

VZ924

Vehicle Research and Test Center
1996 Chevrolet Lumina LS into Left Front of
1997 Honda Accord Oblique 30°
TRC Test Number 980817

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Table of Contents

<u>Section</u>	<u>Description</u>	<u>Page</u>
1.0	Purpose and Test Procedure	1-1
2.0	Left Front Oblique Impact Test Summary	2-1
3.0	Summary of FMVSS 208 Data	3-1
4.0	Vehicle, Occupant, and Camera Measurements	4-1
Appendix A	Photographs	A-1
Appendix B	Data Plots	B-1
Appendix C	Dummy Calibration Information	C-1
Appendix D	Miscellaneous Test Information	D-1

List of Tables

<u>Number</u>	<u>Description</u>	<u>Page</u>
1	Crash Test Summary	2-5
2	Target Test Vehicle Information	2-6
3	Bullet Test Vehicle Information	2-9
4	Post-Impact Data	2-12
5	Target Vehicle Accelerometer Locations and Data Summary	2-15
6	Bullet Vehicle Accelerometer Locations and Data Summary	2-18
7	Target Vehicle Dummy Injury Criteria	3-2
8	Bullet Vehicle Dummy Injury Criteria	3-3
9	Target Vehicle - Post-Impact Dummy and Vehicle Data	3-4
10	Bullet Vehicle - Post-Impact Dummy and Vehicle Data	3-5
11	Target Vehicle Dummy Measurement Data for Front Seat Occupants	4-5
12	Bullet Vehicle Dummy Measurement Data for Front Seat Occupants	4-8
13	Target Vehicle Measurements	4-12
14	Target Vehicle Exterior Crush Profiles - All Levels	4-16
15	Bullet Vehicle Measurements	4-20
16	Bullet Vehicle Exterior Crush Profiles - All Levels	4-24
17	Camera Information	4-27

List of Figures

<u>Number</u>	<u>Description</u>	<u>Page</u>
1	Impact Velocity Measurement System	2-13
2	Target Vehicle Accelerometer Placement	2-14
3	Bullet Vehicle Accelerometer Placement	2-17
4	Target Vehicle Dummy Measurement Locations for Front Seat Occupants	4-4
5	Target Vehicle Seat Belt Positioning Data	4-6
6	Bullet Vehicle Dummy Measurement Locations for Front Seat Occupants	4-7
7	Bullet Vehicle Seat Belt Positioning Data	4-9
8	Target Vehicle Crush	4-10
9	Target Vehicle Pre-Test and Post-Test Measurement Points	4-11
10	Target Vehicle Side Measurements	4-13
11	Target Vehicle Exterior Crush Profile Measurement Points	4-15
12	Bullet Vehicle Crush	4-18
13	Bullet Vehicle Pre-Test and Post-Test Measurement Points	4-19
14	Bullet Vehicle Side Measurements	4-21
15	Bullet Vehicle Exterior Crush Profile Measurement Points	4-23
16	Camera Positions	4-26

List Of Photographs

<u>Description</u>	<u>Figure</u>
Pre-Test Target Vehicle Front View	A-1
Post-Test Target Vehicle Front View	A-2
Pre-Test Target Vehicle Left Front Three-Quarter View	A-3
Post-Test Target Vehicle Left Front Three-Quarter View	A-4
Pre-Test Target Vehicle Left Side View	A-5
Post-Test Target Vehicle Left Side View	A-6
Pre-Test Target Vehicle Rear View	A-7
Post-Test Target Vehicle Rear View	A-8
Pre-Test Target Vehicle Right Side View	A-9
Post-Test Target Vehicle Right Side View	A-10
Pre-Test Target Vehicle Right Front Three-Quarter View	A-11
Post-Test Target Vehicle Right Front Three-Quarter View	A-12
Pre-Test Target Vehicle Front Underbody View	A-13
Post-Test Target Vehicle Front Underbody View	A-14
Pre-Test Target Vehicle Rear Underbody View	A-15
Post-Test Target Vehicle Rear Underbody View	A-16
Pre-Test Bullet Vehicle Front View	A-17
Post-Test Bullet Vehicle Front View	A-18
Pre-Test Bullet Vehicle Left Front Three-Quarter View	A-19
Post-Test Bullet Vehicle Left Front Three-Quarter View	A-20
Pre-Test Bullet Vehicle Left Side View	A-21
Post-Test Bullet Vehicle Left Side View	A-22
Pre-Test Bullet Vehicle Rear View	A-23
Post-Test Bullet Vehicle Rear View	A-24
Pre-Test Bullet Vehicle Right Side View	A-25
Post-Test Bullet Vehicle Right Side View	A-26
Pre-Test Bullet Vehicle Right Front Three-Quarter View	A-27
Post-Test Bullet Vehicle Right Front Three-Quarter View	A-28

List Of Photographs Cont'd.

<u>Description</u>	<u>Figure</u>
Pre-Test Bullet Vehicle Front Underbody View	A-29
Post-Test Bullet Vehicle Front Underbody View	A-30
Pre-Test Bullet Vehicle Rear Underbody View	A-31
Post-Test Bullet Vehicle Rear Underbody View	A-32
Pre-Test Overhead Wide View	A-33
Pre-Test Overhead Tight View	A-34
Pre-Test Target Vehicle Driver Dummy - View 1	A-35
Post-Test Target Vehicle Driver Dummy - View 1	A-36
Pre-Test Target Vehicle Driver Dummy - View 2	A-37
Pre-Test Target Vehicle Driver Dummy - View 3	A-38
Pre-Test Target Vehicle Passenger Dummy - View 1	A-39
Post-Test Target Vehicle Passenger Dummy - View 1	A-40
Pre-Test Target Vehicle Passenger Dummy - View 2	A-41
Post-Test Target Vehicle Passenger Dummy - View 2	A-42
Pre-Test Target Vehicle Passenger Dummy - View 3	A-43
Post-Test Target Vehicle Passenger Dummy - View 3	A-44
Post-Test Bullet Vehicle Driver Dummy - View 1	A-45
Post-Test Bullet Vehicle Driver Dummy - View 2	A-46
Post-Test Bullet Vehicle Driver Dummy - View 3	A-47
Post-Test Bullet Vehicle Passenger Dummy - View 1	A-48
Post-Test Bullet Vehicle Passenger Dummy - View 2	A-49
Post-Test Bullet Vehicle Passenger Dummy - View 3	A-50
Post-Test Target Vehicle Driver Dummy View	A-51
Post-Test Target Vehicle Driver Dummy Head Contact - View 1	A-52
Post-Test Target Vehicle Driver Dummy Head Contact - View 2	A-53
Post-Test Target Vehicle Driver Dummy Knee Contact View	A-54
Post-Test Target Vehicle Passenger Dummy View	A-55
Post-Test Target Vehicle Passenger Dummy Head Contact - View 1	A-56

List Of Photographs Cont'd.

<u>Description</u>	<u>Figure</u>
Post-Test Target Vehicle Passenger Dummy Head Contact - View 2	A-57
Post-Test Target Vehicle Passenger Dummy Head Contact - View 3	A-58
Post-Test Target Vehicle Passenger Dummy Knee Contact - View 1	A-59
Post-Test Target Vehicle Passenger Dummy Knee Contact - View 2	A-60
Post-Test Bullet Vehicle Driver Dummy View	A-61
Post-Test Bullet Vehicle Driver Dummy Head Contact - View 1	A-62
Post-Test Bullet Vehicle Driver Dummy Head Contact - View 2	A-63
Post-Test Bullet Vehicle Driver Dummy Head Contact - View 3	A-64
Post-Test Bullet Vehicle Driver Dummy Knee Contact - View 1	A-65
Post-Test Bullet Vehicle Driver Dummy Knee Contact - View 2	A-66
Post-Test Bullet Vehicle Driver Dummy Knee Contact - View 3	A-67
Post-Test Bullet Vehicle Passenger Dummy View	A-68
Post-Test Bullet Vehicle Passenger Dummy Head Contact - View 1	A-69
Post-Test Bullet Vehicle Passenger Dummy Head Contact - View 2	A-70
Post-Test Bullet Vehicle Passenger Dummy Head Contact - View 3	A-71
Post-Test Bullet Vehicle Passenger Dummy Knee Contact - View 1	A-72
Post-Test Bullet Vehicle Passenger Dummy Knee Contact - View 2	A-73
Target Vehicle Certification Label	A-74
Target Vehicle Tire Load Label	A-75
Bullet Vehicle Certification Label	A-76
Bullet Vehicle Tire Load Label	A-77
Impact Event	A-78

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 August 17, 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 1523.0 kg and its impact speed was 55.5 km/h. The bullet vehicle, a 1996 Chevrolet Lumina LS, was equipped with a 6-cylinder, transverse engine, automatic transmission, power steering, and power brakes. The bullet vehicle's test weight was 1793.0 kg and its impact speed was 56.1 kph. The target vehicle's maximum static crush was undetermined due to missing bumper and bumper beam. The bullet vehicle's maximum crush was 648 millimeters.

The target vehicle driver dummy's Head Injury Criteria (HIC) was 133. The target vehicle driver dummy's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 29.7 g. The target vehicle driver dummy's chest deflection was 25 mm. The target vehicle's driver dummy's left and right femur forces were 2960 N and 5513 N, respectively.

The target vehicle right front passenger dummy's HIC was 142. The target vehicle right front passenger dummy's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 47.6 g. The target vehicle right front passenger dummy's chest deflection was 31 mm. The target vehicle's right front passenger dummy's left and right femur forces were 606 N and 1561 N, respectively.

The bullet vehicle driver dummy's HIC was 351. The bullet vehicle driver dummy's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 46.8 g. The bullet vehicle driver dummy's chest deflection was 38 mm. The bullet vehicle's driver dummy's left and right femur forces were 4599 N and 4312 N, respectively.

The bullet vehicle passenger dummy's HIC was 559. The bullet vehicle right front passenger dummy's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 39.6 g. The bullet vehicle right front passenger dummy's chest deflection was 23 mm. The bullet vehicle passenger dummy's left and right femur forces were 2807 N and 1379 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 62 milliseconds.

The bullet vehicle's left brake caliper X-axis acceleration data channel, BCLXG1, lost data after approximately 135 milliseconds.

The bullet vehicle's rear axle Z-axis acceleration data channel, TFCZG1, lost data after approximately 57 milliseconds.

Table 1 Crash Test Summary

Test type:	Left Front Oblique Impact	
Test date:	08/17/98	
Test time:	1644	
Ambient temperature:	29° C	
Target vehicle:	1997 Honda Accord	
Target vehicle test weight:	1523.0 kg	
Bullet vehicle:	1996 Chevrolet Lumina LS	
Bullet vehicle test weight:	1793.0 kg	
Impact angle: ¹	30°	
Impact velocity: ²	Target vehicle = 55.5 kph Bullet vehicle = 56.1 kph	
Target vehicle's maximum static crush:	undetermined ³	
Bullet vehicle's maximum static crush:	648 mm	
Target vehicle dummies:	Driver #045	Passenger #283
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 #168	Passenger #289
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	13	
Real-time	1	

¹ With respect to tow track centerline.

² Speed trap measurement ($\pm$.08 kph accuracy)

³ Bumper and Bumper Beam were missing post-test

Table 2 Target Test Vehicle Information

Vehicle manufacturer:	Honda of America, Mfg.		
Make/model:	Honda/Accord		
VIN:	1HGCD5632VA099424		
Model year:	1997		
Body style:	4-door		
Color:	Blue		
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:	07/31/98		
Odometer reading:	10,763		
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	Yes
Clock	Yes	Rear window defroster	Yes
Power Door Locks	Yes	Other	None

Certification data from vehicle's label:

Vehicle manufactured by:	Honda of America Mfg., Inc.
Date of manufacture:	1/97
VIN:	1HGCD5632VA099424
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:	N/A
	Rear:	N/A

Spare tire (mfr., line, size): T115/70D14

Type of seats:	Front:	Bucket
	Rear:	Bench

Type of front seat backs: Manually adjustable

Maximum width: 1777 mm

Wheelbase: 2725 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 700 mm;	RF 701 mm;	LR 691 mm;	RR 690 mm
Fully load attitude:	LF 683 mm;	RF 686 mm;	LR 667 mm;	RR 665 mm
Pre-test attitude:	LF 692 mm;	RF 685 mm;	LR 661 mm;	RR 657 mm
Post-test attitude:	LF 715 mm;	RF 592 mm;	LR 596 mm;	RR 743 mm

Table 2 Target Test Vehicle Information, Cont'd.

Delivered Weight:

Right Front:	412.8 kg	Right Rear:	253.1 kg
Left Front:	409.1 kg	Left Rear:	255.4 kg
Total Front Weight:	821.9 kg	(61.8% of total vehicle weight)	
Total Rear Weight:	508.5 kg	(38.2% of total vehicle weight)	
Total Delivered Weight:	1330.4 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated cargo and luggage weight

UDW = Unloaded delivered weight (1330.4 kg)

VCW = Vehicle capacity weight (385.6 kg)

DSC = Designated seating capacity (5)

RCLW = VCW - 68.0 (5) = 45.6 kg

Target test weight = UDW + RCLW + (No. of Hybrid III dummies x 75.8 kg
+ No. of Hybrid III dummies x 47.6 kg)

Target test weight = 1330.4 + 45.6 kg + 75.8 kg + 47.6 kg

Target test weight = 1499.4 kg

Weight of test vehicle with required dummies and 73.2 kg cargo weight:

Right front	447.5 kg	Right rear	317.0 kg
Left front	446.0 kg	Left rear	312.5 kg
Total front weight	893.5 kg	(59.0% of total vehicle weight)	
Total rear weight	629.5 kg	(41.0% of total vehicle weight)	
Total test weight ¹	1523.0 kg		

Weight of ballast secured in cargo area: None

Components removed to meet target test weight: Rear door glass, rear bumper skin, muffler, trunk lid, and rear window motors.

CG rearward of front wheel centerline: 1125 mm

¹ A target test weight of 1521.0 kg was provided by the NHTSA COTR.

Table 3 Bullet Test Vehicle Information

Vehicle manufacturer:	General Motors Corporation
Make/model:	Chevrolet/Lumina LS
VIN:	2G1WN52X5T9219316
Model year:	1996
Body style:	4-door
Color:	Silver
Engine data:	
Type:	V-6 Transverse
Cylinders:	6
Displacement:	3.4 liter
Transmission data:	☐ Speed, ☐ Manual, ☒ Automatic, ☒ FWD, ☐ RWD, ☐ 4WD
Date vehicle received:	N/A
Odometer reading:	N/A
Dealer's name and address:	N/A

Accessories:

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	Yes
Clock	Yes	Rear window defroster	Yes
Power Door Locks	Yes	Other	None

Certification data from vehicle's label:

Vehicle manufactured by:	General Motors Corporation
Date of manufacture:	01/96
VIN:	2G1WN52X5T929316
GVWR:	4484 lbs.
GAWR: Front:	2549 lbs.
Rear:	1935 lbs.

Table 3 Bullet Test Vehicle Information, Cont'd.

Tires on vehicle (mfr., line, size): P225/60R16

Tire pressure with maximum capacity vehicle load:	Front: N/A
	Rear: N/A

Spare tire (mfr., line, size): T125/70D16

Type of seats:	Front: Bucket
	Rear: Bench

Type of front seat backs: Manually adjustable

Maximum width: 1846 mm

Wheelbase: 2735 mm

Location of "Recommended Tire Pressure" label:

N/A

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

Recommended tire size: P225/60R16

Recommended cold tire pressure:	Front: 30 psi
	Rear: 30 psi

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

Vehicle cargo load: 908 lbs.

Test vehicle attitude:

Delivered attitude:	LF 718 mm;	RF 720 mm;	LR 732 mm;	RR 734 mm
Fully loaded attitude:	LF 700 mm;	RF 710 mm;	LR 692 mm;	RR 700 mm
Pre-test attitude:	LF 695 mm;	RF 708 mm;	LR 704 mm;	RR 712 mm
Post-test attitude:	LF 487 mm;	RF 673 mm;	LR 654 mm;	RR 763 mm

Table 3 Bullet Test Vehicle Information, Cont'd.

Delivered Weight:

Right Front:	510.7 kg	Right Rear:	284.4 kg
Left Front:	519.4 kg	Left Rear:	279.4 kg
Total Front Weight:	1030.1 kg	(64.6% of total vehicle weight)	
Total Rear Weight:	563.8 kg	(35.4% of total vehicle weight)	
Total Delivered Weight:	1593.9 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated cargo and luggage weight

GVWR = Gross vehicle weight rating (2034 kg)

UDW = Unloaded delivered weight (1593.9 kg)

VCW = Vehicle capacity weight = 411.9 kg

DSC = Designated seating capacity (5)

RCLW = VCW - 68.0(5) = 411.9 - 68.0(5) = 71.9 kg

Target test weight = UDW + RCLW + (No. of Hybrid III dummies x 75.8 kg +
No. of Hybrid III dummies x 47.6 kg)

Target test weight = 1593.9 + 71.9 + 75.8 + 47.6

Target test weight = 1789.2 kg

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

Right front	543.4 kg	Right rear	336.1 kg
Left front	582.4 kg	Left rear	331.1 kg
Total front weight	1125.8 kg	(62.8% of total vehicle weight)	
Total rear weight	667.2 kg	(37.2% of total vehicle weight)	
Total test weight	1793.0 kg		

Weight of ballast secured in cargo area: None

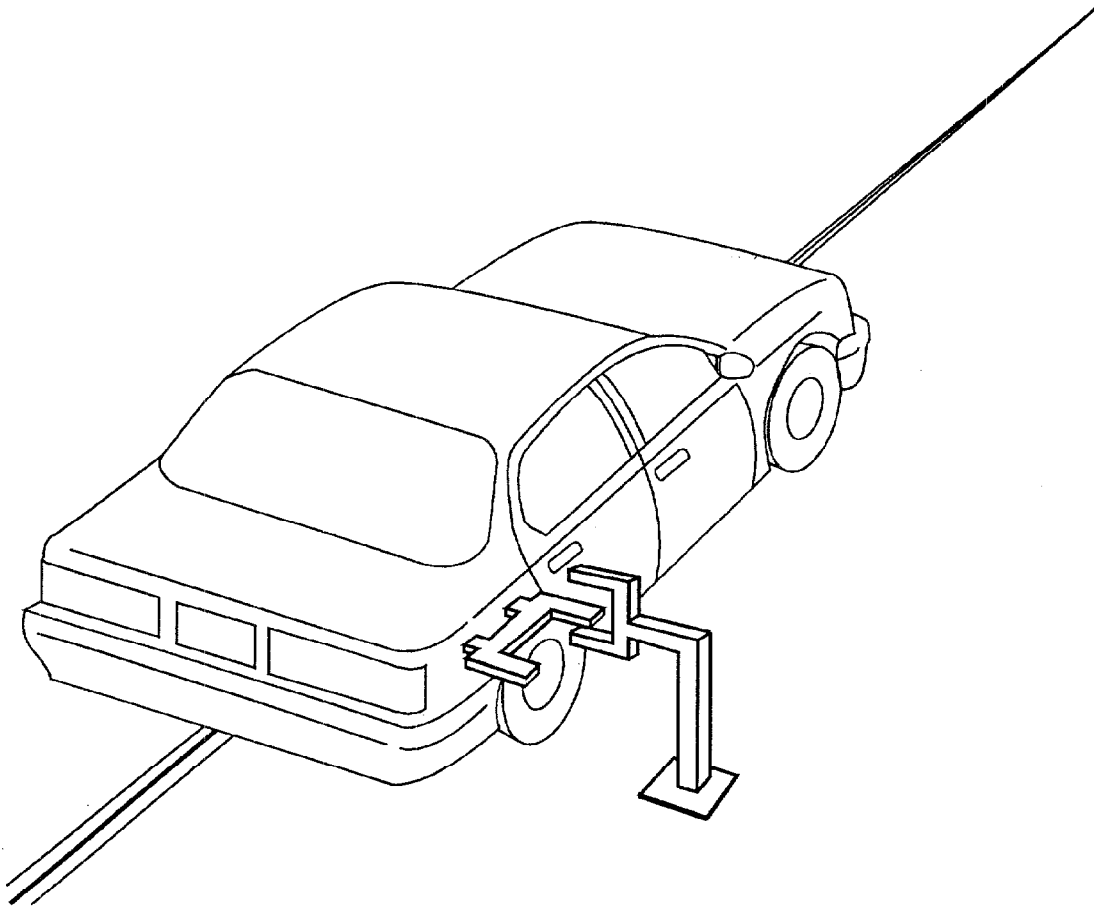
Components removed to meet target test weight: Trunk lid, rear door glass, and electric windows.

CG rearward of front wheel centerline: 1018 mm

Table 4 Post-Impact Data

Test number:	980817
Date of test:	08/17/98
Time of test:	1644
Type of test:	Left Front Oblique Impact
Impact angle:	30°
Ambient temperature at impact area:	29° C
Impact velocity:	
Target vehicle:	55.5 kph
Bullet vehicle:	56.1 kph
	(Specified range = 55.5 to 57.1 kph)
Distance from vehicle to vehicle:	
Entering trap	610 mm
Exiting trap	51 mm

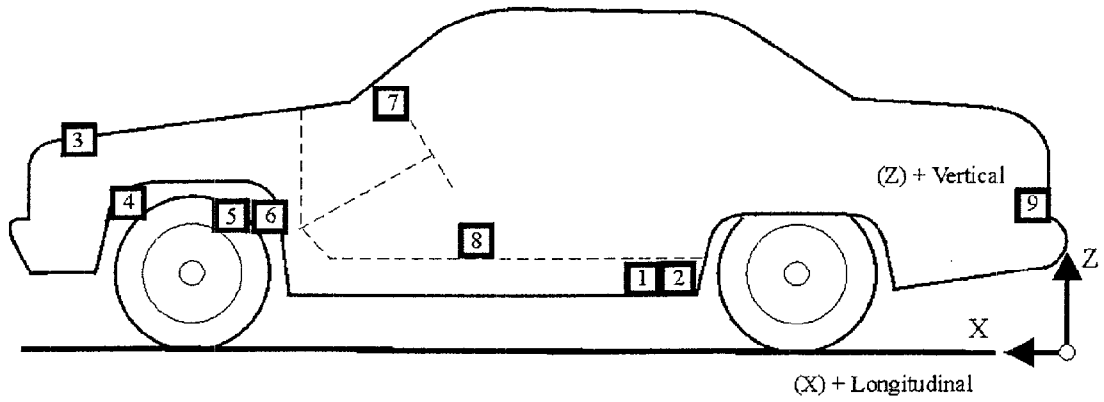
Figure 1 Impact Velocity Measurement System



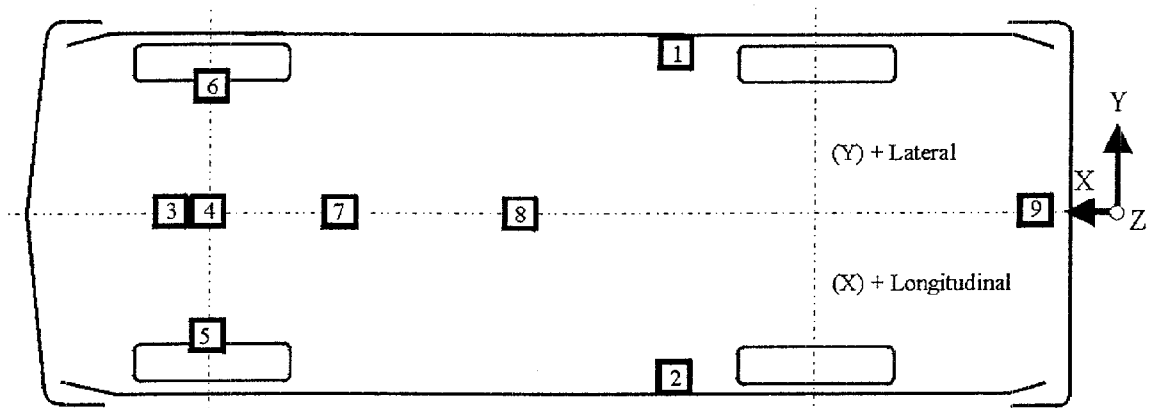
The final vane clears the final emitter/receiver pair 51 millimeters before impact.

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

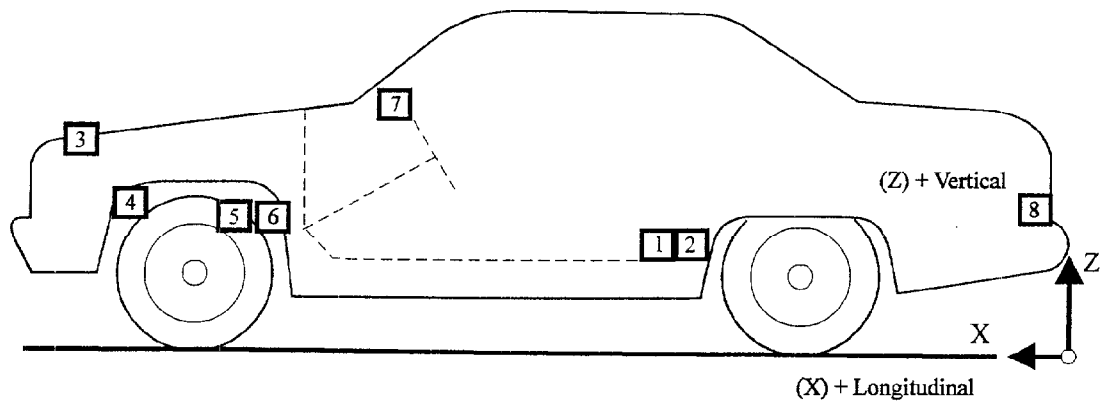
TEST NUMBER: 980817 No. LOCATION	X			Y			Z			POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL LATERIAL	PRE	1784 mm		610 mm			312 mm				
	POST	1815 mm		611 mm			212 mm				
									1.0 g	@ 209.8 ms	18.8 g @ 64.3 ms
									1.3 g	@ 212.4 ms	11.4 g @ 58.6 ms
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL LATERIAL	PRE	1784 mm		-615 mm			312 mm				
	POST	1815 mm		-614 mm			324 mm				
									2.1 g	@ 148.6 ms	21.0 g @ 57.8 ms
									1.6 g	@ 241.4 ms	11.9 g @ 55.3 ms
3 ENGINE TOP LONGITUDINAL	PRE	4025 mm		48 mm			756 mm				
	POST	3826 mm		-64 mm			687 mm				
									5.6 g	@ 226.0 ms	40.8 g @ 33.9 ms
4 ENGINE BOTTOM LONGITUDINAL	PRE	4031 mm		246 mm			166 mm				
	POST	3830 mm		134 mm			135 mm				
									15.5 g	@ 61.5 ms	37.2 g @ 53.4 ms
5 RIGHT BRAKE CALIPER LONGITUDINAL	PRE	3874 mm		-670 mm			274 mm				
	POST	3830 mm		-795 mm			200 mm				
									22.3 g	@ 61.0 ms	48.5 g @ 40.7 ms

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

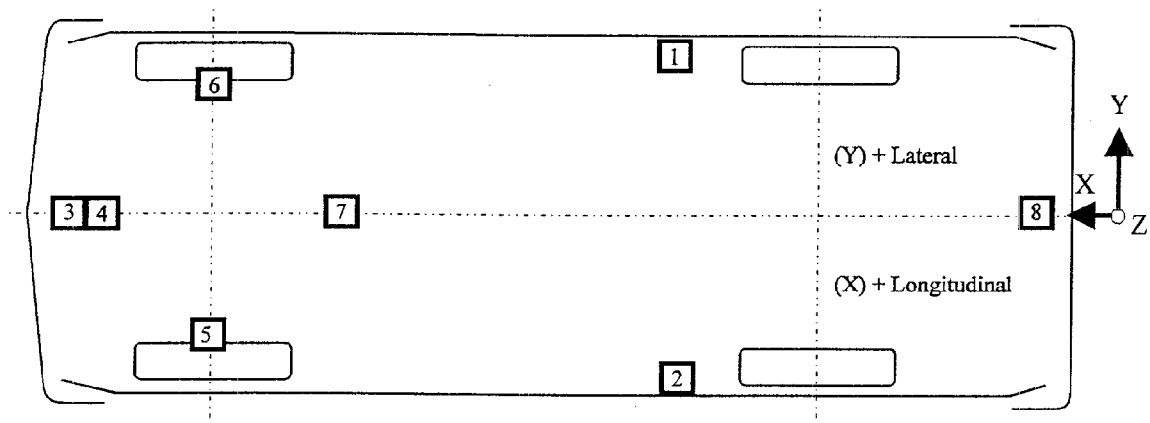
TEST NUMBER: 980817 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
6 LEFT BRAKE CALIPER	PRE 3891 mm POST 3650 mm	670 mm 578 mm	259 mm NA		
LONGITUDINAL			107.4 g	@ 57.1 ms	@ 29.4 ms
7 INSTRUMENT PANEL CENTER	PRE 1497 mm POST 3010 mm	0 mm 0 mm	890 mm NA		
LONGITUDINAL			43.7 g	@ 32.0 ms	@ 70.8 ms
8 VEHICLE CG	PRE 205 mm POST 205 mm	0 mm 0 mm	495 mm 508 mm		
LONGITUDINAL			3.0 g	@ 104.2 ms	@ 58.3 ms
9 VEHICLE REAR CENTER	PRE 912 mm POST 905 mm	0 mm 0 mm	210 mm 222 mm		
LATERAL			4.2 g	@ 43.3 ms	@ 85.1 ms
VERTICAL			11.6 g	@ 73.1 ms	@ 107.6 ms

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

Figure 3 Bullet Vehicle Accelerometer Placement



Side View



Bottom View

Table 6 Bullet Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 980817 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL LATERAL	PRE 1948 mm POST 1913 mm	495 mm 495 mm	376 mm NA	2.6 g @ 174.3 ms 4.5 g @ 88.8 ms	29.1 g @ 66.7 ms 9.5 g @ 68.8 ms
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL LATERAL	PRE 1948 mm POST 1915 mm	-485 mm -485 mm	387 mm NA	2.2 g @ 168.7 ms 2.7 g @ 89.0 ms	23.4 g @ 62.8 ms 9.3 g @ 67.8 ms
3 ENGINE TOP LONGITUDINAL	PRE 4019 mm POST 3868 mm	-35 mm -120 mm	849 mm NA	10.6 g @ 71.4 ms	55.8 g @ 50.1 ms
4 ENGINE BOTTOM LONGITUDINAL	PRE 4085 mm POST 3933 mm	-80 mm -170 mm	181 mm NA	15.6 g @ 89.8 ms	36.7 g @ 62.6 ms
5 RIGHT BRAKE CALIPER LONGITUDINAL	PRE 4004 mm POST 4025 mm	-682 mm -847 mm	278 mm 309 mm	29.1 g @ 57.9 ms	70.6 g @ 79.0 ms

TEST NUMBER: 980817
No. LOCATION

		X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
6 LEFT BRAKE CALIPER LONGITUDINAL ¹	PRE	4004 mm	682 mm	275 mm		
	POST	3720 mm	1010 mm	208 mm		
7 INSTRUMENT PANEL CENTER LONGITUDINAL	PRE	3420 mm	0 mm	943 mm		
	POST	3386 mm	0 mm	NA	14.7 g @ 93.0 ms	68.7 g @ 59.1 ms
8 VEHICLE REAR AXLE LATERAL VERTICAL ¹	PRE	942 mm	0 mm	315 mm		
	POST	975 mm	0 mm	325 mm	2.1 g @ 168.7 ms	15.6 g @ 90.8 ms
					----- g @	----- ms

REFERENCE: X: + FORWARD ACCELERATION
Y: + LEFT FROM VEHICLE CENTERLINE
Z: + UP 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	-40.3 g	-103.1 g	-56.9 g	121.2 g	27.0 g	-25.6 g	-19.5 g
Passenger	-25.5 g	-63.3 g	-27.8 g	65.2 g	-46.3 g	-17.5 g	12.1 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	2960 N	5513 N
Passenger	606 N	1561 N

Head Injury Criteria¹

	HIC	Time t ₁	Time t ₂
Driver	133	76.3 ms	112.3 ms
Passenger	142	114.5 ms	123.5 ms

Chest Maximum Resultant Acceleration²

	Acceleration	Time t ₁	Time t ₂
Driver	29.7 g	89.8 ms	92.9 ms
Passenger	47.6 g	68.7 ms	71.8 ms

Maximum Chest Deflection

Driver	25 mm
Passenger	31 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	-52.0 g	-7.8 g	13.3 g	52.0 g	-47.5 g	-8.6 g	-8.0 g
Passenger	100.1 g	-26.2 g	-50.0 g	103.6 g	-40.6 g	-12.3 g	-11.2 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	4599 N	4312 N
Passenger	2807 N	1379 N

Head Injury Criteria¹

	HIC	Time t ₁	Time t ₂
Driver	351	75.0 ms	103.1 ms
Passenger	559	67.2 ms	103.2 ms

Chest Maximum Resultant Acceleration²

	Acceleration	Time t ₁	Time t ₂
Driver	46.8 g	85.4 ms	88.5 ms
Passenger	39.6 g	81.5 ms	84.6 ms

Maximum Chest Deflection

Driver	38 mm
Passenger	23 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	Airbag/Headrest
Chest	Airbag	Airbag
Abdomen	Steering wheel	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: None

Table 10 Bullet Vehicle Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver</u>	<u>Passenger</u>
Head	Airbag/B-Pillar	Airbag/Seat back
Chest	Airbag	Airbag
Abdomen	Steering wheel	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: The entire windshield was destroyed

Other notable impact effects: None

Section 4.0

Vehicle, Occupant, and Camera Measurements

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 and upper torso rotated rearward as the dummy rebounded into the seat back. 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 B-Pillar. 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 seat back. The passenger dummy came to rest seated in the passenger's seat.

Figure 4 Target Vehicle Dummy Measurement Locations for Front Seat Occupants

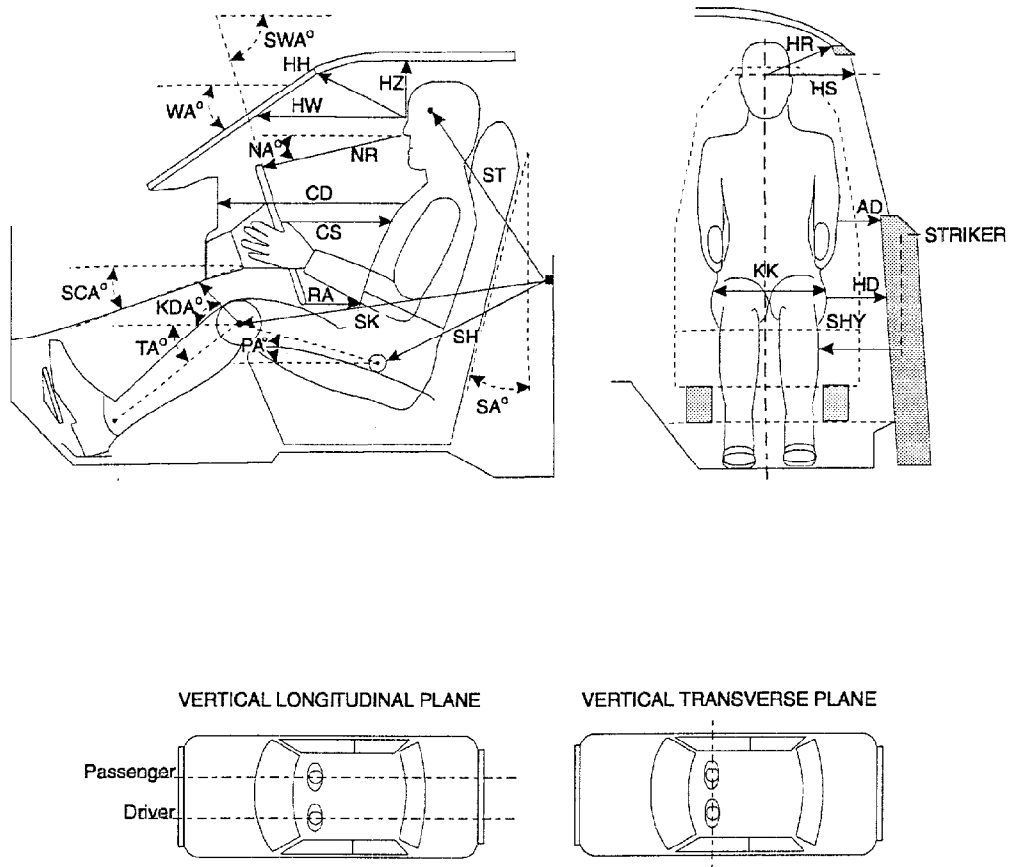


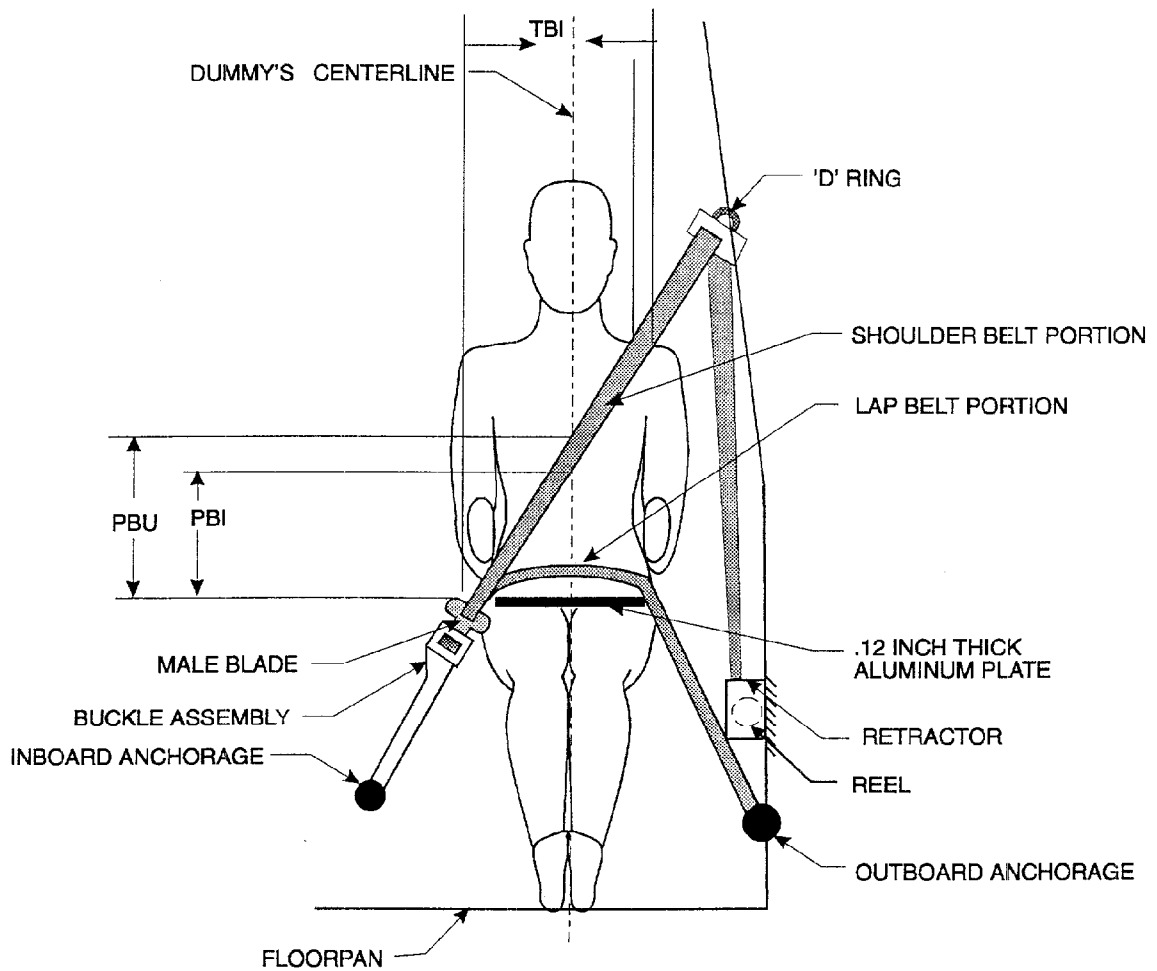
Table 11 Target Vehicle Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #045)	Passenger (Serial #283)
WA	Windshield angle	27°	27°
SWA	Steering wheel angle	63°	NA
SCA	Steering column angle	27°	NA
SA	Seat back angle	20°	13°
HZ	Head to roof	190 mm	221 mm
HH	Head to header	314 mm	260 mm
HW	Head to windshield	574 mm	535 mm
HR	Head to side header	188 mm	249 mm
NR	Nose to rim	447 mm	NA
NA	Nose to rim angle	11°	NA
CD	Chest to dash	574 mm	450 mm
CS	Steering wheel to chest	342 mm	NA
RA	Rim to abdomen	233 mm	NA
KDL	Left knee to dash	233 mm	135 mm
KDR	Right knee to dash	219 mm	130 mm
KDA	Outboard knee to dash angle	31°	41°
PA	Pelvic angle	25°	23°
TA	Tibial angle	35°	61°
KK	Knee to knee	324 mm	257 mm
ST ¹	Striker to head	492 mm	447 mm
	Striker to head angle	-88°	-70°
SK ¹	Striker to knee	532 mm	625 mm
	Striker to knee angle	7°	-1°
SH	Striker to H-point	203 mm	343 mm
	Striker to H-point angle	47°	17°
SHY	Striker to H-point (Y dir.)	253 mm	257 mm
HS	Head to side window	280 mm	340 mm
HD	H-point to door	119 mm	141 mm
AD	Arm to door	97 mm	151 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	341 mm	299 mm
PBI	- Top surface of aluminum plate to belt lower edge	257 mm	224 mm
TBI	- Dummy centerline to intersection of upper torso belt and lap belt	280 mm	265 mm

Figure 6 Bullet Vehicle Dummy Measurement Locations for Front Seat Occupants

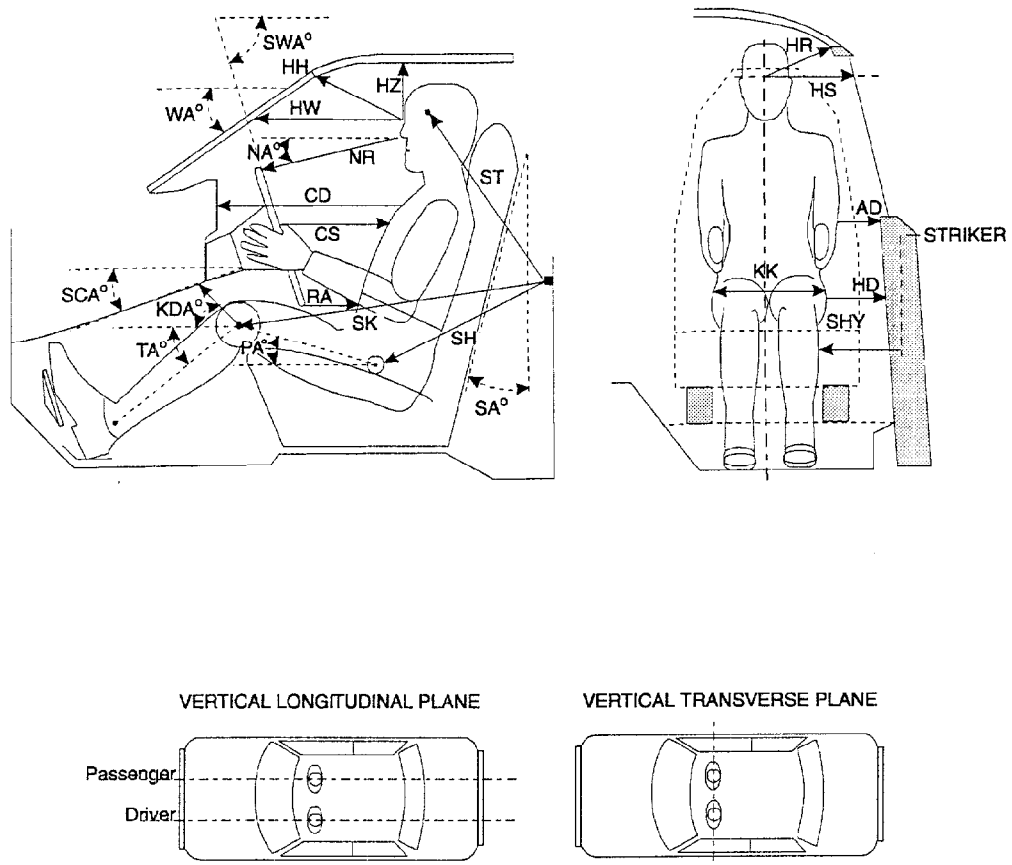


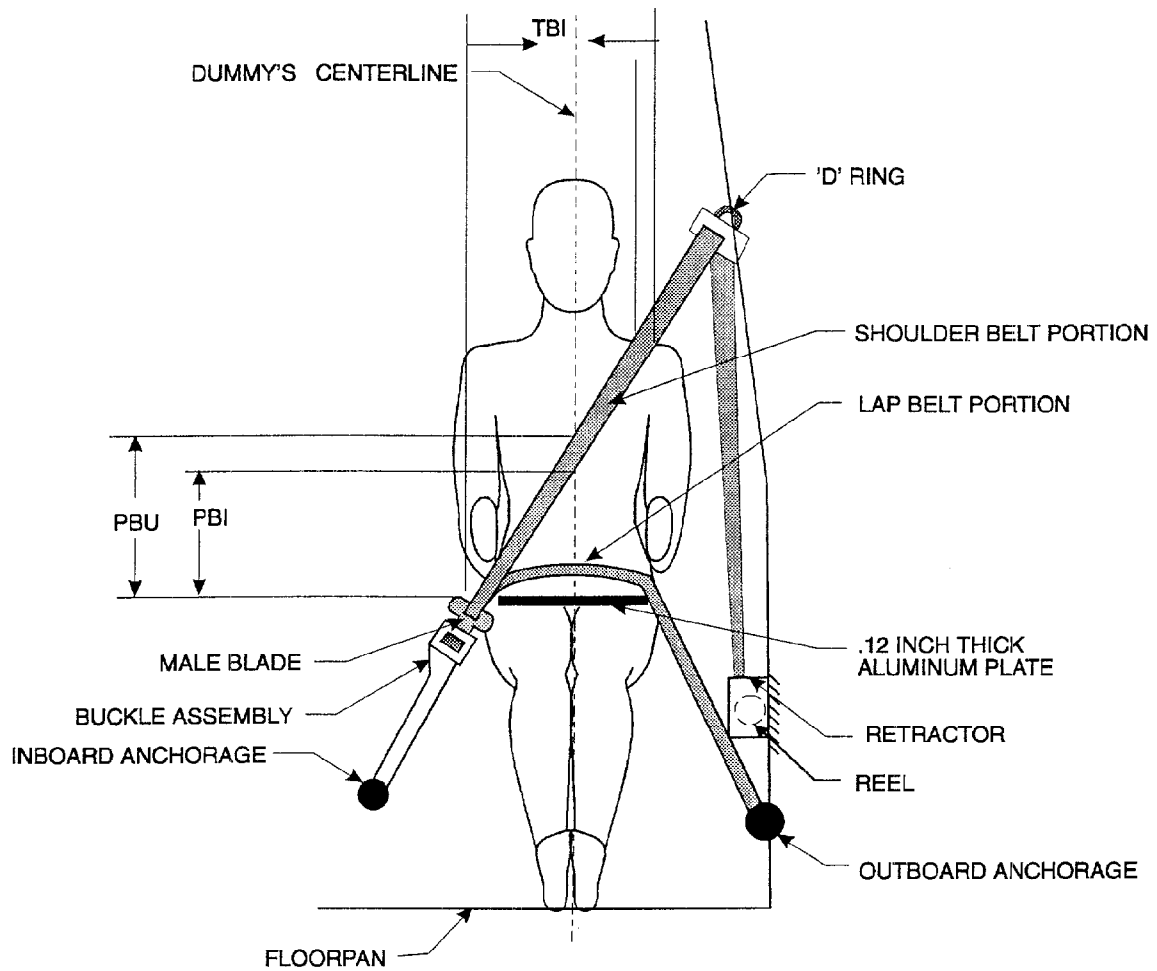
Table 12 Bullet Vehicle Dummy Measurement Data For Front Seat Occupants

<u>Designation</u>	<u>Type of Measurement</u>	<u>Driver (Serial #168)</u>	<u>Passenger (Serial #289)</u>
WA	Windshield angle	27.8°	27.8°
SWA	Steering wheel angle	63.7°	NA
SCA	Steering column angle	26.3°	NA
SA	Seat back angle	25.5°	23.8°
HZ	Head to roof	157 mm	174 mm
HH	Head to header	303 mm	230 mm
HW	Head to windshield	551 mm	513 mm
HR	Head to side header	239 mm	289 mm
NR	Nose to rim	316 mm	NA
NA	Nose to rim angle	7.9°	NA
CD	Chest to dash	495 mm	349 mm
CS	Steering wheel to chest	304 mm	NA
RA	Rim to abdomen	145 mm	NA
KDL	Left knee to dash	132 mm	75 mm
KDR	Right knee to dash	137 mm	76 mm
KDA	Outboard knee to dash angle	33.7°	40°
PA	Pelvic angle	24.5°	21.8°
TA	Tibial angle	44.6°	69.6°
KK	Knee to knee	310 mm	224 mm
ST ¹	Striker to head	500 mm	515 mm
	Striker to head angle	-82°	-63°
SK ¹	Striker to knee	572 mm	646 mm
	Striker to knee angle	-1°	-1°
SH	Striker to H-point	250 mm	355 mm
	Striker to H-point angle	39°	16°
SHY	Striker to H-point (Y dir.)	264 mm	324 mm
HS	Head to side window	360 mm	326 mm
HD	H-point to door	177 mm	221 mm
AD	Arm to door	149 mm	201 mm

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

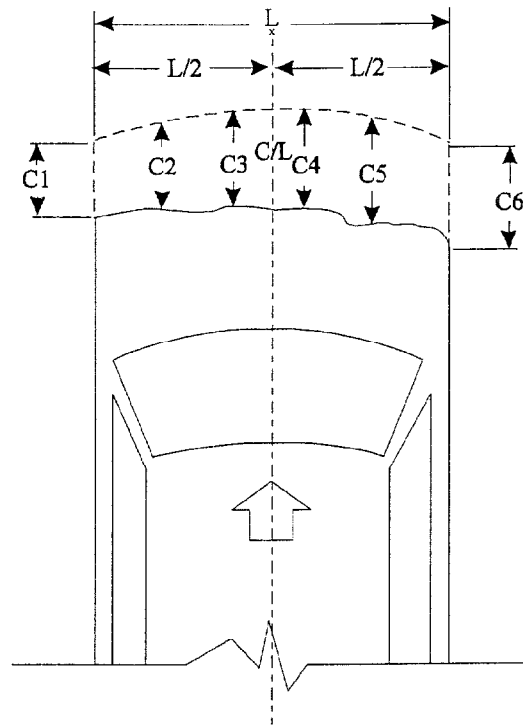
¹ A negative angle indicates the measurement point was above the striker.

Figure 7 Bullet Vehicle Seat Belt Positioning Data



		Driver Dummy	Passenger Dummy
PBU	- Top surface of aluminum plate to belt upper edge	311 mm	303 mm
PBI	- Top surface of aluminum plate to belt lower edge	240 mm	230 mm
TBI	- Dummy centerline to intersection of upper torso belt and lap belt	256 mm	280 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 ¹	Crush ¹
L	1525 mm	N/A	N/A
C1	4569 mm	N/A	N/A
C2	4686 mm	N/A	N/A
C3	4730 mm	N/A	N/A
C4	4750 mm	N/A	N/A
C5	4690 mm	N/A	N/A
C6	4569 mm	N/A	N/A
CL	4755 mm	N/A	N/A

¹ Bumper and bumper beam were missing post-test.

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

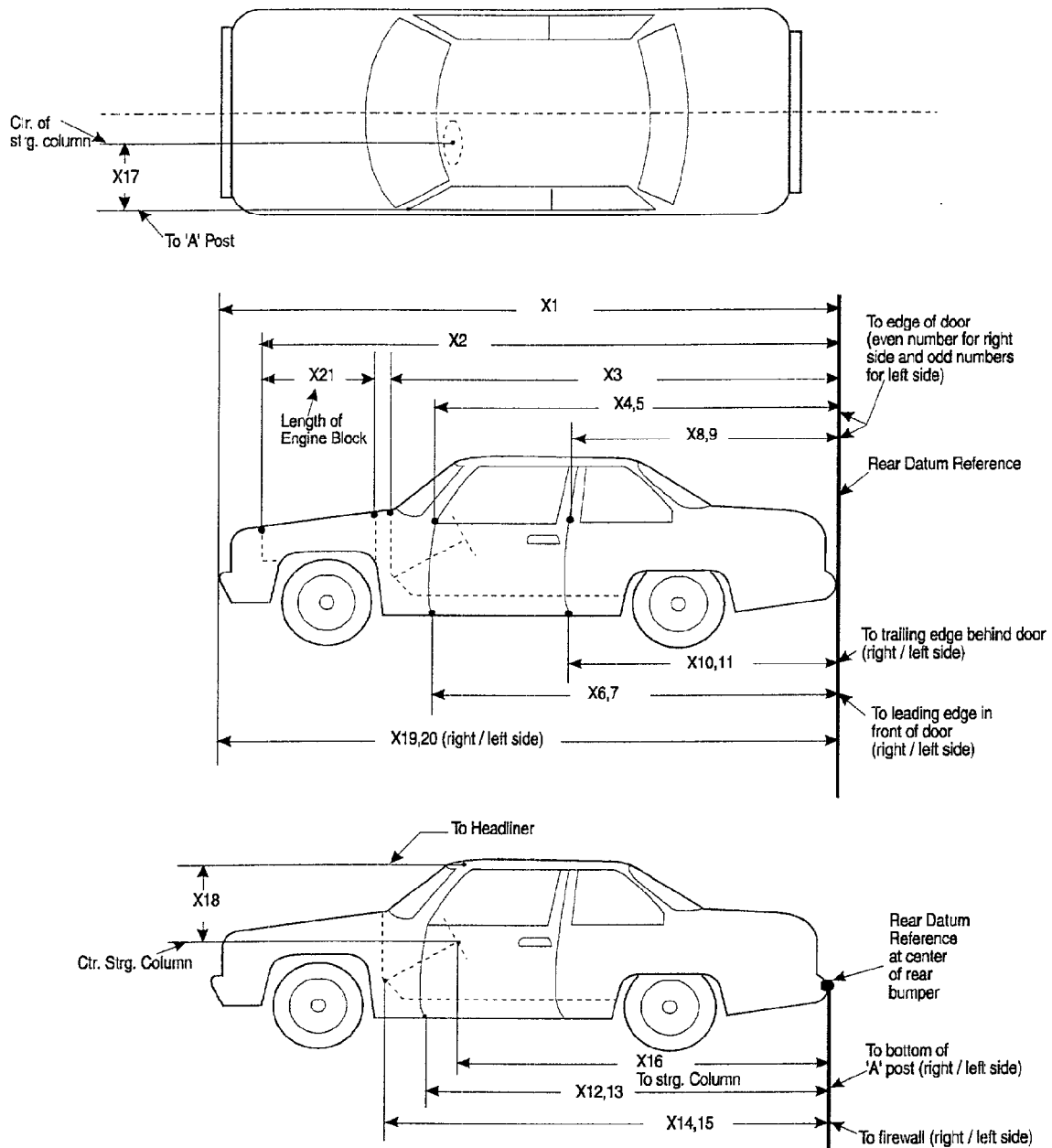


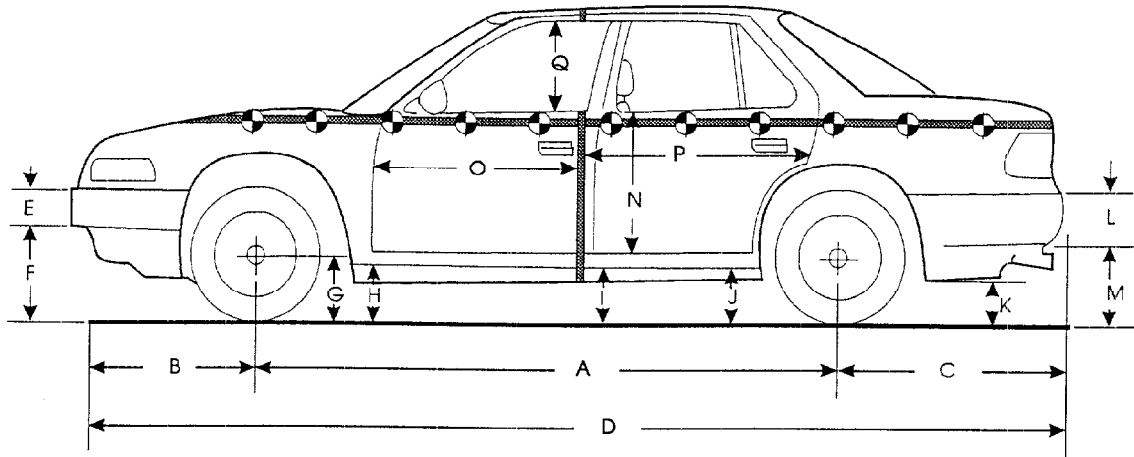
Table 13 Target Vehicle Measurements

Vehicle Make/Model: Honda Accord

Test Number: 980817

No.	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Veh. at Centerline	4755	N/A	N/A
X2	Rear Surface of Veh. to Front of Engine Block	4062	3690	372
X3	Rear Surface of Veh. to Firewall	3625	3580	45
X4	Rear Surface of Veh. to Upper Leading Edge of Right Door	3282	N/A	N/A
X5	Rear Surface of Veh. to Upper Leading Edge of Left Door	3279	3160	119
X6	Rear Surface of Veh. to Lower Leading Edge of Right Door	3306	3292	14
X7	Rear Surface of Veh. to Lower Leading Edge of Left Door	3301	3227	74
X8	Rear Surface of Veh. to Upper Trailing Edge of Right Door	2236	2233	3
X9	Rear Surface of Veh. to Upper Trailing Edge of Left Door	2234	2135	99
X10	Rear Surface of Veh. to Lower Trailing Edge of Right Door	2555	N/A	N/A
X11	Rear Surface of Veh. to Lower Trailing Edge of Left Door	2250	2182	68
X12	Rear Surface of Veh. to Bottom of " A " Post on Right Side	3251	3243	8
X13	Rear Surface of Veh. to Bottom of " A " Post on Left Side	3252	3150	102
X14	Rear Surface of Veh. to Firewall--Right Side	3590	3595	-5
X15	Rear Surface of Veh. to Firewall--Left Side	3678	3405	273
X16	Rear Surface of Veh. to Steering Wheel Center	2800	2650	150
X17	Center of Steering Column to " A " Post	289	376	-87
X18	Center of Steering Column to Headliner	469	475	-6
X19	Rear Surface of Veh. to Right Side of Front Bumper	4569	N/A	N/A
X20	Rear Surface of Veh. to Left Side of Front Bumper	4569	N/A	N/A
X21	Length of Engine Block	460	460	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	2716	2716	2580	136
B	925	925	N/A	N/A
C	1055	1055	1065	-10
D	4755	4755	N/A	N/A
E	162	160	N/A	N/A
F	238	342	N/A	N/A
G	294	286	265	21
H	230	206	90	116
I	230	206	52	154
J1	202	190	85	105
J2	224	193	95	98
K	287	N/A	N/A	N/A
L	167	N/A	N/A	N/A
M	432	N/A	N/A	N/A
N	660	667	690	-23
O	760	1140	740	400
P	1310	970	1245	-275
Q	424	429	440	-11
R	4569	4569	N/A	N/A
S	4569	4569	N/A	N/A
T	1344	1344	1348	-4

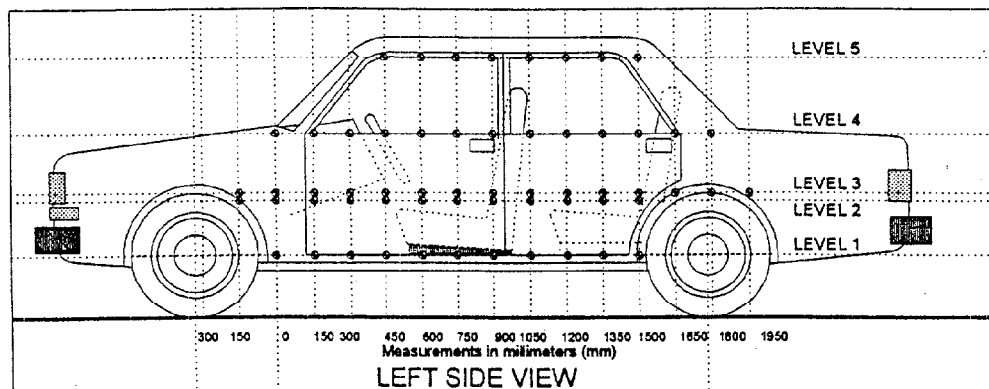
D = Length at centerline
T = Width at B-pillar

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> N/A </u>	millimeters
Level 4 @ Window Sill	=	<u> N/A </u>	millimeters
Level 3 @ Mid Door	=	<u> N/A </u>	millimeters
Level 2 @ Occupant H-Point	=	<u> N/A </u>	millimeters
Level 1 @ Axle Centerline Height	=	<u> N/A </u>	millimeters
			(or Sill Top Height)

Figure 11 Target Vehicle Exterior Crush Profile Measurement Points

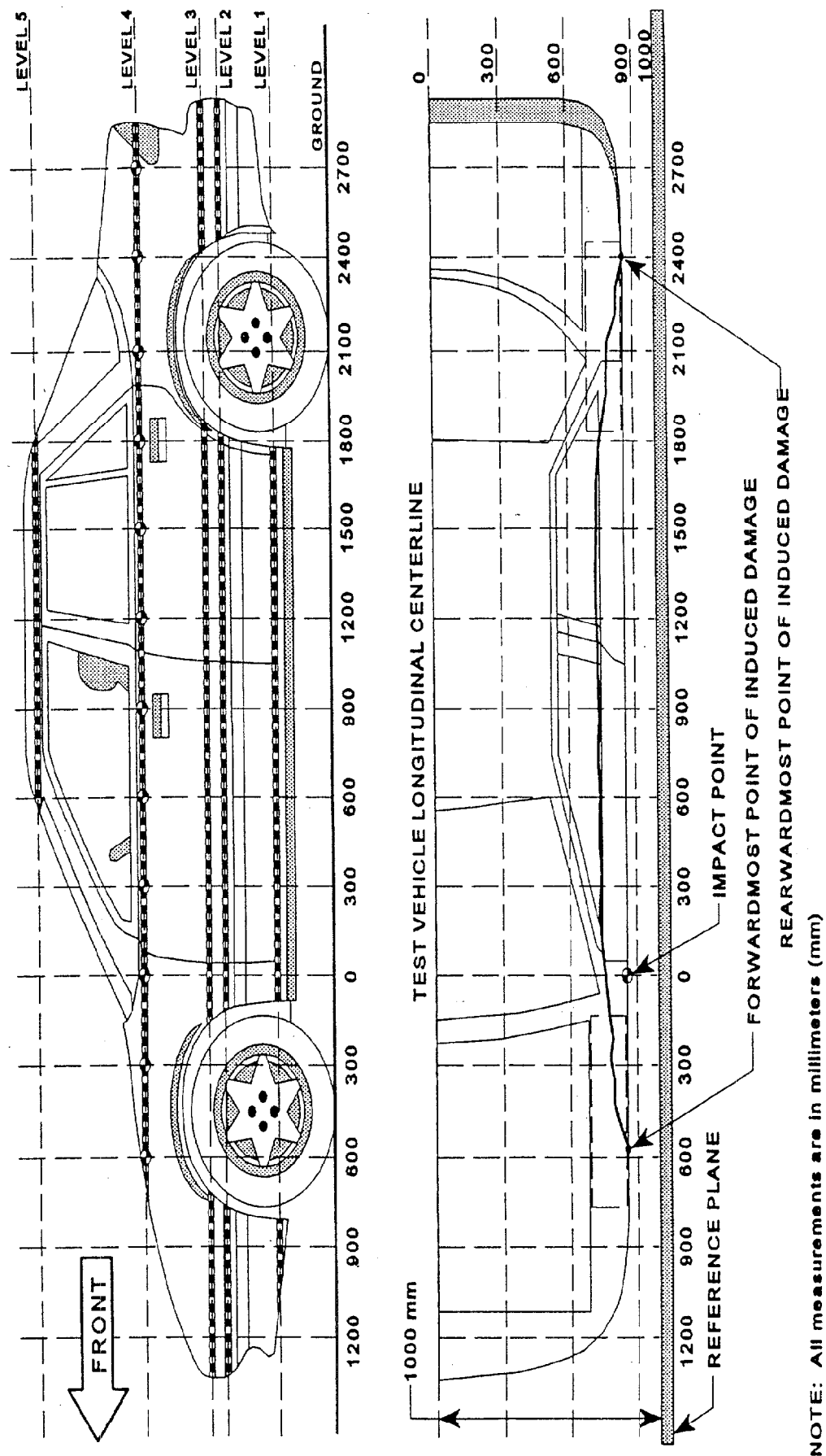


Table 14 Target Vehicle Exterior Crush Profiles - All Levels

Location	Height	(mm) From Impact Point														
		-1050	-900	-750	-600	-450	-300	-150	0	150	300	450	600	750		
Level 1 Side Sill	Pre	426	393	N/A	N/A	N/A	N/A	N/A	381	395	394	396	393	391		
	Post	N/A	N/A	N/A	N/A	N/A	N/A	N/A	455	449	430	422	417	417		
	Crush	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-74	-54	-36	-26	-24	-26		
Level 2 H-Point	Pre	402	379	356	N/A	N/A	N/A	N/A	331	333	333	335	333	333		
	Post	N/A	N/A	N/A	N/A	N/A	N/A	N/A	515	457	465	445	430	383		
	Crush	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-184	-124	-132	-110	-97	-50		
Level 3 Mid-Door	Pre	N/A	406	373	N/A	N/A	N/A	343	345	349	351	353	351	352		
	Post	N/A	730	690	N/A	N/A	N/A	589	536	482	476	455	420	389		
	Crush	N/A	-324	-317	N/A	N/A	N/A	-246	-191	-133	-125	-102	-69	-37		
Level 4 Window Sill	Pre	N/A	490	469	456	432	422	422	406	402	402	400	398	400		
	Post	N/A	820	814	756	674	601	525	478	490	457	443	415	380		
	Crush	N/A	-330	-345	-300	-242	-179	-103	-72	-88	-55	-43	-17	20		
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	N/A		
	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.

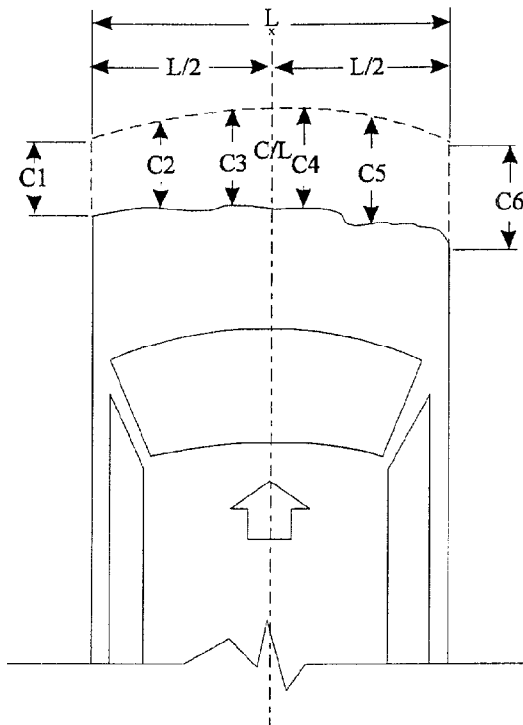
Location	Height	(mm) From Impact Point														
		900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700		
Level 1 Side Sill	Pre	394	395	397	396	400	401	402	N/A	N/A	N/A	N/A	N/A	N/A		
	Post	419	416	424	419	412	419	420	N/A	N/A	N/A	N/A	N/A	N/A		
	Crush	-25	-21	-27	-23	-12	-18	-18	N/A	N/A	N/A	N/A	N/A	N/A		
Level 2 H-Point	Pre	333	333	336	336	339	339	341	356	N/A	N/A	N/A	N/A	377		
	Post	343	312	350	335	323	340	344	357	N/A	N/A	N/A	N/A	N/A		
	Crush	-10	21	-14	1	16	-1	-3	-1	N/A	N/A	N/A	N/A	N/A		
Level 3 Mid-Door	Pre	353	345	351	350	352	351	351	356	N/A	N/A	N/A	369	383		
	Post	357	318	366	340	337	347	351	350	N/A	N/A	N/A	N/A	N/A		
	Crush	-4	27	-15	10	15	4	0	6	N/A	N/A	N/A	N/A	N/A		
Level 4 Window Sill	Pre	401	391	397	392	390	387	385	386	387	390	396	404	391		
	Post	357	330	342	391	375	380	373	364	362	375	369	380	N/A		
	Crush	44	61	55	1	15	7	12	22	25	15	27	24	N/A		
Level 5 Window Top	Pre	704	697	699	693	691	697	702	714	N/A	N/A	N/A	N/A	417		
	Post	709	710	705	692	680	686	686	684	N/A	N/A	N/A	N/A	415		
	Crush	-5	-13	-6	1	11	11	16	30	N/A	N/A	N/A	N/A	2		

*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: 1996 Chevrolet Lumina LS

	Pre-test	Post-test	Crush
L	1524 mm		
C1	4790 mm	4190 mm	600 mm
C2	4942 mm	4294 mm	648 mm
C3	5007 mm	4406 mm	601 mm
C4	5005 mm	4580 mm	425 mm
C5	4930 mm	4736 mm	194 mm
C6	4793 mm	4811 mm	-18 mm
CL	5021 mm	4471 mm	550 mm

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

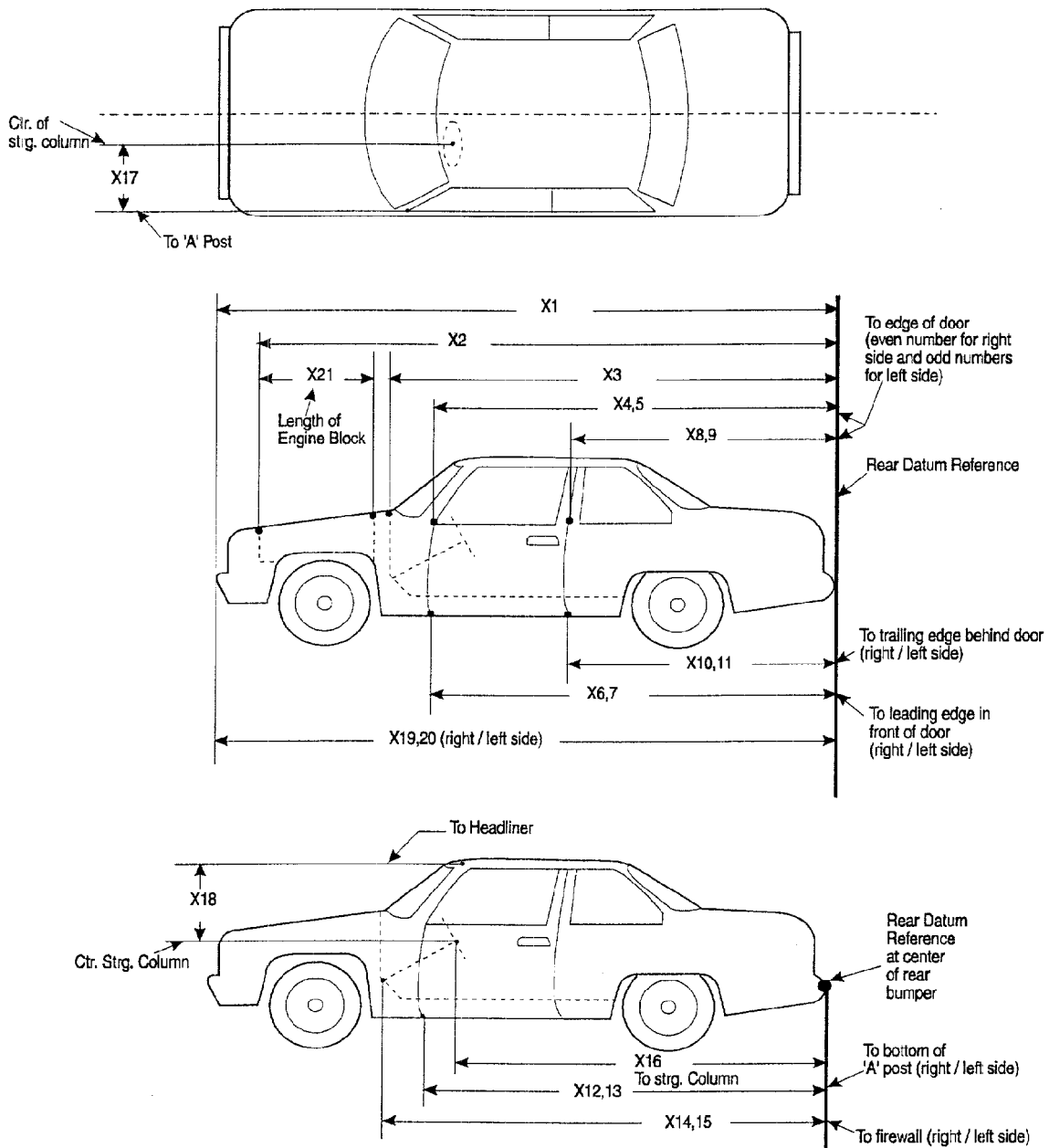


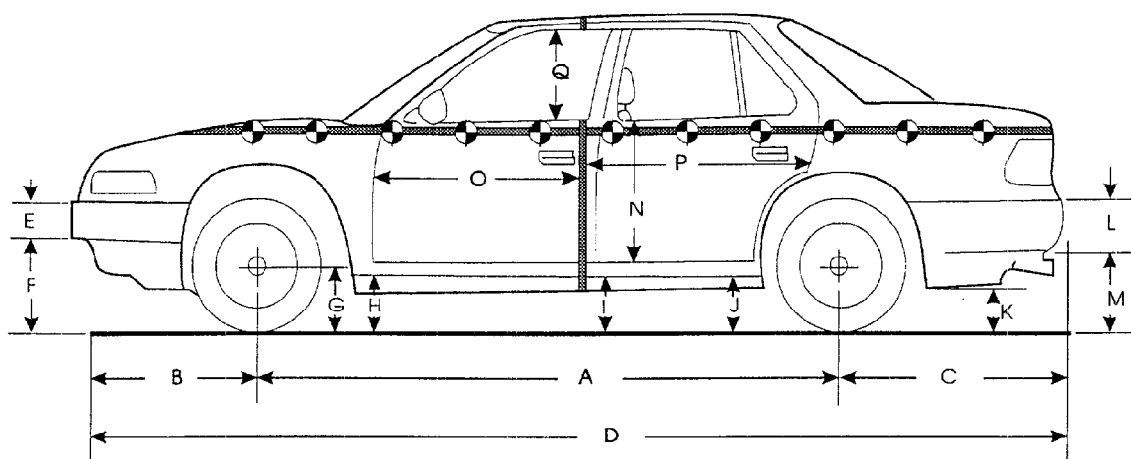
Table 15 Bullet Vehicle Measurements

Vehicle Make/Model: Chevrolet Lumina LS

Test Number: 980817

No.	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Veh. at Centerline	5021	4471	550
X2	Rear Surface of Veh. to Front of Engine Block	4671	4260	411
X3	Rear Surface of Veh. to Firewall	3784	N/A	N/A
X4	Rear Surface of Veh. to Upper Leading Edge of Right Door	3381	3377	4
X5	Rear Surface of Veh. to Upper Leading Edge of Left Door	3384	3350	34
X6	Rear Surface of Veh. to Lower Leading Edge of Right Door	3349	3325	24
X7	Rear Surface of Veh. to Lower Leading Edge of Left Door	3342	3308	34
X8	Rear Surface of Veh. to Upper Trailing Edge of Right Door	2367	2364	3
X9	Rear Surface of Veh. to Upper Trailing Edge of Left Door	2370	2344	26
X10	Rear Surface of Veh. to Lower Trailing Edge of Right Door	2378	2354	24
X11	Rear Surface of Veh. to Lower Trailing Edge of Left Door	2375	2336	39
X12	Rear Surface of Veh. to Bottom of " A " Post on Right Side	3325	3308	17
X13	Rear Surface of Veh. to Bottom of " A " Post on Left Side	3335	3295	40
X14	Rear Surface of Veh. to Firewall--Right Side	3748	3738	10
X15	Rear Surface of Veh. to Firewall--Left Side	3745	N/A	N/A
X16	Rear Surface of Veh. to Steering Wheel Center	2900	2830	70
X17	Center of Steering Column to " A " Post	330	330	0
X18	Center of Steering Column to Headliner	380	415	-35
X19	Rear Surface of Veh. to Right Side of Front Bumper	4793	4811	-18
X20	Rear Surface of Veh. to Left Side of Front Bumper	4790	4190	600
X21	Length of Engine Block	400	400	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	2730	2730	2505	225
B	1185	1185	858	327
C	1195	1195	1105	90
D	5021	5021	4471	550
E	200	200	N/A	N/A
F	339	377	N/A	N/A
G	304	307	278	29
H	229	235	129	106
I	260	255	151	104
J1	242	254	153	101
J2	261	219	158	61
K	297	N/A	N/A	N/A
L	260	260	N/A	N/A
M	382	N/A	N/A	N/A
N	685	685	685	0
O	N/A	N/A	N/A	N/A
P	N/A	N/A	N/A	N/A
Q	450	450	450	0
R	4793	4793	4811	-18
S	4790	4790	4190	600
T	1408	1408	1375	33

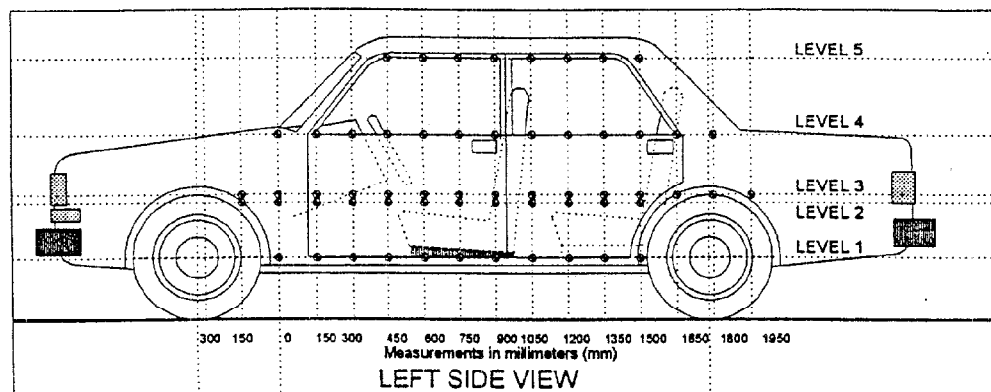
D = Length at centerline
T = Width at B-pillar

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.



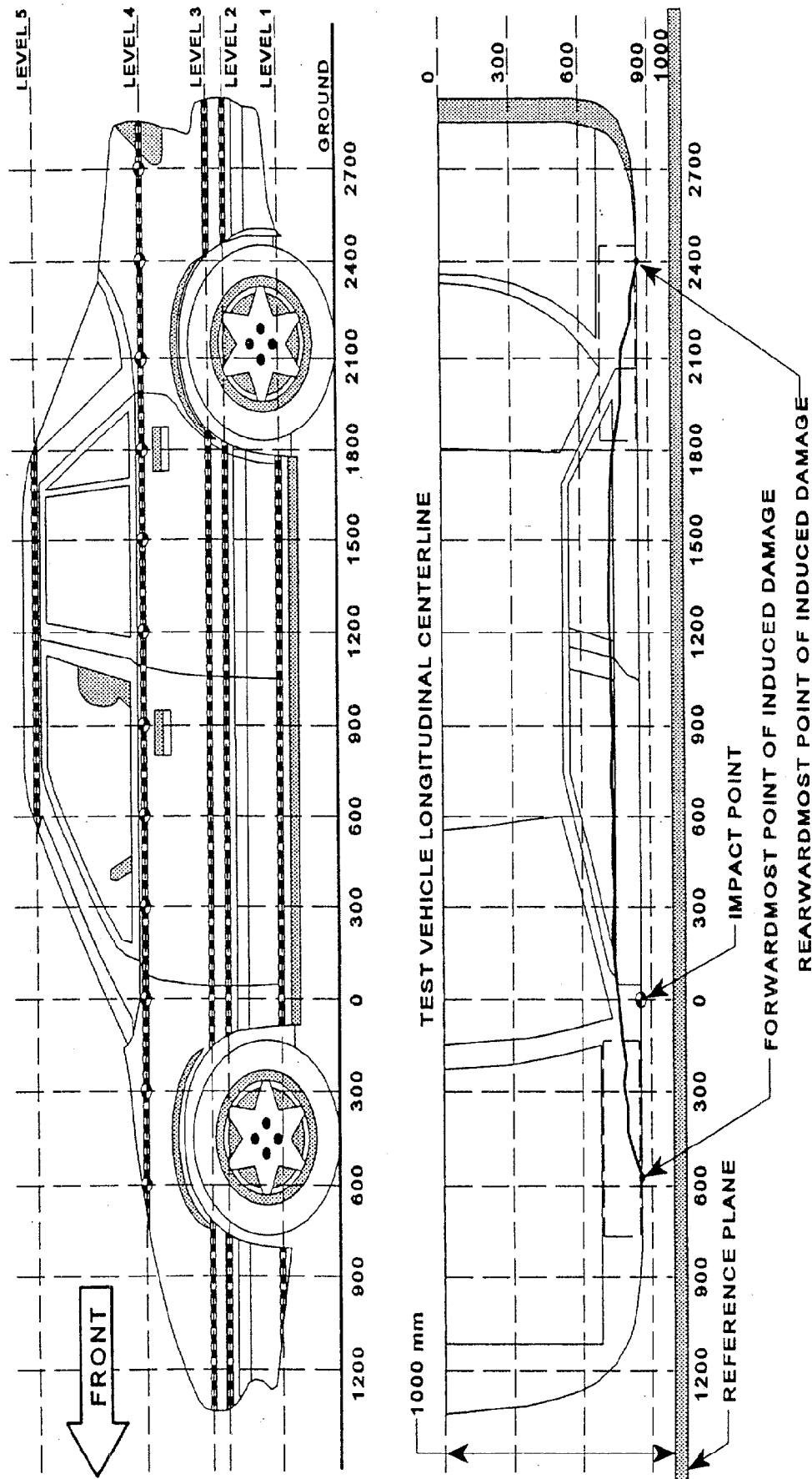
LEVEL 5 - WINDOW TOP
 LEVEL 4 - WINDOW SILL
 LEVEL 3 - MID-DOOR
 LEVEL 2 - OCCUPANT H-POINT
 LEVEL 1 - AXLE CENTERLINE HEIGHT OR SILL TOP HEIGHT

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>1380</u>	millimeters
Level 4 @ Window Sill	=	<u>910</u>	millimeters
Level 3 @ Mid Door	=	<u>610</u>	millimeters
Level 2 @ Occupant H-Point	=	<u>509</u>	millimeters
Level 1 @ Axle Centerline Height (or Sill Top Height)	=	<u>270</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

Location	Height	(mm) From Impact Point																
		-1200	-1050	-900	-750	-600	-450	-300	-150	0	150	300	450	600	750			
Level 1 Side Sill	270	Pre	475	435	412	N/A	N/A	N/A	N/A	N/A	N/A	383	387	395	410	416	401	
		Post	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	311	315	327	340	336	343	
		Crush	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	72	72	68	70	80	58	
Level 2 H-Point	509	Pre	407	380	363	N/A	N/A	N/A	N/A	N/A	N/A	N/A	315	313	310	313	310	309
		Post	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	242	245	246	246	245	247	
		Crush	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	73	68	64	67	65	62	
Level 3 Mid-Door	610	Pre	N/A	402	371	345	N/A	N/A	N/A	N/A	N/A	N/A	305	303	300	300	298	296
		Post	N/A	398	376	358	N/A	N/A	N/A	N/A	N/A	233	234	235	234	234	236	
		Crush	N/A	4	-5	-13	N/A	N/A	N/A	N/A	N/A	72	69	65	66	64	60	
Level 4 Window Sill	910	Pre	518	488	467	440	429	410	405	393	387	376	377	371	370	366		
		Post	494	445	423	395	358	340	320	308	290	305	309	305	299	304		
		Crush	24	43	44	45	71	70	85	85	97	71	68	66	71	62		
Level 5 Window Top	1380	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	N/A	N/A	638	
		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	N/A	565	
		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	N/A	73	

*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	270	Pre	405	400	404	409	398	402	396	N/A	N/A	N/A	N/A	N/A	N/A		
		Post	346	353	343	360	360	368	362	N/A	N/A	N/A	N/A	N/A	N/A		
		Crush	59	47	61	49	38	34	34	N/A	N/A	N/A	N/A	N/A	N/A		
Level 2 H-Point	509	Pre	308	308	314	313	313	323	323	N/A	N/A	N/A	N/A	N/A	N/A		
		Post	252	260	261	268	273	281	294	N/A	N/A	N/A	N/A	N/A	N/A		
		Crush	56	48	53	45	40	42	29	N/A	N/A	N/A	N/A	N/A	N/A		
Level 3 Mid-Door	610	Pre	298	293	300	300	295	303	303	310	N/A	N/A	N/A	N/A	N/A		
		Post	241	245	250	255	254	261	273	278	N/A	N/A	N/A	N/A	N/A		
		Crush	57	48	50	45	41	42	30	32	N/A	N/A	N/A	N/A	N/A		
Level 4 Window Sill	910	Pre	366	360	365	360	357	365	363	365	365	374	380	385	400		
		Post	306	308	310	316	318	326	335	335	335	342	346	364	380		
		Crush	60	52	55	44	39	39	28	30	30	32	34	21	20		
Level 5 Window Top	1380	Pre	627	622	629	627	628	632	636	N/A	N/A	N/A	N/A	N/A	N/A		
		Post	567	560	576	584	590	598	613	N/A	N/A	N/A	N/A	N/A	N/A		
		Crush	60	62	53	43	38	34	23	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.

Figure 16 Camera Positions

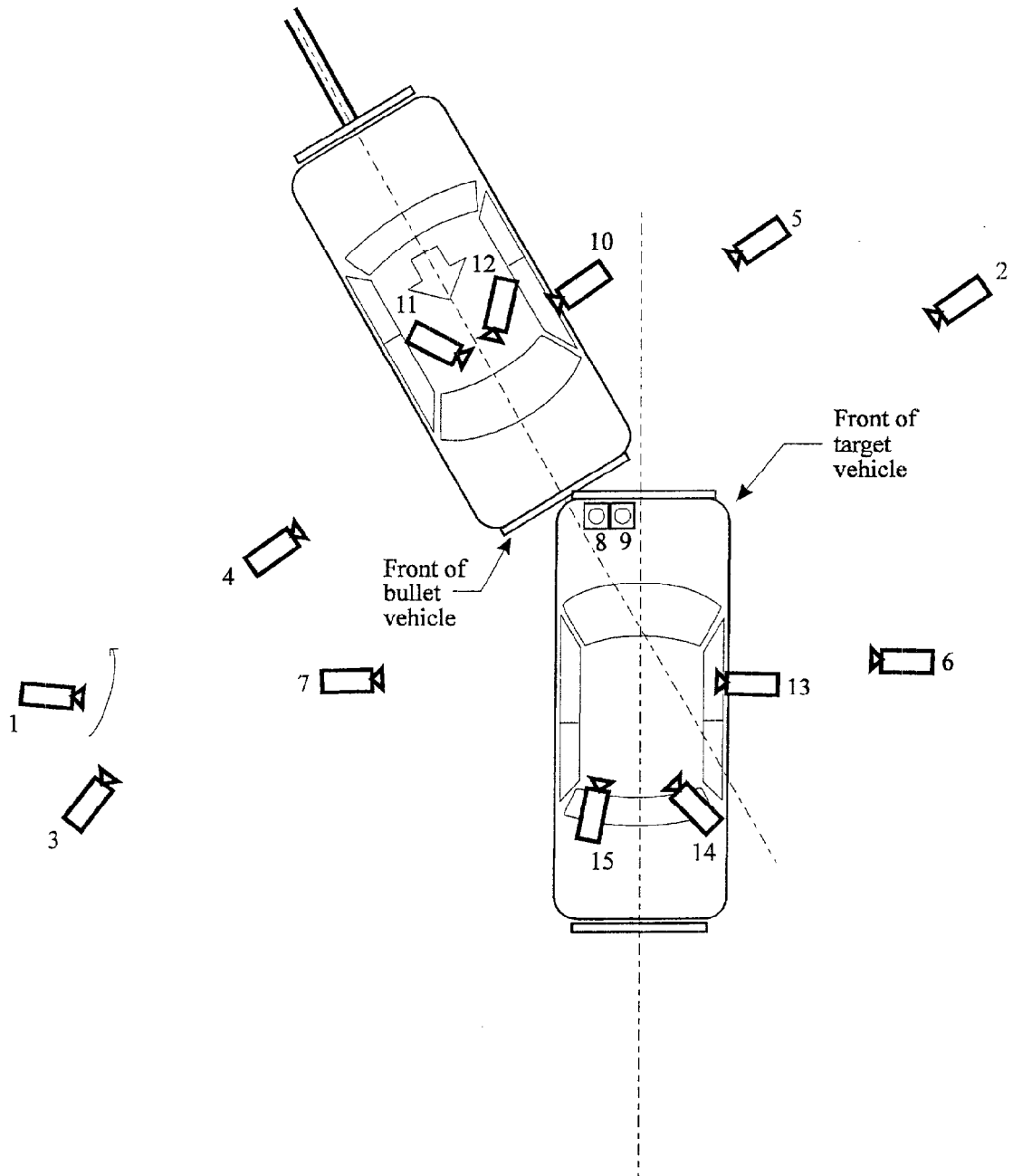


Table 17 Camera Information

Camera Number	Location	Type	Lens (mm)	Speed (fps)	Purpose of camera data
1	Panning	Bolex	16	24	Vehicle dynamics
2	Right wide	Photosonic	13	1015	Vehicle dynamics
3	Left wide	Photosonic	13	1002	Vehicle dynamics
4	Bullet vehicle right medium tight	Stalex	25	N/A ¹	Dummy kinematics
5	Bullet vehicle left medium tight	Stalex	25	1030	Dummy kinematics
6	Target vehicle right medium tight	Stalex	30	1025	Dummy kinematics
7	Target vehicle left medium tight	Stalex	25	1015	Dummy kinematics
8	Overhead wide	Photosonic	8.5	1005	Vehicle crush
9	Overhead tight	Photosonic	25	998	Impact point
10	Onboard bullet vehicle (side)	Photosonic	8	1018	Dummy kinematics
11	Onboard bullet vehicle - driver	Photosonic	8	995	Dummy kinematics
12	Onboard bullet vehicle - passenger	Photosonic	8	995	Dummy kinematics
13	Onboard target vehicle (side)	Photosonic	8	1002	Dummy kinematics
14	Onboard target vehicle - driver	Photosonic	8	995	Dummy kinematics
15	Onboard target vehicle - passenger	Photosonic	8	1000	Dummy kinematics

¹ Camera did not operate.

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.

Appendix A

Photographs



Figure A-1 Pre-Test Target Vehicle Front View



Figure A-2 Post-Test Target Vehicle Front View

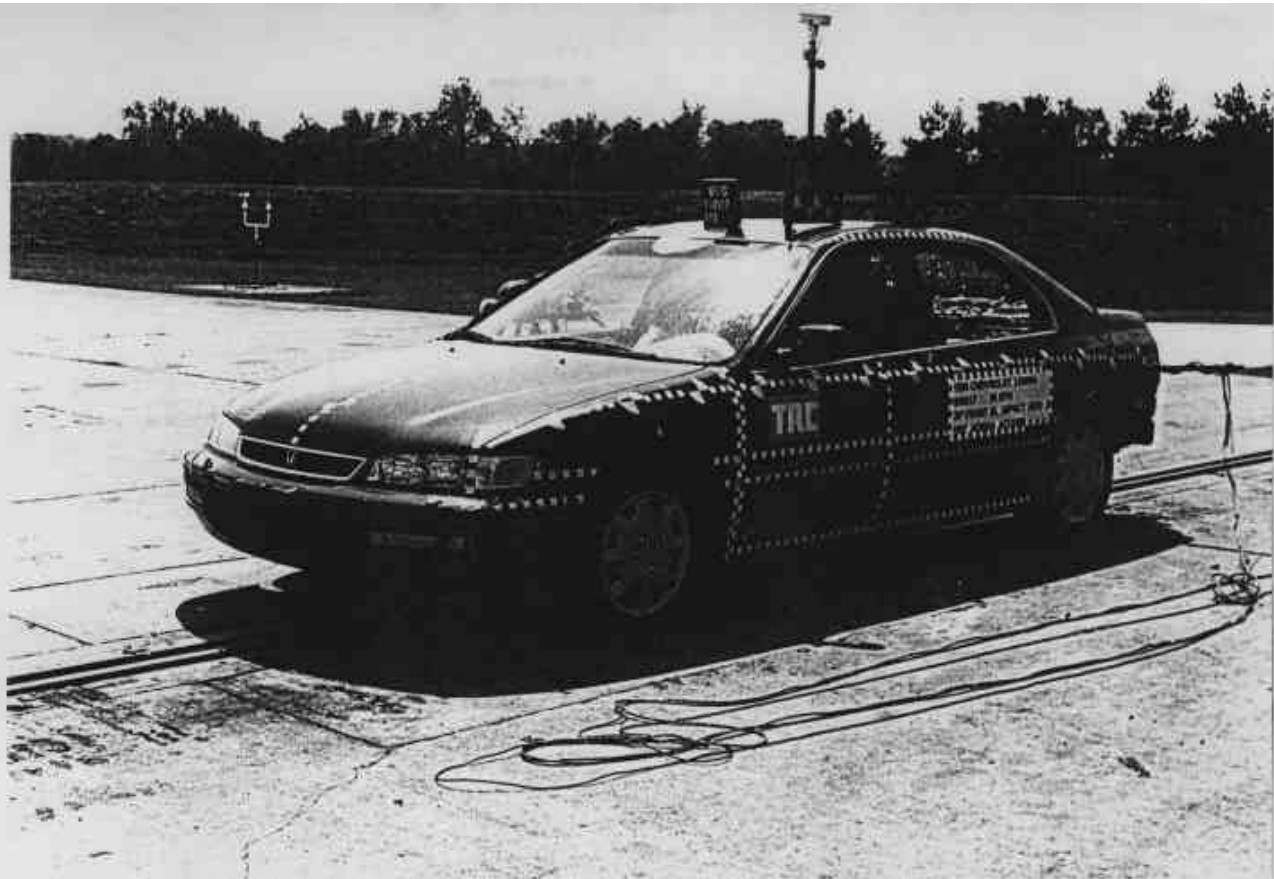


Figure A-3 Pre-Test Target Vehicle Left Front Three-Quarter View

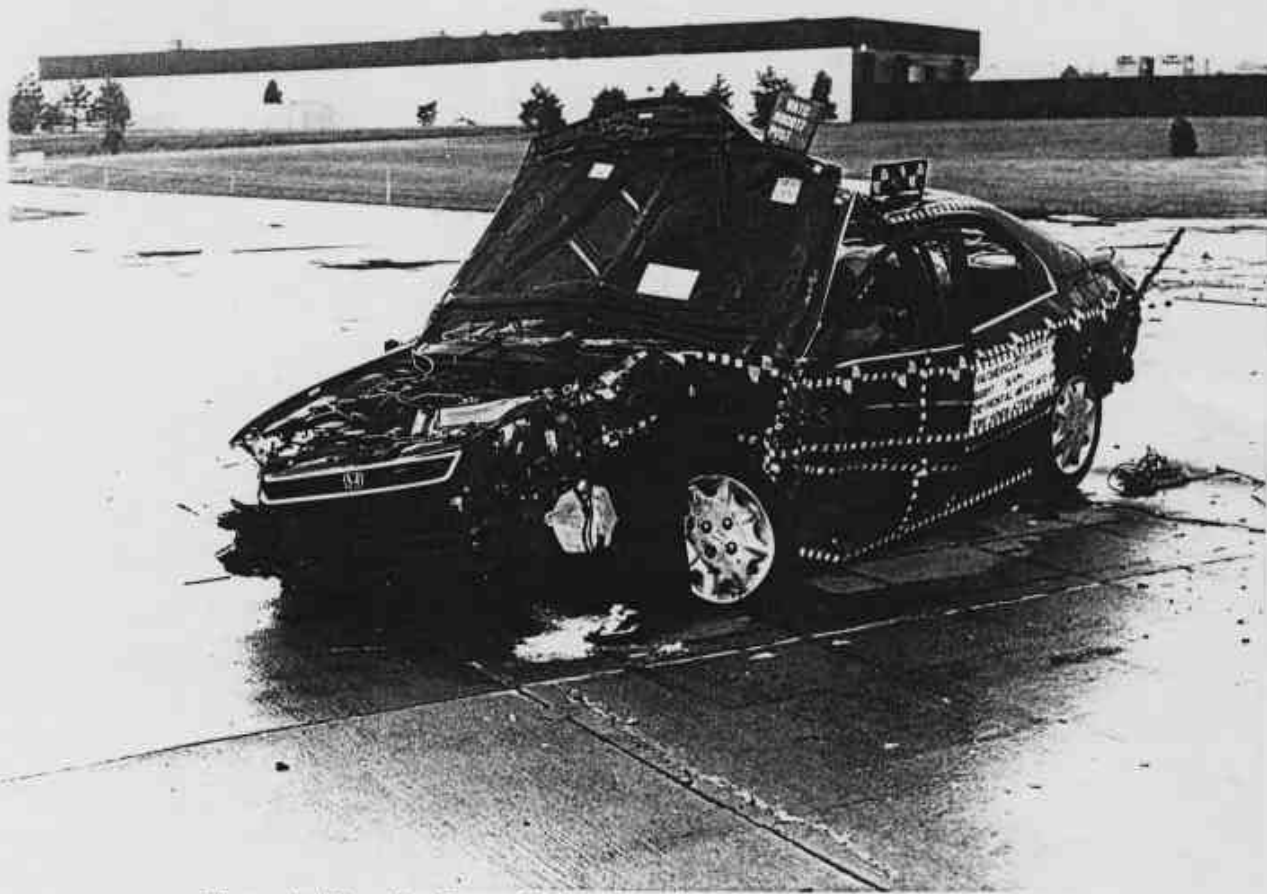


Figure A-4 Post-Test Target Vehicle Left Front Three-Quarter View



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

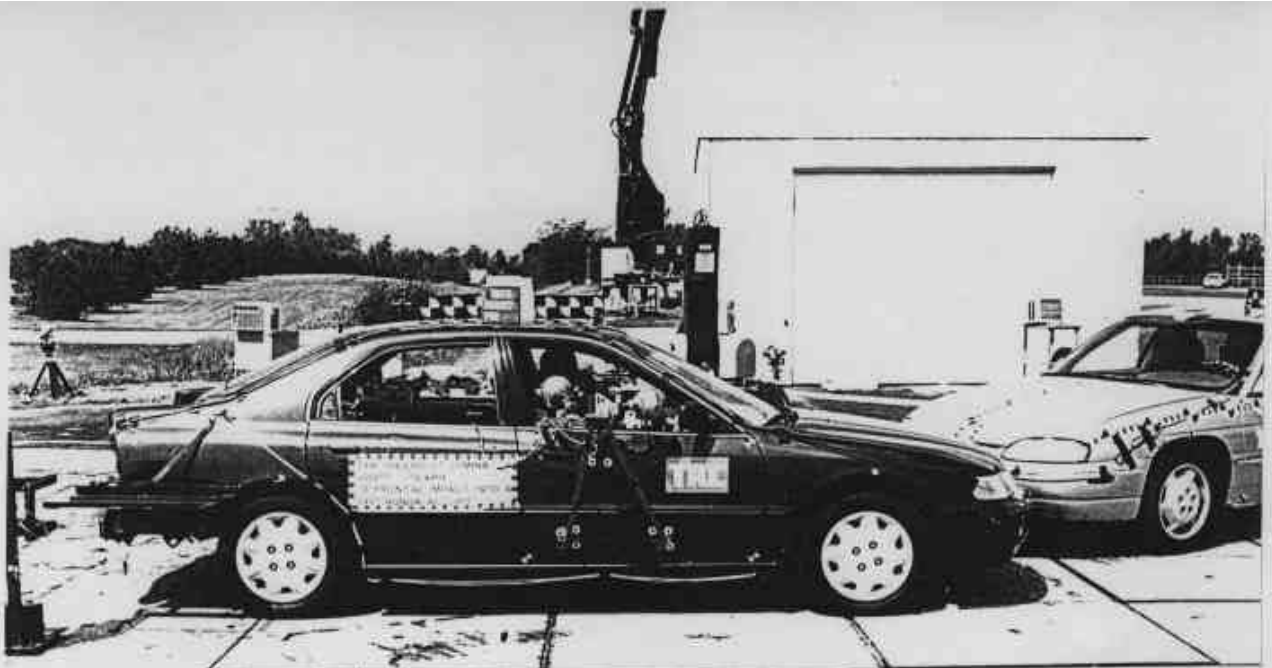


Figure A-9 Pre-Test Target Vehicle Right Side View



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

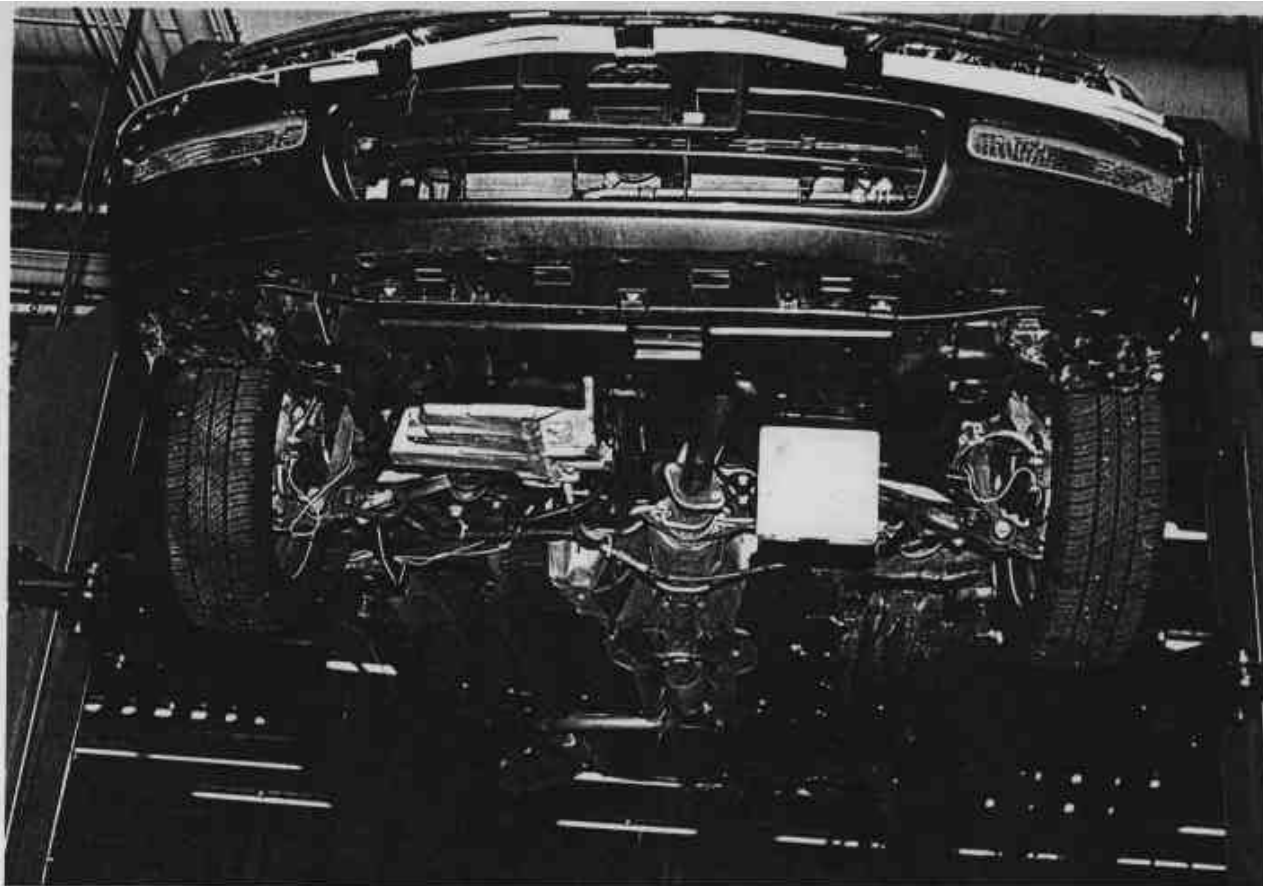


Figure A-13 Pre-Test Target Vehicle Front Underbody View

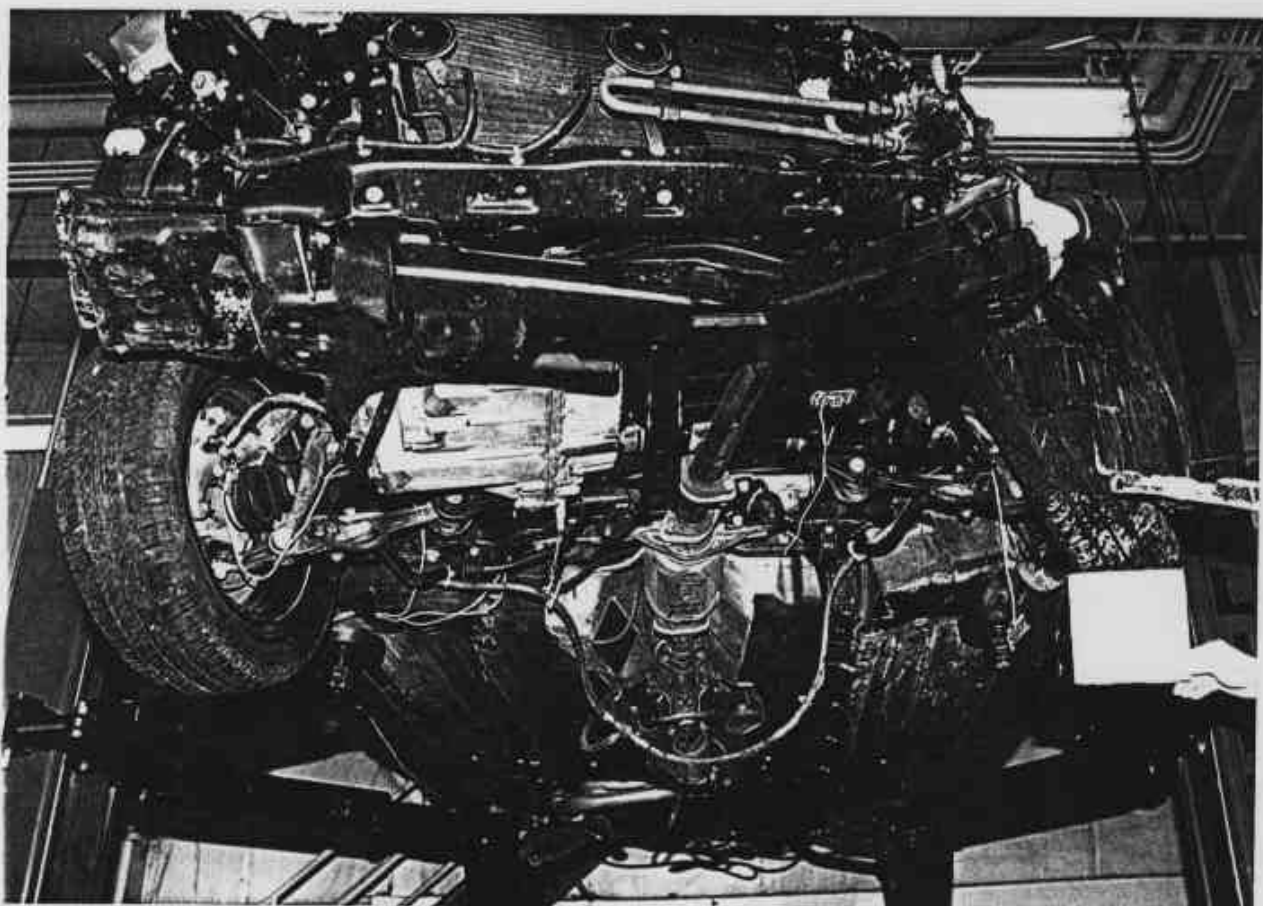


Figure A-14 Post-Test Target Vehicle Front Underbody View

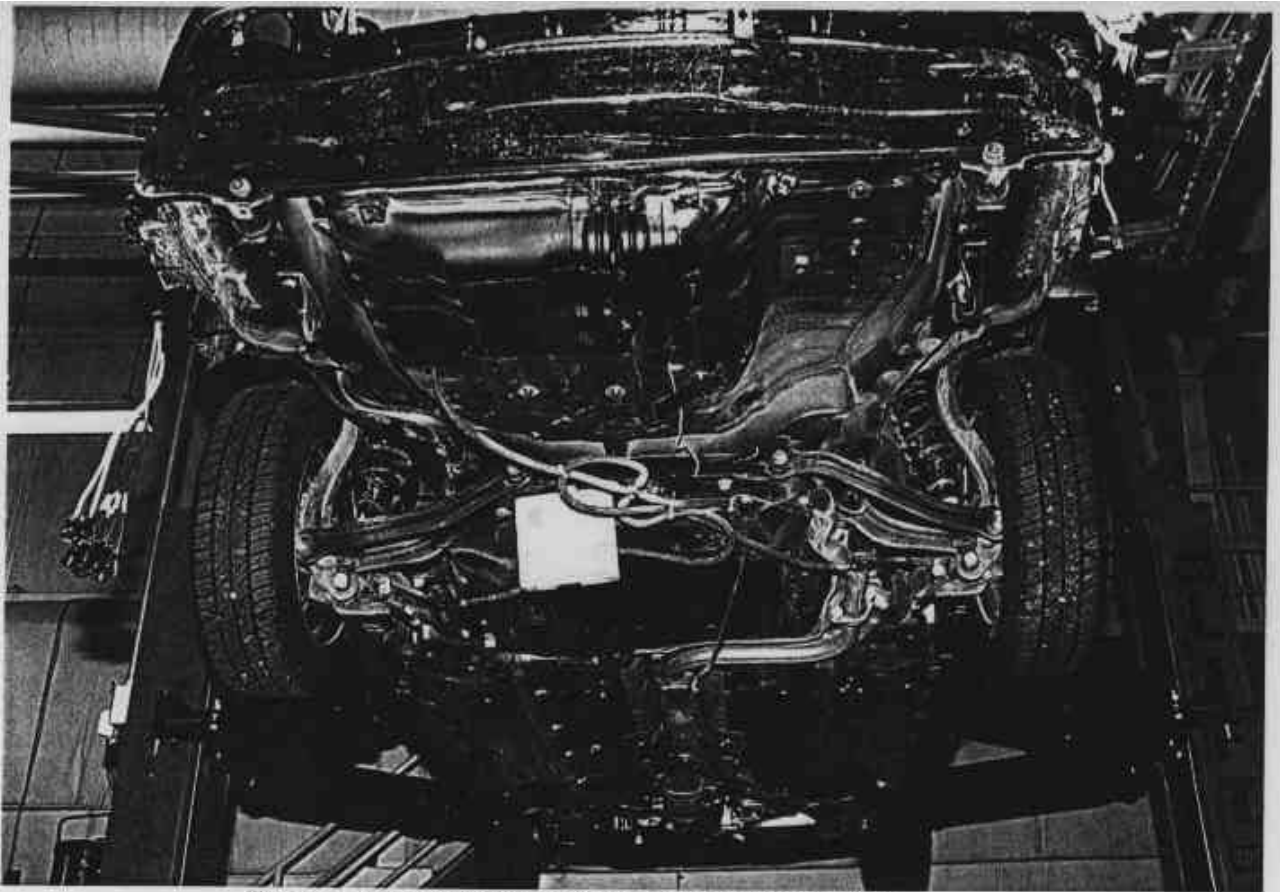


Figure A-15 Pre-Test Target Vehicle Rear Underbody View

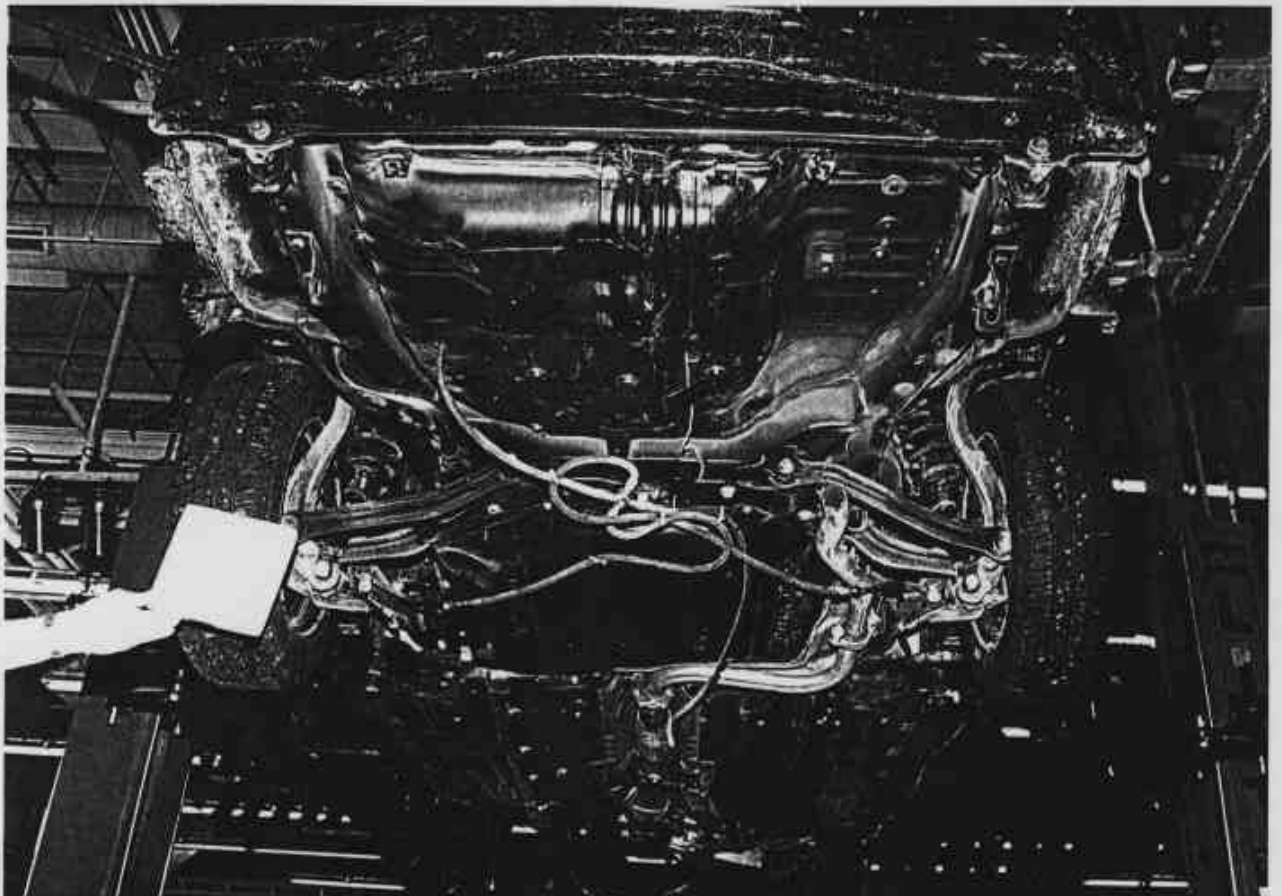


Figure A-16 Post-Test Target Vehicle Rear Underbody View



Figure A-17 Pre-Test Bullet Vehicle Front View



Figure A-18 Post-Test Bullet Vehicle Front View



Figure A-19 Pre-Test Bullet Vehicle Left Front Three-Quarter View



Figure A-20 Post-Test Bullet Vehicle Left Front Three-Quarter View



Figure A-21 Pre-Test Bullet Vehicle Left Side View



Figure A-22 Post-Test Bullet Vehicle Left Side View



Figure A-23 Pre-Test Bullet Vehicle Rear View



Figure A-24 Post-Test Bullet Vehicle Rear View



Figure A-25 Pre-Test Bullet Vehicle Right Side View



Figure A-26 Post-Test Bullet Vehicle Right Side View



Figure A-27 Pre-Test Bullet Vehicle Right Front Three-Quarter View



Figure A-28 Post-Test Bullet Vehicle Right Front Three-Quarter View



Figure A-29 Pre-Test Bullet Vehicle Front Underbody View

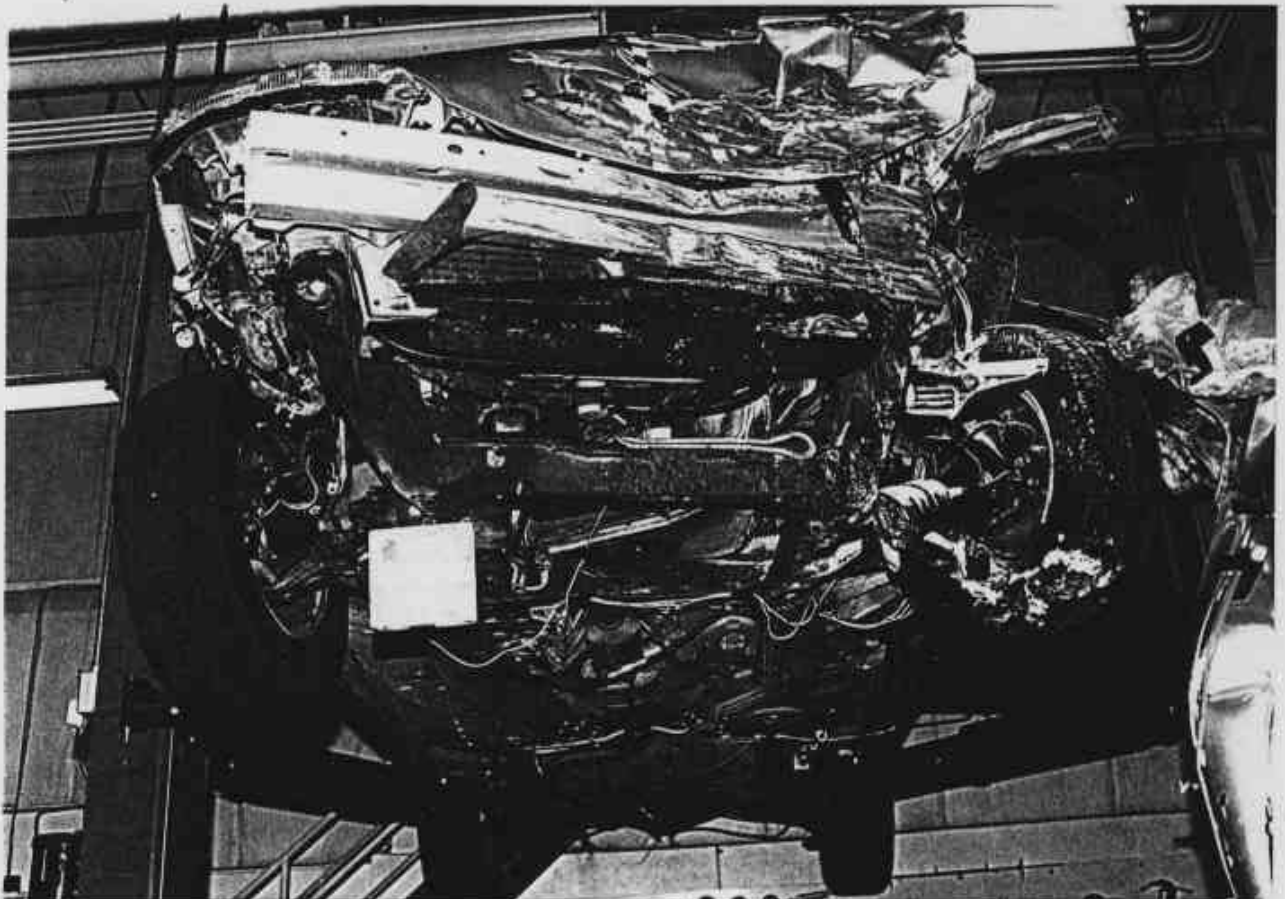


Figure A-30 Post-Test Bullet Vehicle Front Underbody View

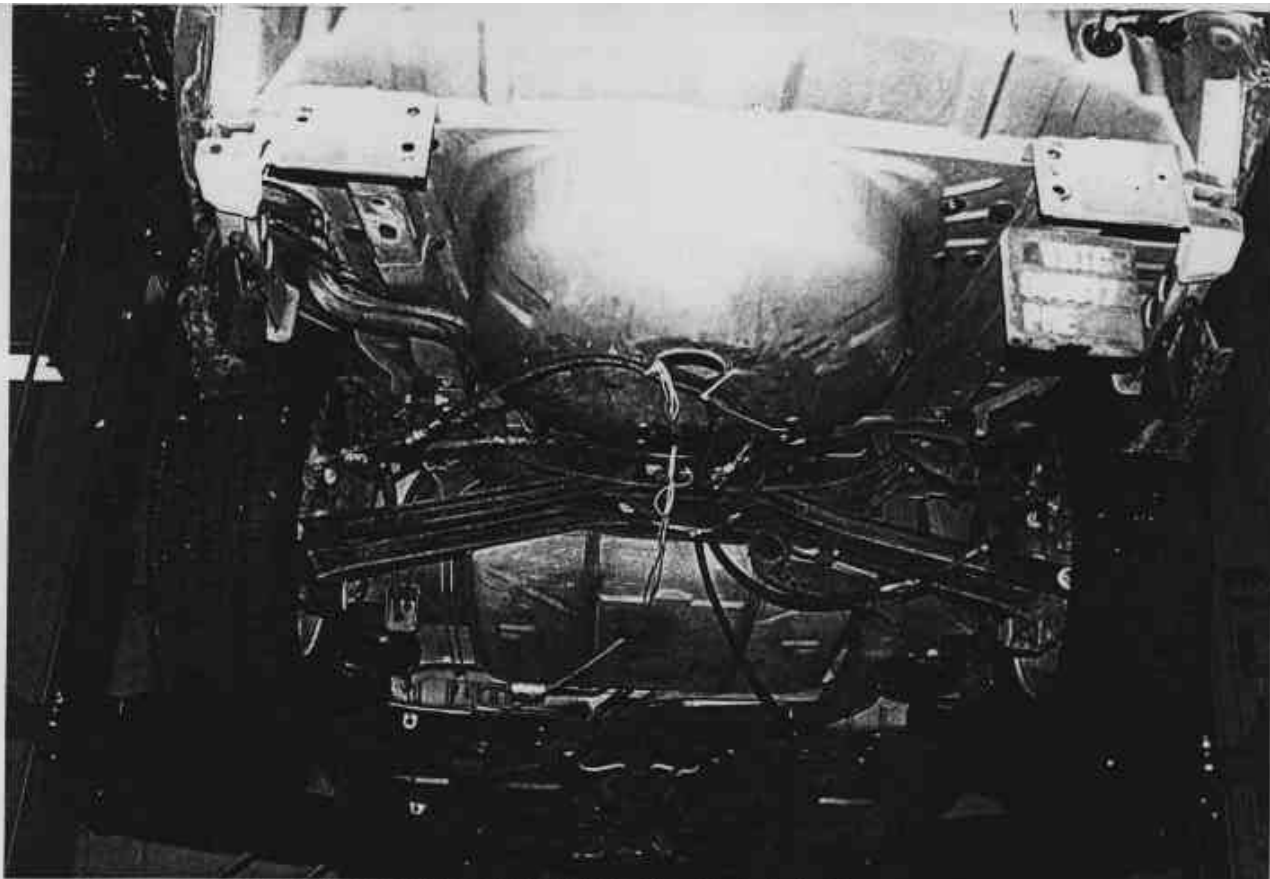


Figure A-31 Pre-Test Bullet Vehicle Rear Underbody View

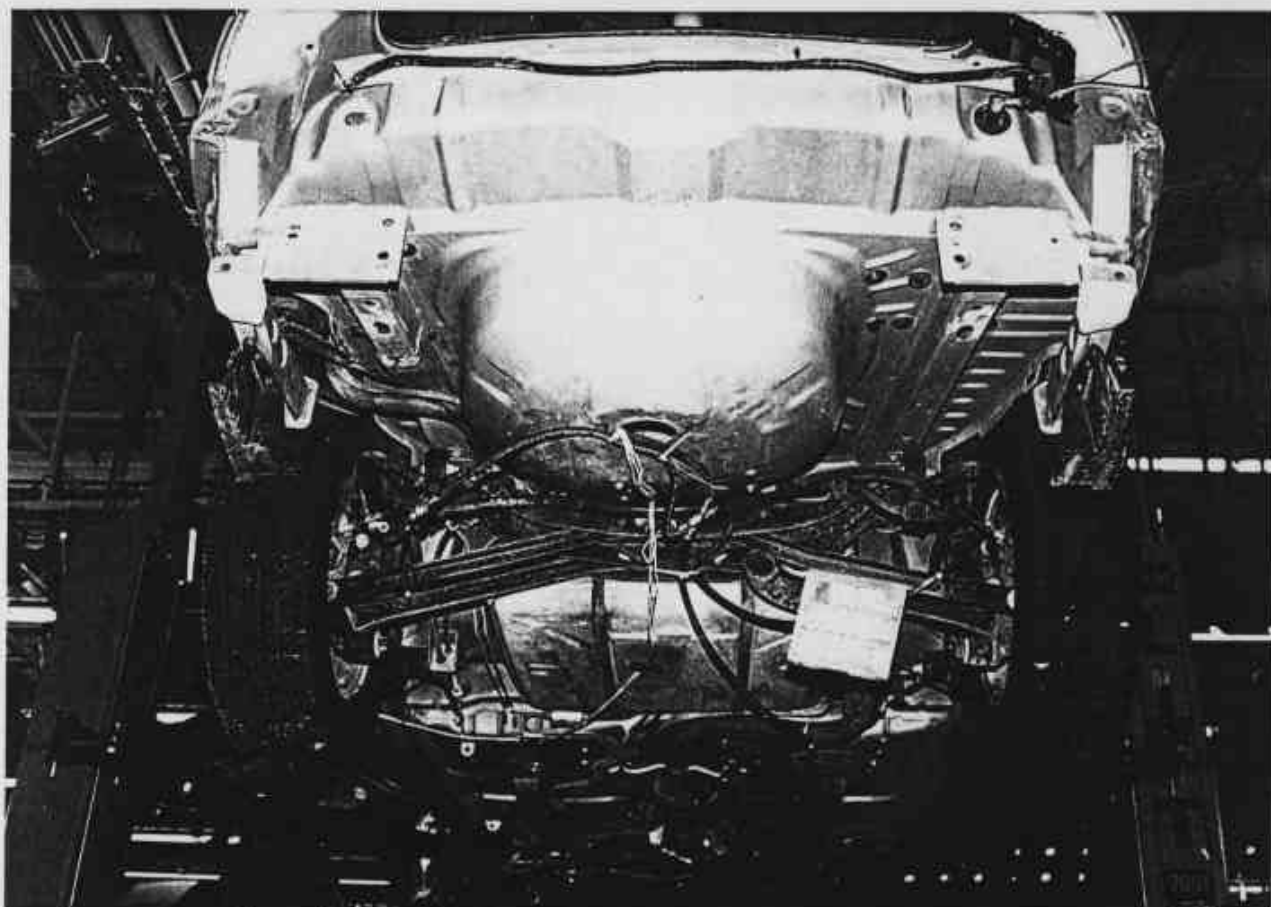


Figure A-32 Post-Test Bullet Vehicle Rear Underbody View

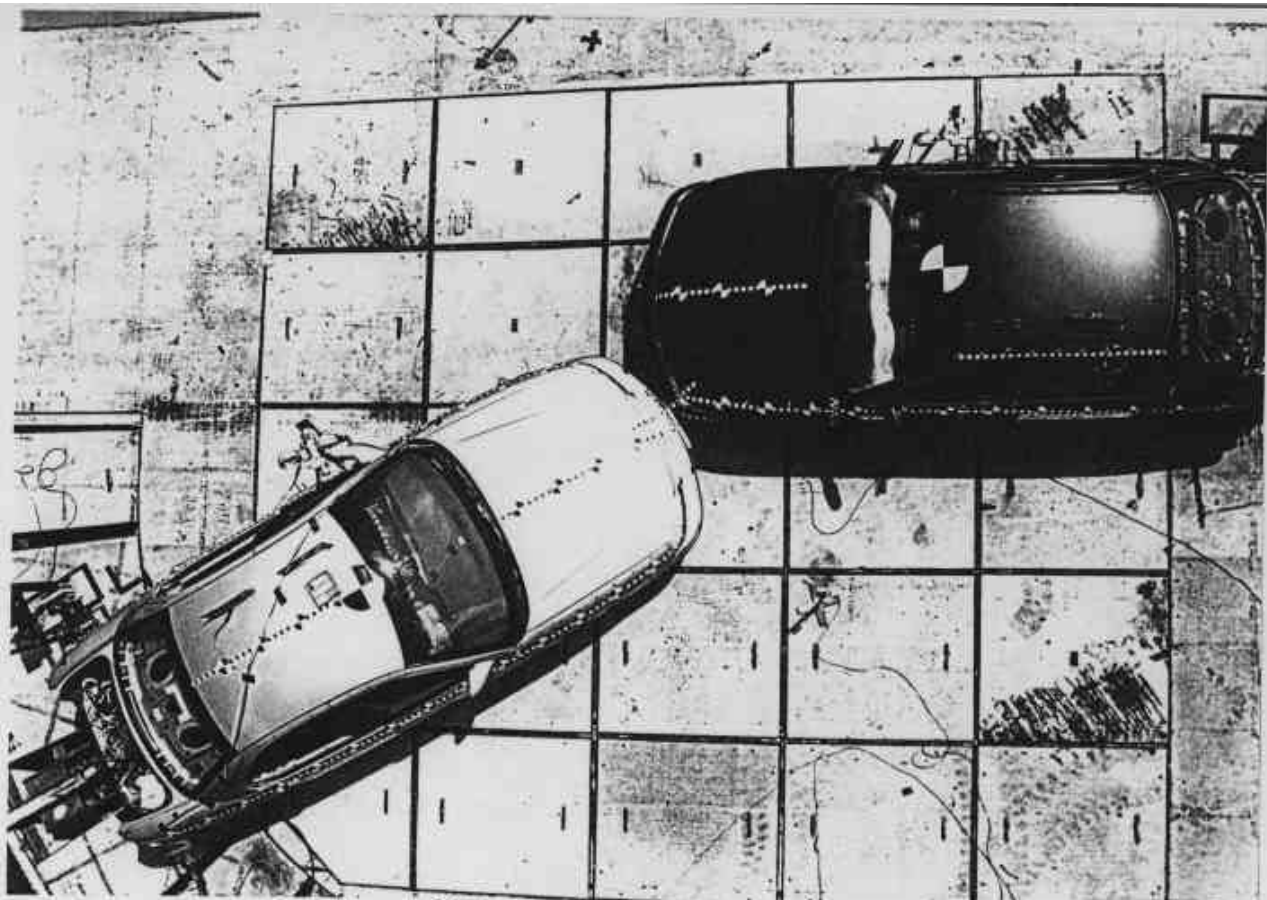


Figure A-33 Pre-Test Overhead Wide View

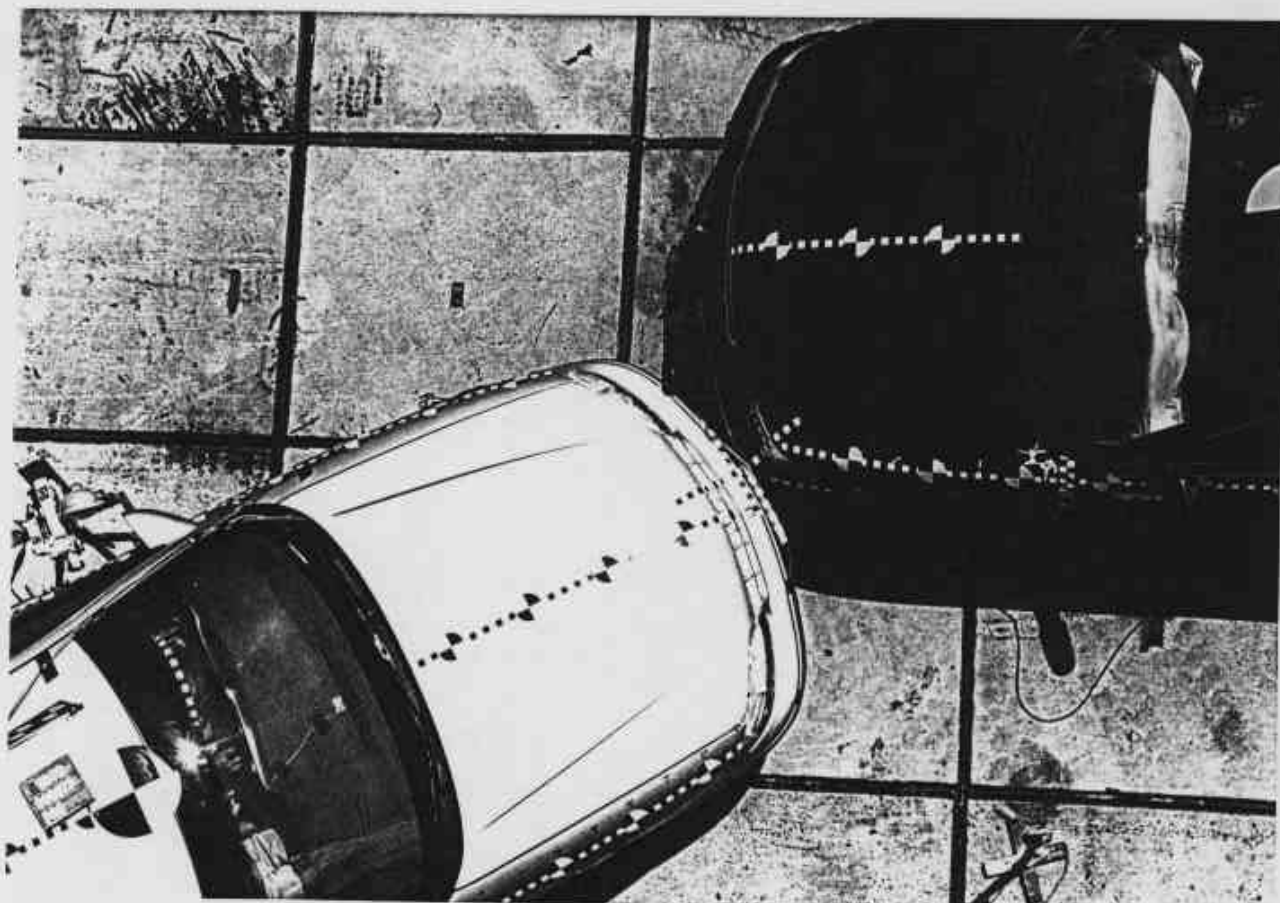


Figure A-34 Pre-Test Overhead Tight View



Figure A-35 Pre-Test Target Vehicle Driver Dummy - View 1



Figure A-36 Post-Test Target Vehicle Driver Dummy - View 1



Figure A-37 Pre-Test Target Vehicle Driver Dummy - View 2



Figure A-38 Pre-Test Target Vehicle Driver Dummy - View 3



Figure A-39 Pre-Test Target Vehicle Passenger Dummy - View 1

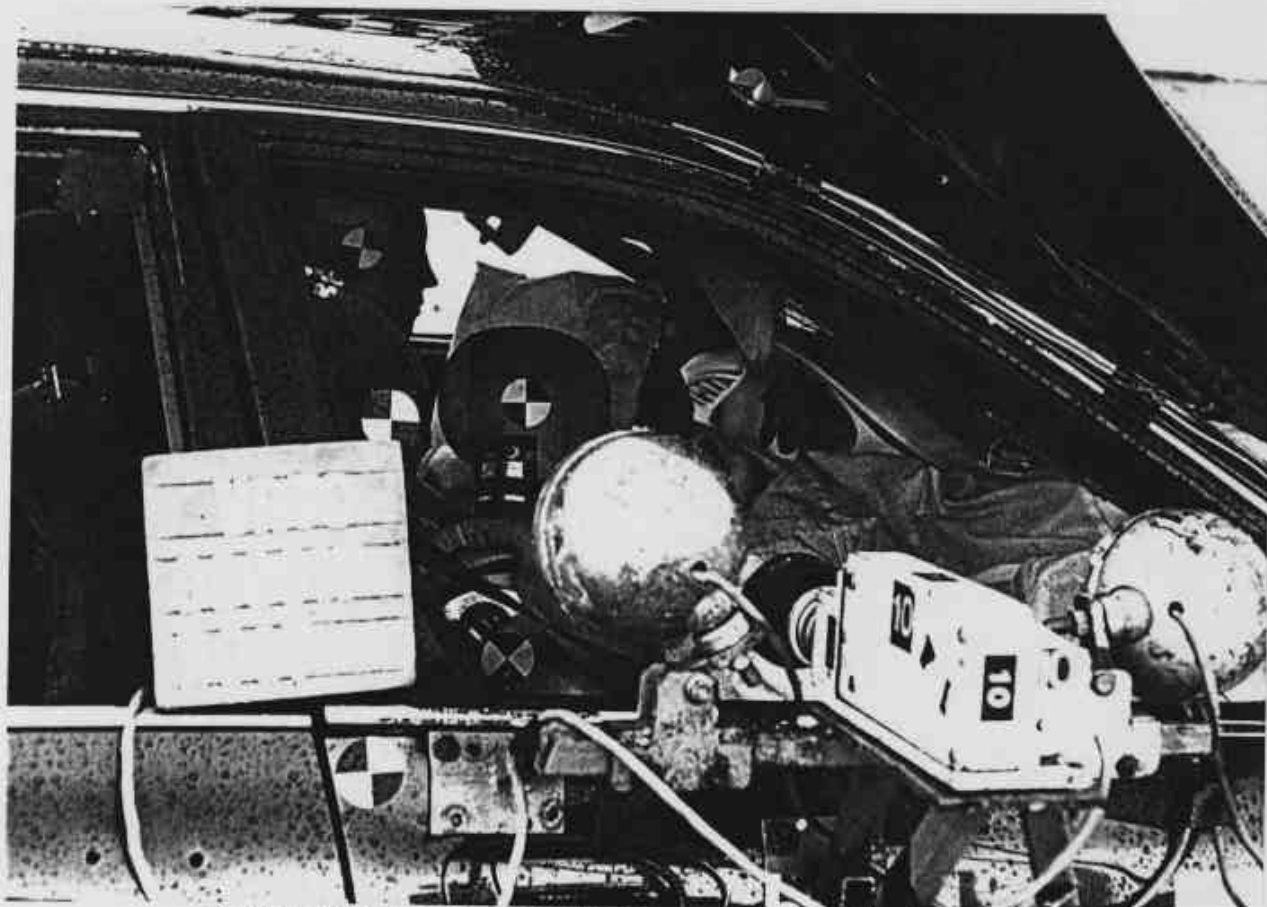


Figure A-40 Post-Test Target Vehicle Passenger Dummy - View 1



Figure A-41 Pre-Test Target Vehicle Passenger Dummy - View 2



Figure A-42 Post-Test Target Vehicle Passenger Dummy - View 2



Figure A-43 Pre-Test Target Vehicle Passenger Dummy - View 3



Figure A-44 Post-Test Target Vehicle Passenger Dummy - View 3



Figure A-45 Post-Test Bullet Vehicle Driver Dummy - View 1



Figure A-46 Post-Test Bullet Vehicle Driver Dummy - View 2



Figure A-47 Post-Test Bullet Vehicle Driver Dummy - View 3



Figure A-48 Post-Test Bullet Vehicle Passenger Dummy - View 1



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



Figure A-50 Post-Test Bullet Vehicle Passenger Dummy - View 3

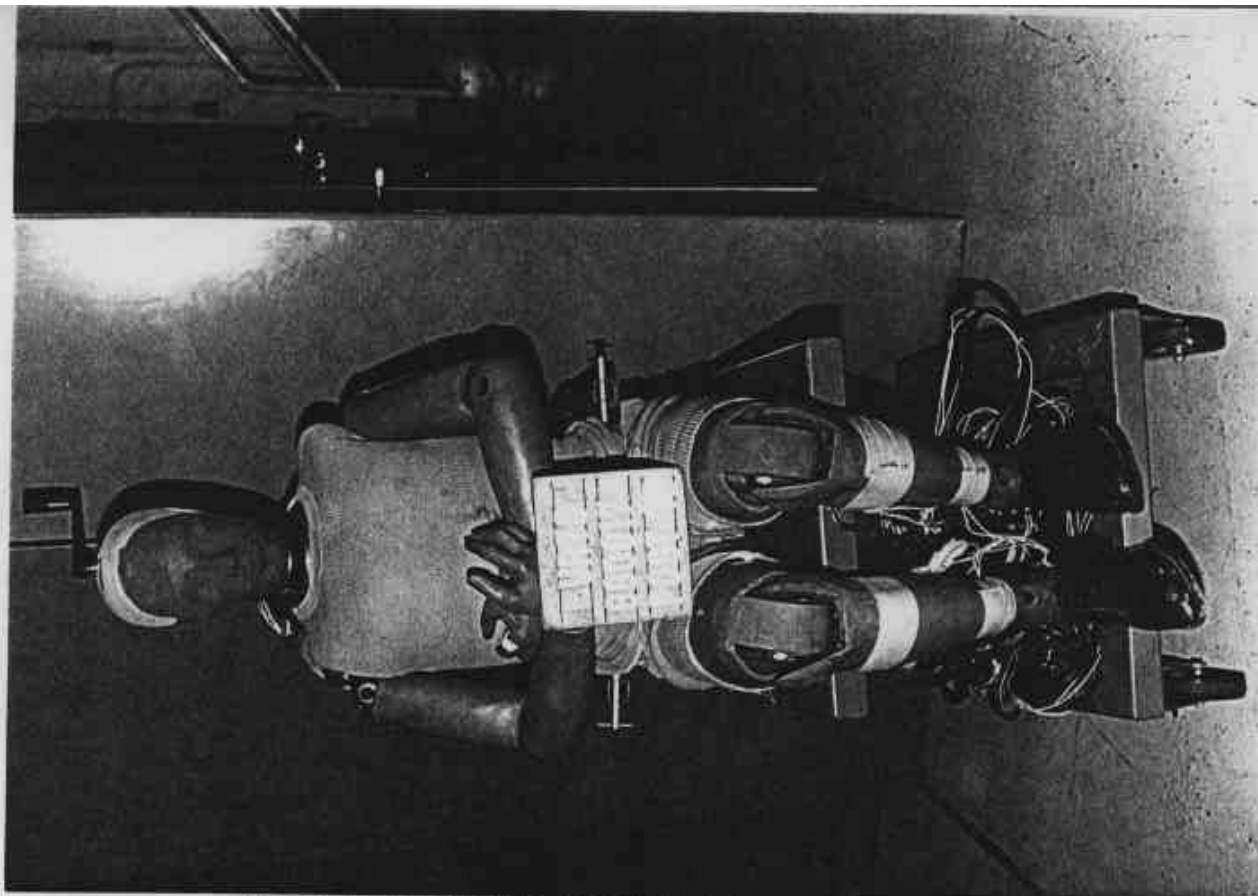


Figure A-51 Post-Test Target Vehicle Driver Dummy View



Figure A-52 Post-Test Target Vehicle Driver Dummy Head Contact - View 1



Figure A-53 Post-Test Target Vehicle Driver Dummy Head Contact - View 2



Figure A-54 Post-Test Target Vehicle Driver Dummy Knee Contact View

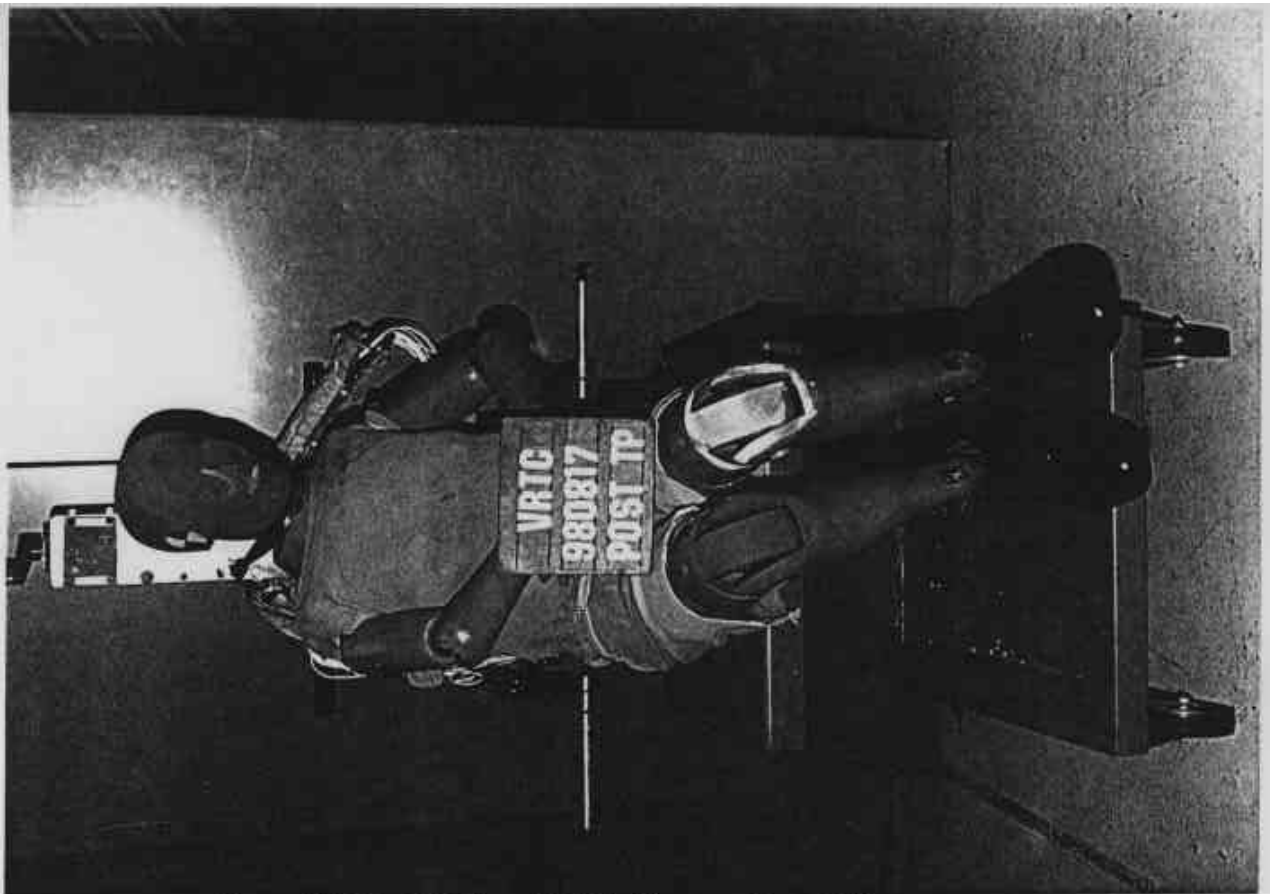


Figure A-55 Post-Test Target Vehicle Passenger Dummy View



Figure A-56 Post-Test Target Vehicle Passenger Dummy Head Contact - View 1



Figure A-57 Post-Test Target Vehicle Passenger Dummy Head Contact - View 2



Figure A-58 Post-Test Target Vehicle Passenger Dummy Head Contact - View 3

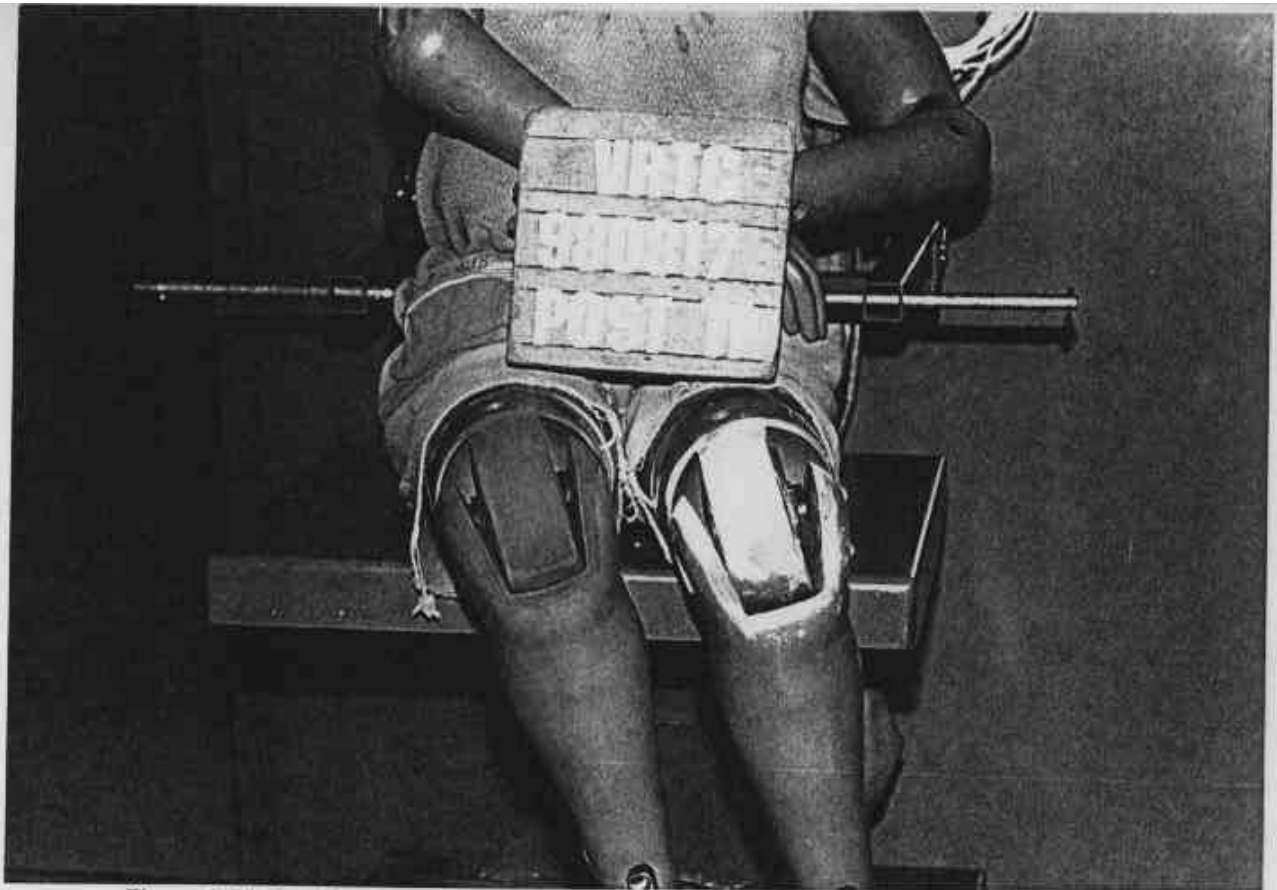


Figure A-59 Post-Test Target Vehicle Passenger Dummy Knee Contact - View 1



Figure A-60 Post-Test Target Vehicle Passenger Dummy Knee Contact - View 2

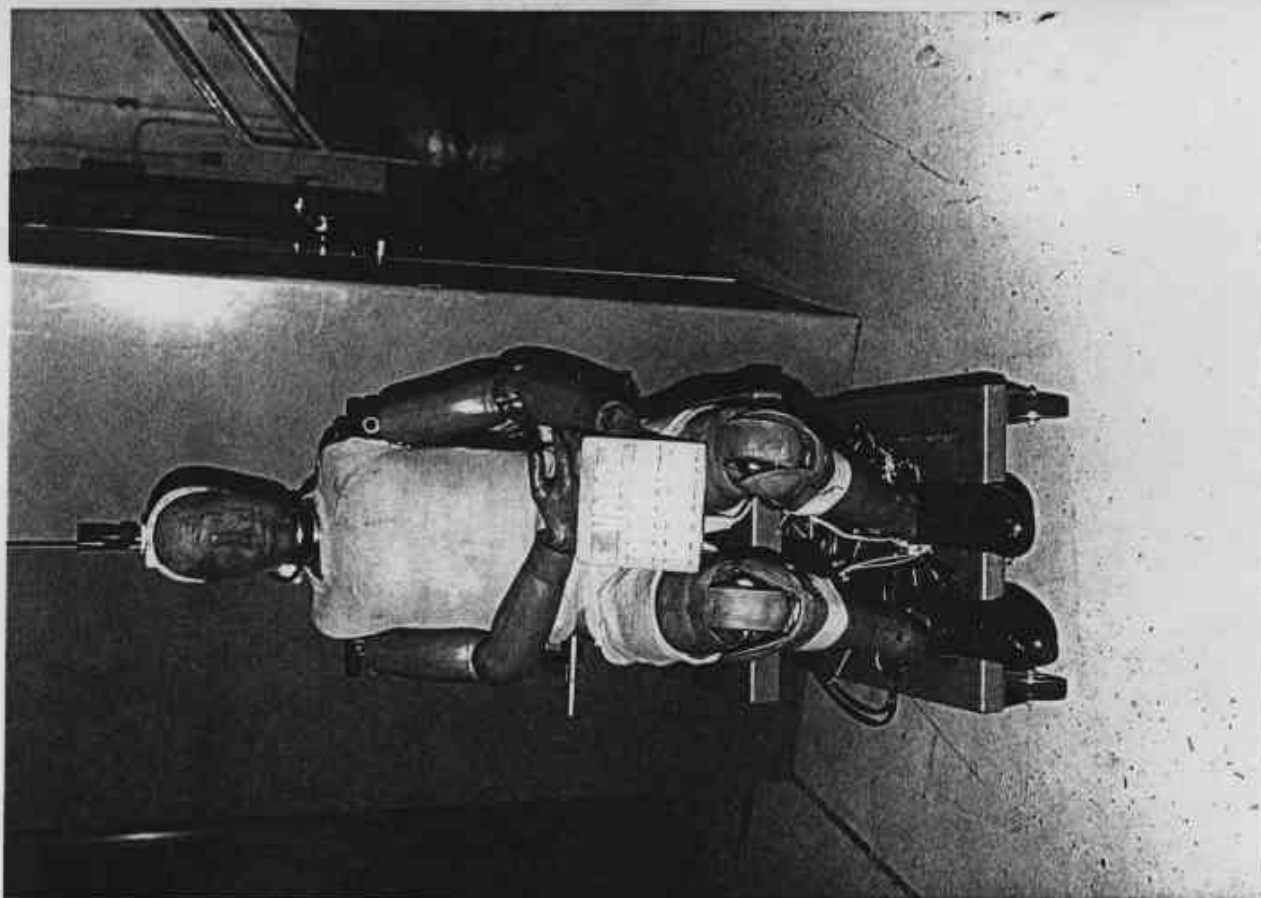


Figure A-61 Post-Test Bullet Vehicle Driver Dummy View



Figure A-62 Post-Test Bullet Vehicle Driver Dummy Head Contact - View 1



Figure A-63 Post-Test Bullet Vehicle Driver Dummy Head Contact - View 2



Figure A-64 Post-Test Bullet Vehicle Driver Dummy Head Contact - View 3

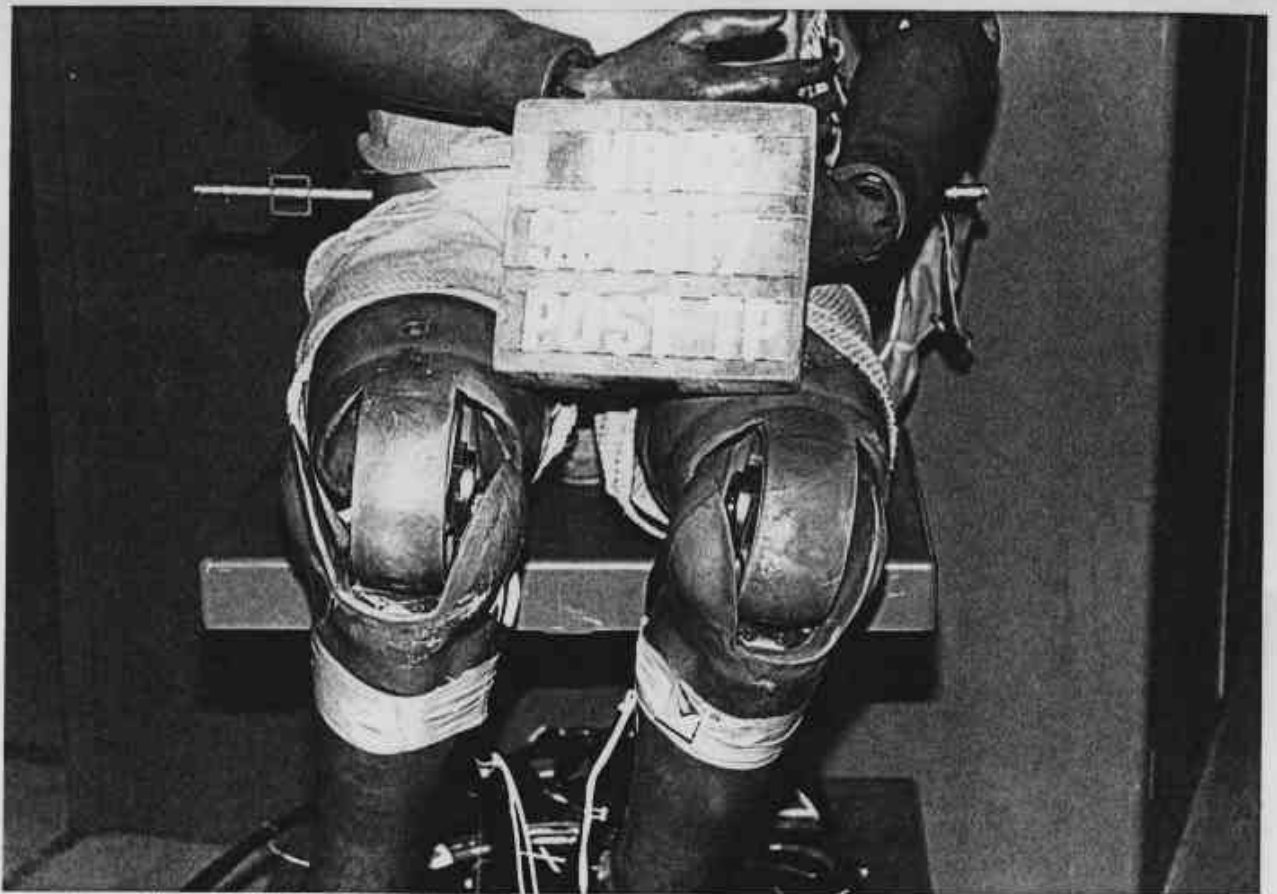


Figure A-65 Post-Test Bullet Vehicle Driver Dummy Knee Contact - View 1



Figure A-66 Post-Test Bullet Vehicle Driver Dummy Knee Contact - View 2



Figure A-67 Post-Test Bullet Vehicle Driver Dummy Knee Contact - View 3

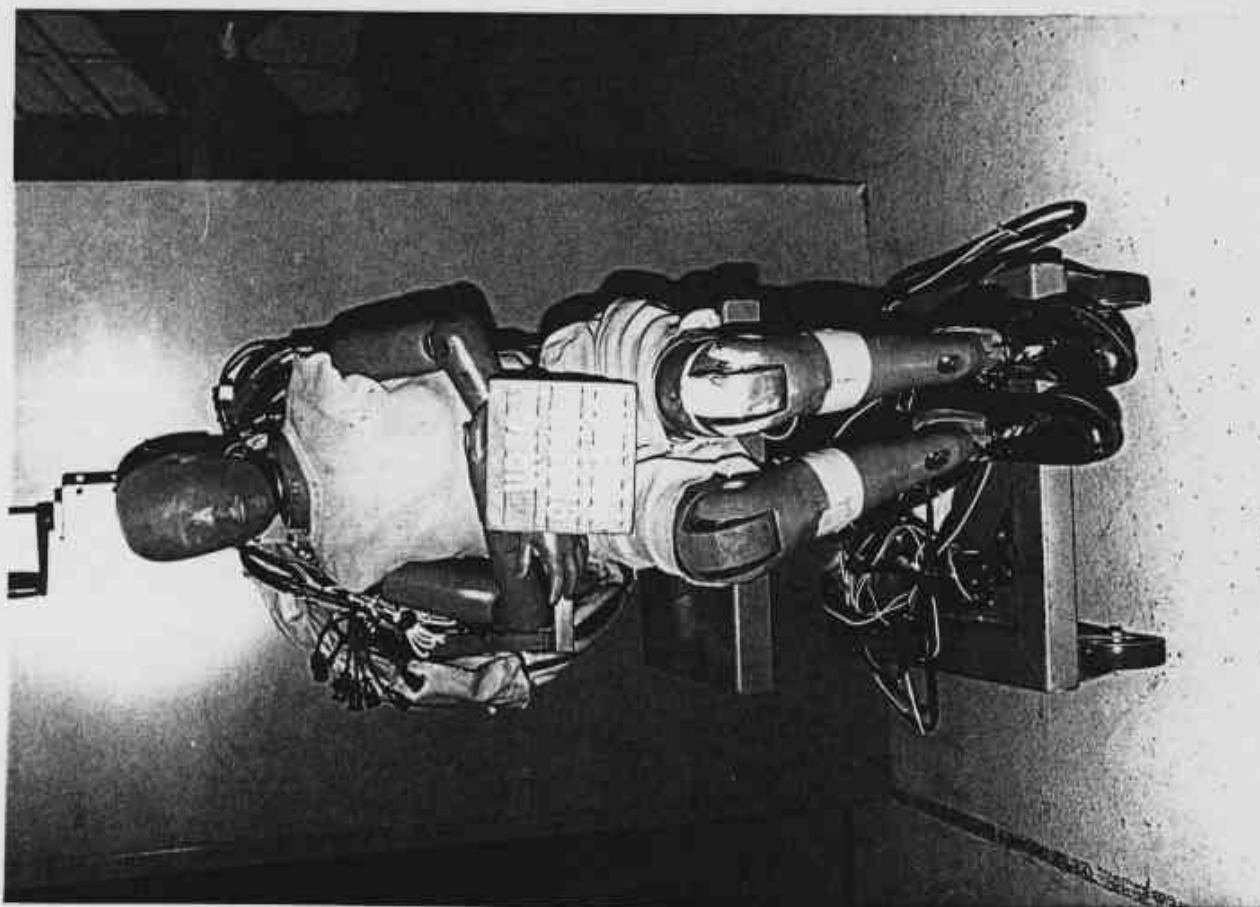


Figure A-68 Post-Test Bullet Vehicle Passenger Dummy View

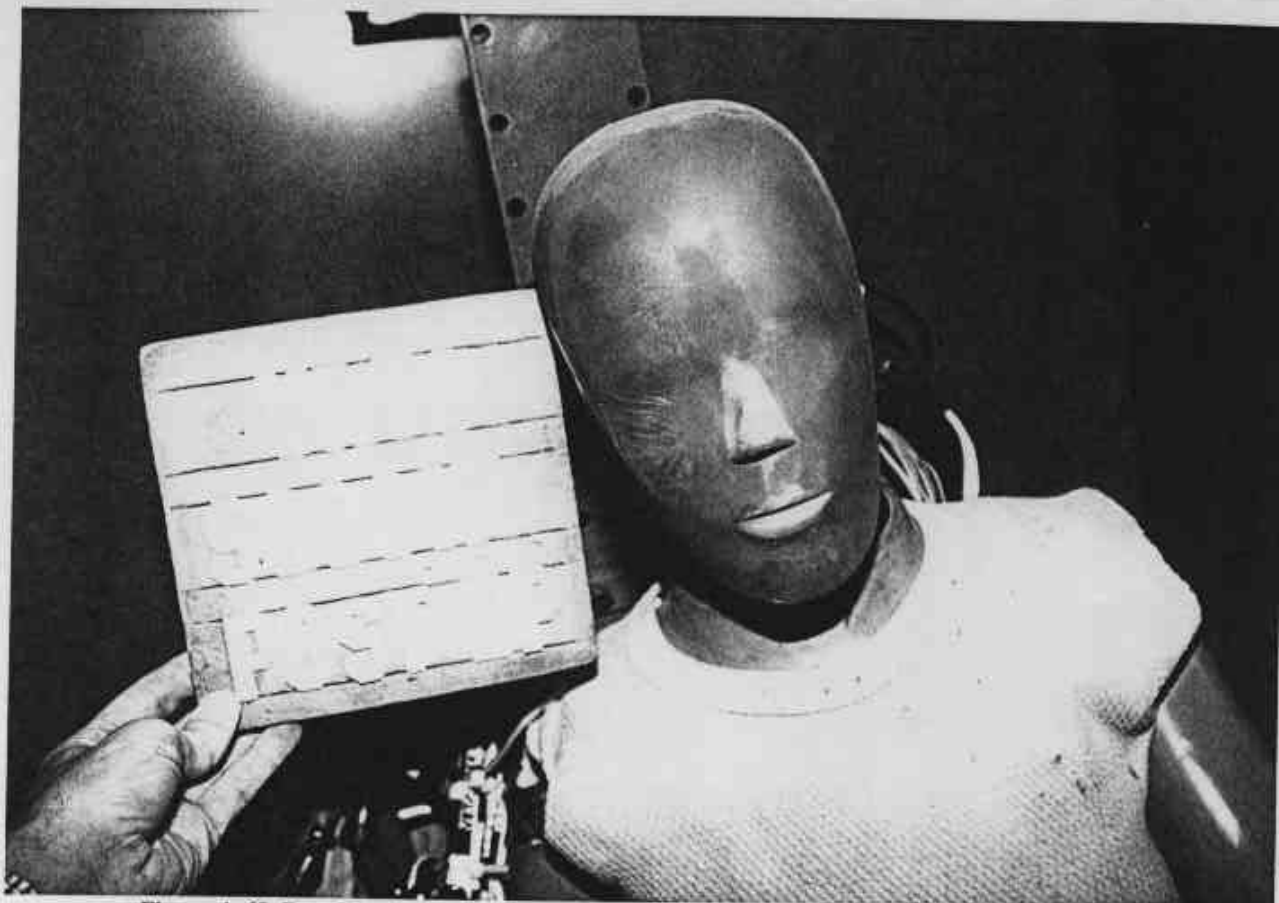


Figure A-69 Post-Test Bullet Vehicle Passenger Dummy Head Contact - View 1



Figure A-70 Post-Test Bullet Vehicle Passenger Dummy Head Contact - View 2

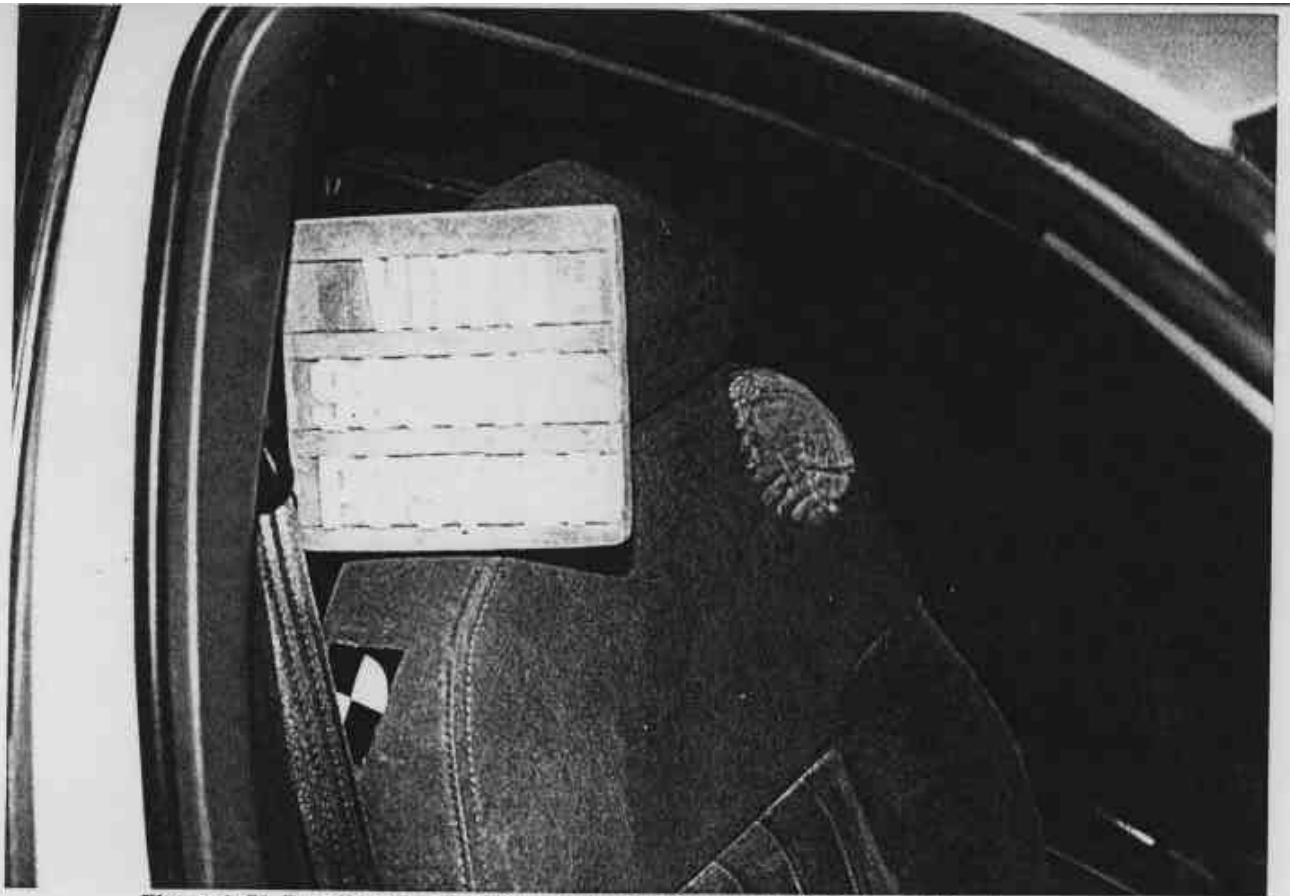


Figure A-71 Post-Test Bullet Vehicle Passenger Dummy Head Contact - View 3



Figure A-72 Post-Test Bullet Vehicle Passenger Dummy Knee Contact - View 1



Figure A-73 Post-Test Bullet Vehicle Passenger Dummy Knee Contact - View 2



Figure A-74 Target Vehicle Certification Label



Figure A-75 Target Vehicle Tire Load Label

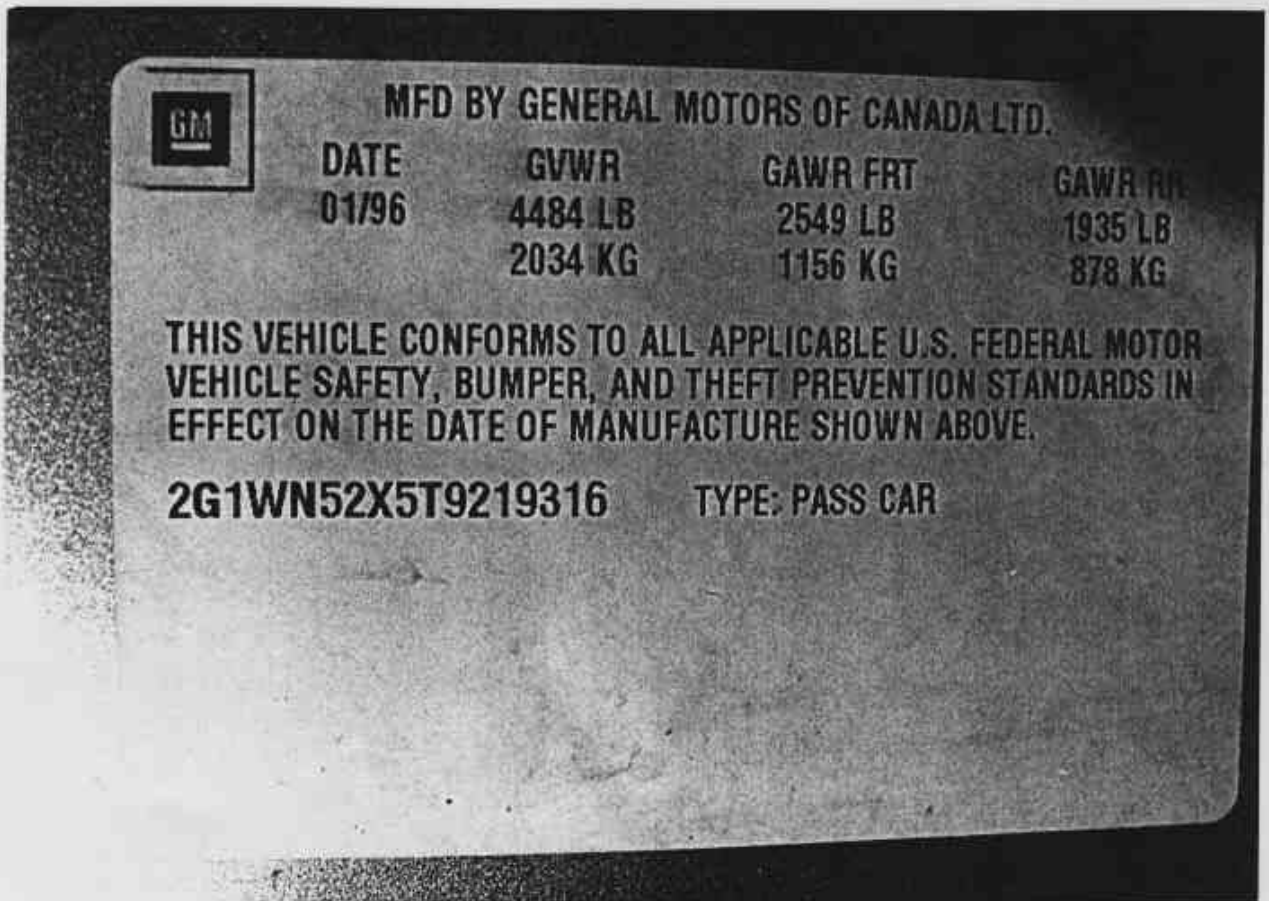


Figure A-76 Bullet Vehicle Certification Label



Figure A-77 Bullet Vehicle Tire Load Label

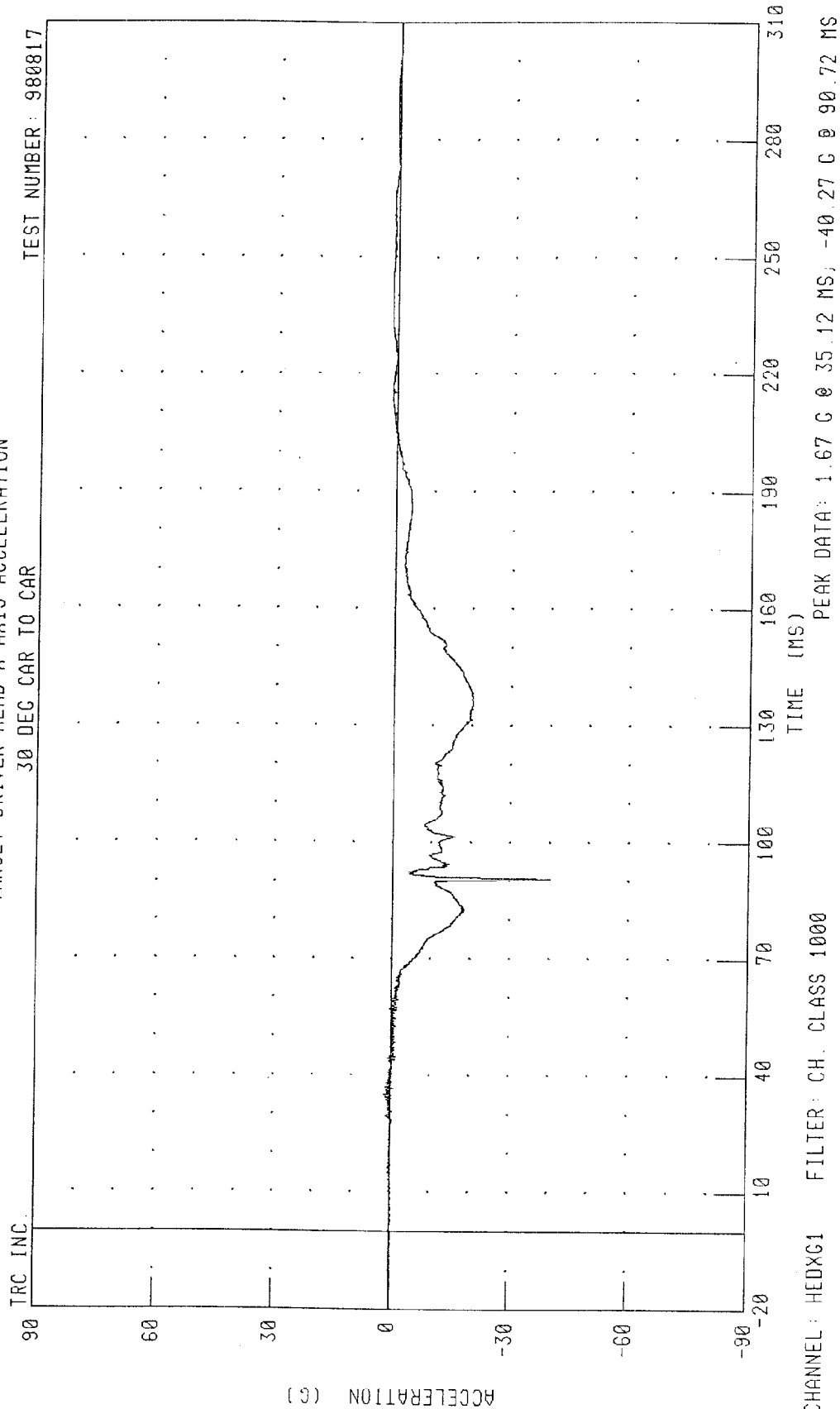


Figure A-78 Impact Event

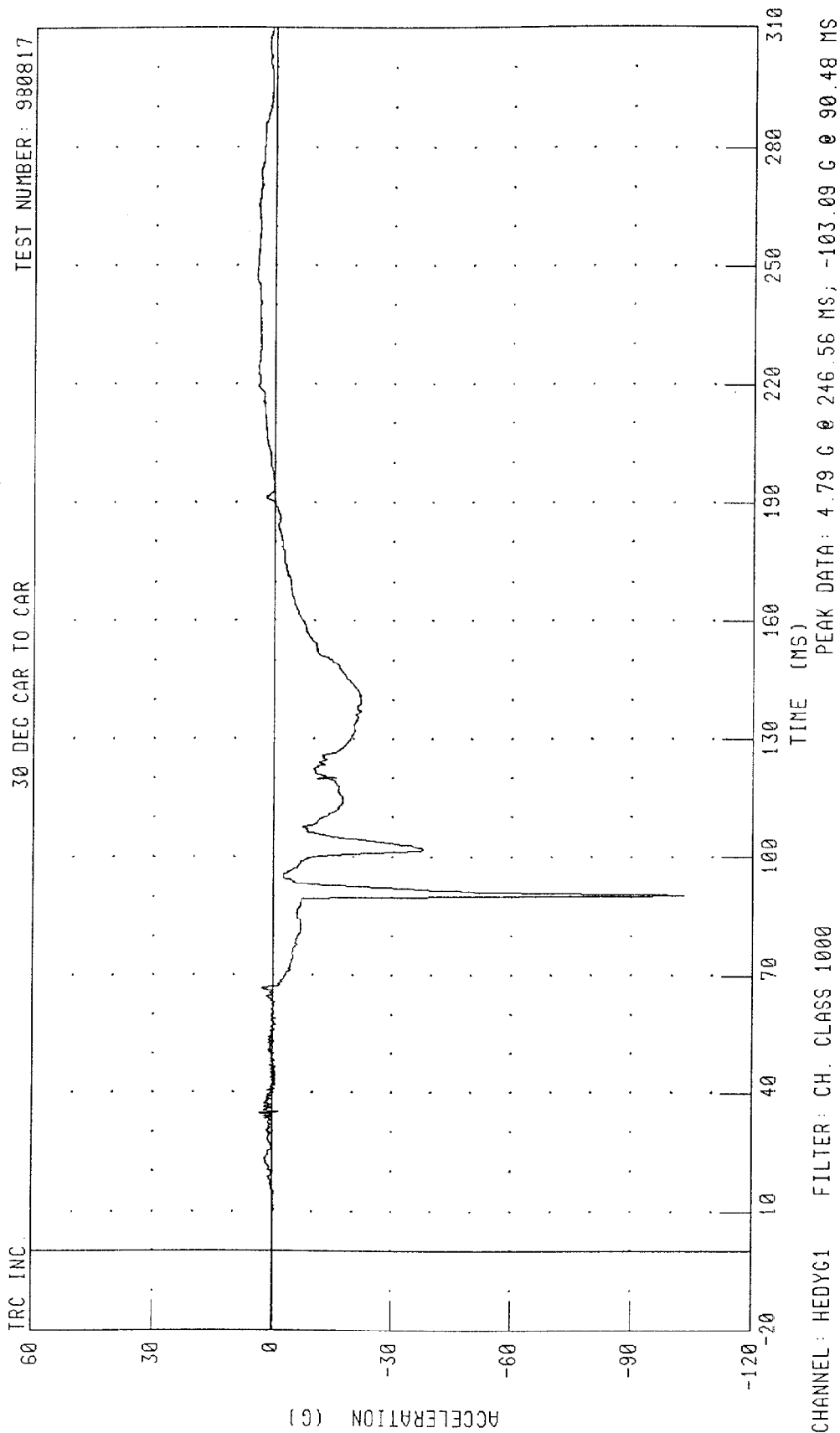
Appendix B

Data Plots

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER HEAD X-AXIS ACCELERATION

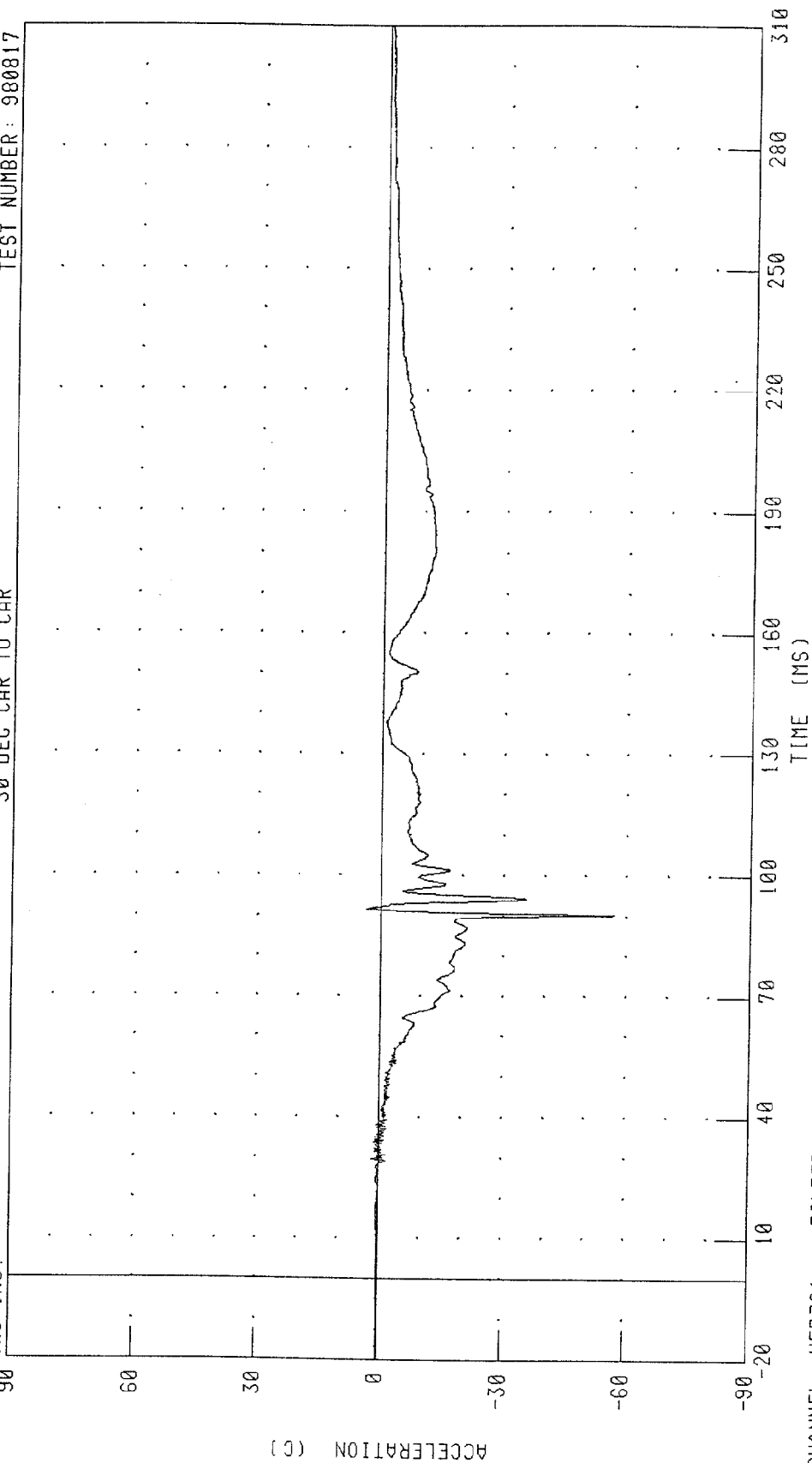


1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER HEAD Y-AXIS ACCELERATION



1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER HEAD Z-AXIS ACCELERATION

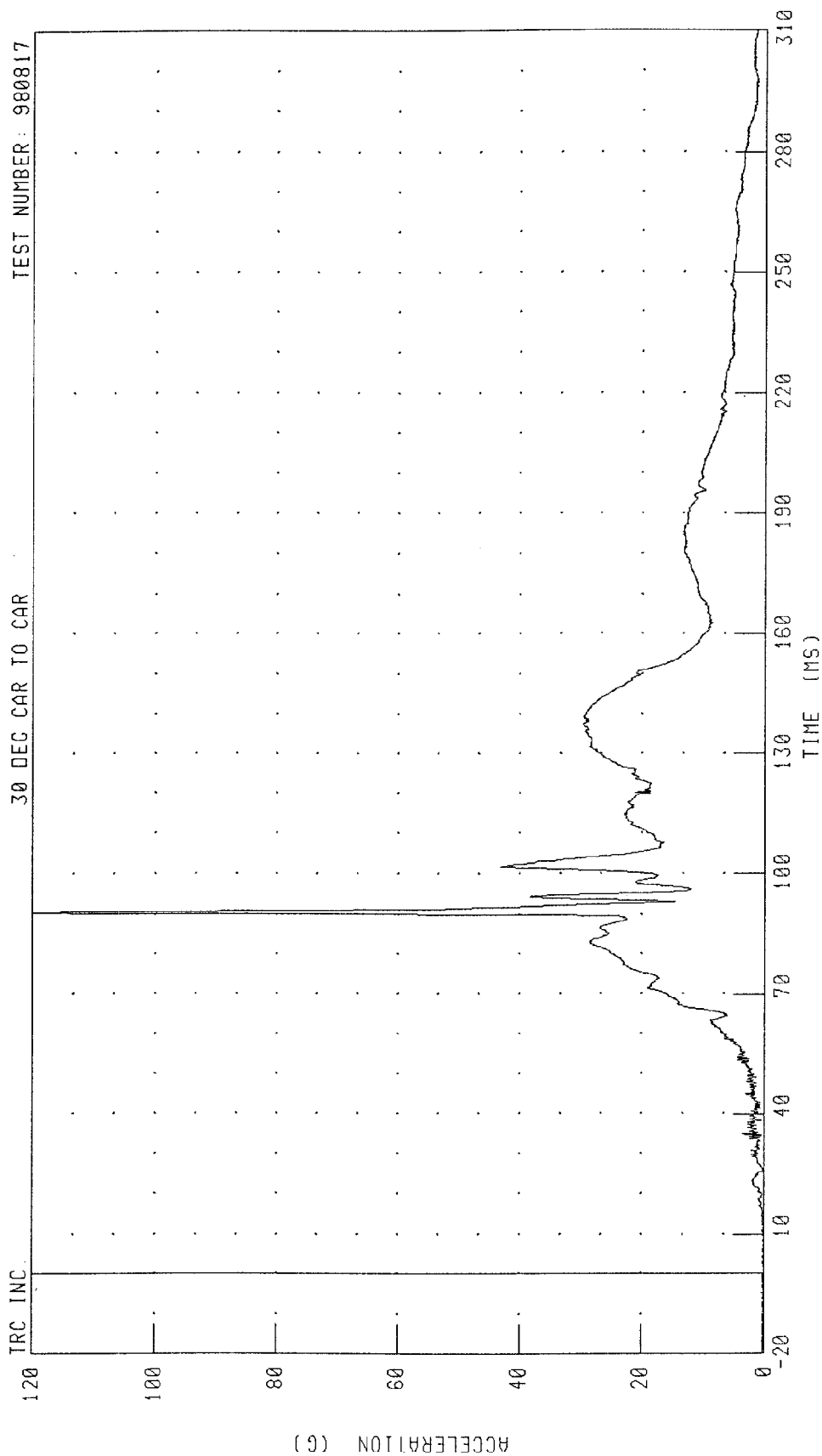
TRC INC. 90 60 30 0 -30 -60 -90
30 DEG CAR TO CAR TEST NUMBER: 980817



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

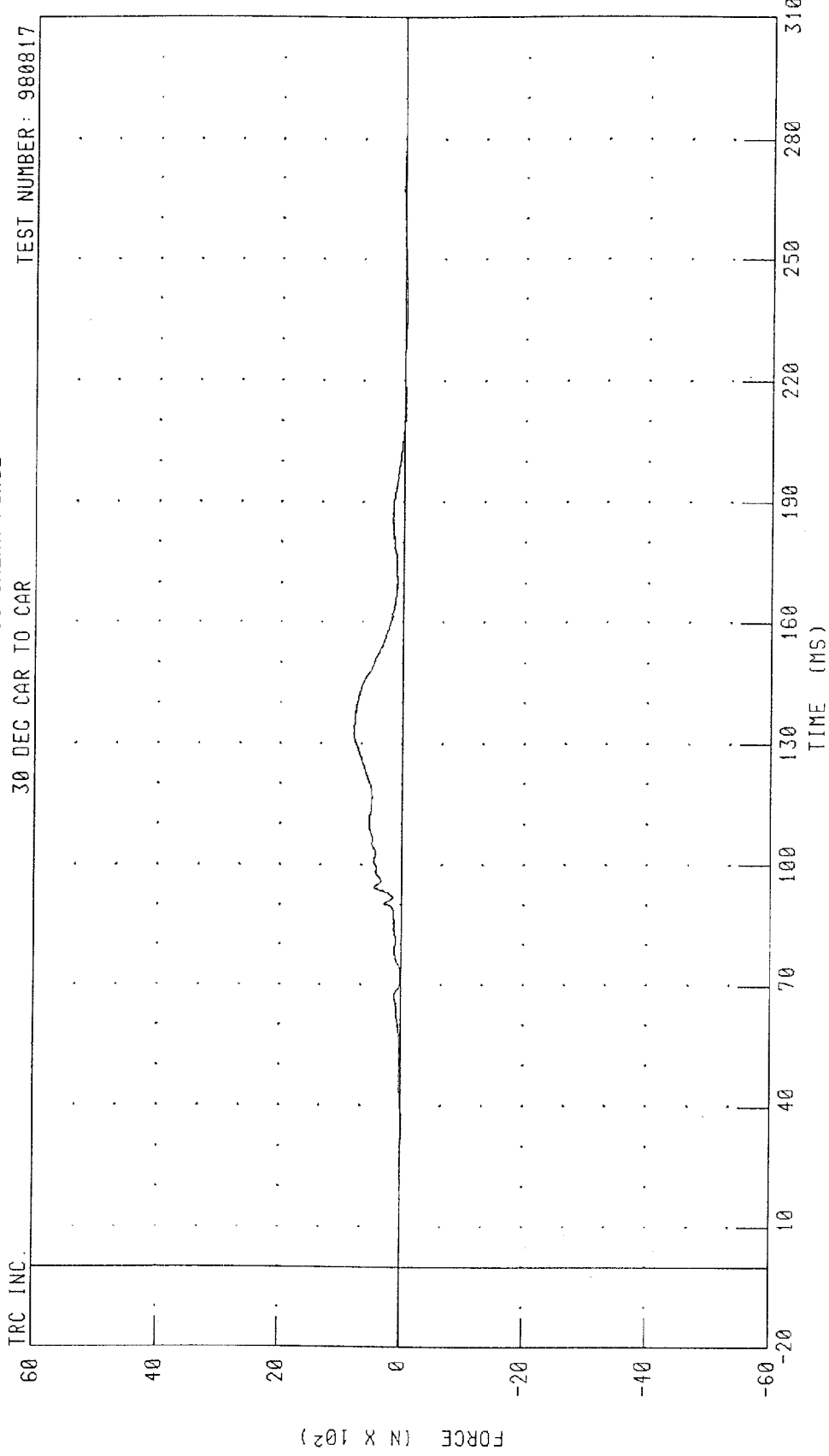
PEAK DATA: 3.41 G @ 91.76 MS, -56.95 G @ 90.40 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER HEAD RESULTANT ACCELERATION

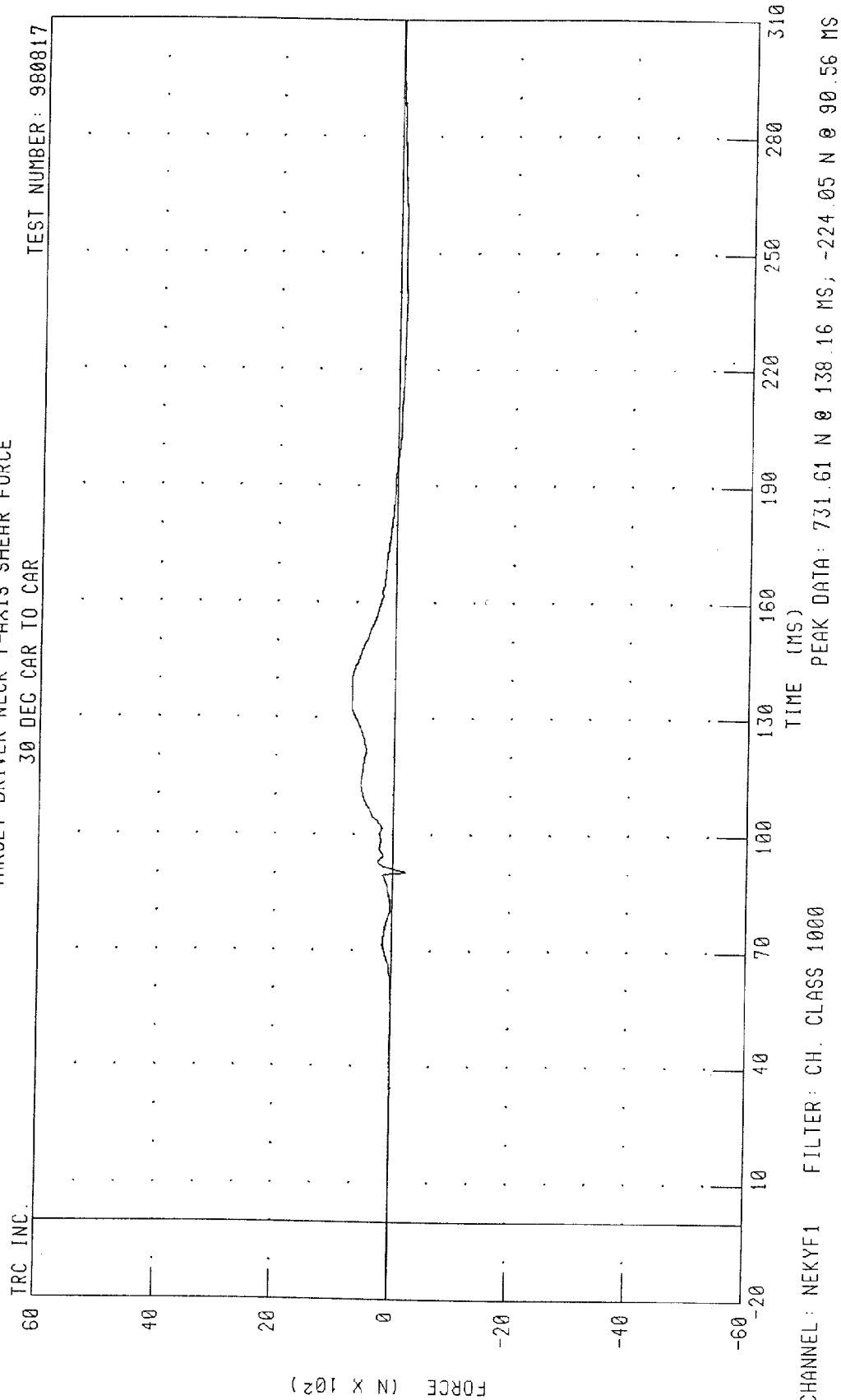


CHANNEL: HEDRC1 FILTER: CH. CLASS 1000 PEAK DATA: 121.20 G @ 90.48 MS, 0.14 G @ -19.76 MS

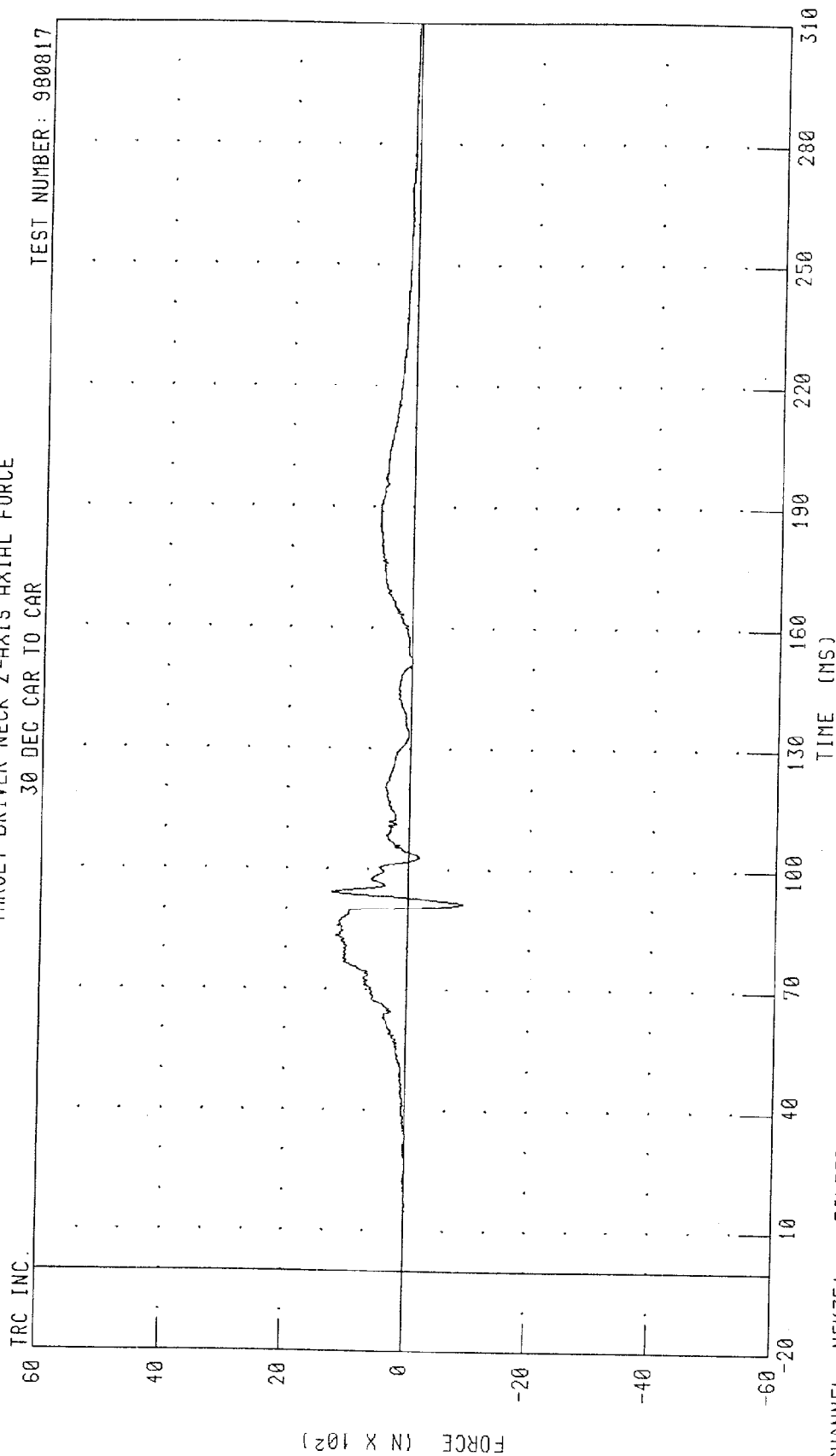
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK X-AXIS SHEAR FORCE



1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK Y-AXIS SHEAR FORCE



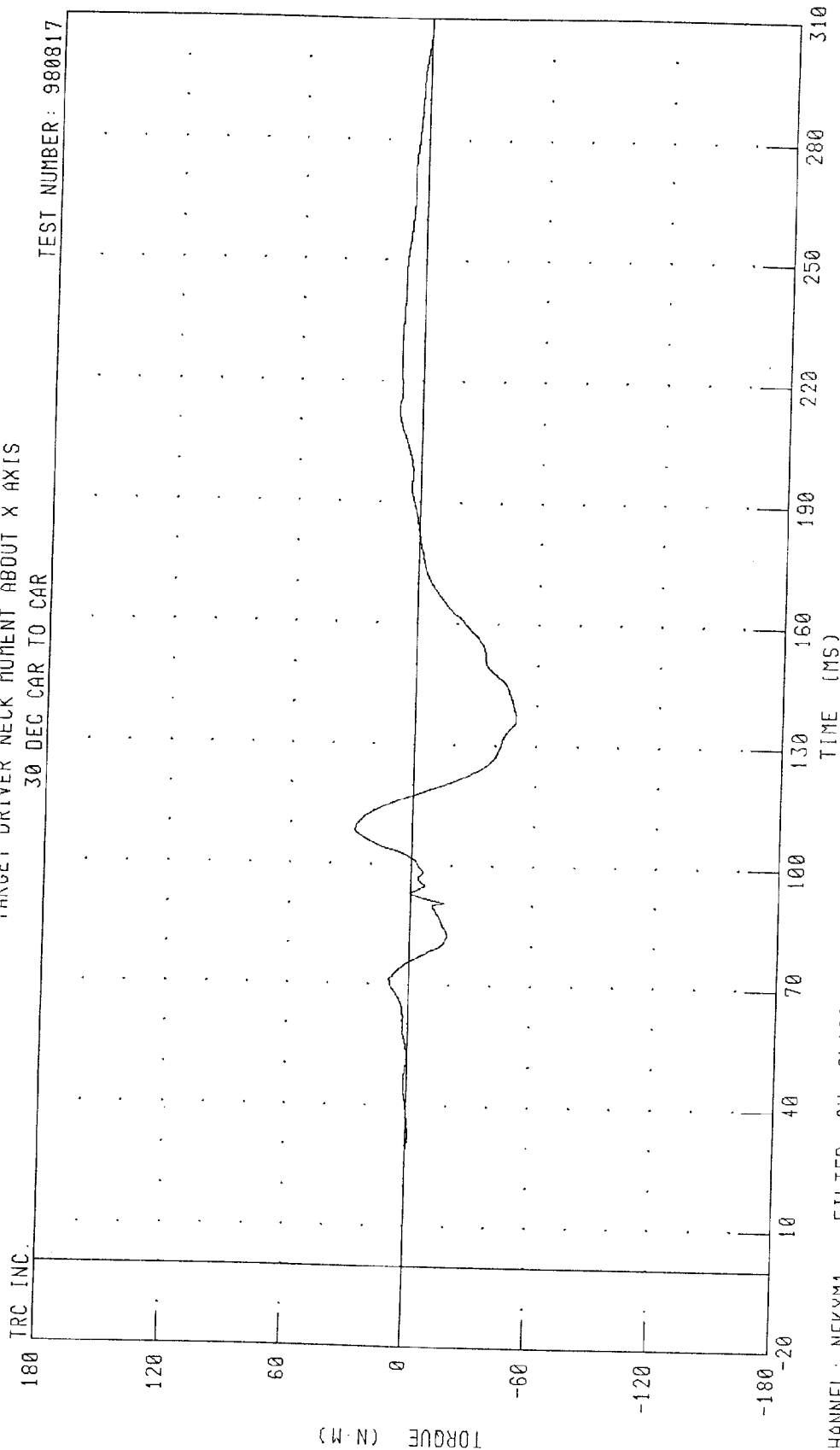
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK Z-AXIS AXIAL FORCE



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

PEAK DATA: 1264.07 N @ 94.40 MS; -912.36 N @ 91.60 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK MOMENT ABOUT X AXIS



CHANNEL: NEKX11 FILTER: CH. CLASS 600

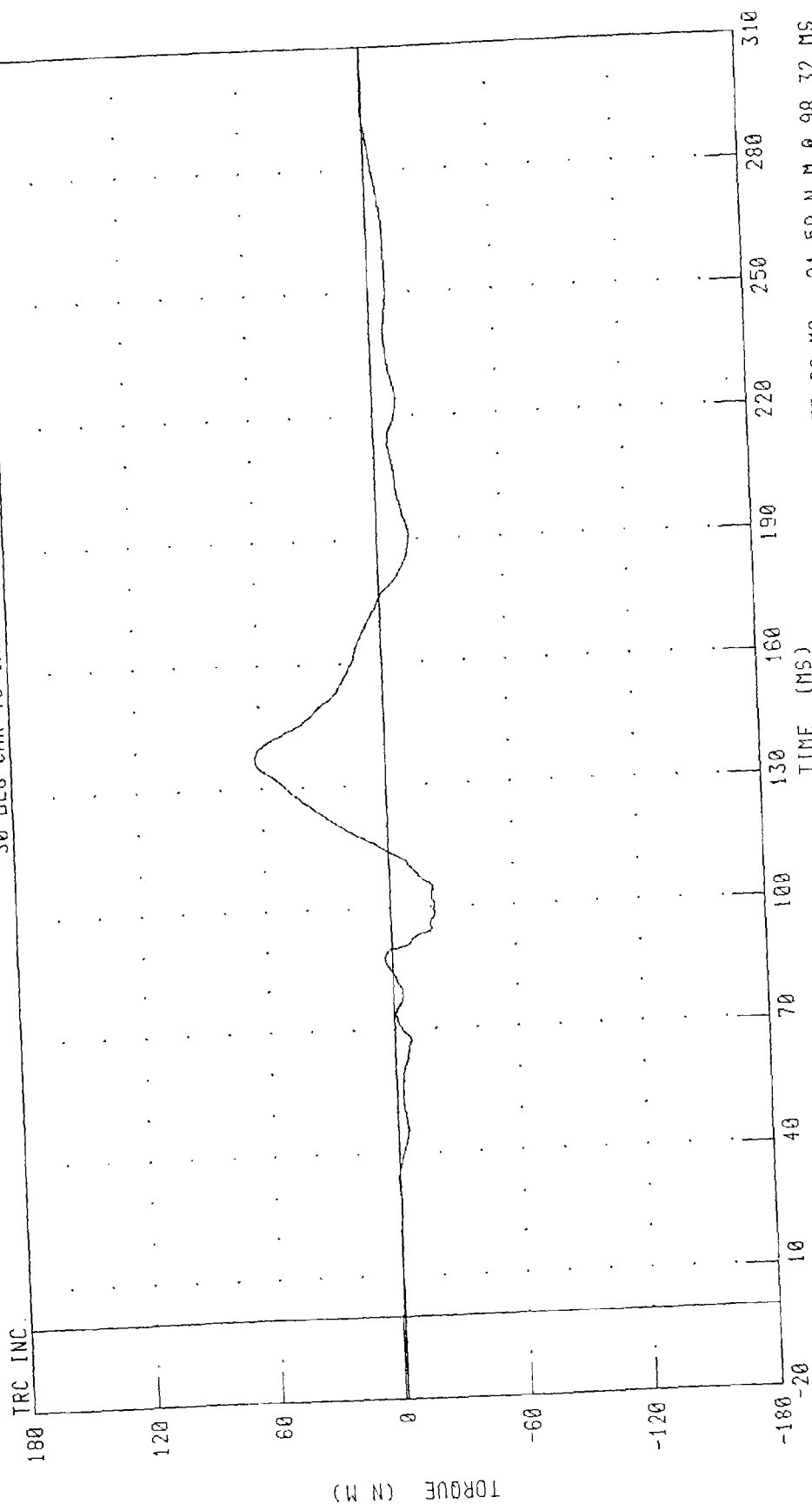
PEAK DATA: 28.09 N·M @ 108.72 MS; -50.23 N·M @ 136.56 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES

TARGET DRIVER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 980817

30 DEG CAR TO CAR



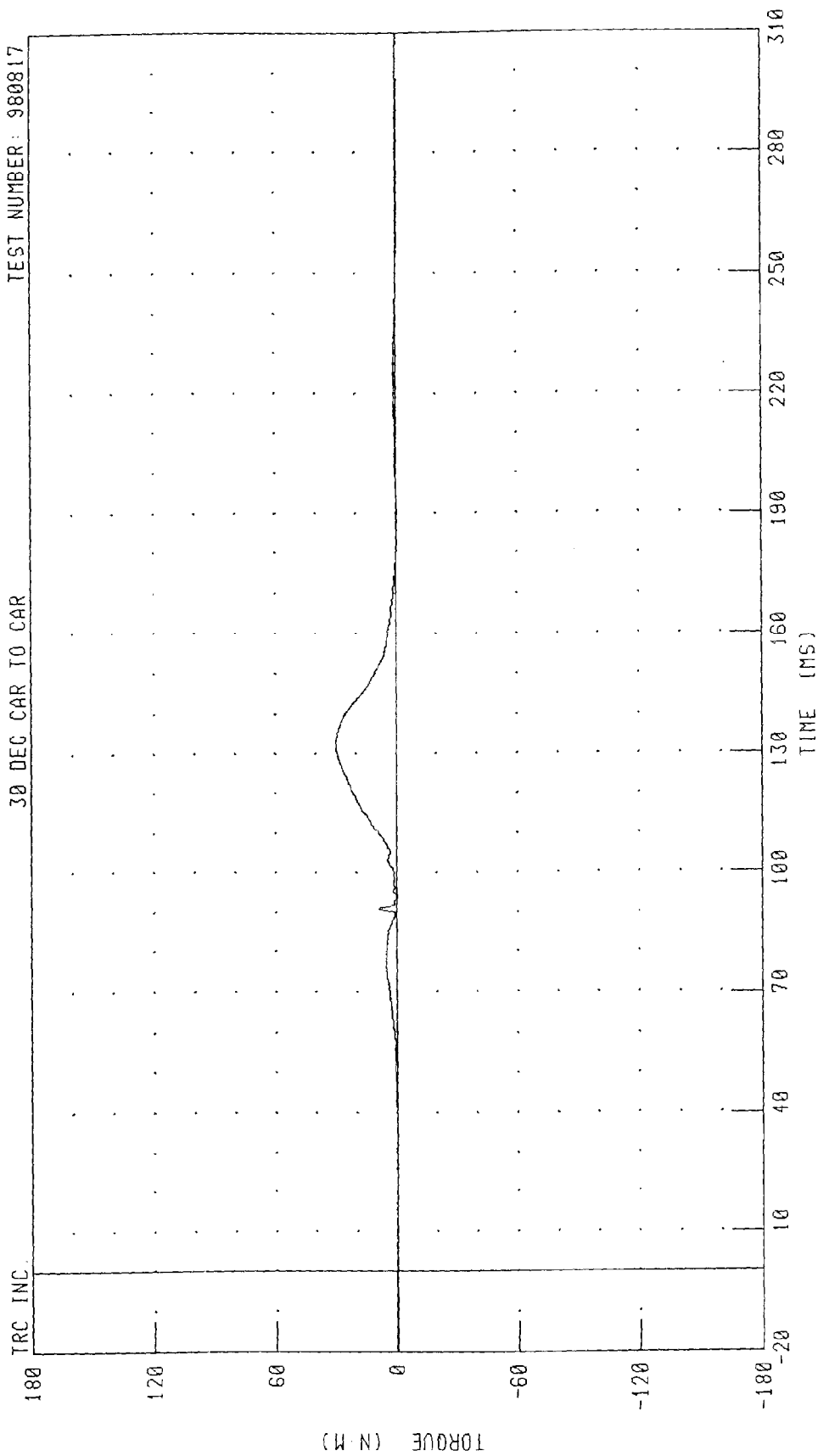
PEAK DATA: 62.00 N.M @ 137.28 MS, -21.59 N.M @ 98.32 MS

CHANNEL: NEKY11 FILTER: CH CLASS 600

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK MOMENT ABOUT Z AXIS

30 DEC CAR TO CAR

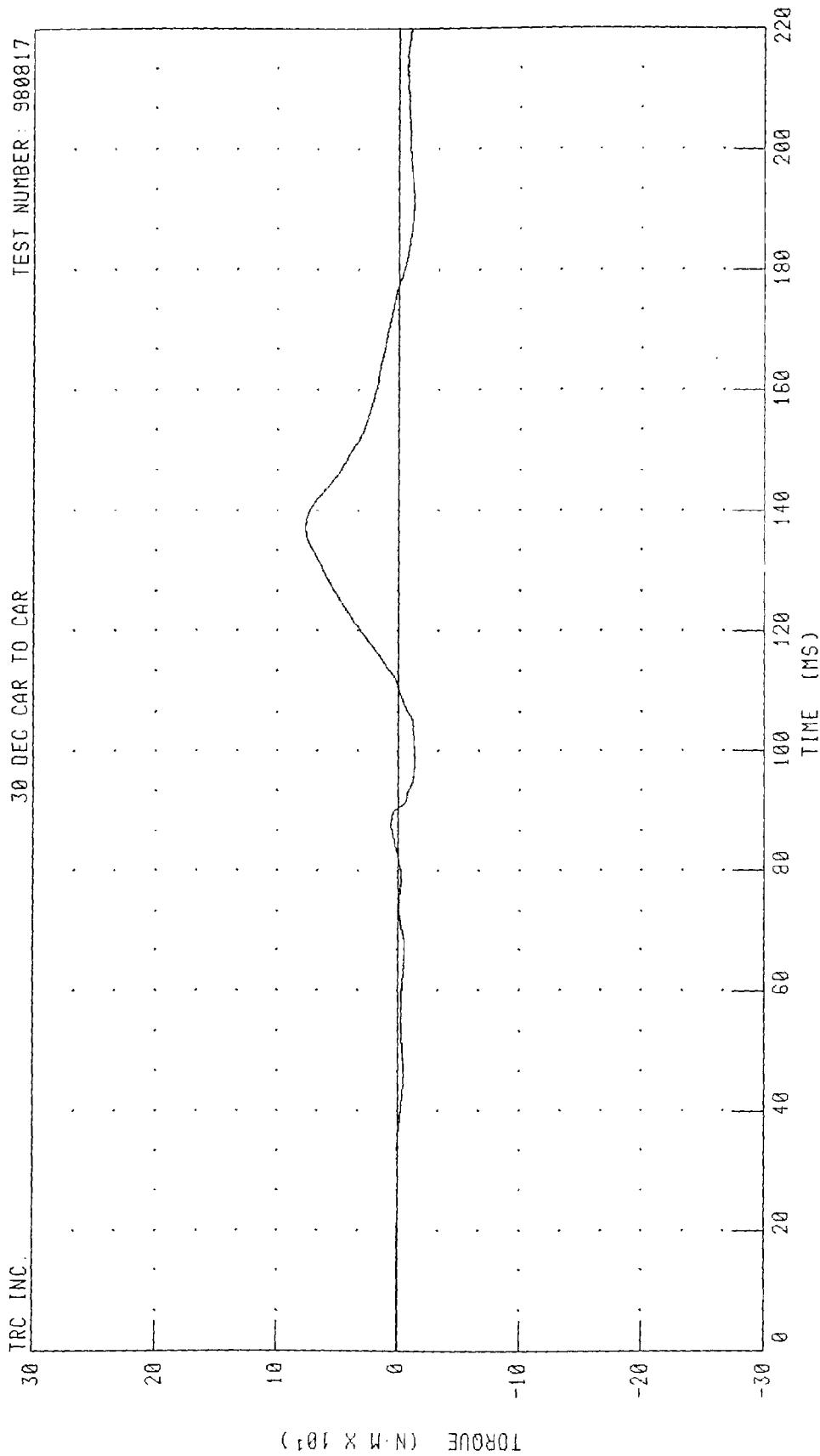
TEST NUMBER: 980817



CHANNEL: NEKZM1 FILTER: CH. CLASS 600

PEAK DATA: 29.78 N-M @ 132.80 MS; -0.99 N-M @ 94.08 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER NECK OCCIPITAL CONDYLE ABOUT Y AXIS



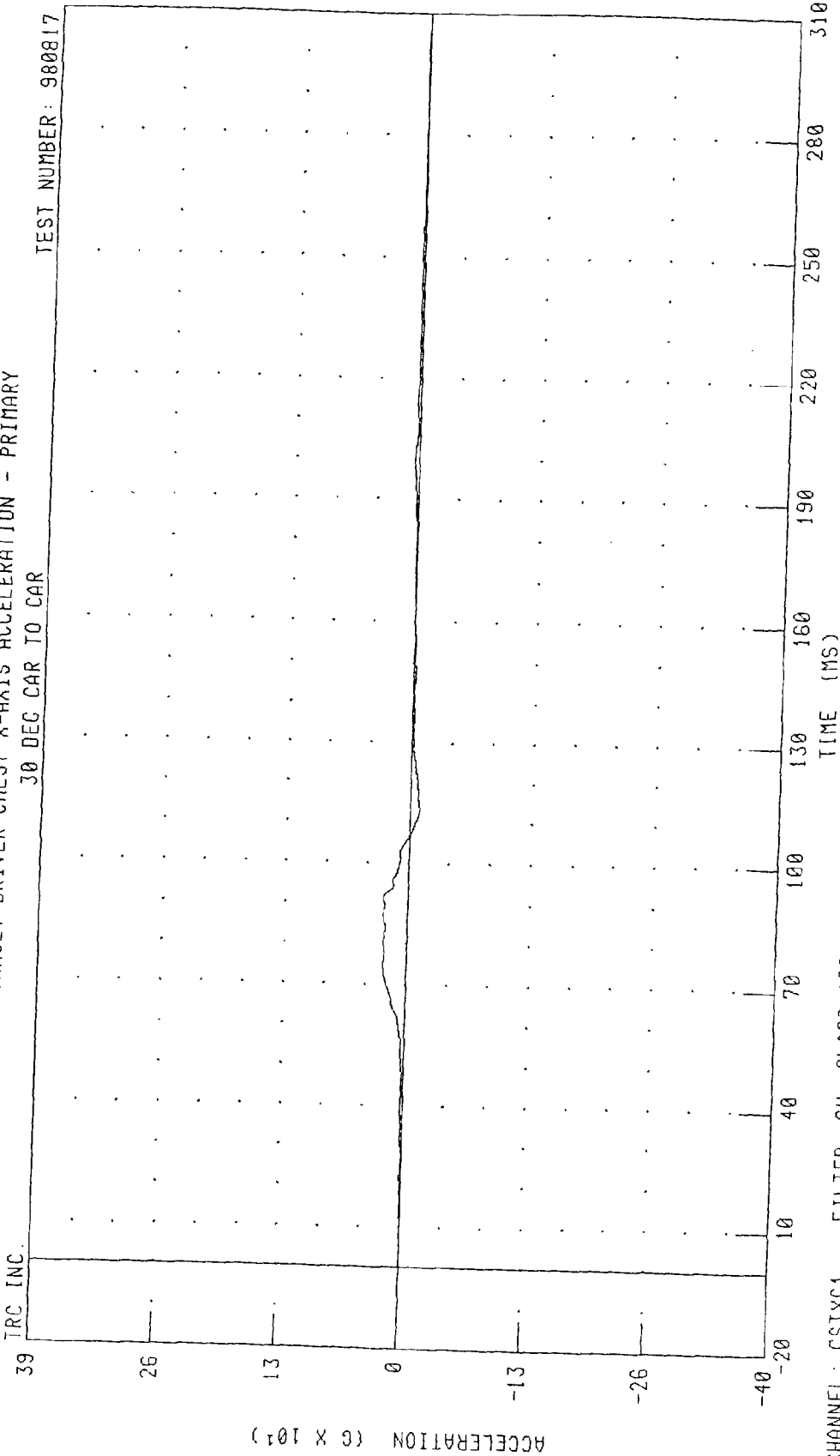
CHANNEL: NEKOM1 FILTER: CH. CLASS 600

PEAK DATA: 76.46 N·M @ 136.88 MS, -14.13 N·M @ 98.00 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER CHEST X-AXIS ACCELERATION - PRIMARY
30 DEG CAR TO CAR

TEST NUMBER: 980817

TRC INC.



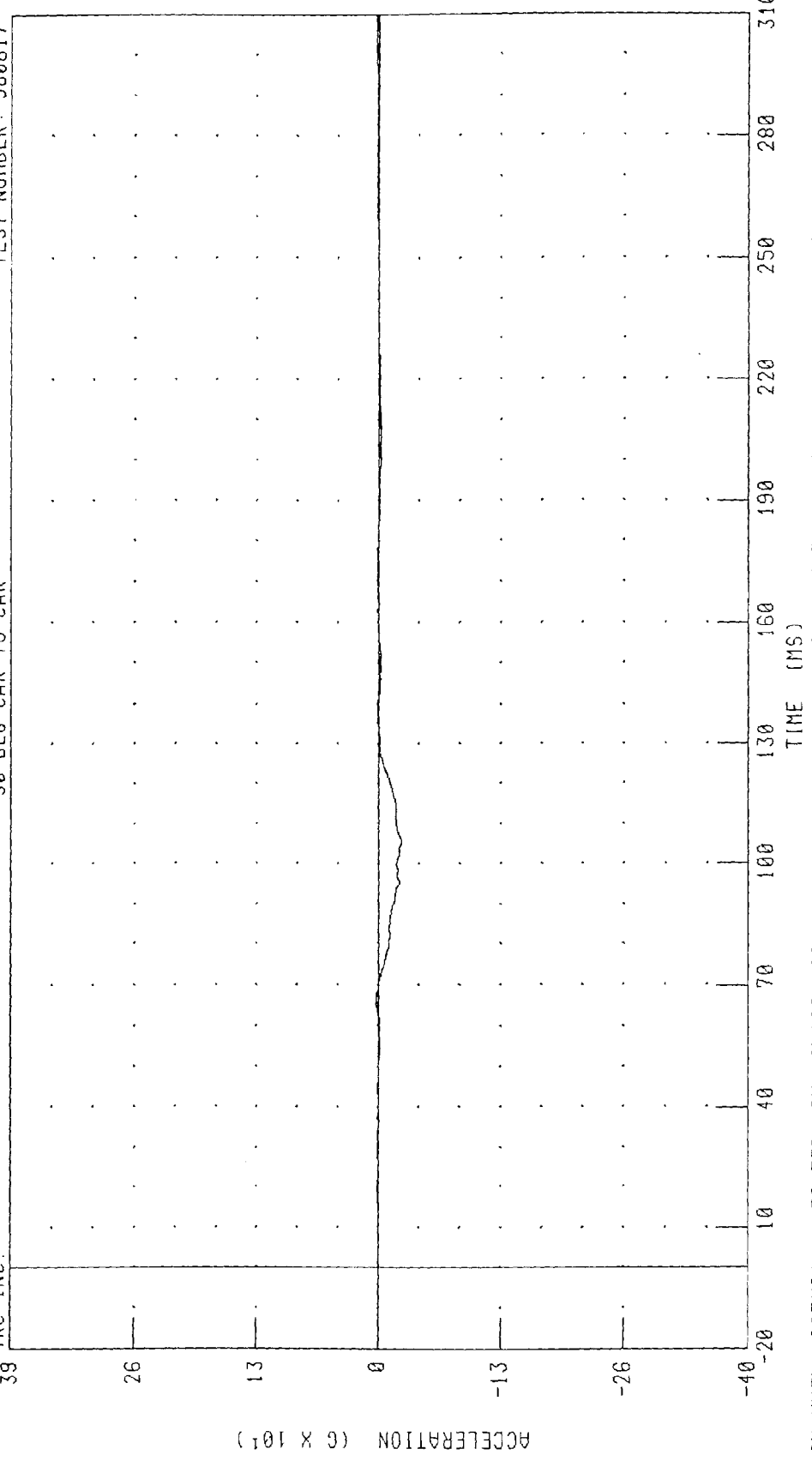
CHANNEL: CSTXG1 FILTER: CH. CLASS 180

PEAK DATA: 26.98 G @ 91.44 MS, -10.28 G @ 113.52 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER CHEST Y-AXIS ACCELERATION - PRIMARY
30 DEG CAR TO CAR

TEST NUMBER: 980817

TRC INC.



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

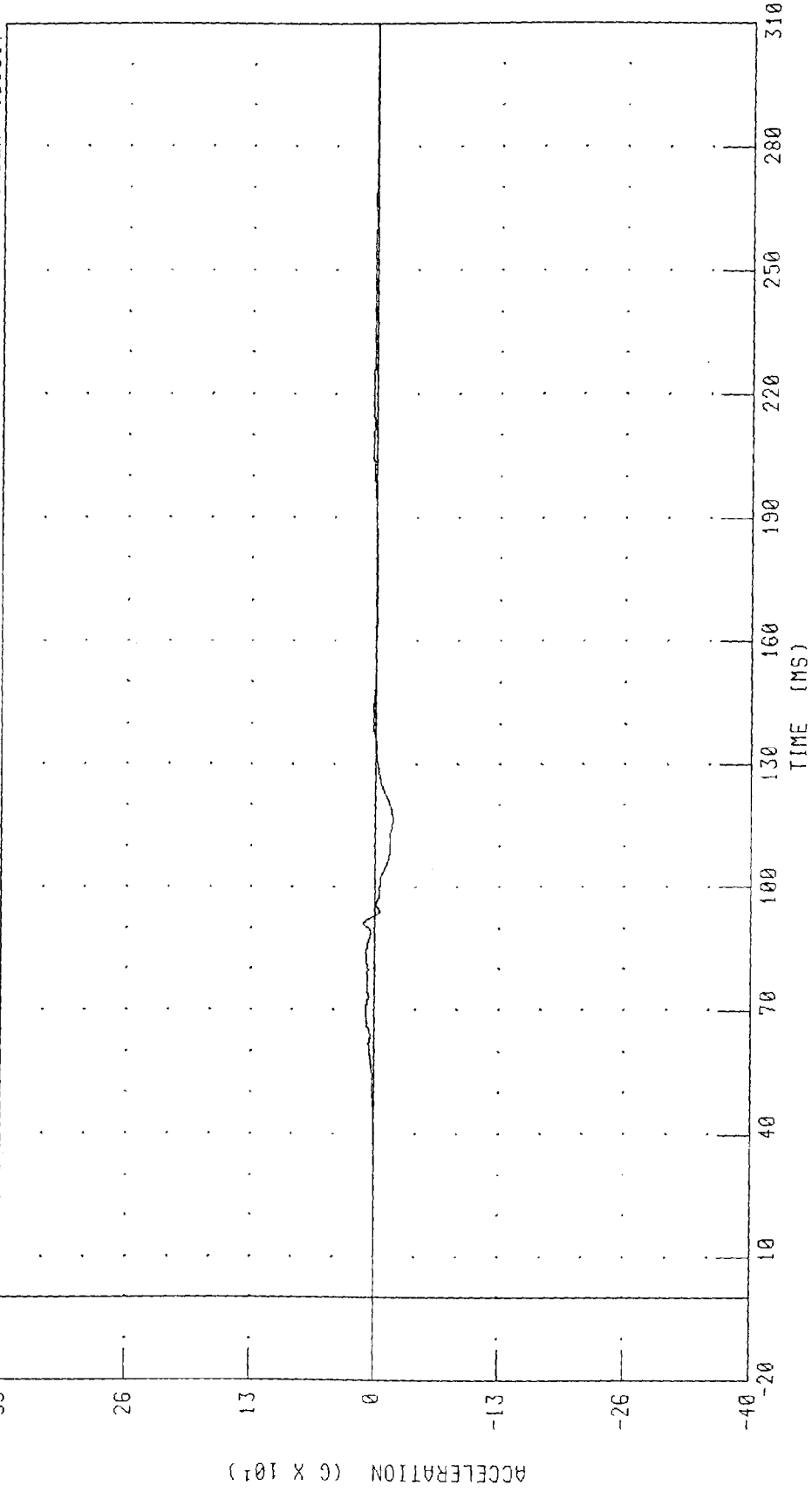
PEAK DATA: 2.14 G @ 66.40 MS; -25.58 G @ 105.36 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER CHEST Z-AXIS ACCELERATION - PRIMARY

TEST NUMBER: 980817

30 DEC CAR TO CAR

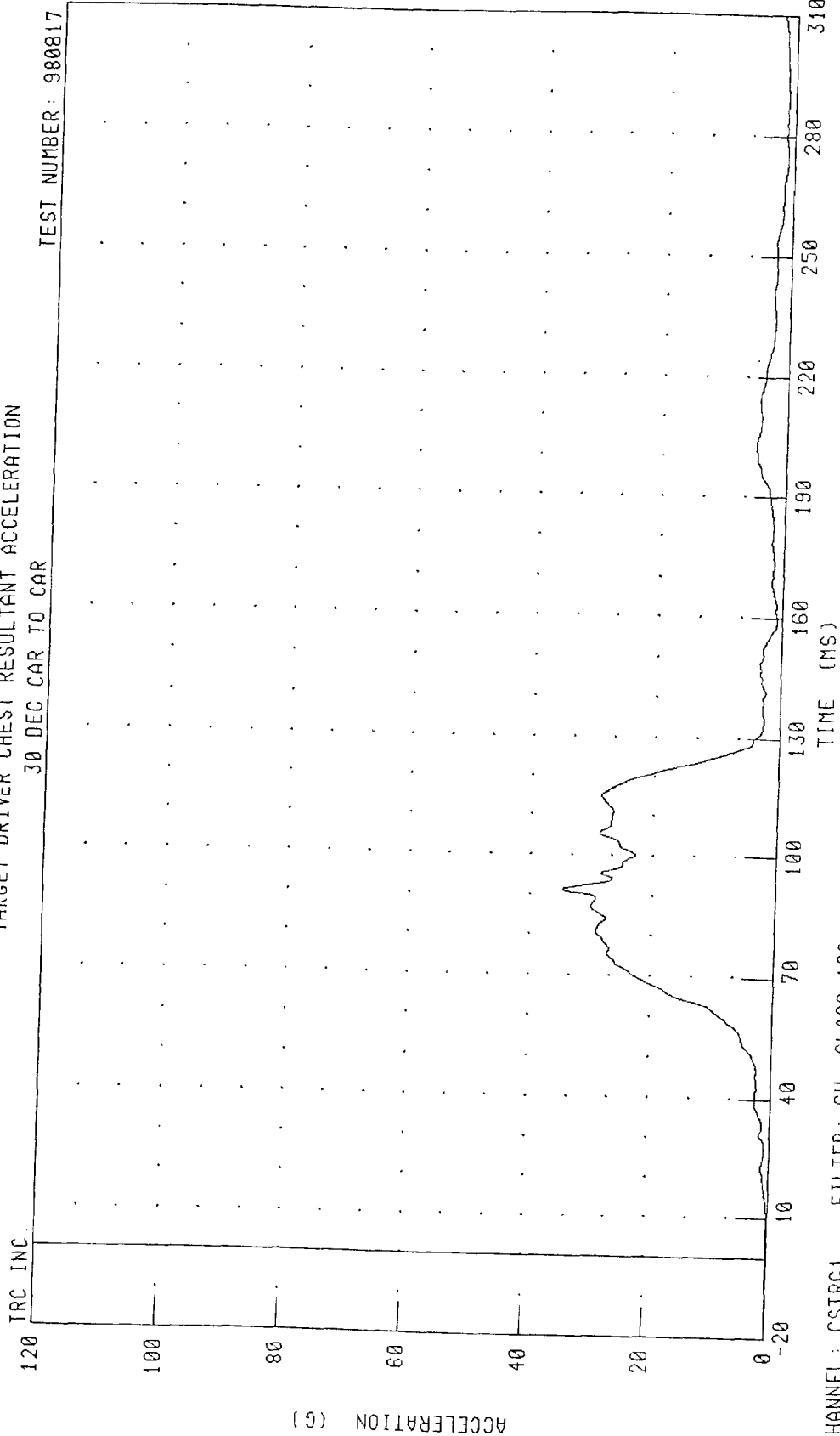
TRC INC.



CHANNEL: CSTZG1 FILTER: CH CLASS 180

PEAK DATA: 11.72 G @ 91.36 MS; -19.46 G @ 116.88 MS

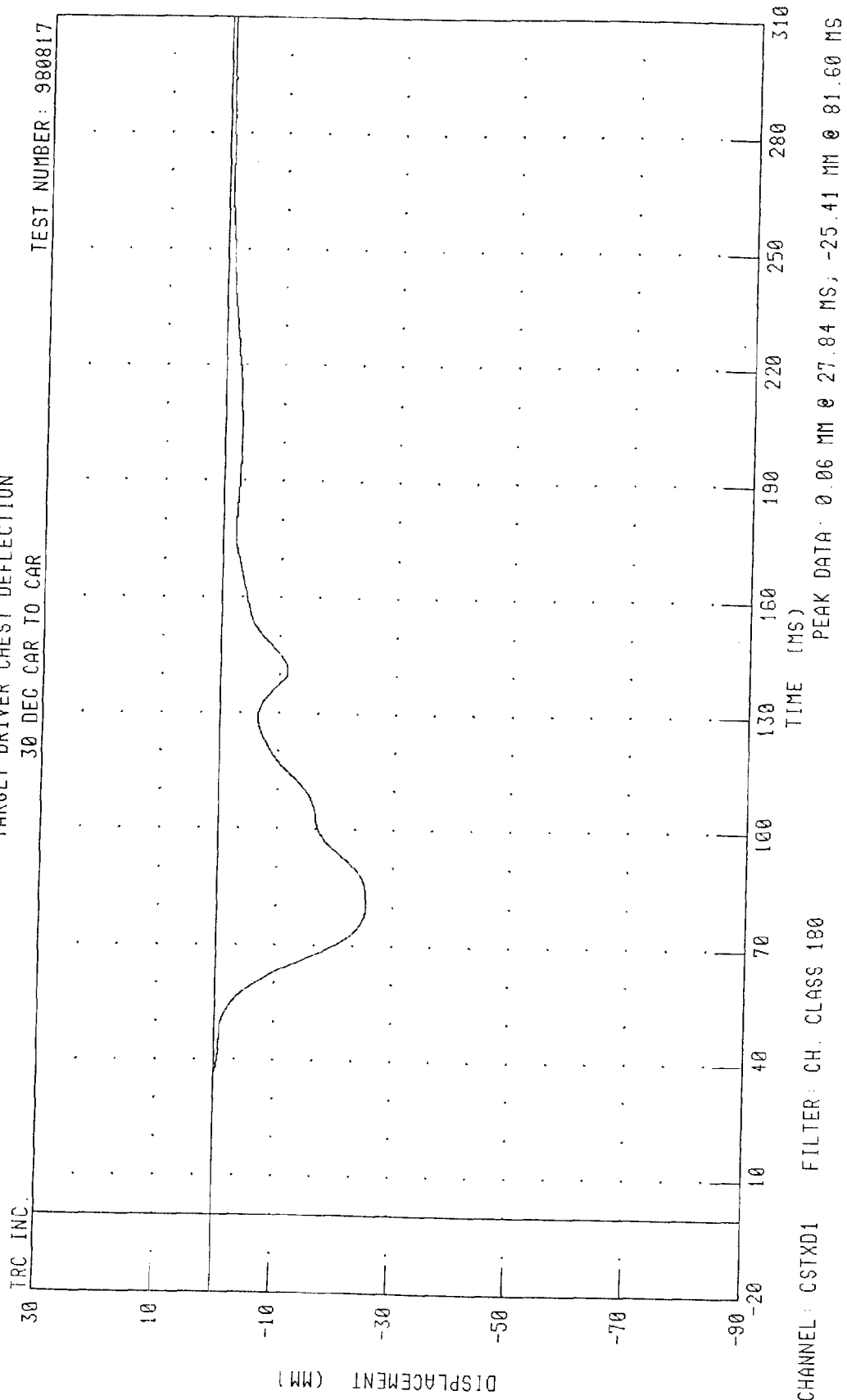
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER CHEST RESULTANT ACCELERATION



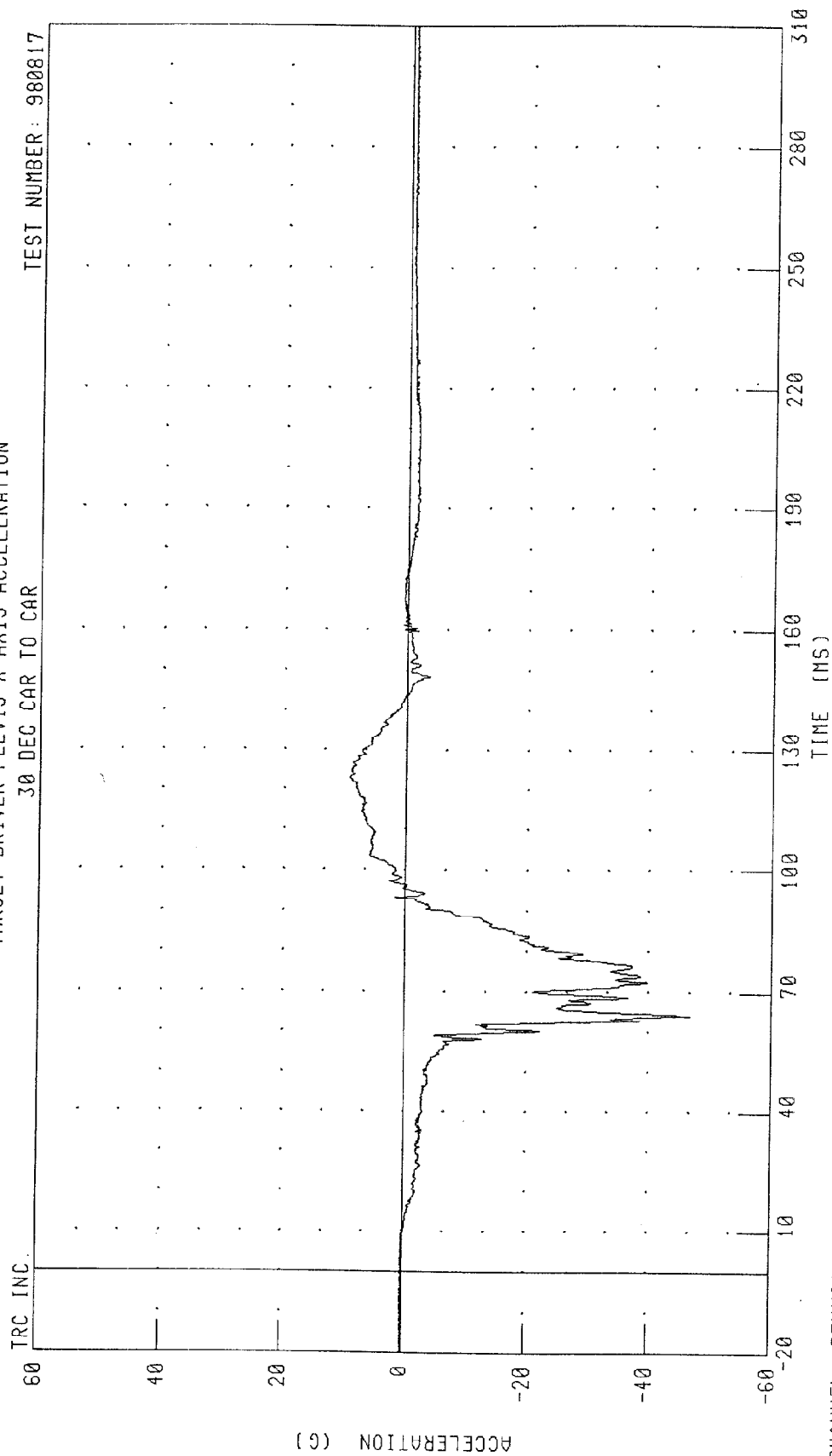
CHANNEL: CSTRG1 FILTER: CH. CLASS 180

PEAK DATA: 34.77 G @ 91.36 MS; 0.01 G @ -20.00 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER CHEST DEFLECTION



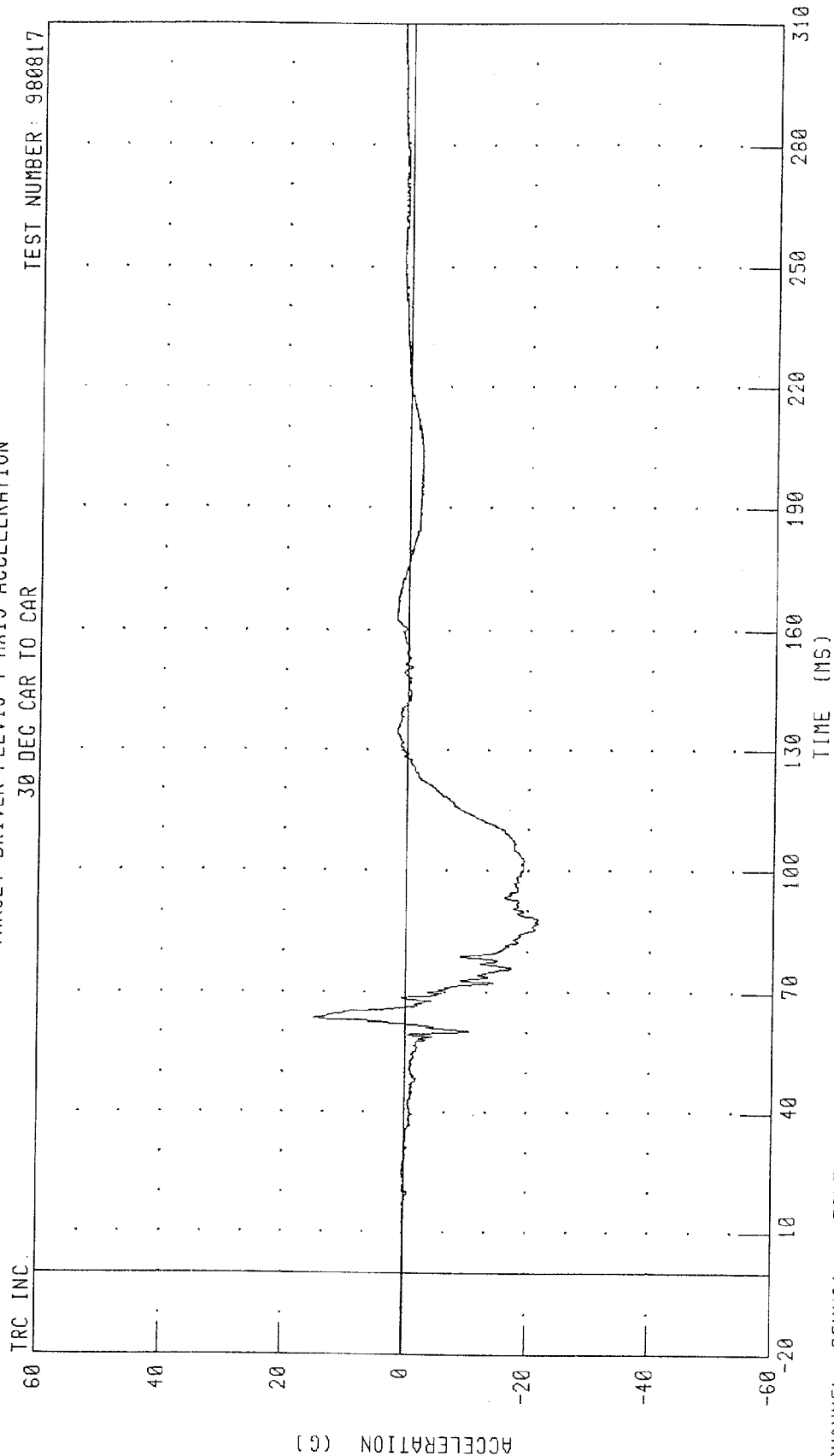
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER PELVIS X-AXIS ACCELERATION



CHANNEL: PEYXG1 FILTER: CH. CLASS 1000

PEAK DATA: 9.26 G @ 122.88 MS, -46.82 G @ 64.08 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER PELVIS Y-AXIS ACCELERATION

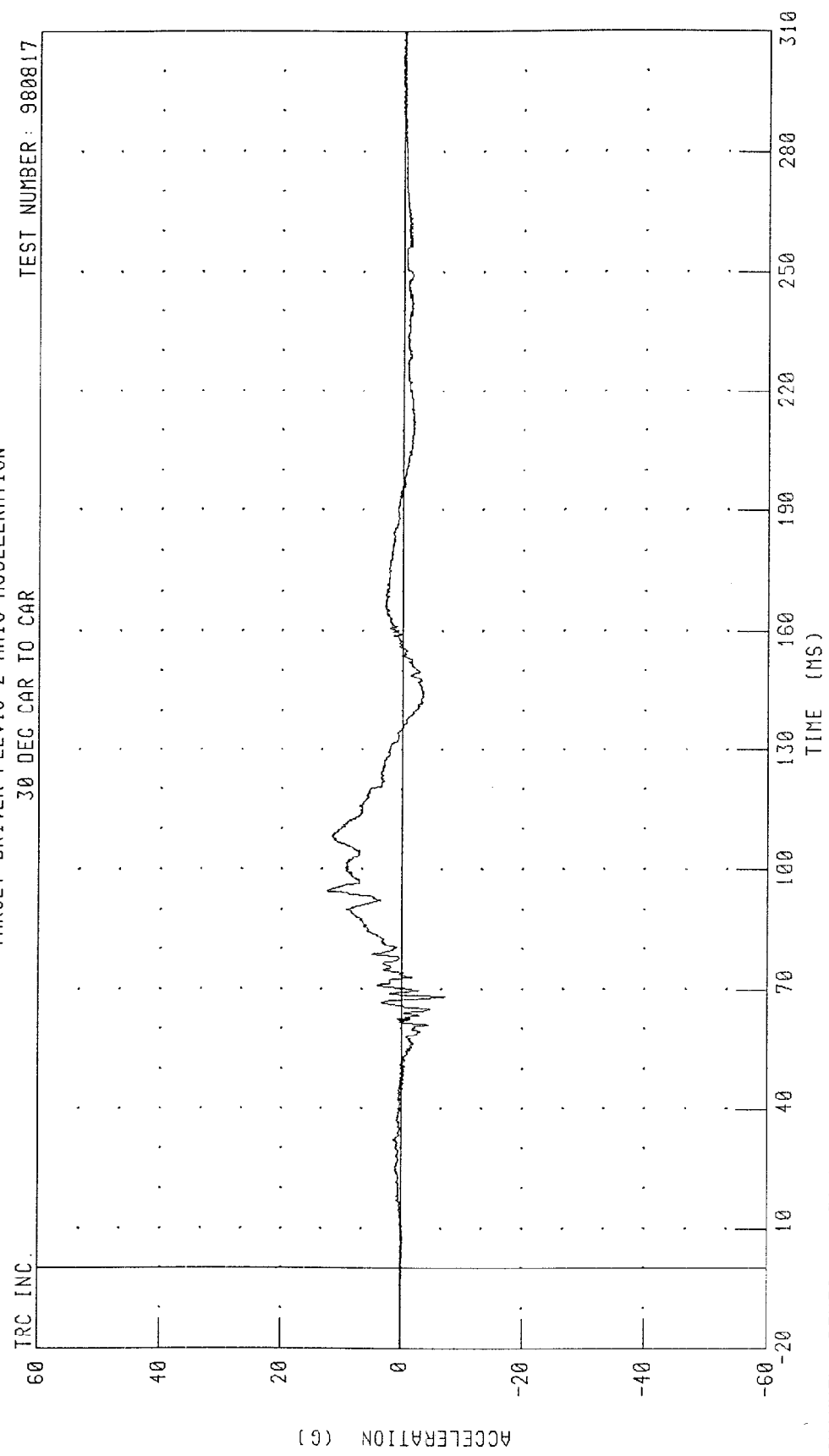


CHANNEL: PEVYG1 FILTER: CH. CLASS 1000

PEAK DATA: 14.94 G @ 63.60 MS; -21.72 G @ 86.96 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER PELVIS Z-AXIS ACCELERATION
30 DEG CAR TO CAR

TEST NUMBER: 980817



CHANNEL: PEVZG1 FILTER: CH. CLASS 1000 PEAK DATA: 12.38 G @ 94.72 MS; -7.44 G @ 68.32 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER PELVIS RESULTANT

TEST NUMBER: 980817

30 DEC CAR TO CAR

TRC INC.

120

100

80

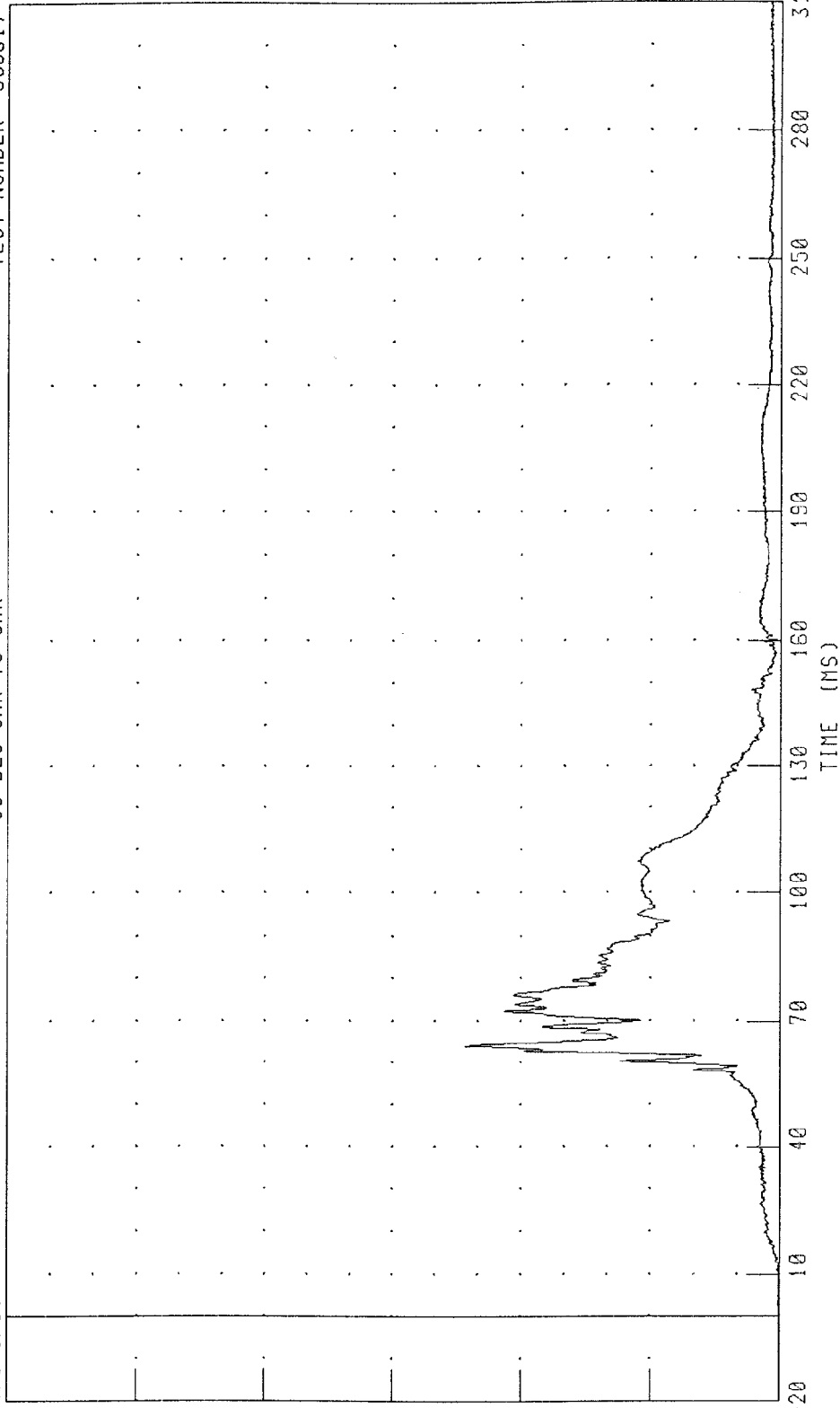
60

40

20

0

ACCELERATION (G)



CHANNEL: PEVRG1 FILTER: CH. CLASS 1000

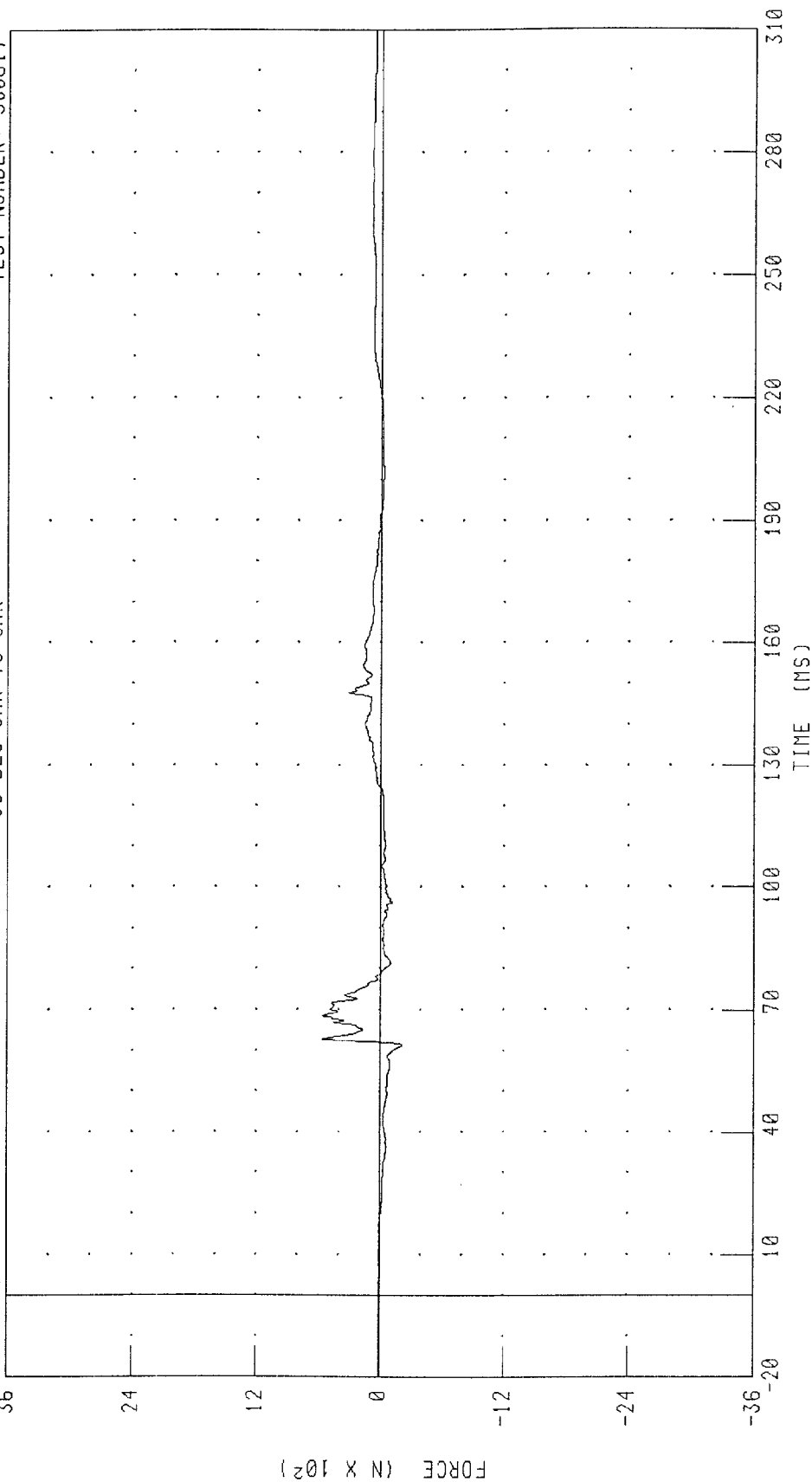
PEAK DATA: 48.53 G @ 64.08 MS; 0.08 G @ -20.00 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT UPPER TIBIA X-AXIS FORCE

TEST NUMBER: 980817

30 DEC CAR TO CAR

TRC INC.



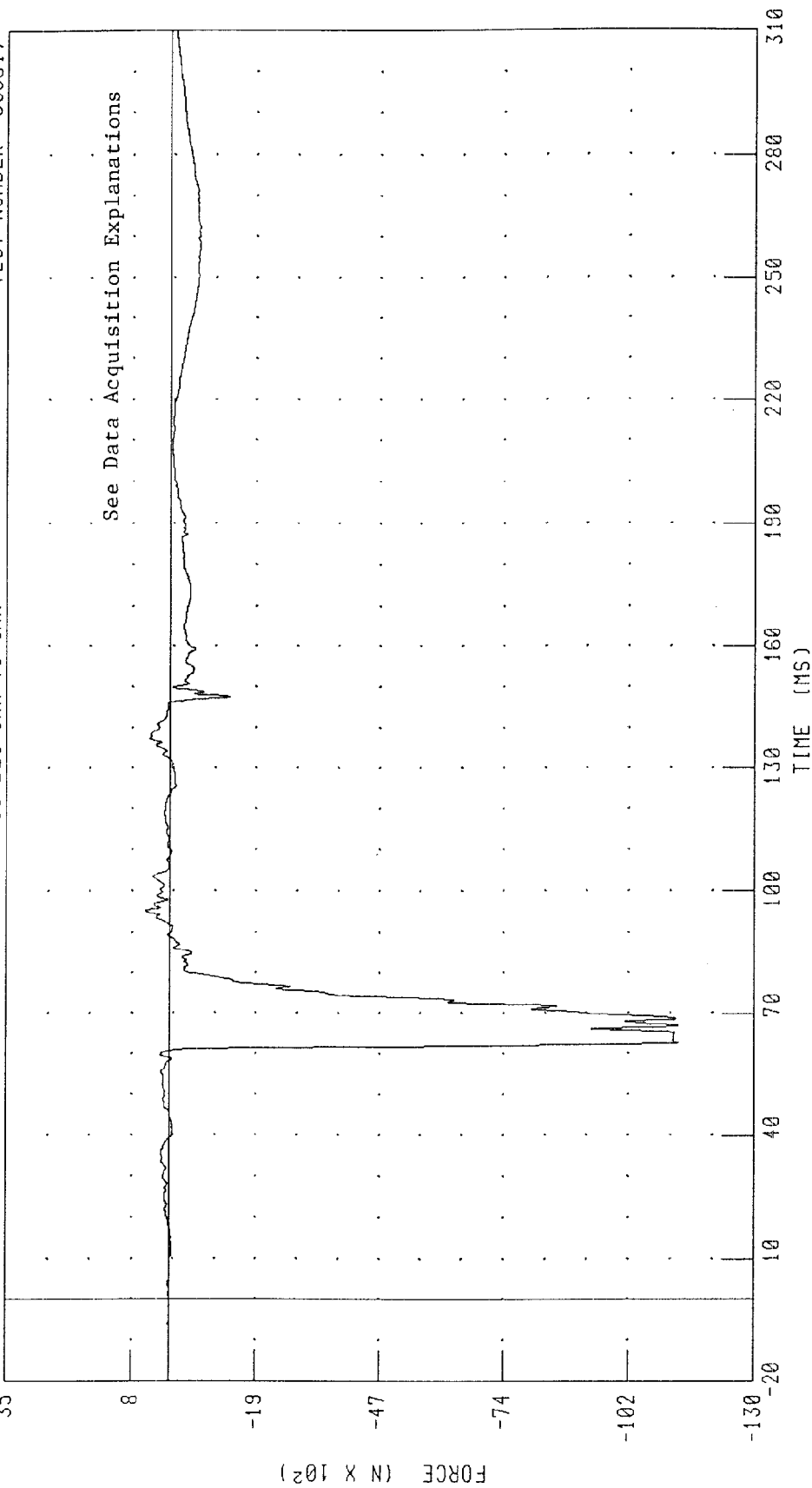
CHANNEL: TBRXF1 FILTER: CH. CLASS 600

PEAK DATA: 557.19 N @ 68.64 MS; -220.22 N @ 61.36 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 TARGET DRIVER RIGHT UPPER TIBIA Z-AXIS FORCE
 30 DEC CAR TO CAR

TEST NUMBER: 980817

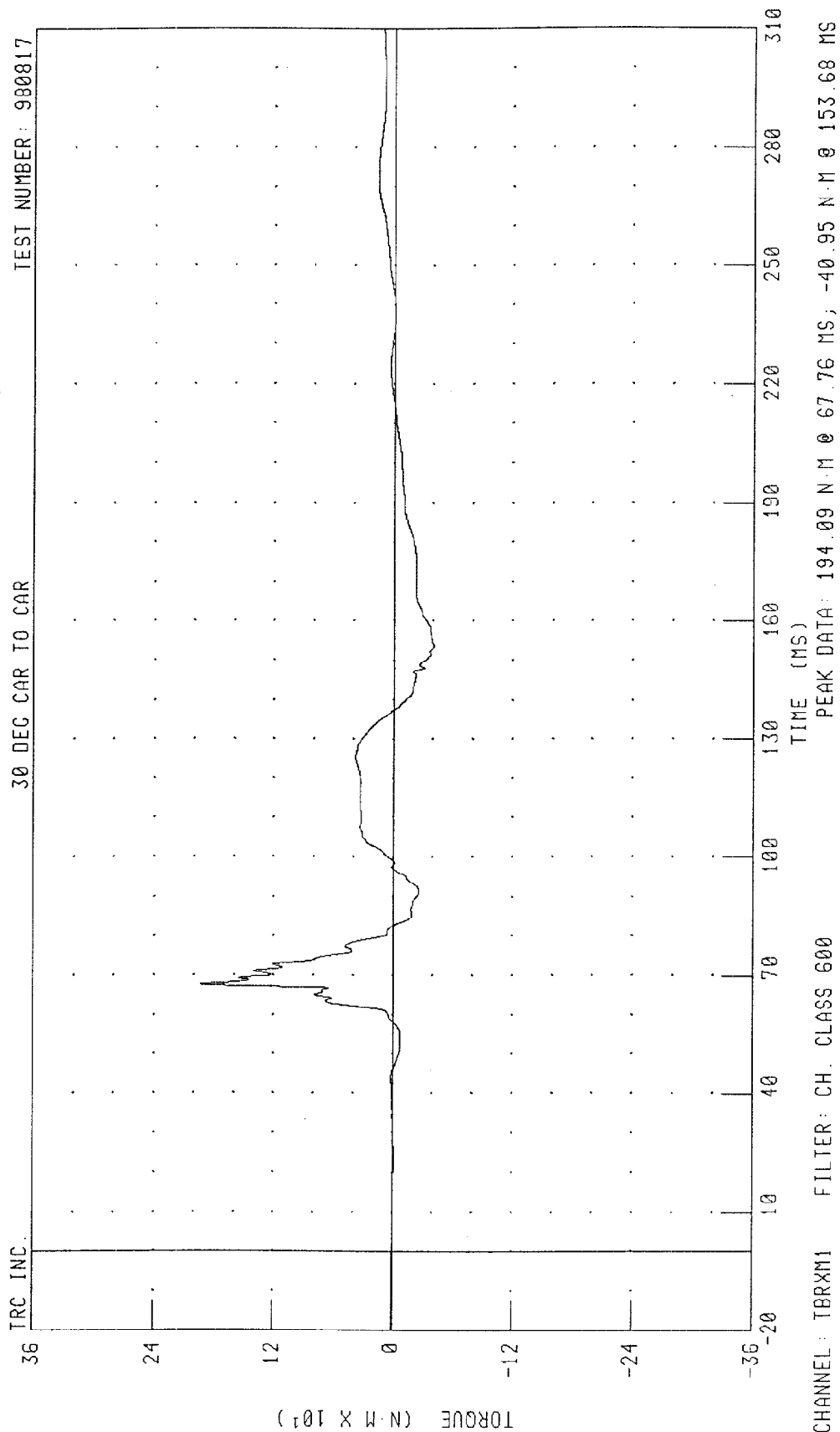
TRC INC.



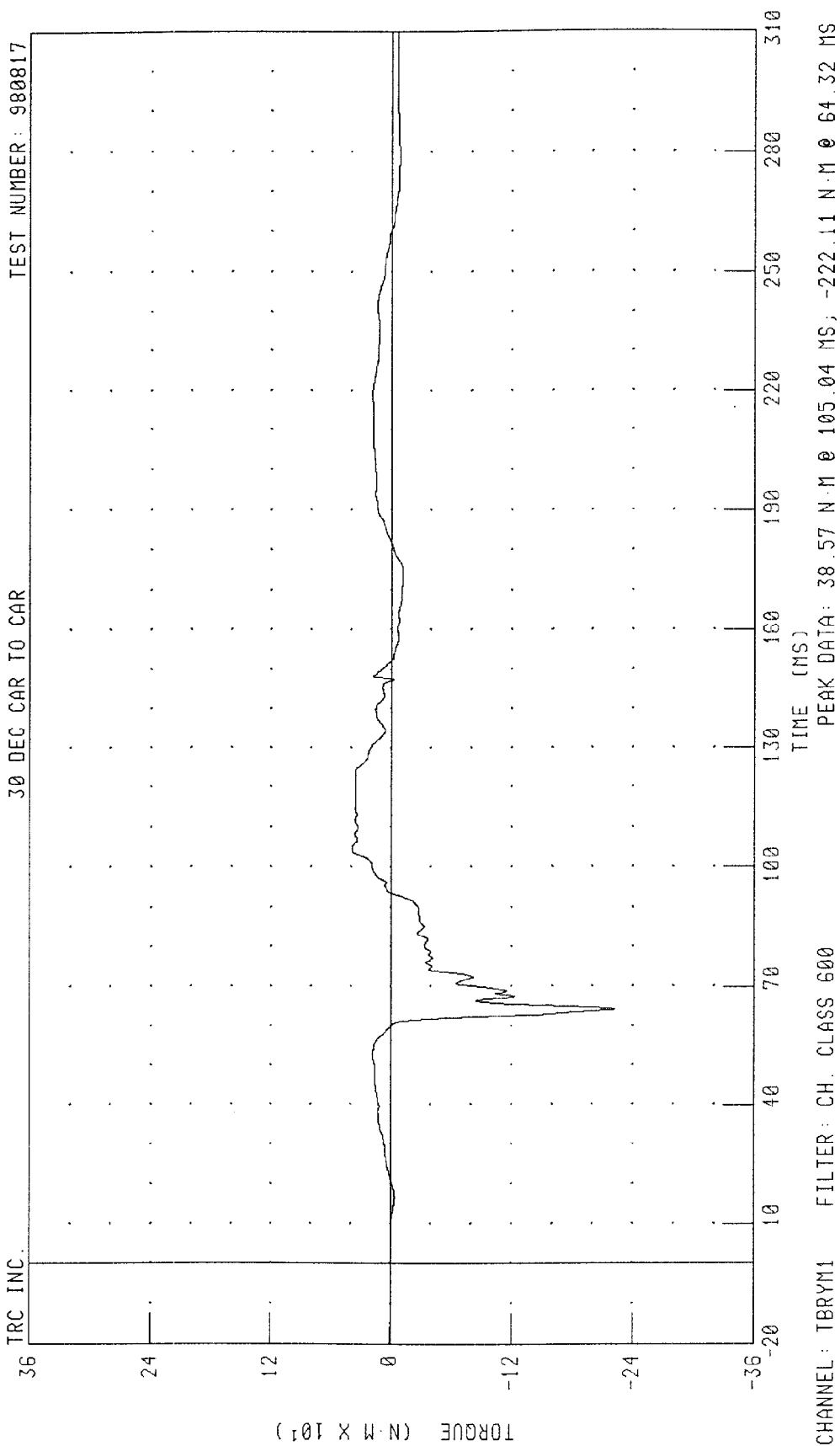
CHANNEL: TBRZF1 FILTER: CH. CLASS 600

PEAK DATA: 540.31 N @ 95.36 MS; -11339.96 N @ 62.64 MS

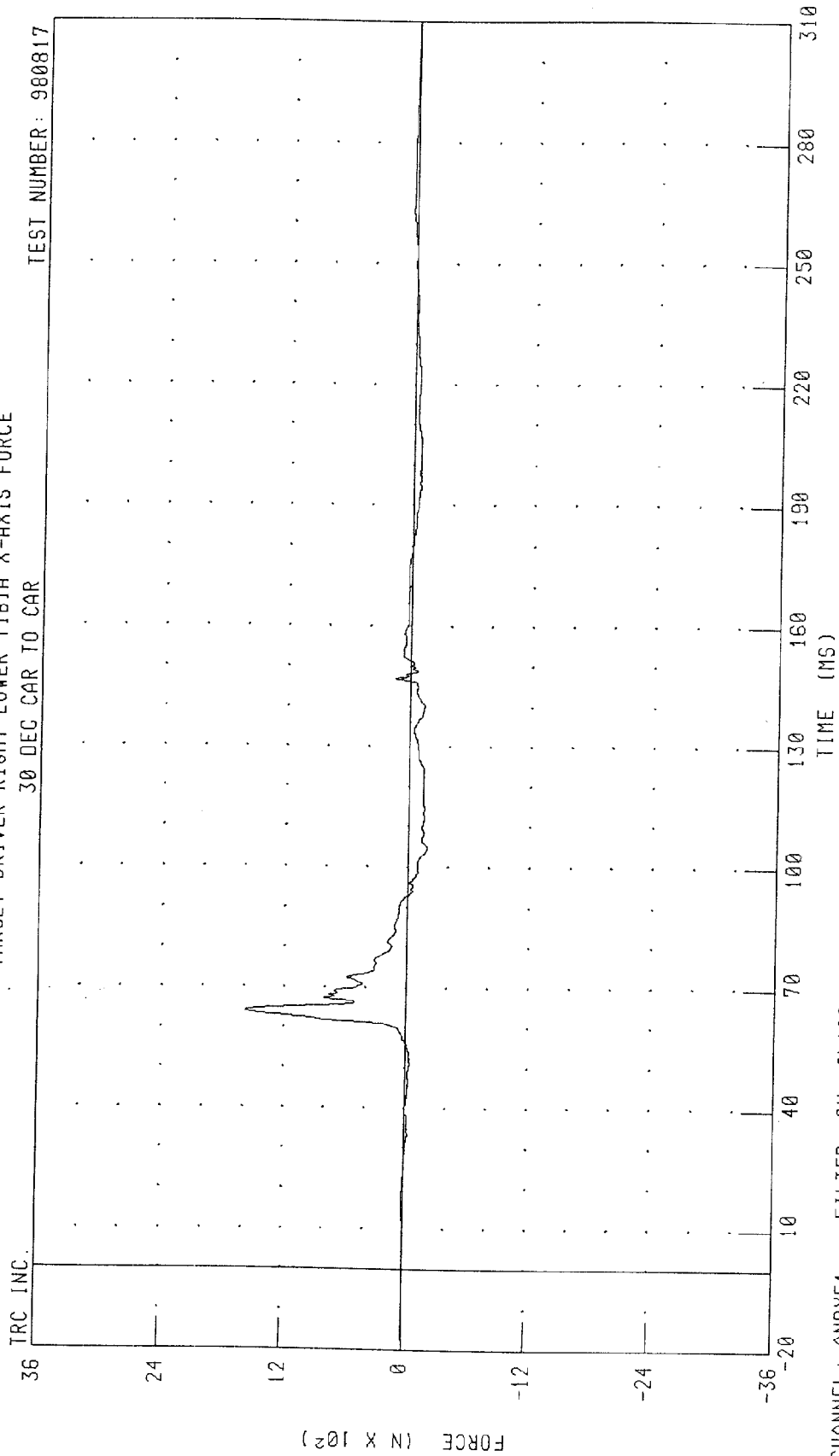
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS



1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS



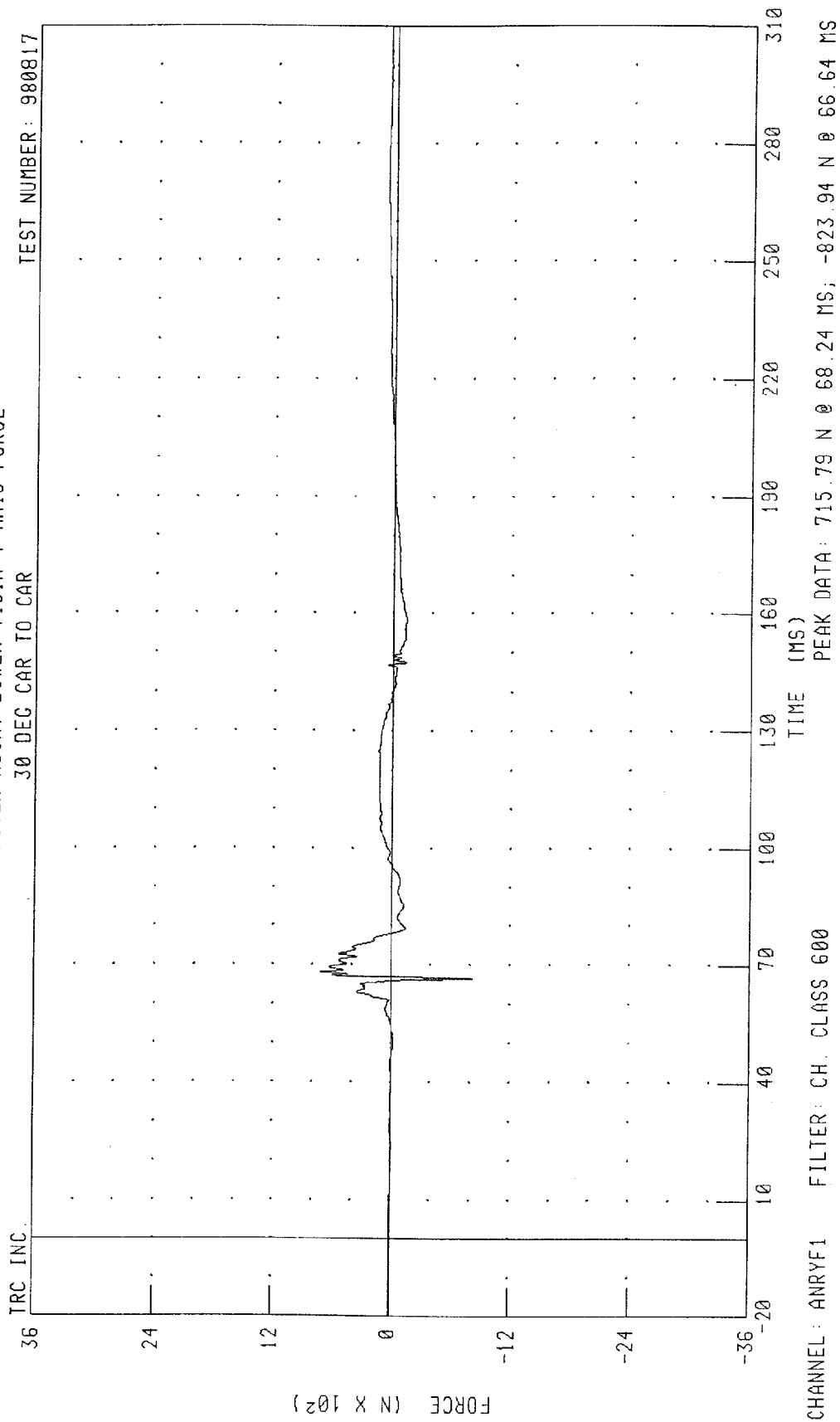
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT LOWER TIBIA X-AXIS FORCE



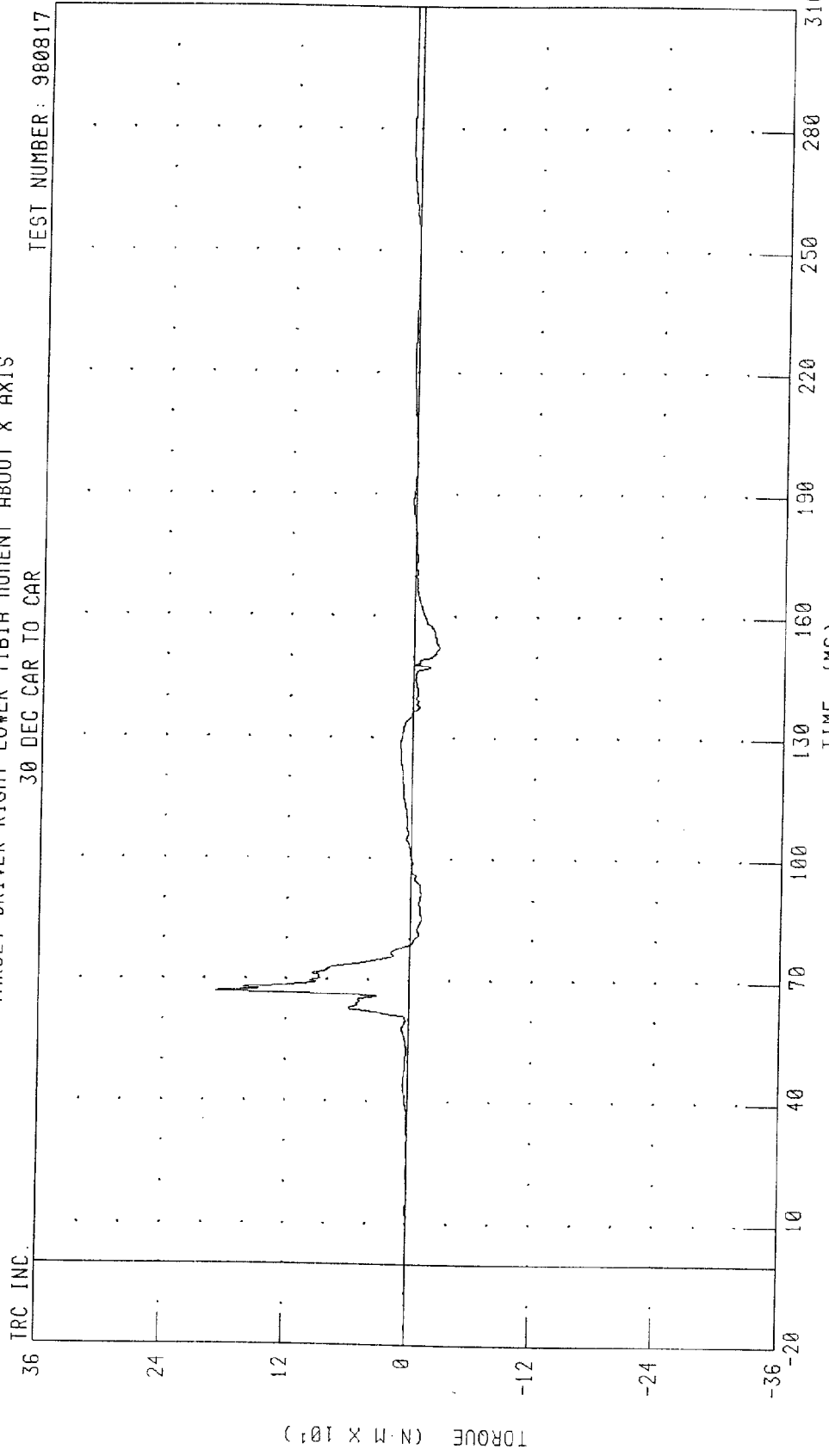
CHANNEL: ANRXF1 FILTER: CH. CLASS 600

PEAK DATA: 1584.92 N @ 64.32 MS, -186.05 N @ 104.64 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT LOWER TIBIA Y-AXIS FORCE



1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT LOWER TIBIA MOMENT ABOUT X AXIS



CHANNEL: ANRXM1 FILTER: CH. CLASS 600

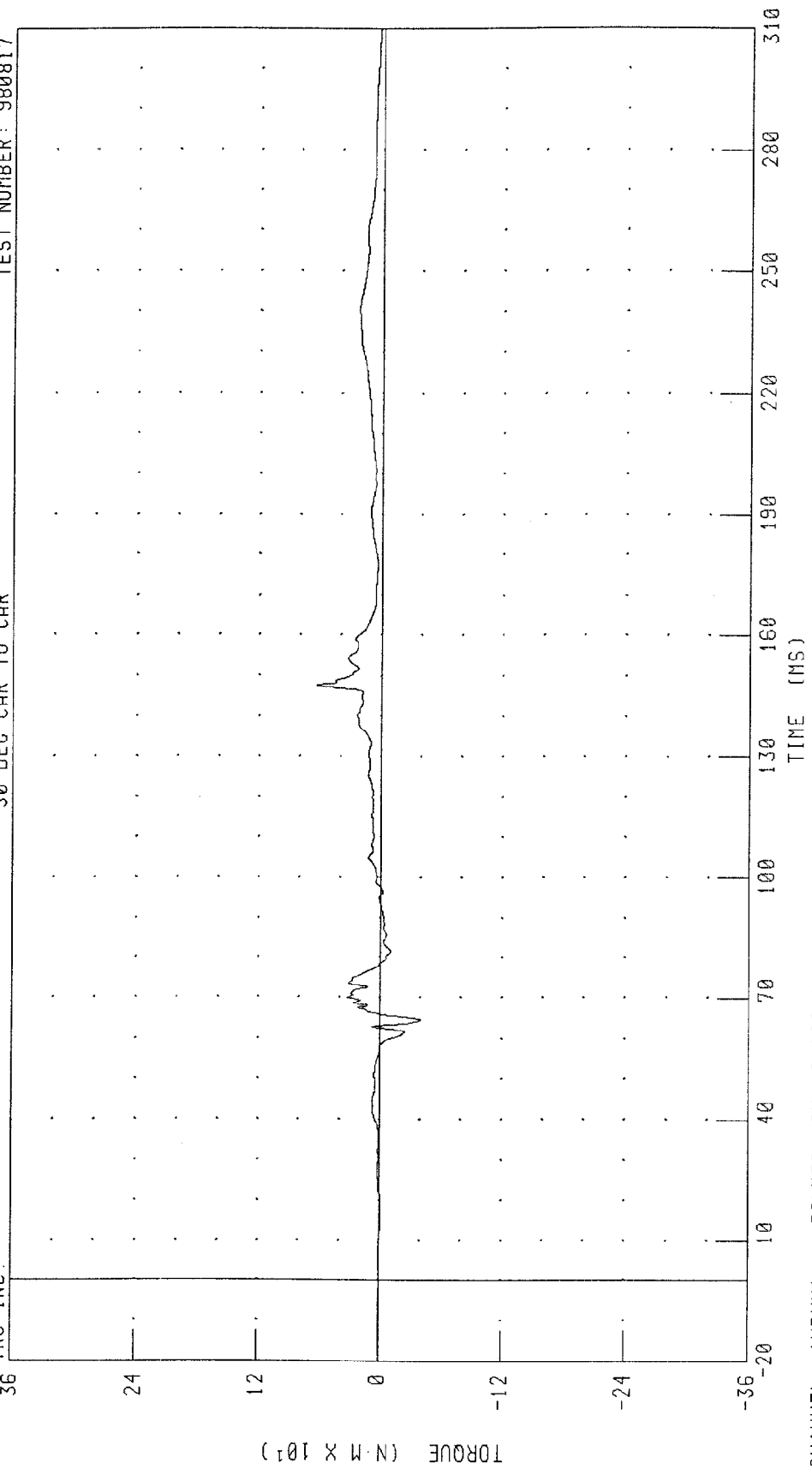
PEAK DATA: 188.77 N·M @ 67.20 MS; -25.36 N·M @ 152.40 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS

TEST NUMBER: 980817

30 DEC CAR TO CAR

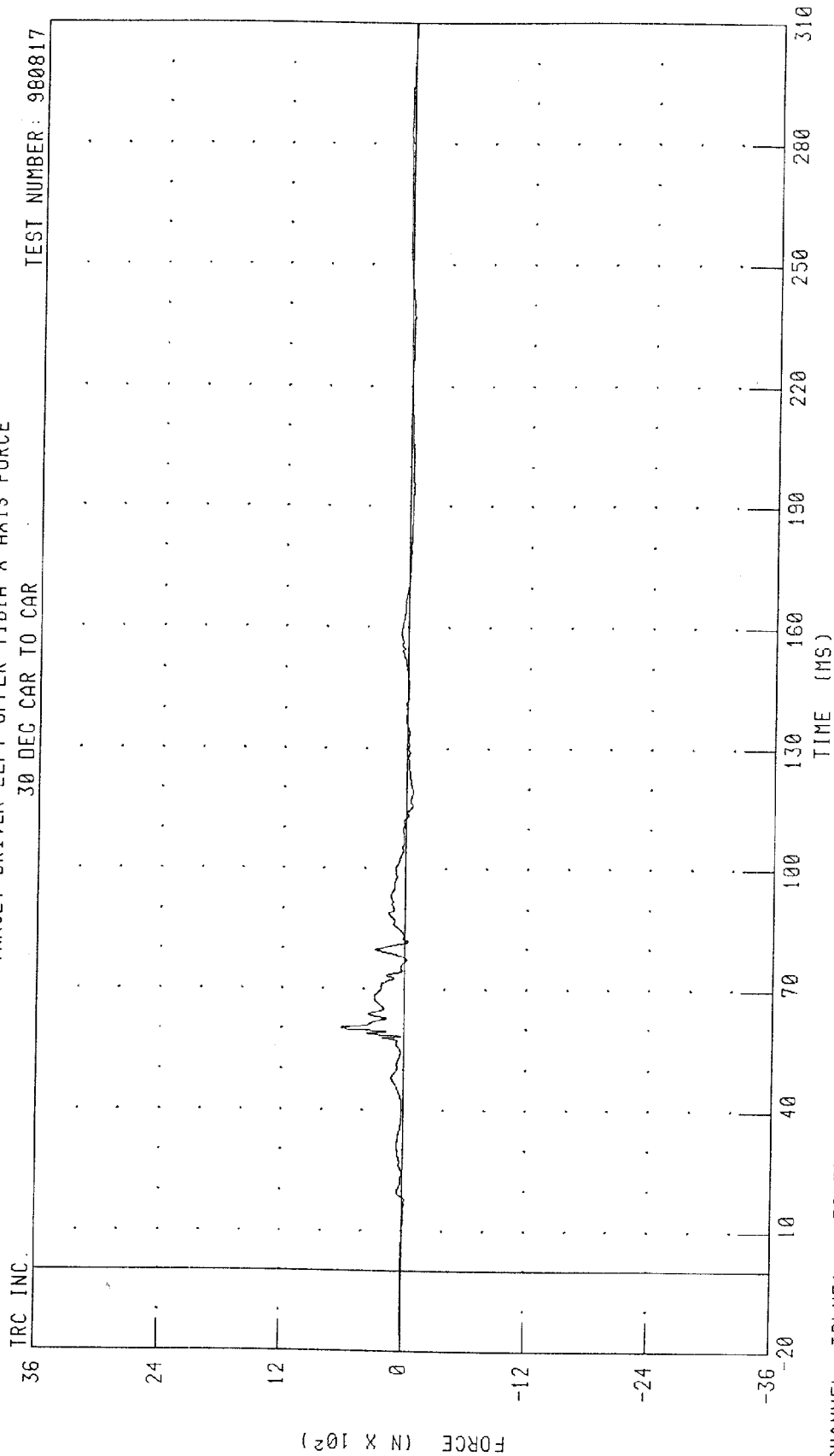
TRC INC.



CHANNEL: ANRYM1 FILTER: CH. CLASS 600

PEAK DATA: 63.81 N·M @ 147.68 MS; -40.42 N·M @ 64.56 MS

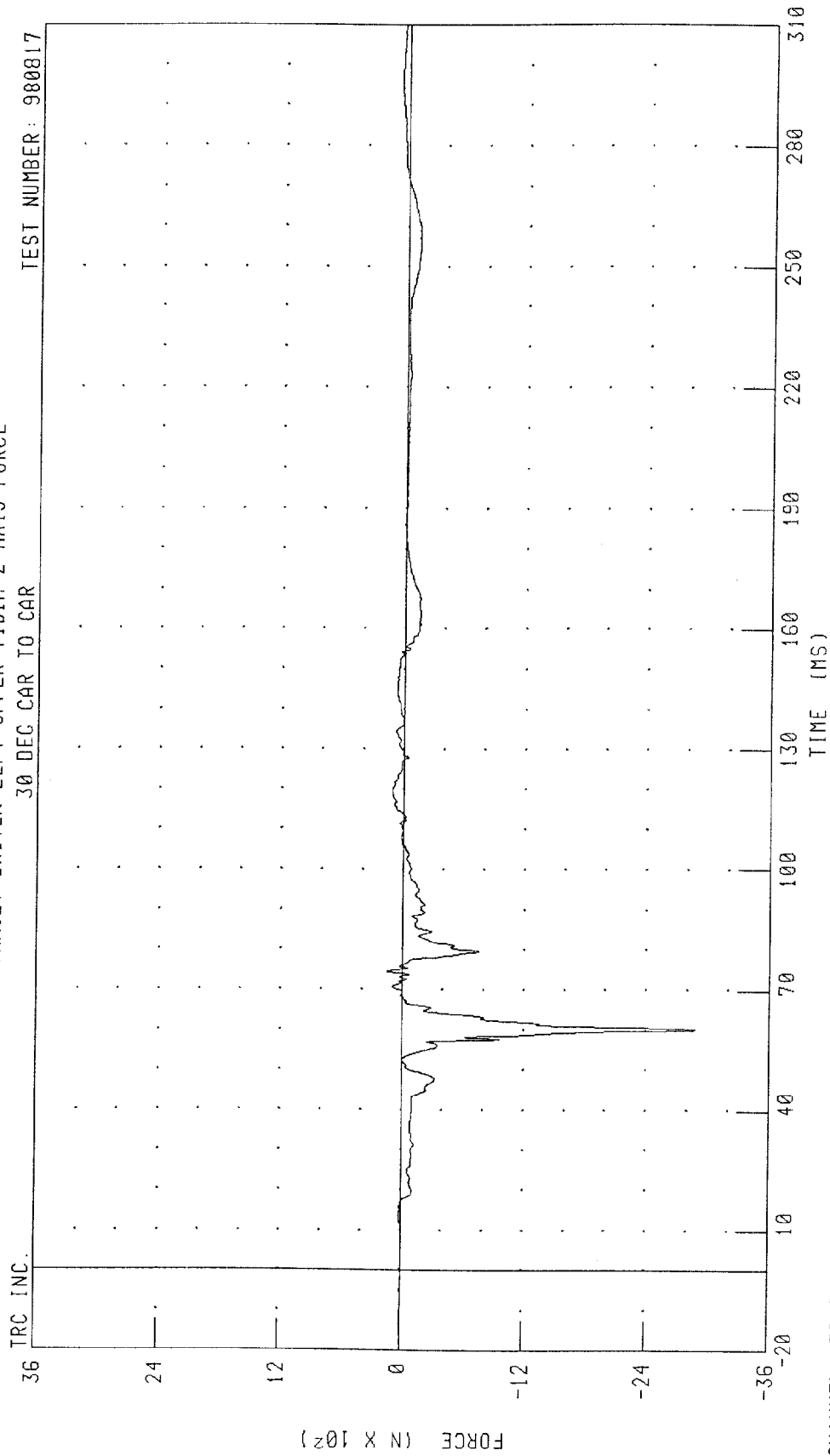
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT UPPER TIBIA X-AXIS FORCE



CHANNEL: TBLXF1 FILTER: CH. CLASS 600

PEAK DATA: 611.61 N @ 60.32 MS, -62.09 N @ 115.92 MS

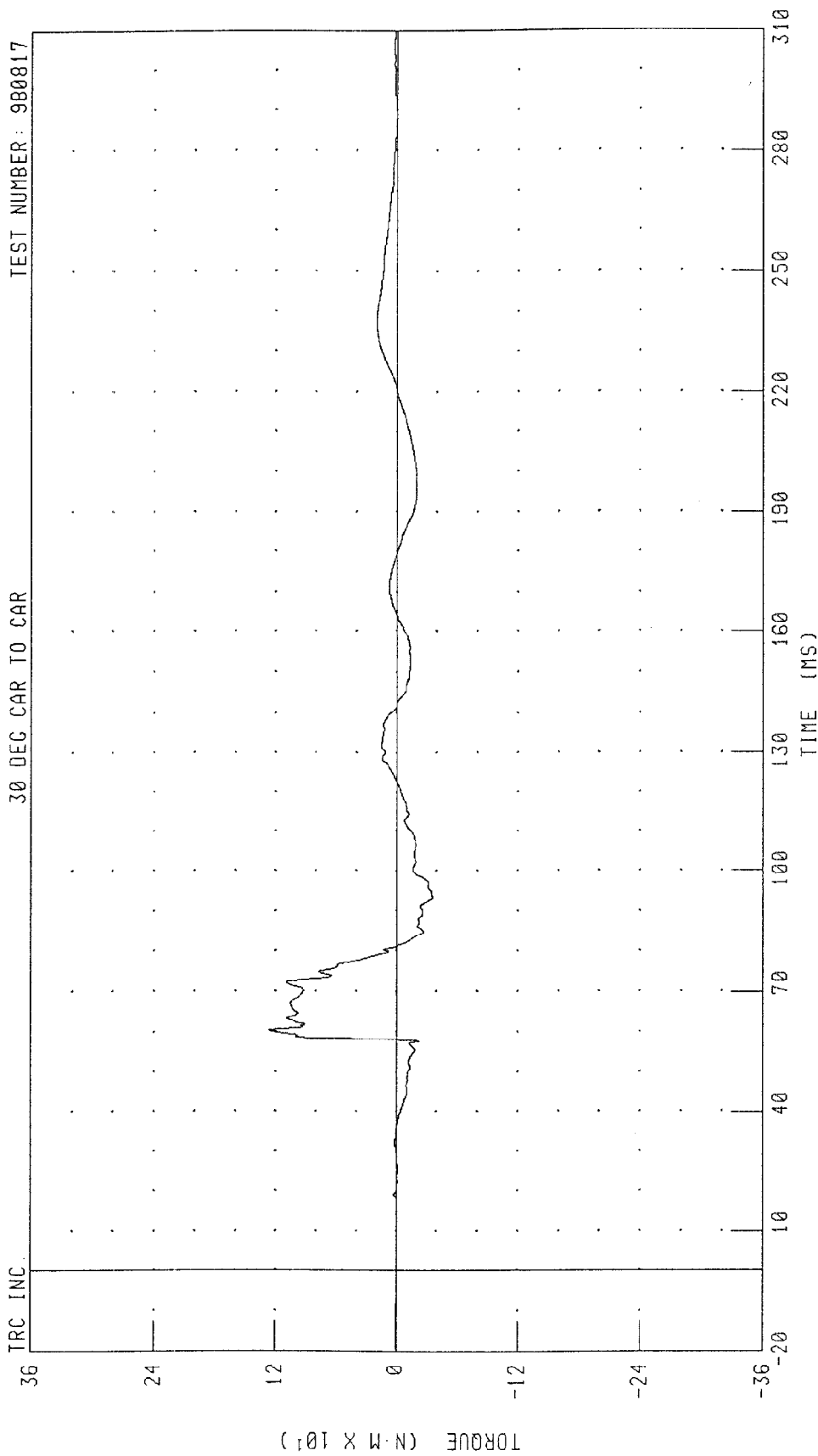
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT UPPER TIBIA Z-AXIS FORCE



CHANNEL: TBLZF1 FILTER: CH. CLASS 600

PEAK DATA: 152.83 N @ 74.64 MS, -2881.24 N @ 60.16 MS

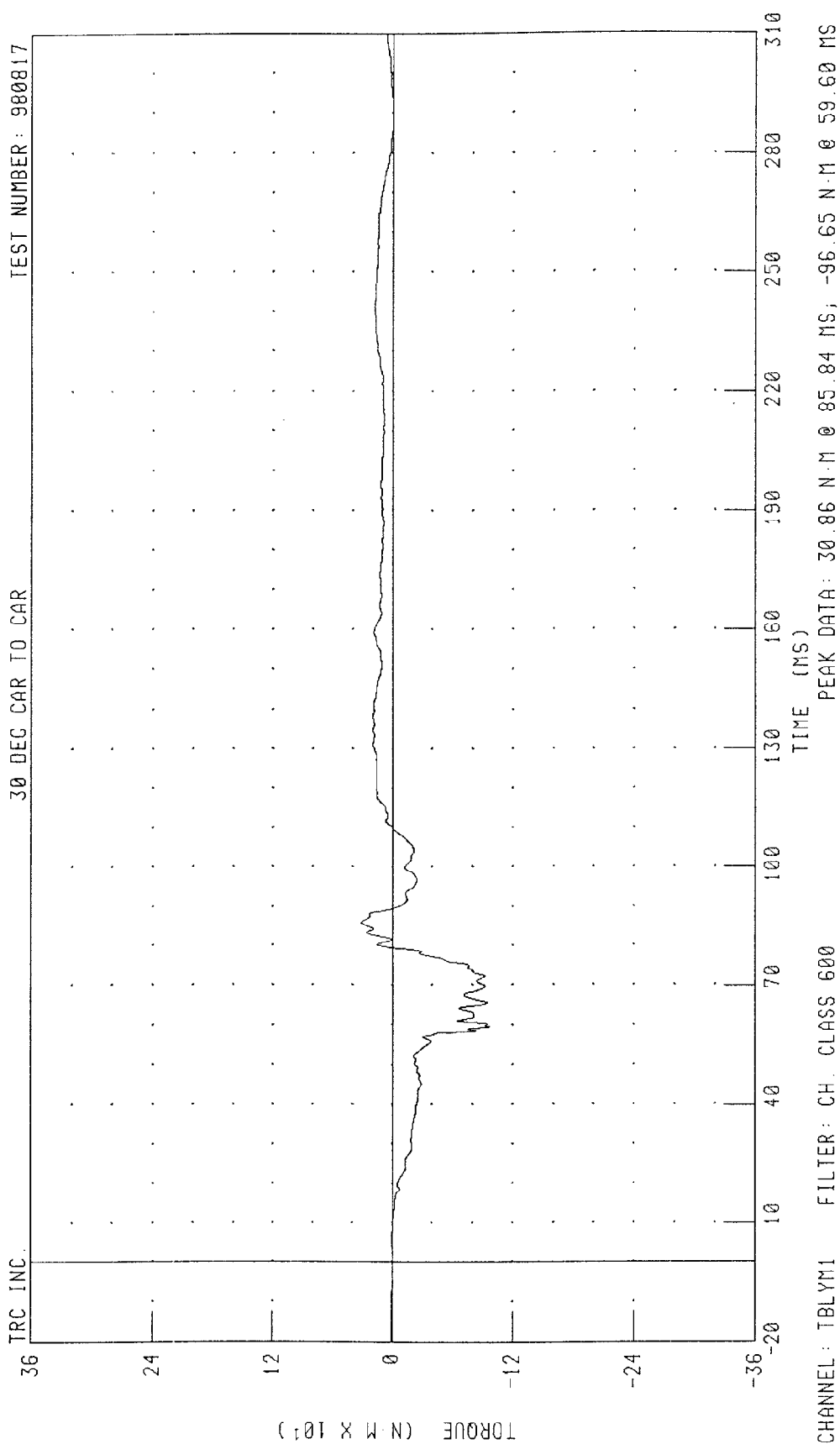
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 TARGET DRIVER LEFT UPPER TIBIA MOMENT ABOUT X AXIS



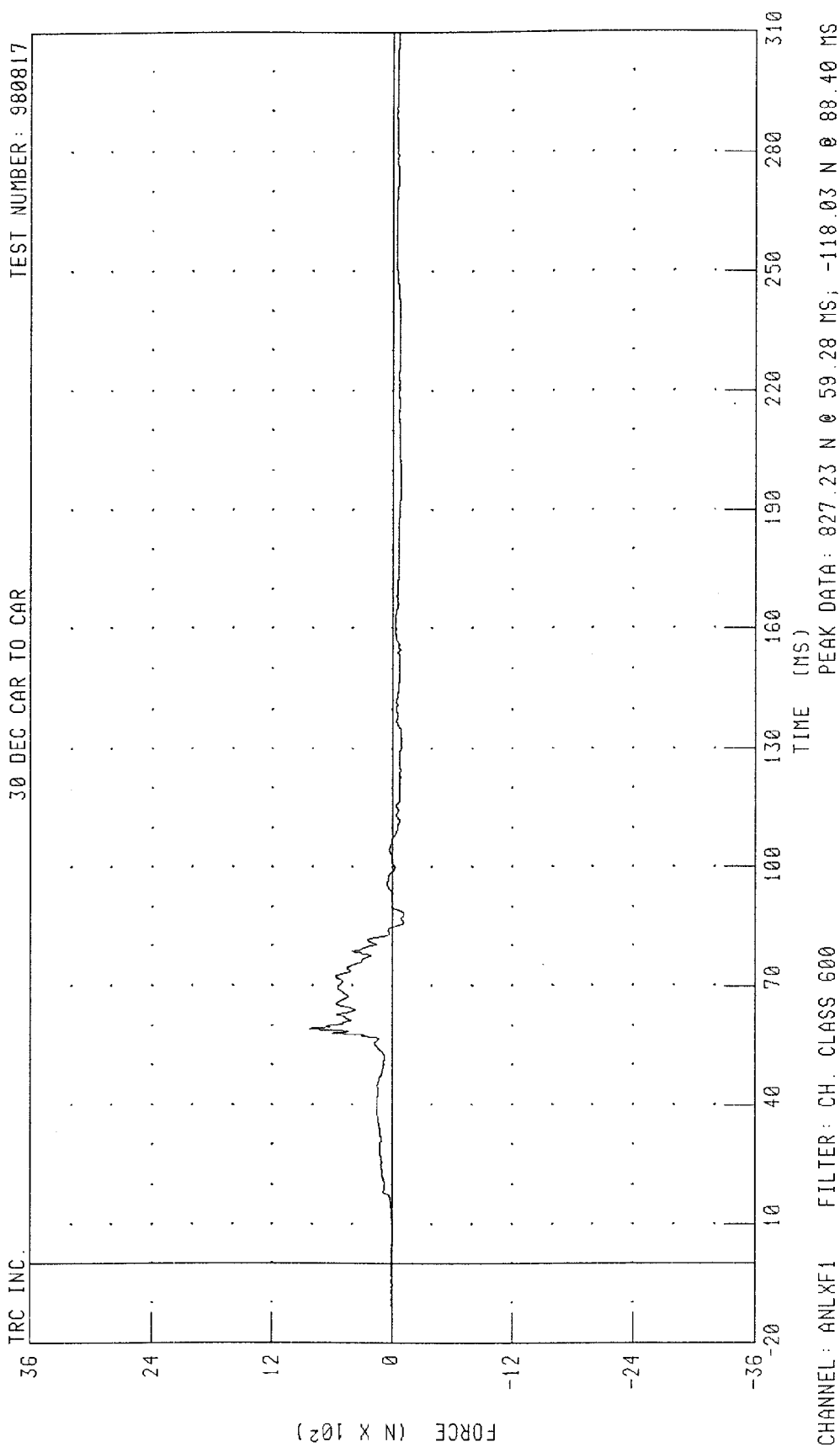
CHANNEL: TBLXM1 FILTER: CH. CLASS 600

PEAK DATA: 126.72 N·M @ 60.40 MS; -35.69 N·M @ 93.44 MS

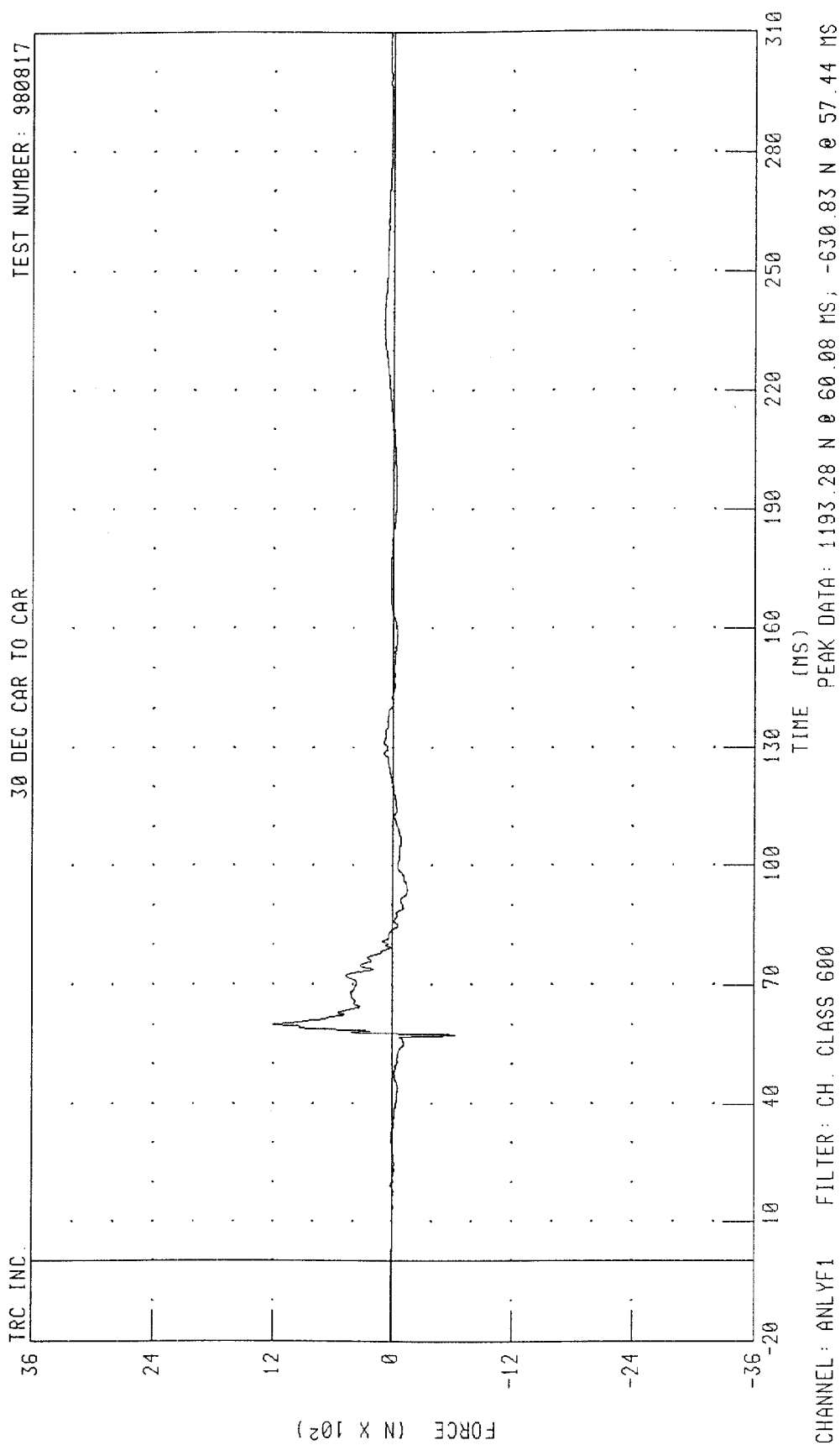
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS



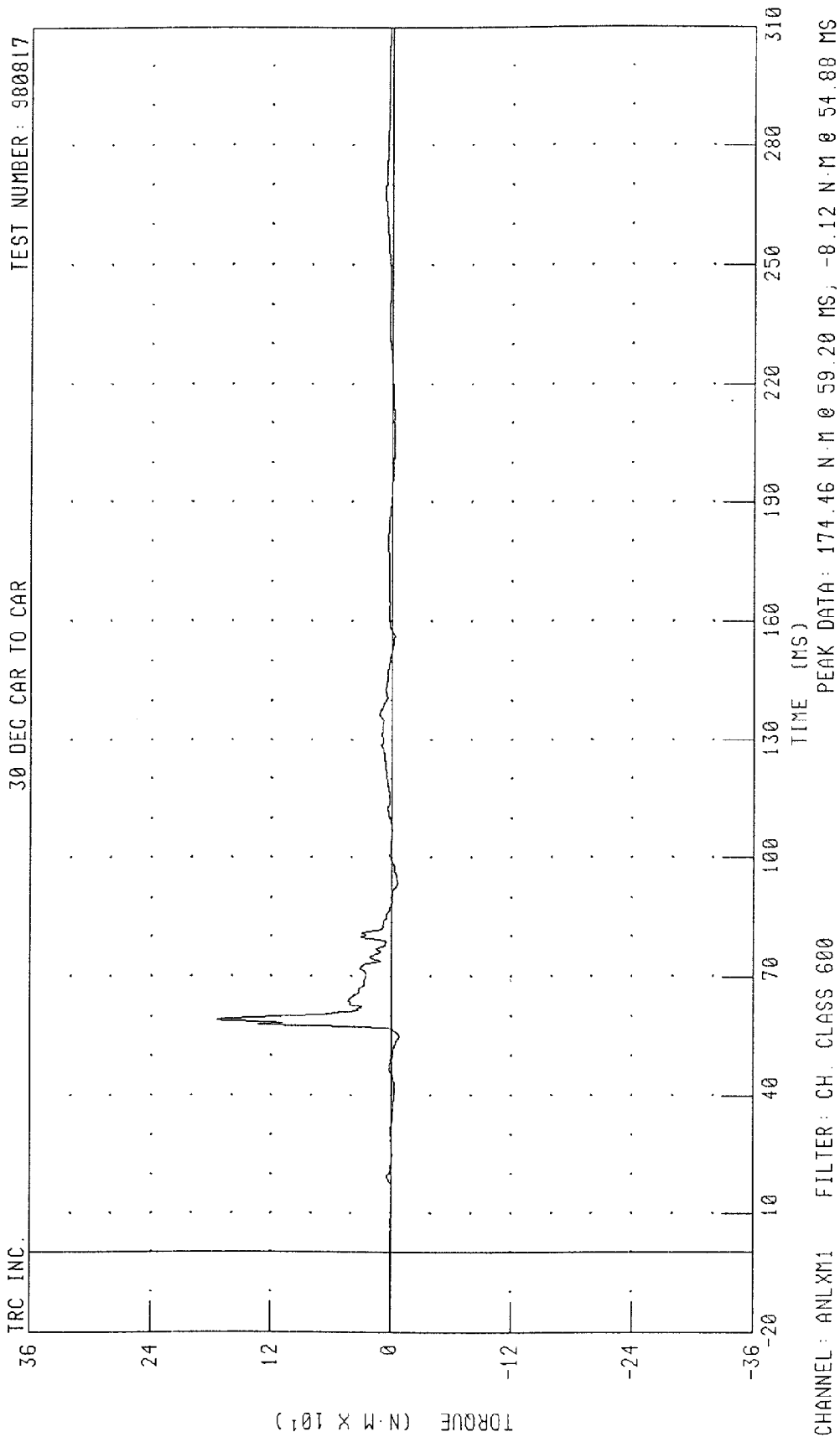
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT LOWER TIBIA X-AXIS FORCE



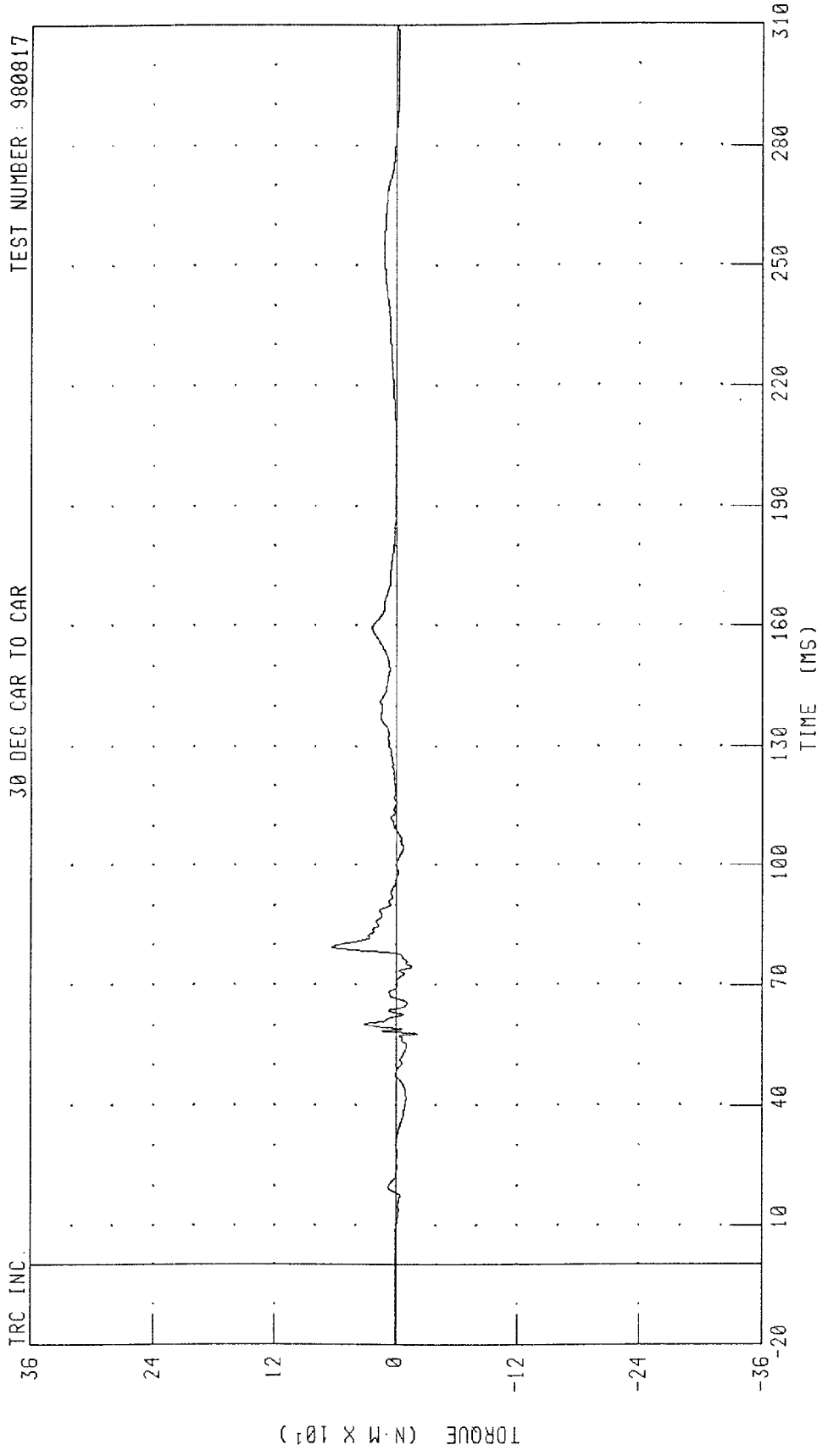
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT LOWER TIBIA Y-AXIS FORCE



1995 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT LOWER TIBIA MOMENT ABOUT X AXIS



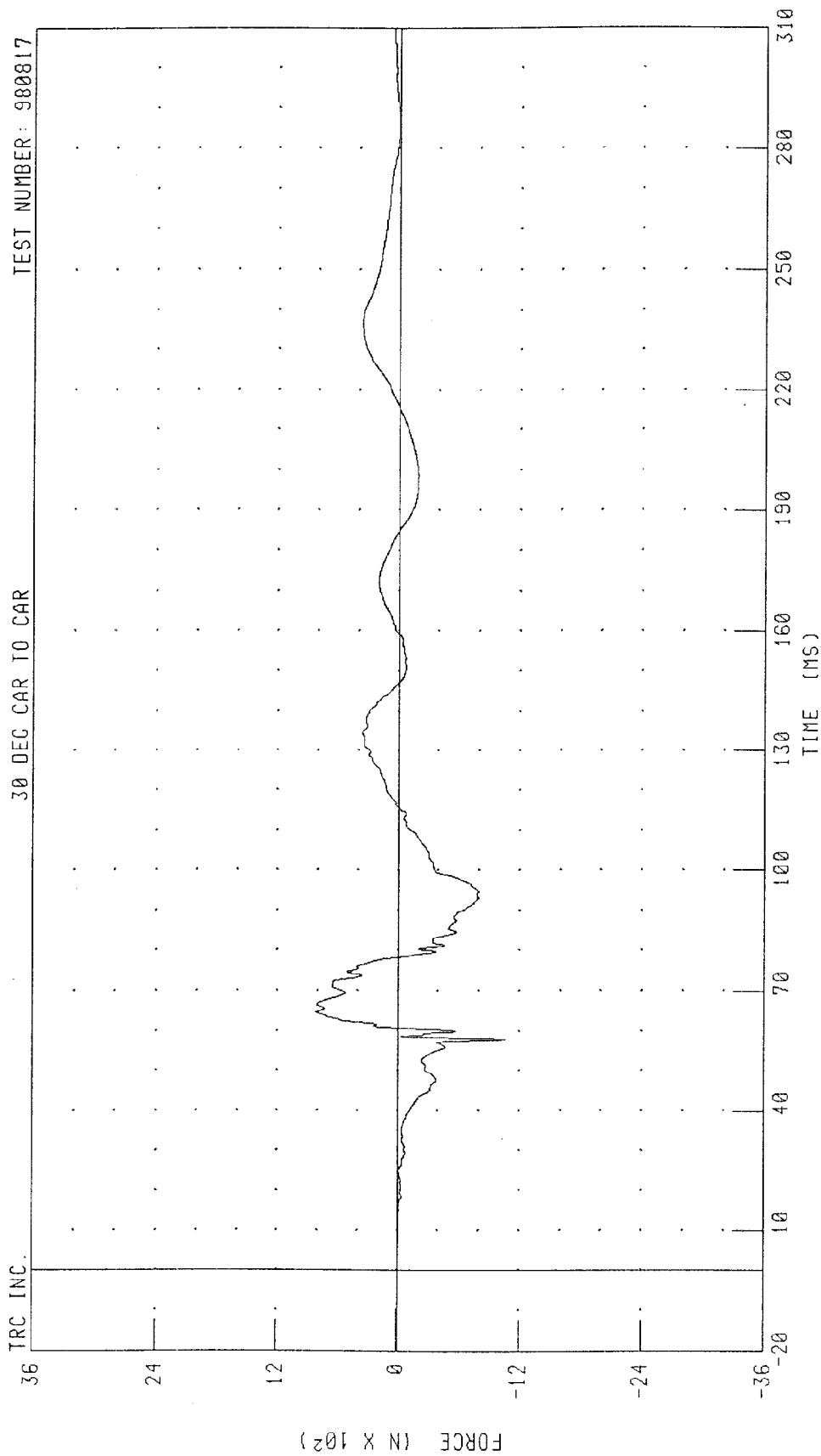
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS



CHANNEL: ANLYM1 FILTER: CH. CLASS 600

PEAK DATA: 63.88 N·M @ 79.44 MS; -21.38 N·M @ 58.00 MS

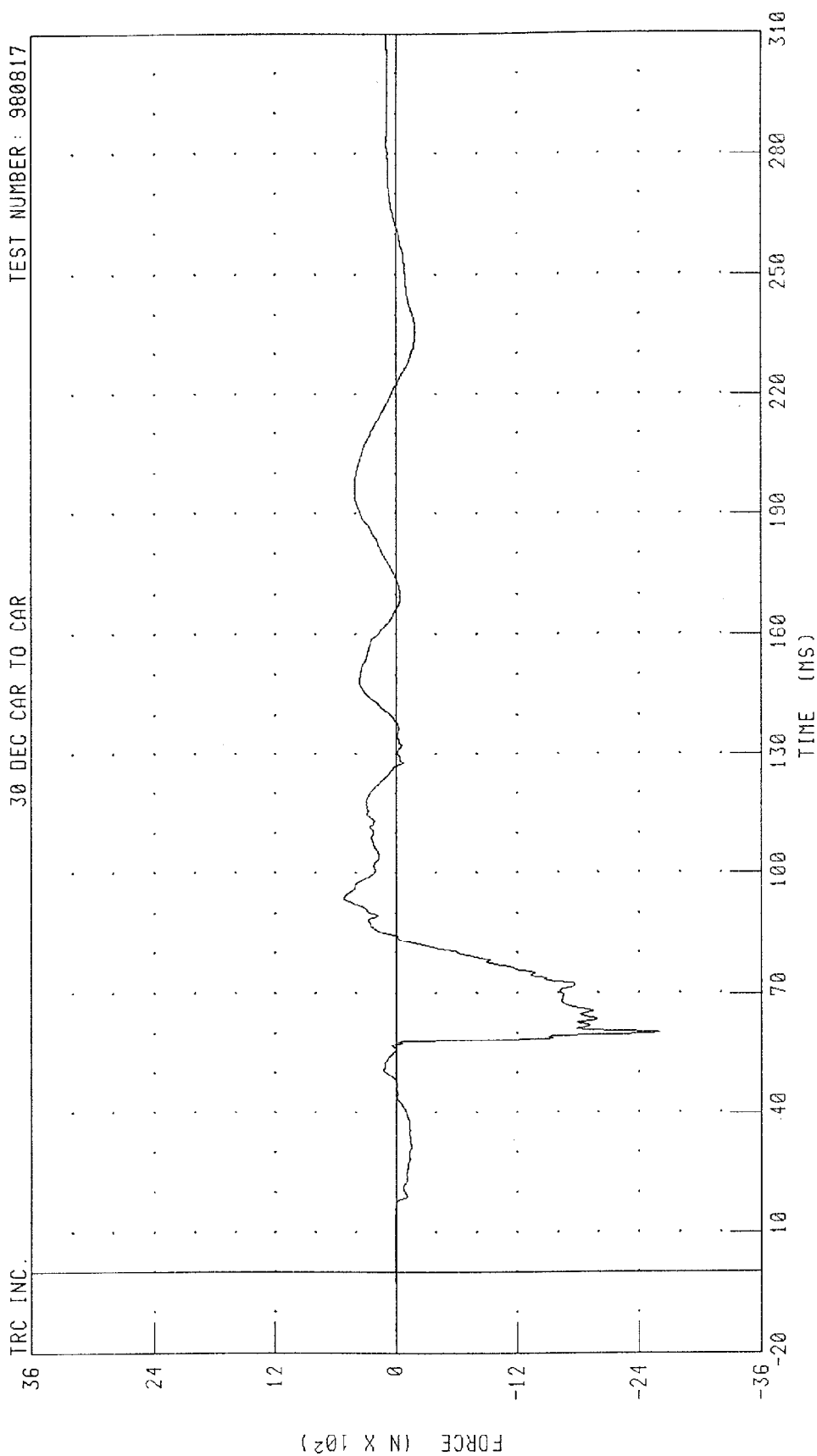
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBlique 30 DEGREES
TARGET DRIVER LEFT KNEE LEFT FORCE



CHANNEL: KNLLF1 FILTER: CH. CLASS 600

PEAK DATA: 815.81 N @ 64.72 MS, -1059.59 N @ 57.92 MS

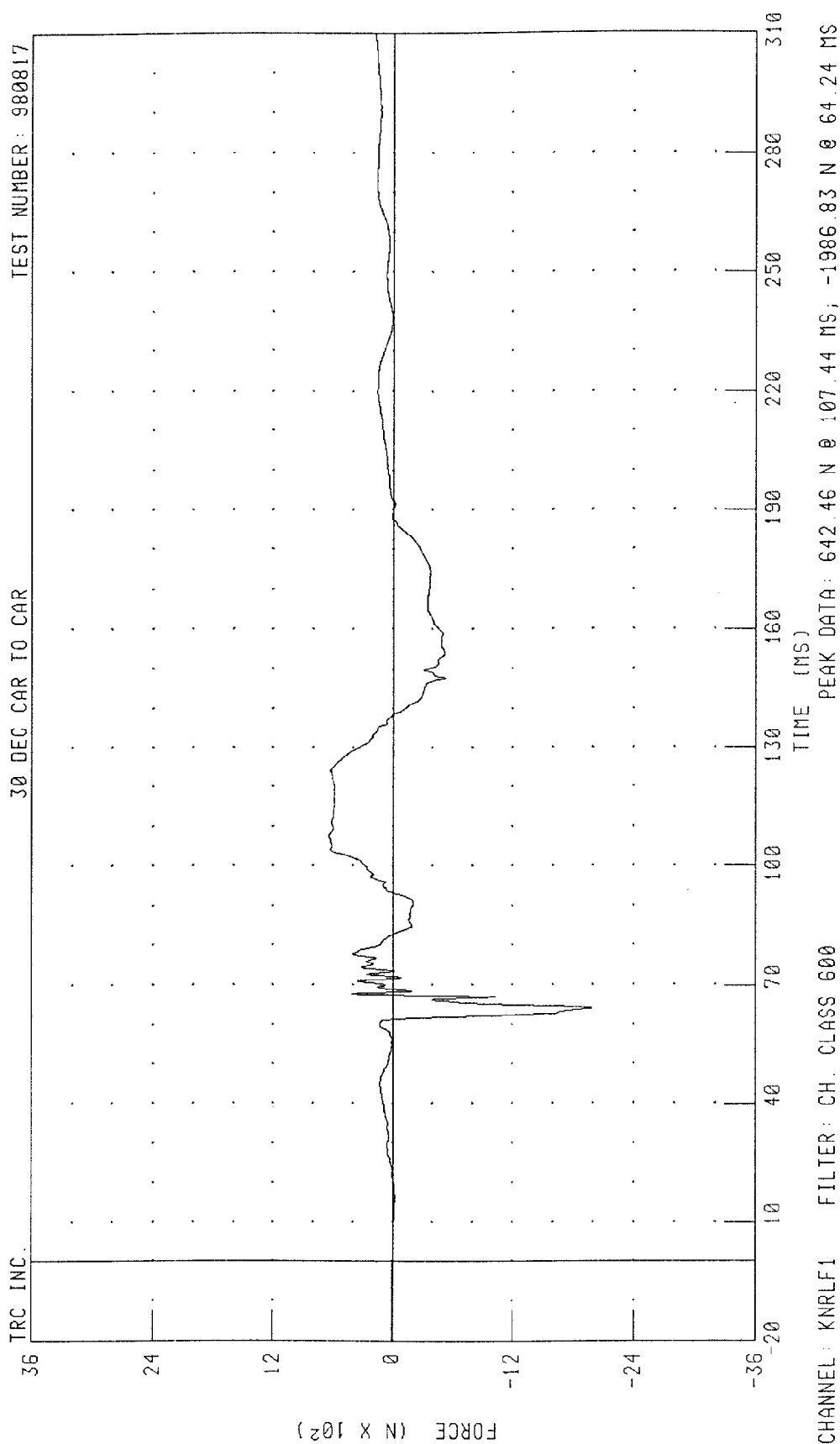
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER LEFT KNEE RIGHT FORCE



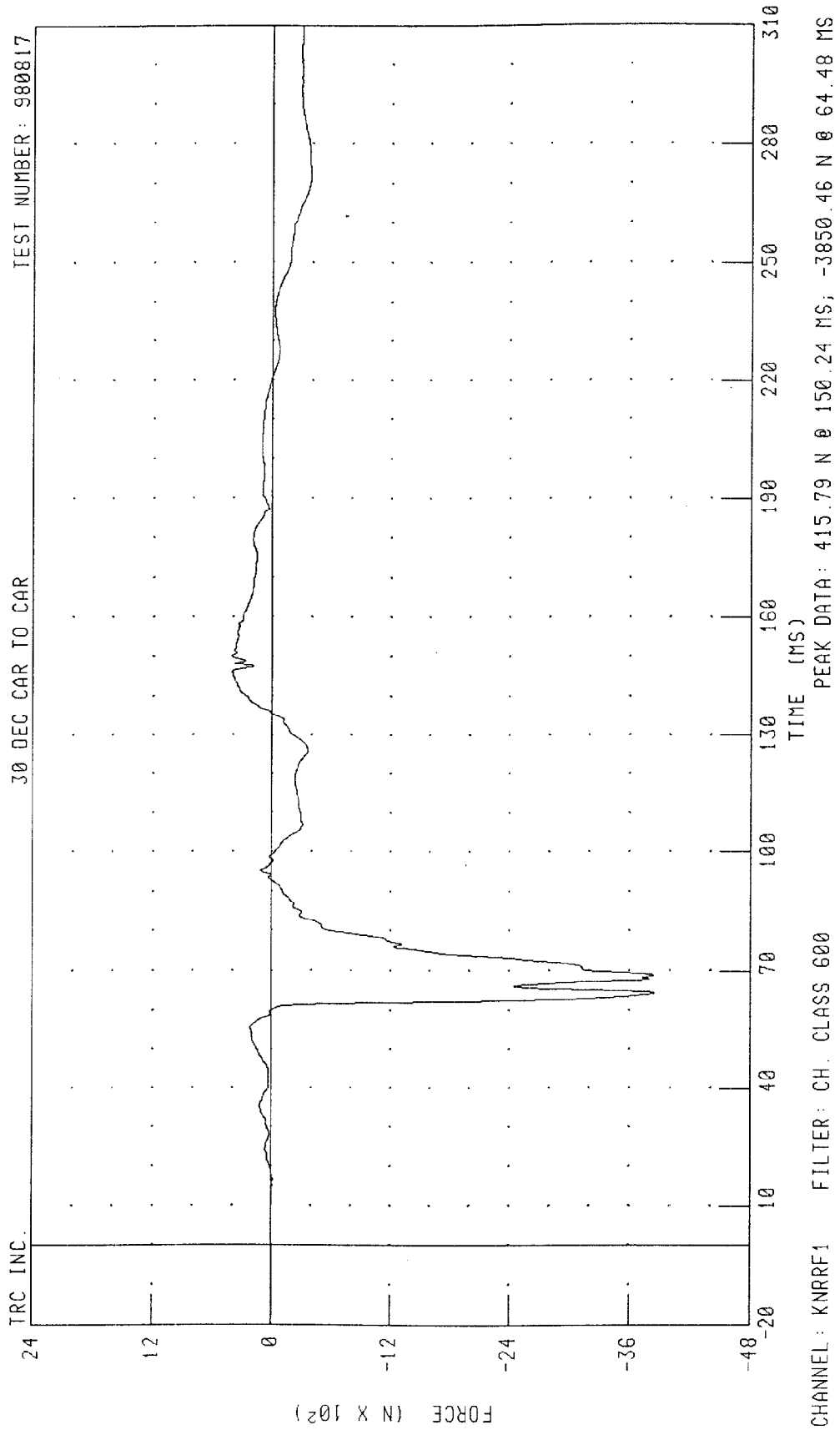
CHANNEL: KNLRF1 FILTER: CH. CLASS 600

PEAK DATA: 511.86 N @ 93.76 MS; -2604.75 N @ 60.32 MS

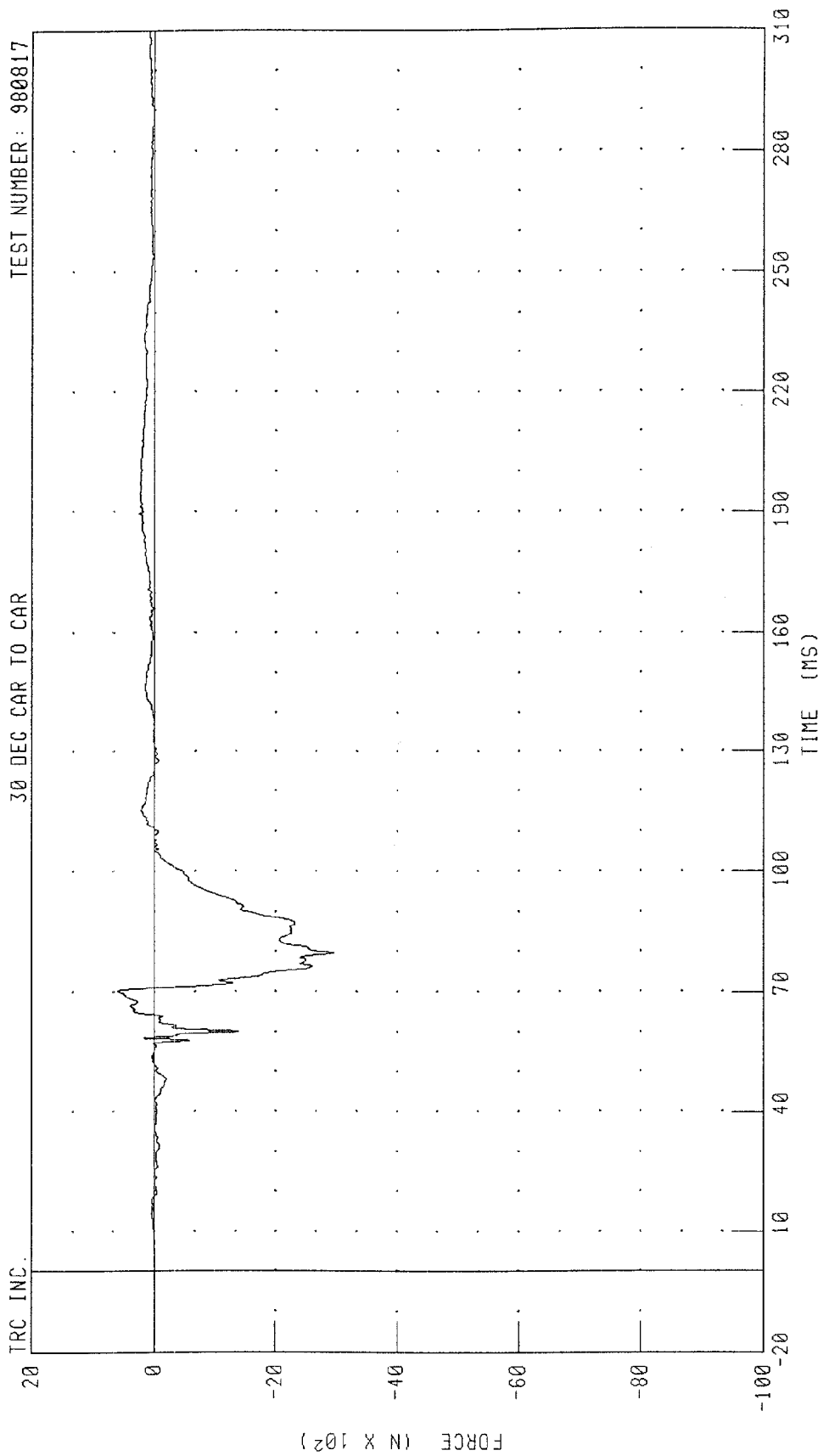
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT KNEE LEFT FORCE



1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT KNEE RIGHT FORCE



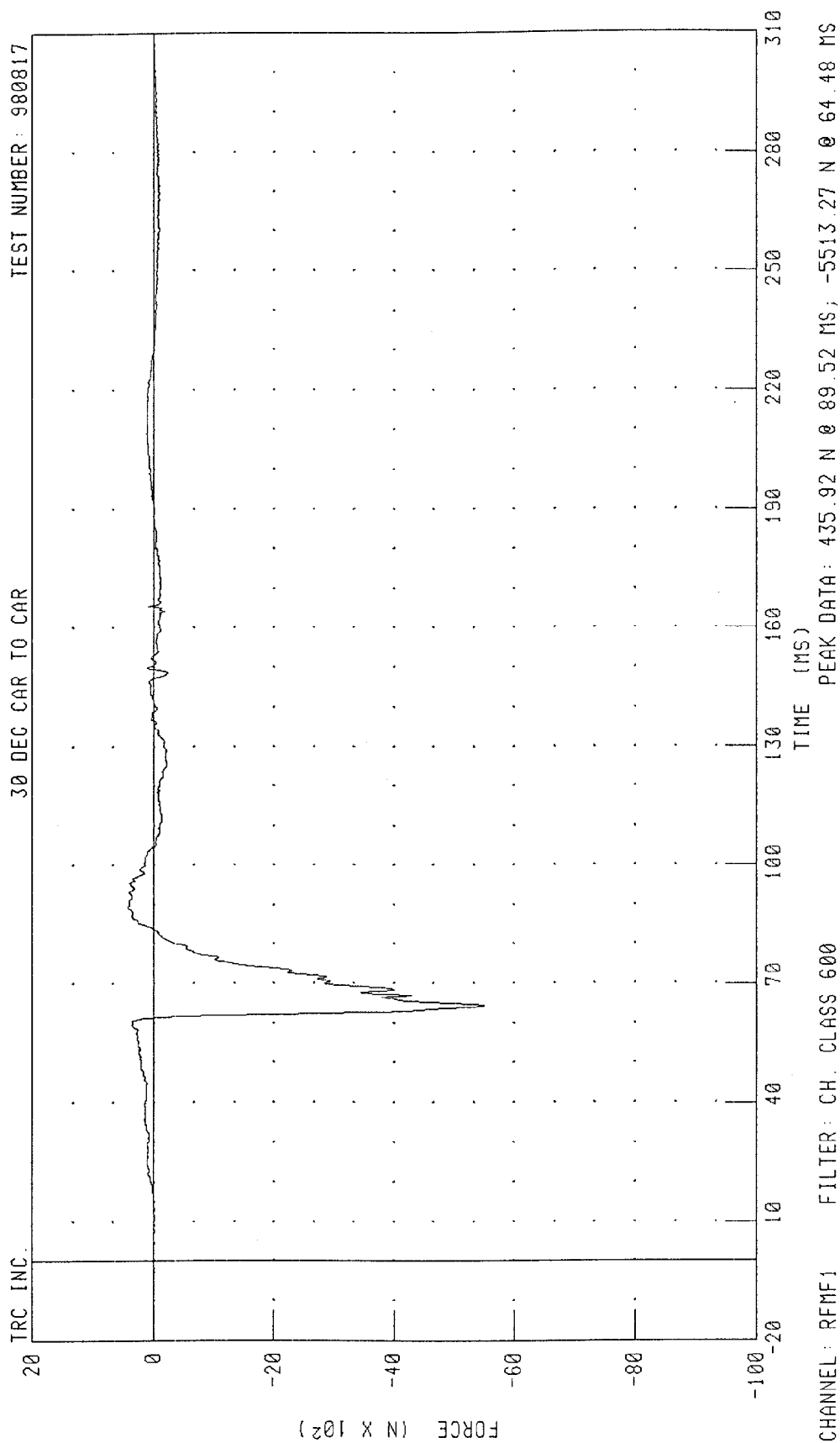
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 TARGET DRIVER LEFT FEMUR FORCE



CHANNEL: LFMF1 FILTER: CH. CLASS 600

PEAK DATA: 600.50 N @ 70.32 MS; -2960.21 N @ 79.68 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET DRIVER RIGHT FEMUR FORCE

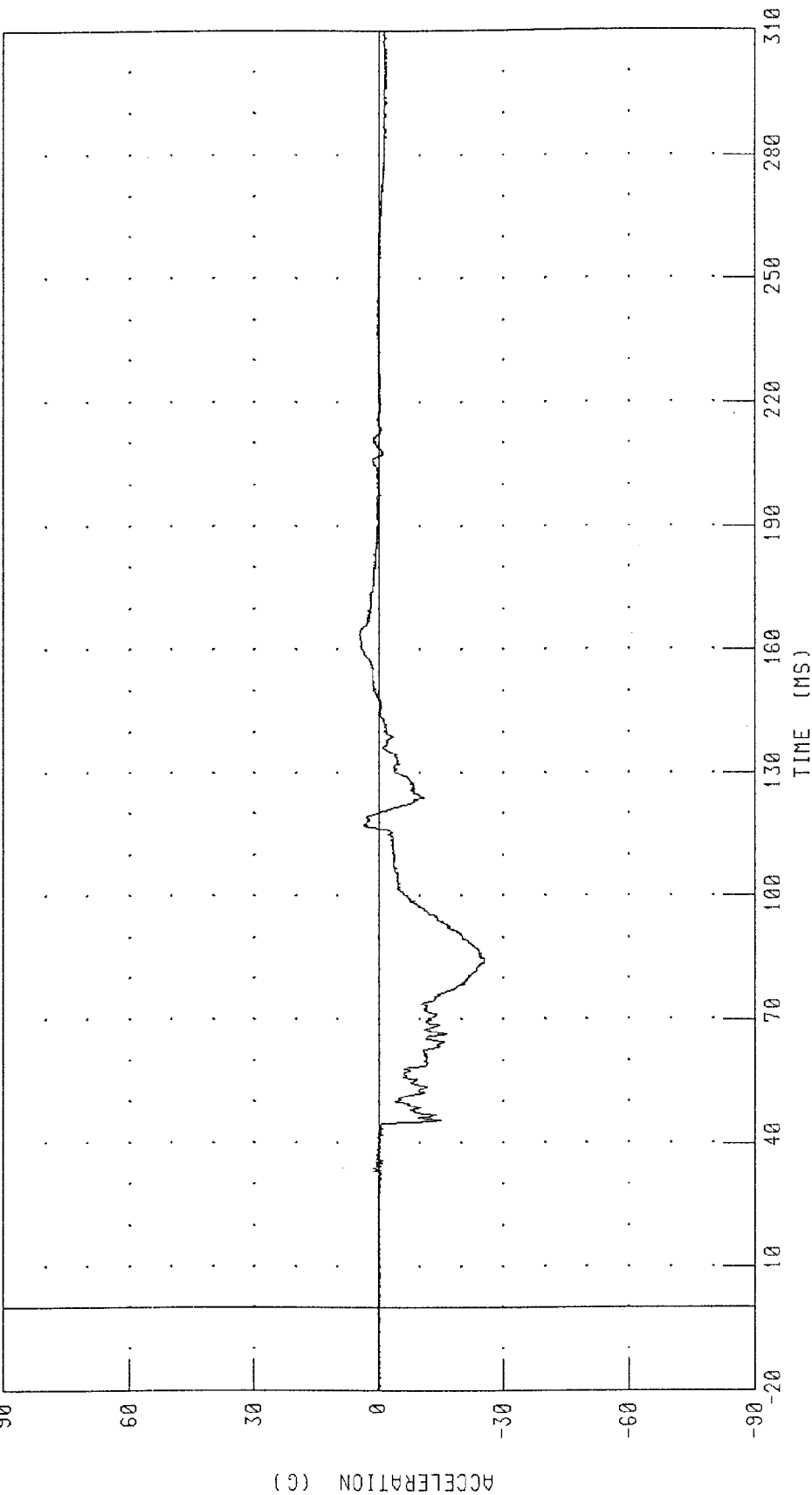


1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER HEAD X-AXIS ACCELERATION

TRC INC.

30 DEG CAR TO CAR

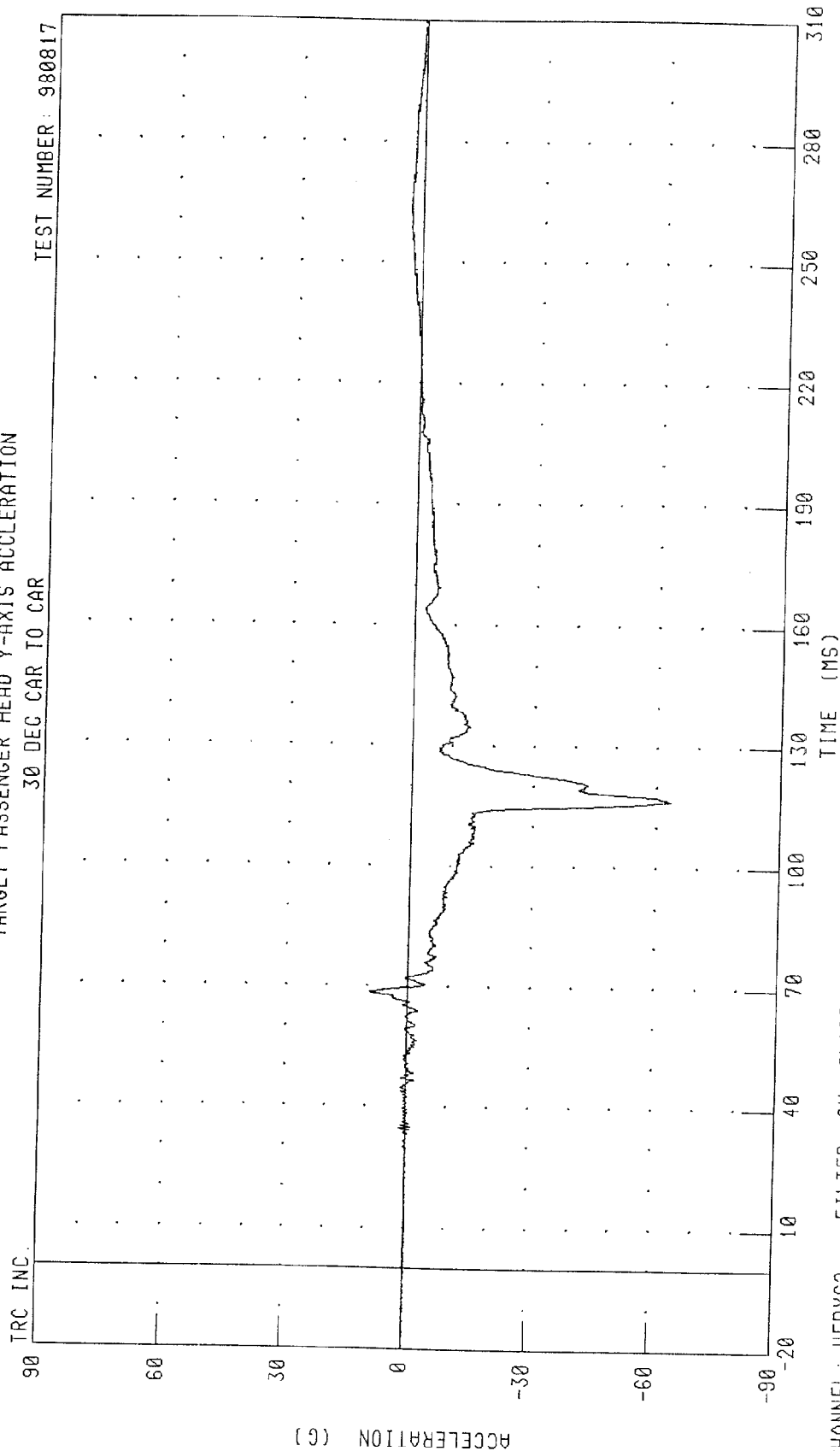
TEST NUMBER: 980817



CHANNEL: HEDXC2 FILTER: CH. CLASS 1000 PEAK DATA: 4.83 G @ 163.76 MS; -25.47 G @ 83.92 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER HEAD Y-AXIS ACCELERATION
30 DEC CAR TO CAR

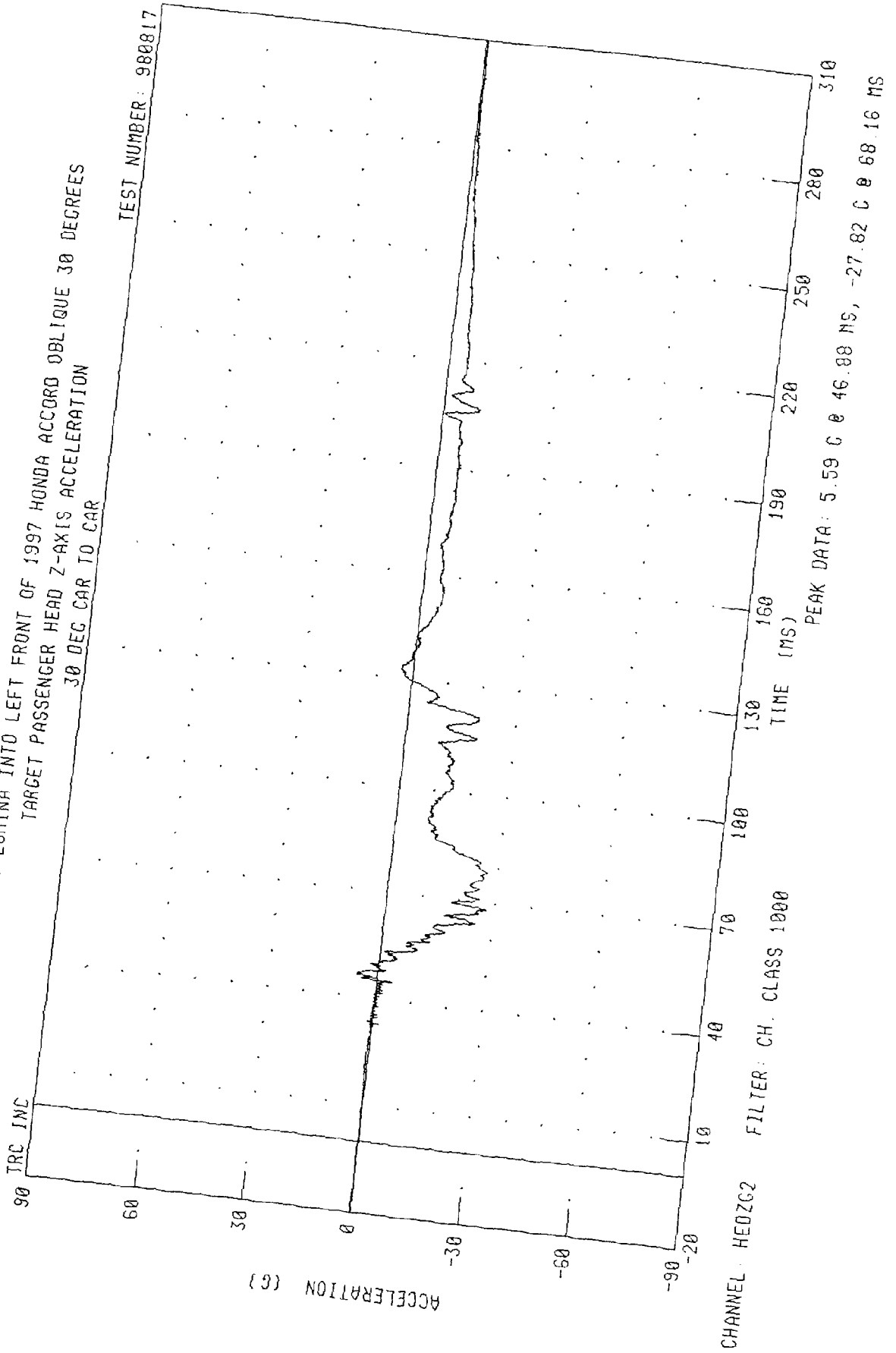
TEST NUMBER: 980817



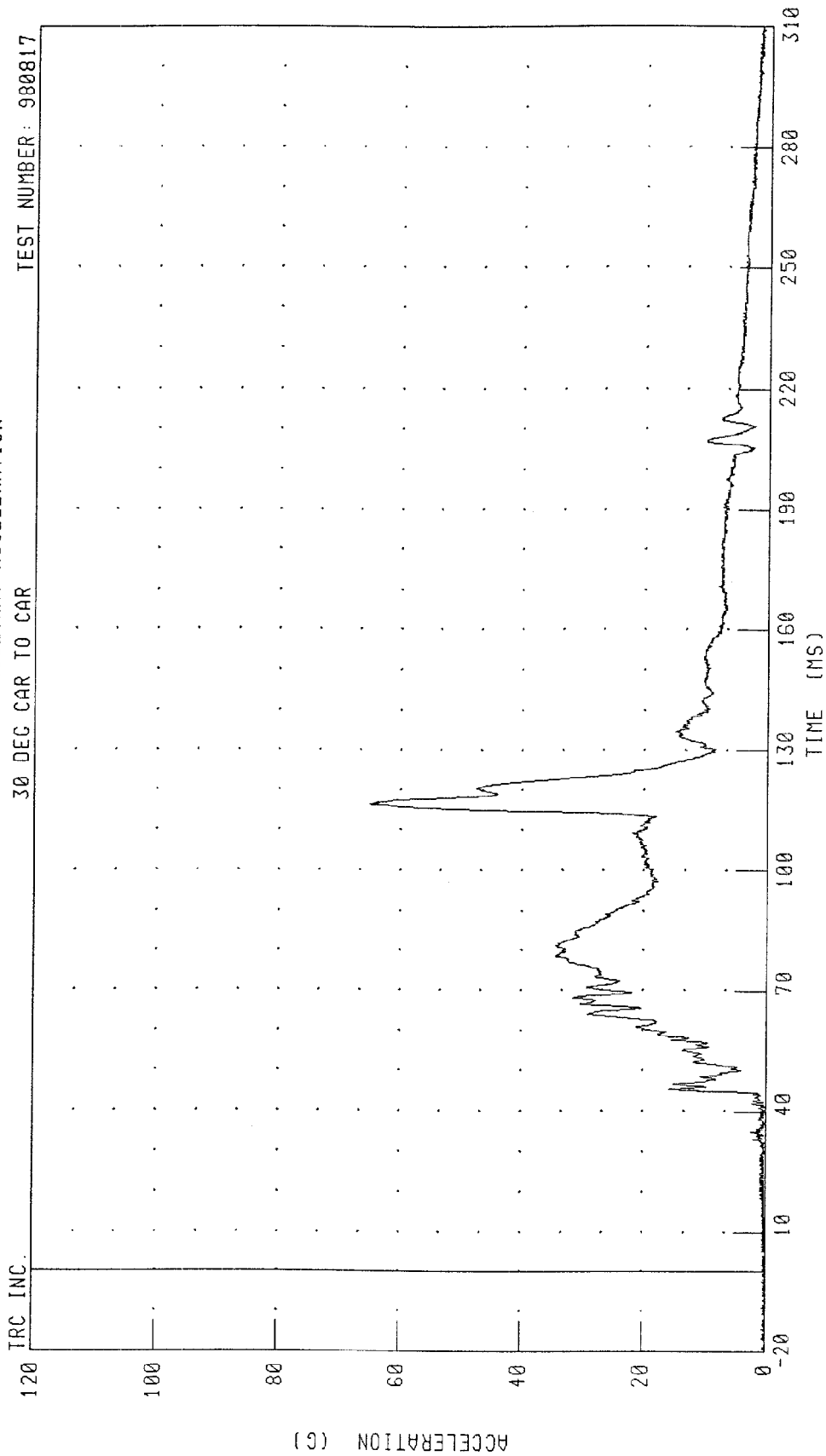
CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER HEAD Z-AXIS ACCELERATION
30 DEG CAR TO CAR

TEST NUMBER: 980817



1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER HEAD RESULTANT ACCELERATION



CHANNEL: HEDRC2 FILTER: CH. CLASS 1000

PEAK DATA: 65.20 G @ 116.56 MS; 0.04 G @ -20.00 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 TARGET PASSENGER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 980817

30 DEG CAR TO CAR

TRC INC.

60

40

20

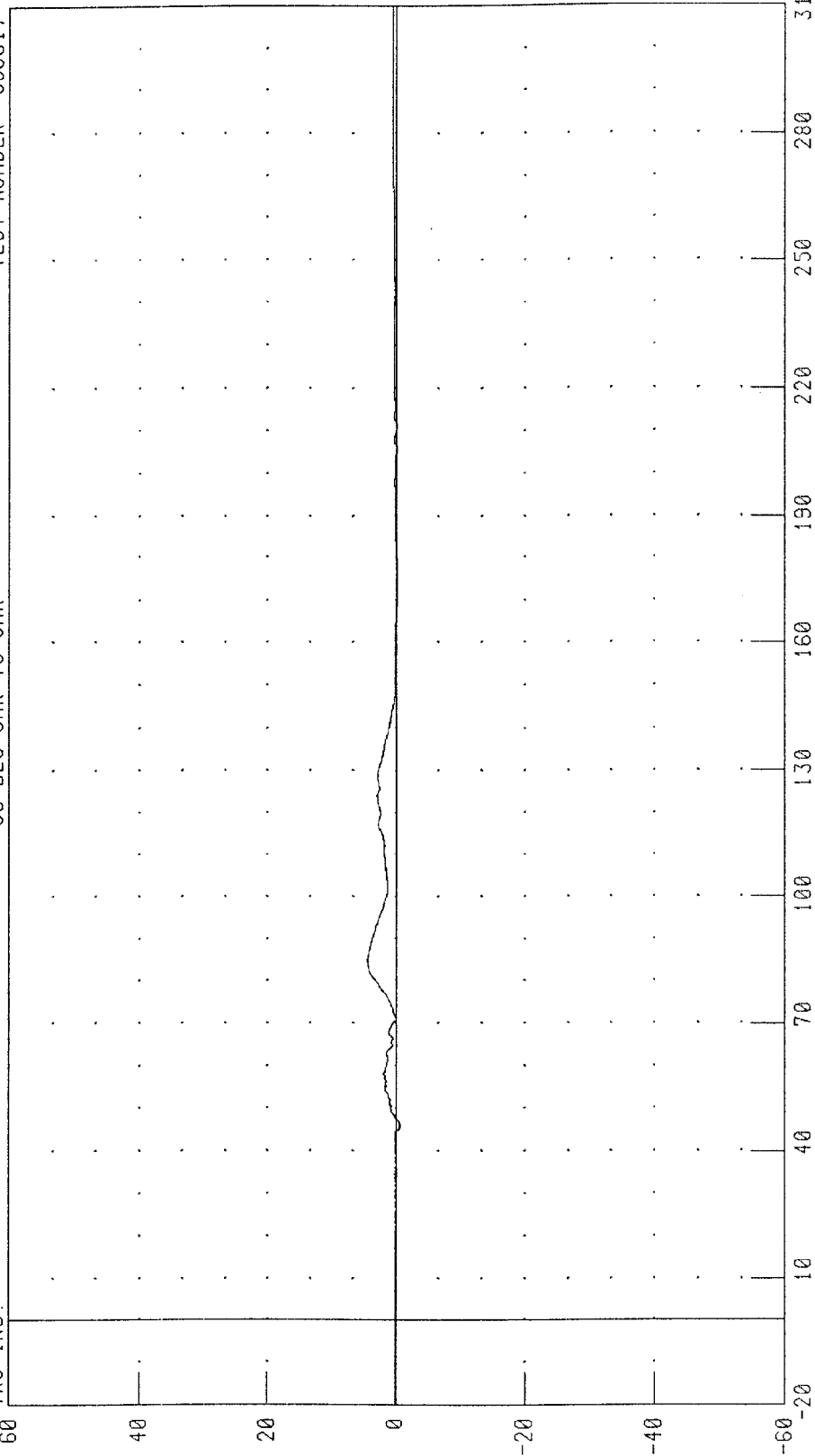
0

-20

-40

-60

FORCE (N X 10²)

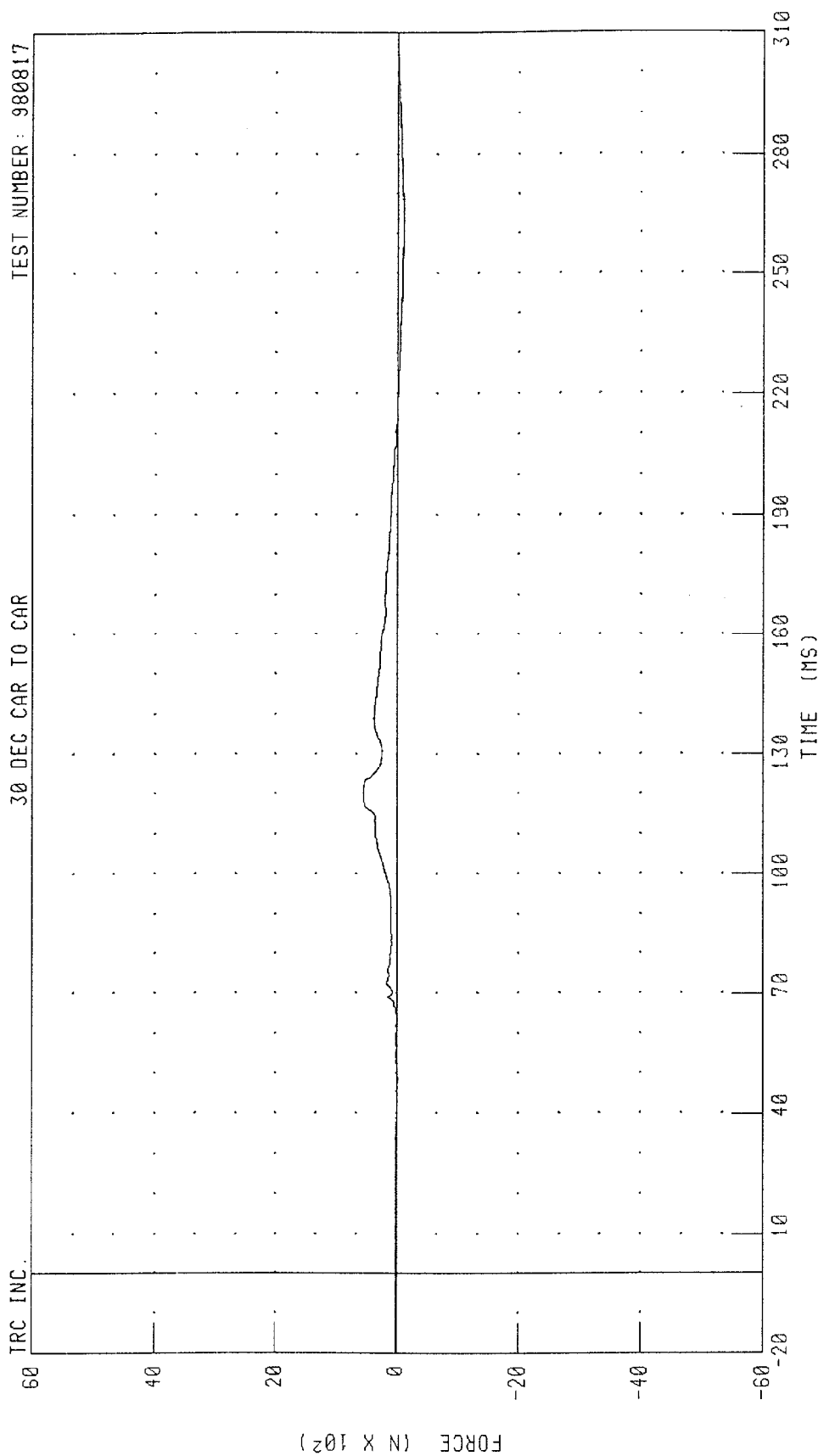


TIME (MS)

CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

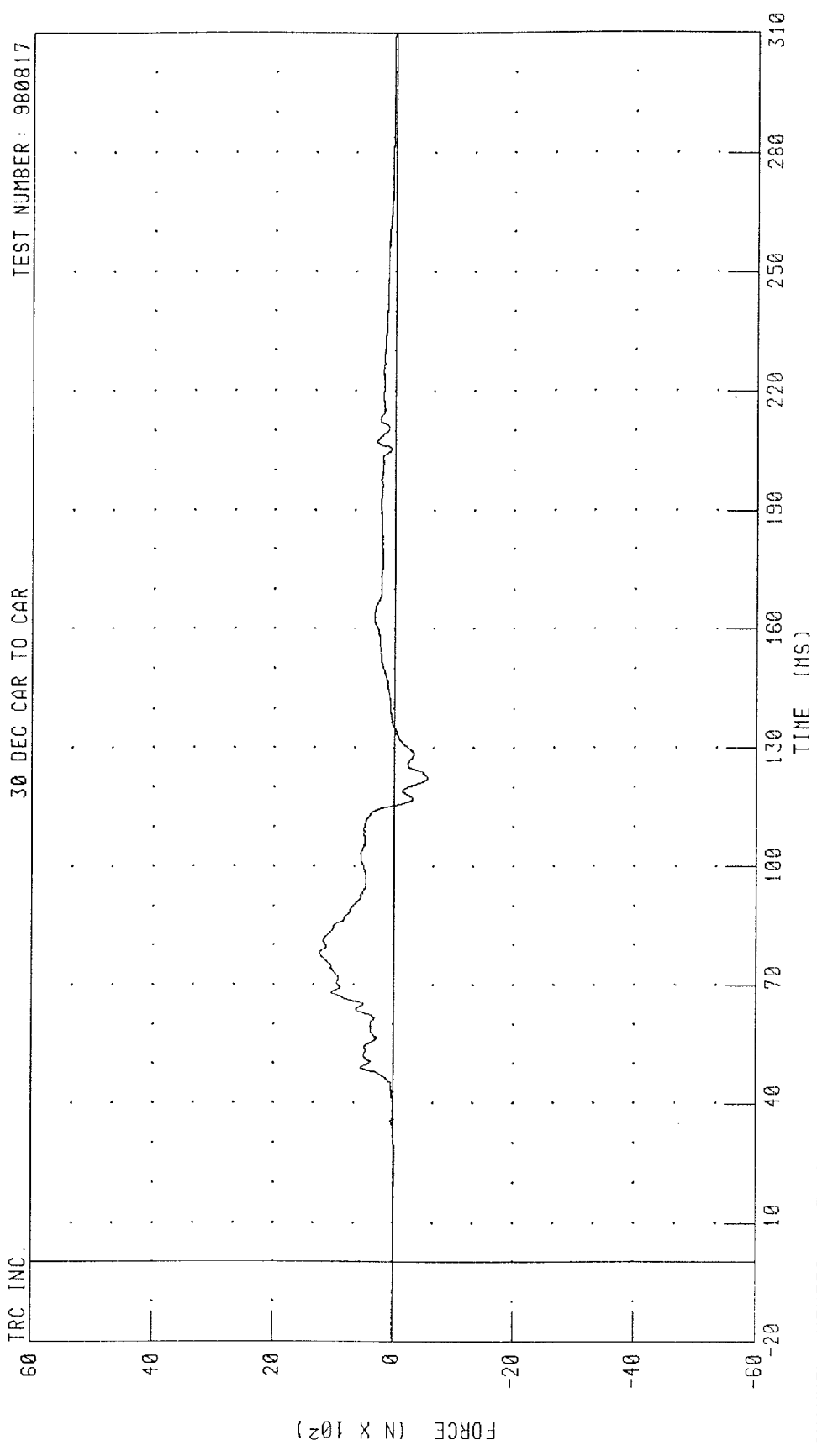
PEAK DATA: 444.90 N @ 84.56 MS; -80.99 N @ 45.60 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER NECK Y-AXIS SHEAR FORCE



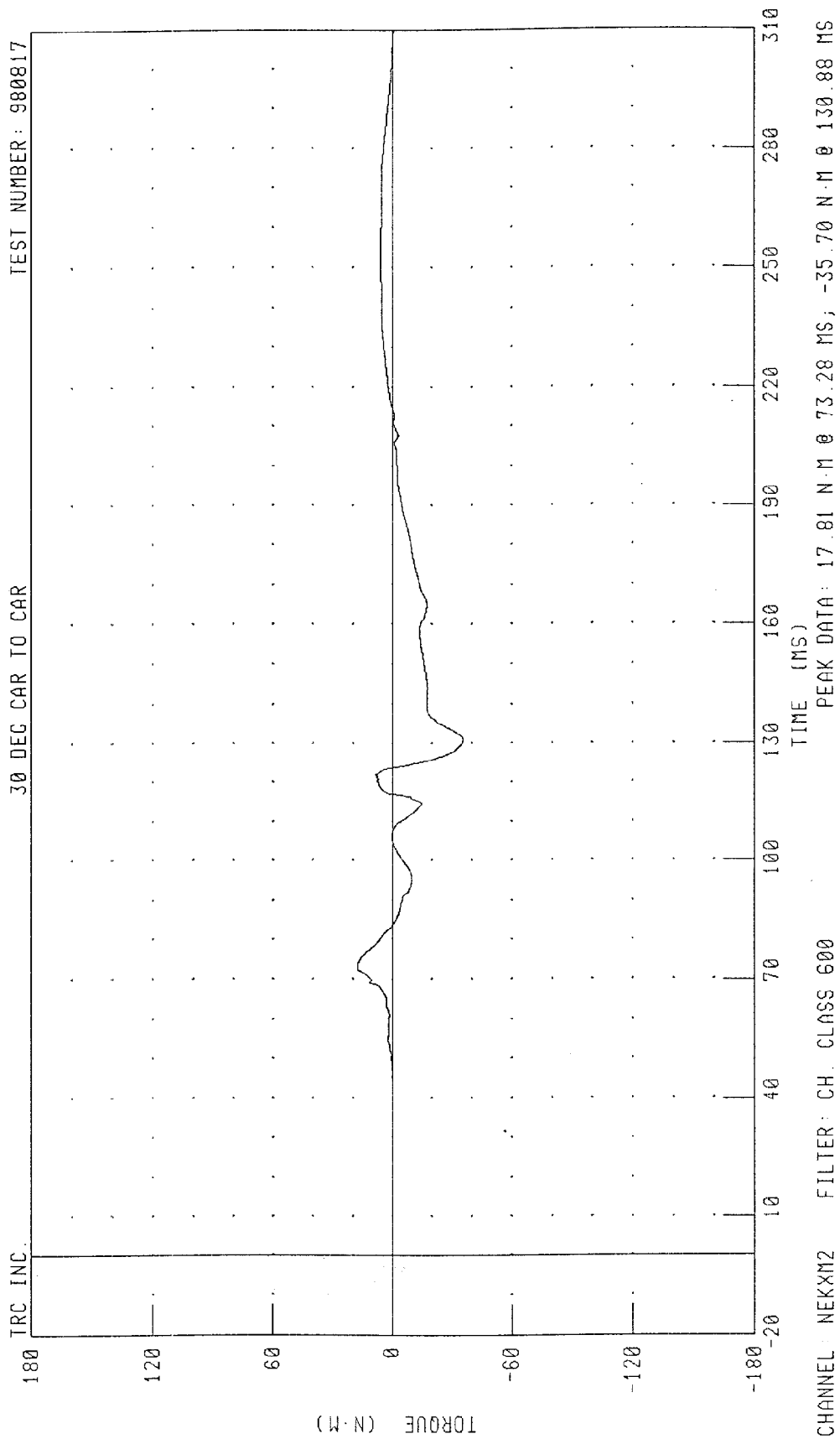
CHANNEL: NEKYF2 FILTER: CH. CLASS 1000 PEAK DATA: 554.17 N @ 119.28 MS; -111.31 N @ 263.92 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER NECK Z-AXIS AXIAL FORCE

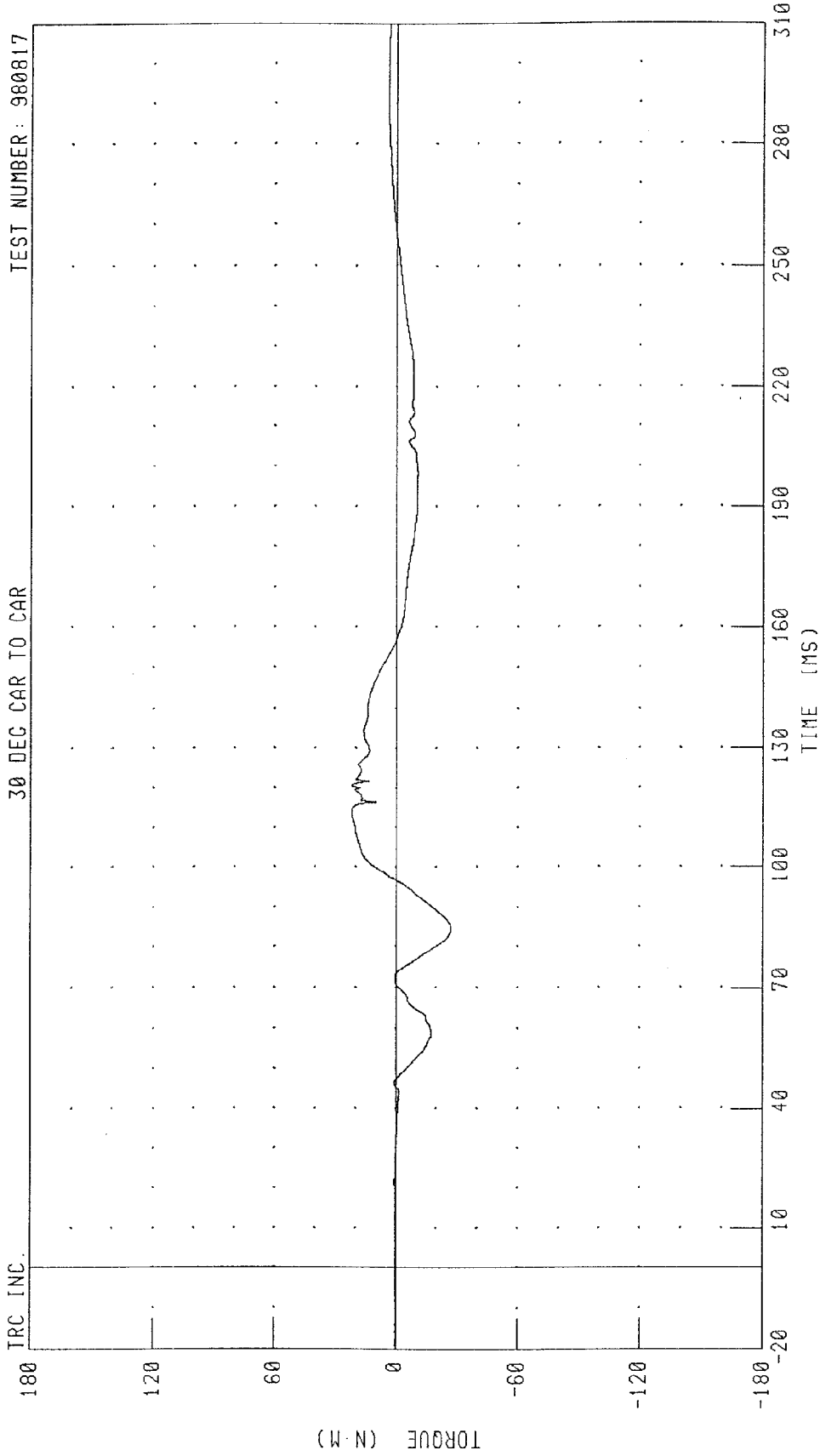


CHANNEL: NEKZF2 FILTER: CH. CLASS 1000 PEAK DATA: 1237.37 N @ 78.16 MS; -567.31 N @ 122.32 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER NECK MOMENT ABOUT X AXIS



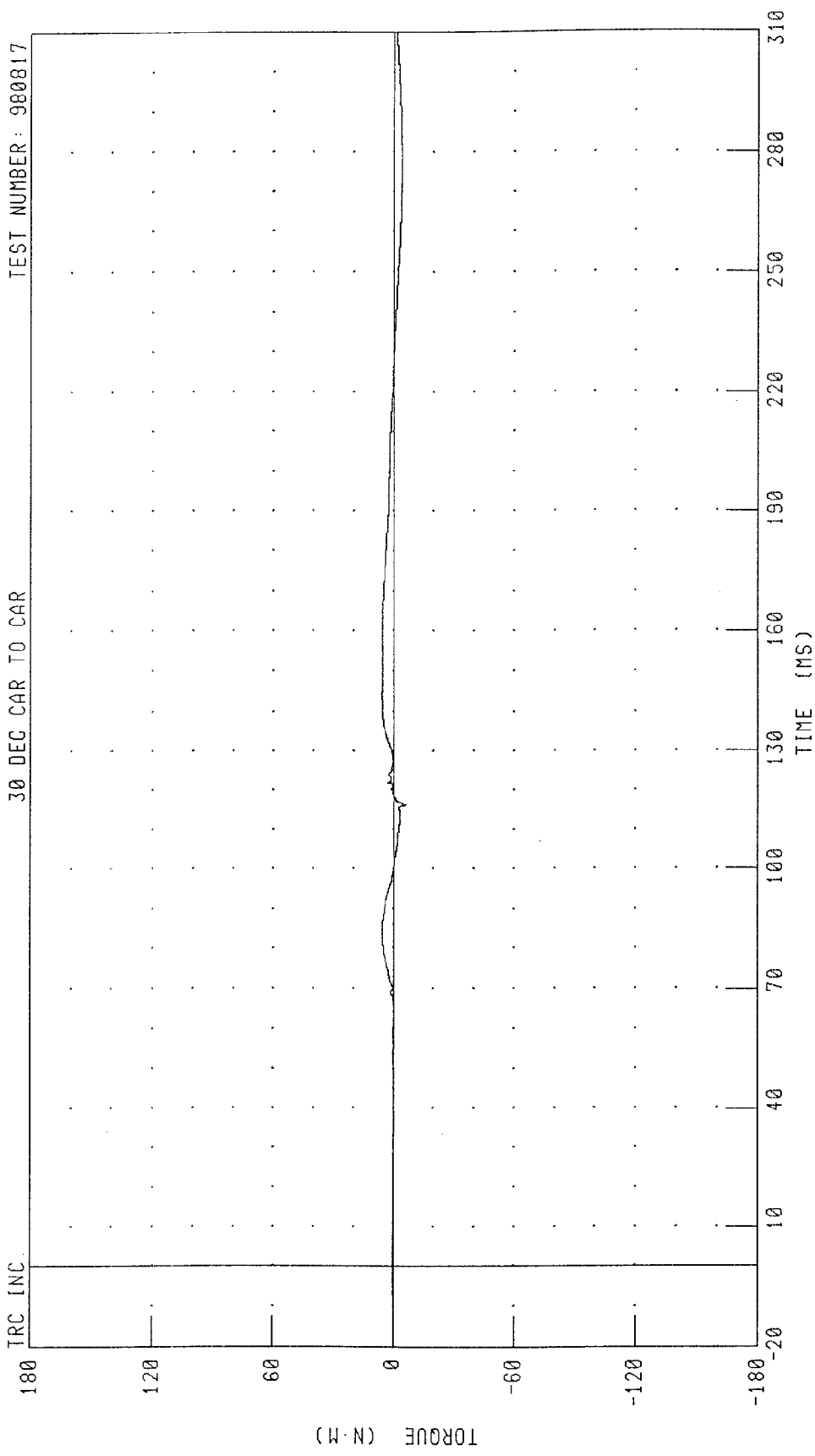
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER NECK MOMENT ABOUT Y AXIS



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

PEAK DATA: 21.96 N·M @ 120.64 MS, -27.29 N·M @ 84.88 MS

1995 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER NECK MOMENT ABOUT Z AXIS



CHANNEL: NEKZN2 FILTER: CH. CLASS 600

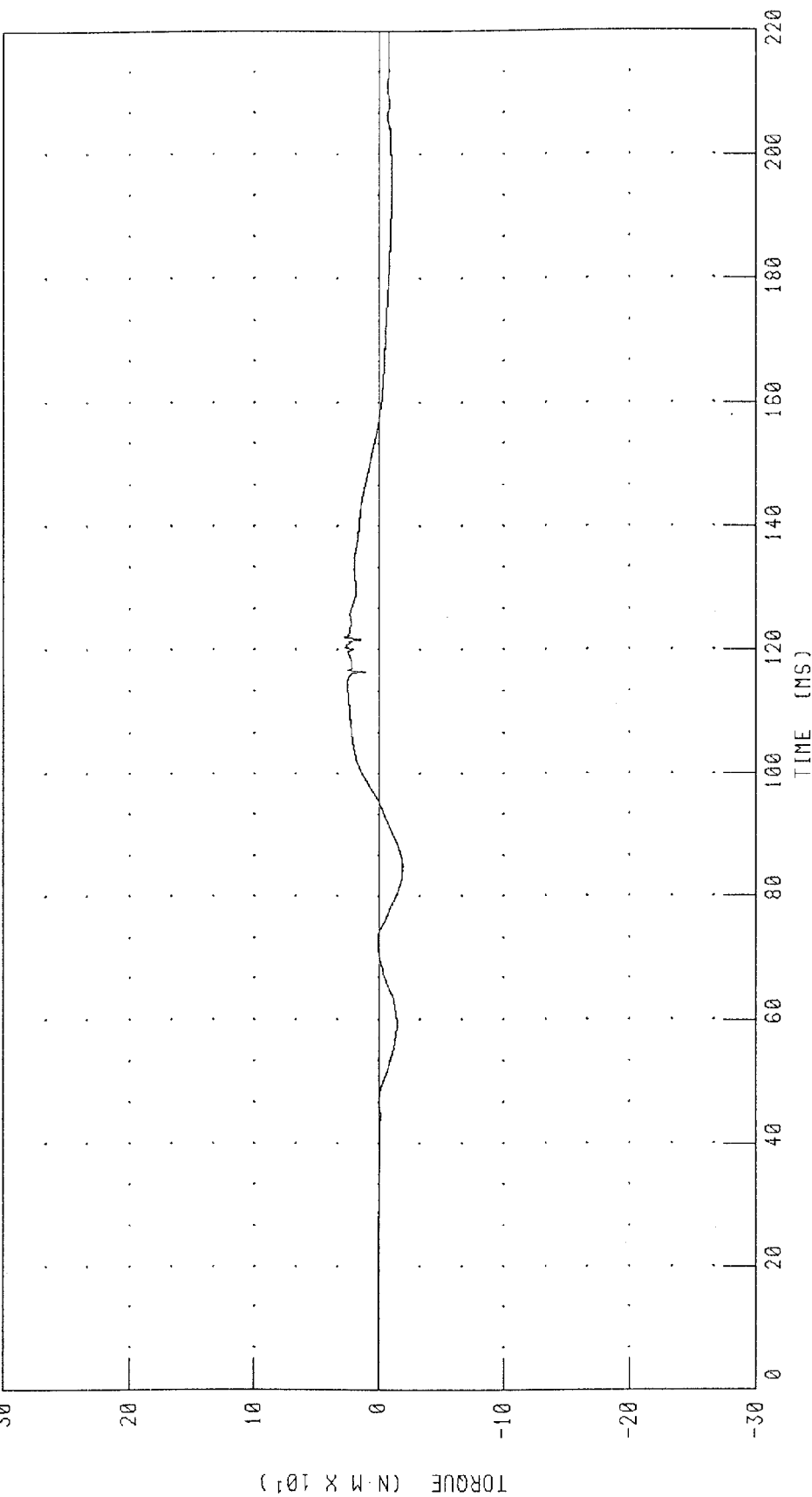
PEAK DATA: 5.65 N·M @ 144.64 MS; -6.34 N·M @ 116.32 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER NECK OCCIPITAL CONDYLE ABOUT Y AXIS

TRC INC.

30 DEC CAR TO CAR

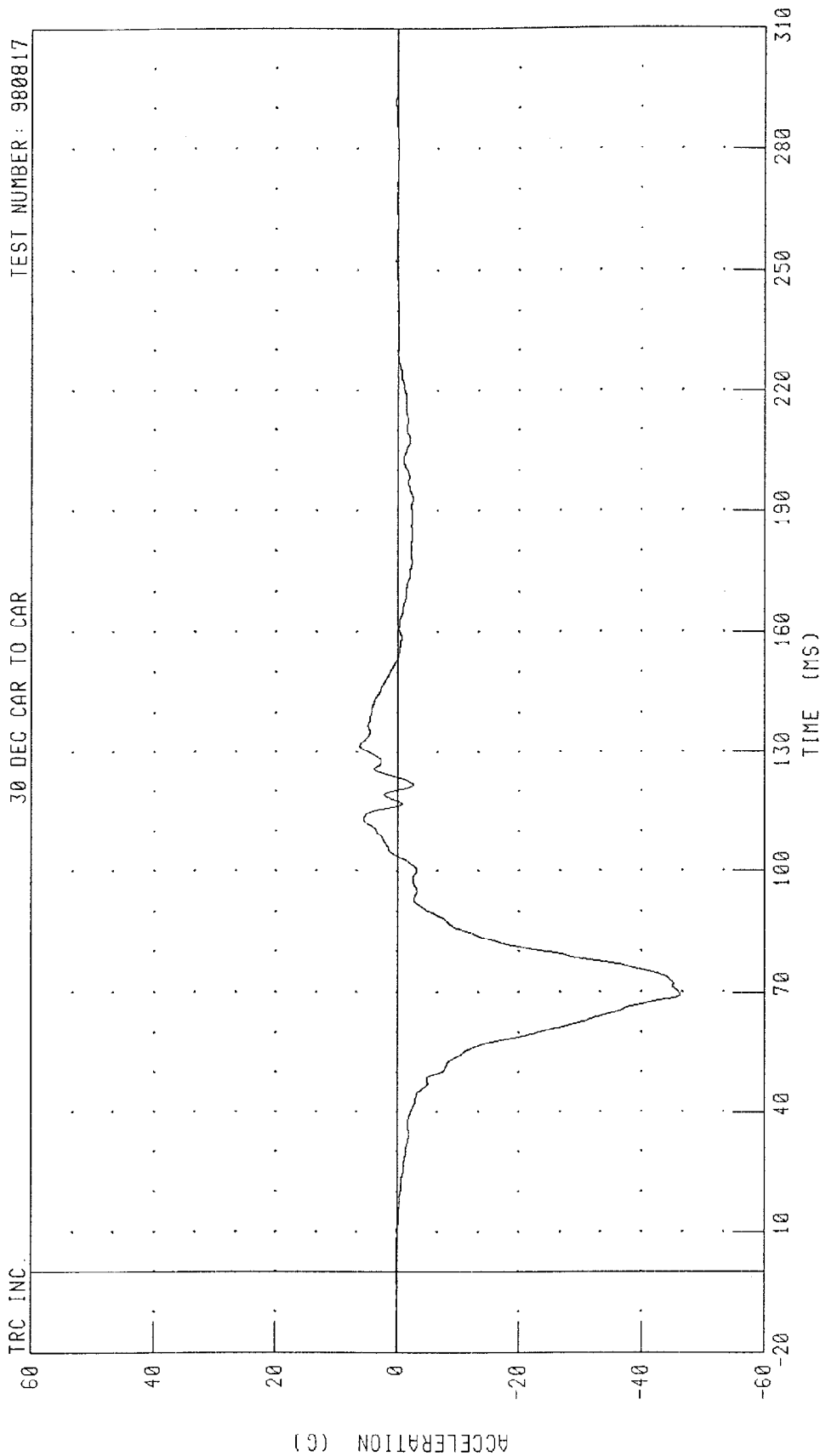
TEST NUMBER: 980817



CHANNEL: NEK0N2 FILTER: CH. CLASS 600

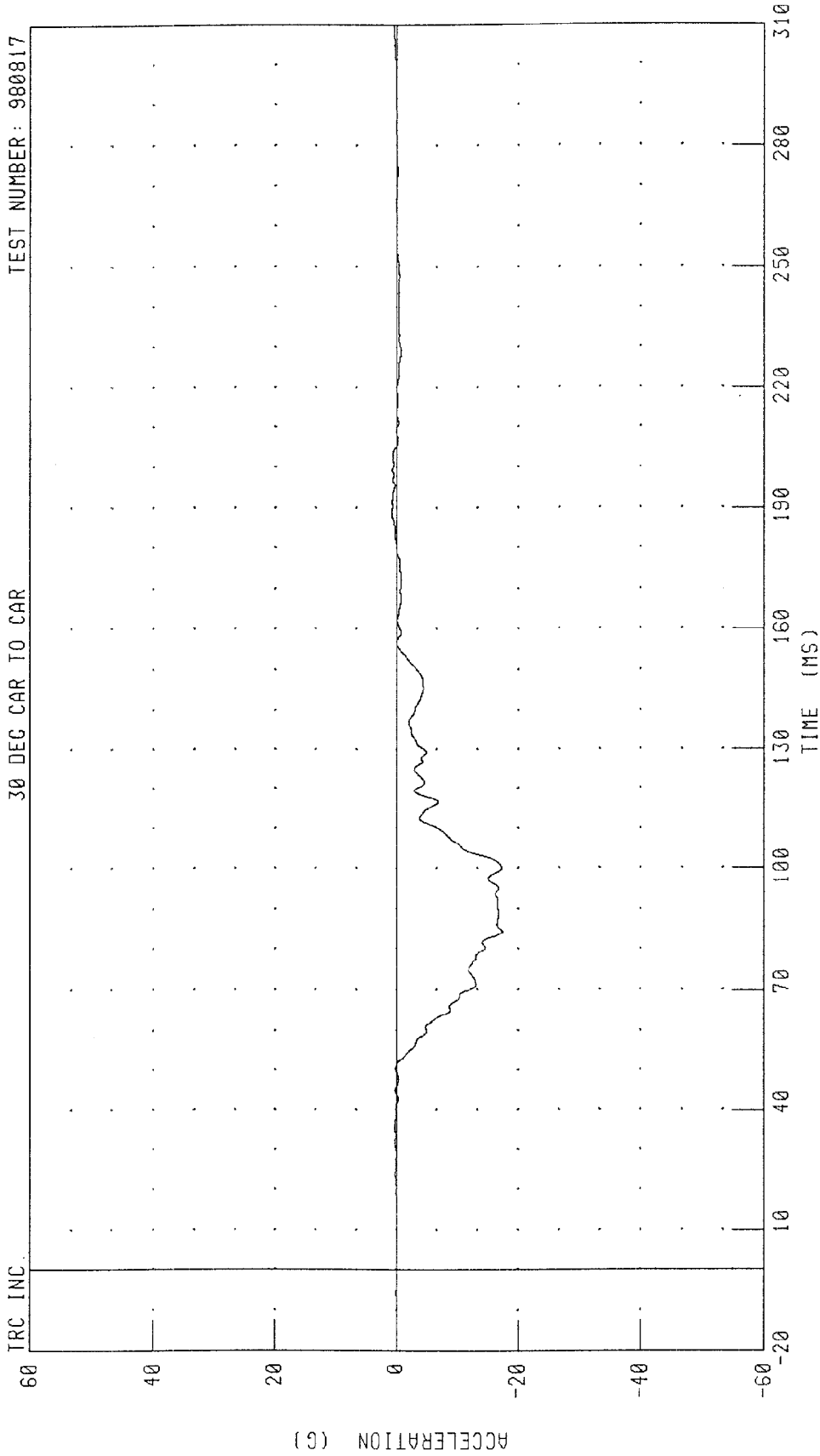
PEAK DATA: 27.25 N·m @ 122.16 MS, -19.52 N·m @ 84.80 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER CHEST X-AXIS ACCELERATION



CHANNEL: CSTXG2 FILTER: CH. CLASS 180

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER CHEST Y-AXIS ACCELERATION



CHANNEL: CSTYC2 FILTER: CH. CLASS 180

PEAK DATA: 0.82 G @ 188.56 MS, -17.46 G @ 84.40 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 980817

30 DEG CAR TO CAR

TRC INC.

60

40

20

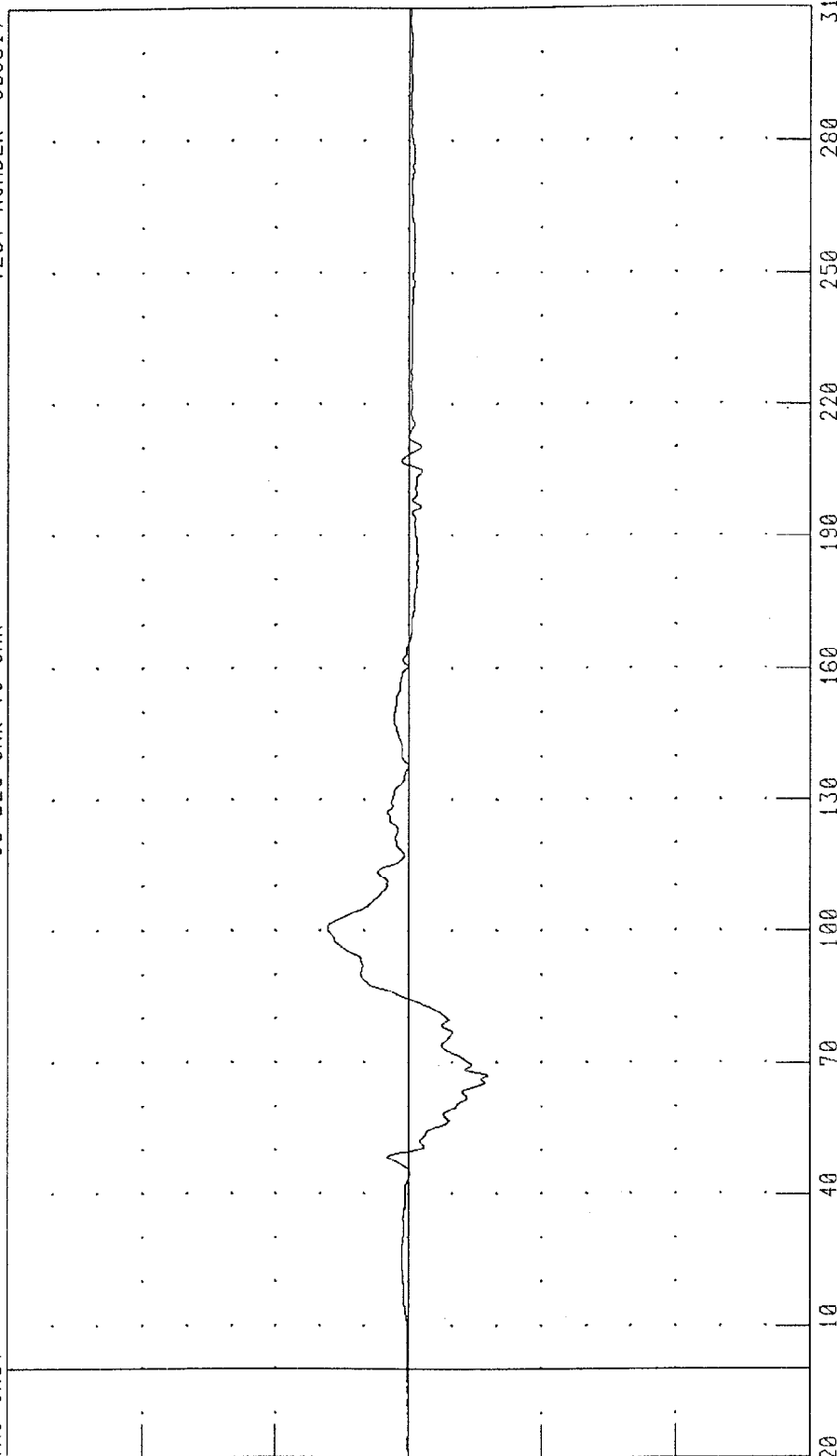
0

-20

-40

-60

ACCELERATION (G)



TIME (MS)

PEAK DATA: 12.14 G @ 100.48 MS; -11.97 G @ 67.28 MS

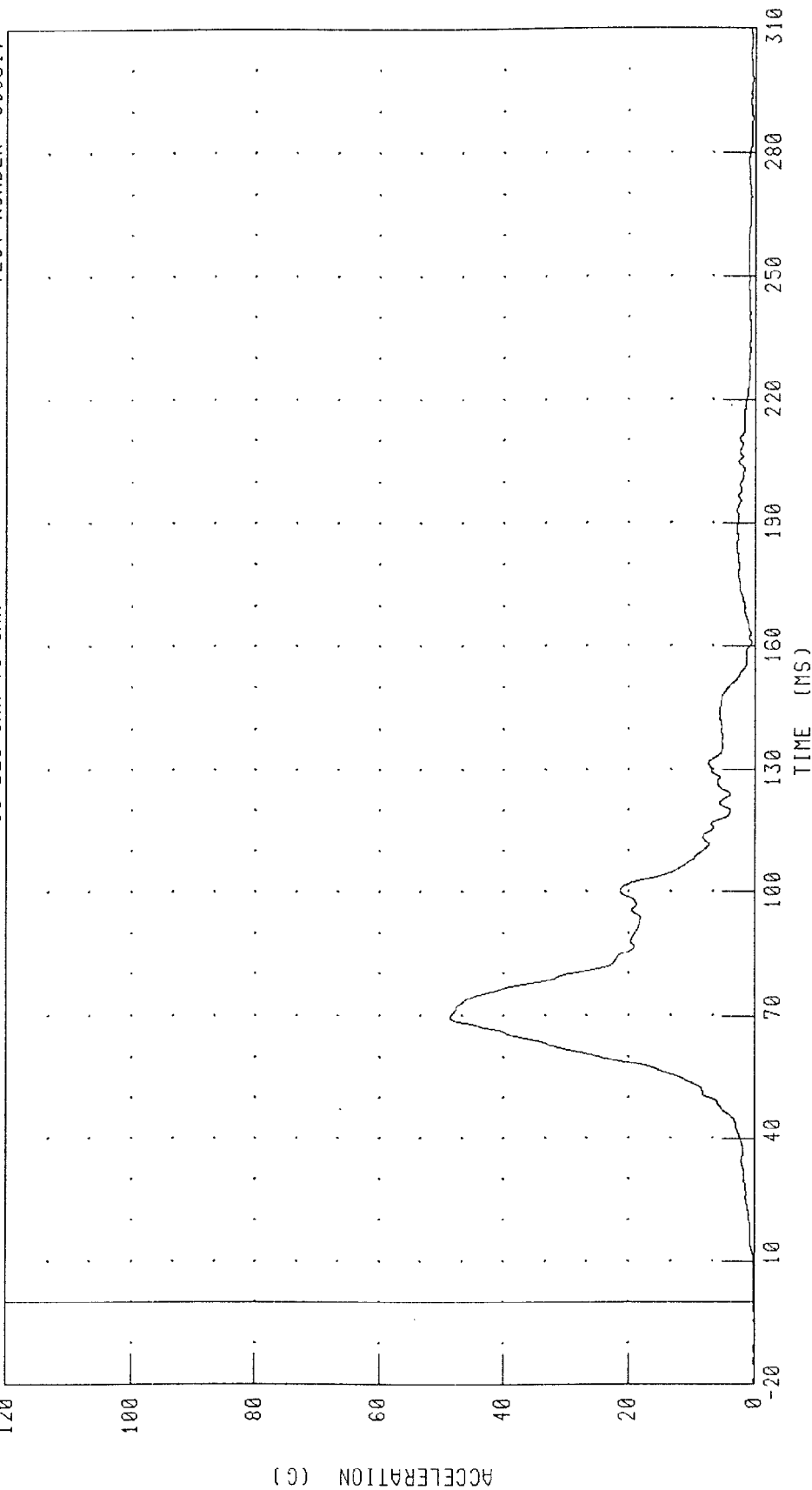
CHANNEL: CS17C2 FILTER: CH. CLASS 180

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER CHEST RESULTANT ACCELERATION

TEST NUMBER: 980817

30 DEG CAR TO CAR

TRC INC.



CHANNEL: CSTRG2 FILTER: CH. CLASS 180

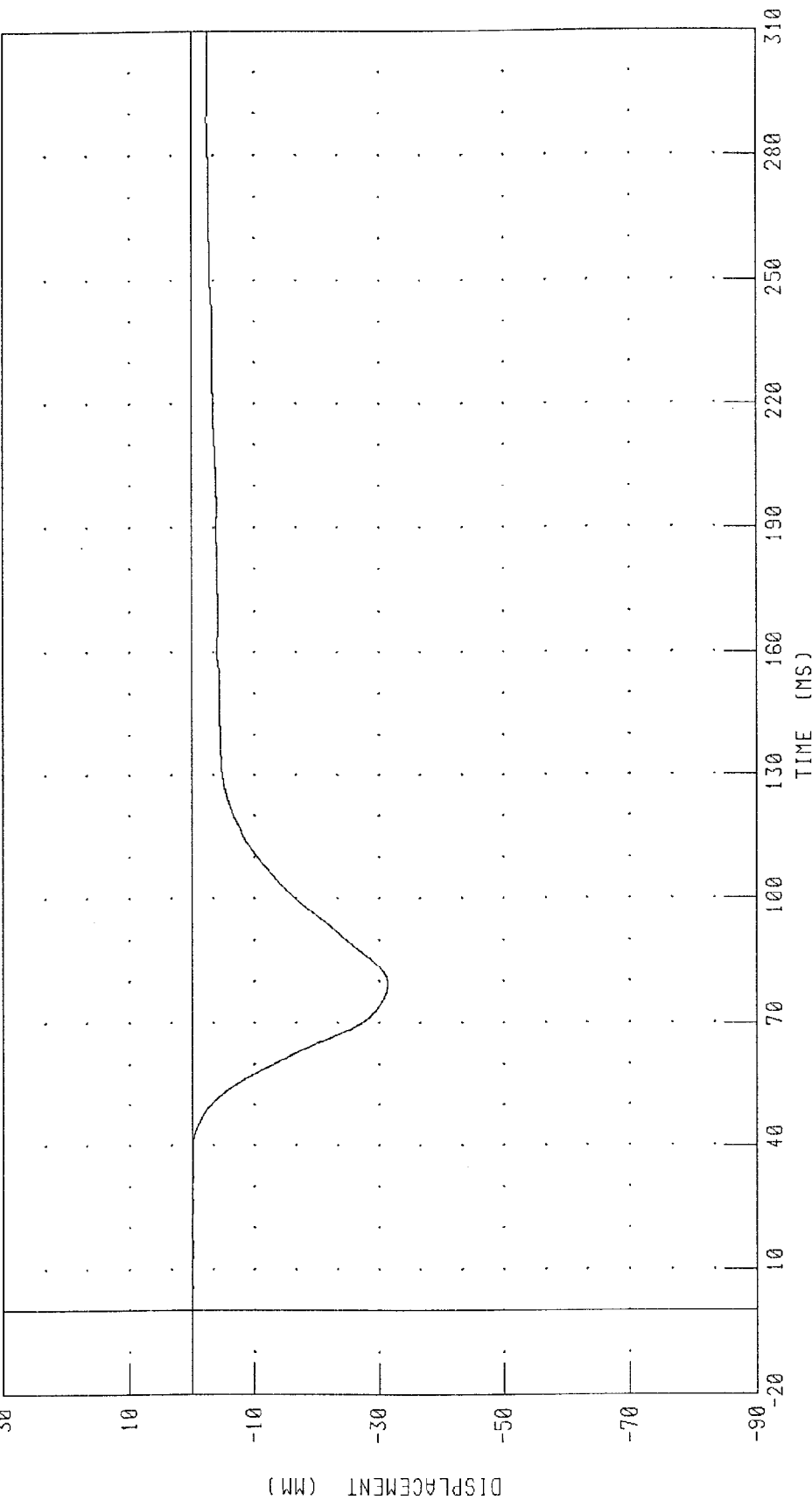
PEAK DATA: 48.55 G @ 69.60 MS; 0.00 G @ -3.52 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER CHEST DEFLECTION

TEST NUMBER: 980817

30 DEC CAR TO CAR

TRC INC.



CHANNEL: CSTXD2 FILTER: CH. CLASS 180

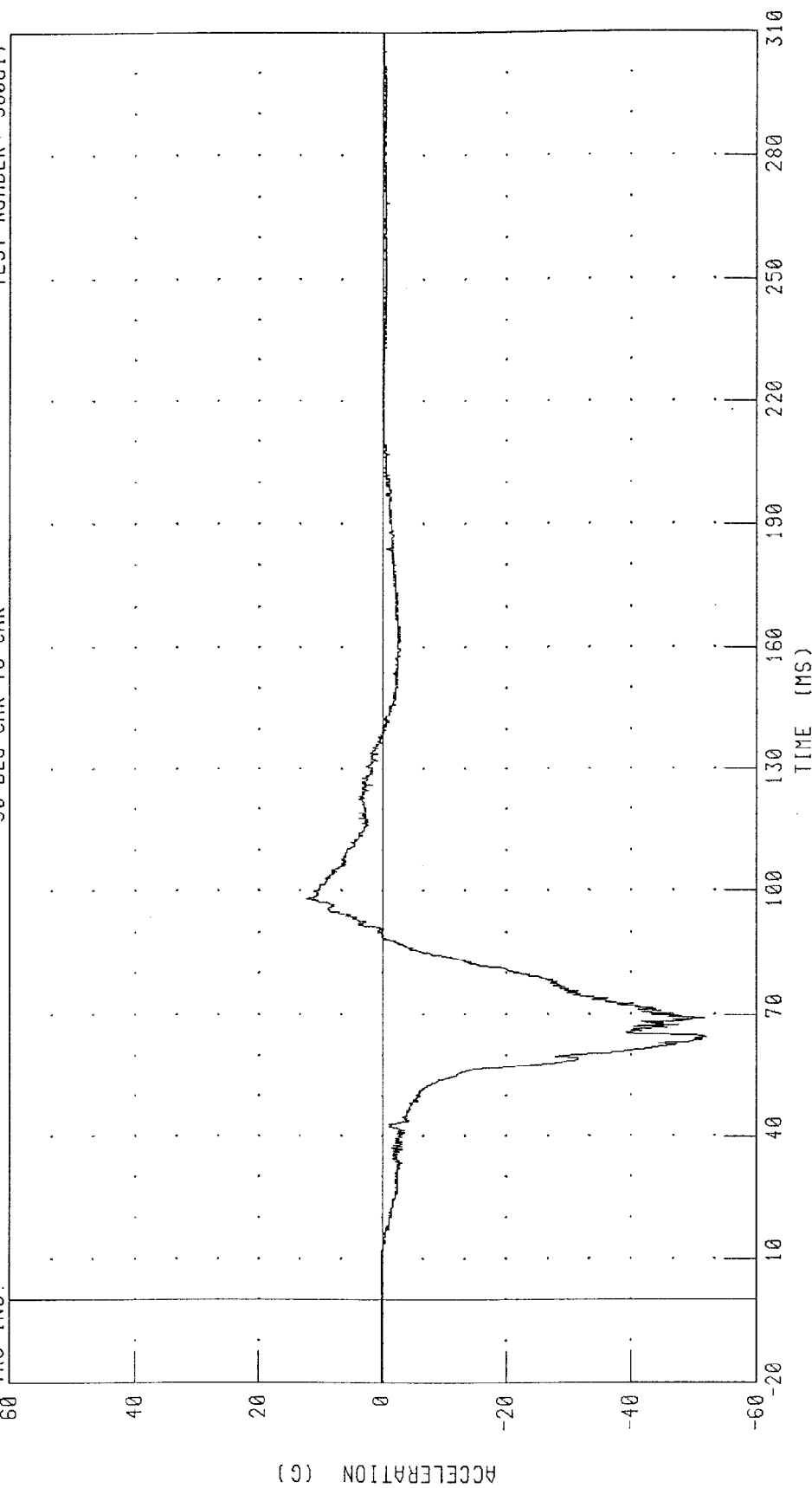
PEAK DATA: 0.01 MM @ 1.92 MS, -31.41 MM @ 79.60 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER PELVIS X-AXIS ACCELERATION

TRC INC.

30 DEG CAR TO CAR

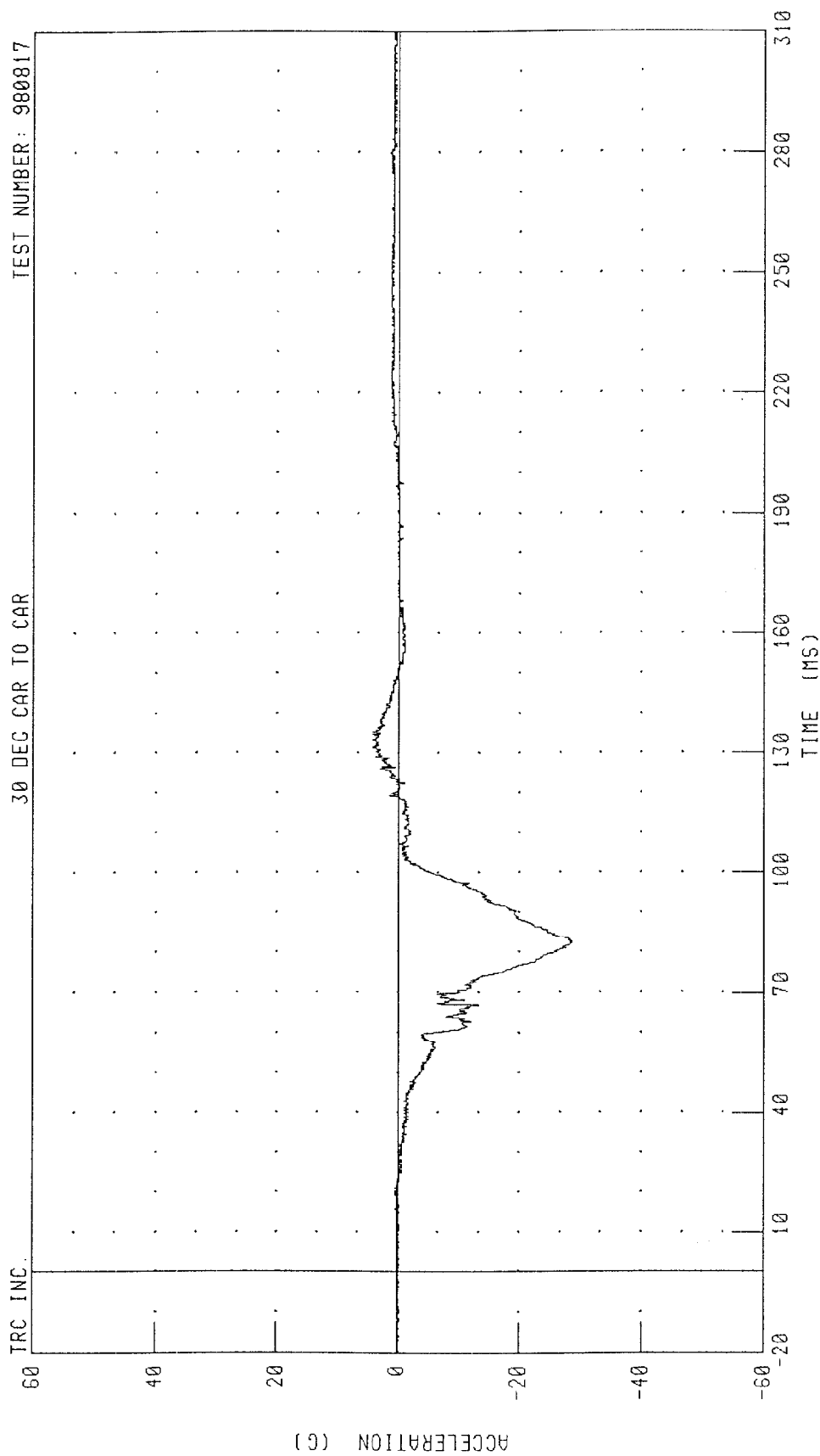
TEST NUMBER: 980817



CHANNEL: PEVXC2 FILTER: CH. CLASS 1000

PEAK DATA: 12 21 G @ 98.16 MS, -52.09 G @ 64.56 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER PELVIS Y-AXIS ACCELERATION



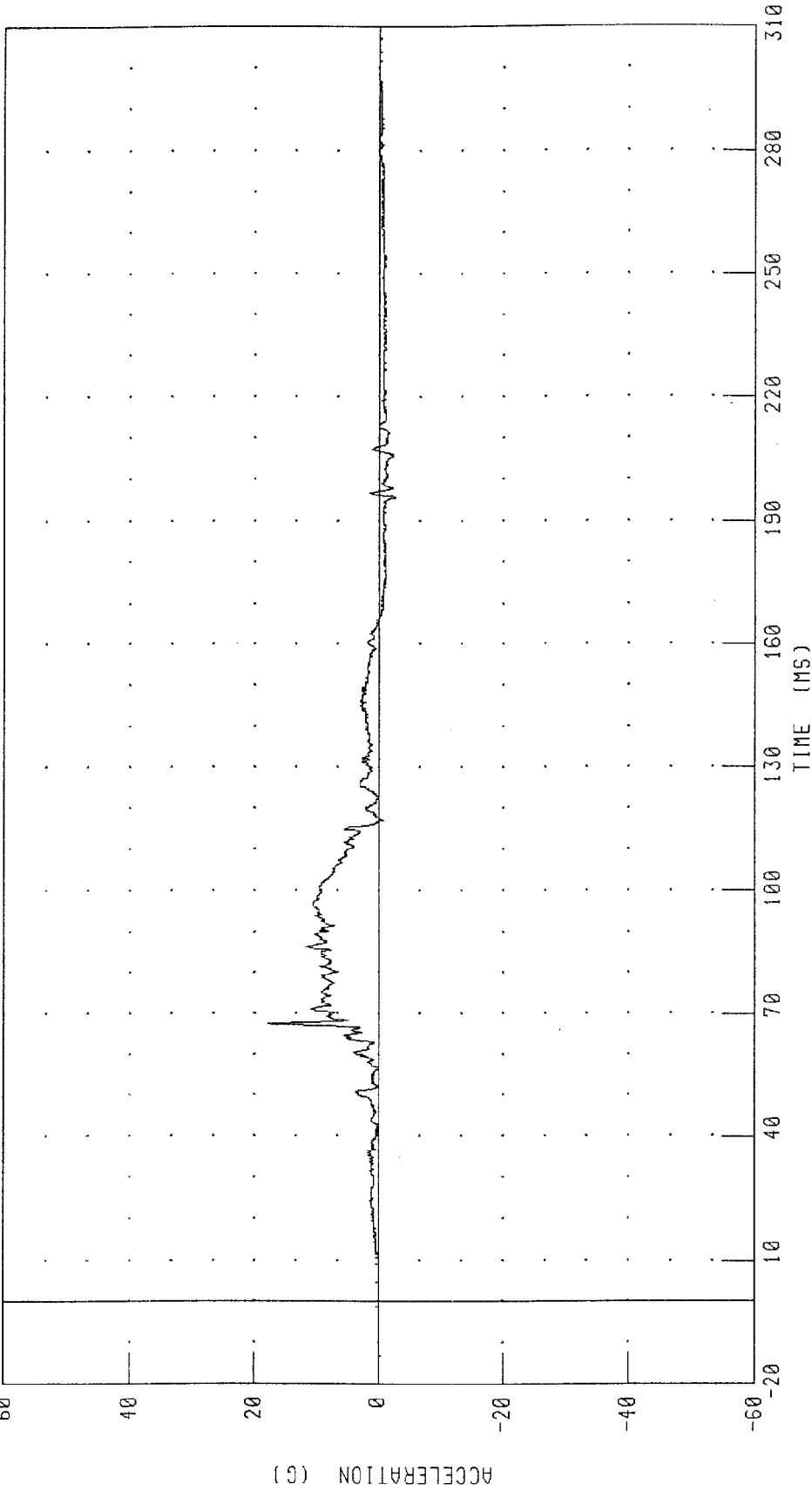
CHANNEL: PEVYG2 FILTER: CH. CLASS 1000 PEAK DATA: 4.10 G @ 131.44 MS; -28.72 G @ 82.40 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 TARGET PASSENGER PELVIS Z-AXIS ACCELERATION

TEST NUMBER: 980817

30 DEG CAR TO CAR

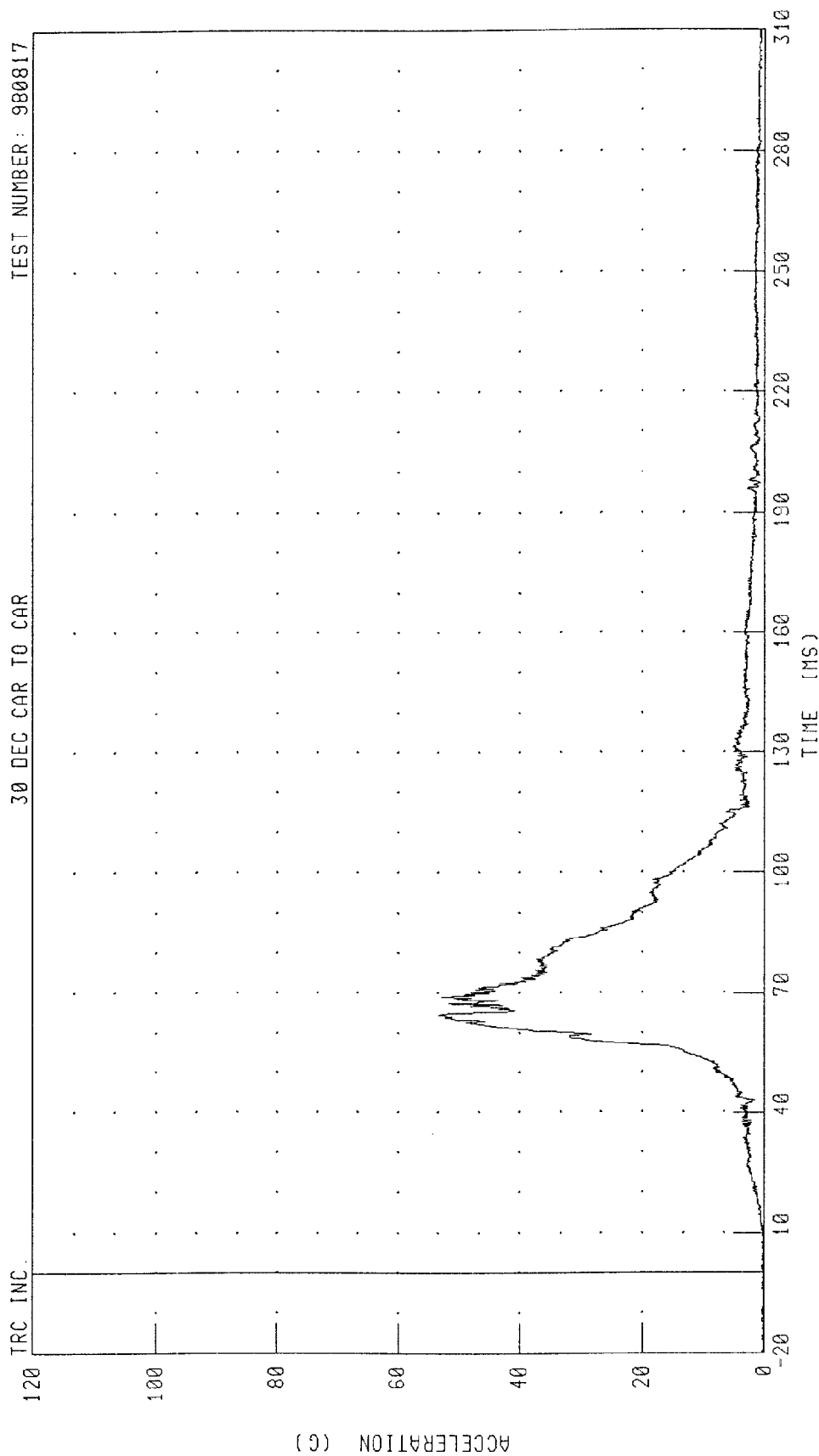
TRC INC.



CHANNEL: PEVZG2 FILTER: CH. CLASS 1000

PEAK DATA: 17.96 G @ 67.52 MS, -2.57 G @ 195.68 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER PELVIS RESULTANT



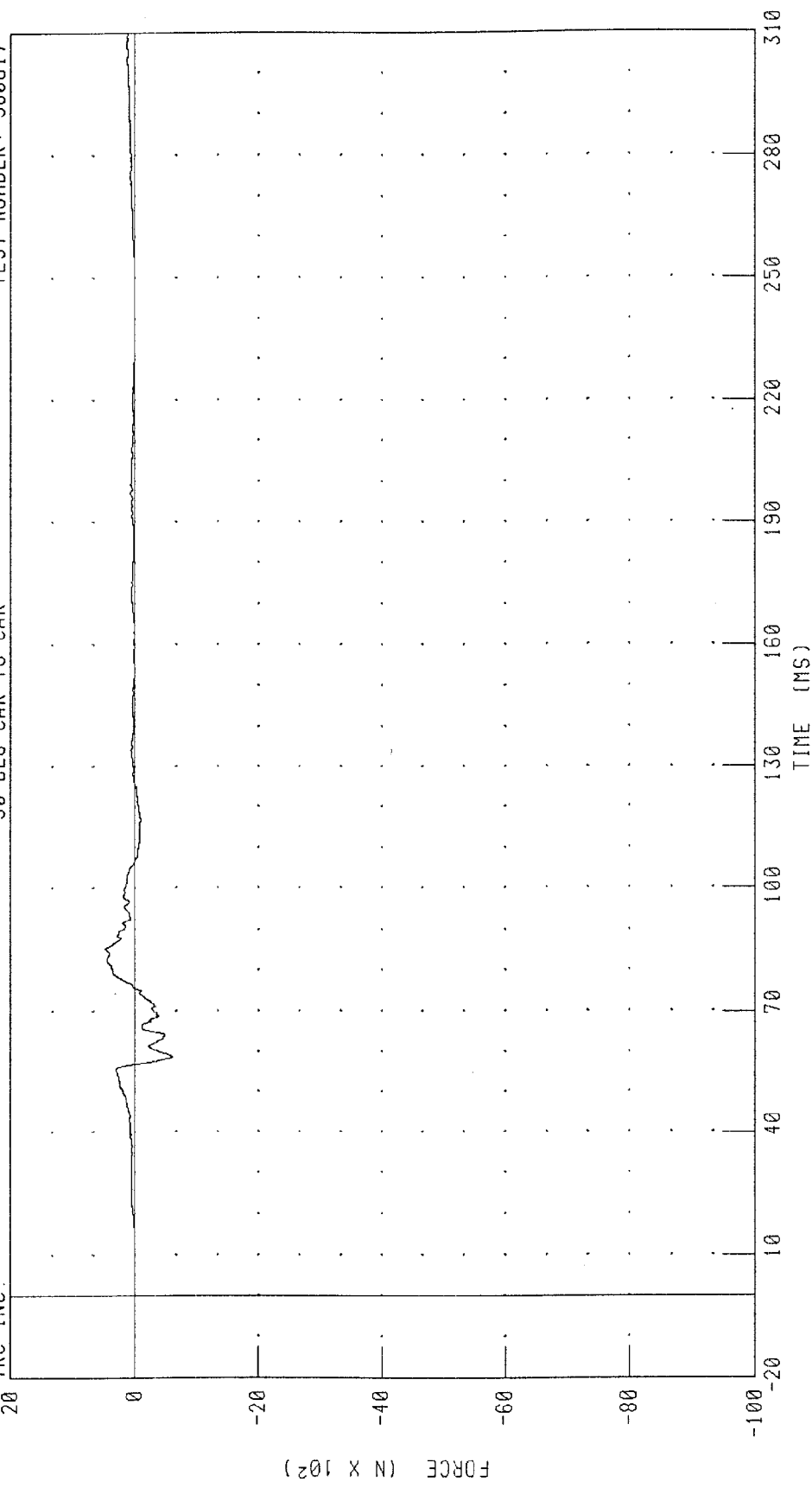
CHANNEL: PEVRC2 FILTER: CH. CLASS 1000 PEAK DATA: 53.30 G @ 64.64 MS; 0.10 G @ -20.00 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER LEFT FEMUR FORCE

TEST NUMBER: 980817

30 DEC CAR TO CAR

TRC INC.

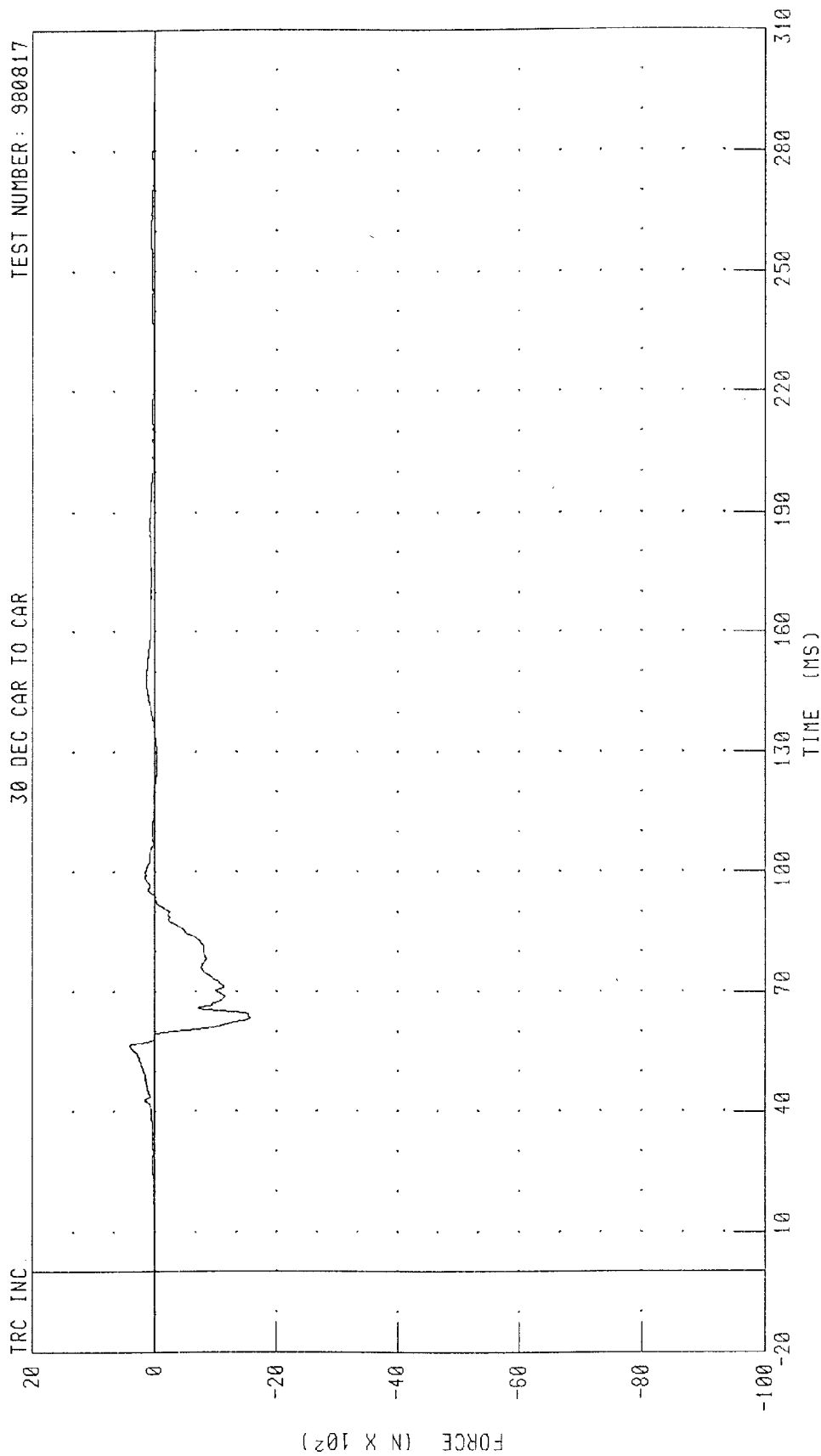


CHANNEL: LFNF2 FILTER: CH. CLASS 600

PEAK DATA: 474.12 N @ 85.44 MS; -605.66 N @ 58.88 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET PASSENGER RIGHT FEMUR FORCE

TRC INC. 30 DEC CAR TO CAR TEST NUMBER: 980817



CHANNEL: RFMF2 FILTER: CH. CLASS 600 PEAK DATA: 410.41 N @ 56.48 MS; -1561.19 N @ 63.52 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET LEFT REAR SEAT X-AXIS ACCELERATION

TRC INC. TEST NUMBER: 980817

30 DEG CAR TO CAR

60

40

20

0

-20

-40

-60

ACCELERATION (G)

TIME (MS)

10

40

70

100

130

160

190

220

250

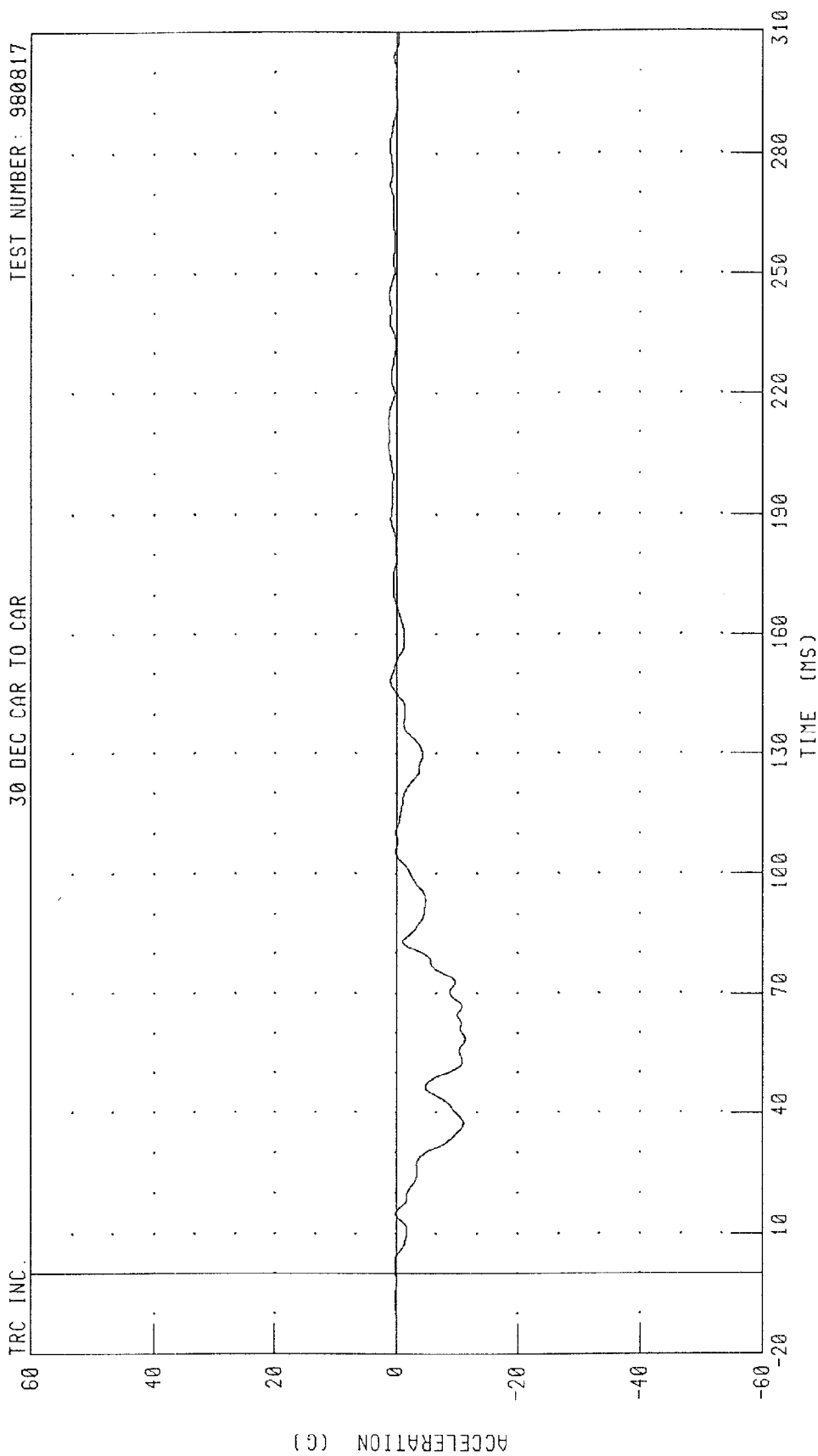
280

310

PEAK DATA: 1.05 G @ 209.76 MS, -18.82 G @ 64.32 MS

CHANNEL: TLRXC2 FILTER: CH. CLASS 60

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 TARGET LEFT REAR SEAT Y-AXIS ACCELERATION



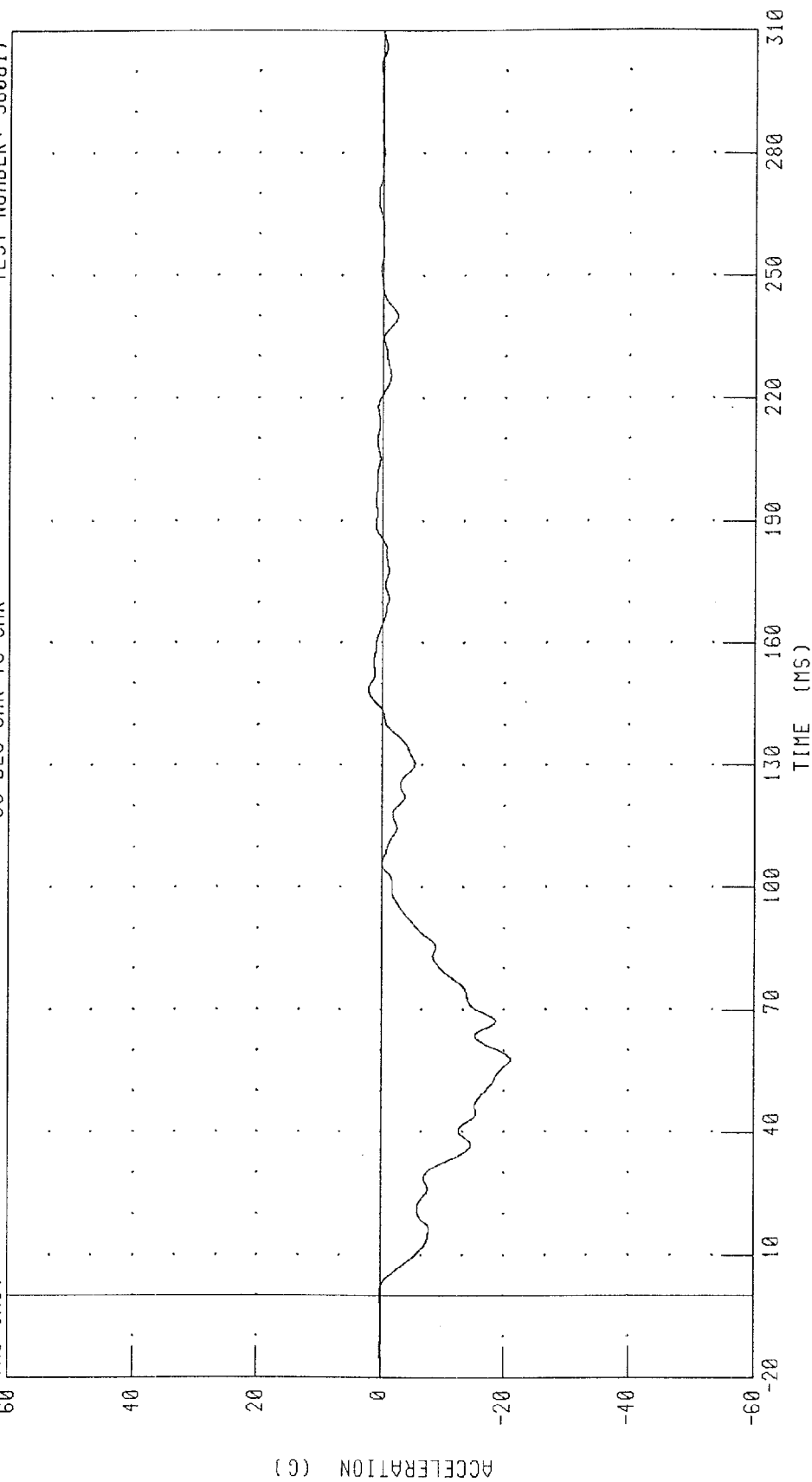
CHANNEL: TLRYG2 FILTER: CH. CLASS 60 PEAK DATA: 1.26 G @ 212.40 MS, -11.39 G @ 58.64 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET RIGHT REAR SEAT X-AXIS ACCELERATION

TRC INC.

30 DEC CAR TO CAR

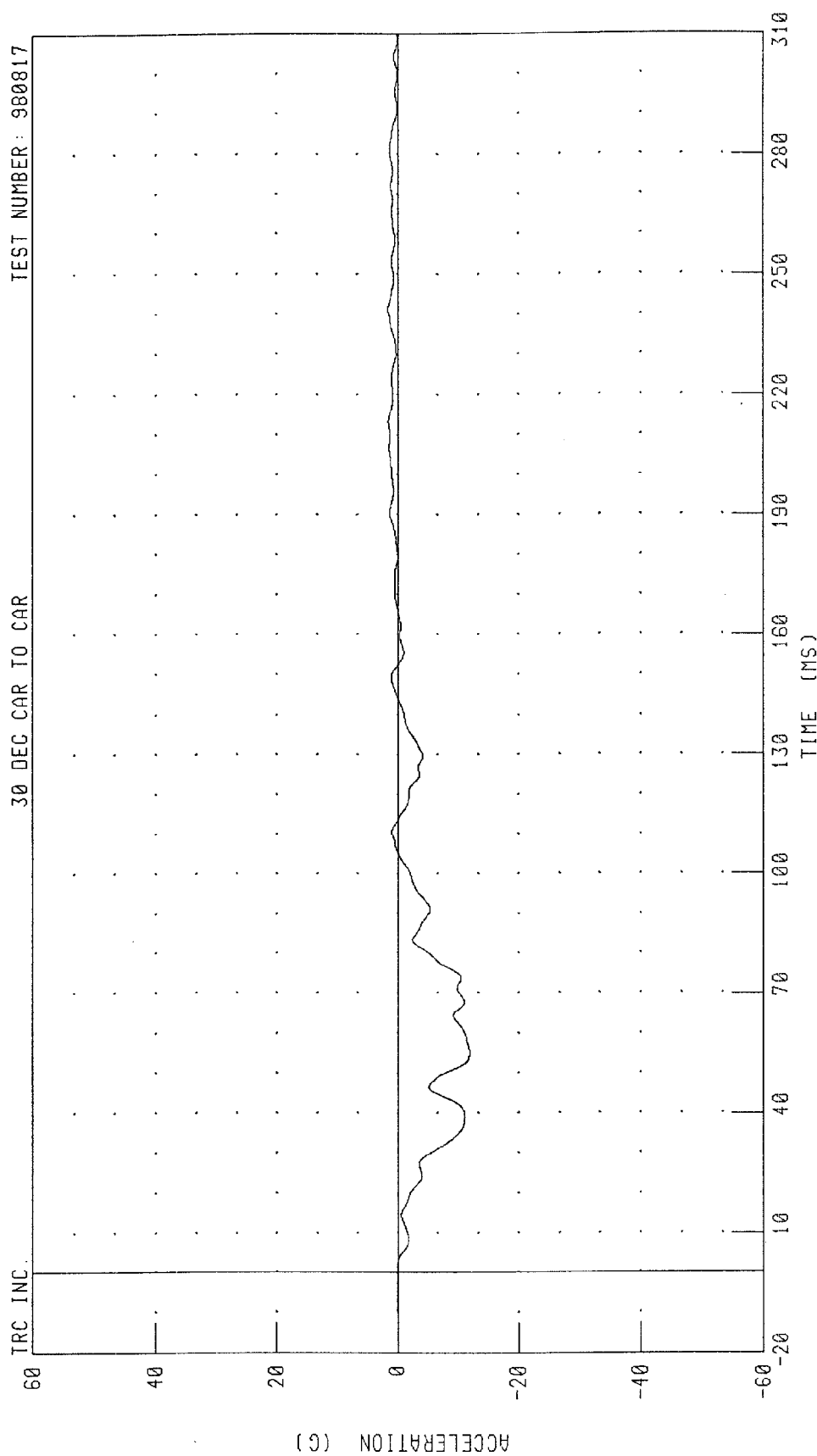
TEST NUMBER: 980817



CHANNEL: TRRXG2 FILTER: CH. CLASS 60

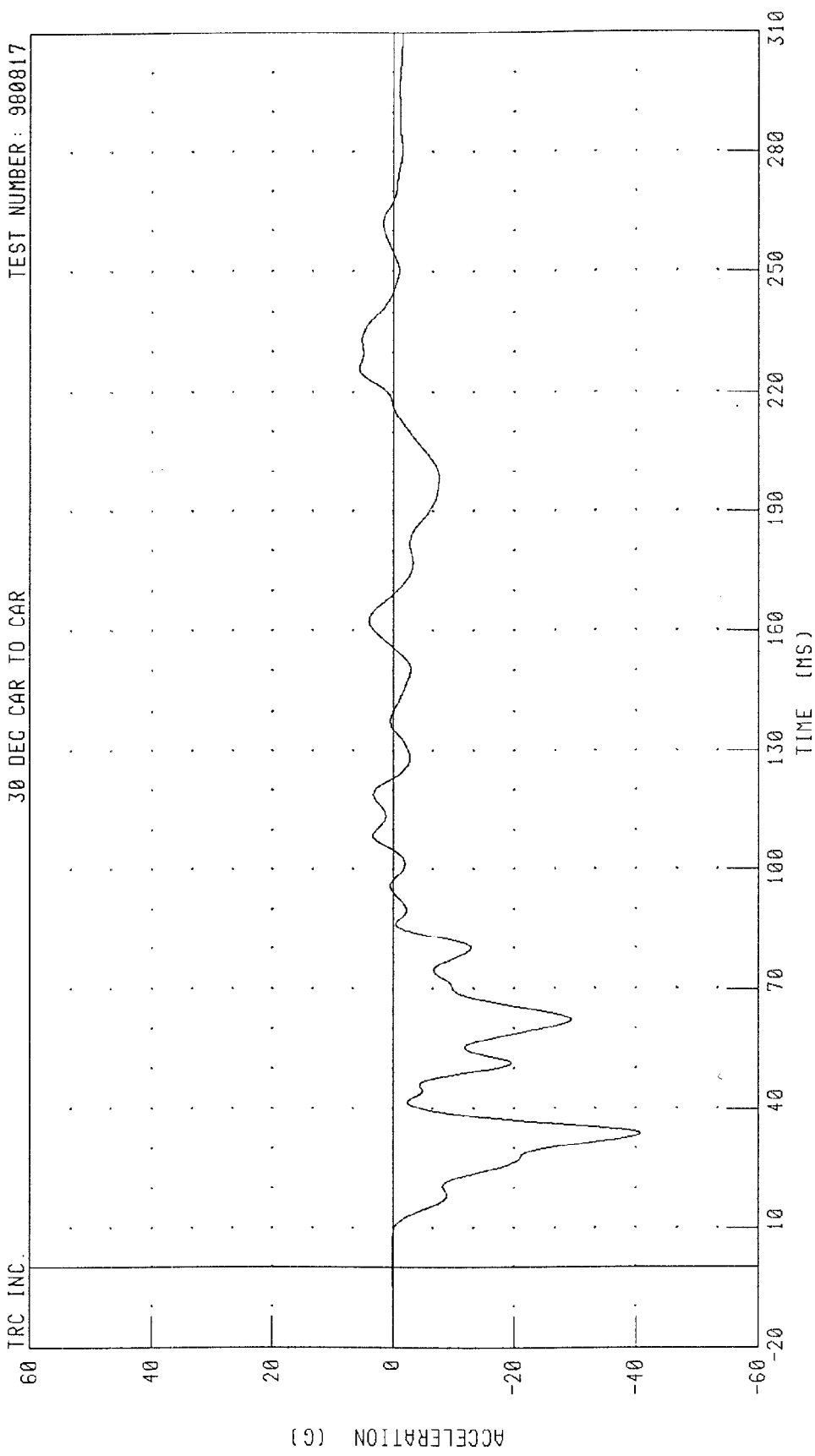
PEAK DATA: 2.13 G @ 148.64 MS, -21.03 G @ 57.84 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 TARGET RIGHT REAR SEAT Y-AXIS ACCELERATION



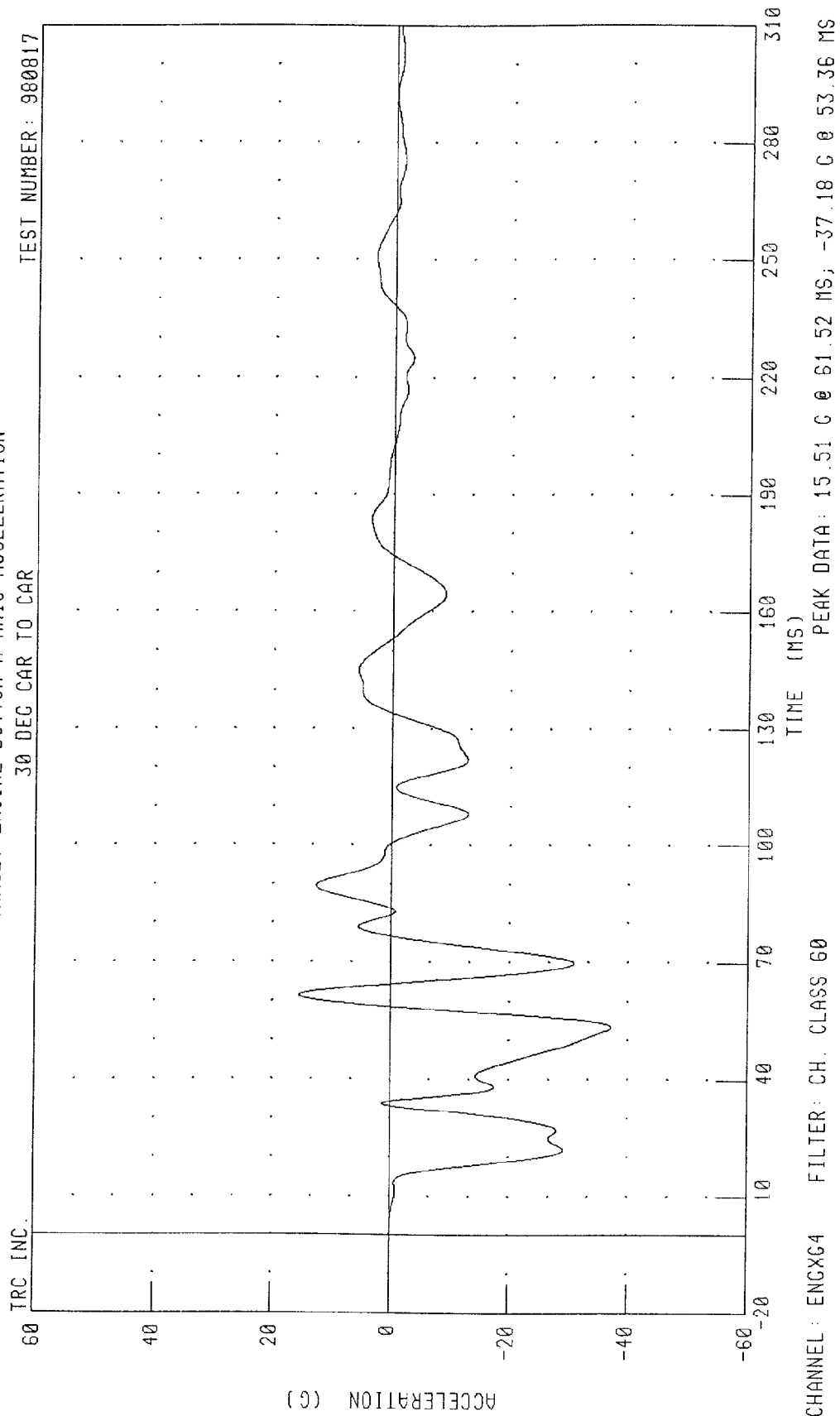
CHANNEL: TTRYG2 FILTER: CH. CLASS 60 PEAK DATA: 1.58 G @ 241.36 MS, -11.90 G @ 55.28 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET ENGINE TOP X-AXIS ACCELERATION

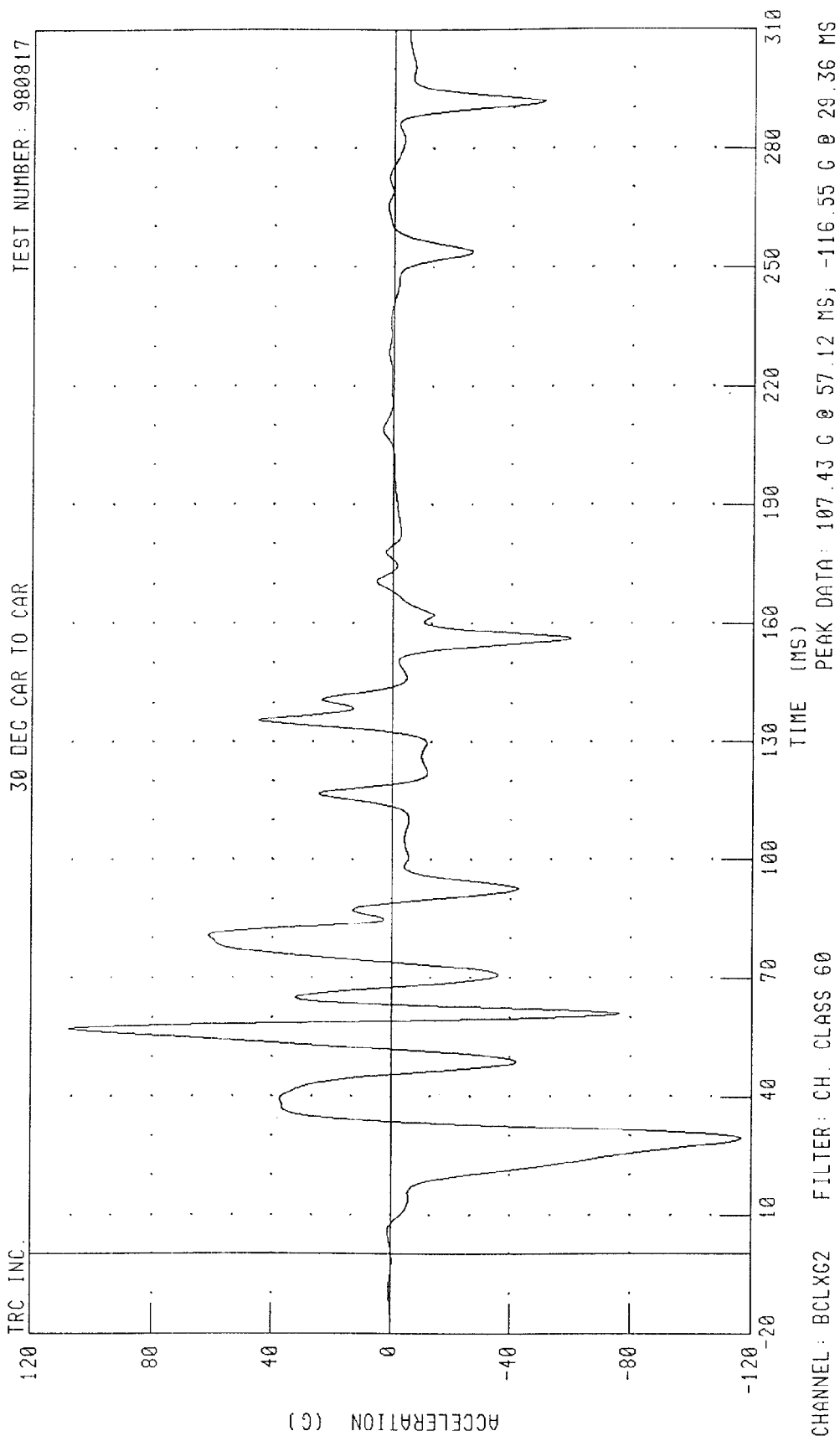


CHANNEL: ENC03 FILTER: CH. CLASS 60 PEAK DATA: 5.57 C @ 226.00 MS, -40.75 C @ 33.92 MS

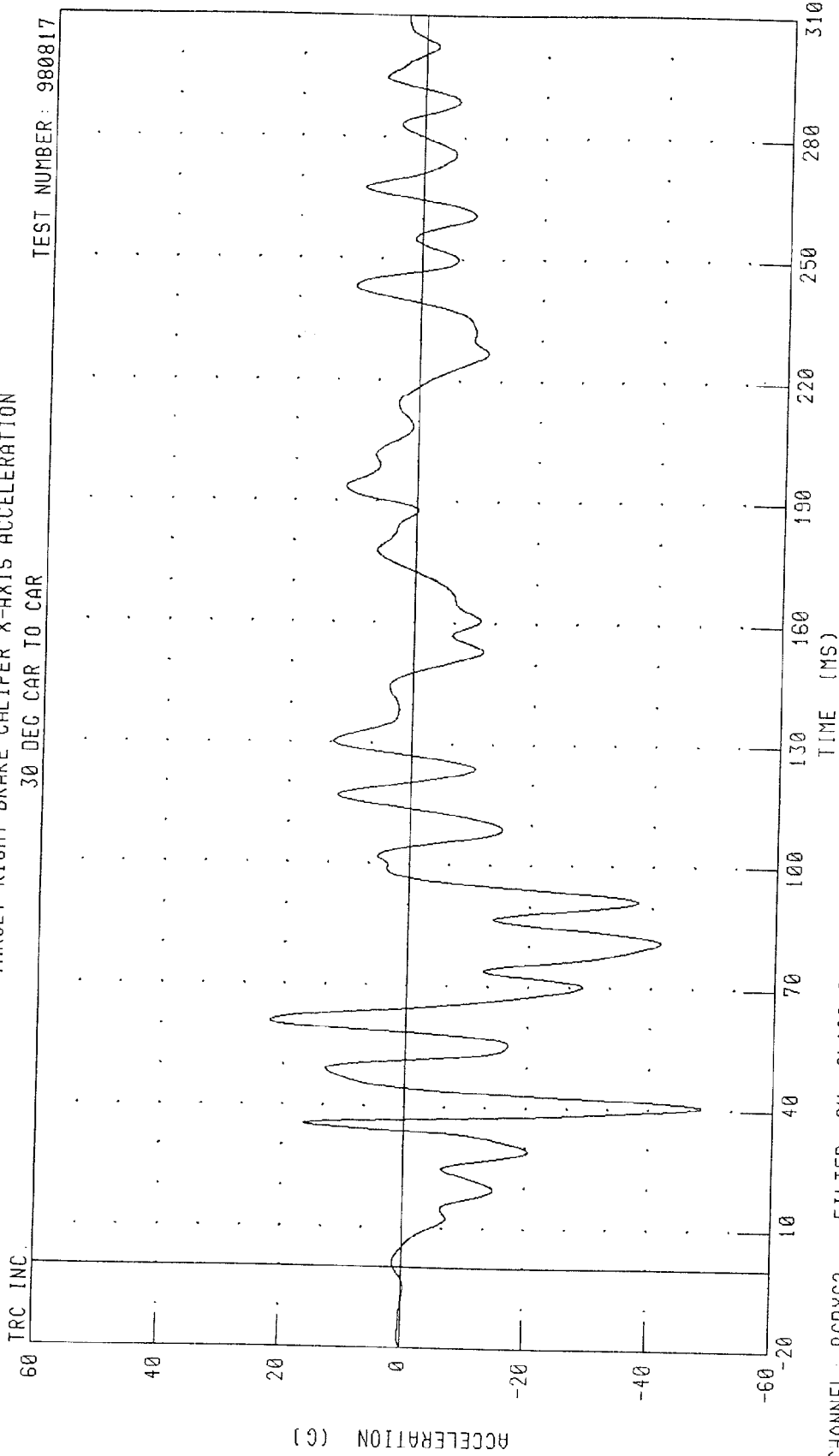
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET ENGINE BOTTOM X-AXIS ACCELERATION



1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET LEFT BRAKE CALIPER X-AXIS ACCELERATION



1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET RIGHT BRAKE CALIPER X-AXIS ACCELERATION



CHANNEL: BCRXG2 FILTER: CH. CLASS 60

PEAK DATA: 22.33 G @ 61.04 MS, -48.55 G @ 40.72 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

TEST NUMBER: 980817

30 DEG CAR TO CAR

TRC INC.

60

40

20

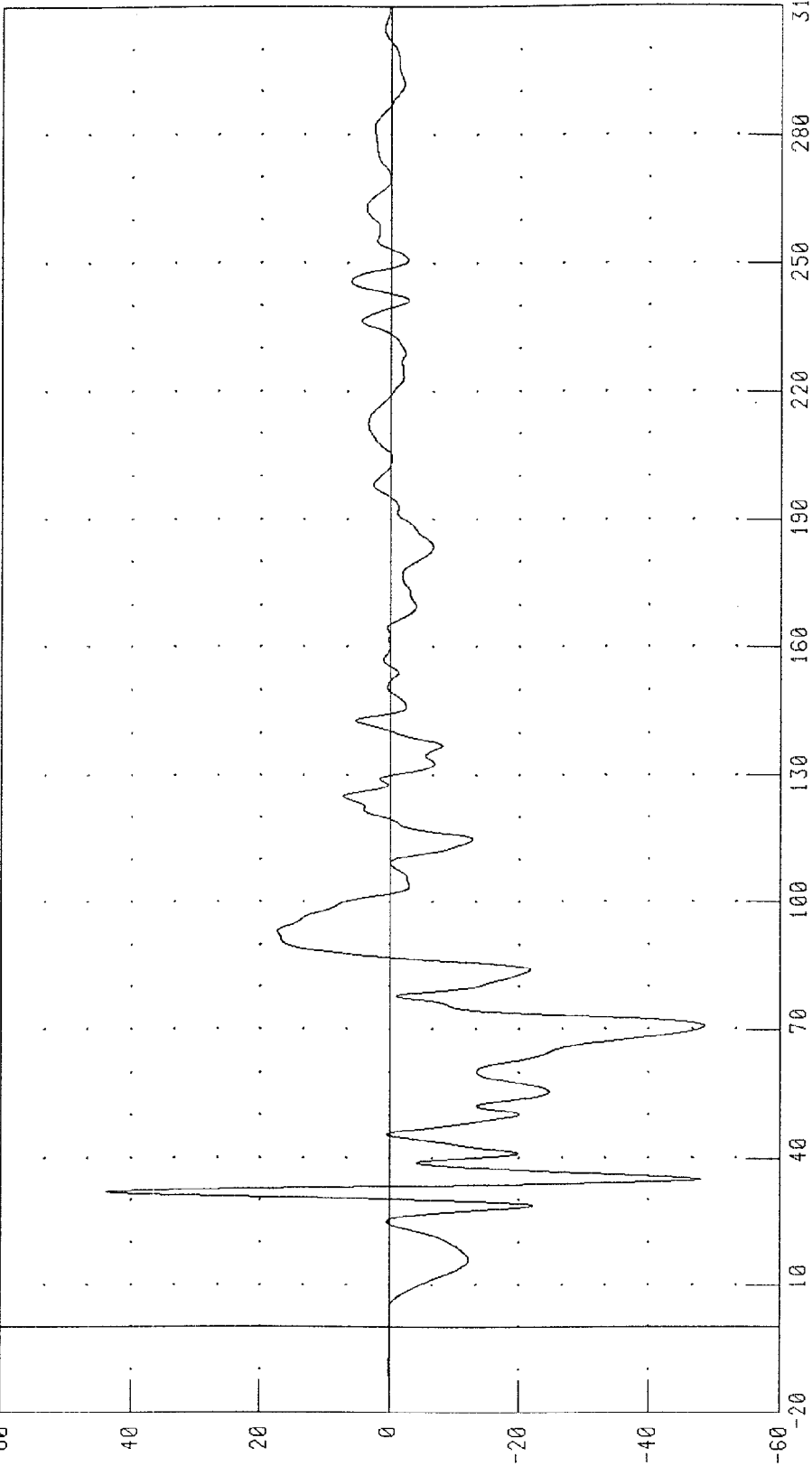
0

-20

-40

-60

ACCELERATION (G)



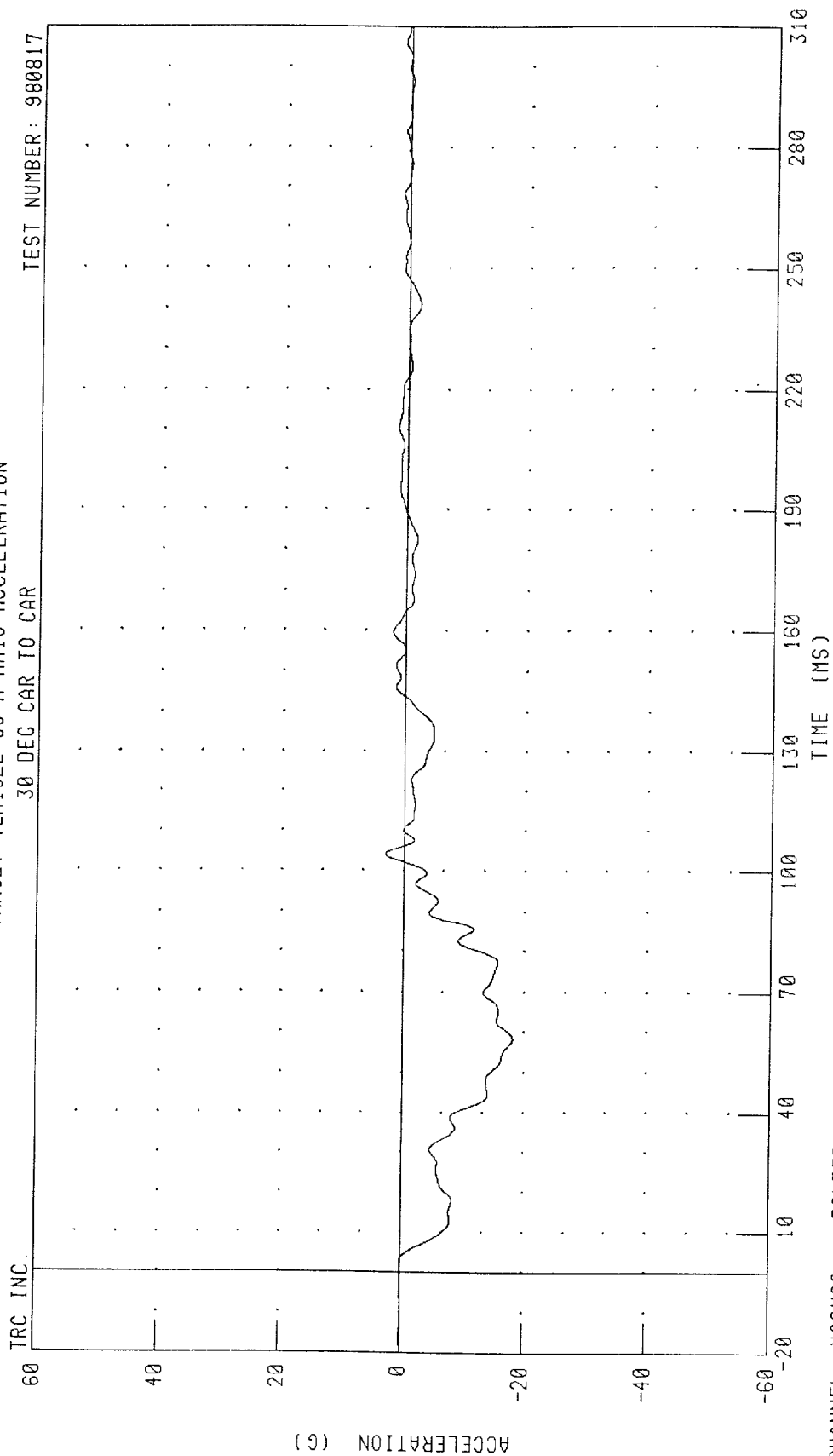
TIME (MS)

CHANNEL: DPCXG2 FILTER: CH. CLASS 60

PEAK DATA: 43.75 G @ 32.00 MS, -48.53 G @ 70.80 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE CG X-AXIS ACCELERATION

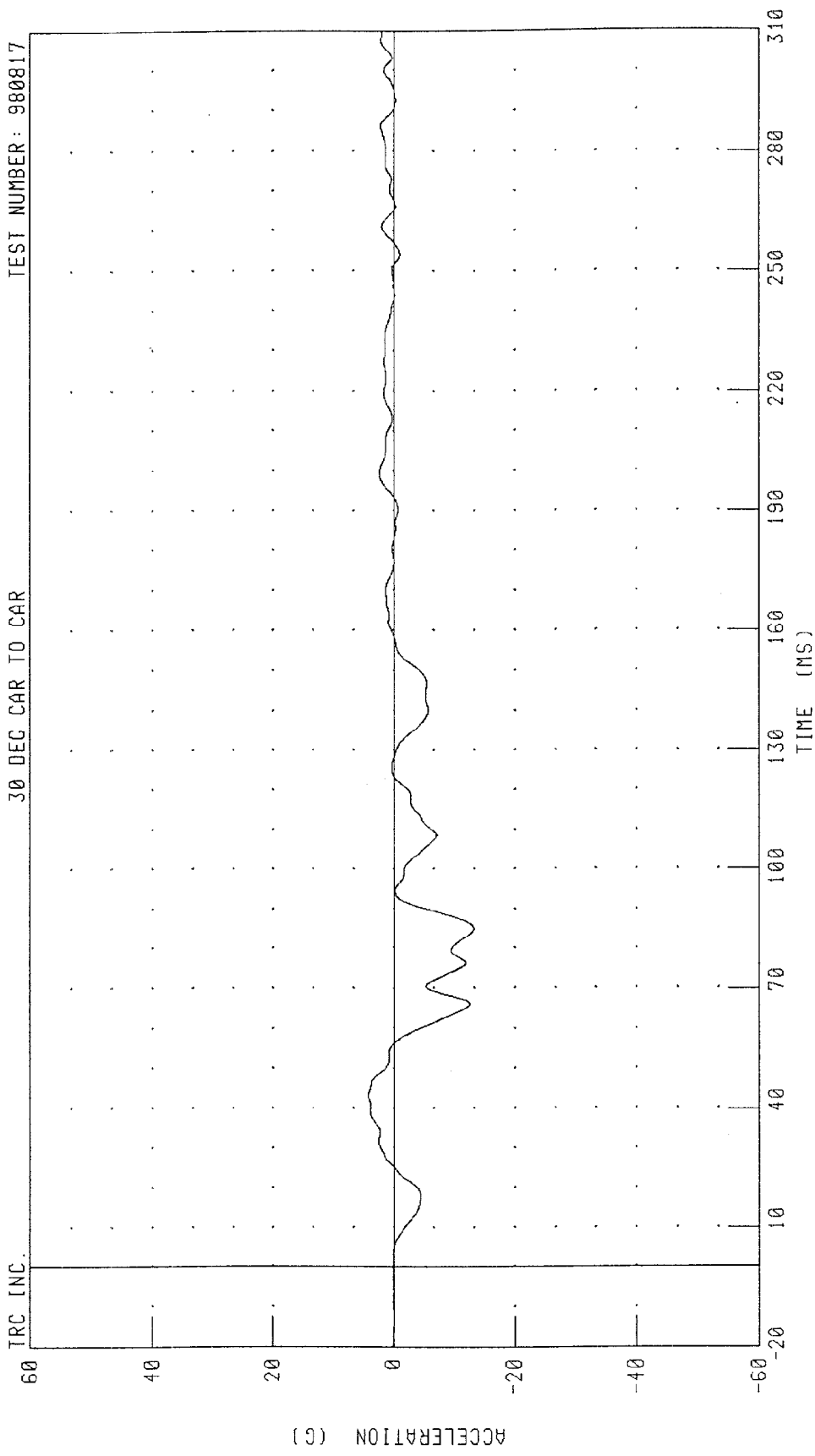
TRC INC. 30 DEG CAR TO CAR TEST NUMBER: 980817



CHANNEL: VCGXG2 FILTER: CH. CLASS 60

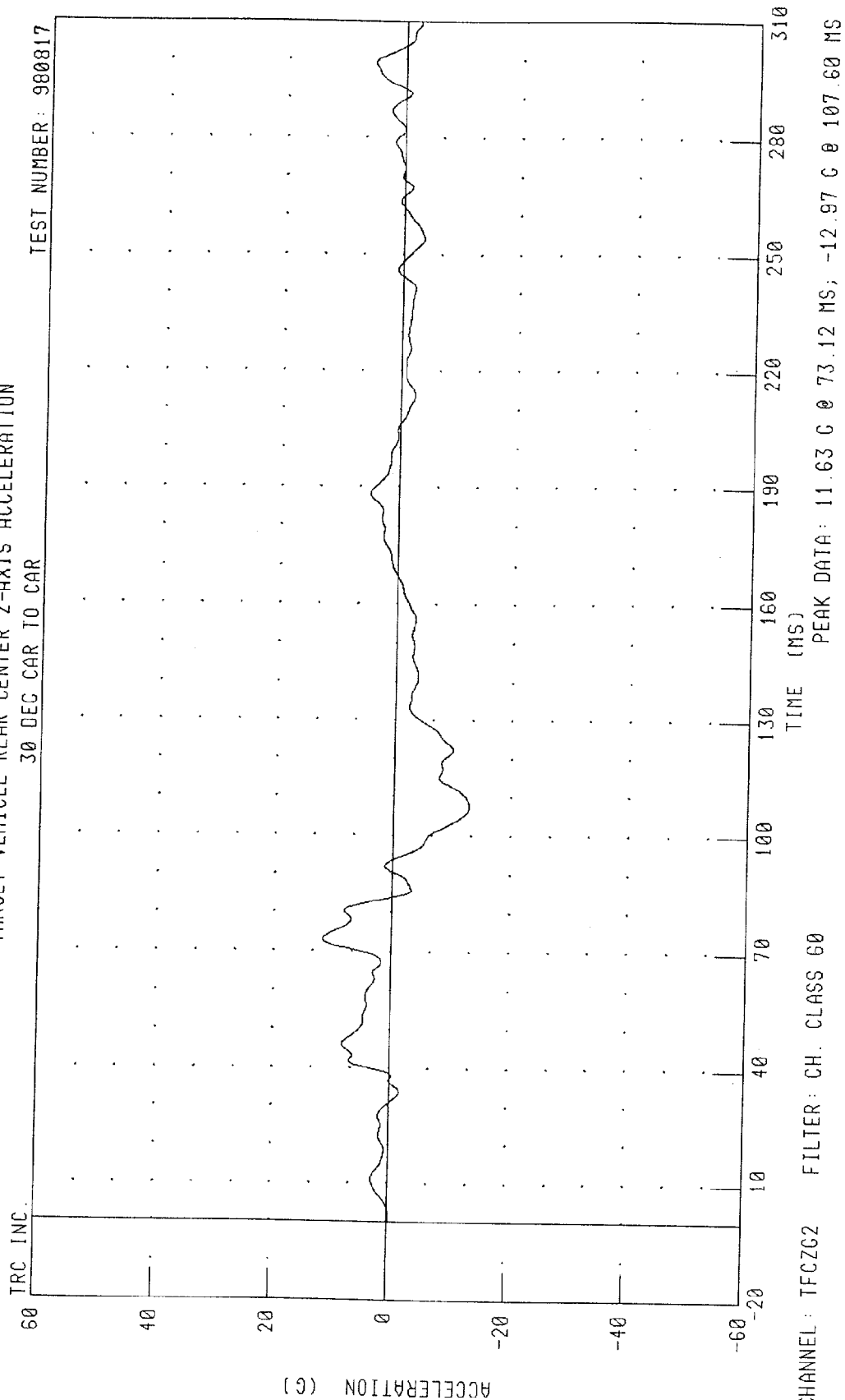
PEAK DATA: 3.04 G @ 104.24 MS; -18.13 G @ 58.32 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE REAR CENTER Y-AXIS ACCELERATION



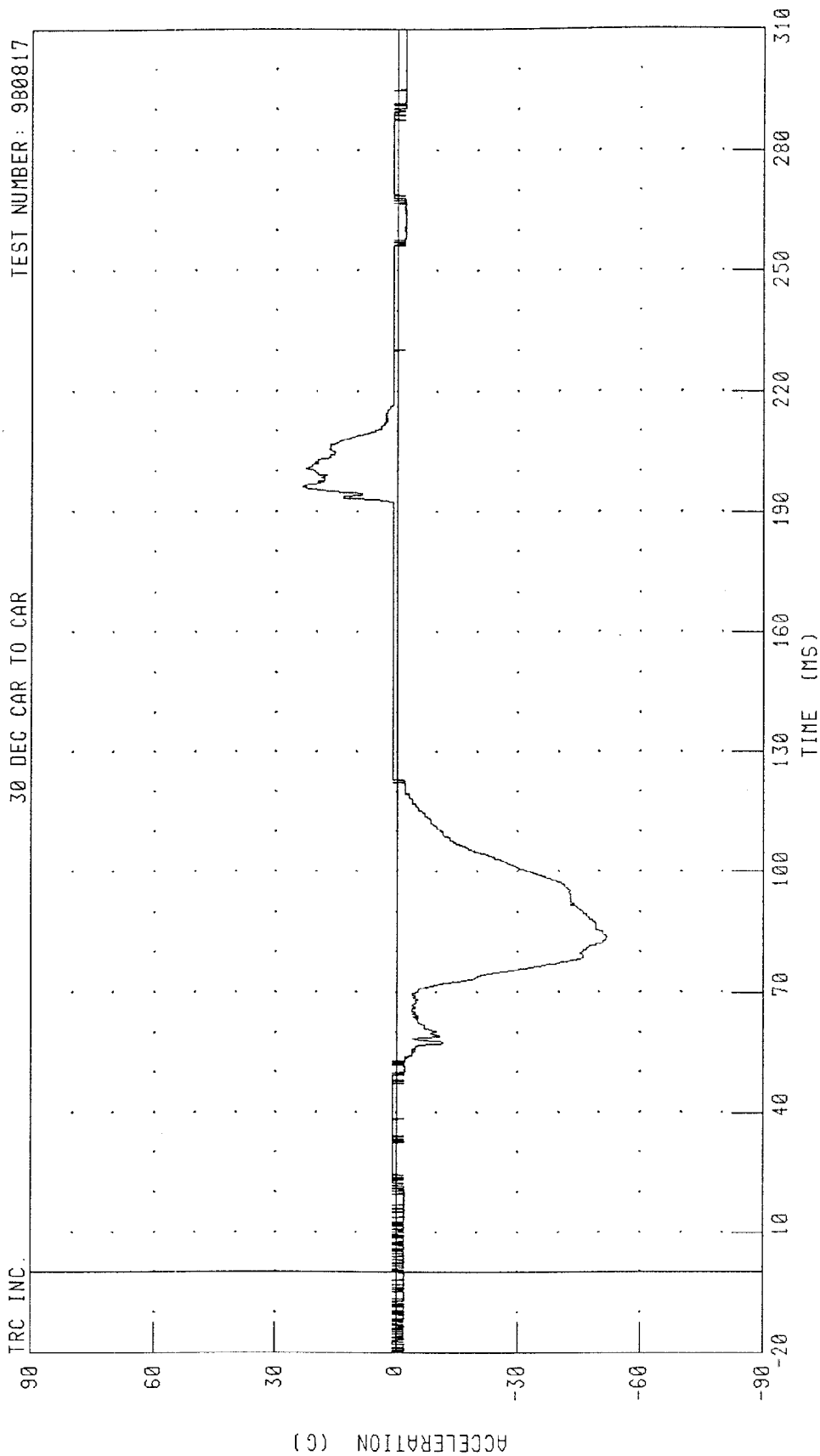
CHANNEL: TFCV62 FILTER: CH. CLASS 60 PEAK DATA: 4.19 G @ 43.28 MS, -13.21 G @ 85.12 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
TARGET VEHICLE REAR CENTER Z-AXIS ACCELERATION



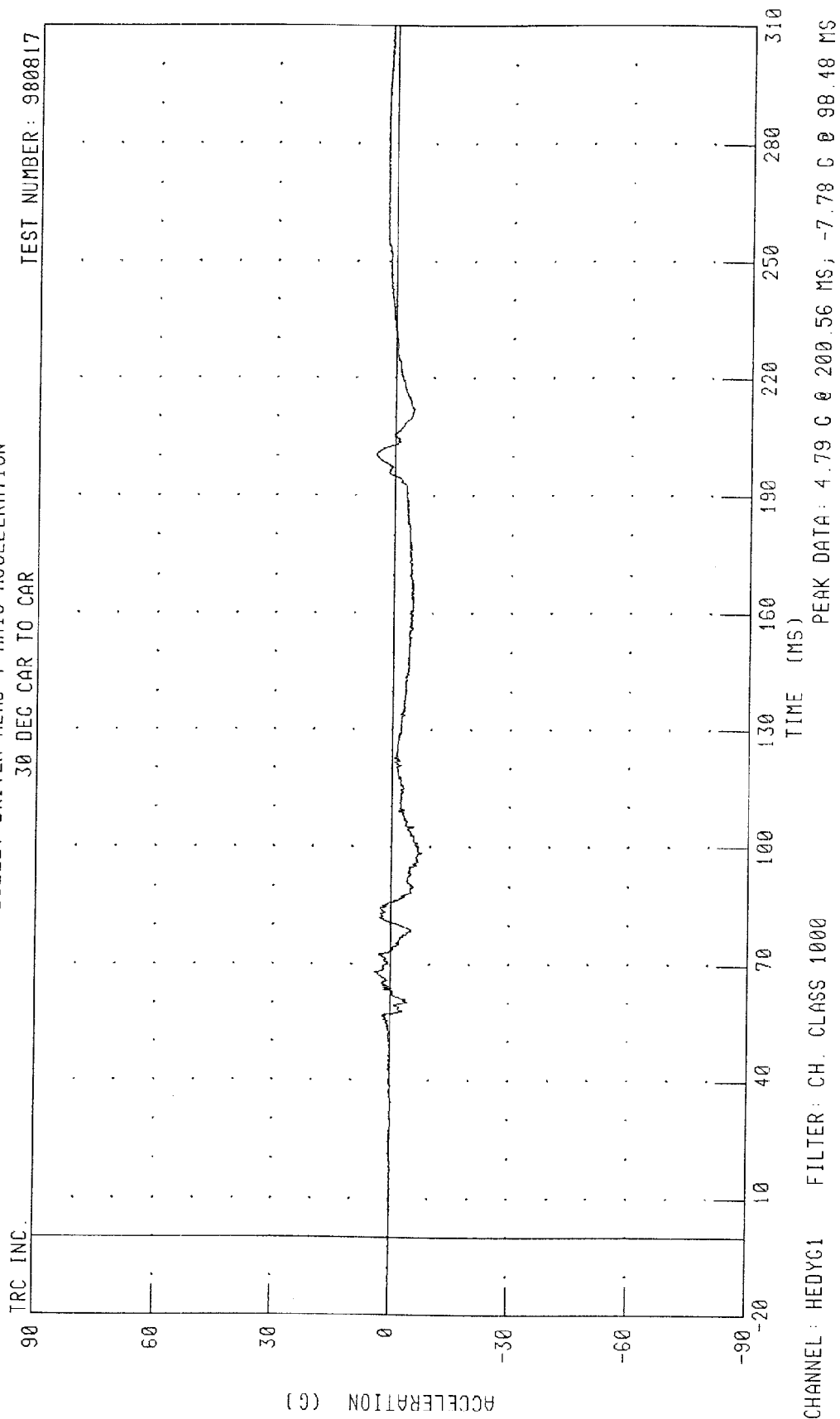
CHANNEL: TFCZG2 FILTER: CH. CLASS 60

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET DRIVER HEAD X-AXIS ACCELERATION

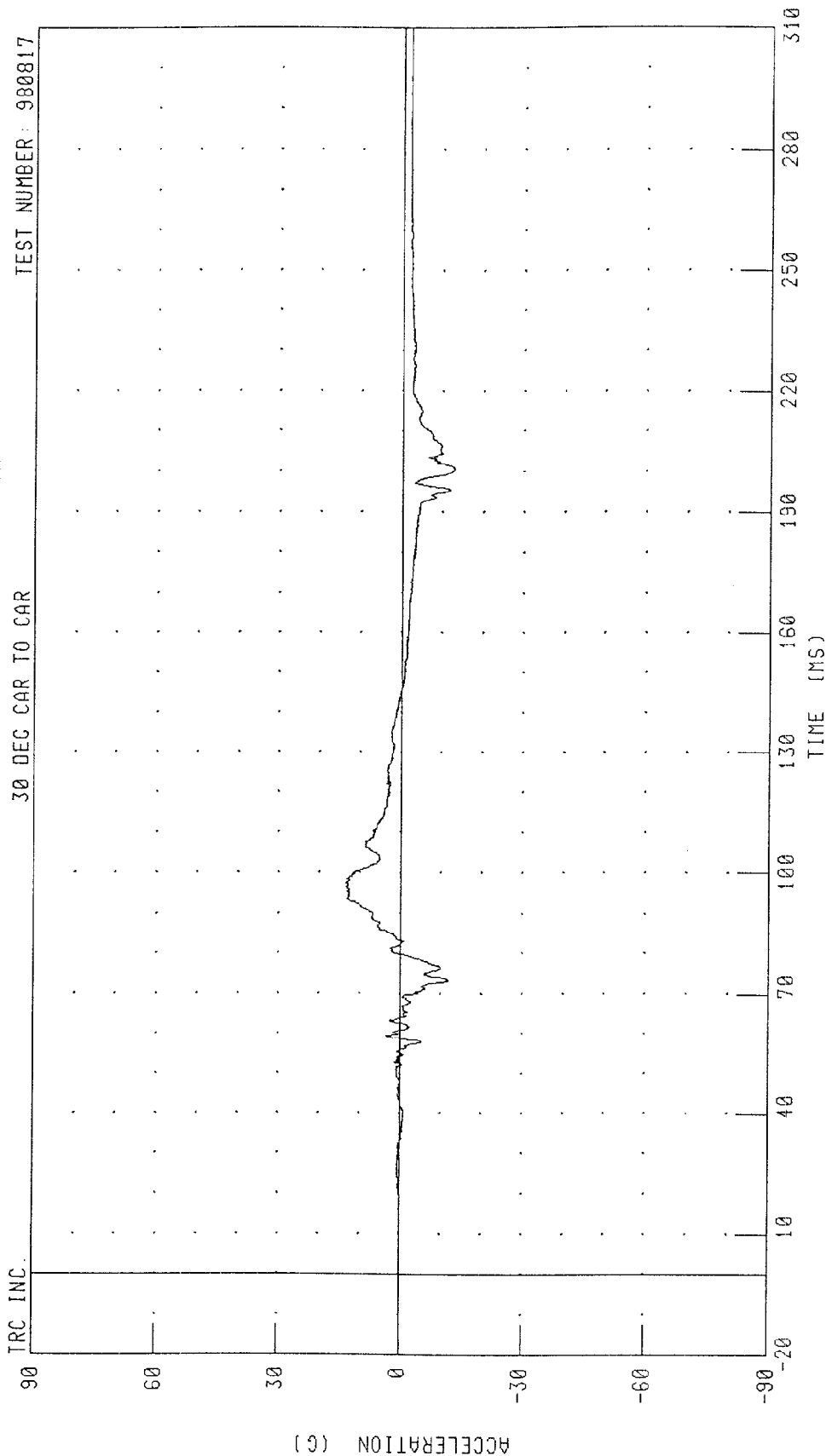


CHANNEL: HEDXC1 FILTER: CH. CLASS 1000 PEAK DATA: 23.59 G @ 196.24 MS, -51.99 G @ 83.60 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER HEAD Y-AXIS ACCELERATION

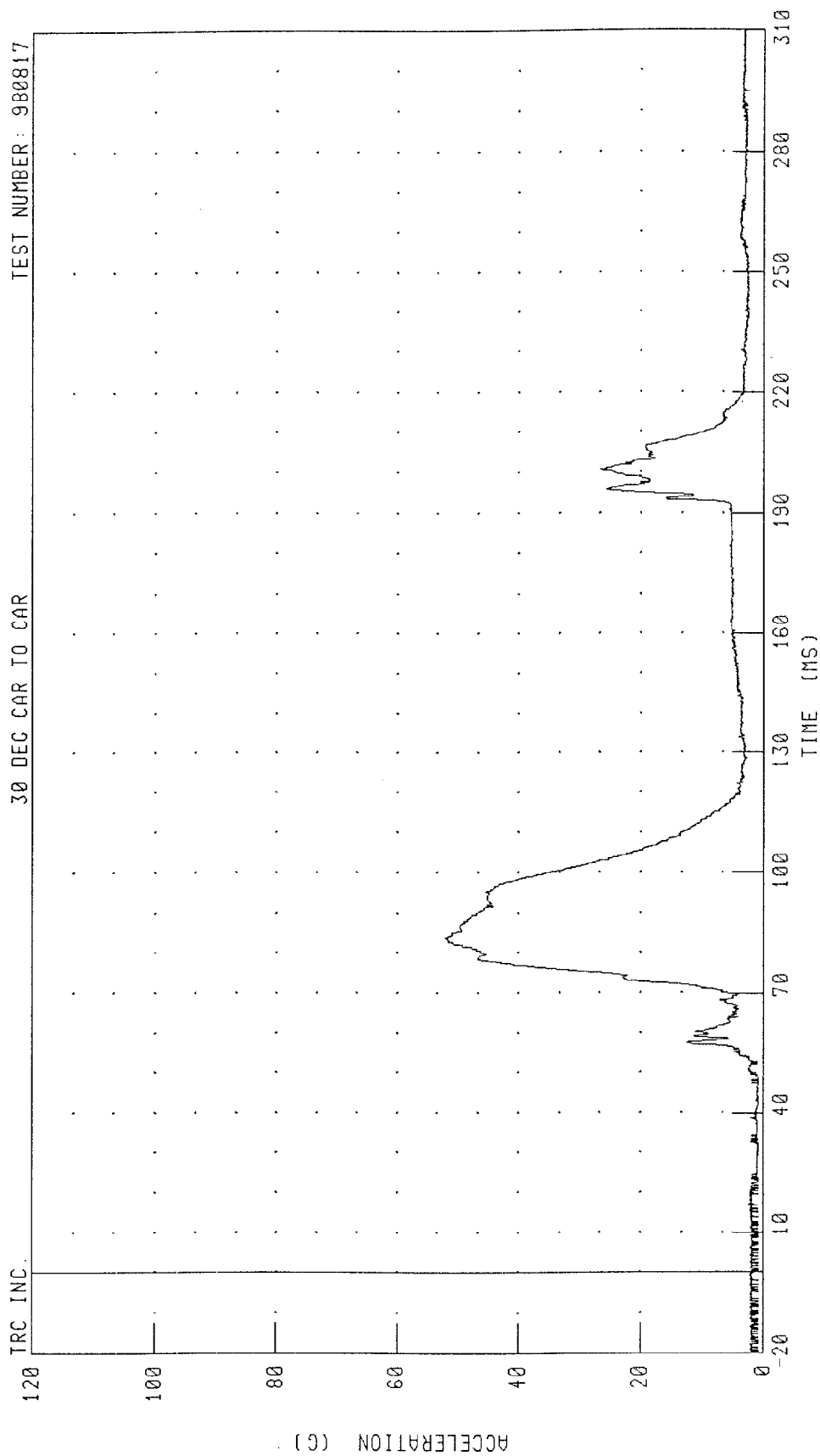


1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER HEAD Z-AXIS ACCELERATION



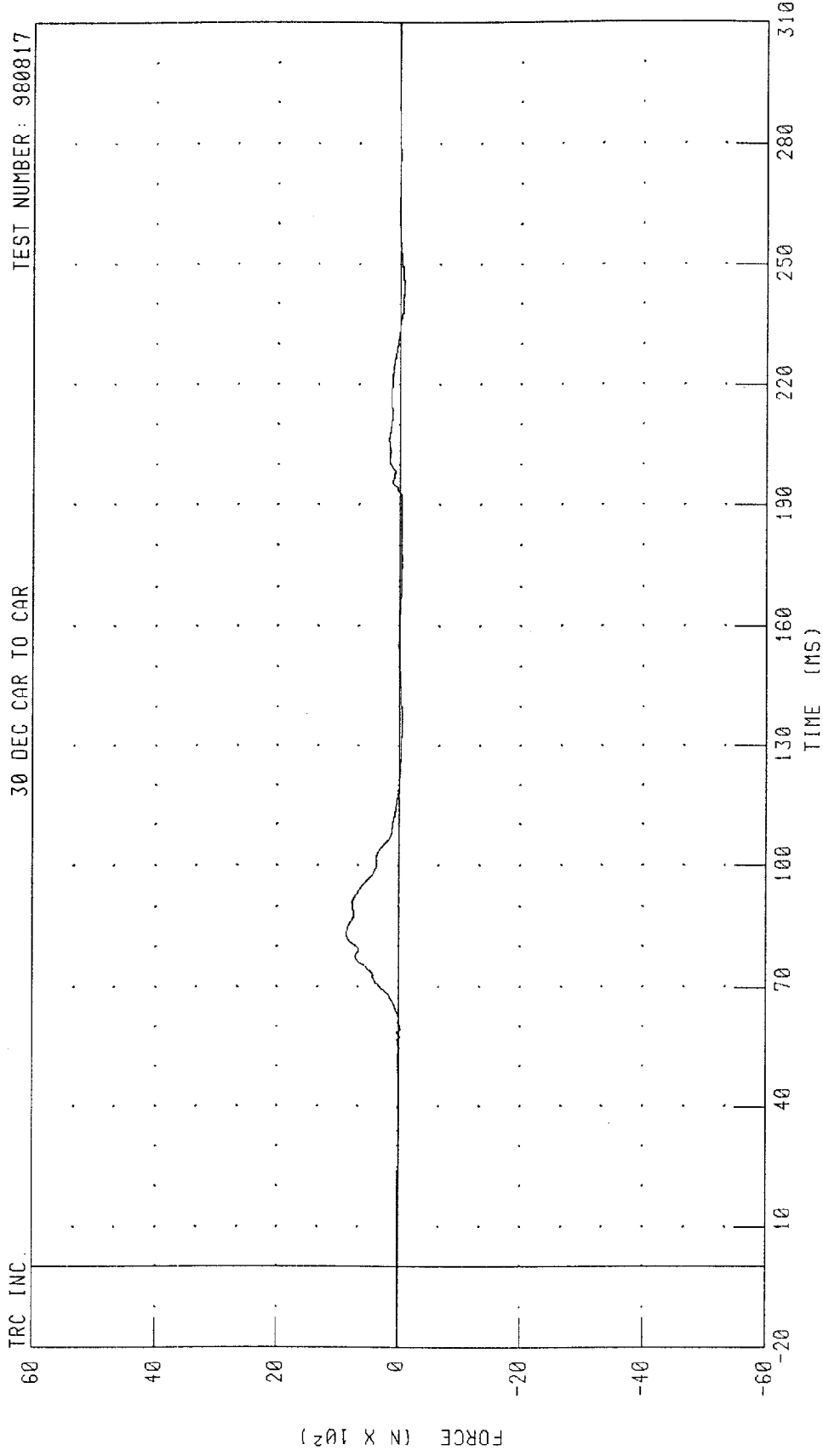
CHANNEL: HEDZG1 FILTER: CH. CLASS 1000 PEAK DATA: 13.29 G @ 96.64 MS, -12.91 G @ 200.40 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER HEAD RESULTANT ACCELERATION



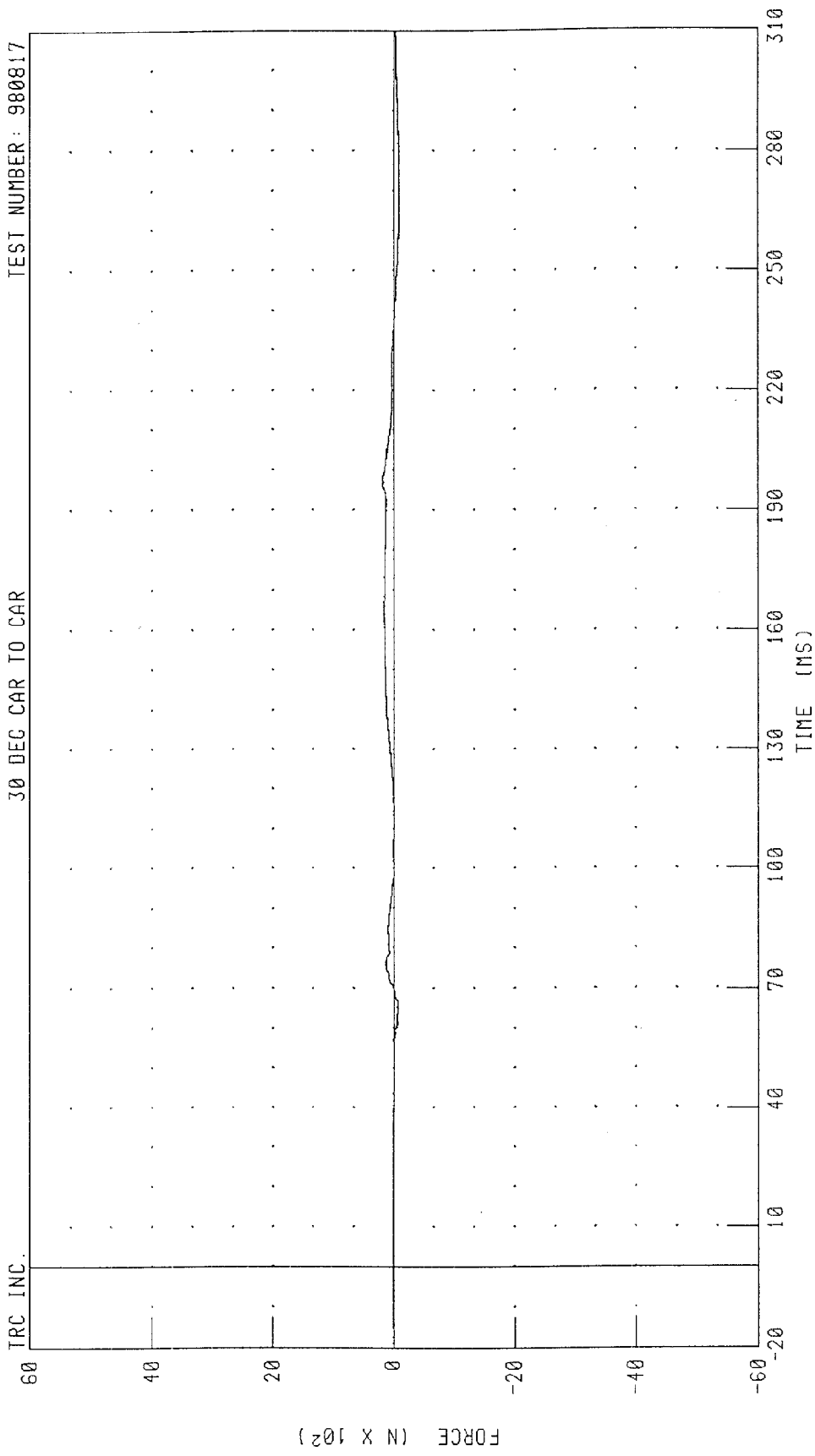
CHANNEL: HEDRG1 FILTER: CH. CLASS 1000 PEAK DATA: 52.04 G @ 83.60 MS, 0.88 G @ -13.76 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK X-AXIS SHEAR FORCE



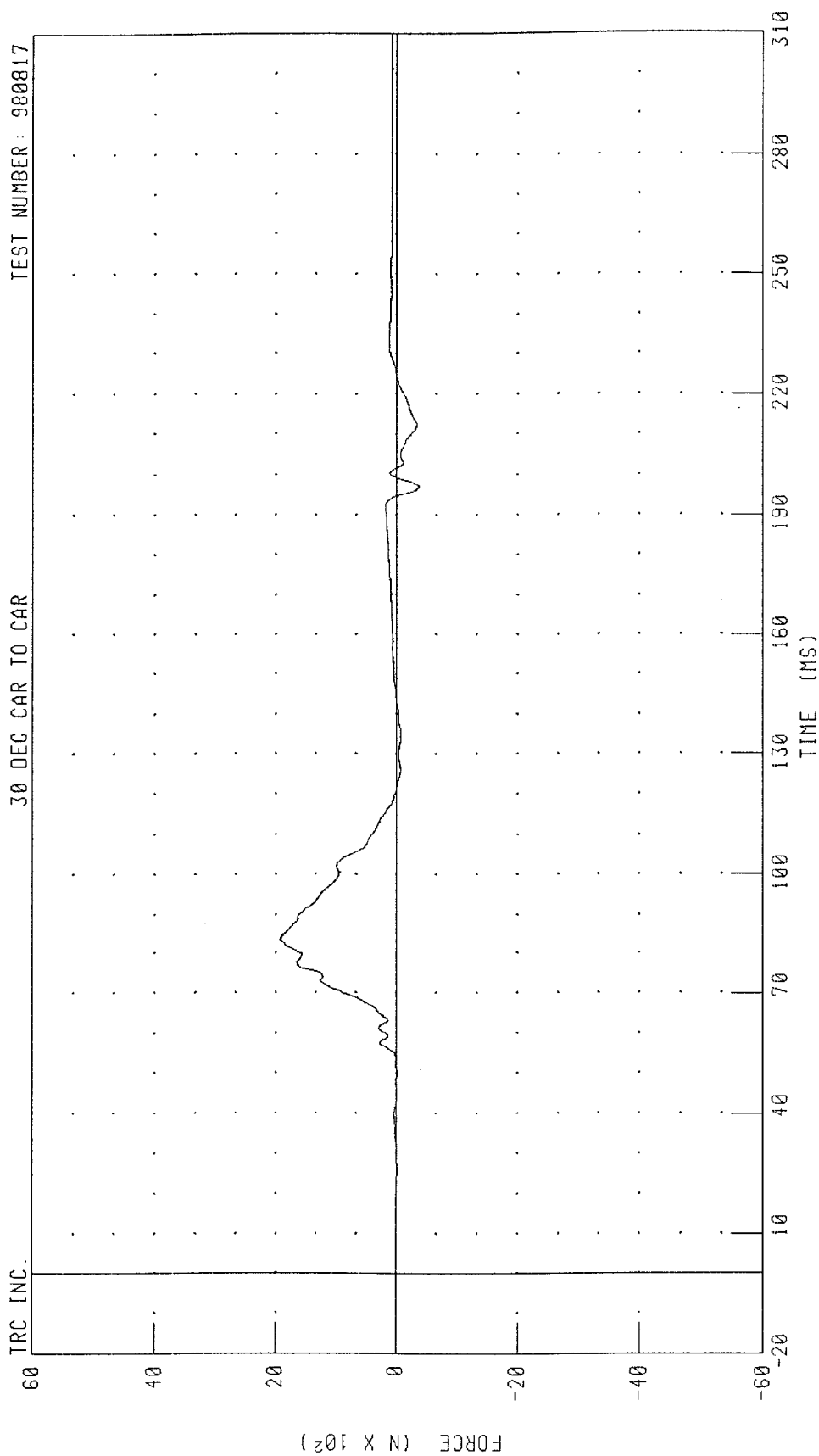
CHANNEL: NEKXF1 FILTER: CH. CLASS 1000 PEAK DATA: 859.91 N @ 83.20 MS; -74.65 N @ 243.44 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK Y-AXIS SHEAR FORCE



CHANNEL: NEKYF1 FILTER: CH. CLASS 1000 PEAK DATA: 181.34 N @ 195.92 MS, -92.59 N @ 264.40 MS

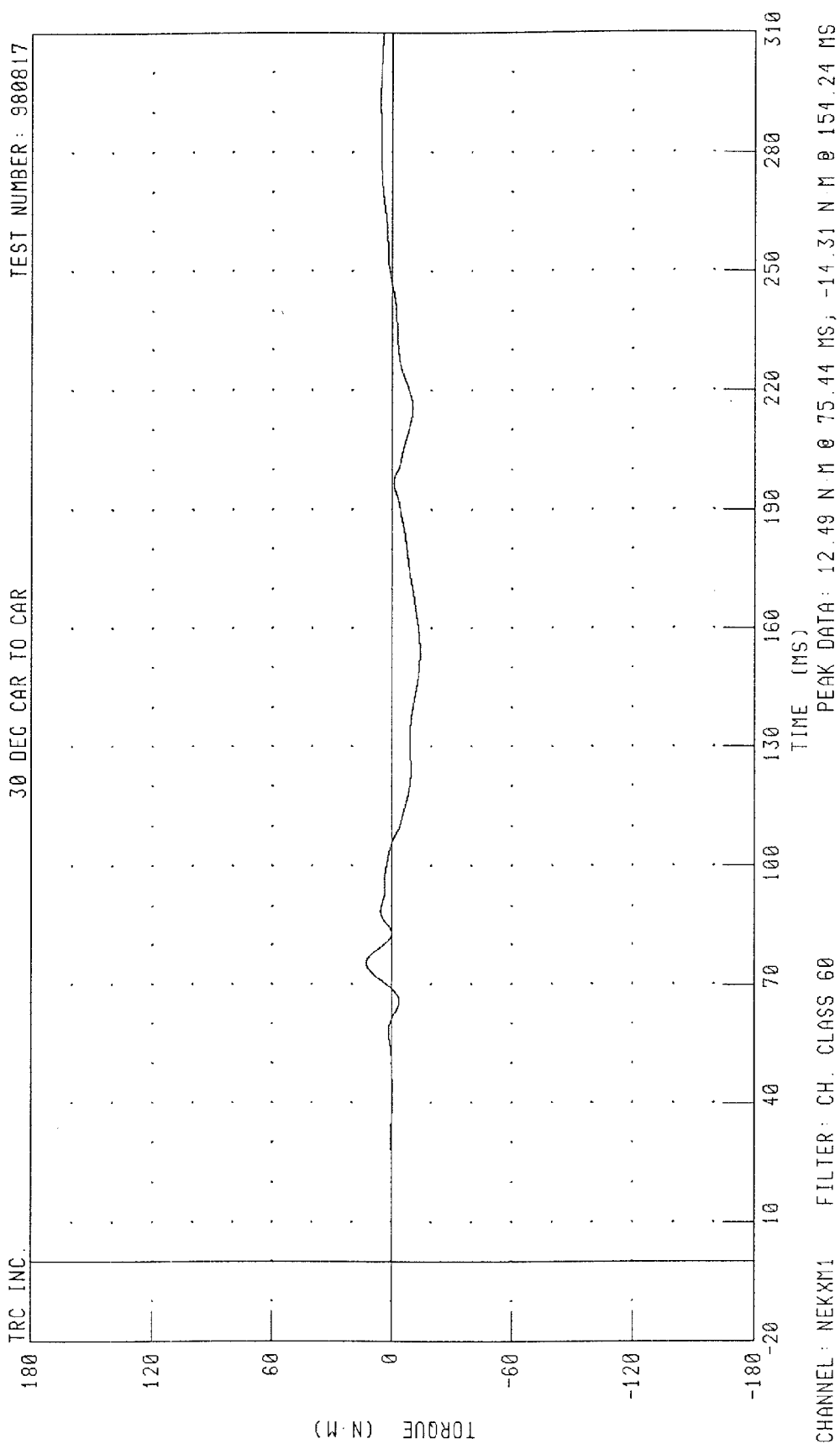
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK Z-AXIS AXIAL FORCE



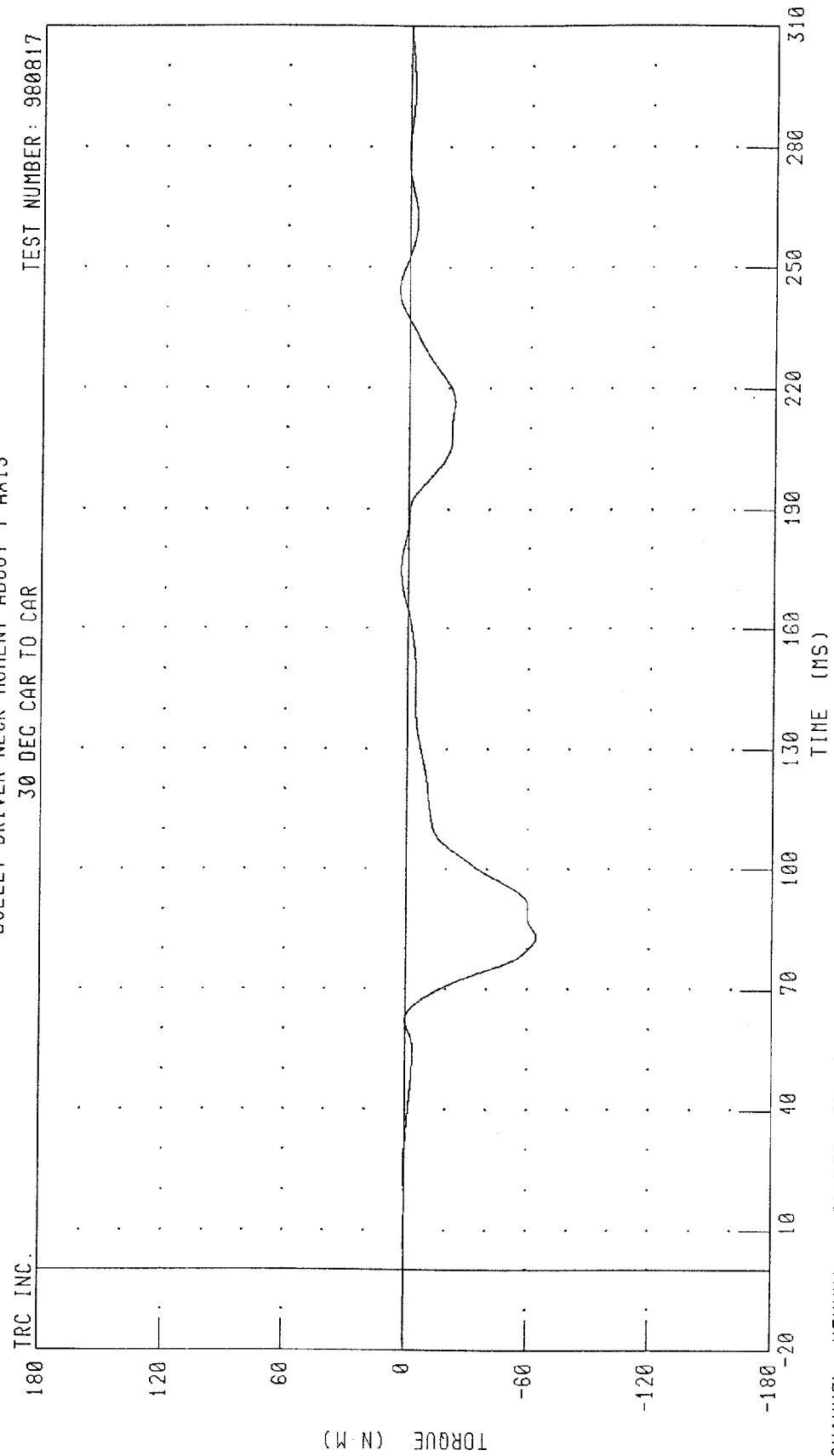
CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

PEAK DATA: 1934.44 N @ 83.60 MS, -373.69 N @ 196.80 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK MOMENT ABOUT X AXIS

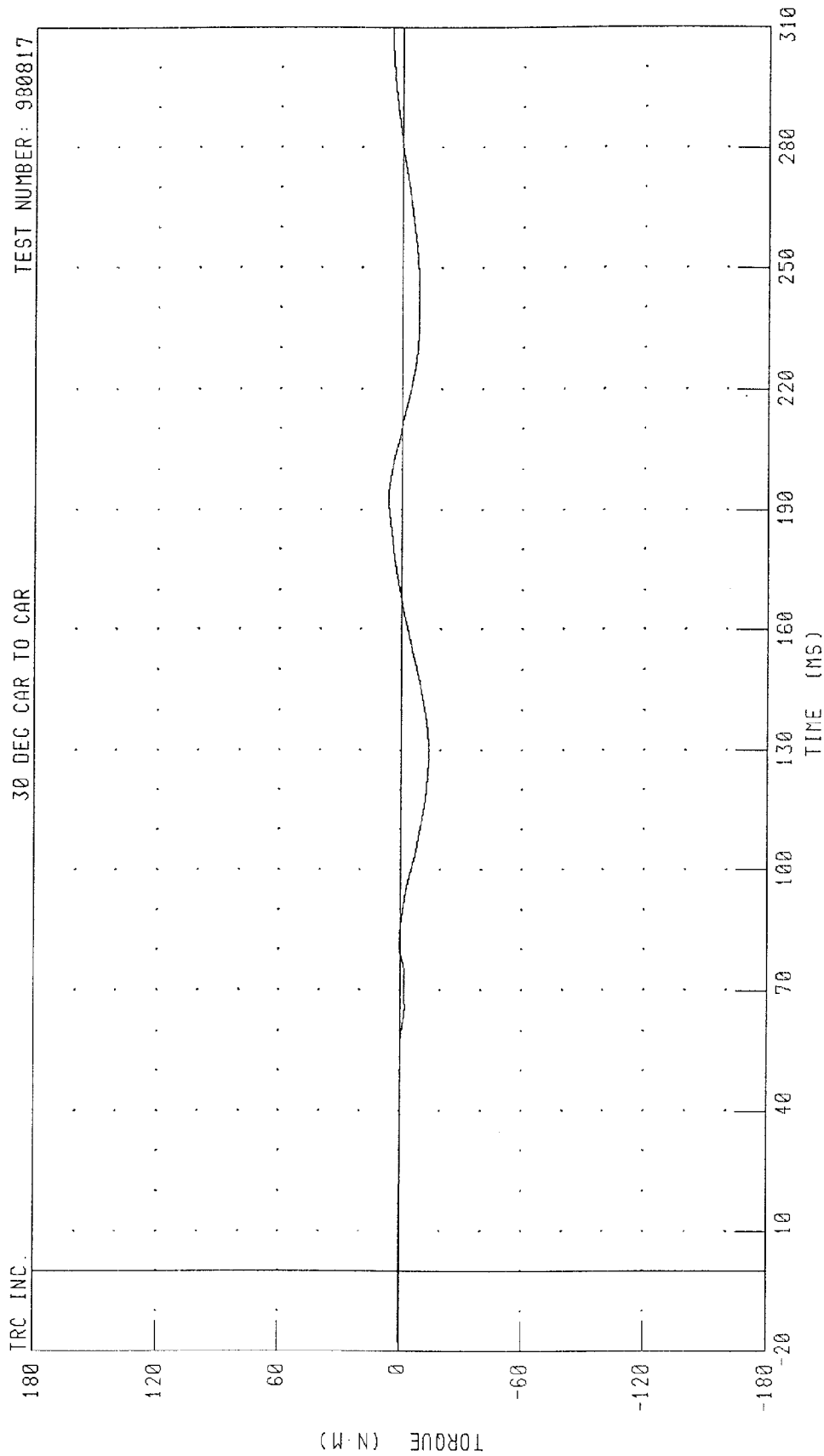


1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET DRIVER NECK MOMENT ABOUT Y AXIS



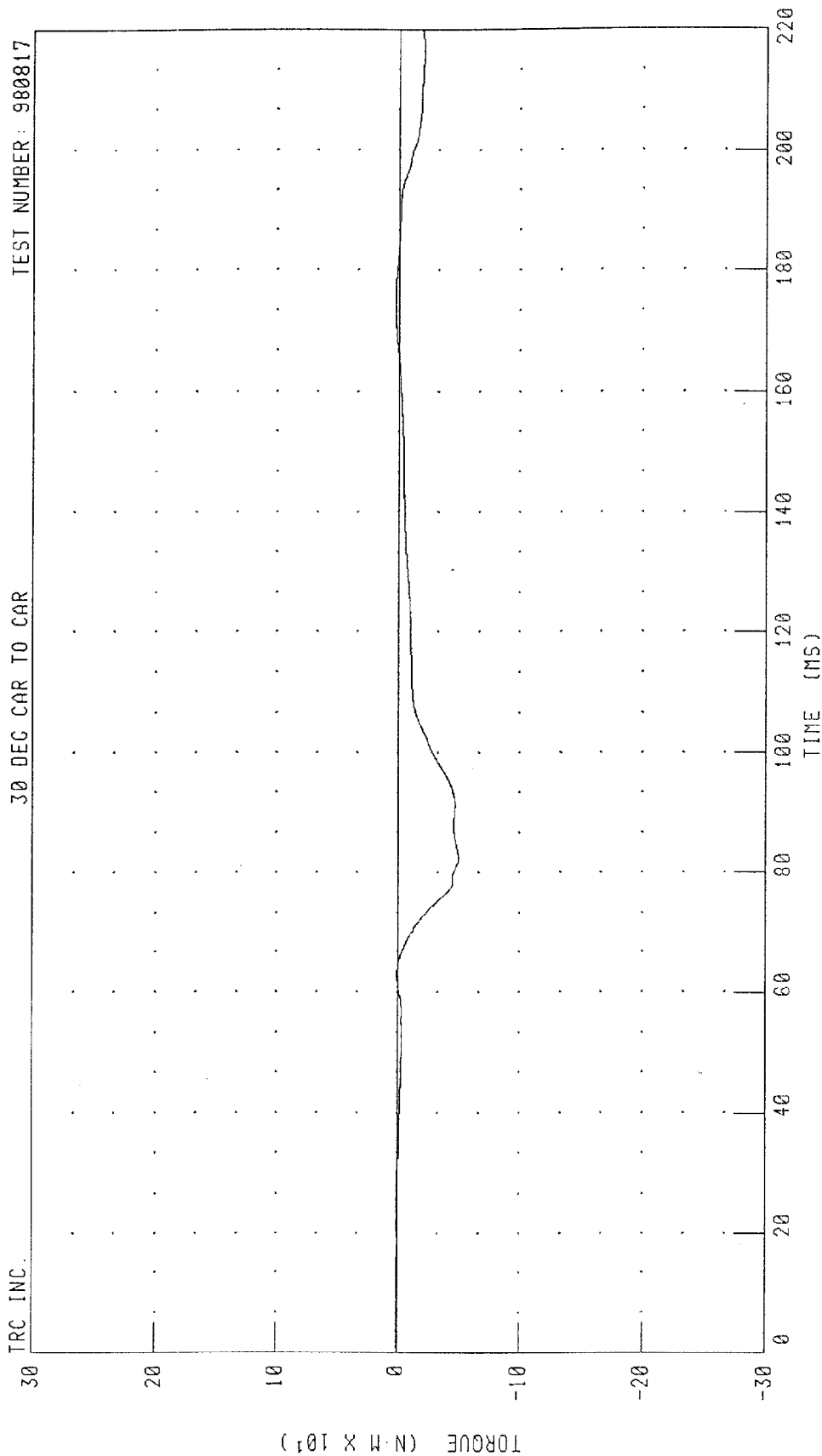
CHANNEL: NEKYM1 FILTER: CH. CLASS 60 PEAK DATA: 4.74 N-M @ 244.64 MS; -64.24 N-M @ 83.04 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET DRIVER NECK MOMENT ABOUT Z AXIS



CHANNEL: NEKZM1 FILTER: CH. CLASS 60 PEAK DATA: 6.39 N-M @ 192.96 MS, -13.90 N-M @ 129.44 MS

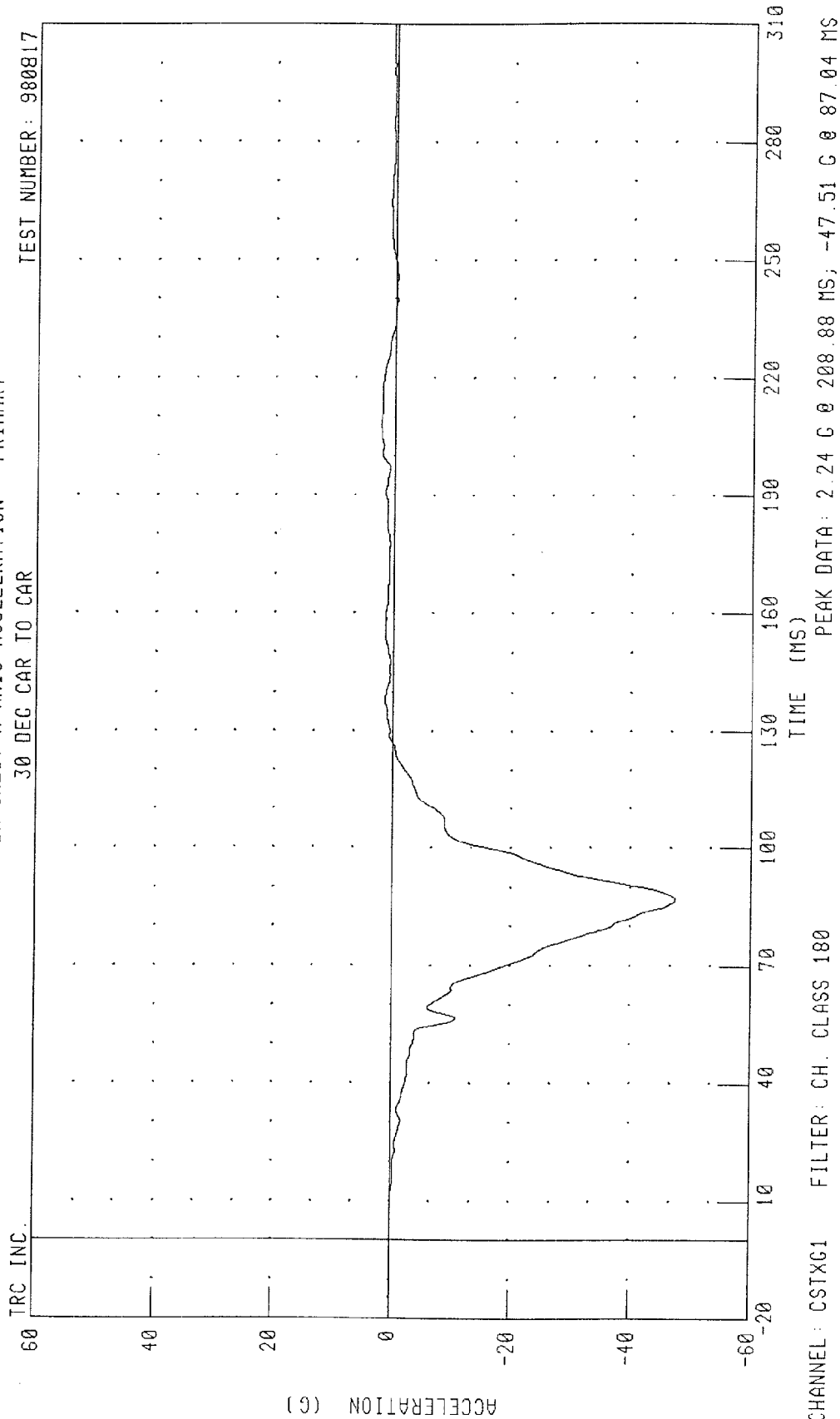
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER NECK OCCIPITAL CONDYLE ABOUT Y AXIS



CHANNEL: NEKOM1 FILTER: CH. CLASS 600

PEAK DATA: 2.34 N·M @ 173.36 MS, -50.37 N·M @ 82.48 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER CHEST X-AXIS ACCELERATION - PRIMARY

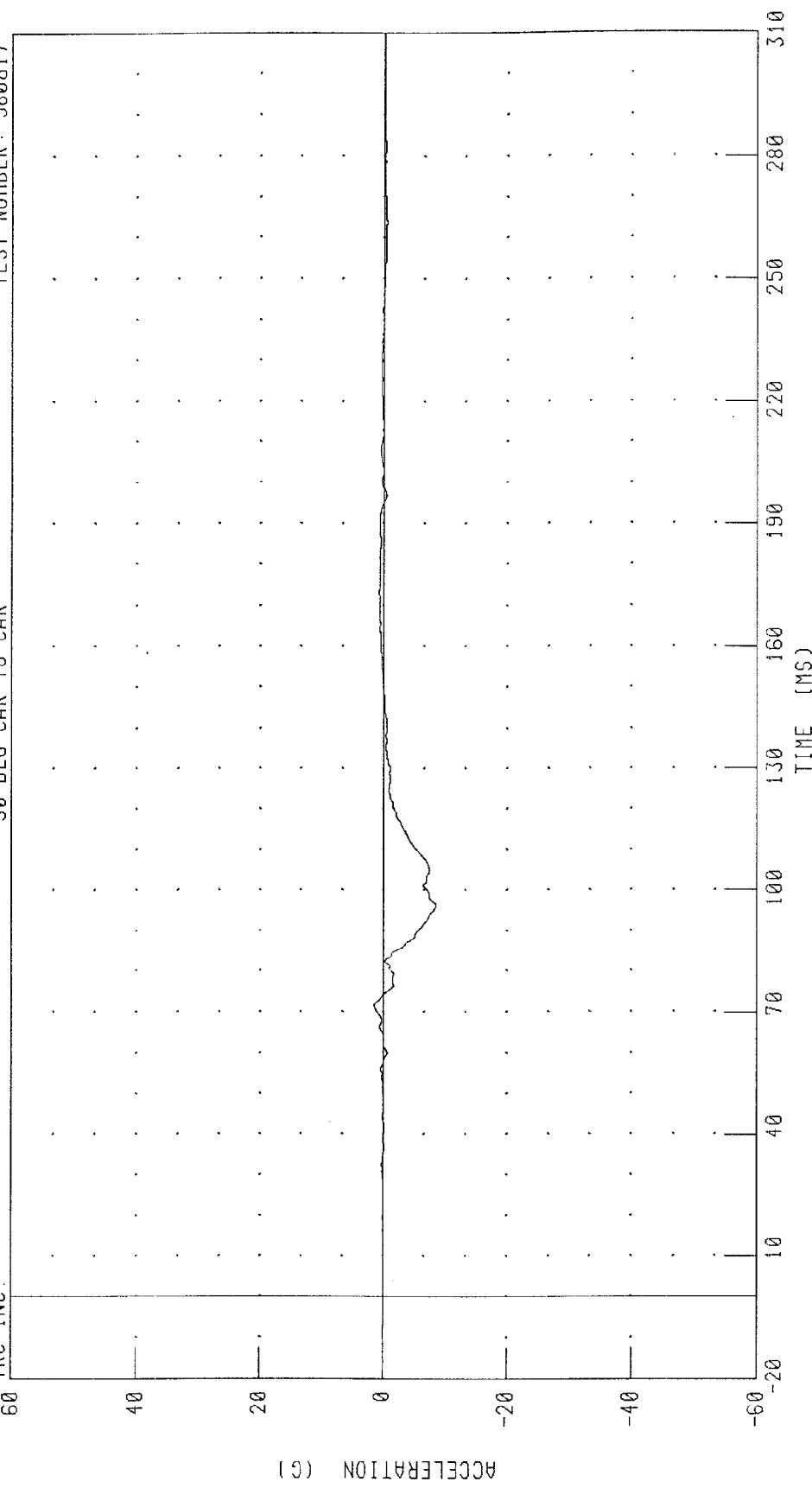


1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER CHEST Y-AXIS ACCELERATION - PRIMARY

TEST NUMBER: 980817

30 DEC CAR TO CAR

TRC INC.



CHANNEL: CSTYC1 FILTER: CH. CLASS 180

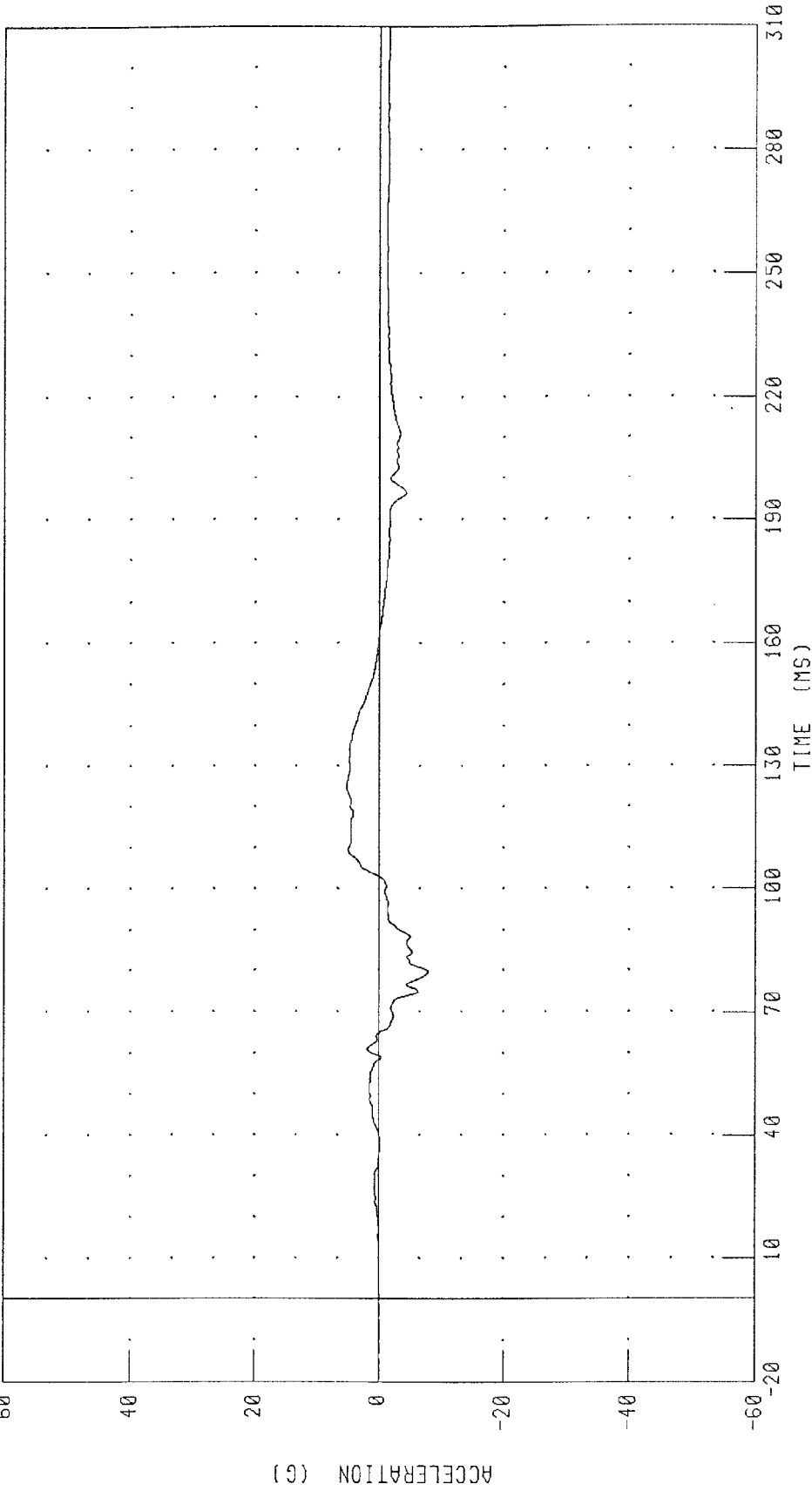
PEAK DATA: 1.42 G @ 71.68 MS; -8.62 G @ 96.16 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER CHEST Z-AXIS ACCELERATION - PRIMARY

TEST NUMBER: 980817

30 DEC CAR TO CAR

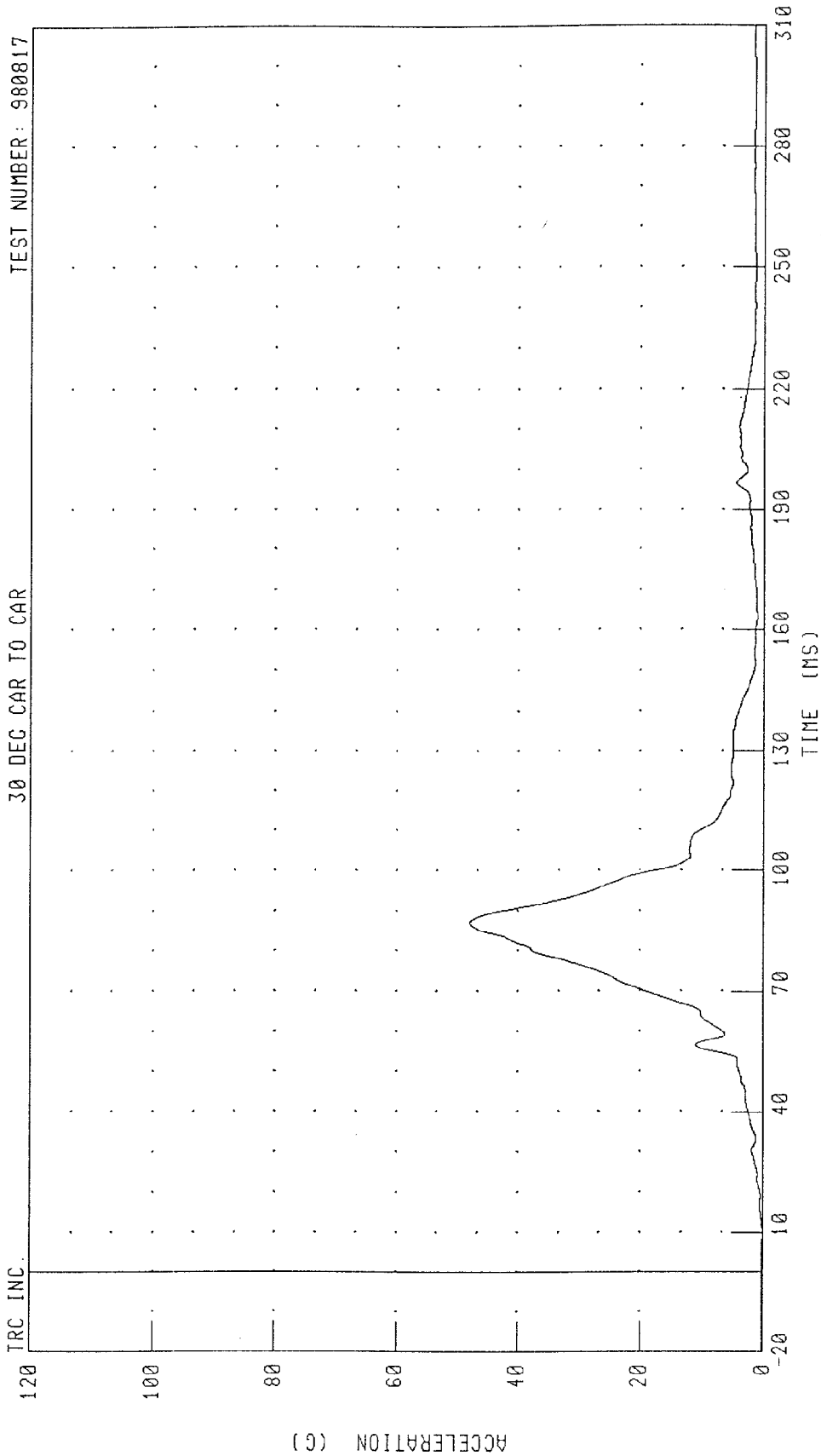
TRC INC.



CHANNEL: CSTZC1 FILTER: CH. CLASS 180

PEAK DATA: 5.15 G @ 125.60 MS, -8.00 G @ 79.76 MS

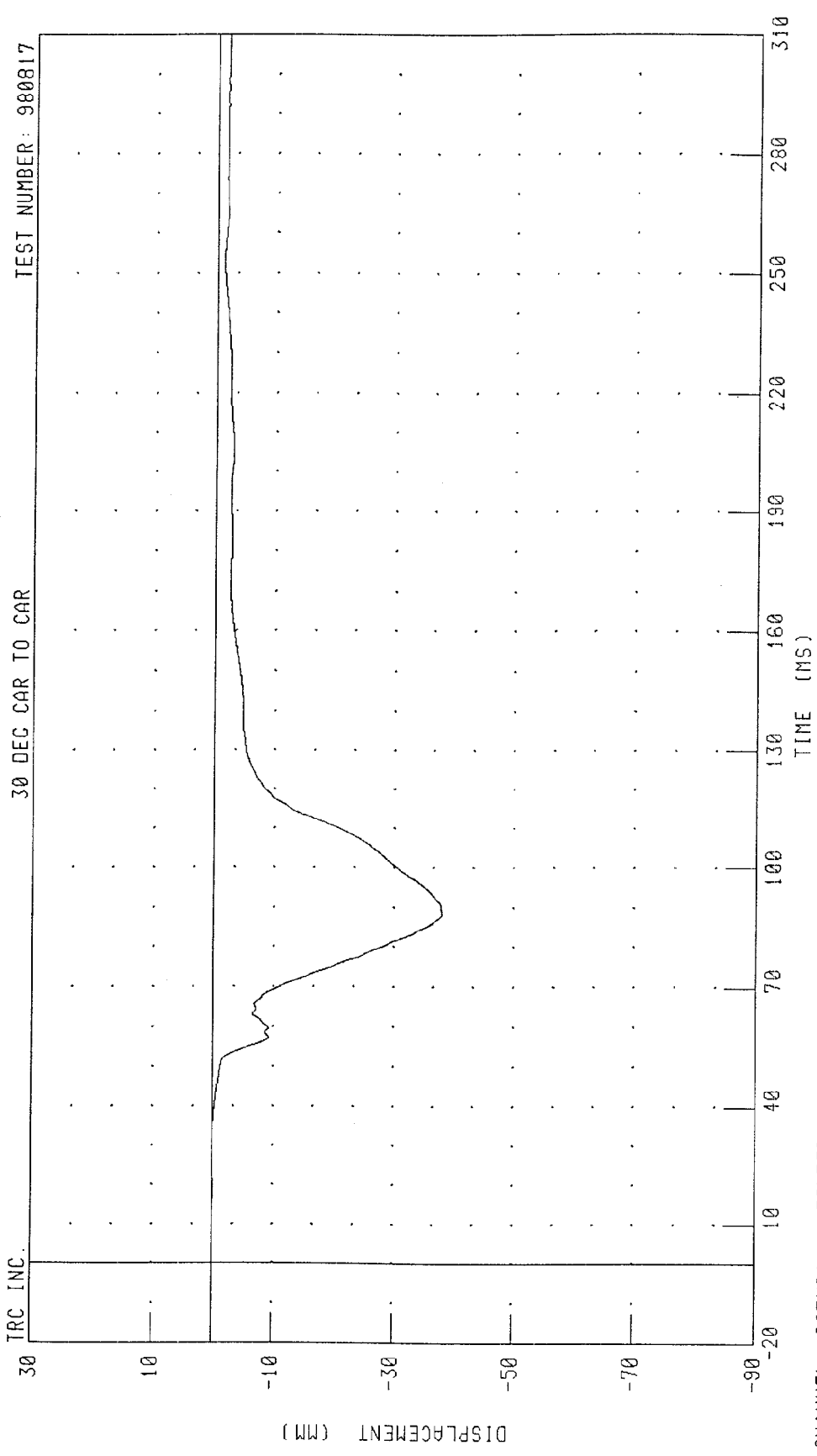
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER CHEST RESULTANT ACCELERATION



CHANNEL: CSTRG1 FILTER: CH. CLASS 180 PEAK DATA: 47.89 G @ 87.04 MS, 0.01 G @ -20.00 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER CHEST DEFLECTION
30 DEC CAR TO CAR

TRC INC.
TEST NUMBER: 980817



CHANNEL: CSTXD1 FILTER: CH. CLASS 180

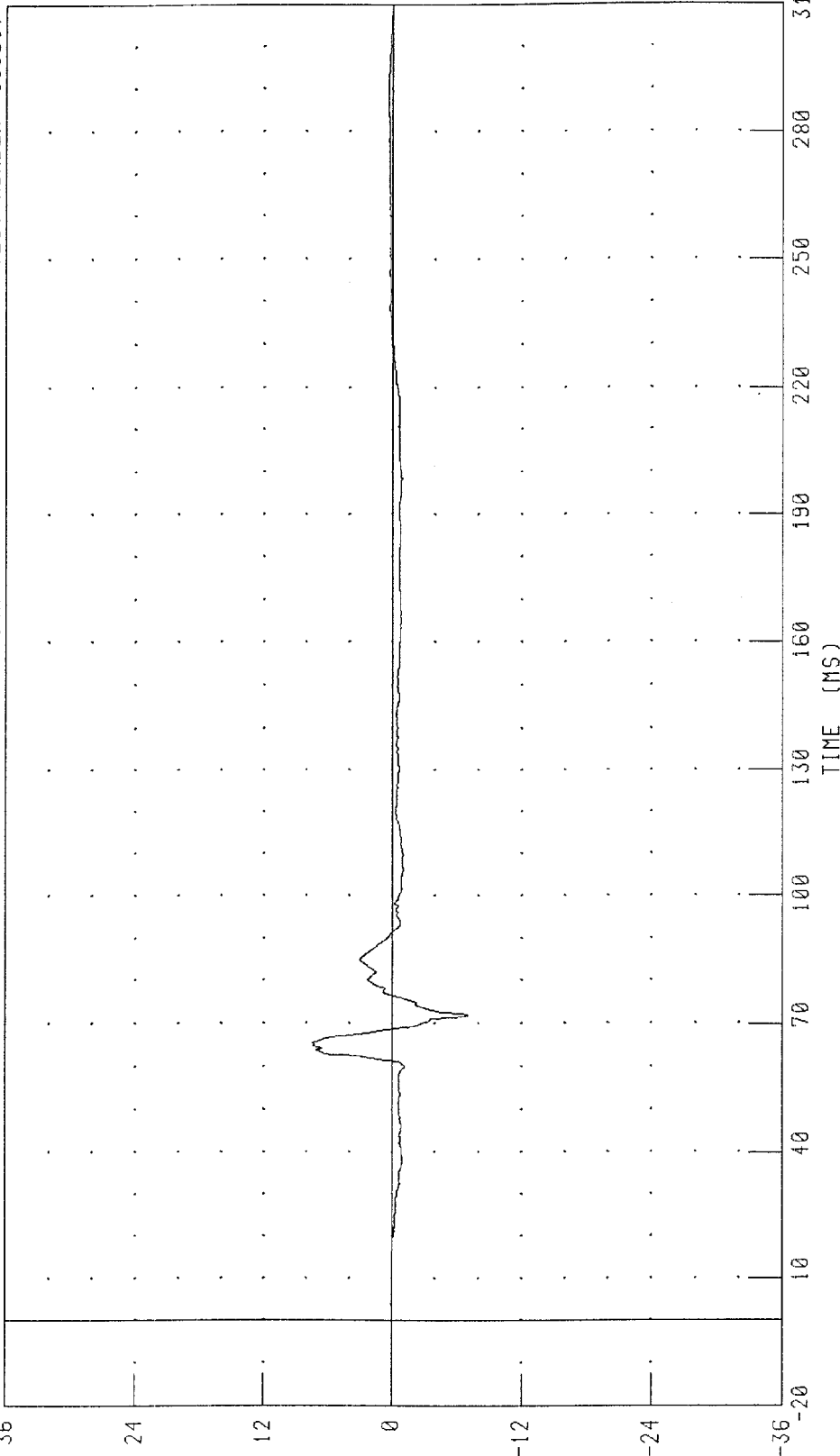
PEAK DATA: 0 01 MM @ 35.12 MS, -38.08 MM @ 88.56 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT UPPER TIBIA X-AXIS FORCE

TEST NUMBER: 980817

30 DEC CAR TO CAR

TRC INC.



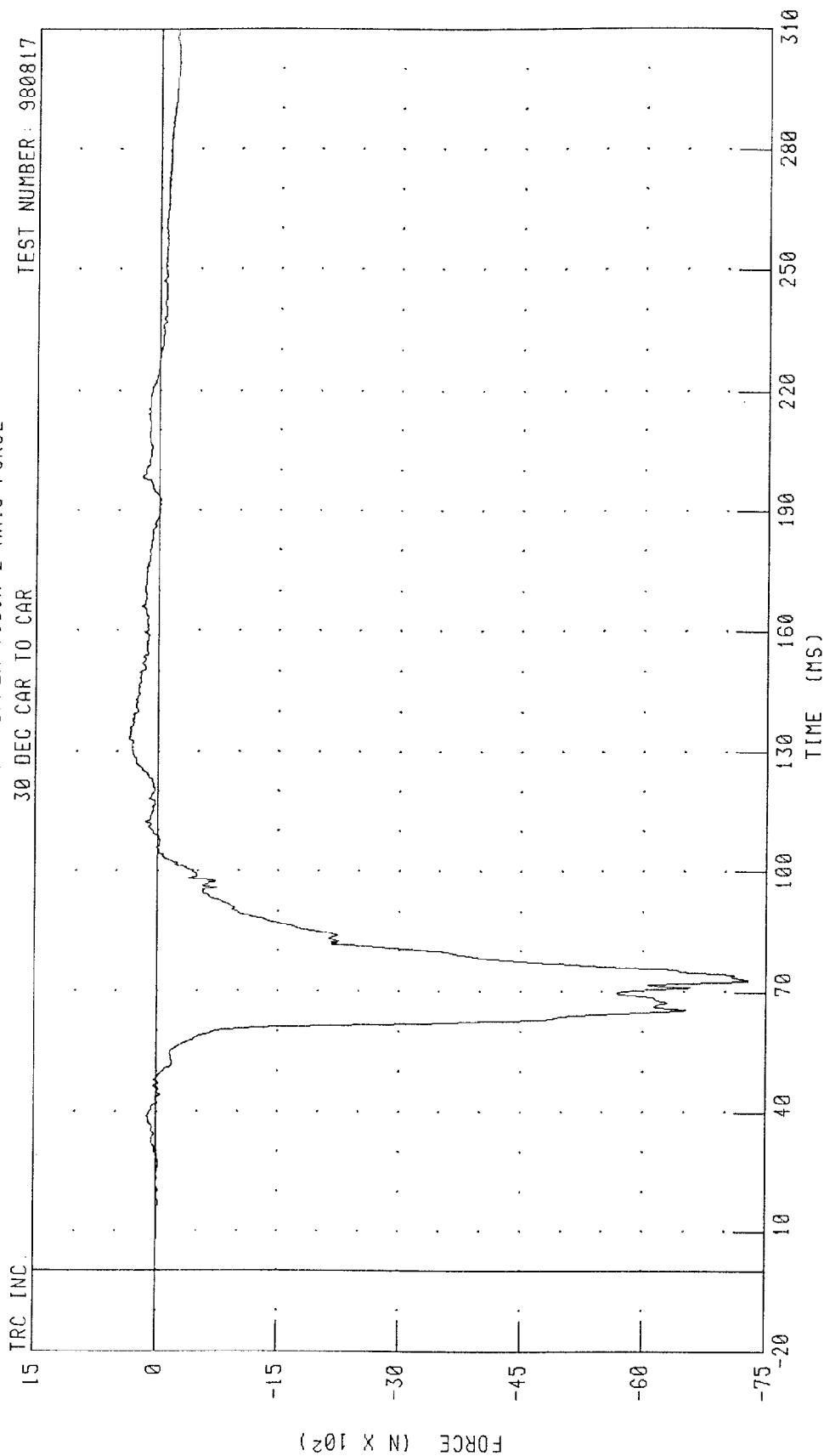
FORCE (N X 10²)

TIME (MS)

CHANNEL: TBRXF1 FILTER: CH. CLASS 600

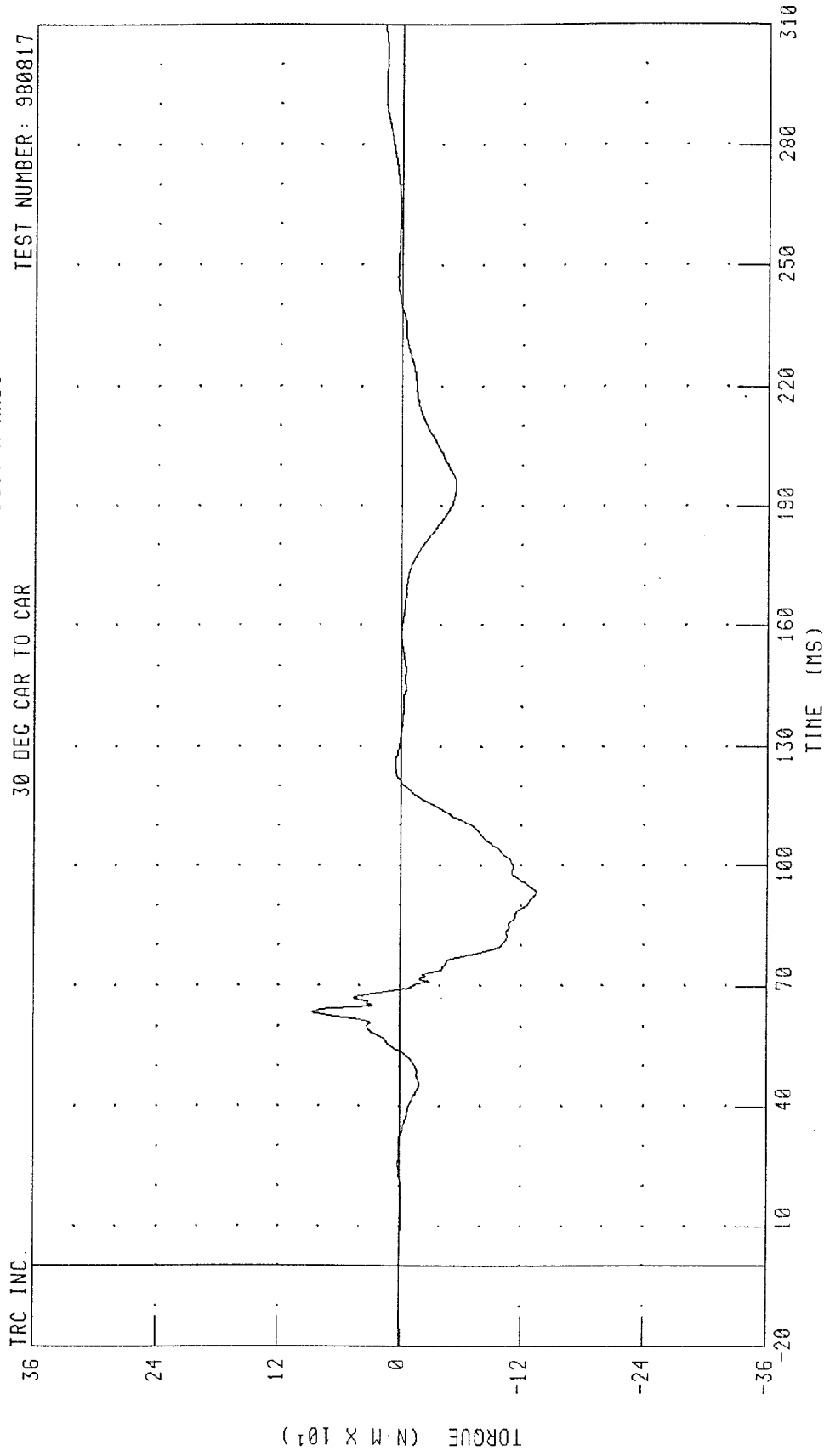
PEAK DATA: 744.56 N @ 65.60 MS; -706.60 N @ 72.08 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET DRIVER RIGHT UPPER TIBIA Z-AXIS FORCE



CHANNEL: TBRZF1 FILTER: CH. CLASS 600 PEAK DATA: 363.50 N @ 133.28 MS, -7291.59 N @ 72.80 MS

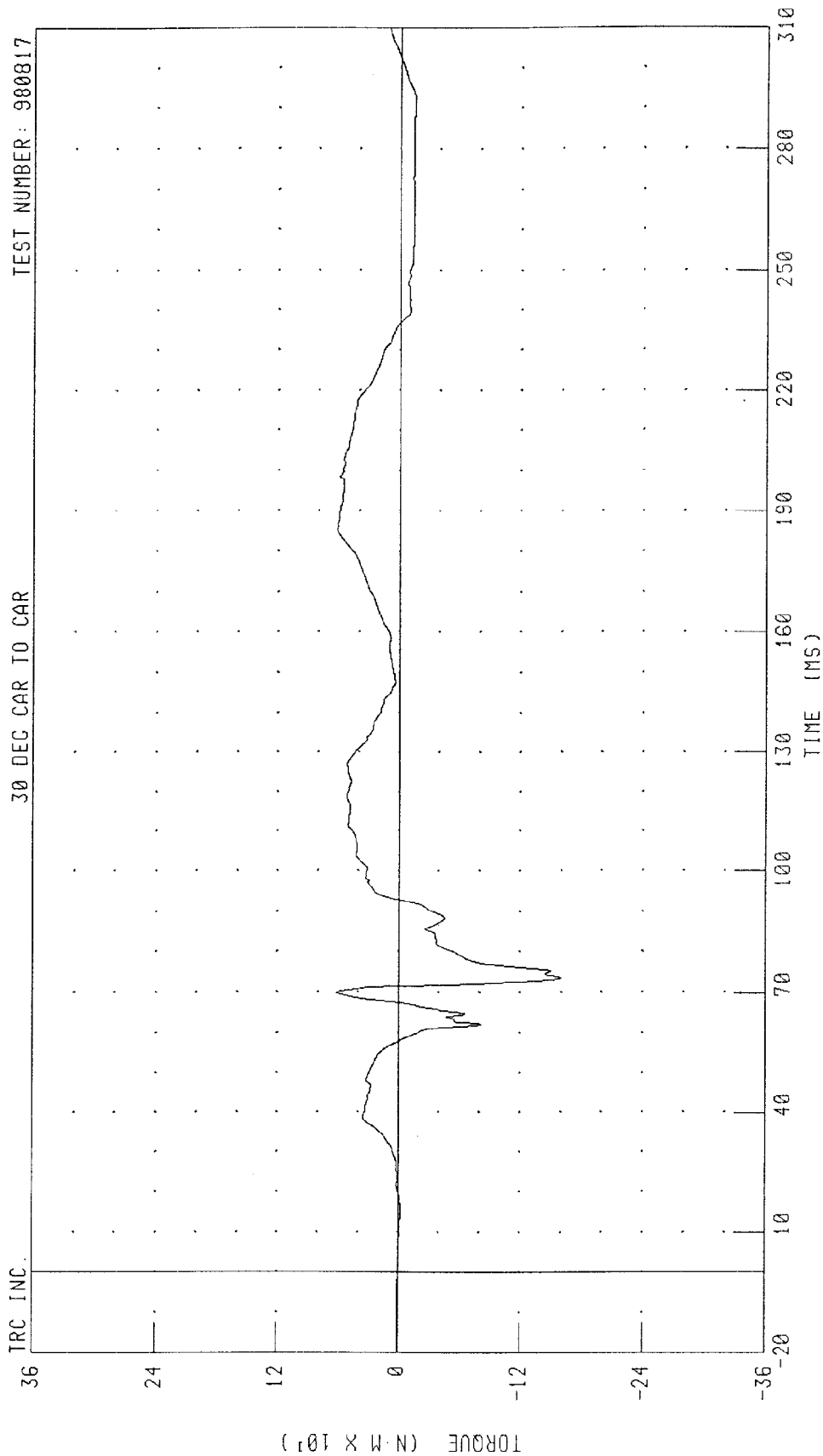
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS



CHANNEL: TBRXM1 FILTER: CH. CLASS 600

PEAK DATA: 86.81 N·m @ 63.52 ms; -134.90 N·m @ 93.20 ms

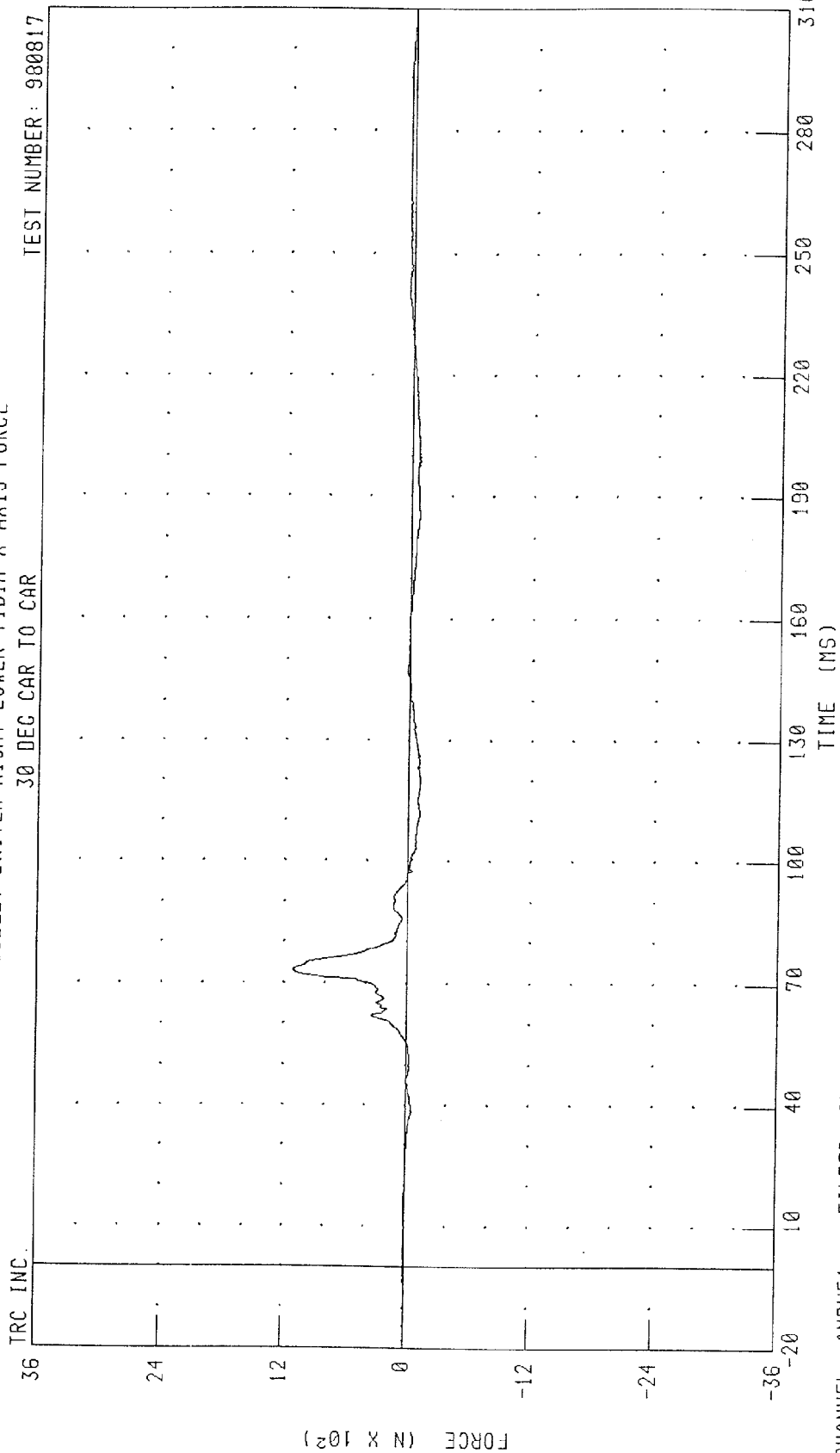
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS



CHANNEL: TBRYM1 FILTER: CH. CLASS 600

PEAK DATA: 61.25 N·M @ 185.36 MS; -159.93 N·M @ 73.60 MS

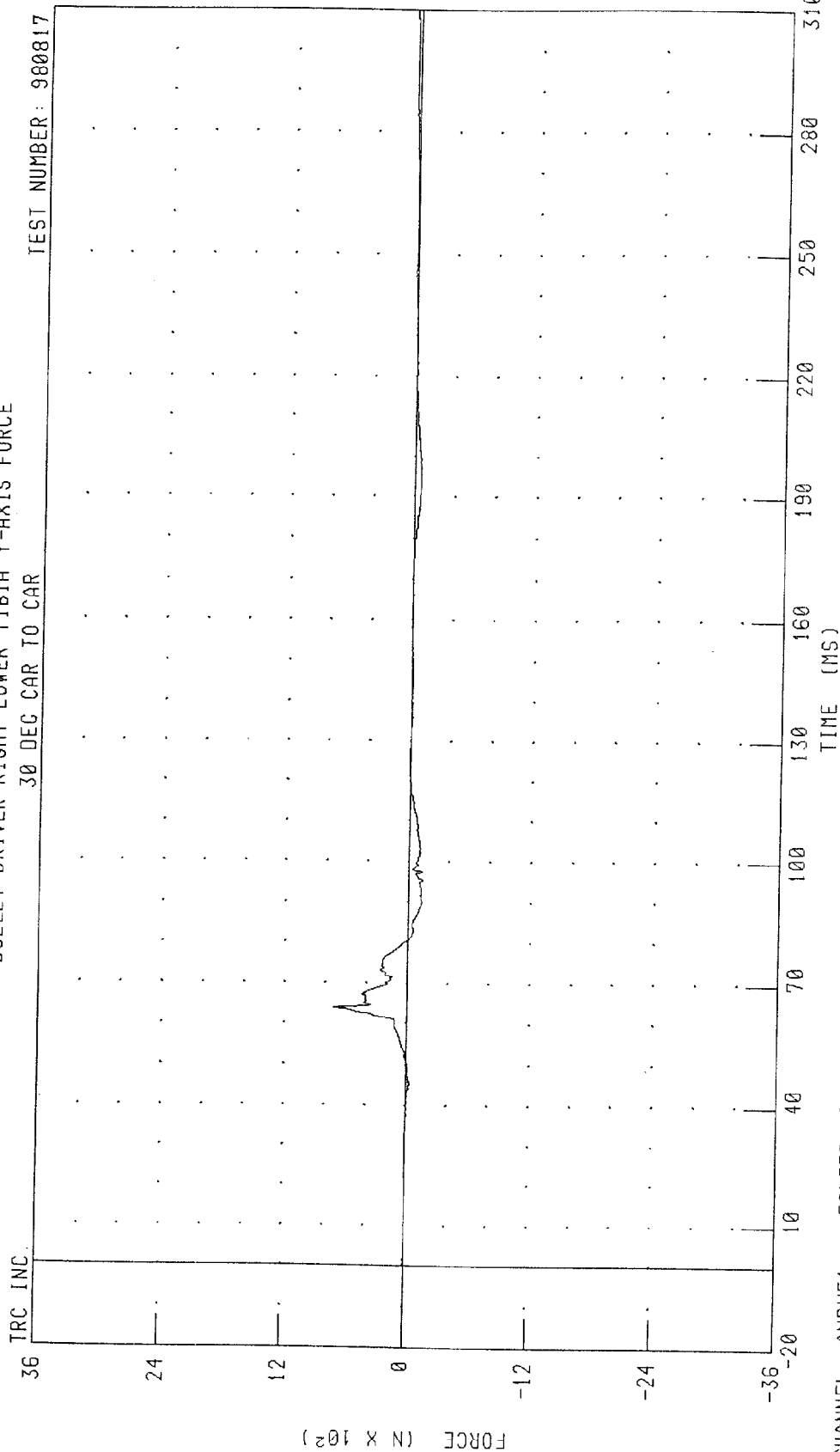
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT LOWER TIBIA X-AXIS FORCE



CHANNEL: ANRXF1 FILTER: CH. CLASS 600

PEAK DATA: 1110.85 N @ 73.28 MS; -120.26 N @ 119.60 MS

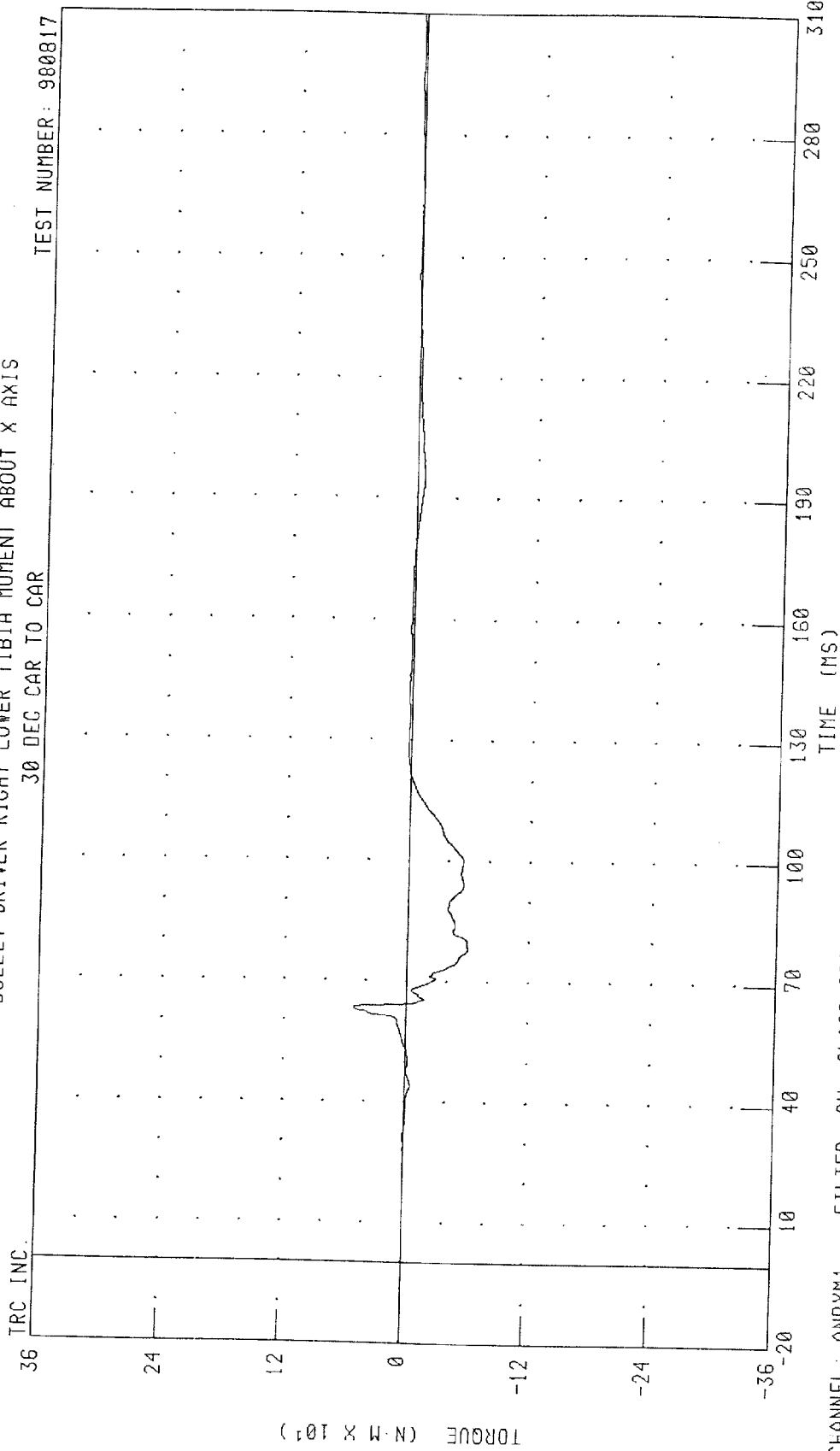
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT LOWER TIBIA Y-AXIS FORCE



CHANNEL: ANRYF1 FILTER: CH. CLASS 600

PEAK DATA: 719.65 N @ 64.08 MS; -149.94 N @ 95.52 MS

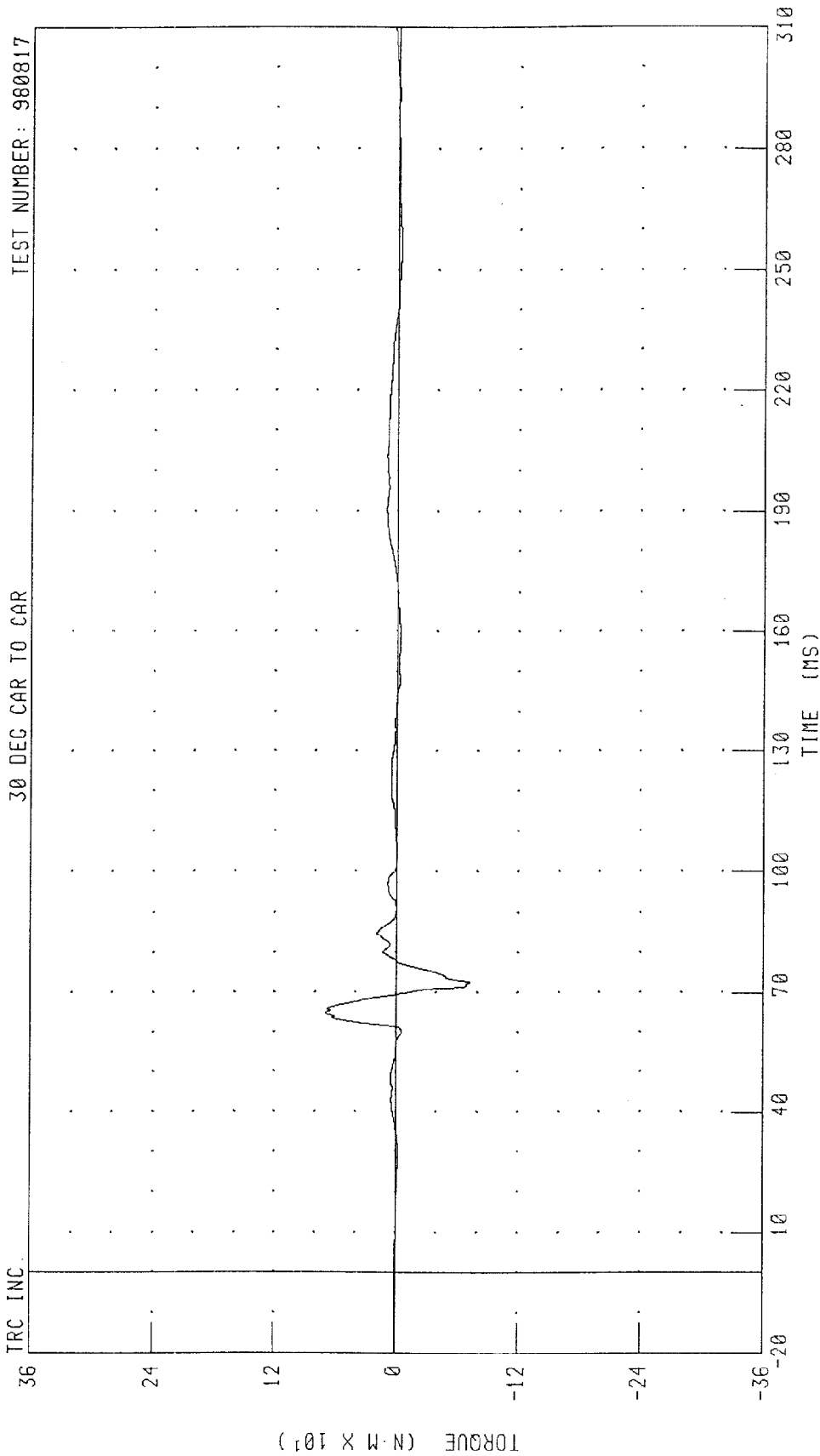
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT LOWER TIBIA MOMENT ABOUT X AXIS



CHANNEL: ANRXM1 FILTER: CH. CLASS 600

PEAK DATA: 51.73 N·M @ 63.36 MS; -60.20 N·M @ 77.92 MS

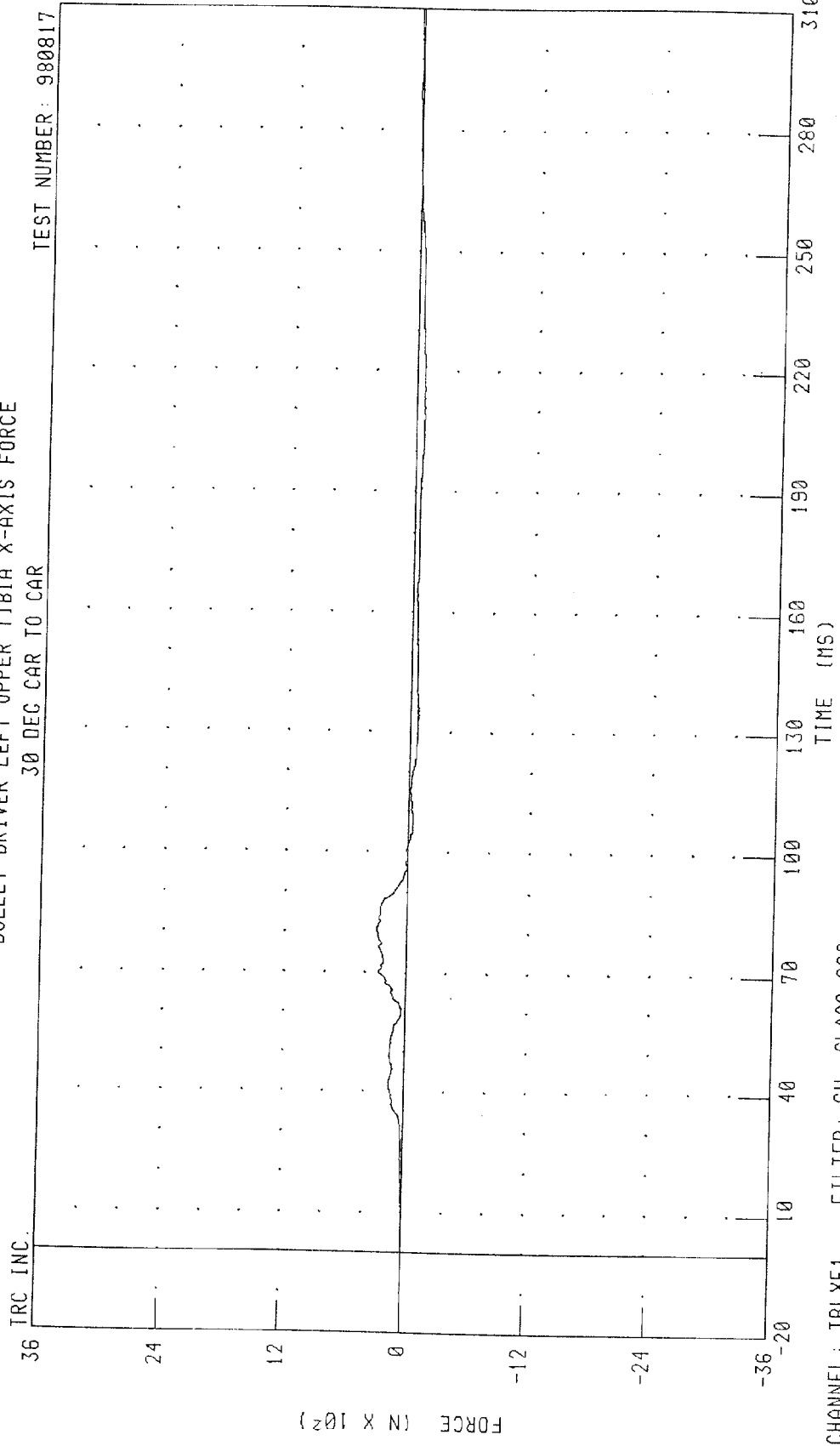
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS



CHANNEL: ANRYM1 FILTER: CH. CLASS 600

PEAK DATA: 69.86 N·M @ 64.88 MS, -72.67 N·M @ 72.48 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT UPPER TIBIA X-AXIS FORCE

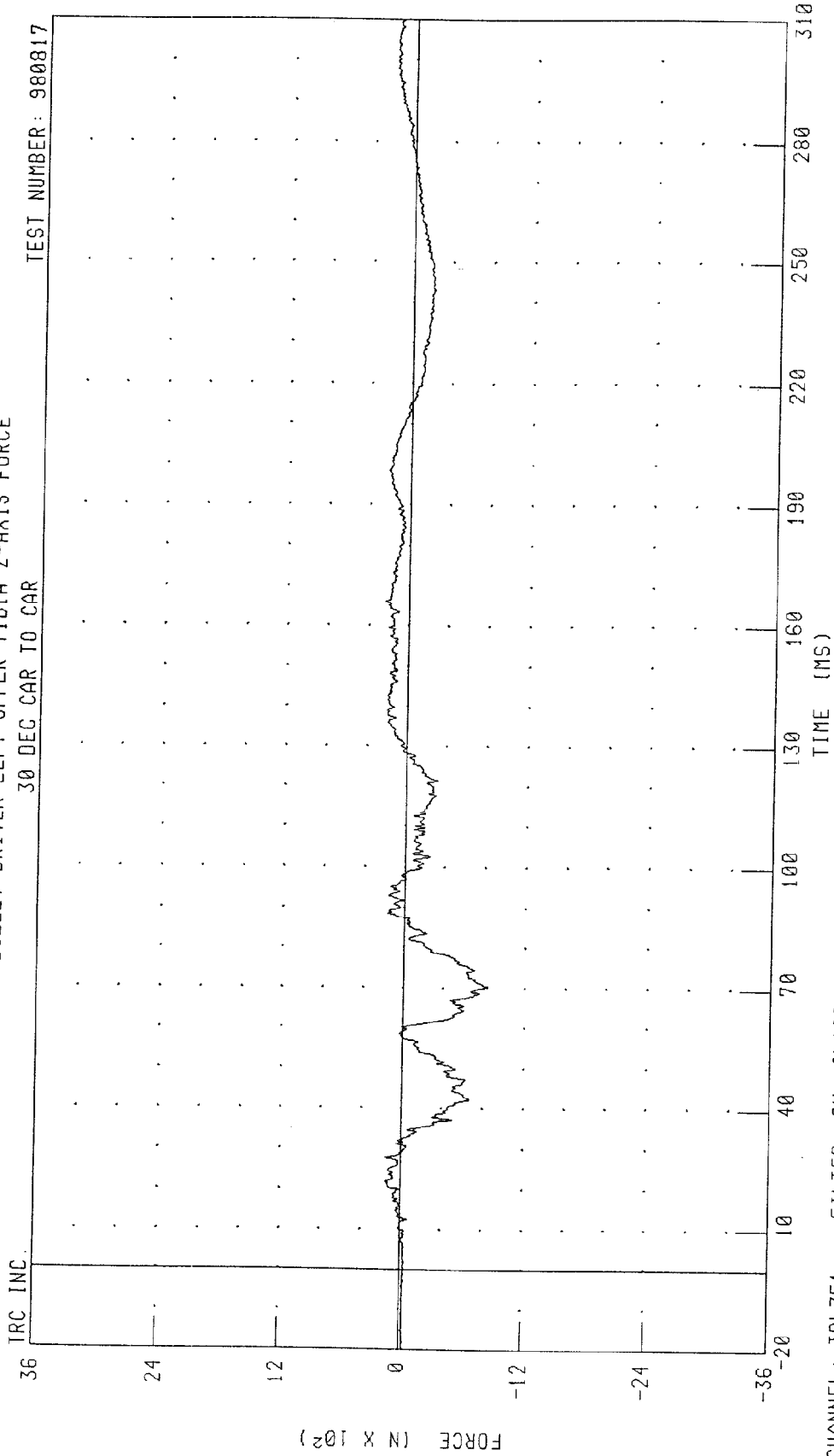


CHANNEL: TBLXF1 FILTER: CH. CLASS 600

PEAK DATA: 290.73 N @ 81.12 MS; -88.35 N @ 215.52 MS

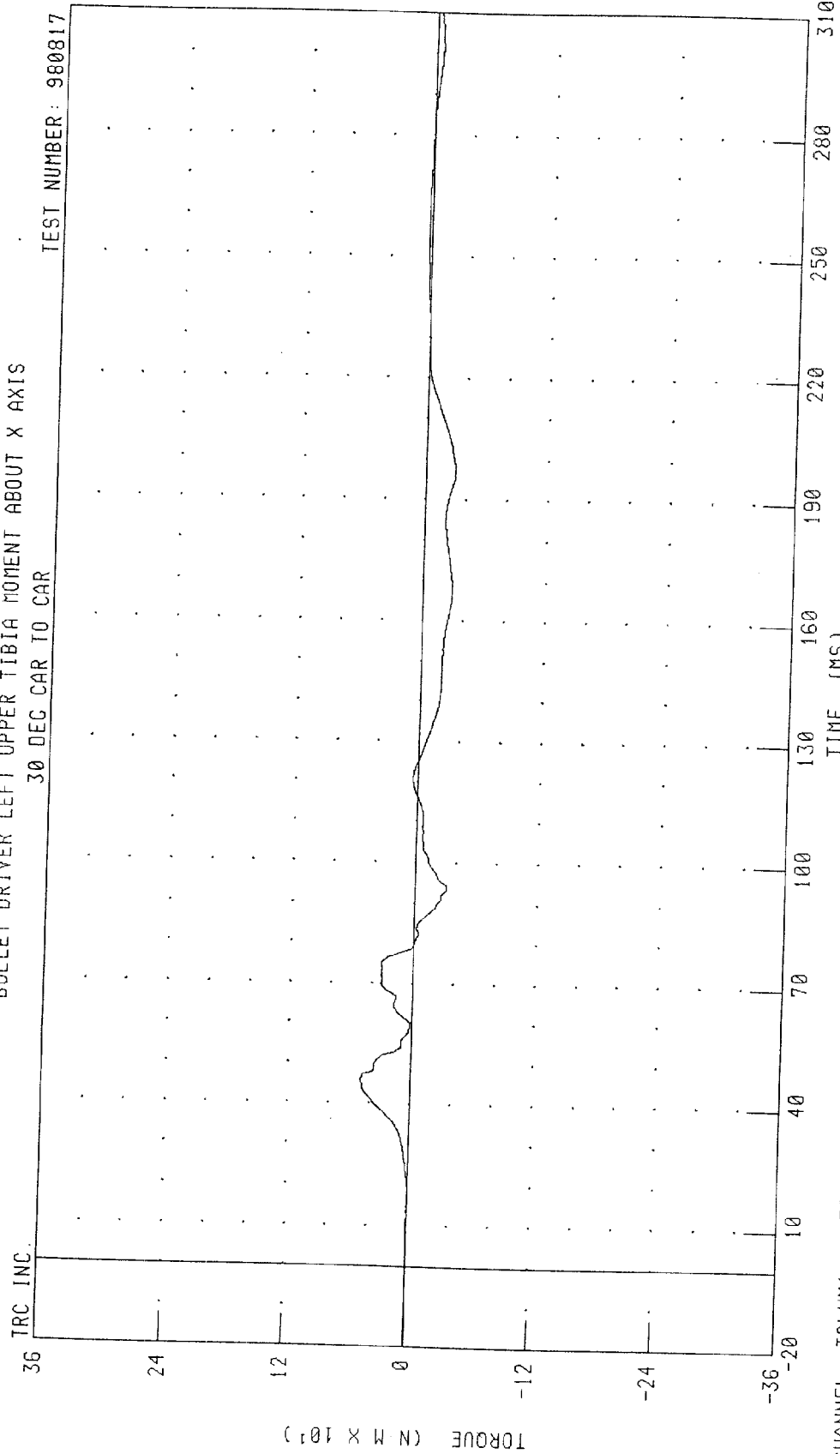
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT UPPER TIBIA Z-AXIS FORCE

IRC INC. 30 DEG CAR TO CAR TEST NUMBER: 980817



CHANNEL: TBLZF1 FILTER: CH. CLASS 600
PEAK DATA: 240.98 N @ 166.32 MS; -840.35 N @ 70.48 MS

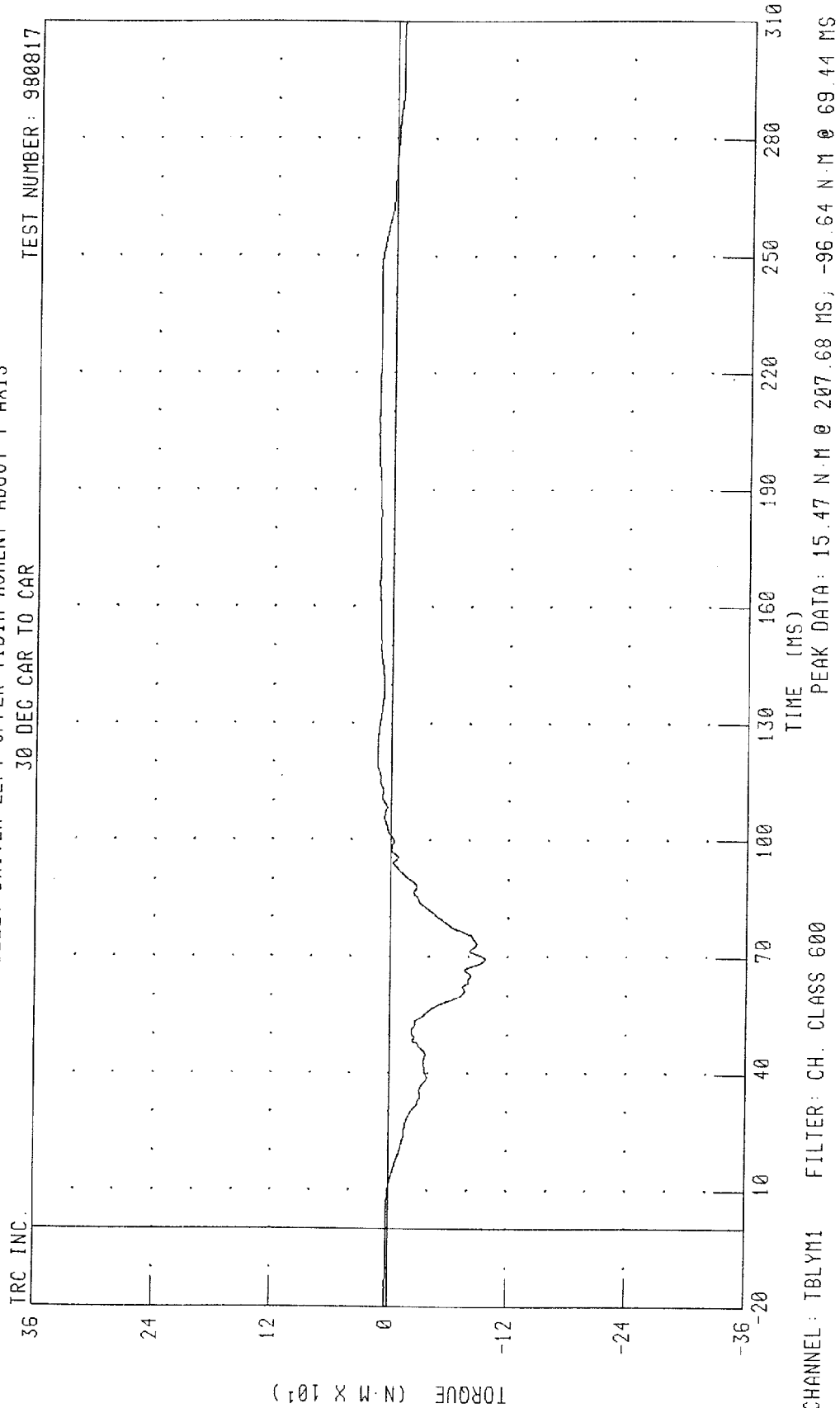
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT UPPER TIBIA MOMENT ABOUT X AXIS



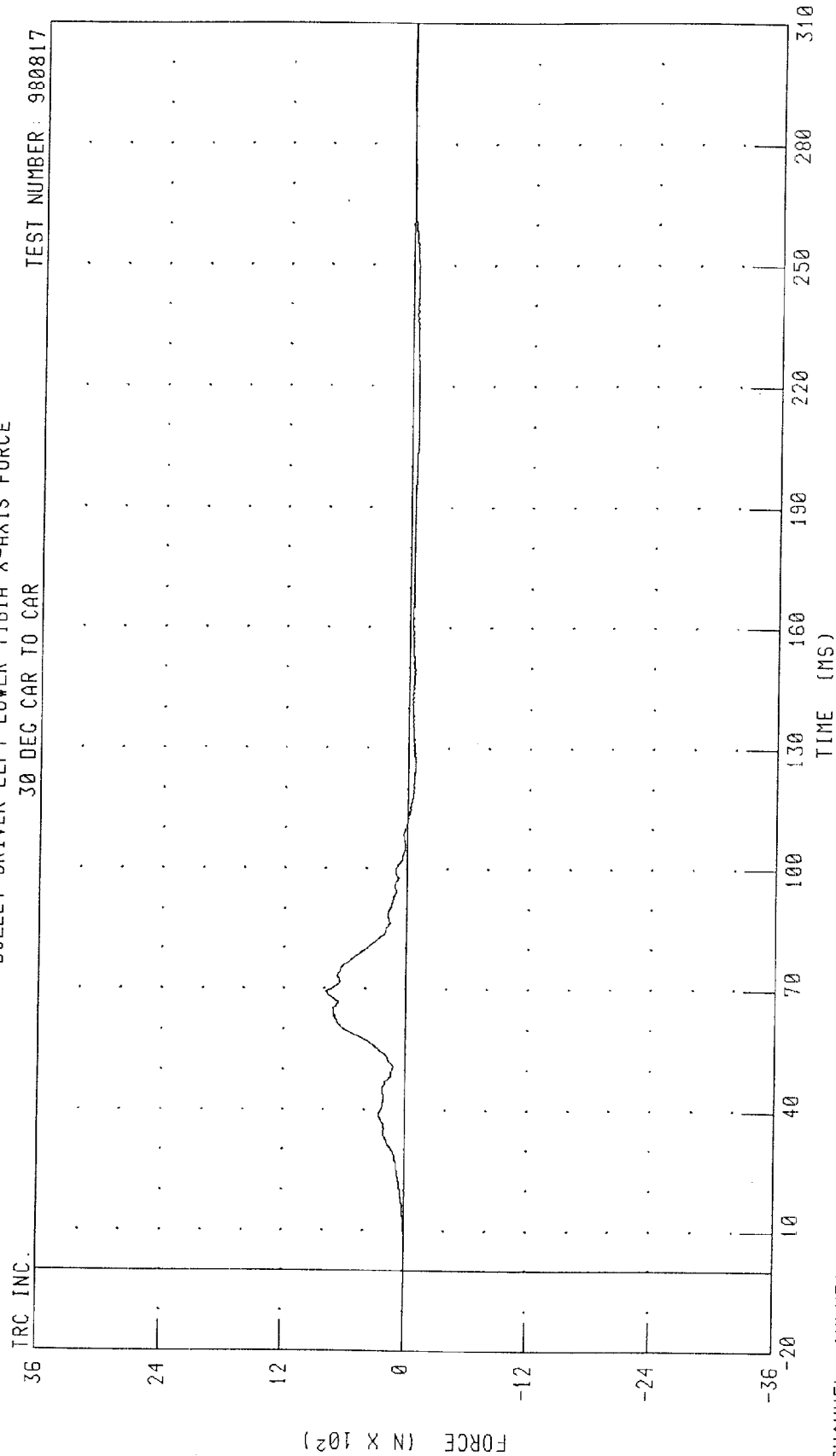
CHANNEL: TBLXM1 FILTER: CH. CLASS 600

PEAK DATA: 48.90 N·M @ 46.00 MS; -31.40 N·M @ 94.40 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS



1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT LOWER TIBIA X-AXIS FORCE



CHANNEL: ANLXF1 FILTER: CH. CLASS 600

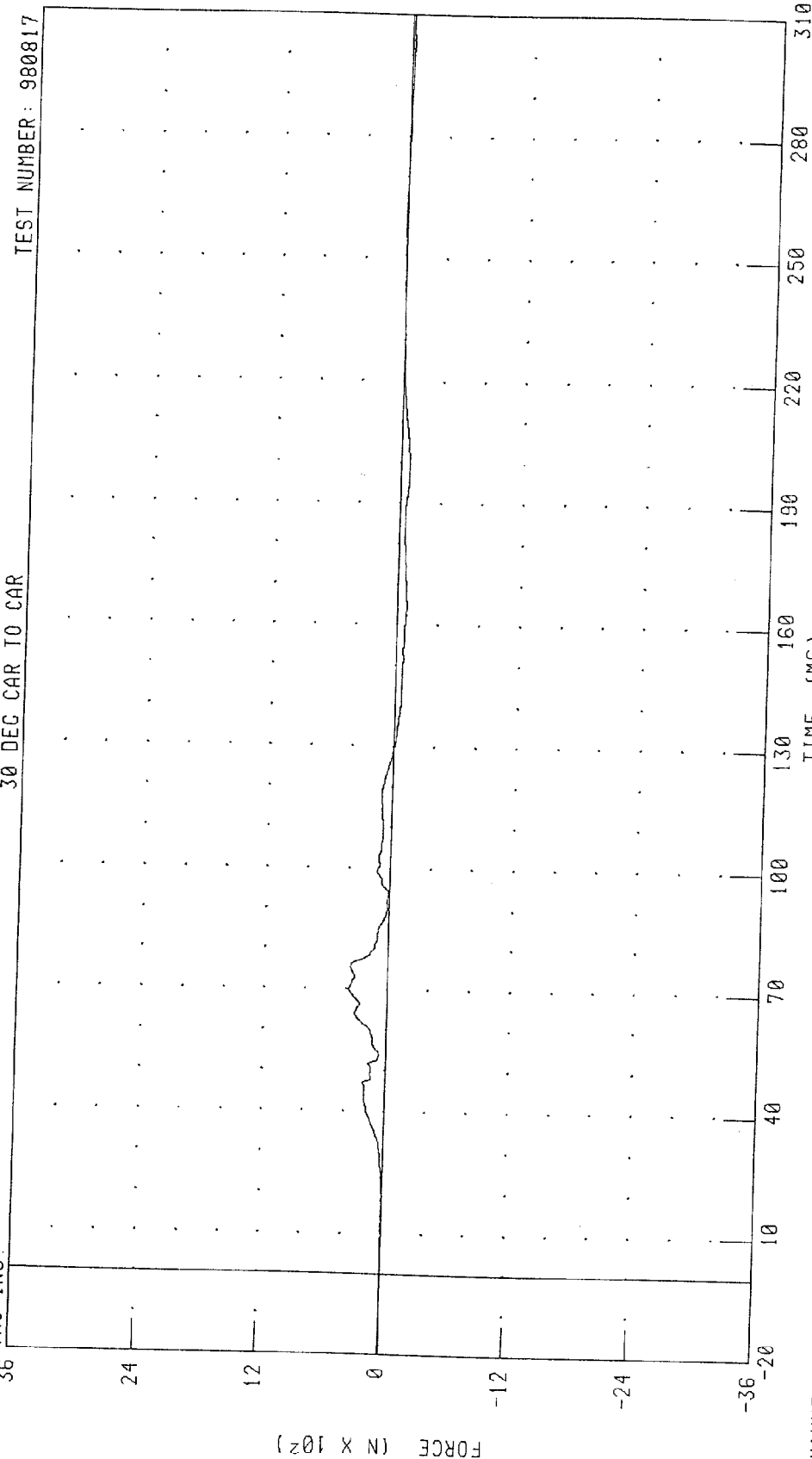
PEAK DATA: 783.15 N @ 69.36 MS; -78.78 N @ 126.64 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT LOWER TIBIA Y-AXIS FORCE

TRC INC.

TEST NUMBER: 980817

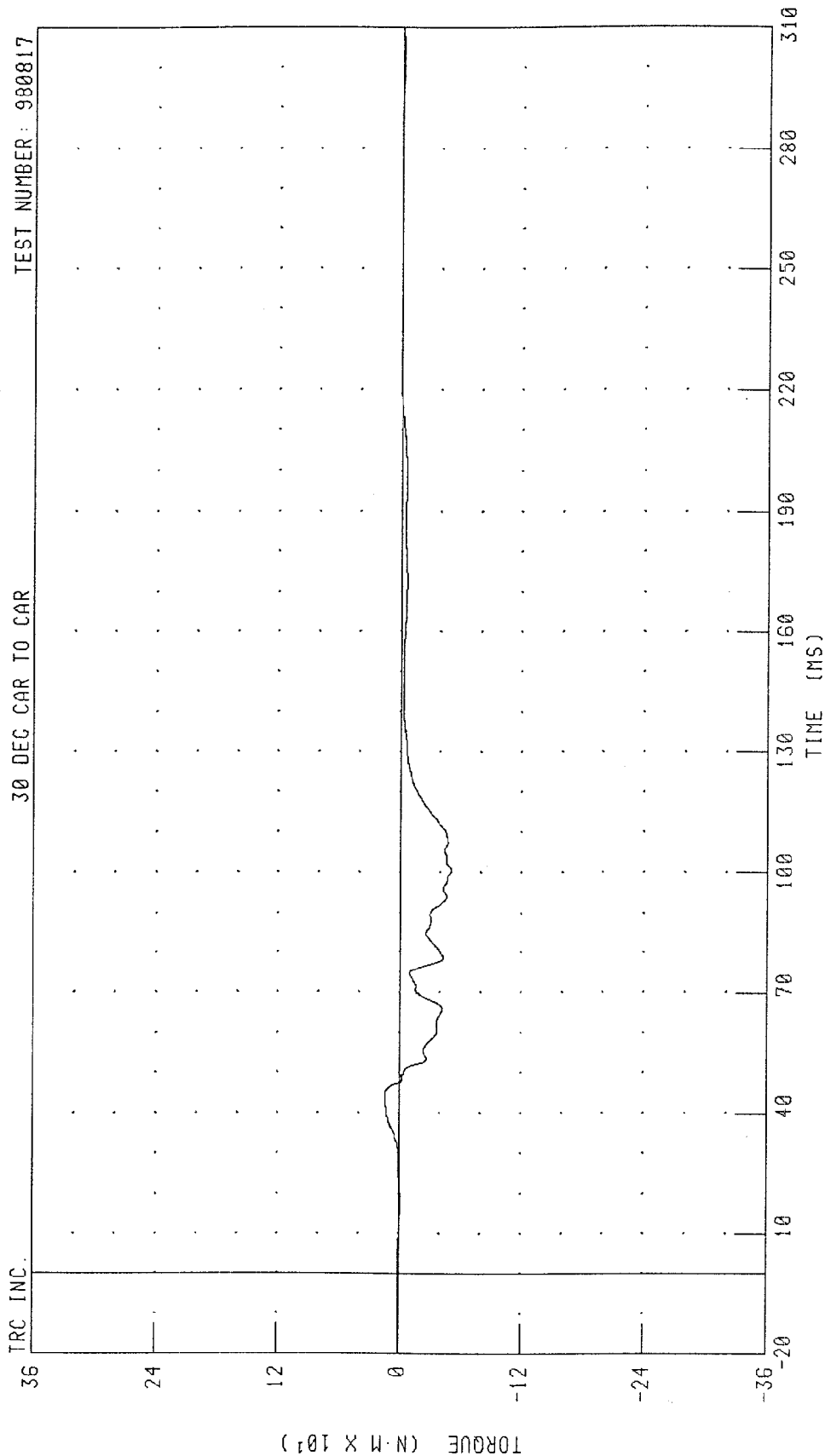
30 DEC CAR TO CAR



CHANNEL: ANLYF1 FILTER: CH. CLASS 600

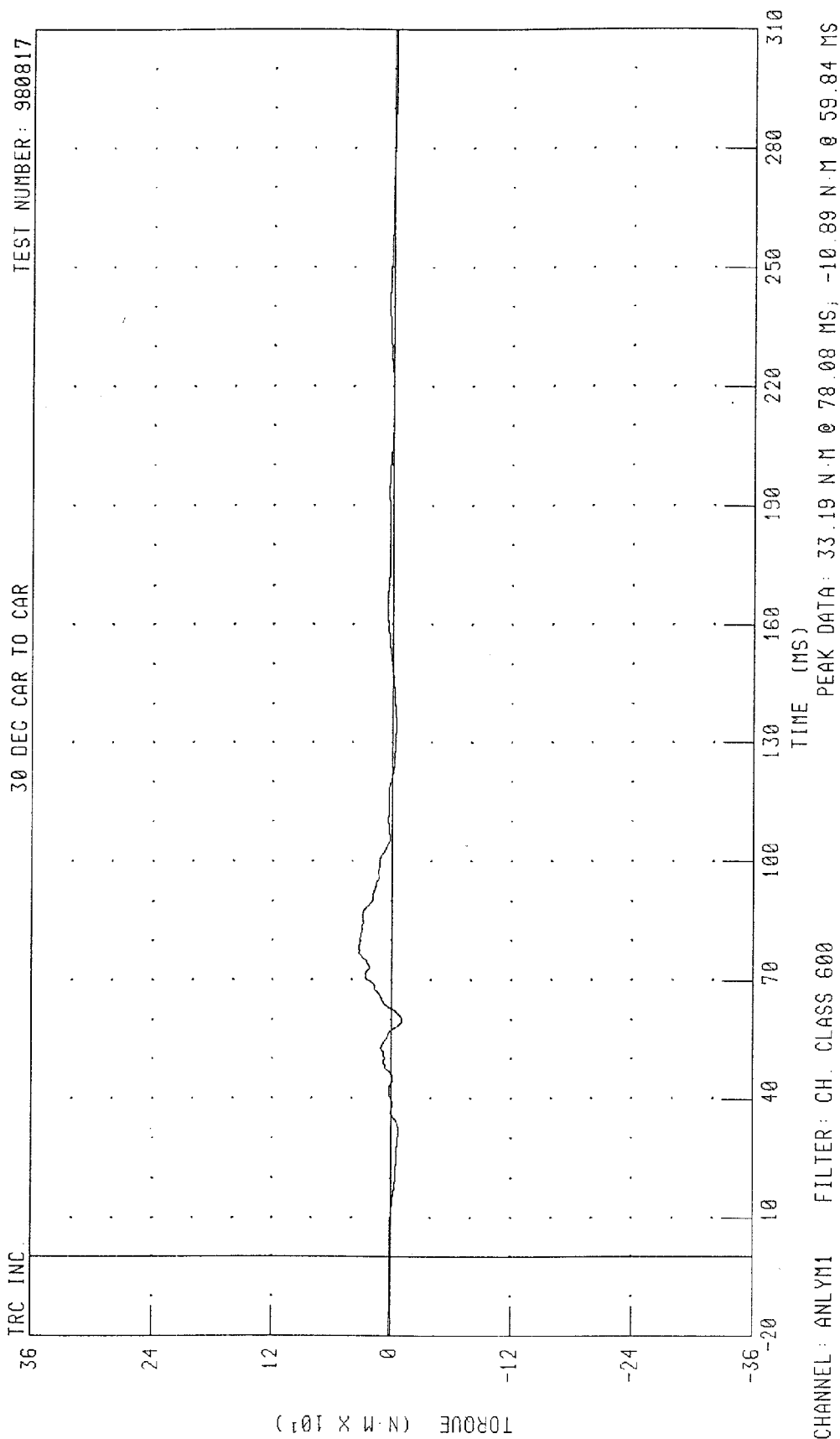
PEAK DATA: 377.17 N @ 70.08 MS; -94.25 N @ 165.60 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET DRIVER LEFT LOWER TIBIA MOMENT ABOUT X AXIS

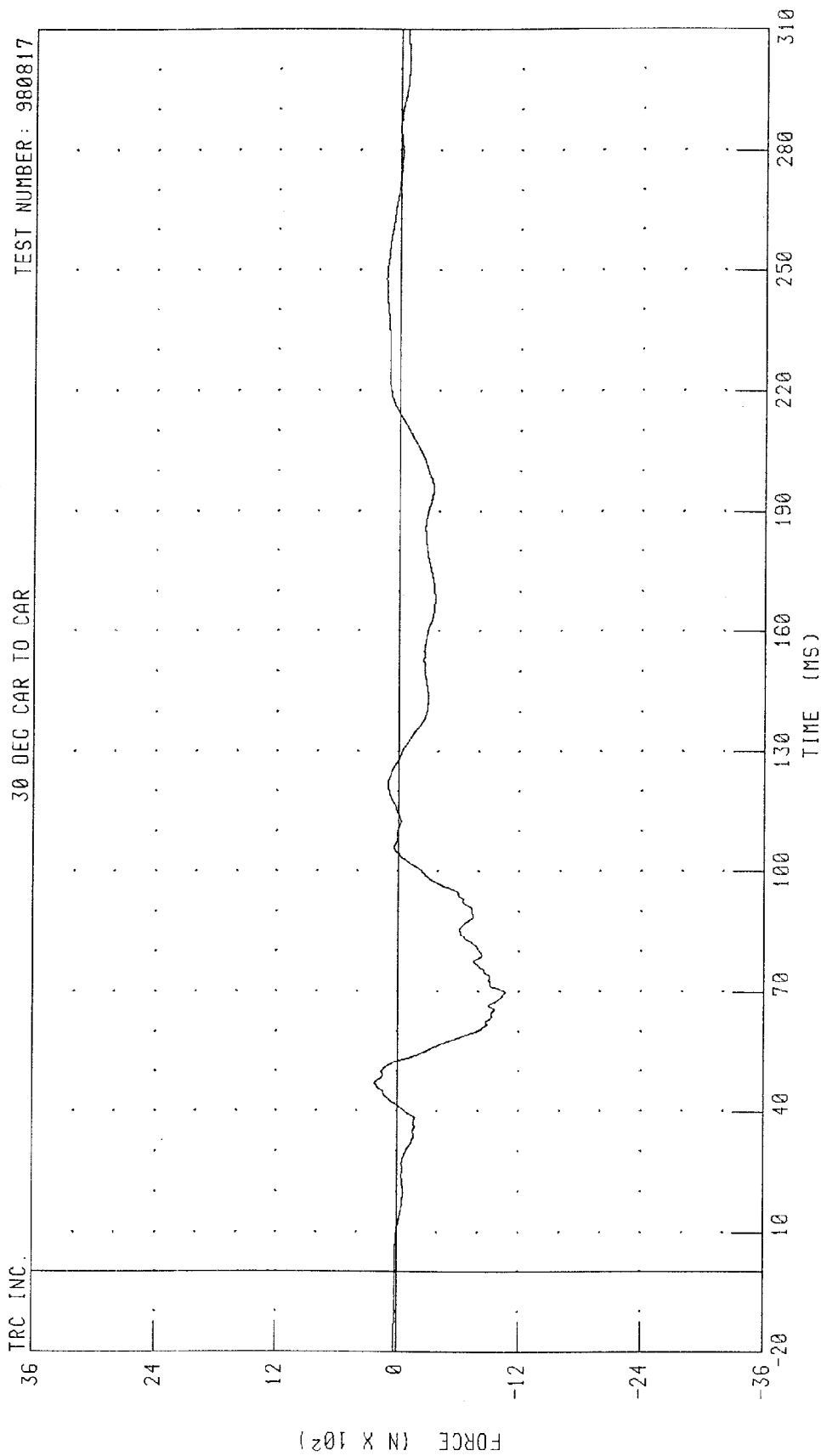


CHANNEL: ANLXM1 FILTER: CH. CLASS 600 PEAK DATA: 14.03 N·M @ 43.52 MS; -51.28 N·M @ 100.64 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET DRIVER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS



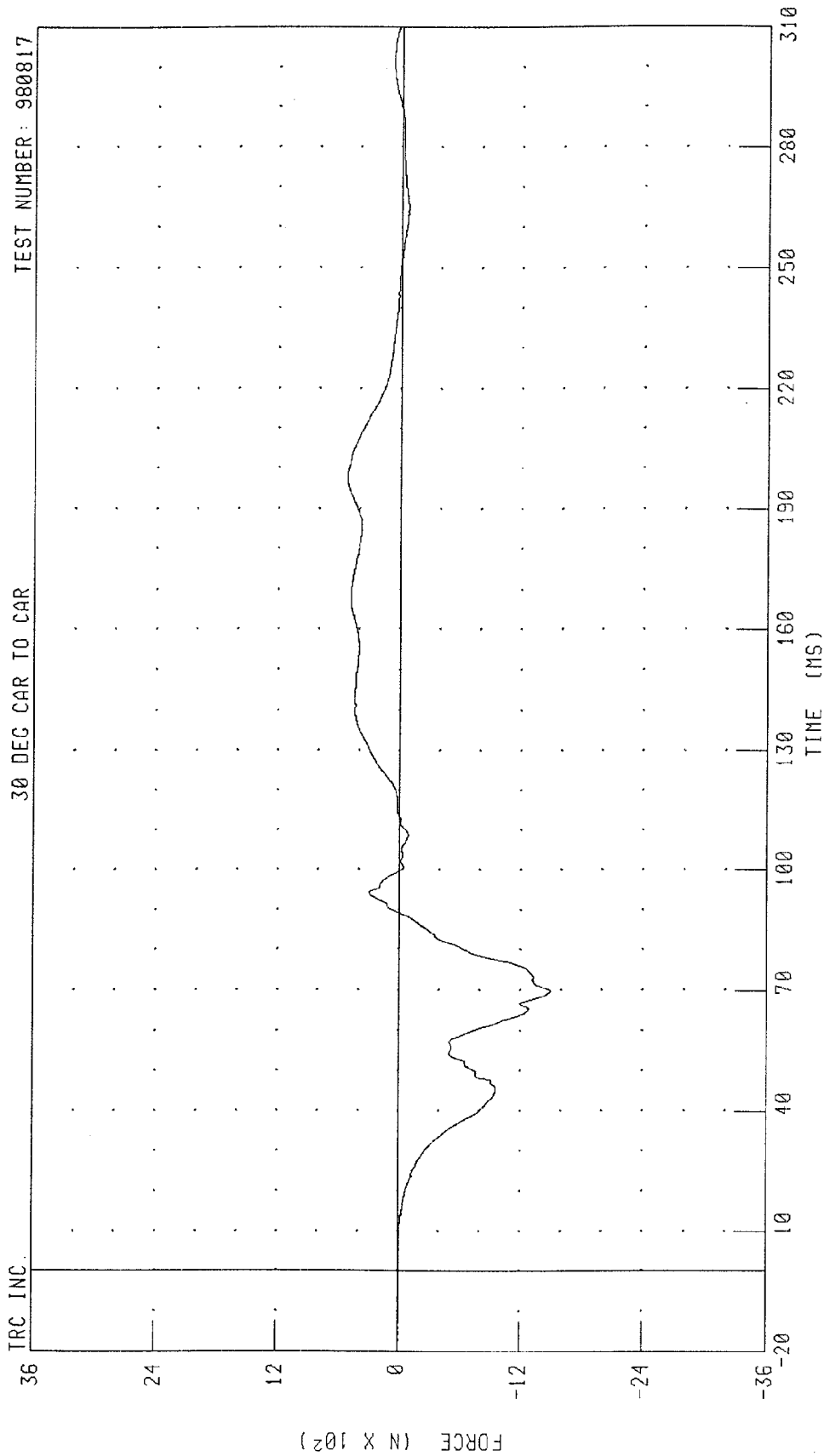
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT KNEE LEFT FORCE



CHANNEL: KNLLF1 FILTER: CH. CLASS 600

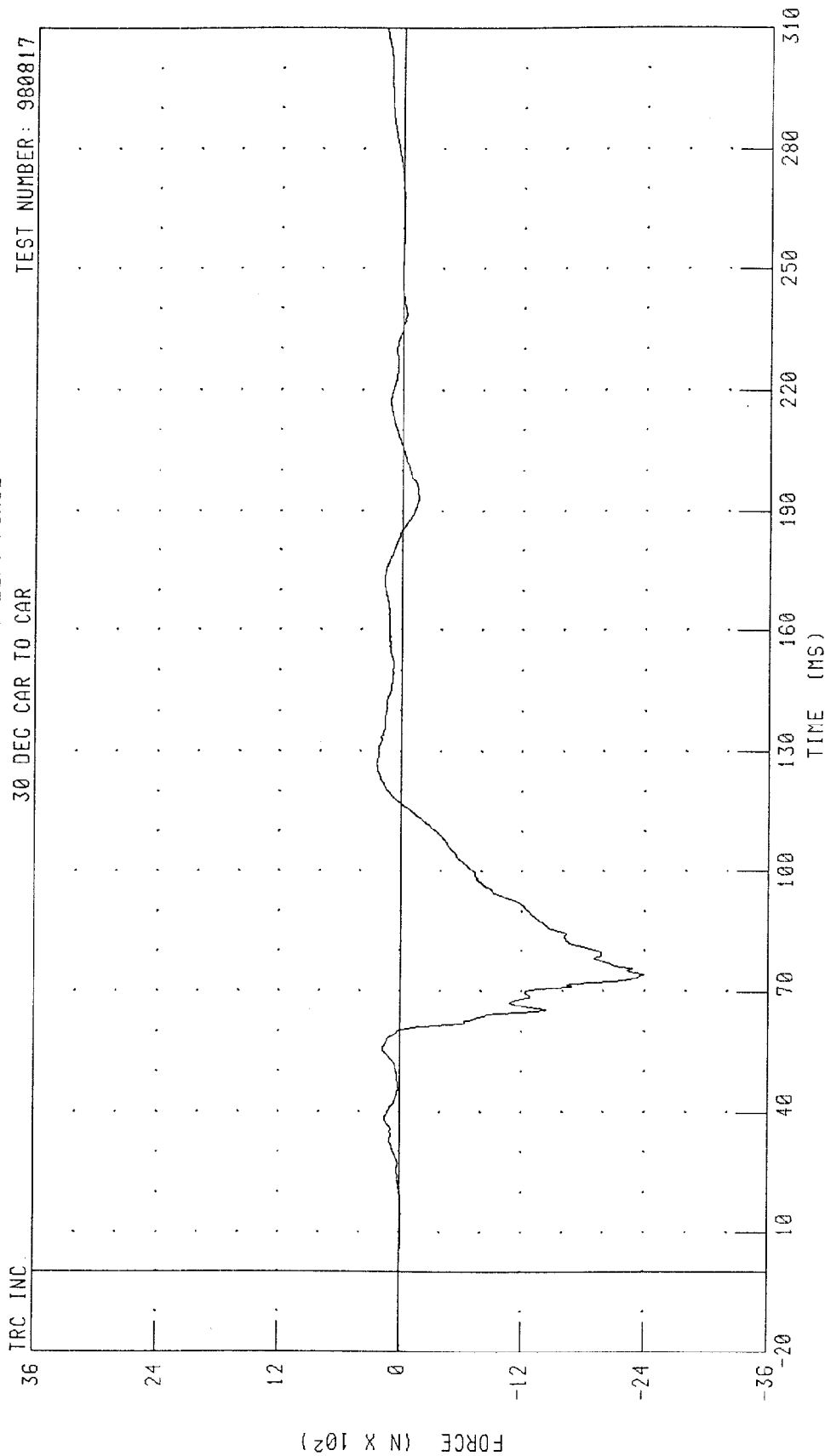
PEAK DATA: 217.35 N @ 47.12 MS, -1067.31 N @ 69.92 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER LEFT KNEE RIGHT FORCE



CHANNEL: KNLRF1 FILTER: CH. CLASS 600 PEAK DATA: 528.42 N @ 197.60 MS; -1501.56 N @ 69.84 MS

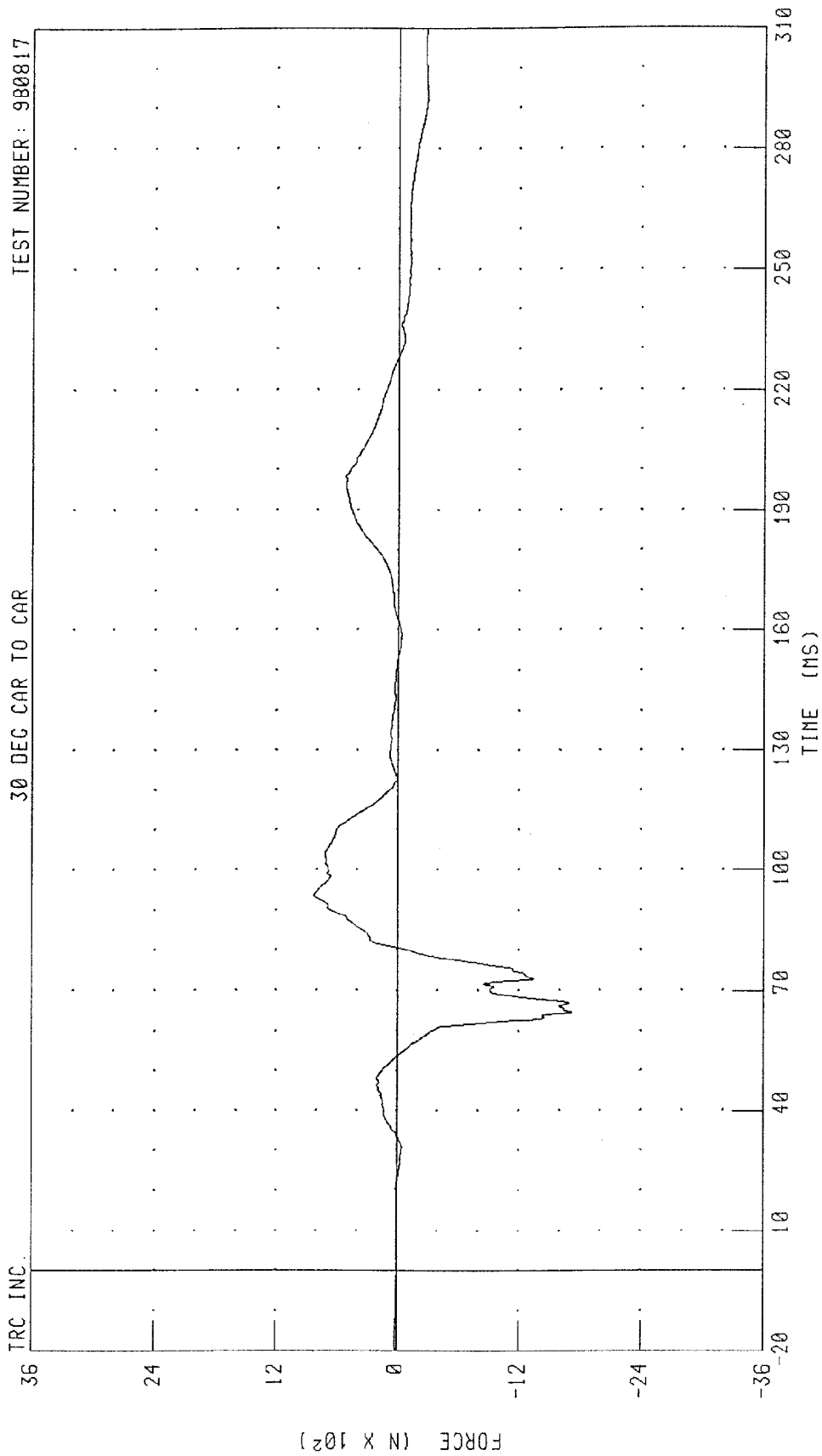
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT KNEE LEFT FORCE



CHANNEL: KNRLF1 FILTER: CH. CLASS 600

PEAK DATA: 237.49 N @ 126.96 MS; -2396.41 N @ 74.08 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET DRIVER RIGHT KNEE RIGHT FORCE



CHANNEL: KNRRF1 FILTER: CH. CLASS 600

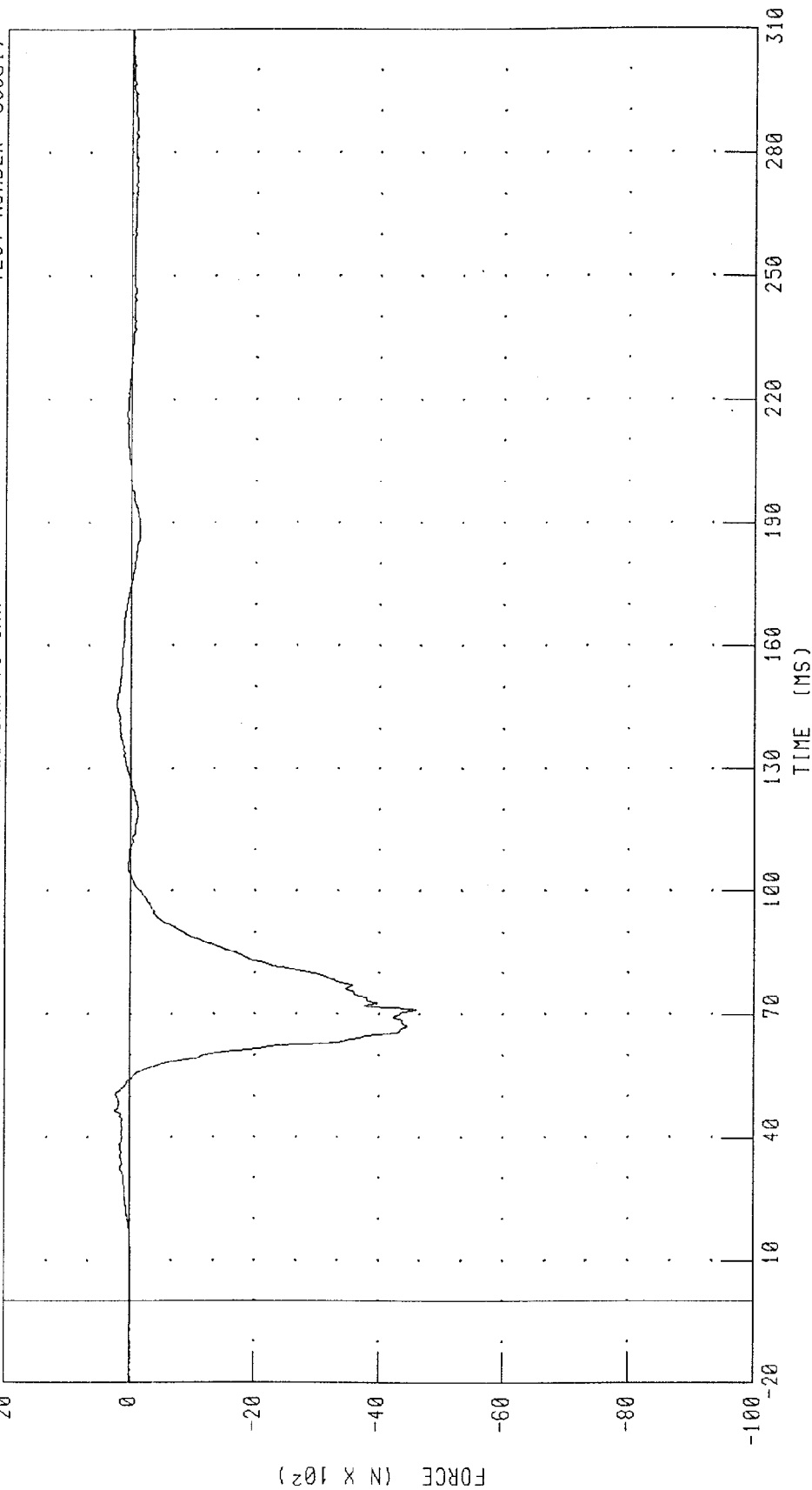
PEAK DATA: 827.57 N @ 93.84 MS, -1719.70 N @ 64.72 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET DRIVER LEFT FEMUR FORCE

TEST NUMBER: 980817

30 DEC CAR TO CAR

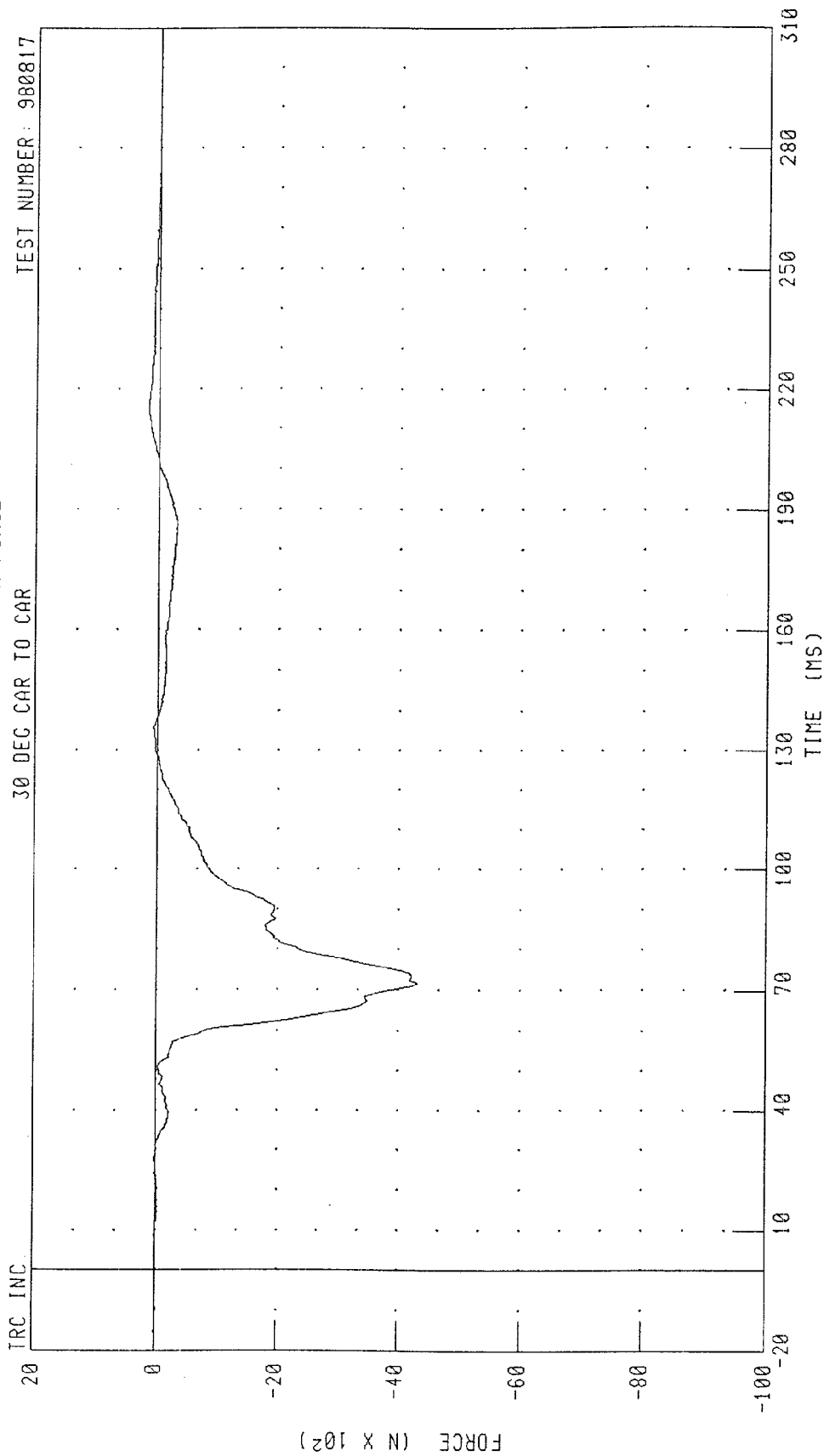
TRC INC.



CHANNEL: LFMF1 FILTER: CH. CLASS 600

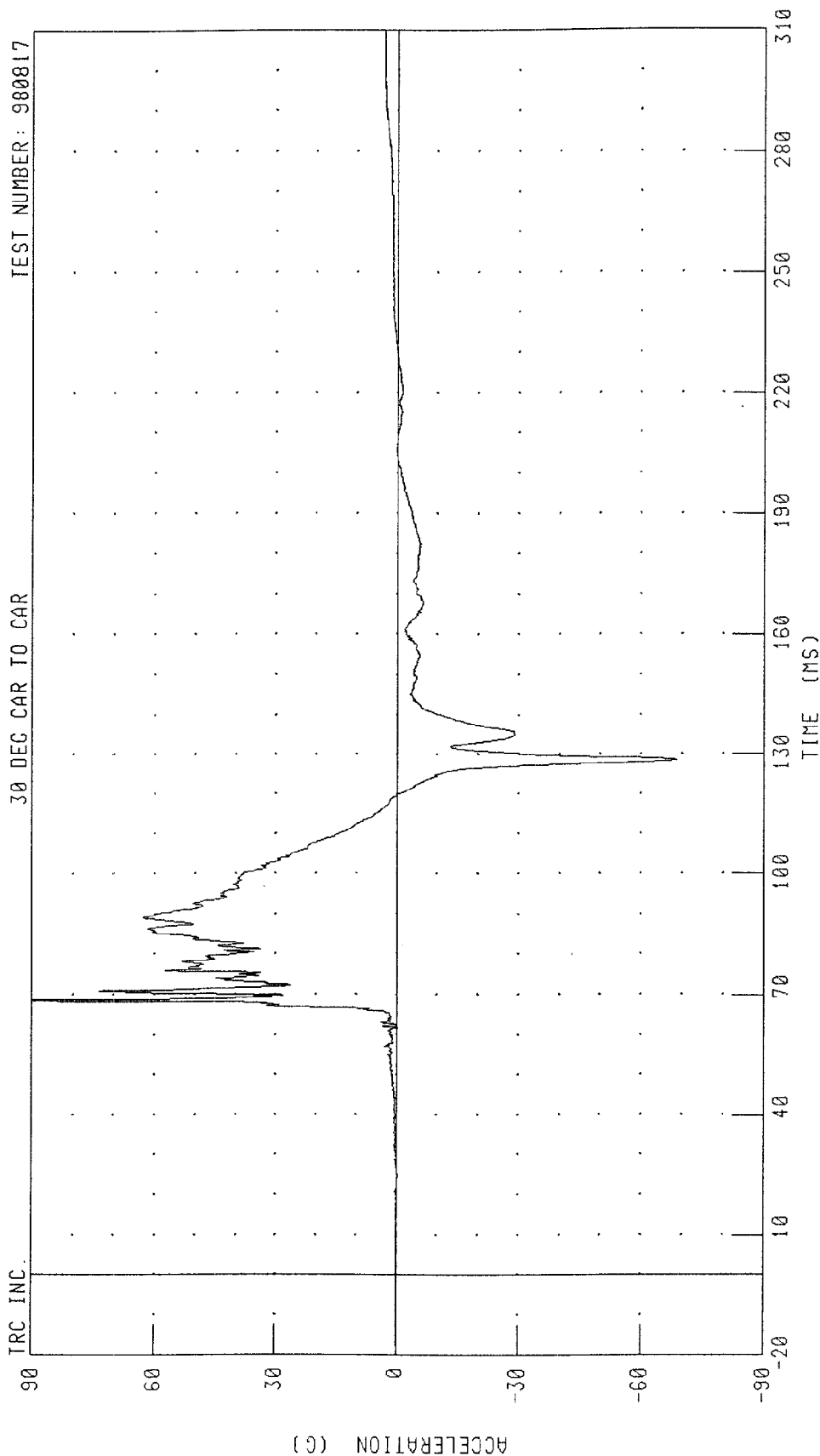
PEAK DATA: 243.81 N @ 46.64 MS; -4599.02 N @ 71.20 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET DRIVER RIGHT FEMUR FORCE



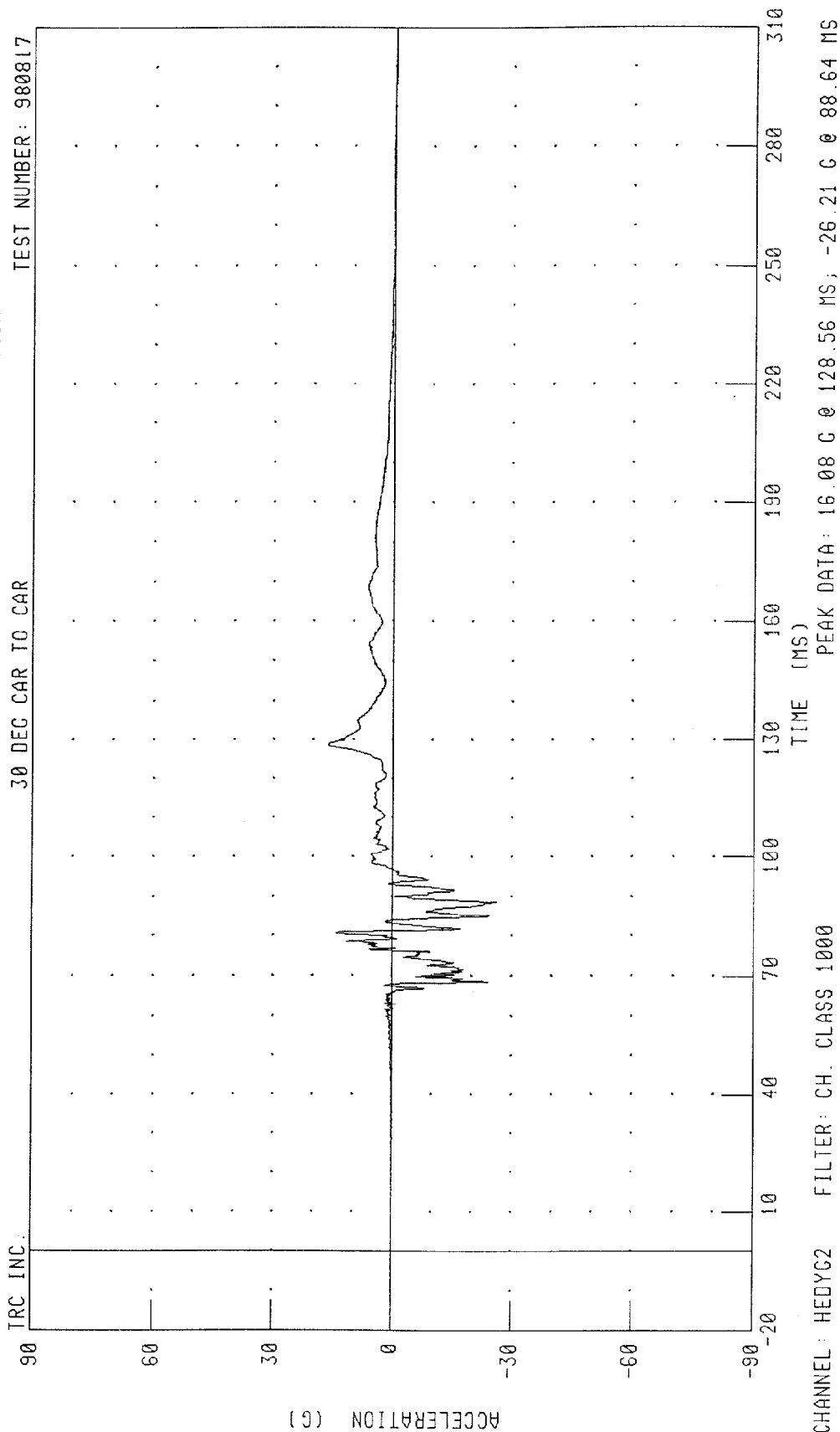
CHANNEL: RFMF1 FILTER: CH. CLASS 600 PEAK DATA: 180.70 N @ 215.20 MS; -4312.91 N @ 71.84 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION



CHANNEL: HEDXC2 FILTER: CH. CLASS 1000 PEAK DATA: 100.13 G @ 68.64 MS; -68.77 G @ 128.64 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

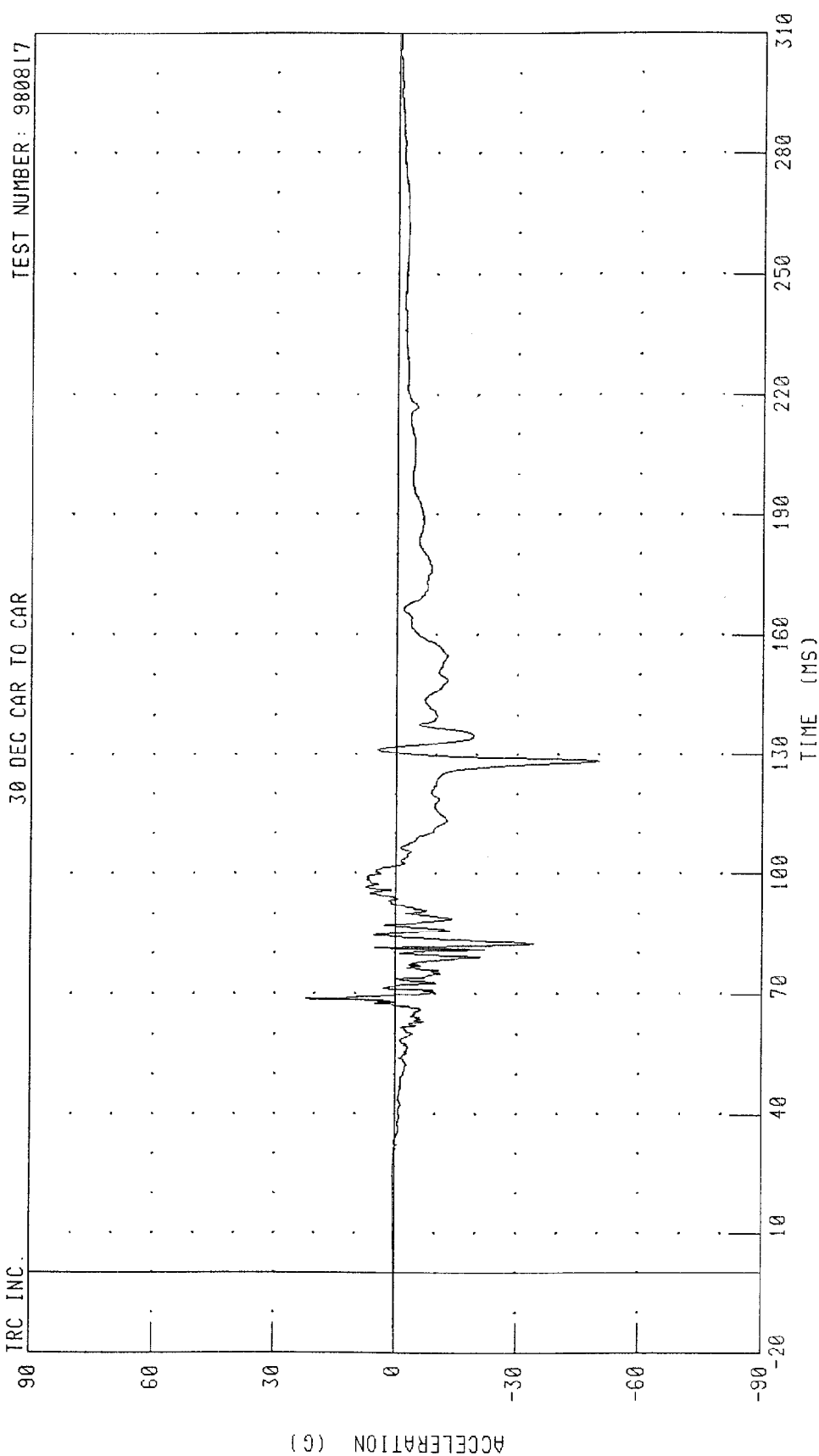


1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 980817

30 DEG CAR TO CAR

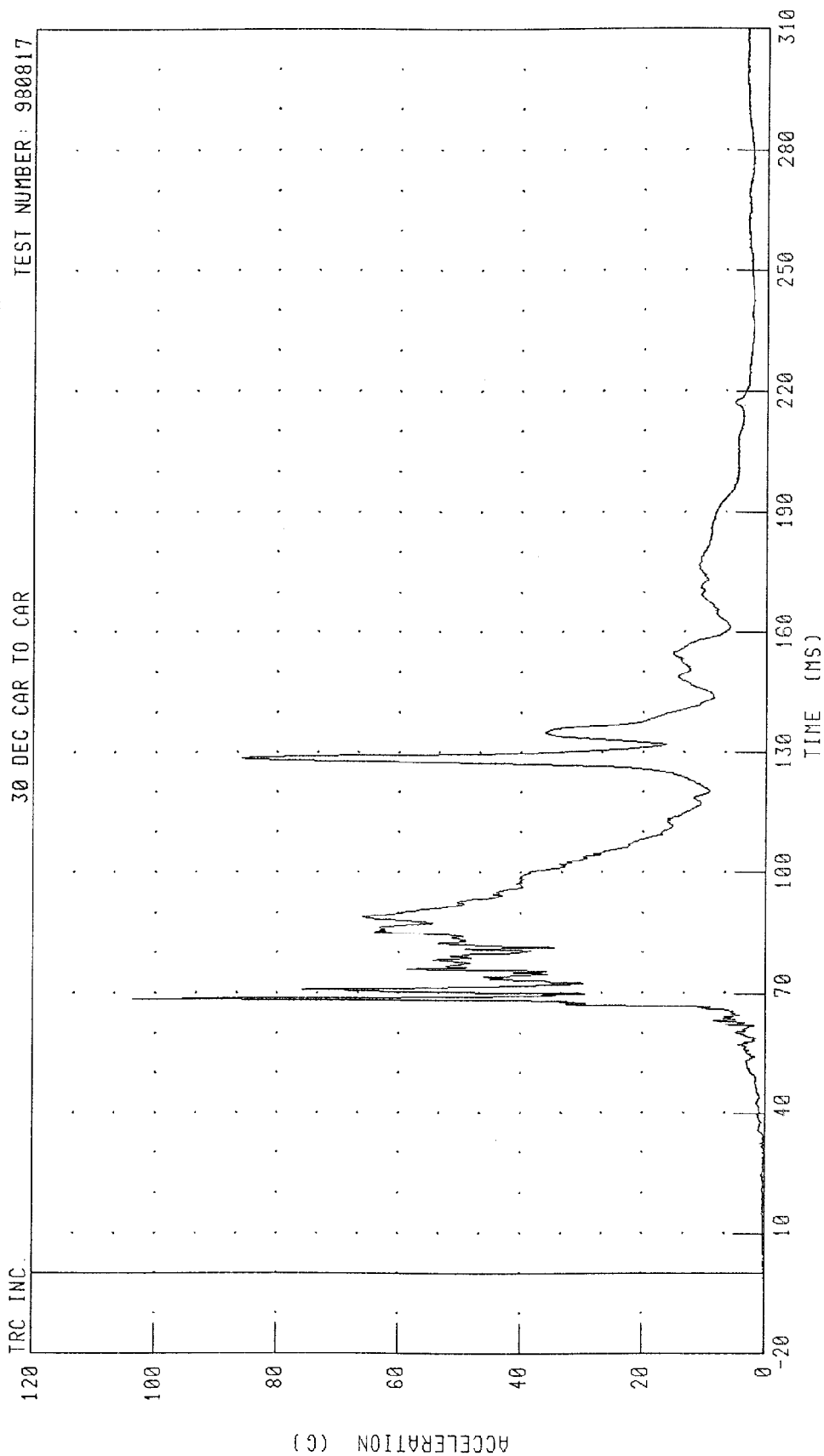
TRC INC.



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

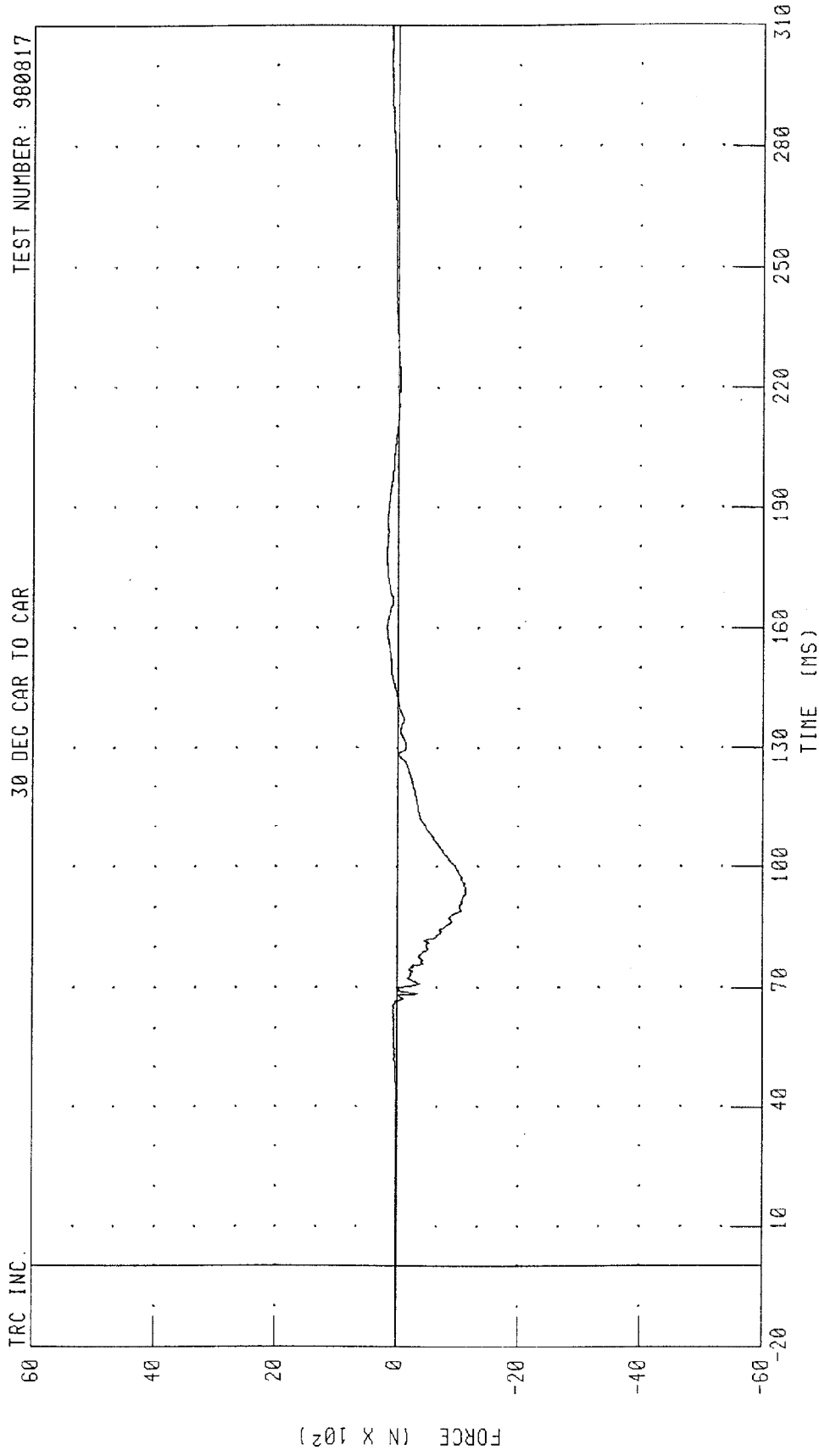
PEAK DATA: 22.26 G @ 68.80 MS; -50.05 G @ 128.32 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET VEHICLE RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION



CHANNEL: HEDRC2 FILTER: CH. CLASS 1000 PEAK DATA: 103.57 G @ 68.64 MS; 0.03 G @ -20.00 MS

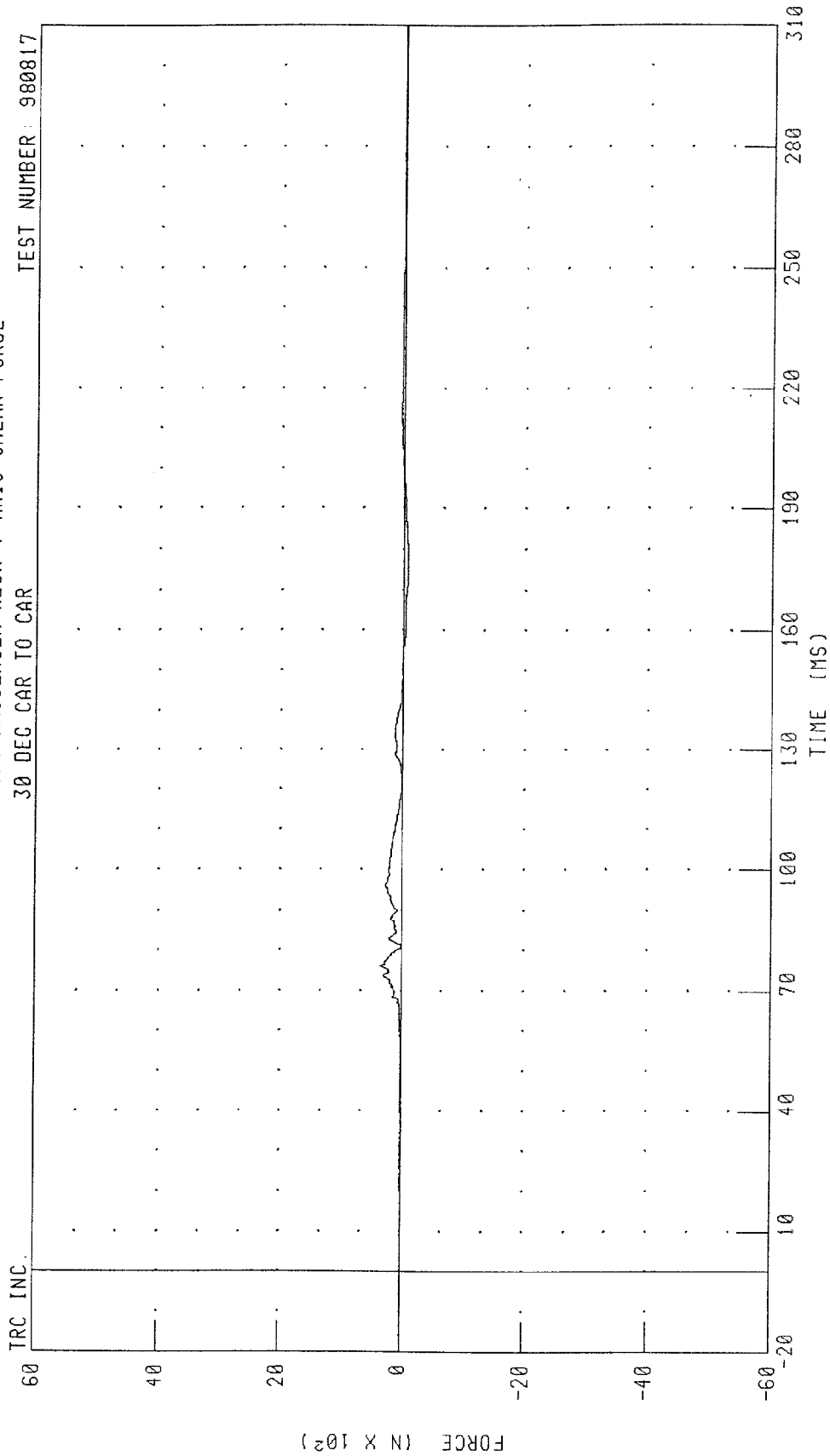
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE



CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

PEAK DATA: 177.03 N @ 176.72 MS, -1140.75 N @ 93.44 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE



CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

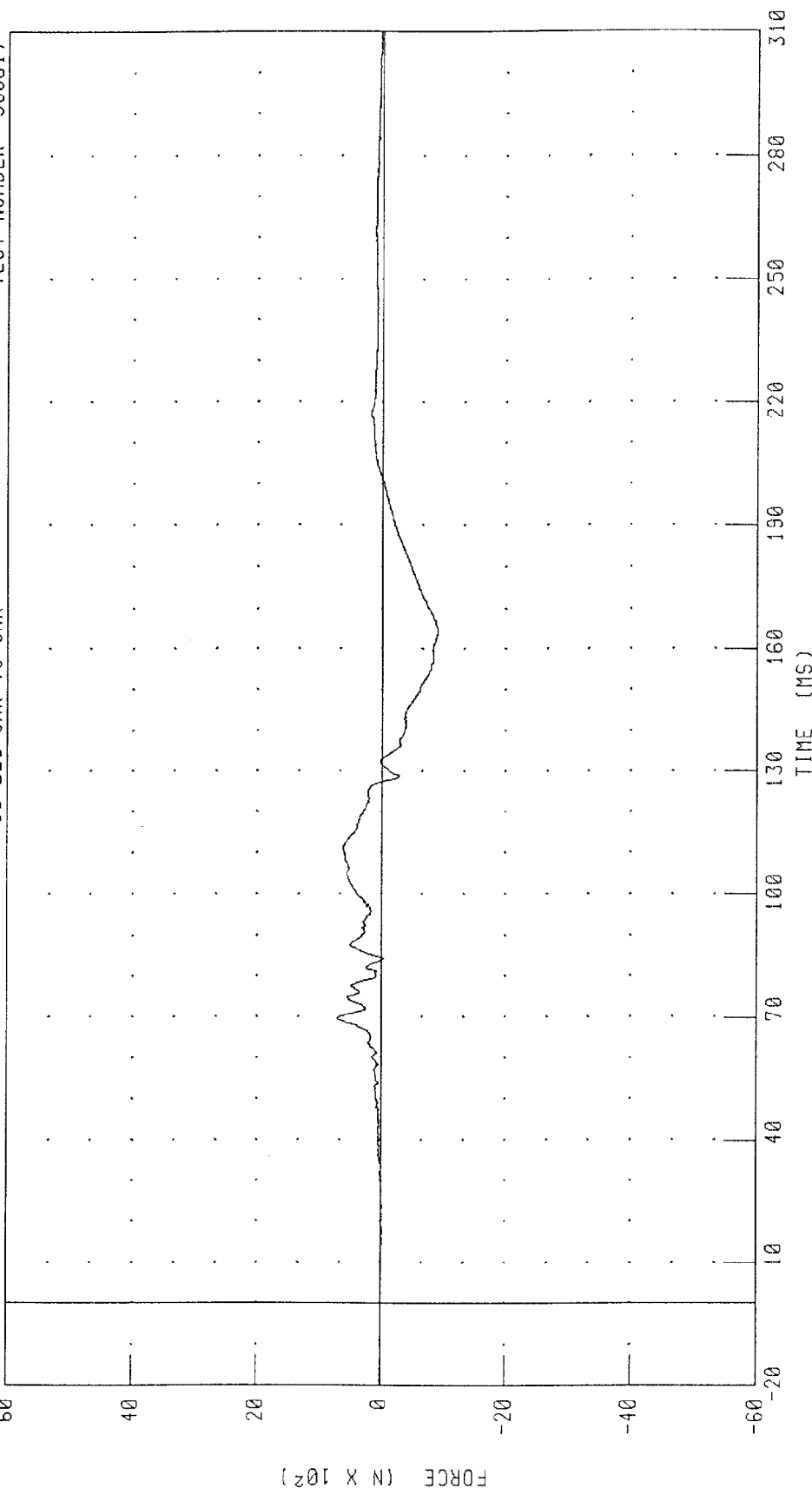
PEAK DATA: 342.41 N @ 76.24 MS; -83.35 N @ 173.68 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET VEHICLE RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 980817

30 DEC CAR TO CAR

TRC INC.



CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

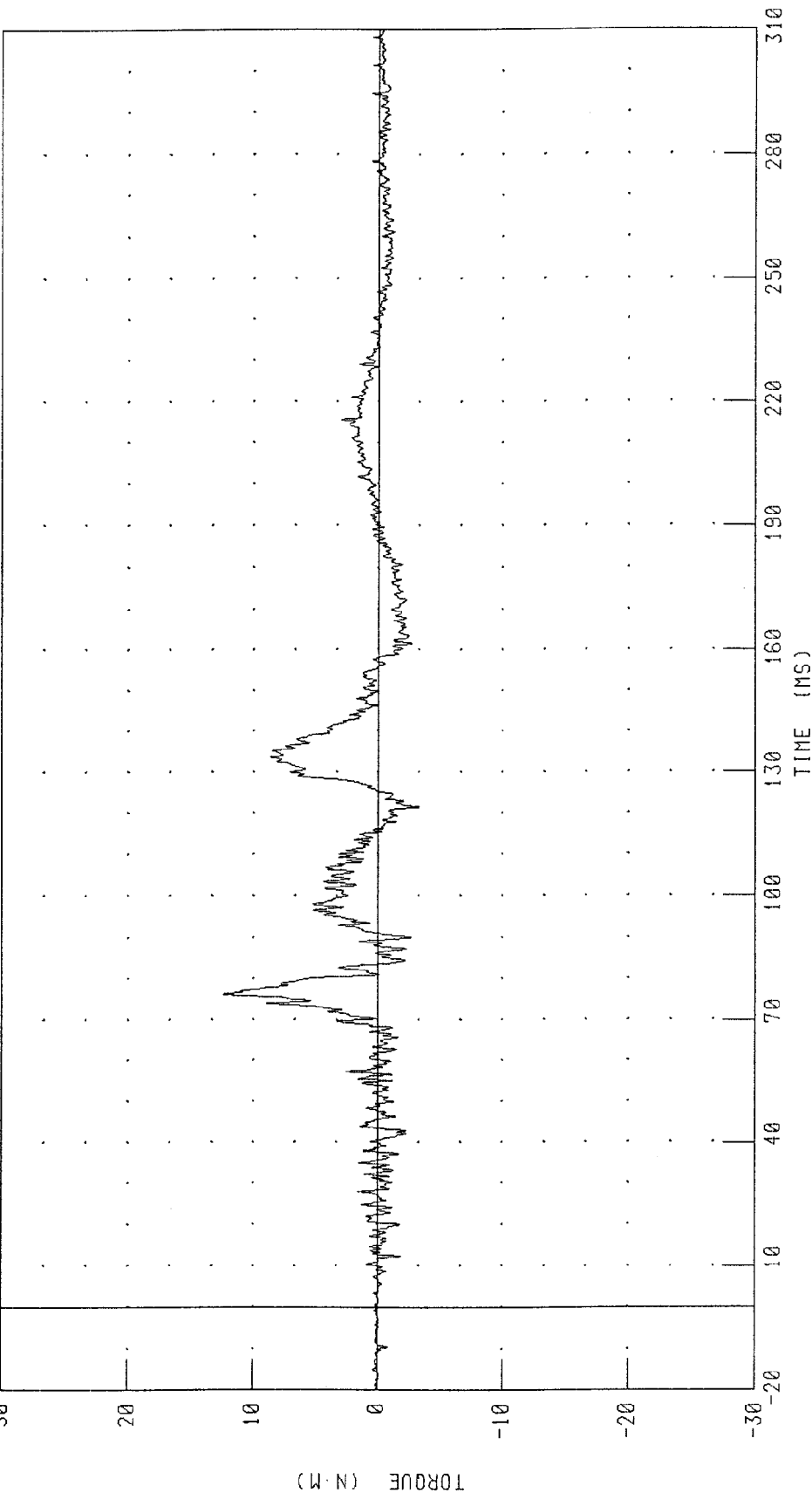
PEAK DATA: 702.03 N @ 69.68 MS, -907.92 N @ 164.32 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 980817

30 DEG CAR TO CAR

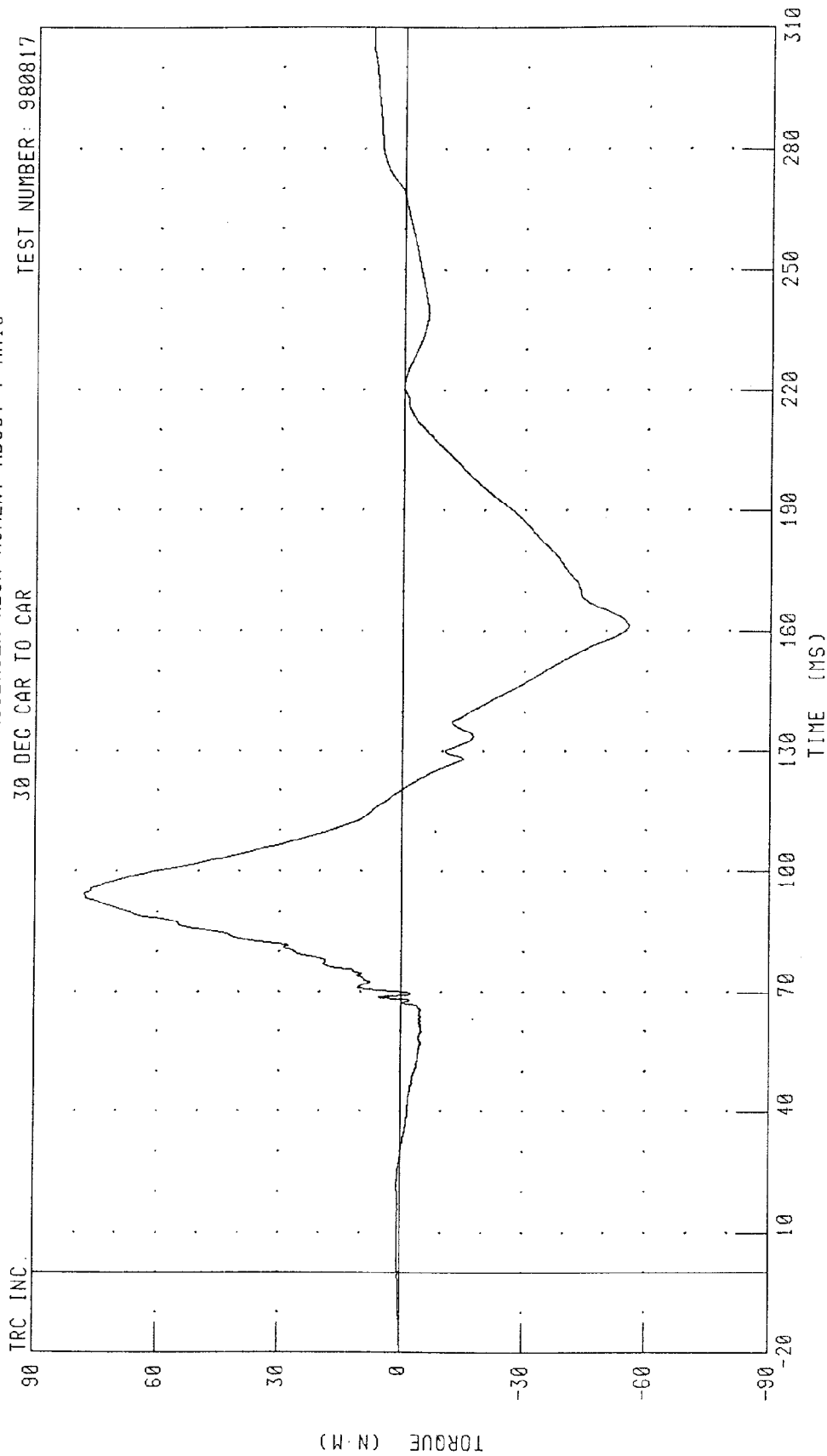
TRC INC.



CHANNEL: NEKXM2 FILTER: CH. CLASS 600

PEAK DATA: 12.42 N·m @ 76.32 ms; -3.32 N·m @ 121.60 ms

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

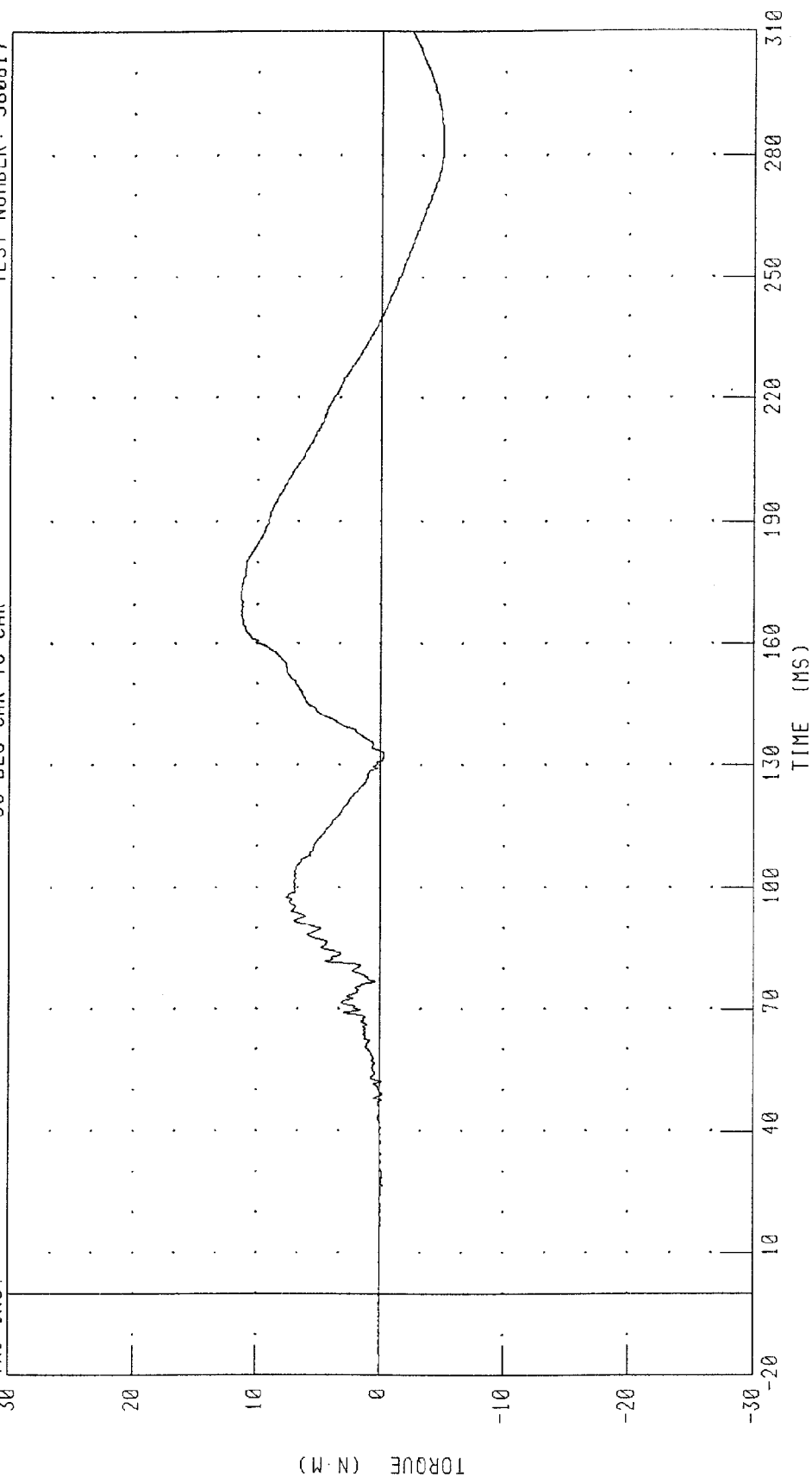
PEAK DATA: 77.84 N·M @ 94.40 MS, -55.47 N·M @ 161.28 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 980817

30 DEG CAR TO CAR

TRC INC.



PEAK DATA: 11.30 N-M @ 171.84 MS; -5.03 N-M @ 282.96 MS

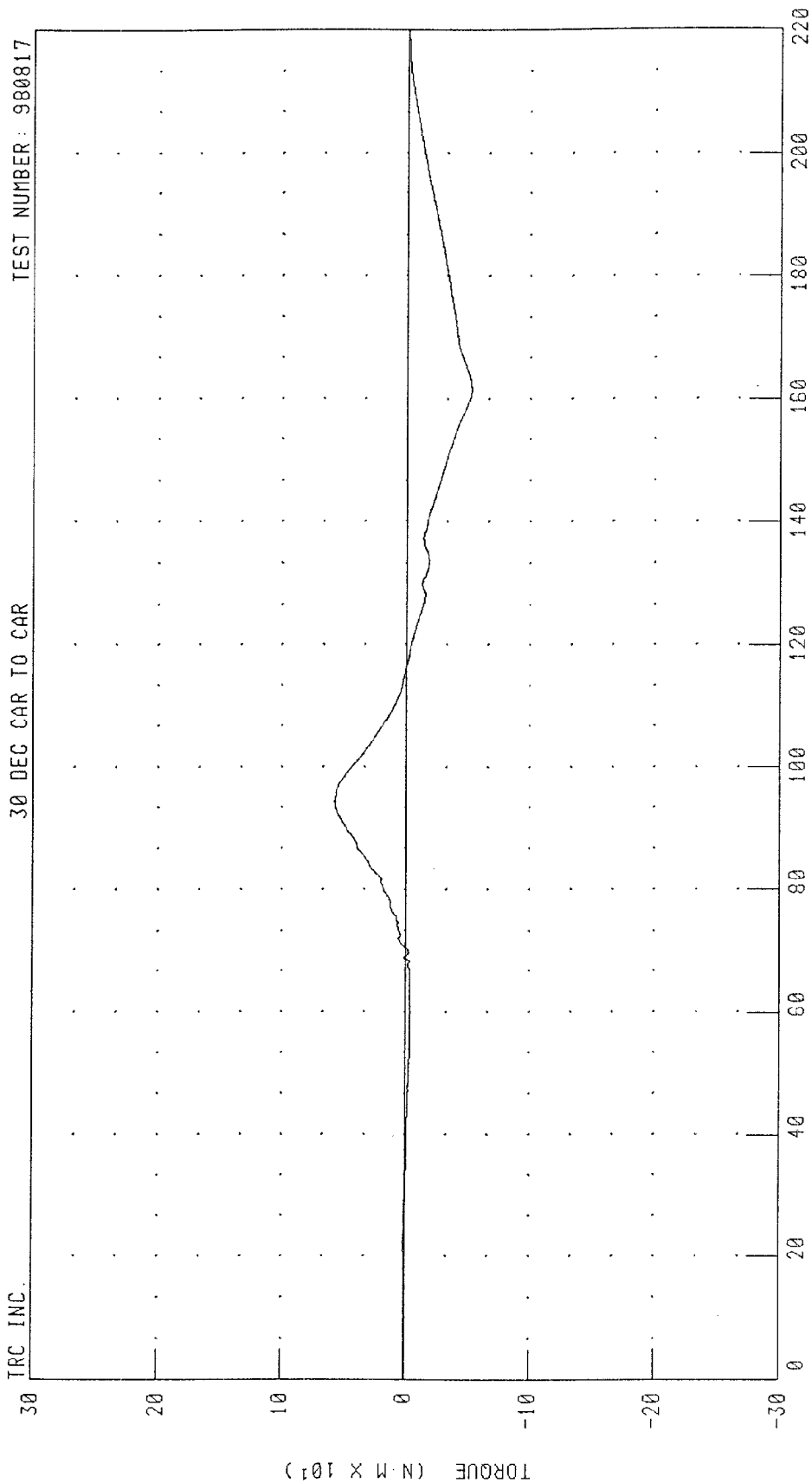
CHANNEL: NEKZM2 FILTER: CH. CLASS 600

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE ABOUT Y AXIS

TEST NUMBER: 980817

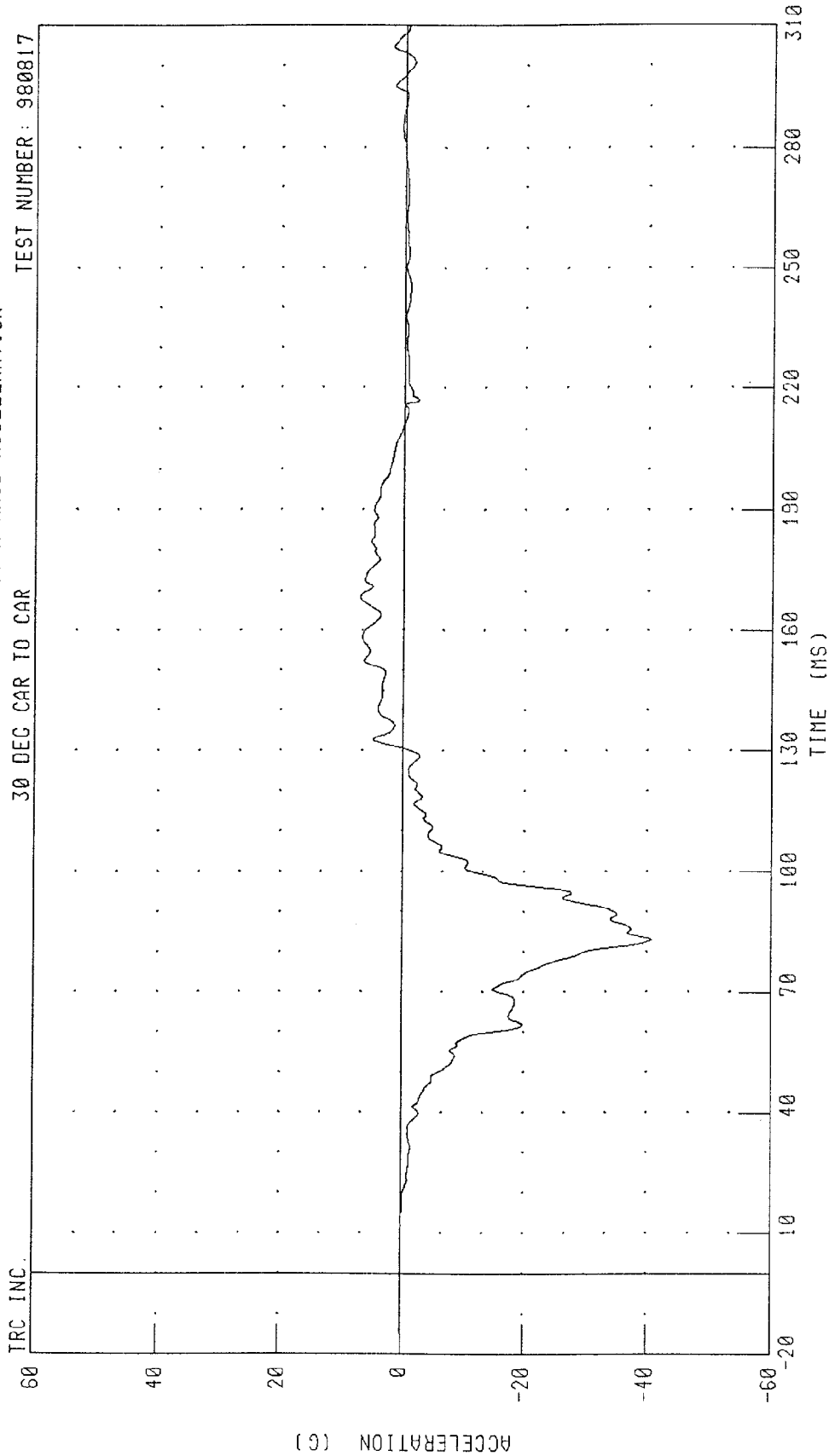
30 DEC CAR TO CAR

TRC INC.



CHANNEL: NEKOM2 FILTER: CH. CLASS 600
PEAK DATA: 57.73 N·m @ 94.32 MS; -52.57 N·m @ 161.60 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION



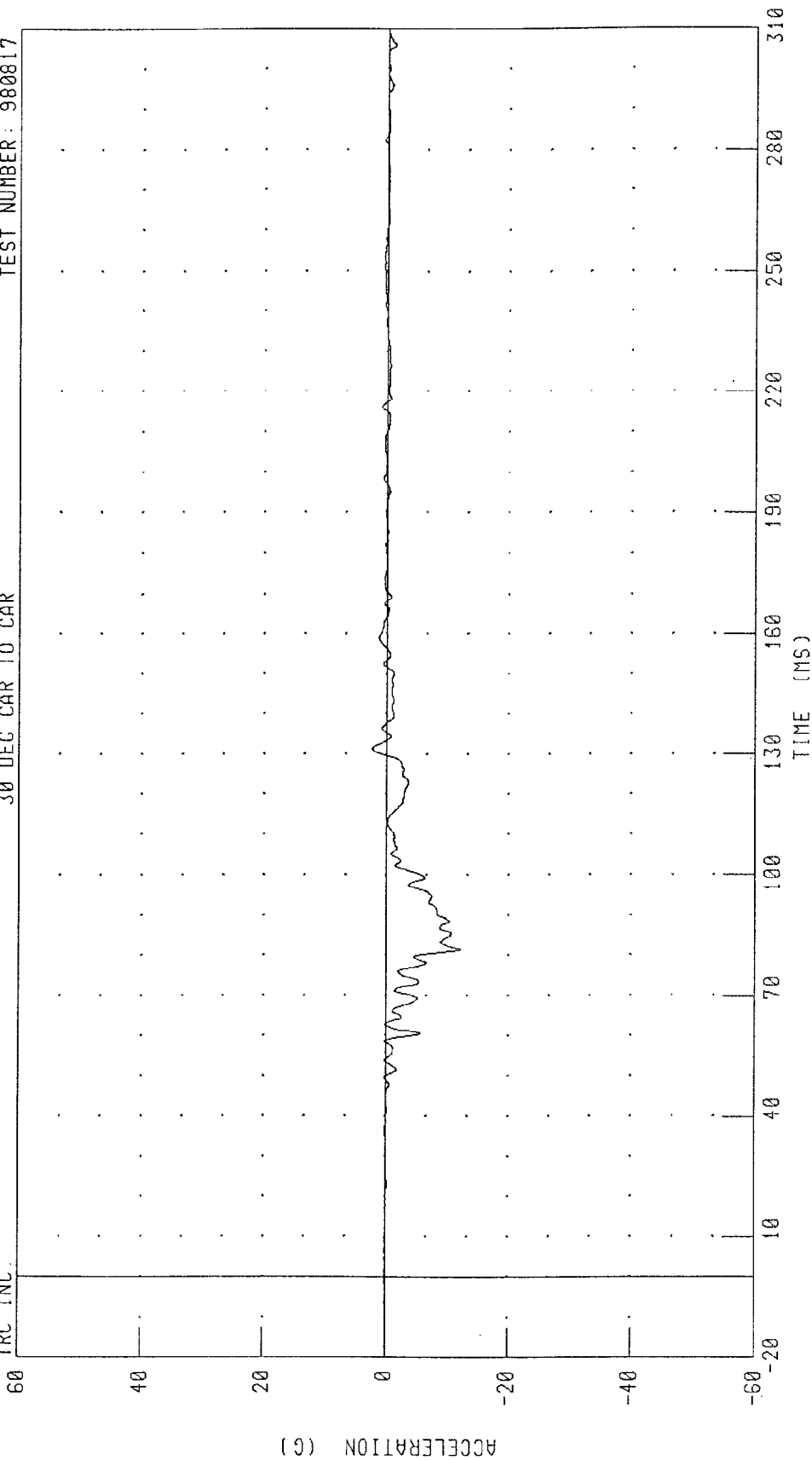
CHANNEL: CSTXG2 FILTER: CH. CLASS 180 PEAK DATA: 7.03 G @ 168.24 MS; -40.64 G @ 83.12 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 980817

30 DEG CAR TO CAR

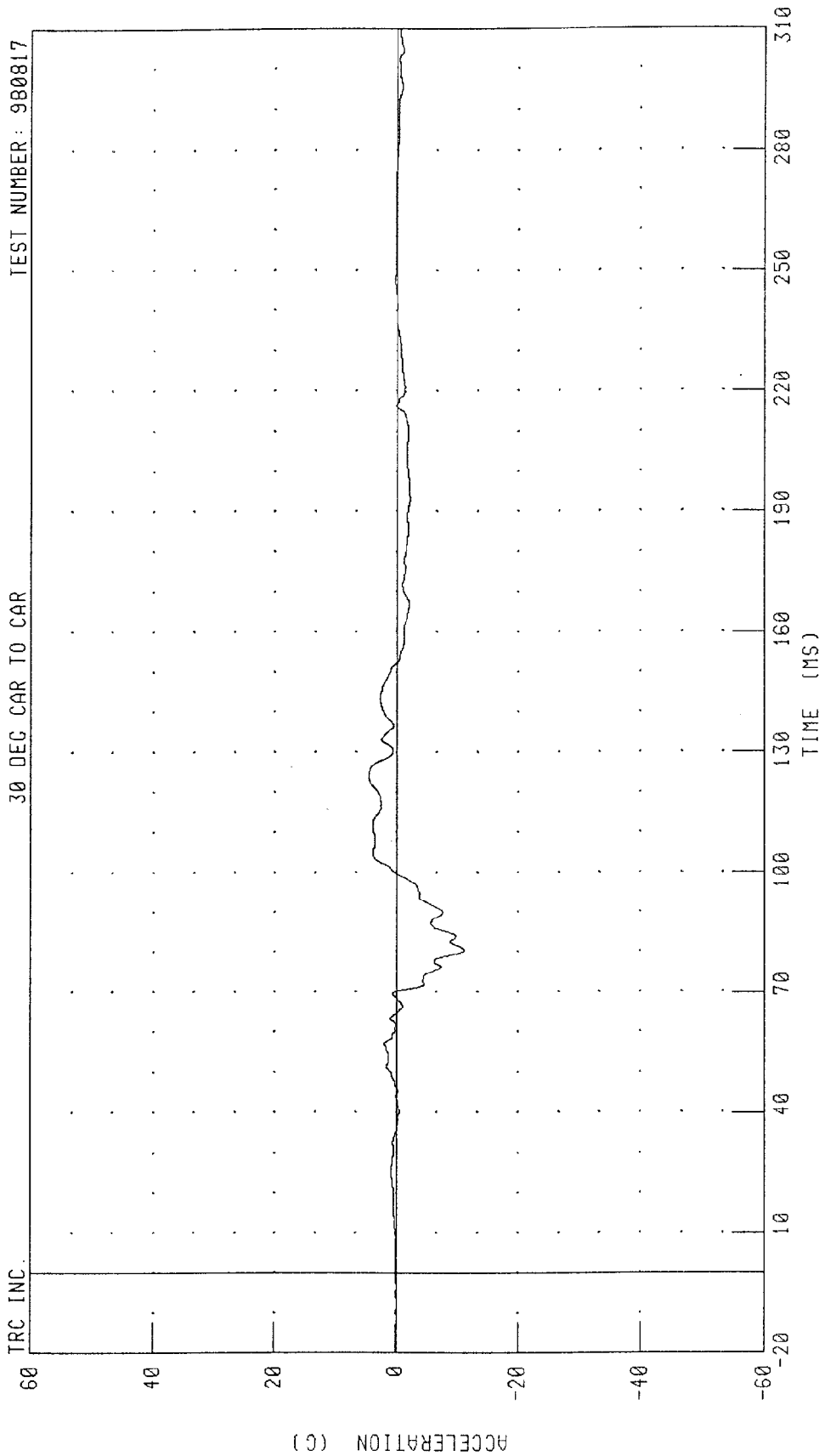
TRC INC.



CHANNEL: CSTYG2 FILTER: CH. CLASS 180

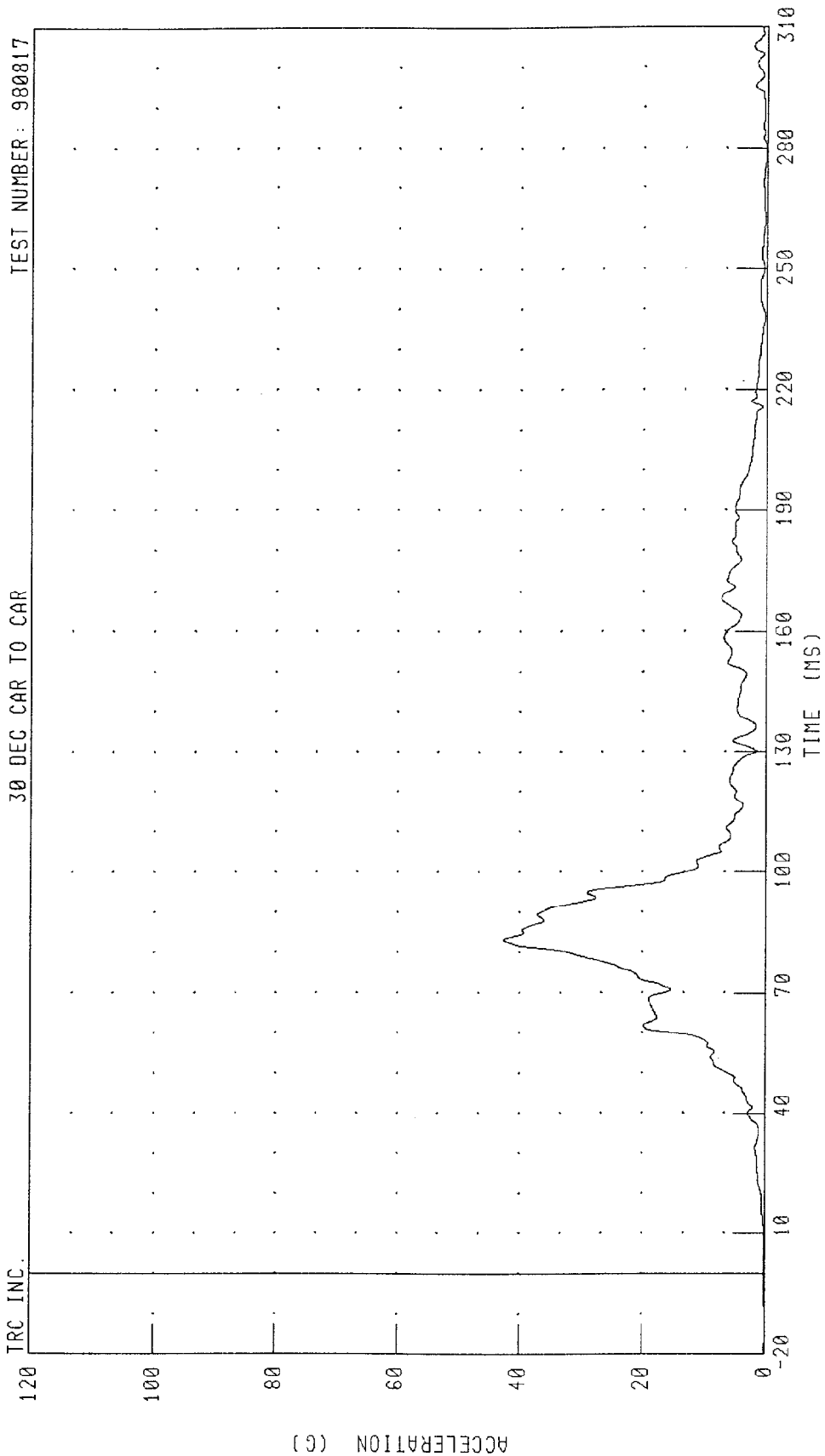
PEAK DATA: 2.27 G @ 131.36 MS, -12.32 G @ 81.52 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION



CHANNEL: CSTZC2 FILTER: CH. CLASS 180 PEAK DATA: 4.56 G @ 123.76 MS, -11.20 G @ 80.32 MS

1995 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION



CHANNEL: CSTRG2 FILTER: CH. CLASS 180

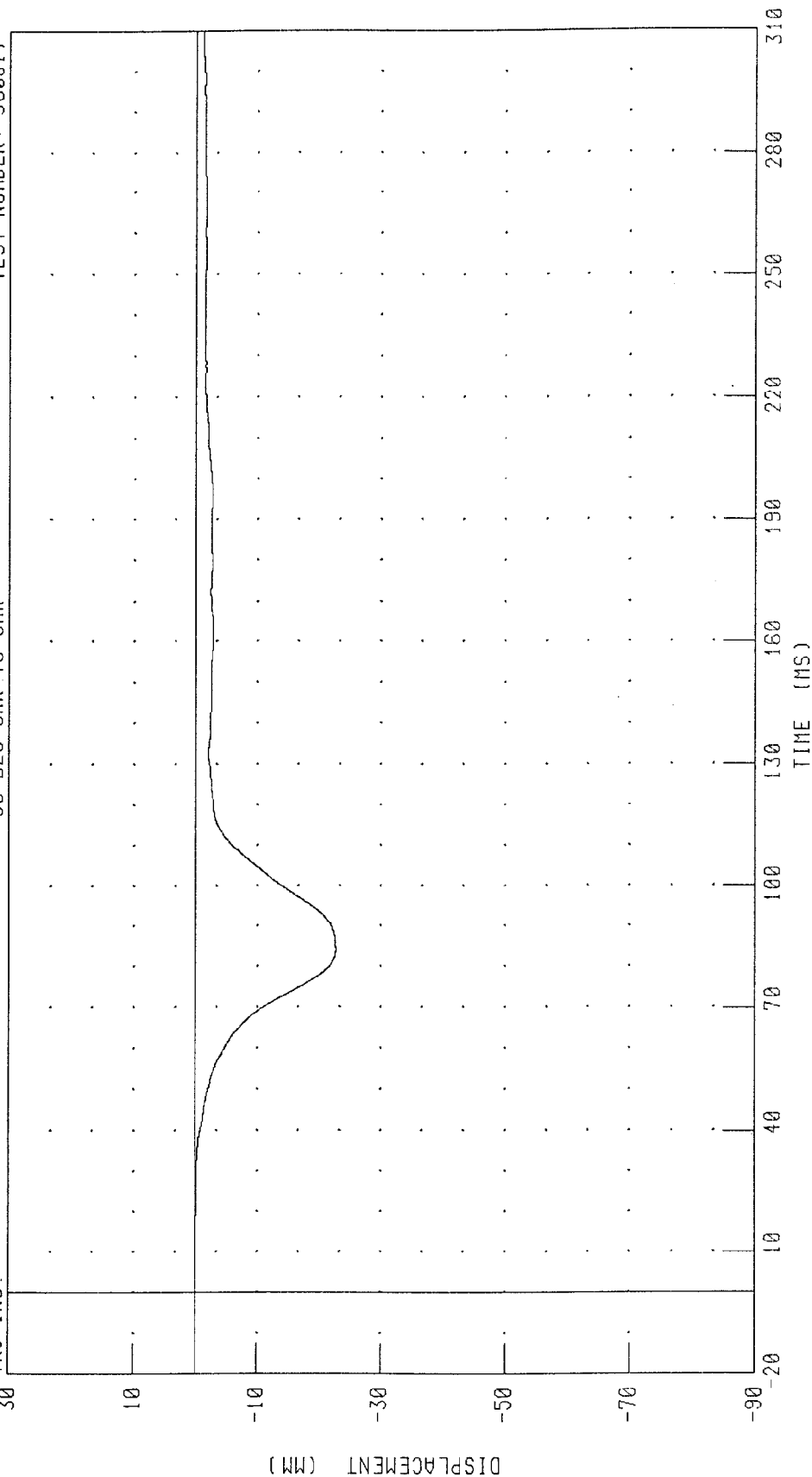
PEAK DATA: 42.67 G @ 83.20 MS; 0.01 G @ -20.00 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 980817

30 DEG CAR TO CAR

TRC INC.



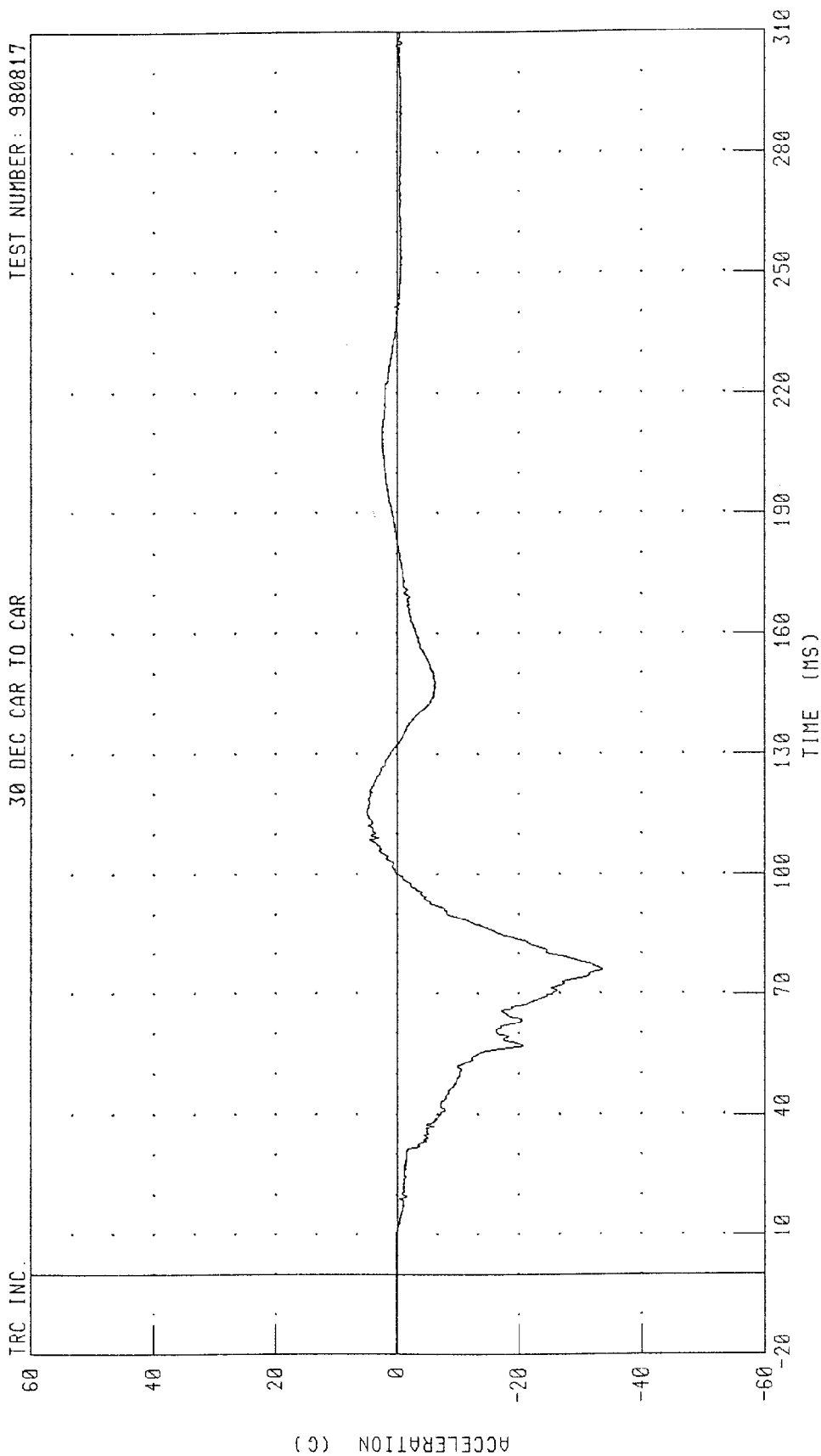
PEAK DATA: 0.01 MM @ 6.64 MS; -22.72 MM @ 84.16 MS

CHANNEL: CSTXD2 FILTER: CH. CLASS 180

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER PELVIS X-AXIS ACCELERATION

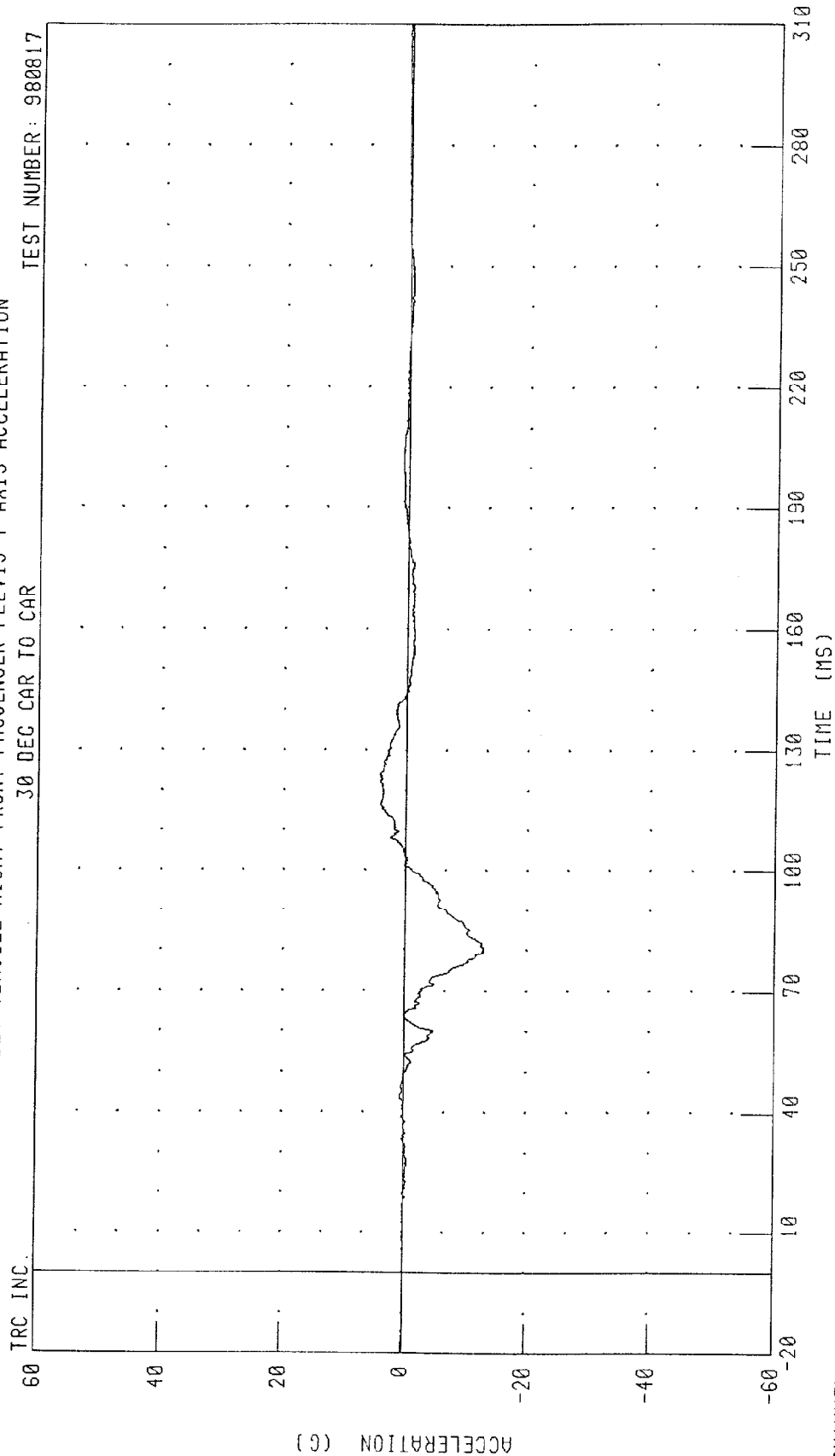
30 DEC CAR TO CAR

TEST NUMBER: 980817



CHANNEL: PEVXC2 FILTER: CH. CLASS 1000

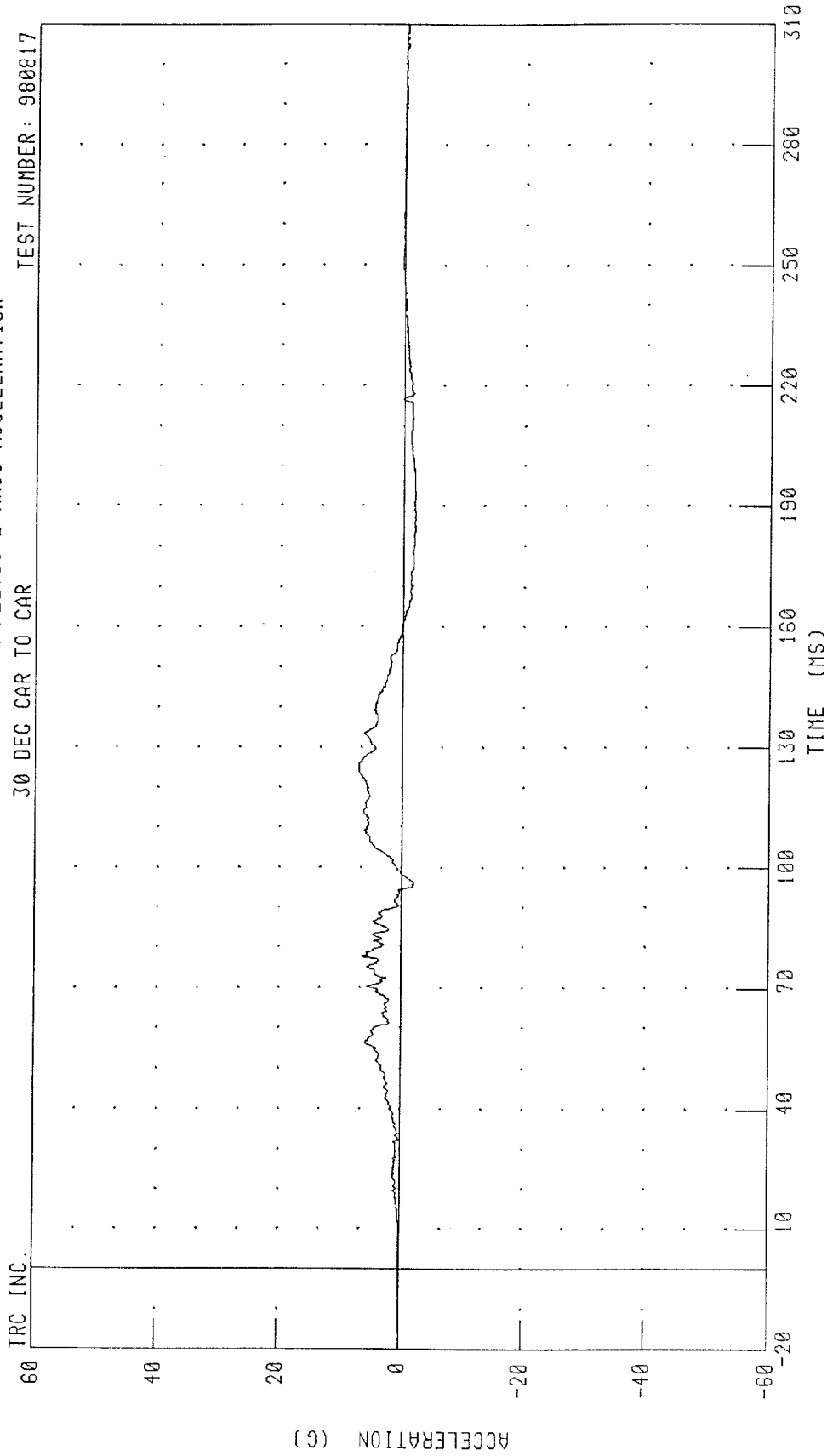
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBlique 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER PELVIS Y-AXIS ACCELERATION



CHANNEL: PEYVG2 FILTER: CH. CLASS 1000

PEAK DATA: 4.27 G @ 124.00 MS, -13.08 G @ 80.40 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER PELVIS Z-AXIS ACCELERATION



CHANNEL: PEVZG2 FILTER: CH. CLASS 1000 PEAK DATA: 7.09 G @ 124.16 MS, -2.10 G @ 96.08 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER STERNUM TOP X-AXIS ACCELERATION
30 DEG CAR TO CAR

TEST NUMBER: 380817

TRC INC.

60

40

20

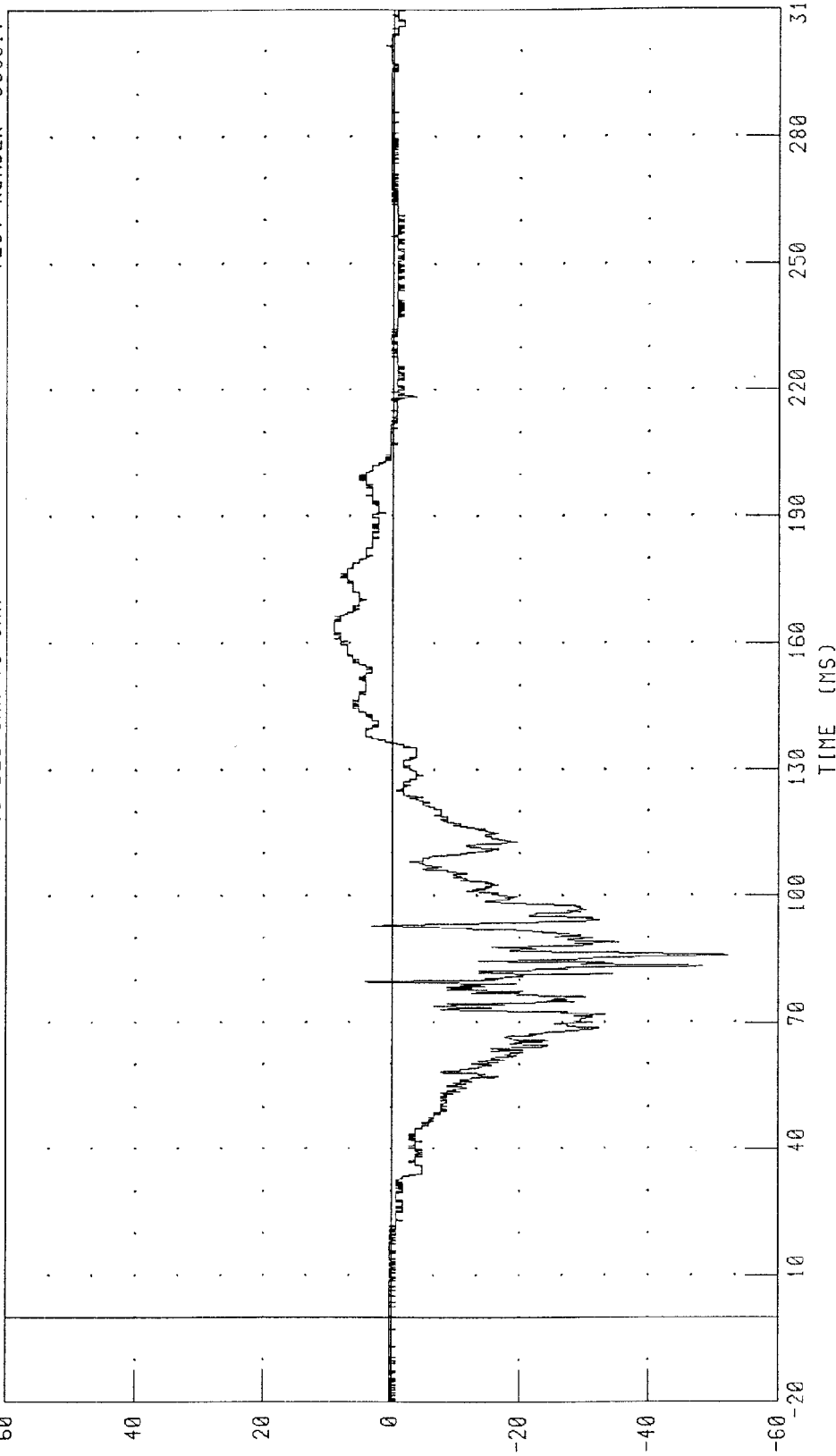
0

-20

-40

-60

ACCELERATION (G)



CHANNEL: STTX02 FILTER: CH. CLASS 1000

PEAK DATA: 9.08 G @ 161.12 MS; -52.21 G @ 86.00 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER STERNUM MIDDLE X-AXIS ACCELERATION

TEST NUMBER: 980817

30 DEC CAR TO CAR

TRC INC.

60

40

20

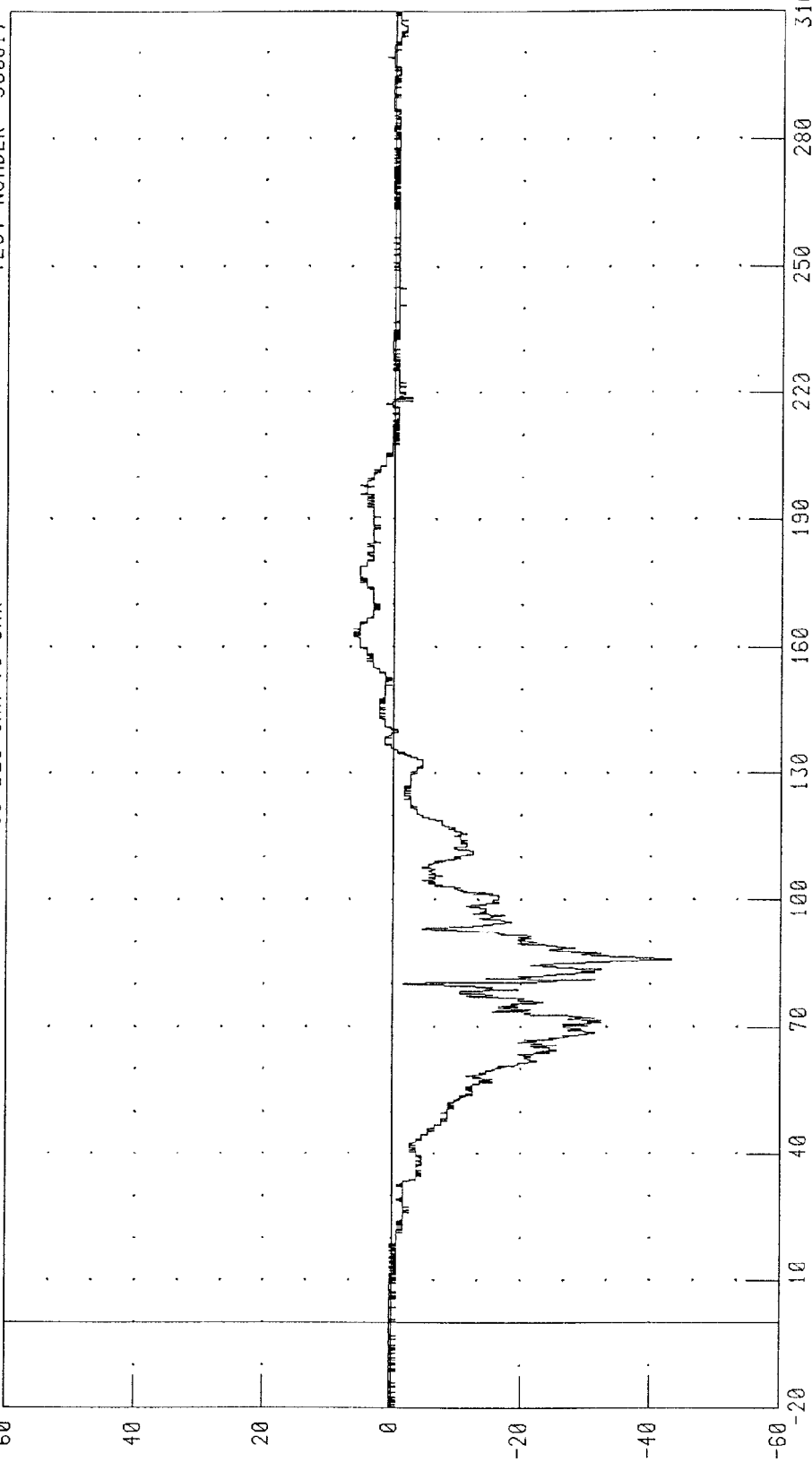
0

-20

-40

-60

ACCELERATION (G)



TIME (MS)

CHANNEL: STMX62 FILTER: CH. CLASS 1000

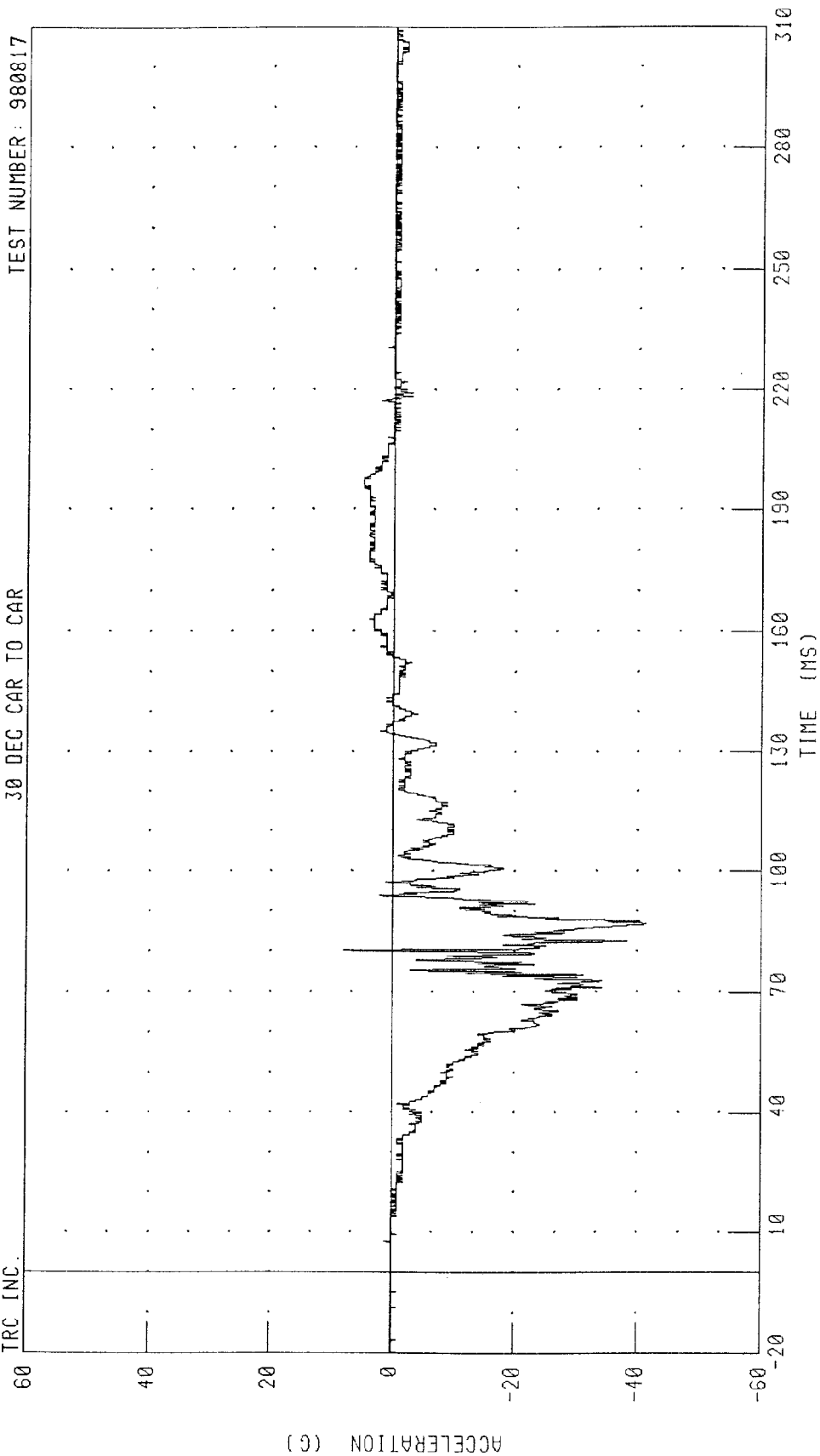
PEAK DATA: 6.15 G @ 162.48 MS, -43.22 G @ 86.00 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER STERNUM BOTTOM X-AXIS ACCELERATION

TEST NUMBER: 980817

30 DEG CAR TO CAR

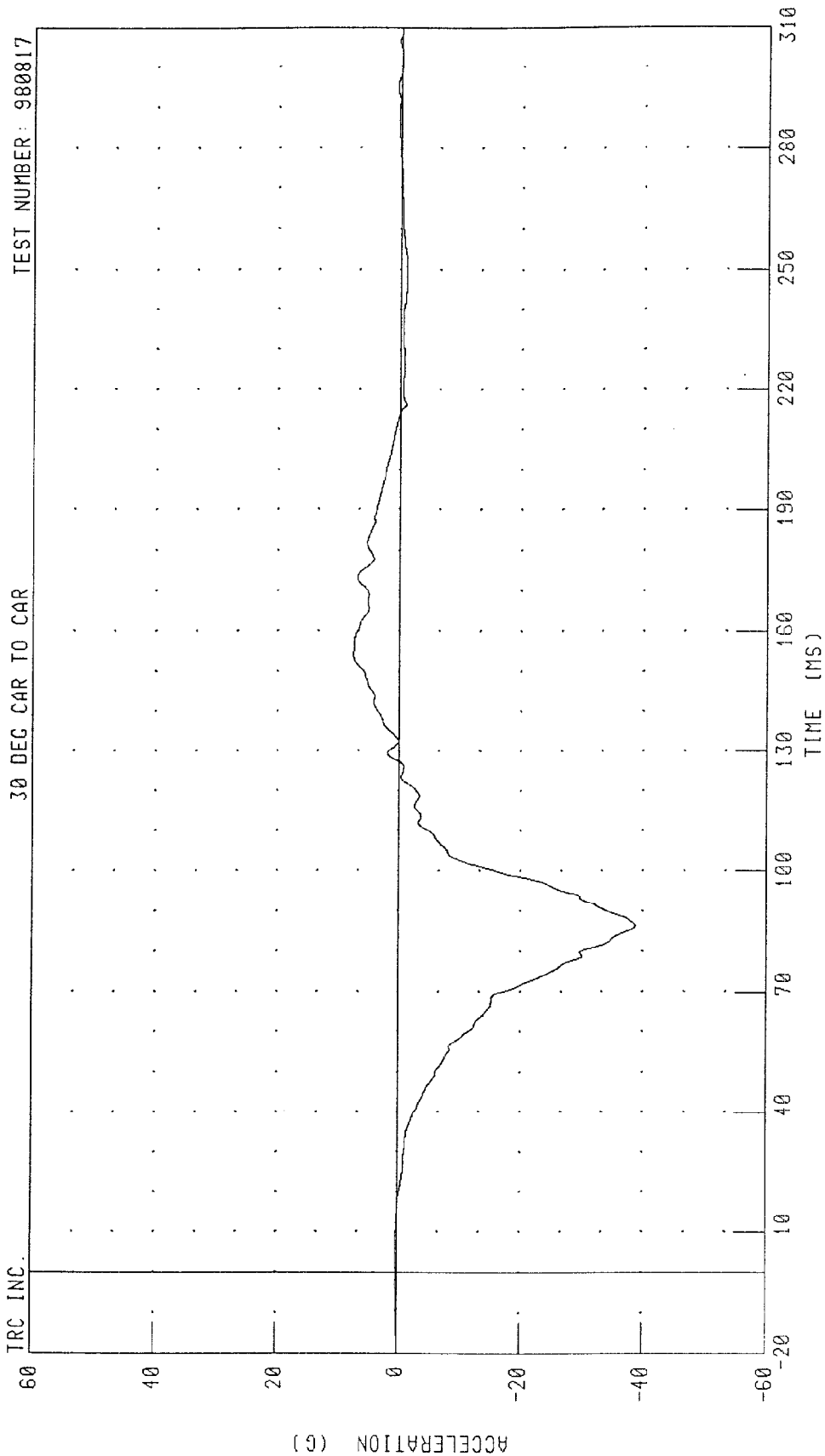
TRC INC.



CHANNEL: STBXC2 FILTER: CH. CLASS 1000

PEAK DATA: 8.11 G @ 80.24 MS; -41.37 G @ 86.80 MS

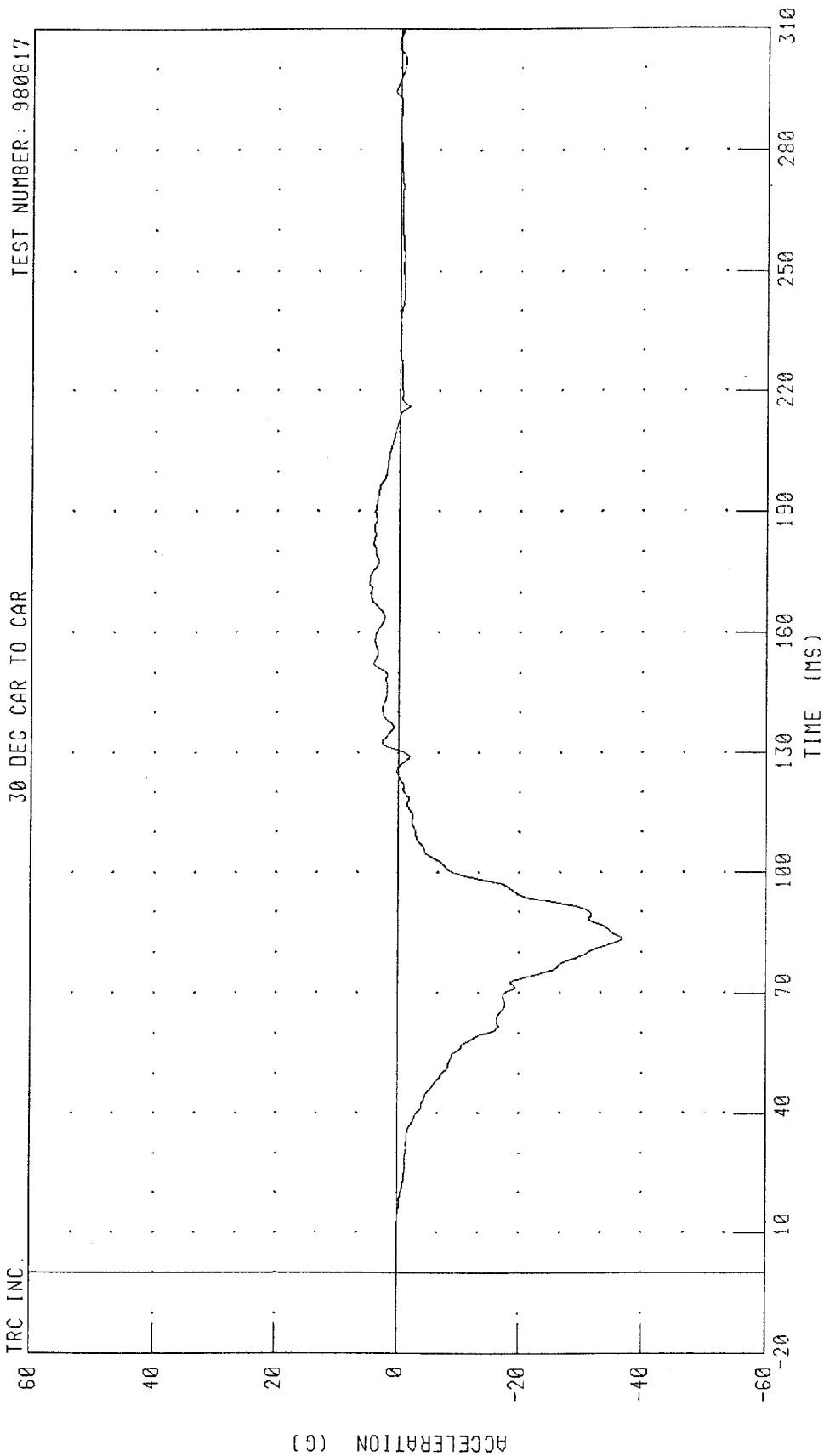
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER SPINE TOP X-AXIS ACCELERATION



CHANNEL: SPTXC2 FILTER: CH. CLASS 180

PEAK DATA: 7.50 G @ 154.16 MS; -38.77 G @ 86.32 MS

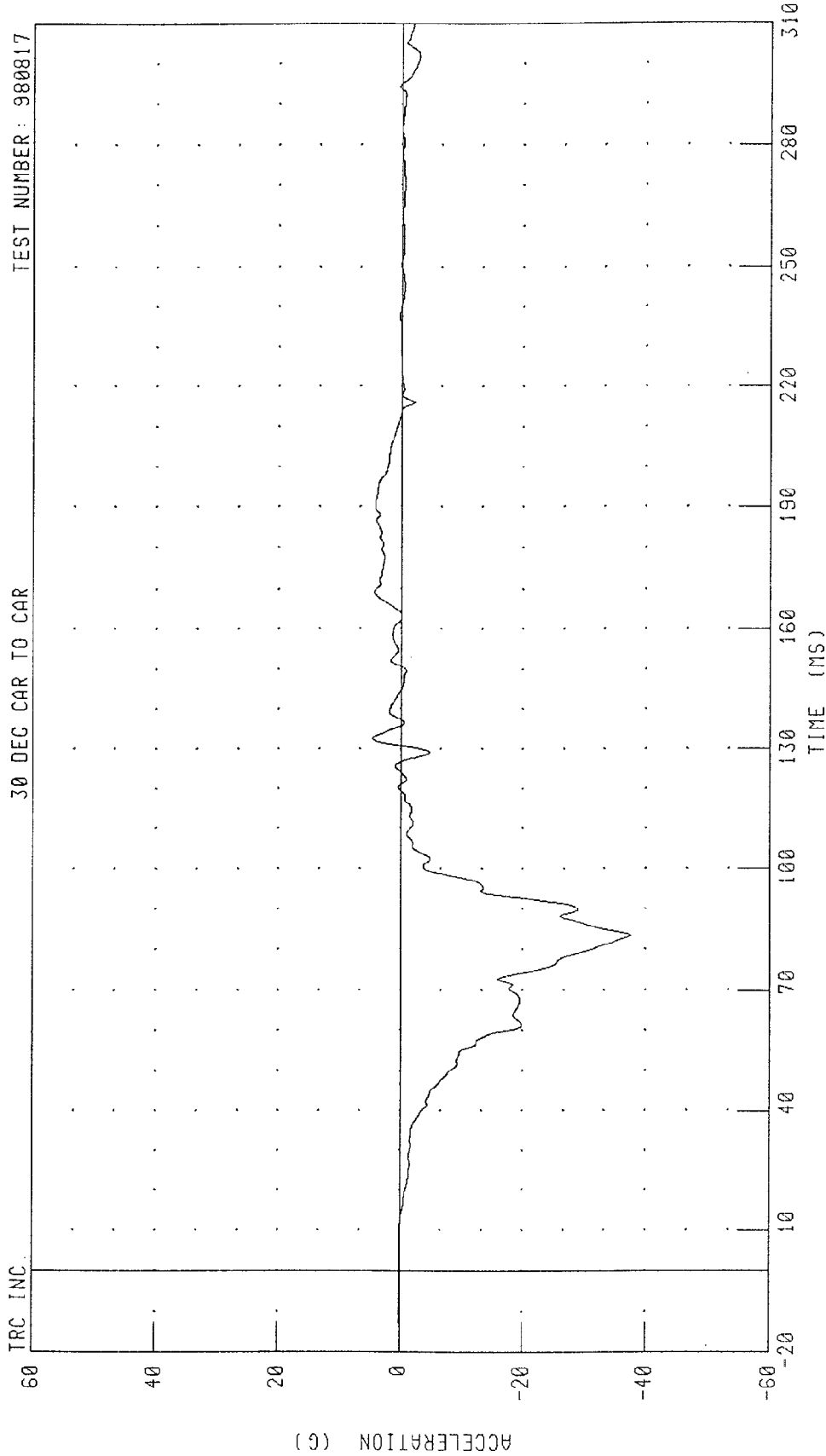
1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER SPINE MIDDLE X-AXIS ACCELERATION



CHANNEL: SPMXG2 FILTER: CH. CLASS 180

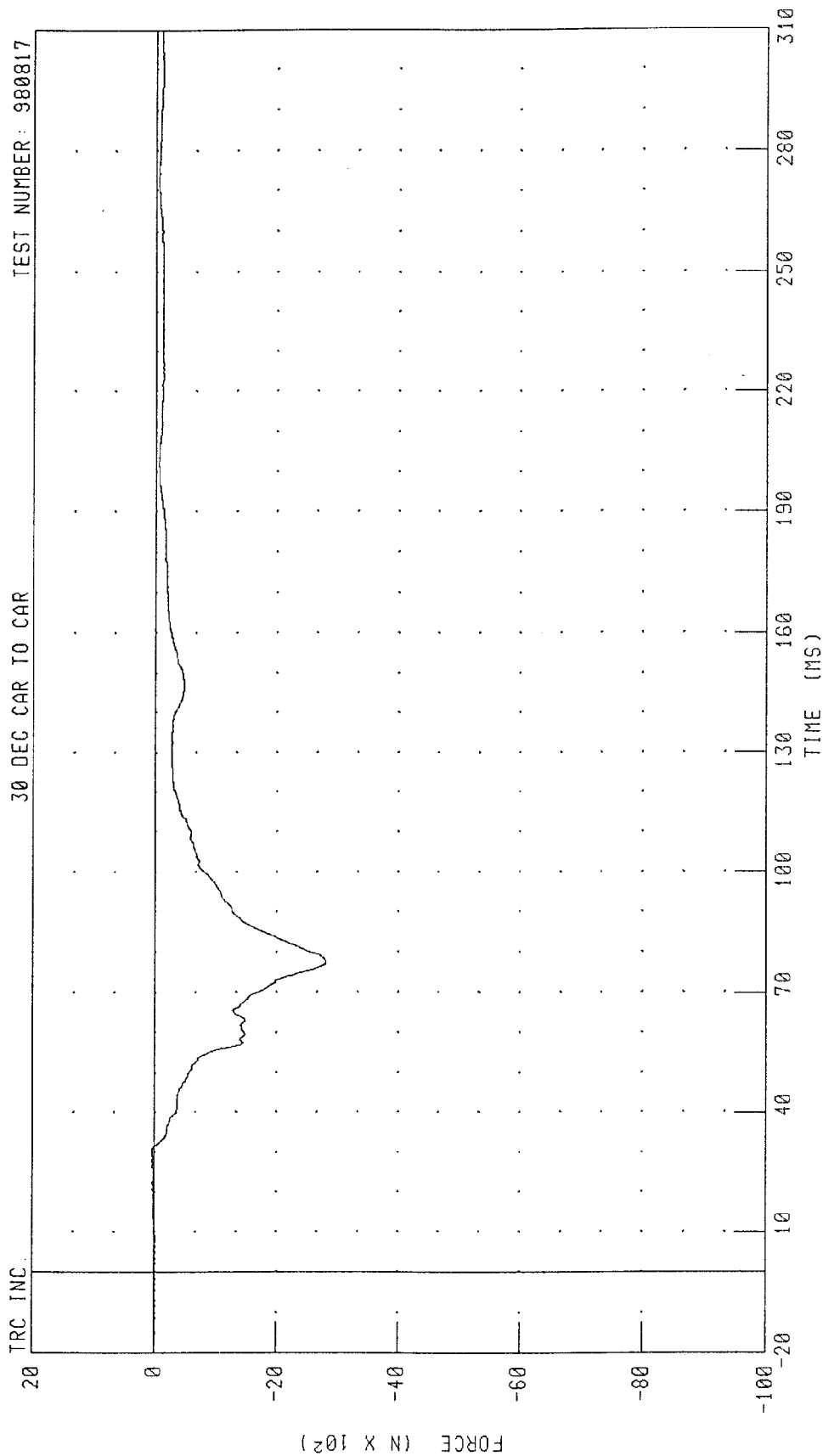
PEAK DATA: 4.88 G @ 172.56 MS, -36.83 G @ 83.44 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER SPINE BOTTOM X-AXIS ACCELERATION



CHANNEL: SPBXC2 FILTER: CH. CLASS 180

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER LEFT FEMUR FORCE

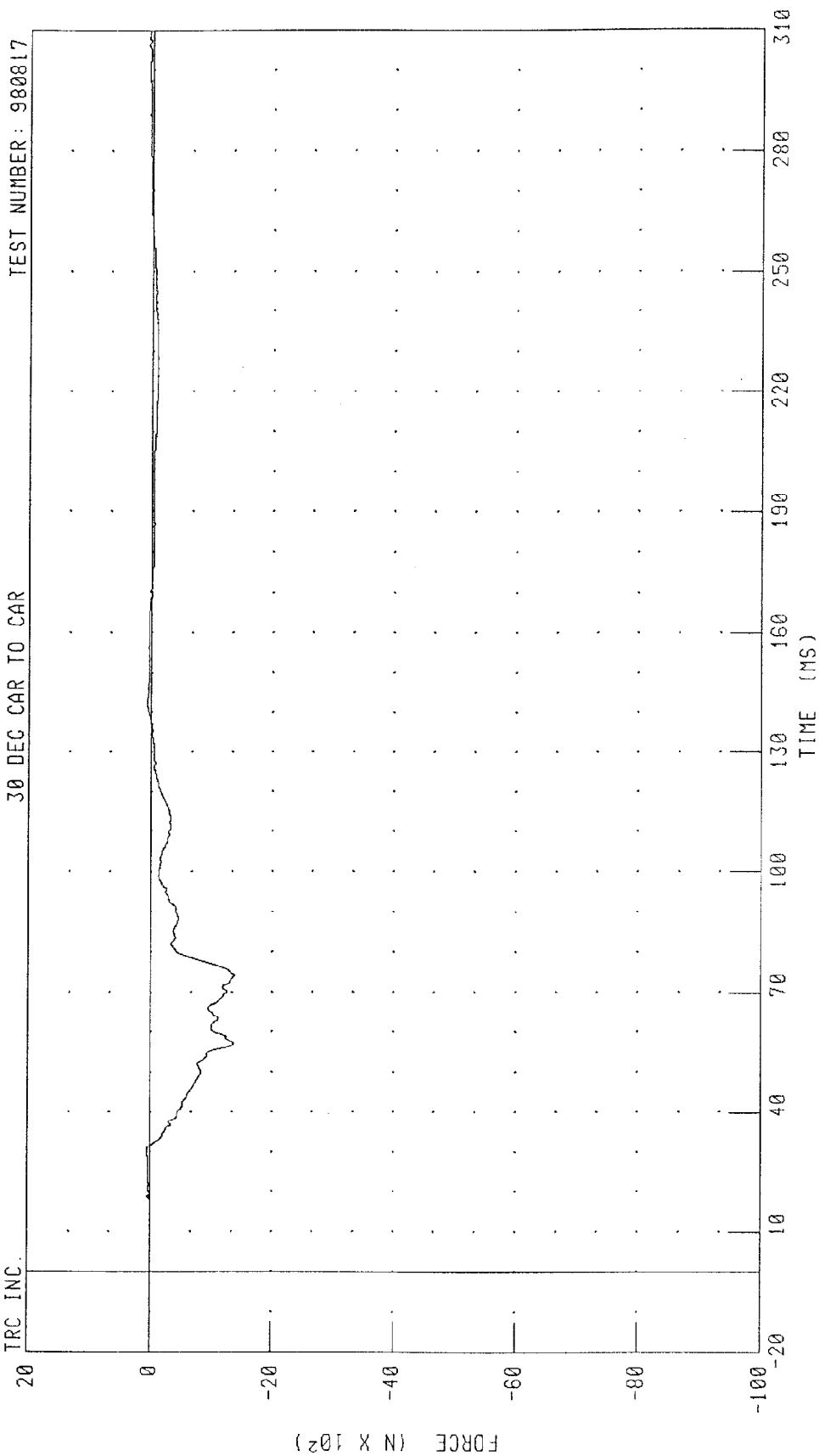


1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

TEST NUMBER: 980817

30 DEG CAR TO CAR

TRC INC.



CHANNEL: RFMF2 FILTER: CH. CLASS 600

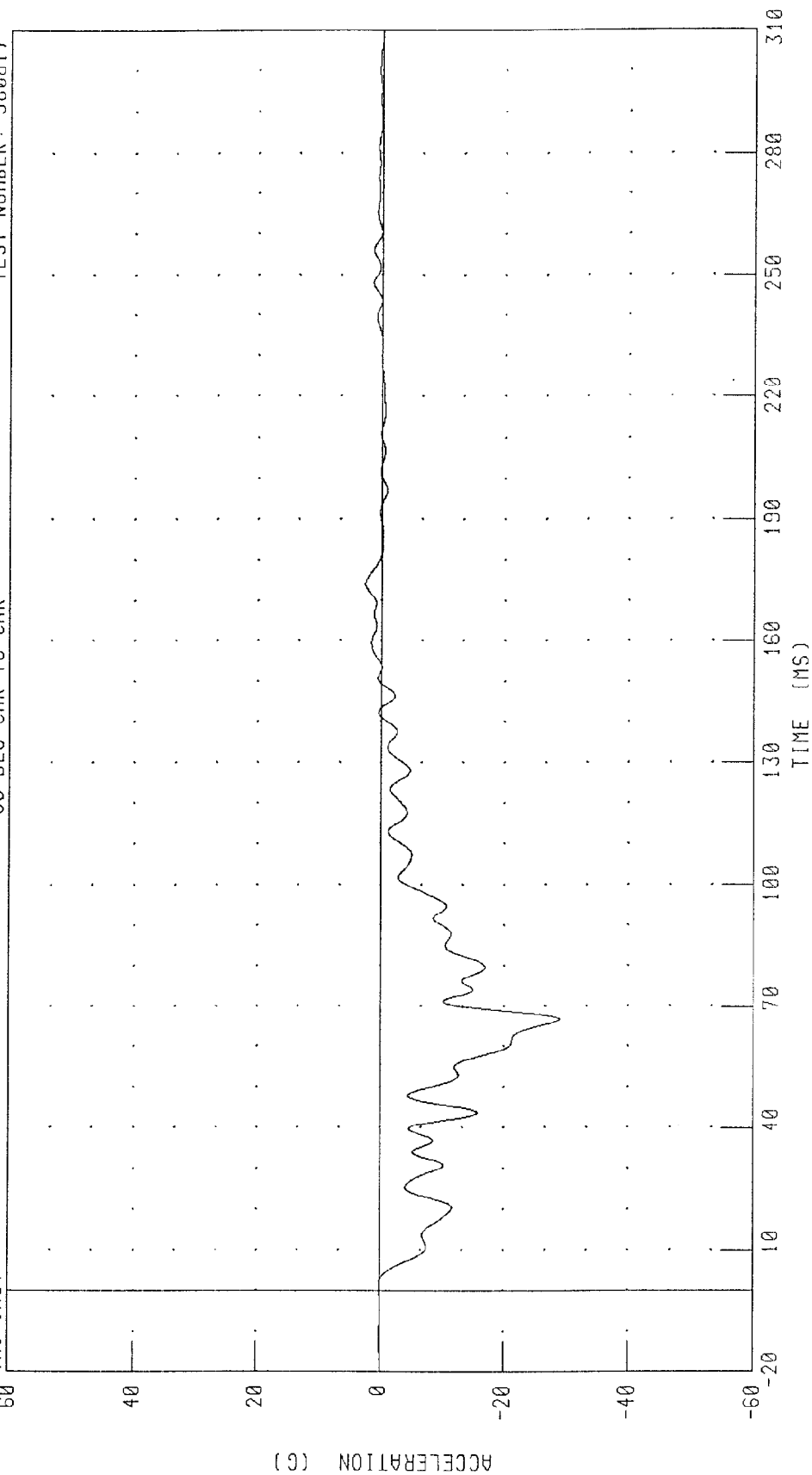
PEAK DATA: 81.89 N @ 306.40 MS, -1379.05 N @ 74.32 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE LEFT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION

TRC INC.

30 DEG CAR TO CAR

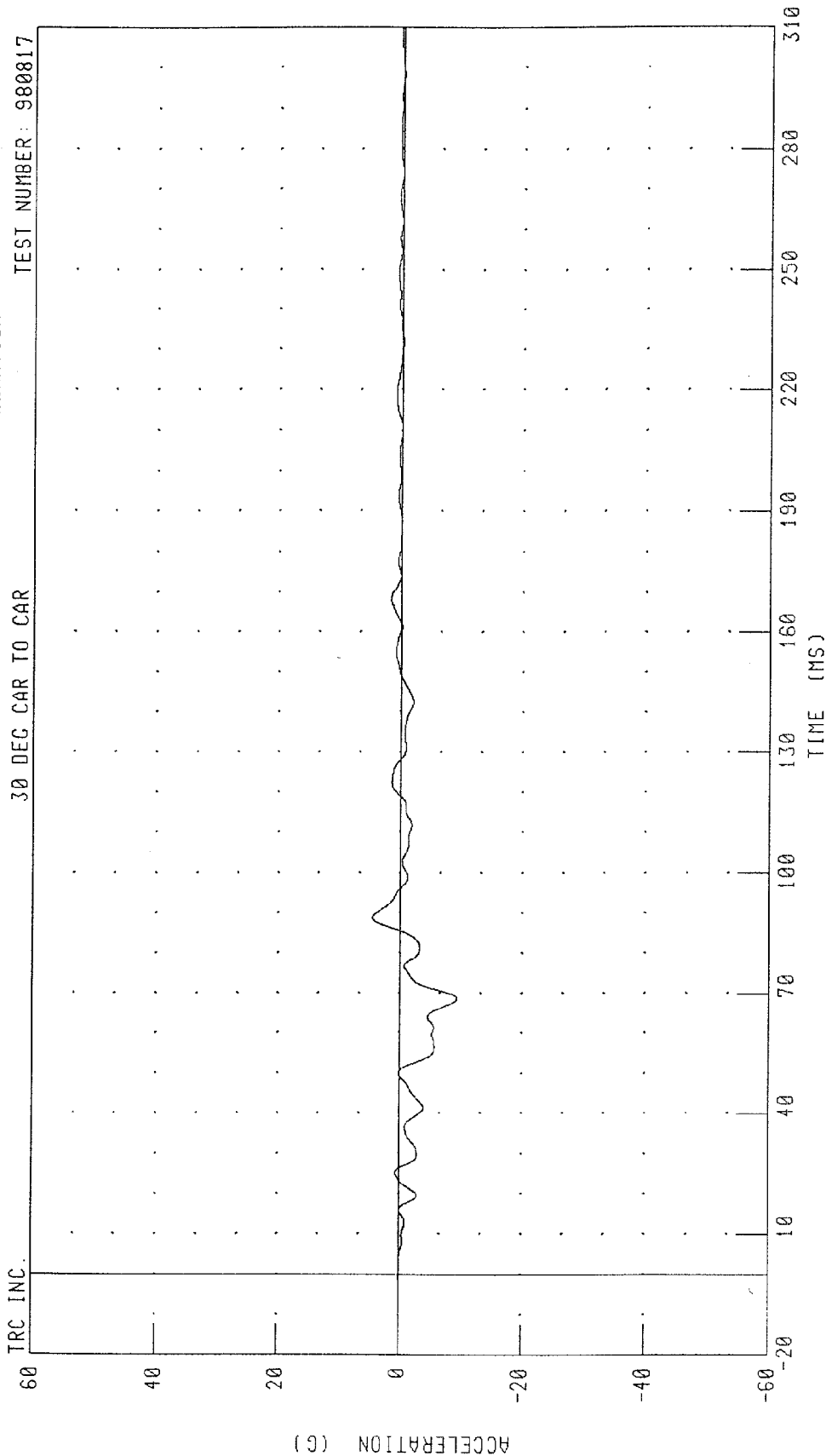
TEST NUMBER: 980817



CHANNEL: TLRXG1 FILTER: CH. CLASS 60

PEAK DATA: 2.57 G @ 174.32 MS; -29.10 G @ 66.72 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE LEFT REAR SEAT CROSSMEMBER Y-AXIS ACCELERATION



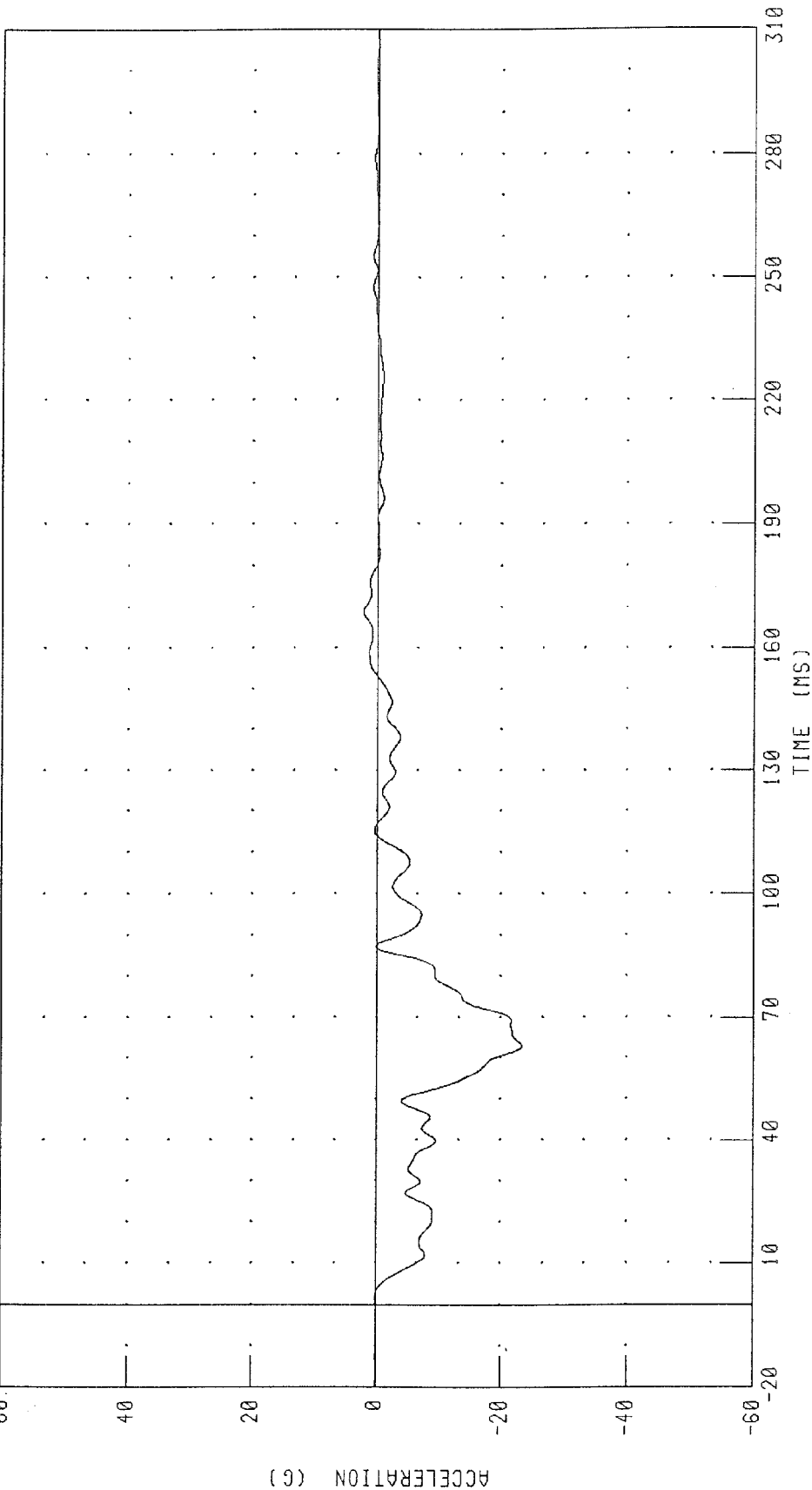
CHANNEL: TLRYG1 FILTER: CH. CLASS 60 PEAK DATA: 4.46 G @ 88.80 MS, -9.47 G @ 68.80 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION

TEST NUMBER: 980817

30 DEG CAR TO CAR

TRC INC.

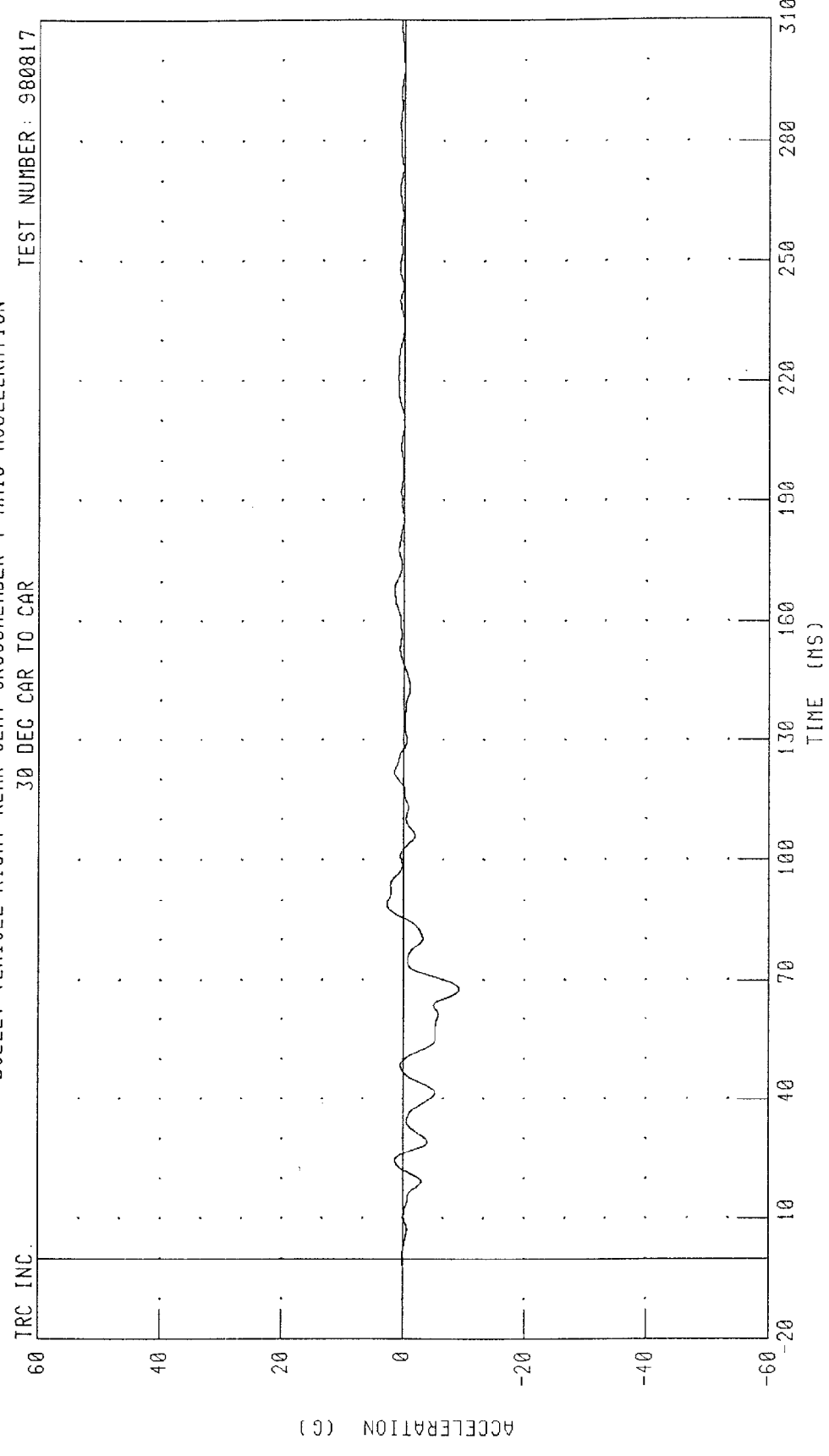


CHANNEL: TRRXG1 FILTER: CH. CLASS 60

PEAK DATA: 2.22 G @ 168.72 MS, -23.43 G @ 62.80 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT REAR SEAT CROSSMEMBER Y-AXIS ACCELERATION
30 DEG CAR TO CAR

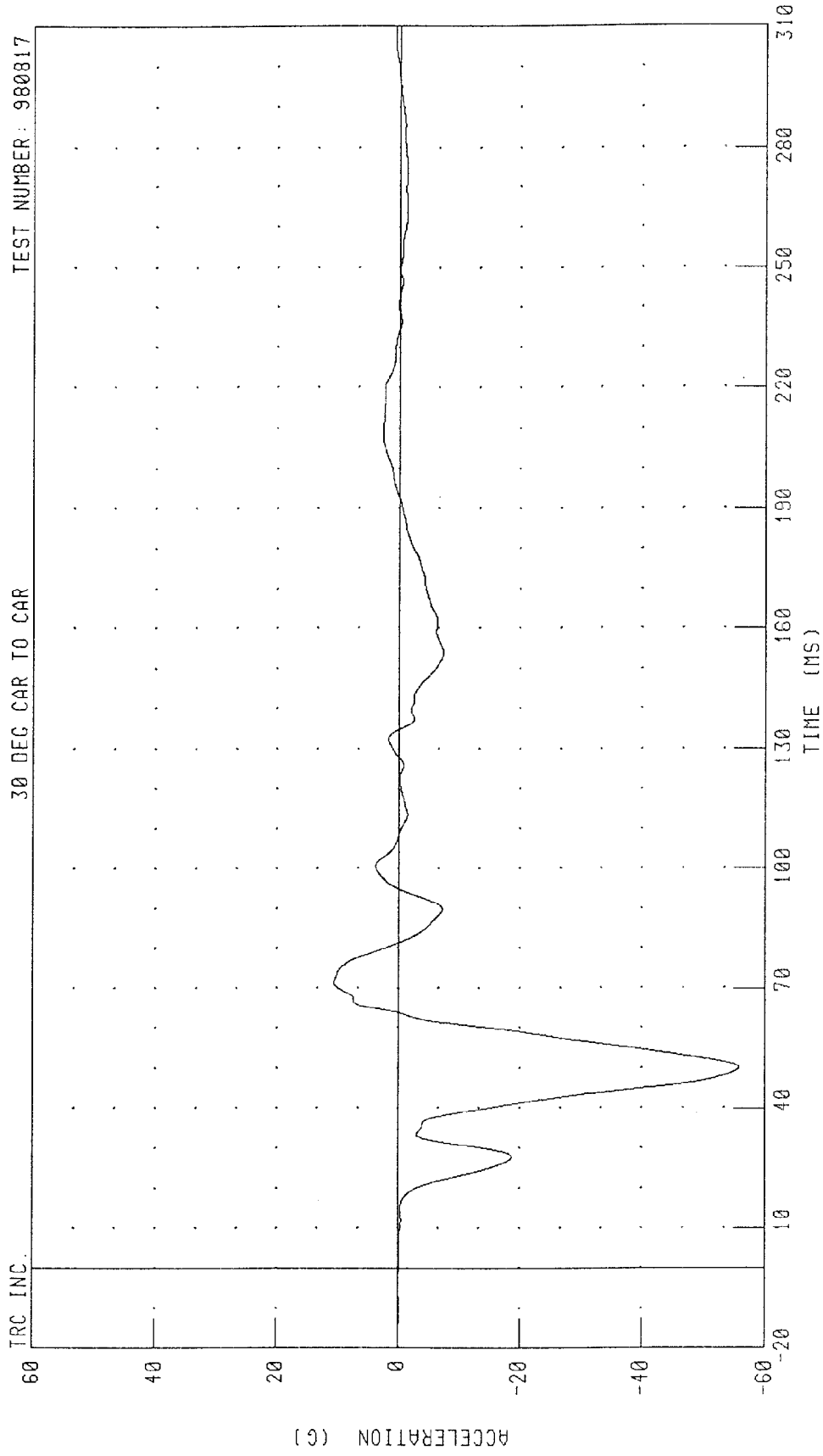
TEST NUMBER: 980817



CHANNEL: TTRYG1 FILTER: CH. CLASS 60 PEAK DATA: 2.72 G @ 88.96 MS, -9.30 G @ 67.76 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE ENGINE TOP X-AXIS ACCELERATION
30 DEG CAR TO CAR

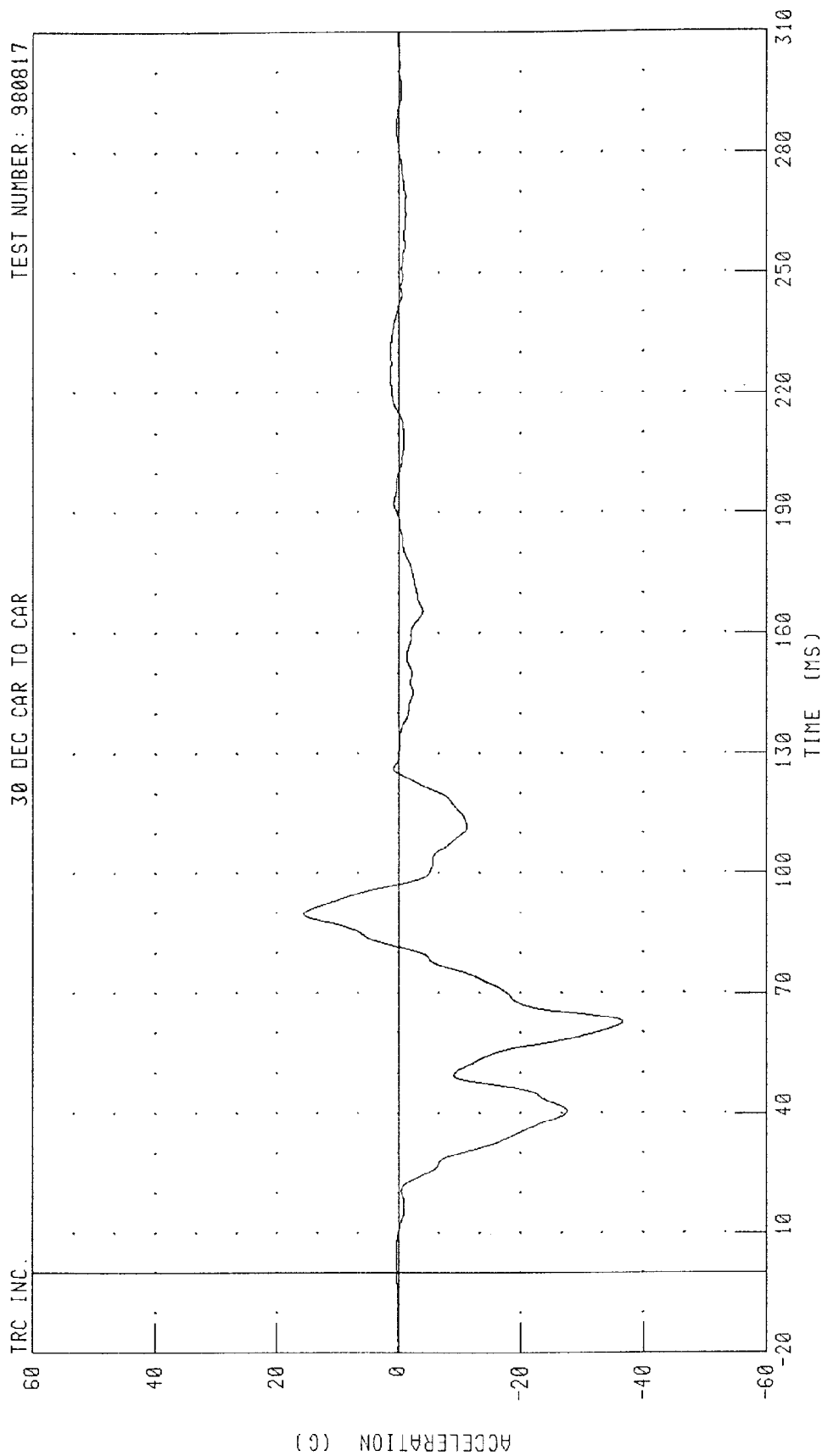
TEST NUMBER: 980817



CHANNEL: ENCXC1 FILTER: CH. CLASS 60 PEAK DATA: 10.61 G @ 71.44 MS; -55.81 G @ 50.08 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE ENGINE BOTTOM X-AXIS ACCELERATION

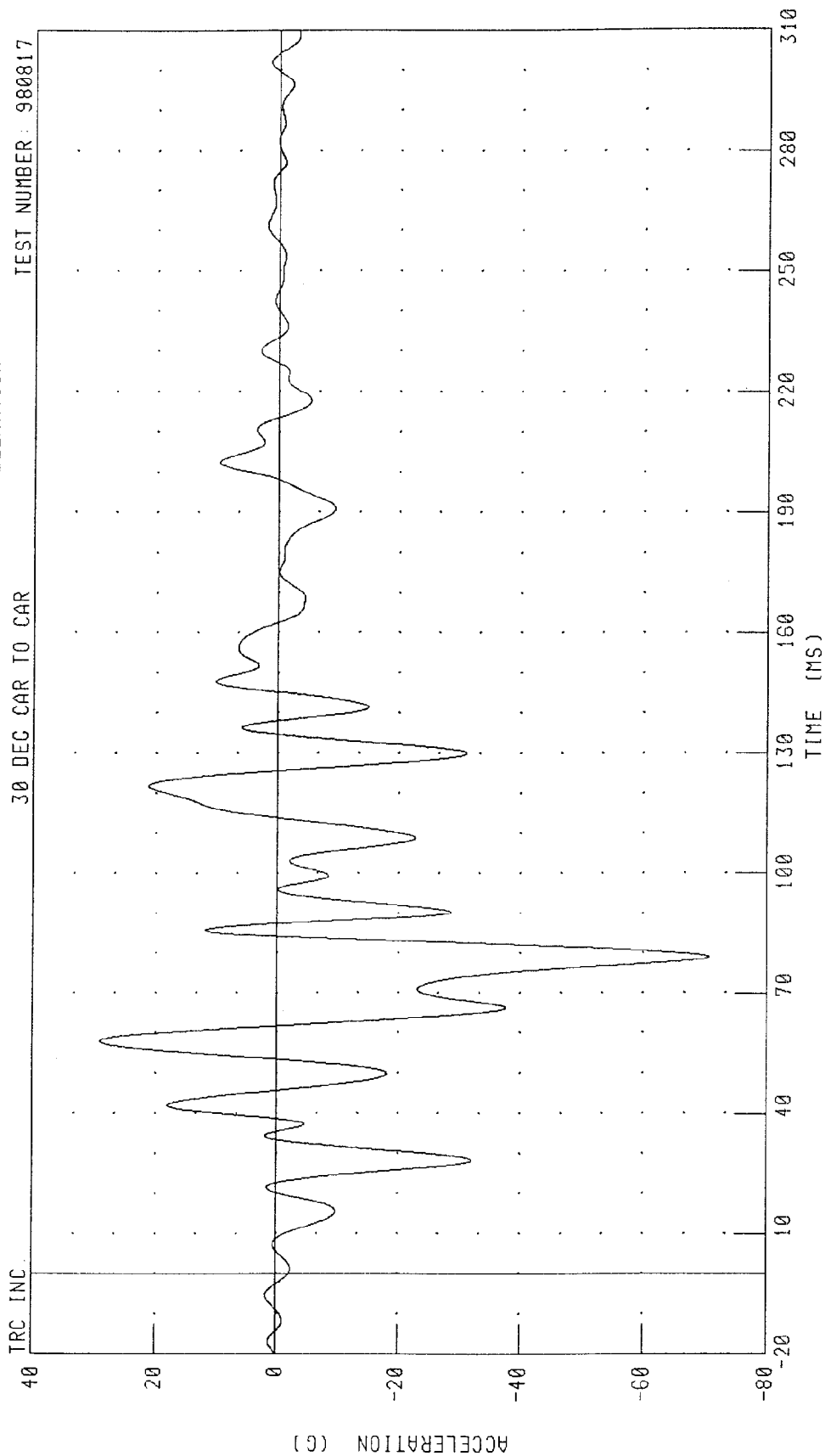
TRC INC. 30 DEG CAR TO CAR TEST NUMBER: 980817



CHANNEL: ENCXC2 FILTER: CH. CLASS 60

PEAK DATA: 15 60 G @ 89.76 MS; -36.72 G @ 62.64 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE RIGHT BRAKE CALIPER X-AXIS ACCELERATION



CHANNEL: BCRXG1 FILTER: CH. CLASS 60

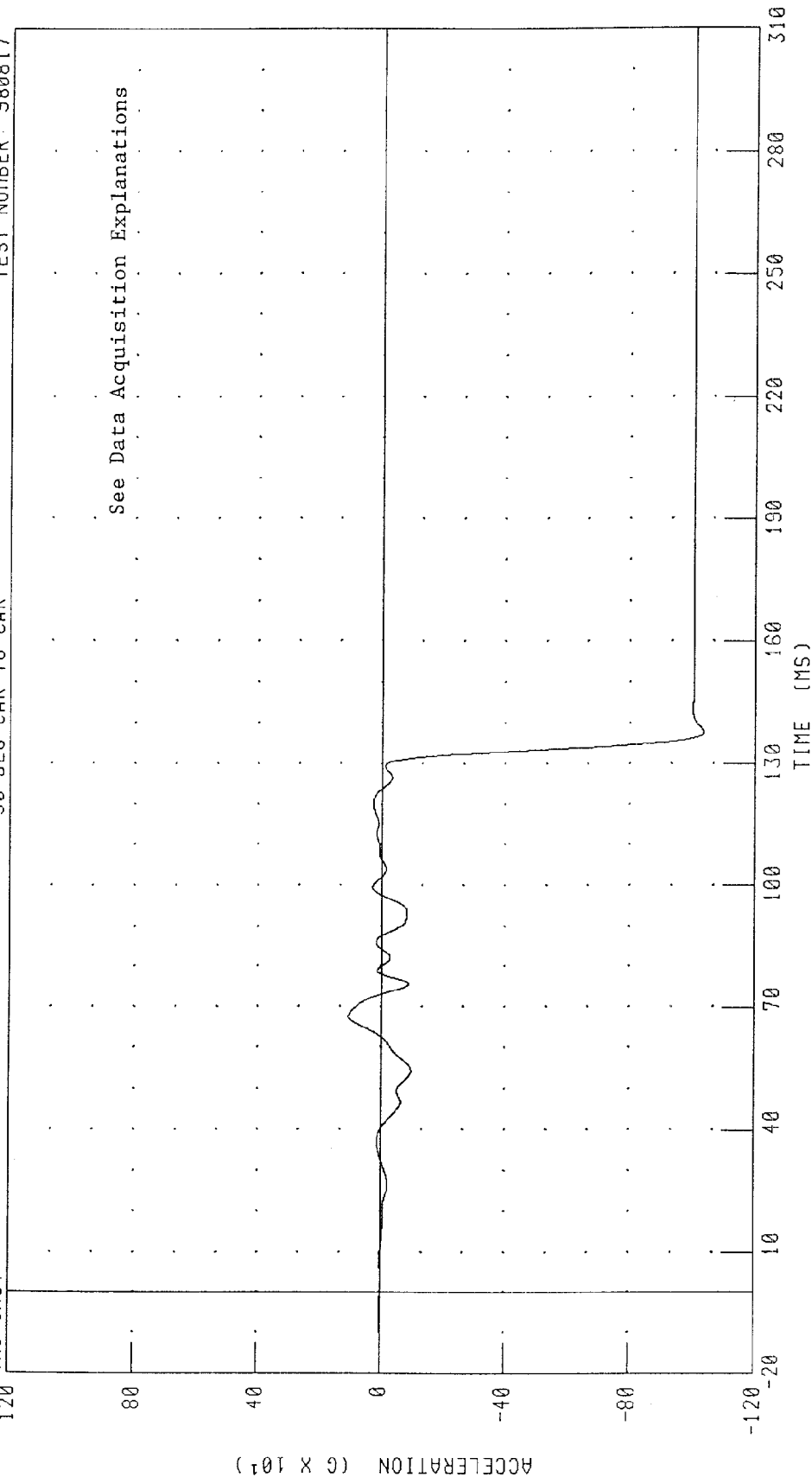
PEAK DATA: 29.12 G @ 57.92 MS, -70.62 G @ 79.04 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE LEFT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 980817

30 DEC CAR TO CAR

TRC INC.



CHANNEL: BCLXG1 FILTER: CH. CLASS 60

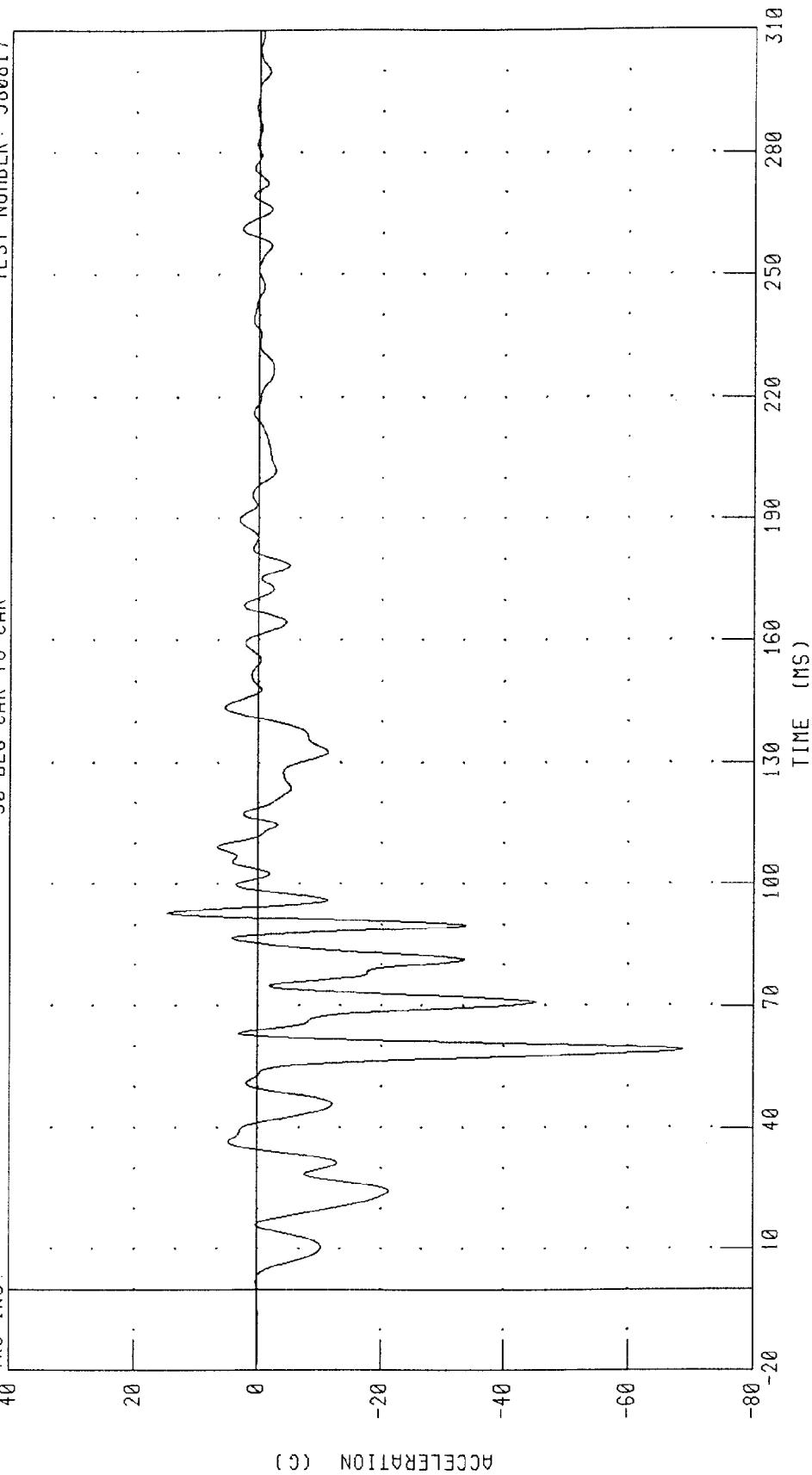
PEAK DATA: 105.80 G @ 67.76 MS; -1036.07 G @ 137.60 MS

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE INSTRUMENT PANEL X-AXIS ACCELERATION

TEST NUMBER: 980817

30 DEC CAR TO CAR

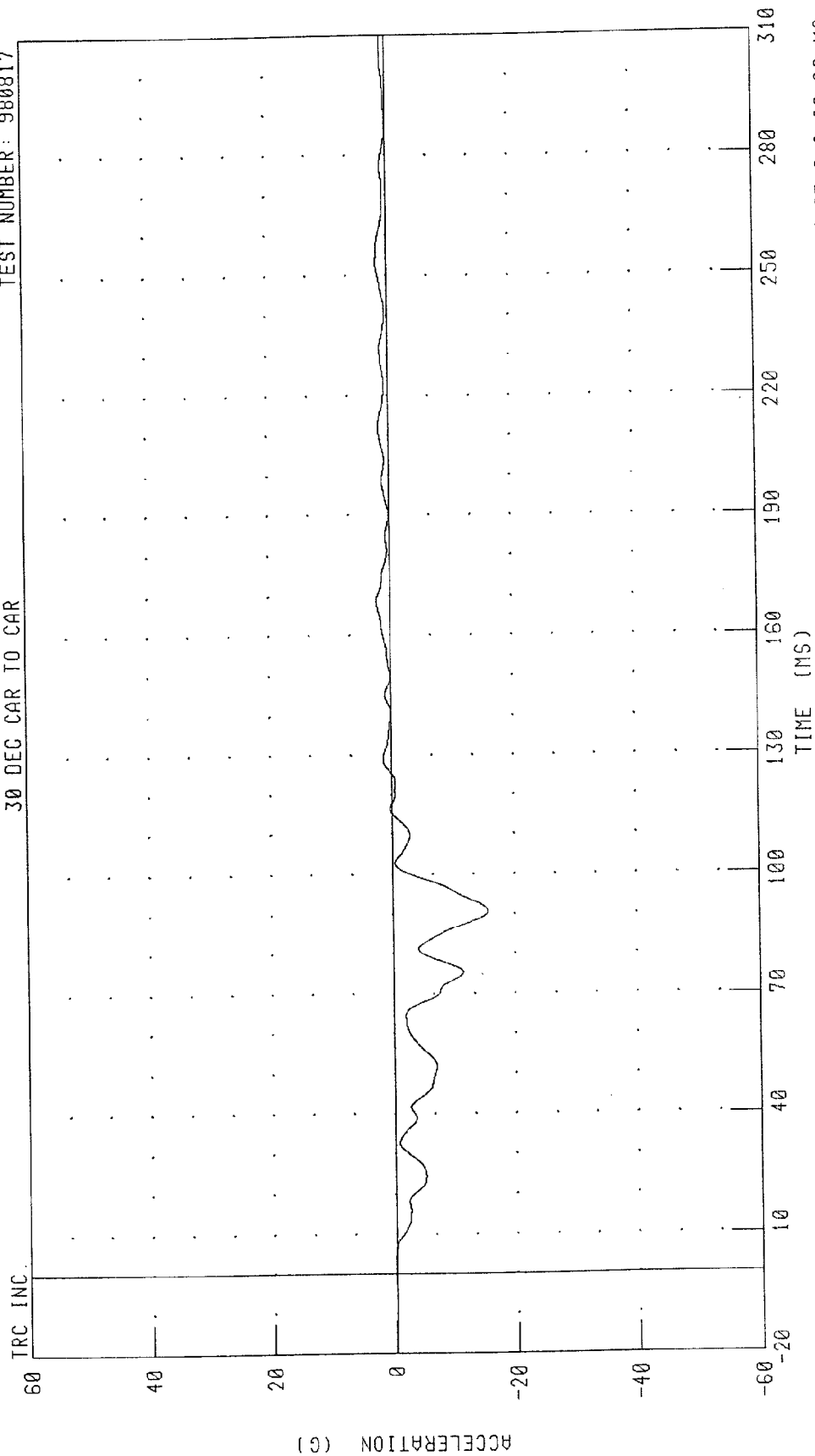
TRC INC.



CHANNEL: DPCXG1 FILTER: CH. CLASS 60

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
BULLET VEHICLE REAR AXLE Y-AXIS ACCELERATION
30 DEC CAR TO CAR

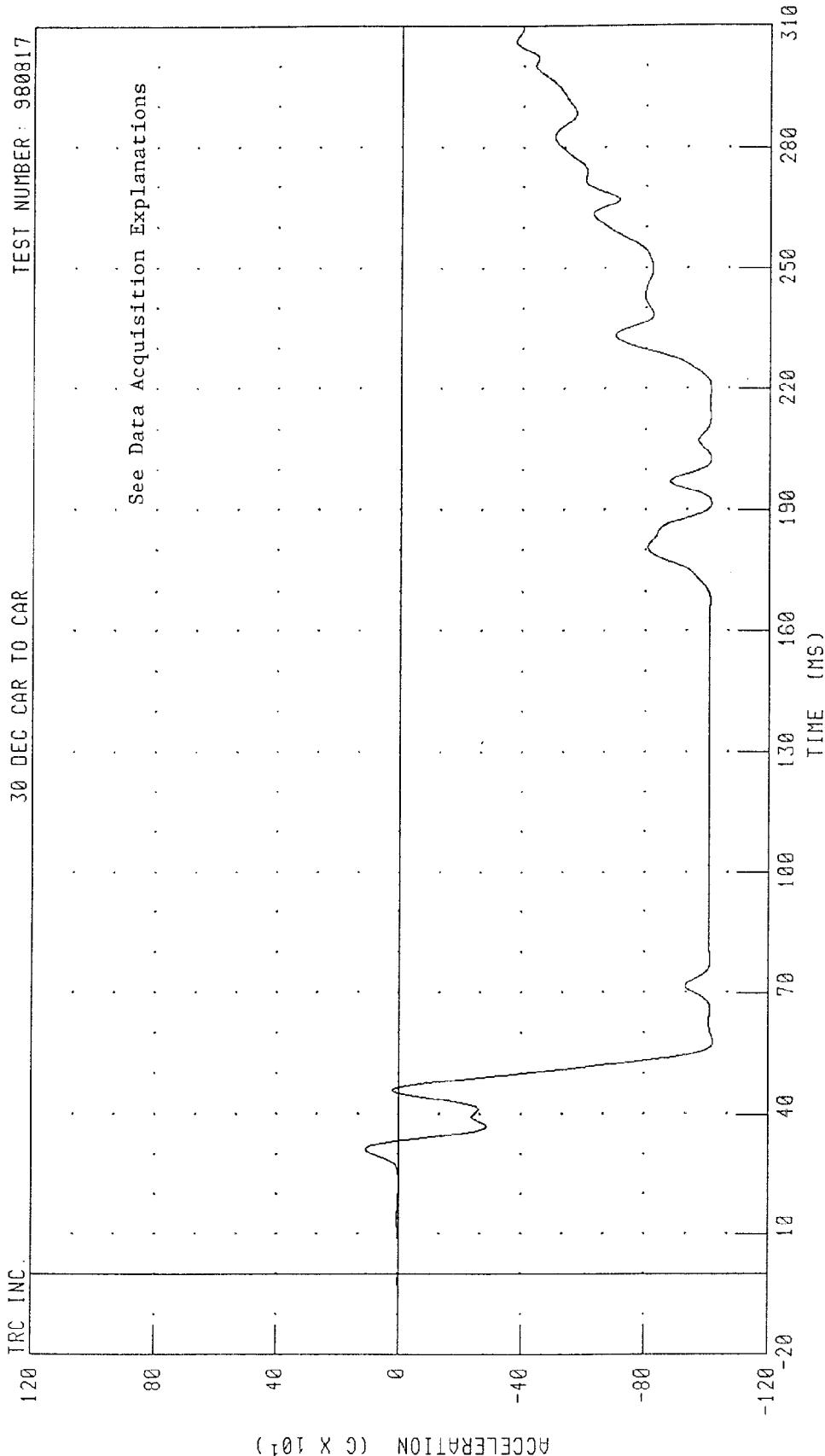
TEST NUMBER: 980817



PEAK DATA: 2.15 G @ 168.72 MS, -15.65 G @ 90.80 MS

CHANNEL: TFCYG1 FILTER: CH. CLASS 60

1996 CHEVROLET LUMINA INTO LEFT FRONT OF 1997 HONDA ACCORD OBLIQUE 30 DEGREES
 BULLET VEHICLE REAR AXLE Z-AXIS ACCELERATION



CHANNEL: TFCZG1 FILTER: CH. CLASS 60 PEAK DATA: 107.75 G @ 31.36 MS; -1020.63 G @ 57.68 MS

Appendix C

Dummy Certification Data

Pre-Test Calibration

Target 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

Bj 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

75

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

TIME (MS X 10⁻¹)

PEAK DATA: 0.00 G @ -0.96 MS; -210.64 G @ 1.92 MS

CHANNEL: HEDXC

FILTER: CH. CLASS 1000

ACCELERATION (G)

75

0

-75

-150

-225

-300

-375

0

10

20

30

40

50

60

70

80

90

100

TIME (MS X 10⁻¹)

PEAK DATA: 0.00 G @ -0.96 MS; -210.64 G @ 1.92 MS

CHANNEL: HEDXC

FILTER: CH. CLASS 1000

ACCELERATION (G)

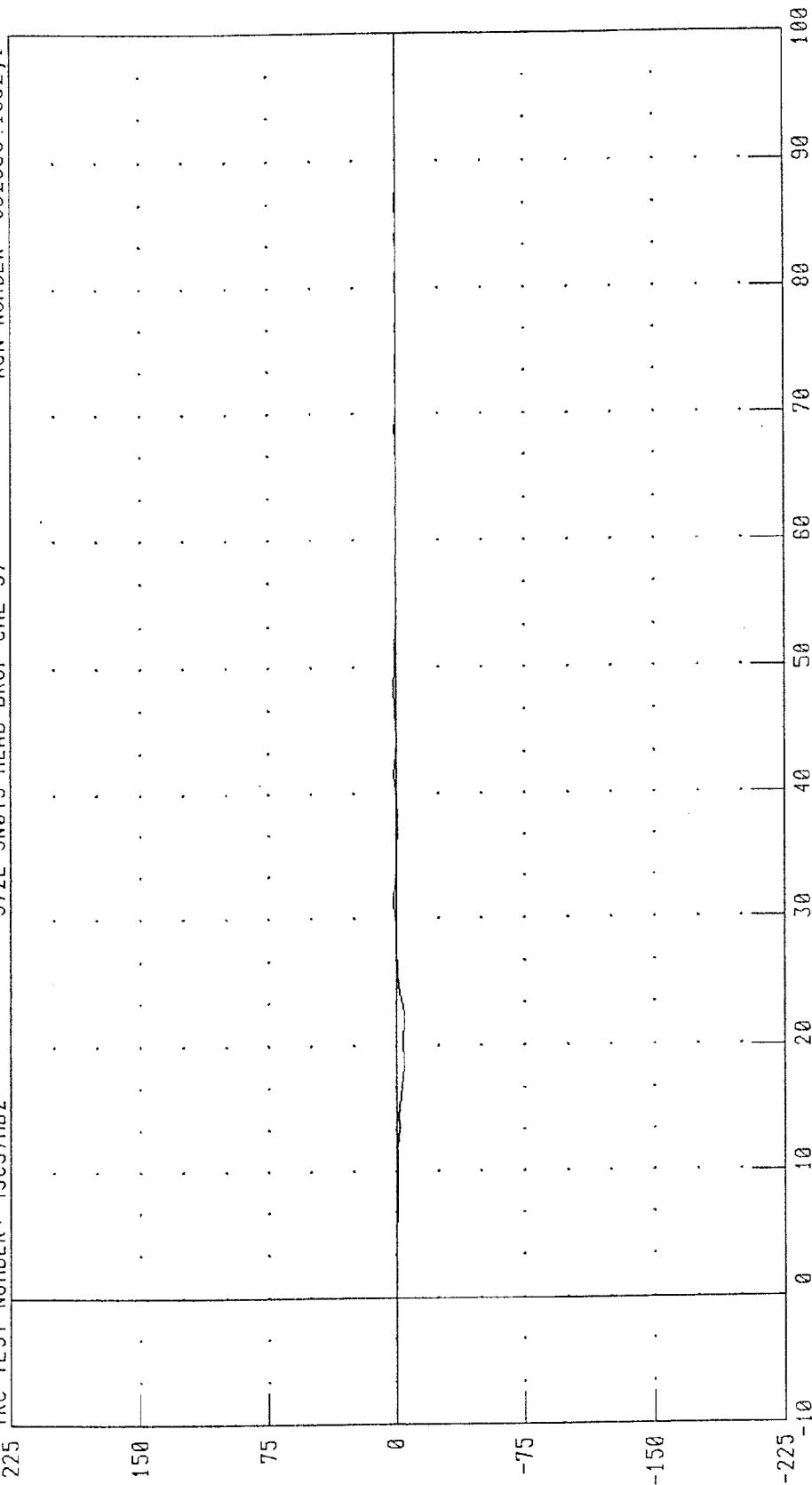
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 45C37HD2

572E SN045 HEAD DROP CAL 37

RUN NUMBER: 052998.1352;1



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

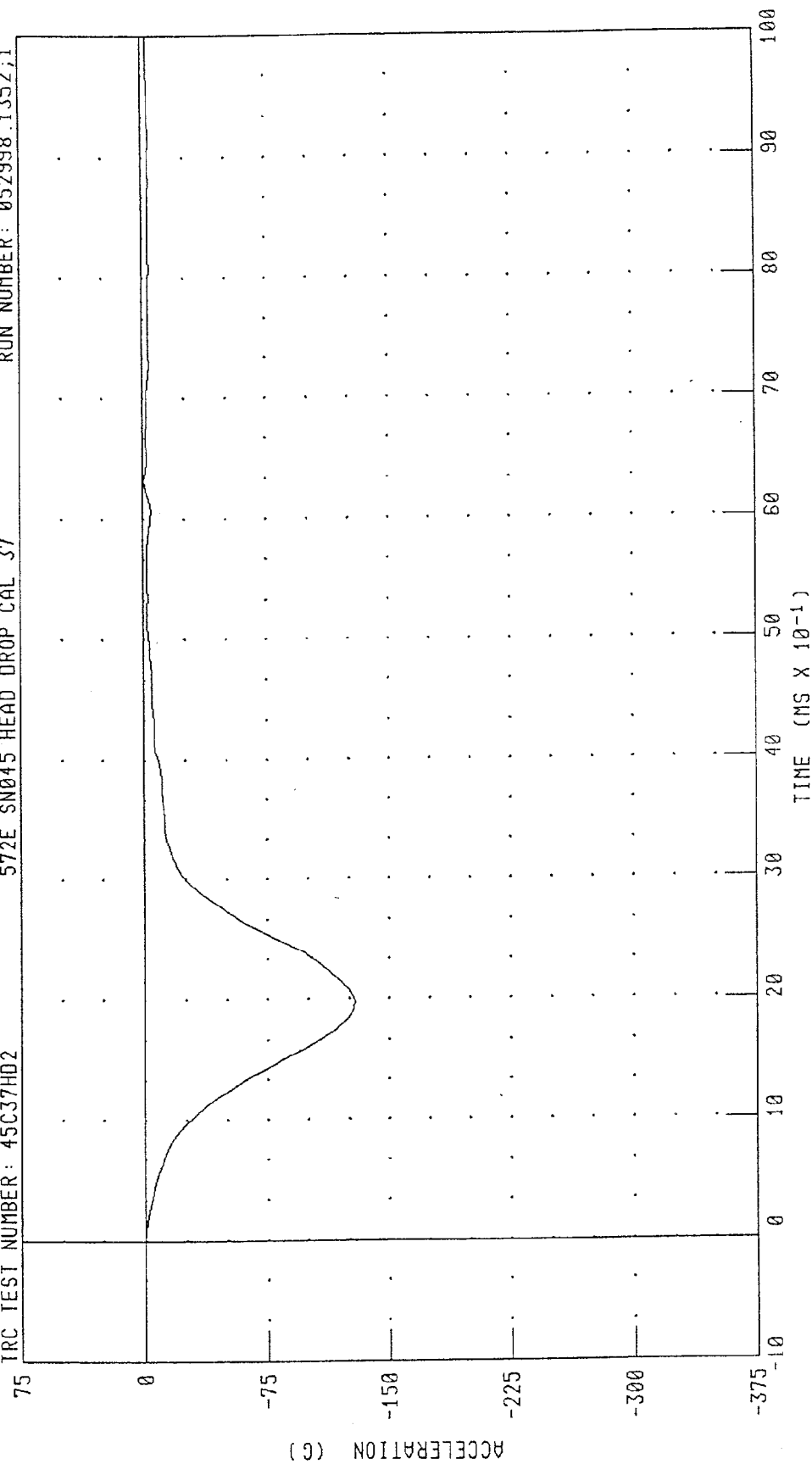
CHANNEL: HEDYG FILTER: CH. CLASS 1000

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



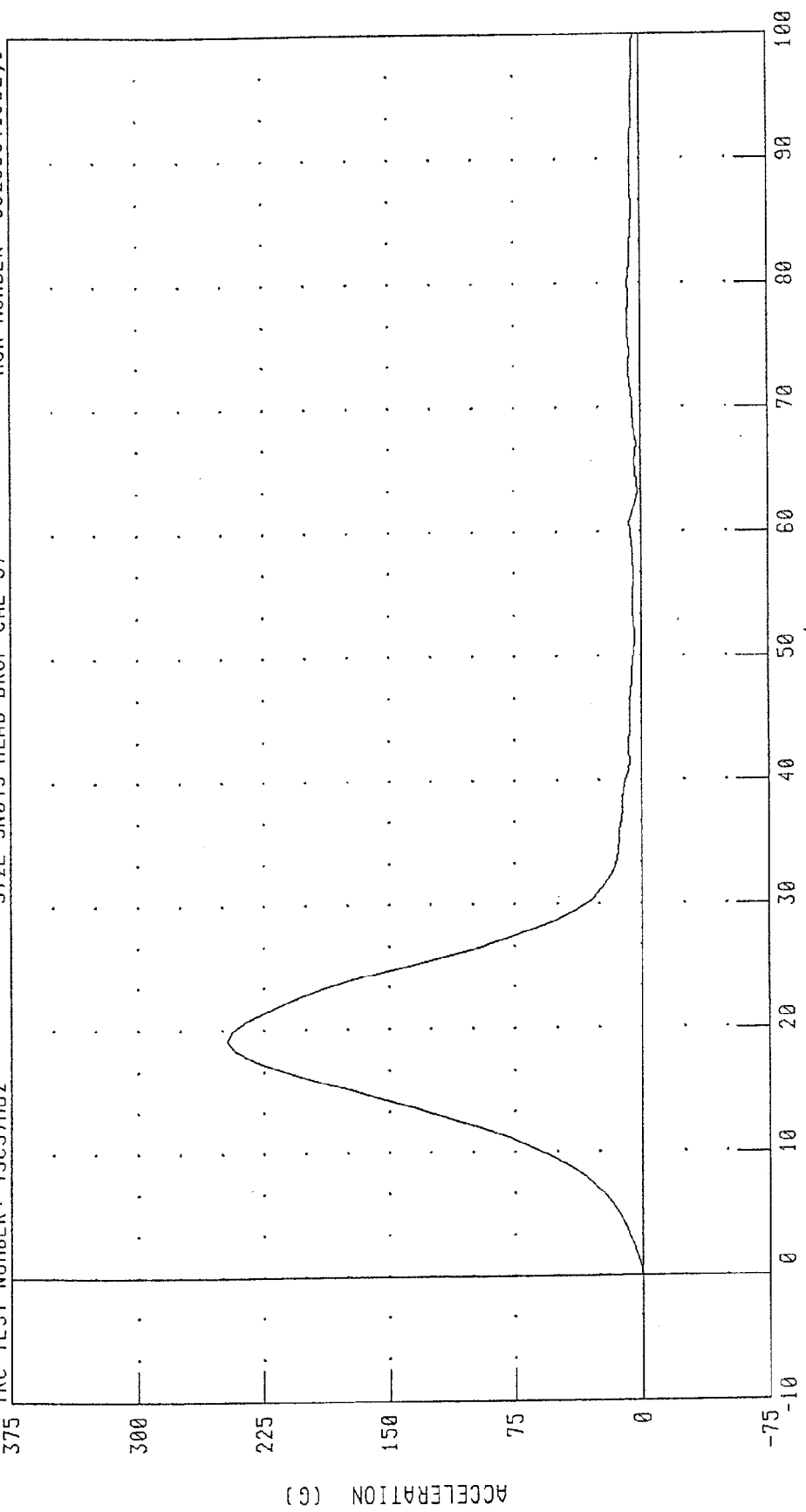
CHANNEL: HEDZG FILTER: CH. CLASS 1000

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

RUN NUMBER: 052998.1352;1

TRC TEST NUMBER: 45C37HD2



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

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

29-MAY-98

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 45C37NF1 572E SNO45 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

Ray cult

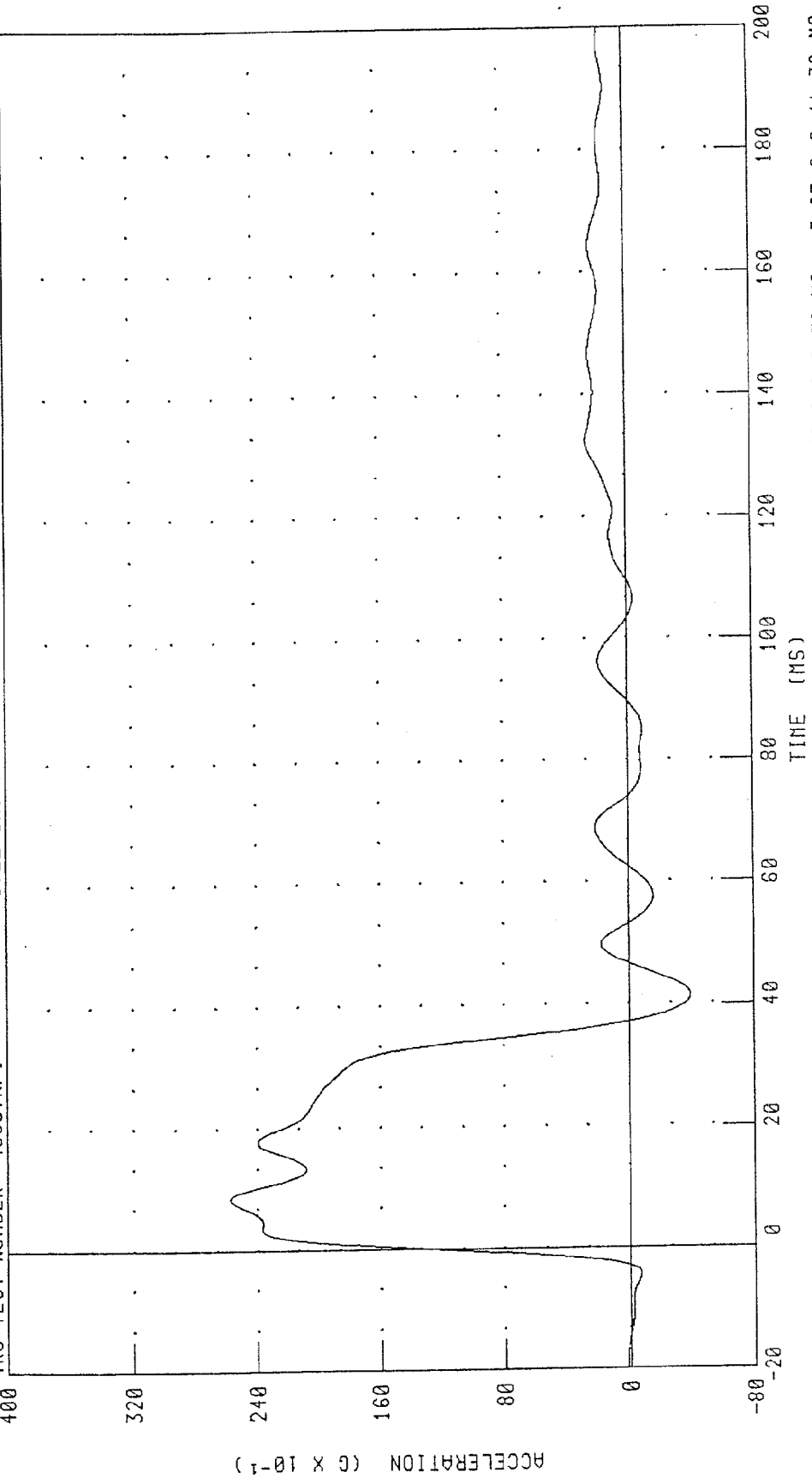
RUN NUMBER: 052998.1255;2

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: 25.76 G @ 8.32 MS; -3.97 G @ 41.36 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

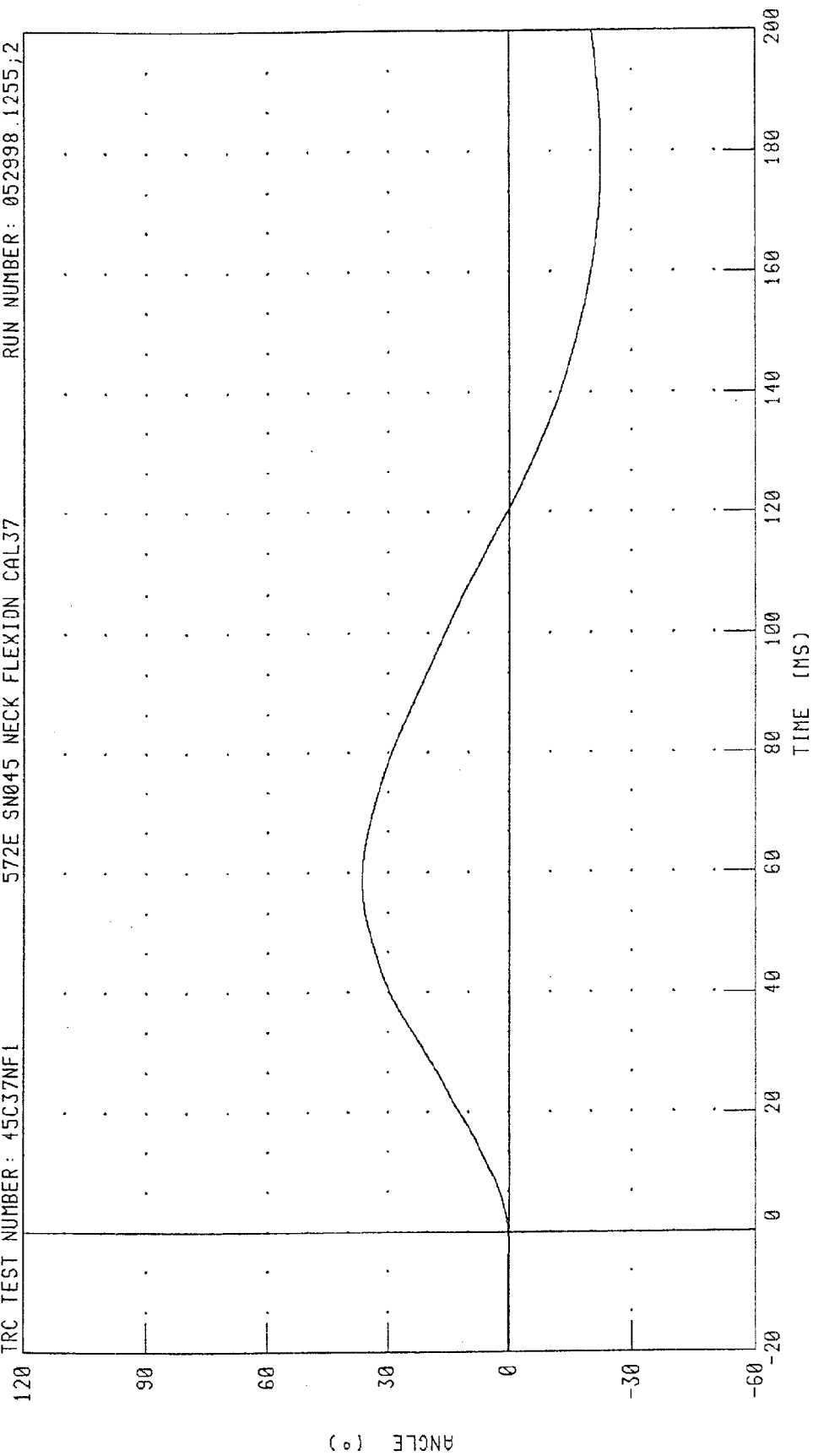
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN045 NECK FLEXIDN CAL37

TRC TEST NUMBER: 45C37NF1

RUN NUMBER: 052998.1255;2



CHANNEL: BETA

FILTER: CH. CLASS 60

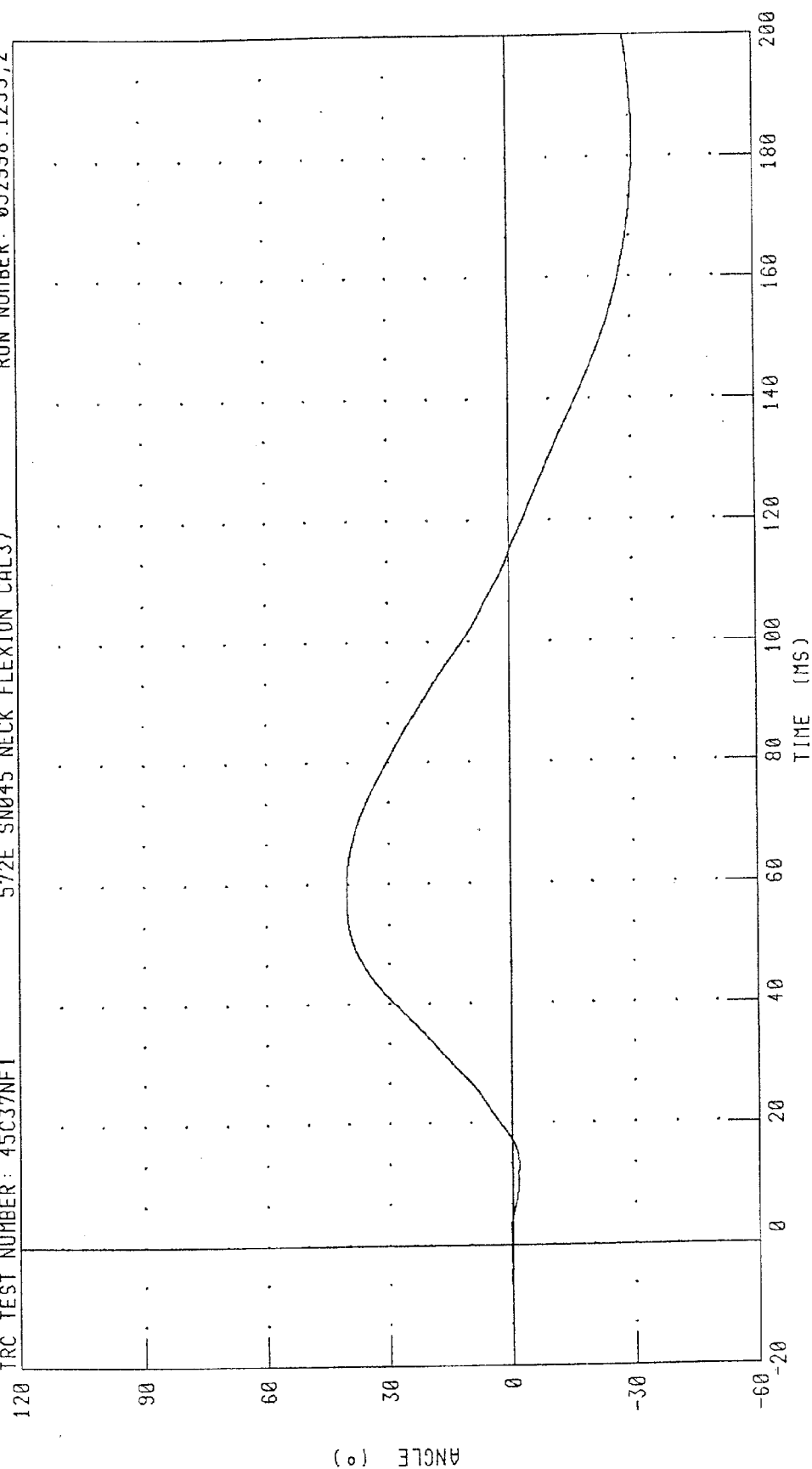
PEAK DATA: 36.44 ° @ 58.64 MS; -22.52 ° @ 178.96 MS

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

TRC TEST NUMBER: 45C37NF1

572E SN045 NECK FLEXION CAL37

RUN NUMBER: 052998.1255;2



CHANNEL: THETA FILTER: CH. CLASS 60

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

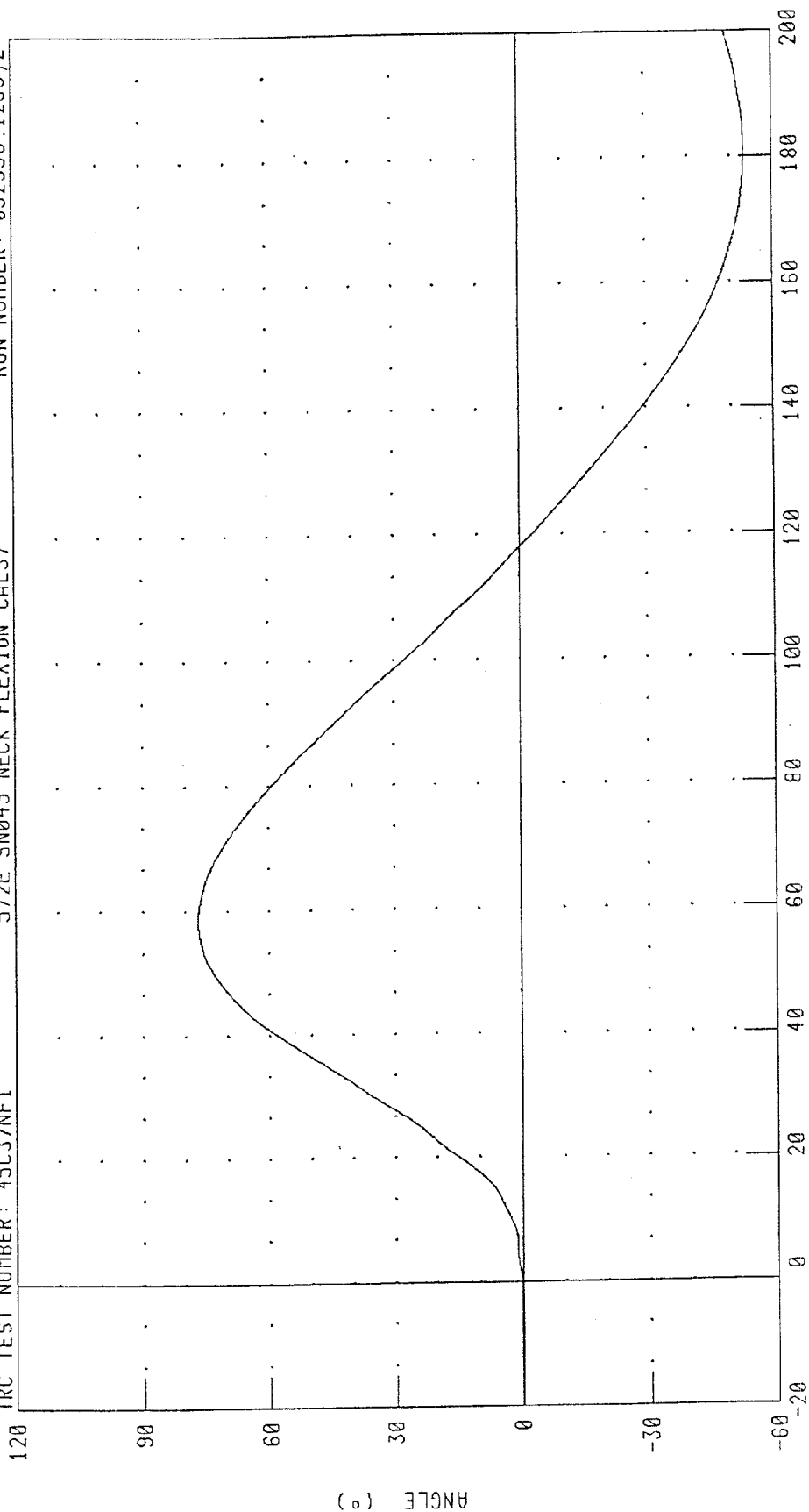
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 45C37NF1

572E SN045 NECK FLEXION CAL37

RUN NUMBER: 052998.1255;2



CHANNEL: TOTAN FILTER: CH. CLASS 60

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

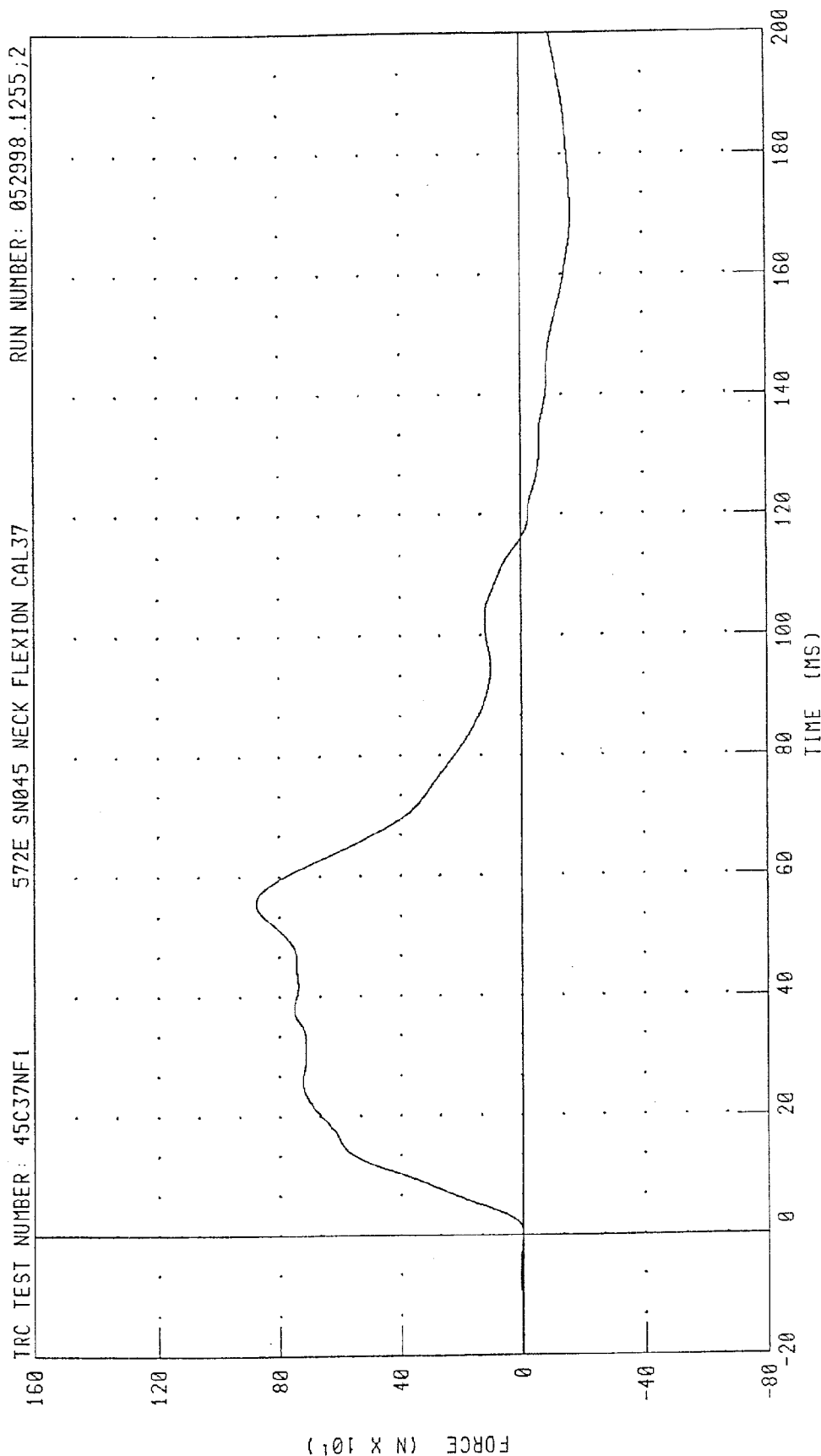
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 45C37NF1

572E SN045 NECK FLEXION CAL37

RUN NUMBER: 052998.1255;2



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

CHANNEL: NEKXF FILTER: CH. CLASS 60

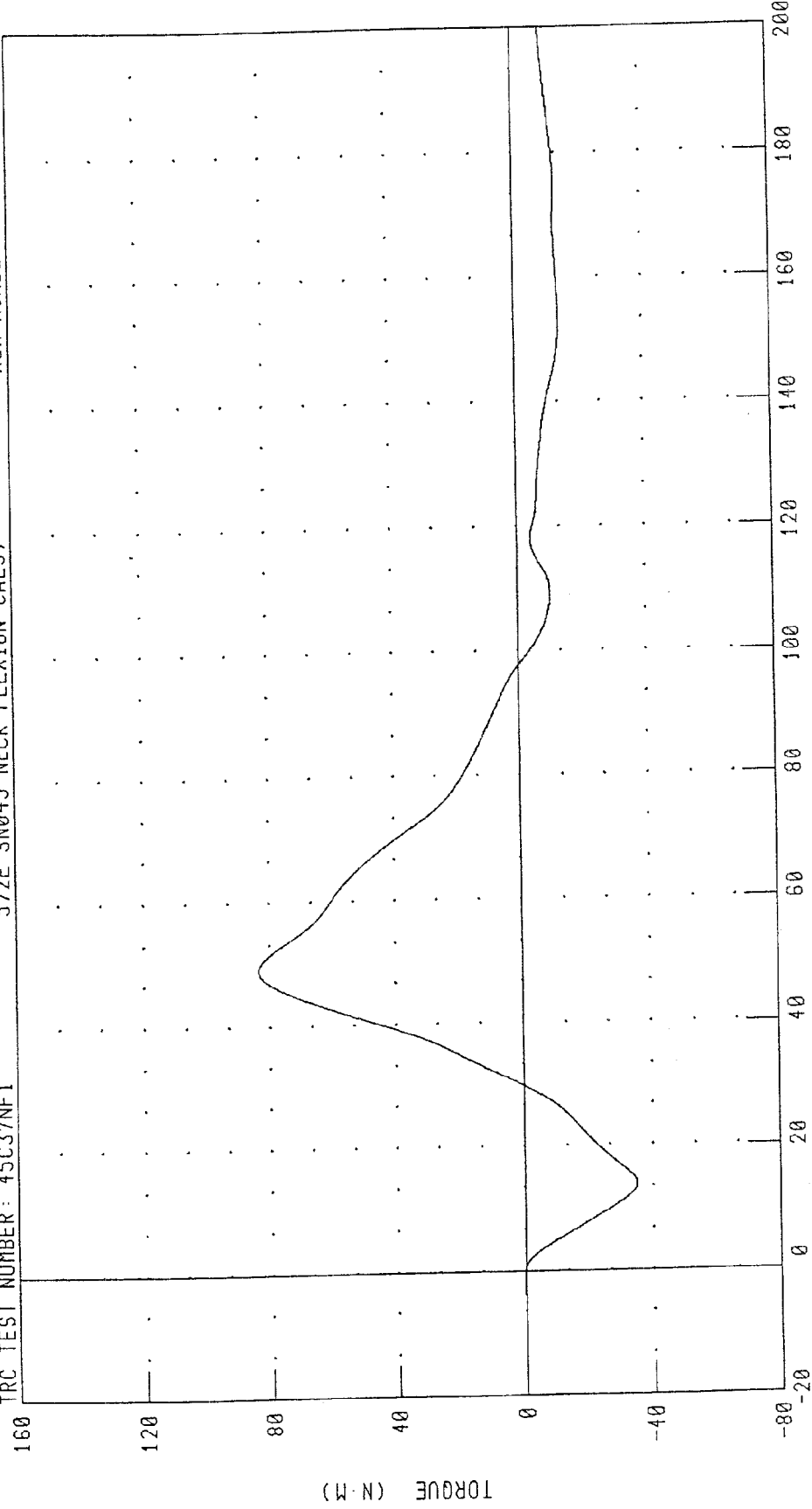
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 052998.1255;2

TRC TEST NUMBER: 45C37NF1

572E SN045 NECK FLEXION CAL37



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

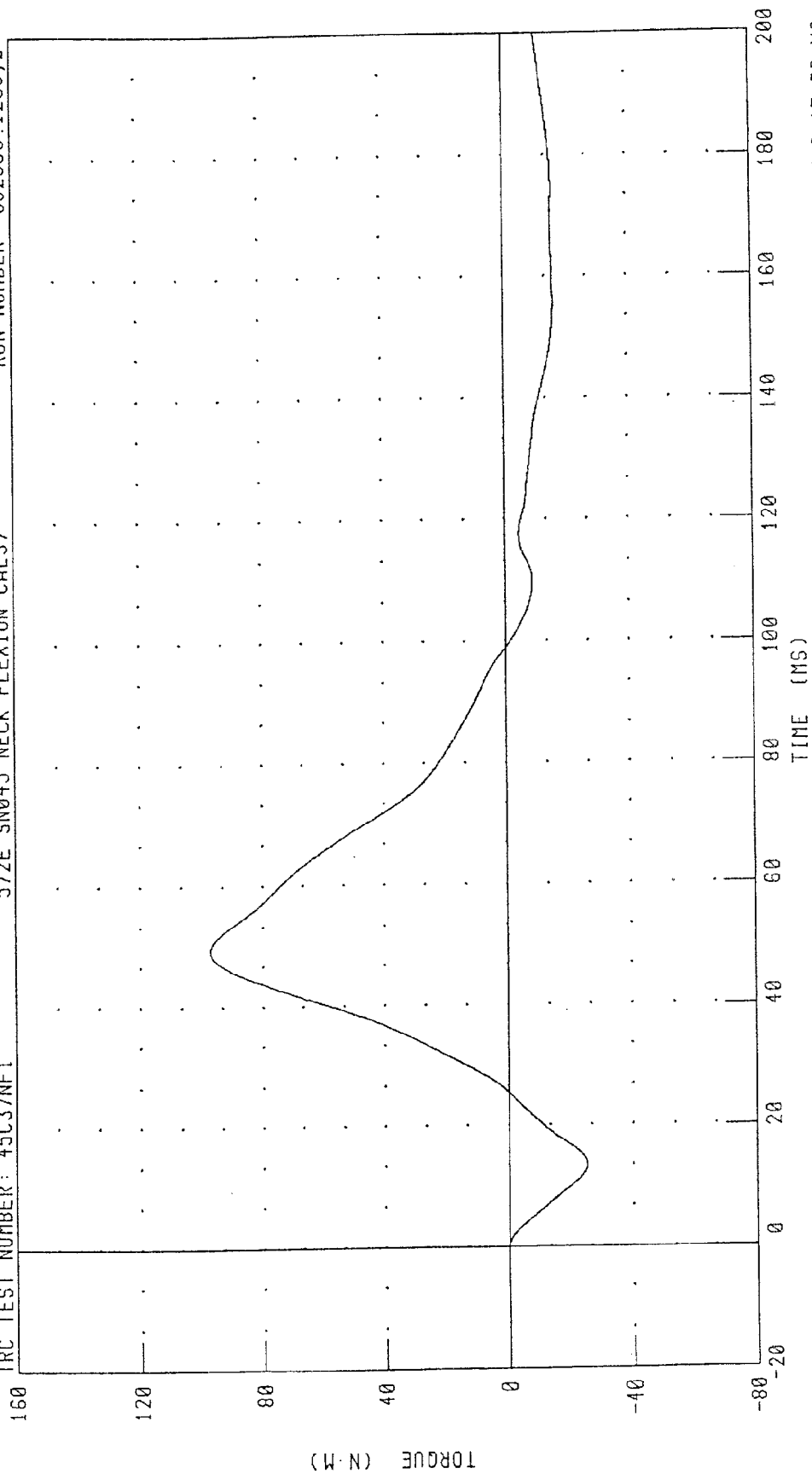
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 45C37NF1

572E SN045 NECK FLEXION CAL37

RUN NUMBER: 052998.1255;2



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 97.06 N·M @ 49.36 MS; -25.19 N·M @ 133.36 MS

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

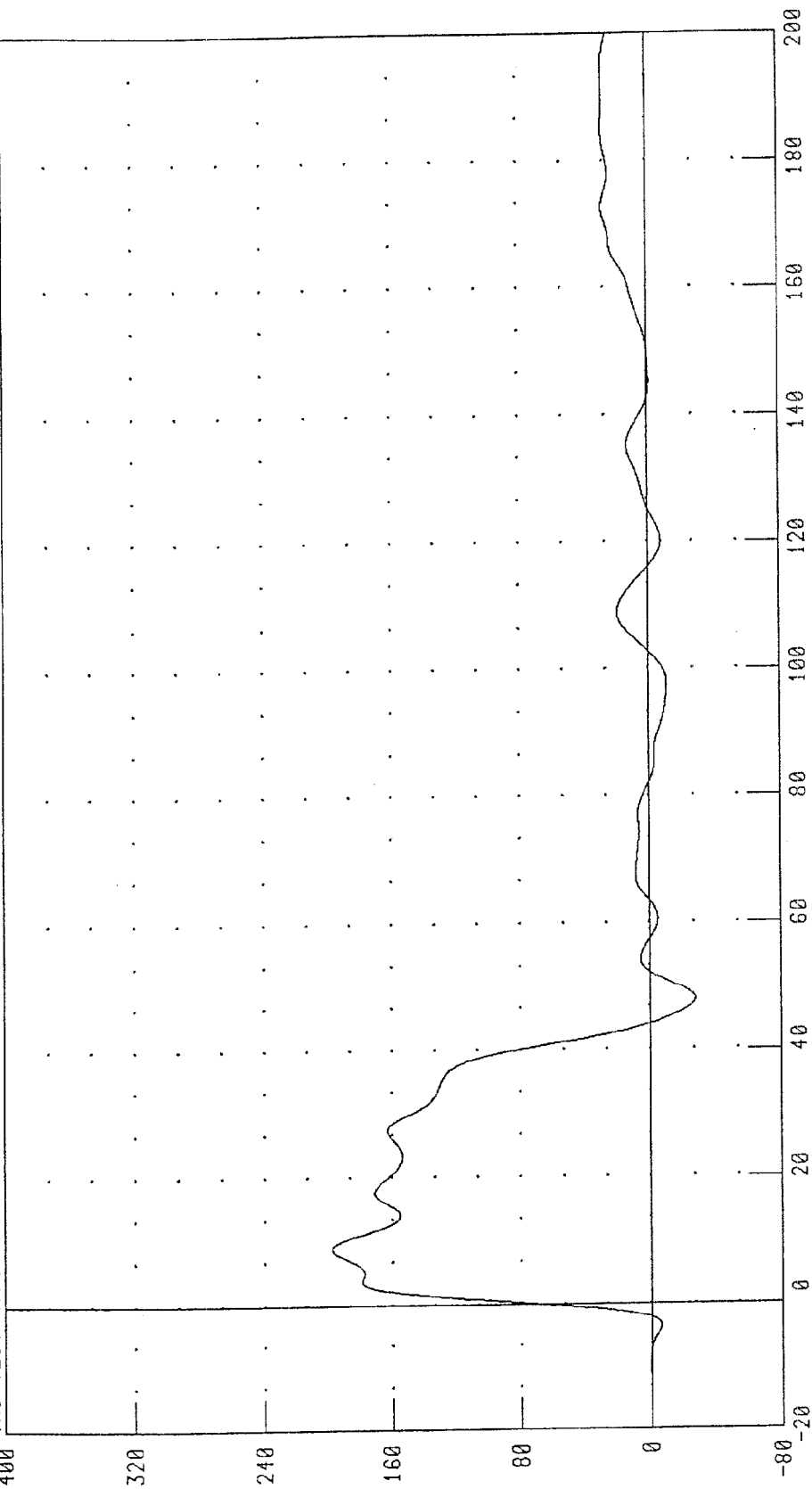
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 45C37NE1

572E SN045 NECK EXT CAL37

RUN NUMBER: 052998.1319,1



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

CHANNEL: PENXC FILTER: CH. CLASS 60

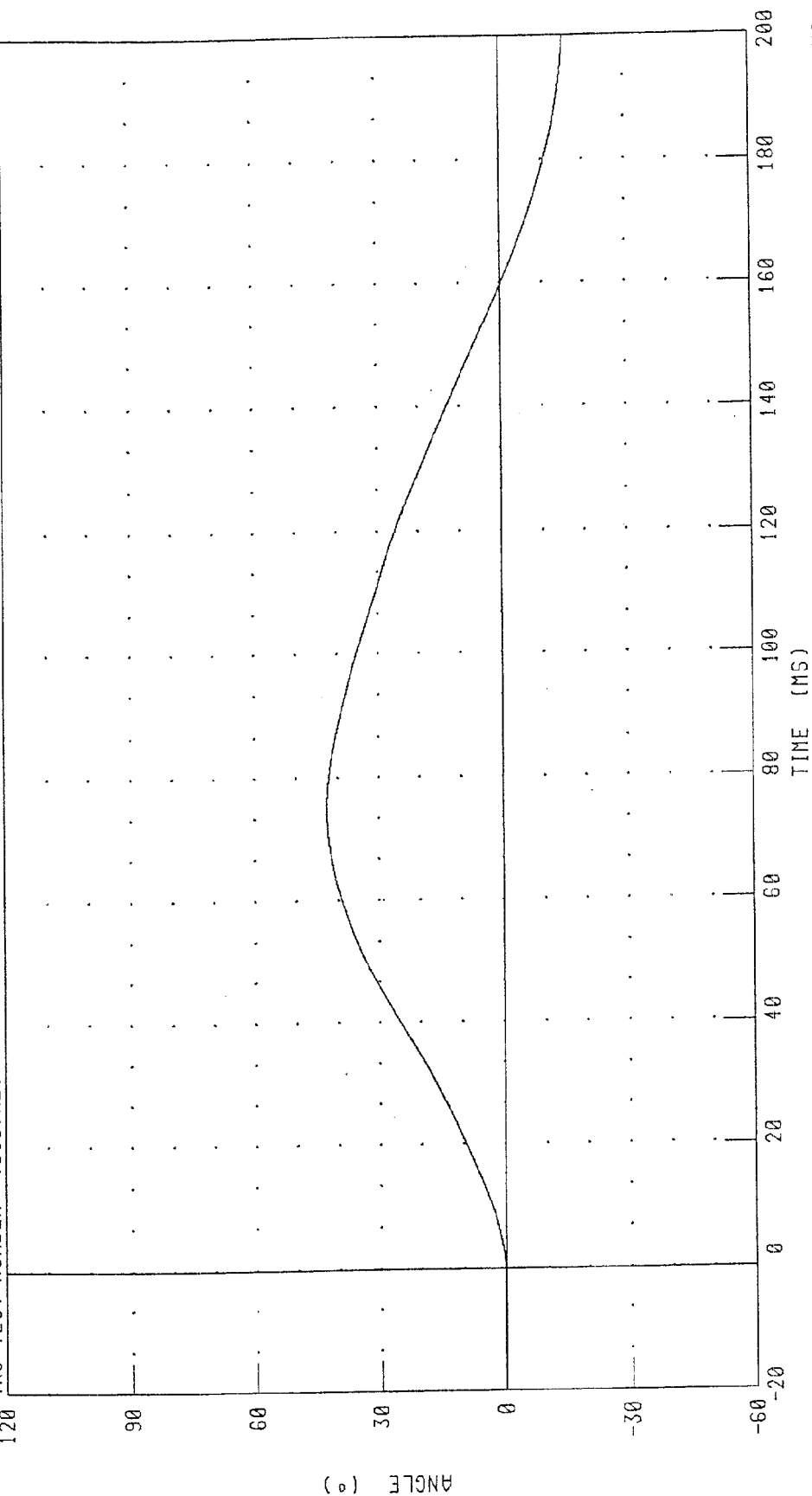
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

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

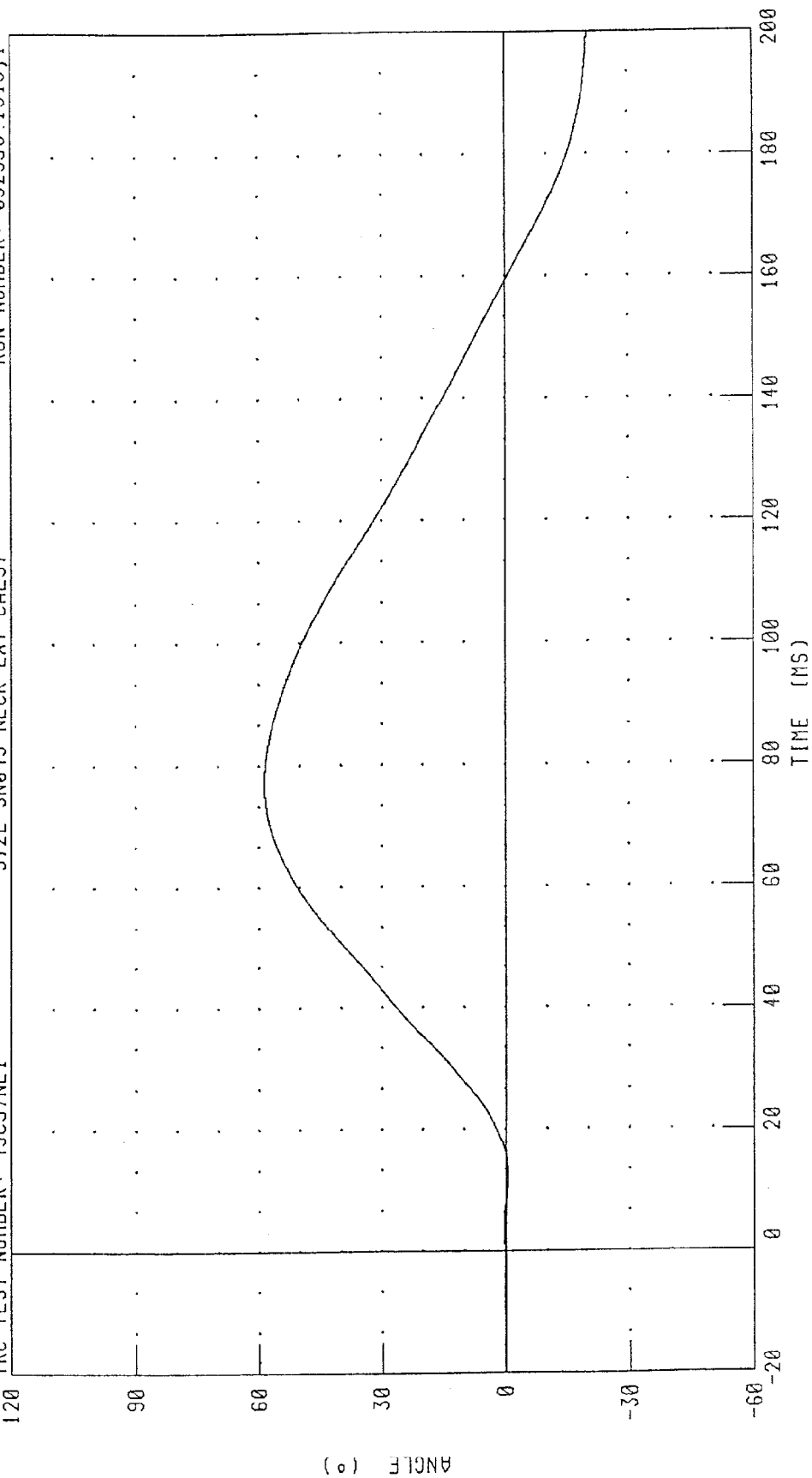
CHANNEL: BETA FILTER: CH. CLASS 60

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



PEAK DATA: 58.59 ° @ 77.04 MS, -20.00 ° @ 200.00 MS

CHANNEL: THETA FILTER: CH. CLASS 60

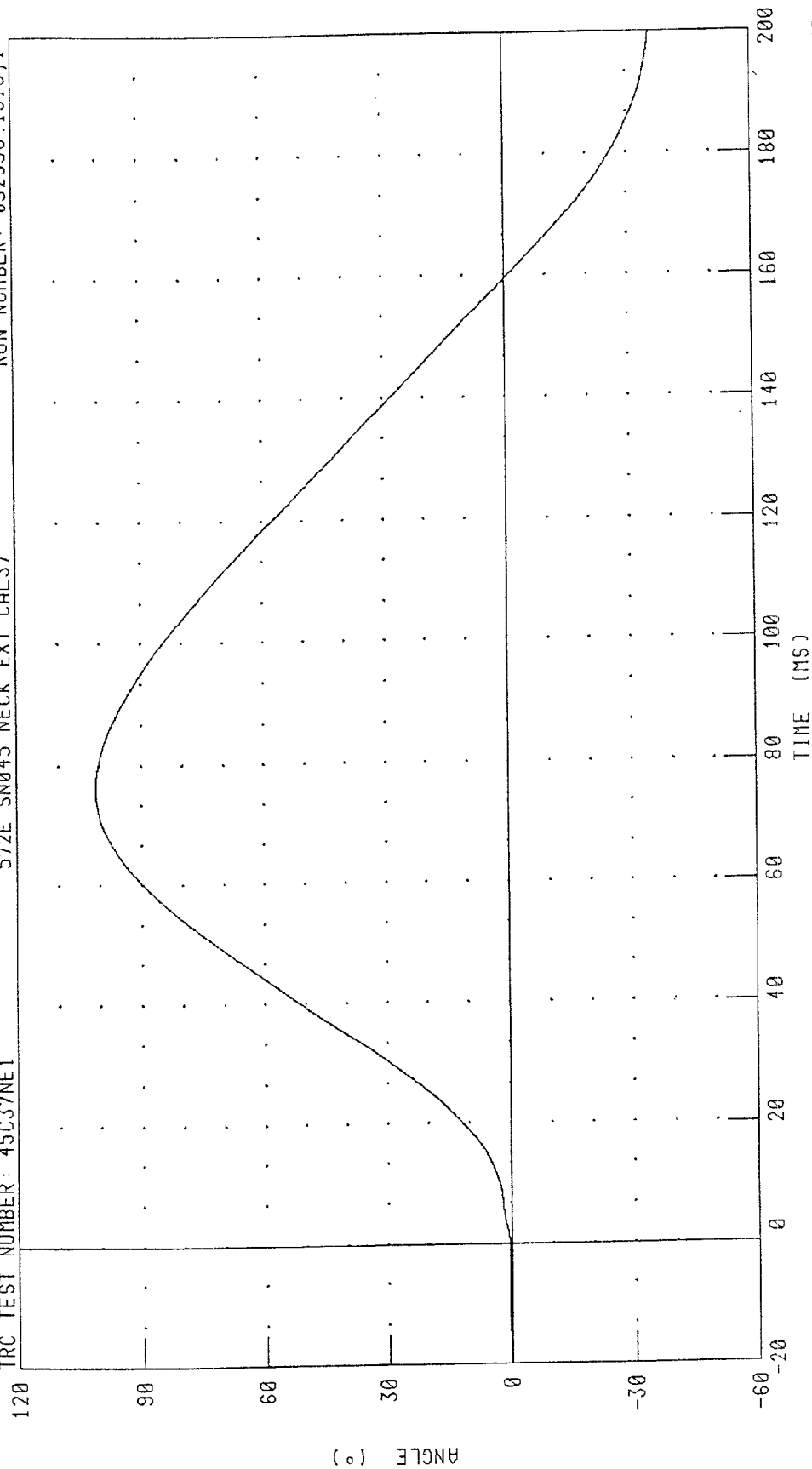
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 45C37NE1

572E SN045 NECK EXT CAL37

RUN NUMBER: 052998.1319;1



CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 101.07 ° @ 76.32 MS, -35.57 ° @ 200.00 MS

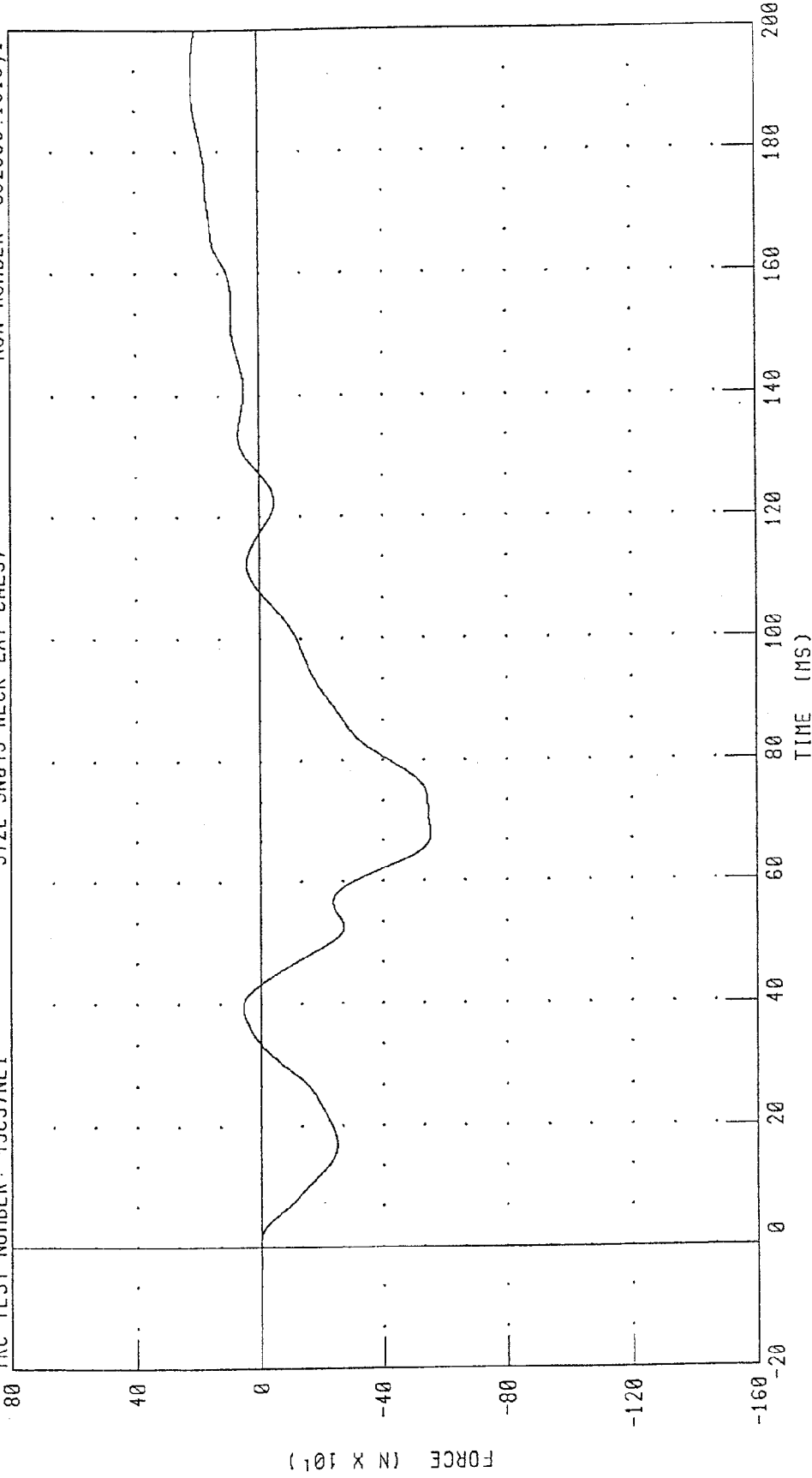
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 052998.1319,1

572E SN045 NECK EXT CAL37

TRC TEST NUMBER: 45C37NE1



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

FILTER: CH. CLASS 60

CHANNEL: NEKXF

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 052998.1319;1

572E SN045 NECK EXT CAL37

TRC TEST NUMBER: 45C37NEI

80

40

0

-40

-80

-120

-160

-200

TORQUE (N·M)

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

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

CHANNEL: NEKYM

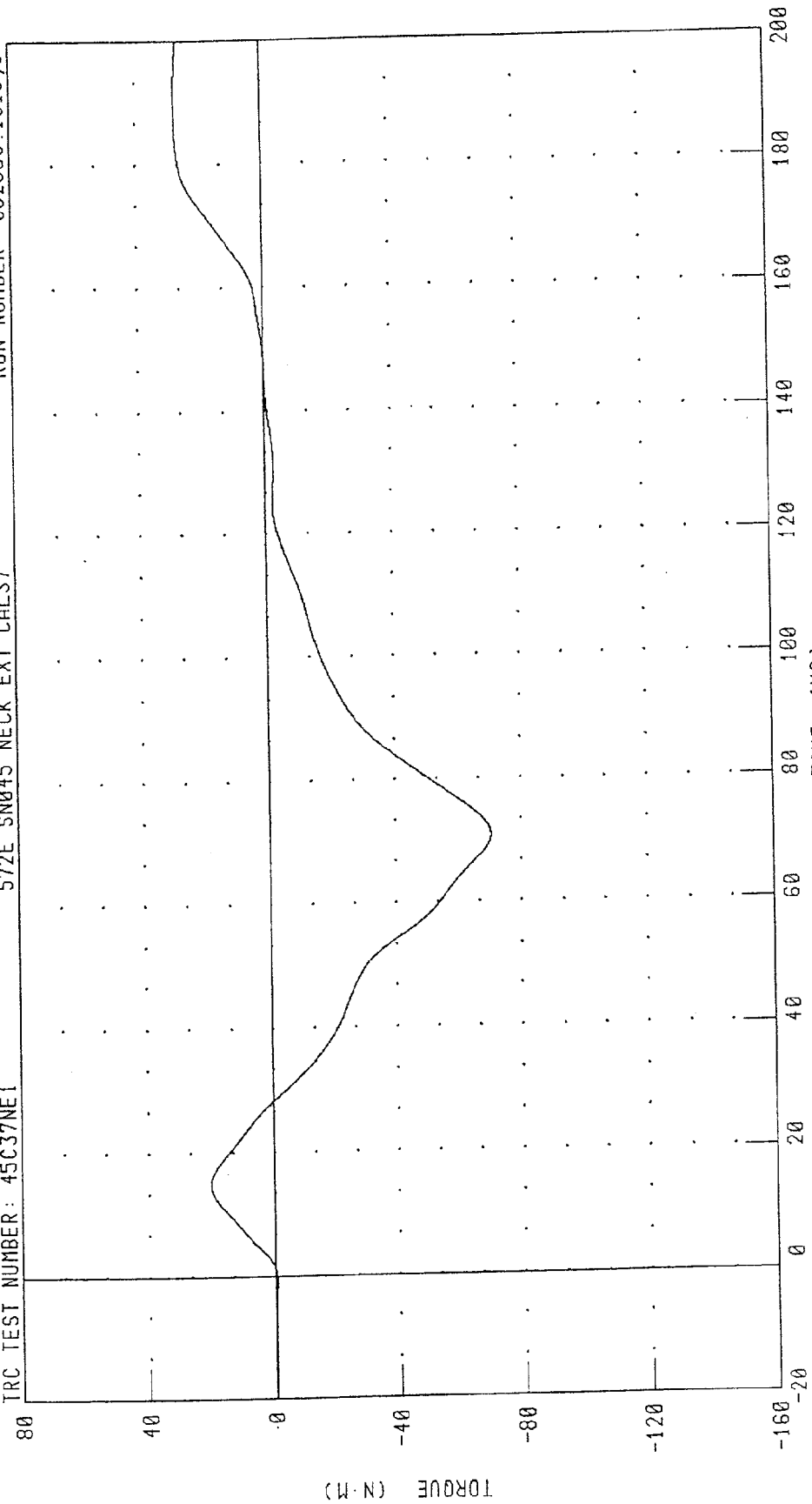
FILTER: CH. CLASS 60

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

RUN NUMBER: 052998.1319;1

572E SN045 NECK EXT CAL37

TRC TEST NUMBER: 45C37NE1



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

FILTER: CH. CLASS 60

CHANNEL: NEKOM

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 Calh

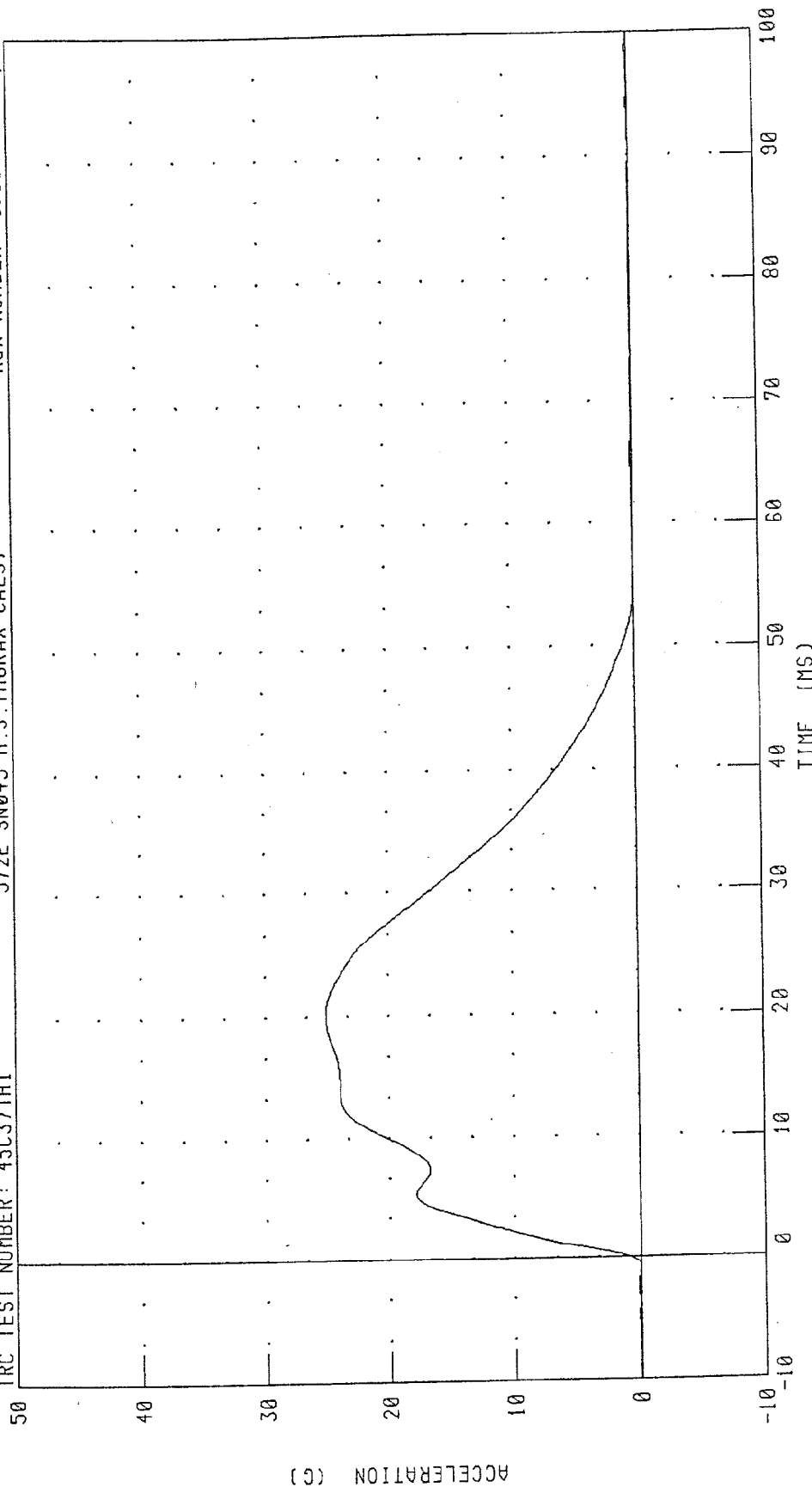
RUN NUMBER: 060198.0851;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 45C37TH1

572E SN045 H.S. THORAX CAL37

RUN NUMBER: 060198 0851;1



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

CHANNEL: PENXC FILTER: CH. CLASS 180

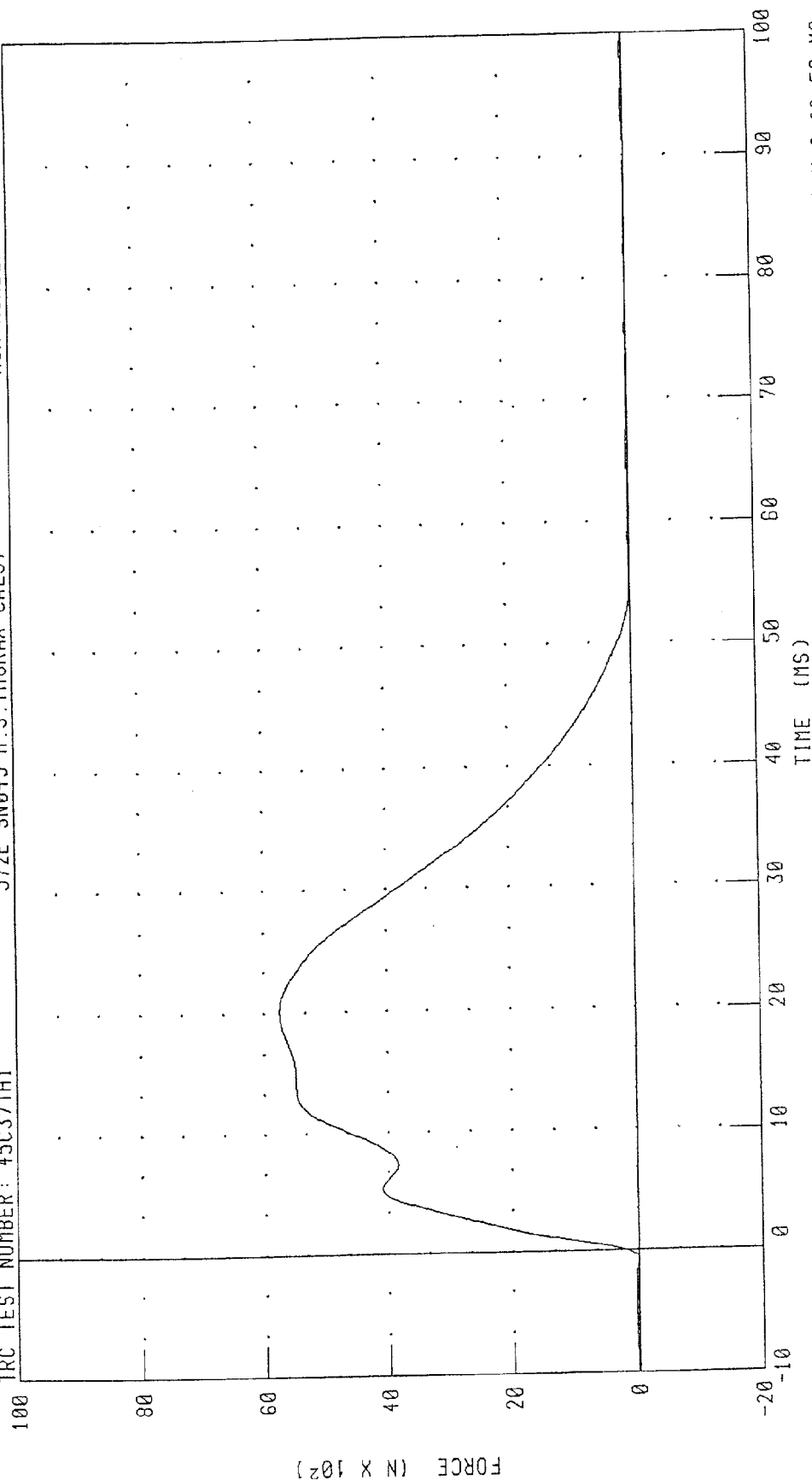
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

RUN NUMBER: 060198.0851;1

TRC TEST NUMBER: 45C37TH1

572E SN045 H.S.THORAX CAL37



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

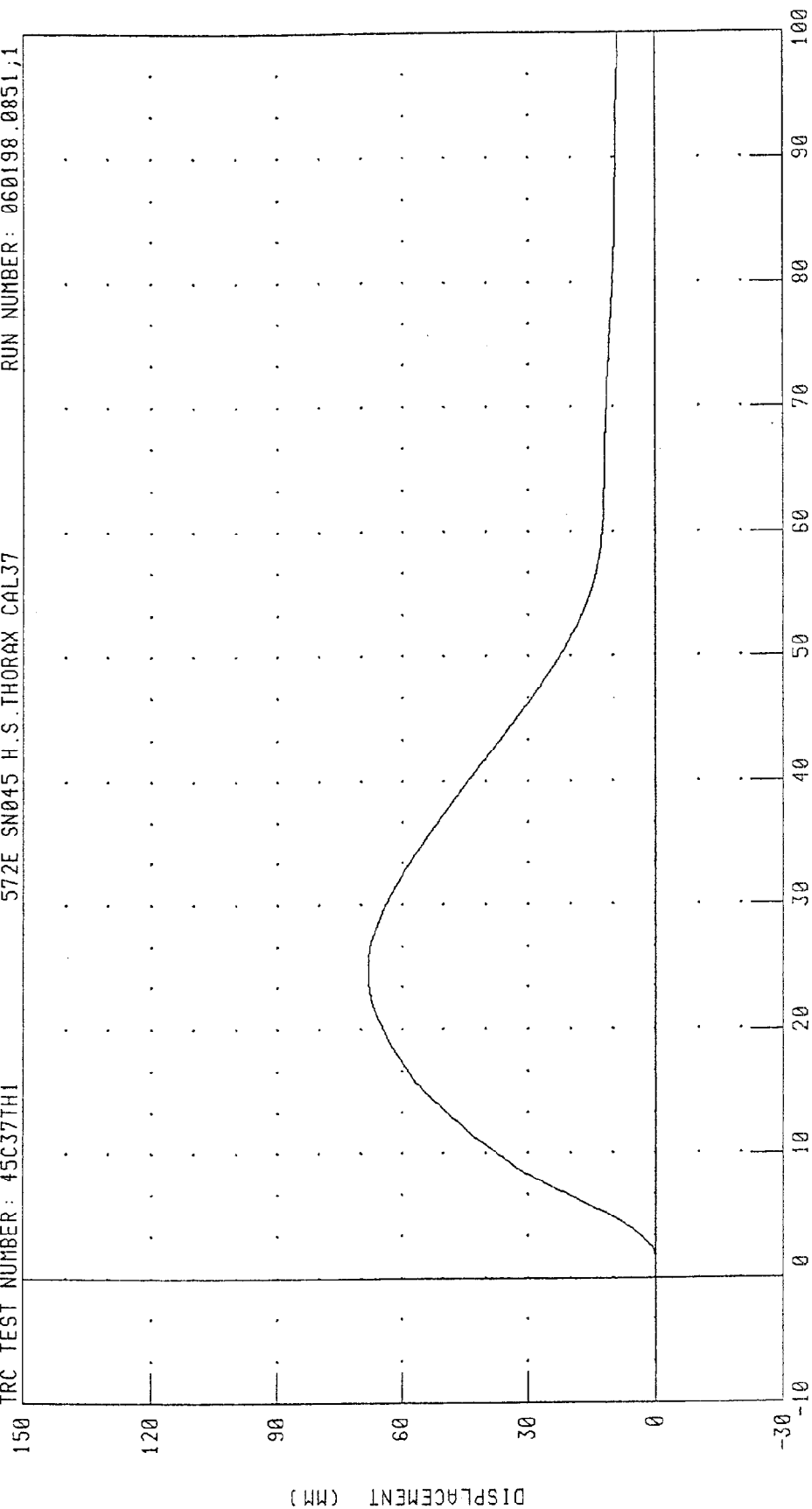
CHANNEL: PENXF FILTER: CH. CLASS 180

PART 572-E HYBRID [II] THORAX CALIBRATION
STERNUM DISPLACEMENT

TRC TEST NUMBER: 45C37TH1

572E SN045 H.S.THORAX CAL37

RUN NUMBER: 060198.0851,1



CHANNEL: CSTXD FILTER: CH. CLASS 100

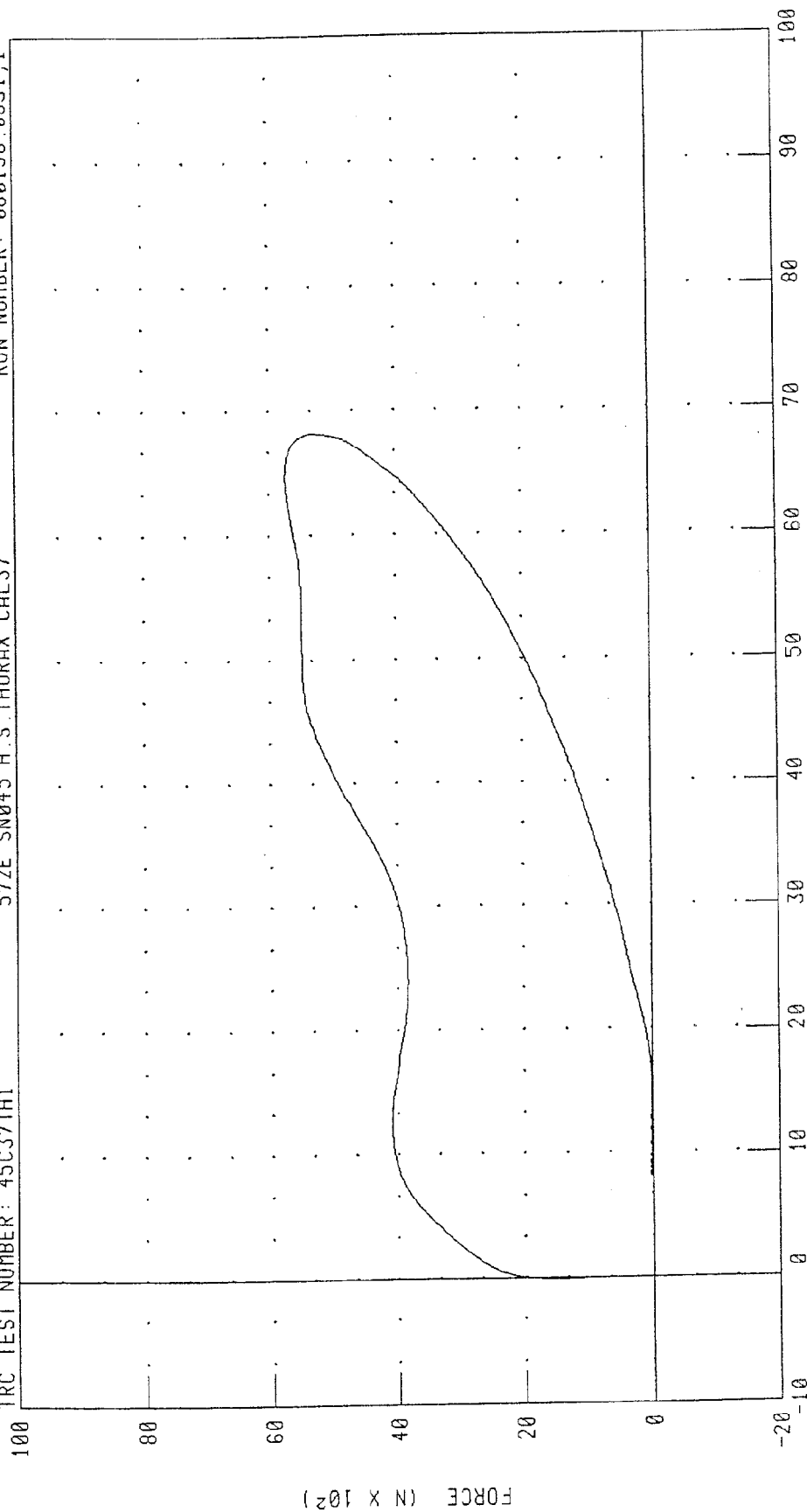
PEAK DATA: 68.12 MM @ 24.56 MS; -0.08 MM @ 1.20 MS

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

TRC TEST NUMBER: 45C37TH1

572E SN045 H.S. THORAX CAL37

RUN NUMBER: 060198.0851,1



CHANNEL: CSTXD FILTER: CH. CLASS 180
PENXF CH. CLASS 180

PEAK DATA:

68.12 MM @ 24.56 MS; -0.08 MM @ 1.20 MS
5745.90 N @ 20.24 MS; -2.92 N @ 90.56 MS

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 _____

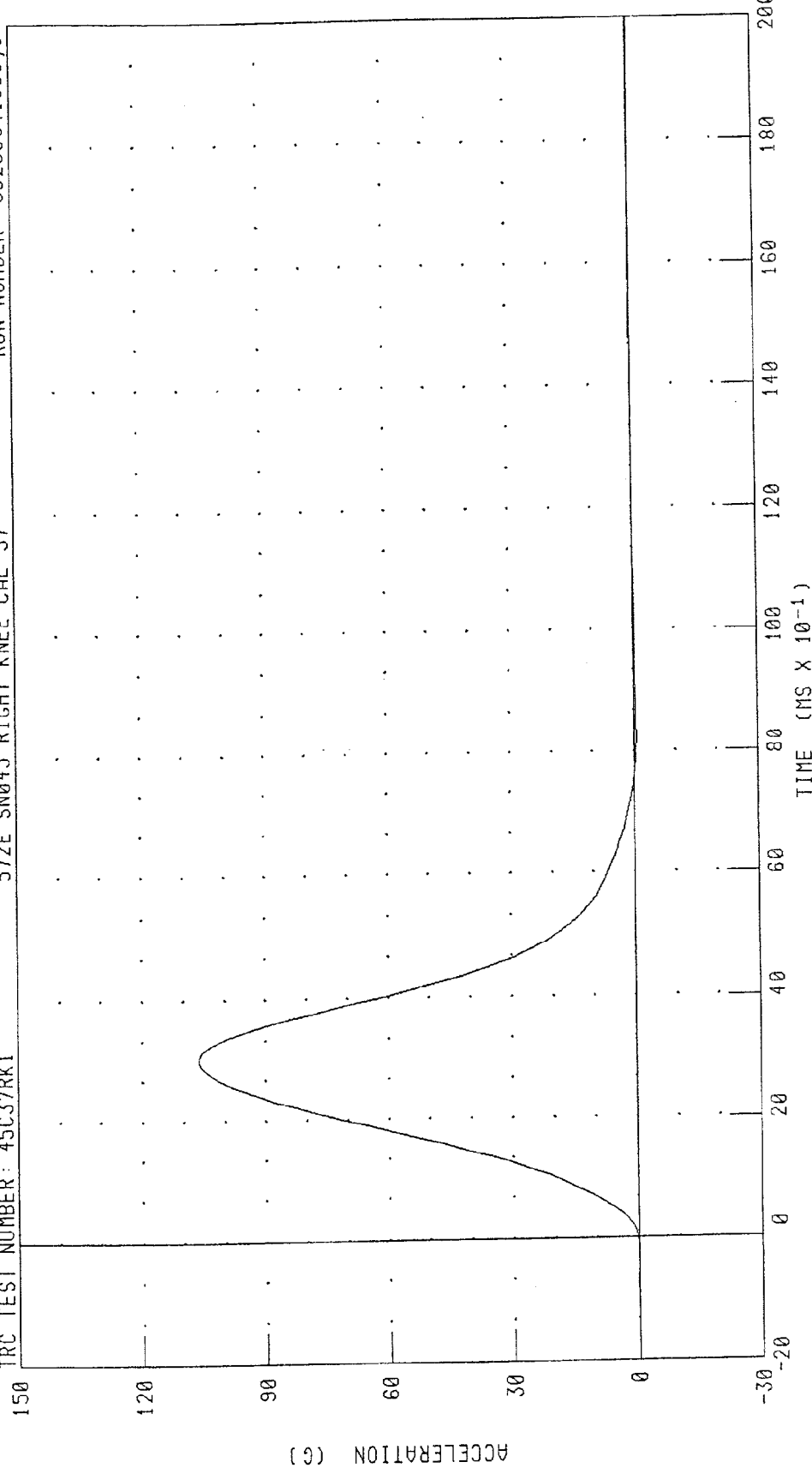
RUN NUMBER: 052998.1029;1

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: 106.14 G @ 3.04 MS; -0.70 G @ 8.24 MS

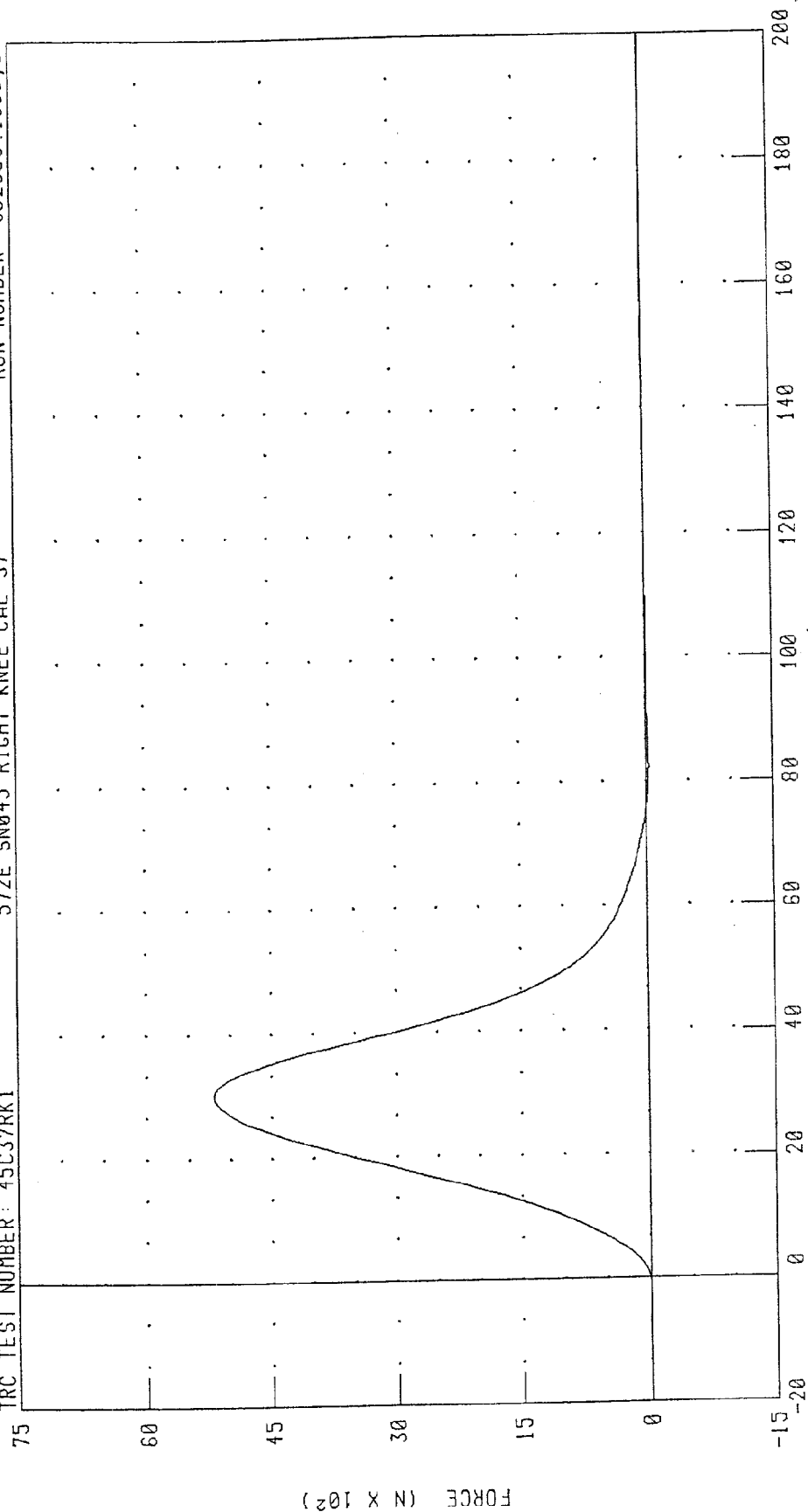
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 052998.1030;1

TRC TEST NUMBER: 45C37RK1

572E SN045 RIGHT KNEE CAL 37



TIME (MS X 10⁻¹)

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

CHANNEL: PENXF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

29-MAY-98

TRC INC.

TEST NO: 45C37LK1

572E SNO45 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

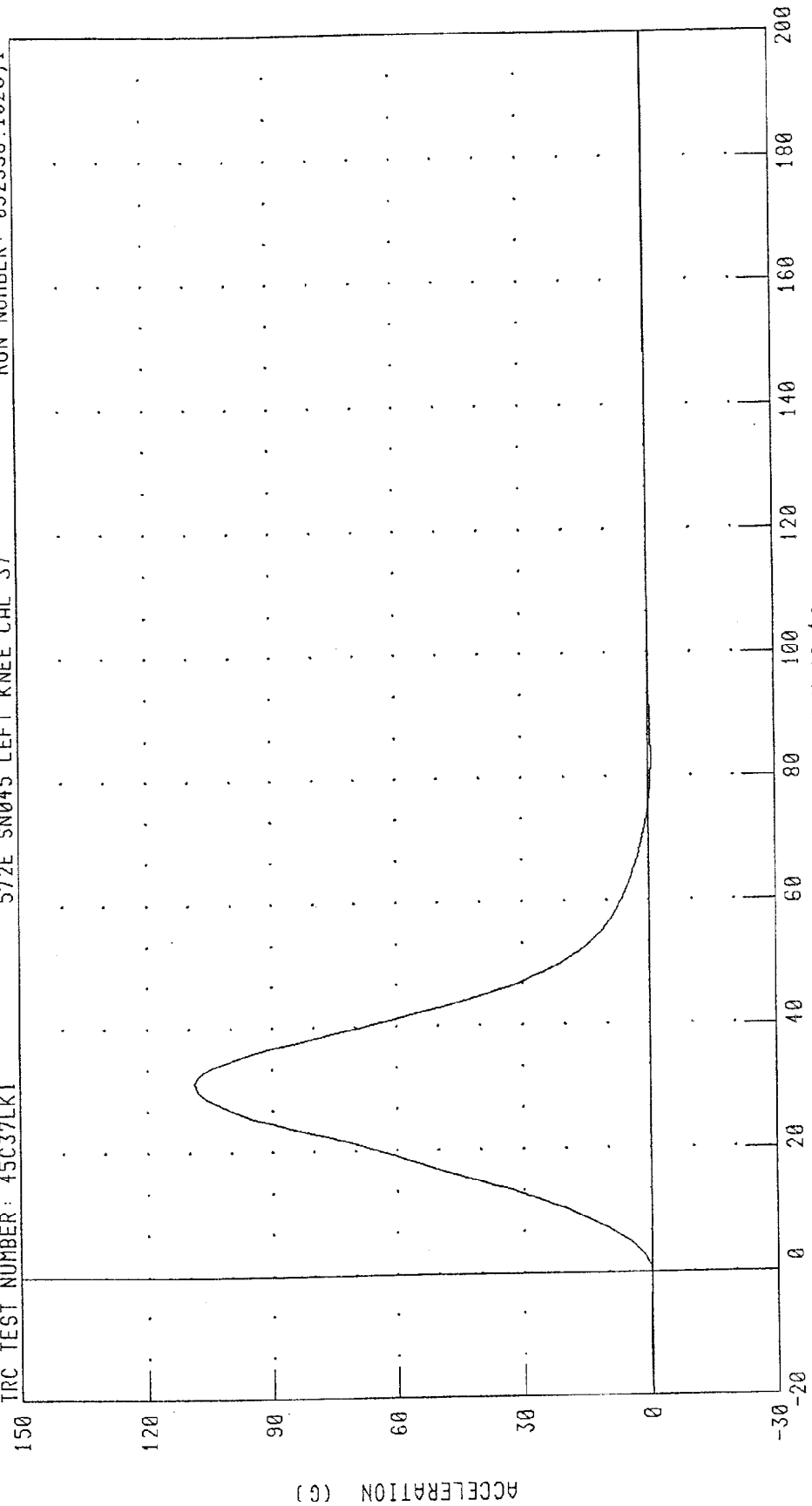
RUN NUMBER: 052998.1027;1

PART 572-E HYBRID [11] LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 45C37LKI

572E SN045 LEFT KNEE CAL 37

RUN NUMBER: 052998.1028;1



CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 108.70 G @ 3.12 MS; -0.76 G @ 8.32 MS

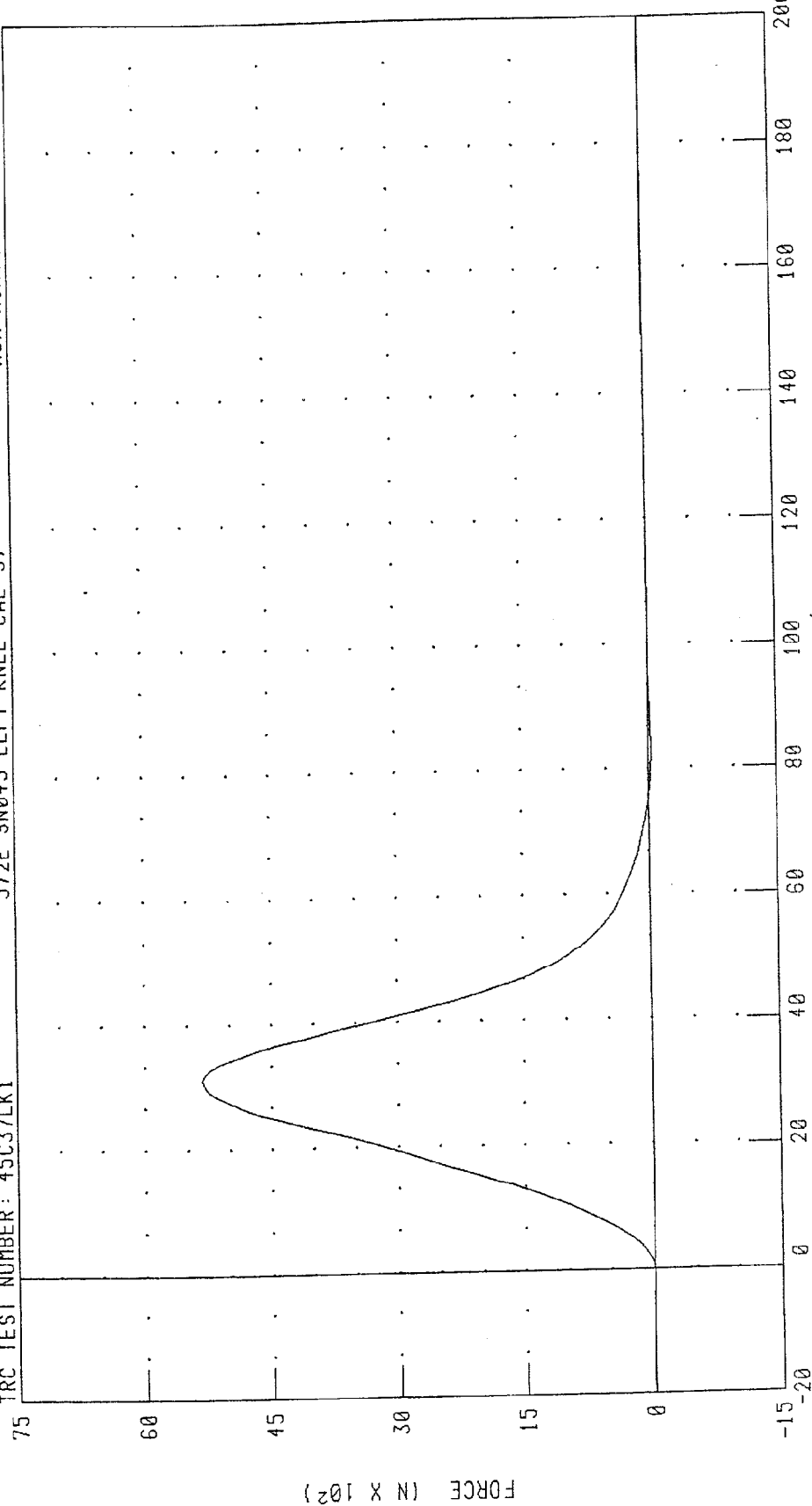
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 052998.1028;1

572E SN045 LEFT KNEE CAL 37

TRC TEST NUMBER: 45C37LK1



TIME (MS X 10⁻¹)

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

FILTER: CH. CLASS 600

CHANNEL: PENXF

Pre-Test Calibration

Target 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

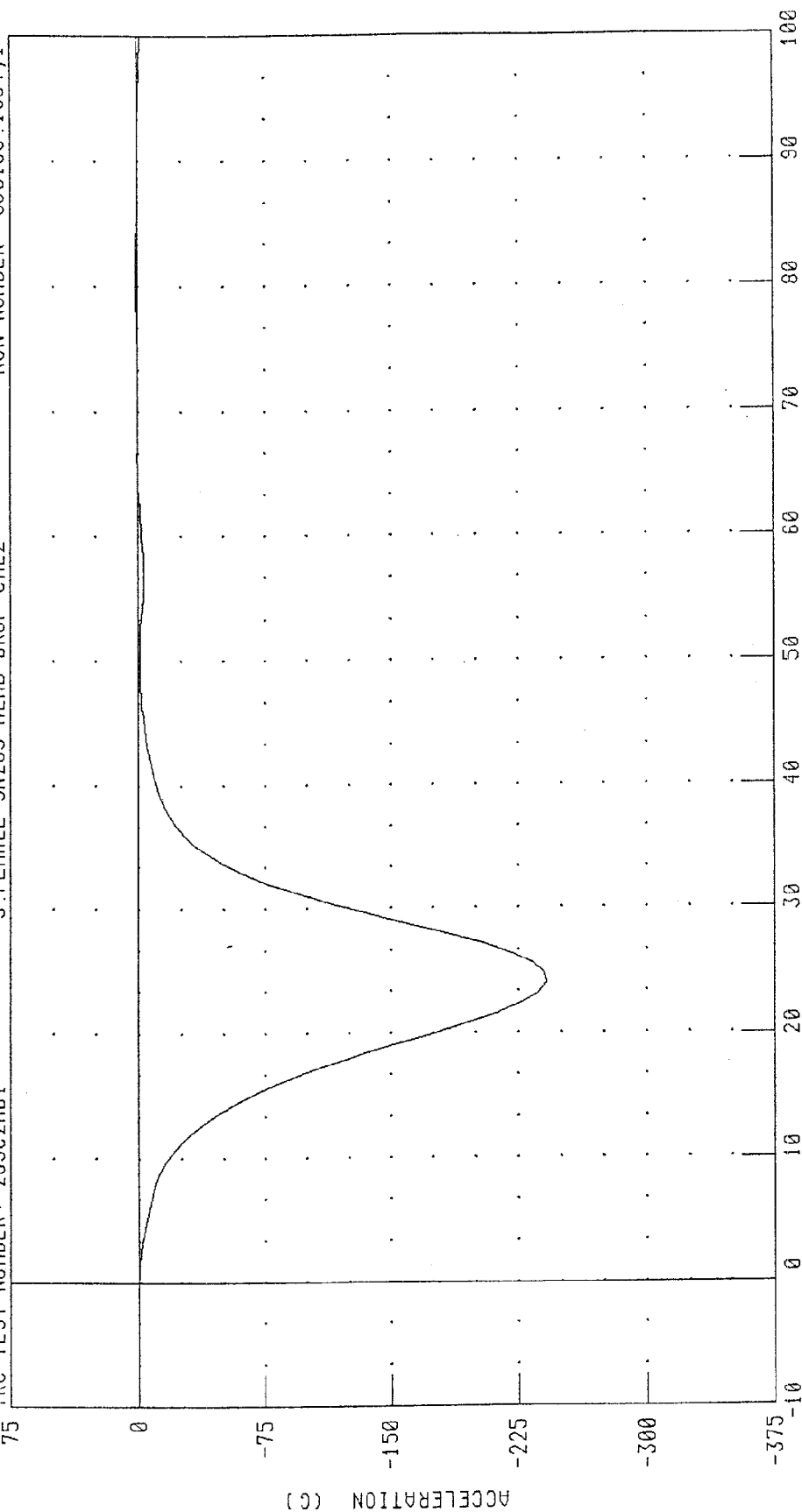
TEST MEETS SPECIFICATIONS

TECHNICIAN B. C. Holt

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



TIME (MS X 10⁻¹)

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

CHANNEL: HEDXC FILTER: CH. CLASS 1000

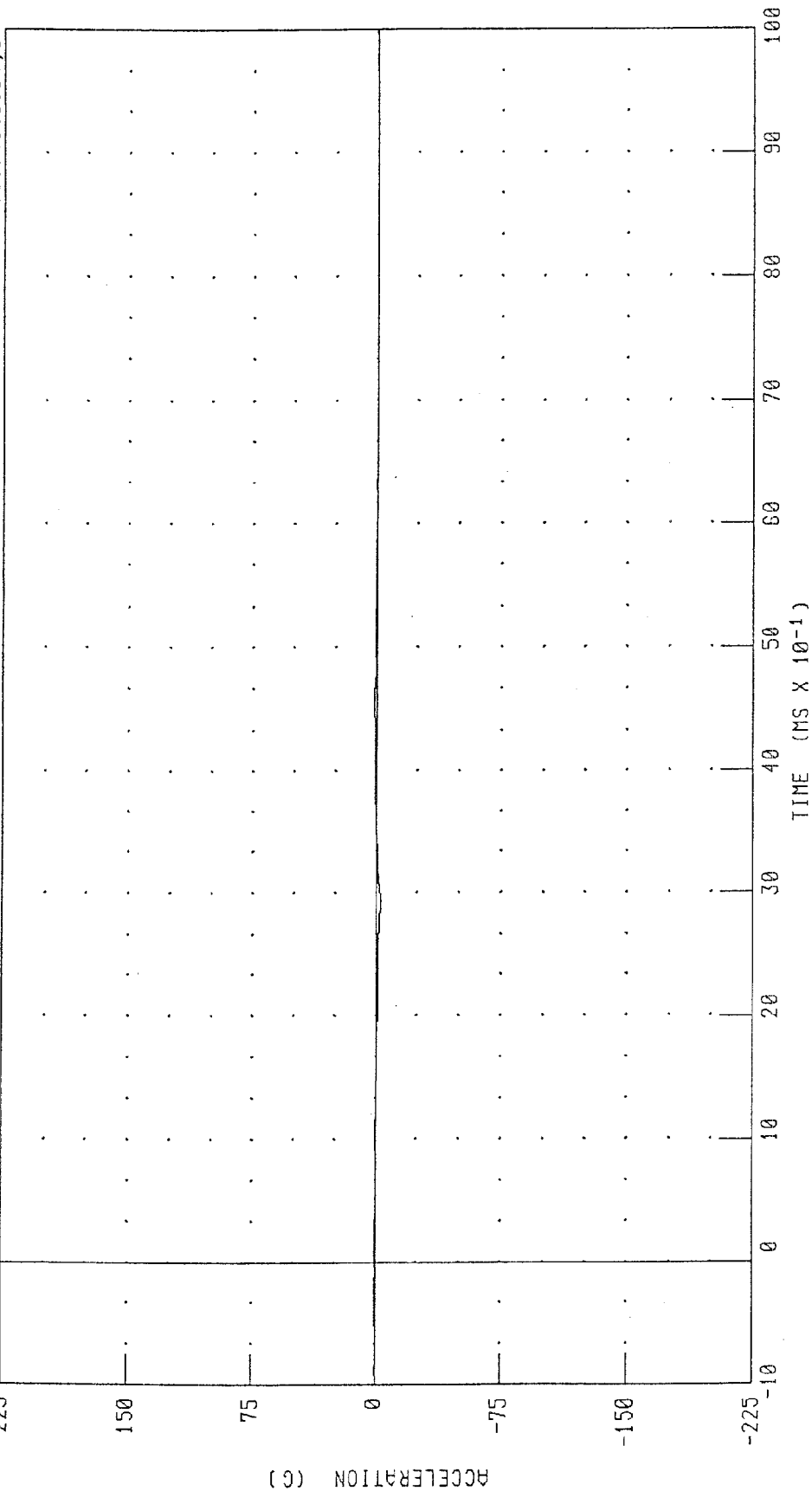
SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 283C2HD1

S.FEMALE SN283 HEAD DROP CAL2

RUN NUMBER: 060198.1054;1



PEAK DATA: 1.87 G @ 4.56 MS; -2.82 G @ 2.96 MS

CHANNEL: HEDYC FILTER: CH. CLASS 1000

SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

S.FEMALE SN283 HEAD DROP CAL2

IRC TEST NUMBER: 283C2HD1

75

ACCELERATION (G)

0

-75

-150

-225

-300

-375

TIME (MS X 10⁻¹)

0 10 20 30 40 50 60 70 80 90 100

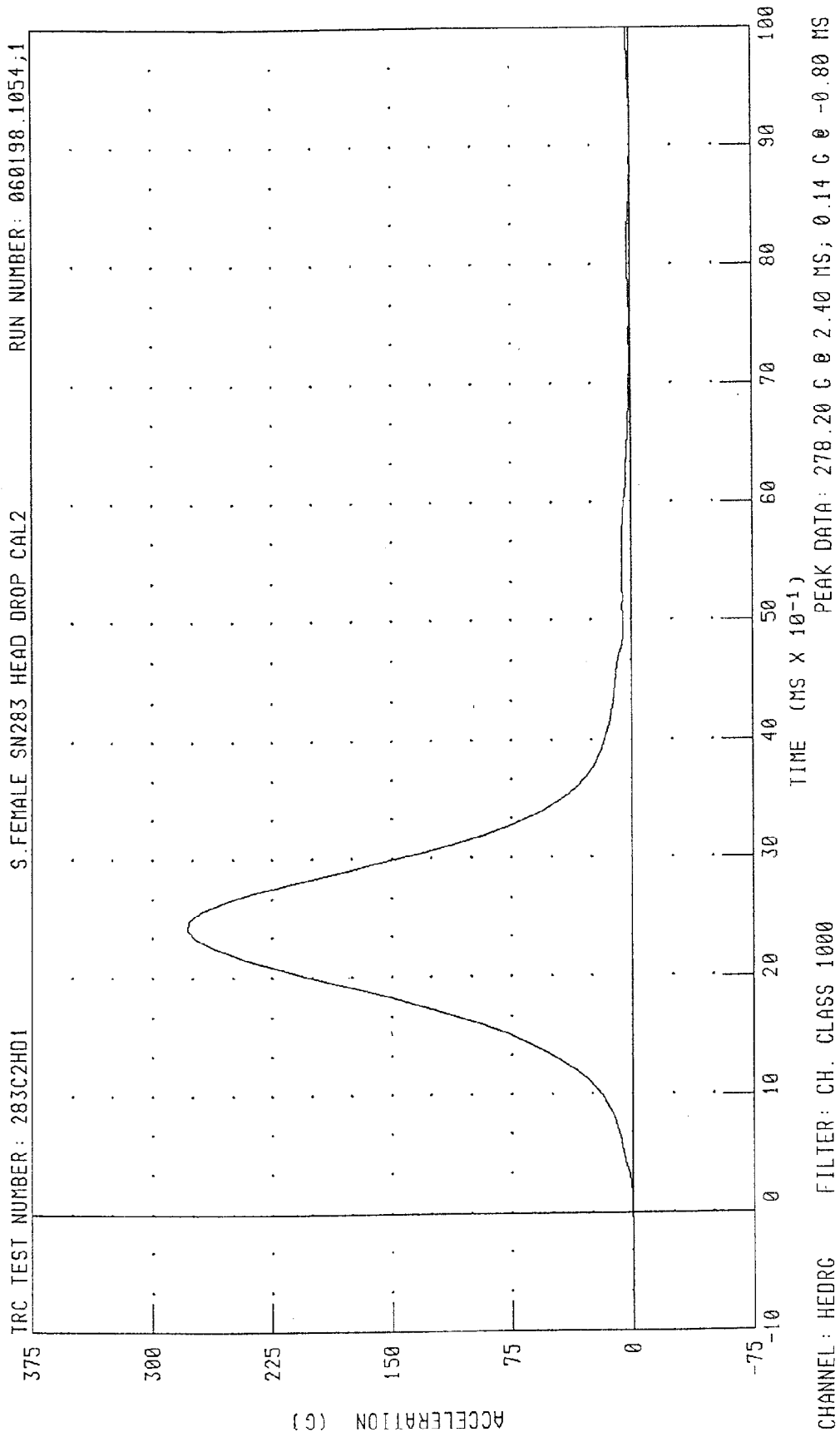
PEAK DATA: 0.65 C 0 8.24 MS; -138.06 C 0 2.40 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

RUN NUMBER: 060198.1054;1

1

SMALL FEMALE HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION



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

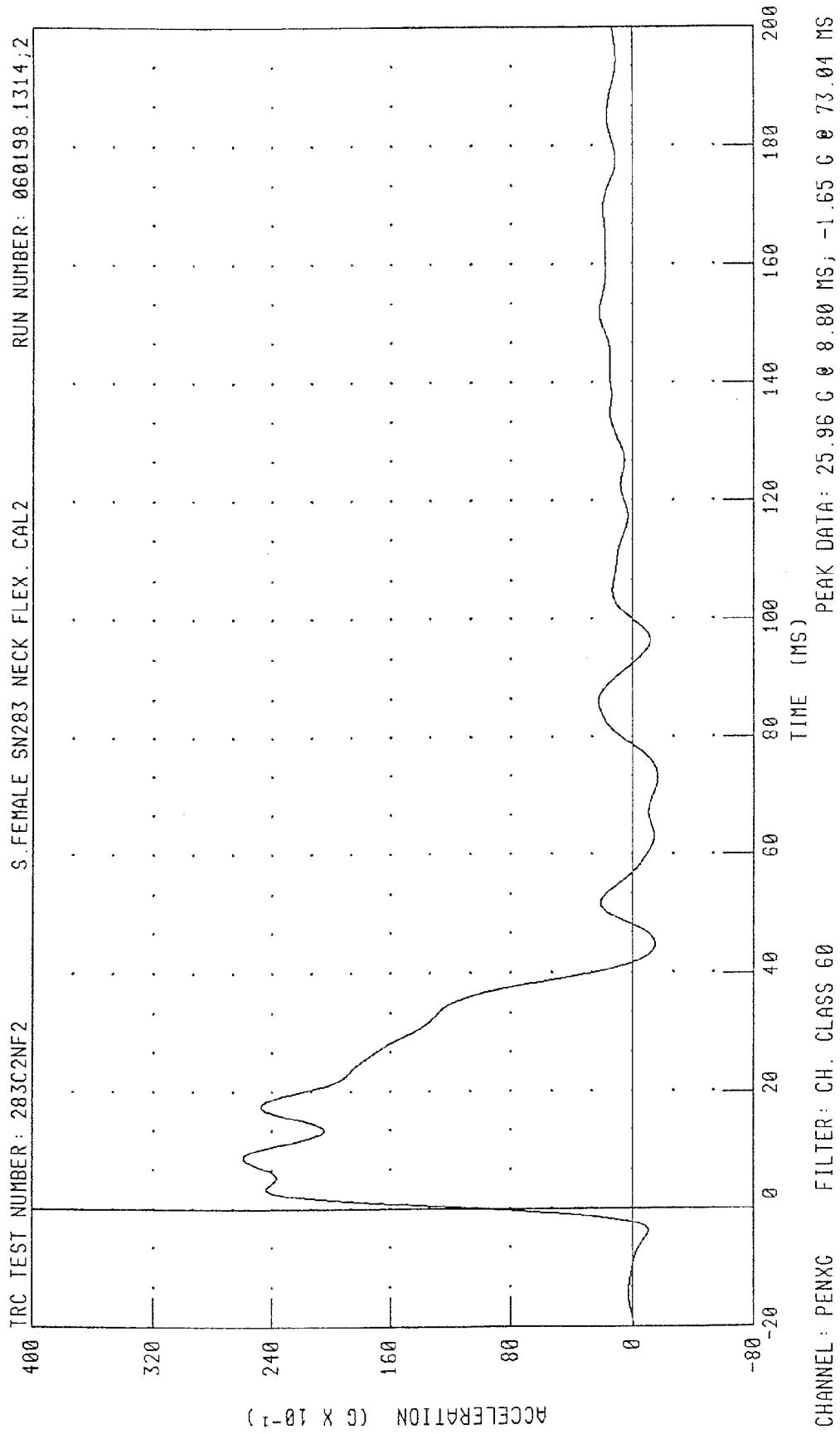
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	52.0 %
IMPACT VELOCITY	6.89 - 7.13 M/S	7.12 M/S
INTEGRATED PENDULUM VELOCITY	10 MS 2.1 - 2.5 M/S	2.31 M/S
	20 MS 4.0 - 5.0 M/S	4.55 M/S
	30 MS 5.8 - 7.0 M/S	6.30 M/S
PEAK D-PLANE ROTATION	78 - 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 By cult

RUN NUMBER: 060198.1313;2

SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION



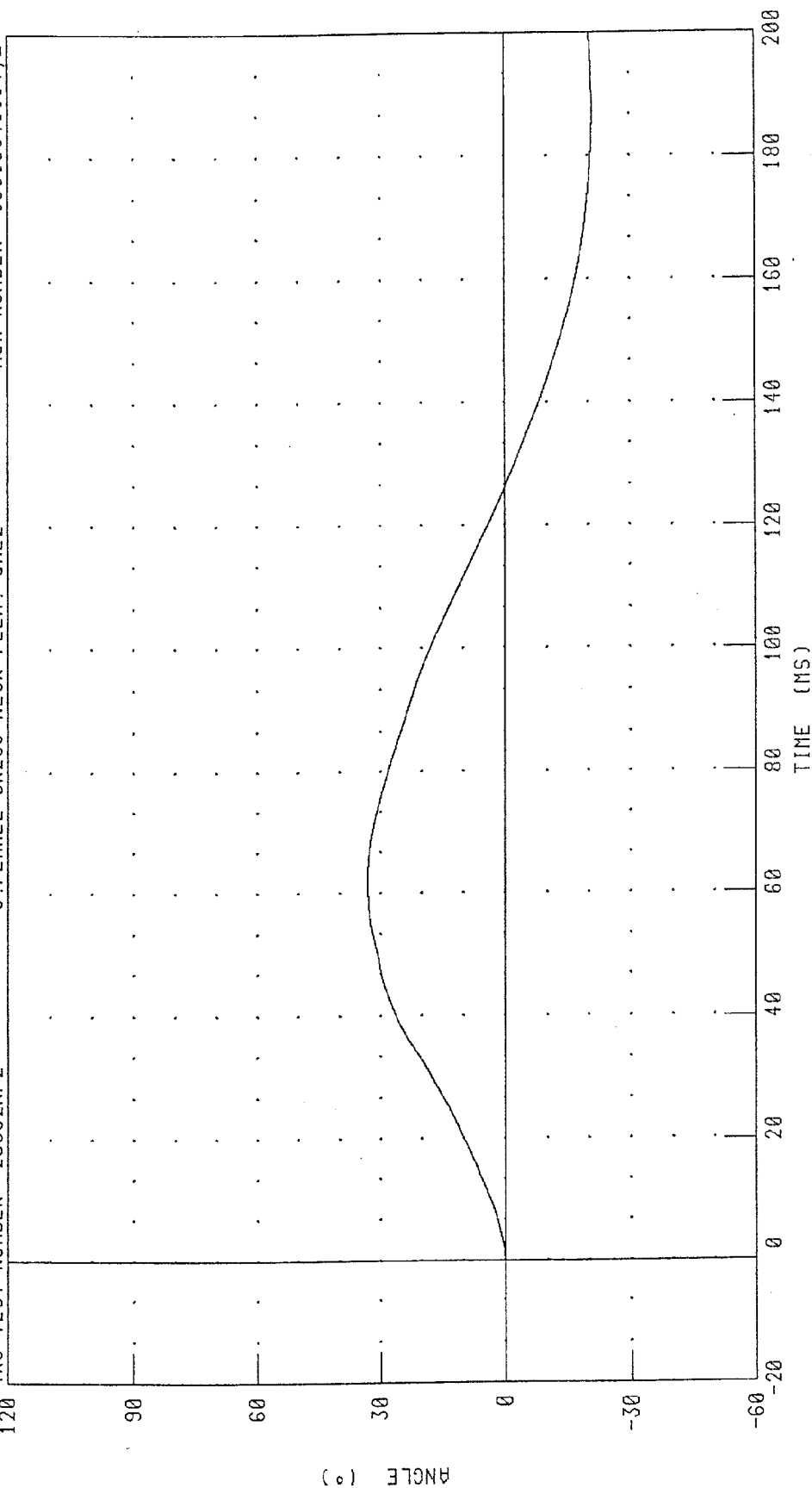
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 283C2NF2

S.FEMALE SN283 NECK FLEX. CAL2

RUN NUMBER: 060198.1314;2



PEAK DATA: 33.19 ° @ 62.00 MS; -21.08 ° @ 187.60 MS

CHANNEL: BETA FILTER: CH. CLASS 60

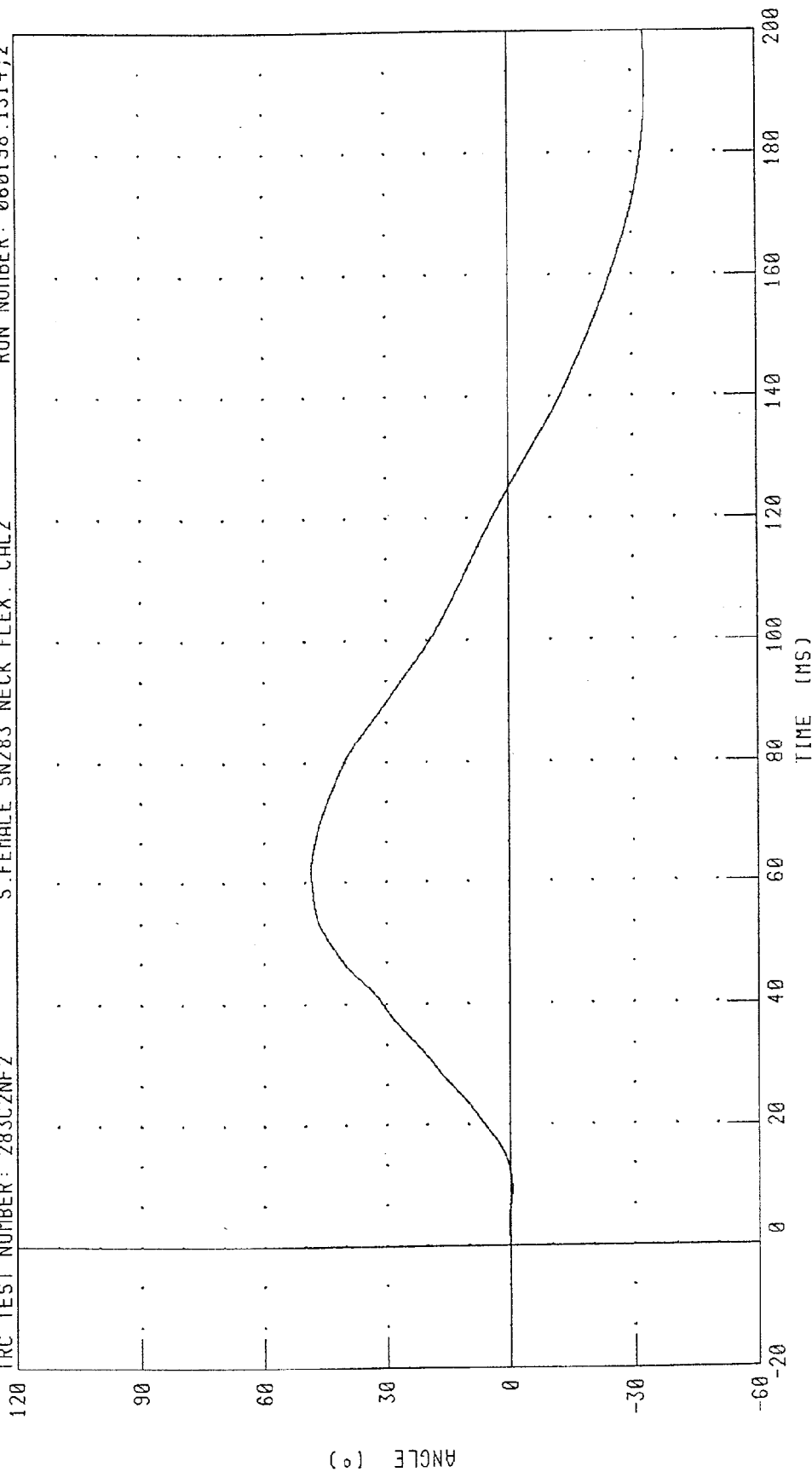
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 283C2NF2

S. FEMALE SN283 NECK FLEX. CAL2

RUN NUMBER: 060198.1314;2



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

CHANNEL: THETA FILTER: CH. CLASS 60

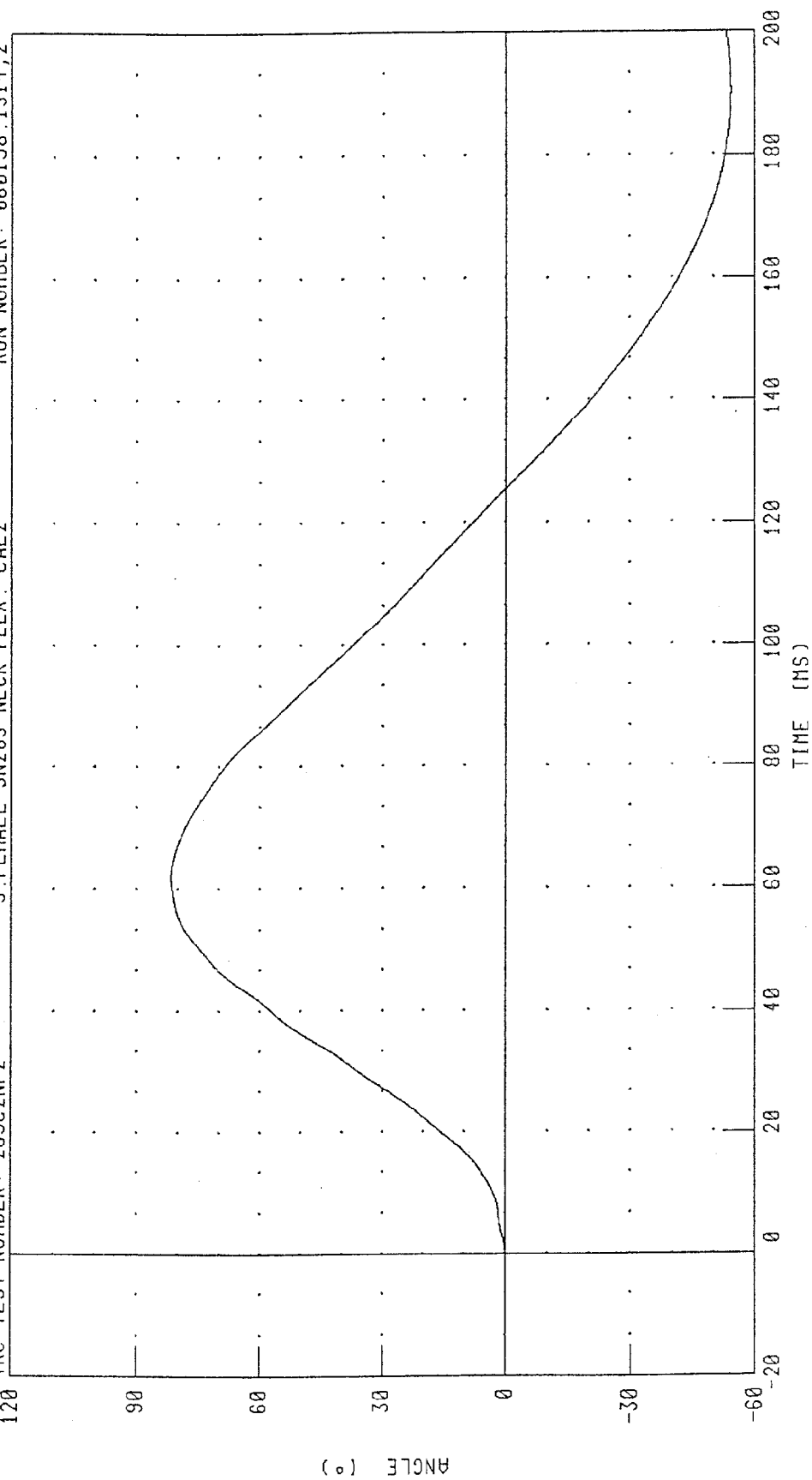
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 283C2NF2

S. FEMALE SN283 NECK FLEX. CAL2

RUN NUMBER: 060198.1314;2



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

CHANNEL: TOTAN FILTER: CH. CLASS 60

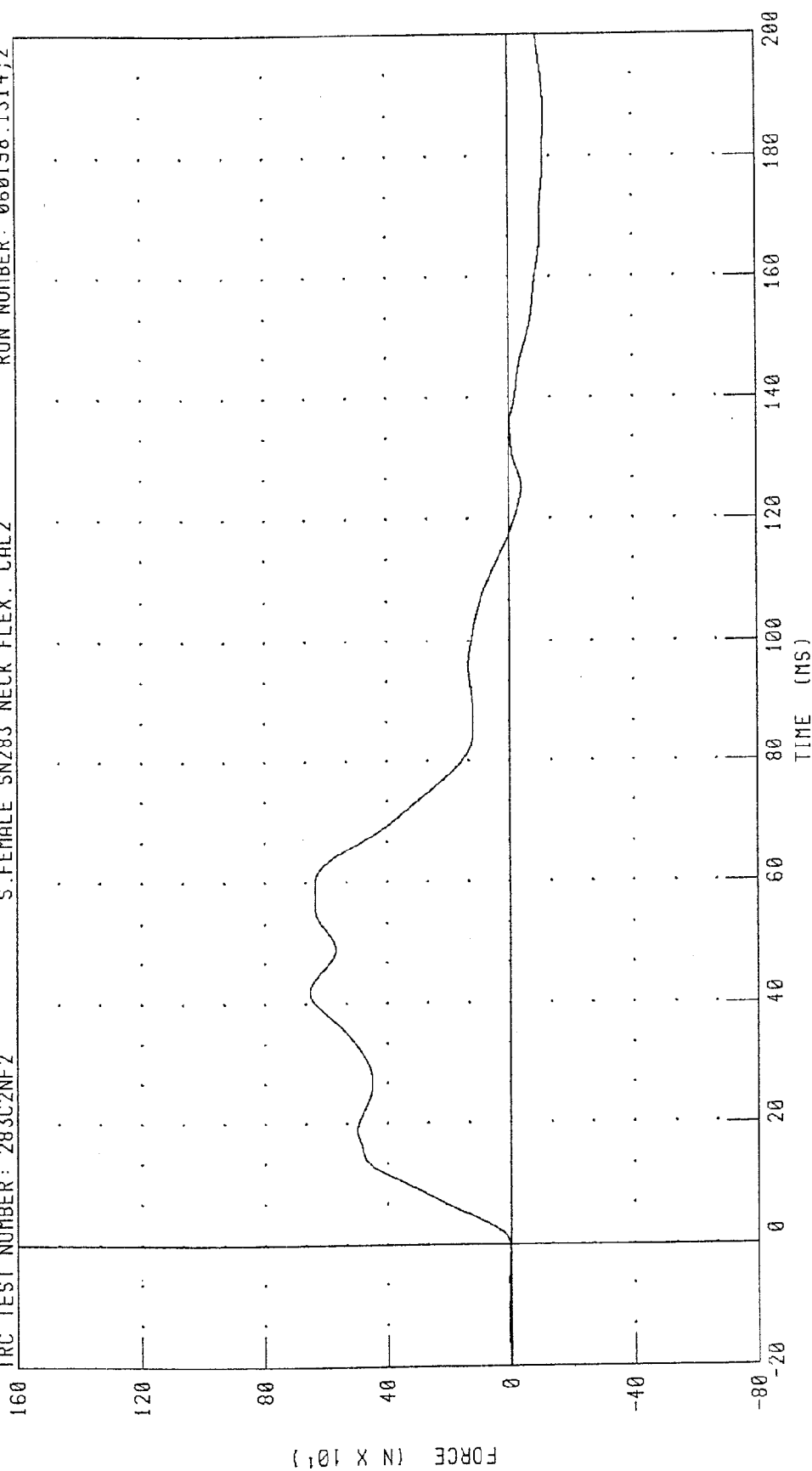
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 283C2NF2

S.FEMALE SN283 NECK FLEX. CAL2

RUN NUMBER: 060198.1314;2



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

CHANNEL: NEKXF FILTER: CH. CLASS 60

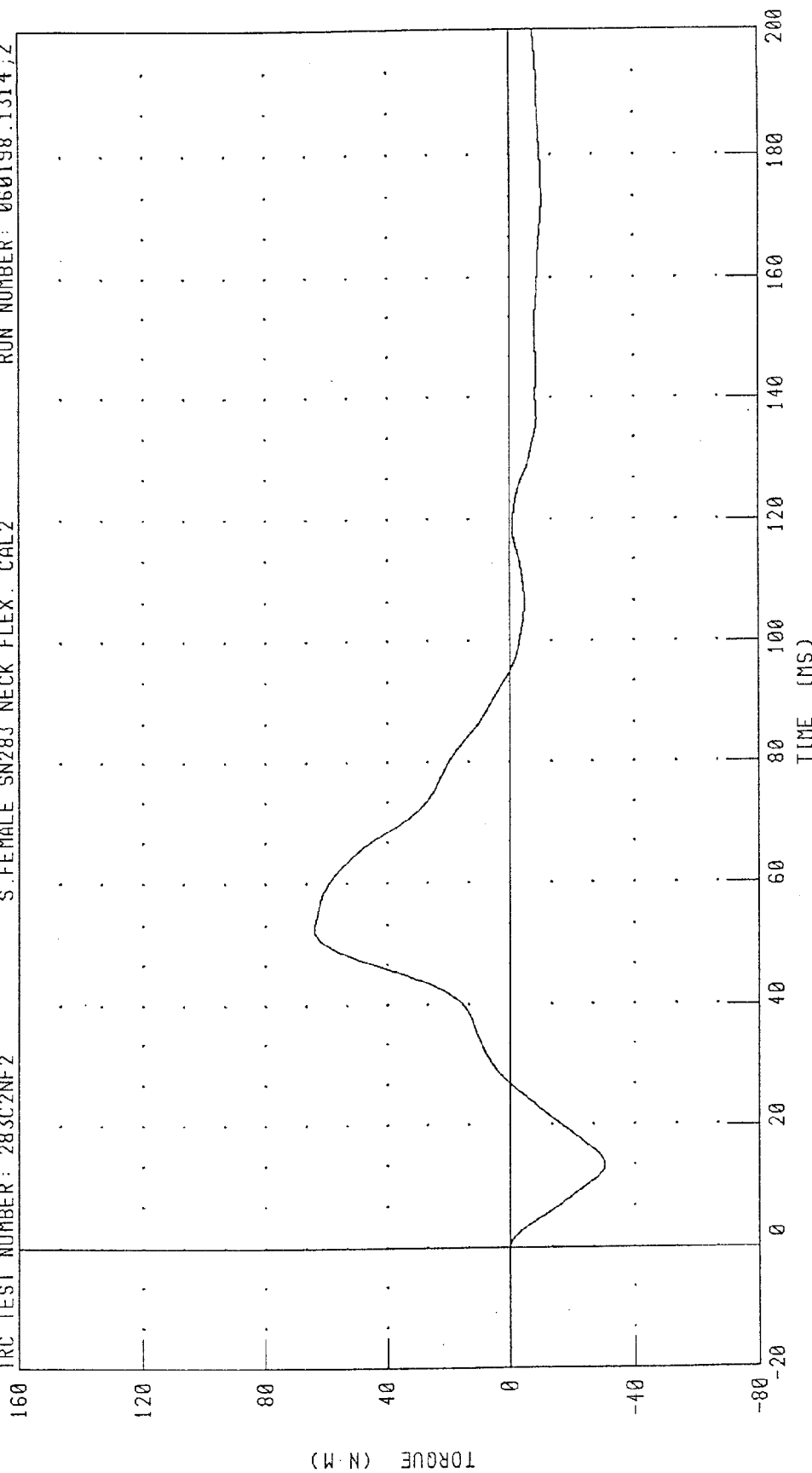
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

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

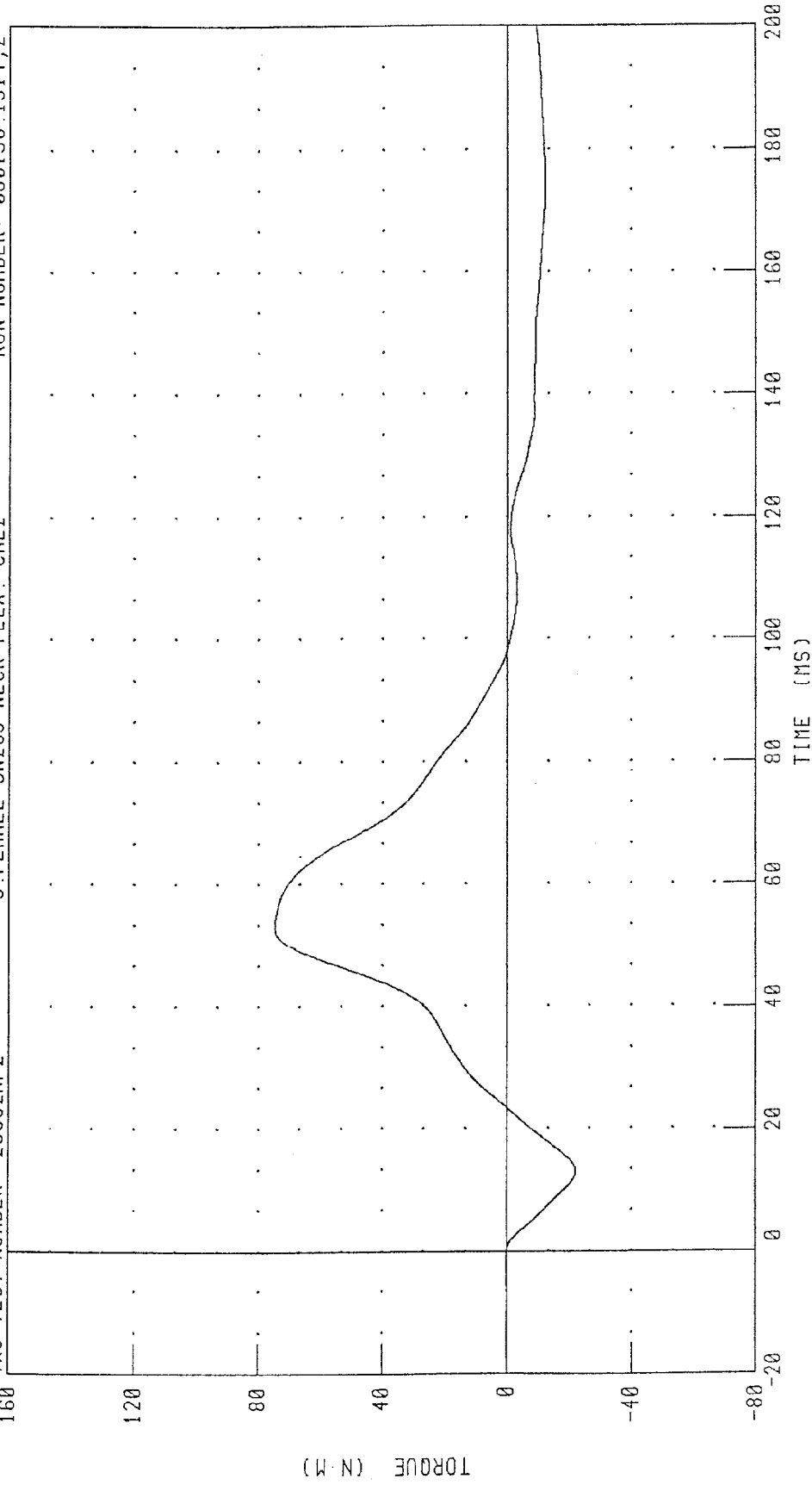
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 283C2NF2

S.FEMALE SN283 NECK FLEX. CAL2

RUN NUMBER: 060198.1314;2



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

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

01-JUN-98

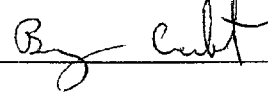
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

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

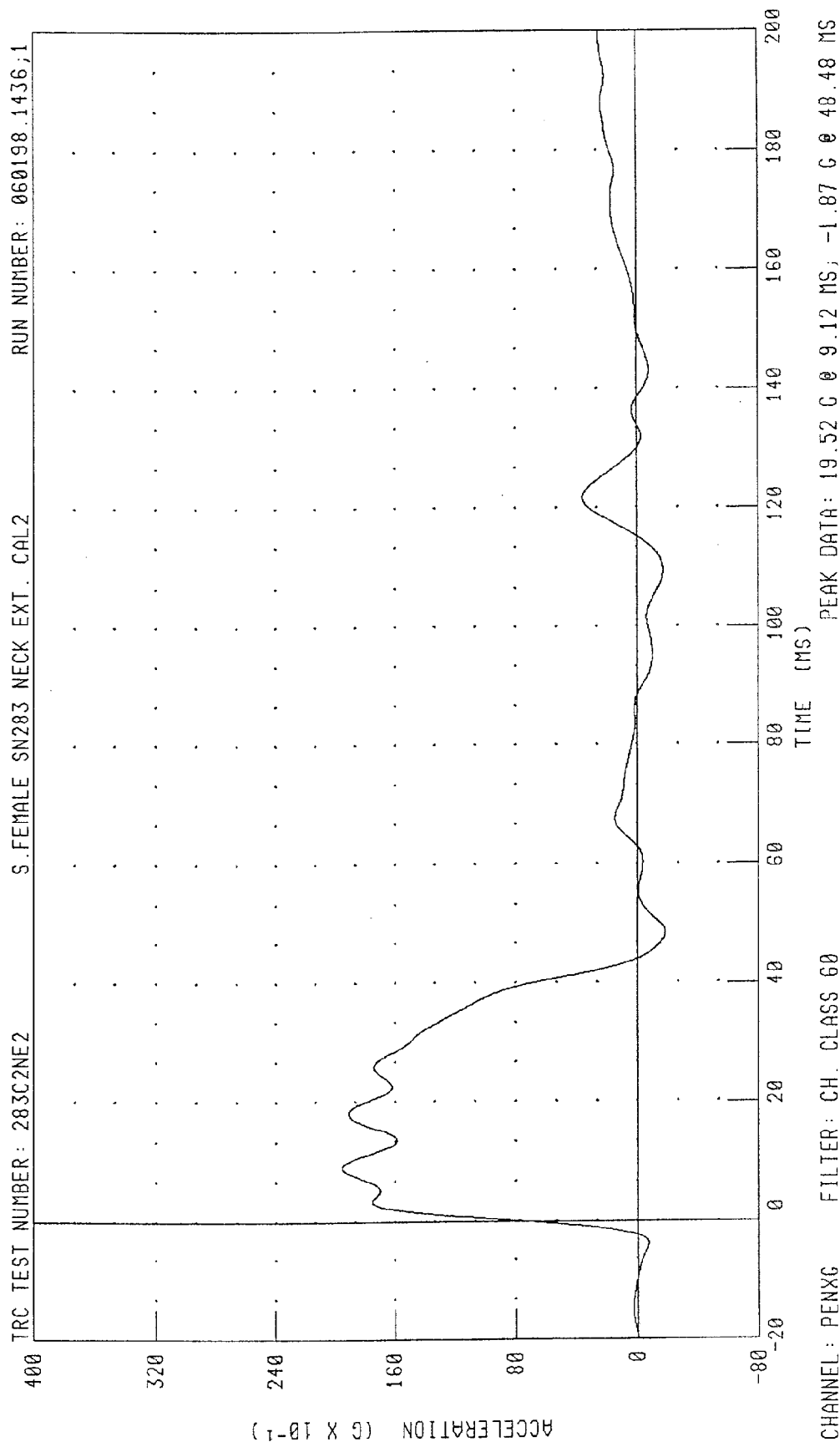
TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 060198.1435;1

SMALL FEMALE NECK EXTENSION CALIBRATION
PENDULUM DECELERATION



SMALL FEMALE NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

S. FEMALE SN283 NECK EXT. CAL2

TRC TEST NUMBER: 283C2NE2

120

90

60

30

0

-30

-60

ANGLE (°)

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

0

20

40

60

80

100

120

140

160

180

200

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

CHANNEL: BETA

FILTER: CH. CLASS 60

RUN NUMBER: 060198.1436;1

0

20

40

60

80

100

120

140

160

180

200

0

20

40

60

80

100

120

140

160

180

200

0

20

40

60

80

100

120

140

160

180

200

0

20

40

60

80

100

120

140

160

180

200

0

20

40

60

80

100

120

140

160

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200

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20

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60

80

100

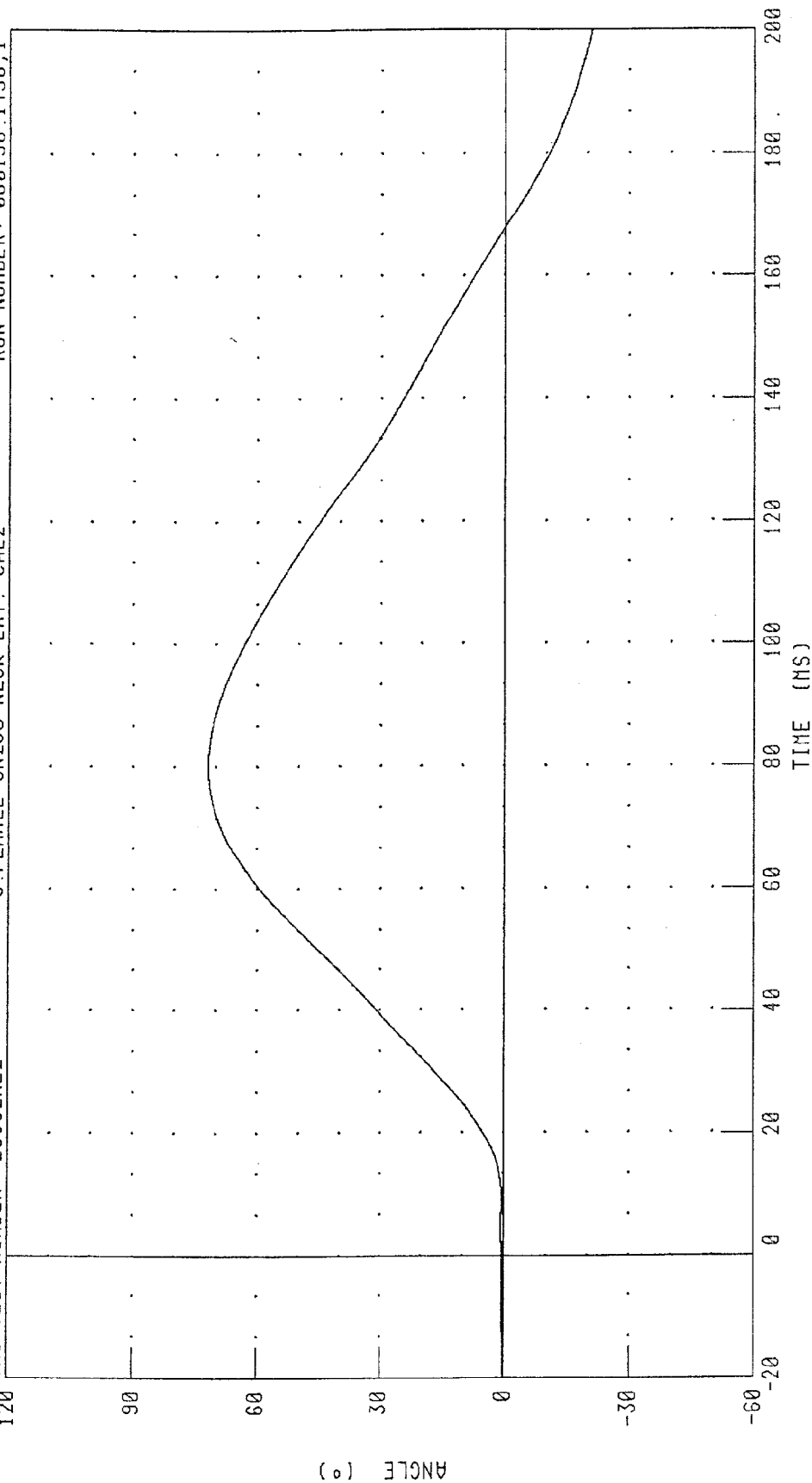
120

140

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

TRC TEST NUMBER: 283C2NE2

RUN NUMBER: 060198.1436.1



CHANNEL: THETA FILTER: CH. CLASS 60

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

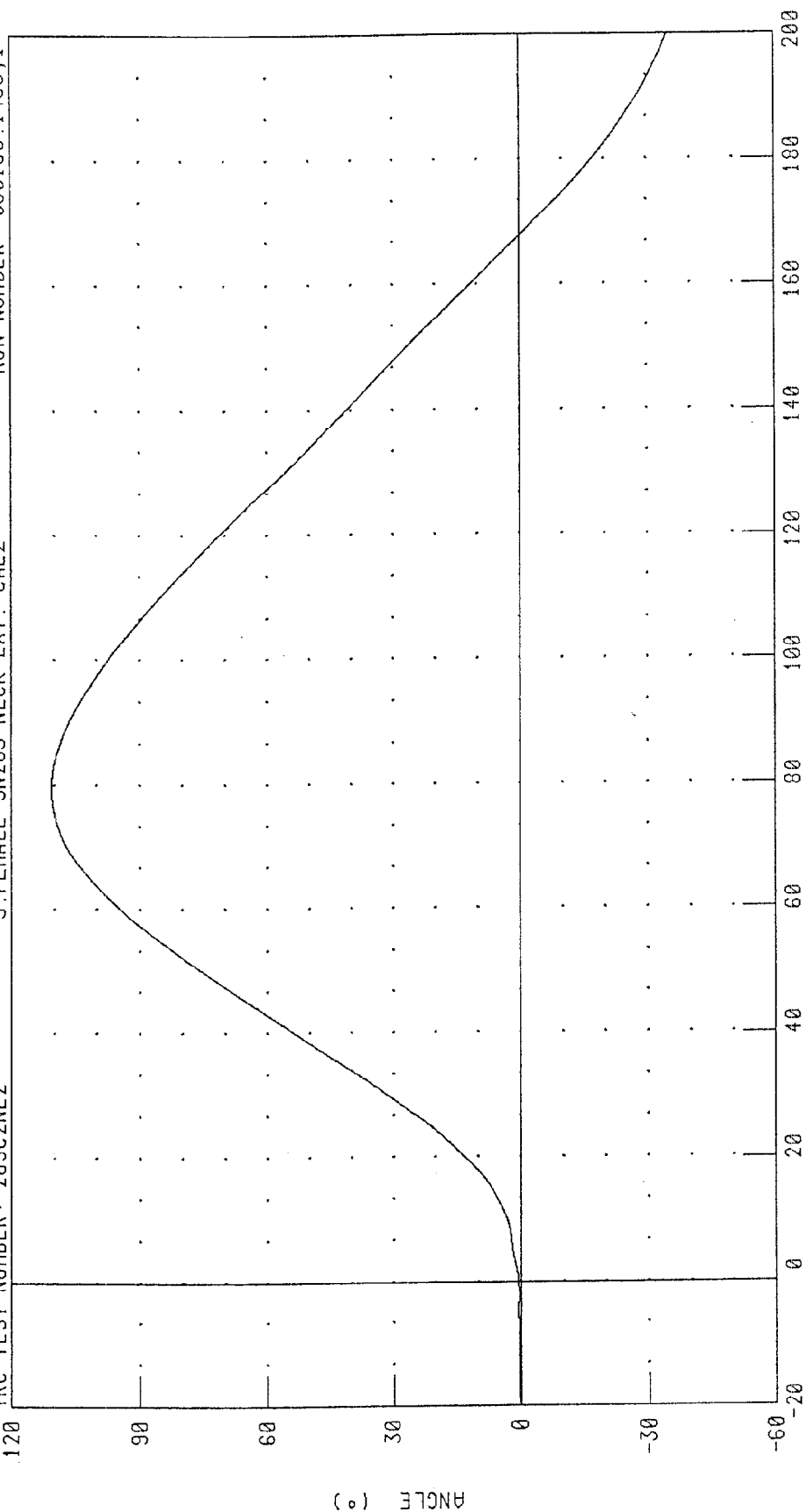
SMALL FEMALE NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 283C2NE2

S. FEMALE SN283 NECK EXT. CAL2

RUN NUMBER: 060198.1436;1



CHANNEL: TOTAL

FILTER: CH. CLASS 60

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

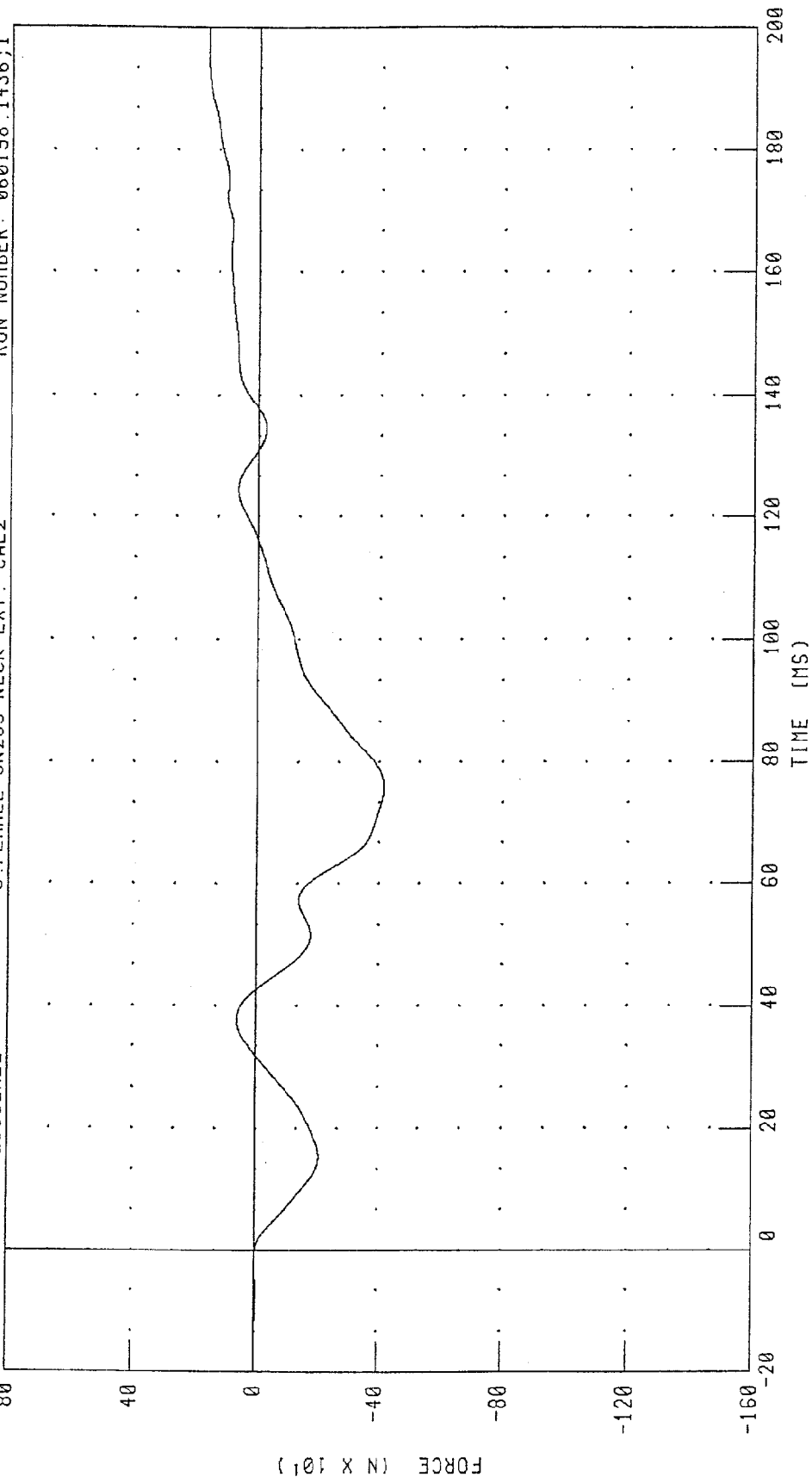
SMALL FEMALE NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 283C2NE2

S. FEMALE SN283 NECK EXT. CAL2

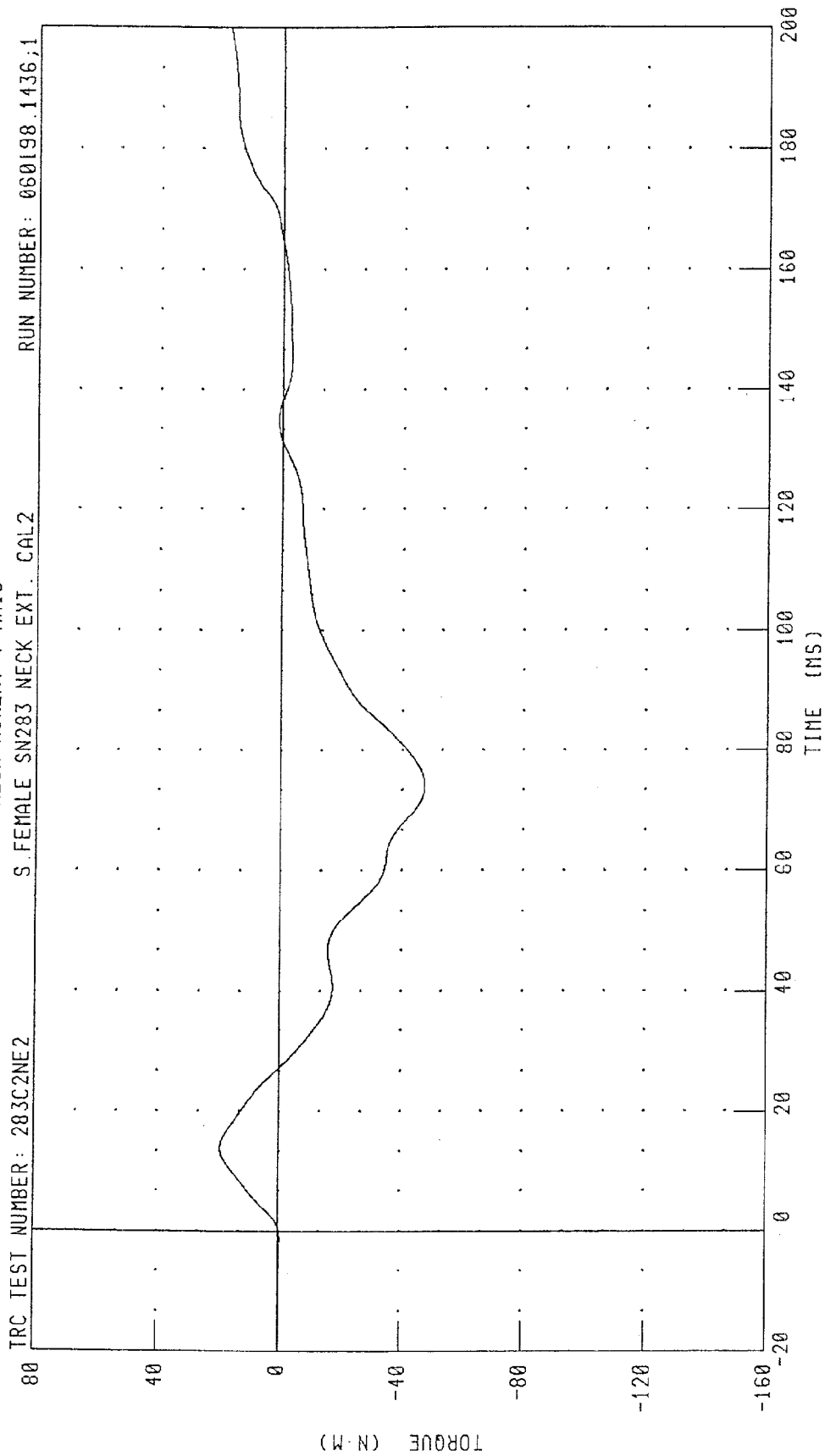
RUN NUMBER: 060198.1436;1



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



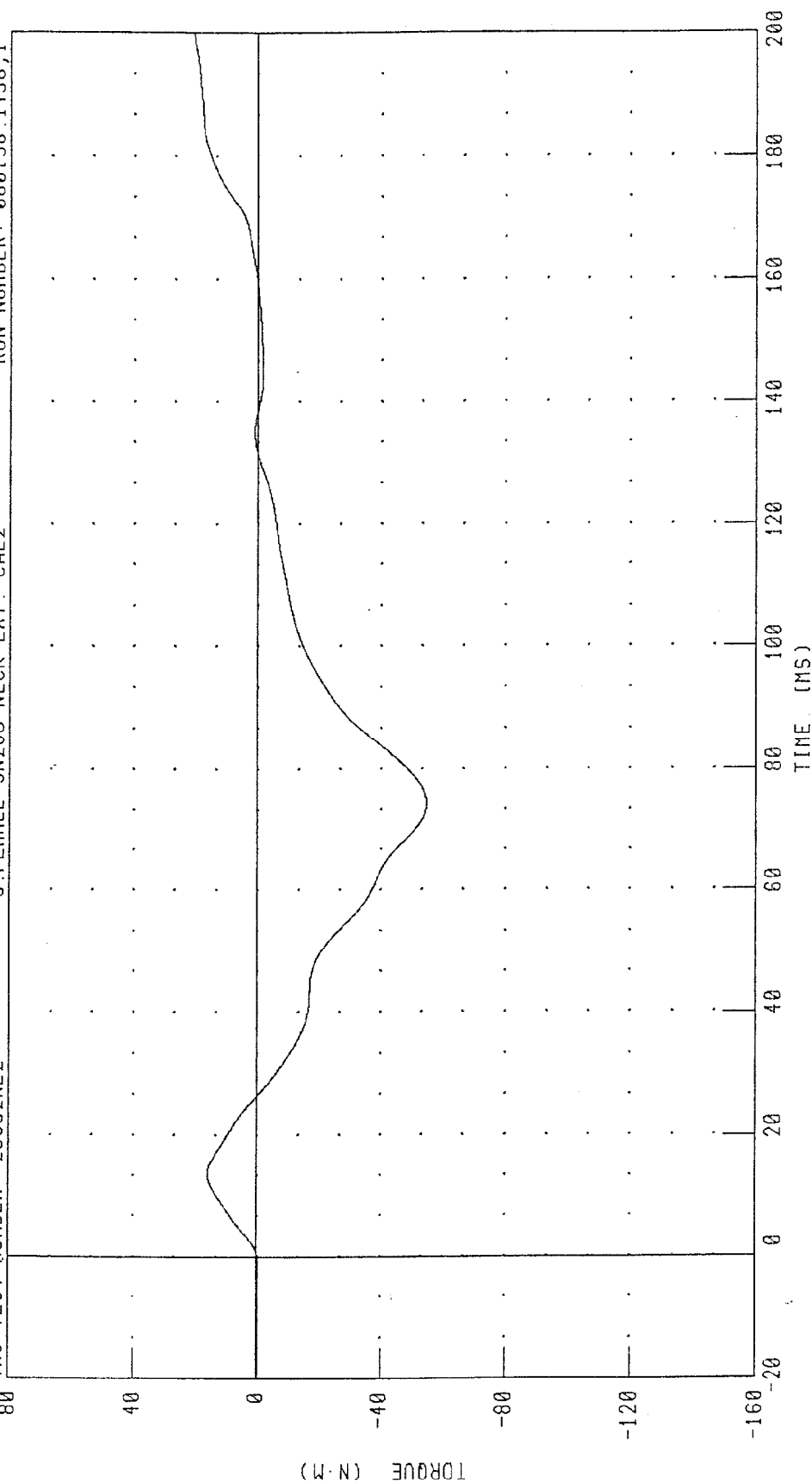
CHANNEL: NEKYM FILTER: CH. CLASS 60

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
S. FEMALE SN283 NECK EXT. CAL2

TRC TEST NUMBER: 283C2NE2

RUN NUMBER: 060198.1436;1



PEAK DATA: 20.55 N.M @ 200.00 MS; -54.74 N.M @ 74.32 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

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

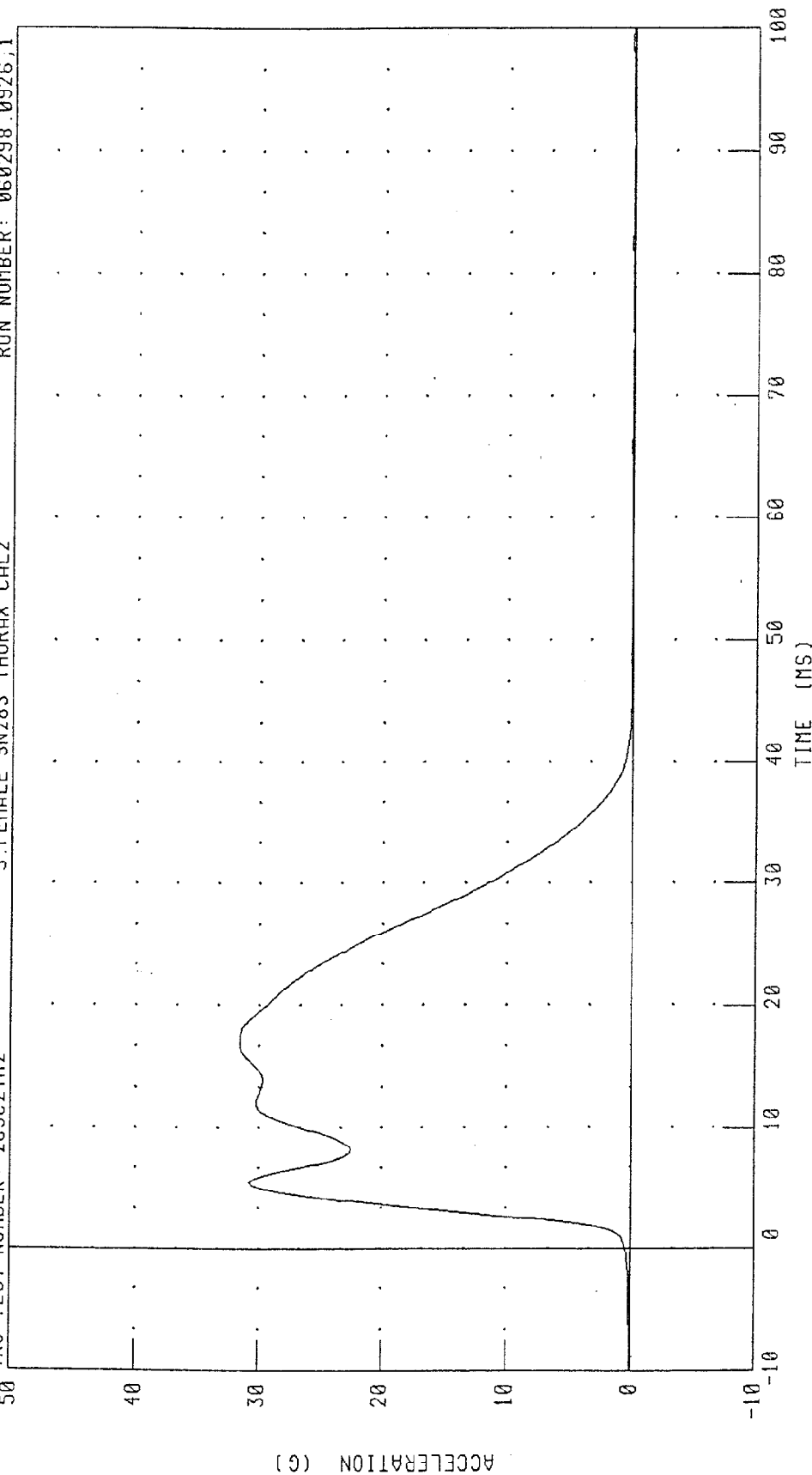
RUN NUMBER: 060298.0925;1

SMALL FEMALE THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 283C2TH2

S.FEMALE SN283 THORAX CAL2

RUN NUMBER: 060298.0926,1

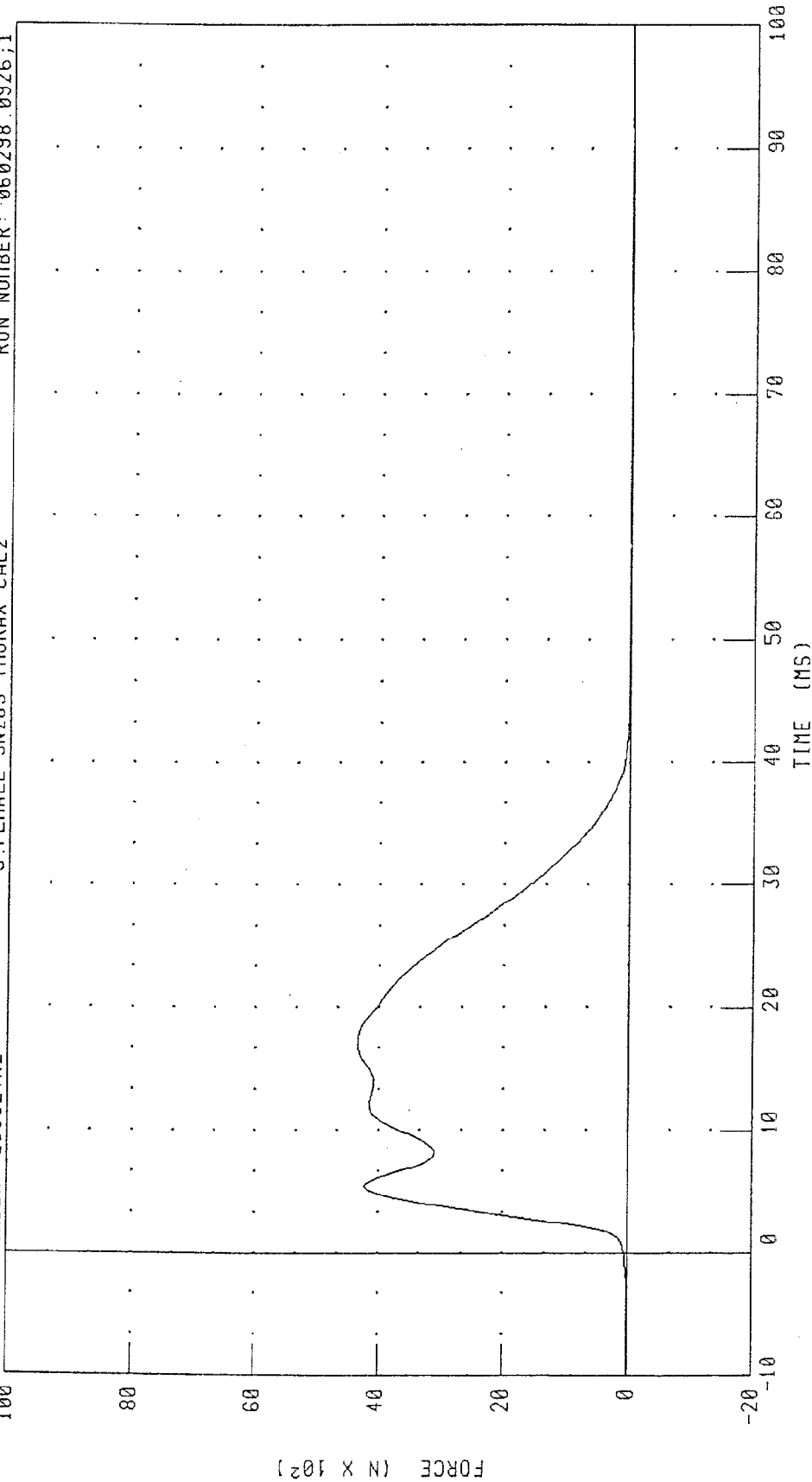


CHANNEL: PENXC FILTER: CH. CLASS 180

PEAK DATA: 31.60 G @ 17.04 MS; -0.01 G @ 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

IRC TEST NUMBER: 283C2TH2

S. FEMALE SN283 THORAX CAL2

RUN NUMBER: 060298.0926,1

150

120

90

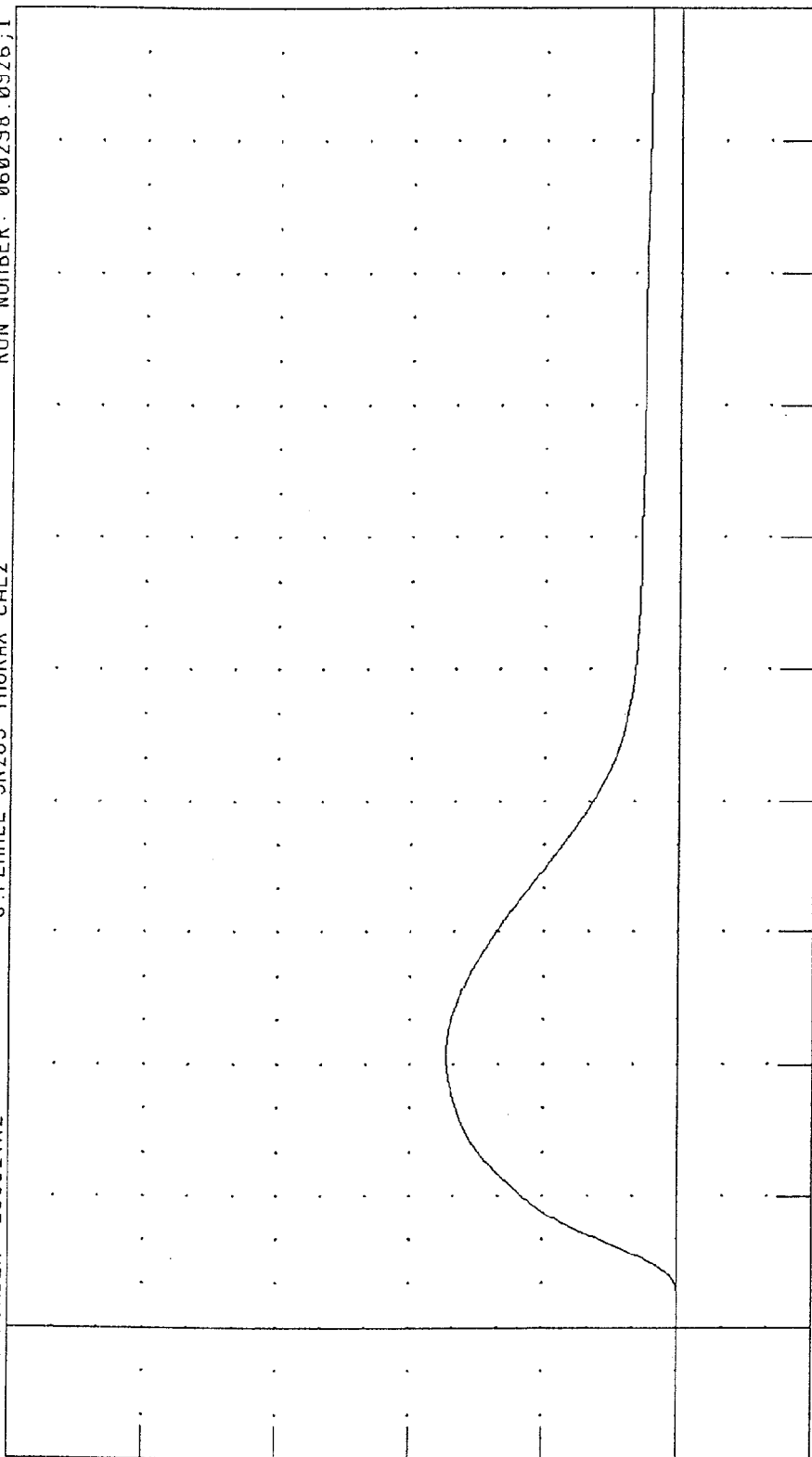
60

30

0

-30

DISPLACEMENT (MM)



TIME (MS)

CHANNEL: CSTXD FILTER: CH. CLASS 180

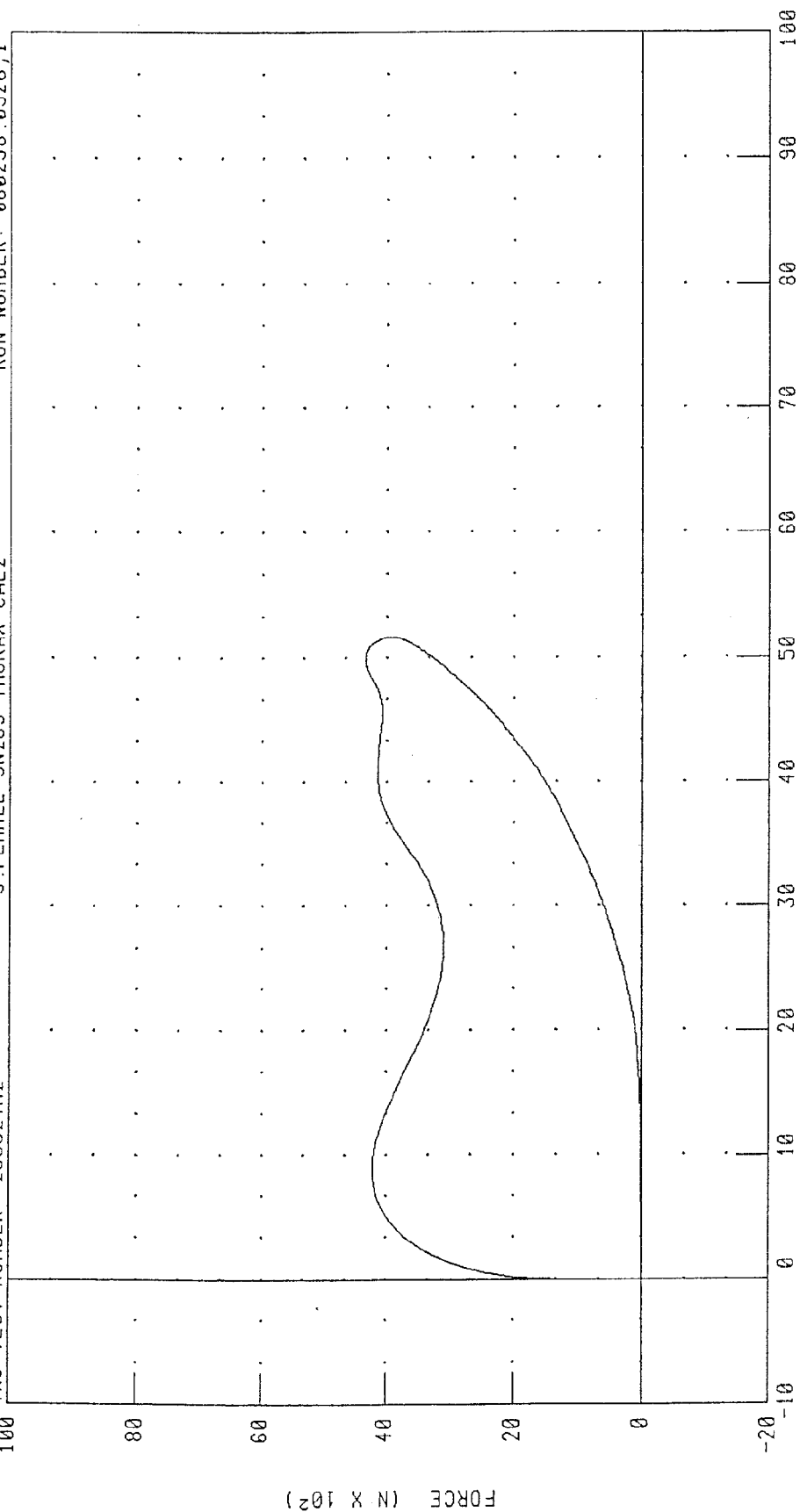
PEAK DATA: 51.73 MM @ 20.80 MS, -0.04 MM @ 2.16 MS

SMALL FEMALE THORAX CALIBRATION CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER: 283C2TH2

S.FEMALE SN283 THORAX CAL2

RUN NUMBER: 060298.0926;1



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

B. Cult

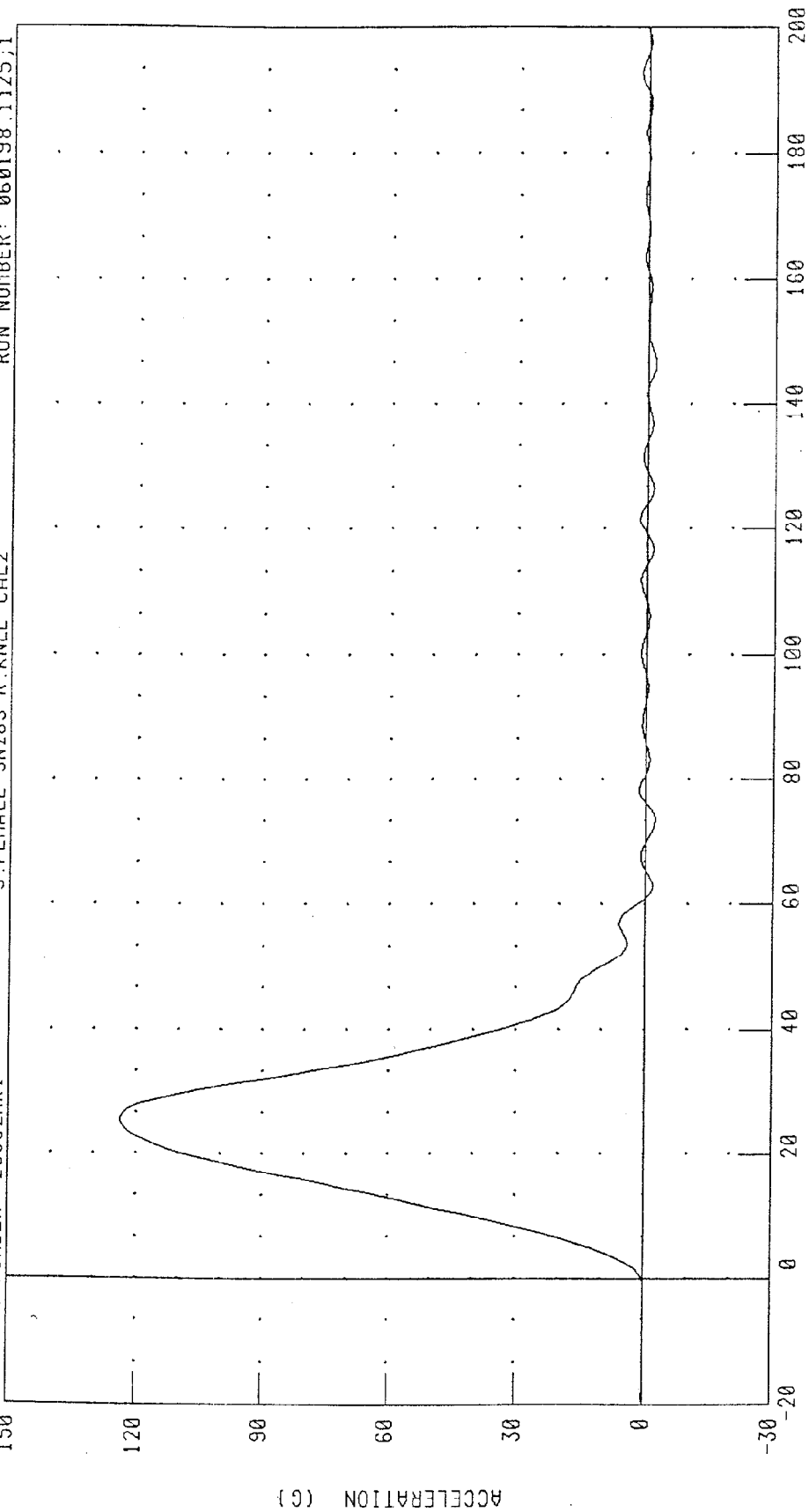
RUN NUMBER: 060198.1124;1

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

TRC TEST NUMBER: 283C2RK1

RUN NUMBER: 060198.1125.1

S.FEMALE SN283 R.KNEE CAL2



CHANNEL: PENXC

FILTER: CH. CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA: 123.93 G @ 2.56 MS; -2.28 G @ 7.36 MS

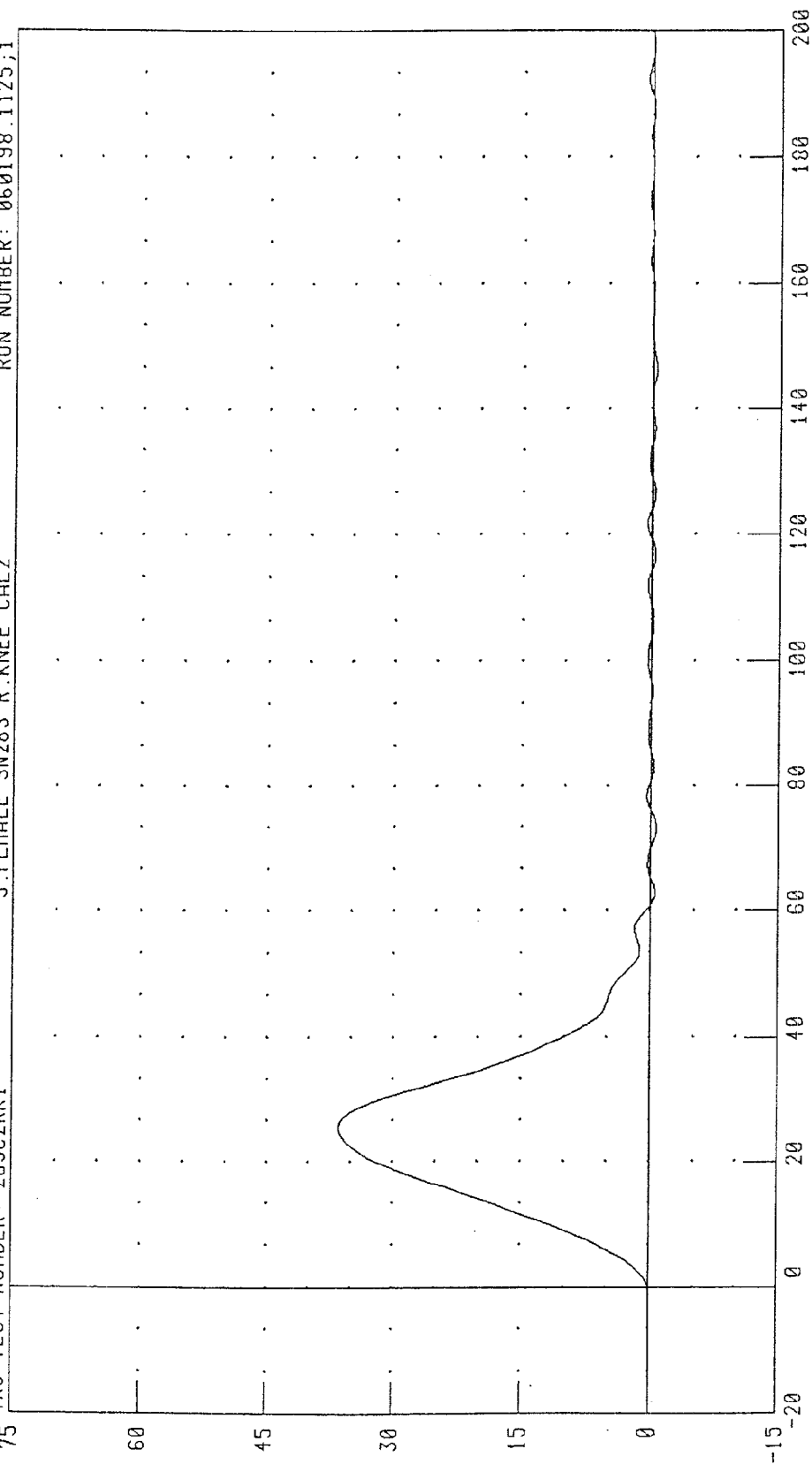
SMALL FEMALE HYBRID III RIGHT KNEE CALIBRATION
 PENDULUM FORCE (5 KC PEND.)

TRC TEST NUMBER: 283C2RK1

S.FEMALE SN283 R.KNEE CAL2

RUN NUMBER: 060198.1125;1

75



TIME (MS X 10⁻¹)

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 Calt

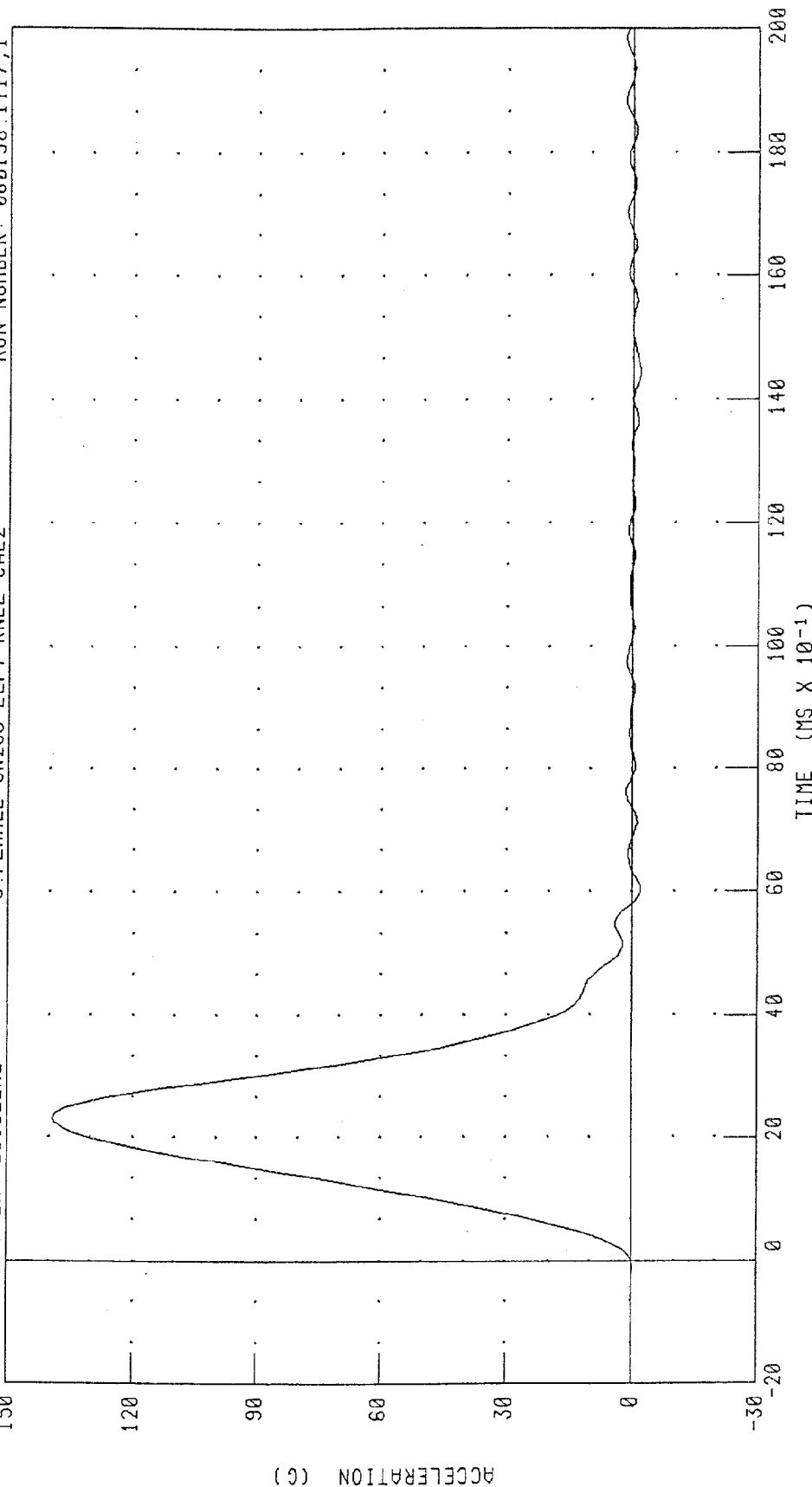
RUN NUMBER: 060198.1117;1

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

TRC TEST NUMBER: 283C2LK2

S. FEMALE SN283 LEFT KNEE CAL2

RUN NUMBER: 060198.1117,1



CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 139.07 G @ 2.32 MS, -2.12 G @ 6.00 MS

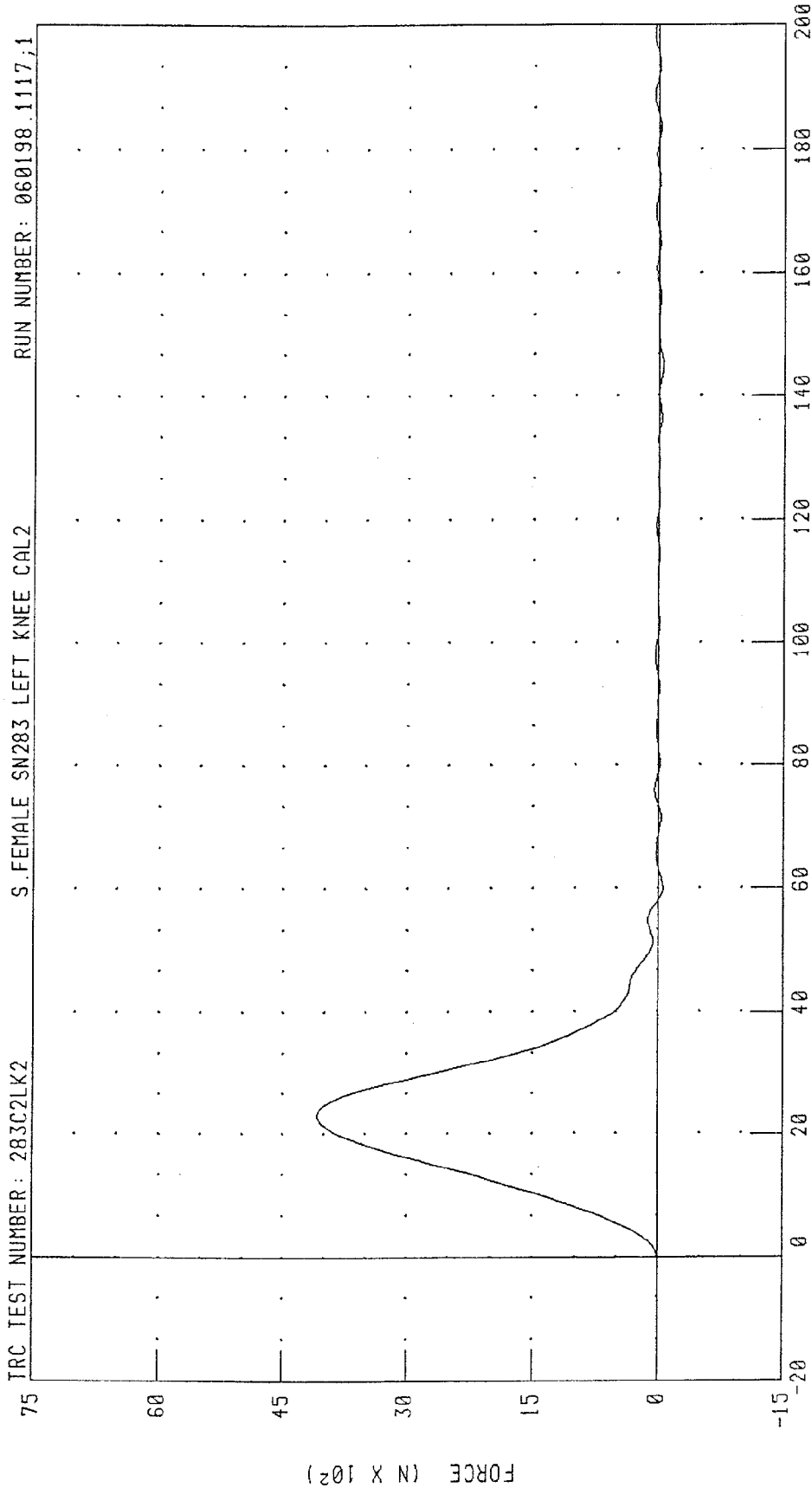
SMALL FEMALE HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 283C2LK2

S.FEMALE SN283 LEFT KNEE CAL2

RUN NUMBER: 060198.1117,1



CHANNEL: PENXF

FILTER: CH. CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA: 4082.59 N @ 2.32 MS, -62.14 N @ 6.00 MS

Pre-Test Calibration

Bullet 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

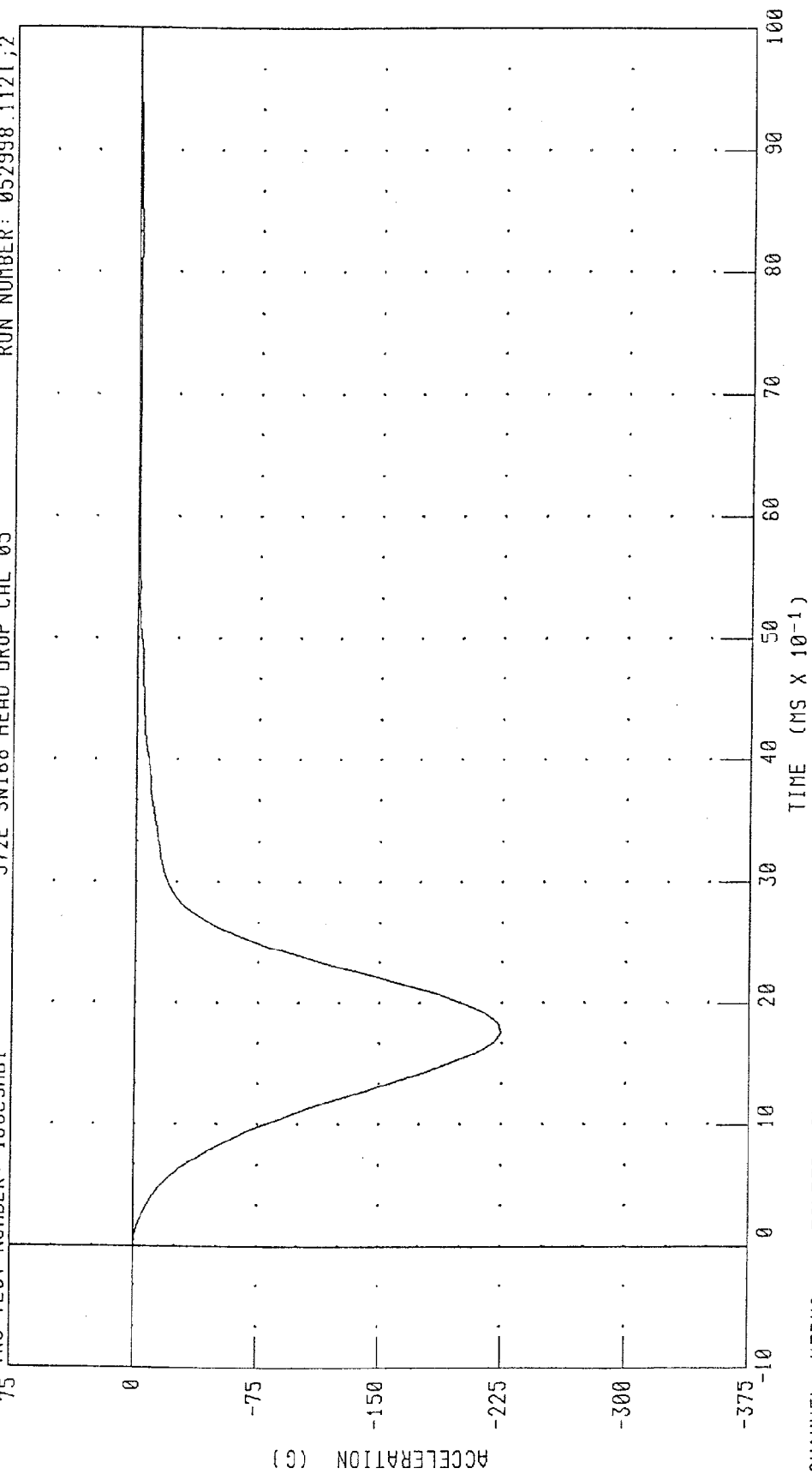
TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 052998.1054;1

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

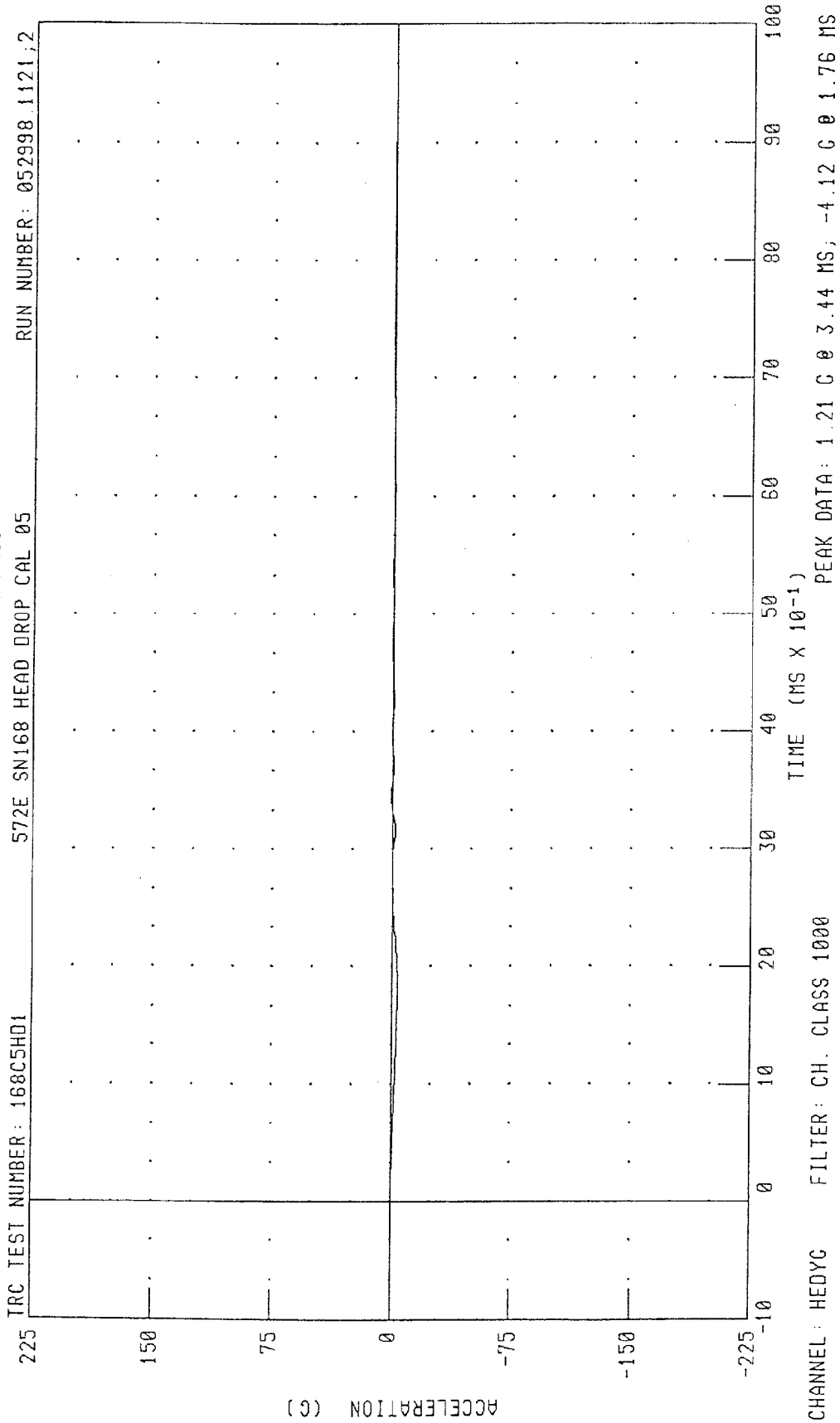
TRC TEST NUMBER: 168C5H01 572E SN168 HEAD DROP CAL 05 RUN NUMBER: 052998.1121,2



CHANNEL: HEDXC FILTER: CH. CLASS 1000

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

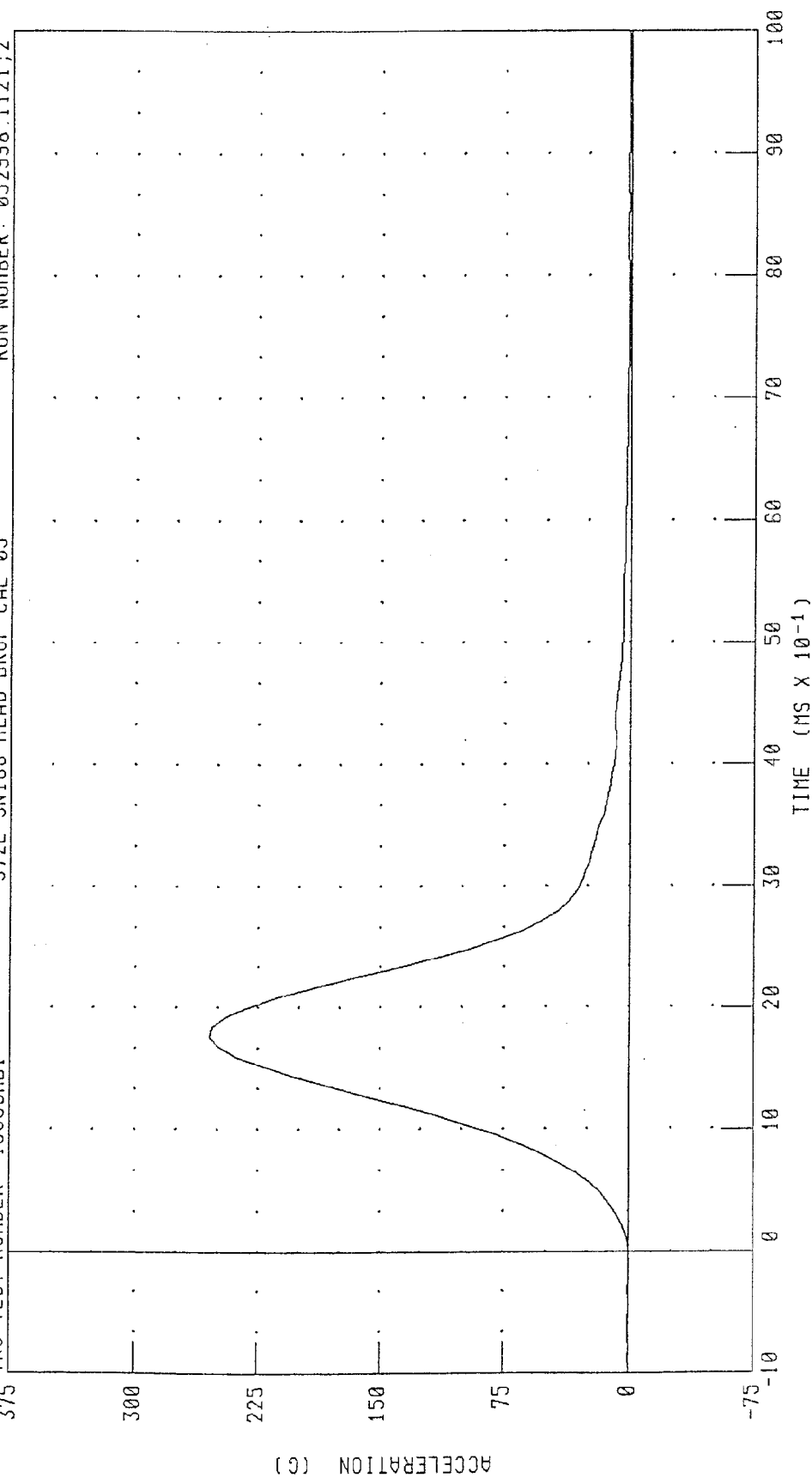
PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS



PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
572E SN168 HEAD DROP CAL 05

TRC TEST NUMBER: 168C5HD1

RUN NUMBER: 052998.1121;2



CHANNEL: HEDRG FILTER: CH. CLASS 1000

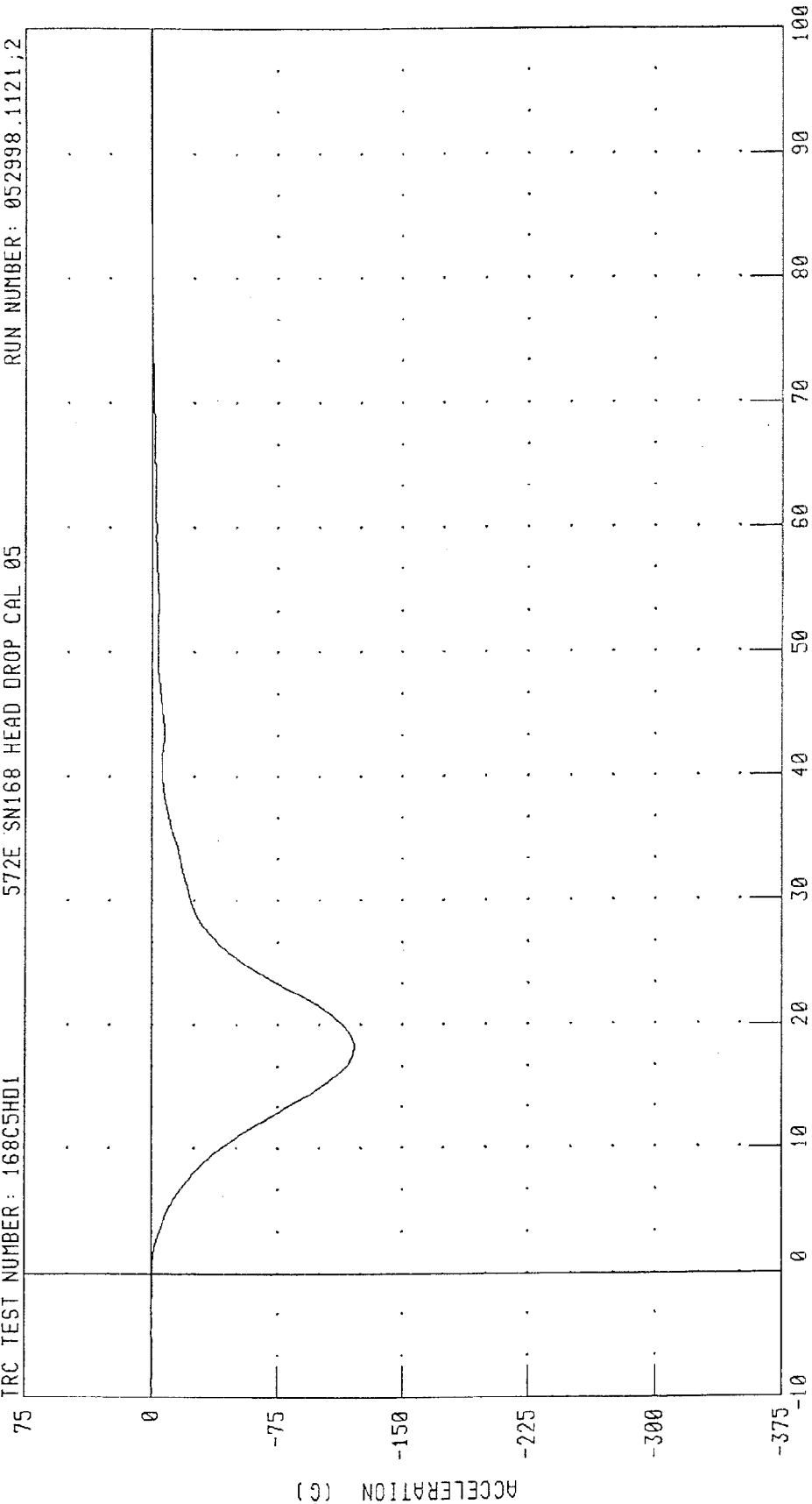
PEAK DATA: 254.78 G @ 1.76 MS; 0.08 G @ -0.48 MS

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

572E SN168 HEAD DROP CAL 05 RUN NUMBER: 052998.1121,2

TRC TEST NUMBER: 168C5HD1



PEAK DATA: 0.86 G @ 10.00 MS; -121.14 G @ 1.84 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

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	MAX	88.2 - 108.5 NM	92.22 NM
CONDYLE	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

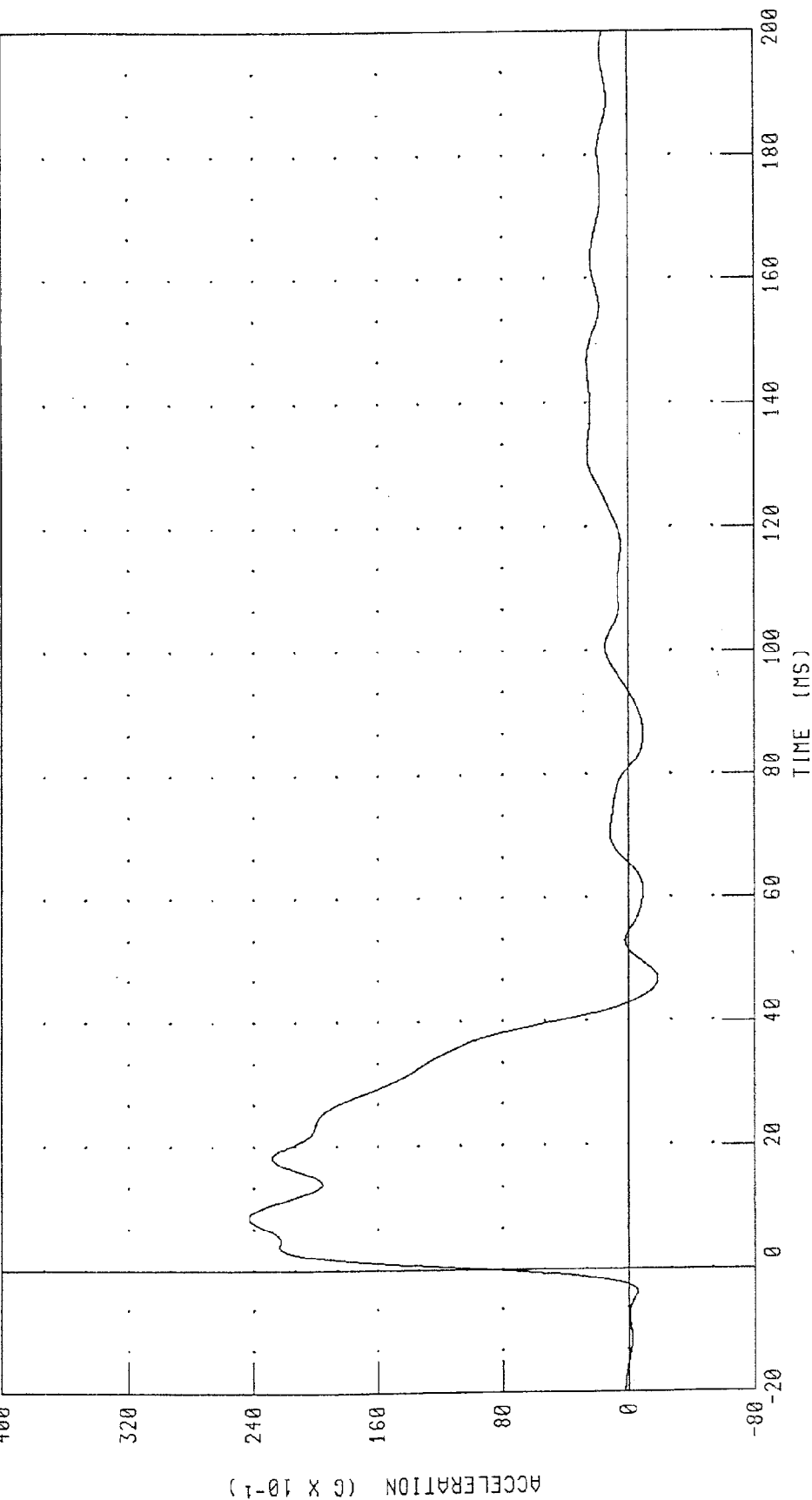
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C5NF1

572E SN168 NECK FLEXION CAL05

RUN NUMBER: 052998.1118;1

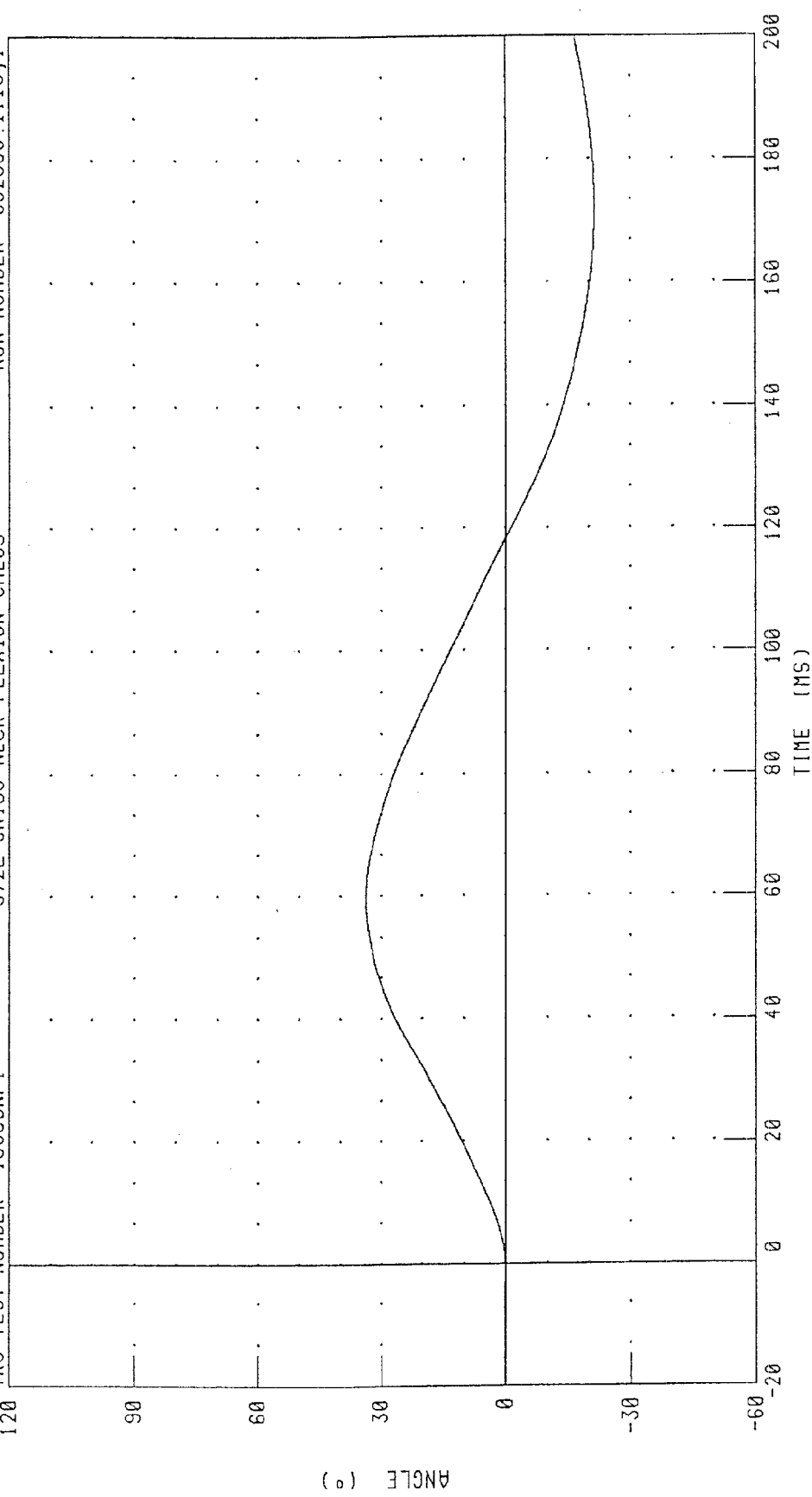


CHANNEL: PENXC FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 16805NF1 572E SN168 NECK FLEXION CAL05 RUN NUMBER: 052998.1118;1



CHANNEL: BETA FILTER: CH. CLASS 60 PEAK DATA: 33.64 ° @ 59.20 MS; -21.37 ° @ 171.68 MS

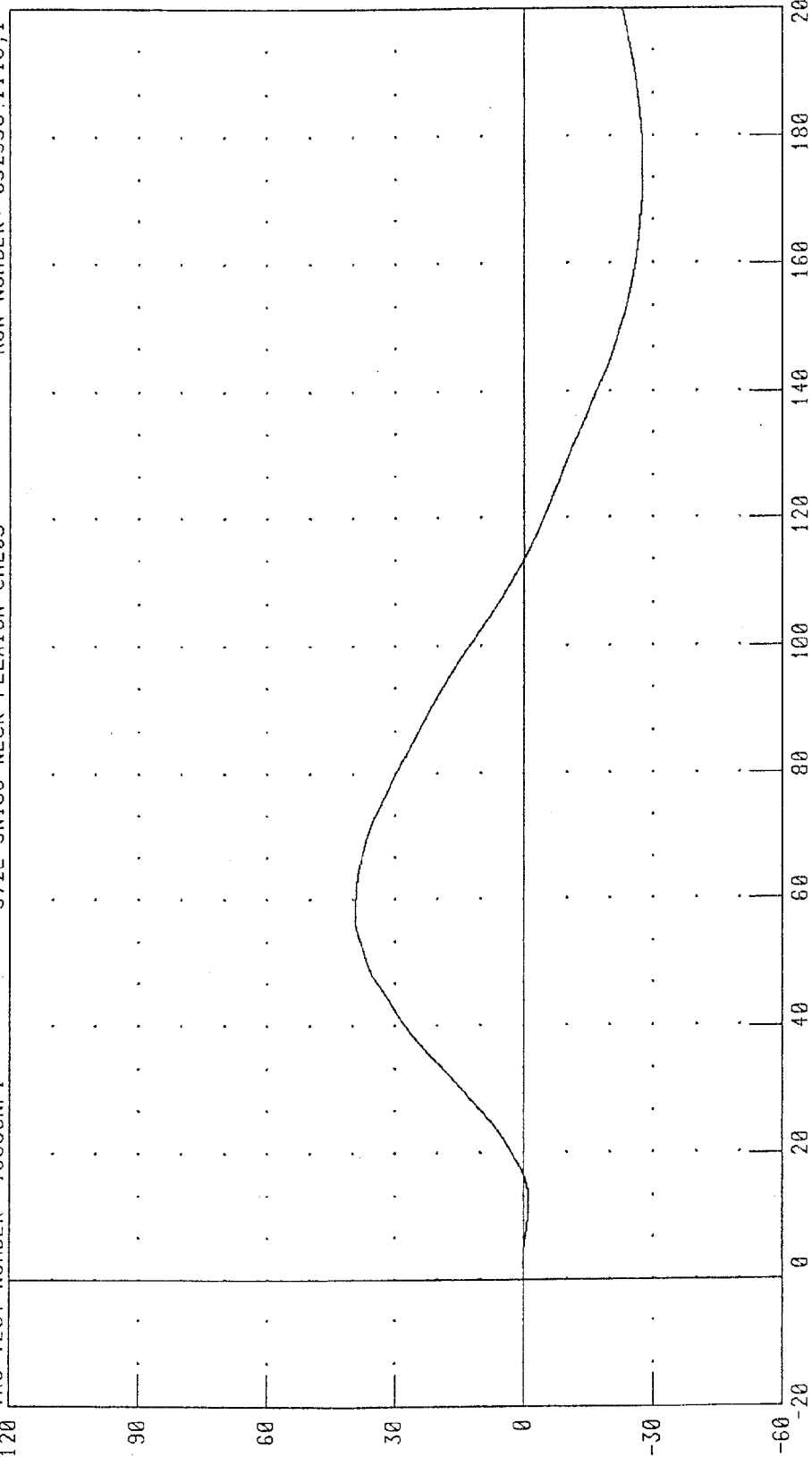
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 168C5NF1

572E SN168 NECK FLEXION CAL05

RUN NUMBER: 052998.1118;1

120



CHANNEL: THETA

FILTER: CH. CLASS 60

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

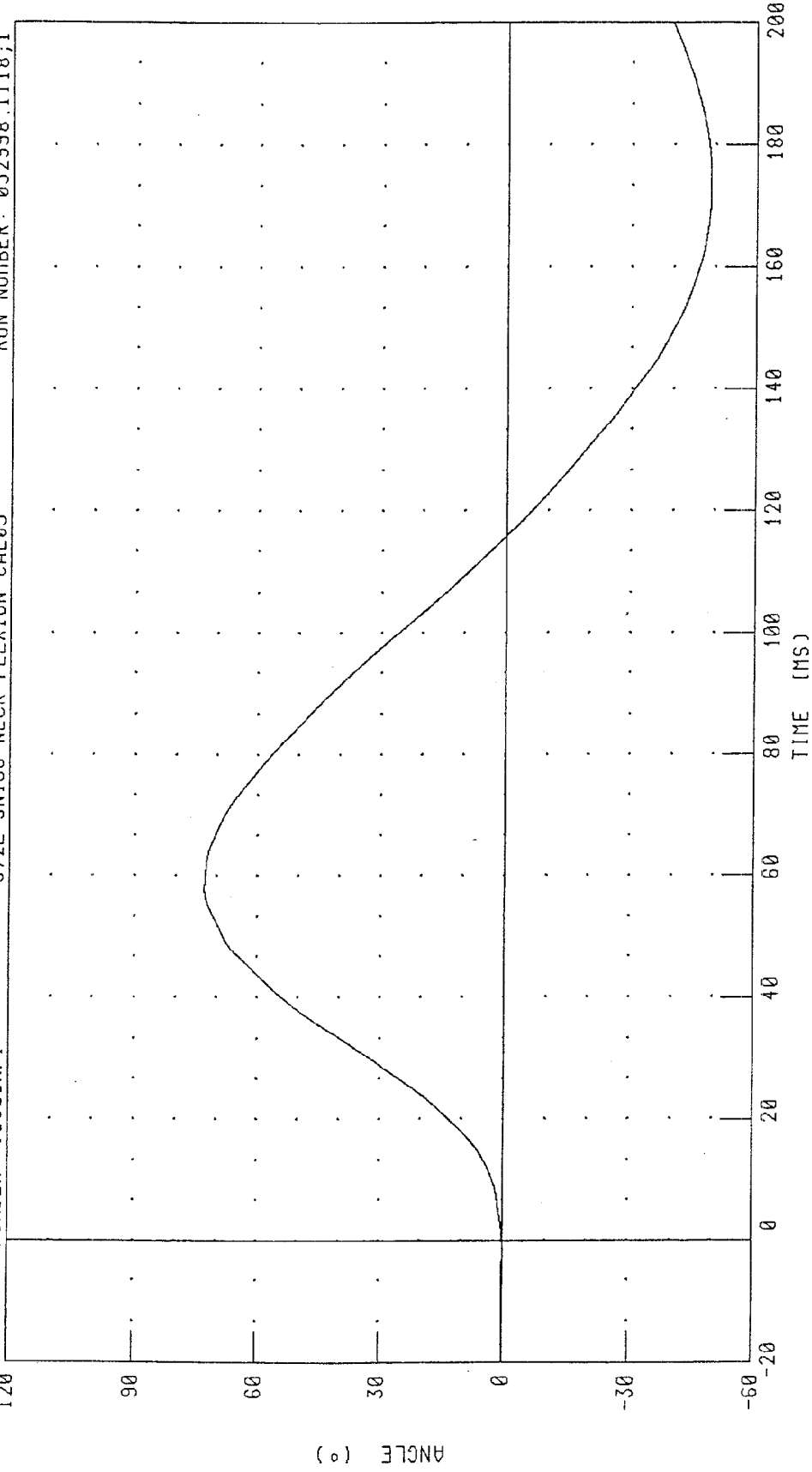
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 168C5NF1

572E SNI68 NECK FLEXION CAL05

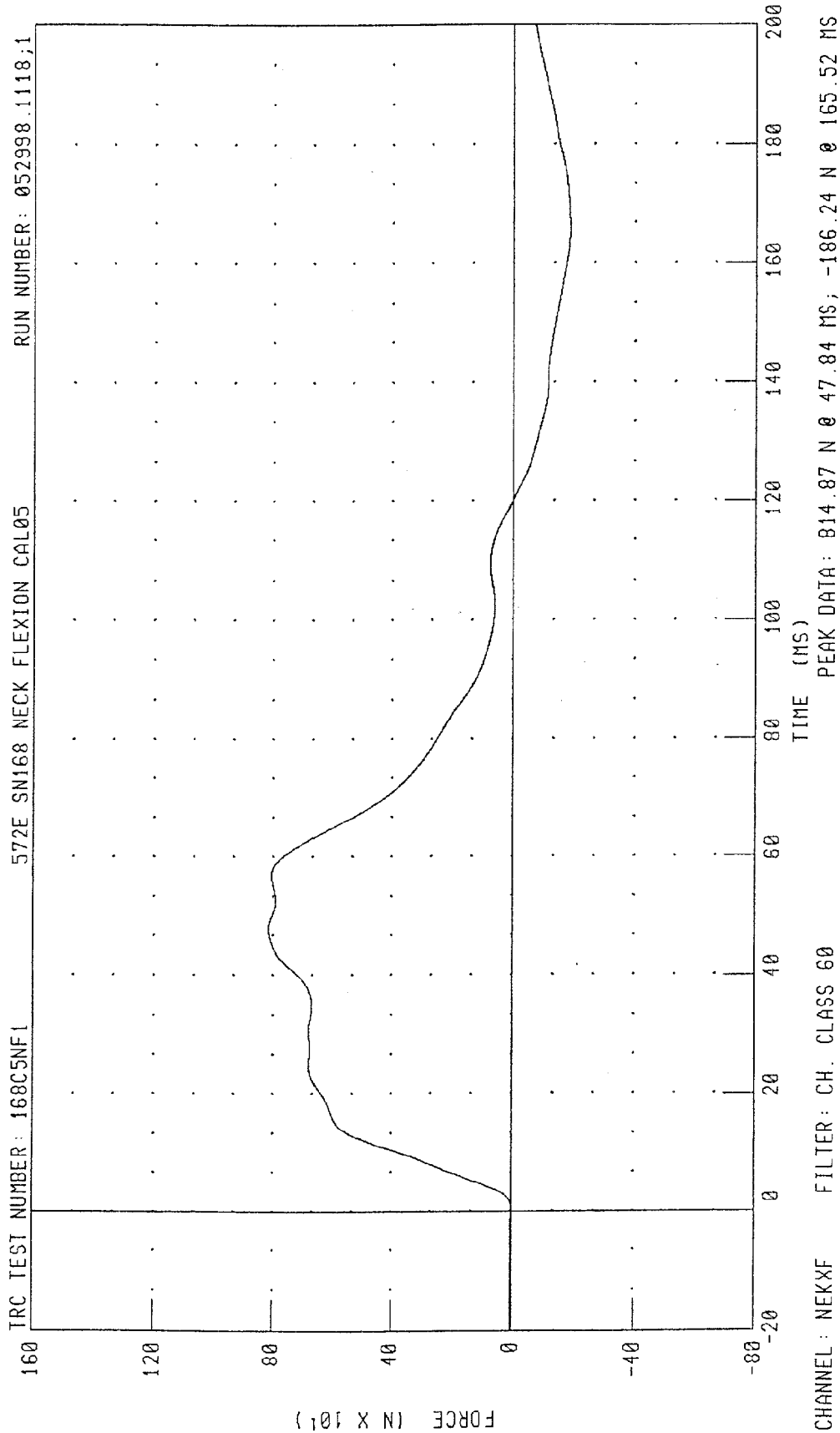
RUN NUMBER: 052998.1118;1



CHANNEL: TOTAL 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



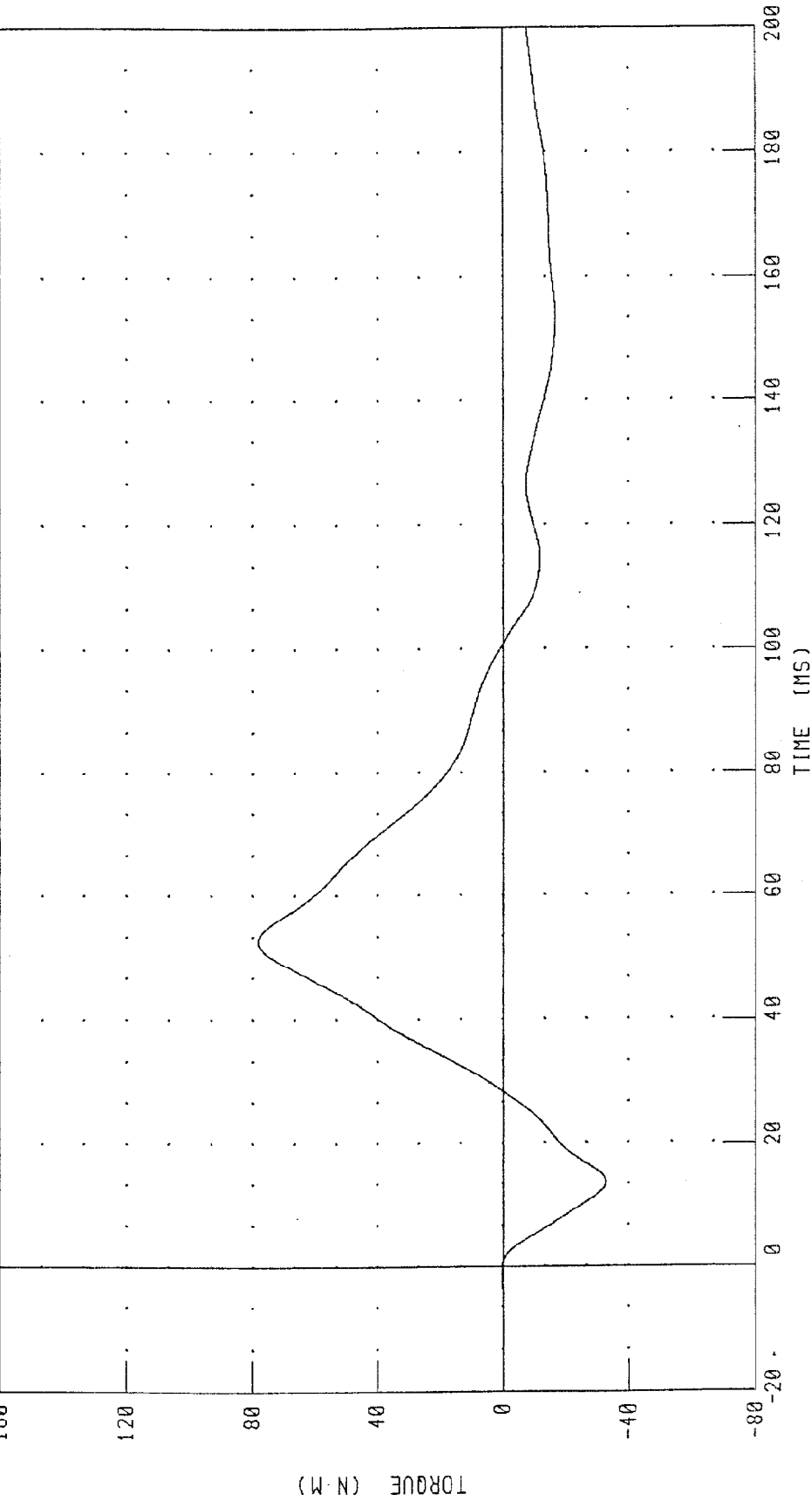
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 168C5NF1

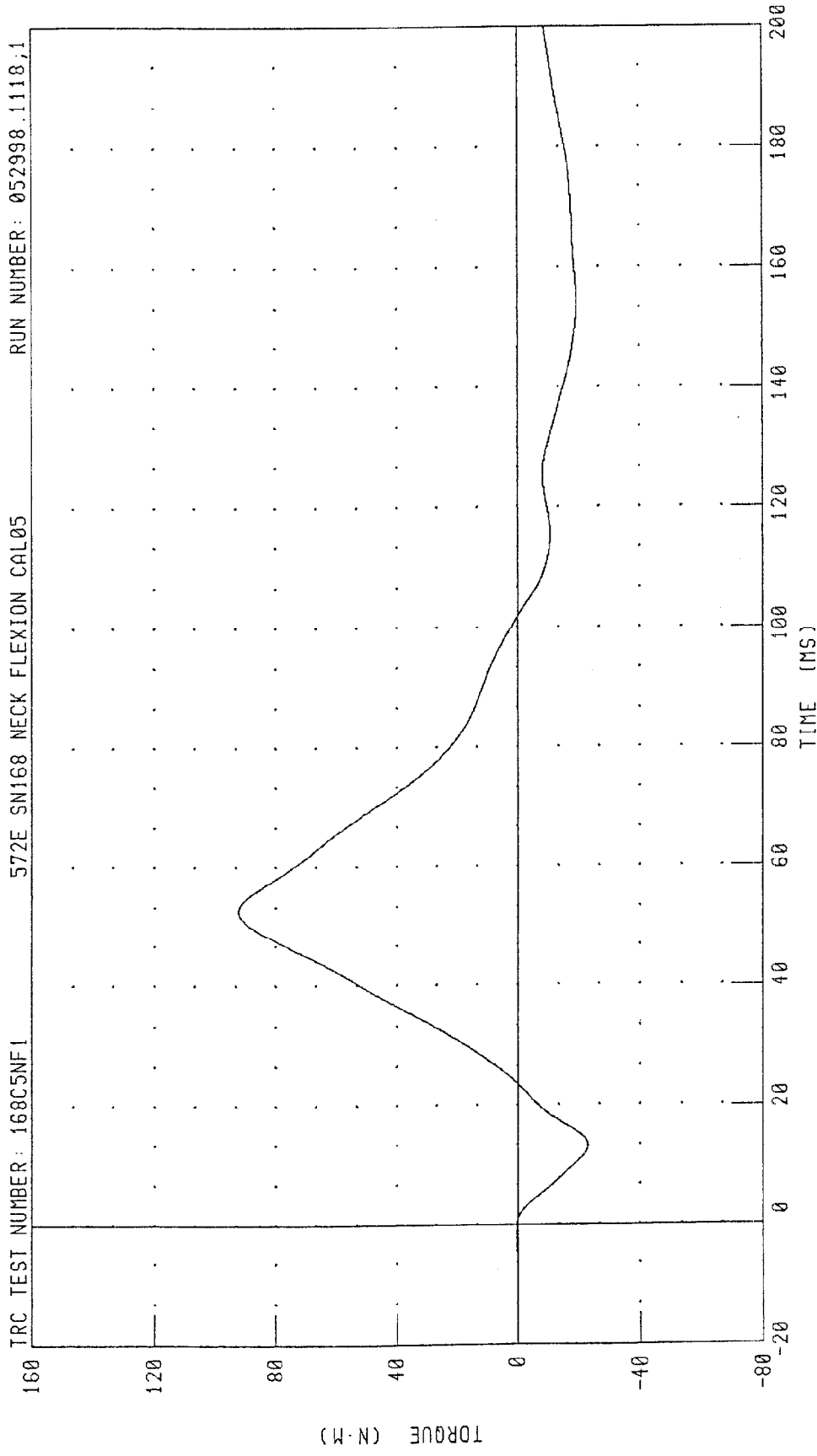
572E SN168 NECK FLEXION CAL05

RUN NUMBER: 052998.1118;1



CHANNEL: NEKYM FILTER: CH. CLASS 60 PEAK DATA: 78.15 N-M @ 52.64 MS; -32.78 N-M @ 13.68 MS

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



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 Bj Calt

RUN NUMBER: 052998.1223;1

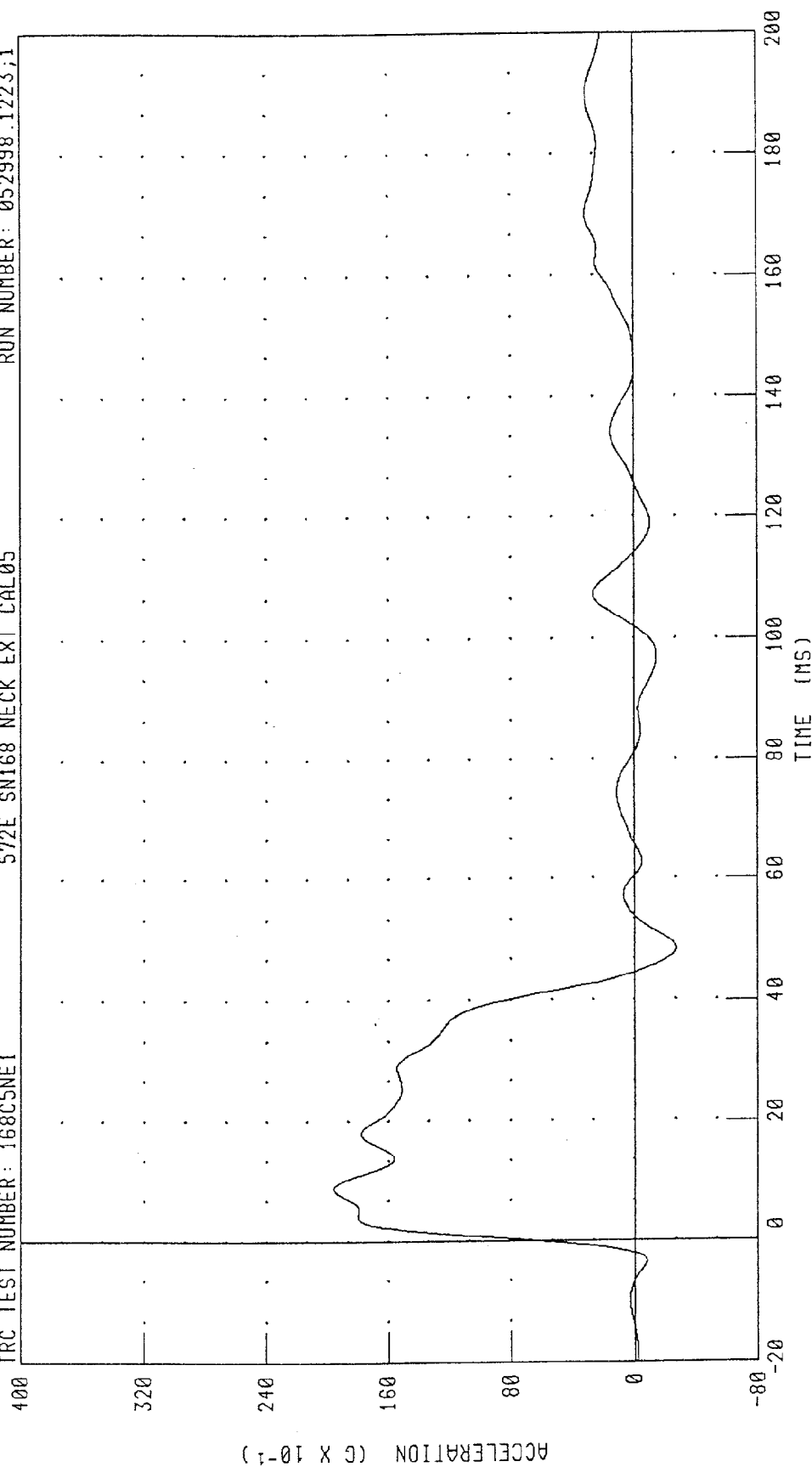
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C5NE1

572E SN168 NECK EXT CAL05

RUN NUMBER: 052998.1223;1



CHANNEL: PENXC

FILTER: CH. CLASS 60

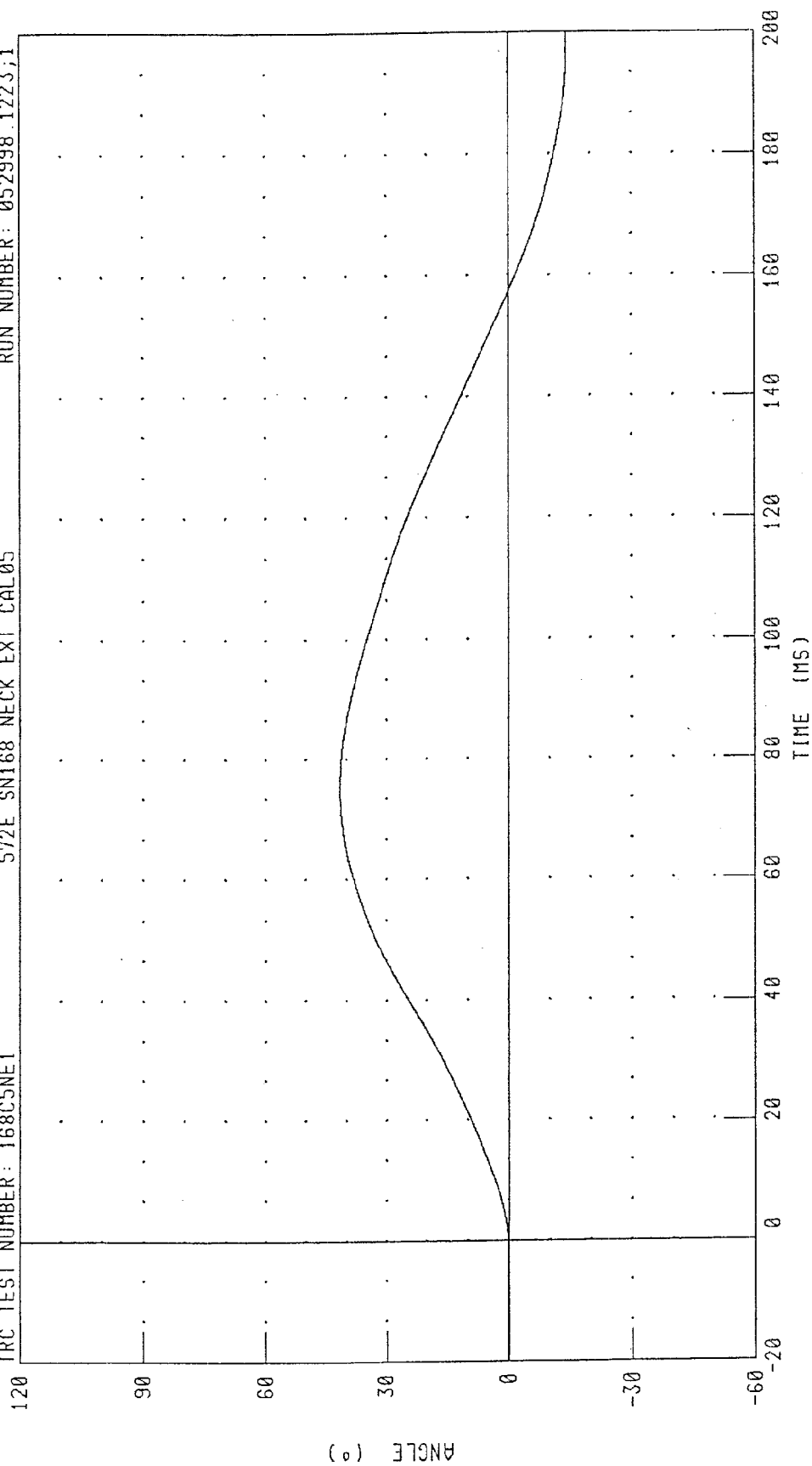
PEAK DATA: 19.56 G @ 8.80 MS; -2.73 G @ 48.40 MS

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

TRC TEST NUMBER: 168C5NE1

572E SN168 NECK EXT CAL05

RUN NUMBER: 052998.1223;1

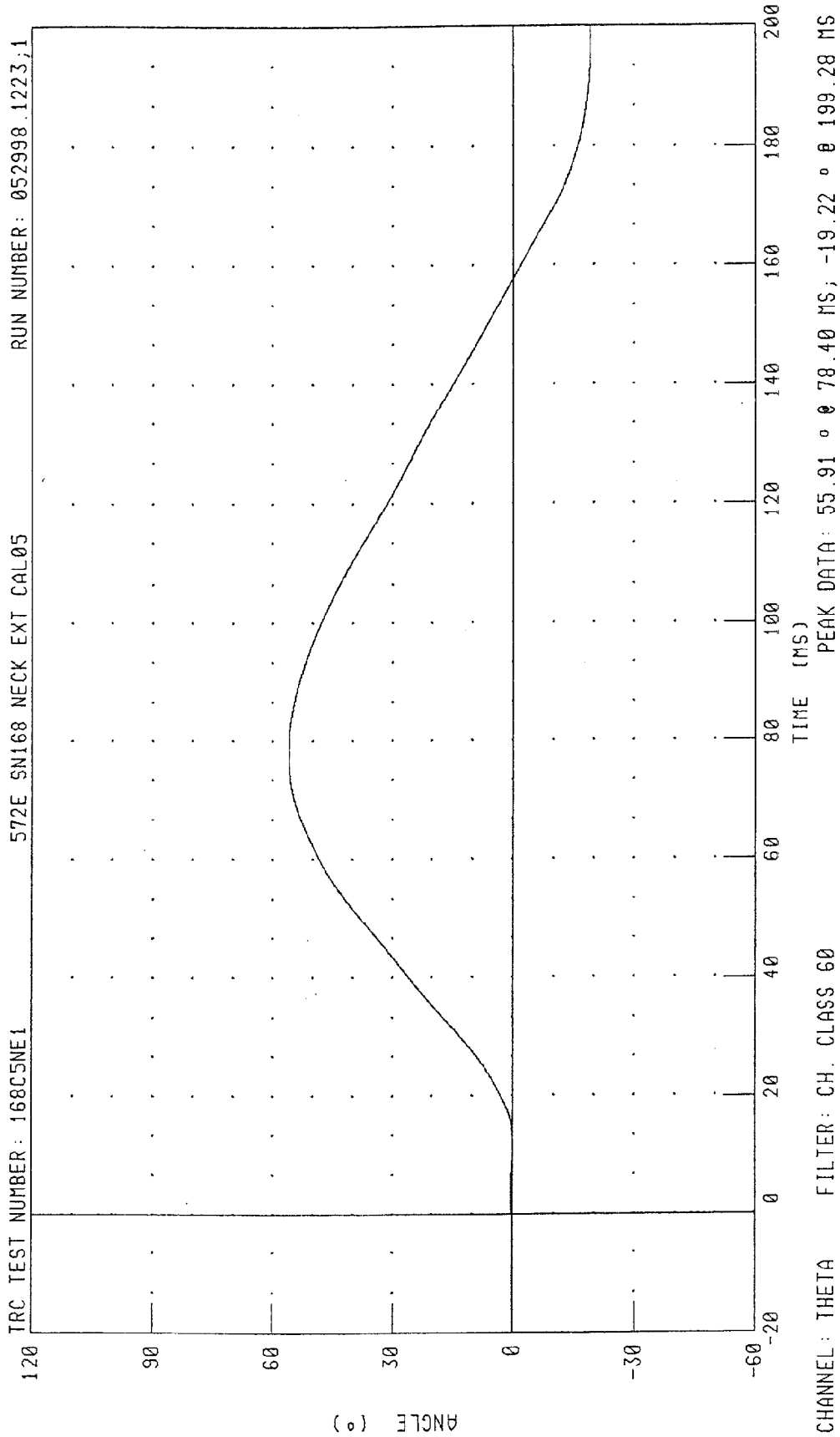


CHANNEL: BETA

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



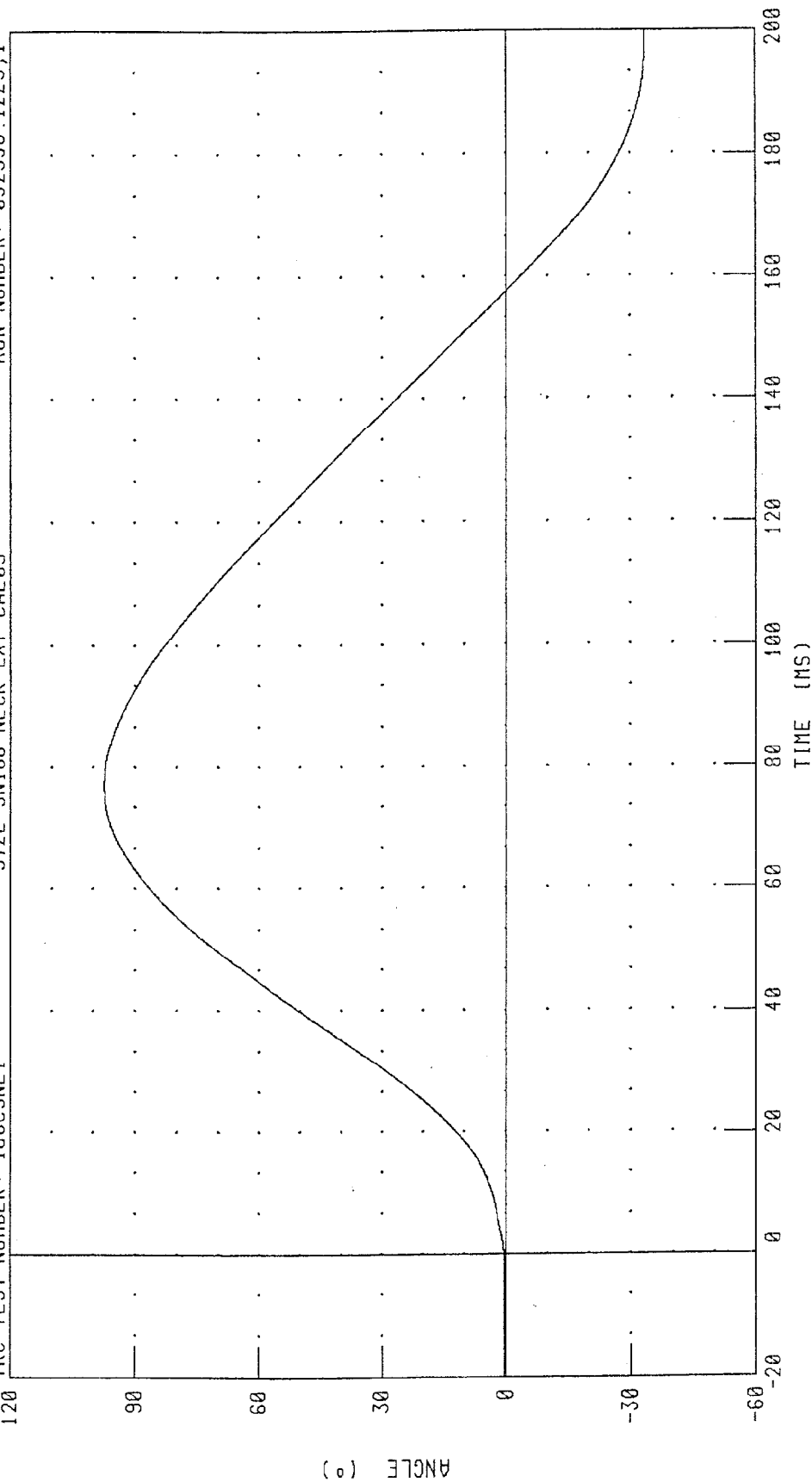
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

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

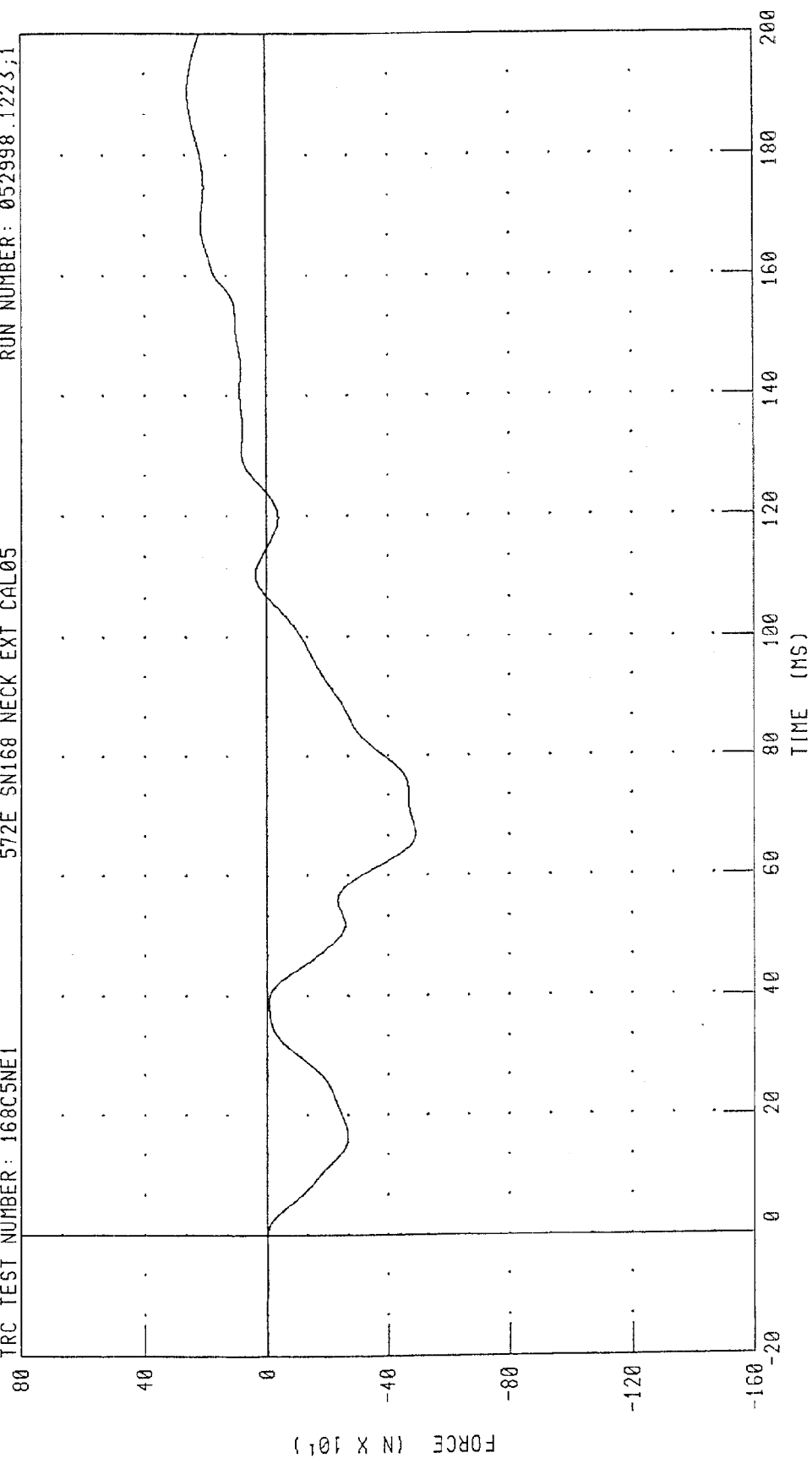
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 168C5NE1

572E SN168 NECK EXT CAL05

RUN NUMBER: 052998.1223;1



PEAK DATA: 258.11 N @ 190.56 MS, -491.75 N @ 67.04 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

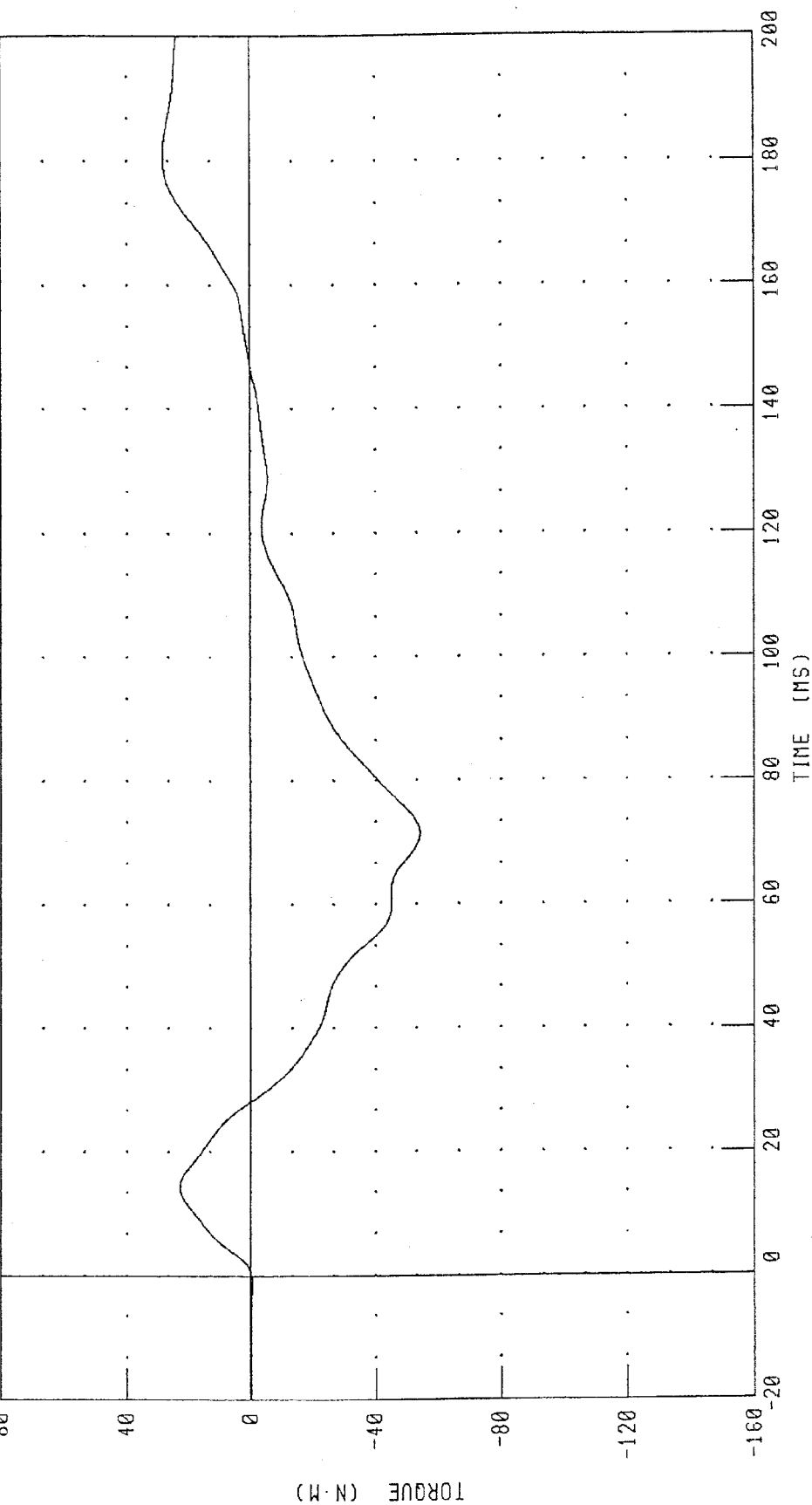
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 168C5NE1

572E SN168 NECK EXT CAL05

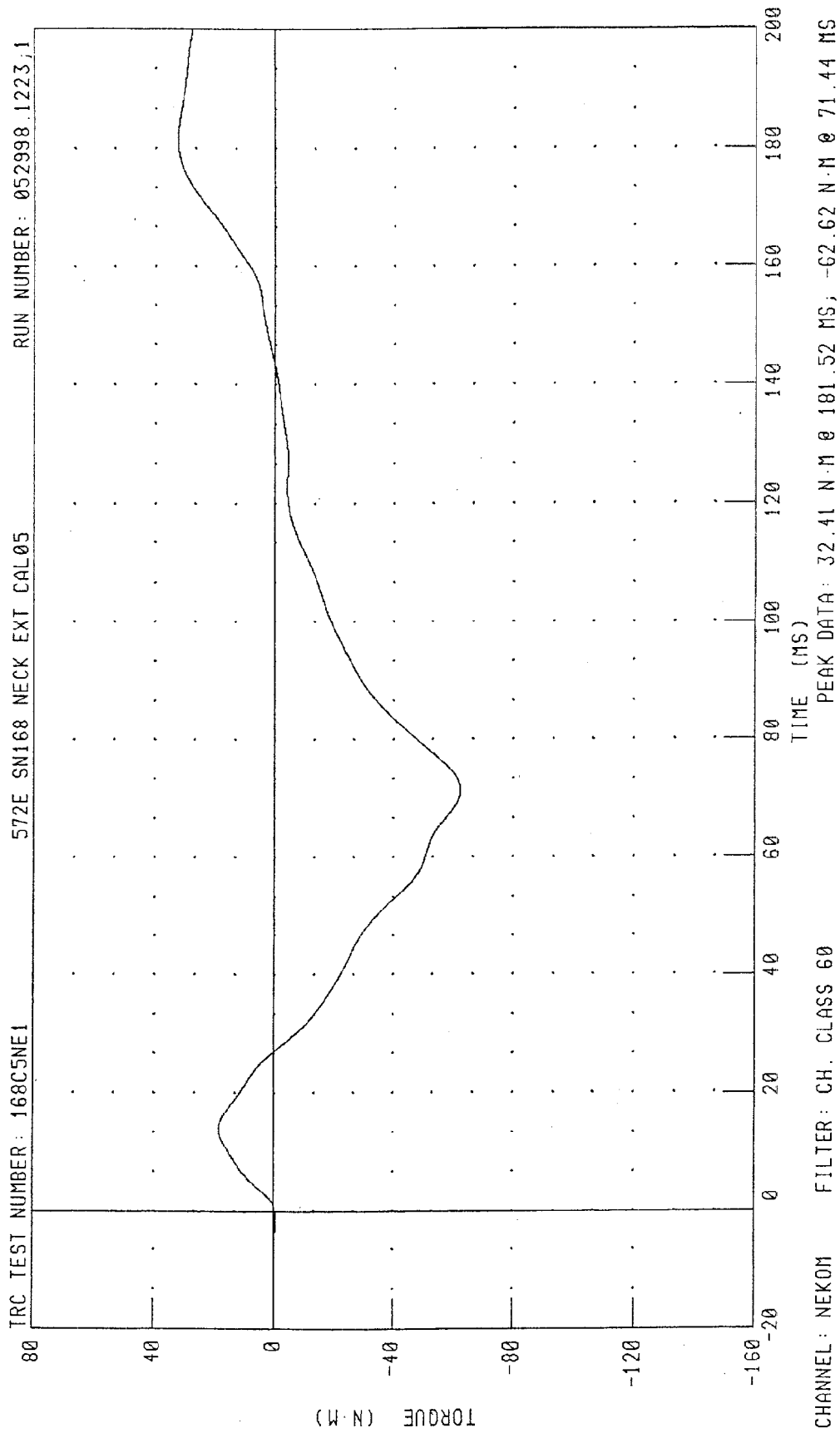
RUN NUMBER: 052998.1223,1



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



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. C. L. T.

RUN NUMBER: 060198.0753;1

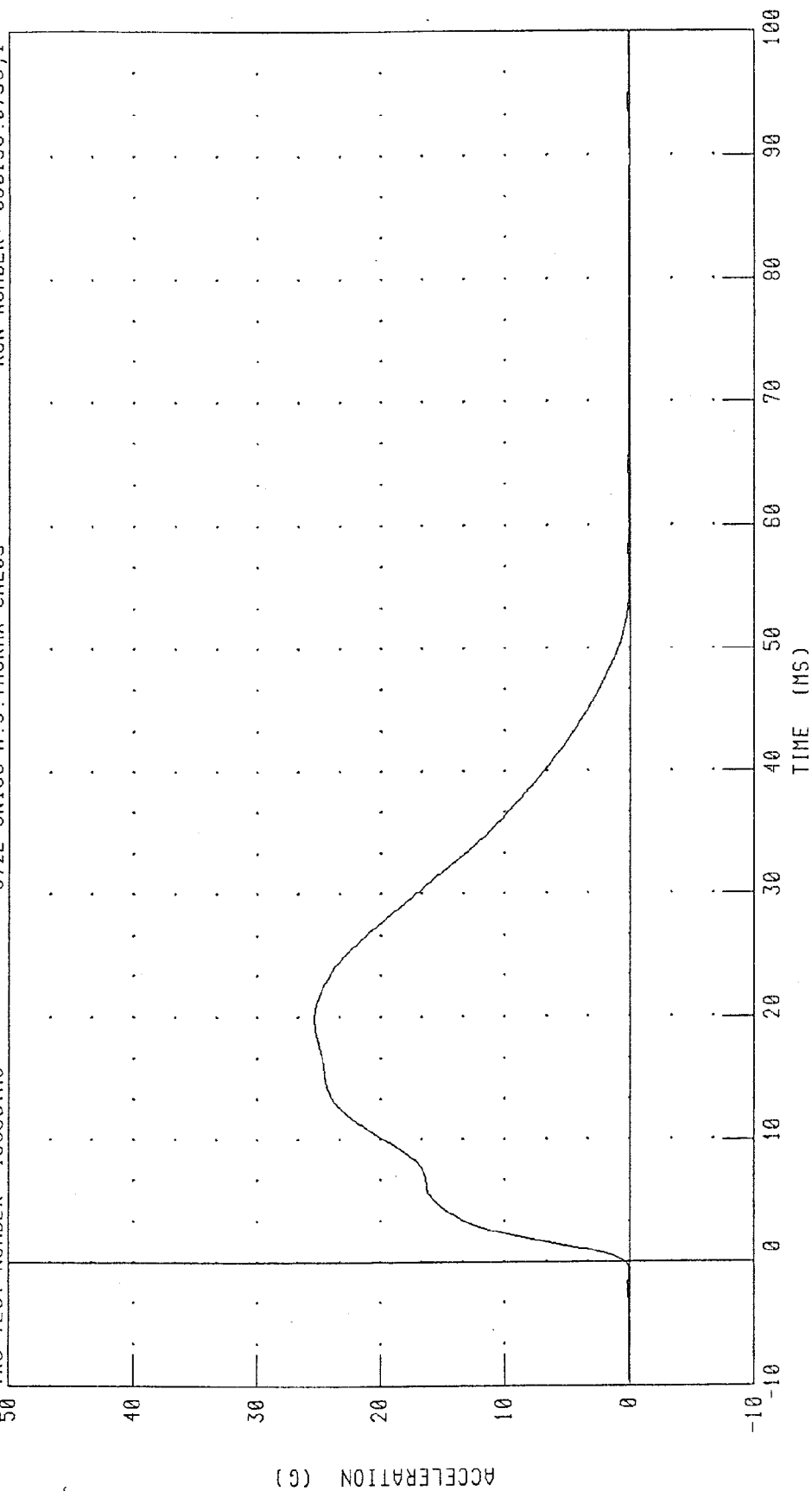
PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

572E SN168 H.S.THORAX CAL05

IRC TEST NUMBER: 168C5TH3

50

RUN NUMBER: 060198.0753;1



CHANNEL: PENXC FILTER: CH. CLASS 180

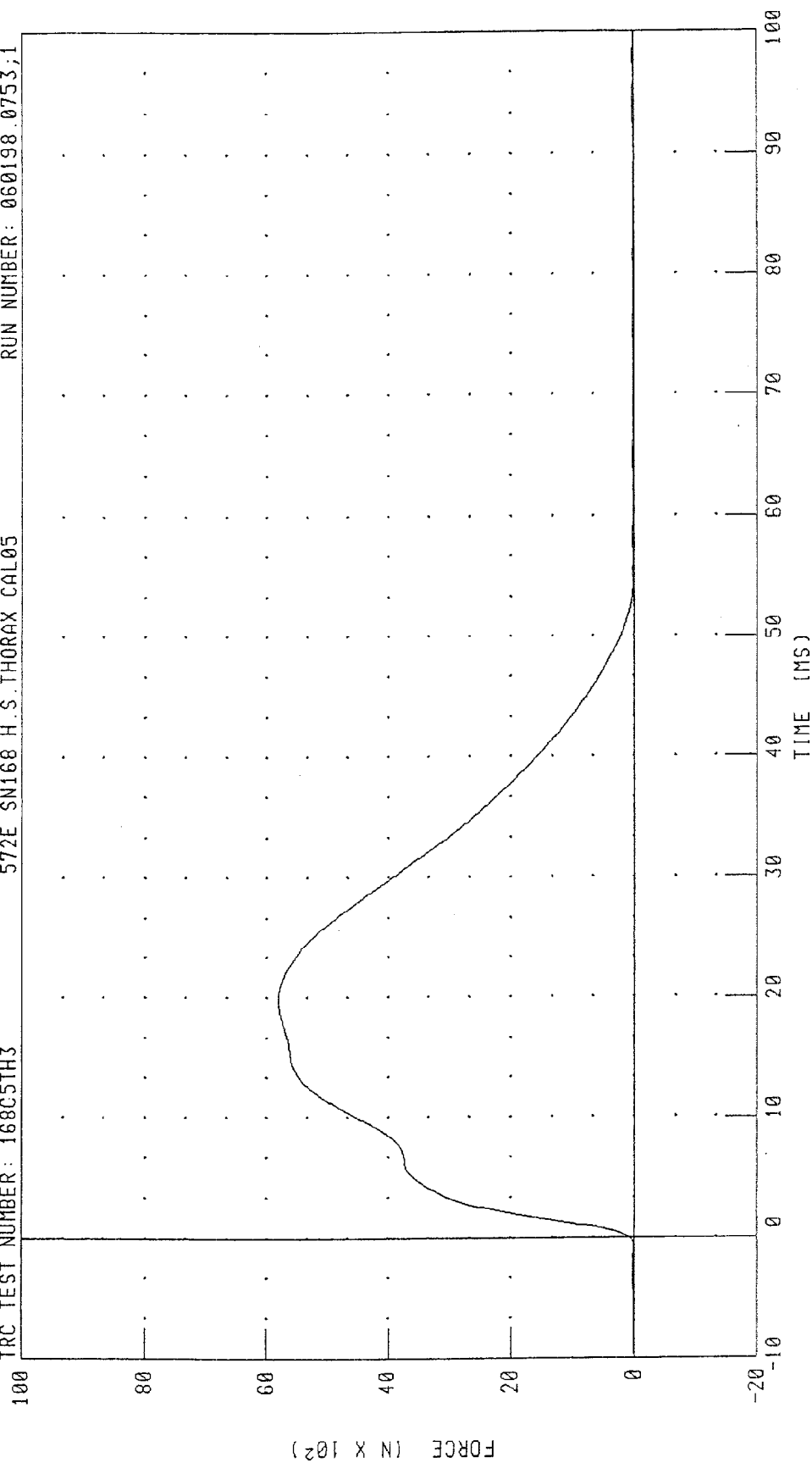
PEAK DATA: 25.36 G @ 19.84 MS; 0.01 G @ 89.92 MS

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

TRC TEST NUMBER: 168C5TH3

572E SN168 H.S. THORAX CAL05

RUN NUMBER: 060198 0753;1



CHANNEL: PENXF

FILTER: CH. CLASS 180

TIME (MS)

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

150

120

90

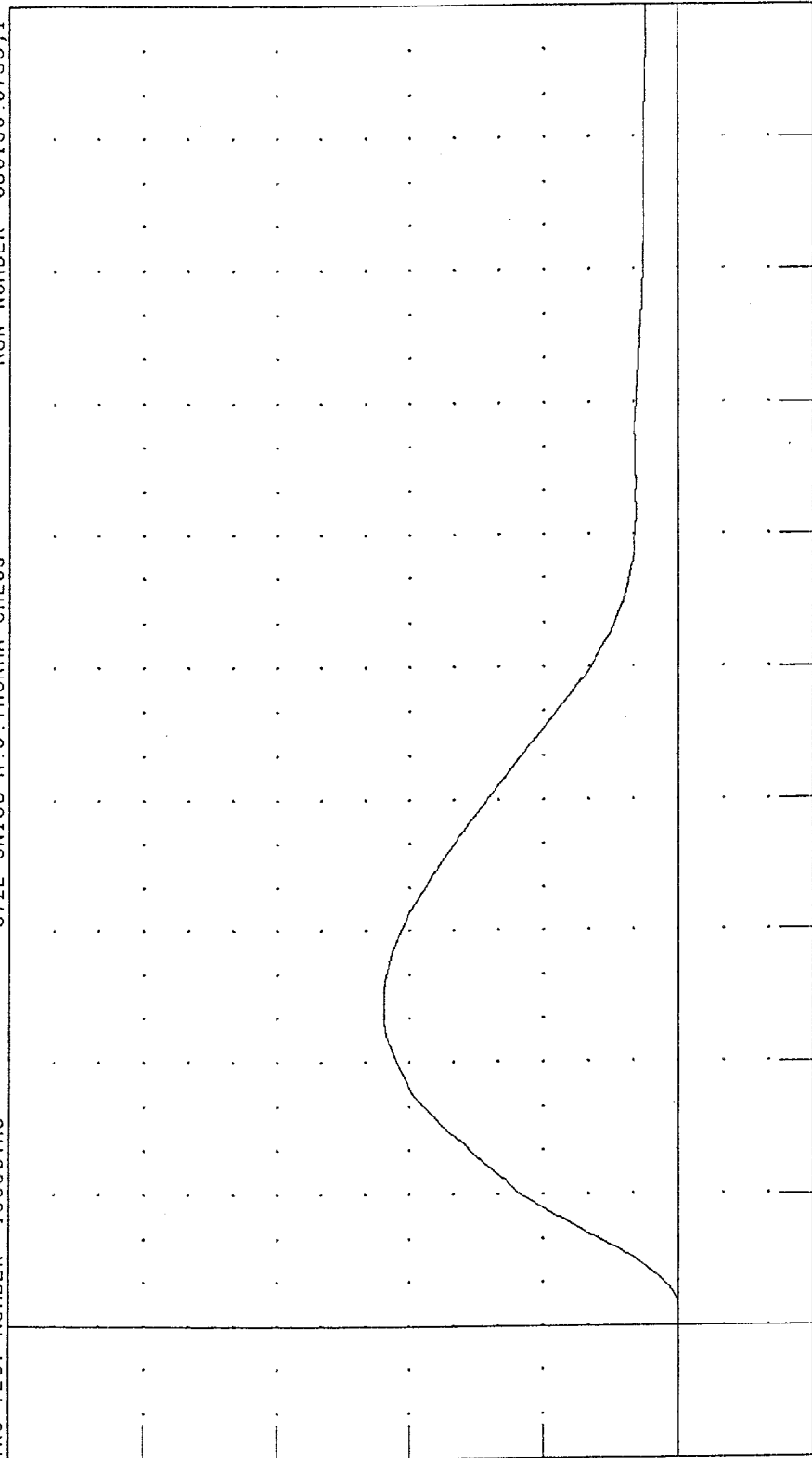
60

30

0

-30

DISPLACEMENT (MM)

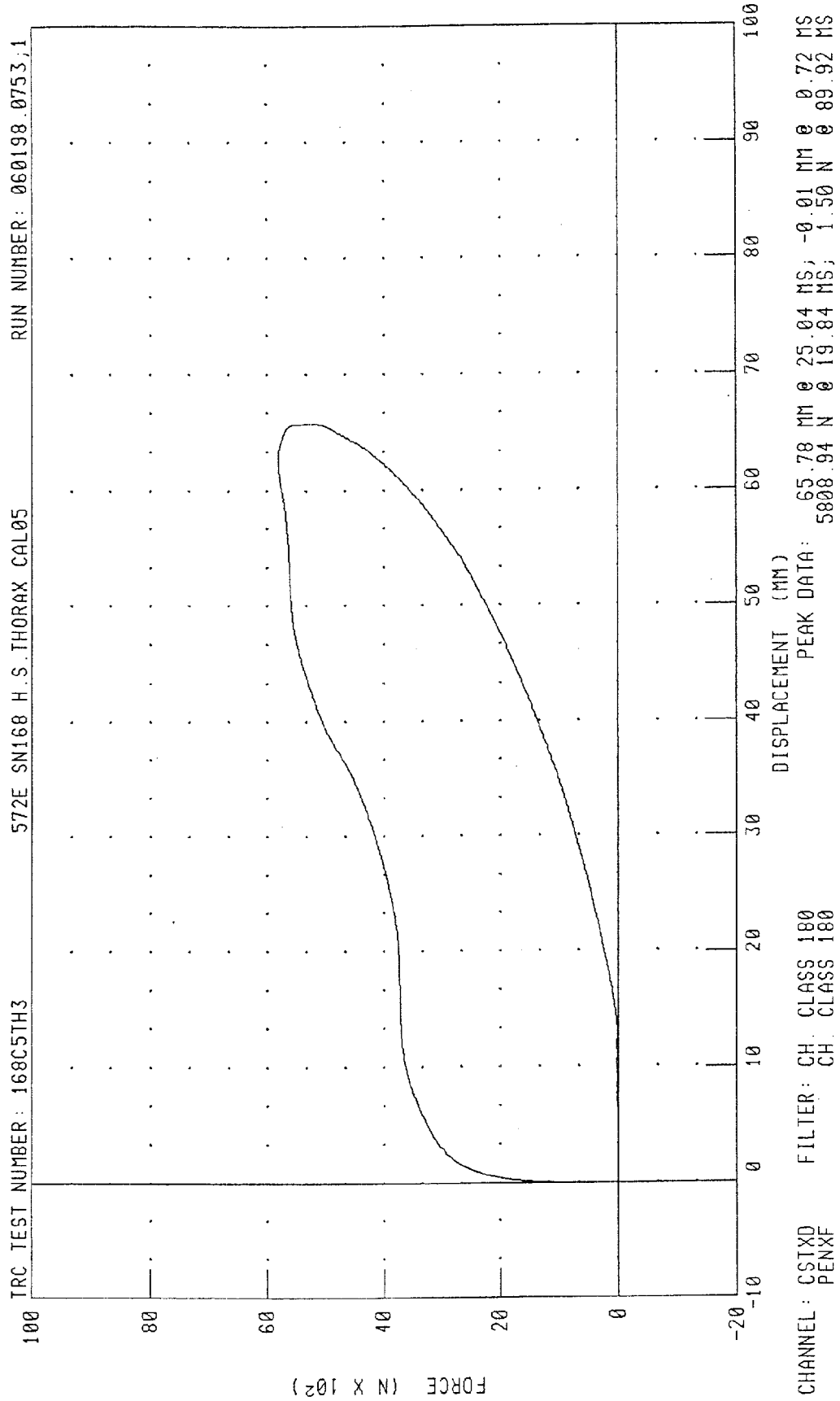


TIME (MS)

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

CHANNEL: CSTXD FILTER: CH. CLASS 180

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: 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

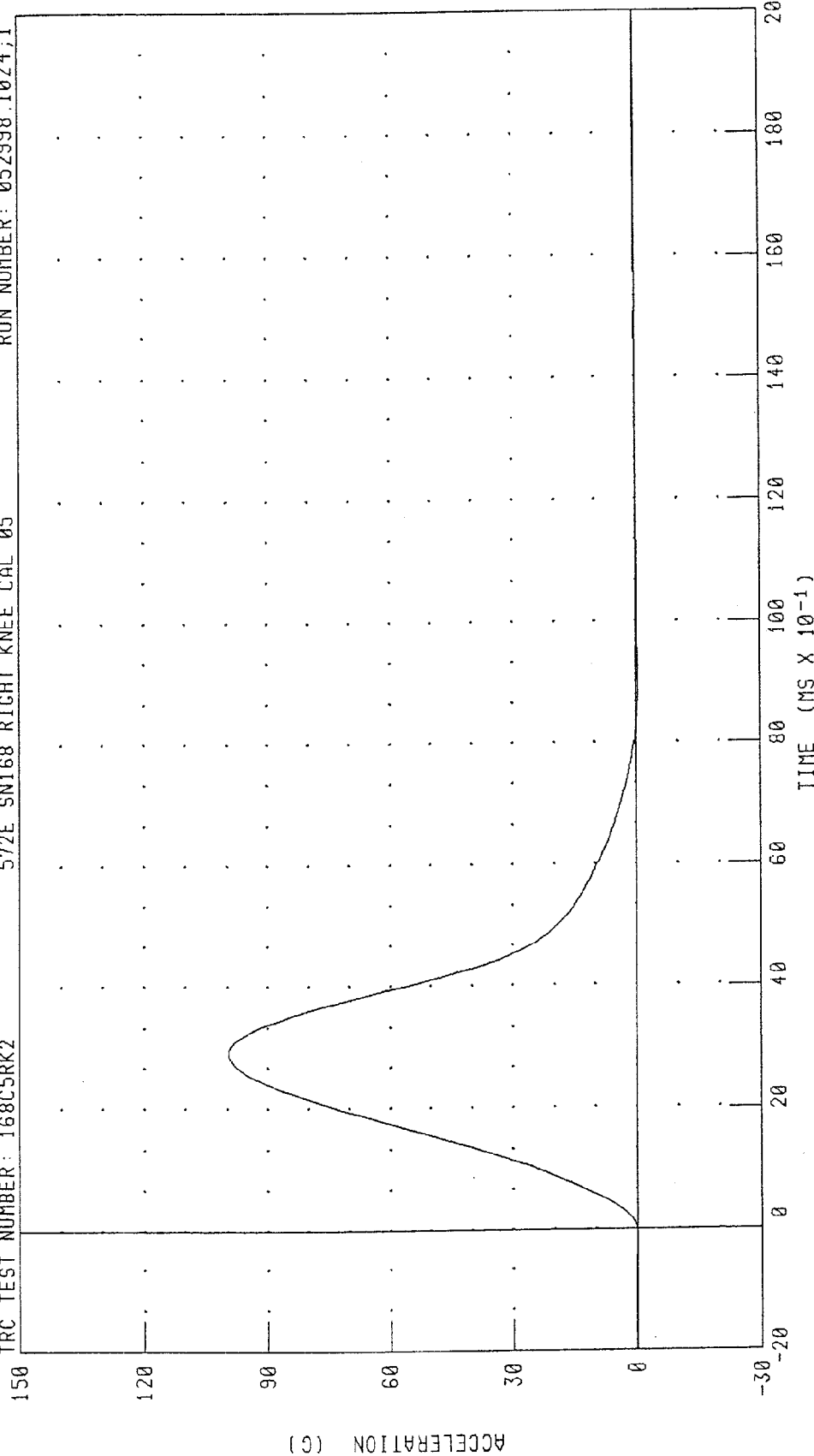
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND.)

RUN NUMBER: 052998.1024,1

572E SN168 RIGHT KNEE CAL 05

TRC TEST NUMBER: 168C5RK2



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

CHANNEL: PENXG FILTER: CH. CLASS 600

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN168 RIGHT KNEE CAL 05

TRC TEST NUMBER: 168C5RK2

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

75

60

45

30

15

0

-15

0

20

40

60

80

100

120

140

160

180

200

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

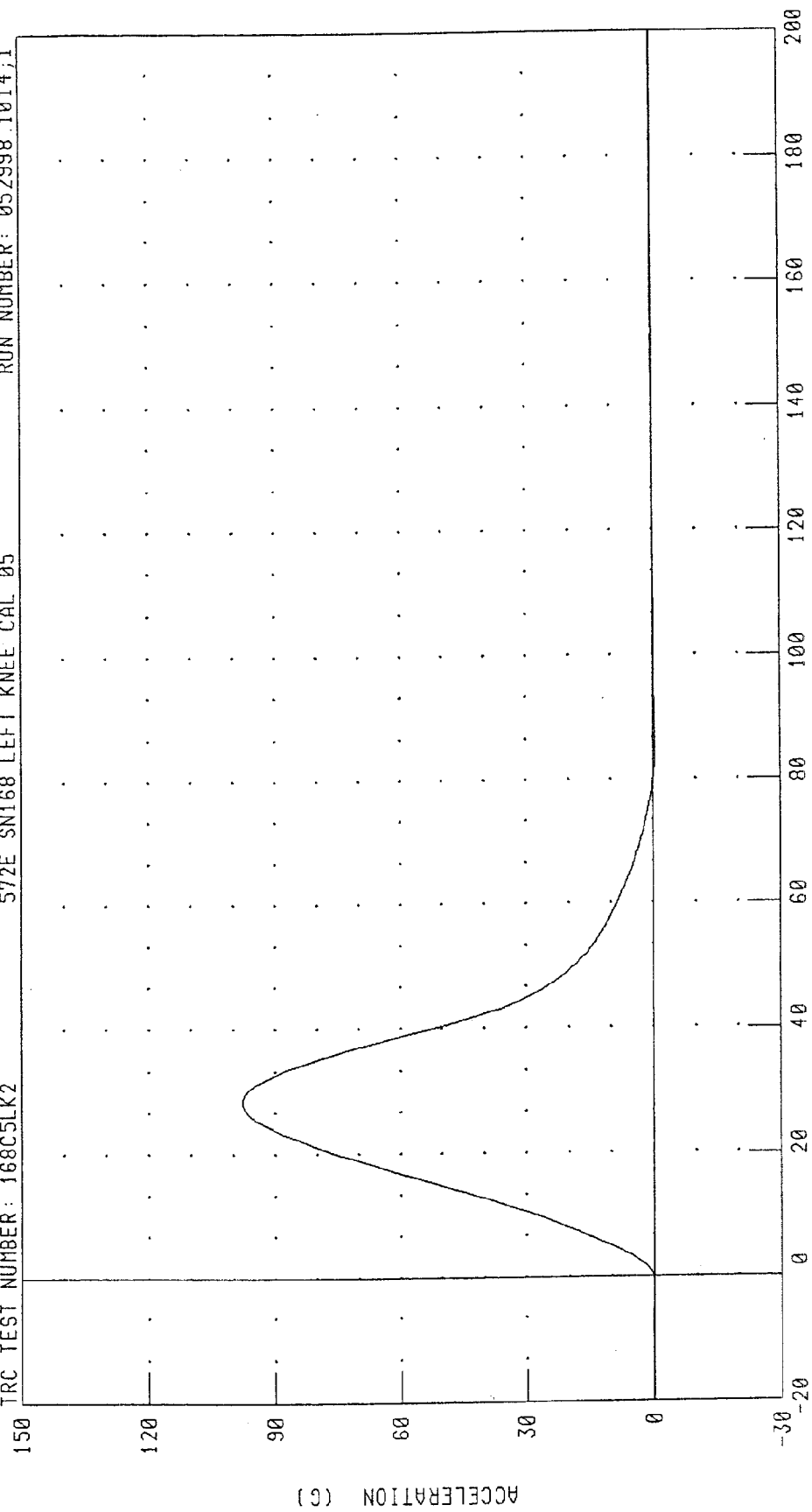
RUN NUMBER: 052998.1014;1

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

TRC TEST NUMBER: 168C5LK2

572E SN168 LEFT KNEE CAL 05

RUN NUMBER: 052998.1014;1



CHANNEL: PENXC FILTER: CH. CLASS 600

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

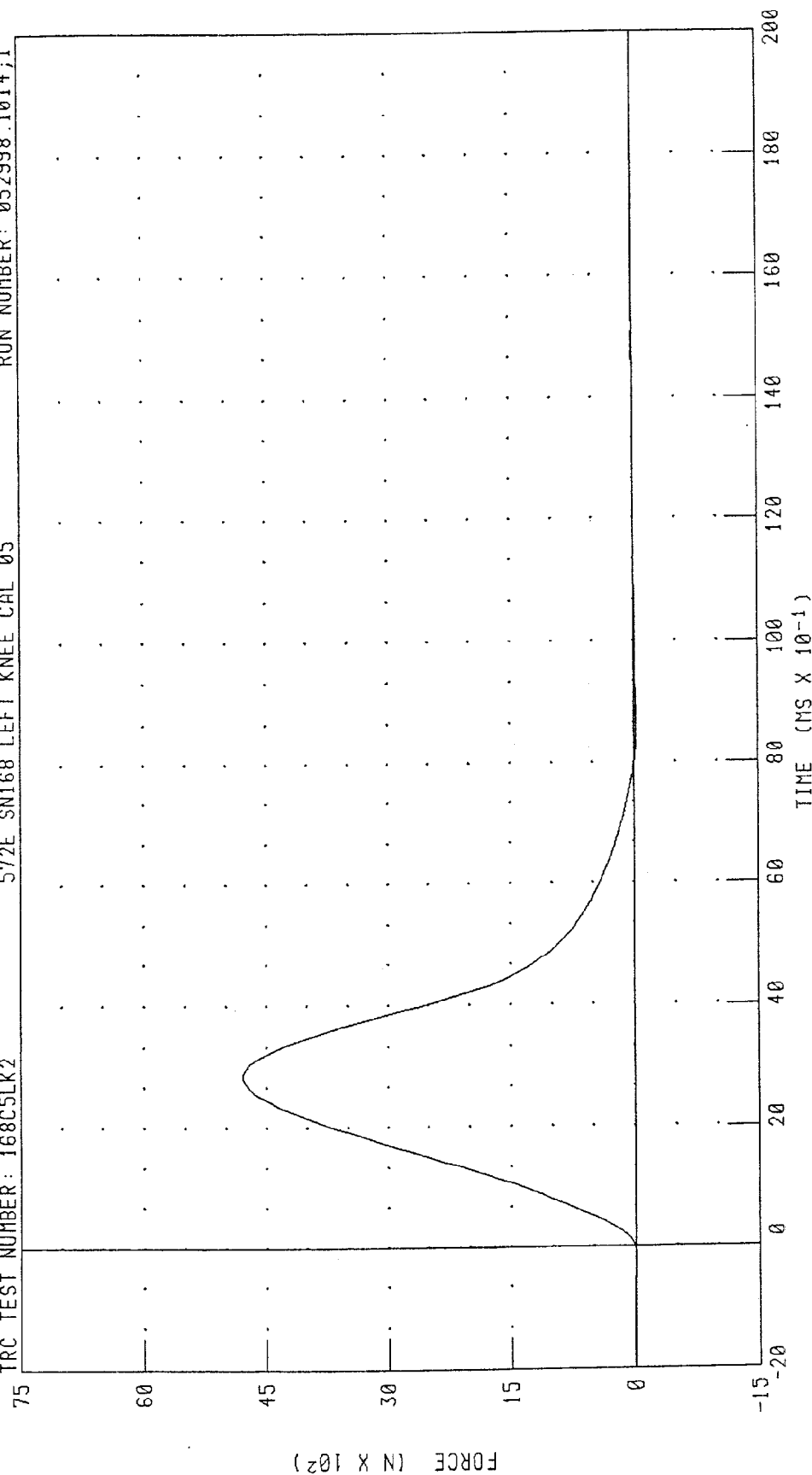
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 168C5LK2

572E SN168 LEFT KNEE CAL 05

RUN NUMBER: 052998.1014;1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 4782.20 N @ 2.88 MS, -33.54 N @ 8.56 MS

Pre-Test Calibration

Bullet 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

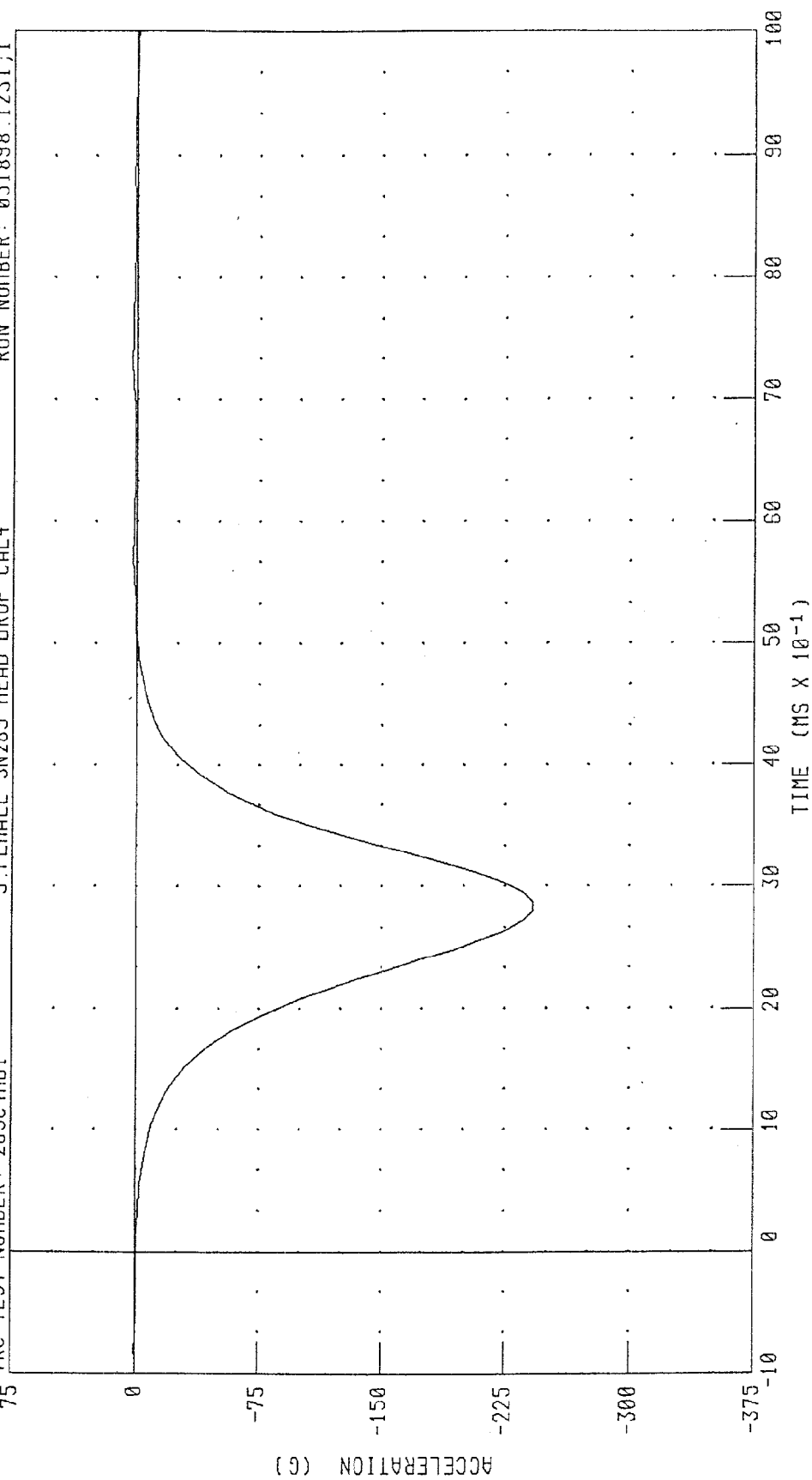
TECHNICIAN By Calt

RUN NUMBER: 051898.1228;1

SMALL FEMALE HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
S. FEMALE SN289 HEAD DROP CAL4

TRC TEST NUMBER: 289C4HD1

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

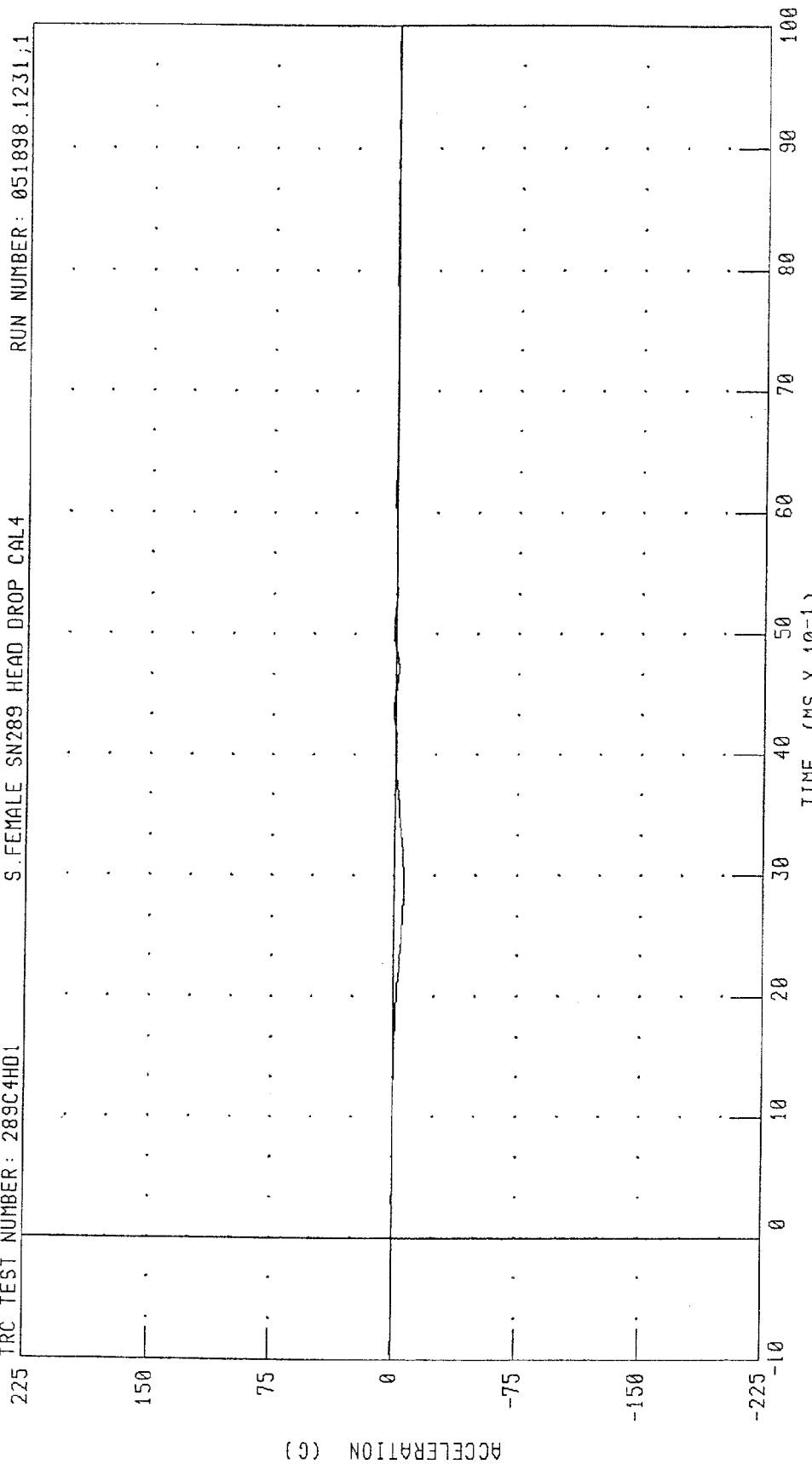
SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 289C4HD1

S.FEMALE SN289 HEAD DROP CAL4

RUN NUMBER: 051898.1231;1



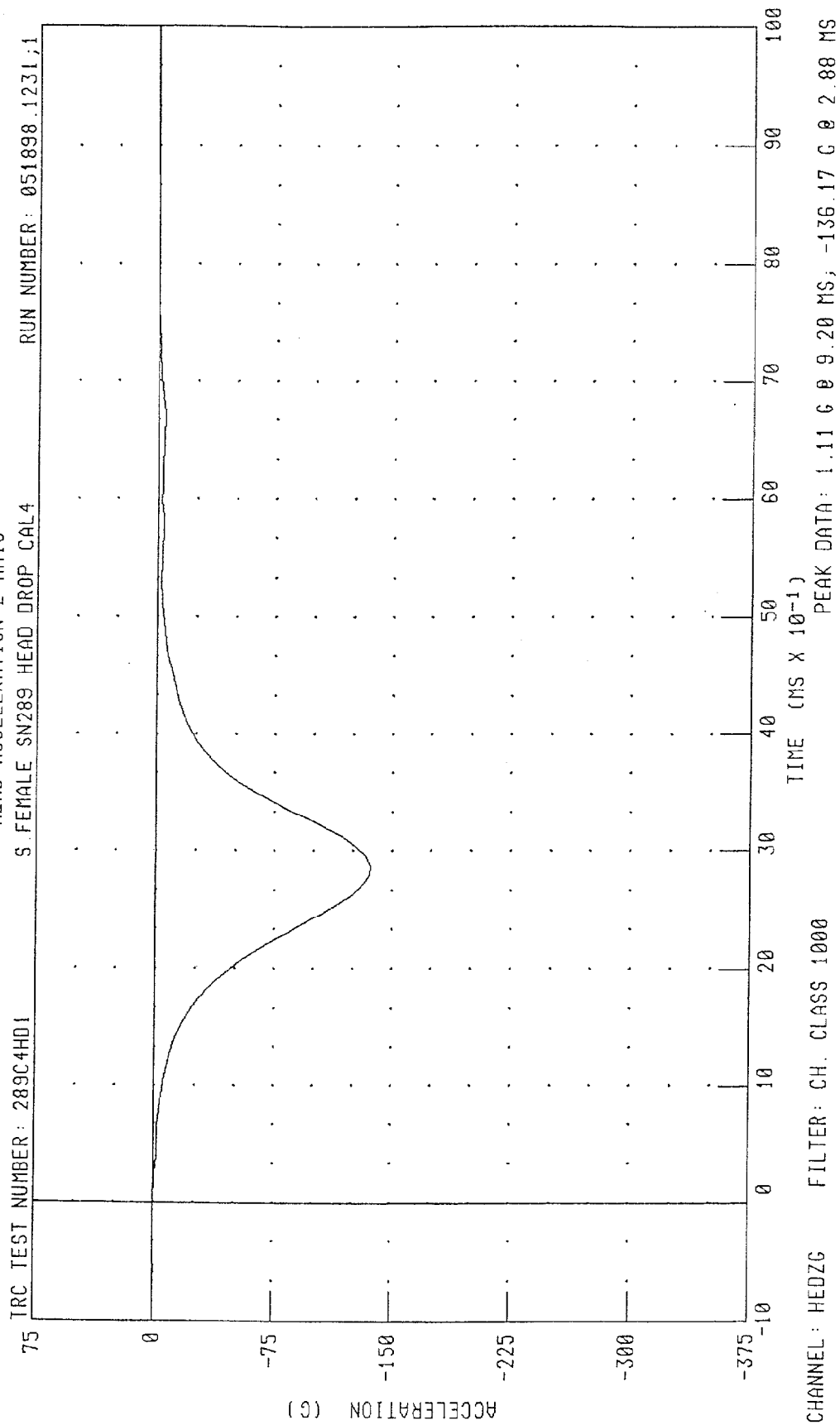
TIME (MS X 10⁻¹)

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

FILTER: CH. CLASS 1000

CHANNEL: HEDYG

SMALL FEMALE HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS



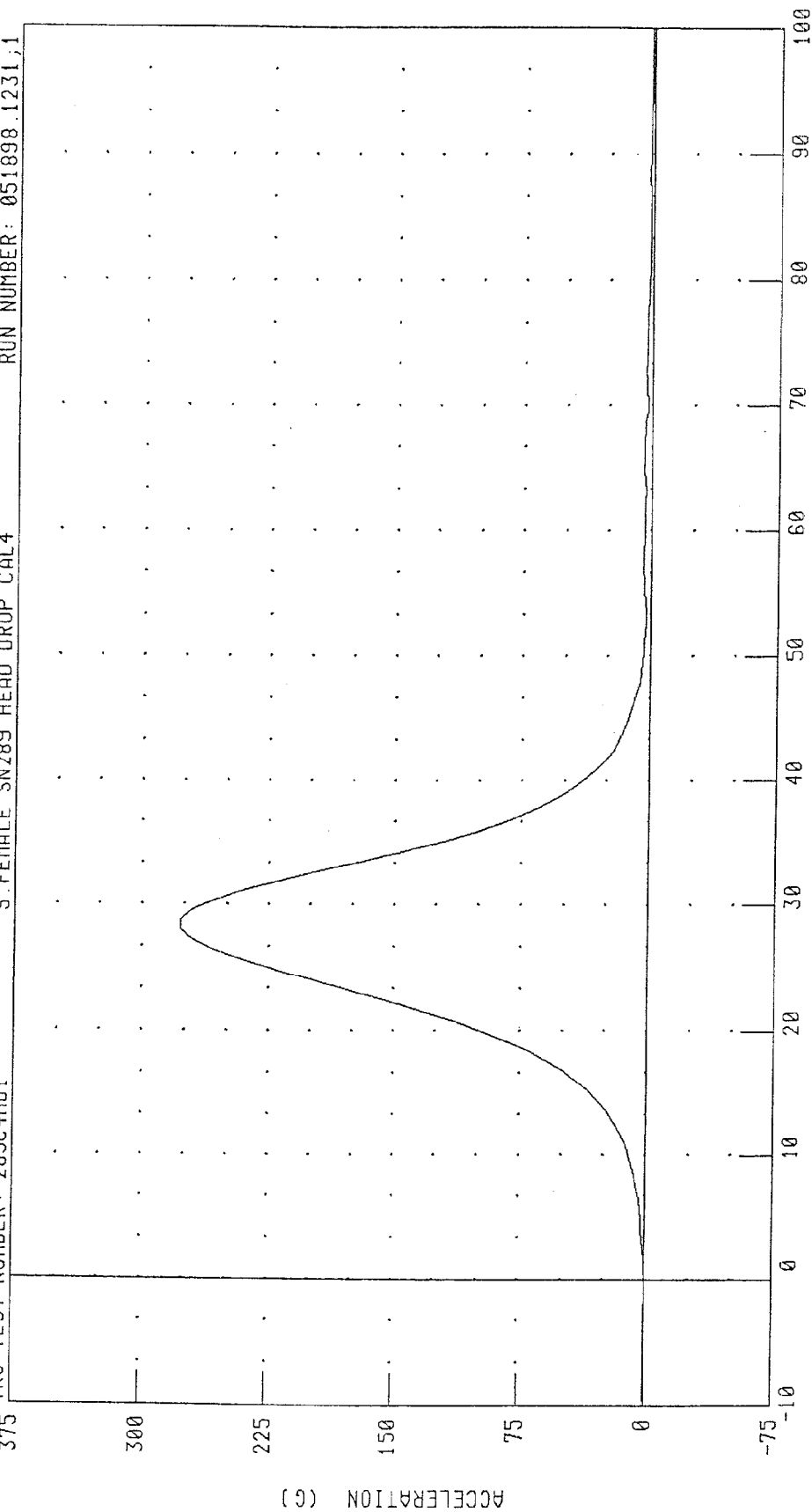
SMALL FEMALE HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 28904H01

RUN NUMBER: 051898.1231,1

S. FEMALE SN289 HEAD DROP CAL4



CHANNEL: HEDRC FILTER: CH. CLASS 1000

TIME (MS $\times 10^{-1}$)

PEAK DATA: 277.31 G @ 2.88 MS; 0.18 G @ -0.16 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

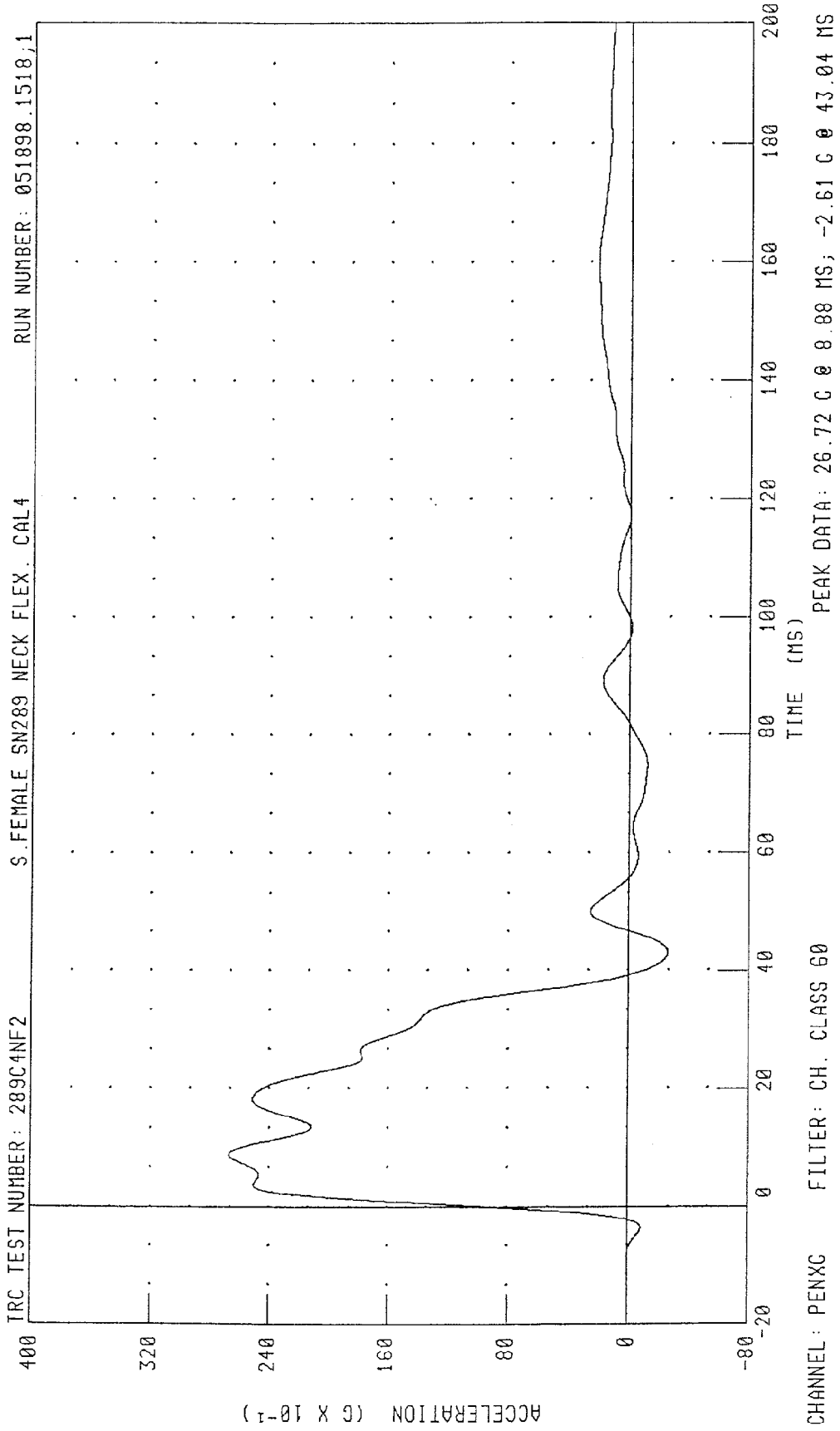
TEST MEETS SPECIFICATIONS

TECHNICIAN

B. C. Alt

RUN NUMBER: 051898.1517;1

SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION



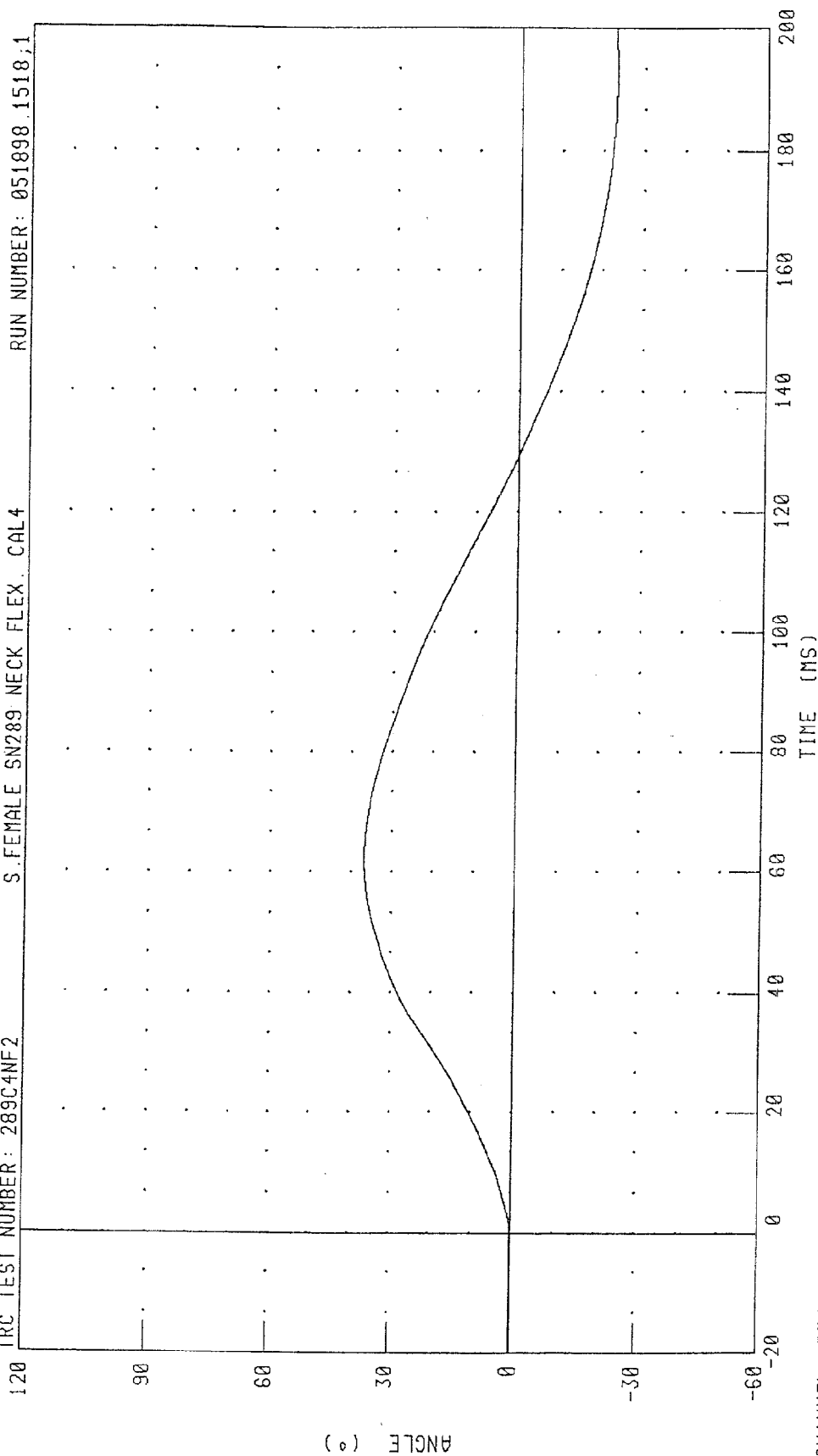
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

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

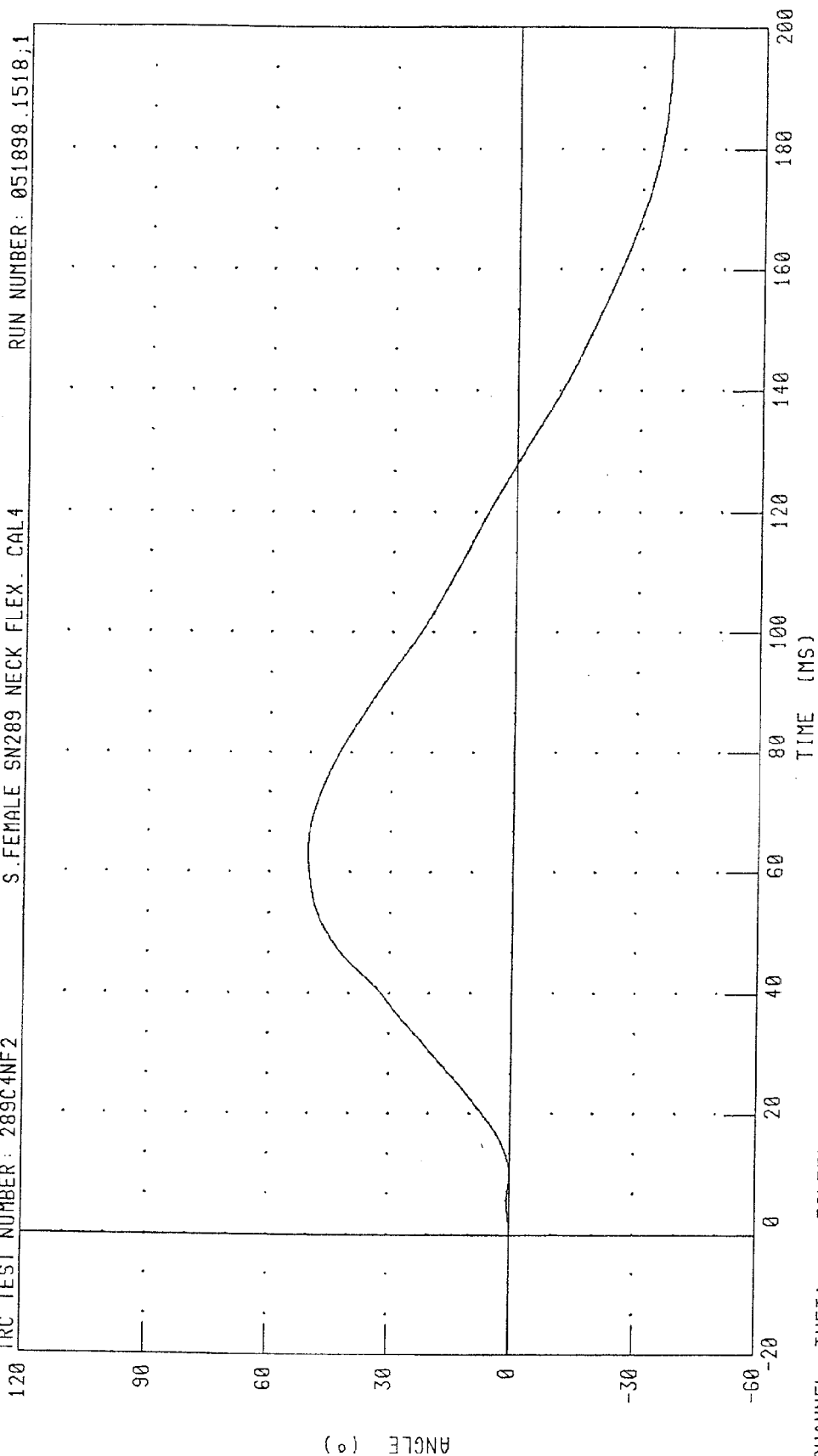
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

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

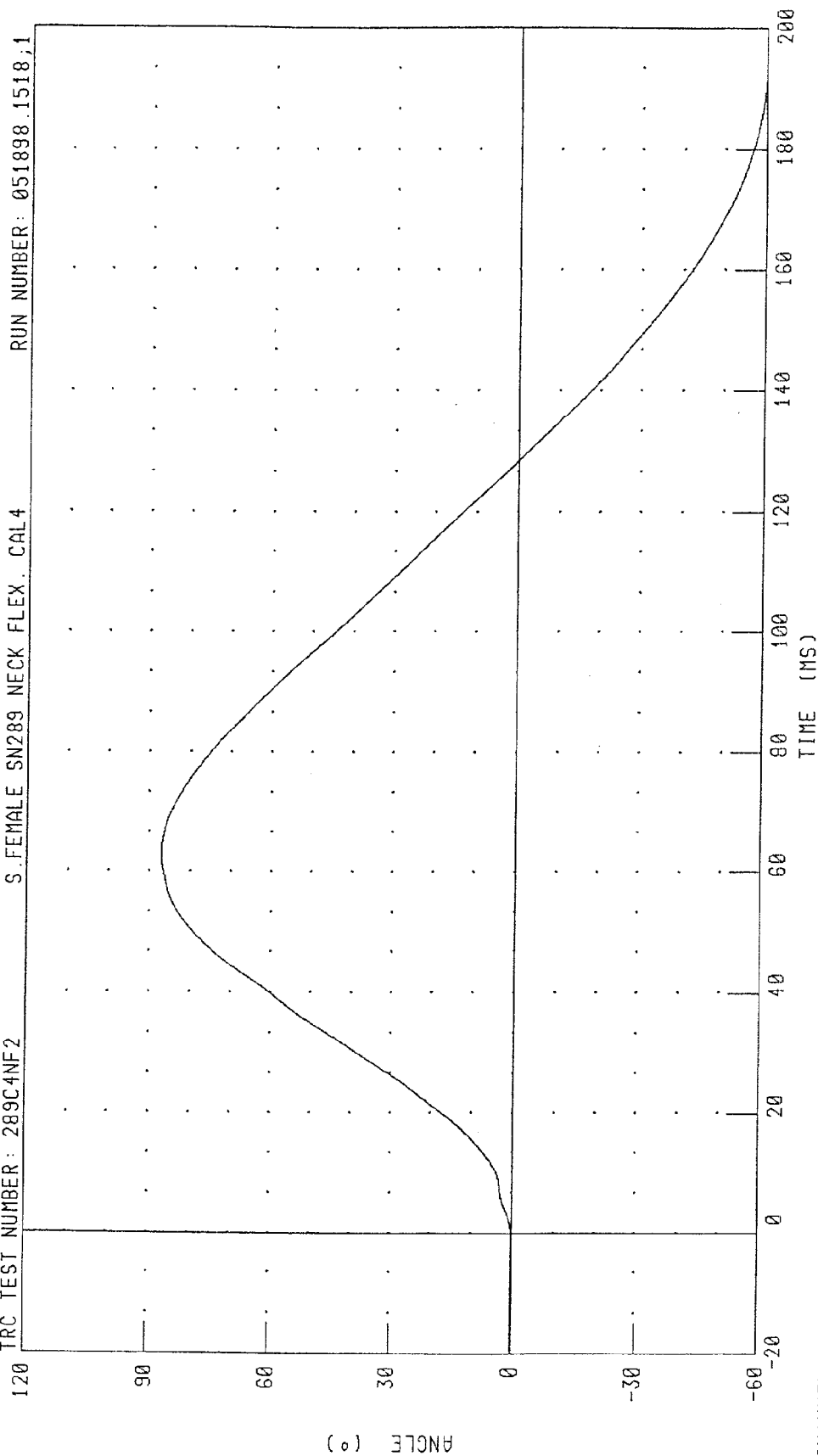
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

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

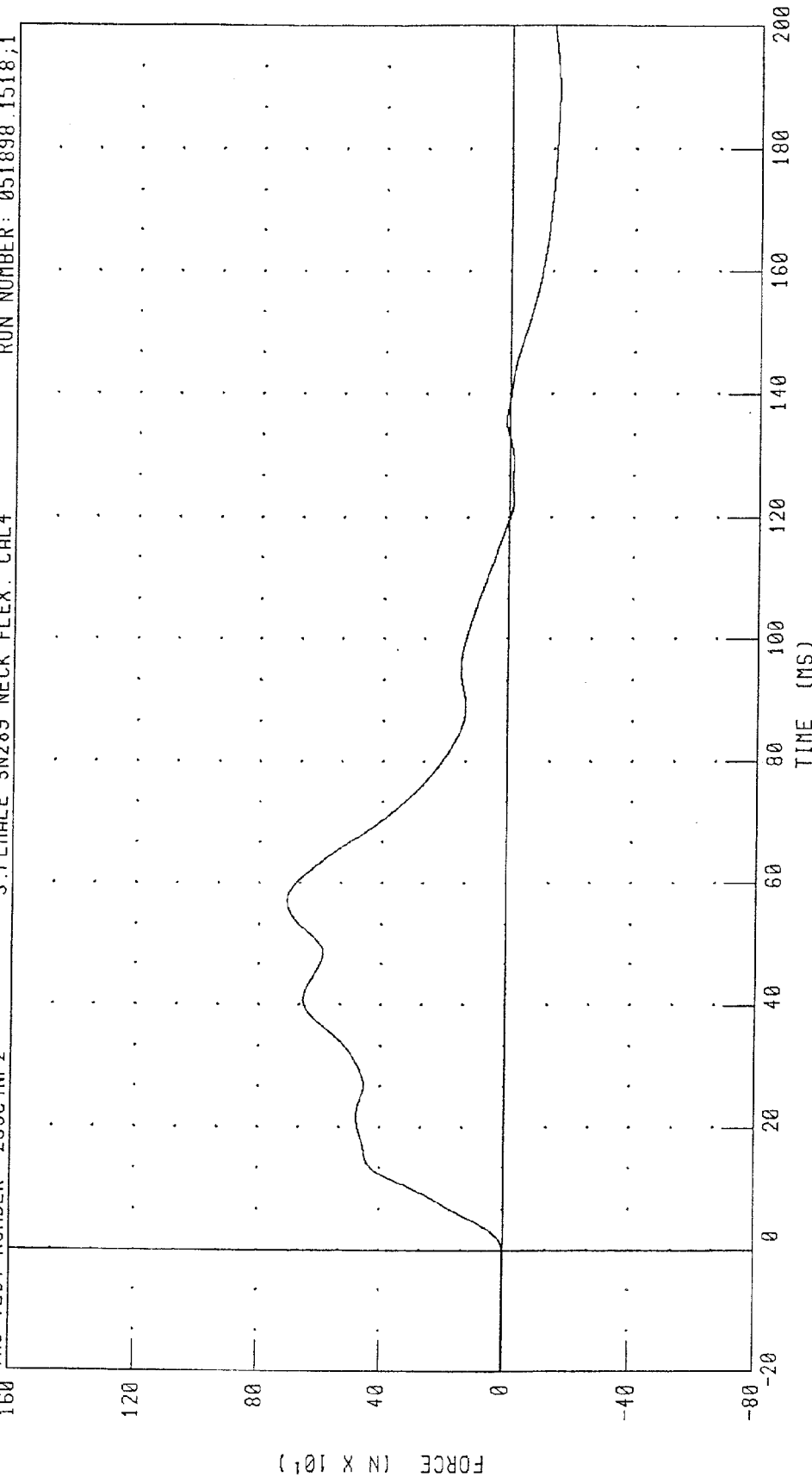
SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 289C4NF2

S. FEMALE SN289 NECK FLEX. CAL4

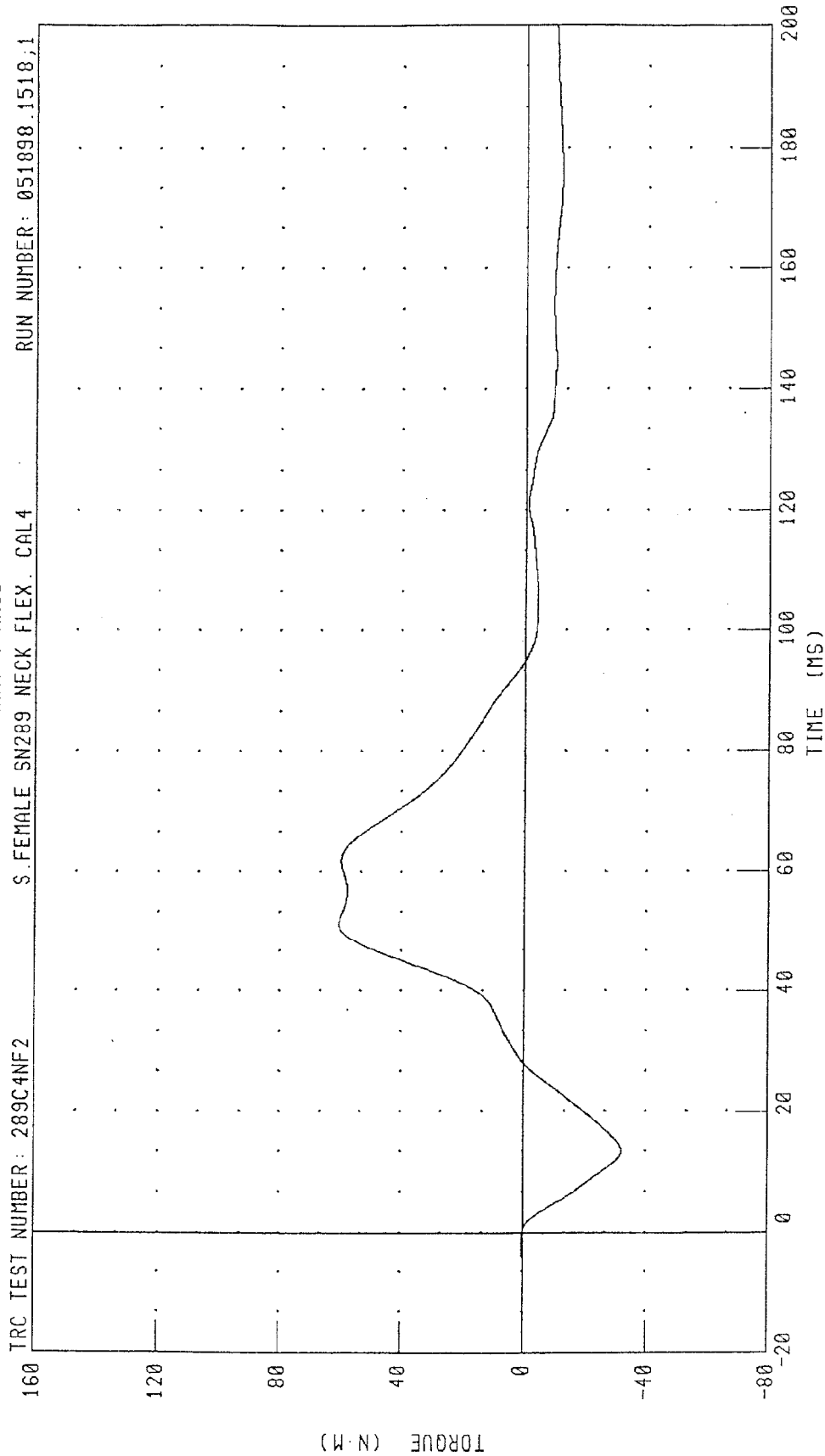
RUN NUMBER: 051898.1518;1



CHANNEL: NEKXF FILTER: CH. CLASS 60

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

SMALL FEMALE HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS



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

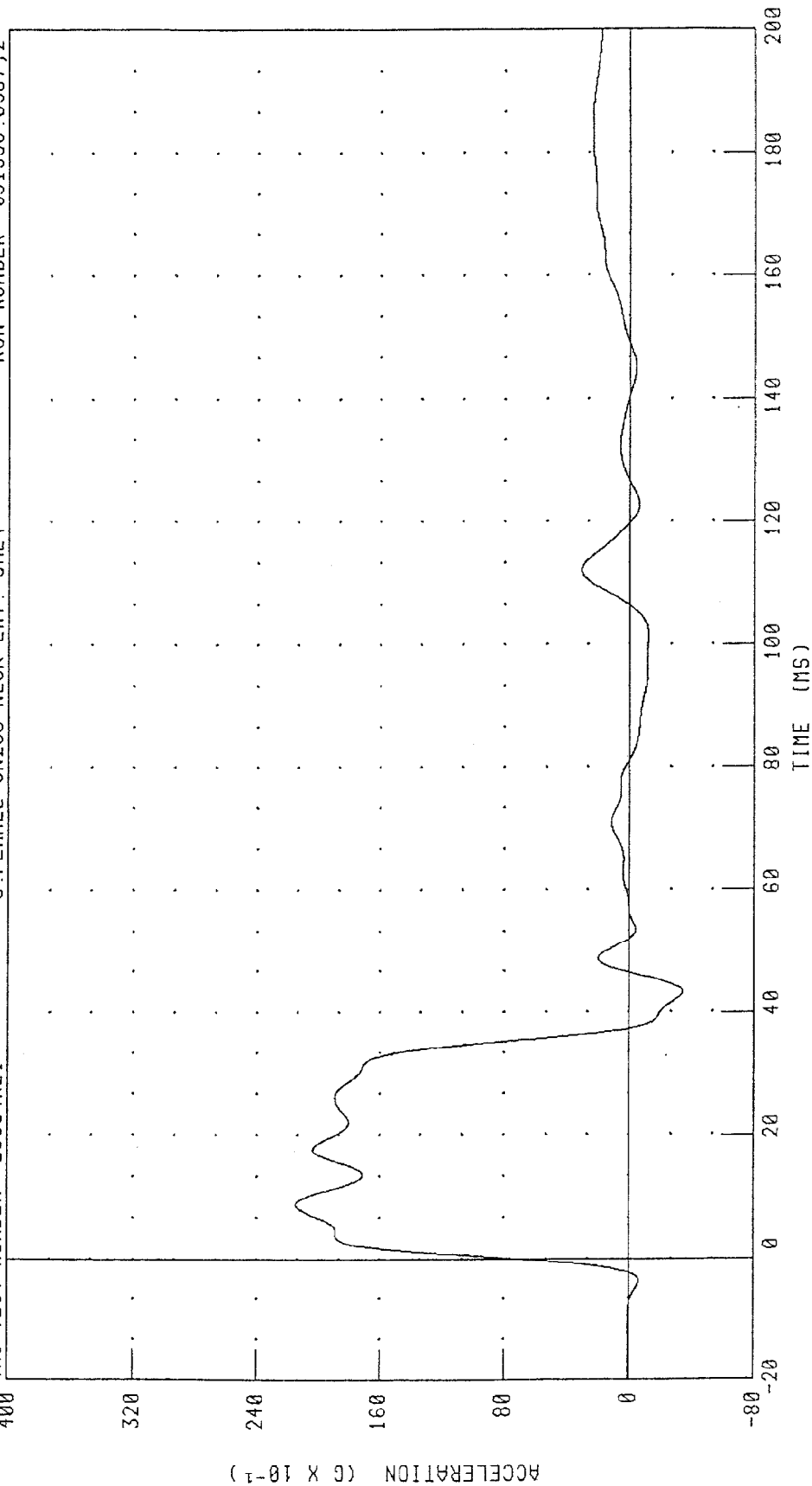
TECHNICIAN B. C. Pitt

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



CHANNEL: PENXC FILTER: CH. CLASS 60

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

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

120

90

60

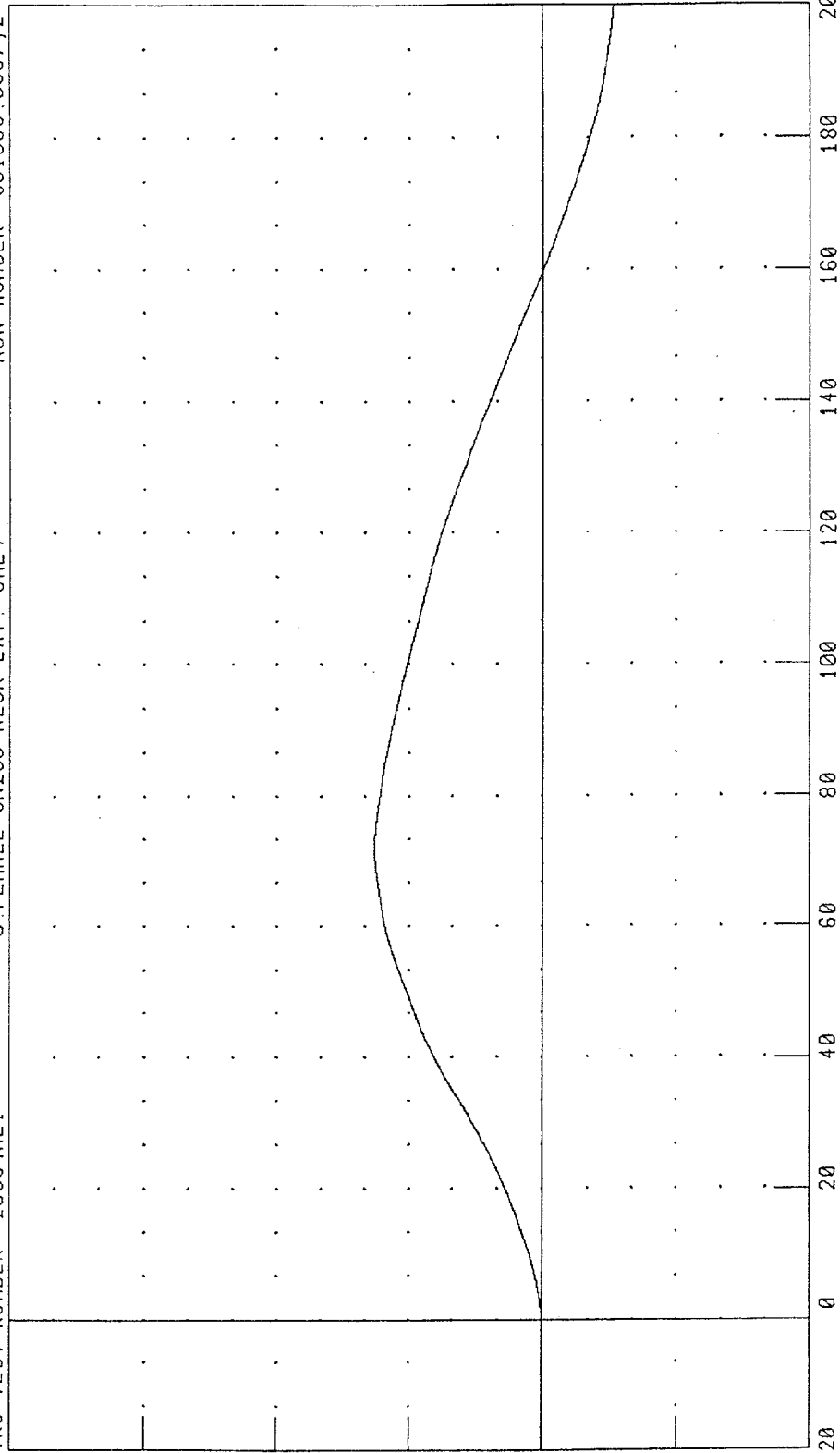
30

0

-30

-60

ANGLE (°)



TIME (MS)

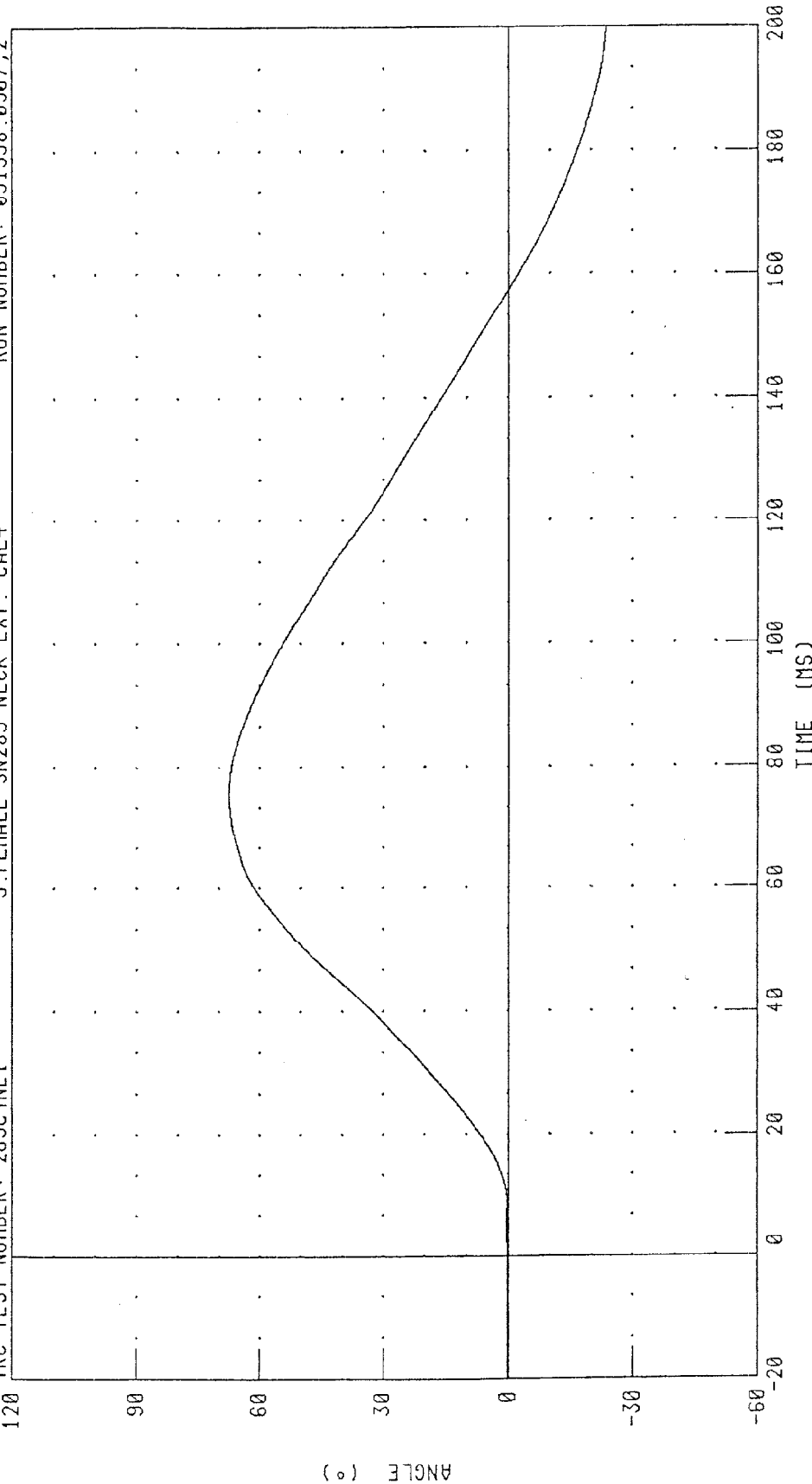
CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 37.73 ° @ 72.16 MS; -16.03 ° @ 200.00 MS

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

TRC TEST NUMBER: 289C4NE1

RUN NUMBER: 051998.0907,2



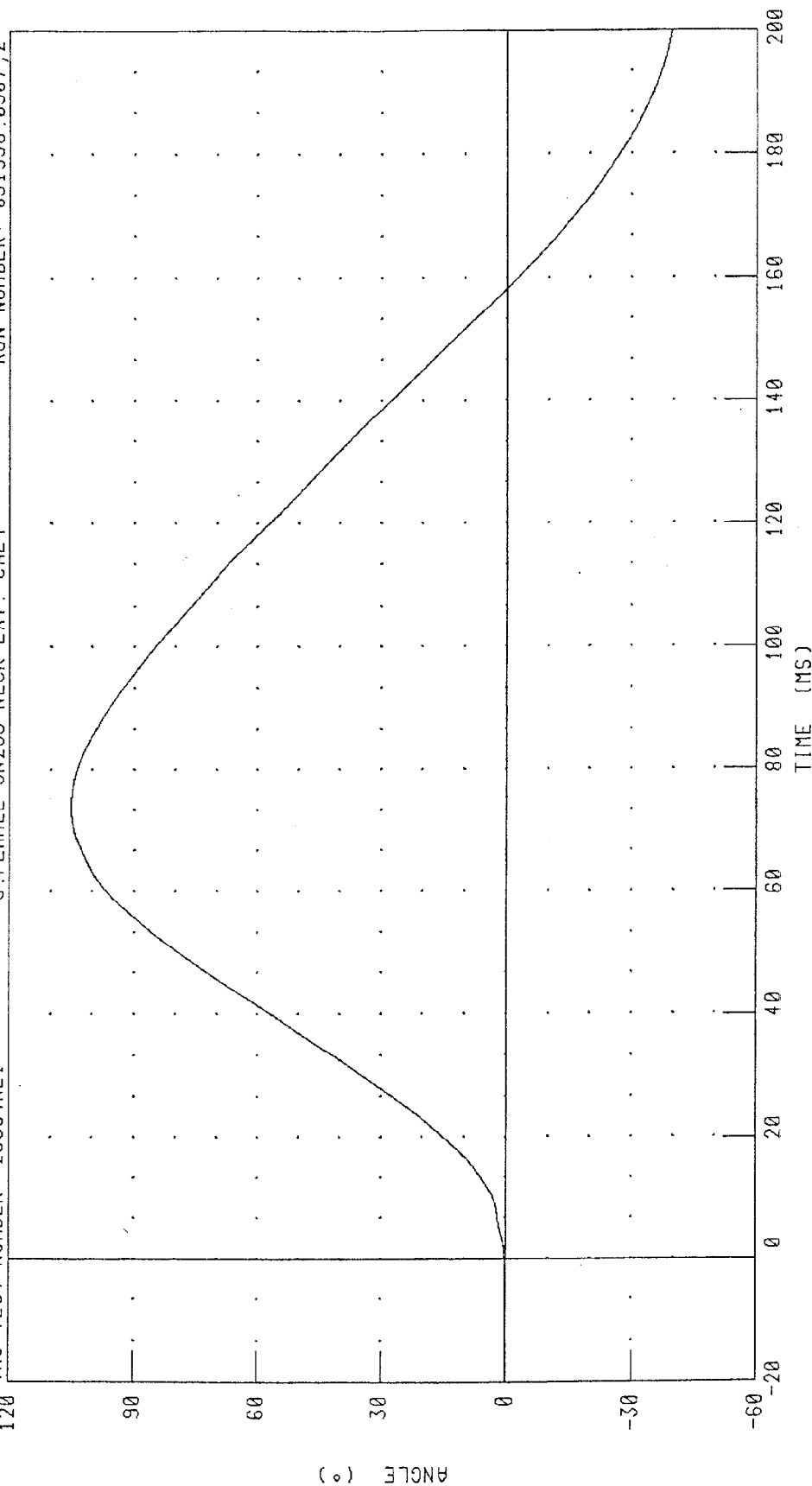
CHANNEL: THETA FILTER: CH. CLASS 60

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



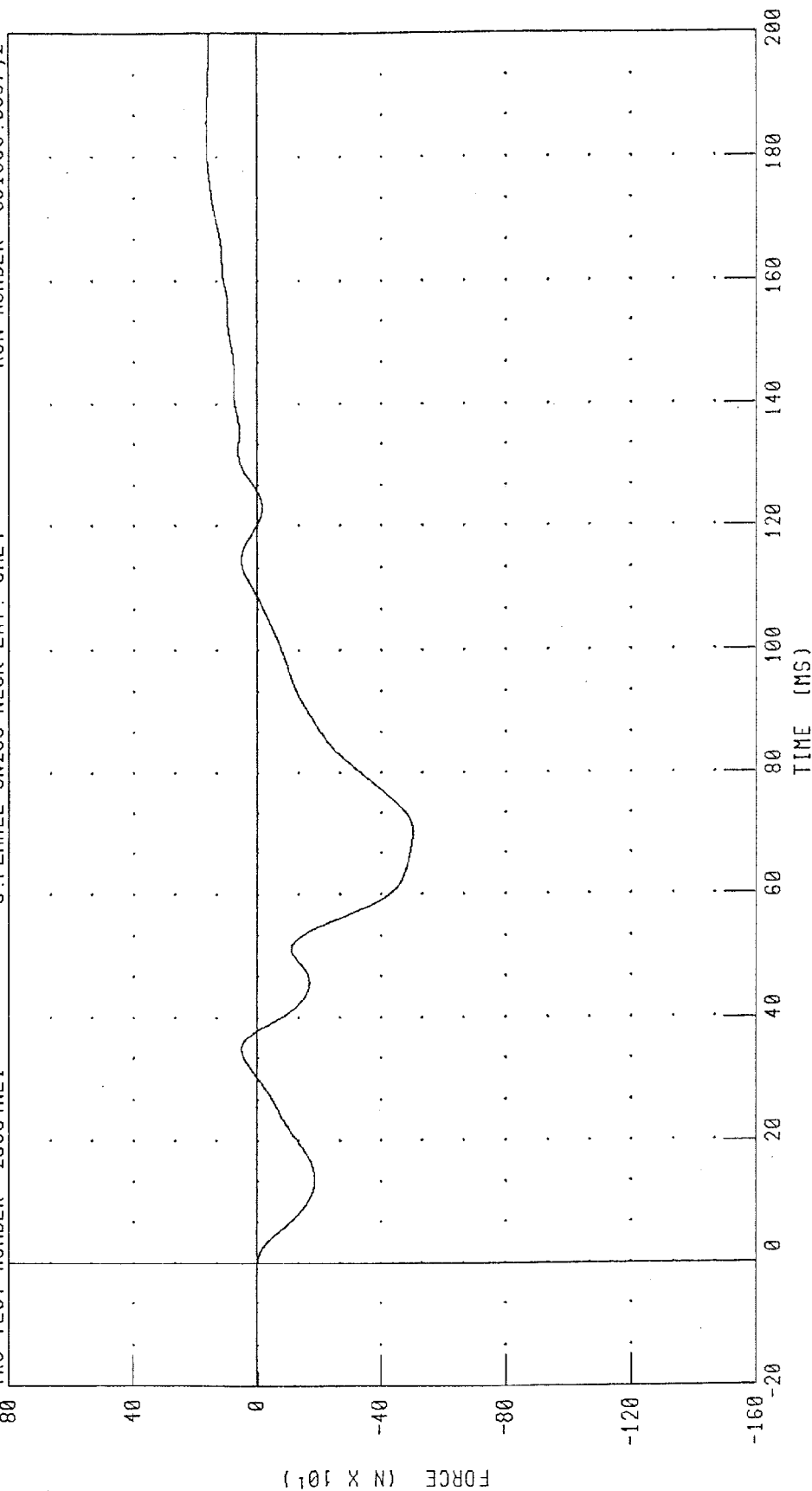
CHANNEL: TOTAL FILTER: CH. CLASS 60

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

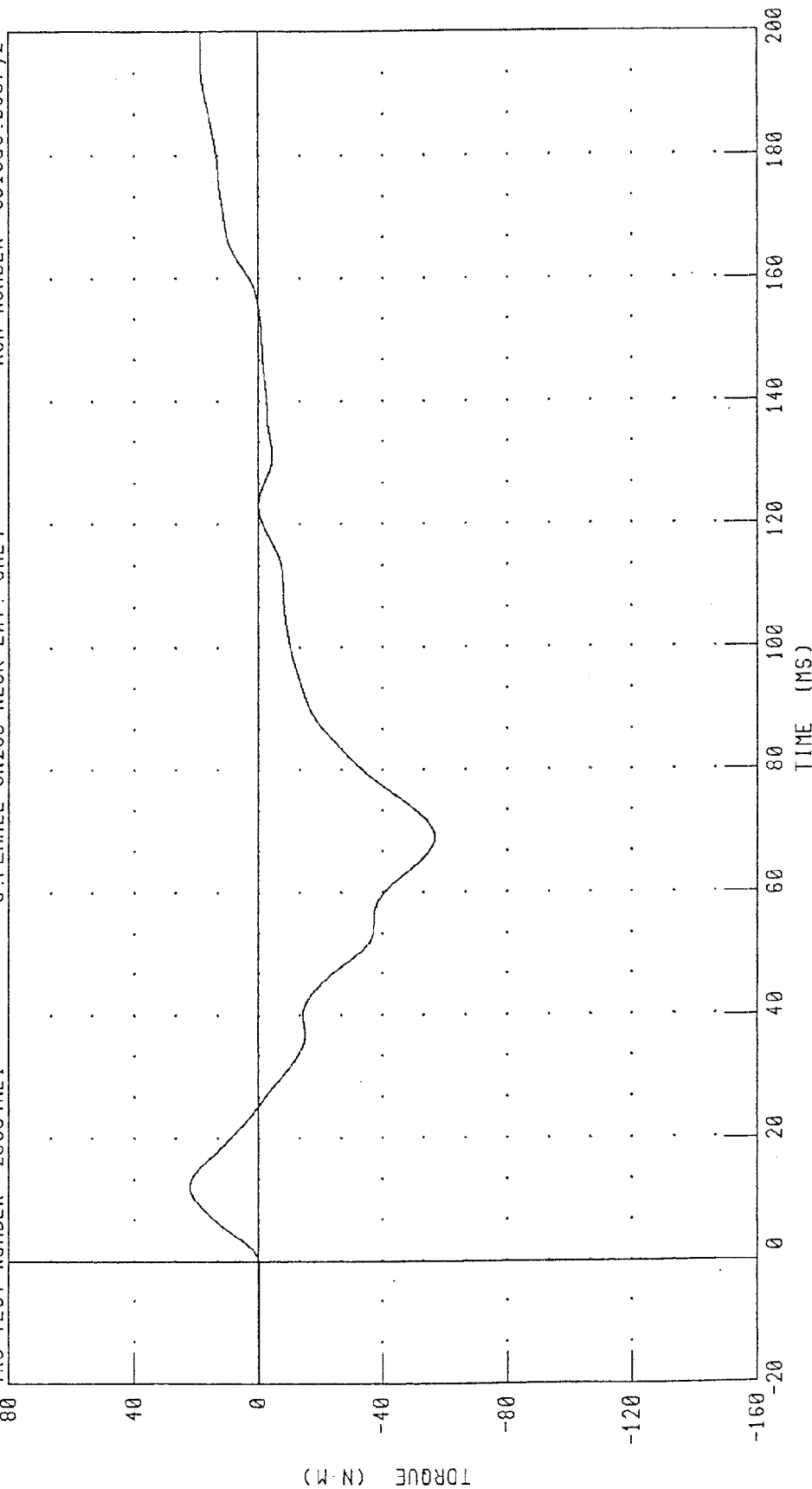


CHANNEL: NEKXF FILTER: CH. CLASS 60

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

SMALL FEMALE NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS

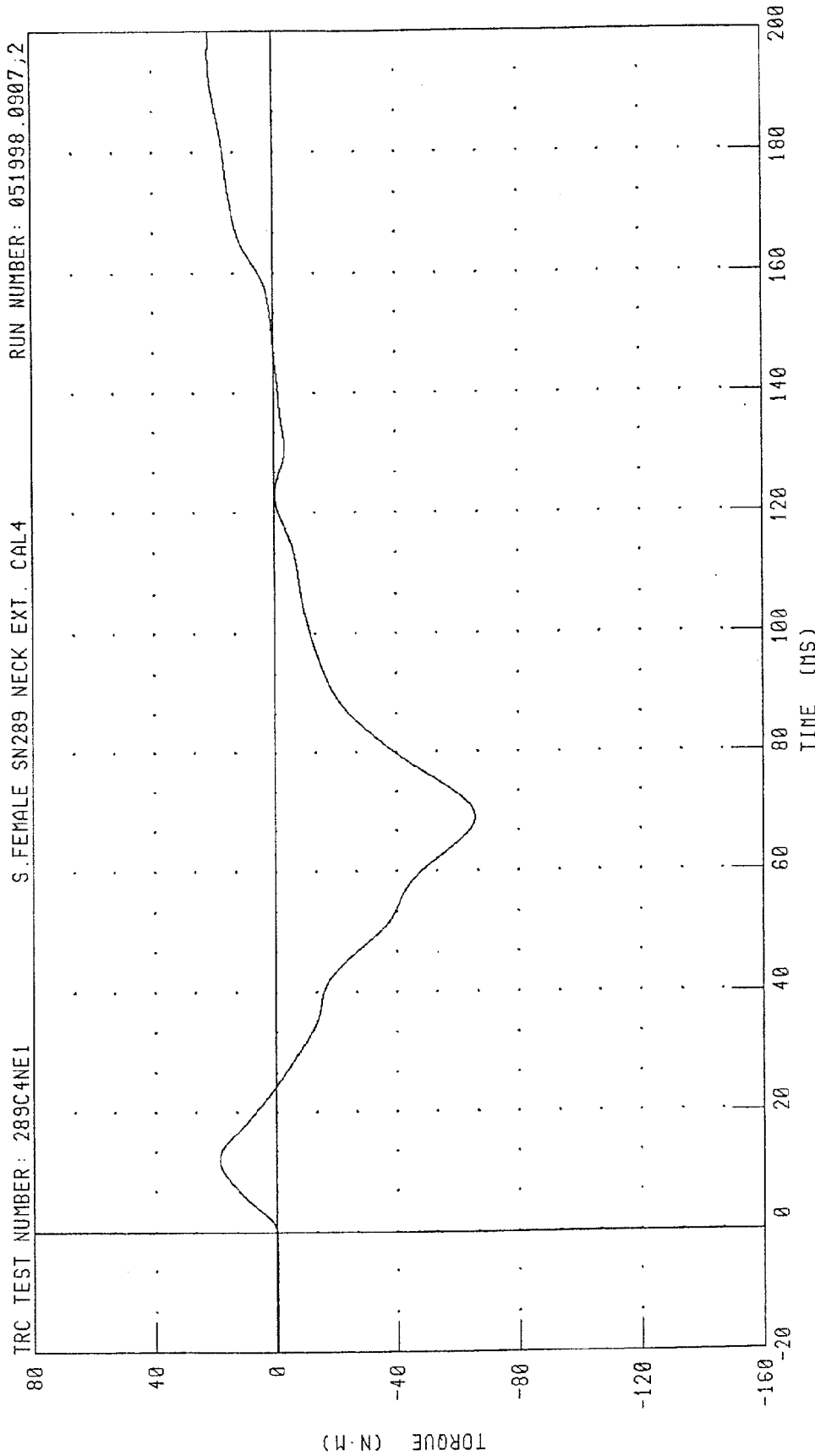
TRC TEST NUMBER: 289C4NE1 S.FEMALE SN289 NECK EXT. CAL4 RUN NUMBER: 051998.0907;2



PEAK DATA: 22.14 N M @ 12.24 MS, -56.87 N M @ 68.96 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

SMALL FEMALE NECK EXTENSION CALIBRATION TOTAL MOMENT ABOUT OCCIPITAL CONDYLE



TRC TEST NUMBER: 289C4NE1

S. FEMALE SN289 NECK EXT. CAL4

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

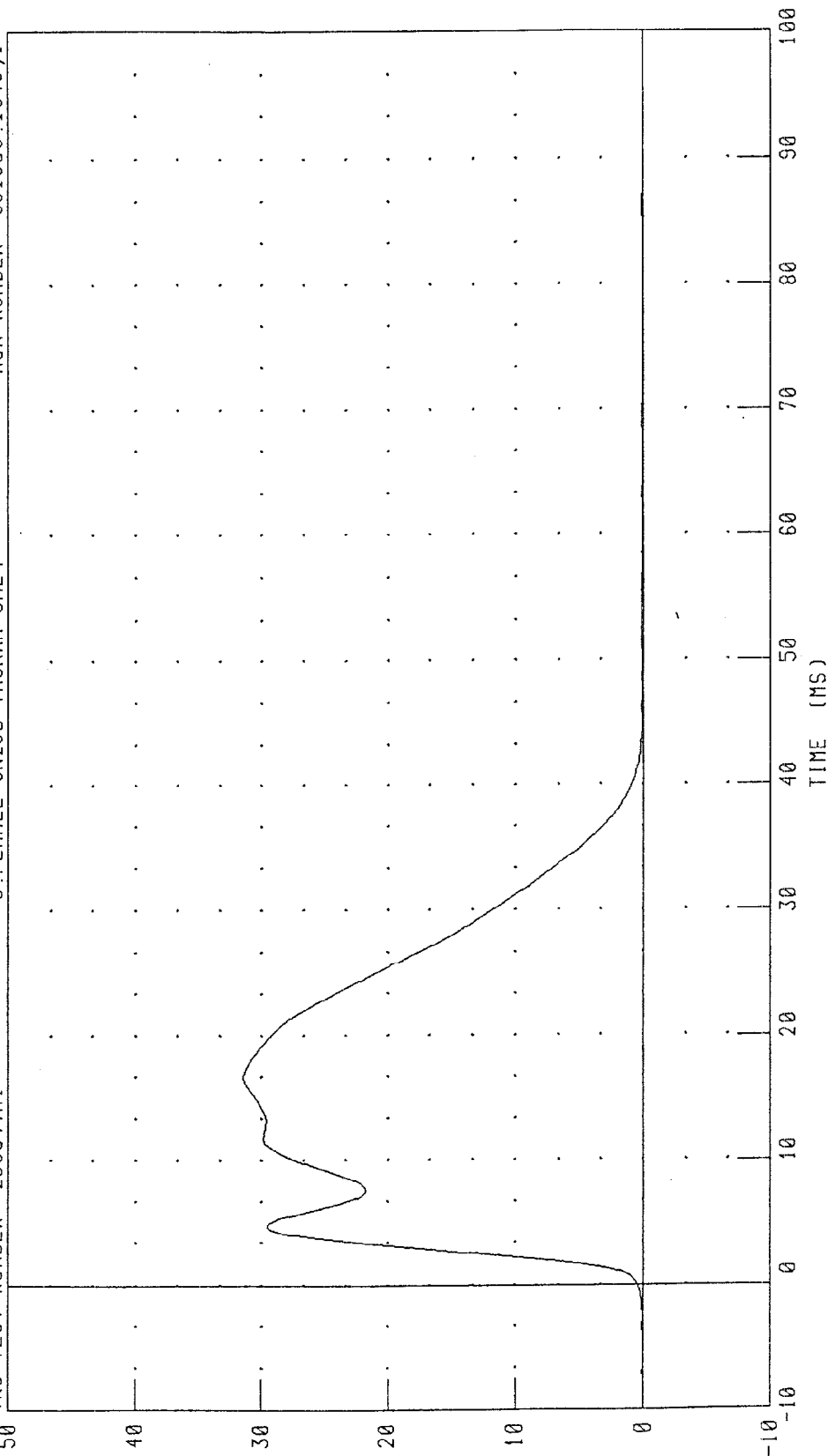
SMALL FEMALE THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 289C4TH1

S. FEMALE SN289 THORAX CAL4

RUN NUMBER: 051998.1046;1

50



CHANNEL: PENXC FILTER: CH. CLASS 180

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

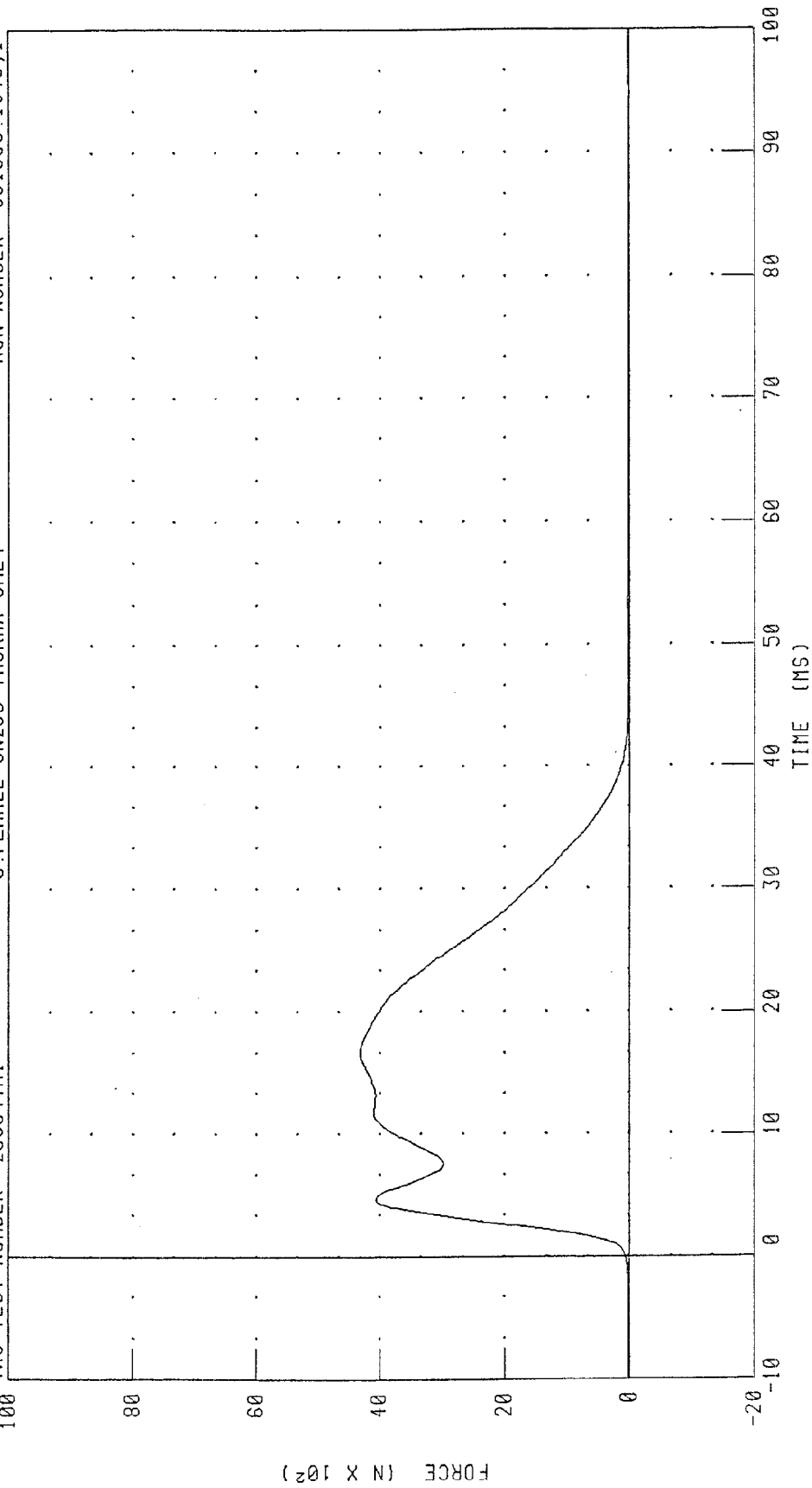
SMALL FEMALE THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 289C4TH1

S.FEMALE SN289 THORAX CAL4

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

150

120

90

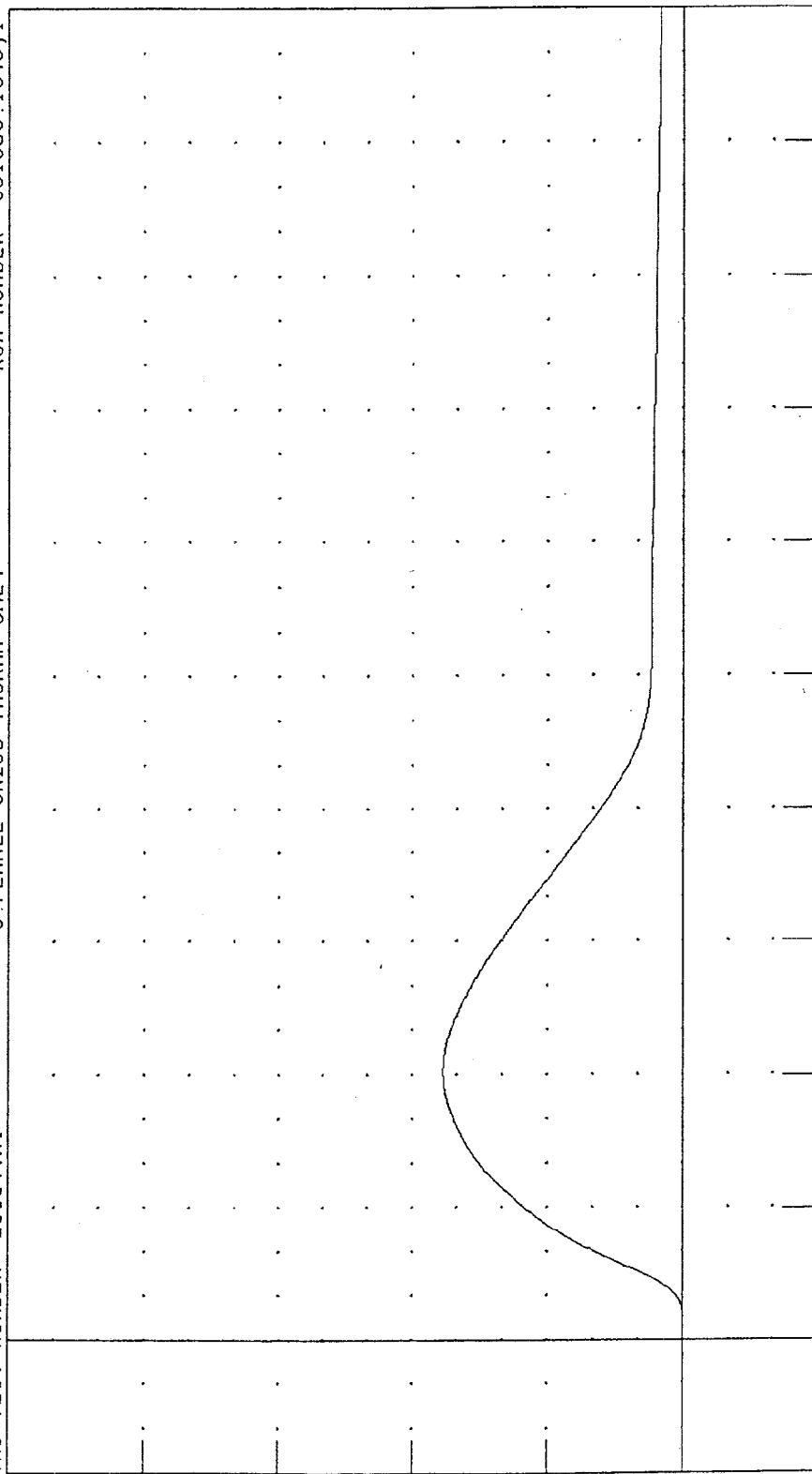
60

30

0

-30

DISPLACEMENT (MM)

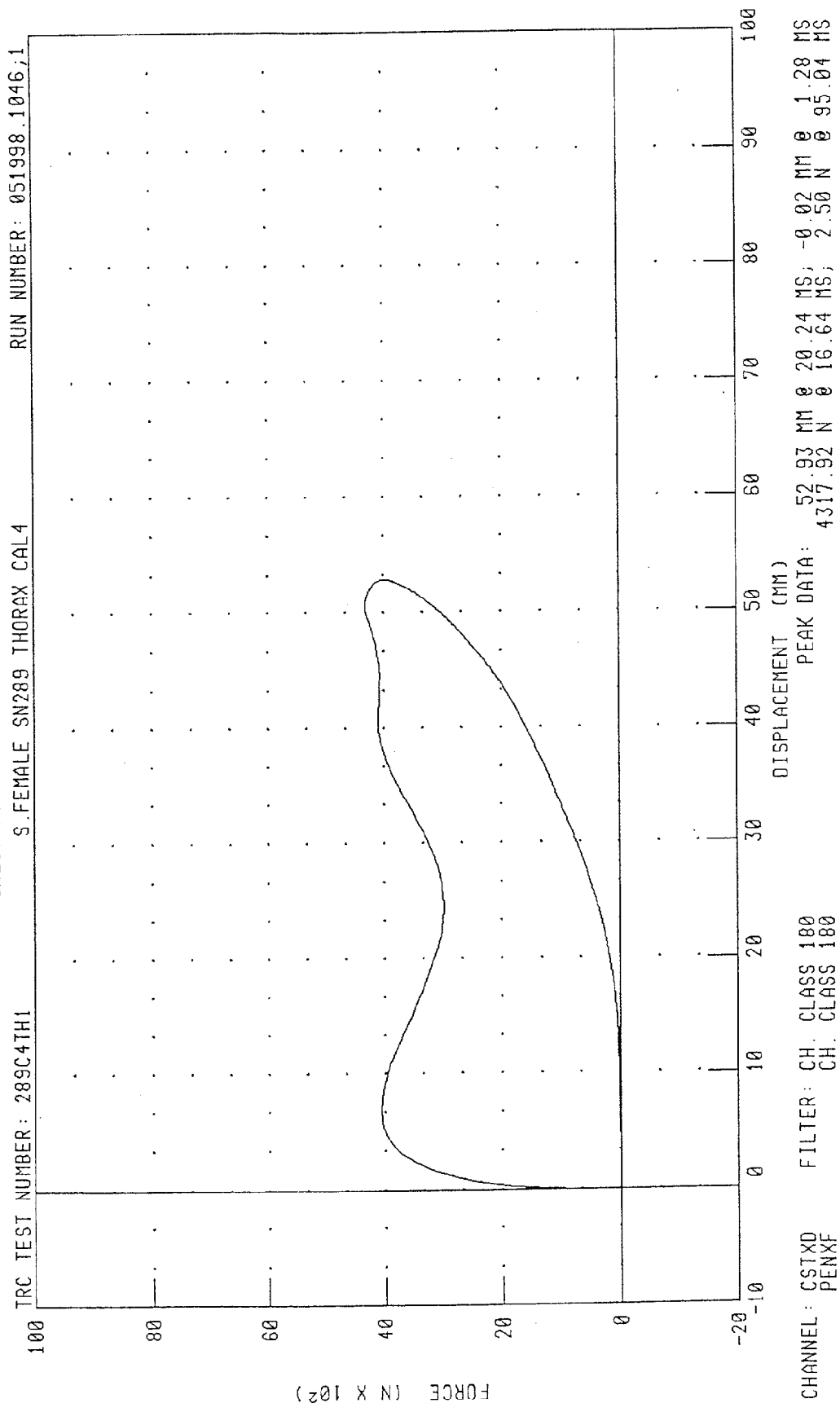


TIME (MS)

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



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

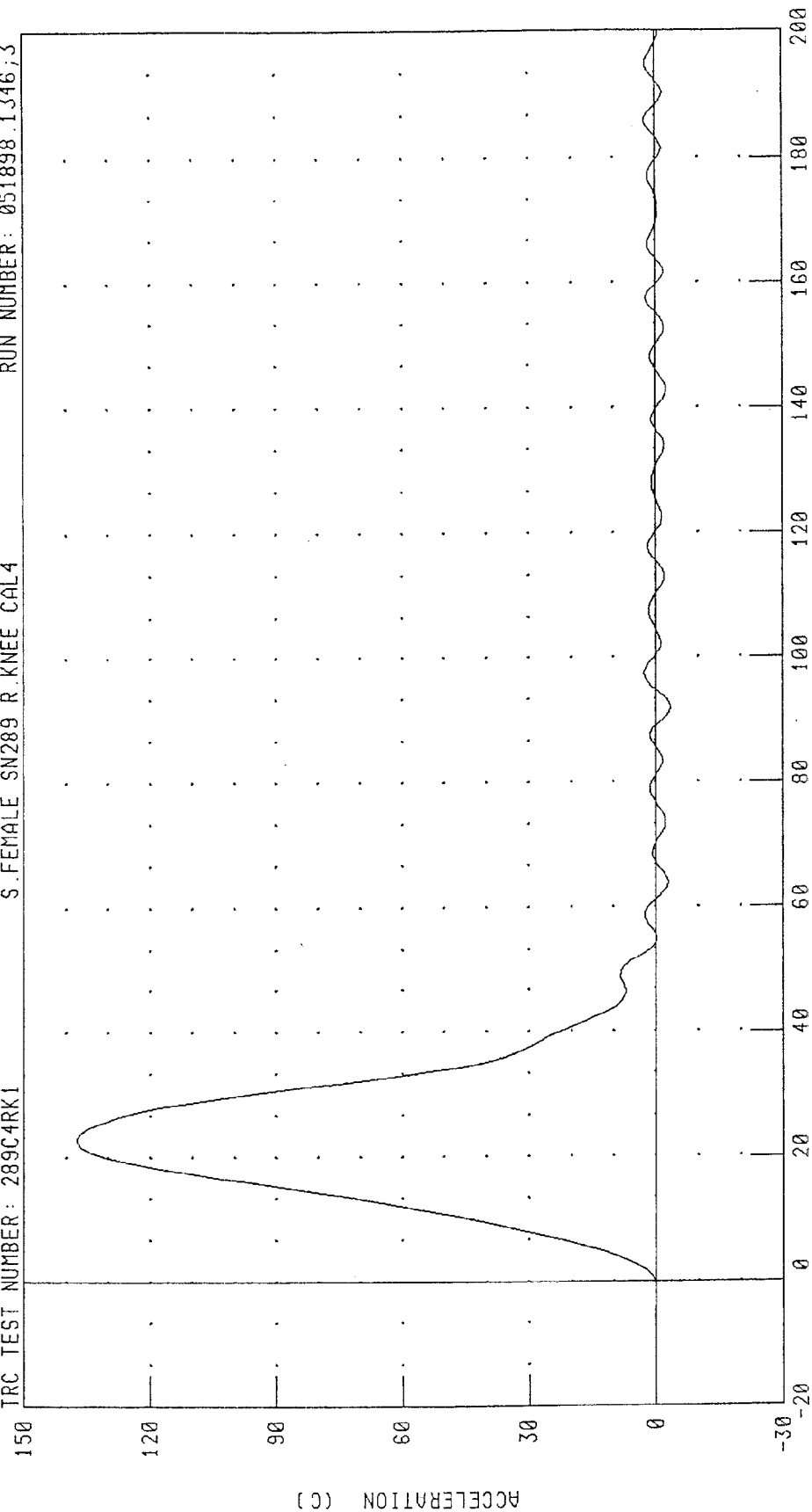
RUN NUMBER: 051898.1346;3

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

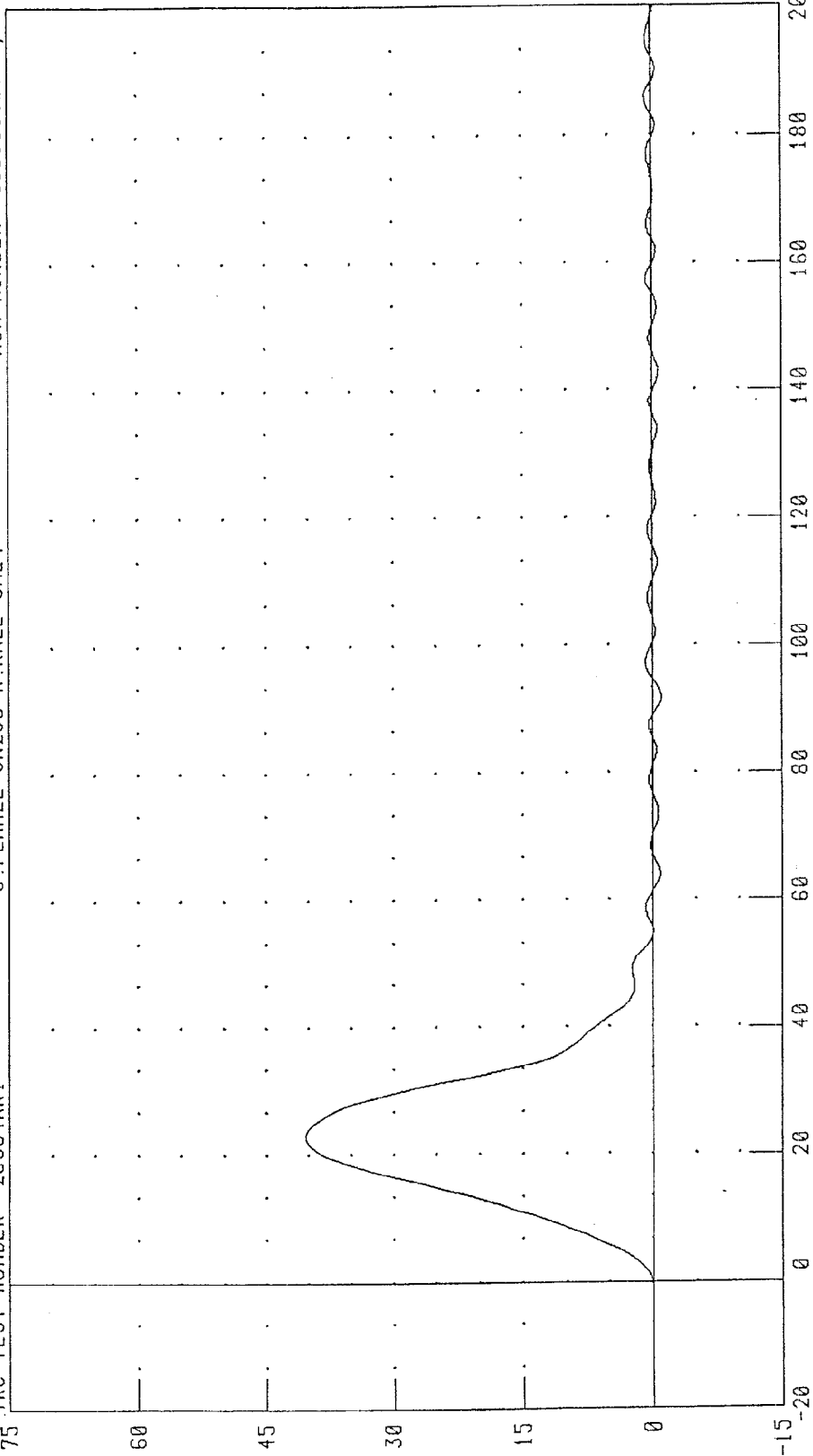
SMALL FEMALE HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)

JRC TEST NUMBER: 289C4RK1

S.FEMALE SN289 R.KNEE CAL4

RUN NUMBER: 051898.1346,3

75



TIME (MS X 10⁻¹)

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

Bj Calt

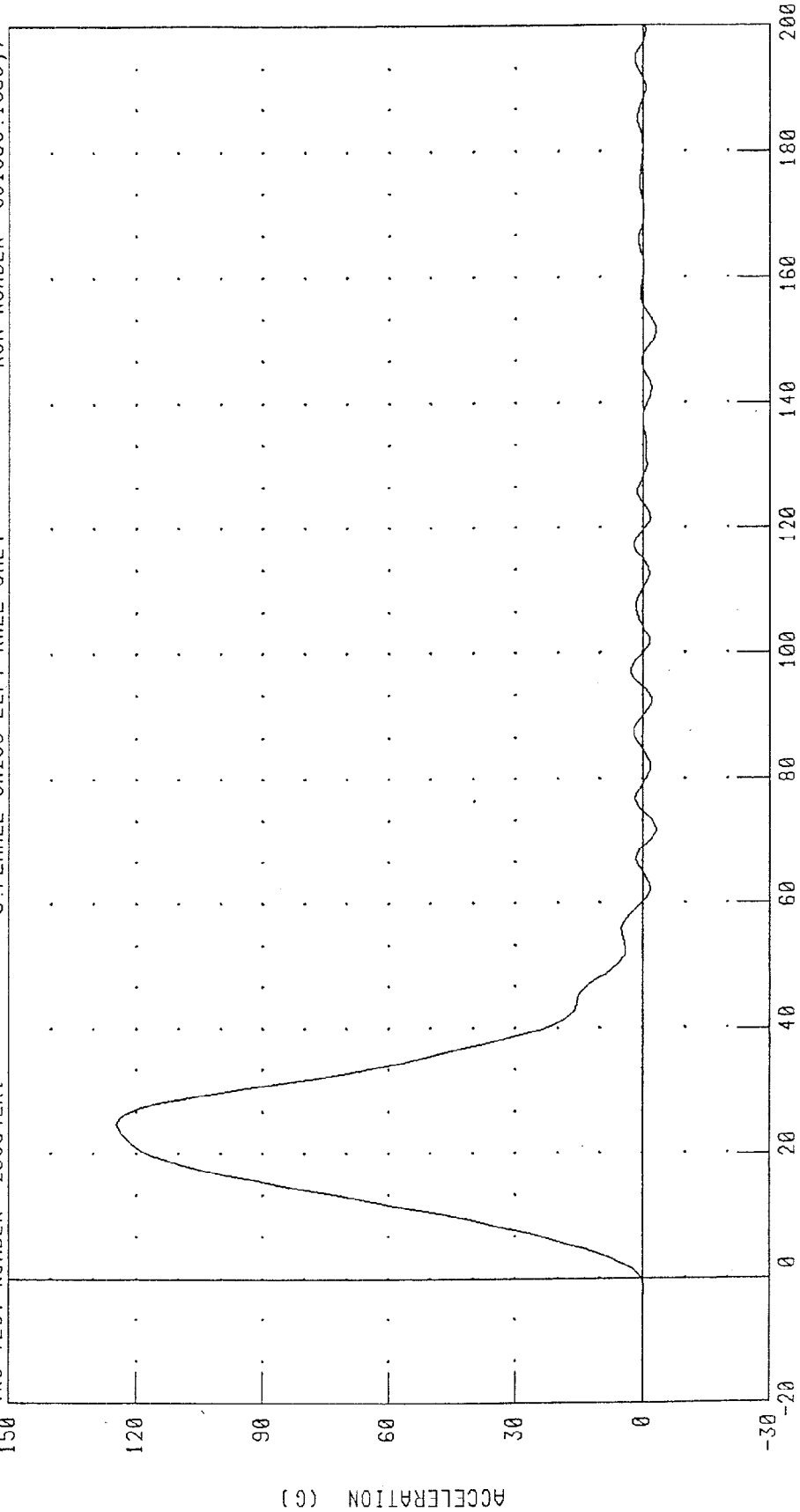
RUN NUMBER: 051898.1356;7

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.)

TRC TEST NUMBER: 289C4LK1

S.FEMALE SN289 LEFT KNEE CAL4

RUN NUMBER: 051898.1356;7

75

60

45

30

15

0

-15

-20

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

FORCE (N X 10²)

75

60

45

30

15

0

-15

-20

0

20

40

60

80

100

120

140

160

180

200

TIME (MS X 10⁻¹)

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

CHANNEL: PENXF

FILTER: CH. CLASS 600

FORCE (N X 10²)

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: Humanetics/045

Seating position: Driver

Mnemonic	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
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

Target Vehicle Dummy Instrumentation Placement, Cont'd.

Dummy Manufacturer and S/N: Humanetics/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>
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

Target Vehicle Dummy Instrumentation Placement

Dummy Manufacturer and S/N: First Technology Safety Systems/283

Seating position: Passenger

<u>Mnemonic</u>	<u>Location</u>	<u>Axis</u>	<u>Manufacturer</u>	<u>Model</u>	<u>S/N</u>	<u>Orientation (+ Sensing)</u>
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

Bullet Vehicle Dummy Instrumentation Placement

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

Bullet Vehicle Dummy Instrumentation Placement, Cont'd.

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

Bullet Vehicle Dummy Instrumentation Placement

Dummy Manufacturer and S/N: First Technology Safety Systems/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

Target Vehicle Instrumentation Placement

Number	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
1	Left rear seat crossmember	X	Endevco	7264	J23959	Forward
		Y	Endevco	7264	J21801	Left
2	Right rear seat crossmember	X	Endevco	7264	J23982	Forward
		Y	Endevco	7264	J21747	Left
3	Engine top	X	Endevco	7264	10076	Forward
4	Engine bottom	X	Entran	EGE-73BE0QT	J20329	Forward
5	Right brake caliper	X	Entran	EGE-73BE0QT	J19547	Forward
6	Left brake caliper	X	Entran	EGE-73BE0QT	J19905	Forward
7	Instrument panel center	X	Endevco	7264	J21765	Forward
8	Vehicle center of gravity	X	Endevco	7264	J19884	Rearward
9	Vehicle rear center	Z	Endevco	7264	J23983	Up
		Y	Endevco	7264	J21600	Right

Bullet Vehicle Instrumentation Placement

Number	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
1	Left rear seat crossmember	X	Endevco	7264	J20625	Forward
		Y	Endevco	7264	J21756	Left
2	Right rear seat crossmember	X	Endevco	7264	J20294	Forward
		Y	Endevco	7264	J22250	Left
3	Engine top	X	Endevco	7264	96G01-Z02	Forward
4	Engine bottom	X	Endevco	7264	J19639	Forward
5	Right brake caliper	X	Endevco	7264	J20015	Forward
6	Left brake caliper	X	Endevco	7264	J20085	Rearward
7	Instrument panel center	X	Endevco	7264	J20158	Forward
8	Vehicle rear center	Z	Endevco	7264	CY47H	Up
		Y	Endevco	7264	J20003	Right