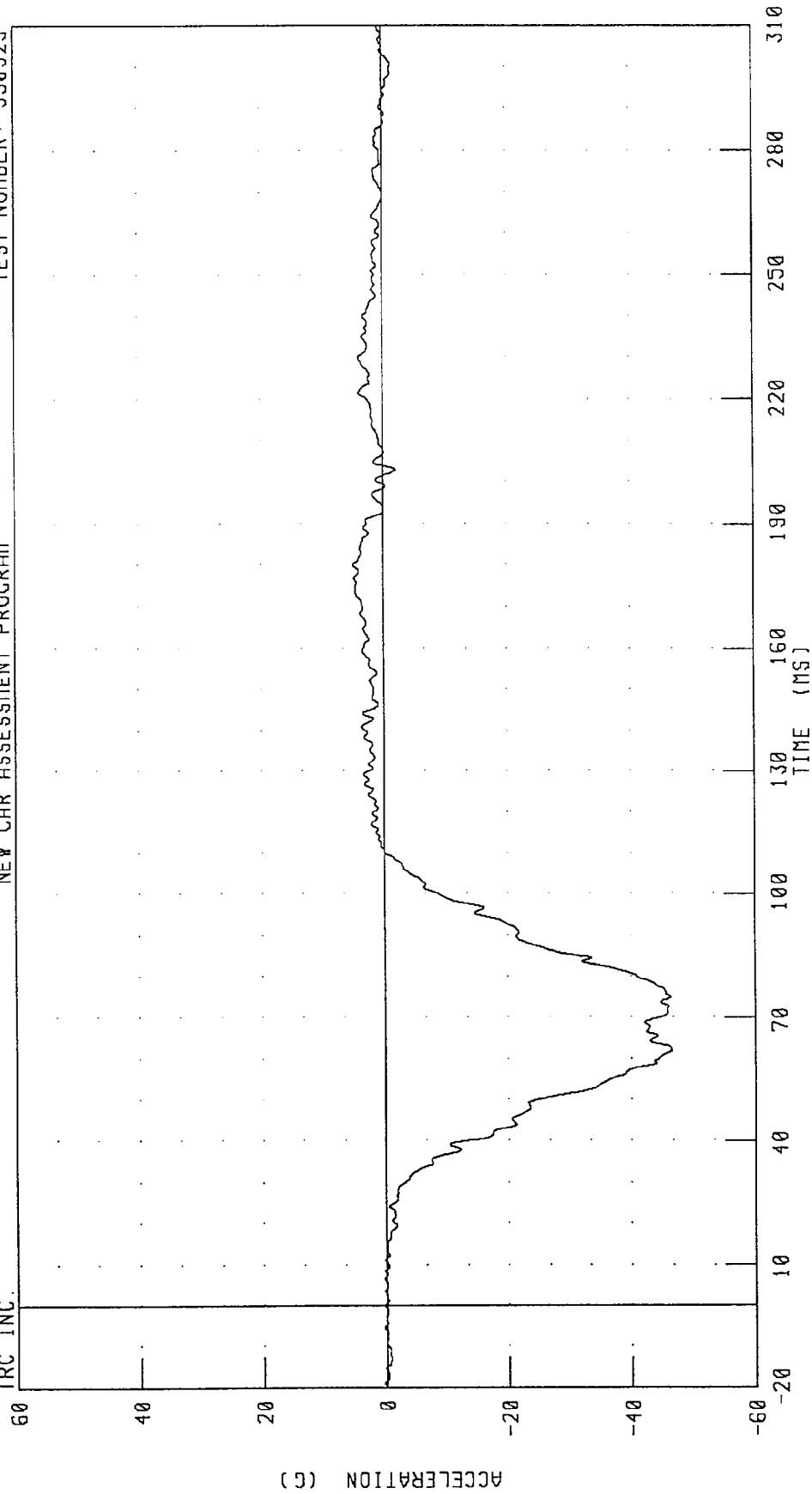
PEAK DATA: 23.59 N M @ 64.56 MS, -6.18 N M @ 148.16 MS

CHANNEL: NEKZM2 FILTER: CH. CLASS 600

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.



CHANNEL: CSTXC2 FILTER: CH. CLASS 180

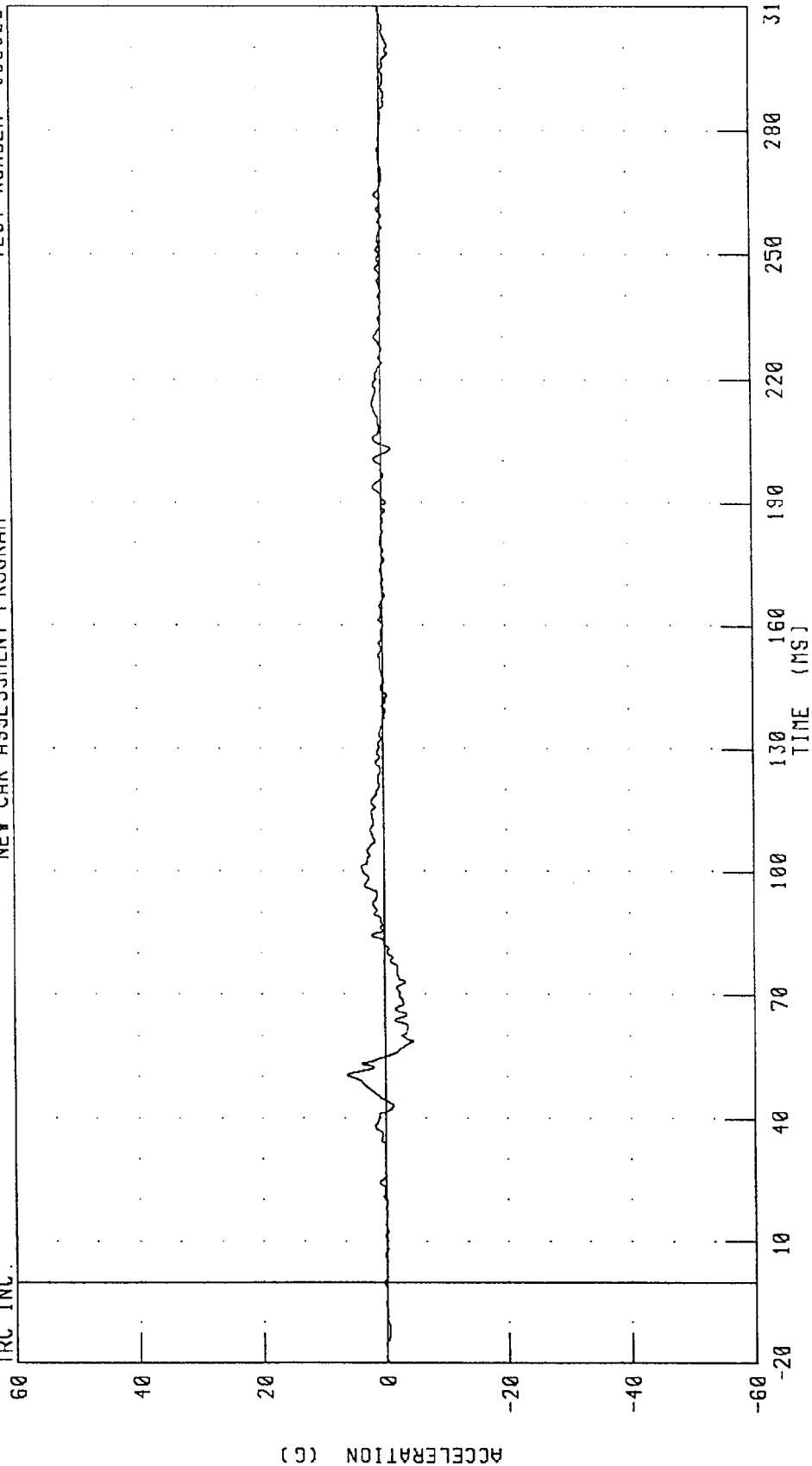
PEAK DATA: 4.96 G @ 179.92 MS, -46.48 G @ 62.08 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.

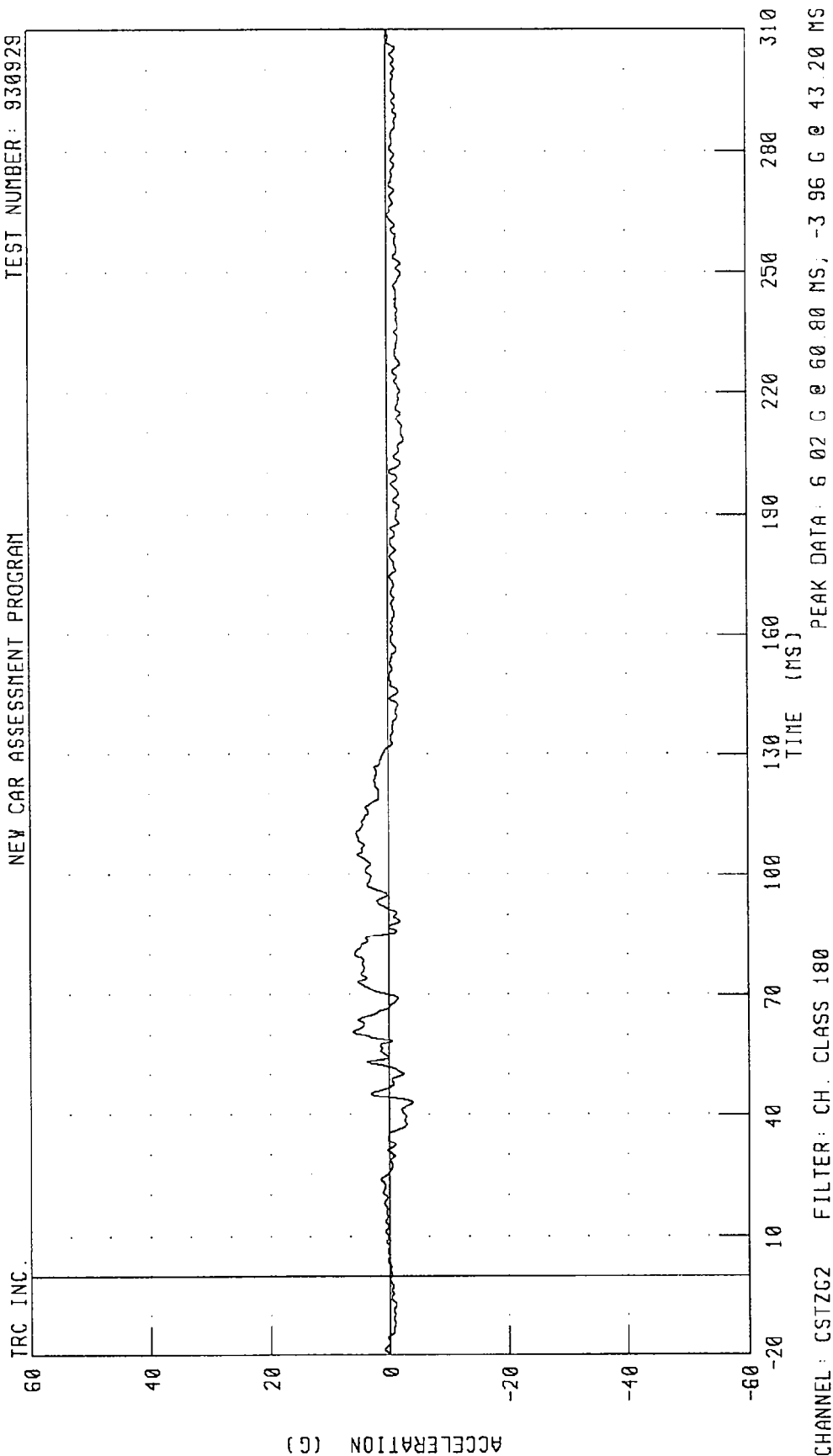


PEAK DATA: 6.25 G @ 50.56 MS, -4.48 G @ 58.64 MS

CHANNEL: CSTYG2 FILTER: CH. CLASS 180

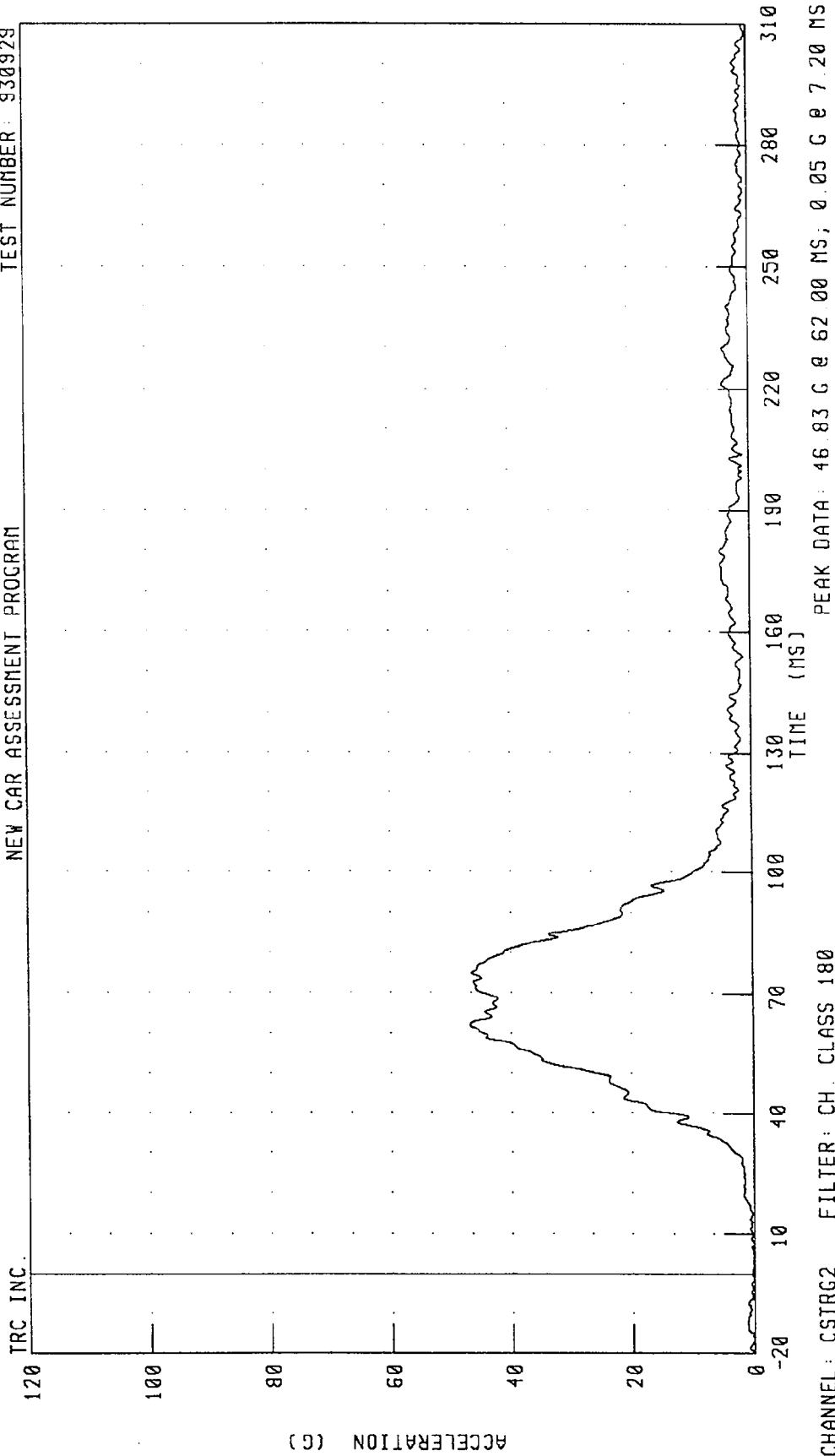
1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST RESULTANT ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

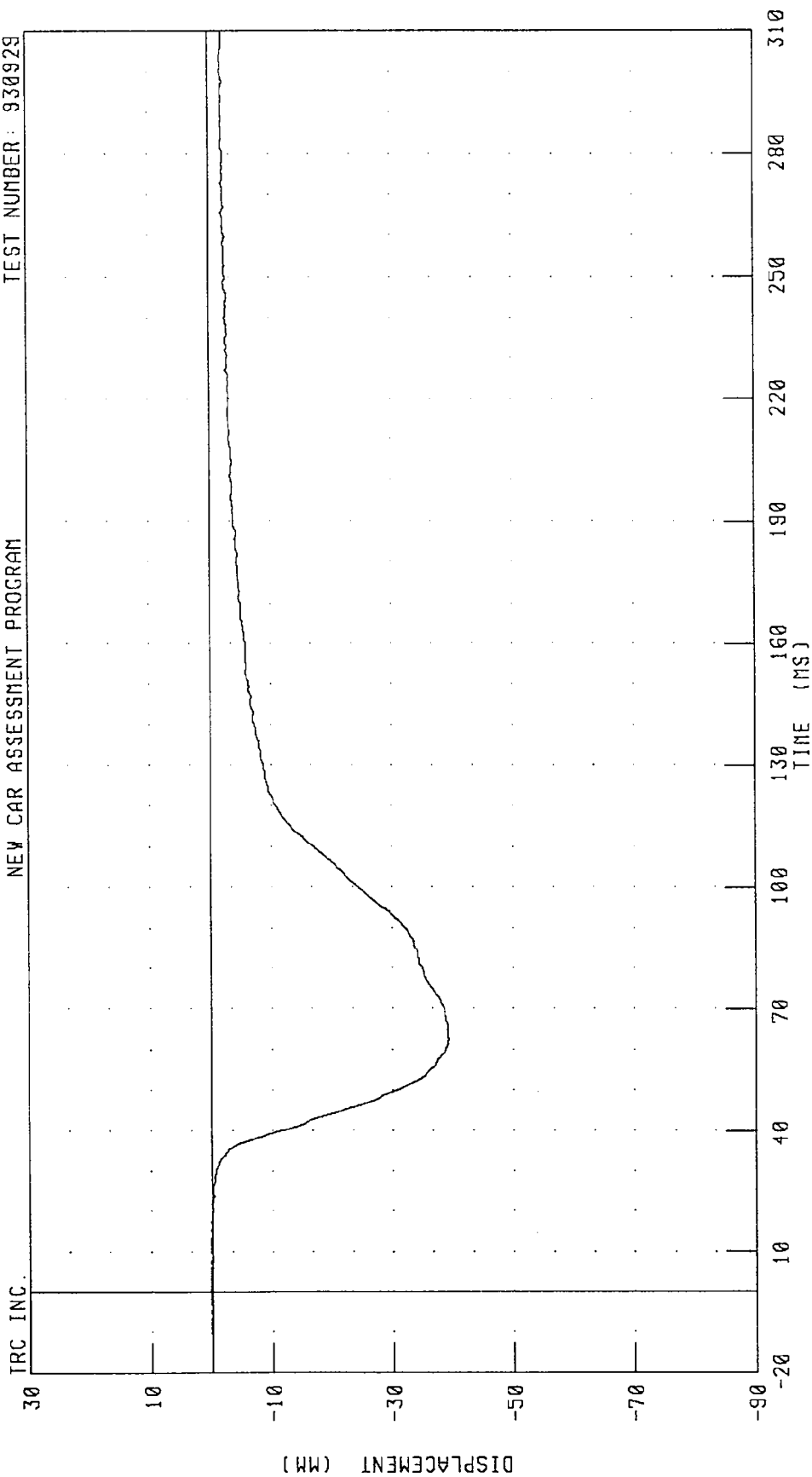


CHANNEL: CSTRG2 FILTER: CH. CLASS 180

PEAK DATA: 46.83 G @ 62.00 MS; 0.05 G @ 7.20 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST DEFLECTION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

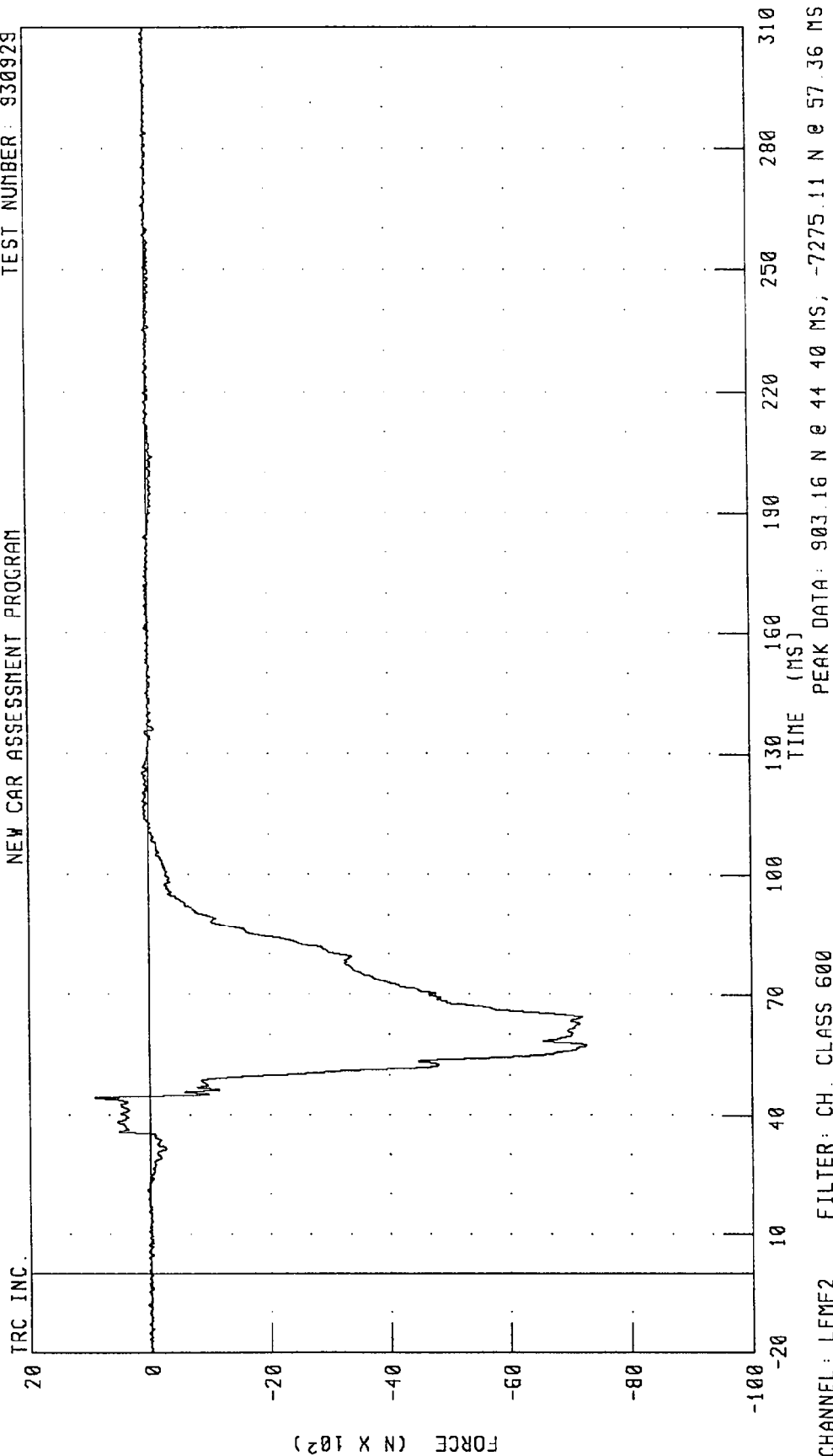


PEAK DATA: 0 24 MM @ 0 32 MS; -39 23 MM @ 62 64 MS

CHANNEL: CSTX02 FILTER: CH. CLASS 180

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER LEFT FEMUR FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

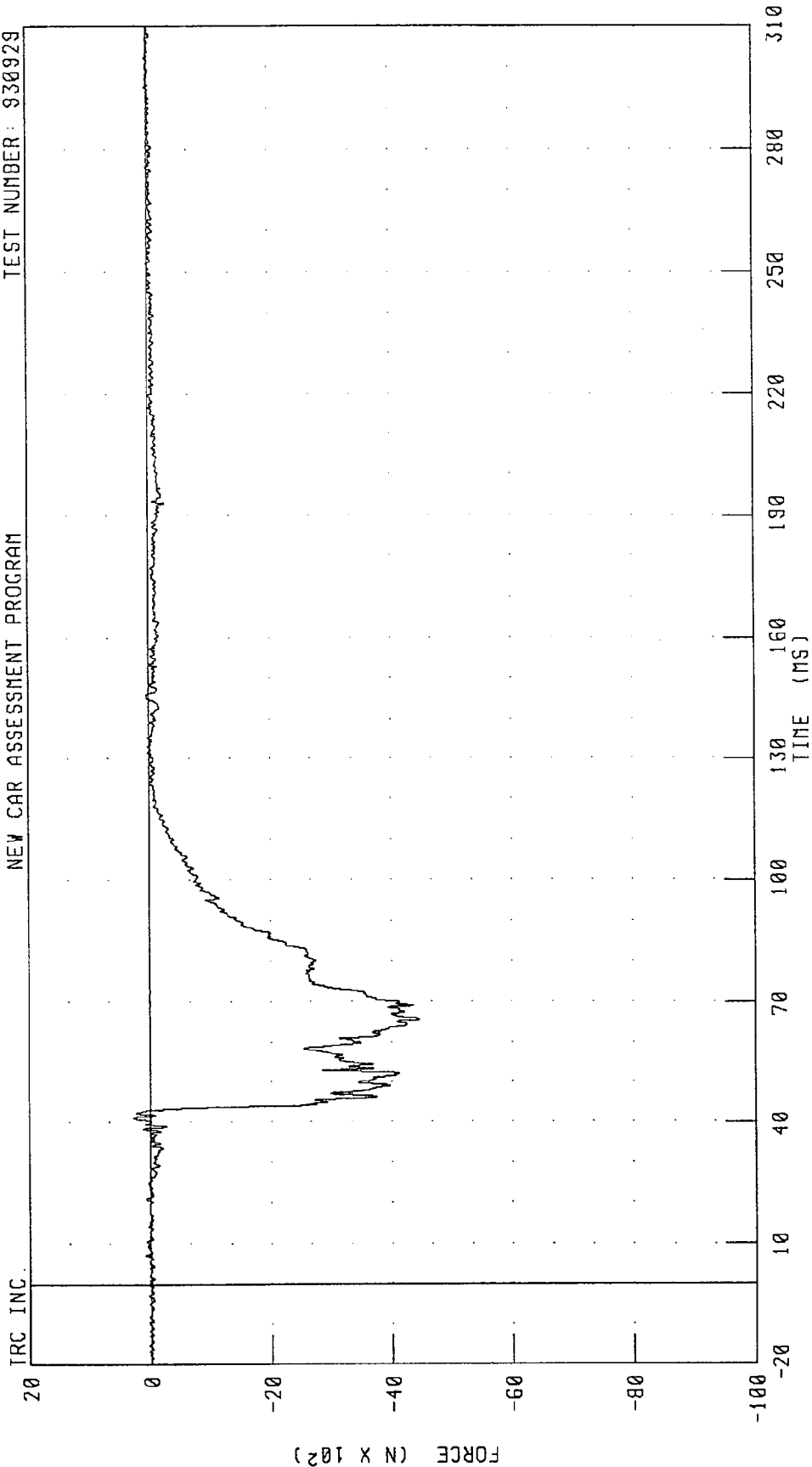


CHANNEL: LFMF2 FILTER: CH. CLASS 600

PEAK DATA: 903.16 N @ 44.40 MS, -7275.11 N @ 57.36 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FEMUR FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

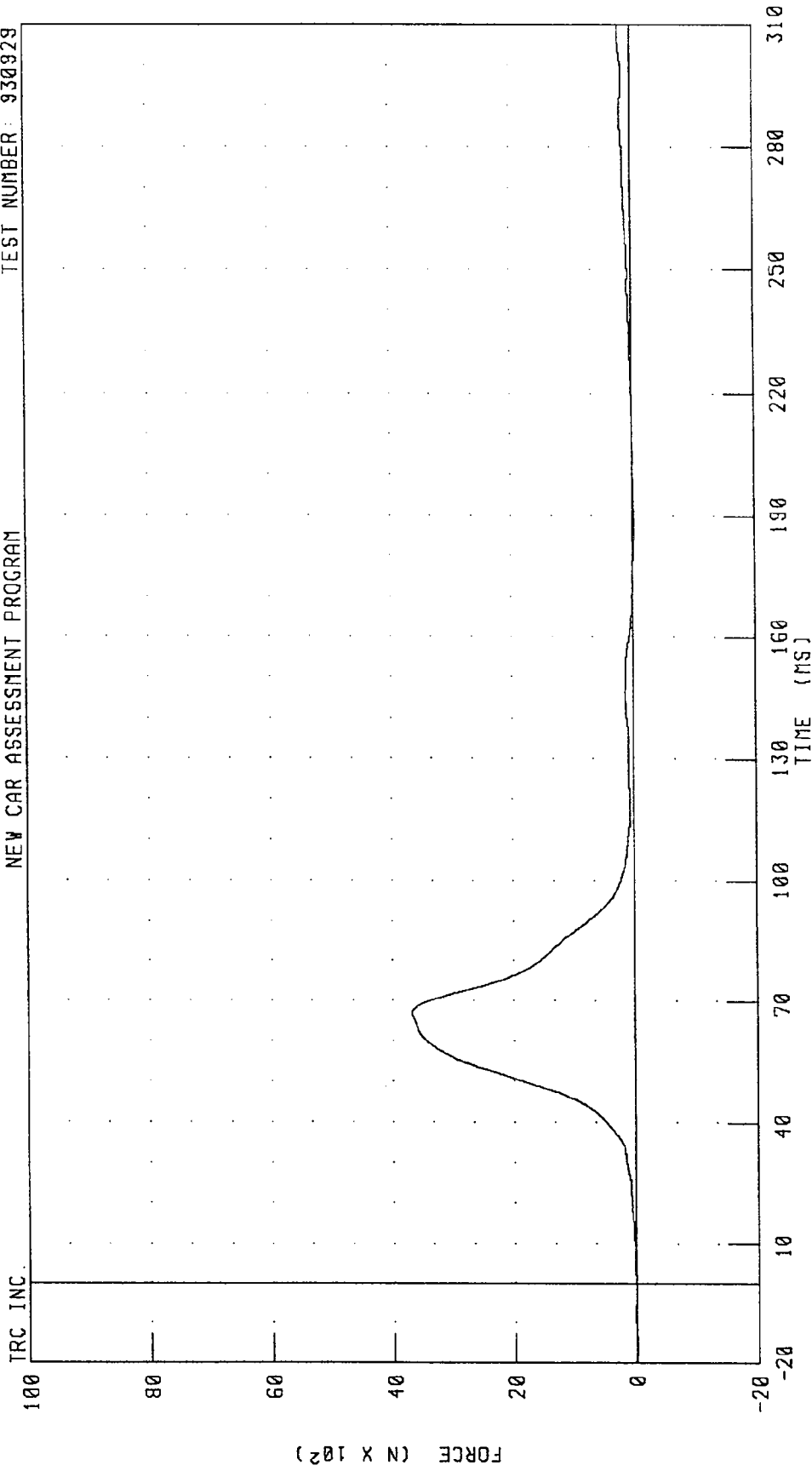


PEAK DATA: 275.61 N @ 41.04 MS, -4460.37 N @ 65.60 MS

CHANNEL: RFMF2 FILTER: CH. CLASS 600

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER LAP BELT OUTBOARD FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

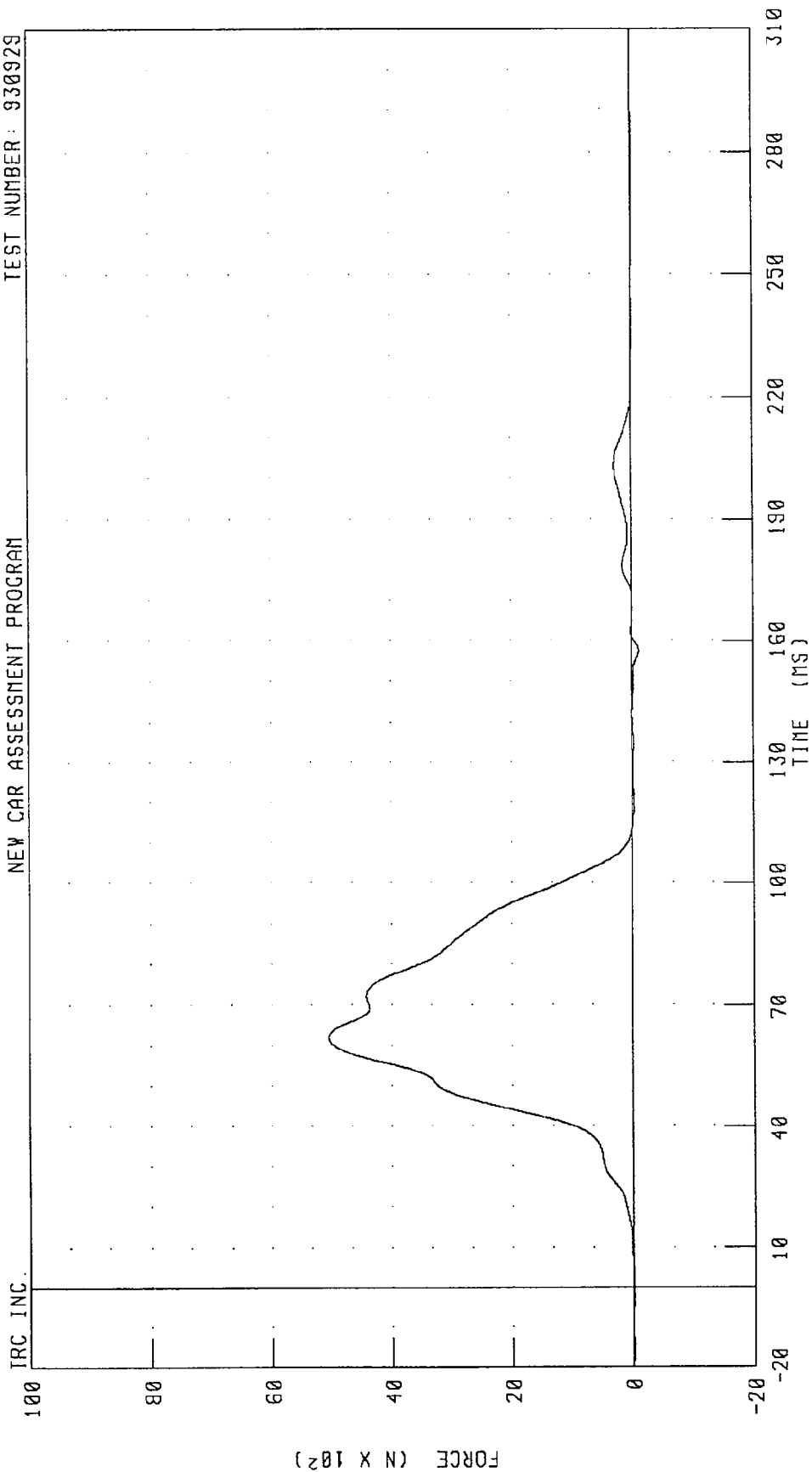


CHANNEL: LBOF2 FILTER: CH. CLASS 60

PEAK DATA: 3683.12 N @ 66.96 MS, -28.95 N @ 187.52 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

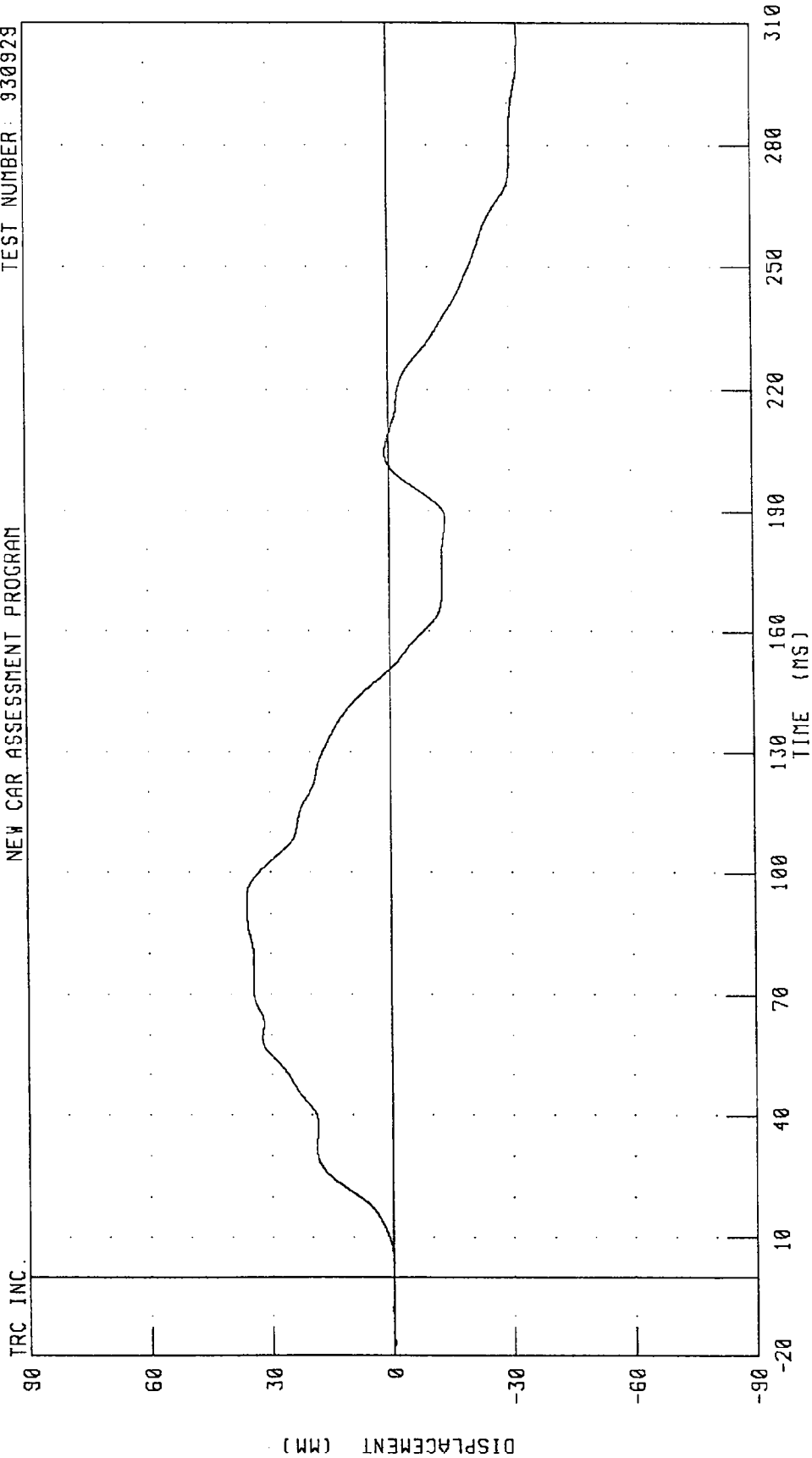


PEAK DATA: 5048.29 N @ 62.08 MS; -111.78 N @ 157.52 MS

CHANNEL: SHBF2 FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT DISPLACEMENT
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

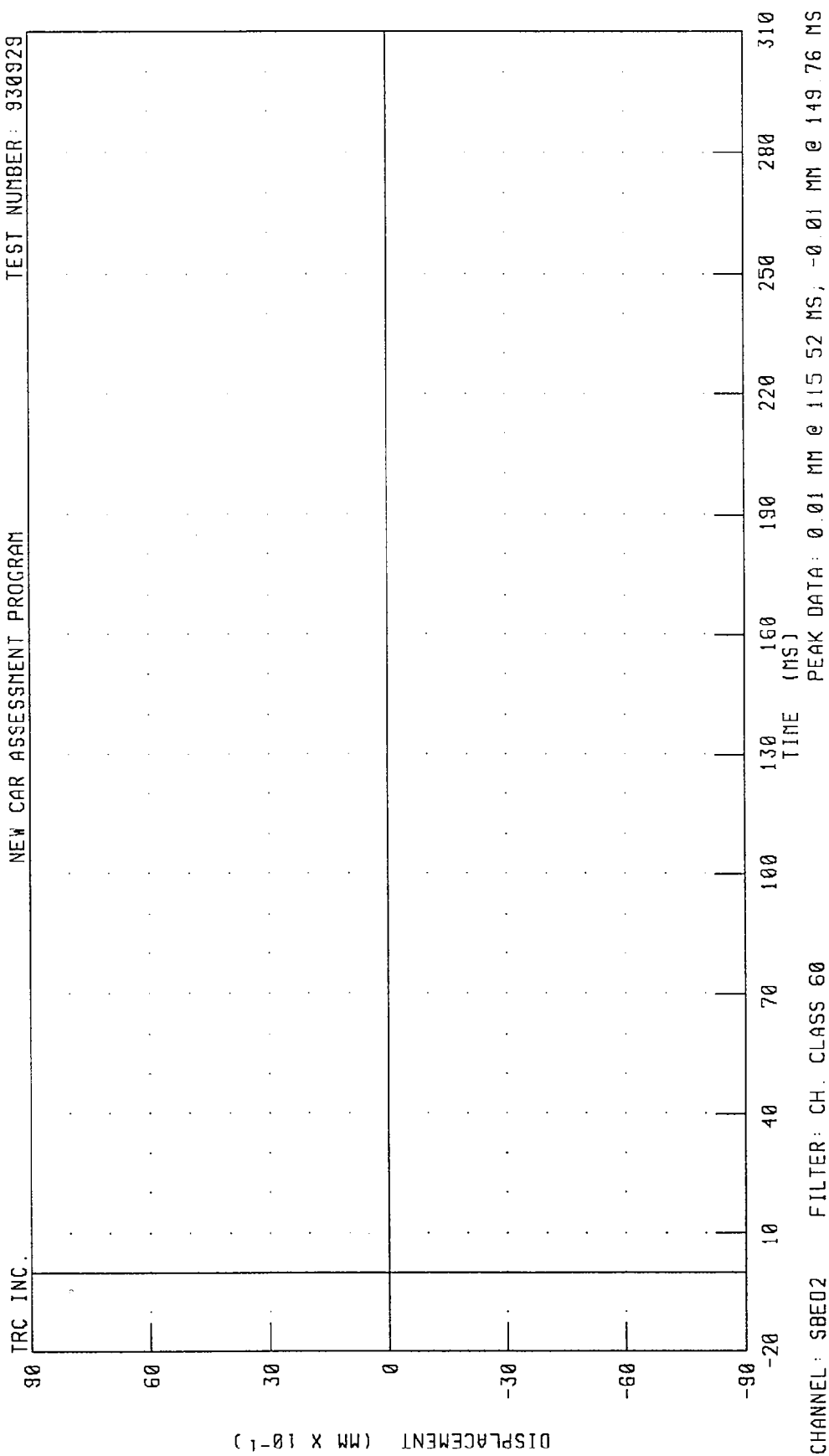


CHANNEL: SHB02 FILTER: CH. CLASS 60

PEAK DATA: 35.87 MM @ 93.84 MS; -32.40 MM @ 305.44 MS

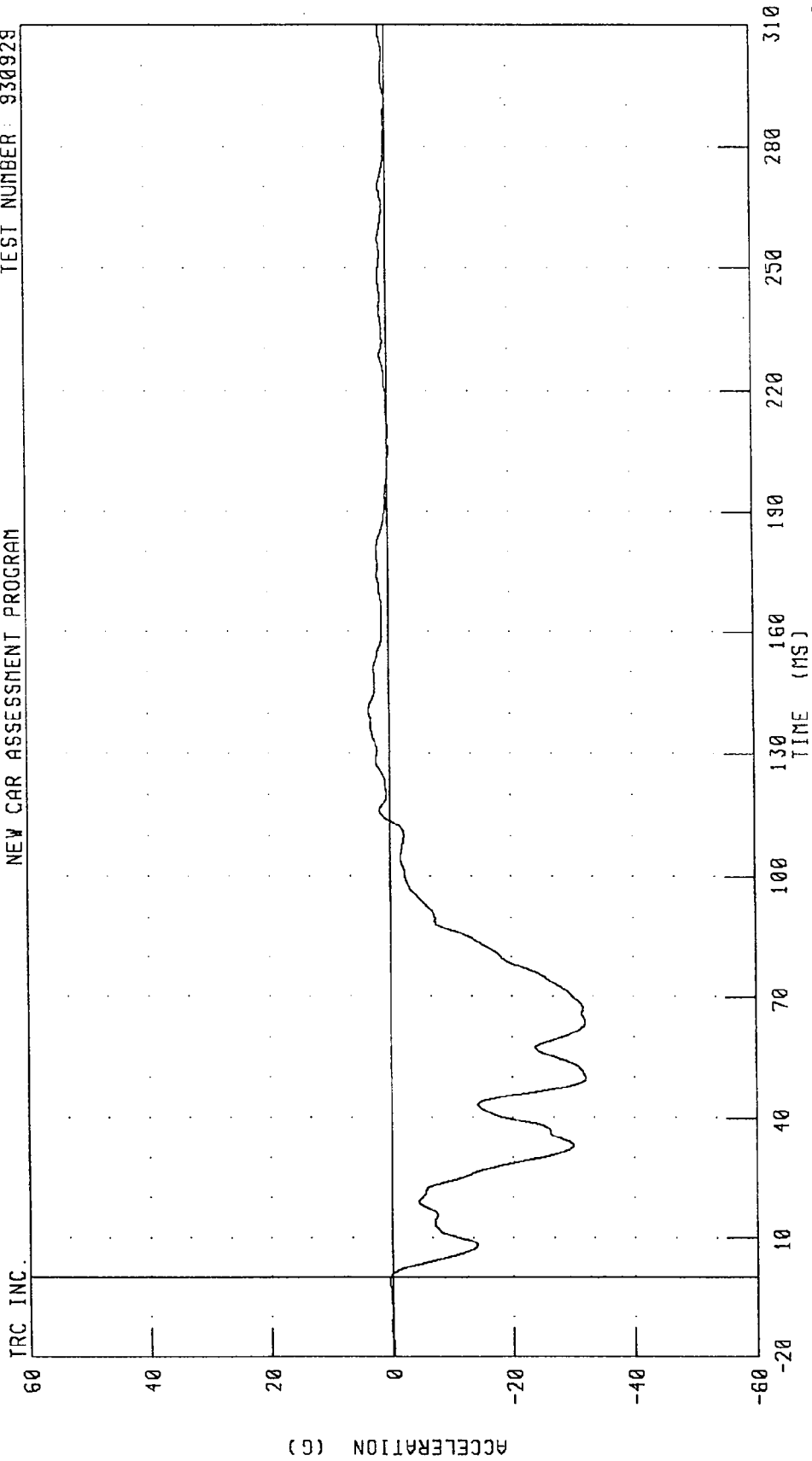
1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER SEAT BELT EXTENSION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



PEAK DATA: 3.38 G @ 140.64 MS, -32.06 G @ 49.84 MS

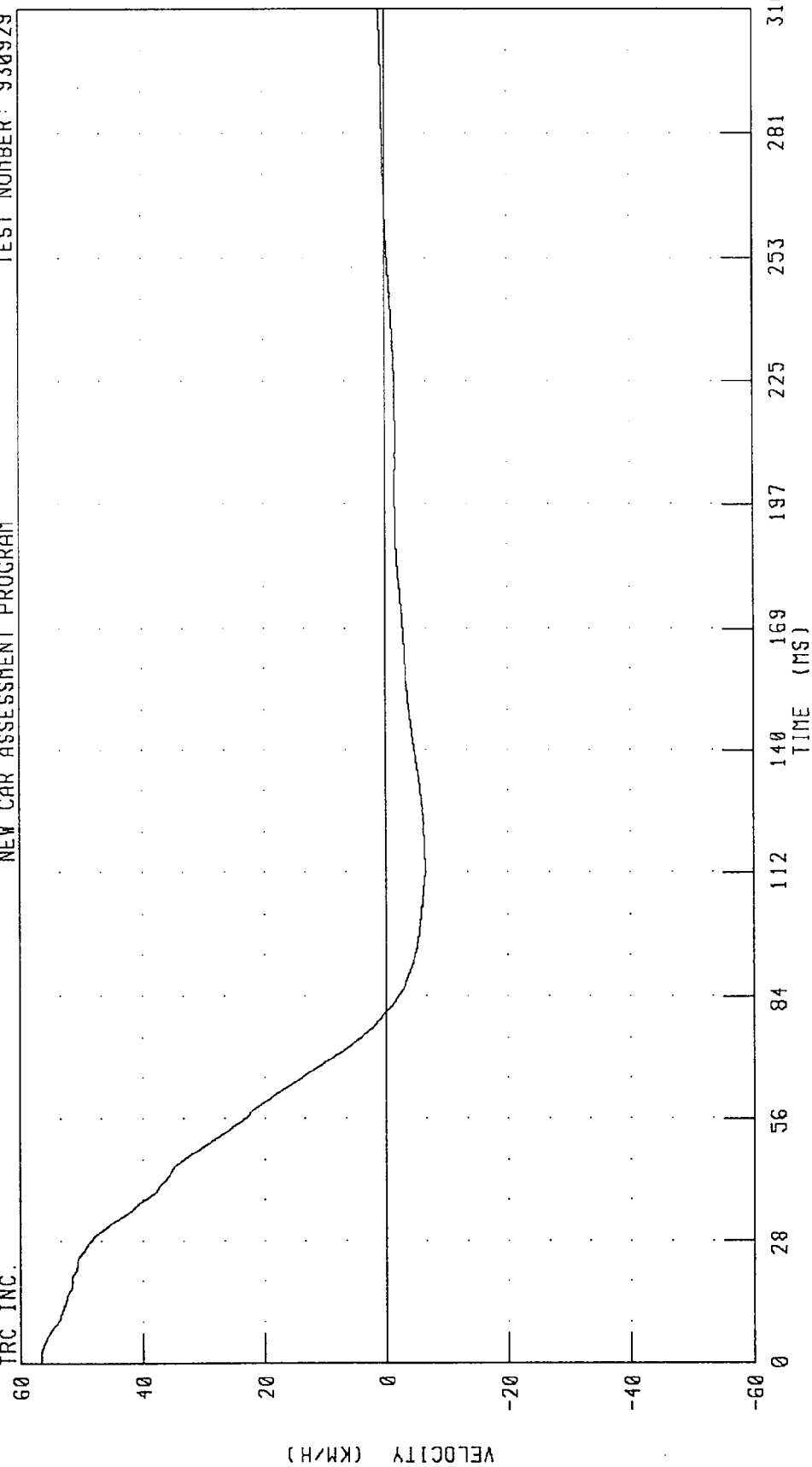
CHANNEL: TLRXG1 FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS VELOCITY

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.

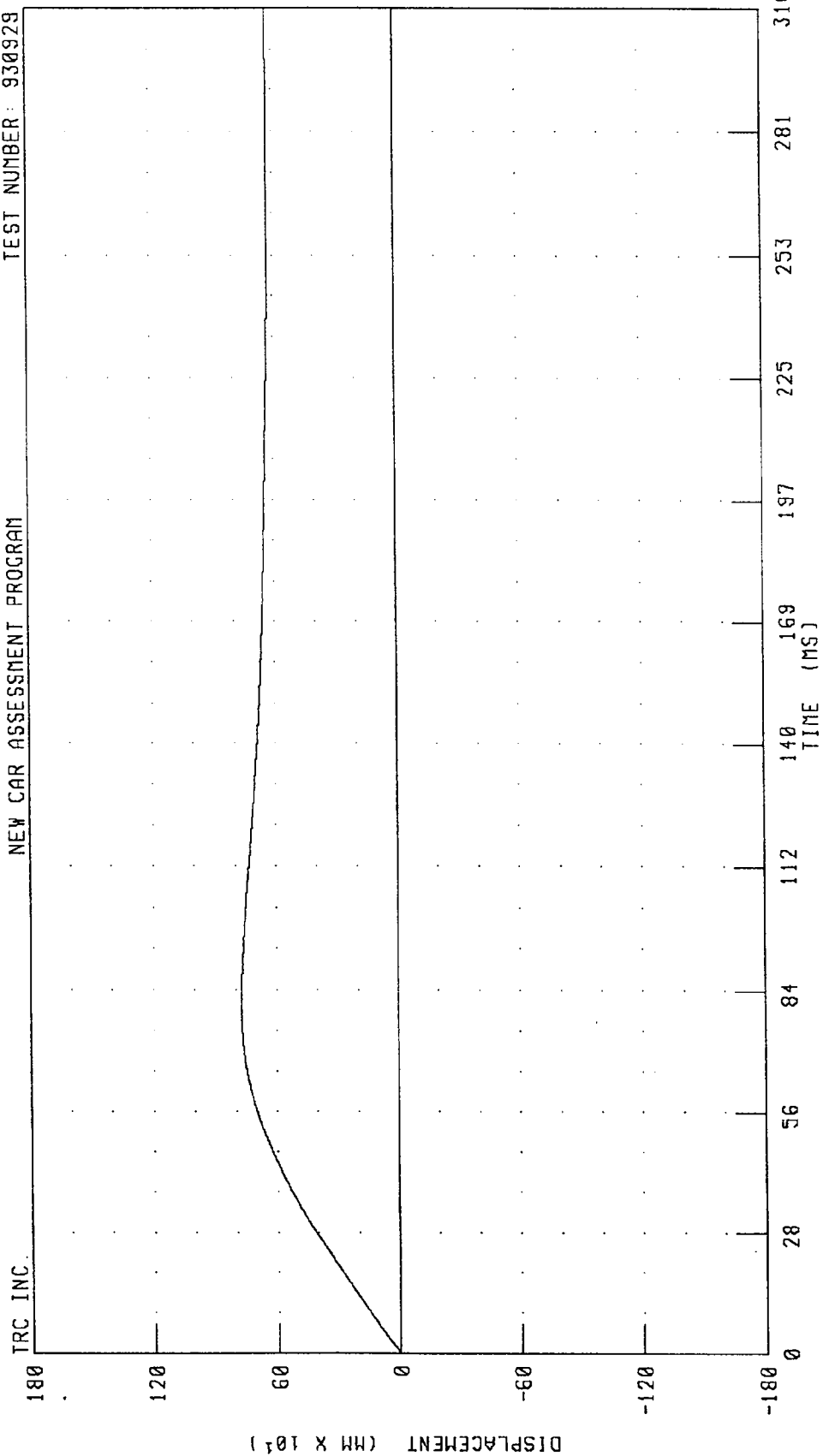


PEAK DATA: 56.51 KM/H @ 2.16 MS; -6.45 KM/H @ 114.00 MS

CHANNEL: TLRXV1 FILTER: CH. CLASS 180

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS DISPLACEMENT
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



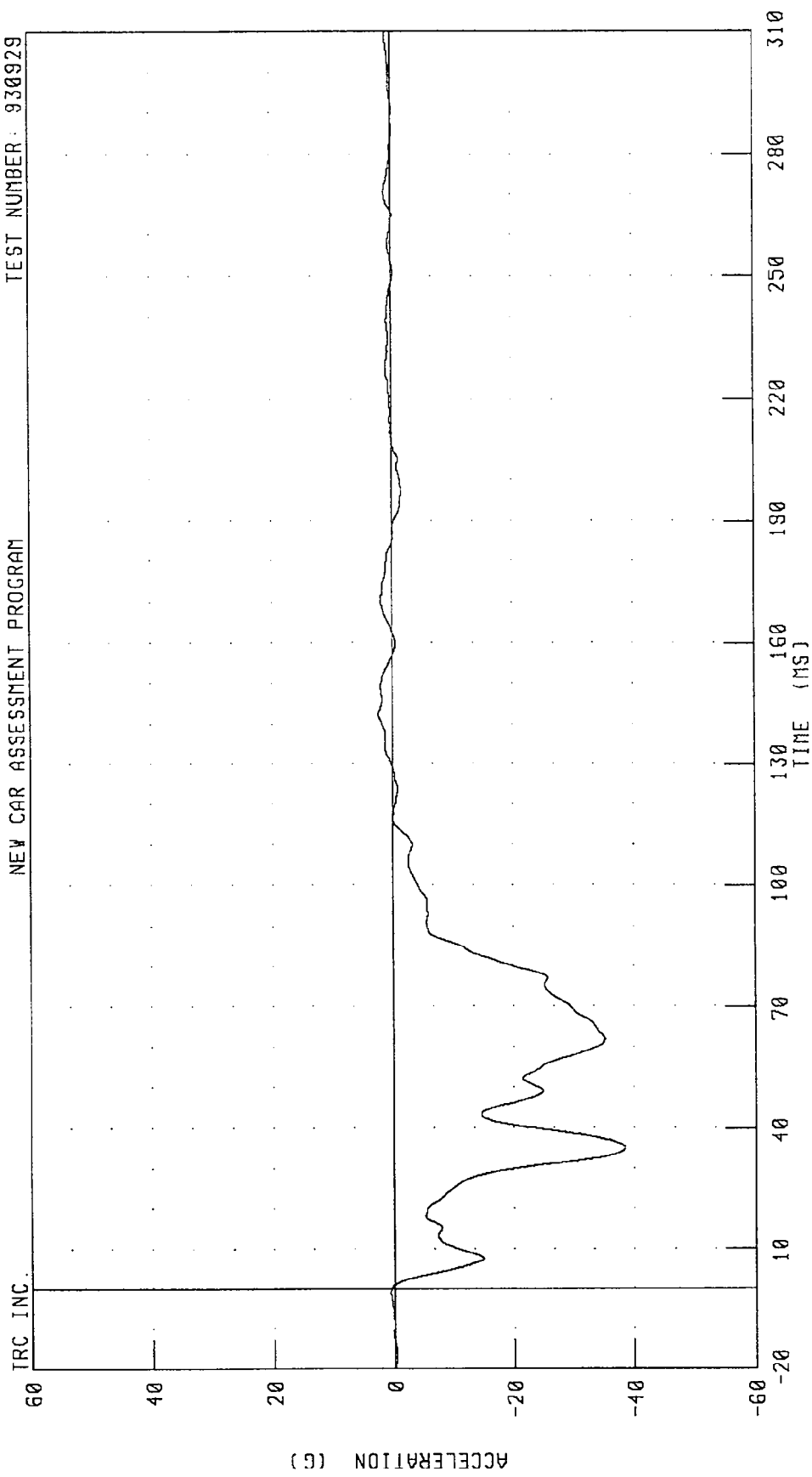
PEAK DATA: 773.90 MM @ 80.96 MS; 0.00 MM @ 0.00 MS

CHANNEL: TLRXD1 FILTER: CH. CLASS 180

TRC INC.

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS ACCELERATION
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

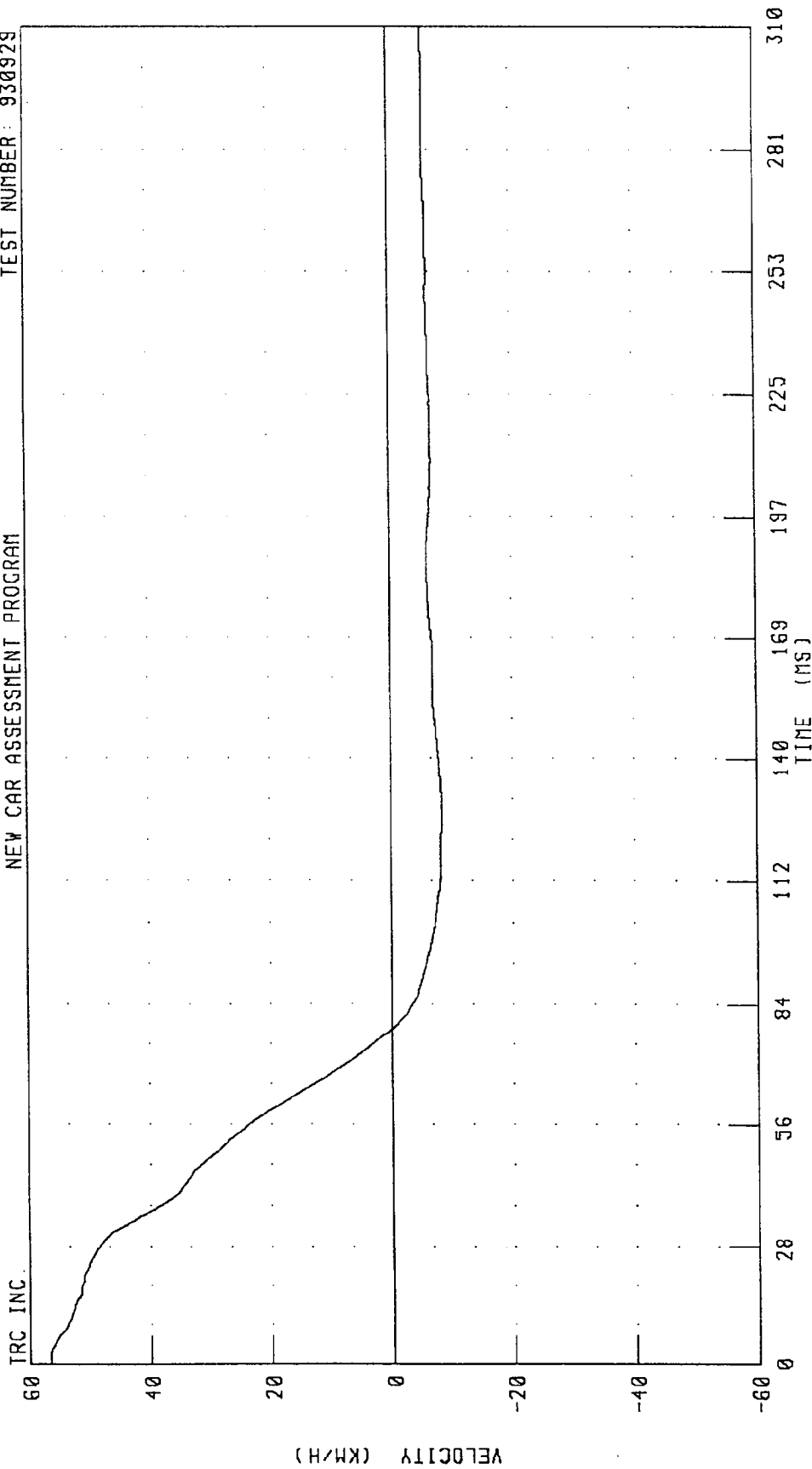


PEAK DATA: 2.36 G @ 142.56 MS; -38.46 G @ 35.20 MS

CHANNEL: TRRXG1 FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS VELOCITY
 NEW CAR ASSESSMENT PROGRAM

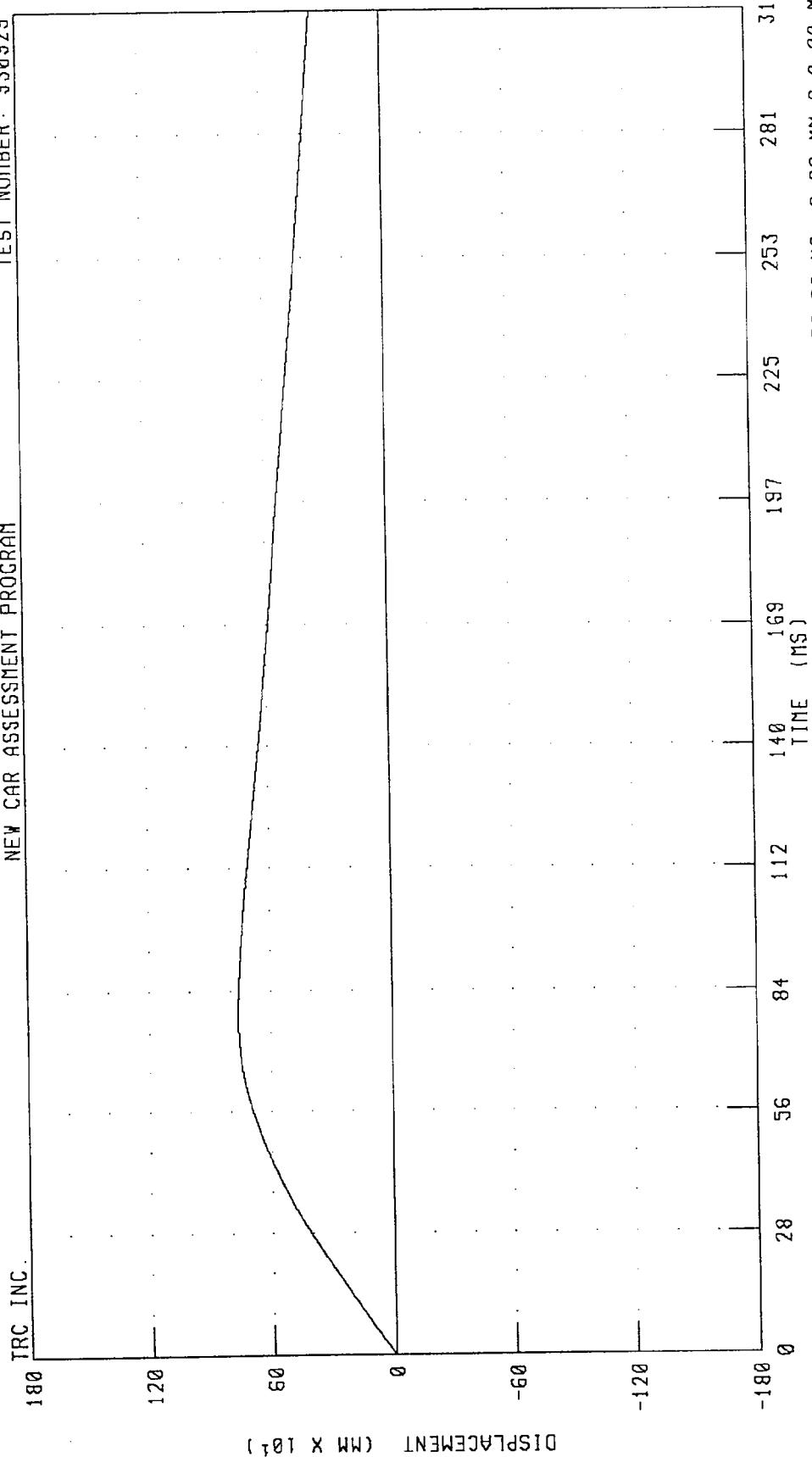
TEST NUMBER: 930929



CHANNEL: TRRXV1 FILTER: CH. CLASS 180

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS DISPLACEMENT
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

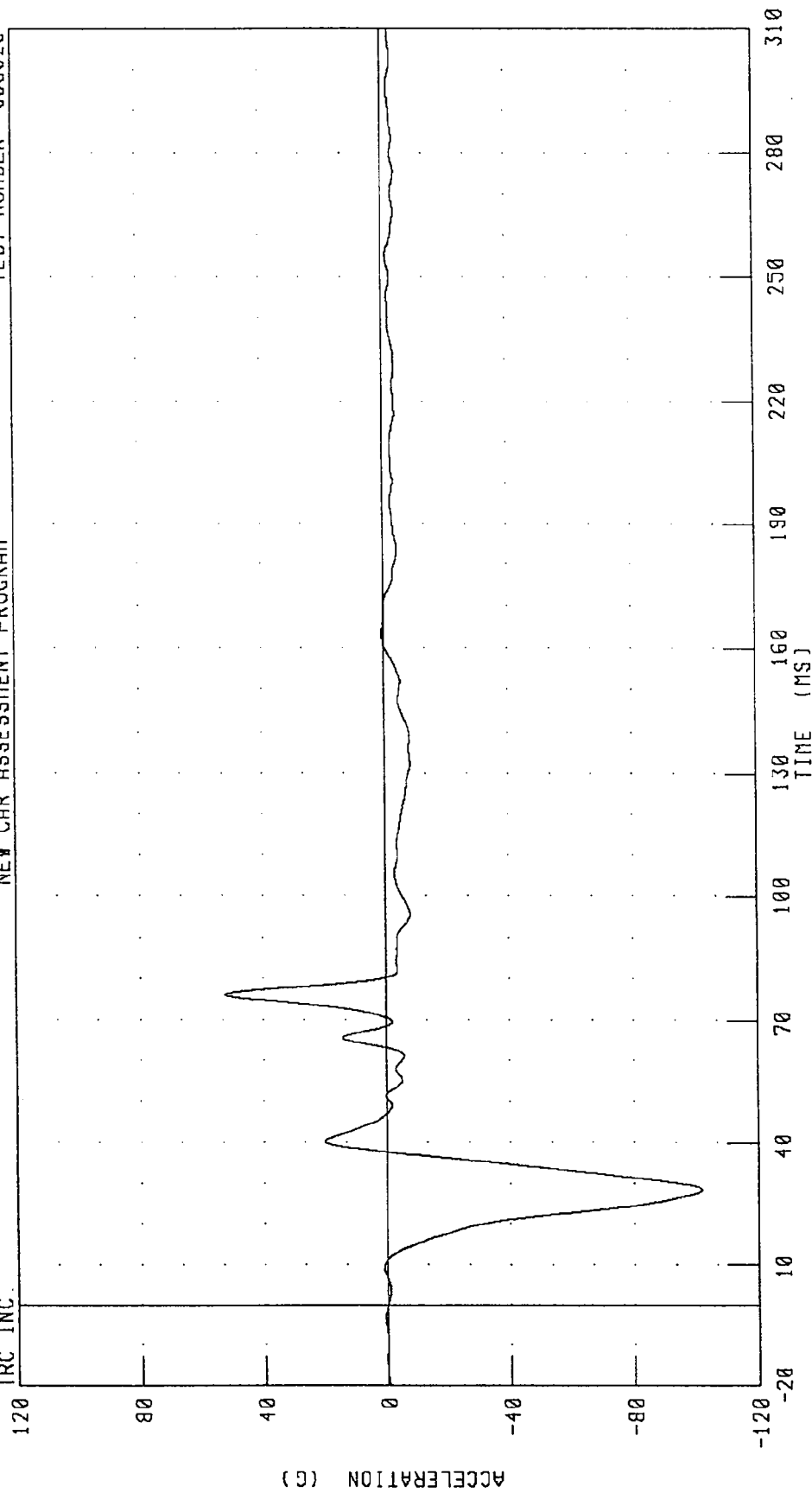


CHANNEL: TRRXD1 FILTER: CH. CLASS 180

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
ENGINE TOP X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.



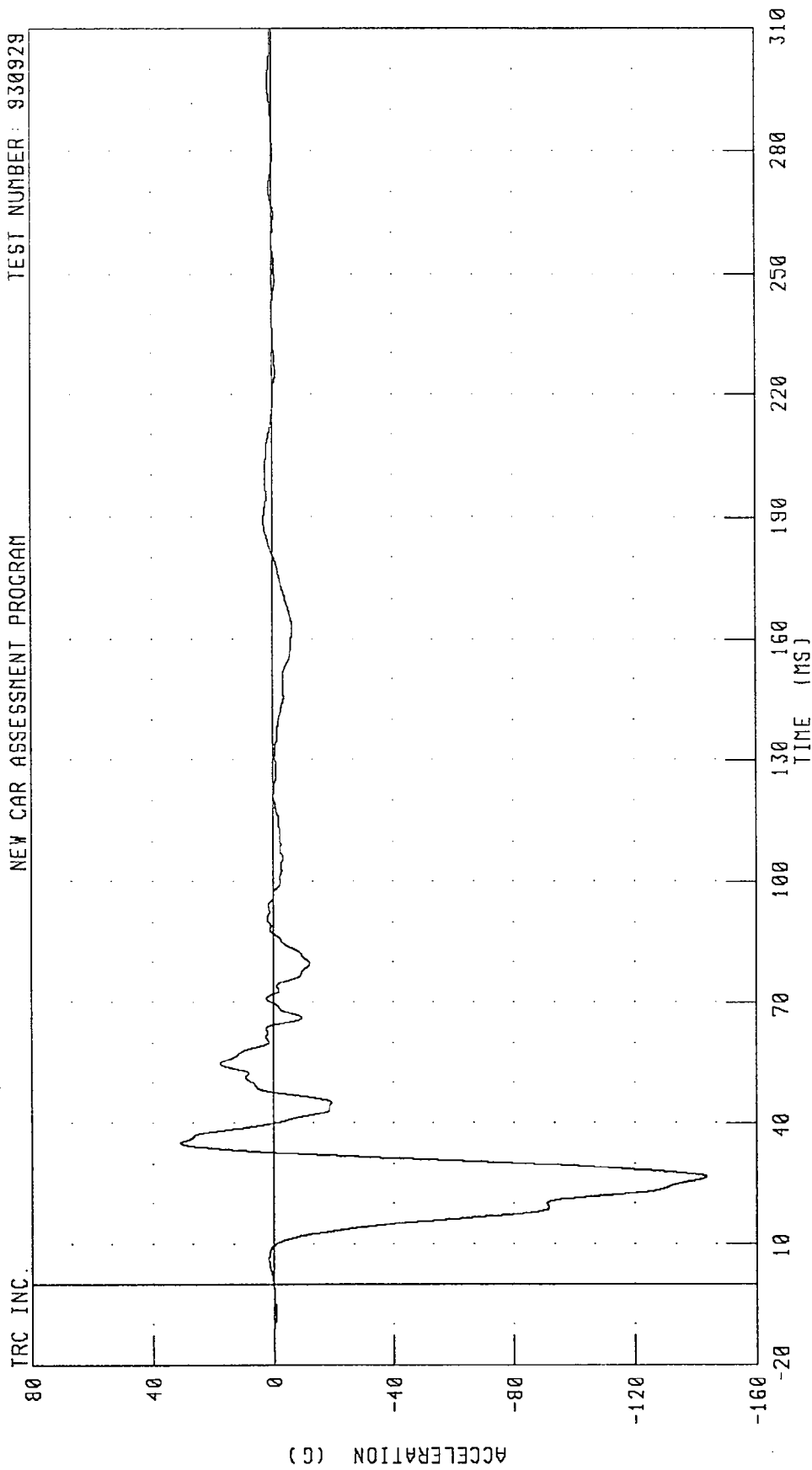
CHANNEL: ENGCG1 FILTER: CH. CLASS 60

PEAK DATA: 52.43 G @ 76.16 MS; -101.76 G @ 28.56 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



CHANNEL: ENGXC2 FILTER: CH. CLASS 60

PEAK DATA: 30.93 G @ 35.12 MS; -143.34 G @ 26.56 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.

See DATA ACQUISITION EXPLANATIONS

ACCELERATION (G)

TIME (MS)

PEAK DATA: 1077 93 G @ 65 36 MS; -153 47 G @ 40 56 MS

CHANNEL: BCRXG1 FILTER: CH. CLASS 60

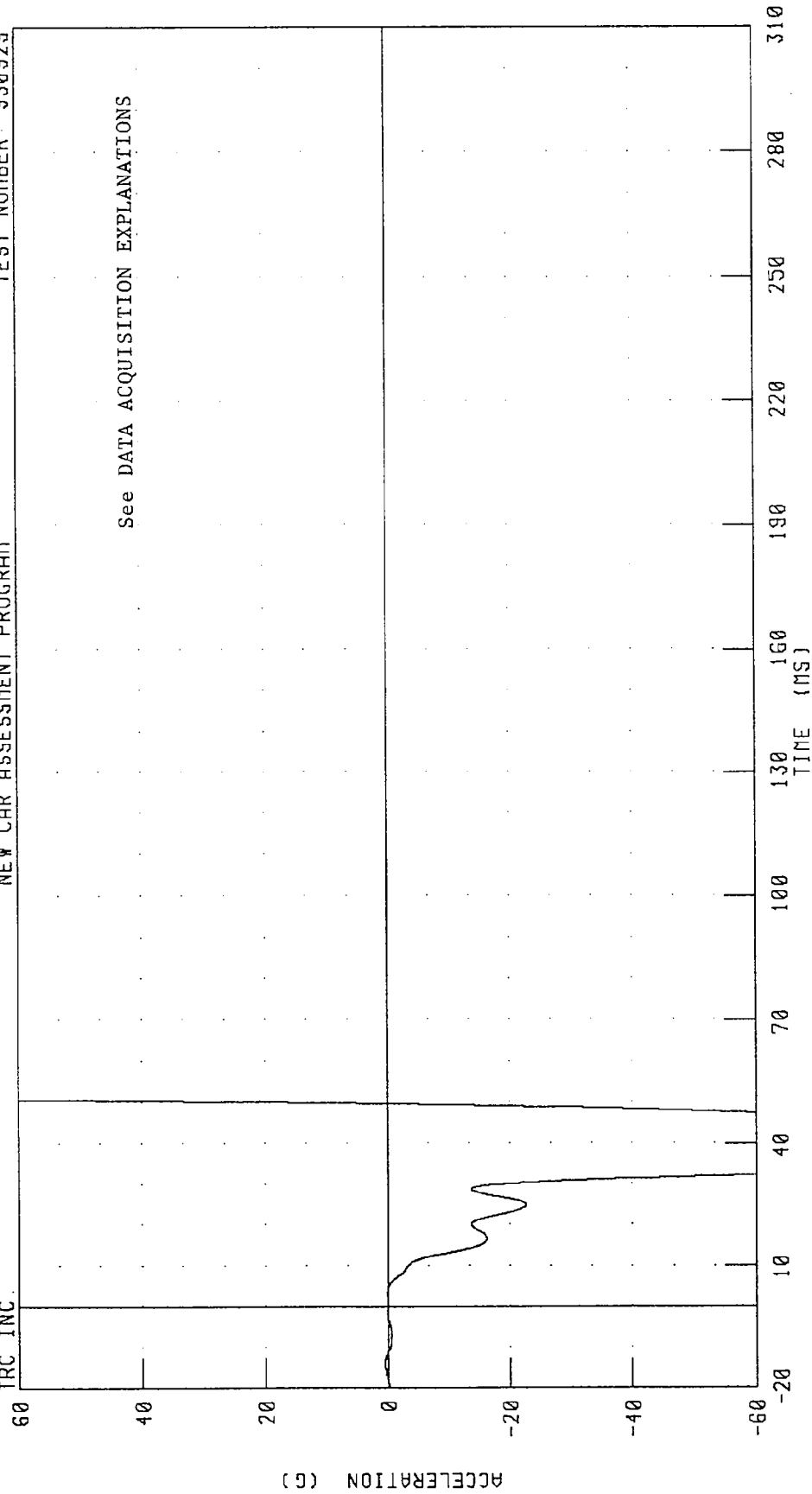
1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.

See DATA ACQUISITION EXPLANATIONS



PEAK DATA: 1142 48 G @ 63.52 MS, -132 01 G @ 35.60 MS

CHANNEL: BCLXG1 FILTER: CH CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.

120

80

40

0

-40

-80

-120

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

PEAK DATA: 25.23 G @ 96.08 MS; -86.30 G @ 69.28 MS

CHANNEL: DPCXG1 FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT REDUNDANT X-AXIS ACCELERATION

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.

60

40

20

ACCELERATION (G)

B-55

-20

-40

-60

310

280

250

220

190

160

130

100

70

40

10

TIME (MS)

PEAK DATA: 2.55 G @ 140 72 MS; -32 34 G @ 63 52 MS

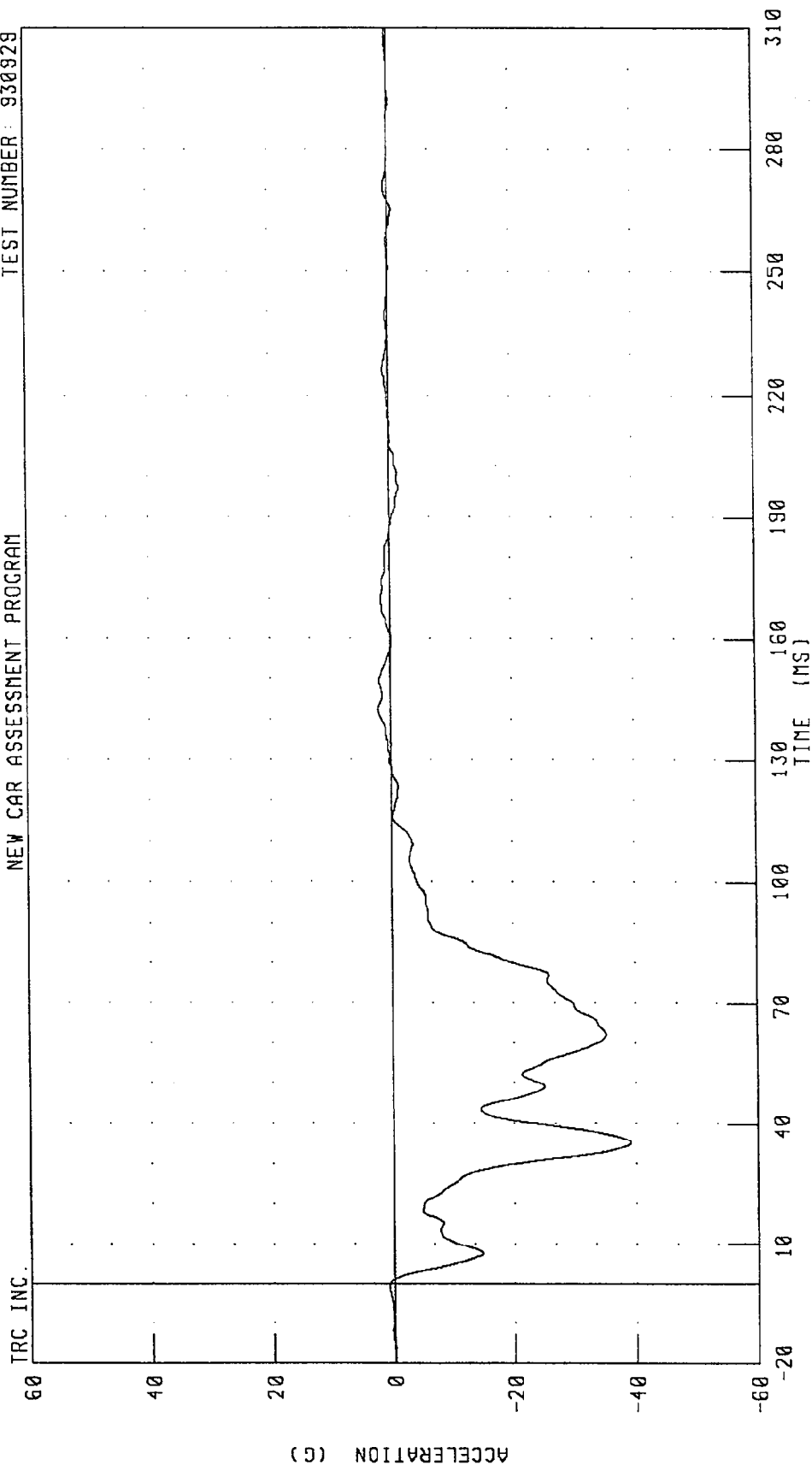
CHANNEL: TLRXGA FILTER: CH. CLASS 60

930929

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT REDUNDANT X-AXIS ACCELERATION

TEST NUMBER: 930929

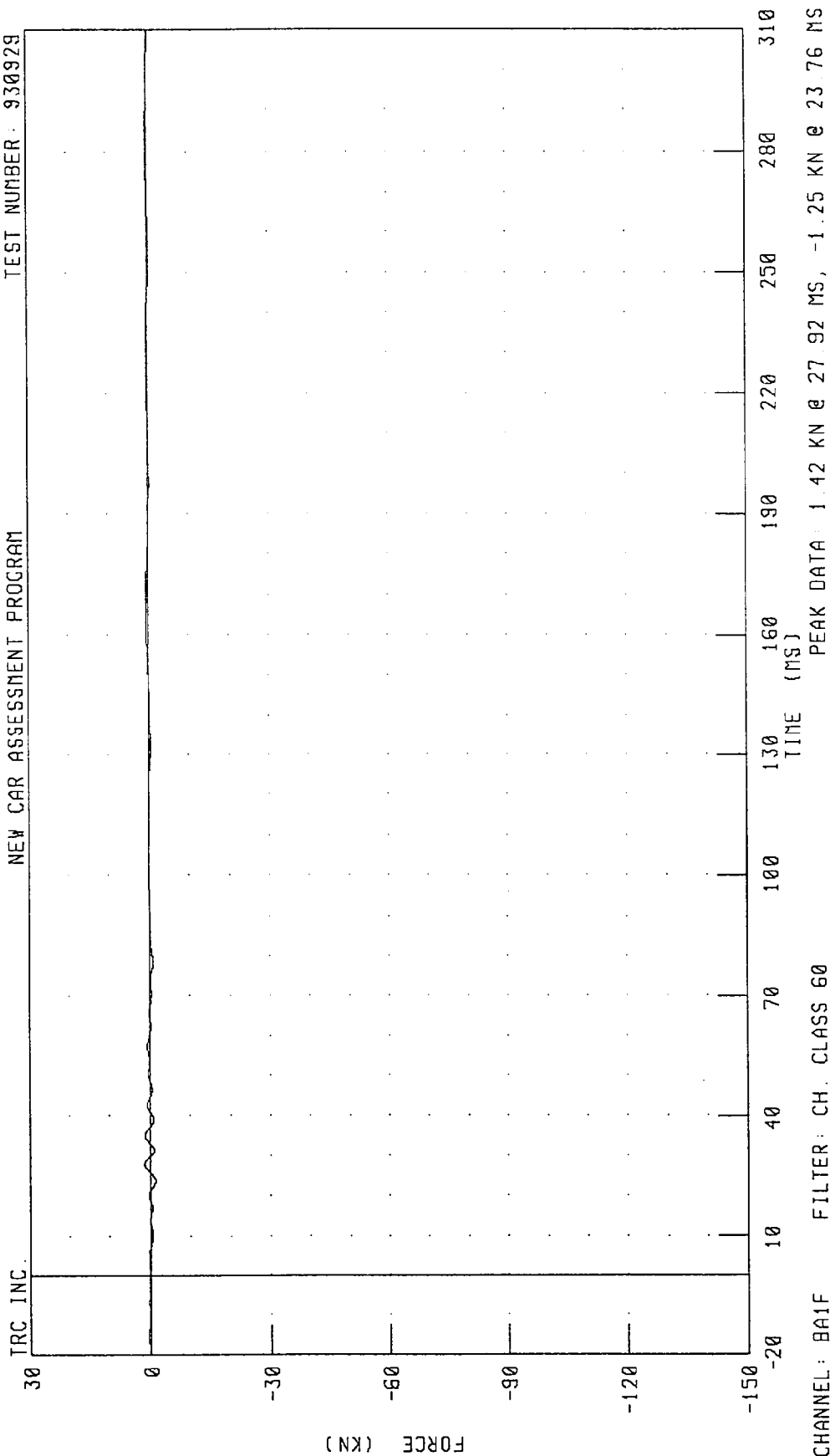
NEW CAR ASSESSMENT PROGRAM



CHANNEL: TRRXGA FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A1 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



CHANNEL: BA1F

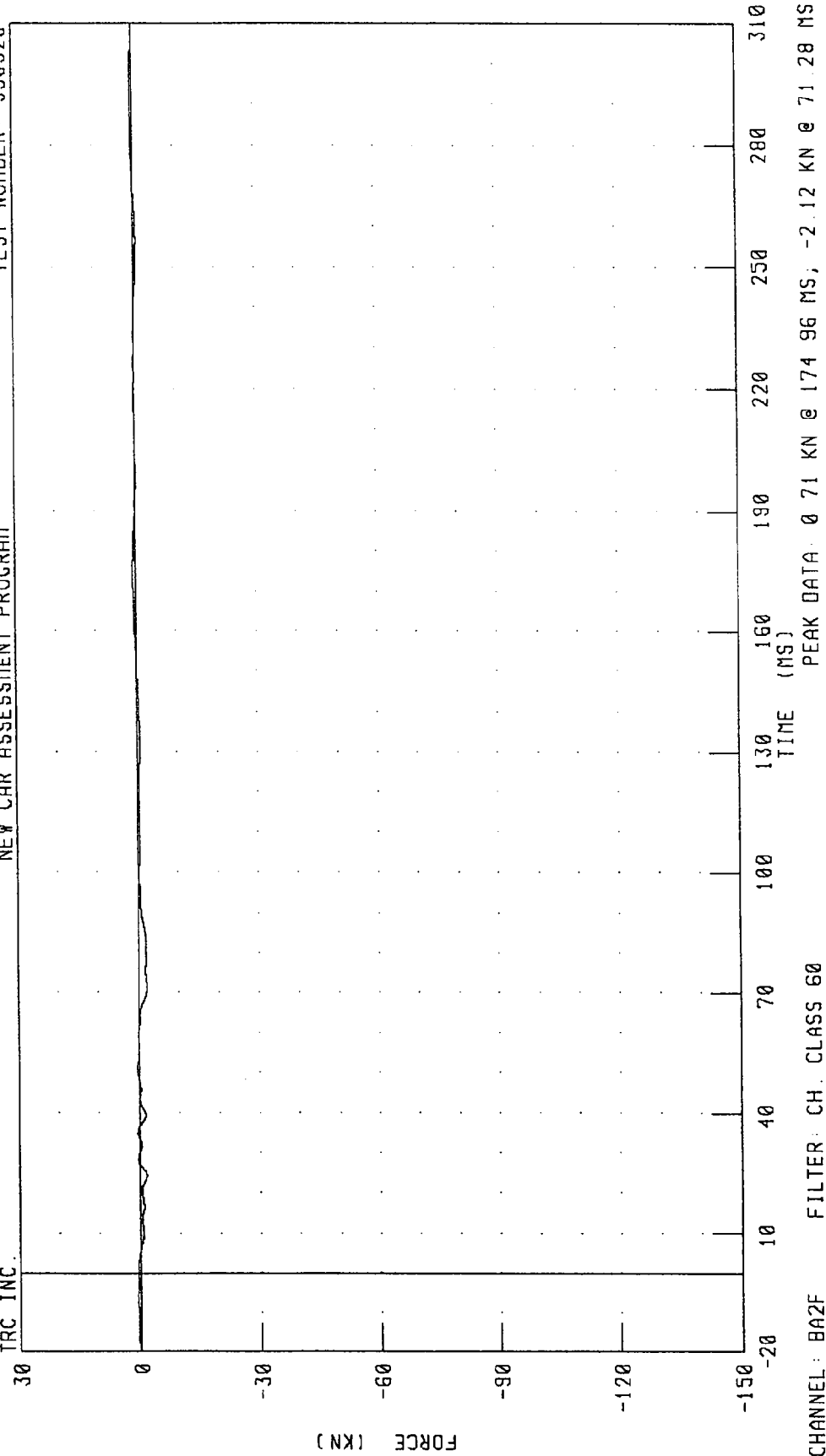
FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A2 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



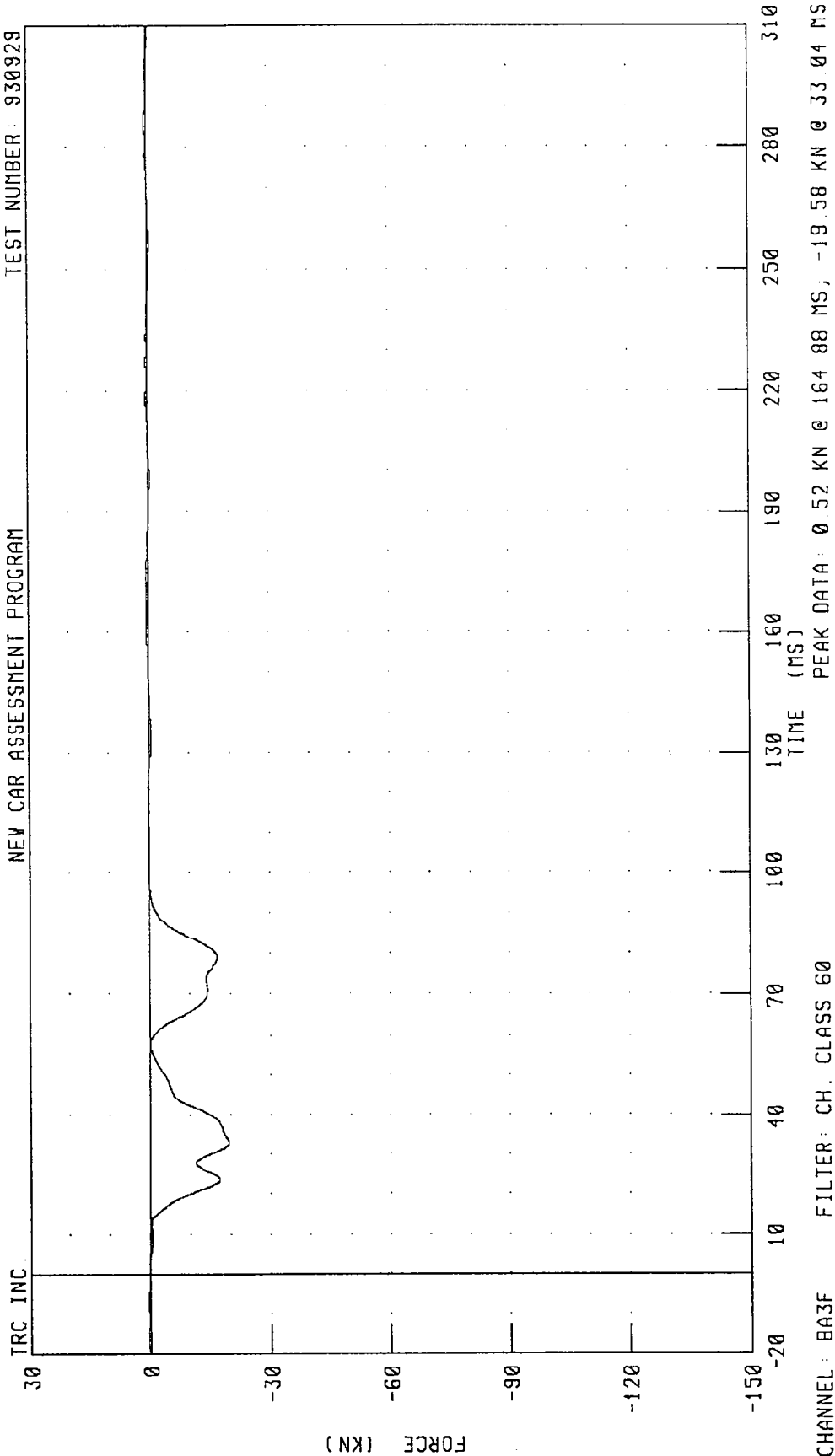
CHANNEL: BA2F

FILTER: CH. CLASS 60

PEAK DATA: 0.71 KN @ 174.96 MS, -2.12 KN @ 71.28 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A3 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



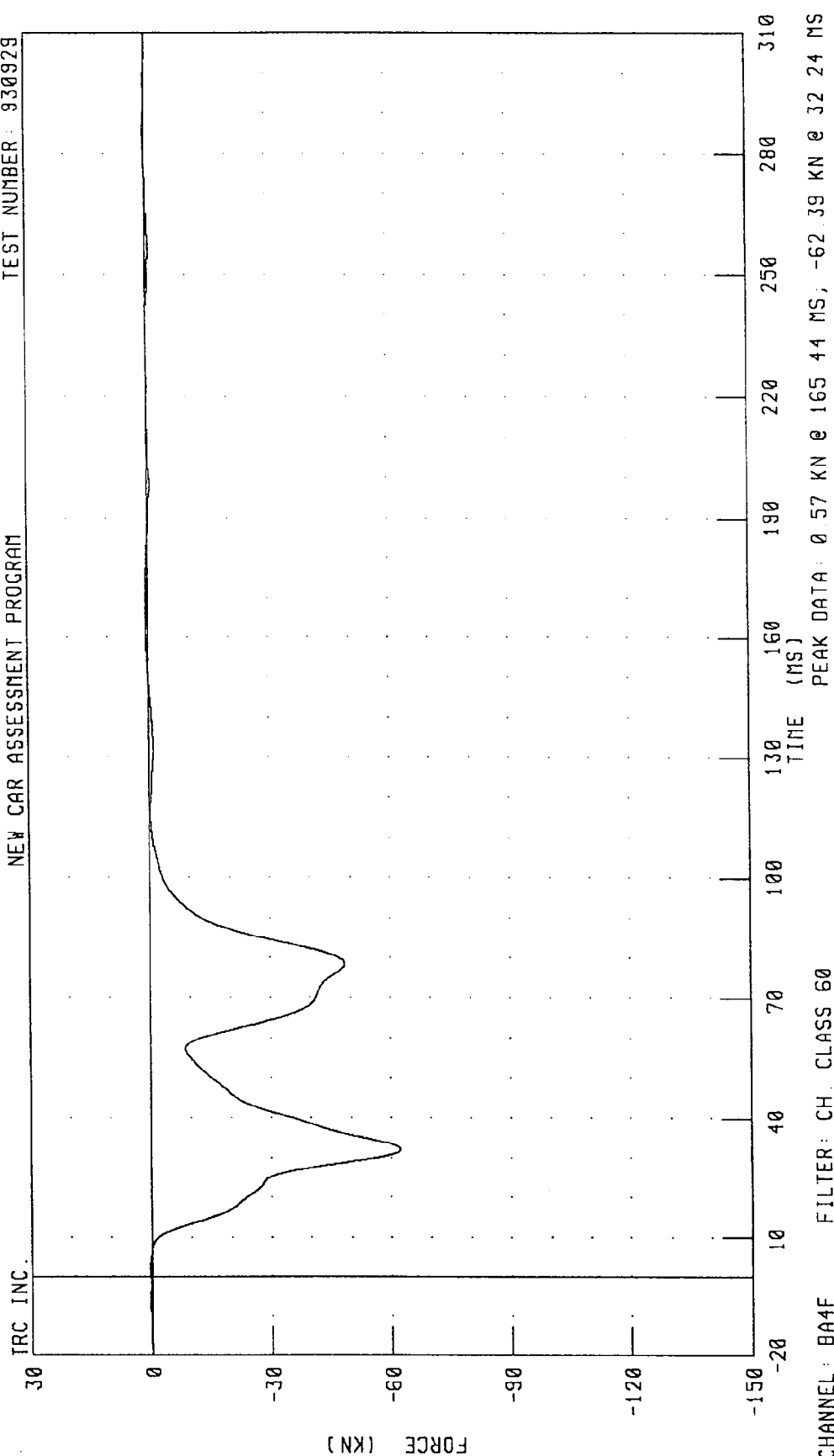
PEAK DATA: 0.52 KN @ 164.88 MS, -19.58 KN @ 33.04 MS

FILTER: CH. CLASS 60

CHANNEL: BA3F

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A4 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



CHANNEL: BA4F FILTER: CH CLASS 60

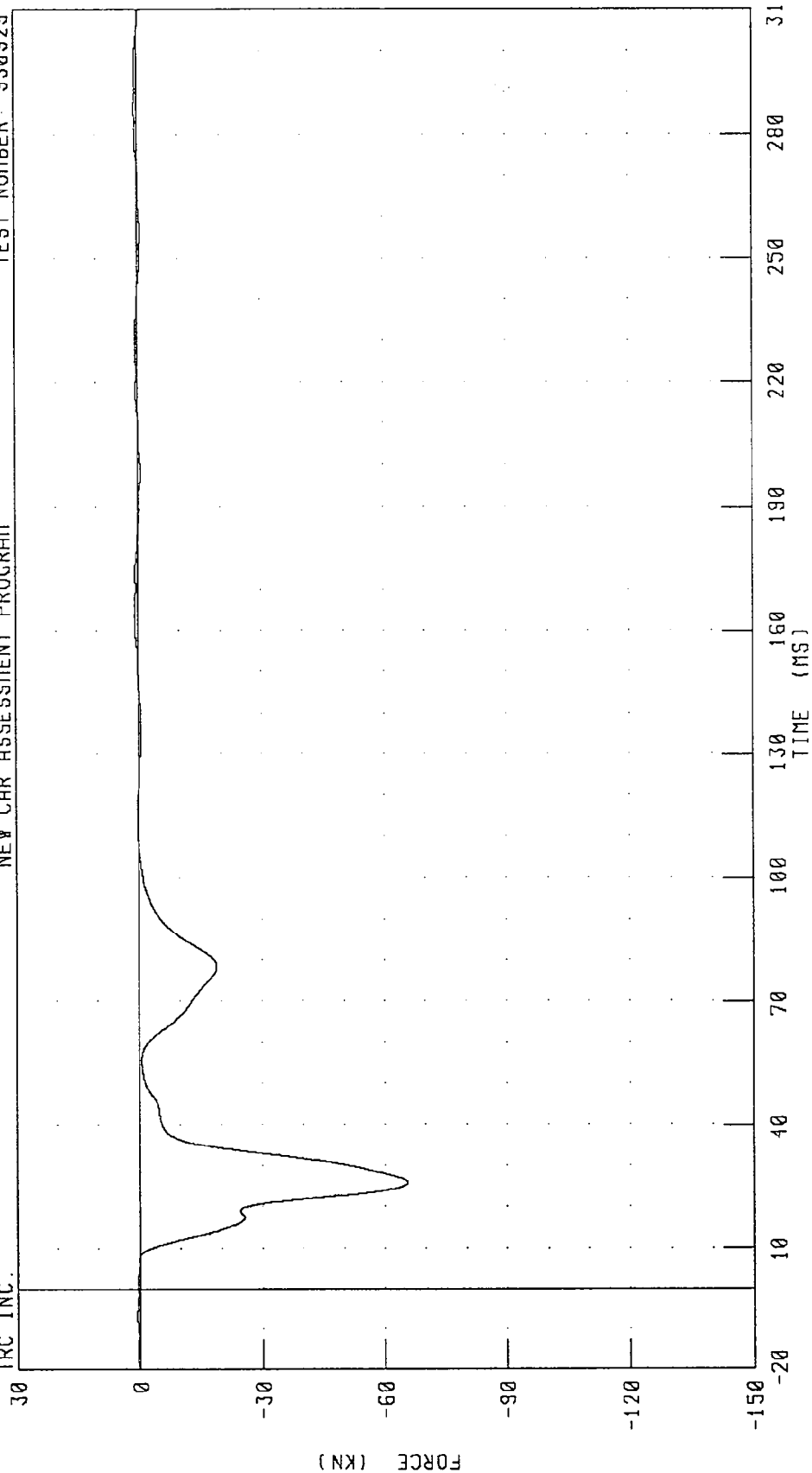
09-8

930929

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A5 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.



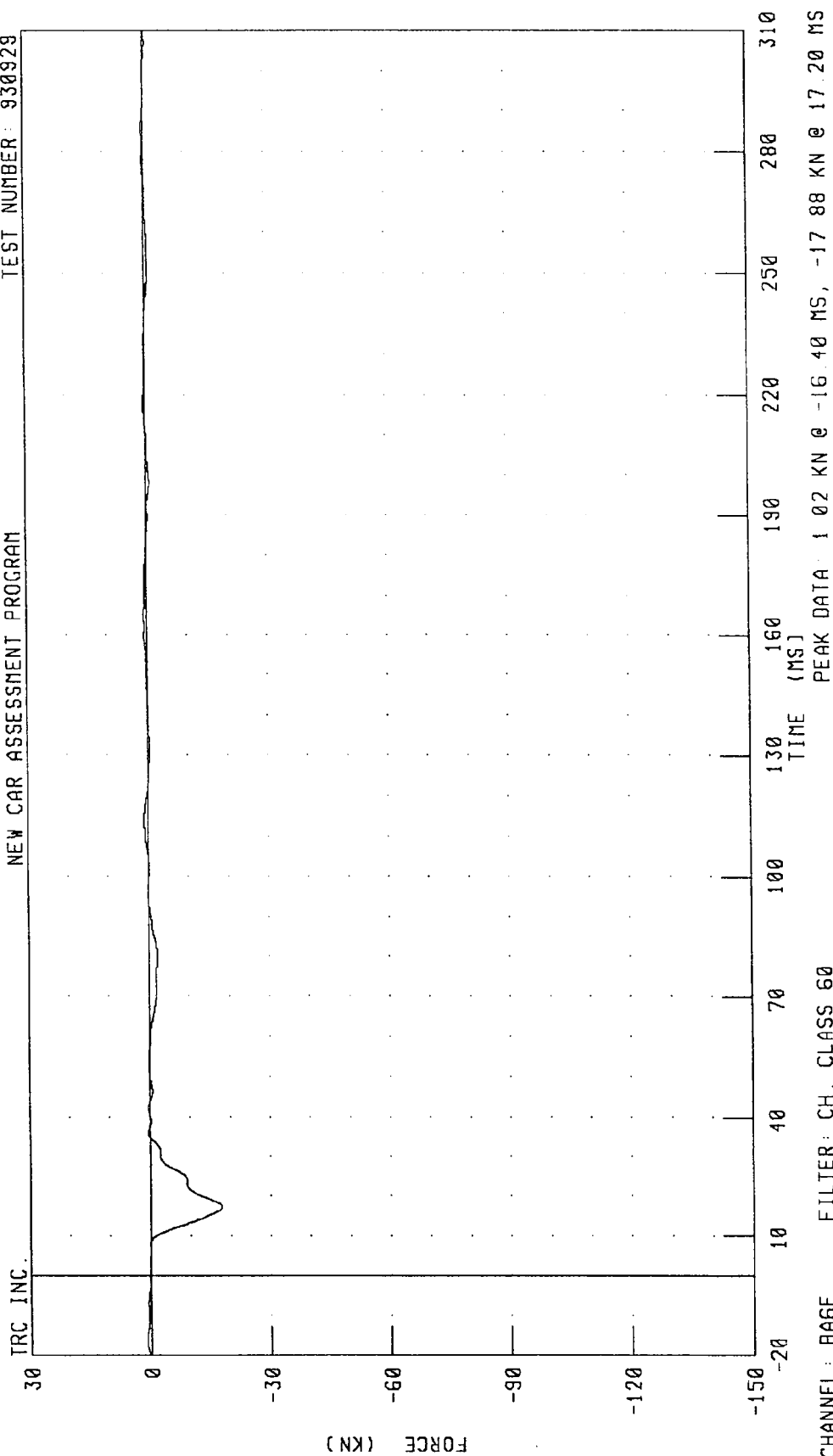
PEAK DATA: 0 71 KN @ 164.96 MS, -65.56 KN @ 25.84 MS

FILTER: CH. CLASS 60

CHANNEL: BASF

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A6 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



PEAK DATA: 1 02 KN @ -16.40 MS, -17 88 KN @ 17.20 MS

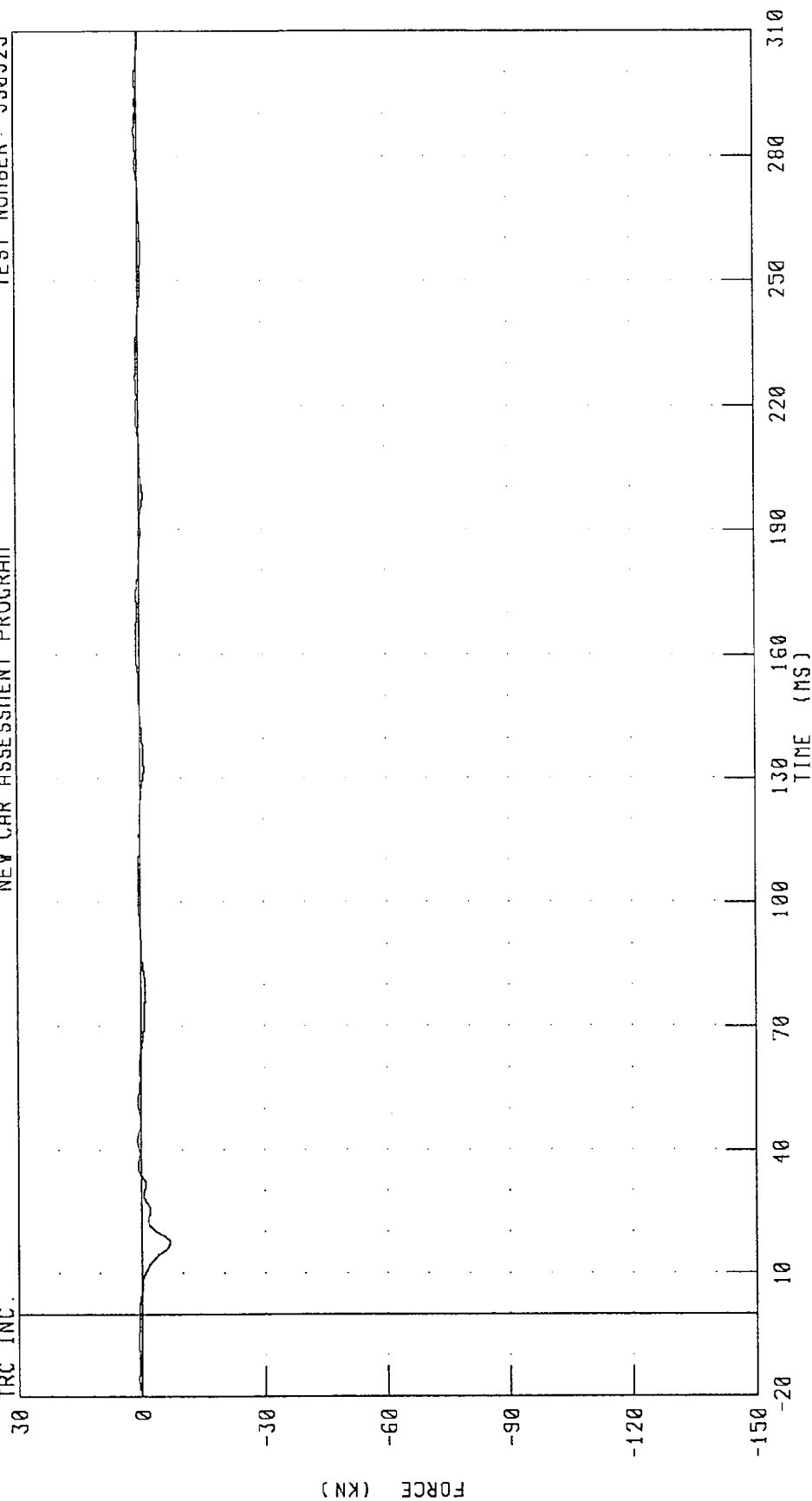
CHANNEL: BA6F FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A7 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.94 KN @ 42.40 MS, -7.00 KN @ 17.44 MS

FILTER: CH. CLASS 60

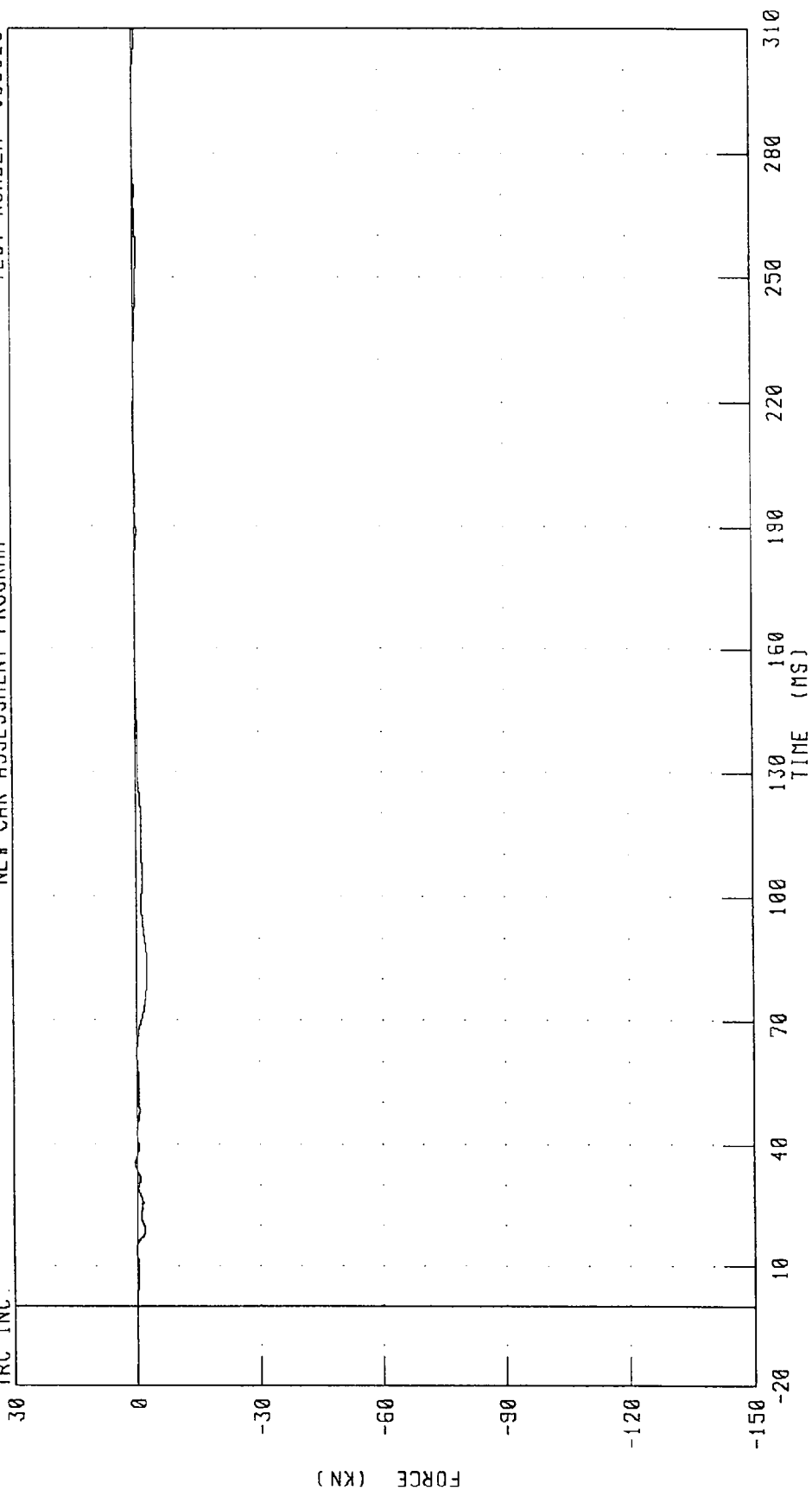
CHANNEL: BA7F

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A8 FORCE

TEST NUMBER 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 0.51 KN @ 35.44 MS, -2.70 KN @ 80.24 MS

FILTER: CH. CLASS 60

CHANNEL: B8BF

FORCE (KN)

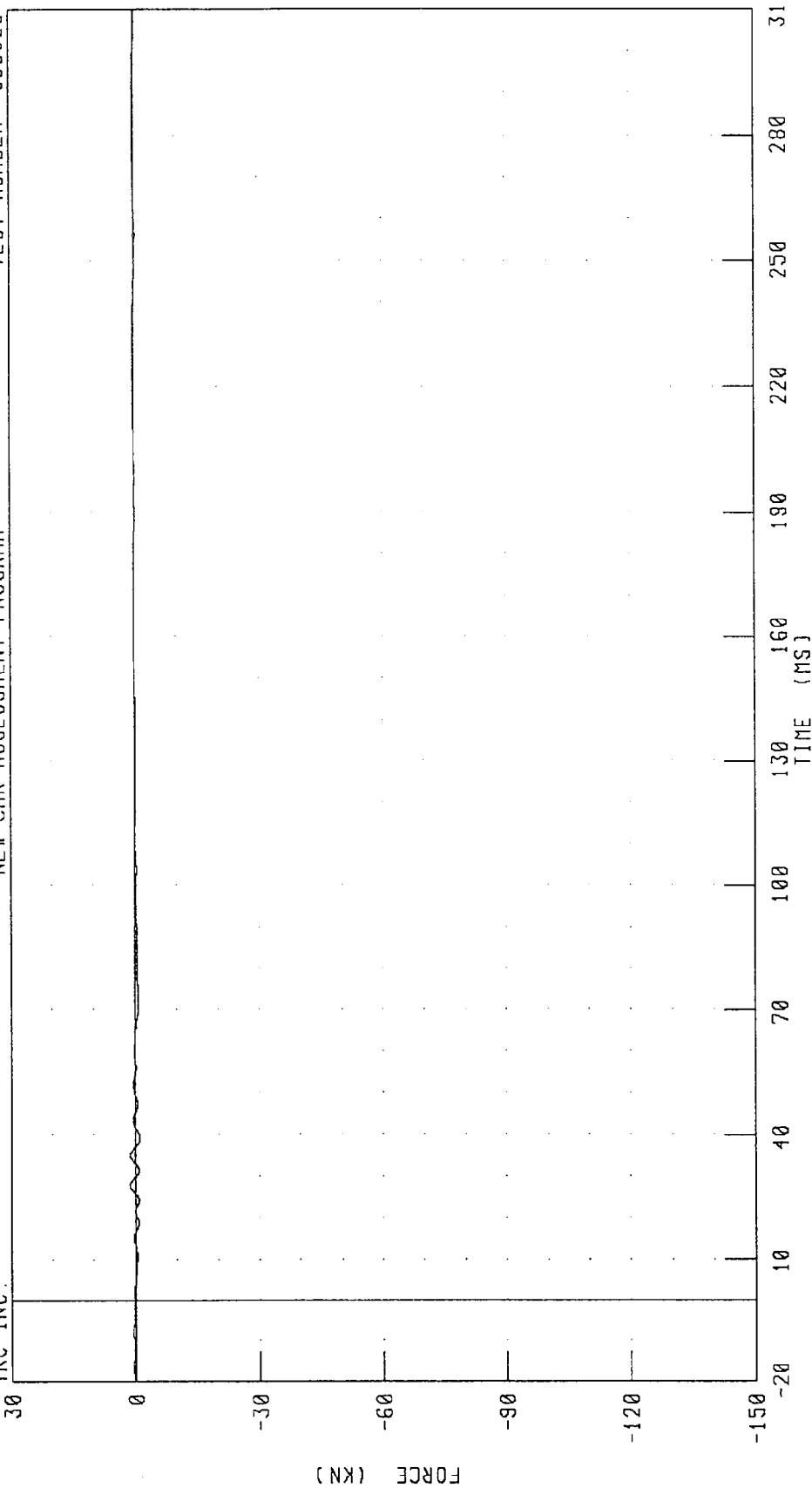
TIME (MS)

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION AS FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



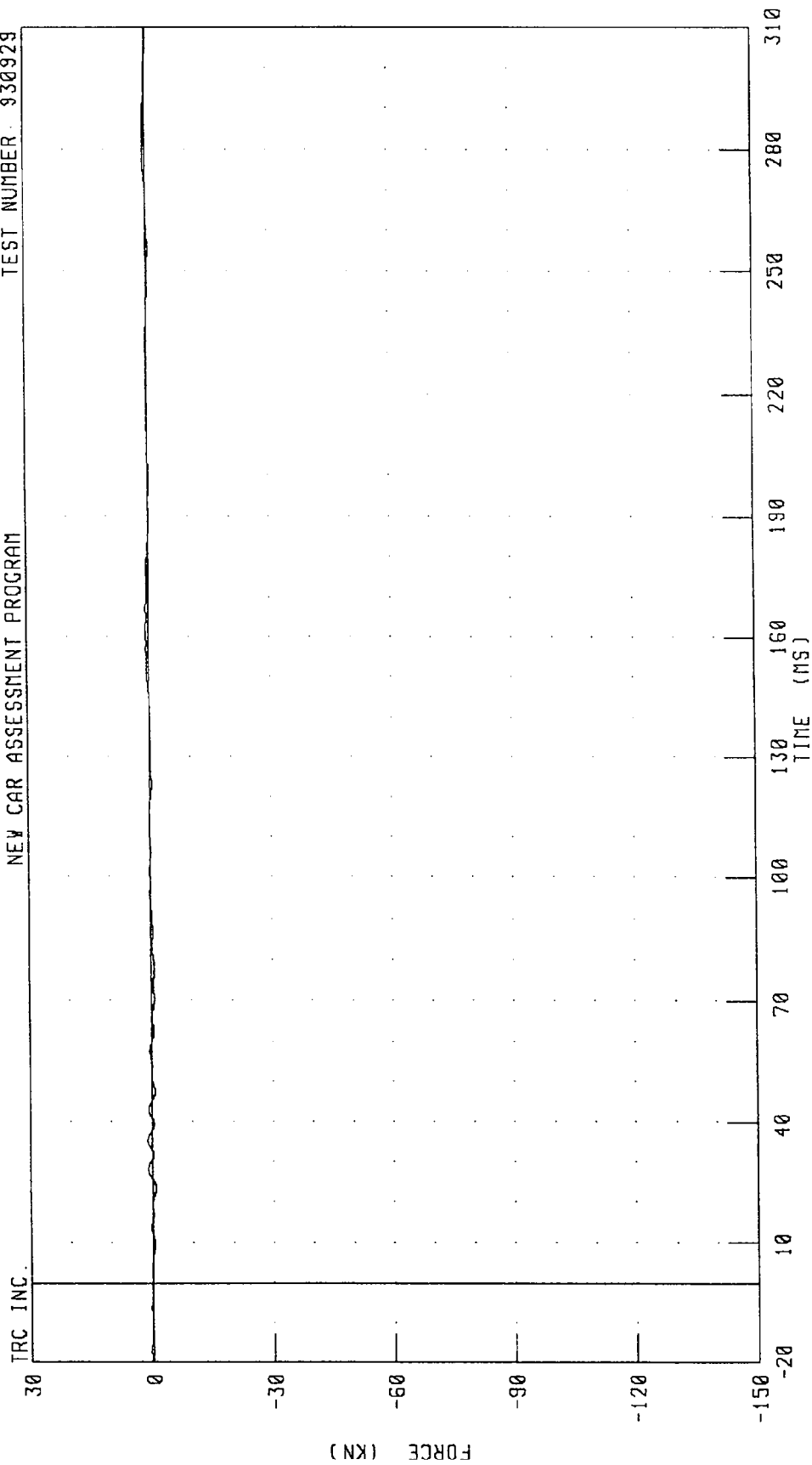
CHANNEL: BA9F

FILTER: CH. CLASS 60

PEAK DATA 1 30 KN @ 27.84 MS, -1.11 KN @ 39.36 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B1 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER 930929



PEAK DATA: 1 11 KN @ 35.36 MS, -0.89 KN @ 23.60 MS

CHANNEL: BB1F FILTER: CH. CLASS 60

FORCE (KN)

TIME (MS)

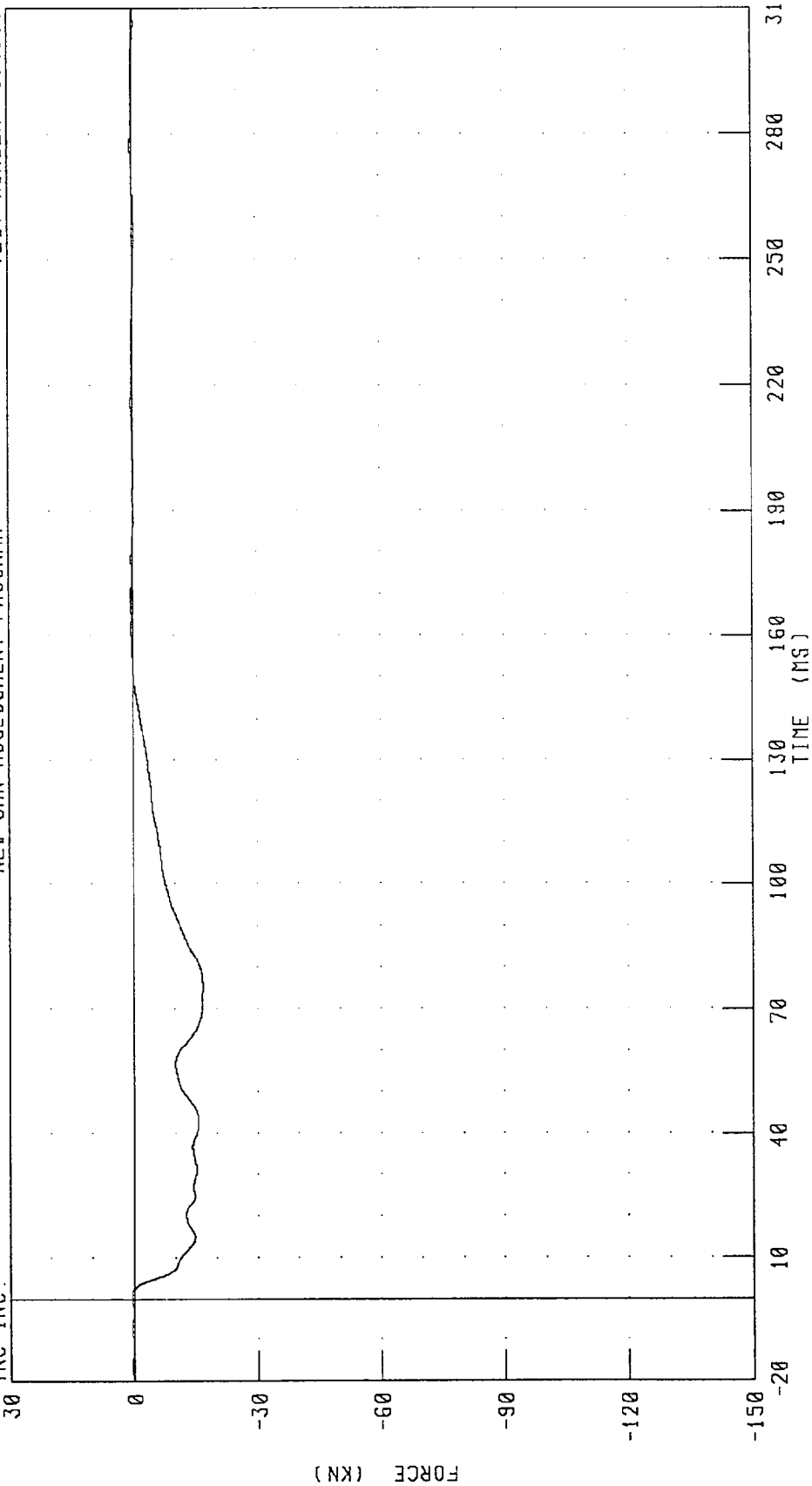
TRC INC.

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B2 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BB2F

FILTER: CH. CLASS 60

PEAK DATA: 0.59 KN @ 0.72 MS, -16.69 KN @ 74.96 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B3 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.

30

0

-30

-60

-90

-120

-150

FORCE (KN)

-20

10

40

70

100

130

160

190

220

250

280

310

TIME (MS)

PEAK DATA: 0.61 KN @ -16.88 MS, -46.79 KN @ 16.08 MS

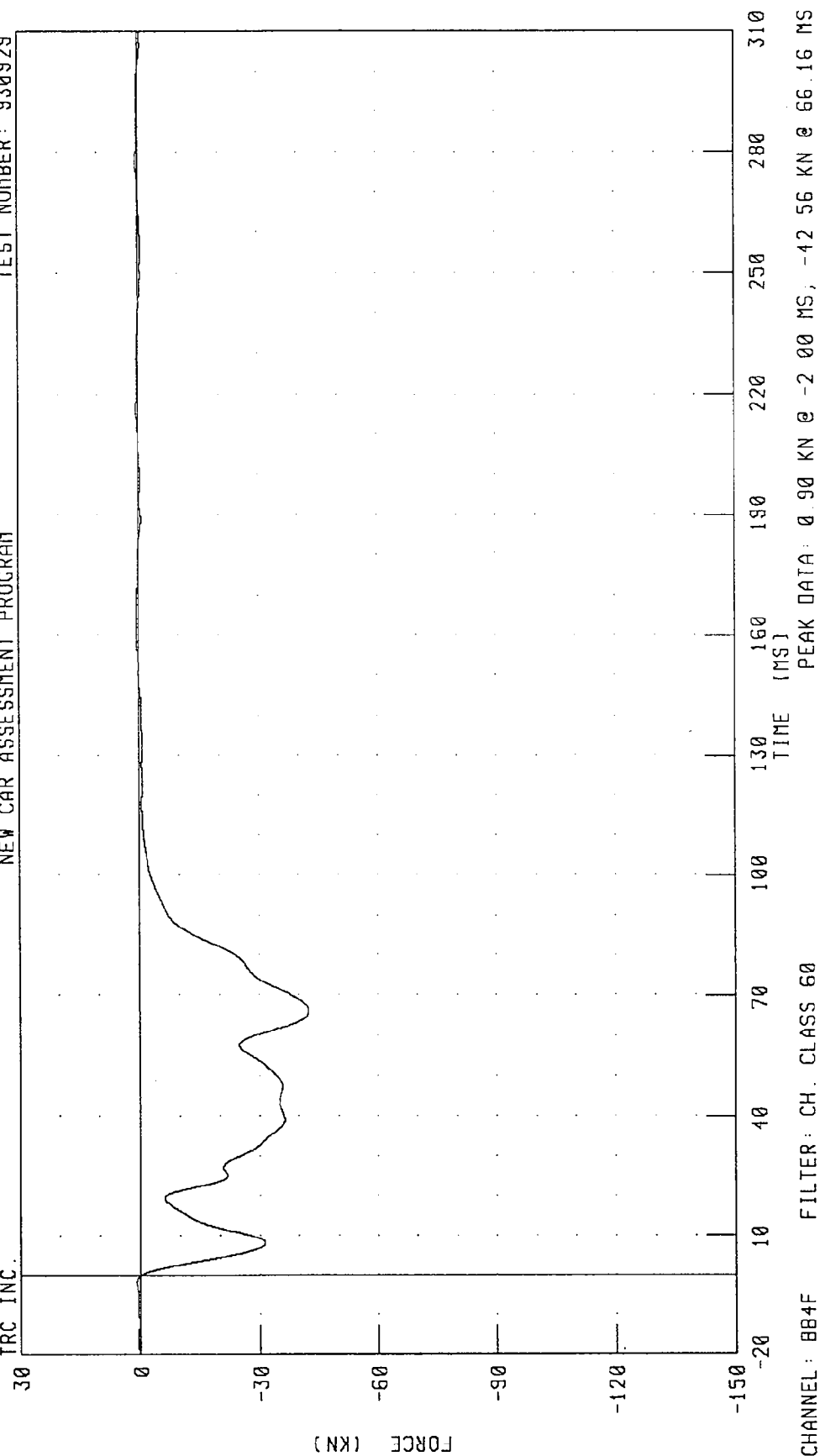
CHANNEL: BB3F FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B4 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



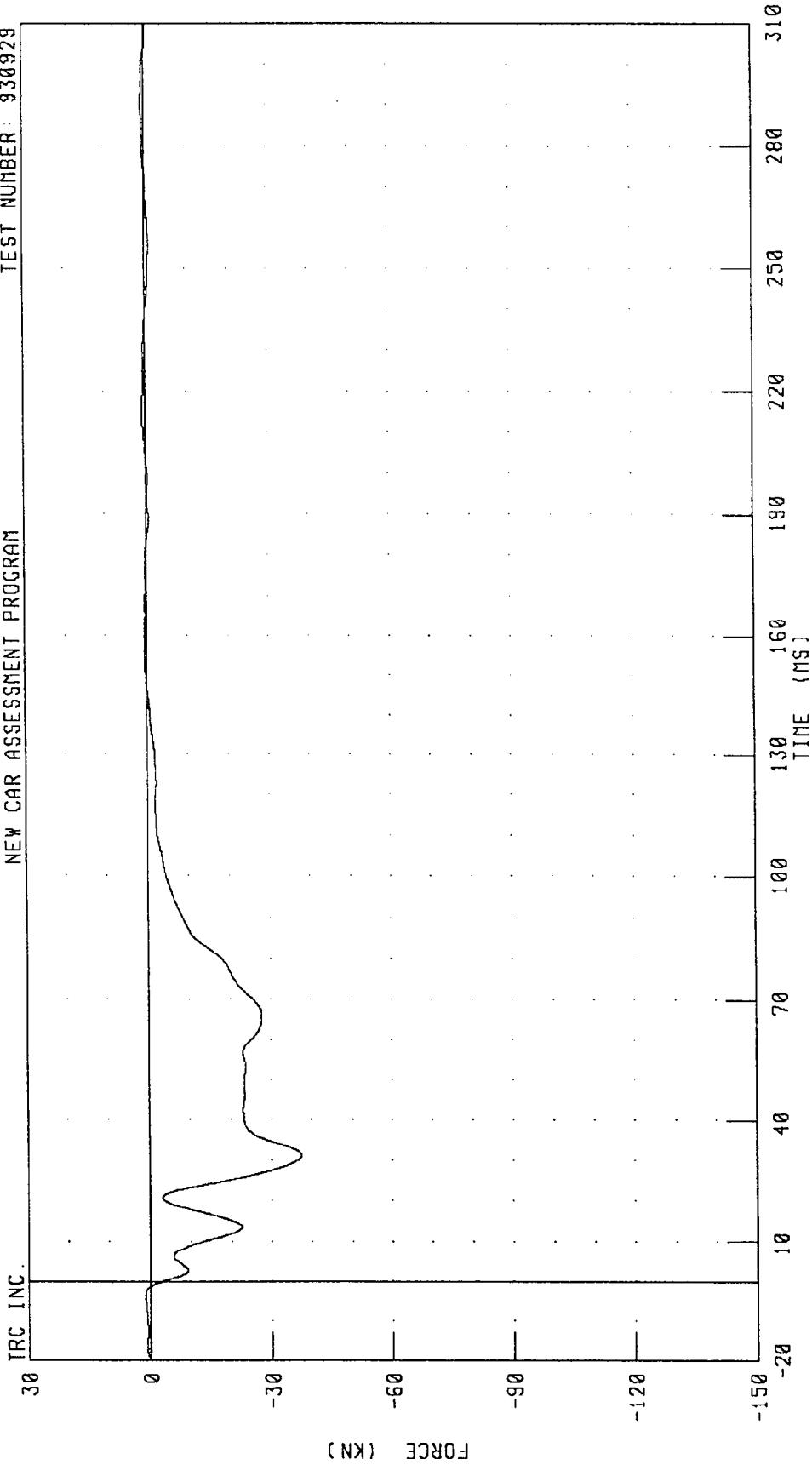
CHANNEL: BB4F

FILTER: CH. CLASS 60

PEAK DATA: 0.90 KN @ -2.00 MS, -42.56 KN @ 66.16 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B5 FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



PEAK DATA: 1.25 KN @ -3.68 MS, -37.47 KN @ 31.12 MS

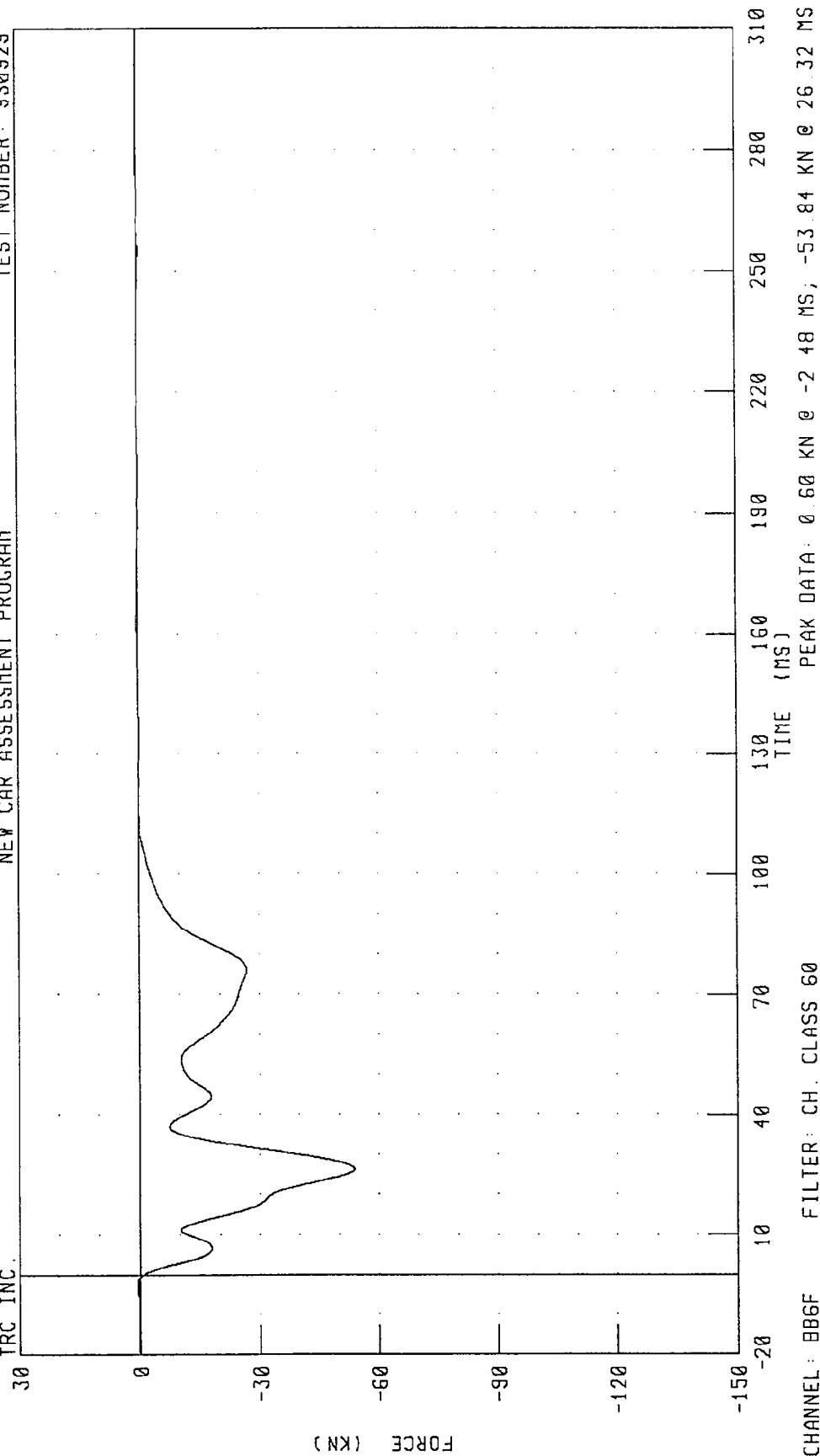
CHANNEL: BB5F FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B6 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



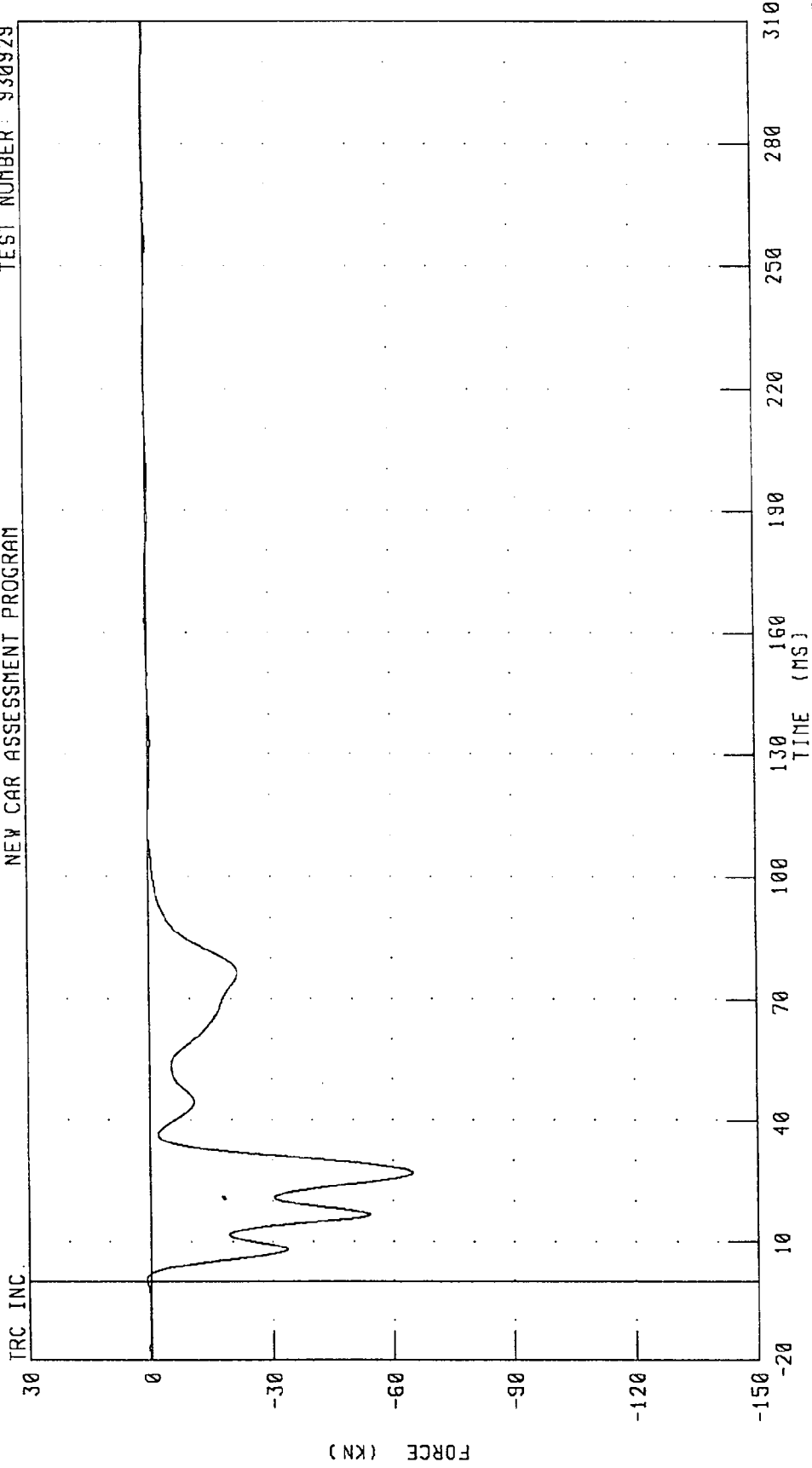
CHANNEL: BB6F

FILTER: CH. CLASS 60

PEAK DATA: 0.60 KN @ -2.48 MS; -53.84 KN @ 26.32 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B7 FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



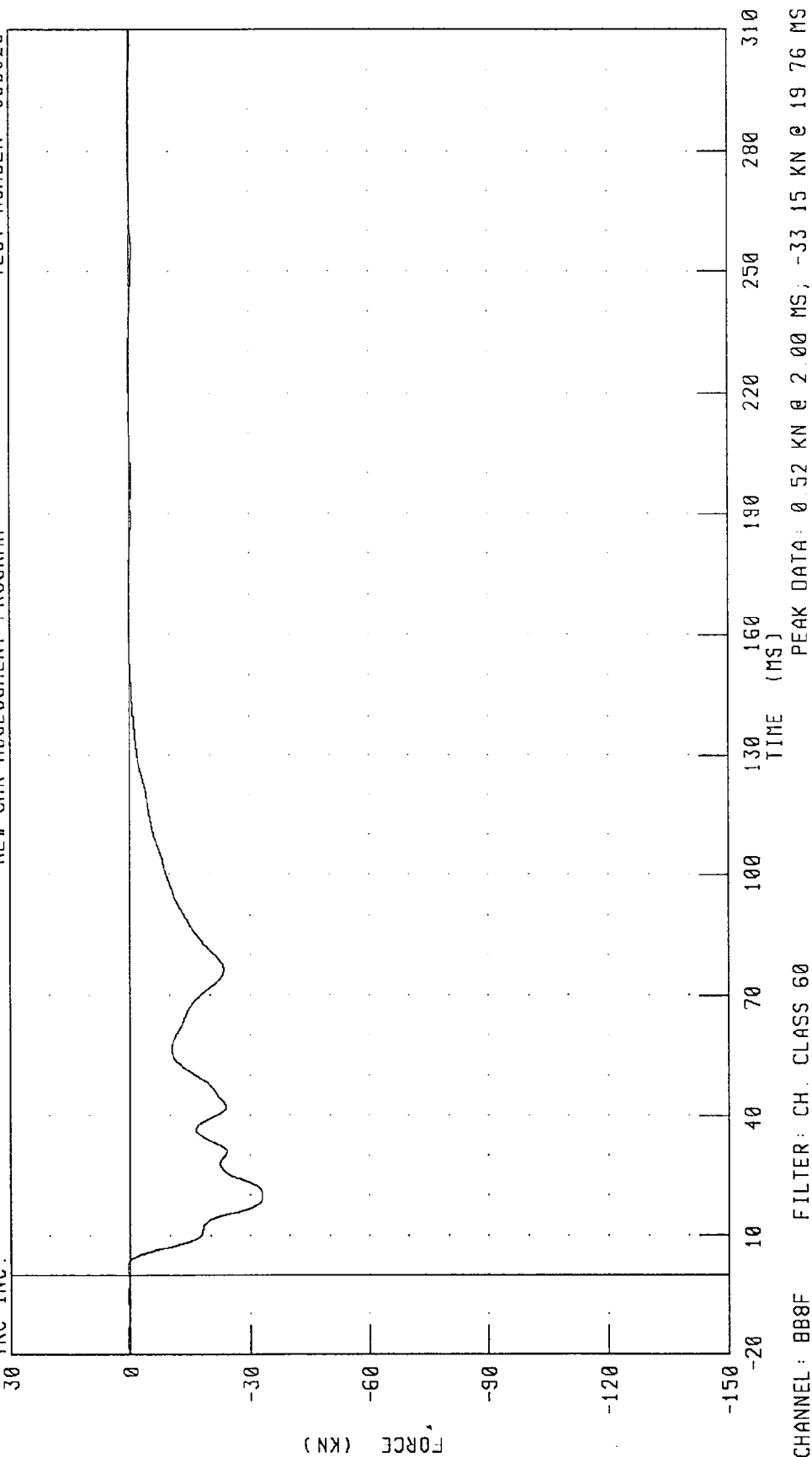
CHANNEL: BB7F FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B8 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BB8F

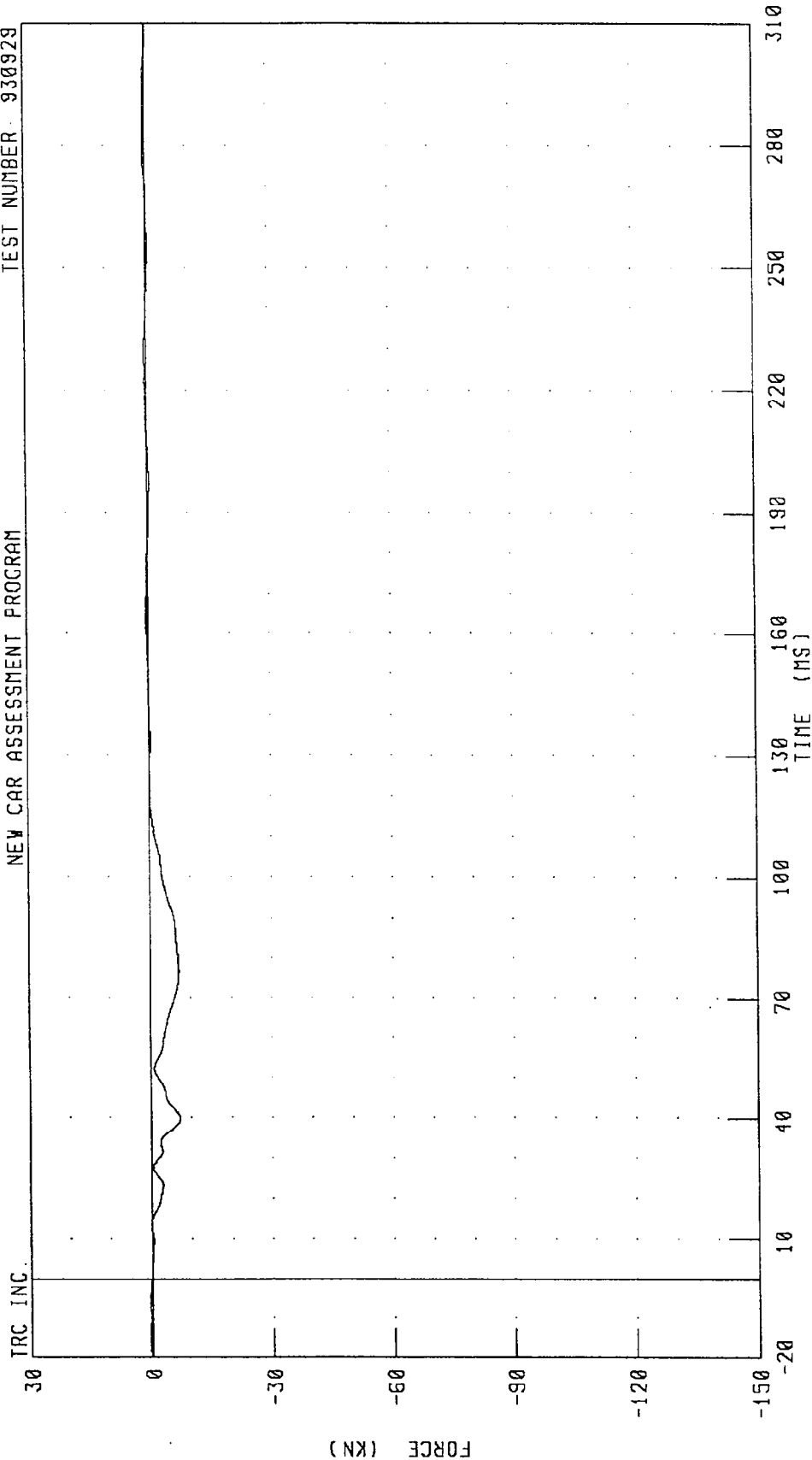
FILTER: CH. CLASS 60

PEAK DATA:

0.52 KN @ 2.00 MS, -33.15 KN @ 19.76 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B9 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



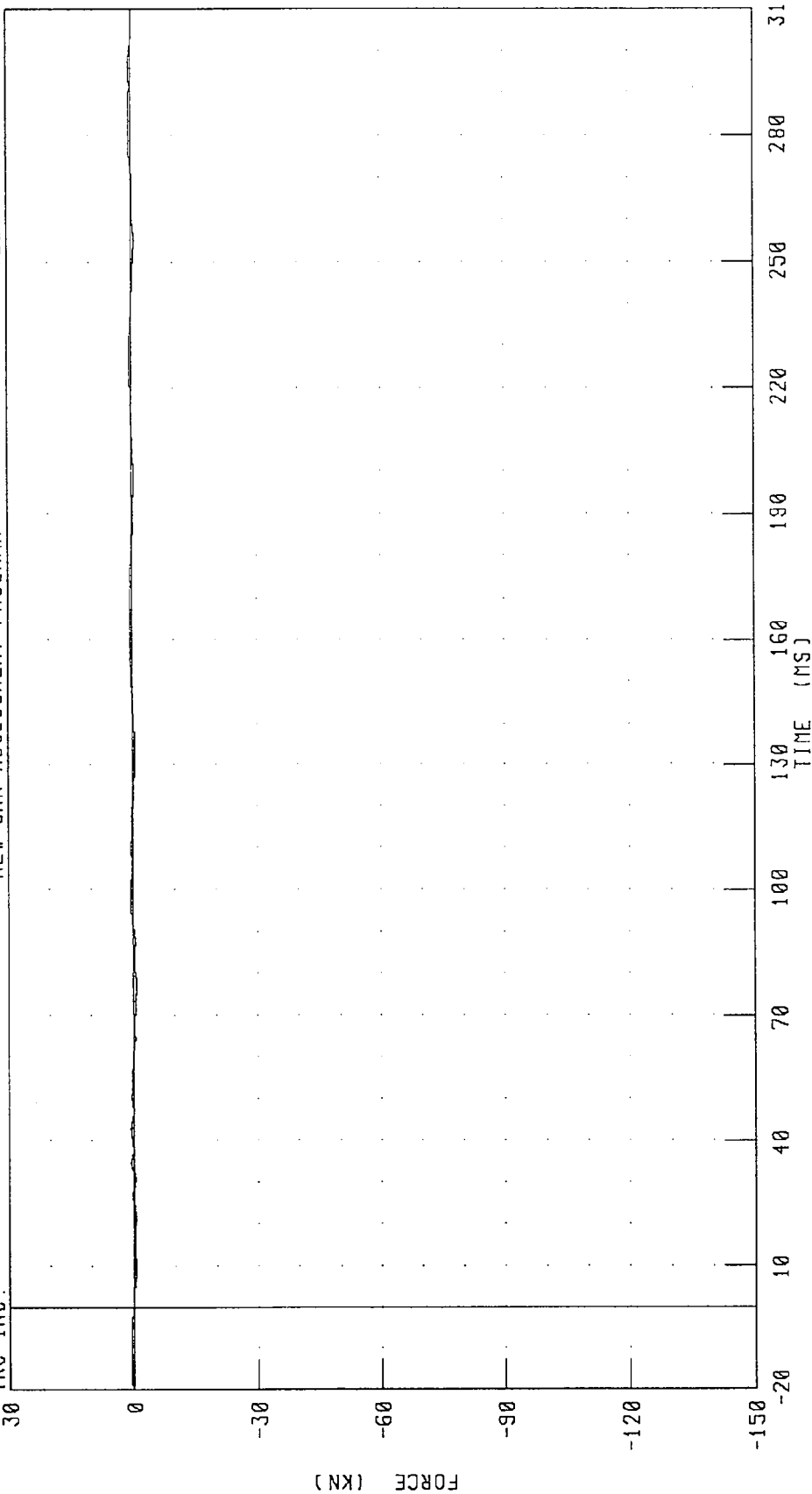
CHANNEL: BB9F FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C1 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BC1F

FILTER: CH. CLASS 60

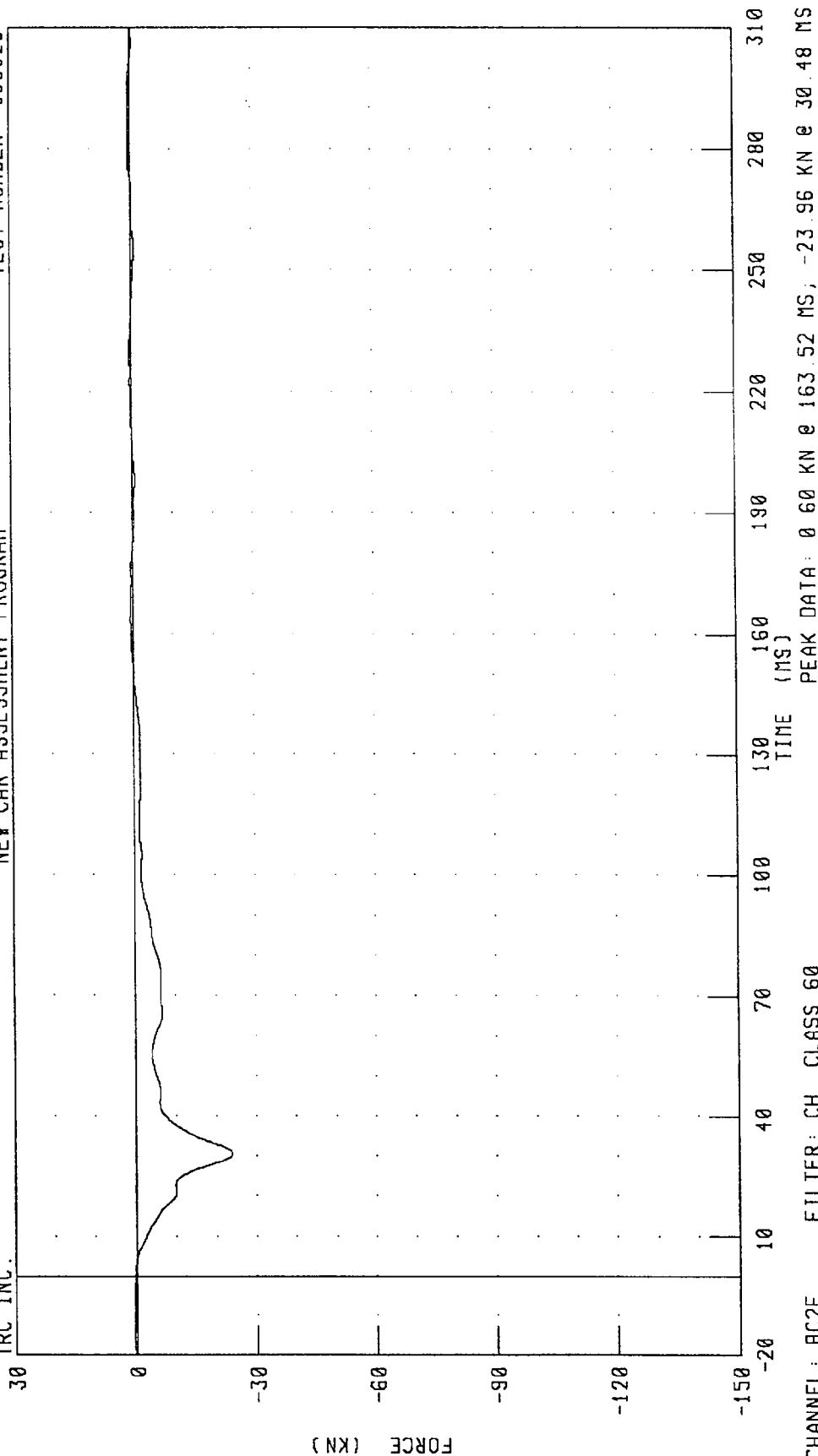
PEAK DATA: 0.60 KN @ 42.96 MS, -0.82 KN @ 77.36 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C2 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BC2F FILTER: CH. CLASS 60

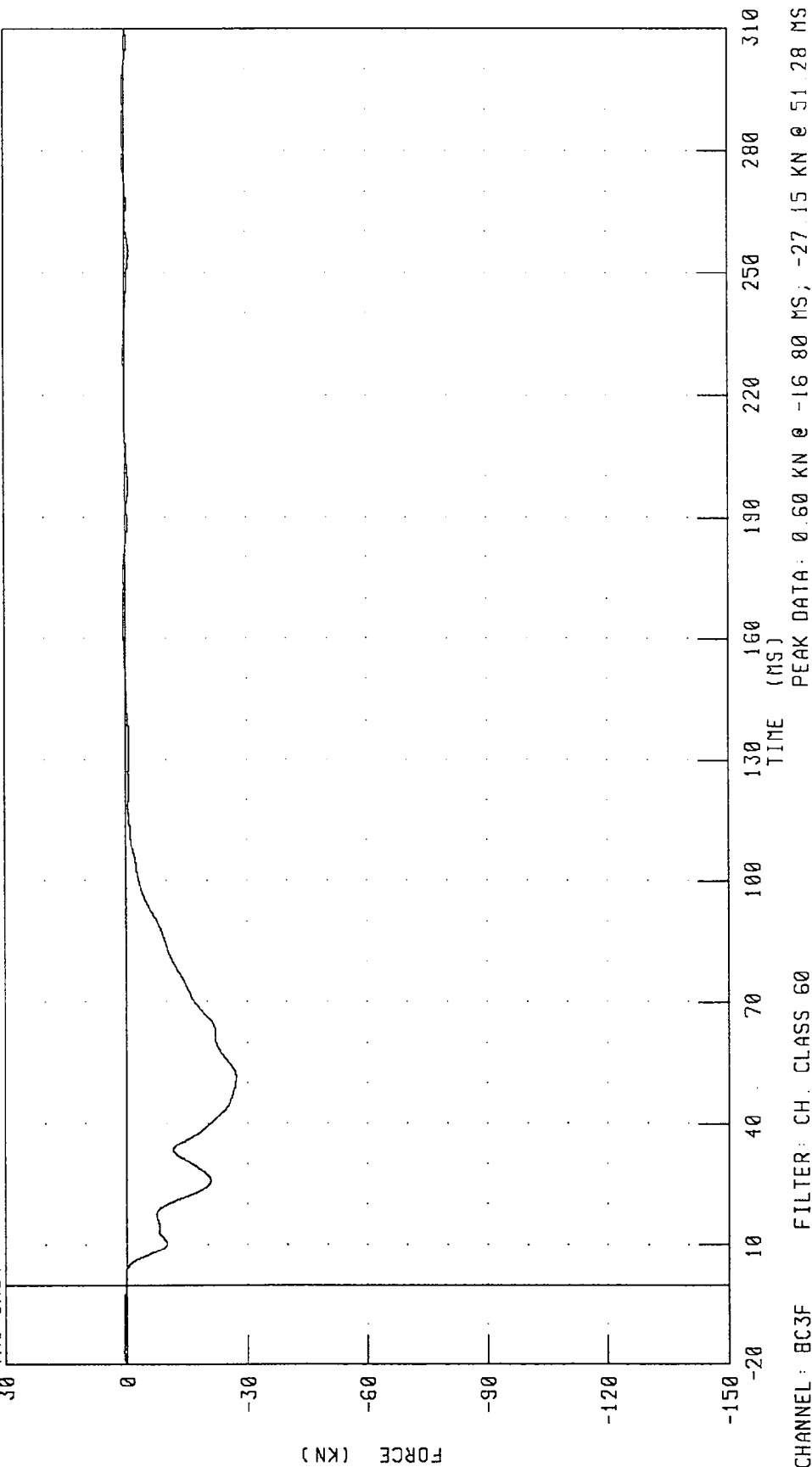
PEAK DATA: 0 60 KN @ 163.52 MS, -23.96 KN @ 30.48 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C3 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



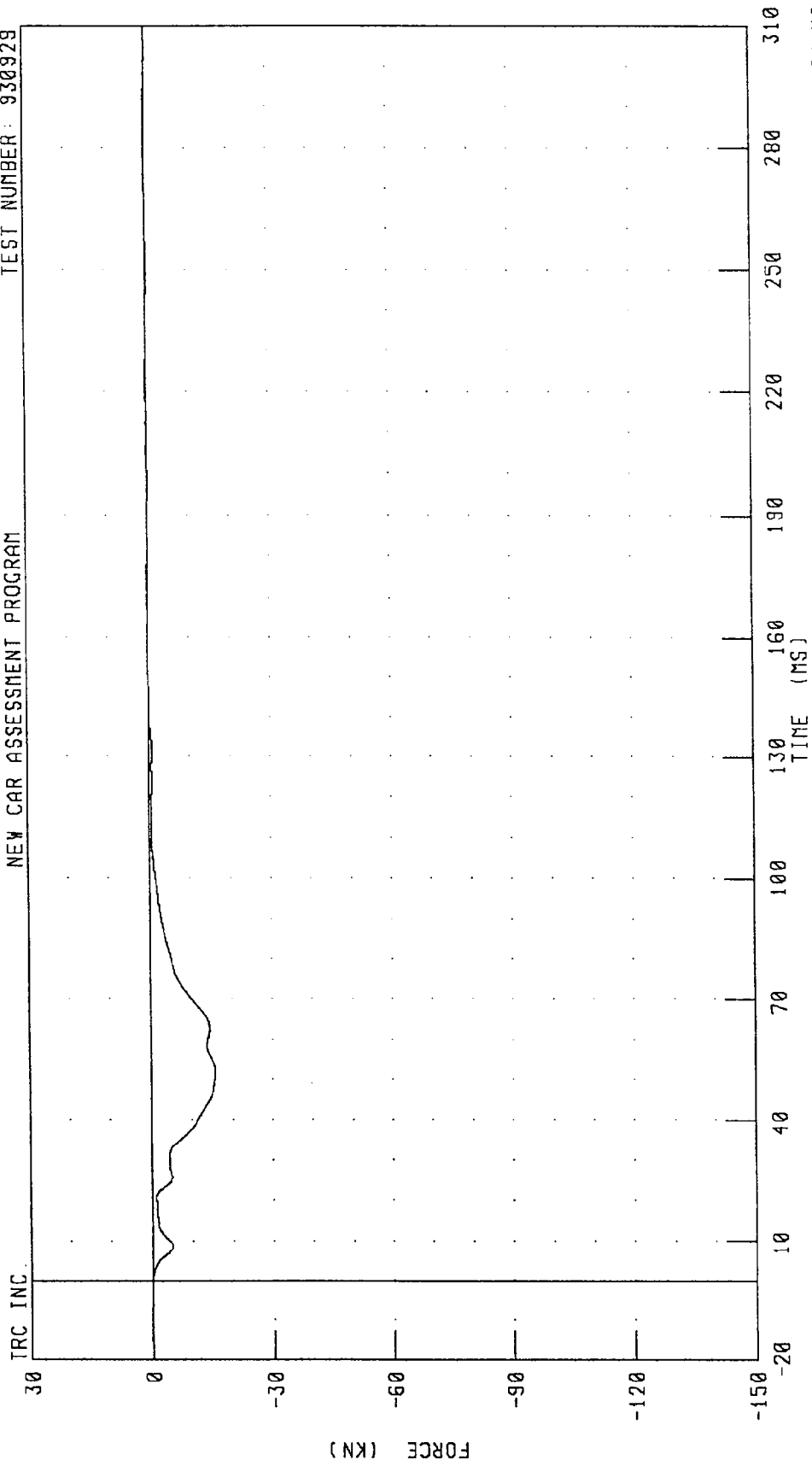
CHANNEL: BC3F

FILTER: CH. CLASS 60

PEAK DATA: 0.60 KN @ -16.80 MS; -27.15 KN @ 51.28 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C4 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



PEAK DATA: 0.33 KN @ 274.40 MS, -15.89 KN @ 51.84 MS

CHANNEL: BC4F FILTER: CH. CLASS 60

FORCE (KN)

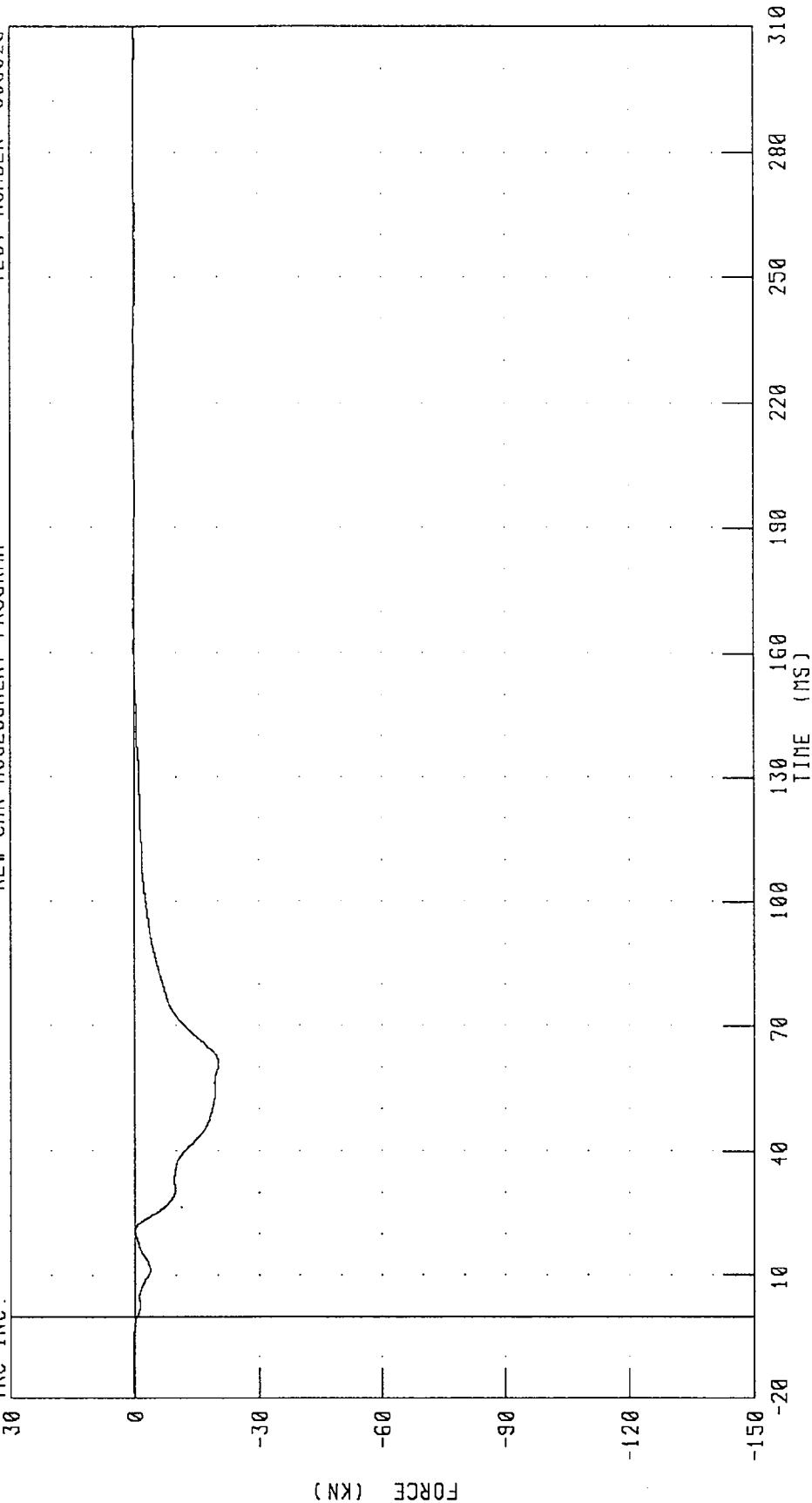
TIME (MS)

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C5 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BC5F

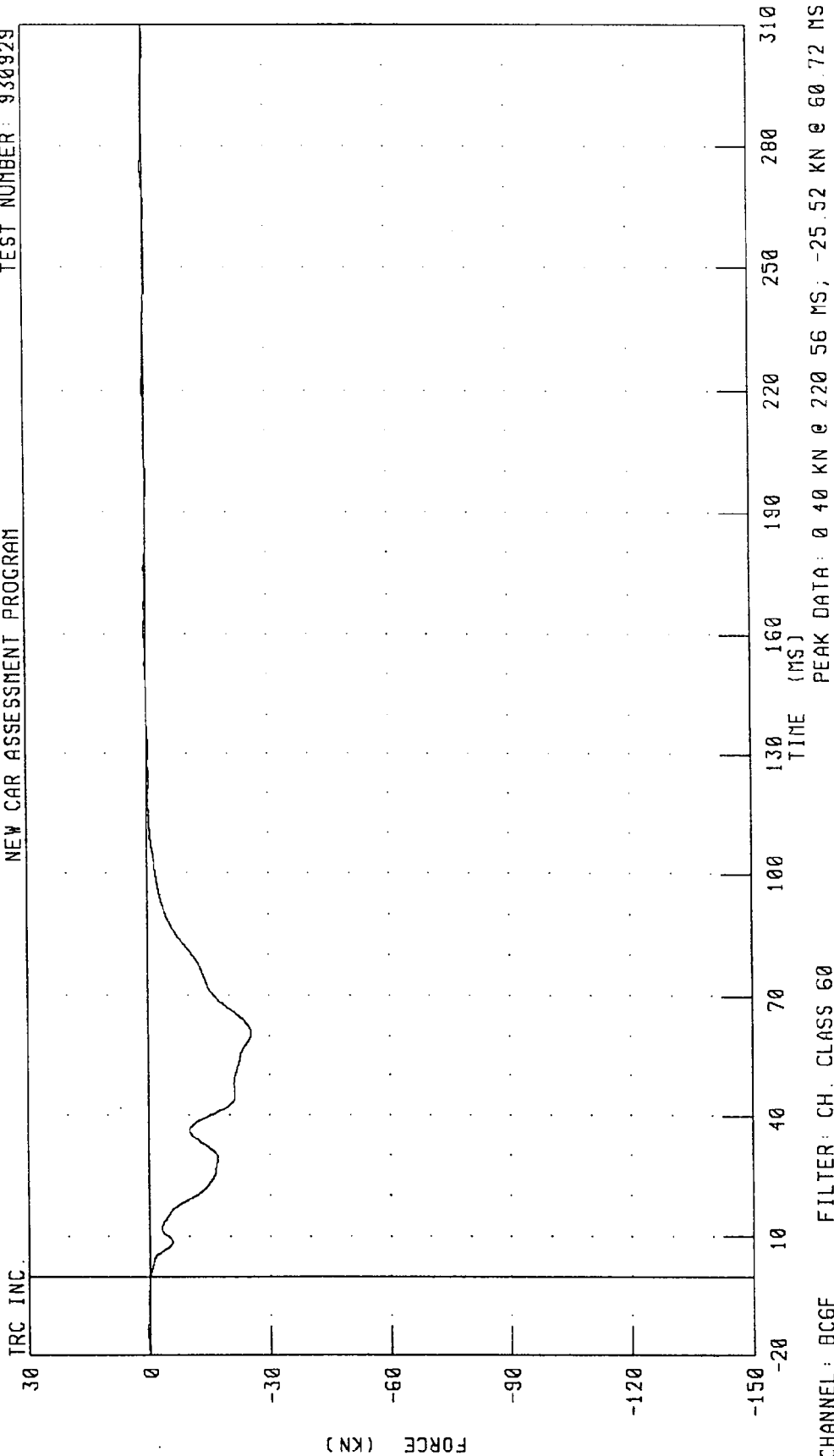
FILTER: CH. CLASS 60

PEAK DATA: 0 31 KN @ -14 00 MS, -20 15 KN @ 60 88 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C6 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.



PEAK DATA: 0 40 KN @ 220 56 MS; -25.52 KN @ 60.72 MS

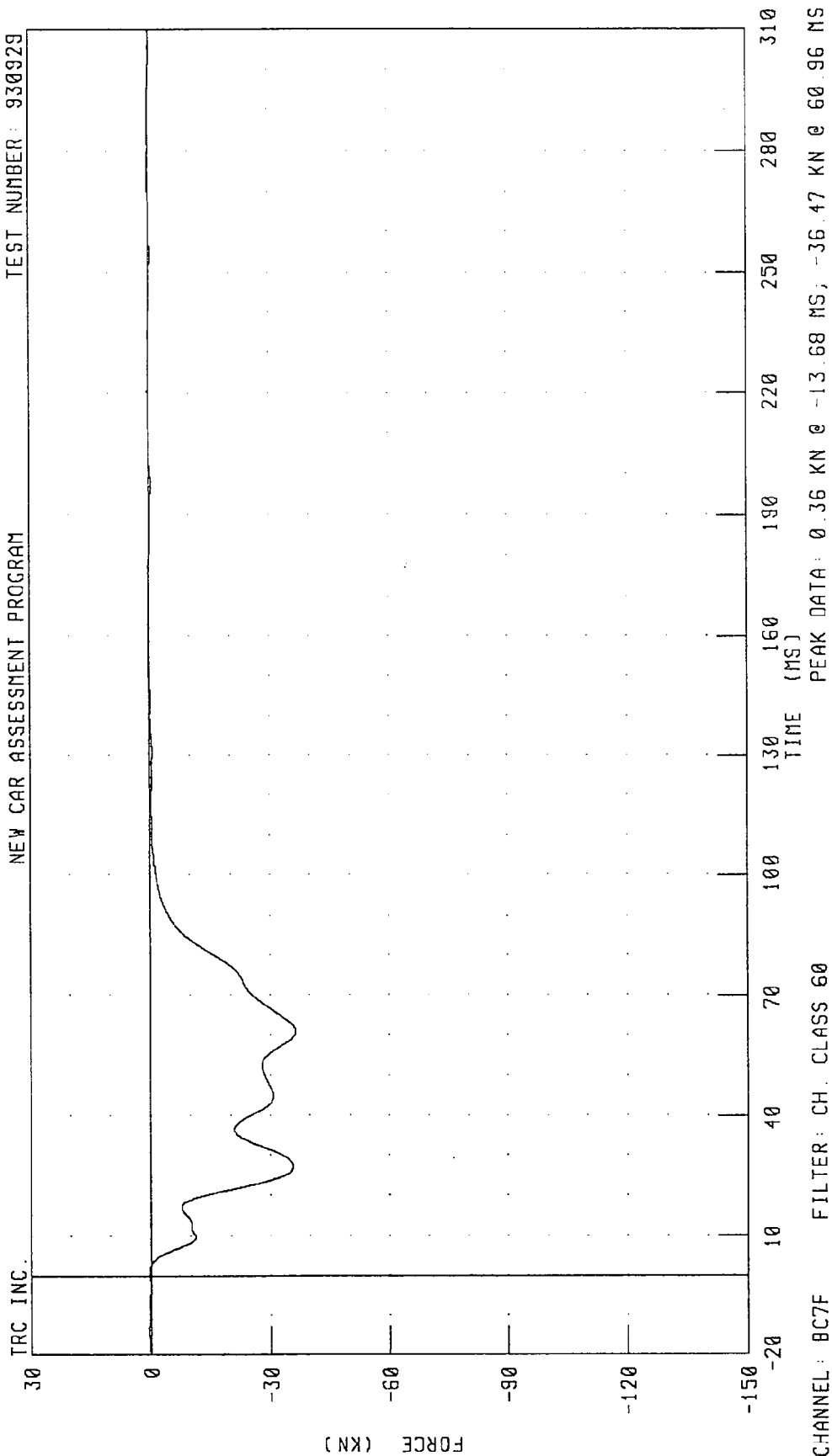
FILTER: CH. CLASS 60

CHANNEL: BC6F

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C'7 FORCE

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



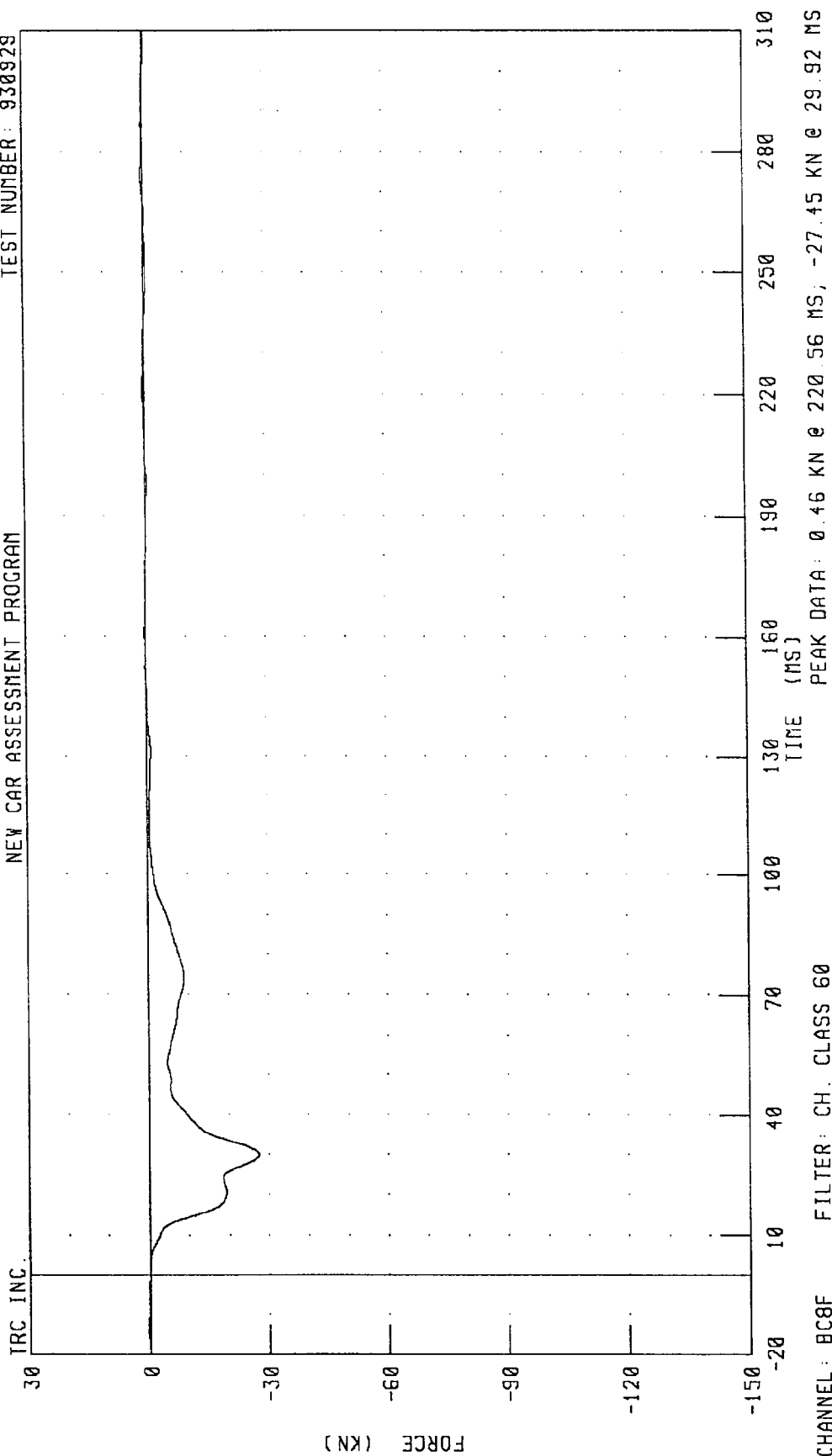
PEAK DATA: 0.36 KN @ 13.68 MS; -36.47 KN @ 60.96 MS

FILTER: CH. CLASS 60

CHANNEL: BC7F

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C8 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



CHANNEL: BC8F FILTER: CH. CLASS 60

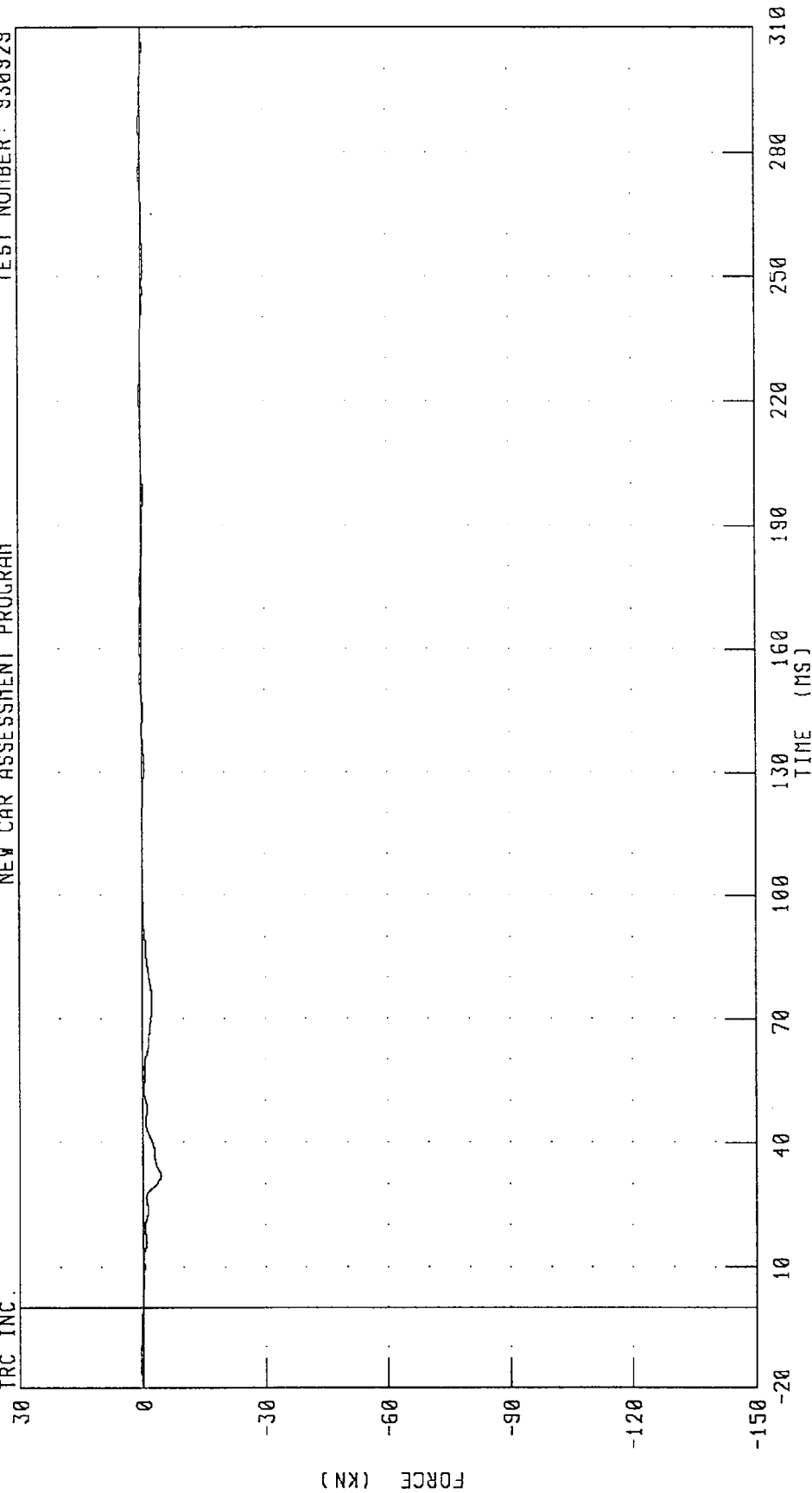
PEAK DATA: 0.46 KN @ 220.56 MS; -27.45 KN @ 29.92 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C9 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BC9F

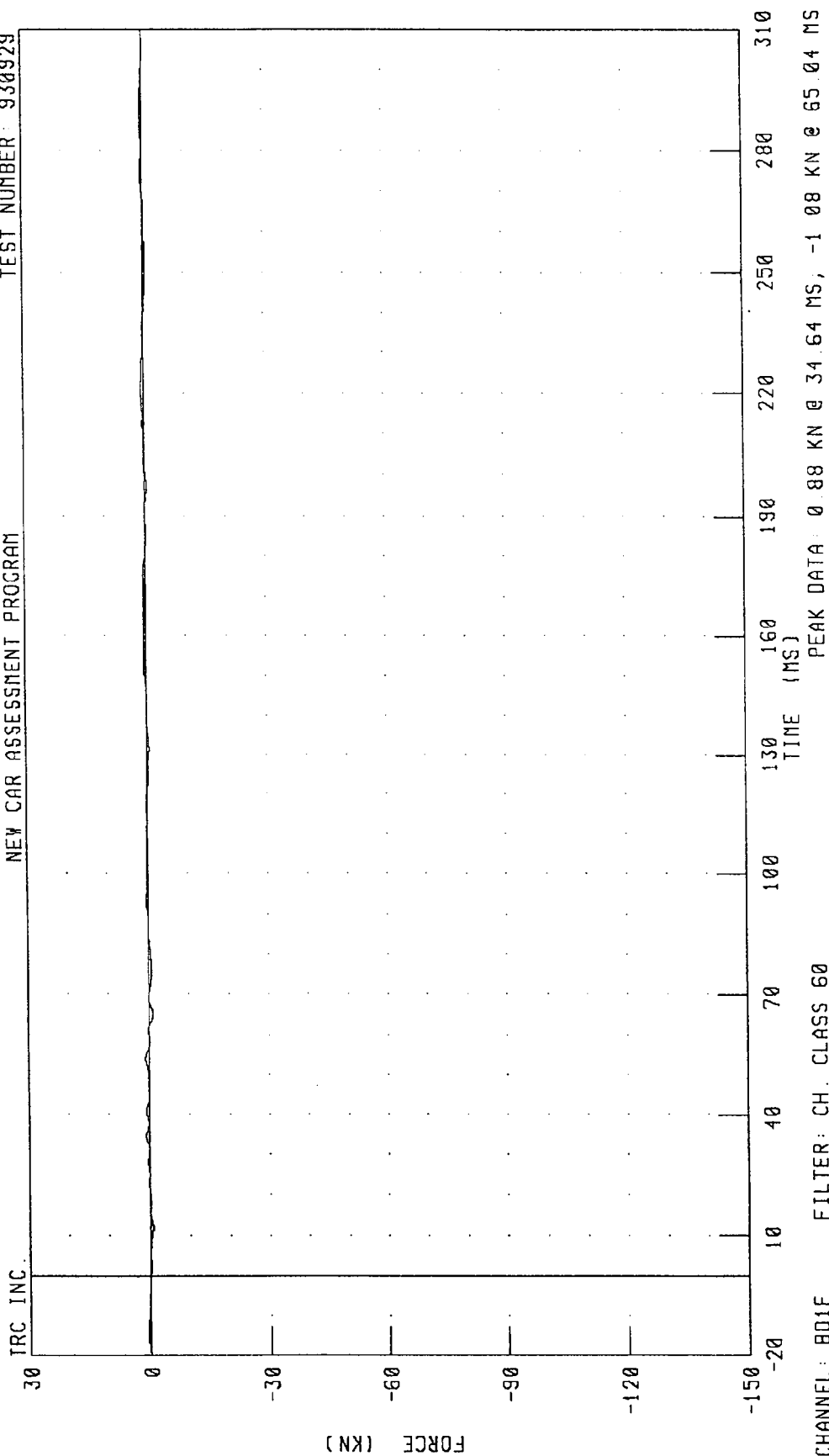
FILTER: CH. CLASS 60

PEAK DATA: 0 50 KN @ 160 96 MS; -4 49 KN @ 32 08 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D1 FORCE

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



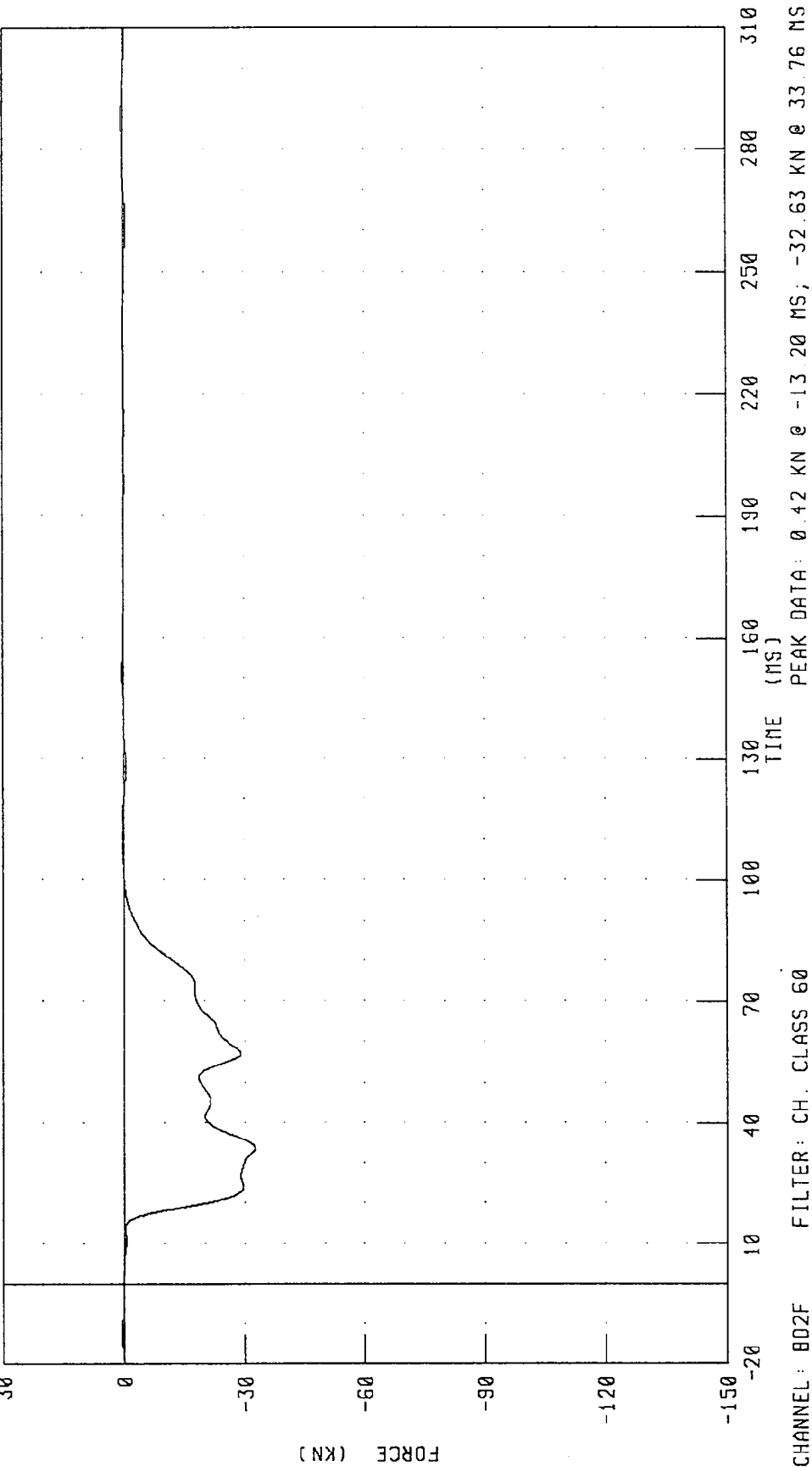
CHANNEL: BD1F FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D2 FORCE

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.



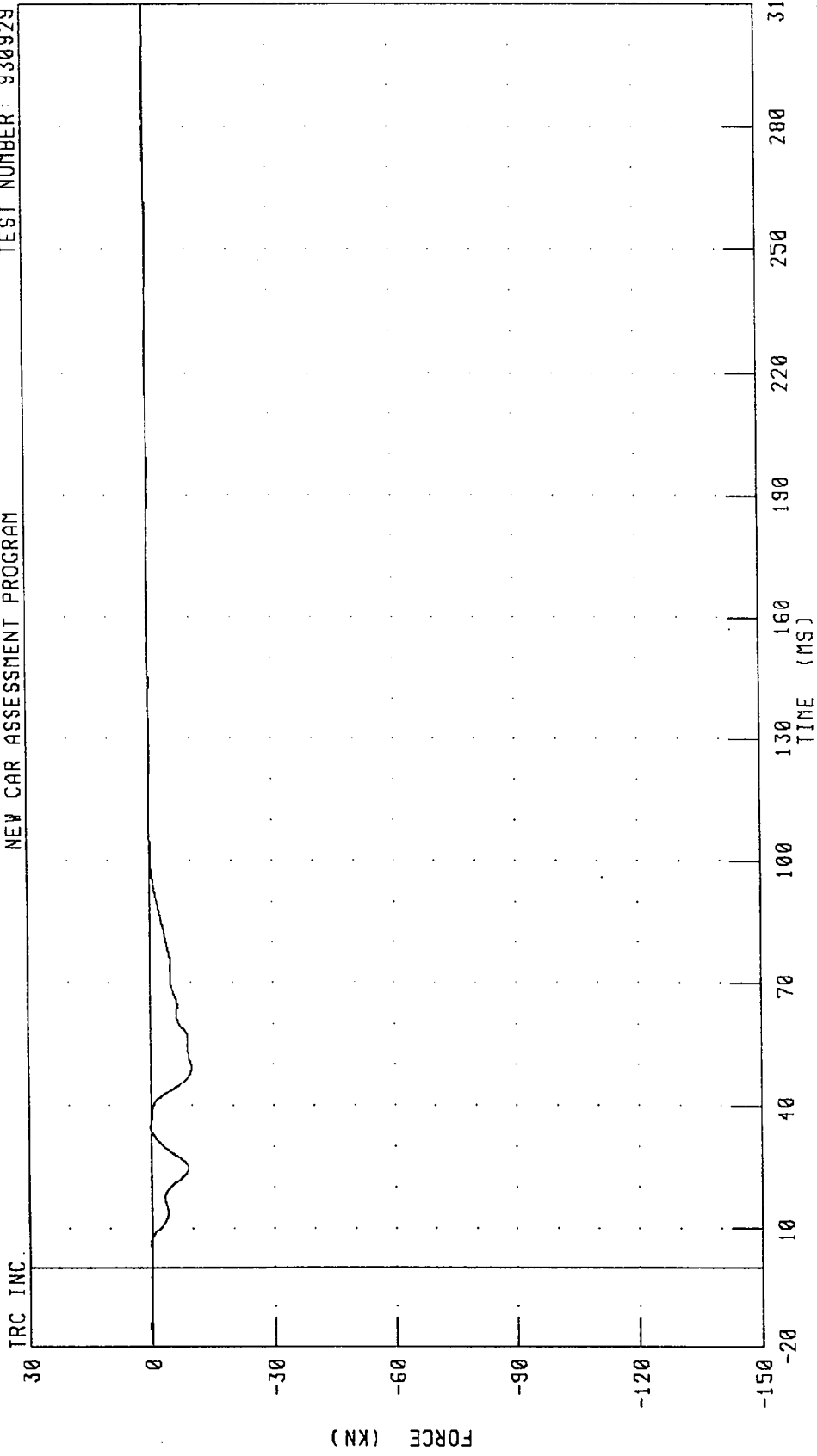
PEAK DATA: 0.42 KN @ -13 20 MS; -32.63 KN @ 33.76 MS

FILTER: CH. CLASS 60

CHANNEL: 802F

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D3 FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



PEAK DATA: 0.35 KN @ -14.80 MS; -9.92 KN @ 49.20 MS

FILTER: CH. CLASS 60

CHANNEL: BD3F

FORCE (KN)

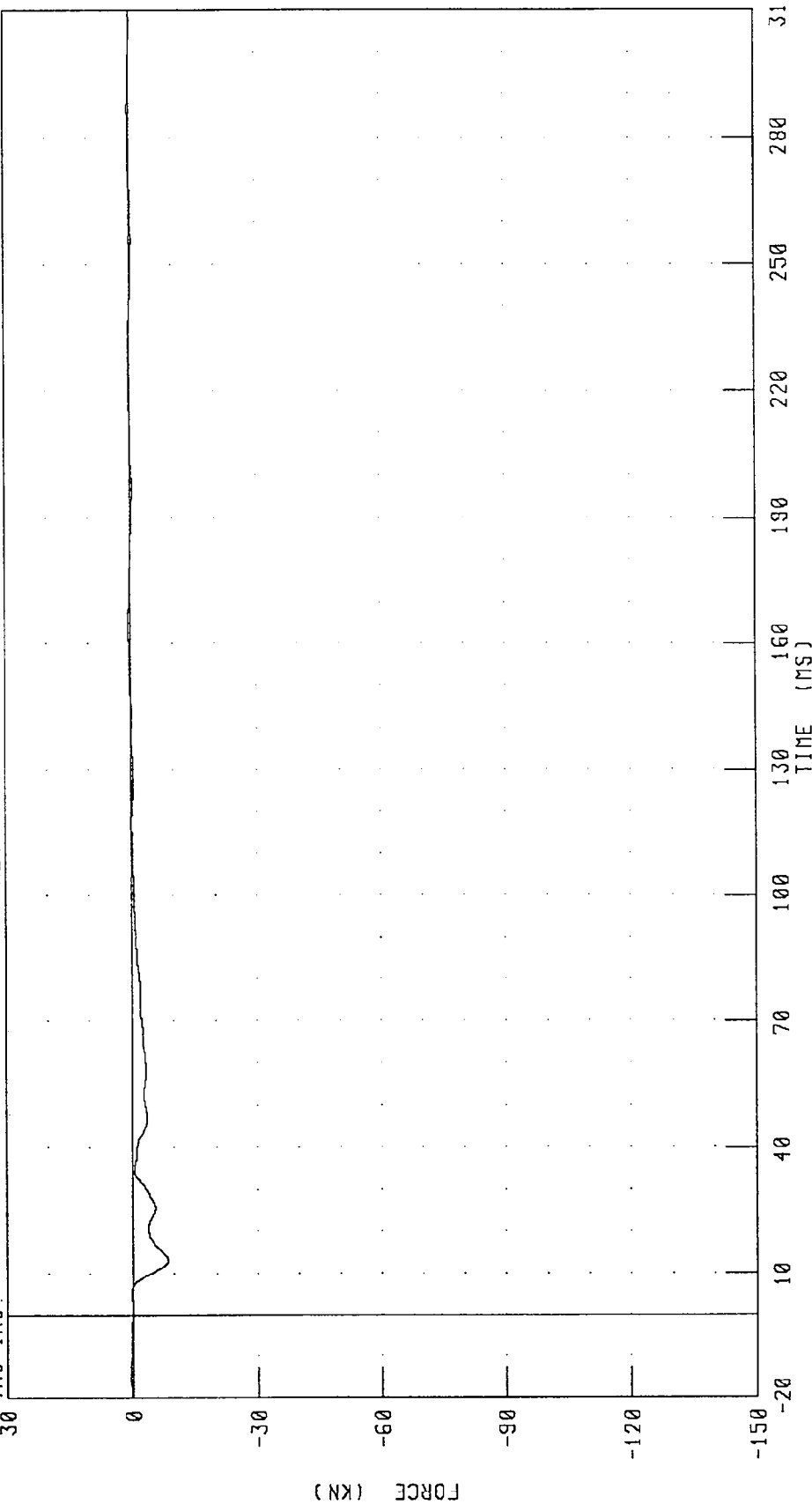
TIME (MS)

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D4 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



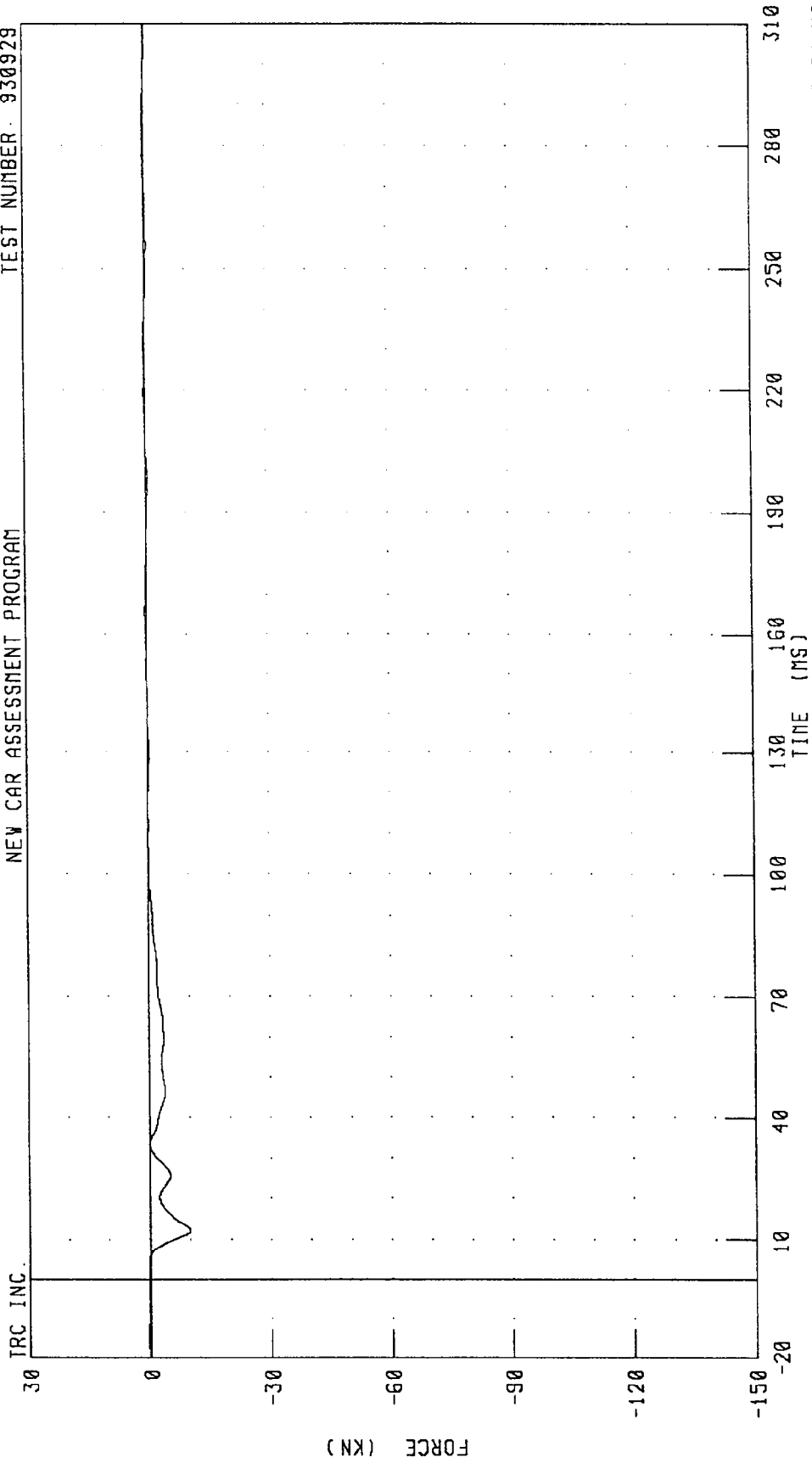
CHANNEL: B04F

FILTER: CH. CLASS 60

PEAK DATA: 0.48 KN @ -14.16 MS, -8.53 KN @ 13.28 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D5 FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



PEAK DATA: 0.49 KN @ -14.72 MS; -10.02 KN @ 12.24 MS

CHANNEL: BDSF FILTER: CH. CLASS 60

FORCE (KN)

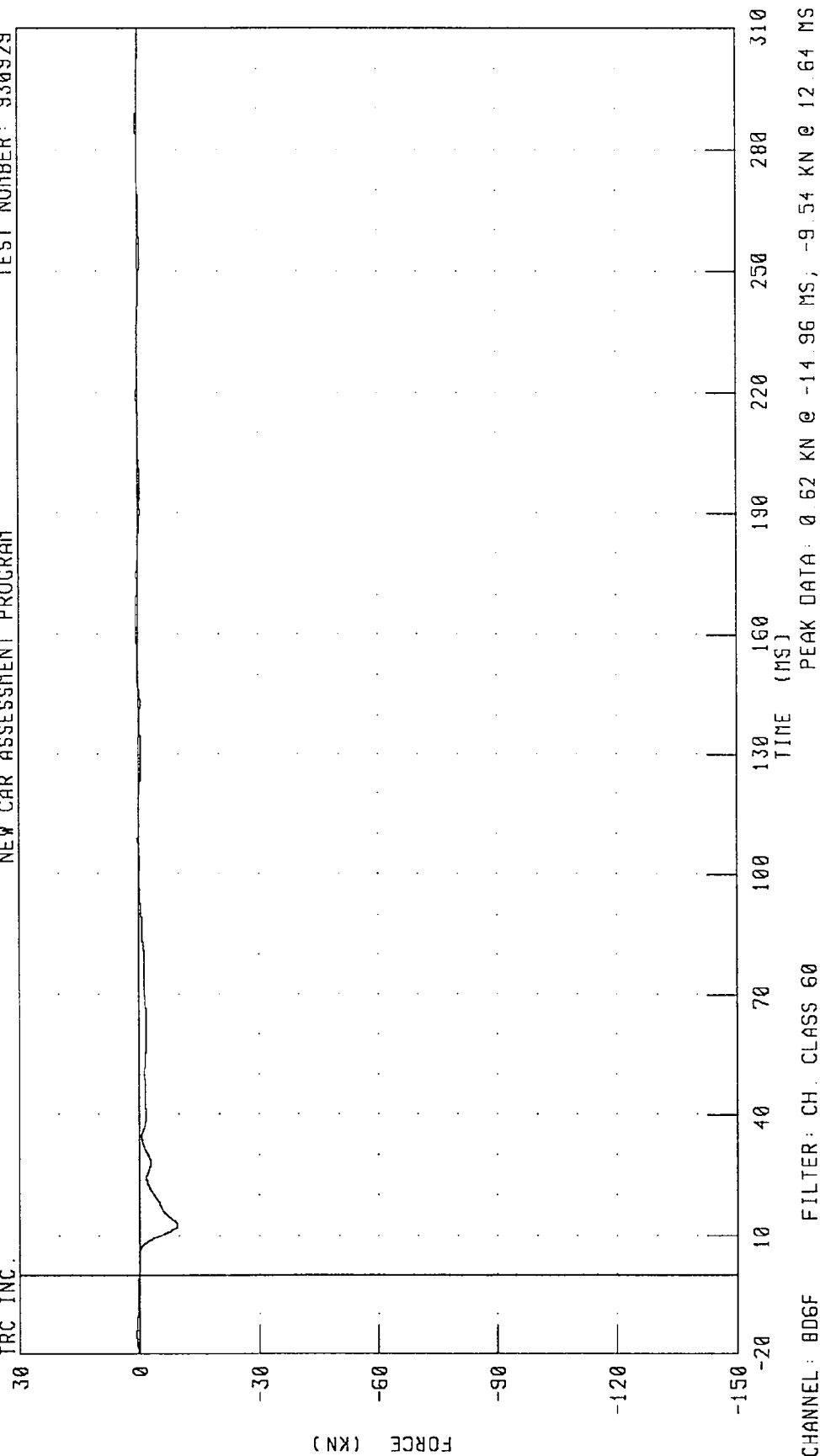
TIME (MS)

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D6 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

IRC INC.



PEAK DATA: 0.62 KN @ -14.96 MS; -9.54 KN @ 12.64 MS

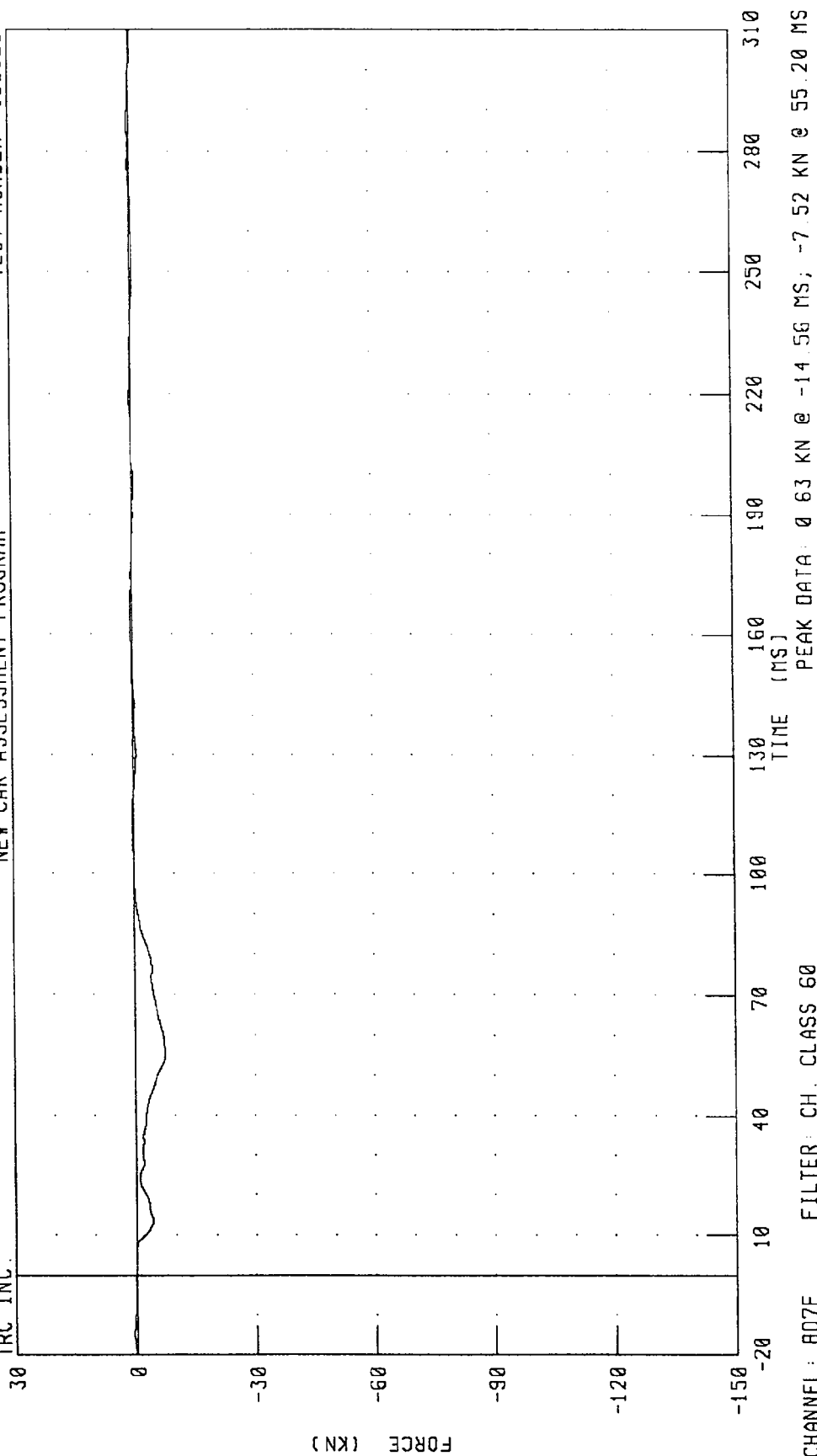
FILTER: CH. CLASS 60

CHANNEL: BD6F

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D7 FORCE
NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.



CHANNEL: 807F

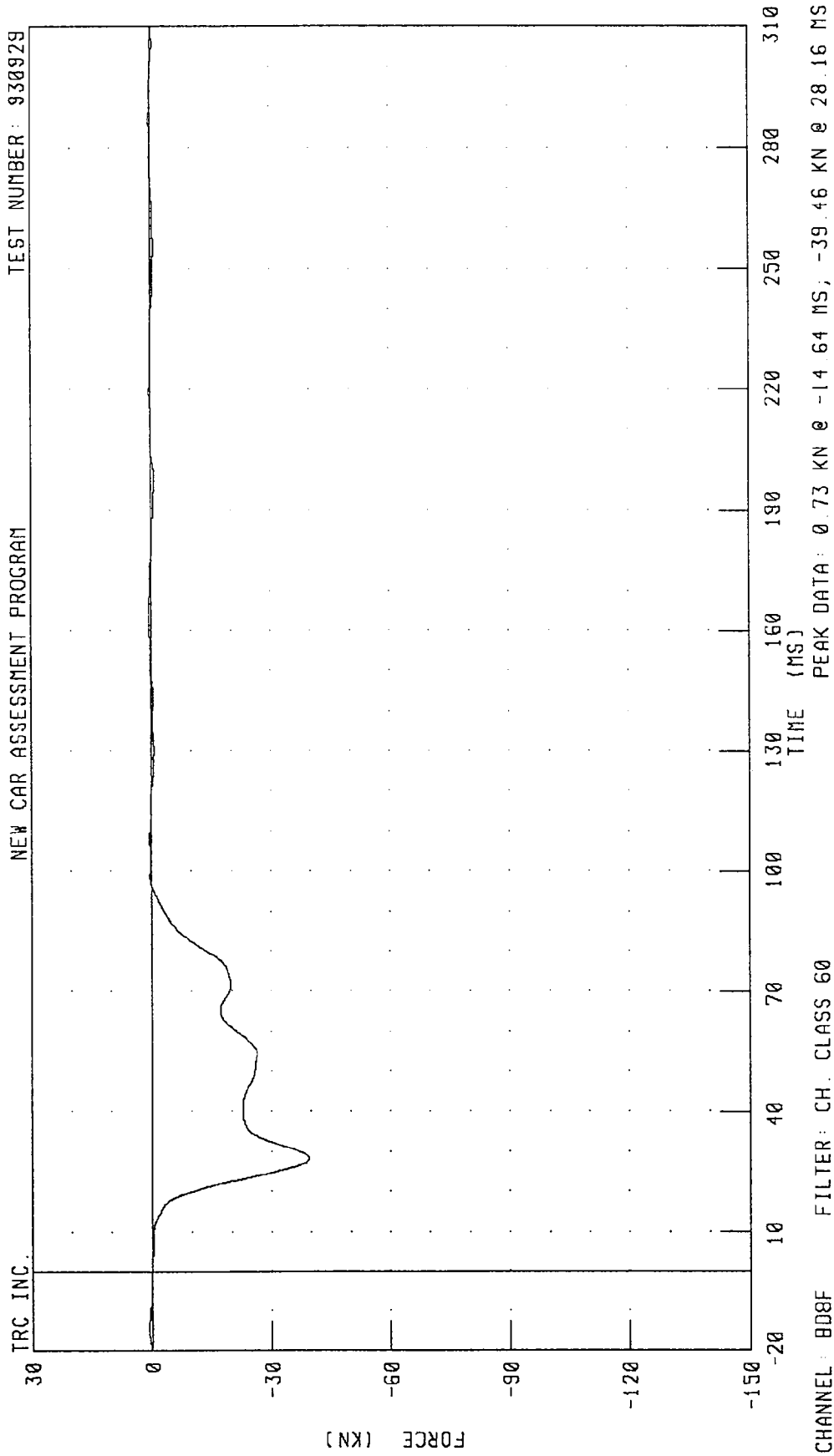
FILTER: CH. CLASS 60

PEAK DATA: 0.63 KN @ -14.56 MS; -7.52 KN @ 55.20 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION DB FORCE

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



PEAK DATA: 0.73 KN @ -14.64 MS; -39.46 KN @ 28.16 MS

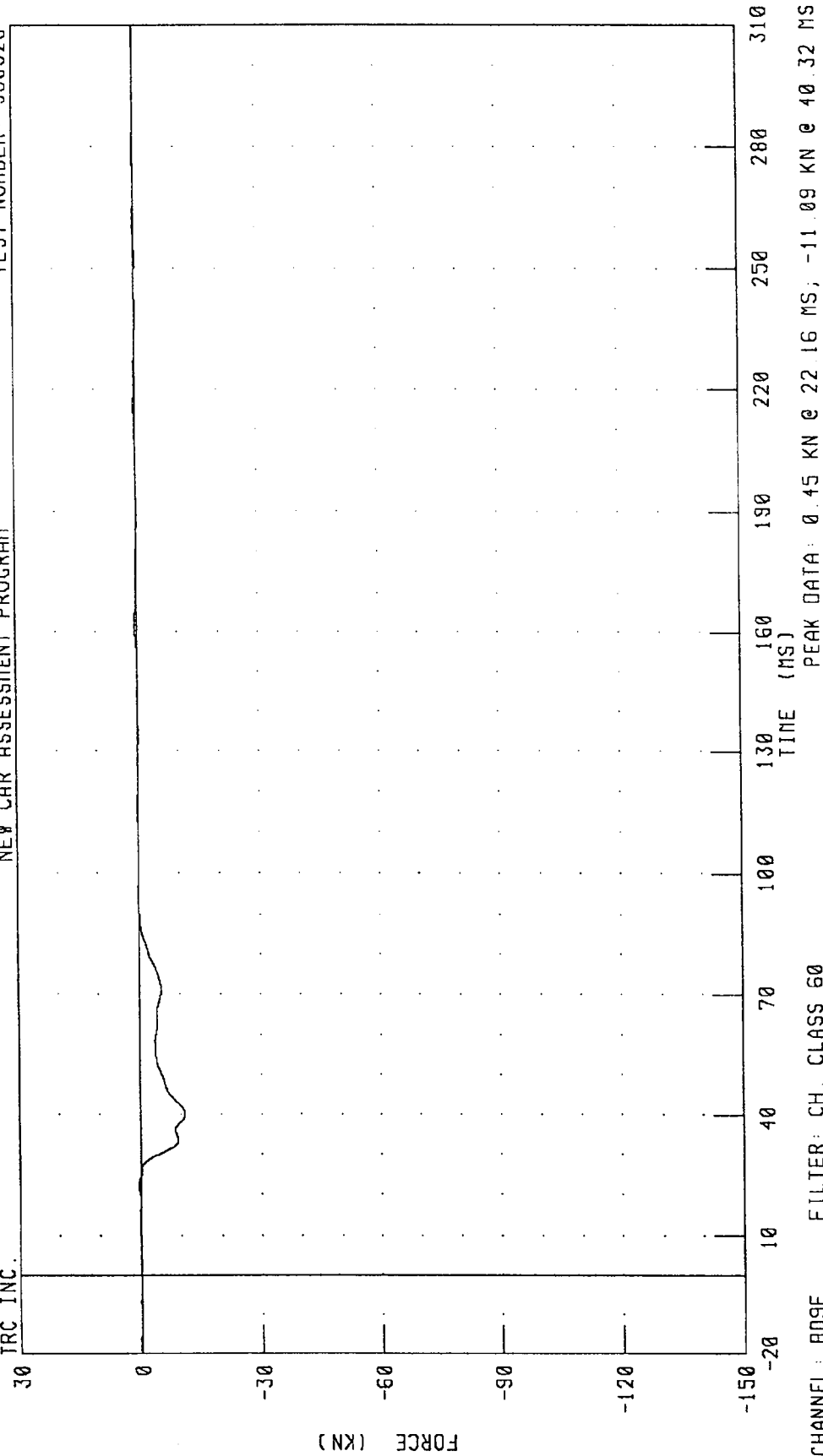
CHANNEL: BD8F FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D9 FORCE

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



CHANNEL: BD9F FILTER: CH. CLASS 60

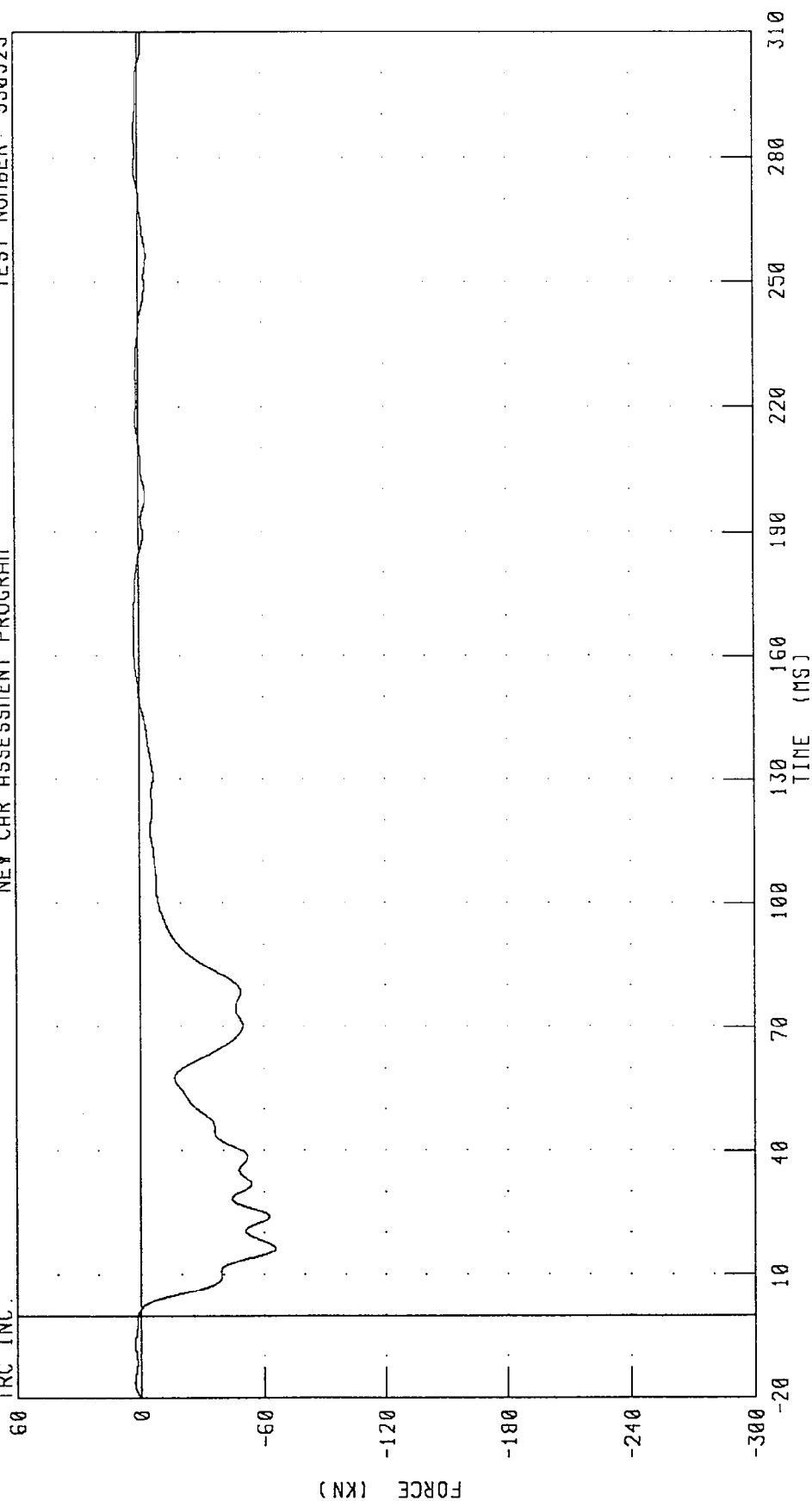
PEAK DATA: 0.45 KN @ 22.16 MS; -11.09 KN @ 40.32 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 1 FORCE TOTAL

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

TRC INC.



PEAK DATA: 2.73 KN @ -16.24 MS; -65.68 KN @ 16.24 MS

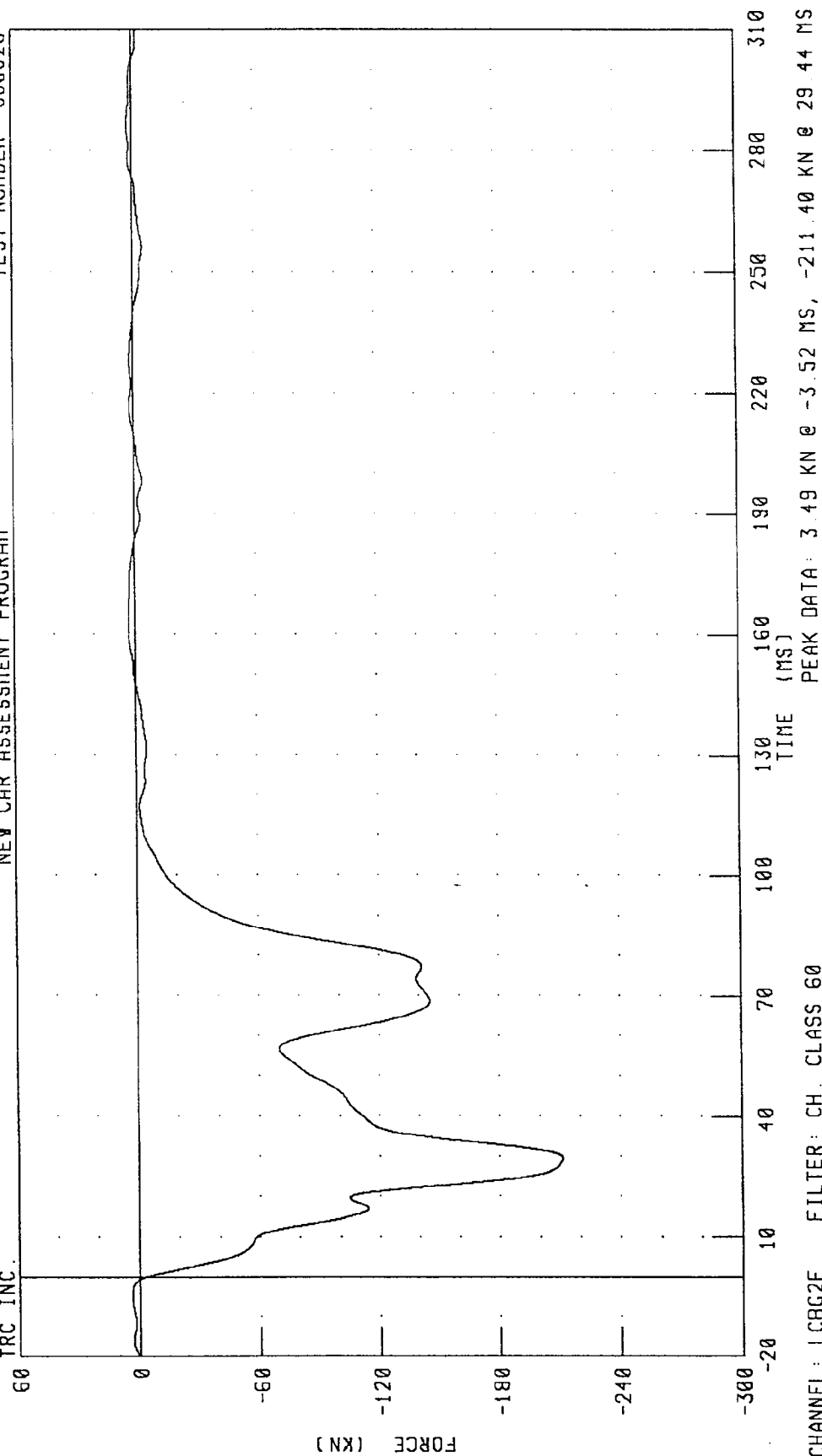
CHANNEL: LCBGIF FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 2 FORCE TOTAL

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.



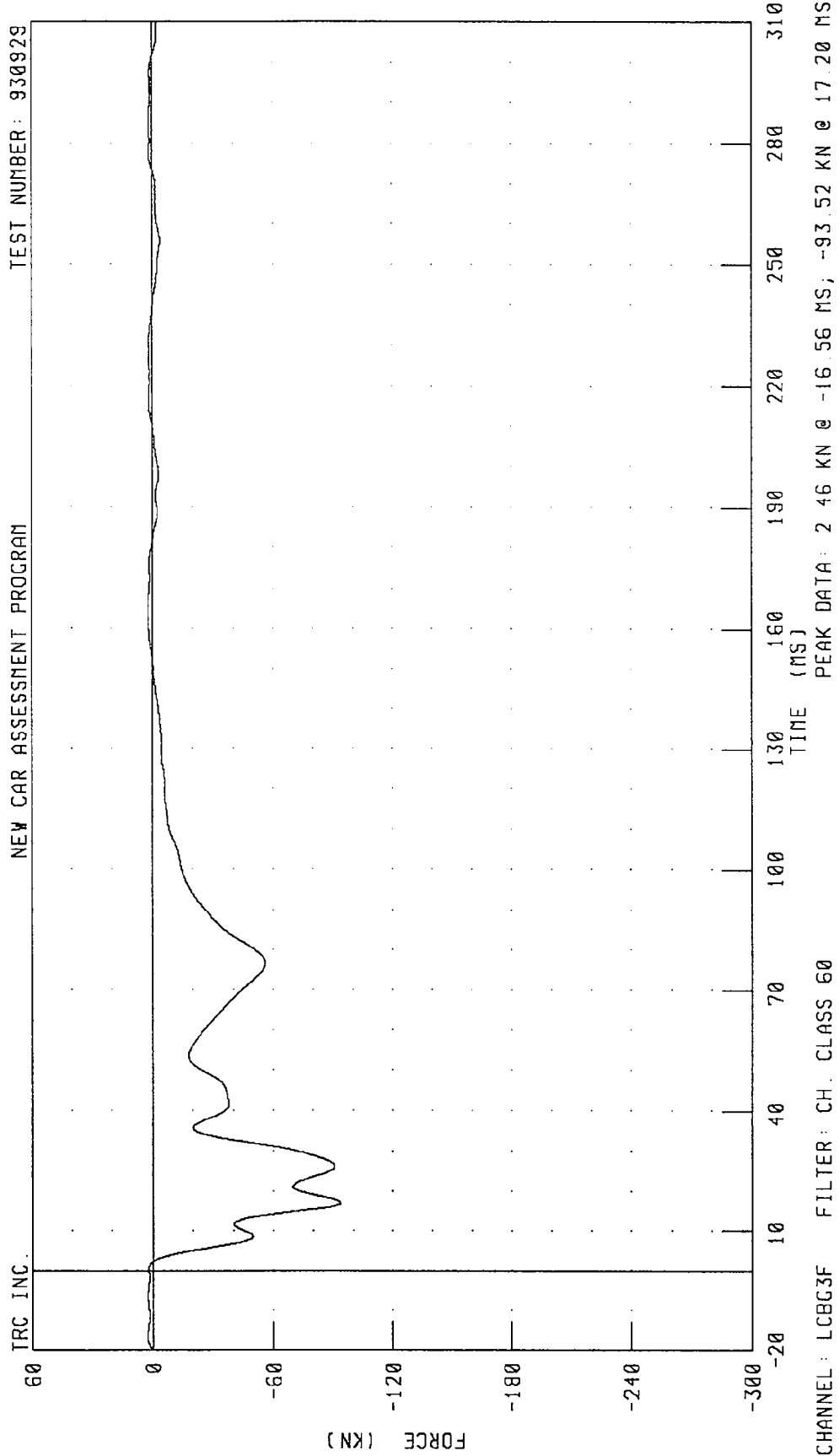
CHANNEL: LCBG2F FILTER: CH. CLASS 60

PEAK DATA: 3.49 KN @ -3.52 MS, -211.40 KN @ 29.44 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 3 FORCE TOTAL

TEST NUMBER: 930929

NEW CAR ASSESSMENT PROGRAM

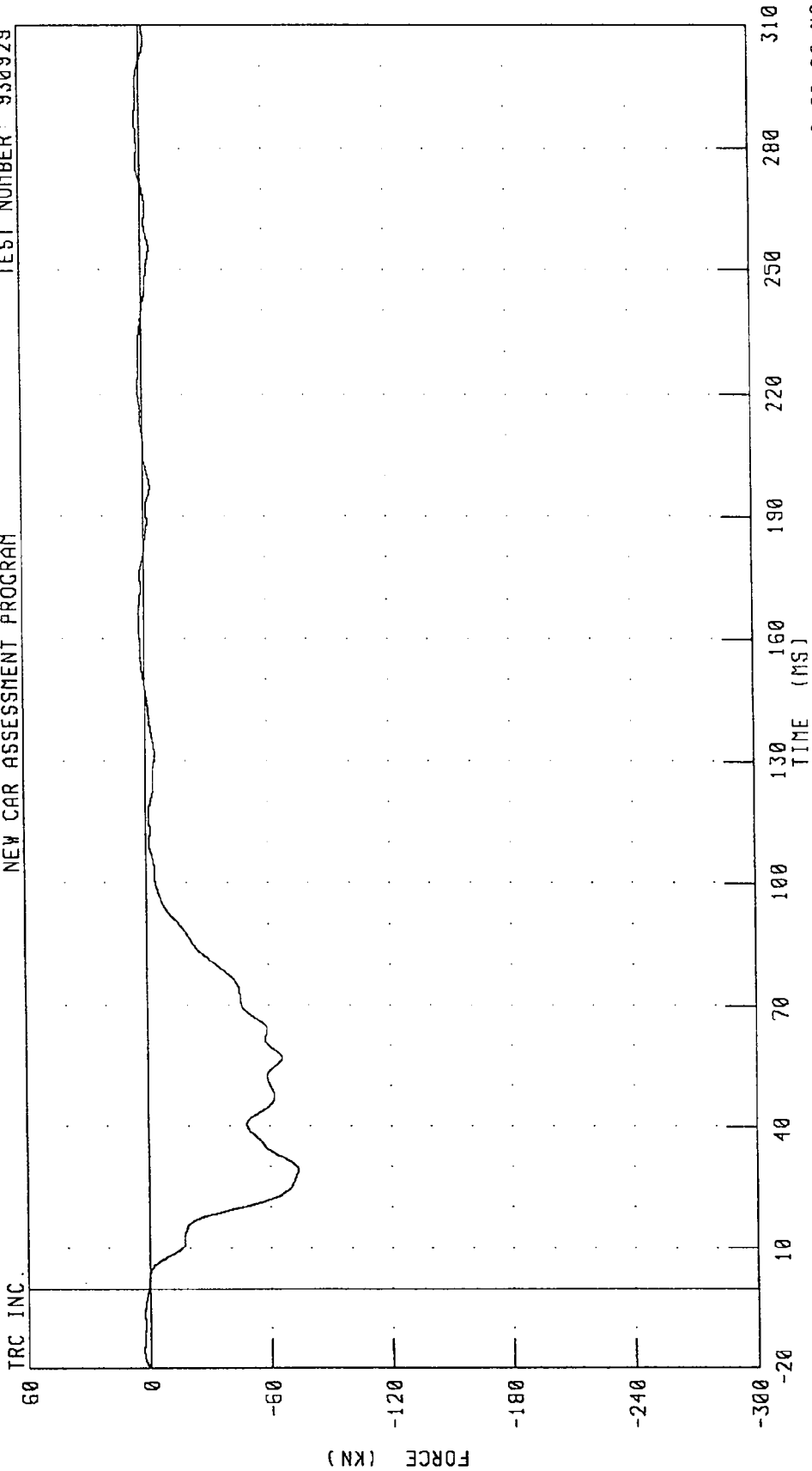


CHANNEL: LCBG3F FILTER: CH. CLASS 60

PEAK DATA: 2.46 KN @ -16.56 MS; -93.52 KN @ 17.20 MS

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 4 FORCE TOTAL
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



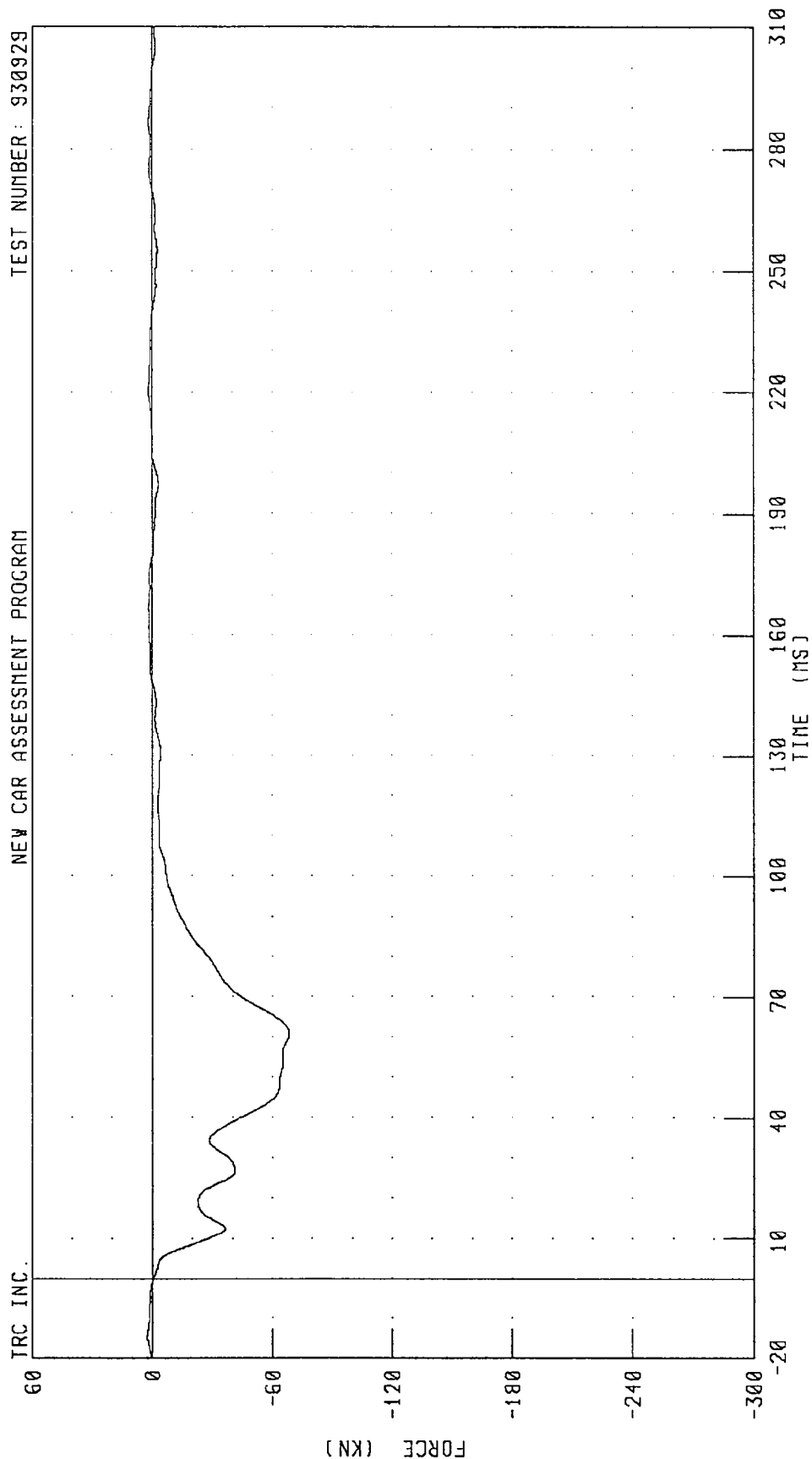
PEAK DATA: 2.76 KN @ -15.36 MS; -73.65 KN @ 29.20 MS

CHANNEL: LCBG4F FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 5 FORCE TOTAL

NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

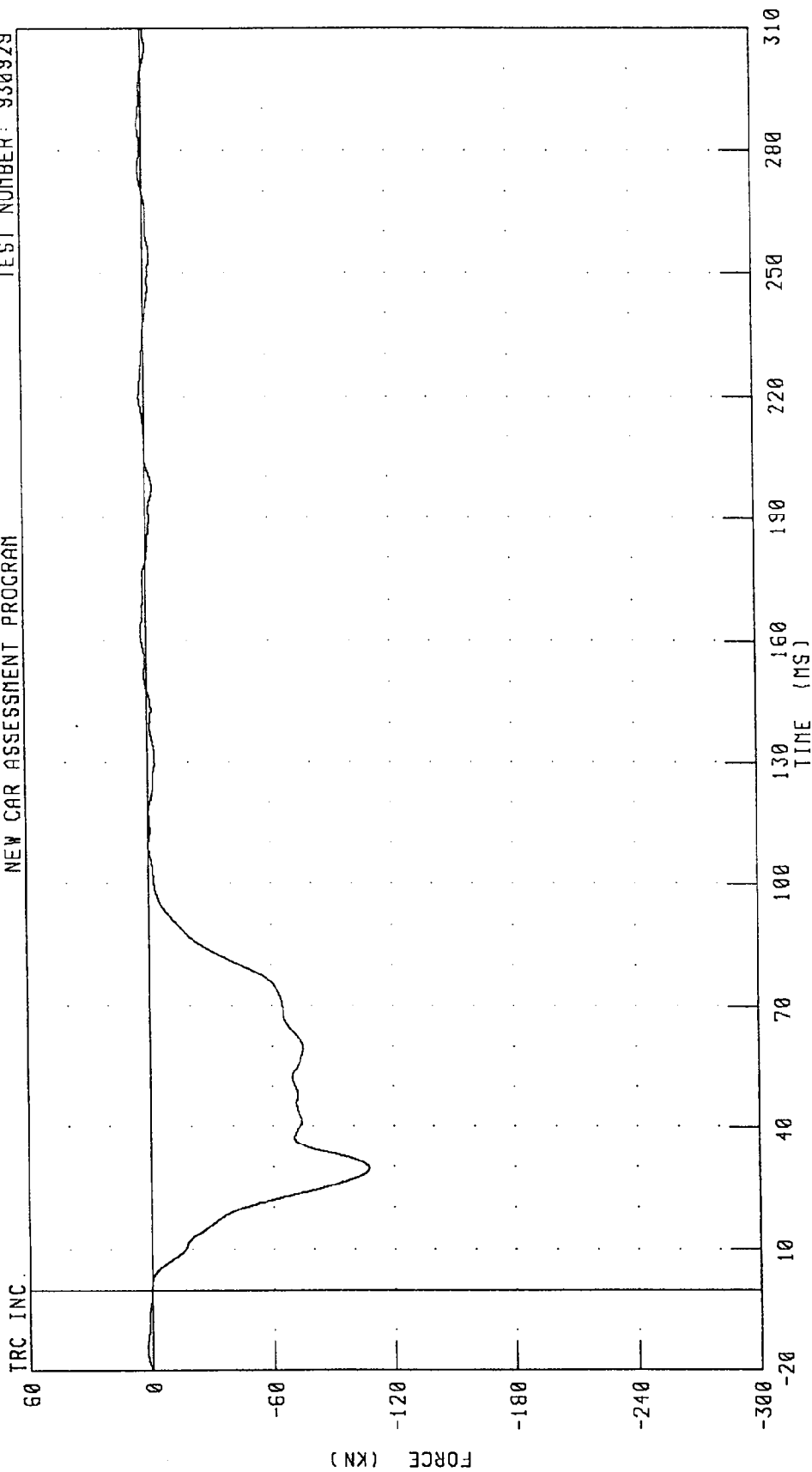


PEAK DATA: 2 39 KN @ -14.24 MS; -68 38 KN @ 60.72 MS

CHANNEL: LCBG5F FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 6 FORCE TOTAL
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929



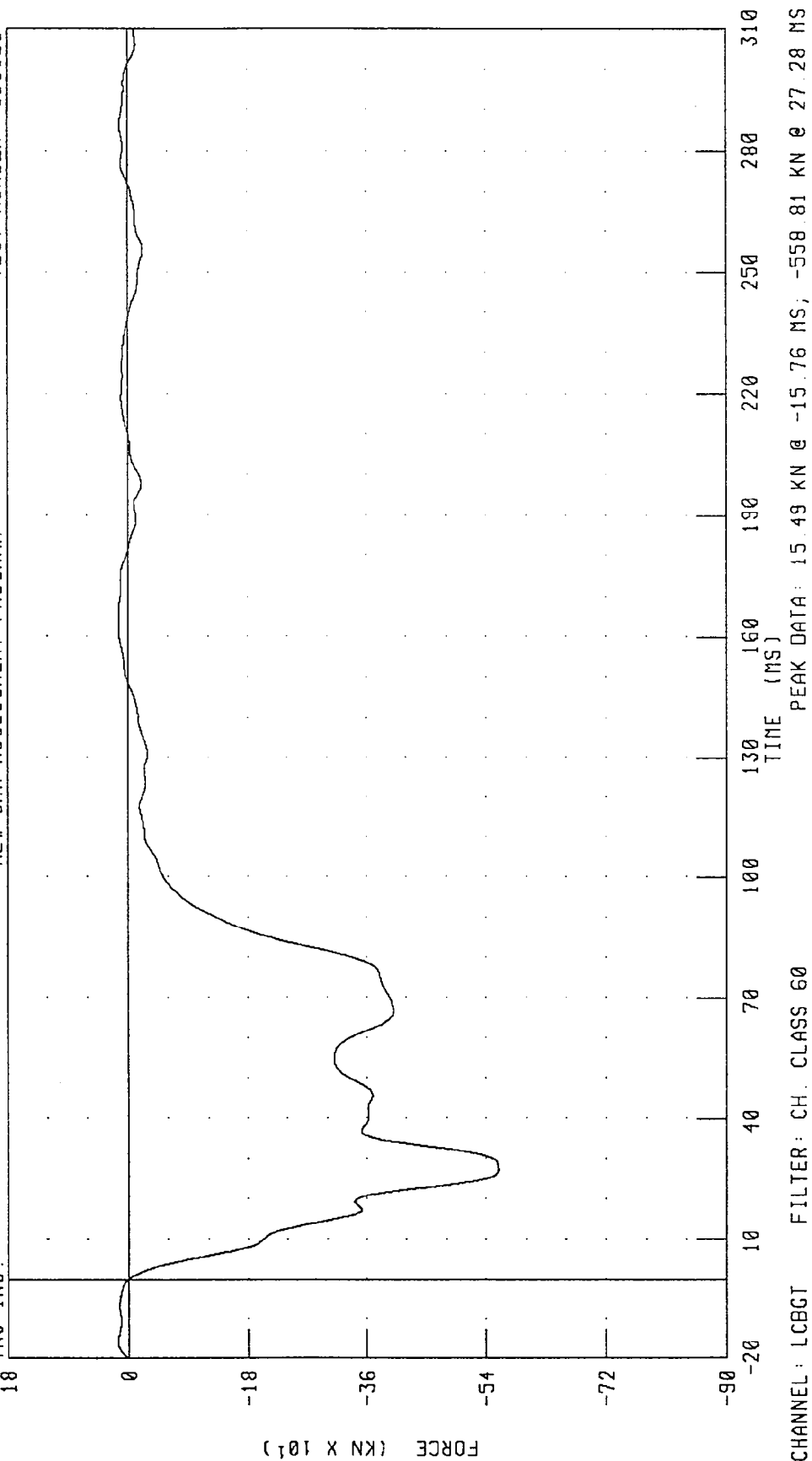
PEAK DATA: 2.47 KN @ -14.72 MS; -107.60 KN @ 29.60 MS

CHANNEL: LCBG6F FILTER: CH CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 TOTAL LOAD CELL BARRIER FORCE
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.



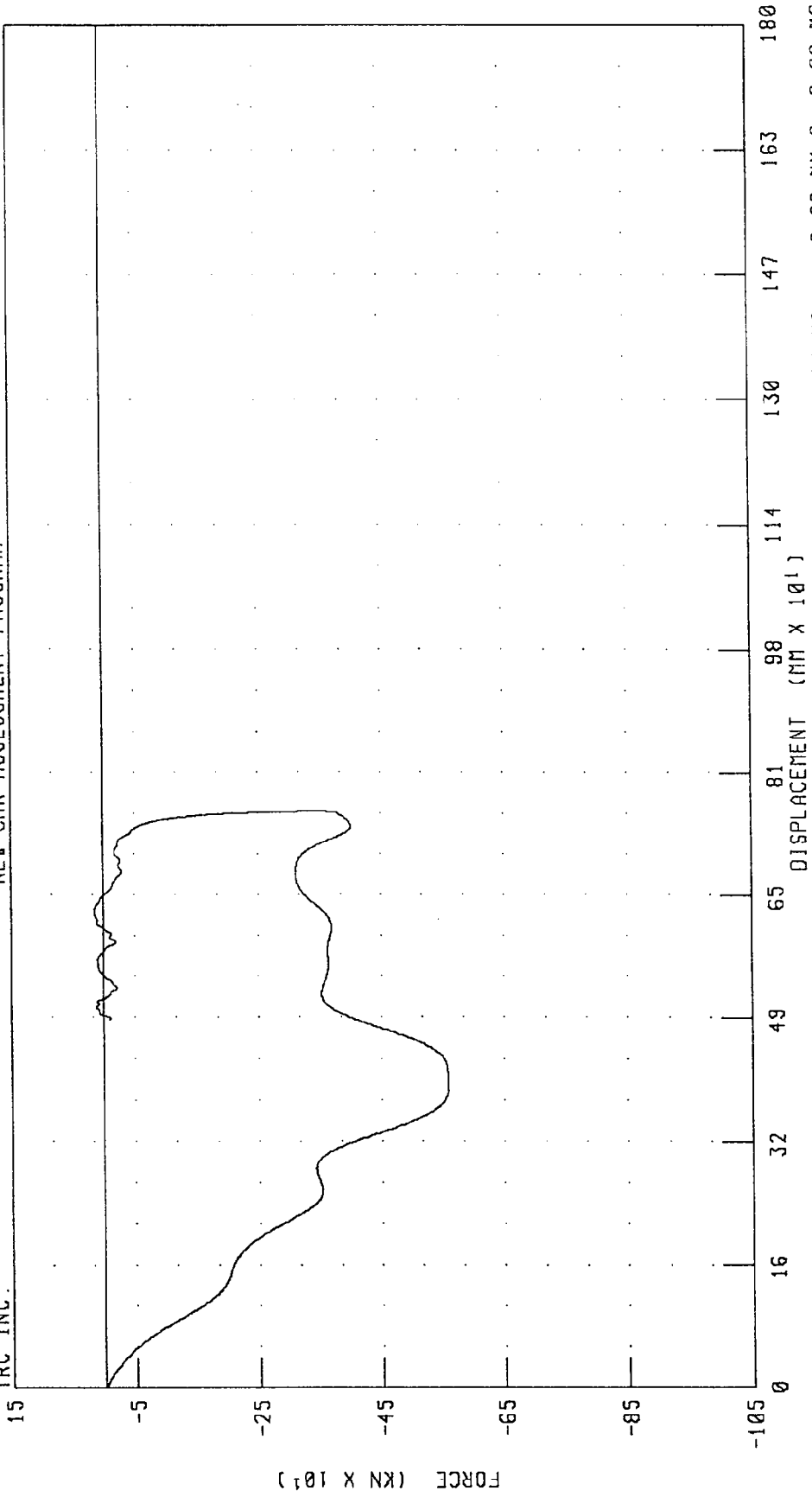
PEAK DATA: 15.49 KN @ -15.76 MS; -558.81 KN @ 27.28 MS

CHANNEL: LCBGT FILTER: CH. CLASS 60

1994 DODGE CARAVAN INTO FRONTAL LOAD CELL BARRIER
 TOTAL LOAD CELL BARRIER FORCE VS AVERAGE VEHICLE X-AXIS DISPLACEMENT
 NEW CAR ASSESSMENT PROGRAM

TEST NUMBER: 930929

TRC INC.



CHANNEL: 0THXD FILTER: CH CLASS 180
 LCBGT CH CLASS 60
 PEAK DATA: 767.44 MM @ 79.84 MS, 0.00 MM @ 0.00 MS
 13.76 KN @ 166.80 MS, -558.81 KN @ 27.28 MS

APPENDIX C

DUMMY CERTIFICATION DATA

PRE-TEST CERTIFICATION DATA

DRIVER DUMMY S/N: 142

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
142 HUMANOID

23-SEP-93

TRC 142C16ED1 572E SN142 EXT.DIMENSION CAL16

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970 - 1001 MM	983. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	846. MM
CHEST DEPTH (O)		213 - 229 MM	218. MM
H-POINT HEIGHT (C)		84 - 89 MM	84. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	137. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	884. MM
THIGH CLEARANCE (F)		140 - 155 MM	145. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	597. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	475. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	452. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	490. MM
FOOT LENGTH (P)		252 - 267 MM	257. MM
FOOT BREADTH (W)		91 - 107 MM	97. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	89. MM
SHOULDER BREADTH (V)		422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	508. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	208. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	345. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	292. MM

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Gault

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

27-SEP-93

TRC

142C16HD1

572E SN142 HEAD DROP CAL 16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	52.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	273.31 G
PEAK LATERAL ACCELERATION	15 G MAX	-0.95 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

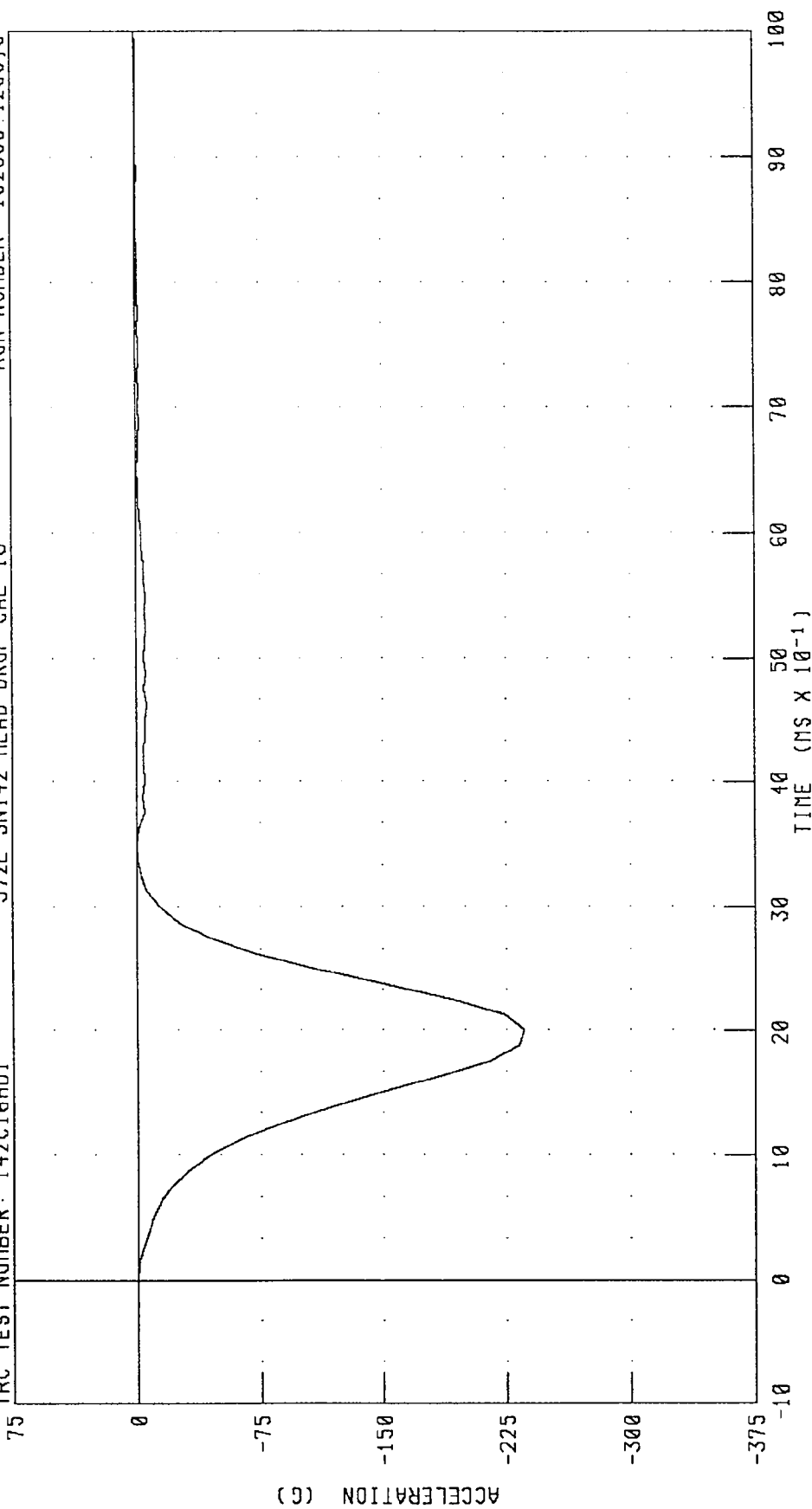
TECHNICIAN Pete Fout

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 142C16HD1

572E SN142 HEAD DROP CAL 16

RUN NUMBER: 102093.1238,5



CHANNEL: HEDXC FILTER: CH. CLASS 1000

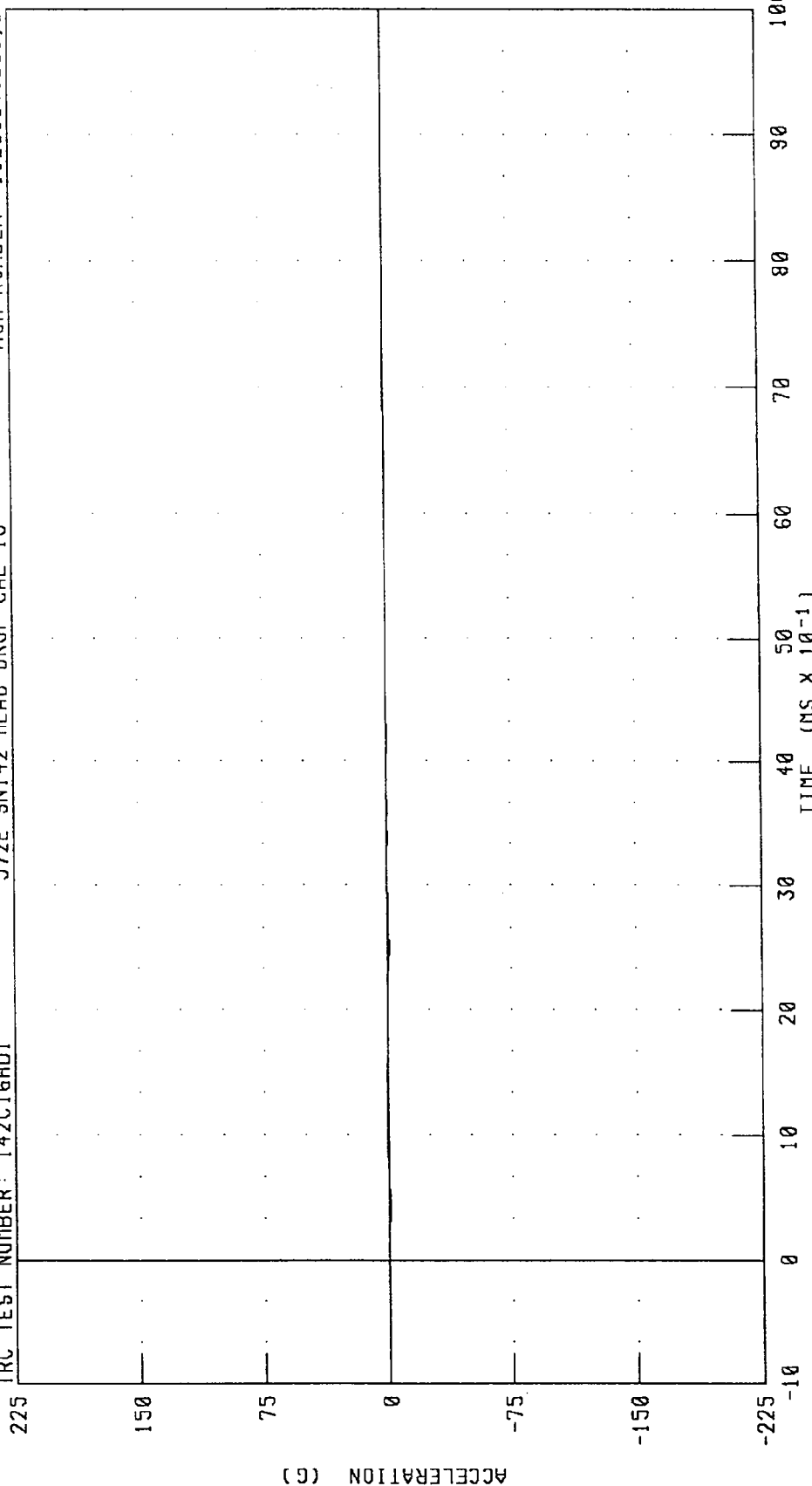
PEAK DATA: -0.01 G @ -1.00 MS; -235.89 G @ 2.00 MS

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 142C16HD1

572E SN142 HEAD DROP CAL 16

RUN NUMBER: 102093 1238.5



PEAK DATA: 0.48 G @ 1.13 MS; -0.96 G @ 2.50 MS

CHANNEL: HEDYG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 142C16HD1

572E SN142 HEAD DROP CAL 16

RUN NUMBER: 102093.1238,5

75

0

-75

-150

-225

-300

-375

ACCELERATION (G)

100

90

80

70

60

50

40

30

20

10

0

-10

TIME (MS X 10⁻¹)

PEAK DATA: 0.00 G @ -1.00 MS; -138.05 G @ 2.00 MS

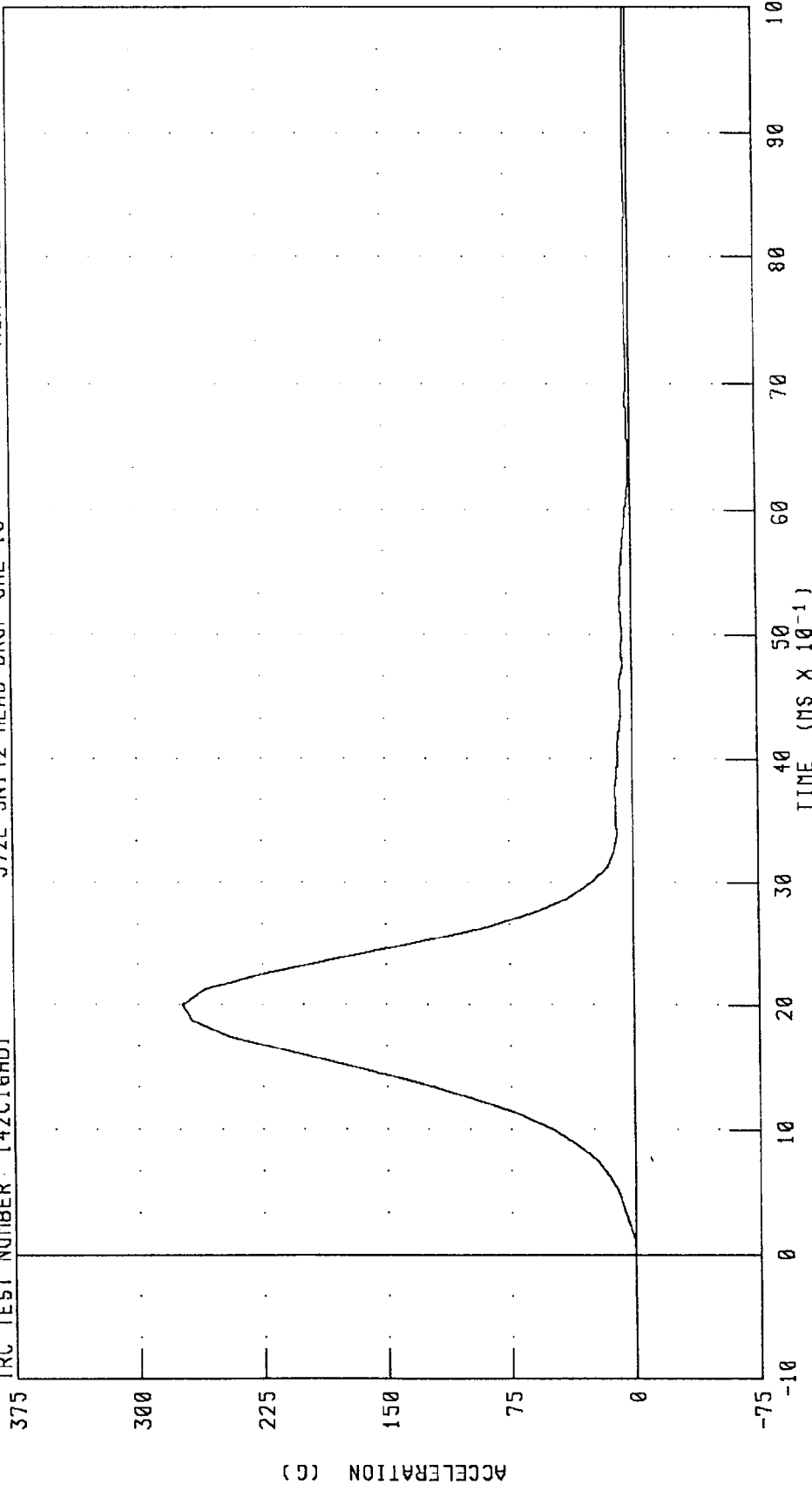
FILTER: CH. CLASS 1000

CHANNEL: HEDZG

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
572E SN142 HEAD DROP CAL 16

RUN NUMBER: 102093.1238,5

TRC TEST NUMBER: 142C16HD1



PEAK DATA: 273.32 G @ 2.00 MS, 0.03 G @ -0.50 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST

HYBRID III

27-SEP-93

6 AXIS NECK TRANSDUCER
TRC 142C16NF1

572E SN142 NECK FLEXION CAL16

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10% - 70%	52.0 %
IMPACT VELOCITY		6.89 - 7.13 M/SEC	7.03 M/SEC
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.80 G
	20 MS	17.60 - 22.60 G	20.94 G
	30 MS	12.50 - 18.50 G	16.52 G
MAX PENDULUM G		29 G MAX	24.68 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.45 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	37.25 MS
D PLANE	MAX	64 - 78 DEG.	73.05 DEG.
ROTATION	TIME	57 - 64 MS	59.25 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	92.04 NM
	TIME	47 - 58 MS	50.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	115.38 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.38 MS

TEST MEETS SPECIFICATIONS

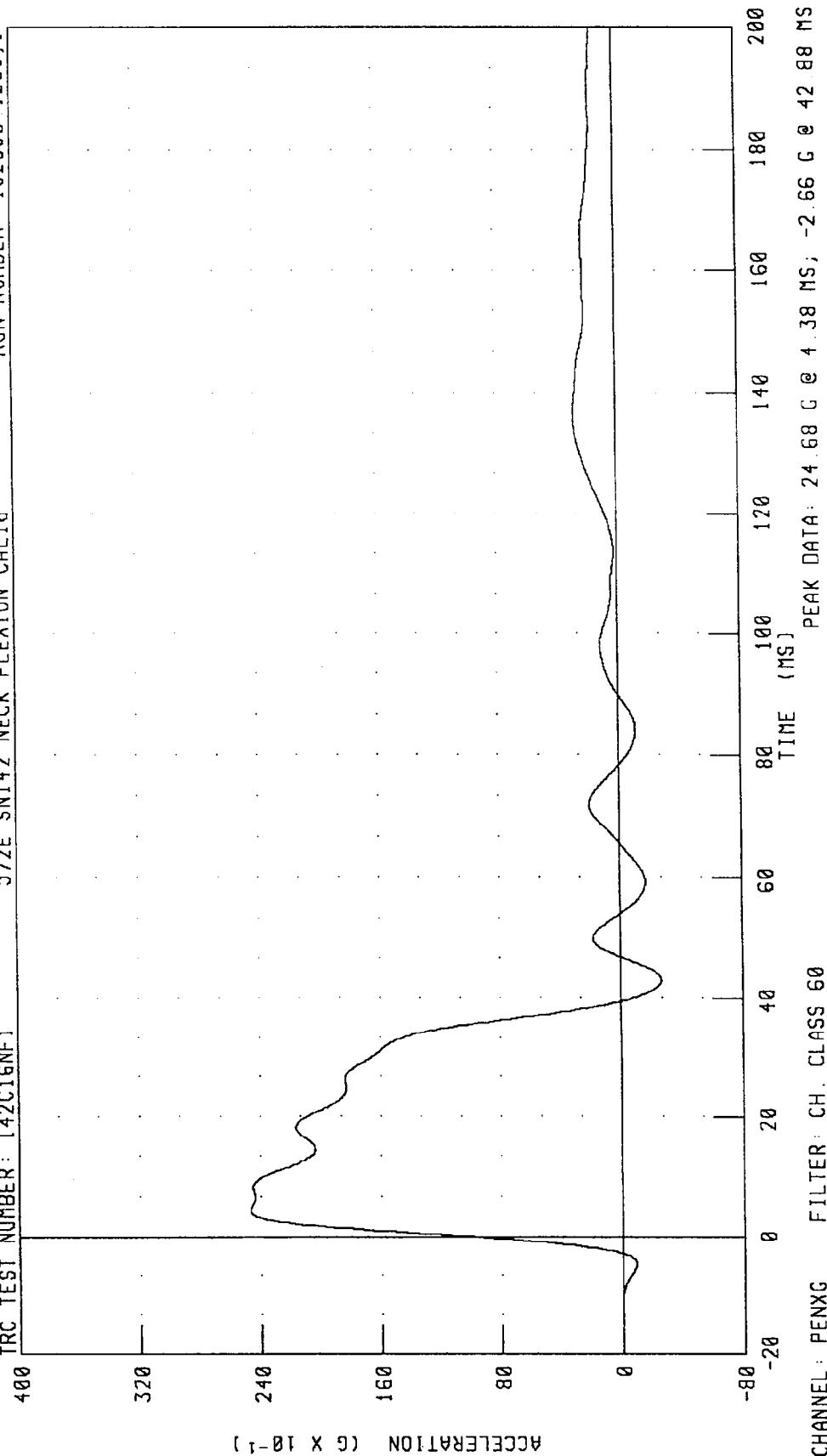
TECHNICIAN Rita Fort

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

RUN NUMBER: 102093 1238,1

572E SN142 NECK FLEXION CAL16

TRC TEST NUMBER: 142C16NF1



CHANNEL: PENXC FILTER: CH. CLASS 60

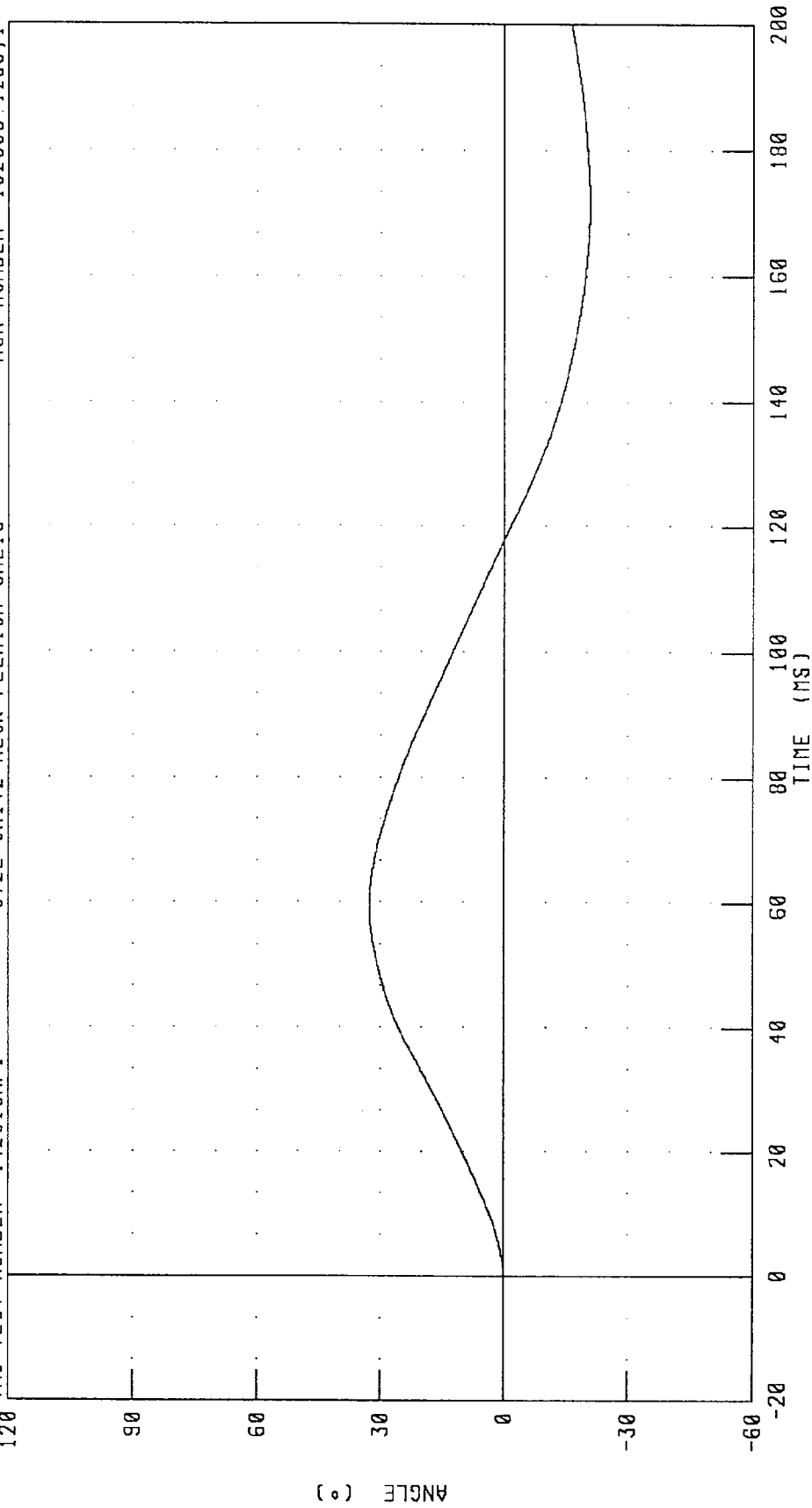
PEAK DATA: 24.68 G @ 4.38 MS; -2.66 G @ 42.88 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 142C16NF1

572E SN142 NECK FLEXION CAL16

RUN NUMBER: 102093.1238,1

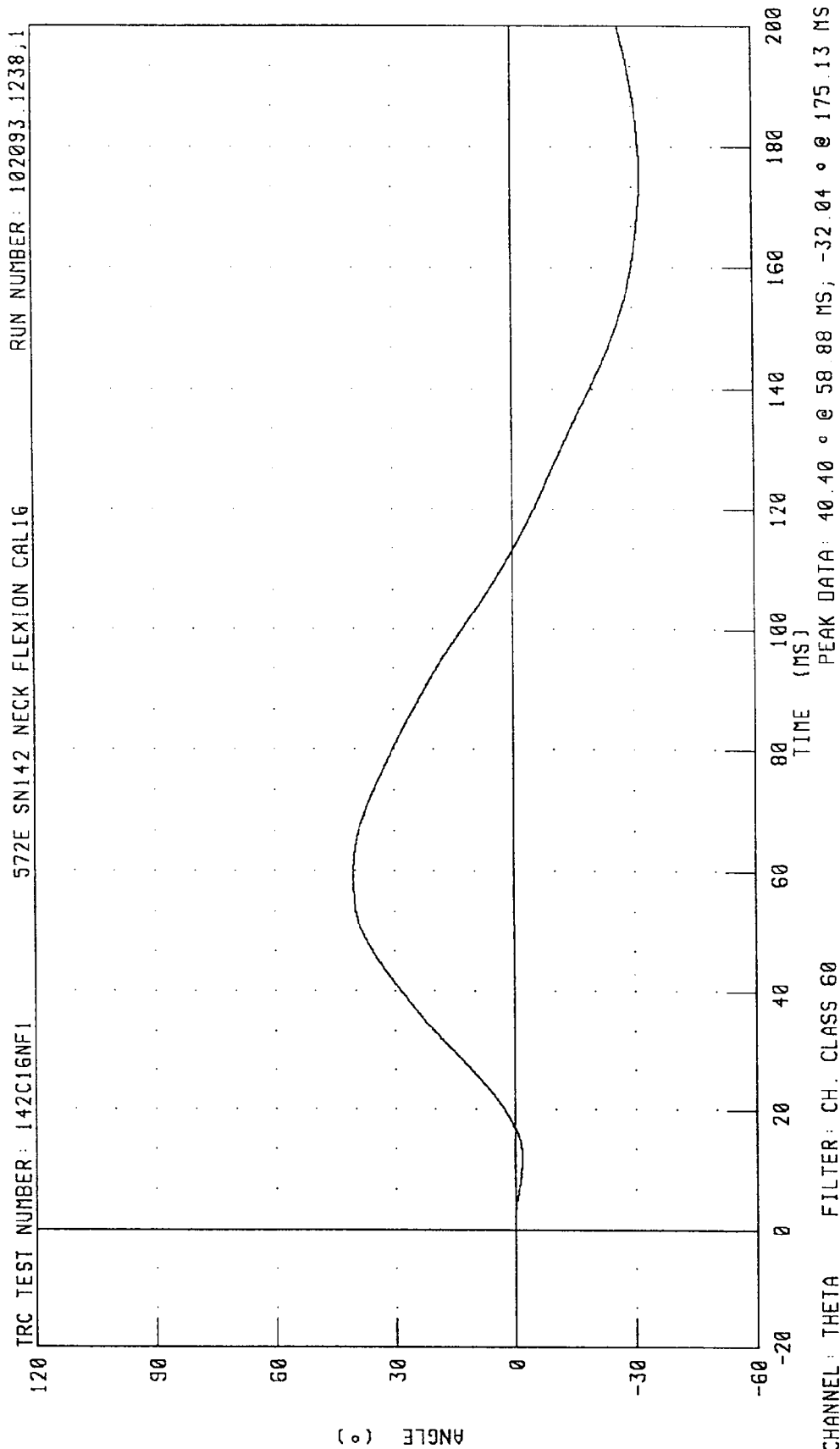


PEAK DATA: 32.67 ° @ 59.63 MS, -20.71 ° @ 171.38 MS

FILTER: CH. CLASS 60

CHANNEL: BETA

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE



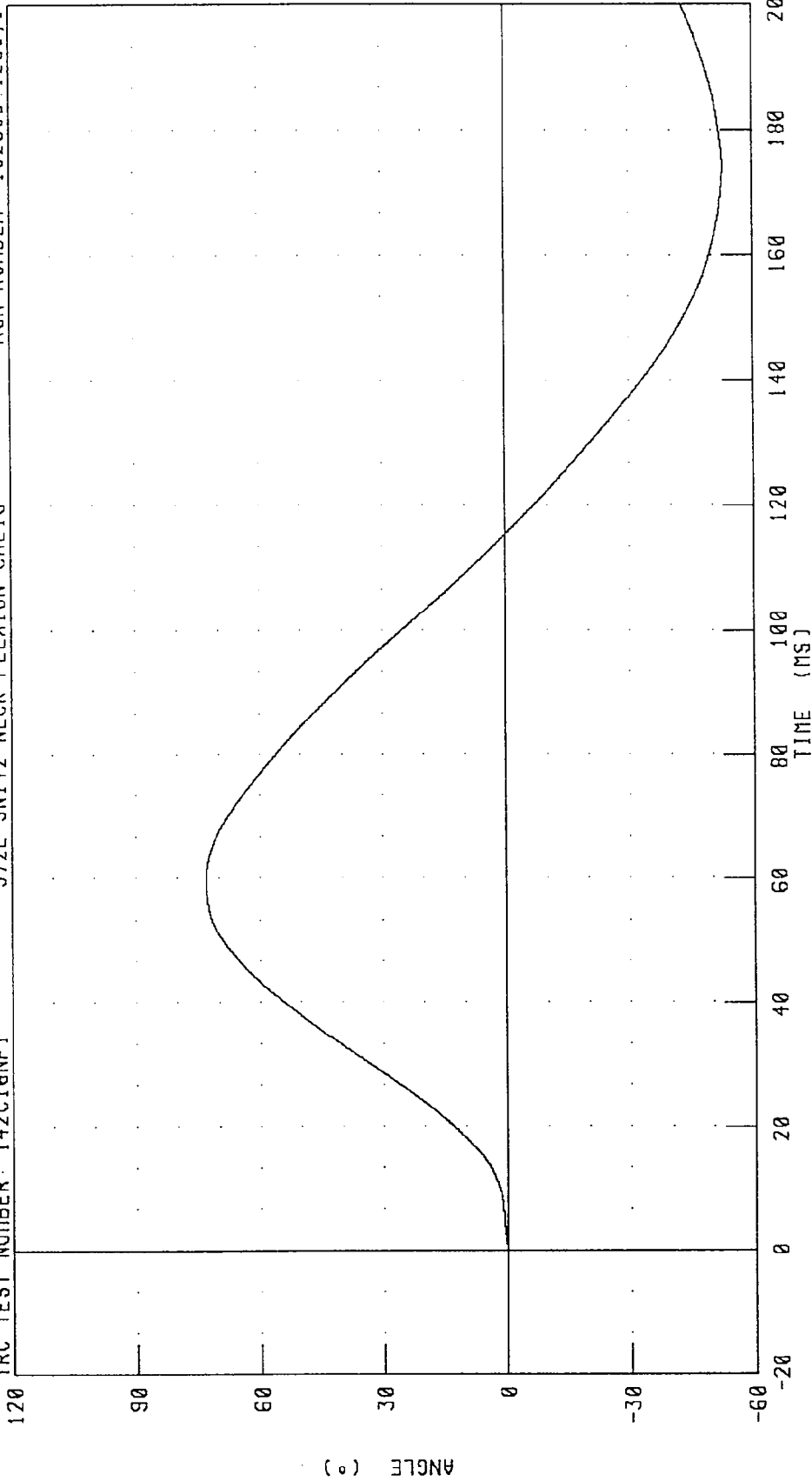
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 142C16NF1

572E SN142 NECK FLEXION CAL16

RUN NUMBER: 102093.1238,1



PEAK DATA: 73.06 ° @ 59.25 MS, -52.69 ° @ 174.13 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

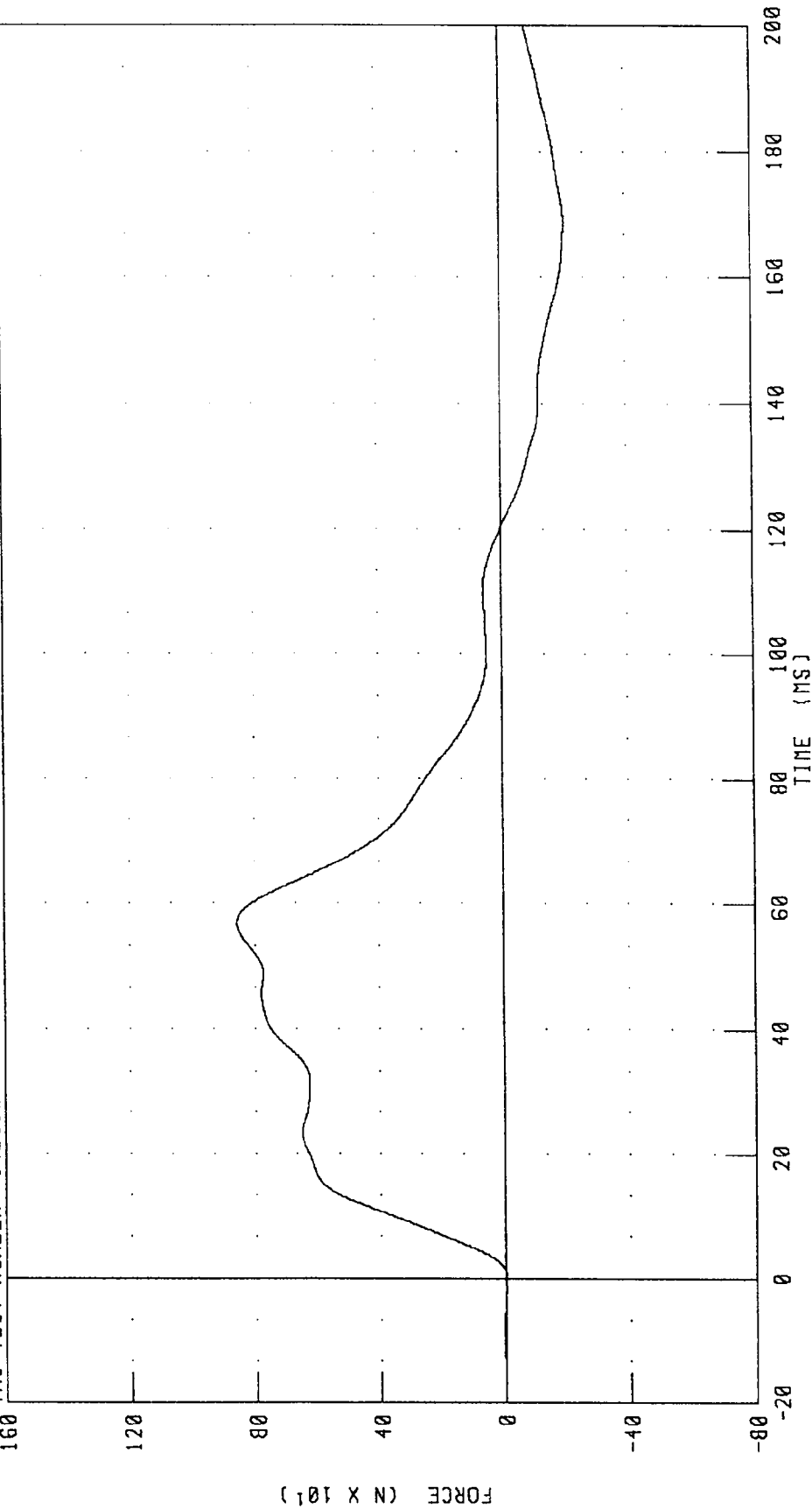
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 142C16NF1

572E SN142 NECK FLEXION CAL16

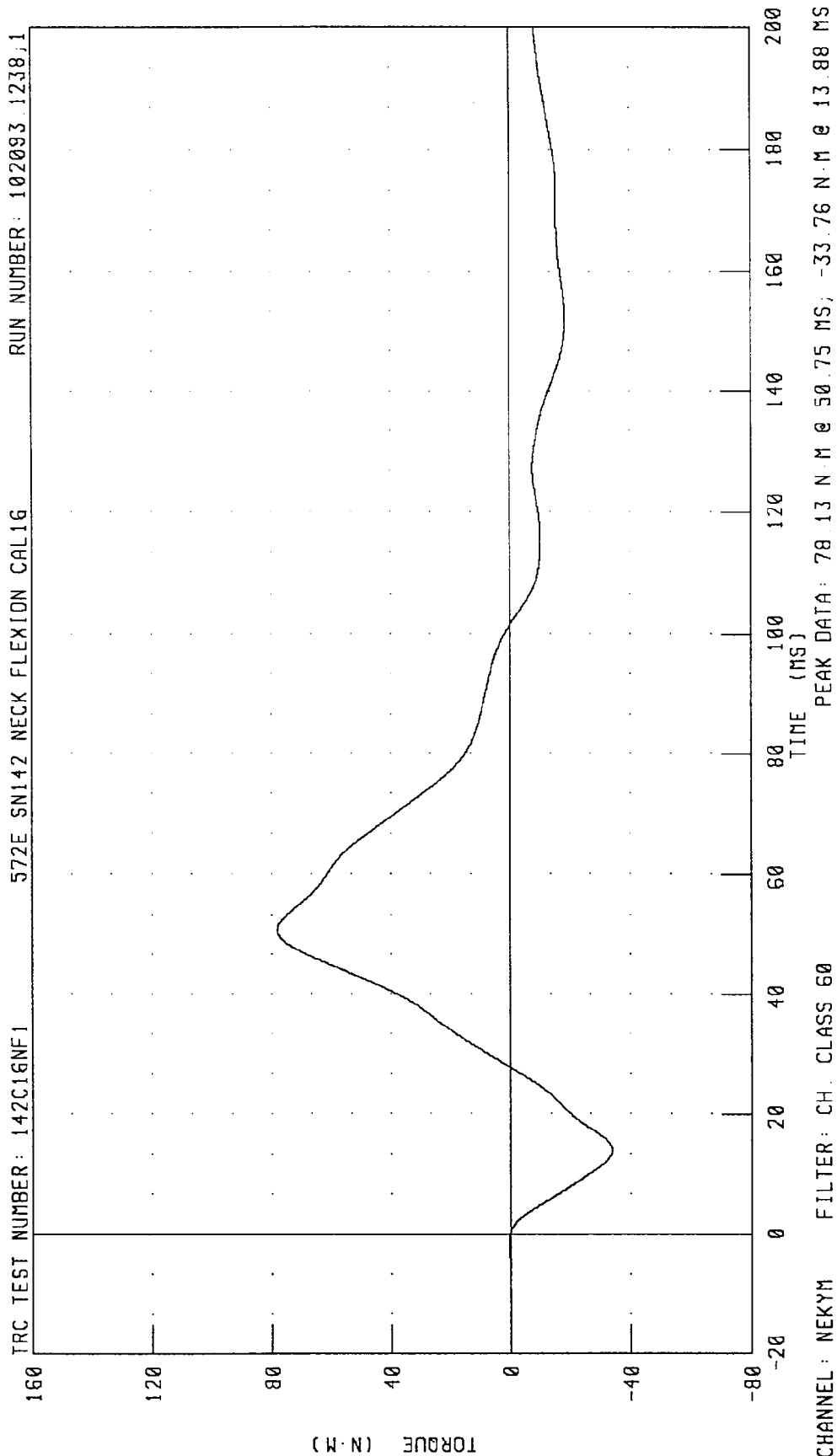
RUN NUMBER: 102093.1238,1



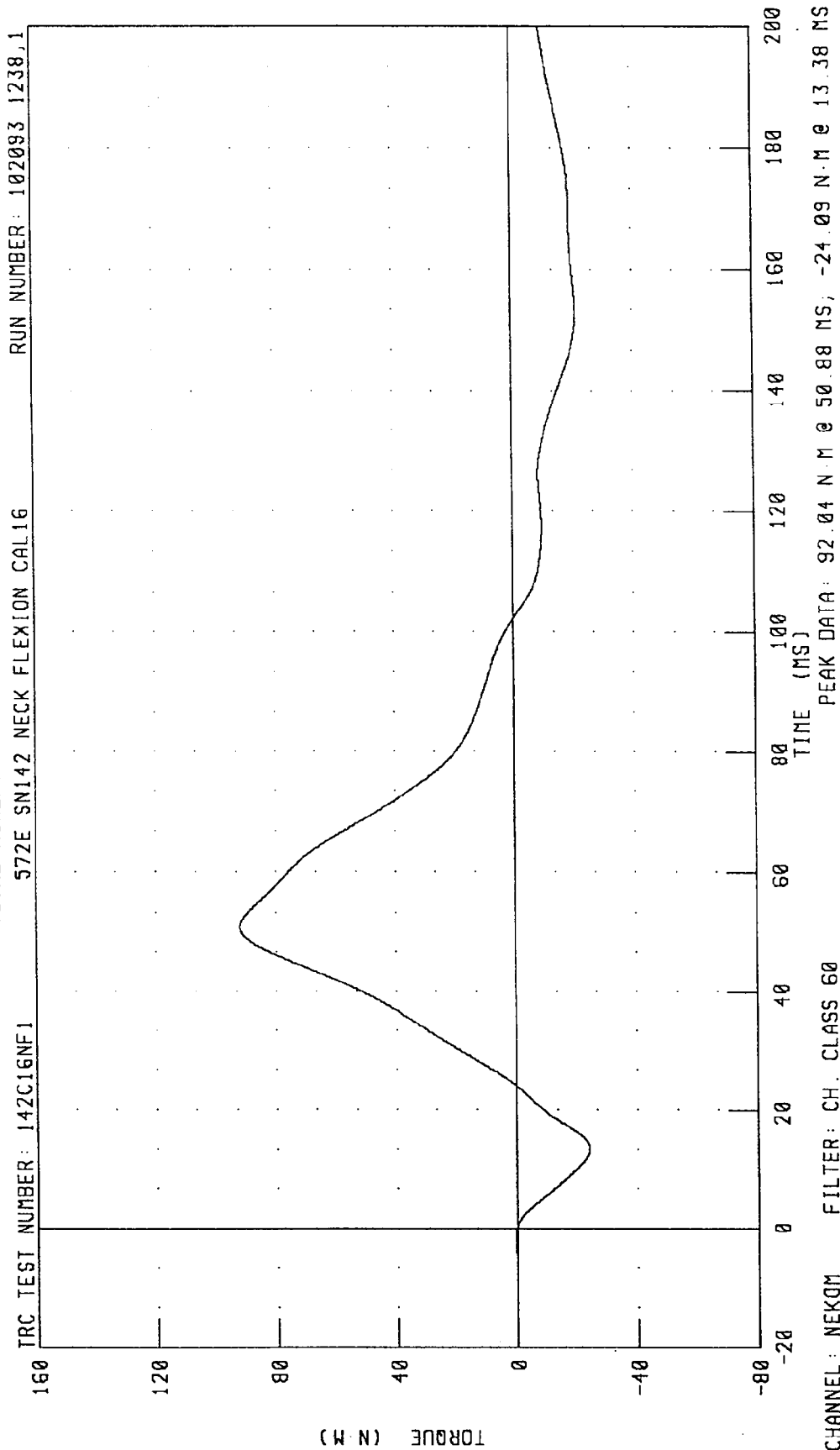
CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 857.22 N @ 56.88 MS; -204.93 N @ 168.50 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS



PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE



TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST

HYBRID III

27-SEP-93

6 AXIS NECK TRANSDUCER
TRC 142C16NE1

572E SN142 NECK EXT. CAL16

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10% - 70%	52.0 %
IMPACT VELOCITY		5.95 - 6.19 M/SEC	6.05 M/SEC
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.54 G
	20 MS	14.00 - 19.00 G	16.35 G
	30 MS	11.00 - 16.00 G	14.00 G
MAX PENDULUM G		22 G MAX	19.20 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.96 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.63 MS
D PLANE	MAX	81 - 106 DEG.	96.59 DEG.
ROTATION	TIME	72 - 82 MS	74.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-71.29 NM
	TIME	65 - 79 MS	70.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	152.88 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	139.25 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Faust

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 142C16NE1 572E SN142 NECK EXT. CAL16 RUN NUMBER: 102093 1238,1

ACCELERATION ($G \times 10^{-1}$)

TIME (MS)

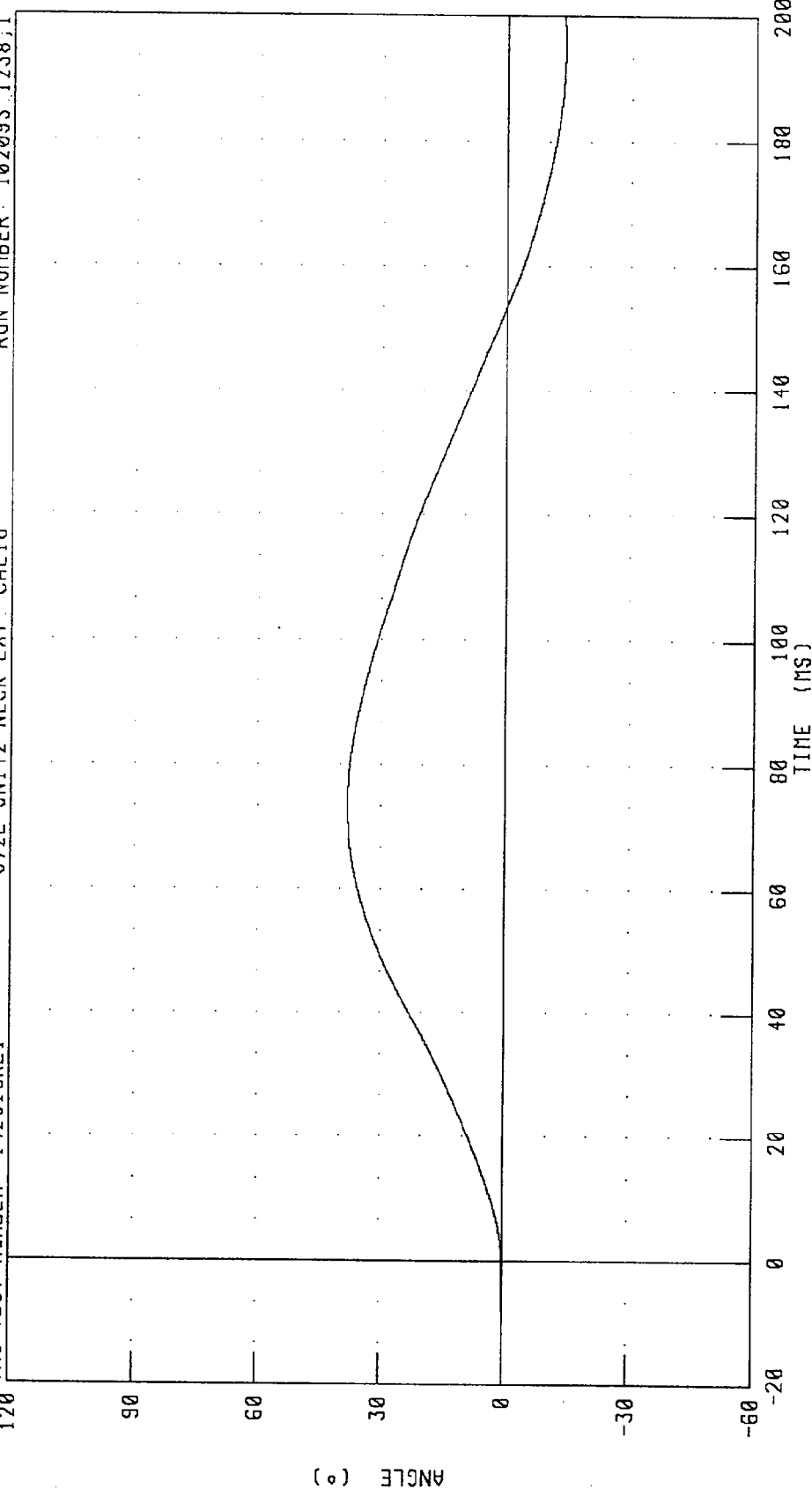
CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 19.20 G @ 8.25 MS; -2.17 G @ 47.38 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 142C16NE1 RUN NUMBER: 102093.1238,1

572E SN142 NECK EXT. CAL16



PEAK DATA: 38.09 ° @ 73.75 MS; -13.83 ° @ 195.63 MS

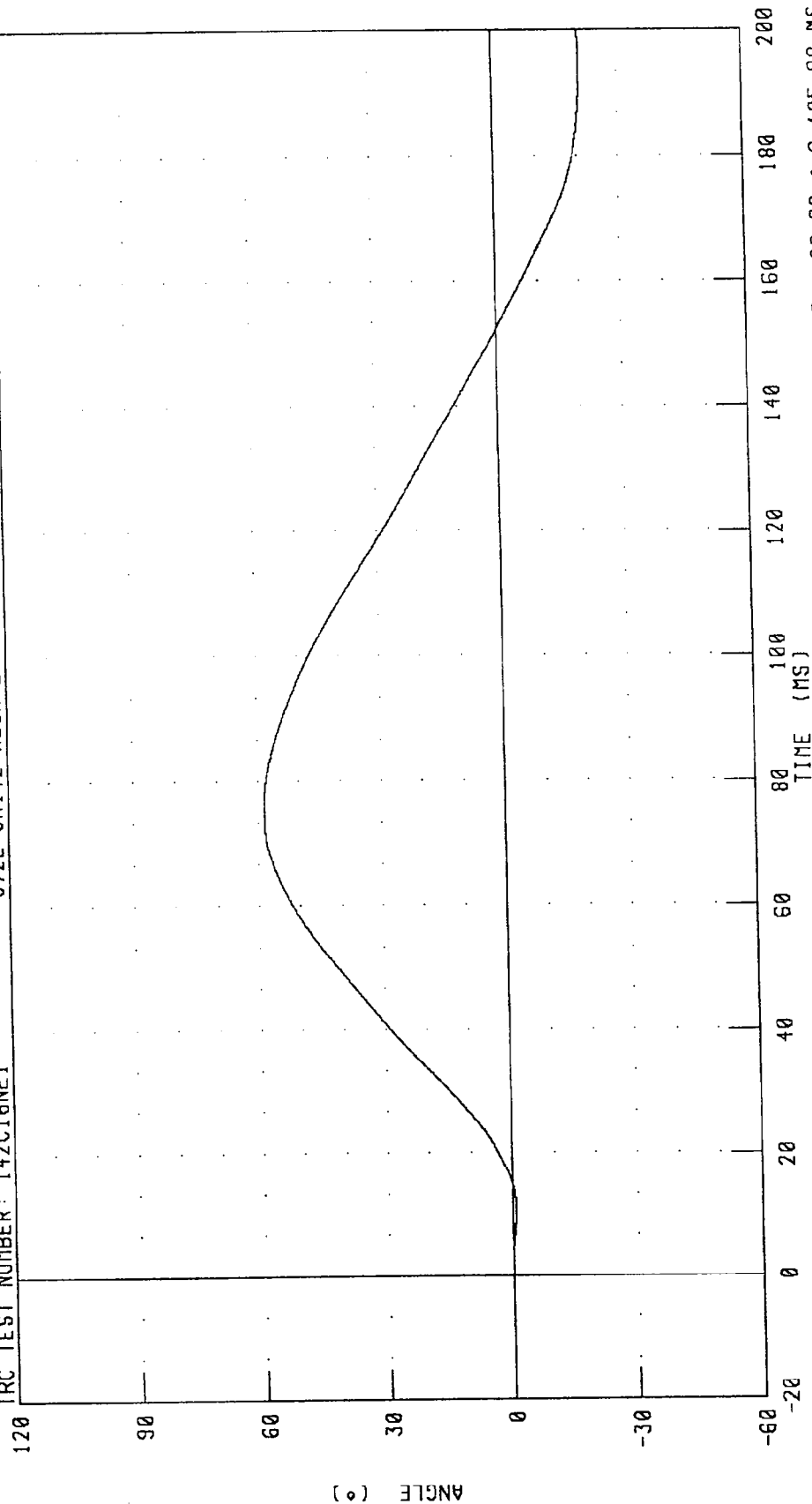
CHANNEL: BETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 142C16NE1

572E SN142 NECK EXT. CAL16

RUN NUMBER: 102093.1238,1



PEAK DATA: 58.51 ° @ 74.75 MS; -20.72 ° @ 195.88 MS

CHANNEL: THETA FILTER: CH. CLASS 60

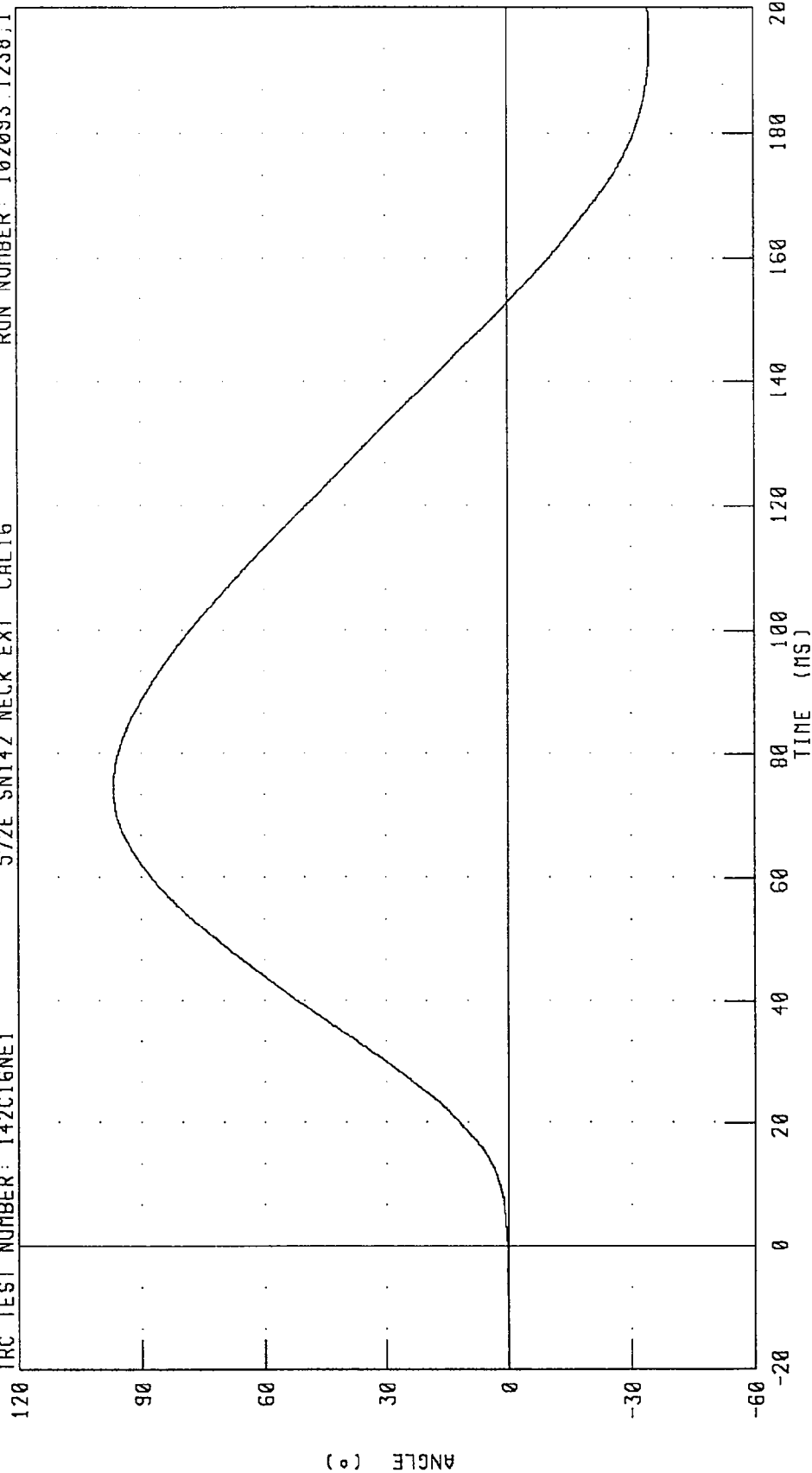
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 142C16NE1

572E SN142 NECK EXT CAL16

RUN NUMBER: 102093.1238.1



PEAK DATA: 96.59 ° @ 74.38 MS, -34.55 ° @ 195.75 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

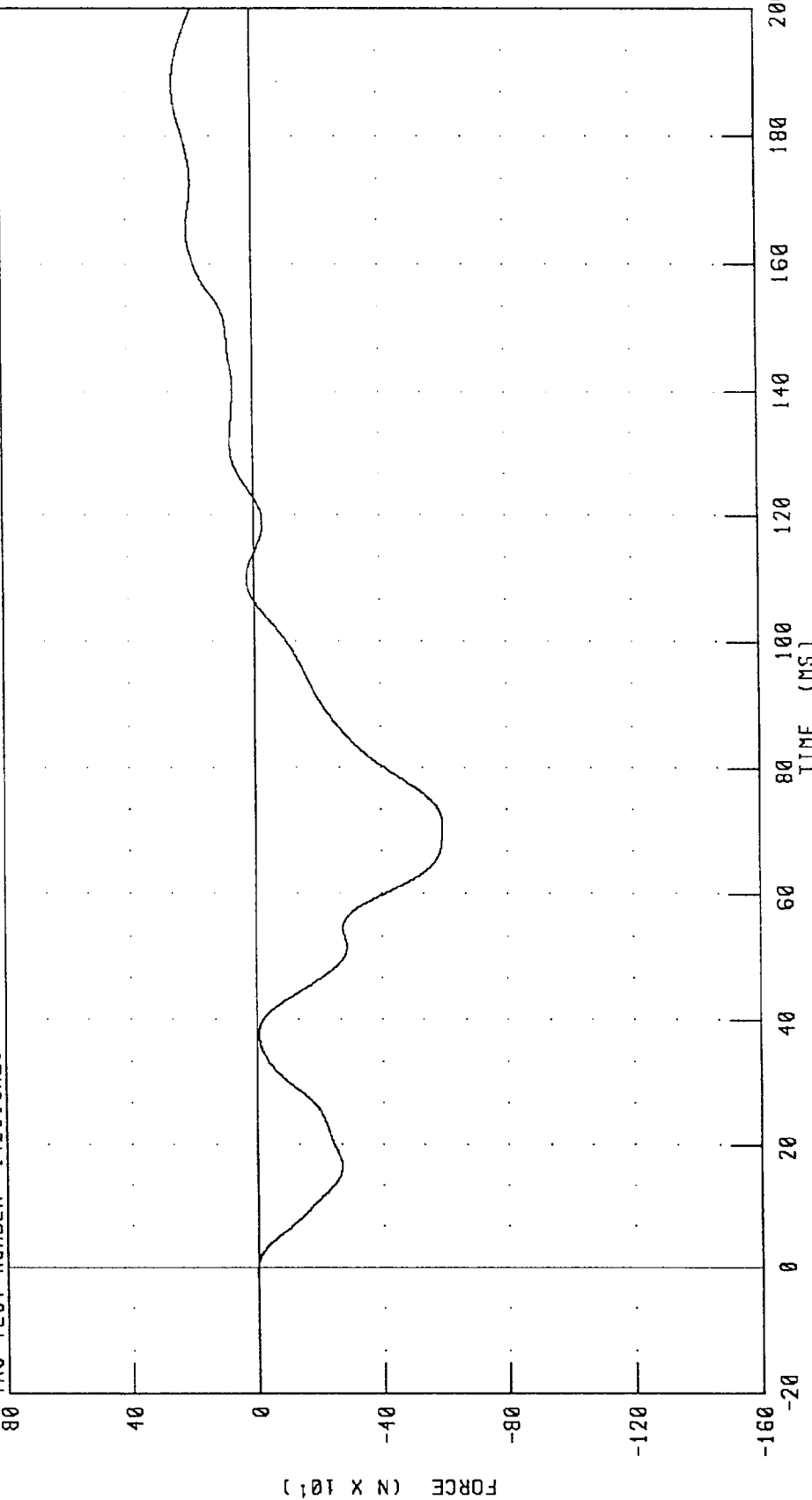
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 142C16NE1

572E SN142 NECK EXT. CAL16

RUN NUMBER: 102093.1238,1



PEAK DATA: 250.58 N @ 187.88 MS; -593.99 N @ 70.63 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

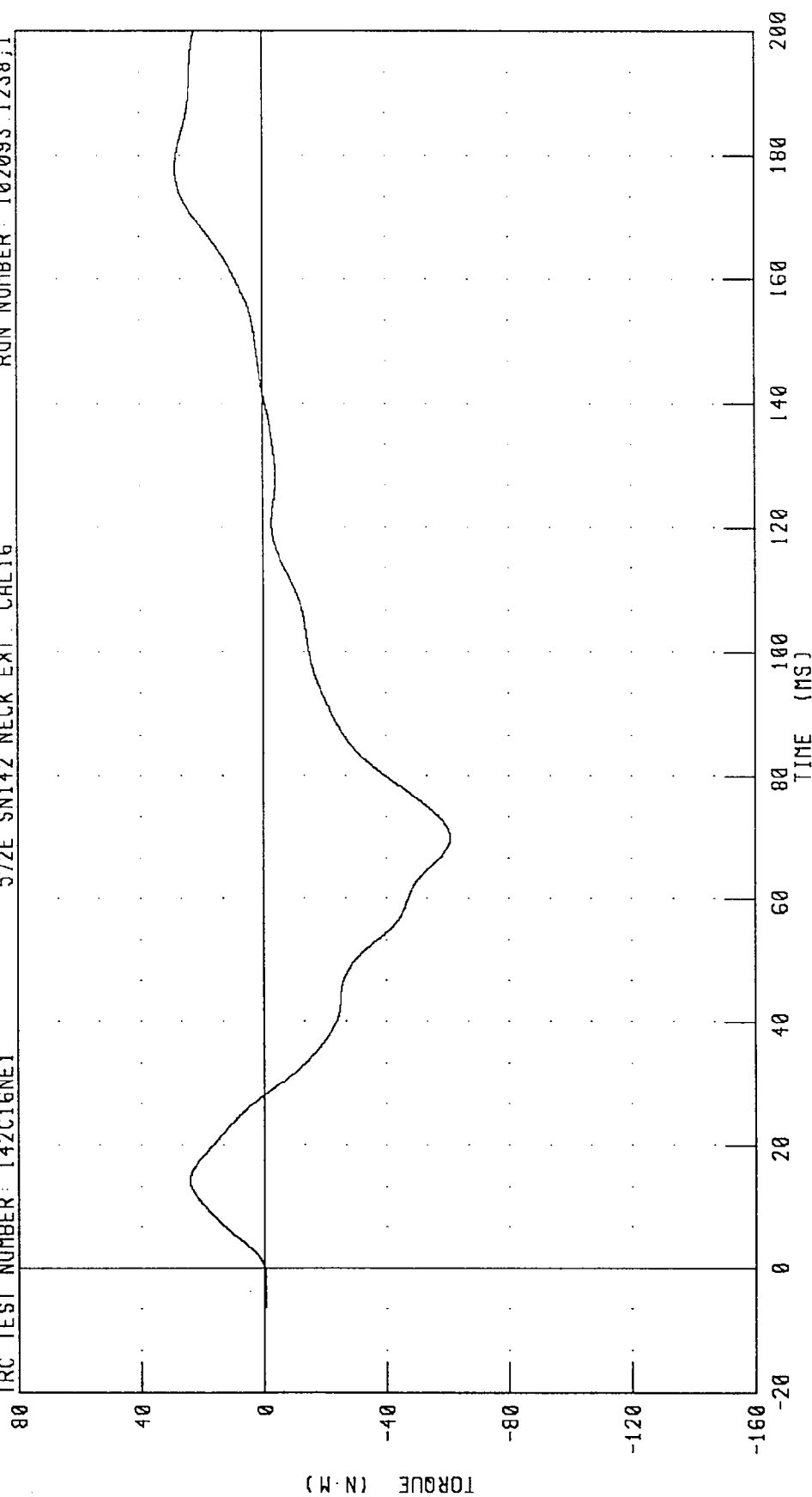
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 142C16NE1

572E SN142 NECK EXT. CAL16

RUN NUMBER: 102093.1238;1



PEAK DATA: 28.40 N·M @ 178.00 MS; -60.74 N·M @ 70.00 MS

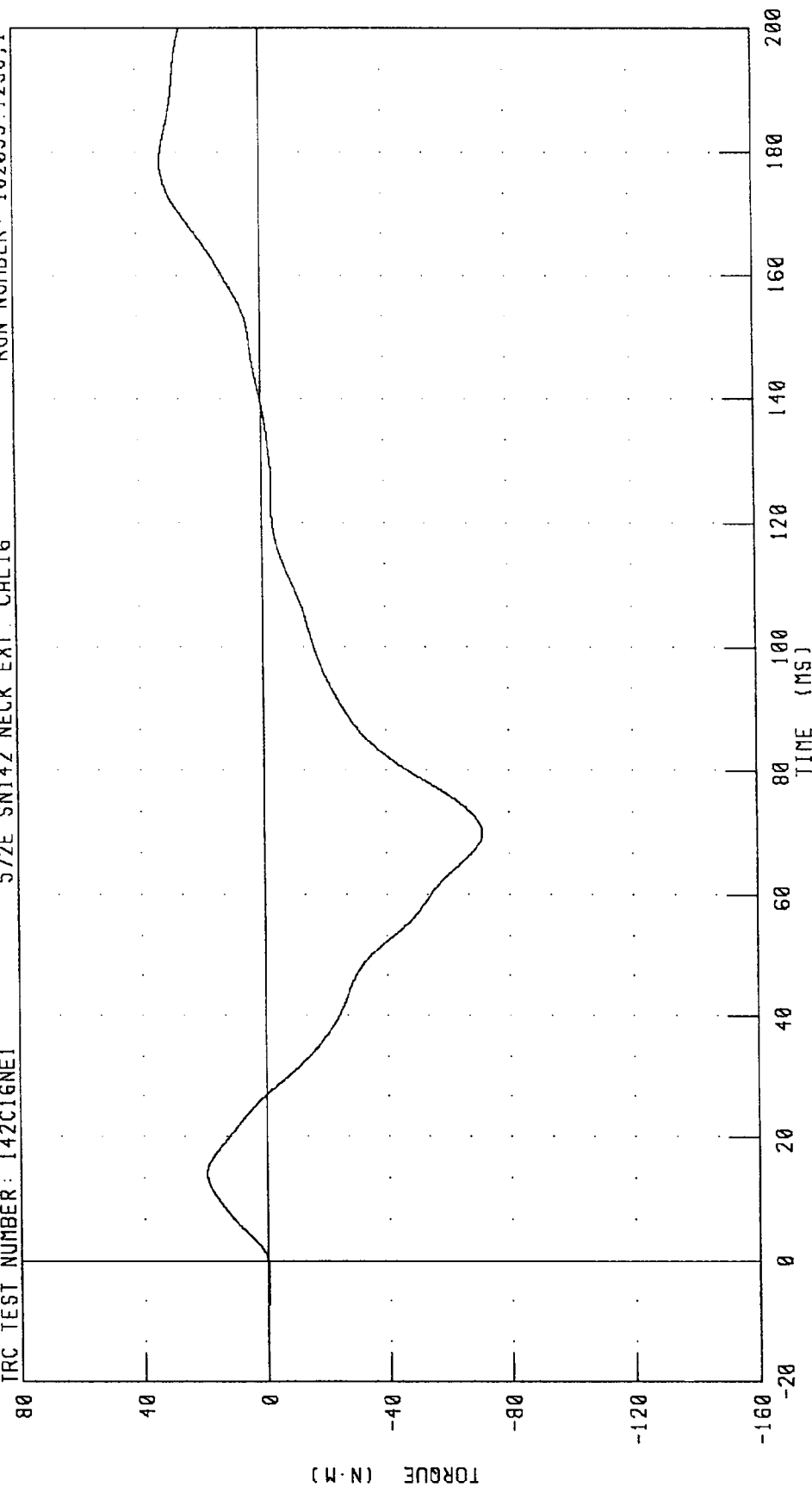
CHANNEL: NEKYM FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 142C16NE1

572E SN142 NECK EXT. CAL16

RUN NUMBER: 102093.1238;1



PEAK DATA: 32.13 N·m @ 178.50 MS; -71.29 N·m @ 70.00 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

28-SEP-93

TRC

142C16TH2

572E SN142 H.S.THORAX CAL16

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	52.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/SEC	6.68 M/SEC
MAXIMUM DEFLECTION	63.5 - 72.6 MM	68.6 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5381. N
INTERNAL HYSTERESIS	69% - 85%	75.4%

TEST MEETS SPECIFICATIONS

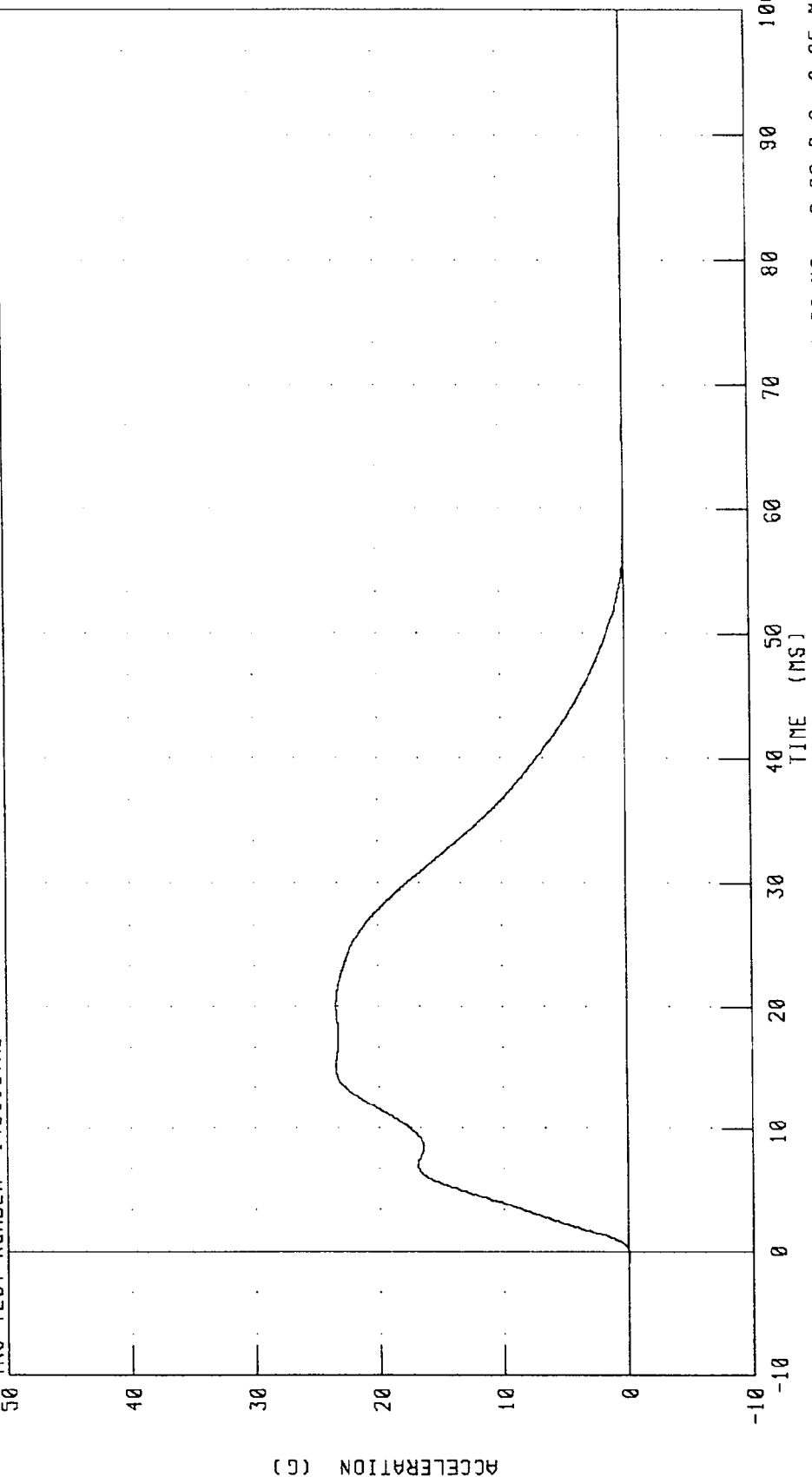
TECHNICIAN Pete Foust

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 142C16TH2

572E SN142 H.S. THORAX CAL16

RUN NUMBER: 102093.1238;1

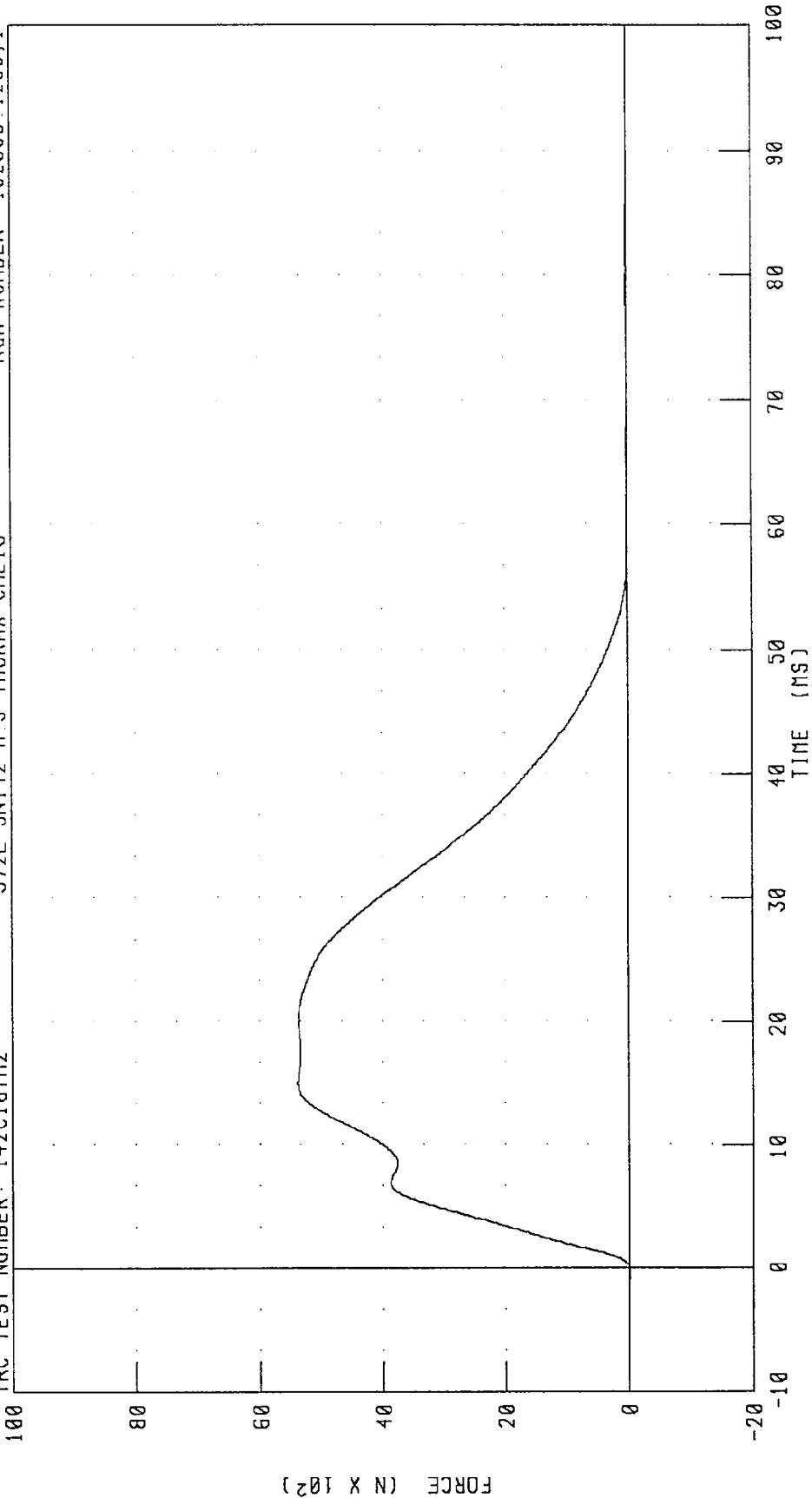


PEAK DATA: 23.49 G @ 14.88 MS, -0.08 G @ -0.25 MS

CHANNEL: PENXG FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM FORCE

TRC TEST NUMBER: 142C16TH2 572E SN142 H S THORAX CAL16 RUN NUMBER: 102093.1238,1



PEAK DATA: 5381 75 N @ 14.88 MS, -18.35 N @ -0 25 MS

CHANNEL: PENXF FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

572E SN142 H.S. THORAX CAL16 RUN NUMBER: 102093 1238,1

TRC TEST NUMBER: 142C16TH2

150

120

90

60

30

0

-30

DISPLACEMENT (MM)

TIME (MS)

100

90

80

70

60

50

40

30

20

10

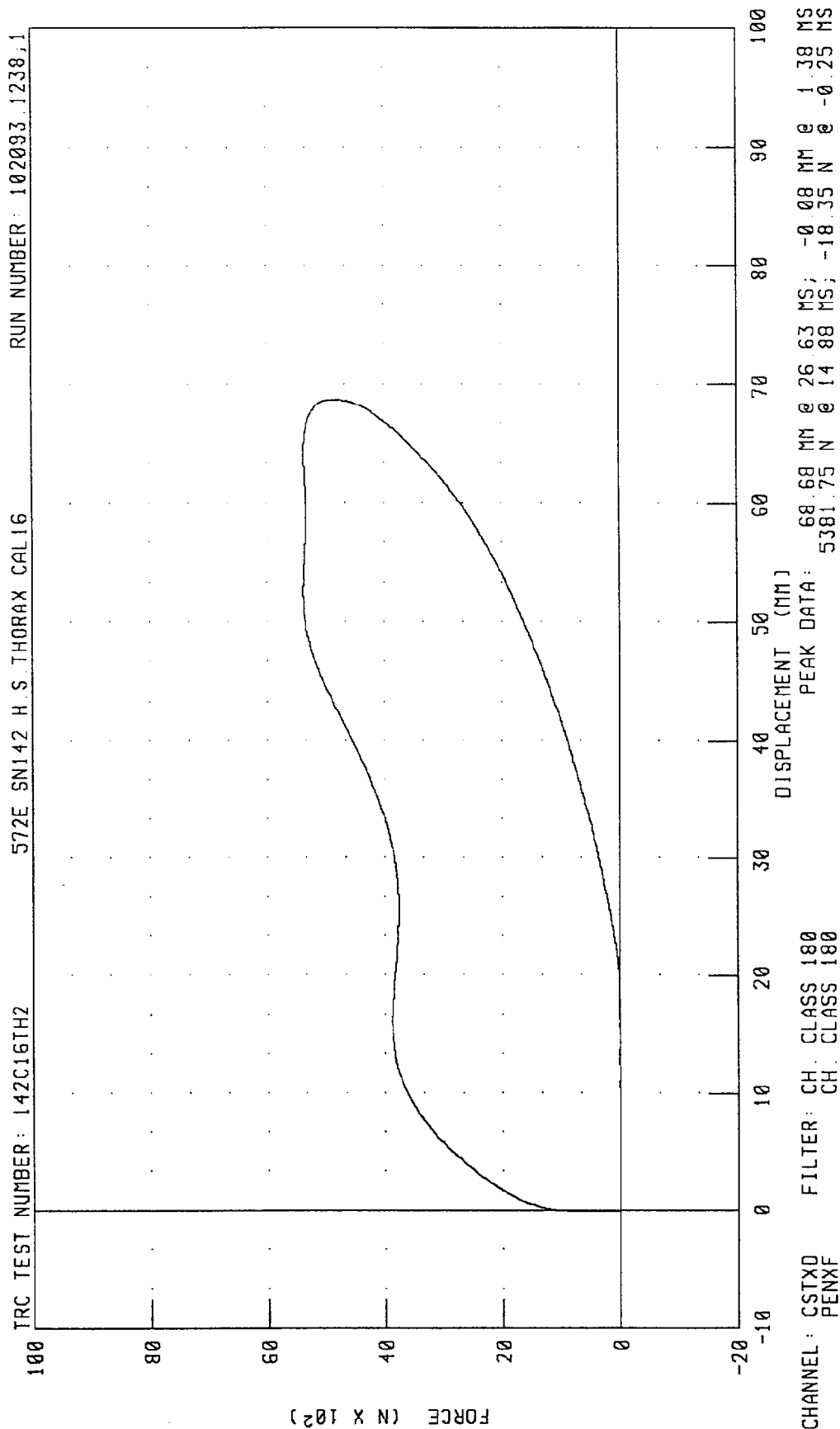
0

-10

PEAK DATA: 68.68 MM @ 26.63 MS; -0.08 MM @ 1.38 MS

CHANNEL: CSTXD FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE



TRANSPORTATION RESEARCH CENTER INC.

KNEE IMPACT TEST

HYBRID III

23-SEP-93

RIGHT KNEE
TRC

142C16RK1

572E SN142 RIGHT KNEE CAL 16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10% - 70%	64.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.09 M/SEC
PEAK KNEE IMPACT FORCE PROBE WEIGHT	4714 - 5783 N 5.0 KG	5349.3 N

TEST MEETS SPECIFICATIONS

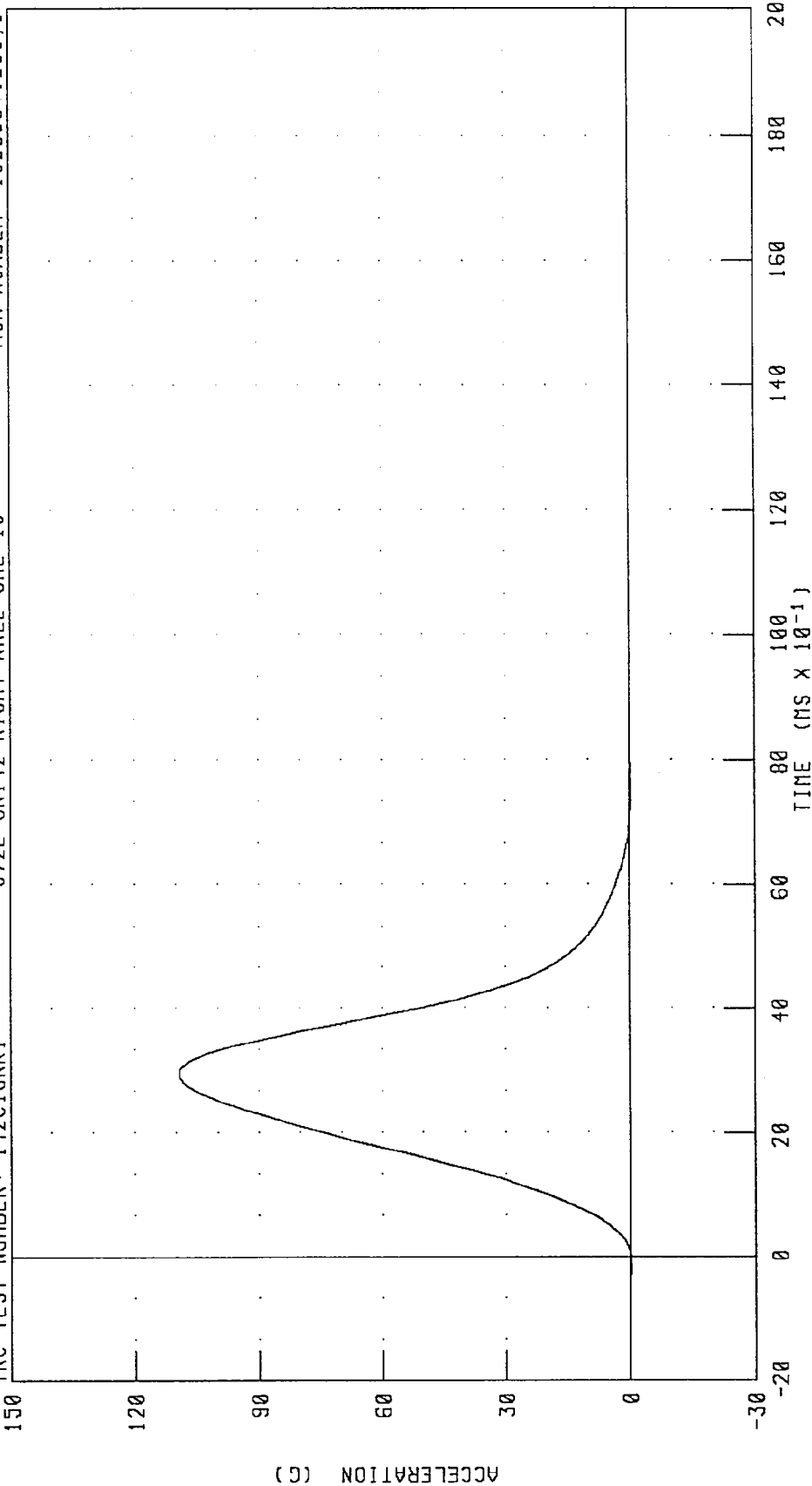
TECHNICIAN Pete Faust

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
 PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 142C16RK1

572E SN142 RIGHT KNEE CAL 16

RUN NUMBER: 102093 1238.1



PEAK DATA: 109.33 G @ 2.88 MS; -0.15 G @ 7.50 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KC PEND.)

572E SN142 RIGHT KNEE CAL 16

RUN NUMBER: 102093.1238,1

TRC TEST NUMBER: 142C16RK1

75

60

45

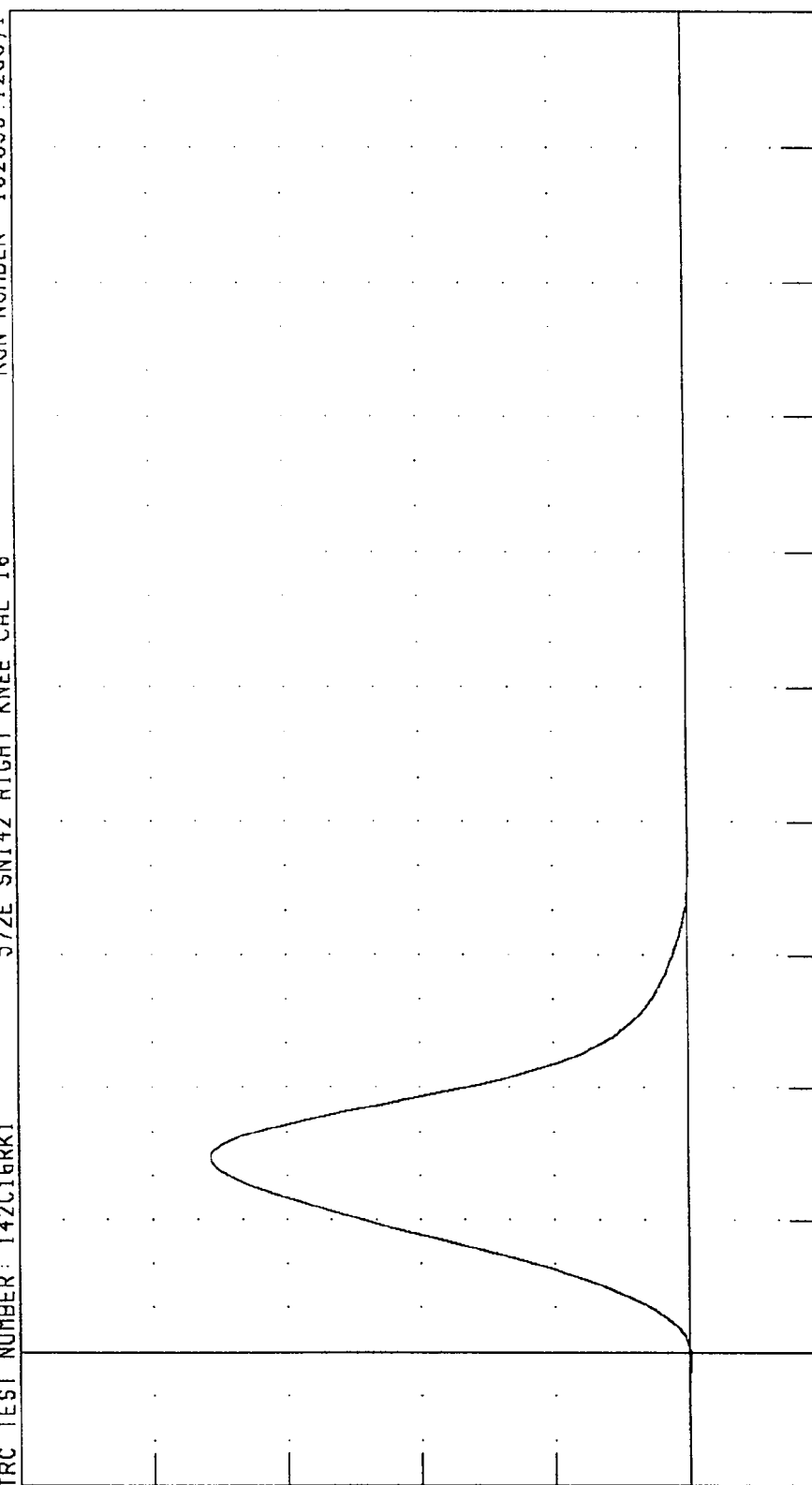
30

15

0

-15

FORCE (N X 10²)



TIME (MS X 10⁻¹)

PEAK DATA: 5349.33 N @ 2.88 MS; -7.14 N @ 7.50 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

KNEE IMPACT TEST

HYBRID III

23-SEP-93

LEFT KNEE

TRC

142C16LK1

572E SN142 LEFT KNEE CAL 16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10% - 70%	64.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.09 M/SEC
PEAK KNEE IMPACT FORCE	4714 - 5783 N	5622.0 N
PROBE WEIGHT	5.0 KG	

TEST MEETS SPECIFICATIONS

TECHNICIAN

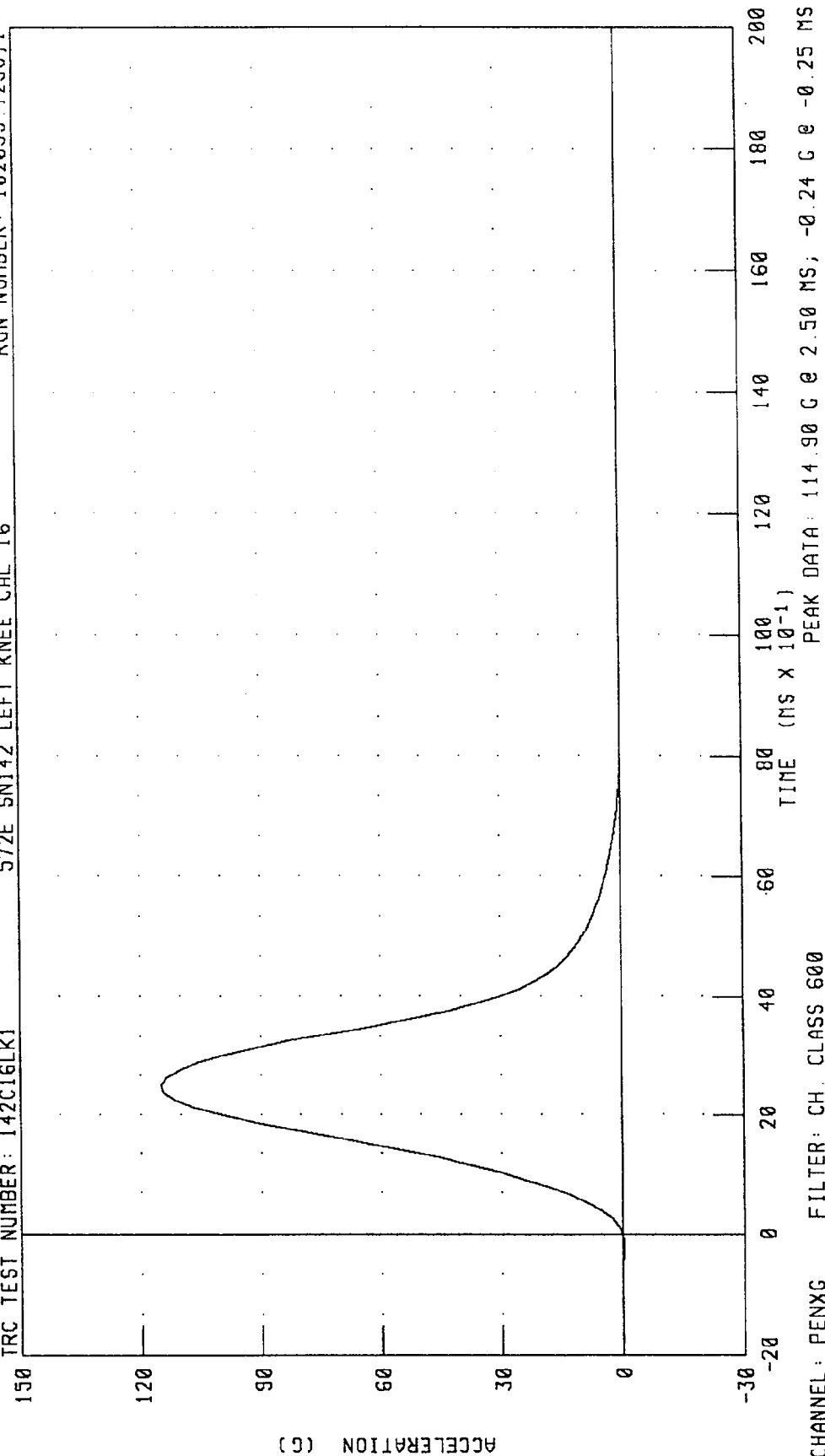
Rita Ford

PART 572-E HYBRID III LEFT KNEE CALIBRATION
 PENDULUM DECELERATION (5 KC PEND.)

TRC TEST NUMBER: 142C16LK1

572E SN142 LEFT KNEE CAL 16

RUN NUMBER: 102093.1238;1



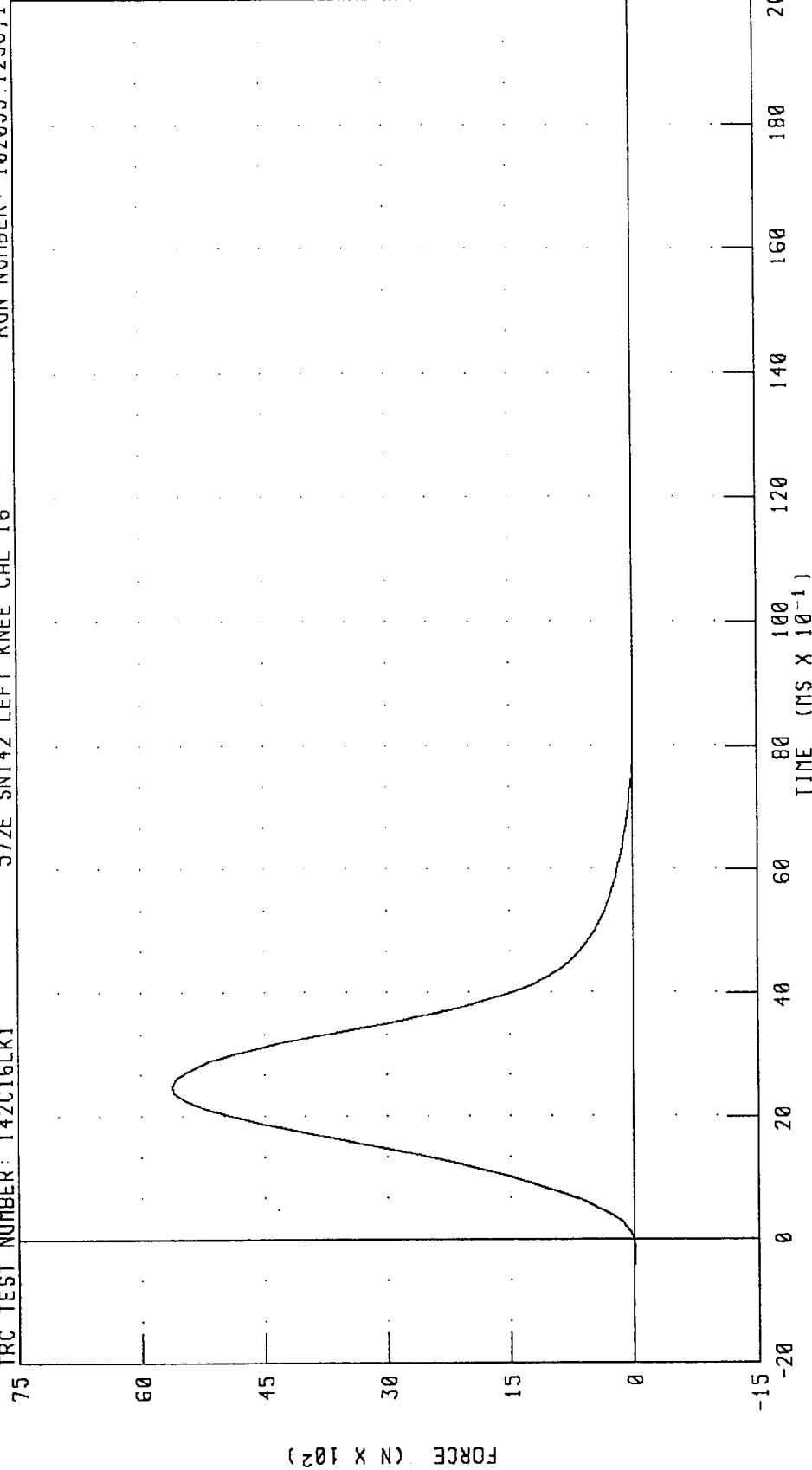
CHANNEL: PENXG FILTER: CH. CLASS 600

PART 572-E HYBRID III LEFT KNEE CALIBRATION
 PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 102093.1238;1

572E SN142 LEFT KNEE CAL 16

TRC TEST NUMBER: 142C16LK1



PEAK DATA: 5622.03 N @ 2.50 MS; -11.70 N @ -0.25 MS

FILTER: CH. CLASS 600

CHANNEL: PENXF

PRE-TEST CERTIFICATION DATA

PASSENGER DUMMY S/N: 192

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
192 ARL

23-SEP-93

TRC 192C15ED1 572E SN192 EXT.DIMENSION CAL15

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970 - 1001 MM	980. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	848. MM
CHEST DEPTH (O)		213 - 229 MM	218. MM
H-POINT HEIGHT (C)		84 - 89 MM	84. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	136. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	884. MM
THIGH CLEARANCE (F)		140 - 155 MM	147. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	472. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	450. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	493. MM
FOOT LENGTH (P)		252 - 267 MM	259. MM
FOOT BREADTH (W)		91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	91. MM
SHOULDER BREADTH (V)		422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	513. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	206. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	340. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	295. MM

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Fout

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

27-SEP-93

TRC

192C15HD1

572E SN192 HEAD DROP CAL 15

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	52.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	259.59 G
PEAK LATERAL ACCELERATION	15 G MAX	-5.88 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

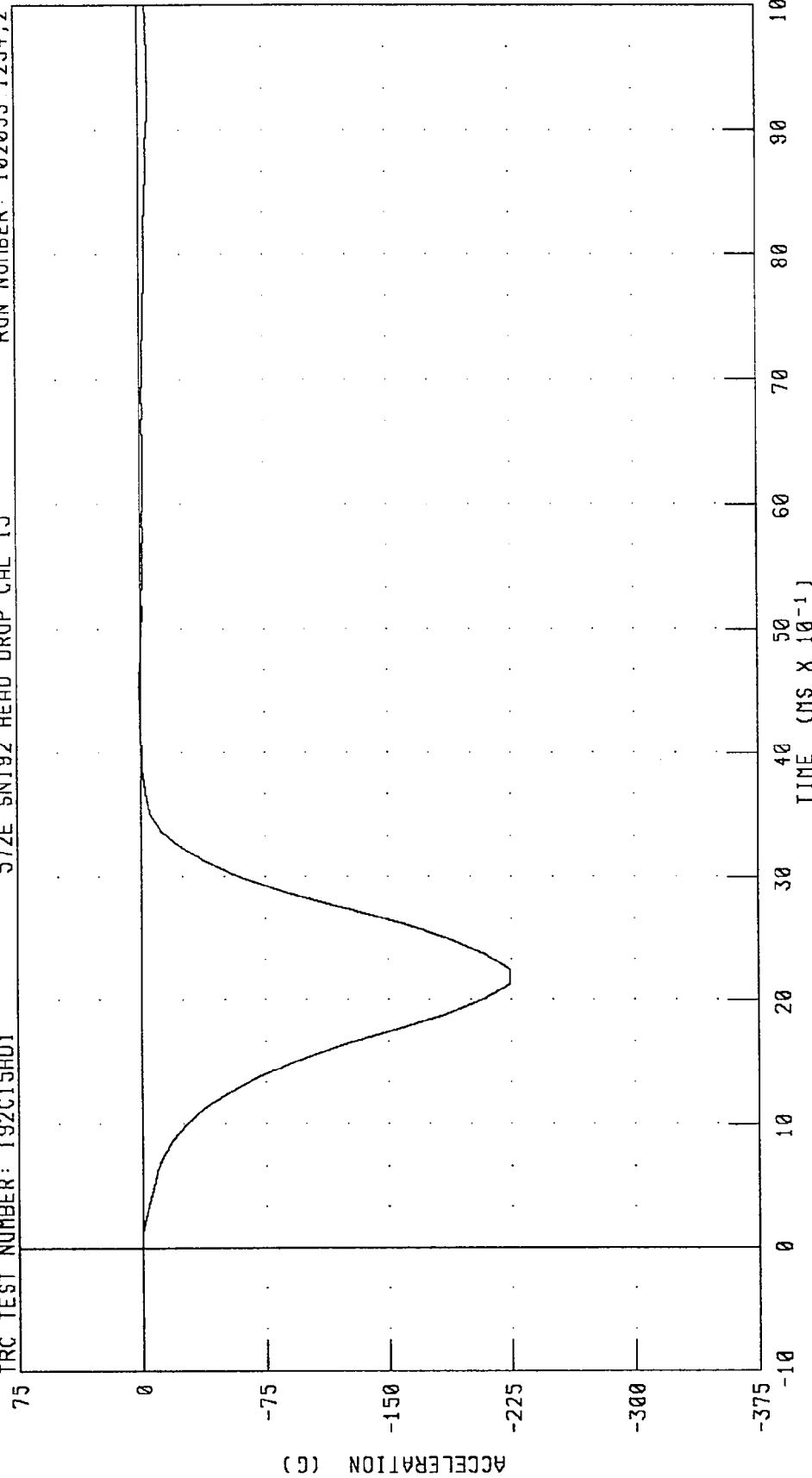
TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Fount

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 192C15HD1 RUN NUMBER: 102093 1254.2

572E SN192 HEAD DROP CAL 15



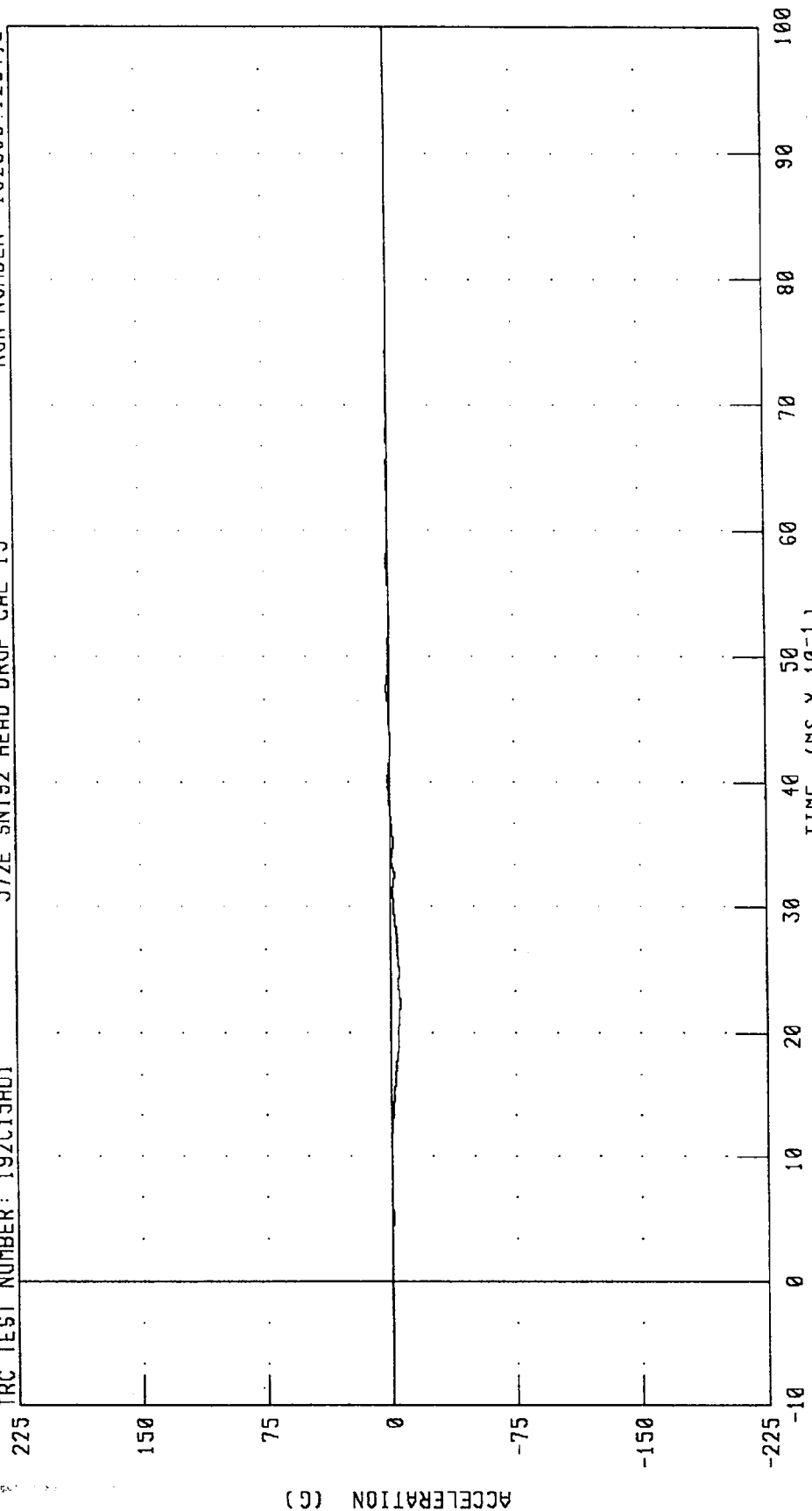
PEAK DATA: 1.03 G @ 4.50 MS; -224.56 G @ 2.13 MS

CHANNEL: HEDXC FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS

572E SN192 HEAD DROP CAL 15 RUN NUMBER: 102093.1254.2

TRC TEST NUMBER: 192C15HD1



PEAK DATA: 1.76 G @ 4.75 MS; -5.88 G @ 2.25 MS

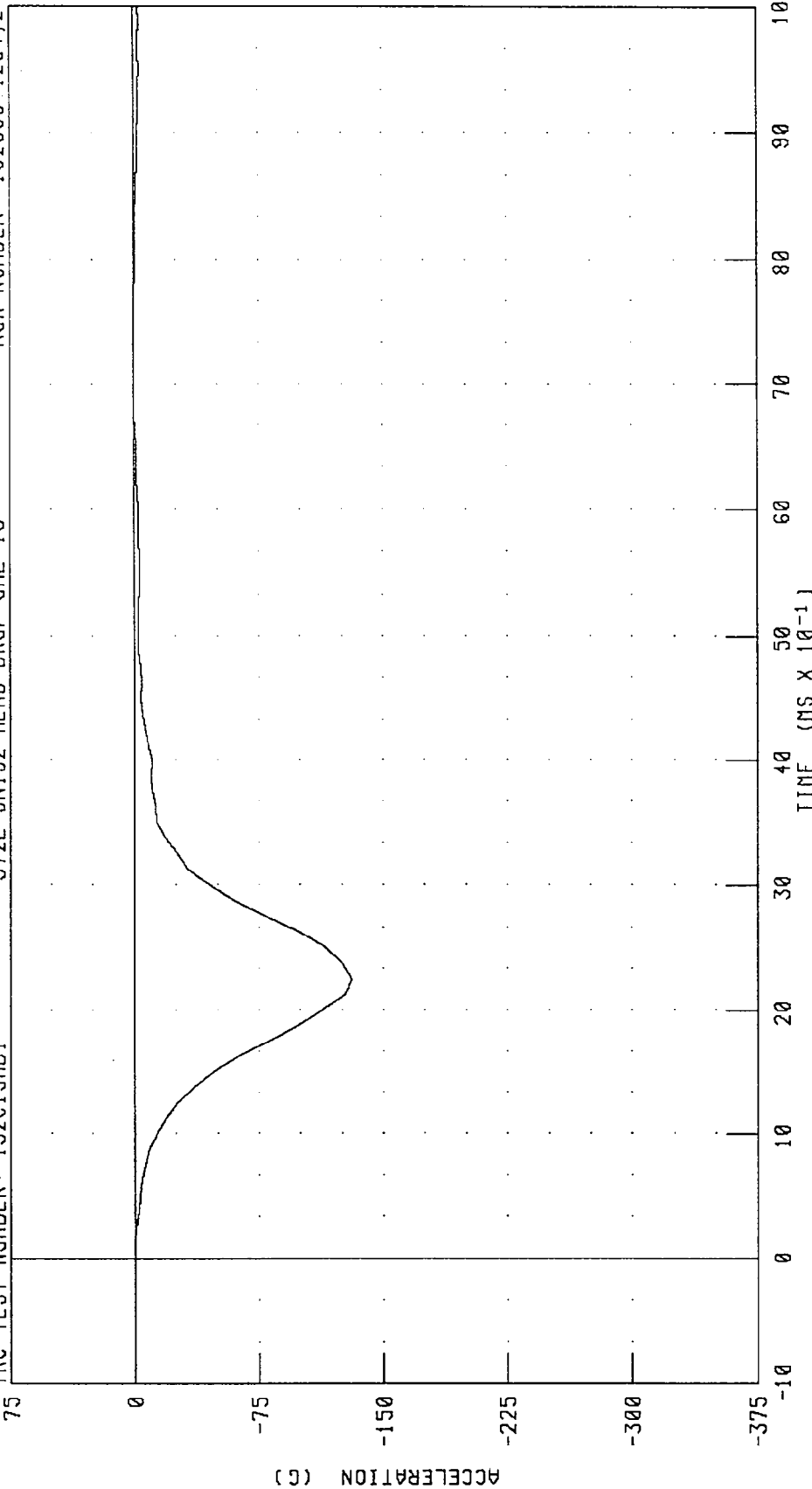
CHANNEL: HEDYC FILTER: CH. CLASS 1000

ACCELERATION (G)

TIME (NS X 10⁻¹)

PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS

IRC TEST NUMBER: 192C15HD1 572E SN192 HEAD DROP CAL 15 RUN NUMBER: 102093 1254,2



PEAK DATA: 0.26 G @ 7.38 MS; -131.07 G @ 2.25 MS

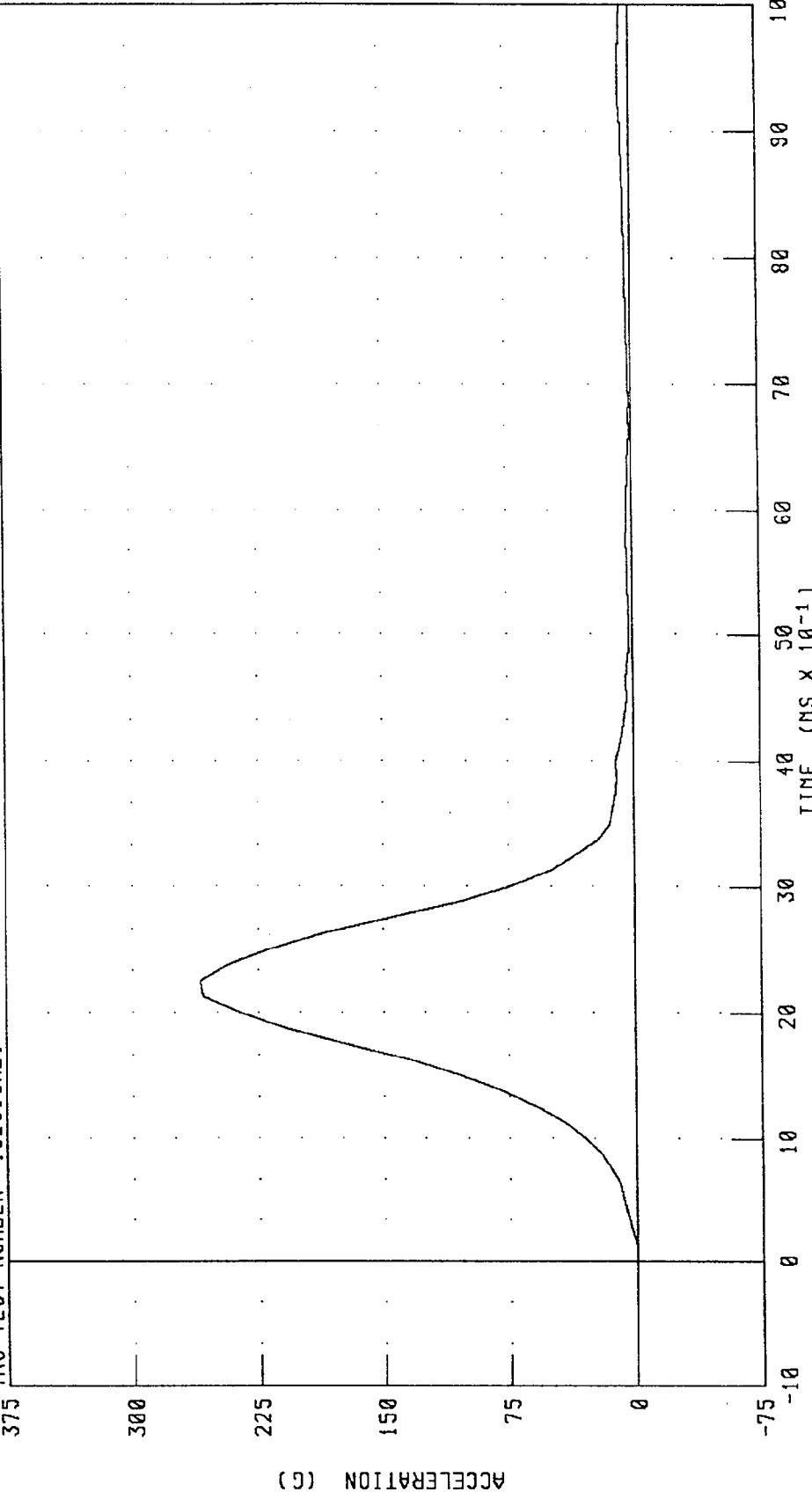
CHANNEL: HEDZG FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 192C15HD1

572E SN192 HEAD DROP CAL 15

RUN NUMBER: 102093.1254,2



PEAK DATA: 259.60 G @ 2.25 MS; 0.02 G @ -0.75 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST

HYBRID III

27-SEP-93

6 AXIS NECK TRANSDUCER
TRC 192C15NF1

572E SN192 NECK FLEXION CAL15

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10% - 70%	52.0 %
IMPACT VELOCITY		6.89 - 7.13 M/SEC	6.97 M/SEC
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	25.31 G
	20 MS	17.60 - 22.60 G	20.48 G
	30 MS	12.50 - 18.50 G	17.42 G
MAX PENDULUM G		29 G MAX	26.08 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.32 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	36.00 MS
D PLANE	MAX	64 - 78 DEG.	69.98 DEG.
ROTATION	TIME	57 - 64 MS	57.88 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	90.38 NM
	TIME	47 - 58 MS	48.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	114.88 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	103.63 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

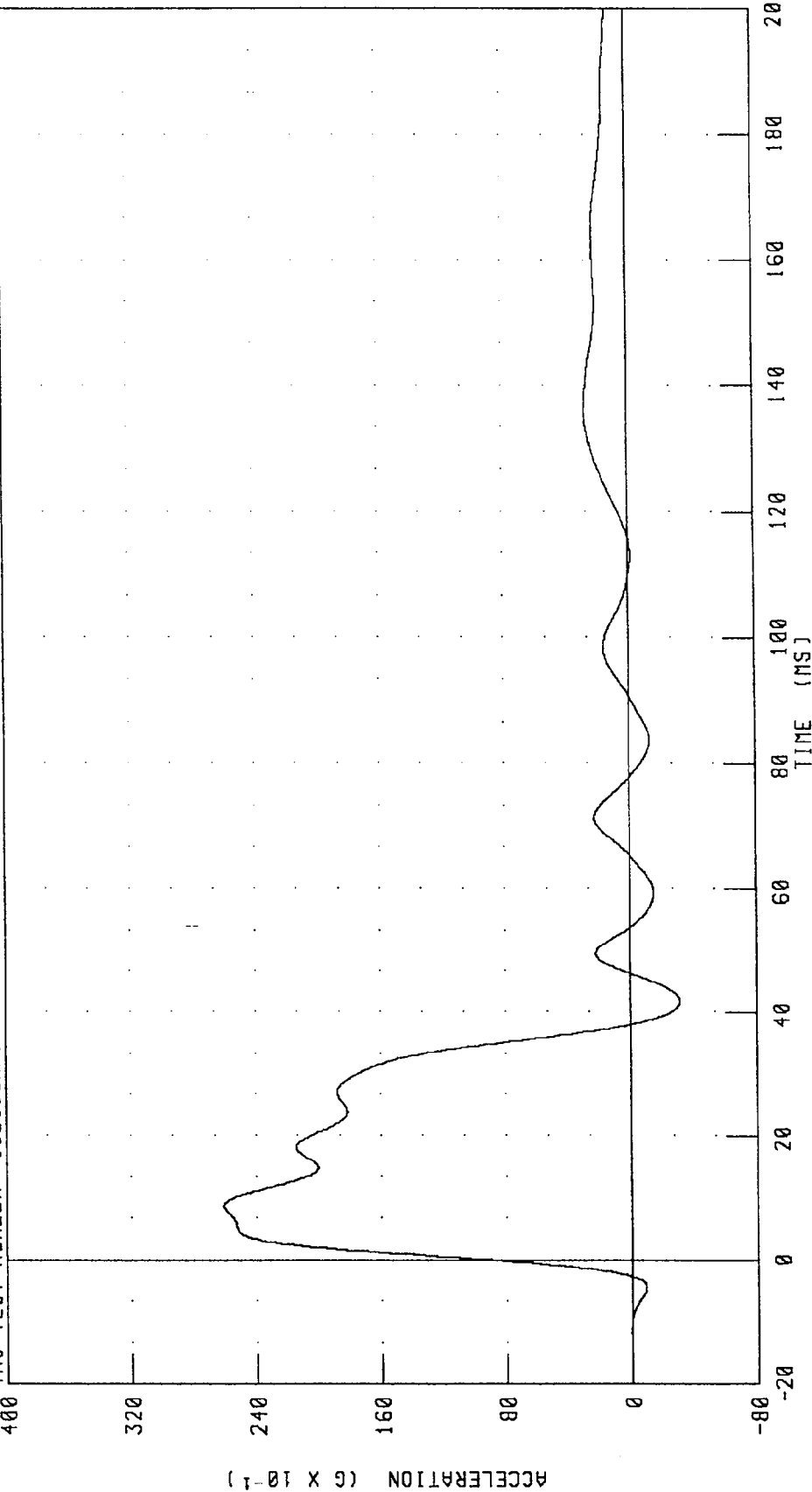
Peter Font

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 192C15NF1

572E SN192 NECK FLEXION CALIS

RUN NUMBER: 102093 1254.2



PEAK DATA: 26.08 G @ 8.63 MS; -3.12 G @ 41.75 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

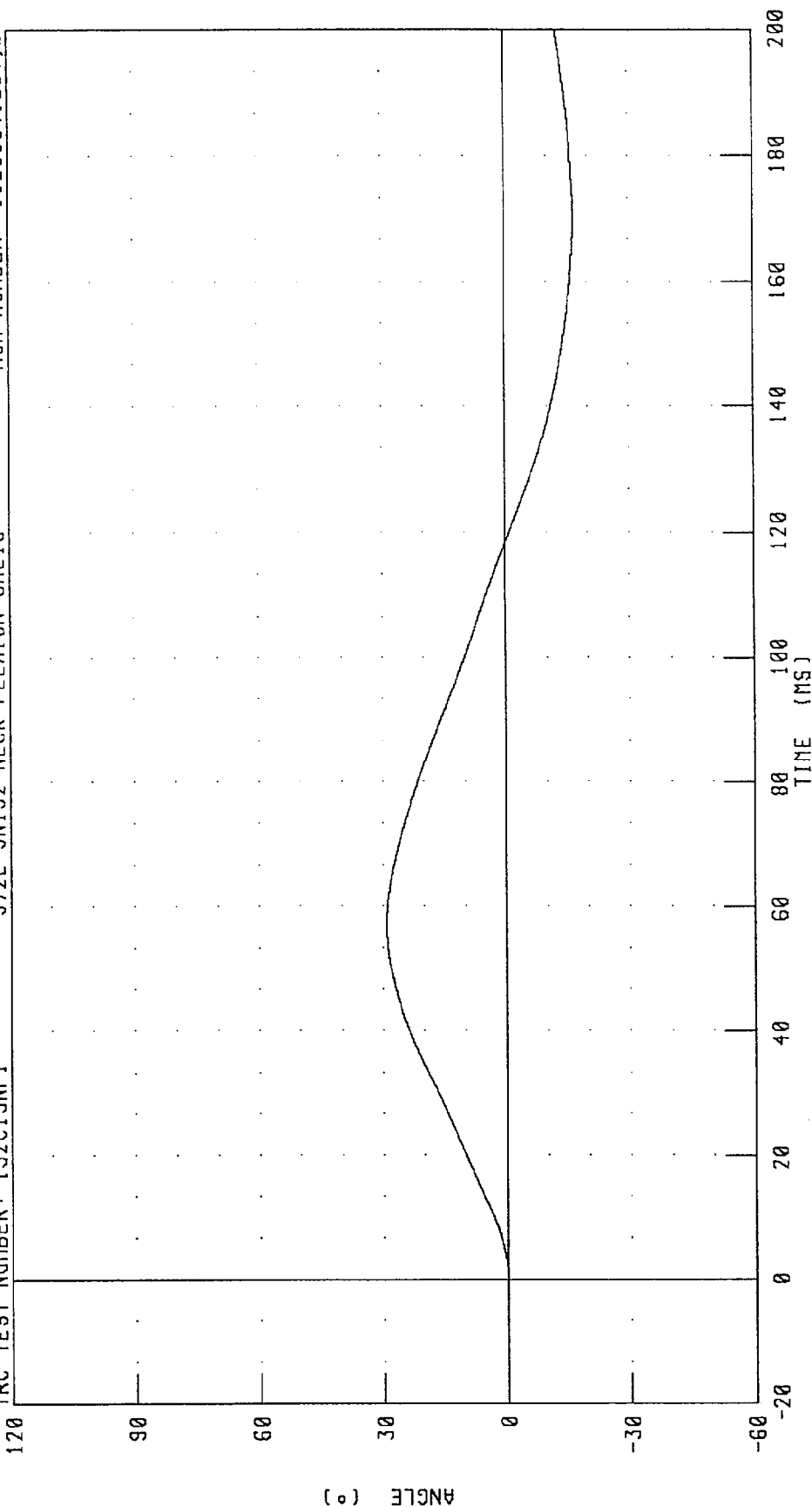
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 192C15NF1

572E SN192 NECK FLEXION CAL15

RUN NUMBER: 102093.1254;2



PEAK DATA: 29.19 ° @ 57.00 MS, -16.70 ° @ 170.25 MS

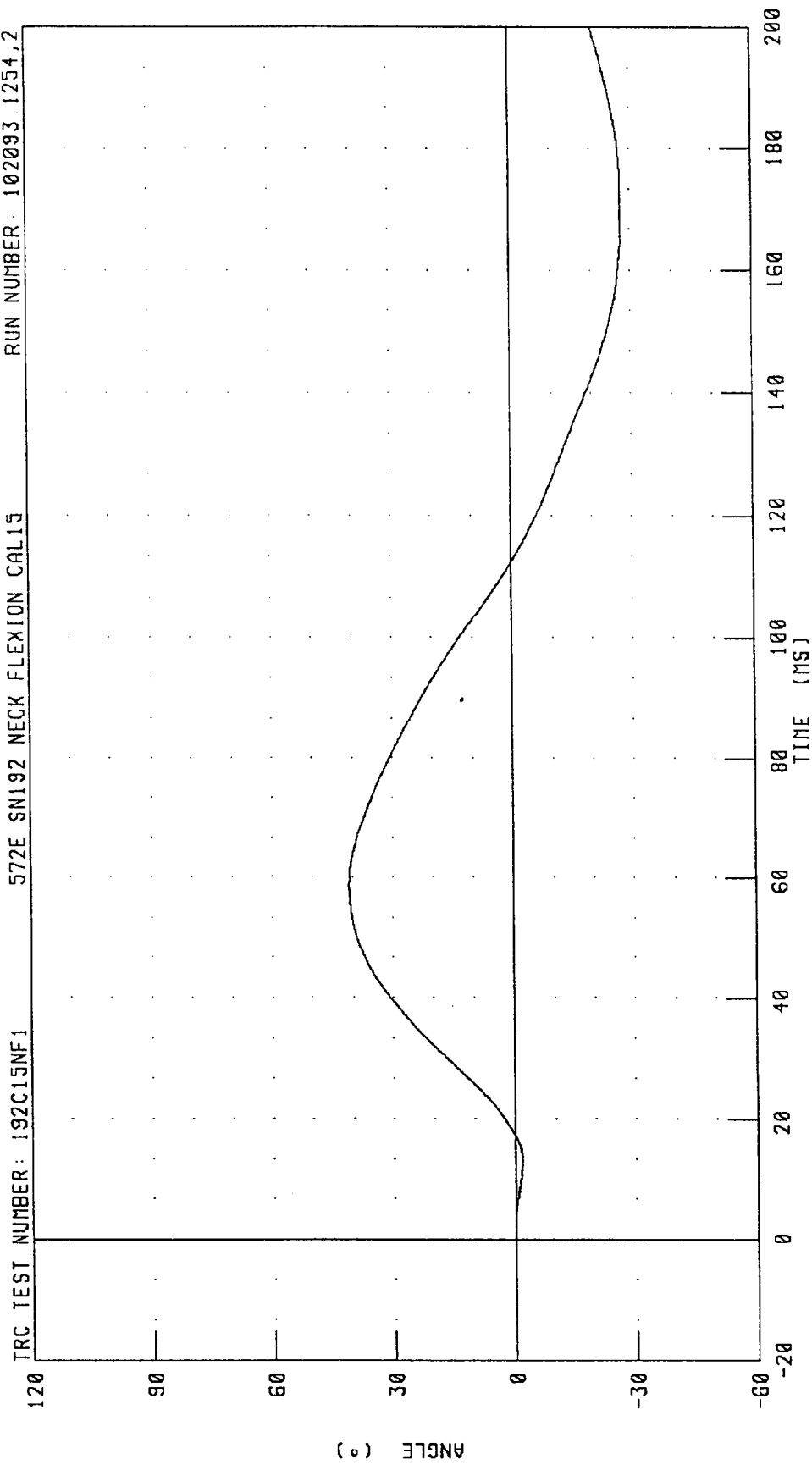
CHANNEL: BETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 192C15NF1

572E SN192 NECK FLEXION CAL15

RUN NUMBER: 102093.1254,2



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 40 82 ° @ 58 50 MS, -27.67 ° @ 172 75 MS

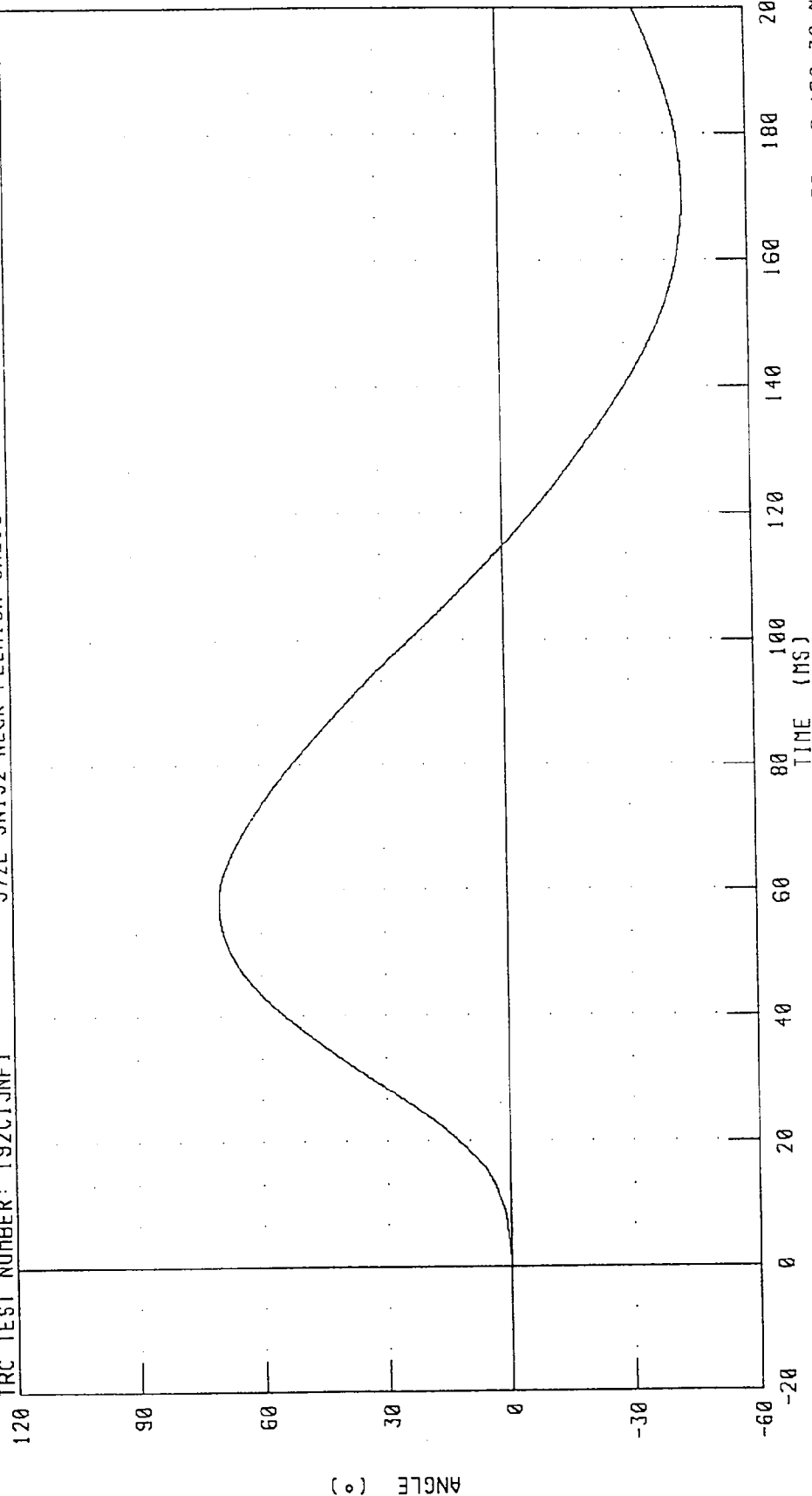
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 192C15NF1

572E SN192 NECK FLEXION CAL15

RUN NUMBER 102093.1254,2



PEAK DATA: 69.99 ° @ 57.88 MS, -44.36 ° @ 170.38 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

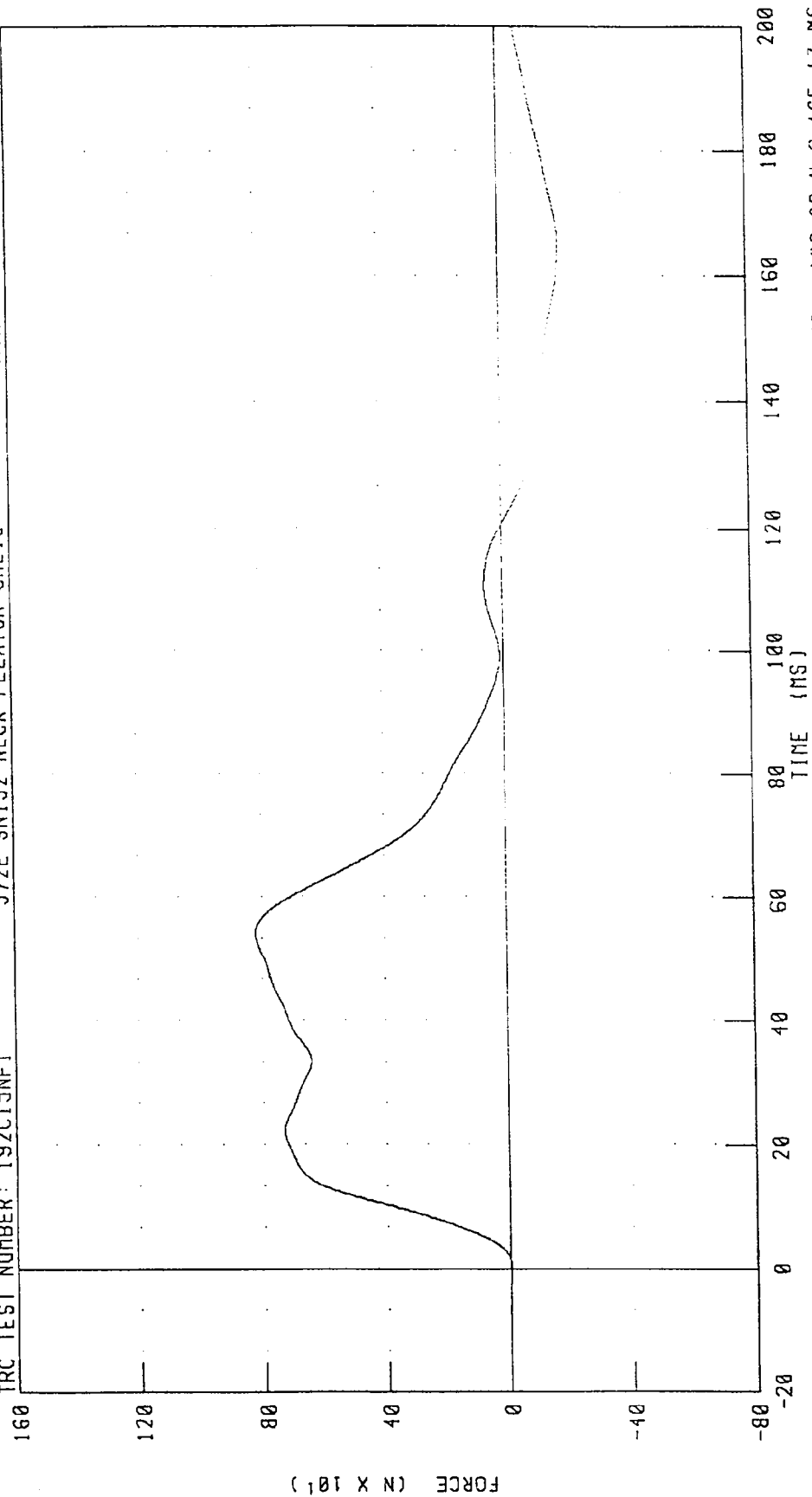
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 192C15NF1

572E SN192 NECK FLEXION CAL15

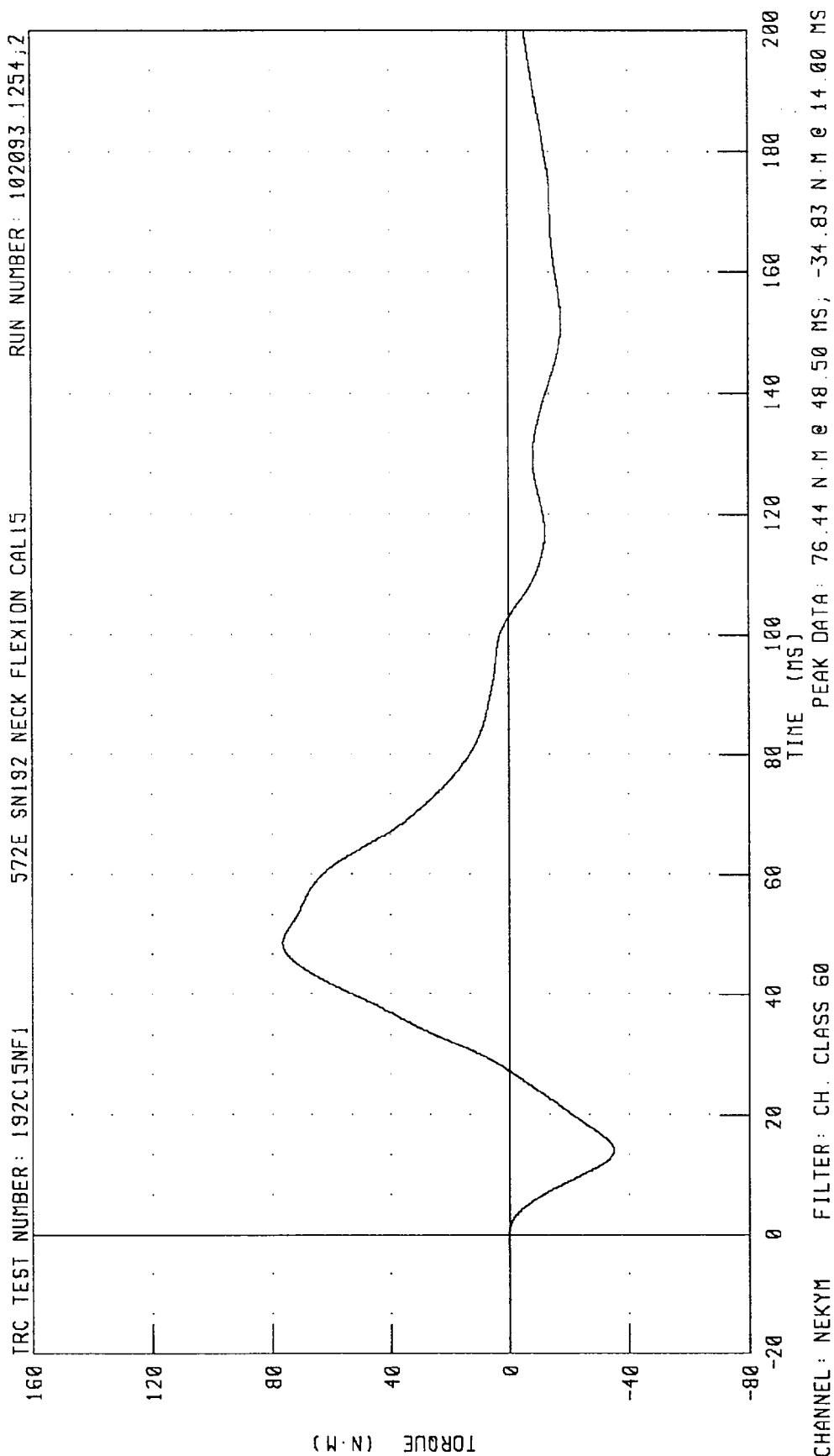
RUN NUMBER: 102093 1254,2



PEAK DATA: 820 30 N @ 54 00 MS, -192 22 N @ 165.13 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

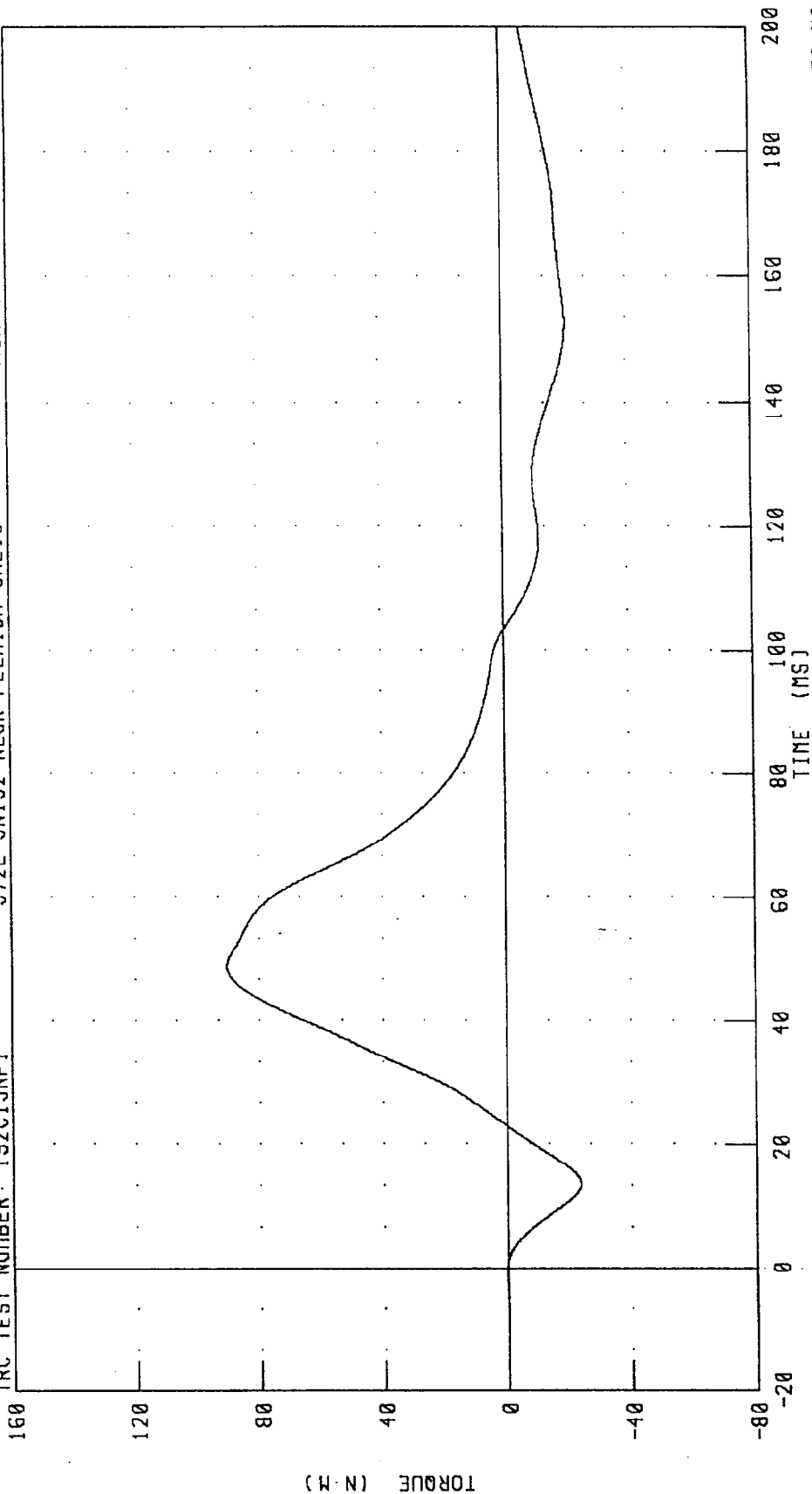
PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS



PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 192C15NF1 RUN NUMBER: 102093.1254;2

572E SN192 NECK FLEXION CAL15



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 90.38 N-M @ 48.63 MS, -23.59 N-M @ 13.50 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST

HYBRID III

27-SEP-93

6 AXIS NECK TRANSDUCER
TRC 192C15NE1

572E SN192 NECK EXT. CAL15

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10% - 70%	52.0 %
IMPACT VELOCITY		5.95 - 6.19 M/SEC	6.00 M/SEC
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.54 G
	20 MS	14.00 - 19.00 G	16.28 G
	30 MS	11.00 - 16.00 G	13.38 G
MAX PENDULUM G		22 G MAX	19.28 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.34 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	41.25 MS
D PLANE	MAX	81 - 106 DEG.	90.41 DEG.
ROTATION	TIME	72 - 82 MS	75.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-56.79 NM
	TIME	65 - 79 MS	71.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.63 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	138.00 MS

TEST MEETS SPECIFICATIONS

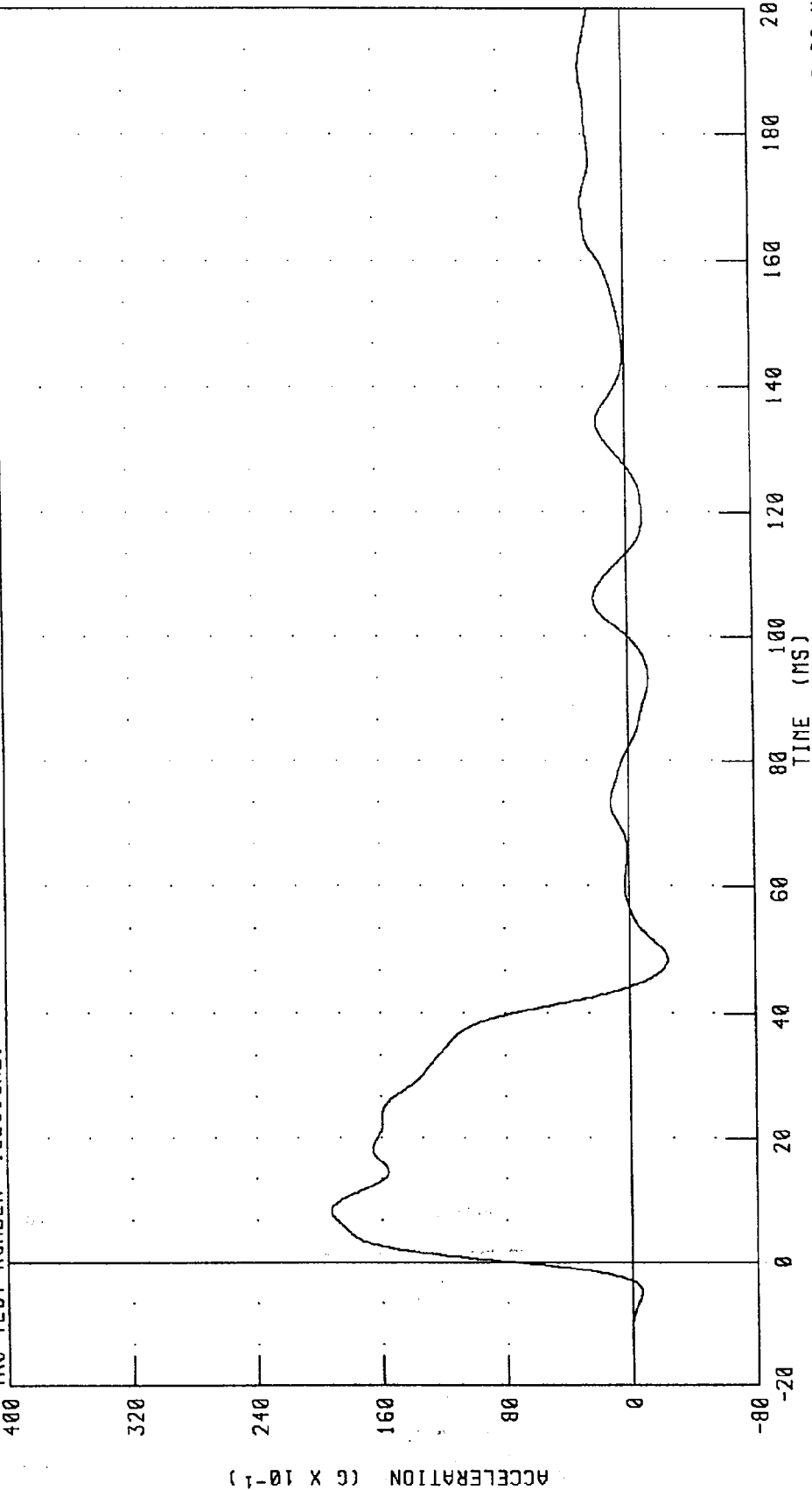
TECHNICIAN Pete Foust

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 PENDULUM DECELERATION

TRC TEST NUMBER: 192C15NE1

572E SN192 NECK EXT. CAL15

RUN NUMBER: 102093 1254;1



CHANNEL: PENXG FILTER: CH. CLASS 60

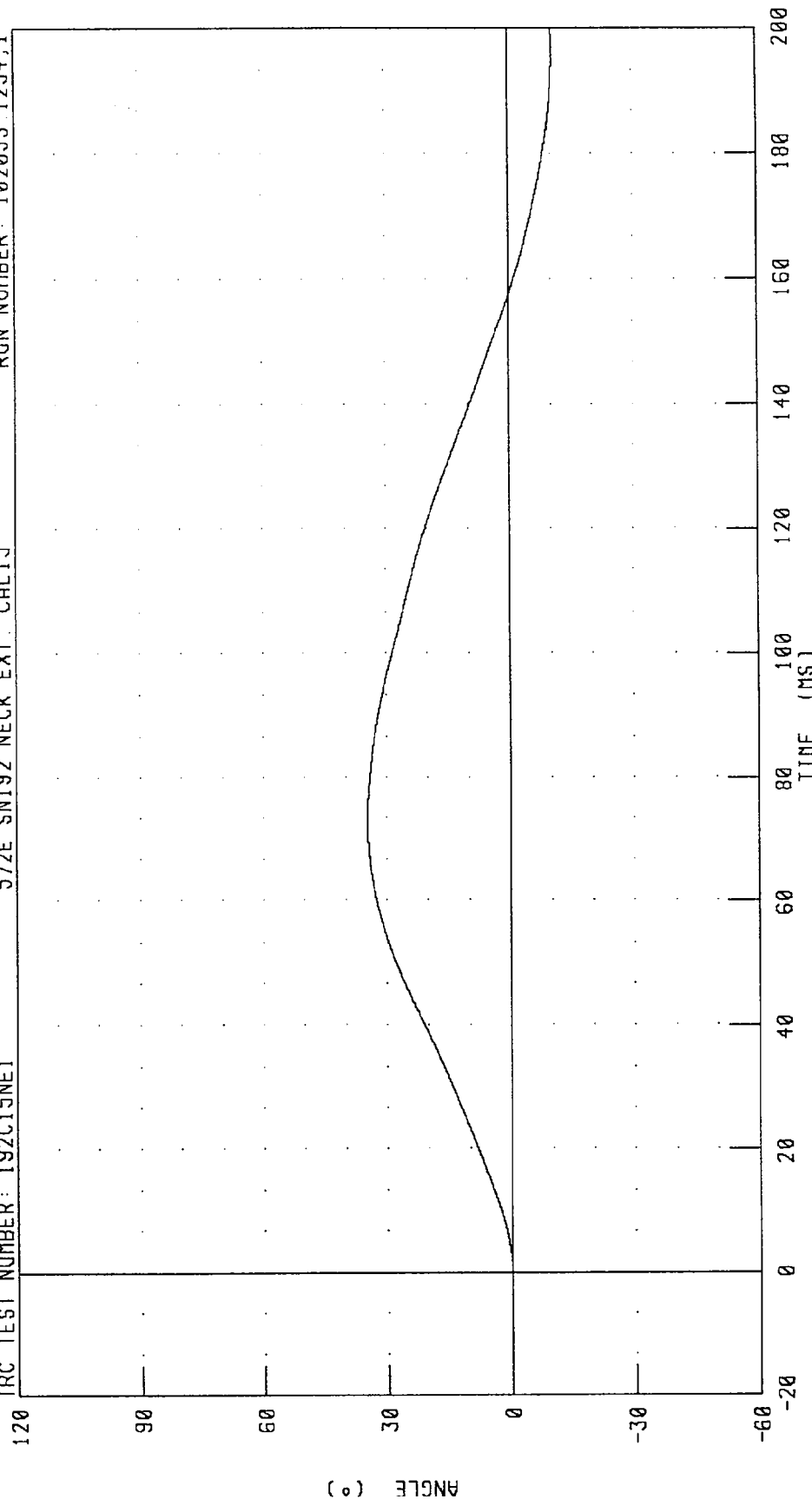
PEAK DATA: 19.28 G @ 8.13 MS; -2.41 G @ 48.38 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 192C15NE1

572E SN192 NECK EXT. CAL15

RUN NUMBER: 102093 1254;1



PEAK DATA: 34.58 ° @ 72.88 MS; -10.60 ° @ 196.50 MS

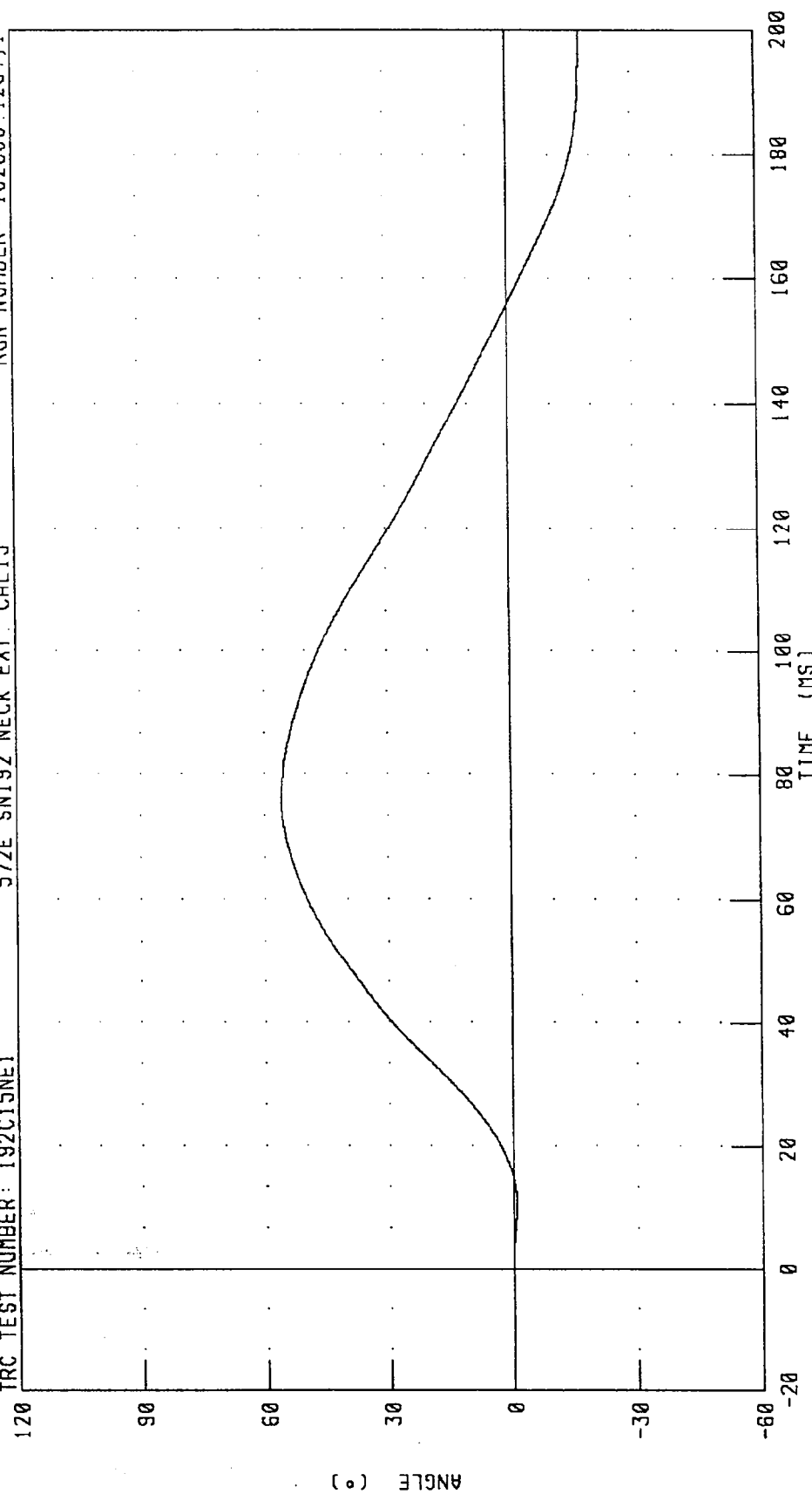
CHANNEL: BETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 192C15NE1

572E SN192 NECK EXT. CAL15

RUN NUMBER: 102093.1254;1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 55.90 ° @ 76.00 MS; -17.81 ° @ 198.50 MS

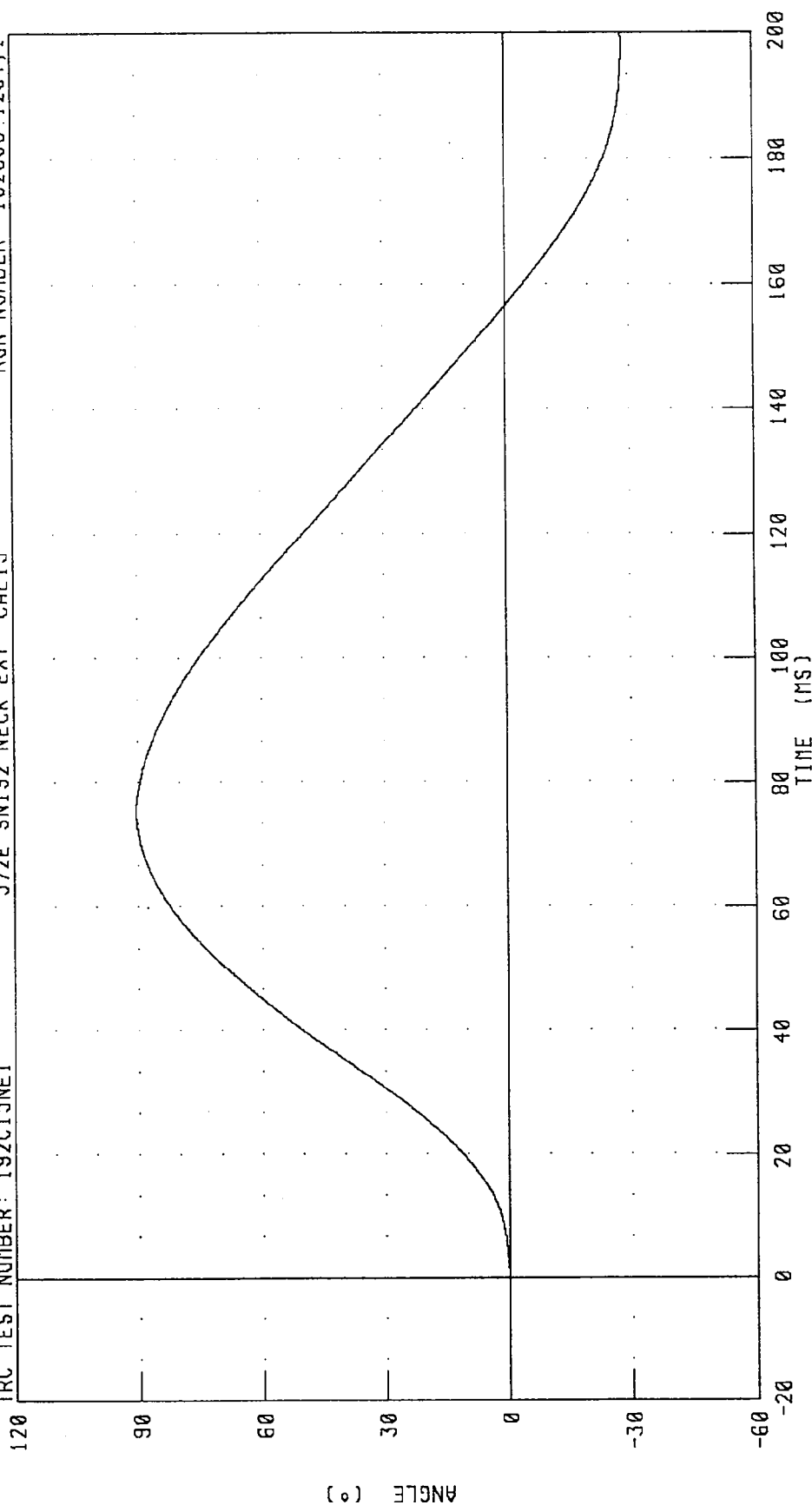
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 192C15NE1

572E SN192 NECK EXT CAL15

RUN NUMBER: 102093.1254;1



PEAK DATA: 90.41 ° @ 75.38 MS; -28.37 ° @ 197.63 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

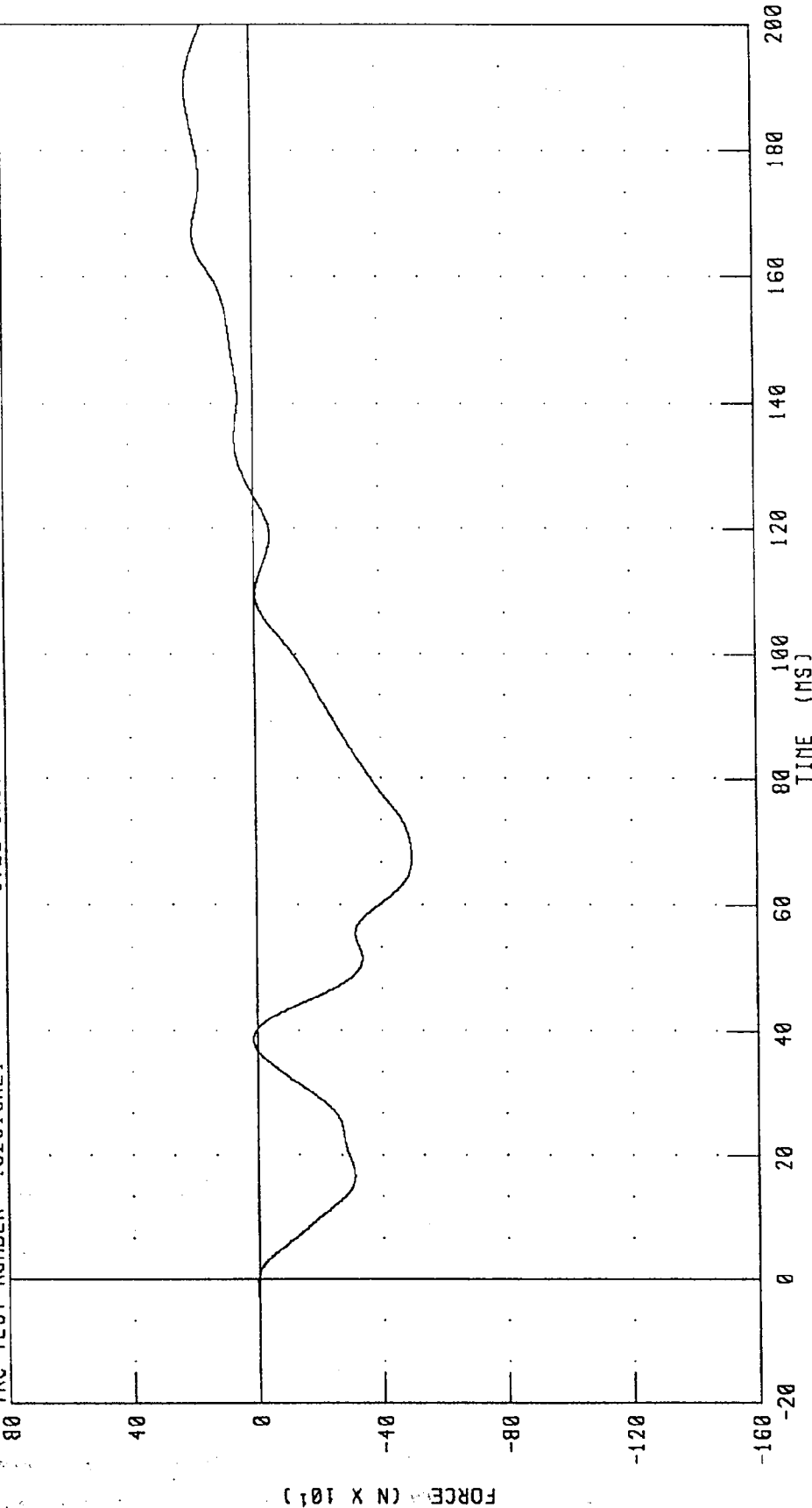
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 192C15NE1

572E SN192 NECK EXT. CAL15

RUN NUMBER: 102093 1254;1



PEAK DATA: 210.47 N @ 189.88 MS; -497.71 N @ 67.25 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

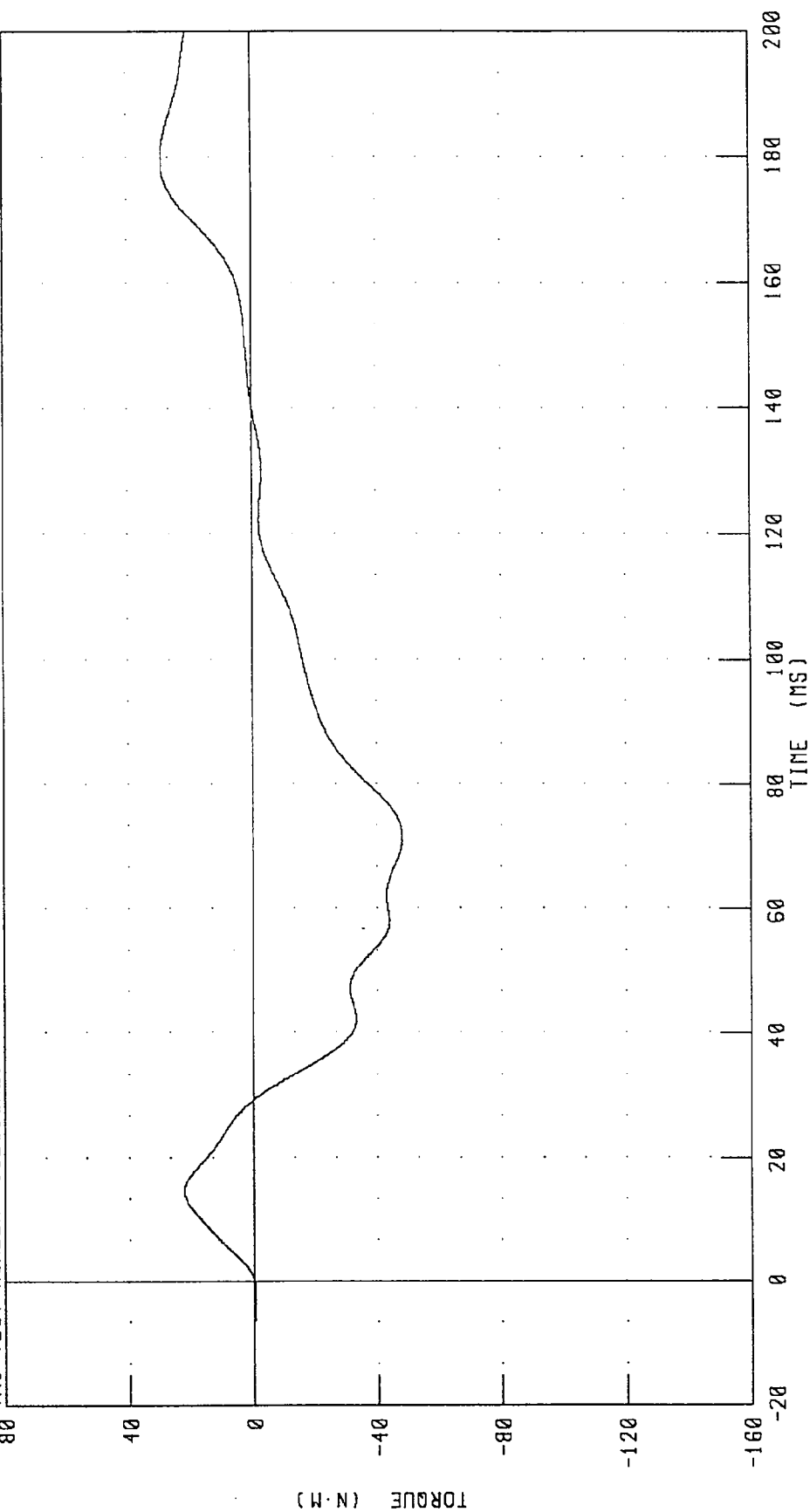
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 192C15NE1

572E SN192 NECK EXT. CAL15

RUN NUMBER: 102093.1254;1



PEAK DATA: 28.93 N·M @ 179.50 MS; -48.15 N·M @ 71.50 MS

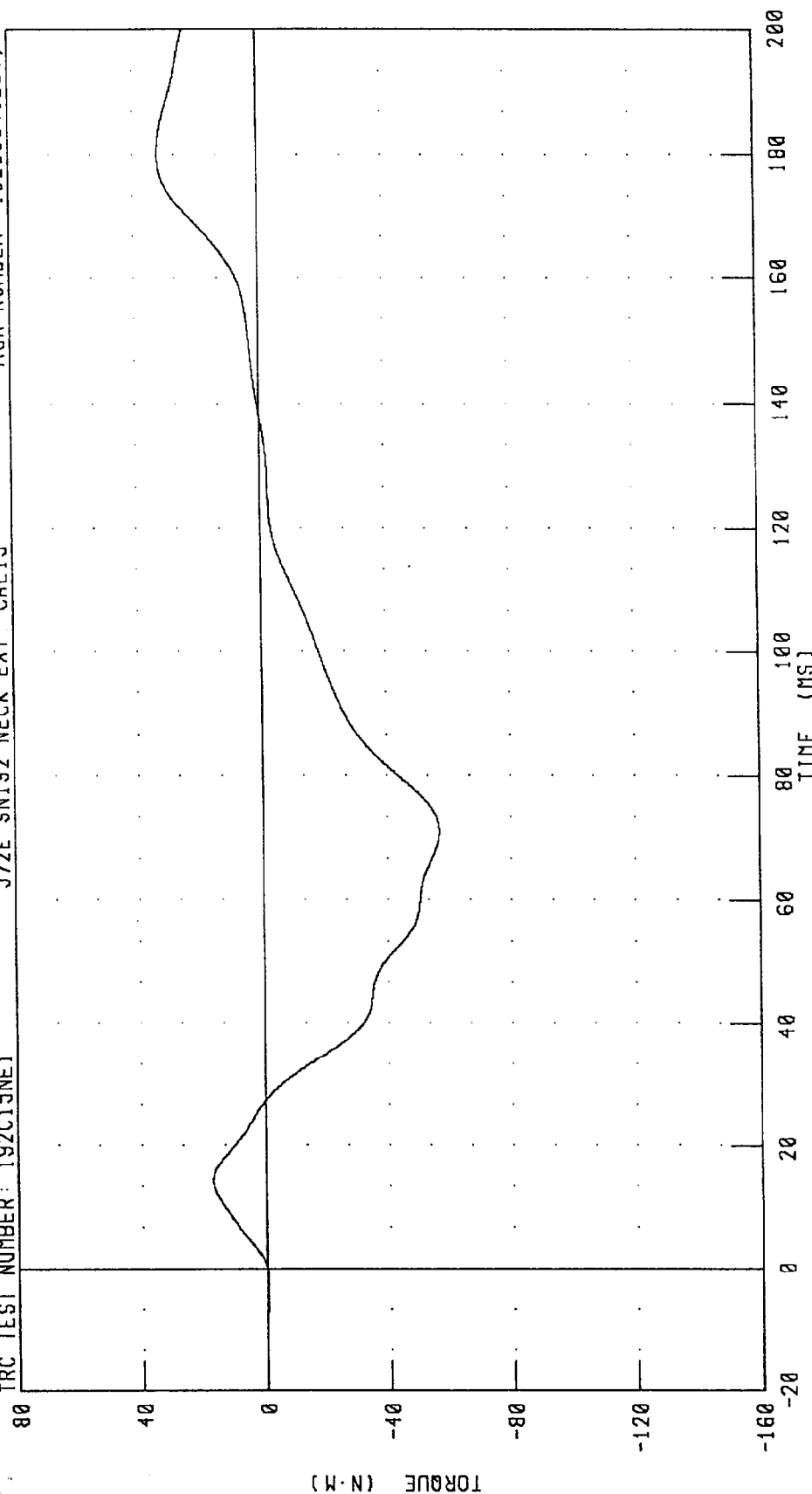
CHANNEL: NEKYM FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 192C15NE1

572E SN192 NECK EXT CAL15

RUN NUMBER: 102093.1254,1



PEAK DATA: 32.07 N·M @ 180.13 MS; -56.79 N·M @ 71.13 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

27-SEP-93

TRC

192C15TH1

572E SN192 H.S.THORAX CAL15

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	52.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/SEC	6.68 M/SEC
MAXIMUM DEFLECTION	63.5 - 72.6 MM	71.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5426. N
INTERNAL HYSTERESIS	69% - 85%	71.9%

TEST MEETS SPECIFICATIONS

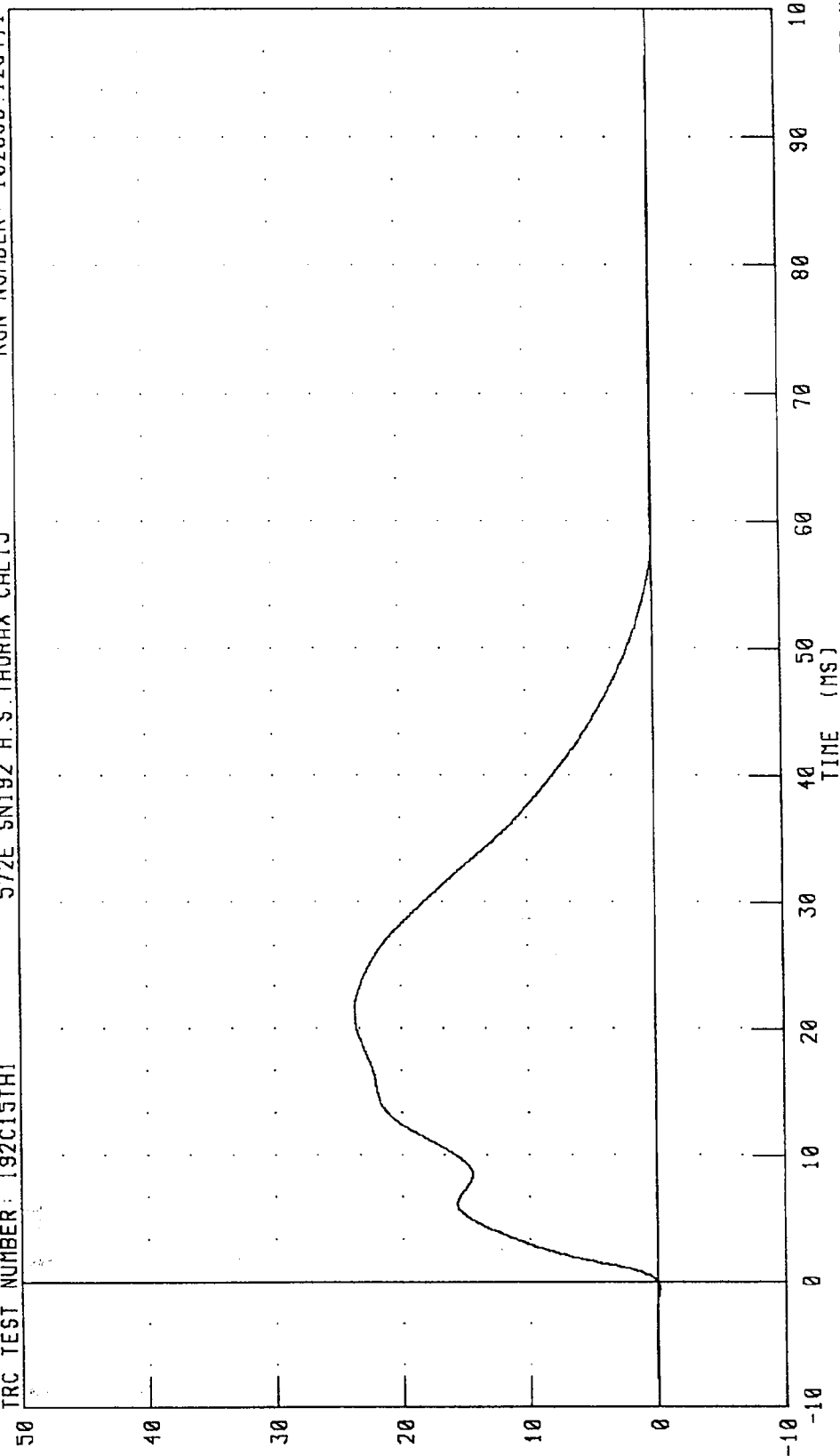
TECHNICIAN Pete Fournier

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 192C15TH1

572E SN192 H.S. THORAX CAL15

RUN NUMBER: 102093.1254,1



PEAK DATA: 23.69 G @ 21.25 MS; -0.12 G @ -0.50 MS

CHANNEL: PENXC FILTER: CH. CLASS 180

ACCELERATION (G)

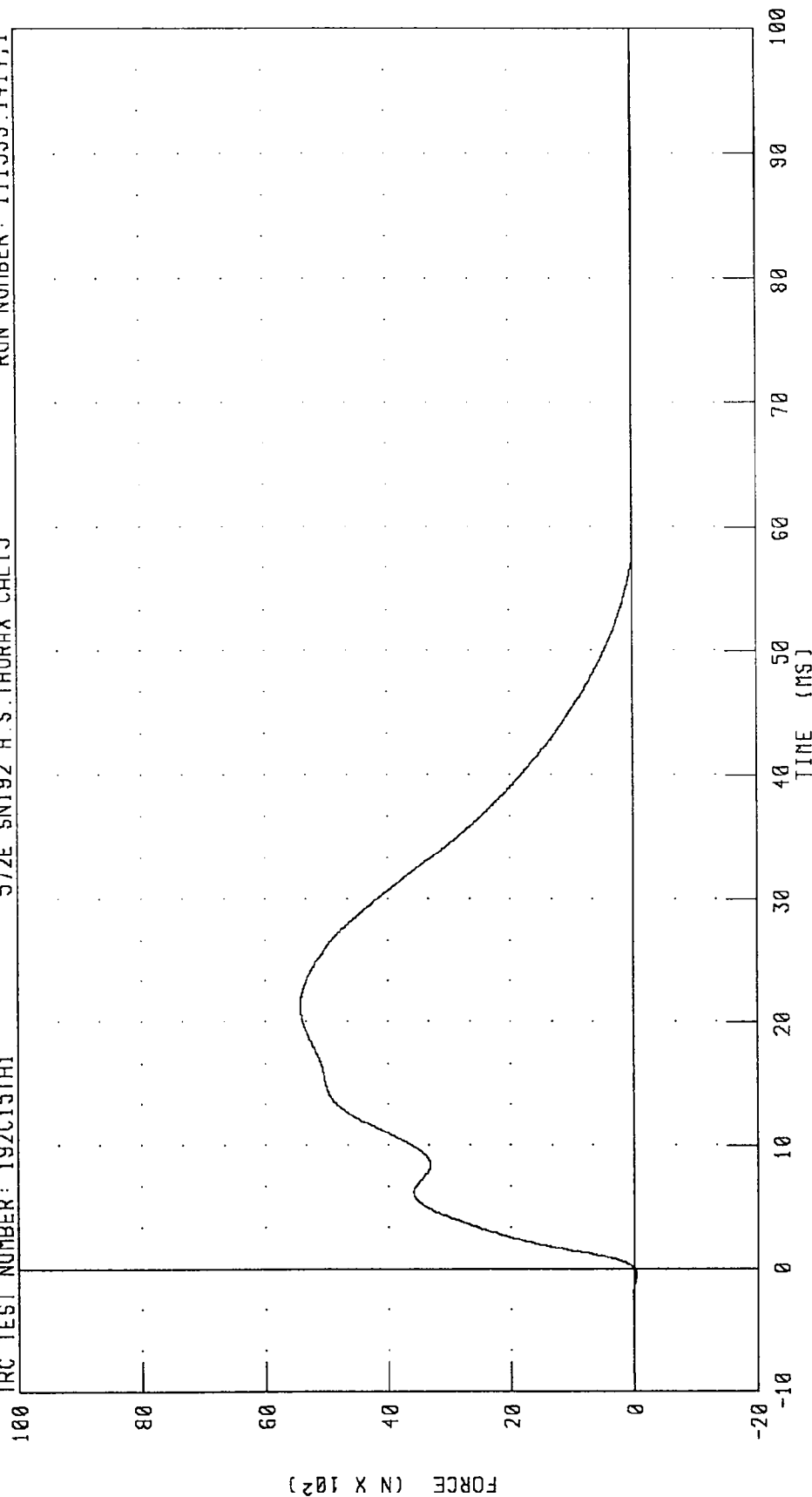
TIME (MS)

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

TRC TEST NUMBER: 192C15TH1

572E SN192 H.S. THORAX CAL15

RUN NUMBER: 111593.1414;1



PEAK DATA: 5426.17 N @ 21.25 MS; -27.24 N @ -0.50 MS

CHANNEL: PENXF FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

TRC TEST NUMBER: 192C15TH1

572E SN192 H.S. THORAX CAL15

RUN NUMBER: 102093.1254,1

150

120

90

60

30

0

-30

DISPLACEMENT (MM)

-10

0

10

20

30

40

50

60

70

80

90

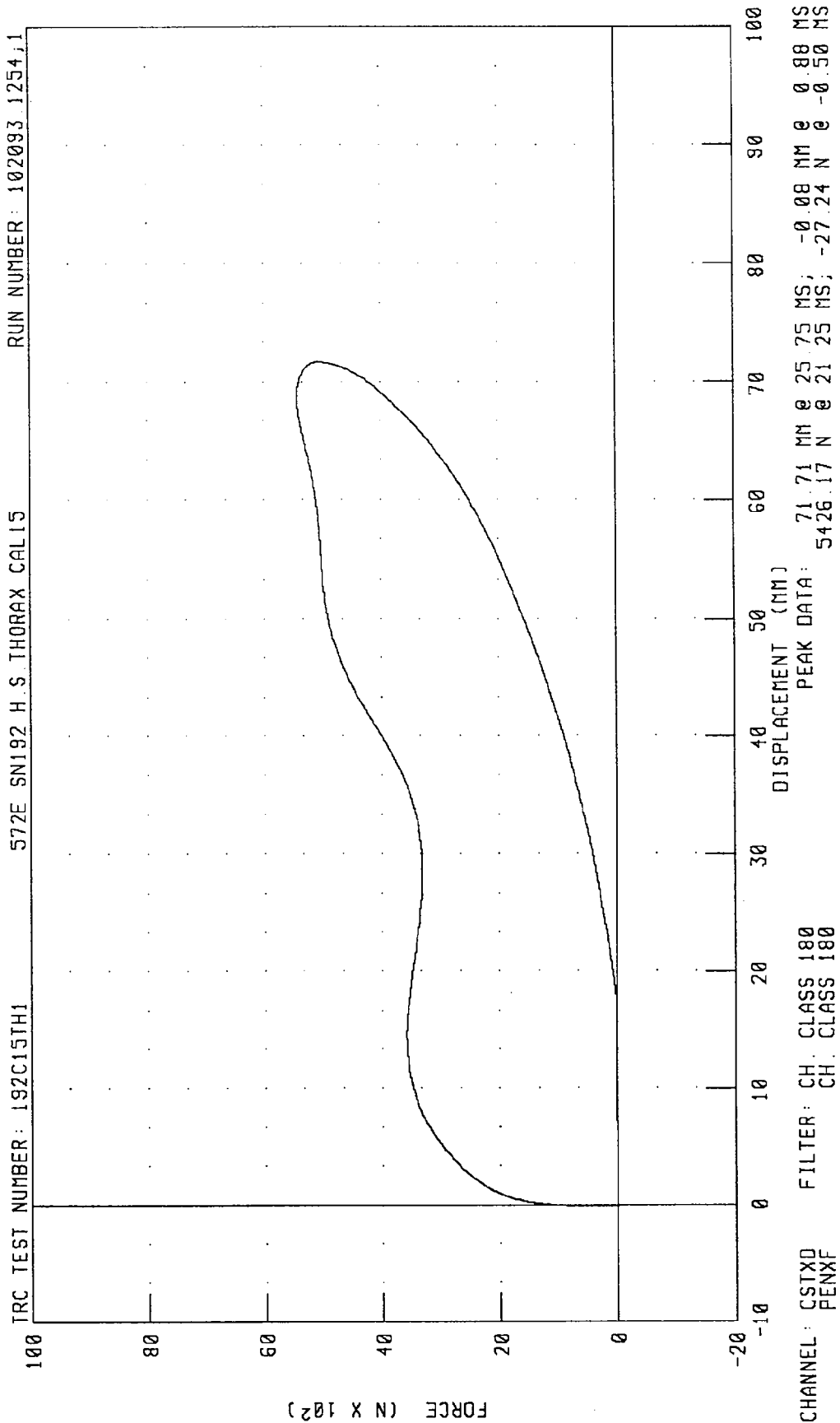
100

TIME (MS)

PEAK DATA: 71.71 MM @ 25.75 MS; -0.08 MM @ 0.88 MS

CHANNEL: CSTXD FILTER: CH. CLASS 180

PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE



TRANSPORTATION RESEARCH CENTER INC.

KNEE IMPACT TEST

HYBRID III

23-SEP-93

RIGHT KNEE
TRC

192C15RK1

572E SN192 RIGHT KNEE CAL 15

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10% - 70%	64.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.10 M/SEC
PEAK KNEE IMPACT FORCE PROBE WEIGHT	4714 - 5783 N 5.0 KG	4910.6 N

TEST MEETS SPECIFICATIONS

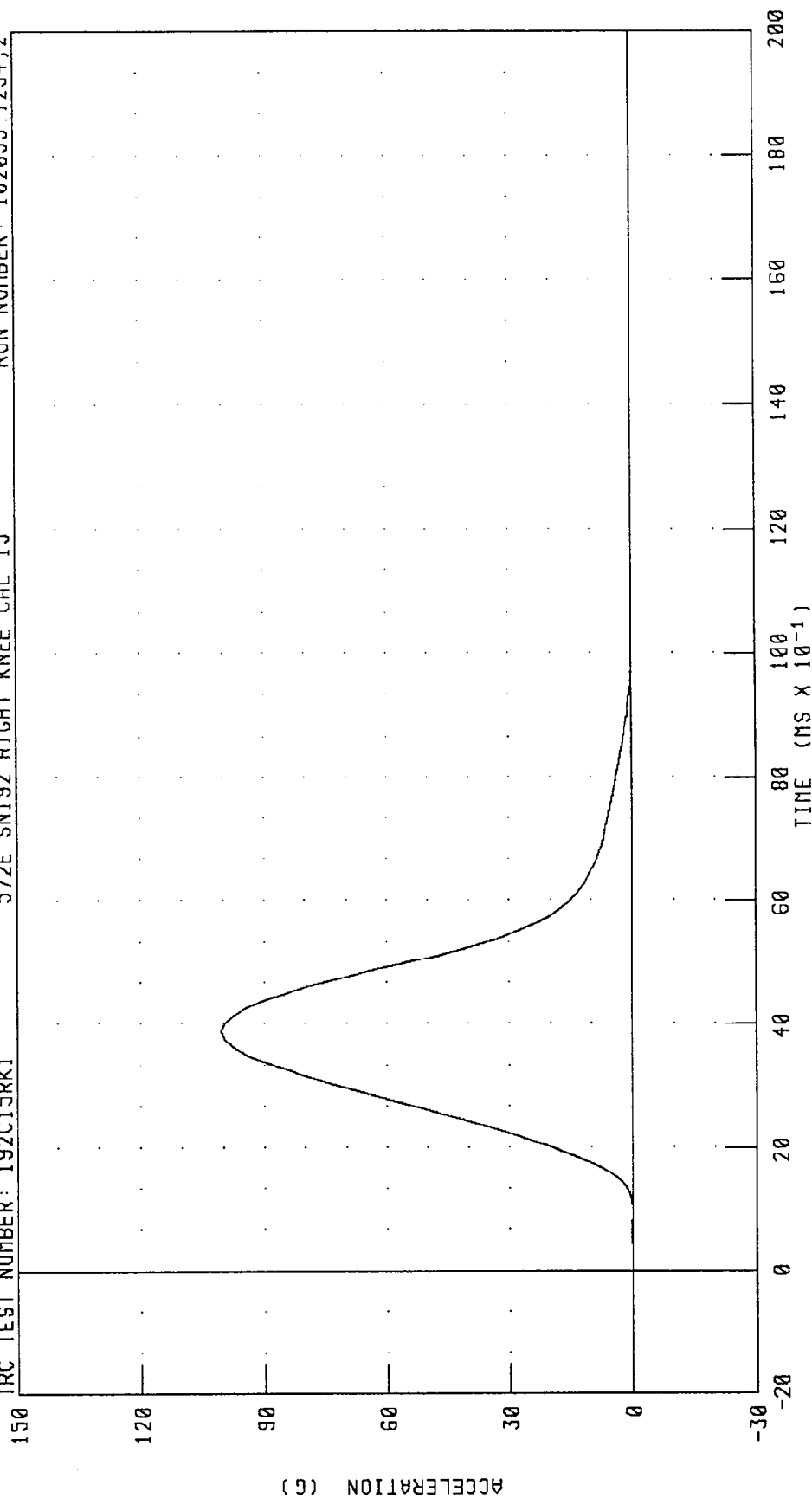
TECHNICIAN Pete Fout

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
 PENDULUM DECELERATION (5 KC PEND.)

TRC TEST NUMBER: 192C15RK1

572E SN192 RIGHT KNEE CAL 15

RUN NUMBER: 102093 1254;2



PEAK DATA: 100.36 G @ 3.88 MS; -0.01 G @ -0.38 MS

CHANNEL: PENXG FILTER: CH. CLASS 600

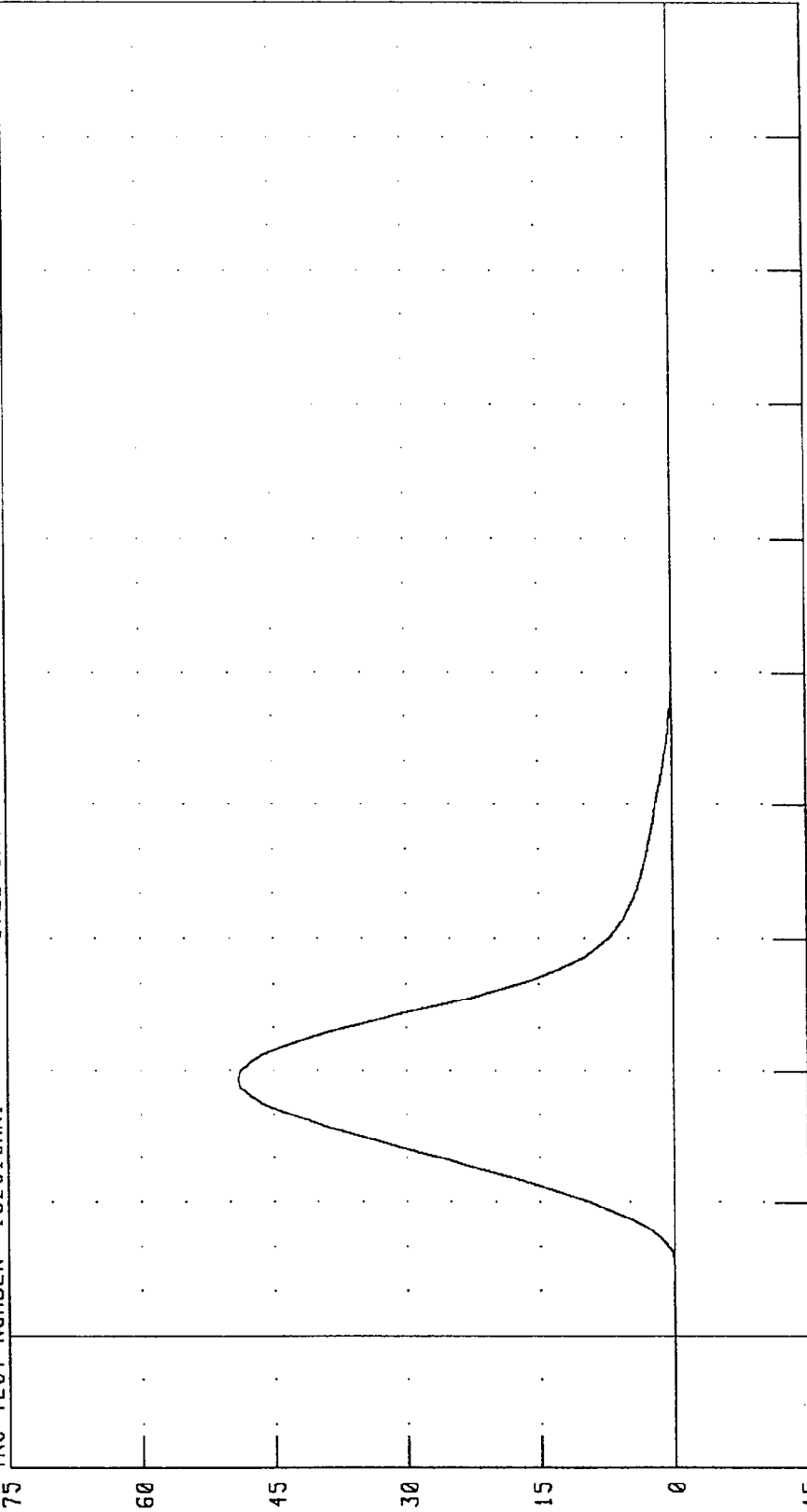
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 102093.1254;2

572E SN192 RIGHT KNEE CAL 15

TRC TEST NUMBER: 192C15RK1



PEAK DATA: 4910.61 N @ 3.88 MS; -0.35 N @ -0.38 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

KNEE IMPACT TEST

HYBRID III

23-SEP-93

LEFT KNEE

TRC

192C15LK1

572E SN192 LEFT KNEE CAL 15

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10% - 70%	64.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.09 M/SEC
PEAK KNEE IMPACT FORCE PROBE WEIGHT	4714 - 5783 N 5.0 KG	5491.4 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Ford

PART 572-E HYBRID III LEFT KNEE CALIBRATION
 PENDULUM DECELERATION (5 KG PEND.)

RUN NUMBER: 102093.1254;1

572E SN192 LEFT KNEE CAL 15

TRC TEST NUMBER: 192C15LK1

150

120

90

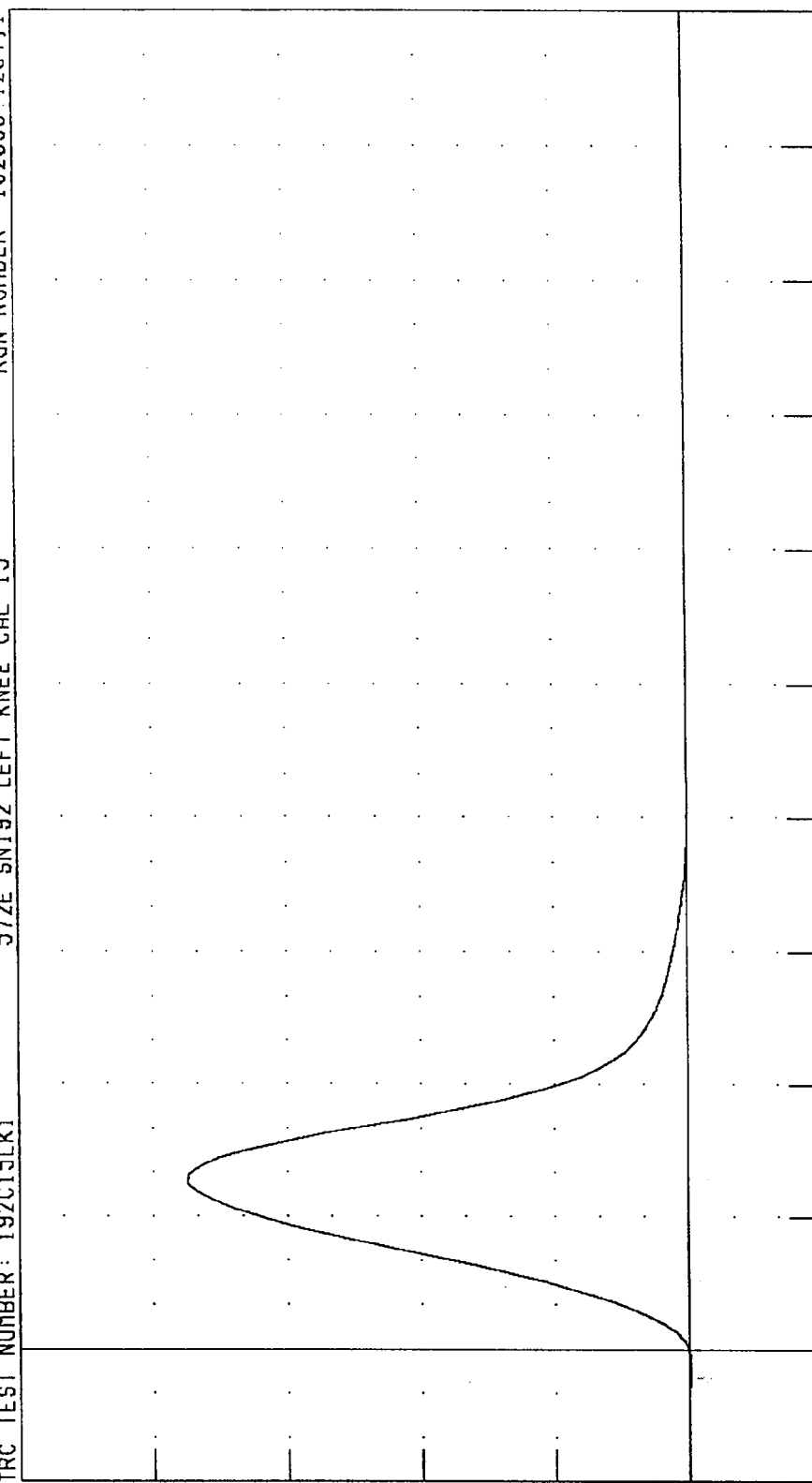
60

30

0

-30

ACCELERATION (G)



TIME (MS X 10⁻¹)

200

180

160

140

120

100

80

60

40

20

0

PEAK DATA: 112.24 G @ 2.50 MS; -0.27 G @ -0.25 MS

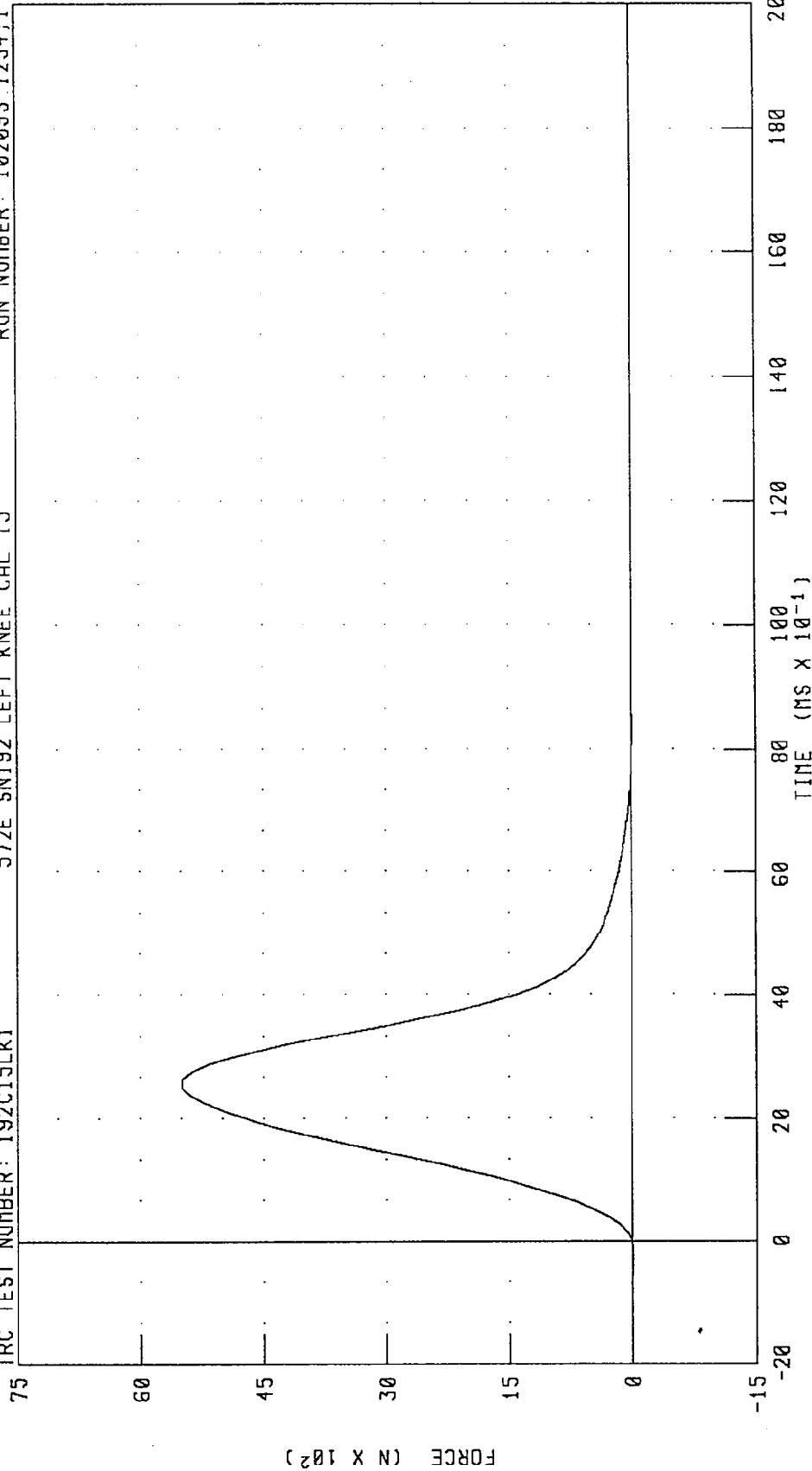
CHANNEL: PENXG FILTER: CH. CLASS 600

PART 572-E HYBRID III LEFT KNEE CALIBRATION
 PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 192C15LK1

572E SN192 LEFT KNEE CAL 15

RUN NUMBER: 102093.1254,1



PEAK DATA: 5491.48 N @ 2.50 MS; -13.44 N @ -0.25 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

APPENDIX D

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENT CALIBRATIONS

DRIVER DUMMY #142

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	FH25J	7264	ENDEVCO	09/24/93	03/24/94
Y-AXIS ACCEL.	CY32H	7264	ENDEVCO	09/14/93	03/14/94
Z-AXIS ACCEL.	AC8K2	7264	ENDEVCO	09/14/93	03/14/94
CHEST X-AXIS ACCEL.	DR49J7	7264	ENDEVCO	09/14/93	03/14/94
Y-AXIS ACCEL.	AC8W6	7264	ENDEVCO	09/14/93	03/14/94
Z-AXIS ACCEL.	CW42H	7264	ENDEVCO	09/14/93	03/14/94
LEFT FEMUR FORCE LOAD CELL	901	2430	GSE	09/23/93	03/23/94
RIGHT FEMUR FORCE LOAD CELL	902	2430	GSE	09/23/93	03/23/94
*NECK X-AXIS FORCE LOAD CELL	0280	1716	DENTON	09/20/93	03/20/94
Y-AXIS FORCE LOAD CELL	0280	1716	DENTON	09/20/93	03/20/94
Z-AXIS FORCE LOAD CELL	0280	1716	DENTON	09/20/93	03/20/94
*NECK MOMENT ABOUT X-AXIS LOAD CELL	0280	1716	DENTON	09/20/93	03/20/94
MOMENT ABOUT Y-AXIS LOAD CELL	0280	1716	DENTON	09/20/93	03/20/94
MOMENT ABOUT Z-AXIS LOAD CELL	0280	1716	DENTON	09/20/93	03/20/94
*CHEST DEFLECTION POTENTIOMETER	90320B	81422A	VERNITECH	09/22/93	03/22/94
LAP BELT FORCE LOAD CELL	616	3419	LEBOW	08/24/93	02/24/94
SHOULDER BELT FORCE LOAD CELL	610	3419	LEBOW	08/23/93	02/23/94
SHOULDER BELT SPOOL-OUT POTENTIOMETER	A51809	PT-101-50A	CELESCO	09/23/93	03/23/94
SHOULDER BELT STRETCH POTENTIOMETER	2690	2051414101	BOURNES	09/23/93	03/23/94

*HYBRID III USE ONLY.

DUMMY INSTRUMENT CALIBRATIONS

PASSENGER DUMMY #192

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	AAL82	7264	ENDEVCO	09/14/93	03/14/94
Y-AXIS ACCEL.	A84JJ	7264	ENDEVCO	09/14/93	03/14/94
Z-AXIS ACCEL.	A62JJ	7264	ENDEVCO	09/14/93	03/14/94
CHEST X-AXIS ACCEL.	ACCJ0	7264	ENDEVCO	09/14/93	03/14/94
Y-AXIS ACCEL.	AC708	7264	ENDEVCO	09/14/93	03/14/94
Z-AXIS ACCEL.	CW59H	7264	ENDEVCO	09/14/93	03/14/94
LEFT FEMUR FORCE LOAD CELL	986	2430	GSE	09/23/93	03/23/94
RIGHT FEMUR FORCE LOAD CELL	987	2430	GSE	09/23/93	03/23/94
*NECK X-AXIS FORCE LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
Y-AXIS FORCE LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
X-AXIS FORCE LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
*NECK MOMENT ABOUT X-AXIS LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
MOMENT ABOUT Y-AXIS LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
MOMENT ABOUT Z-AXIS LOAD CELL	085	1716	DENTON	09/20/93	03/20/94
*CHEST DEFLECTION POTENTIOMETER	87313-96	81422A	VERNITECH	09/24/93	03/24/94
LAP BELT FORCE LOAD CELL	673	3419	LEBOW	08/23/93	02/23/94
SHOULDER BELT FORCE LOAD CELL	236	3419	LEBOW	08/23/93	02/23/94
SHOULDER BELT SPOOL-OUT POTENTIOMETER	A02465	PT-101-40A	CELESCO	09/23/93	03/23/94
SHOULDER BELT STRETCH POTENTIOMETER	1291	2051414101	BOURNES	09/23/93	03/24/94

*HYBRID III USE ONLY.

VEHICLE AND CALIBRATION LABORATORY INSTRUMENT CALIBRATIONS

VEHICLE ACCELEROMETERS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
LEFT REAR SEAT CROSSMEMBER X-AXIS	CW63H	7264	ENDEVCO	07/06/93	01/06/94
LEFT REAR SEAT CROSSMEMBER X-AXIS REDUN	CR26H	7264	ENDEVCO	09/01/93	03/01/94
RIGHT REAR SEAT CROSSMEMBER X-AXIS	BK96J	7264	ENDEVCO	07/06/93	01/06/94
RIGHT REAR SEAT CROSSMEMBER X-AXIS REDUN	BW77J	7264	ENDEVCO	07/22/93	01/22/94
ENGINE TOP X-AXIS	CM07H	7264	ENDEVCO	04/28/93	10/28/93
ENGINE BOTTOM X-AXIS	CH34H	7264	ENDEVCO	09/01/93	03/01/94
RIGHT BRAKE CALIPER X-AXIS	CH86H	7264	ENDEVCO	04/28/93	10/28/93
LEFT BRAKE CALIPER X-AXIS	CE72H	7264	ENDEVCO	07/06/93	01/06/94
INSTRUMENT PANEL CENTER X-AXIS	BM06J	7264	ENDEVCO	04/28/93	10/28/93

CALIBRATION LABORATORY INSTRUMENTS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
NECK BENDING PENDULUM ACCEL.	CB27	7232	ENDEVCO	04/04/93	10/04/93
NECK BENDING ROTARY POTENTIOMETER	NA	35435-1-102	BOURNES	MFR. SPECIFICATION	
NECK BENDING LINEAR POTENTIOMETER	NA	5184-2051846003	BOURNES	04/06/93	10/06/93
THORAX/HYBRID II FEMUR PEND. ACCEL.	CC64	7232	ENDEVCO	04/06/93	10/06/94
LUMBAR FLEXION FORCE GAUGE	NA	DPPH-50	CHATILLON	05/03/89	REPAIRED
LUMBAR FLEXION ROTATION GAUGE	CP17-0601-1	7020	HUMPHREY	MFR. SPECIFICATION	
ABDOMEN COMPRESSION DISPL. GAUGE	4075-175	80294-2051941504	BOURNES	04/06/93	10/06/93
ABDOMEN COMPRESSION FORCE GAUGE	3443	3167	LEBOW	04/06/93	10/06/93
HYBRID III FEMUR PEND. ACCEL.	CG83	7232	ENDEVCO	04/06/93	10/06/93

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TIBIA LOAD CELLS: +X FORCE: TENSION
+Y FORCE: TENSION
+Z FORCE: TENSION
+X MOMENT: BOTTOM OF TIBIA MOVING LEFTWARD
+Y MOMENT: BOTTOM OF TIBIA MOVING REARWARD

FREQUENCY RESPONSE CLASSES

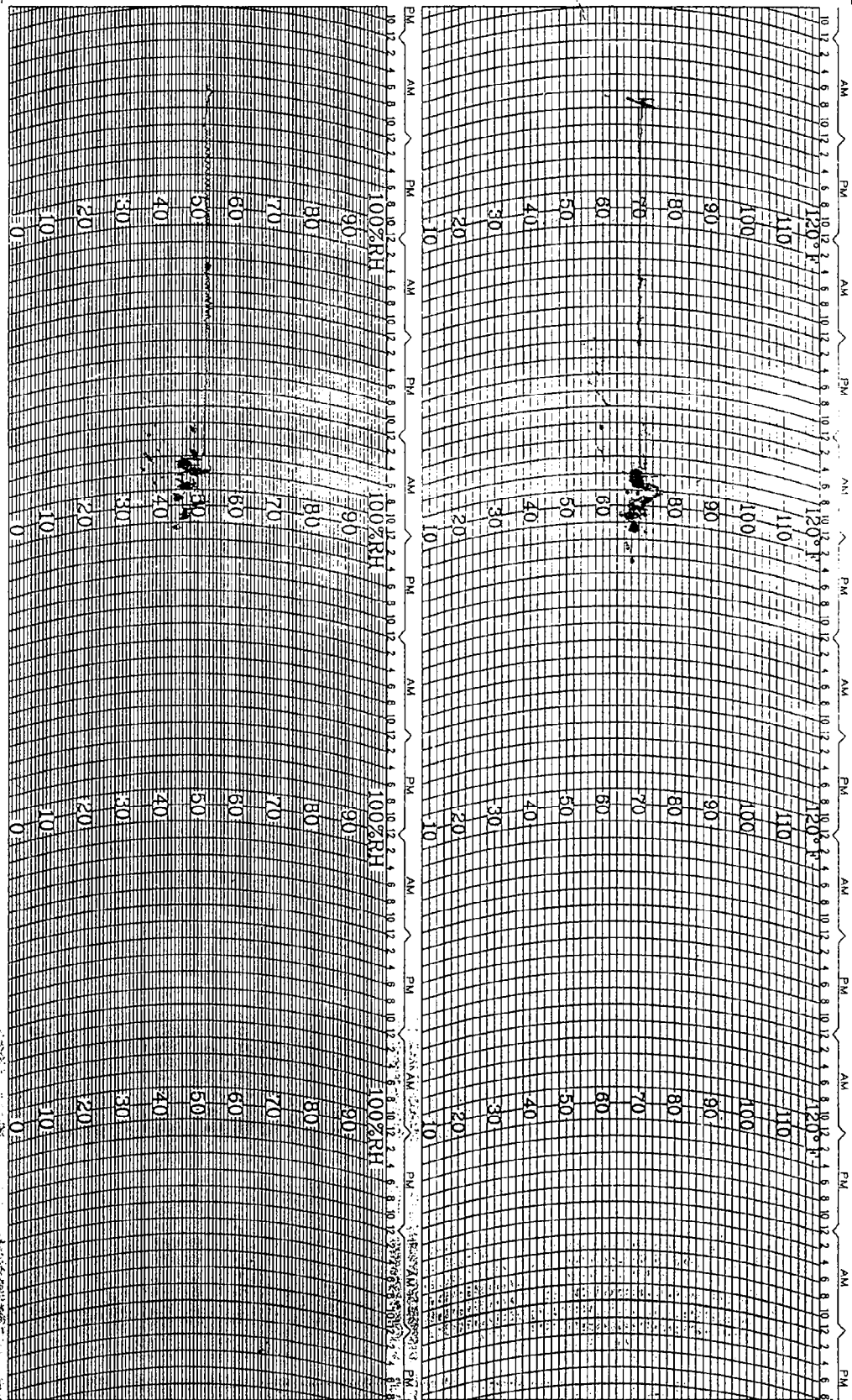
SAE J211 OCT88

TYPICAL TEST MEASUREMENTS

CHANNEL CLASS

Vehicle Structural Accelerations for use in:

Total vehicle comparison	60
Collision simulation input	60
Component analysis	600
Integration for velocity or displacement	180
Barrier Face Forces	60
Belt Restraint System Loads	60
Anthropomorphic Test Device	
Head accelerations (linear and angular)	1000
Neck	
Forces	1000
Moments	600
Thorax	
Spine accelerations	180
Rib accelerations	1000
Sternum accelerations	1000
Deflections	180
Lumbar	
Forces	1000
Moments	1000
Pelvis	
Accelerations	1000
Forces	1000
Moments	1000
Femur/Knee/Tibia/Ankle	
Forces	600
Moments	600
Displacements	180
Sled Accelerations	60
Steering Column Loads	600
Headform Accelerations	1000



Weather Measure
WEATHERtronics
Division of QUALLISTICS, Inc.

P.O. BOX 41039
SACRAMENTO, CA 95841
TELEPHONE: (916) 481-7565

HYGROTHERMOGRAPH
7 DAY

CHART NO. M699124
C311-W-HF
ECN 2563

STATION _____ DATE ON _____ DATE OFF _____

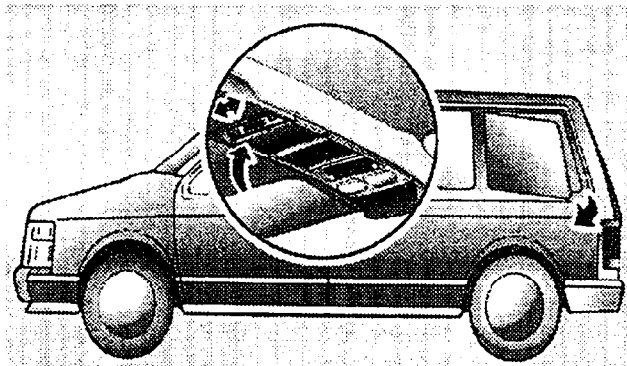
APPENDIX E

RESTRAINT SYSTEM INSTRUCTIONS FROM OWNER'S MANUAL

WINDOWS

Manual Rear Vent Windows

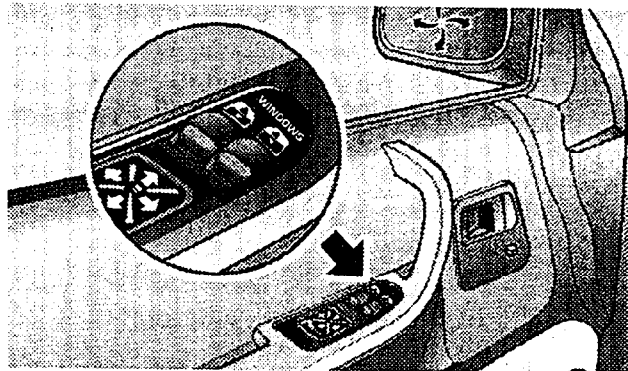
A lever at the rear of each window releases the window so that it can be pushed out for ventilation.



Power Vent Windows (optional)

Switches on the overhead console, let you or the front seat passenger operate the two vent windows from the front seat.

Power Windows (optional)



You can control either front window using switches on the door armrest. There is a single switch on the passenger's armrest. The switches will operate only when the ignition is in the ON or ACCESSORY position.

OCCUPANT RESTRAINTS

One of the most important safety features in your vehicle is the restraint system. This system includes the

12

front and rear seat belts and the driver's and passenger side airbags. Your seat belts can also be used to hold infant and child restraint systems if you will be carrying children too small for adult-size belts.

Please pay close attention to the information in this section. It tells you how to use your restraint system properly to keep you and your passengers as safe as possible.

WARNING!

In a collision, you and your passengers can suffer much greater injuries if you are not properly buckled up. You can strike parts on the inside of your vehicle or other passengers, or you can be thrown out of the vehicle. Always be sure you and others in your vehicle are buckled up properly.

Buckle up even though you are an excellent driver. Even on short trips. Someone on the road may be a poor

driver and cause a collision which includes you. And this can happen far away from home or on your own street.

Research has shown that seat belts save lives and they can reduce the seriousness of injuries in a collision. Some of the worst injuries happen when people are thrown from the vehicle. Seat belts provide protection against that, and they reduce the risk of injury caused by striking the inside of the vehicle. **Everyone** in a motor vehicle needs to be buckled up all the time.

UNIBELTS

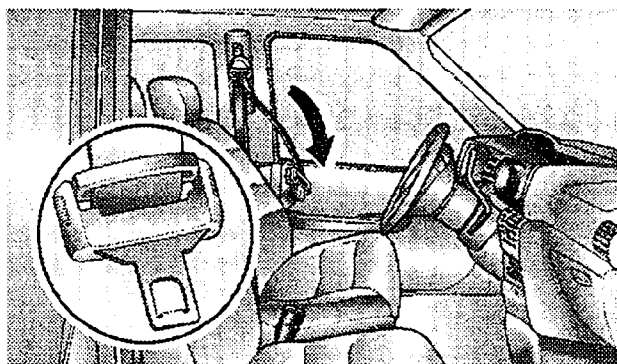
The UNIBELT, or single continuous-belt restraint system, is installed for the driver, front seat passenger, and right and left rear seating positions.

Each unibelt is a combined lap/shoulder belt system. The belt webbing retractor will lock only during very sudden stops or impacts. This feature allows the shoulder part of the belt to move freely with you under

normal conditions. But in a collision, the belt will lock and reduce the risk of your striking the inside of the vehicle or being thrown out.

WARNING!

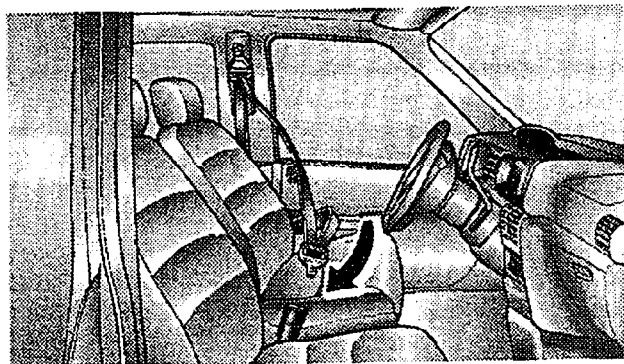
Wearing a seat belt incorrectly is dangerous. Seat belts are designed to go around the large bones of your body. These are the strongest parts of your body and can take the forces of a collision the best. Wearing your belt in the wrong place could make your injuries in a collision much worse. You might suffer internal injuries, or you could even slide out of part of the belt. Follow these instructions to wear your seat belt safely and to keep your passengers safe, too.



Unibelt Operating Instructions

1. Enter the vehicle and close the door. Sit back and adjust the seat.
2. The seat belt latch plate is above the back of your seat. Grasp the latch plate and pull out the belt. Slide the latch plate up the webbing as far as necessary to make the belt go around your lap.

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3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a "click."

WARNING!

A belt that is buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.

A belt that is too loose will not protect you as well. In a sudden stop you could move too far forward, increasing the possibility of injury. Wear your seat belt snugly.

A belt that is worn under your arm is very dangerous. Your body could fall into the inside surfaces of the vehicle in a collision, increasing head and neck injury. And a belt worn under the arm can cause internal injuries. Ribs aren't as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will take the force in a collision.

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BEFORE STARTING YOUR VEHICLE

4. Position the lap belt across your thighs, below your abdomen. To remove slack in the lap belt portion, pull up a bit on the shoulder belt. To loosen the lap belt if it is too tight, tilt the latch plate and pull on the lap belt. A snug lap belt reduces the risk of sliding under the belt in a collision.

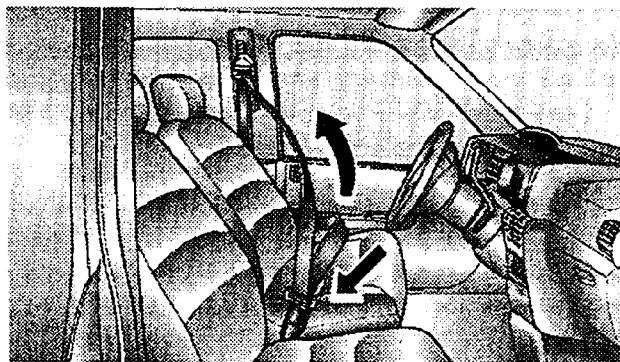
WARNING!

A lap belt worn too high can increase the risk of internal injury in a collision. The belt forces won't be at the strong hip and pelvic bones, but across your abdomen. Always wear the lap belt as low as possible and keep it snug.

5. Position the lap/shoulder belt on your chest so that it is comfortable and not resting on your neck. The retractor will withdraw any slack in the belt.

WARNING!

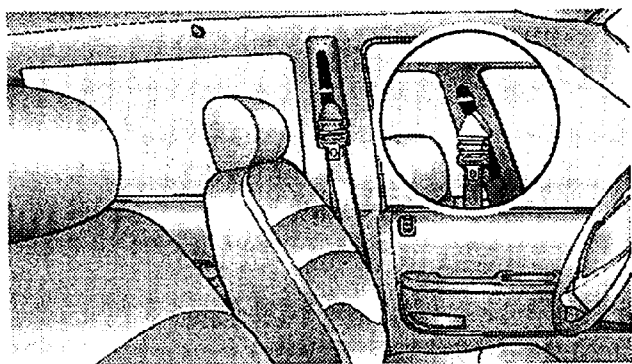
A twisted belt can't do its job as well. In a collision it could even cut into you. Be sure the belt is straight. If you can't straighten a belt in your vehicle, take it to your dealer and have it fixed.



6. To release the belt, push the red button on the buckle. The belt will automatically retract to its

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stowed position. If necessary, slide the latch plate down the webbing to allow it to retract fully.



Adjustable Upper Shoulder Belt Anchorage

In the front seat, the shoulder belt can be adjusted upward or downward to position the belt away from your neck. Push on the release lever to release the anchorage, and then move it up or down to the position that serves you best.

BEFORE STARTING YOUR VEHICLE

As a guide, if you are shorter than average, you will prefer a lower position, and if you are taller than average, you'll prefer a higher position. When you release the anchorage, try to move it up or down to make sure that it is locked in position.

In the rear seat, move toward the center of the seat to position the belt away from your neck.

SEAT BELTS AND PREGNANT WOMEN

We recommend that pregnant women use the seat belts throughout their pregnancies. Keeping the mother safe is the best way to keep the baby safe.

Pregnant women should wear the lap part of the belt across the thighs and as snug across the hips as possible. Keep the belt low so that it does not come across the abdomen. That way the strong bones of the hips will take the force if there is a collision.

CENTER SEAT LAP BELTS

Center seating positions have a lap belt only. To fasten a lap belt, slip the latch plate into the buckle. To lengthen a lap belt, tilt the latch plate and pull. To remove slack, pull the loose end of the webbing.

Wear the belt snug against the hips. Sit back and erect in the seat, then adjust the belt as tightly as is comfortable.

WARNING!

A lap belt worn too loose or too high is dangerous.

A belt worn too loose can allow you to slip down and under the belt in a collision.

A belt that is too high will apply crash forces to the abdomen, not to the stronger hip bones.

In either case, the risk of internal injuries is greater. Wear the lap belt low and snug.

WARNING!

A frayed or torn belt could rip apart in a collision and leave you with no protection. Inspect the belt system periodically, checking for cuts, frays, or loose parts. Damaged parts must be replaced immediately. Do not disassemble or modify the system. Seat belt assemblies must be replaced after an accident if they have been damaged (bent retractor, torn webbing, etc).

WARNING!

Belting two people into one seat belt can lead to greater injury. People belted together can crash into one another in an accident, hurting one another badly. Never use a unbelt or a lap belt for more than one person, no matter what their size.

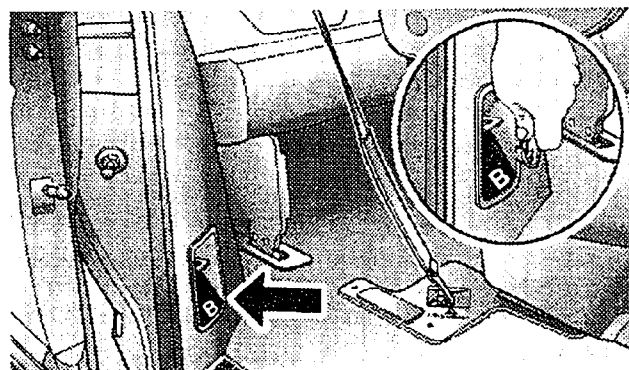
SEAT BELT EXTENDER

If a seat belt is too short, even when fully extended, your dealer can provide you with a seat belt extender. This extender should be used only if the existing belt is not long enough. When it is not required, remove the extender and stow it.

SECOND ROW REAR SEAT BELT ANCHOR

The seat belt anchor at the right end of the second row seat has a hook which allows the anchor to be moved to work properly with different seats.

If the vehicle has a two passenger seat in the second row, the anchor must be installed in the floor mounting position, marked with an "A", next to the seat. To make it easier to enter and leave the third seat, rotate the end of the seat belt toward the right side of the vehicle. An adhesive patch on the belt will align with a similar patch on the carpet. Press the patches together and the belt will lie flat on the floor. The belt must be pulled up and away from the floor when it is being used.



If the vehicle has a three passenger seat or bucket seat in the second row, the seat belt must be installed in the side mounting position. This position is on the lower part of the trim panel, marked with a "B", just rearward of the side door opening.

WARNING!

The seat belt must be properly installed at the correct location. Failure to do so may result in an injury in the event of a collision.

CHRYSLER INTEGRATED CHILD SEAT (optional)

Operating instructions for this seat are included with the seat. If the instructions are not with the seat or in the Owner's Manual Package, replacement instructions can be obtained.

To obtain replacement instructions:

Use the order form at the rear of this manual and specify publication number 81-016-2050.

CHILD RESTRAINT

Everyone in your vehicle needs to be buckled up all the time, babies and children, too.

WARNING!

In a collision, an unrestrained child, even a tiny baby, can become a missile inside the vehicle. The force required to hold even an infant on your lap could become so great that you could not hold the child, no matter how strong you are. The child and others could be badly injured. Any child riding in your vehicle should be in a proper restraint for the child's size.

All states and Canadian provinces require small children to ride in proper restraint systems. This is the law, and you can be prosecuted for ignoring it.

Infants and Small Children

There are different sizes and types of restraints for children from newborn size to the bigger child almost large enough for an adult safety belt. Use the restraint that is correct for your child.

Two different child restraint systems are generally available:

- The infant carrier for babies weighing up to 20 lbs. (9 kg.)
- The child seat for small children over 20 lbs.

In addition, some manufacturers make systems that can be first used as an infant carrier, and then converted to a child seat as the child grows.

Here are some tips on getting the most out of your child restraint:

- Before buying any restraint system, make sure that it has a label certifying that it meets Motor Vehicle Safety Standard 213. Chrysler also recommends that before you buy a child restraint, you try it in the vehicle seats where you will use it.
- The restraint must be appropriate for your child's weight and height. Check the label on the restraint for this, too.

- Install the restraint in the rear seat if possible. According to accident statistics, children are safer when properly restrained in the rear seats than in the front.
- Carefully follow the instructions that come with the restraint. If you install the restraint improperly, it may not work when you need it.

WARNING!

Improper installation can lead to failure of an infant or child restraint. It could come loose in a collision. The child could be badly injured or killed. Follow the manufacturer's directions exactly when installing an infant or child restraint.

- Infant and child restraints are secured in the vehicle seats by the lap belt or the lap part of the lap/shoulder belt. In the rear seats, you may have trouble tightening the belt on the child restraint because the buckle or latch plate interferes with the belt path opening on the restraint. Disconnect the latch plate from the

BEFORE STARTING YOUR VEHICLE

- buckle and twist the short buckle-end belt several turns to shorten it. Reassemble the latch plate to the buckle with the release button so that it is facing out.
- In the front seat, move the seat forward to reposition the buckle against the side of the child restraint.
 - In the center rear seat, if the belt still can't be tightened, or if pulling and pushing on the restraint loosens the belt, you may need to do something more. Disconnect the latch plate from the buckle, turn it over, and reconnect it to the buckle. If you still can't make the child restraint secure, try a different seating position.
 - Some child seat manufacturer's recommend the use of a top anchorage (tether) strap in addition to the lap belt. Your vehicle has tether strap anchorages behind some rear seating positions for use with these child seats. Your dealer can provide you with anchorage hardware and installation instructions.
 - Buckle the child into the seat exactly as the seat manufacturer's directions tell you. The cinching latch plate will keep the belt tight.
 - When your infant carrier or child seat is not in use, secure it with the seat belt or remove it from the vehicle. Don't leave it loose in the vehicle. In a sudden stop or collision, it could strike occupants and injure them.

Children Too Large For Child Seats

Children who are too large for child seats and who can sit upright by themselves should use the available lap/shoulder belts for best protection.

- Make sure that the child is seated upright in the seat.
- The lap belt should be fastened low on the hips and as snug as possible.
- Check belt fit periodically. A child's squirming or slouching can move the belt out of position.

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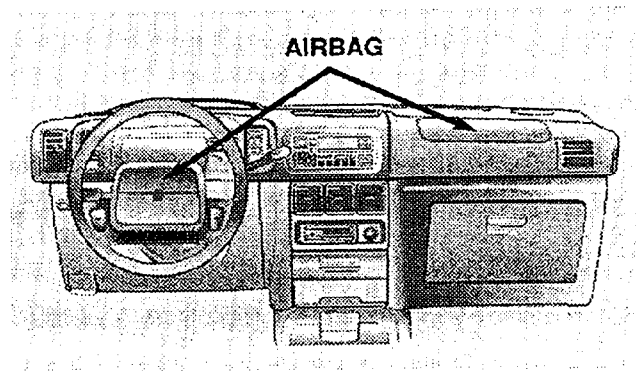
If the shoulder belt contacts the face or neck, move the child closer to the middle of the vehicle. If this doesn't solve the problem, move the child to the center rear seating position and use the lap belt.

Booster seats that may help overcome this problem are also available for use with lap/shoulder belts. Before buying a booster seat, make sure that it has a label certifying that it meets applicable Motor Vehicle Safety Standards. Make sure that is satisfactory for use in this vehicle.

DRIVER AND RIGHT FRONT PASSENGER SUPPLEMENTAL MINIVAN RESTRAINT SYSTEM - AIRBAG

This vehicle has airbags for the driver and right front passenger as a supplement to the seat belt restraint systems. The driver's airbag is mounted in the steering wheel. The passenger side airbag is mounted in the instrument panel above the glove compartment. These airbags inflate in higher speed frontal impacts. They

work with the instrument panel knee bolsters and the seat belts to provide improved protection for the driver and right front passenger.



WARNING!

Relying on airbags alone could lead to more severe injuries in a collision. The airbags do not provide any restraint in side or rear collisions or rollovers. Always wear the seat belt.

The seat belt system is designed to protect you in many types of collisions. The airbags deploy only in frontal collisions. They will not deploy in collisions at slow speed. But even in collisions where the airbags deploy, you need the seat belt to keep you in the right position for the airbags to protect you properly.

Ignoring the AIRBAG light in your message center could mean you won't have the airbags to protect you in a collision. If the light does not come on, stays on after you start the vehicle, or if it comes on as you drive, have the airbag system checked right away.

The airbag system consists of the following:

- Airbag Control Module
- AIRBAG Light
- Driver and Passenger Airbag/Inflator Units
- Unique Steering Wheel and Column
- Unique Instrument Panel
- Interconnecting Wiring
- Knee Impact Bolster

How The Airbag System Works

- **Airbag Control Module** in the occupant compartment determines if a frontal impact is severe enough to require the airbag. The sensor in the control module will not detect side, rollover, or rear impacts. Switches in the control module are connected to the airbag/inflator unit.

This module also monitors the readiness of the electronic parts of the system whenever the ignition switch is in the START or RUN positions. These include all of the items listed above except the knee bolster. The airbag control module also turns on the Airbag light in the instrument panel for 6 to 8 seconds when the ignition is first turned on, then turns the light off. If it detects a malfunction in any part of the system, it turns on the light either momentarily or continuously.

- **The Airbag/Inflator Units** are in the center of the steering wheel and the instrument panel. The words SRS/AIRBAG are embossed on the airbag covers.

WARNING!

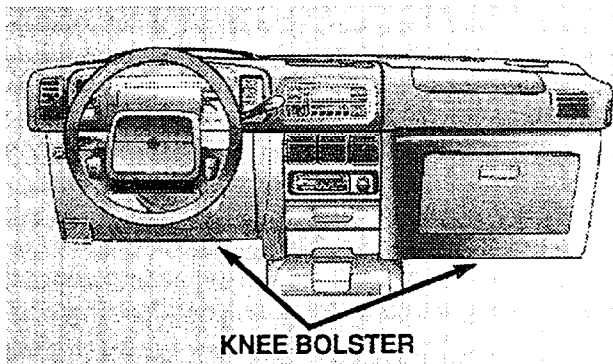
Do not put anything on or around the airbag covers or attempt to manually open them. You may damage the airbags and you could be injured because the airbags are not there to protect you. These protective covers for the airbag cushions are designed to open only when the airbags are inflating.

- When the crash sensor detects an impact requiring the airbags, the control module signals the inflator units. A large quantity of non-toxic nitrogen or argon gas is generated to inflate the airbags. The airbag covers separate and fold out of the way as the airbags inflate to their full size. The airbags fully inflate in about 50 milliseconds. This is only about half of the time it takes you to blink your eyes. The airbags then quickly deflate while helping to restrain the driver and right front passenger. The airbag gas is vented

BEFORE STARTING YOUR VEHICLE

through the airbag material towards the instrument panel. In this way the airbags do not interfere with your control of the vehicle.

The Knee Impact Bolsters help protect the knees and position you for the best interaction with the airbags.



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WARNING!

- You could be more seriously injured in a collision if you rely on the airbag alone for restraint. Wear your seat belt even though you have an airbag.
- Being too close to the steering wheel or instrument panel during airbag deployment could cause serious injury. Airbags need room to inflate. Sit back, comfortably extending your arms to reach the steering wheel or instrument panel.
- A rearward-facing child restraint should only be used in a rear seat. A child may be seriously or fatally injured in a rearward-facing child restraint placed in the front seat if the restraint is struck by a deploying passenger airbag.

If A Deployment Occurs

The airbag system is designed to deploy when the impact sensors detect a moderate-to-severe frontal collision, to help restrain the driver and right front passenger, and then immediately deflate.

BEFORE STARTING YOUR VEHICLE

NOTE: A frontal collision that is not severe enough to need airbag protection will not activate the system. This does not mean something is wrong with the airbag system.

If you do have a collision which deploys the airbag, any or all of the following may occur:

- The nylon airbag material may sometimes cause abrasions and/or skin reddening to the driver and right front passenger as the airbags deploy and unfold.

The abrasions are similar to friction rope burns or those you might get sliding along a carpet or gymnasium floor. They are not caused by contact with chemicals. They are not permanent and normally heal quickly. However, if you haven't healed significantly within a few days, or if you have any blistering, see your doctor immediately.

- As the airbags deflate you may see some smoke-like particles. The particles are a normal by-product of the process that generates the non-toxic nitrogen or argon gas used for airbag inflation. These airborne

particles may irritate the skin, eyes, nose, or throat. If you have skin or eye irritation, rinse the area with cool water. For nose or throat irritation, move to fresh air. If the irritation continues, see your doctor.

If these particles settle on your clothing, follow the garment manufacturer's instructions for cleaning.

- Your vehicle may be safely driveable after the airbags deploy. If so, you can tuck the deployed airbags inside the opening in the steering wheel hub and instrument panel trim covers to make driving somewhat easier.

WARNING!

Deployed airbags cannot protect you in another collision. Have the airbags replaced by an authorized dealer as soon as possible.

BEFORE STARTING YOUR VEHICLE

Transporting Pets

Airbags deploying in the front seat could harm your pet. An unrestrained pet will be thrown about and possibly injured, or injure a passenger during panic braking or in a collision.

Pets should be restrained in the rear seat in pet harnesses or pet carriers that are secured by seat belts.

MAINTAINING YOUR AIRBAG SYSTEM

WARNING!

- Modifications to any part of the airbag system could cause it to fail when you need it. You could be injured because the airbag is not there to protect you. Do not modify the components or wiring, including adding any kind of badges or stickers to the airbag covers. Do not modify the front bumper or vehicle body structure.
- You need proper knee impact protection in a collision. Do not mount or locate any aftermarket equipment on or behind the knee bolsters.
- You can be injured if you are too close to either airbag cover when the airbags inflate. It is dangerous to try to repair any part of the airbag system yourself. Don't try to repair the airbag system. Be sure to tell anyone who works on your vehicle that it has airbags.

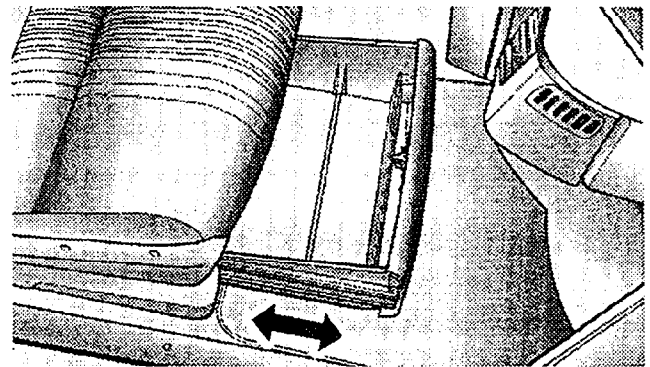
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BEFORE STARTING YOUR VEHICLE

You will want to have the airbags ready for your protection in a collision. While the airbag Supplemental Restraint System (SRS) is designed to be maintenance free, if any of the following occurs, have an authorized dealer service the system immediately.

- The AIRBAG light does not come on or flickers during the 6 to 8 seconds when the ignition switch is first turned on.
- The light remains on or flickers after the 6 to 8 second interval.
- The light flickers or comes on and remains on while driving.

STORAGE BIN (if so equipped)



The storage bin located under the front passenger's seat can be locked with the master key. If you must leave your vehicle with a parking attendant, give the attendant the "valet" key to maintain secure storage.