

V2915

**Vehicle Research and Test Center
1997 Dodge Caravan into Left Front of
1997 Honda Accord Oblique 30°
TRC Test Number 980709**

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Section 1.0

Purpose and Test Procedure

Purpose

This 56 kph 30° oblique vehicle-to-vehicle impact test was conducted for National Highway Transportation and Safety Administration (NHTSA) and Vehicle Research and Test Center (VRTC) by Transportation Research Center Inc. (TRC). The purpose of this test was to determine the response of the subject vehicle, a 1997 Honda Accord in the 56 kph 30° oblique vehicle-to-vehicle impact mode.

Test Procedure

This test was conducted per NHTSA and VRTC instructions. Data was obtained relative to FMVSS 208, "Occupant Protection."

The target vehicle was instrumented with eight (8) longitudinal axis accelerometers, three (3) lateral axis accelerometers, and one (1) vertical axis accelerometer. Its specified impact velocity range was 55.5 to 57.1 km/h.

The bullet vehicle was instrumented with eight (8) vertical axis accelerometers, three (3) lateral axis accelerometers, and one (1) vertical axis accelerometer. Its specified impact velocity range was 55.5 to 57.1 kph.

The bullet vehicle's left edge was aligned with the target vehicle's impact point, which is the vehicle's centerline. The impact angle was 30°.

One (1) 50th percentile adult male Hybrid III dummy and one (1) 5th percentile adult female dummy were placed in the bullet vehicle's left front and right front designated seating positions, respectively. Each dummy had accelerometers in the head, chest, and pelvis to measure longitudinal, lateral, and vertical accelerations; 6-axis upper neck load cells to measure forces and moments in the neck; a potentiometer in the chest to measure chest deflection; and femur load cells to measure axial forces. Additionally, the driver dummy was instrumented with enhanced lower legs to measure forces and moments in the upper and lower tibias; additionally the passenger dummy was instrumented with spine and sternum accelerometers to measure longitudinal axis accelerations; and femur load cells to measure uniaxial forces in the femurs. Each dummy was restrained with a 3-point unbelt.

One (1) 50th percentile adult male Hybrid III dummy and one (1) 5th percentile adult female dummy were placed in the target vehicle's left front and right front designated seating positions, respectively. Each dummy had accelerometers in the head, chest, and pelvis to measure longitudinal, lateral, and vertical accelerations; 6-axis upper neck load cells to measure forces

and moments in the neck; a potentiometer in the chest to measure chest deflection; and femur load cells to measure axial forces. Additionally, the driver dummy was instrumented with enhanced lower legs to measure forces and moments in the upper and lower tibias; additionally the passenger dummy was instrumented with femur load cells to measure uniaxial forces in the femurs. Each dummy was restrained with a 3-point unbelt.

The one hundred-thirty-nine (139) data channels were digitally sampled and recorded at 12,500 samples per second and processed per SAE J211 October 1988.

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

The vehicle data are summarized in Section 2.0. The FMVSS 208 are presented in Section 3.0. The vehicle, occupant, and camera measurements are presented in Section 4.0. Appendix A contains the still photographic prints. Appendix B contains the vehicle data plots. Appendix C contains dummy calibration information. Appendix D contains miscellaneous test information.

Section 2.0

Left Front Oblique Impact Test Summary

Test Results Summary

This 56 kph 30° left front oblique vehicle-to-vehicle impact test was conducted at TRC on July 9, 1998.

The target test vehicle, a 1997 Honda Accord, was equipped with a 4-cylinder, transverse engine, automatic transmission, power steering, and power brakes. The target vehicle's test weight was 1521.4 kg and its impact speed was 56.8 km/h. The bullet vehicle, a 1997 Dodge Caravan, was equipped with a 6-cylinder, transverse engine, automatic transmission, power steering, and power brakes. The bullet vehicle's test weight was 1984.9 kg and its impact speed was 56.2 kph. The target vehicle's maximum static crush was 859 millimeters. The bullet vehicle's maximum crush was 555 millimeters.

The target vehicle driver dummy's Head Injury Criteria (HIC) was 344. The target vehicle driver dummy's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.7 g. The target vehicle driver dummy's chest deflection was 32 mm. The target vehicle's driver dummy's left and right femur forces were 3546 N and 9477 N, respectively.

The target vehicle right front passenger dummy's HIC was 340. The target vehicle right front passenger dummy's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 56.0 g. The target vehicle right front passenger dummy's chest deflection was 38 mm. The target vehicle's right front passenger dummy's left and right femur forces were 2438 N and 2558 N, respectively.

The bullet vehicle driver dummy's HIC was 424. The bullet vehicle driver dummy's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 44.1 g. The bullet vehicle driver dummy's chest deflection was 30 mm. The bullet vehicle's driver dummy's left and right femur forces were 4061 N and 4889 N, respectively.

The bullet vehicle passenger dummy's HIC was 580. The bullet vehicle right front passenger dummy's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.2 g. The bullet vehicle right front passenger dummy's chest deflection was 30 mm. The bullet vehicle passenger dummy's left and right femur forces were 2530 N and 2671 N, respectively.

Data Acquisition Explanation

The target vehicle's driver dummy's right upper tibia Z-axis force data channel, TBRZF1, exceeded its data channel's full scale input at approximately 49 milliseconds.

The target vehicle's driver dummy's right upper tibia X-axis moment data channel, TBRXM1, exceeded its data channel's full scale input at approximately 52 milliseconds.

The target vehicle's driver dummy's right upper tibia Y-axis moment data channel, TBRYM1, exceeded its data channel's full scale input at approximately 49 milliseconds.

The target vehicle's driver dummy's left lower tibia Y-axis moment data channel, ANLYM1, exceeded its data channel's full scale input at approximately 54 to 60 milliseconds and 67 to 69 milliseconds.

The target vehicle's driver dummy's right knee left force data channel, KNRLF1, exceeded its data channel's full scale input at approximately 53 milliseconds.

The target vehicle's right brake caliper X-axis acceleration data channel, BCRXG1, lost data after approximately 11 milliseconds.

The target vehicle's instrument panel X-axis acceleration data channel, DPCXG1, lost data after approximately 65 milliseconds.

The bullet vehicle's driver dummy's left lower tibia Y-axis moment data channel, ANLYM1, exceeded its data channel's full scale input at approximately 64 to 68 milliseconds.

The bullet vehicle's passenger dummy's neck Y-axis moment data channel, NEKYM2, exceeded its data channel's full scale input at approximately 44 to 50 milliseconds. This affected the calculation for bullet vehicle's passenger dummy's neck moment about the occipital condyle data channel, NEKOM2.

The bullet vehicle's engine bottom X-axis acceleration data channel, ENGXG4, lost data after approximately 45 milliseconds.

The bullet vehicle's left front brake caliper X-axis acceleration data channel, BCLXG2, lost data after approximately 30 milliseconds.

Table 1 Crash Test Summary

Test type:	Left Front Oblique Impact	
Test date:	07/09/98	
Test time:	1659	
Ambient temperature:	27° C	
Target vehicle:	1997 Honda Accord	
Target vehicle test weight:	1521.4 kg	
Bullet vehicle:	1997 Dodge Caravan	
Bullet vehicle test weight:	1984.9 kg	
Impact angle: ¹	30°	
Impact velocity: ²	Target vehicle = 56.8 kph Bullet vehicle = 56.2 kph	
Target vehicle's maximum static crush:	859 mm	
Bullet vehicle's maximum static crush:	555 mm	
Target vehicle dummies:	Driver #168	Passenger #289
Type:	572 E (50% male)	Hybrid III (5% female)
Location:	Left front	Right front
Restraint:	3-point unbelt	3-point unbelt
Bullet vehicle dummies:	Driver #45	Passenger #283
Type:	572 E(50% Male)	Hybrid III (5% female)
Location:	Left front	Right front
Restraint:	3-point unbelt/airbag	3-point unbelt/airbag
Total number of data channels:	139	
Number of cameras:		
High-speed	14	
Real-time	1	

¹ With respect to tow track centerline.

² Speed trap measurement (± .08 kph accuracy)

Table 2 Target Test Vehicle Information

Vehicle manufacturer:	Honda of America, Mfg.		
Make/model:	Honda/Accord		
VIN:	1HGCD5636VA069634		
Model year:	1997		
Body style:	4-door		
Color:	Green		
Engine data:			
Type:	Transverse		
Cylinders:	4		
Displacement:	2.2		
Transmission data:	<u>4</u> Speed, <u> </u> Manual, <u> X</u> Automatic, <u> X</u> FWD, <u> </u> RWD, <u> </u> 4WD		
Date vehicle received:	N/A		
Odometer reading:	29,228		
Dealer's name and address:	N/A		
<u>Accessories:</u>			
Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	No	Tilting steering wheel	Yes
Power windows	Yes	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	No
Clock	Yes	Rear window defroster	Yes
Other	None		
<u>Certification data from vehicle's label:</u>			
Vehicle manufactured by:	Honda of America Mfg., Inc.		
Date of manufacture:	11/96		
VIN:	1HGCD5636VA069634		
VWR:	3915 lbs.		
GAWR: Front:	2140 lbs.		
Rear:	1810 lbs.		

Table 2 Target Test Vehicle Information, Cont'd.

Tires on vehicle (mfr., line, size): P185/65R15

Tire pressure with maximum capacity vehicle load: Front: 220 kPa
Rear: 220 kPa

Spare tire (mfr., line, size): N/A

Type of seats: Front: Bucket
Rear: Bench

Type of front seat backs: Manually adjustable

Maximum width: 1780 mm

Wheelbase: 2710 mm

Location of "Recommended Tire Pressure" label:

The label was located on the driver B-pillar.

Data from vehicle's "Recommended Tire Pressure" label:

Recommended tire size: P185/65R15

Recommended cold tire pressure: Front: 32 psi
Rear: 32 psi

Seating capacity: Front: 2
Rear: 3
Total: 5

Vehicle capacity weight: 850 lbs.

Test vehicle attitude:

Delivered attitude:	LF 692 mm;	RF 687 mm;	LR 690 mm;	RR 680 mm
Fully load attitude:	LF 677 mm;	RF 677 mm;	LR 657 mm;	RR 652 mm
Pre-test attitude:	LF 669 mm;	RF 670 mm;	LR 647 mm;	RR 649 mm
Post-test attitude:	LF 675 mm;	RF 653 mm;	LR 619 mm;	RR 718 mm

Table 2 Target Test Vehicle Information, Cont'd.

Delivered Weight:

Right Front:	414.1 kg	Right Rear:	252.2 kg
Left Front:	409.1 kg	Left Rear:	249.9 kg
Total Front Weight:	823.2 kg	(62.1% of total vehicle weight)	
Total Rear Weight:	502.1 kg	(37.9% of total vehicle weight)	
Total Delivered Weight:	1325.3 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated cargo and luggage weight

UDW = Unloaded delivered weight (1325.3 kg)

VCW = Vehicle capacity weight (385.6 kg)

DSC = Designated seating capacity (5)

$RCLW = VCW - 68.0 (5) = 45.6 \text{ kg}$

Target test weight = $UDW + RCLW + (\text{No. of Hybrid III dummies} \times 75.8 \text{ kg} + \text{No. of Hybrid III dummies} \times 47.6 \text{ kg})$

Target test weight = $1325.3 + 45.6 \text{ kg} + 75.8 \text{ kg} + 47.6 \text{ kg}$

Target test weight = 1494.3 kg

Weight of test vehicle with required dummies and 72.7 kg cargo weight:

Right front	455.9 kg	Right rear	313.9 kg
Left front	445.4 kg	Left rear	306.2 kg
Total front weight	901.3 kg	(59.2% of total vehicle weight)	
Total rear weight	620.1 kg	(40.8% of total vehicle weight)	
Total test weight	1521.4 kg		

Weight of ballast secured in cargo area: None

Components removed to meet target test weight: Rear deck, rear speakers, rear seatbelts, rear seats, all rear trim panels, rear bumper, right front door glass, trunk lid, exhaust system, rear door panels, right rear door glass.

CG rearward of front wheel centerline: 1105 mm

Table 3 Bullet Test Vehicle Information

Vehicle manufacturer:	Chrysler Corporation
Make/model:	Chrysler/Caravan
VIN:	1B4GP54R7VB200303
Model year:	1997
Body style:	Mini Van
Color:	Candy apple red
Engine data:	
Type:	Transverse
Cylinders:	6
Displacement:	3.3 liter
Transmission data:	☐ Speed, ☐ Manual, ☒ Automatic, ☒ FWD, ☐ RWD, ☐ 4WD
Date vehicle received:	N/A
Odometer reading:	19,300
Dealer's name and address:	N/A

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	Yes	Tilting steering wheel	Yes
Power windows	Yes	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	Yes
Clock	No	Rear window defroster	Yes
Other	None		

Certification data from vehicle's label:

Vehicle manufactured by:	Chrysler Corporation
Date of manufacture:	07/96
VIN:	1B4GP54R7VB200303
GVWR:	5350 lbs.
GAWR: Front:	2746 lbs.
Rear:	2746 lbs.

Table 3 Bullet Test Vehicle Information, Cont'd.

Tires on vehicle (mfr., line, size): P215/65R16

Tire pressure with maximum capacity vehicle load:	Front: 35 psi Rear: 35 psi
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Spare tire (mfr., line, size):	Spare Saver
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Type of seats:	Front: Captains chairs Rear: Bench
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Type of front seat backs:	Manually adjustable
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Maximum width:	1925 mm
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Wheelbase:	3040 mm
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Location of "Recommended Tire Pressure" label:

N/A

Data from vehicle's "Recommended Tire Pressure" label:

Recommended tire size:	P215/65R15
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Recommended cold tire pressure:	Front: 35 psi Rear: 35 psi
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Seating capacity:	Front: 2 Rear: 5 Total: 7
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Vehicle cargo load:	1150 lbs.
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Test vehicle attitude:

Delivered attitude:	LF 762 mm;	RF 763 mm;	LR 751 mm;	RR 761 mm
Fully loaded attitude:	LF 738 mm;	RF 743 mm;	LR 728 mm;	RR 738 mm
Pre-test attitude:	LF 735 mm;	RF 738 mm;	LR 746 mm;	RR 745 mm
Post-test attitude:	LF 757 mm;	RF 724 mm;	LR 687 mm;	RR 728 mm

Table 3. Bullet Test Vehicle Information, Cont'd.

Delivered Weight:

Right Front:	487.6 kg	Right Rear:	387.4 kg
Left Front:	553.4 kg	Left Rear:	390.5 kg
Total Front Weight:	1041.0 kg	(57.2% of total vehicle weight)	
Total Rear Weight:	777.9 kg	(42.8% of total vehicle weight)	
Total Delivered Weight:	1818.9 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated cargo and luggage weight

UDW = Unloaded delivered weight (1818.9 kg)

VCW = Vehicle capacity weight (512.6 kg)

DSC = Designated seating capacity (7)

$RCLW = VCW - 68.0(7) = 512.6 - 68.0(7) = 45.6 \text{ kg}$

Target test weight = $UDW + RCLW + (\text{No. of Hybrid III dummies} \times 75.8 \text{ kg} + \text{No. of Hybrid III dummies} \times 47.6 \text{ kg})$

Target test weight = $1818.9 + 45.6 + 75.8 + 47.6$

Target test weight = 1987.9 kg

Weight of test vehicle with required dummies and 42.6 kg cargo weight:

Right front	533.4 kg	Right rear	424.6 kg
Left front	605.1 kg	Left rear	421.8 kg
Total front weight	1138.5 kg	(57.4% of total vehicle weight)	
Total rear weight	846.4 kg	(42.6% of total vehicle weight)	
Total test weight	1984.9 kg		

Weight of ballast secured in cargo area: None

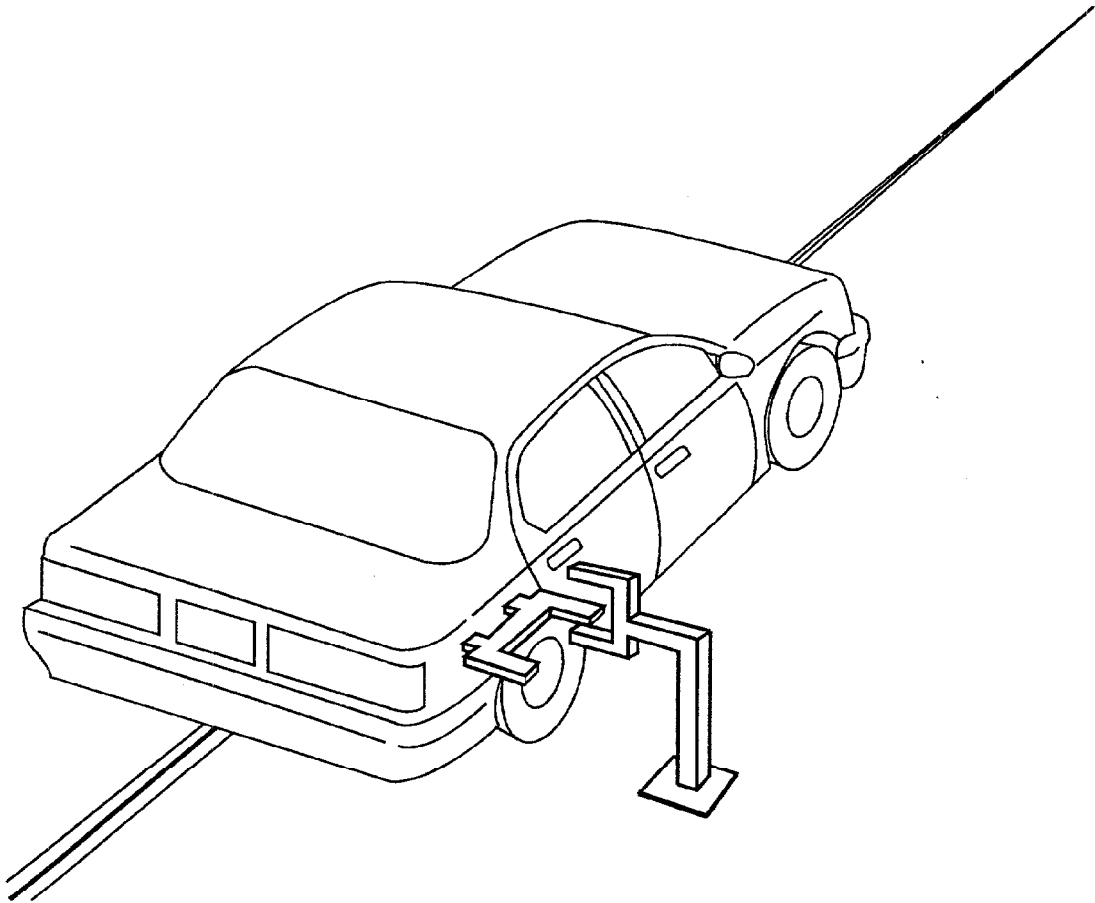
Components removed to meet target test weight: Exhaust system, spare tire, rear bumper, rear seatbelts, taillights, rear hatch trim, rear wiper motor, and rear side garnishes.

CG rearward of front wheel centerline: 1296 mm

Table 4 Post-Impact Data

Test number:	980709
Date of test:	07/09/98
Time of test:	1659
Type of test:	Left Front Oblique Impact
Impact angle:	30°
Ambient temperature at impact area:	27° C
Impact velocity:	
Target vehicle:	56.8 kph
Bullet vehicle:	56.2 kph
	(Specified range = 55.5 to 57.1 kph)
Distance from vehicle to vehicle:	
Entering trap	610 mm
Exiting trap	51 mm

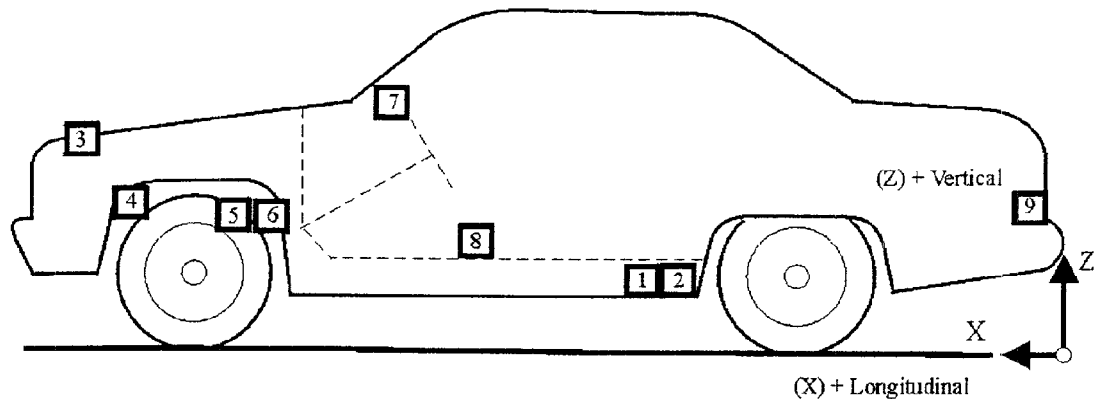
Figure 1 Impact Velocity Measurement System



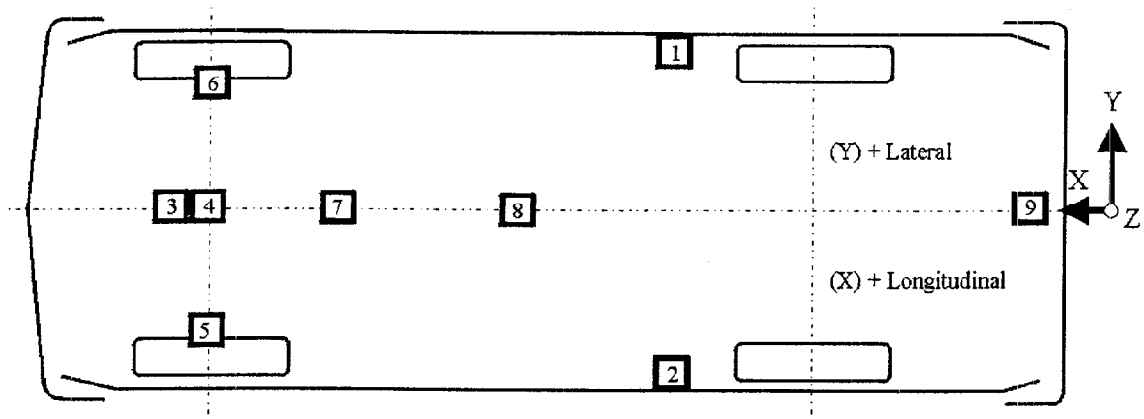
The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 610-millimeter spacing.

Figure 2 Target Vehicle Accelerometer Placement



Side View



Bottom View

Table 5 Target Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 980709
No. LOCATION

	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT REAR SEAT	PRE 1969 mm	495 mm	315 mm		
CROSSMEMBER	POST 1875 mm	495 mm	186 mm		
LONGITUDINAL				0.5 g @ 33.2 ms	@ 54.6 ms
LATERAL				7.9 g @ 74.3 ms	@ 55.6 ms
2 RIGHT REAR SEAT	PRE 1969 mm	-495 mm	315 mm		
CROSSMEMBER	POST 1882 mm	-495 mm	286 mm		
LONGITUDINAL				0.8 g @ 199.9 ms	@ 46.5 ms
LATERAL				0.9 g @ 208.2 ms	@ 56.3 ms
3 ENGINE TOP	PRE 4012 mm	-75 mm	740 mm		
LONGITUDINAL	POST 3607 mm	135 mm	711 mm	7.5 g @ 83.3 ms	@ 36.7 ms
4 ENGINE BOTTOM	PRE 4015 mm	263 mm	160 mm		
LONGITUDINAL	POST NA	NA	118 mm	30.5 g @ 50.8 ms	@ 35.5 ms
5 RIGHT BRAKE CALIPER	PRE 3875 mm	-680 mm	275 mm		
LONGITUDINAL ¹	POST 3940 mm	-700 mm	259 mm	---	---

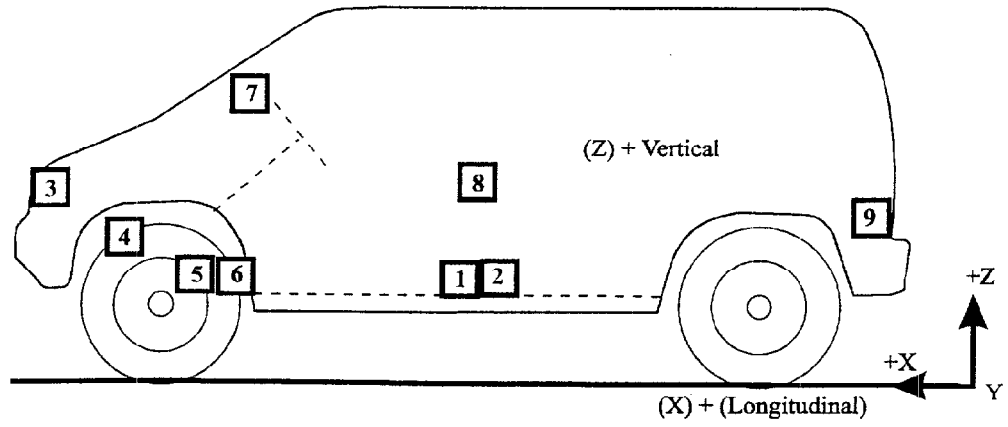
Table 5 Target Vehicle Accelerometer Locations and Data Summary, Cont'd.

TEST NUMBER: 980709 No. LOCATION	X			Y			Z			POSITIVE DIRECTION		NEGATIVE DIRECTION	
6 LEFT BRAKE CALIPER LONGITUDINAL	PRE	3875 mm		680 mm			275 mm						
	POST	3310 mm		515 mm			198 mm						
										101.3 g	@ 38.8 ms	180.6 g	@ 27.9 ms
7 INSTRUMENT PANEL CENTER LONGITUDINAL ¹	PRE	3162 mm		0 mm			875 mm						
	POST	2975 mm		-155 mm			895 mm						
										---	---	---	---
8 VEHICLE CENTER OF GRAVITY LONGITUDINAL	PRE	310 mm		0 mm			488 mm						
	POST	277 mm		0 mm			525 mm						
										1.3 g	@ 219.2 ms	28.2 g	@ 46.0 ms
9 VEHICLE REAR CENTER LATERAL VERTICAL	PRE	985 mm		-15 mm			199 mm						
	POST	970 mm		0 mm			225 mm						
										4.2 g	@ 37.6 ms	11.9 g	@ 74.3 ms
										11.6 g	@ 81.0 ms	15.9 g	@ 130.0 ms

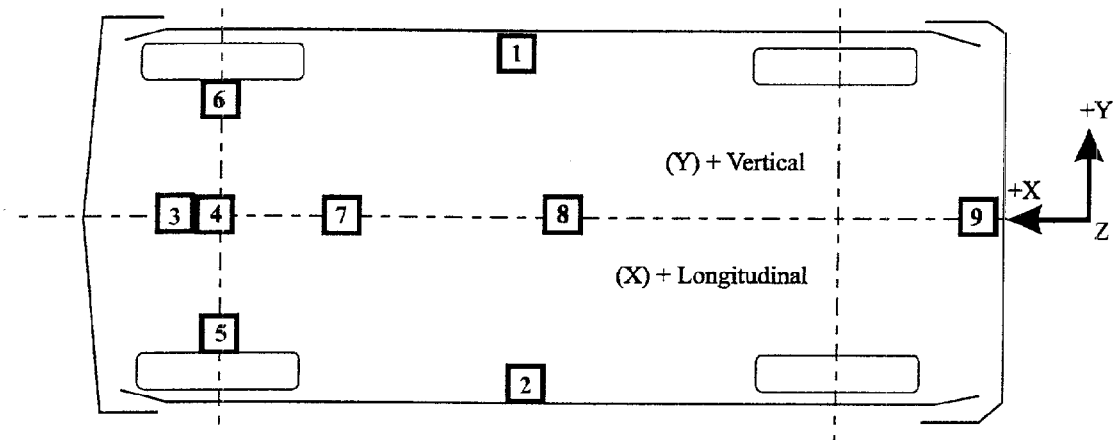
REFERENCE: X: + FORWARD FROM REAR BUMPER
Y: + LEFTWARD FROM VEHICLE CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

¹See DATA ACQUISITION EXPLANATIONS

Figure 3 Bullet Vehicle Accelerometer Placement



Side View



Bottom View

Table 6 Bullet Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 980709					POSITIVE		NEGATIVE	
No.	LOCATION	X	Y	Z	DIRECTION		DIRECTION	
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL LATERAL	PRE 2195 mm	750 mm	443 mm				
		POST 2183 mm	750 mm	396 mm				
					2.2 g @ 198.6 ms	44.0 g	@ 65.4 ms	
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL LATERAL	PRE 2195 mm	-750 mm	443 mm				
		POST 2183 mm	-750 mm	427 mm				
					1.3 g @ 203.8 ms	26.2 g	@ 64.0 ms	
3	ENGINE TOP LONGITUDINAL	PRE 4530 mm	-53 mm	770 mm				
		POST 4438 mm	0 mm	715 mm				
					12.3 g @ 64.8 ms	89.7 g	@ 32.4 ms	
4	ENGINE BOTTOM LONGITUDINAL	PRE 4349 mm	-130 mm	162 mm				
		POST 4205 mm	-77 mm	134 mm				
					---	---	---	
5	RIGHT BRAKE CALIPER LONGITUDINAL	PRE 4254 mm	-695 mm	305 mm				
		POST 4380 mm	-730 mm	309 mm				
					22.8 g @ 103.0 ms	45.7 g	@ 69.7 ms	

Table 6 Bullet Vehicle Accelerometer Locations and Data Summary, Cont'd.

TEST NUMBER: 980709 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
6 LEFT BRAKE CALIPER	PRE 4254 mm POST 4080 mm	695 mm 760 mm	295 mm 120 mm		
LONGITUDINAL ¹			---	---	---
7 INSTRUMENT PANEL CENTER	PRE 3797 mm POST 3785 mm	0 mm 0 mm	1120 mm 1138 mm		
LONGITUDINAL			41.7 g	@ 31.1 ms	@ 34.7 ms
8 VEHICLE CENTER OF GRAVITY	PRE 333 mm POST 333 mm	0 mm 0 mm	516 mm 456 mm		
LONGITUDINAL			12.1 g	@ 124.3 ms	@ 69.8 ms
9 VEHICLE REAR CENTER	PRE 1135 mm POST 1173 mm	0 mm 0 mm	207 mm 165 mm		
LATERAL			17.8 g	@ 145.8 ms	@ 97.6 ms
VERTICAL			19.5 g	@ 63.4 ms	@ 199.1 ms

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

¹See DATA ACQUISITION EXPLANATIONS

Section 3.0

Summary of FMVSS 208 Data

Table 7 Target Vehicle Dummy Injury Criteria

<u>Maximum Acceleration</u>							
	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	-80.7 g	-112.1 g	-49.8 g	143.0 g	-37.5 g	-21.7 g	11.7 g
Passenger	-50.6 g	22.5 g	-34.9 g	63.7 g	-71.2 g	-28.6 g	-11.5 g

<u>Maximum Femur Compressive Force</u>		
	Left Femur	Right Femur
Driver	3546 N	9477 N
Passenger	2438 N	2558 N

<u>Head Injury Criteria¹</u>			
	HIC	Time t ₁	Time t ₂
Driver	344	103.7 ms	114.6 ms
Passenger	340	61.3 ms	97.3 ms

<u>Chest Maximum Resultant Acceleration²</u>			
	Acceleration	Time t ₁	Time t ₂
Driver	40.7 g	78.2 ms	81.2 ms
Passenger	56.0 g	69.7 ms	72.7 ms

<u>Maximum Chest Deflection</u>	
Driver	32 mm
Passenger	38 mm

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

Table 8 Bullet Vehicle Dummy Injury Criteria

	<u>Maximum Acceleration</u>						
	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	-54.1 g	17.2 g	12.9 g	54.8 g	44.5 g	-6.0 g	-6.6 g
Passenger	-143.9 g	-51.6 g	97.5 g	158.8 g	-51.3 g	8.4 g	29.2 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	4061 N	4889 N
Passenger	2530 N	2671 N

Head Injury Criteria¹

	HIC	Time t ₁	Time t ₂
Driver	424	66.6 ms	96.2 ms
Passenger	580	35.4 ms	52.4 ms

Chest Maximum Resultant Acceleration²

	Acceleration	Time t ₁	Time t ₂
Driver	44.1 g	85.7 ms	88.7 ms
Passenger	48.2 g	65.9 ms	69.0 ms

Maximum Chest Deflection

Driver	30 mm
Passenger	30 mm

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

Table 9 Target Vehicle Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver</u>	<u>Passenger</u>
Head	Airbag/A-pillar/headrest	Airbag/headrest
Chest	Airbag	Airbag
Abdomen	None	None
Left knee	Instrument panel	Instrument panel
Right knee	Instrument panel	Instrument panel

Door opening:

	<u>Left</u>	<u>Right</u>
Front	Difficult, need tools	Easy
Rear	Difficult, need tools	Easy

Seat movement:

	<u>Seat back failure</u>	<u>Seat shift</u>
Front	None	None
Rear	None	None

Glazing damage: The entire windshield was destroyed.

Other notable impact effects: The driver dummy's legs had to be removed to get the dummy out of the vehicle.

Table 10 Bullet Vehicle Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver</u>	<u>Passenger</u>
Head	Airbag/head rest	Airbag/head rest
Chest	Airbag	Airbag
Abdomen	None	None
Left knee	Instrument panel	Instrument panel
Right knee	Instrument panel	Instrument panel

Door opening:

	<u>Left</u>	<u>Right</u>
Front	Needed tools	Easy
Rear	Needed tools	Easy

Seat movement:

	<u>Seat back failure</u>	<u>Seat shift</u>
Front	None	None
Rear	NA	NA

Glazing damage: There was damage to the lower passenger side portion of the windshield.

Other notable impact effects: None

Target Vehicle 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. The dummy's head impacted the A-pillar. The dummy's head and upper torso rotated rearward as the dummy rebounded into the seat back. The dummy's head contacted the head restraint. The driver dummy came to rest seated in the driver's seat.

Right Front Passenger Dummy

Upon impact, the passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest impacted the airbag. The dummy's head and chest were restrained by the airbag. The dummy's head and upper torso rotated rearward as the dummy rebounded into the seat back. The dummy's head contacted the head restraint. The passenger dummy came to rest seated in the passenger's seat.

Bullet Vehicle 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. The dummy's head and chest were restrained by the airbag. The dummy's head and upper torso rotated rearward as the dummy rebounded into the seat back. The dummy's head contacted the head restraint. The driver dummy came to rest seated in the driver's seat.

Right Front Passenger Dummy

Upon impact, the passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest impacted the airbag. The dummy's head and chest were restrained by the airbag. The dummy's head and upper torso rotated rearward as the dummy rebounded into the seat back. The dummy's head contacted the head restraint. The passenger dummy came to rest seated in the passenger's seat.

Figure 4 Target Vehicle Dummy Measurement Locations for Front Seat Occupants

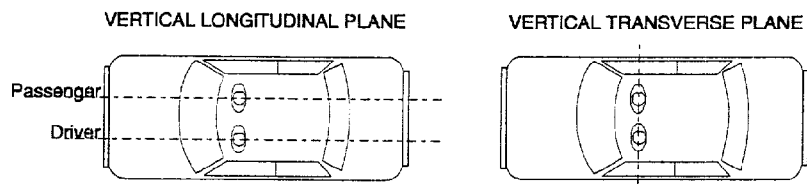
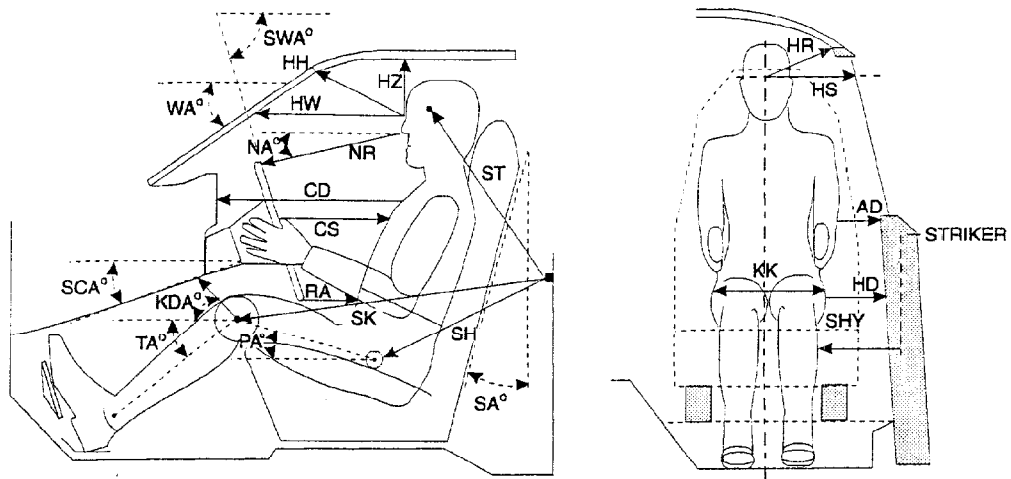


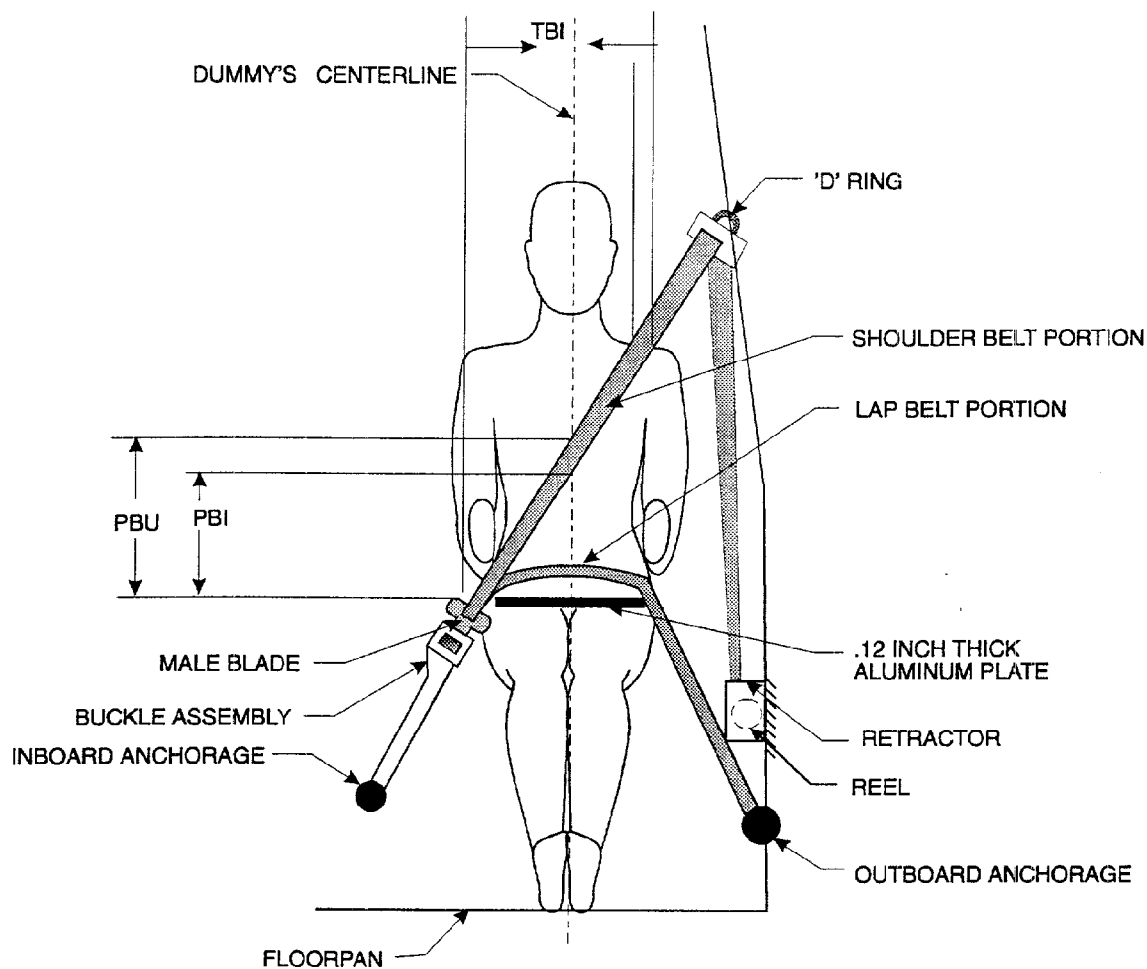
Table 11 Target Vehicle Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #168)	Passenger (Serial #289)
WA	Windshield angle	27°	27°
SWA	Steering wheel angle	64°	NA
SCA	Steering column angle	26°	NA
SA	Seat back angle	16°	10°
HZ	Head to roof	178 mm	231 mm
HH	Head to header	292 mm	256 mm
HW	Head to windshield	551 mm	597 mm
HR	Head to side header	183 mm	251 mm
NR	Nose to rim	423 mm	NA
NA	Nose to rim angle	15°	NA
CD	Chest to dash	574 mm	449 mm
CS	Steering wheel to chest	320 mm	NA
RA	Rim to abdomen	202 mm	NA
KDL	Left knee to dash	221 mm	148 mm
KDR	Right knee to dash	222 mm	139 mm
KDA	Outboard knee to dash angle	27°	22°
PA	Pelvic angle	23°	22°
TA	Tibial angle	39°	60°
KK	Knee to knee	310 mm	219 mm
ST ¹	Striker to head	490 mm	454 mm
	Striker to head angle	-81°	-69°
SK	Striker to knee	564 mm	597 mm
	Striker to knee angle	7°	1°
SH	Striker to H-point	212 mm	325 mm
	Striker to H-point angle	46°	25°
SHY	Striker to H-point (Y dir.)	248 mm	262 mm
HS	Head to side window	280 mm	333 mm
HD	H-point to door	134 mm	152 mm
AD	Arm to door	70 mm	60 mm

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

¹ A negative angle indicates the measurement point was above the striker.

Figure 5 Target Vehicle Seat Belt Positioning Data



	Driver Dummy	Passenger Dummy
PBU - Top surface of aluminum plate to belt upper edge	N/A	N/A
PBI - Top surface of aluminum plate to belt lower edge	N/A	N/A
TBI - Dummy centerline to intersection of upper torso belt and lap belt	N/A	N/A

Figure 6 Bullet Vehicle Dummy Measurement Locations for Front Seat Occupants

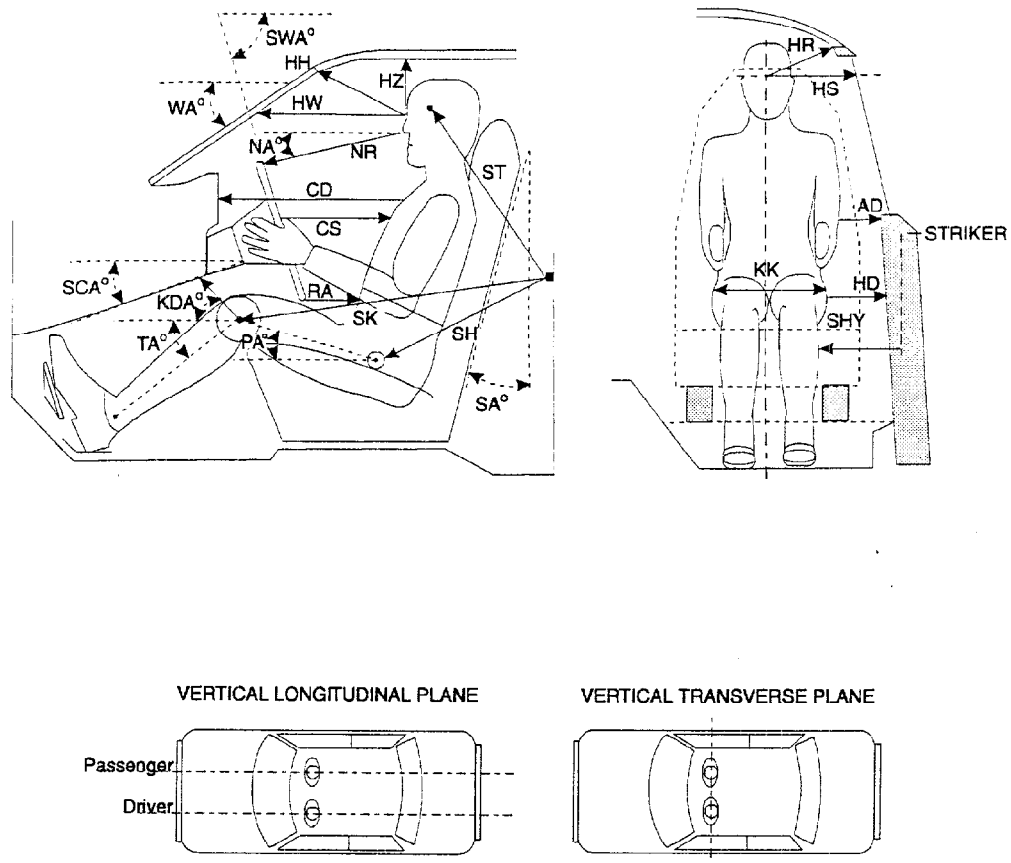


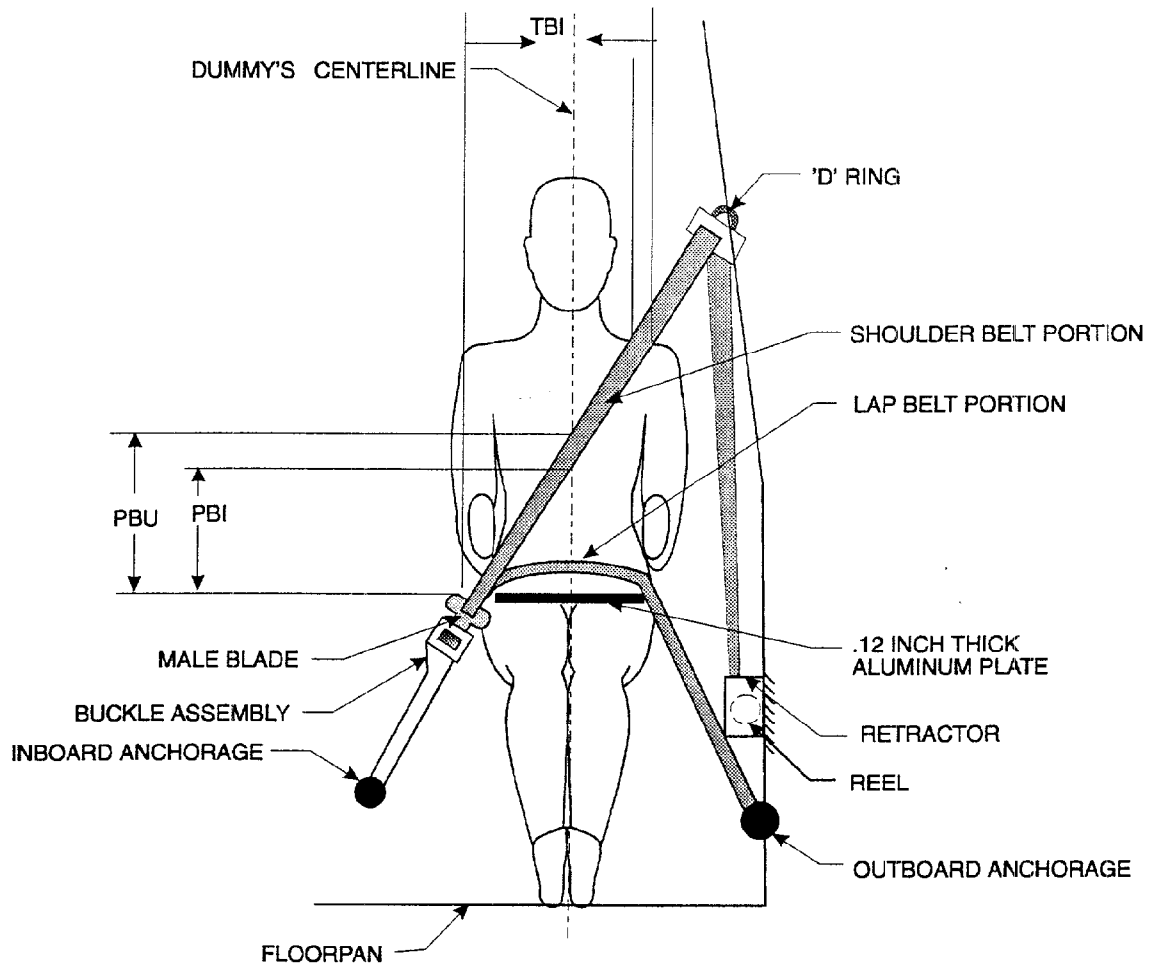
Table 12 Bullet Vehicle Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #045)	Passenger (Serial #283)
WA	Windshield angle	27°	27°
SWA	Steering wheel angle	64°	NA
SCA	Steering column angle	26°	NA
SA	Seat back angle	8°	3°
HZ	Head to roof	248 mm	287 mm
HH	Head to header	341 mm	308 mm
HW	Head to windshield	667 mm	614 mm
HR	Head to side header	254 mm	270 mm
NR	Nose to rim	409 mm	NA
NA	Nose to rim angle	12°	NA
CD	Chest to dash	587 mm	420 mm
CS	Steering wheel to chest	301 mm	NA
RA	Rim to abdomen	197 mm	NA
KDL	Left knee to dash	221 mm	100 mm
KDR	Right knee to dash	220 mm	101 mm
KDA	Outboard knee to dash angle	25°	22°
PA	Pelvic angle	23°	22°
TA	Tibial angle	52°	13°
KK	Knee to knee	289 mm	233 mm
ST ¹	Striker to head	628 mm	619 mm
	Striker to head angle	-80°	-66°
SK ¹	Striker to knee	605 mm	733 mm
	Striker to knee angle	-5°	-8°
SH ¹	Striker to H-point	220 mm	392 mm
	Striker to H-point angle	11°	-3°
SHY	Striker to H-point (Y dir.)	234 mm	260 mm
HS	Head to side window	360 mm	312 mm
HD	H-point to door	157 mm	160 mm
AD	Arm to door	108 mm	70 mm

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

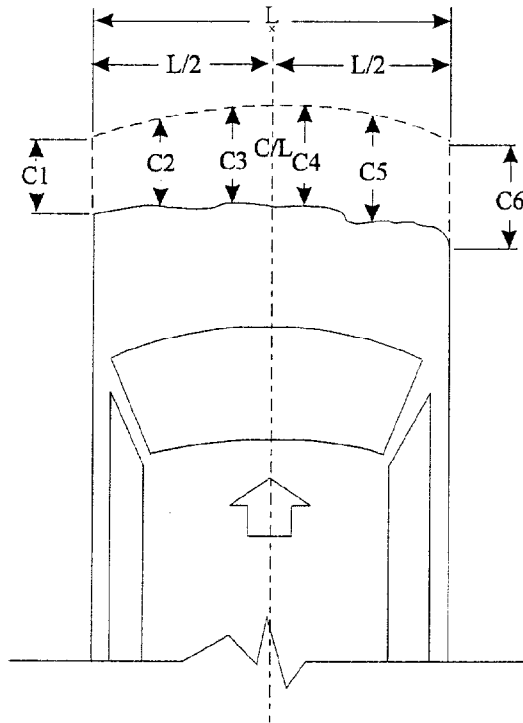
¹ A negative angle indicates the measurement point was above the striker.

Figure 7 Bullet Vehicle Seat Belt Positioning Data



		Driver Dummy	Passenger Dummy
PBU	- Top surface of aluminum plate to belt upper edge	365 mm	225 mm
PBI	- Top surface of aluminum plate to belt lower edge	295 mm	150 mm
TBI	- Dummy centerline to intersection of upper torso belt and lap belt	300 mm	245 mm

Figure 8 Target Vehicle Crush



NOTES: L is pre-test length of contact surface.
 $C1$ through $C6$ are spaced equally apart.
 CL is vehicle centerline.

Vehicle: 1997 Honda Accord

	Pre-test	Post-test	Crush
L	1524 mm		
$C1$	4562 mm	3703 mm	859 mm
$C2$	4682 mm	3980 mm	702 mm
$C3$	4745 mm	4247 mm	498 mm
$C4$	4742 mm	4455 mm	287 mm
$C5$	4673 mm	4616 mm	57 mm
$C6$	4557 mm	4725 mm	-168 mm
CL	4742 mm	4350 mm	392 mm

Figure 9 Target Vehicle Pre-test and Post-test Measurement Points

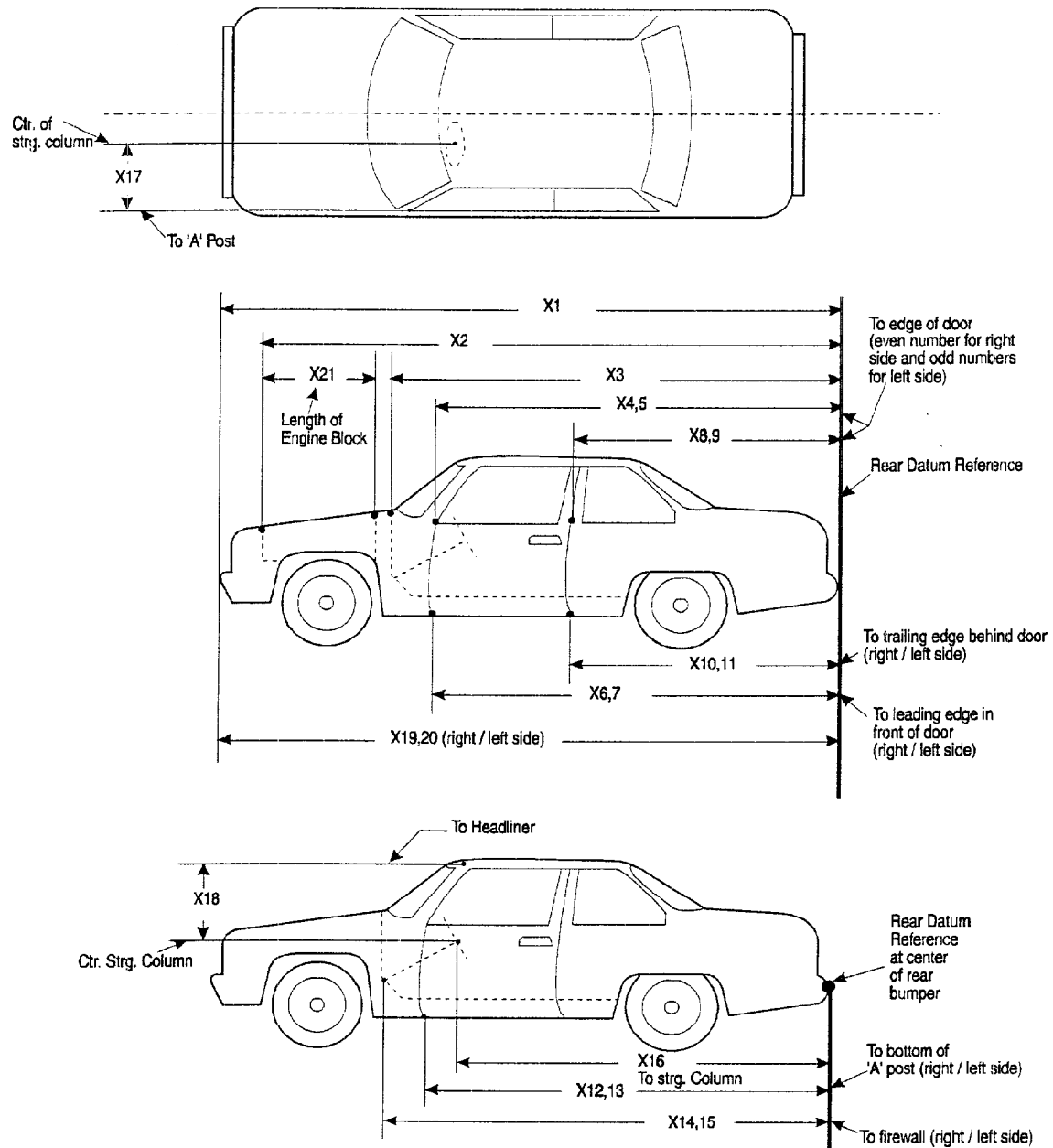


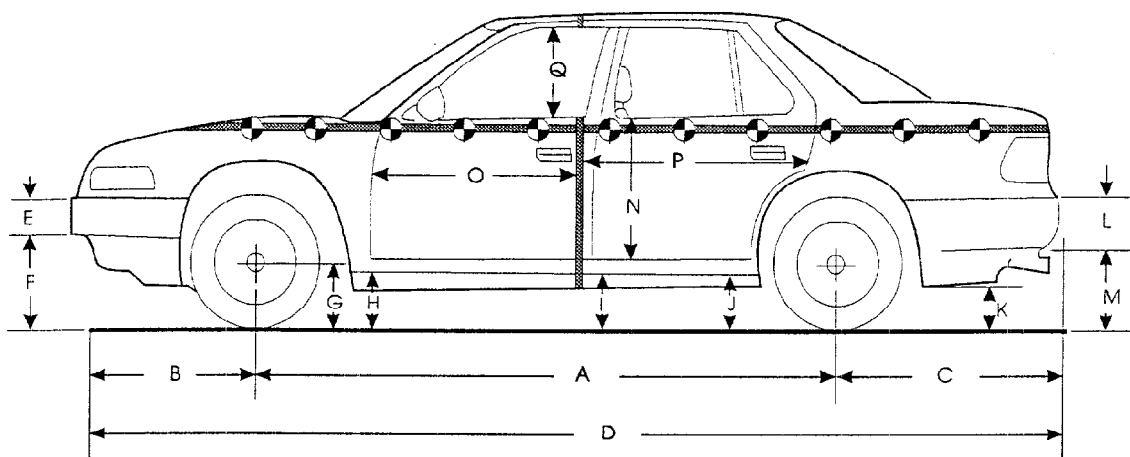
Table 13 Target Vehicle Measurements

Vehicle Make/Model: Honda Accord

Test Number: 980709

No.	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Veh. at Centerline	4742	4350	392
X2	Rear Surface of Veh. to Front of Engine Block	4052	3780	272
X3	Rear Surface of Veh. to Firewall	3612	3337	275
X4	Rear Surface of Veh. to Upper Leading Edge of Right Door	3255	3243	12
X5	Rear Surface of Veh. to Upper Leading Edge of Left Door	3252	N/A	N/A
X6	Rear Surface of Veh. to Lower Leading Edge of Right Door	3286	3232	54
X7	Rear Surface of Veh. to Lower Leading Edge of Left Door	3275	N/A	N/A
X8	Rear Surface of Veh. to Upper Trailing Edge of Right Door	2218	2205	13
X9	Rear Surface of Veh. to Upper Trailing Edge of Left Door	2211	N/A	N/A
X10	Rear Surface of Veh. to Lower Trailing Edge of Right Door	2234	2184	50
X11	Rear Surface of Veh. to Lower Trailing Edge of Left Door	2226	N/A	N/A
X12	Rear Surface of Veh. to Bottom of " A " Post on Right Side	3270	3235	35
X13	Rear Surface of Veh. to Bottom of " A " Post on Left Side	3213	2890	323
X14	Rear Surface of Veh. to Firewall--Right Side	3557	3436	121
X15	Rear Surface of Veh. to Firewall--Left Side	3569	3197	372
X16	Rear Surface of Veh. to Steering Wheel Center	2800	2541	259
X17	Center of Steering Column to " A " Post	315	385	-70
X18	Center of Steering Column to Headliner	475	305	170
X19	Rear Surface of Veh. to Right Side of Front Bumper	4557	4725	-168
X20	Rear Surface of Veh. to Left Side of Front Bumper	4562	3703	859
X21	Length of Engine Block	430	430	0

Figure 10 Target Vehicle Side Measurements



LEFT SIDE VIEW

Note: All dimensions are in millimeters with tolerance of ± 3 mm

	Pre-Test (as delivered)	Pre-Test (as tested)	Post-Test (as tested)	Change
A	2710	2710	2130	580
B	935	935	1167	-232
C	1010	1010	755	255
D	4742	4742	4350	392
E	165	165	205	-40
F	212	319	282	37
G	277	282	280	2
H	189	172	97	75
I	195	168	52	116
J1	180	159	111	48
J2	192	175	120	55
K	297	356	369	-13
L	163	163	163	0
M	297	466	489	-23
N	693	693	680	13
O	N/A	N/A	N/A	N/A
P	N/A	N/A	N/A	N/A
Q	417	417	380	37
R	4557	4557	4725	-168
S	4562	4562	3703	859
T	1090	1090	1320	-230

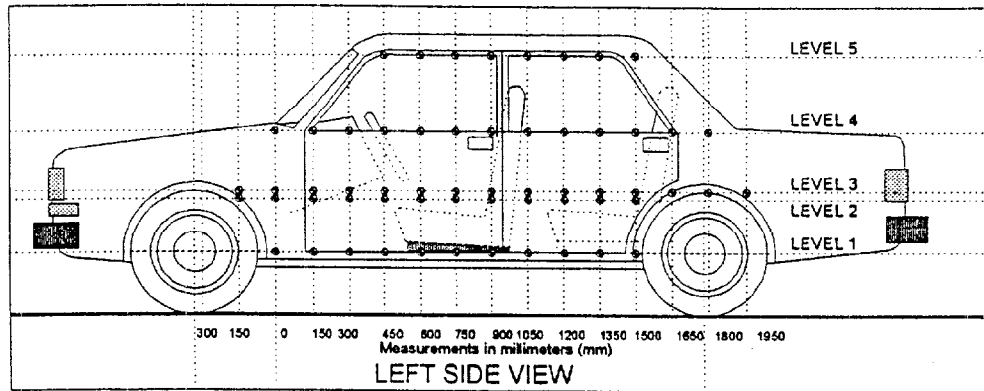
D = Length at centerline
T = Width at B-pillar

E&L = Bumper Thickness
J1 = To Pinch Weld

R = Right Side Length
J2 = To Sill

S = Left Side Length

Figure 10 Target Vehicle Side Measurements, Cont'd.



LEVEL 5 - WINDOW TOP
 LEVEL 4 - WINDOW SILL
 LEVEL 3 - MID-DOOR
 LEVEL 2 - OCCUPANT H-POINT
 LEVEL 1 - AXLE CENTERLINE HEIGHT OR SILL TOP HEIGHT

MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE "AS TESTED" CONFIGURATION

Measurements along the vertical 750 mm line shown above:

Level 5 @ Window Top	=	<u>1346</u>	millimeters
Level 4 @ Window Sill	=	<u>870</u>	millimeters
Level 3 @ Mid Door	=	<u>605</u>	millimeters
Level 2 @ Occupant H-Point	=	<u>458</u>	millimeters
Level 1 @ Axle Centerline Height	=	<u>247</u>	millimeters
			(or Sill Top Height)

Figure 11 Target Vehicle Exterior Crush Profile Measurement Points

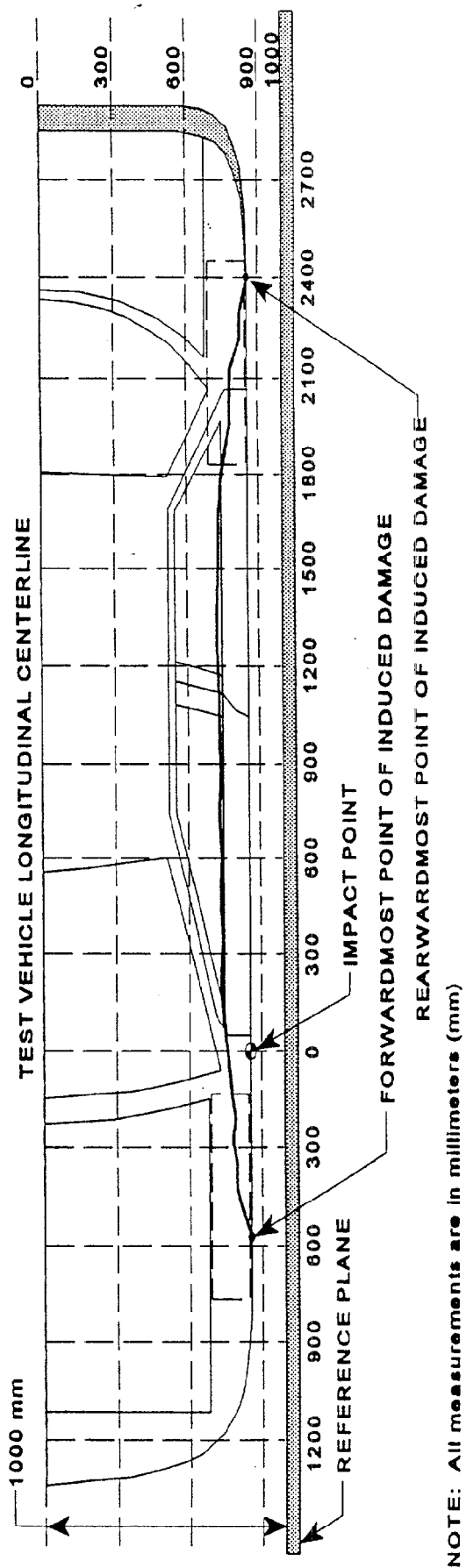
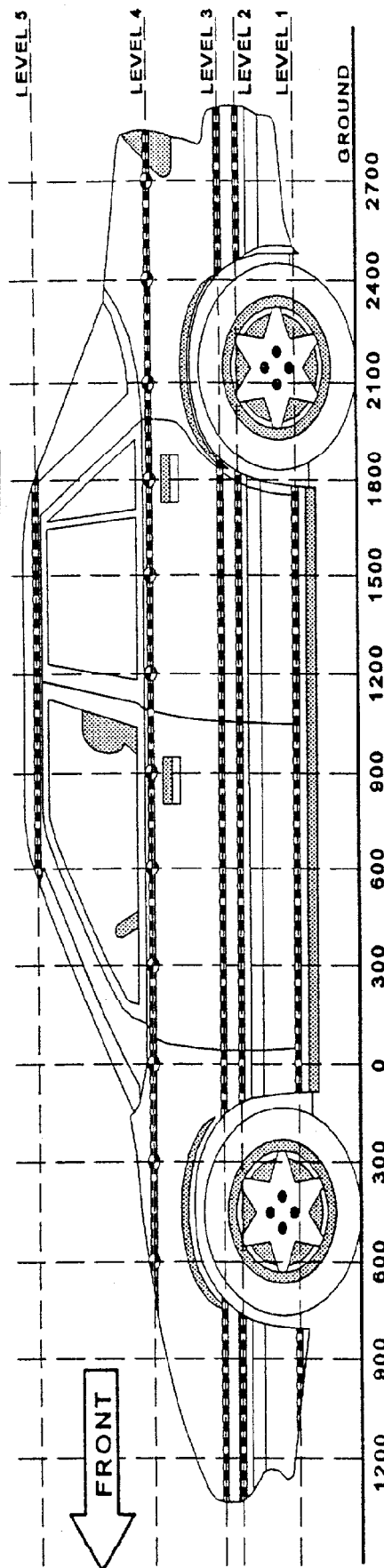


Table 14 Target Vehicle Exterior Crush Profiles - All Levels

Location	Height	(mm) From Impact Point														
		-1050	-900	-750	-600	-450	-300	-150	0	150	300	450	600	750		
Level 1 Side Sill	Pre	434	405	N/A	N/A	N/A	N/A	N/A	377	386	391	390	389	390		
	Post	675	660	N/A	N/A	N/A	N/A	N/A	711	632	540	490	500	510		
	Crush	241	255	N/A	N/A	N/A	N/A	N/A	334	246	149	100	111	120		
Level 2 H-Point	Pre	395	373	N/A	N/A	N/A	N/A	N/A	346	341	343	345	342	346		
	Post	750	752	N/A	N/A	N/A	N/A	N/A	760	N/A	N/A	N/A	N/A	N/A		
	Crush	355	379	N/A	N/A	N/A	N/A	N/A	414	N/A	N/A	N/A	N/A	N/A		
Level 3 Mid-Door	Pre	458	410	370	N/A	N/A	N/A	341	345	342	345	350	347	350		
	Post	N/A	825	830	N/A	N/A	N/A	757	720	N/A	N/A	N/A	N/A	N/A		
	Crush	N/A	415	460	N/A	N/A	N/A	416	375	N/A	N/A	N/A	N/A	N/A		
Level 4 Window Sill	Pre	512	495	467	460	441	426	417	413	409	409	412	408	410		
	Post	797	806	822	760	789	777	689	640	N/A	N/A	N/A	N/A	N/A		
	Crush	285	311	355	300	348	351	272	227	N/A	N/A	N/A	N/A	N/A		
Level 5 Window Top	Pre	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	709		
	Post	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	Crush	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

*Column readings are front to rear from left to right.

**Reference plane is parallel to and 1200 mm from the vehicle's longitudinal centerline.

All measurements are in millimeters.

Table 14 Target Vehicle Exterior Crush Profiles - All Levels, Cont'd.

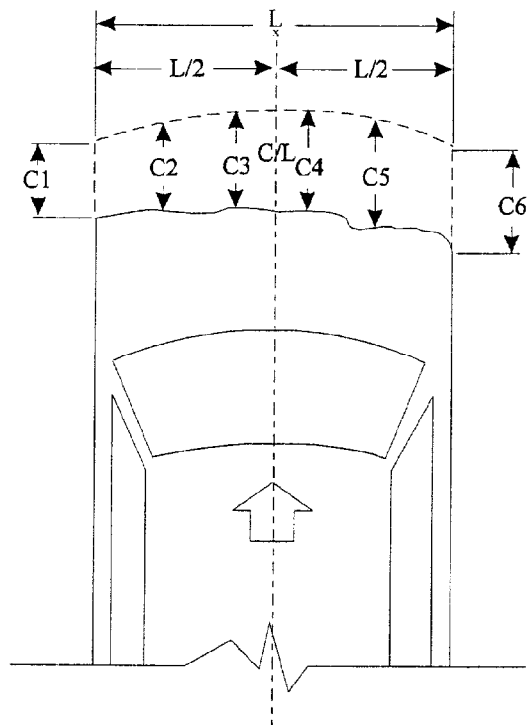
Location	Height	(mm) From Impact Point															
		900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700			
Level 1 Side Sill	Pre	392	392	369	394	393	393	395	N/A	N/A	N/A	N/A	N/A	N/A			
	Post	515	525	530	543	544	546	555	N/A	N/A	N/A	N/A	N/A	N/A			
	Crush	123	133	161	149	151	153	160	N/A	N/A	N/A	N/A	N/A	N/A			
Level 2 H-Point	Pre	343	343	347	349	347	352	353	358	N/A	N/A	N/A	N/A	N/A			
	Post	N/A	N/A	468	460	455	450	450	473	N/A	N/A	N/A	N/A	N/A			
	Crush	N/A	N/A	121	111	108	98	97	115	N/A	N/A	N/A	N/A	N/A			
Level 3 Mid-Door	Pre	344	343	345	347	340	346	348	350	N/A	N/A	N/A	364	375			
	Post	N/A	N/A	465	475	460	435	435	430	N/A	N/A	N/A	N/A	N/A			
	Crush	N/A	N/A	120	128	120	89	87	80	N/A	N/A	N/A	N/A	N/A			
Level 4 Window Sill	Pre	403	403	406	405	392	395	398	395	394	401	407	415	429			
	Post	N/A	N/A	525	505	497	480	475	455	441	445	442	443	451			
	Crush	N/A	N/A	119	100	105	85	77	60	47	44	35	28	22			
Level 5 Window Top	Pre	695	682	691	682	680	682	690	710	N/A	N/A	N/A	N/A	N/A			
	Post	900	810	809	777	765	757	766	761	N/A	N/A	N/A	N/A	N/A			
	Crush	205	128	118	95	85	75	76	51	N/A	N/A	N/A	N/A	N/A			

*Column readings are front to rear from left to right.

**Reference plane is parallel to and 1200 mm from the vehicle's longitudinal centerline.

All measurements are in millimeters.

Figure 12 Bullet Vehicle Crush



Notes: L is pre-test length of contact surface.
C1 through C6 are spaced equally apart.
CL is vehicle centerline.

Vehicle: 1997 Dodge Caravan

	Pre-test	Post-test	Crush
L	1524 mm		
C1	4931 mm	4555 mm	376 mm
C2	5054 mm	4320 mm	734 mm
C3	5100 mm	4545 mm	555 mm
C4	5100 mm	4788 mm	312 mm
C5	5060 mm	4910 mm	150 mm
C6	4943 mm	4992 mm	-49 mm
CL	5130 mm	4676 mm	454 mm

Figure 13 Bullet Vehicle Pre-test and Post-test Measurement Points

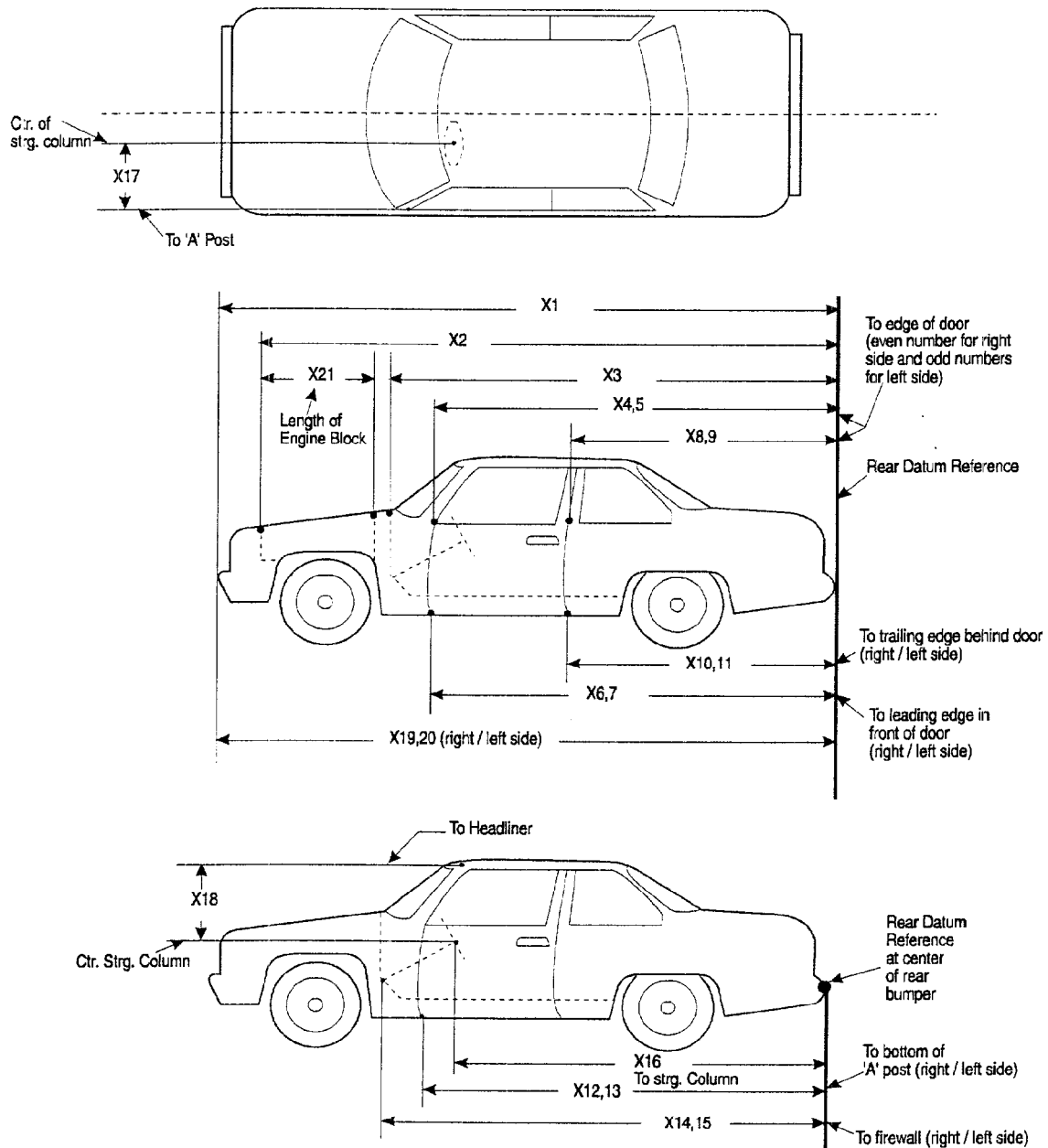


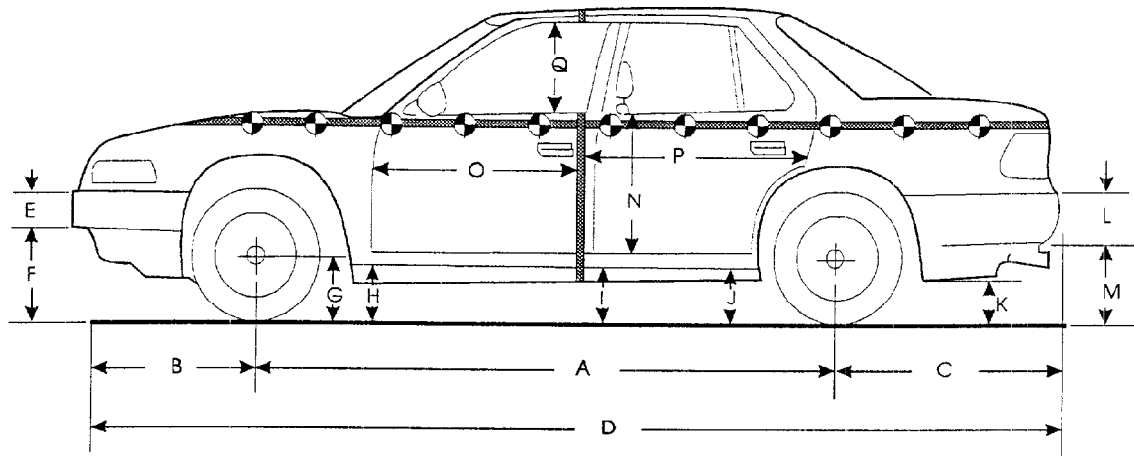
Table 15 Bullet Vehicle Measurements

Vehicle Make/Model: Dodge Caravan

Test Number: 980709

No.	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Veh. at Centerline	5130	4676	454
X2	Rear Surface of Veh. to Front of Engine Block	4580	4483	97
X3	Rear Surface of Veh. to Firewall	4395	4392	3
X4	Rear Surface of Veh. to Upper Leading Edge of Right Door	3708	3713	-5
X5	Rear Surface of Veh. to Upper Leading Edge of Left Door	3705	3681	24
X6	Rear Surface of Veh. to Lower Leading Edge of Right Door	3687	3684	3
X7	Rear Surface of Veh. to Lower Leading Edge of Left Door	3674	3637	37
X8	Rear Surface of Veh. to Upper Trailing Edge of Right Door	2724	2729	-5
X9	Rear Surface of Veh. to Upper Trailing Edge of Left Door	2722	2703	19
X10	Rear Surface of Veh. to Lower Trailing Edge of Right Door	2742	2736	6
X11	Rear Surface of Veh. to Lower Trailing Edge of Left Door	2724	2687	37
X12	Rear Surface of Veh. to Bottom of " A " Post on Right Side	3665	3680	-15
X13	Rear Surface of Veh. to Bottom of " A " Post on Left Side	3662	3648	14
X14	Rear Surface of Veh. to Firewall--Right Side	4243	4244	-1
X15	Rear Surface of Veh. to Firewall--Left Side	4213	4183	30
X16	Rear Surface of Veh. to Steering Wheel Center	3272	3264	8
X17	Center of Steering Column to " A " Post	305	339	-34
X18	Center of Steering Column to Headliner	472	460	12
X19	Rear Surface of Veh. to Right Side of Front Bumper	4943	4992	-49
X20	Rear Surface of Veh. to Left Side of Front Bumper	4931	4555	376
X21	Length of Engine Block	391	391	0

Figure 14 Bullet Vehicle Side Measurements



LEFT SIDE VIEW

Note: All dimensions are in millimeters with tolerance of ± 3 mm

	Pre-Test (as delivered)	Pre-Test (as tested)	Post-Test (as tested)	Change
A	3046	3046	2790	256
B	911	911	777	134
C	1109	1109	1109	0
D	5130	5130	4676	454
E	141	141	170	-29
F	427	372	200	172
G	301	310	238	72
H	216	254	160	94
I	220	243	238	5
J1	228	227	181	46
J2	239	251	231	20
K	283	353	303	50
L	152	152	152	0
M	360	410	357	53
N	800	800	800	0
O	N/A	N/A	N/A	N/A
P	N/A	N/A	N/A	N/A
Q	545	545	553	-8
R	4943	4943	4992	-49
S	4931	4931	4555	376
T	1248	1248	1255	-7

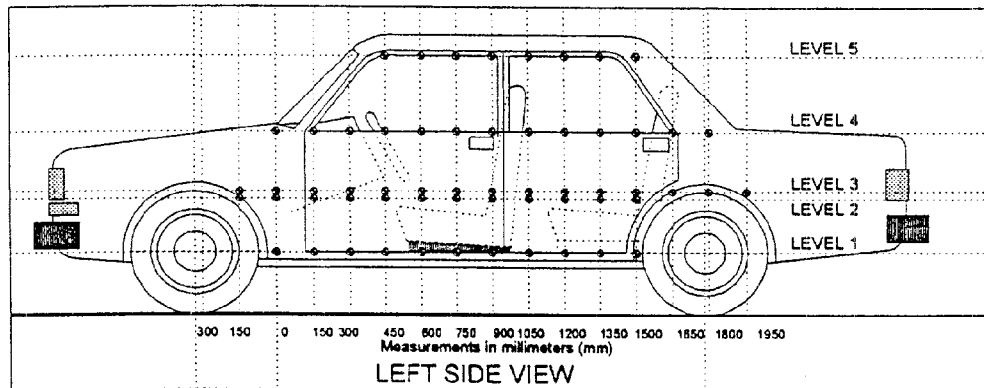
D = Length at centerline
T = Width at B-pillar

E&L = Bumper Thickness
J1 = To Pinch Weld

R = Right Side Length
J2 = To Sill

S = Left Side Length

Figure 14 Bullet Vehicle Side Measurements, Cont'd.



LEVEL 5 - WINDOW TOP

LEVEL 4 - WINDOW SILL

LEVEL 3 - MID-DOOR

LEVEL 2 - OCCUPANT H-POINT

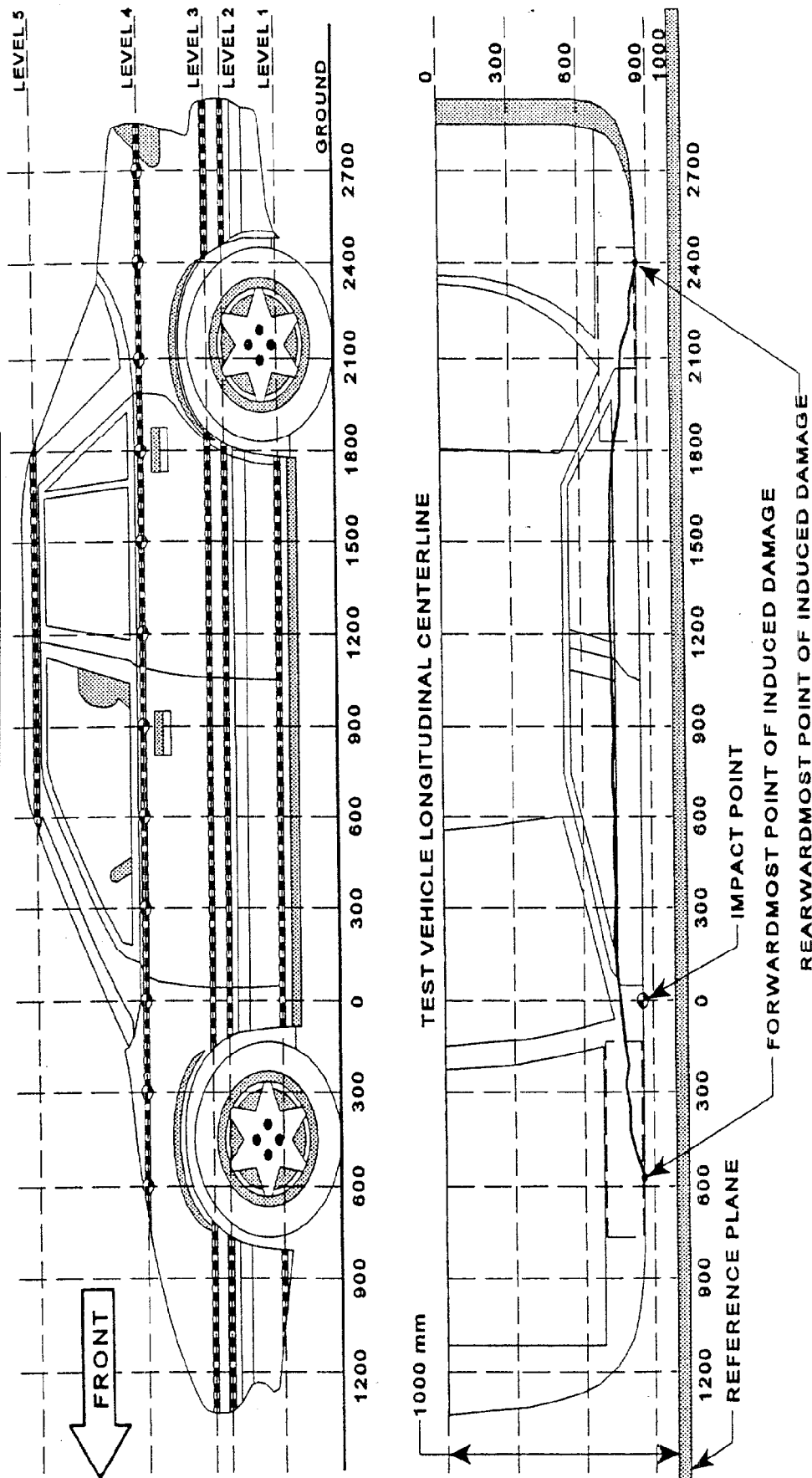
LEVEL 1 - AXLE CENTERLINE HEIGHT OR SILL TOP HEIGHT

MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE "AS TESTED" CONFIGURATION

Measurements along the vertical 750 mm line shown above:

Level 5 @ Window Top	=	<u>1667</u>	millimeters
Level 4 @ Window Sill	=	<u>992</u>	millimeters
Level 3 @ Mid Door	=	<u>747</u>	millimeters
Level 2 @ Occupant H-Point	=	<u>664</u>	millimeters
Level 1 @ Axle Centerline Height (or Sill Top Height)	=	<u>277</u>	millimeters

Figure 15 Bullet Vehicle Exterior Crush Profile Measurement Points



NOTE: All measurements are in millimeters (mm)

Table 16 Bullet Vehicle Exterior Crush Profiles - All Levels

		(mm) From Impact Point													
		-1050	-900	-750	-600	-450	-300	-150	0	150	300	450	600	750	
Level 1 Side Sill	Pre	380	N/A	N/A	N/A	N/A	N/A	345	370	365	360	359	357	355	
	Post	525	N/A	N/A	N/A	N/A	N/A	316	332	337	331	333	333	335	
	Crush	155	N/A	N/A	N/A	N/A	N/A	-29	-38	-28	-29	-26	-24	-20	
Level 2 H-Point	Pre	325	N/A	N/A	N/A	N/A	N/A	270	266	263	265	262	264	264	
	Post	420	N/A	N/A	N/A	N/A	N/A	255	351	254	252	250	248	246	
	Crush	95	N/A	N/A	N/A	N/A	N/A	-15	85	-9	-13	-12	-16	-18	
Level 3 Mid-Door	Pre	489	325	300	N/A	N/A	268	278	272	270	269	266	267	270	
	Post	N/A	415	377	N/A	N/A	280	266	355	254	253	250	249	250	
	Crush	N/A	90	77	N/A	N/A	12	-12	83	-16	-16	-16	-18	-20	
Level 4 Window Sill	Pre	N/A	424	390	360	342	329	324	314	305	302	291	292	289	
	Post	N/A	527	457	399	360	340	320	310	305	302	294	284	282	
	Crush	N/A	103	67	39	18	11	-4	-4	0	0	3	-8	-7	
Level 5 Window Top	Pre	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	570	554	554	
	Post	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	584	573	559	
	Crush	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14	19	5	

*Column readings are front to rear from left to right.

**Reference plane is parallel to and 1200 mm from the vehicle's longitudinal centerline.

All measurements are in millimeters.

Table 16 Bullet Vehicle Exterior Crush Profiles - All Levels, Cont'd.

Location	Height	(mm) From Impact Point													
		900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700	
Level 1 Side Sill	277	Pre	355	355	353	354	355	353	355	362	N/A	N/A	N/A	N/A	
		Post	333	337	344	345	351	351	353	358	N/A	N/A	N/A	N/A	
		Crush	-22	-18	-9	-9	-4	-2	-2	-4	N/A	N/A	N/A	N/A	
Level 2 H-Point	664	Pre	263	262	262	264	265	265	262	260	262	262	N/A	279	
		Post	249	252	251	253	256	255	260	260	261	263	N/A	277	
		Crush	-14	-10	-11	-11	-9	-10	-2	0	-1	1	N/A	-2	
Level 3 Mid-Door	747	Pre	265	268	267	270	271	271	270	272	274	N/A	N/A	394	
		Post	250	253	255	257	260	264	266	270	271	N/A	N/A	357	
		Crush	-15	-15	-12	-13	-11	-7	-4	-2	-3	N/A	N/A	-37	
Level 4 Window Sill	992	Pre	285	280	284	282	286	283	283	280	285	283	290	300	
		Post	280	279	278	280	280	284	283	288	286	289	292	301	
		Crush	-5	-1	-6	-2	-6	1	0	8	1	6	2	7	1
Level 5 Window Top	1667	Pre	555	540	545	546	555	544	547	555	556	556	568	585	
		Post	564	559	558	555	559	560	568	566	573	564	580	590	
		Crush	9	19	13	9	4	16	21	11	17	8	12	19	5

*Column readings are front to rear from left to right.

**Reference plane is parallel to and 1200 mm from the vehicle's longitudinal centerline.

All measurements are in millimeters.

Figure 16 Camera Positions

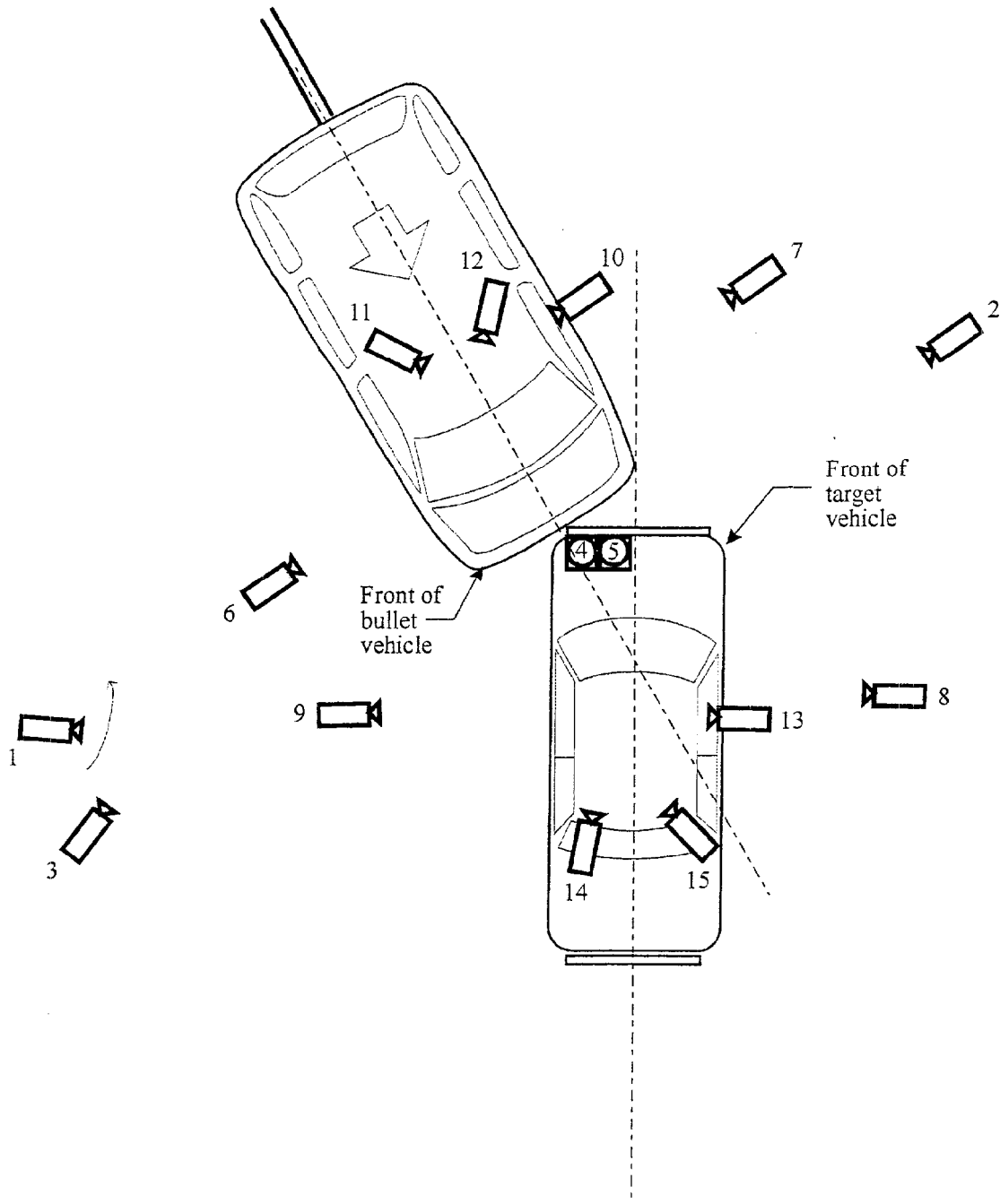


Table 17 Camera Information

Camera Number	Location	Type	Lens (mm)	Speed (fps)	Purpose of camera data
1	Panning	Bolex	16	24	Vehicle dynamics
2	Right wide	Photosonic	13	1008	Vehicle dynamics
3	Left wide	Photosonic	13	995	Vehicle dynamics
4	Overhead wide	Photosonic	8	1000	Vehicle crush
5	Overhead tight	Photosonic	25	995	Impact point
6	Bullet vehicle right medium tight	Stalex	25	1000	Dummy kinematics
7	Bullet vehicle left medium tight	Stalex	25	1033	Dummy kinematics
8	Target vehicle right medium tight	Stalex	25	1027	Dummy kinematics
9	Target vehicle left medium tight	Stalex	25	1015	Dummy kinematics
10	Onboard bullet vehicle (side)	Photosonic	8	N/A ¹	Dummy kinematics
11	Onboard bullet vehicle - driver	Photosonic	8	N/A ¹	Dummy kinematics
12	Onboard bullet vehicle - passenger	Photosonic	8	N/A ¹	Dummy kinematics
13	Onboard target vehicle (side)	Photosonic	8	1000	Dummy kinematics
14	Onboard target vehicle - driver	Photosonic	8	1005	Dummy kinematics
15	Onboard target vehicle - passenger	Photosonic	8	995	Dummy kinematics

¹ No exact speed due to an umbilical cable problem.

Description Of Timing Marks On TRC High-Speed Film

All TRC high-speed cameras are equipped with red LED's which put timing marks on the right edge of the film. TRC uses a single timing generator to generate the timing for all cameras. This allows the timing marks to be common to all cameras. The timing marks can be used to measure camera speed (frames per second) or to locate a point in time before or after the time-zero event.

The timing marks appear on the film as small red marks on the right edge of the film. Round marks are left by the Photo-Sonics and Stalex cameras while horizontal bars are left by the Hycam, Locam, and Fastax II cameras.

The timing generator puts out a pulse for every millisecond plus it generates additional pulses for hundredths and tenths of seconds. To explain this further, we can use an example of a camera running at 1000 frames per second.

1. Every frame will have **one** LED appear in it. This indicates a *millisecond* pulse.
2. Every ten frames will have **two** LED's appear in it. These indicate a *millisecond* pulse plus a *hundredth of a second* pulse.
3. Every one hundred frames will have **three** LED's appear in it. These indicate a *millisecond* pulse, a *hundredth of a second* pulse, and a *tenth of a second* pulse.



Figure A-1 Pre-Test Target Vehicle Front View



Figure A-2 Post-Test Target Vehicle Front View



Figure A-3 Pre-Test Target Vehicle Left Front Three-Quarter View

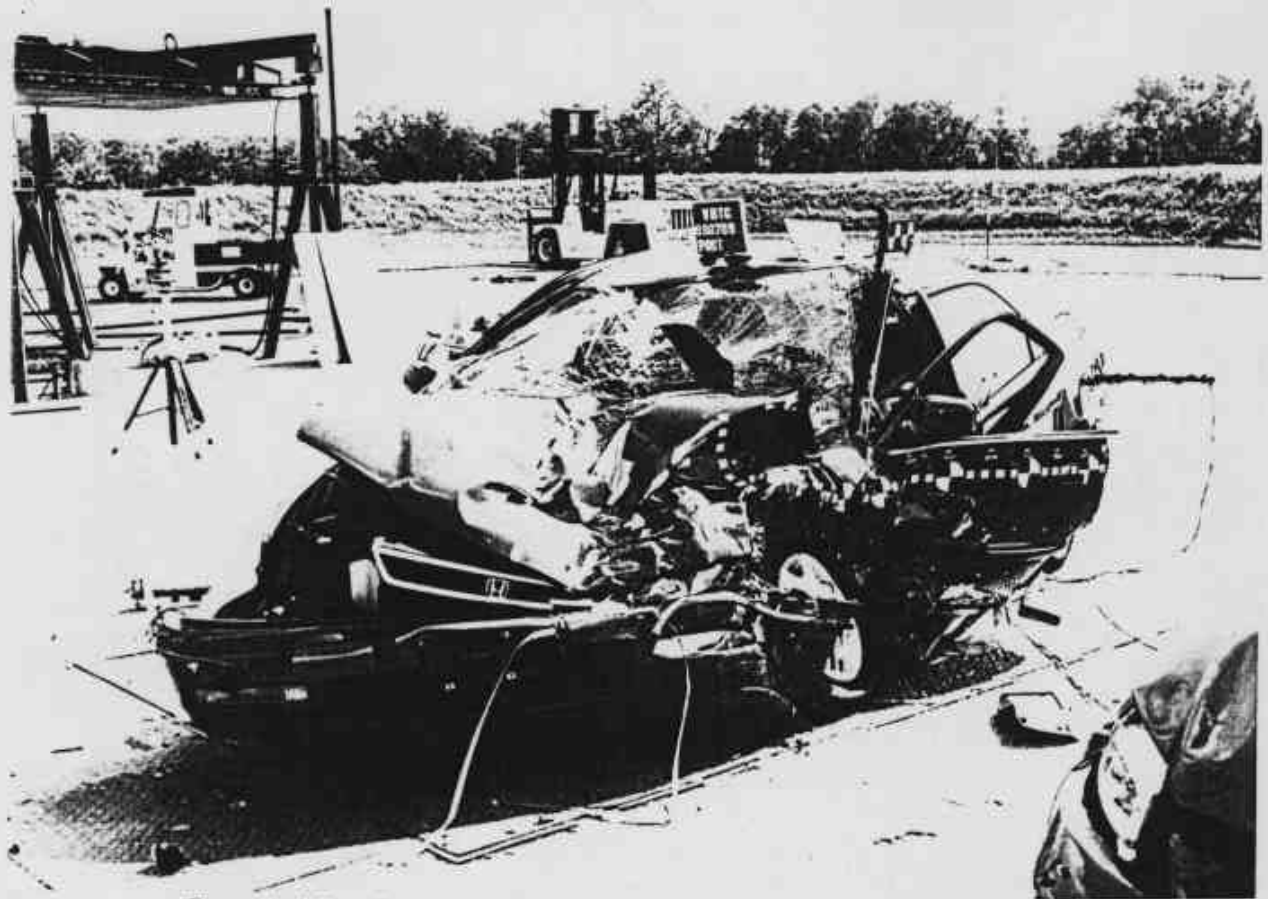


Figure A-4 Post-Test Target Vehicle Left Front Three-Quarter View

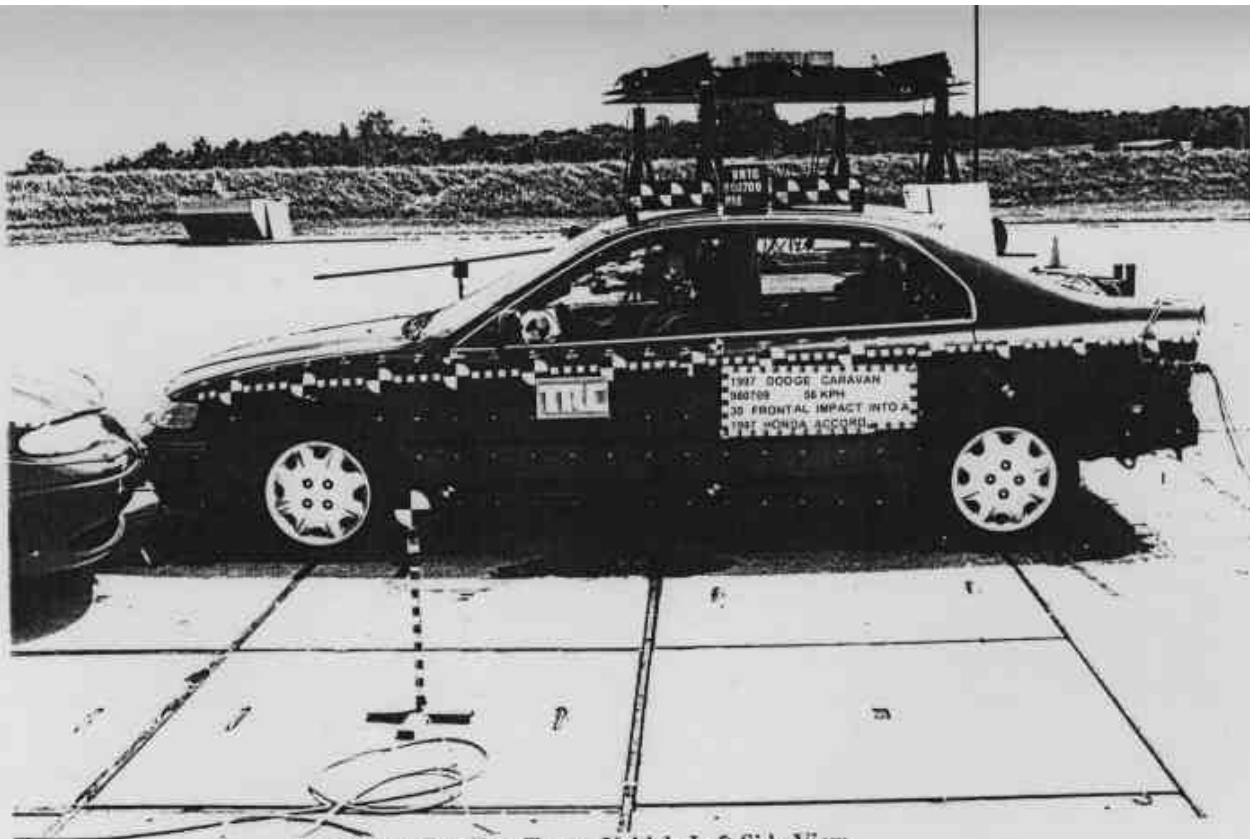


Figure A-5 Pre-Test Target Vehicle Left Side View



Figure A-6 Post-Test Target Vehicle Left Side View



Figure A-7 Pre-Test Target Vehicle Rear View



Figure A-8 Post-Test Target Vehicle Rear View



Figure A-9 Pre-Test Target Vehicle Right Side View



Figure A-10 Post-Test Target Vehicle Right Side View



Figure A-11 Pre-Test Target Vehicle Right Front Three-Quarter View



Figure A-12 Post-Test Target Vehicle Right Front Three-Quarter View



Figure A-13 Post-Test Target Vehicle Overhead View

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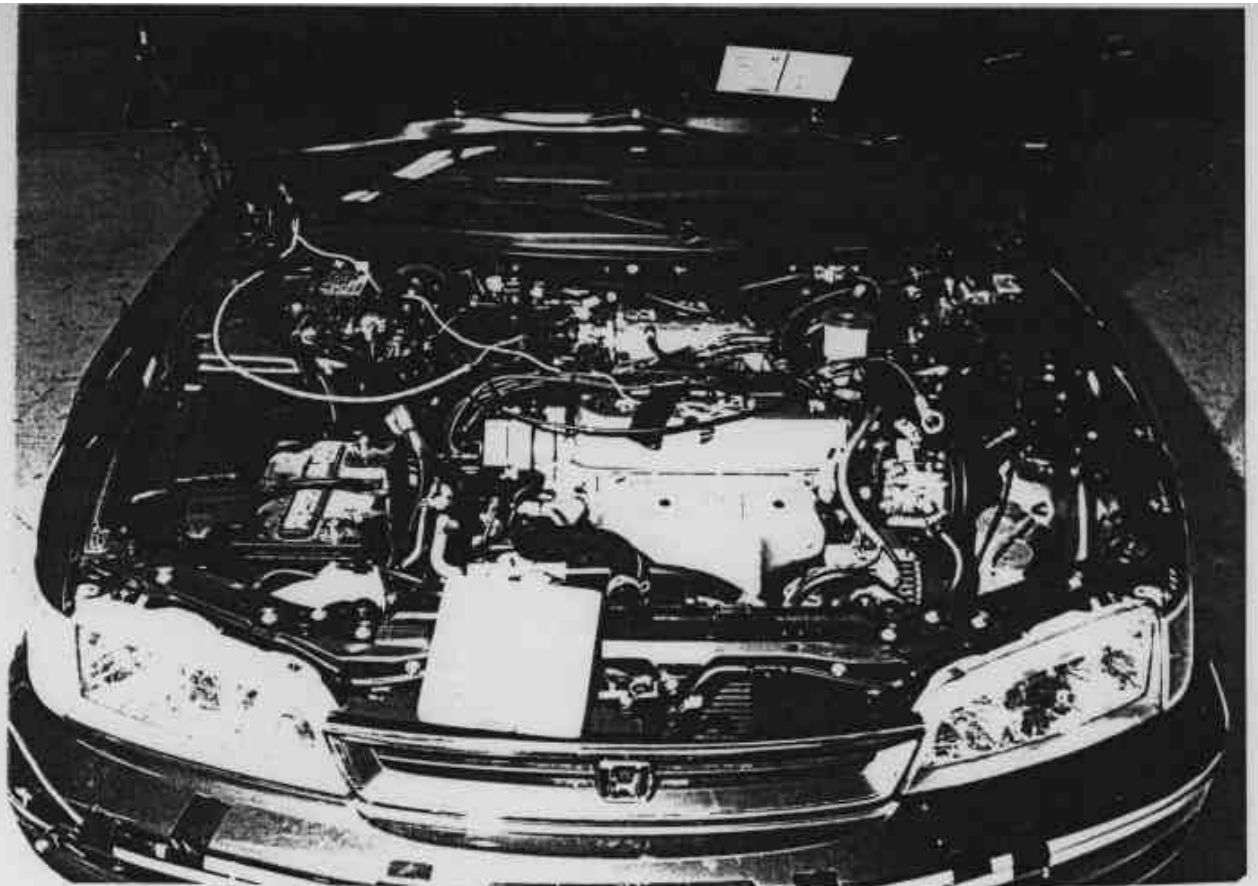


Figure A-14 Pre-Test Target Vehicle Engine Compartment View

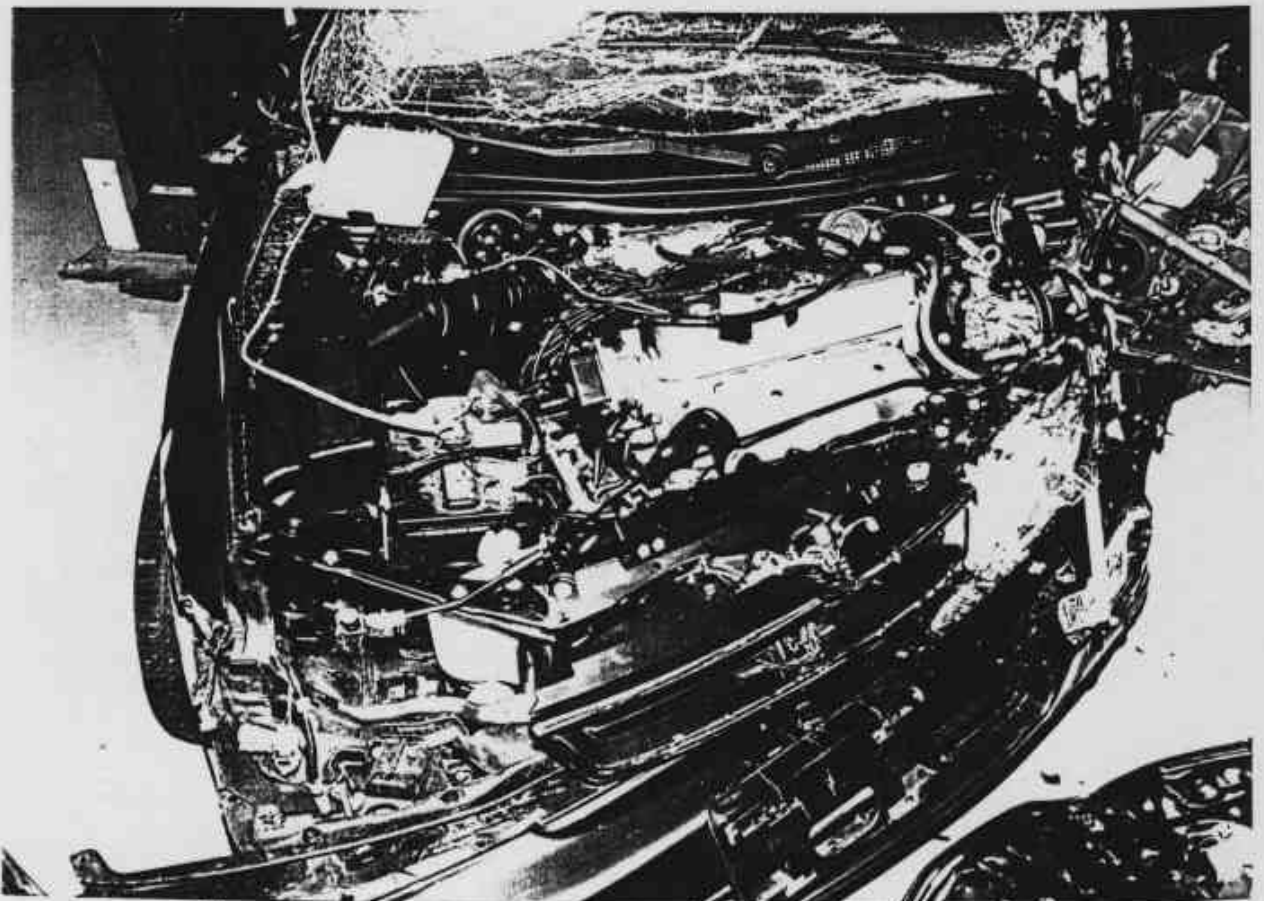


Figure A-15 Post-Test Target Vehicle Engine Compartment View

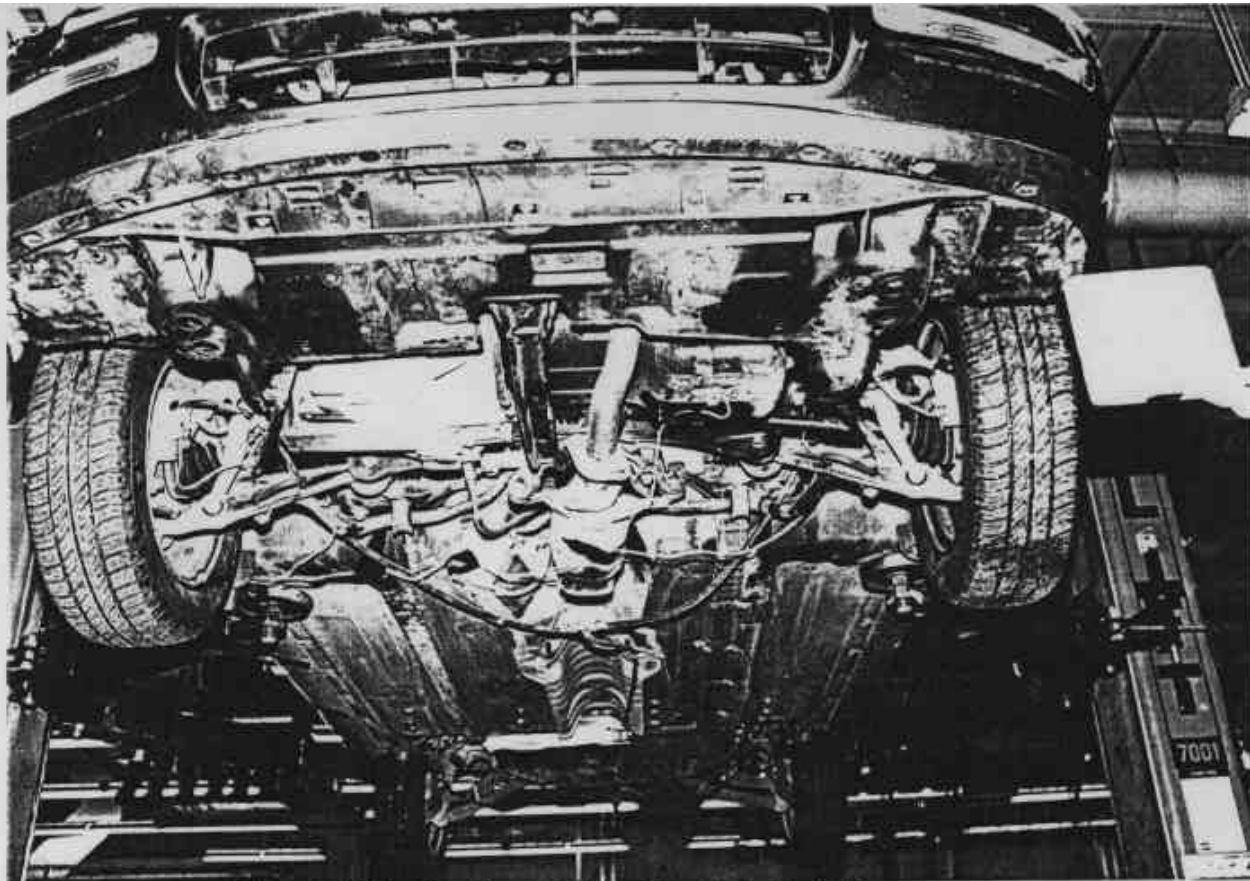


Figure A-16 Pre-Test Target Vehicle Front Underbody View

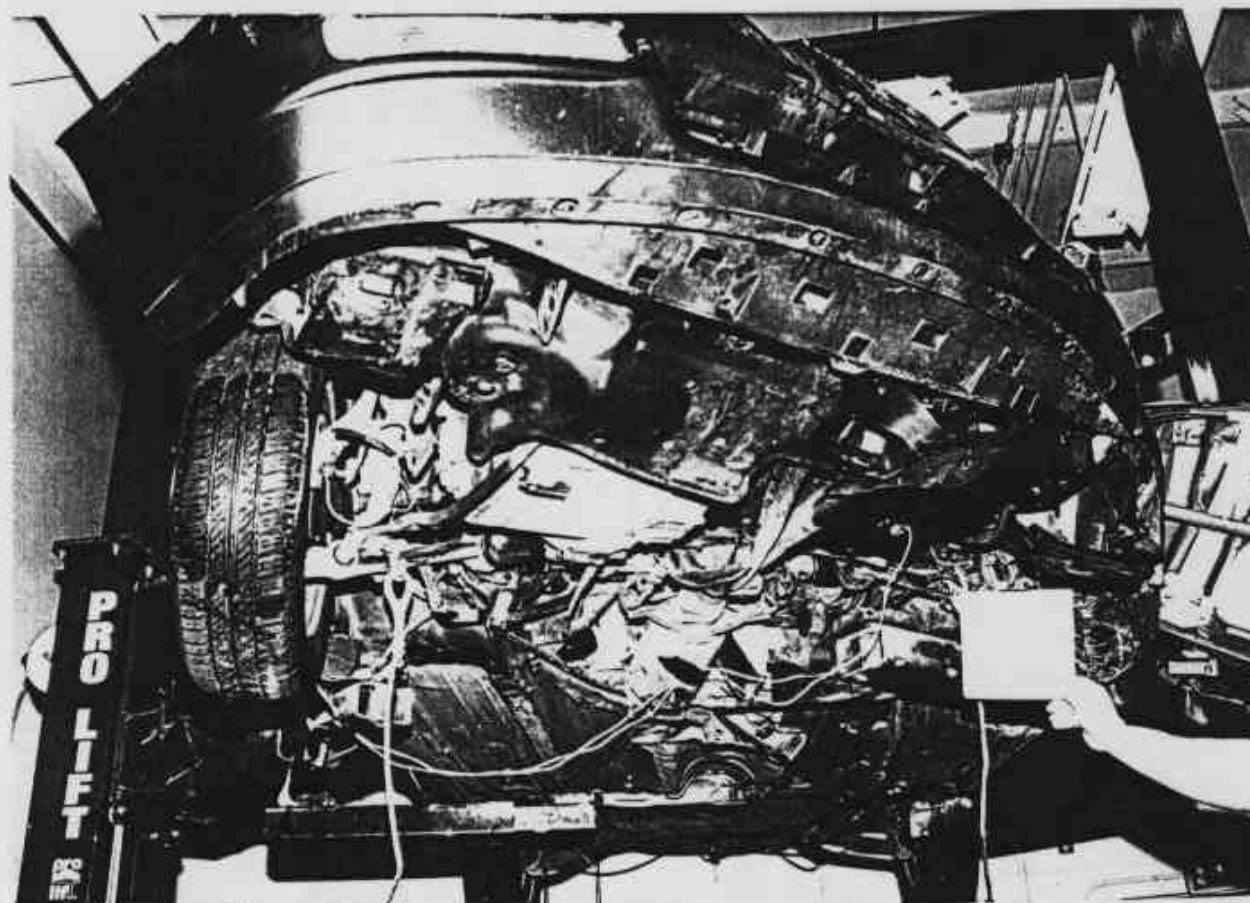


Figure A-17 Post-Test Target Vehicle Front Underbody View

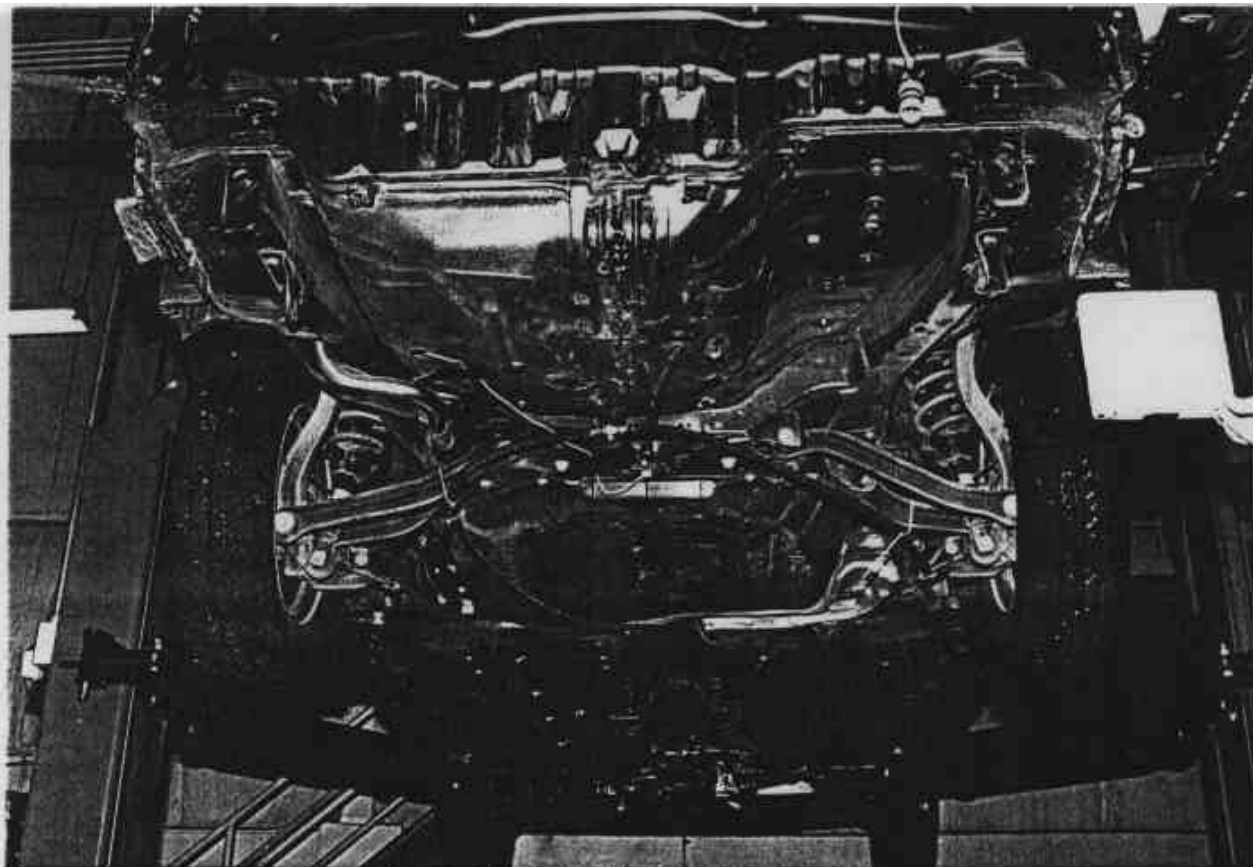


Figure A-18 Pre-Test Target Vehicle Rear Underbody View

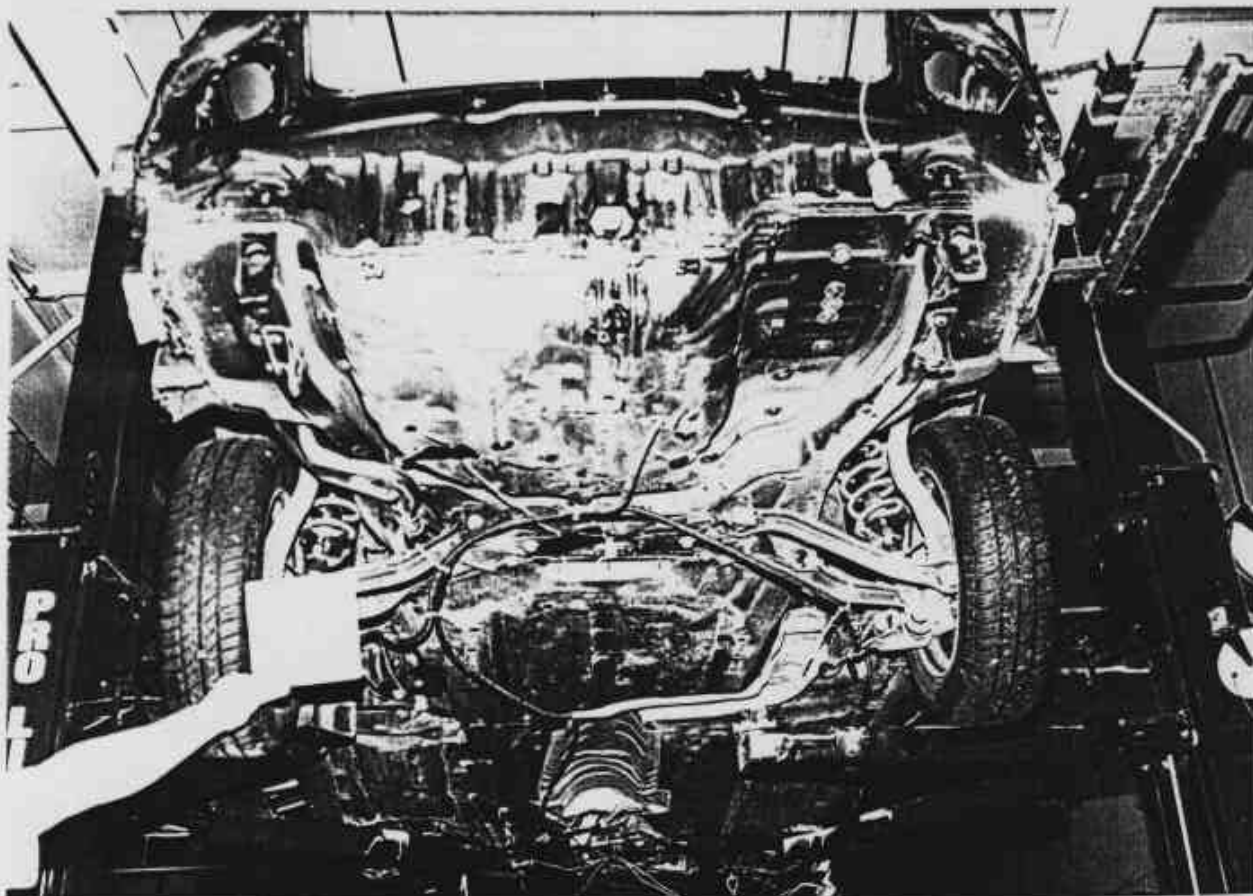


Figure A-19 Post-Test Target Vehicle Rear Underbody View



Figure A-20 Pre-Test Bullet Vehicle Front View



Figure A-21 Post-Test Bullet Vehicle Front View



Figure A-22 Pre-Test Bullet Vehicle Left Front Three-Quarter View



Figure A-23 Post-Test Bullet Vehicle Left Front Three-Quarter View

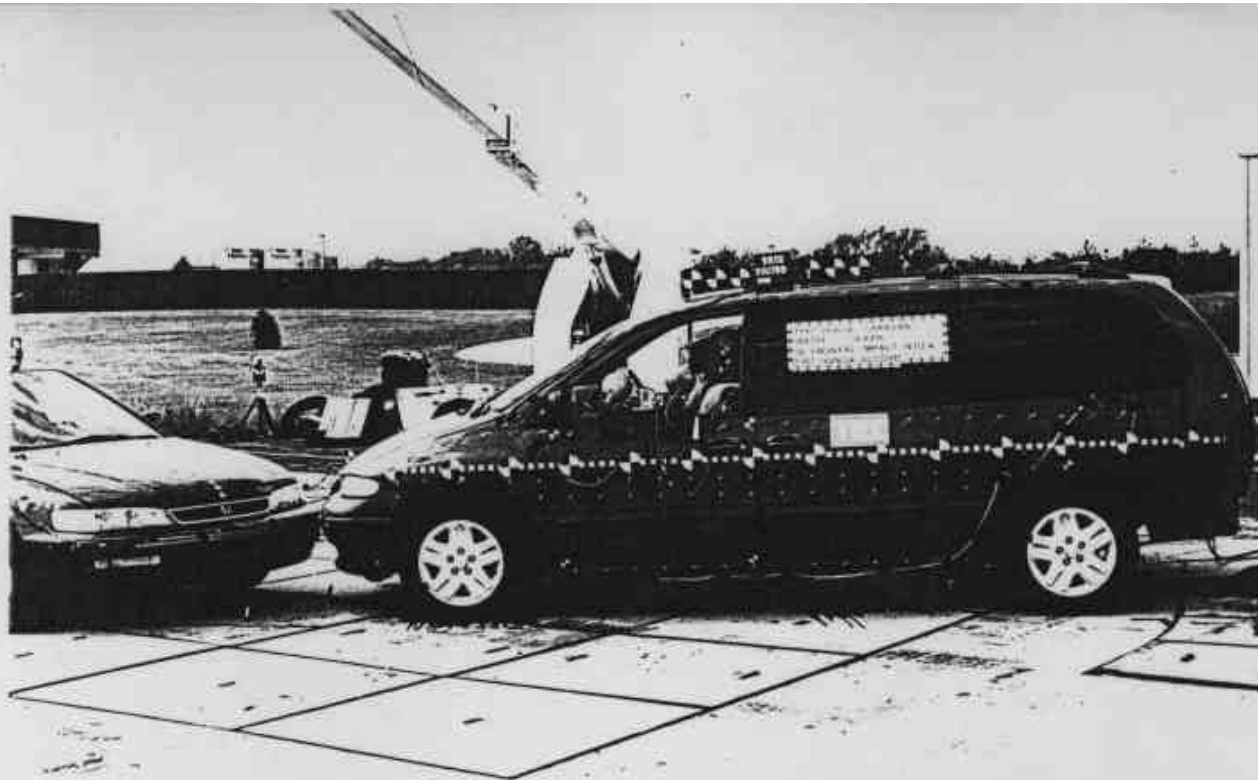


Figure A-24 Pre-Test Bullet Vehicle Left Side View



Figure A-25 Post-Test Bullet Vehicle Left Side View



Figure A-26 Pre-Test Bullet Vehicle Rear View



Figure A-27 Post-Test Bullet Vehicle Rear View

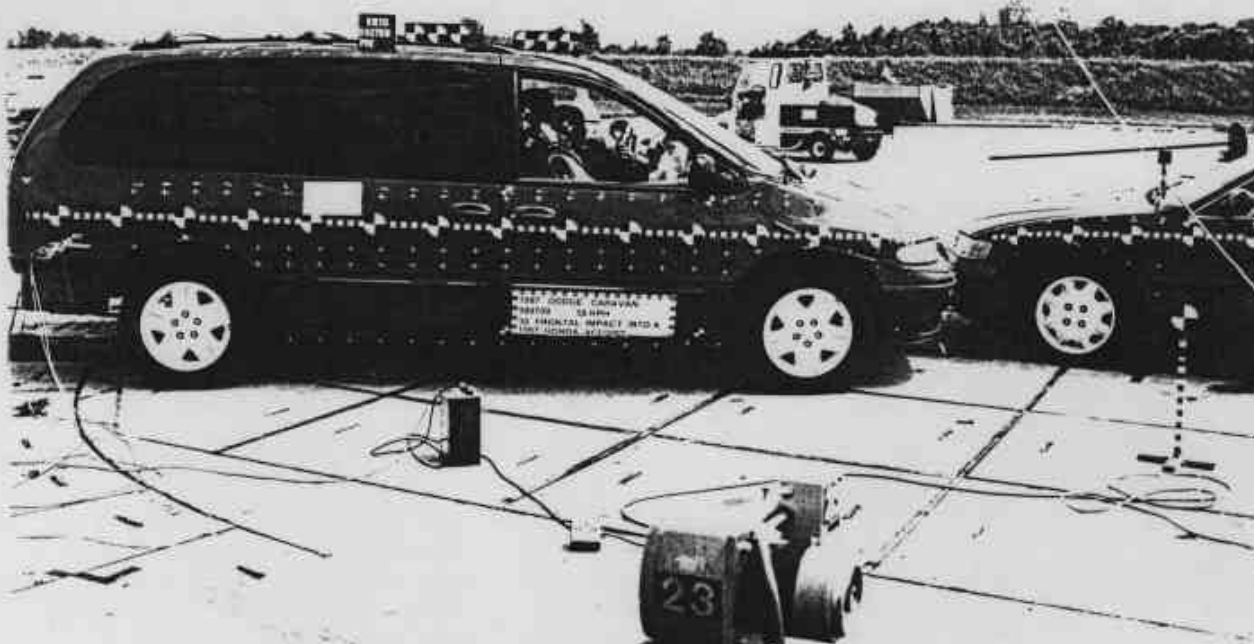


Figure A-28 Pre-Test Bullet Vehicle Right Side View

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Figure A-29 Pre-Test Bullet Vehicle Right Front Three-Quarter View



Figure A-30 Post-Test Bullet Vehicle Right Front Three-Quarter View



Figure A-31 Post-Test Bullet Vehicle Overhead View

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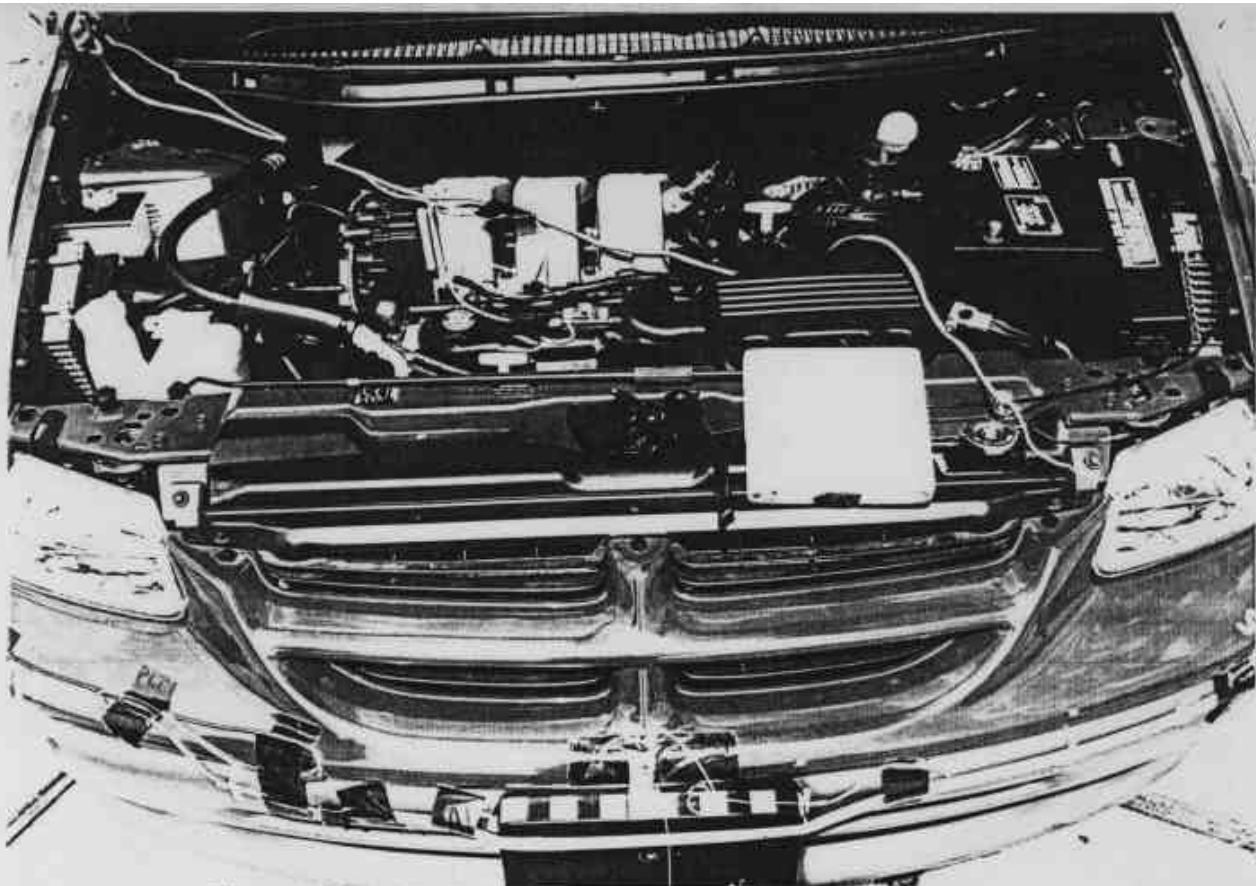


Figure A-32 Pre-Test Bullet Vehicle Engine Compartment View

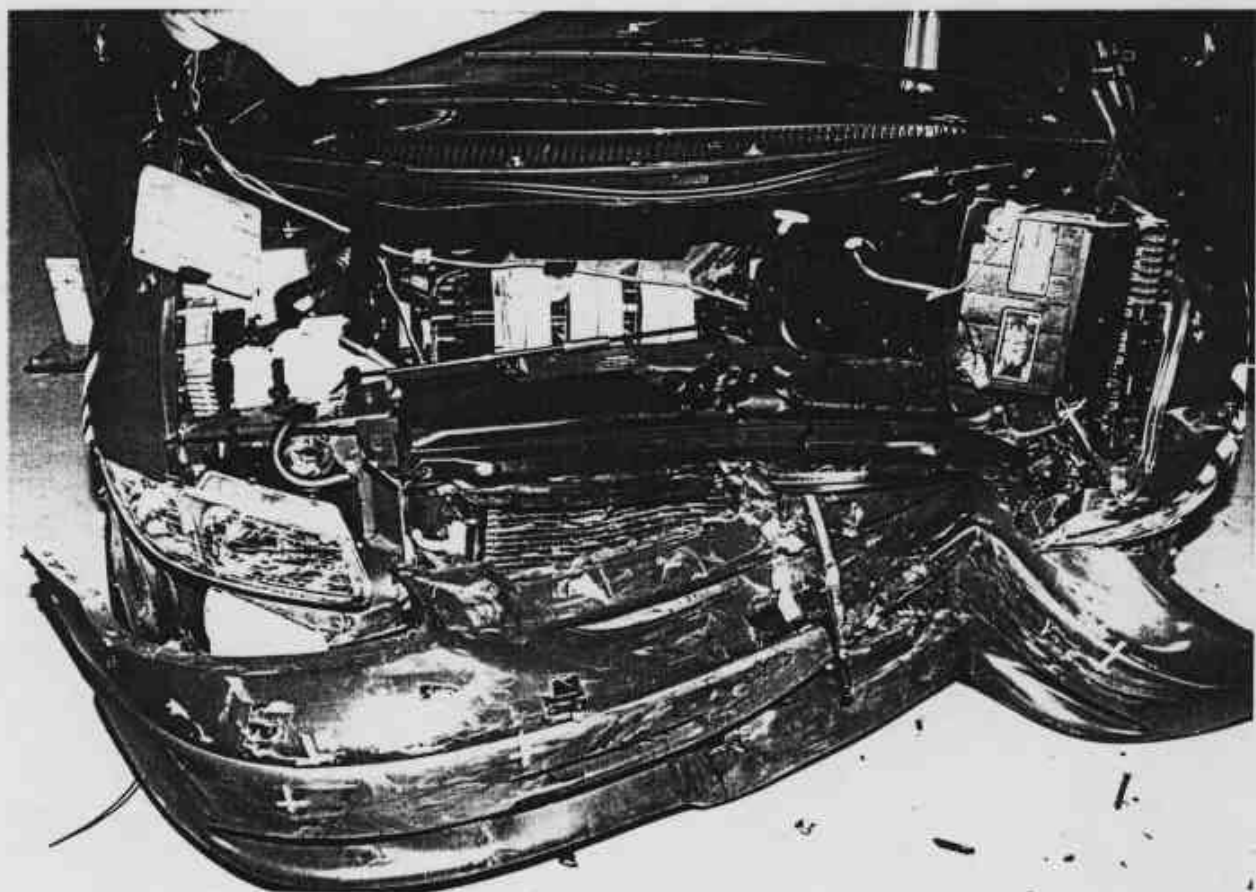


Figure A-33 Post-Test Bullet Vehicle Engine Compartment View

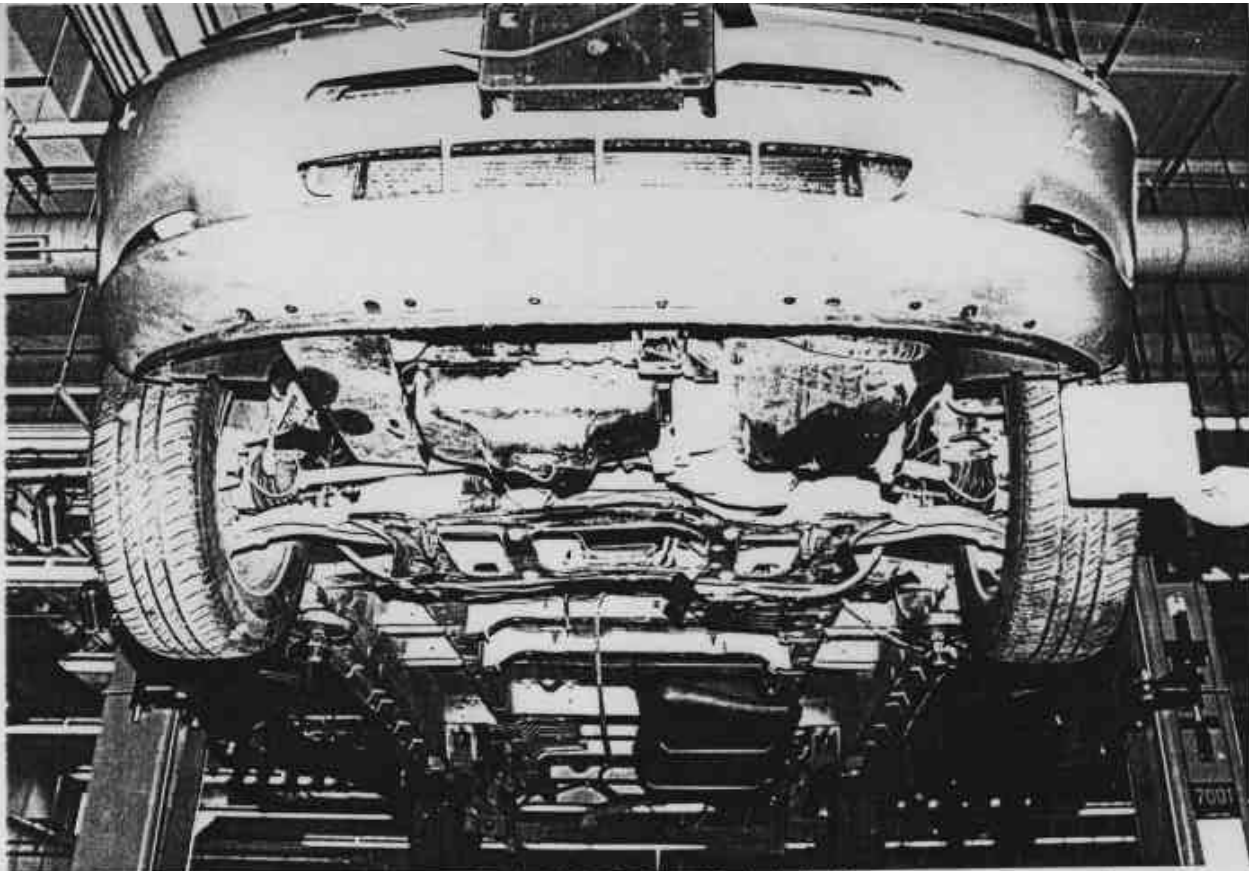


Figure A-34 Pre-Test Bullet Vehicle Front Underbody View

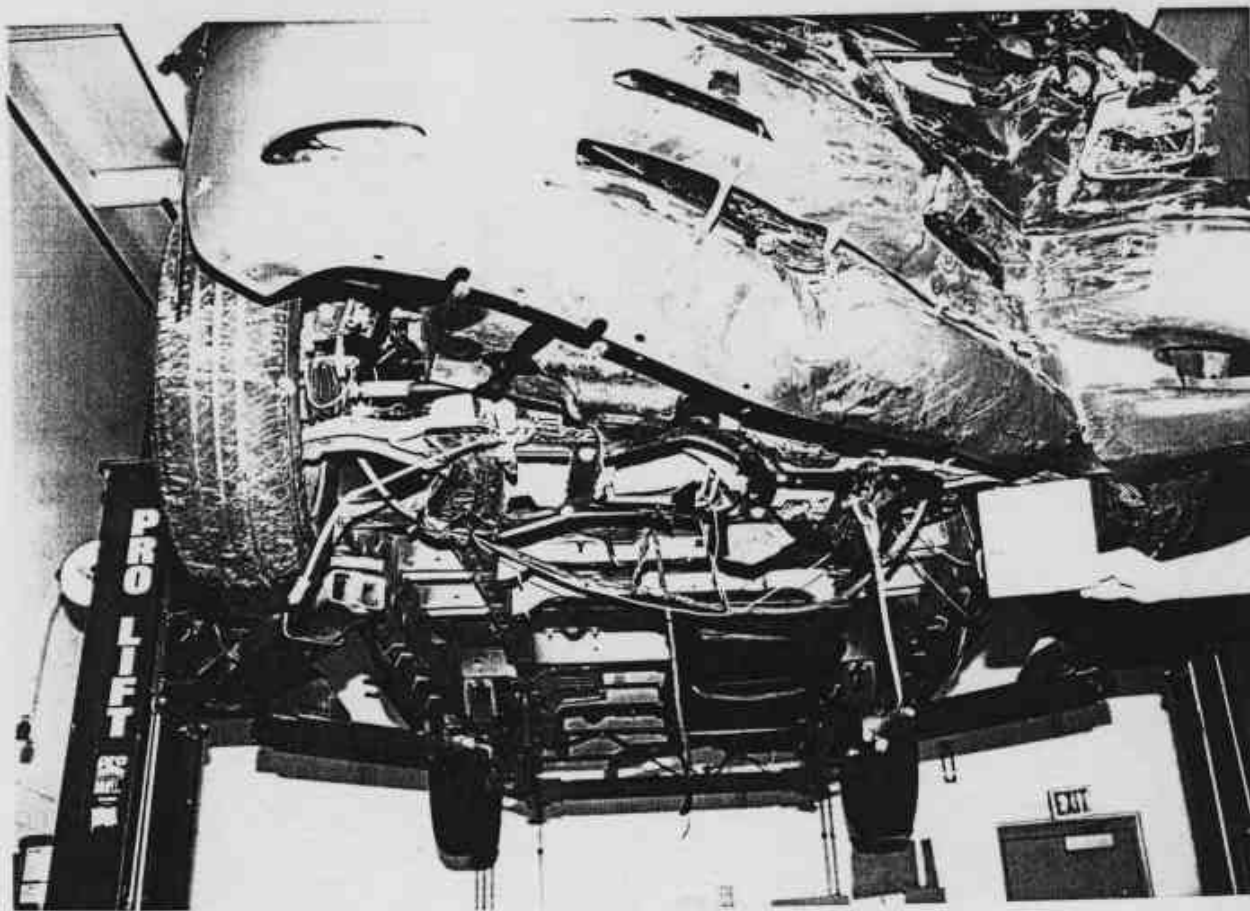


Figure A-35 Post-Test Bullet Vehicle Front Underbody View

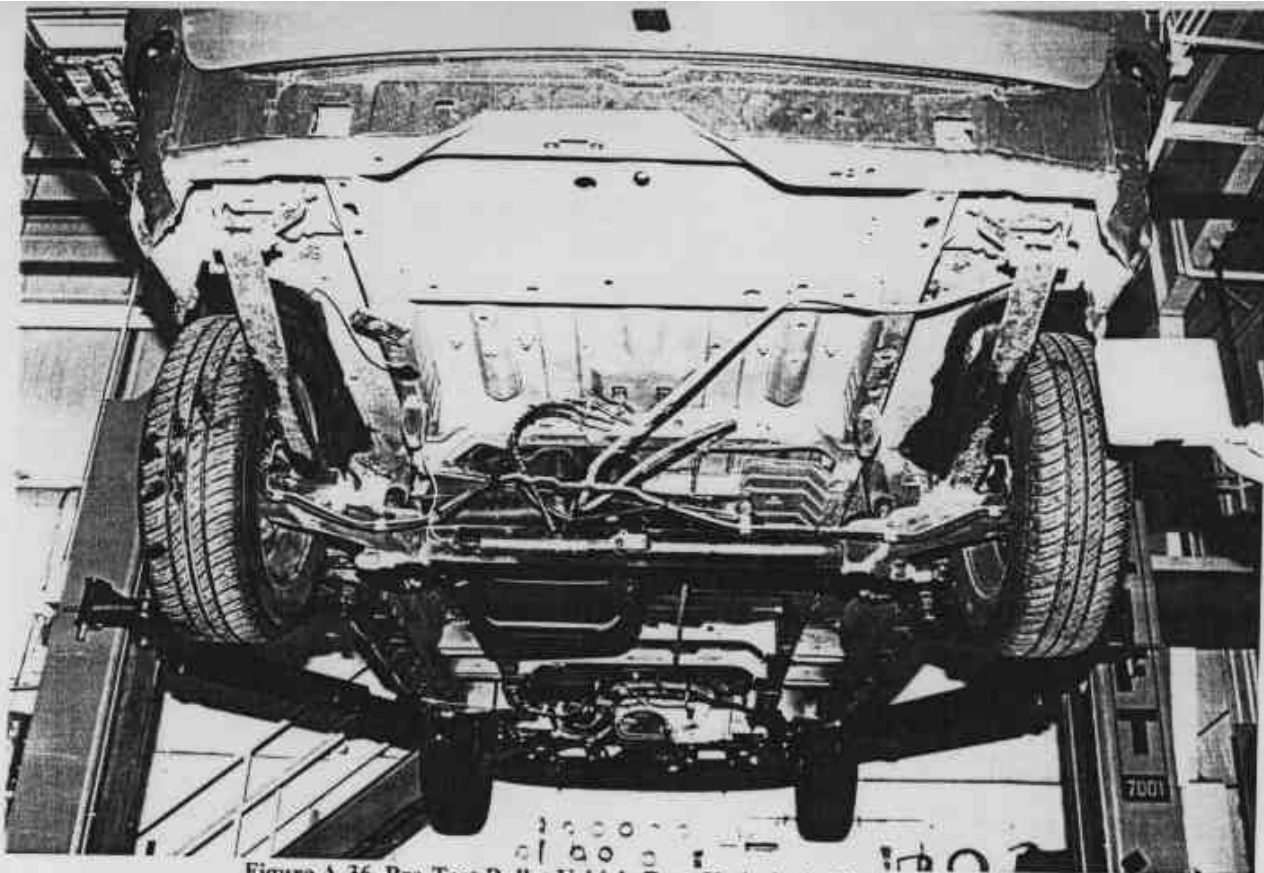


Figure A-36 Pre-Test Bullet Vehicle Rear Underbody View

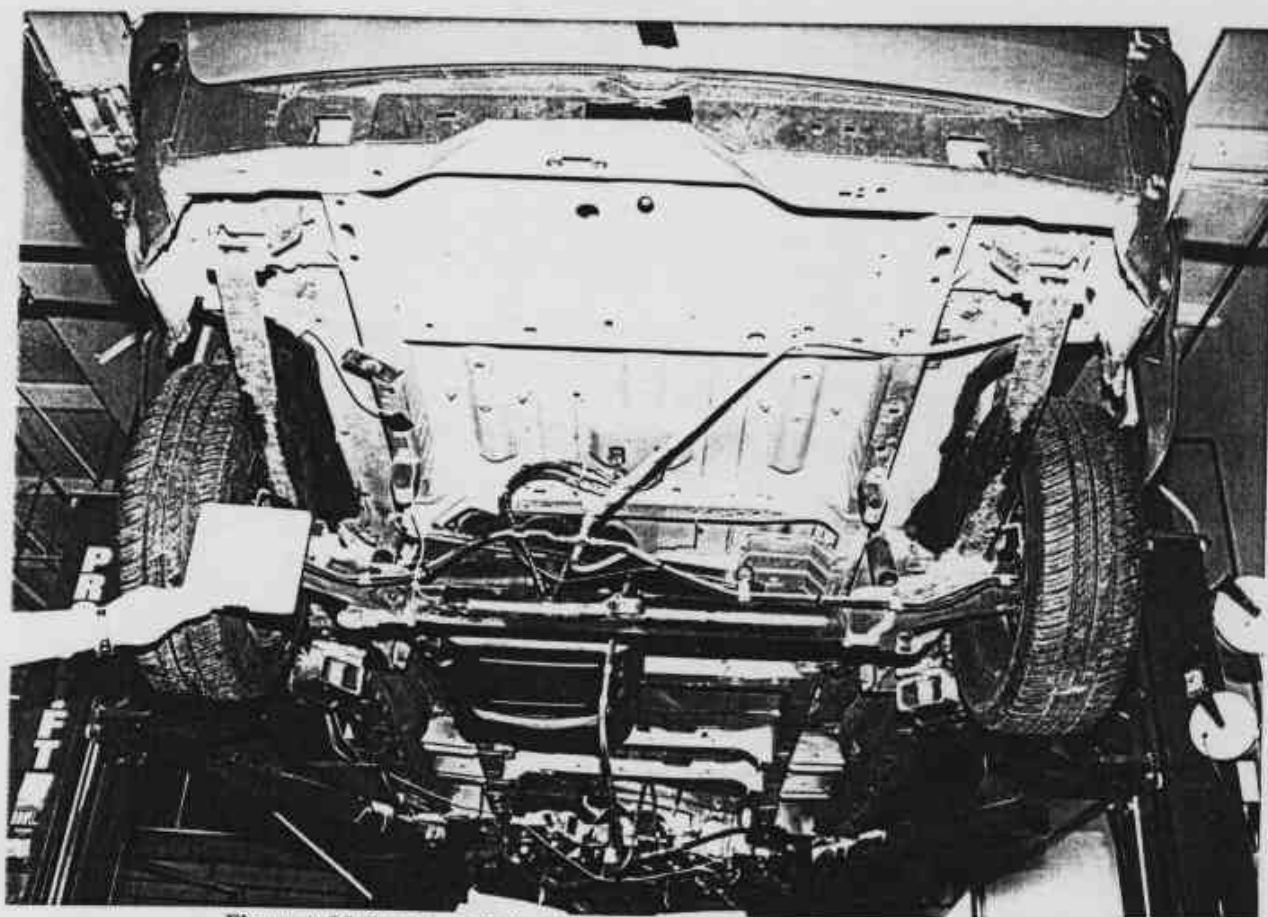


Figure A-37 Post-Test Bullet Vehicle Rear Underbody View



Figure A-38 Pre-Test Right Side Wide View

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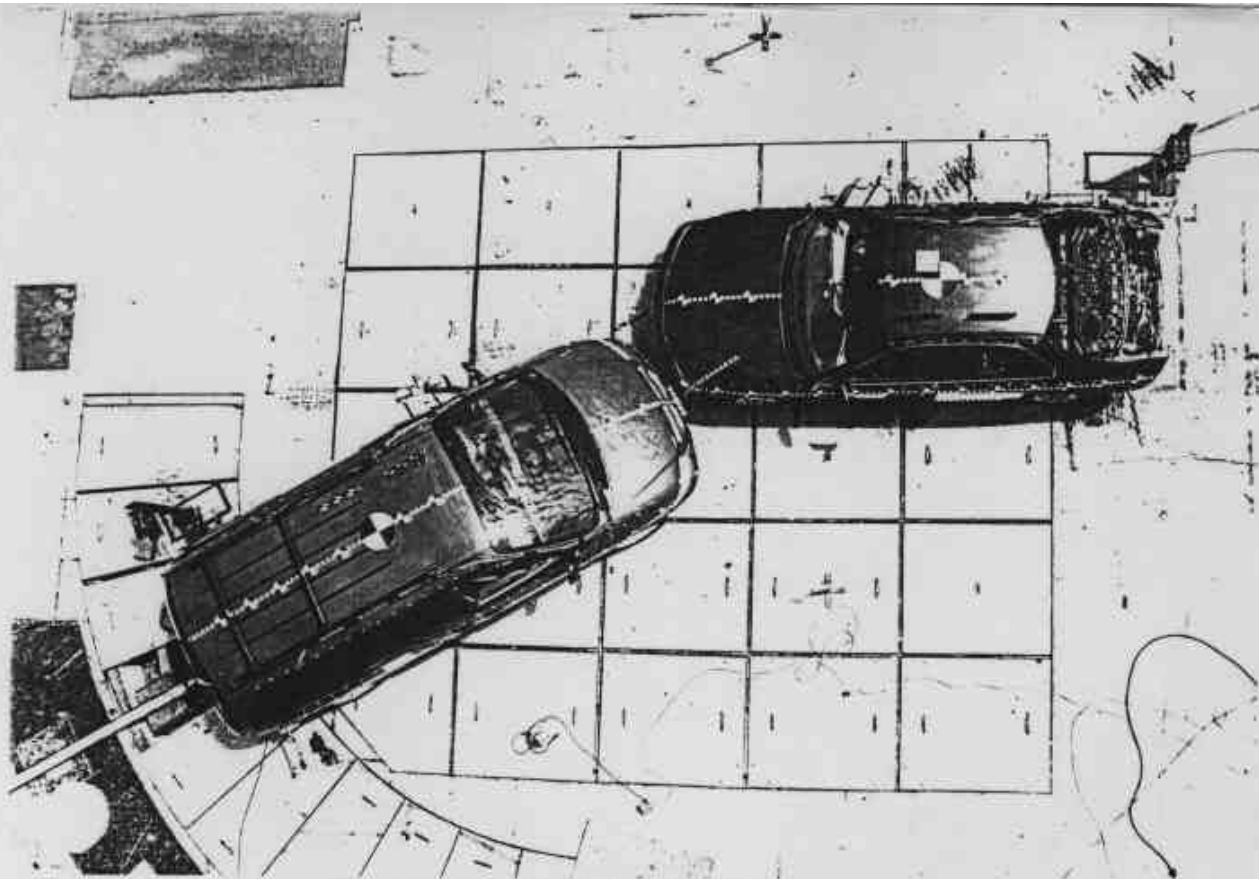


Figure A-39 Pre-Test Overhead Wide View

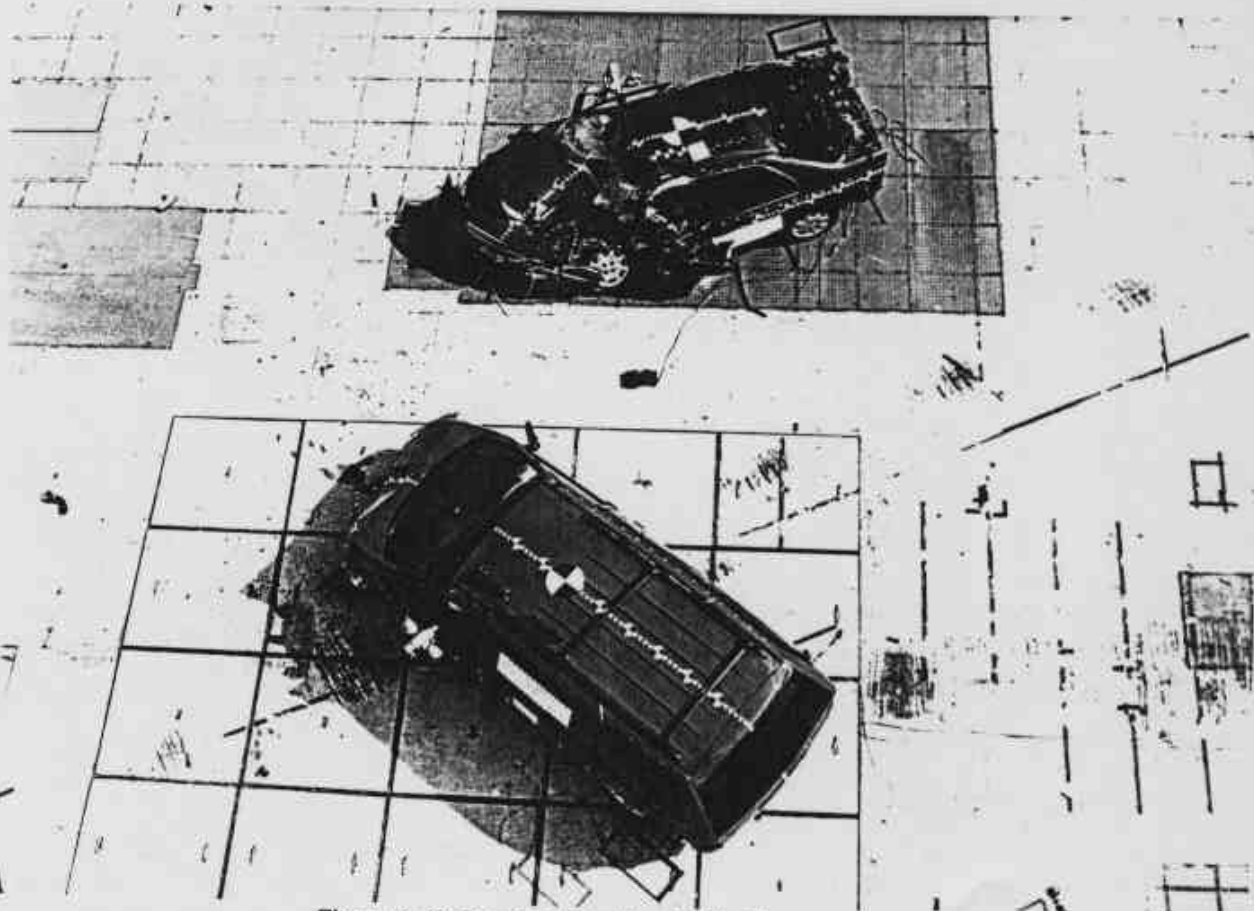


Figure A-40 Post-Test Overhead Wide View

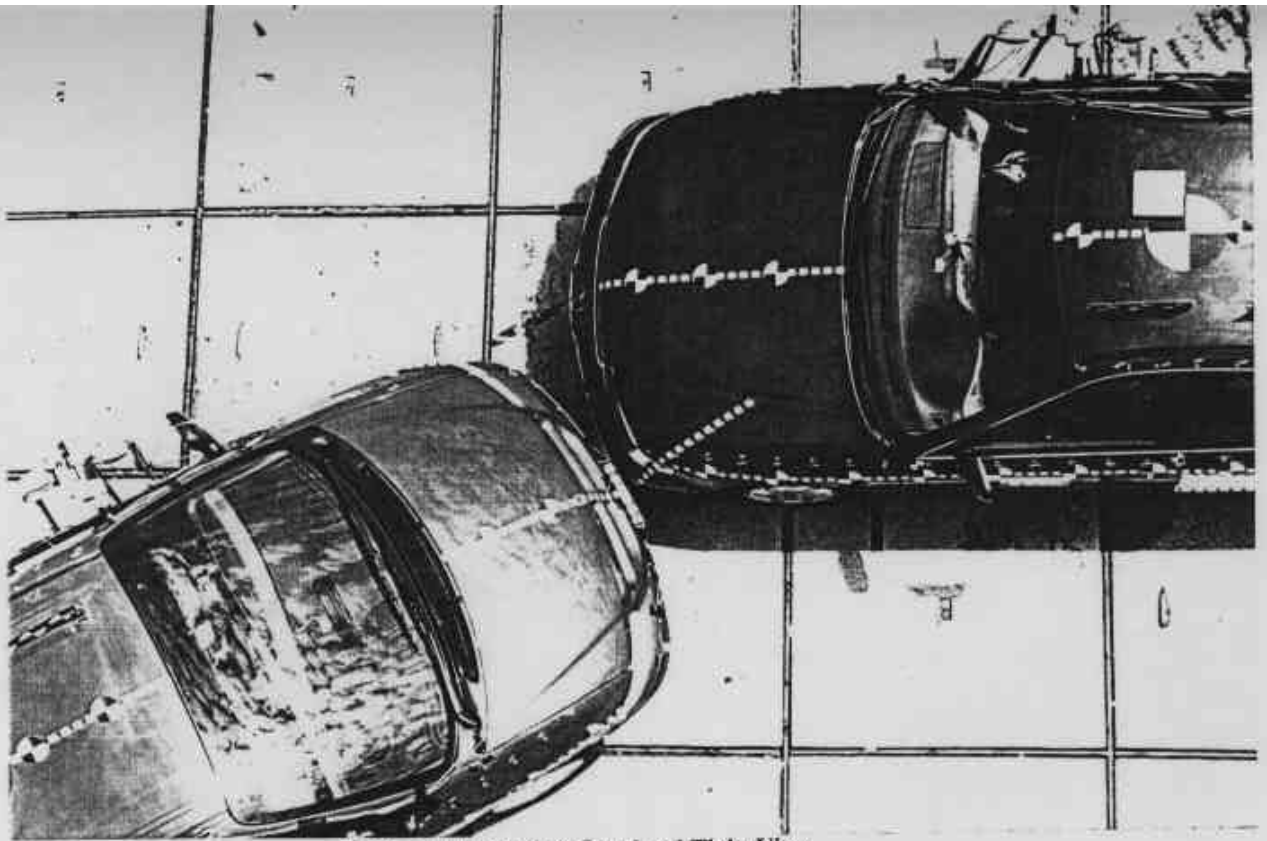


Figure A-41 Pre-Test Overhead Tight View

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Figure A-42 Pre-Test Target Vehicle Driver Dummy - View 1



Figure A-43 Post-Test Target Vehicle Driver Dummy - View 1



Figure A-44 Pre-Test Target Vehicle Driver Dummy - View 2



Figure A-45 Pre-Test Target Vehicle Driver Dummy - View 3



Figure A-46 Pre-Test Target Vehicle Passenger Dummy - View 1



Figure A-47 Post-Test Target Vehicle Passenger Dummy - View 1



Figure A-48 Pre-Test Target Vehicle Passenger Dummy - View 2

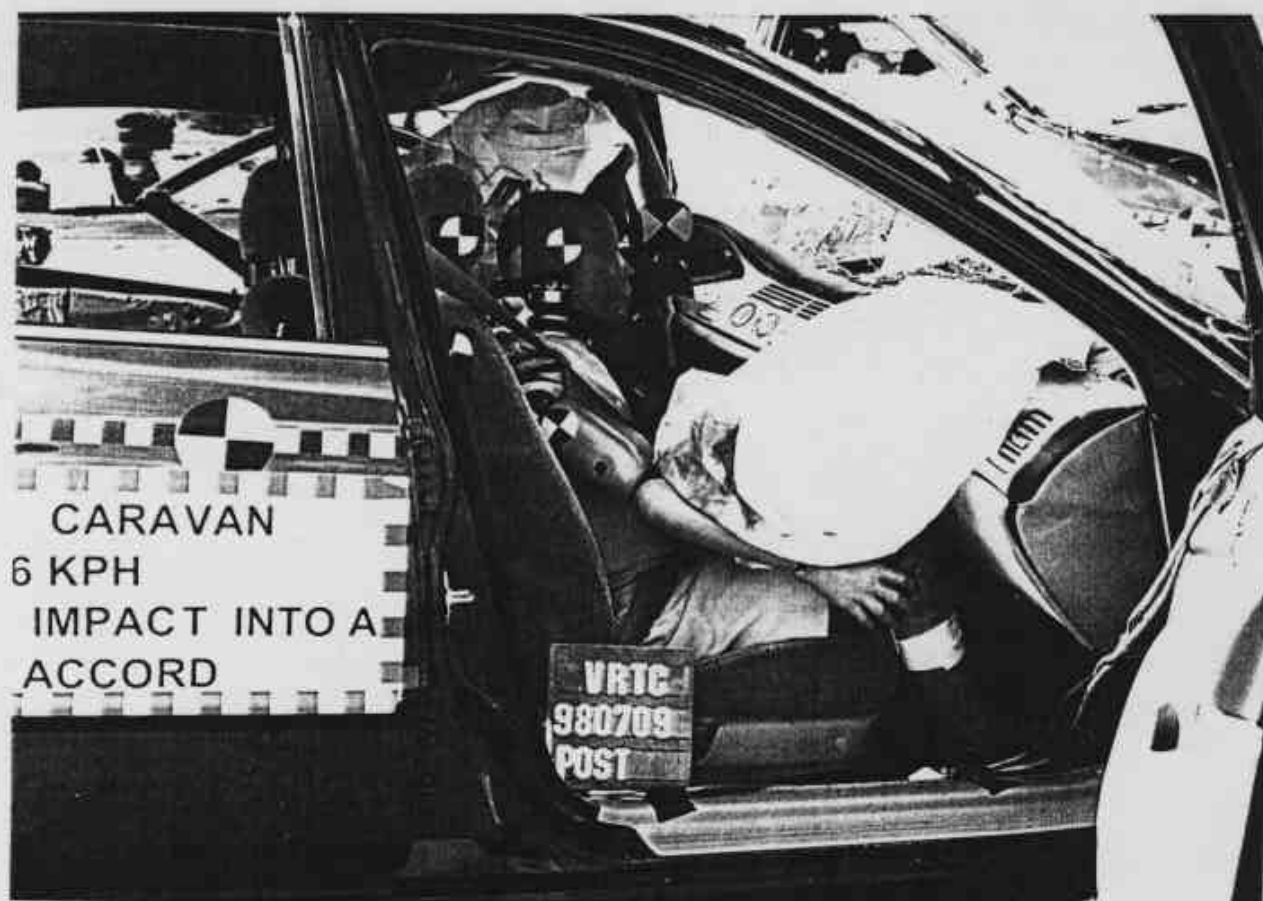


Figure A-49 Post-Test Target Vehicle Passenger Dummy - View 2



Figure A-50 Pre-Test Target Vehicle Passenger Dummy - View 3



Figure A-51 Post-Test Target Vehicle Passenger Dummy - View 3

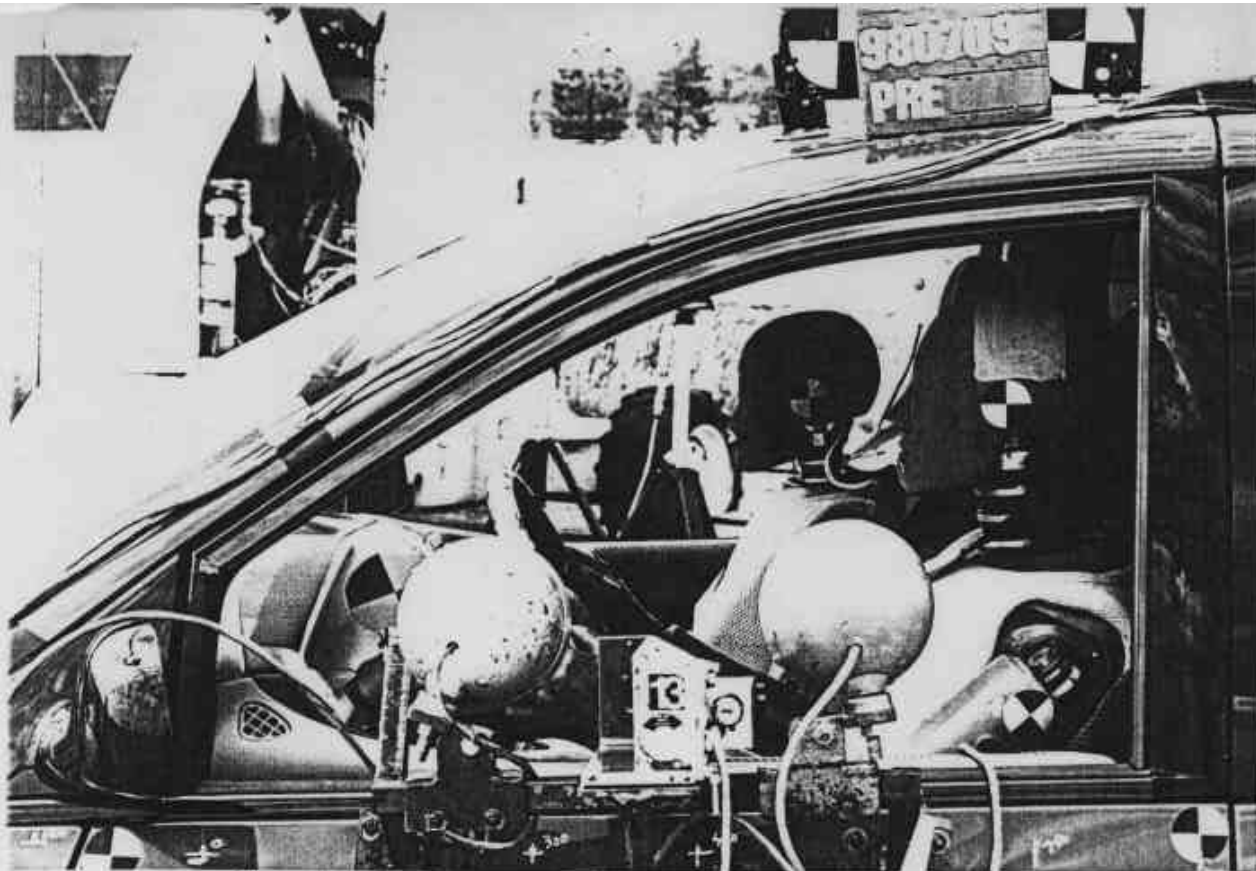


Figure A-52 Pre-Test Bullet Vehicle Driver Dummy - View 1



Figure A-53 Post-Test Bullet Vehicle Driver Dummy - View 1



Figure A-54 Pre-Test Bullet Vehicle Driver Dummy - View 2

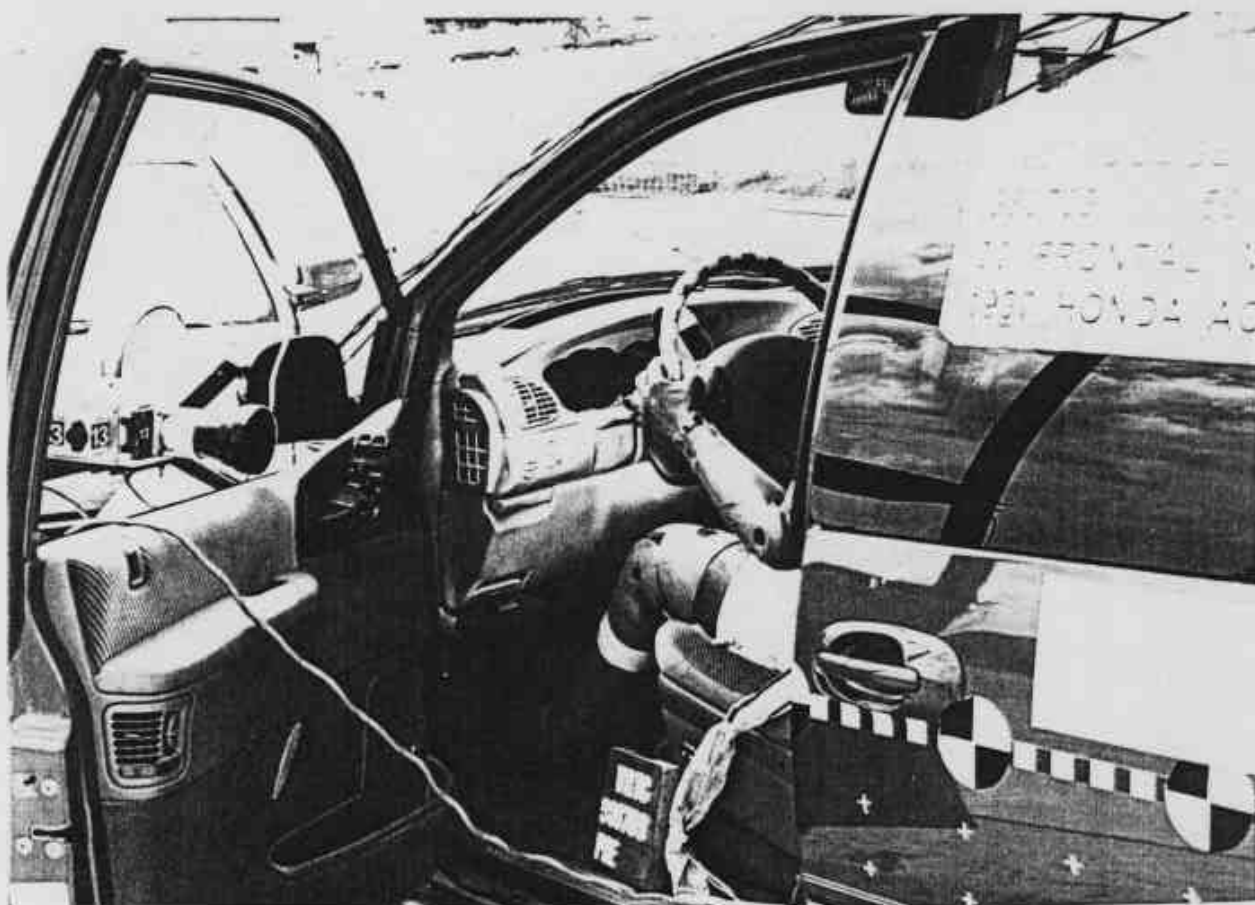


Figure A-55 Pre-Test Bullet Vehicle Driver Dummy - View 3



Figure A-56 Pre-Test Bullet Vehicle Passenger Dummy - View 1



Figure A-57 Post-Test Bullet Vehicle Passenger Dummy - View 1



Figure A-58 Pre-Test Bullet Vehicle Passenger Dummy - View 2



Figure A-59 Post-Test Bullet Vehicle Passenger Dummy - View 2



Figure A-60 Pre-Test Bullet Vehicle Passenger Dummy - View 3

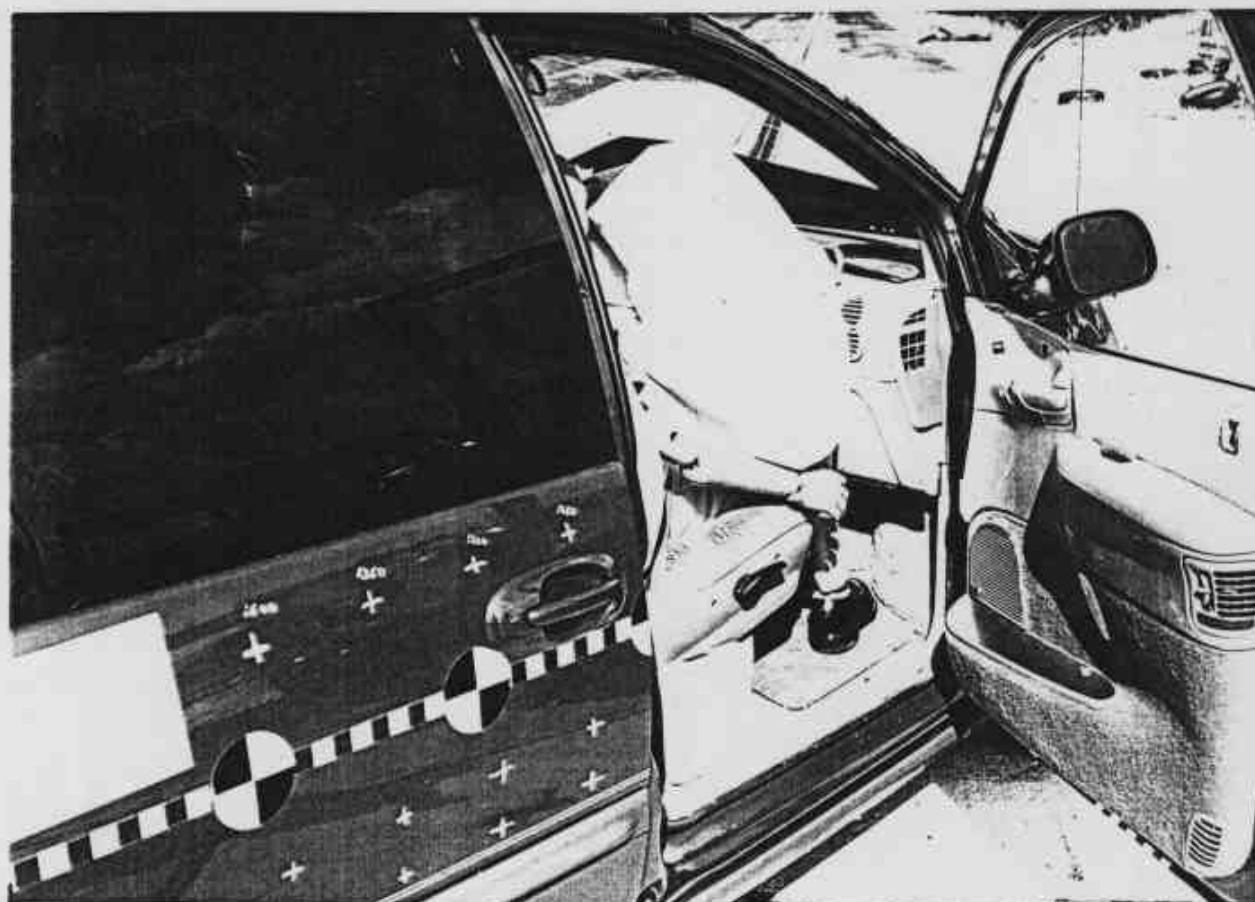


Figure A-61 Post-Test Bullet Vehicle Passenger Dummy - View 3

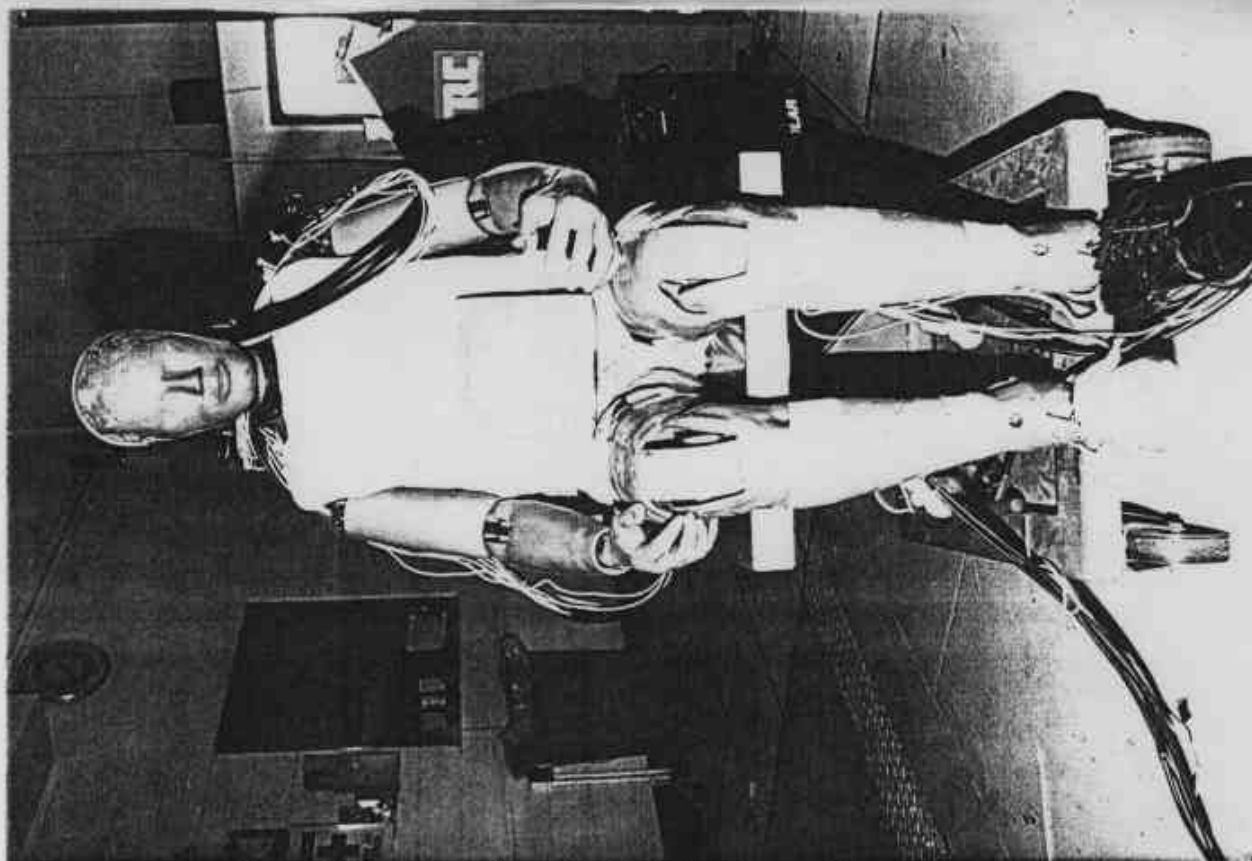


Figure A-62 Post-Test Target Vehicle Driver Dummy View



Figure A-63 Post-Test Target Vehicle Driver Dummy Head Contact - View 1



Figure A-64 Post-Test Target Vehicle Driver Dummy Head Contact - View 2

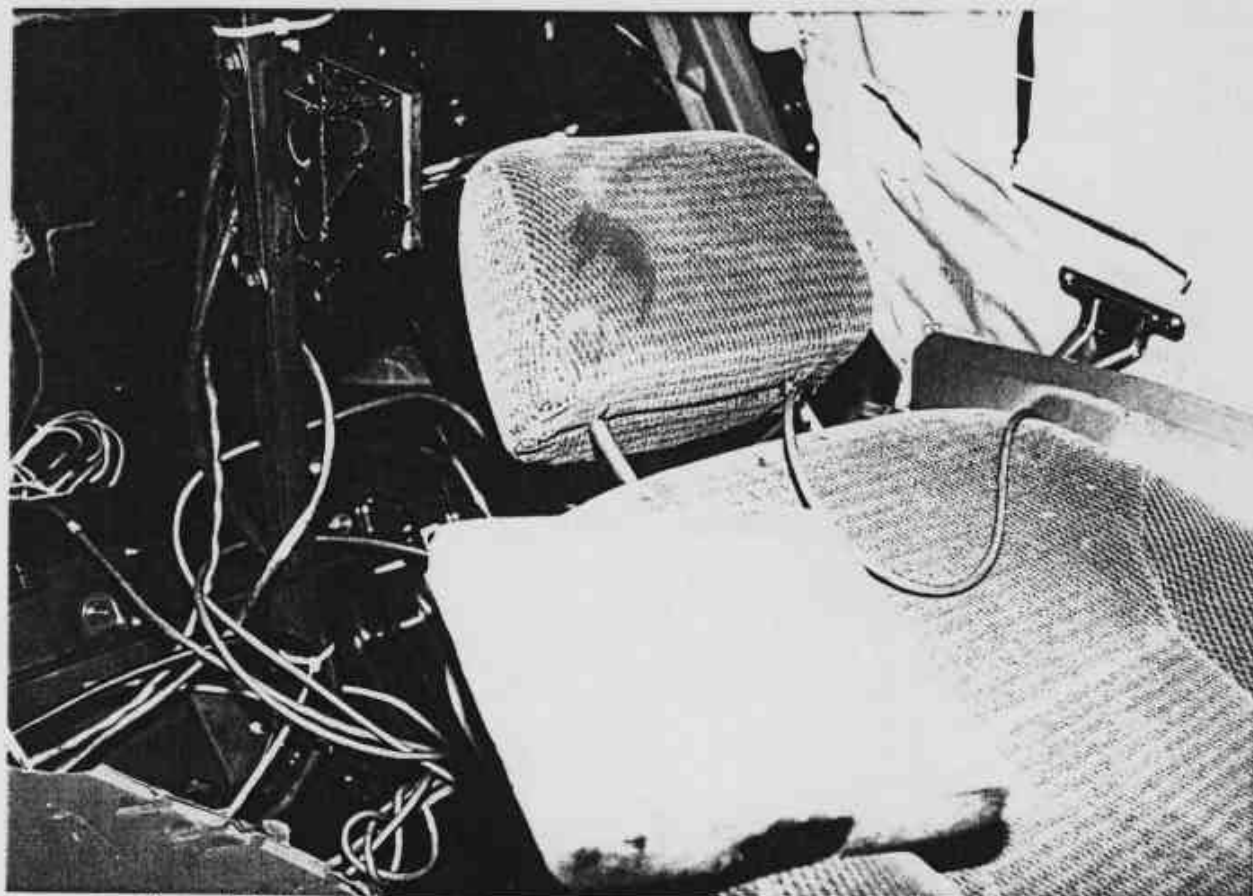


Figure A-65 Post-Test Target Vehicle Driver Dummy Head Contact - View 3

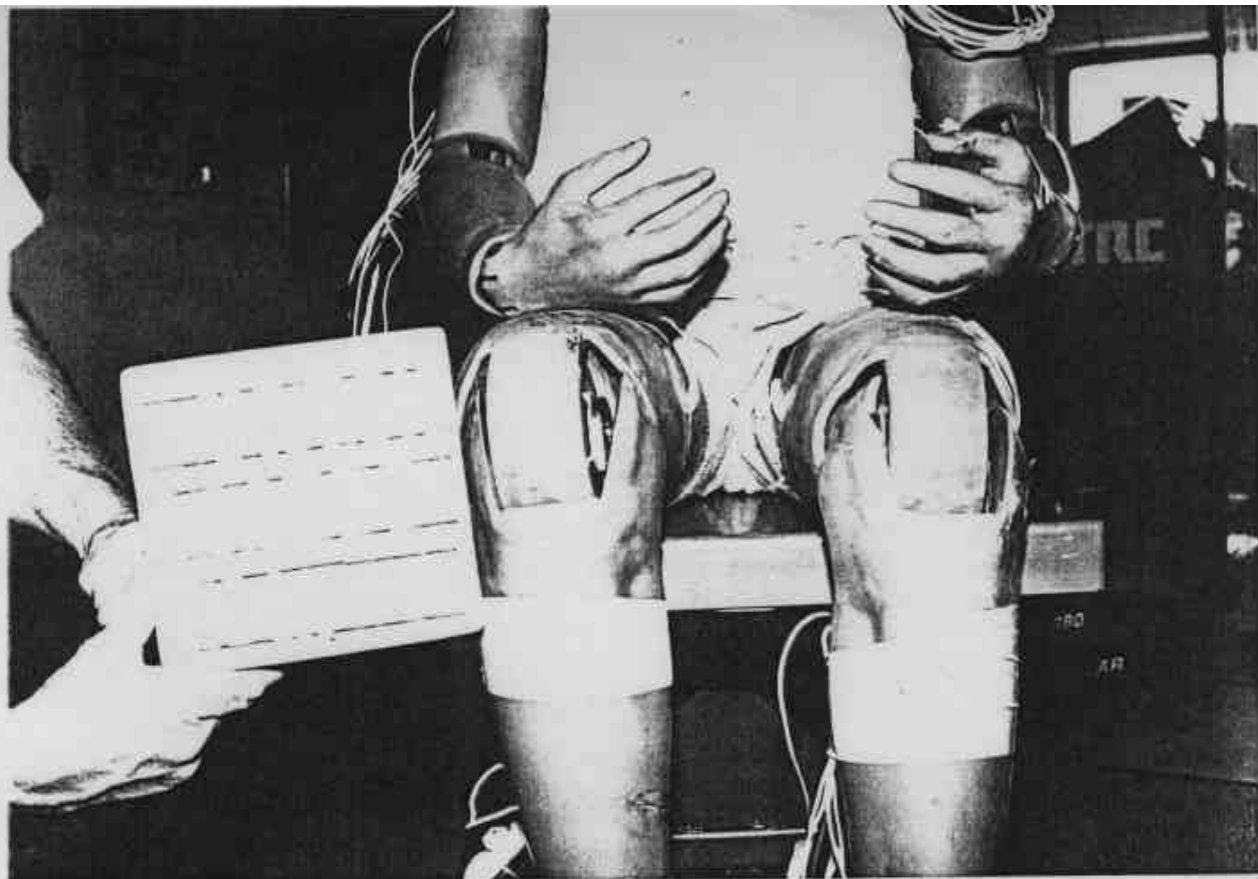


Figure A-66 Post-Test Target Vehicle Driver Dummy Knee Contact - View 1

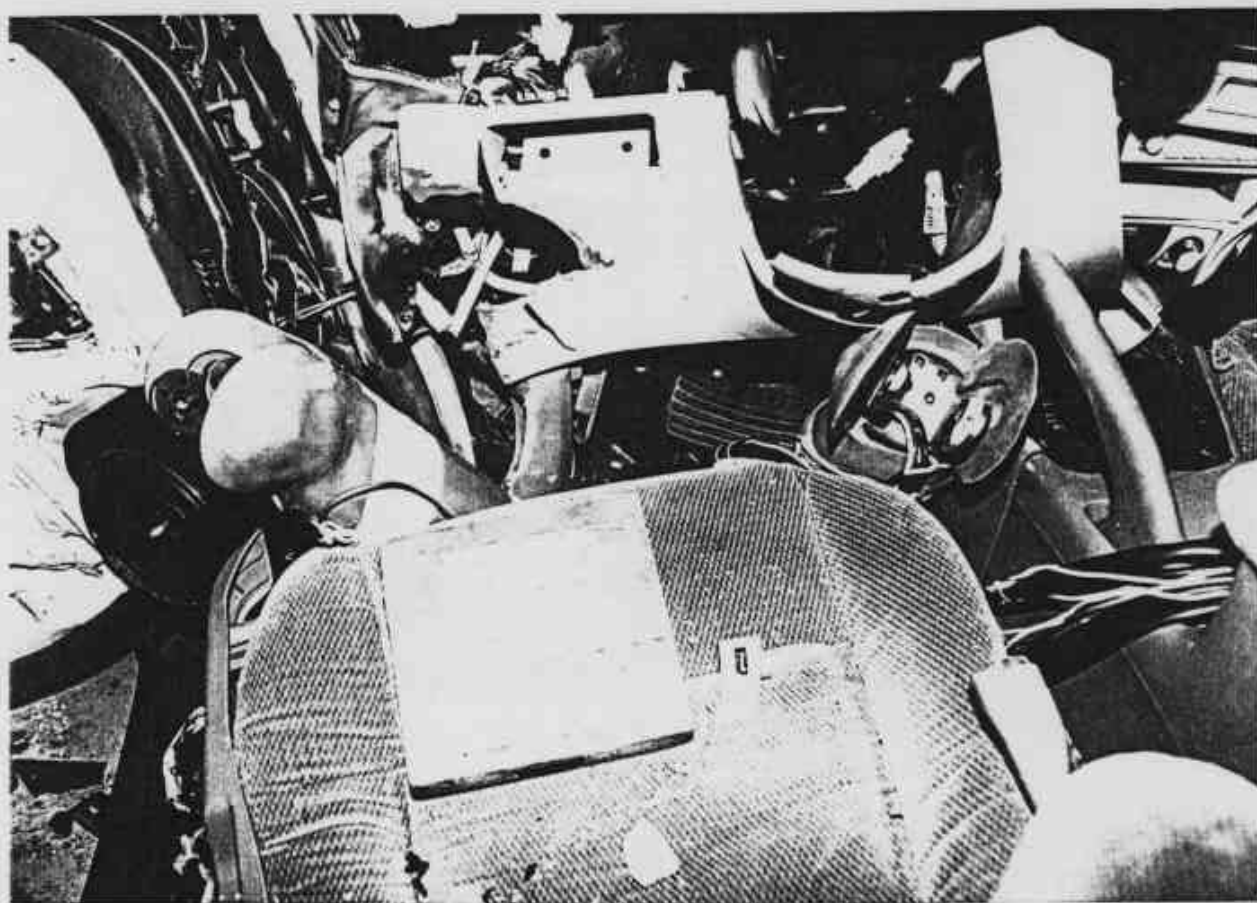


Figure A-67 Post-Test Target Vehicle Driver Dummy Knee Contact - View 2



Figure A-68 Post-Test Target Vehicle Driver Dummy Knee Contact - View 3

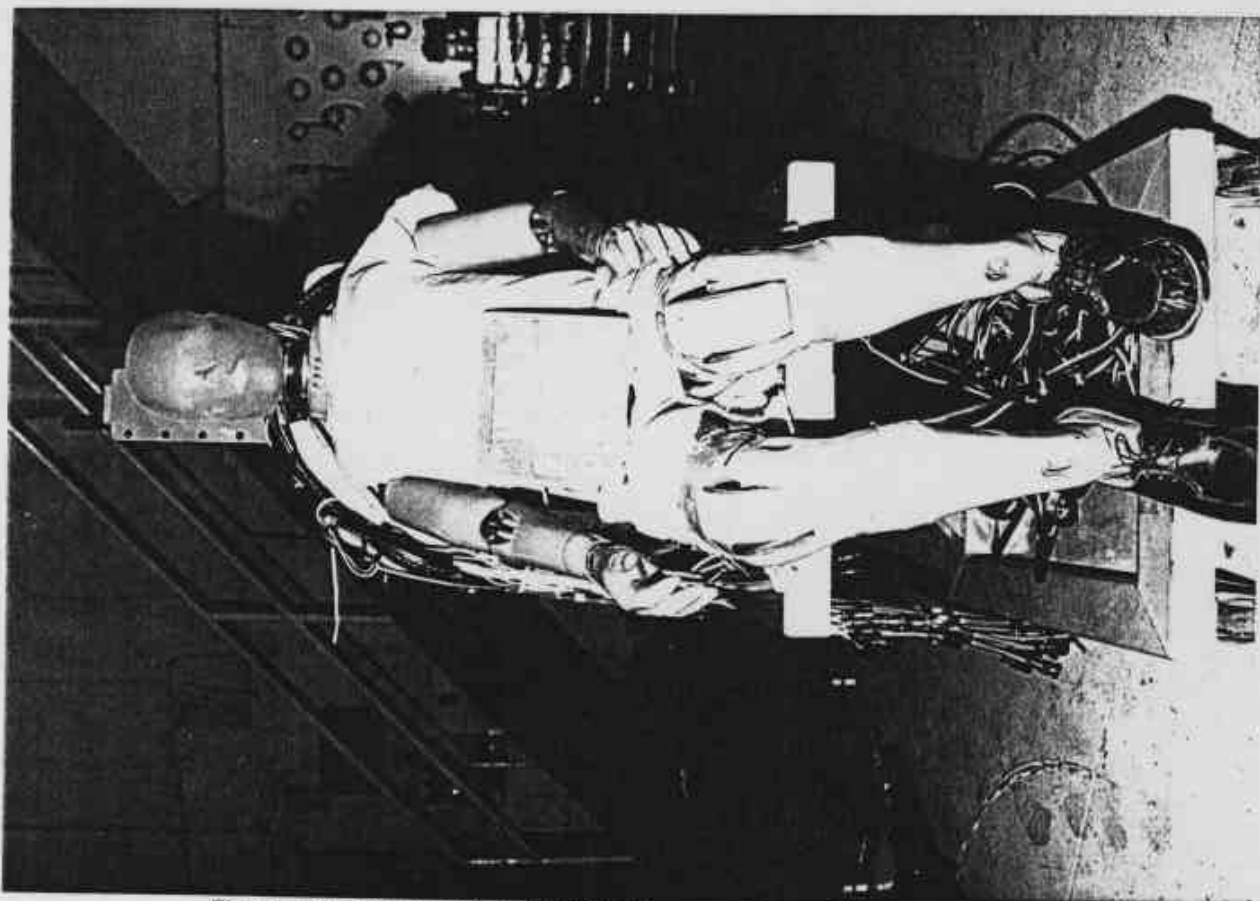


Figure A-69 Post-Test Target Vehicle Passenger Dummy View

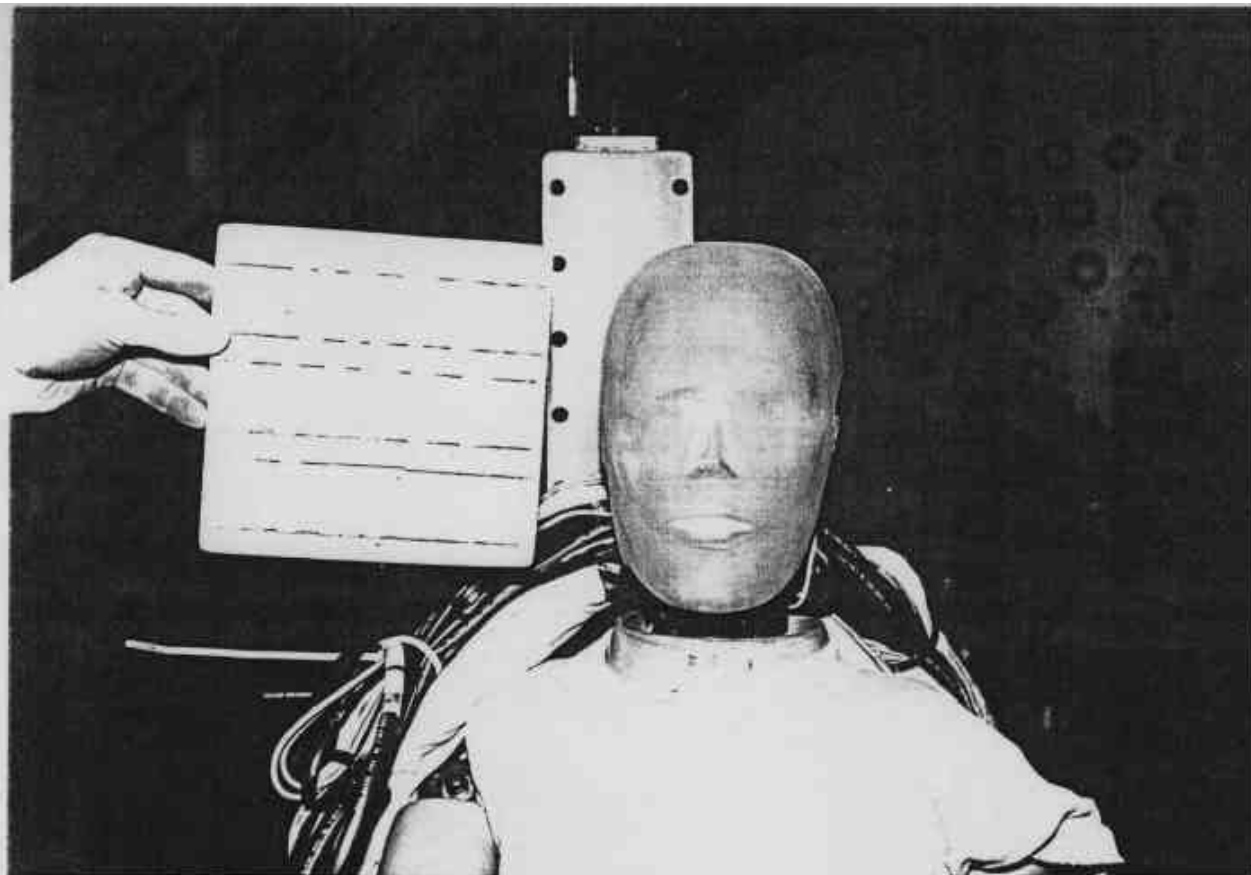


Figure A-70 Post-Test Target Vehicle Passenger Dummy Head Contact - View 1



Figure A-71 Post-Test Target Vehicle Passenger Dummy Head Contact - View 2

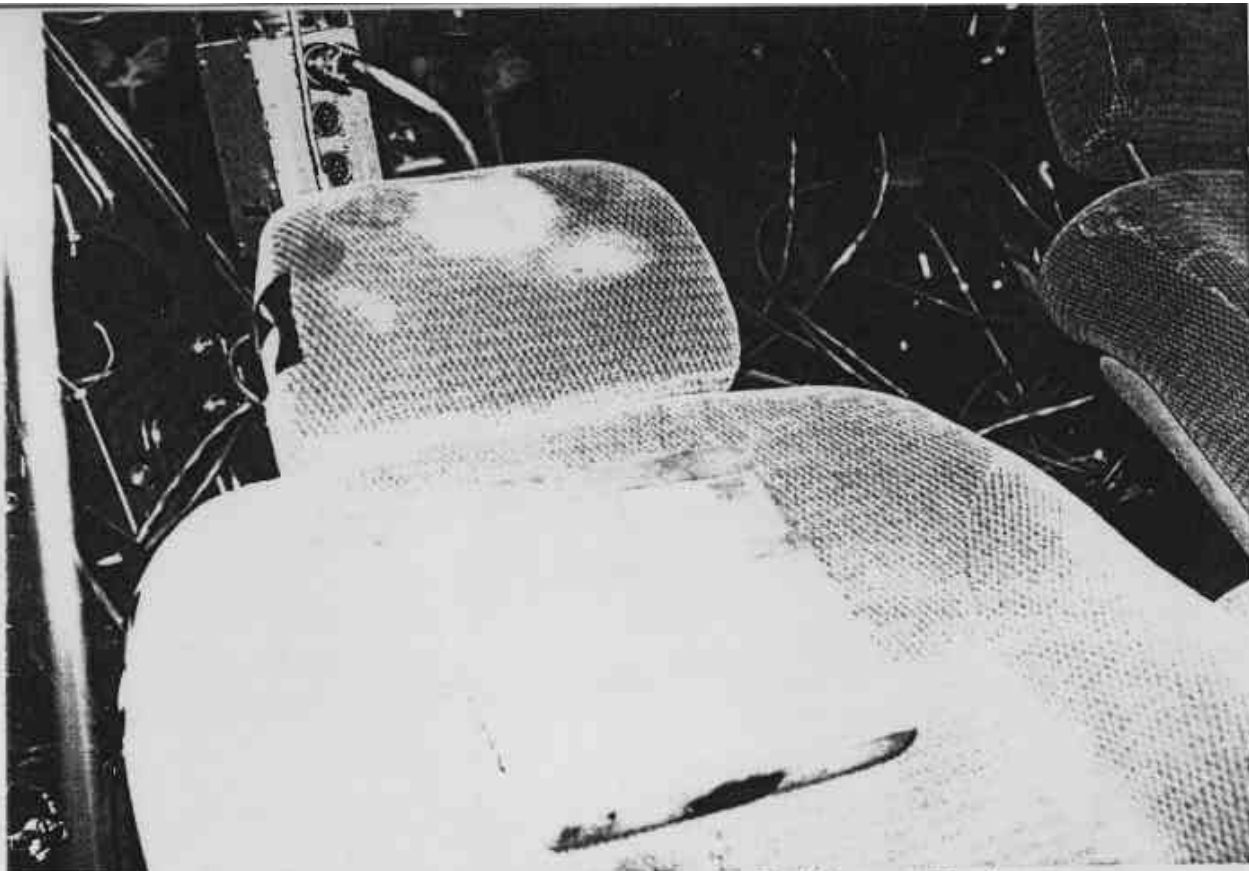


Figure A-72 Post-Test Target Vehicle Passenger Dummy Head Contact - View 3

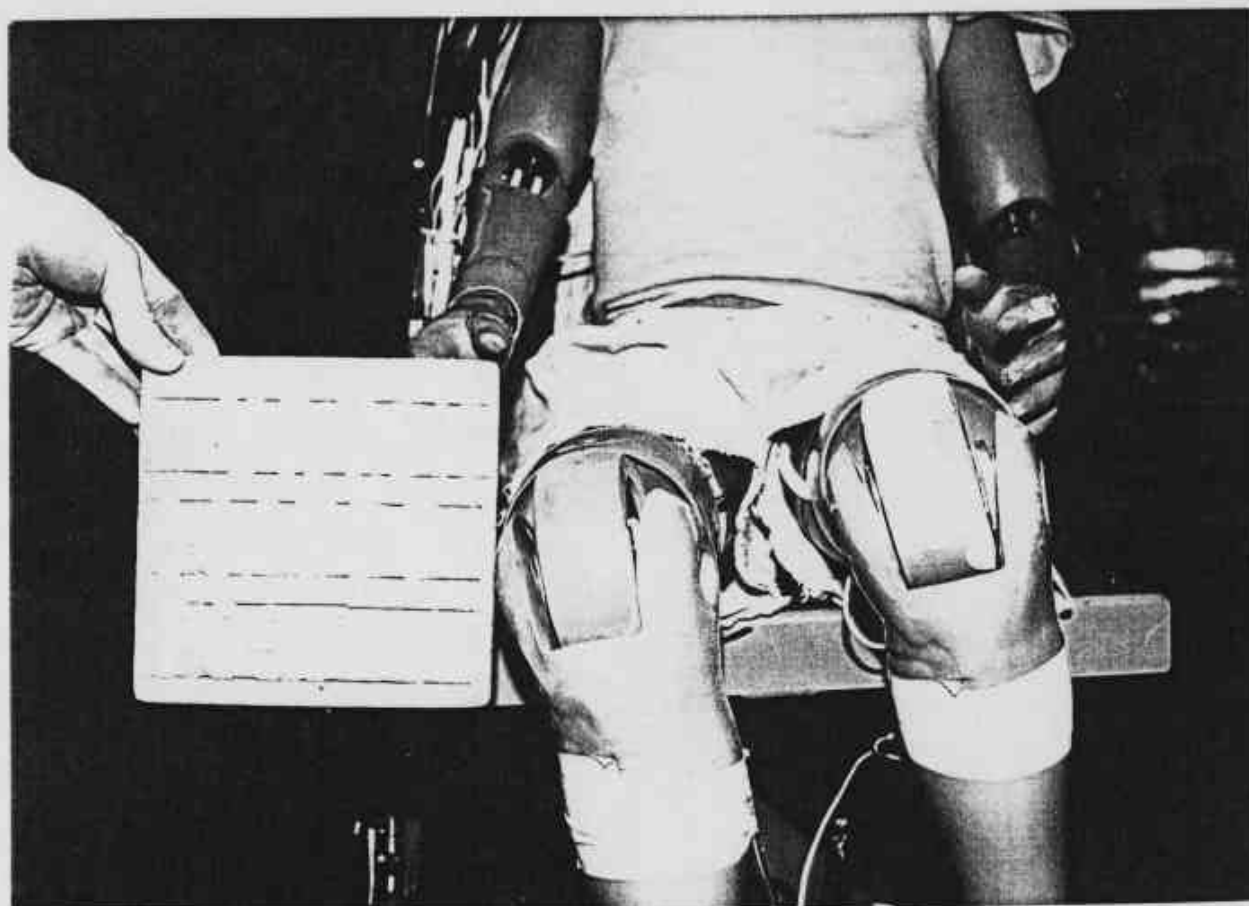


Figure A-73 Post-Test Target Vehicle Passenger Dummy Knee Contact - View 1



Figure A-74 Post-Test Target Vehicle Passenger Dummy Knee Contact - View 2

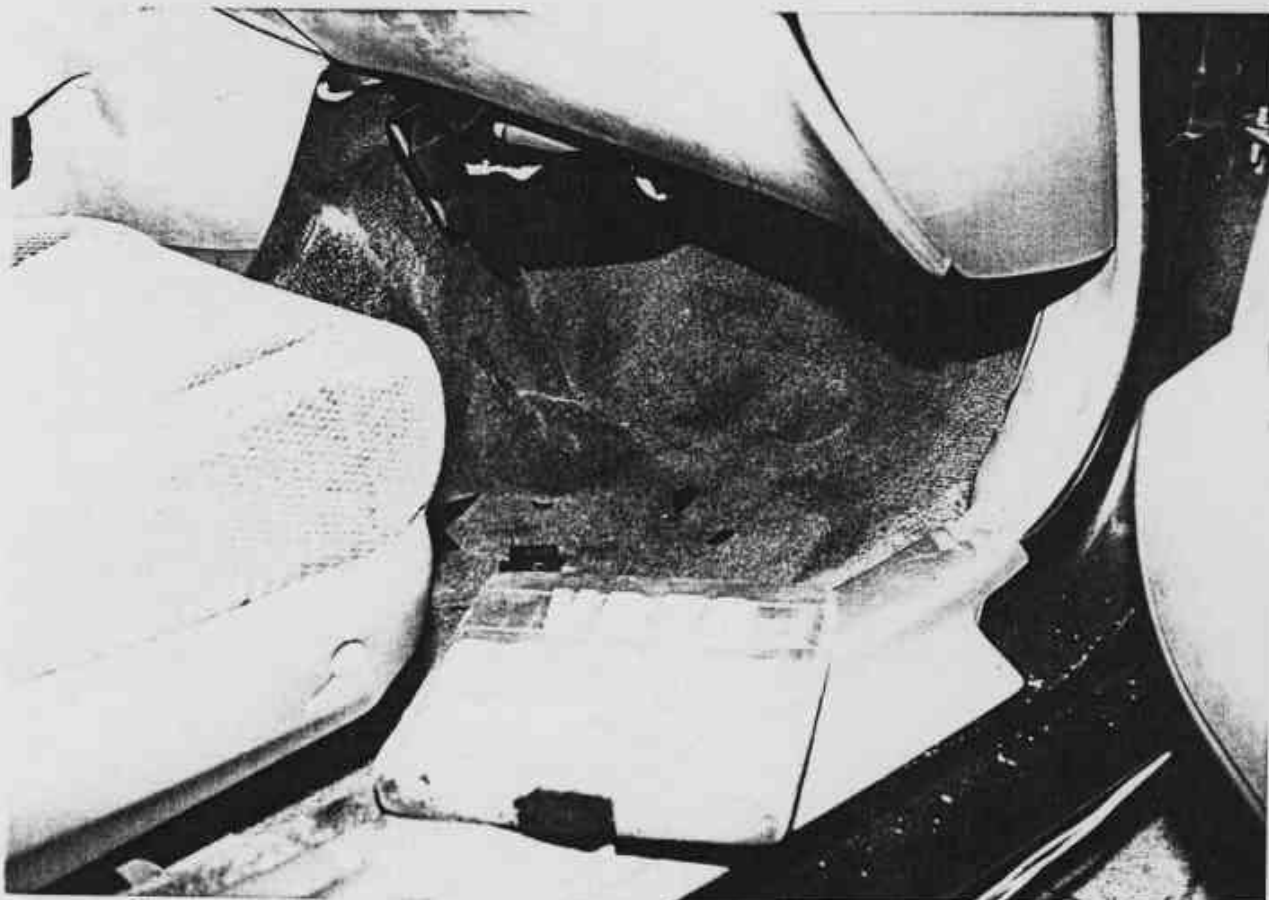


Figure A-75 Post-Test Target Vehicle Passenger Dummy Knee Contact - View 3

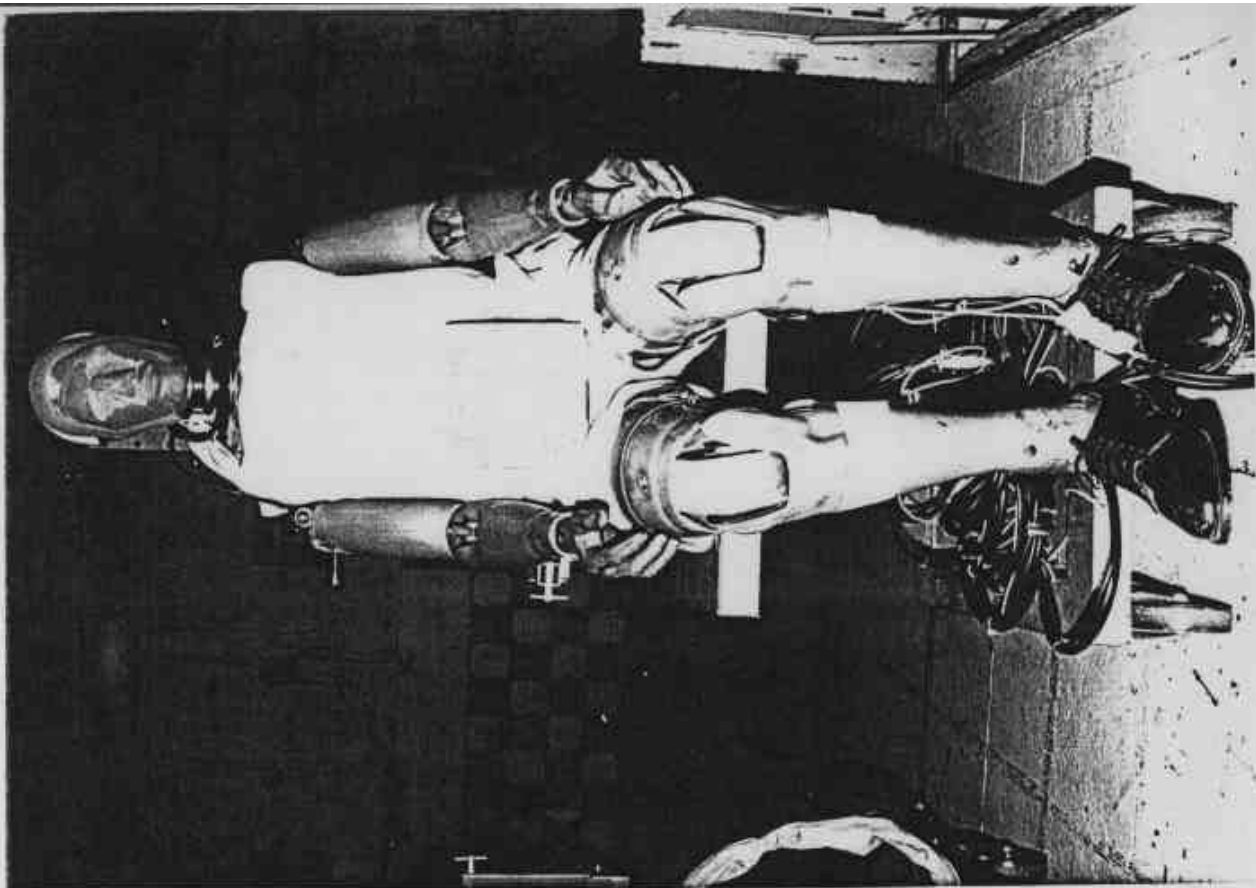


Figure A-76 Post-Test Bullet Vehicle Driver Dummy View

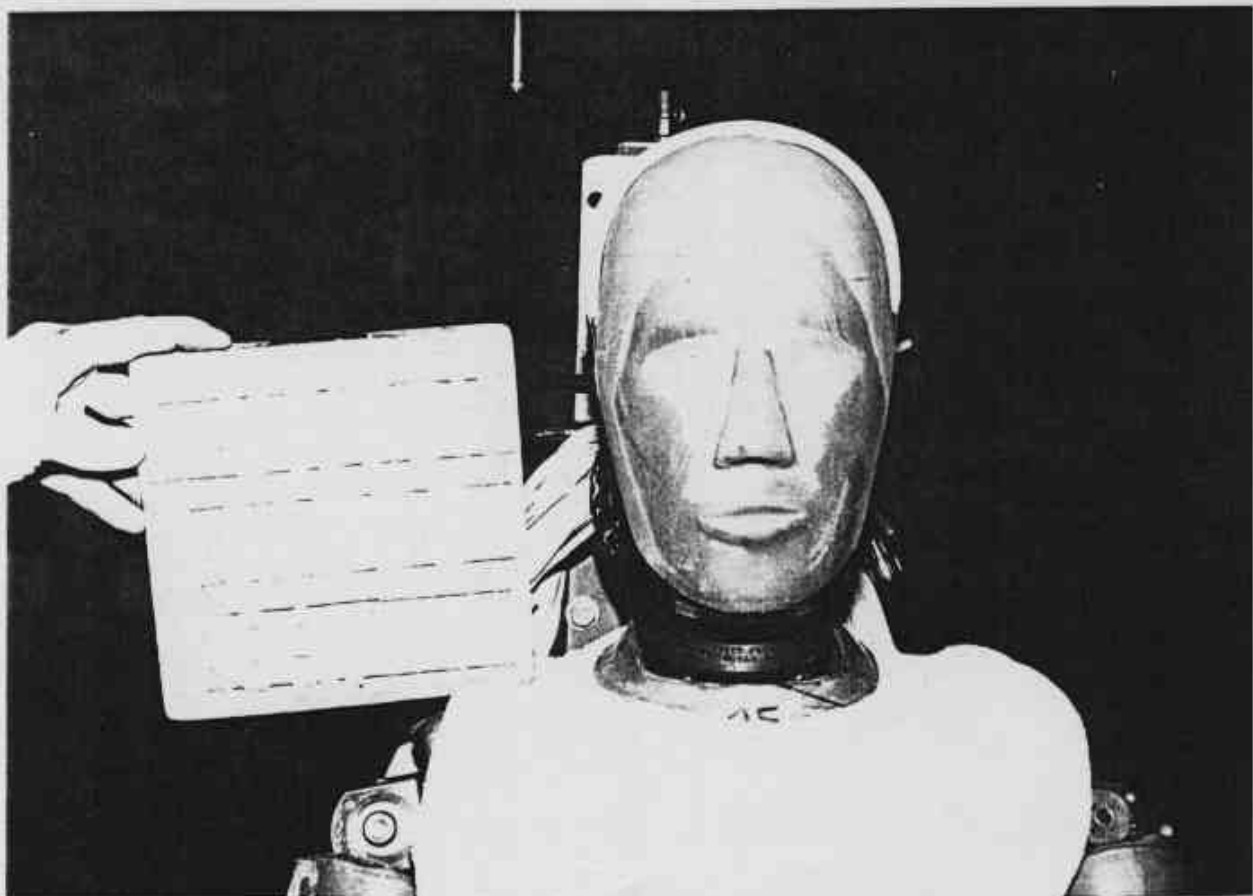


Figure A-77 Post-Test Bullet Vehicle Driver Dummy Head Contact - View 1



Figure A-78 Post-Test Bullet Vehicle Driver Dummy Head Contact - View 2



Figure A-79 Post-Test Bullet Vehicle Driver Dummy Head Contact - View 3

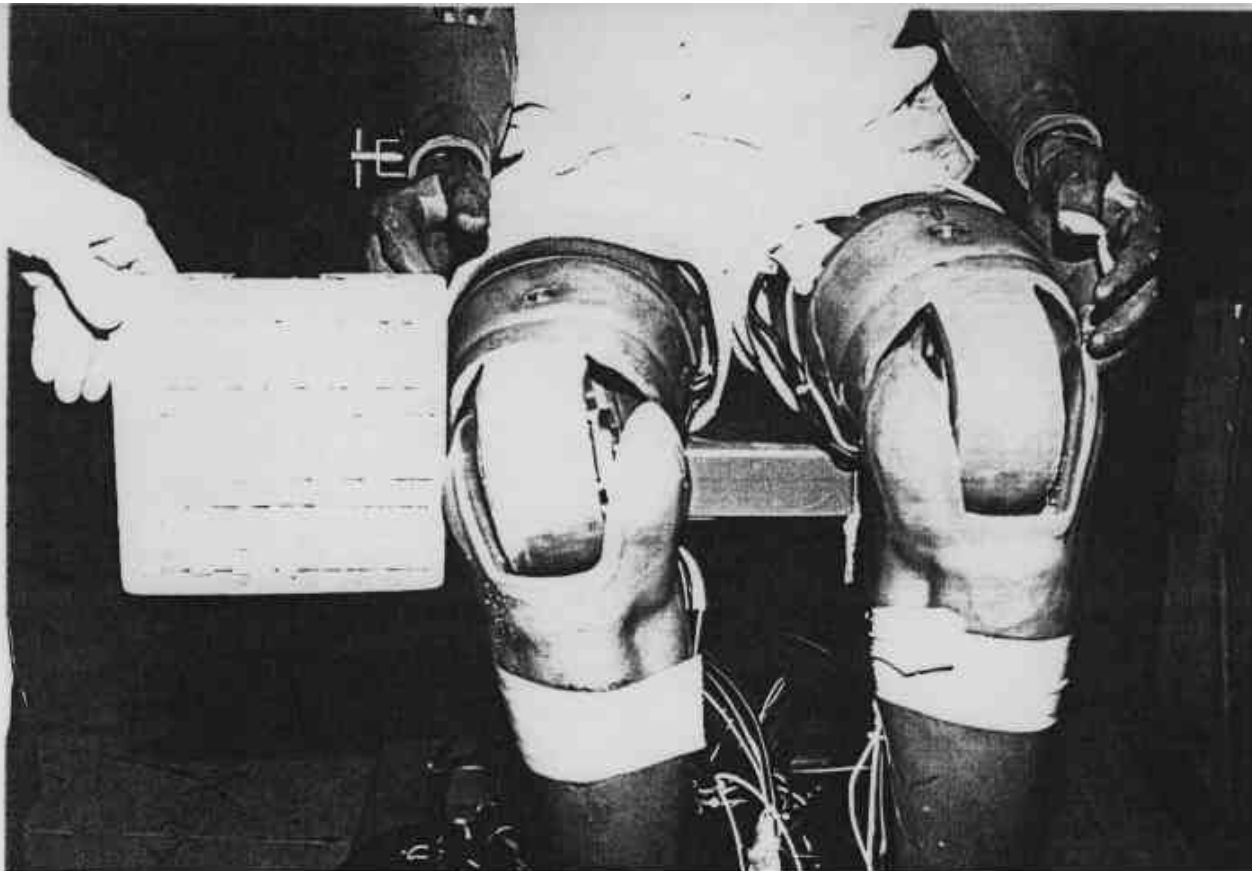


Figure A-80 Post-Test Bullet Vehicle Driver Dummy Leg Contact - View 1



Figure A-81 Post-Test Bullet Vehicle Driver Dummy Leg Contact - View 2

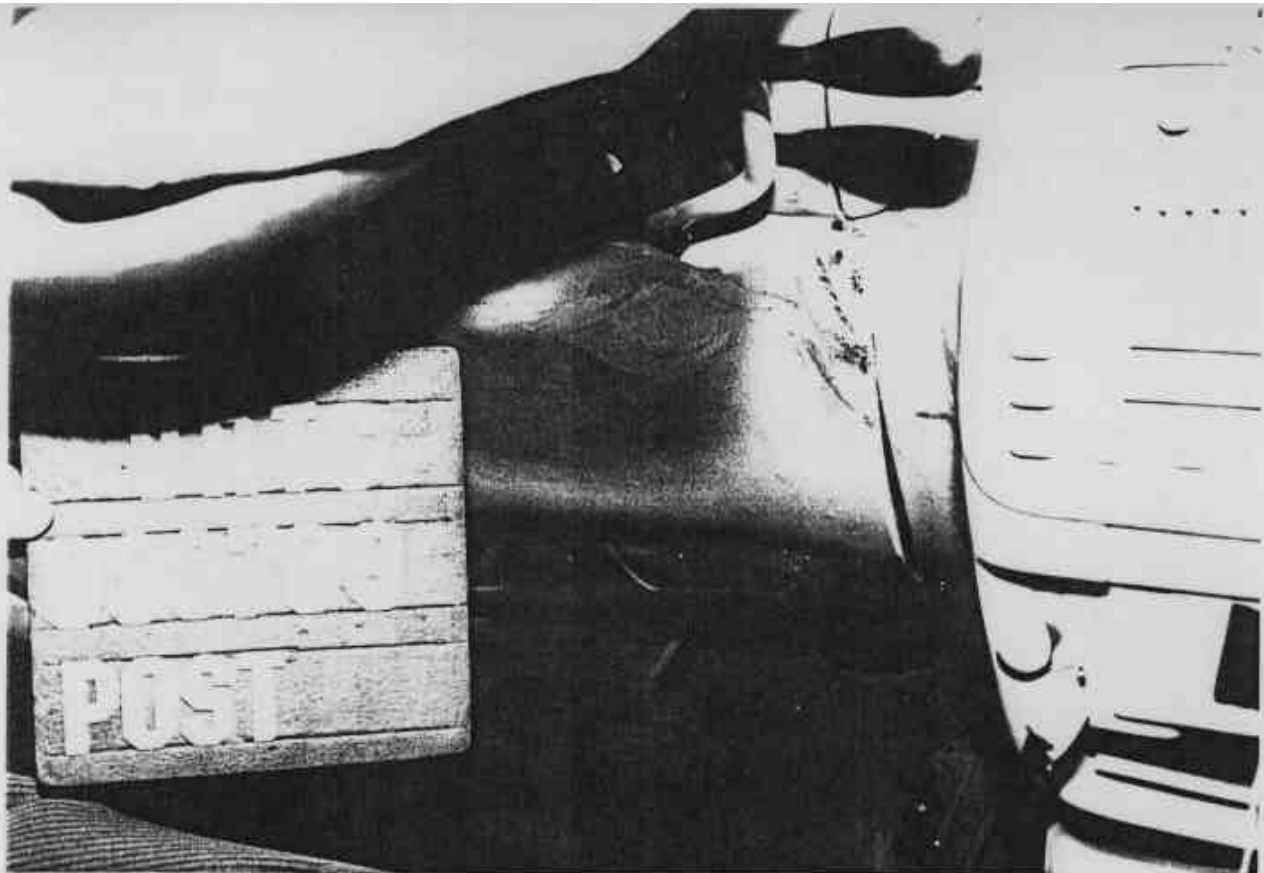


Figure A-82 Post-Test Bullet Vehicle Driver Dummy Leg Contact - View 3

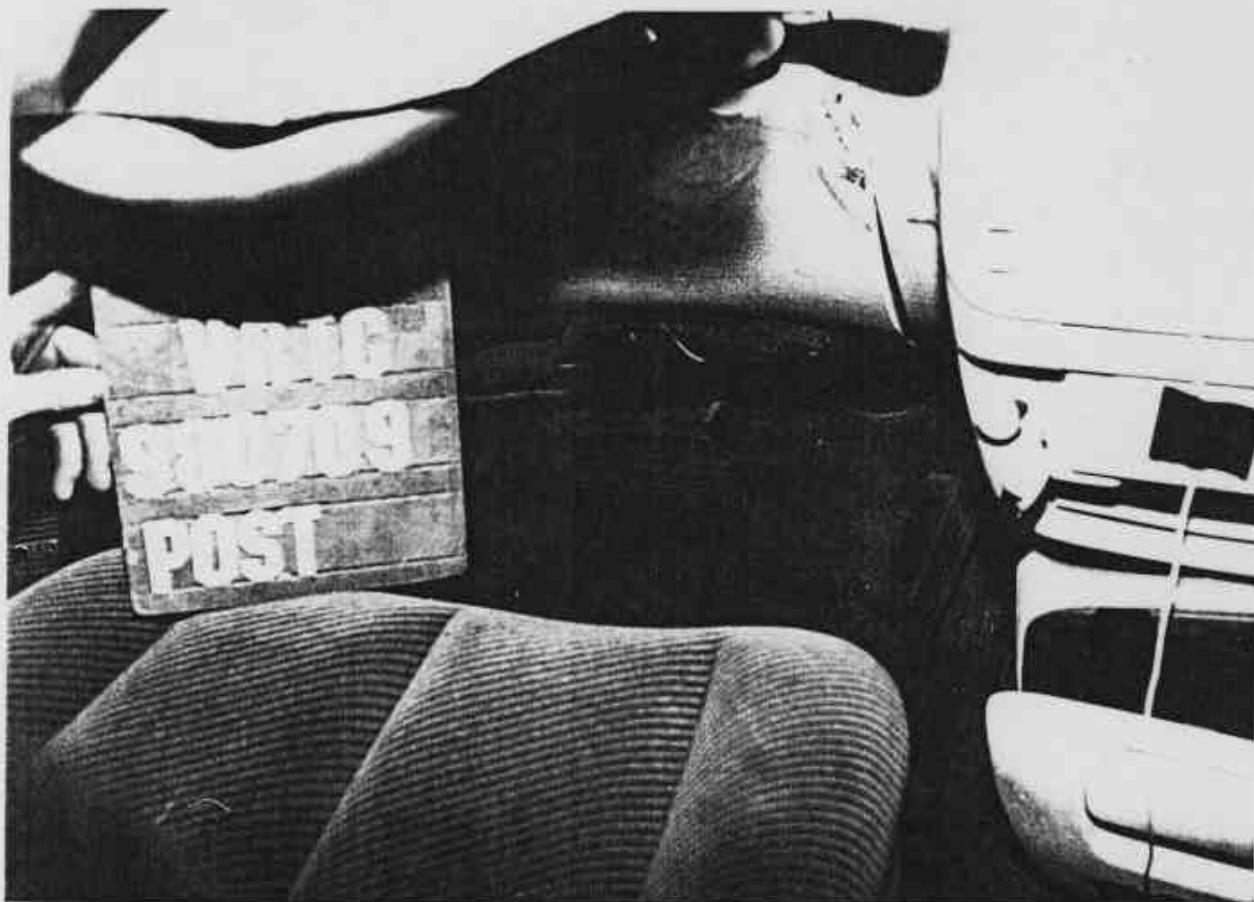


Figure A-83 Post-Test Bullet Vehicle Driver Dummy Leg Contact - View 4

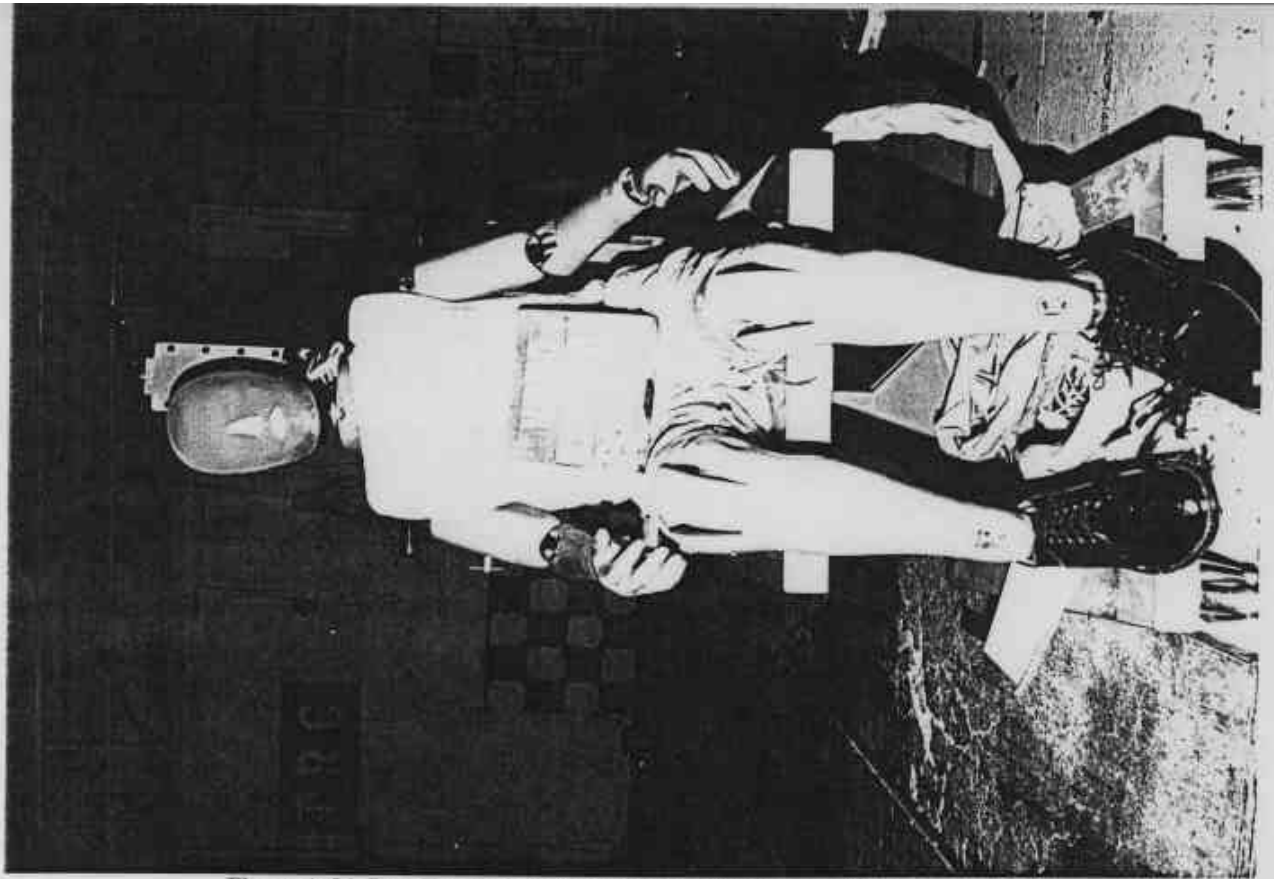


Figure A-84 Post-Test Bullet Vehicle Passenger Dummy View

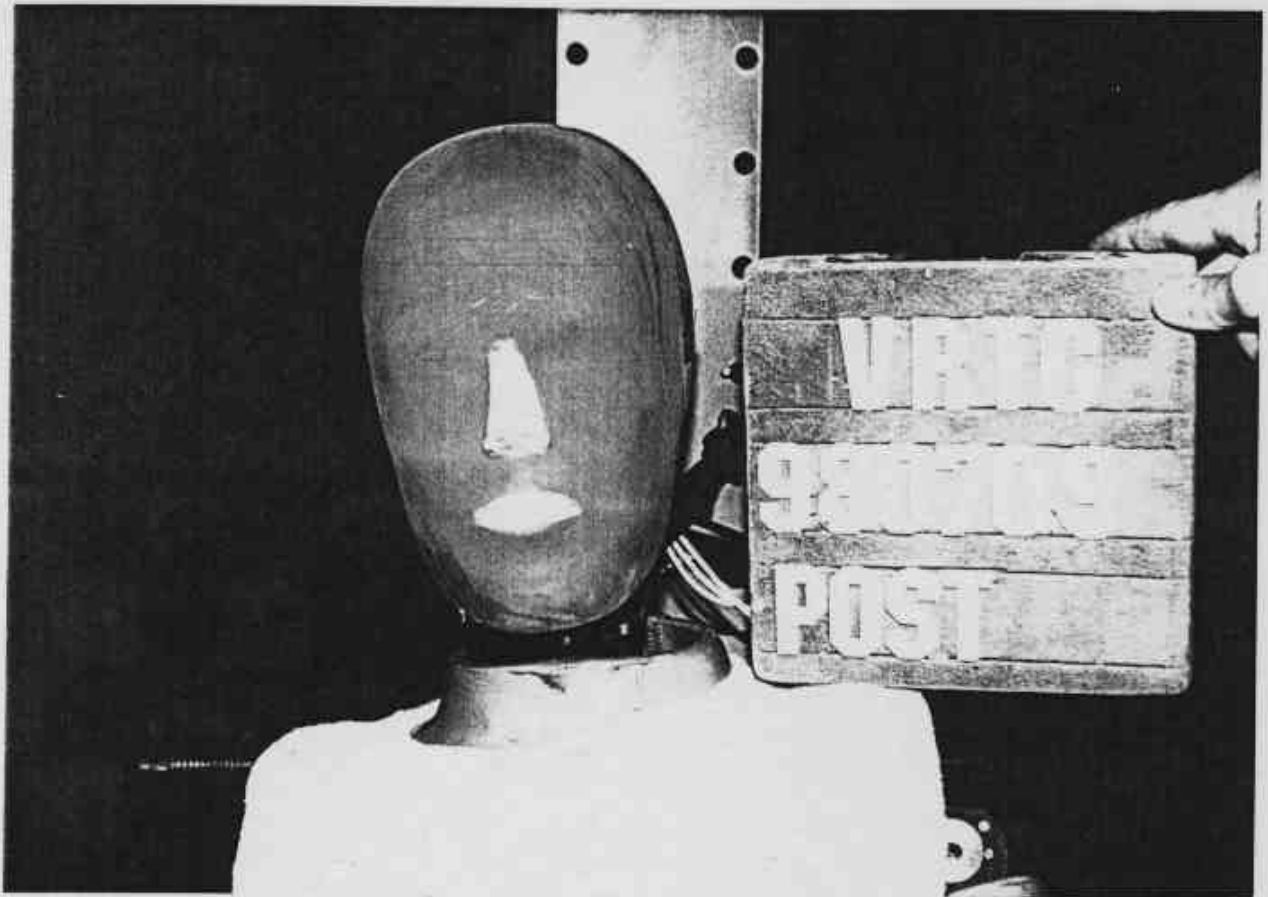


Figure A-85 Post-Test Bullet Vehicle Passenger Dummy Head Contact - View 1

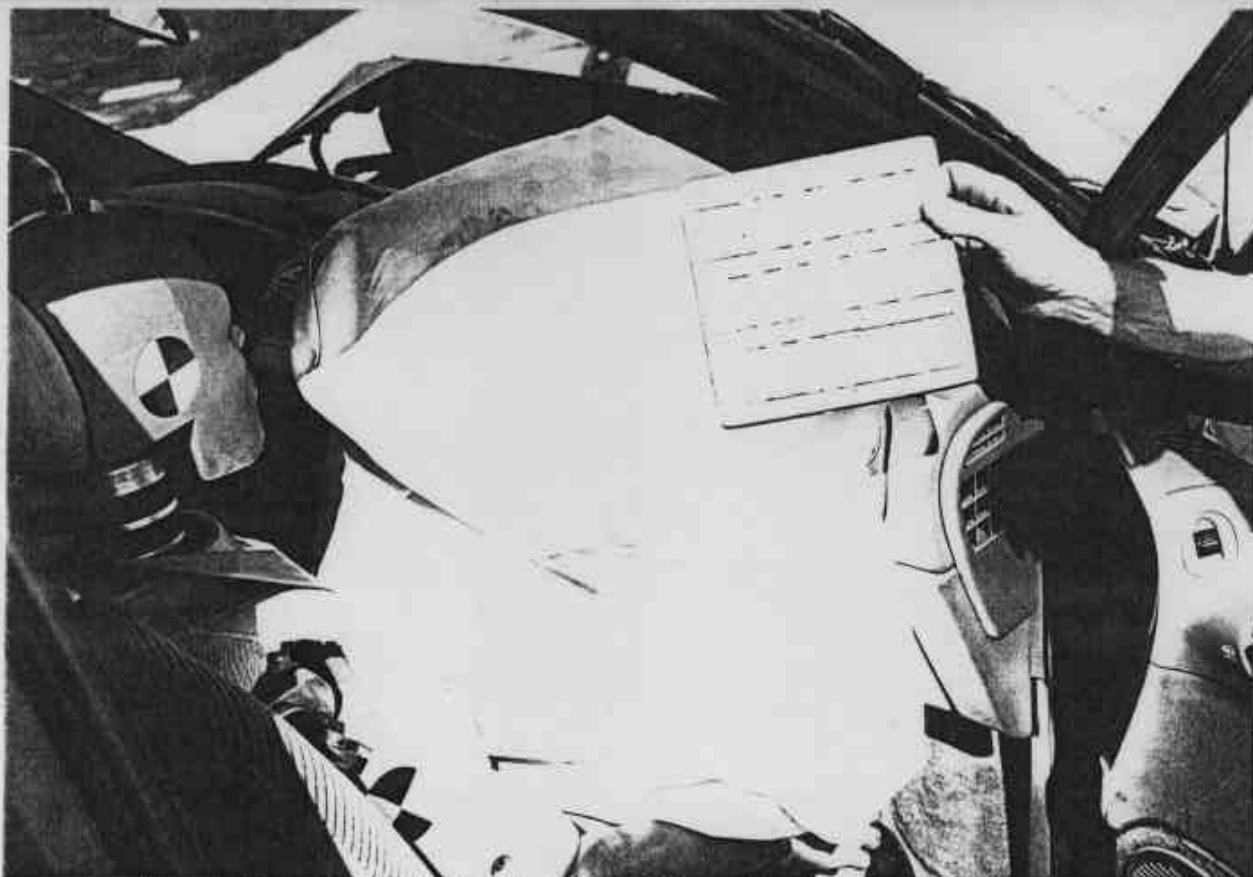


Figure A-86 Post-Test Bullet Vehicle Passenger Dummy Head Contact - View 2

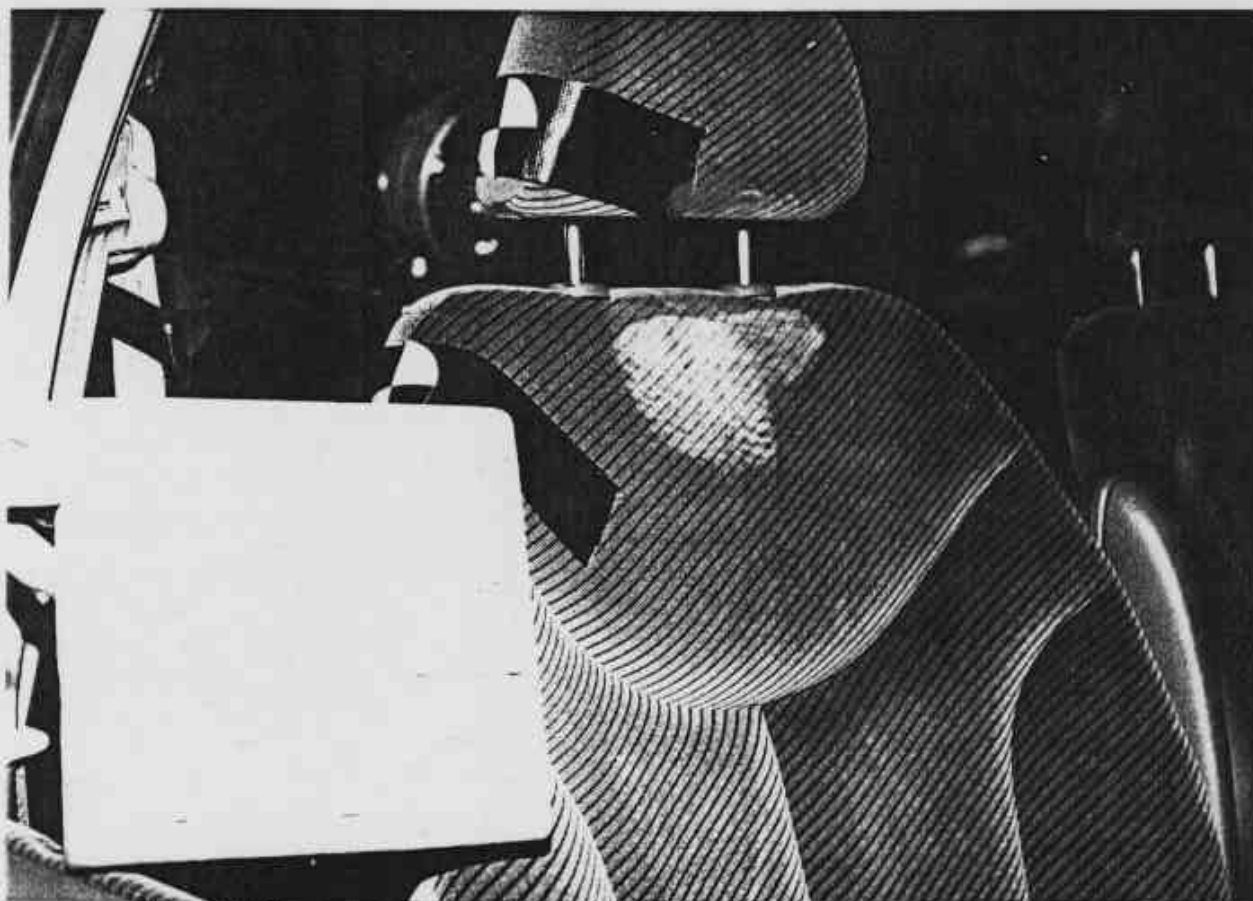


Figure A-87 Post-Test Bullet Vehicle Passenger Dummy Head Contact - View 3



Figure A-88 Post-Test Bullet Vehicle Passenger Dummy Leg Contact - View 1



Figure A-89 Post-Test Bullet Vehicle Passenger Dummy Leg Contact - View 2

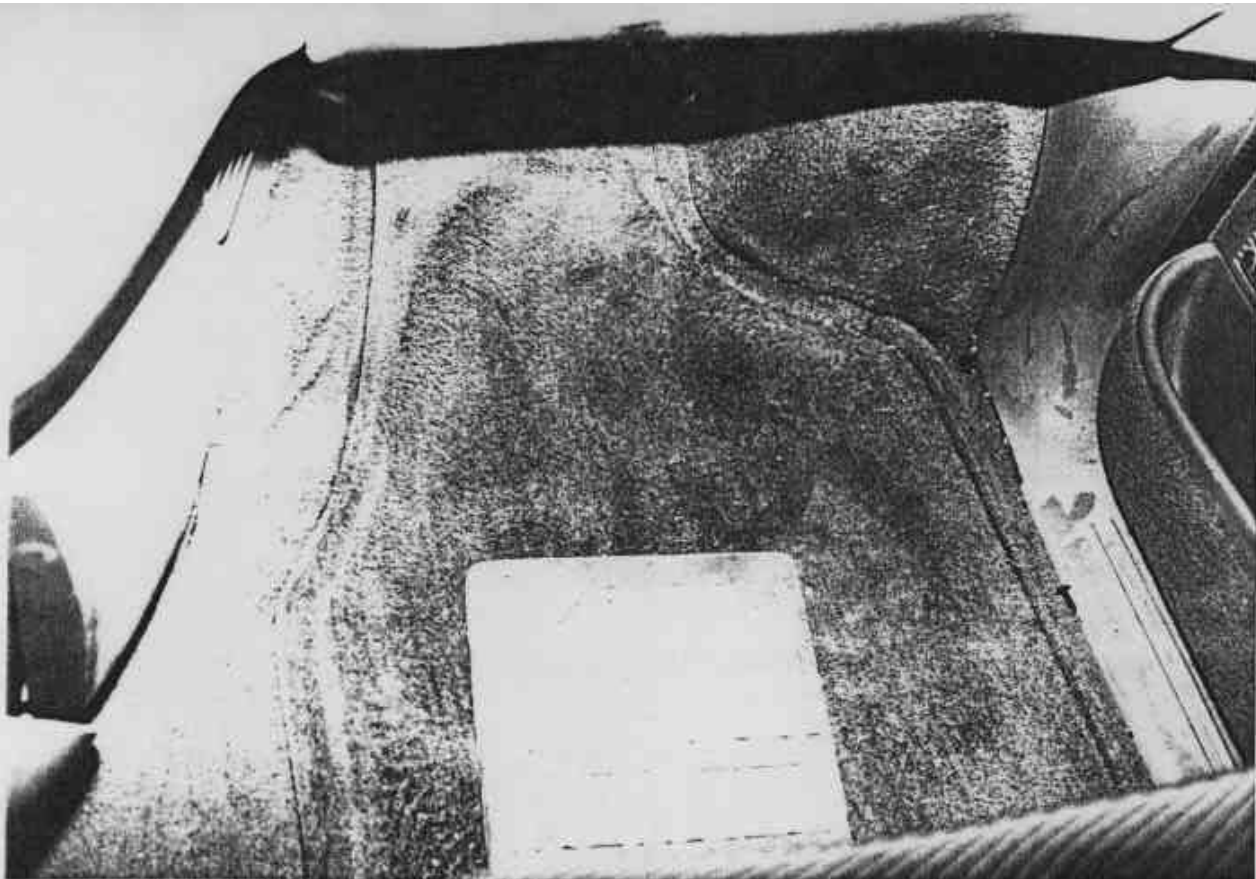


Figure A-90 Post-Test Bullet Vehicle Passenger Dummy Leg Contact - View 3



Figure A-91 Target Vehicle Certification Label

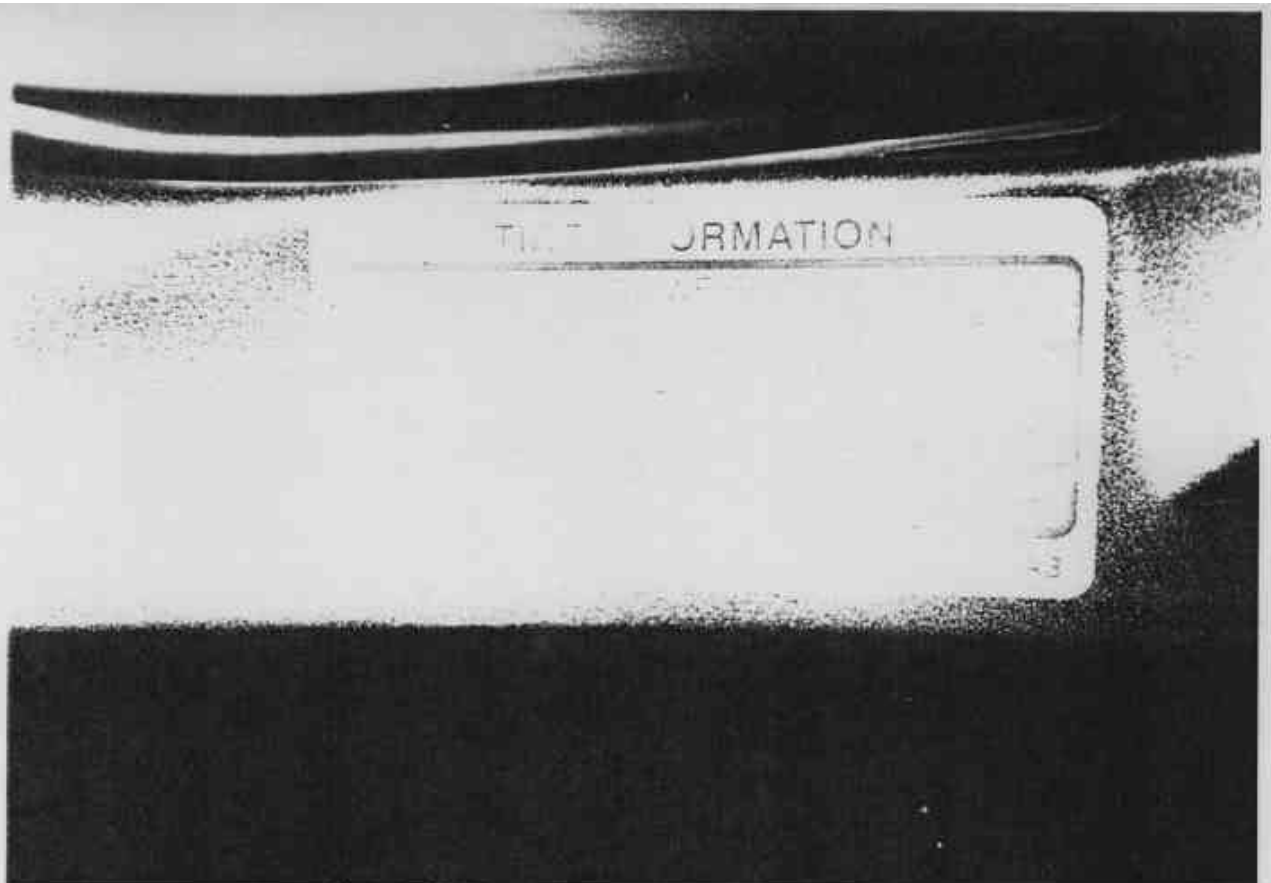


Figure A-92 Target Vehicle Tire Load Label

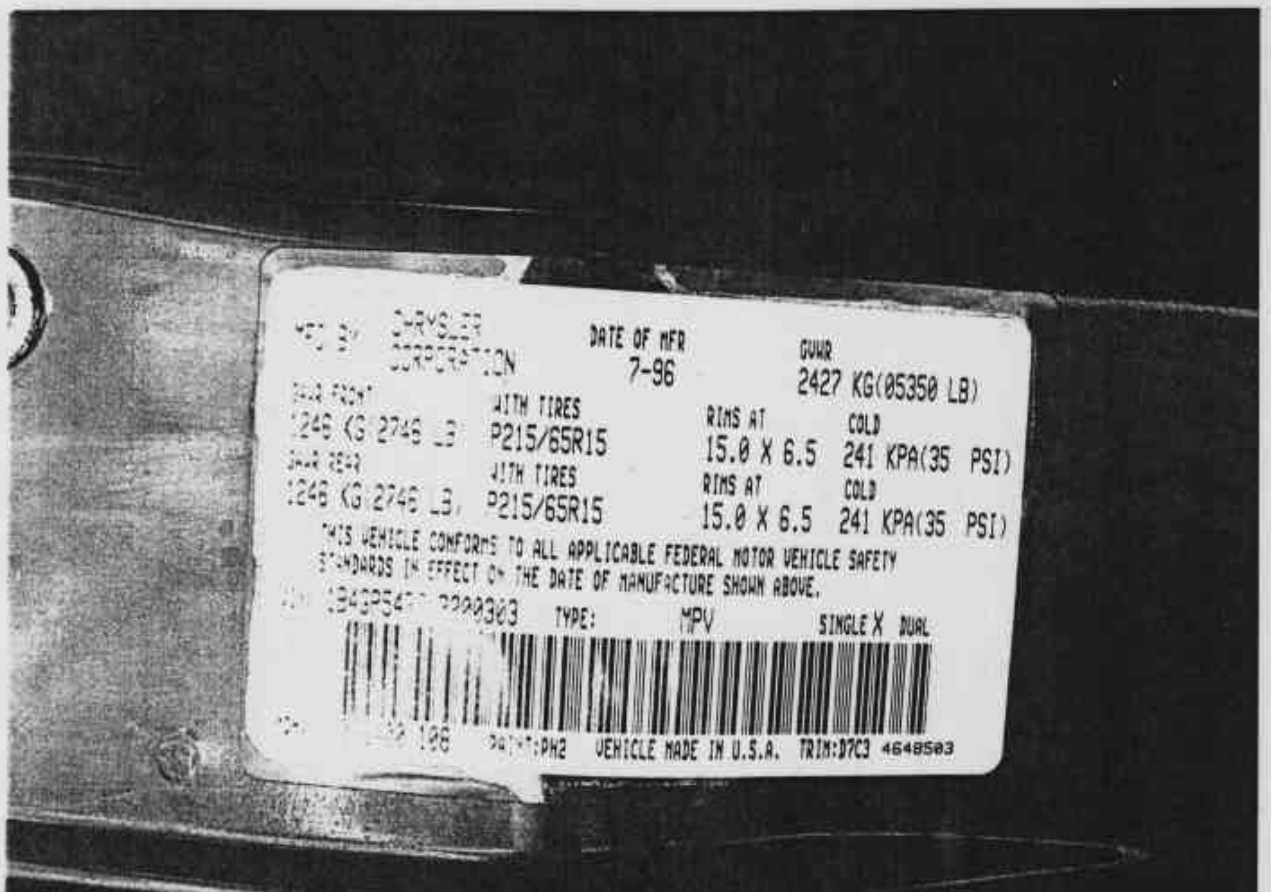


Figure A-93 Bullet Vehicle Certification Label

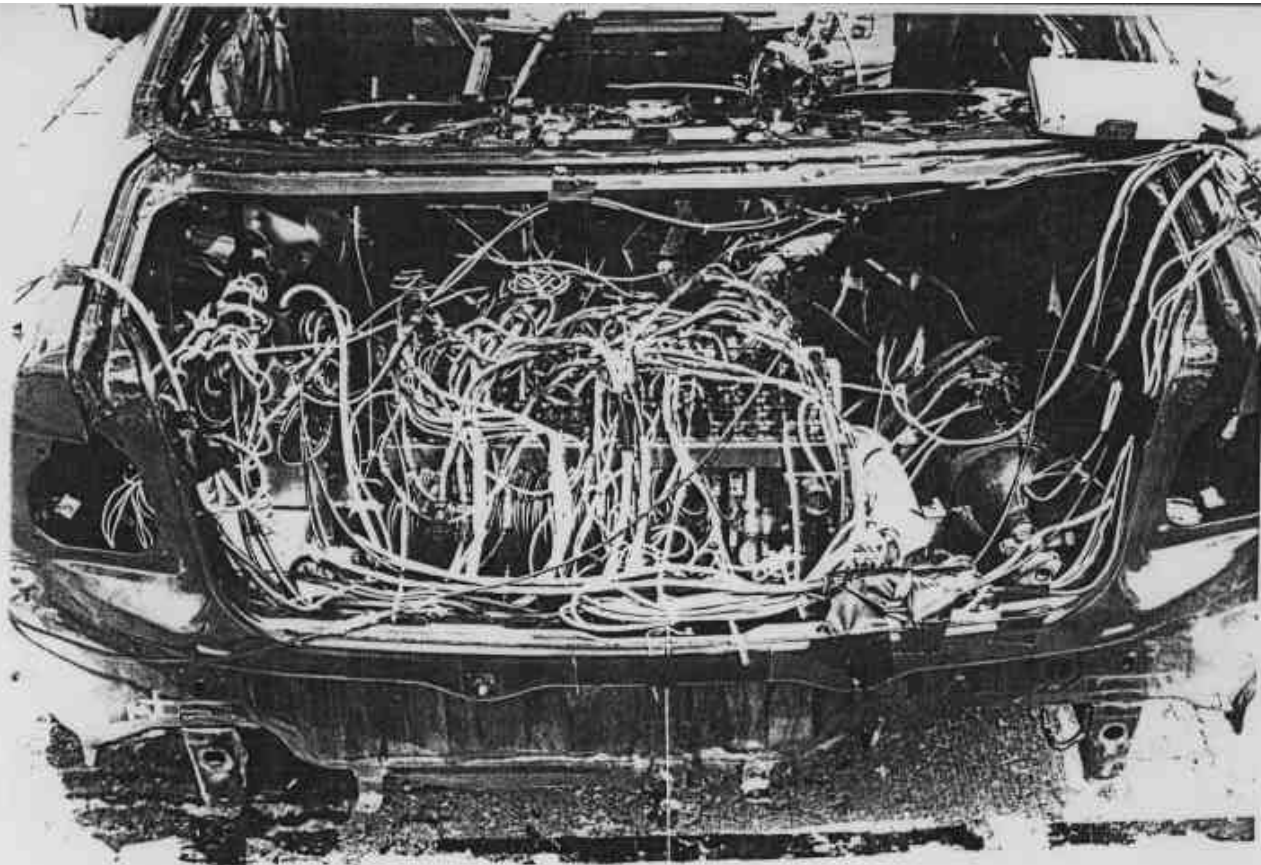


Figure A-94 Pre-Test Target Vehicle Ballast Location View

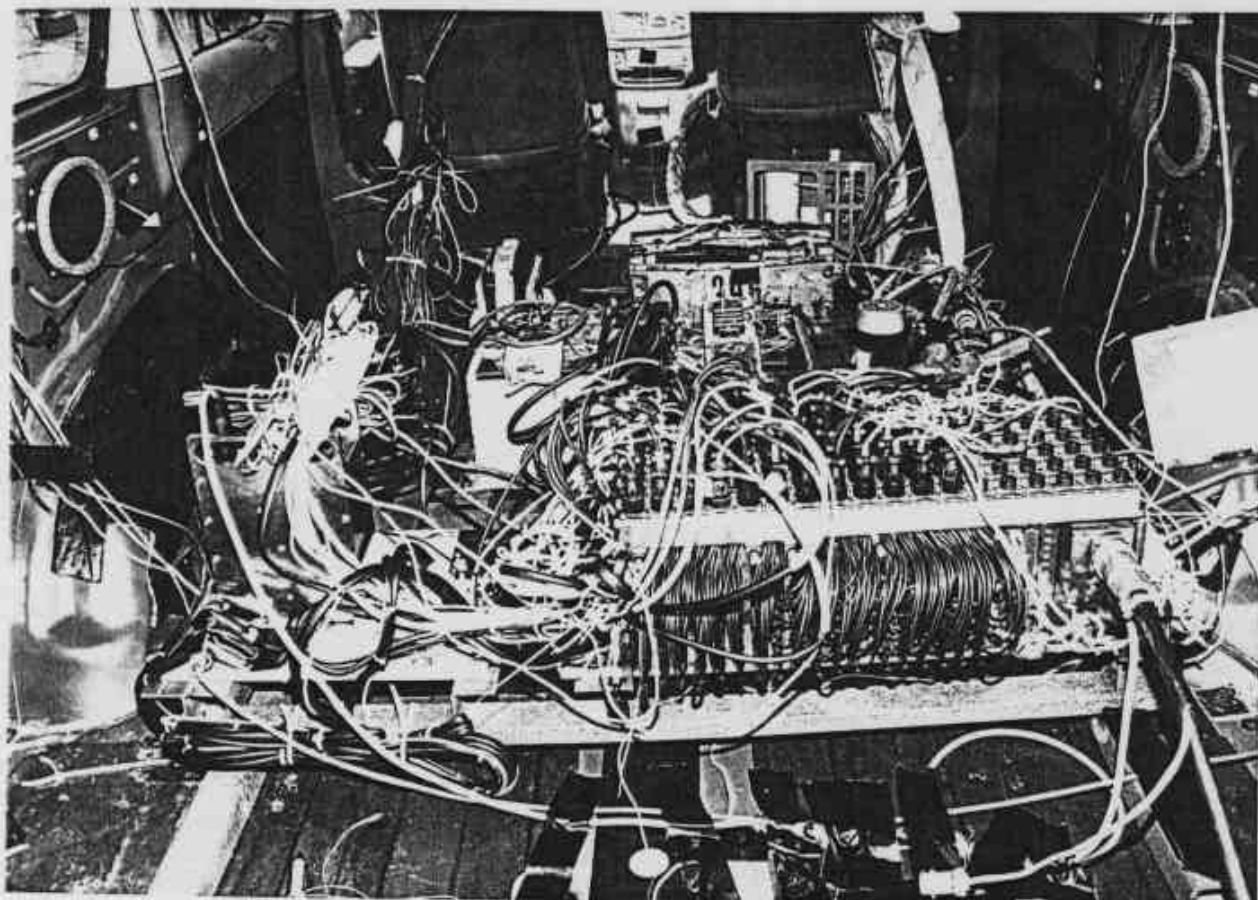


Figure A-95 Pre-Test Bullet Vehicle Ballast Location View

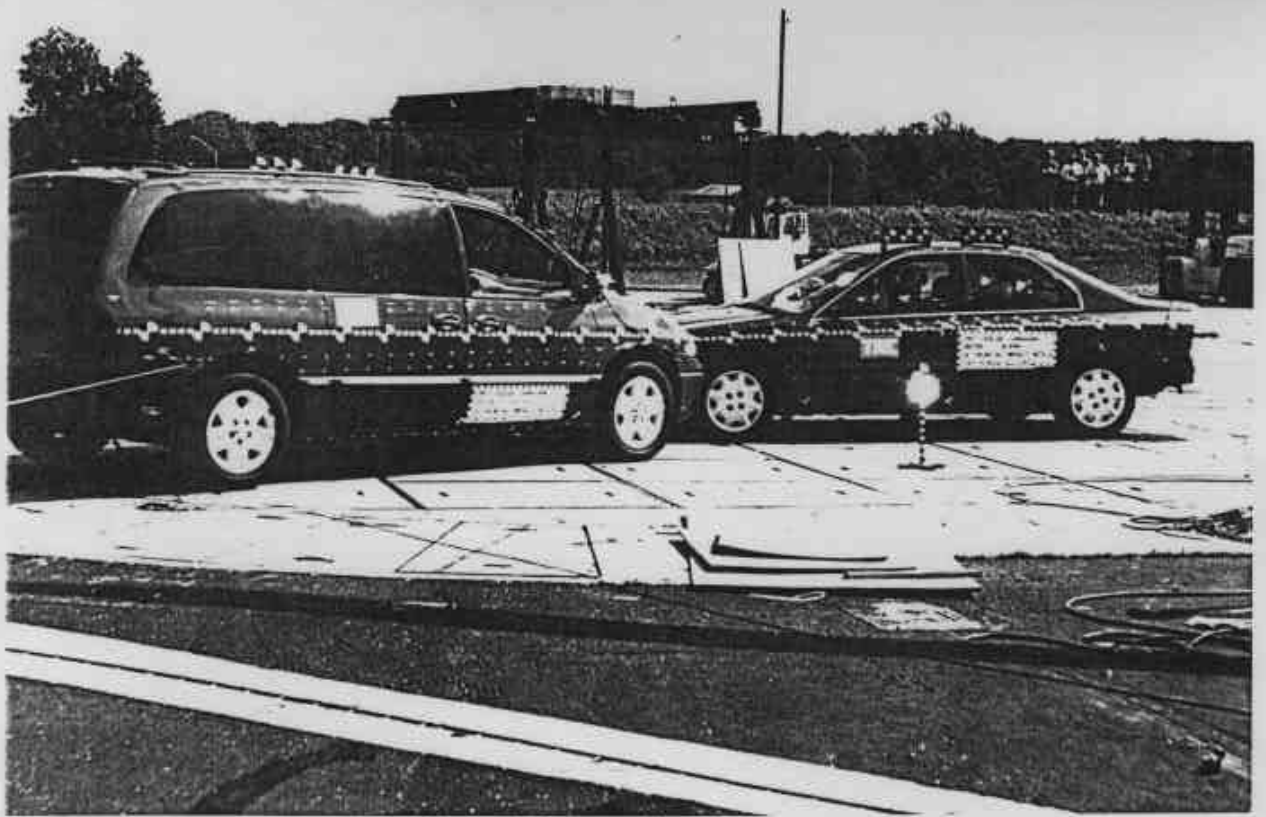


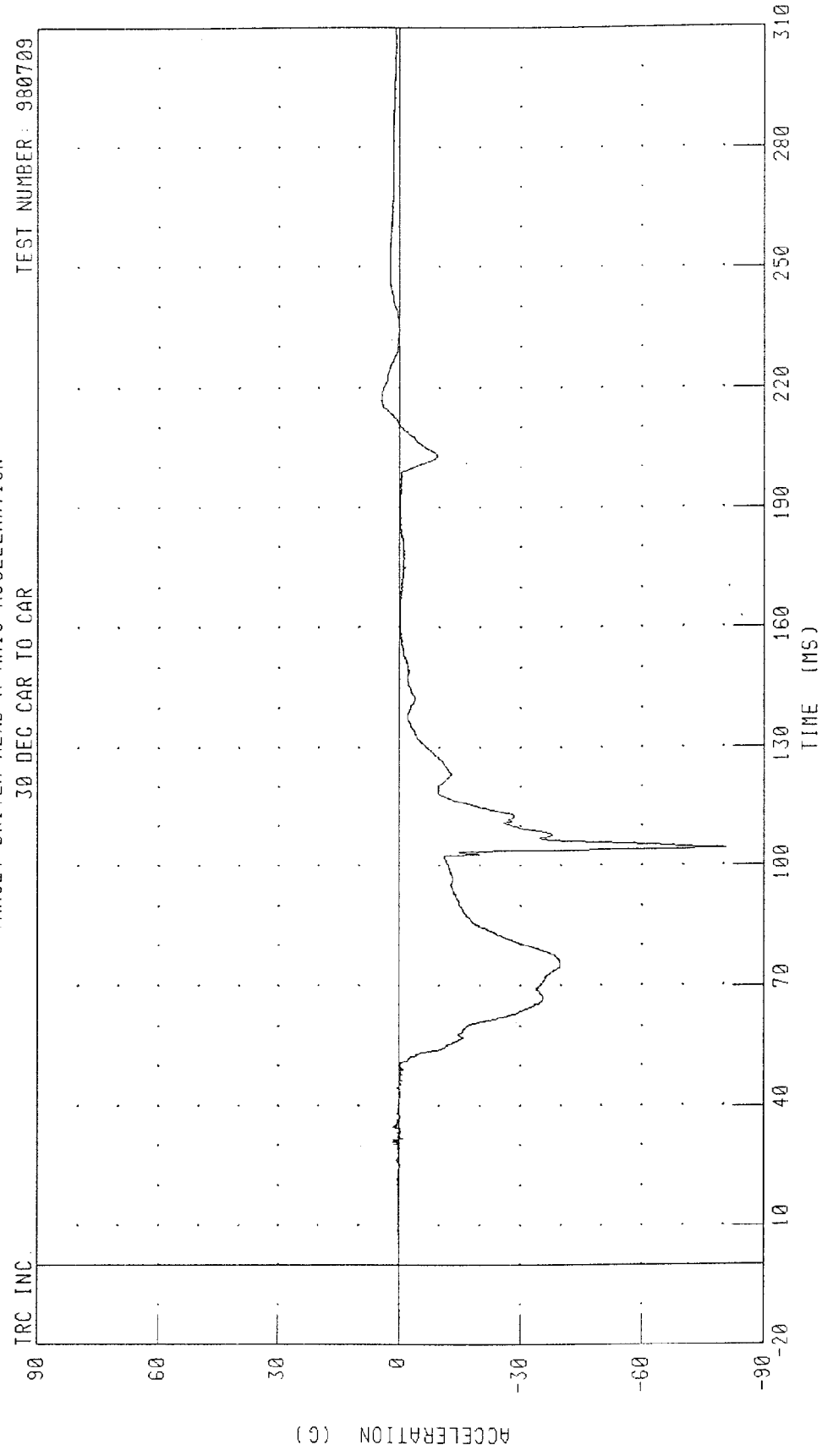
Figure A-96 Impact Event

Appendix B

Data Plots

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER HEAD X-AXIS ACCELERATION
30 DEG CAR TO CAR

TEST NUMBER: 980709



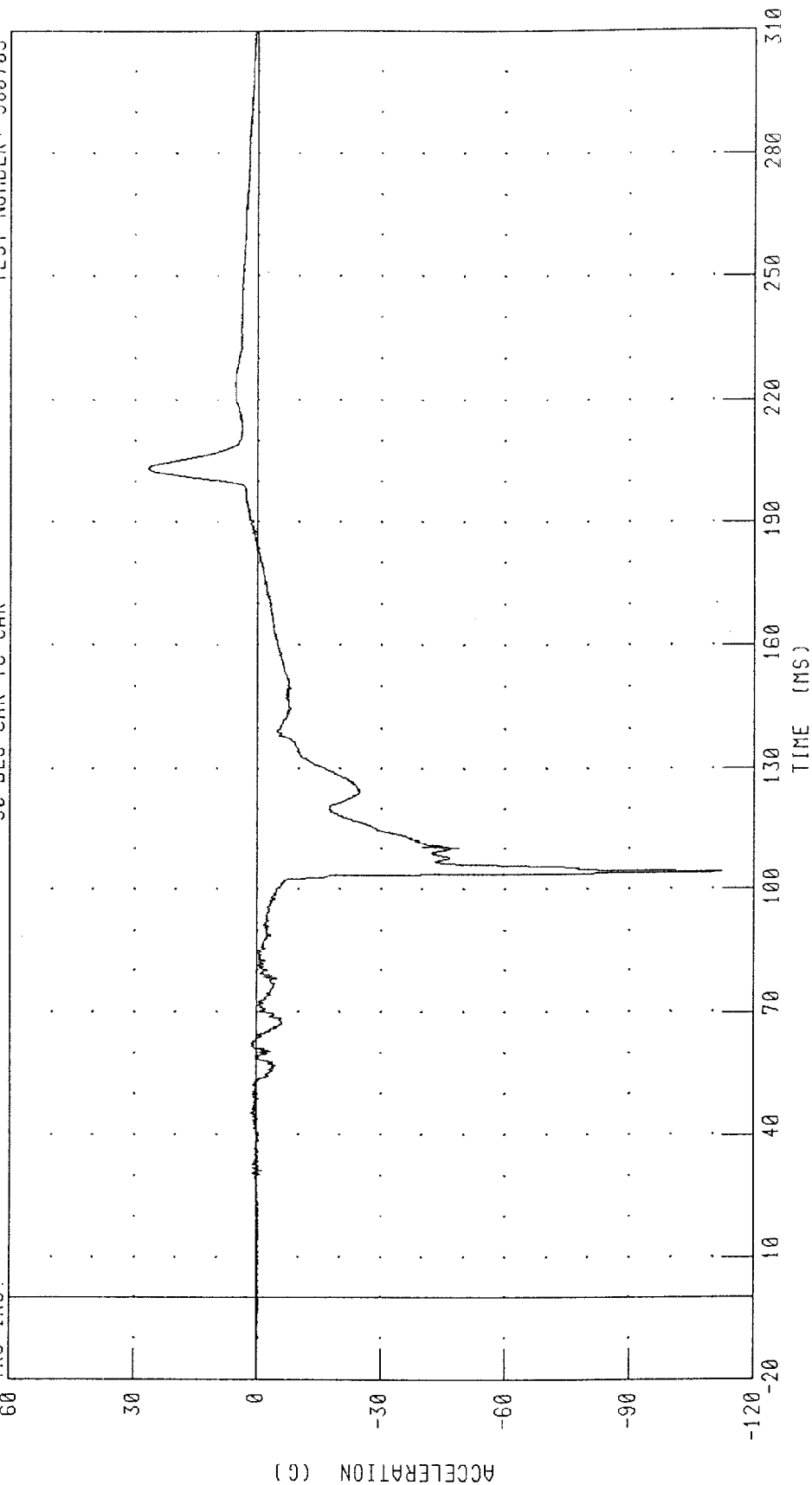
CHANNEL: HEDXG1 FILTER: CH. CLASS 1000
PEAK DATA: 4.42 G @ 217.04 MS, -80.75 G @ 104.48 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

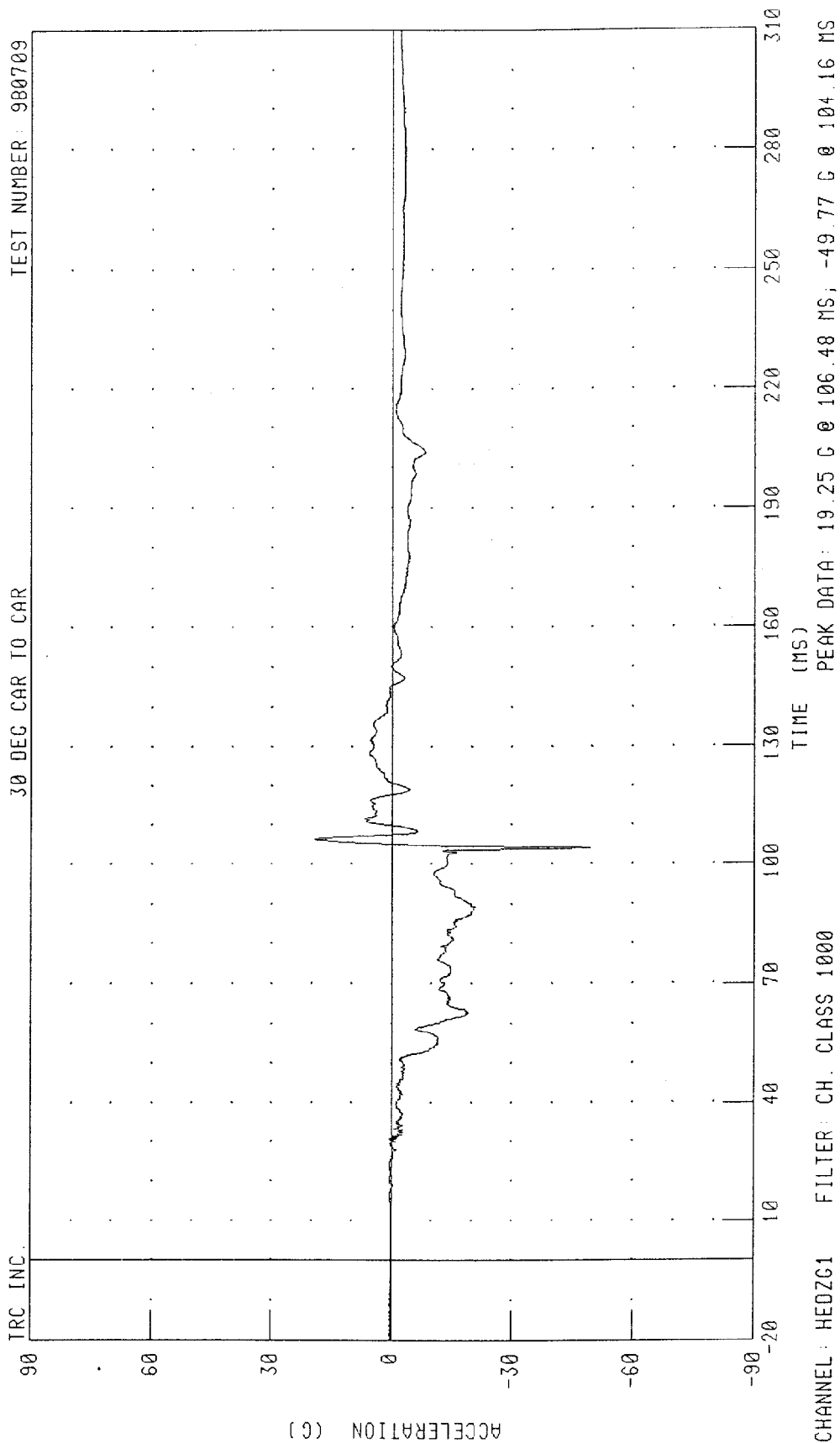
TRC INC.



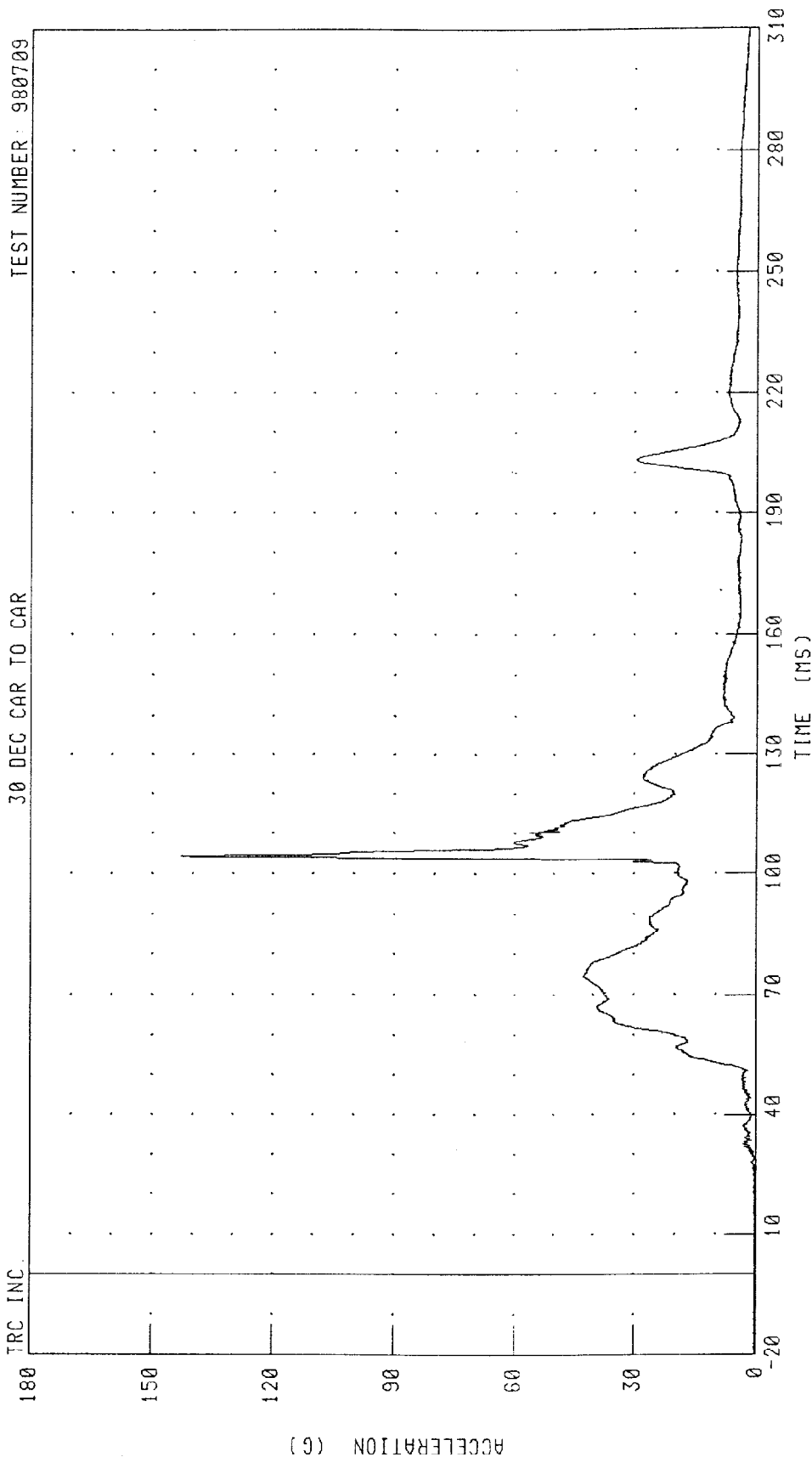
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

PEAK DATA: 26.79 G @ 203.20 MS; -112.05 G @ 104.32 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER HEAD Z-AXIS ACCELERATION



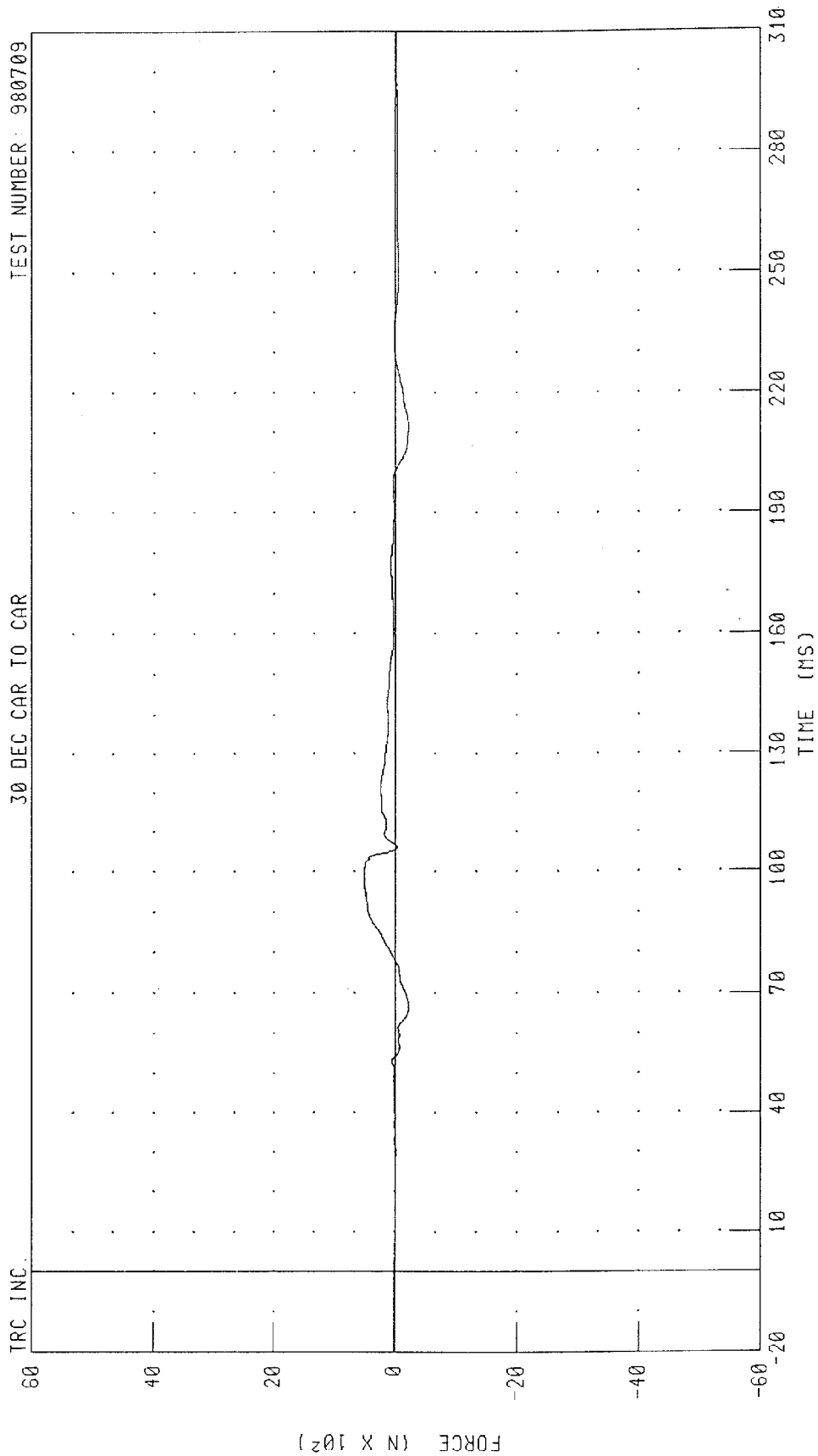
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER HEAD RESULTANT ACCELERATION



CHANNEL: HEDRG1 FILTER: CH CLASS 1000

PEAK DATA: 143.02 G @ 104.32 MS; 0.14 G @ -18.96 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK X-AXIS SHEAR FORCE



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

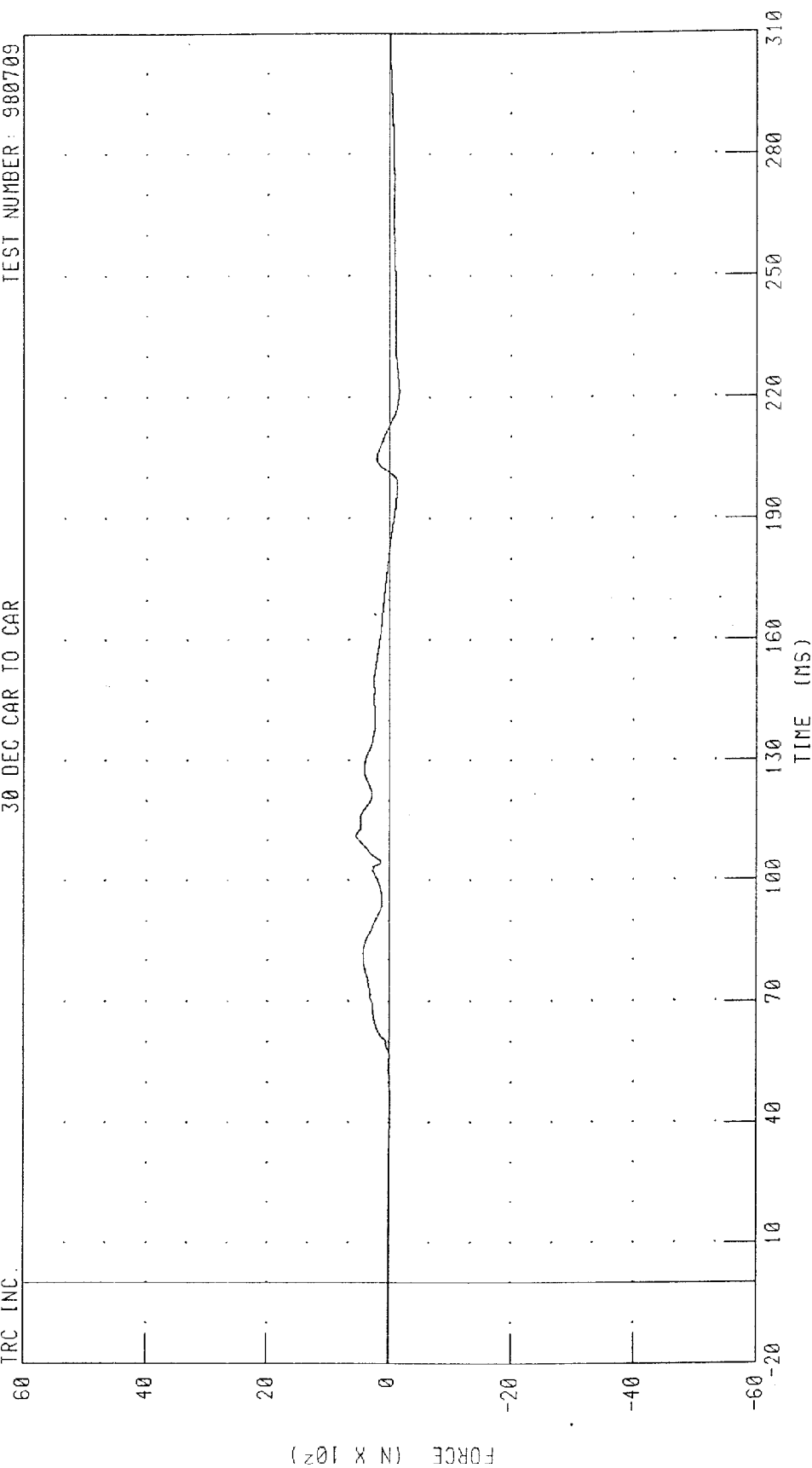
PEAK DATA: 508.22 N @ 99.76 MS; -235.08 N @ 66.48 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

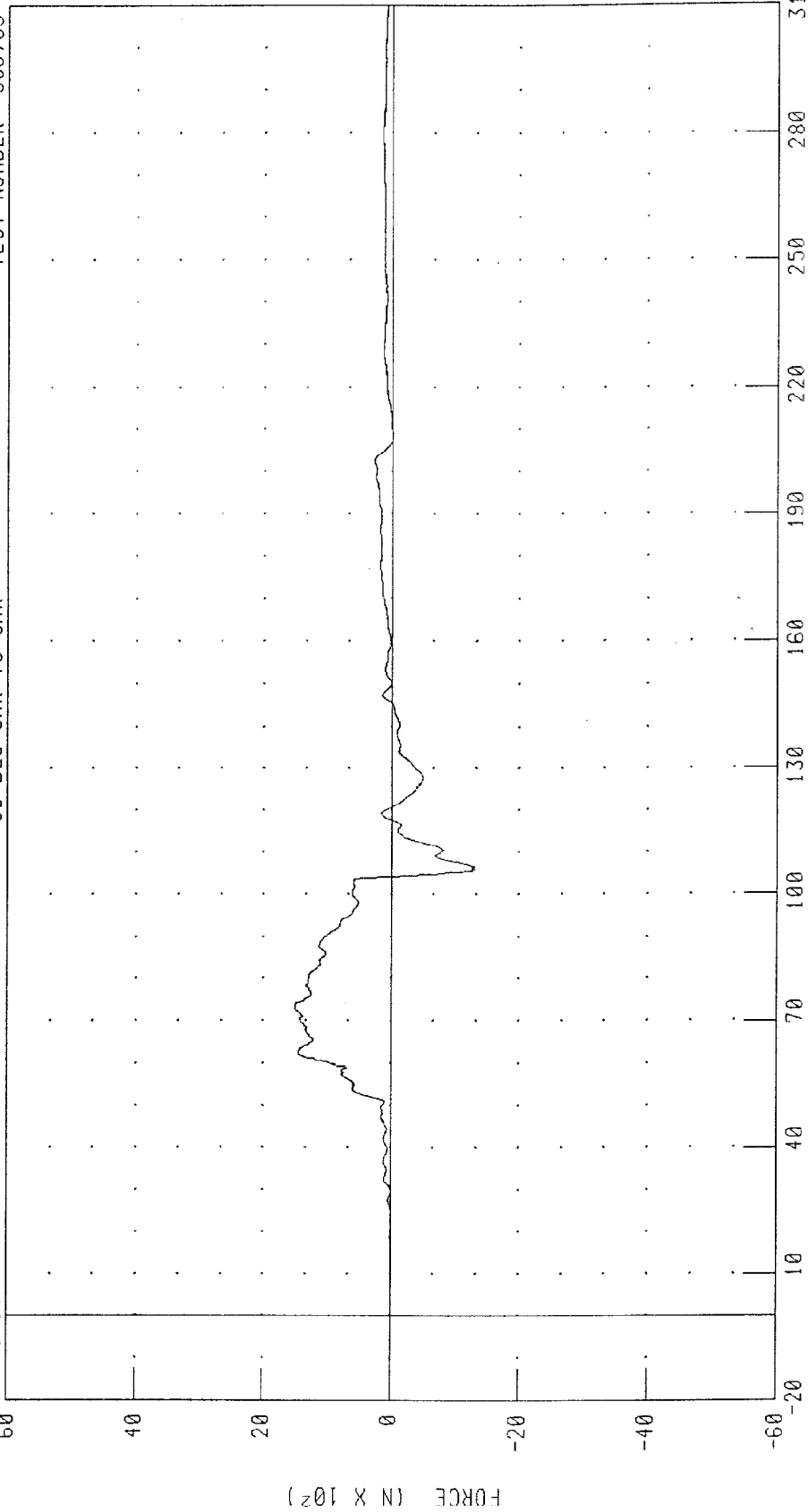
PEAK DATA: 536.20 N @ 111.20 MS, -168.21 N @ 221.04 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 980709

30 DEC CAR TO CAR

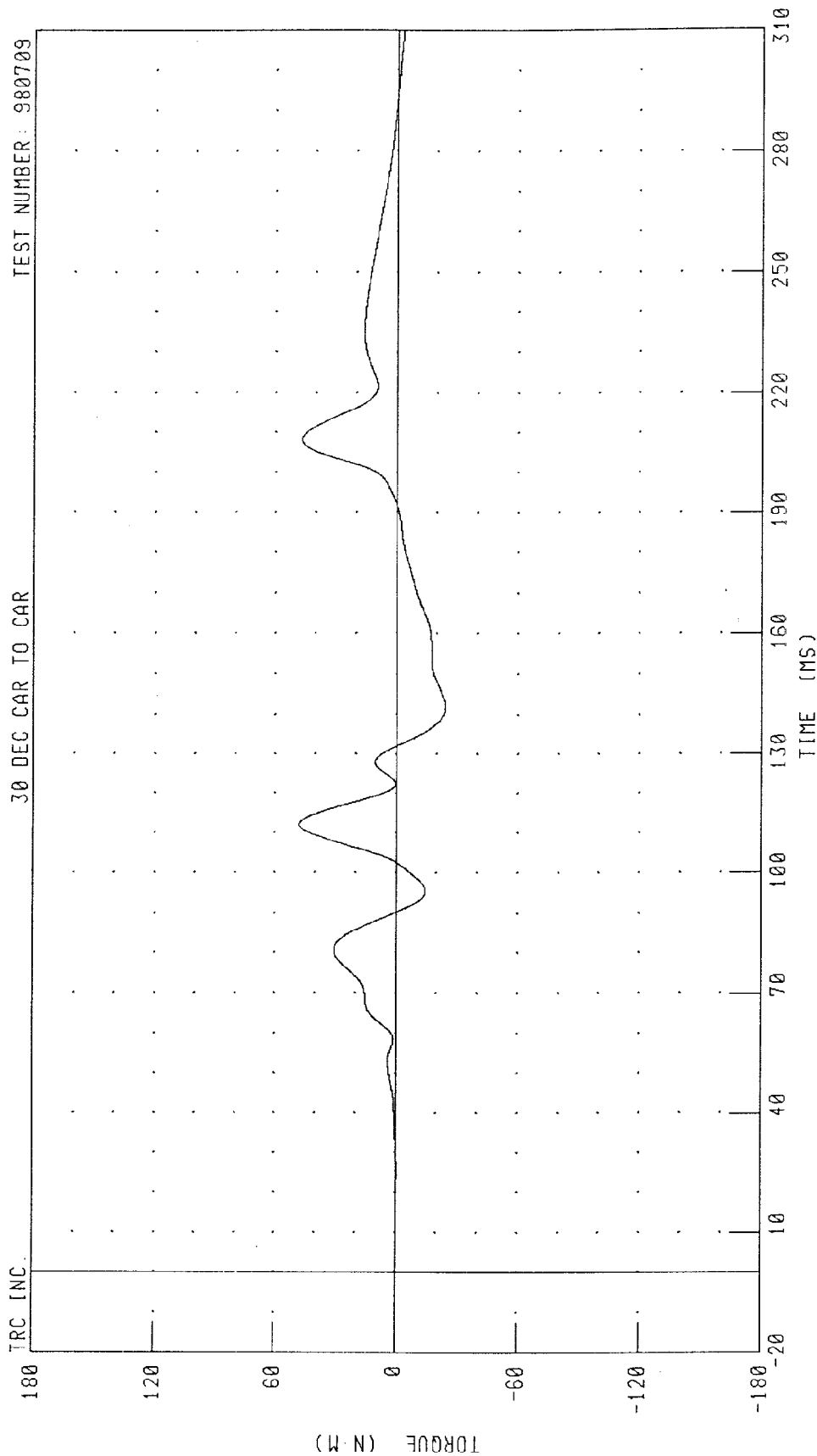
TRC INC.



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

PEAK DATA: 1506.50 N @ 72.80 MS, -1303.68 N @ 105.92 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK MOMENT ABOUT X AXIS



CHANNEL: NEKXH1 FILTER: CH. CLASS 60

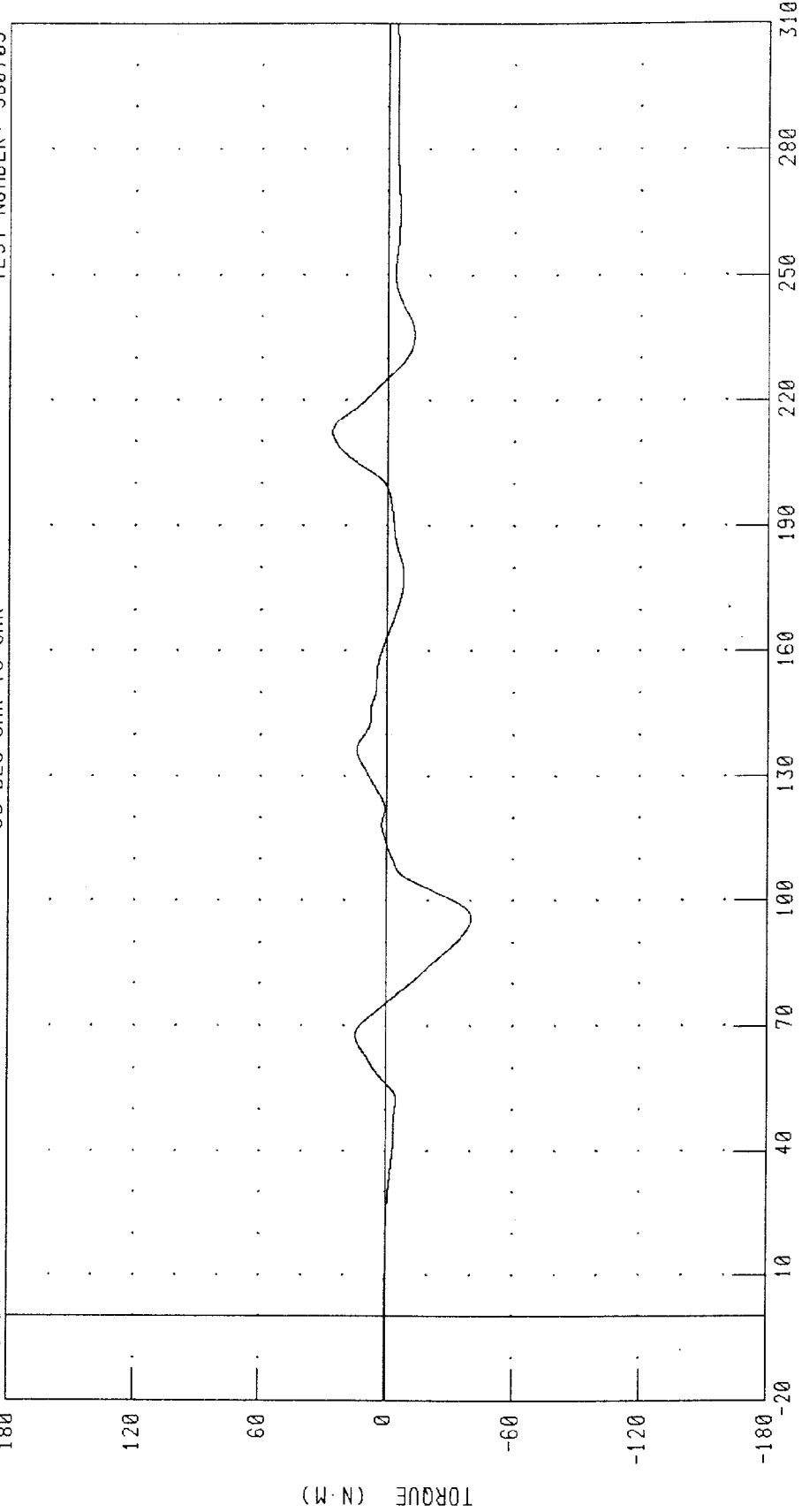
PEAK DATA: 48.03 N·M @ 112.16 MS, -24.30 N·M @ 142.00 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 980709

30 DEG CAR TO CAR

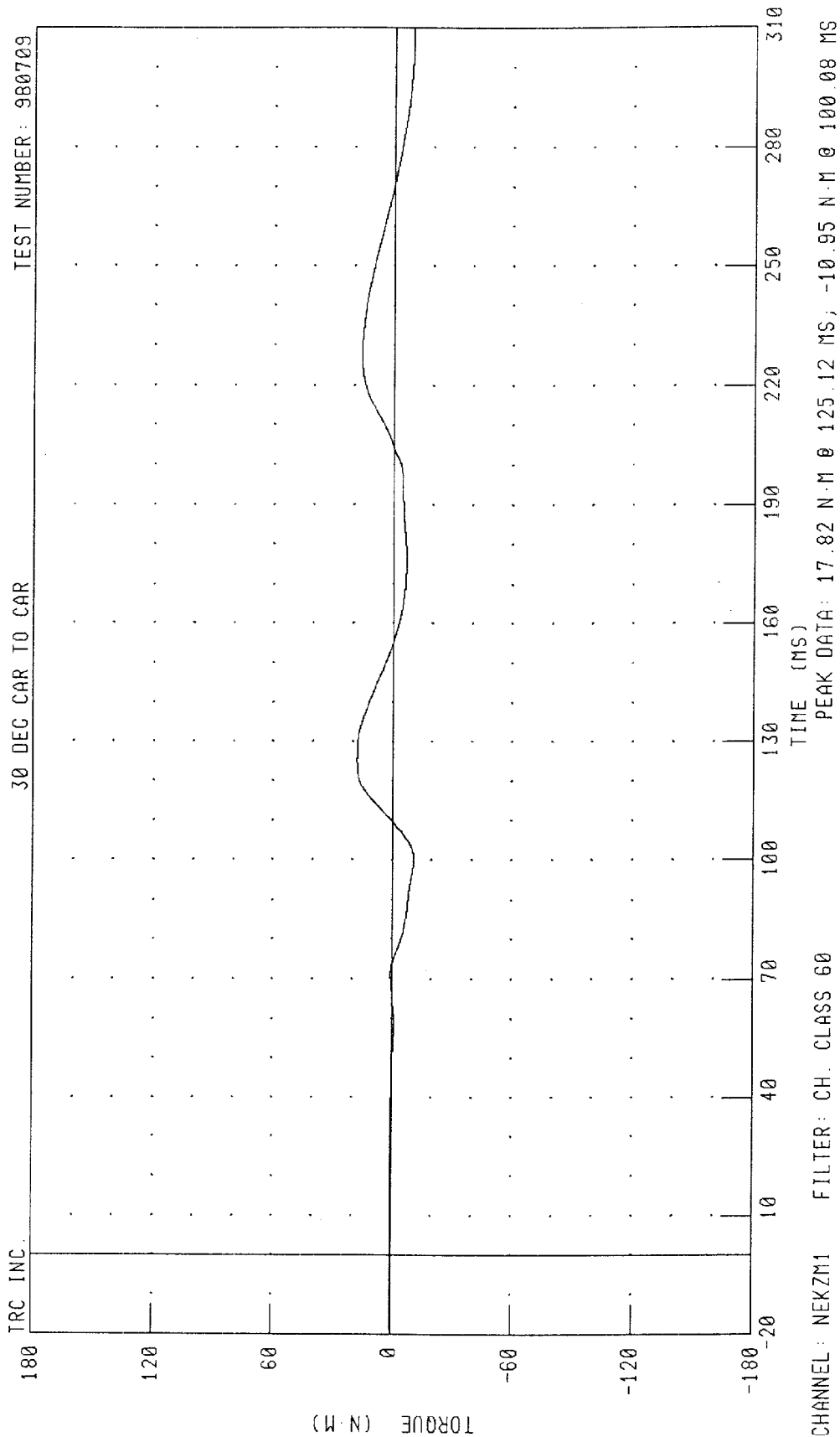
TRC INC.



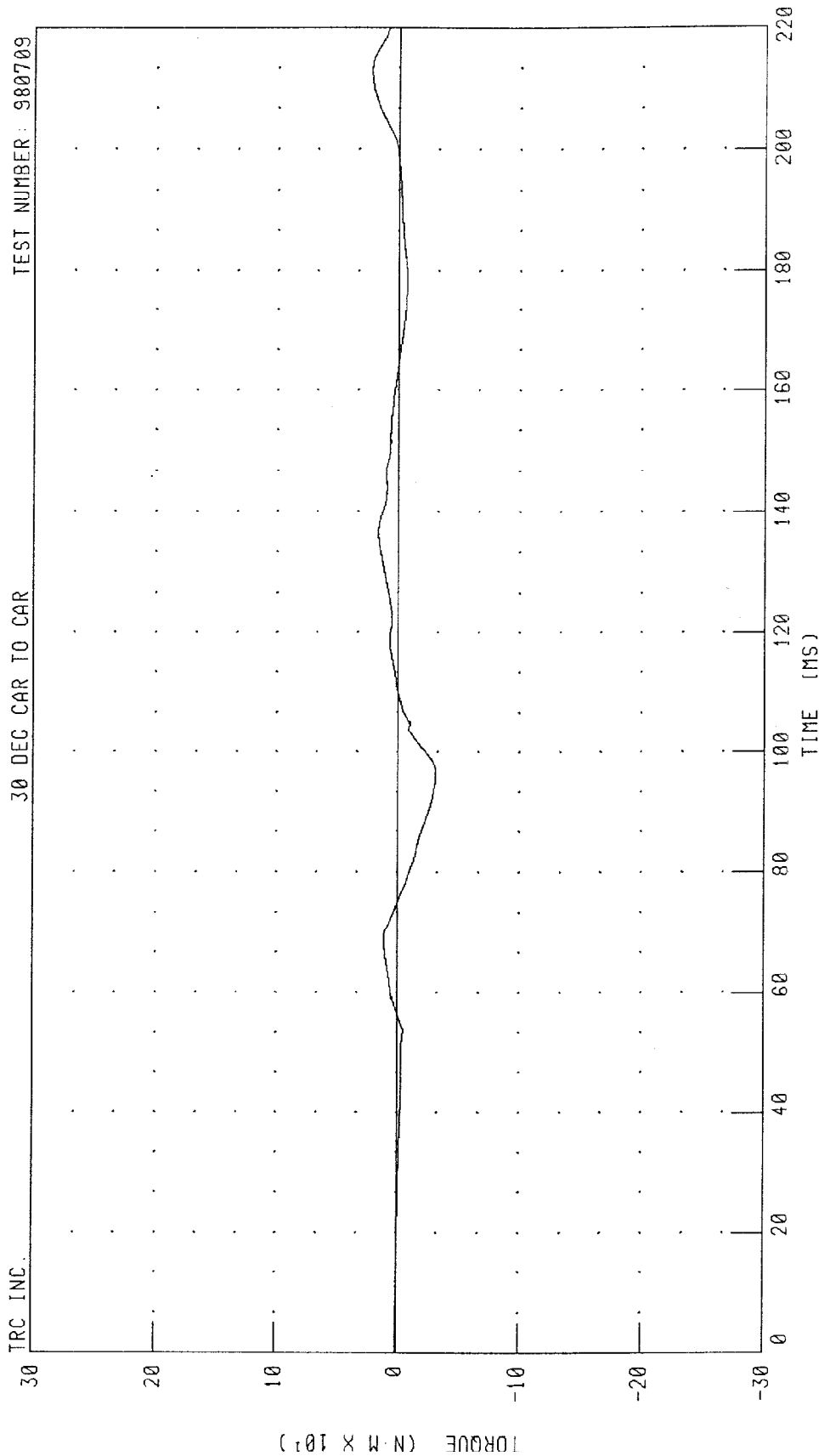
CHANNEL: NEKYM1 FILTER: CH. CLASS 60

PEAK DATA: 26.07 N·M @ 212.32 MS, -40.48 N·M @ 96.00 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK MOMENT ABOUT Z AXIS



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK OCCIPITAL CONDYLE ABOUT Y AXIS



CHANNEL: NEKOM1 FILTER: CH. CLASS 600

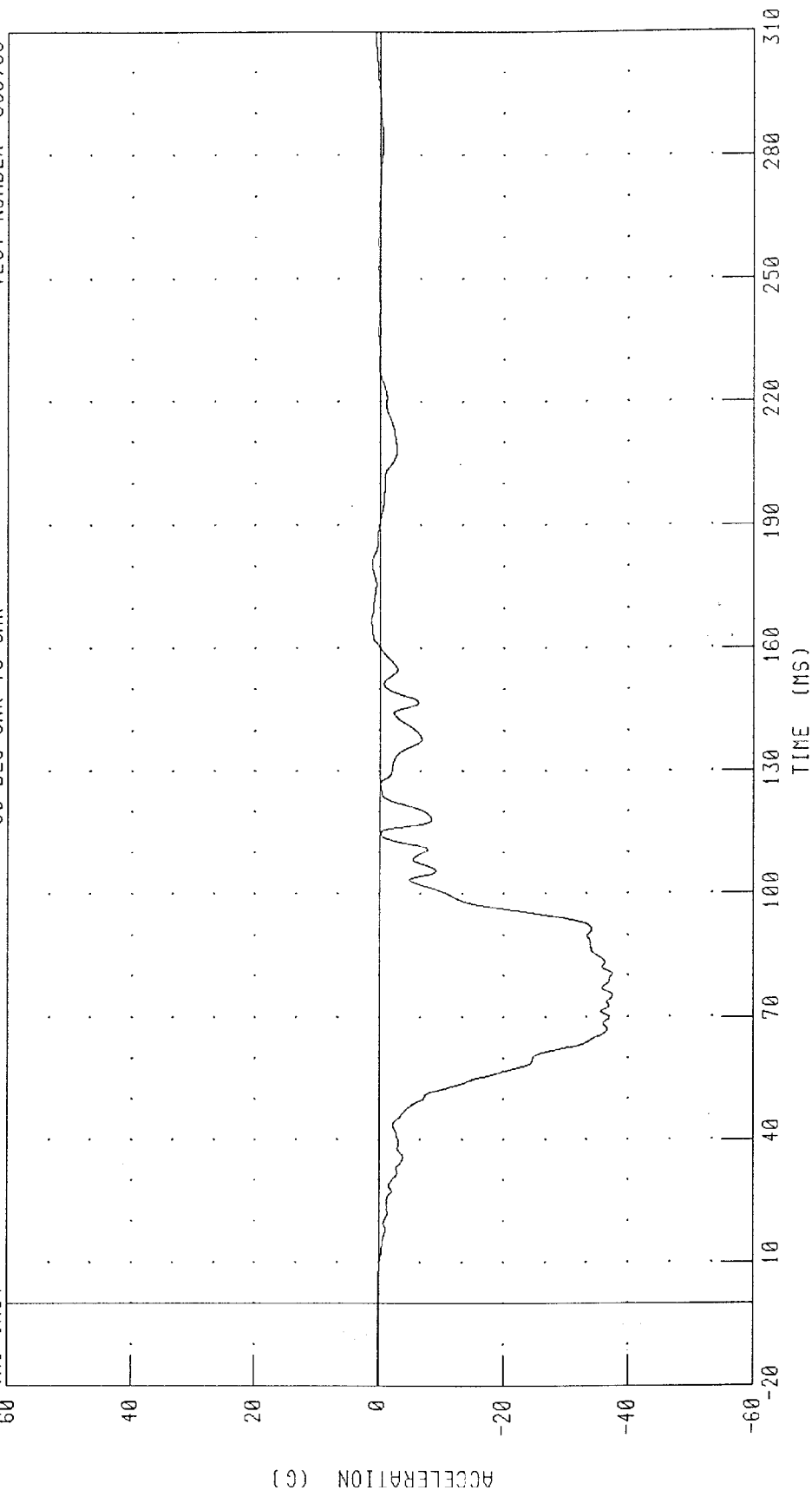
PEAK DATA: 22.24 N·M @ 213.20 MS; -32.05 N·M @ 96.40 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER CHEST X-AXIS ACCELERATION - PRIMARY

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: CSTXG1 FILTER: CH. CLASS 180

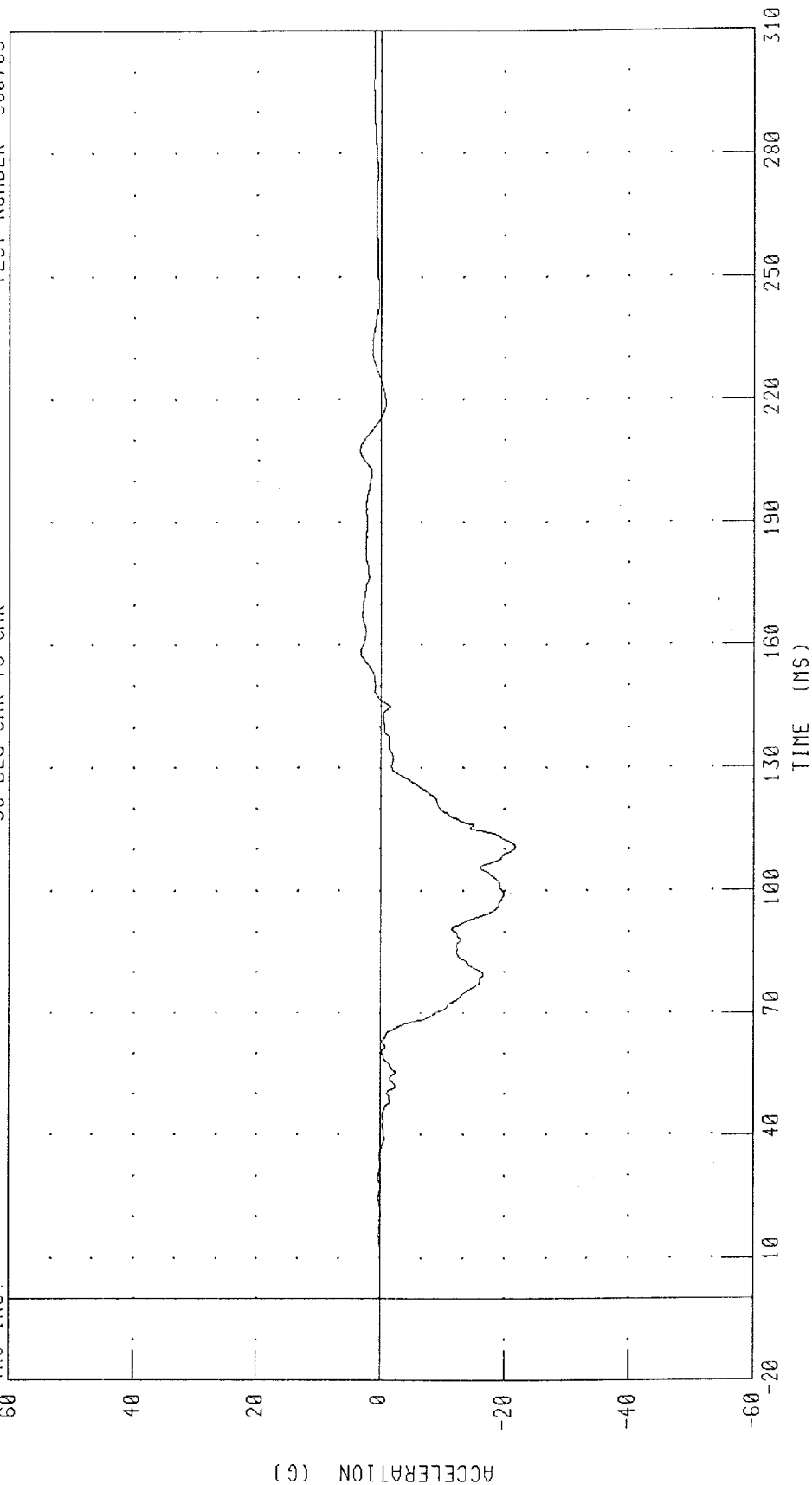
PEAK DATA: 1.26 G @ 167.12 MS, -37.54 G @ 75.36 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER CHEST Y-AXIS ACCELERATION - PRIMARY

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

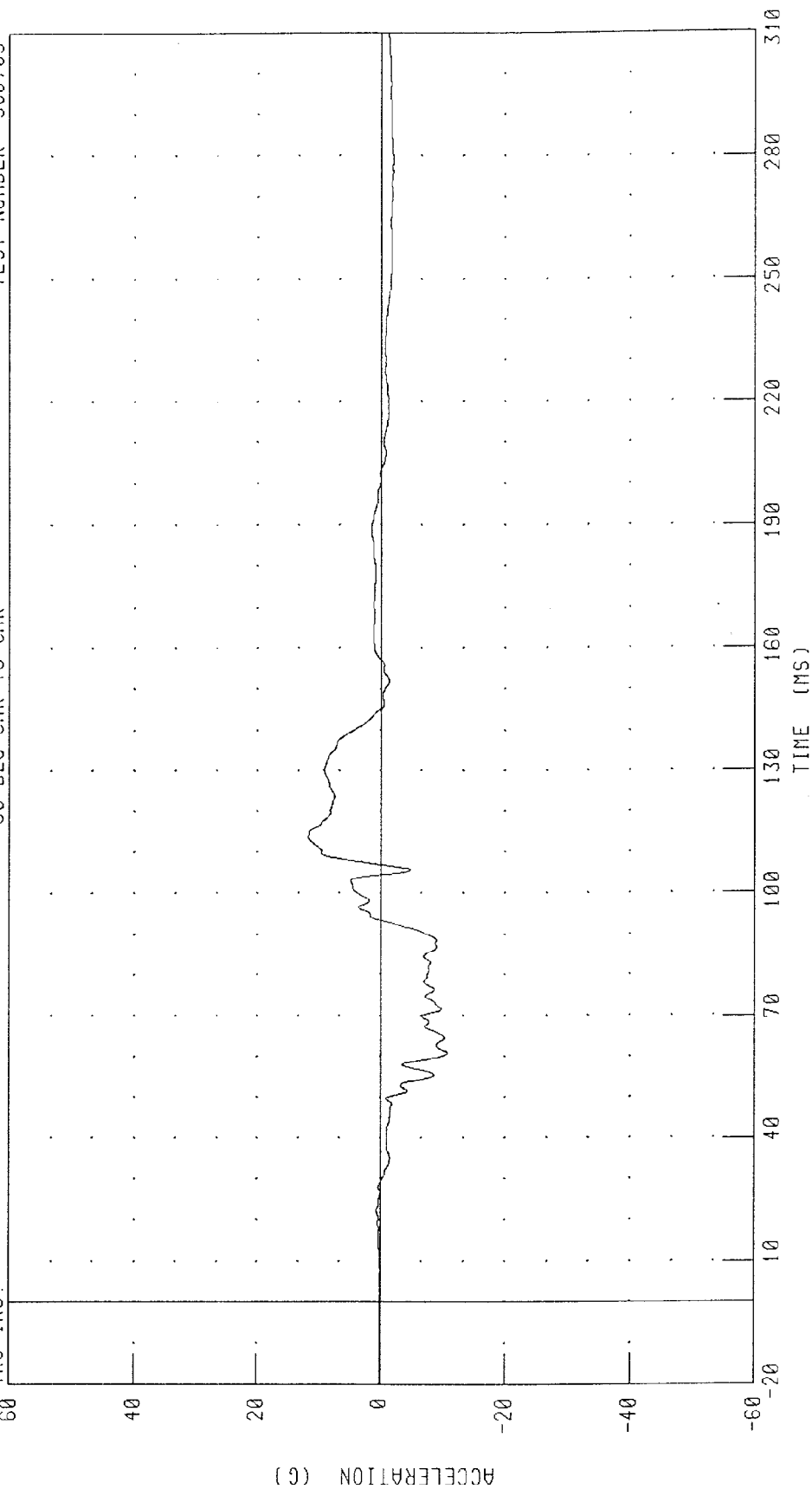
PEAK DATA: 3.29 G @ 207.68 MS, -21.69 G @ 110.72 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER CHEST Z-AXIS ACCELERATION - PRIMARY

TEST NUMBER: 980709

30 DEG CAR TO CAR

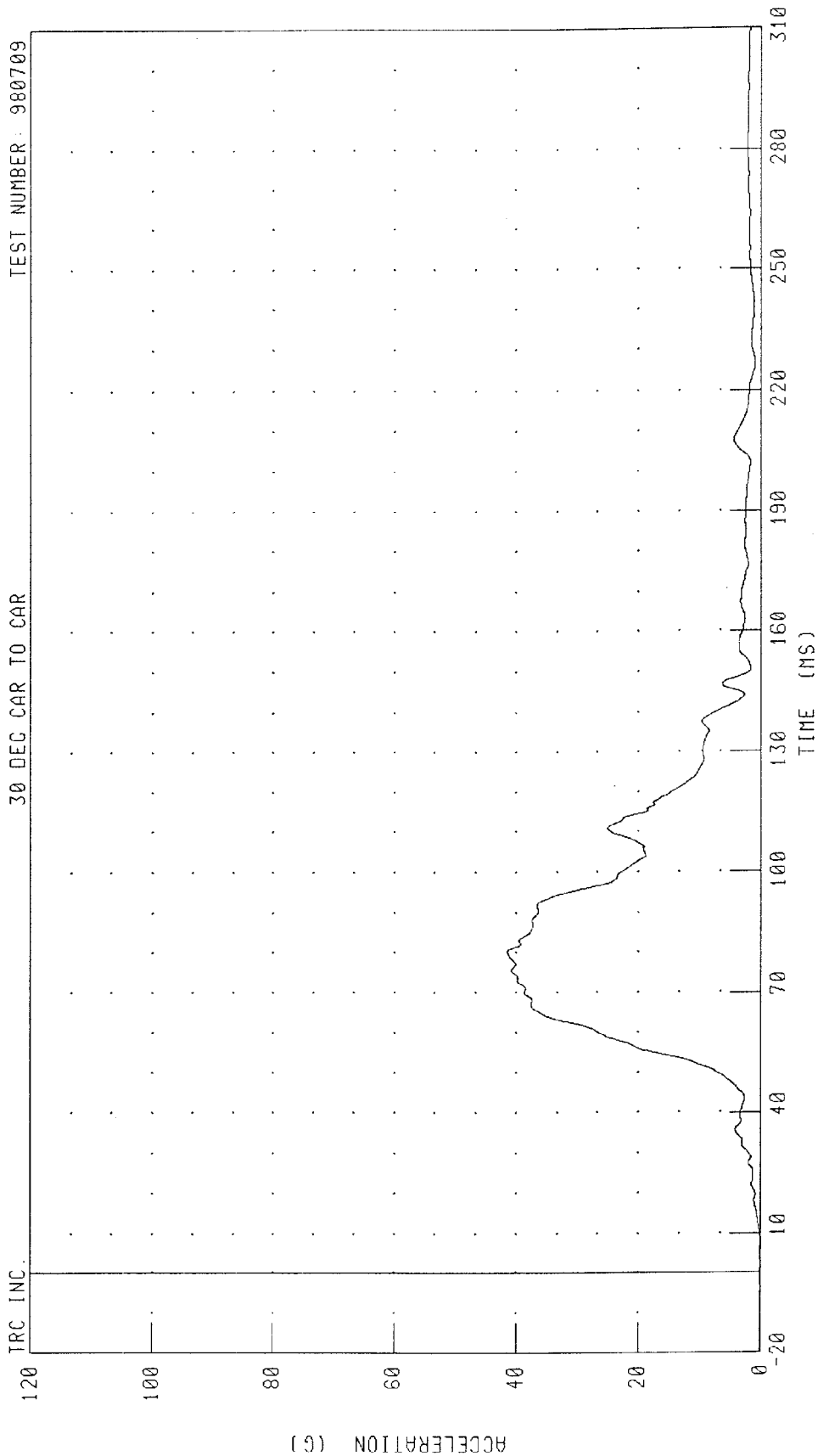
TRC INC.



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 11.73 G @ 113.84 MS; -10.87 G @ 60.96 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER CHEST RESULTANT ACCELERATION



CHANNEL: CSTRG1 FILTER: CH CLASS 180

PEAK DATA: 41.51 G @ 80.32 MS; 0.01 G @ -20.00 MS

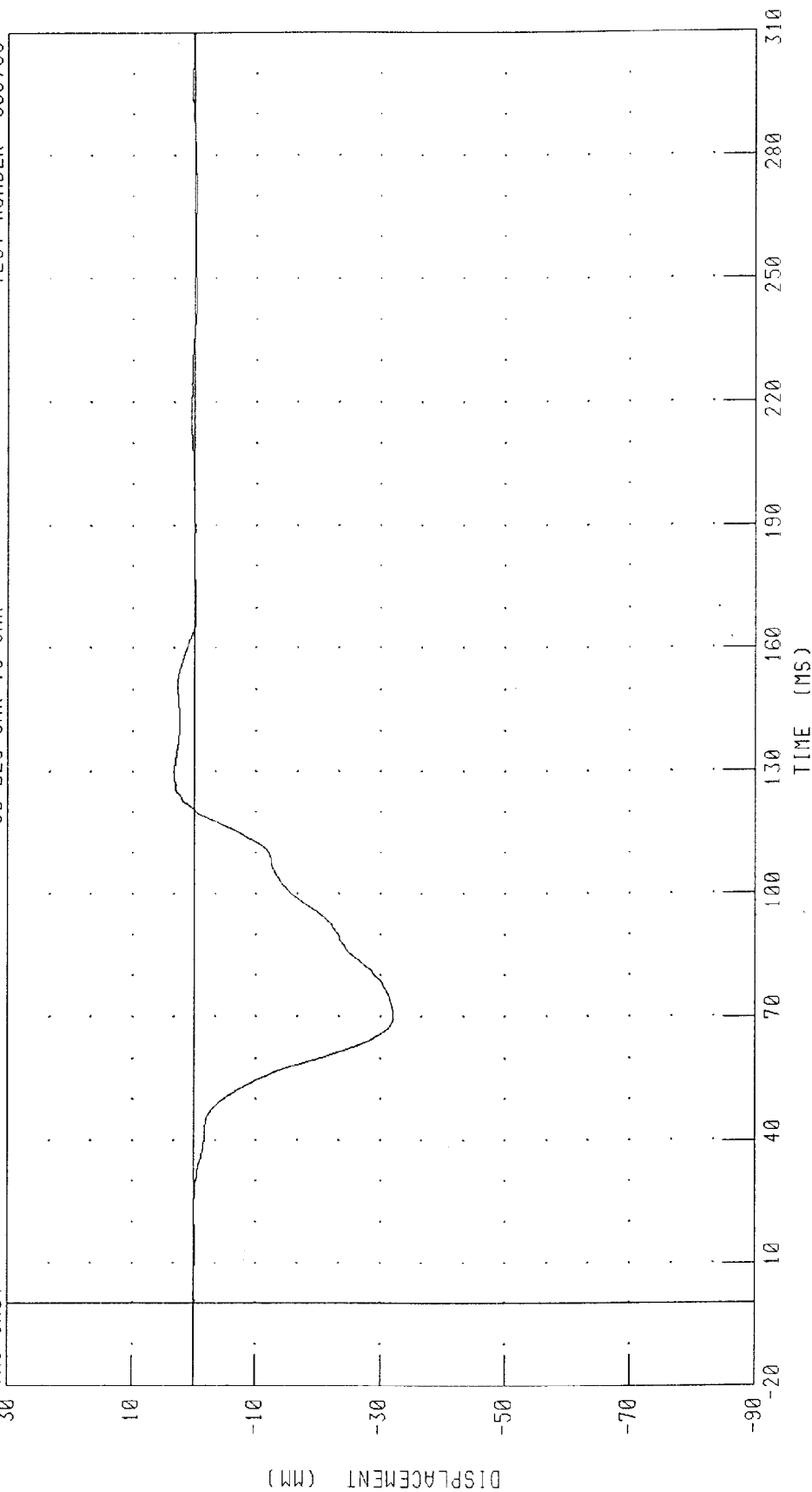
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES

TARGET DRIVER CHEST DEFLECTION

30 DEC CAR TO CAR

TEST NUMBER: 980709

TRC INC.



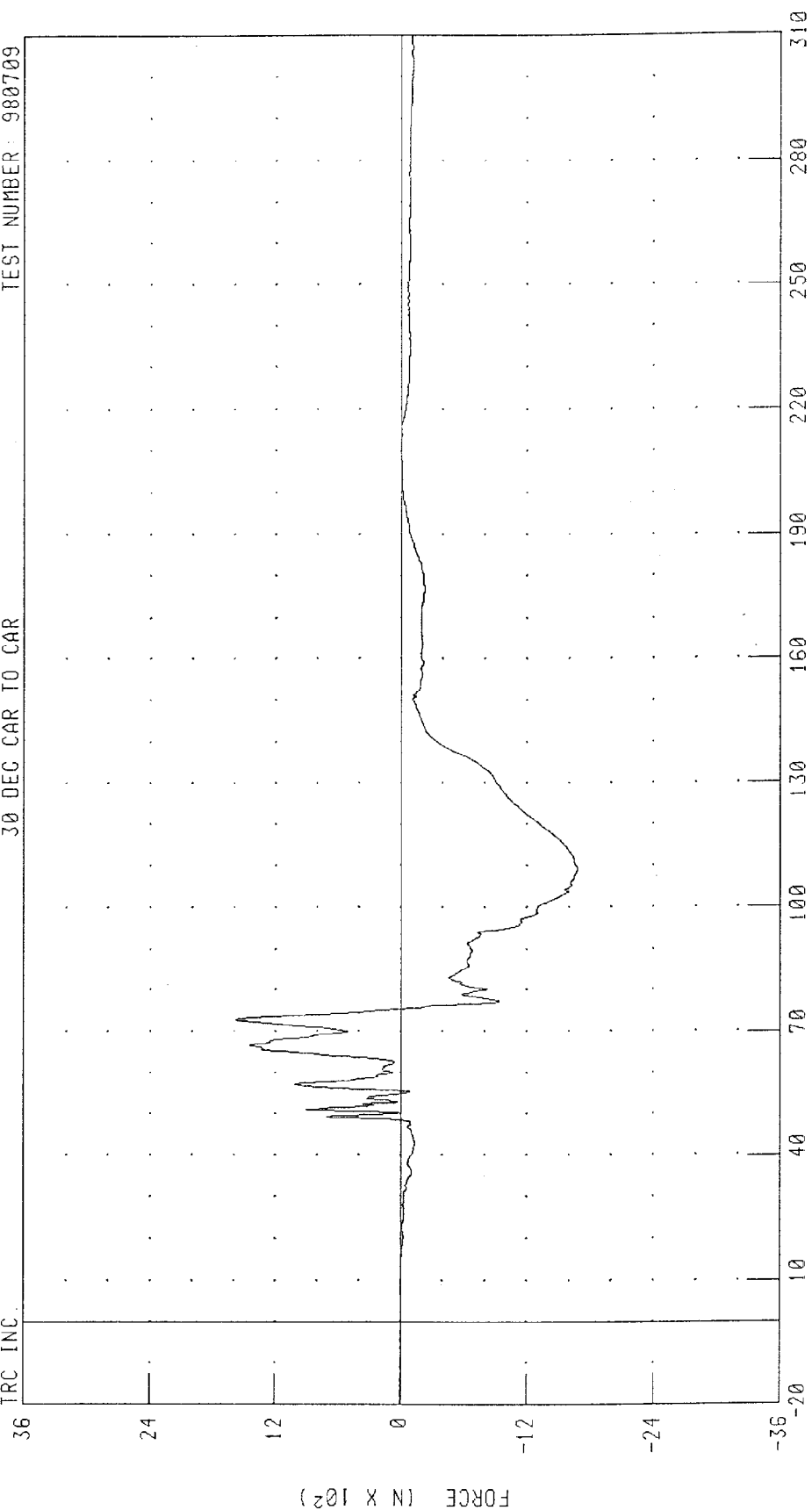
CHANNEL: CSTXD1 FILTER: CH. CLASS 180

PEAK DATA: 3.33 MM @ 128.40 MS, -32.18 MM @ 70.24 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT UPPER TIBIA X-AXIS FORCE
30 DEC CAR TO CAR

TEST NUMBER: 980709

TRC INC.



CHANNEL: TBRXF1 FILTER: CH. CLASS 600

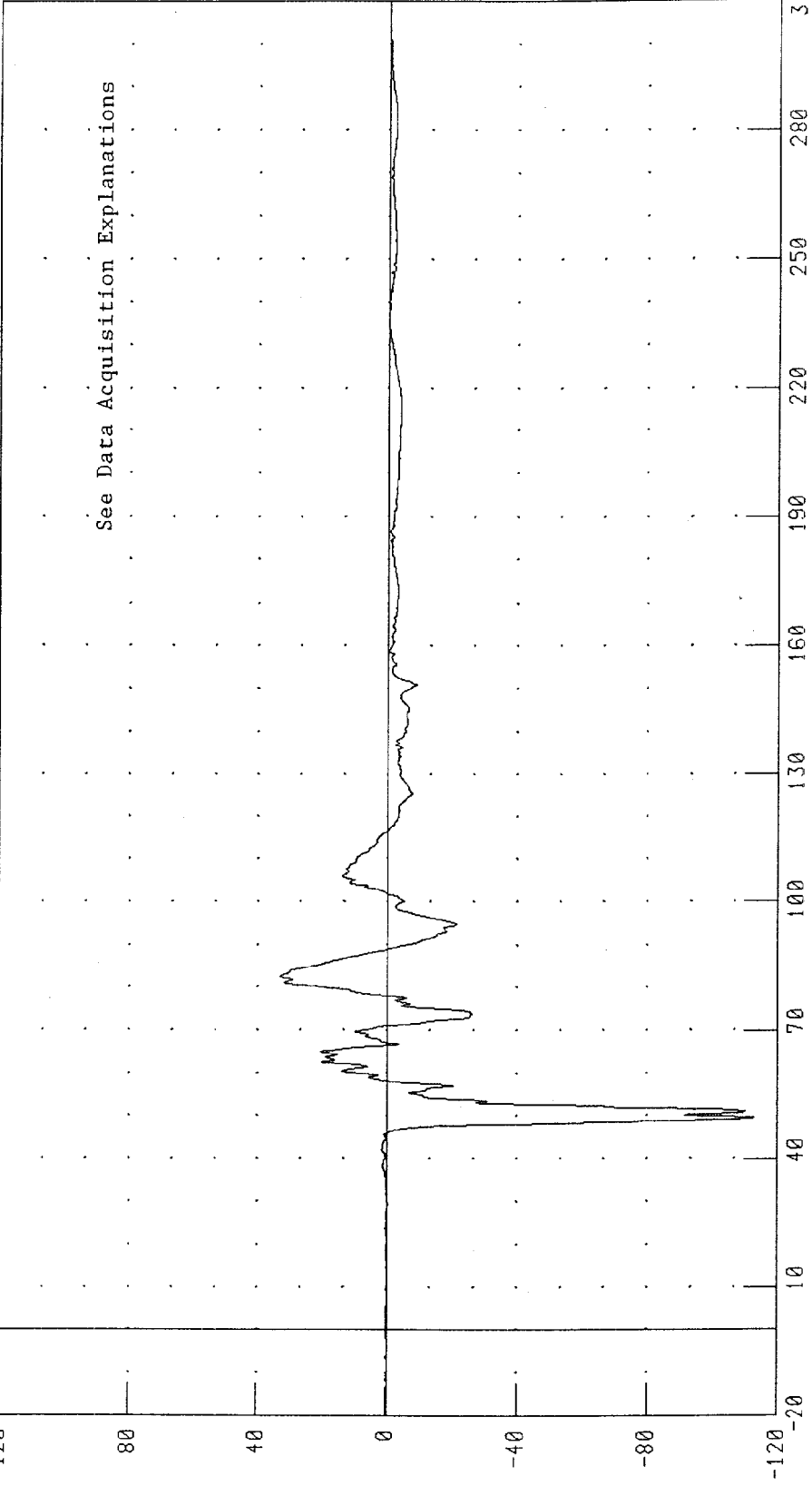
PEAK DATA: 1579.98 N @ 72.96 MS, -1683.63 N @ 109.04 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT UPPER TIBIA Z-AXIS FORCE

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.



CHANNEL: TBRZF1 FILTER: CH. CLASS 600

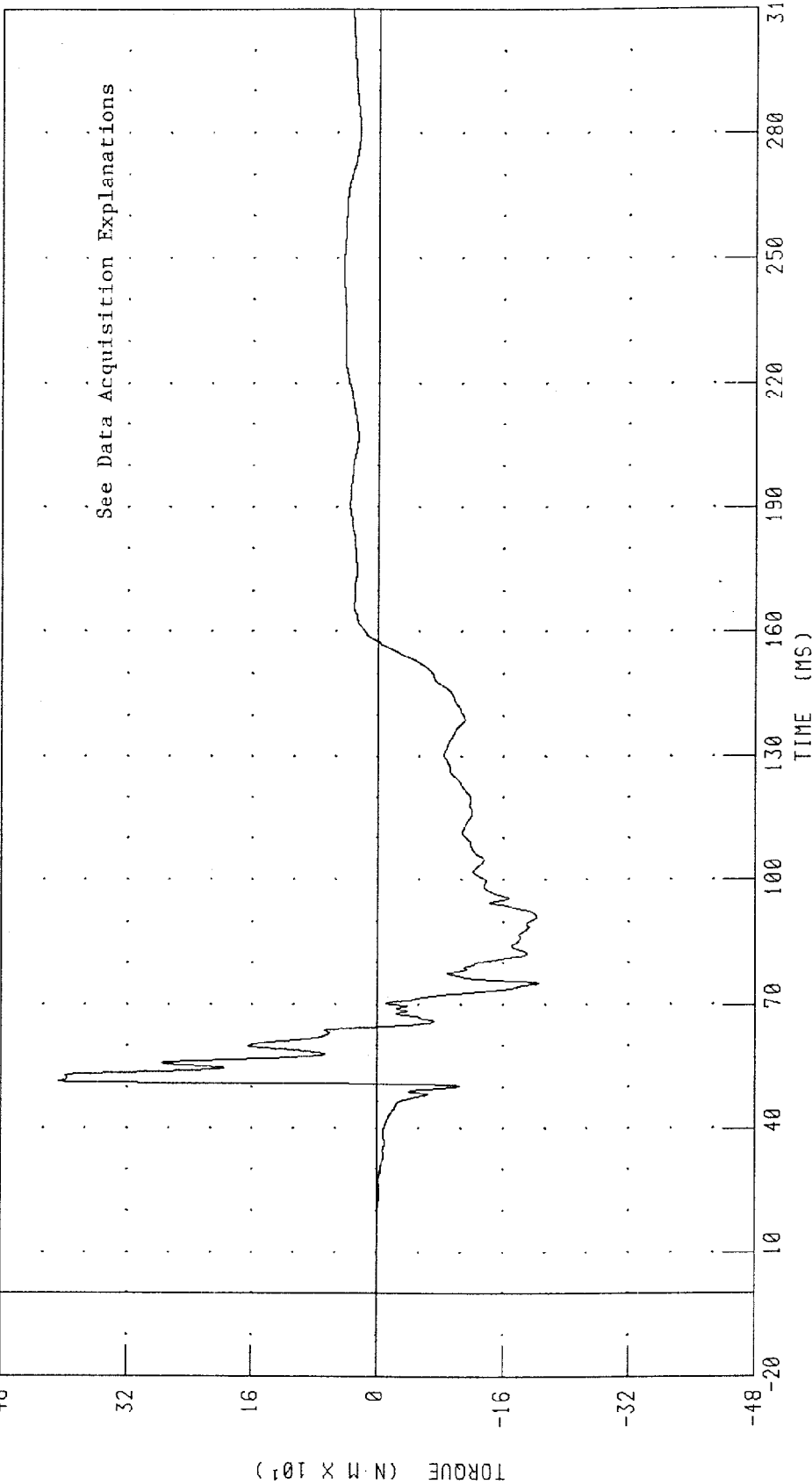
PEAK DATA: 3308.49 N @ 82.48 MS, -11275.40 N @ 49.44 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC



CHANNEL: TBRXM1 FILTER: CH. CLASS 600

PEAK DATA: 406.95 N-M @ 51.60 MS, -204.89 N-M @ 75.20 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.

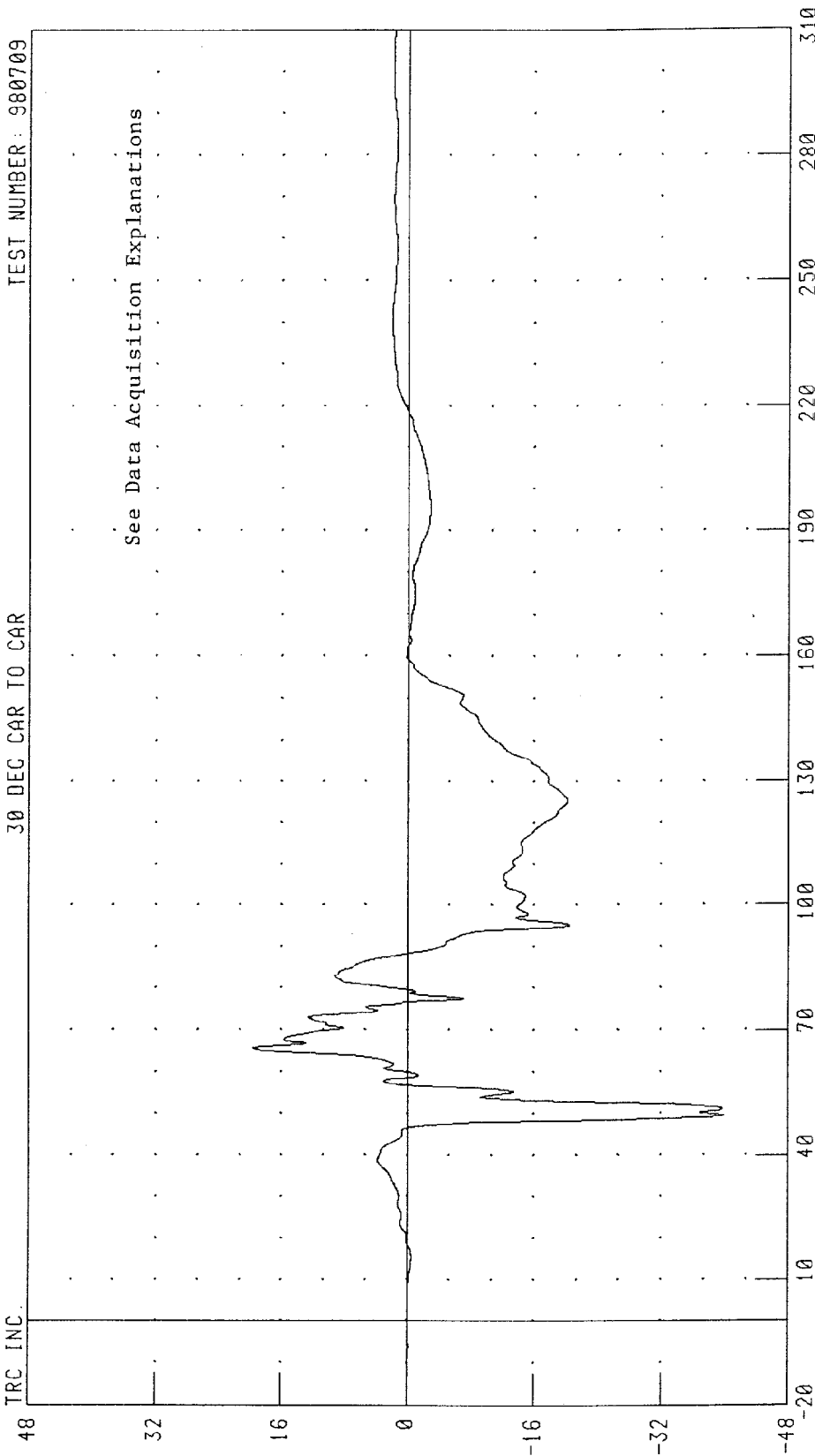
See Data Acquisition Explanations

TORQUE (N·M × 10¹)

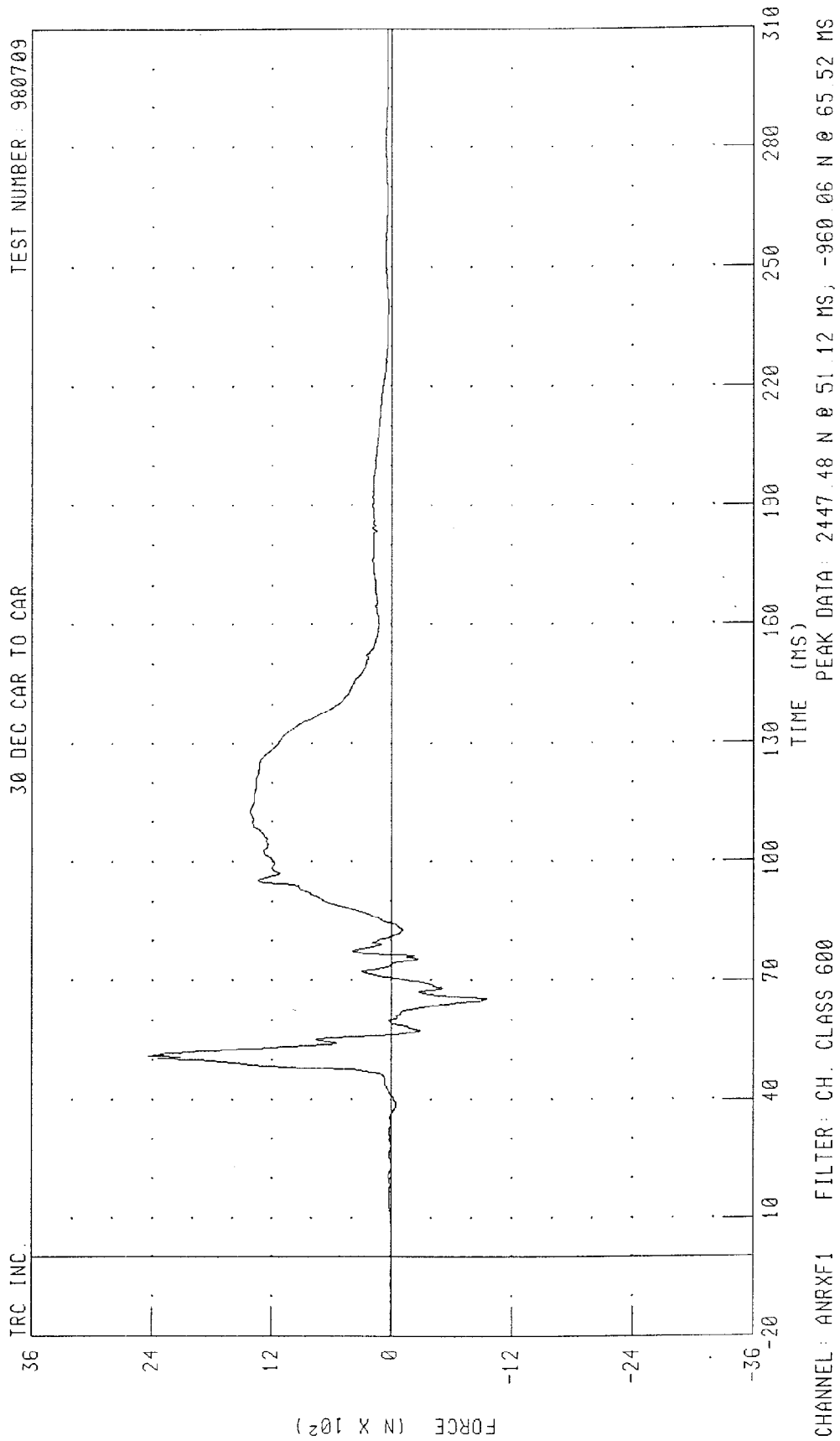
TIME (MS)

CHANNEL: TBRYM1 FILTER: CH. CLASS 600

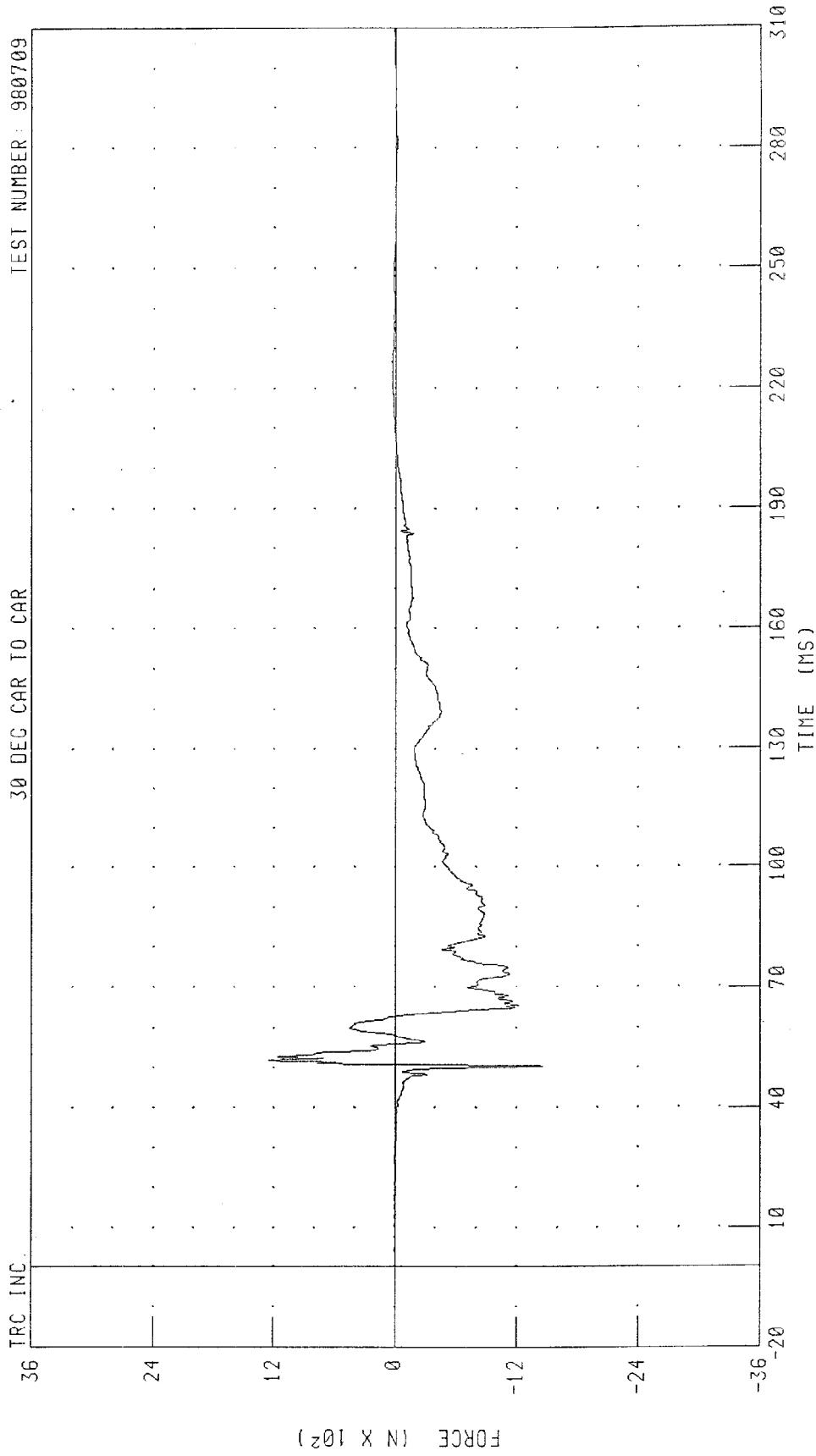
PEAK DATA: 195.82 N·M @ 65.76 MS, -398.19 N·M @ 49.44 MS



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT LOWER TIBIA X-AXIS FORCE



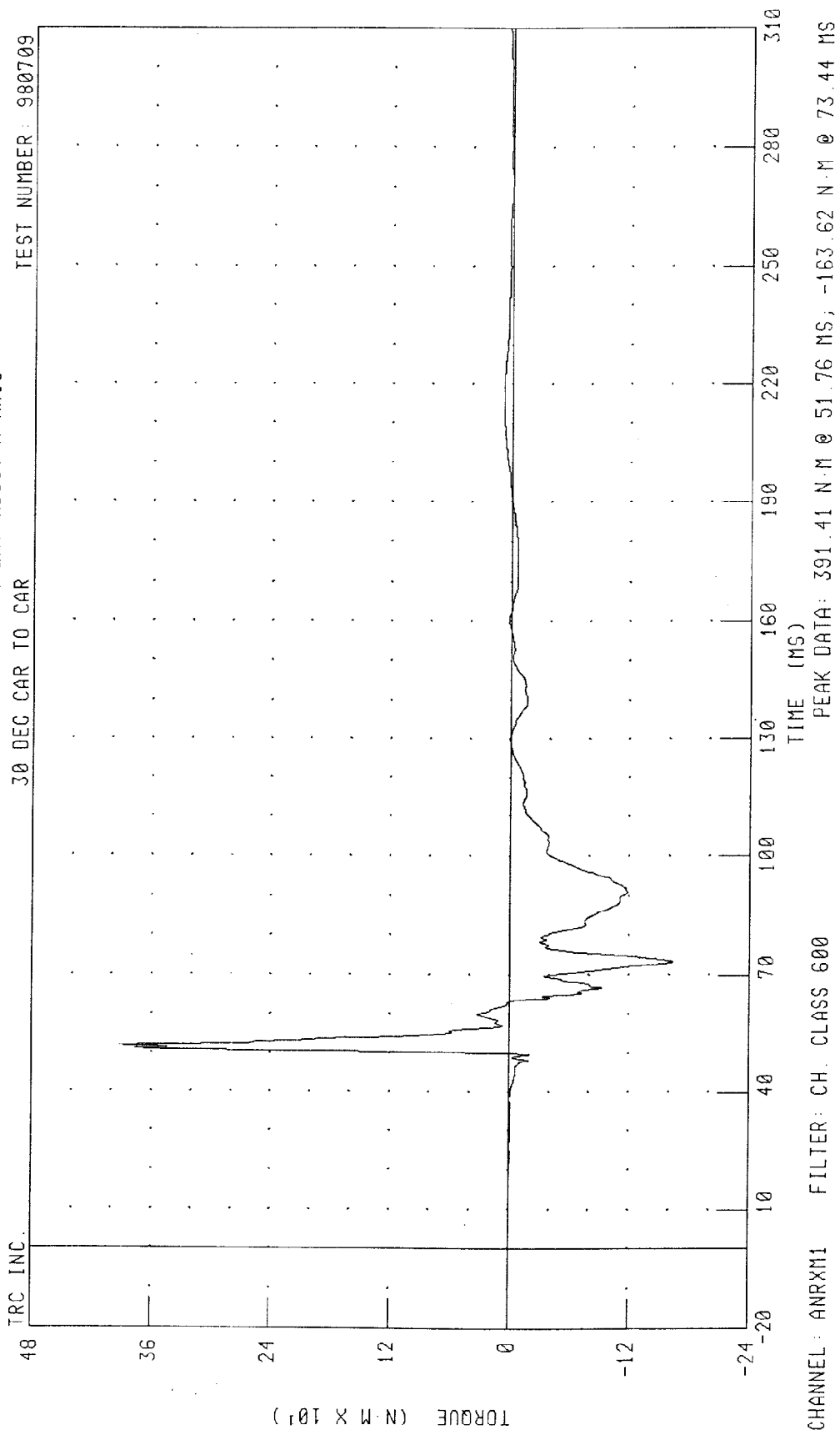
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBlique 30 DEGREES
TARGET DRIVER RIGHT LOWER TIBIA Y-AXIS FORCE



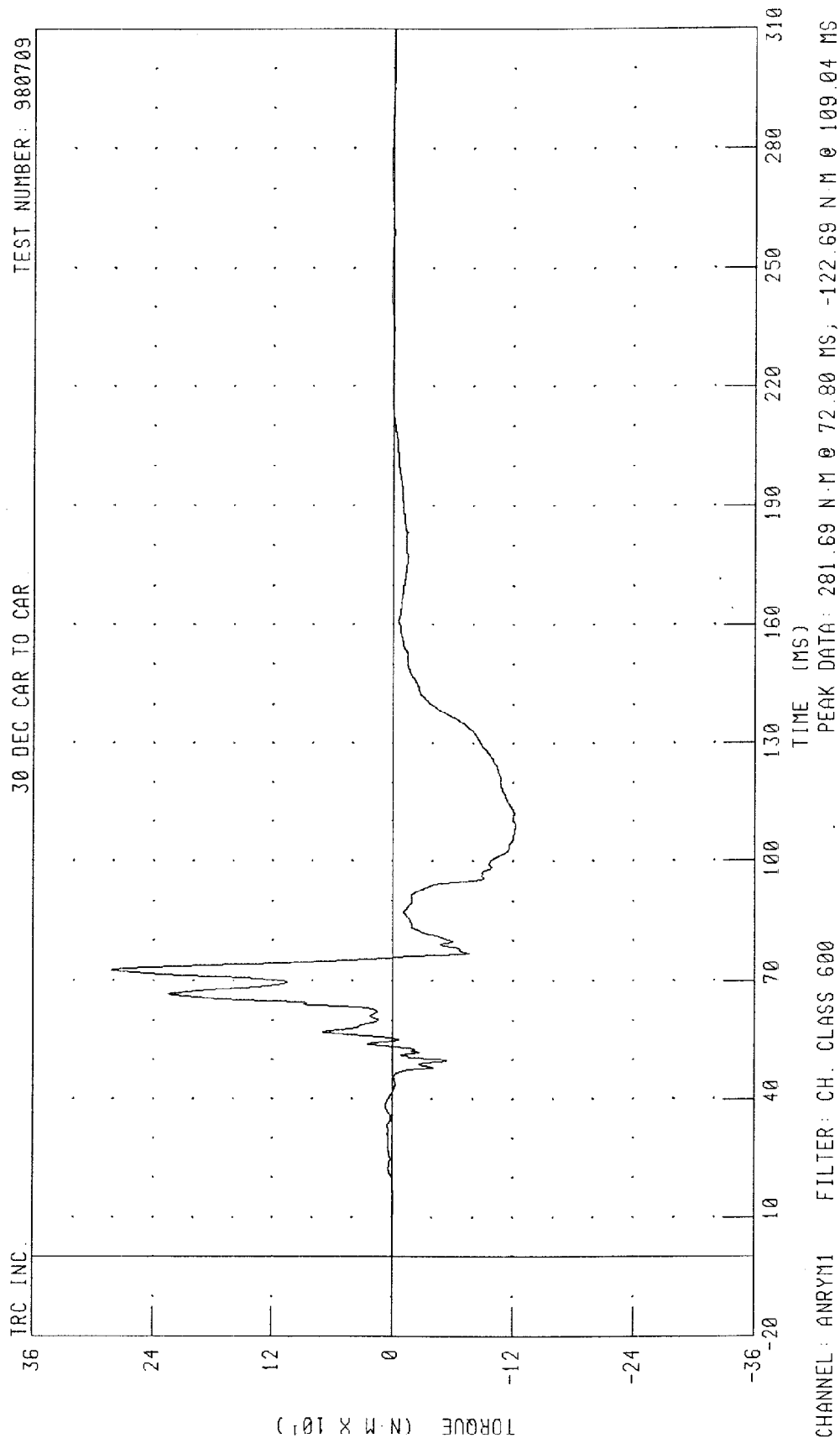
CHANNEL: ANRYF1 FILTER: CH. CLASS 600

PEAK DATA: 1252.89 N @ 51.84 MS, -1457.05 N @ 50.40 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT LOWER TIBIA MOMENT ABOUT X AXIS



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS

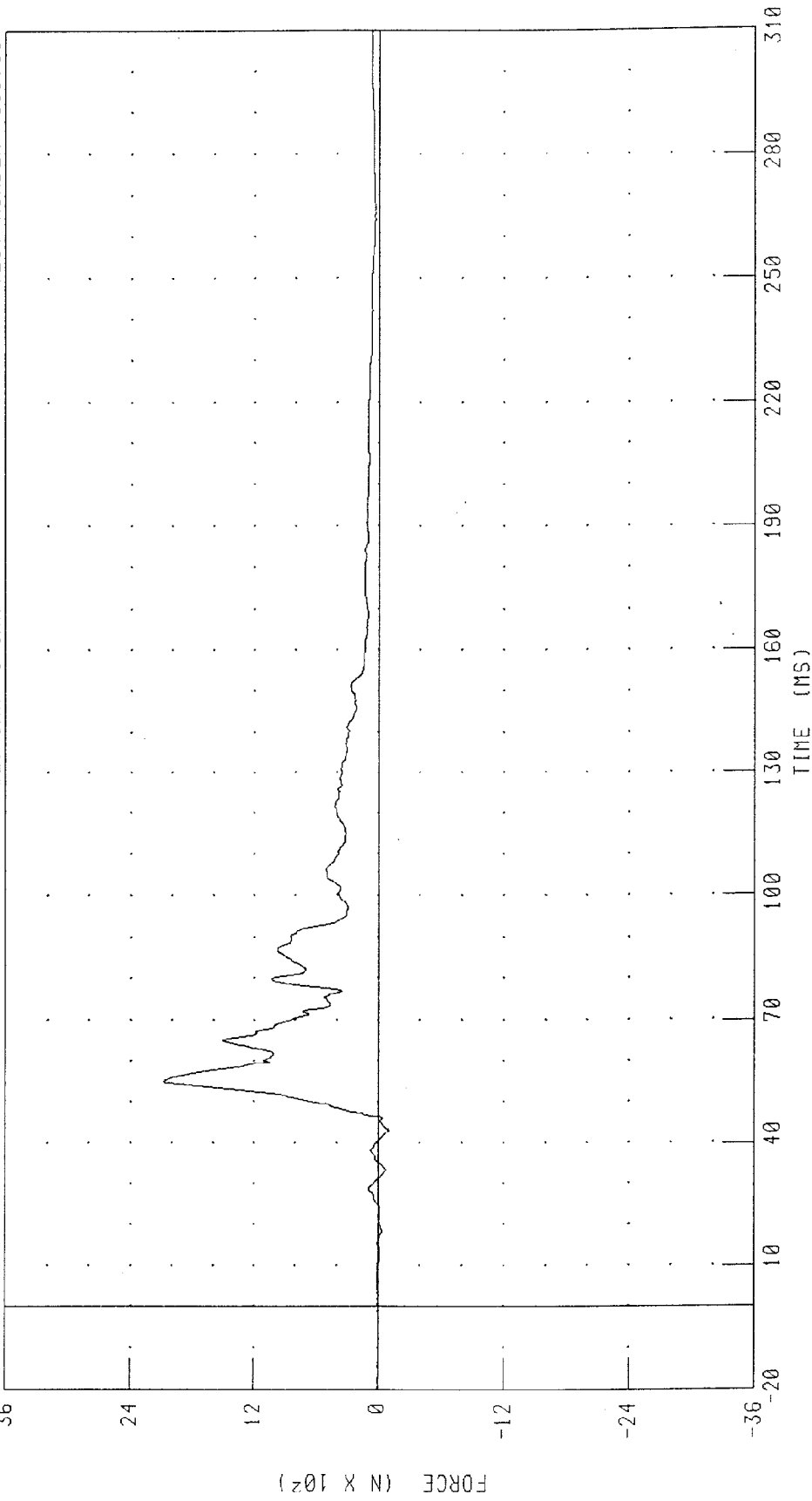


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT UPPER TIBIA X-AXIS FORCE

TEST NUMBER: 980709

30 DEC CAR TO CAR

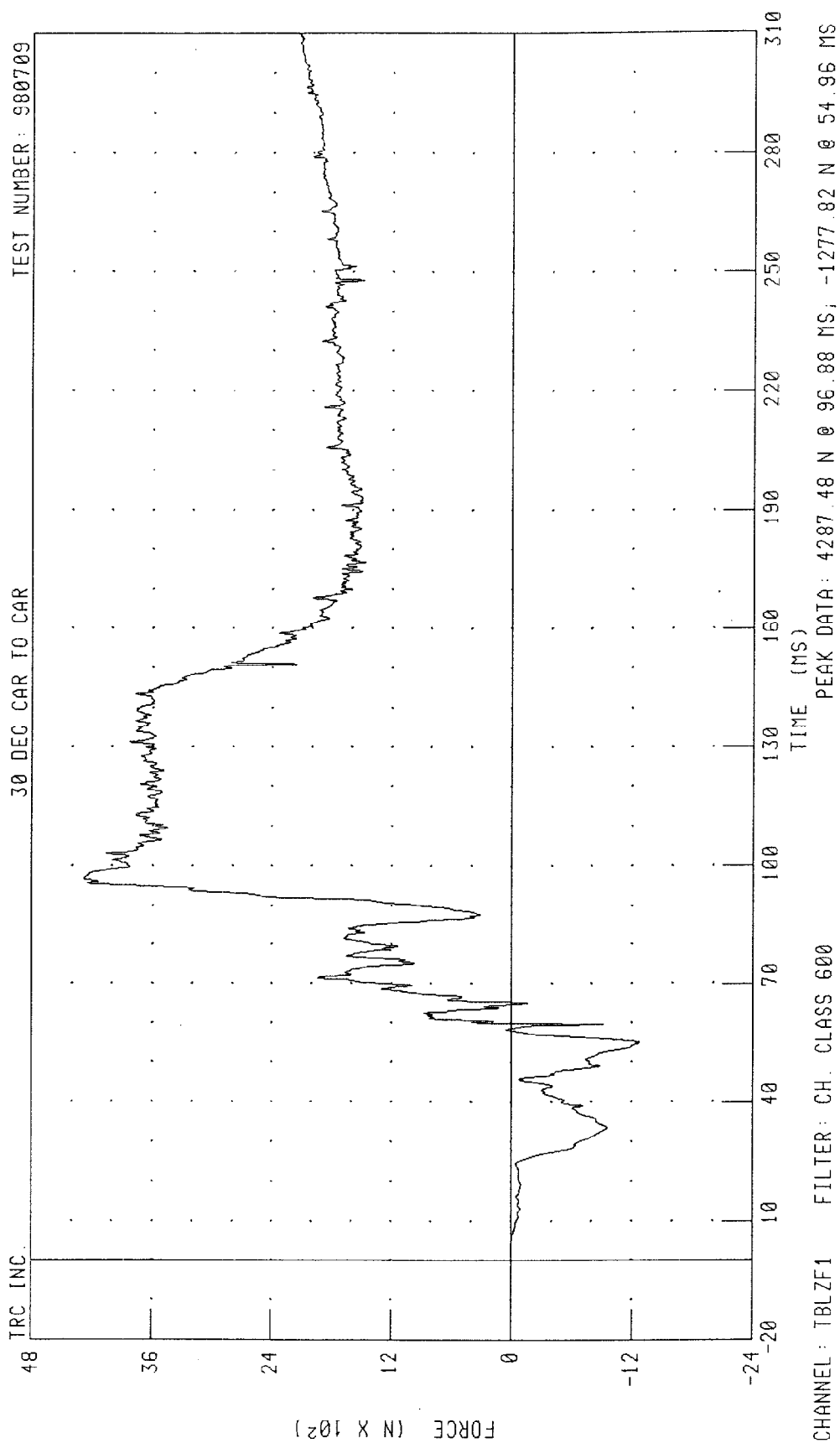
TRC INC.



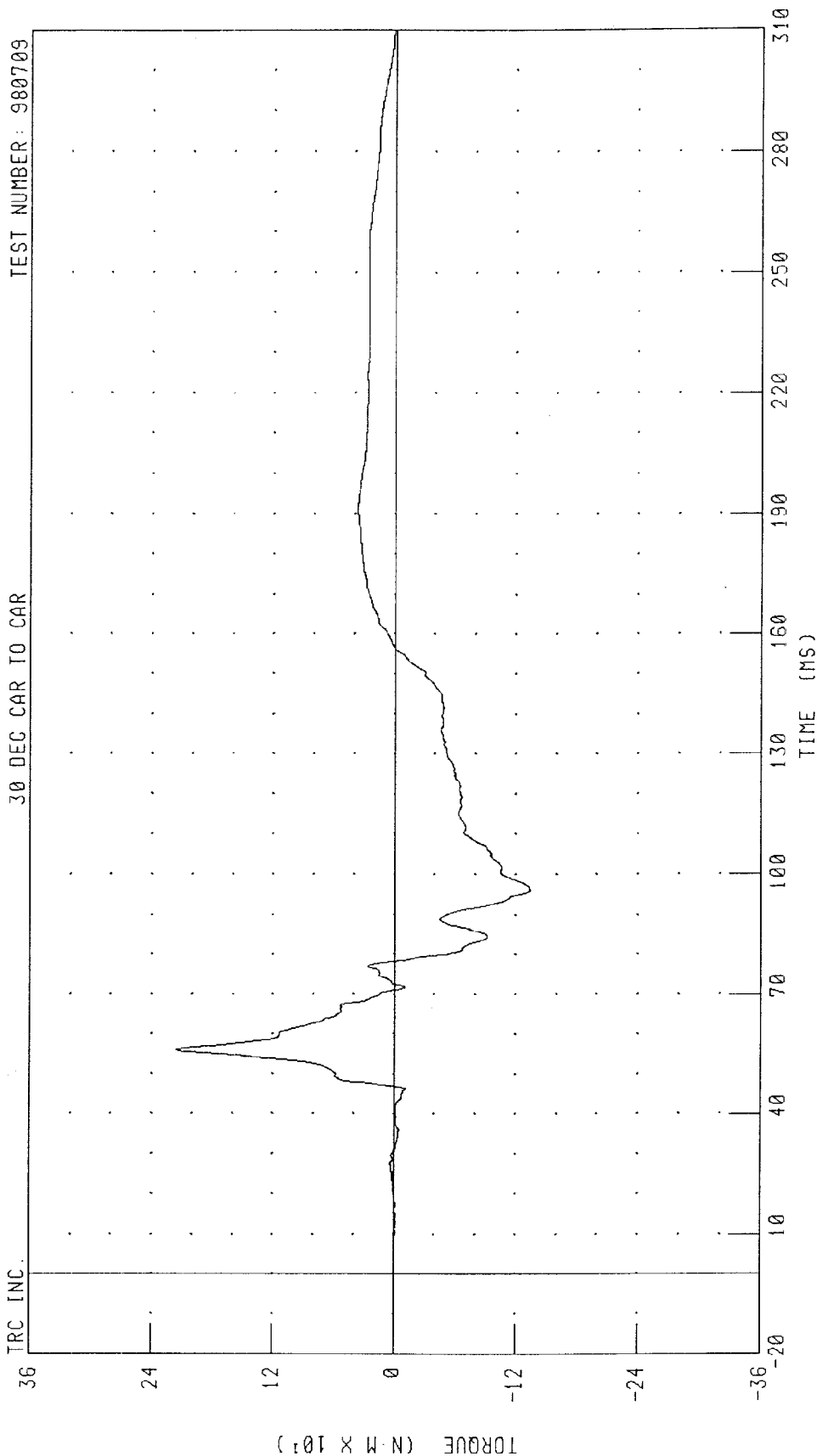
CHANNEL: TBLXF1 FILTER: CH. CLASS 600

PEAK DATA: 2083.28 N @ 54.96 MS; -101.42 N @ 43.12 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT UPPER TIBIA Z-AXIS FORCE



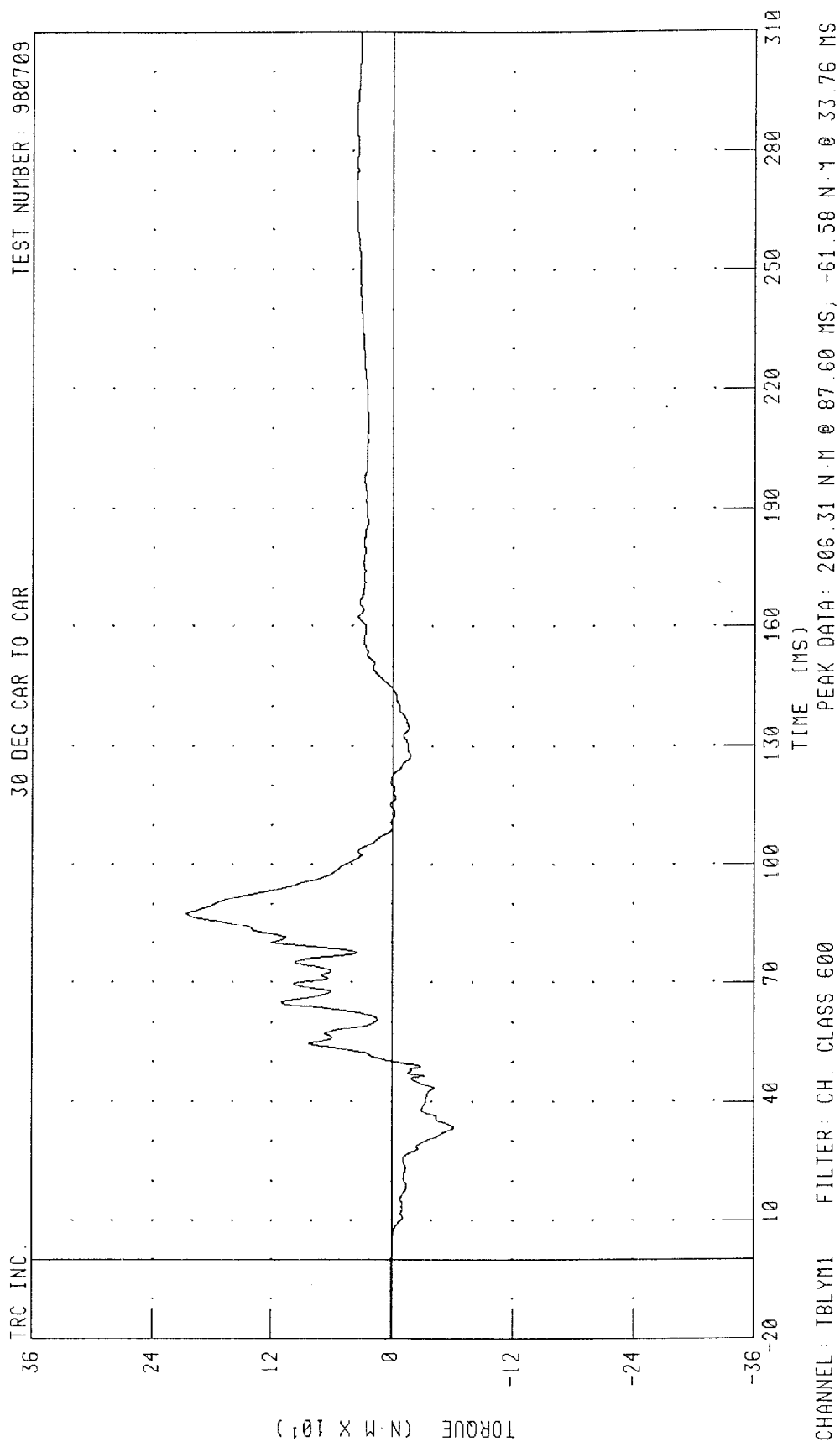
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT UPPER TIBIA MOMENT ABOUT X AXIS



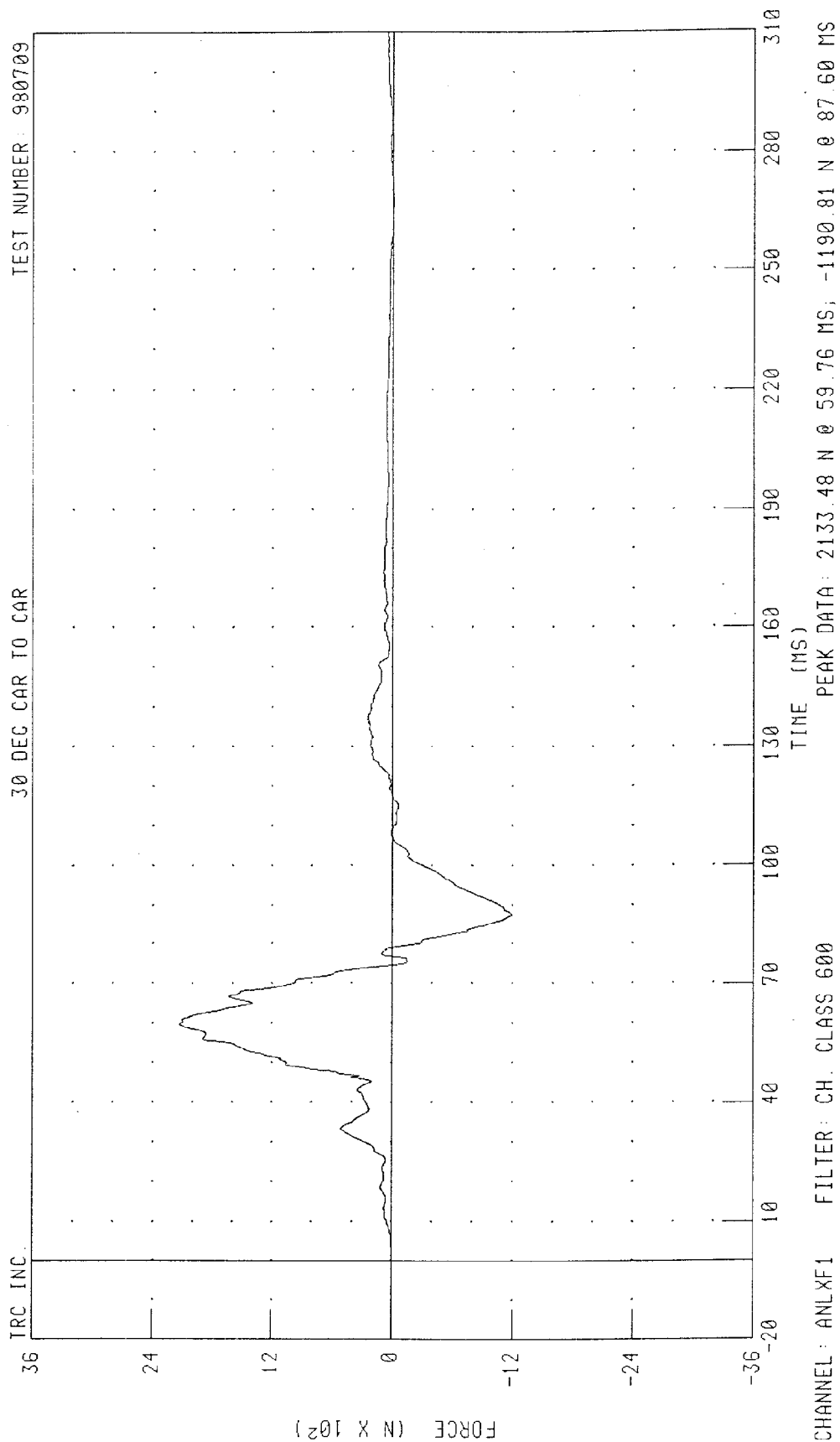
CHANNEL: TBLXHI FILTER: CH CLASS 600

PEAK DATA: 215.56 N·M @ 56.00 MS, -134.27 N·M @ 96.16 MS

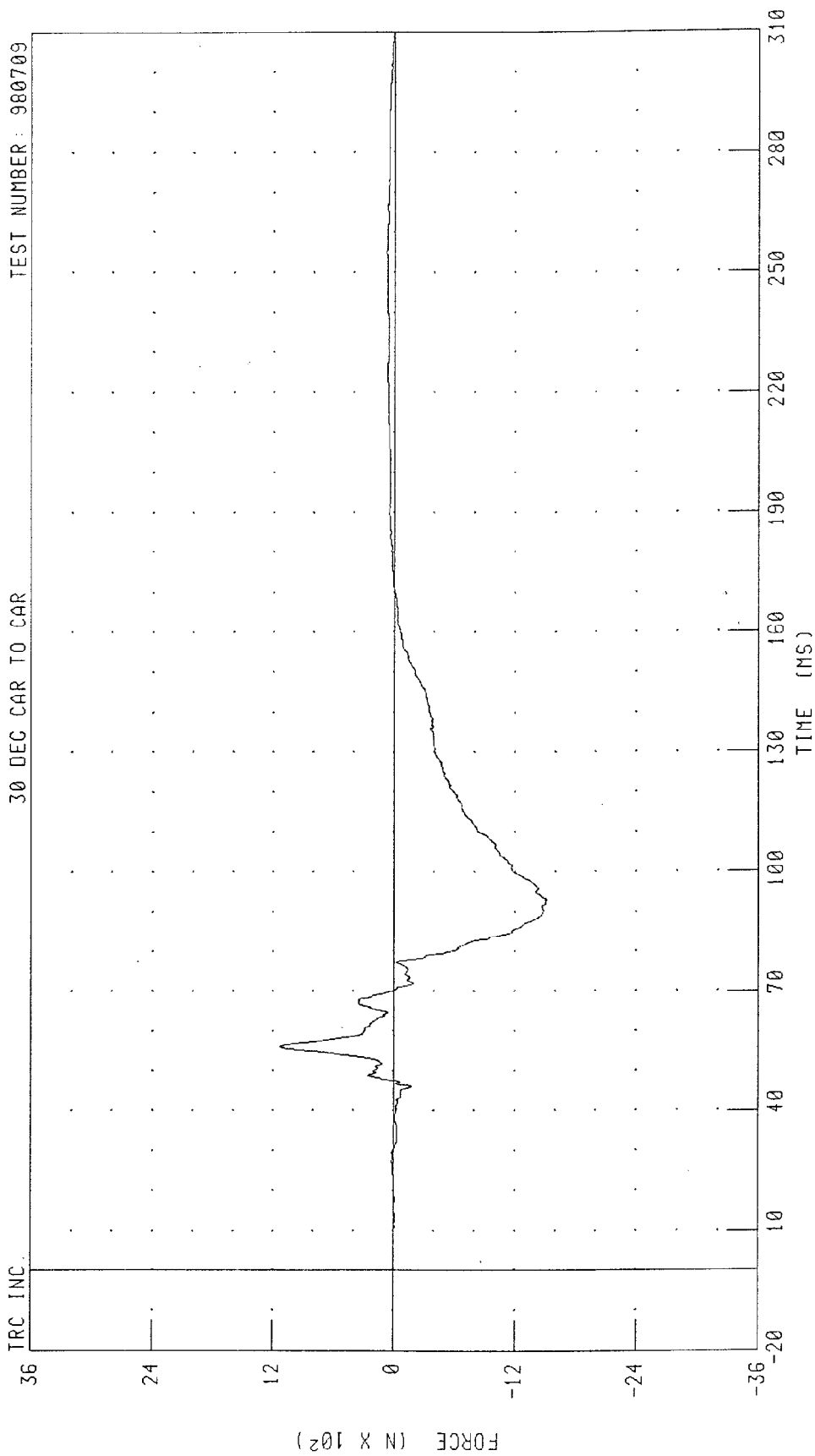
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT LOWER TIBIA X-AXIS FORCE

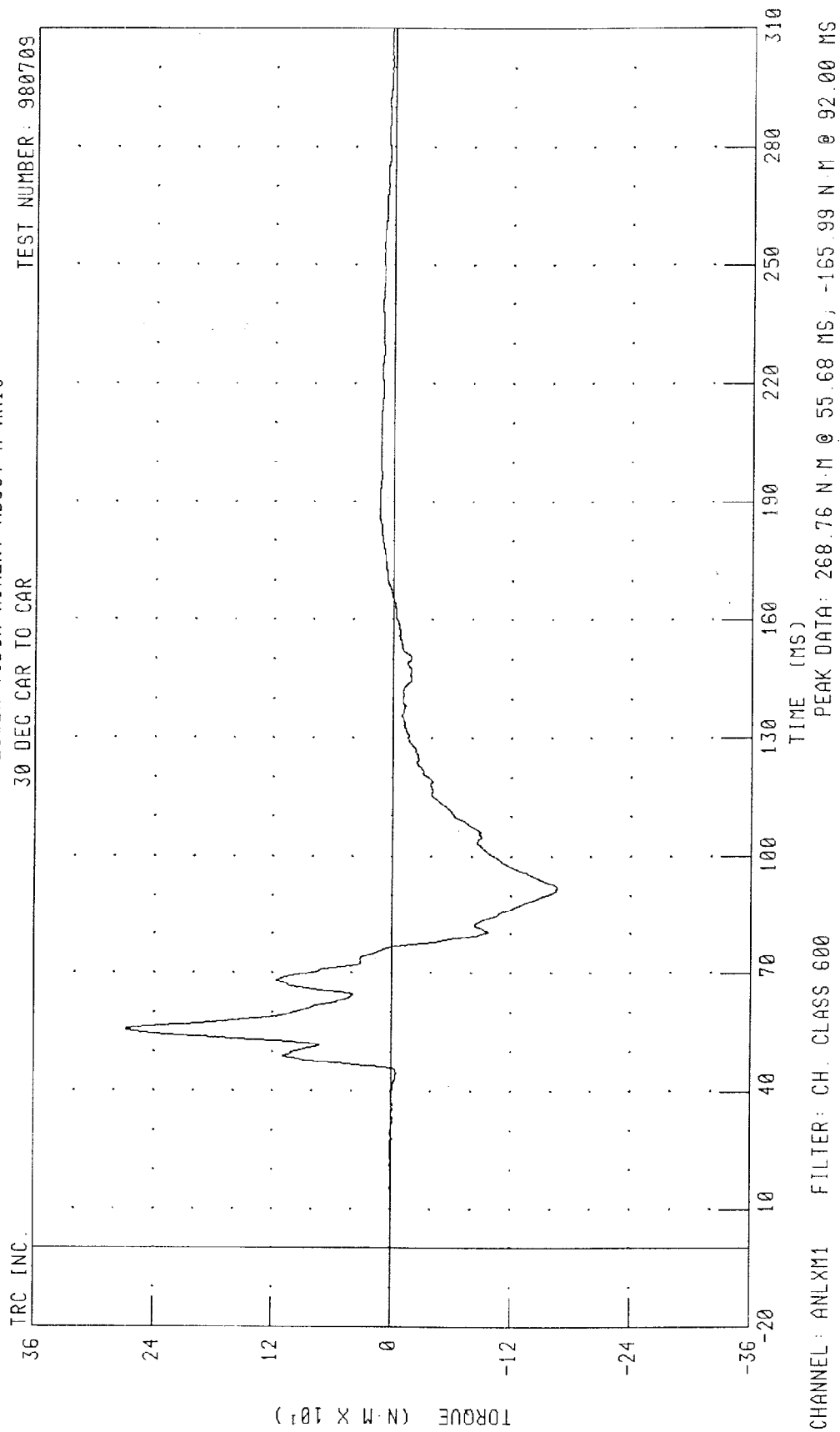


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT LOWER TIBIA Y-AXIS FORCE

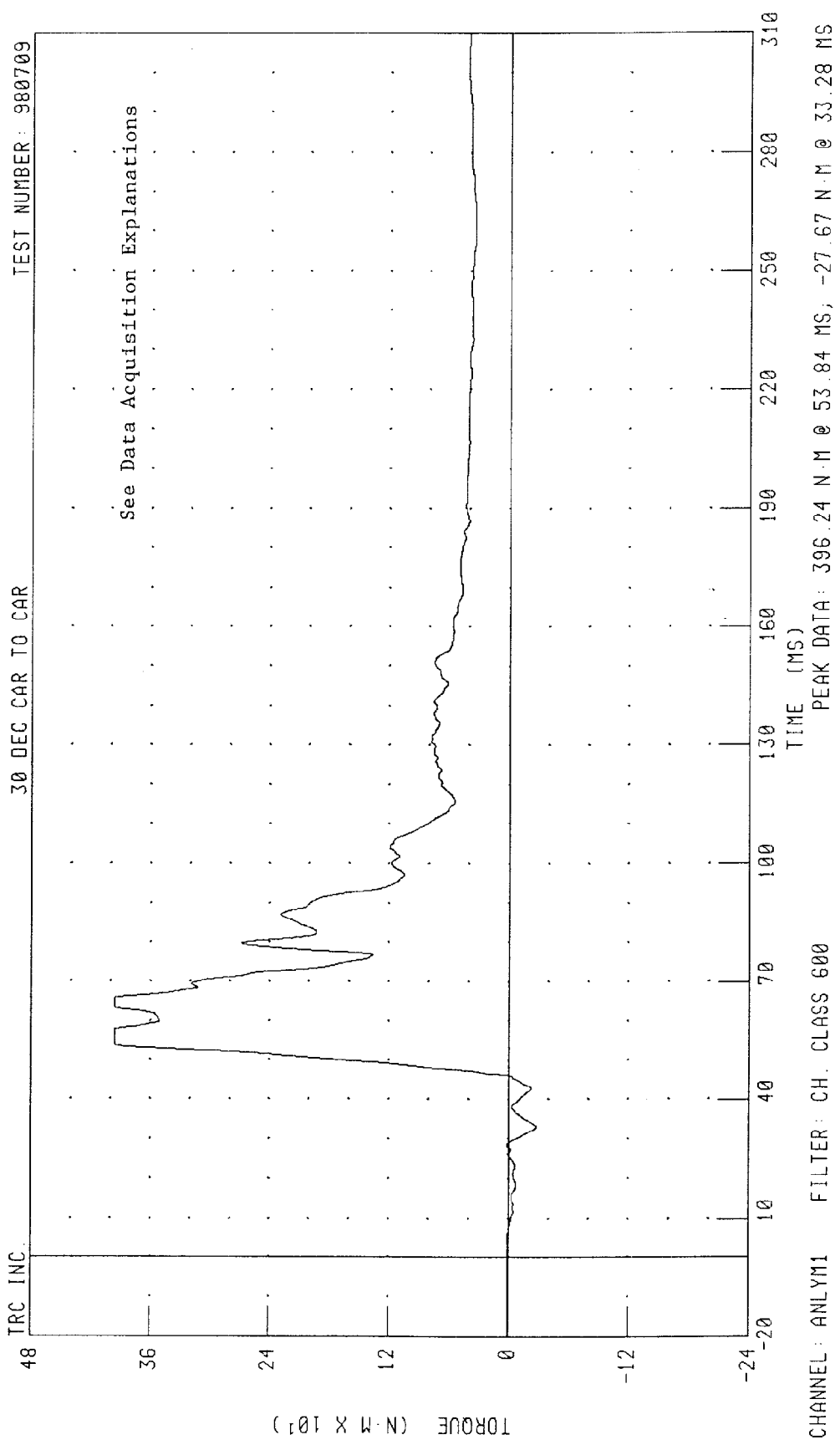


CHANNEL: ANLYF1 FILTER: CH. CLASS 600 PEAK DATA: 1129.16 N @ 56.00 MS, -1518.06 N @ 93.20 MS

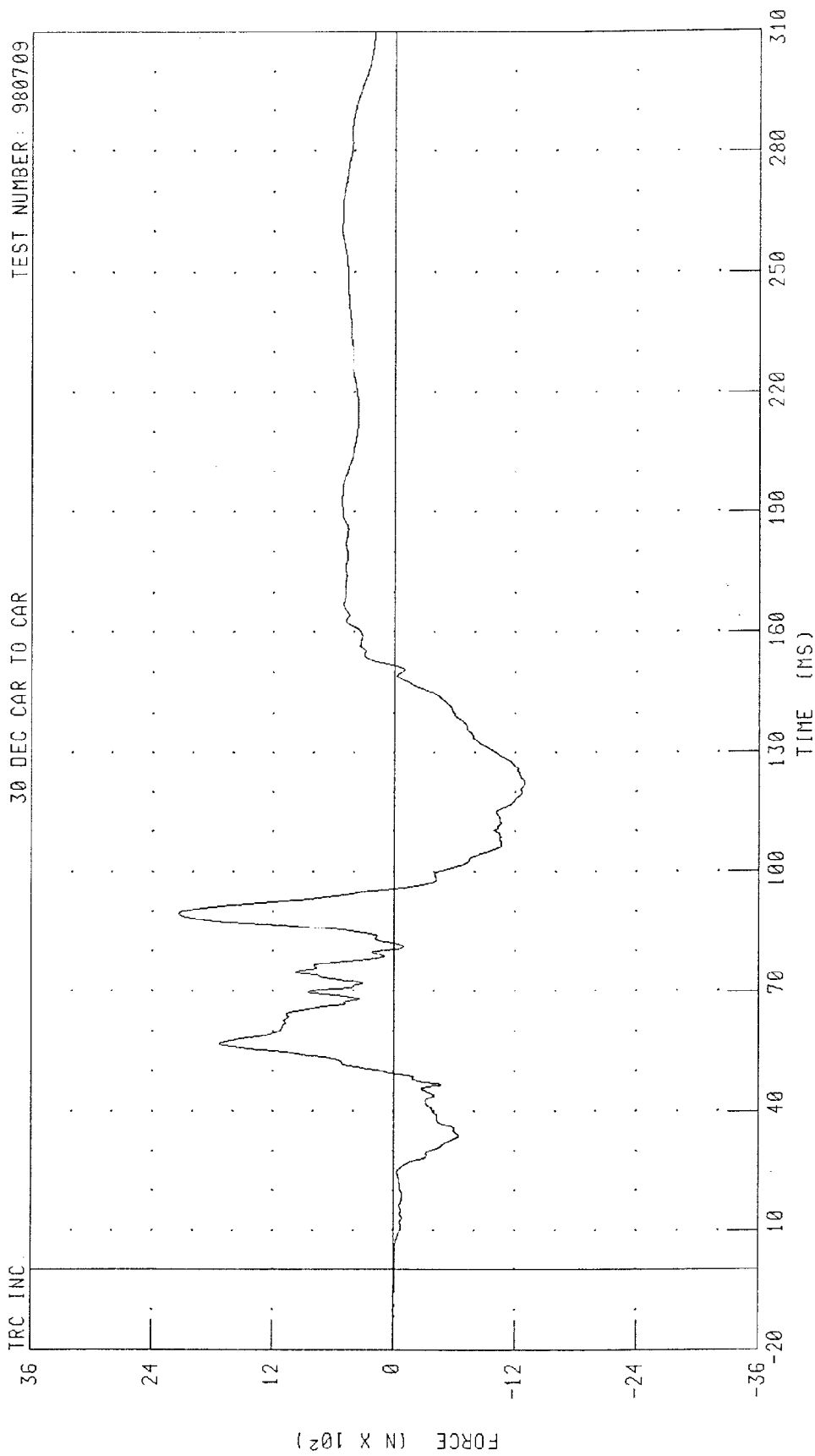
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT LOWER TIBIA MOMENT ABOUT X AXIS



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS



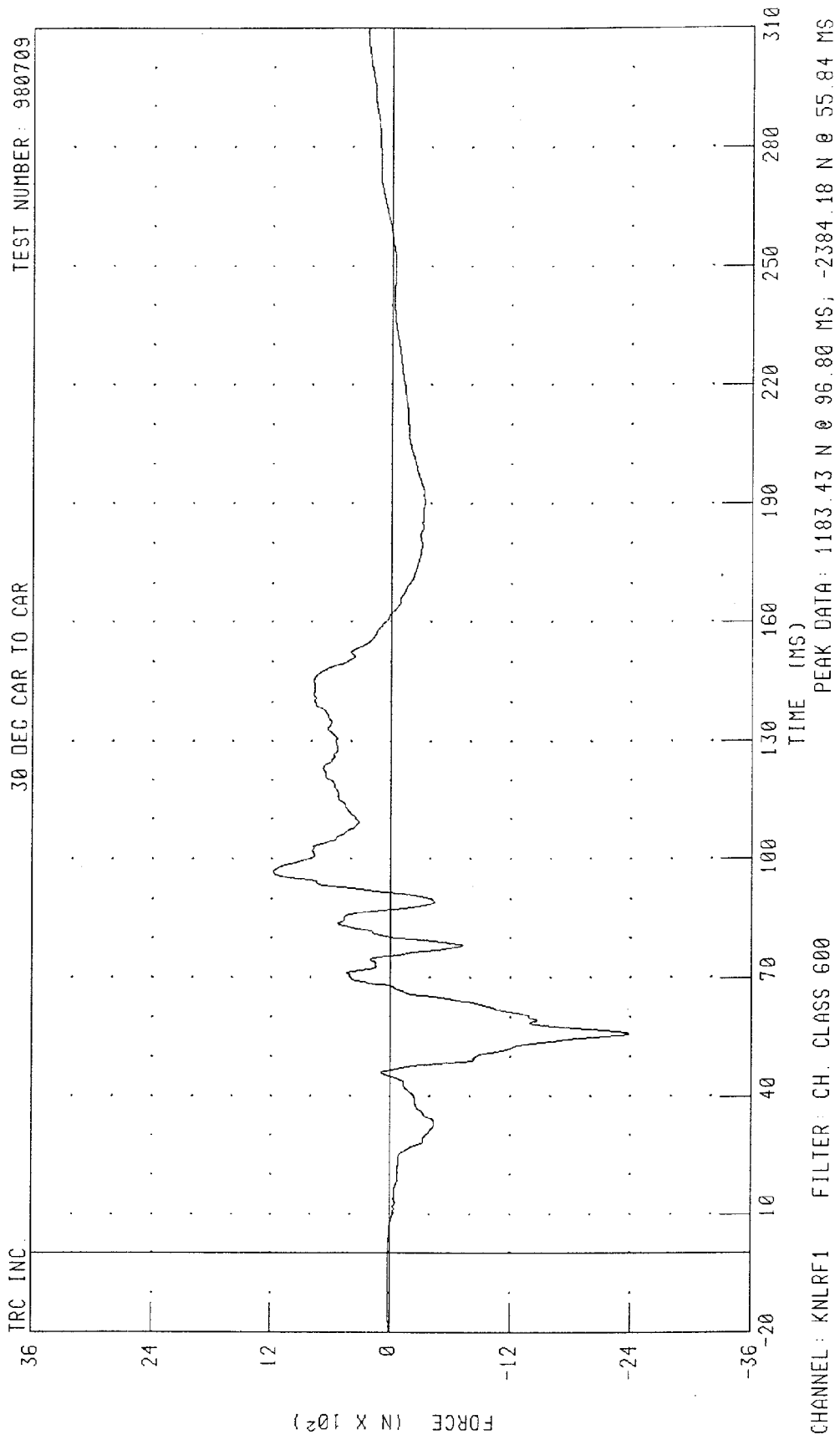
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT KNEE LEFT FORCE



CHANNEL: KNLLF1 FILTER: CH. CLASS 600

PEAK DATA: 2137.51 N @ 89.52 MS; -1293.62 N @ 122.08 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT KNEE RIGHT FORCE

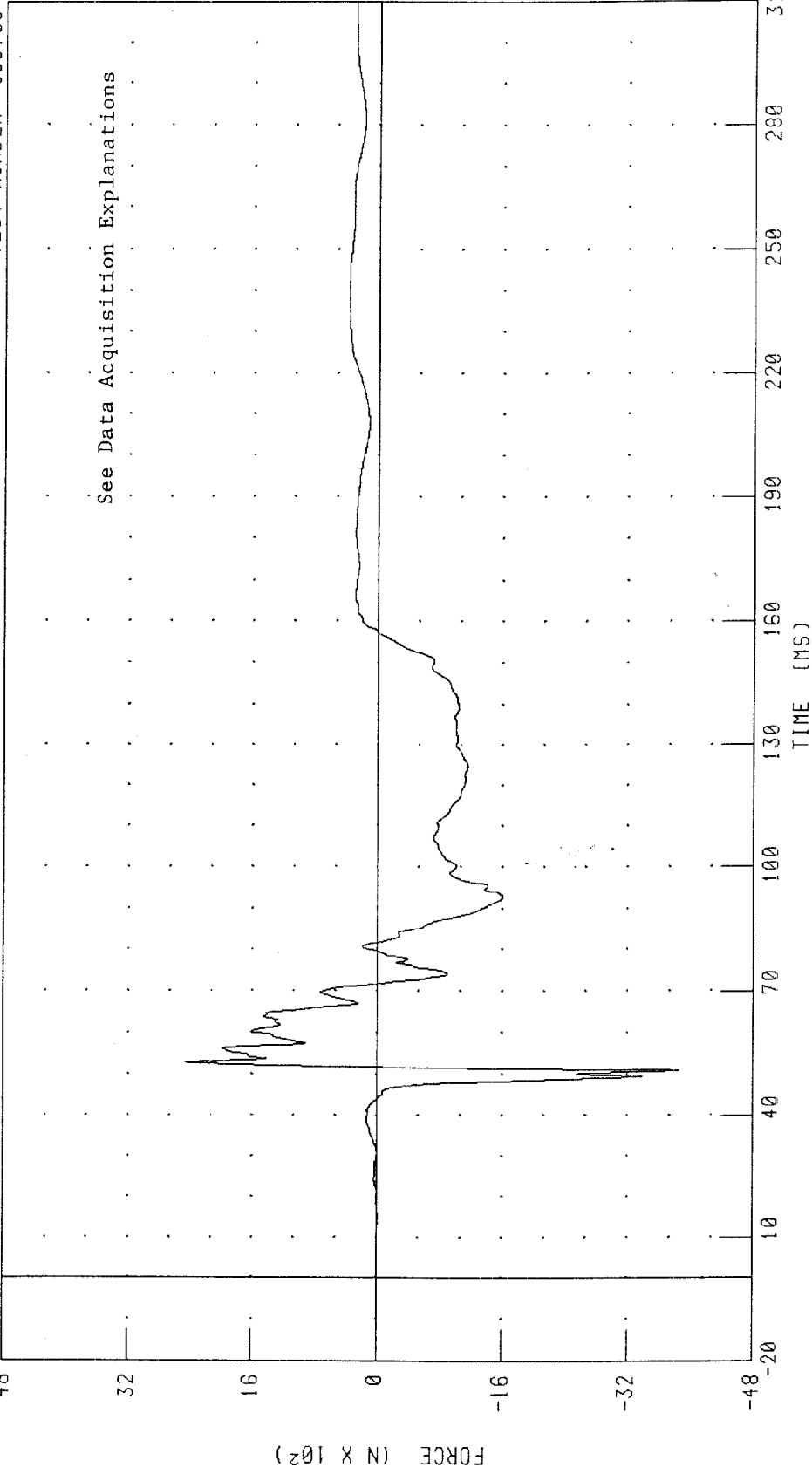


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT KNEE LEFT FORCE

TEST NUMBER: 980709

30 DEG CAR TO CAR

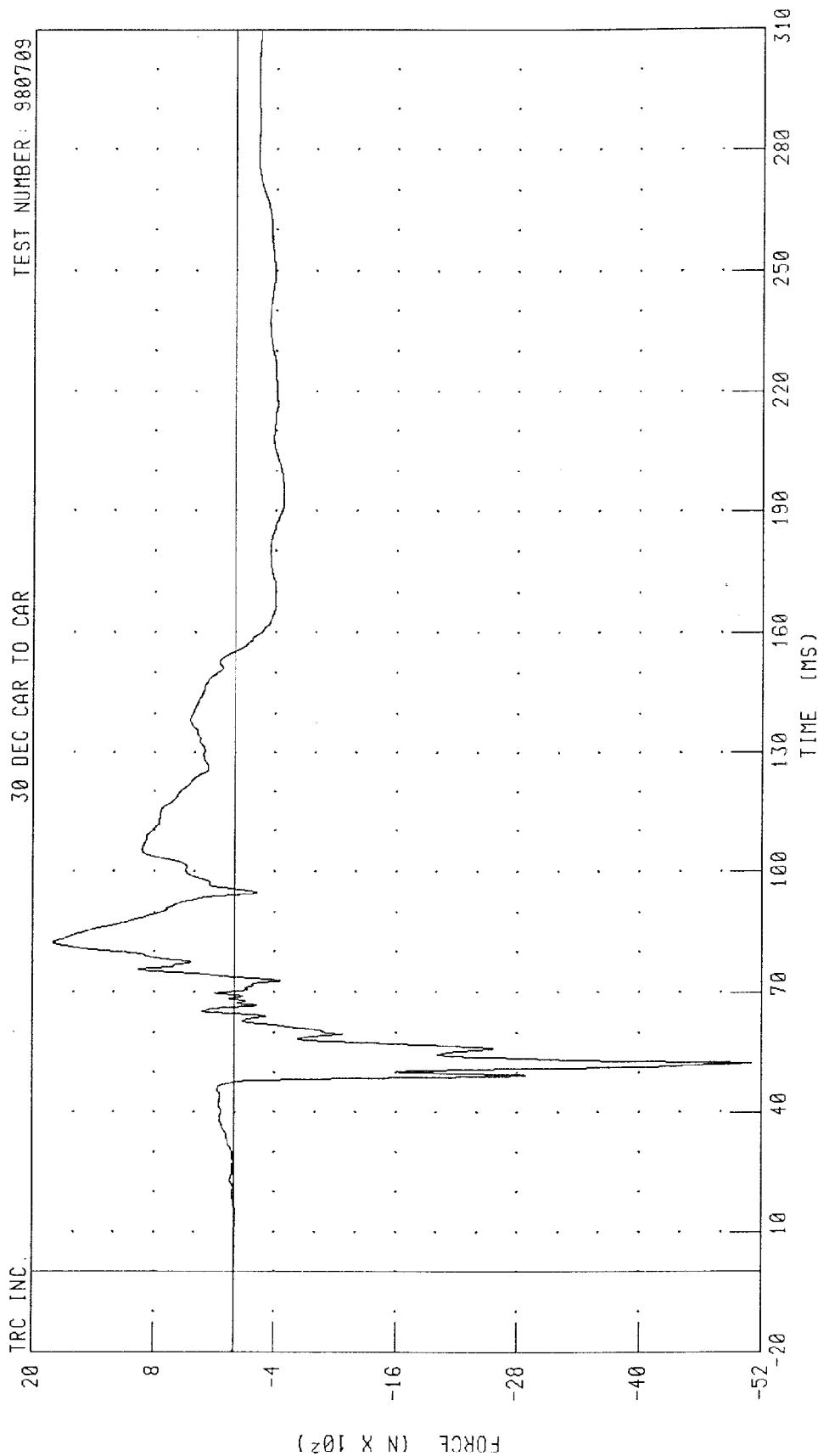
TRC INC.



CHANNEL: KNRLF1 FILTER: CH. CLASS 600

PEAK DATA: 2462.74 N @ 52.80 MS, -3857.97 N @ 50.80 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT KNEE RIGHT FORCE



CHANNEL: KNRRF1 FILTER: CH. CLASS 600

PEAK DATA: 1802.78 N @ 82.32 MS, -5094.74 N @ 52.32 MS

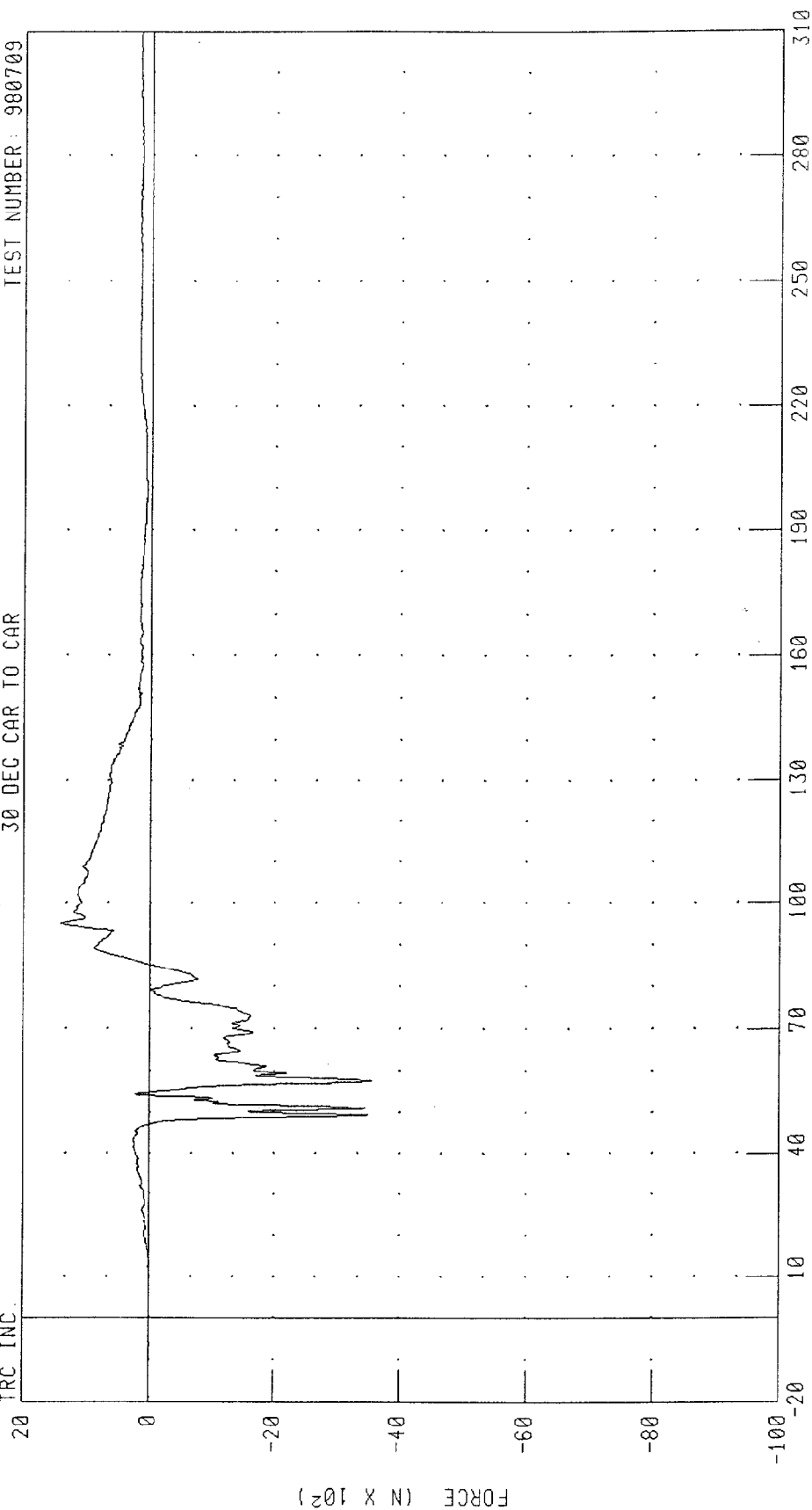
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES

TARGET DRIVER LEFT FEMUR FORCE

30 DEC CAR TO CAR

TEST NUMBER: 980709

TRC INC.



CHANNEL: LFMF1 FILTER: CH. CLASS 600

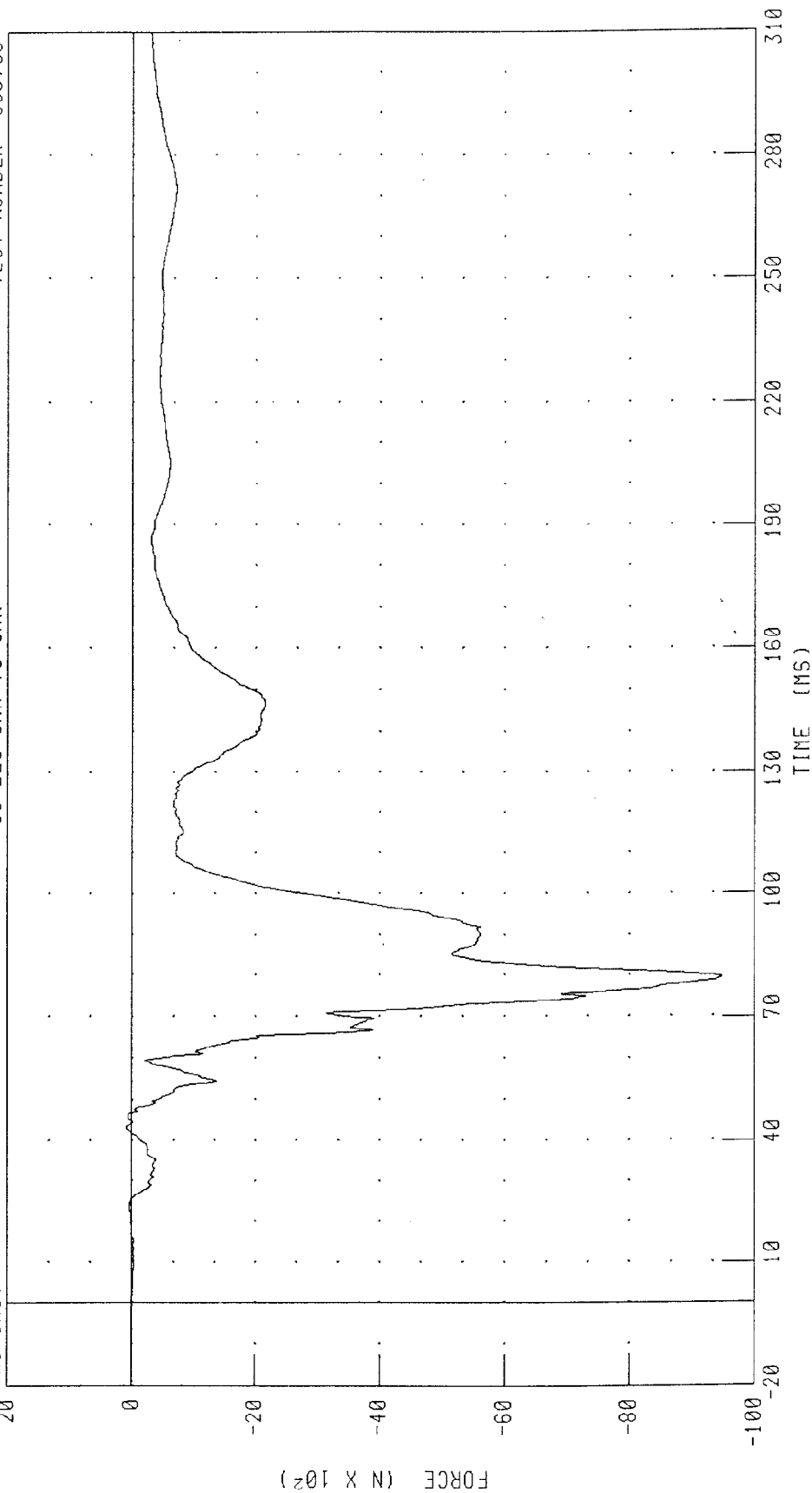
PEAK DATA: 1431.41 N @ 95.20 MS, -3546.26 N @ 57.52 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT FEMUR FORCE

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.

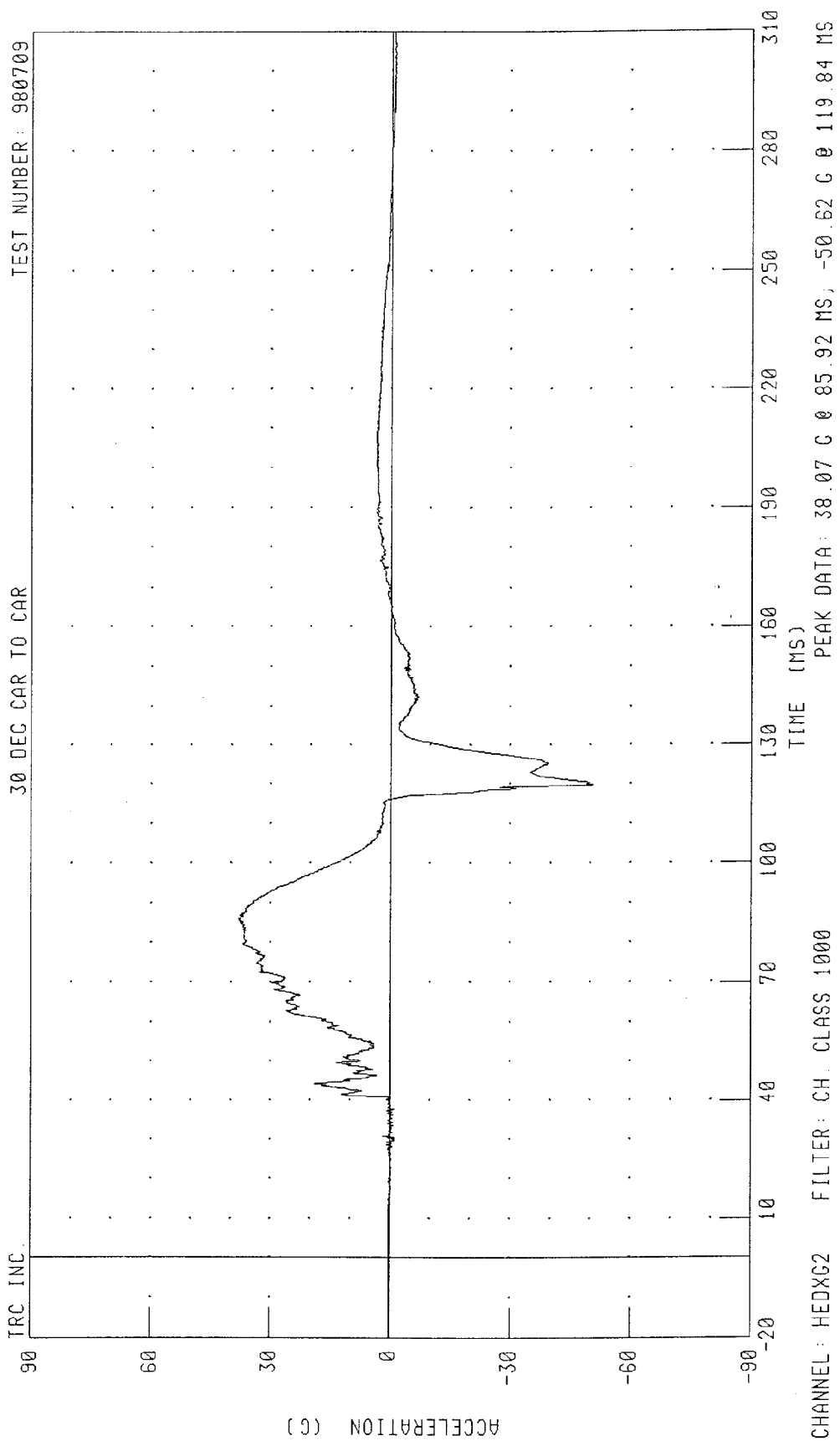


CHANNEL: RFMF1

FILTER: CH. CLASS 600

PEAK DATA: 90.60 N @ 43.52 MS, -9476 72 N @ 79.52 MS

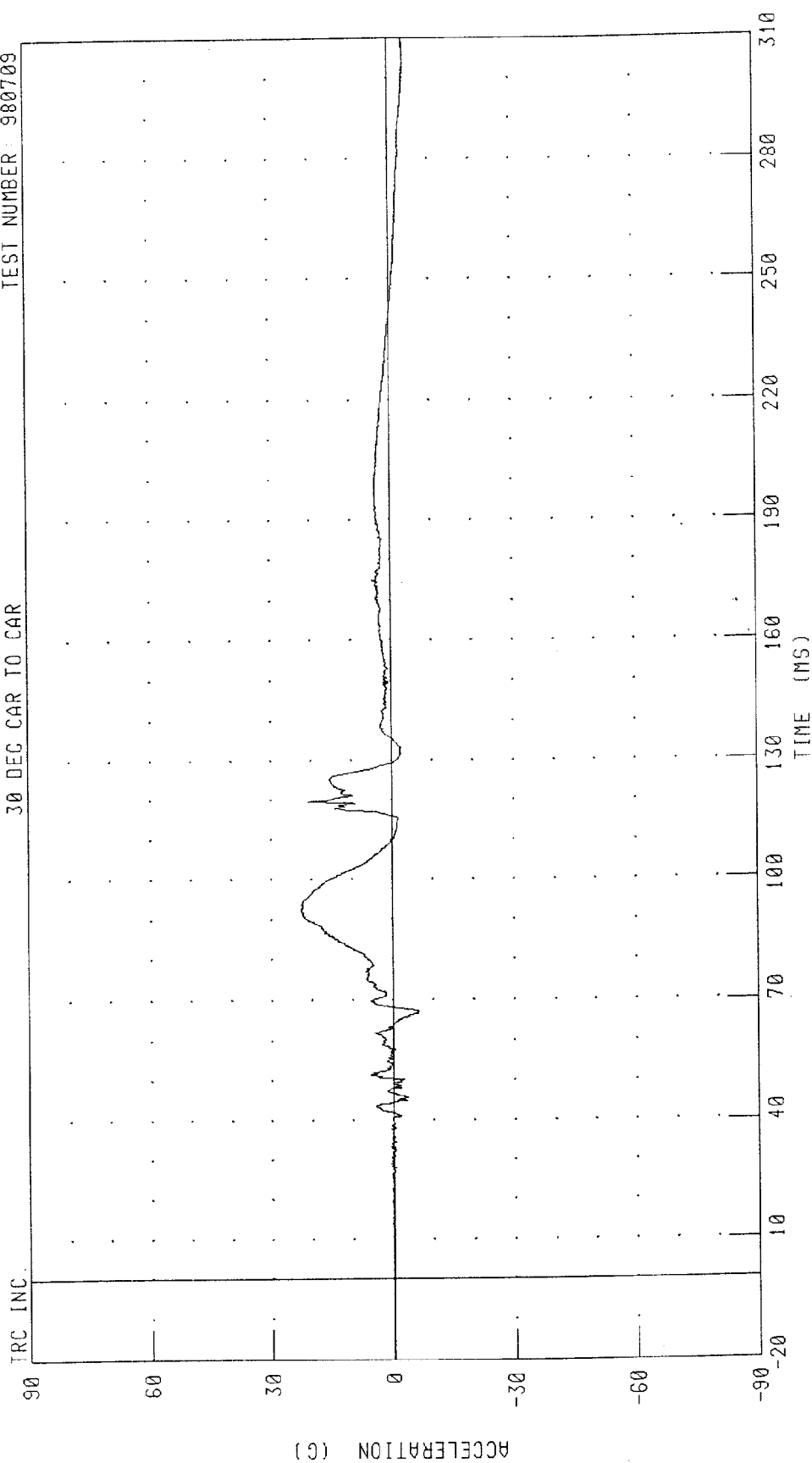
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR



CHANNEL: HEDYC2 FILTER: CH. CLASS 1000

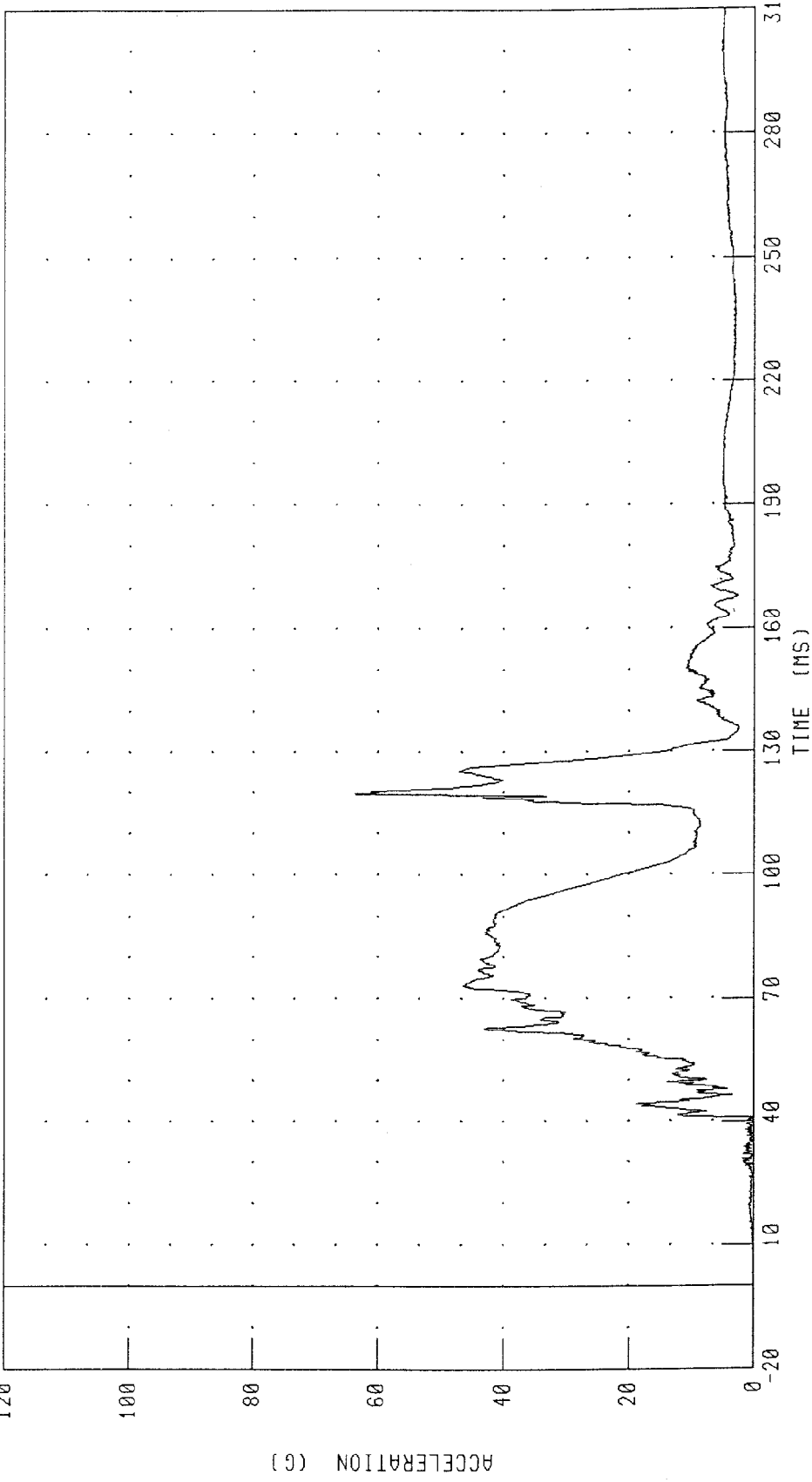
PEAK DATA: 22.50 G @ 92.00 MS, -6.38 G @ 67.36 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: HEDRC2 FILTER: CH. CLASS 1000

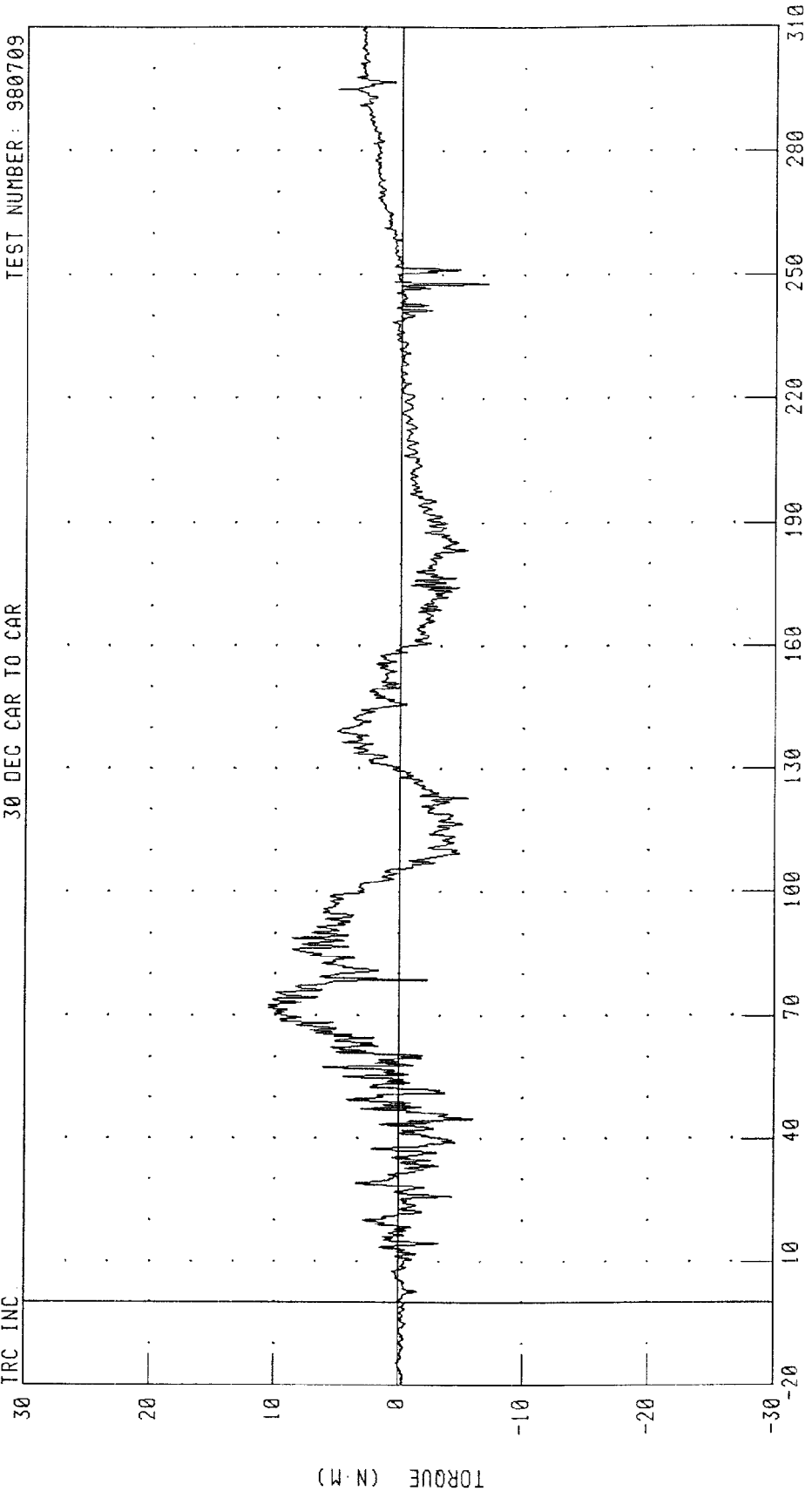
PEAK DATA: 63.68 G @ 119.84 MS; 0.03 G @ -16.96 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC

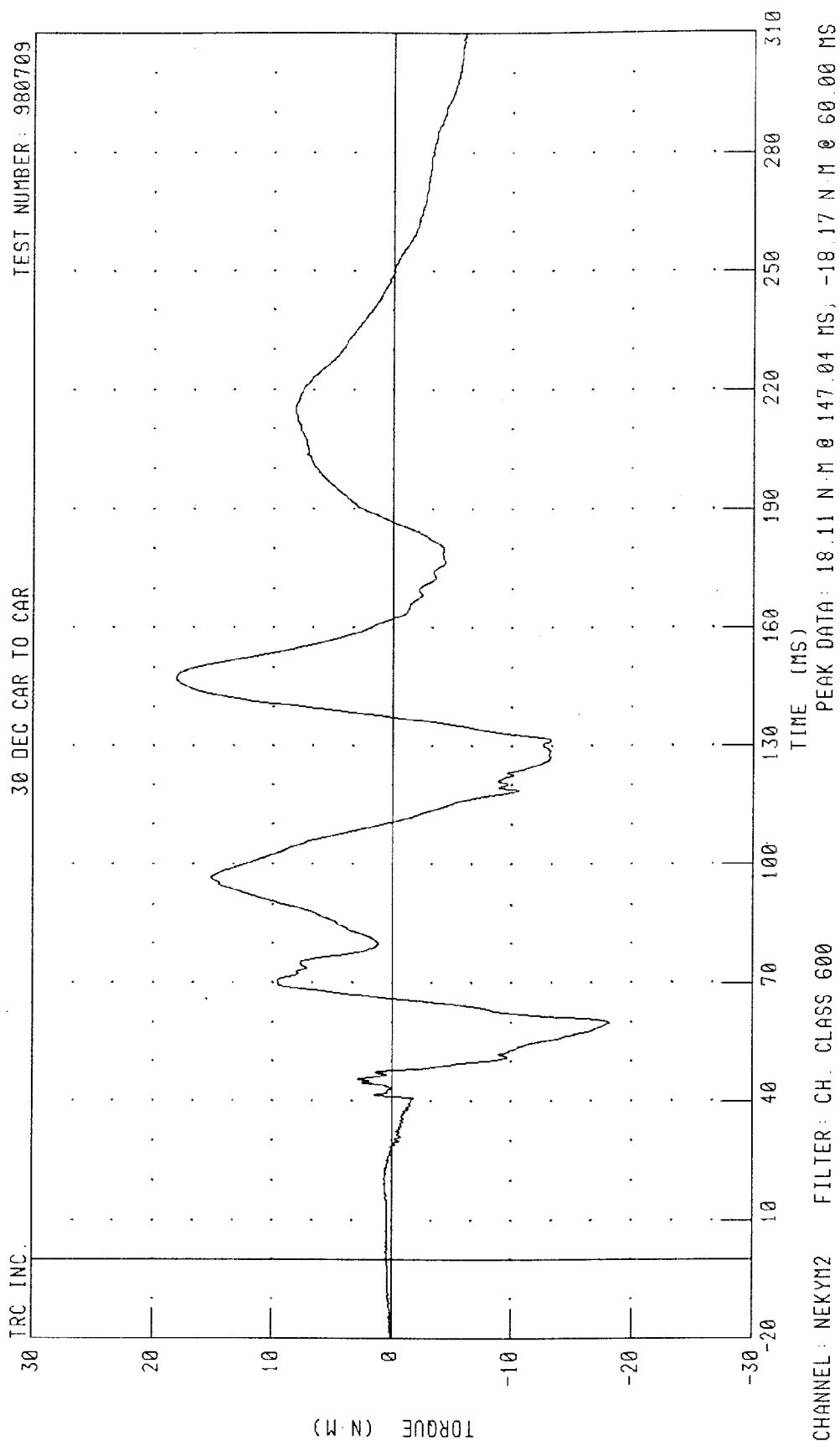


TIME (MS)

PEAK DATA: 10.57 N·M @ 71.92 MS, -7.09 N·M @ 247.92 MS

CHANNEL: NEXXM2 FILTER: CH. CLASS 600

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS

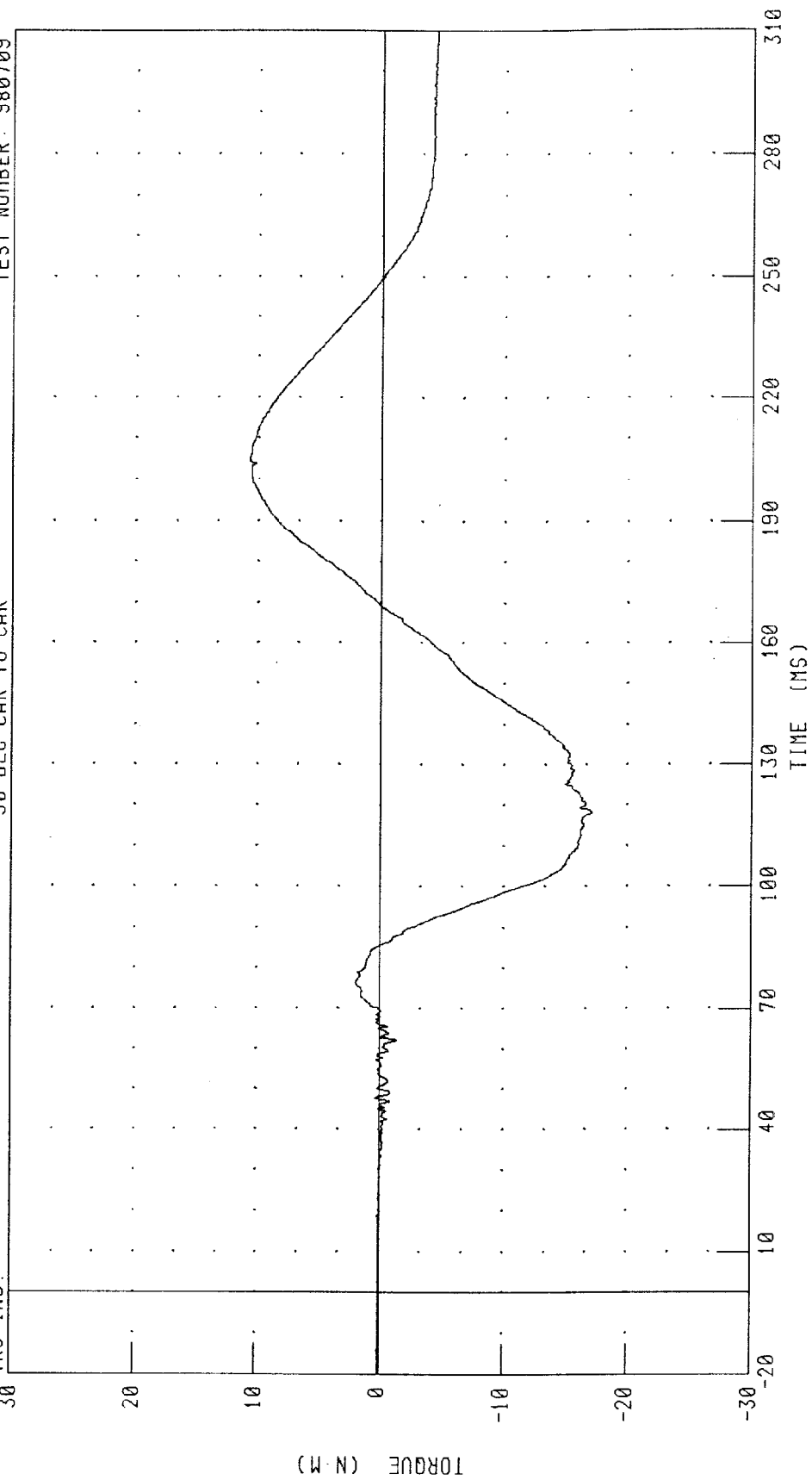


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS

TRC INC.

30 DEG CAR TO CAR

TEST NUMBER: 980709



CHANNEL: NEKZM2 FILTER: CH. CLASS 600

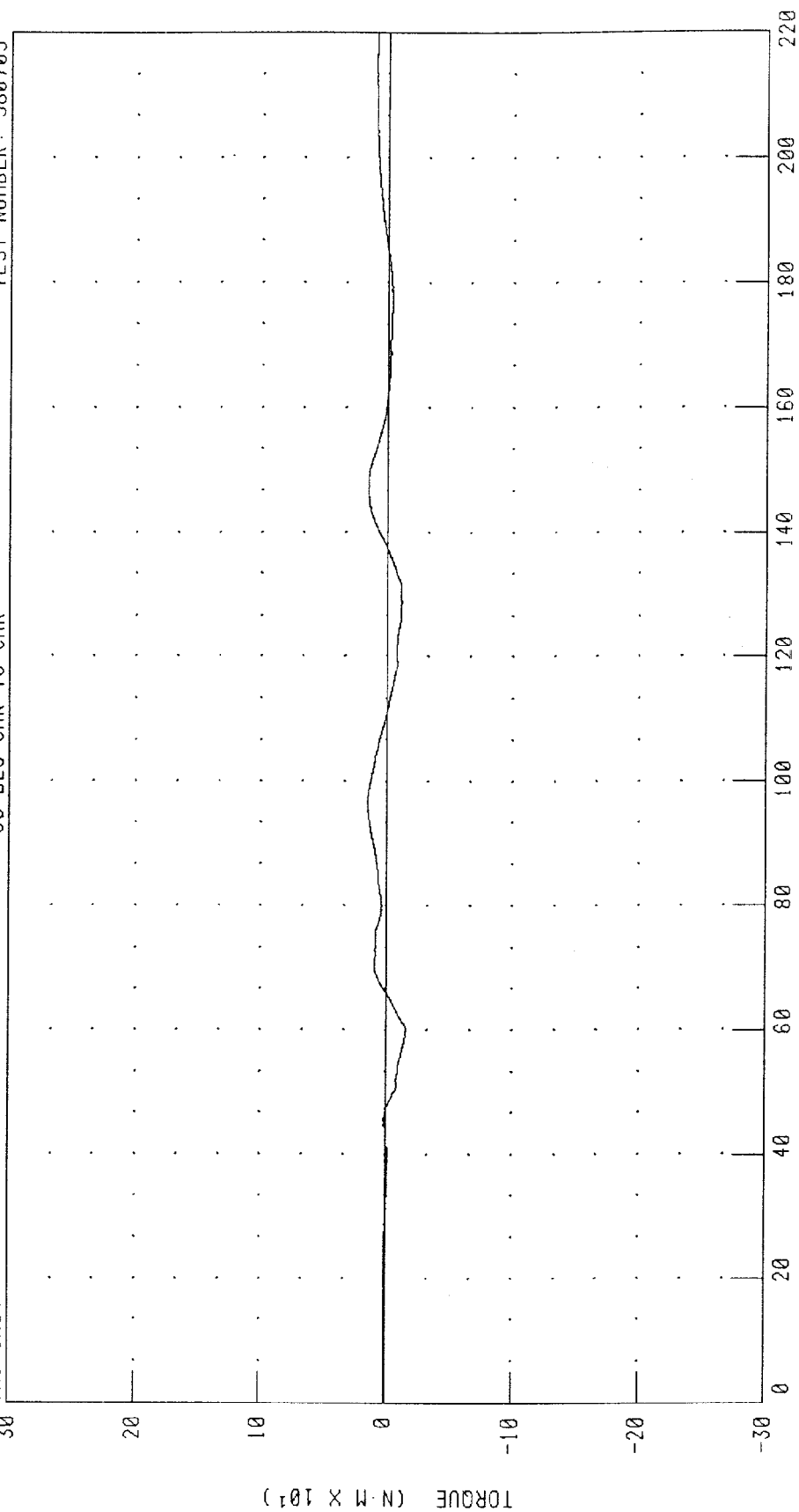
PEAK DATA: 10.71 N-M @ 205.12 MS, -17.11 N-M @ 118.24 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE ABOUT Y AXIS

TRC INC.

30 DEC CAR TO CAR

TEST NUMBER: 980709



CHANNEL: NEKOM2 FILTER: CH. CLASS 600

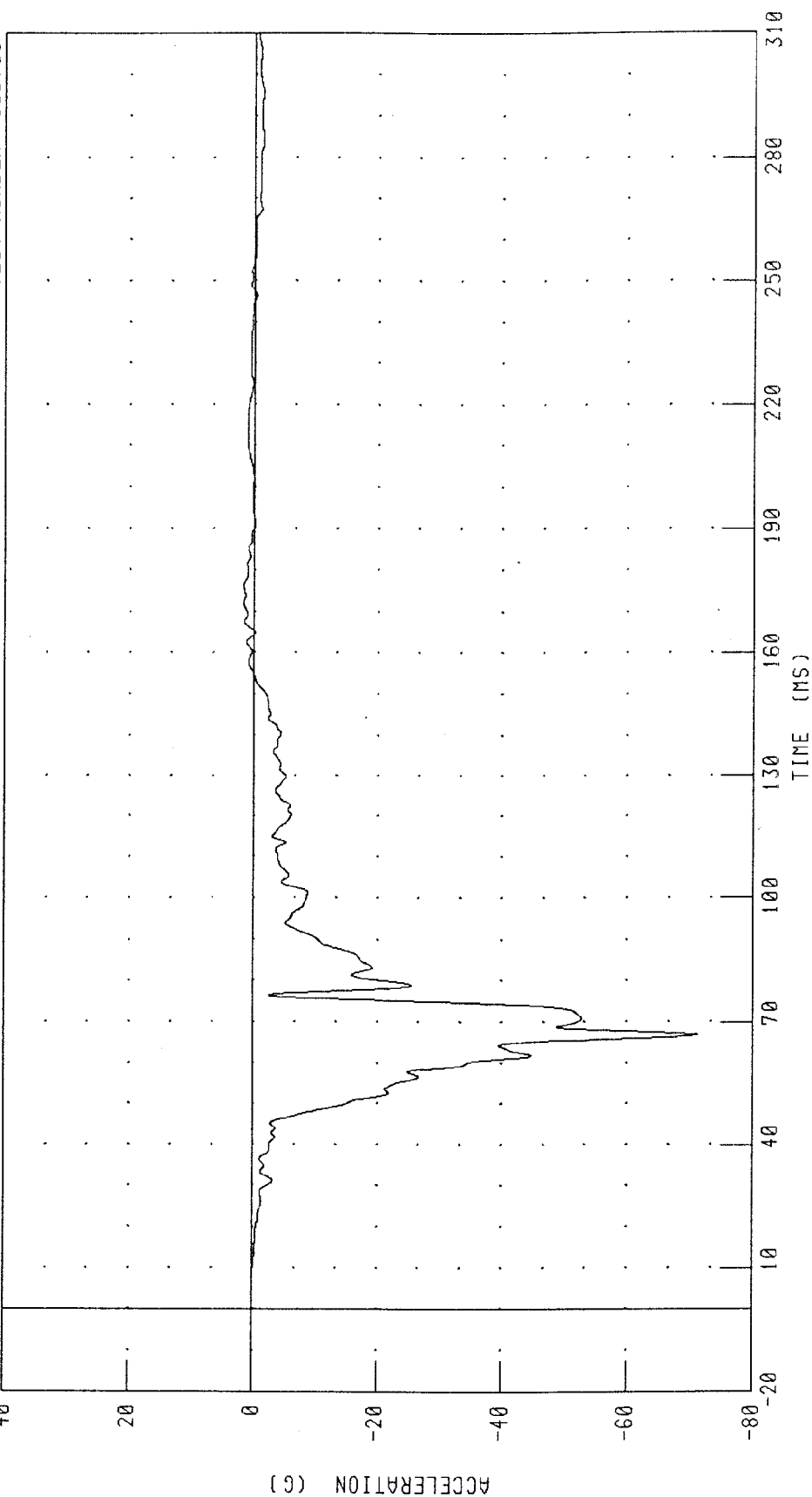
PEAK DATA: 15.13 N·m @ 148.16 ms, -16.11 N·m @ 60.08 ms

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.



CHANNEL: CSTXC2 FILTER: CH. CLASS 180

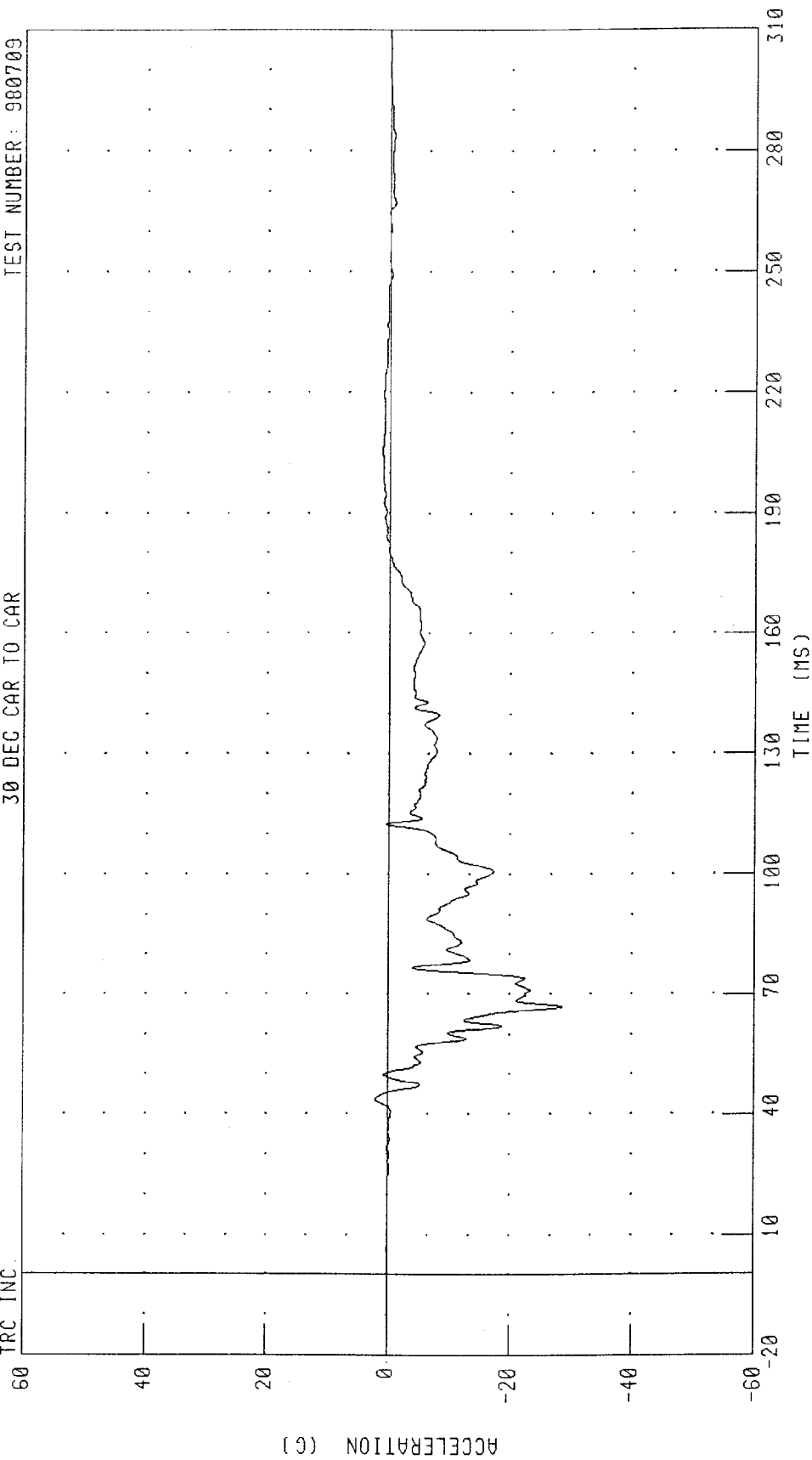
PEAK DATA: 1.80 G @ 172.16 MS, -71.21 G @ 66.88 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TRC INC.

30 DEC CAR TO CAR

TEST NUMBER: 980709



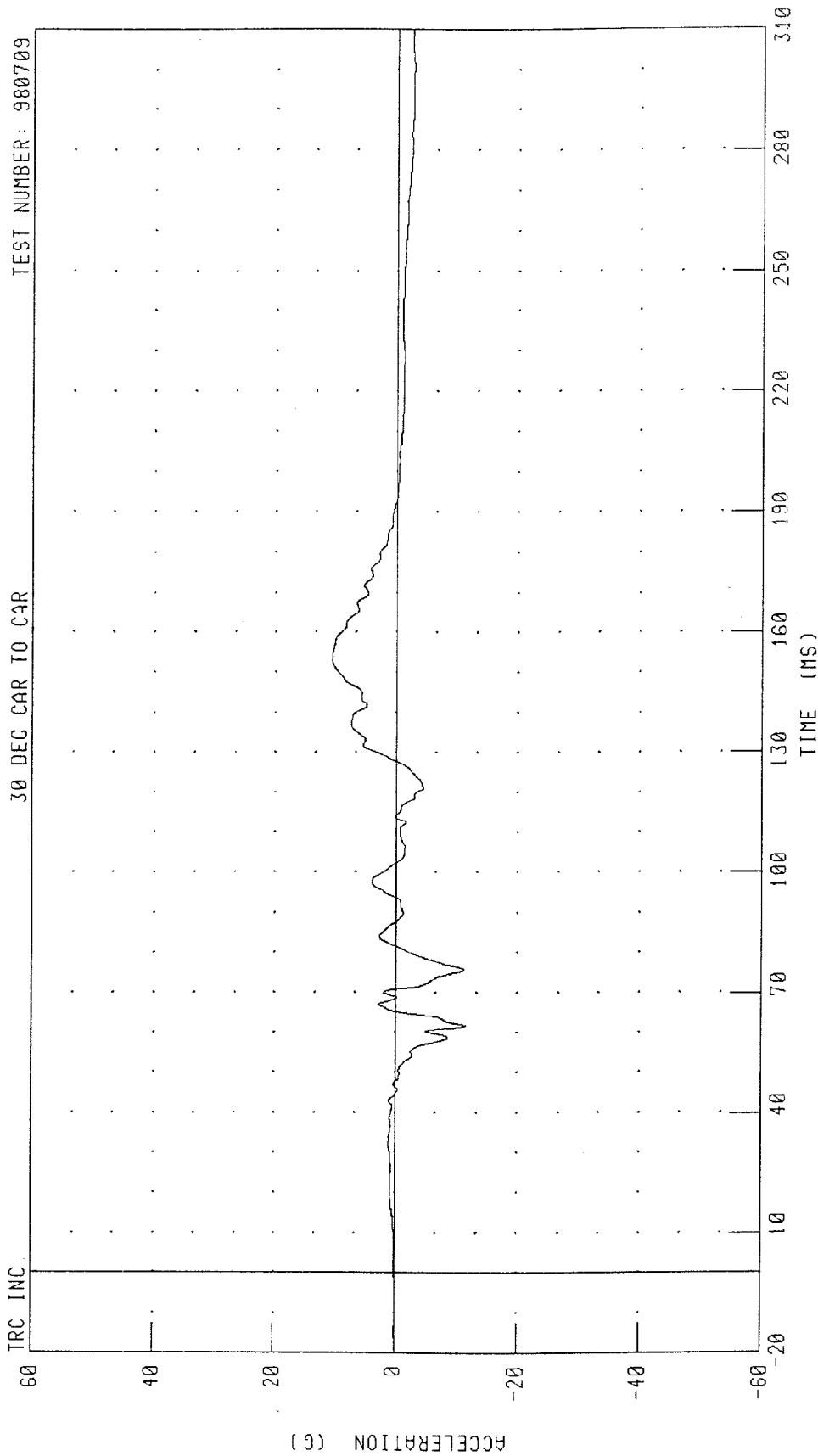
CHANNEL: CSTYG2 FILTER: CH. CLASS 180

PEAK DATA: 1.97 G @ 43.76 MS, -28.58 G @ 66.96 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TRC INC. TEST NUMBER: 980709

30 DEC CAR TO CAR



CHANNEL: CSTZC2 FILTER: CH. CLASS 180

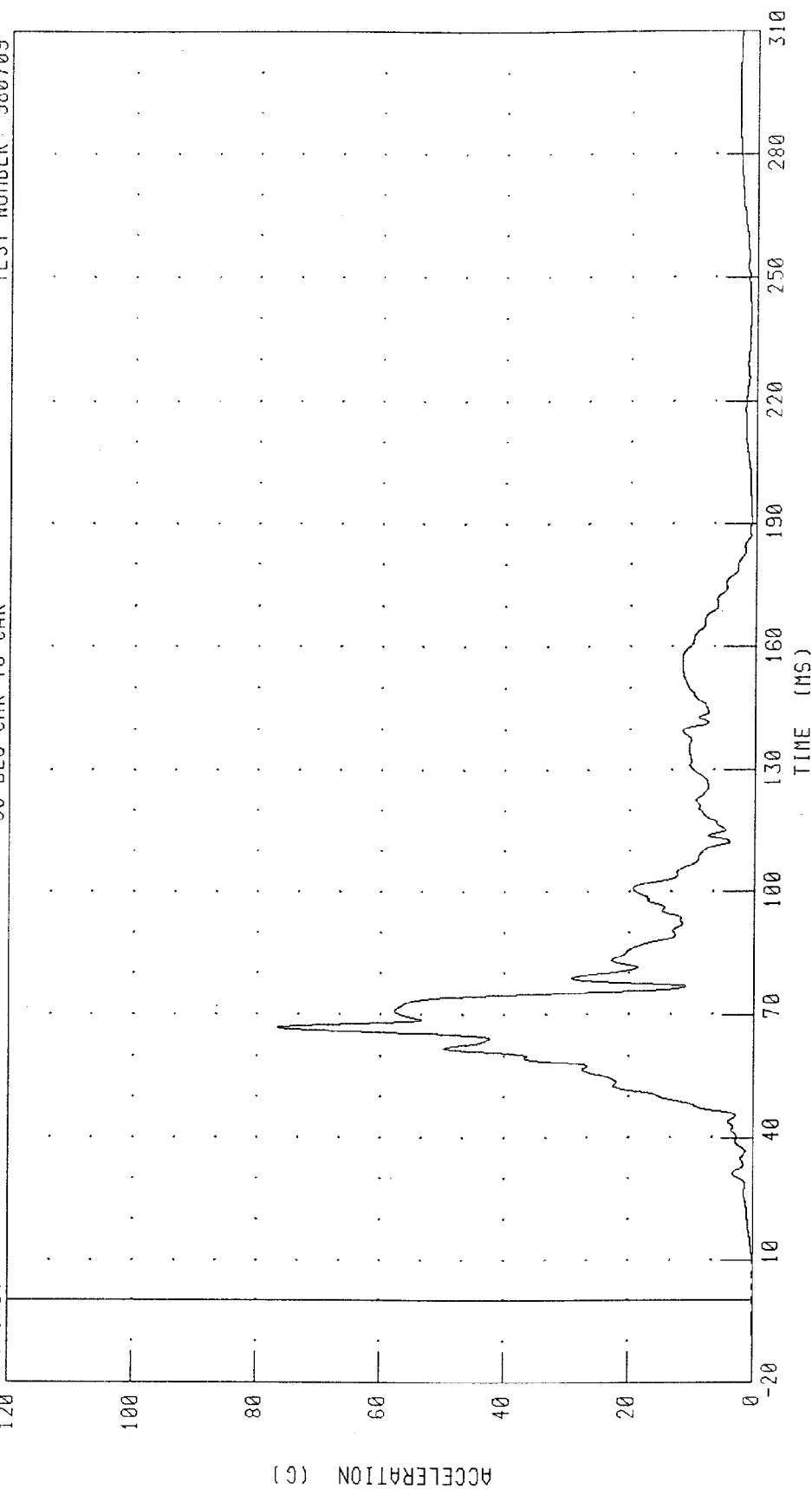
PEAK DATA: 10.64 G @ 153.36 MS, -11.51 G @ 61.92 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TRC INC.

30 DEC CAR TO CAR

TEST NUMBER: 980709



CHANNEL: CSTRG2 FILTER: CH. CLASS 180

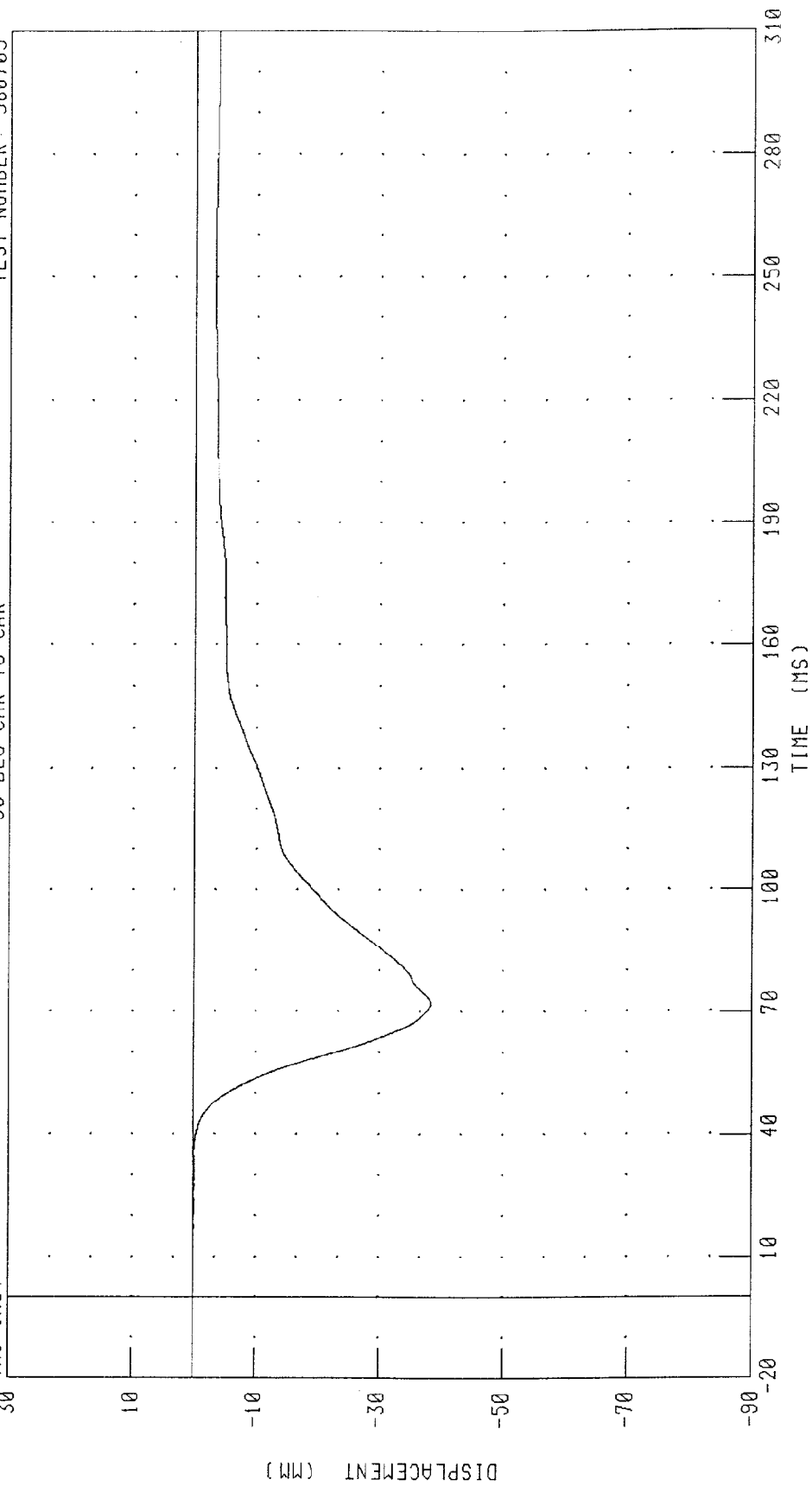
PEAK DATA: 76.73 C 0 66.88 MS, 0.00 C 0 -20.00 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: CSTXD2 FILTER: CH. CLASS 180

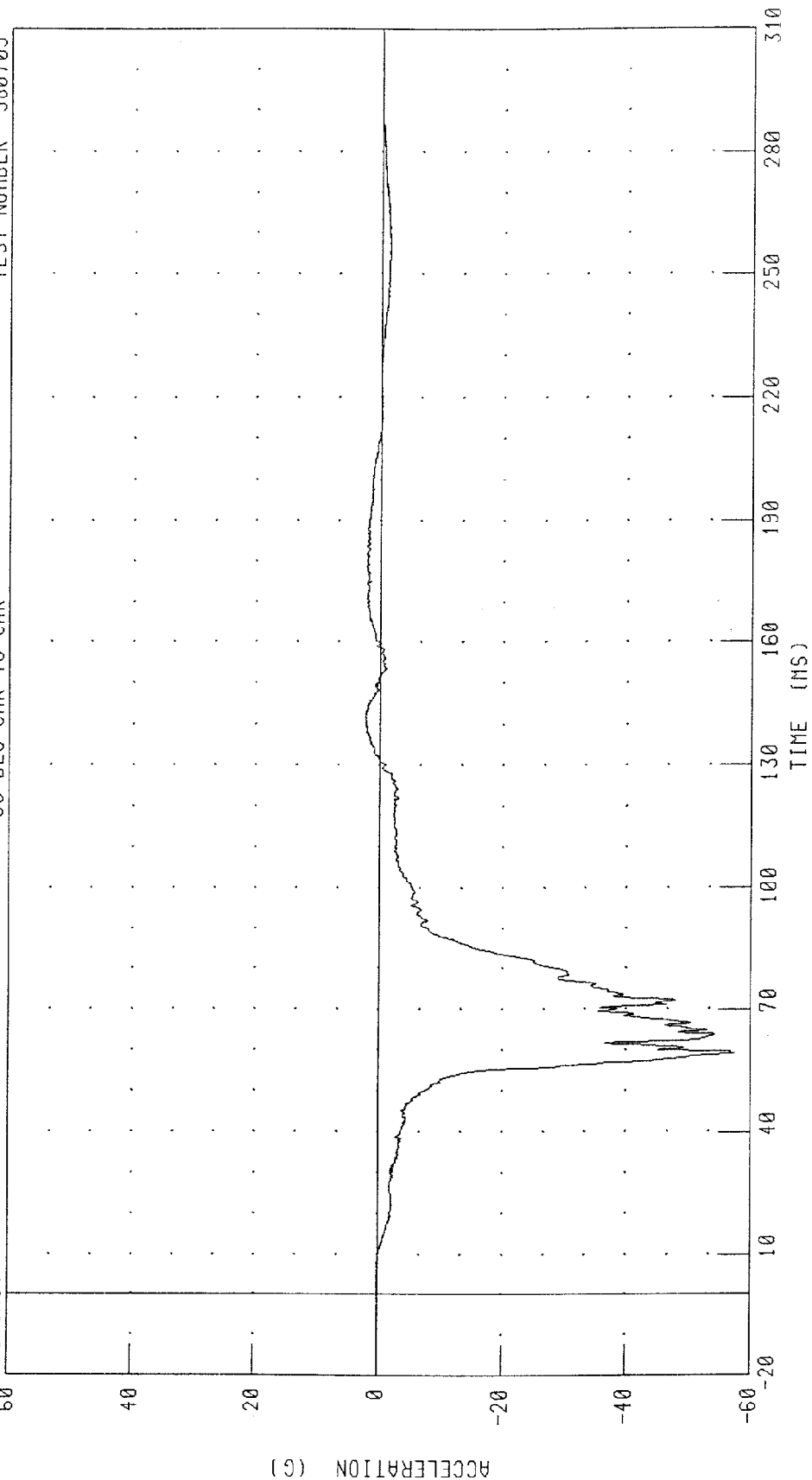
PEAK DATA: 0.02 MM @ -18.88 MS; -38.37 MM @ 72.16 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER PELVIS X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: PEVXC2 FILTER: CH. CLASS 1000

PEAK DATA: 2.22 G @ 140.00 MS; -57.54 G @ 59.12 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER PELVIS Y-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.

60

40

20

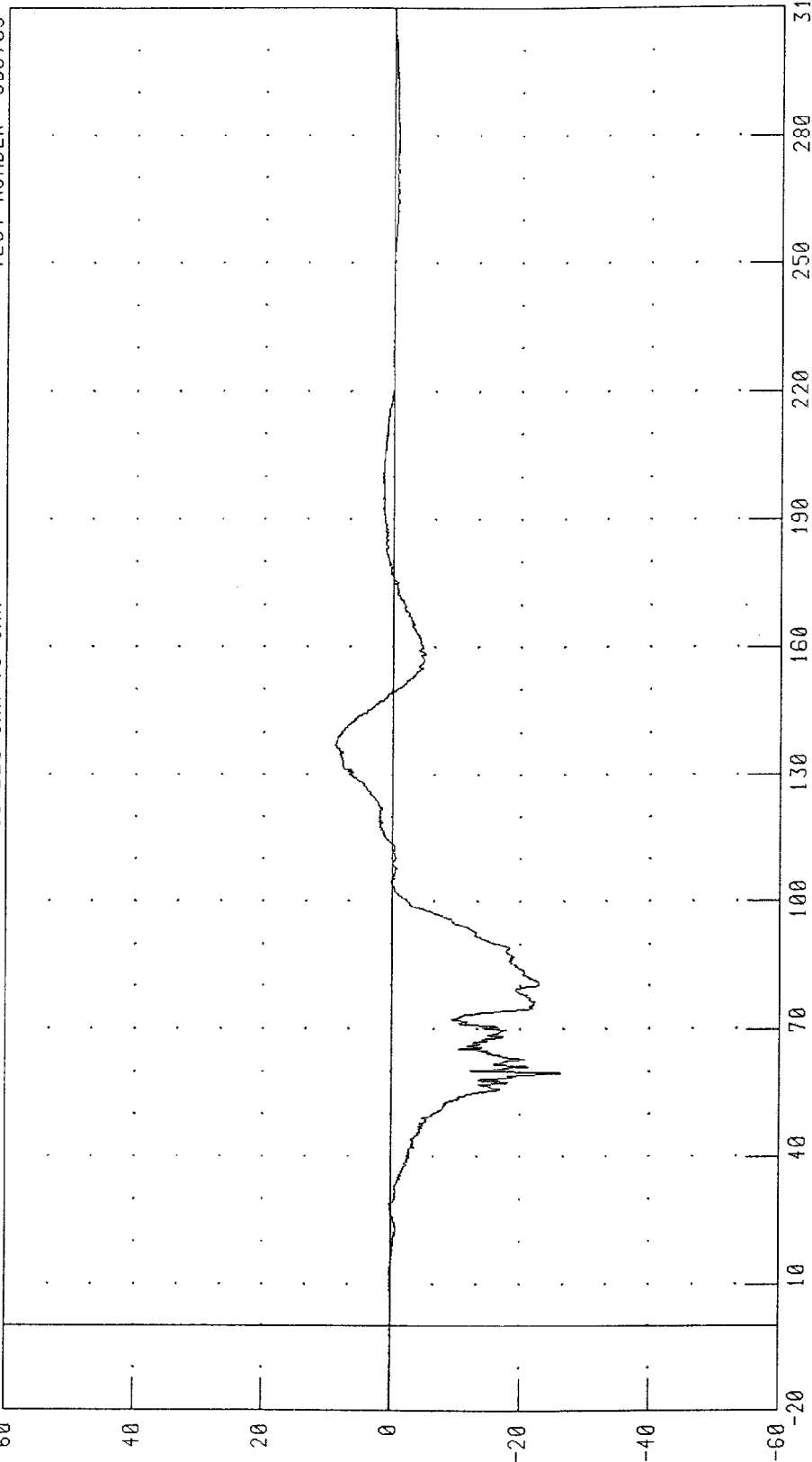
0

-20

-40

-60

ACCELERATION (G)



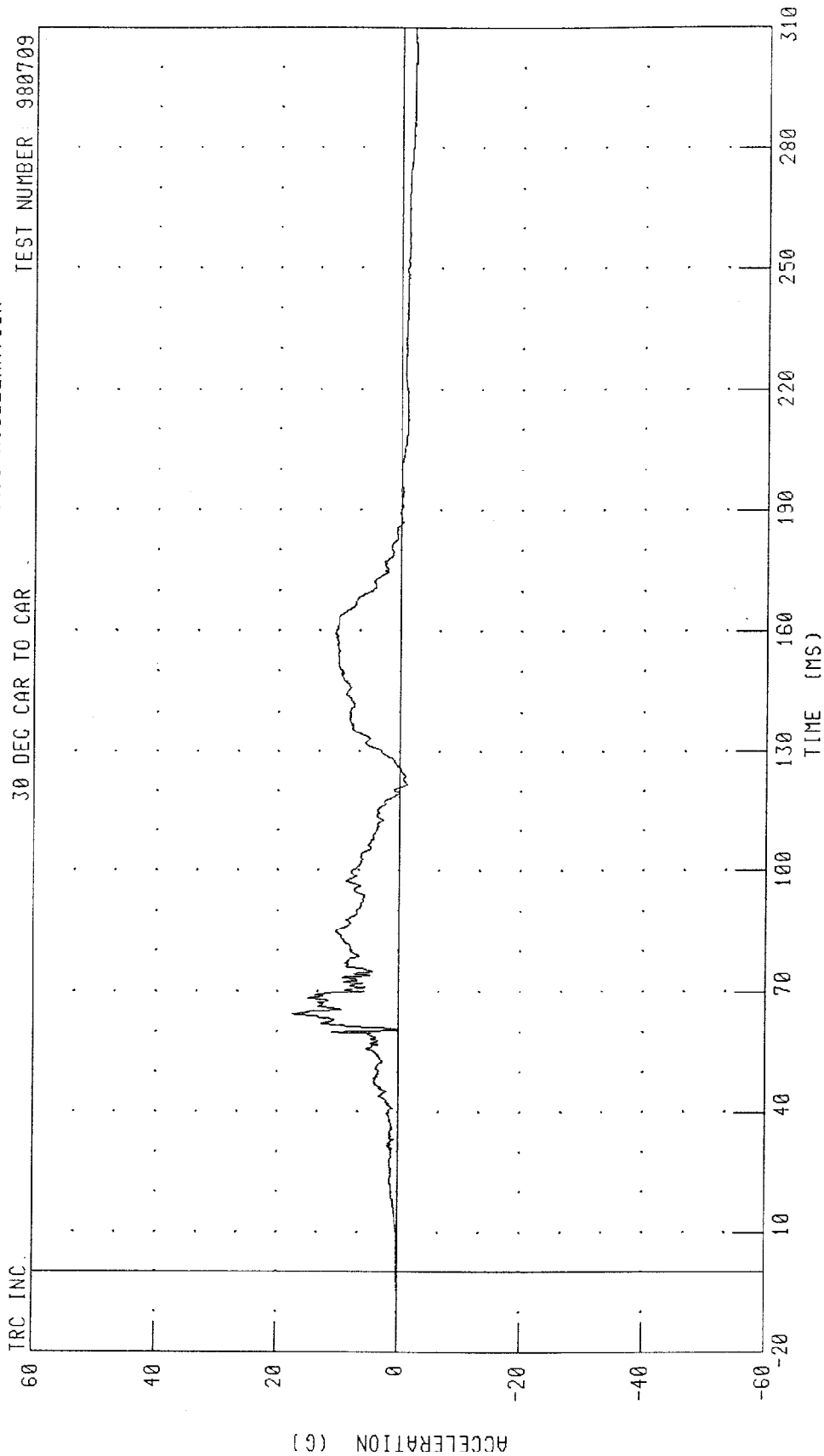
CHANNEL: PEVYG2 FILTER: CH. CLASS 1000

PEAK DATA: 8.87 G @ 137.04 MS, -25.32 G @ 59.84 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER PELVIS Z-AXIS ACCELERATION

TRC INC. TEST NUMBER: 980709

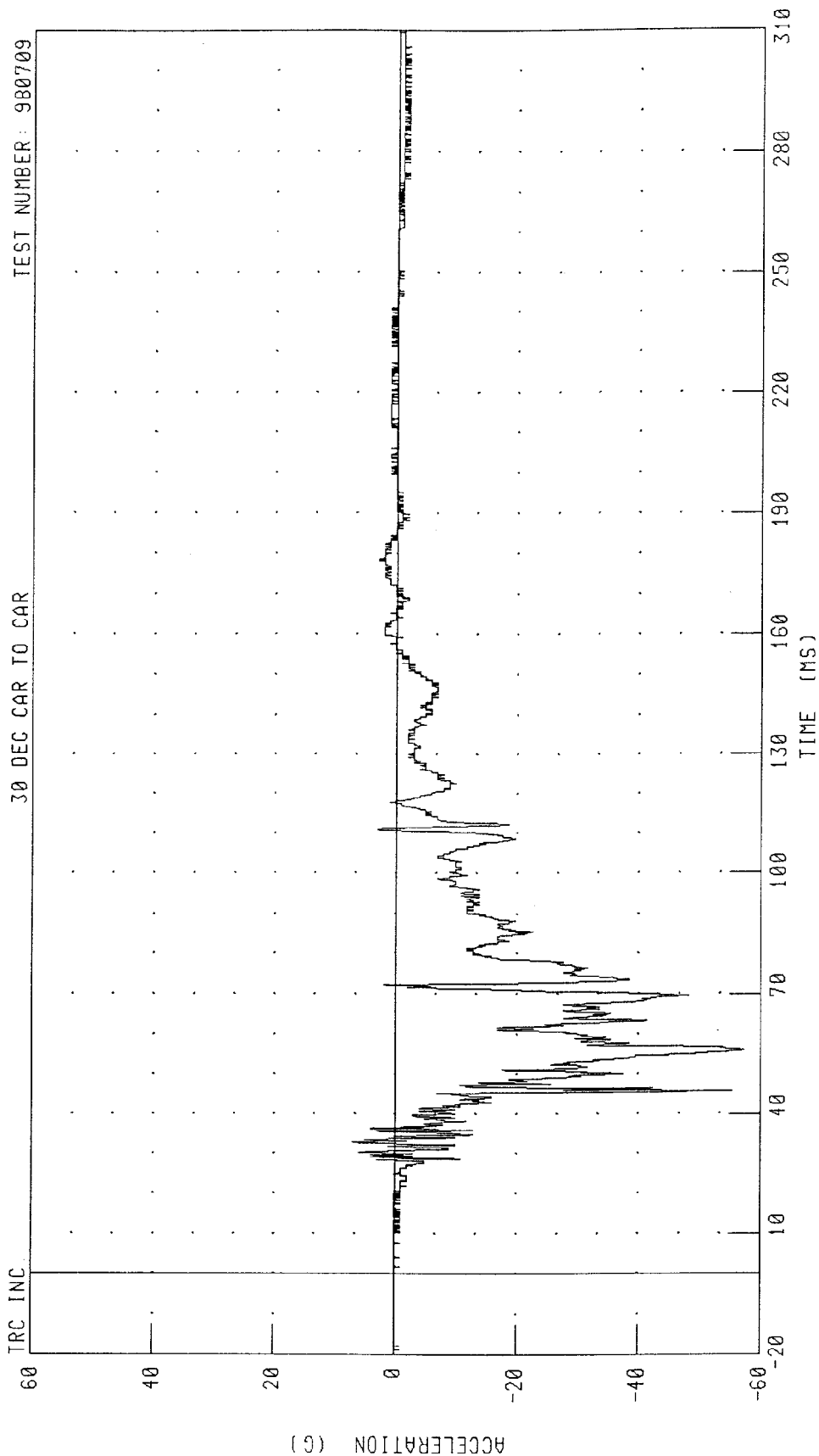
30 DEC CAR TO CAR



CHANNEL: PEVZ02 FILTER: CH. CLASS 1000

PEAK DATA: 17.46 G @ 64.48 MS, -2.28 G @ 301.12 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER STERNUM TOP X-AXIS ACCELERATION



CHANNEL: STTXG2 FILTER: CH. CLASS 1000

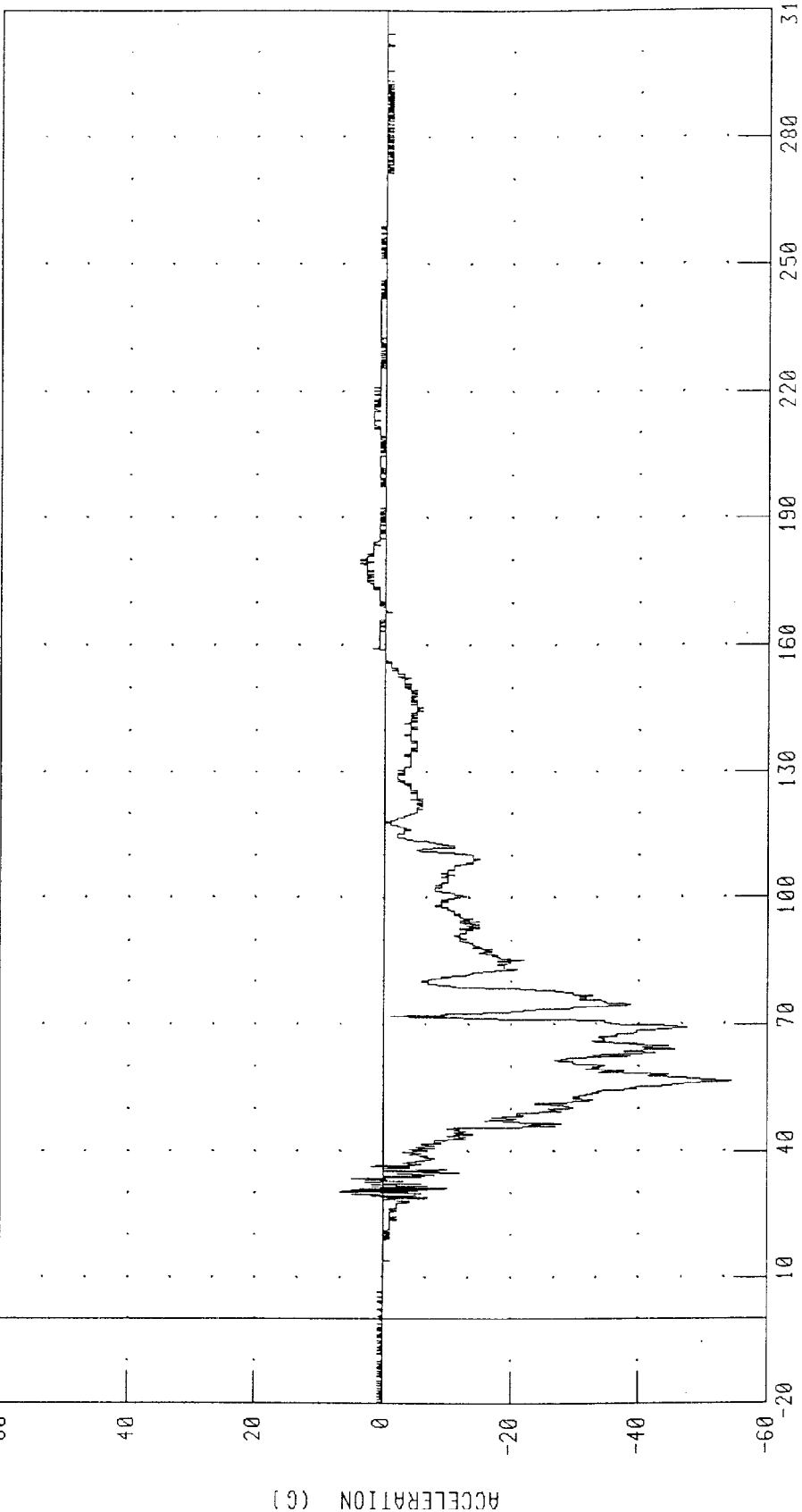
PEAK DATA: 6.97 G @ 32.72 MS; -57.29 G @ 55.84 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER STERNUM MIDDLE X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: STMXC2 FILTER: CH. CLASS 1000

PEAK DATA: 6.77 G @ 30.32 MS; -54.44 G @ 56.32 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER STERNUM BOTTOM X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

IRC INC.

60

40

20

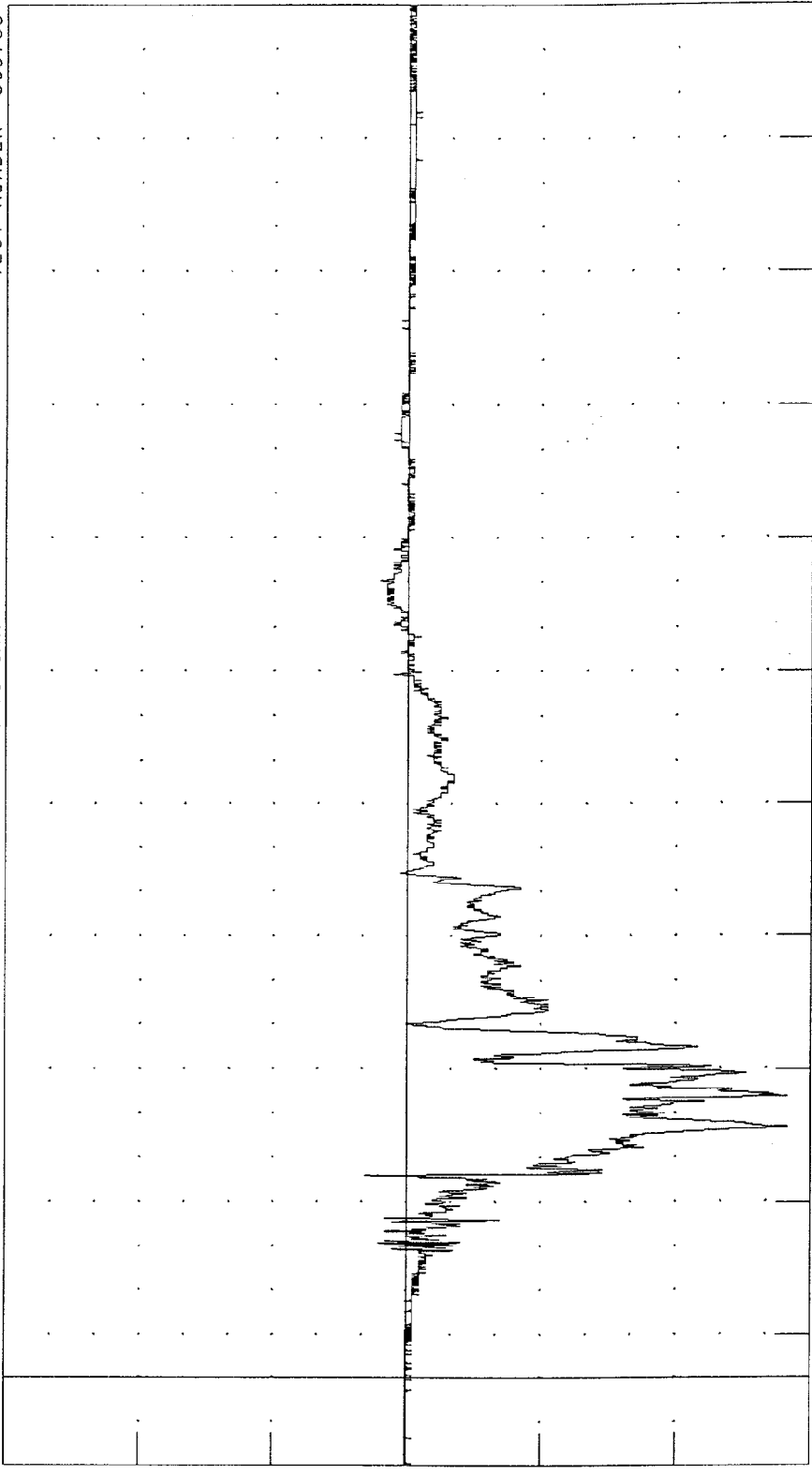
0

-20

-40

-60

ACCELERATION (G)



TIME (MS)

310

280

250

220

190

160

130

100

70

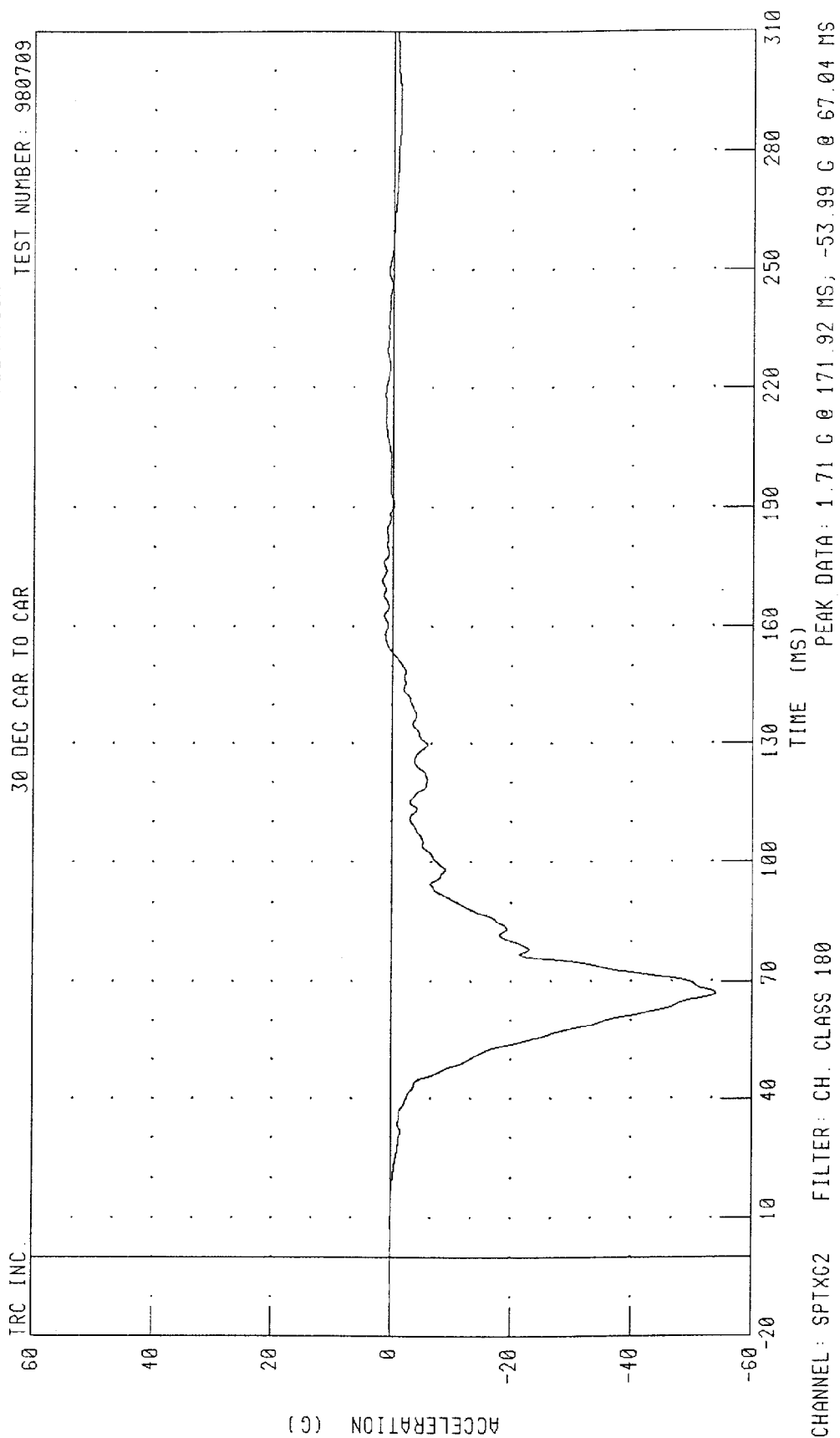
40

10

CHANNEL: STBX02 FILTER: CH CLASS 1000

PEAK DATA: 6.16 G @ 45.92 MS; -56.44 G @ 56.72 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER SPINE TOP X-AXIS ACCELERATION



CHANNEL: SPTXC2 FILTER: CH. CLASS 180

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER SPINE MIDDLE X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.

60

40

20

0

-20

-40

-60

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

CHANNEL: SPMX02 FILTER: CH. CLASS 180

PEAK DATA: 2.39 G @ 176.48 MS, -59.61 G @ 66.88 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER SPINE BOTTOM X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.

40

20

0

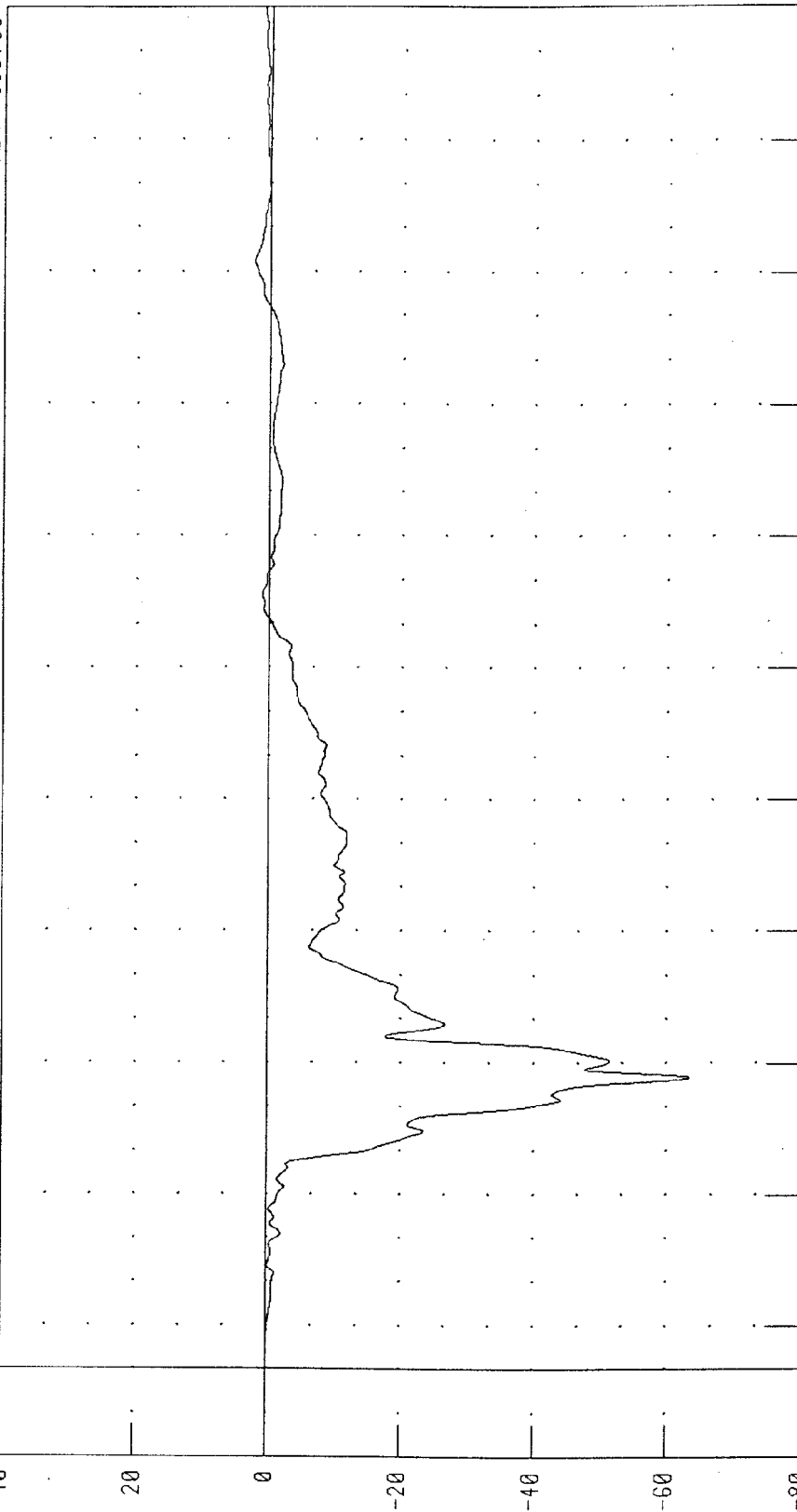
-20

-40

-60

-80

ACCELERATION (G)



TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

CHANNEL: SPBXC2 FILTER: CH. CLASS 100

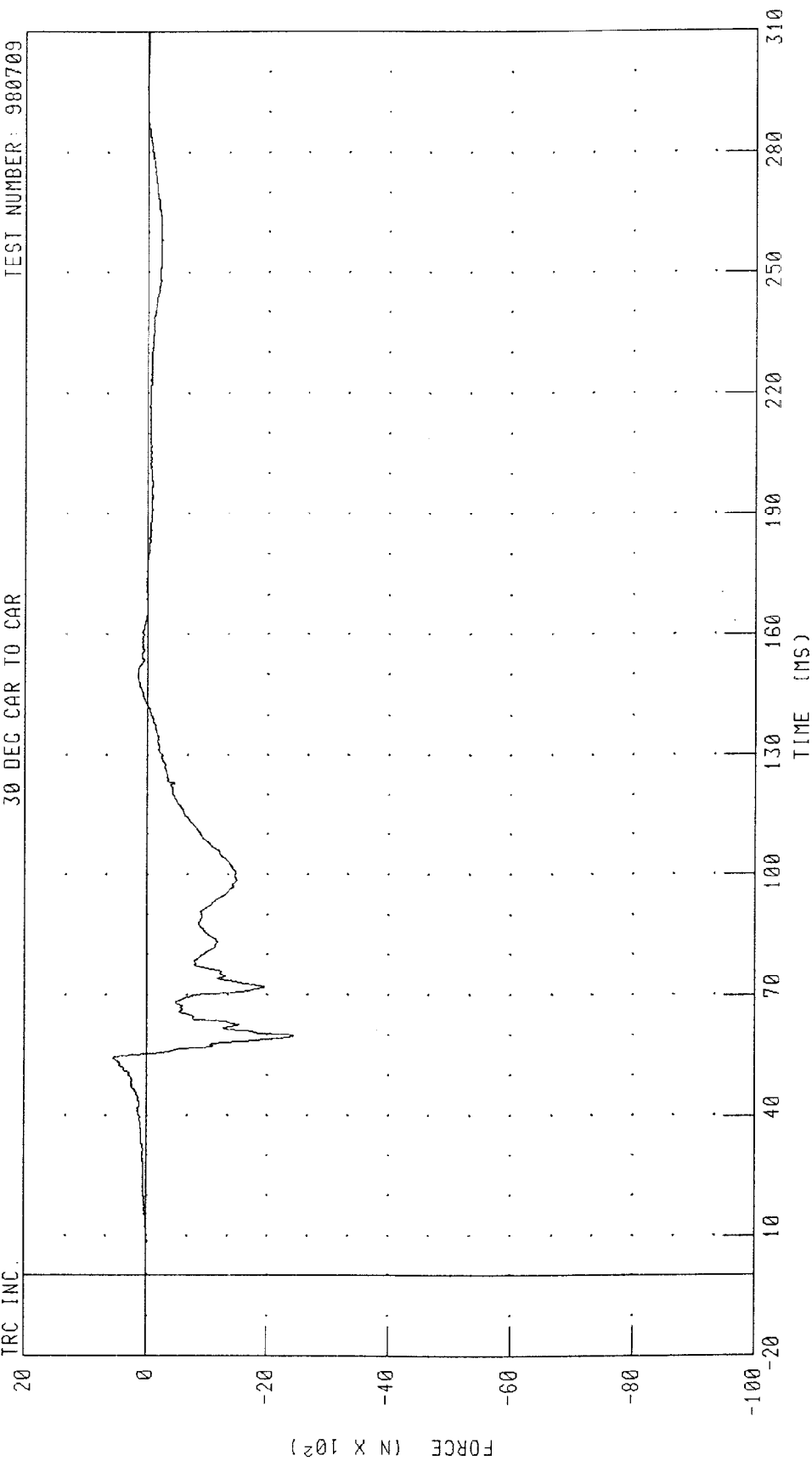
PEAK DATA: 2.43 G @ 252.32 MS, -63.46 G @ 66.80 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TEST NUMBER: 980709

30 DEC CAR TO CAR

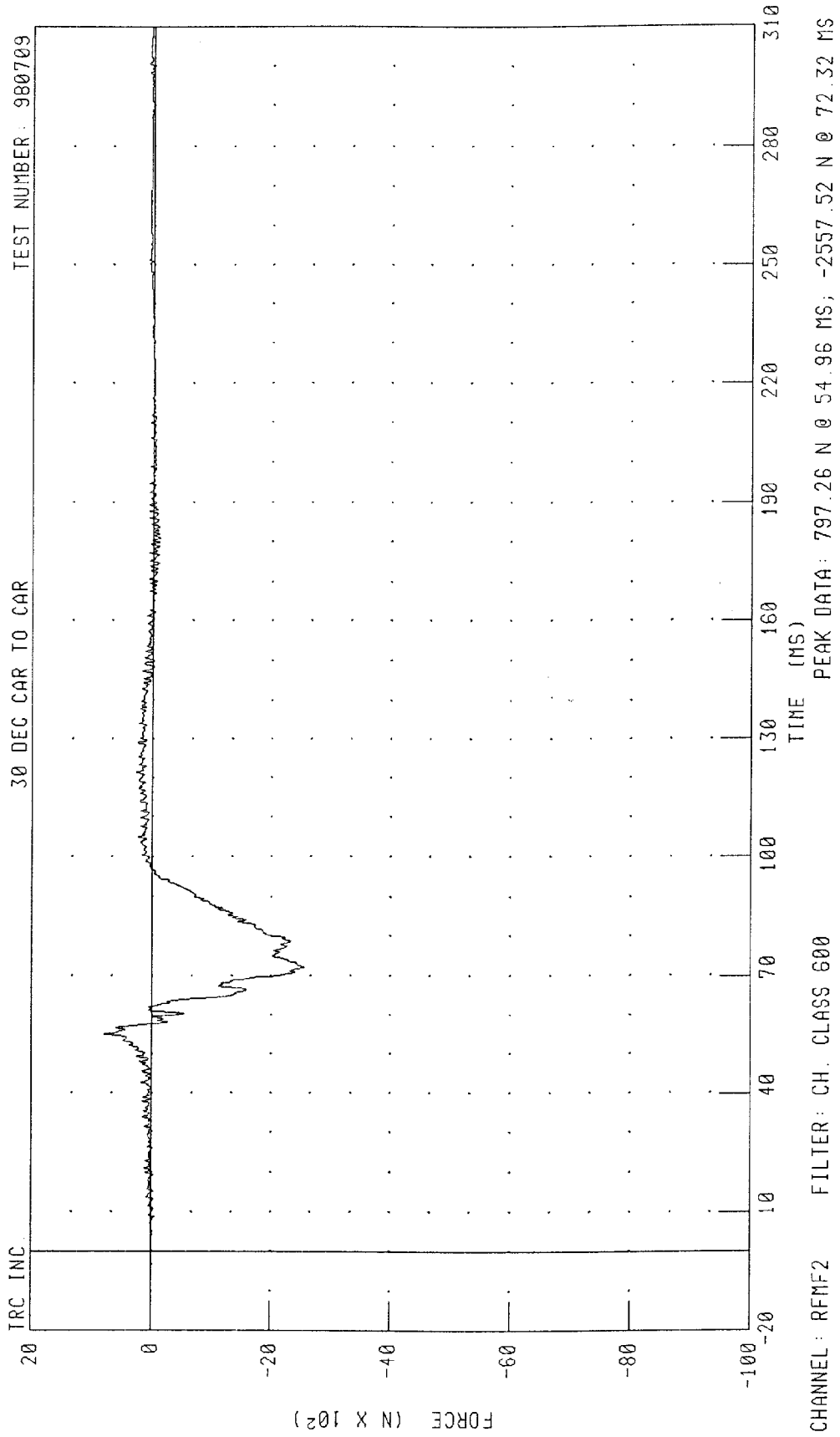
TRC INC.



CHANNEL: LFMF2 FILTER: CH. CLASS 600

PEAK DATA: 543.91 N @ 54.40 MS, -2438.48 N @ 59.92 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT FRONT PASSENGER RIGHT FEMUR FORCE



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE LEFT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.

60

40

20

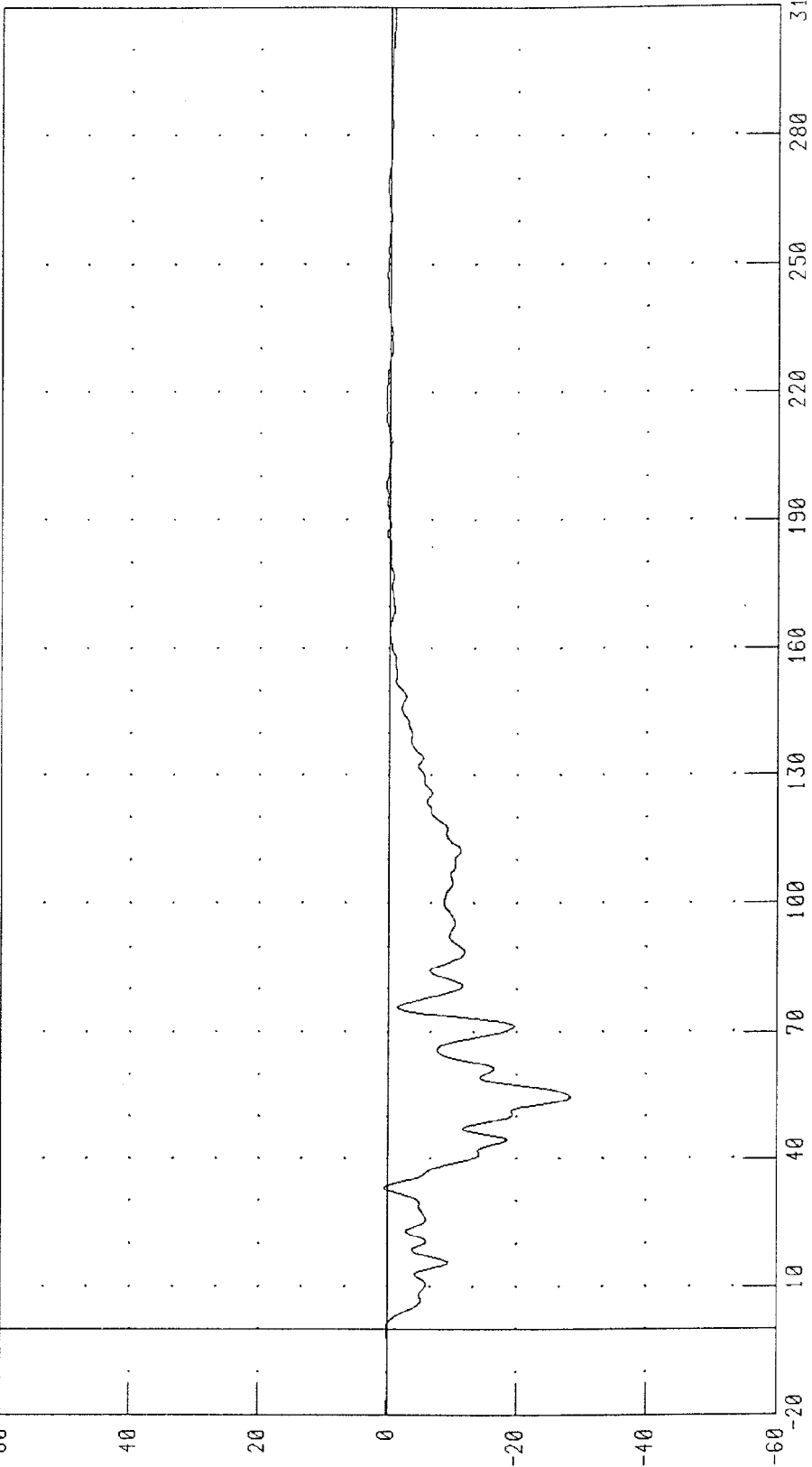
0

-20

-40

-60

ACCELERATION (G)



TIME (MS)

CHANNEL: TLRXG1 FILTER: CH. CLASS 60

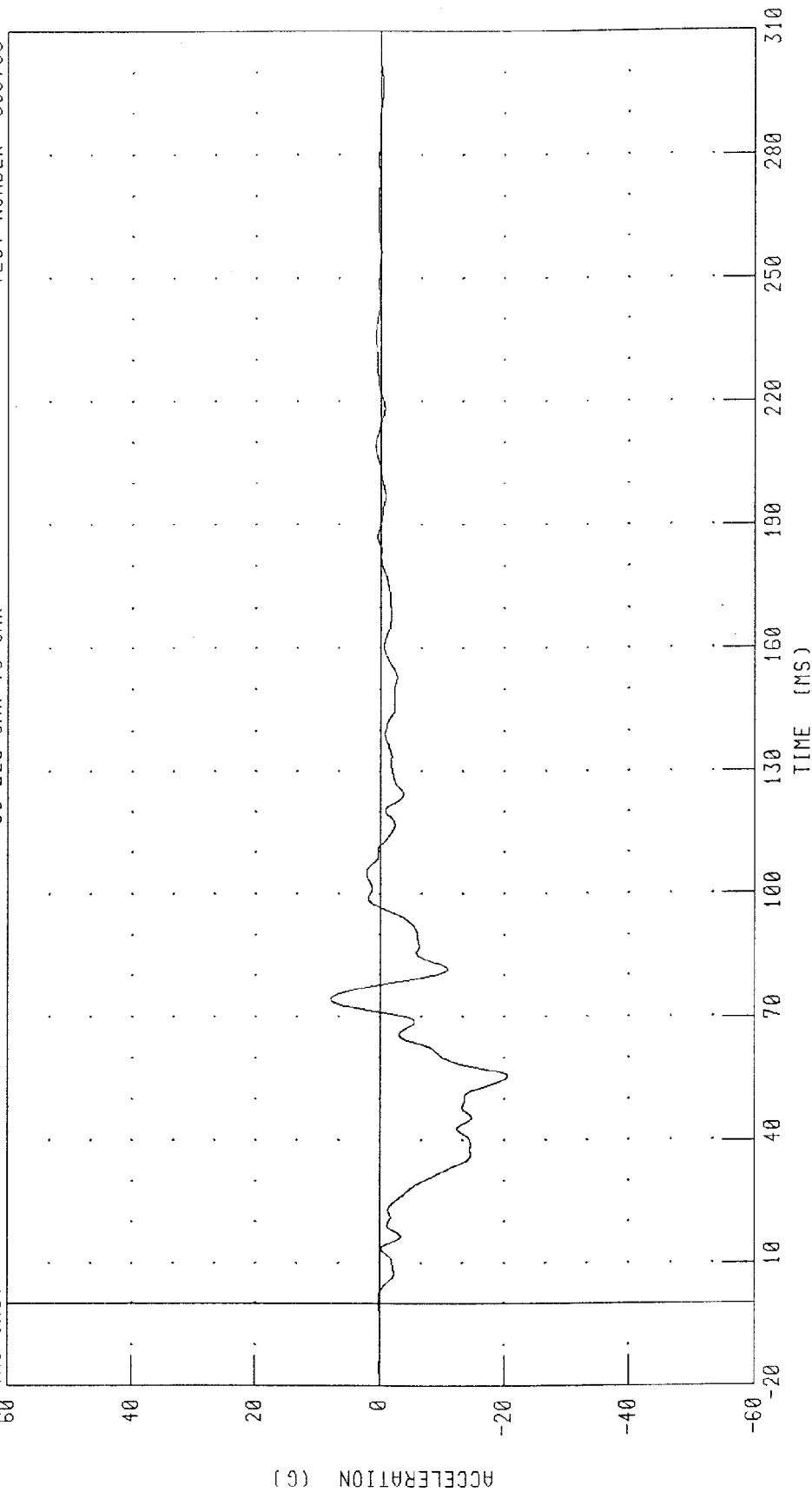
PEAK DATA: 0.53 G @ 33.20 MS, -28.30 G @ 54.56 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE LEFT REAR SEAT CROSSMEMBER Y-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: TLRYG1 FILTER: CH. CLASS 60

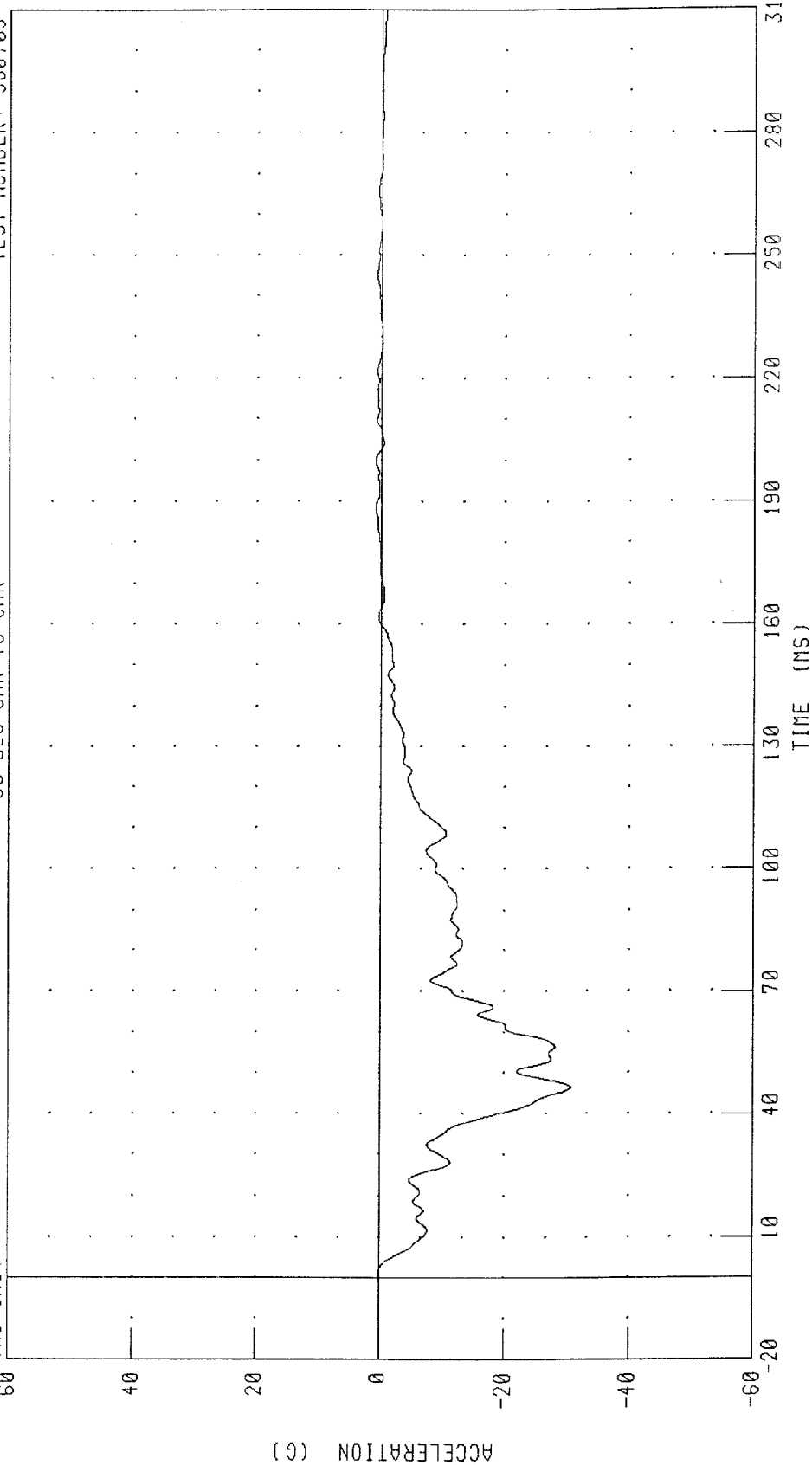
PEAK DATA: 7.87 G @ 74.32 MS; -20.60 G @ 55.60 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.

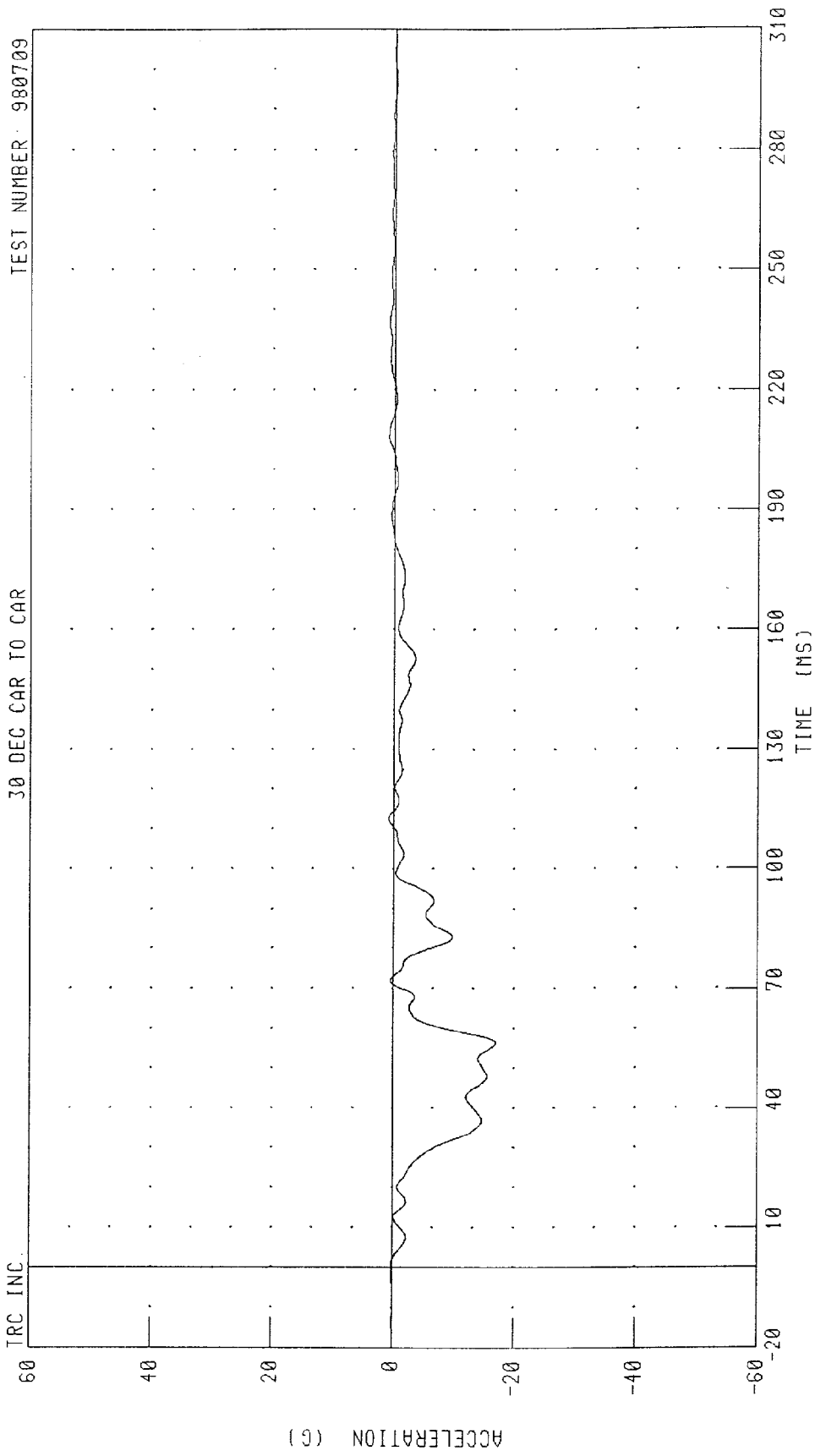


CHANNEL: TRRXG1 FILTER: CH. CLASS 60

PEAK DATA: 0.84 G @ 199.92 MS, -30.74 G @ 46.48 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT REAR SEAT CROSSMEMBER Y-AXIS ACCELERATION

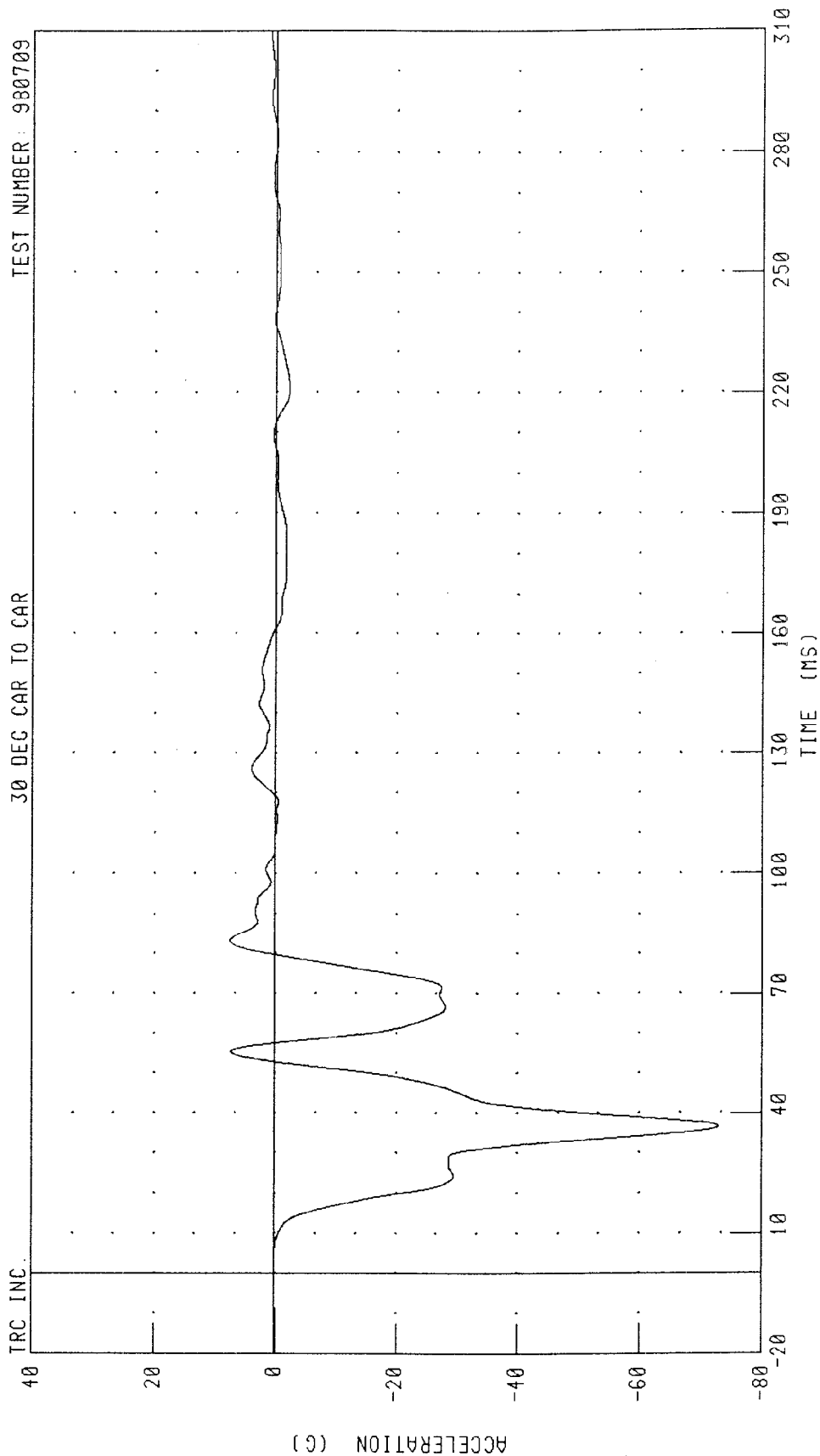
TRC INC. 30 DEC CAR TO CAR TEST NUMBER 980709



CHANNEL: TTRYG1 FILTER: CH. CLASS 60

PEAK DATA: 0.88 G @ 208.24 MS; -17.07 G @ 56.32 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE ENGINE TOP X-AXIS ACCELERATION



CHANNEL: ENCXC1 FILTER: CH. CLASS 60

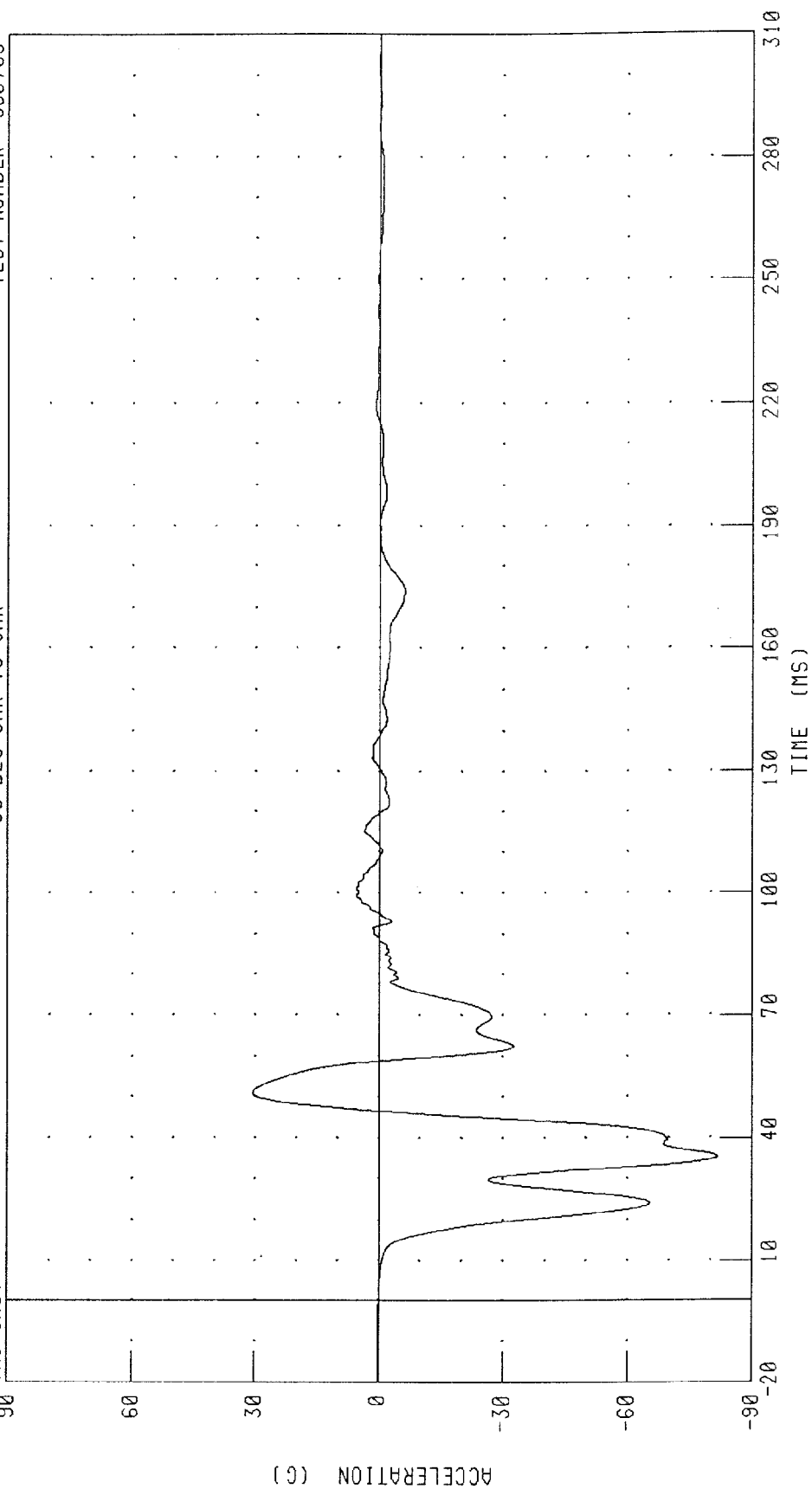
PEAK DATA: 7.52 G @ 83.28 MS, -72.96 G @ 36.72 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE ENGINE BOTTOM X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.



CHANNEL: ENCXC2 FILTER: CH. CLASS 60

PEAK DATA: 30.53 G @ 50.80 MS, -81.67 G @ 35.52 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE RIGHT BRAKE CALIPER X-AXIS ACCELERATION

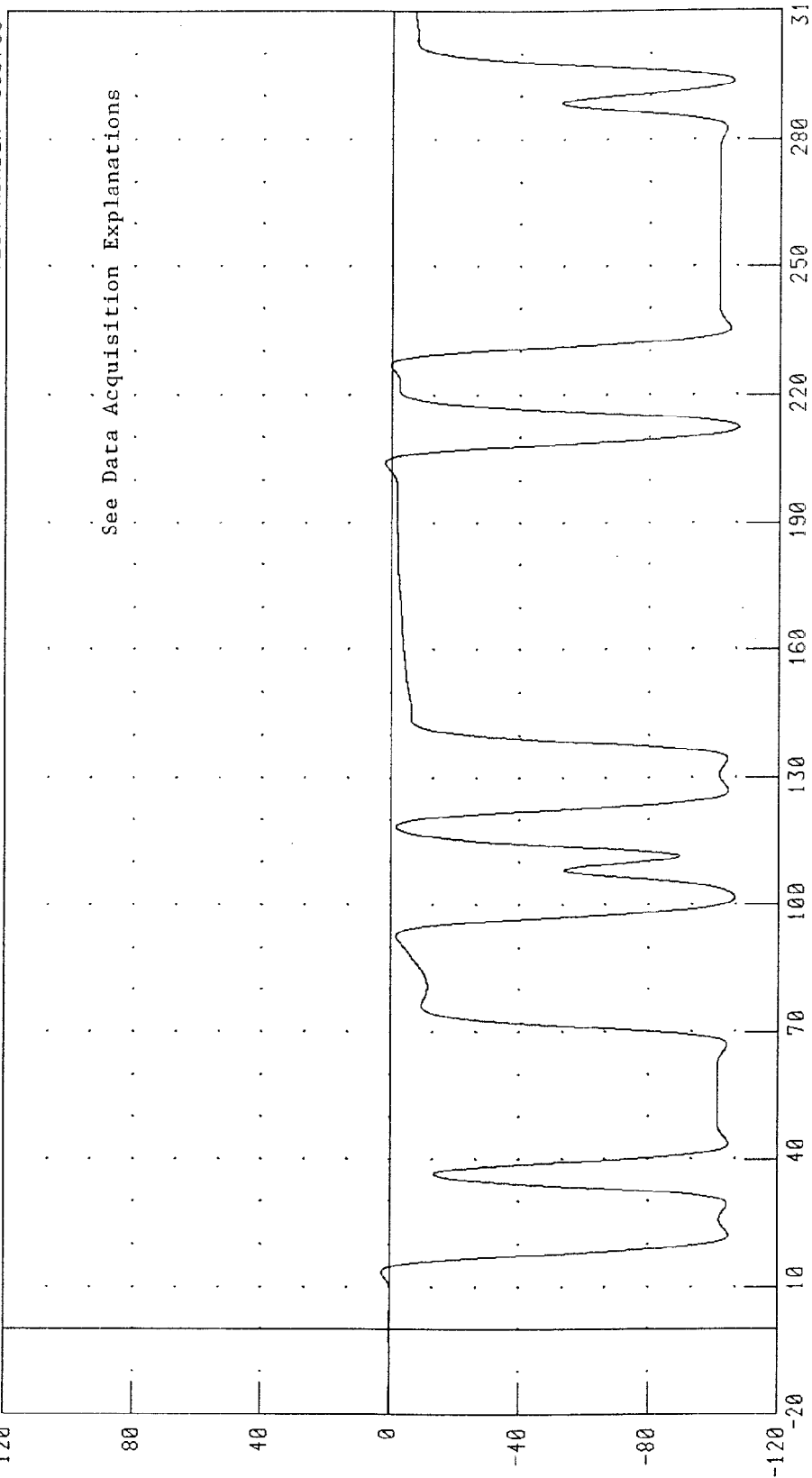
TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.

See Data Acquisition Explanations

ACCELERATION (G X 10¹)



CHANNEL: BCRXC1 FILTER: CH. CLASS 60

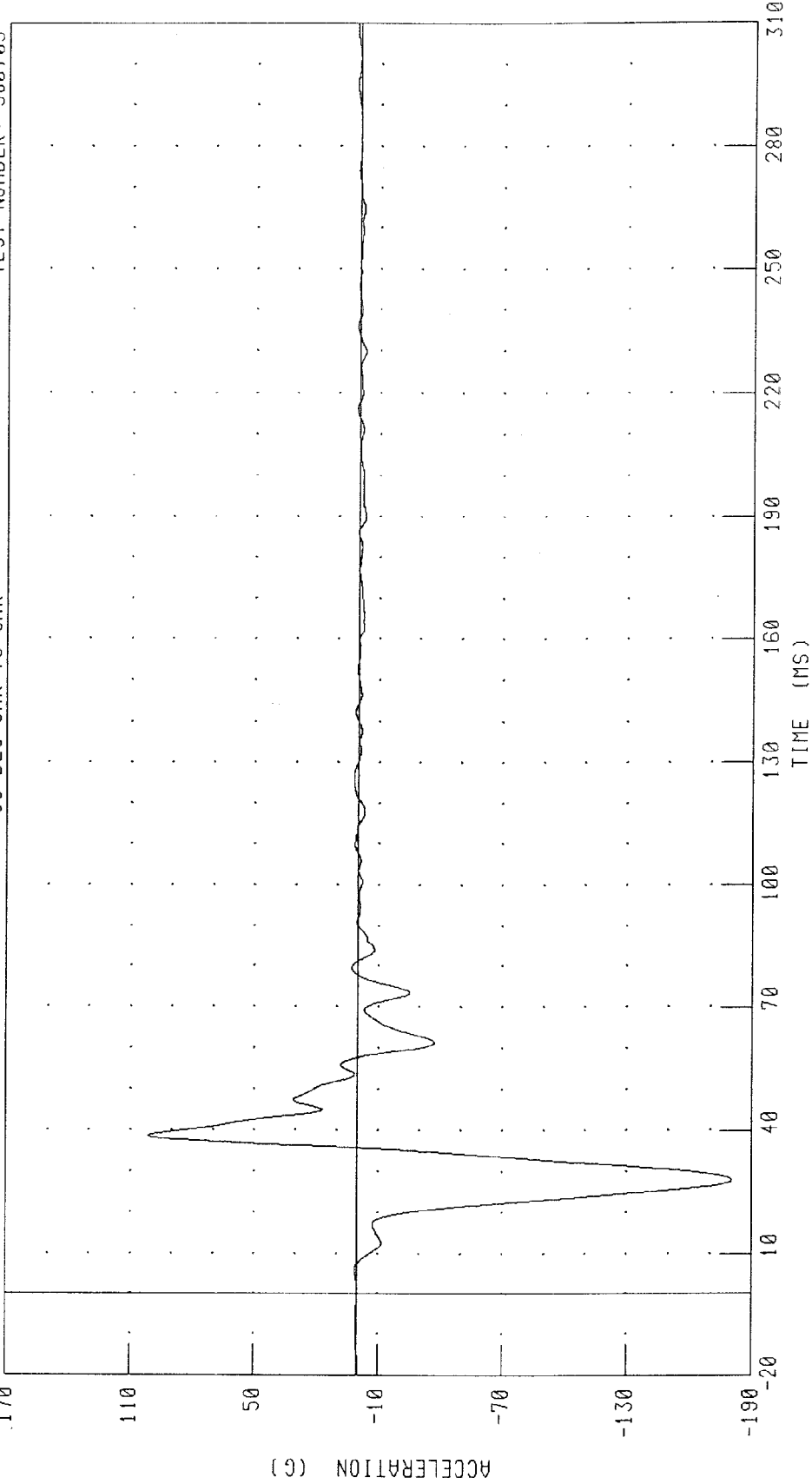
PEAK DATA: 24.42 G @ 13.60 MS, -1074.67 G @ 212.32 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE LEFT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.



CHANNEL: BCLXG1 FILTER: CH CLASS 60

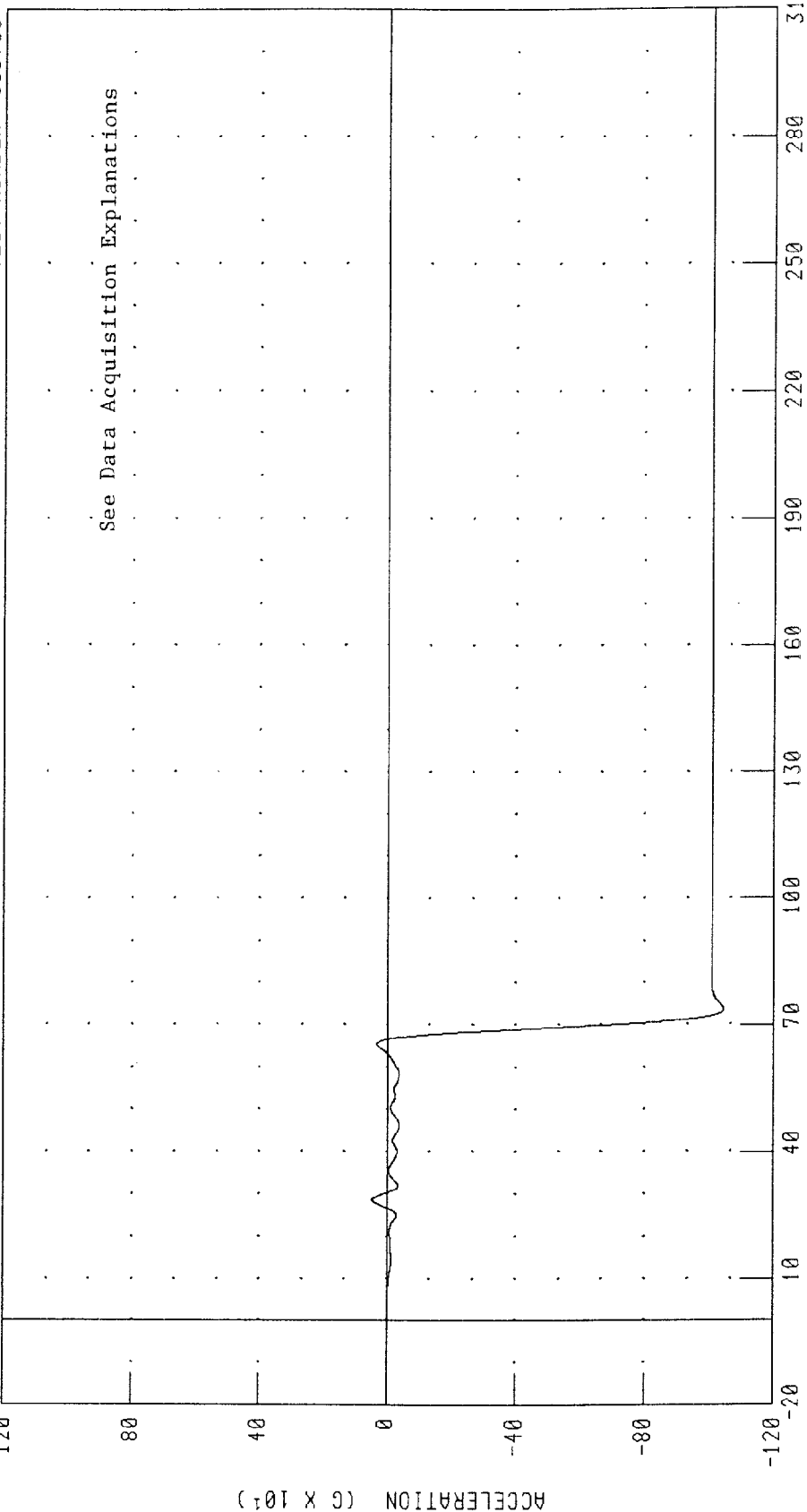
PEAK DATA: 101.33 G @ 38.80 MS, -180.62 G @ 27.92 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 TARGET VEHICLE INSTRUMENT PANEL X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.



CHANNEL: DPCXG1 FILTER: CH. CLASS 60

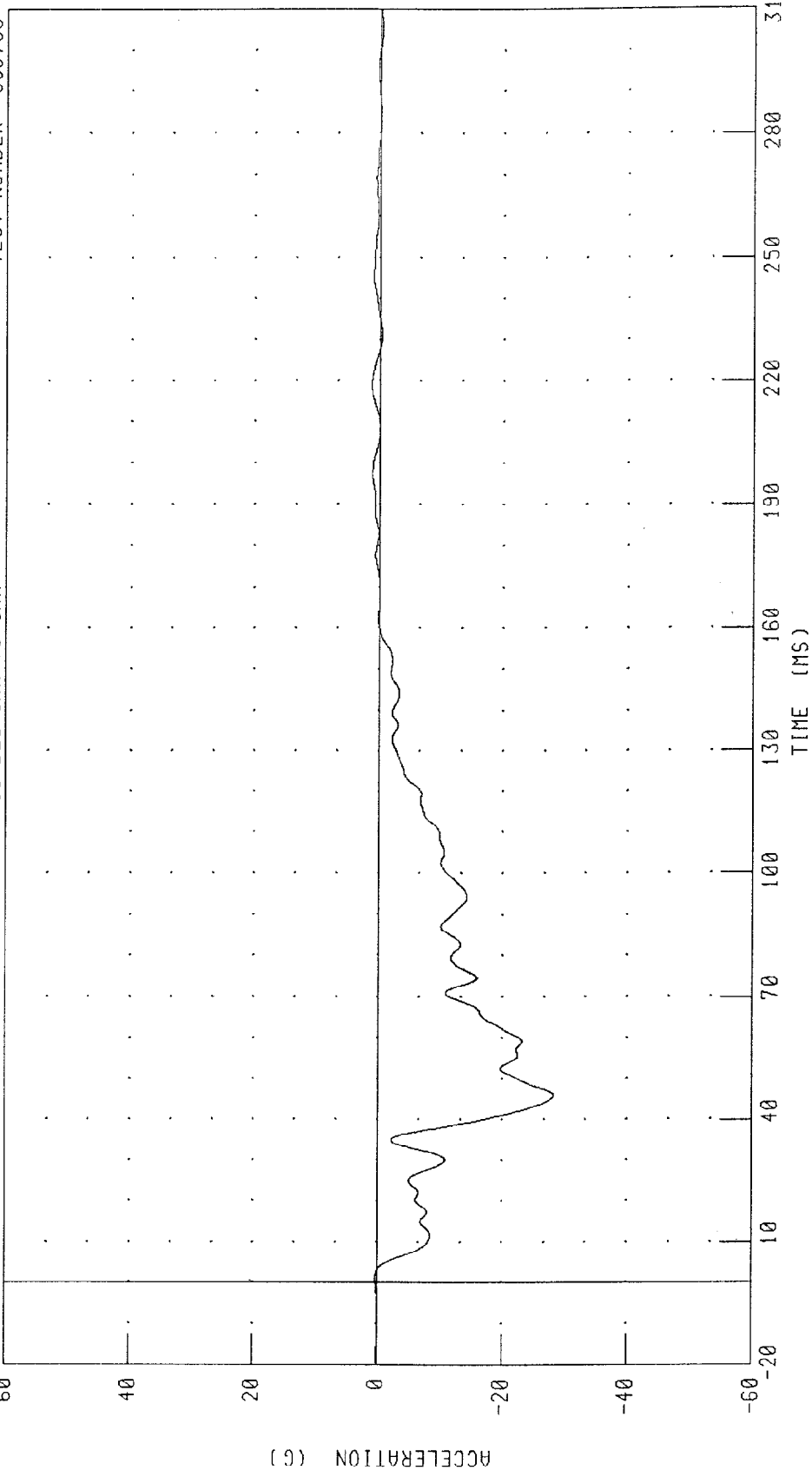
PEAK DATA: 45.30 G @ 28.64 MS, -1046.13 G @ 73.60 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE CG X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: VCCXG1 FILTER: CH. CLASS 60

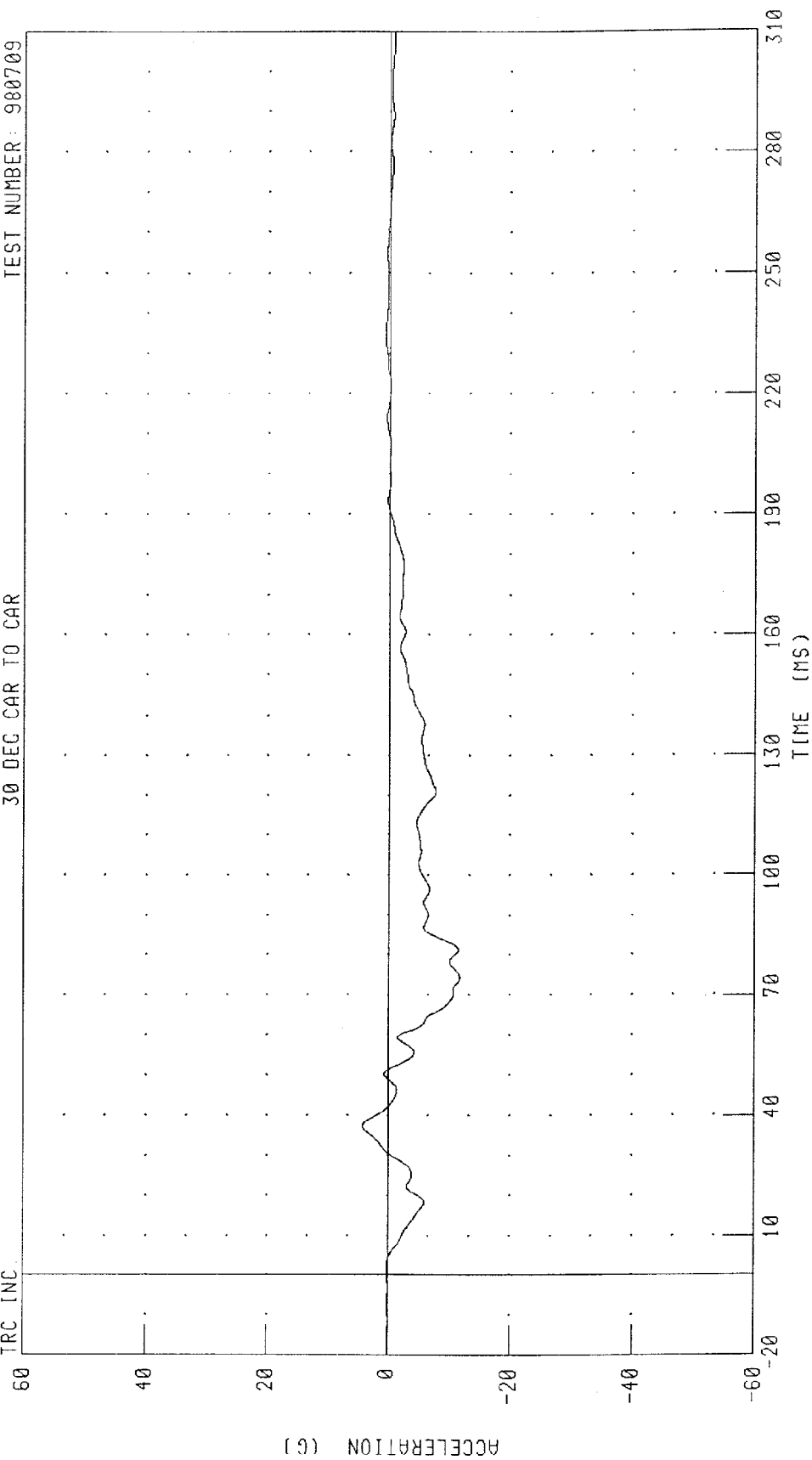
PEAK DATA: 1.25 G @ 219.20 MS, -28.23 G @ 46.00 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE REAR AXLE Y-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: TFCYG1 FILTER: CH. CLASS 60

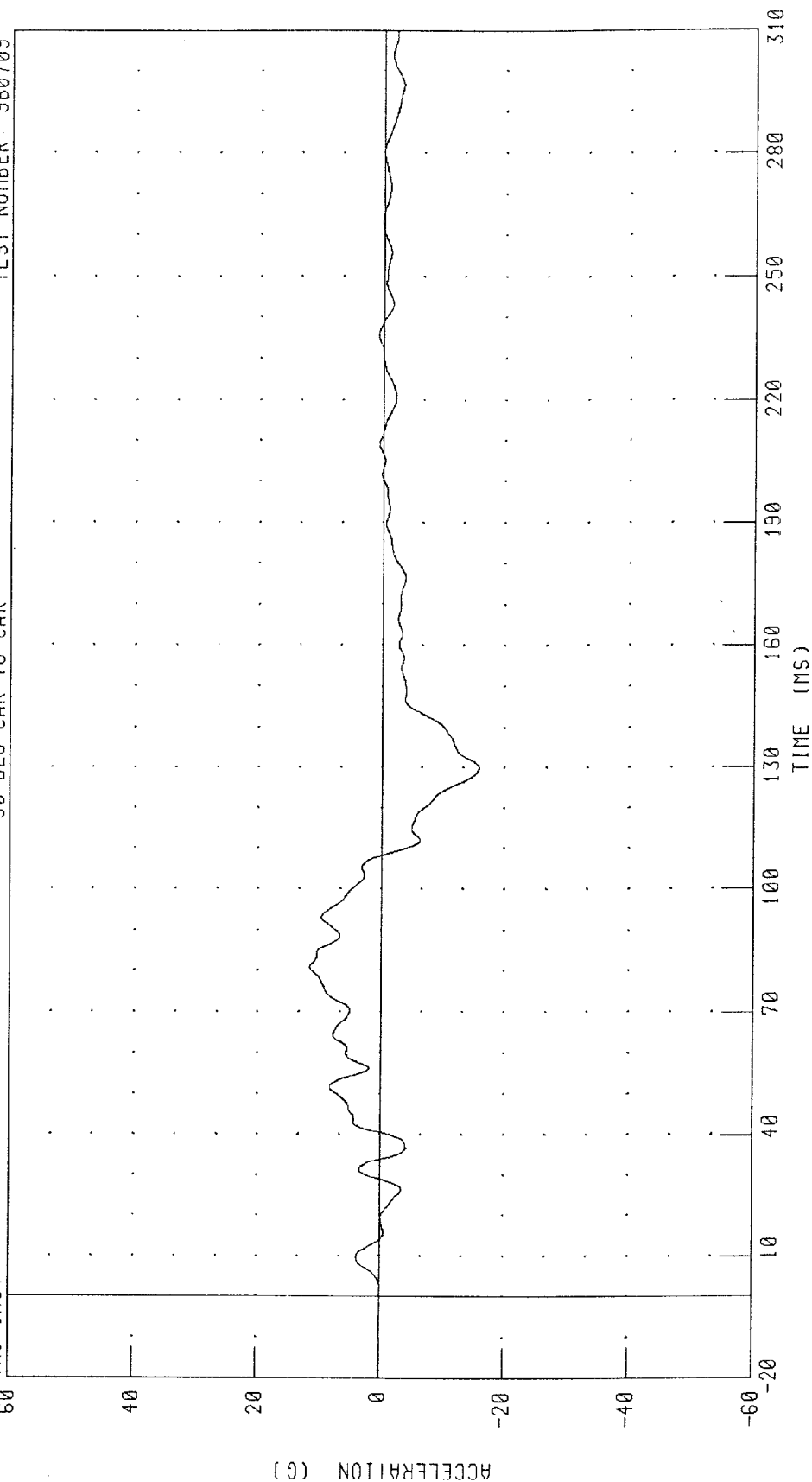
PEAK DATA: 4.21 G @ 37.60 MS; -11.85 G @ 74.32 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE REAR AXLE Z-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

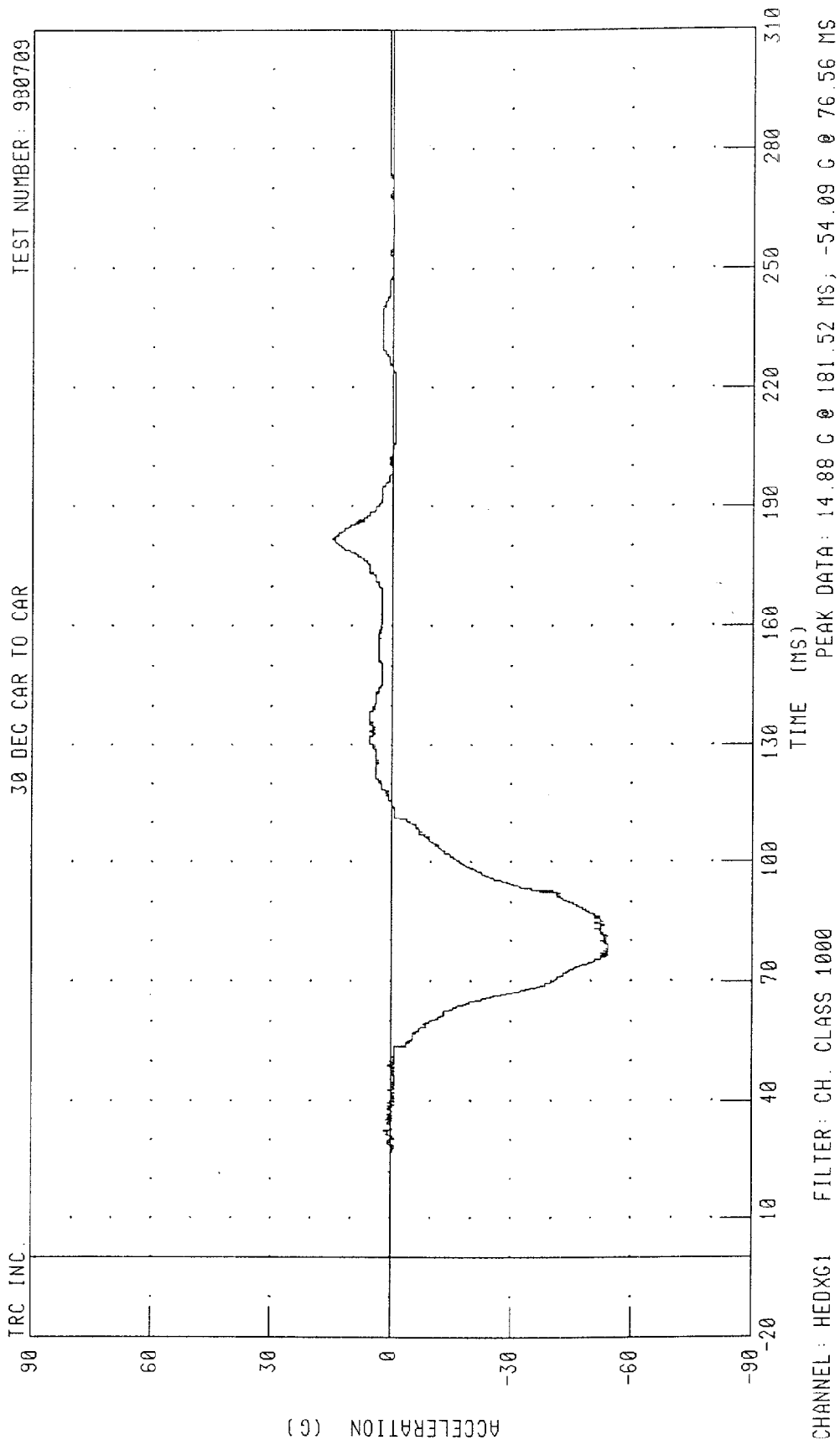
TRC INC.



CHANNEL: TFCZG1 FILTER: CH. CLASS 60

PEAK DATA: 11.61 G @ 80.96 MS; -15.92 G @ 130.00 MS

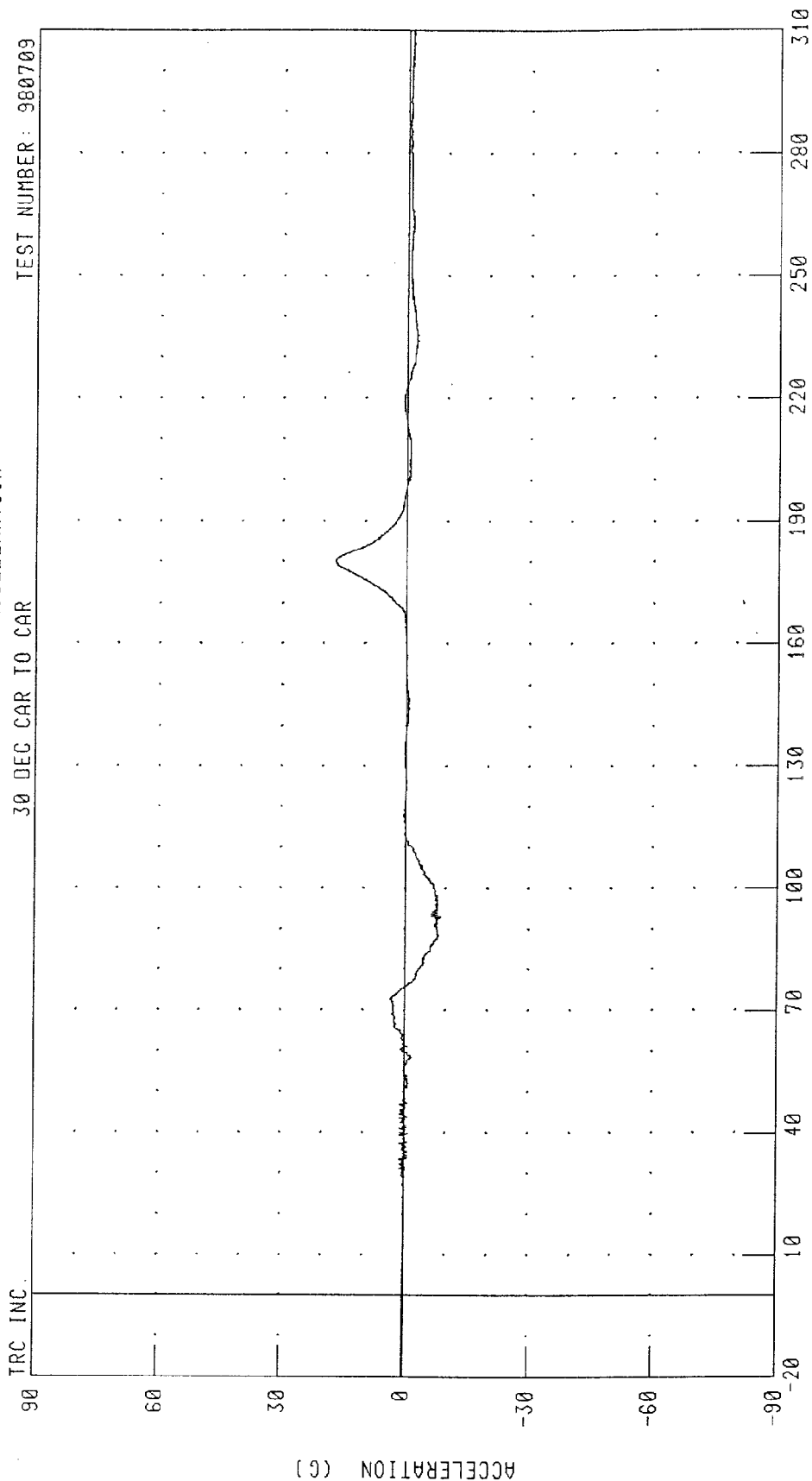
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER HEAD X-AXIS ACCELERATION



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER HEAD Y-AXIS ACCELERATION

TRC INC. TEST NUMBER: 980709

30 DEC CAR TO CAR



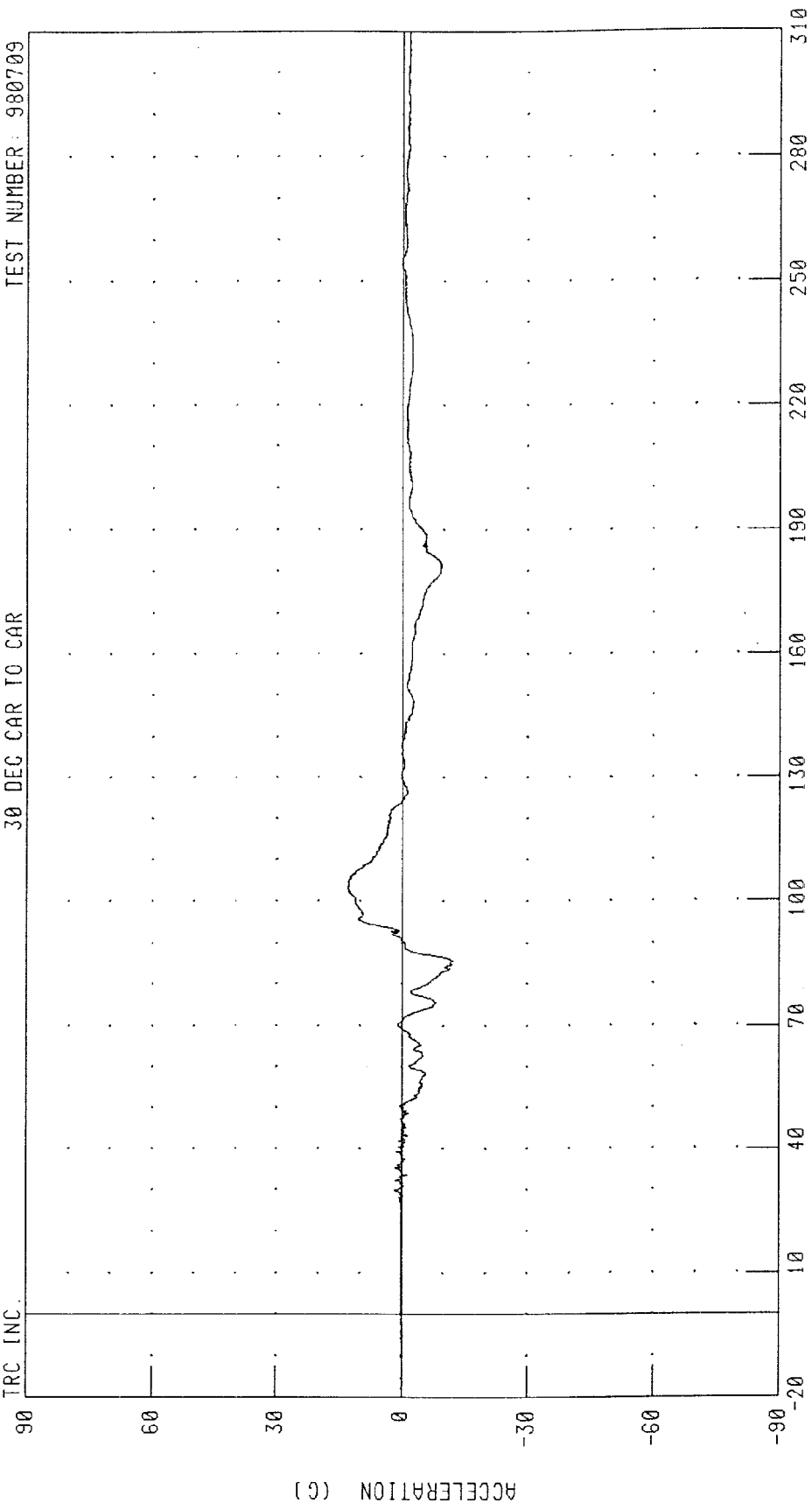
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

PEAK DATA: 12.94 G @ 103.12 MS, -12.26 G @ 85.60 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER HEAD RESULTANT ACCELERATION

TRC INC.

30 DEC CAR TO CAR

TEST NUMBER: 980709

120

100

80

60

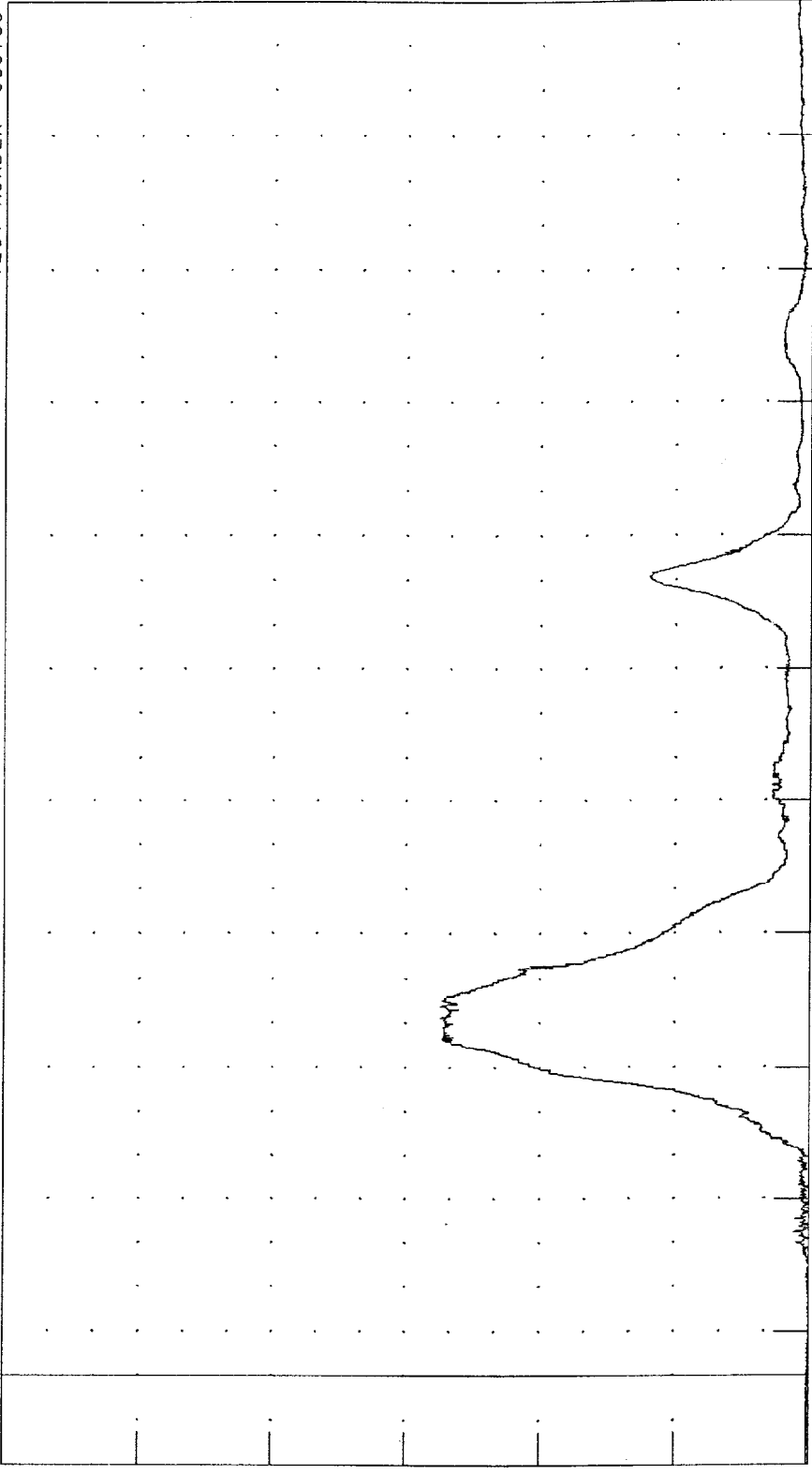
40

20

0

-20

ACCELERATION (G)



TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

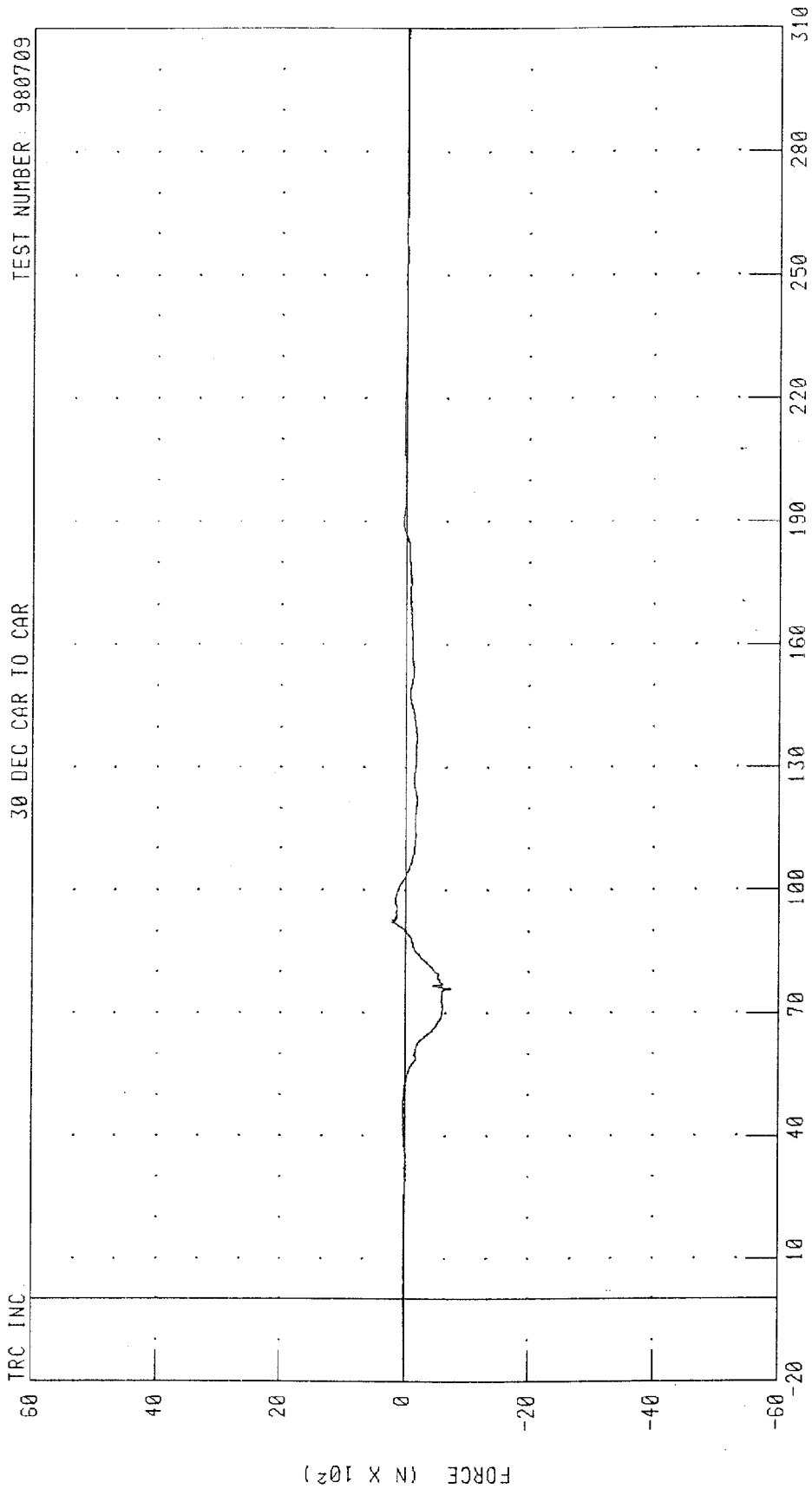
CHANNEL: HEDRG1 FILTER: CH CLASS 1000

PEAK DATA: 54.79 G @ 81.36 MS; 0.05 G @ -3.68 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK X-AXIS SHEAR FORCE

TRC INC. TEST NUMBER: 980709

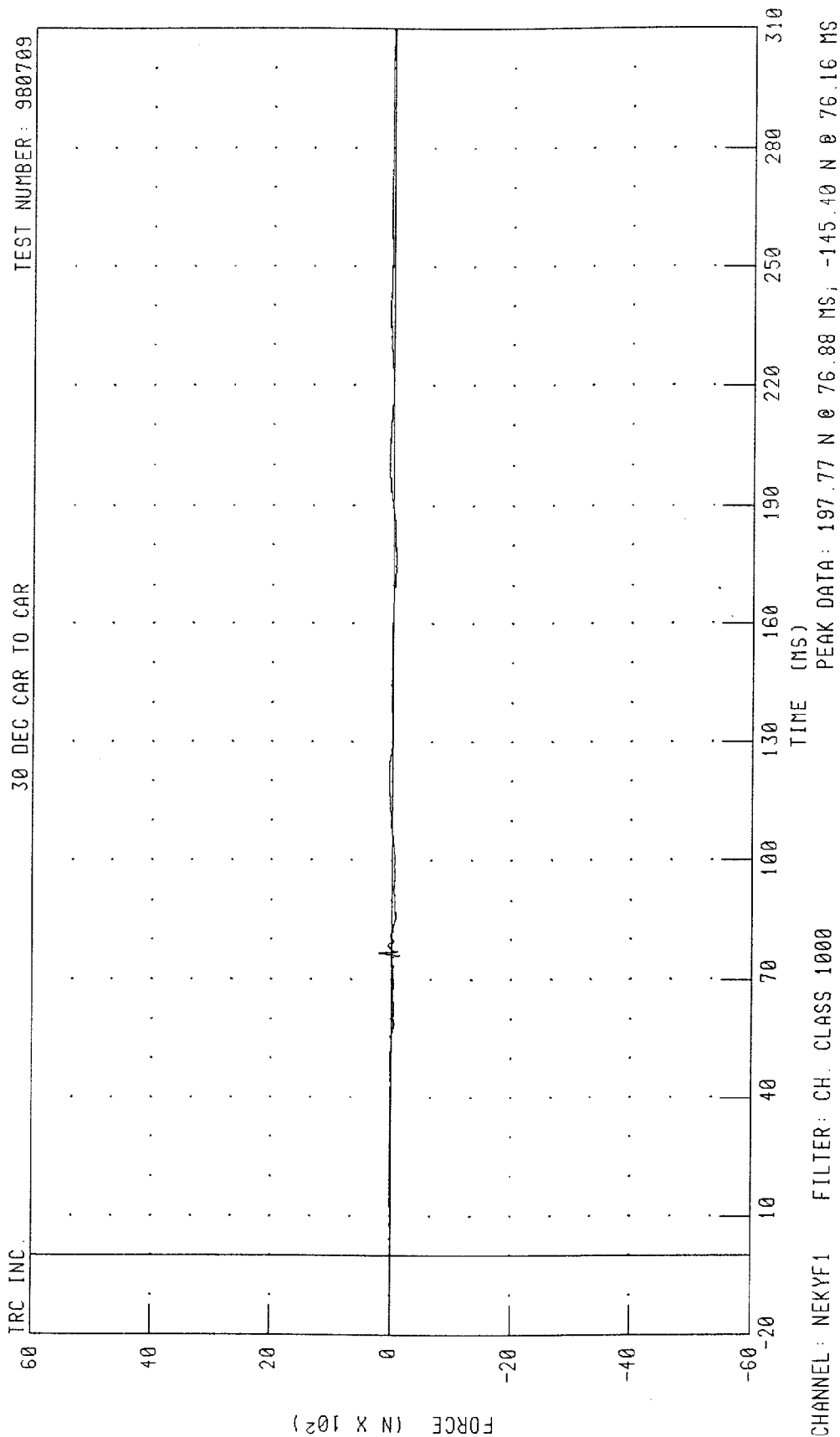
30 DEC CAR TO CAR



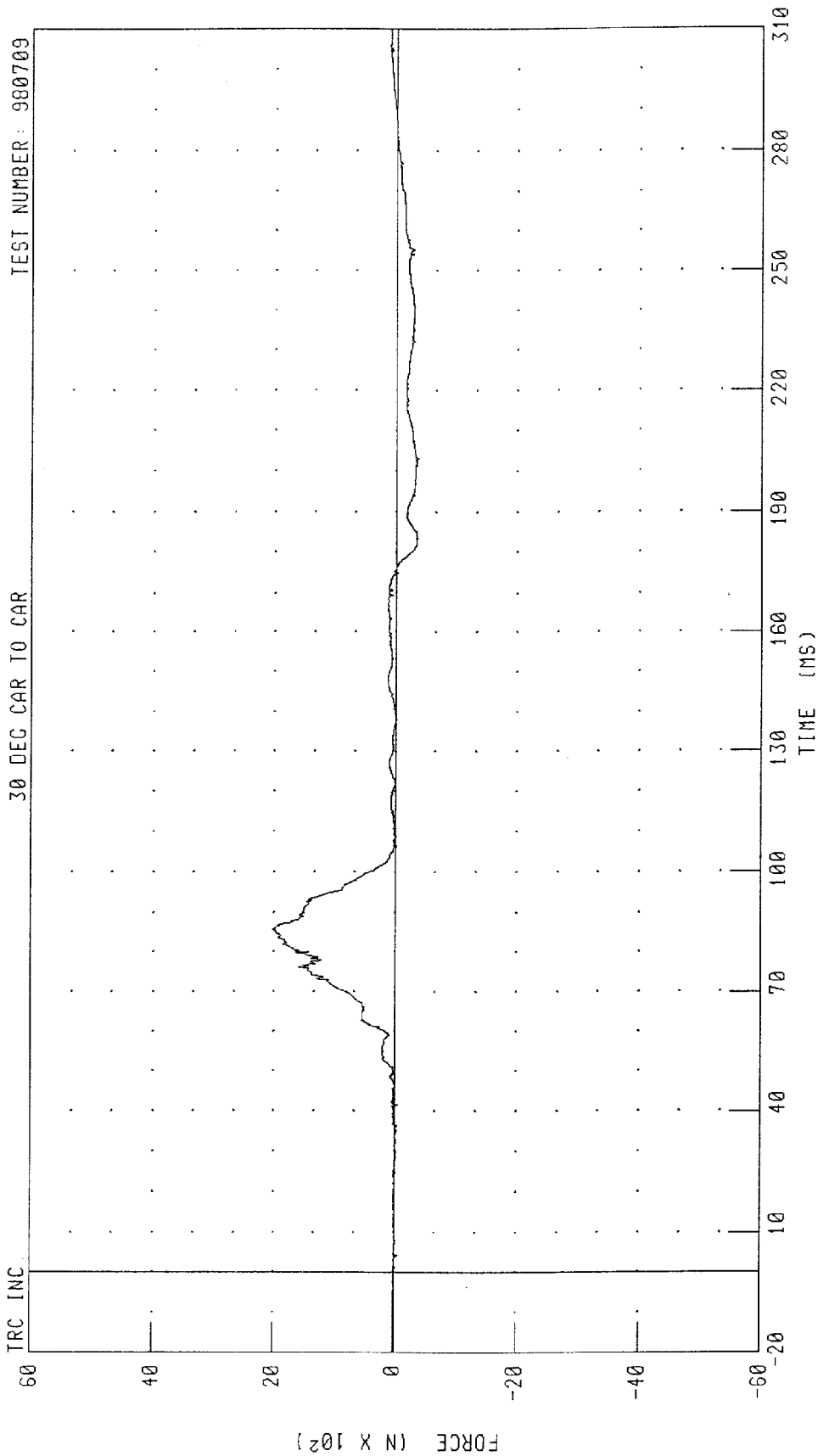
CHANNEL: NEXXF1 FILTER: CH. CLASS 1000

PEAK DATA: 210.36 N @ 92.88 MS, -728.53 N @ 76.08 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK Y-AXIS SHEAR FORCE



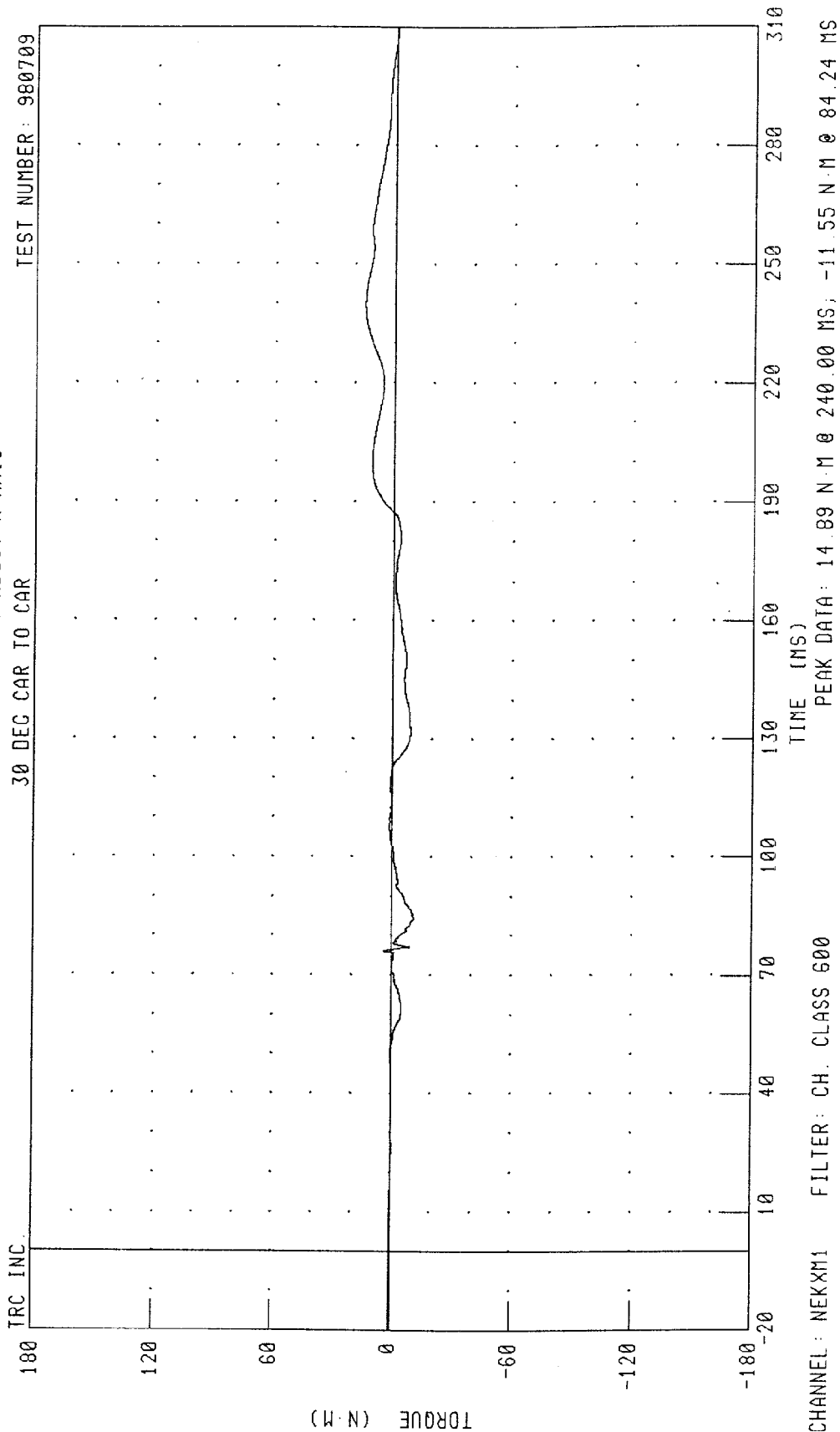
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK Z-AXIS AXIAL FORCE



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

PEAK DATA: 2019.90 N @ 85.84 MS, -378.08 N @ 203.20 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK MOMENT ABOUT X AXIS

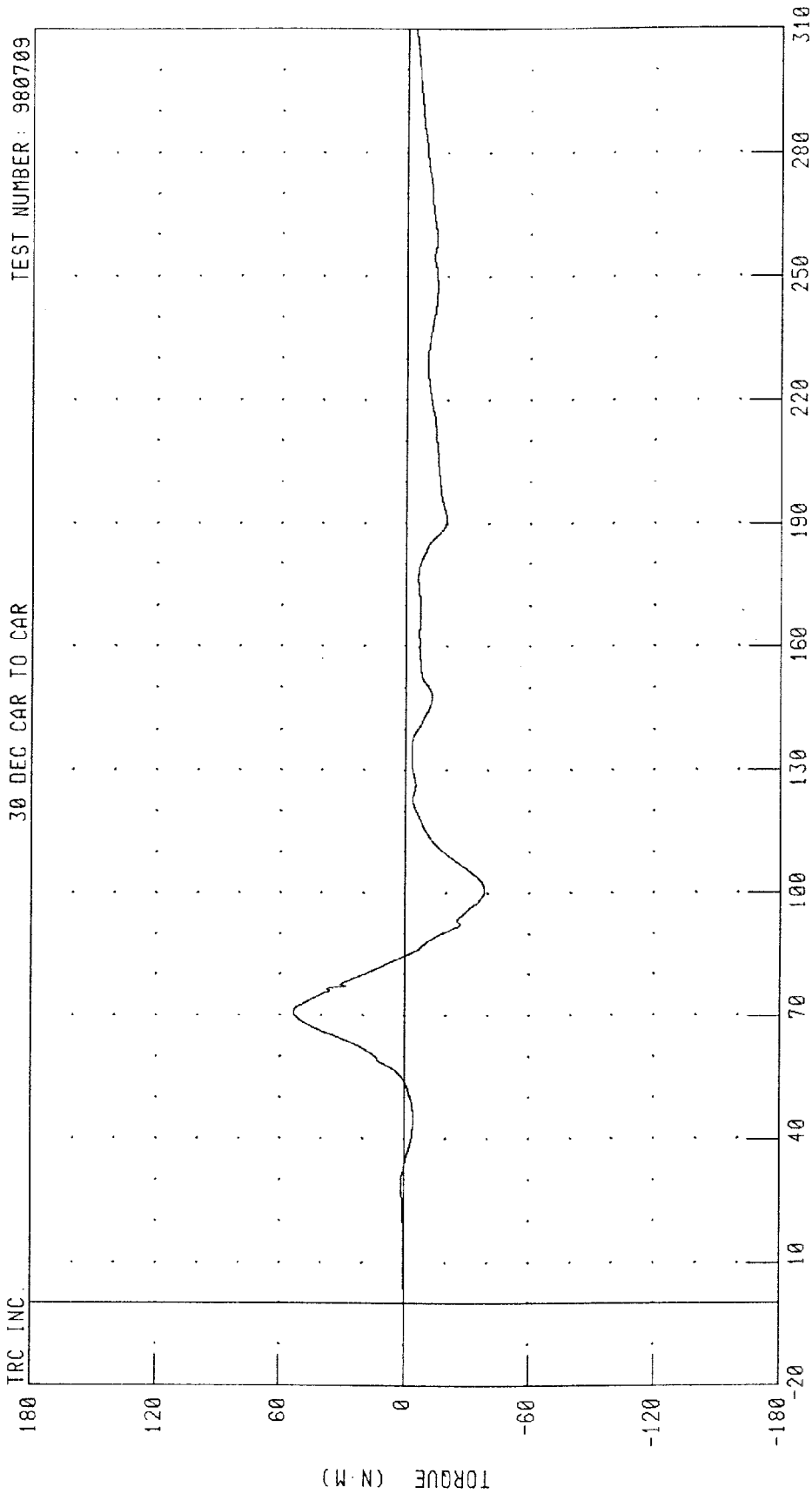


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.

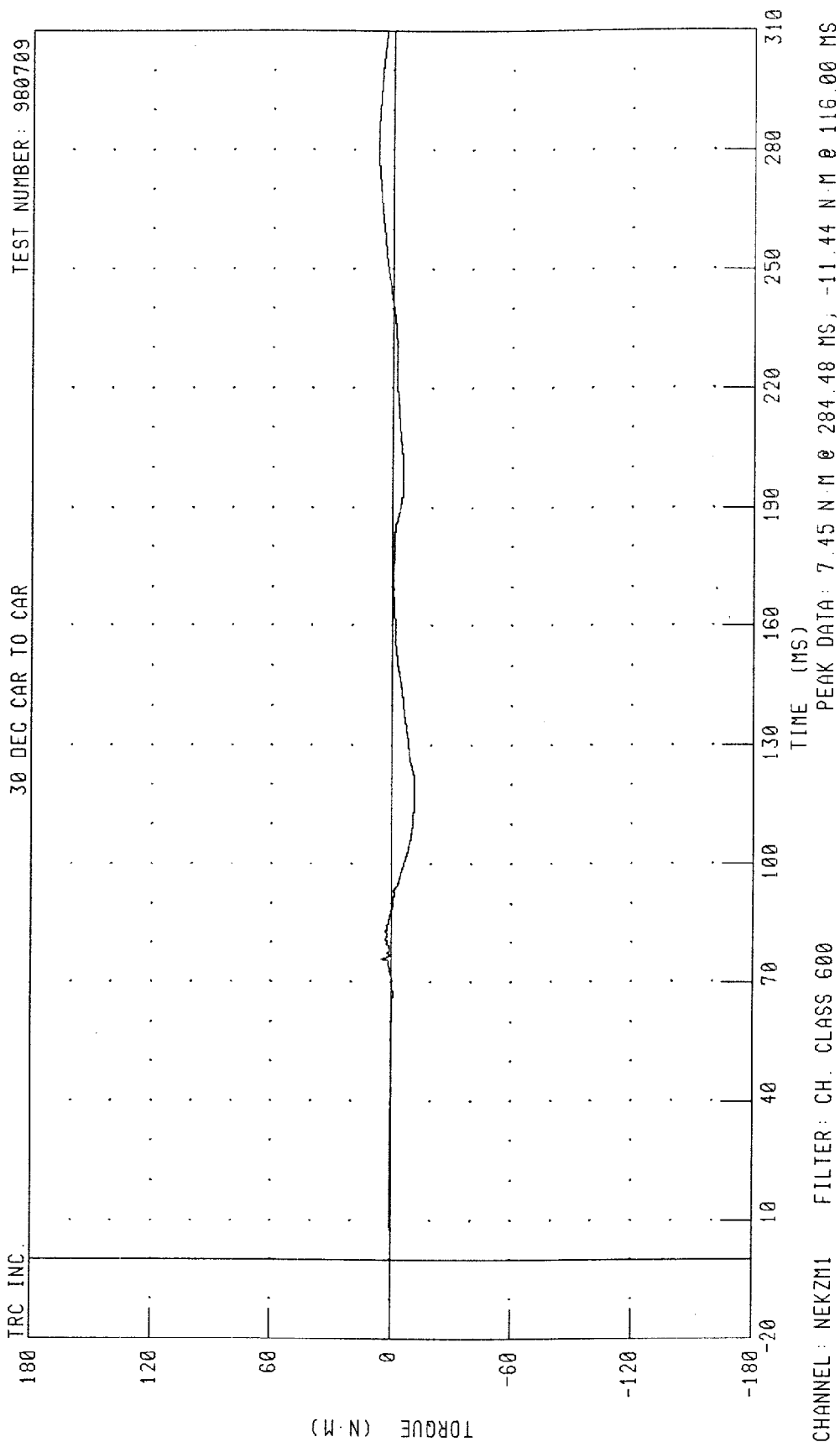


TIME (MS)

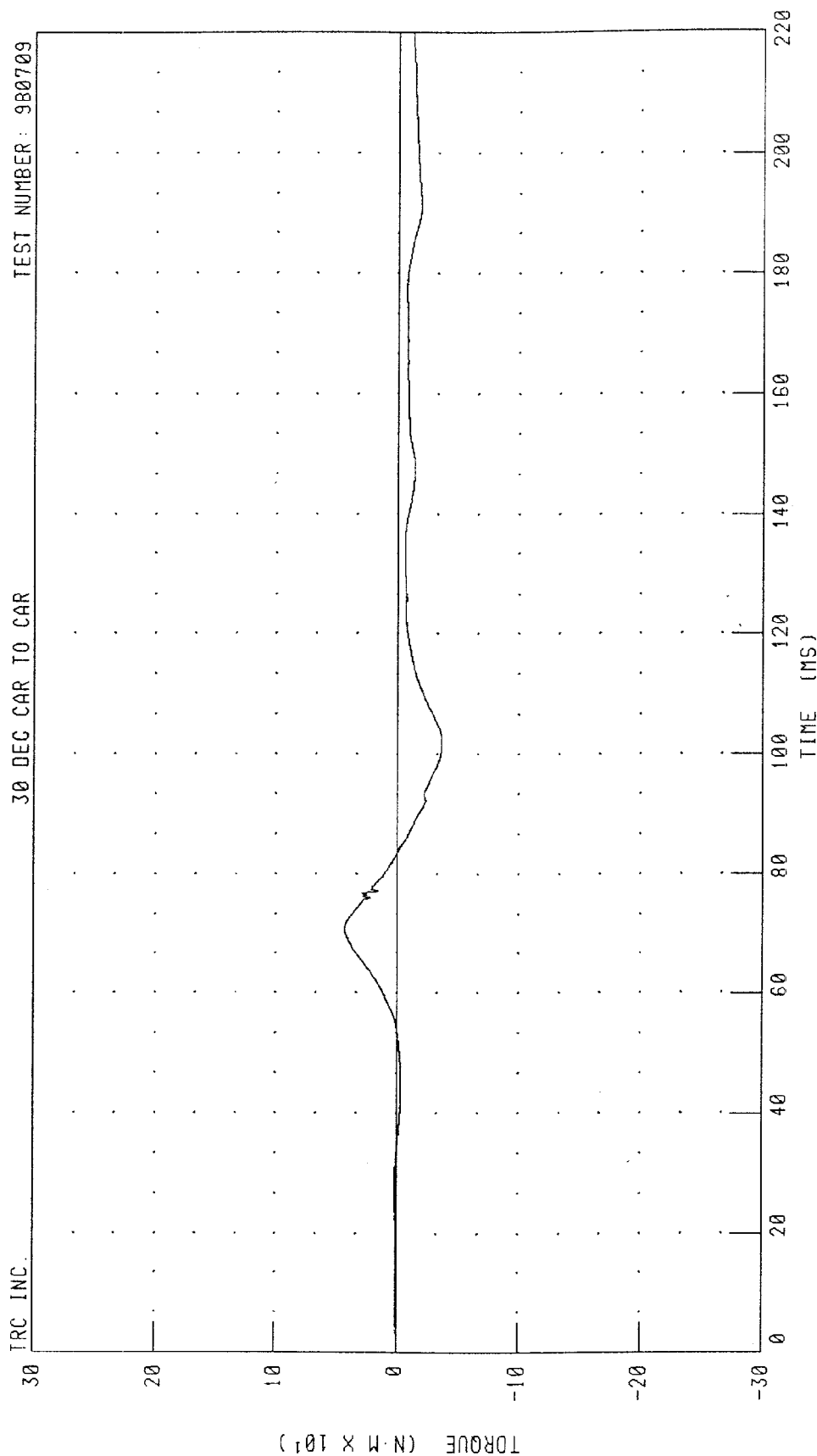
CHANNEL: NEKYM1 FILTER: CH. CLASS 600

PEAK DATA: 53.32 N-M @ 70.80 MS, -38.53 N-M @ 100.96 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK MOMENT ABOUT Z AXIS



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK OCCIPITAL CONDYLE ABOUT Y AXIS



CHANNEL: NEKOM1 FILTER: CH. CLASS 600

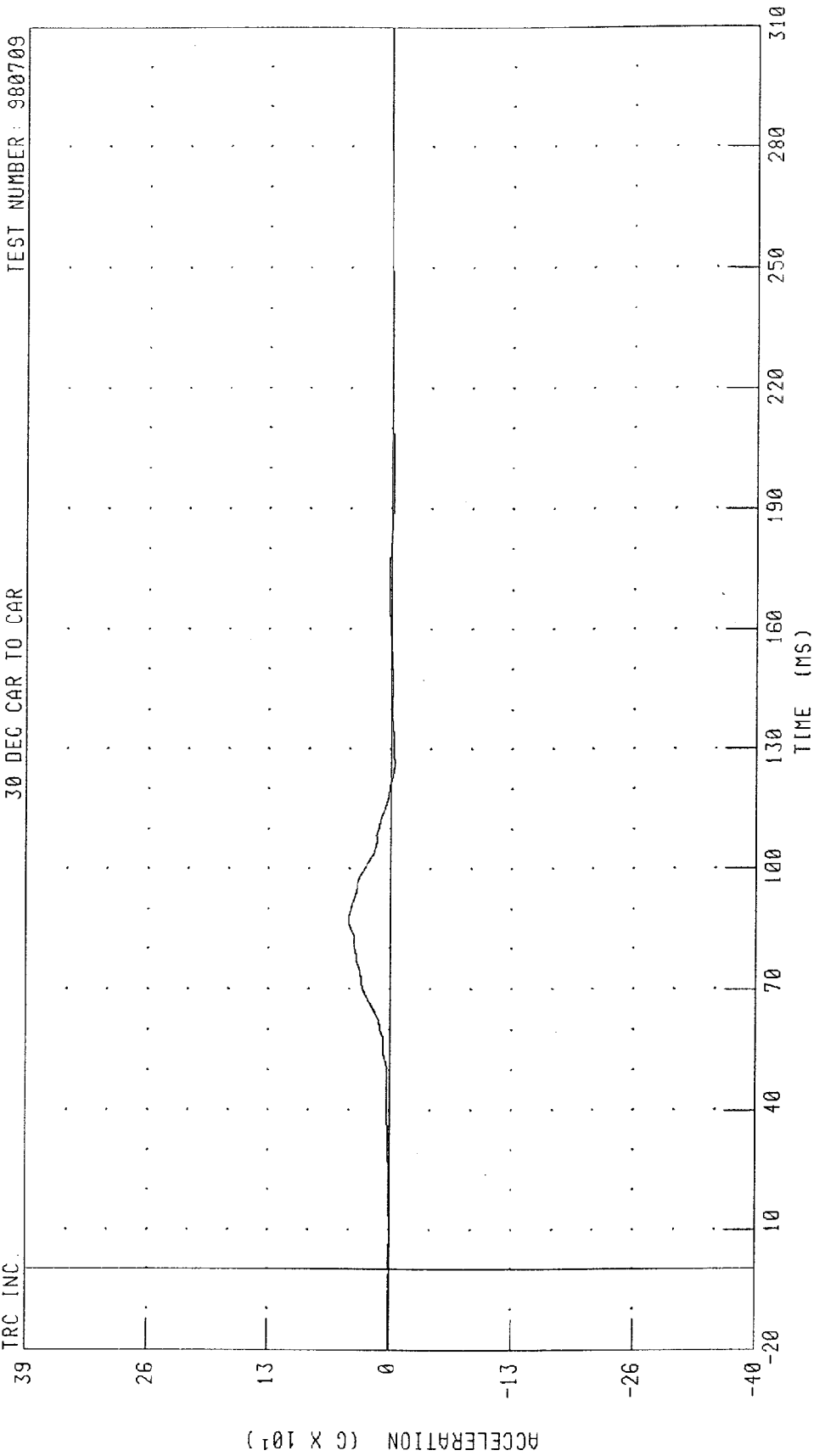
PEAK DATA: 42.64 N·M @ 70.72 MS, -37.14 N·M @ 102.00 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER CHEST X-AXIS ACCELERATION - PRIMARY

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.



CHANNEL: CSTXC1 FILTER: CH. CLASS 180

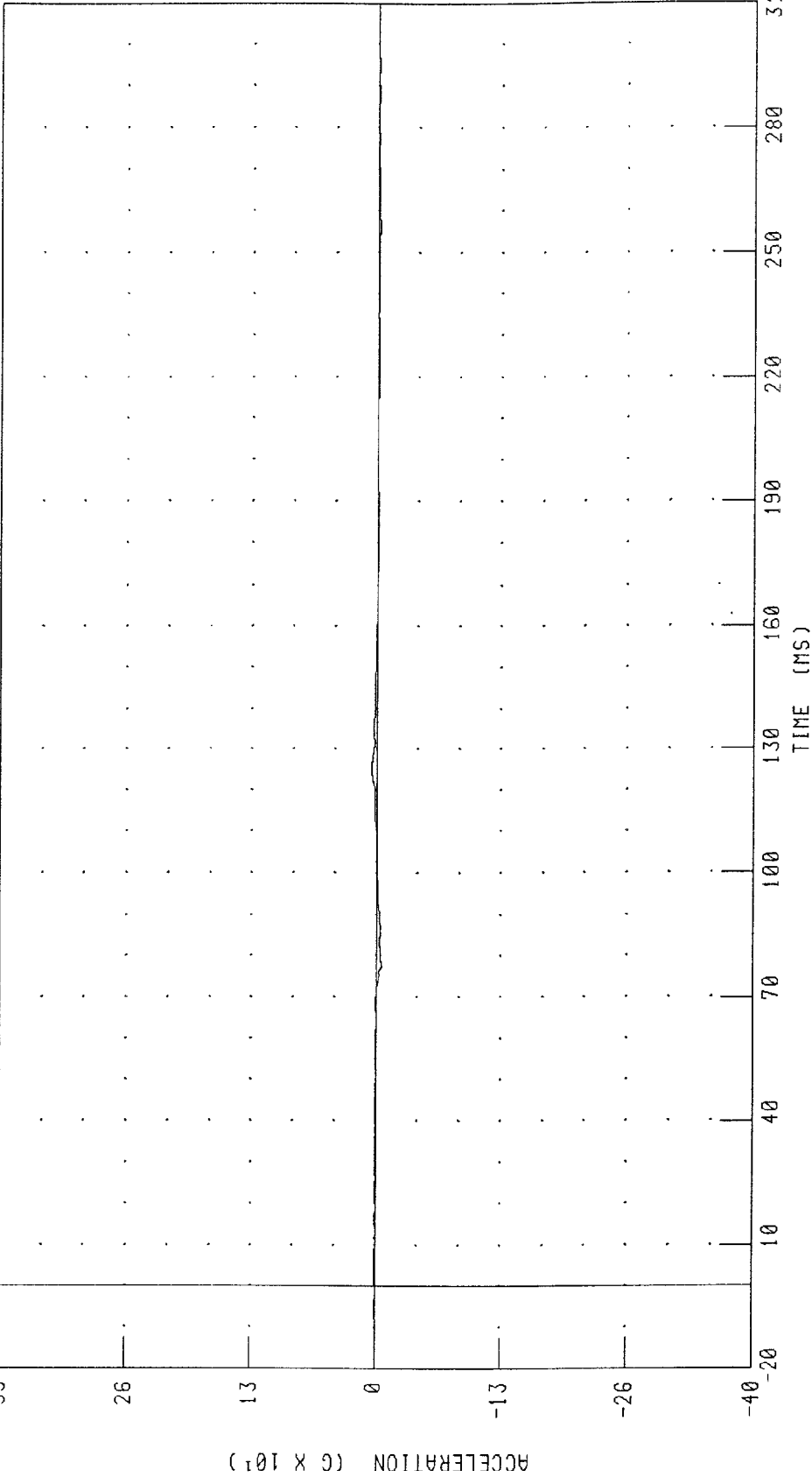
PEAK DATA: 44.50 G @ 87.60 MS, -4.56 G @ 126.16 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET DRIVER CHEST Y-AXIS ACCELERATION - PRIMARY

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



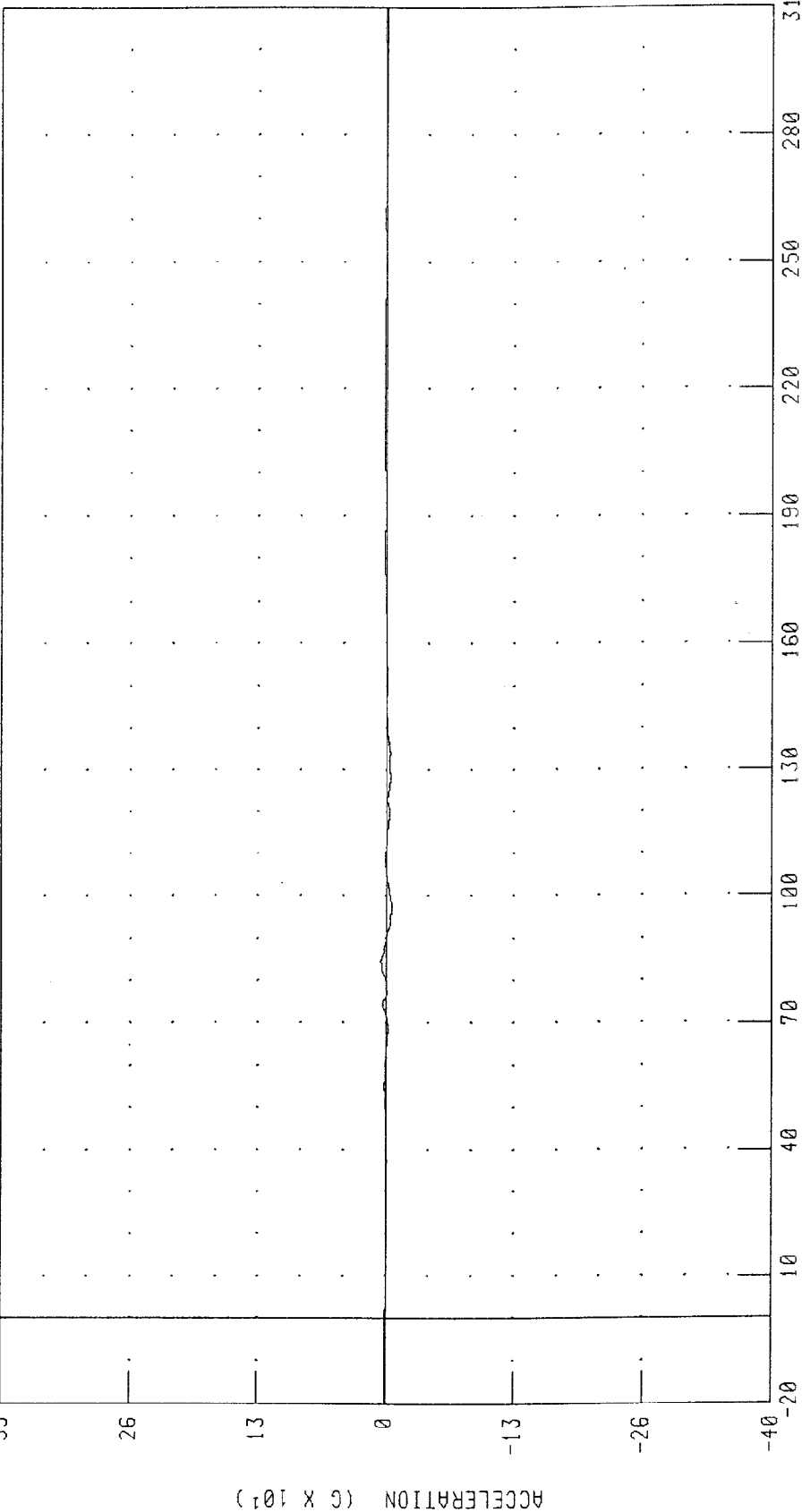
CHANNEL: CSTYG1 FILTER: CH CLASS 180

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET DRIVER CHEST Z-AXIS ACCELERATION - PRIMARY

TEST NUMBER: 980709

30 DEC CAR TO CAR

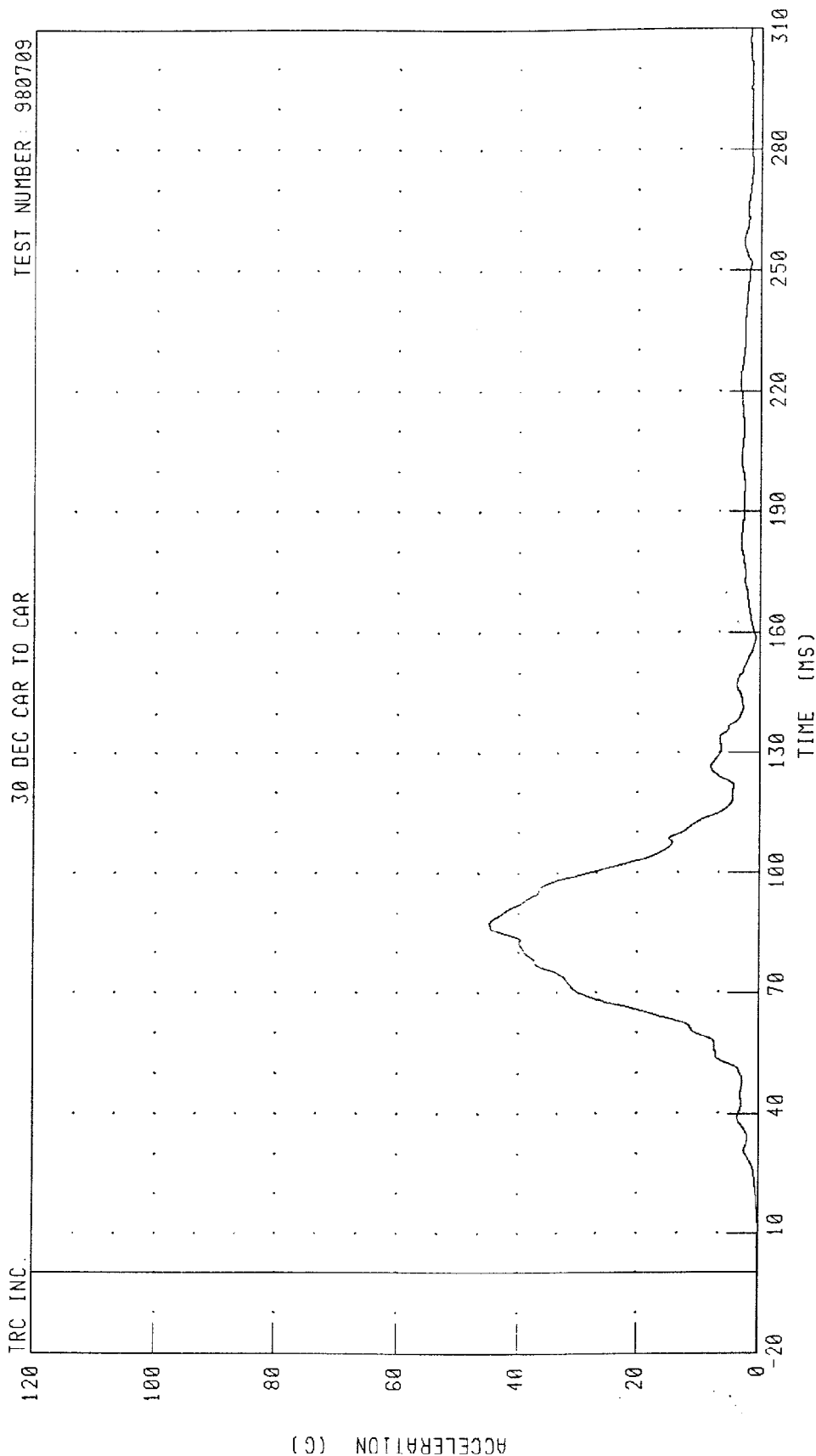
TRC INC.



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 4.71 G @ 84.64 MS; -6.61 G @ 97.04 MS

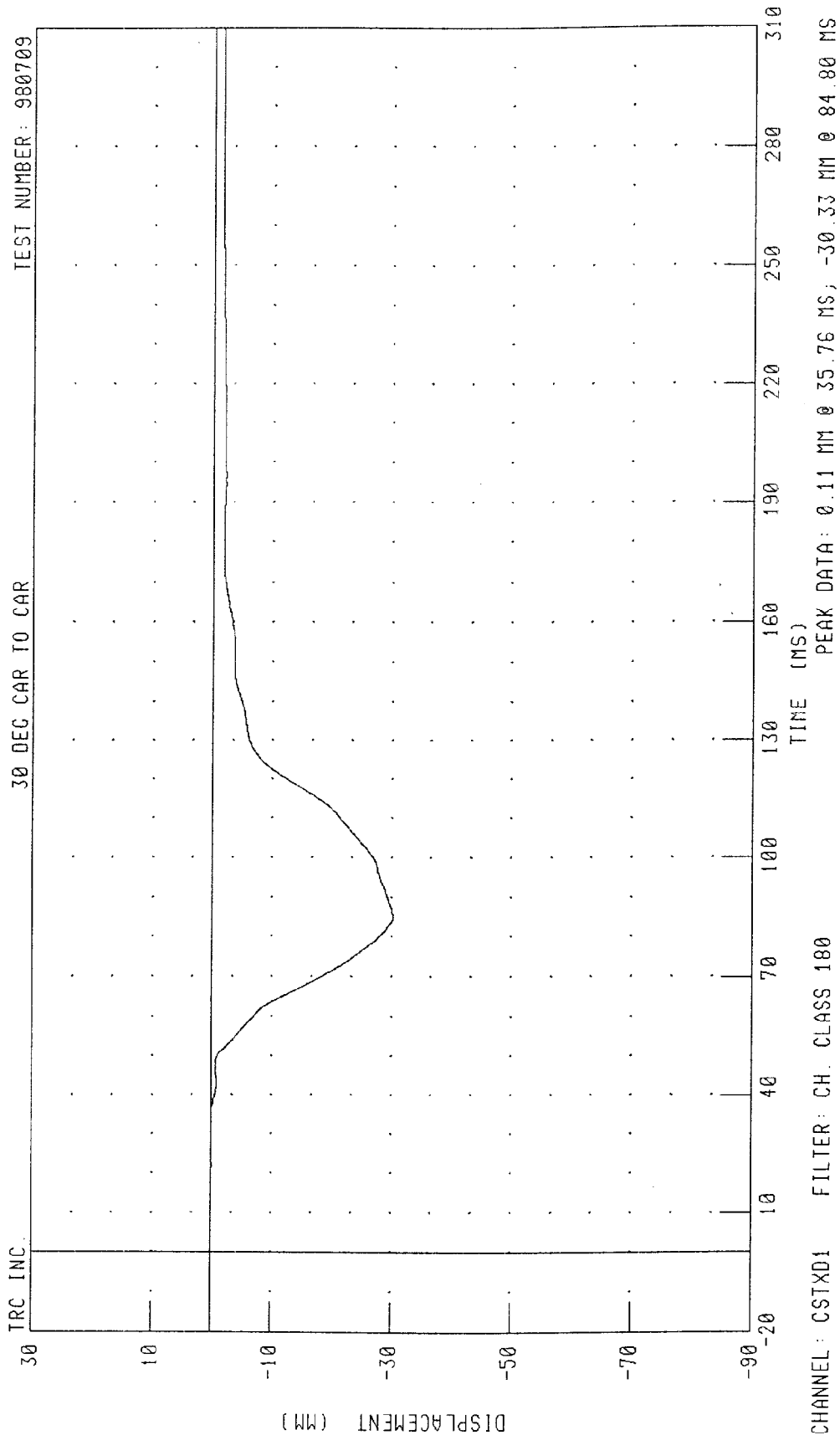
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER CHEST RESULTANT ACCELERATION



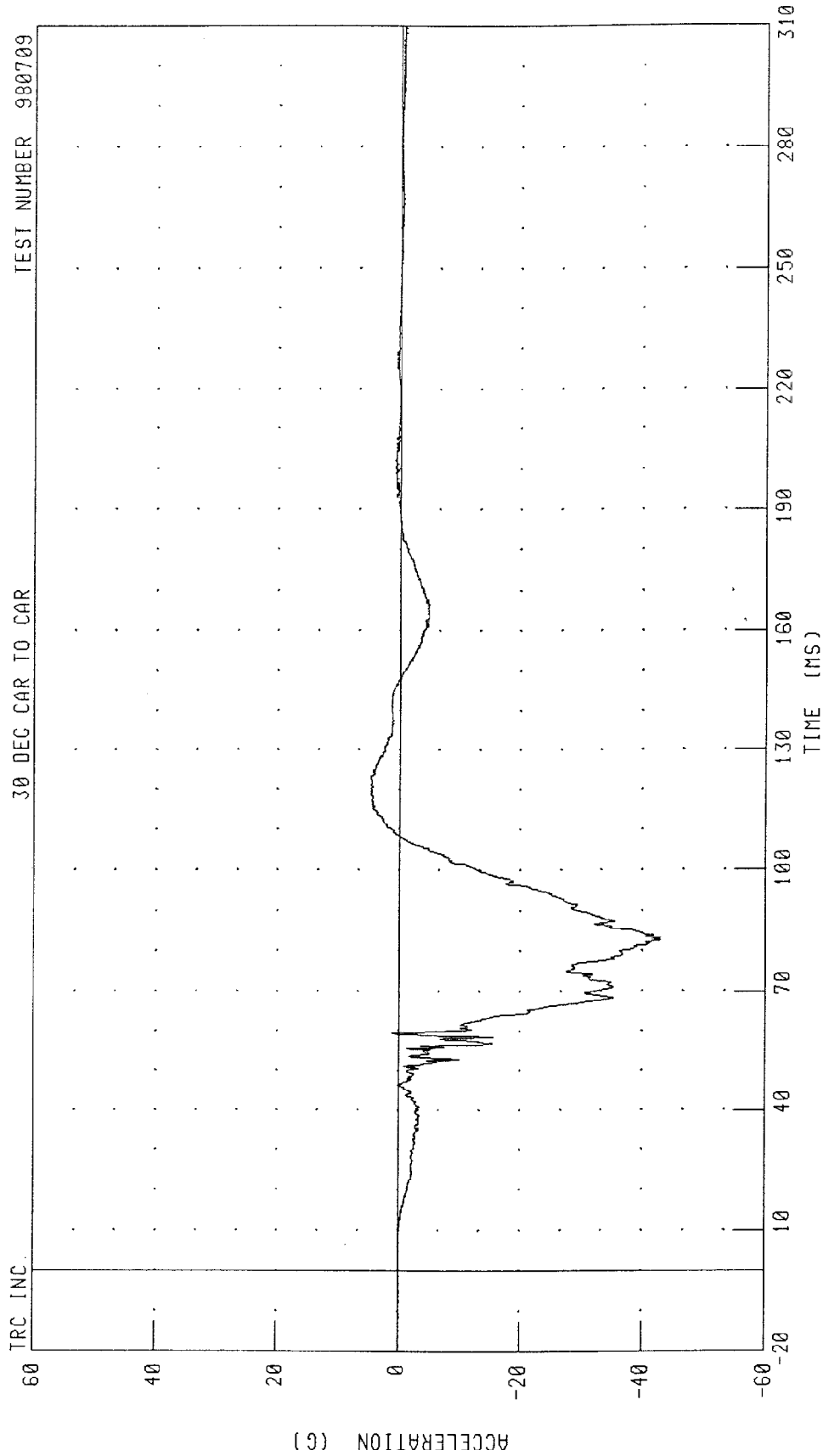
CHANNEL: CSTRG1 FILTER: CH. CLASS 180

PEAK DATA: 44.79 G @ 87.44 MS; 0.01 G @ -20.00 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER CHEST DEFLECTION



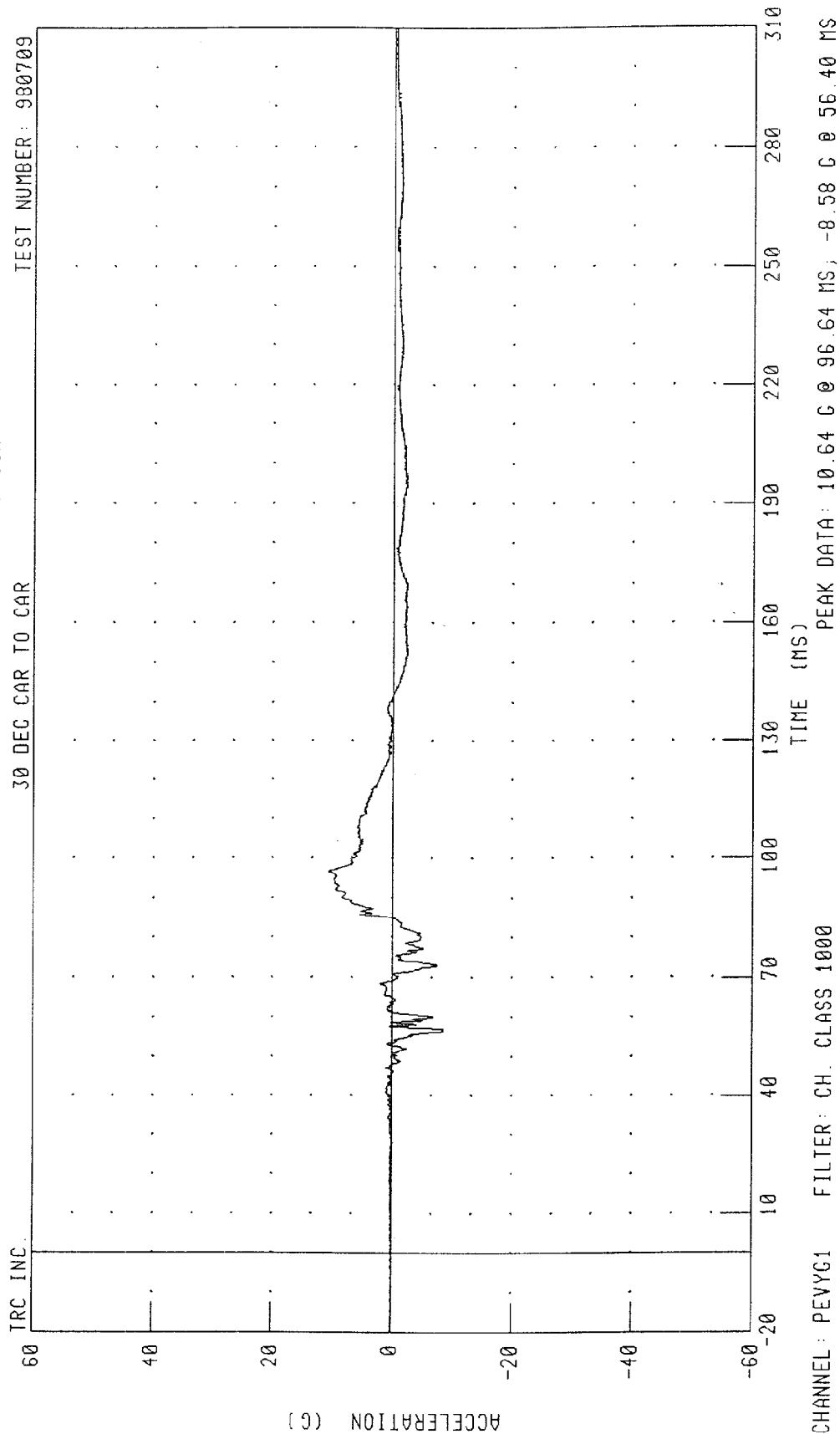
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER PELVIS X-AXIS ACCELERATION



CHANNEL: PEVXG1 FILTER: CH. CLASS 1000

PEAK DATA: 4.66 G @ 118.64 MS, -42.96 G @ 82.72 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER PELVIS Y-AXIS ACCELERATION

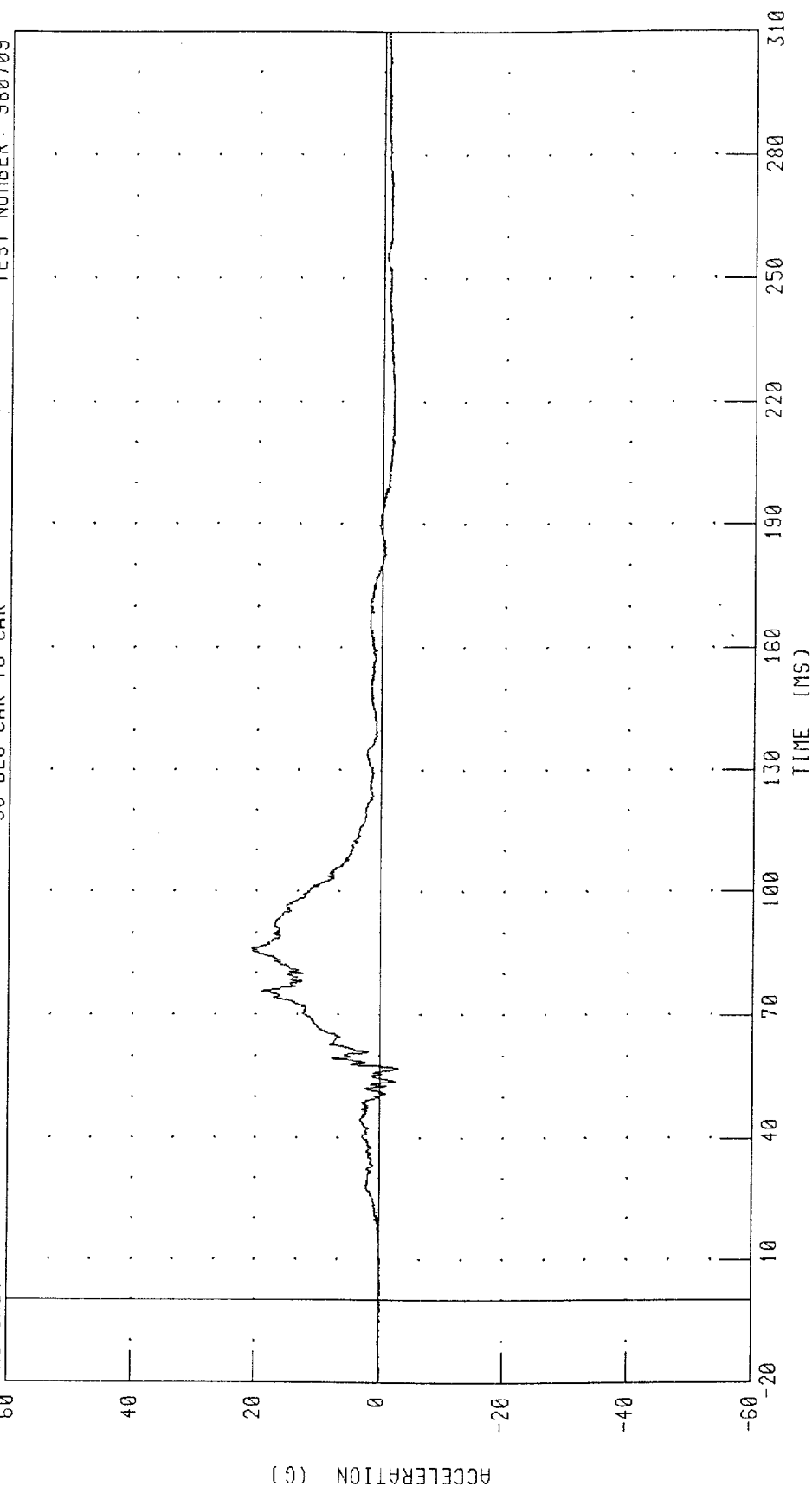


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER PELVIS Z-AXIS ACCELERATION

TRC INC.

30 DEG CAR TO CAR

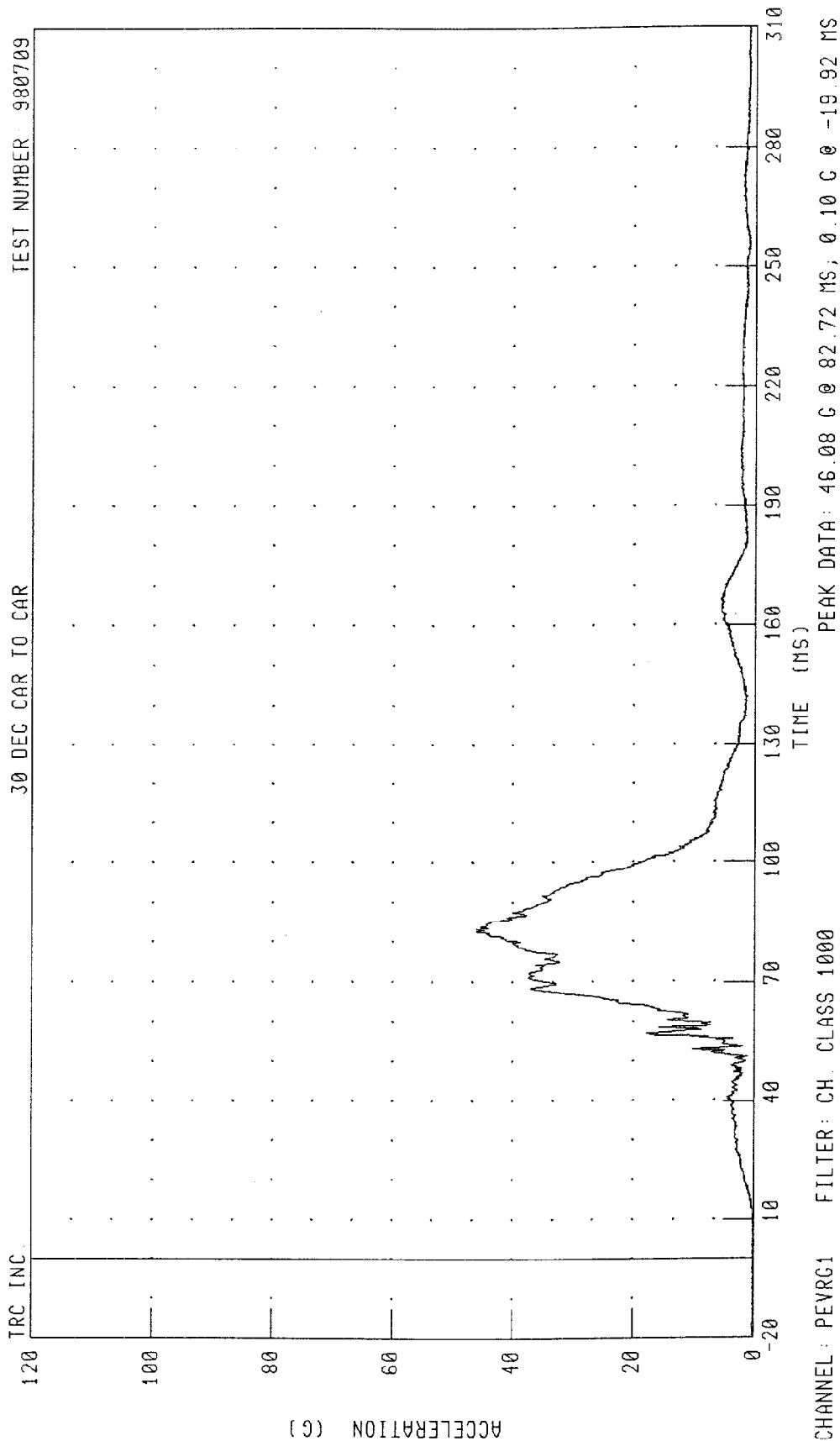
TEST NUMBER: 980709



CHANNEL: PEVZG1 FILTER: CH. CLASS 1000

PEAK DATA: 20.74 G @ 85.52 MS; -3.00 G @ 57.04 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER PELVIS RESULTANT

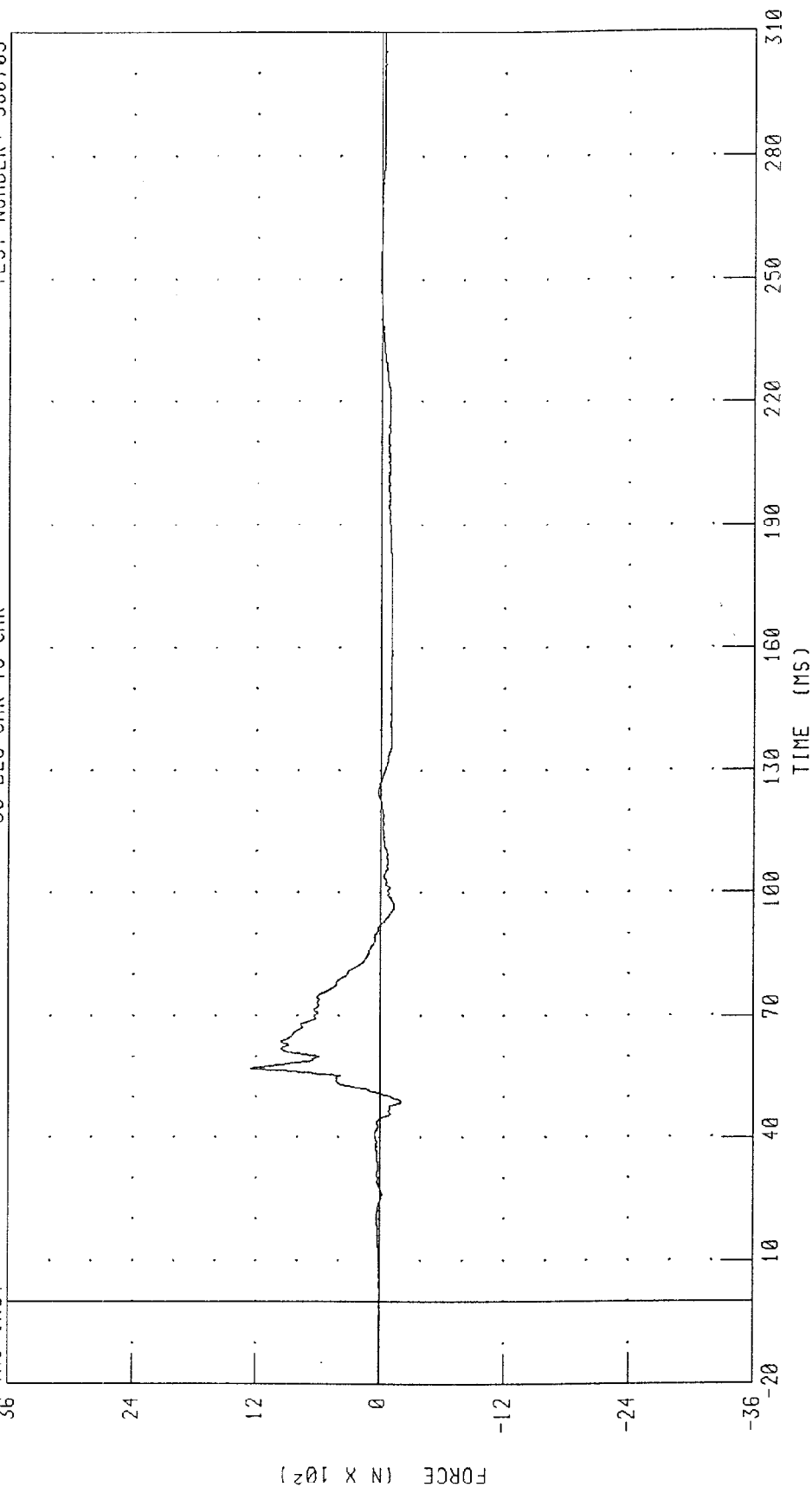


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT UPPER TIBIA X-AXIS FORCE

TEST NUMBER: 980709

30 DEC CAR TO CAR

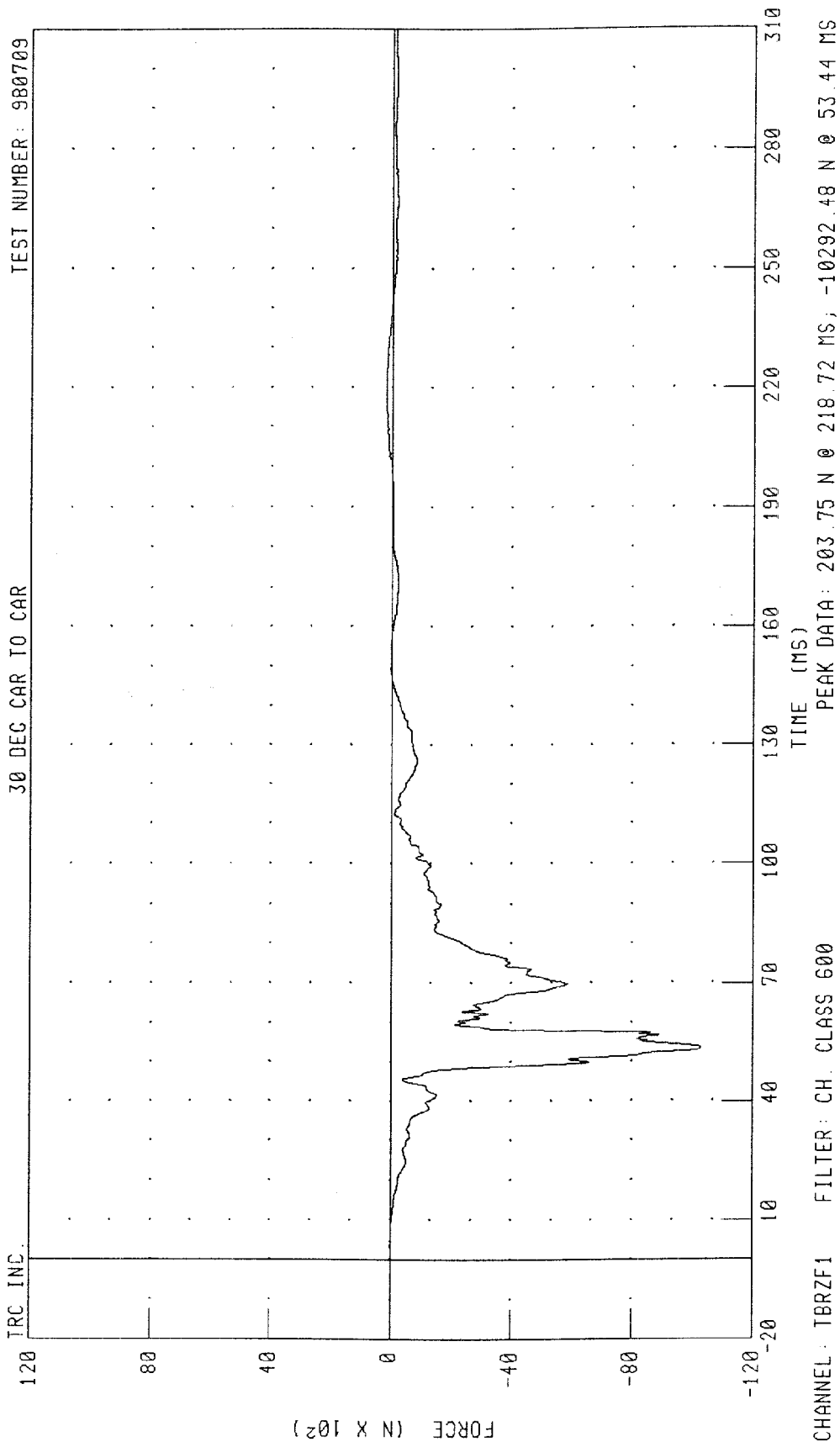
TRC INC.



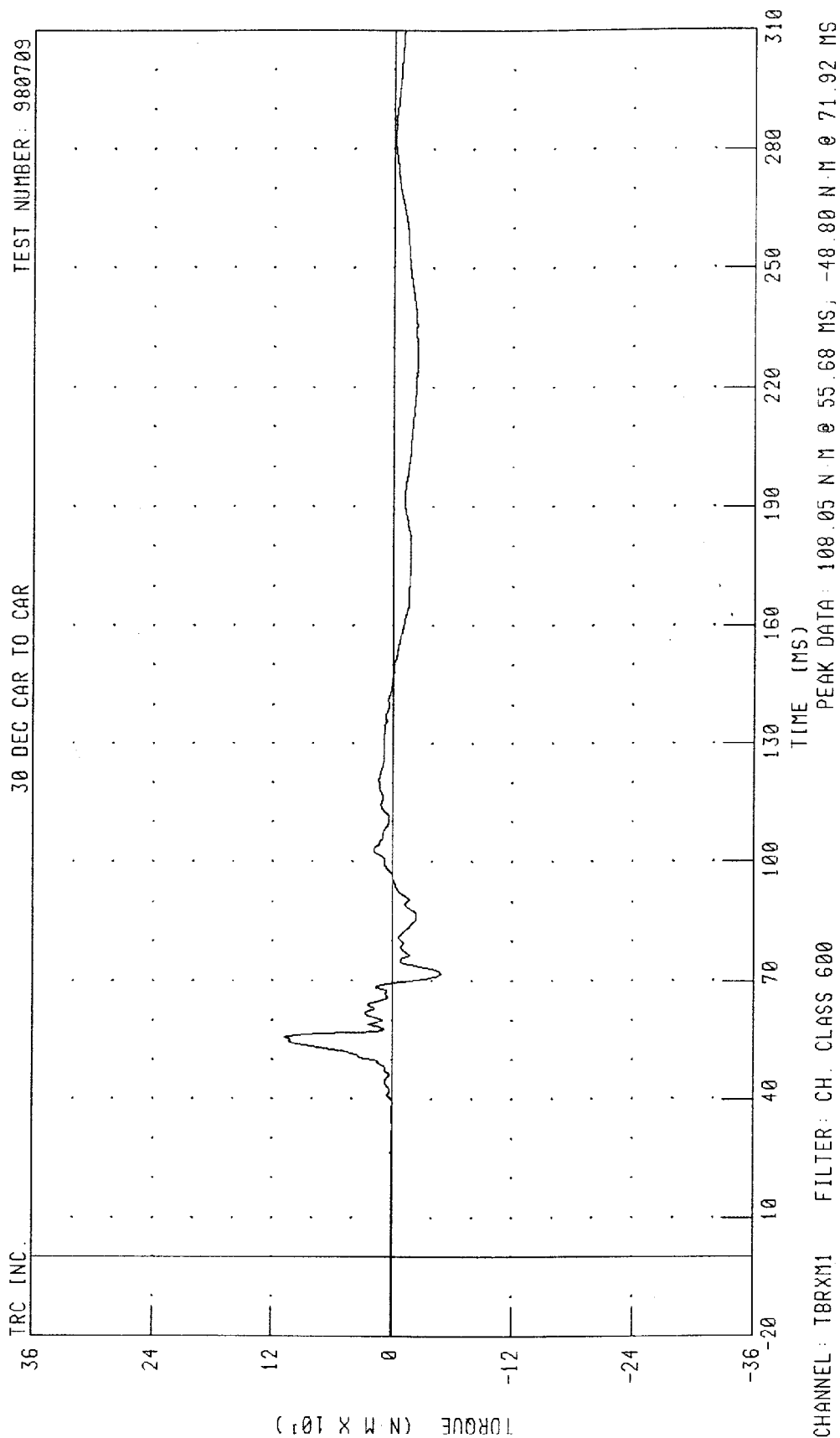
CHANNEL: TBRXF1 FILTER: CH. CLASS 600

PEAK DATA: 1250.39 N @ 57.20 MS, -212.43 N @ 48.96 MS

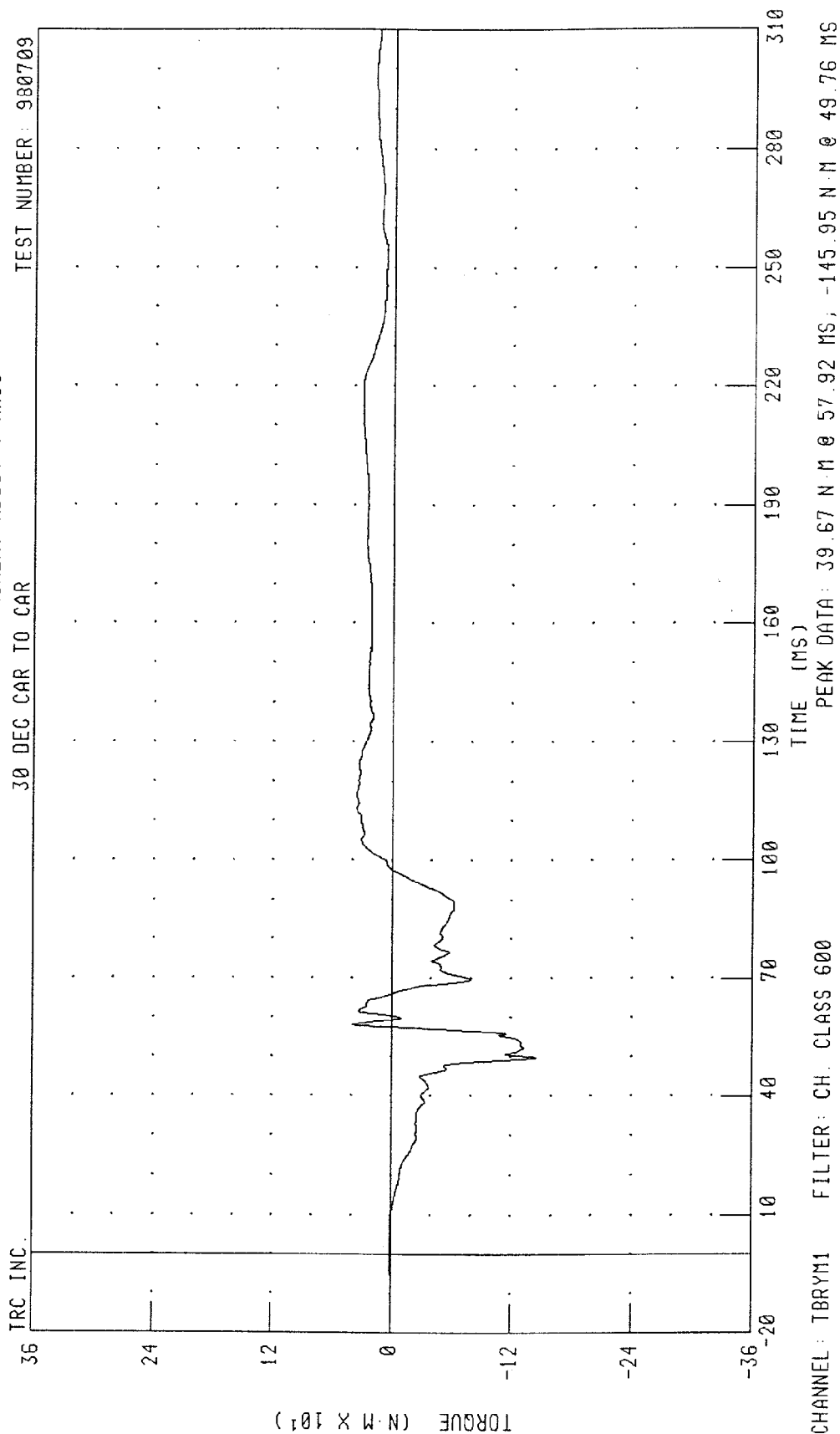
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT UPPER TIBIA Z-AXIS FORCE



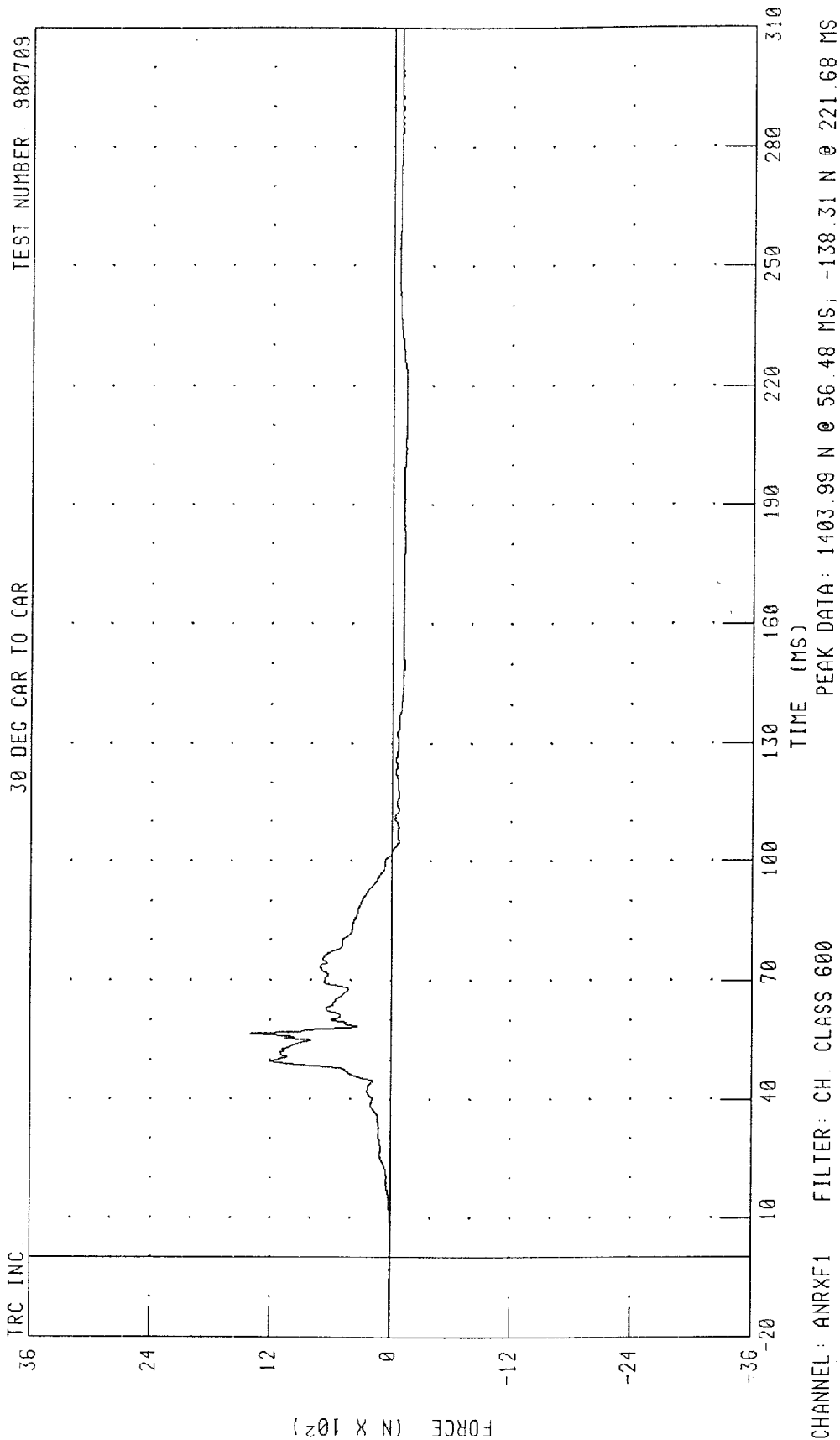
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT LOWER TIBIA X-AXIS FORCE

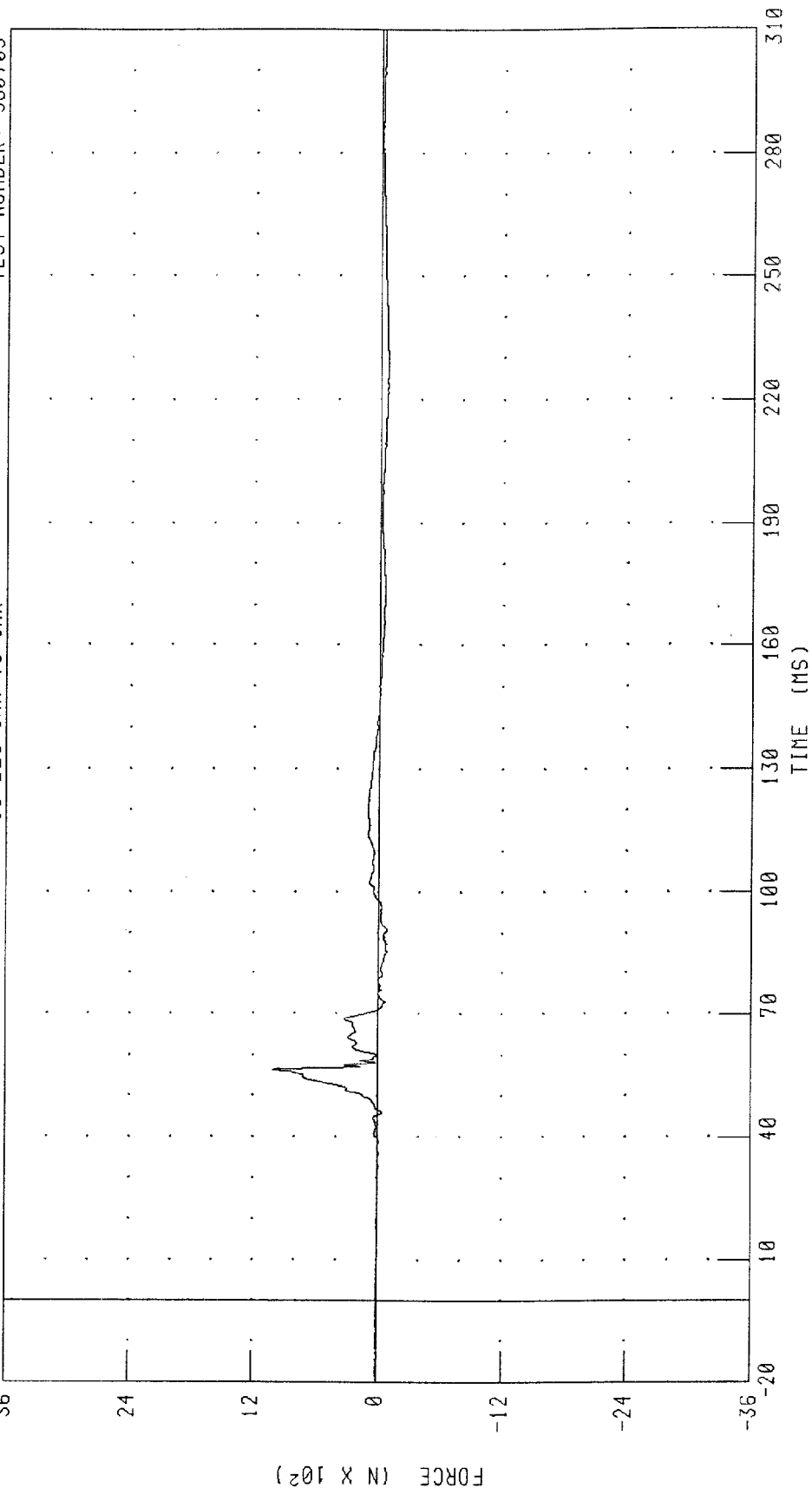


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT LOWER TIBIA Y-AXIS FORCE

TRC INC.

30 DEC CAR TO CAR

TEST NUMBER: 980709



CHANNEL: ANRYF1 FILTER: CH. CLASS 600

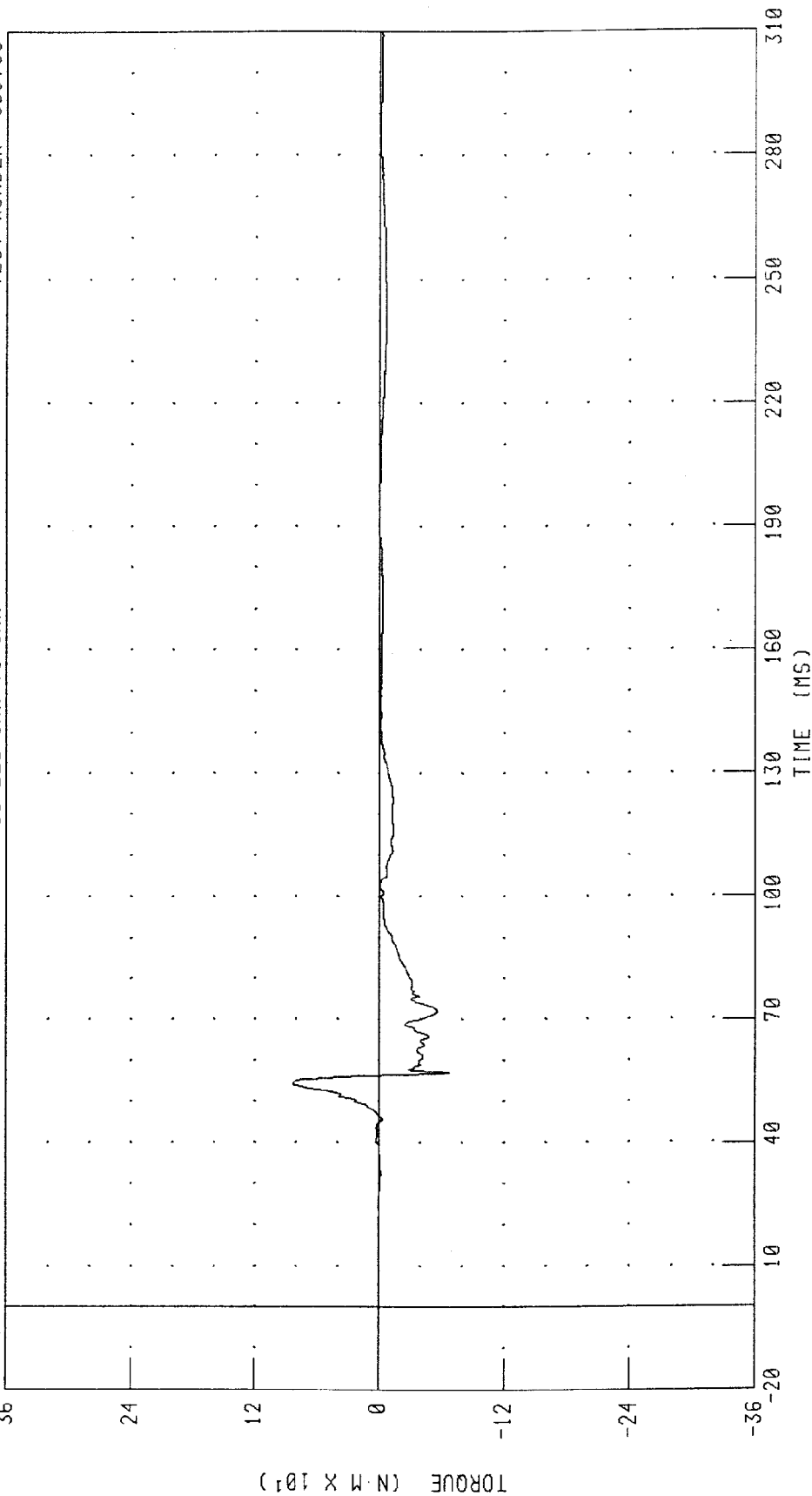
PEAK DATA: 1012.08 N @ 56.24 MS; -85.84 N @ 90.80 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT LOWER TIBIA MOMENT ABOUT X AXIS

TEST NUMBER: 980709

30 DEC CAR TO CAR

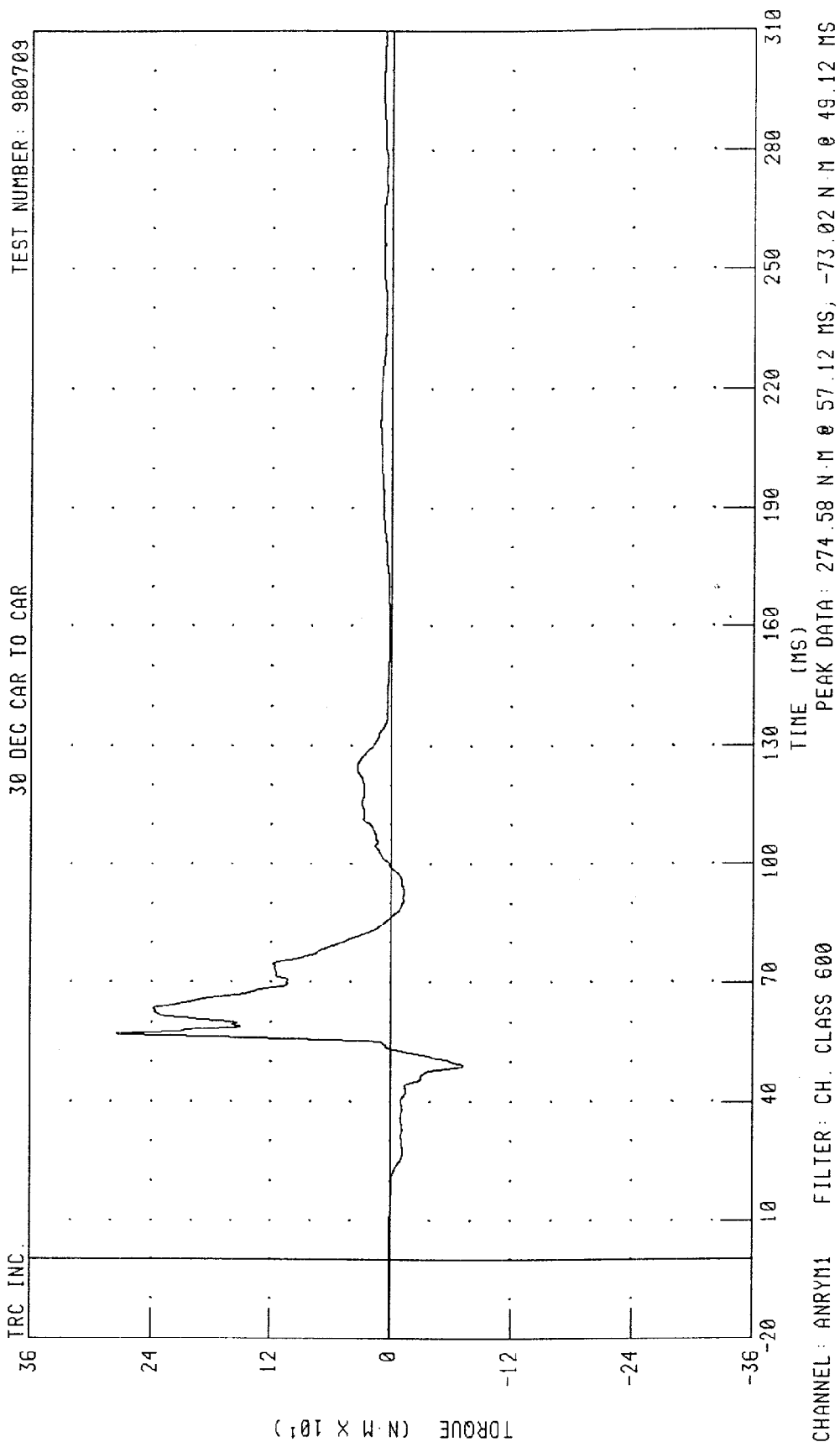
TRC INC



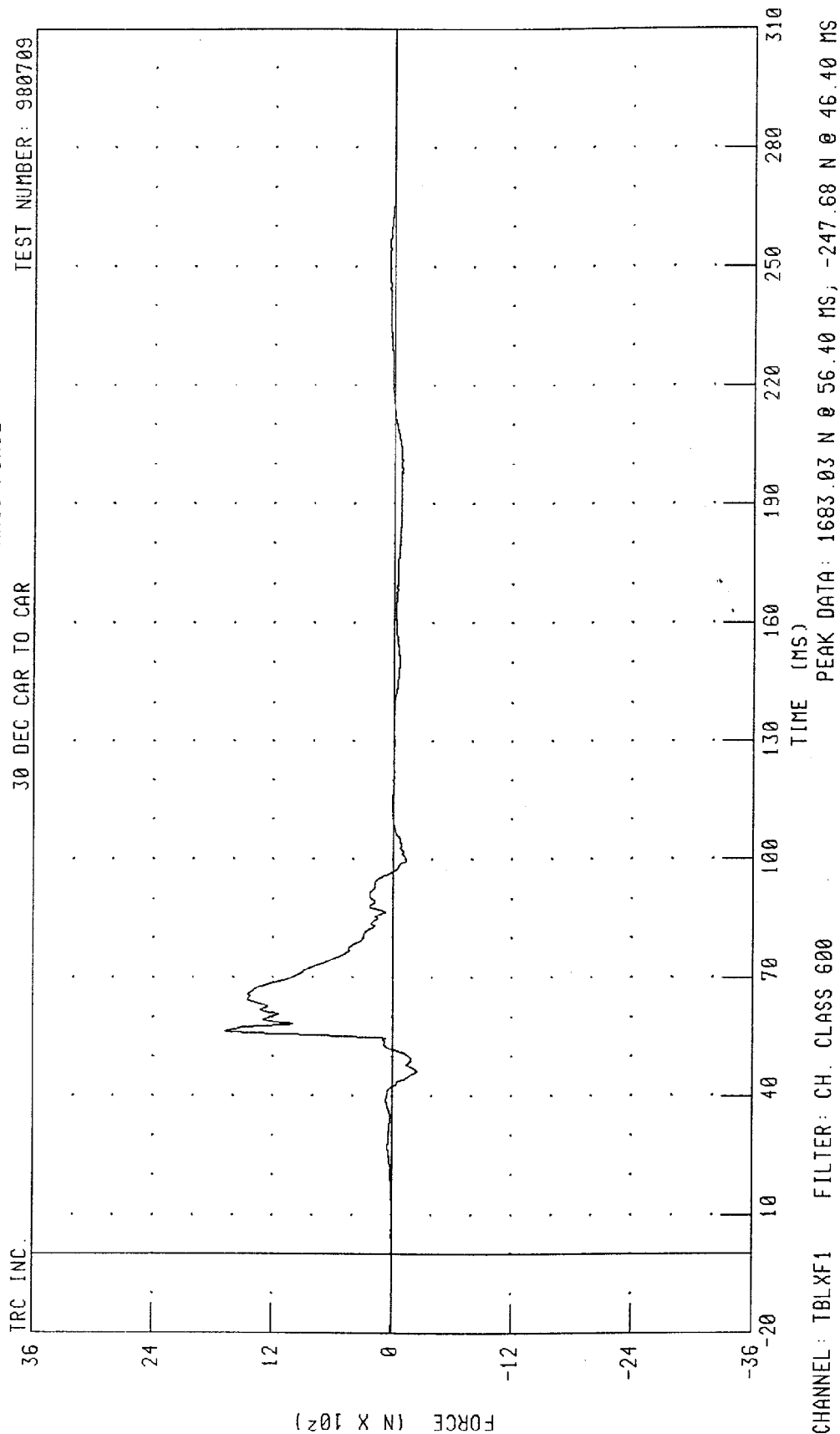
CHANNEL: ANRXM1 FILTER: CH. CLASS 600

PEAK DATA: 83.01 N·m @ 54.32 MS, -67.47 N·m @ 56.88 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS

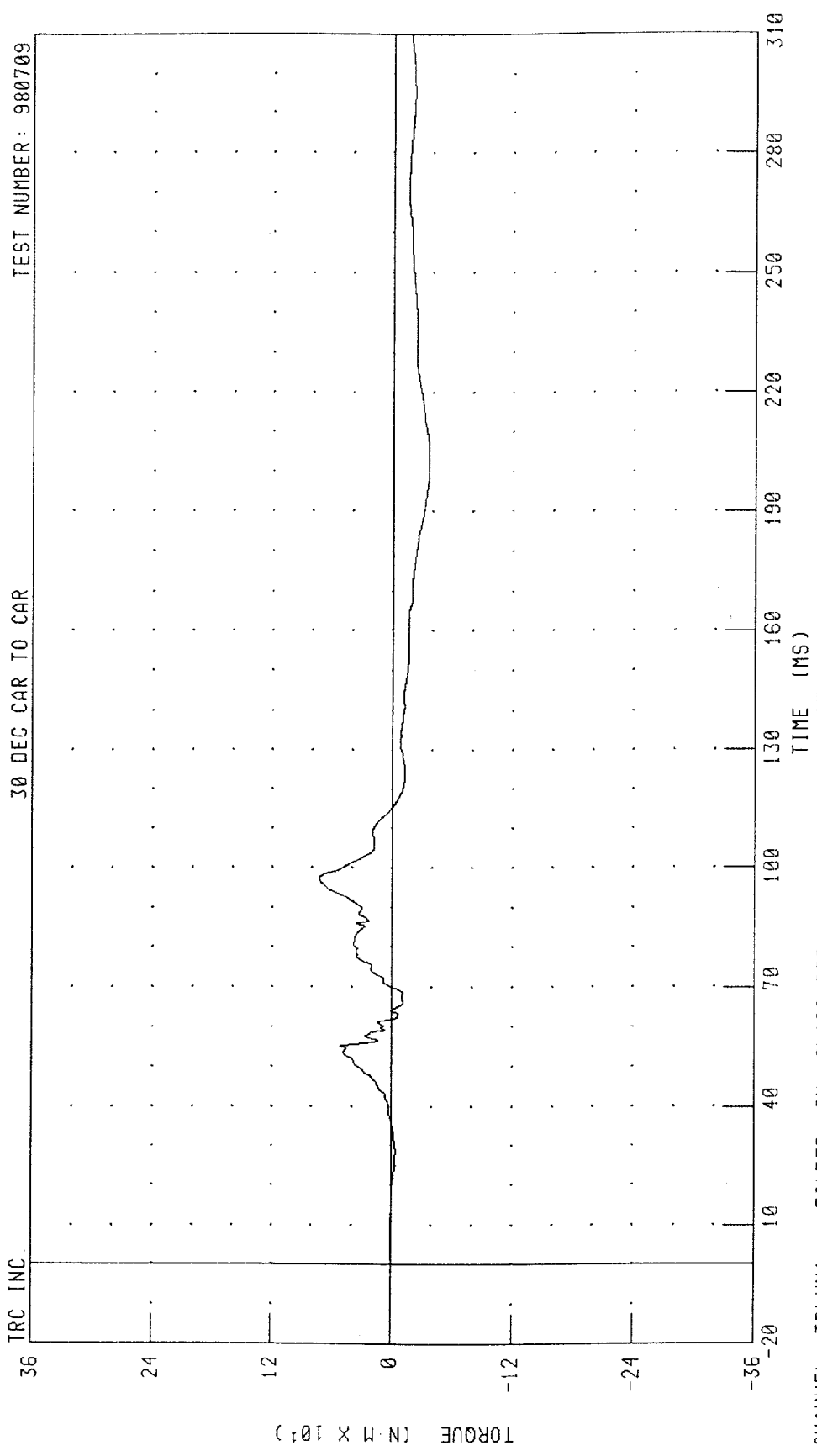


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT UPPER TIBIA X-AXIS FORCE



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT UPPER TIBIA MOMENT ABOUT X AXIS

TRC INC. 30 DEC CAR TO CAR TEST NUMBER: 980709

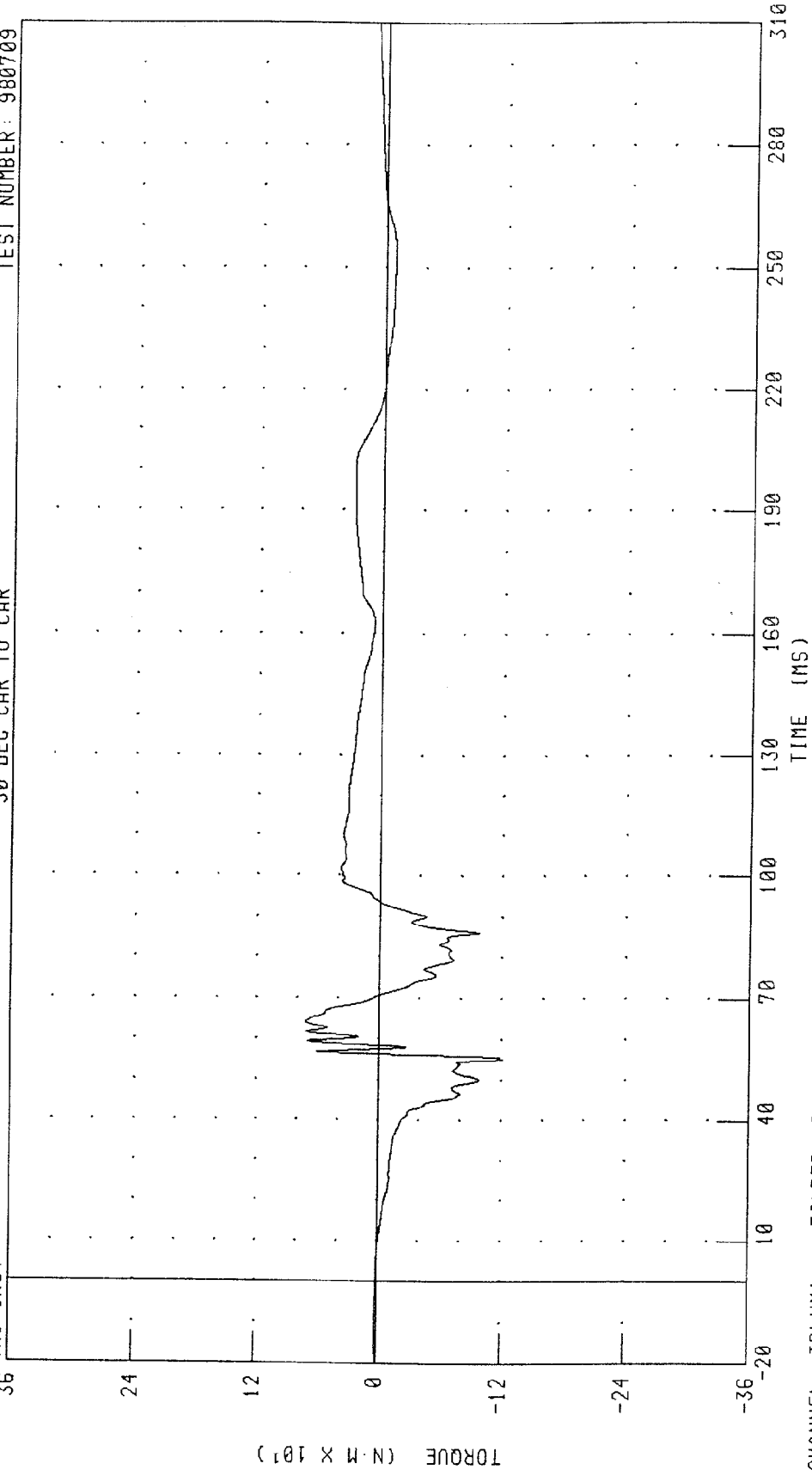


CHANNEL: TBLXM1 FILTER: CH. CLASS 600

PEAK DATA: 72.89 N·m @ 97.52 MS; -36.45 N·m @ 202.72 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS

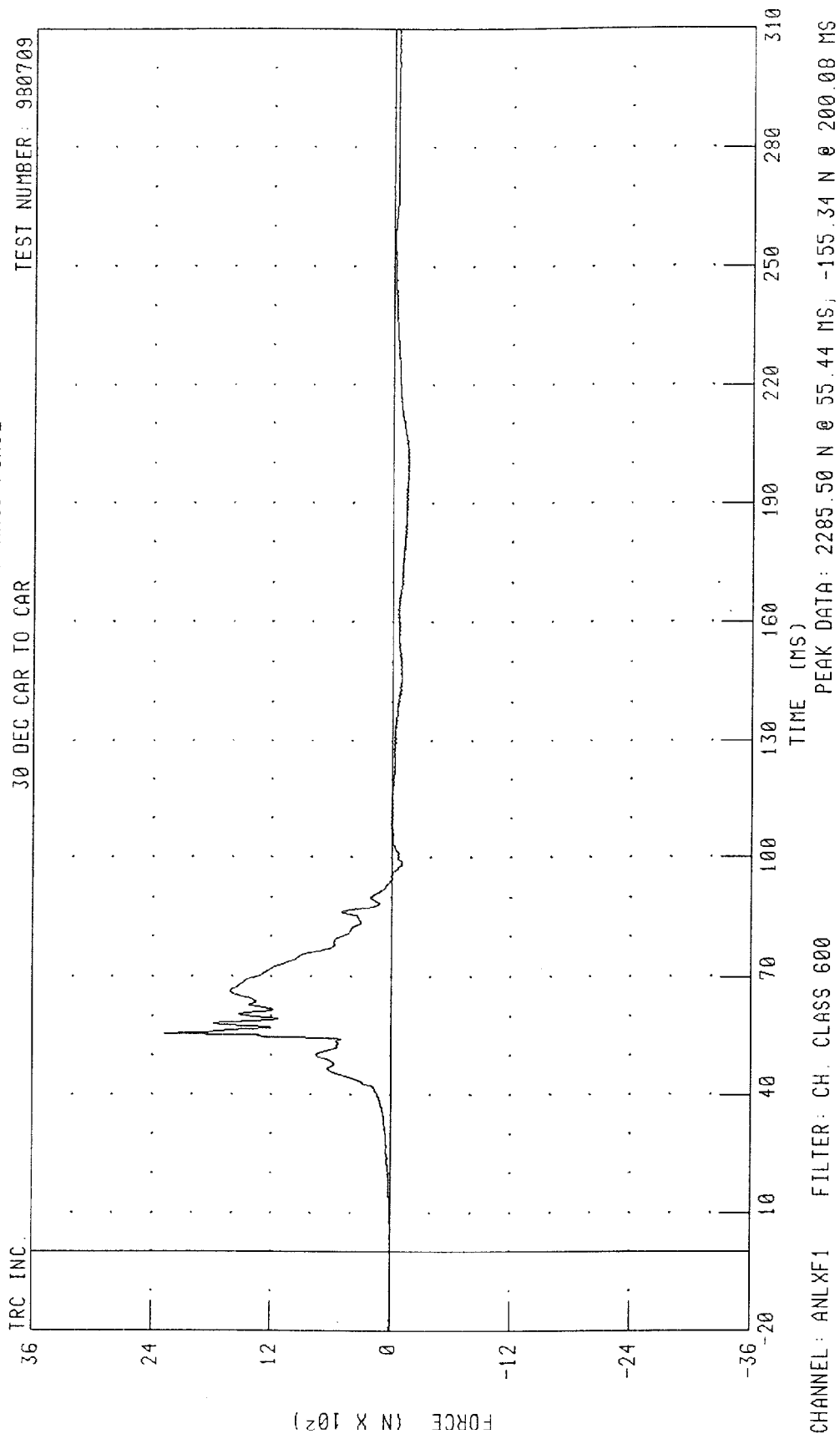
TRC INC. 36
30 DEC CAR TO CAR
TEST NUMBER: 980709



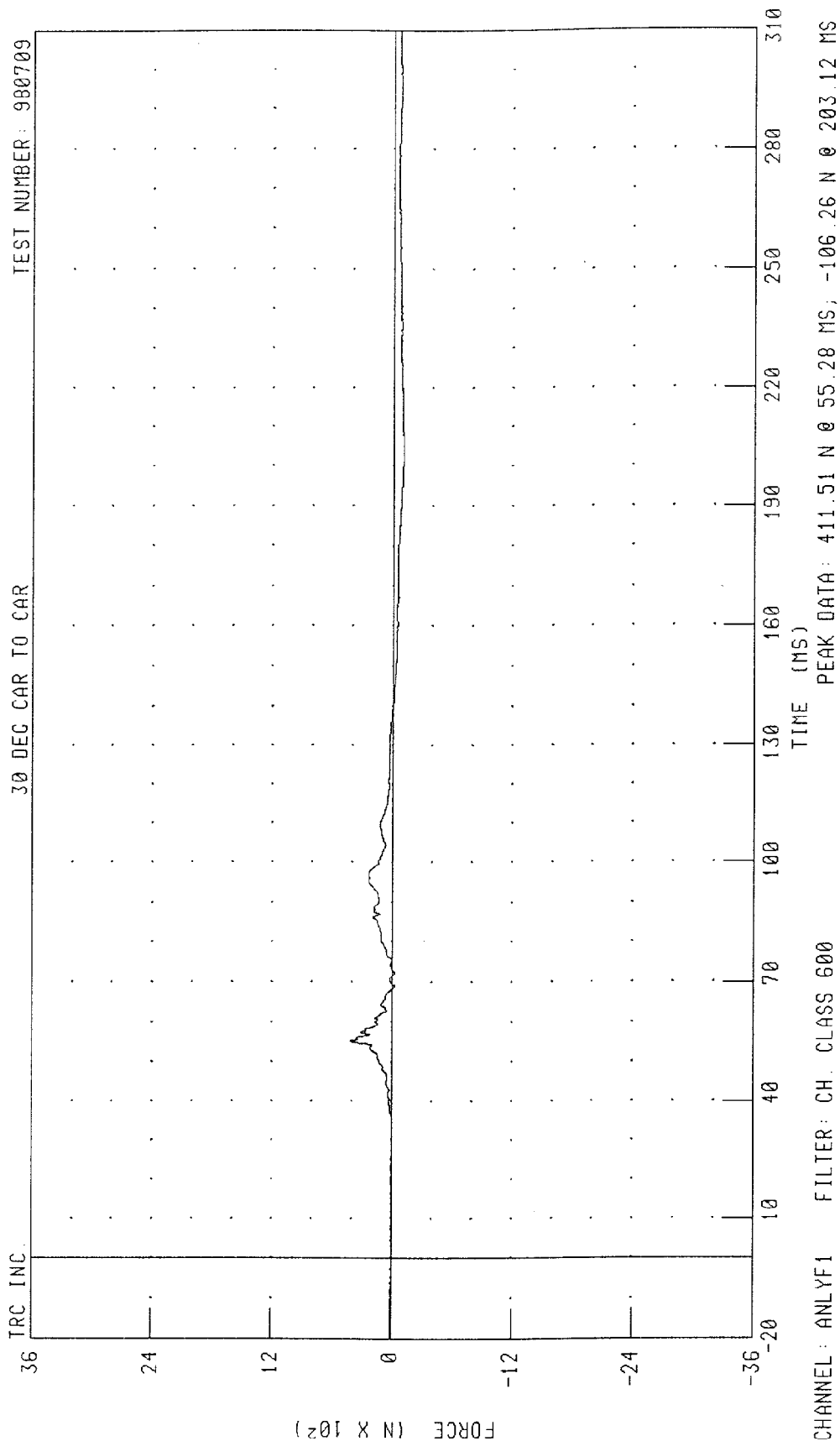
CHANNEL: TBLYM1 FILTER: CH. CLASS 600

PEAK DATA: 72.07 N-M @ 64.24 MS; -120.89 N-M @ 55.12 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT LOWER TIBIA X-AXIS FORCE



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT LOWER TIBIA Y-AXIS FORCE

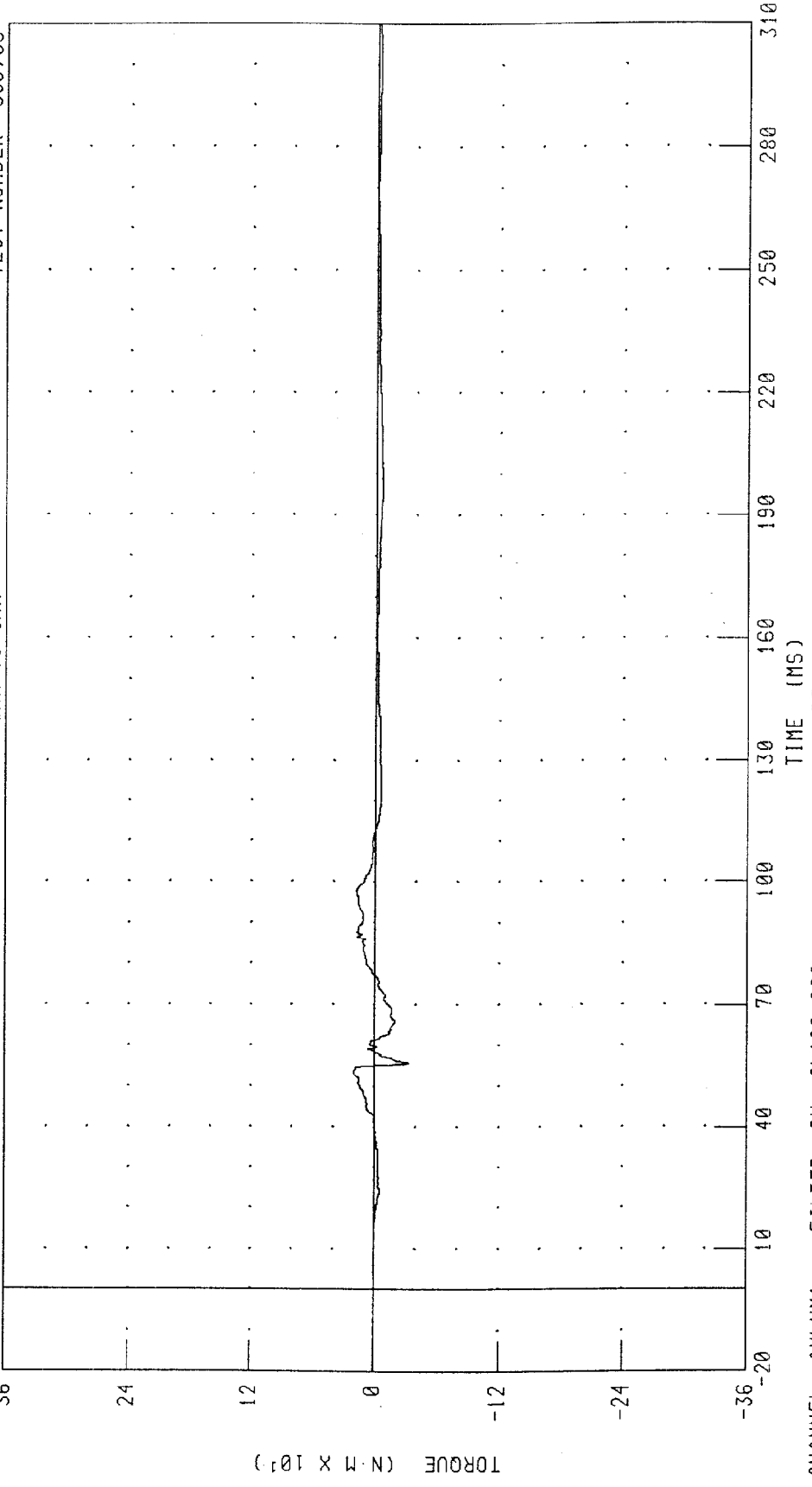


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT LOWER TIBIA MOMENT ABOUT X AXIS

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: ANLXM1 FILTER: CH. CLASS 600

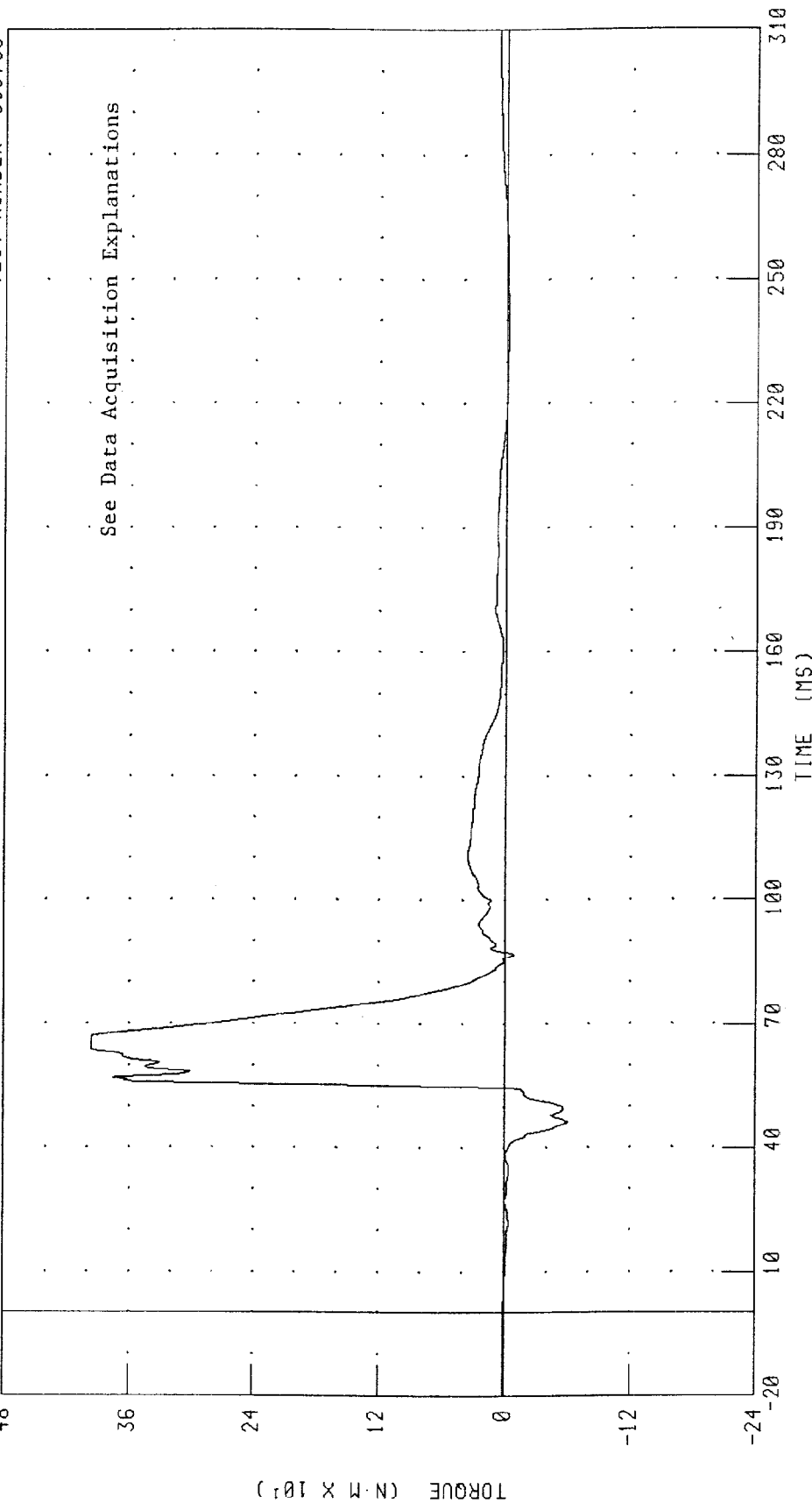
PEAK DATA: 19.99 N·M @ 53.44 MS, -32.82 N·M @ 55.68 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



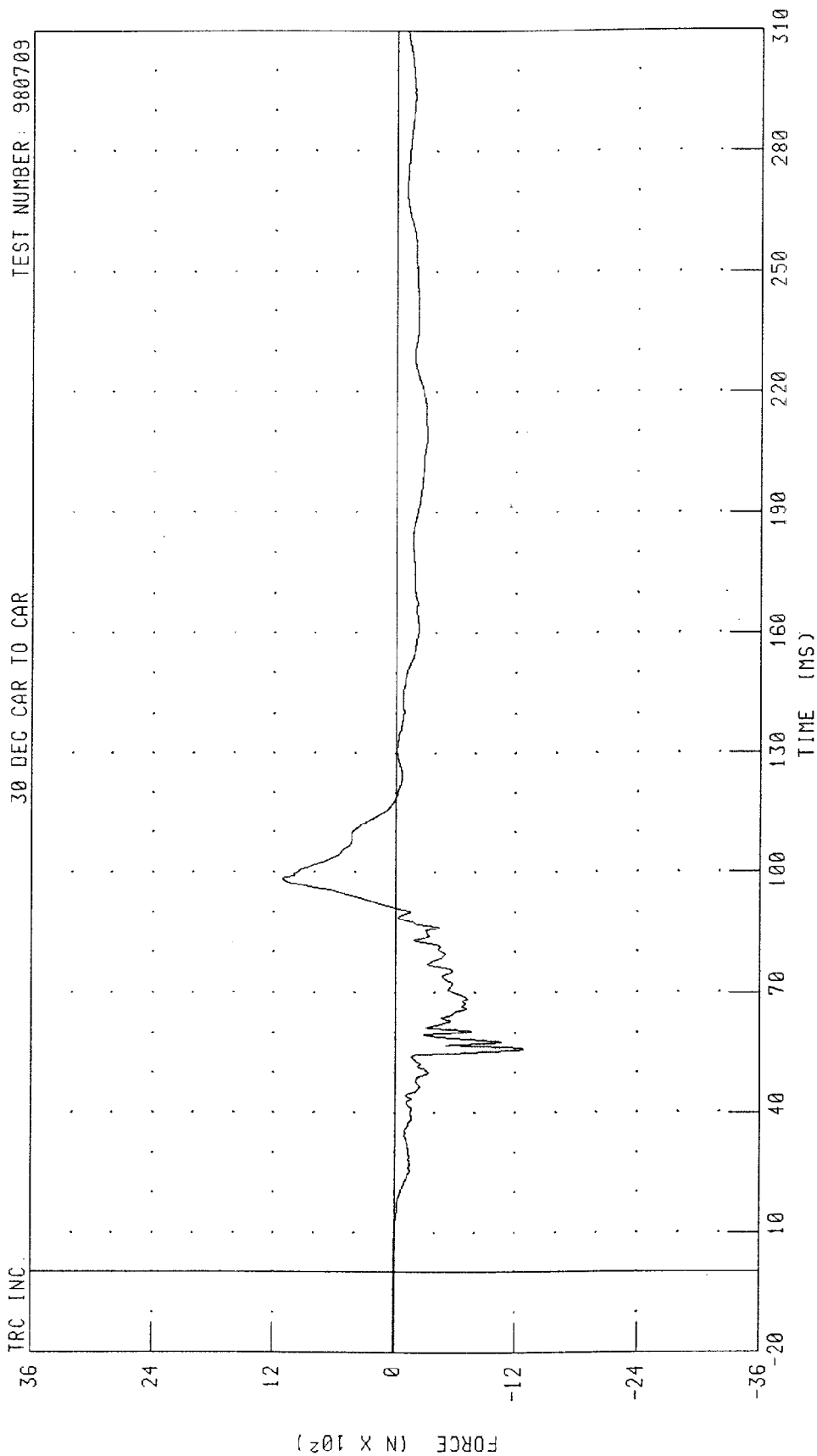
CHANNEL: ANLYM1 FILTER: CH. CLASS 600

PEAK DATA: 396.17 N·M @ 64.00 MS, -60.02 N·M @ 46.32 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT KNEE LEFT FORCE

TRC INC. TEST NUMBER: 980709

30 DEC CAR TO CAR



CHANNEL: KNLLF1 FILTER: CH. CLASS 600

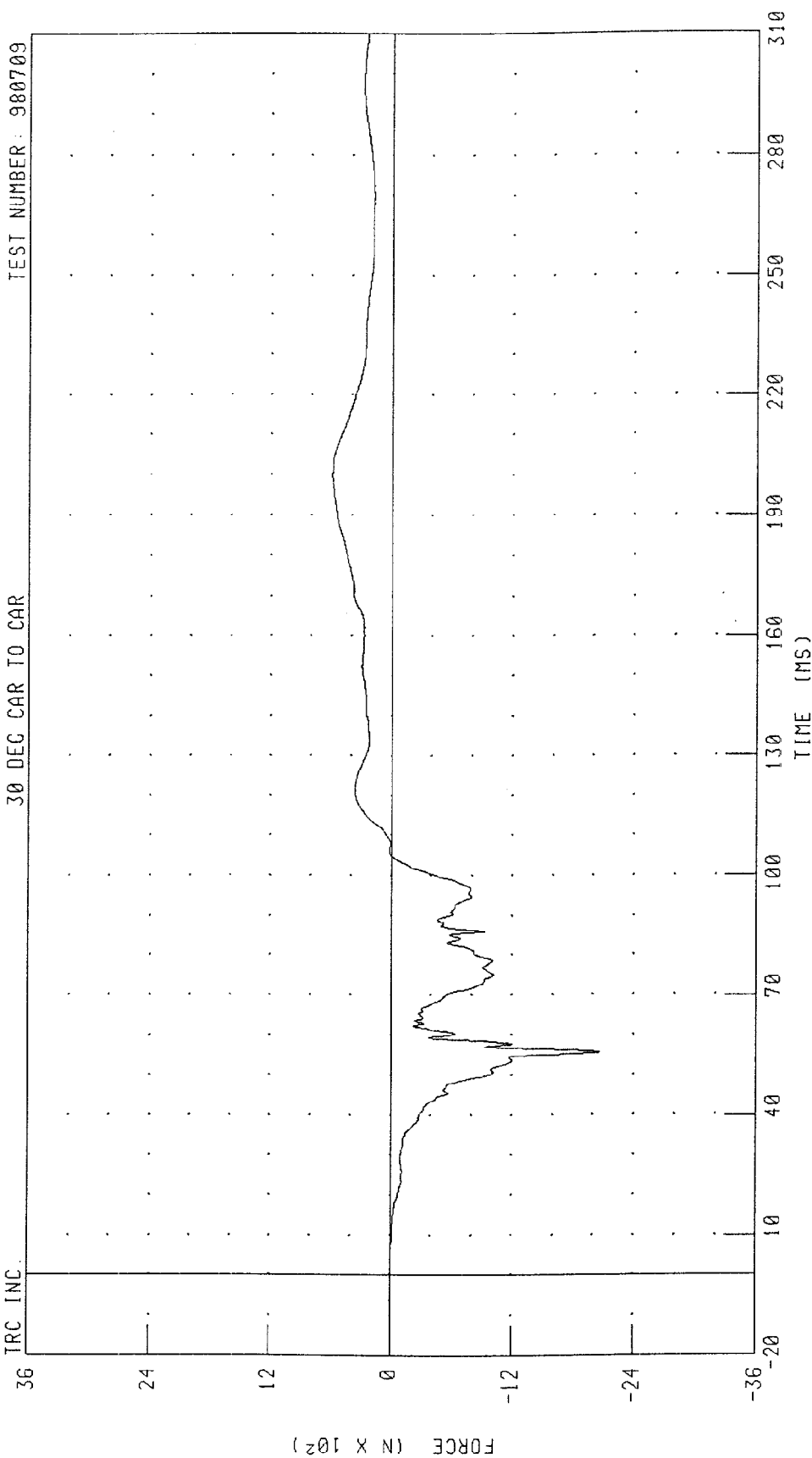
PEAK DATA: 1112.68 N @ 98.48 MS, -1280.81 N @ 56.00 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT KNEE RIGHT FORCE

TEST NUMBER: 980709

30 DEC CAR TO CAR

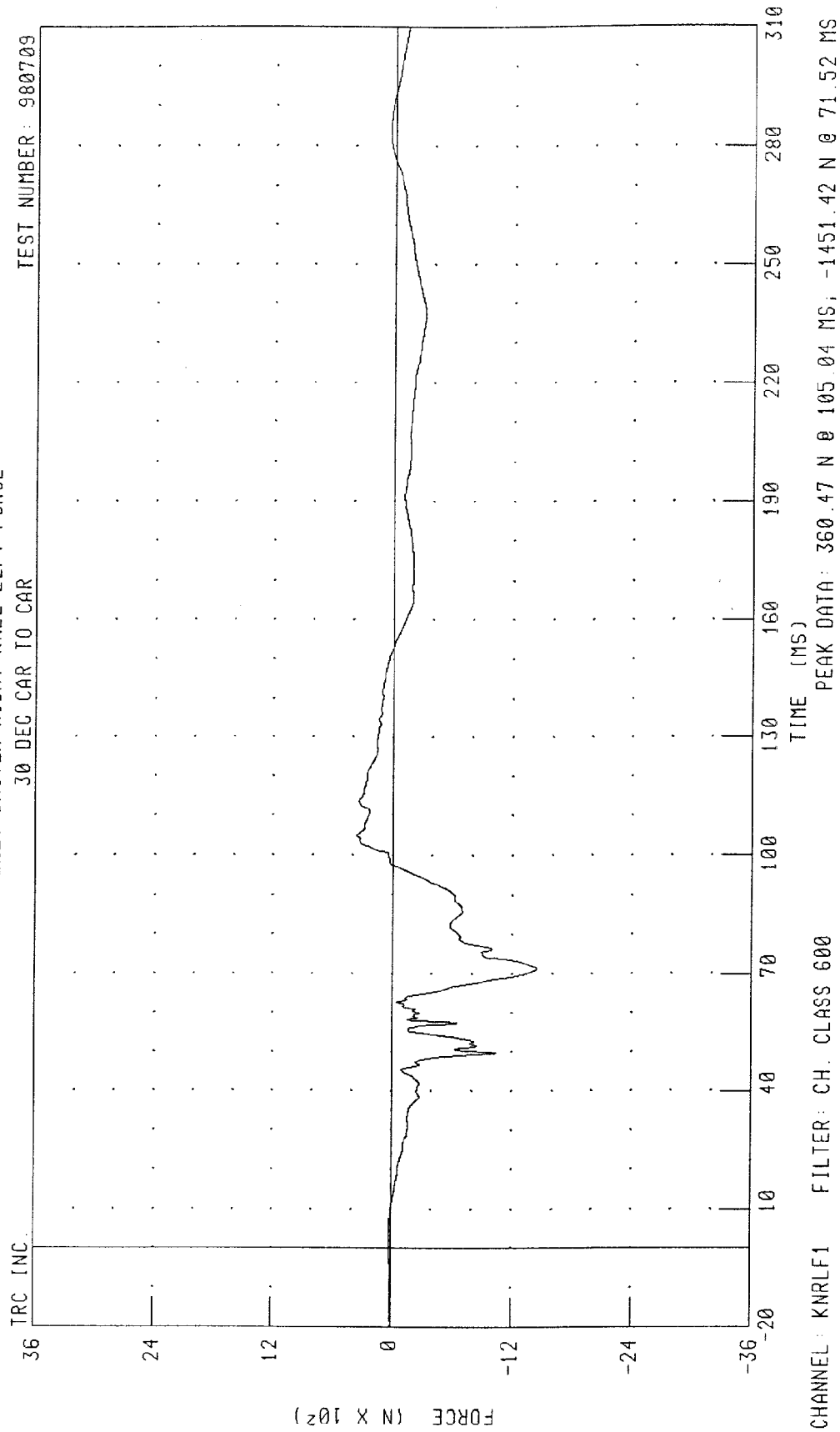
TRC INC.



CHANNEL: KNLR1 FILTER: CH. CLASS 600

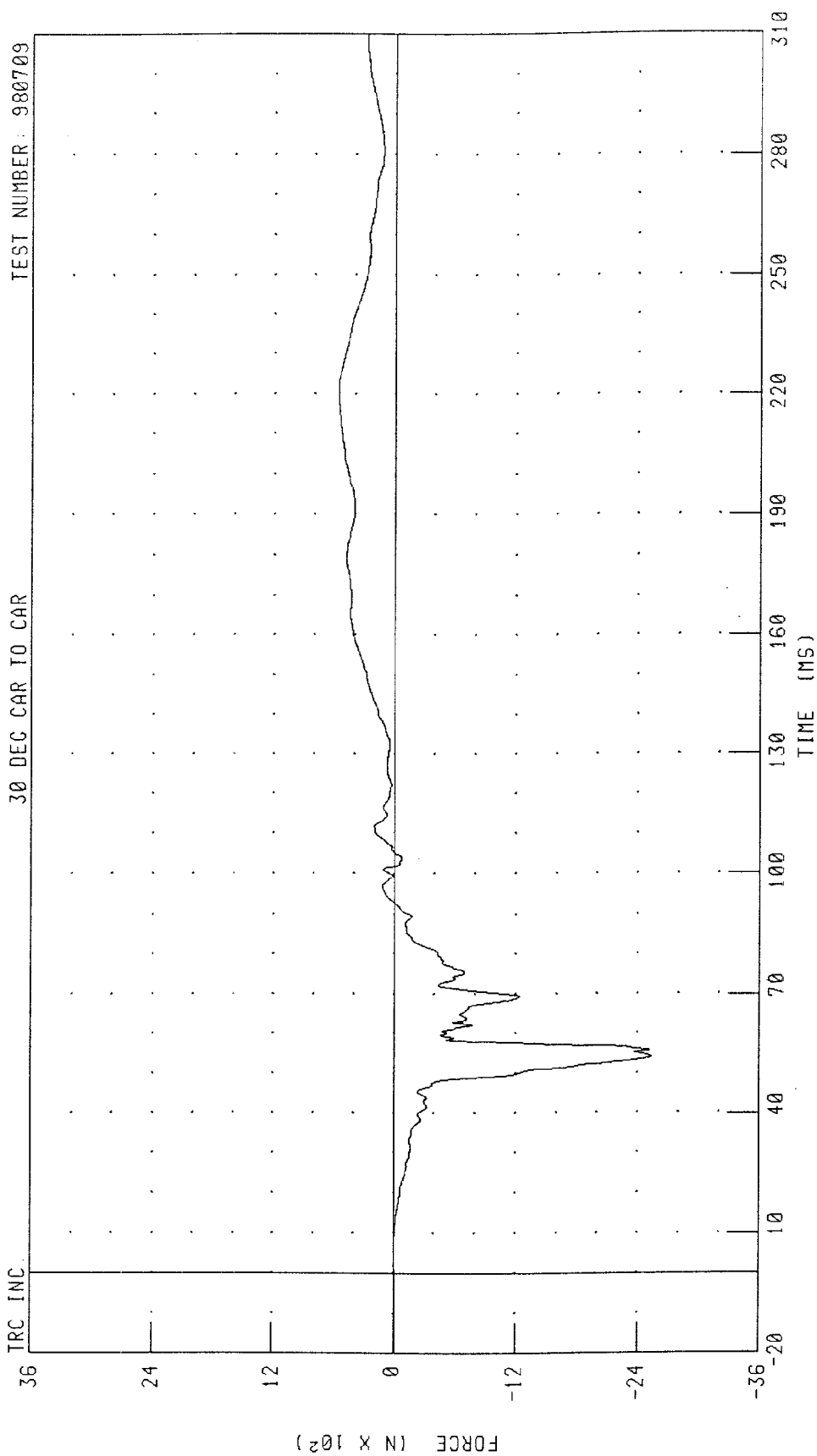
PEAK DATA: 592.02 N @ 199.84 MS; -2067.60 N @ 55.60 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT KNEE LEFT FORCE



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT KNEE RIGHT FORCE

TRC INC. 30 DEC CAR TO CAR TEST NUMBER: 980709



CHANNEL: KNRRF1 FILTER: CH. CLASS 600

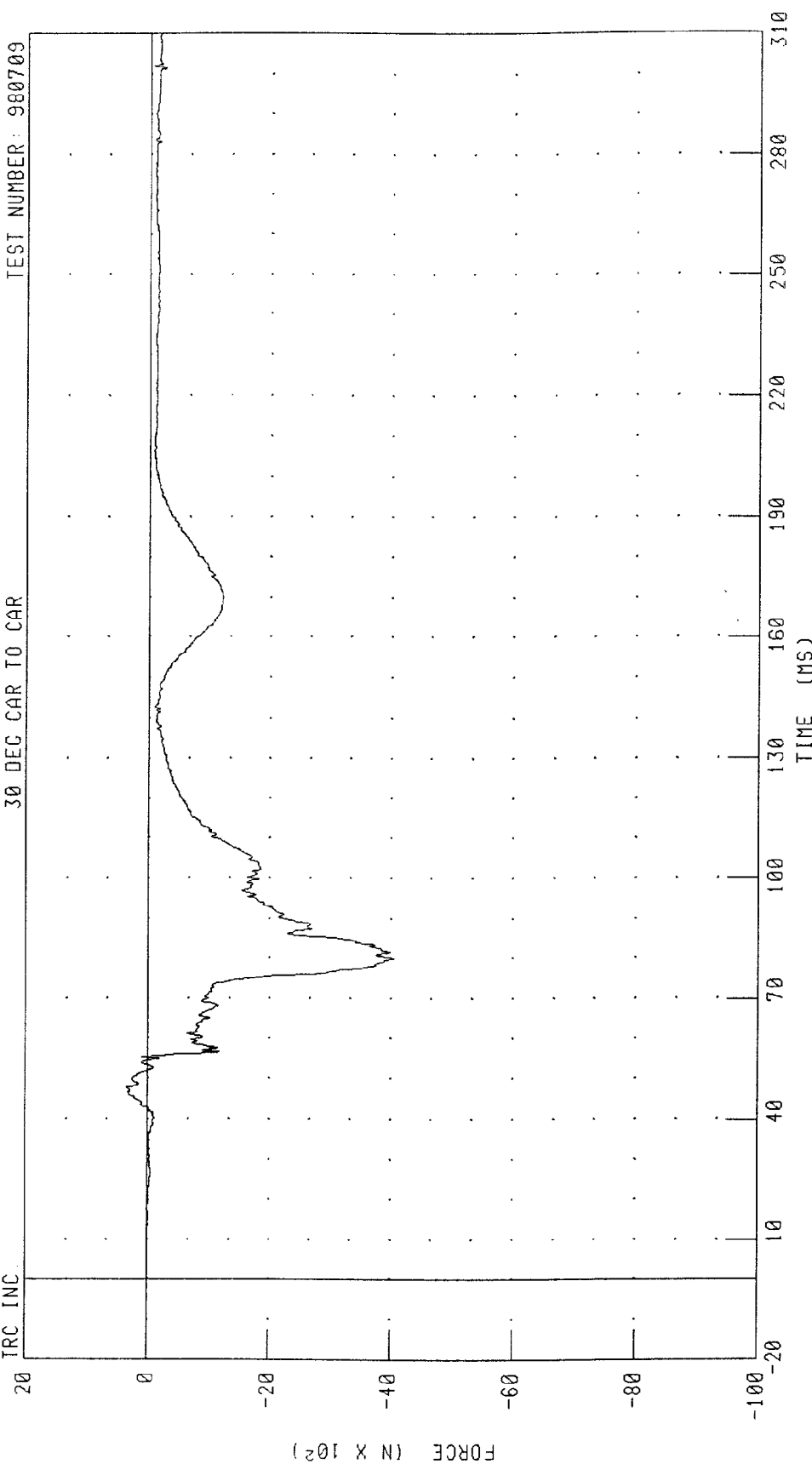
PEAK DATA: 568.01 N @ 219.92 MS; -2531.69 N @ 54.16 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT FEMUR FORCE

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



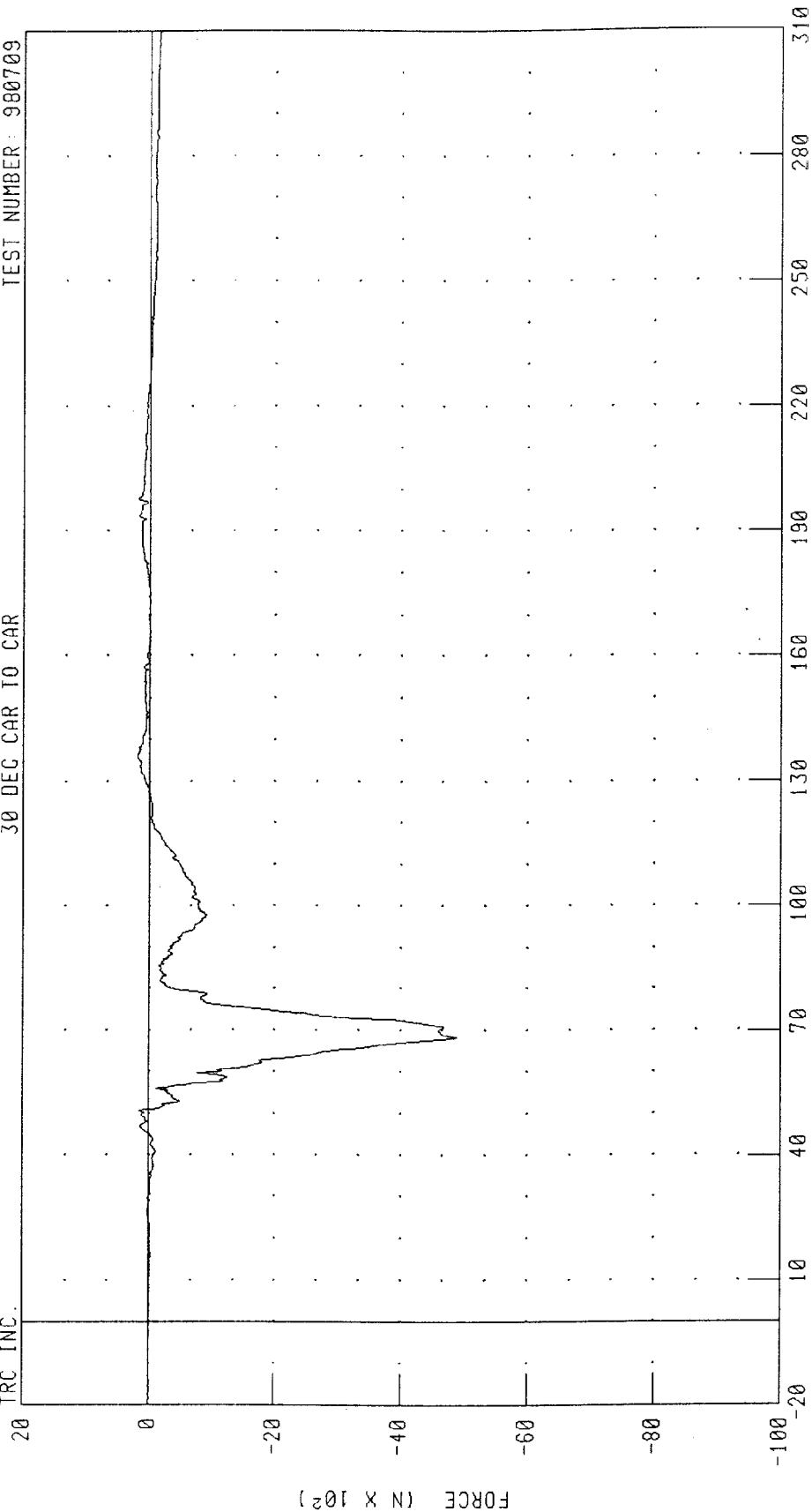
CHANNEL: LFMF1 FILTER: CH. CLASS 600

PEAK DATA: 353.04 N @ 47.84 MS, -4061.23 N @ 80.00 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT FEMUR FORCE
30 DEG CAR TO CAR

TEST NUMBER: 980709

TRC INC.



TIME (MS)

CHANNEL: RFMF1 FILTER: CH. CLASS 600

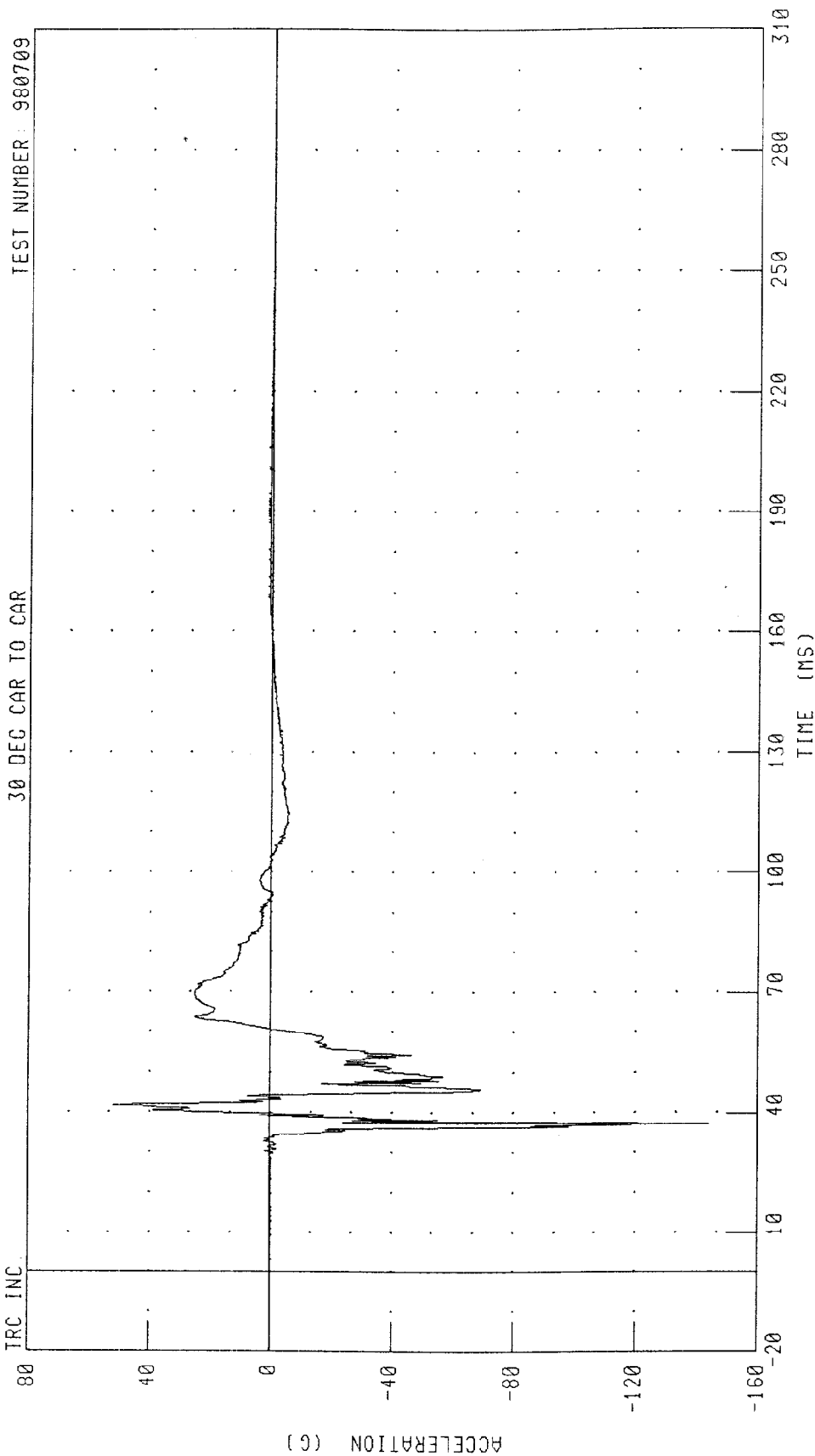
PEAK DATA: 195.55 N @ 197.92 MS, -4889.12 N @ 68.32 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER HEAD X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC



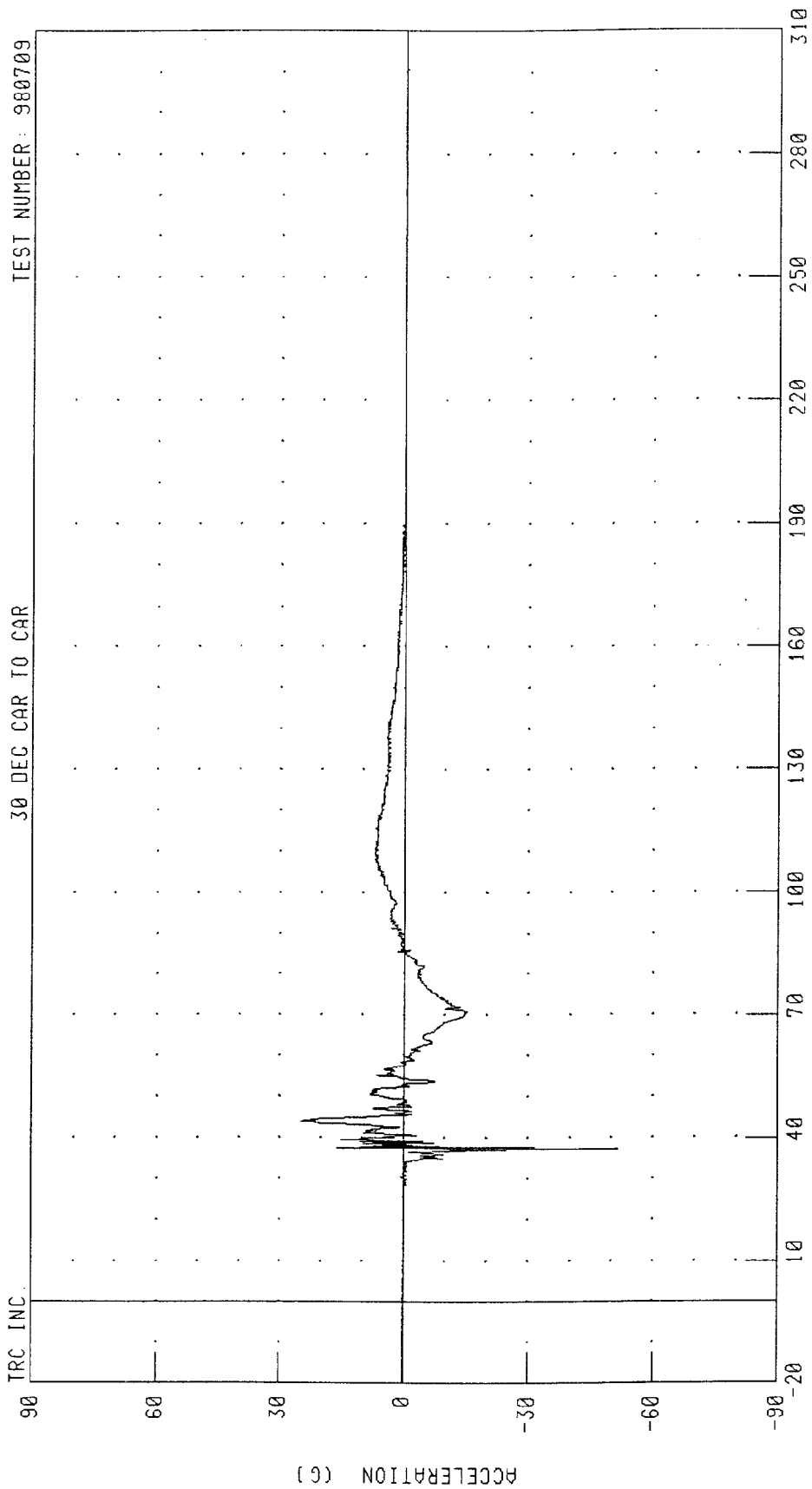
CHANNEL: HEDXC2 FILTER: CH. CLASS 1000

PEAK DATA: 51.99 G @ 41.76 MS, -143.86 G @ 37.36 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER HEAD Y-AXIS ACCELERATION

TRC INC. TEST NUMBER: 980709

30 DEC CAR TO CAR

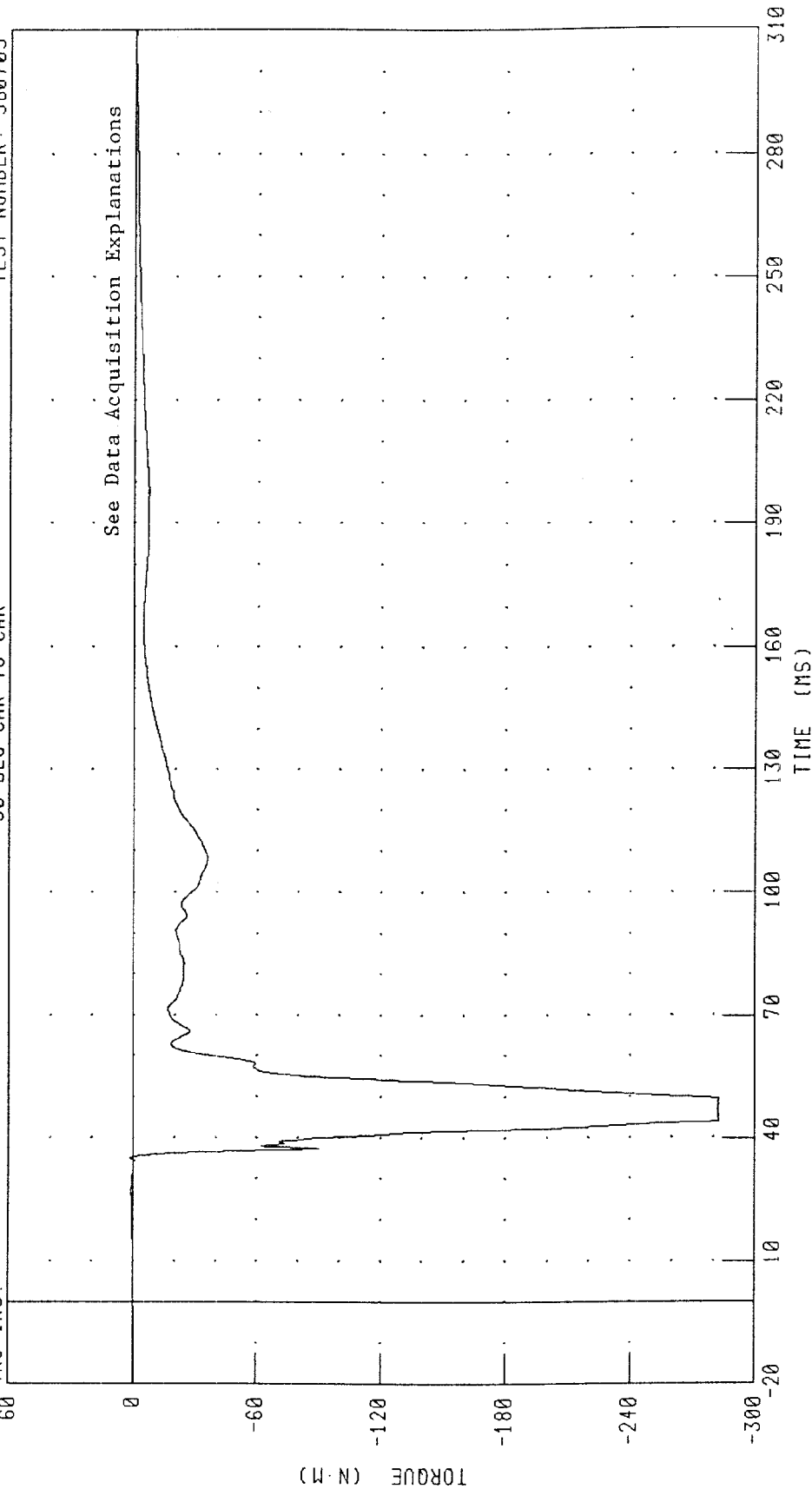


CHANNEL: HEDYC2 FILTER: CH. CLASS 1000

PEAK DATA: 24.66 G @ 44.08 MS, -51.61 G @ 37.36 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER NECK MOMENT ABOUT Y AXIS

TRC INC. 30 DEG CAR TO CAR TEST NUMBER: 980709

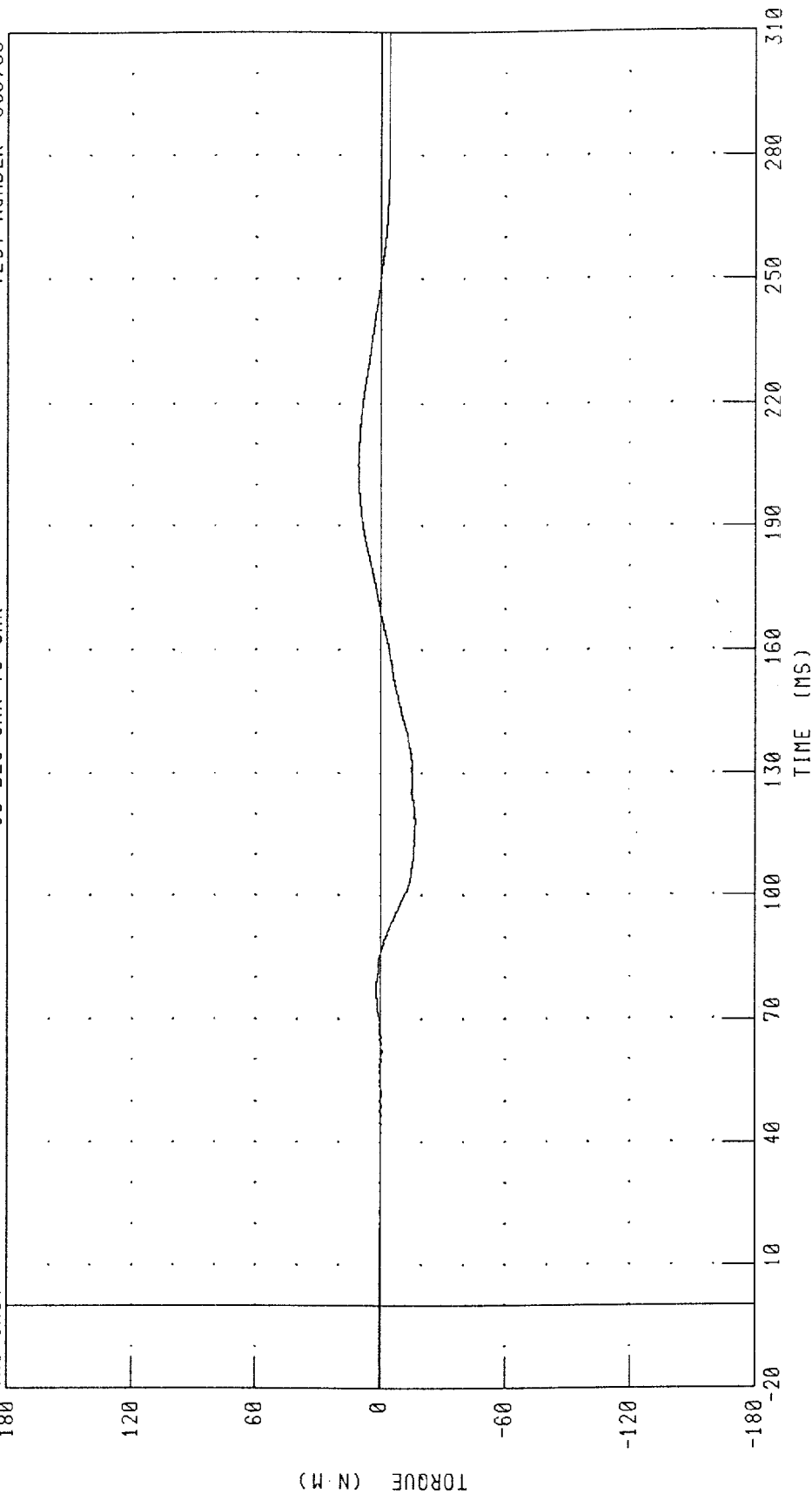


CHANNEL: NEKYM2 FILTER: CH. CLASS 600

PEAK DATA: 1.87 N-M @ 35.12 MS, -282.98 N-M @ 44.16 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER NECK MOMENT ABOUT Z AXIS

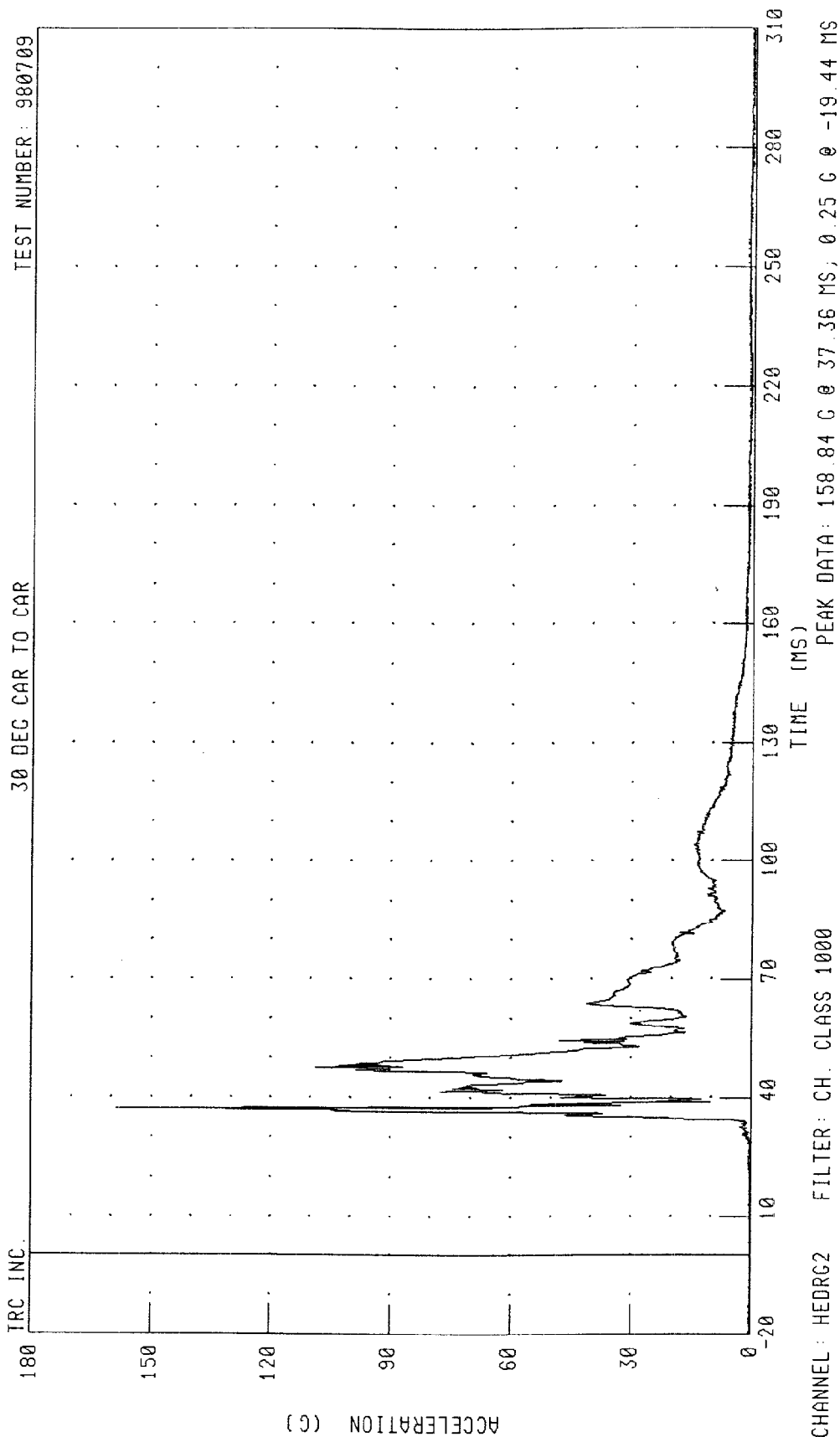
TRC INC. 30 DEC CAR TO CAR TEST NUMBER: 980709



CHANNEL: NEKZM2 FILTER: CH. CLASS 600

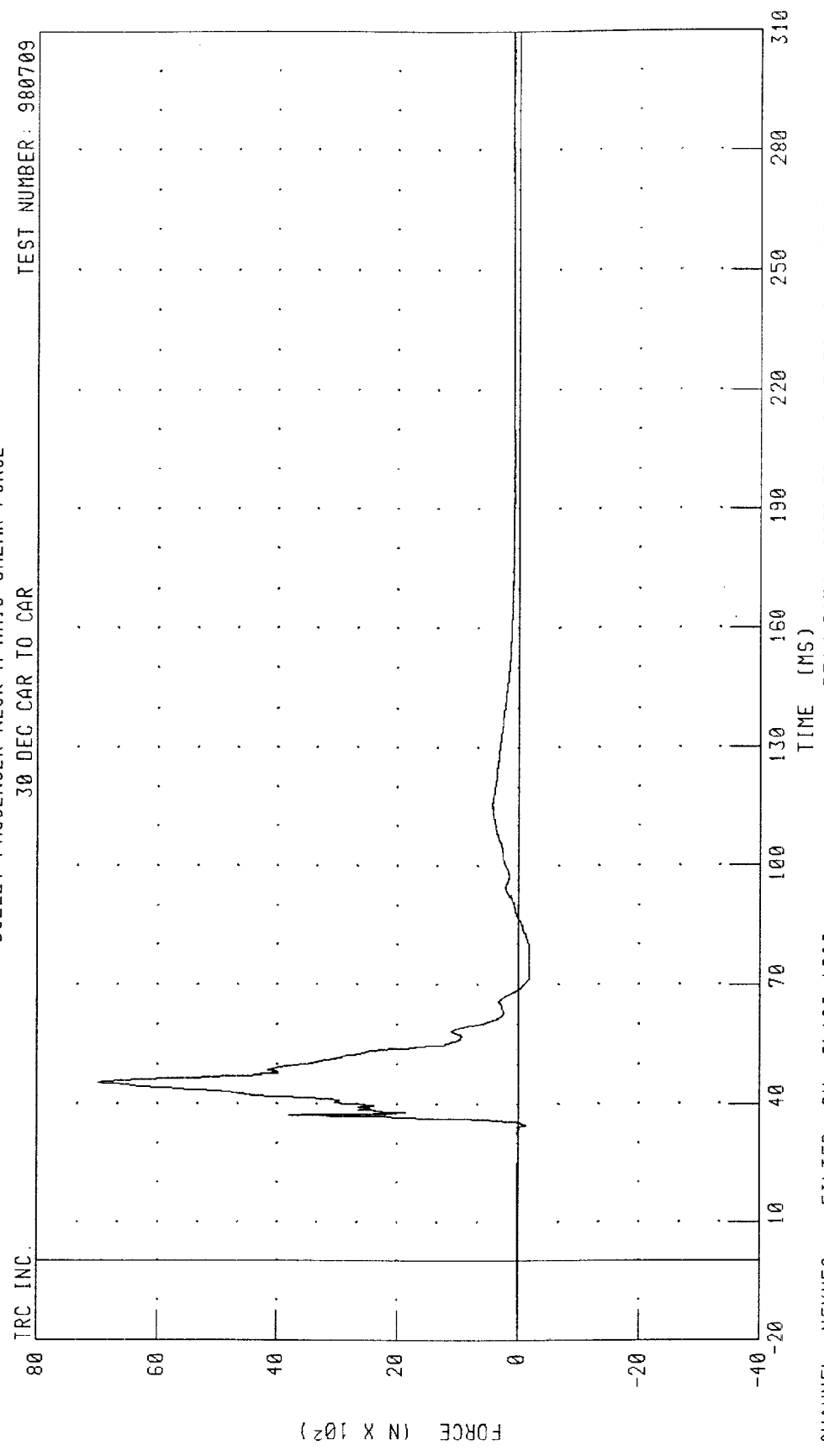
PEAK DATA: 10.71 N·m @ 205.12 ms, -17.11 N·m @ 118.24 ms

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER HEAD RESULTANT ACCELERATION



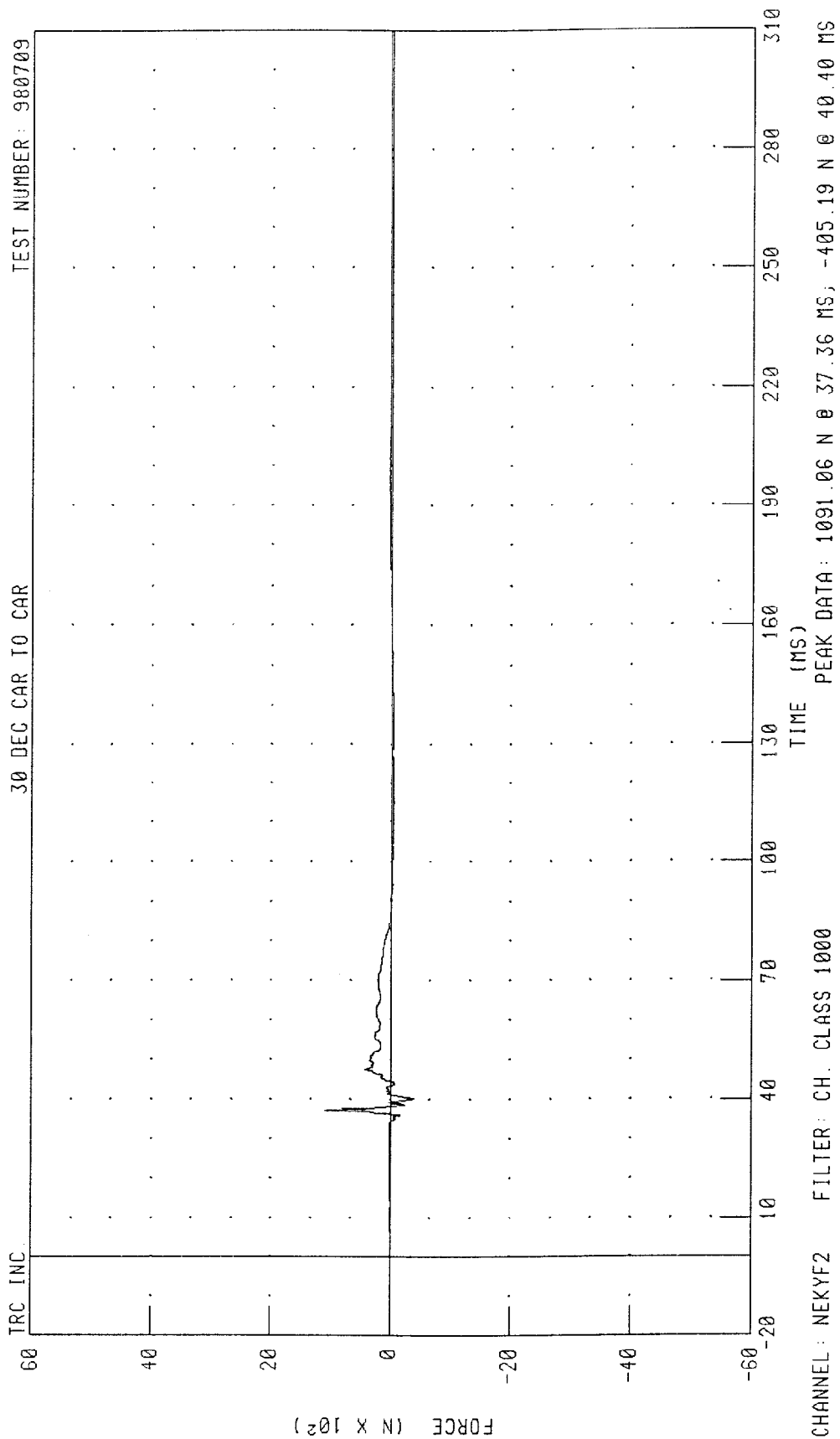
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER NECK X-AXIS SHEAR FORCE
30 DEC CAR TO CAR

TEST NUMBER: 980709



CHANNEL: NEKXF2 FILTER: CH. CLASS 1000
PEAK DATA: 6996.66 N @ 45.52 MS, -187.62 N @ 71.84 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER NECK Y-AXIS SHEAR FORCE

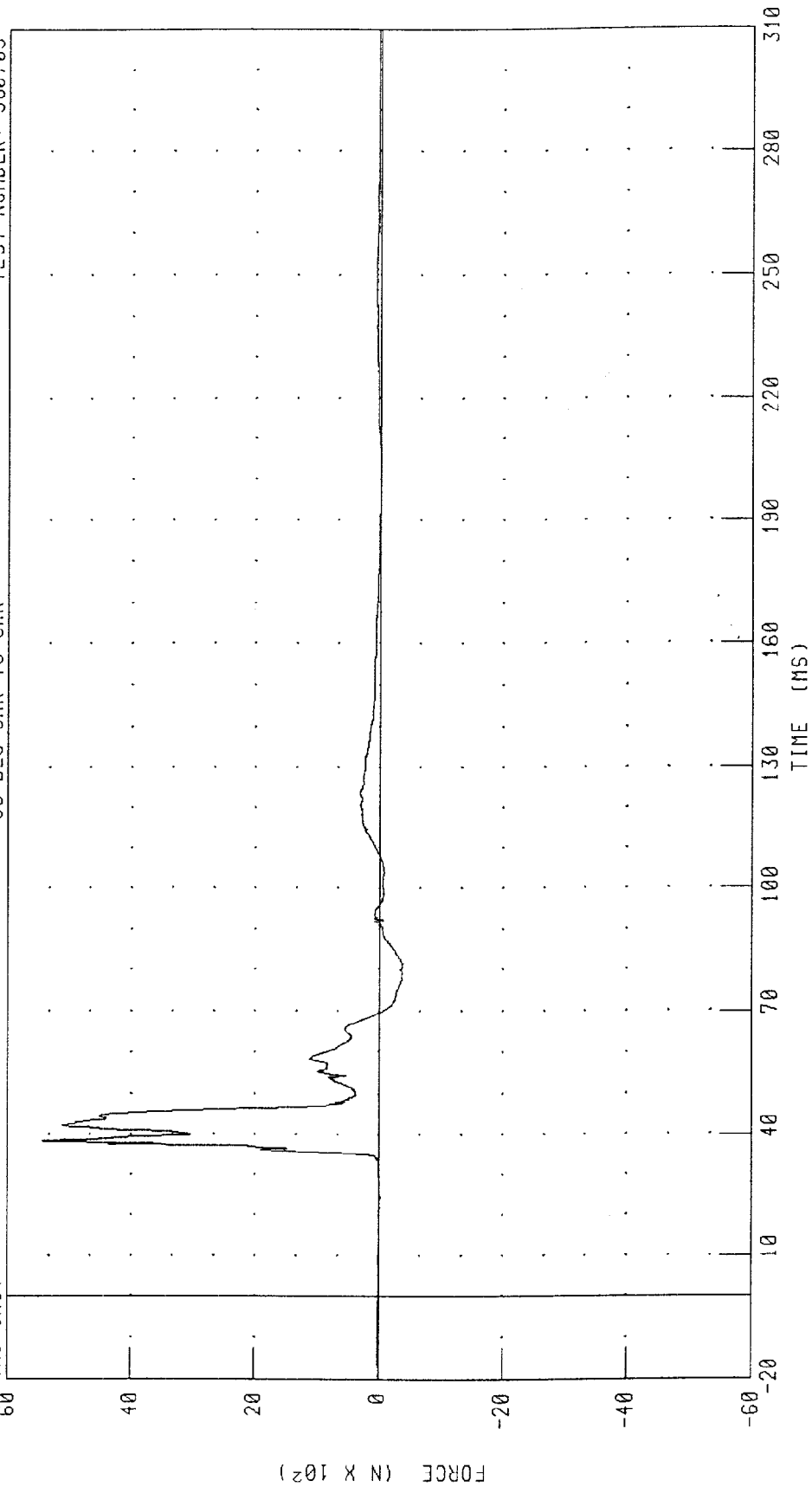


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

PEAK DATA: 5453.30 N @ 38.56 MS, -390.71 N @ 81.44 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.

180

120

60

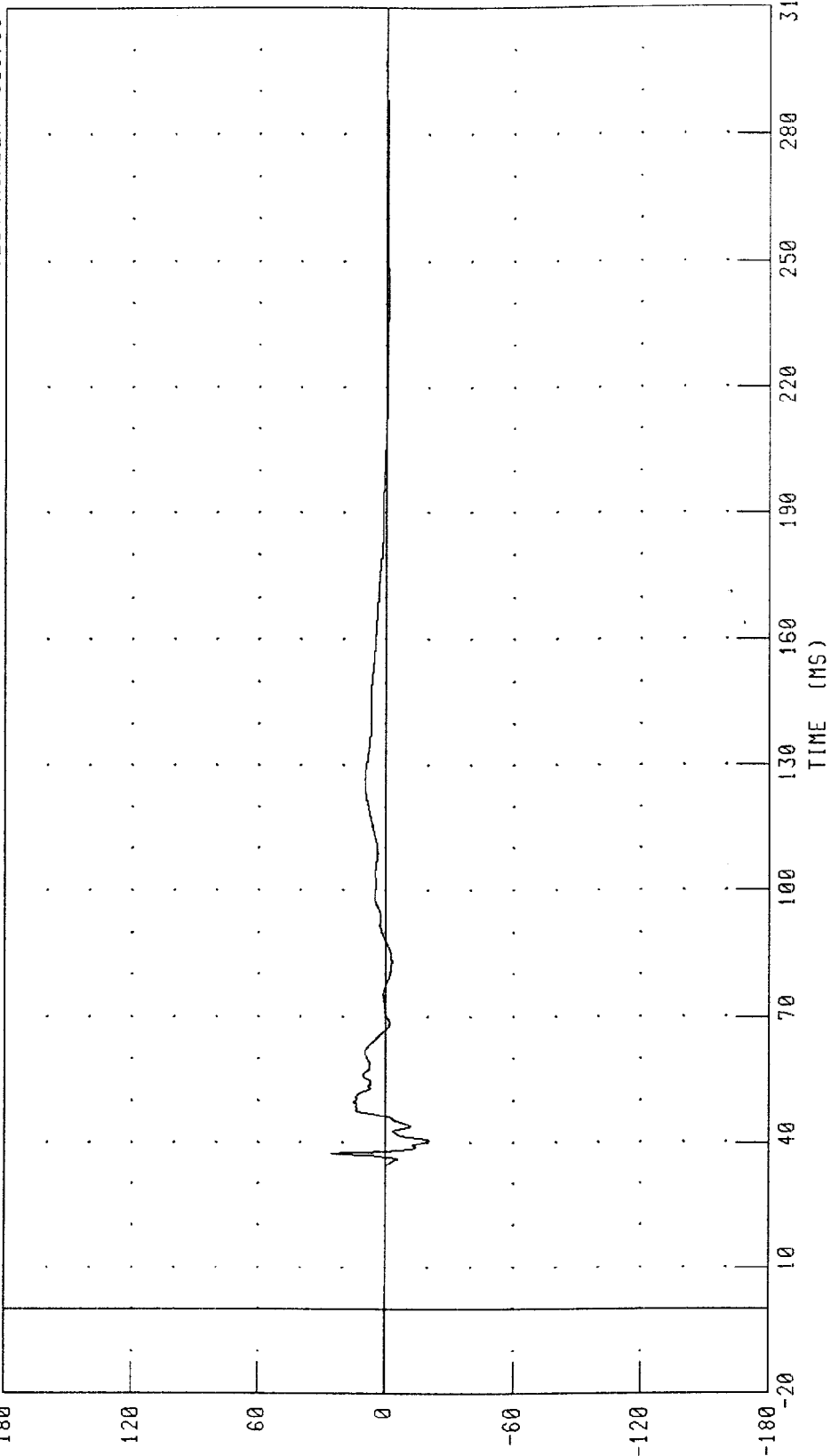
0

-60

-120

-180

TORQUE (N·M)

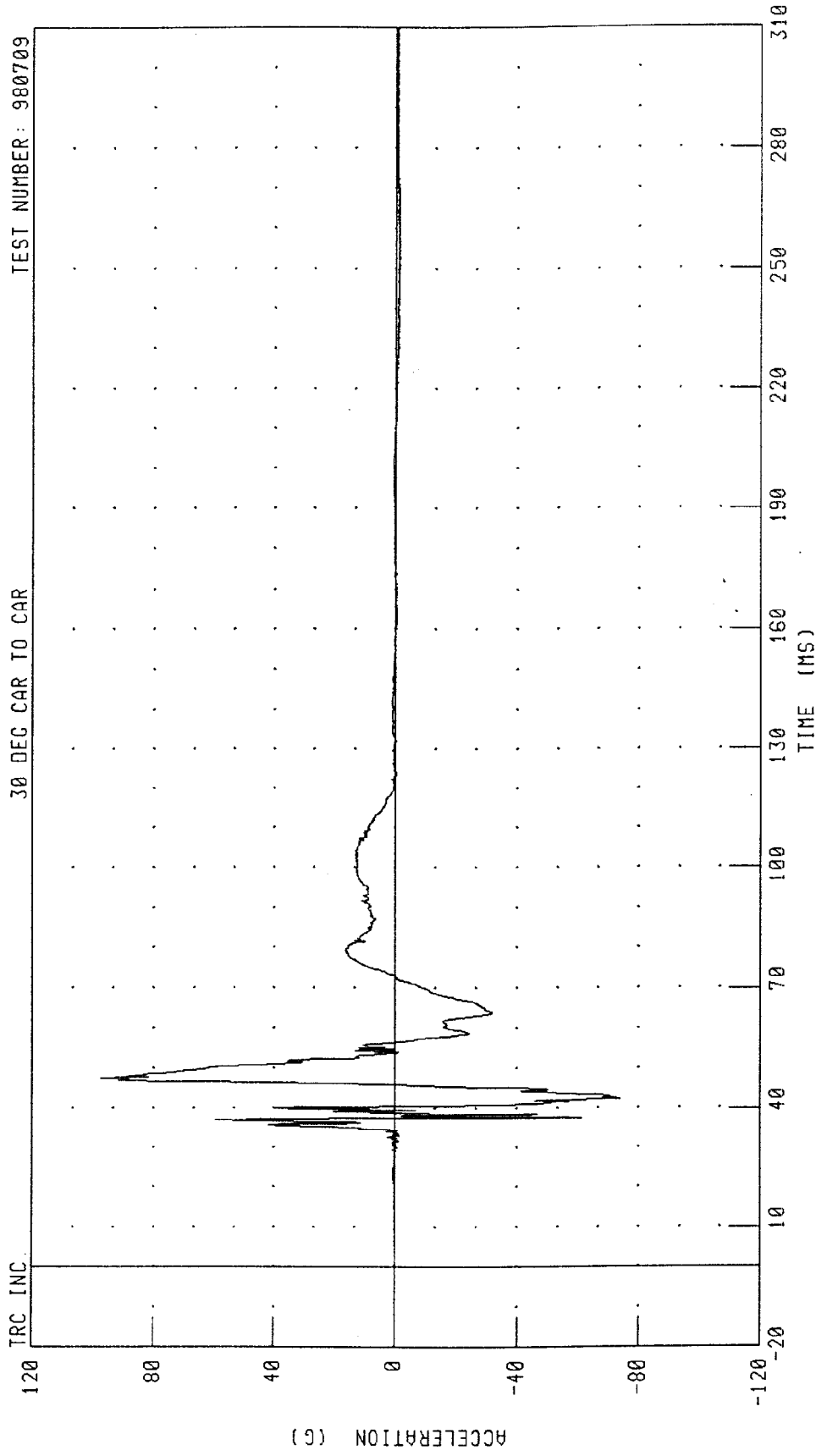


CHANNEL: NEKX2 FILTER: CH. CLASS 600

PEAK DATA: 25.20 N·M @ 37.52 MS, -20.41 N·M @ 40.64 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER HEAD Z-AXIS ACCELERATION
30 DEG CAR TO CAR

TEST NUMBER: 980709



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

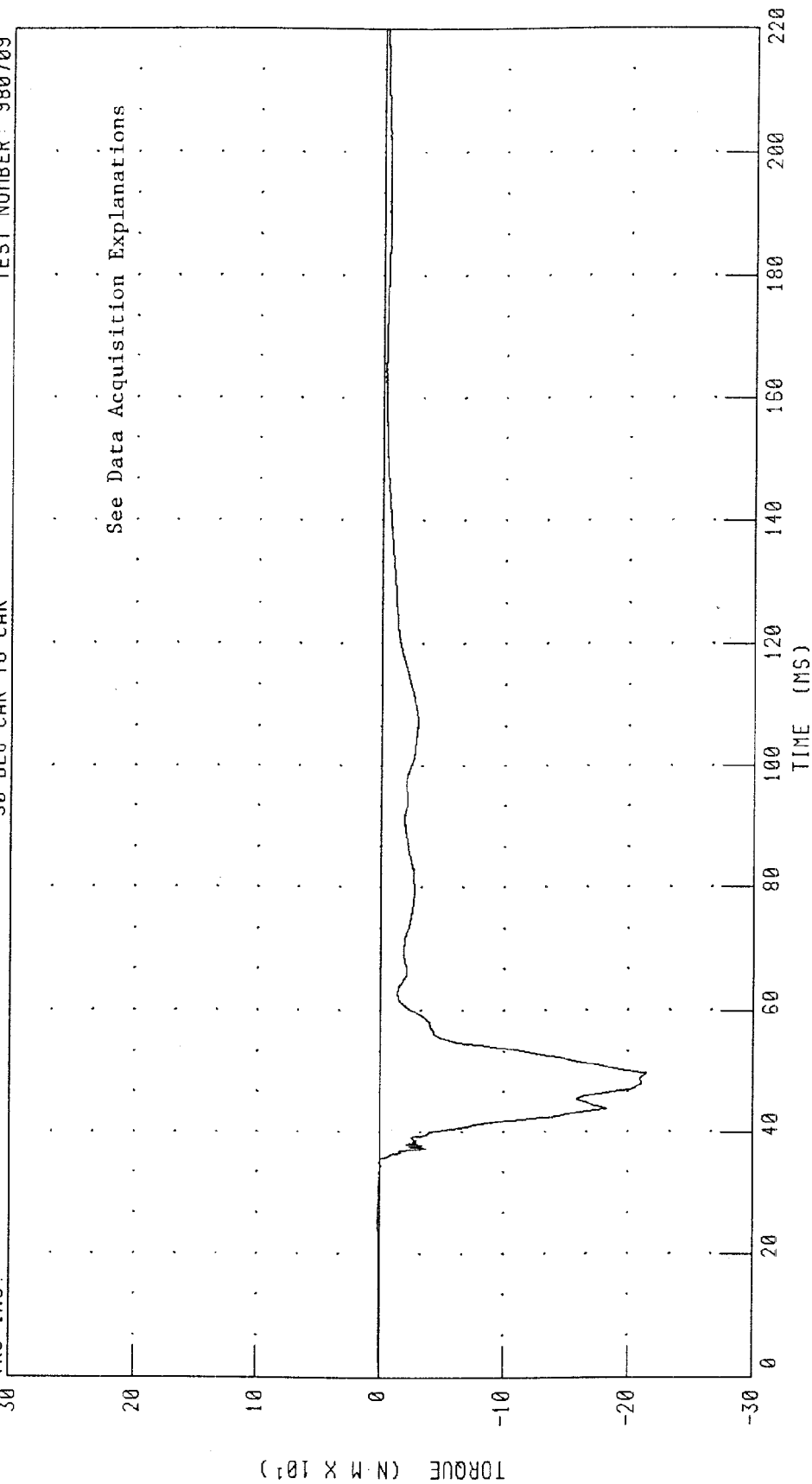
PEAK DATA: 97.47 G @ 47.52 MS; -74.04 G @ 42.56 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER NECK OCCIPITAL CONDYLE ABOUT Y AXIS

TRC INC.

30 DEC CAR TO CAR

TEST NUMBER: 980709



CHANNEL: NEKOM2 FILTER: CH. CLASS 600

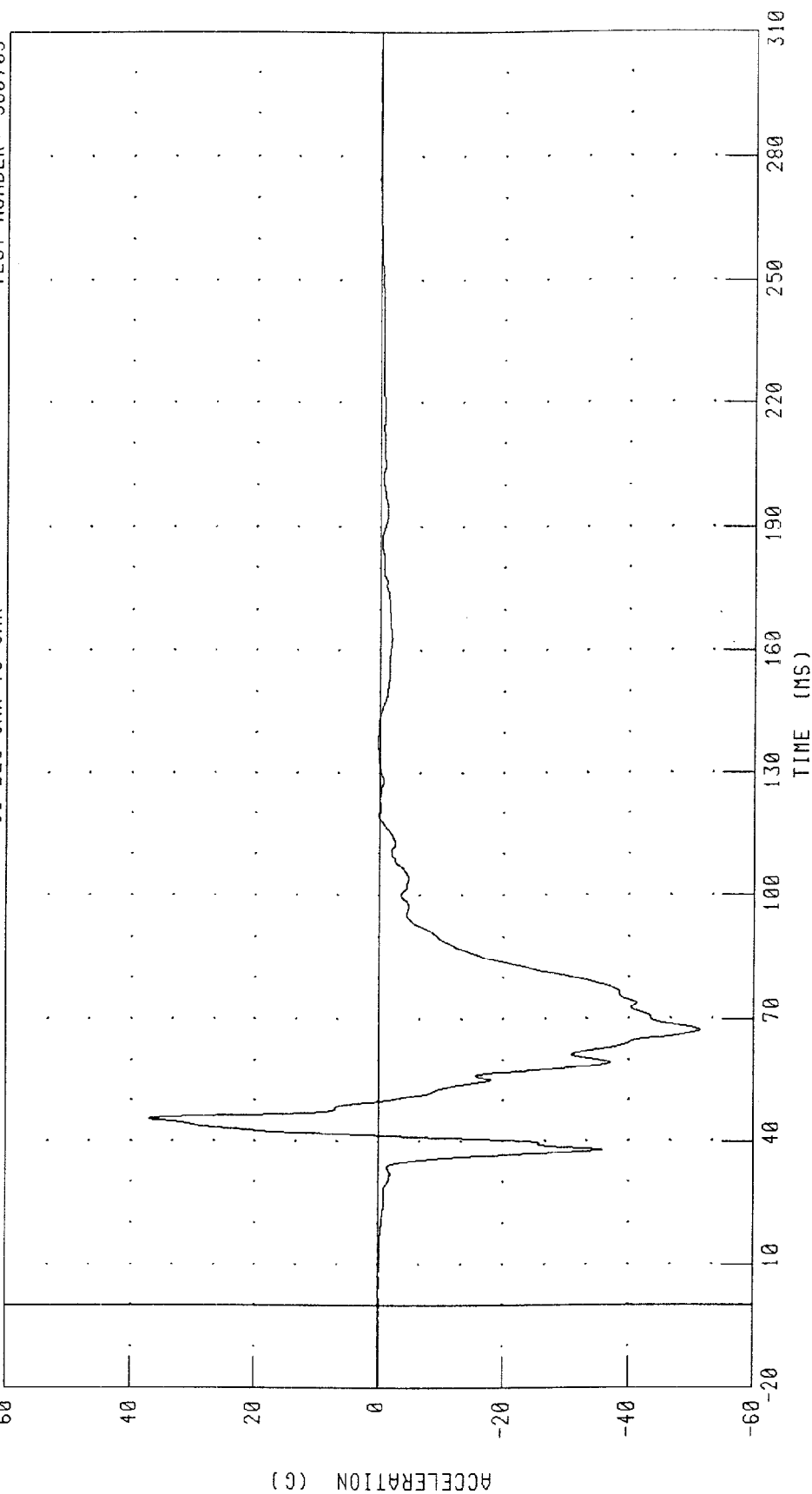
PEAK DATA: 1.05 N·m @ 26.24 ms; -214.52 N·m @ 49.68 ms

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER CHEST X-AXIS ACCELERATION

TRC INC.

30 DEC CAR TO CAR

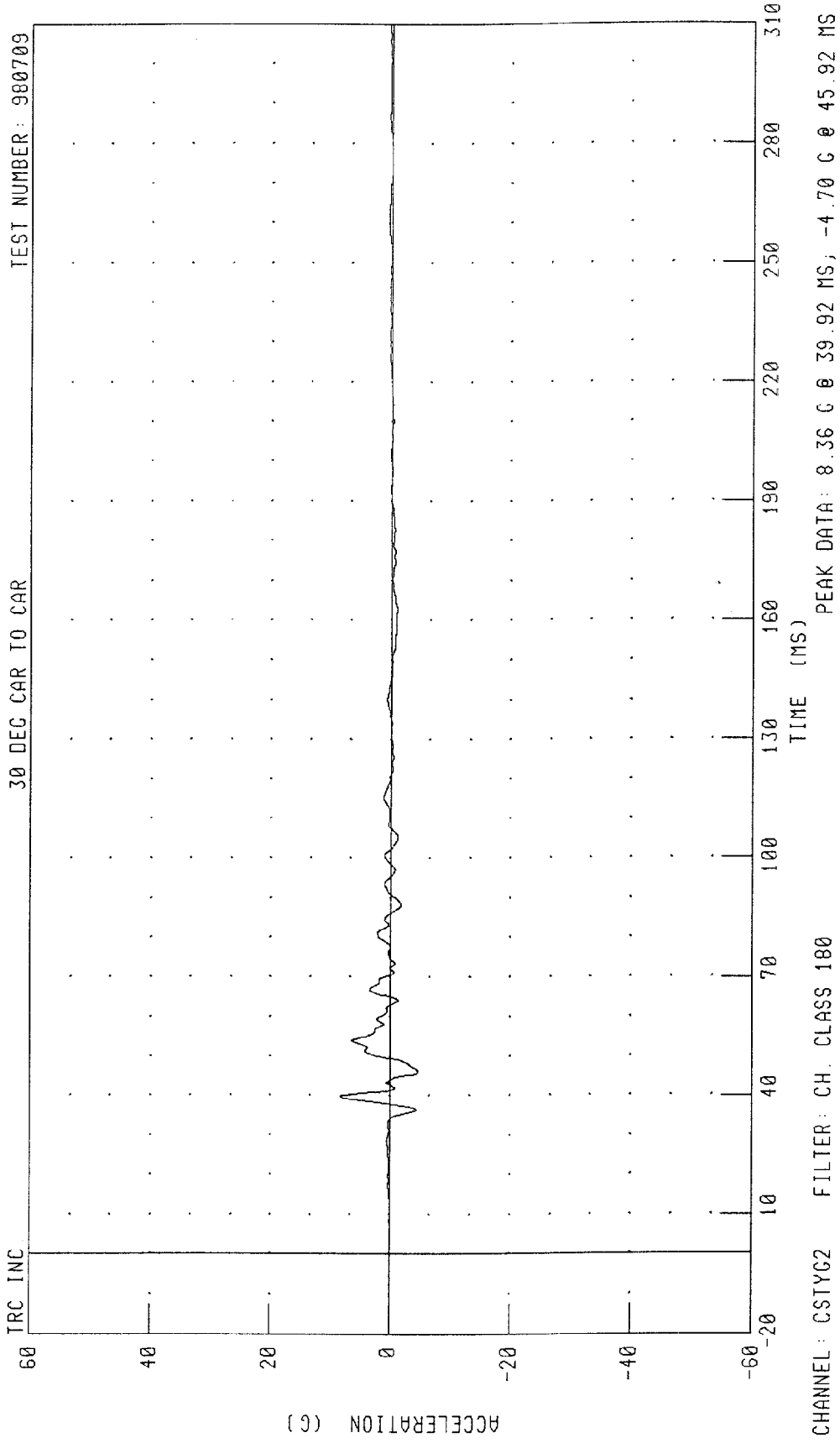
TEST NUMBER: 980709



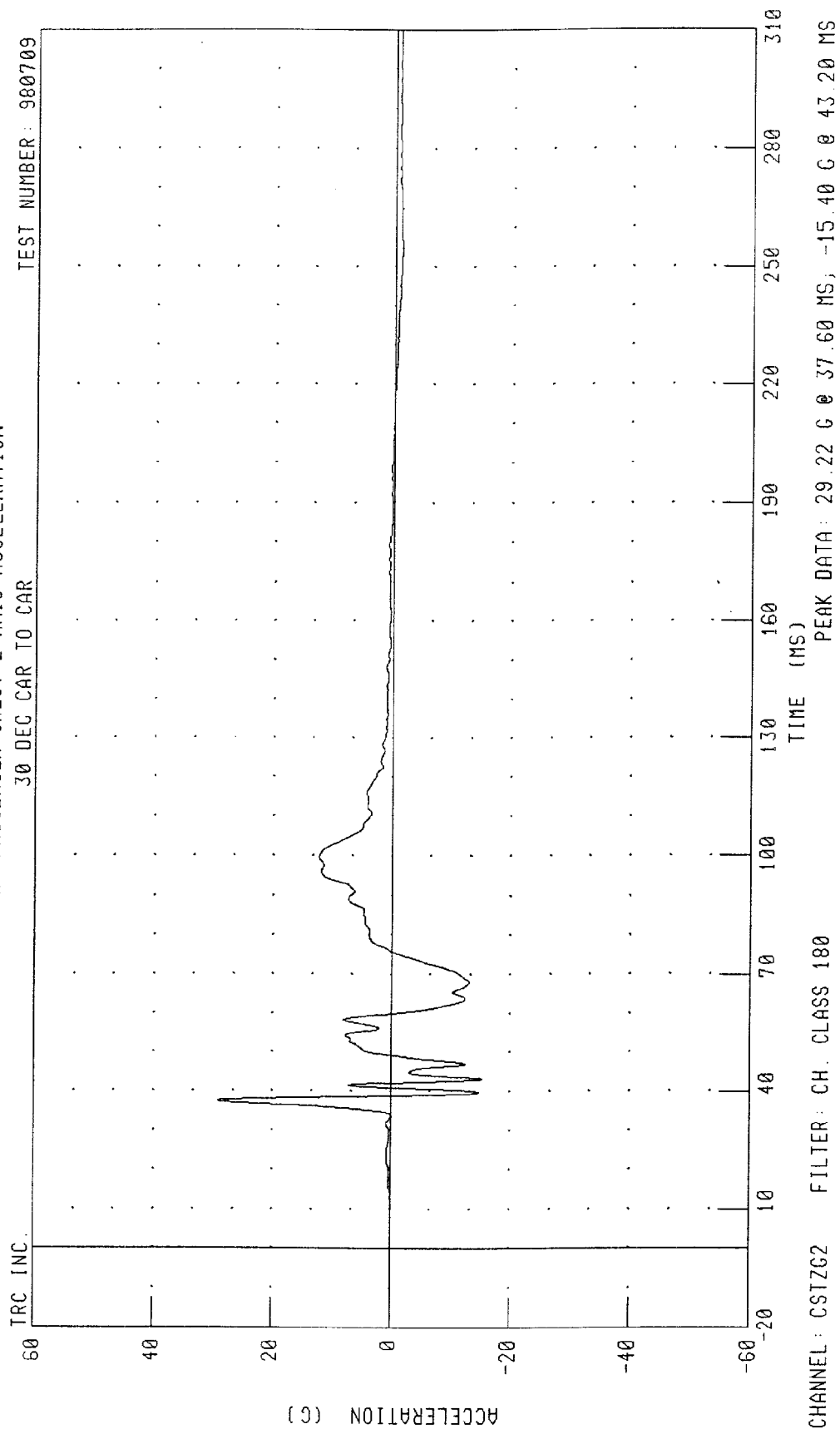
CHANNEL: CSTXC2 FILTER: CH. CLASS 180

PEAK DATA: 37.25 G @ 45.60 MS, -51.33 G @ 67.36 MS

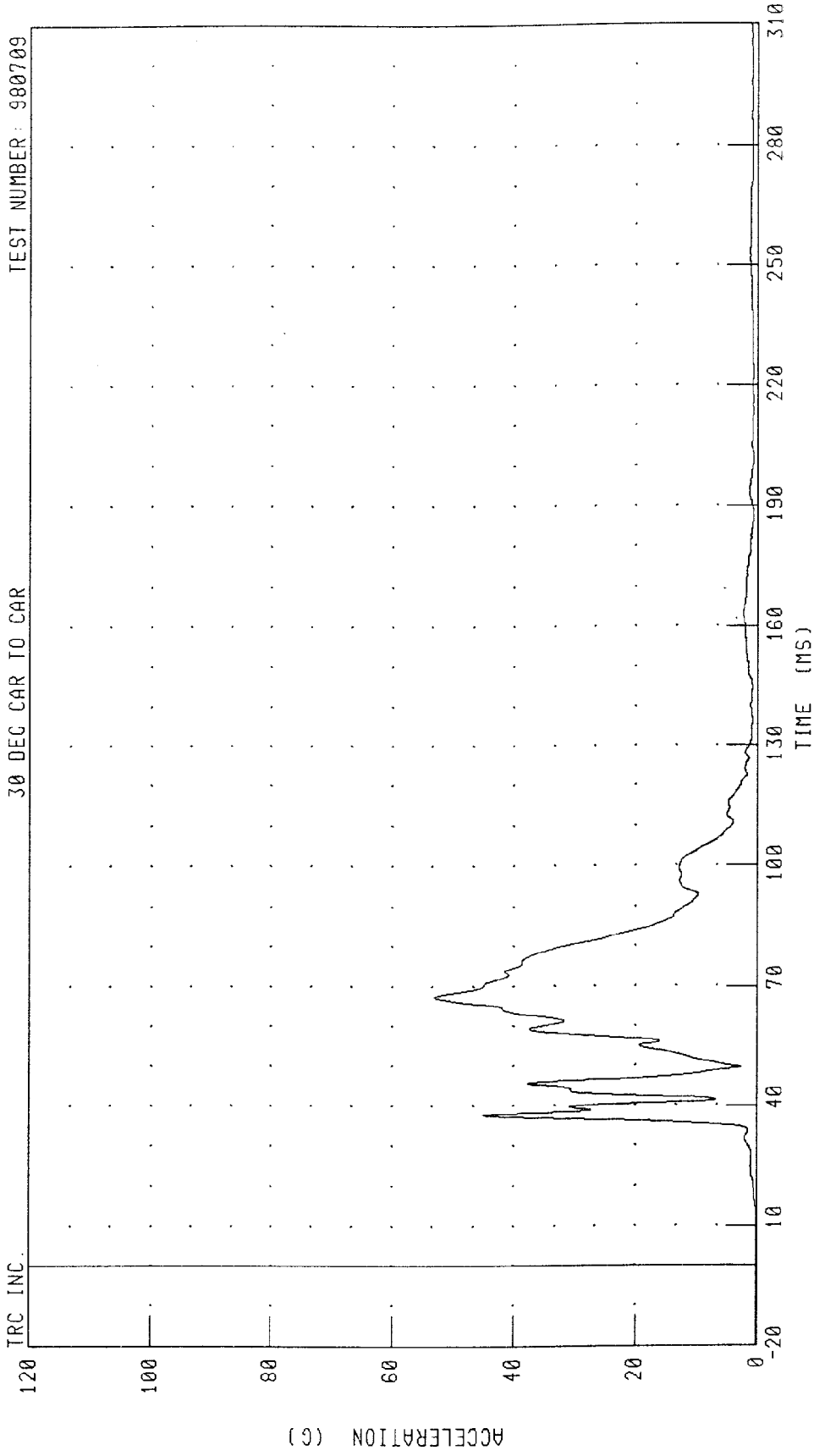
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER CHEST Y-AXIS ACCELERATION



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER CHEST Z-AXIS ACCELERATION



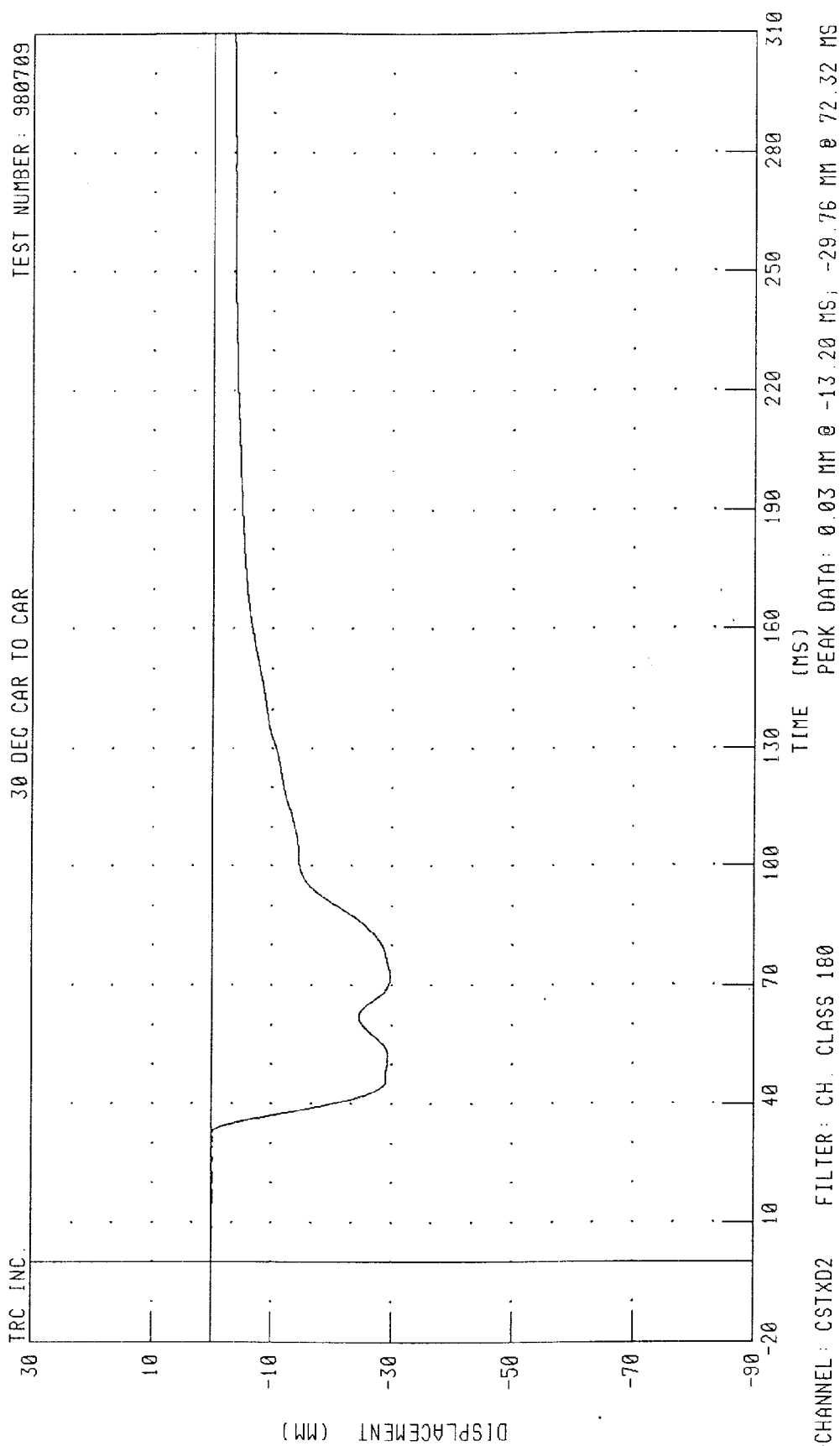
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER CHEST RESULTANT ACCELERATION



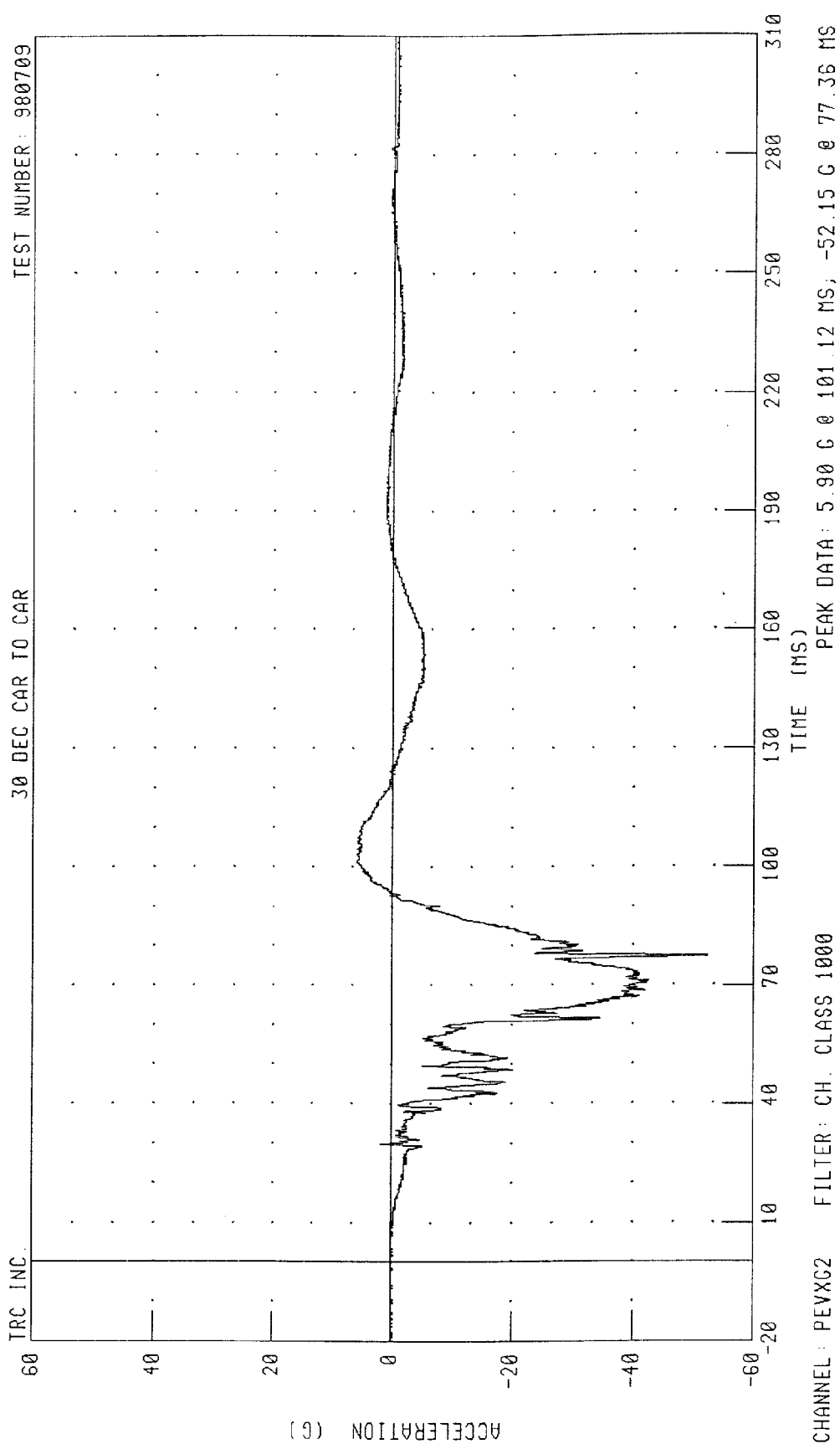
CHANNEL: CSTRG2 FILTER: CH. CLASS 180

PEAK DATA: 52.99 G @ 67.36 MS; 0.02 G @ -20.00 MS

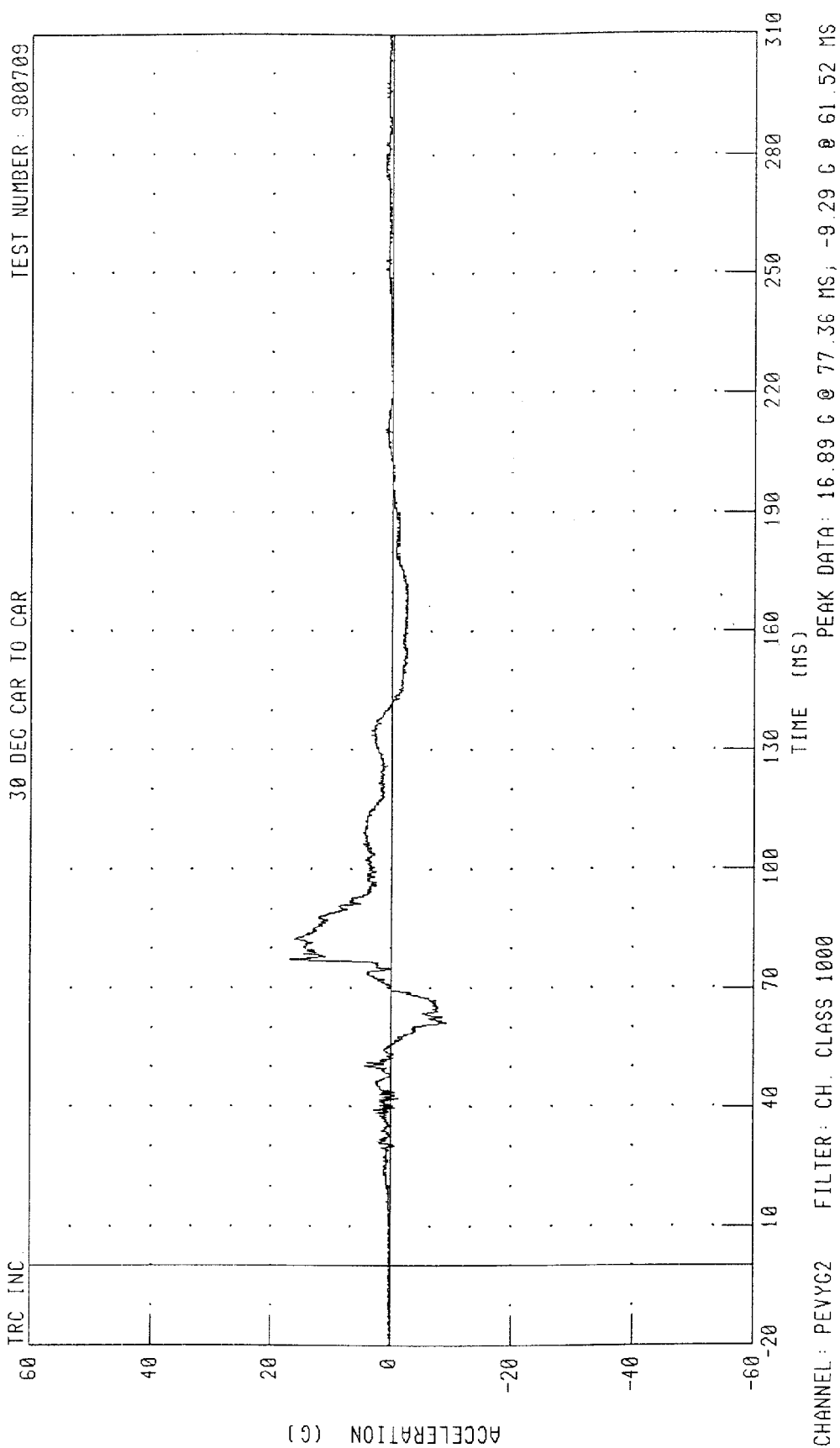
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER CHEST DEFLECTION



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER PELVIS X-AXIS ACCELERATION



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER PELVIS Y-AXIS ACCELERATION

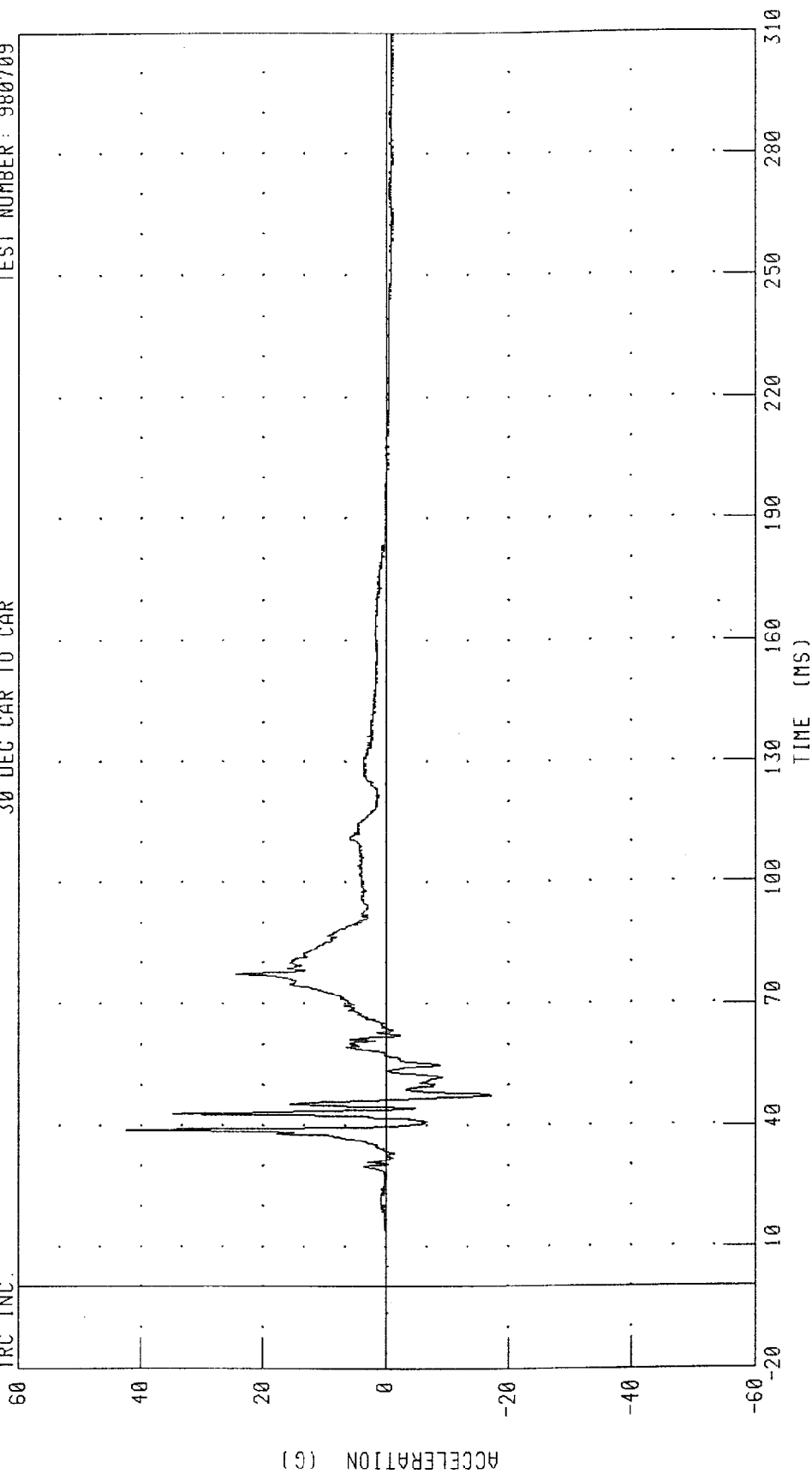


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.

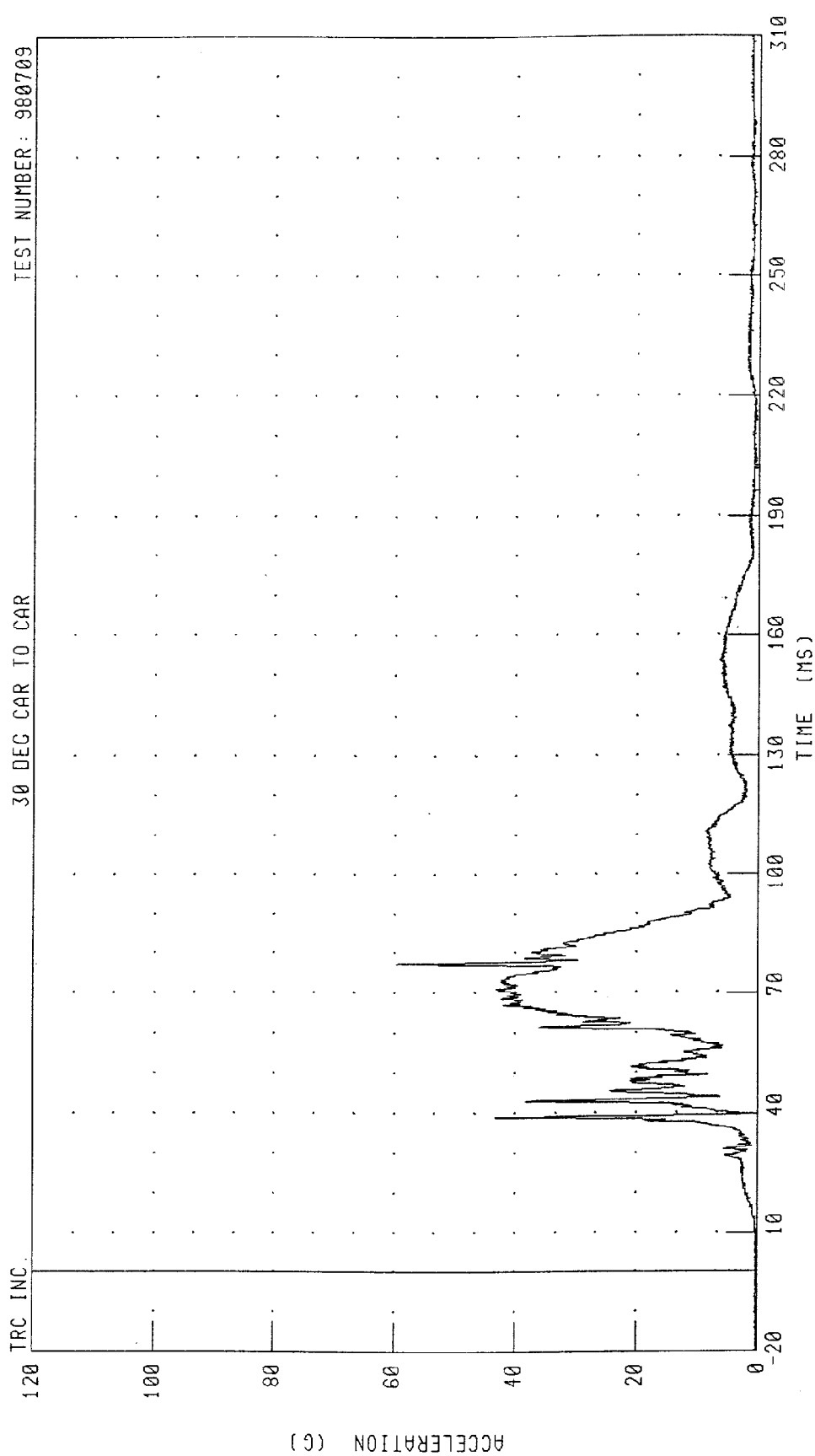


PEAK DATA: 42.48 G @ 38.96 MS; -17.26 G @ 47.36 MS

CHANNEL: PEVZG2 FILTER: CH. CLASS 1000

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER PELVIS RESULTANT
30 DEG CAR TO CAR

TEST NUMBER: 980709



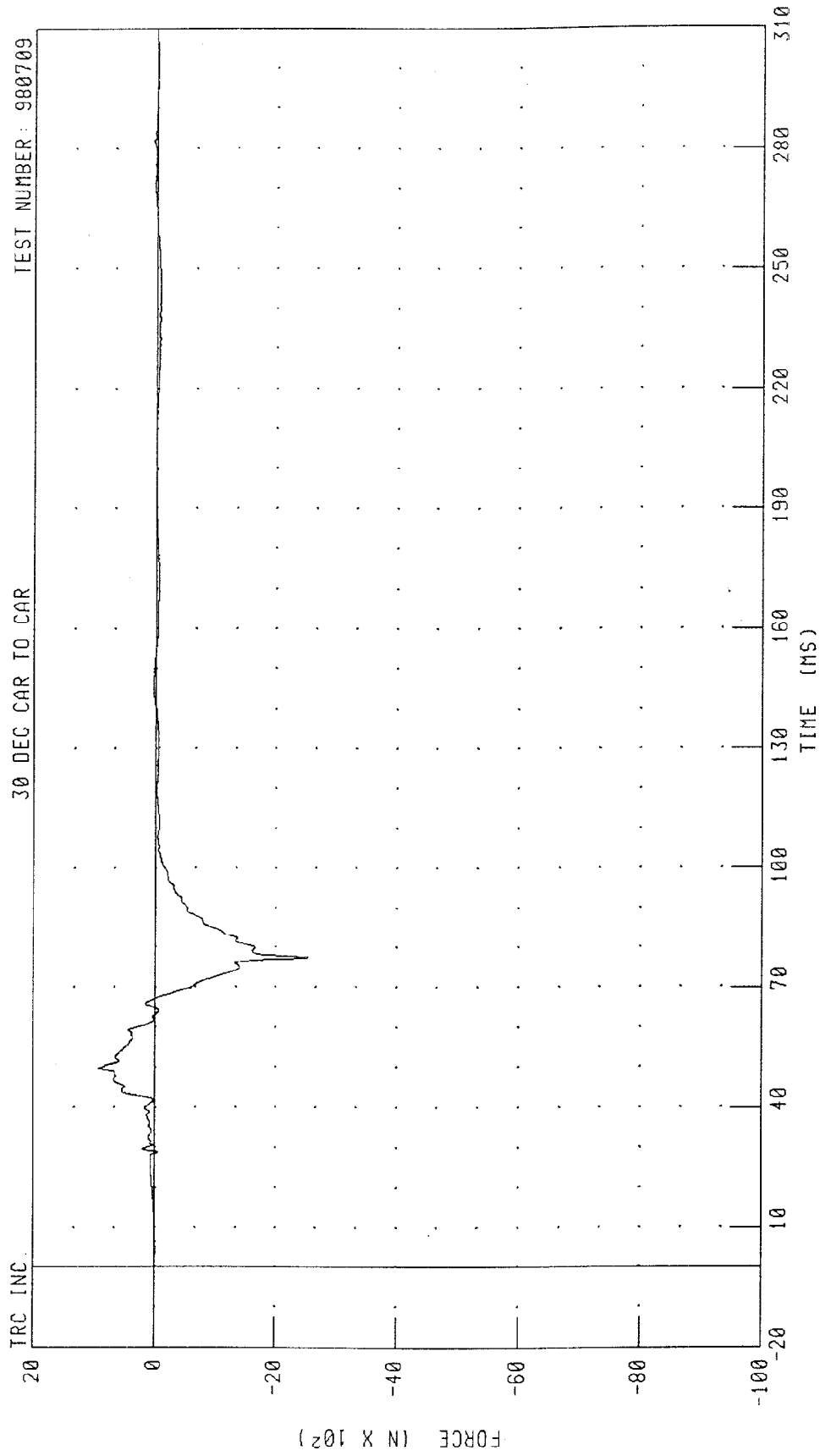
CHANNEL: PEVRC2 FILTER: CH. CLASS 1000

PEAK DATA: 59.76 G @ 77.36 MS, 0.08 G @ -20.00 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER LEFT FEMUR FORCE

30 DEC CAR TO CAR

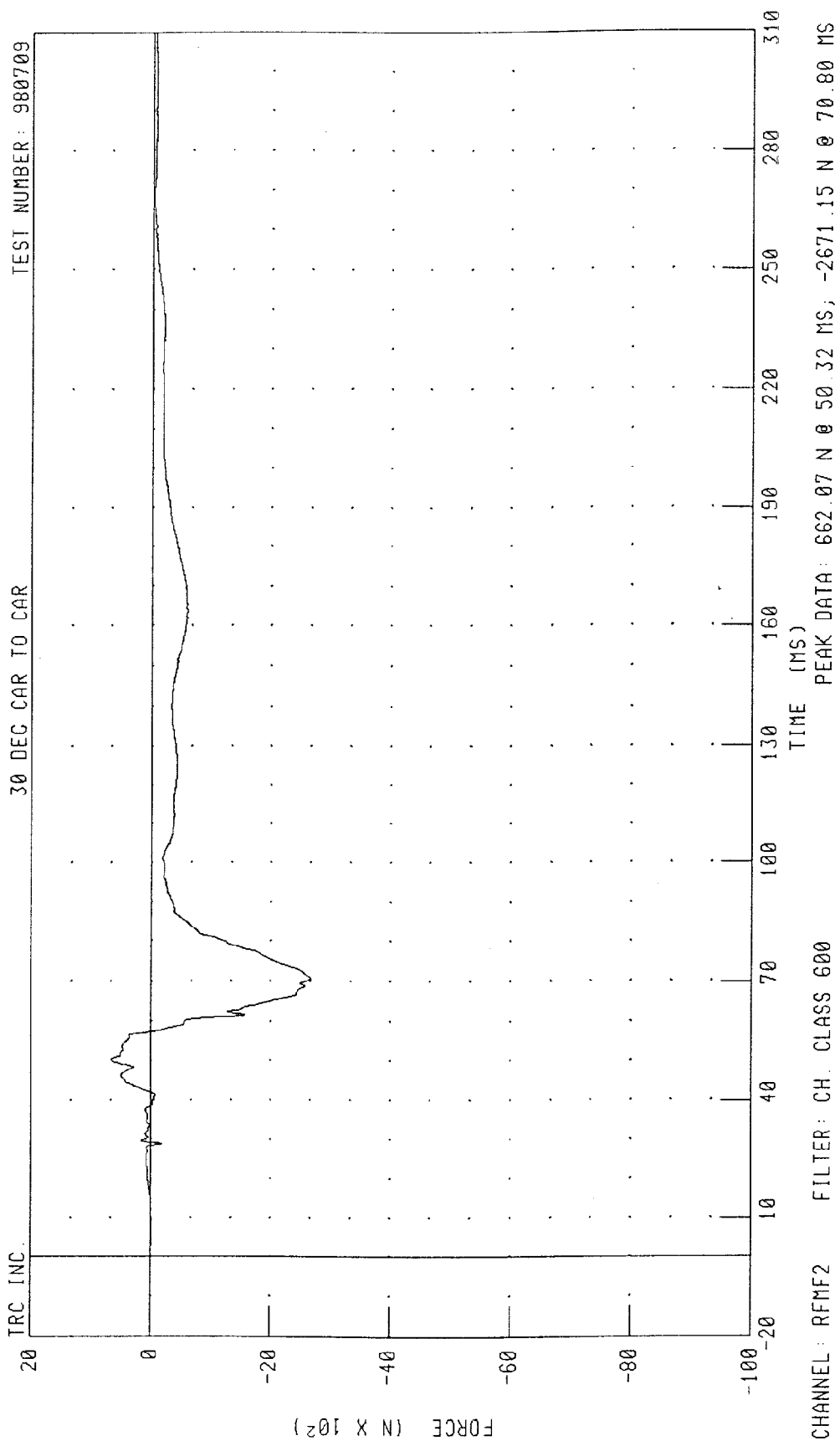
TEST NUMBER: 980709



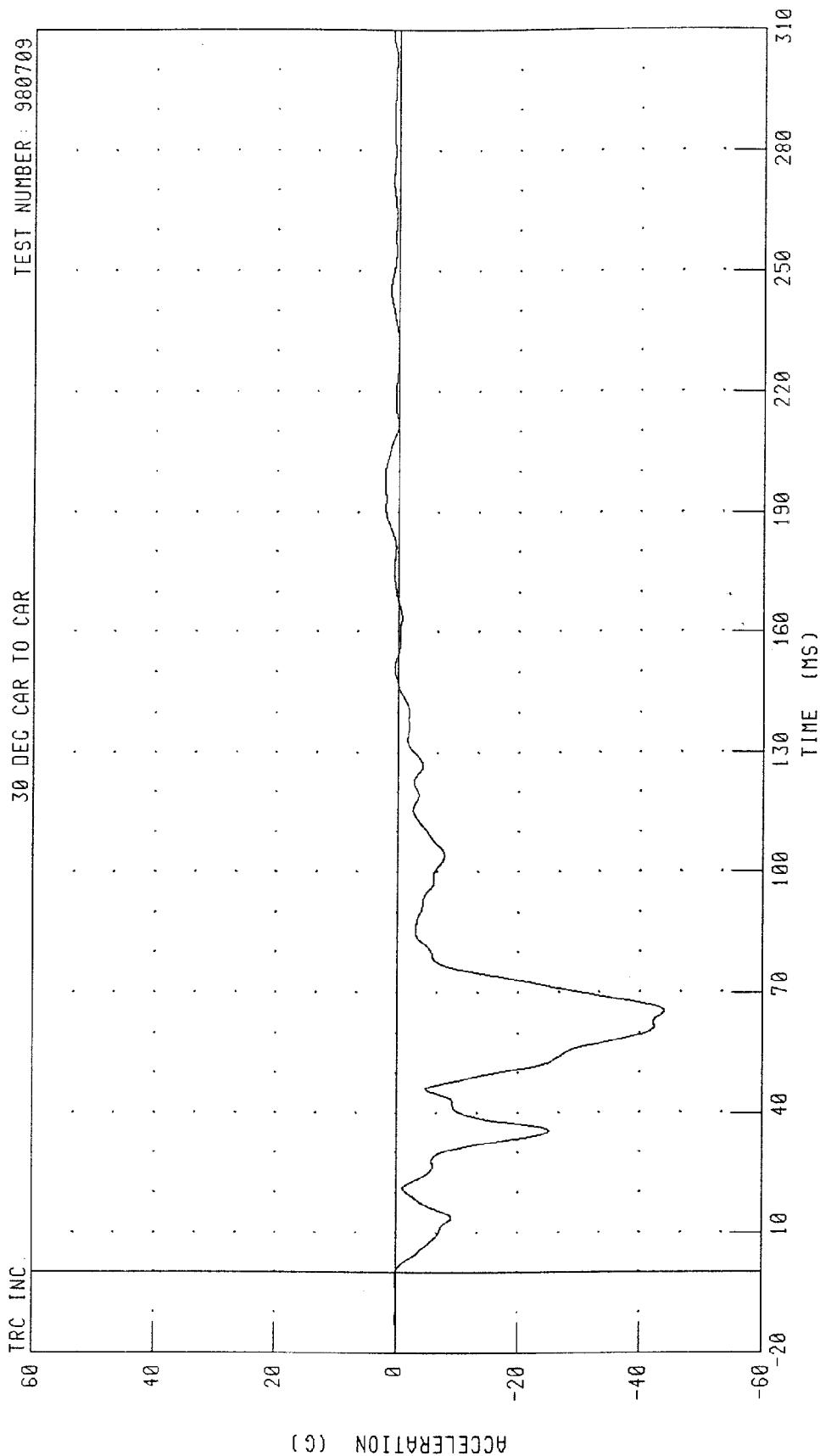
CHANNEL: LFMF2 FILTER: CH. CLASS 600

PEAK DATA: 915.22 N @ 49.68 MS, -2530.13 N @ 77.44 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET PASSENGER RIGHT FEMUR FORCE



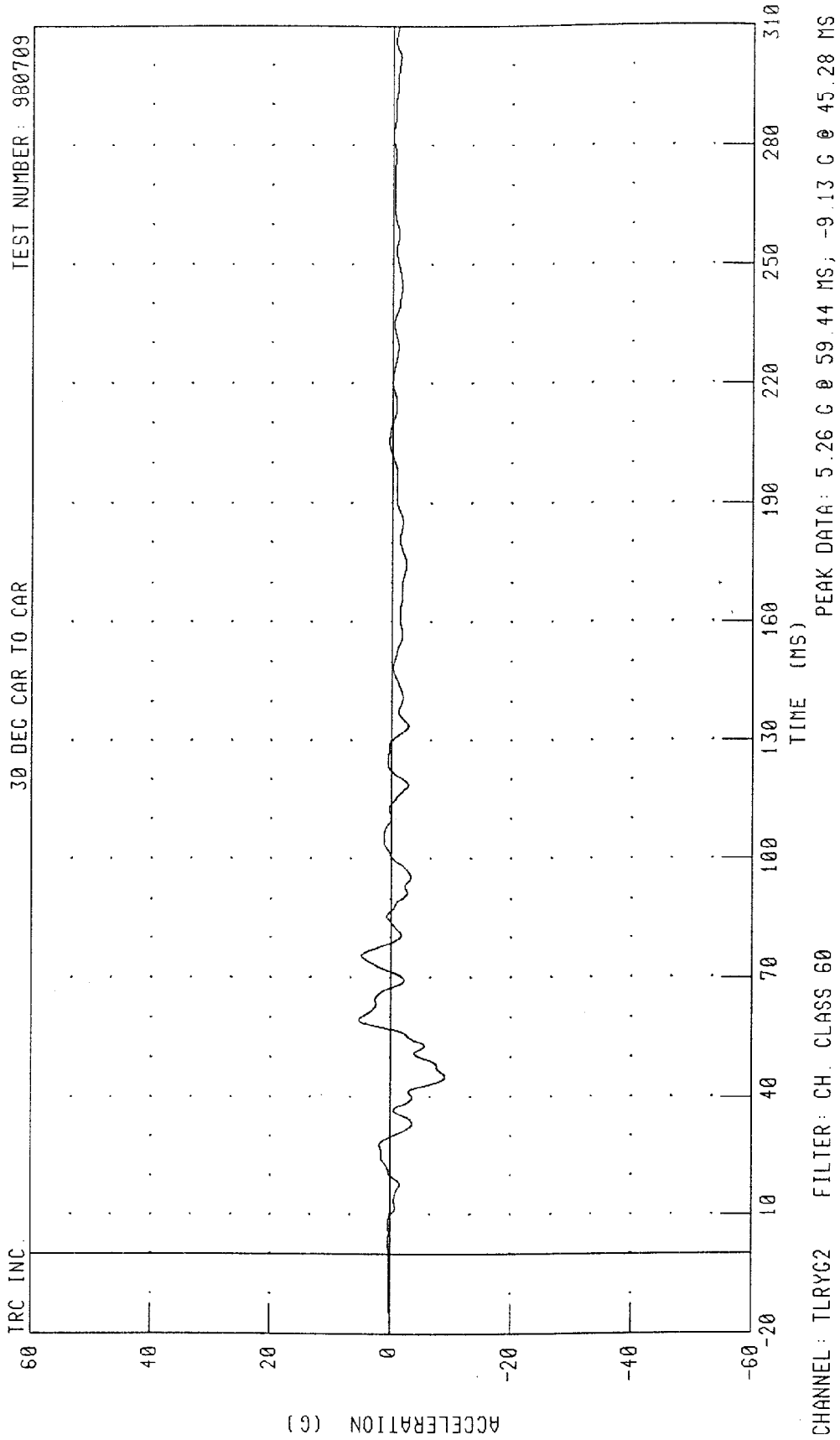
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET LEFT REAR SEAT X-AXIS ACCELERATION



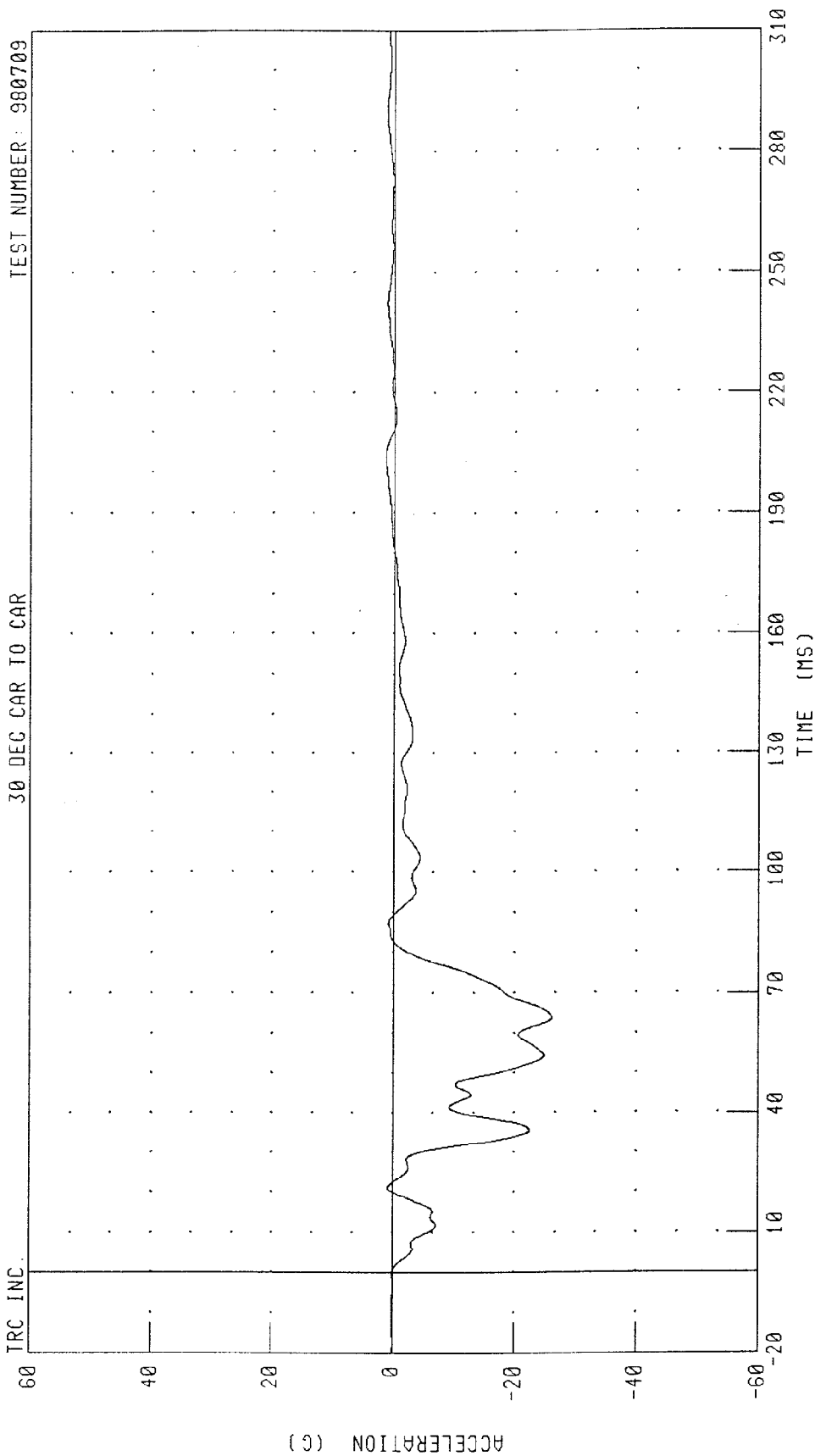
CHANNEL: TLRXC2 FILTER: CH. CLASS 60

PEAK DATA: 2.20 G @ 198.64 MS, -43.96 G @ 65.44 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET LEFT REAR SEAT Y-AXIS ACCELERATION



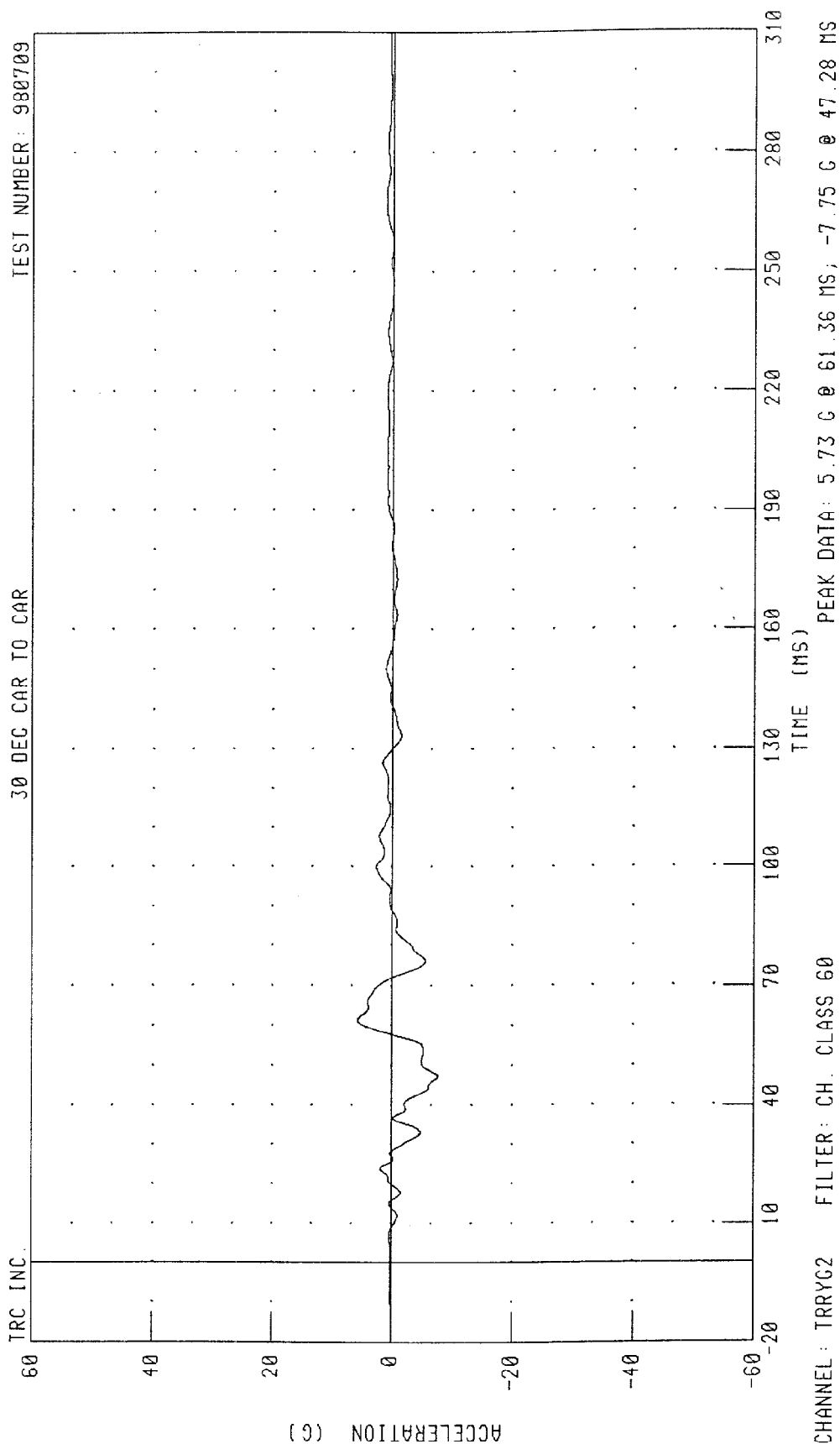
1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET RIGHT REAR SEAT X-AXIS ACCELERATION



CHANNEL: TRXC2 FILTER: CH. CLASS 60

PEAK DATA: 1.30 G @ 203.84 MS, -26.17 G @ 64.00 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET RIGHT REAR SEAT Y-AXIS ACCELERATION

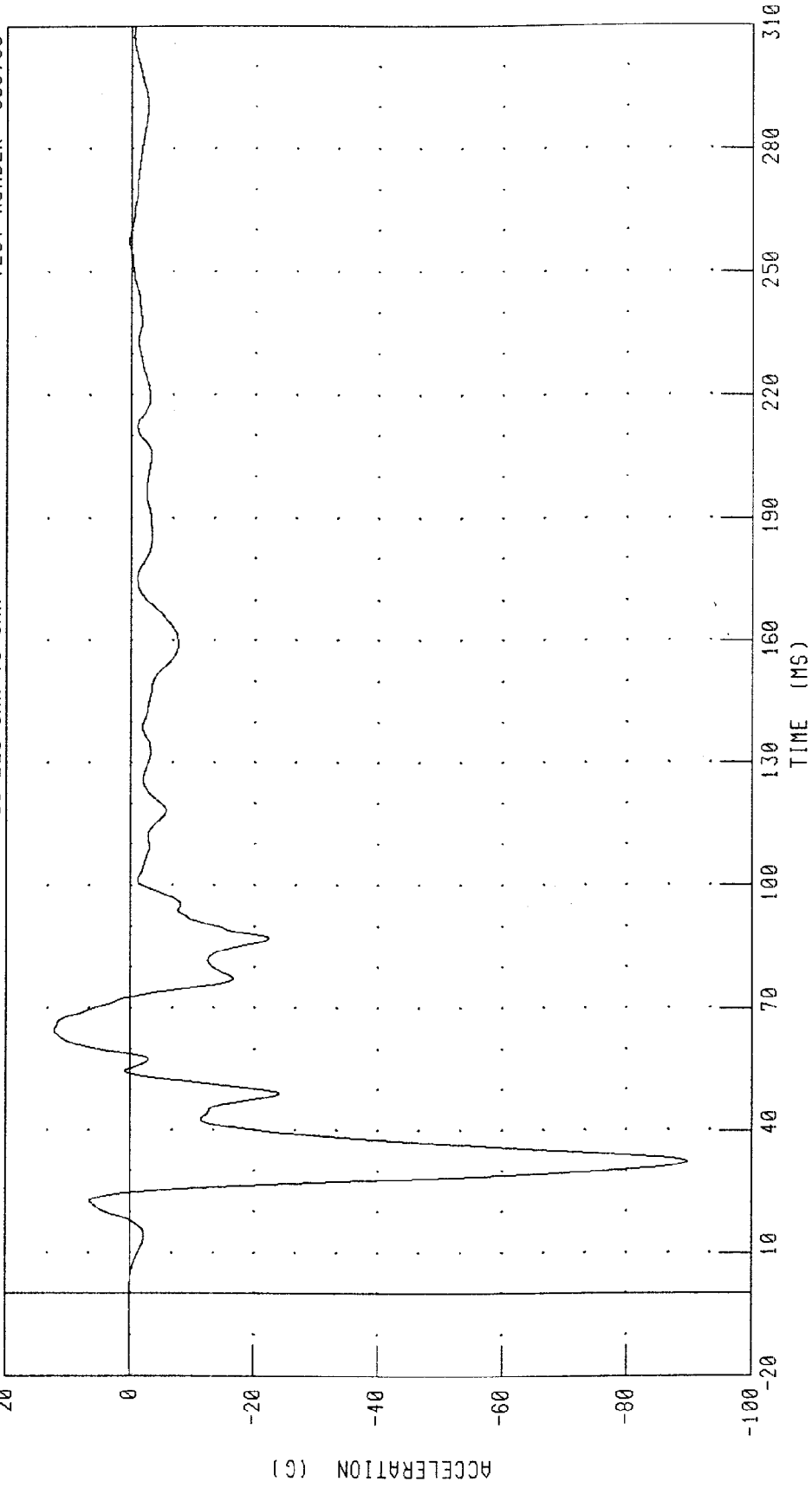


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET ENGINE TOP X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEG CAR TO CAR

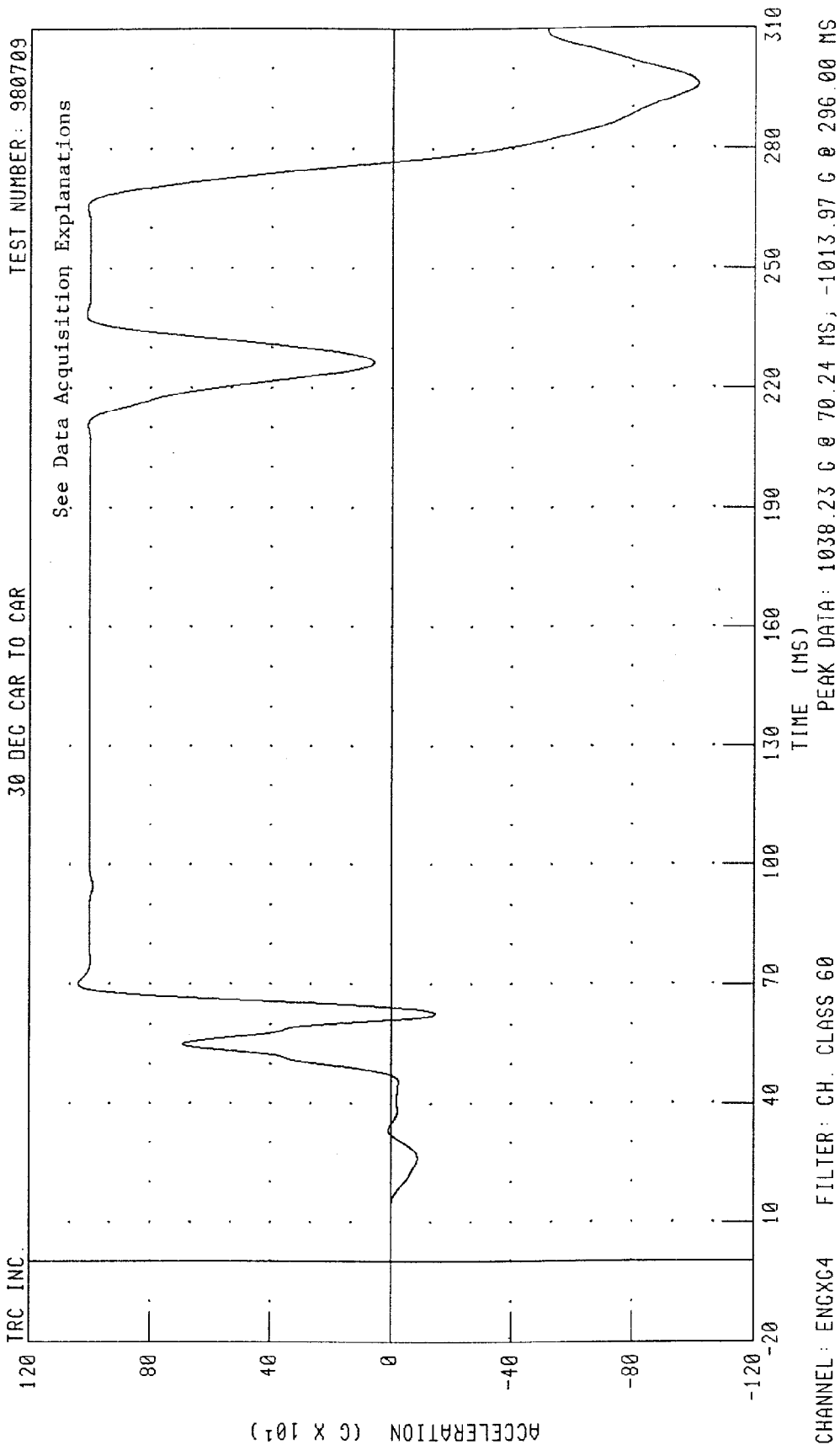
TRC INC.



CHANNEL: ENGXC3 FILTER: CH. CLASS 60

PEAK DATA: 12.31 G @ 64.80 MS; -89.72 G @ 32.40 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET ENGINE BOTTOM X-AXIS ACCELERATION

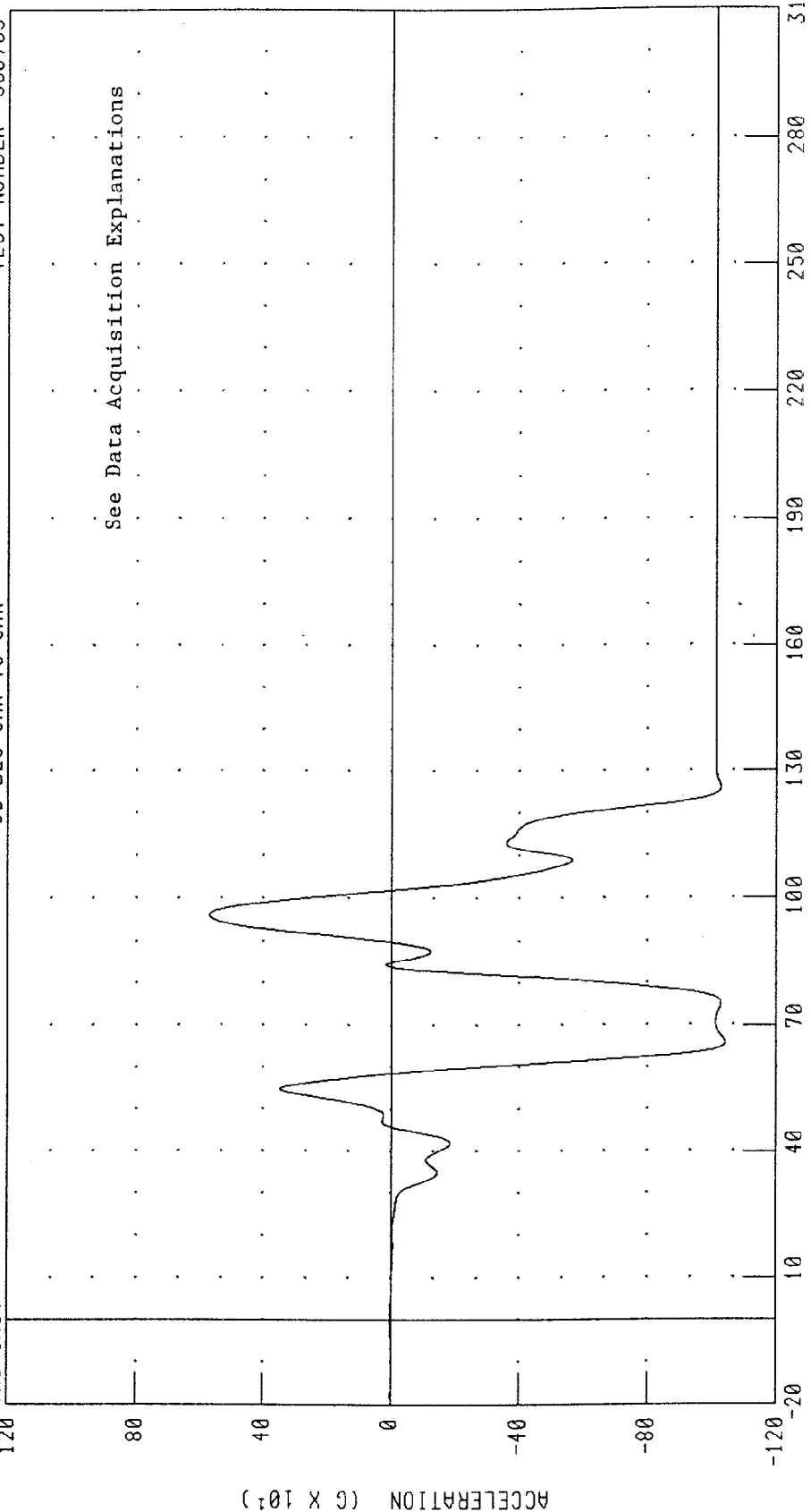


1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET LEFT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEG CAR TO CAR

TRC INC.



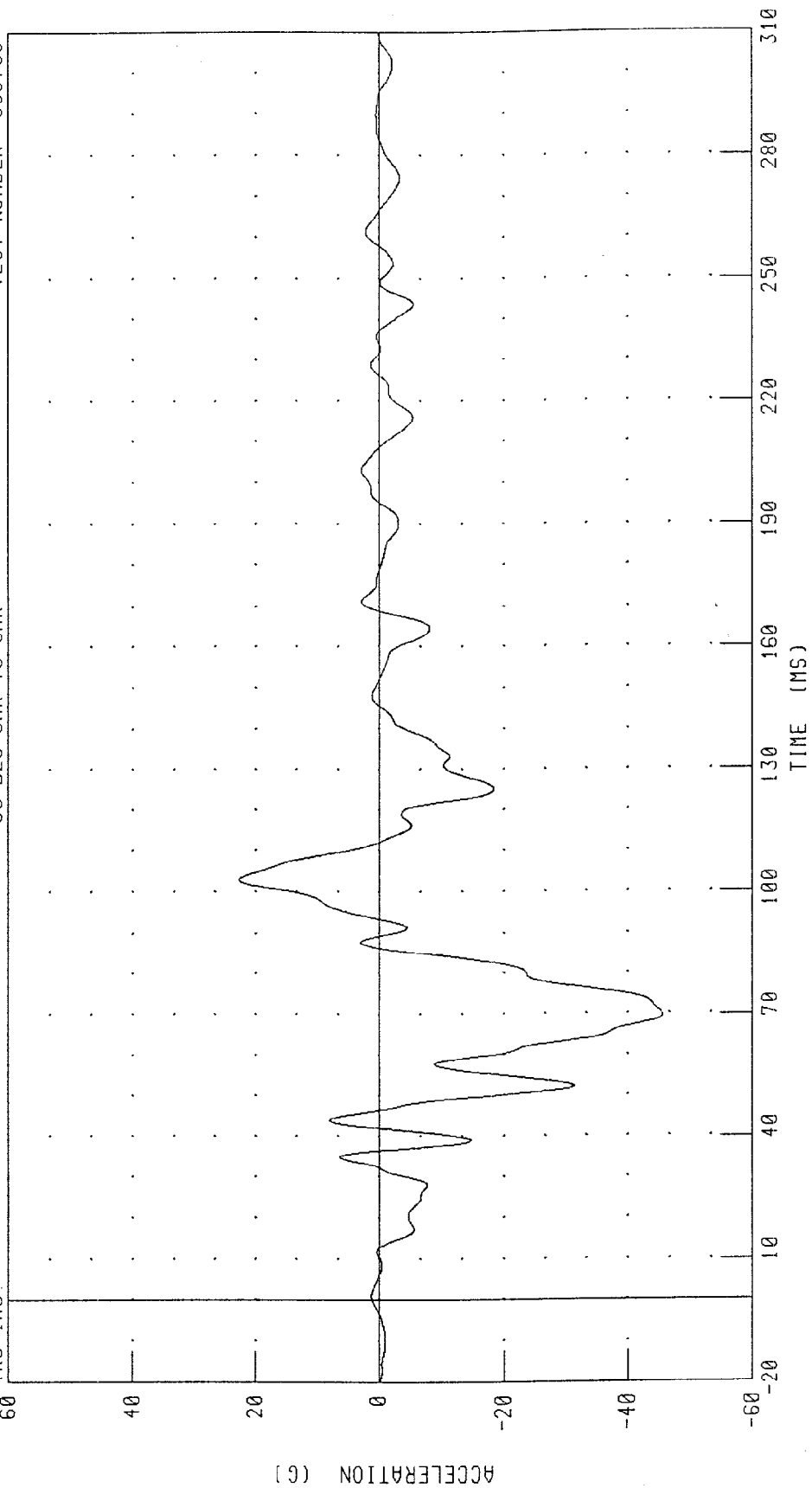
CHANNEL: BCLXC2 FILTER: CH. CLASS 60

PEAK DATA: 570.90 G @ 96.08 MS, -1041.50 G @ 65.76 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET RIGHT BRAKE CALIPER X-AXIS ACCELERATION
30 DEG CAR TO CAR

TEST NUMBER: 980709

TRC INC.

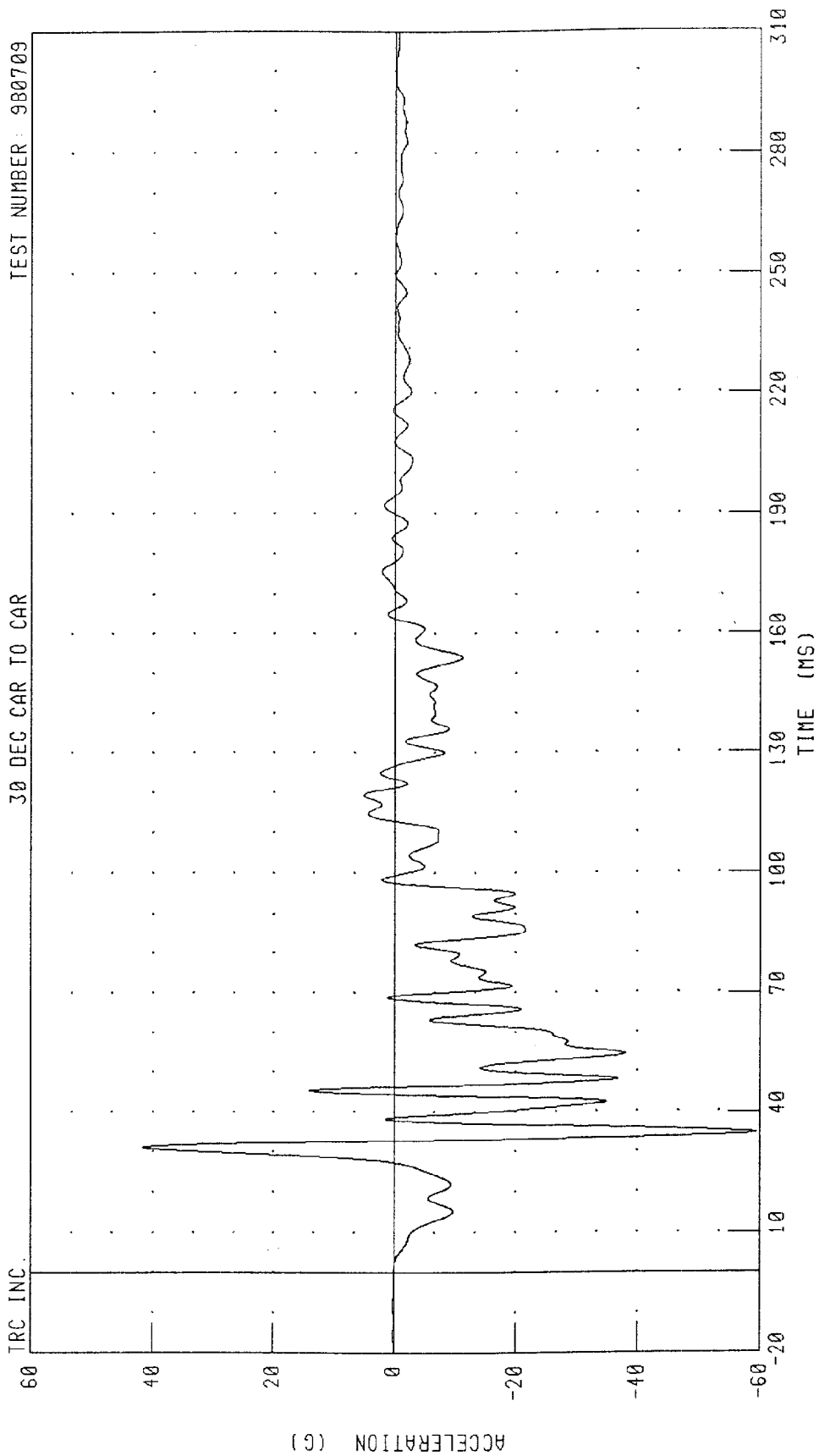


CHANNEL: BCRXG2 FILTER: CH. CLASS 60

PEAK DATA: 22.81 G @ 103.04 MS, -45.66 G @ 69.68 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET INSTRUMENT PANEL CENTER X-AXIS ACCELERATION
30 DEG CAR TO CAR

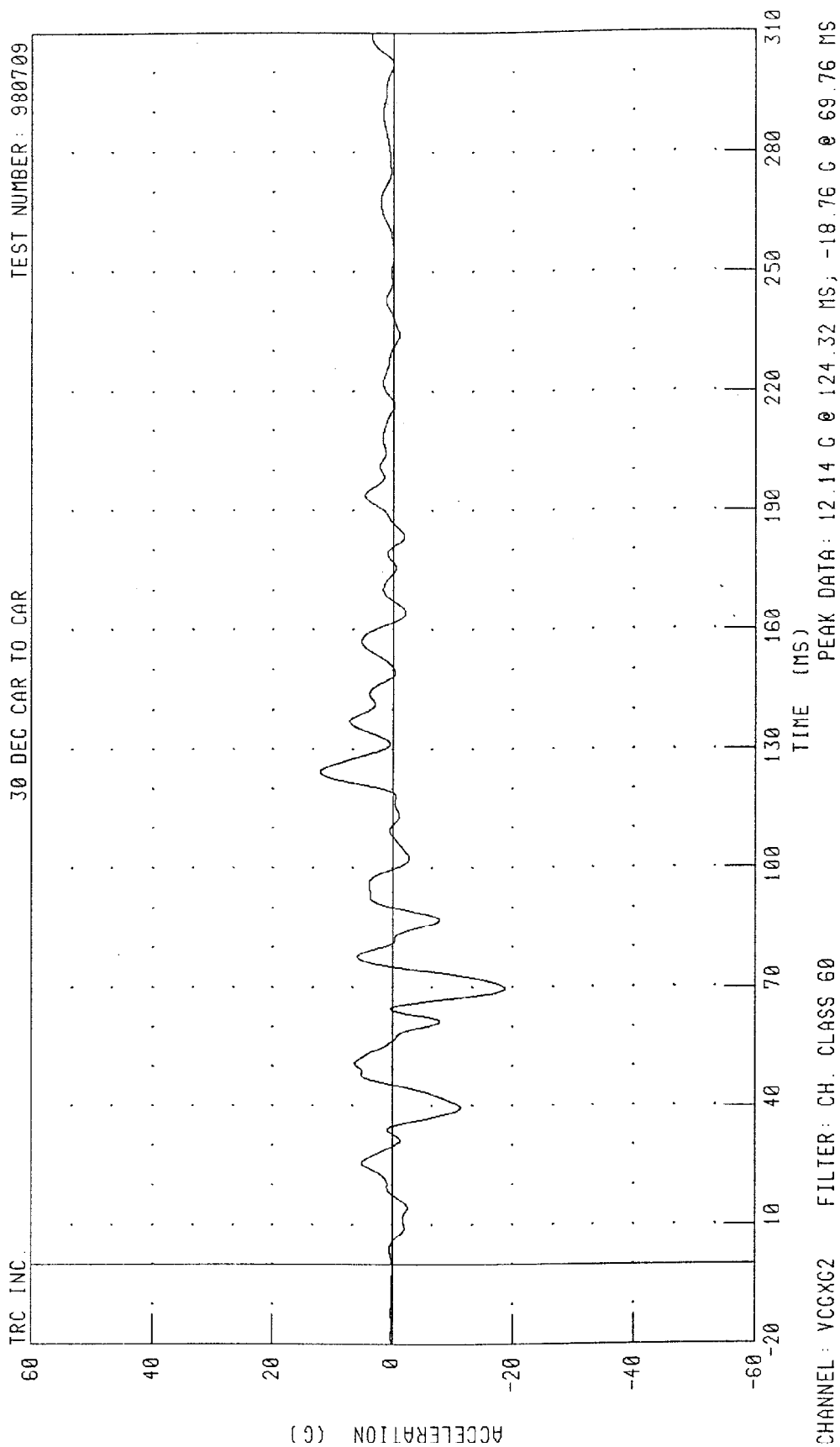
TEST NUMBER: 980709



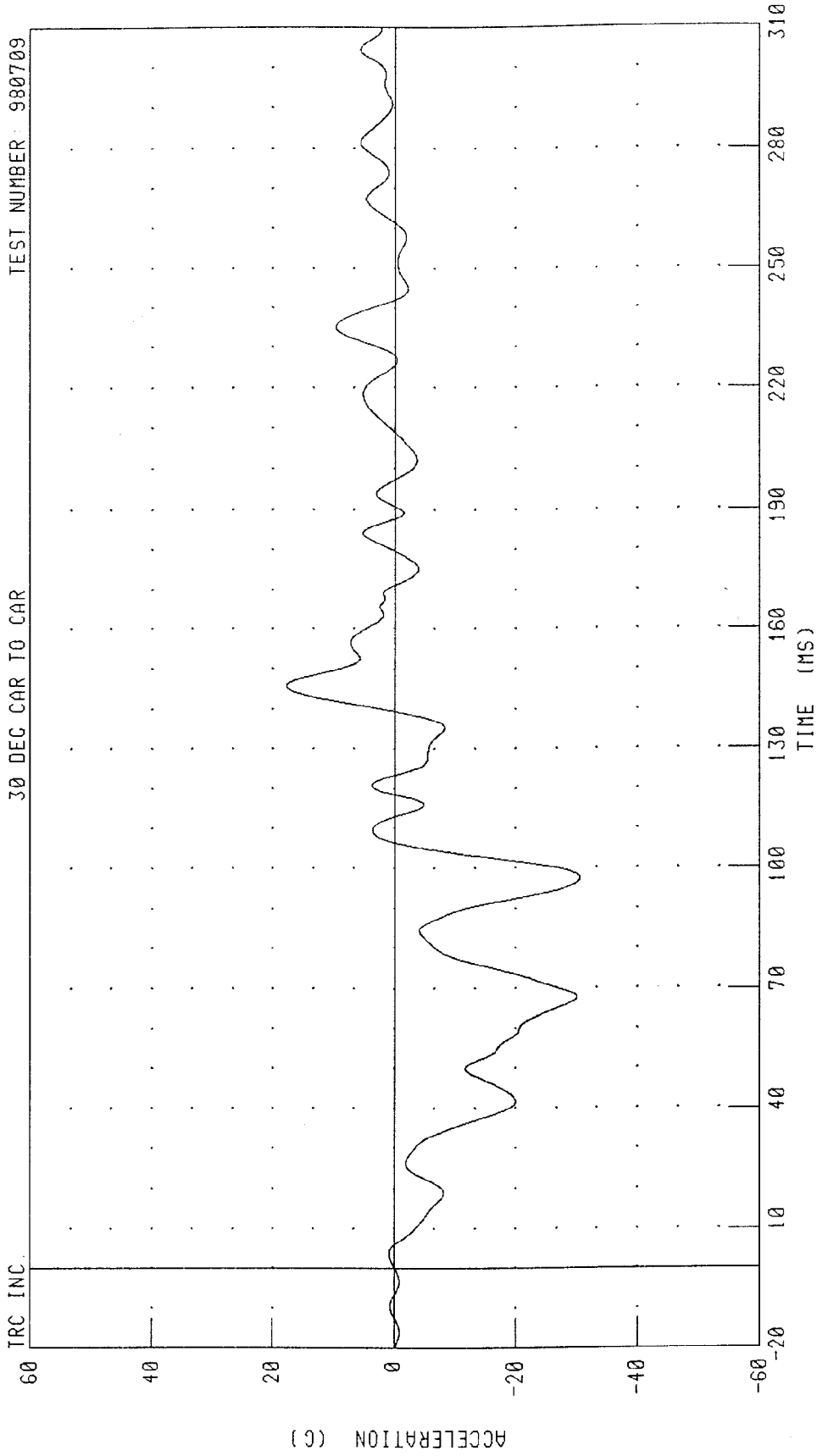
CHANNEL: DPCXG2 FILTER: CH. CLASS 60

PEAK DATA: 41.72 G @ 31.12 MS, -59.50 G @ 34.72 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE CG X-AXIS ACCELERATION



1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE REAR CENTER Y-AXIS ACCELERATION



CHANNEL: TFCYC2 FILTER: CH. CLASS 60

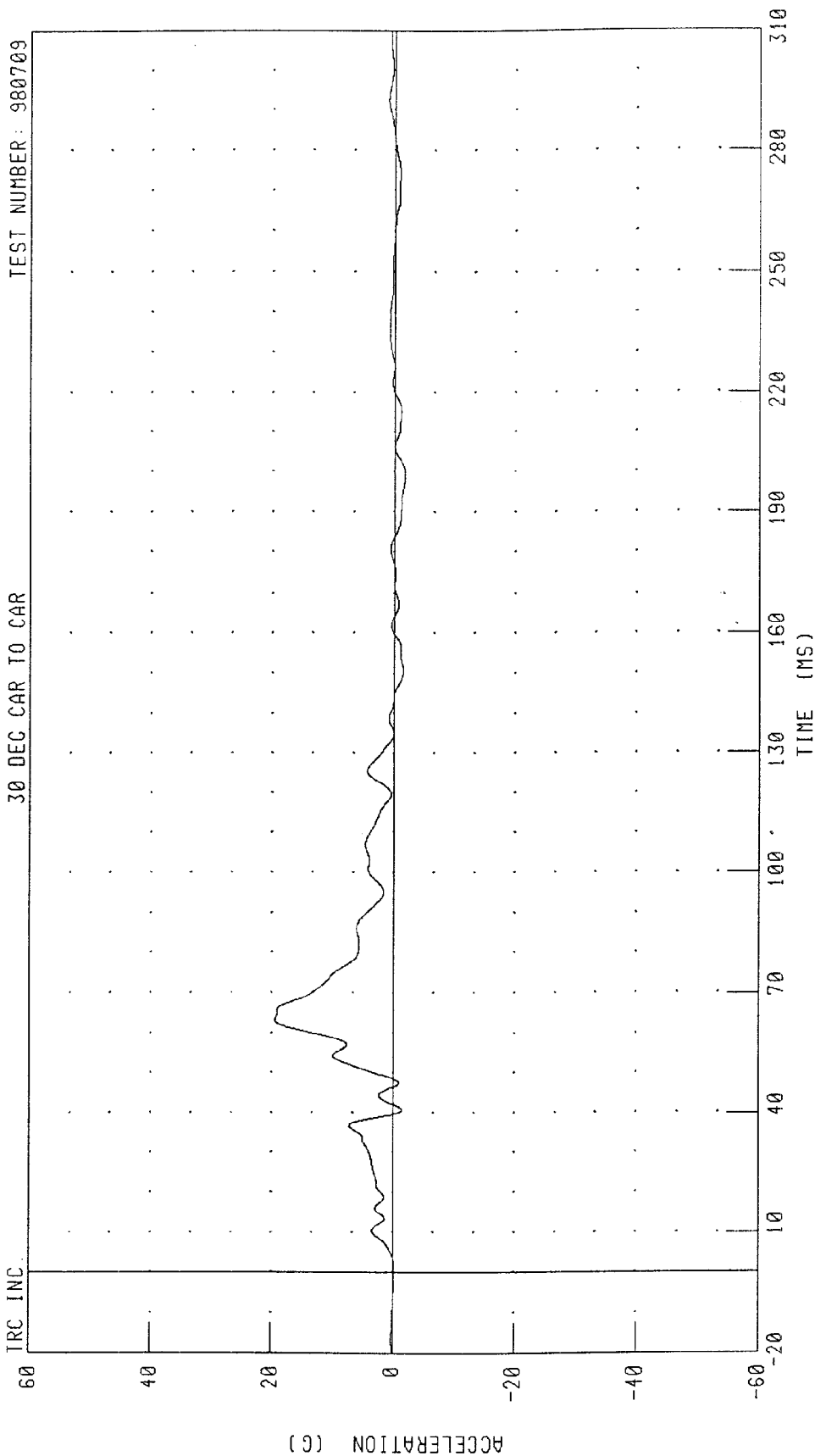
PEAK DATA: 17.76 G @ 145.76 MS, -30.56 G @ 97.60 MS

1997 DODGE CARAVAN INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE REAR CENTER Z-AXIS ACCELERATION

TEST NUMBER: 980709

30 DEC CAR TO CAR

TRC INC.



CHANNEL: TFCZG2 FILTER: CH. CLASS 60

PEAK DATA: 19.49 G @ 63.44 MS, -1.80 G @ 199.12 MS

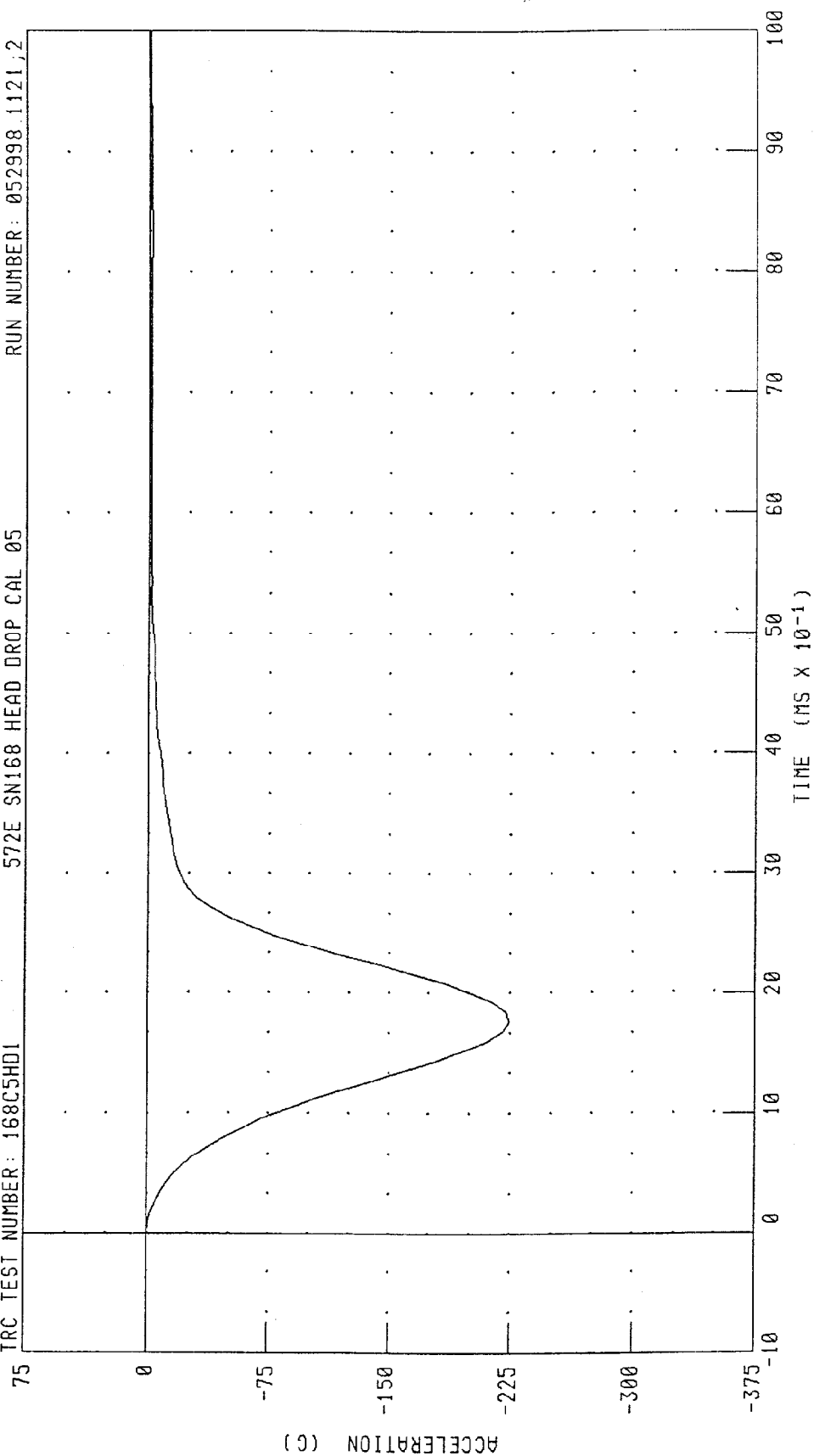
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN168 HEAD DROP CAL 05

RUN NUMBER: 052998.1121;2

TRC TEST NUMBER: 168C5HDI



CHANNEL: HEDXC FILTER: CH. CLASS 1000

PEAK DATA: 0.00 G @ -0.96 MS, -224.42 G @ 1.76 MS

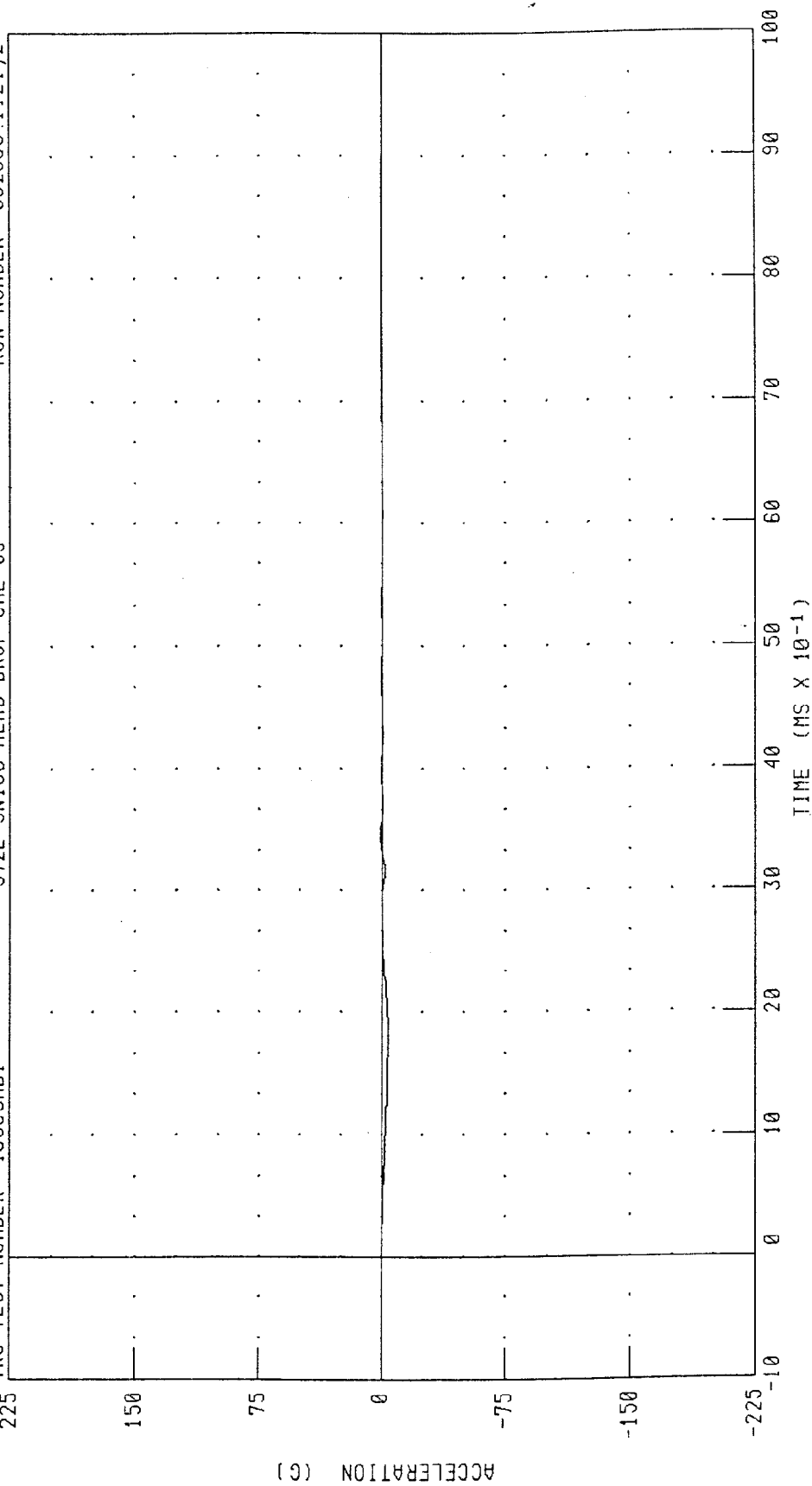
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 168C5HD1

572E SN168 HEAD DROP CAL 05

RUN NUMBER: 052998.1121,2



CHANNEL: HEDYC FILTER: CH. CLASS 1000

PEAK DATA: 1.21 G @ 3.44 MS, -4.12 G @ 1.76 MS

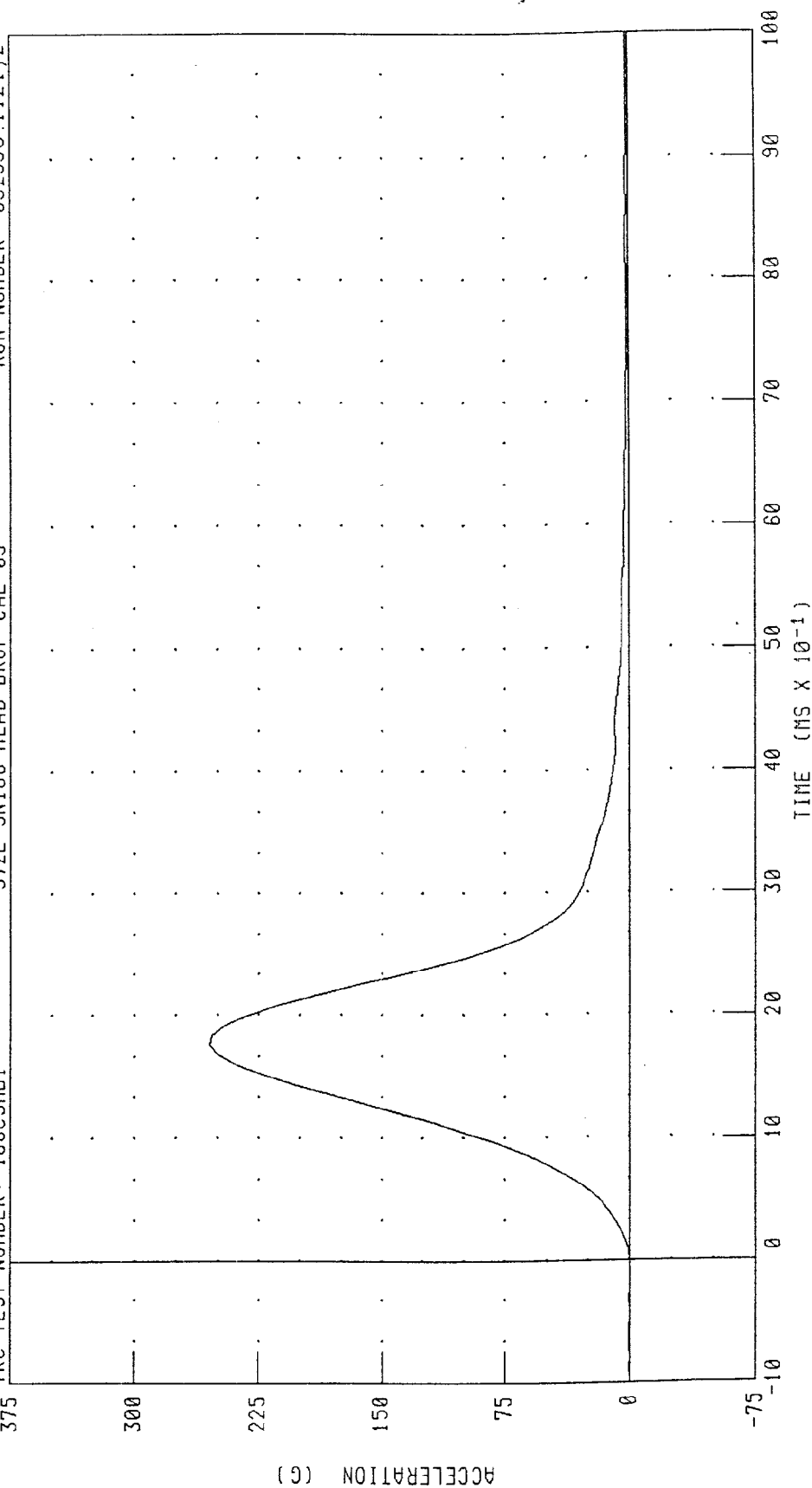
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN168 HEAD DROP CAL 05

RUN NUMBER: 052998.1121,2

TRC TEST NUMBER: 168C5HD1



CHANNEL: HEDRC

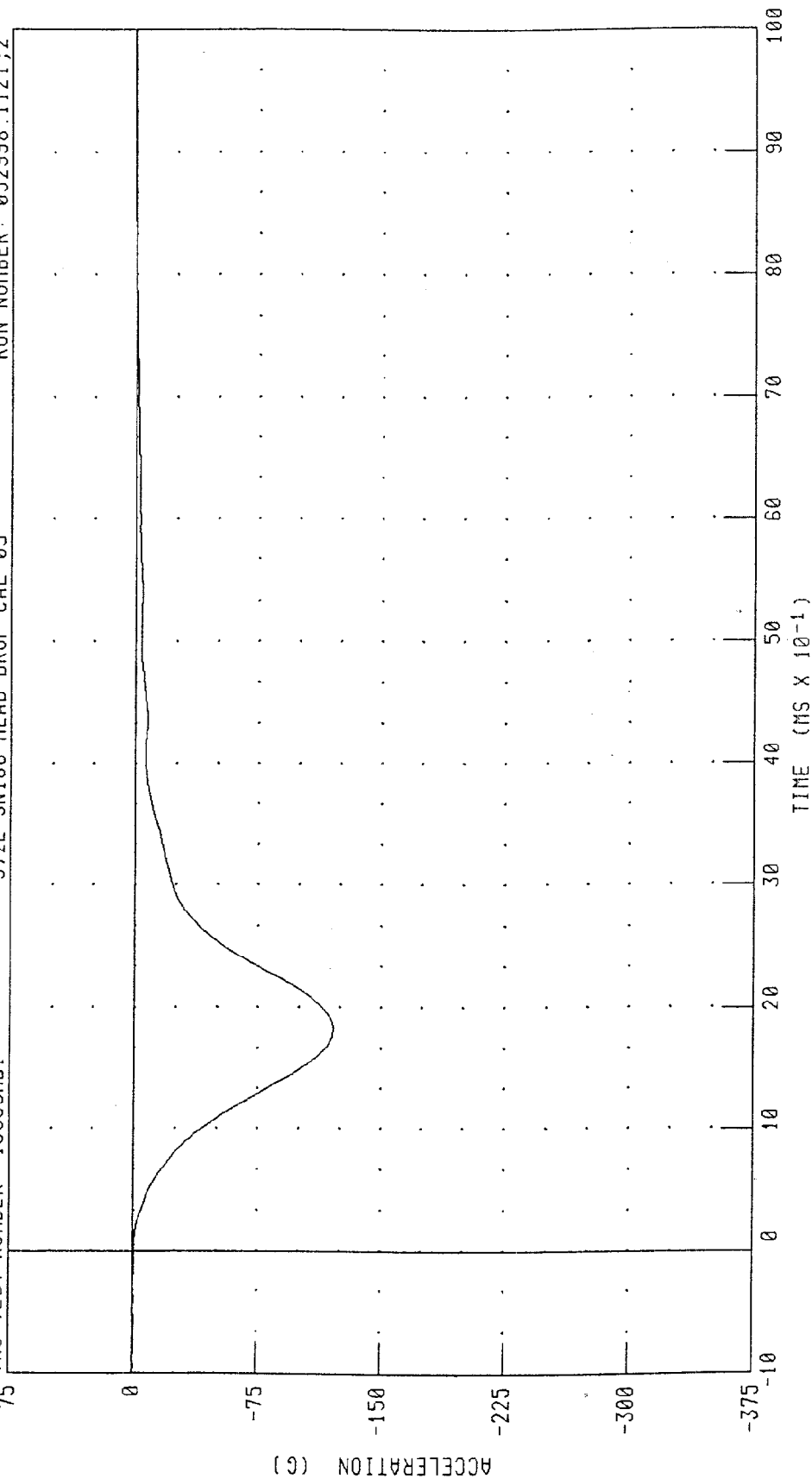
FILTER: CH. CLASS 1000

PEAK DATA: 254.78 G @ 1.76 MS; 0.08 G @ -0.48 MS

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 168C5HD1 572E SN168 HEAD DROP CAL 05 RUN NUMBER: 052998.1121;2



CHANNEL: HEDZG FILTER: CH. CLASS 1000 PEAK DATA: 0.86 G @ 10.00 MS; -121.14 G @ 1.84 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

29-MAY-98

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C5NF1 572E SN168 NECK FLEXION CAL05

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	56.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.61 G
	20 MS	17.60 - 22.60 G	21.78 G
	30 MS	12.50 - 18.50 G	15.21 G
MAX PENDULUM G		29 G MAX	24.33 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.13 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	39.84 MS
D PLANE	MAX	64 - 78 DEG.	72.96 DEG.
ROTATION	TIME	57 - 64 MS	57.92 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	92.22 NM
	TIME	47 - 58 MS	52.72 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	115.84 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	101.92 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

B. Calt

RUN NUMBER: 052998.1118;1

Appendix C

Dummy Certification Data

Pre-Test Calibration

Target Vehicle Driver Dummy S/N 168

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

29-MAY-98

TRC INC.

TEST NO: 168C5HD1

572E SN168 HEAD DROP CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	56.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	254.77 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.11 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

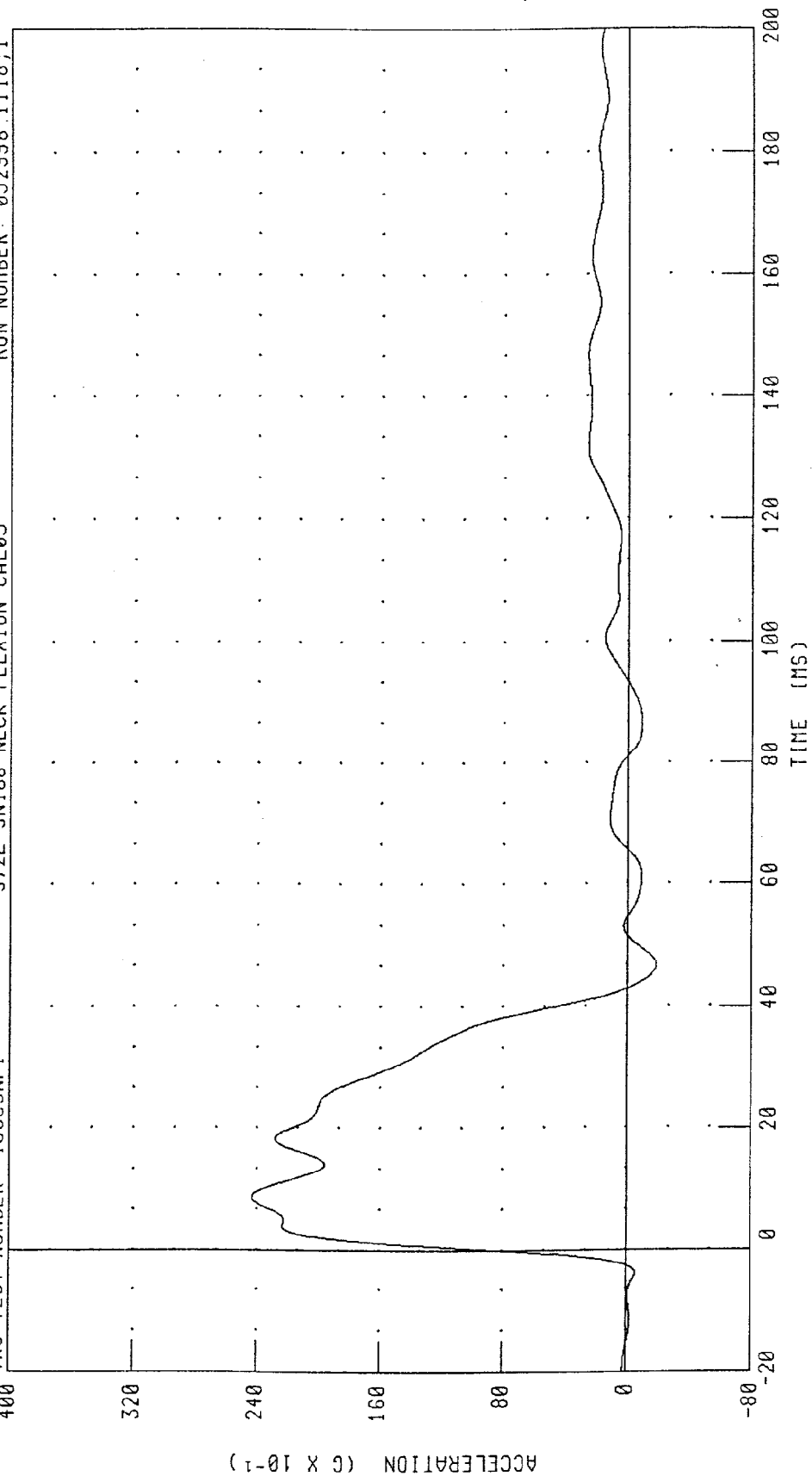
Kevin Watkins

RUN NUMBER: 052998.1054;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C5NF1 572E SN168 NECK FLEXION CAL05 RUN NUMBER: 052998.1118;1



CHANNEL: PENXG

FILTER: CH. CLASS 60

PEAK DATA: 24.33 G @ 8.64 MS; -1.88 G @ 46.72 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN168 NECK FLEXION CAL05

TRC TEST NUMBER: 168C5NF1

RUN NUMBER: 052998.1118;1

120

90

60

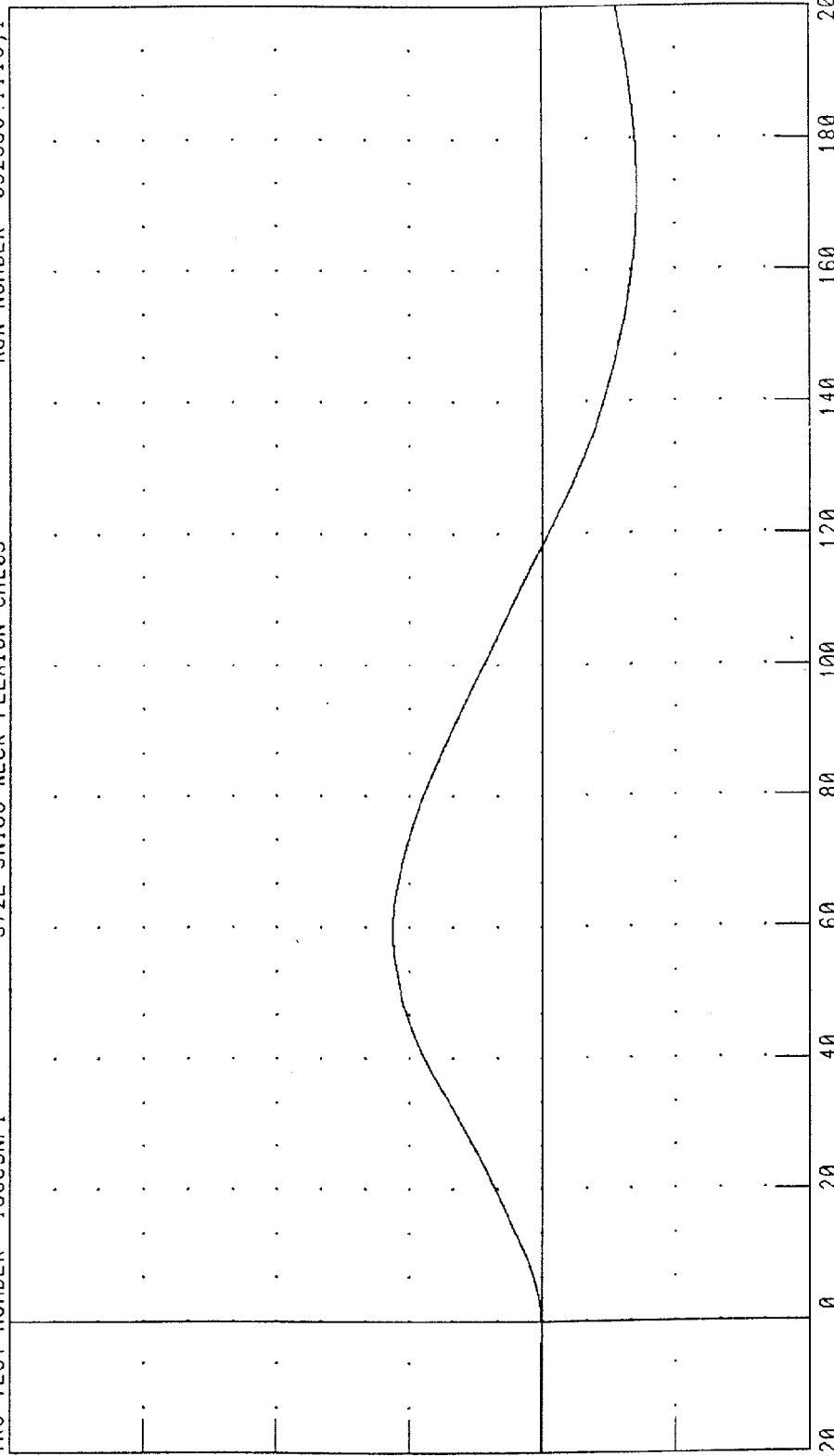
30

0

-30

-60

ANGLE (°)



TIME (MS)

CHANNEL: BETA

FILTER: CH. CLASS 60

PEAK DATA: 33.64 ° @ 59.20 MS; -21.37 ° @ 171.68 MS

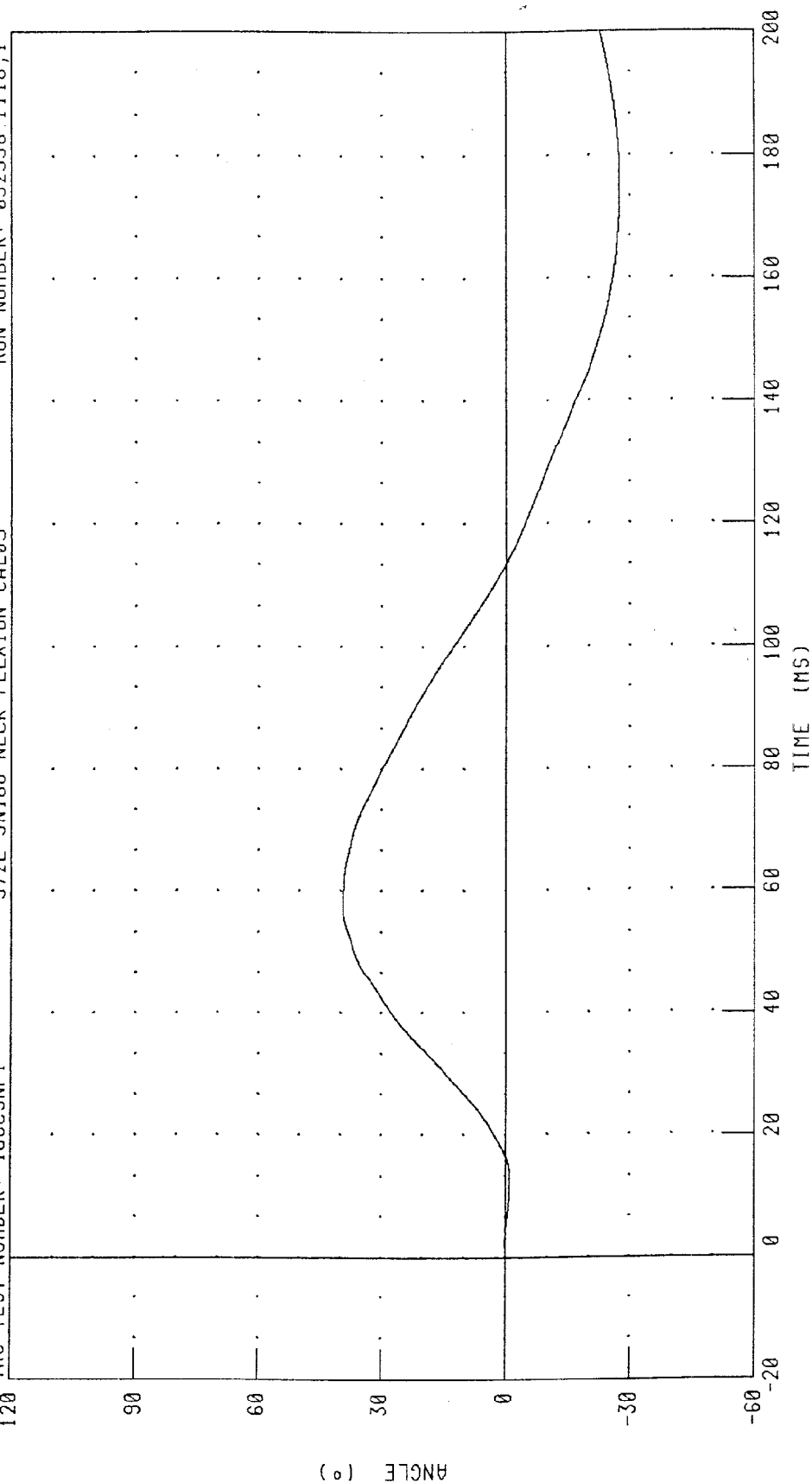
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 168C5NF1

572E SN168 NECK FLEXION CAL05

RUN NUMBER: 052998.1118;1



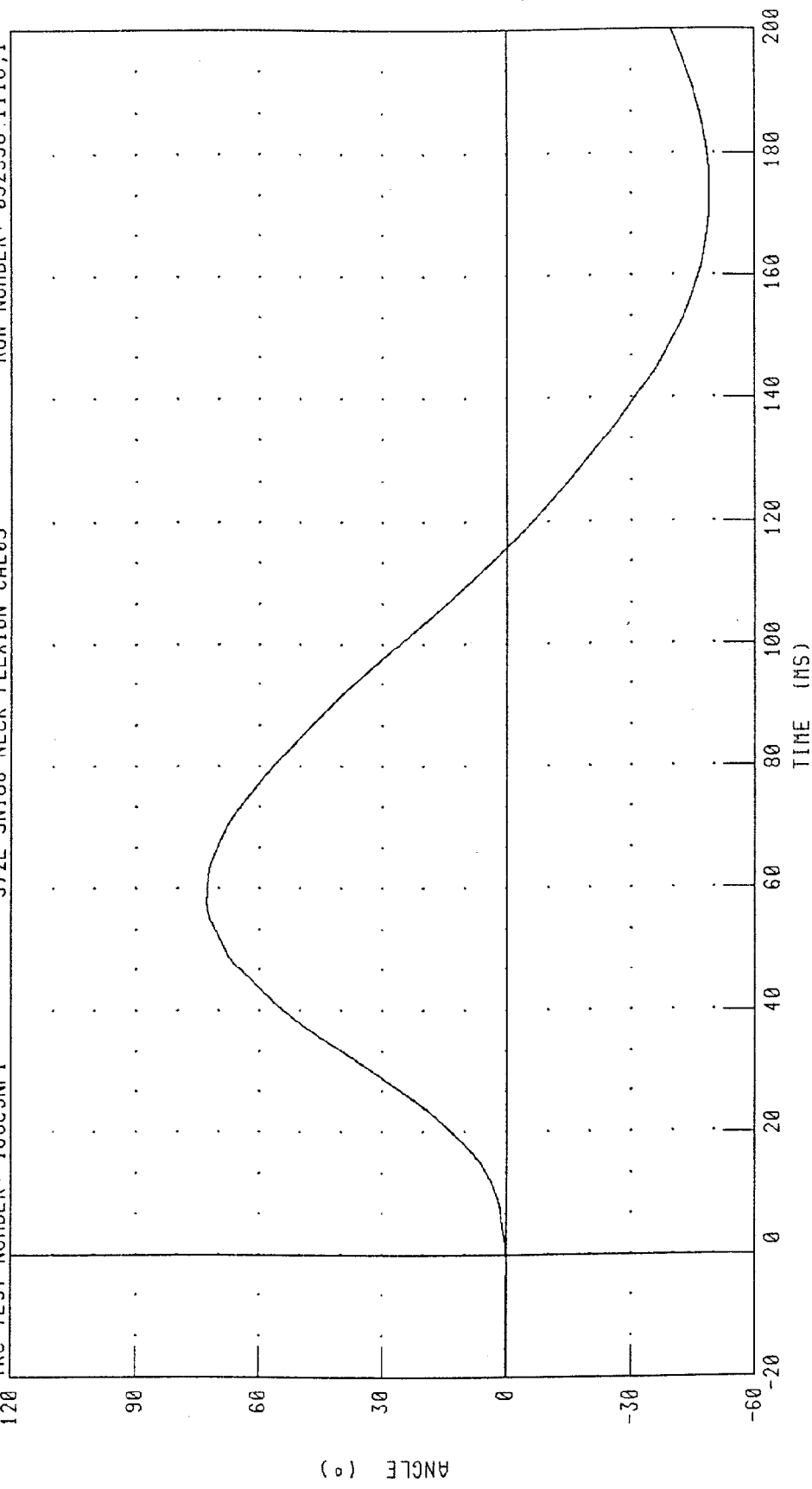
PEAK DATA: 39.37 ° @ 57.44 MS; -27.60 ° @ 174.56 MS

CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 168C5NF1 572E SN168 NECK FLEXION CAL05 RUN NUMBER: 052998.11118,1



CHANNEL: TOTAN

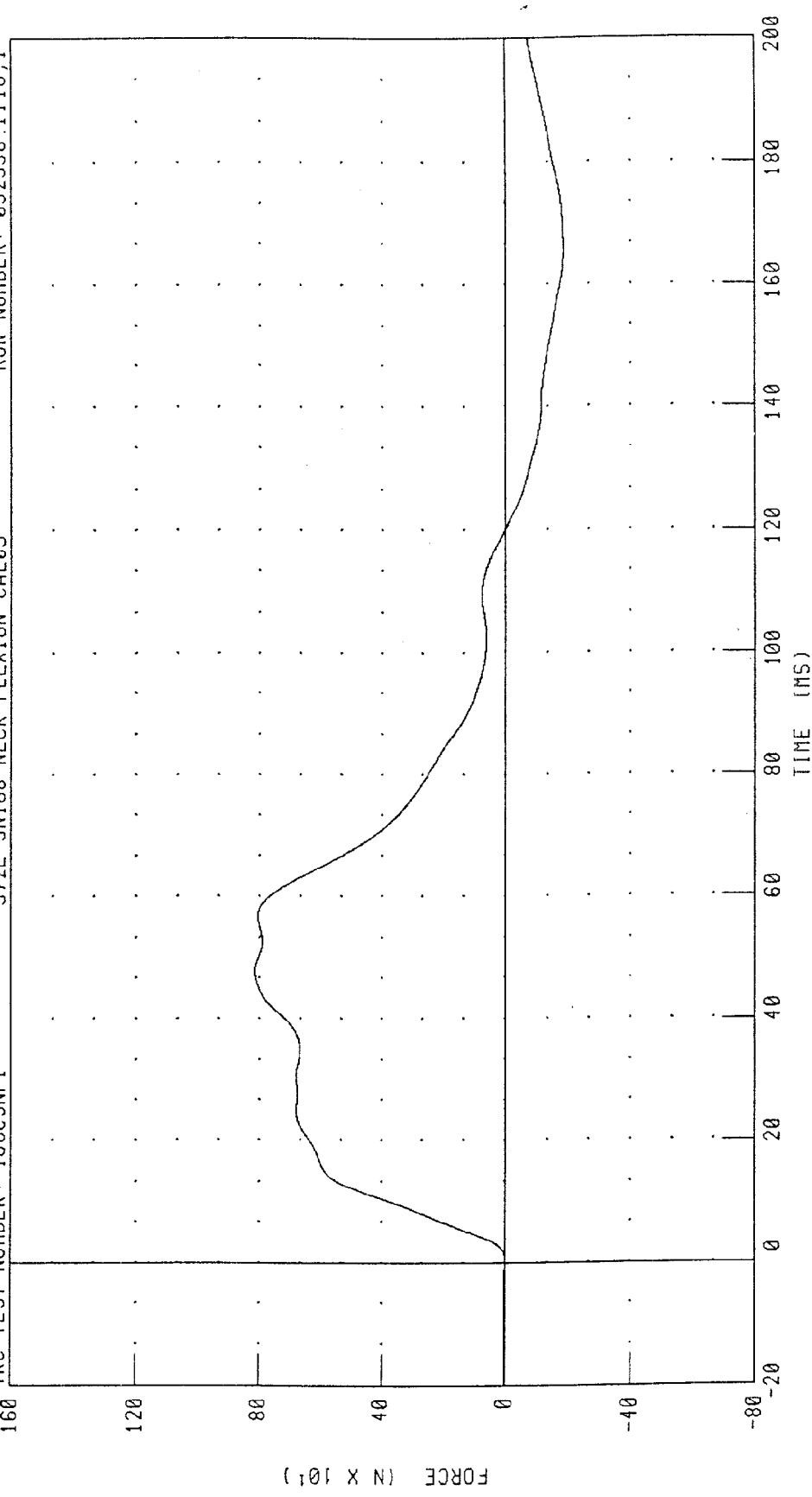
FILTER: CH. CLASS 60

PEAK DATA: 72.97 ° @ 57.92 MS; -48.95 ° @ 173.52 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 168C5NF1 572E SN168 NECK FLEXION CAL05 RUN NUMBER: 052998.1118.1



CHANNEL: NEKXF

FILTER: CH. CLASS 60

PEAK DATA: 814.87 N @ 47.84 MS, -186.24 N @ 165.52 MS

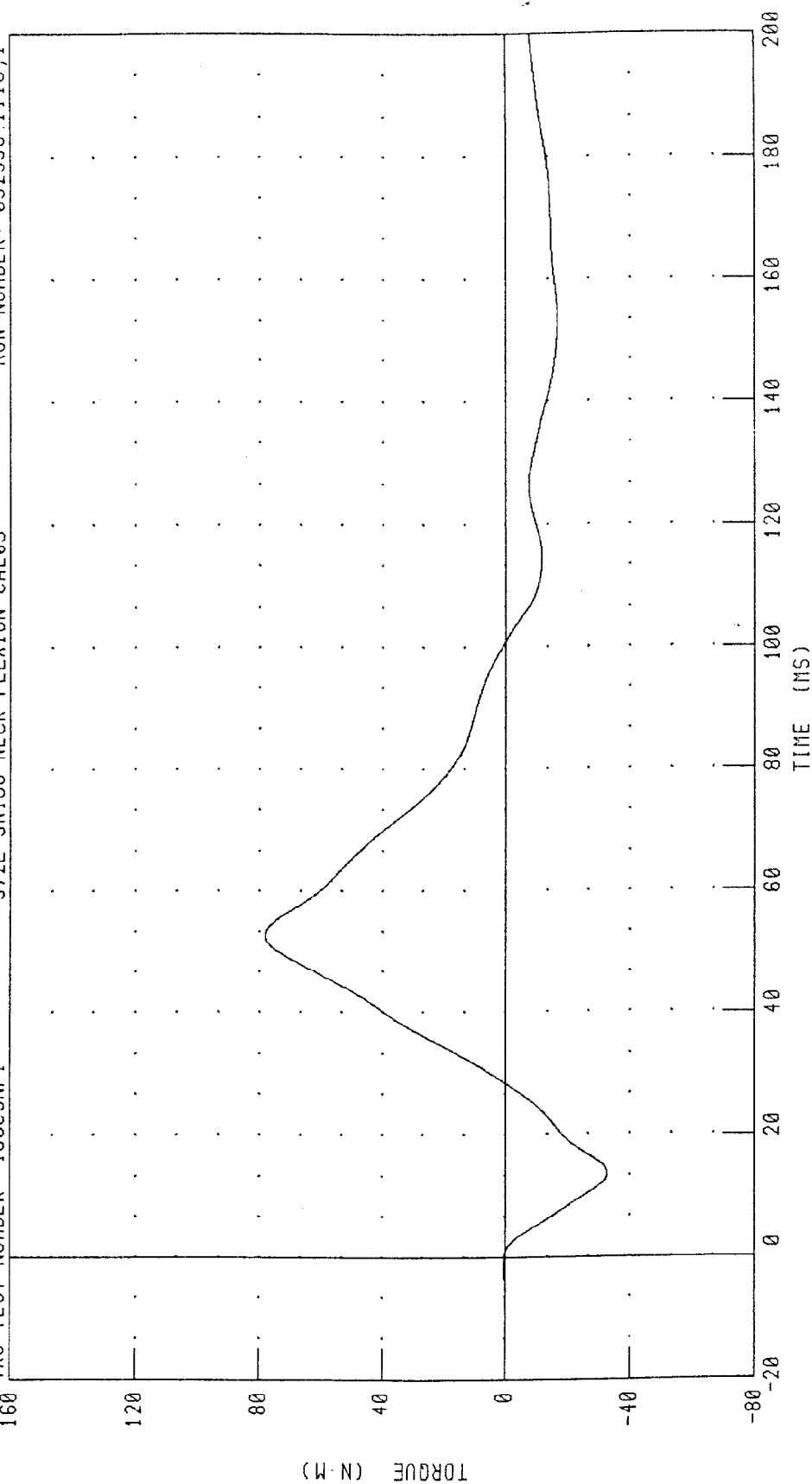
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 168C5NF1

572E SN168 NECK FLEXION CAL05

RUN NUMBER: 052998.1118,1



PEAK DATA: 78.15 N-M @ 52.64 MS, -32.78 N-M @ 13.68 MS

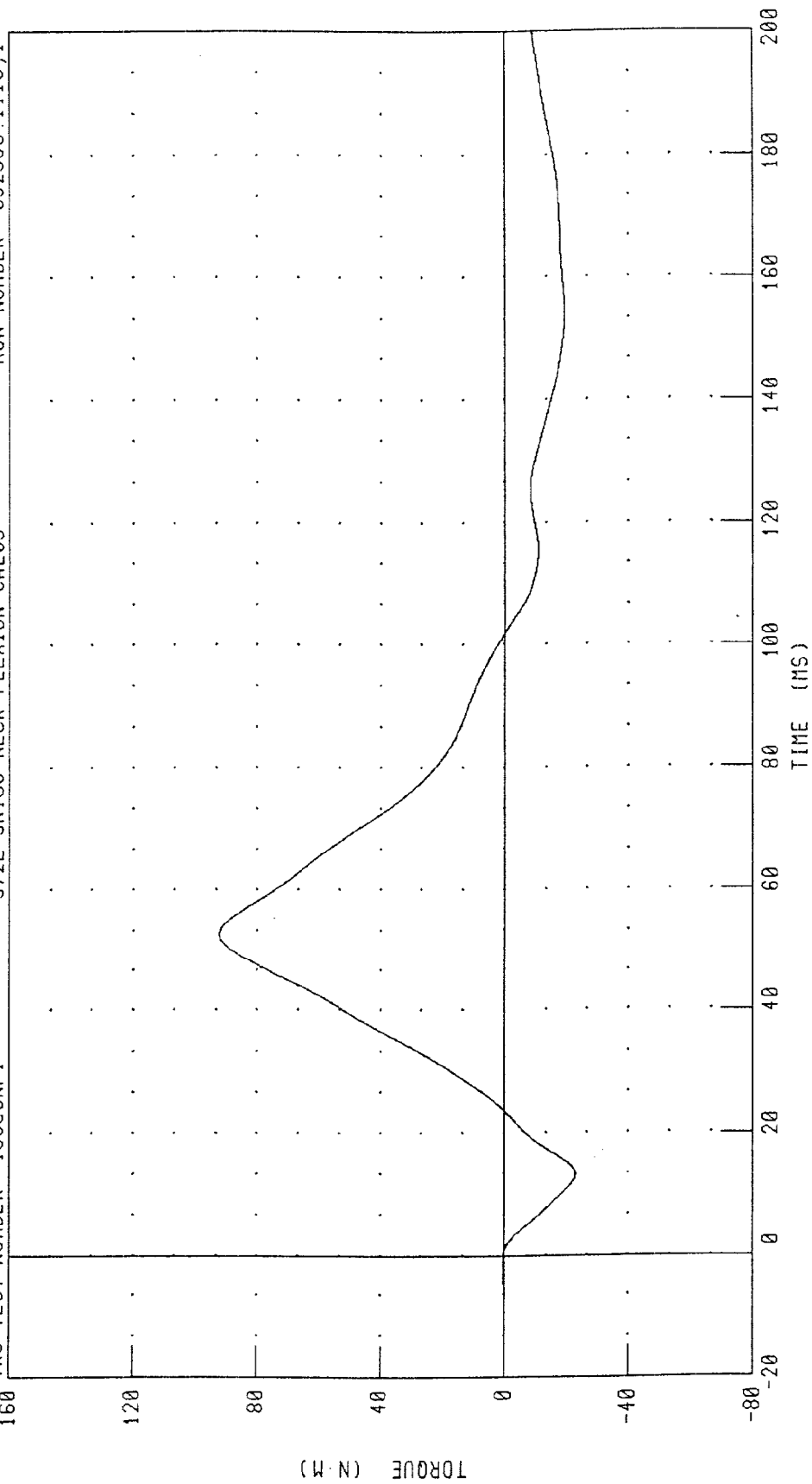
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C5NF1

572E SN168 NECK FLEXION CAL05

RUN NUMBER: 052998.1118;1



CHANNEL: NEKOM

FILTER: CH. CLASS 60

PEAK DATA: 92.22 N·M @ 52.72 MS, -22.97 N·M @ 13.28 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

29-MAY-98

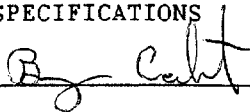
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C5NE1 572E SN168 NECK EXT CAL05

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	56.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.02 G
	20 MS	14.00 - 19.00 G	16.90 G
	30 MS	11.00 - 16.00 G	15.14 G
MAX PENDULUM G		22 G MAX	19.56 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.10 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	41.60 MS
D PLANE	MAX	81 - 106 DEG.	97.33 DEG.
ROTATION	TIME	72 - 82 MS	76.88 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-62.62 NM
	TIME	65 - 79 MS	71.44 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	157.60 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	143.28 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 052998.1223;1

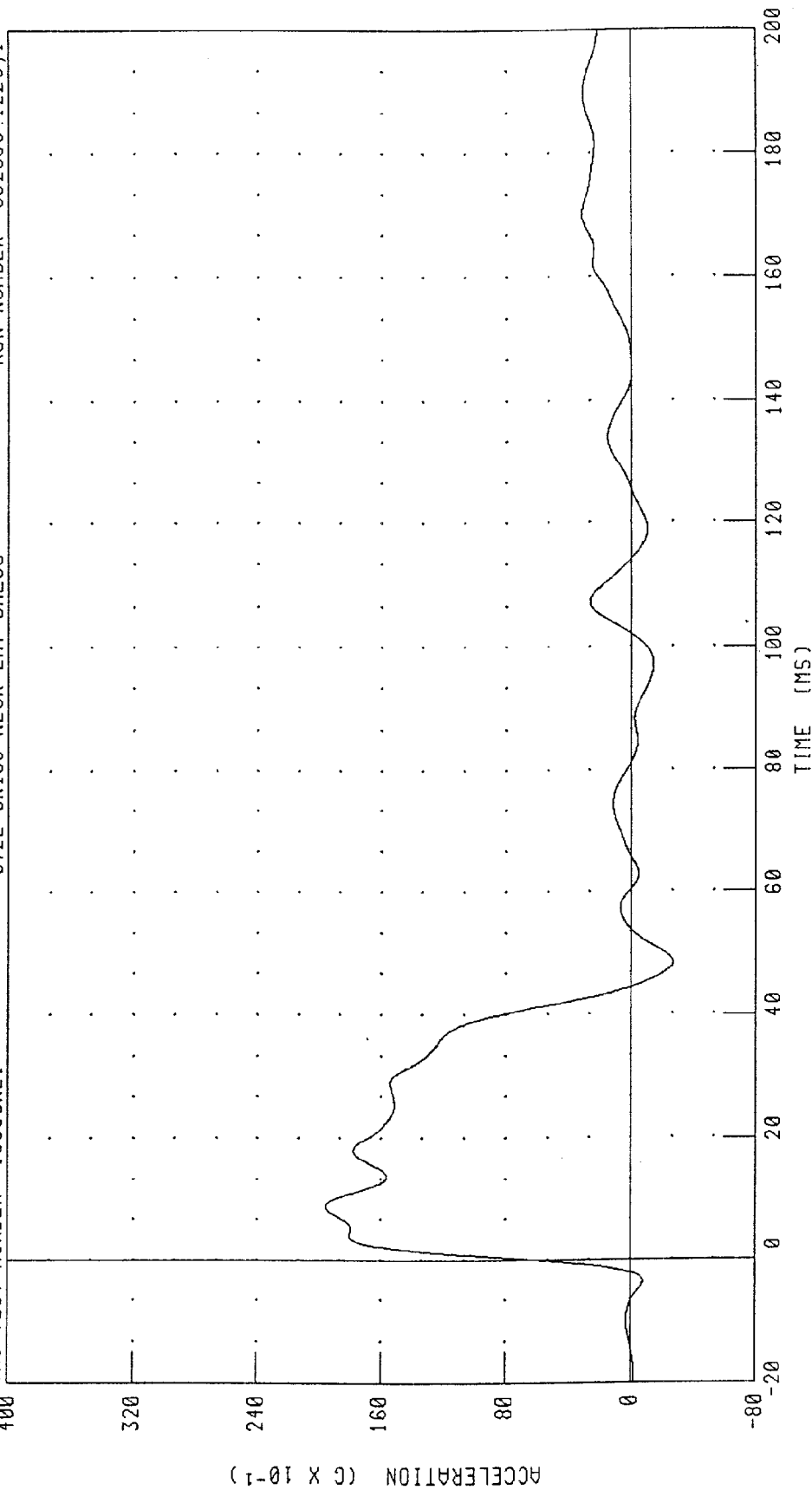
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C5NE1

572E SN168 NECK EXT CAL05

RUN NUMBER: 052998.1223,1



CHANNEL: PENXC

FILTER: CH. CLASS 60

PEAK DATA: 19.56 G @ 8.80 MS, -2.73 G @ 48.40 MS

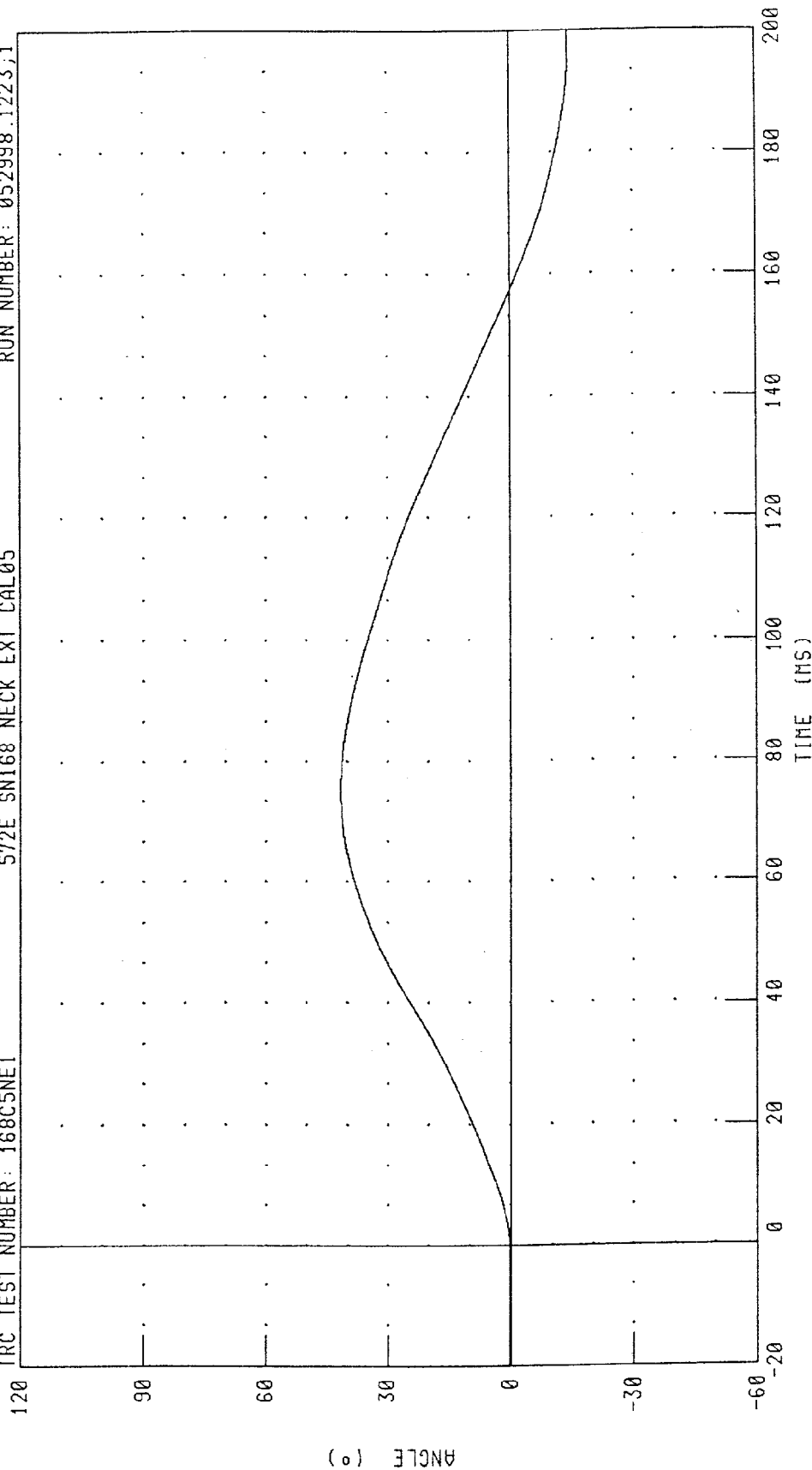
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN168 NECK EXT CAL05

TRC TEST NUMBER: 168C5NE1

RUN NUMBER: 052998.1223;1

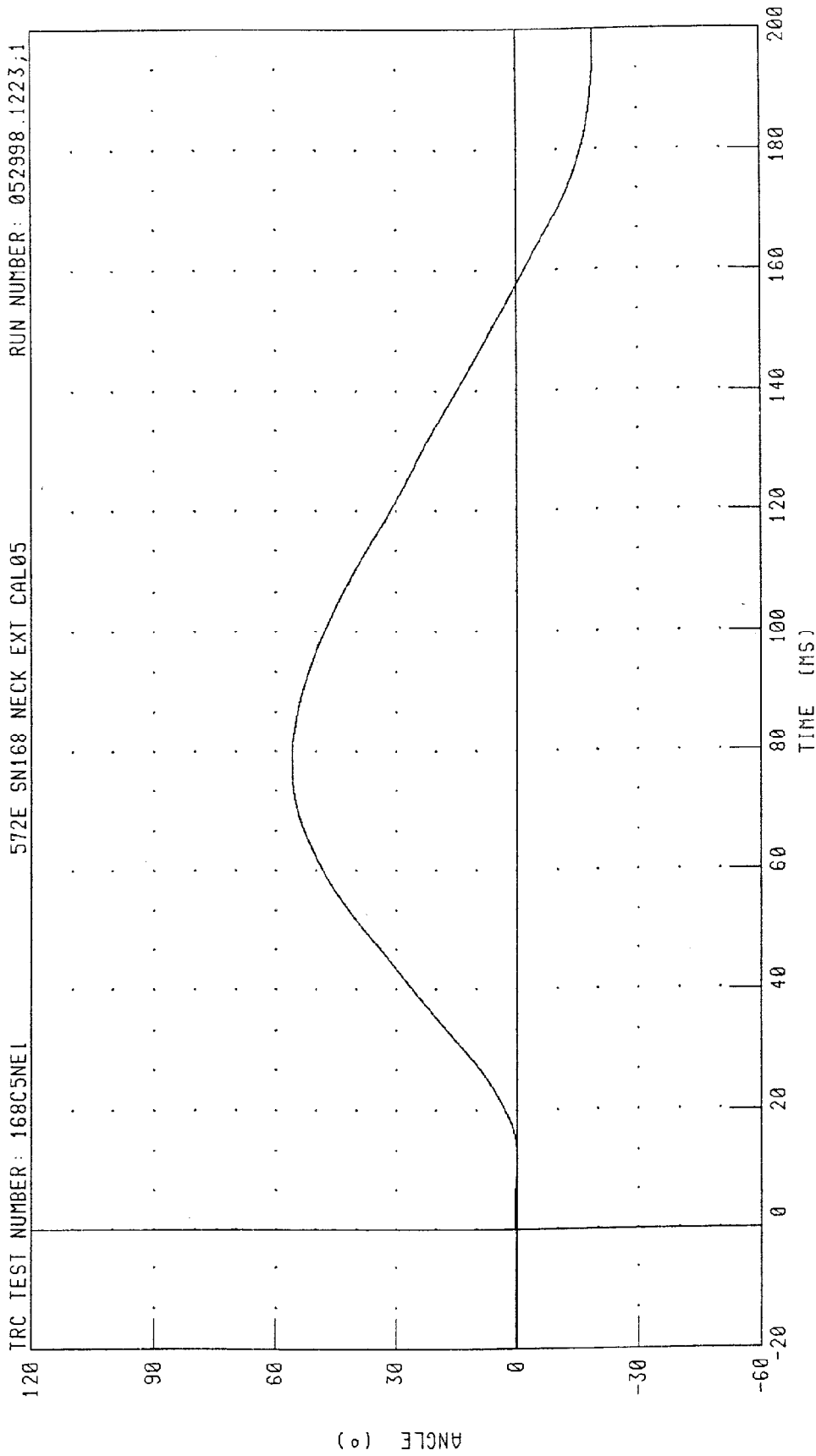


CHANNEL: BETA

FILTER: CH. CLASS 60

PEAK DATA: 41.50 ° @ 75.12 MS; -14.38 ° @ 197.60 MS

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



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 55.91 ° @ 78.40 MS; -19.22 ° @ 199.28 MS

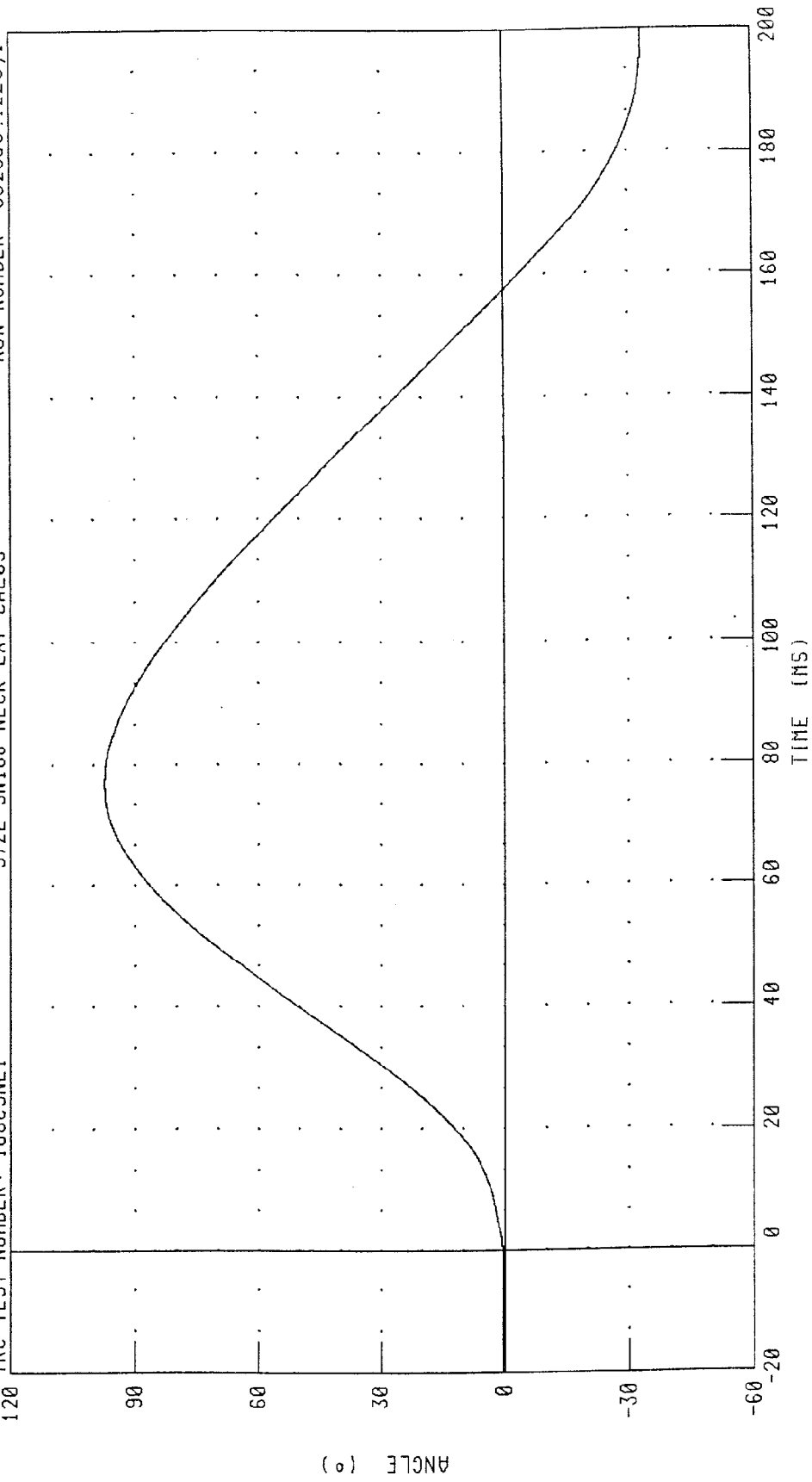
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 168C5NE1

572E SN168 NECK EXT CAL05

RUN NUMBER: 052998.1223;1

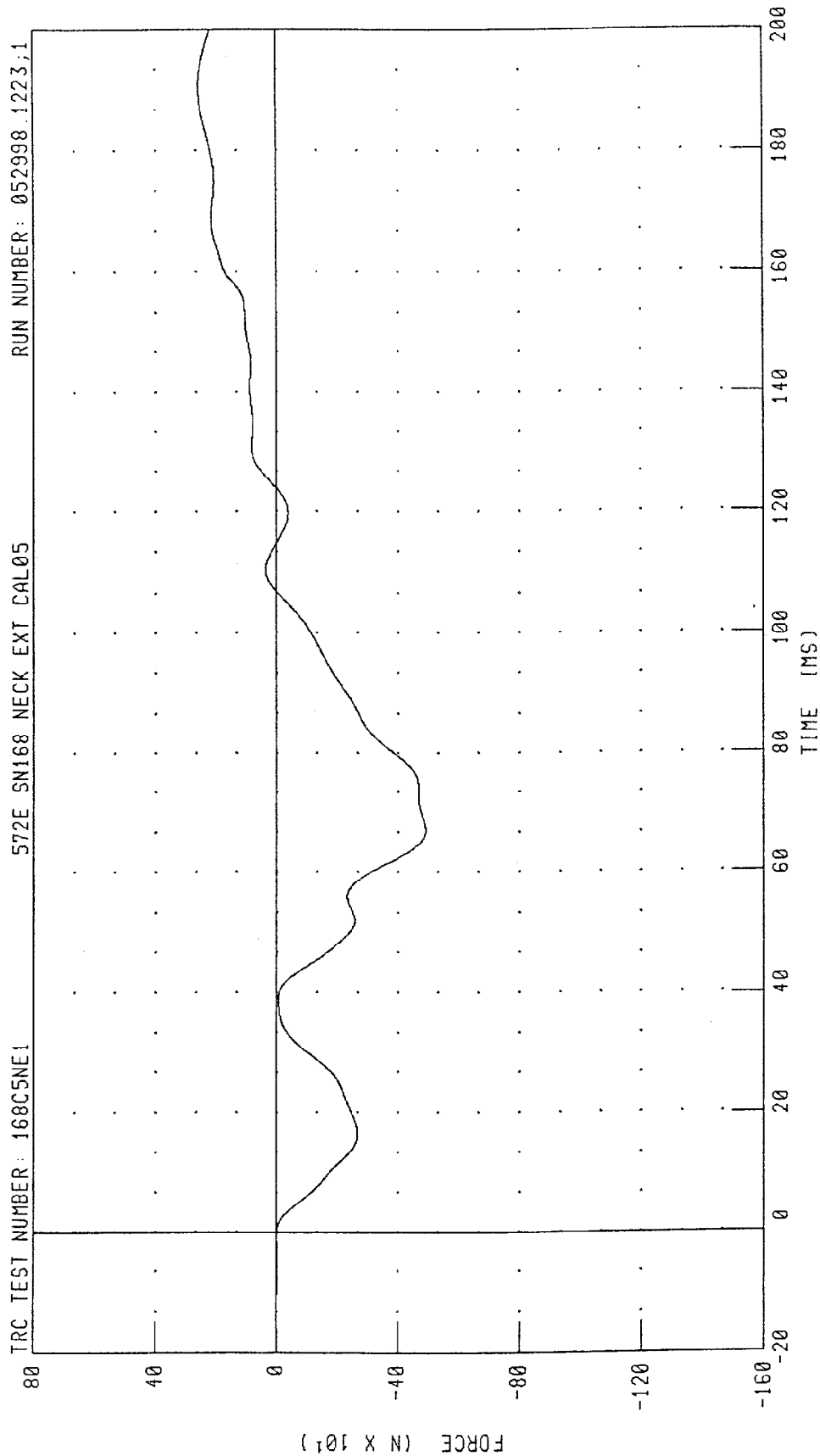


CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 97.34 ° @ 76.88 MS; -33.59 ° @ 197.76 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS



CHANNEL: NEKXF FILTER: CH. CLASS 60 PEAK DATA: 258.11 N @ 190.56 MS, -491.75 N @ 67.04 MS

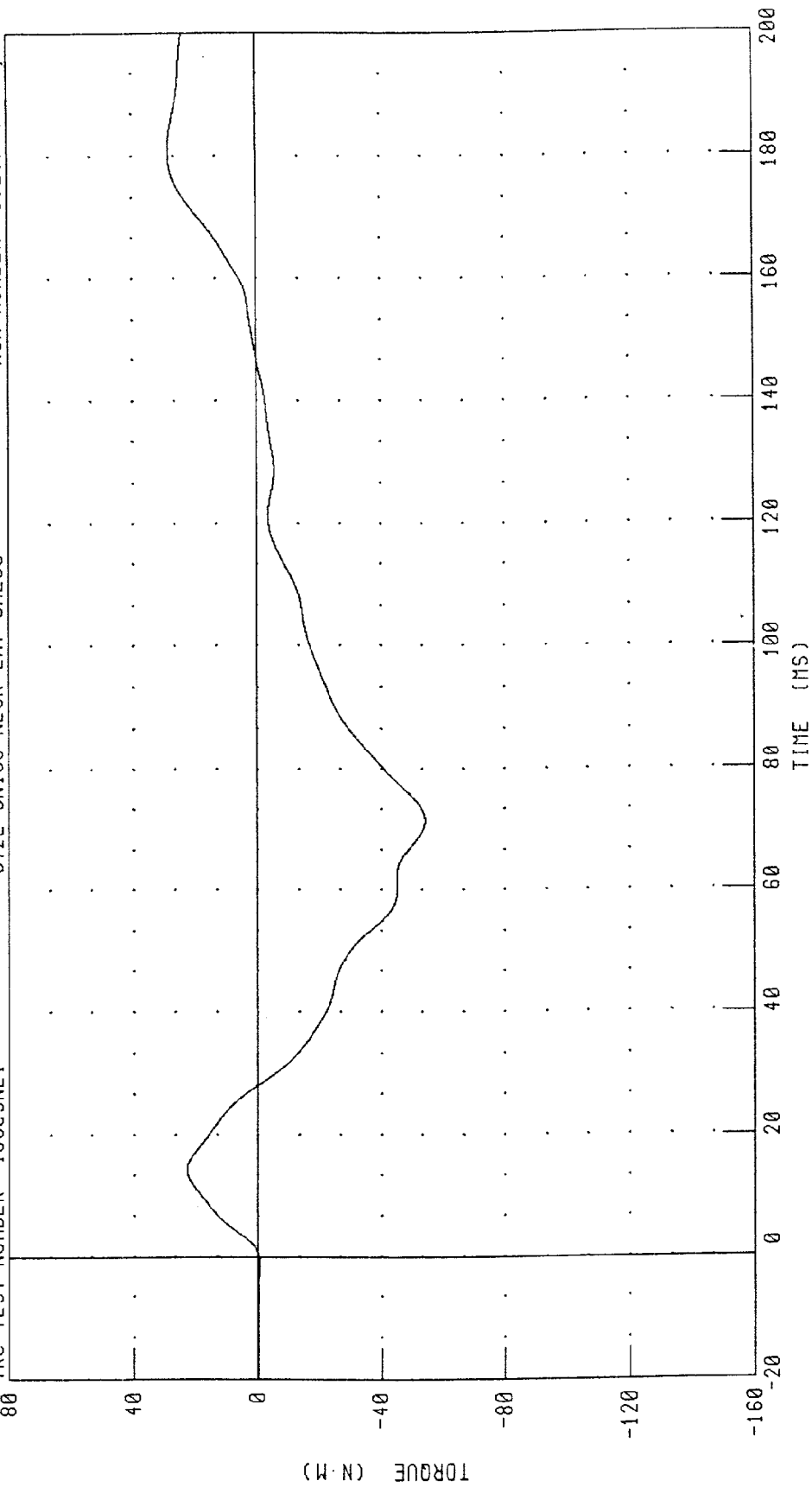
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 168C5NE1

572E SN168 NECK EXT CAL05

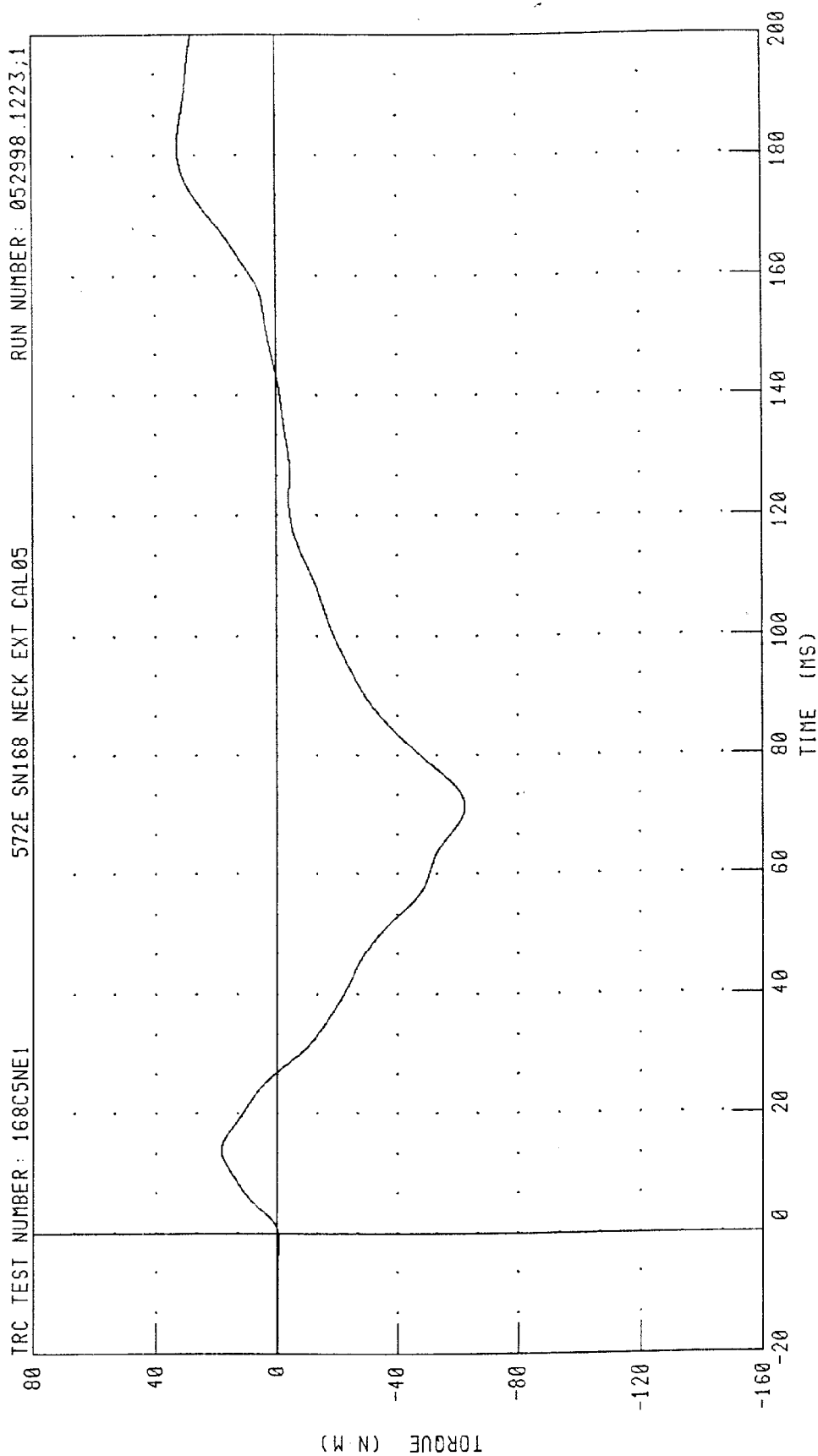
RUN NUMBER: 052998.1223,1



PEAK DATA: 28.43 N·M @ 180.80 MS; -54.26 N·M @ 71.52 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

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



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 32.41 N-M @ 181.52 MS; -62.62 N-M @ 71.44 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

01-JUN-98

TRC INC.

TEST NO: 168C5TH3

572E SN168 H.S.THORAX CAL05

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	65.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5808. N
INTERNAL HYSTERESIS	69% - 85%	70.9%

TEST MEETS SPECIFICATIONS

TECHNICIAN

B. Calt

RUN NUMBER: 060198.0753;1

PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C5TH3

572E SN168 H.S. THORAX CAL05

RUN NUMBER: 060198.0753;1

50

40

30

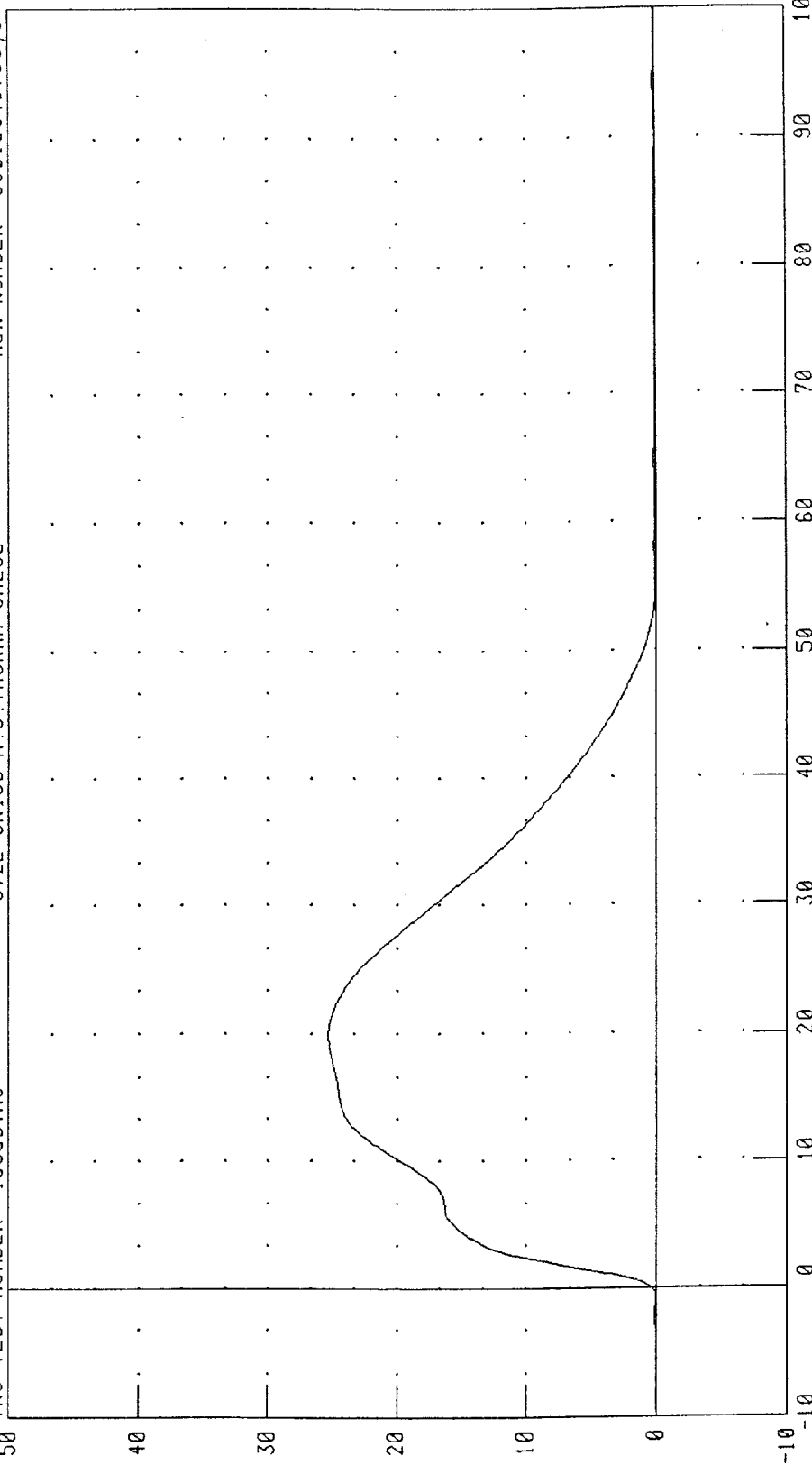
20

10

0

-10

ACCELERATION (G)



TIME (MS)

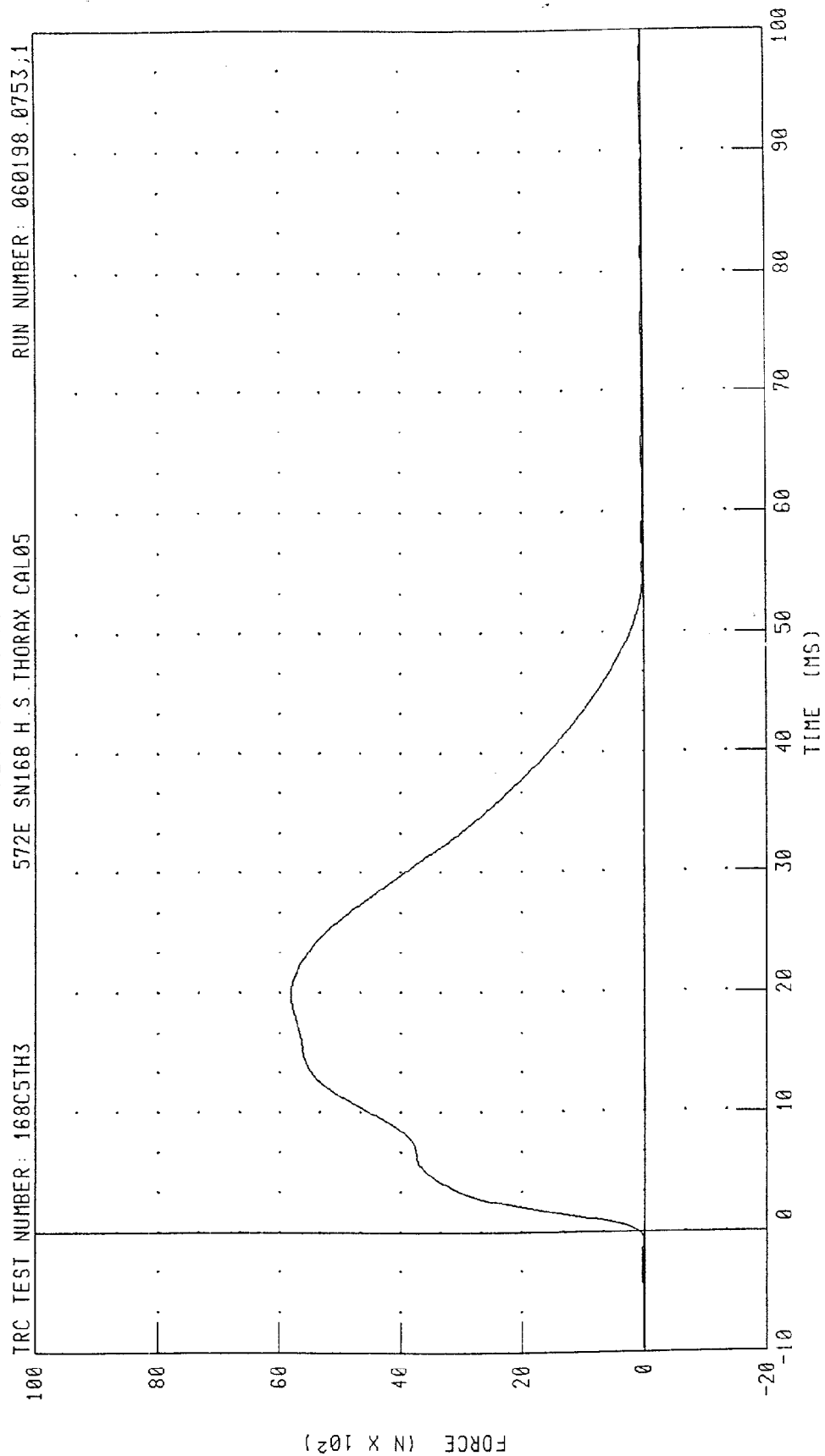
CHANNEL: PENXC

FILTER: CH. CLASS 180

PEAK DATA: 25.36 G @ 19.84 MS; 0.01 G @ 89.92 MS

PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE



CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 5808.94 N @ 19.84 MS; 1.50 N @ 89.92 MS

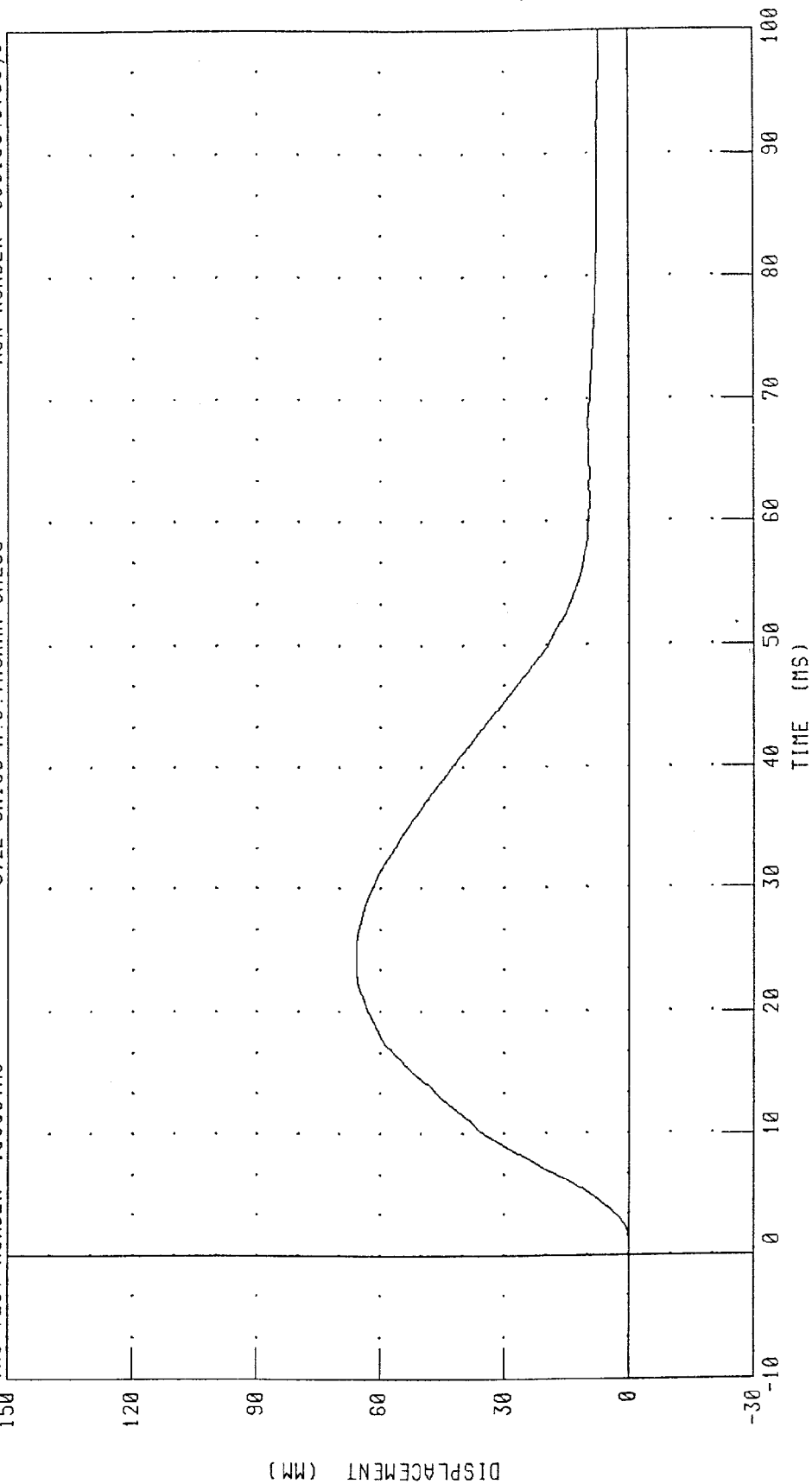
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 168C5TH3

572E SN168 H.S. THORAX CAL05

RUN NUMBER: 060198.0753;1



CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 65.78 MM @ 25.04 MS; -0.01 MM @ 0.72 MS

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

572E SN168 H.S. THORAX CAL05

TRC TEST NUMBER: 168C5TH3

100

80

60

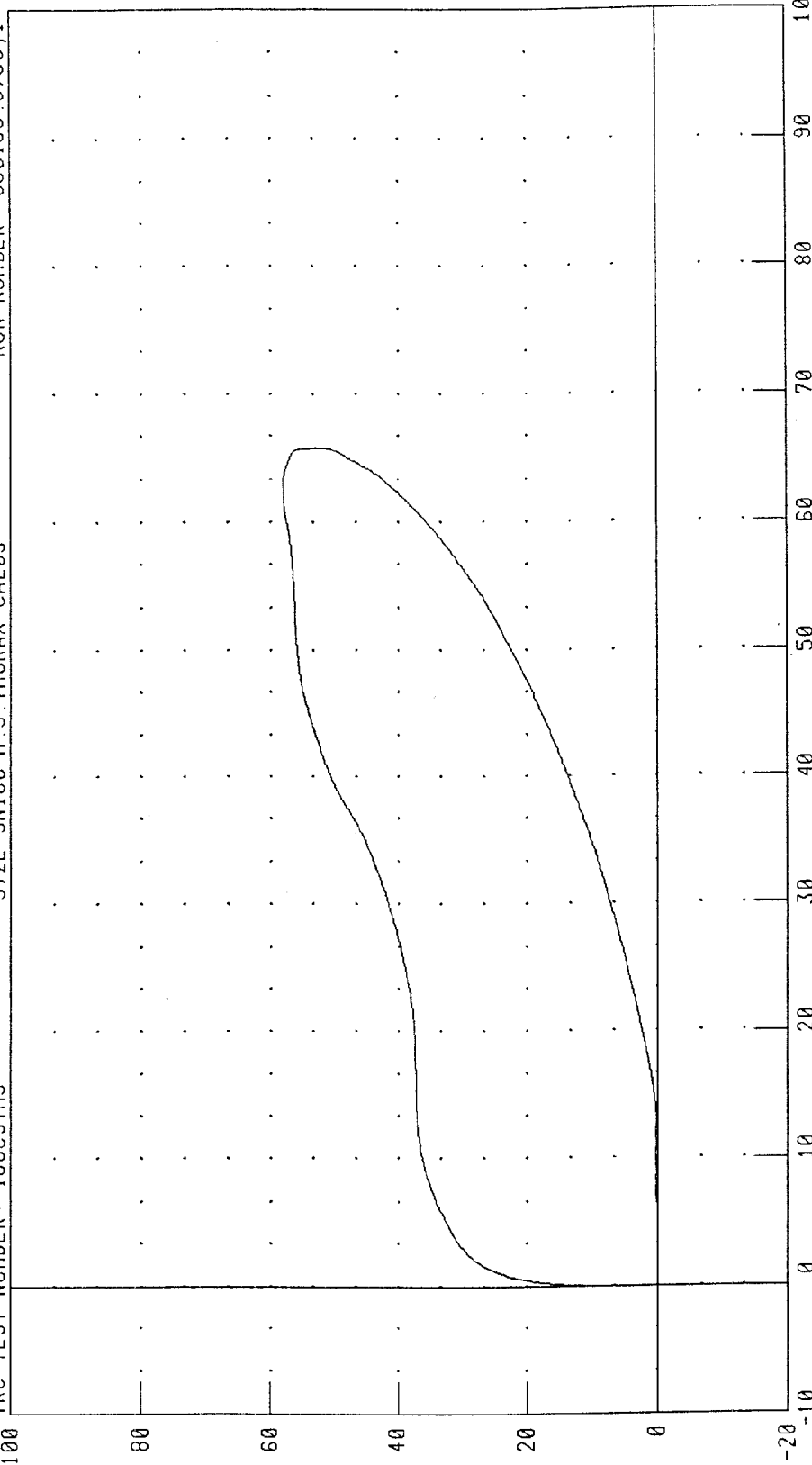
40

20

0

-20

FORCE (N X 10²)



DISPLACEMENT (MM)

CHANNEL: CSTXD
PENXF

FILTER: CH CLASS 180
CH CLASS 180

PEAK DATA:

65.78 MM @ 25.04 MS; -0.01 MM @ 0.72 MS
5008.94 N @ 19.84 MS; 1.50 N @ 89.92 MS

RUN NUMBER: 060198 0753;1

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

29-MAY-98

TRC INC.

TEST NO: 168C5RK2

572E SN168 RIGHT KNEE CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	56.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4872.7 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 052998.1023;1

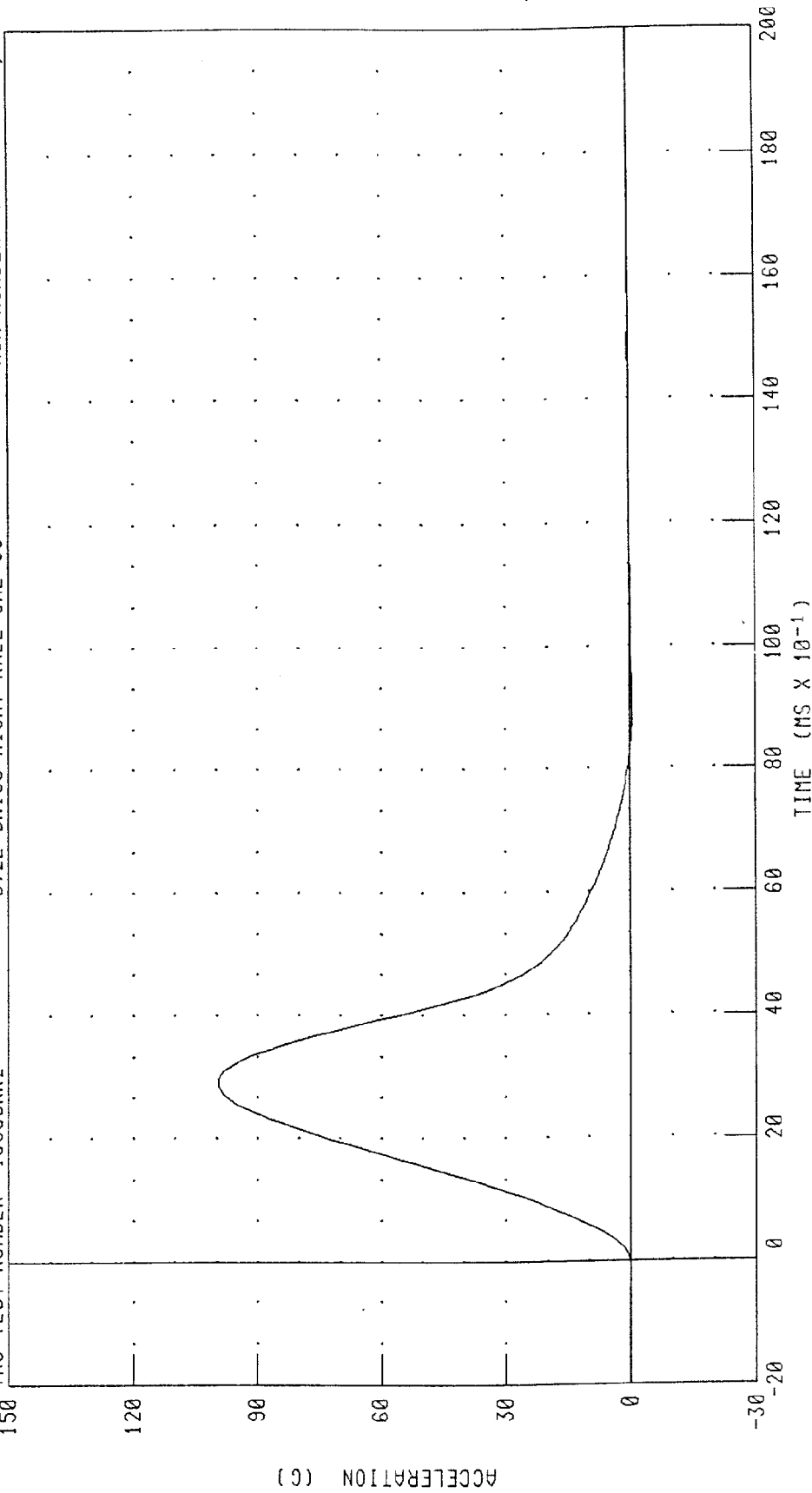
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 168C5RK2

572E SNI68 RIGHT KNEE CAL 05

RUN NUMBER: 052998.1024,1



CHANNEL: PENXC

FILTER: CH. CLASS 600

PEAK DATA: 99.59 G @ 2.88 MS; -0.51 G @ 9.04 MS

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KC PEND.)

572E SN168 RIGHT KNEE CAL 05

RUN NUMBER: 052998.1024;1

TRC TEST NUMBER: 168C5RK2

75

60

45

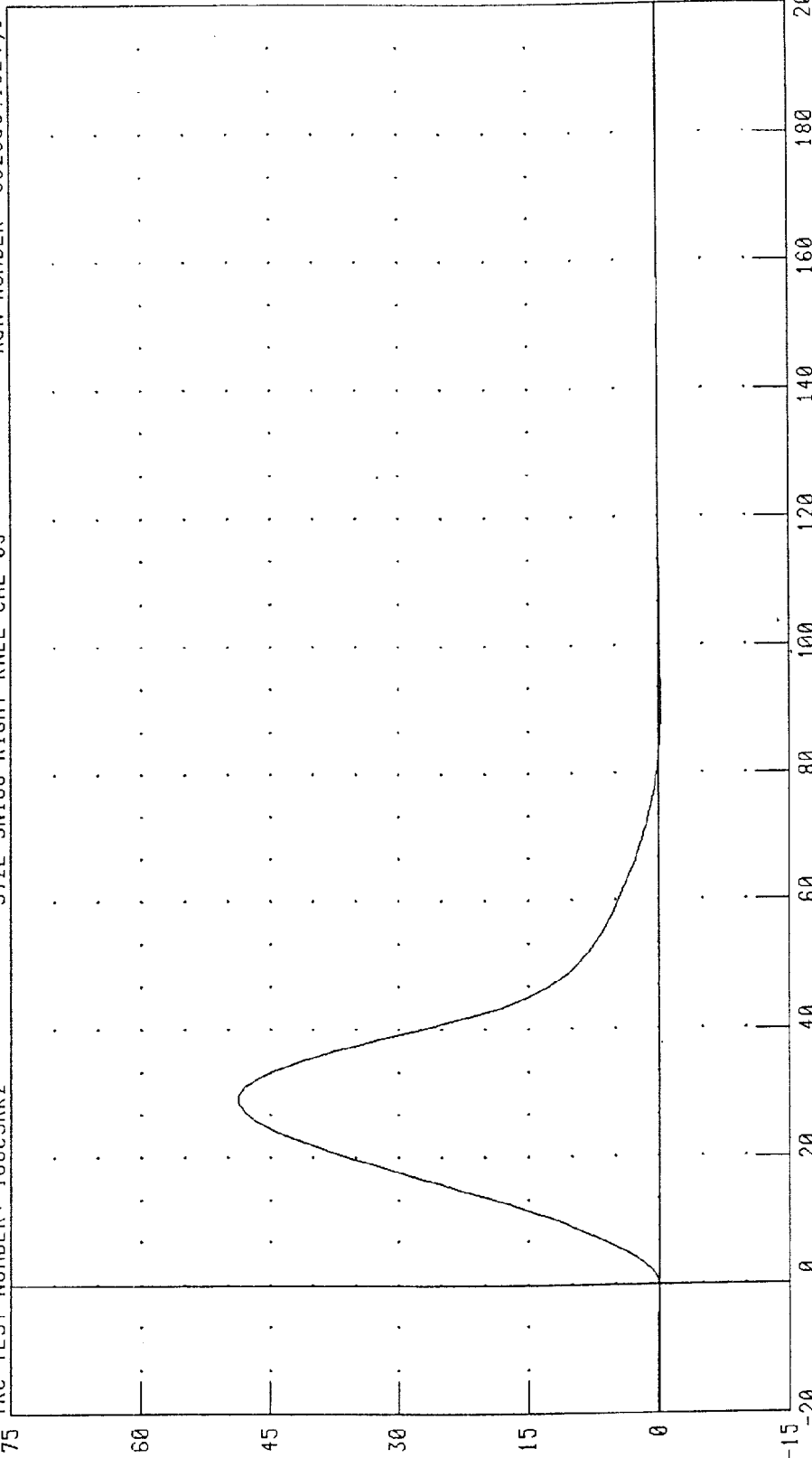
30

15

0

-15

FORCE (N X 10²)



TIME (MS X 10⁻¹)

CHANNEL: PENXF

FILTER: CH. CLASS 600

PEAK DATA: 4872.74 N @ 2.88 MS; -24.98 N @ 9.04 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

29-MAY-98

TRC INC.

TEST NO: 168C5LK2

572E SN168 LEFT KNEE CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	56.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4782.1 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 052998.1014;1

PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND.)

572E SN168 LEFT KNEE CAL 05 RUN NUMBER: 052998 1014,1

TRC TEST NUMBER: 16805LK2

150

120

90

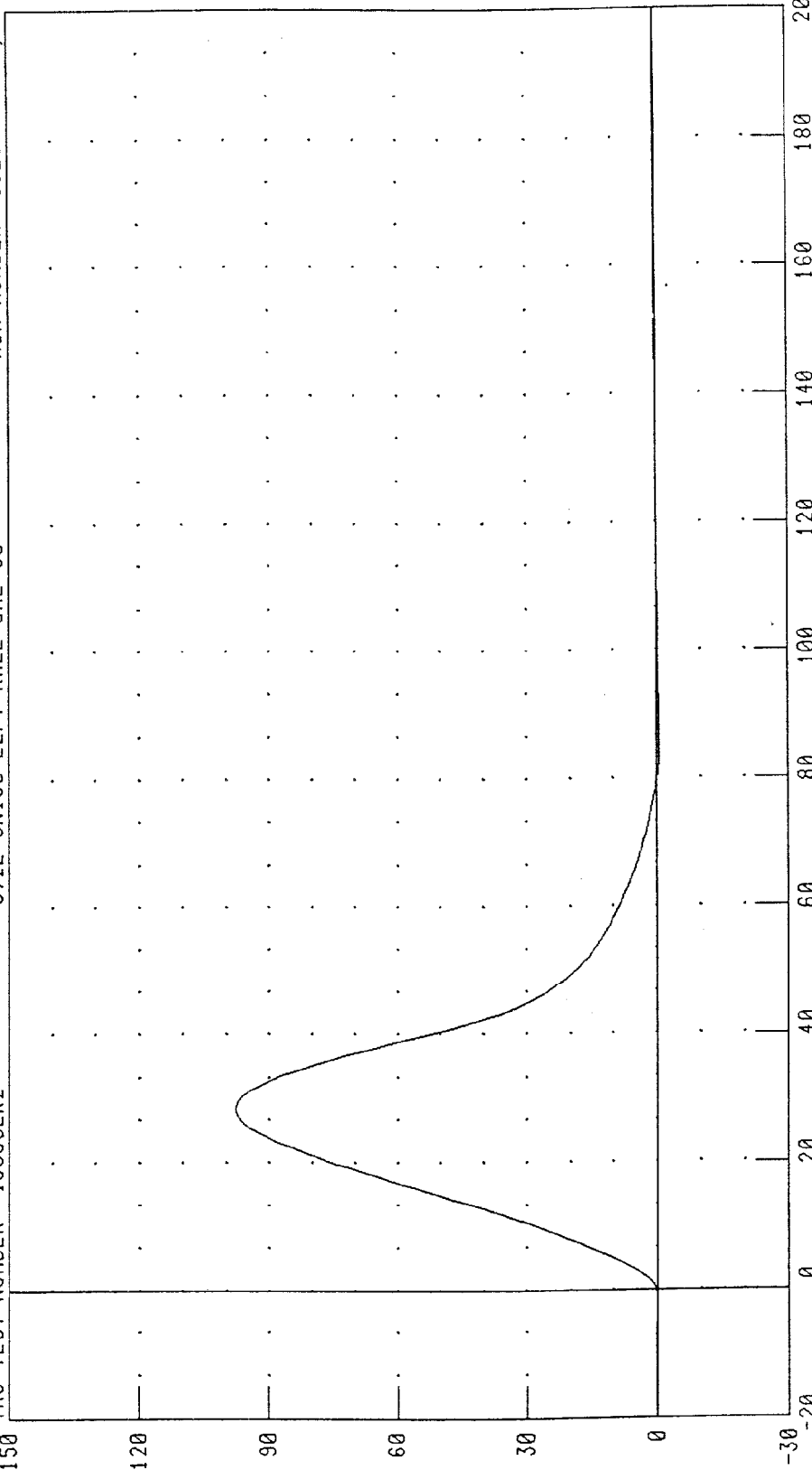
60

30

0

-30
-20

ACCELERATION (G)



TIME (MS X 10⁻¹)

PEAK DATA: 97.74 G @ 2.88 MS; -0.69 G @ 8.56 MS

CHANNEL: PENXC FILTER: CH. CLASS 600

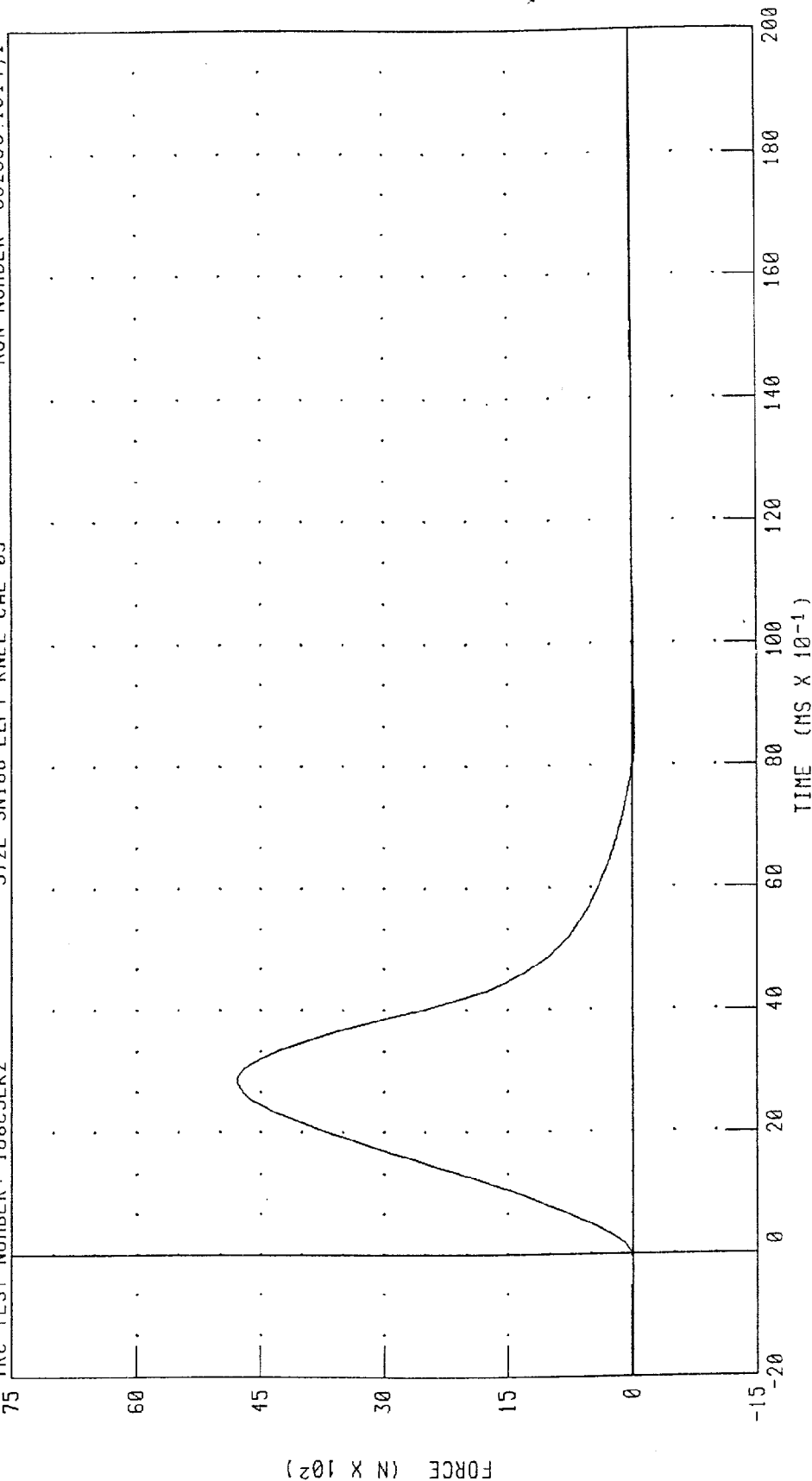
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN168 LEFT KNEE CAL 05

TRC TEST NUMBER: 168C5LK2

RUN NUMBER: 052998.1014;1



PEAK DATA: 4782.20 N @ 2.68 MS; -33.54 N @ 8.56 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Pre-Test Calibration

Target Vehicle Passenger Dummy S/N 289

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III SMALL FEMALE

18-MAY-98

TRC INC.

TEST NO: 289C4HD1

S.FEMALE SN289 HEAD DROP CAL4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	40.0 %
PEAK RESULTANT ACCELERATION	240 - 295 G	277.30 G
PEAK LATERAL ACCELERATION	15 G MAX	-5.98 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN By alt

RUN NUMBER: 051898.1228;1

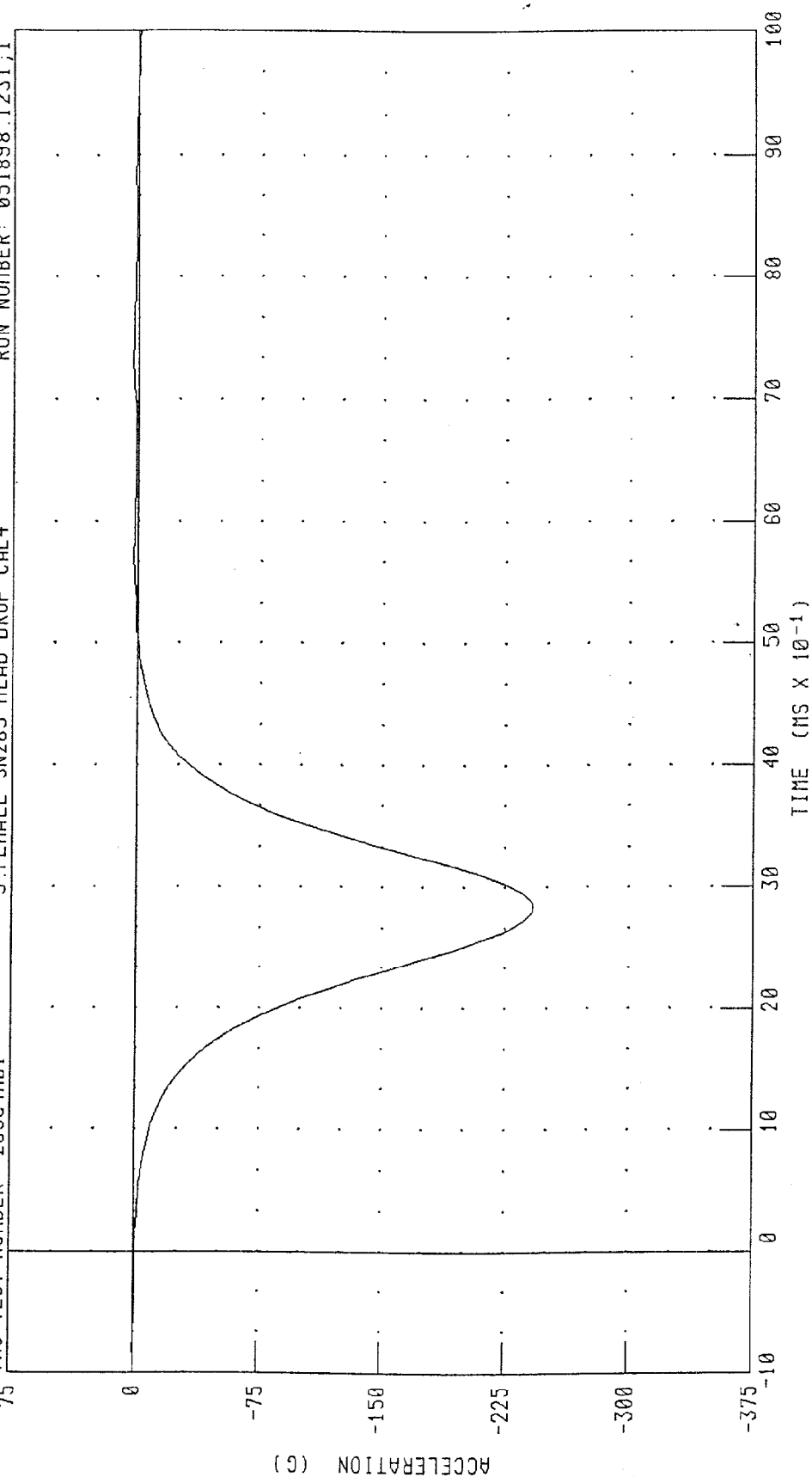
SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 289C4HD1

S.FEMALE SN289 HEAD DROP CAL4

RUN NUMBER: 051898.1231,1



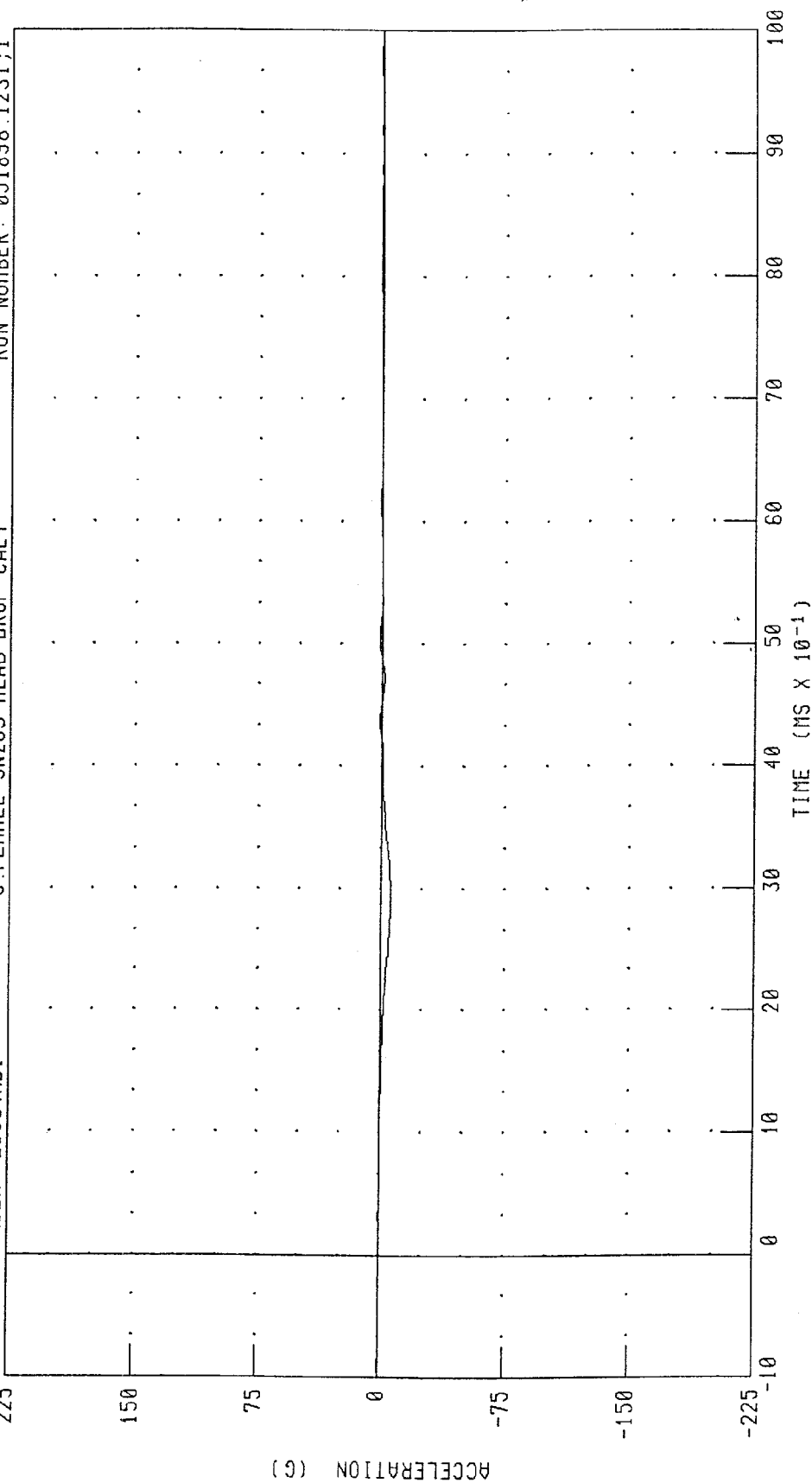
CHANNEL: HEDXC FILTER: CH. CLASS 1000

PEAK DATA: 3.20 G @ 7.28 MS, -241.69 G @ 2.80 MS

SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 289C4HD1 S. FEMALE SN289 HEAD DROP CAL4 RUN NUMBER: 051898.1231;1



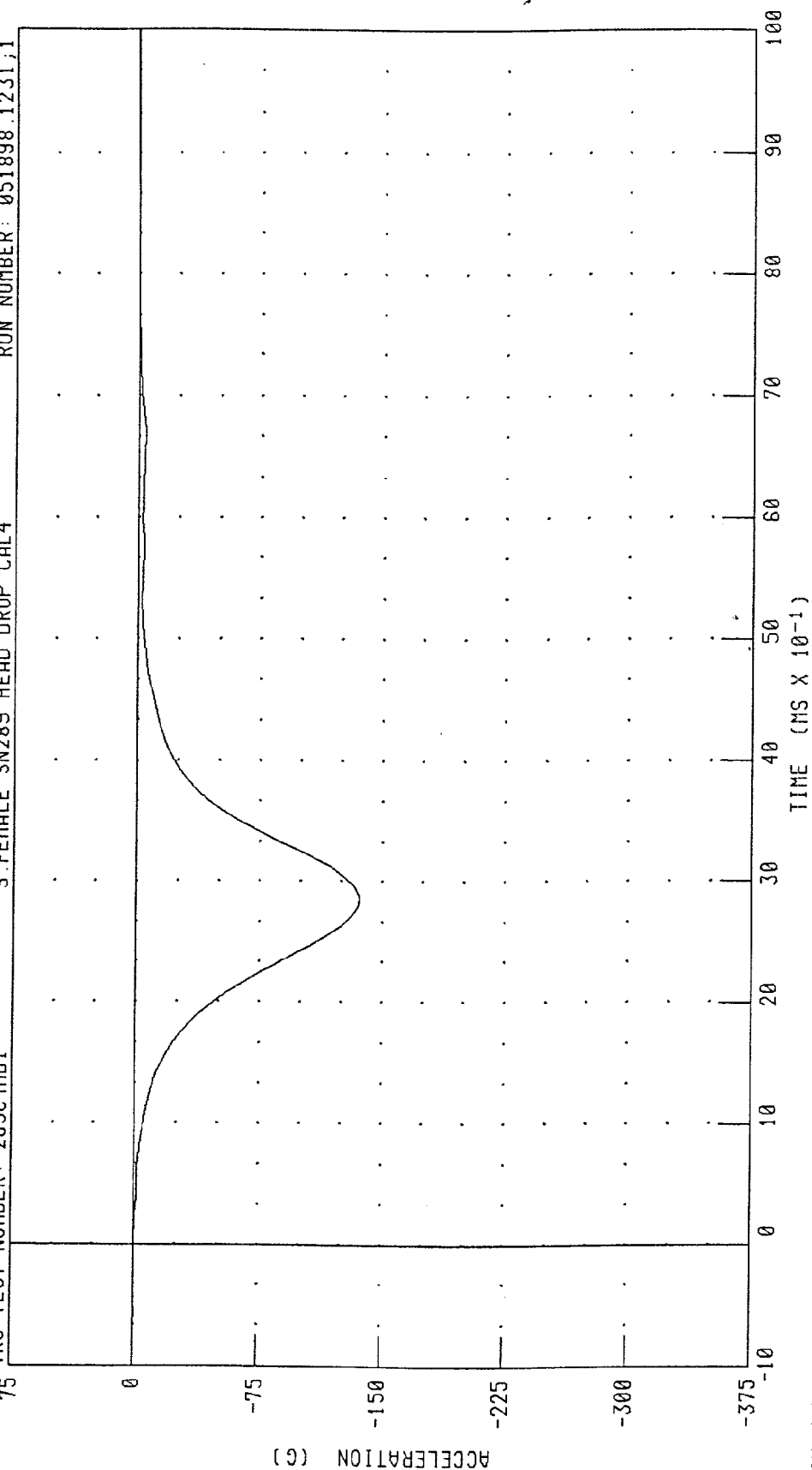
CHANNEL: HEDYC FILTER: CH. CLASS 1000

PEAK DATA: 1.11 G @ 5.04 MS; -5.98 G @ 2.88 MS

SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 289C4HD1 S.FEMALE SN289 HEAD DROP CAL4 RUN NUMBER: 051898.1231,1



CHANNEL: HEDZG FILTER: CH. CLASS 1000

PEAK DATA: 1.11 G @ 9.20 MS; -136.17 G @ 2.88 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

18-MAY-98

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 289C4NF2 S.FEMALE SN289 NECK FLEX. CAL4

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	40.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.12 M/S
INTEGRATED PENDULUM VELOCITY	10 MS	2.1 - 2.5 M/S	2.36 M/S
	20 MS	4.0 - 5.0 M/S	4.67 M/S
	30 MS	5.8 - 7.0 M/S	6.53 M/S
PEAK D-PLANE ROTATION		78 - 96 DEG.	87.11 DEG.
ROTATION ANGLE DECAY TIME FROM PEAK TO ZERO		57 - 69 MS	65.60 MS
PEAK MOMENT ABOUT OCCIPITAL CONDYLE		69 - 84 NM	71.59 NM
POSITIVE MOMENT DECAY TIME FROM PEAK TO ZERO		41 - 50 MS	45.76 MS
TIME OF PEAK ROTATION AFTER PEAK MOMENT		2 - 12 MS	11.12 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Bjalt

RUN NUMBER: 051898.1517;1

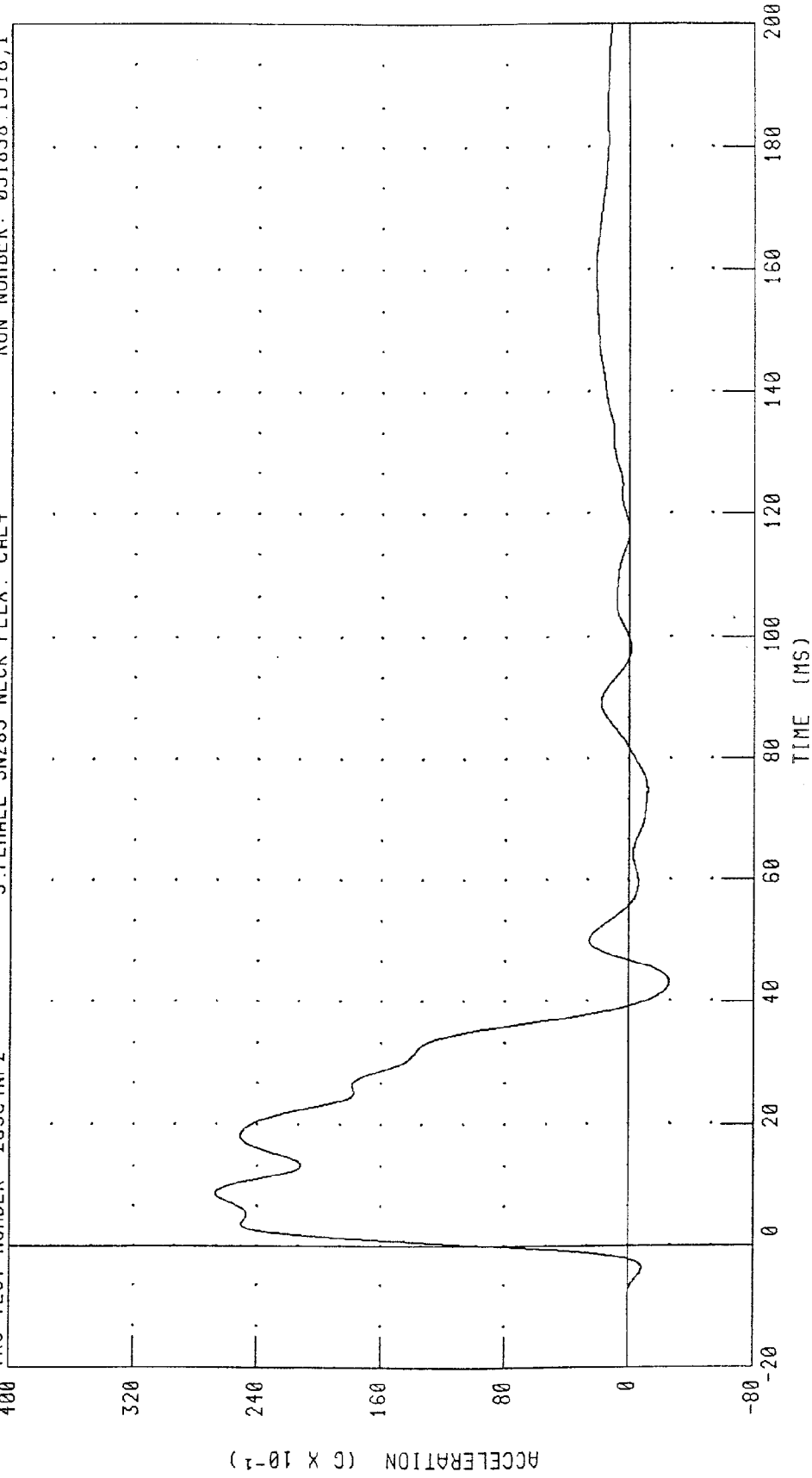
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 289C4NF2

S. FEMALE SN289 NECK FLEX. CAL4

RUN NUMBER: 051898.1518;1



CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 26.72 G @ 8.88 MS; -2.61 G @ 43.04 MS

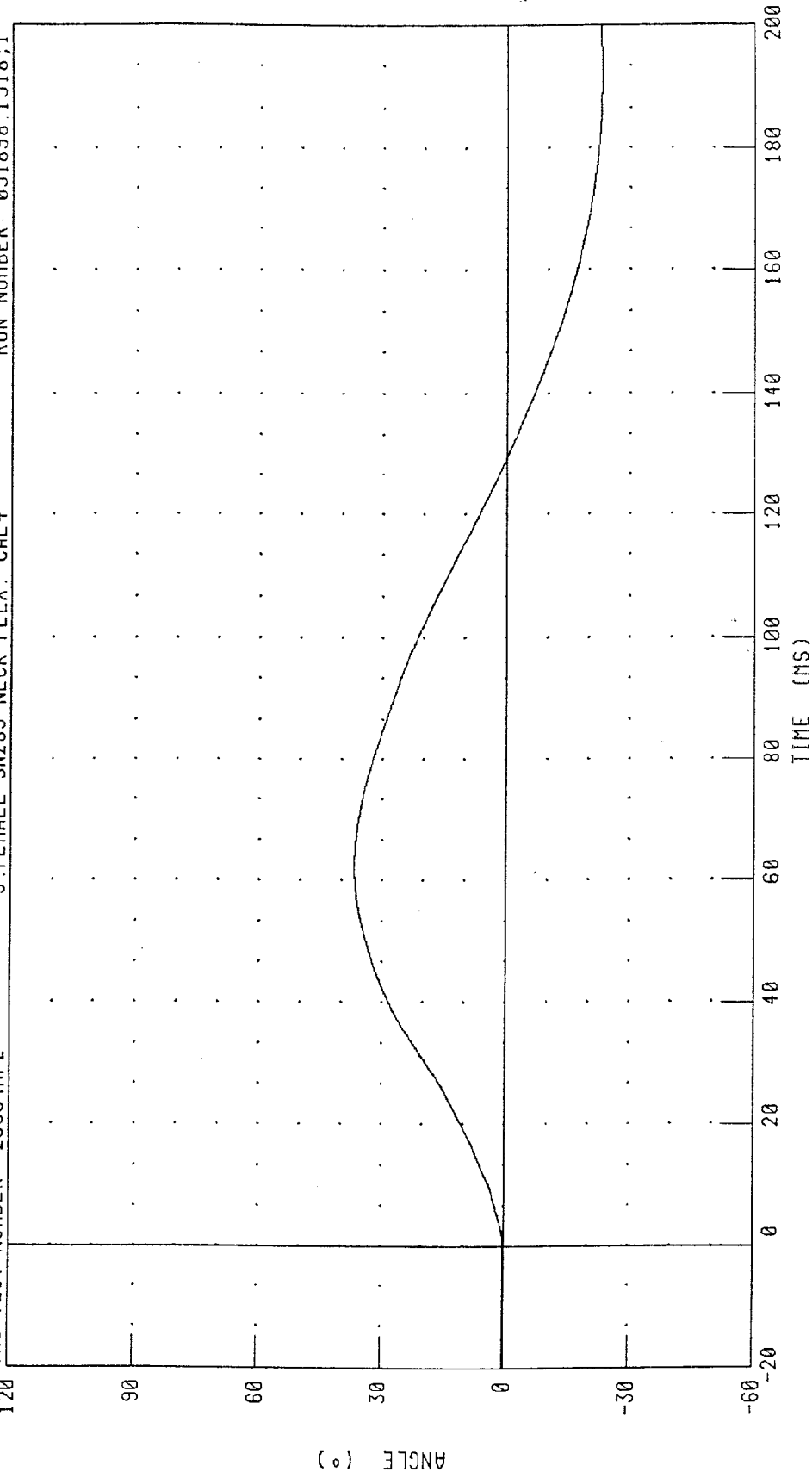
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 289C4NF2

S.FEMALE SN289 NECK FLEX. CAL4

RUN NUMBER: 051898.1518,1



CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 36.69 ° @ 62.32 MS, -23.11 ° @ 192.72 MS

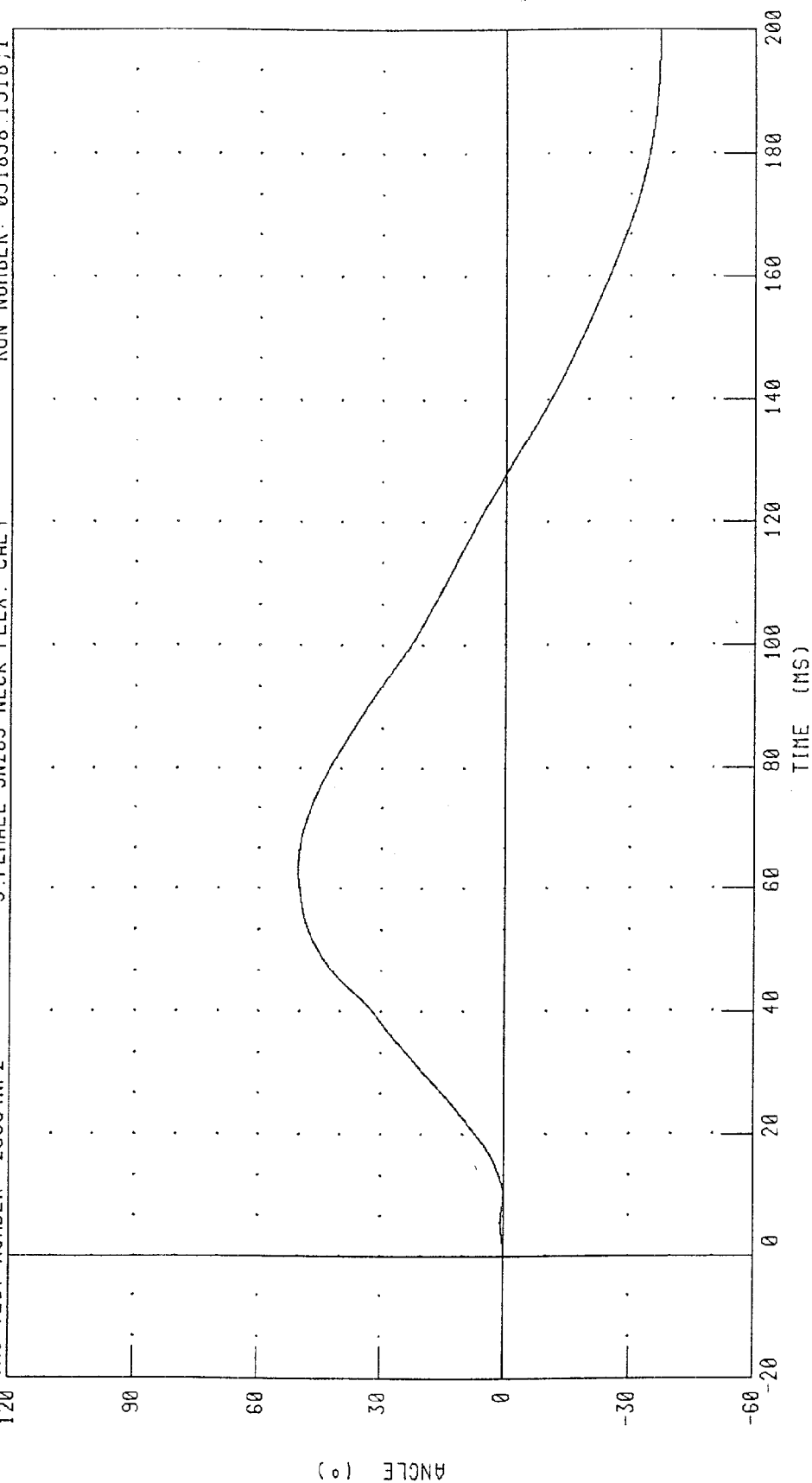
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 289C4NF2

S. FEMALE SN289 NECK FLEX. CAL4

RUN NUMBER: 051898.1518,1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 50.43 ° @ 63.12 MS, -37.10 ° @ 197.36 MS

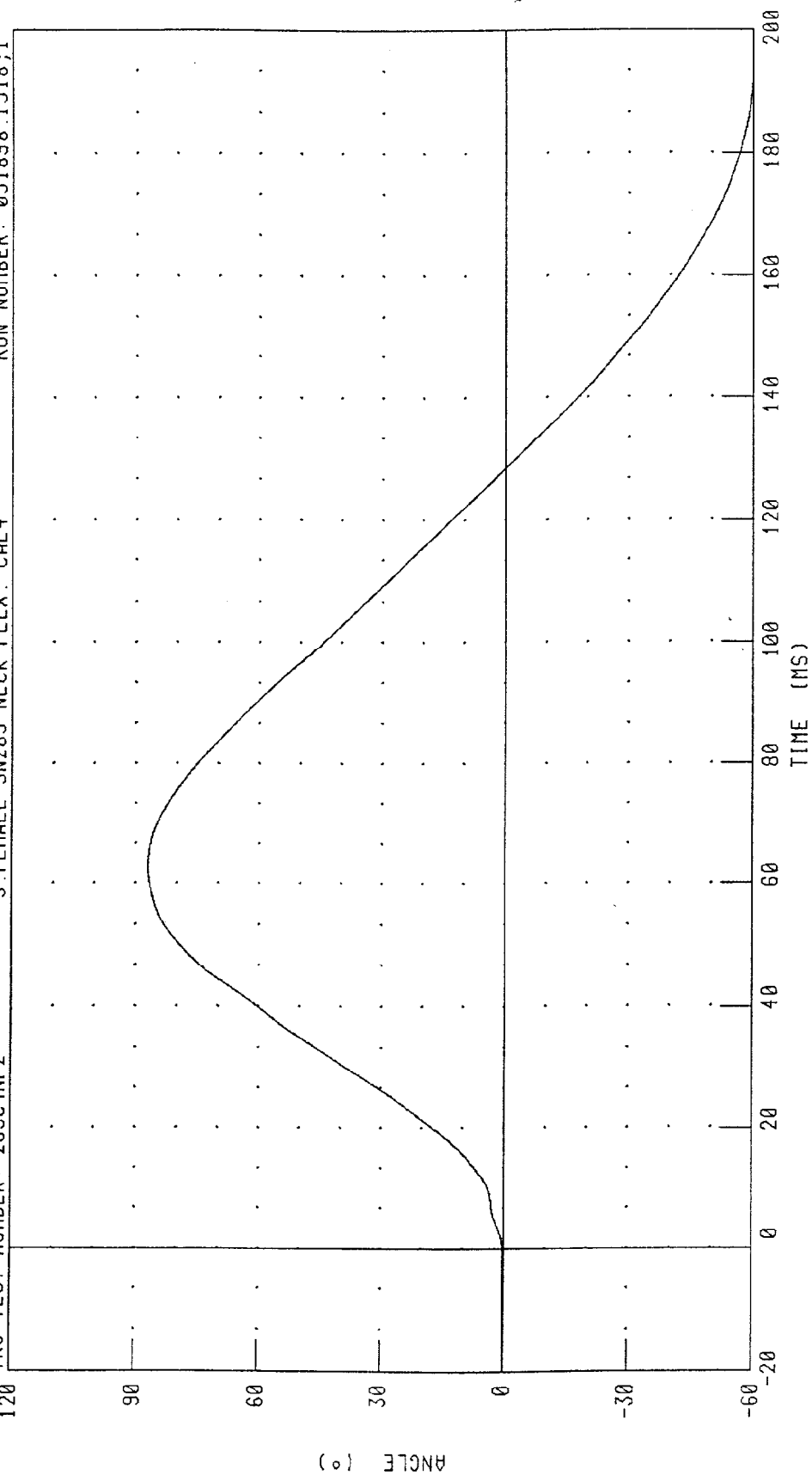
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 289C4NF2

S. FEMALE SN289 NECK FLEX. CAL4

RUN NUMBER: 051898.1518;1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 87.11 ° @ 62.88 MS; -60.16 ° @ 196.16 MS

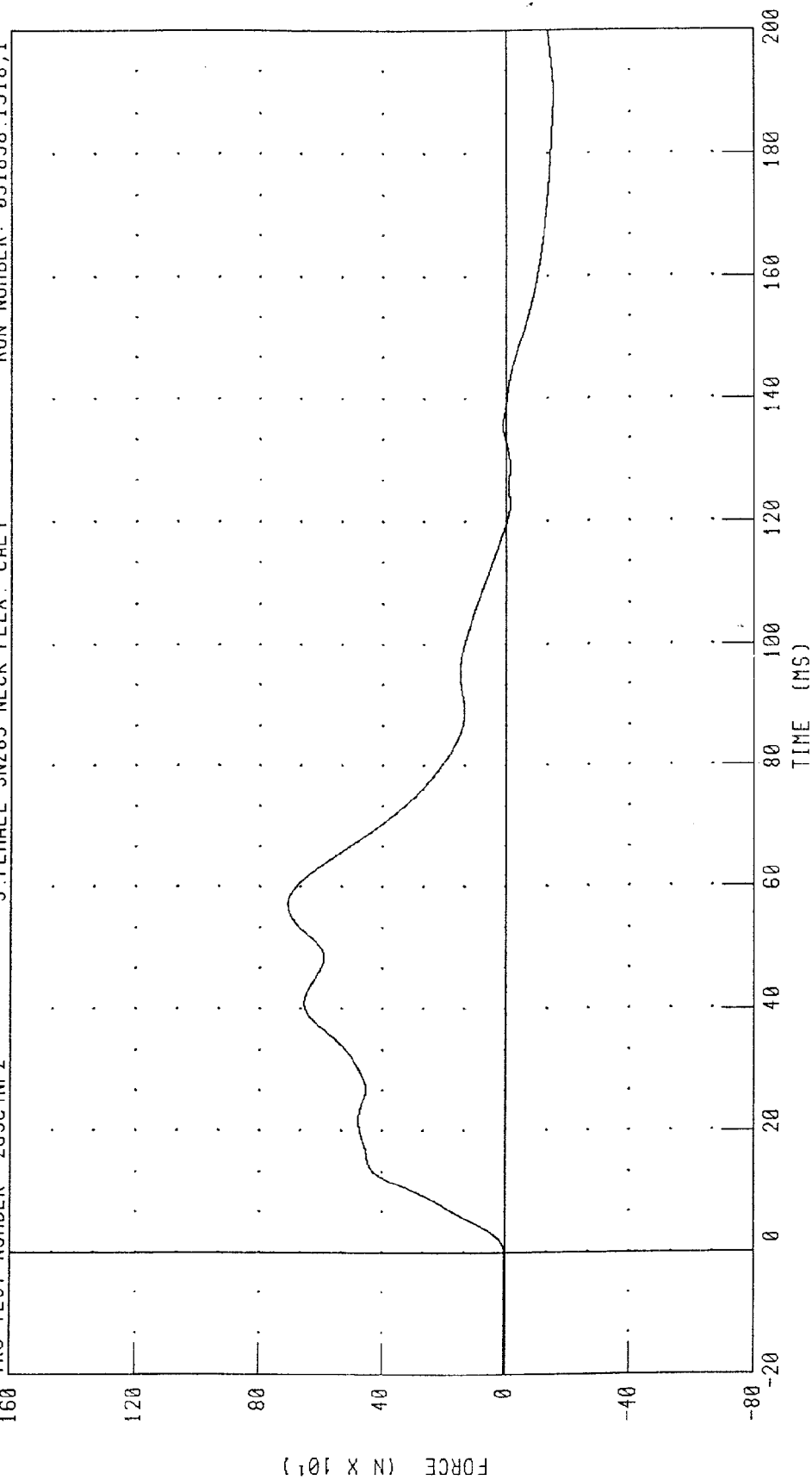
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 289C4NF2

S. FEMALE SN289 NECK FLEX. CAL4

RUN NUMBER: 051898.1518,1



PEAK DATA: 708.45 N @ 57.12 MS; -152.61 N @ 189.76 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

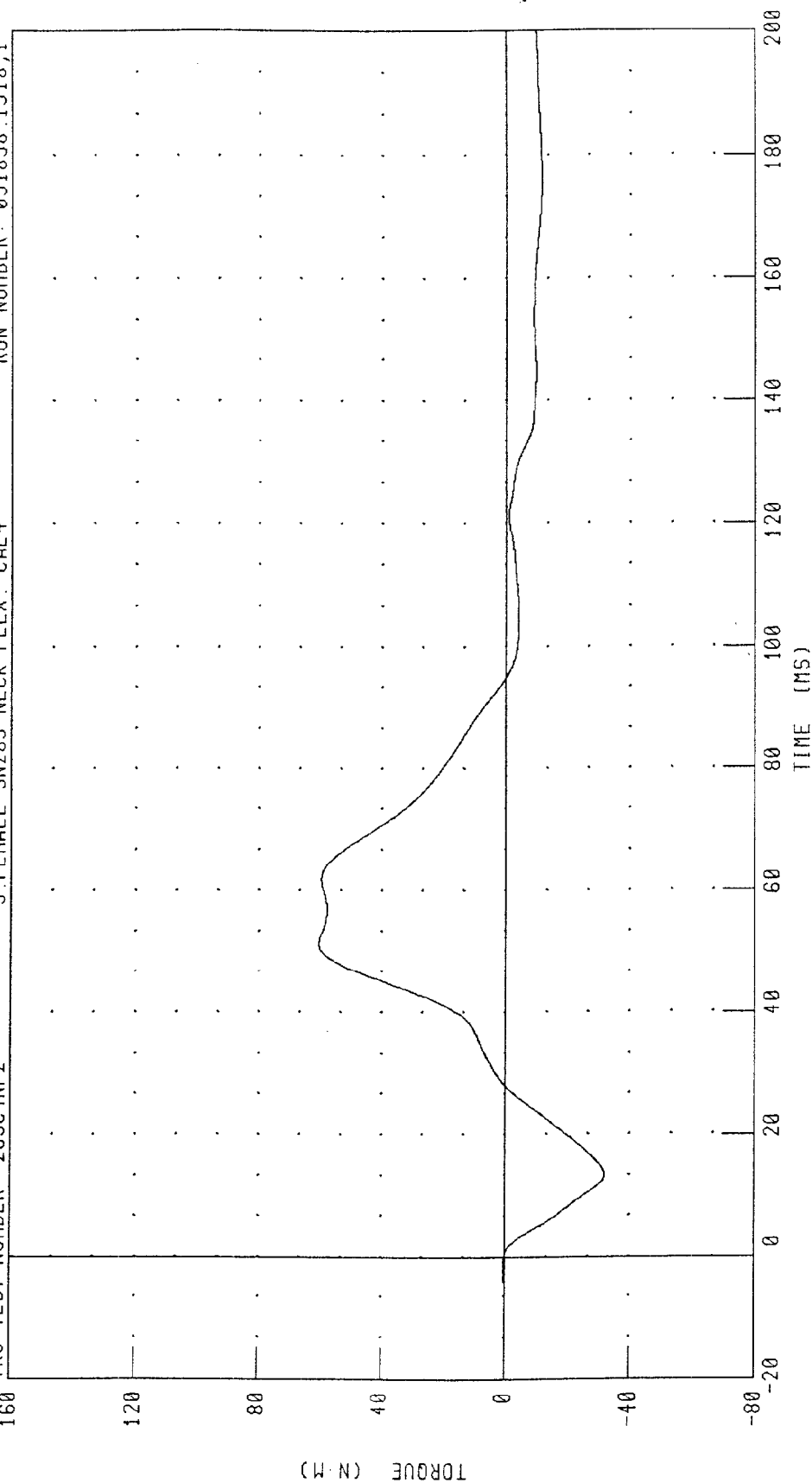
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 289C4NF2

S. FEMALE SN289 NECK FLEX. CAL 4

RUN NUMBER: 051898.1518;1



CHANNEL: NEKYM FILTER: CH. CLASS 60

PEAK DATA: 60.43 N-M @ 51.28 MS, -31.97 N-M @ 13.44 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

19-MAY-98

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC.

TEST NO: 289C4NE1

S.FEMALE SN289 NECK EXT. CAL4

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	40.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.10 M/S
INTEGRATED PENDULUM VELOCITY	10 MS	1.5 - 1.9 M/S	1.83 M/S
	20 MS	3.1 - 3.9 M/S	3.69 M/S
	30 MS	4.6 - 5.6 M/S	5.49 M/S
PEAK D-PLANE ROTATION		97 - 119 DEG.	105.05 DEG.
ROTATION ANGLE DECAY AT THE 10 NM MOMENT LEVEL		80 - 96 DEG.	80.78 DEG.
PEAK MOMENT ABOUT OCCIPITAL CONDYLE		54 - 67 NM	-65.79 NM
NEGATIVE MOMENT DECAY TIME FROM PEAK TO 10 NM LEVEL		28 - 38 MS	34.16 MS
TIME OF PEAK ROTATION AFTER PEAK MOMENT		0 - 10 MS	4.96 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

RUN NUMBER: 051998.0907;2

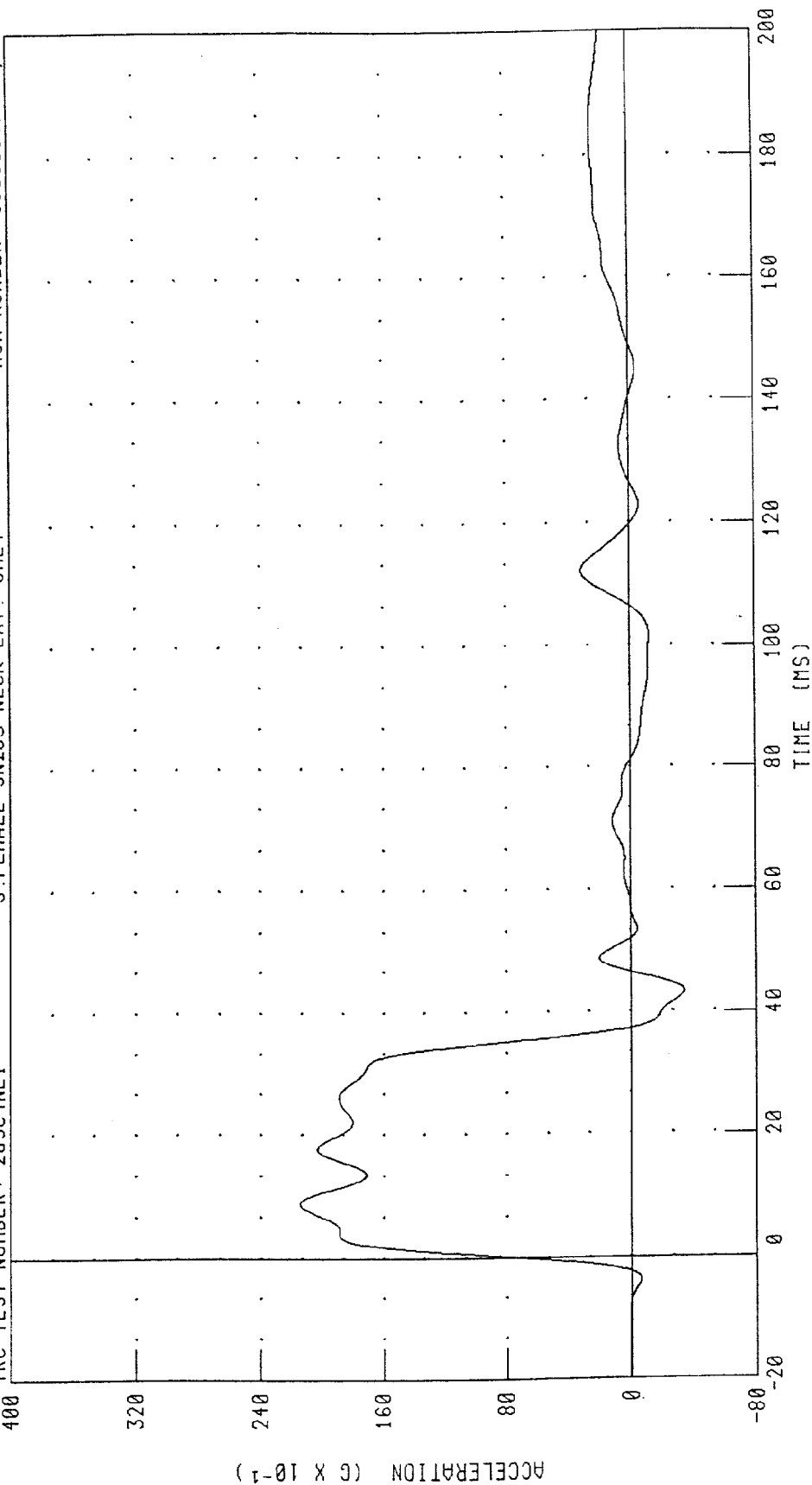
SMALL FEMALE NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 289C4NE1

S.FEMALE SN289 NECK EXT. CAL4

RUN NUMBER: 051998.0907;2



PEAK DATA: 21.46 G @ 8.88 MS, -3.40 G @ 43.28 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

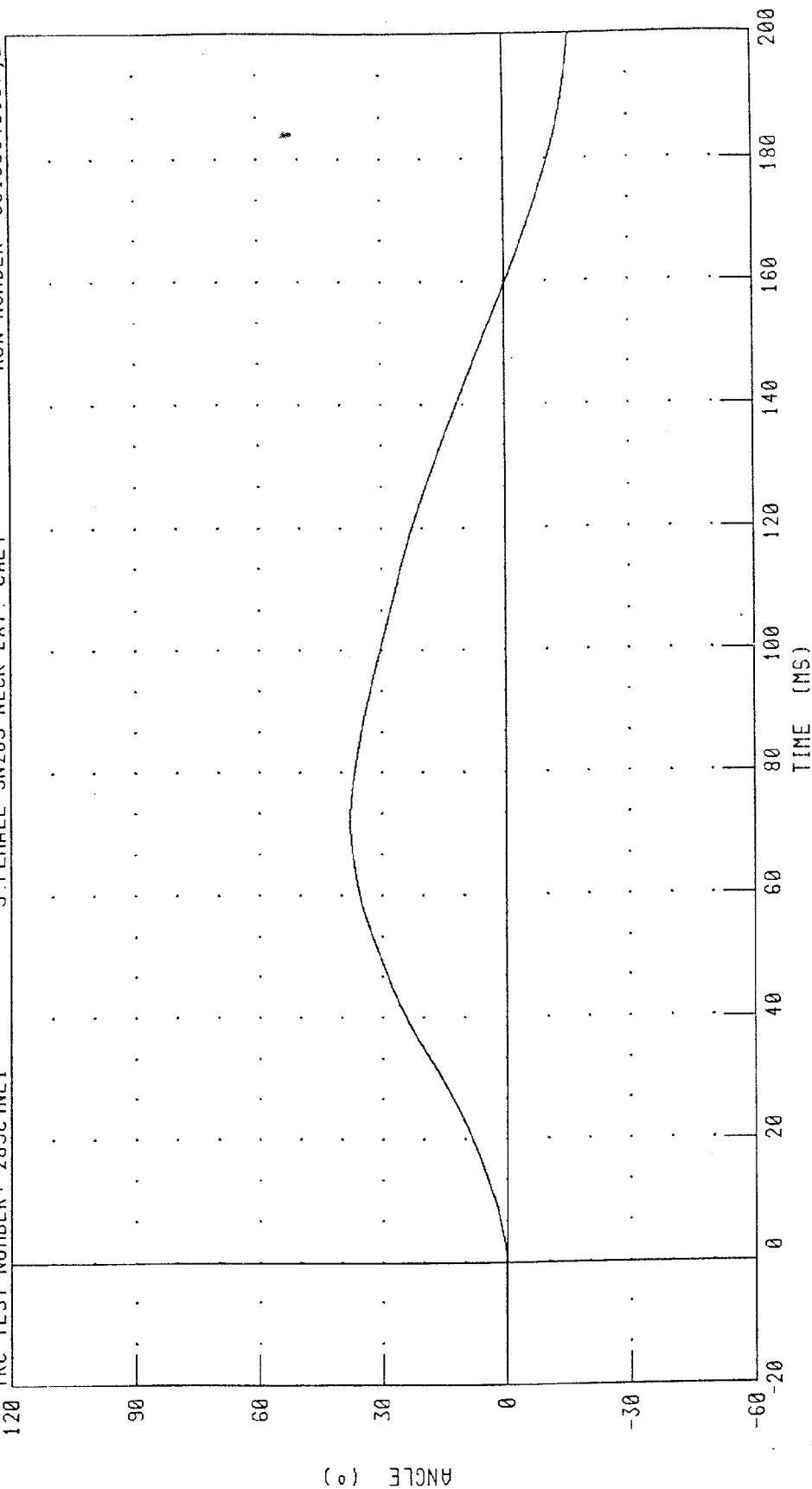
SMALL FEMALE NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 289C4NE1

S. FEMALE SN289 NECK EXT. CAL4

RUN NUMBER: 051998.0907,2

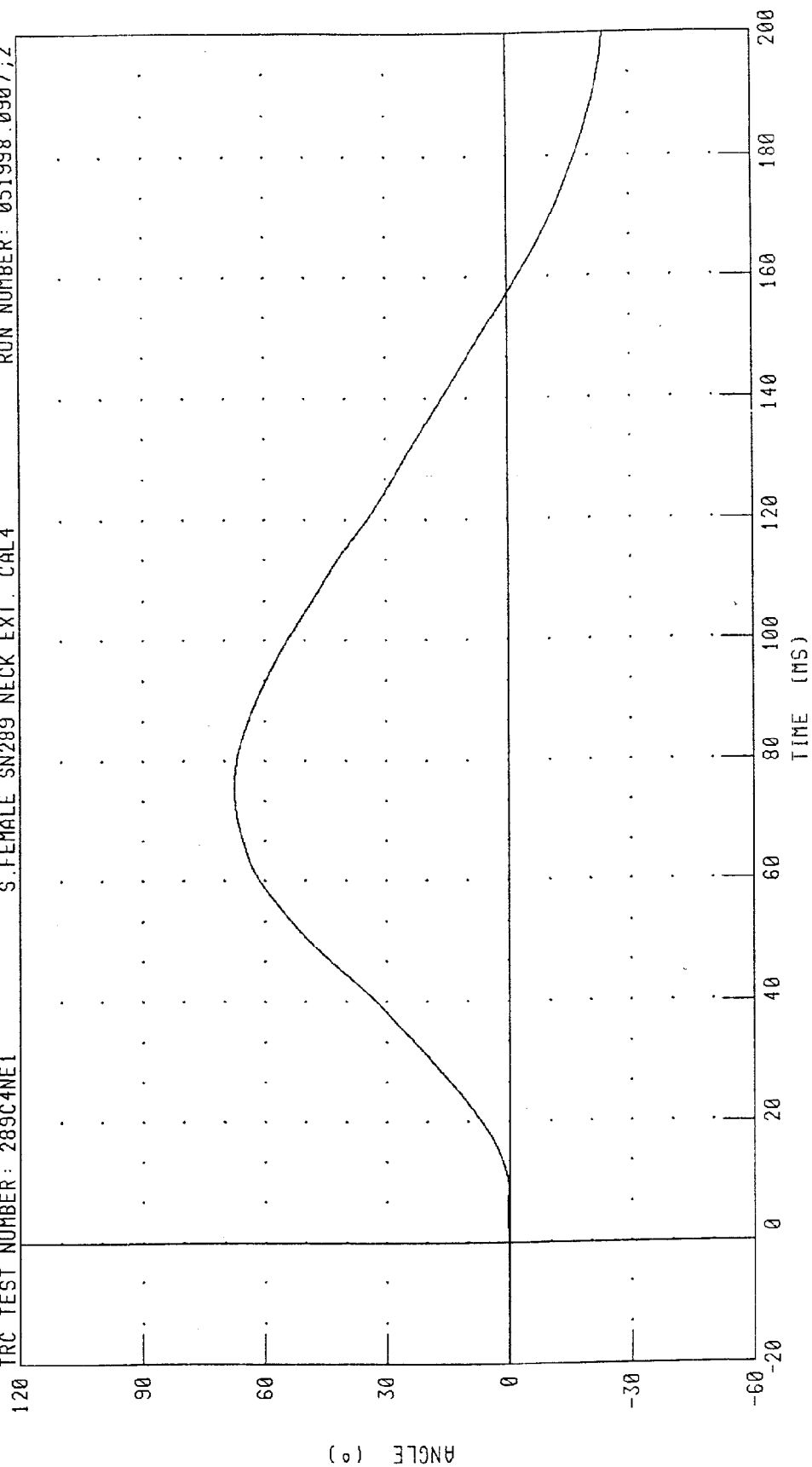


CHANNEL: BETA FILTER: CH. CLASS 60

SMALL FEMALE NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
S. FEMALE SN289 NECK EXT. CAL4

TRC TEST NUMBER: 289C4NE1

RUN NUMBER: 051998.0907,2



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 67.48 ° @ 75.76 MS; -23.71 ° @ 200.00 MS

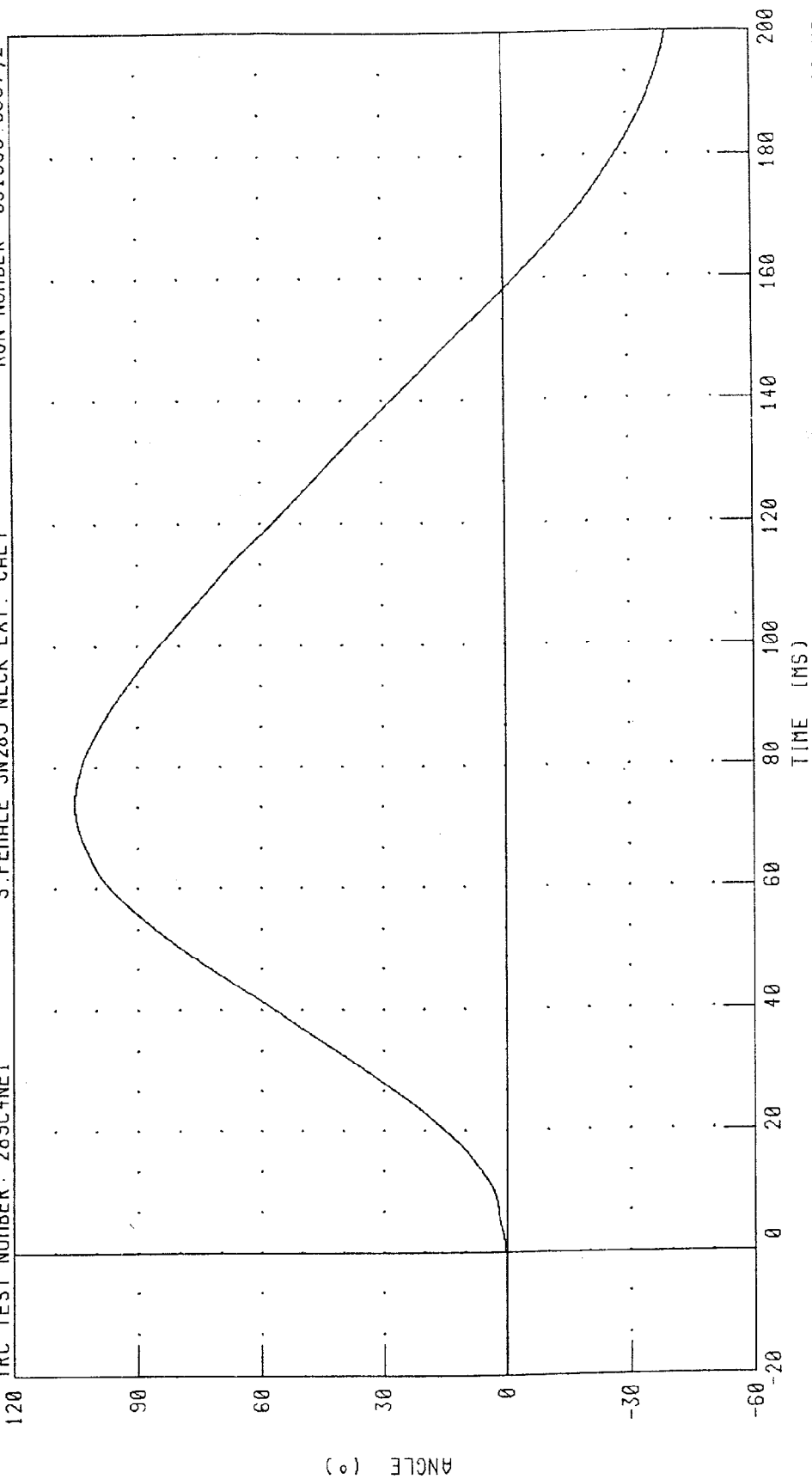
SMALL FEMALE NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 289C4NE1

S. FEMALE SN289 NECK EXT. CAL4

RUN NUMBER: 051998 0907;2



CHANNEL: TOTAL

FILTER: CH. CLASS 60

TIME (MS)

PEAK DATA: 105.05 ° @ 74.00 MS; -39.74 ° @ 200.00 MS

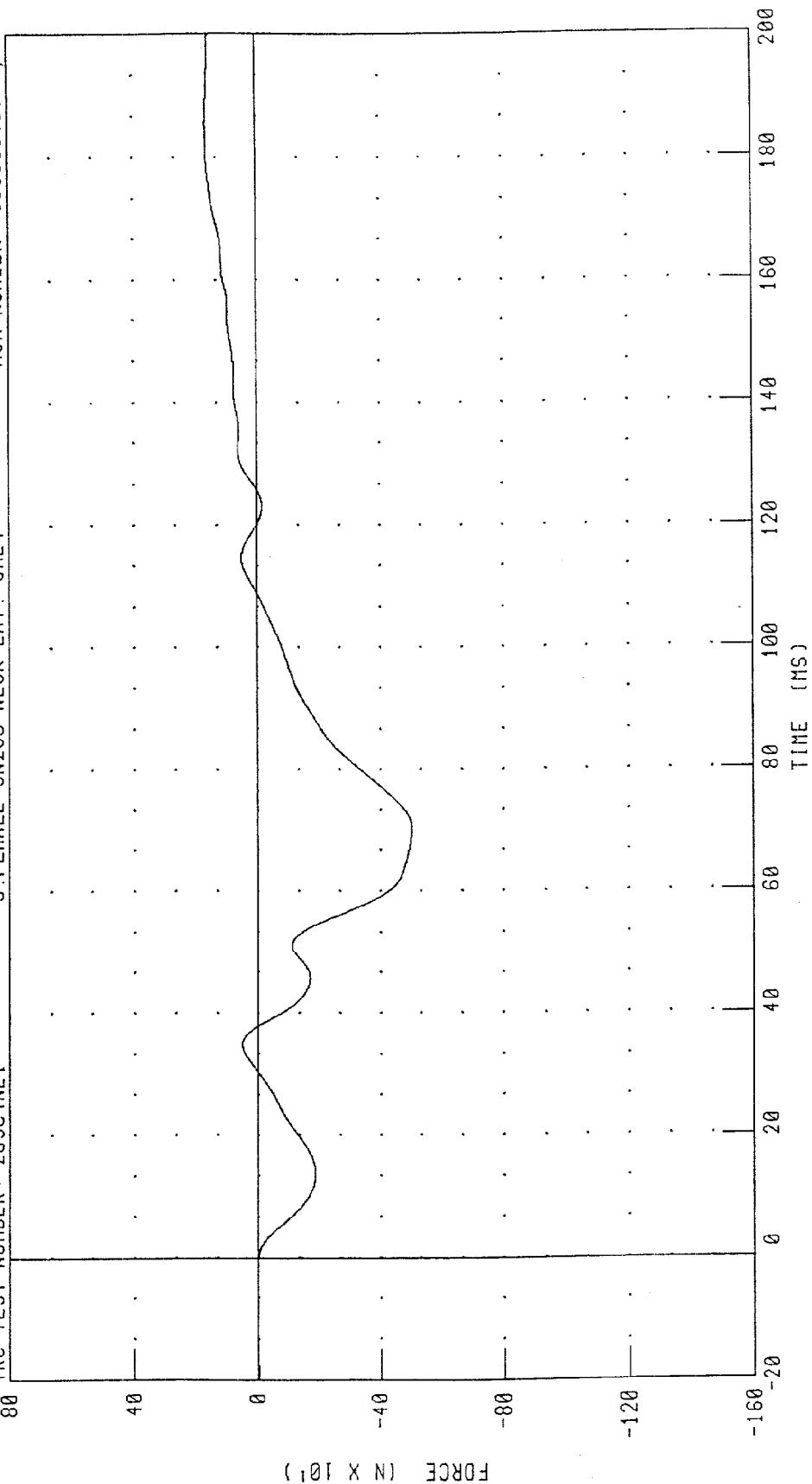
SMALL FEMALE NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 289C4NE1

S.FEMALE SN289 NECK EXT. CAL4

RUN NUMBER: 051998.0907;2



CHANNEL: NEKXF

FILTER: CH. CLASS 60

PEAK DATA: 165.80 N @ 185.52 MS; -503.74 N @ 70.32 MS

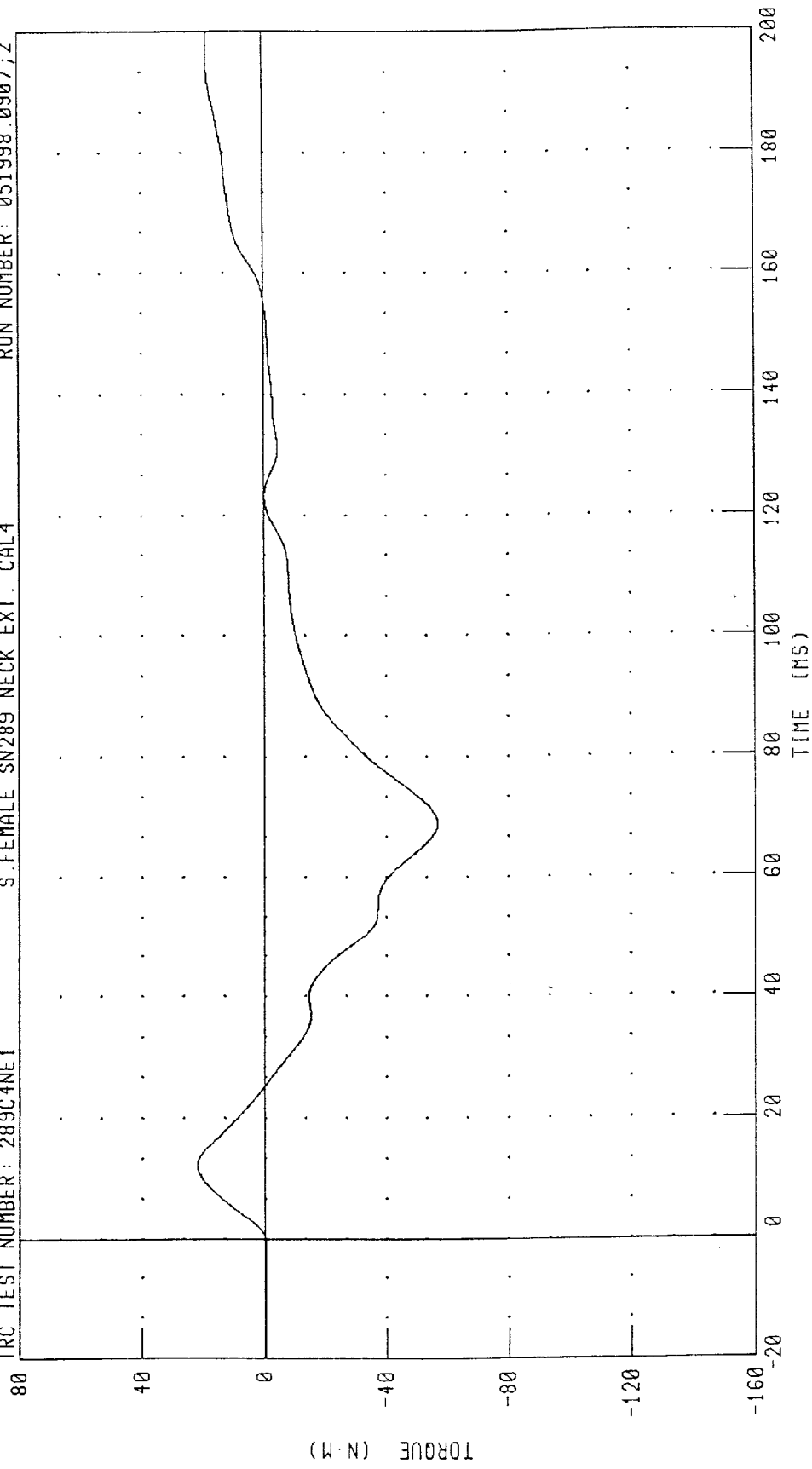
SMALL FEMALE NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 289C4NE1

S.FEMALE SN289 NECK EXT. CAL4

RUN NUMBER: 051998.0907;2



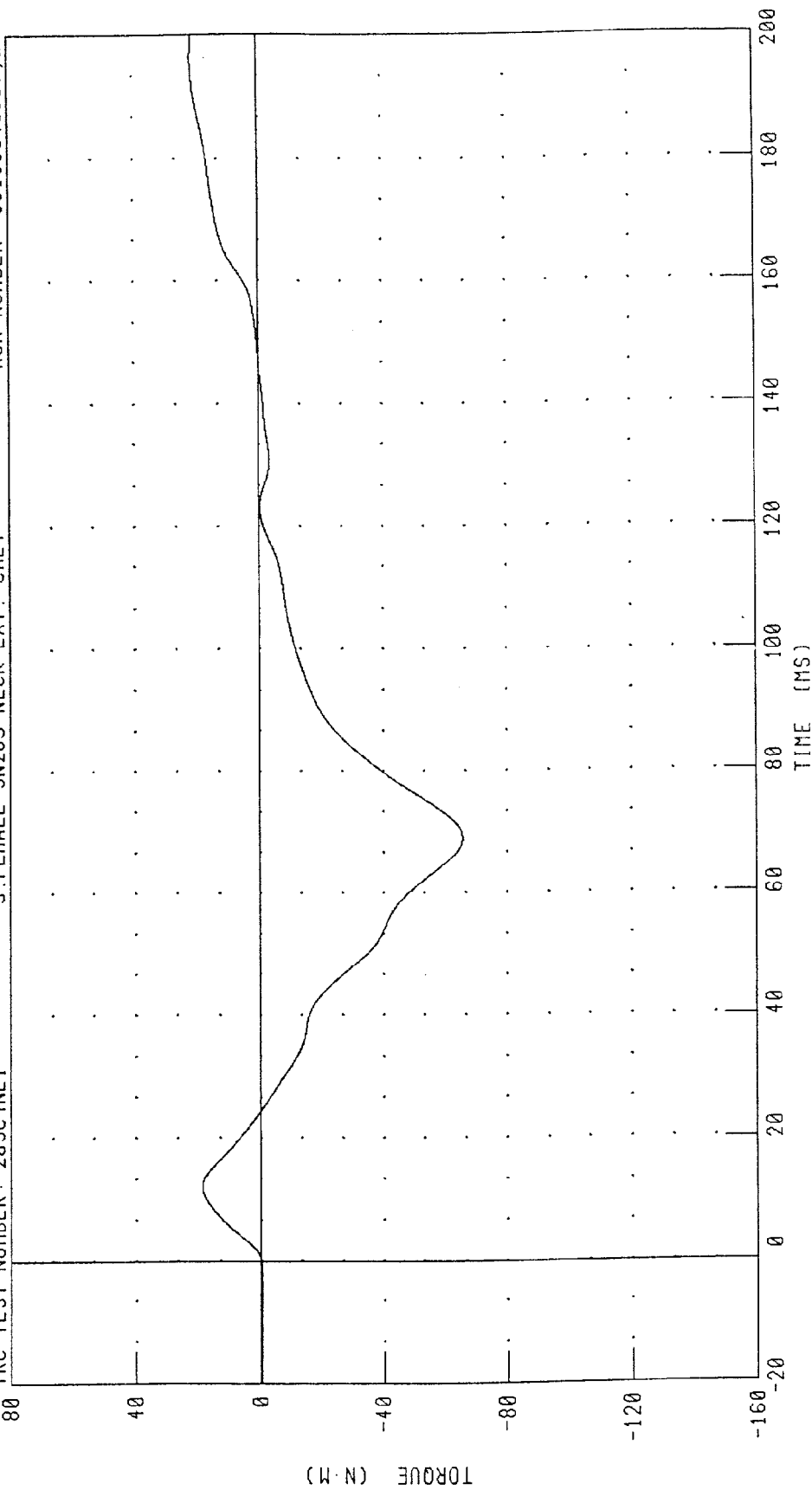
CHANNEL: NEKYM FILTER: CH. CLASS 60

PEAK DATA: 22.14 N.M @ 22.24 MS, -56.87 N.M @ 68.96 MS

SMALL FEMALE NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
S.FEMALE SN289 NECK EXT. CAL4

TRC TEST NUMBER: 289C4NE1

RUN NUMBER: 051998.0907;2



PEAK DATA: 21.34 N·M @ 196.24 MS, -65.79 N·M @ 69.04 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE

19-MAY-98

TRC INC.

TEST NO: 289C4TH1

S.FEMALE SN289 THORAX CAL4

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.3 DEG. C
RELATIVE HUMIDITY	10 - 70 %	40.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.77 M/S
MAXIMUM DEFLECTION	51 - 58 MM	52.9 MM
MAXIMUM RESISTIVE FORCE <i>AT PEAK Deflection</i>	3300 - 3800 N	3992.8 N *
INTERNAL HYSTERESIS	69% - 85%	74.9%

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN *By cult*

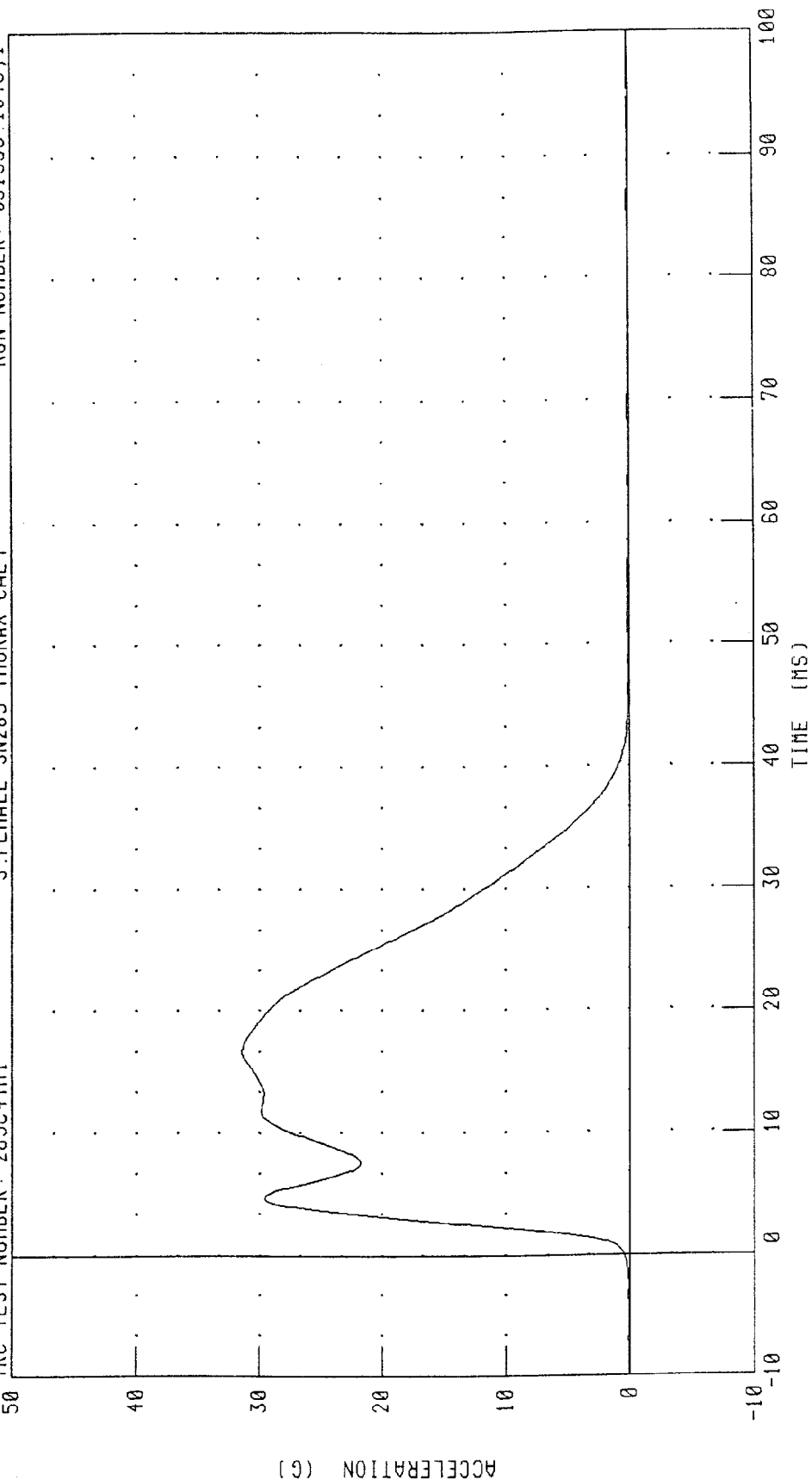
RUN NUMBER: 051998.1045;1

SMALL FEMALE THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 289C4TH1

S.FEMALE SN289 THORAX CAL4

RUN NUMBER: 051998.1046;1



CHANNEL: PENXC FILTER: CH. CLASS 180

PEAK DATA: 31.47 G @ 16.64 MS; 0.02 G @ 95.04 MS

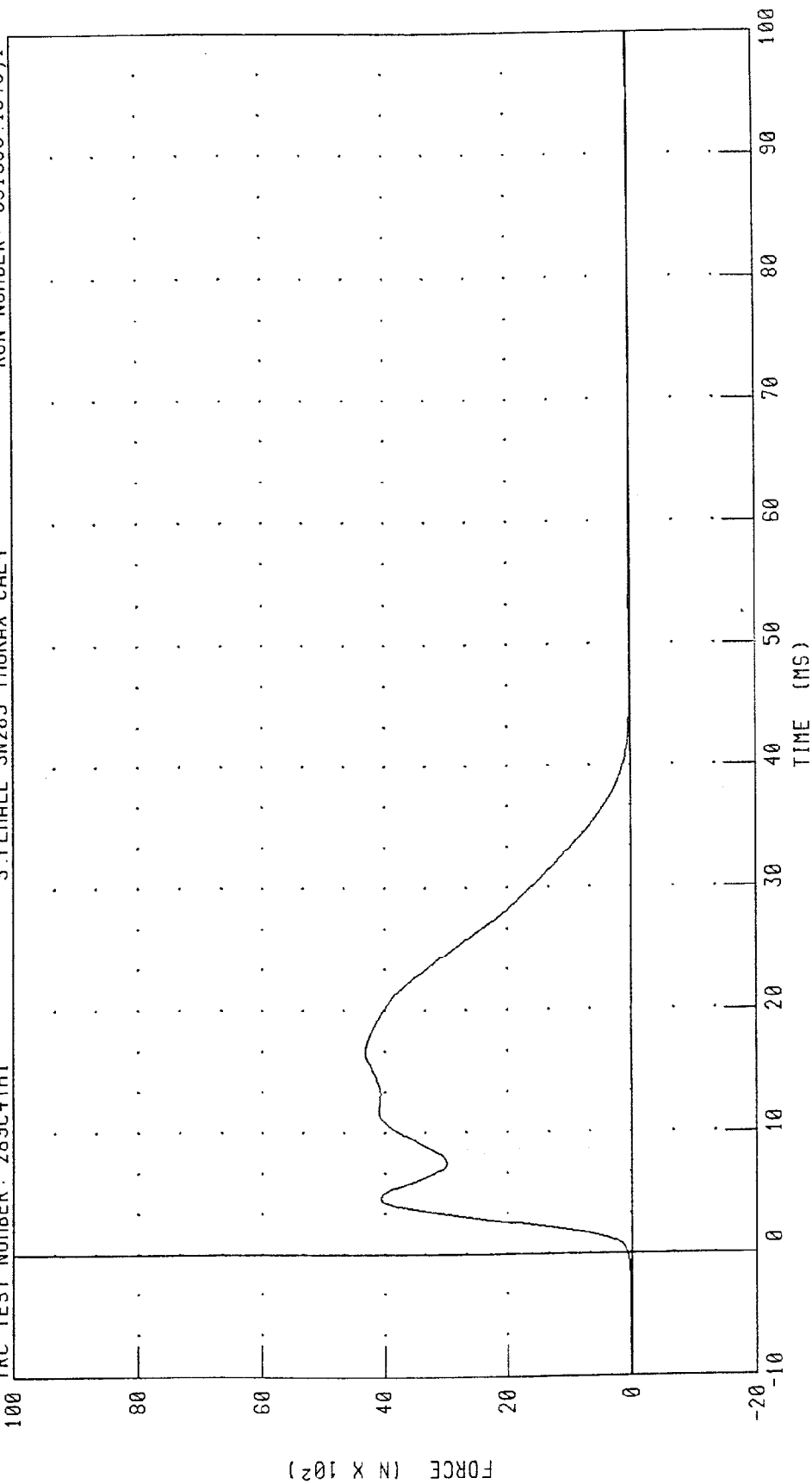
SMALL FEMALE THORAX CALIBRATION

PENDULUM FORCE

S. FEMALE SN289 THORAX CAL4

TRC TEST NUMBER: 289C4TH1

RUN NUMBER: 051998.1046;1



PEAK DATA: 4317.92 N @ 16.64 MS; 2.50 N @ 95.04 MS

CHANNEL: PENXF FILTER: CH. CLASS 180

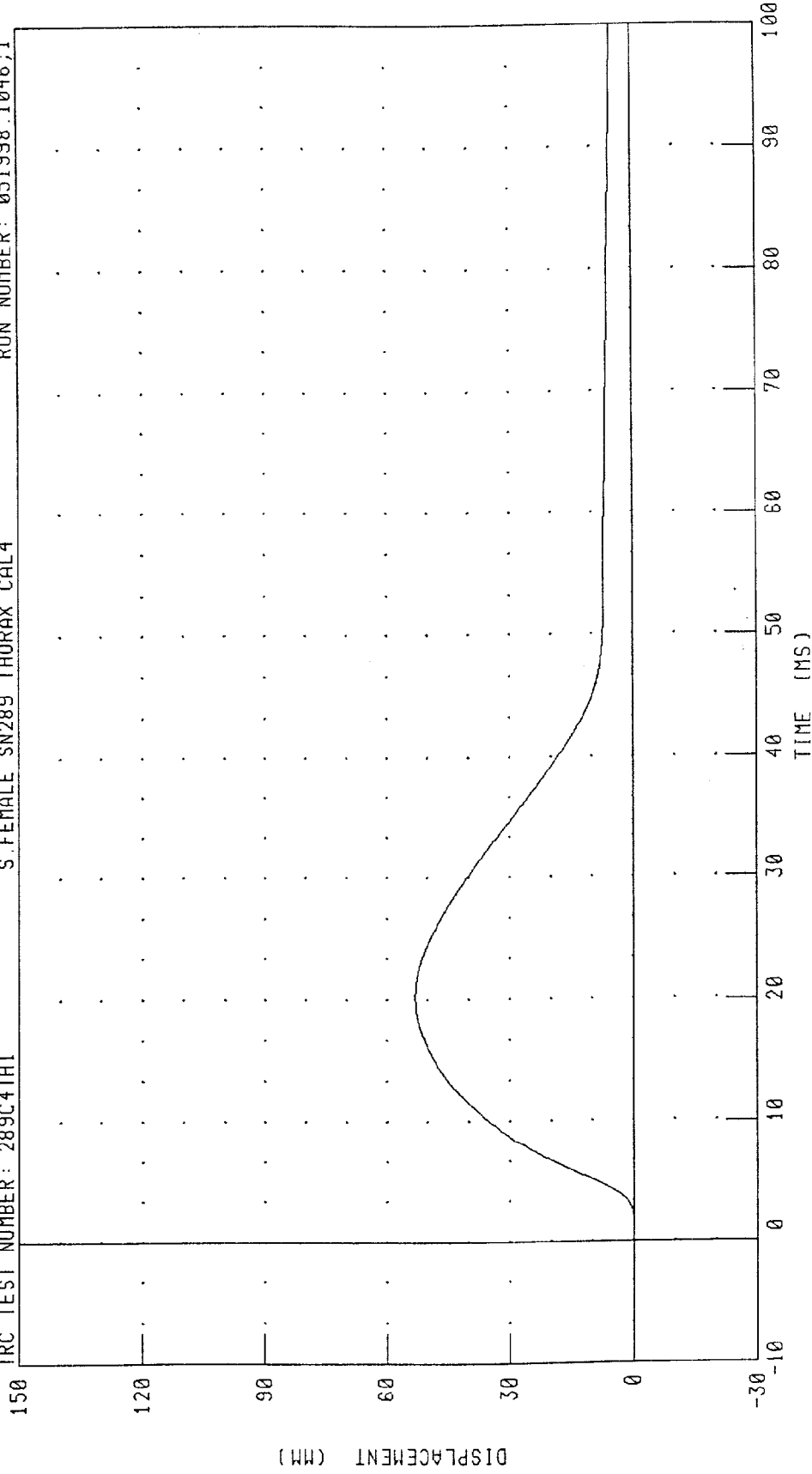
SMALL FEMALE THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 289C4TH1

S. FEMALE SN289 THORAX CAL4

RUN NUMBER: 051998.1046.1



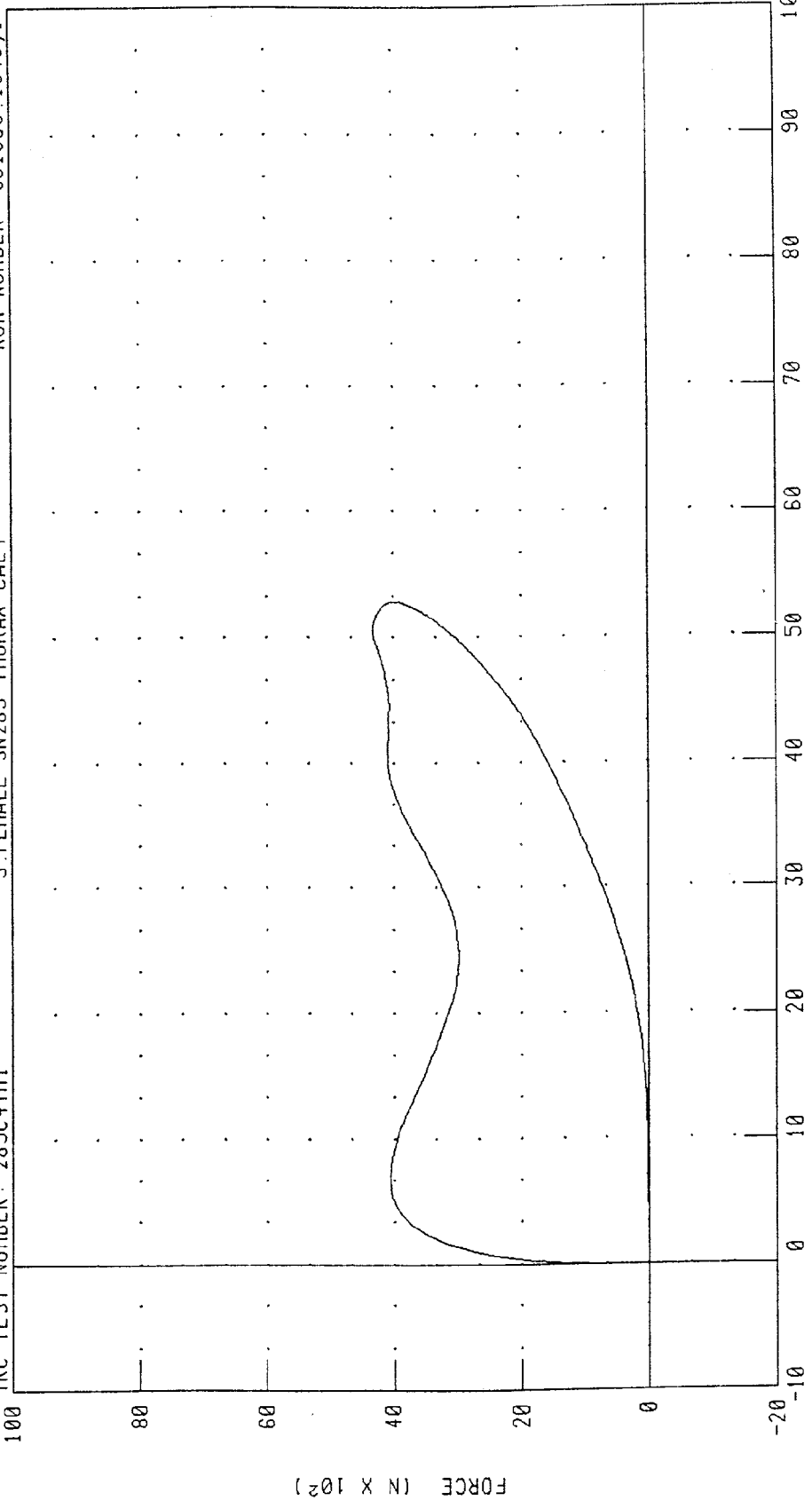
CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 52.93 MM @ 20.24 MS, -0.02 MM @ 1.28 MS

SMALL FEMALE THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE
S.FEMALE SN289 THORAX CAL4

TRC TEST NUMBER: 289C4TH1

RUN NUMBER: 051998.1046;1



CHANNEL: CSTXD
PENXF
FILTER: CH. CLASS 180
CH. CLASS 180
PEAK DATA: 52.93 MM @ 20.24 MS; -0.02 MM @ 1.28 MS
4317.92 N @ 16.64 MS; 2.50 N @ 95.04 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

18-MAY-98

TRC INC.

TEST NO: 289C4RK1

S.FEMALE SN289 R.KNEE CAL4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	40.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3400 - 4200 N	4034.6 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

By cult

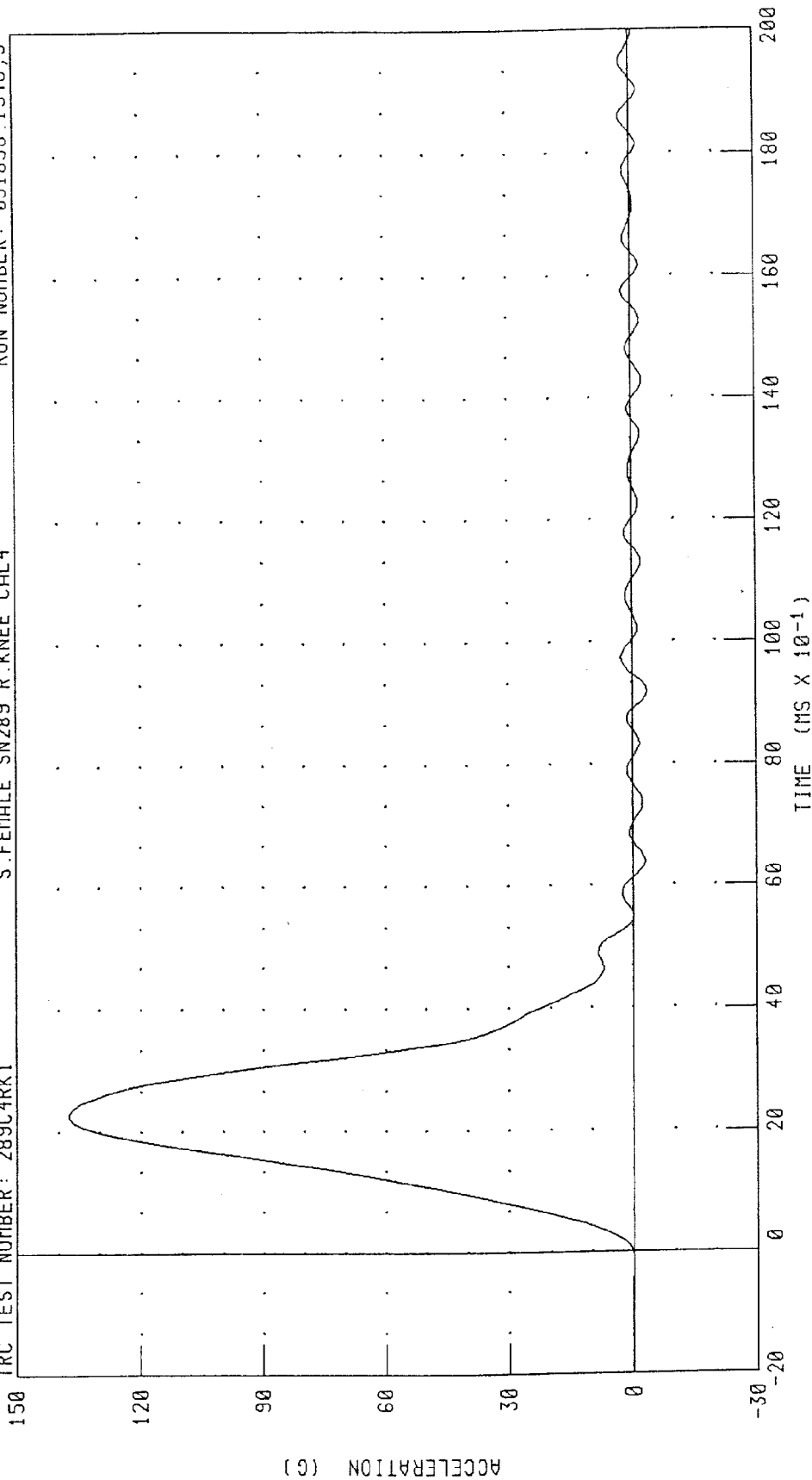
RUN NUMBER: 051898.1346;3

SMALL FEMALE HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 289C4RK1

S. FEMALE SN289 R. KNEE CAL4

RUN NUMBER: 051898.1346;3



CHANNEL: PENXC

FILTER: CH. CLASS 600

PEAK DATA: 137.44 G @ 2.32 MS, -3.73 G @ 9.20 MS

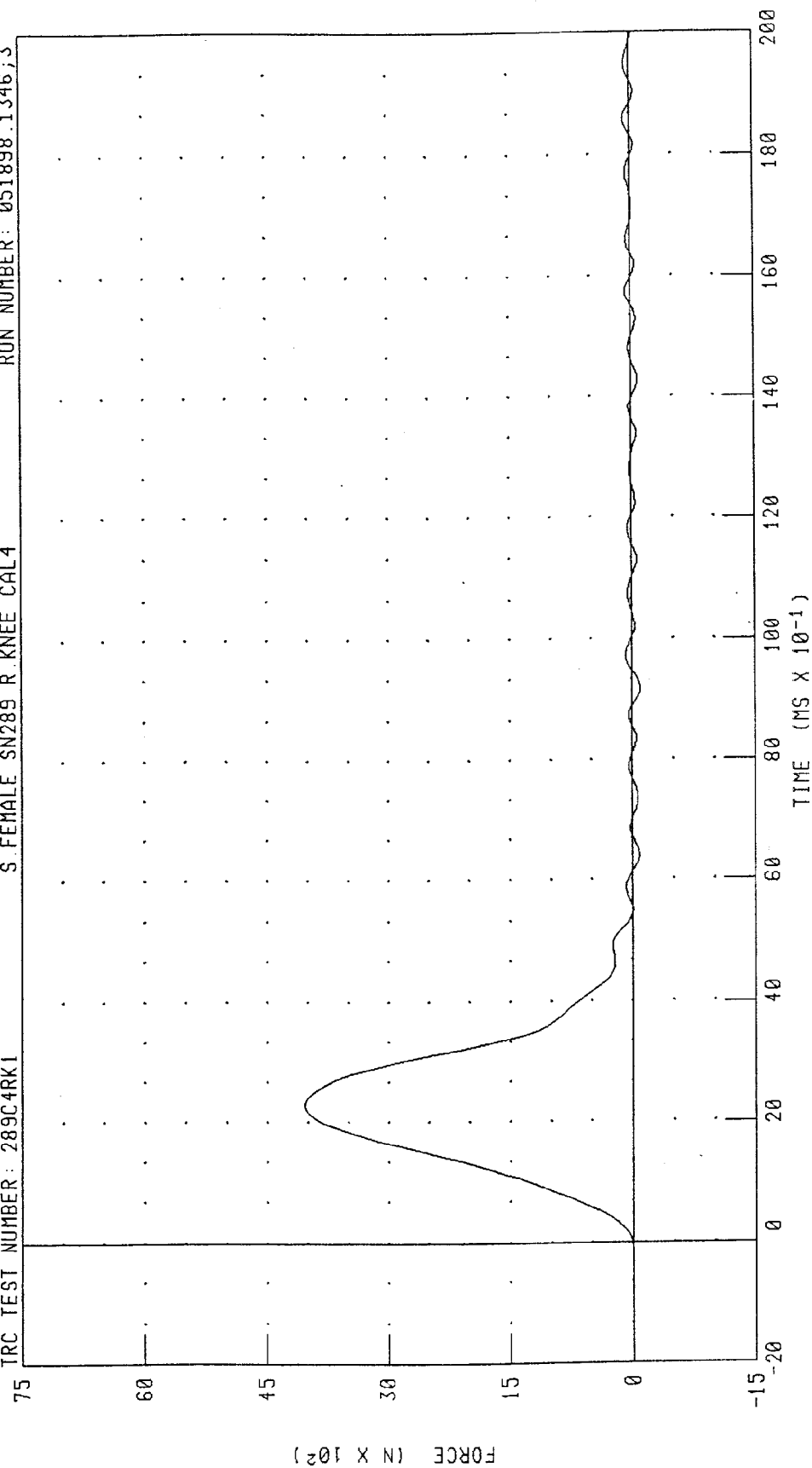
SMALL FEMALE HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

S. FEMALE SN289 R KNEE CAL4

RUN NUMBER: 051898.1346,3

TRC TEST NUMBER: 289C4RK1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 4034.70 N @ 2.32 MS; -109.52 N @ 9.20 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

18-MAY-98

TRC INC.

TEST NO: 289C4LK1

S.FEMALE SN289 LEFT KNEE CAL4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	40.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3400 - 4200 N	3659.2 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Ry Calt

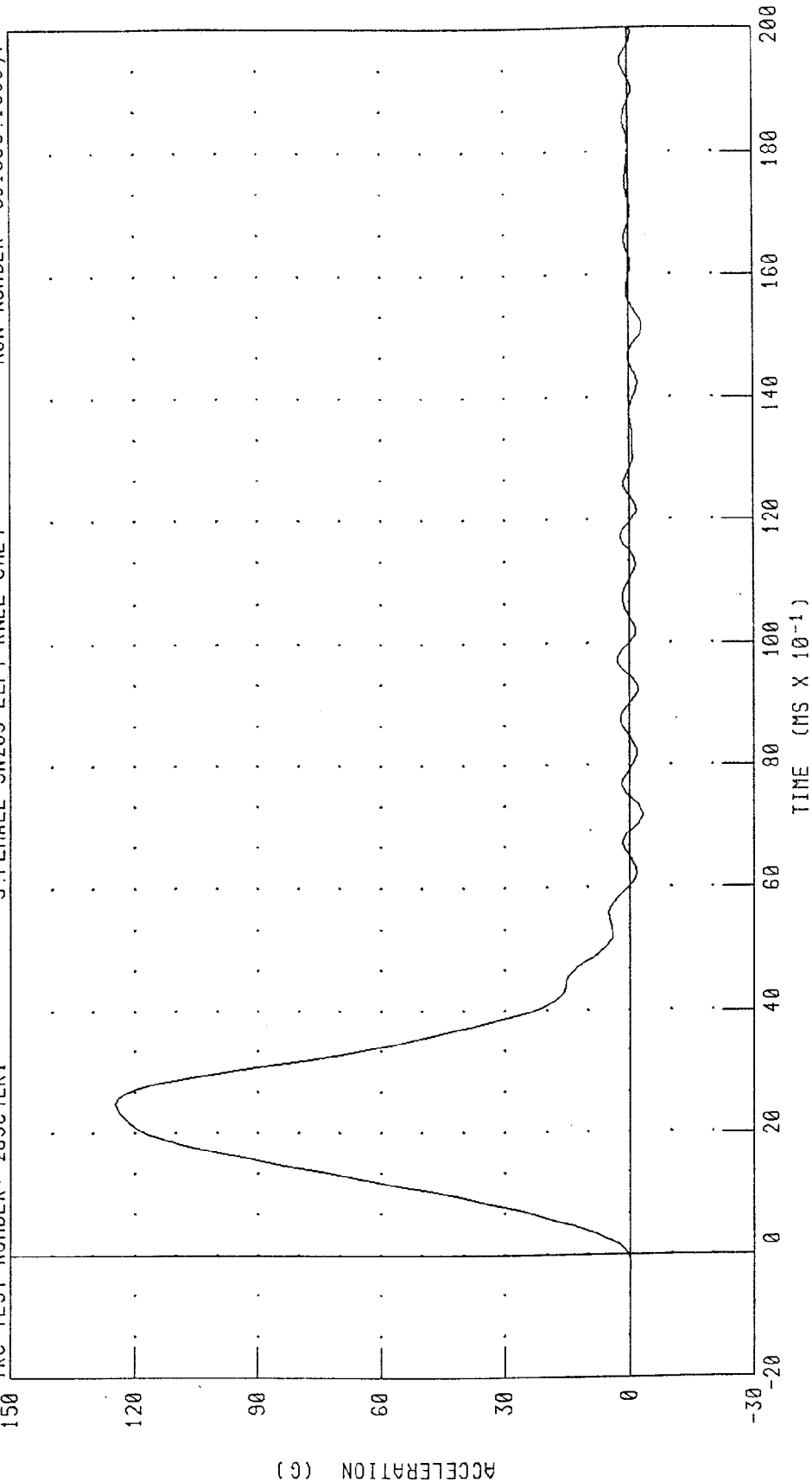
RUN NUMBER: 051898.1356;7

SMALL FEMALE HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 289C4LK1

S. FEMALE SN289 LEFT KNEE CAL4

RUN NUMBER: 051898.1356;7



CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 124.65 G @ 2.48 MS; -3.28 G @ 7.20 MS

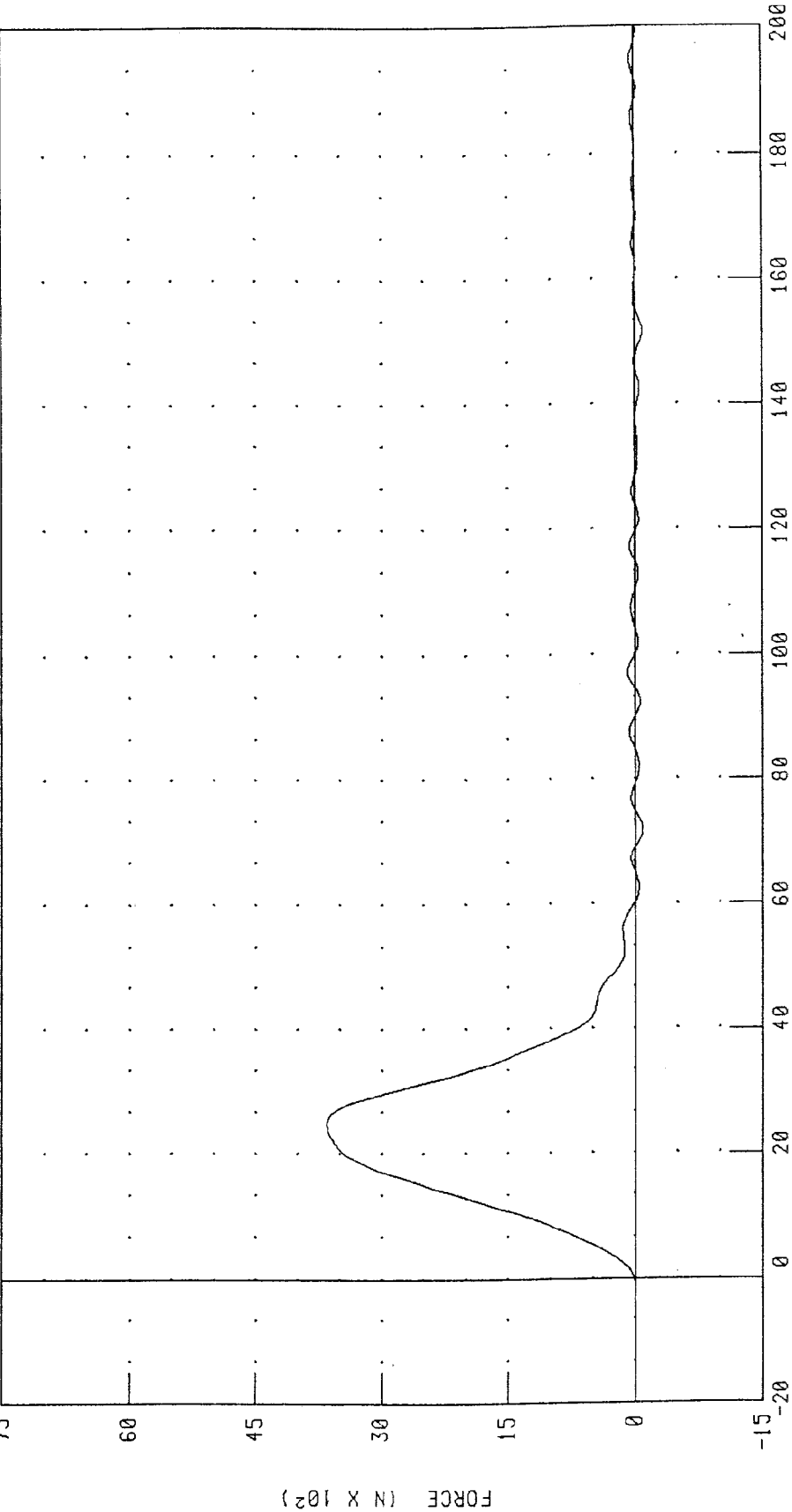
SMALL FEMALE HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

S. FEMALE SN289 LEFT KNEE CAL4

RUN NUMBER: 051898.1356;7

TRC TEST NUMBER: 289C4LK1



CHANNEL: PENXF FILTER: CH. CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA: 3659.23 N @ 2.48 MS; -96.34 N @ 7.20 MS

Pre-Test Calibration

Bullet Vehicle Driver Dummy S/N 045

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

29-MAY-98

TRC INC.

TEST NO: 45C37HD2

572E SN045 HEAD DROP CAL 37

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	56.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	246.68 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.71 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

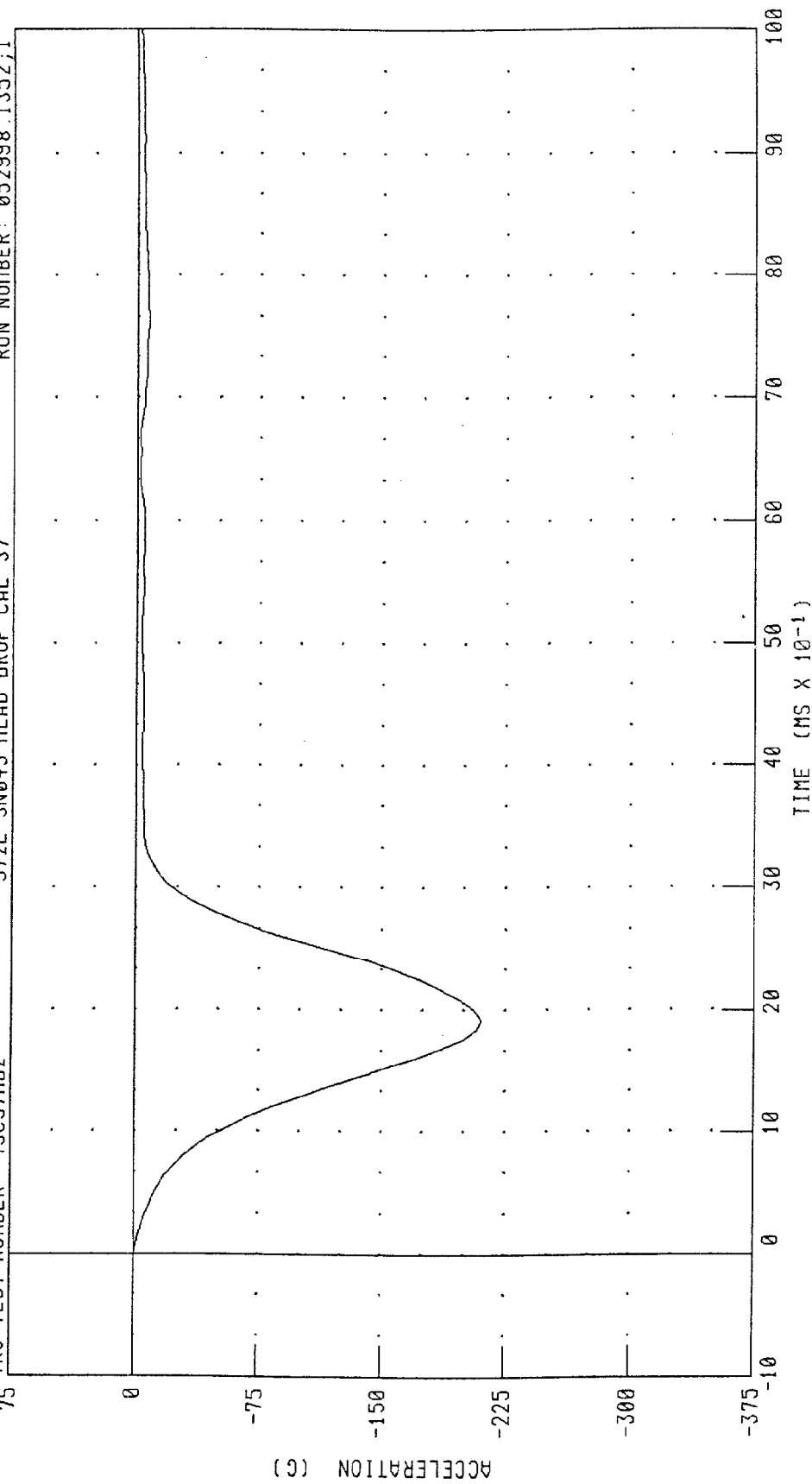
By cult

RUN NUMBER: 052998.1351;1

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 45C37HD2 572E SN045 HEAD DROP CAL 37 RUN NUMBER: 052998.1352;1



CHANNEL: HEDXC FILTER: CH. CLASS 1000 PEAK DATA: 0.00 G @ -0.96 MS; -210.64 G @ 1.92 MS

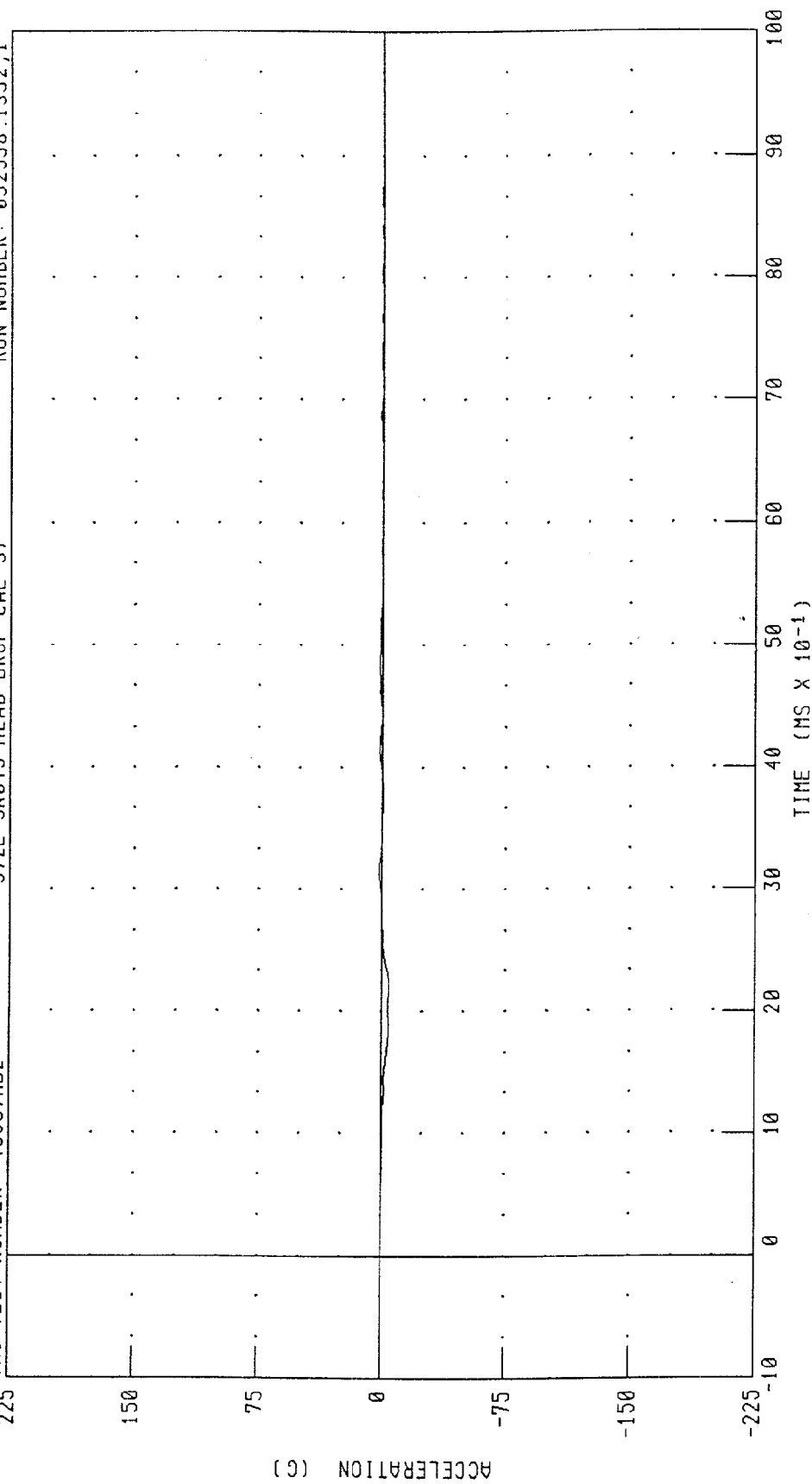
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 45C37HD2

572E SN045 HEAD DROP CAL 37

RUN NUMBER: 052998.1352;1



CHANNEL: HEDYC

FILTER: CH. CLASS 1000

PEAK DATA: 1.79 G @ 3.12 MS; -4.72 G @ 2.24 MS

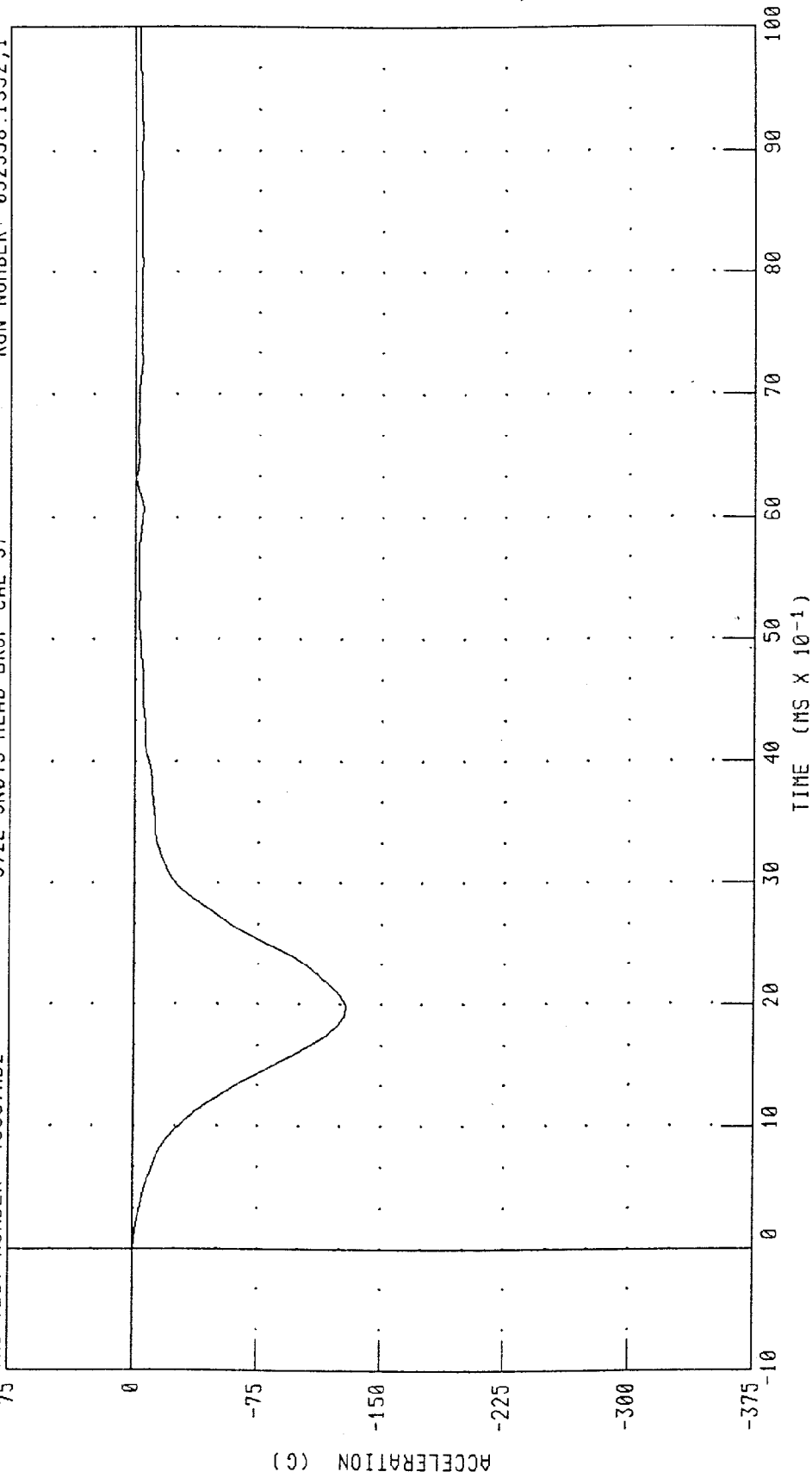
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 45C37HD2

572E SN045 HEAD DROP CAL 37

RUN NUMBER: 052998.1352,1



CHANNEL: HEDZC FILTER: CH. CLASS 1000

PEAK DATA: 0.16 G @ -0.88 MS, -128.51 G @ 2.00 MS

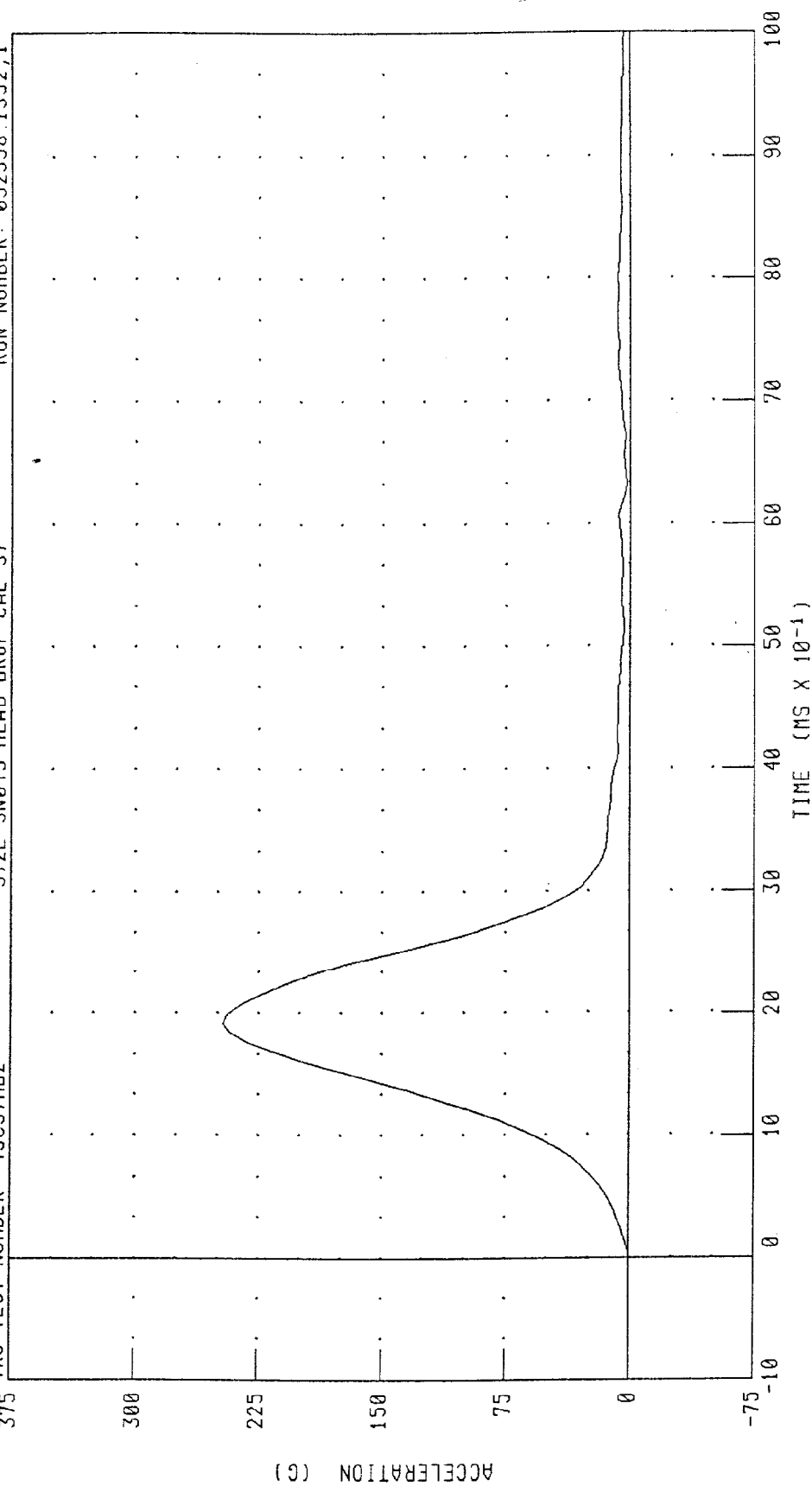
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN045 HEAD DROP CAL 37

TRC TEST NUMBER: 45C37HD2

RUN NUMBER: 052998.1352;1



CHANNEL: HEDRC

FILTER: CH. CLASS 1000

TIME (MS X 10⁻¹)

PEAK DATA: 246.68 G @ 1.92 MS; 0.04 G @ -0.96 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

29-MAY-98

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 45C37NF1 572E SN045 NECK FLEXION CAL37

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	56.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.06 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	24.43 G
	20 MS	17.60 - 22.60 G	22.57 G
	30 MS	12.50 - 18.50 G	18.22 G
MAX PENDULUM G		29 G MAX	25.76 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	18.17 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	35.44 MS
D PLANE	MAX	64 - 78 DEG.	76.86 DEG.
ROTATION	TIME	57 - 64 MS	58.48 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	97.06 NM
	TIME	47 - 58 MS	49.36 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	118.00 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	99.04 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

Bay Calt

RUN NUMBER: 052998.1255;2

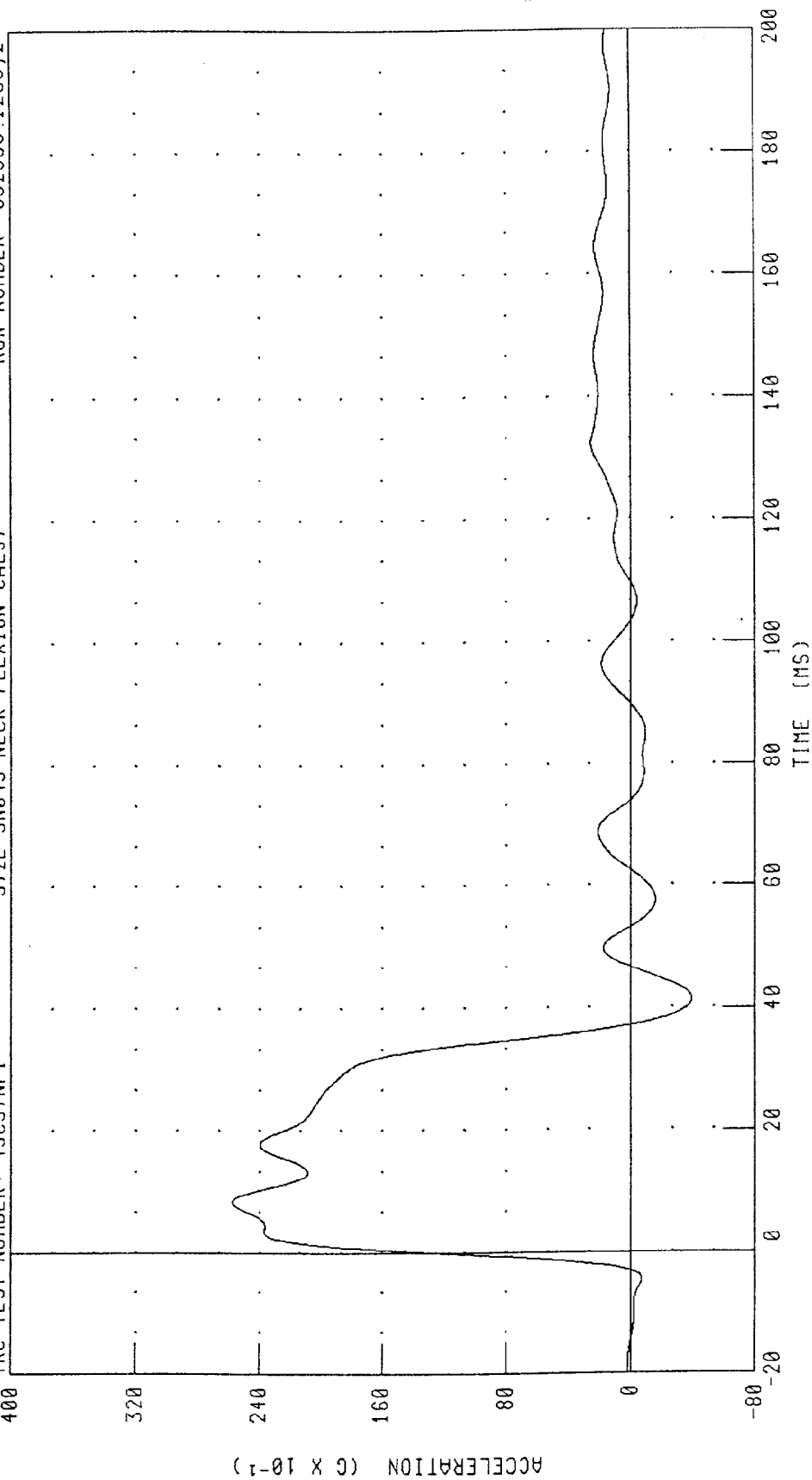
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 45C37NF1

572E SN045 NECK FLEXION CAL37

RUN NUMBER: 052998.1255;2



PEAK DATA: 25.75 G @ 8.32 MS; -3.97 G @ 41.36 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

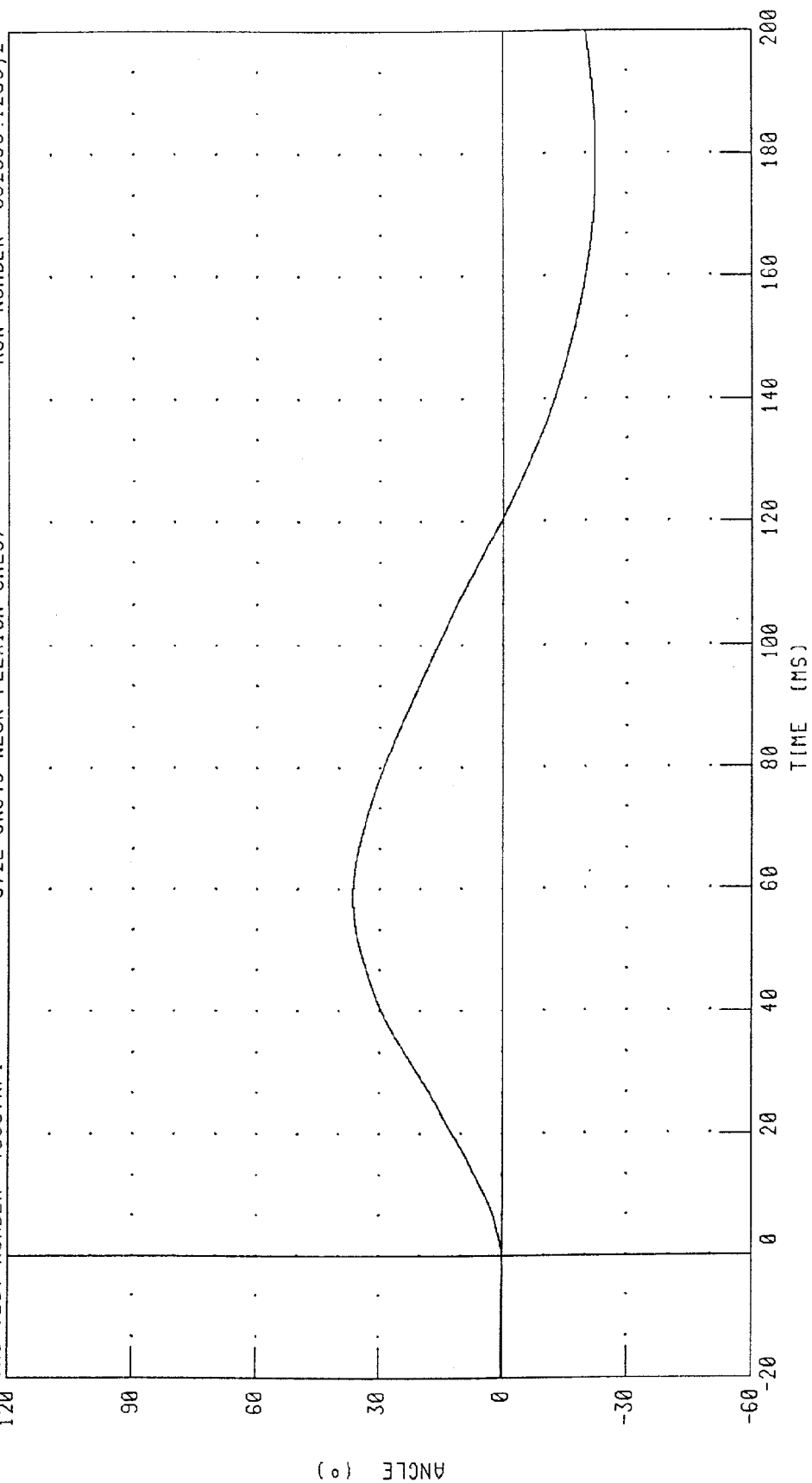
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 45C37NF1

572E SN045 NECK FLEXION CAL37

RUN NUMBER: 052998.1255;2



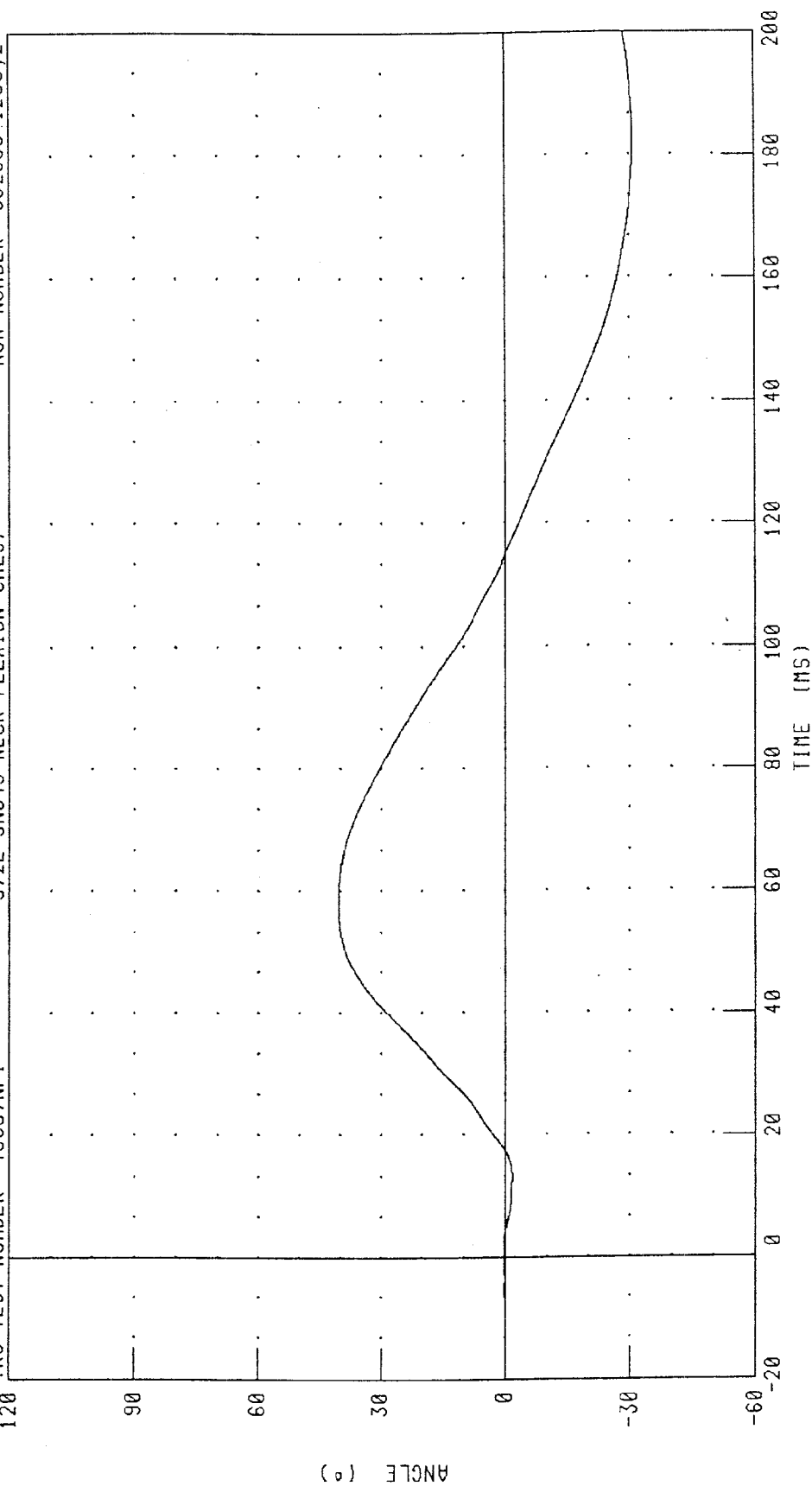
CHANNEL: BETA

FILTER: CH. CLASS 60

PEAK DATA: 36.44 ° @ 58.64 MS; -22.52 ° @ 178.96 MS

ROTATION ABOUT OCCIPITAL CONDYLE

RUN NUMBER: 052998.1255;2



CHANNEL: THETA

FILTER: CH. CLASS 60

PEAK DATA: 40.42 ° @ 58.32 MS; -30.88 ° @ 182.00 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 45C37NF1

572E SN045 NECK FLEXION CAL37

RUN NUMBER: 052998.1255;2

120

90

60

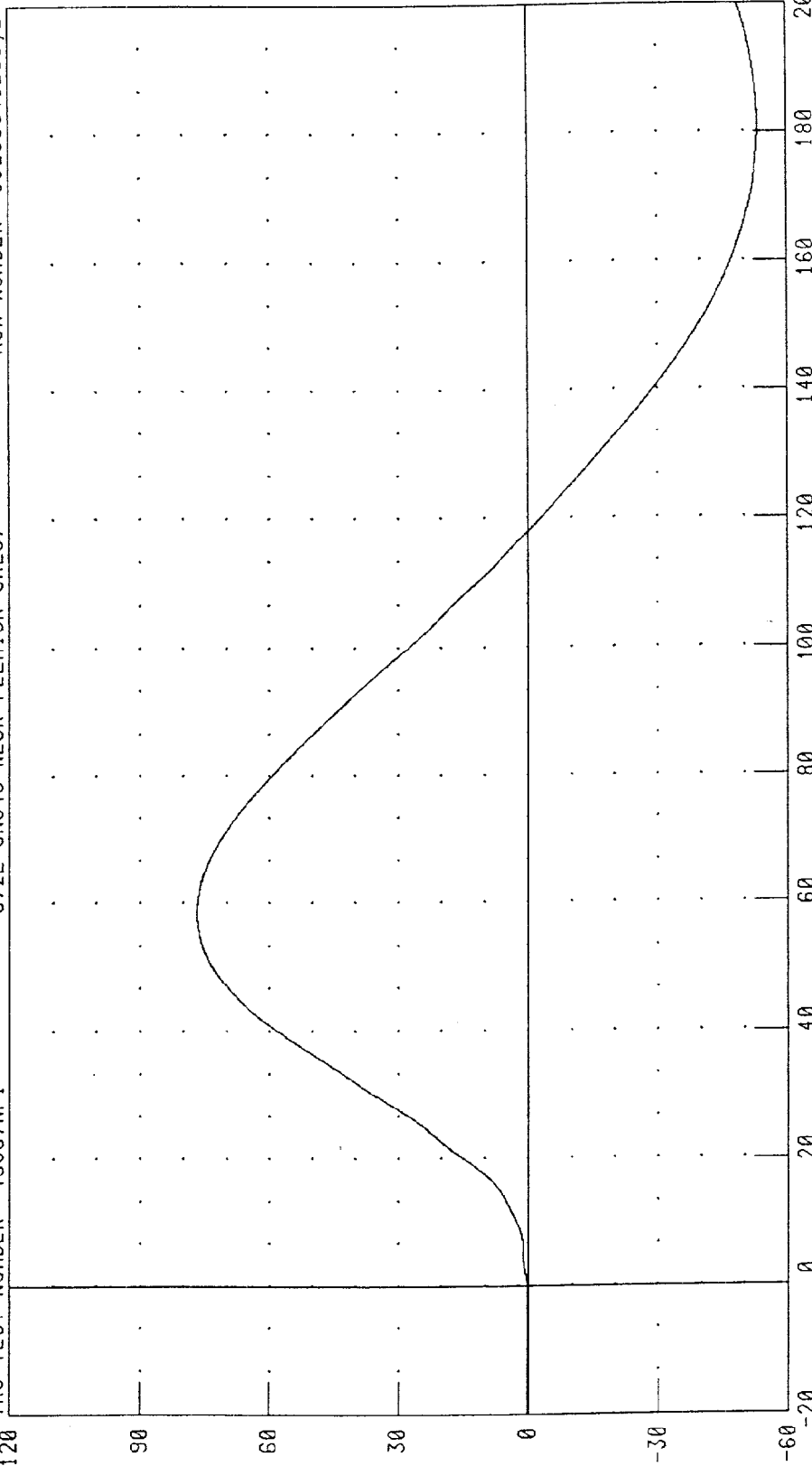
30

0

-30

-60

ANGLE (°)



TIME (MS)

CHANNEL: TOTAN

FILTER: CH. CLASS 60

PEAK DATA: 76.86 ° @ 58.48 MS; -53.37 ° @ 181.04 MS

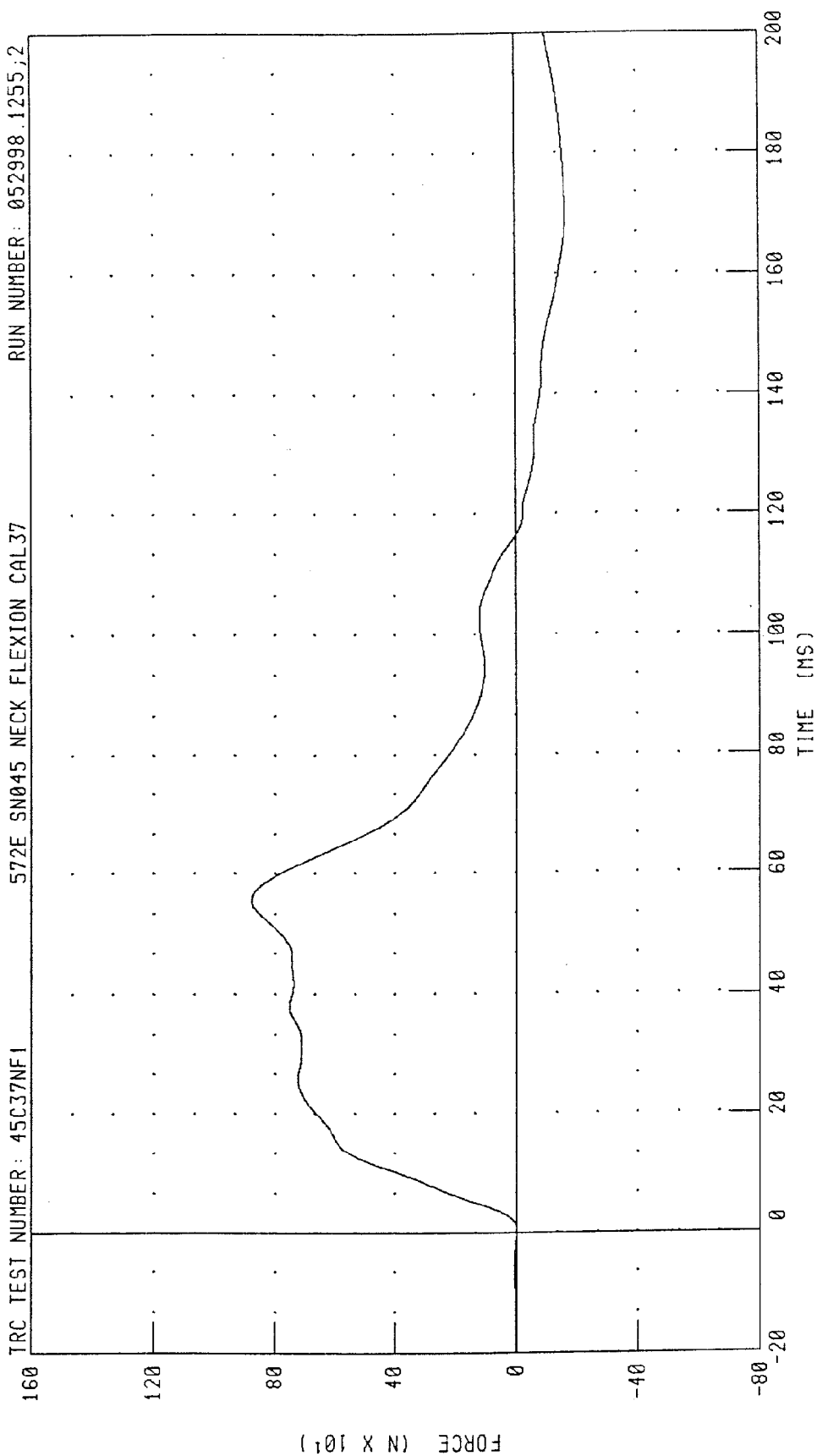
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 45C37NF1

572E SN045 NECK FLEXION CAL37

RUN NUMBER: 052998.1255;2



CHANNEL: NEKXF

FILTER: CH. CLASS 60

PEAK DATA: 877.28 N @ 55.68 MS; -167.00 N @ 170.08 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 45C37NF1

572E SN045 NECK FLEXION CAL37

RUN NUMBER: 052998.1255;2

160

120

80

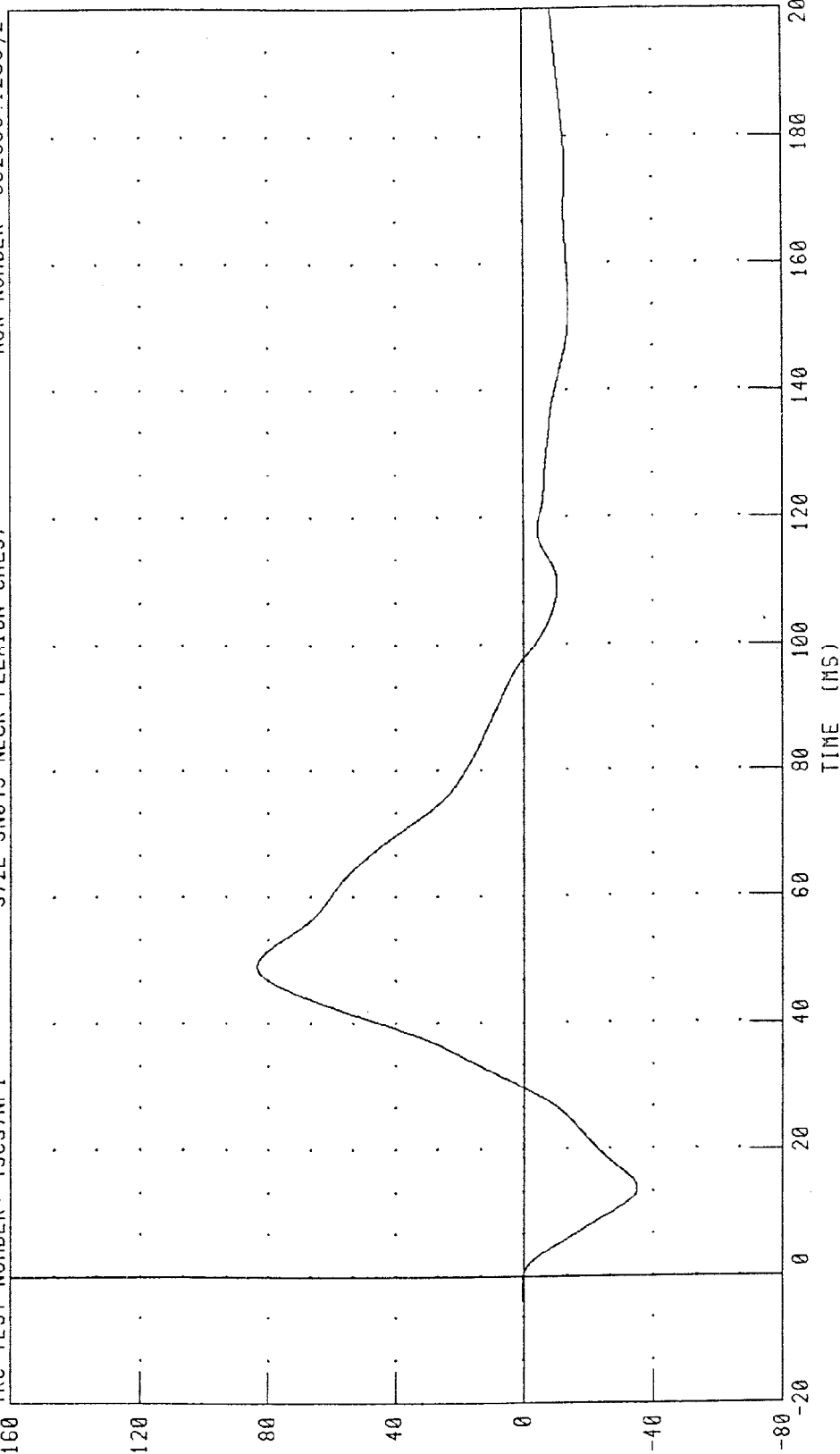
40

0

-40

-80

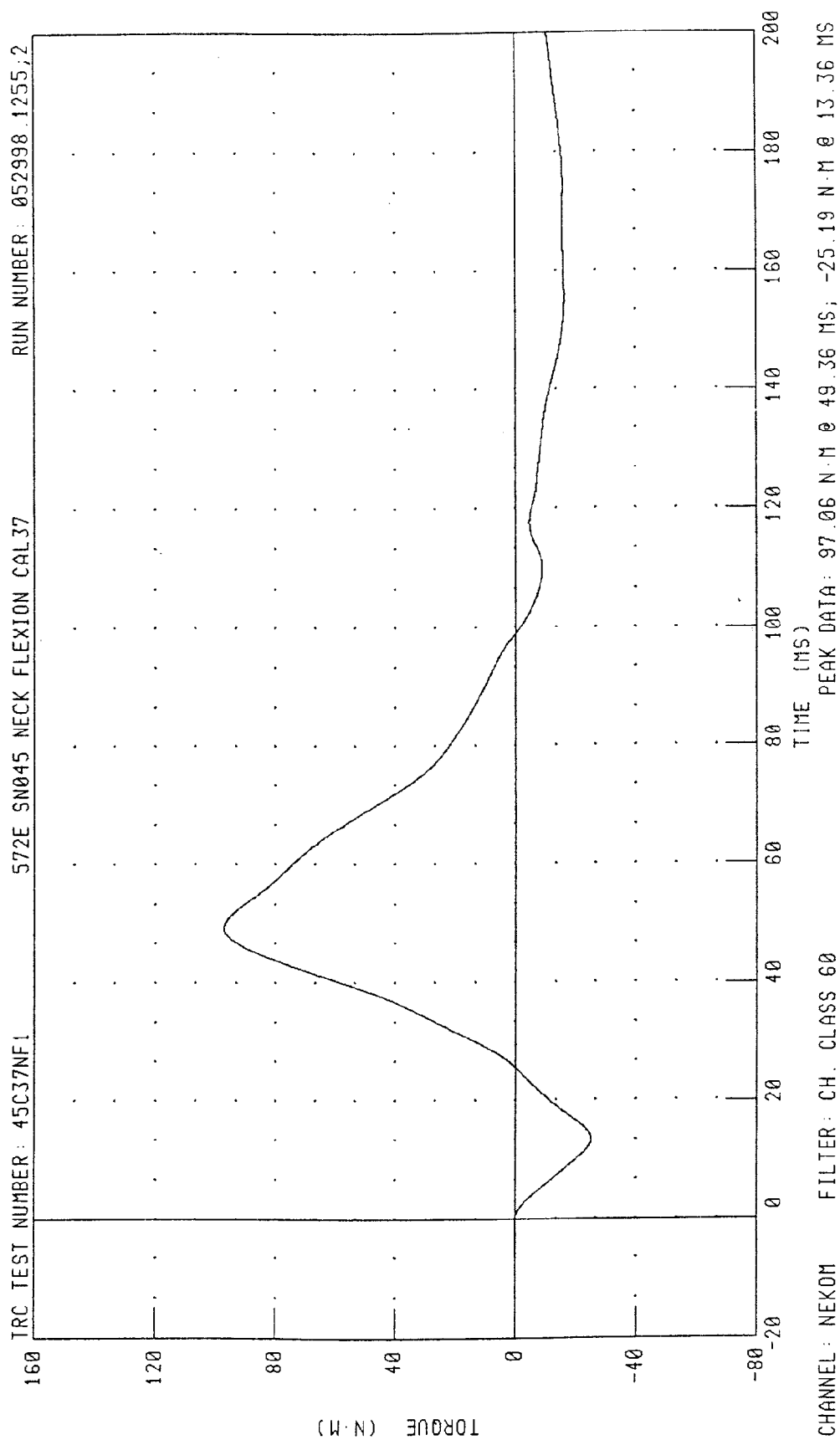
TORQUE (N·M)



CHANNEL: NEKYM FILTER: CH. CLASS 60

PEAK DATA: 83.44 N·M @ 49.12 MS, -35.15 N·M @ 13.76 MS

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



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

29-MAY-98

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 45C37NE1 572E SN045 NECK EXT CAL37

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	56.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.26 G
	20 MS	14.00 - 19.00 G	16.26 G
	30 MS	11.00 - 16.00 G	14.74 G
MAX PENDULUM G		22 G MAX	19.77 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.67 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	41.28 MS
D PLANE	MAX	81 - 106 DEG.	101.06 DEG.
ROTATION	TIME	72 - 82 MS	76.32 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-70.51 NM
	TIME	65 - 79 MS	70.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	159.44 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	145.44 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN By Calt

RUN NUMBER: 052998.1319;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 45C37NE1

572E SN045 NECK EXT CAL37

RUN NUMBER: 052998.1319;1

400

320

ACCELERATION (G X 10⁻¹)

240

160

80

0

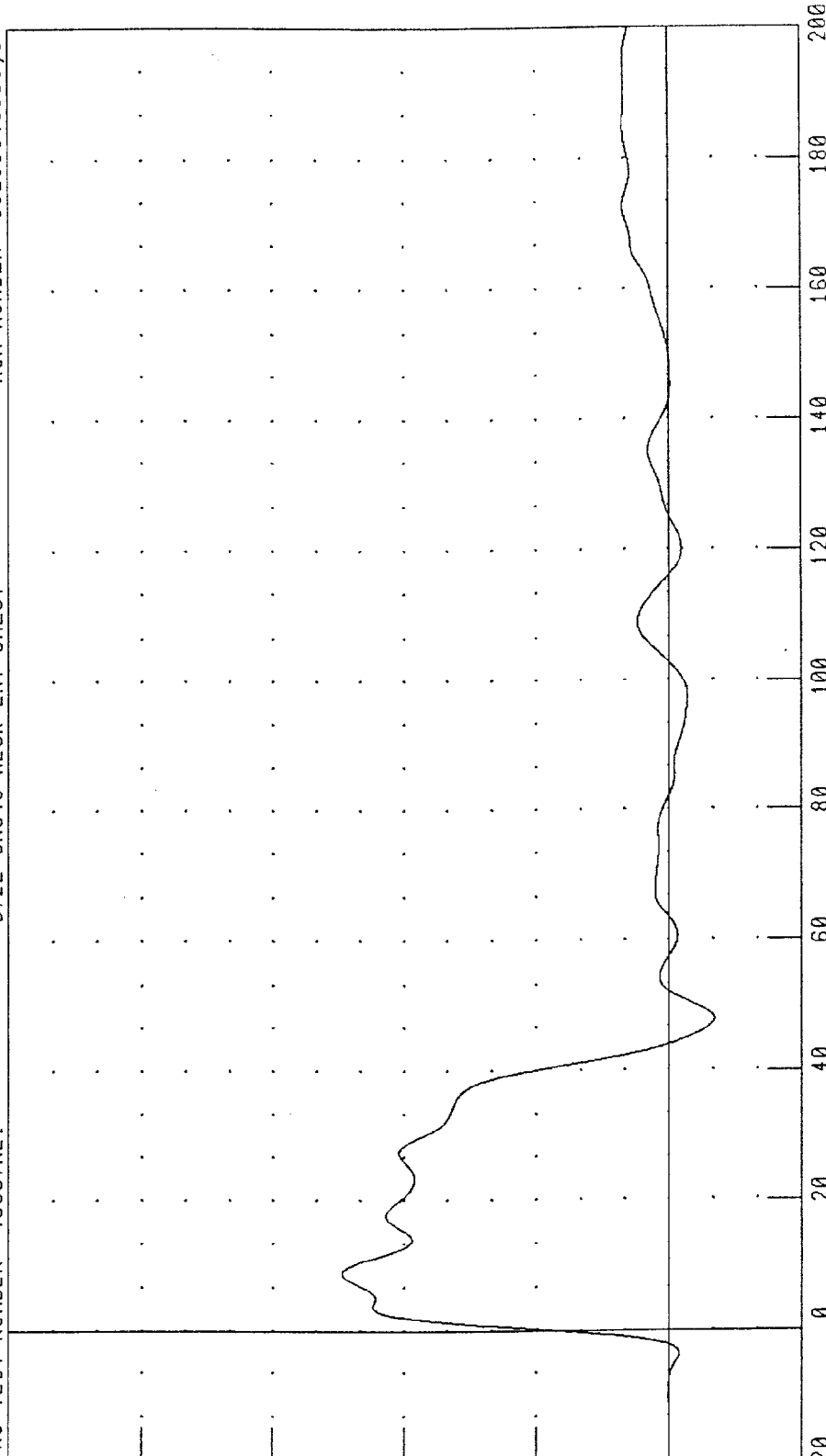
-80

TIME (MS)

CHANNEL: PENXC

FILTER: CH. CLASS 60

PEAK DATA: 19.77 G @ 8.88 MS; -2.77 G @ 47.92 MS



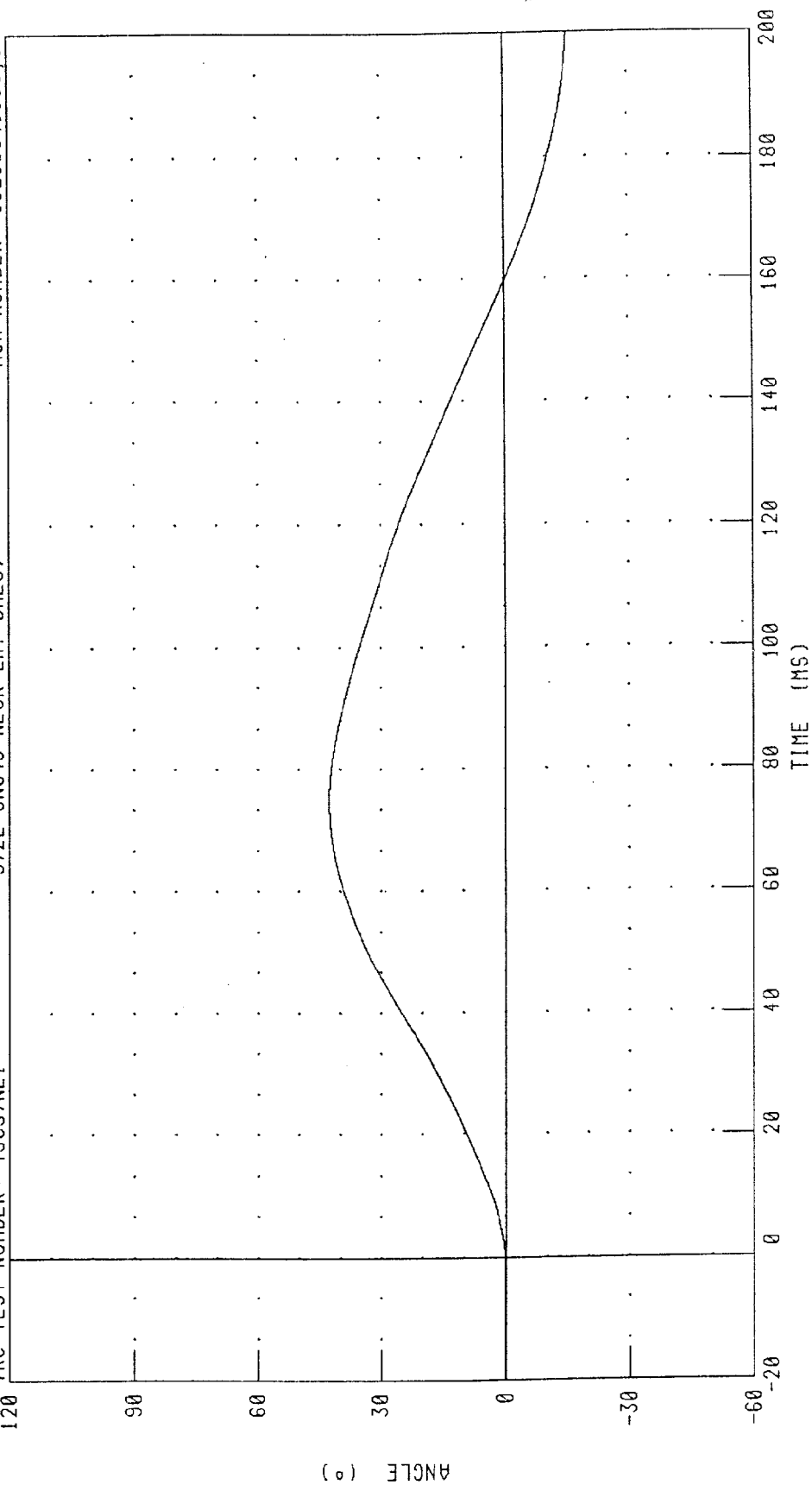
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN045 NECK EXT CAL37

TRC TEST NUMBER: 45C37NE1

RUN NUMBER: 052998.1319,1



PEAK DATA: 42.53 ° @ 74.88 MS; -15.49 ° @ 200.00 MS

FILTER: CH. CLASS 60

CHANNEL: BETA

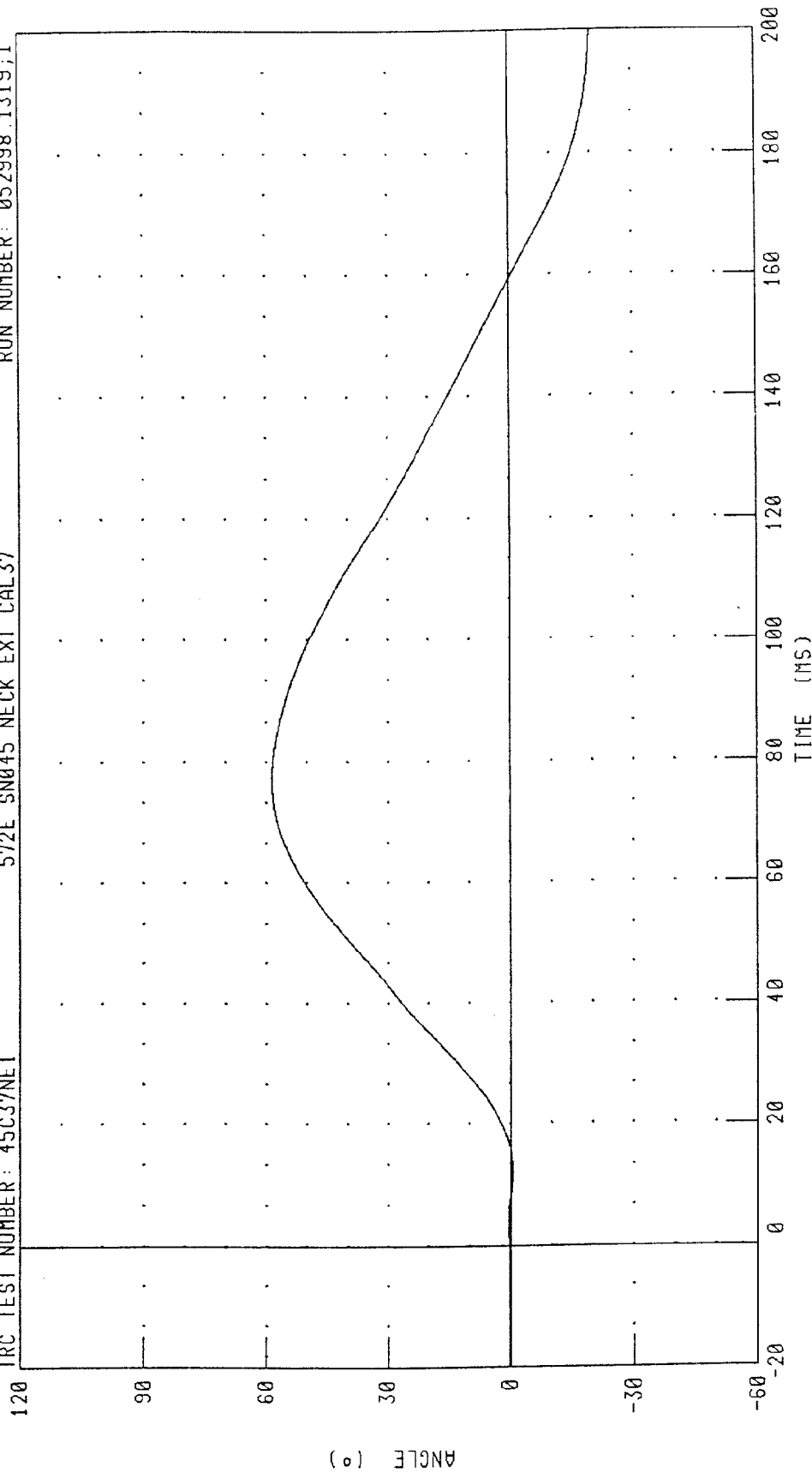
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 45C37NE1

572E SN045 NECK EXT CAL37

RUN NUMBER: 052998.1319;1

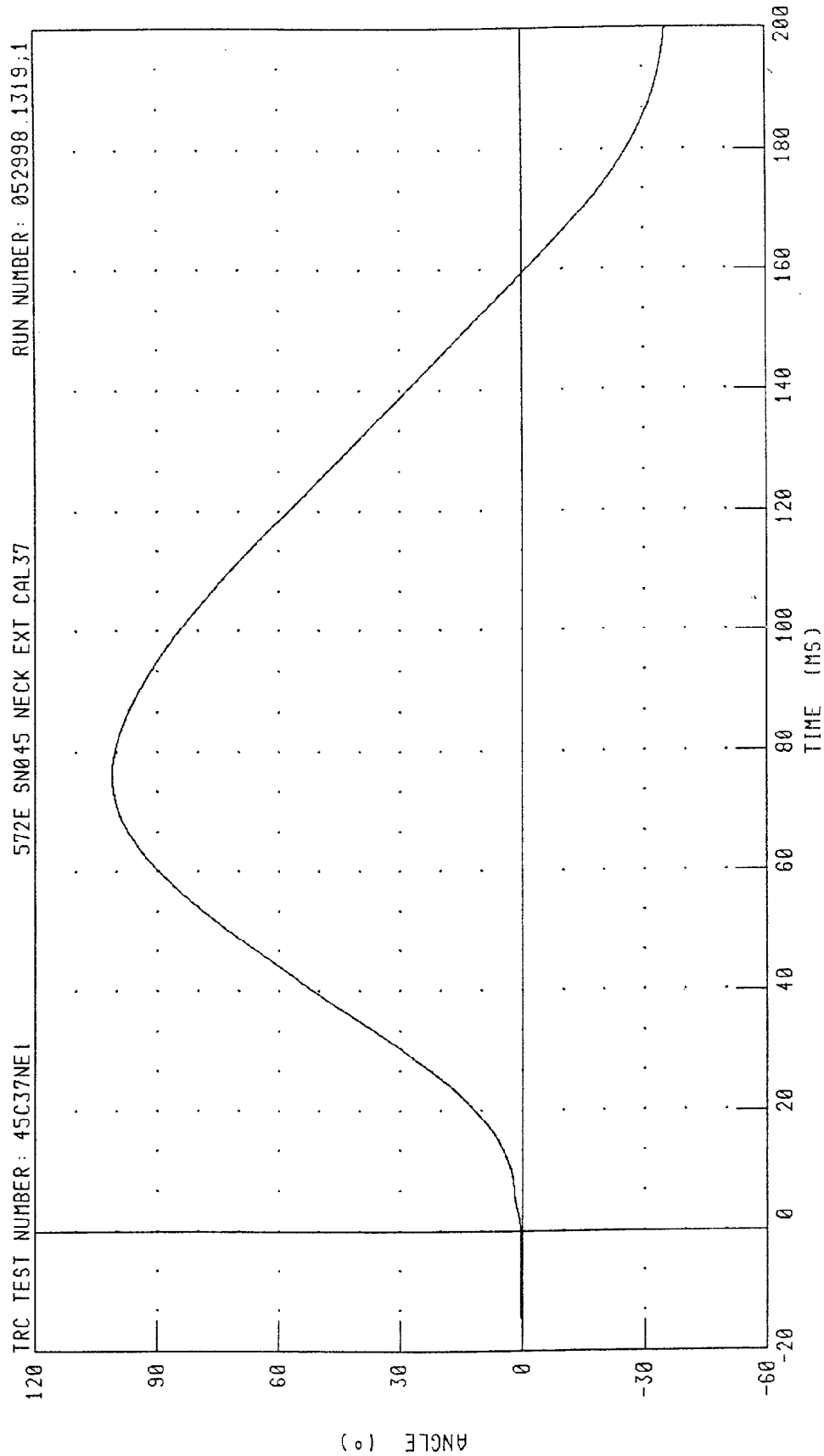


CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 58.59 ° @ 77.04 MS; -20.08 ° @ 200.00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION



CHANNEL: TOTAL FILTER: CH. CLASS 60 PEAK DATA: 101.07 ° @ 76.32 MS, -35.57 ° @ 200.00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 45C37NE1

572E SN045 NECK EXT CAL37

RUN NUMBER: 052998.1319;1

80

40

0

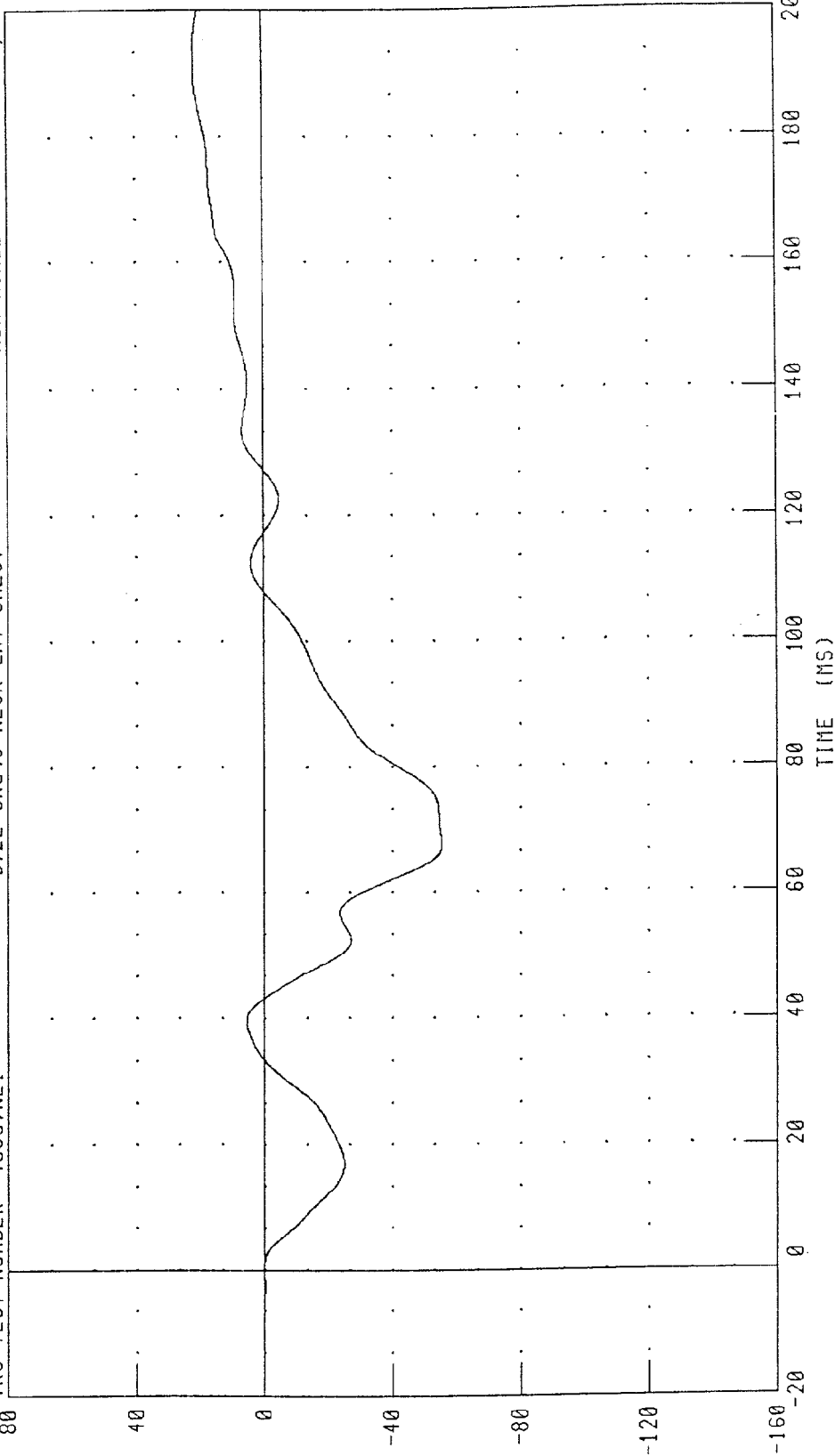
-40

-80

-120

-160

FORCE (N X 10¹)



CHANNEL: NEKXF

FILTER: CH. CLASS 60

TIME (ms)

PEAK DATA: 216.36 N @ 192.64 MS, -555.31 N @ 67.84 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 45C37NE1

572E SN045 NECK EXT CAL37

RUN NUMBER: 052998.1319;1

80

40

0

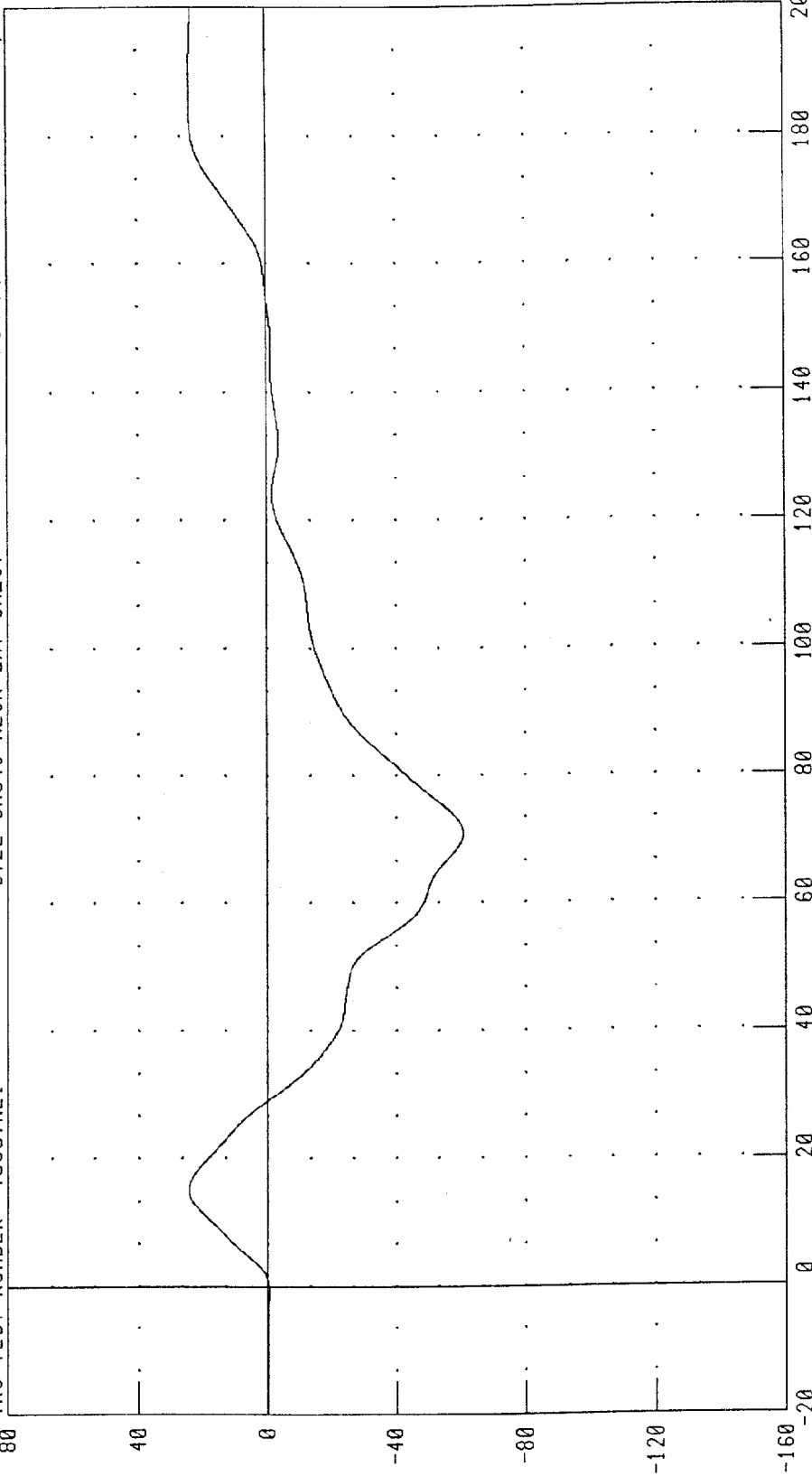
-40

-80

-120

-160

TORQUE (N·M)



TIME (MS)

PEAK DATA: 24.53 N·M @ 15.20 MS, -60.78 N·M @ 70.88 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

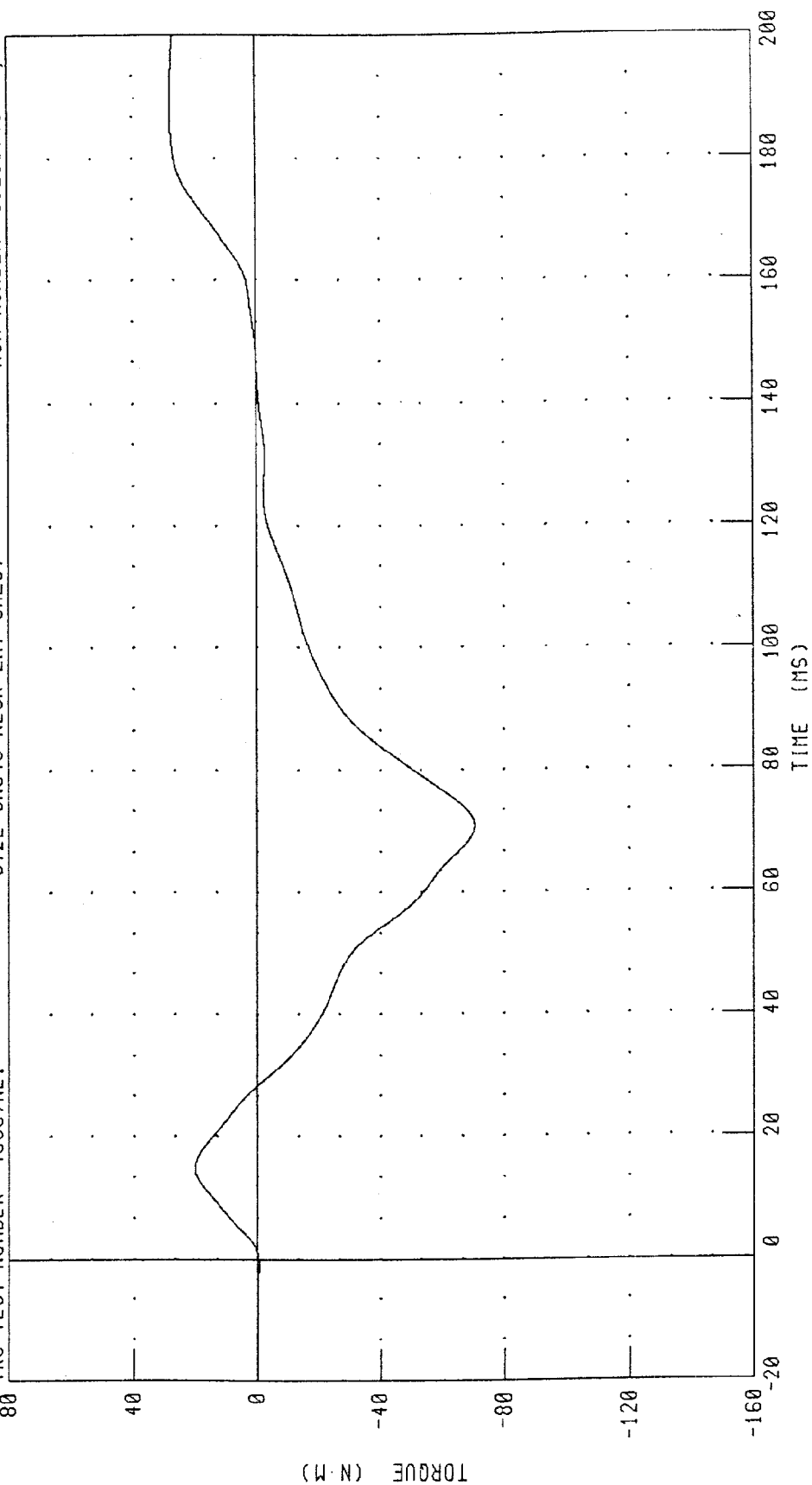
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 45C37NE1

572E SN045 NECK EXT CAL37

RUN NUMBER: 052998.1319,1



CHANNEL: NEKOM

FILTER: CH. CLASS 60

PEAK DATA: 27.74 N-M @ 188.72 MS; -70.51 N-M @ 70.88 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

01-JUN-98

TRC INC.

TEST NO: 45C37TH1

572E SN045 H.S.THORAX CAL37

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.71 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	68.1 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5745. N
INTERNAL HYSTERESIS	69% - 85%	72.7%

TEST MEETS SPECIFICATIONS

TECHNICIAN

By C. L. H.

RUN NUMBER: 060198.0851;1

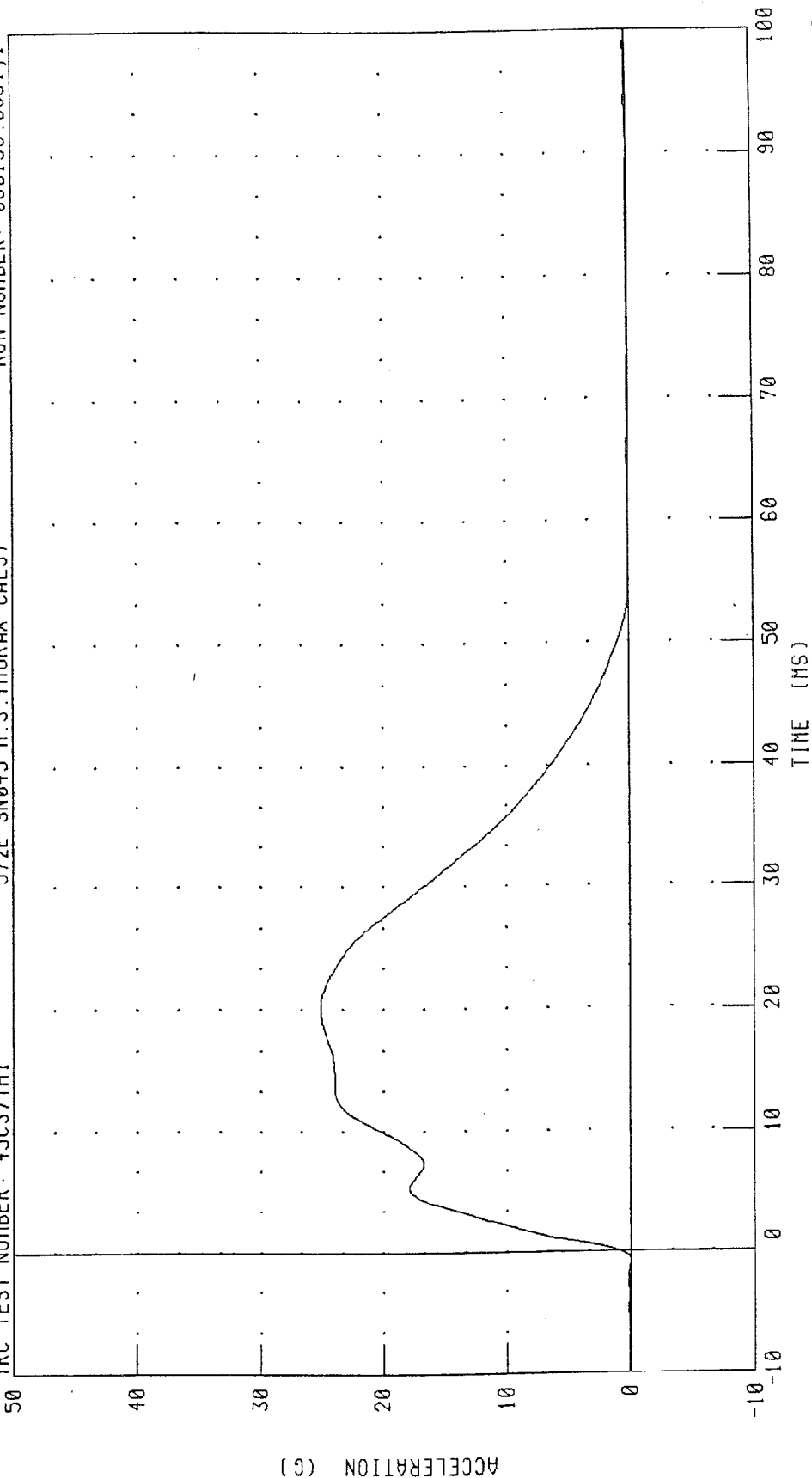
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 45C37TH1

572E SN045 H.S.THORAX CAL37

RUN NUMBER: 060198.0851;1



CHANNEL: PENXG FILTER: CH. CLASS 180

PEAK DATA: 25.08 G @ 20.24 MS, -0.01 G @ 90.56 MS

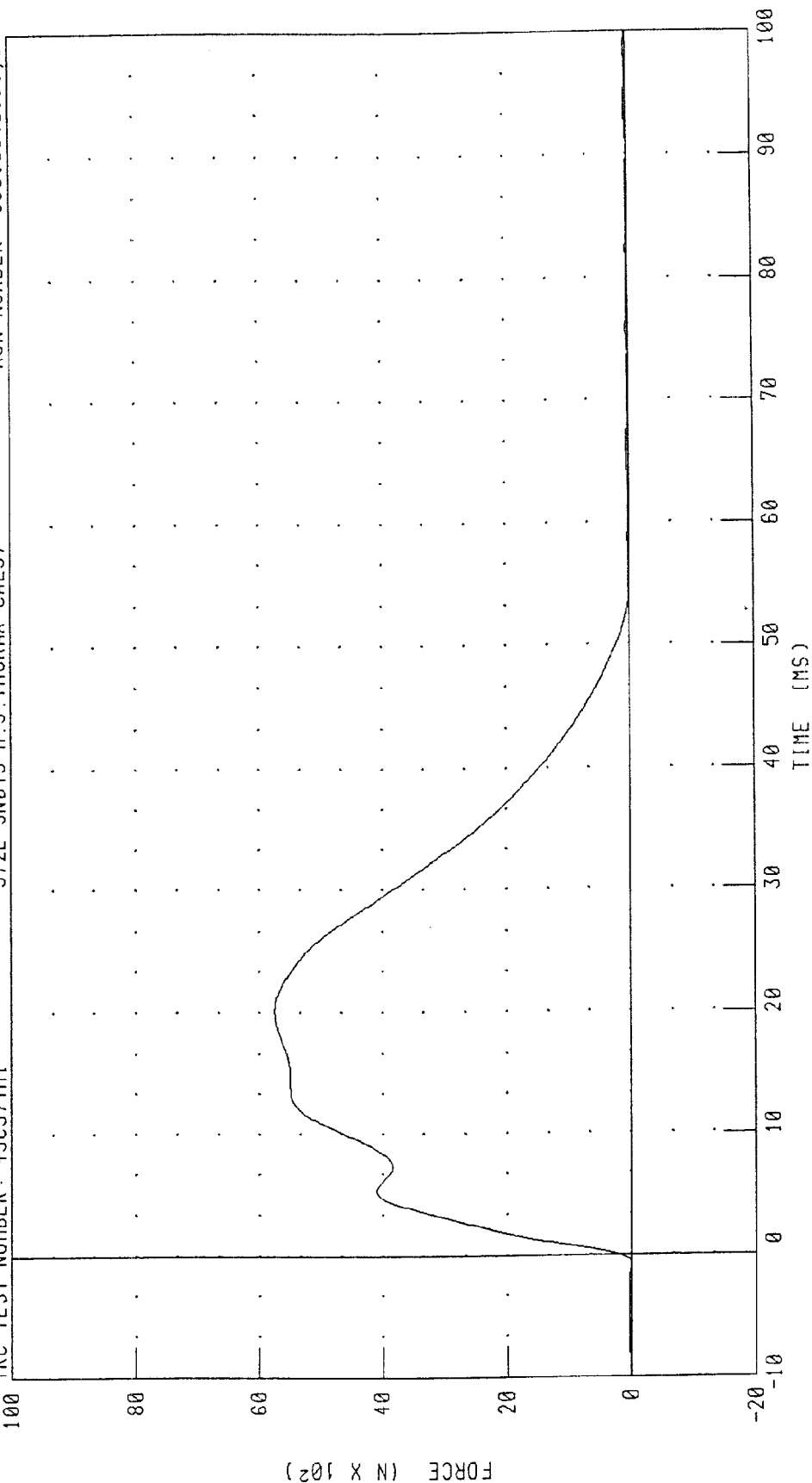
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 45C37TH1

572E SN045 H.S.THORAX CAL37

RUN NUMBER: 060198 0851;1



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 5745.90 N @ 20.24 MS; -2.92 N @ 90.56 MS

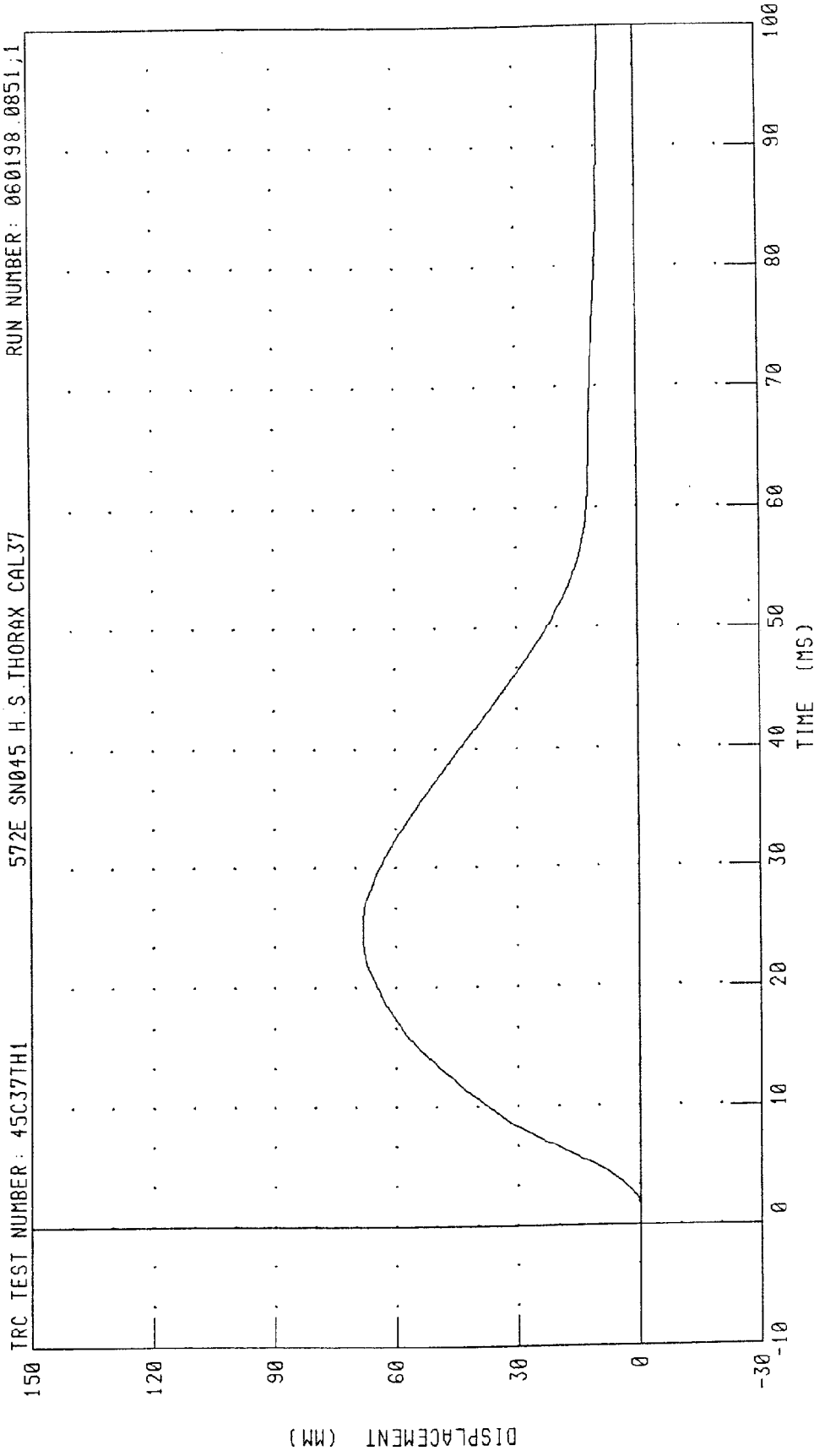
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 45C37TH1

572E SN045 H.S. THORAX CAL37

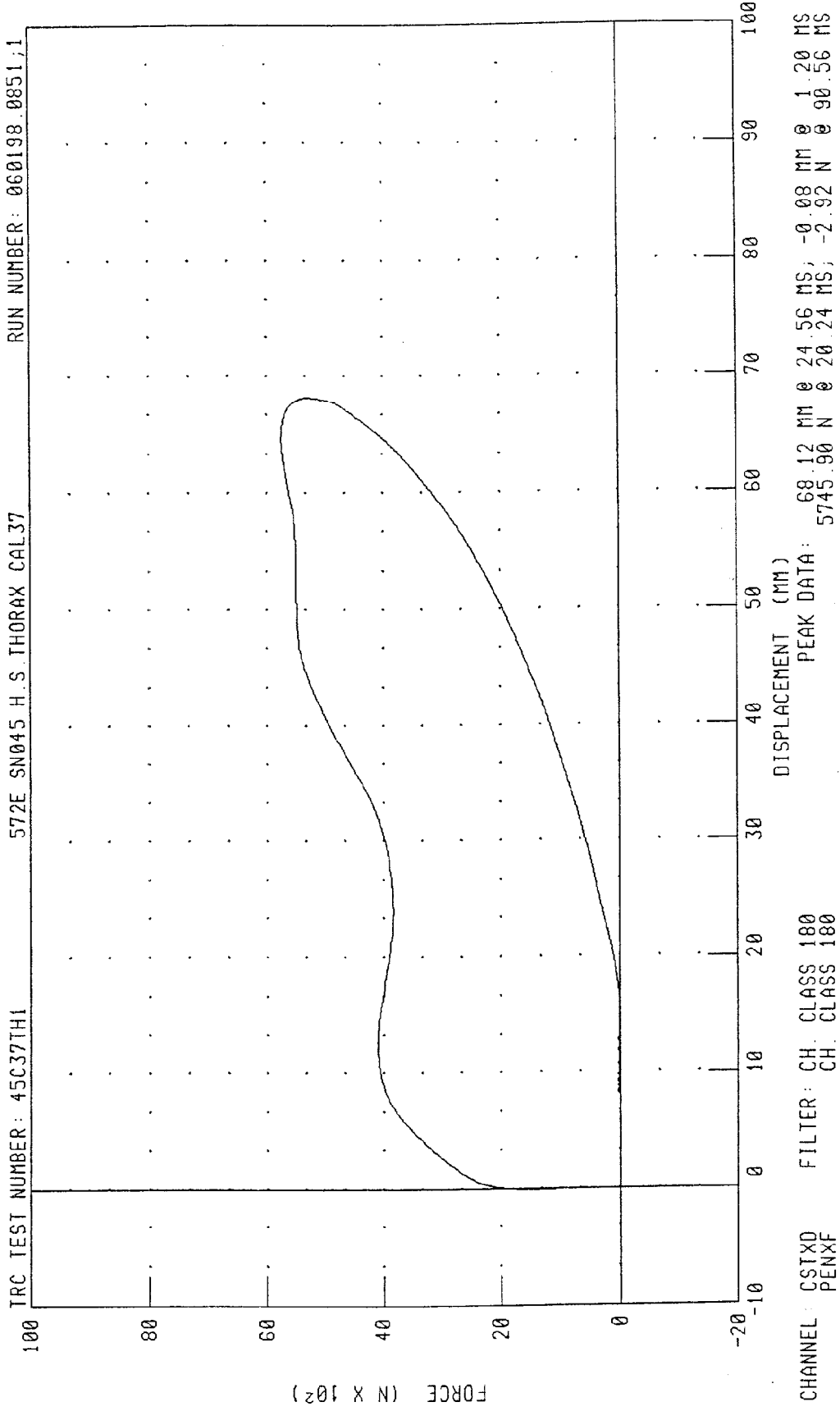
RUN NUMBER: 060198.0851,1



CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 68.12 MM @ 24.56 MS, -0.08 MM @ 1.20 MS

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



TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

29-MAY-98

TRC INC.

TEST NO: 45C37RK1

572E SN045 RIGHT KNEE CAL 37

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	56.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5193.4 N

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

RUN NUMBER: 052998.1029;1

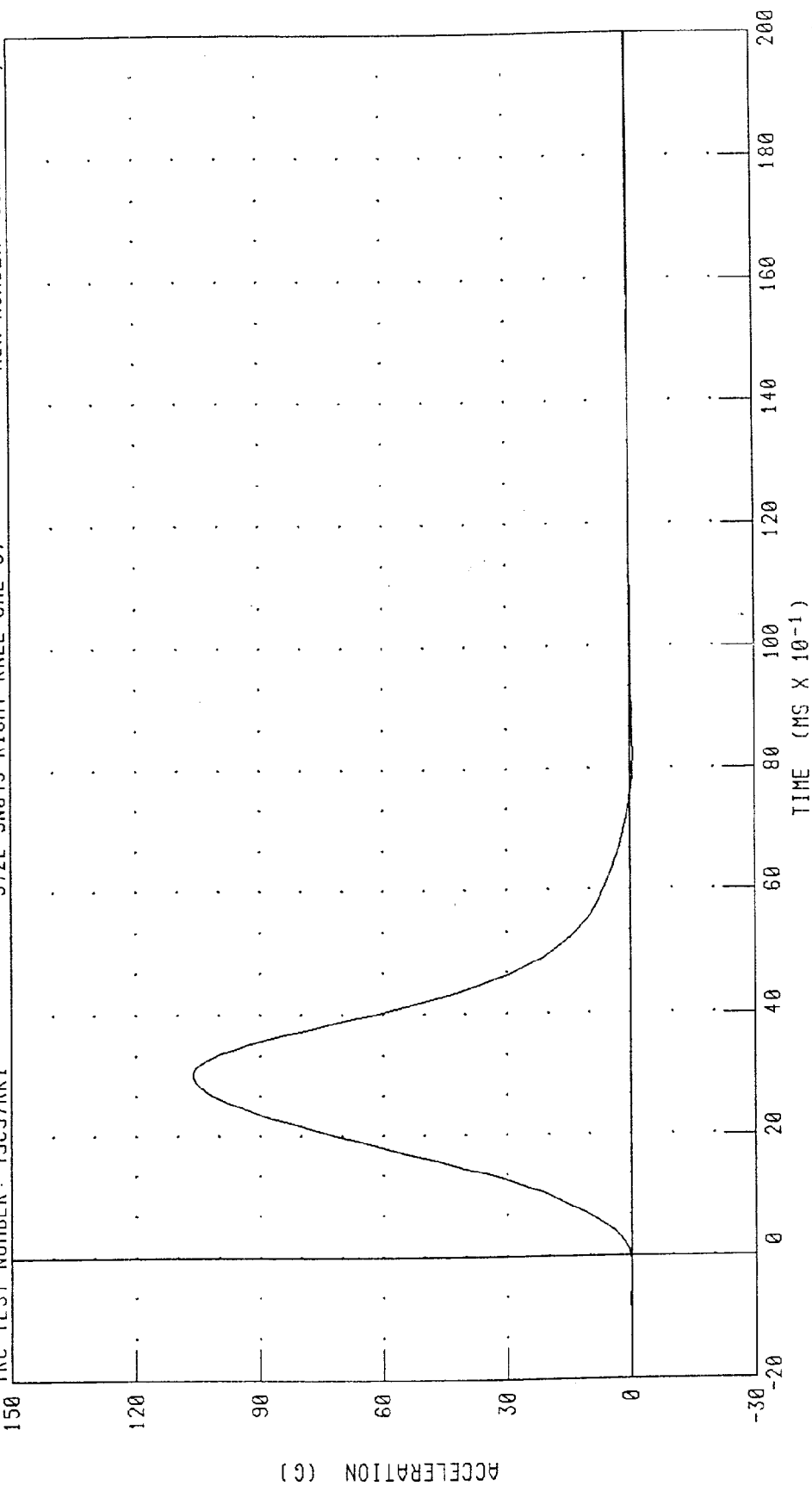
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND.)

RUN NUMBER: 052998.1030,1

TRC TEST NUMBER: 45C37RK1

572E SN045 RIGHT KNEE CAL 37



CHANNEL: PENXC

FILTER: CH. CLASS 600

PEAK DATA: 105.14 G @ 3.04 MS; -0.70 G @ 8.24 MS

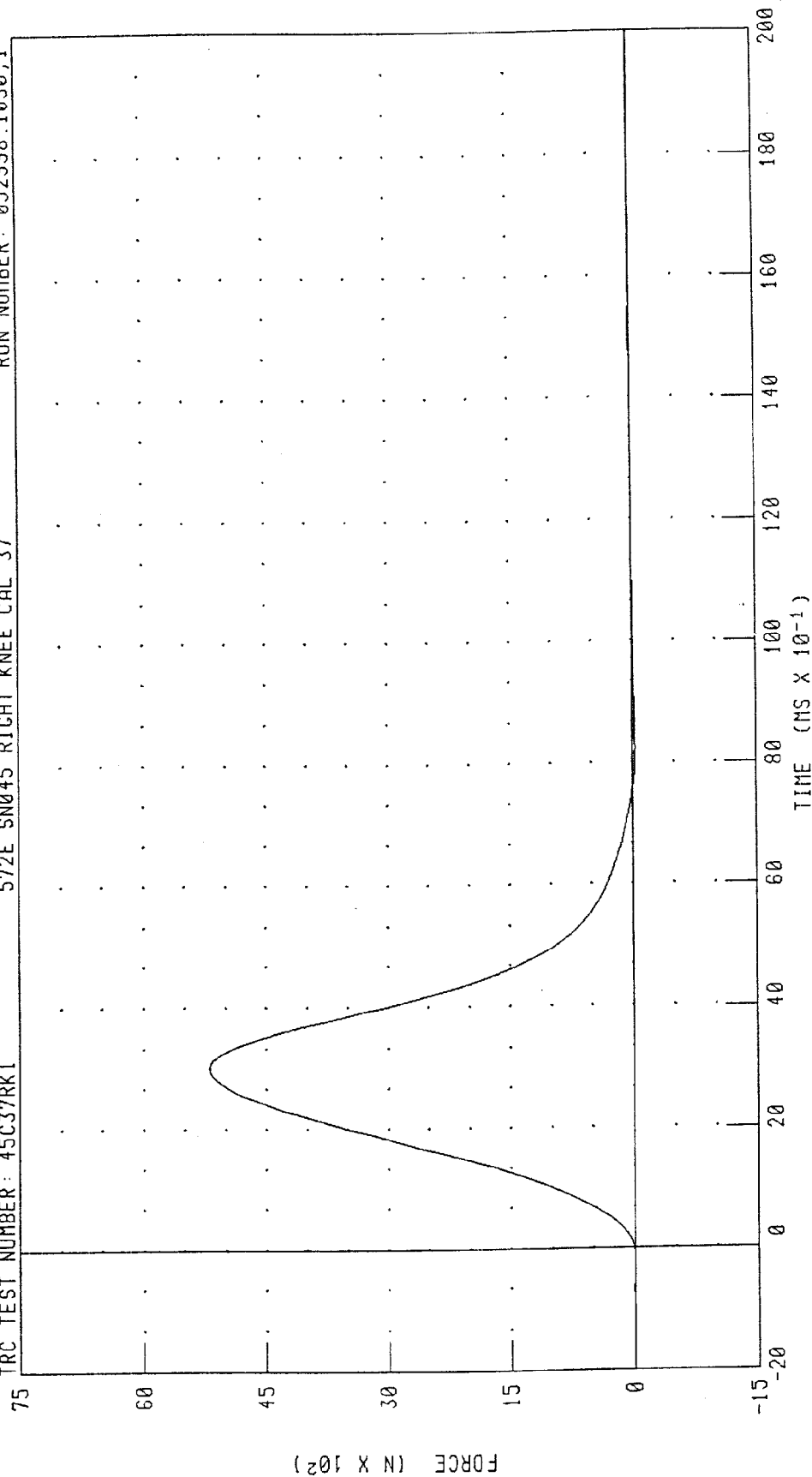
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 052998.1030;1

TRC TEST NUMBER: 45C37RK1

572E SN045 RIGHT KNEE CAL 37



CHANNEL: PENXF

FILTER: CH. CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA: 5193.44 N @ 3.04 MS; -34.49 N @ 8.24 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

29-MAY-98

TRC INC.

TEST NO: 45C37LK1

572E SN045 LEFT KNEE CAL 37

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	56.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5318.2 N

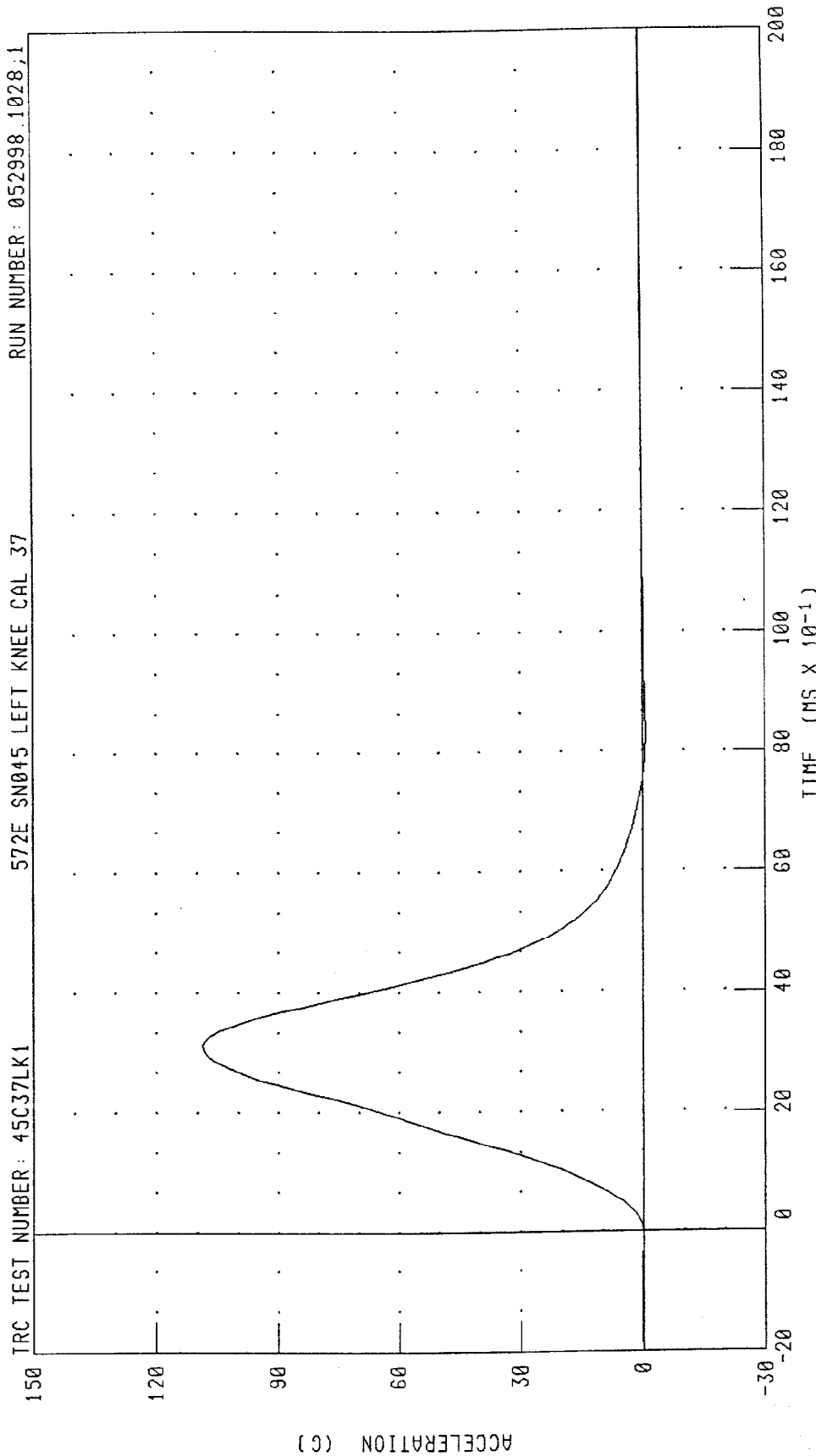
TEST MEETS SPECIFICATIONS

TECHNICIAN

Kevin Watkins

RUN NUMBER: 052998.1027;1

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



CHANNEL: PENXC FILTER: CH. CLASS 600 PEAK DATA: 108.70 G @ 3.12 MS; -0.76 G @ 0.32 MS

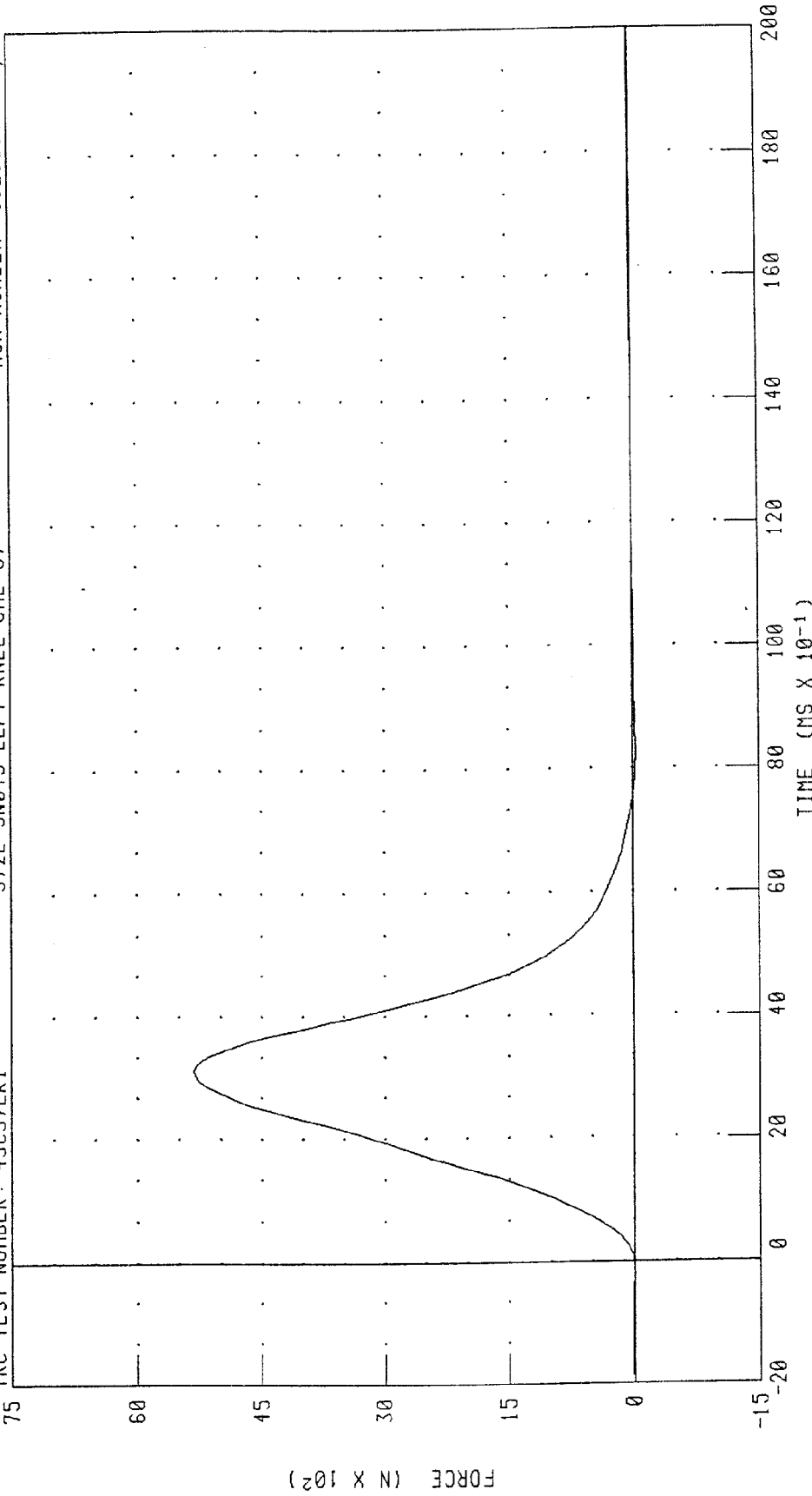
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN045 LEFT KNEE CAL 37

TRC TEST NUMBER: 45C37LK1

RUN NUMBER: 052998 1028,1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5318.24 N @ 3.12 MS, -37.28 N @ 8.32 MS

Pre-Test Calibration

Bullet Vehicle Passenger Dummy S/N 283

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III SMALL FEMALE

01-JUN-98

TRC INC.

TEST NO: 283C2HD1

S.FEMALE SN283 HEAD DROP CAL2

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	240 - 295 G	278.19 G
PEAK LATERAL ACCELERATION	15 G MAX	-2.81 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Bj Cull

RUN NUMBER: 060198.1053;1

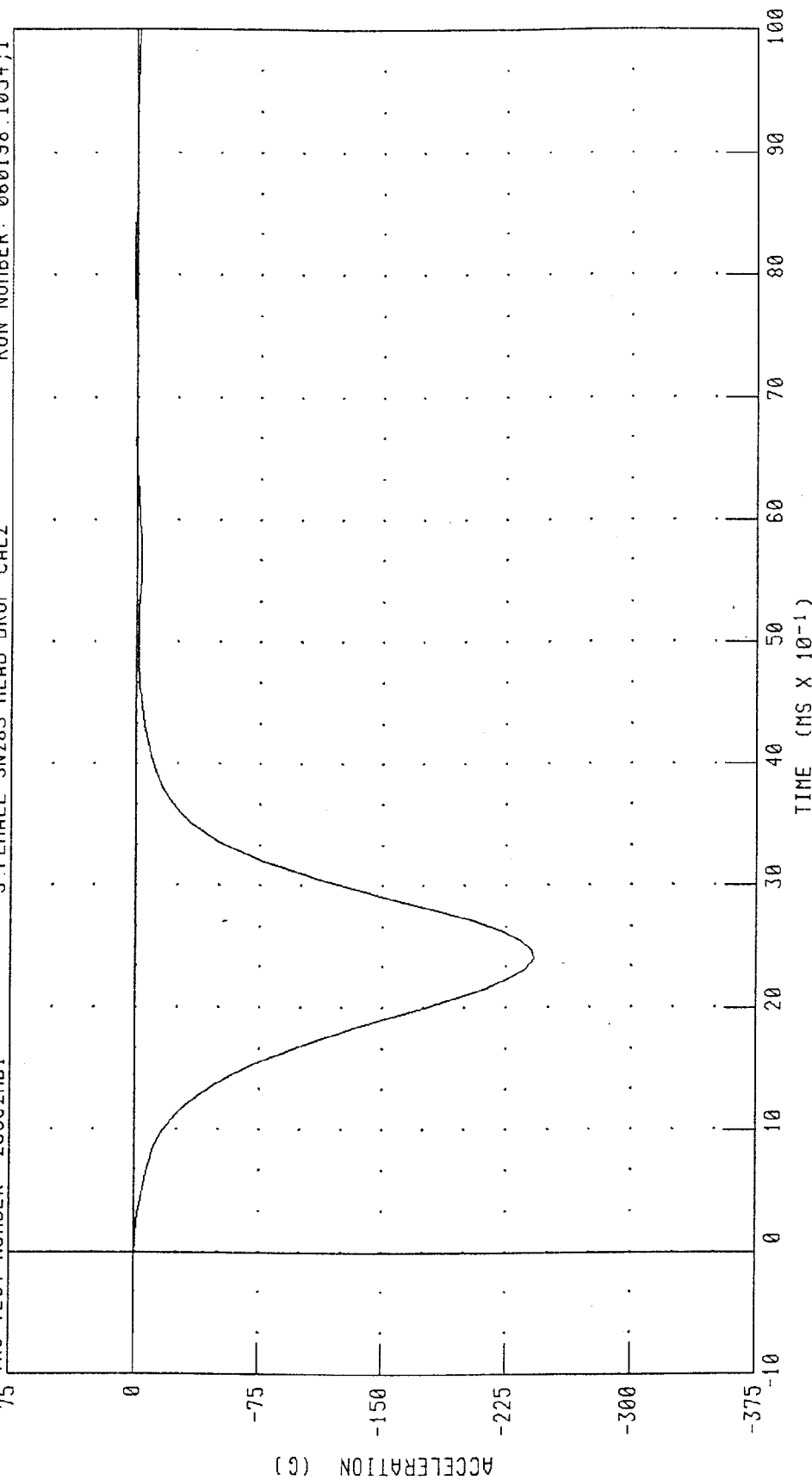
SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 283C2HD1

S FEMALE SN283 HEAD DROP CAL2

RUN NUMBER: 060198.1054,1



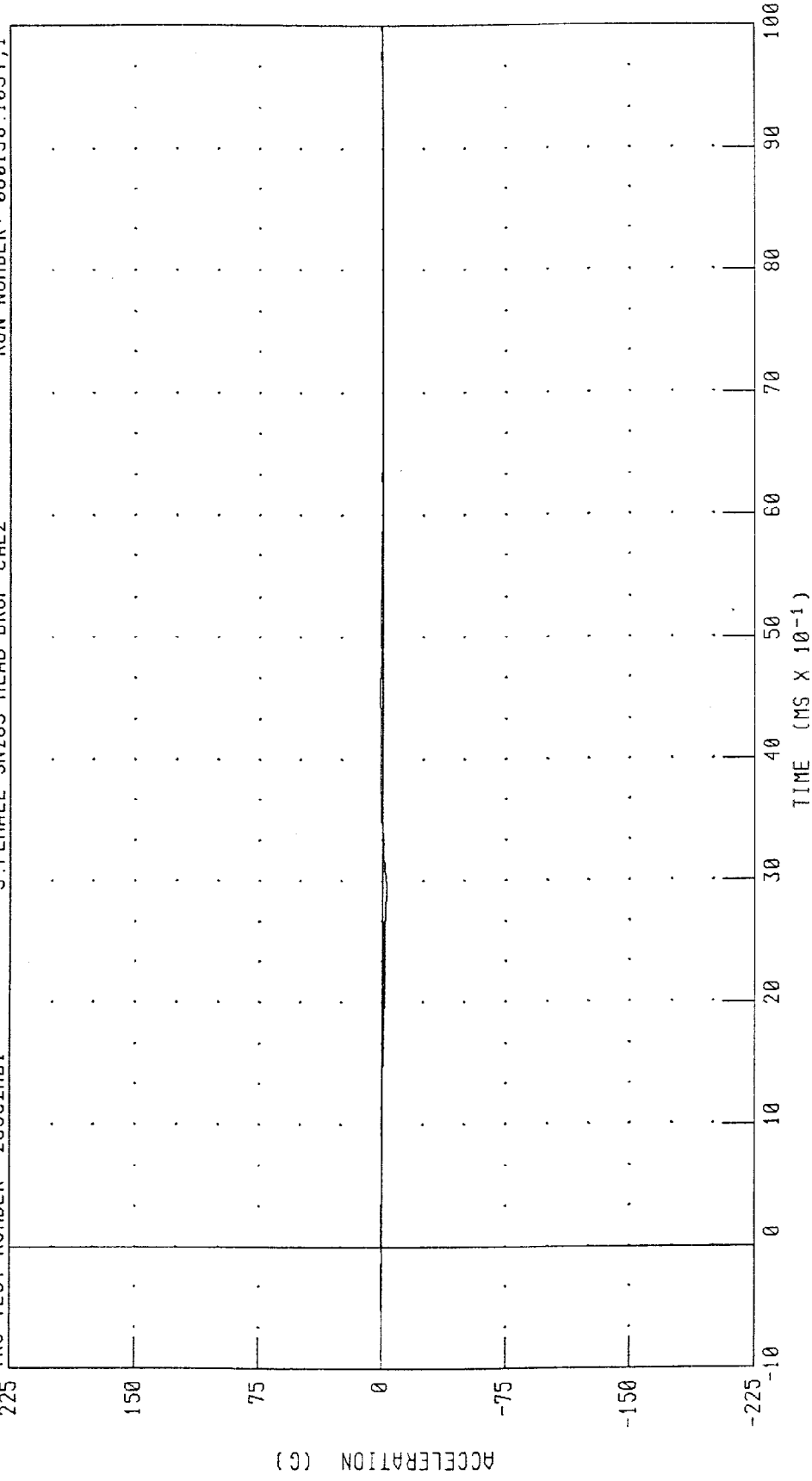
PEAK DATA: 1.66 G @ 8.00 MS, -241.52 G @ 2.40 MS

CHANNEL: HEDXC FILTER: CH. CLASS 1000

SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 283C2HD1 S.FEMALE SN283 HEAD DROP CAL2 RUN NUMBER: 060198.1054;1



CHANNEL: HEDYC FILTER: CH. CLASS 1000 PEAK DATA: 1.87 G @ 4.56 MS; -2.82 G @ 2.96 MS

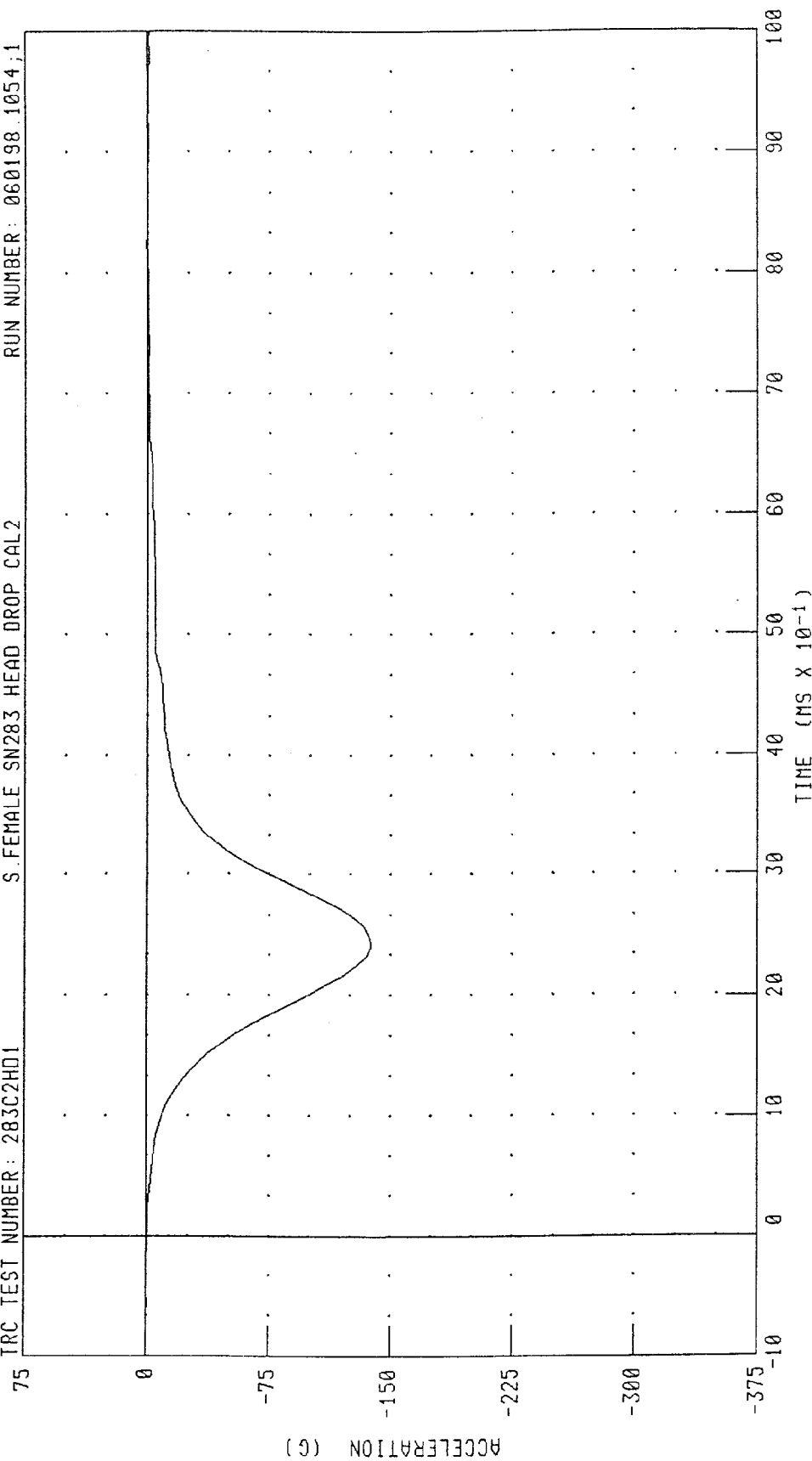
SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 283C2HD1

S. FEMALE SN283 HEAD DROP CAL2

RUN NUMBER: 060198.1054; 1



CHANNEL: HEDZG FILTER: CH. CLASS 1000

PEAK DATA: 0.65 G @ 8.24 MS; -138.06 G @ 2.40 MS

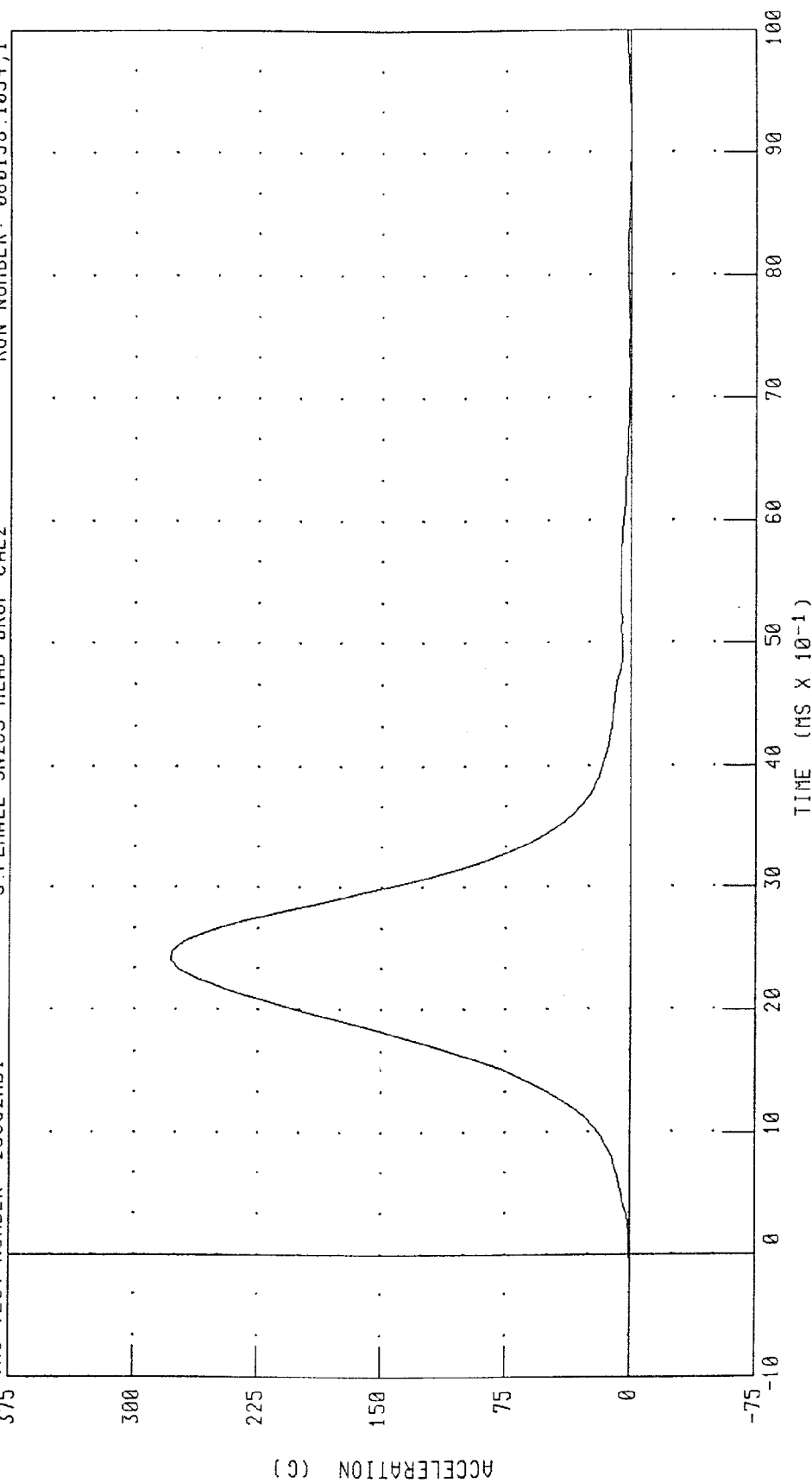
SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 283C2HD1

S. FEMALE SN283 HEAD DROP CAL2

RUN NUMBER: 060198.1054,1



CHANNEL: HEDRC

FILTER: CH. CLASS 1000

PEAK DATA: 278.20 G @ 2.40 MS, 0.14 G @ -0.80 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

01-JUN-98

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 283C2NF2 S.FEMALE SN283 NECK FLEX. CAL2

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/S	7.12 M/S
INTEGRATED PENDULUM VELOCITY	10 MS 2.1 - 2.5 M/S	2.31 M/S
	20 MS 4.0 - 5.0 M/S	4.55 M/S
	30 MS 5.8 - 7.0 M/S	6.30 M/S
PEAK D-PLANE ROTATION	78 - 96 DEG.	81.60 DEG.
ROTATION ANGLE DECAY TIME FROM PEAK TO ZERO	57 - 69 MS	63.52 MS
PEAK MOMENT ABOUT OCCIPITAL CONDYLE	69 - 84 NM	74.85 NM
POSITIVE MOMENT DECAY TIME FROM PEAK TO ZERO	41 - 50 MS	44.80 MS
TIME OF PEAK ROTATION AFTER PEAK MOMENT	2 - 12 MS	8.72 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN B. G. Calt

RUN NUMBER: 060198.1313;2

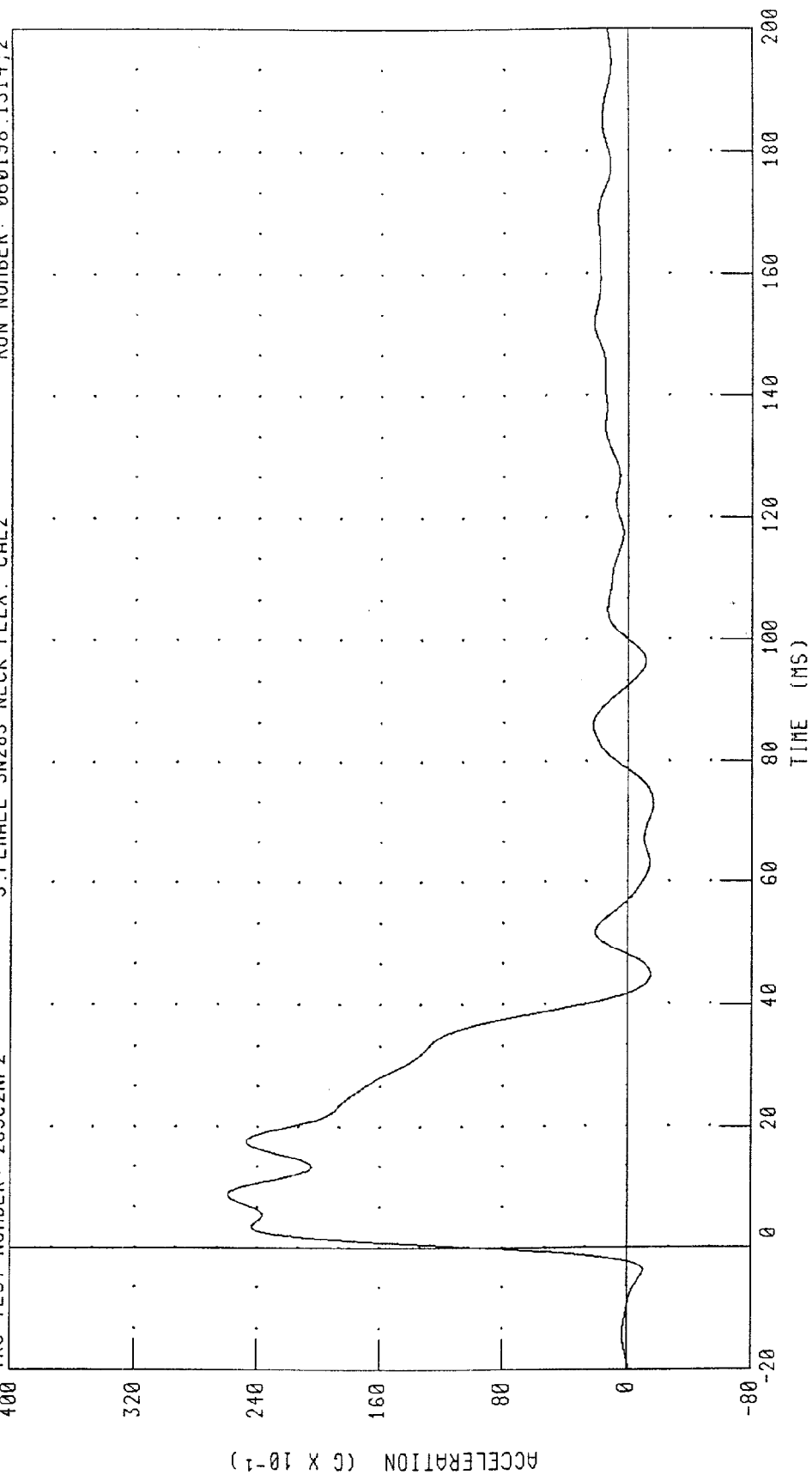
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 283C2NF2

S.FEMALE SN283 NECK FLEX. CAL2

RUN NUMBER: 060198.1314,2



CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 25.96 G @ 8.80 MS, -1.65 G @ 73.04 MS

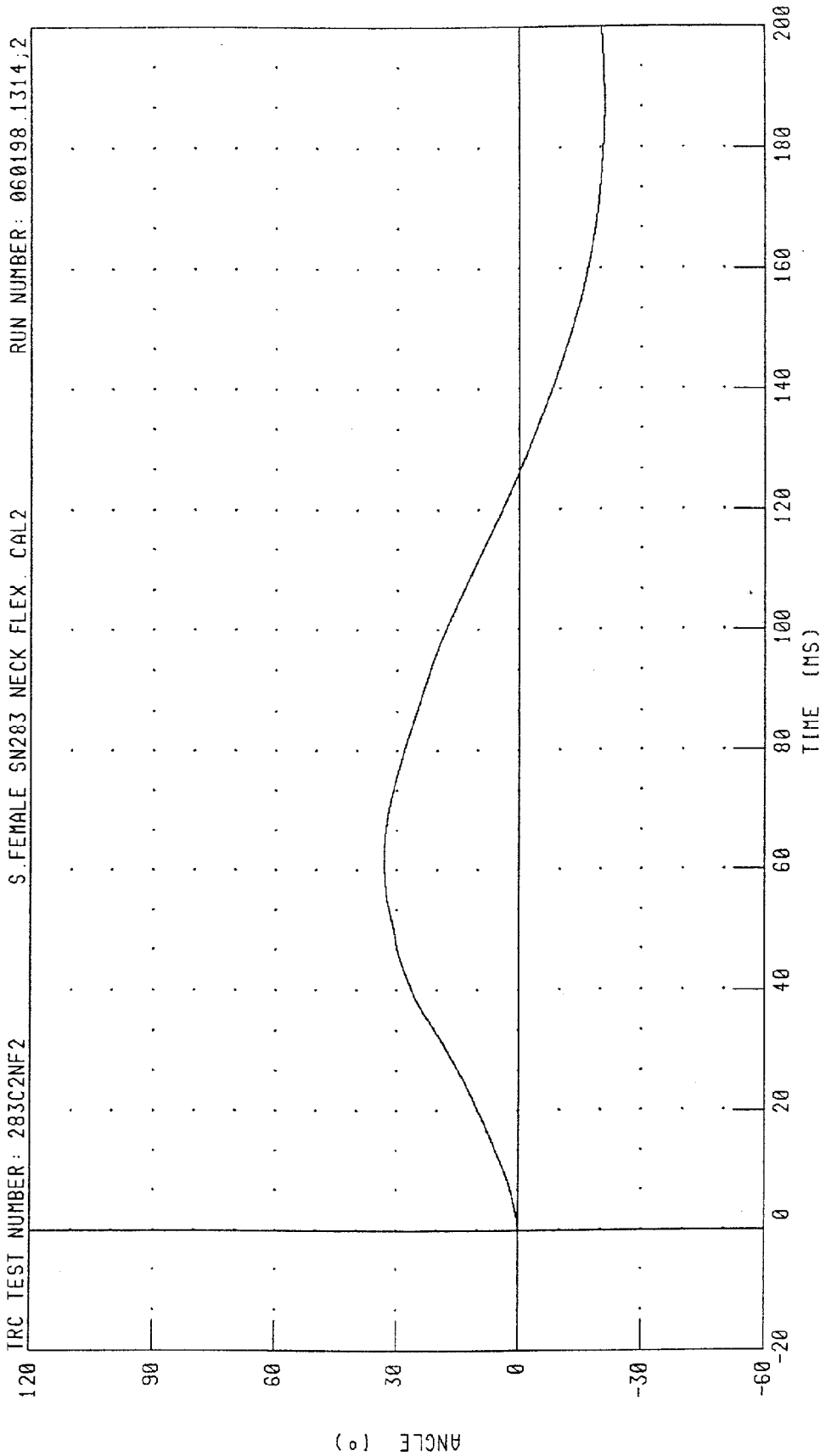
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 283C2NF2

S. FEMALE SN283 NECK FLEX. CAL2

RUN NUMBER: 060198.1314.2

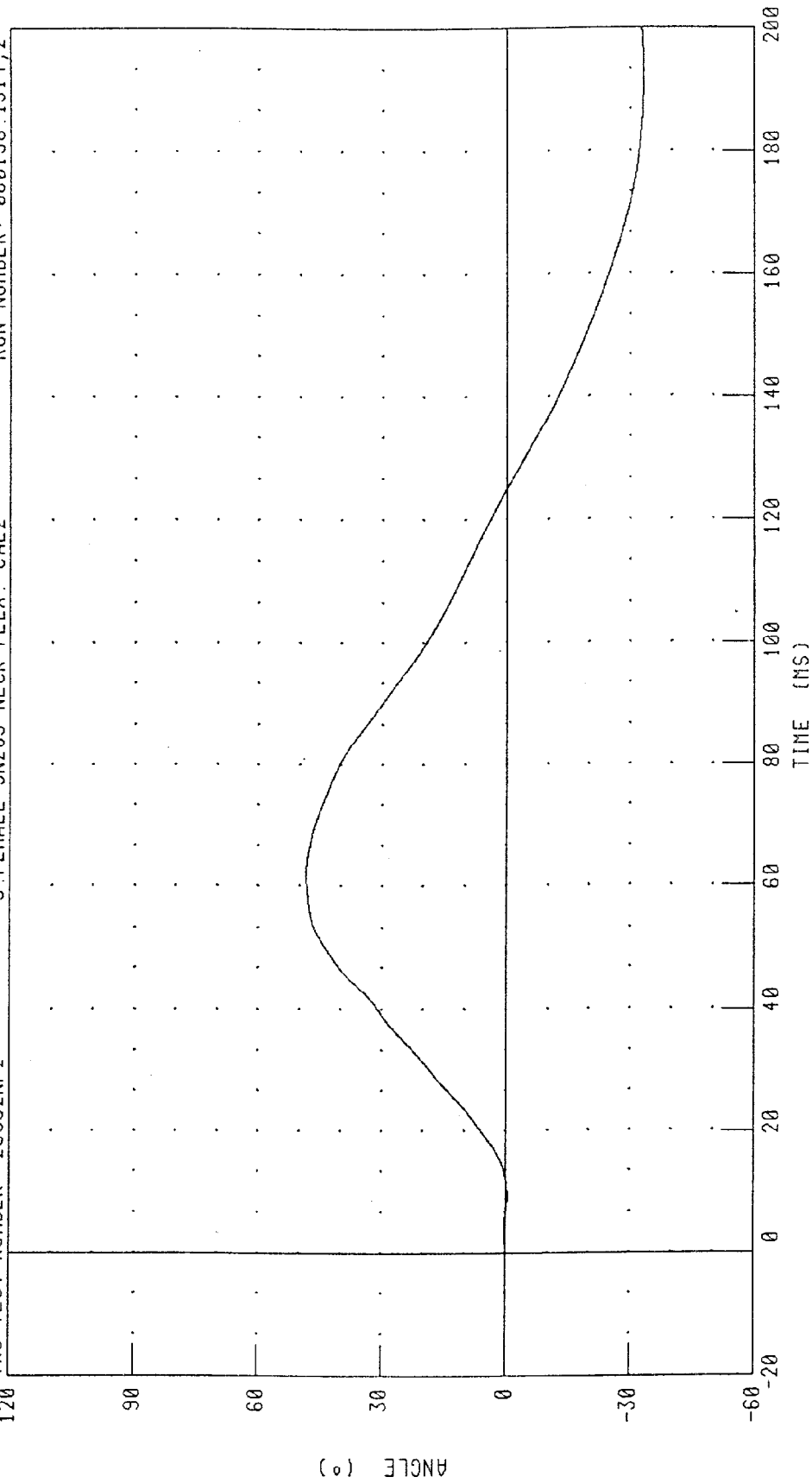


CHANNEL: BETA FILTER: CH. CLASS 60

SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 283C2NF2 S. FEMALE SN283 NECK FLEX. CAL2 RUN NUMBER: 060198.1314;2



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 48.41 ° @ 61.84 MS, -33.32 ° @ 192.88 MS

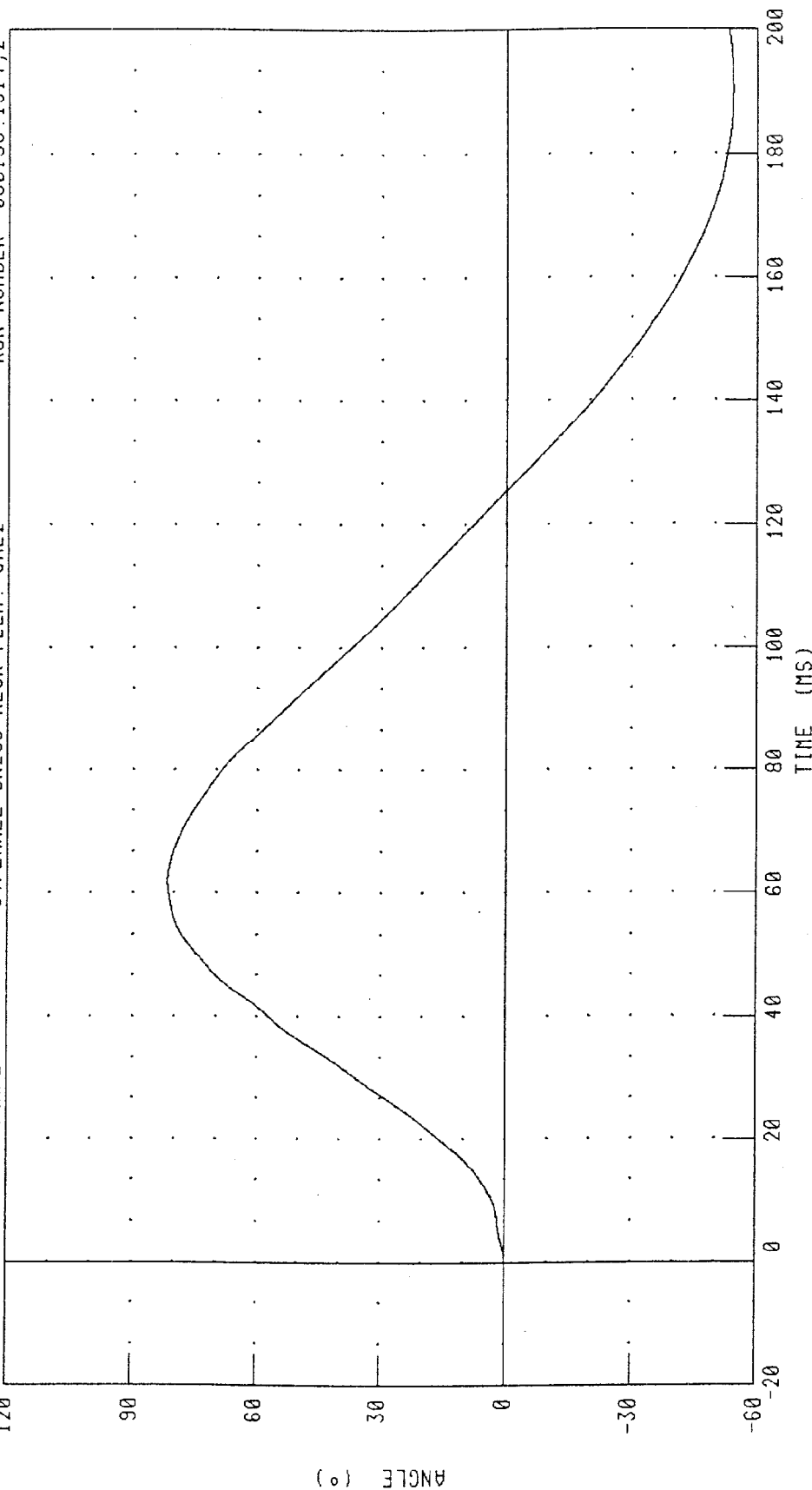
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 283C2NF2

S. FEMALE SN283 NECK FLEX. CAL2

RUN NUMBER: 060198.1314;2



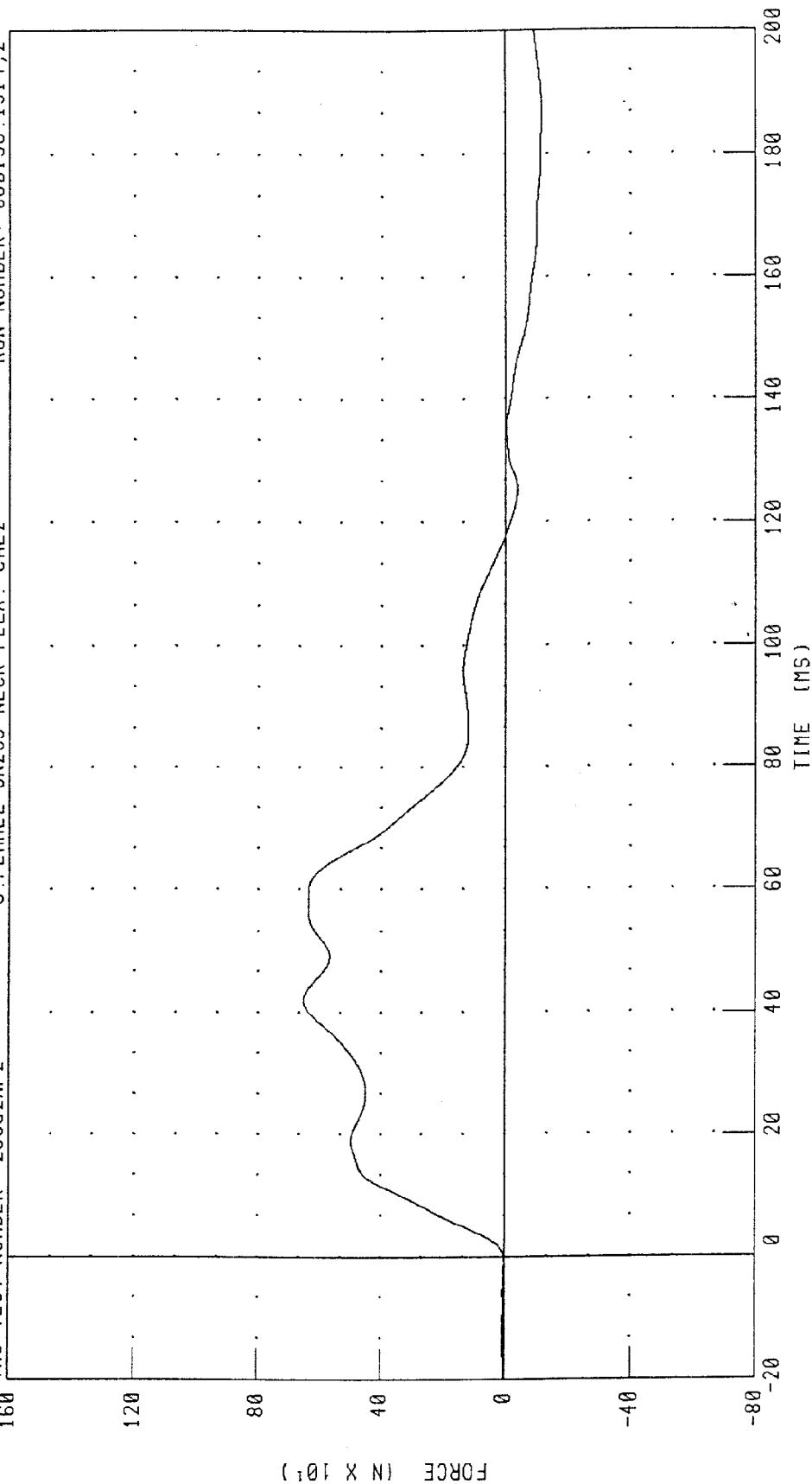
CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 81.60 ° @ 61.92 MS; -54.32 ° @ 190.40 MS

SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 283C2NF2 S. FEMALE SN283 NECK FLEX. CAL2 RUN NUMBER: 060198.1314.2



CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 652.26 N @ 42.00 MS, -116.68 N @ 186.64 MS

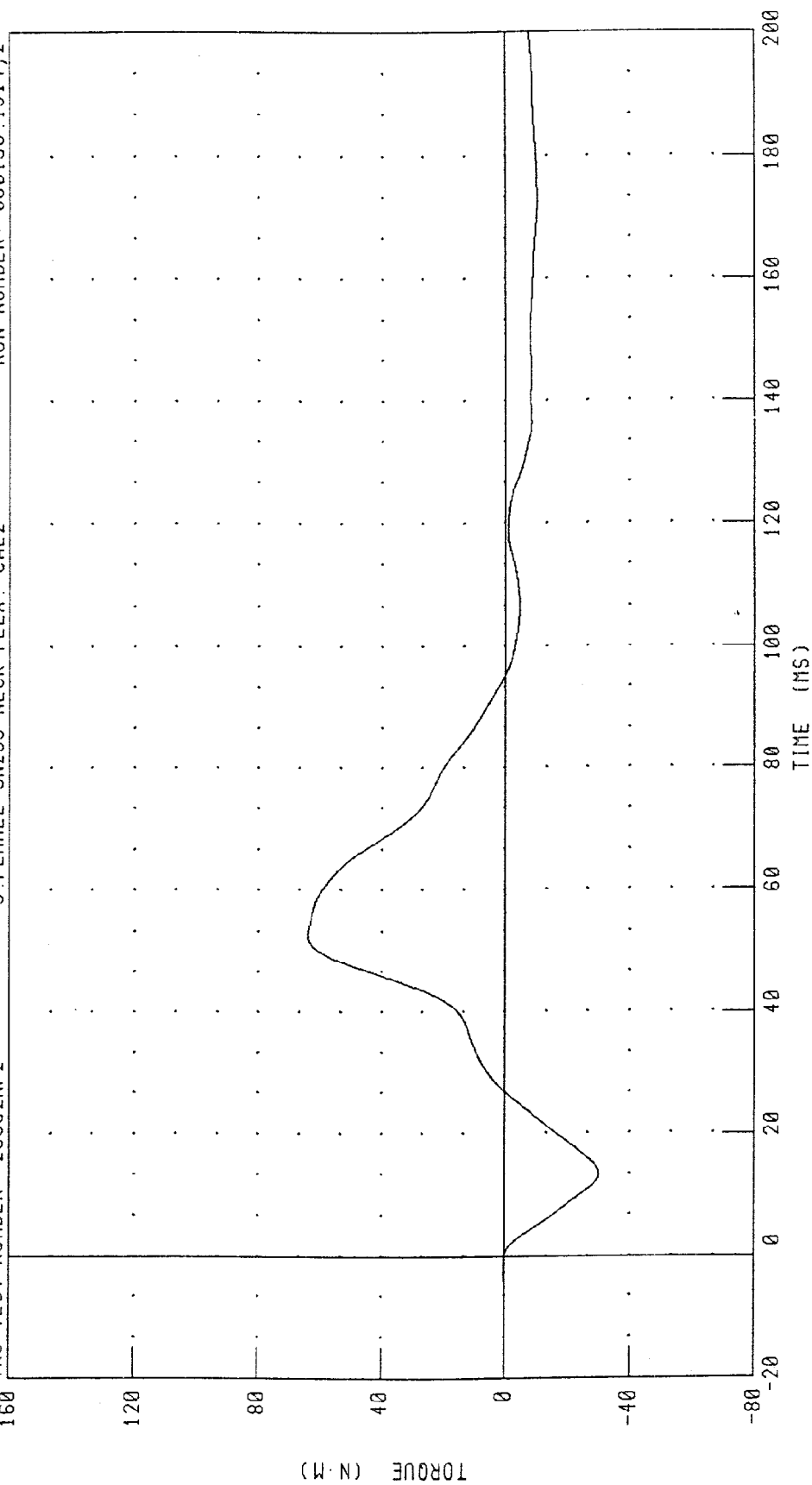
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 283C2NF2

S. FEMALE SN283 NECK FLEX. CAL2

RUN NUMBER: 060198.1314;2



PEAK DATA: 63.98 N·M @ 52.80 MS; -30.32 N·M @ 13.28 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

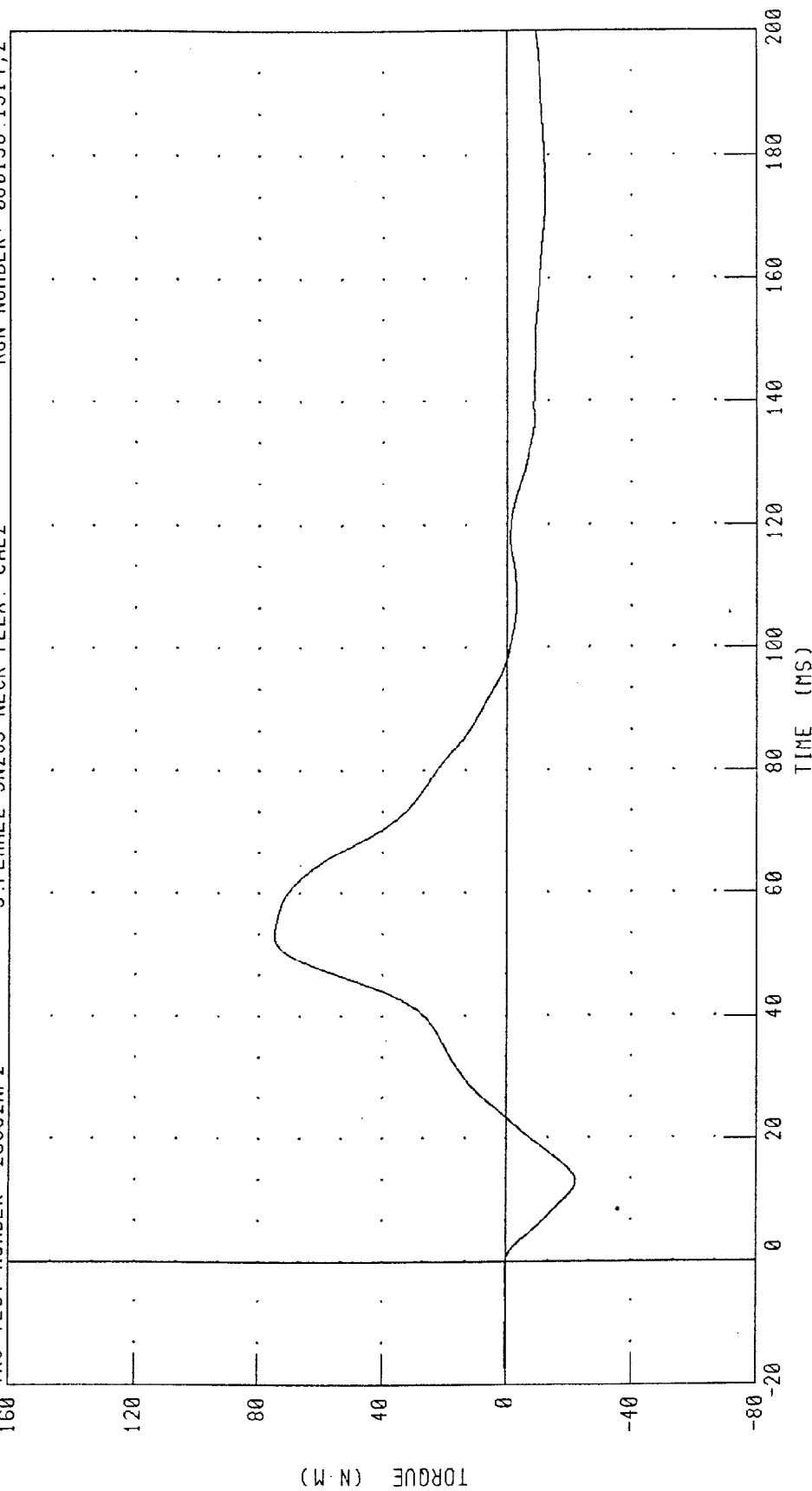
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 283C2NF2

S.FEMALE SN283 NECK FLEX. CAL2

RUN NUMBER: 060198.1314;2



CHANNEL: NEKOM FILTER: CH. CLASS 60.

PEAK DATA: 74.85 N-M @ 53.20 MS, -22.26 N-M @ 12.96 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

01-JUN-98

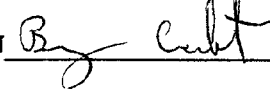
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 283C2NE2 S.FEMALE SN283 NECK EXT. CAL2

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/S	6.10 M/S
INTEGRATED PENDULUM VELOCITY	10 MS	1.5 - 1.9 M/S	1.69 M/S
	20 MS	3.1 - 3.9 M/S	3.42 M/S
	30 MS	4.6 - 5.6 M/S	5.05 M/S
PEAK D-PLANE ROTATION		97 - 119 DEG.	110.66 DEG.
ROTATION ANGLE DECAY AT THE 10 NM MOMENT LEVEL		80 - 96 DEG.	87.88 DEG.
PEAK MOMENT ABOUT OCCIPITAL CONDYLE		54 - 67 NM	-54.74 NM
NEGATIVE MOMENT DECAY TIME FROM PEAK TO 10 NM LEVEL		28 - 38 MS	33.76 MS
TIME OF PEAK ROTATION AFTER PEAK MOMENT		0 - 10 MS	5.20 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 060198.1435;1

SMALL FEMALE NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 283C2NE2

S. FEMALE SN283 NECK EXT. CAL2

RUN NUMBER: 060198.1436;1

400

320

ACCELERATION (G X 10⁻¹)

240

160

80

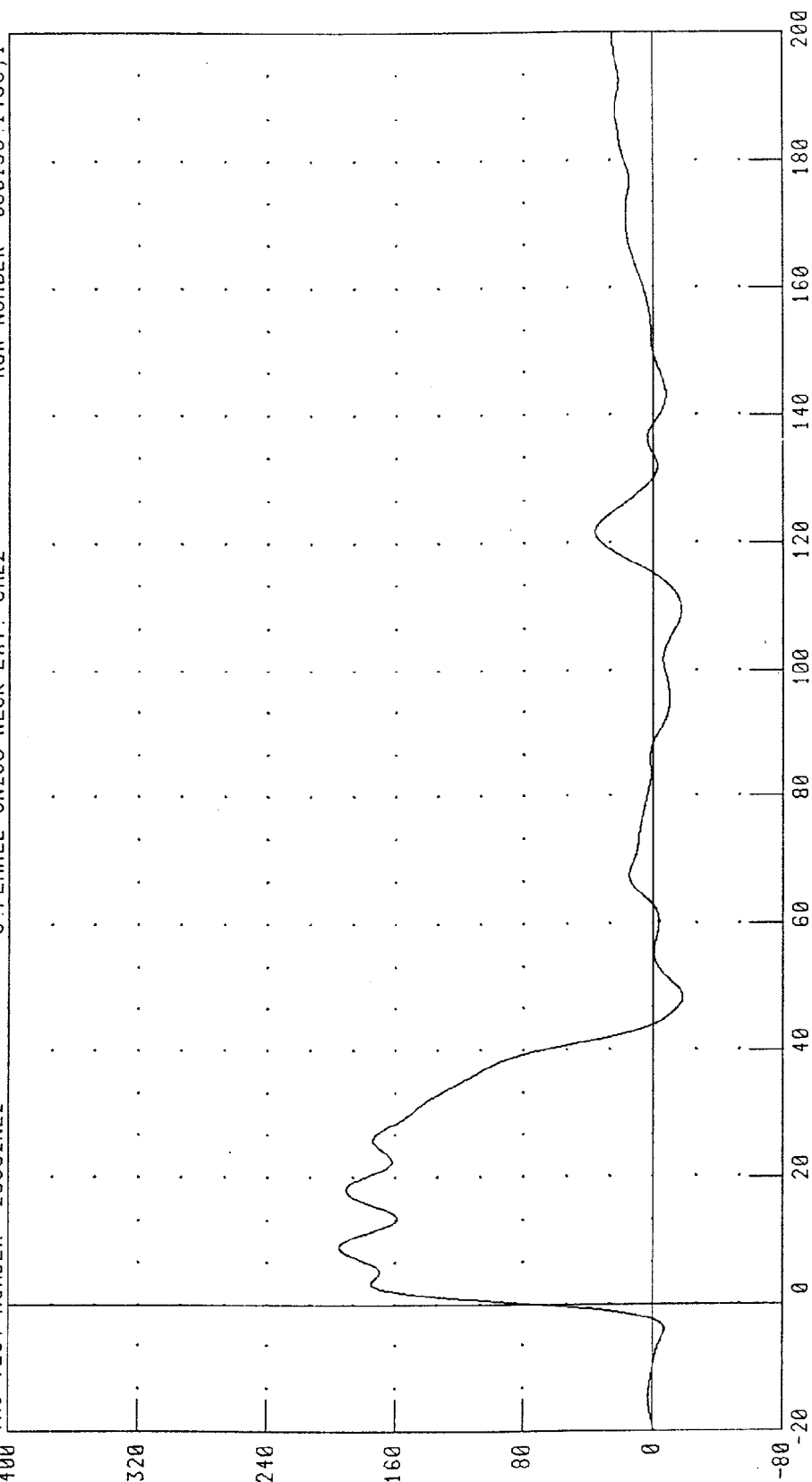
0

-80

TIME (MS)

CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 19.52 C @ 9.12 MS, -1.87 C @ 48.48 MS



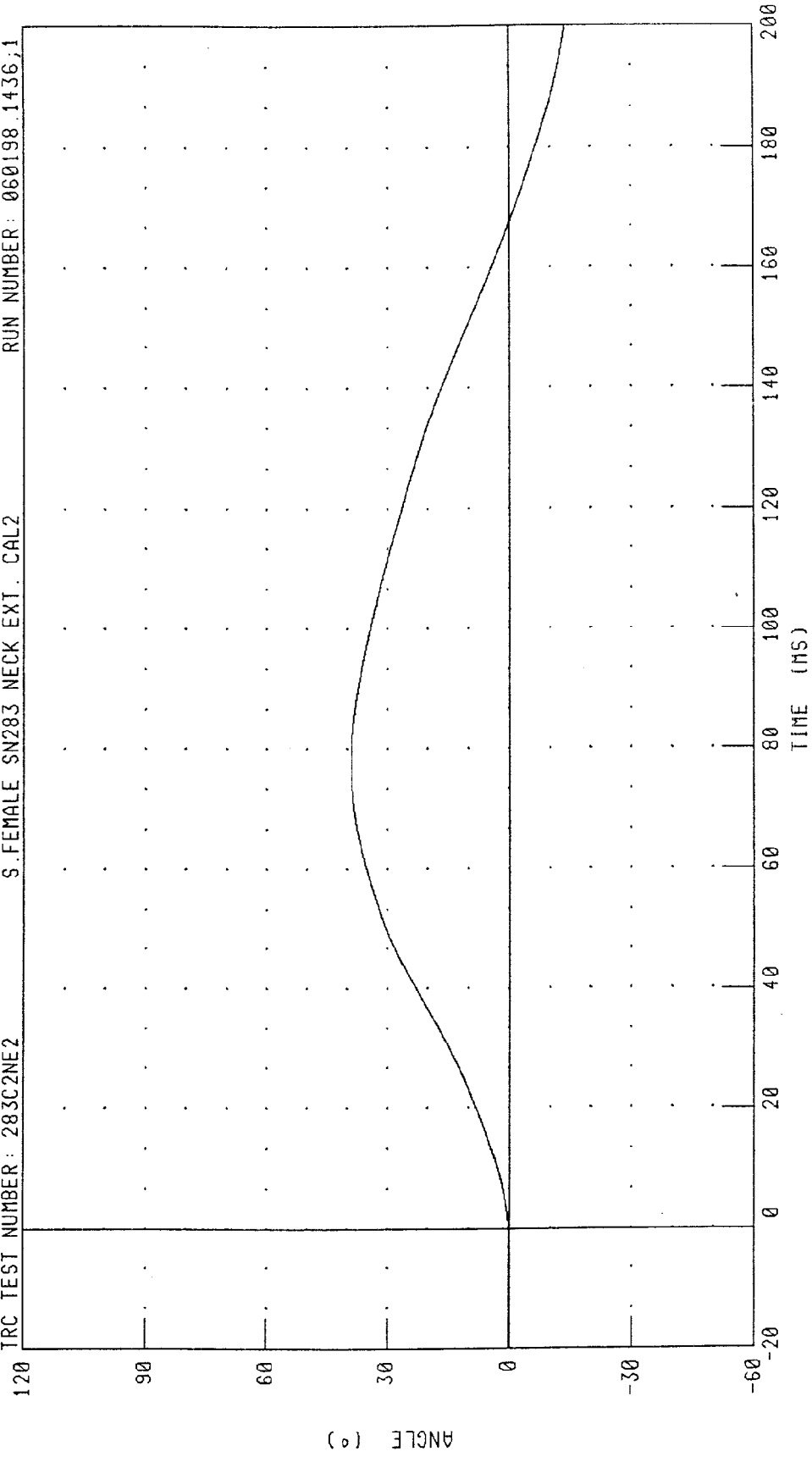
SMALL FEMALE NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

S.FEMALE SN283 NECK EXT. CAL2

TRC TEST NUMBER: 283C2NE2

RUN NUMBER: 060198.1436;1



CHANNEL: BETA

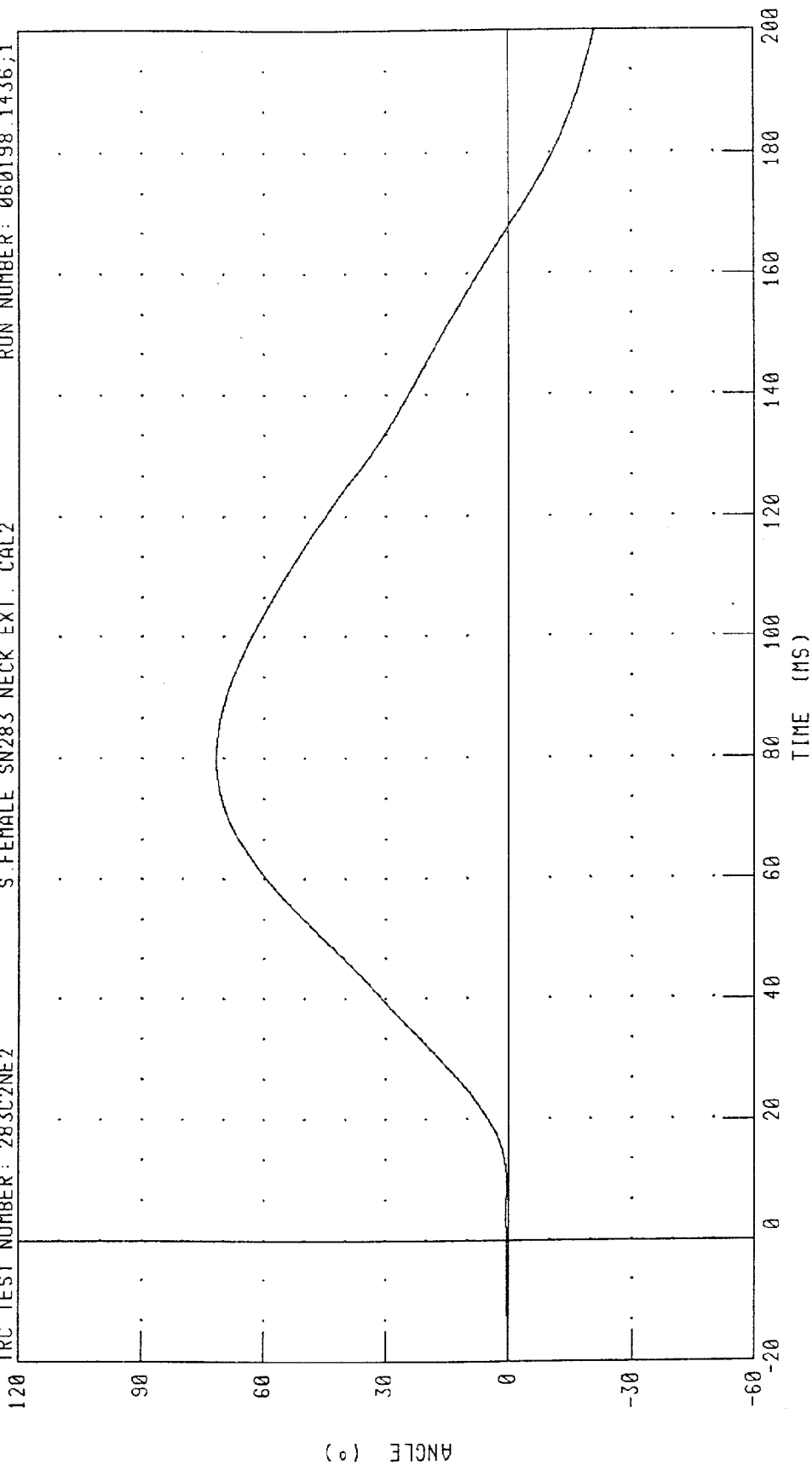
FILTER: CH. CLASS 60

PEAK DATA: 38.90 ° @ 78.08 MS; -13.93 ° @ 200.00 MS

SMALL FEMALE NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
S FEMALE SN283 NECK EXT. CAL2

TRC TEST NUMBER: 283C2NE2

RUN NUMBER: 060198.1436;1



PEAK DATA: 71.79 ° @ 80.00 MS; -21.10 ° @ 200.00 MS

FILTER: CH. CLASS 60

CHANNEL: THETA

SMALL FEMALE NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 283C2NE2

S.FEMALE SN283 NECK EXT. CAL2

RUN NUMBER: 060198.1436;1

120

90

60

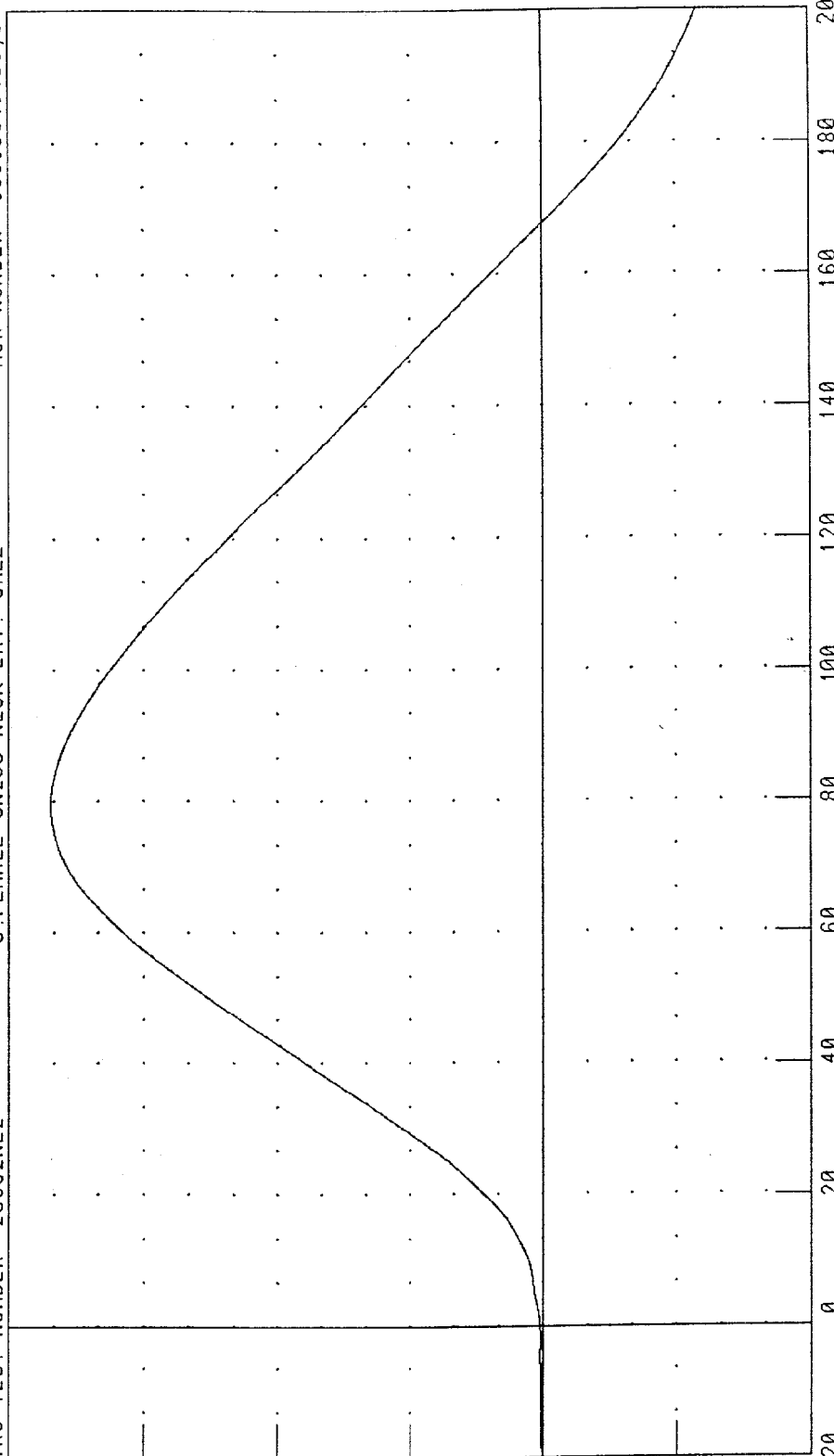
30

0

-30

-60

ANGLE (°)



TIME (MS)

PEAK DATA: 110.66 ° @ 79.52 MS, -35.03 ° @ 200.00 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

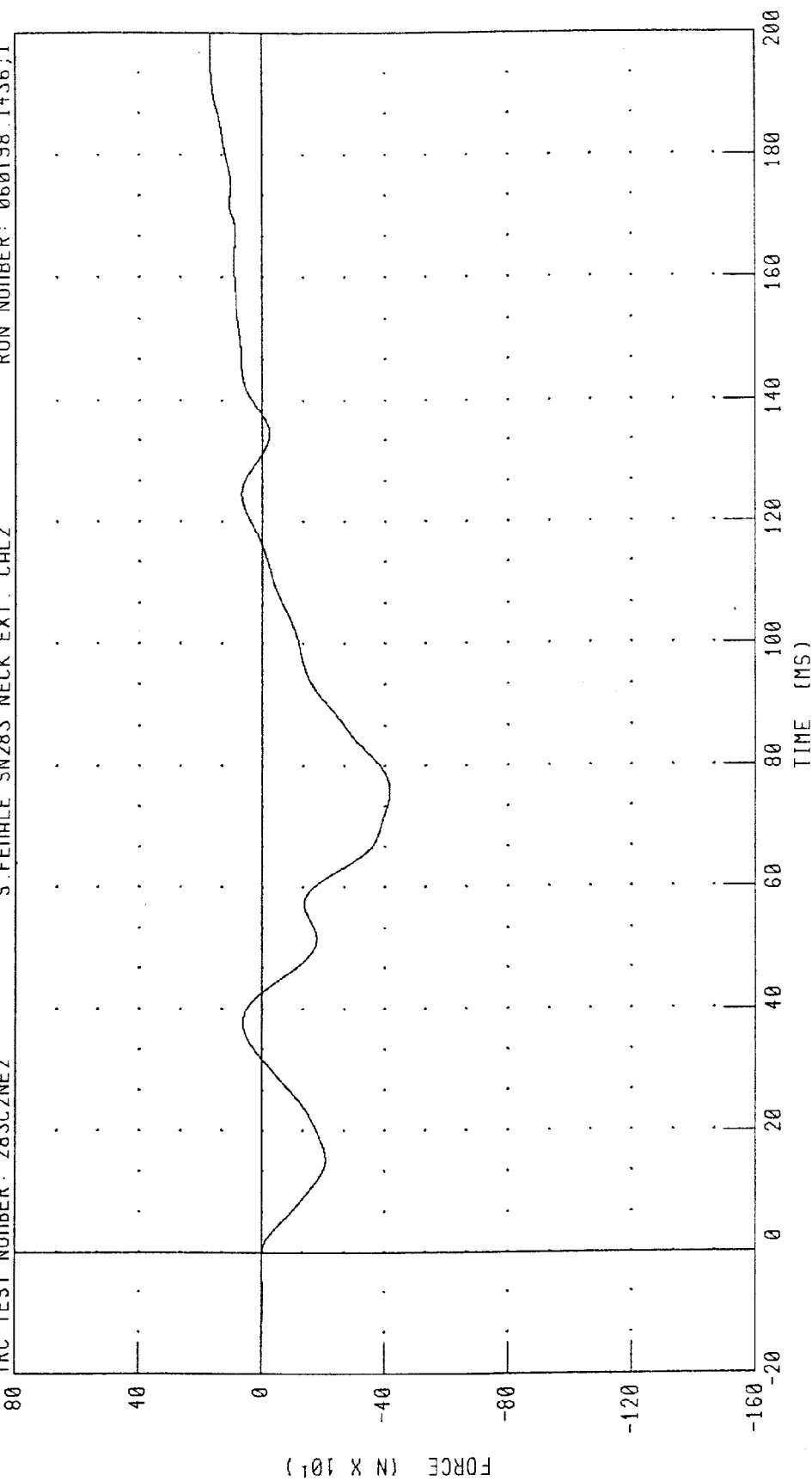
SMALL FEMALE NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 283C2NE2

S. FEMALE SN283 NECK EXT. CAL2

RUN NUMBER: 060198.1436;1



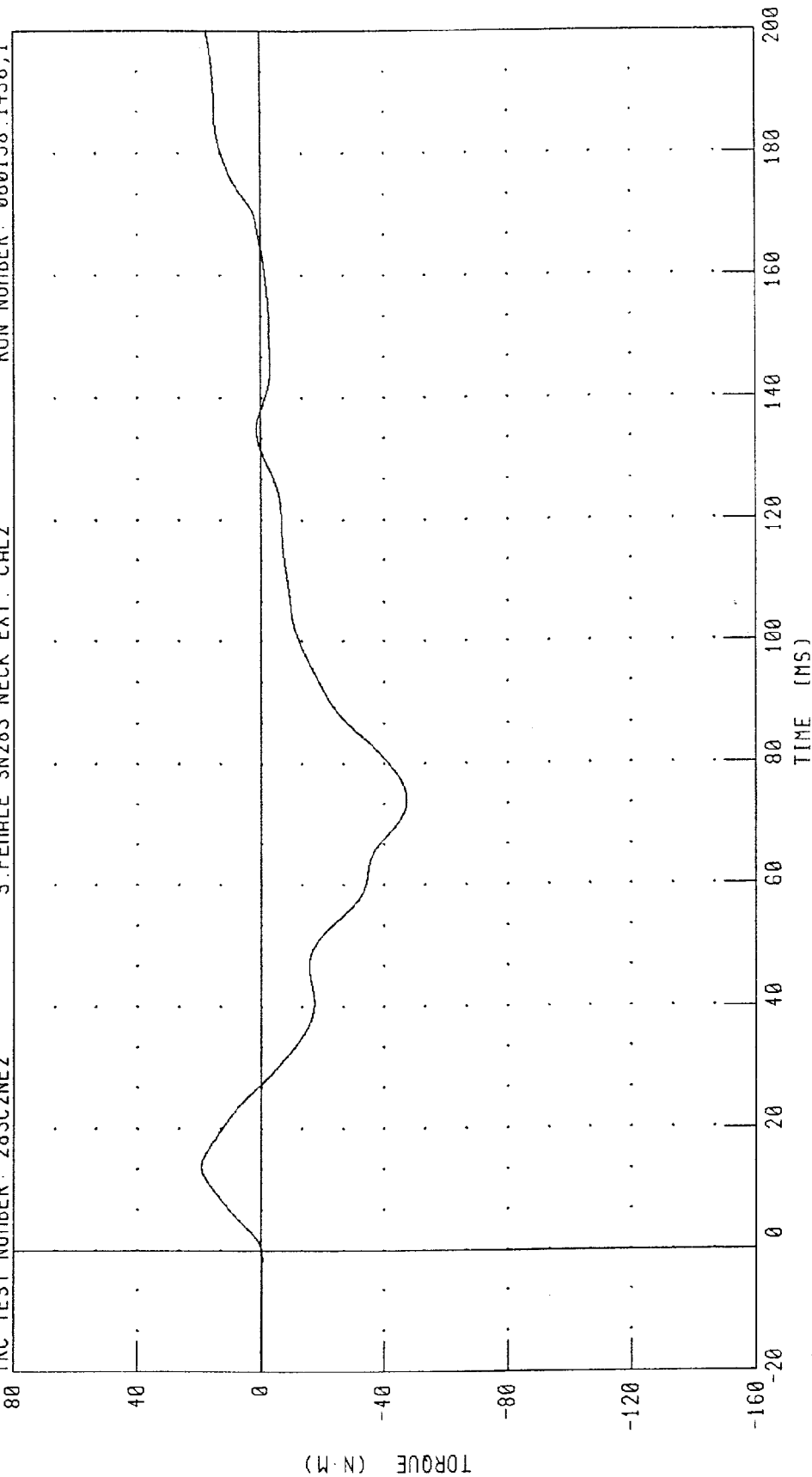
CHANNEL: NEKXF FILTER: CH. CLASS 60

PEAK DATA: 169.09 N @ 196.96 MS, -416.14 N @ 75.84 MS

SMALL FEMALE NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

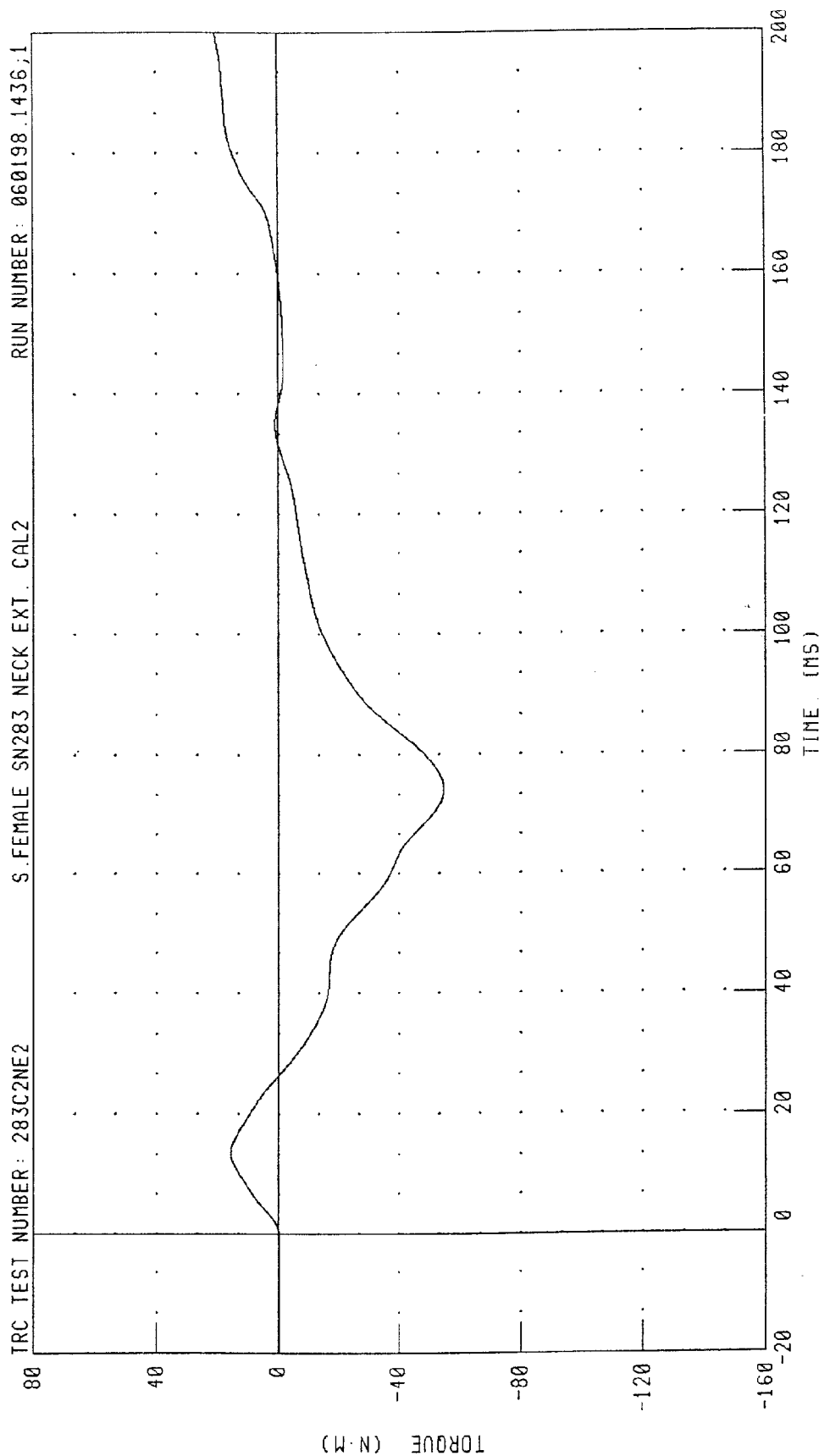
TRC TEST NUMBER: 283C2NE2 S.FEMALE SN283 NECK EXT. CAL2 RUN NUMBER: 060198.1436,1



CHANNEL: NEKYM FILTER: CH. CLASS 60

PEAK DATA: 19.37 N-M @ 13.84 MS, -47.41 N-M @ 74.16 MS

SMALL FEMALE NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE



CHANNEL: NEKOM FILTER: CH. CLASS 60 PEAK DATA: 20.55 N.M @ 200.00 MS, -54.74 N.M @ 74.32 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE

02-JUN-98

TRC INC.

TEST NO: 283C2TH2

S.FEMALE SN283 THORAX CAL2

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	22.2 DEG. C
RELATIVE HUMIDITY	10 - 70 %	54.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.83 M/S
MAXIMUM DEFLECTION	51 - 58 MM	51.7 MM
MAXIMUM RESISTIVE FORCE @ MAXIMUM DEFLECTION	3300 - 3800 N	3927. N *
INTERNAL HYSTERESIS	69% - 85%	77.9%

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN

Kevin Watkins

RUN NUMBER: 060298.0925;1

SMALL FEMALE THORAX CALIBRATION
PENDULUM DECELERATION
S.FEMALE SN283 THORAX CAL2

TRC TEST NUMBER: 283C2TH2

RUN NUMBER: 060298.0926,1

50

40

30

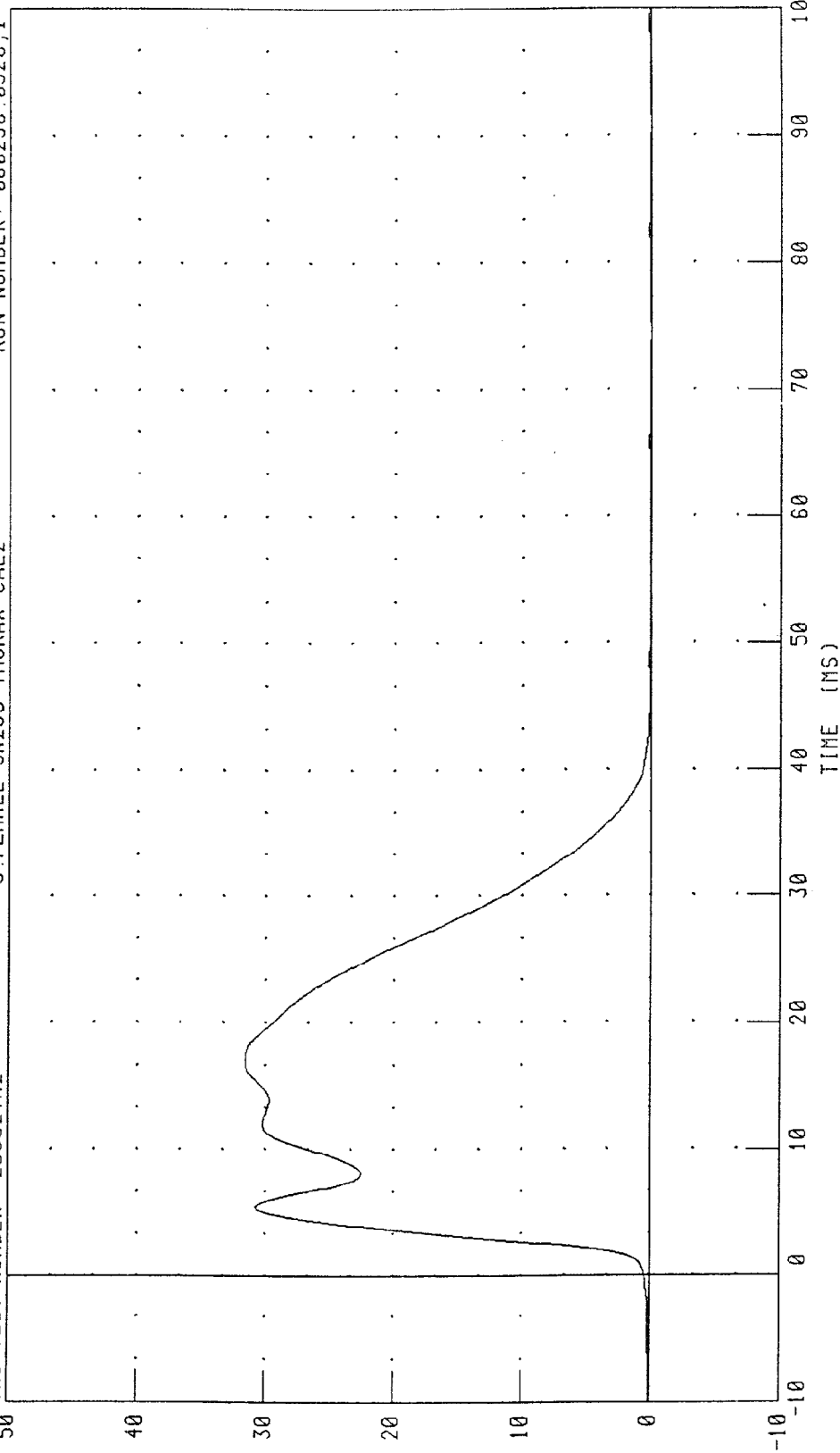
20

10

0

-10

ACCELERATION (G)



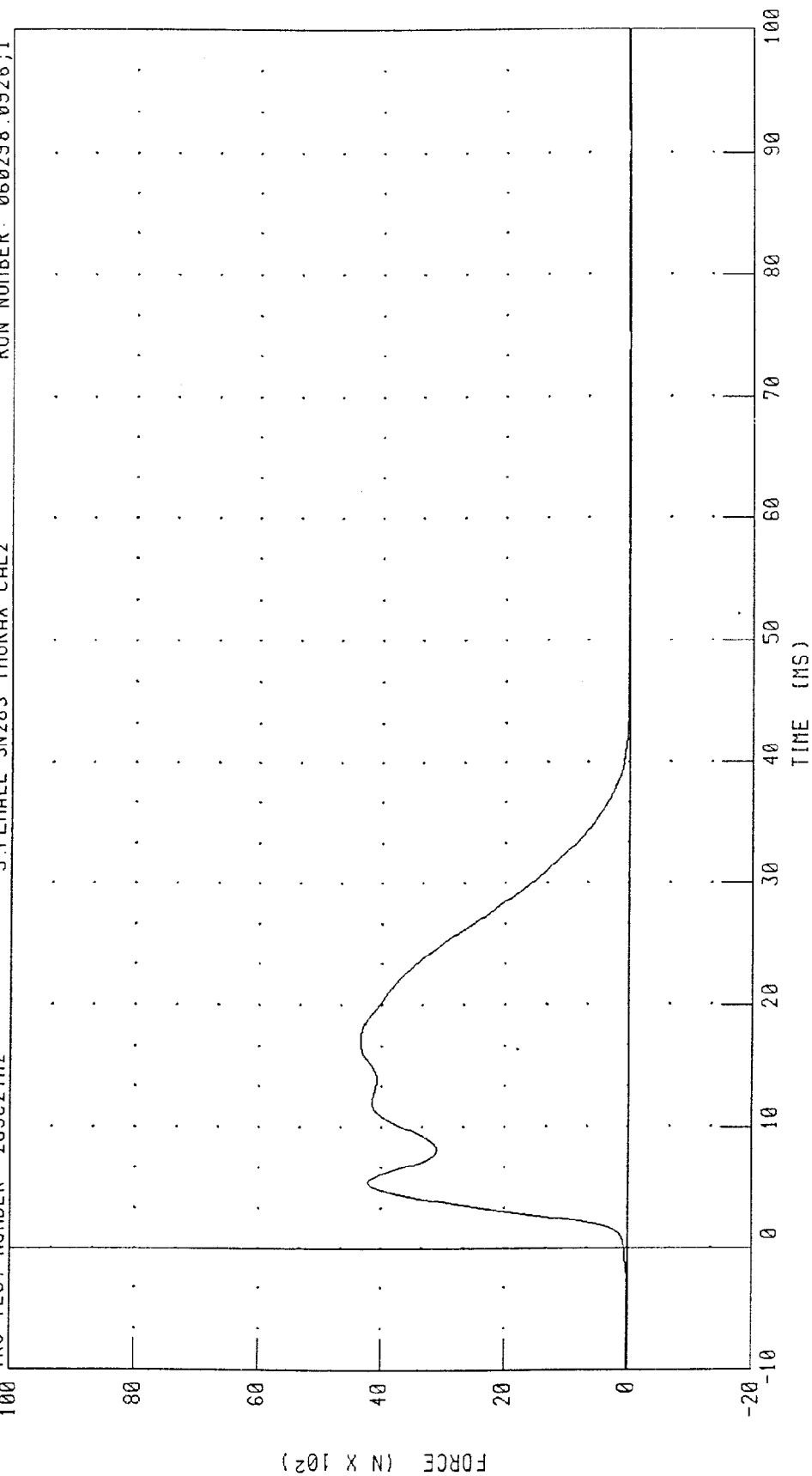
CHANNEL: PENXC FILTER: CH. CLASS 180

PEAK DATA: 31.60 C @ 17.04 MS; -0.01 C @ 74.48 MS

SMALL FEMALE THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 283C2TH2 S.FEMALE SN283 THORAX CAL2 RUN NUMBER: 060298.0926;1



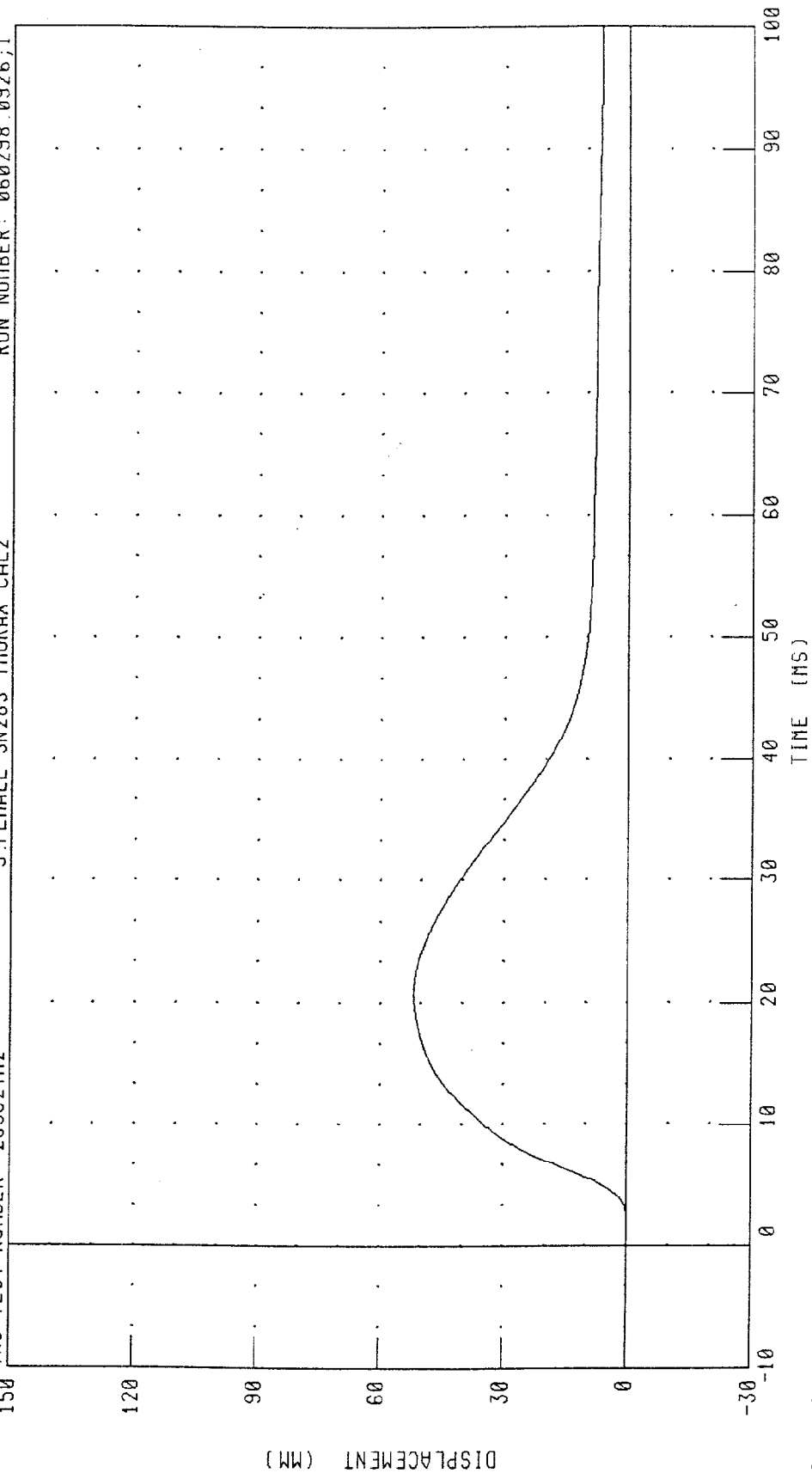
CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 4336.39 N @ 17.04 MS; -1.94 N @ 74.48 MS

SMALL FEMALE THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 283C2TH2 S.FEMALE SN283 THORAX CAL2 RUN NUMBER: 060298.0926;1



CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 51.73 MM @ 20.80 MS, -0.04 MM @ 2.16 MS

SMALL FEMALE THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER: 283C2TH2

S. FEMALE SN283 THORAX CAL2

RUN NUMBER: 060298.0926;1

100

80

60

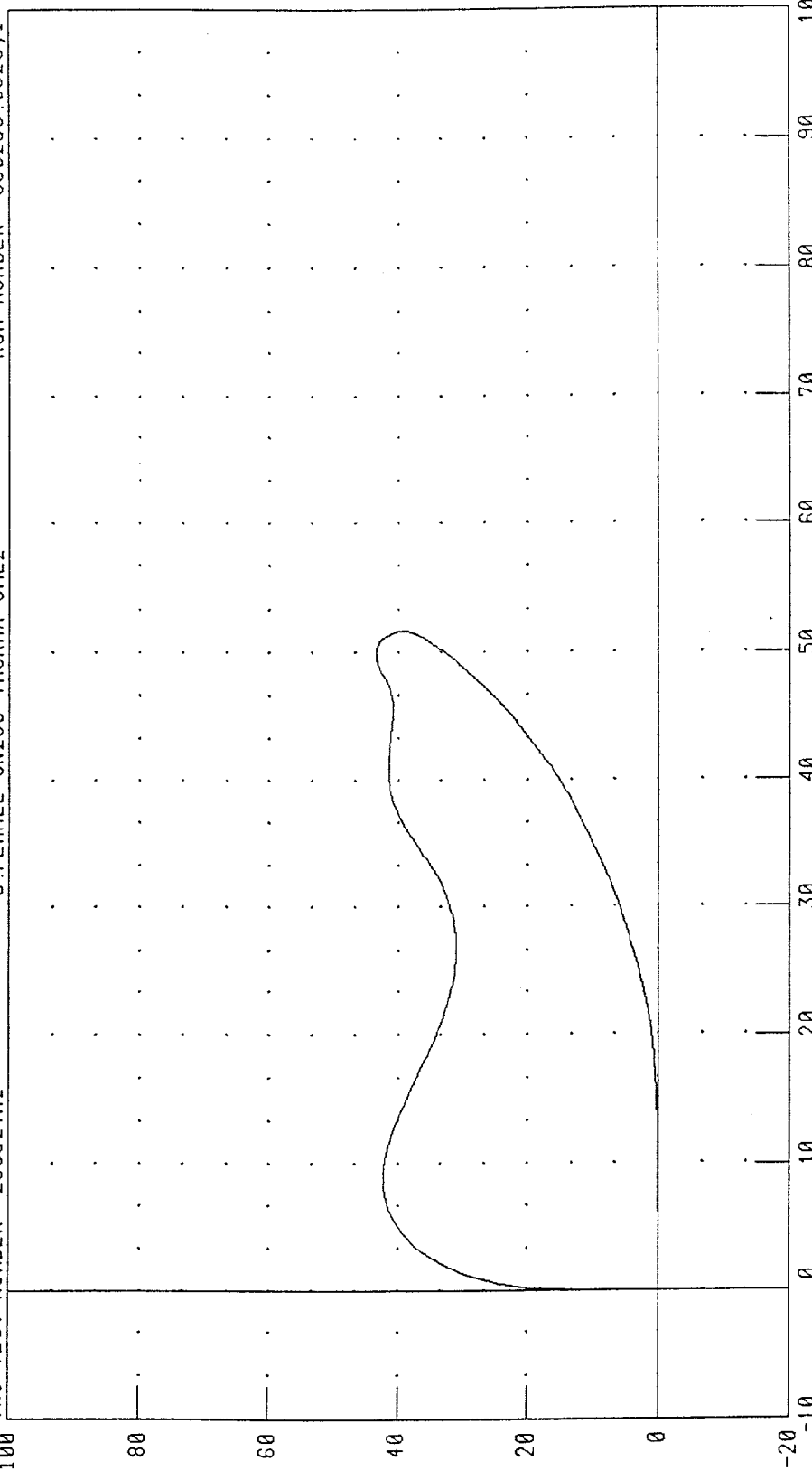
40

20

0

-20

FORCE (N X 10²)



DISPLACEMENT (MM)

CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

PEAK DATA:

51.73 MM @ 20.80 MS; -0.04 MM @ 2.16 MS
4336.39 N @ 17.04 MS; -1.94 N @ 74.48 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

01-JUN-98

TRC INC.

TEST NO: 283C2RK1

S.FEMALE SN283 R.KNEE CAL2

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3400 - 4200 N	3638.2 N

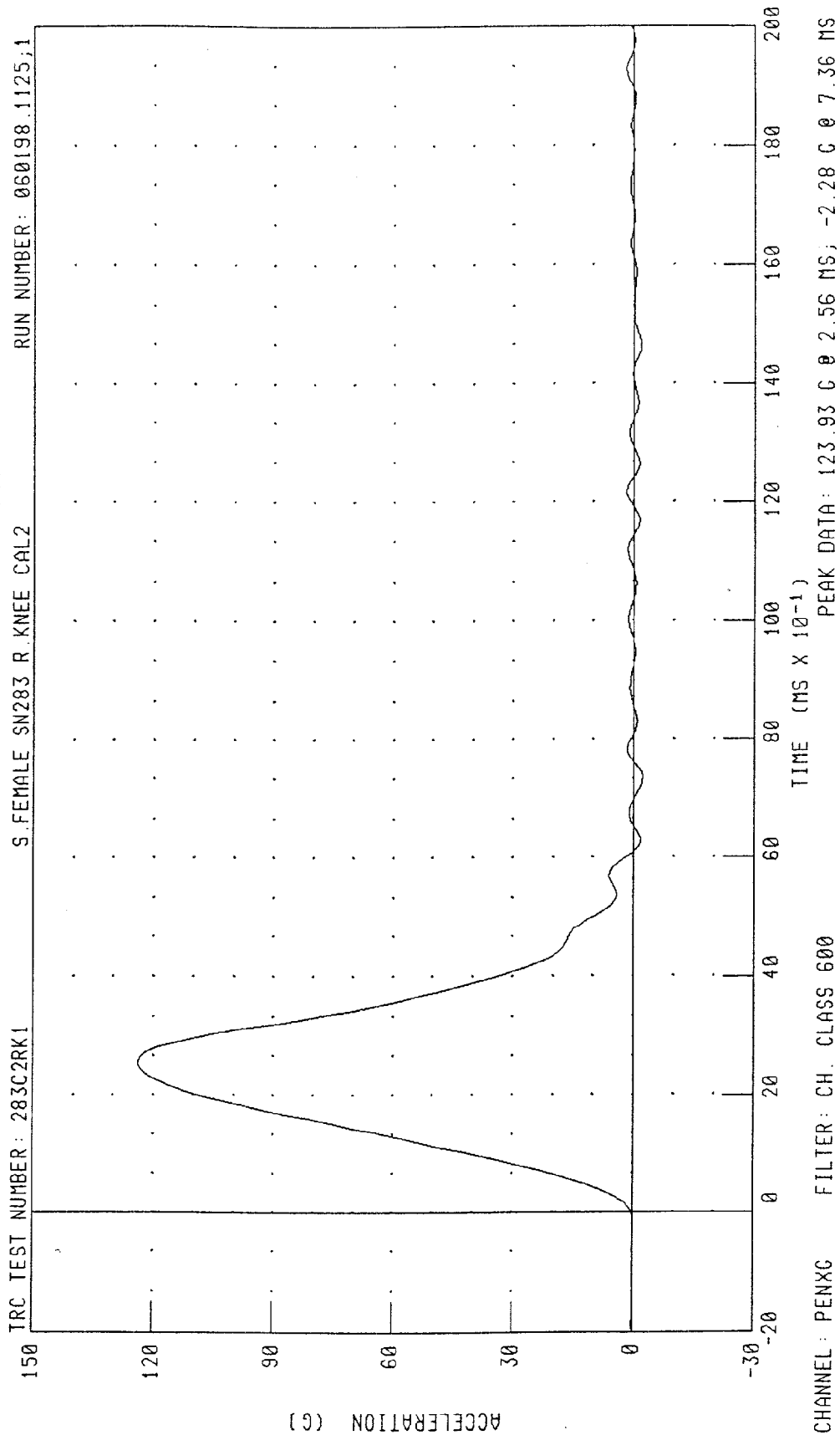
TEST MEETS SPECIFICATIONS

TECHNICIAN

By cult

RUN NUMBER: 060198.1124;1

SMALL FEMALE HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)



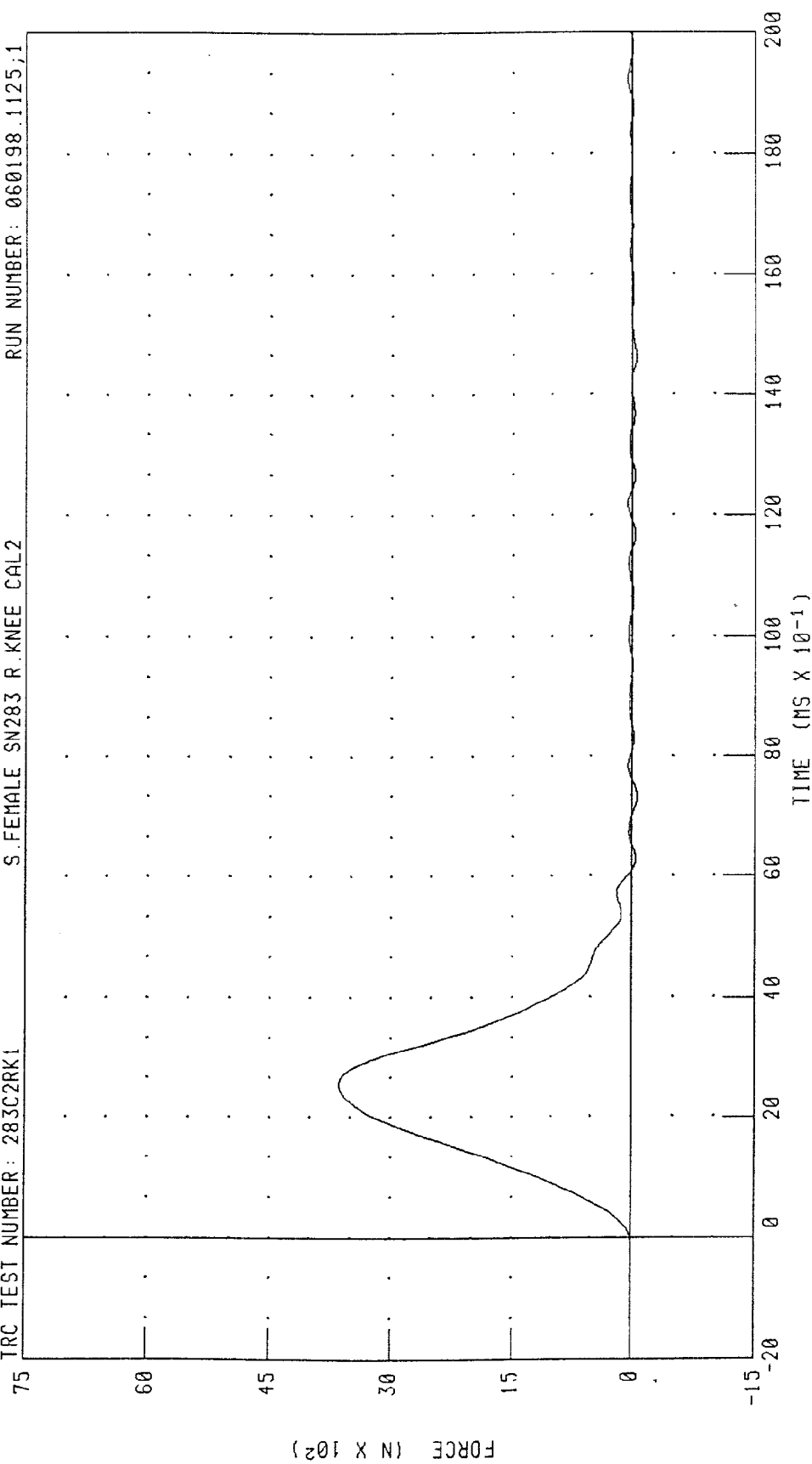
SMALL FEMALE HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

S.FEMALE SN283 R.KNEE CAL2

TRC TEST NUMBER: 283C2RK1

RUN NUMBER: 060198.1125;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 3638.24 N @ 2.56 MS; -66.95 N @ 7.36 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

01-JUN-98

TRC INC.

TEST NO: 283C2LK2

S.FEMALE SN283 LEFT KNEE CAL2

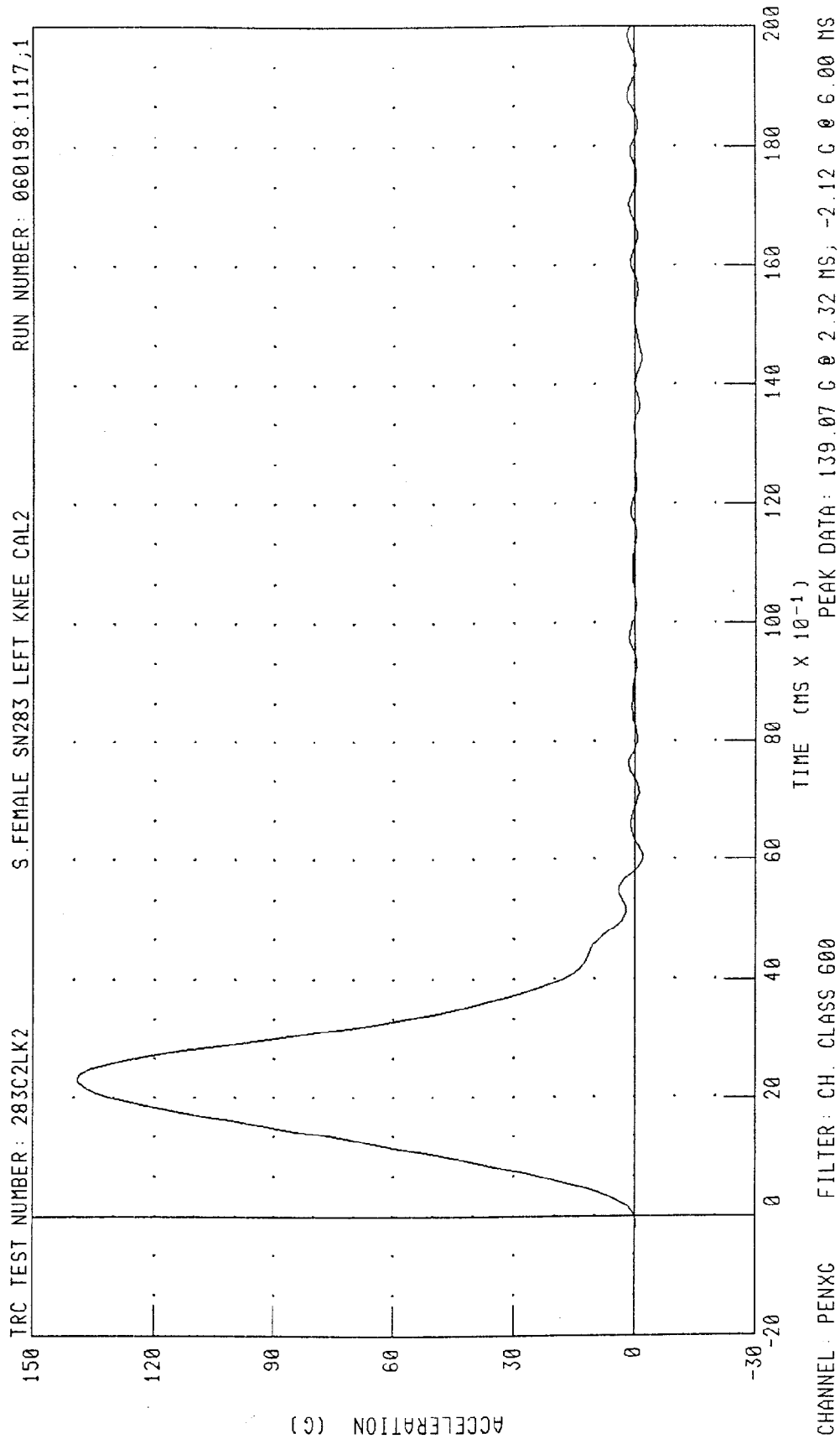
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3400 - 4200 N	4082.5 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Bj clt

RUN NUMBER: 060198.1117;1

SMALL FEMALE HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)



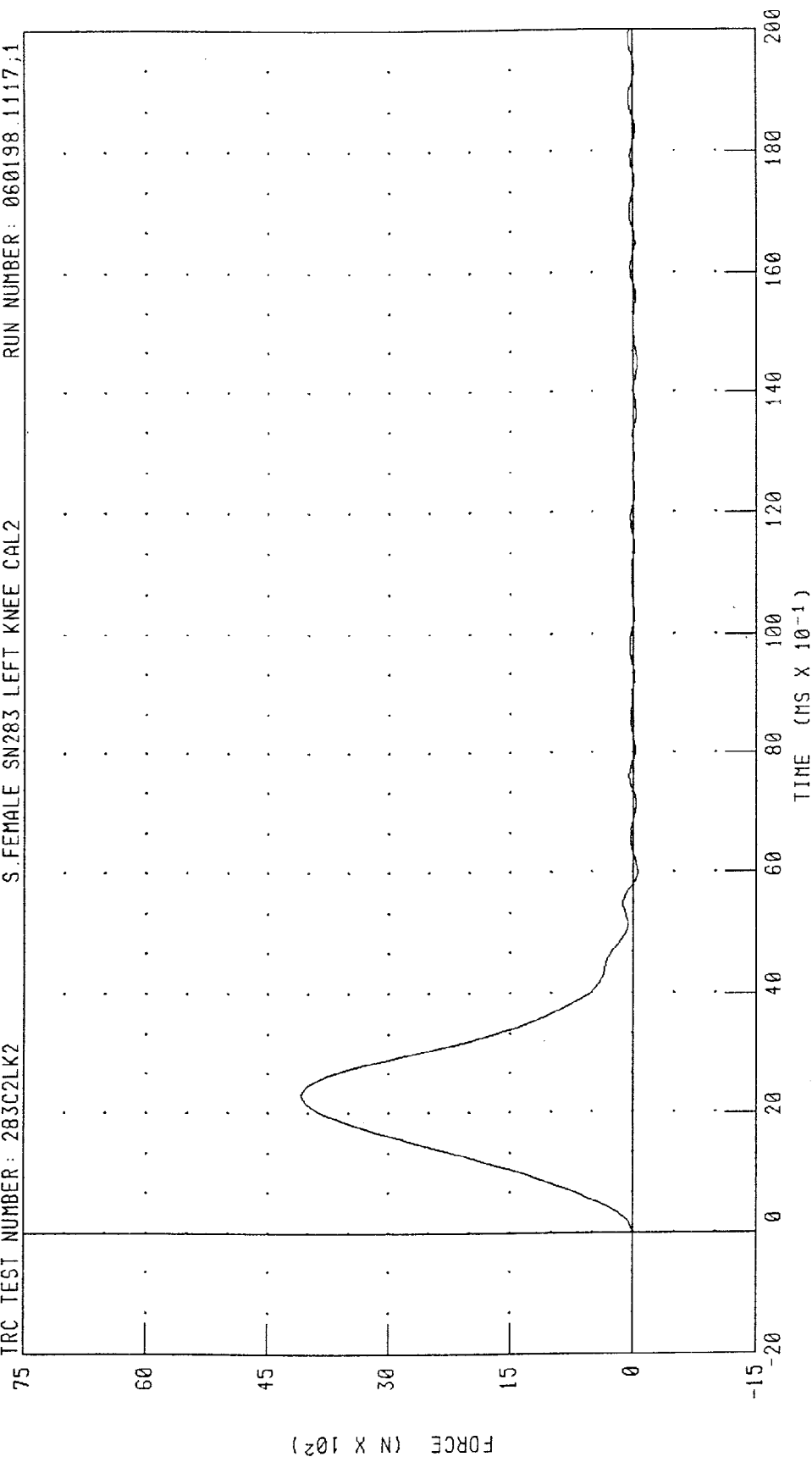
SMALL FEMALE HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

S. FEMALE SN283 LEFT KNEE CAL2

TRC TEST NUMBER: 283C2LK2

RUN NUMBER: 060198.1117,1



CHANNEL: PENXF

FILTER: CH. CLASS 600

PEAK DATA: 4082.59 N @ 2.32 MS;

-62.14 N @ 6.00 MS

Appendix D

Miscellaneous Test Information

Dummy Sign Convention

Accelerometers:

+X: Forward

+Y: Leftward

+Z: Upward

Potentiometers:

+Chest longitudinal deflection: Inward

Load cells:

+Femur force: Compression

Neck load cells:

+X force: Head forward

+Y force: Head leftward

+Z force: Head upward (tension on neck)

+X moment: Right ear rotating toward right shoulder

+Y moment: Chin rotating toward chest

+Z moment: Chin rotating toward left shoulder

Filtering Data

J211 OCT88

Load Cell Barrier Forces Class 60

Vehicle Structural Accelerations Class 60

Occupant

Head Accelerometer Class 1000

Neck Class 60

Chest Accelerometer Class 180

Chest Deflection Class 180

Femur Force Class 600

Sternum Accelerometer Class 180

Lower Leg Class 600

Target Vehicle Dummy Instrumentation Placement

Dummy Manufacturer and S/N: Applied Safety Technologies/168

Seating position: Driver

Mnemonic	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
HEDXG1	Head	X	Endevco	7264	J19535	Rear
HEDYG1	Head	Y	Endevco	7264	J19548	Left
HEDZG1	Head	Z	Endevco	7264	J20026	Up
NEKXF1 ¹	Neck	X	Denton	1716	0853FX	N/A
NEKYF1 ¹	Neck	Y	Denton	1716	0853FY	N/A
NEKZF1 ¹	Neck	Z	Denton	1716	0853FZ	N/A
NEKXM1 ¹	Neck	X	Denton	1716	0853MX	N/A
NEKYM1 ¹	Neck	Y	Denton	1716	0853MY	N/A
NEKZM1 ¹	Neck	Z	Denton	1716	0853MZ	N/A
CSTXG1	Chest	X	Endevco	7264	J20011	Forward
CSTYG1	Chest	Y	Endevco	7264	J20001	Left
CSTZG1	Chest	Z	Endevco	7264	J20438	Up
CSTXD1	Chest	X	Servo	14CB1-2897	168	Inward
LFMF1	Left femur	Z	Denton	1914	383FZ	Compression
RFMF1	Right femur	Z	Denton	1914	376FZ	Compression
TBRXM1	Right upper tibia	X	Denton	3115	0261MX	N/A
TBRYM1	Right upper tibia	Y	Denton	3115	0261MY	N/A
TBRZF1	Right upper tibia	Z	Denton	3115	0261FZ	Compression
ANLXF1	Left lower tibia	X	Denton	3114	211FX	Compression
ANLYF1	Left lower tibia	Y	Denton	3114	211FY	Compression
ANLXM1	Left lower tibia	X	Denton	3114	211MX	N/A
ANLYM1	Left lower tibia	Y	Denton	3114	211MY	N/A
ANRXF1	Right lower tibia	X	Denton	3114	198FX	Compression
ANRYF1	Right lower tibia	Y	Denton	3114	198FY	Compression
ANRXM1	Right lower tibia	X	Denton	3114	198MX	N/A
ANRYM1	Right lower tibia	Y	Denton	3114	198MY	N/A
KNLLF1	Left knee	X	Denton	1587	760-left	Compression
KNLLF1	Left knee	X	Denton	1587	760-right	Compression
KNRLF1	Right knee	X	Denton	1587	775-left	Compression
KNRLF1	Right knee	X	Denton	1587	775-right	Compression

¹ See Dummy Sign Convention sheet for polarity

Target Vehicle Dummy Instrumentation Placement, Cont'd.

Dummy Manufacturer and S/N: Applied Safety Technologies/168

Seating position: Driver

Mnemonic	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
TBLXF1	Left upper tibia	X	Denton	3115	0262FX	Compression
TBLXM1	Left upper tibia	X	Denton	3115	0262MX	N/A
TBLYM1	Left upper tibia	Y	Denton	3115	0262MY	N/A
TBLZF1	Left upper tibia	Z	Denton	3115	0262FZ	Compression
TBRXF1	Right upper tibia	X	Denton	3115	0261FX	Compression

¹ See Dummy Sign Convention sheet for polarity

Target Vehicle Dummy Instrumentation Placement

Dummy Manufacturer and S/N: Applied Safety Technologies/289

Seating position: Passenger

Mnemonic	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
HEDXG2	Head	X	Endevco	7264	J20165	Rear
HEDYG2	Head	Y	Endevco	7264	J19865	Left
HEDZG2	Head	Z	Endevco	7264	J19934	Up
NEKXF2 ¹	Neck	X	Denton	1716	0425FX	N/A
NEKYF2 ¹	Neck	Y	Denton	1716	0425FY	N/A
NEKZF2 ¹	Neck	Z	Denton	1716	0425FZ	N/A
NEKXM2 ¹	Neck	X	Denton	1716	0425MX	N/A
NEKYM2 ¹	Neck	Y	Denton	1716	0425MY	N/A
NEKZM2 ¹	Neck	Z	Denton	1716	0425MZ	N/A
CSTXG2	Chest	X	Endevco	7264	J20599	Forward
CSTYG2	Chest	Y	Endevco	7264	J20580	Left
CSTZG2	Chest	Z	Endevco	7264	EH88J	Up
CSTXD2	Chest	X	Denton	019	289	Inward
PEVXG2	Pelvis	X	Endevco	7264	CY06H	Rearward
PEVYG2	Pelvis	Y	Endevco	7264	AGAC4	Left
PEVZG2	Pelvis	Z	Endevco	7264	BF65J	Up
LFMF2	Left femur	Z	Denton	1914	259	Compression
RFMF2	Right femur	Z	Denton	1914	257	Compression
STTXG2	Sternum top	X	Endevco	7264	J20569	Forward
STMXG2	Sternum middle	X	Endevco	7264	J20064	Forward
STBXG2	Sternum bottom	X	Endevco	7264	J20570	Forward
SPTXG2	Spine top	X	Endevco	7264	J19872	Rear
SPMXG2	Spine middle	X	Endevco	7264	J19877	Rear
SPBXG2	Spine bottom	X	Endevco	7264	J19890	Rear

¹ See Dummy Sign Convention sheet for polarity

Bullet Vehicle Dummy Instrumentation Placement

Dummy Manufacturer and S/N: Alderson Research Laboratories/045

Seating position: Driver

<u>Mnemonic</u>	<u>Location</u>	<u>Axis</u>	<u>Manufacturer</u>	<u>Model</u>	<u>S/N</u>	<u>Orientation (+ Sensing)</u>
HEDXG1	Head	X	Endevco	7264	EH75J	Rear
HEDYG1	Head	Y	Endevco	7264	FJ66J	Left
HEDZG1	Head	Z	Endevco	7264	EY99J	Up
NEKXF1 ¹	Neck	X	Denton	1716	0452FX	N/A
NEKYF1 ¹	Neck	Y	Denton	1716	0452FY	N/A
NEKZF1 ¹	Neck	Z	Denton	1716	0452FZ	N/A
NEKXM1 ¹	Neck	X	Denton	1716	0452MX	N/A
NEKYM1 ¹	Neck	Y	Denton	1716	0452MY	N/A
NEKZM1 ¹	Neck	Z	Denton	1716	0452MZ	N/A
CSTXG1	Chest	X	Endevco	7264	J20218	Forward
CSTYG1	Chest	Y	Endevco	7264	AJ507	Left
CSTZG1	Chest	Z	Endevco	7264	AC9F9	Up
CSTXD1	Chest	X	Vernitech	N/A	86696-1	Inward
PEVXG1	Pelvis	X	Endevco	7264	J17988	Rear
PEVYG1	Pelvis	Y	Endevco	7264	J18037	Left
PEVZG1	Pelvis	Z	Endevco	7264	AJ4R3	Up
LFMXF1	Left femur	Z	GSE	2430T	605	Compression
RFMXF1	Right femur	Z	GSE	2430T	611	Compression
TBRYM1	Upper tibia	Y	Denton	3115	0410MY	N/A
TBRZF1	Upper tibia	Z	Denton	3115	0410FZ	Compression
ANLXF1	Lower tibia	X	Denton	3114	289FX	Compression
ANLYF1	Lower tibia	Y	Denton	3114	289FY	Compression
ANLXM1	Lower tibia	X	Denton	3114	289MX	N/A
ANLYM1	Lower tibia	Y	Denton	3114	289MY	N/A
ANRXF1	Lower tibia	X	Denton	3114	290FX	Compression
ANRYF1	Lower tibia	Y	Denton	3114	290FY	Compression
ANRXM1	Lower tibia	X	Denton	3114	290MX	N/A
ANRYM1	Lower tibia	Y	Denton	3114	290MY	N/A

Bullet Vehicle Dummy Instrumentation Placement, Cont'd.

Dummy Manufacturer and S/N: Alderson Research Laboratories/045

Seating position: Driver

Mnemonic	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
KNLLF1	Left knee	X	Denton	1587	864-left	Compression
KNLLF1	Left knee	X	Denton	1587	864-right	Compression
KNRLF1	Right knee	X	Denton	1587	865-left	Compression
KNRLF1	Right knee	X	Denton	1587	865-right	Compression
TBLXF1	Upper tibia	X	Denton	3115	0409FX	N/A
TBLXM1	Upper tibia	X	Denton	3115	0409MX	N/A
TBLYM1	Upper tibia	Y	Denton	3115	0409MY	N/A
TBLZF1	Upper tibia	Z	Denton	3115	0409FZ	Compression
TBRXF1	Upper tibia	X	Denton	3115	0410FX	Compression
TBRXM1	Upper tibia	X	Denton	3115	0410FX	N/A

¹ See dummy sign convention sheet for polarity

Bullet Vehicle Dummy Instrumentation Placement

Dummy Manufacturer and S/N: Applied Safety Technologies/283

Seating position: Passenger

Mnemonic	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
HEDXG2	Head	X	Endevco	7264	AH5C9	Rear
HEDYG2	Head	Y	Endevco	7264	A15E	Left
HEDZG2	Head	Z	Endevco	7264	A52F	Up
NEKXF2 ¹	Neck	X	Denton	1716	0235FX	N/A
NEKYF2 ¹	Neck	Y	Denton	1716	0235FY	N/A
NEKZF2 ¹	Neck	Z	Denton	1716	0235FZ	N/A
NEKXM2 ¹	Neck	X	Denton	1716	0235MX	N/A
NEKYM2 ¹	Neck	Y	Denton	1716	0235MY	N/A
NEKZM2 ¹	Neck	Z	Denton	1716	0235MZ	N/A
CSTXG2	Chest	X	Endevco	7264	A11K	Forward
CSTYG2	Chest	Y	Endevco	7264	A03C	Left
CSTZG2	Chest	Z	Endevco	7264	A89D	Down
CSTXD2	Chest	X	Bourne	14CB1-2897	283	Inward
PEVXG2	Pelvis	X	Endevco	7264	AN319	Rearward
PEVYG2	Pelvis	Y	Endevco	7264	APED5	Left
PEVZG2	Pelvis	Z	Endevco	7264	AE8G2	Up
LFMF2	Left femur	Z	Denton	1914	0169	Compression
RFMF2	Left femur	Z	Denton	1914	0170	Compression

¹ See Dummy Sign Convention sheet for polarity

Target Vehicle Instrumentation Placement

Number	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
1	Left rear seat crossmember	X	Endevco	7264	J20085	Forward
		Y	Endevco	7264	A65JJ	Right
2	Right rear seat crossmember	X	Endevco	7264	J19884	Forward
		Y	Endevco	7264	AAL82	Right
3	Engine top	X	Endevco	7264	J20015	Forward
4	Engine bottom	X	Endevco	7264	J20329	Forward
5	Right brake caliper	X	Endevco	7264	J20158	Forward
6	Left brake caliper	X	Endevco	7264	J19905	Forward
7	Instrument panel center	X	Endevco	7264	J20003	Forward
8	Vehicle center of gravity	X	Endevco	7264	J19639	Forward
9	Vehicle rear center	Z	Endevco	7264	J20294	Up
		Y	Endevco	7264	10102	Right

Bullet Vehicle Instrumentation Placement

Number	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
1	Left rear seat crossmember	X	Endevco	7264	CA57H	Forward
		Y	Endevco	7264	J21854	Right
2	Right rear seat crossmember	X	Endevco	7264	J21851	Forward
		Y	Endevco	7264	J19629	Left
3	Engine top	X	Endevco	7264	J20625	Forward
4	Engine bottom	X	Endevco	7264	AY66	Forward
5	Right brake caliper	X	Endevco	7264	J19868	Rearward
6	Left brake caliper	X	Endevco	7264	J19885	Rearward
7	Instrument panel center	X	Endevco	7264	J14373	Rearward
8	Vehicle center of gravity	X	Endevco	7264	10076	Rearward
9	Vehicle rear center	Z	Endevco	7264	CY47H	Up
		Y	Endevco	7264	J19547	Right

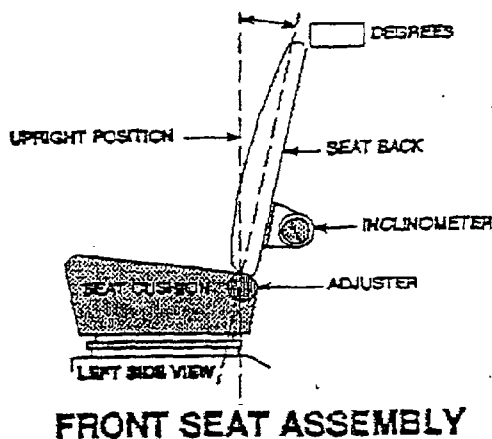
Figure 1

TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 1994 Vehicle Model: Honda Accord DX Body Style : 4-door sedan

1. Nominal Design Riding Position for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.



Seat back angle for driver's seat : -

Measurement instructions : Seat back adjusted to 5th latch position from first locking position (zero). 0-4

Seat back angle for passenger's seat : -

Measurement instructions : Same as driver seating position.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat : Seat set at 10th (mid) position from foremost locking position (zero). There are 21 total detents.

Positioning of the passenger's seat (if applicable) : Same as driver seating position.

3. Fuel Tank Capacity Data

A. "Usable Capacity" of the standard equipment fuel tank is 17.0 gallons

B. "Usable Capacity" of the optional equipment fuel tank is N/A gallons

4. Steering Column Position :

Steering column set at mid-position.

5. Other:

None

TEST VEHICLE INFORMATION

Vehicle Model Year & Make: 1998 Dodge Caravan

Vehicle Model & Body Style: Minivan

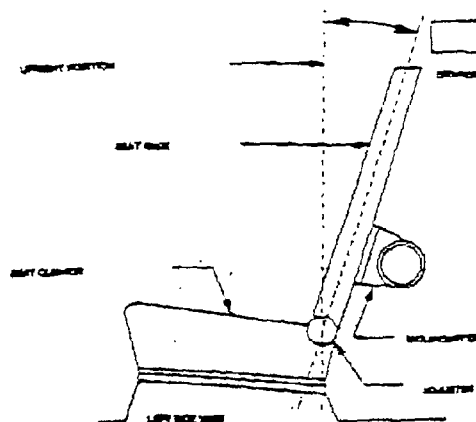
1. NOMINAL DESIGN RIDING POSITION --

For adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent if applicable. Indicate, if applicable, how the detents are numbered (Is the first detent "0" or "1"?). Indicate if the seat back angle is measured with the dummy in the seat.

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

Measurement Instructions:

Set seatback without dummy in seat. Fully incline seatback. Hold inclinometer against frame of seatback approximately 55 mm above pivot point. Recline seat four degrees.



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

Measurement Instructions:

Same as driver.

2. SEAT FORE & AFT POSITIONS - -

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

Positioning of the driver's seat

Ensure seat is completely lowered. Only power seat has vertical adjustment. Locate full-forward and full-rear positions. Mark the seat at those positions. Distance should be 200 mm. Place seat mid-way between forward and rear. — or — For seat with manual adjuster, from latched position is number one. Move seat rearward ten clicks to eleventh latched position.

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

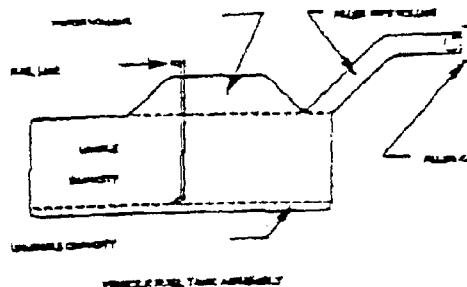
Same as driver seat.

3. FUEL TANK CAPACITY DATA --

3.1 A. "Usable Capacity" of standard equipment fuel tank = 20.0 gallons.

Et. "Usable Capacity" of optional equipment fuel tank = N/A gallons.

C. "Usable Capacity" of vehicle(s) used for certification testing to requirements of FMVSS 301 - 20.0 gallons.



Operational Instructions:

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 19.0 gallons

Continued

VEHICLE INFORMATION

Vehicle equipped with electric fuel pump? ☒ YES ☐ NOIf YES, does pump normally operate when vehicle's electrical system is activated? ☒ YES ☐ NO

Key in Ignition. Turn key to "run" position. Fuel pump will operate briefly, pressurizing fuel lines.

ADJUSTABLE UPPER ANCHORAGE POSITION:

Highest latched position is one. Lower turning loop two clicks to position number three. Verify it is securely latched.

5. STEERING COLUMN ADJUSTMENTS . .

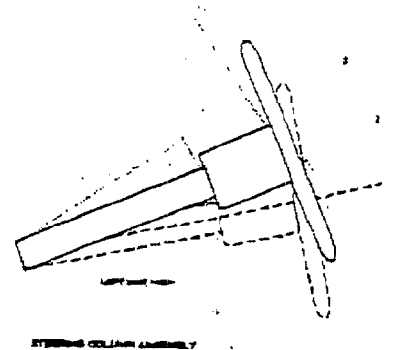
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions.

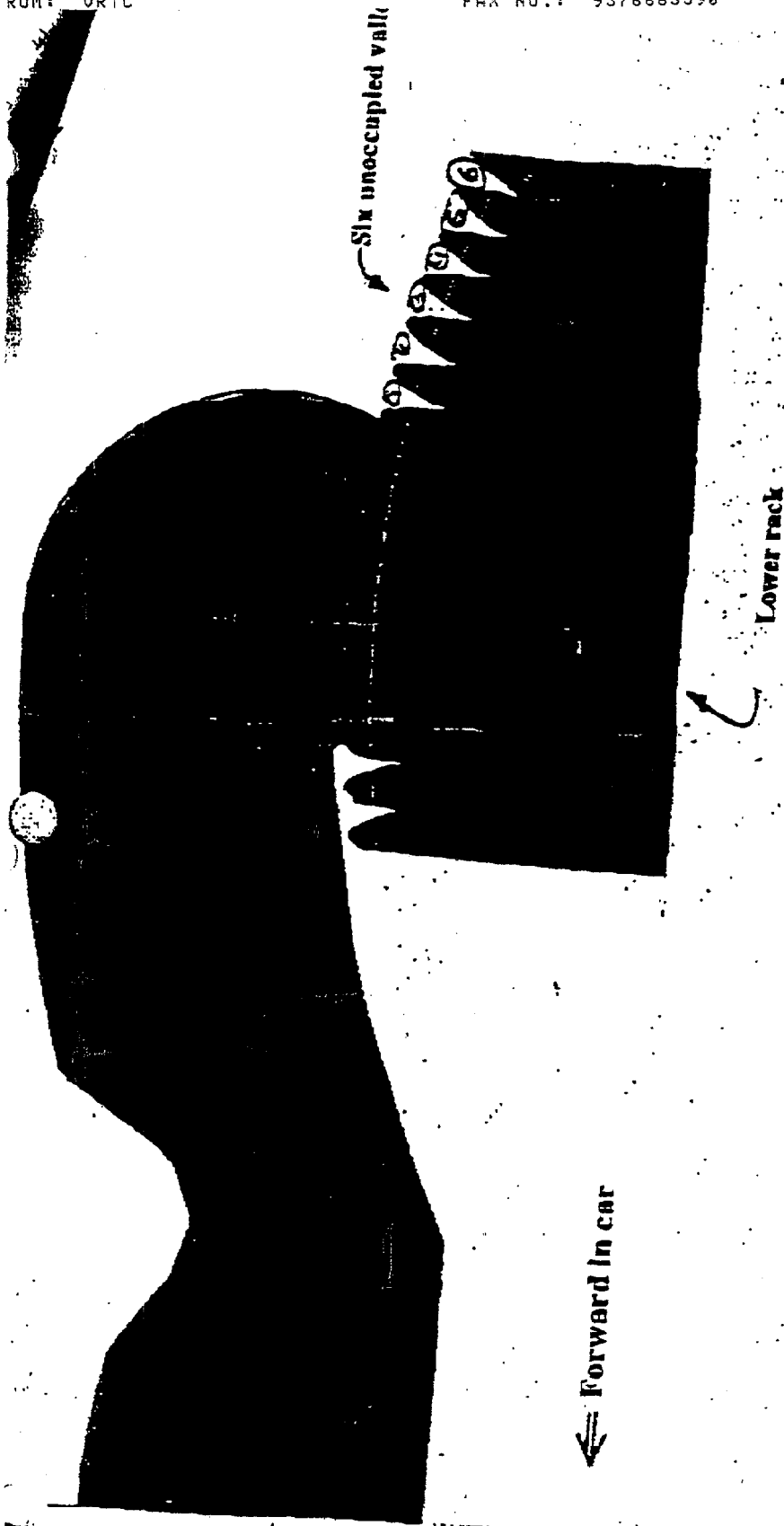
If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions:

Place tilt column in highest locked position. Verify tilt mechanism is engaged. This is position one. Lower steering wheel five clicks to position number six.

- or - Remove steering column shrouds to expose the tilt mechanism. A tilt pawl (pivots on fixed portion of column) engages a lower rack (resides on non-fixed portion of column). When column is correctly placed in "neutral" six unoccupied valleys are visible in the lower rack, rearward-in-car of the tilt pawl. See attachment.





Left Side View

NS-Body Tilt Steering Column: Proper Position for Impact

Achieve proper tilt head position for impact by:

- Locking tilt head in the full-up position. Ensure teeth are engaged.
- Lower tilt head (5) clicks.

This is also achieved by removing the shroud and visually inspecting the tilt mechanism. There should be six unoccupied valleys in the lower rack.

MWC

6/20/97

FORM NO. 1

TEST VEHICLE INFORMATION

Vehicle Model Year & Make: 1996 DodgeVehicle Model & Body Style: Caravan (MPV)

1. NOMINAL DESIGN RIDING POSITION - -

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

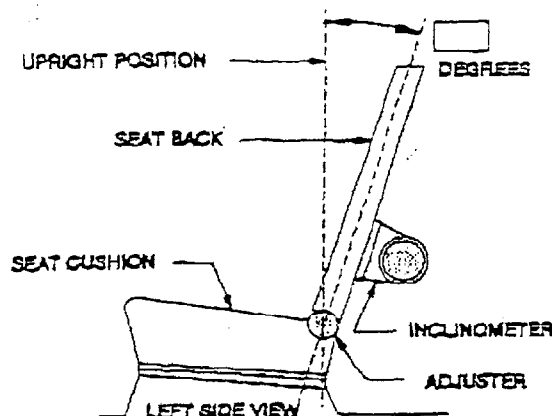
Seat back angle for driver's seat = 18.0 degrees.

Measurement Instructions:

Adjust the seat back to full upright position (which is 14 degrees from full upright). Utilizing an inclinometer recline seat back 4 degrees.

Seat back angle for passenger's seat = degrees.

Measurement Instructions:

Same as above

2. SEAT FORE & AFT POSITIONS - -

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

Positioning of the driver's seat:

Adjust seat to full forward and down position, move seat rearward to full rearmost locking position and measure travel of the seat assembly. Travel should be 200 mm, move seat 100 mm or to the center of the travel of the seat on the track.

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

See above

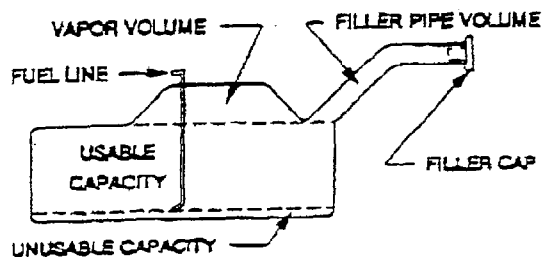
3. FUEL TANK CAPACITY DATA - -

3.1 A. "Usable Capacity" of standard equipment fuel tank = 20.0 gallons.

B. "Usable Capacity" of optional equipment fuel tank = N/A gallons.

C. Capacity used when certification testing to requirements of FMVSS 301 = 19.0 gallons.

Operational Instructions:



VEHICLE FUEL TANK ASSEMBLY

3.2 Amount of Stoddard solvent added to vehicle for certification test = 19.0 gallons

3.3 Is vehicle equipped with electric fuel pump? x YES NO
If YES, does pump normally operate when vehicle's electrical system is activated? x YES NO

FORM NO. 1 Continued

FUEL PUMP WILL RUN IN EITHER THE "IGNITION START" OR "IGNITION RUN" KEY POSITIONS.
NOTE: PUMP STOPS IF ENGINE DOES NOT RUN FOR ONE SECOND.

TEST VEHICLE INFORMATION

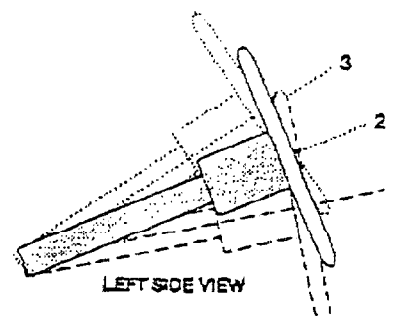
4. STEERING COLUMN ADJUSTMENTS --

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

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

Operational Instructions:

Tilt adjustable steering columns are provided as optional equipment on certain models of the 1996 Dodge Caravan. For testing with an adjustable tilt steering column: 1) The adjustable steering wheel is positioned to the highest position. 2) Tilt wheel is then adjusted 5 detents (clicks) downward from the highest position to achieve the geometric center of locus.



STEERING COLUMN ASSEMBLY