

V3223

**1999 Acura 3.5 RL
into a Flat Frontal Barrier
TRC Test Number: 991210-1**

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Purpose and Test Summary

This 27.5 mph flat frontal barrier impact test has as the main objective to investigate both vehicle and occupant dynamics during a flat frontal barrier test. A secondary objective is to gather information on depowered airbags.

This test was conducted with a 1999 Acura 3.5 RL that impacted a flat frontal barrier. The test vehicle contained two instrumented Hybrid III 5th percentile adult female dummies.

Test Procedure

This test was conducted per VRTC personnel's instructions. Data was obtained relative to FMVSS 208, "Occupant Crash Protection," performance.

The test vehicle was instrumented with twelve (12) accelerometers to measure longitudinal, lateral, and vertical axis accelerations and three (3) airbag squib circuits to measure airbag fire times. The vehicle's specified impact velocity range was 43.5 to 45.1 kph. The vehicle impacted a flat frontal barrier.

The test vehicle contained two (2) Hybrid III 5th percentile adult female anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to SAE's recommended practice (Hybrid III Small Female Dummy Seating Procedure).

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

The forty-five (45) data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.13 through 11.15 of the Laboratory Test Procedure.

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

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 208 data 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 dummy and vehicle data plots. Appendix C contains the dummy calibration information. Appendix D contains miscellaneous test information.

Test Results Summary

This flat frontal barrier test was conducted at TRC on December 10, 1999.

The test vehicle, a 1999 Acura 3.5 RL, was equipped with airbags at the driver's and right front passenger's seating positions. The vehicle's test weight was 1859.7 kilograms. The vehicle's impact speed was 44.4 kph. The vehicle's maximum static crush was 462 millimeters.

The driver's 15-millisecond HIC was 122 and its 36-millisecond HIC was 135. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 38.2 g. The driver's chest deflection was 43 millimeters. The driver's left and right femur maximum compressive forces were 4490 N and 4700 N, respectively.

The right front passenger's 15-millisecond HIC was 173 and its 36-millisecond HIC was 223. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 44.0 g. The passenger's chest deflection was 9 millimeters. The right front passenger's left and right femur maximum compressive forces were 4480 N and 5129 N, respectively.

Table 1 Crash Test Summary

Test type:	Frontal barrier impact
Test date:	12/10/99
Test time:	1007
Ambient temperature at impact area:	21° C
Vehicle year/make/ model/body style:	1999/Acura/3.5 RL/Sedan
Vehicle test weight:	1859.7 kg
Impact angle ¹ :	0°
Impact velocity ² :	
Primary:	N/A kph
Secondary:	44.4 kph
Maximum static crush:	462 mm
Average rebound:	831 mm
Number of cameras:	
Real-time:	1
High-speed:	14
Door opening data:	
Left-front:	Easy
Right-front:	Easy

¹ With respect to tow track centerline.

² Speed trap measurement ($\pm .08$ km/h accuracy)

Table 1. Crash Test Summary, Cont'd.

Dummies:	Driver #369	Passenger #283
Type:	Hybrid III 5 th percentile adult female	Hybrid III 5th percentile adult female
Location:	Left front	Right front
Restraint:	Airbag	Airbag
Number of data channels:	15	15
Front seat data:		
Seat track failure:	None	None
Seat back failure:	None	None
Visible dummy contact points:		
Head:	Airbag/head rest	Airbag
Chest:	Airbag	Airbag
Abdomen:	None	None
Left knee:	Instrument panel	Instrument panel
Right knee:	Instrument panel	Instrument panel

Table 2 Test Vehicle Information

Vehicle year/make/
model/body style: 1999/Acura/3.5 RL/Sedan

Color: Green

VIN: JH4KA9656XC003280

Engine data:

Placement: Transverse

Cylinders: V-6

Displacement: 3.5 liters

Transmission data: 4 speed, manual, X automatic, X overdrive

Final drive: X fwd, rwd, 4wd

Date vehicle received: 12/08/99

Odometer reading: 5411

Dealer's name and address: N/A

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	Yes	Tilting steering wheel	Yes
Power windows	Yes	Telescoping steering wheel	Yes
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: Japan Honda Motor Co. Ltd.

Date of manufacture: 10/98

VIN: JH4KA9656XC003280

GVWR: 4830 lbs.

GAWR: Front: 2570 lbs.

Rear: 2260 lbs.

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle: P215/60R16
Spare tire: Space saver
Type of front seats: Bucket

Tire & capacity data from vehicle's label:

Recommended tire size: P215/60R16
Recommended cold tire pressure:
Front: 29 psi
Rear: 29 psi
Designated Seating Capacity:
Front 2
Rear 3
Total 5
Vehicle Cargo Weight: 850 lbs.

Test vehicle attitudes:

Delivered attitude:	LF: 708 mm	RF: 702 mm	LR: 701 mm	RR: 701 mm
Fully loaded attitude:	LF: 695 mm	RF: 692 mm	LR: 675 mm	RR: 677 mm
Pre-test attitude:	LF: 689 mm	RF: 698 mm	LR: 674 mm	RR: 675 mm
Post-test attitude:	LF: 694 mm	RF: 714 mm	LR: 660 mm	RR: 689 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	499.9 kg	Right rear	355.6 kg
Left front	522.1 kg	Left rear	350.6 kg
Total front weight	1022.0 kg	(59.1% of total vehicle weight)	
Total rear weight	706.2 kg	(40.9% of total vehicle weight)	
Total delivered weight	1728.2 kg		

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1728.2 kg)

DSC = Designated Seating Capacity (5)

RCLW = 45.4 kg

Target test weight = UDW + RCLW + (number of Hybrid III Dummies x 47.6 kg per dummy)

Target test weight = 1728.2 + 45.4 + 95.2 = 1868.8 kg

Weight of test vehicle with required dummies and 36.3 kg of cargo weight:

Right front	517.1 kg	Right rear	396.0 kg
Left front	552.0 kg	Left rear	394.6 kg
Total front weight	1069.1 kg	(57.5% of total vehicle weight)	
Total rear weight	790.6 kg	(42.5% of total vehicle weight)	
Total test weight	1859.7 kg	(0.5% under target test weight)	

Weight of ballast secured in vehicle: 3.2 kg of shot in engine.

Components removed to meet target test weight: Muffler, bumper skin, rear deck trim, and Speakers.

CG rearward of front wheel centerline: 1239 mm

Vehicle Wheelbase: 2915 mm

Table 3 Post-Impact Data

Test number: 991210-1
Test date: 12/10/99
Test time: 1007
Test type: Frontal barrier impact
Impact angle: 0°
Ambient temperature
at impact area: 21° C
Temperature in
occupant compartment: 21° C
Impact velocity:
Primary: N/A kph
Secondary: 44.4 kph
Specified range: 43.5 to 45.1 kph

Distance from vehicle to barrier:

Entering velocity trap: 356 mm
Exiting velocity trap: 51 mm

Test vehicle static crush:

Overall length of test vehicle:

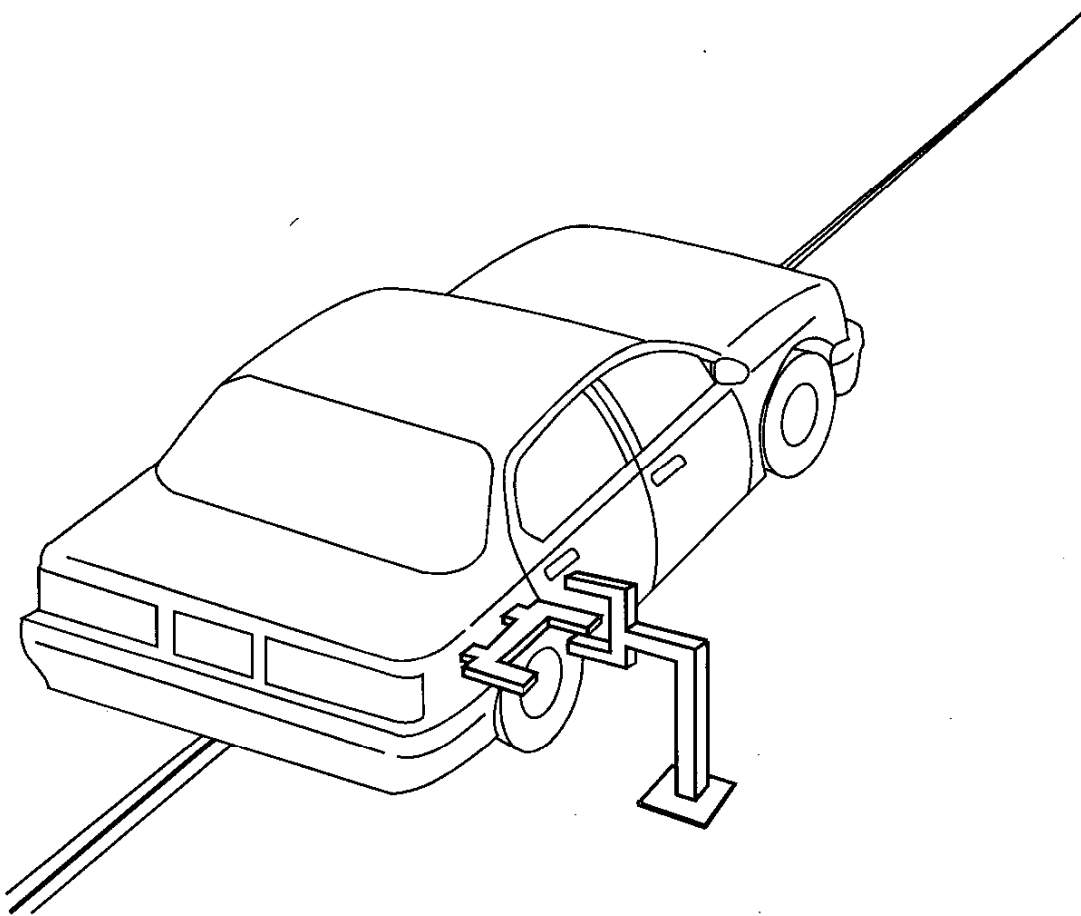
Pre-test:	L: 4950 mm	C: 5170 mm	R: 4953 mm
Post-test:	L: 4660 mm	C: 4708 mm	R: 4681 mm
Total crush:	L: 290 mm	C: 462 mm	R: 272 mm
Average crush:	341 mm		

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L: 958 mm	C: 720 mm	R: 814 mm
Average rebound:	831 mm		

Figure 1 Impact Velocity Measurement System



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

The vanes have 305-millimeter spacing.

Figure 2 Accident Investigation Division Data for 30 mph Frontal Barrier Impact

Test date: 12/10/99
 Vehicle year/make/
 model/body style: 1999/Acura/3.5 RL/Sedan
 VIN: JH4KA9656XC003280
 Build date: 10/98
 Test weight: 1859.7 kg
 Vehicle wheelbase: 2915 mm
 Maximum width: 1810 mm
 Front overhang: 948 mm

Collision Deformation
 Classification (CDC) Code: 12FDAW2

Crush depth
 measurements: C1: 290 mm
 C2: 350 mm
 C3: 405 mm
 C4: 401 mm
 C5: 337 mm
 C6: 272 mm

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged
 region: L: 1525 mm

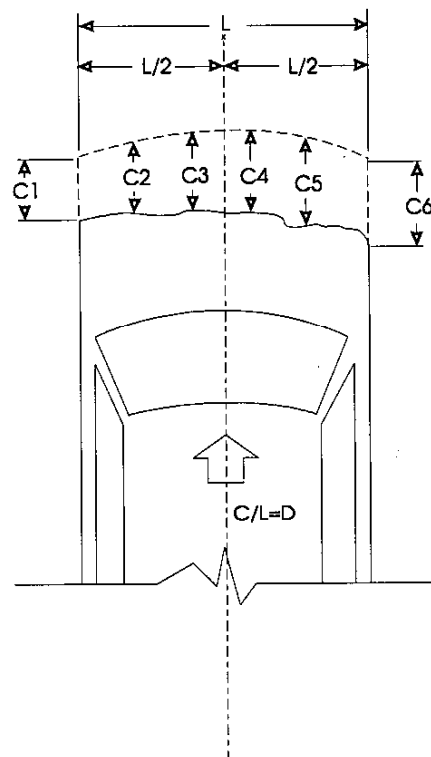


Figure 3 Vehicle Accelerometer Placement

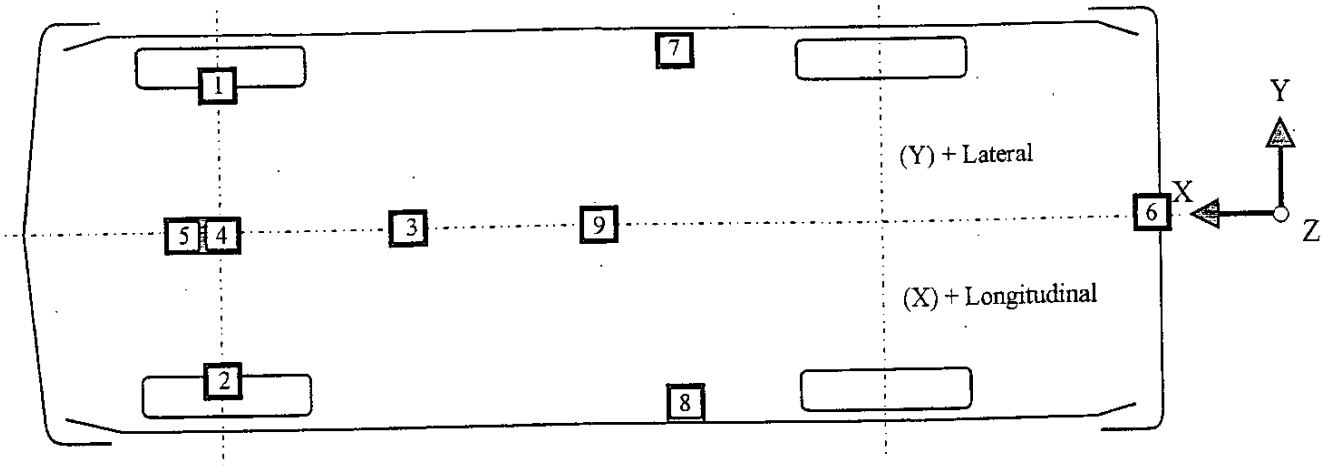
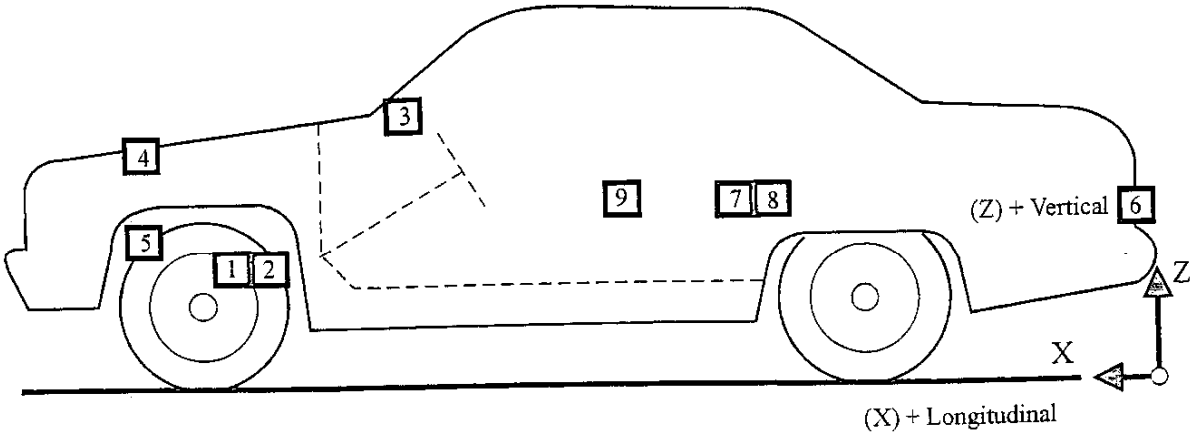


Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 991210-1 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT BRAKE CALIPER	PRE 3930 mm POST 3890 mm	700 mm 712 mm	381 mm 198 mm		
LONGITUDINAL			13.3 g	@ 73.0 ms	@ 50.6 ms
2 RIGHT BRAKE CALIPER	PRE 3930 mm POST 3890 mm	-700 mm -700 mm	390 mm 239 mm		
LONGITUDINAL			15.9 g	@ 76.1 ms	@ 44.0 ms
3 INSTRUMENT PANEL CENTER	PRE 3480 mm POST 3457 mm	0 mm 0 mm	974 mm 916 mm		
LONGITUDINAL			9.0 g	@ 29.0 ms	@ 65.1 ms
4 ENGINE TOP	PRE 4075 mm POST 3992 mm	305 mm 305 mm	764 mm 755 mm		
LONGITUDINAL			13.5 g	@ 60.2 ms	@ 47.2 ms
5 ENGINE BOTTOM	PRE 4090 mm POST 4025 mm	-71 mm -71 mm	160 mm 198 mm		
LONGITUDINAL			15.4 g	@ 61.2 ms	@ 45.6 ms

Table 4 Vehicle Accelerometer Locations and Data Summary, Cont'd.

TEST NUMBER: 991210-1		X		Y		Z		POSITIVE DIRECTION		NEGATIVE DIRECTION	
No. LOCATION											
6	REAR VEHICLE	PRE	410 mm	0 mm	0 mm	529 mm					
	CENTERLINE	POST	410 mm	0 mm	0 mm	572 mm					
	LONGITUDINAL						7.1 g	@ 119.7 ms	34.6 g	@ 70.2 ms	
	LATERAL						3.2 g	@ 97.0 ms	4.6 g	@ 49.3 ms	
	VERTICAL						11.9 g	@ 92.6 ms	12.9 g	@ 66.2 ms	
	RESULTANT						35.3 g	@ 70.0 ms			
7	LEFT REAR SEAT	PRE	2131 mm	590 mm	590 mm	387 mm					
	LONGITUDINAL	POST	2131 mm	590 mm	590 mm	371 mm	2.7 g	@ 99.8 ms	30.2 g	@ 59.9 ms	
8	RIGHT REAR SEAT	PRE	2131 mm	-590 mm	-590 mm	398 mm					
	LONGITUDINAL	POST	2130 mm	-590 mm	-590 mm	378 mm	1.8 g	@ 101.4 ms	30.3 g	@ 60.5 ms	
9	VEHICLE CENTER	PRE	2905 mm	0 mm	0 mm	507 mm					
	OF GRAVITY	POST	2905 mm	0 mm	0 mm	NA					
	LONGITUDINAL						6.3 g	@ 64.2 ms	59.9 g	@ 57.7 ms	
	LATERAL						9.9 g	@ 37.8 ms	11.3 g	@ 80.3 ms	

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

Table 5 Dummy Injury Criteria

<u>Maximum Acceleration</u>							
	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	-42.7 g	-8.3 g	-15.9 g	43.6 g	-40.3 g	7.4 g	-7.4 g
Passenger	-44.0 g	-27.8 g	-75.1 g	75.4 g	-61.5 g	-11.1 g	16.9 g

<u>Maximum Femur Compressive Force</u>		
	Left Femur	Right Femur
Driver	4490 N	4700 N
Passenger	4480 N	5129 N

<u>15-Millisecond Head Injury Criteria¹</u>			
	HIC	Time t_1	Time t_2
Driver	122	48.2 ms	63.2 ms
Passenger	173	73.8 ms	88.9 ms

<u>36 millisecond Head Injury Criteria</u>			
	HIC	Time t_1	Time t_2
Driver	135	47.1 ms	67.0 ms
Passenger	223	60.2 ms	95.8 ms

<u>Chest Maximum Resultant Acceleration²</u>			
	Acceleration	Time t_1	Time t_2
Driver	38.2 g	95.8 ms	98.9 ms
Passenger	44.0 g	84.6 ms	87.6 ms

<u>Maximum Chest Deflection</u>	
Driver	43 mm
Passenger	9 mm

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

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 face impacted the airbag. The dummy's head rotated right. The dummy's head was restrained by the airbag. The dummy's abdomen impacted the steering wheel. The dummy's head rotated rearward into the seat back. The dummy came to rest in a seated position.

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 to the left. The dummy came to rest in a seated position.

Figure 4 Pre-test and Post-test Measurement Points

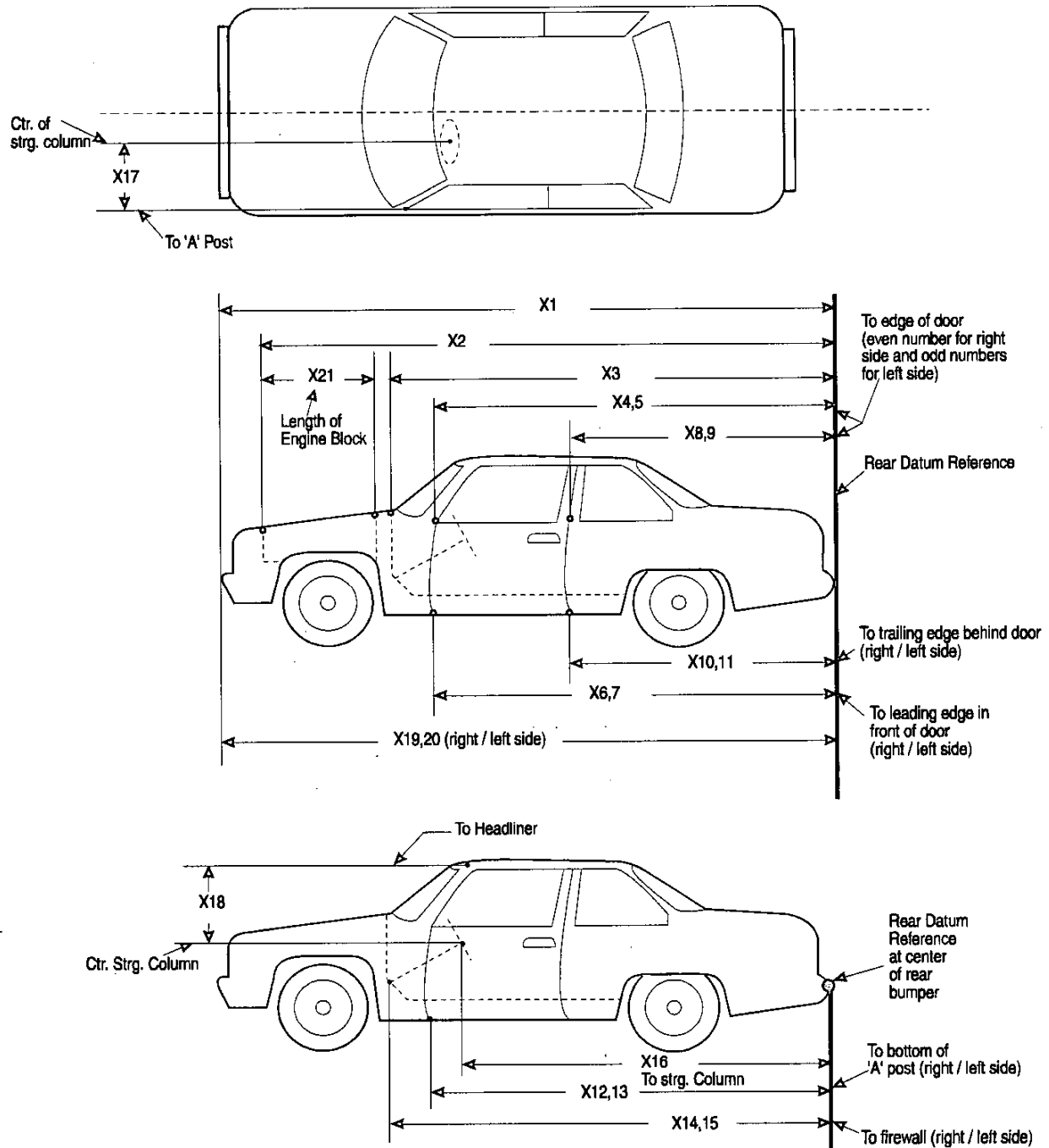


Table 6 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1999/Acura/3.5 RL/Sedan

Test Number: 991210-1

No.	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Veh. at Centerline	5170	4708	462
X2	Rear Surface of Veh. to Front of Engine Block	4483	4373	110
X3	Rear Surface of Veh. to Firewall	3894	3850	44
X4	Rear Surface of Veh. to Upper Leading Edge of Right Door	3505	3505	0
X5	Rear Surface of Veh. to Upper Leading Edge of Left Door	3506	3506	0
X6	Rear Surface of Veh. to Lower Leading Edge of Right Door	3525	3525	0
X7	Rear Surface of Veh. to Lower Leading Edge of Left Door	3525	3525	0
X8	Rear Surface of Veh. to Upper Trailing Edge of Right Door	2496	2496	0
X9	Rear Surface of Veh. to Upper Trailing Edge of Left Door	2495	2495	0
X10	Rear Surface of Veh. to Lower Trailing Edge of Right Door	2505	2505	0
X11	Rear Surface of Veh. to Lower Trailing Edge of Left Door	2506	2506	0
X12	Rear Surface of Veh. to Bottom of " A " Post on Right Side	3535	3530	5
X13	Rear Surface of Veh. to Bottom of " A " Post on Left Side	3535	3535	0
X14	Rear Surface of Veh. to Firewall--Right Side	3911	3915	-4
X15	Rear Surface of Vehicle to Firewall --Left Side	3833	3815	18
X16	Rear Surface of Veh. to Steering Wheel Center	3105	3127	-22
X17	Center of Steering Column to " A " Post	290	335	-45
X18	Center of Steering Column to Headliner	420	490	-70
X19	Rear Surface of Veh. to Right Side of Front Bumper	4953	4681	272
X20	Rear Surface of Veh. to Left Side of Front Bumper	4950	4660	290
X21	Length of Engine Block	630	630	0

Figure 5 Vehicle Target Locations

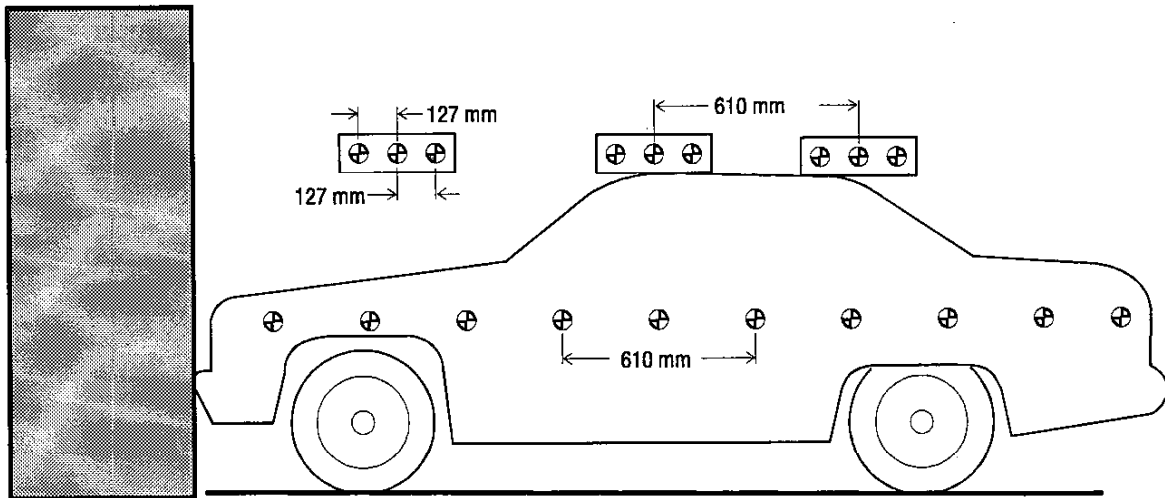


Figure 6 Dummy Measurement Locations for Front Seat Occupants

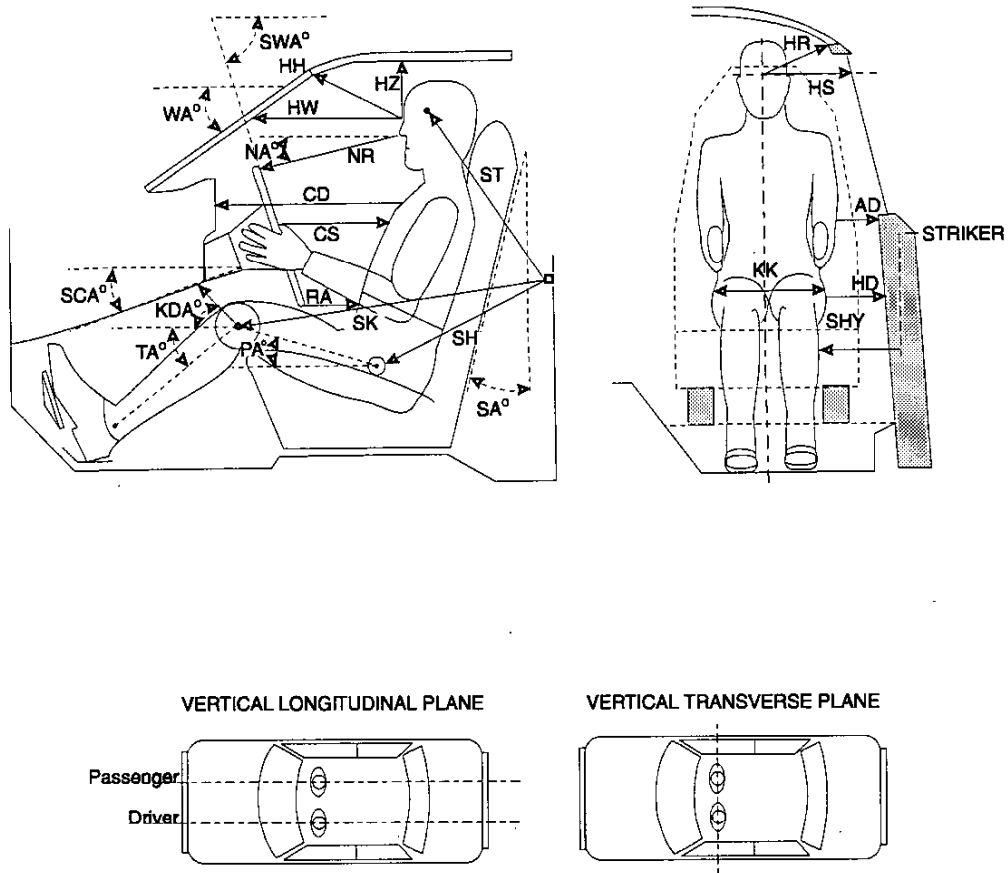


Table 7 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #369)	Passenger (Serial #283)
WA	Windshield angle	31°	31°
SWA	Steering wheel angle	65°	N/A
SCA	Steering column angle	25°	N/A
SA	Seat back angle	10°	11°
HZ	Head to roof	198 mm	207 mm
HH	Head to header	282 mm	296 mm
HW	Head to windshield	512 mm	545 mm
HR	Head to side header	237 mm	250 mm
NR	Nose to rim	275 mm	N/A
NA	Nose to rim angle	5°	N/A
CD	Chest to dash	451 mm	422 mm
CS	Steering wheel to chest	211 mm	N/A
RA	Rim to abdomen	90 mm	N/A
KDL	Left knee to dash	143 mm	125 mm
KDR	Right knee to dash	140 mm	139 mm
KDA	Outboard knee to dash angle	38°	25°
PA	Pelvic angle	22°	22°
TA	Tibial angle	46°	50°
KK	Knee to knee	260 mm	205 mm
ST ¹	Striker to head	437 mm	425 mm
	Striker to head angle	-68°	-65°
SK ¹	Striker to knee	666 mm	680 mm
	Striker to knee angle	-11°	-5°
SH	Striker to H-point	374 mm	383 mm
	Striker to H-point angle	22°	22°
SHY	Striker to H-point (Y dir.)	270 mm	284 mm
HS	Head to side window	353 mm	338 mm
HD	H-point to door	75 mm	170 mm
AD	Arm to door	120 mm	145 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 Camera Positions

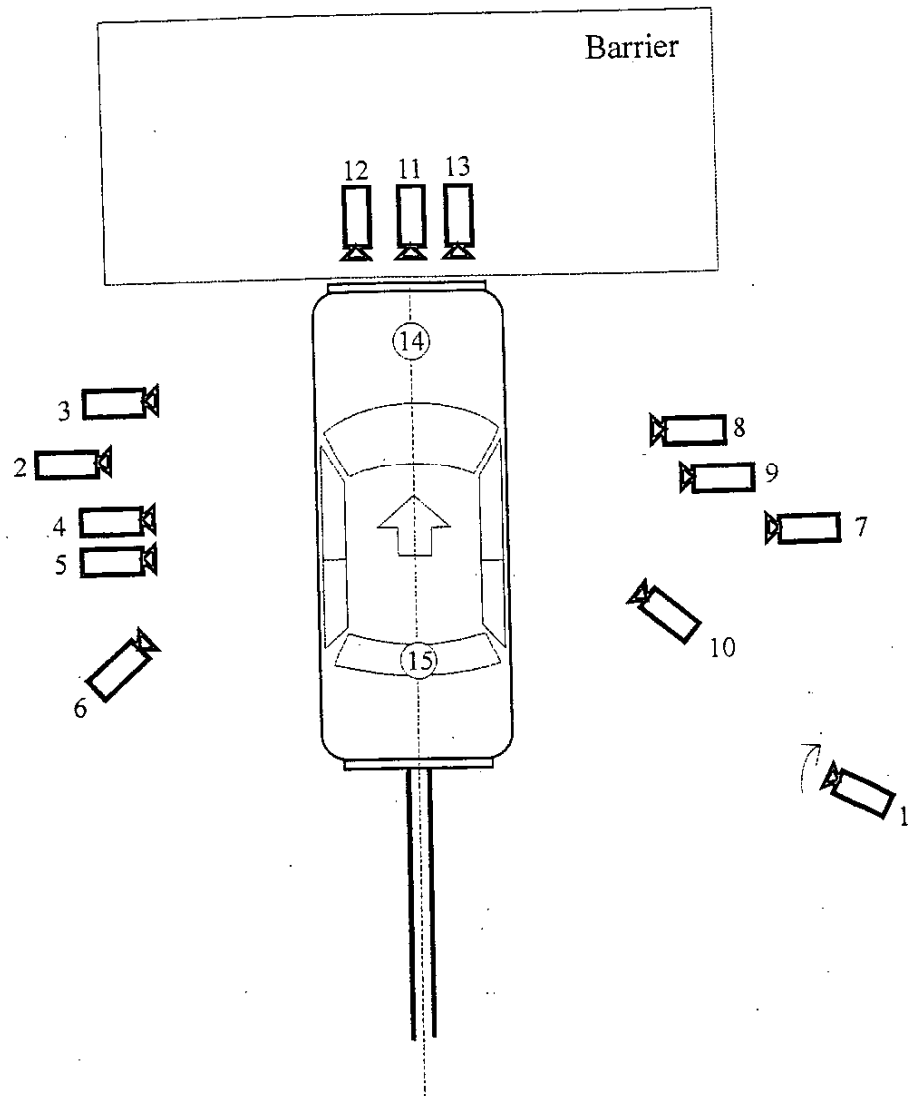


Table 8 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1999/Acura/3.5 RL/ Sedan

Test number: 991210-1

Camera Number	View	Camera Positions ¹			Camera Angle ²	Film Plane to Head Target	Camera Lens	Film Speed
		X	Y	Z				
1	Real-time panning	NA	NA	NA	NA	NA	16 mm	24 frames/s
2	Left vehicle crush	1321 mm	6553 mm	1499 mm	0°	6920 mm	25 mm	987 frames/s
3	Left windshield intrusion	1219 mm	6401 mm	1181 mm	0°	7340 mm	50 mm	975 frames/s
4	Steering column motion	3251 mm	8534 mm	1765 mm	-13.6°	6710 mm	25 mm	952 frames/s
5	Steering column motion	3251 mm	8534 mm	2718 mm	-5.8°	6600 mm	25 mm	997 frames/s
6	Driver kinematics	4267 mm	2438 mm	2007 mm	-20.4°	3060 mm	25 mm	1000 frames/s
7	Right overall	1626 mm	-6401 mm	1499 mm	0°	6130 mm	13 mm	1002 frames/s
8	Right windshield intrusion	1219 mm	-6401 mm	1219 mm	0°	7574 mm	50 mm	1000 frames/s
9	Passenger kinematics	2743 mm	-7925 mm	838 mm	-15.8°	3090 mm	25 mm	987 frames/s
10	Passenger kinematics	4267 mm	-1981 mm	2083 mm	-3.3°	6874 mm	25 mm	1000 frames/s
11	Windshield front view	0 mm	0 mm	2311 mm	-61.6°	NA	8.5 mm	1002 frames/s
12	Driver - front view	0 mm	305 mm	2311 mm	-55.3°	NA	13 mm	1012 frames/s
13	Passenger - front view	0 mm	-305 mm	2311 mm	-58.4°	NA	13 mm	1000 frames/s
14	Pit - front position	1549 mm	0 mm	-2743 mm	90°	NA	13 mm	1002 frames/s
15	Pit - rear position	2540 mm	0 mm	-2743 mm	90°	NA	13 mm	997 frames/s

¹ +X: Film plane forward of barrier face

+Y: Film plane to left of monorail centerline

+Z: Film plane above ground level

² +Angle: Film plane angled upward from horizontal plane



Figure A-1 Pre-Test Front View

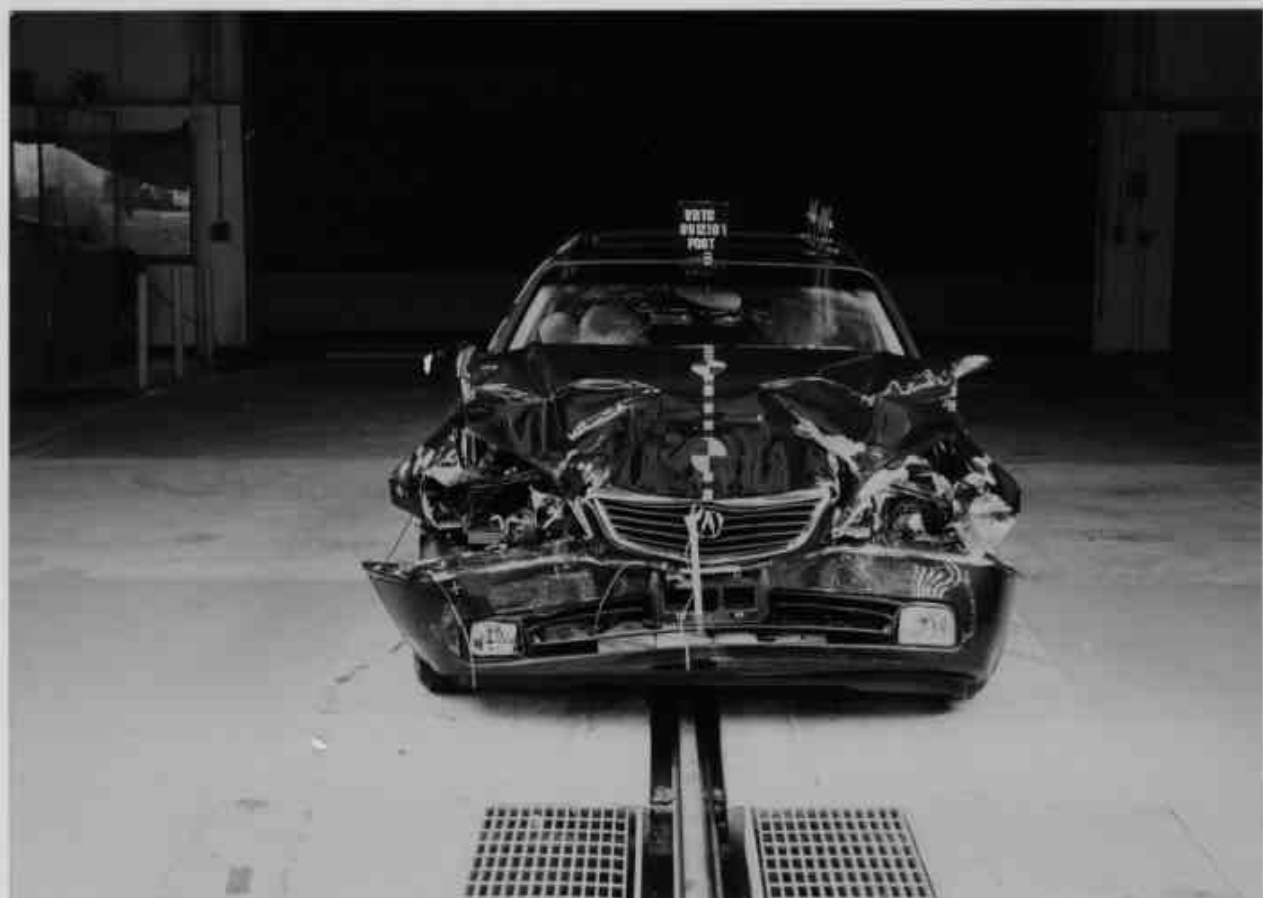


Figure A-2 Post-Test Front View



Figure A-3 Pre-Test Left Side View



Figure A-4 Post-Test Left Side View



Figure A-5 Pre-Test Left Rear Three-Quarter View



Figure A-6 Post-Test Left Rear Three-Quarter View



Figure A-7 Pre-Test Rear View

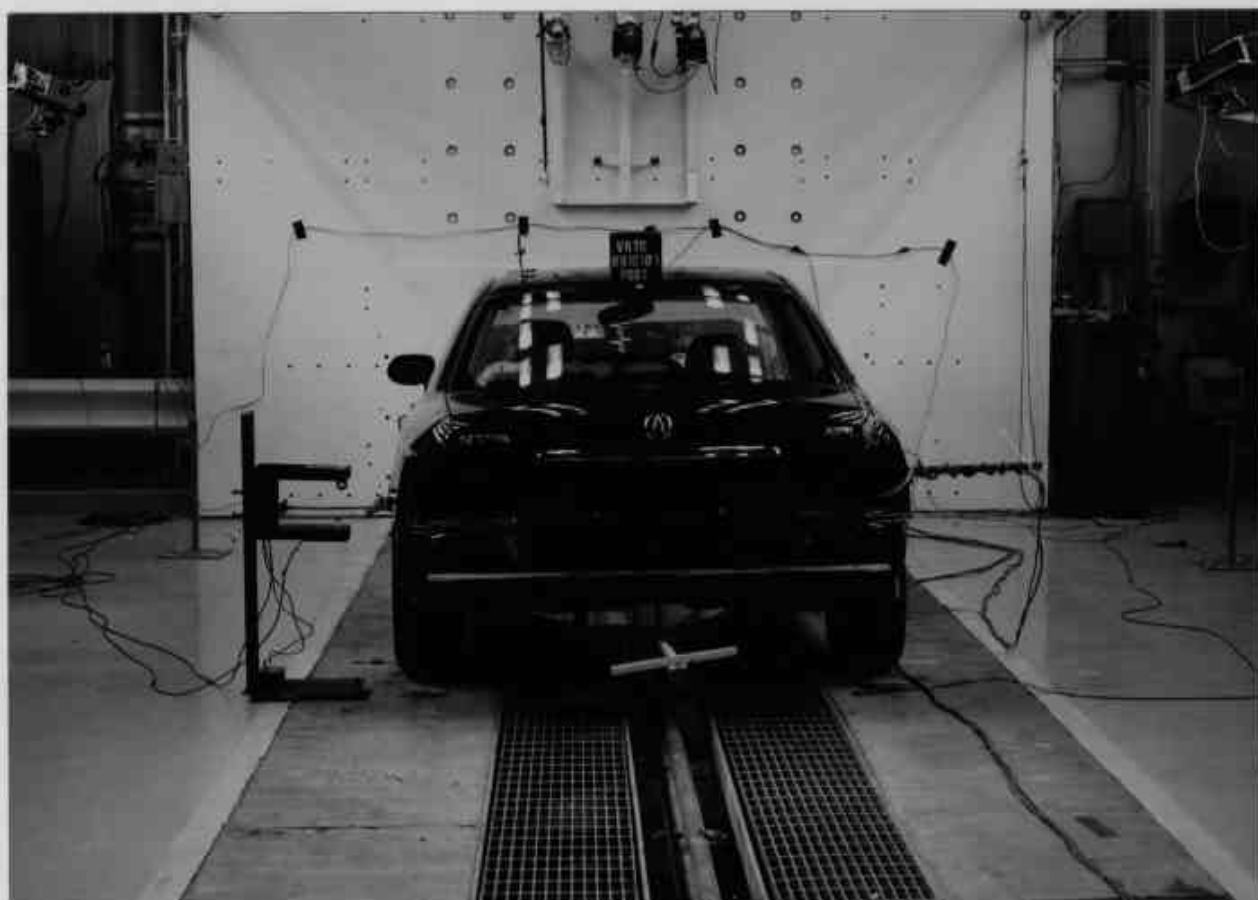


Figure A-8 Post-Test Rear View



Figure A-9 Pre-Test Right Side View



Figure A-10 Post-Test Right Side View



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



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

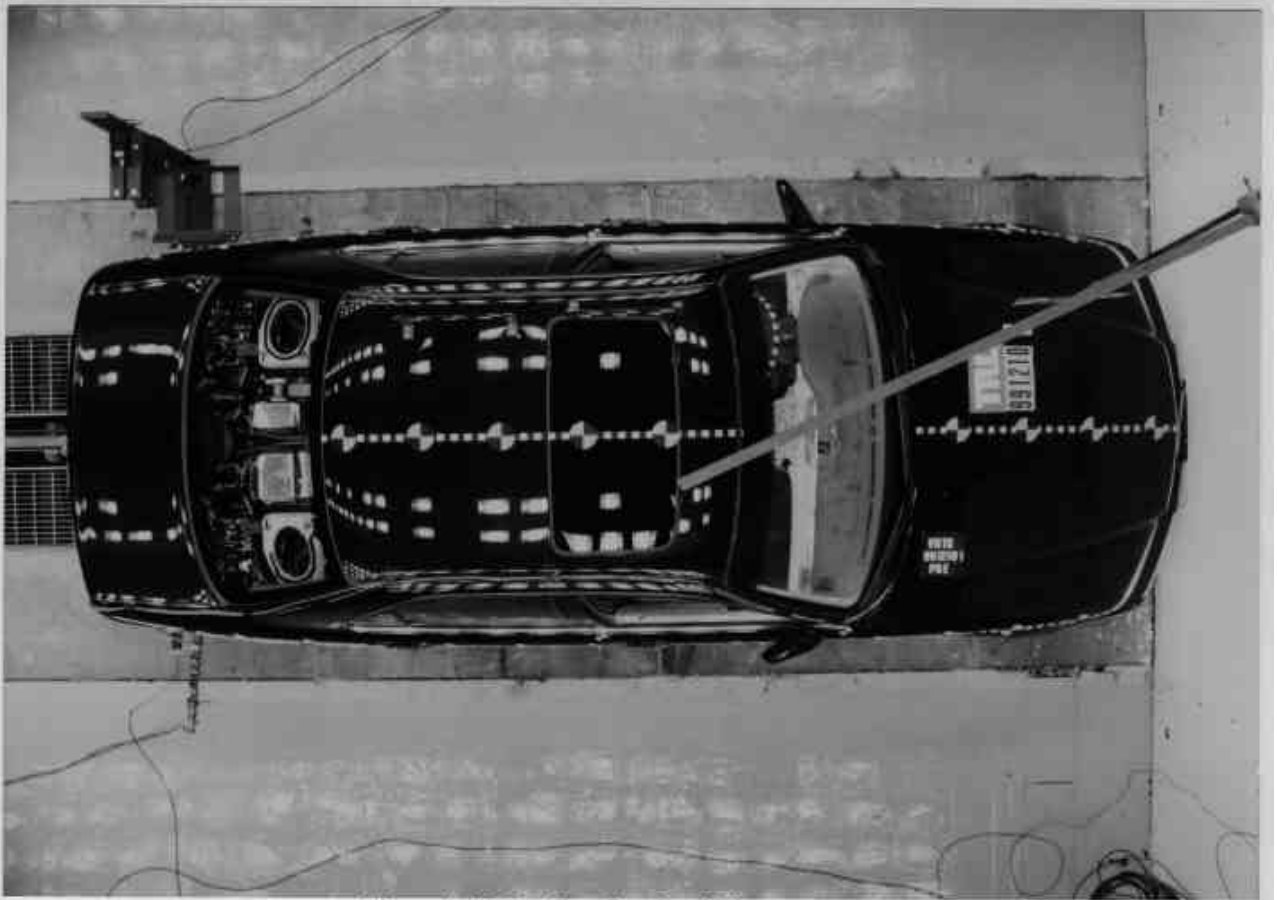


Figure A-13 Pre-Test Overhead View

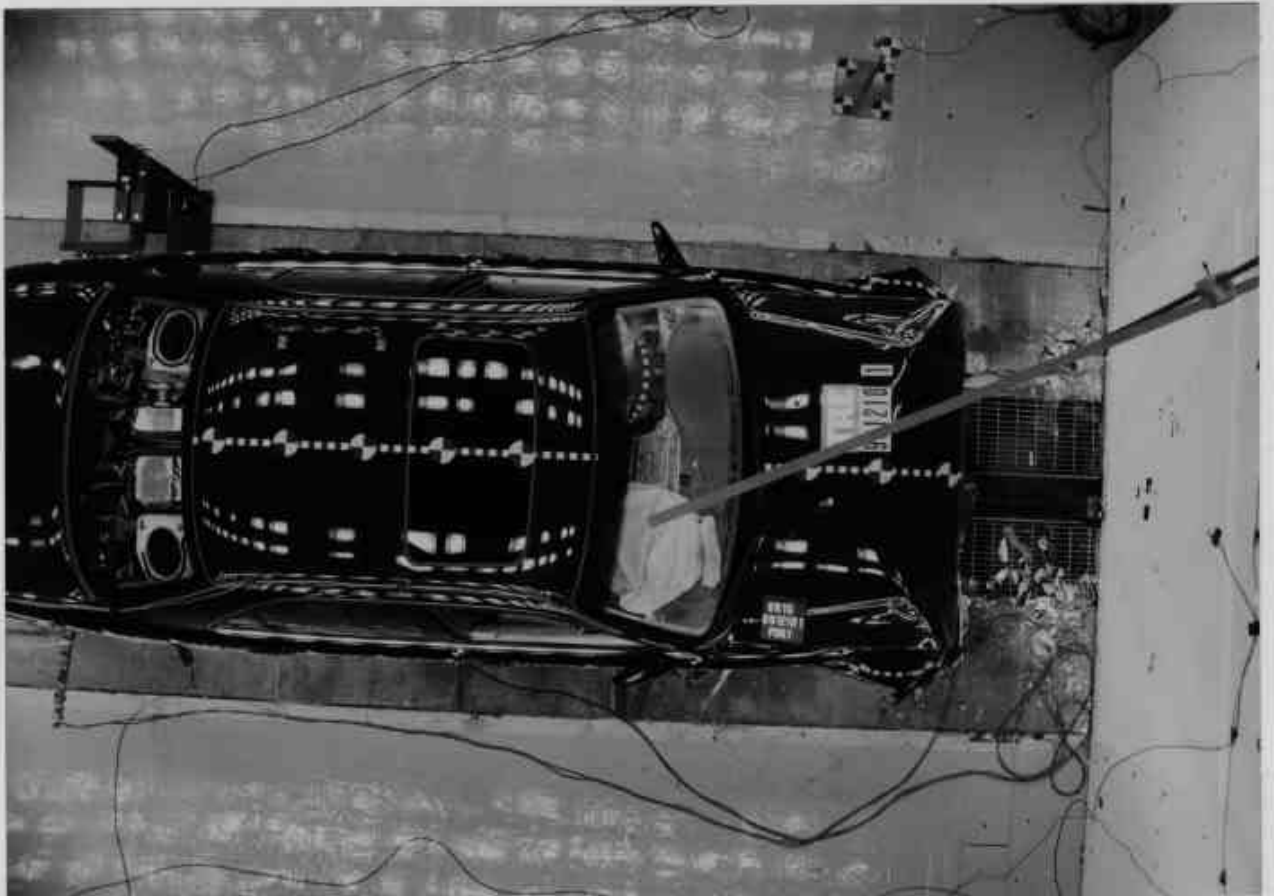


Figure A-14 Post-Test Overhead View



Figure A-15 Pre-Test Front Underbody View



Figure A-16 Post-Test Front Underbody View



Figure A-17 Pre-Test Rear Underbody View

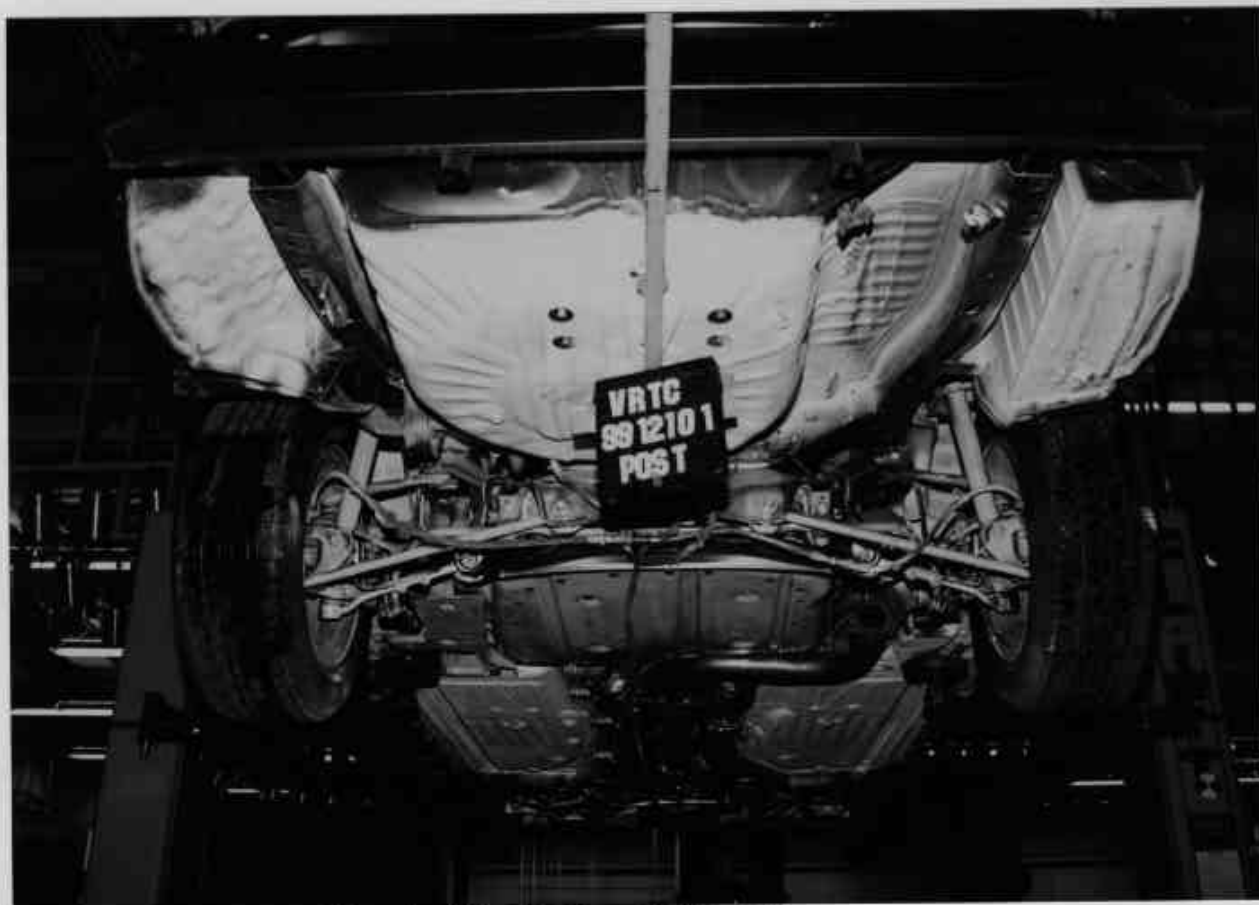


Figure A-18 Post-Test Rear Underbody View



Figure A-19 Pre-Test Engine Compartment View



Figure A-20 Post-Test Engine Compartment View



Figure A-21 Pre-Test Driver and Passenger Dummy Windshield View



Figure A-22 Post-Test Driver and Passenger Dummy Windshield View

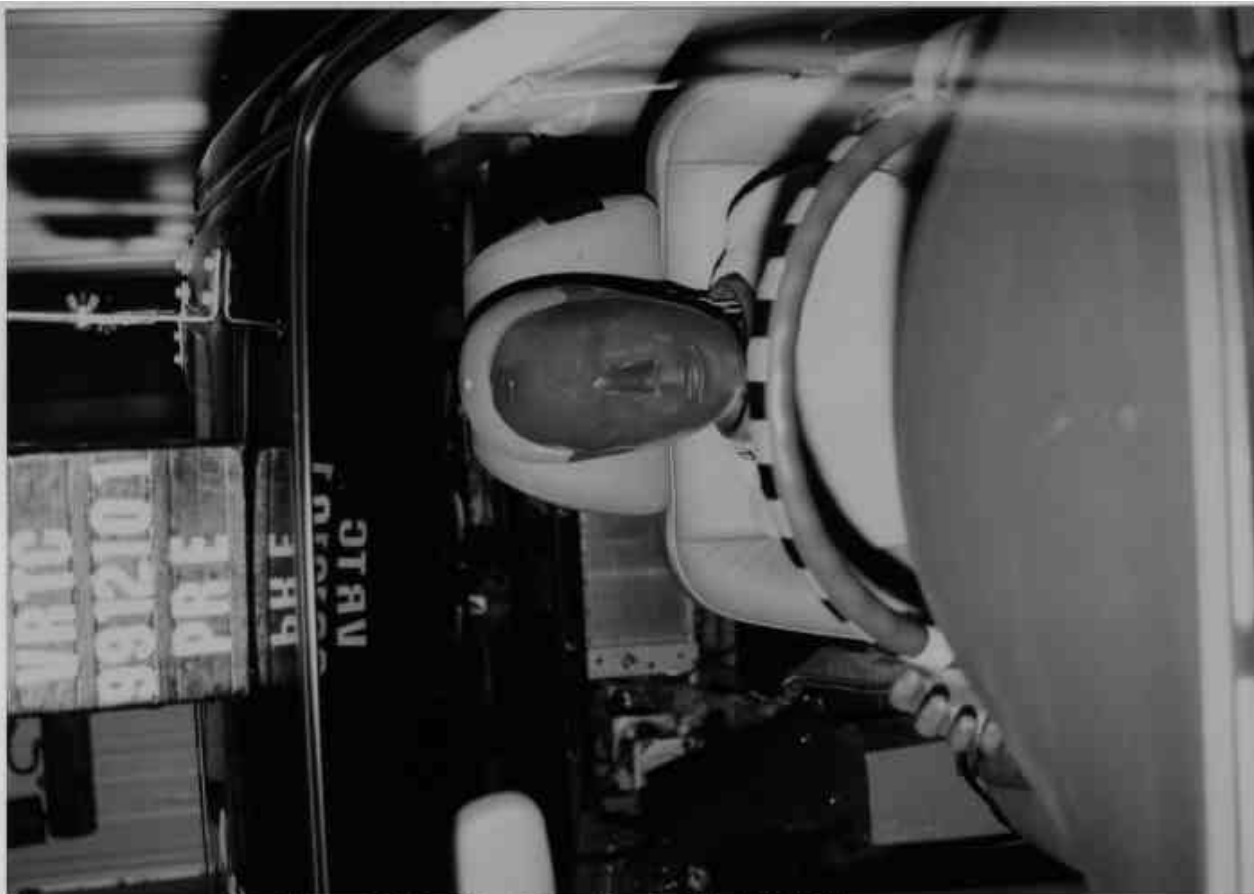


Figure A-23 Pre-Test Driver Dummy Windshield View



Figure A-24 Post-Test Driver Dummy Windshield View



Figure A-25 Pre-Test Passenger Dummy Windshield View



Figure A-26 Post-Test Passenger Dummy Windshield View



Figure A-27 Pre-Test Driver Dummy Position - View 1



Figure A-28 Post-Test Driver Dummy Position - View 1



Figure A-29 Pre-Test Driver Dummy Position - View 2



Figure A-30 Post-Test Driver Dummy Position - View 2



Figure A-31 Pre-Test Driver Dummy Position - View 3



Figure A-32 Post-Test Driver Dummy Position - View 3



Figure A-33 Pre-Test Passenger Dummy Position - View 1



Figure A-34 Post-Test Passenger Dummy Position - View 1



Figure A-35 Pre-Test Passenger Dummy Position - View 2



Figure A-36 Post-Test Passenger Dummy Position - View 2



Figure A-37 Pre-Test Passenger Dummy Position - View 3



Figure A-38 Post-Test Passenger Dummy Position - View 3



Figure A-39 Post-Test Driver Dummy View



Figure A-40 Post-Test Driver Dummy Head Contact - View 1



Figure A-41 Post-Test Driver Dummy Head Contact - View 2



Figure A-42 Post-Test Driver Dummy Head Contact - View 3

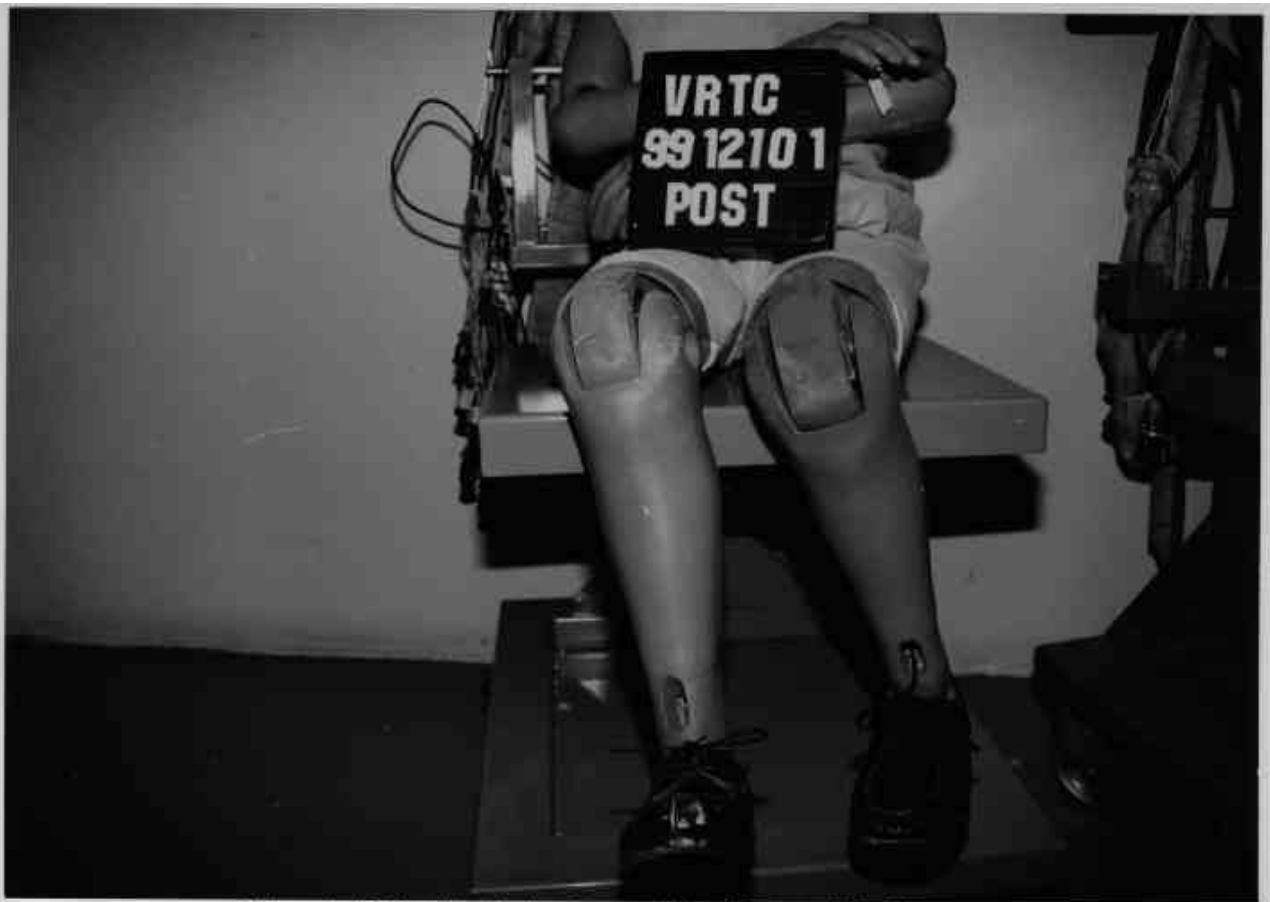


Figure A-43 Post-Test Driver Dummy Knee Contact - View 1



Figure A-44 Post-Test Driver Dummy Knee Contact - View 2



Figure A-45 Post-Test Passenger Dummy View



Figure A-46 Post-Test Passenger Dummy Head Contact - View 1



Figure A-47 Post-Test Passenger Dummy Head Contact - View 2



Figure A-48 Post-Test Passenger Dummy Knee Contact - View 1



Figure A-49 Post-Test Passenger Dummy Knee Contact - View 2

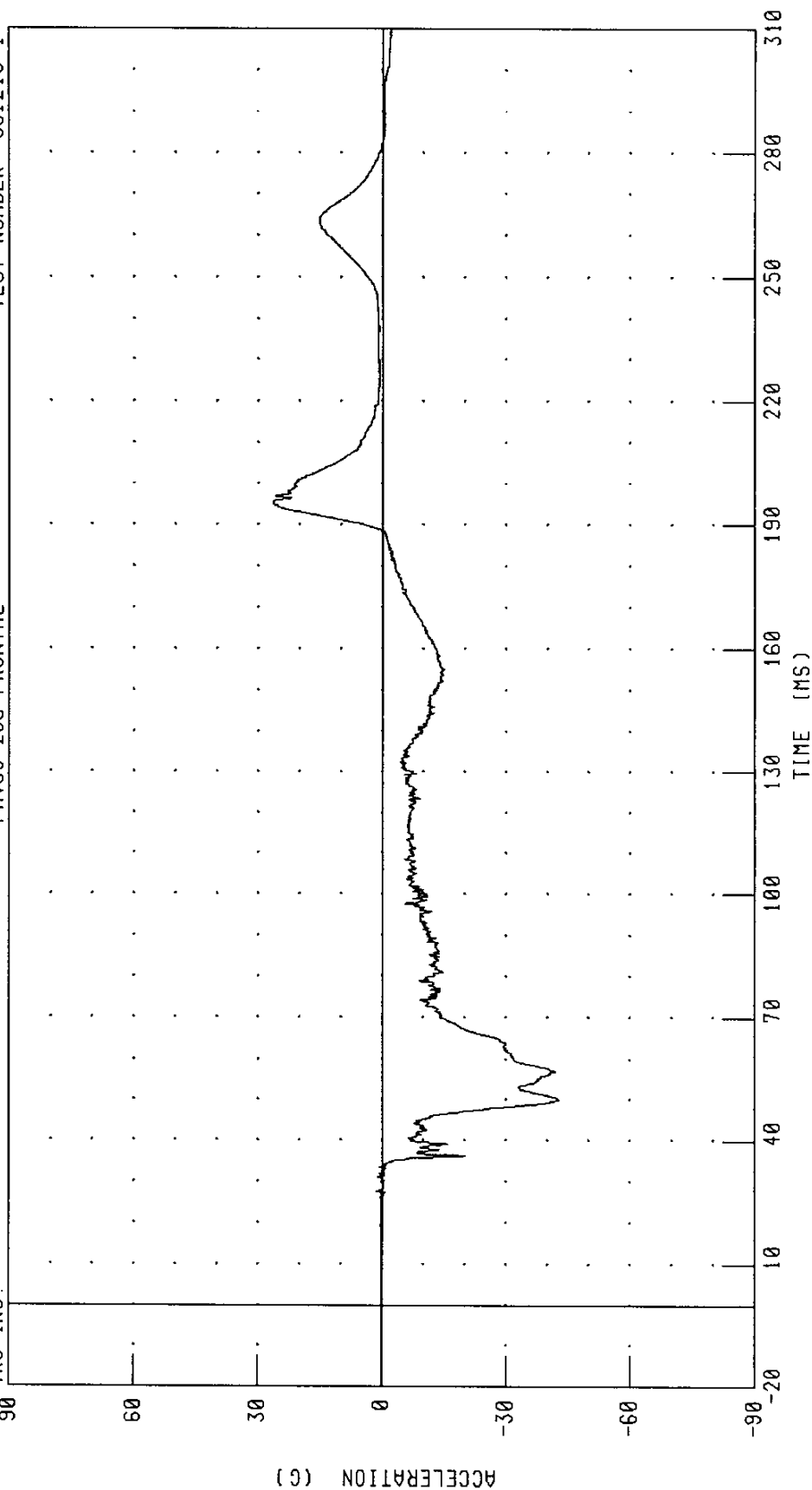


Figure A-50 Pre-Test Vehicle Tire Load and Certification Label View

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER HEAD X-AXIS ACCELERATION
FMVSS 208 FRONTAL

TEST NUMBER: 991210-1

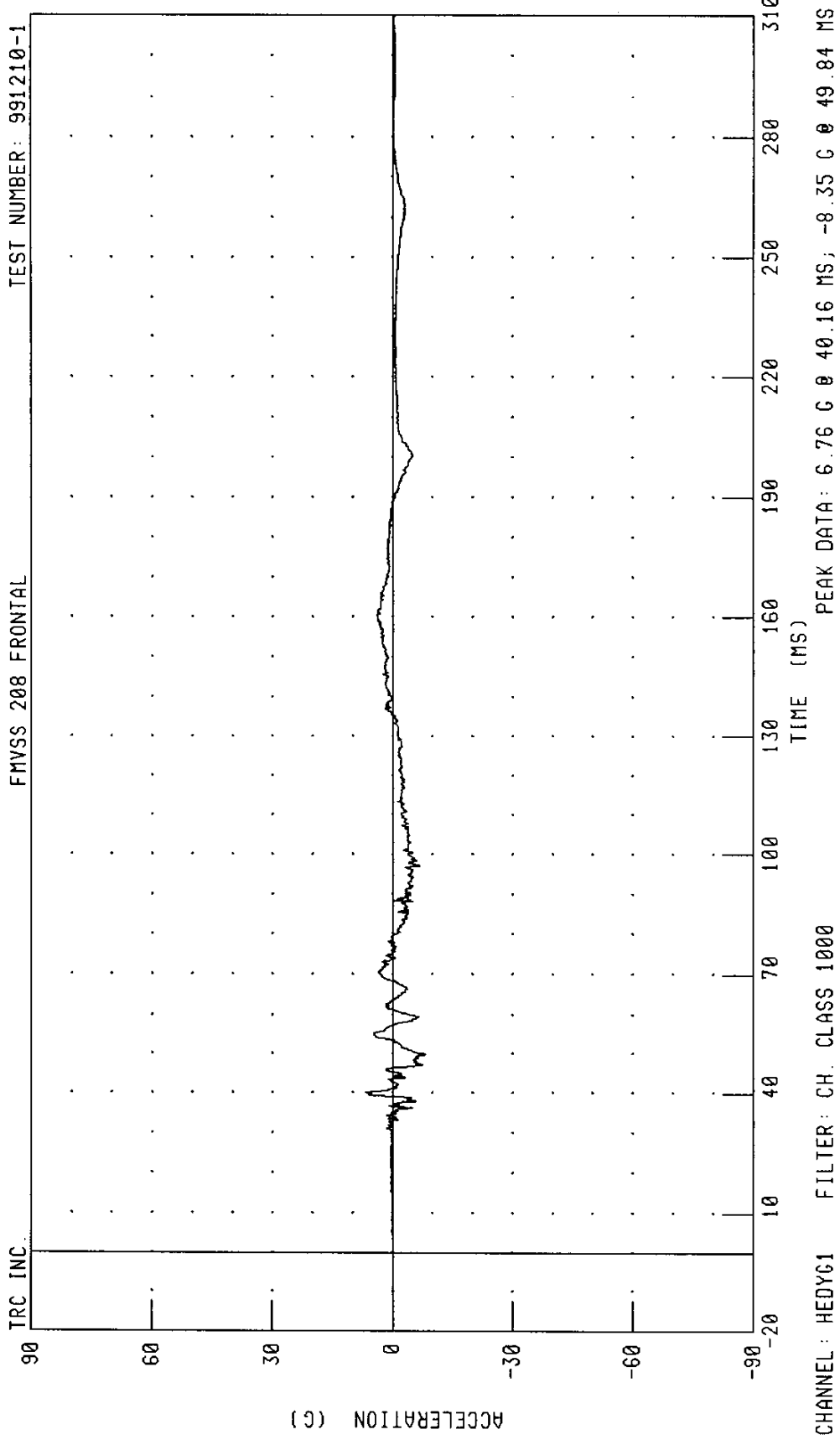
TRC INC.



CHANNEL: HEDXC1 FILTER: CH. CLASS 1000

PEAK DATA: 26.38 G @ 195.28 MS, -42.68 G @ 26.38 MS

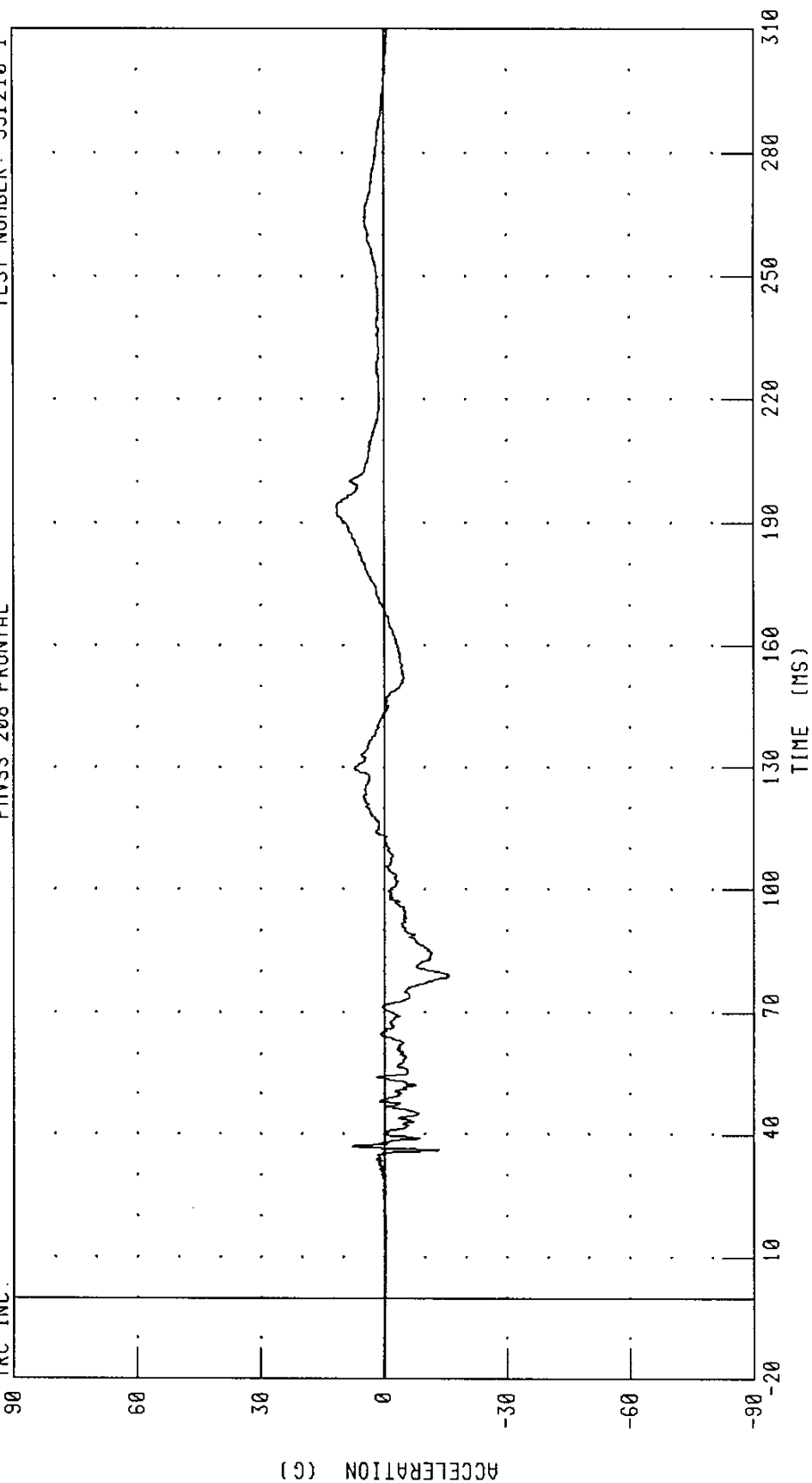
1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER HEAD Y-AXIS ACCELERATION



1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER HEAD Z-AXIS ACCELERATION
FMVSS 208 FRONTAL

TEST NUMBER: 991210-1

TRC INC.



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

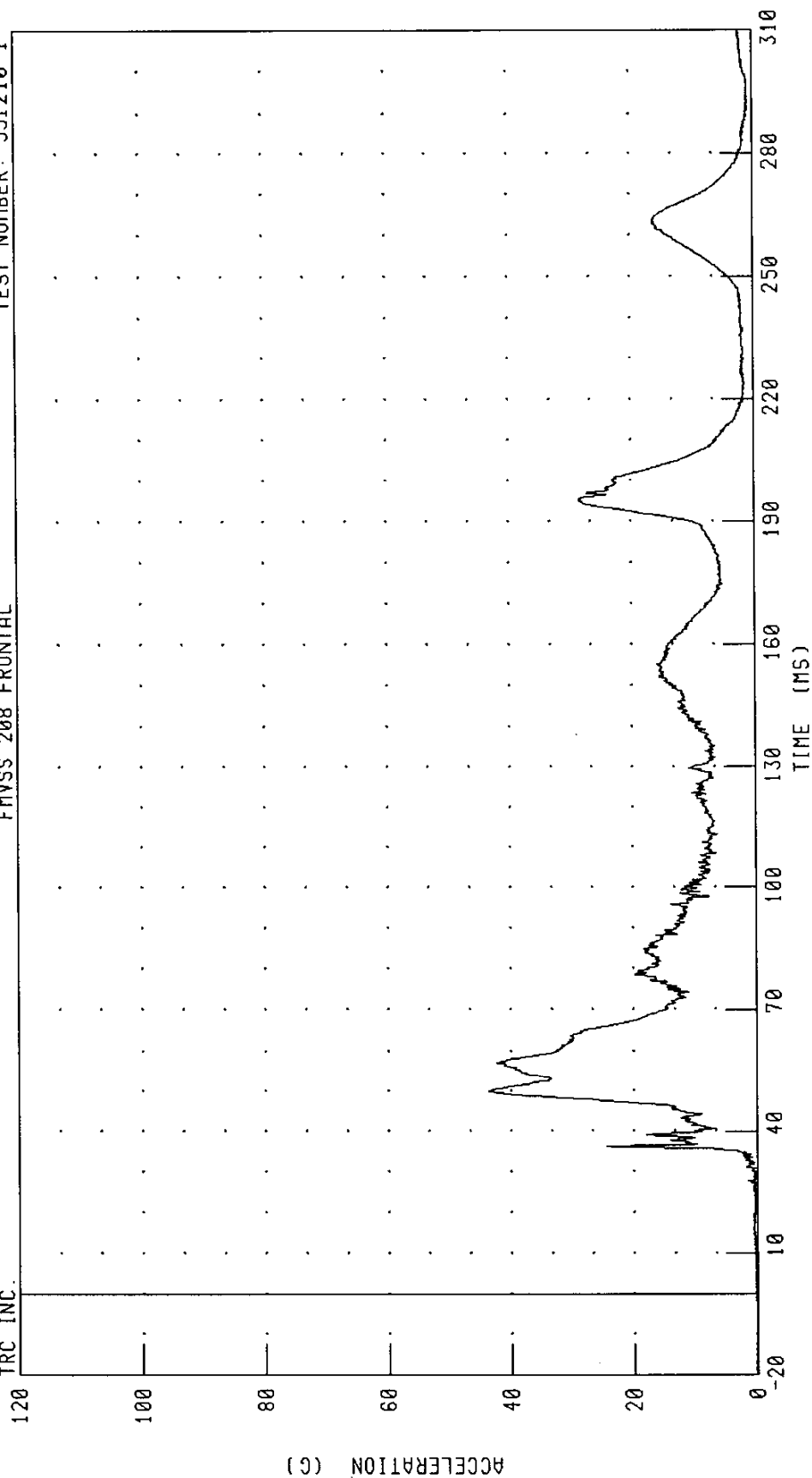
PEAK DATA: 11.58 G @ 192.48 MS, -15.87 G @ 79.04 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

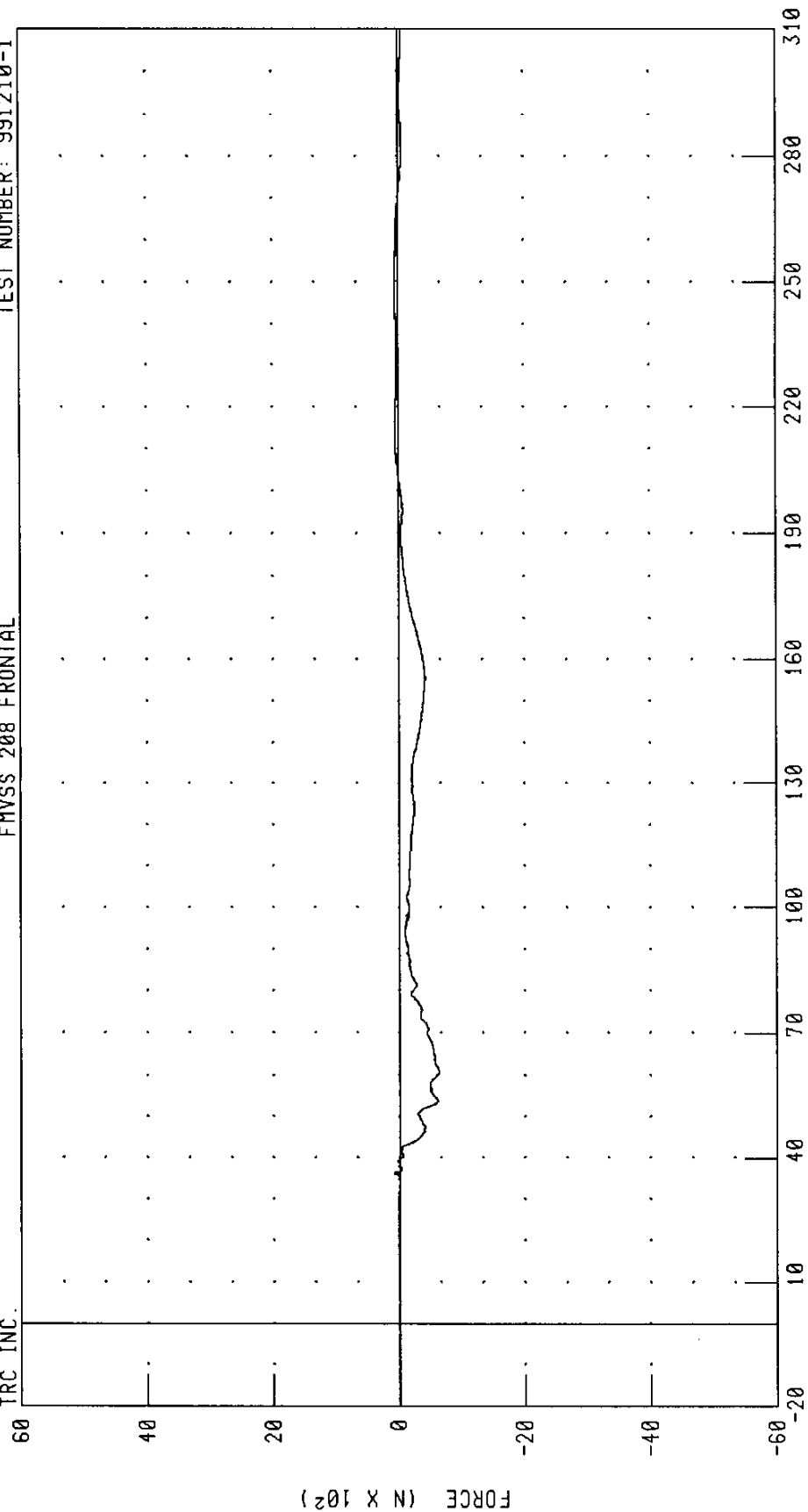
PEAK DATA: 43.62 G @ 49.84 MS, 0.14 G @ 29.68 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

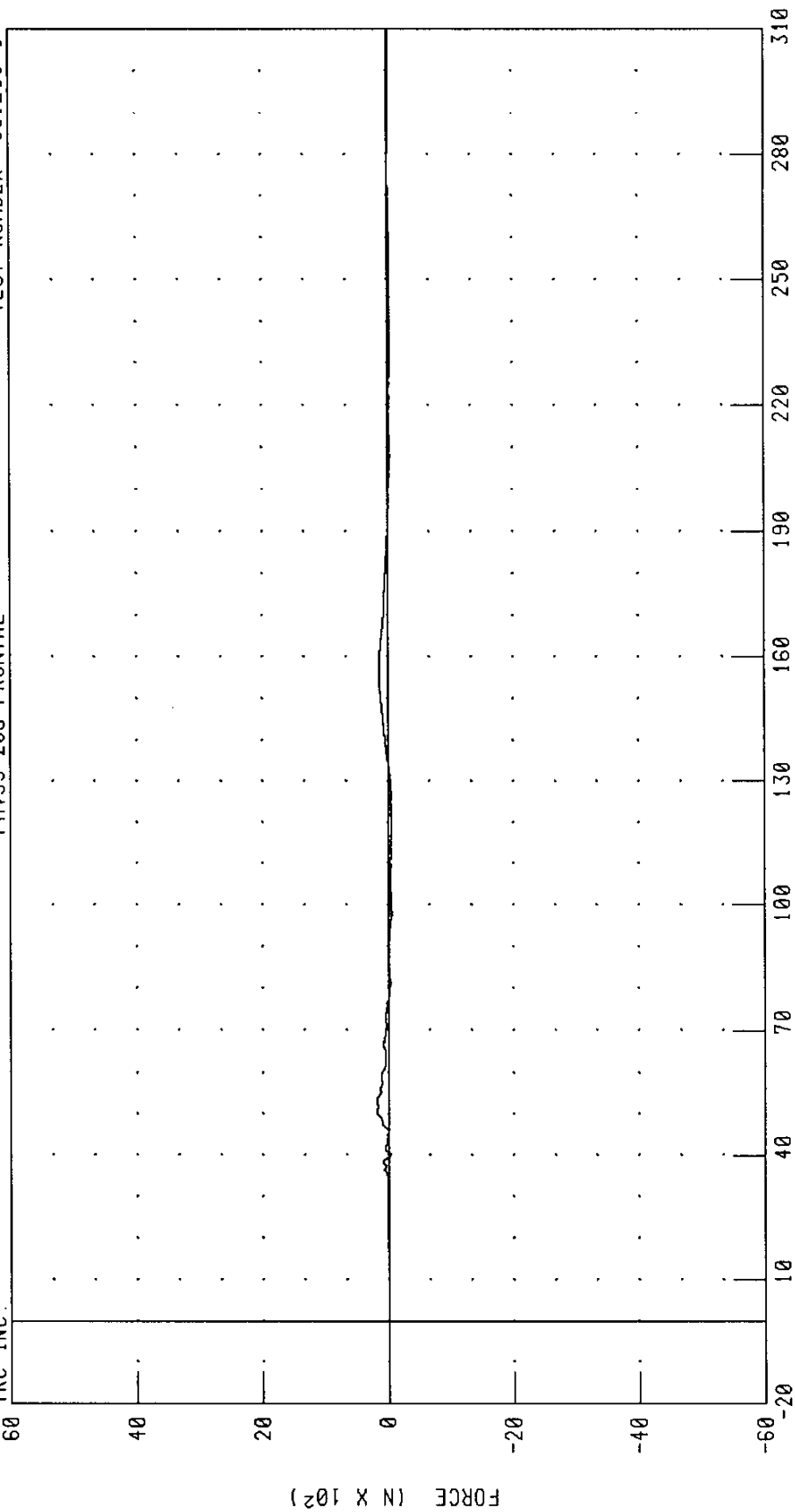
PEAK DATA: 81.57 N @ 36.32 MS; -634.86 N @ 60.64 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.

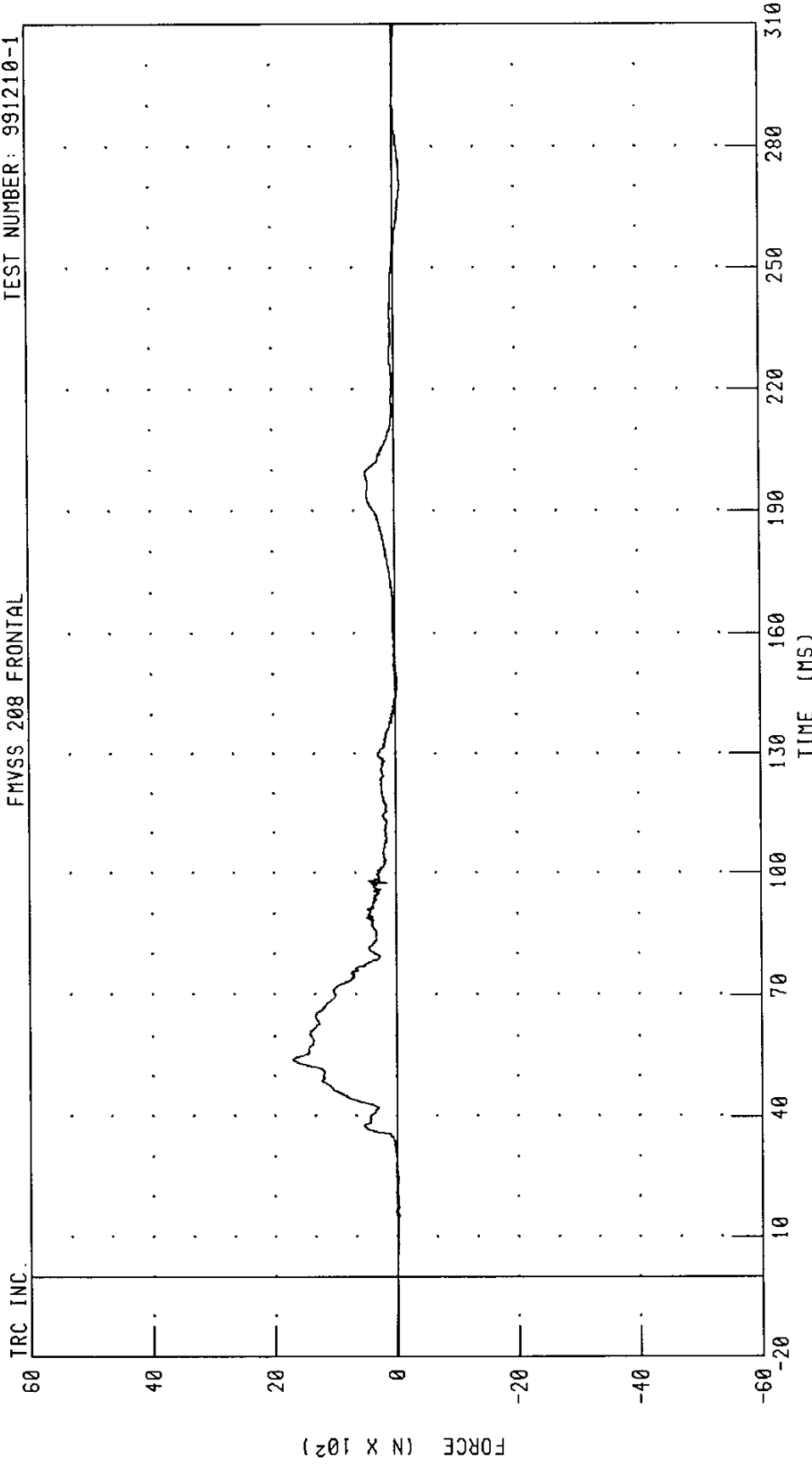


CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

PEAK DATA: 179.11 N @ 50.56 MS, -81.64 N @ 97.60 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK Z-AXIS AXIAL FORCE
FMVSS 208 FRONTAL

TEST NUMBER: 991210-1



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

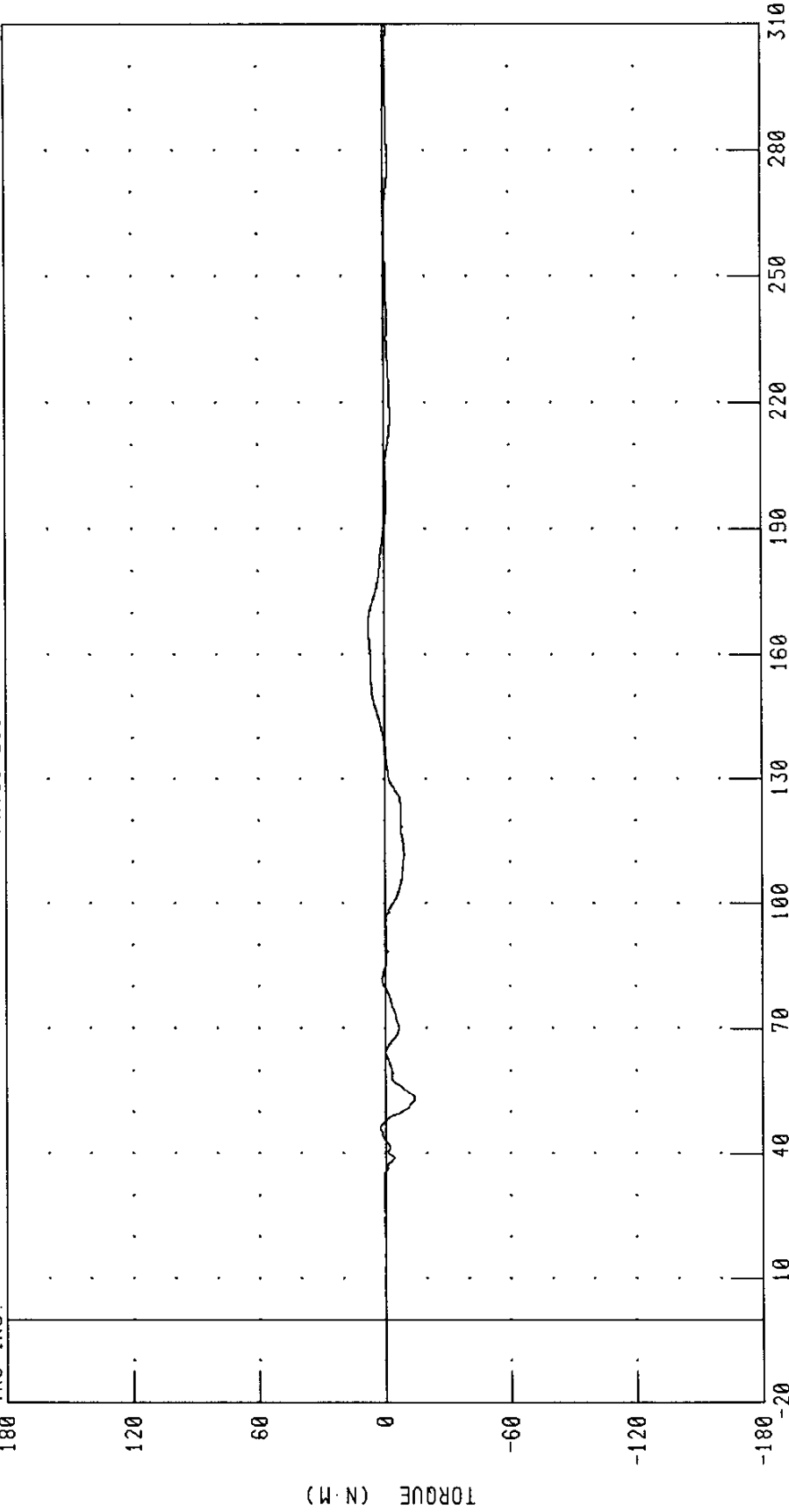
PEAK DATA: 1702.15 N @ 54.00 MS; -121.78 N @ 269.36 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



TIME (MS)

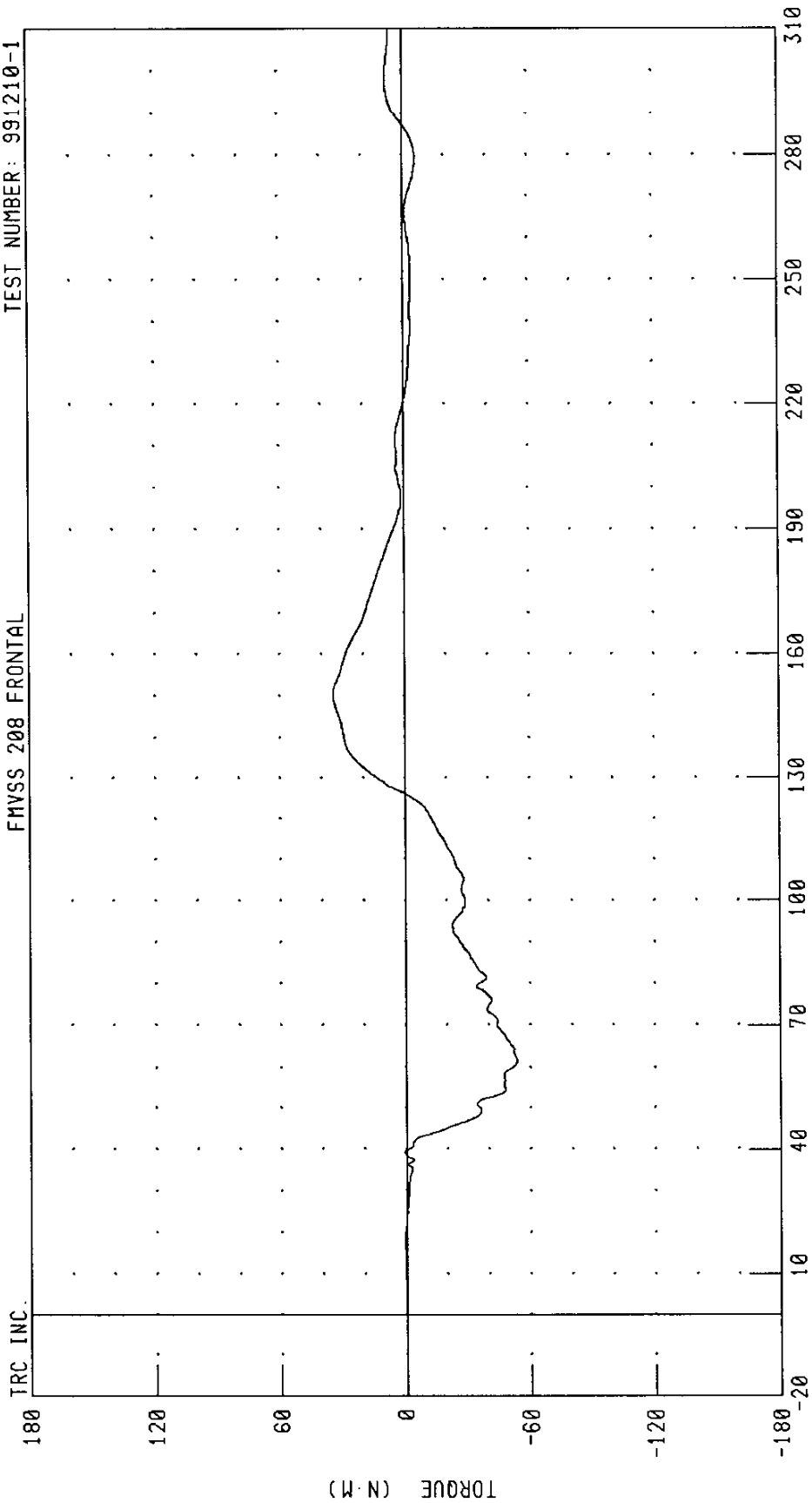
PEAK DATA: 7.47 N-M @ 166.24 MS; -14.12 N-M @ 53.36 MS

CHANNEL: NEKXM1 FILTER: CH. CLASS 600

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK MOMENT ABOUT Y AXIS

FMVSS 208 FRONTAL

TEST NUMBER: 991210-1



CHANNEL: NEKYM1 FILTER: CH. CLASS 600

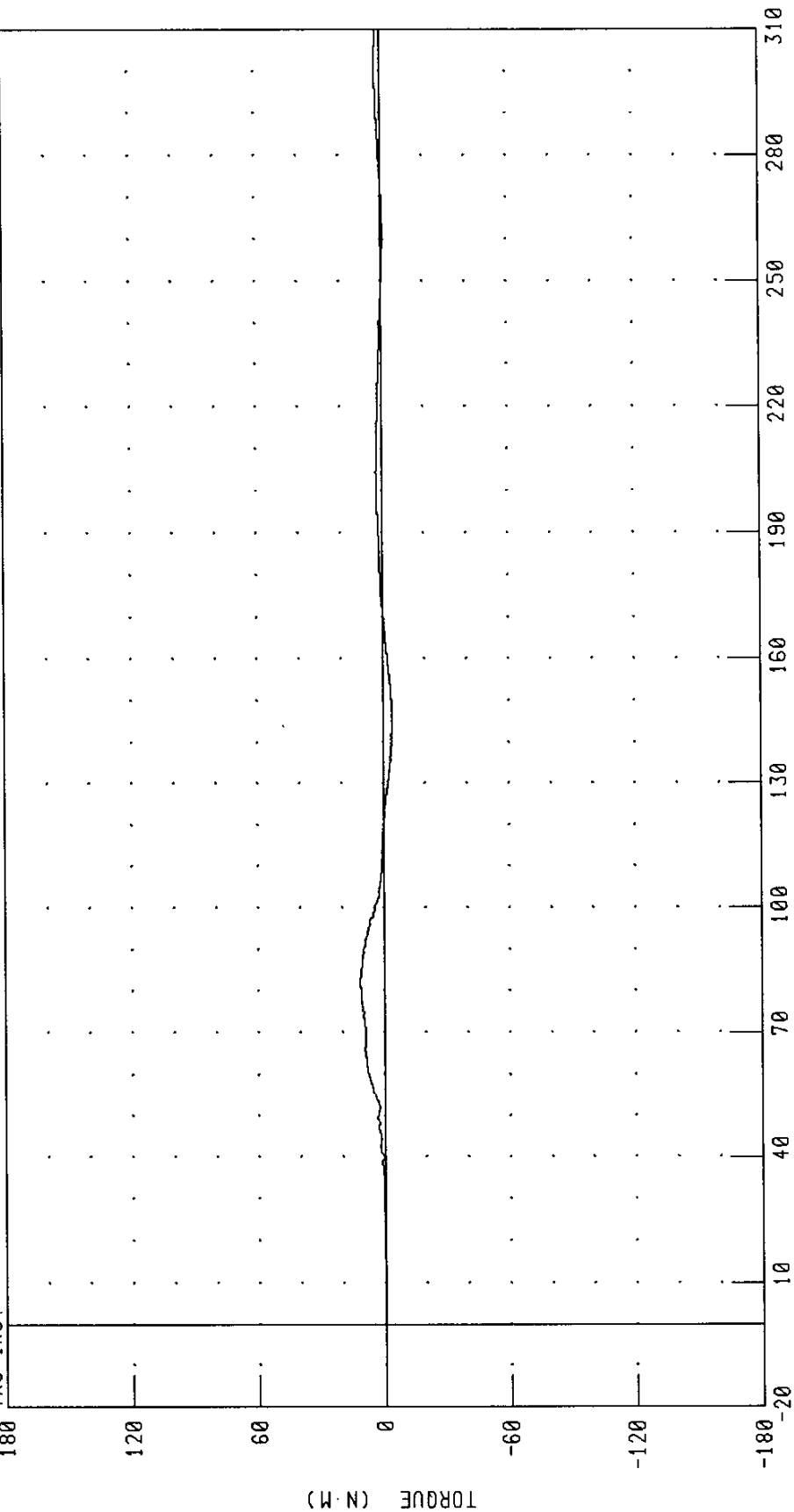
PEAK DATA: 34.50 N-M @ 150.56 MS, -53.55 N-M @ 61.68 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



TIME (MS)

PEAK DATA: 11.40 N·M @ 82.00 MS; -4.40 N·M @ 146.48 MS

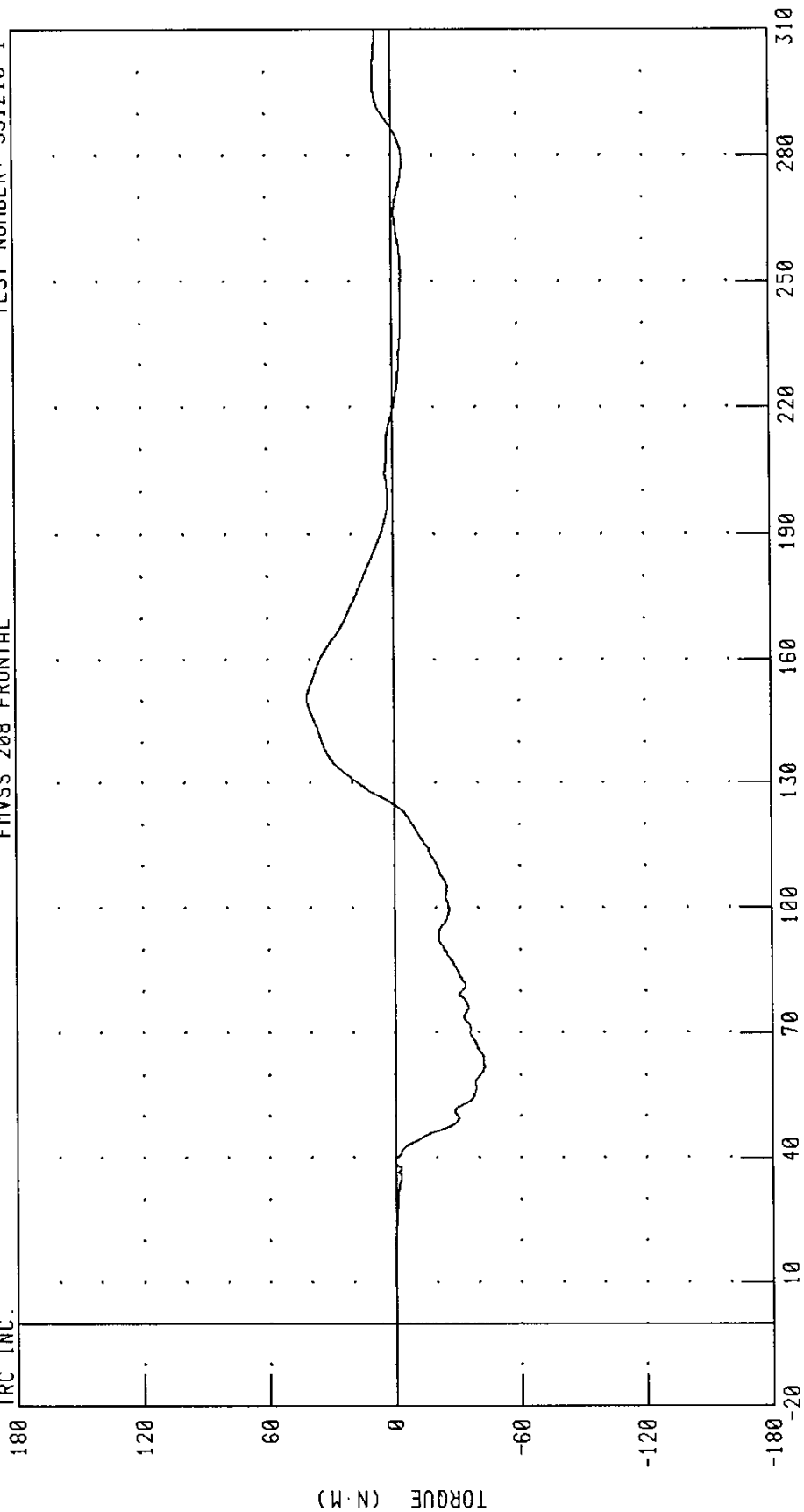
CHANNEL: NEKZM1 FILTER: CH. CLASS 600

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER NECK OCCIPITAL CONDYLE MOMENT ABOUT Y AXIS

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.

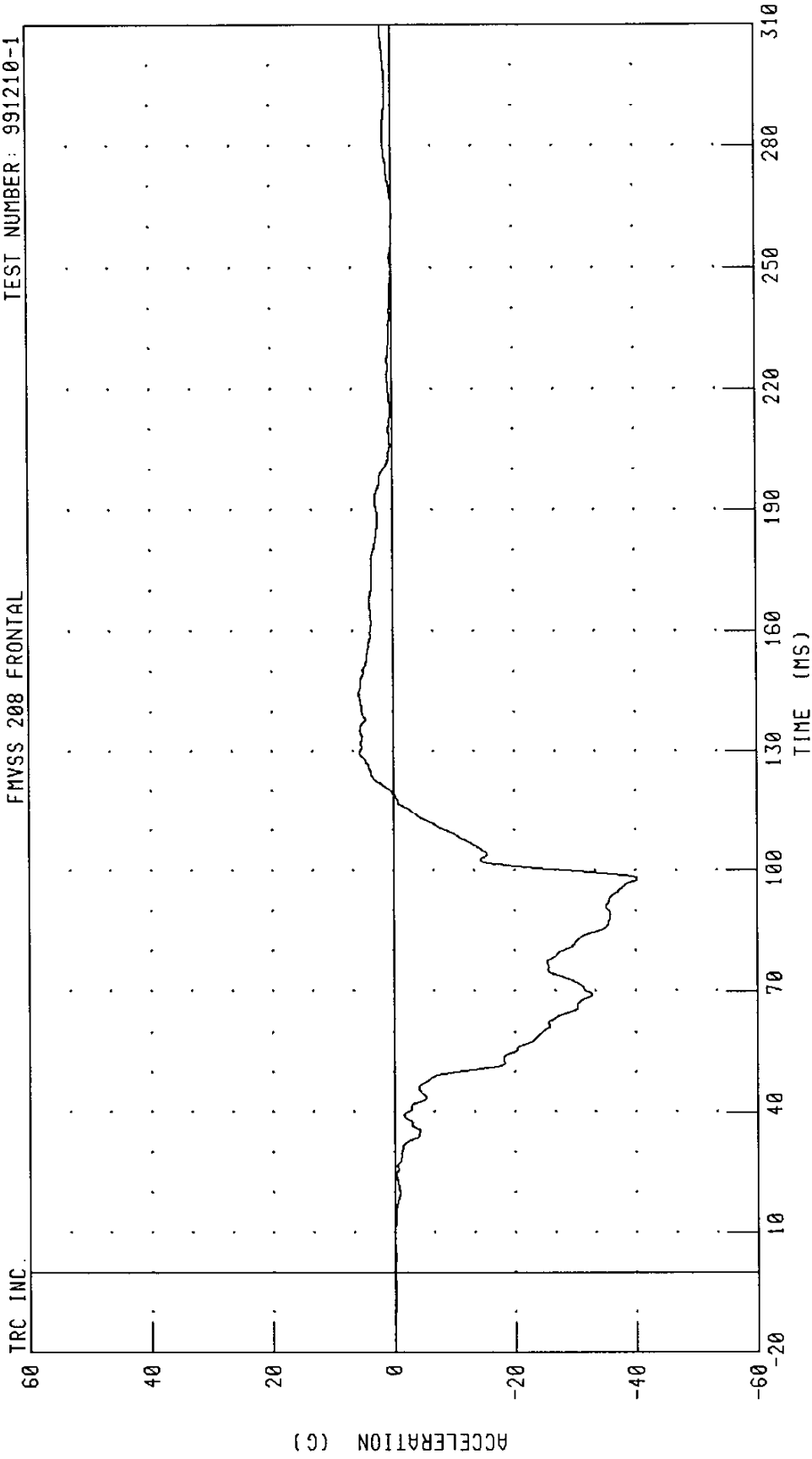


CHANNEL: NEKOM1 FILTER: CH. CLASS 600

PEAK DATA: 41.56 N·M @ 150.64 MS, -42.69 N·M @ 62.00 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER CHEST X-AXIS ACCELERATION
FMVSS 208 FRONTAL

TEST NUMBER: 991210-1

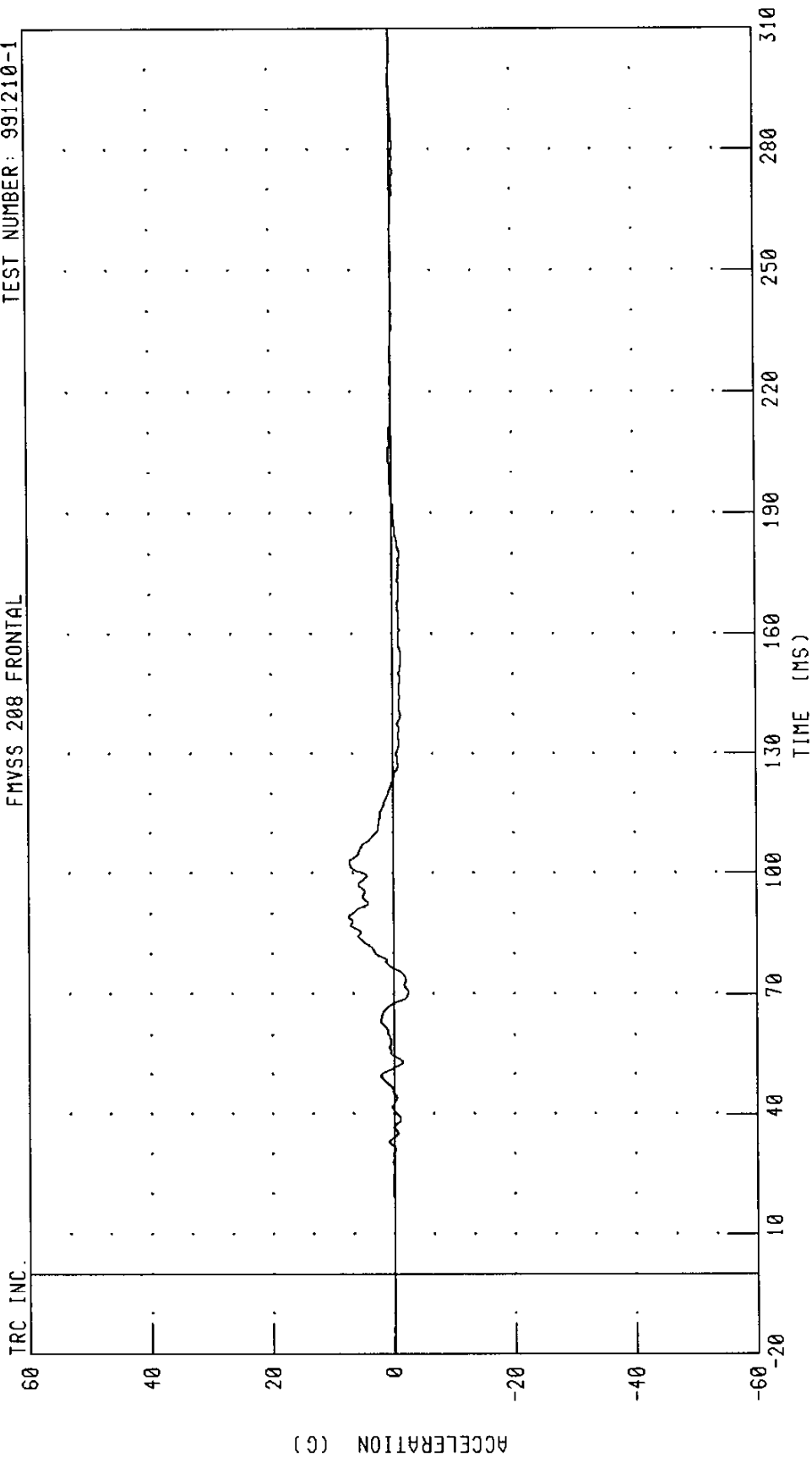


CHANNEL: CSTXG1 FILTER: CH. CLASS 180

PEAK DATA: 5.61 G @ 144.96 MS, -40.28 G @ 98.00 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER CHEST Y-AXIS ACCELERATION
FMVSS 208 FRONTAL

TEST NUMBER: 991210-1

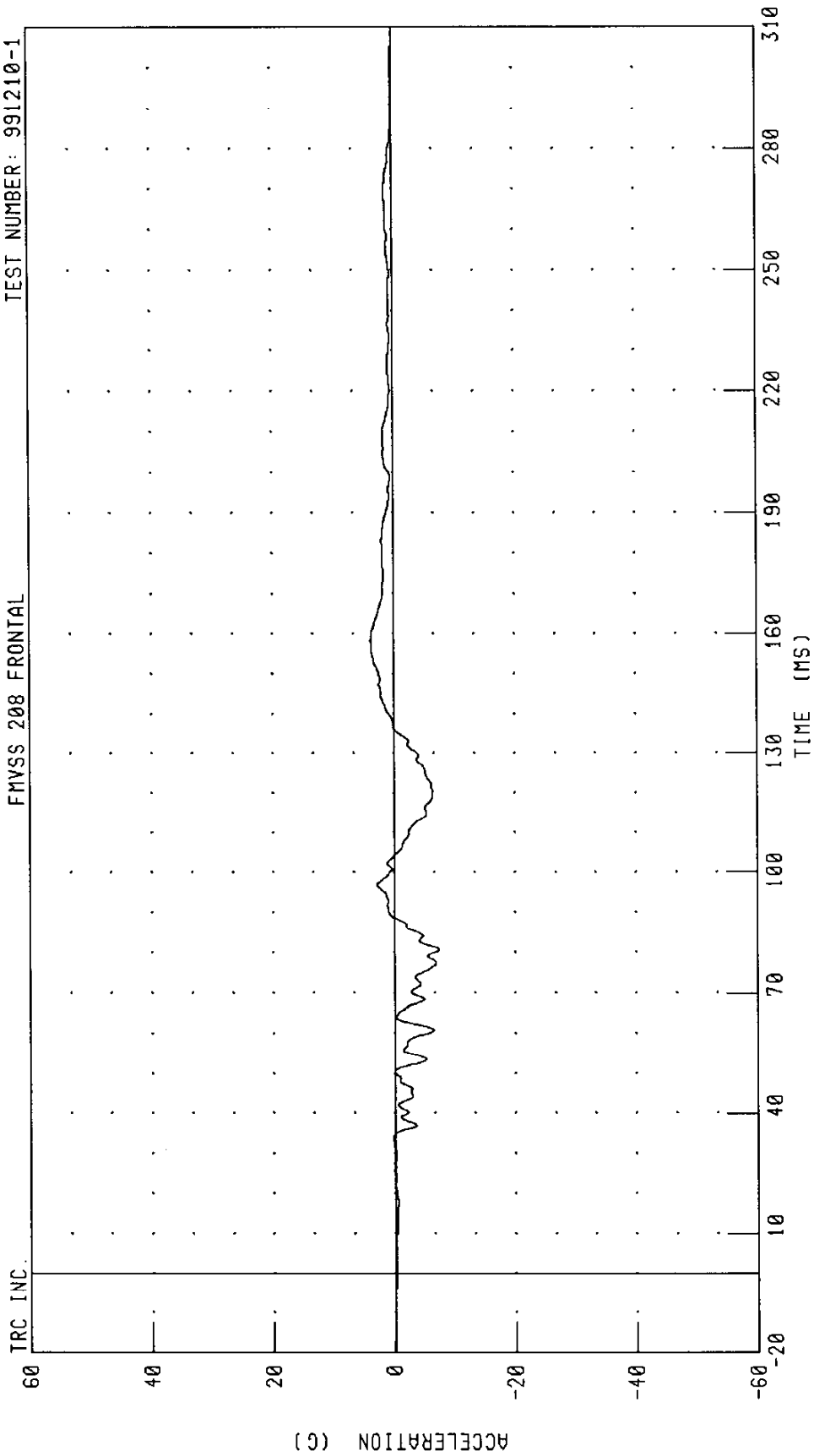


CHANNEL: CSTYG1 FILTER: CH. CLASS 180

PEAK DATA: 7.35 G @ 89.20 MS, -2.41 G @ 70.48 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER CHEST Z-AXIS ACCELERATION
FMVSS 208 FRONTAL

TEST NUMBER: 991210-1



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

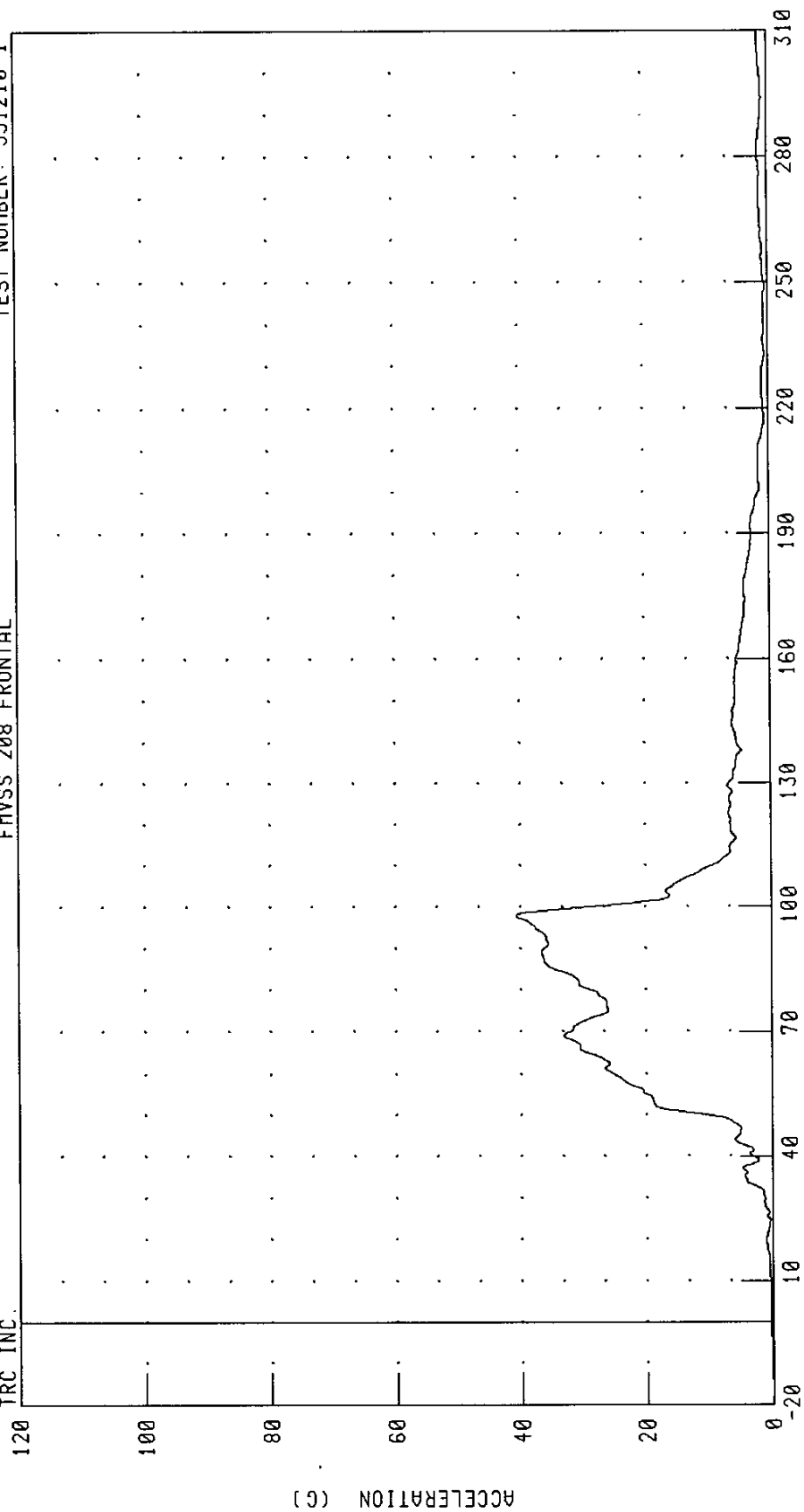
PEAK DATA: 3.77 G @ 158.32 MS, -7.40 G @ 80.80 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER CHEST RESULTANT ACCELERATION

TEST NUMBER: 991210-1

FMYSS 208 FRONTAL

TRC INC.

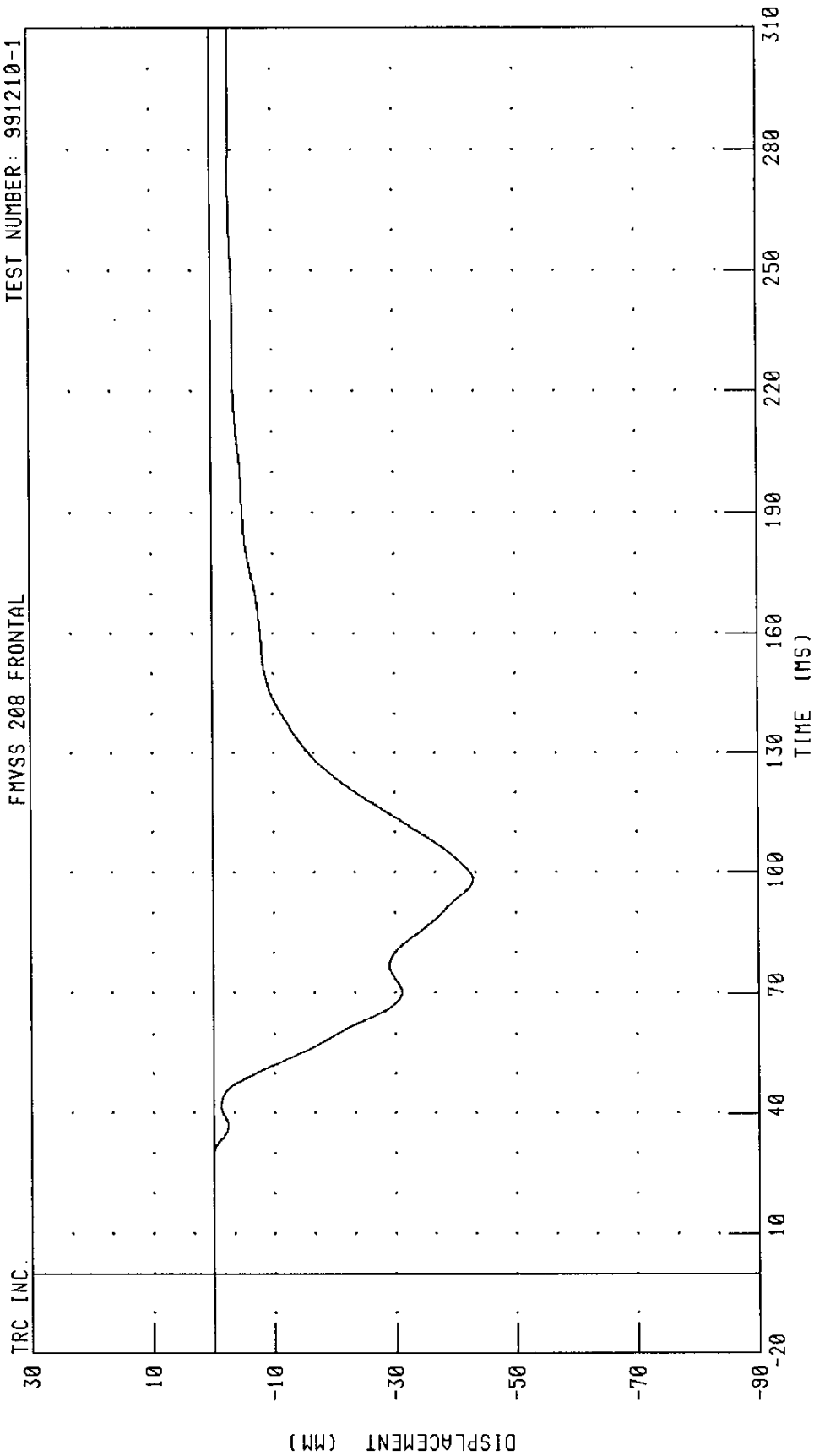


PEAK DATA: 40.69 G @ 97.92 MS, 0.01 G @ -20.00 MS

CHANNEL: CSTRG1 FILTER: CH. CLASS 180

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER CHEST DEFLECTION
FMVSS 208 FRONTAL

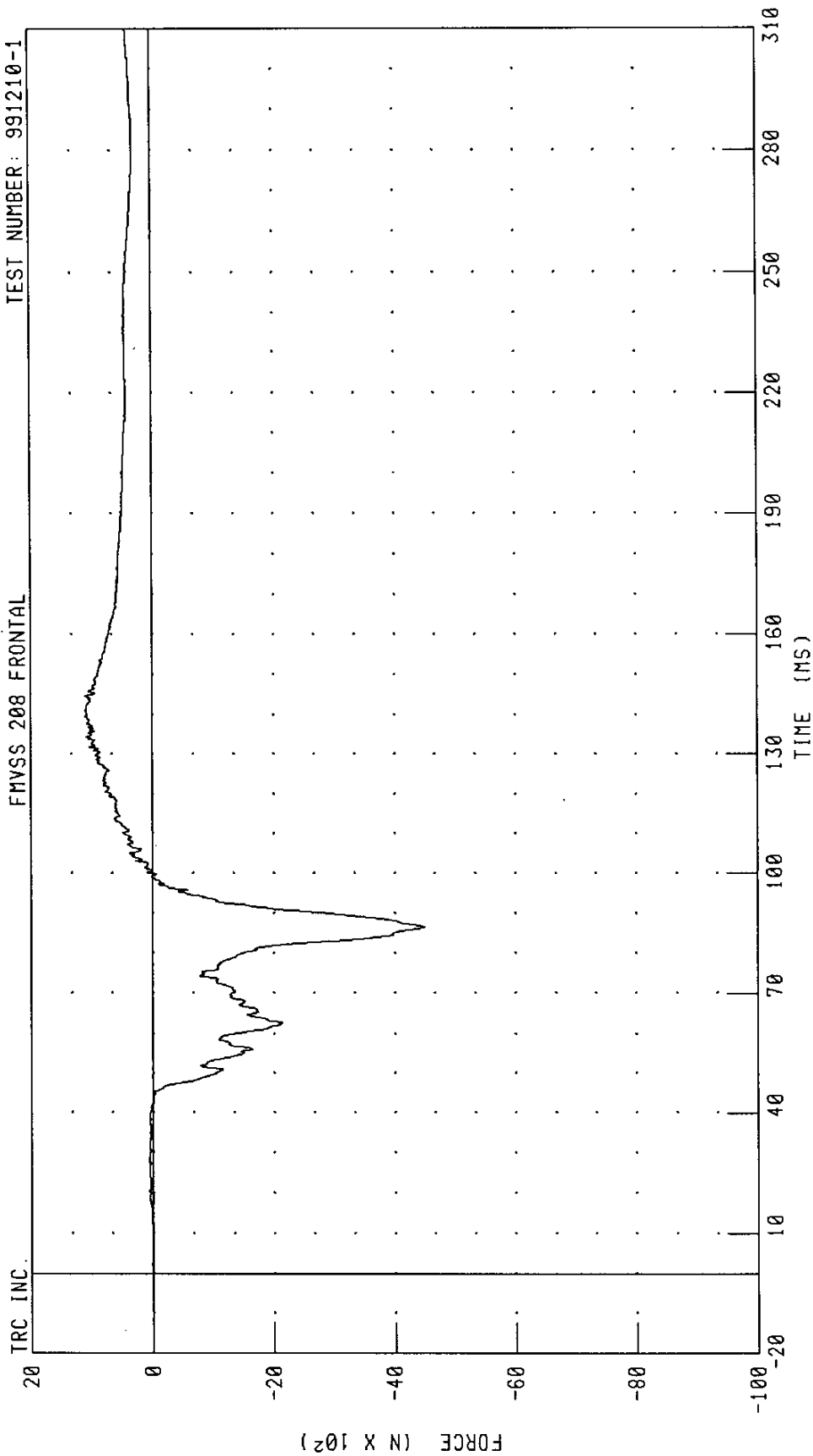
TEST NUMBER: 991210-1



CHANNEL: CSTX01 FILTER: CH. CLASS 180

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER LEFT FEMUR FORCE
FMVSS 208 FRONTAL

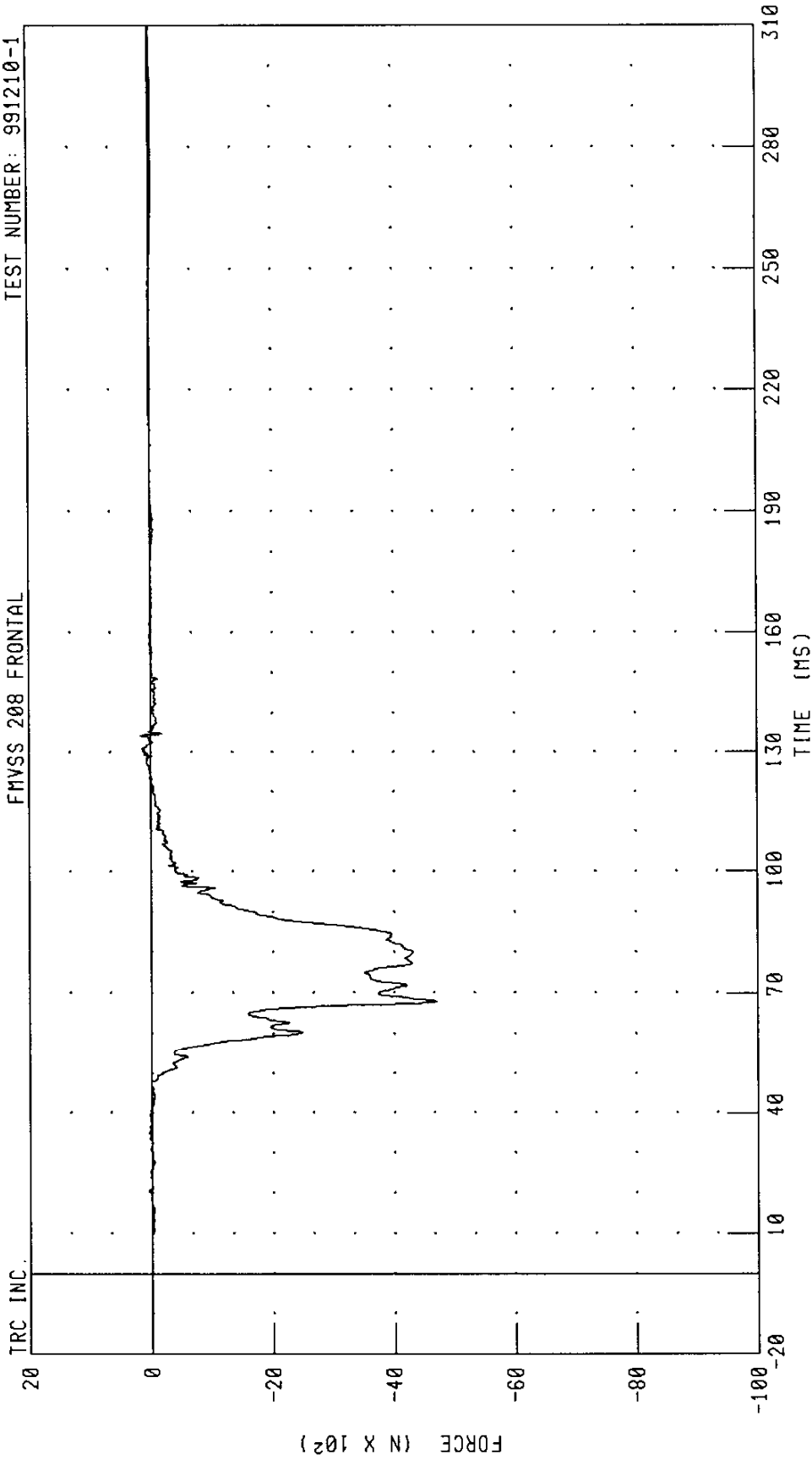
TEST NUMBER: 991210-1



CHANNEL: LFMF1 FILTER: CH. CLASS 600

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
DRIVER RIGHT FEMUR FORCE
FMVSS 208 FRONTAL

TEST NUMBER: 991210-1



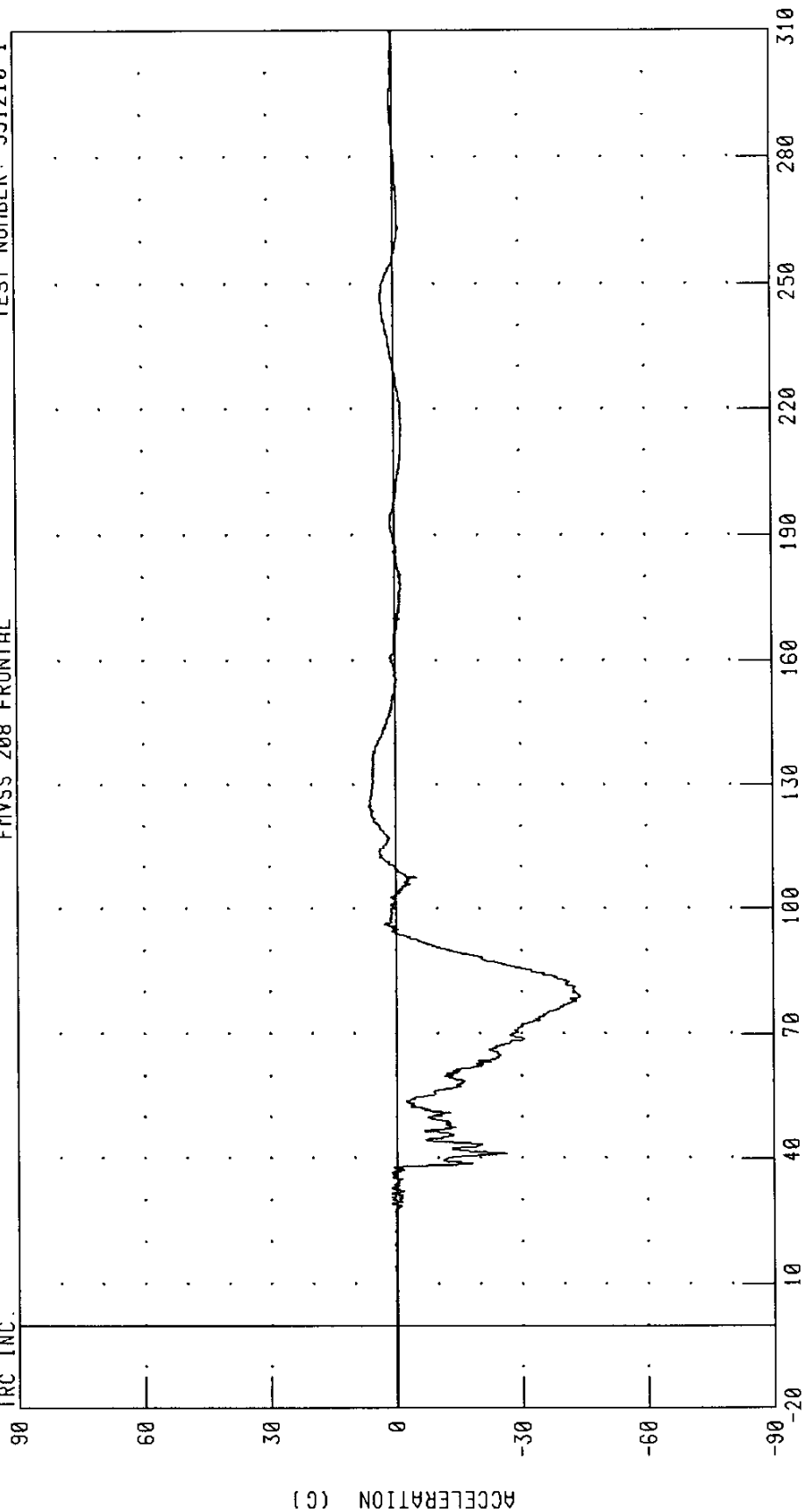
CHANNEL: RFMF1 FILTER: CH. CLASS 600 PEAK DATA: 170.45 N @ 134.40 MS; -4700.33 N @ 67.84 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: HEDXC2 FILTER: CH. CLASS 1000

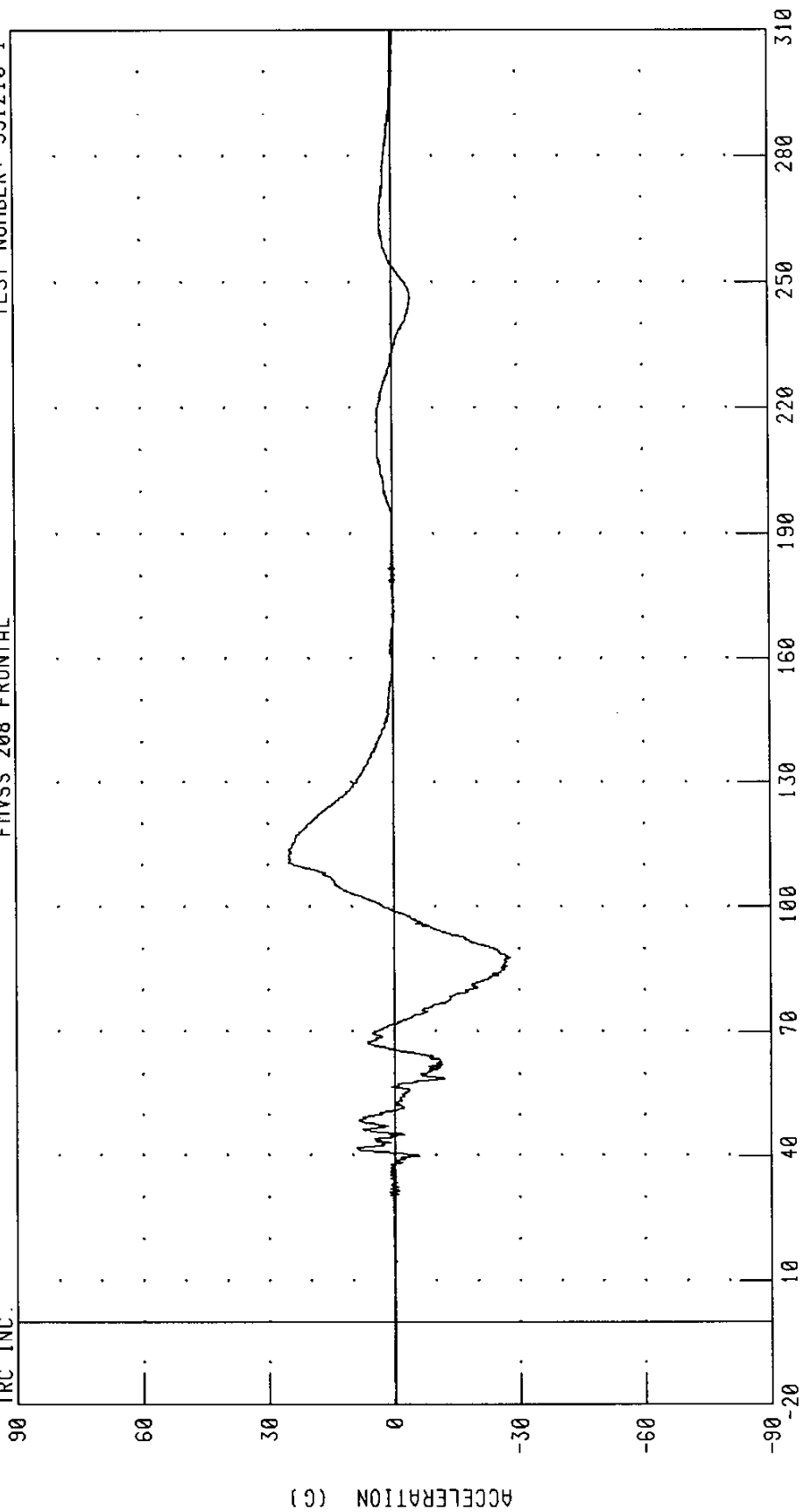
PEAK DATA: 6.32 G @ 124.72 MS, -44.04 G @ 78.96 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 99I210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

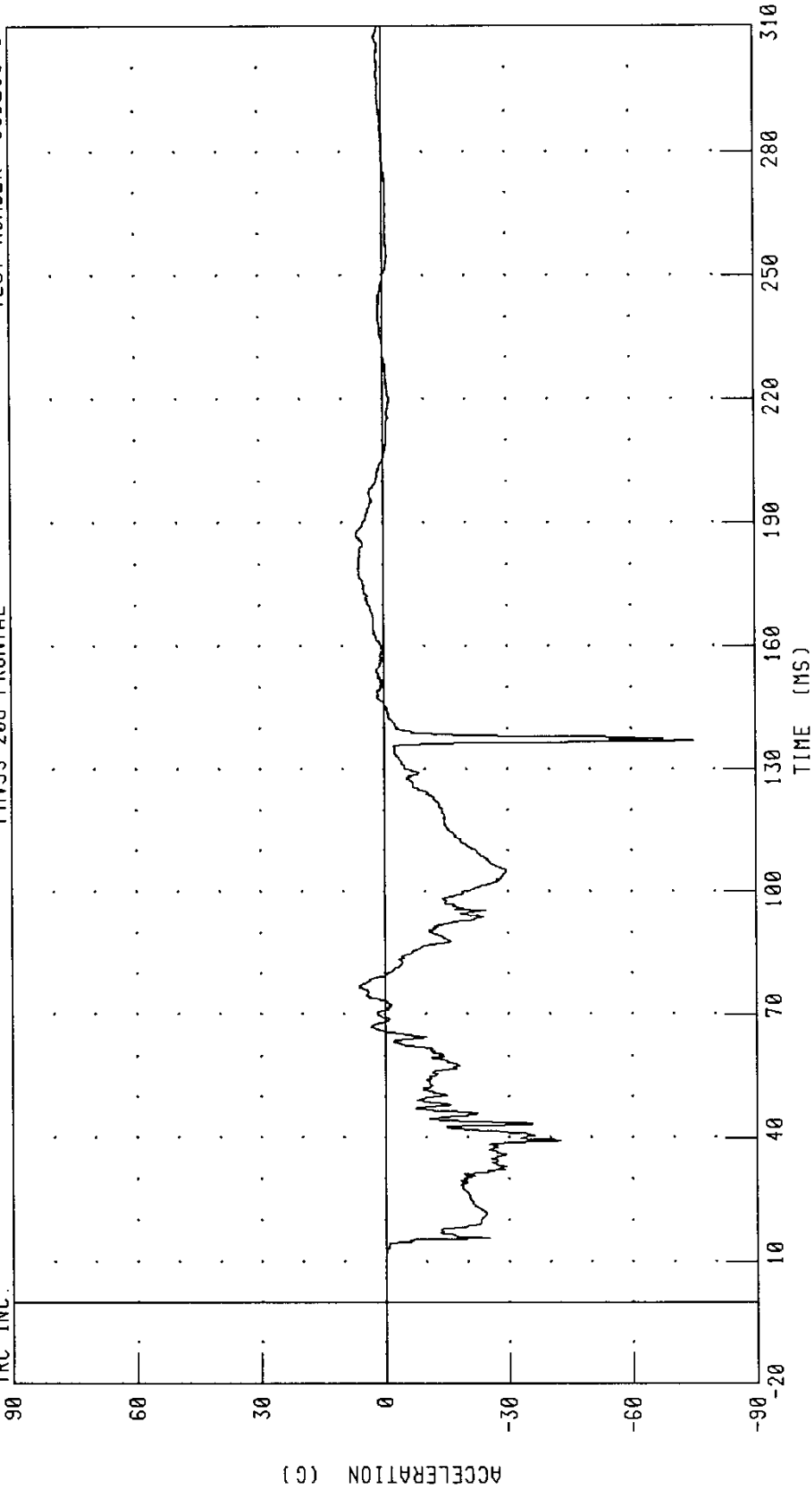
PEAK DATA: 25.11 G @ 110.64 MS, -27.78 G @ 87.84 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



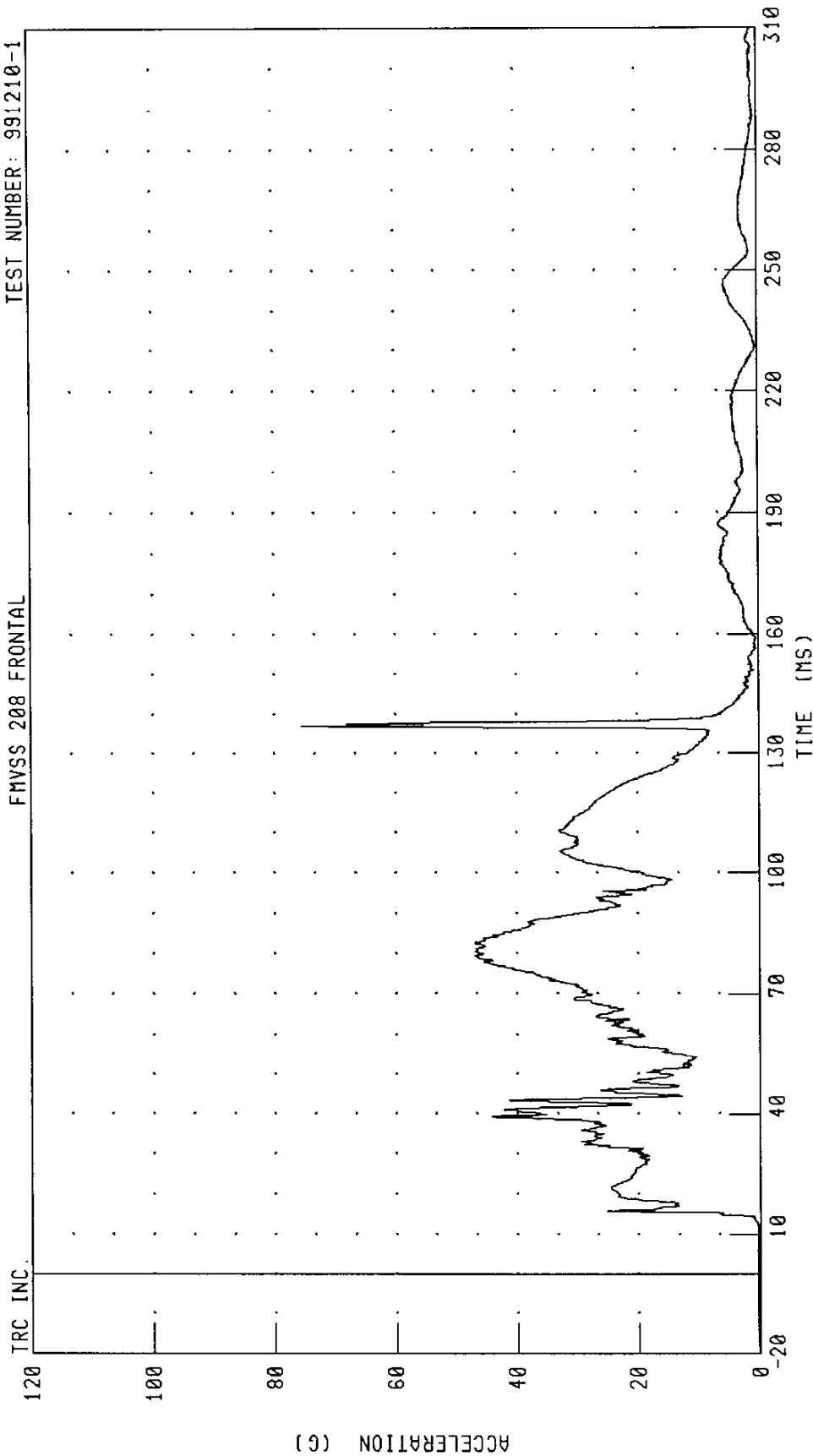
CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

PEAK DATA: 6.62 G @ 187.04 MS; -75.07 G @ 137.20 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL



PEAK DATA: 75.43 G @ 137.20 MS; 0.06 G @ -19.92 MS

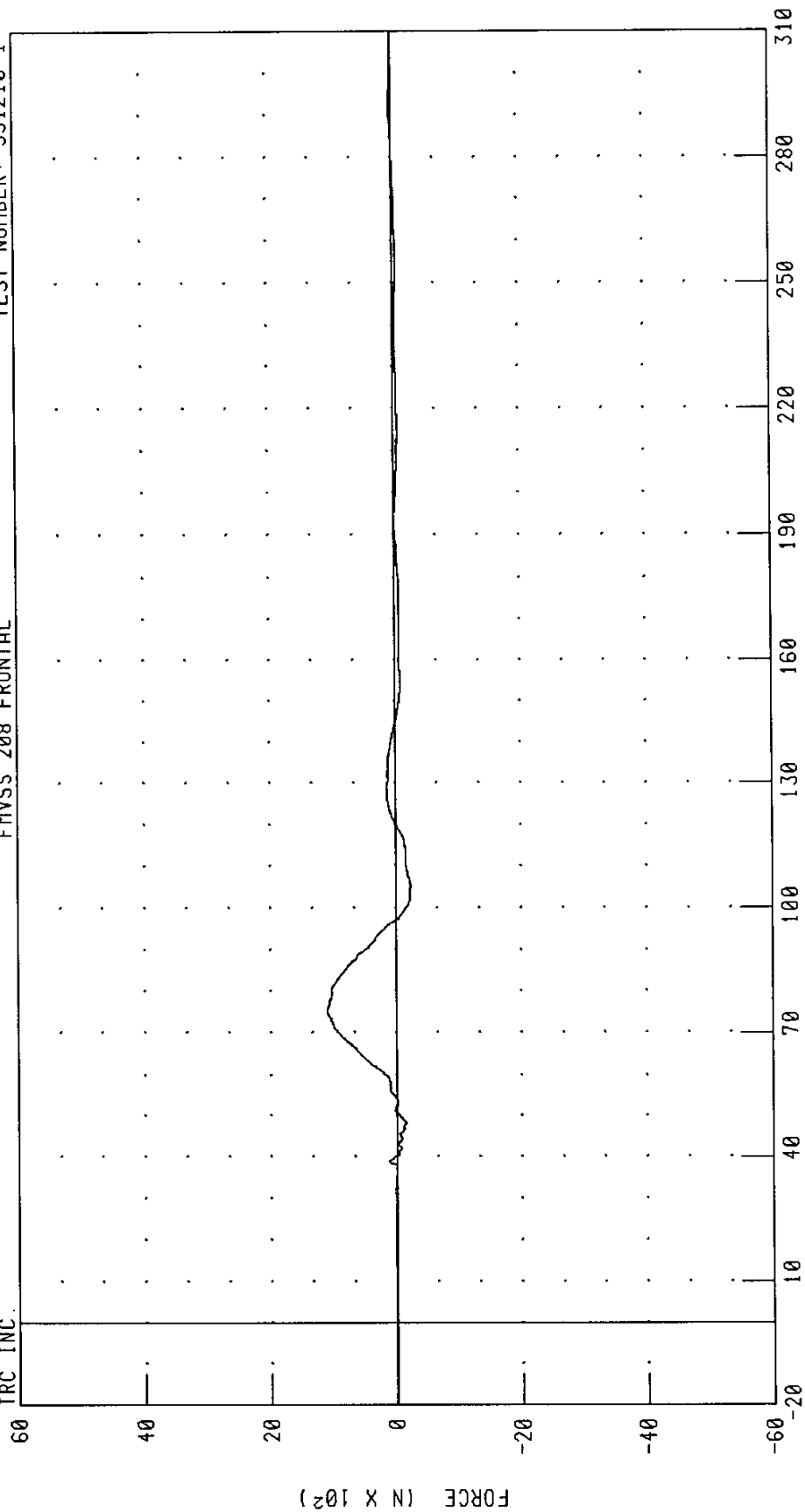
CHANNEL: HEDRC2 FILTER: CH. CLASS 1000

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 991210-1

FHVSS 208 FRONTAL

TRC INC.



PEAK DATA: 1094.83 N @ 75.60 MS; -237.79 N @ 104.80 MS

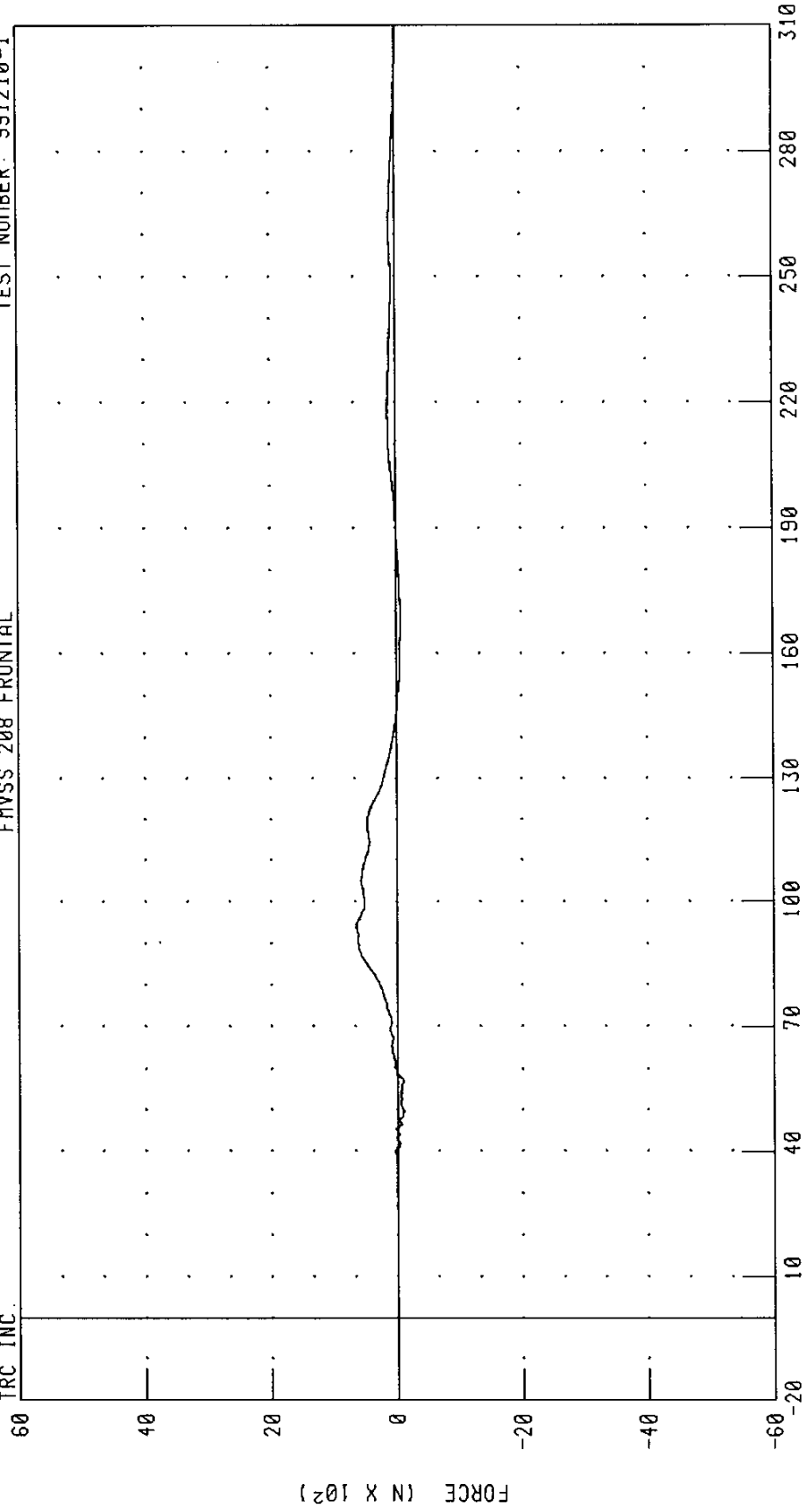
CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



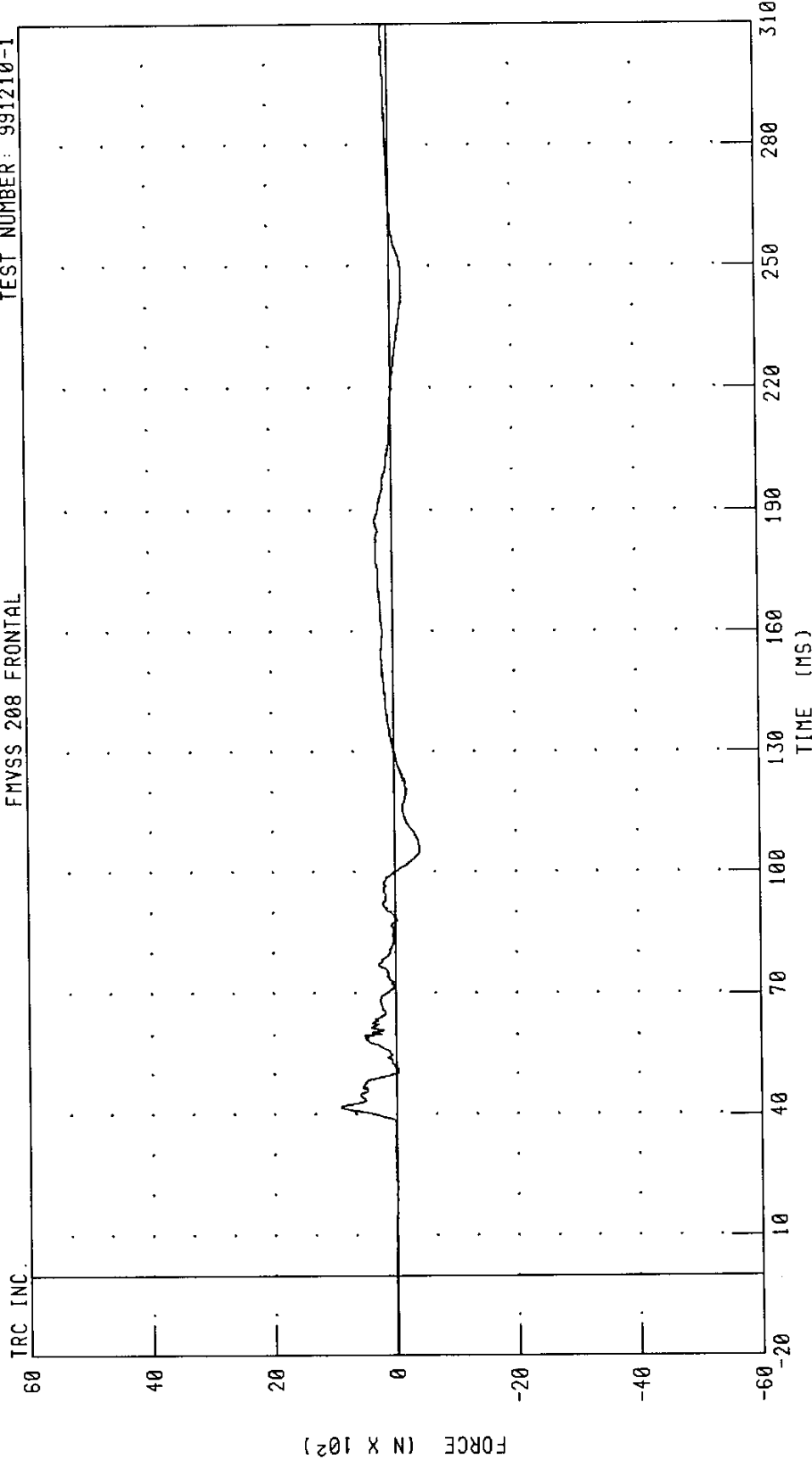
CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

PEAK DATA: 644.80 N @ 93.84 MS; -111.25 N @ 58.96 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

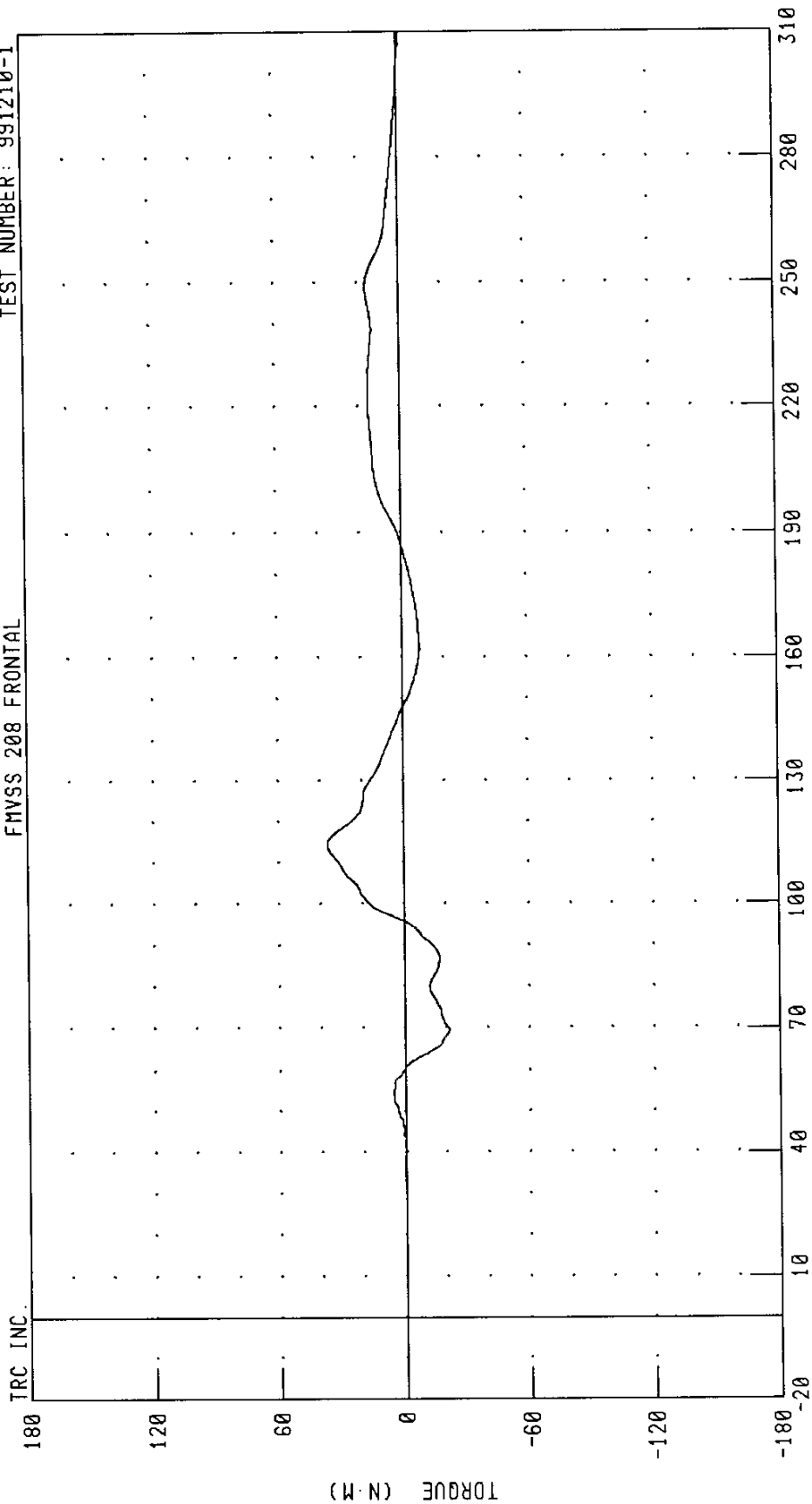


CHANNEL: NEKZF2 FILTER: CH. CLASS 1000 PEAK DATA: 901.60 N @ 41.76 MS; -414.97 N @ 104.96 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL



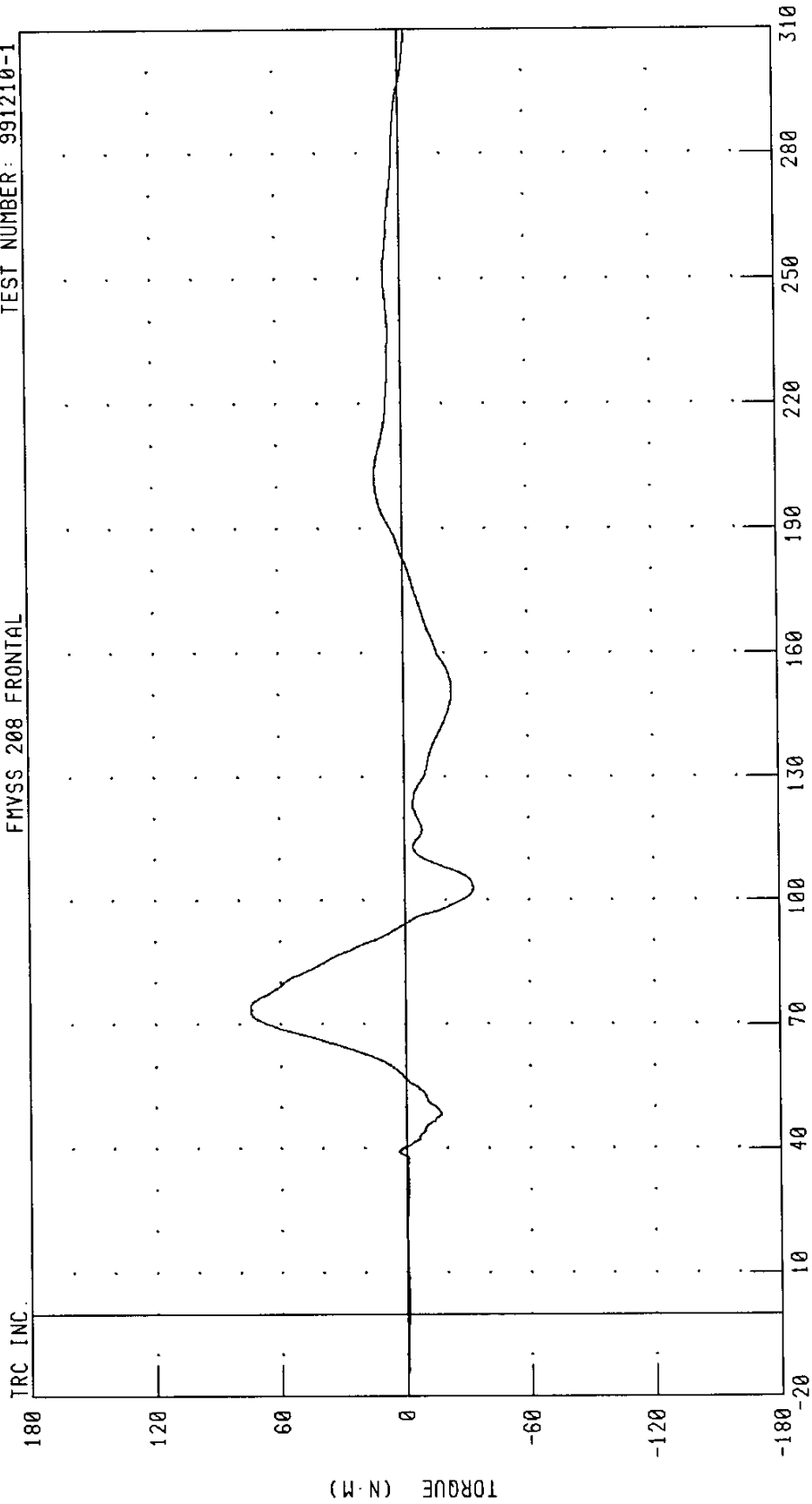
PEAK DATA: 36.60 N·m @ 114.56 ms, -21.41 N·m @ 69.52 ms

CHANNEL: NEKX12 FILTER: CH. CLASS 600

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL



PEAK DATA: 74.54 N·m @ 73.04 ms, -33.09 N·m @ 103.04 ms

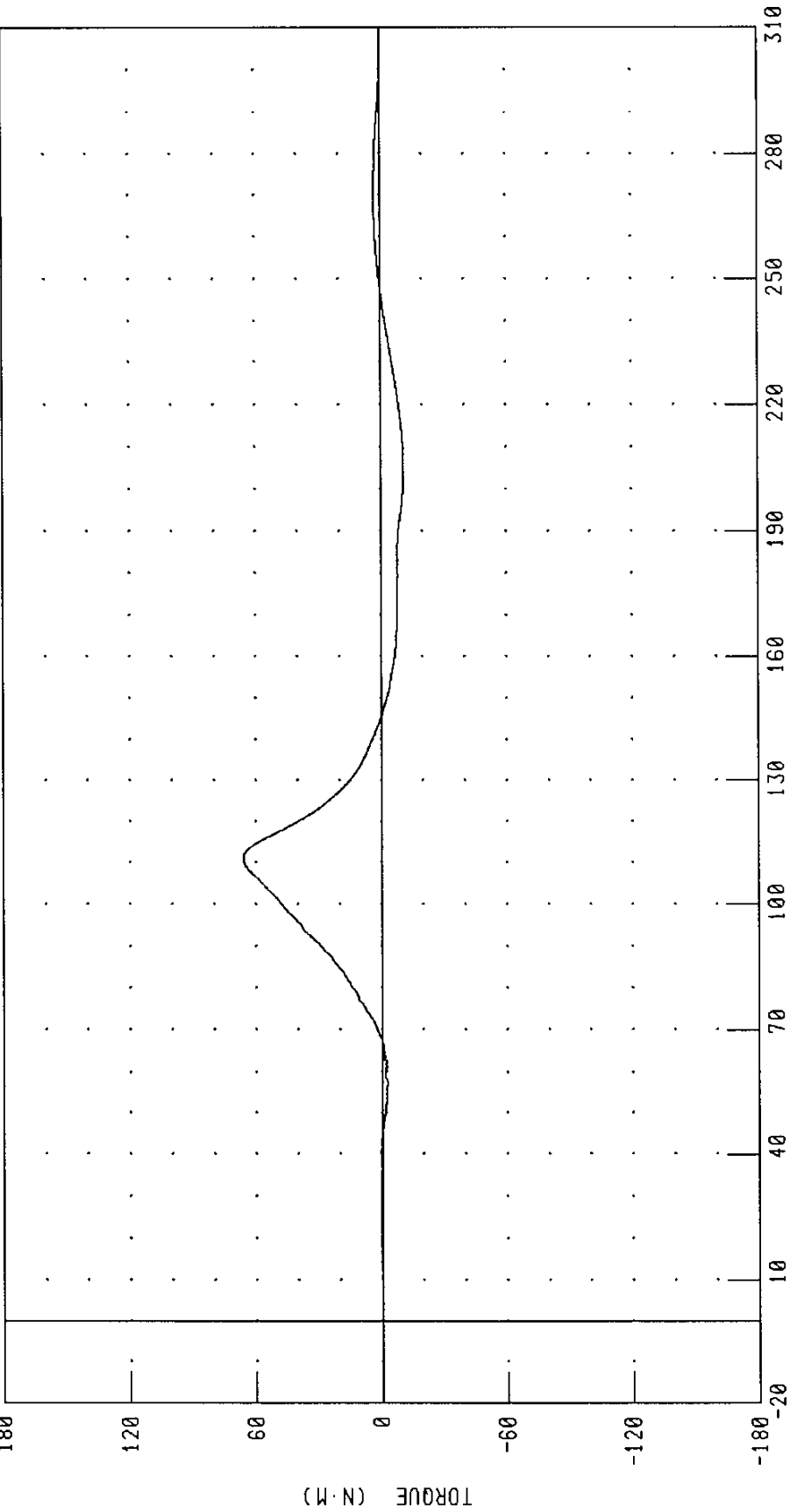
CHANNEL: NEKYH2 FILTER: CH. CLASS 600

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



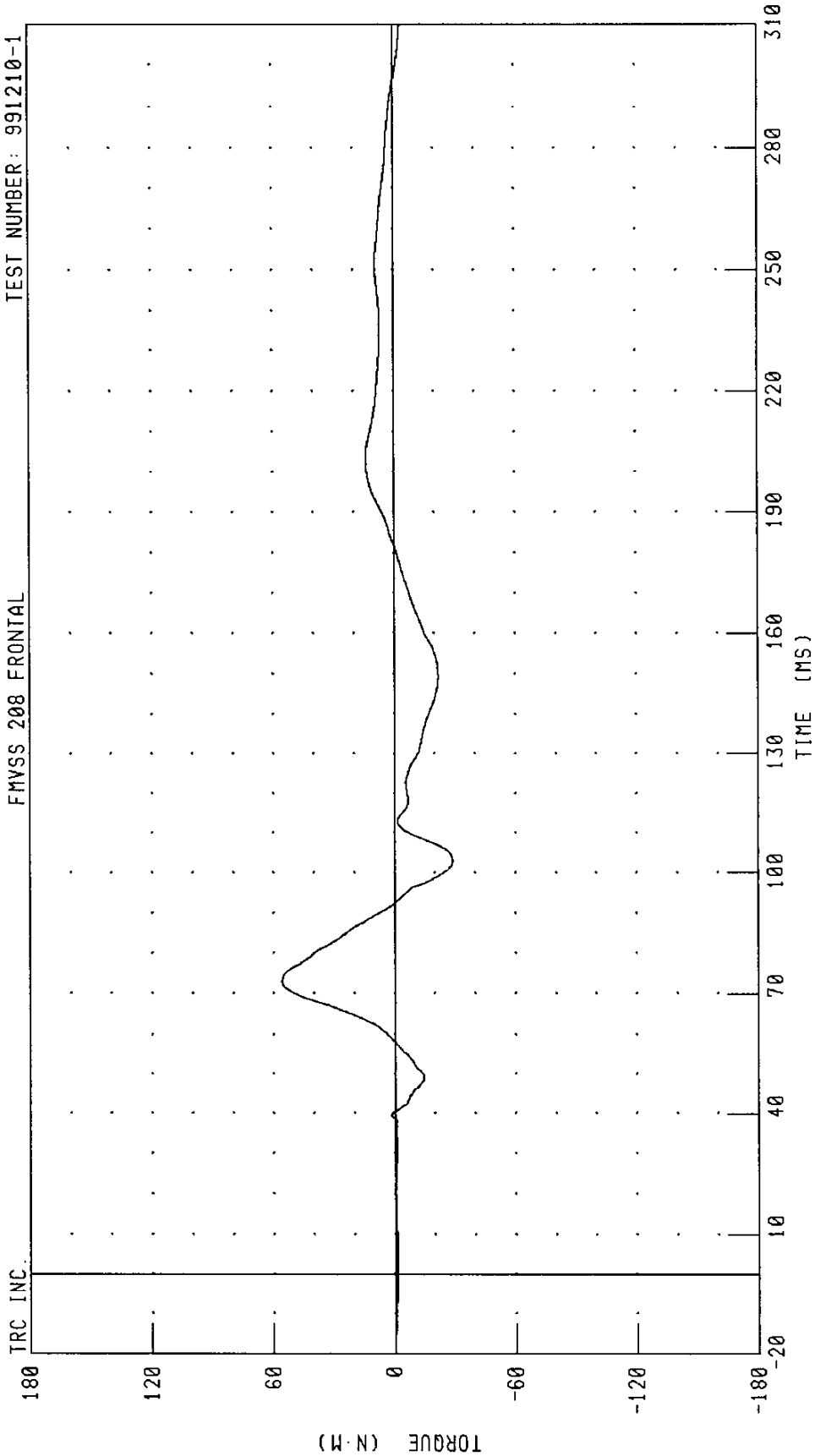
TIME (MS)

PEAK DATA: 65.94 N·M @ 111.20 MS; -10.95 N·M @ 207.04 MS

CHANNEL: NEKZM2 FILTER: CH. CLASS 600

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE MOMENT ABOUT Y AXIS
FMVSS 208 FRONTAL

TEST NUMBER: 991210-1

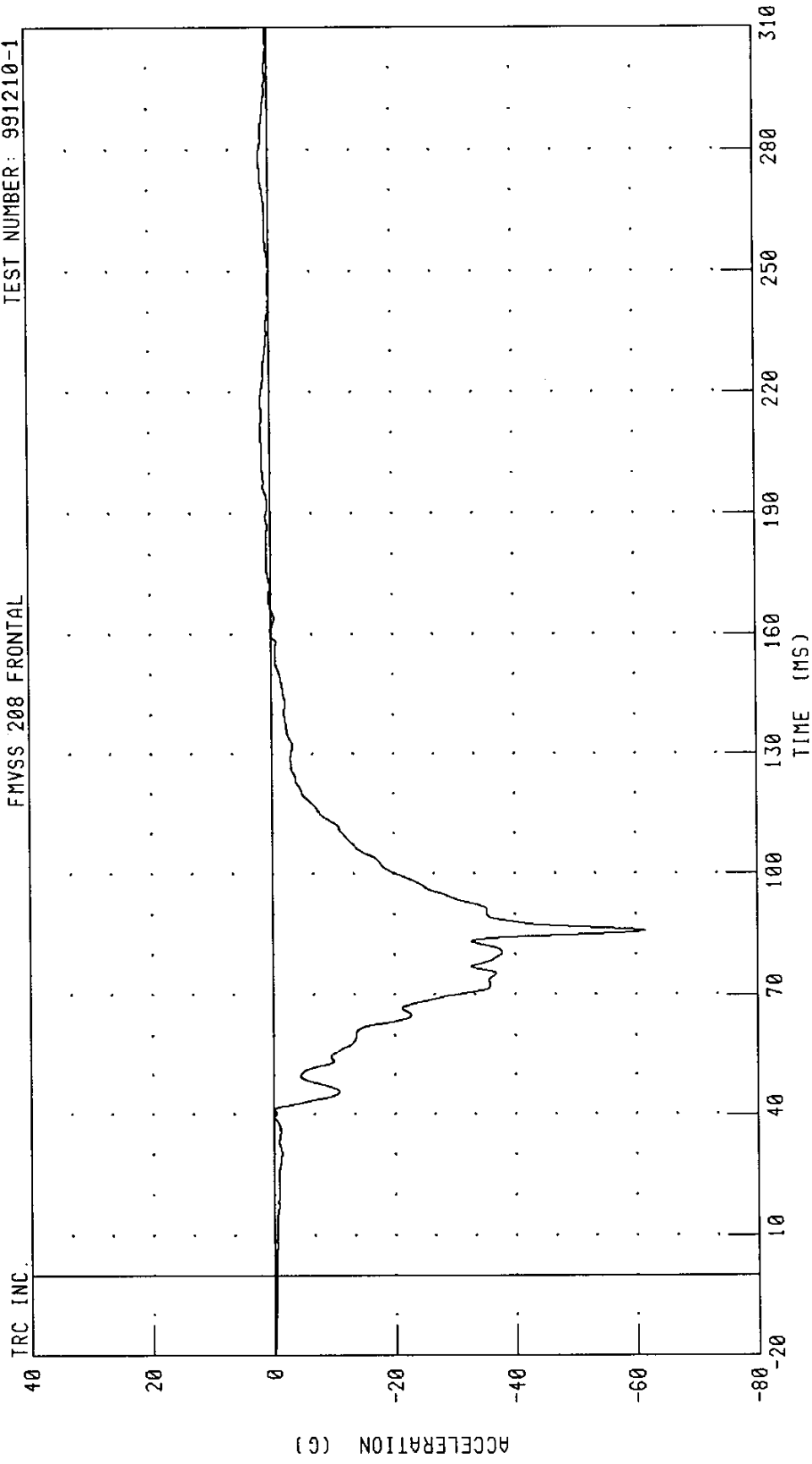


CHANNEL: NEKOM2 FILTER: CH. CLASS 600 PEAK DATA: 56.01 N-M @ 73.04 MS, -28.93 N-M @ 103.04 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL



CHANNEL: CSTXC2 FILTER: CH. CLASS 180

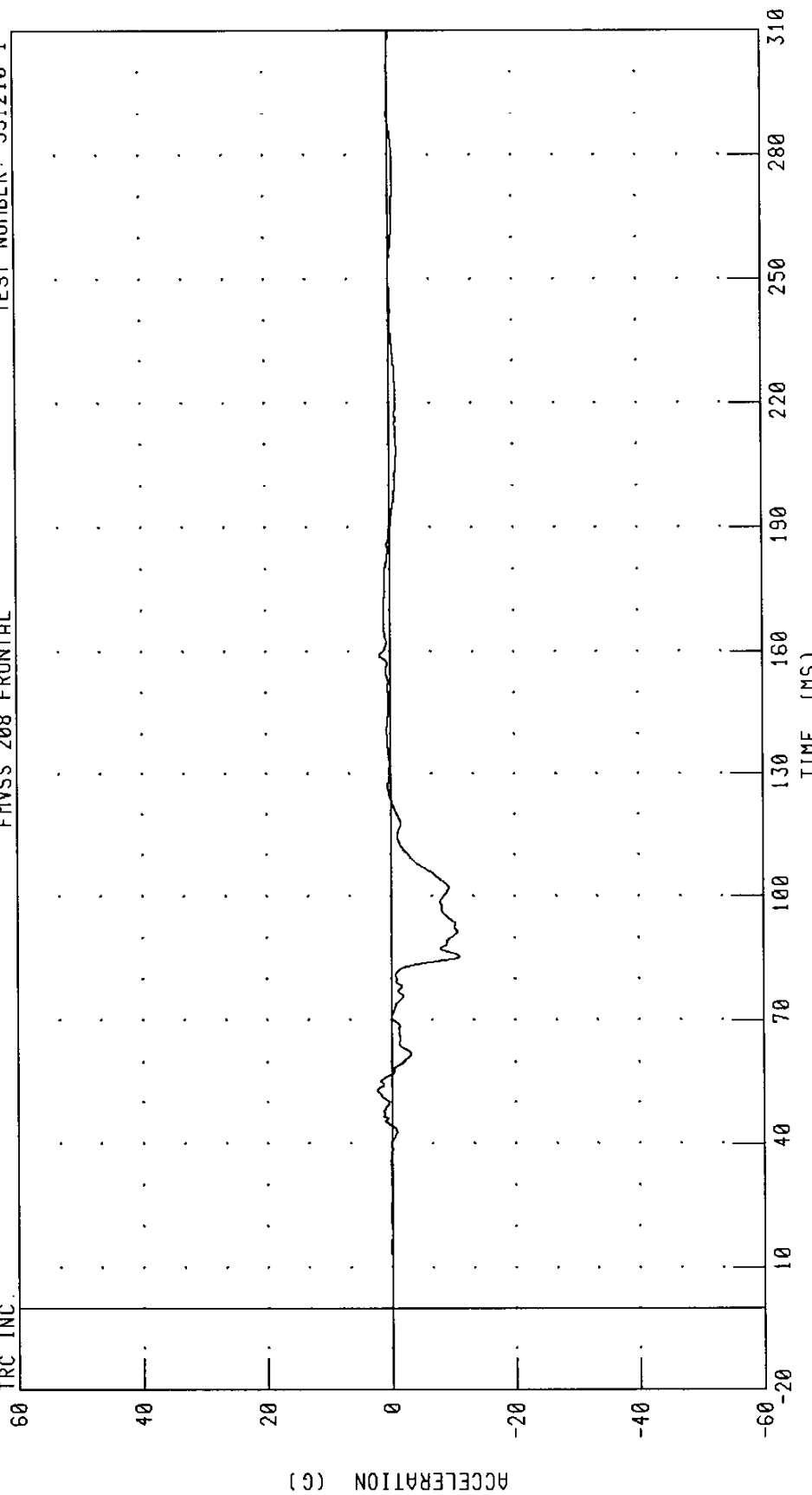
PEAK DATA: 1.62 G @ 209.44 MS, -61.49 G @ 85.92 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



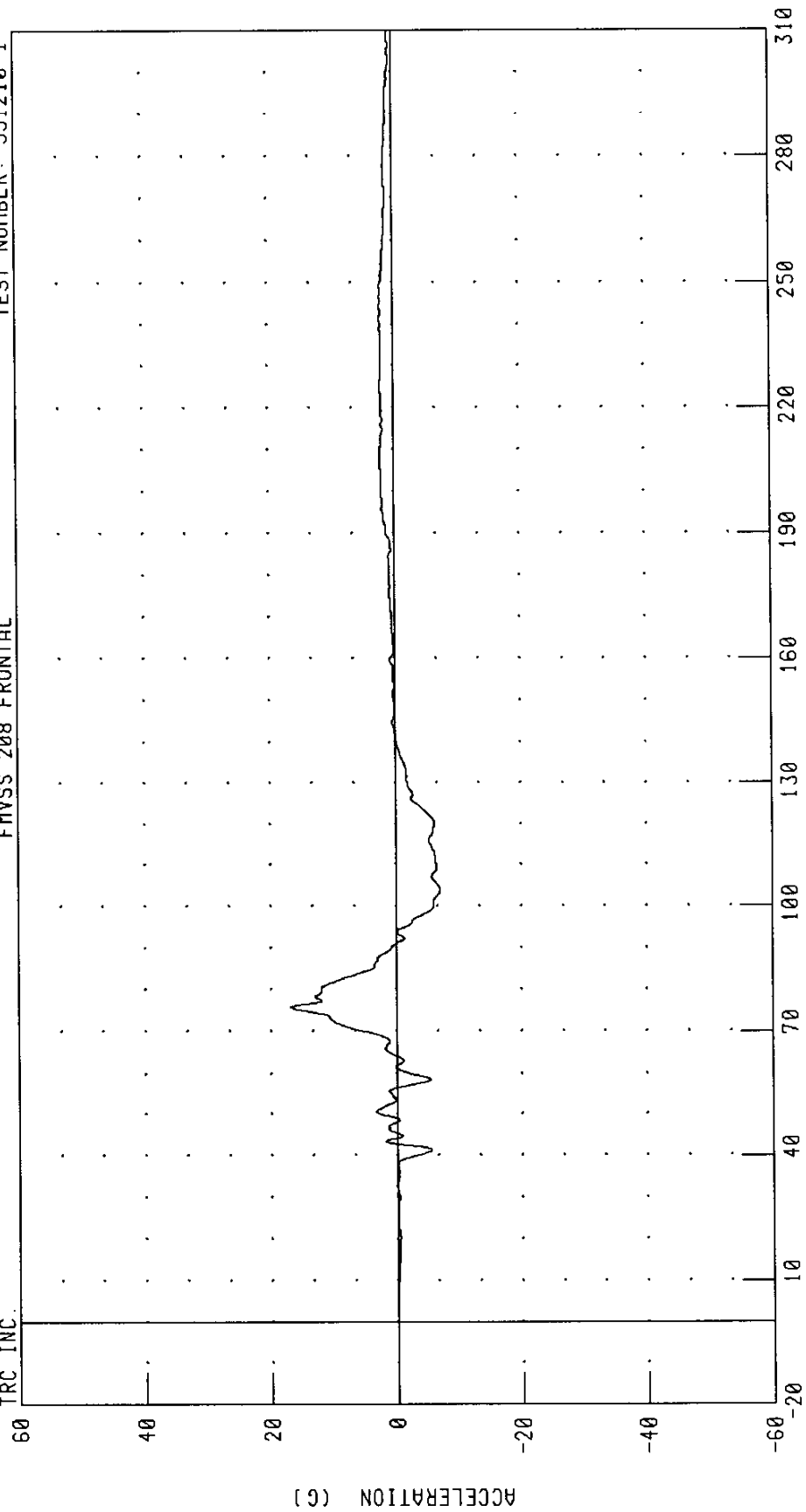
CHANNEL: CSTYG2 FILTER: CH. CLASS 180

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



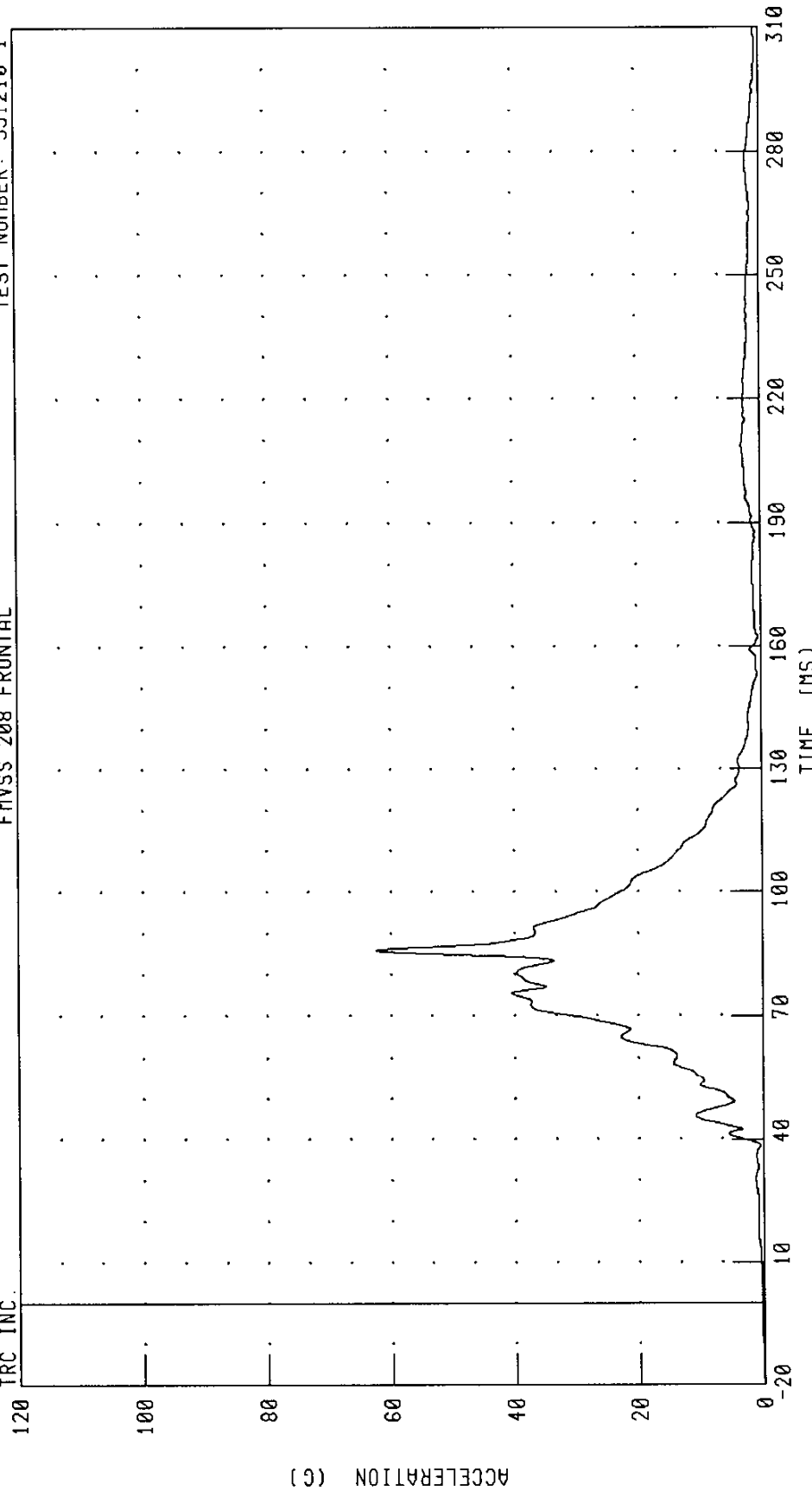
CHANNEL: CSTZ02 FILTER: CH. CLASS 180 PEAK DATA: 16.93 G @ 75.84 MS, -7.05 G @ 103.84 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



PEAK DATA: 62.54 G @ 85.92 MS; 0.00 G @ -20.00 MS

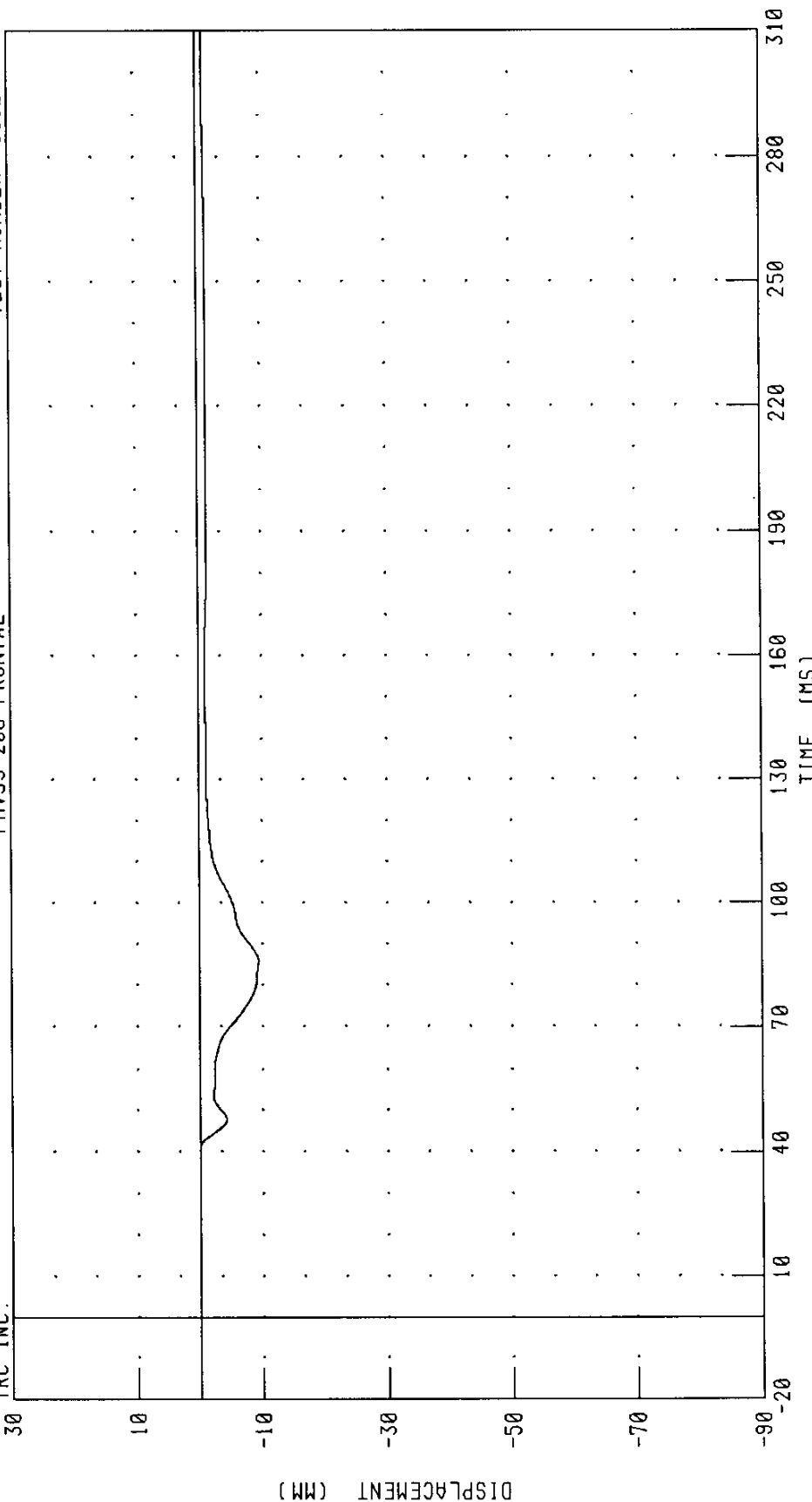
CHANNEL: CSTR02 FILTER: CH. CLASS 180

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: CSTX02 FILTER: CH. CLASS 180

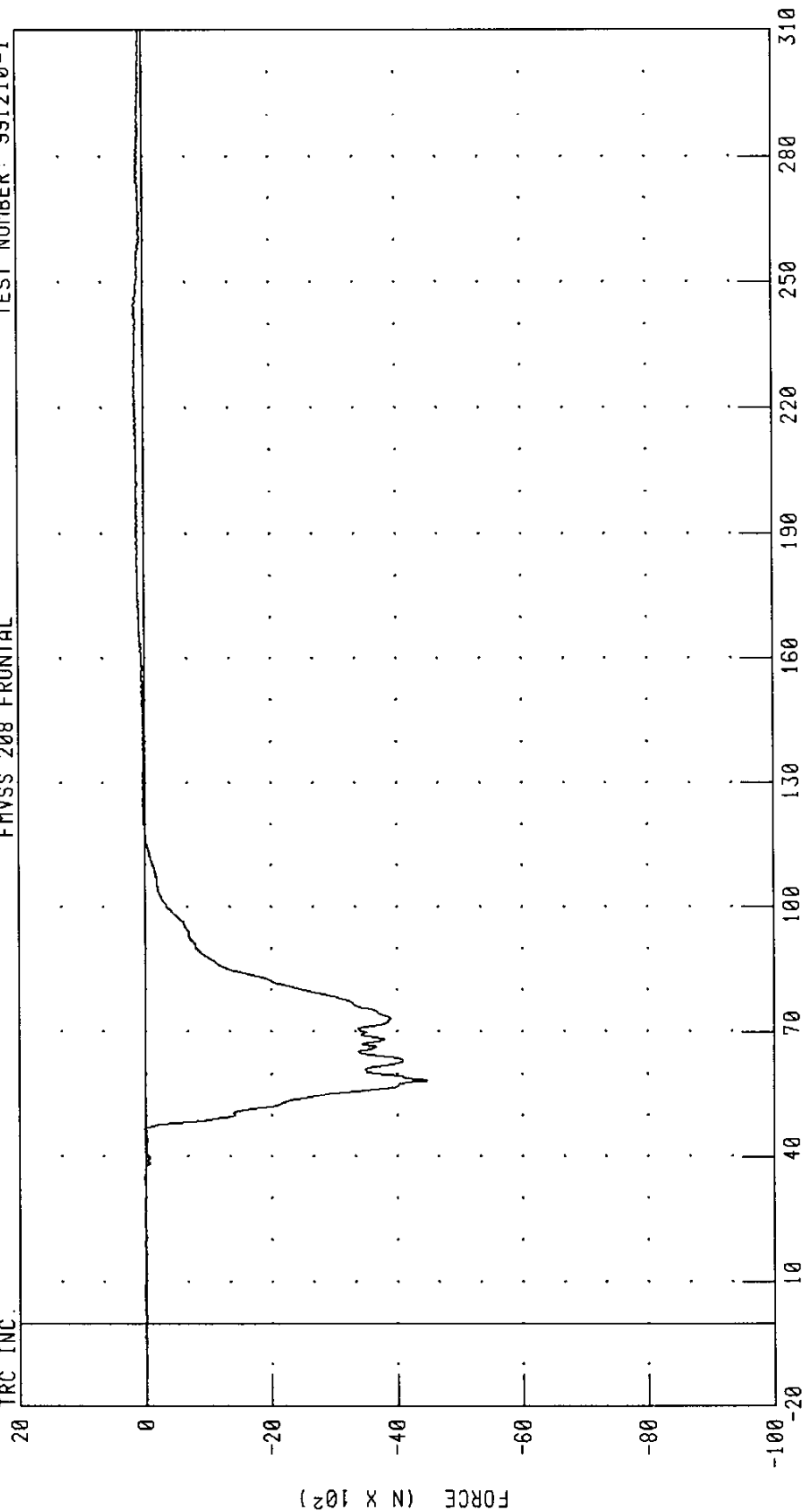
PEAK DATA: 0.13 MM @ 40.40 MS; -9.38 MM @ 85.76 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



TIME (MS)

PEAK DATA: 157.78 N @ 244.48 MS; -4479.85 N @ 58.64 MS

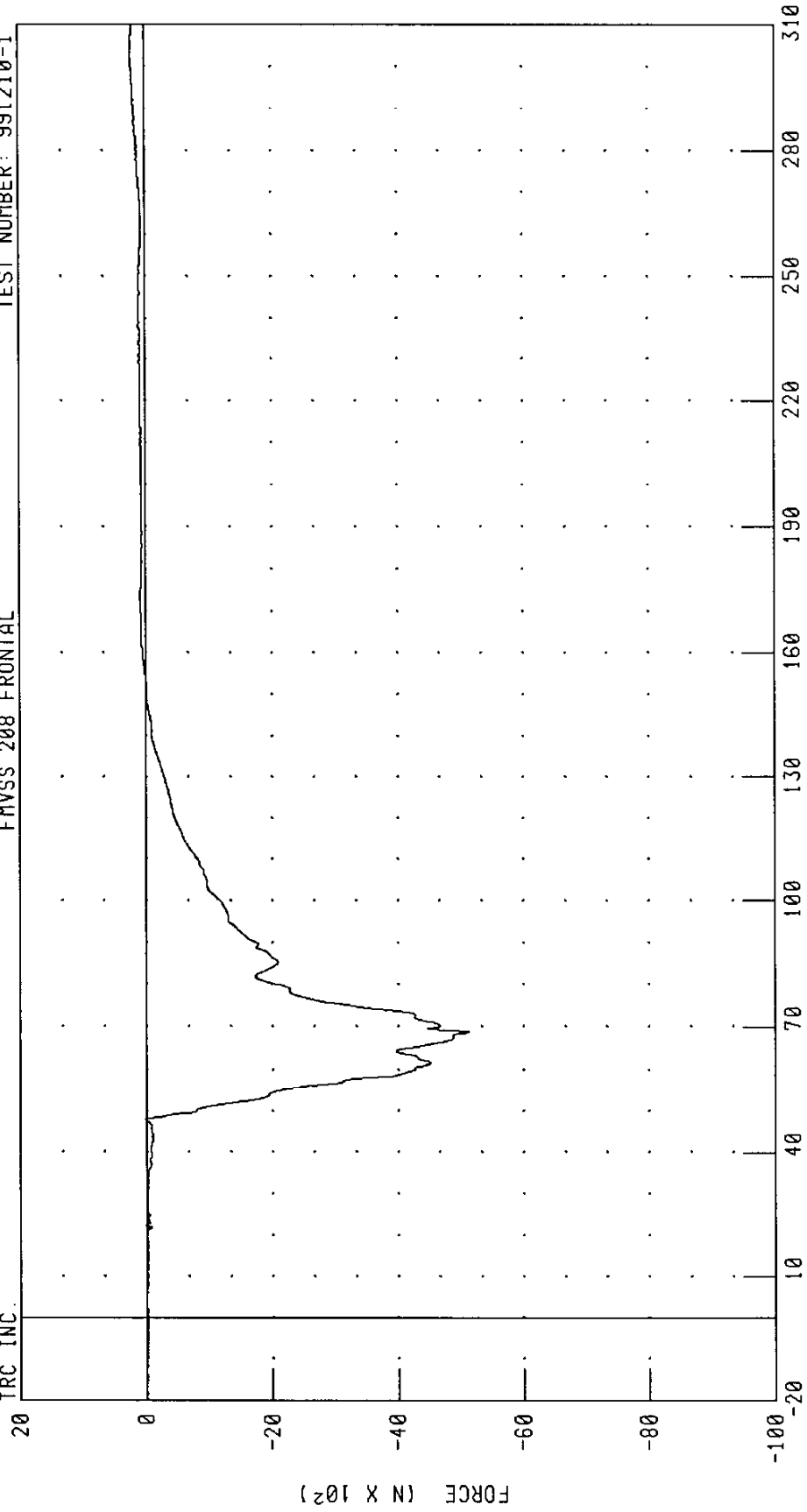
CHANNEL: LFMF2 FILTER: CH. CLASS 600

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

TEST NUMBER: 99L210-1

FMVSS 208 FRONTAL

TRC INC.



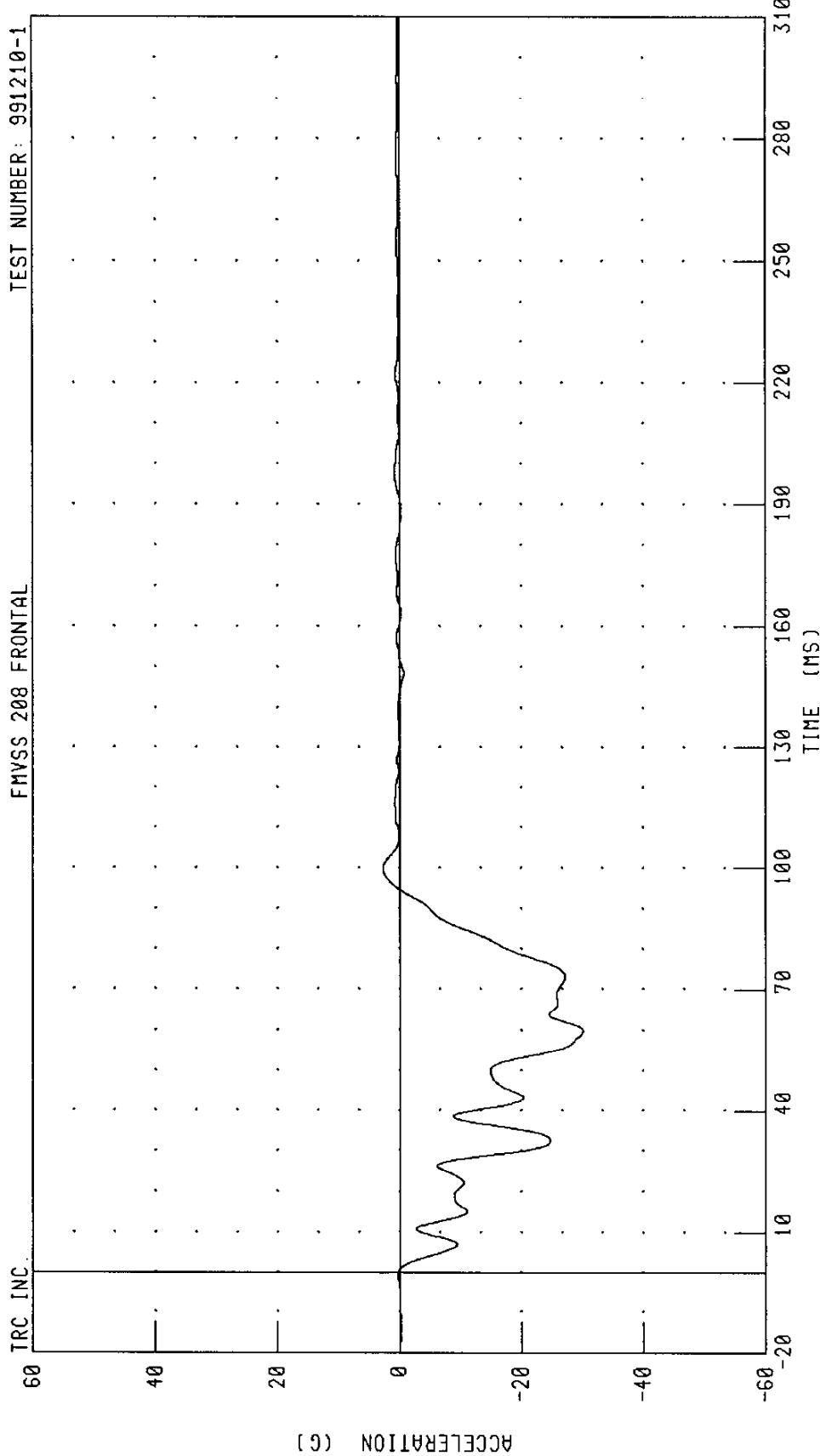
CHANNEL: RFMF2 FILTER: CH. CLASS 600

PEAK DATA: 224.79 N @ 302.24 MS; -5128.88 N @ 63.72 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
LEFT REAR SEAT X-AXIS ACCELERATION

FMVSS 208 FRONTAL

TEST NUMBER: 991210-1



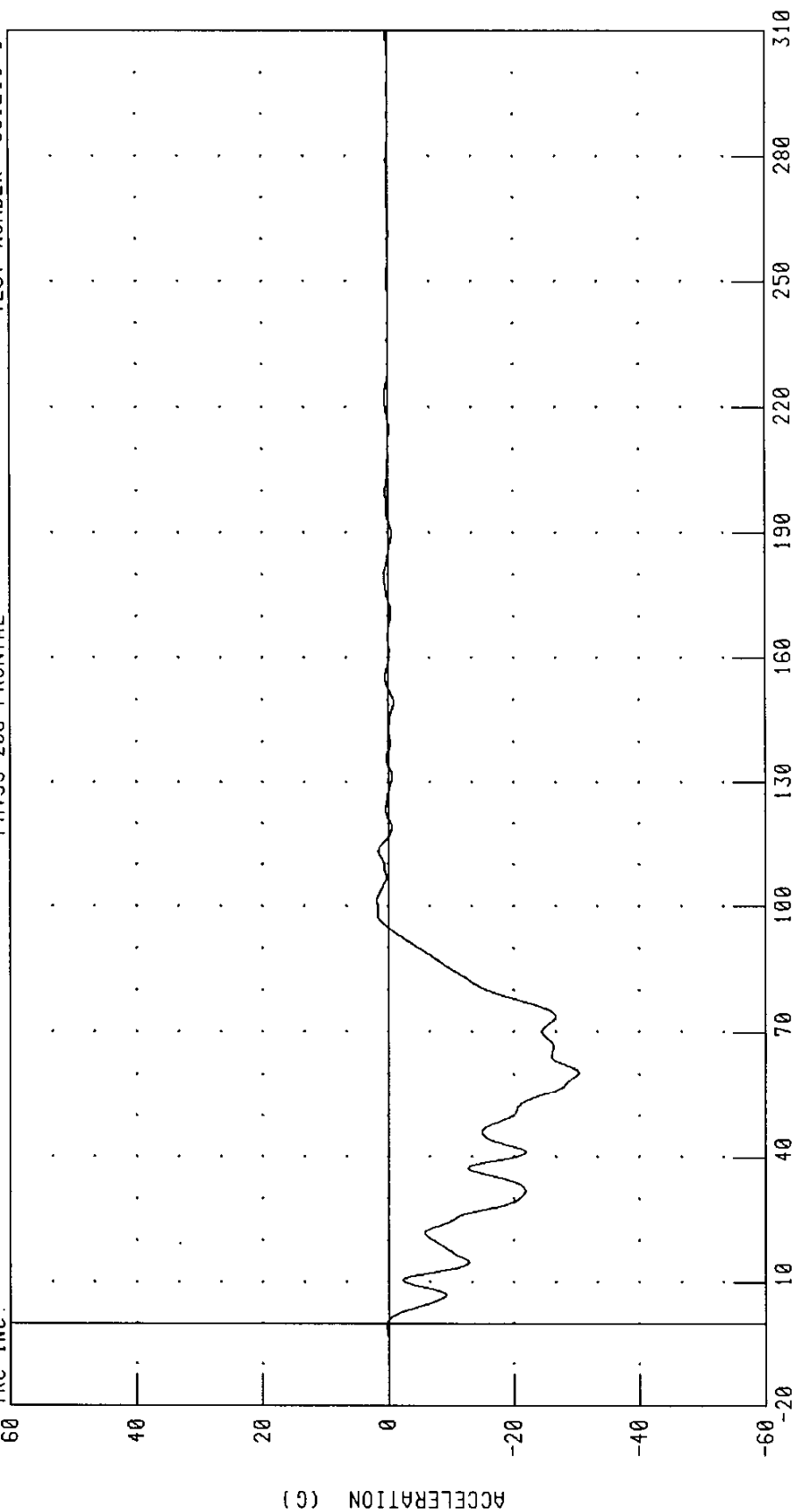
CHANNEL: TLRXG1 FILTER: CH. CLASS 60 PEAK DATA: 2.69 G @ 99.84 MS, -30.16 G @ 59.92 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT REAR SEAT X-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



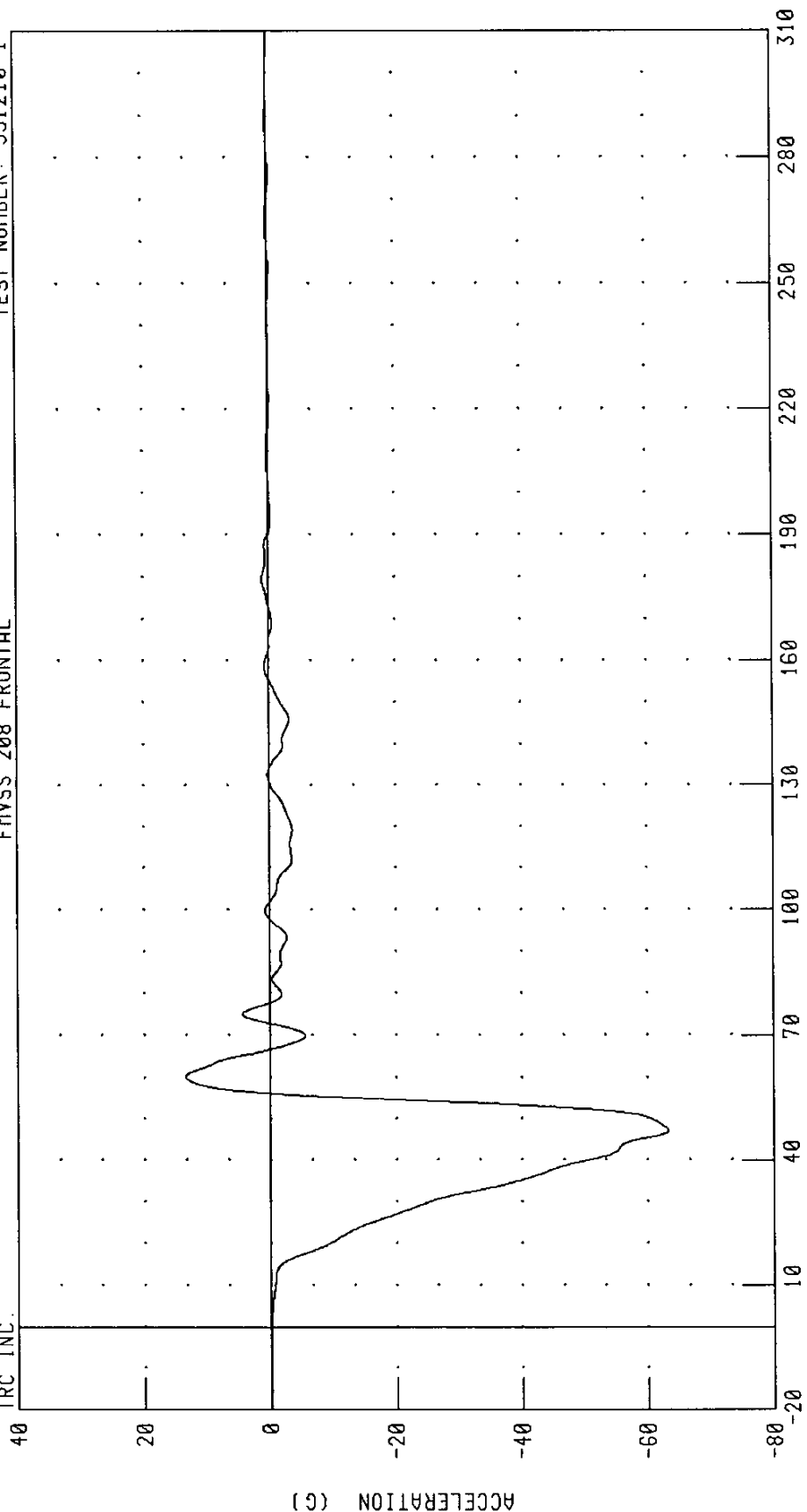
CHANNEL: TRRXG1 FILTER: CH. CLASS 60 PEAK DATA: 1.75 G @ 101.36 MS; -30.33 G @ 60.48 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
ENGINE TOP X-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: ENGXC1 FILTER: CH. CLASS 60

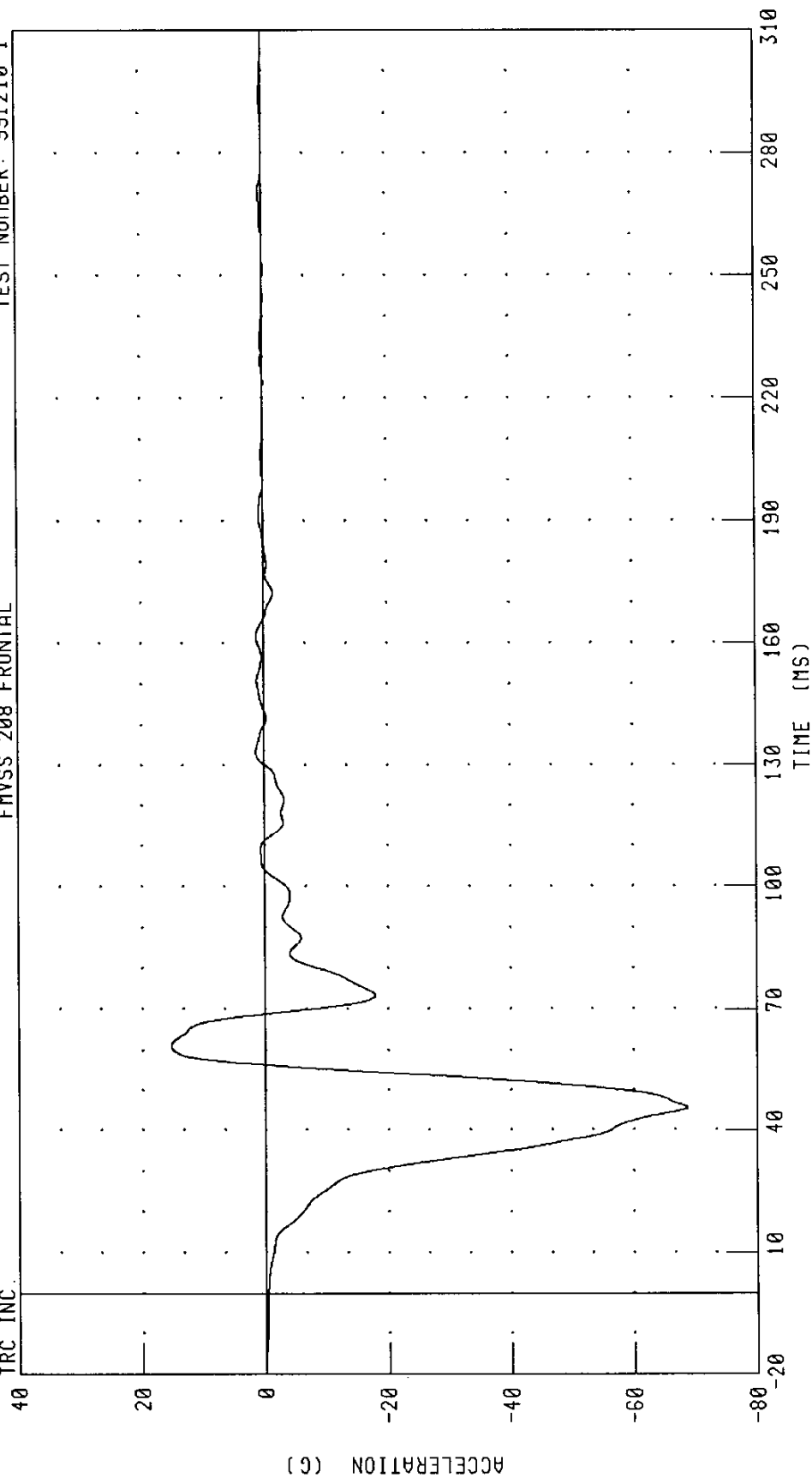
PEAK DATA: 13.50 G @ 60.24 MS; -63.31 G @ 47.20 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
ENGINE BOTTOM X-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: ENCXC2 FILTER: CH. CLASS 60

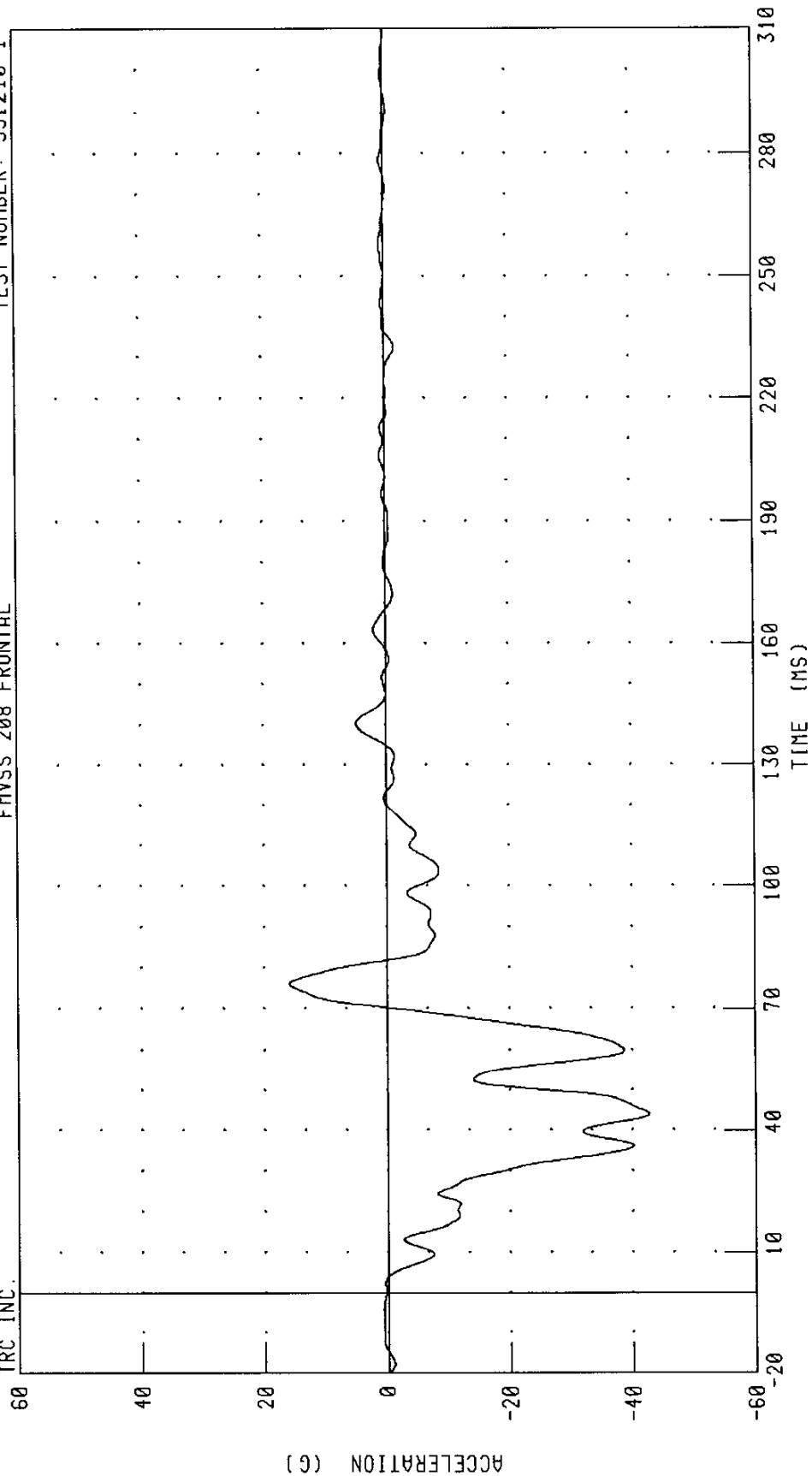
PEAK DATA: 15.37 G @ 61.20 MS; -68.74 G @ 45.60 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: BCRXG1 FILTER: CH. CLASS 60

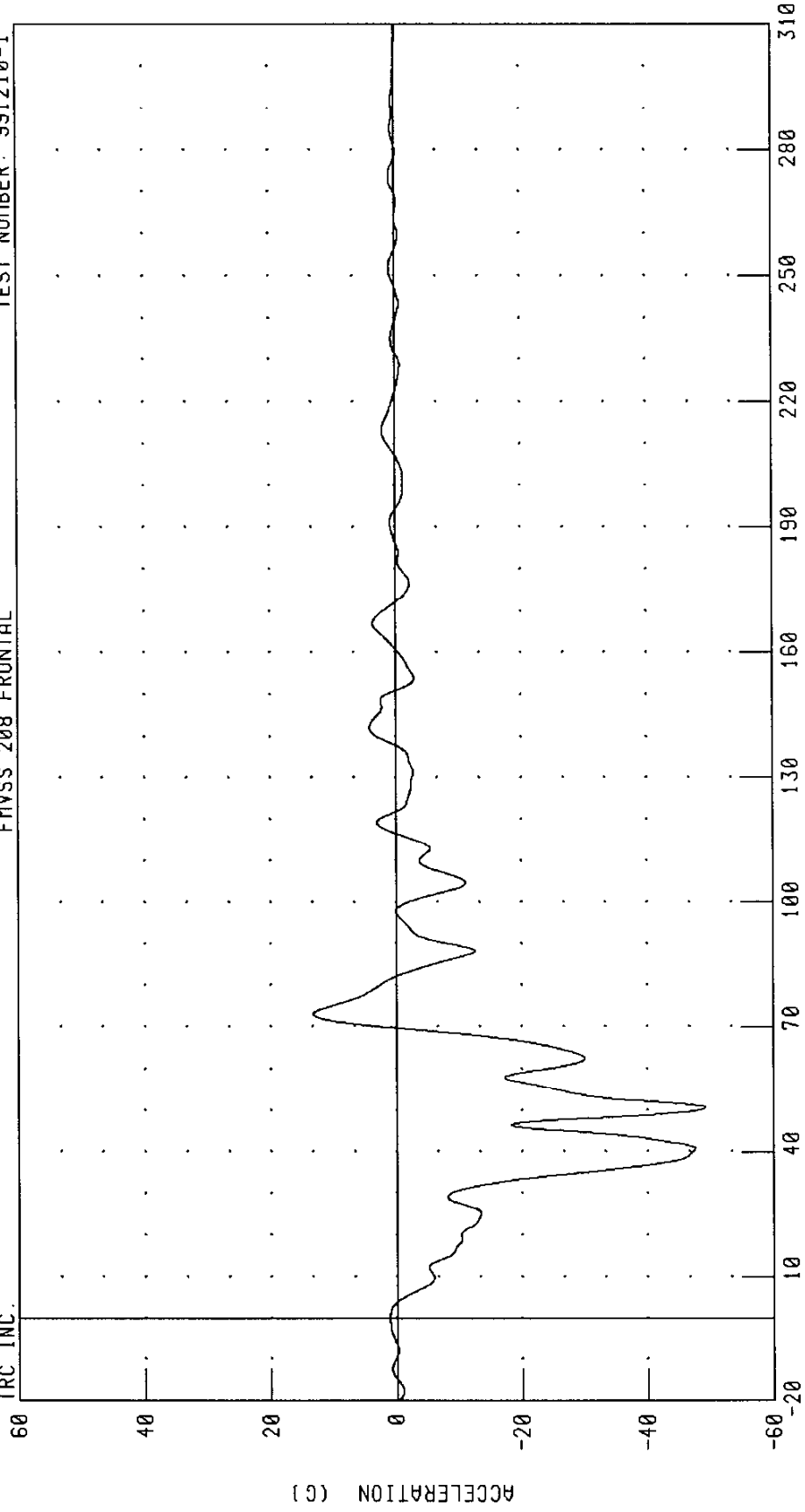
PEAK DATA: 15.90 G @ 76.08 MS; -42.73 G @ 44.00 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



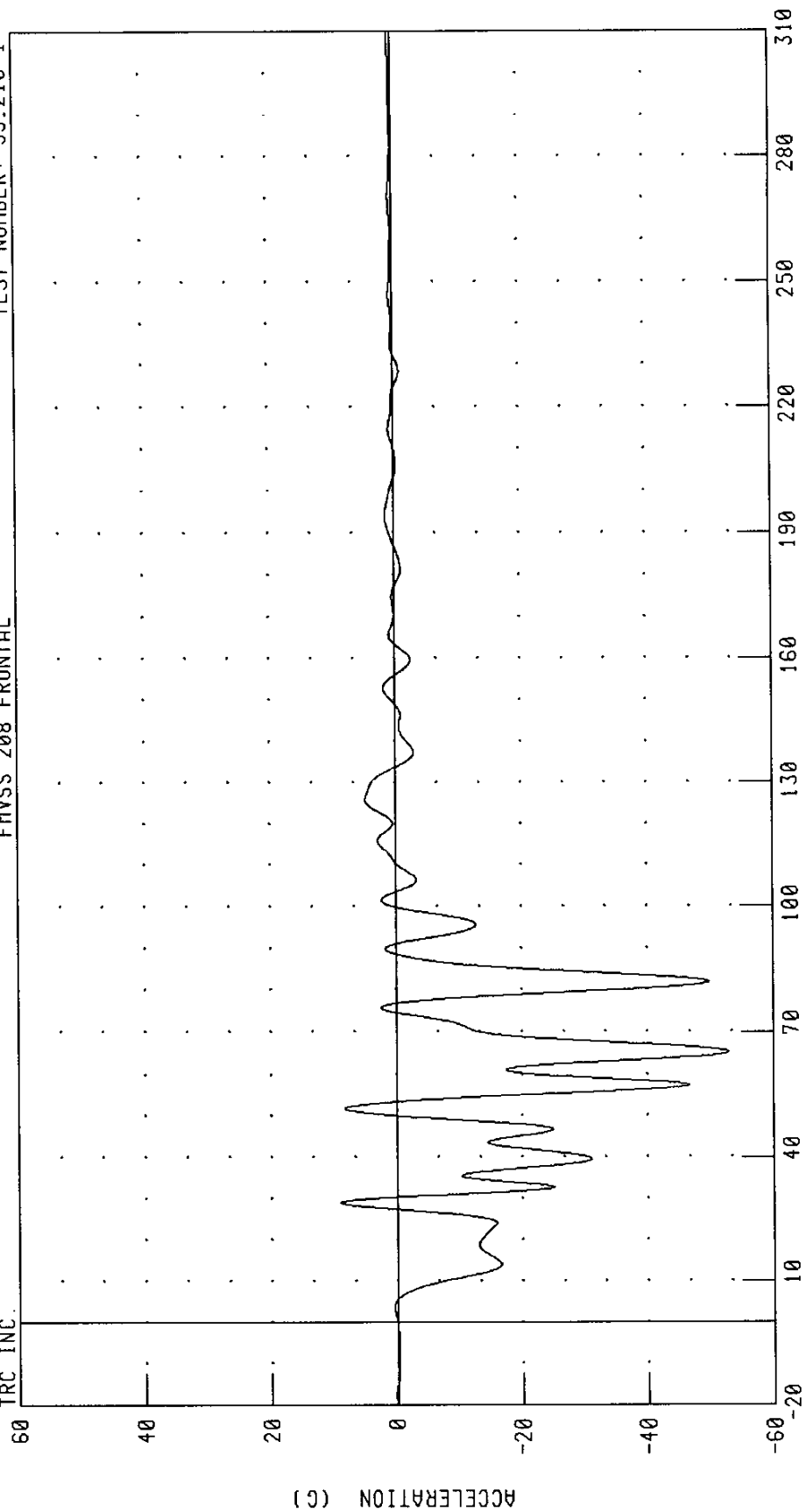
CHANNEL: BCLXG1 FILTER: CH. CLASS 60 PEAK DATA: 13.27 G @ 73.04 MS, -49.21 G @ 50.64 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

TEST NUMBER: 99:210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: IPCXG1 FILTER: CH. CLASS 60

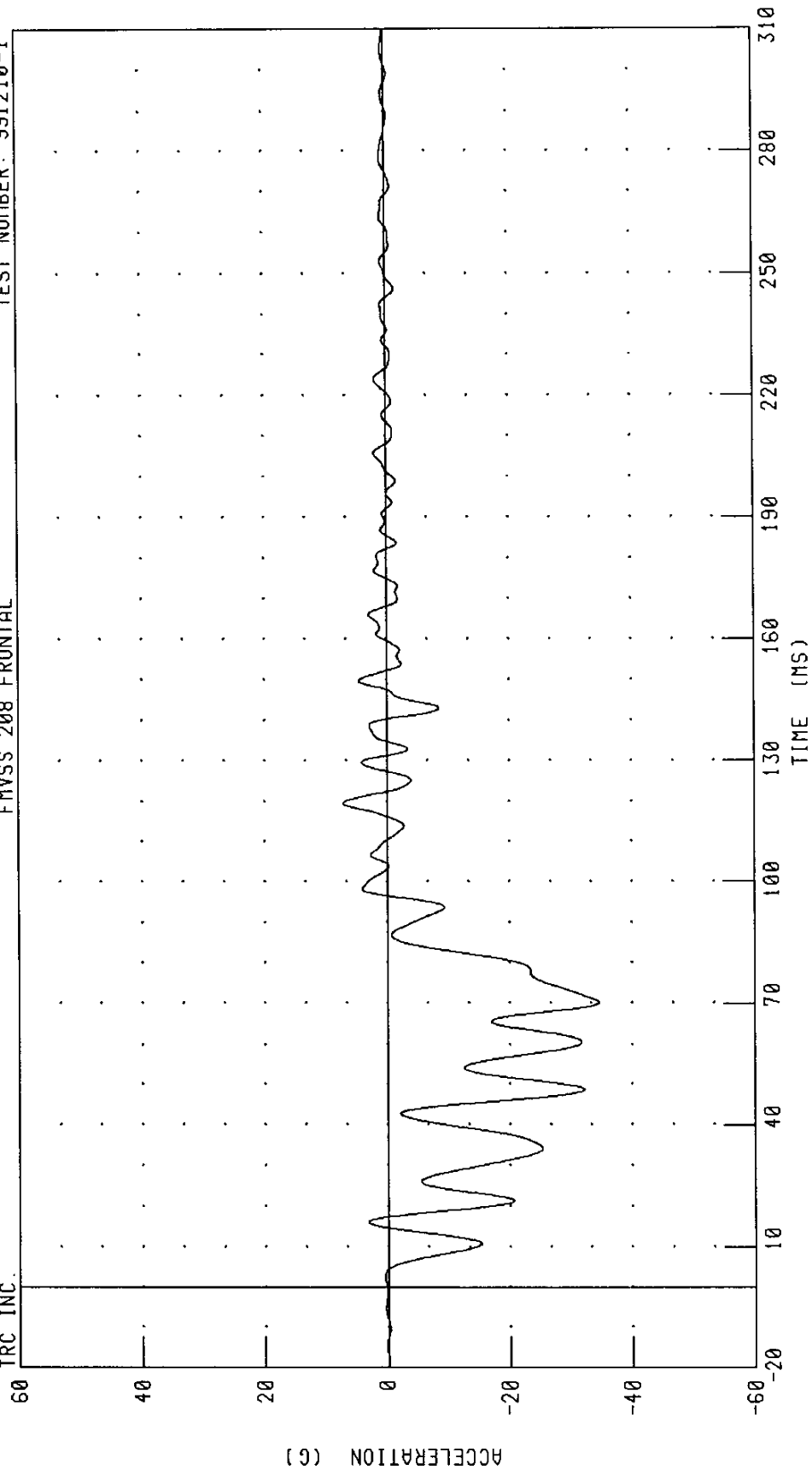
PEAK DATA: 9.02 G @ 29.04 MS; -52.89 G @ 65.12 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE REAR CENTER X-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: RDKXG1 FILTER: CH. CLASS 60

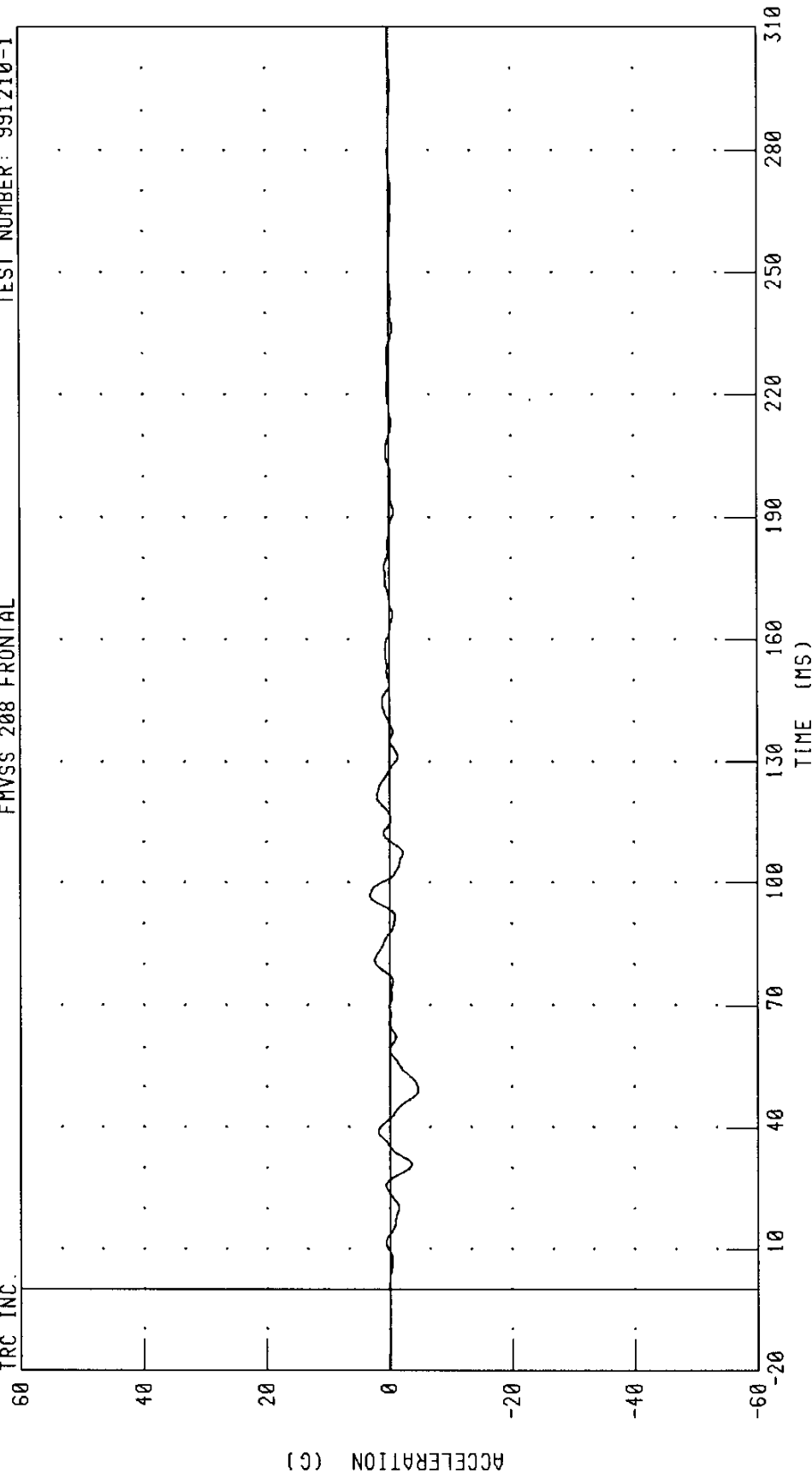
PEAK DATA: 7.14 G @ 119.68 MS; -34.60 G @ 70.16 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE REAR CENTER Y-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: RDKYC1 FILTER: CH. CLASS 60

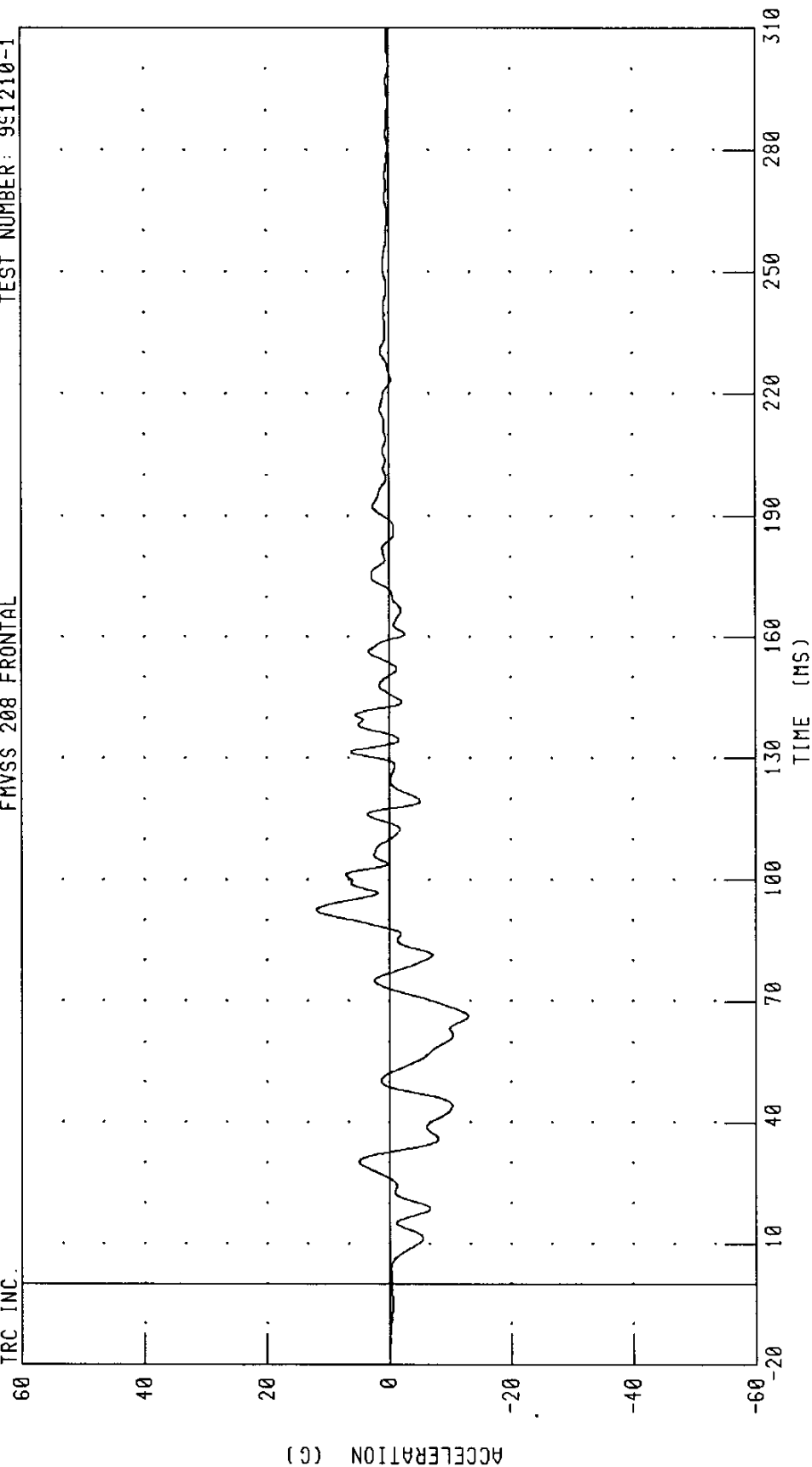
PEAK DATA: 3.15 G @ 96.96 MS; -4.64 G @ 29.28 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE REAR CENTER Z-AXIS ACCELERATION

TEST NUMBER: 951210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: RDKZC1 FILTER: CH. CLASS 60

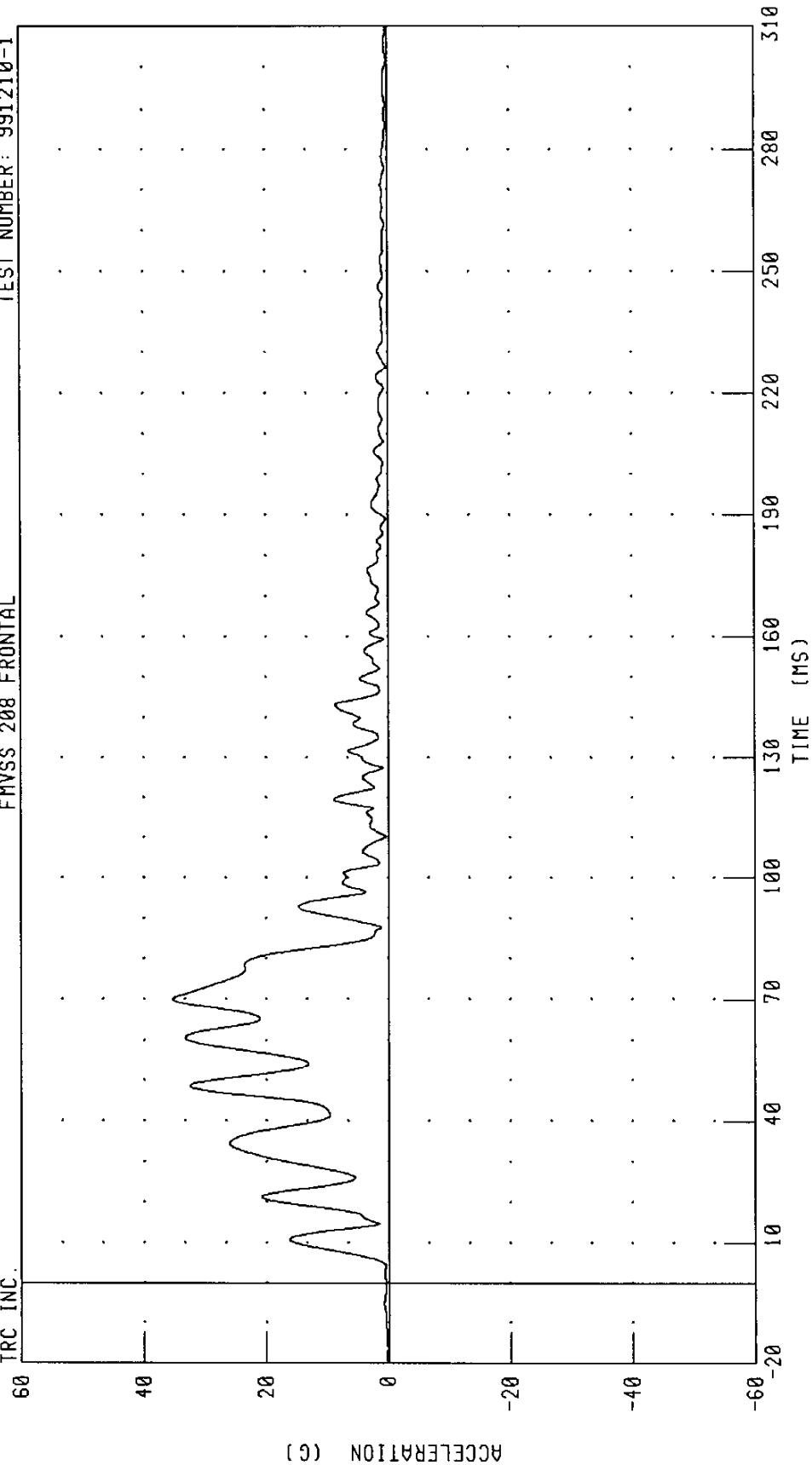
PEAK DATA: 11.93 G @ 92.56 MS; -12.93 G @ 66.24 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE REAR CENTER RESULTANT ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: RDKRG1 FILTER: CH. CLASS 60

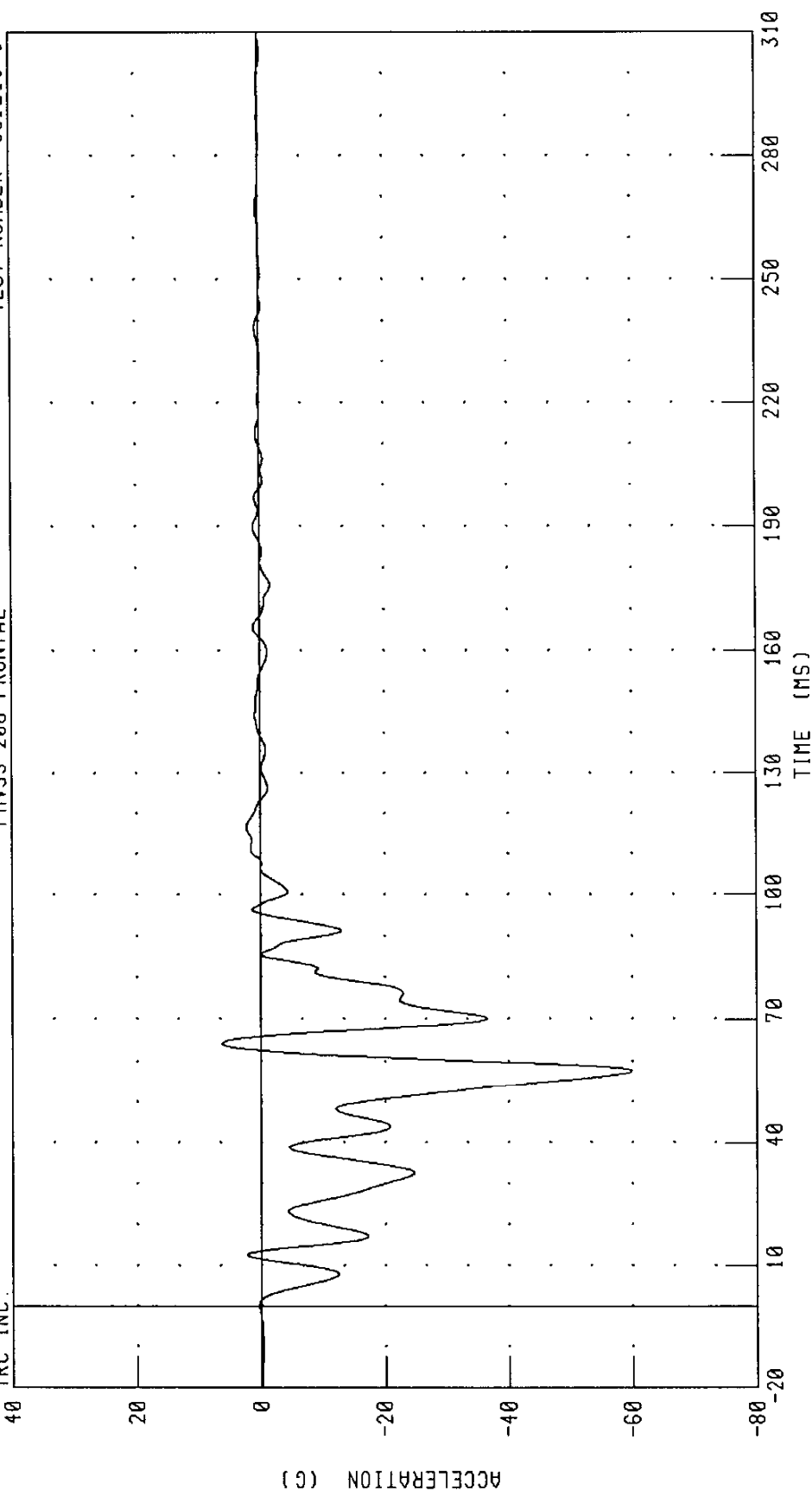
PEAK DATA: 35.32 G @ 70.00 MS; 0.03 G @ 301.68 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: VCCXG1 FILTER: CH. CLASS 60

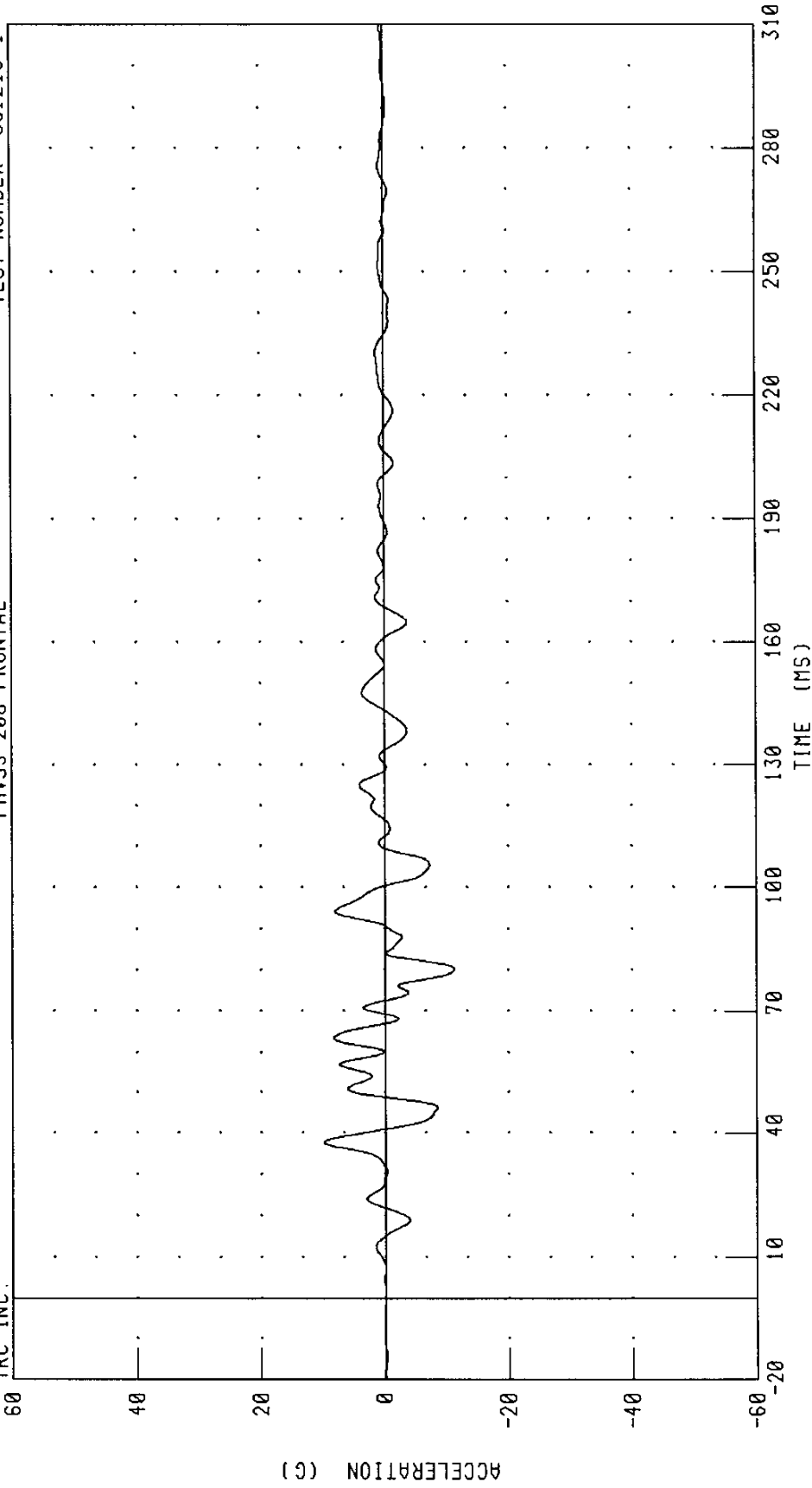
PEAK DATA: 6.35 G @ 64.24 MS; -59.91 G @ 57.68 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION

TEST NUMBER: 991210-1

FMVSS 208 FRONTAL

TRC INC.



CHANNEL: VCGY01 FILTER: CH. CLASS 60

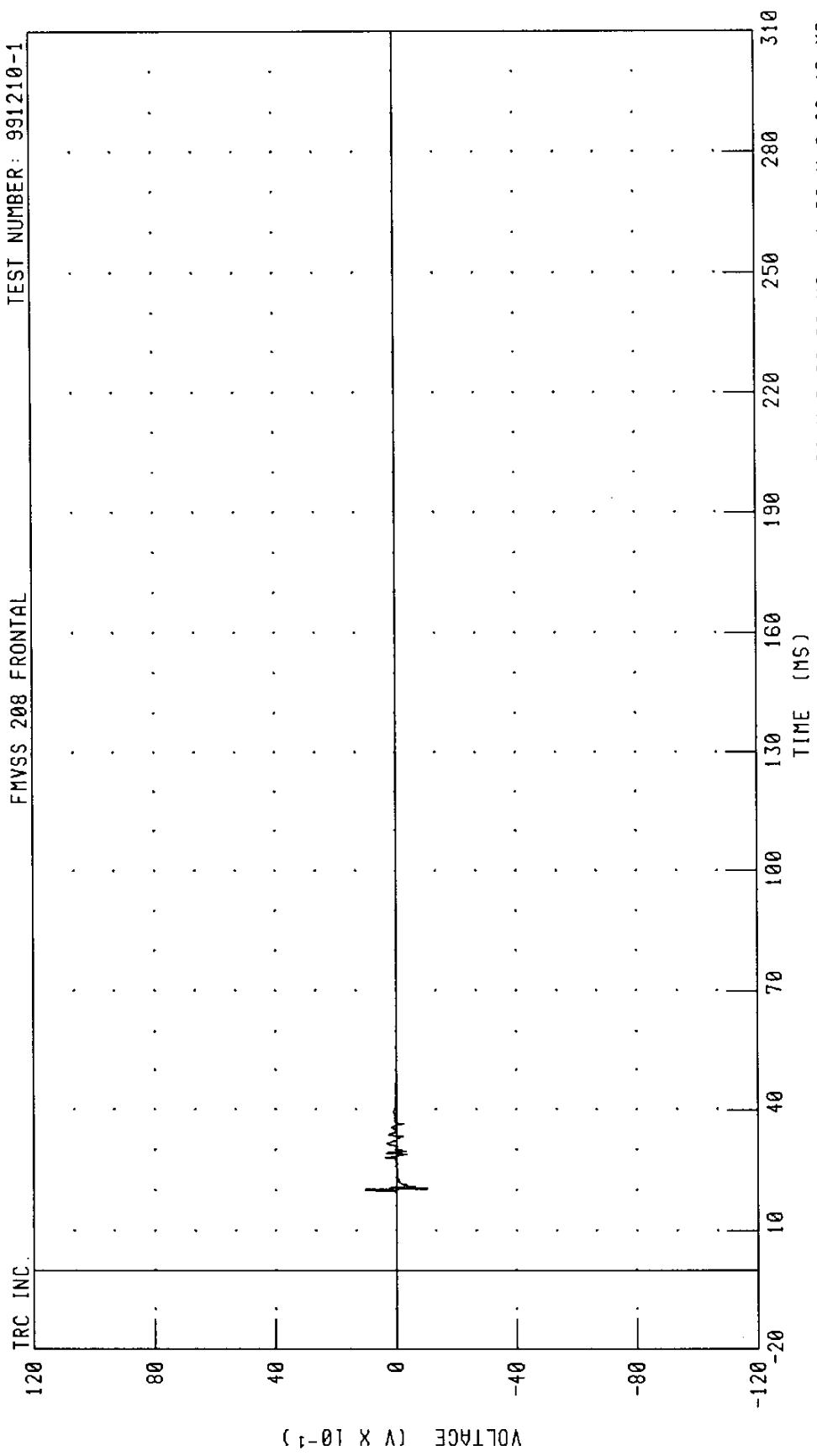
PEAK DATA: 9.89 G @ 37.76 MS; -11.31 G @ 80.32 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH

DRIVER STAGE 2

FMVSS 208 FRONTAL

TEST NUMBER: 991210-1



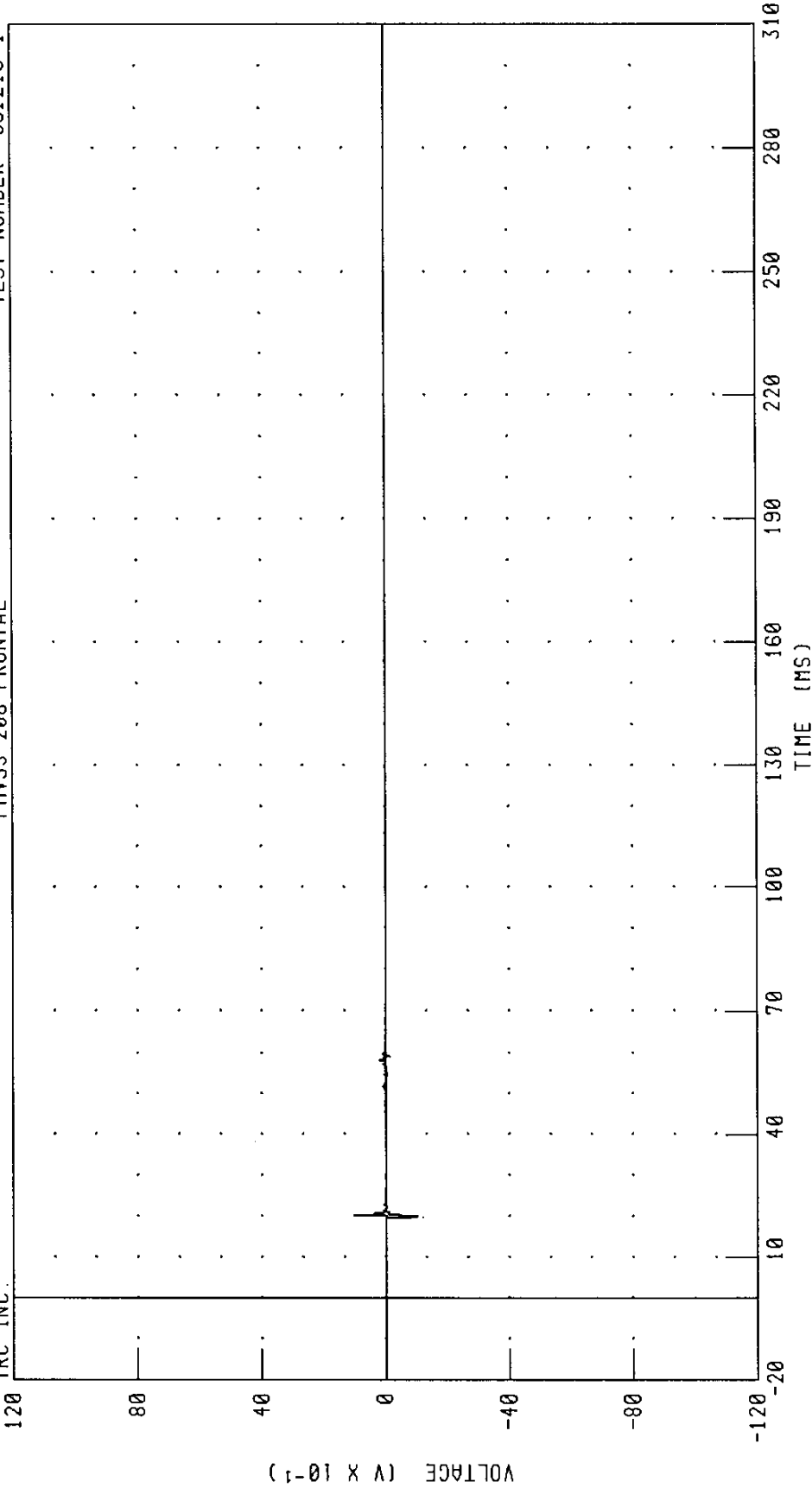
CHANNEL: ABSQA FILTER: CH. CLASS 1000

PEAK DATA: 1.02 V @ 20.00 MS; -1.02 V @ 20.40 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
PASSENGER STAGE 1
FMVSS 208 FRONTAL

TEST NUMBER: 991210-1

TRC INC.



CHANNEL: ABSQ2 FILTER: CH. CLASS 1000

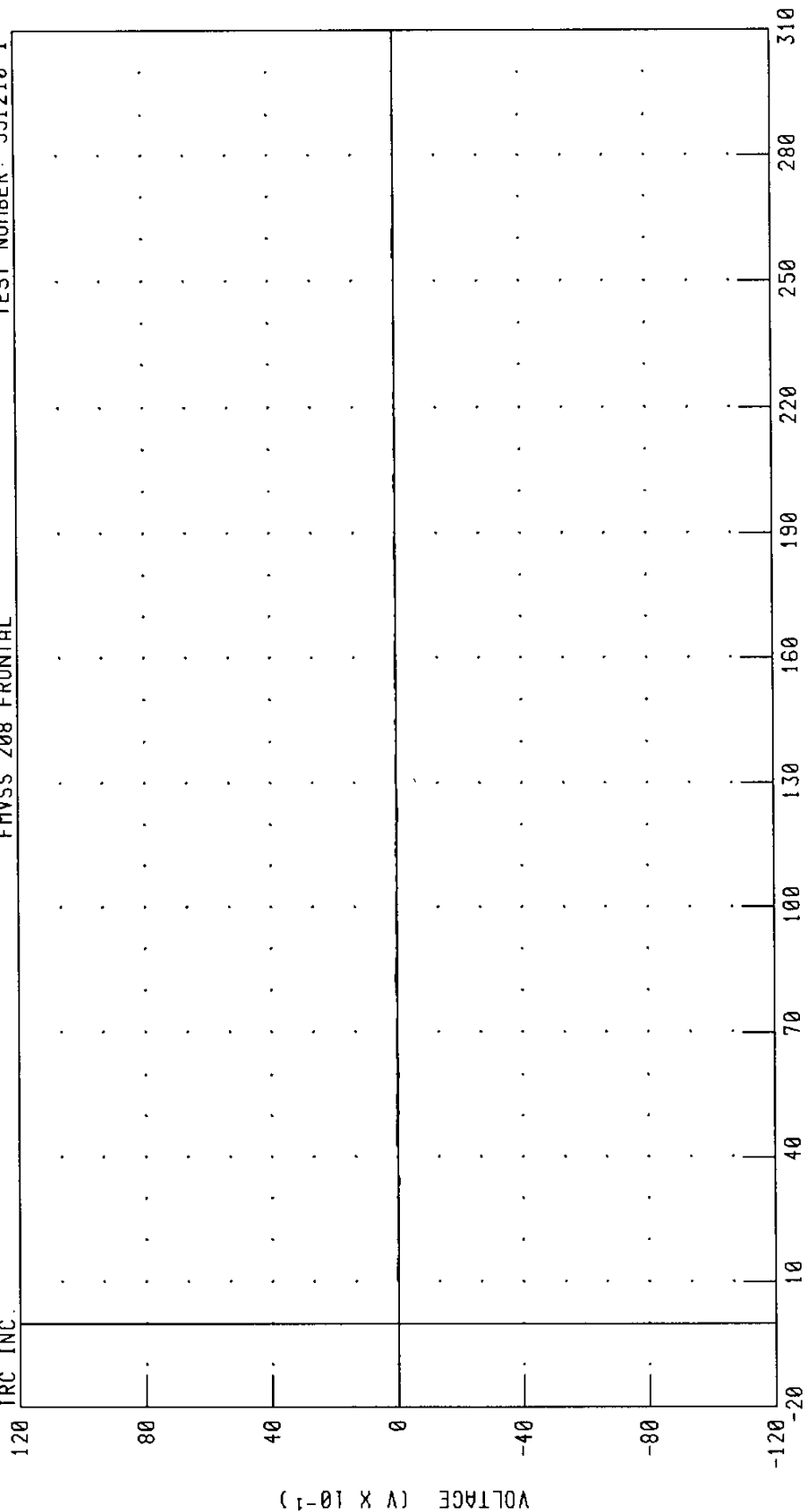
TIME (MS)

PEAK DATA: 1.02 V @ 20.08 MS; -1.02 V @ 19.76 MS

1999 ACURA RL INTO A FLAT FRONTAL BARRIER AT 27.5 MPH
PASSENGER STAGE 2
FMVSS 208 FRONTAL

TEST NUMBER: 991210-1

TRC INC.



CHANNEL: ABSQB FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III SMALL FEMALE EXTERNAL DIMENSIONS
SN369 TRC.

06-DEC-99

TRC INC. TEST NO: 369C8ED 570 0 SN369 EXT DIMENSION

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		300 - 310 MM	305. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		160 - 170 MM	165. MM
CHEST CIRCUMFERENCE	(X)	851 - 881 MM	869. MM
WAIST CIRCUMFERENCE	(Y)	757 - 787 MM	775. MM
CHEST DEPTH	(O)	183 - 199 MM	183. MM
H-POINT HEIGHT	(C)	81.5 - 86.5 MM	81. MM
H-POINT FROM SEATBACK	(D)	144.5-149.5 MM	150. MM
SKULL CAP TO BACKLINE	(H)	43.2 - 48.2 MM	46. MM
TOTAL SITTING HEIGHT	(A)	775 - 800 MM	775. MM
THIGH CLEARANCE	(F)	114 - 130 MM	127. MM
BUTTOCK KNEE LENGTH	(K)	508.5-533.5 MM	528. MM
BUTTOCK POPLITEAL LENGTH	(N)	414.0-429.4 MM	427. MM
POPLITEAL HEIGHT	(L)	348.5-373.5 MM	366. MM
KNEE TO FLOOR HEIGHT	(M)	394 - 419 MM	406. MM
FOOT LENGTH	(P)	216 - 232 MM	226. MM
FOOT BREADTH	(R)	76 - 92 MM	86. MM
SHOULDER PIVOT FROM BACKLINE	(E)	71 - 81 MM	76. MM
SHOULDER BREADTH	(V)	348 - 364 MM	358. MM
SHOULDER PIVOT HEIGHT	(B)	434 - 450 MM	436.8. MM
ELBOW REST HEIGHT	(J)	183 - 203 MM	185. MM
SHOULDER-ELBOW LENGTH	(I)	279 - 297 MM	290. MM
BACK OF ELBOW TO FINGER TIP	(G)	244 - 259 MM	251. MM
HIP WIDTH AT H-POINT	(W)	272 - 287 MM	287. MM

HYBRID III SMALL FEMALE EXTERNAL DIMENSIONS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

RUN NUMBER: 121799.1123

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III SMALL FEMALE

06-DEC-99

TRC INC.

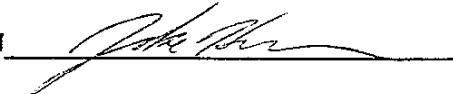
TEST NO: 369C8HD1

572 0 SN369 HEAD DROP CAL 8

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PEAK RESULTANT ACCELERATION	250 - 300 G	280.63 G
PEAK LATERAL ACCELERATION	15 G MAX	10.28 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 120699.0934;1

PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572 0 SN369 HEAD DROP CAL 8

TRC TEST NUMBER: 369C8HD1

75

0

-75

-150

-225

-300

-375

ACCELERATION (G)

0

10

20

30

40

50

60

70

80

90

100

TIME (MS X 10⁻¹)

PEAK DATA: 1.89 G @ 6.64 MS, -243.61 G @ 2.24 MS

CHANNEL: HEDXC

FILTER: CH. CLASS 1000

RUN NUMBER: 120699.0934;1

75

0

-75

-150

-225

-300

-375

ACCELERATION (G)

0

10

20

30

40

50

60

70

80

90

100

TIME (MS X 10⁻¹)

PEAK DATA: 1.89 G @ 6.64 MS, -243.61 G @ 2.24 MS

CHANNEL: HEDXC

FILTER: CH. CLASS 1000

RUN NUMBER: 120699.0934;1

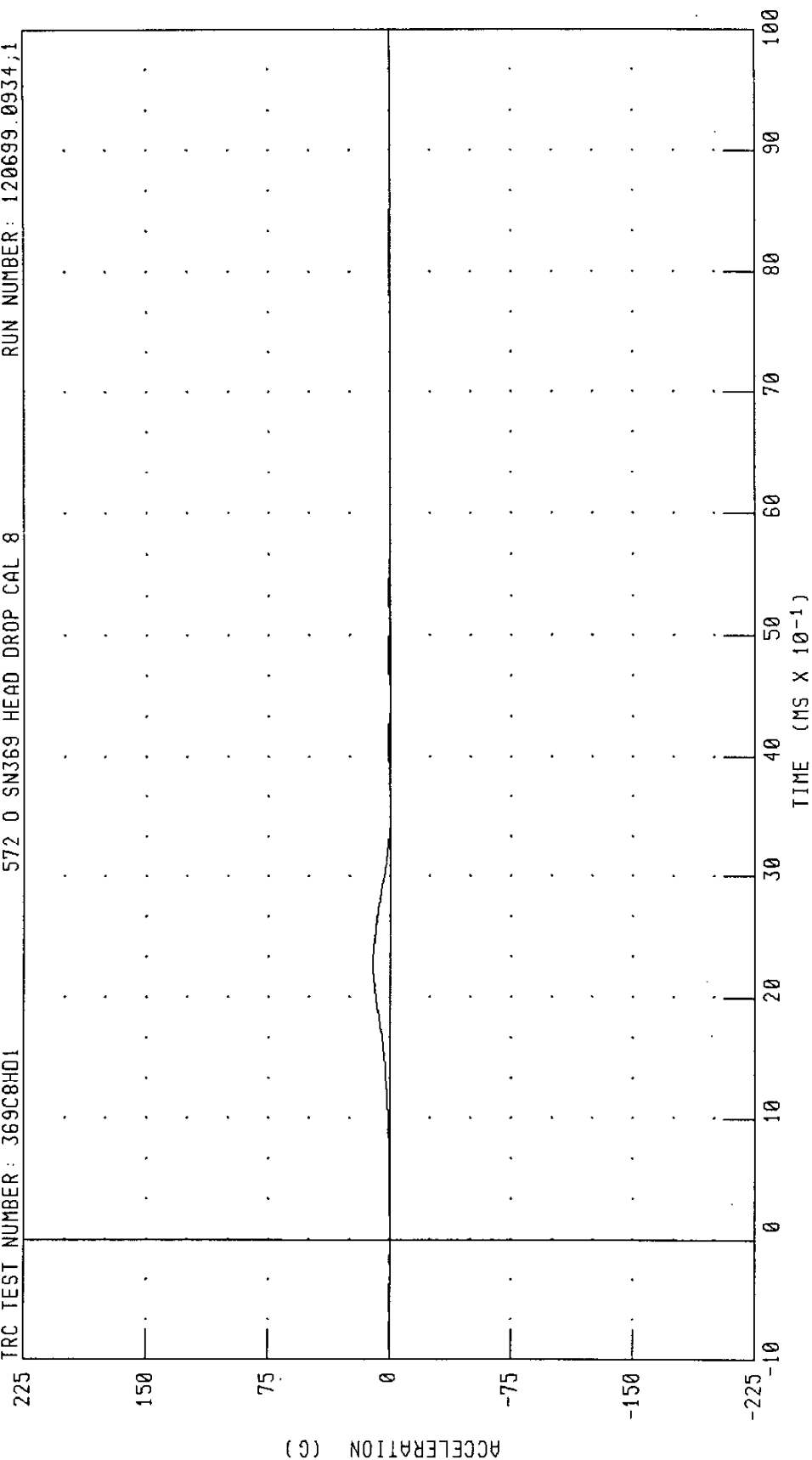
PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 369C8HD1

572 0 SN369 HEAD DROP CAL 8

RUN NUMBER: 120699.0934,1



CHANNEL: HEDYC FILTER: CH. CLASS 1000

PEAK DATA: 10.28 G @ 2.24 MS; -0.54 G @ 4.48 MS

PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

572 0 SN369 HEAD DROP CAL 8 RUN NUMBER: 120699.0934;1

TRC TEST NUMBER: 369C8HD1

375

300

225

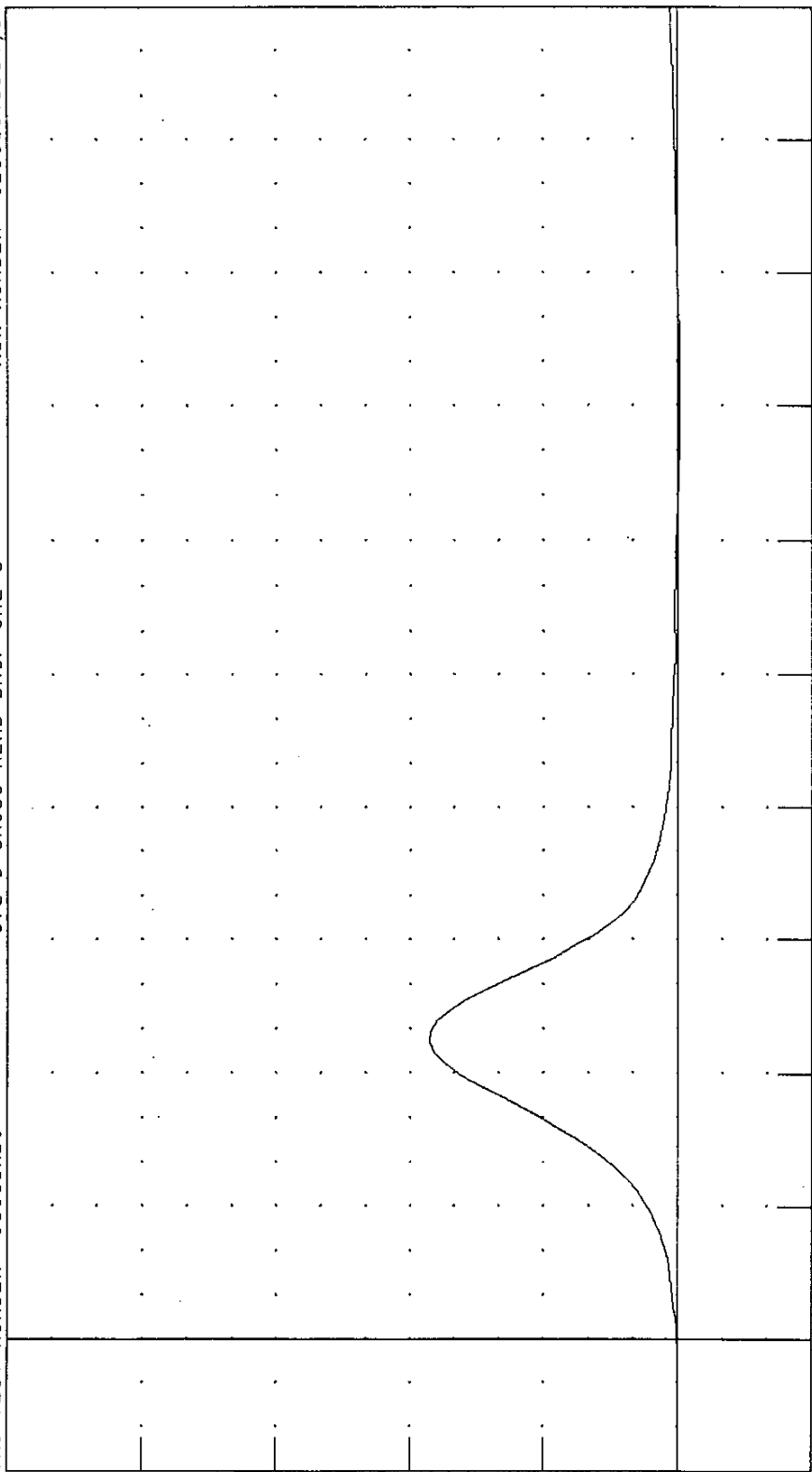
150

75

0

-75

ACCELERATION (G)



TIME (MS X 10⁻¹)

PEAK DATA: 138.93 G @ 2.24 MS; -1.46 G @ 7.04 MS

FILTER: CH. CLASS 1000

CHANNEL: HEDZG

PART 572-0 HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572 0 SN369 HEAD DROP CAL 8

TRC TEST NUMBER: 369C8HD1

375

300

225

150

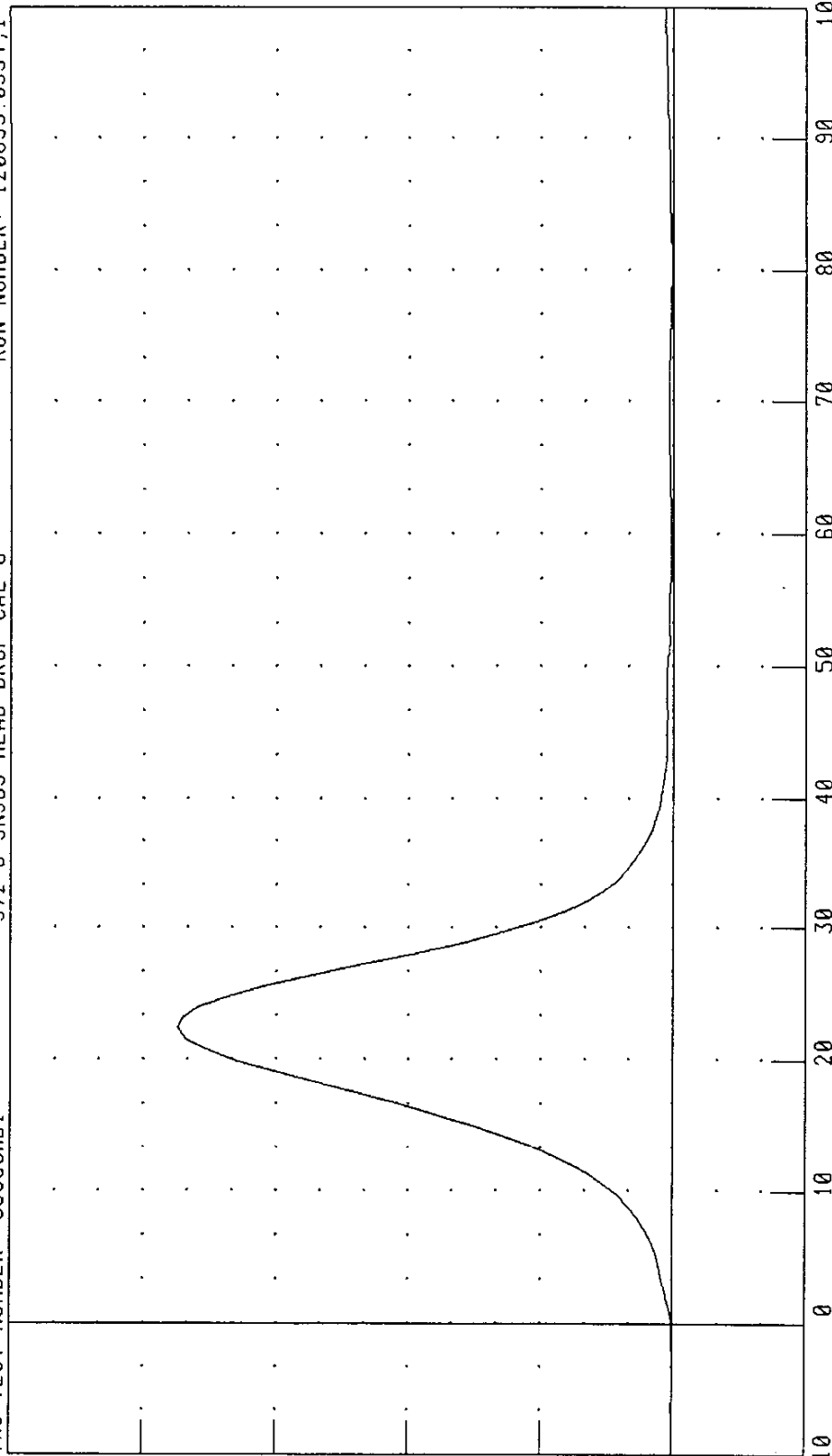
75

0

-75

-10

ACCELERATION (G)



TIME (MS X 10⁻¹)

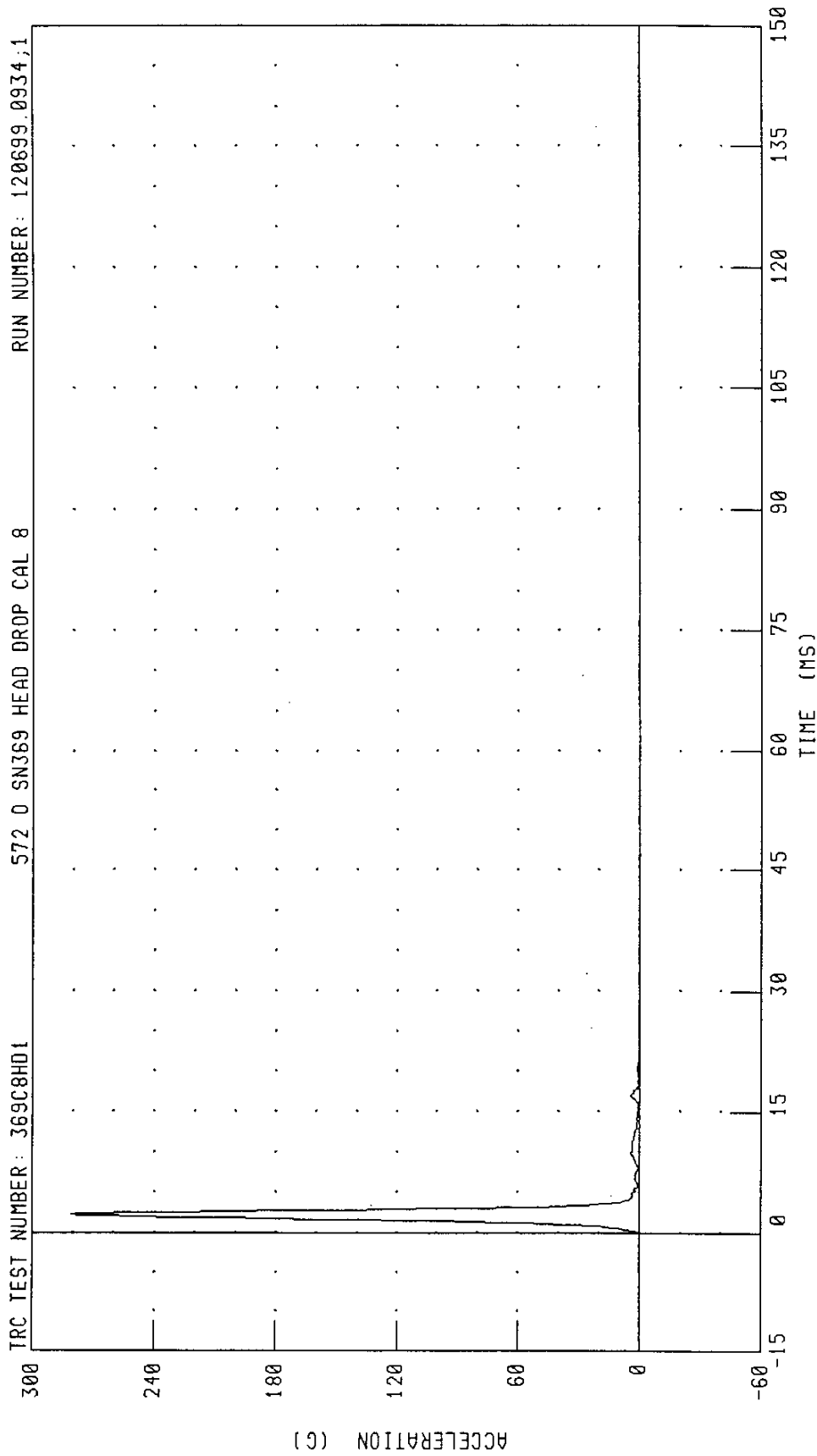
CHANNEL: HEDRC

FILTER: CH. CLASS 1000

PEAK DATA: 280.63 G @ 2.24 MS; 0.09 G @ -0.88 MS

RUN NUMBER: 120699.0934;1

PART 572-0 HYBRID III HEAD CALIBRATION
CHECK PLOT - HEAD RESULTANT ACCELERATION



CHANNEL: HEDRG FILTER: CH. CLASS 1000 PEAK DATA: 280.63 G @ 2.24 MS; 0.09 C @ -14.88 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

06-DEC-99

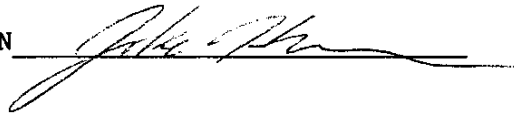
NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 369C8NF2 572 0 SN369 NECK FLEX. CAL8

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.12 M/S
INTEGRATED PENDULUM VELOCITY	10 MS	2.1 - 2.5 M/S	2.15 M/S
	20 MS	4.0 - 5.0 M/S	4.26 M/S
	30 MS	5.8 - 7.0 M/S	6.32 M/S
PEAK D-PLANE ROTATION		80 - 92 DEG.	83.62 DEG.
PEAK MOMENT ABOUT OCCIPITAL CONDYLE DURING ROTATION INT		69 - 83 NM	78.16 NM
POSITIVE MOMENT DECAY TIME FROM TO / 10 NM		80 - 100 MS	87.6 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 120699.1515;1

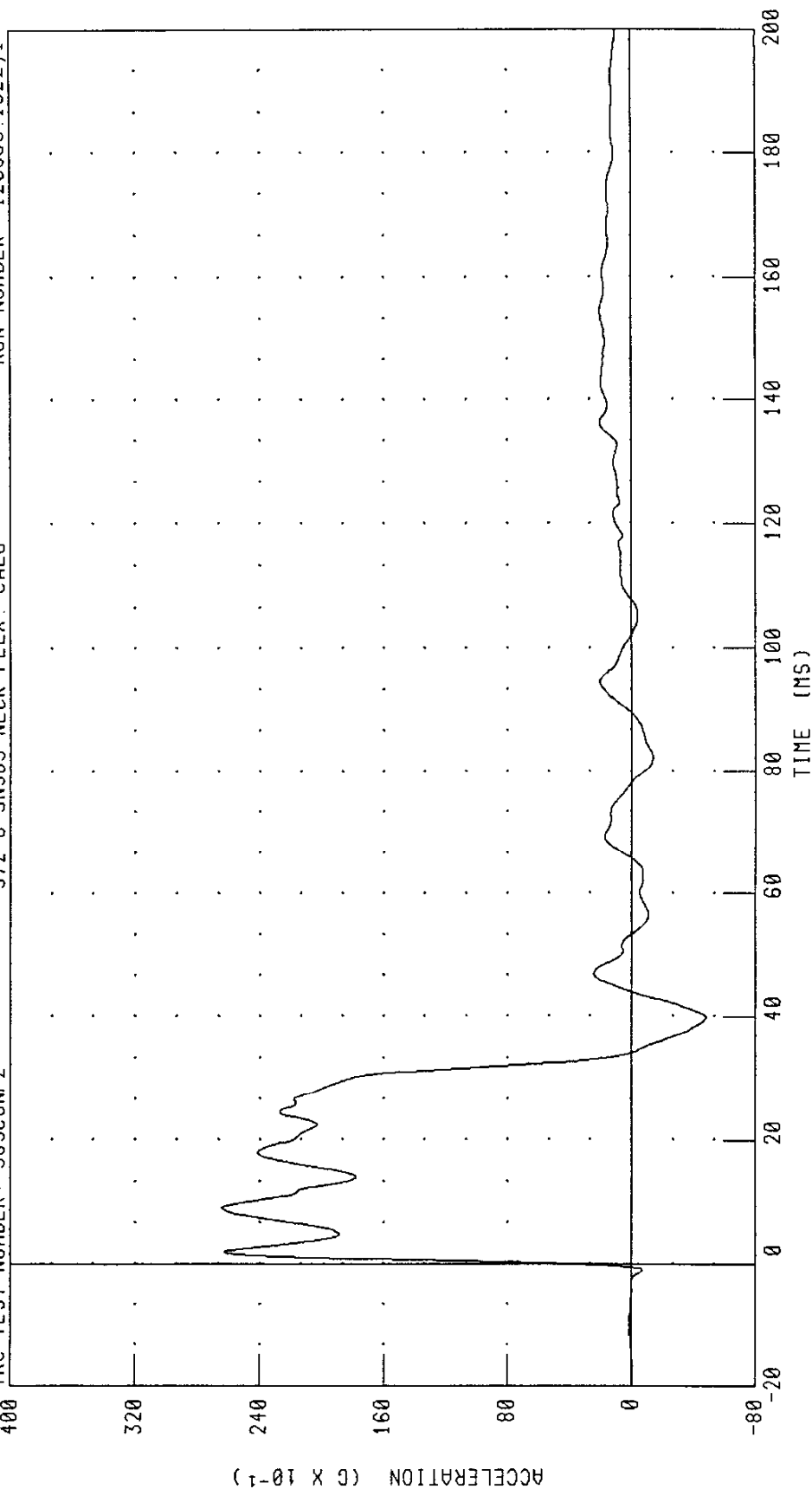
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 369C8NF2

572 0 SN369 NECK FLEX. CAL8

RUN NUMBER: 120699.1522;1



CHANNEL: PENXC FILTER: CH. CLASS 180

PEAK DATA: 26.46 G @ 9.12 MS; -4.81 G @ 39.84 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572 0 SN369 NECK FLEX. CAL8

TRC TEST NUMBER: 369C8NF2

120

90

60

30

0

-30

-60

ANGLE (°)

0

20

40

60

80

100

120

140

160

180

200

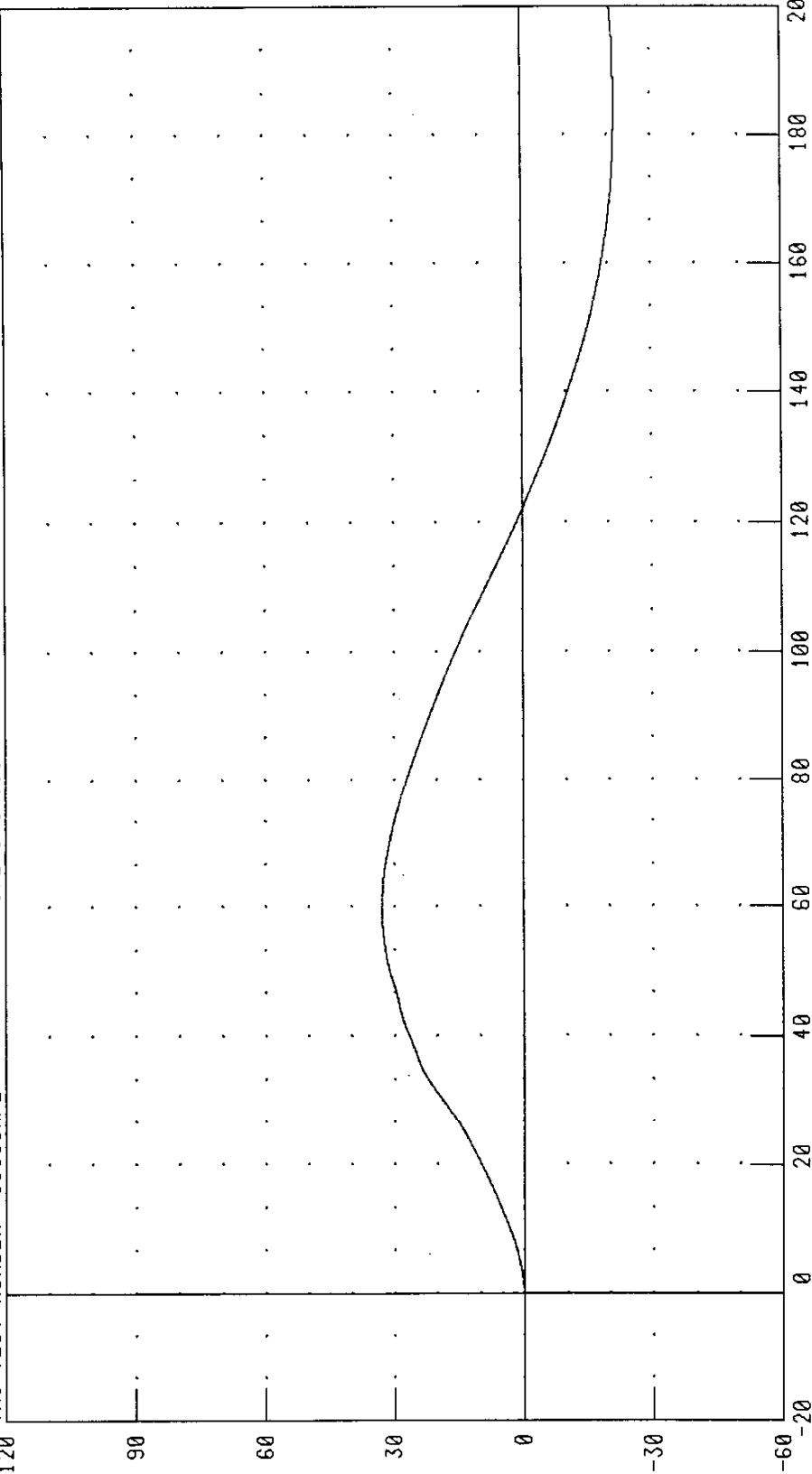
TIME (MS)

PEAK DATA: 32.92 ° @ 59.04 MS; -21.61 ° @ 184.40 MS

CHANNEL: BETA

FILTER: CH. CLASS 60

RUN NUMBER: 120699.1522;1



PART 572-0 HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

572 0 SN369 NECK FLEX. CAL8

TRC TEST NUMBER: 369C8NF2

120

90

60

30

0

-30

-60

-90

-120

ANGLE (°)

TIME (MS)

0

20

40

60

80

100

120

140

160

180

200

PEAK DATA: 50.71 ° @ 59.60 MS; -35.27 ° @ 189.68 MS

CHANNEL: THETA

FILTER: CH. CLASS 60

RUN NUMBER: 120699.1522;1

572 0 SN369 NECK FLEX. CAL8

TRC TEST NUMBER: 369C8NF2

120

90

60

30

0

-30

-60

-90

-120

ANGLE (°)

TIME (MS)

0

20

40

60

80

100

120

140

160

180

200

PEAK DATA: 50.71 ° @ 59.60 MS; -35.27 ° @ 189.68 MS

CHANNEL: THETA

FILTER: CH. CLASS 60

RUN NUMBER: 120699.1522;1

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 369C8NF2

572 0 SN369 NECK FLEX. CAL8

RUN NUMBER: 120699.1522;1

120

90

60

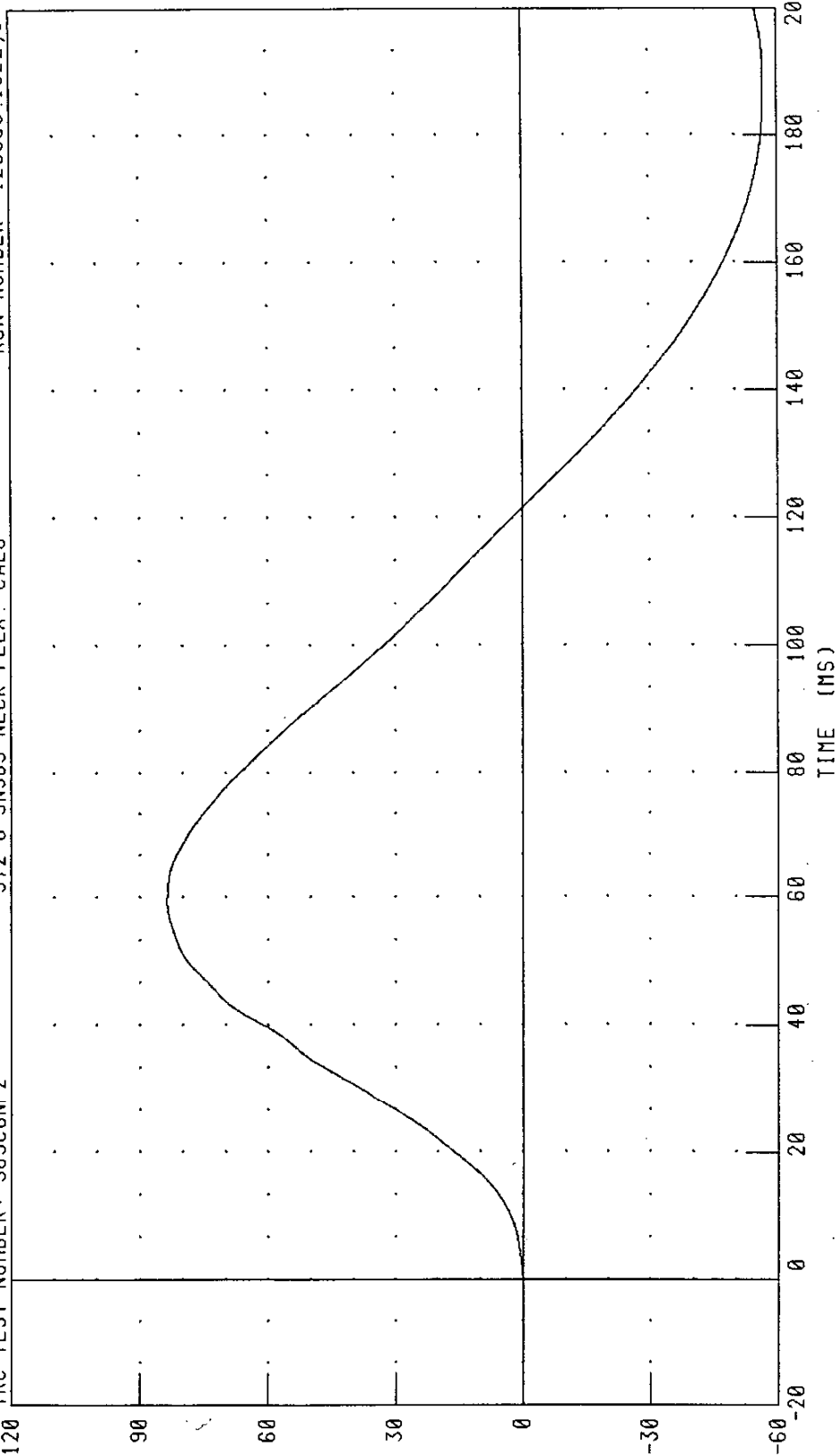
30

0

-30

-60

ANGLE (°)



CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 83.63 ° @ 59.36 MS, -56.82 ° @ 187.68 MS

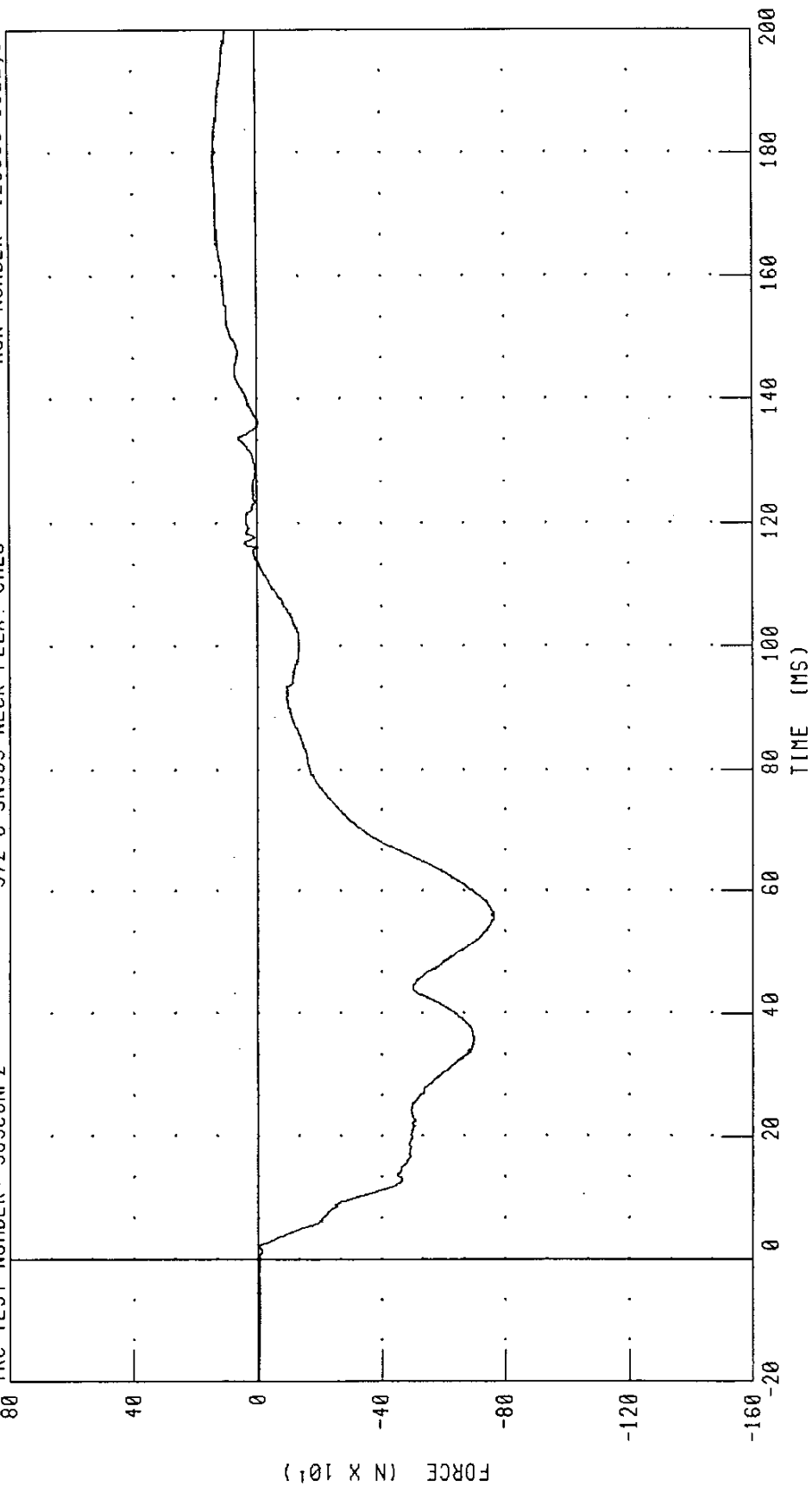
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 369C8NF2

572 0 SN359 NECK FLEX. CAL8

RUN NUMBER: 120699 1522;1

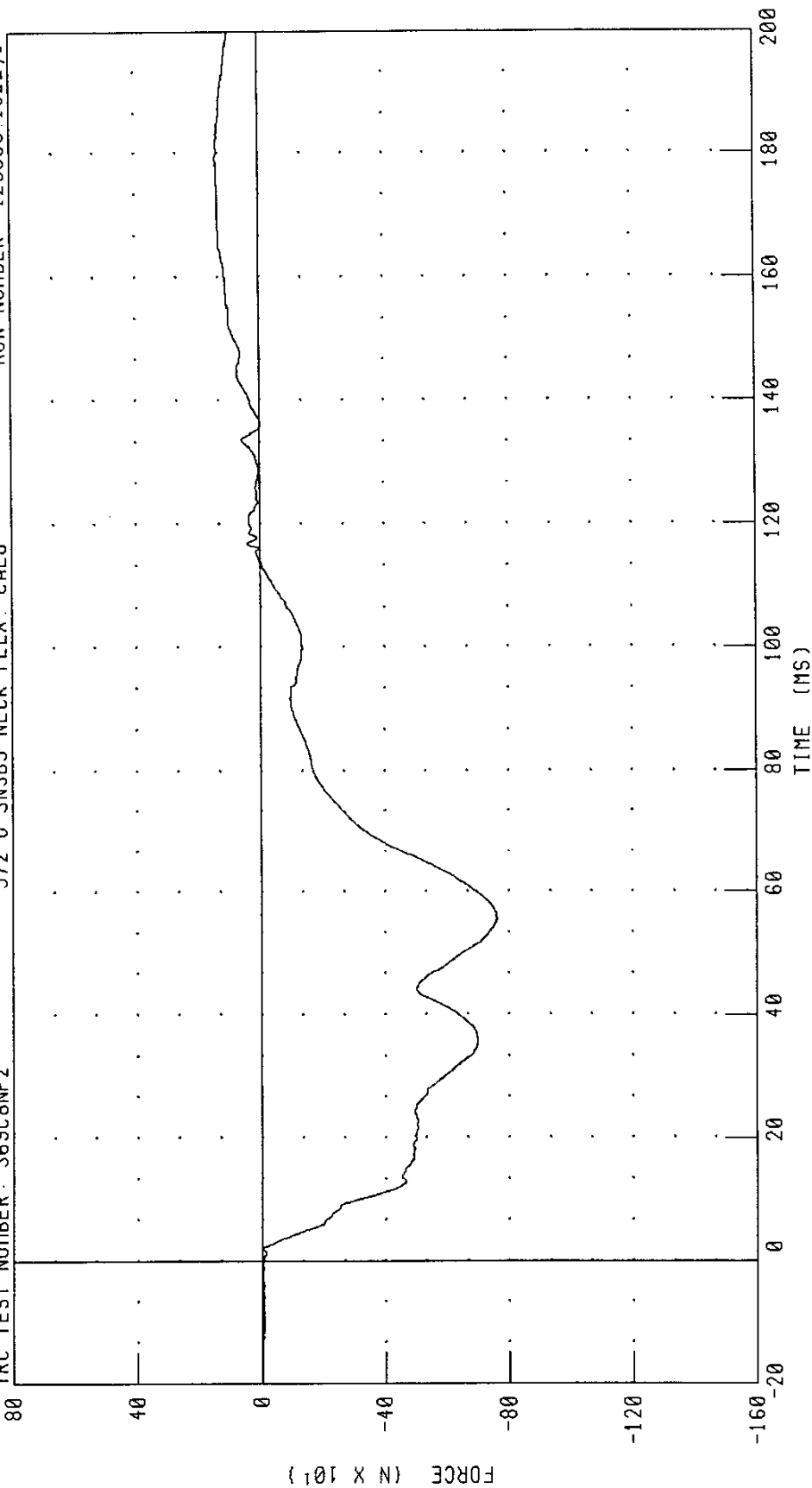


CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 140.19 N @ 176.96 MS, -762.46 N @ 55.20 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION
 NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 369C8NF2 572 0 SN369 NECK FLEX. CAL8 RUN NUMBER: 120699.1522;1



CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 139.56 N @ 179.20 MS; -762.55 N @ 55.44 MS

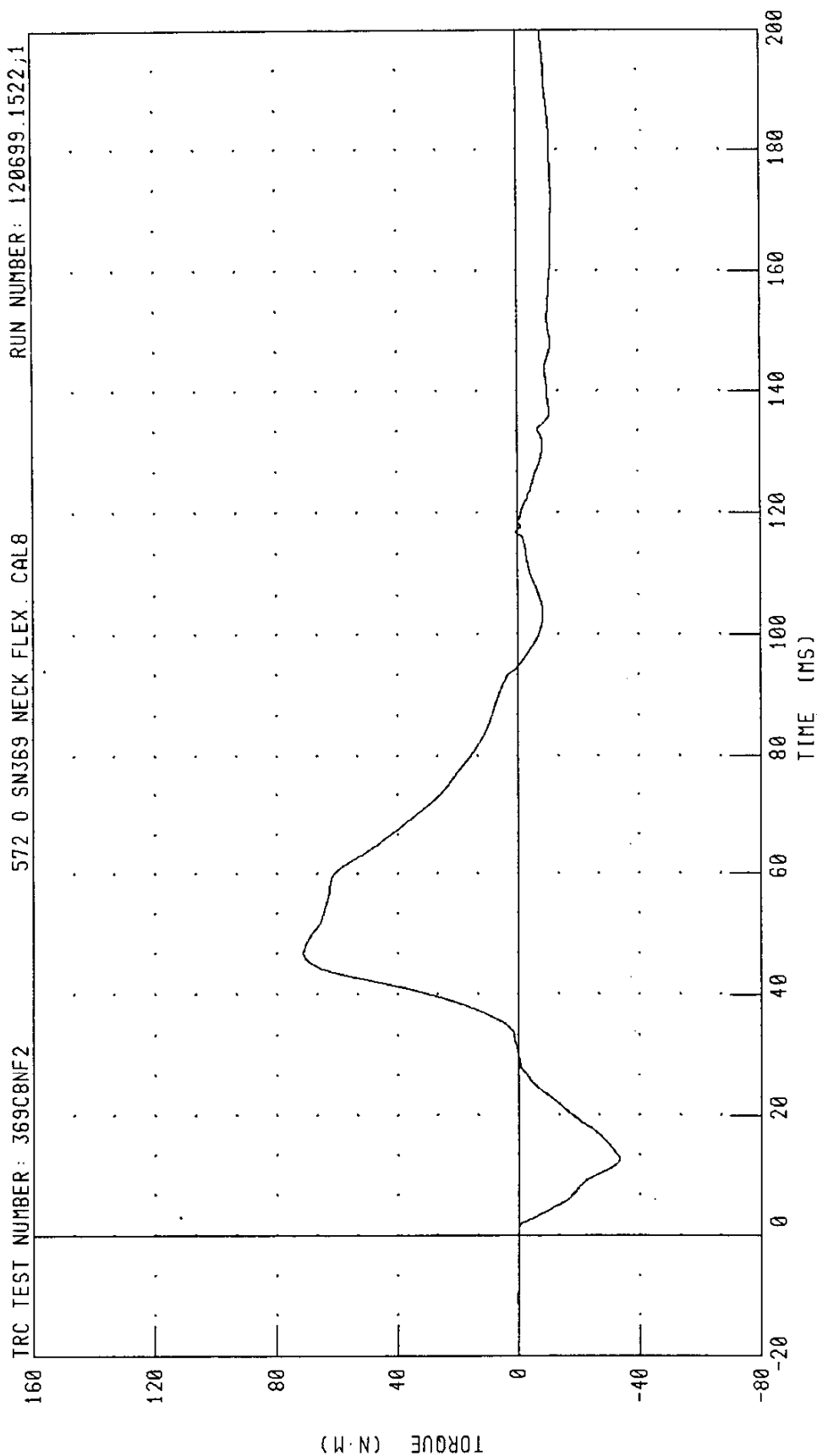
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 369C8NF2

572 0 SN369 NECK FLEX. CAL8

RUN NUMBER: 120699.1522;1



PEAK DATA: 71.26 N·M @ 46.80 MS; -33.32 N·M @ 12.64 MS

CHANNEL: NEKYM FILTER: CH. CLASS 600

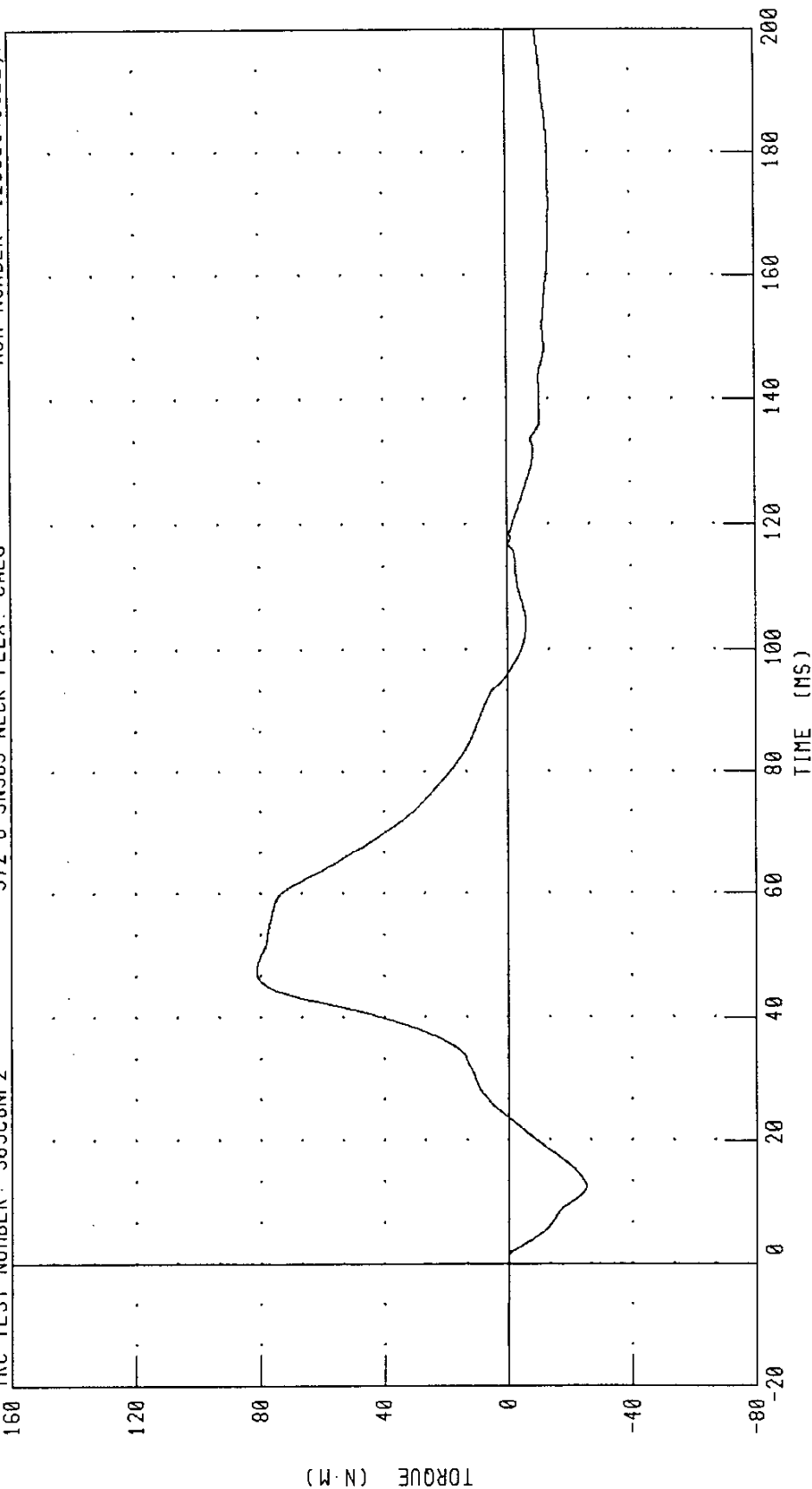
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

RUN NUMBER: 120699.1522;1

TRC TEST NUMBER: 369C8NF2

572 0 SN369 NECK FLEX. CAL8



PEAK DATA: 81.25 N-M @ 47.76 MS; -25.10 N-M @ 12.56 MS

FILTER: CH. CLASS 600

CHANNEL: NEKOM

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

07-DEC-99

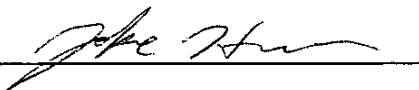
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 369C8NE1 572 0 SN369 NECK EXT. CAL 8

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
IMPACT VELOCITY	5.95 - 6.19 M/S	6.05 M/S
INTEGRATED PENDULUM VELOCITY	10 MS 1.5 - 1.9 M/S	1.71 M/S
	20 MS 3.1 - 3.9 M/S	3.44 M/S
	30 MS 4.6 - 5.6 M/S	5.05 M/S
PEAK D-PLANE ROTATION	97 - 109 DEG.	103.24 DEG.
PEAK MOMENT ABOUT OCCIPITAL CONDYLE DURING ROTATION INT	-55 / -69 NM	-56.79 NM
NEGATIVE MOMENT DECAY TIME FROM TO \ -10 NM	94 - 114 MS	107.2 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 120799.0741;1

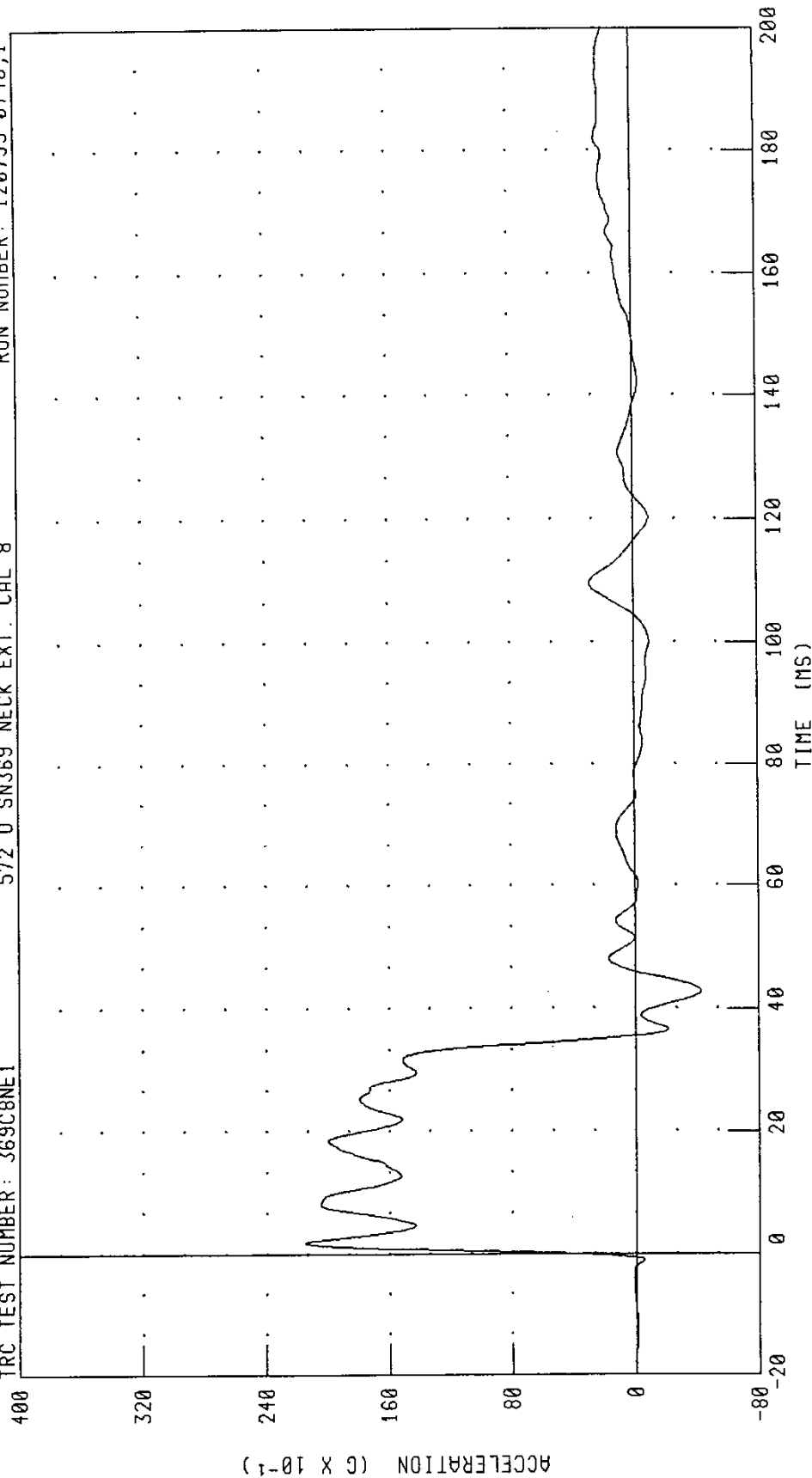
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 369C8NE1

572 0 SN369 NECK EXT. CAL 8

RUN NUMBER: 120799 0748;1



PEAK DATA: 21.51 G @ 1.76 MS; -4.29 G @ 42.80 MS

CHANNEL: PENXC FILTER: CH. CLASS 180

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572 0 SN369 NECK EXT. CAL 8

TRC TEST NUMBER: 369C8NE1

120

90

60

30

0

-30

-60

-90

-120

-150

-180

-210

-240

-270

-300

-330

-360

-390

-420

-450

-480

-510

-540

-570

-600

-630

-660

-690

-720

-750

-780

-810

-840

-870

-900

-930

-960

-990

-1020

-1050

-1080

-1110

-1140

-1170

-1200

-1230

-1260

-1290

-1320

-1350

-1380

-1410

-1440

-1470

-1500

-1530

-1560

-1590

-1620

-1650

-1680

-1710

-1740

-1770

-1800

-1830

-1860

-1890

-1920

-1950

-1980

-2010

-2040

-2070

-2100

-2130

-2160

-2190

-2220

-2250

-2280

-2310

-2340

-2370

-2400

-2430

-2460

-2490

-2520

-2550

-2580

-2610

-2640

-2670

-2700

-2730

-2760

-2790

-2820

-2850

-2880

-2910

-2940

-2970

-3000

-3030

-3060

-3090

-3120

-3150

-3180

-3210

-3240

-3270

-3300

-3330

-3360

-3390

-3420

-3450

-3480

-3510

-3540

-3570

-3600

-3630

-3660

-3690

-3720

-3750

-3780

-3810

-3840

-3870

-3900

-3930

-3960

-3990

-4020

-4050

-4080

-4110

-4140

-4170

-4200

-4230

-4260

-4290

-4320

-4350

-4380

-4410

-4440

-4470

-4500

-4530

-4560

-4590

-4620

-4650

-4680

-4710

-4740

-4770

-4800

-4830

-4860

-4890

-4920

-4950

-4980

-5010

-5040

-5070

-5100

-5130

-5160

-5190

-5220

-5250

-5280

-5310

-5340

-5370

-5400

-5430

-5460

-5490

-5520

-5550

-5580

-5610

-5640

-5670

-5700

-5730

-5760

-5790

-5820

-5850

-5880

-5910

-5940

-5970

-6000

-6030

-6060

-6090

-6120

-6150

-6180

-6210

-6240

-6270

-6300

-6330

-6360

-6390

-6420

-6450

-6480

-6510

-6540

-6570

-6600

-6630

-6660

-6690

-6720

-6750

-6780

-6810

-6840

-6870

-6900

-6930

-6960

-6990

-7020

-7050

-7080

-7110

-7140

-7170

-7200

-7230

-7260

-7290

-7320

-7350

-7380

-7410

-7440

-7470

-7500

-7530

-7560

-7590

-7620

-7650

-7680

-7710

-7740

-7770

-7800

-7830

-7860

-7890

-7920

-7950

-7980

-8010

-8040

-8070

-8100

-8130

-8160

-8190

-8220

-8250

-8280

-8310

-8340

-8370

-8400

-8430

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-8610

-8640

-8670

-8700

-8730

-8760

-8790

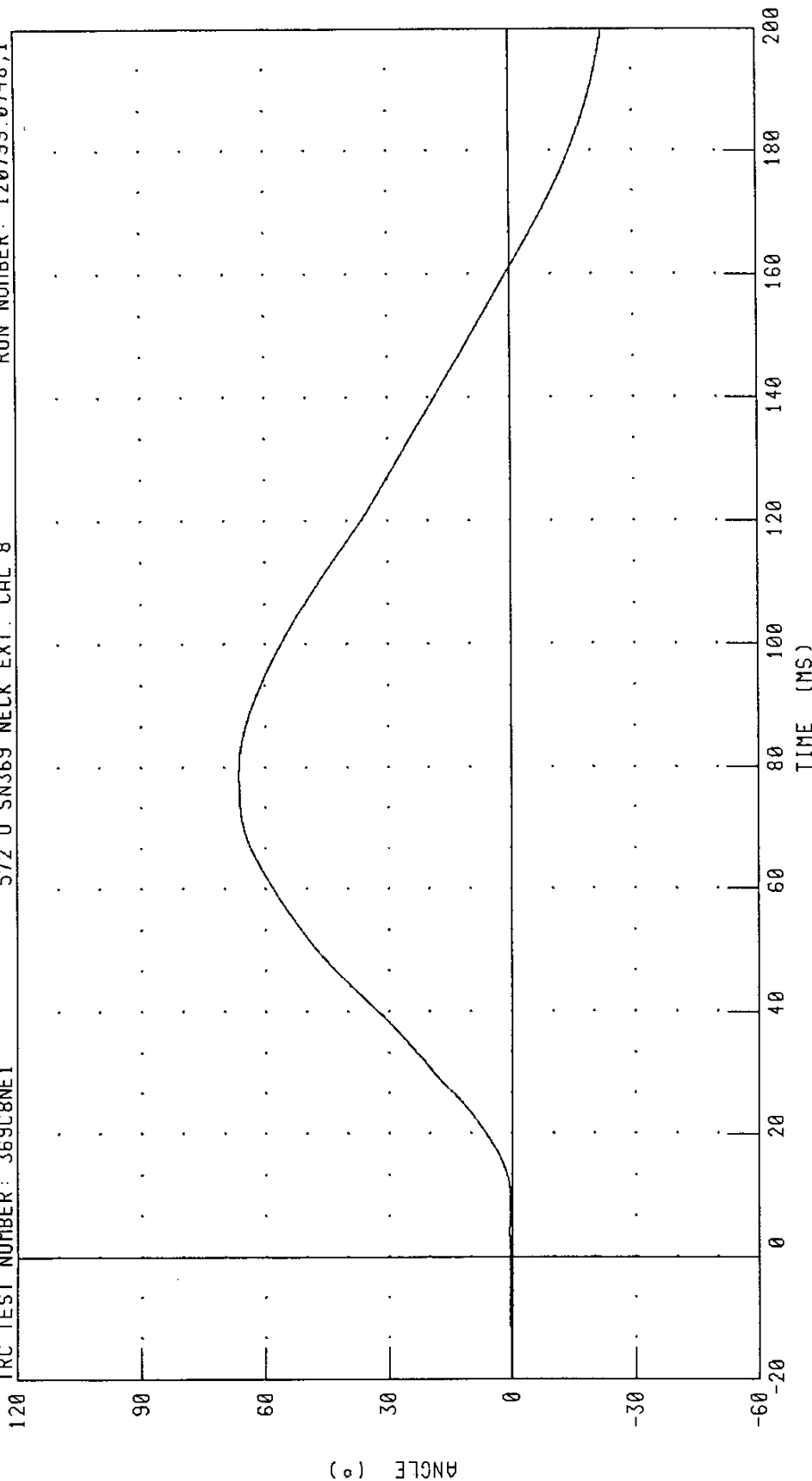
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 369C8NE1

572 0 SN369 NECK EXT. CAL 8

RUN NUMBER: 120799.0748;1



PEAK DATA: 66.35 ° @ 78.64 MS; -22.62 ° @ 200.00 MS

CHANNEL: THETA FILTER: CH. CLASS 60

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

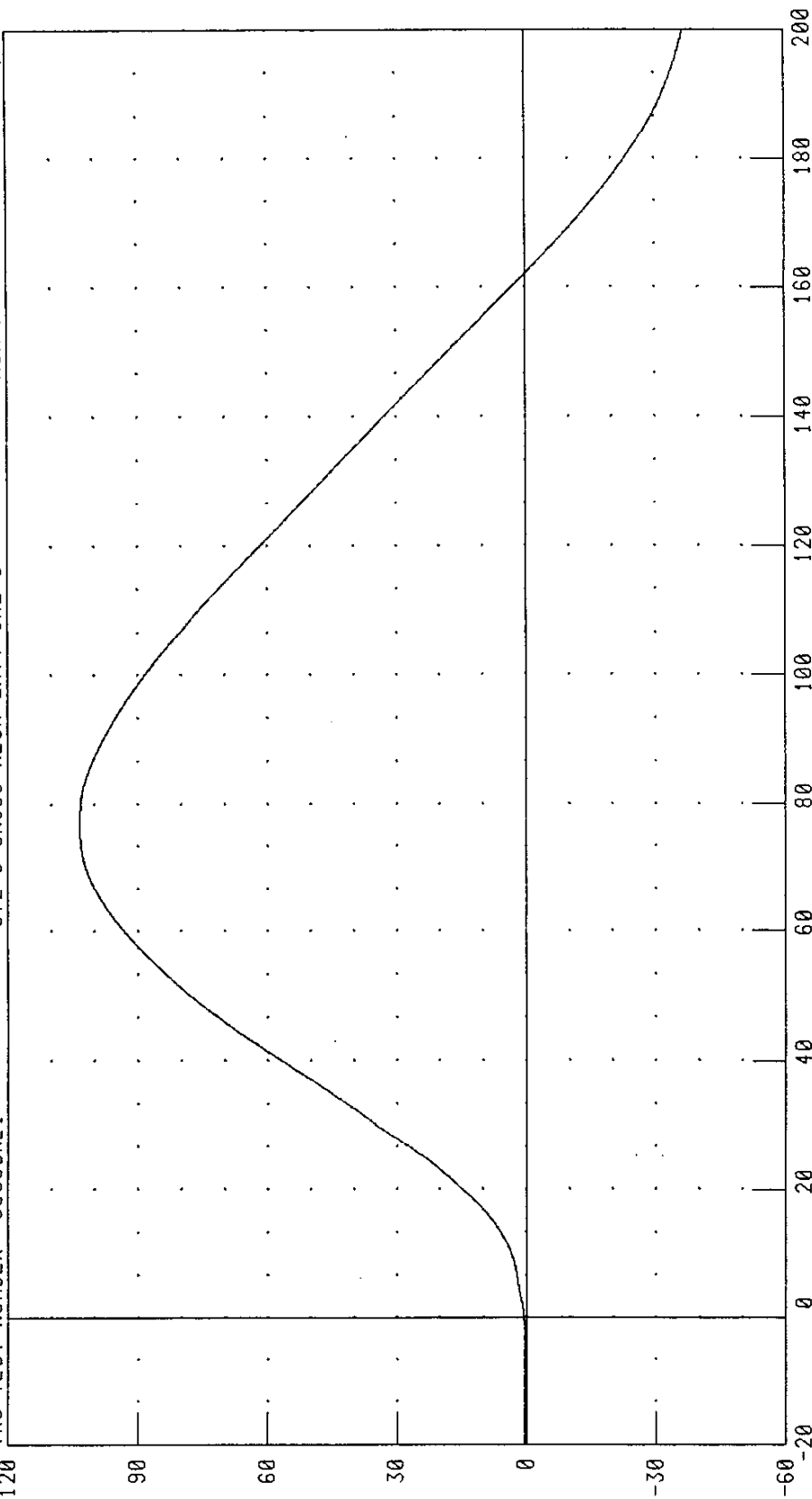
TOTAL ROTATION

TRC TEST NUMBER: 369C8NE1

572 0 SN369 NECK EXT. CAL 8

RUN NUMBER: 120799.0748;1

120



TIME (MS)

PEAK DATA: 103.25 ° @ 76.56 MS; -36.76 ° @ 200.00 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE

07-DEC-99

TRC INC.

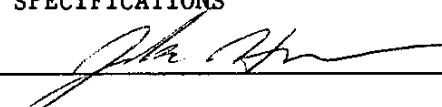
TEST NO: 369C8TH1

572 0 SN369 THORAX CAL8

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	48 - 55 MM	51.3 MM
MAXIMUM RESISTIVE FORCE WITHIN DEFLECTION CORRIDOR	3900 - 4400 N	4224. N
INTERNAL HYSTERESIS	69% - 85%	70.9%

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 120799.0848;1

PART 572-0 HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 369C8TH1

572 0 SN369 THORAX CAL8

RUN NUMBER: 120799.0851,1

50

40

30

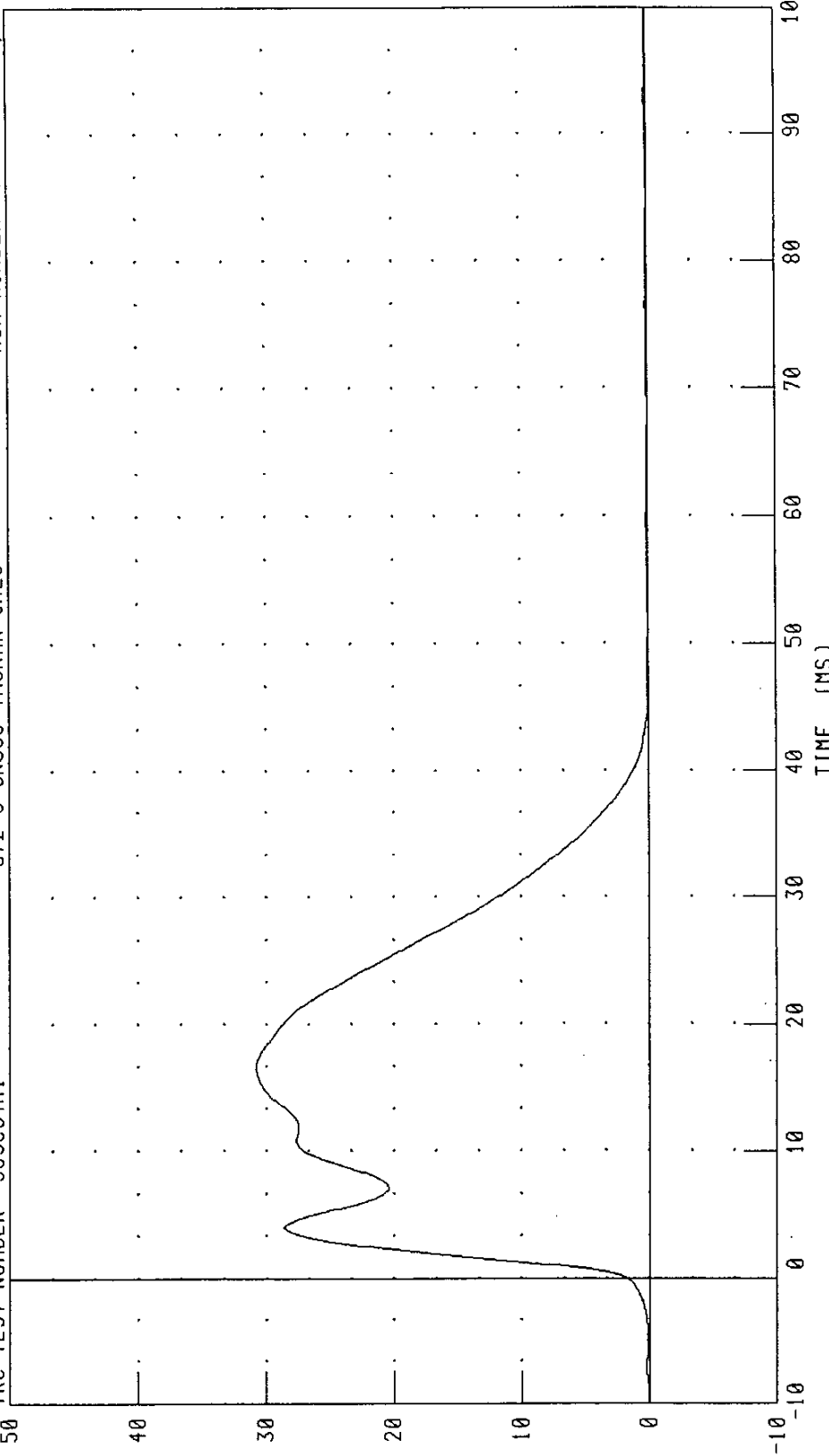
20

10

0

-10

ACCELERATION (G)



PEAK DATA: 30.78 G @ 16.64 MS; -0.05 G @ 68.32 MS

CHANNEL: PENXC FILTER: CH. CLASS 180

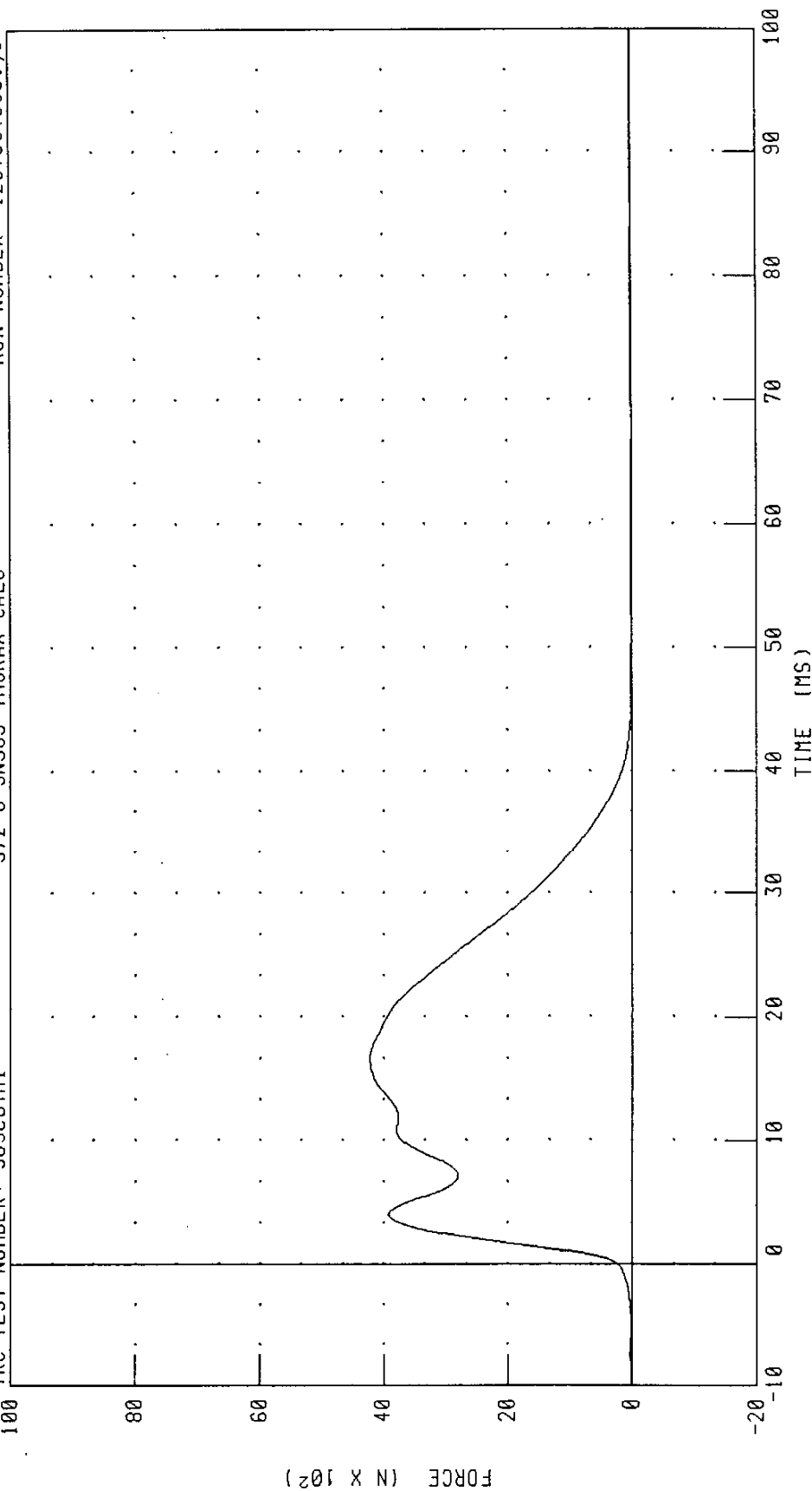
PART 572-0 HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 369C8TH1

572 0 SN369 THORAX CAL8

RUN NUMBER: 120799.0851,1



CHANNEL: PENXF

FILTER: CH. CLASS 180

PEAK DATA: 4224.46 N @ 16.64 MS; -7.09 N @ 68.32 MS

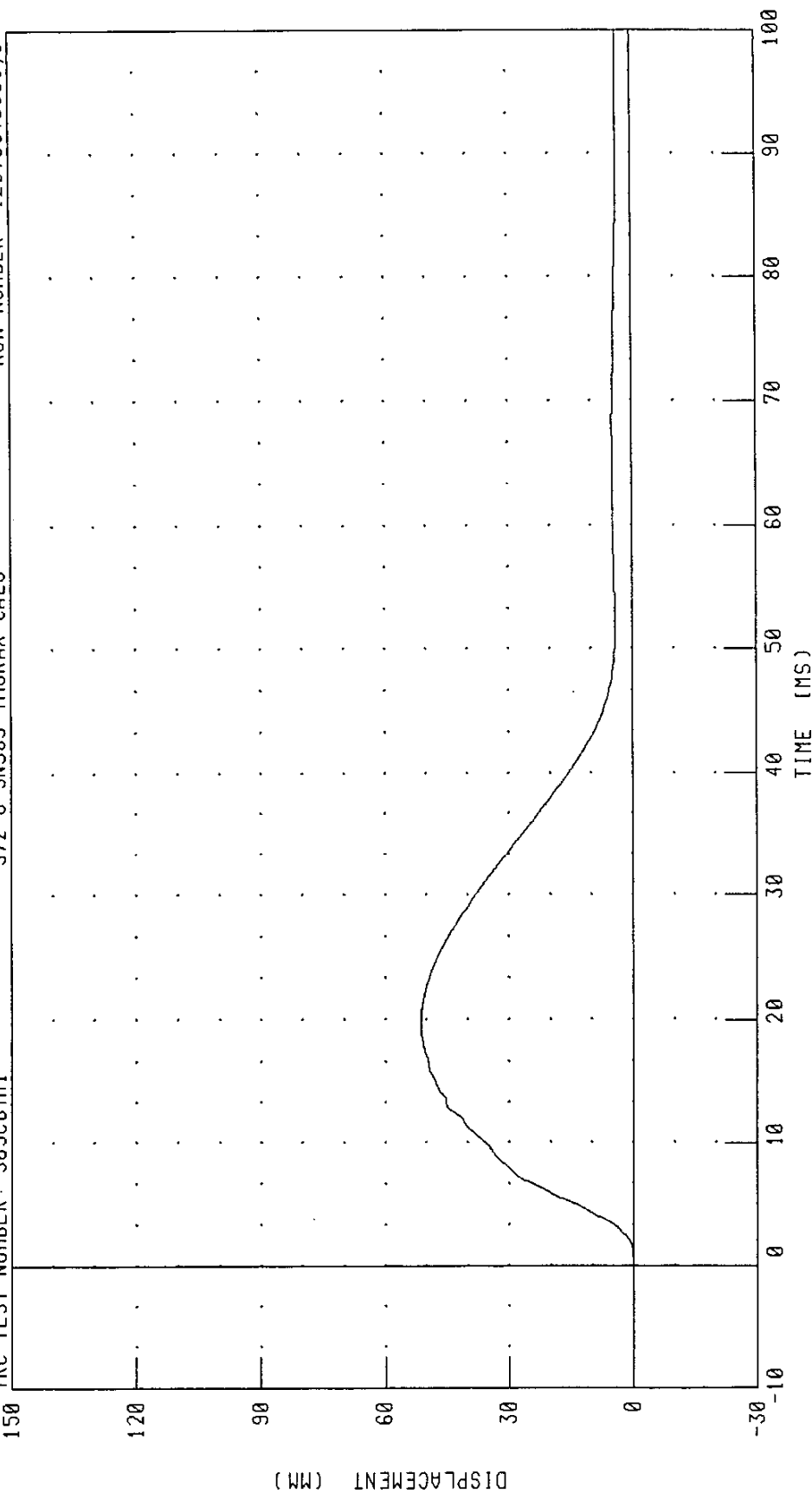
PART 572-0 HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 369C8TH1

572 0 SN369 THORAX CAL8

RUN NUMBER: 120799.0851,1



CHANNEL: CSTXD FILTER: CH. CLASS 600

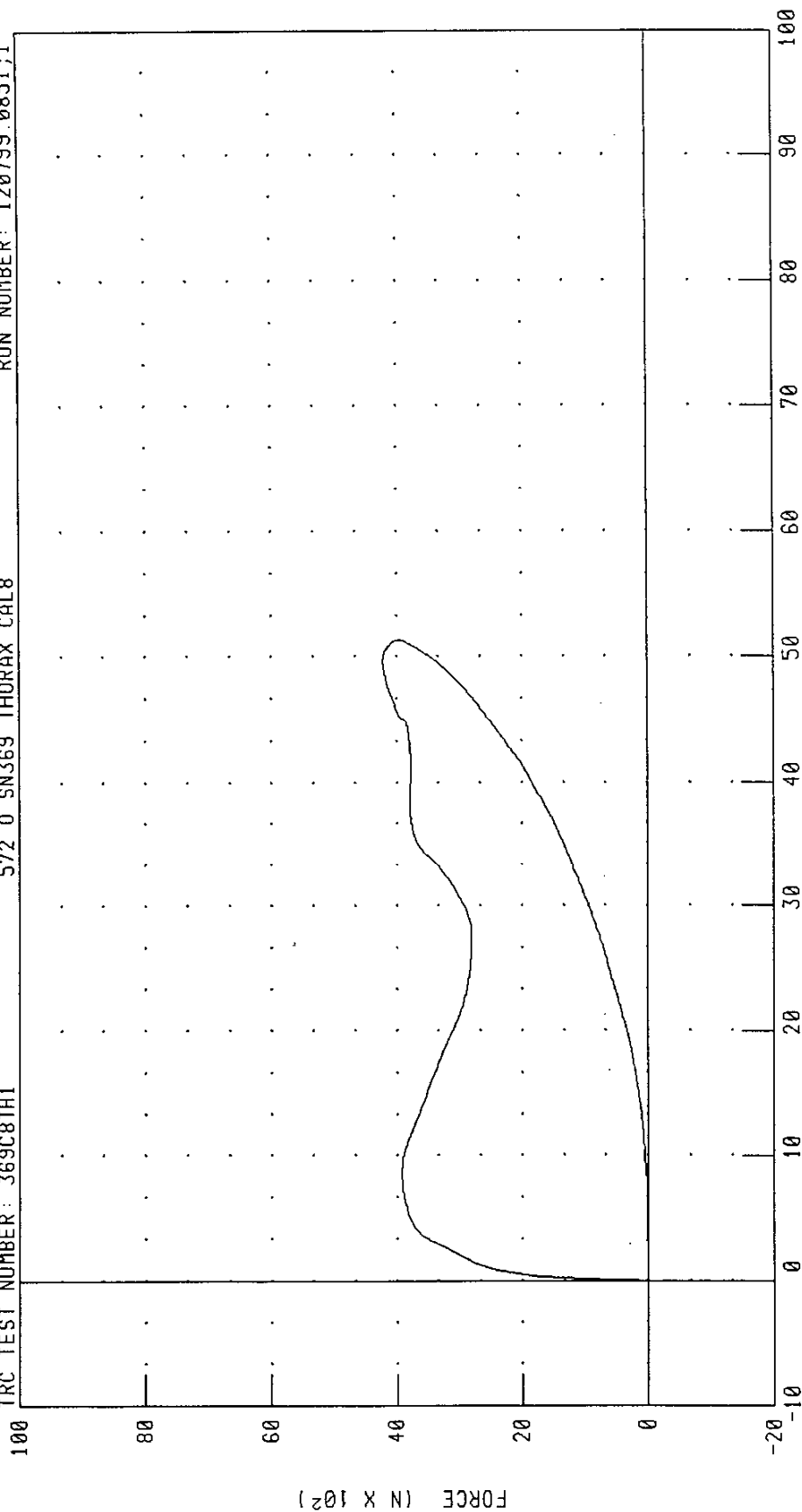
PEAK DATA: 51.33 MM @ 20.00 MS; -0.01 MM @ -6.08 MS

PART 572-0 HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER: 369C8TH1

572 0 SN369 THORAX CAL8

RUN NUMBER: 120799.0851;1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 600
CH. CLASS 180

PEAK DATA:

51.33 MM @ 20.00 MS; -0.01 MM @ -6.08 MS
4224.46 N @ 16.64 MS; -7.09 N @ 68.32 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

06-DEC-99

TRC INC.

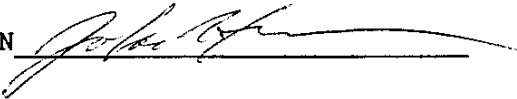
TEST NO: 369C8RK1

572 0 SN369 R.KNEE CAL8

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3360 - 4080 N	3725.1 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



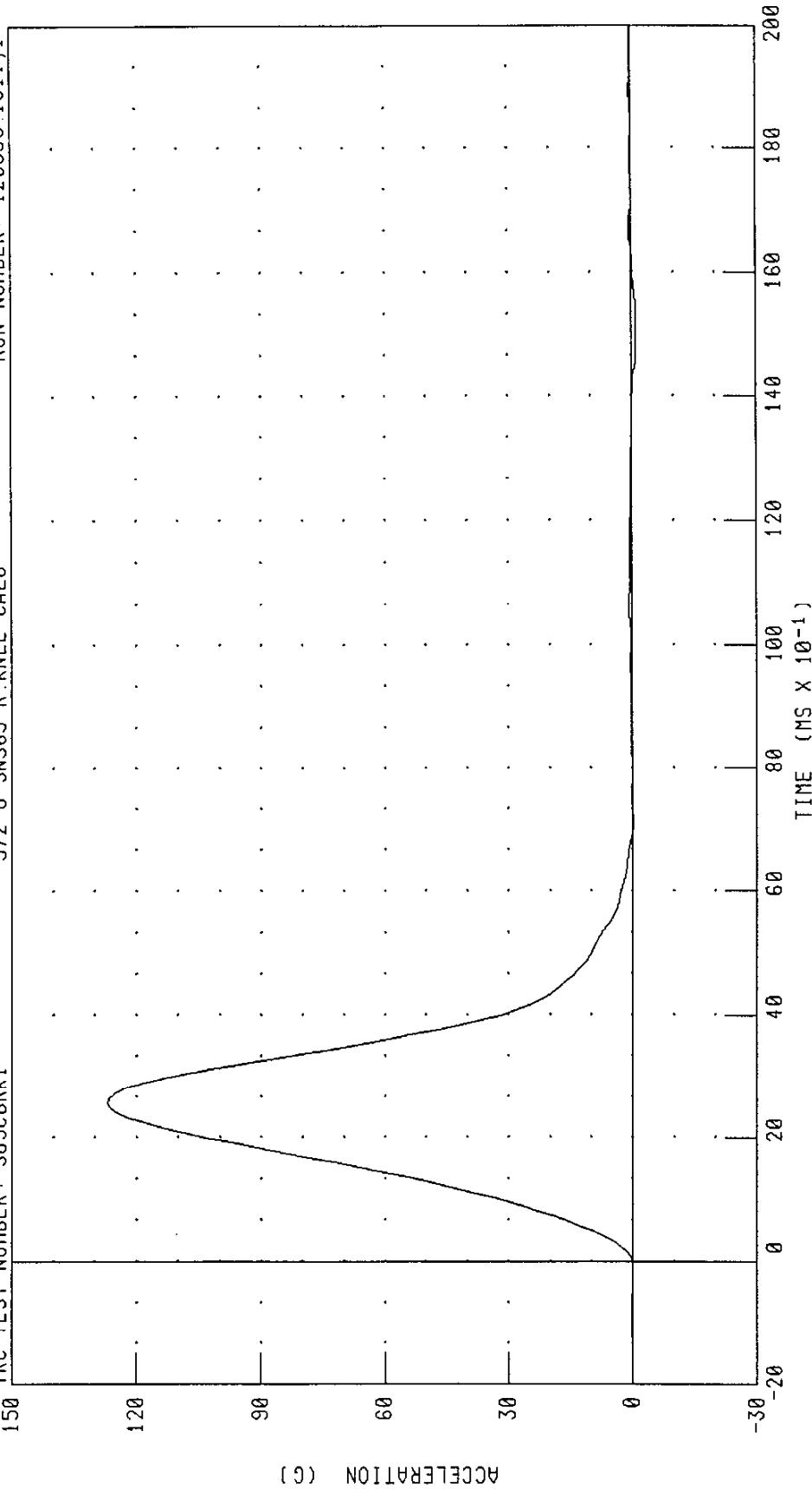
RUN NUMBER: 120699.1011;1

PART 572-0 HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 369C8RK1

572 0 SN369 R.KNEE CAL8

RUN NUMBER: 120699.1011,1



CHANNEL: PENXC FILTER: CH. CLASS 600

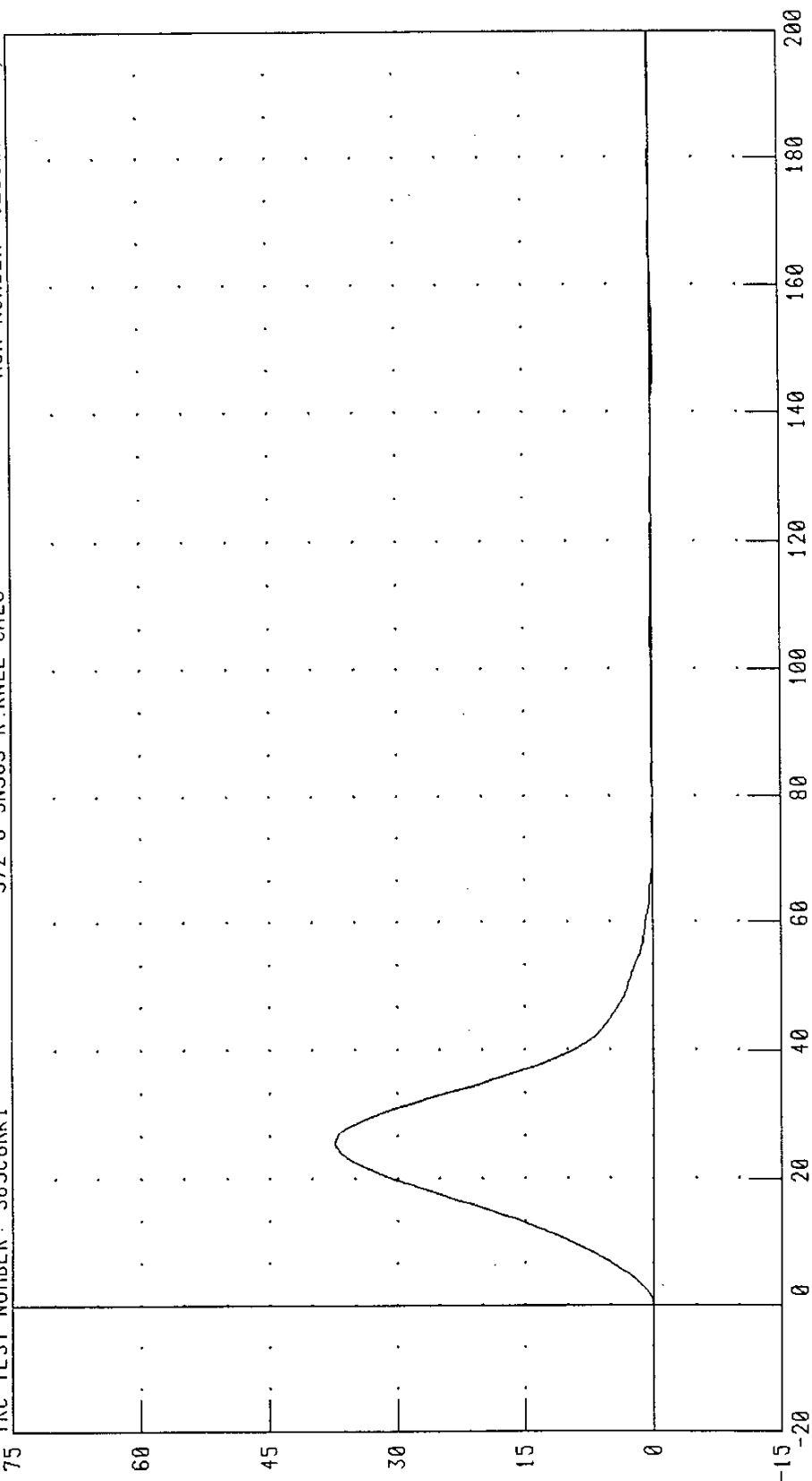
PEAK DATA: 126.89 G @ 2.56 MS; -1.13 G @ 14.80 MS

PART 572-0 HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572 0 SN369 R.KNEE CAL8 RUN NUMBER: 120699.1011.1

TRC TEST NUMBER: 369C8RK1



PEAK DATA: 3725.12 N @ 2.56 MS; -33.11 N @ 14.80 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

06-DEC-99

TRC INC.

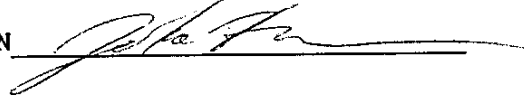
TEST NO: 369C8LK1

572 0 SN369 LEFT KNEE CAL8

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3360 - 4080 N	3435.4 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



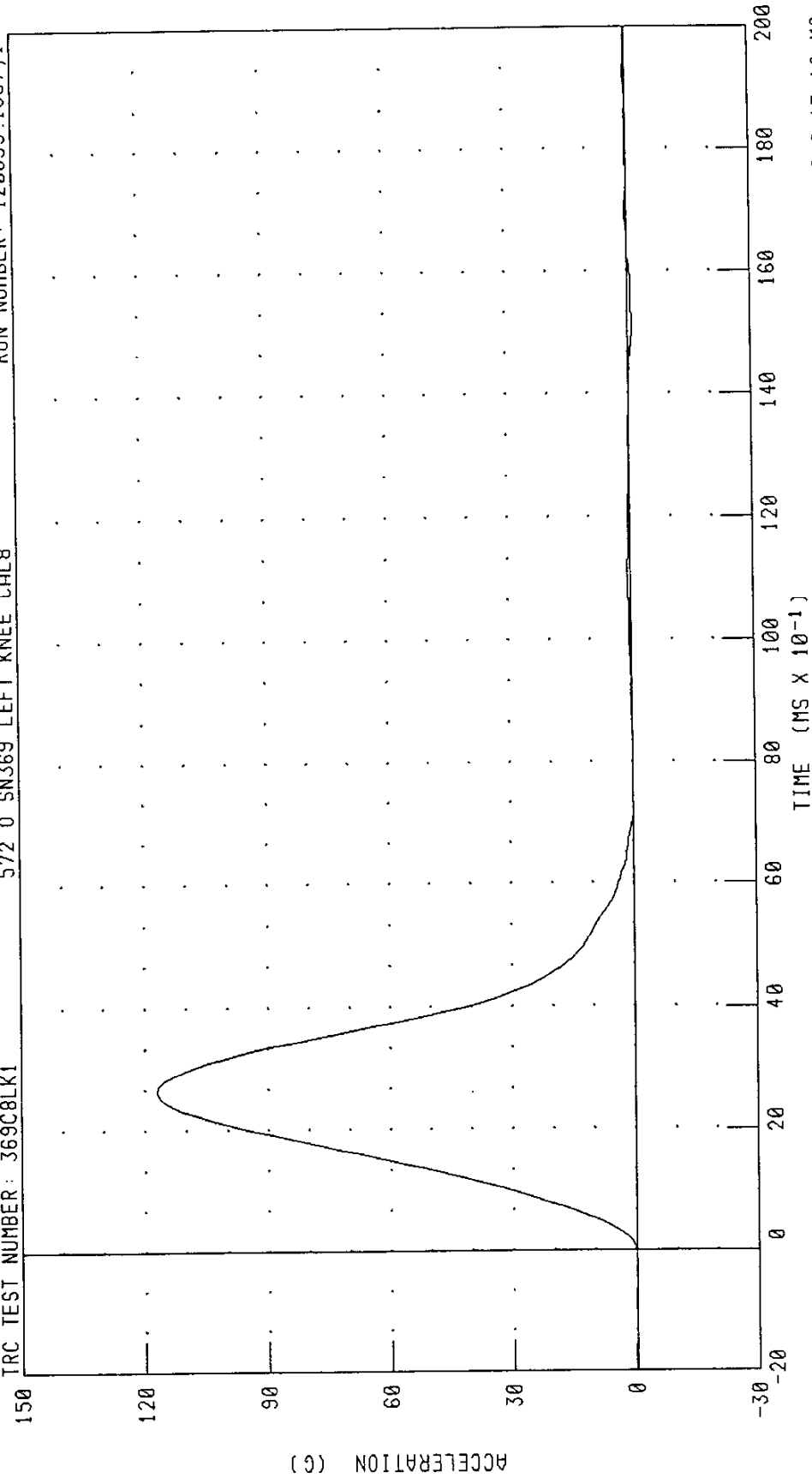
RUN NUMBER: 120699.1006;1

PART 572-0 HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 369C8LK1

572 0 SN369 LEFT KNEE CAL8

RUN NUMBER: 120699.1007,1



CHANNEL: PENXC FILTER: CH. CLASS 600 PEAK DATA: 117.02 G @ 2.64 MS, -1.17 G @ 15.12 MS

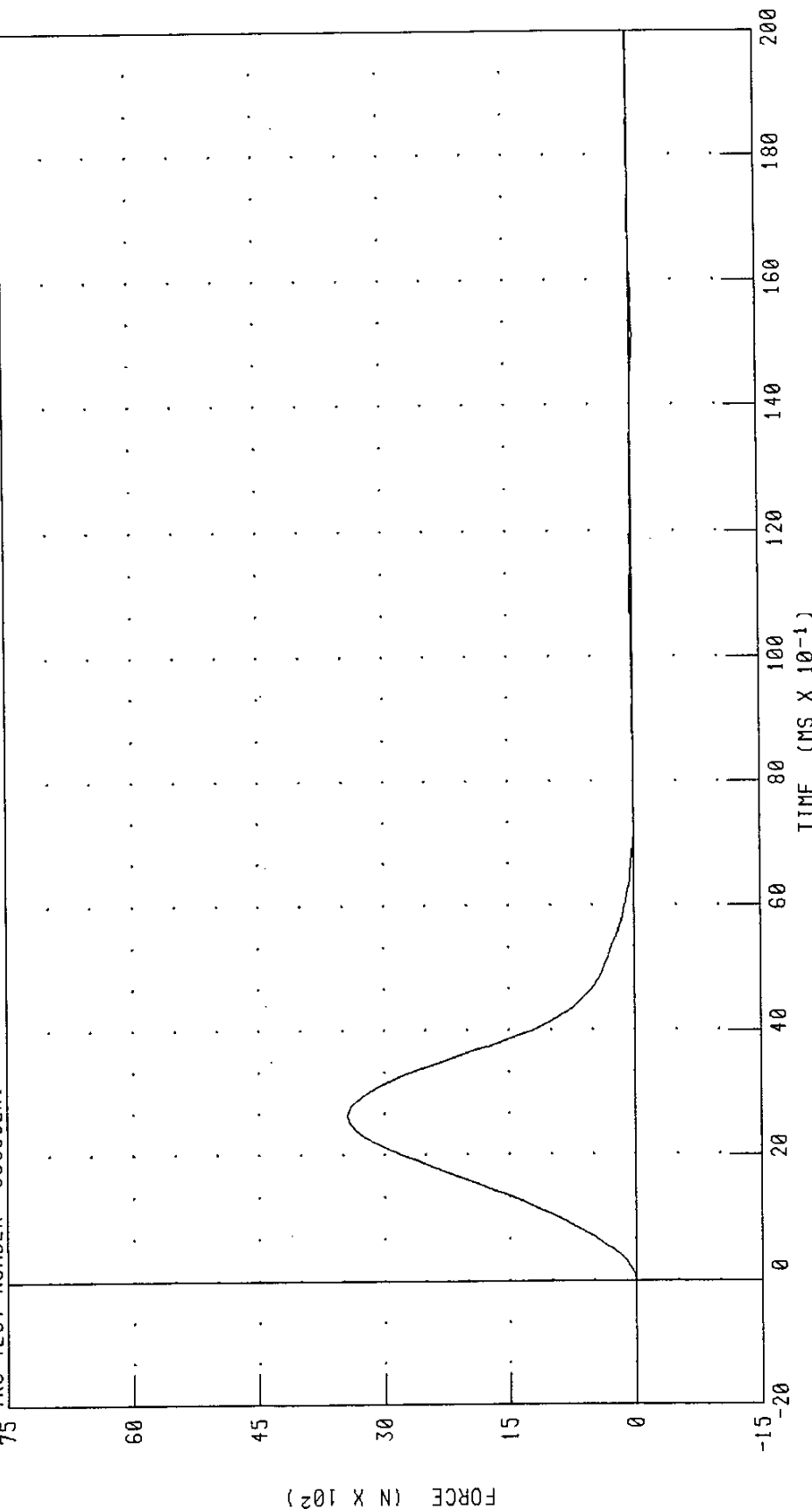
PART 572-0 HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572 0 SN369 LEFT KNEE CAL8

TRC TEST NUMBER: 369C8LK1

RUN NUMBER: 120699.1007;1



CHANNEL: PENXF FILTER: CH. CLASS 600

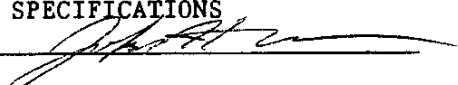
PEAK DATA: 3435.44 N @ 2.64 MS; -34.32 N @ 15.12 MS

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III SMALL FEMALE EXTERNAL DIMENSIONS
TRC. SN283

06-DEC-99

TRC. INC. TEST NO: 283C9ED 572 0 SN283 EXT. DIMENSIONS

TEST PARAMETER (DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)	300 - 310 MM	305. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)	160 - 170 MM	163. MM
CHEST CIRCUMFERENCE (X)	851 - 881 MM	871. MM
WAIST CIRCUMFERENCE (Y)	757 - 787 MM	775. MM
CHEST DEPTH (O)	183 - 199 MM	183. MM
H-POINT HEIGHT (C)	81.5 - 86.5 MM	81. MM
H-POINT FROM SEATBACK (D)	144.5-149.5 MM	147. MM
SKULL CAP TO BACKLINE (H)	43.2 - 48.2 MM	45.7 MM
TOTAL SITTING HEIGHT (A)	775 - 800 MM	775. MM
THIGH CLEARANCE (F)	114 - 130 MM	127. MM
BUTTOCK KNEE LENGTH (K)	508.5-533.5 MM	533. MM
BUTTOCK POPLITEAL LENGTH (N)	414.0-429.4 MM	419. MM
POPLITEAL HEIGHT (L)	348.5-373.5 MM	361. MM
KNEE TO FLOOR HEIGHT (M)	394 - 419 MM	411. MM
FOOT LENGTH (P)	216 - 232 MM	224. MM
FOOT BREADTH (R)	76 - 92 MM	86.3. MM
SHOULDER PIVOT FROM BACKLINE (E)	71 - 81 MM	79. MM
SHOULDER BREADTH (V)	348 - 364 MM	361. MM
SHOULDER PIVOT HEIGHT (B)	434 - 450 MM	434. MM
ELBOW REST HEIGHT (J)	183 - 203 MM	183. MM
SHOULDER-ELBOW LENGTH (I)	279 - 297 MM	284. MM
BACK OF ELBOW TO FINGER TIP (G)	244 - 259 MM	251. MM
HIP WIDTH AT H-POINT (W)	272 - 287 MM	279. MM

HYBRID III SMALL FEMALE EXTERNAL DIMENSIONS
DUMMY MEETS SPECIFICATIONS
TECHNICIAN 

RUN NUMBER: 121799.1050

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III SMALL FEMALE

06-DEC-99

TRC INC.

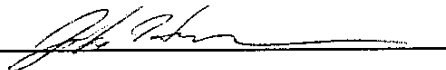
TEST NO: 283C9HD1

572 0 SN283 HEAD DROP CAL 9

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PEAK RESULTANT ACCELERATION	250 - 300 G	291.78 G
PEAK LATERAL ACCELERATION	15 G MAX	5.64 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



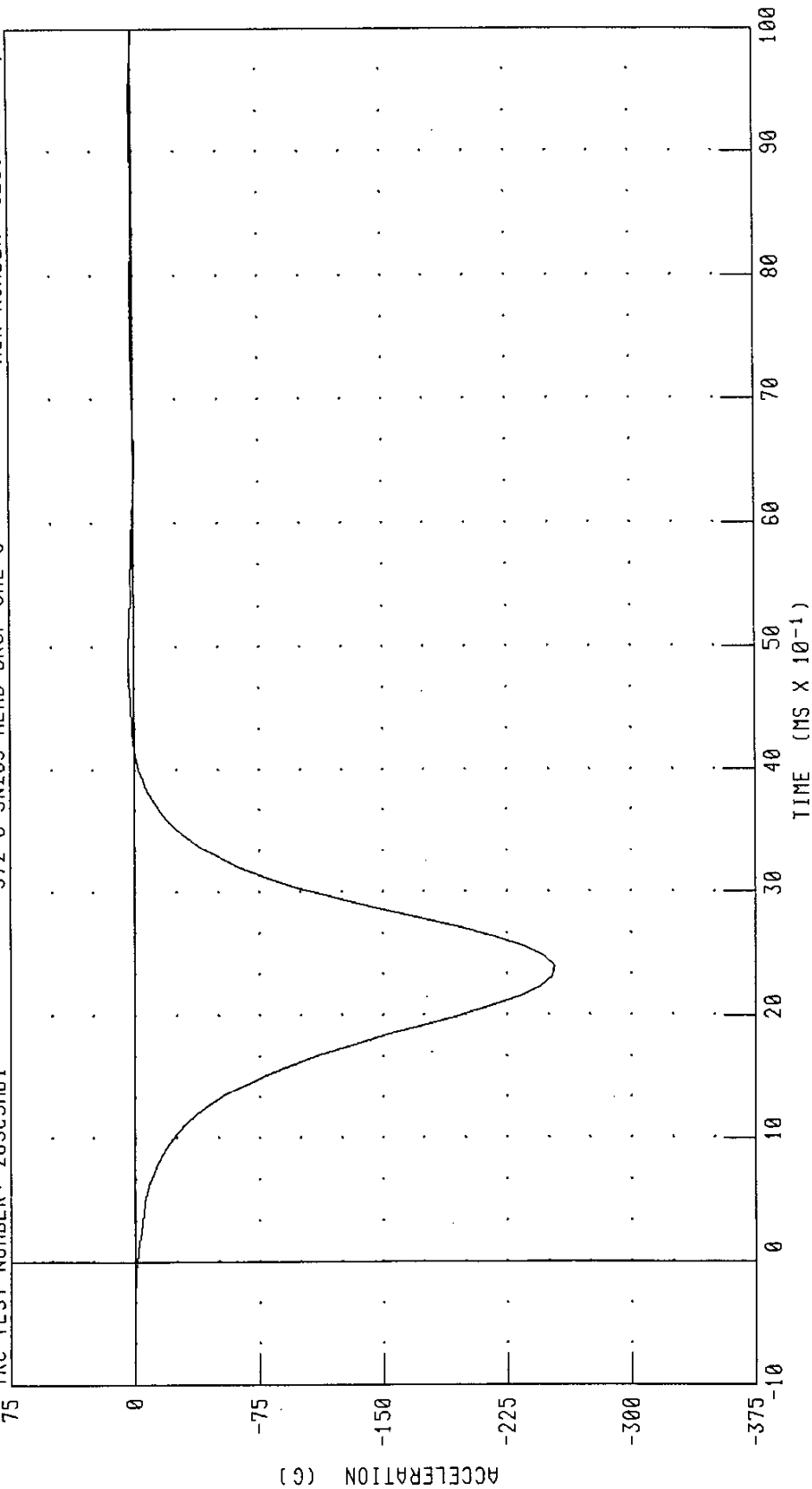
RUN NUMBER: 120699.0831;1

PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572 0 SN283 HEAD DROP CAL 9 RUN NUMBER: 120699 0832;1

TRC TEST NUMBER: 283C9HD1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

PEAK DATA: 3.63 G @ 4.96 MS; -253.52 G @ 2.40 MS

PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

572 0 SN283 HEAD DROP CAL 9

TRC TEST NUMBER : 283C9HD1

225

150

75

0

-75

-150

-225

ACCELERATION (G)

0

10

20

30

40

50

60

70

80

90

100

TIME (MS X 10⁻¹)

PEAK DATA: 5.64 G @ 2.32 MS; -1.61 G @ 4.00 MS

CHANNEL: HEDYC

FILTER: CH. CLASS 1000

RUN NUMBER: 120699.0832;1

PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

572 0 SN283 HEAD DROP CAL 9

TRC TEST NUMBER: 283C9HD1

375

300

225

150

75

0

-75

-10

ACCELERATION (G)

TIME (MS X 10⁻¹)

0 10 20 30 40 50 60 70 80 90 100

PEAK DATA: 144.34 G @ 2.40 MS, -1.65 G @ 7.44 MS

CHANNEL: HEDZG

FILTER: CH. CLASS 1000

RUN NUMBER: 120699 0832;1

1

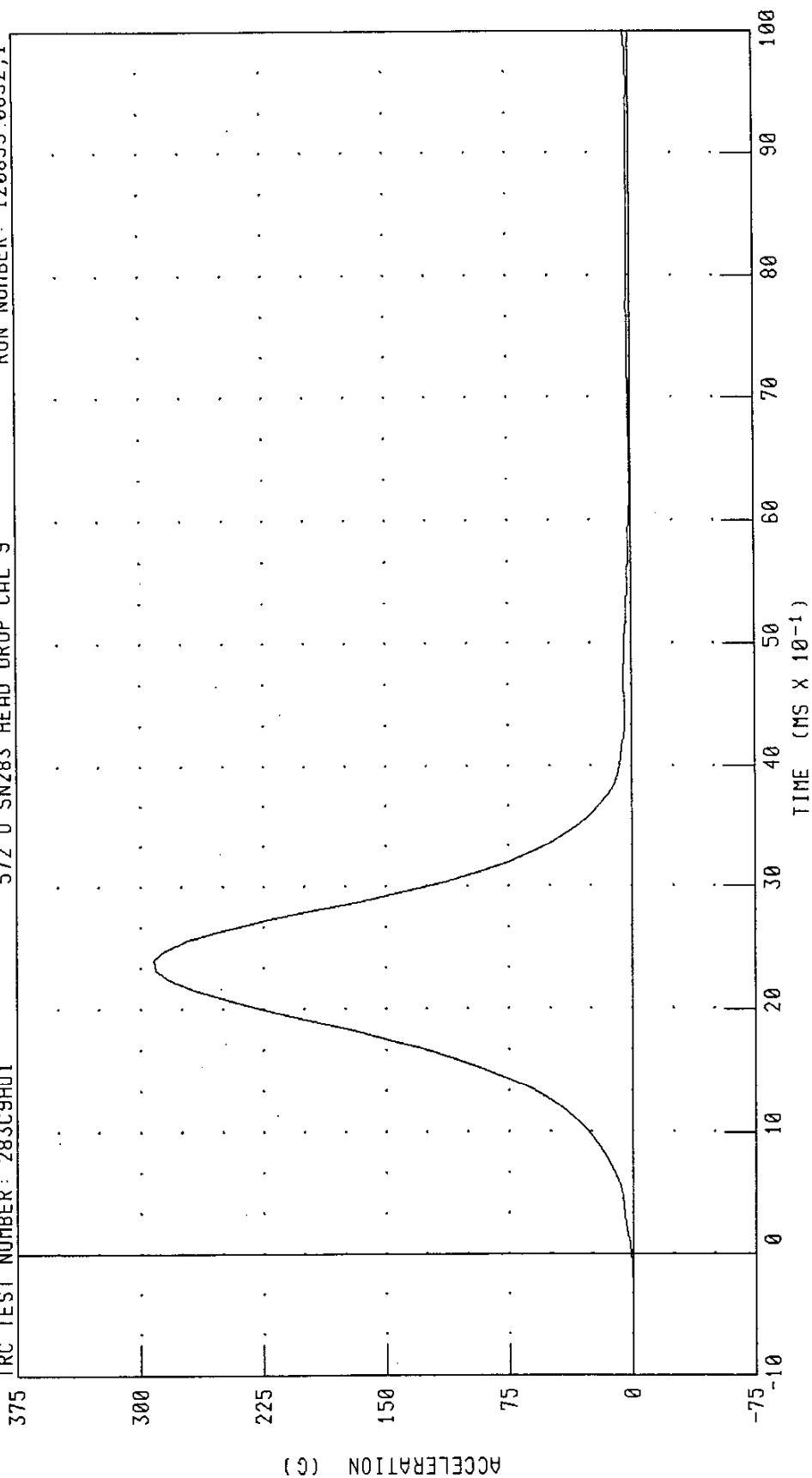
PART 572-0 HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572 0 SN283 HEAD DROP CAL 9

TRC TEST NUMBER: 283C9H01

RUN NUMBER: 120699.0832,1



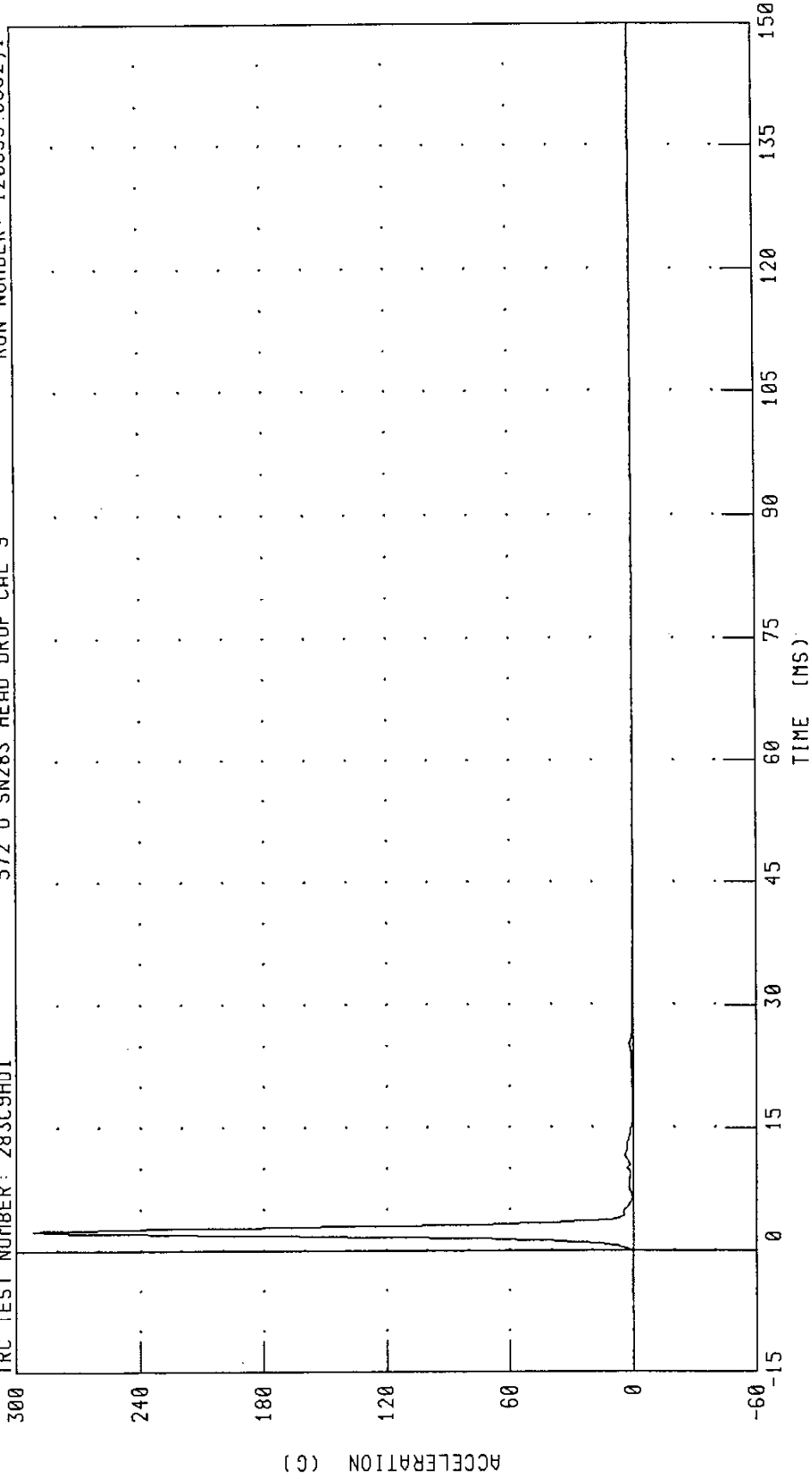
CHANNEL: HEDRG

FILTER: CH. CLASS 1000

PEAK DATA: 291.78 G @ 2.40 MS, 0.04 G @ -0.96 MS

PART 572-0 HYBRID III HEAD CALIBRATION
CHECK PLOT - HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 283C9HD1 572 0 SN283 HEAD DROP CAL 9 RUN NUMBER: 120699.0832;1



CHANNEL: HEDRC FILTER: CH. CLASS 1000 PEAK DATA: 291.78 G @ 2.40 MS; 0.04 G @ -14.96 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

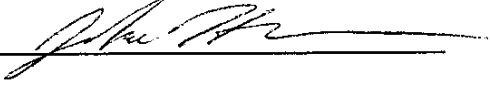
06-DEC-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 283C9NF3 572 0 SN283 NECK FLEX. CAL9

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
IMPACT VELOCITY	6.89 - 7.13 M/S	7.06 M/S
INTEGRATED PENDULUM VELOCITY	10 MS 2.1 - 2.5 M/S	2.10 M/S
	20 MS 4.0 - 5.0 M/S	4.07 M/S
	30 MS 5.8 - 7.0 M/S	5.97 M/S
PEAK D-PLANE ROTATION	80 - 92 DEG.	88.44 DEG.
PEAK MOMENT ABOUT OCCIPITAL CONDYLE DURING ROTATION INT	69 - 83 NM	73.10 NM
POSITIVE MOMENT DECAY TIME FROM TO / 10NM	80 - 100 MS	92.24 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 120699.1217;3

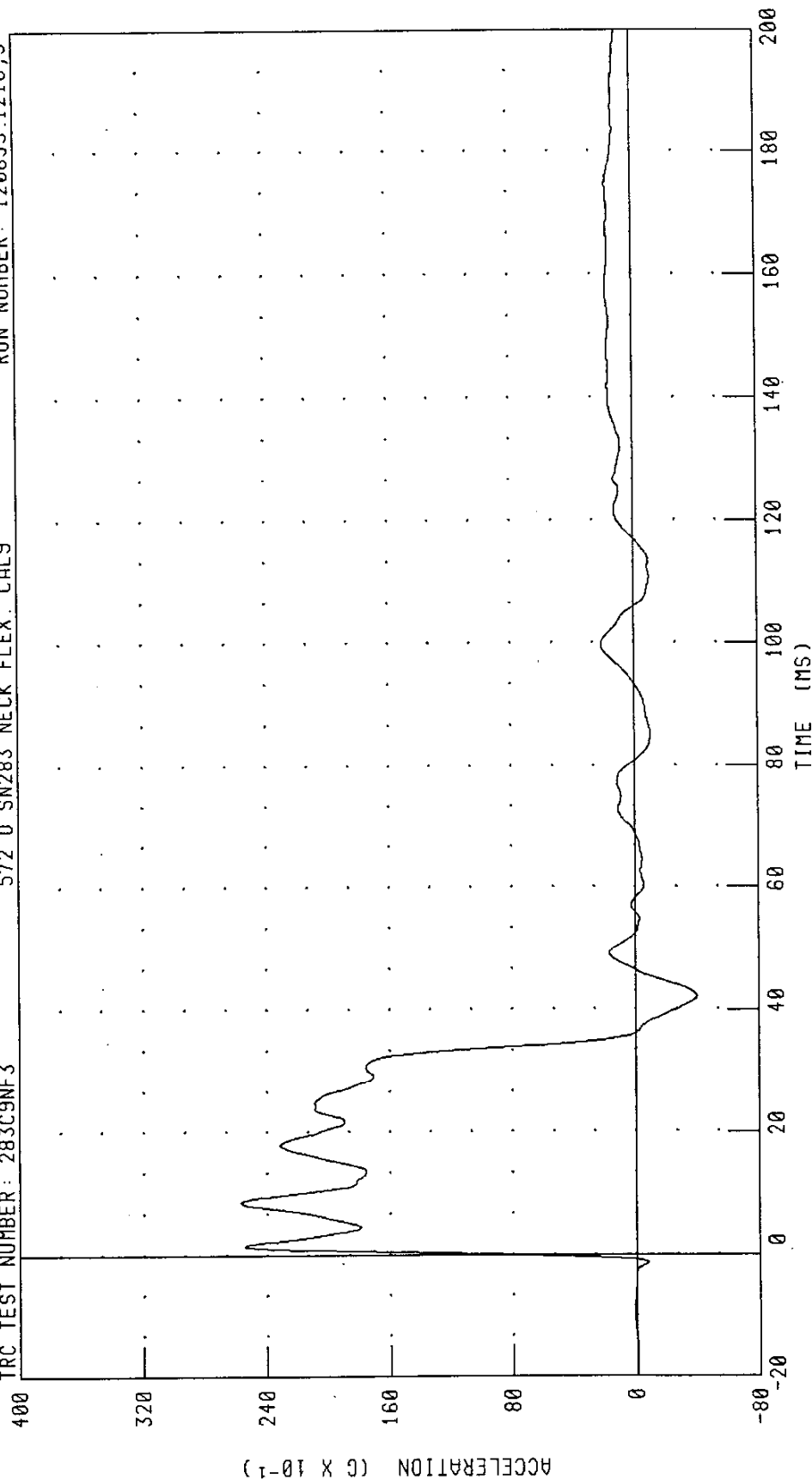
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 283C9NF3

572 0 SN283 NECK FLEX. CAL9

RUN NUMBER: 120699.1218,3



CHANNEL: PENXC FILTER: CH. CLASS 180 PEAK DATA: 25.71 G @ 8.56 MS; -3.98 G @ 42.08 MS

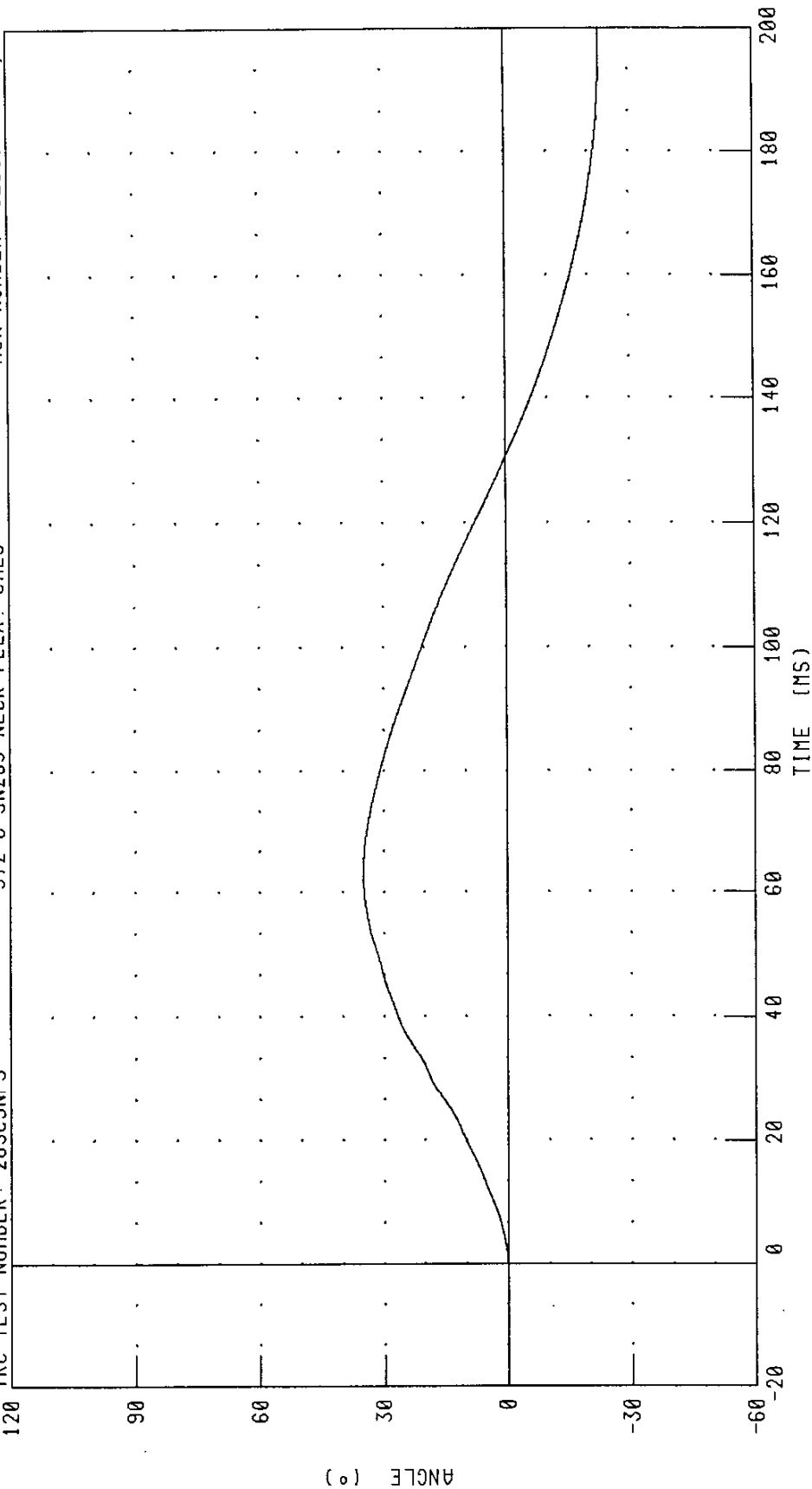
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 283C9NF3

572 0 SN283 NECK FLEX. CAL9

RUN NUMBER: 120699.1218;3



PEAK DATA: 34.92 ° @ 63.04 MS; -22.98 ° @ 199.68 MS

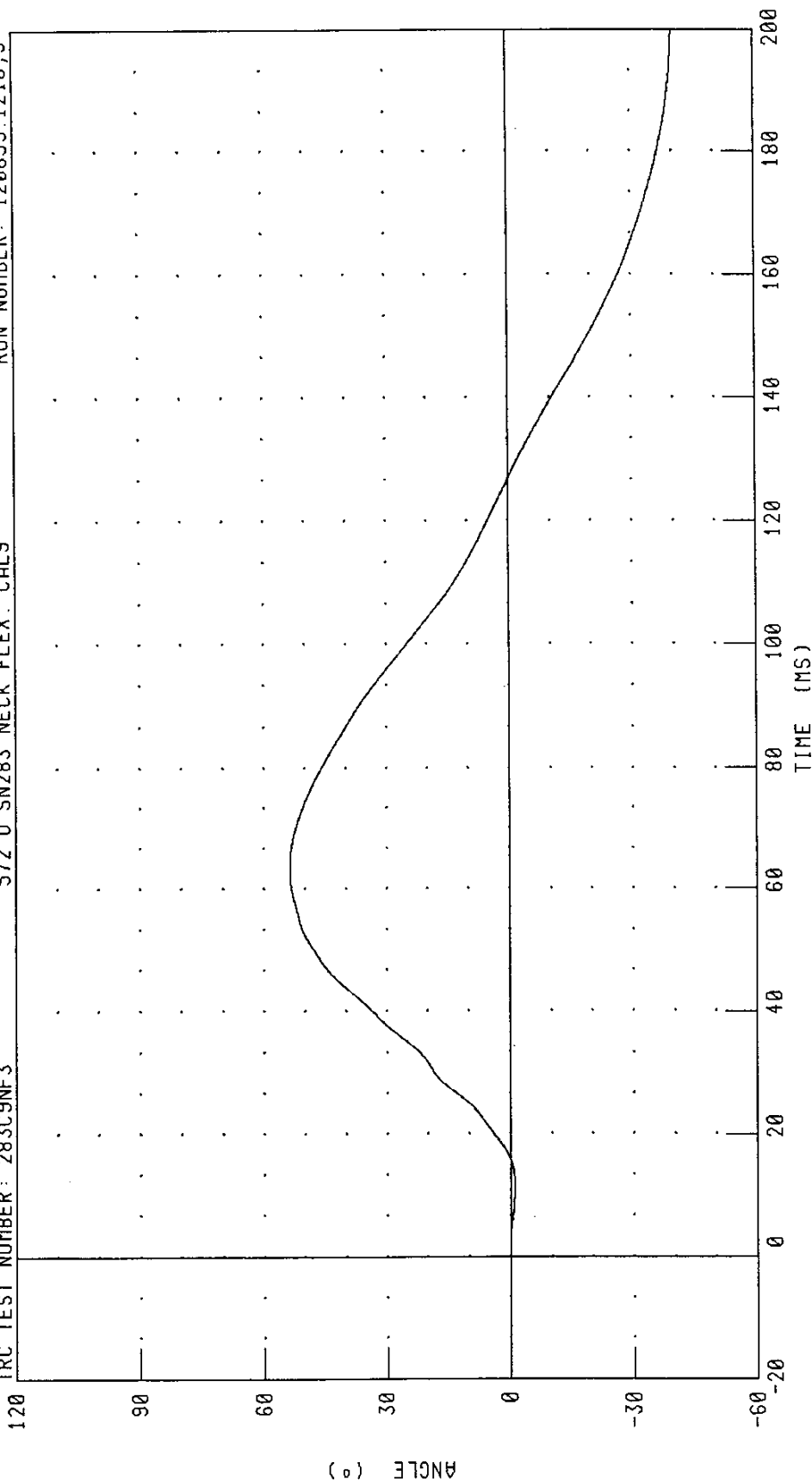
CHANNEL: BETA FILTER: CH. CLASS 60

PART 572-0 HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

RUN NUMBER: 120699.1218;3

TRC TEST NUMBER: 283C9NF3

572 0 SN283 NECK FLEX. CAL9



PEAK DATA: 53.53 ° @ 63.68 MS; -40.13 ° @ 200.00 MS

CHANNEL: THETA FILTER: CH. CLASS 60

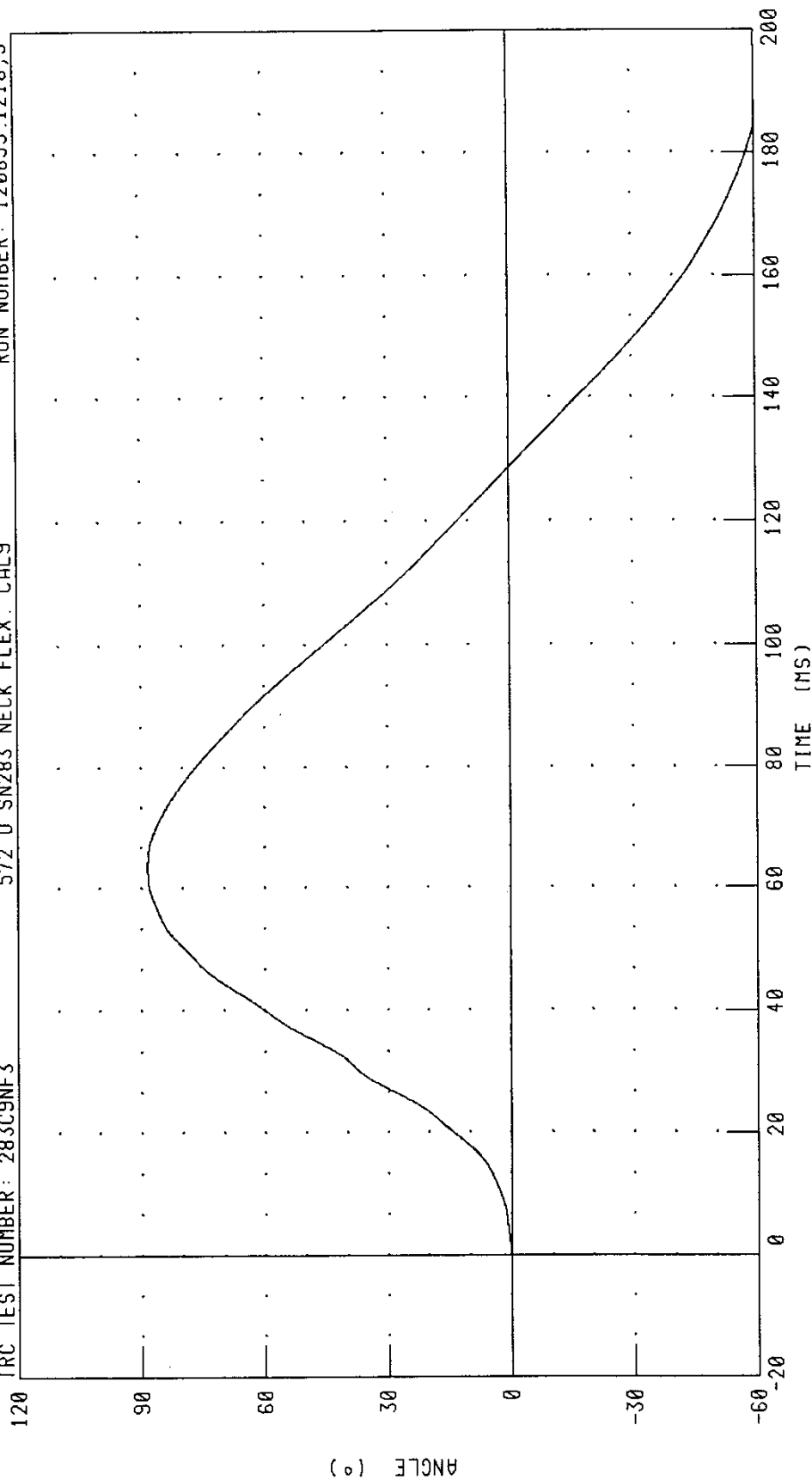
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 283C9NF3

572 0 SN283 NECK FLEX. CAL9

RUN NUMBER: 120699.1218;3



CHANNEL: TOTAN

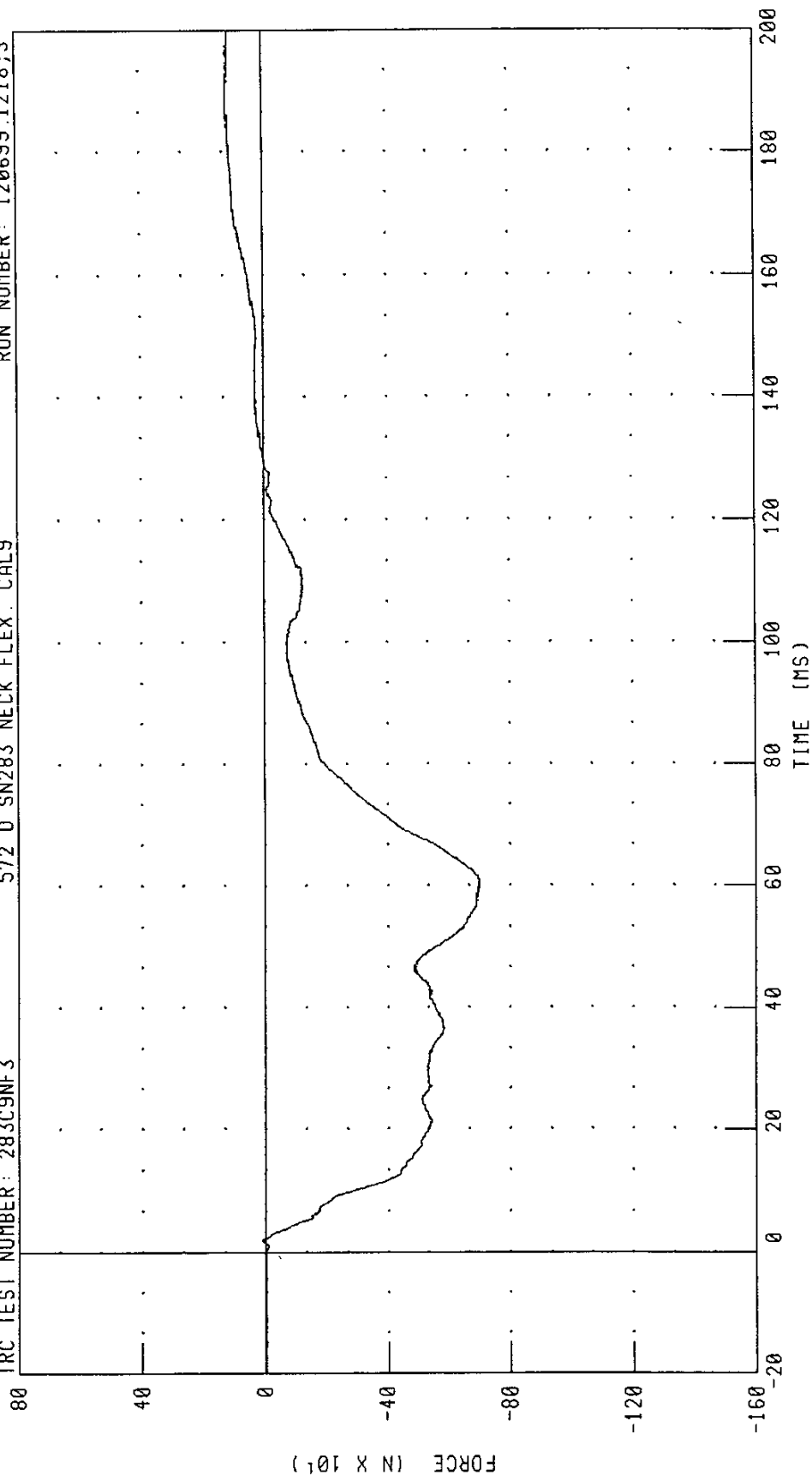
FILTER: CH. CLASS 60

PEAK DATA: 88.45 ° @ 63.44 MS, -63.12 ° @ 200.00 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

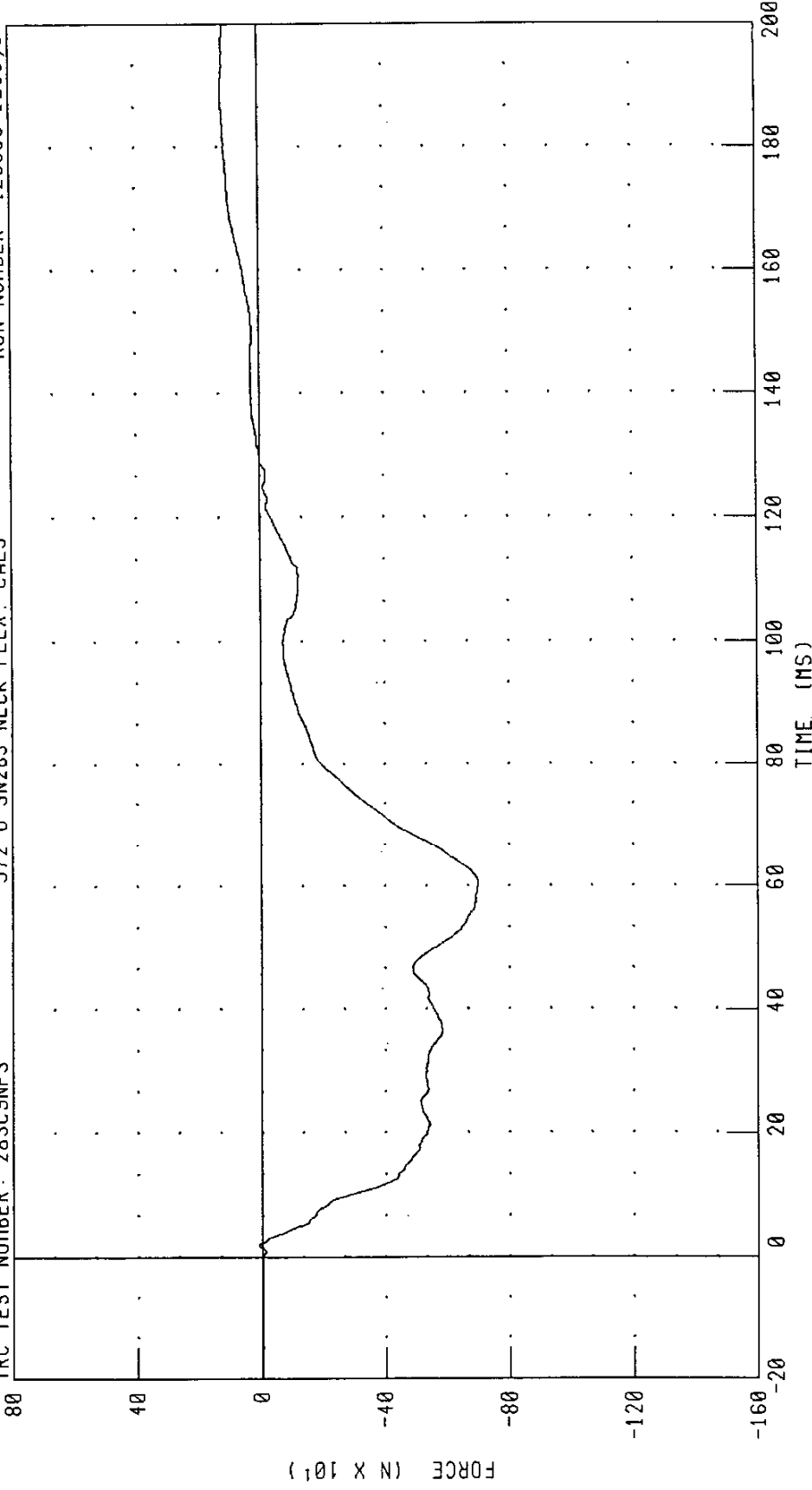
TRC TEST NUMBER: 283C9NF3 572 0 SN283 NECK FLEX. CAL9 RUN NUMBER: 120699.1218,3



CHANNEL: NEKXF FILTER: CH. CLASS 1000 PEAK DATA: 118.82 N @ 184.00 MS, -698.65 N @ 59.12 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 283C9NF3 572 0 SN283 NECK FLEX. CAL9 RUN NUMBER: 120699 1218;3



CHANNEL: NEKXFC FILTER: CH. CLASS 600 PEAK DATA: 118.92 N @ 191.12 MS; -698.80 N @ 60.72 MS

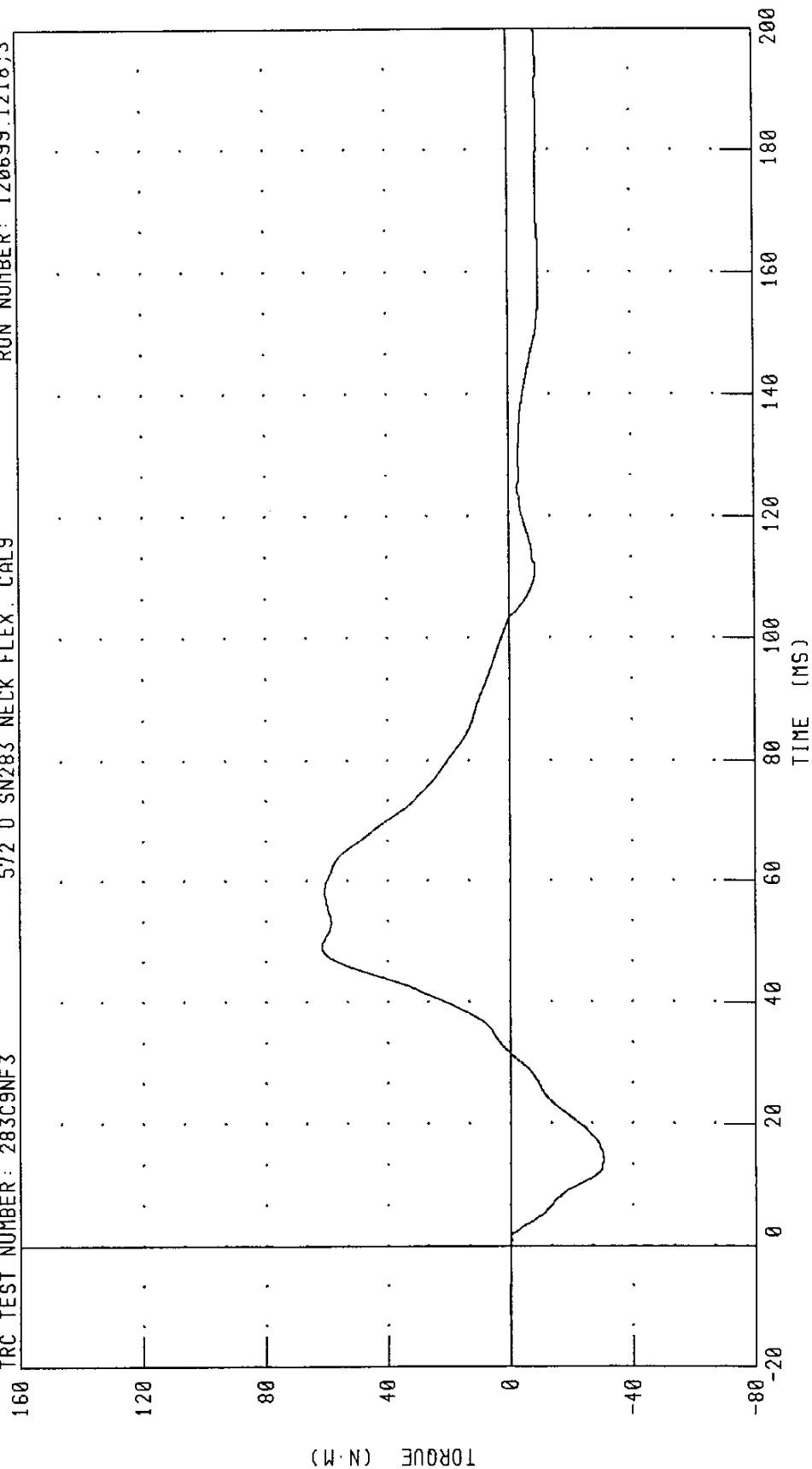
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 283C9NF3

572 0 SN283 NECK FLEX. CAL9

RUN NUMBER: 120699.1218.3



CHANNEL: NEKYM FILTER: CH. CLASS 600

PEAK DATA: 61.63 N·M @ 49.20 MS; -30.46 N·M @ 14.08 MS

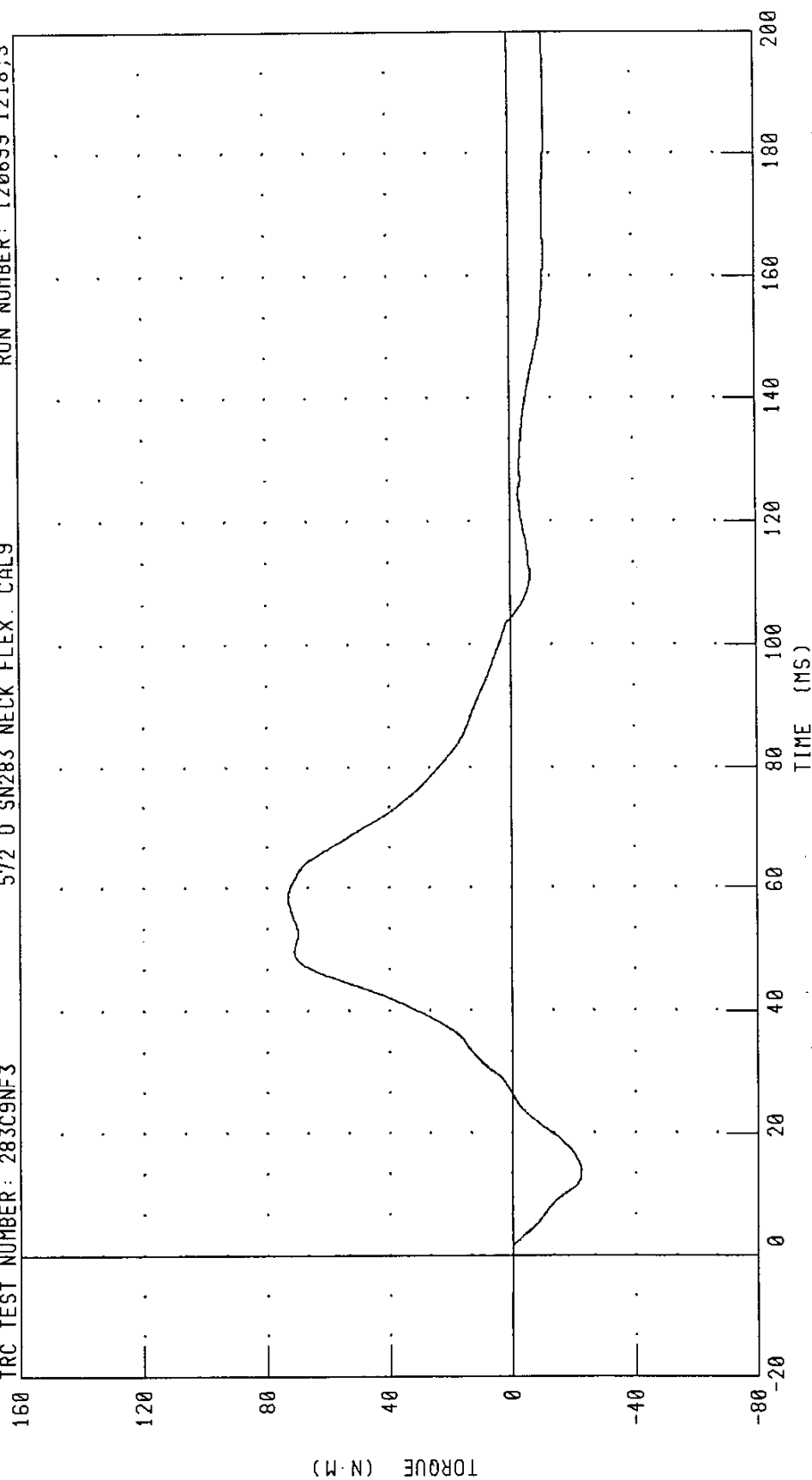
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

RUN NUMBER: 120699 1218,3

TRC TEST NUMBER: 283C9NF3

572 0 SN283 NECK FLEX. CAL9



PEAK DATA: 73.10 N·M @ 58.32 MS; -22.31 N·M @ 14.00 MS

CHANNEL: NEKOM FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

06-DEC-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 283C9NE3 572 0 SN283 NECK EXT. CAL 9

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
INTEGRATED PENDULUM VELOCITY	10 MS	1.5 - 1.9 M/S	1.65 M/S
	20 MS	3.1 - 3.9 M/S	3.31 M/S
	30 MS	4.6 - 5.6 M/S	4.86 M/S
PEAK D-PLANE ROTATION		97 - 109 DEG.	112.69 DEG. *
PEAK MOMENT ABOUT OCCIPITAL CONDYLE DURING ROTATION INT		-55 / -69 NM	-66.96 NM
NEGATIVE MOMENT DECAY TIME FROM TO / -10 NM		94 - 114 MS	105.68 MS

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 120699.1341;1

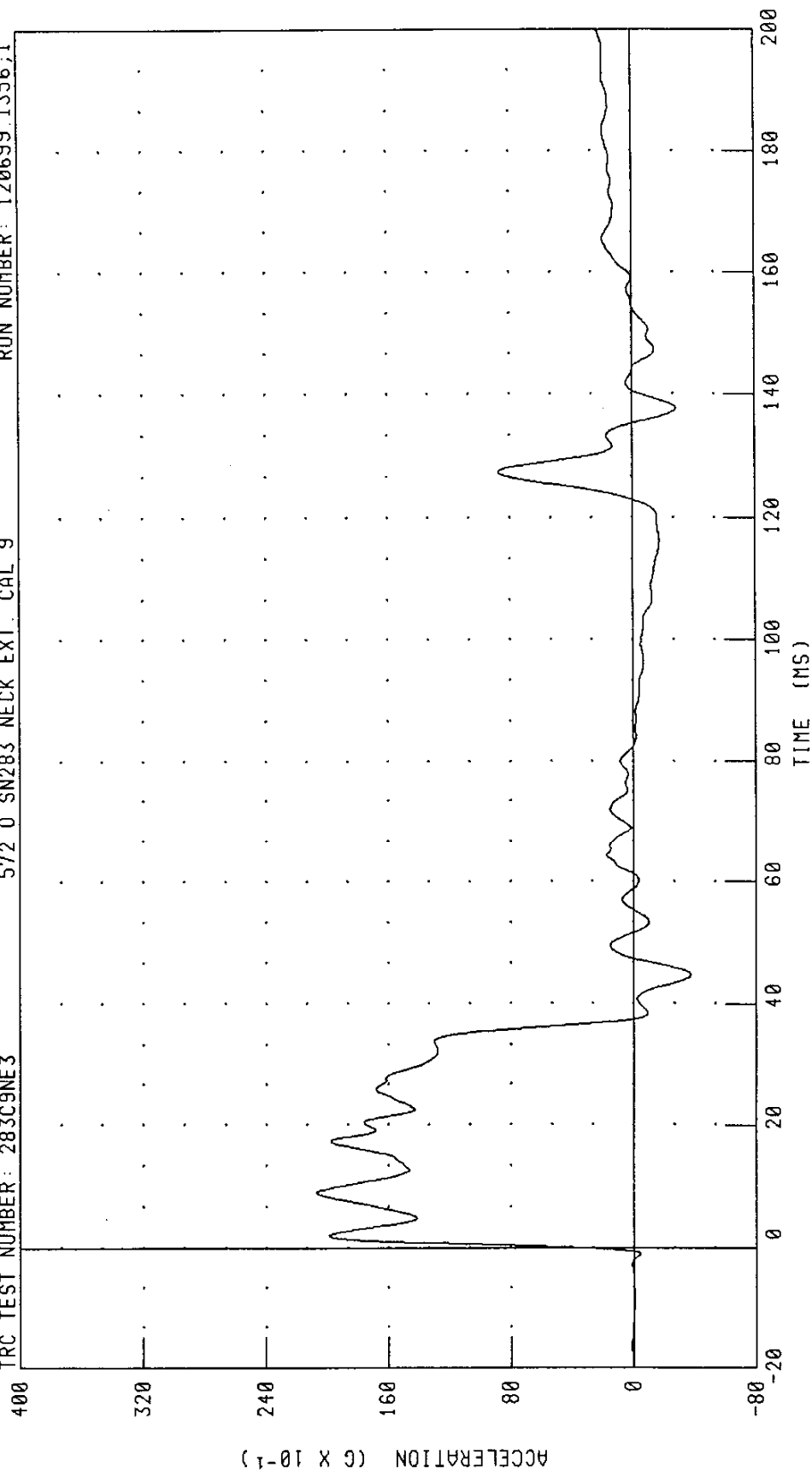
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 283C9NE3

572 0 SN283 NECK EXT. CAL 9

RUN NUMBER: 120699.1356;1



CHANNEL: PENXG FILTER: CH. CLASS 180

PEAK DATA: 20.70 G @ 9.04 MS; -3.71 G @ 44.72 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572 0 SN283 NECK EXT. CAL 9

TRC TEST NUMBER: 283C9NE3

120

90

60

30

0

-30

-60

ANGLE (°)

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

PEAK DATA: 38.82 ° @ 75.60 MS; -11.83 ° @ 200.00 MS

CHANNEL: BETA

FILTER: CH. CLASS 60

RUN NUMBER: 120699.1356,1

120

90

60

30

0

-30

-60

ANGLE (°)

0

20

40

60

80

100

120

140

160

180

200

TIME (MS)

PEAK DATA: 38.82 ° @ 75.60 MS; -11.83 ° @ 200.00 MS

CHANNEL: BETA

FILTER: CH. CLASS 60

RUN NUMBER: 120699.1356,1

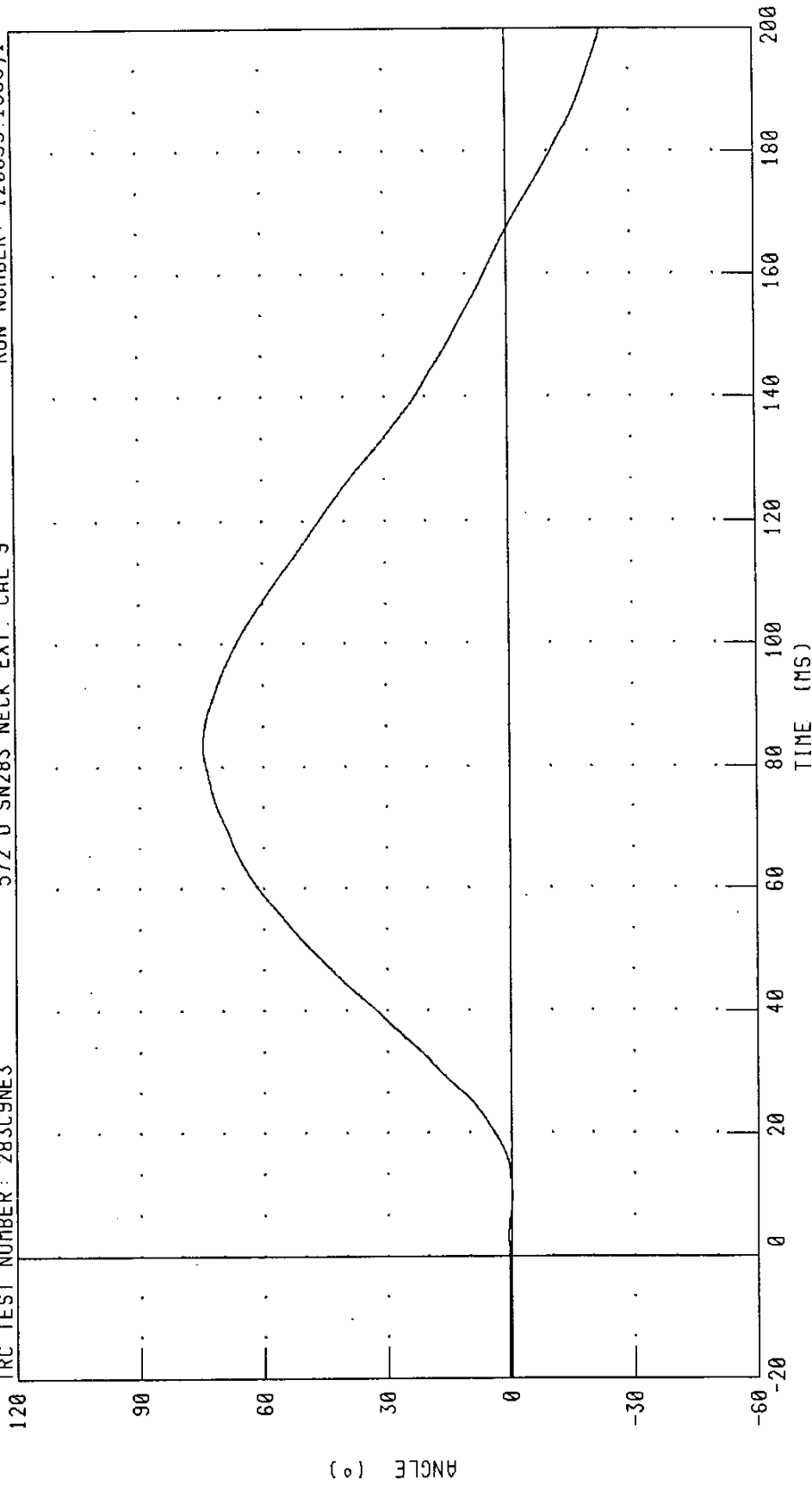
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

RUN NUMBER: 120699.1356;1

TRC TEST NUMBER: 283C9NE3

572 0 SN283 NECK EXT. CAL 9



CHANNEL: THETA FILTER: CH. CLASS 60

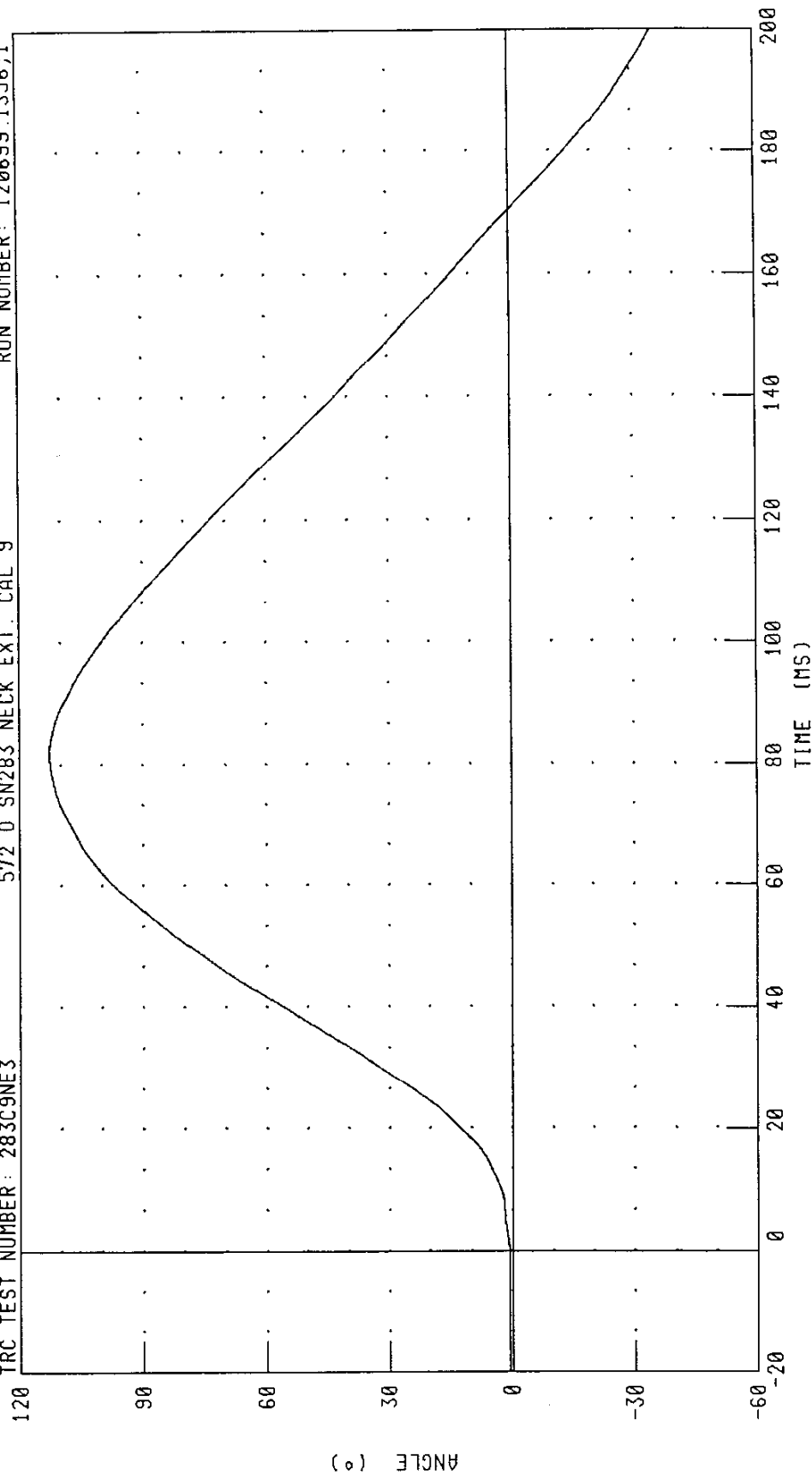
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 283C9NE3

572 0 SN283 NECK EXT. CAL 9

RUN NUMBER: 120699.1356.1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 112.69 ° @ 81.92 MS; -35.00 ° @ 200.00 MS

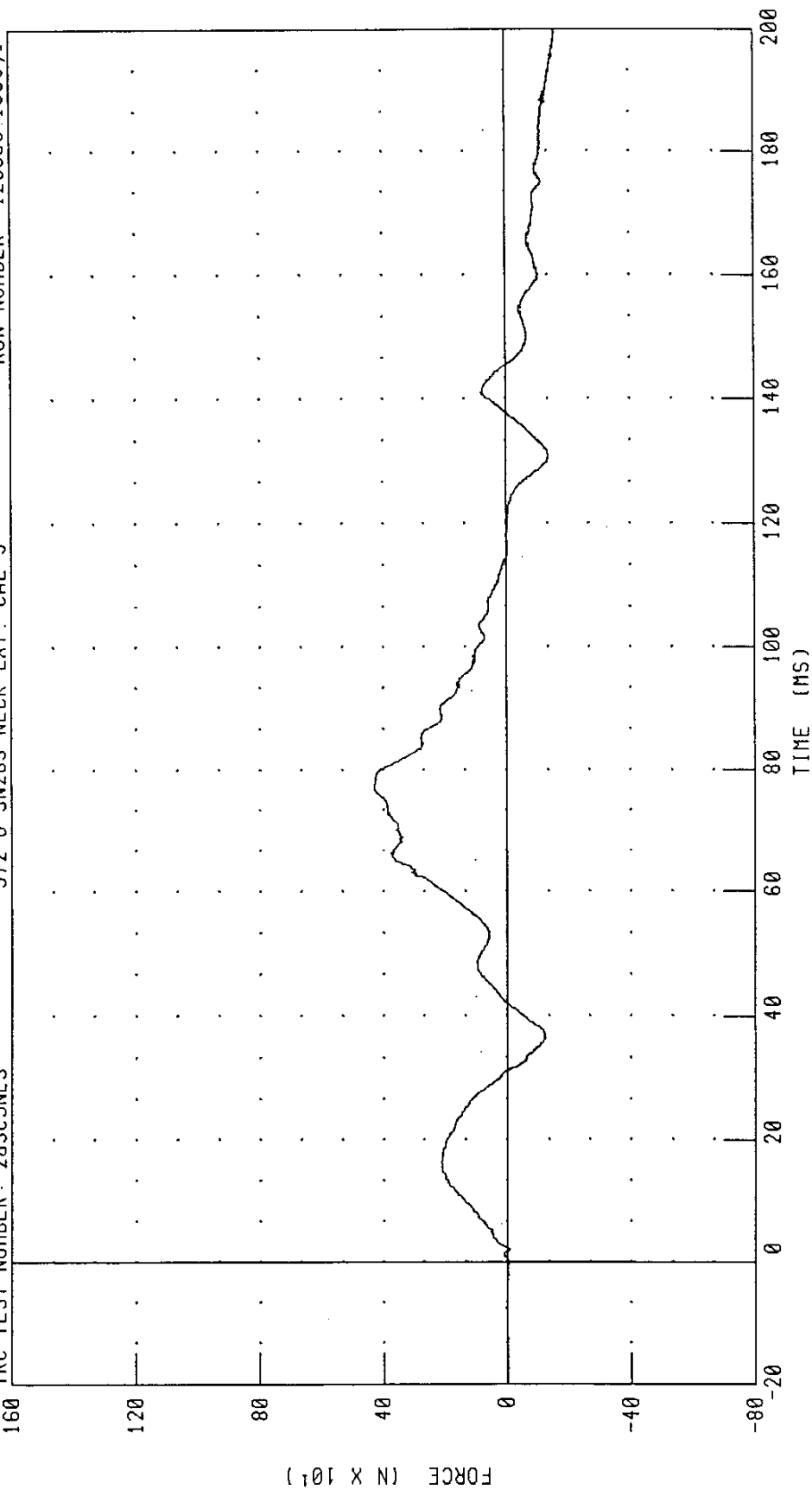
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 283C9NE3

572 0 SN283 NECK EXT. CAL 9

RUN NUMBER: 120699.1356;1



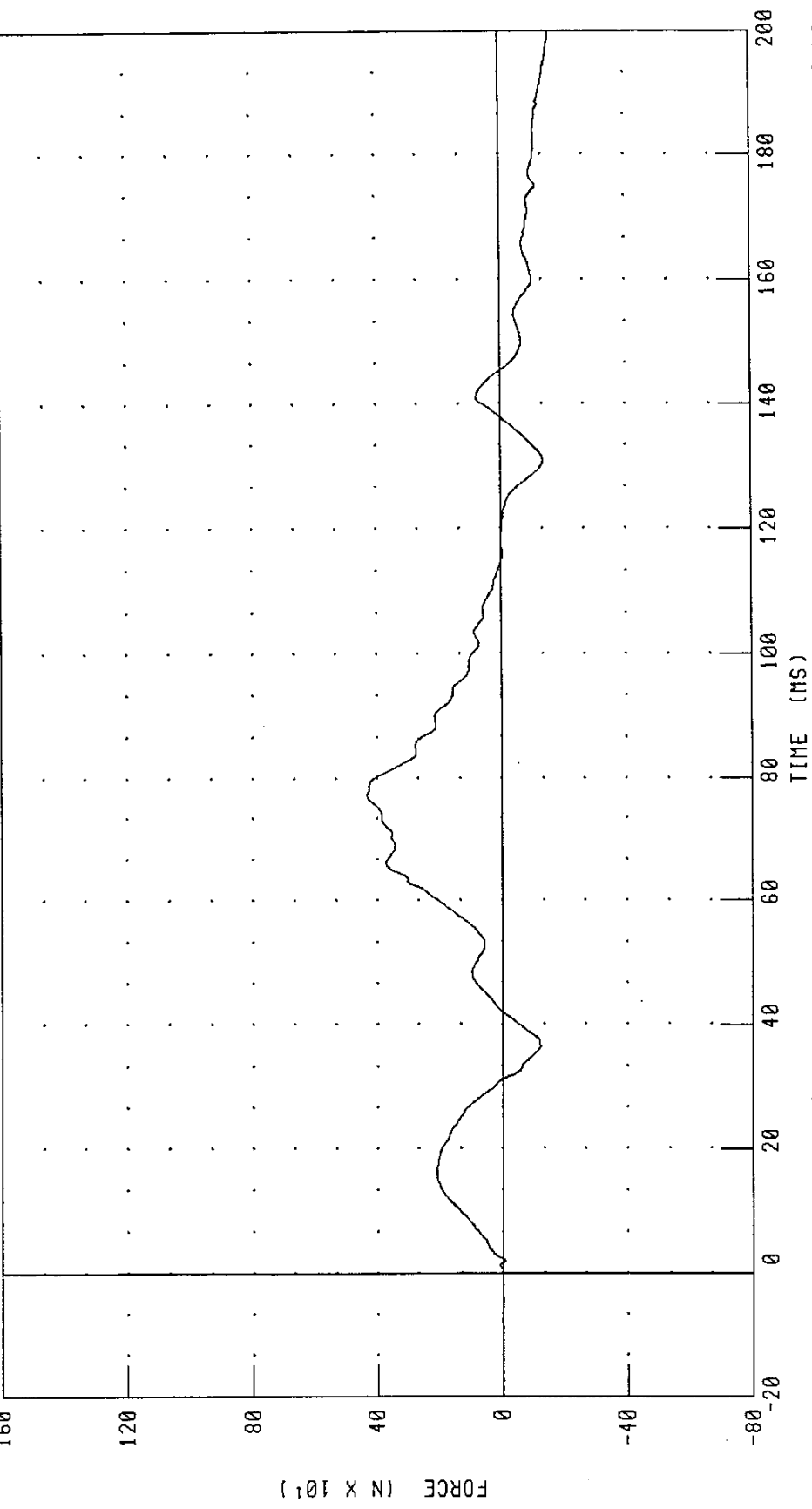
CHANNEL: NEKXF

FILTER: CH. CLASS 1000

PEAK DATA: 430.65 N @ 76.72 MS; -163.87 N @ 199.44 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 283C9NE3 572 0 SN283 NECK EXT. CAL 9 RUN NUMBER: 120699.1356.1



CHANNEL: NEKXFC FILTER: CH. CLASS 600 PEAK DATA: 430.93 N @ 77.12 MS; -161.58 N @ 200.00 MS

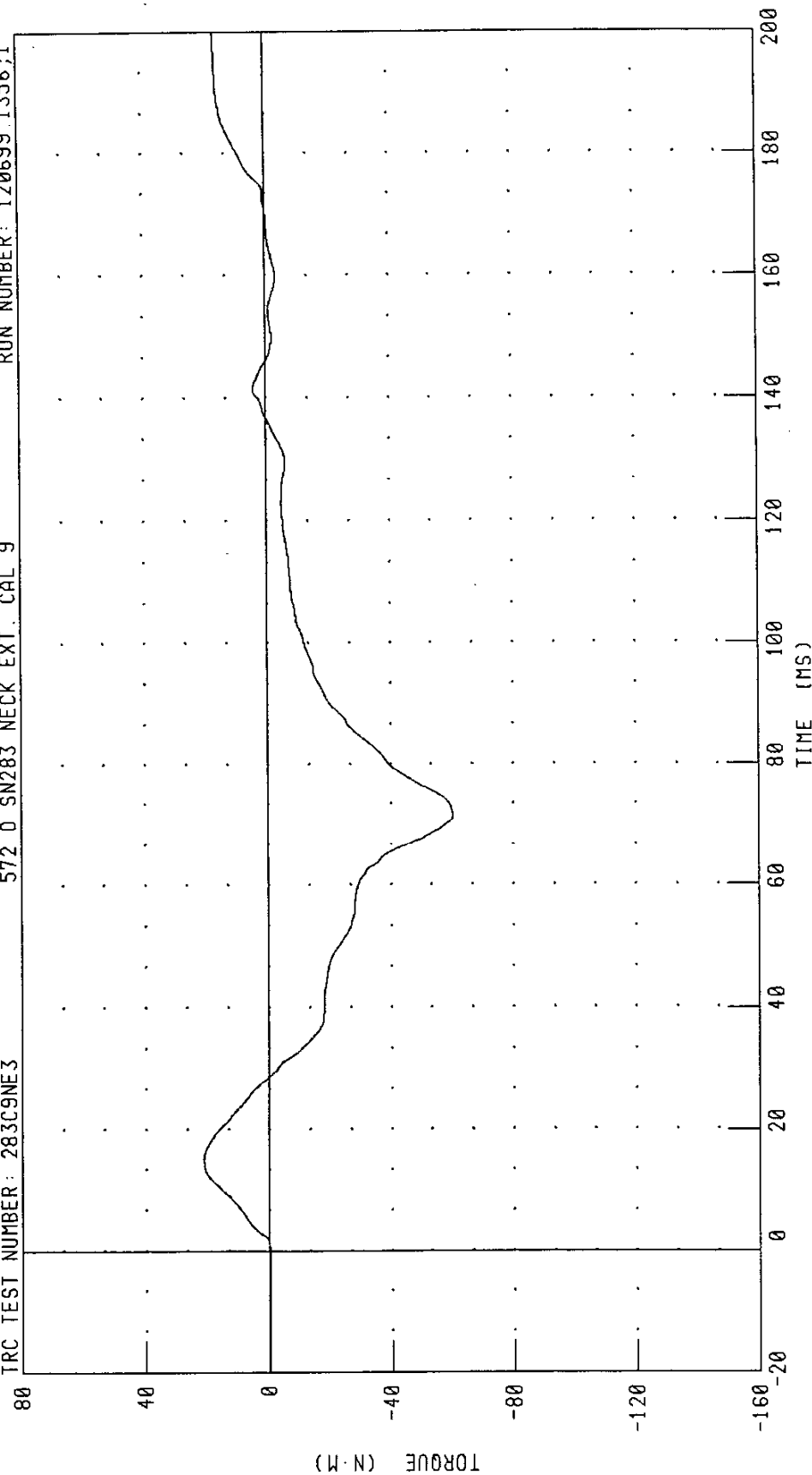
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 283C9NE3

572 0 SN283 NECK EXT. CAL 9

RUN NUMBER: 120699.1356;1



PEAK DATA: 21.34 N·M @ 14.96 MS; -60.55 N·M @ 71.44 MS

CHANNEL: NEKYM FILTER: CH. CLASS 600

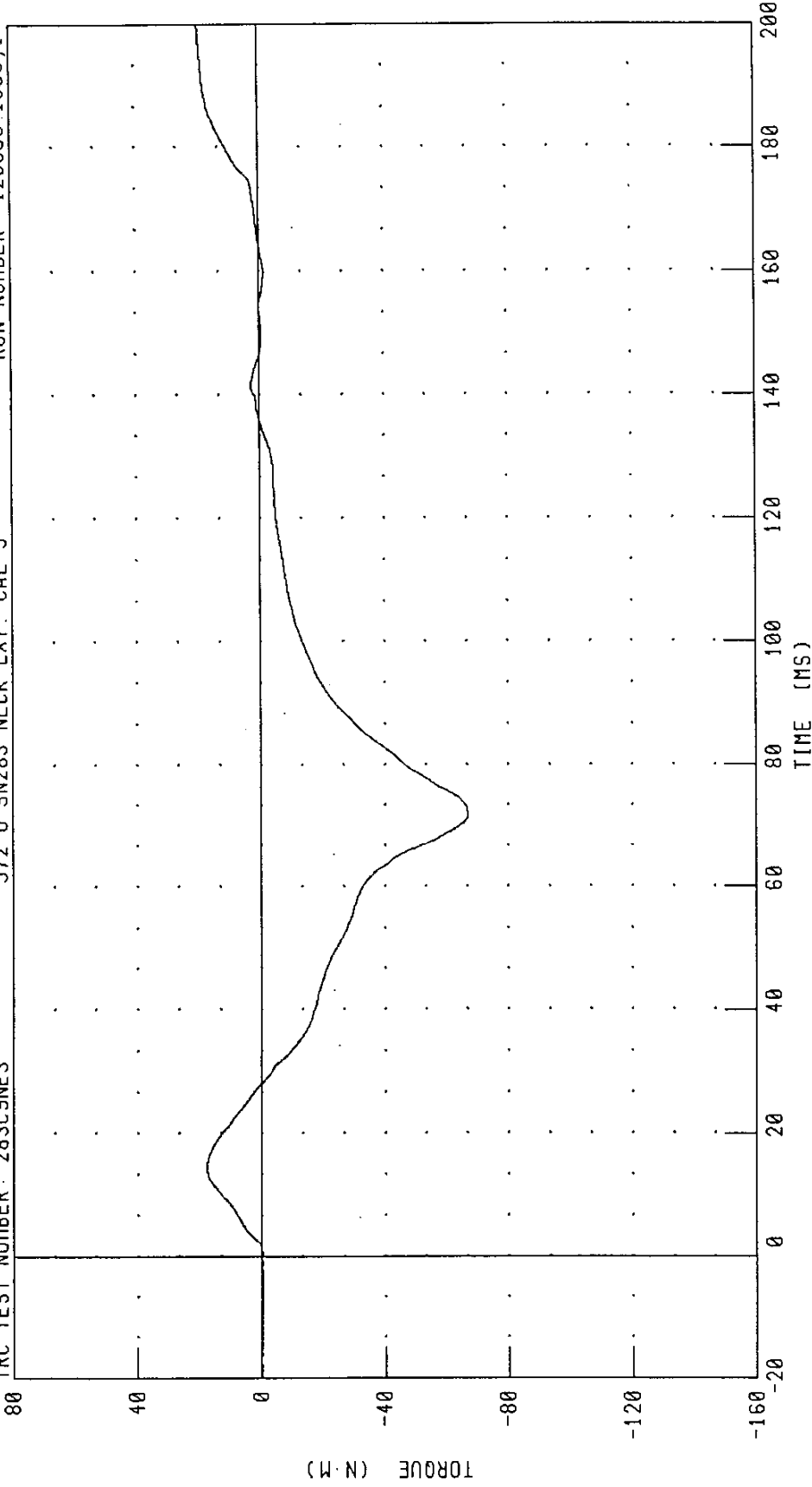
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 283C9NE3

572 0 SN283 NECK EXT. CAL 9

RUN NUMBER: 120699.1356;1



CHANNEL: NEKOM FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE

07-DEC-99

TRC INC.

TEST NO: 283C9TH2

572 0 SN283 THORAX CAL9

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	48 - 55 MM	49.1 MM
MAXIMUM RESISTIVE FORCE WITHIN DEFLECTION CORRIDOR	3900 - 4400 N	4472. N *
INTERNAL HYSTERESIS	69% - 85%	74.6%

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN



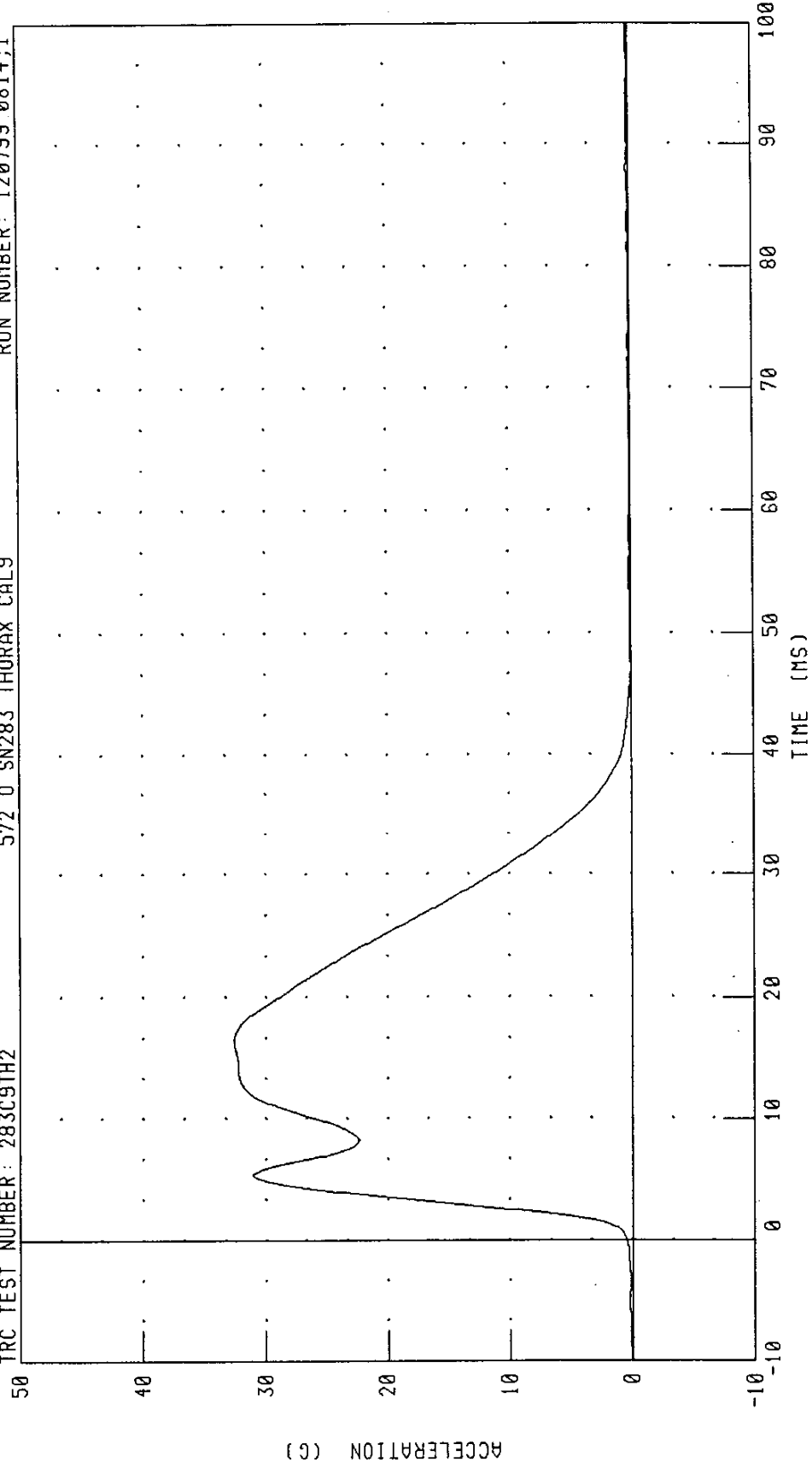
RUN NUMBER: 120799.0720;1

PART 572-0 HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 283C9TH2

572 0 SN283 THORAX CAL9

RUN NUMBER: 120799 0814;1



CHANNEL: PENXC FILTER: CH. CLASS 180

PEAK DATA: 32.59 G @ 16.40 MS; 0.02 G @ 47.20 MS

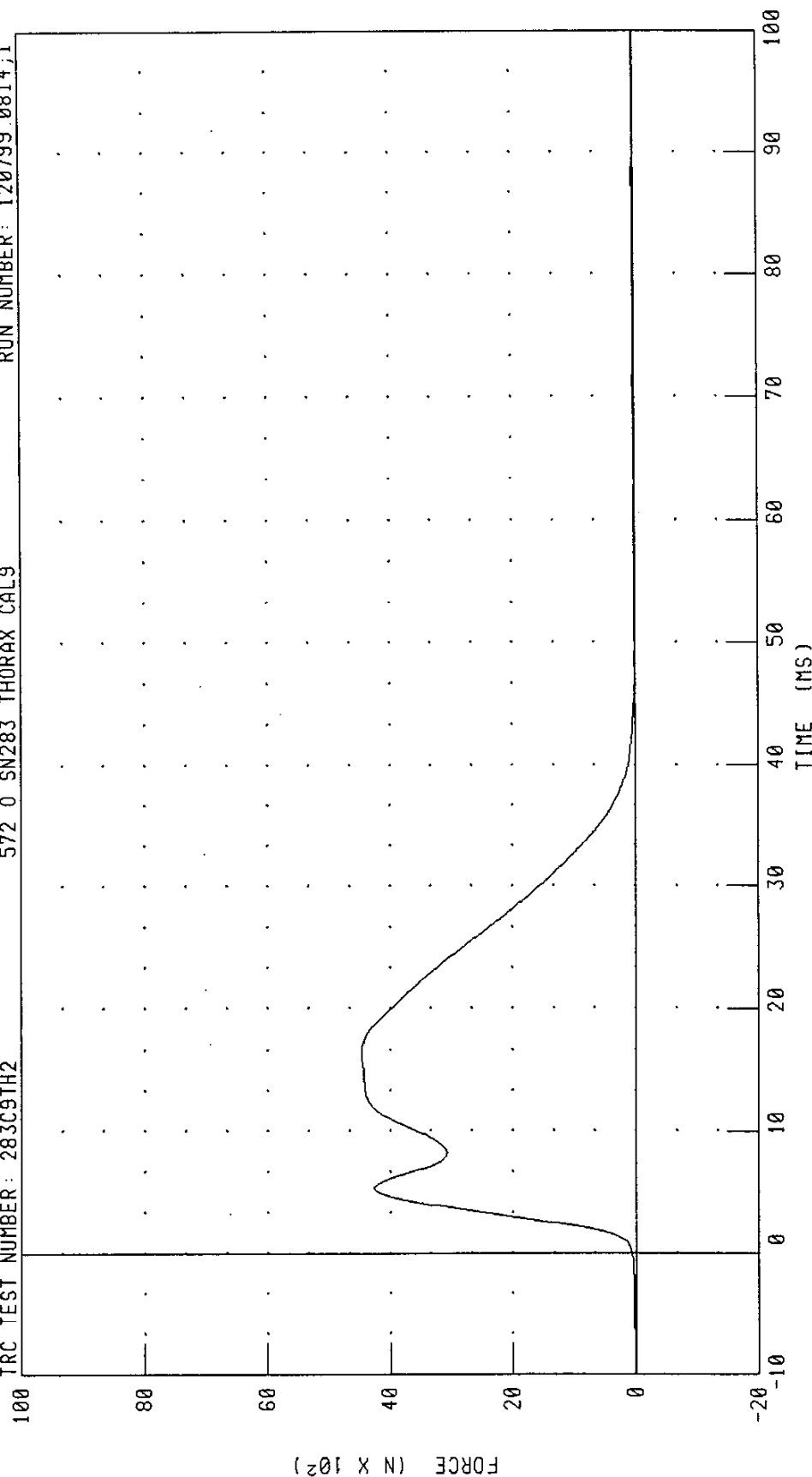
PART 572-0 HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 283C9TH2

572 0 SN283 THORAX CAL9

RUN NUMBER: 120799 0814;1



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 4472.48 N @ 16.40 MS; 2.39 N @ 47.20 MS

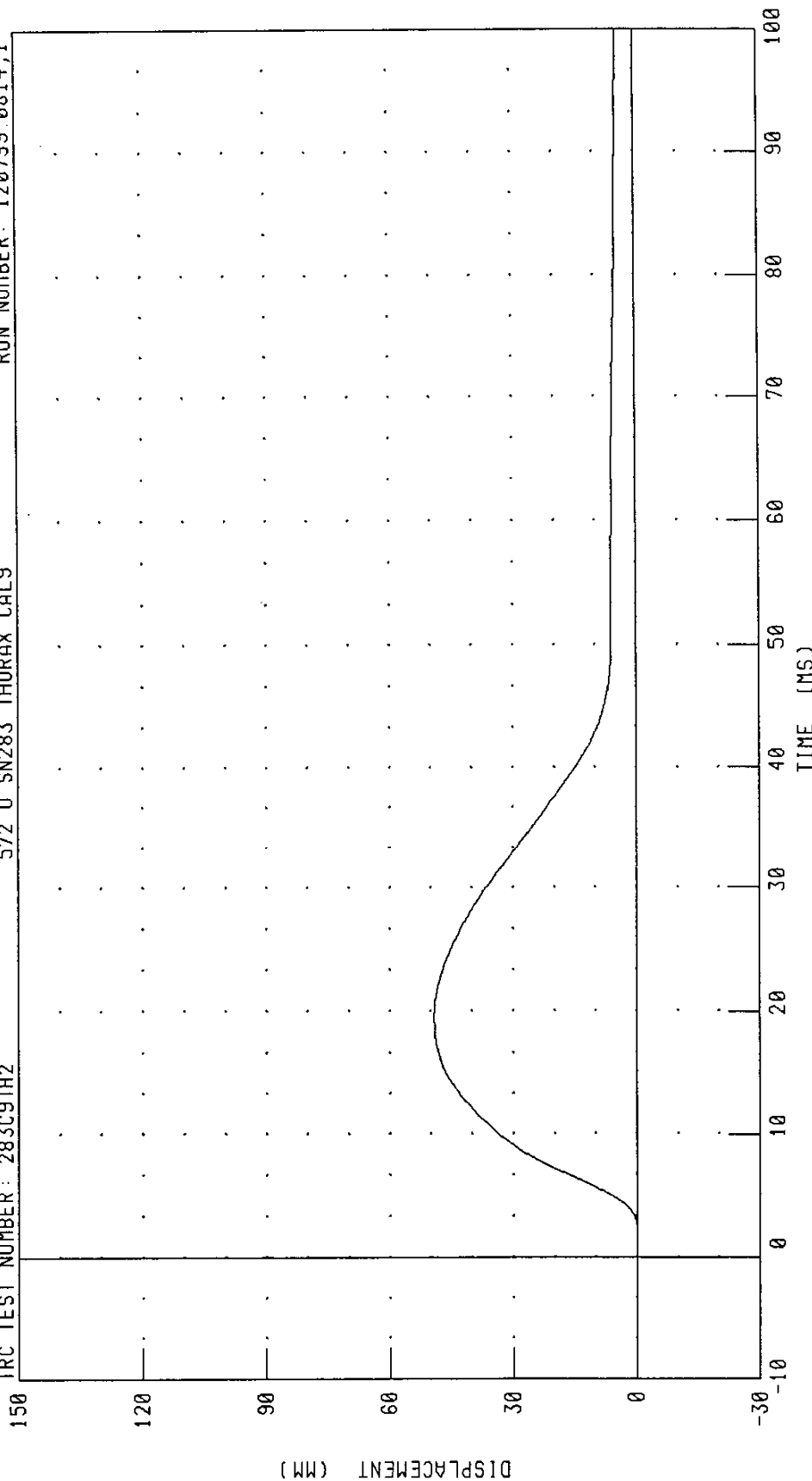
PART 572-0 HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 283C9TH2

572 0 SN283 THORAX CAL9

RUN NUMBER: 120799.0814;1



CHANNEL: CSTXD FILTER: CH. CLASS 600

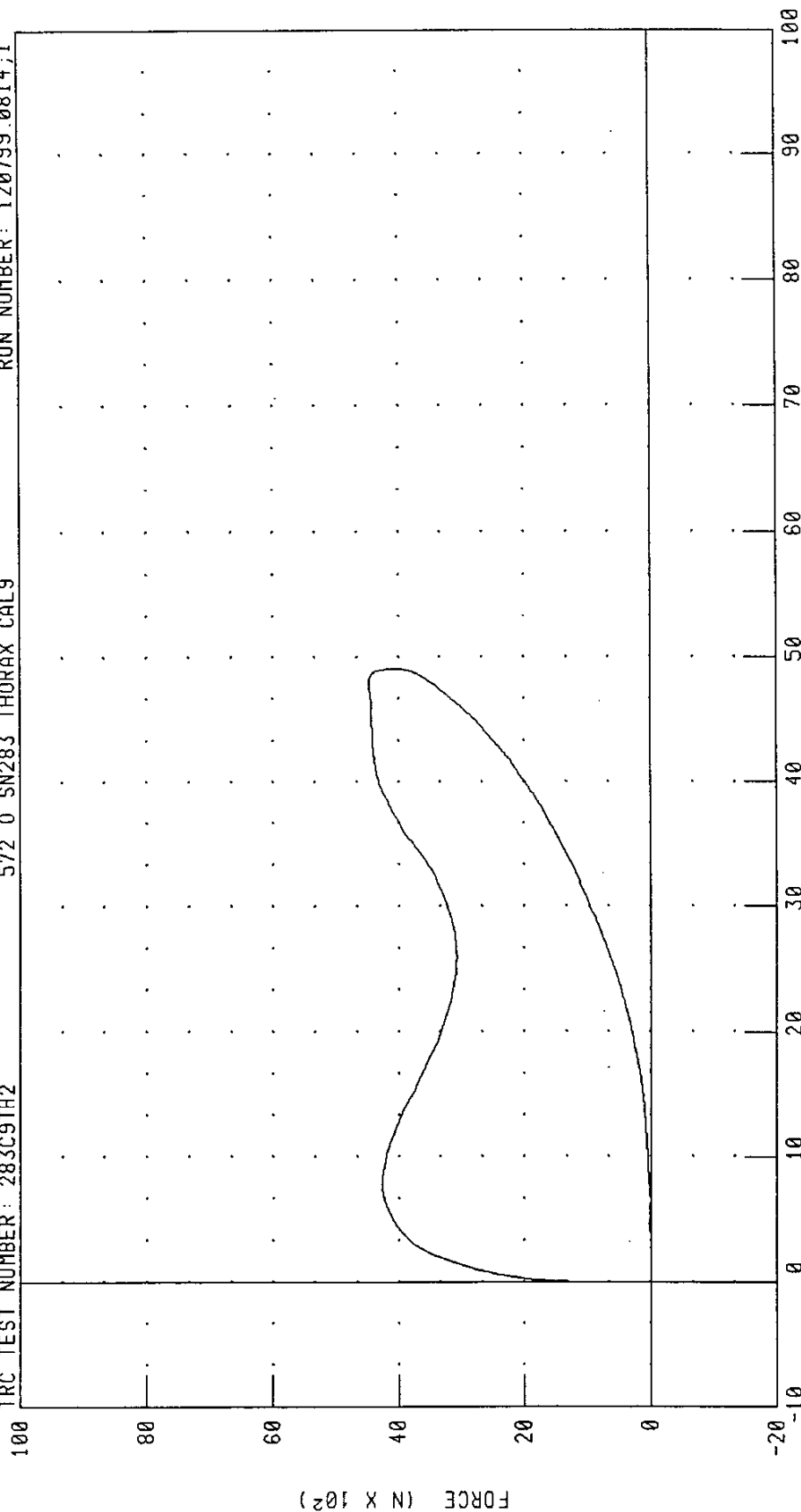
PEAK DATA: 49.11 MM @ 19.44 MS; -0.01 MM @ -6.72 MS

PART 572-0 HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER: 283C9TH2

572 0 SN283 THORAX CAL9

RUN NUMBER: 120799.0814,1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 600
CH. CLASS 180

DISPLACEMENT (MM)

PEAK DATA: 49.11 MM @ 19.44 MS; -0.01 MM @ -6.72 MS
4472.48 N @ 16.40 MS; 2.39 N @ 47.20 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

06-DEC-99

TRC INC.

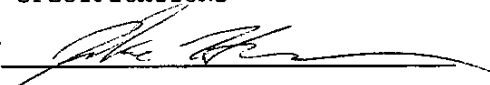
TEST NO: 283C9RK2

572 0 SN283 R.KNEE CAL9

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3360 - 4080 N	3451.8 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



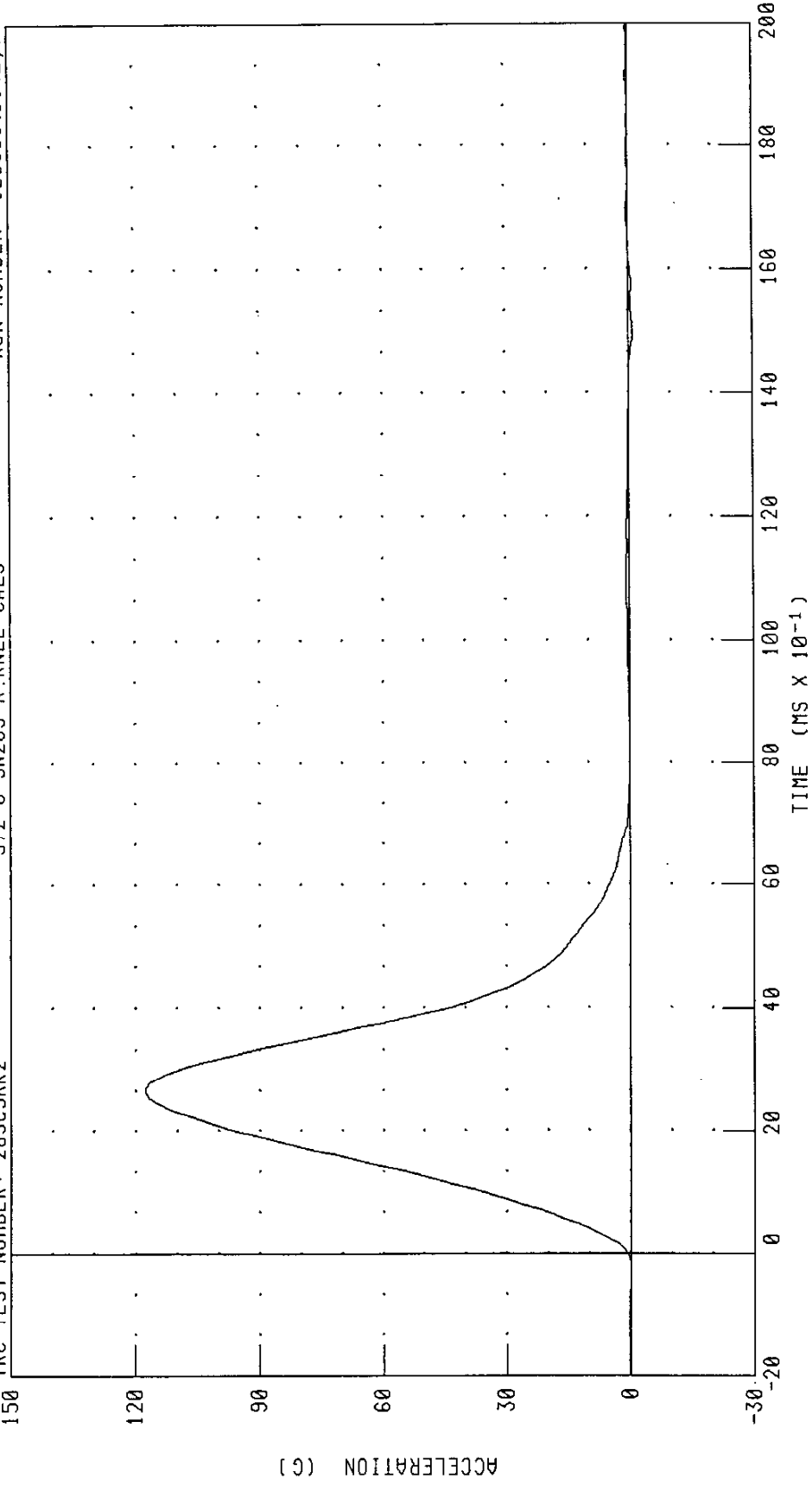
RUN NUMBER: 120699.0942;1

PART 572-0 HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 283C9RK2

572 0 SN283 R.KNEE CAL9

RUN NUMBER: 120699.0942;1



CHANNEL: PENXC

FILTER: CH. CLASS 600

PEAK DATA: 117.58 G @ 2.64 MS;

-1.10 G @ 15.04 MS

PART 572-0 HYBRID III RIGHT KNEE CALIBRATION

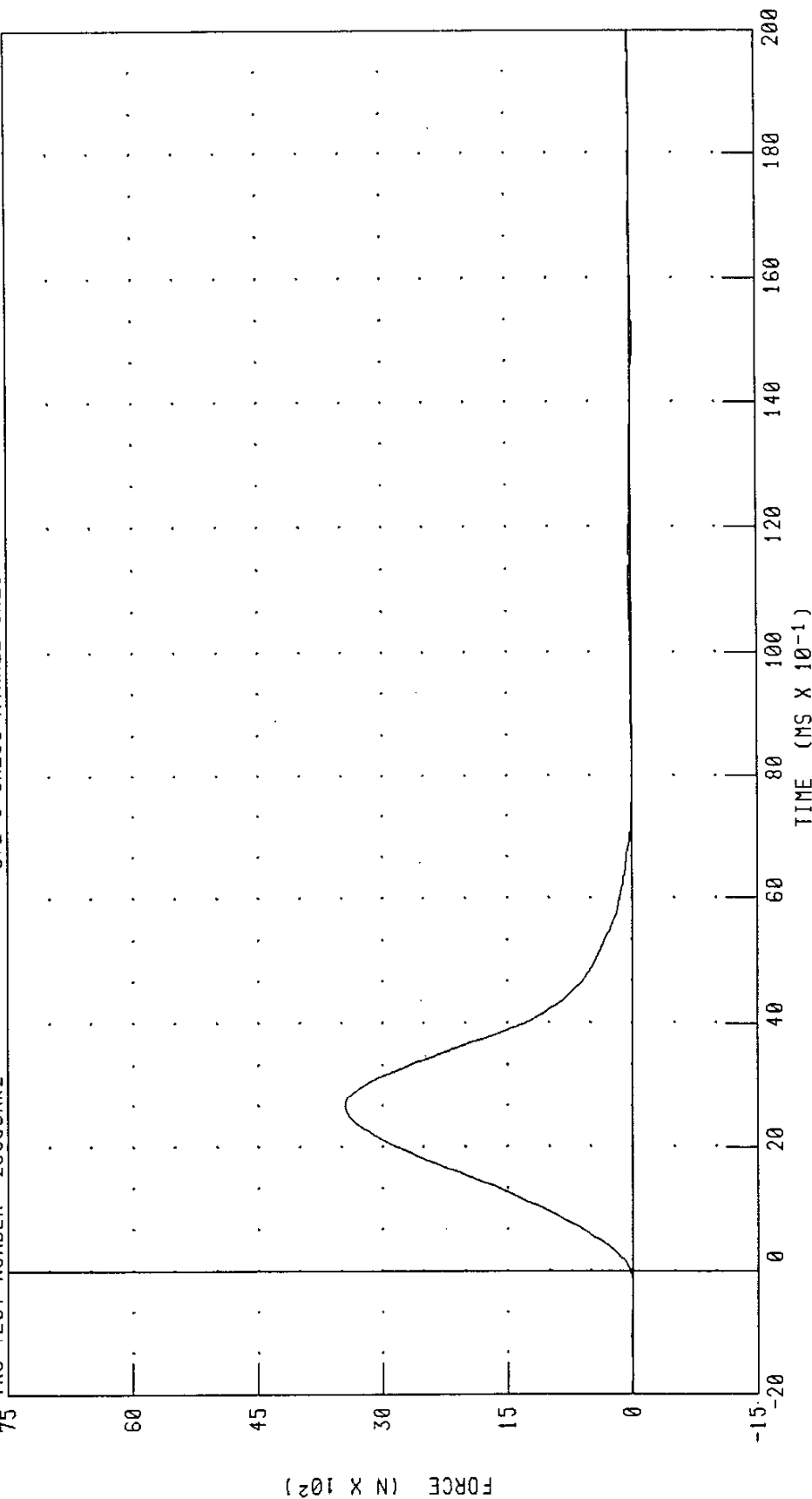
PENDULUM FORCE (5 KG PEND.)

572 0 SN283 R.KNEE CAL9

TRC TEST NUMBER: 283C9RK2

75

RUN NUMBER: 120699.0942;1



CHANNEL: PENXF

FILTER: CH. CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA: 3451.89 N @ 2.64 MS; -32.16 N @ 15.04 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

06-DEC-99

TRC INC.

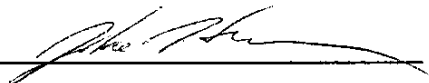
TEST NO: 283C9LK1

572 O SN283 LEFT KNEE CAL9

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.09 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3360 - 4080 N	3765.7 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



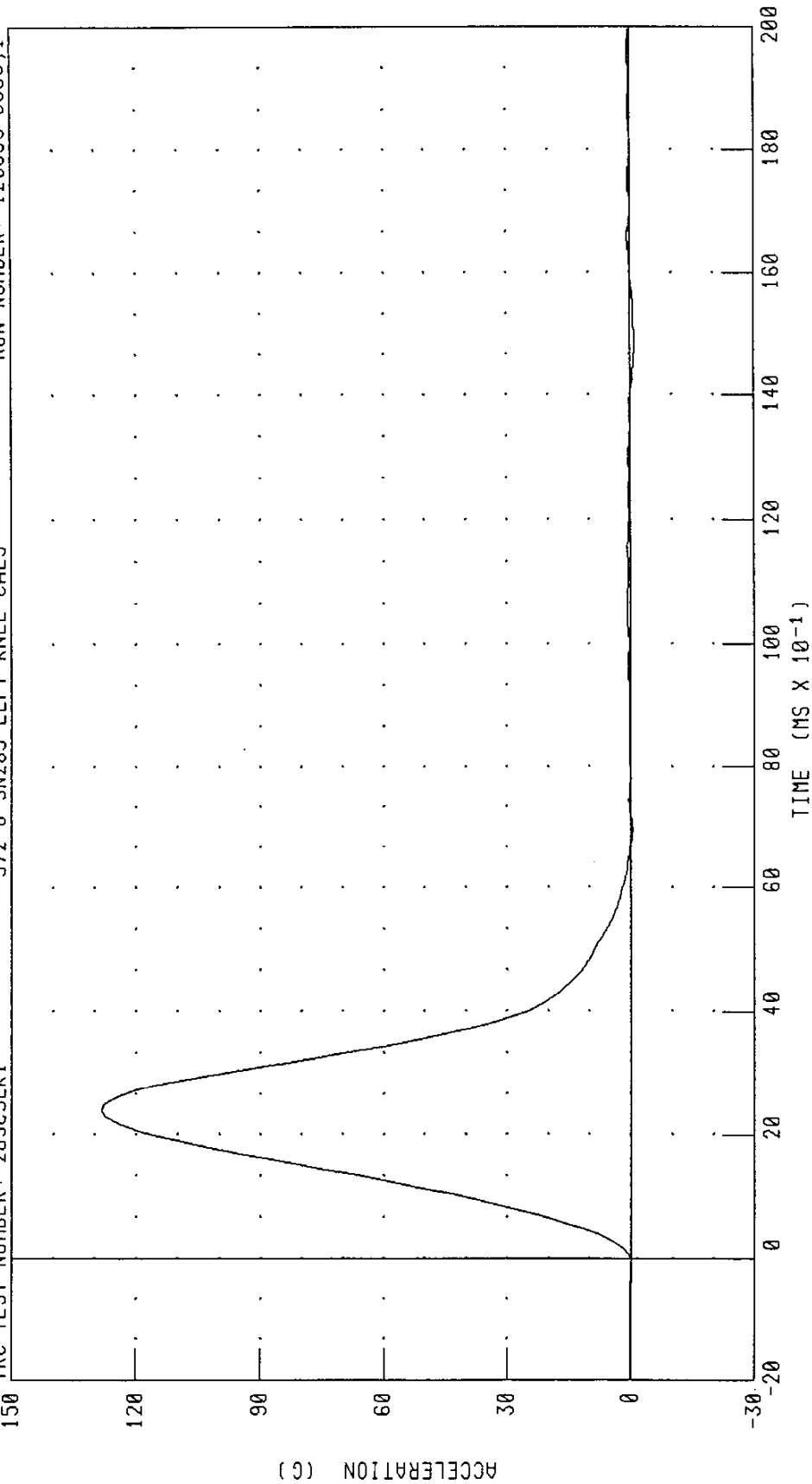
RUN NUMBER: 120699.0858;1

PART 572-0 HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 283C9LK1

572 0 SN283 LEFT KNEE CAL9

RUN NUMBER: 120699 0858;1



CHANNEL: PENXG

FILTER: CH. CLASS 600

PEAK DATA: 128.28 G @ 2.40 MS; -1.15 G @ 14.88 MS

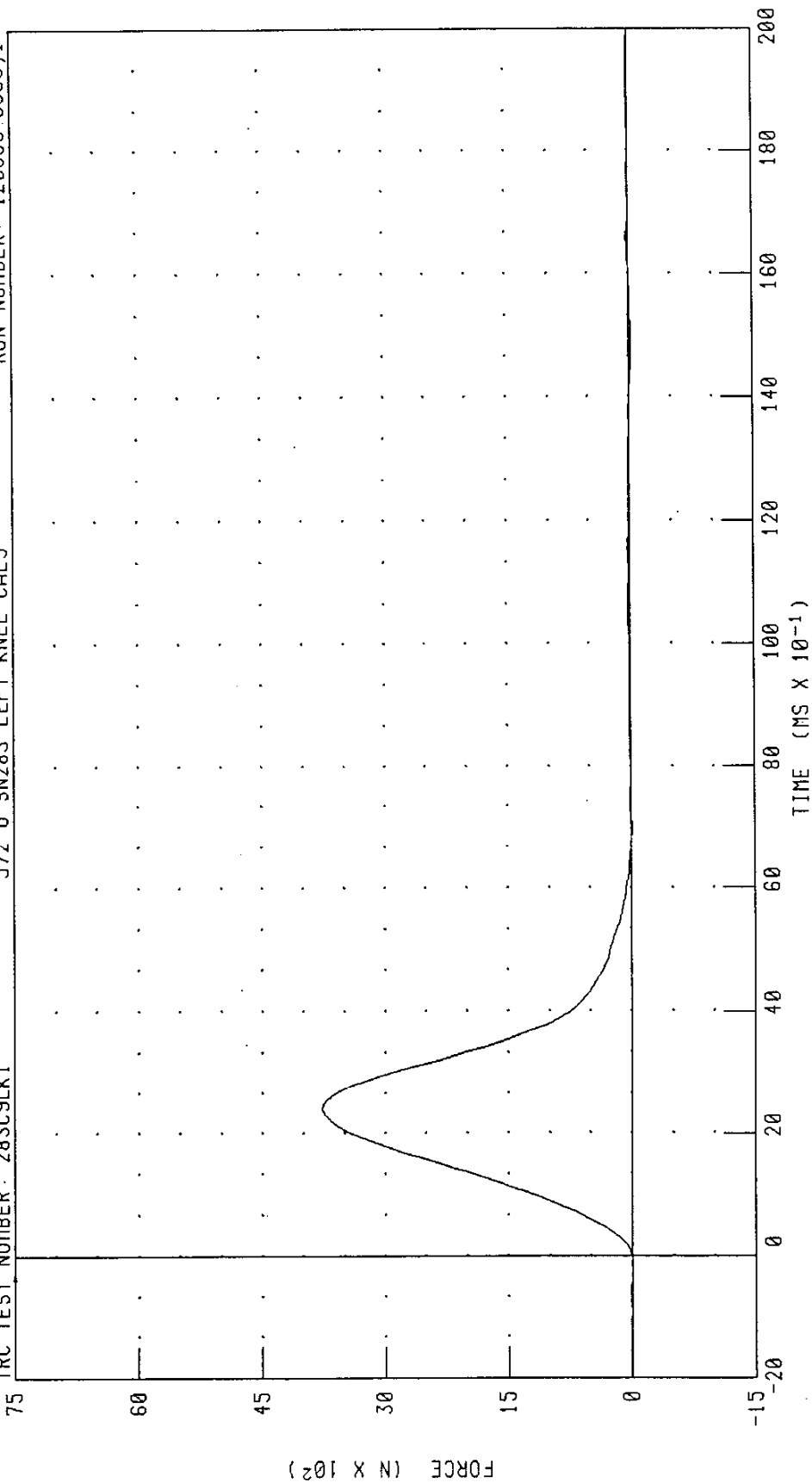
PART 572-0 HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572 0 SN283 LEFT KNEE CAL9

RUN NUMBER: 120699 0858;1

TRC TEST NUMBER: 283C9LK1



CHANNEL: PENXF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III SMALL FEMALE

23-DEC-99

TRC INC.

TEST NO: 369C9HD1

572 0 SN369 HEAD DROP CAL 9

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PEAK RESULTANT ACCELERATION	250 - 300 G	280.17 G
PEAK LATERAL ACCELERATION	15 G MAX	4.78 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Walker

RUN NUMBER: 122399.0840;1

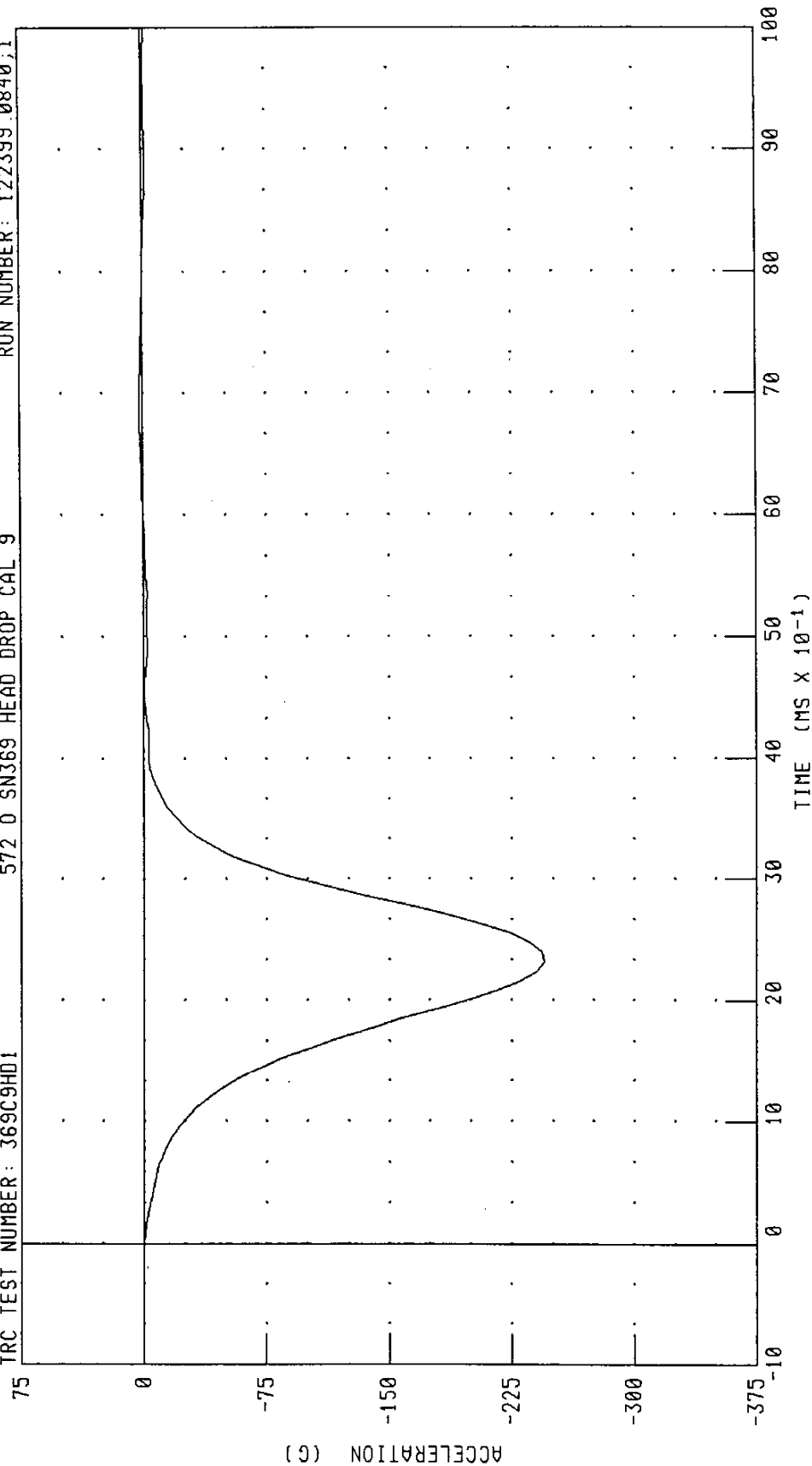
PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 369C9HD1

572 0 SN369 HEAD DROP CAL 9

RUN NUMBER: 122399.0840.1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

PEAK DATA: 1.97 G @ 6.72 MS, -245.19 G @ 2.32 MS

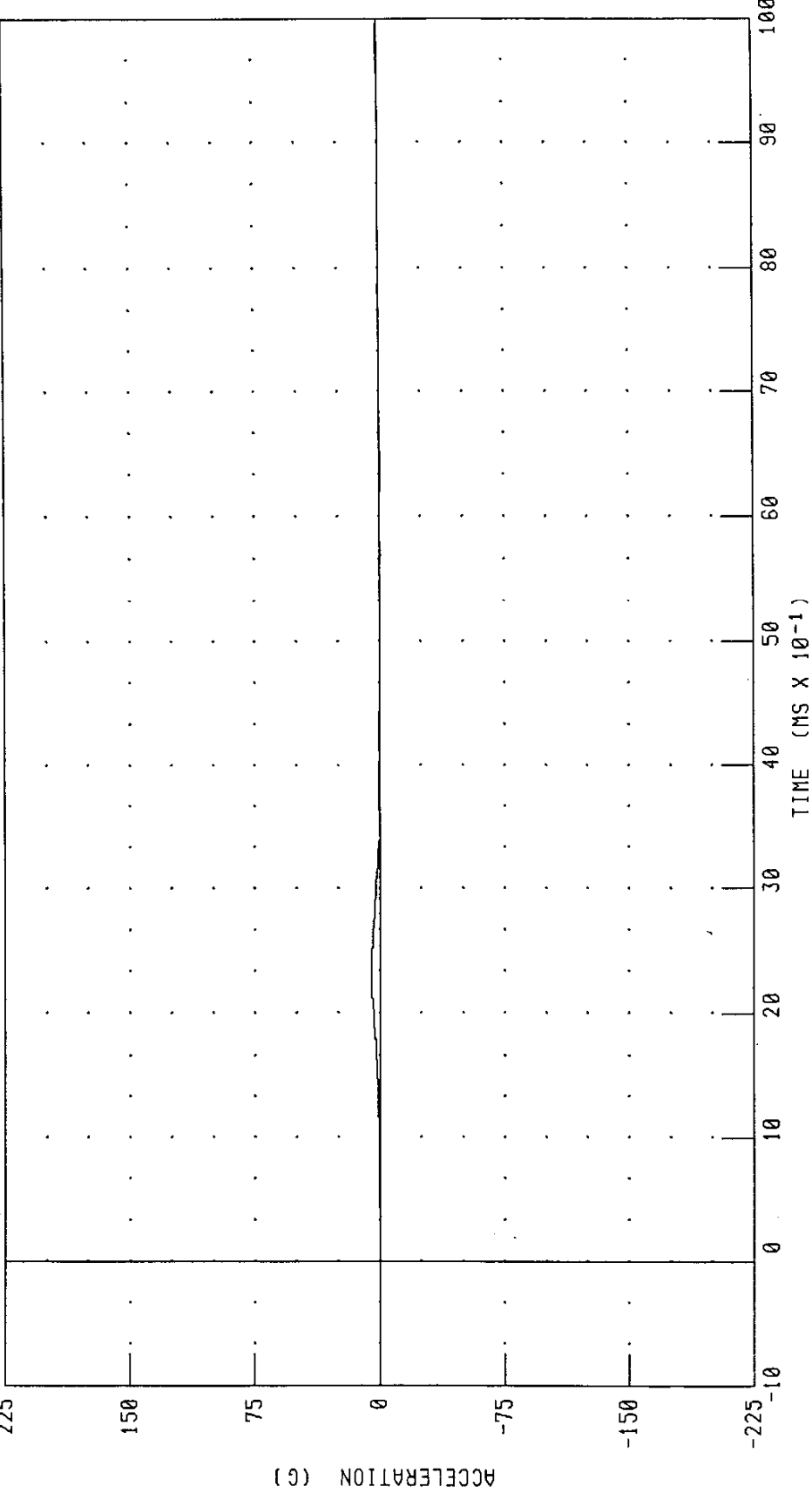
PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

572 0 SN369 HEAD DROP CAL 9

TRC TEST NUMBER: 369C9HD1

RUN NUMBER: 122399 0840,1



PEAK DATA: 4.79 G @ 2.24 MS, -0.62 G @ 5.68 MS

FILTER: CH. CLASS 1000

CHANNEL: HEDYC

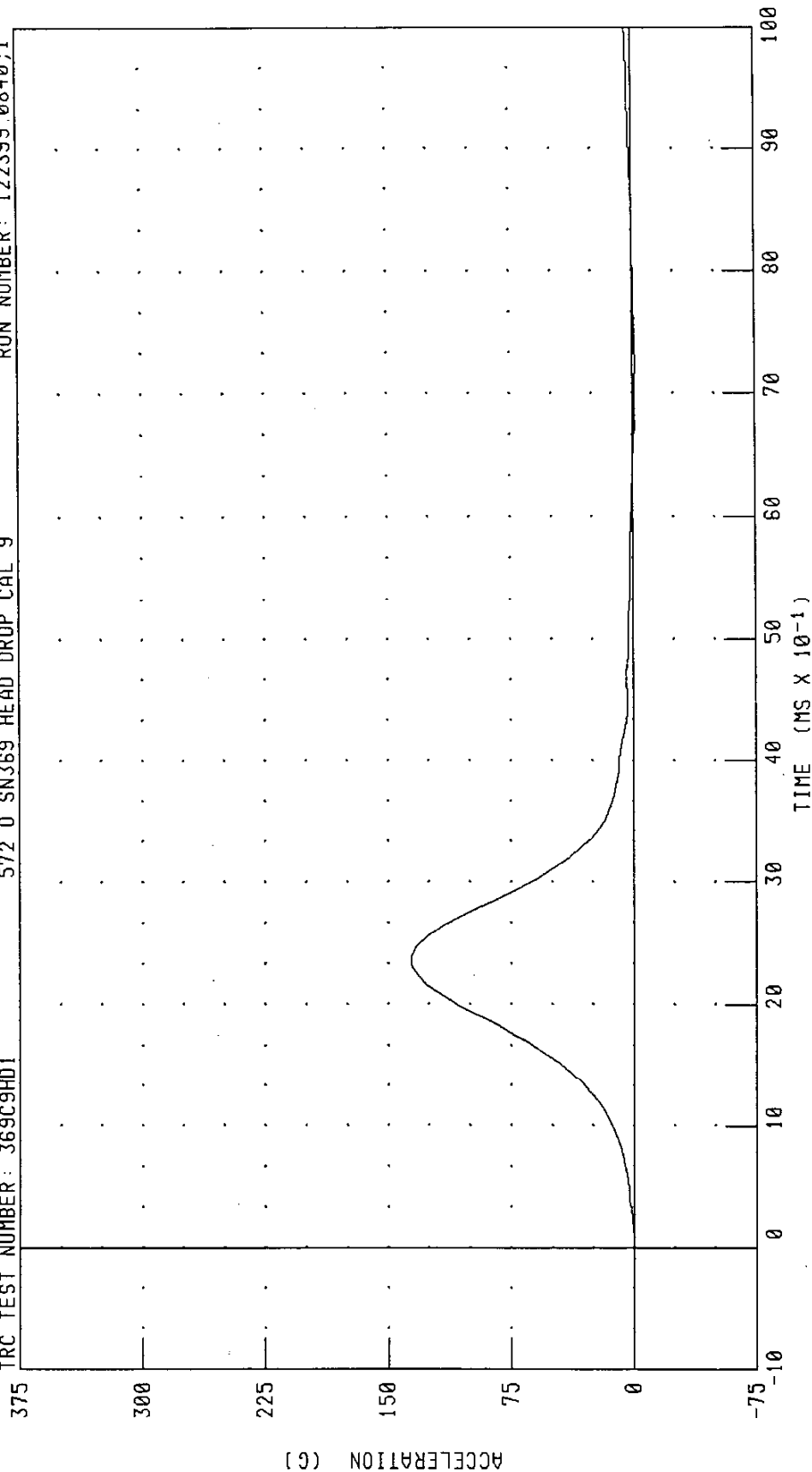
PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 369C9HD1

572 0 SN369 HEAD DROP CAL 9

RUN NUMBER: 122399.0840;1



CHANNEL: HEDZC FILTER: CH. CLASS 1000

PEAK DATA: 135.48 G @ 2.32 MS; -1.80 G @ 7.20 MS

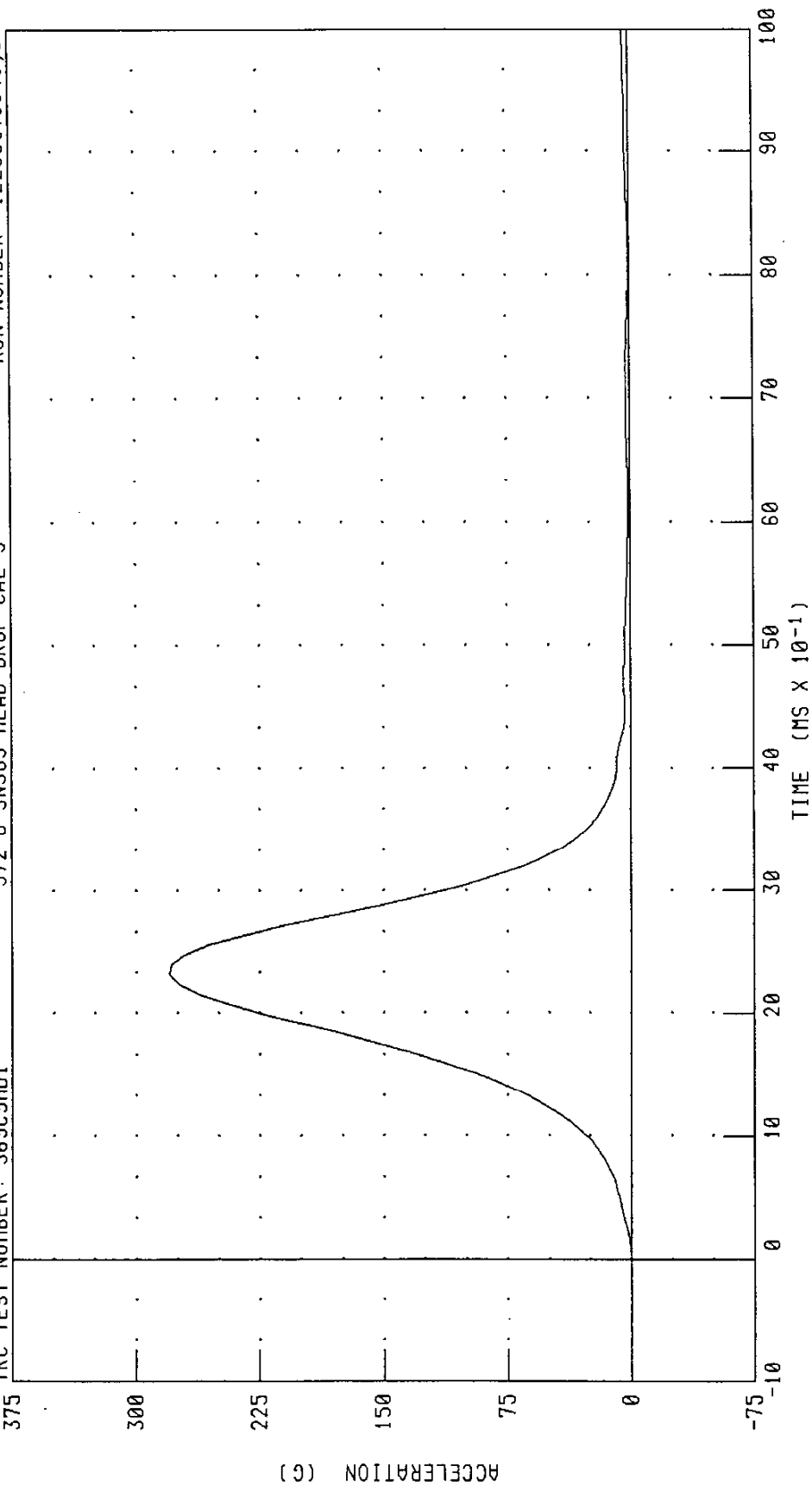
PART 572-0 HYBRID 111 HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 369C9HD1

572 0 SN369 HEAD DROP CAL 9

RUN NUMBER: 122399.0840;1



CHANNEL: HEDRG

FILTER: CH. CLASS 1000

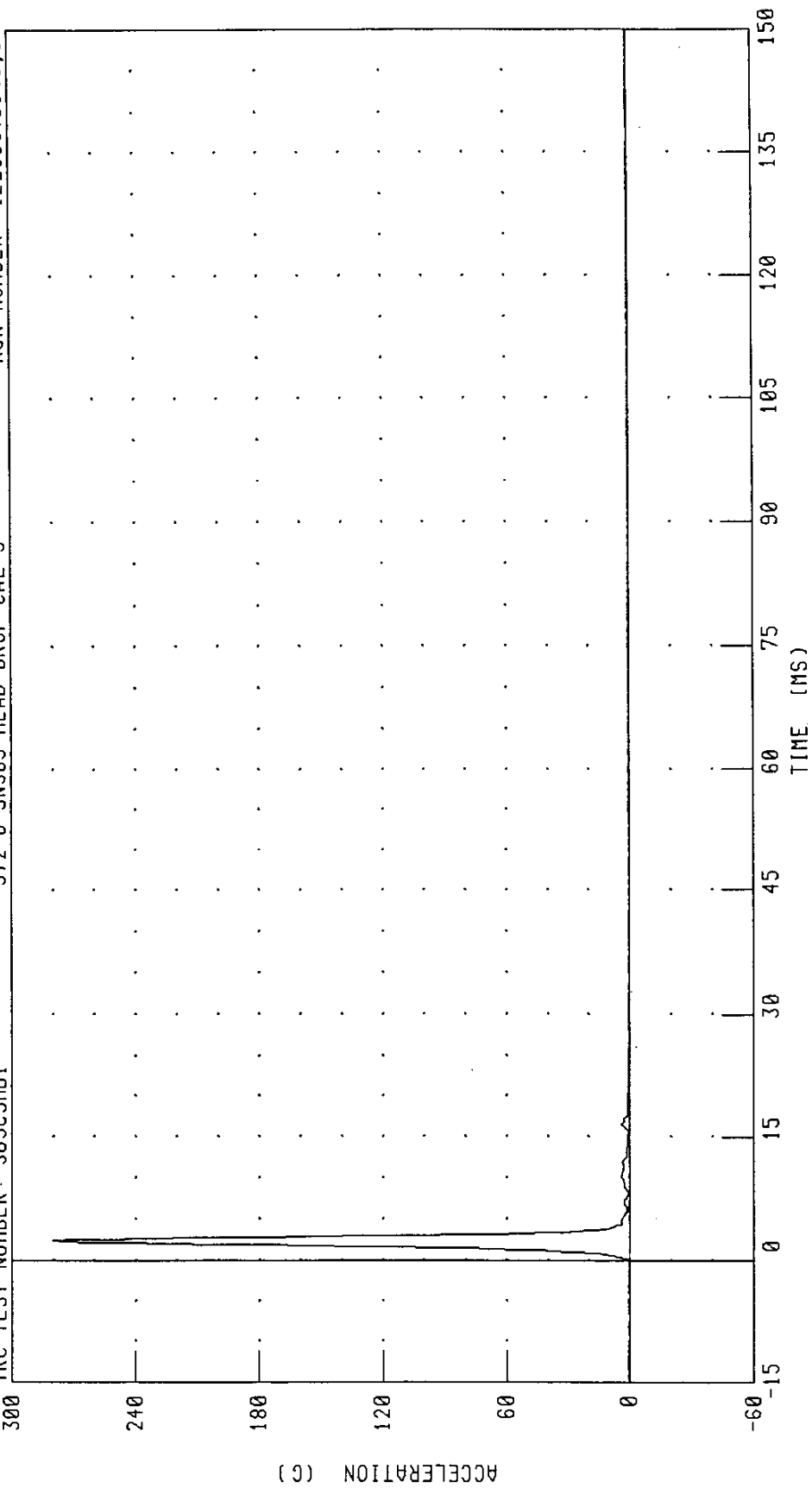
PEAK DATA: 280.17 G @ 2.32 MS; 0.12 G @ -0.96 MS

PART 572-0 HYBRID III HEAD CALIBRATION
CHECK PLOT - HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 369C9HD1

572 0 SN369 HEAD DROP CAL 9

RUN NUMBER: 122399.0840;1



PEAK DATA: 280.17 G @ 2.32 MS; 0.12 G @ -14.88 MS

CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

23-DEC-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 369C9NF1 572 0 SN369 NECK FLEX. CAL9

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
IMPACT VELOCITY	6.89 - 7.13 M/S	7.12 M/S
INTEGRATED PENDULUM VELOCITY	10 MS 2.1 - 2.5 M/S	2.13 M/S
	20 MS 4.0 - 5.0 M/S	4.23 M/S
	30 MS 5.8 - 7.0 M/S	6.05 M/S
PEAK D-PLANE ROTATION	80 - 92 DEG.	80.06 DEG.
PEAK MOMENT DURING ROTATION INTERVAL	69 - 83 NM	71.95 NM
MOMENT DECAY TIME FROM TO TO 10NM	80 - 100 MS	86.72 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Walker RUN NUMBER: 122399.1006;1

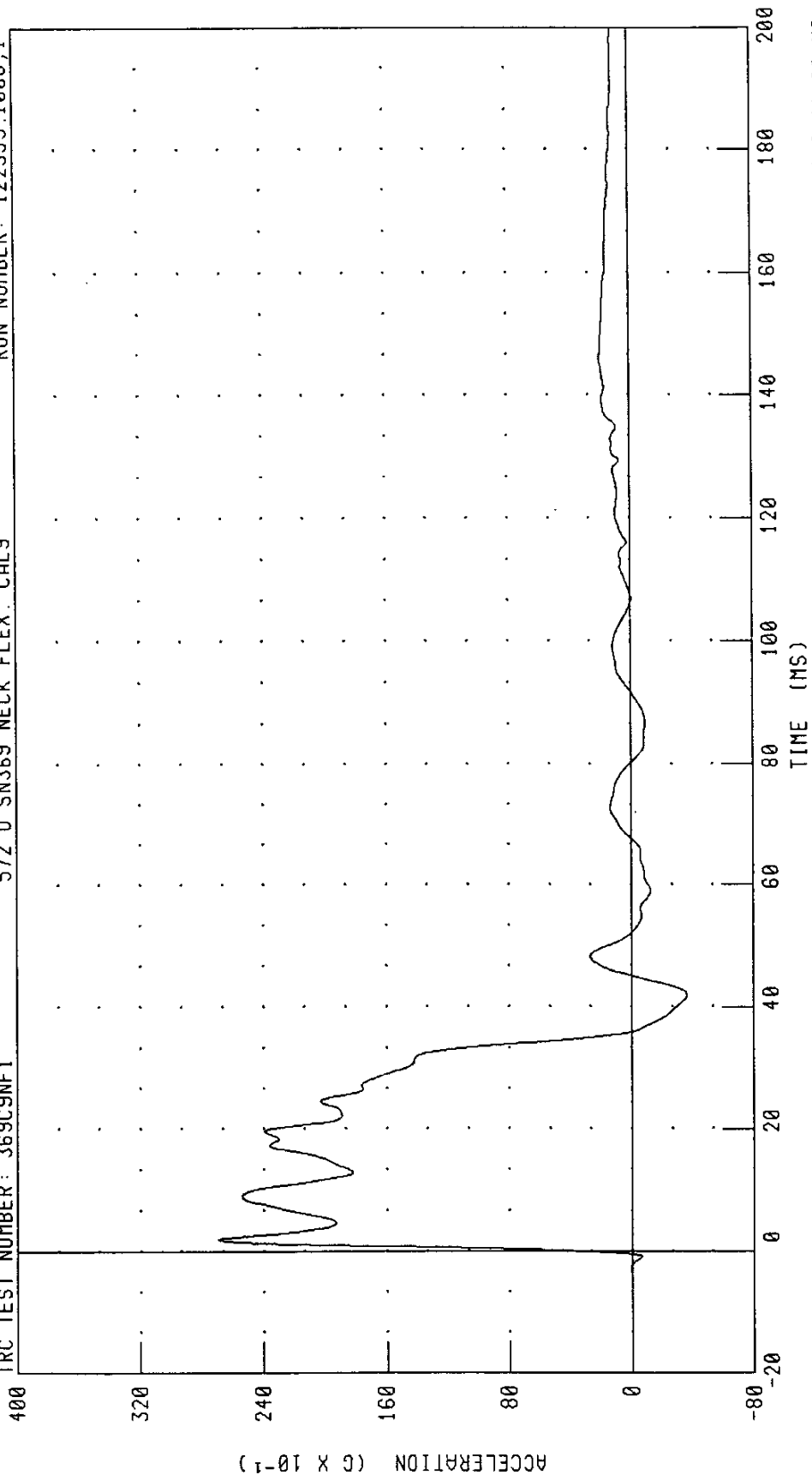
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 369C9NF1

572 0 SN369 NECK FLEX. CAL9

RUN NUMBER: 122399.1006;1



CHANNEL: PENXC FILTER: CH. CLASS 180

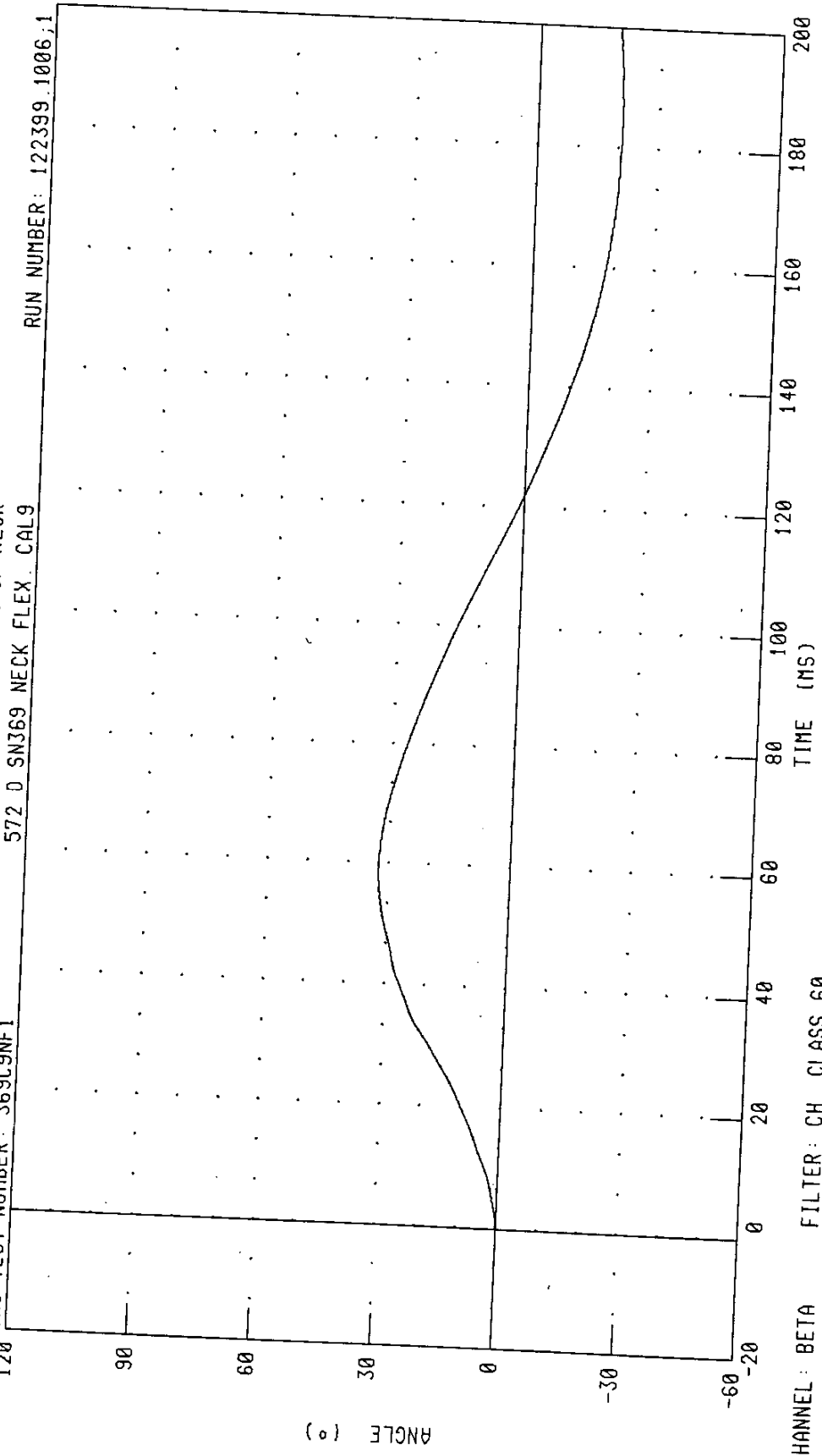
PEAK DATA: 26.91 G @ 1.92 MS; -3.66 G @ 41.92 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK
572 0 SN369 NECK FLEX. CAL9

TRC TEST NUMBER: 369C9NF1

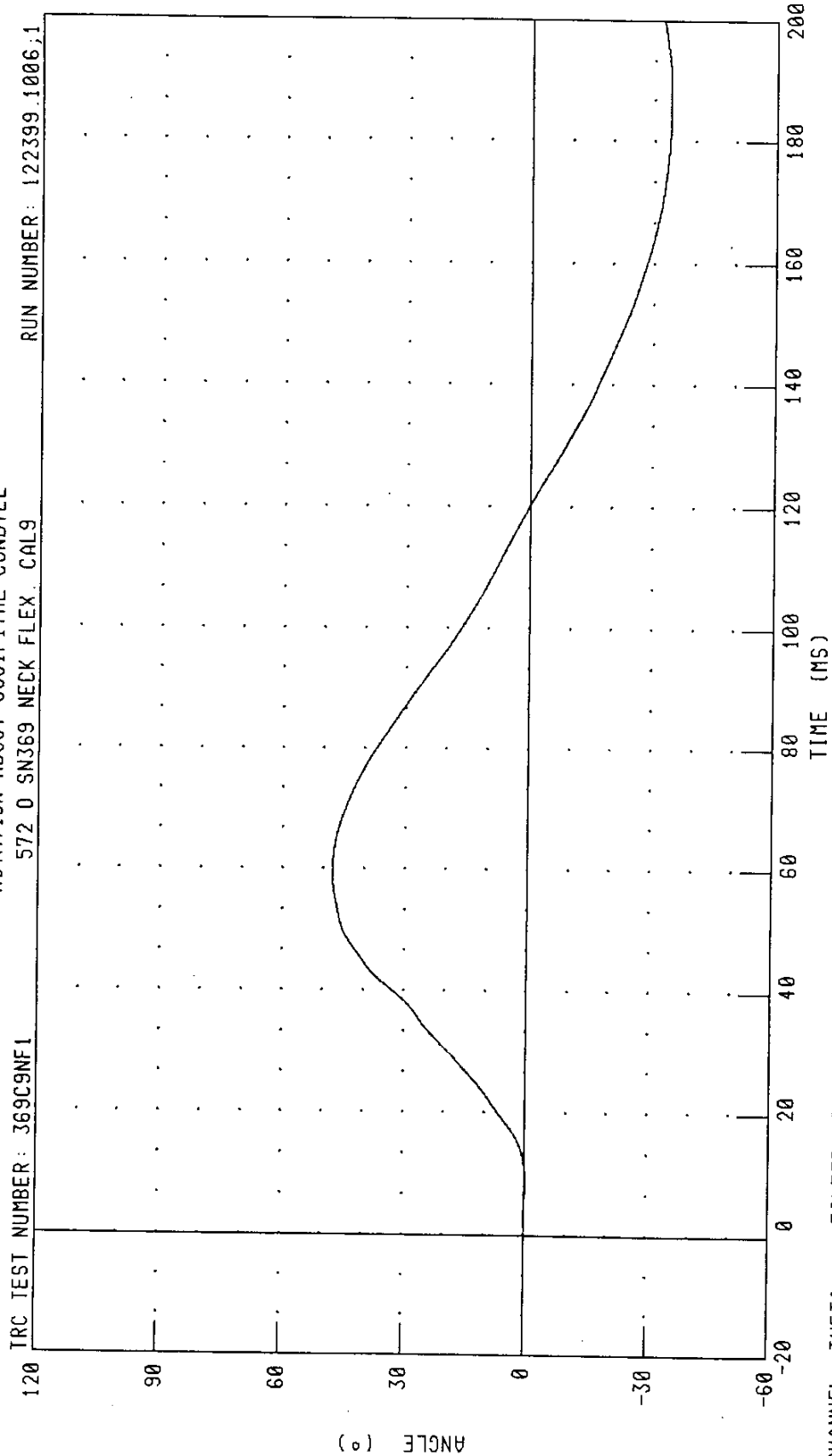
RUN NUMBER: 122399.1006;1



CHANNEL: BETA FILTER: CH. CLASS 60

PEAK DATA: 32.40 ° @ 59.04 MS; -20.87 ° @ 183.60 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE

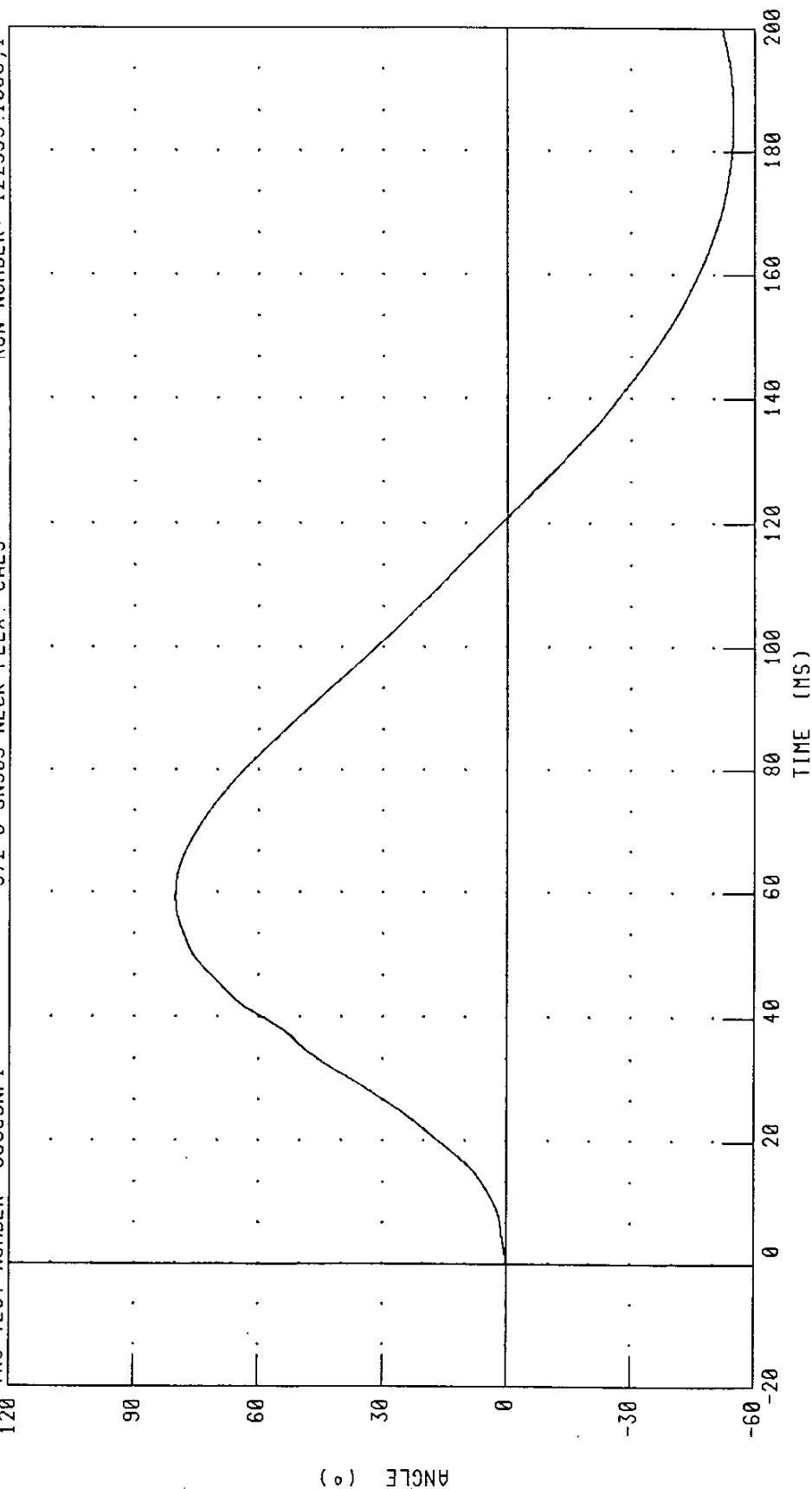


CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 47.67 ° @ 59.36 MS, -33.93 ° @ 186.48 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 369C9NF1 572 0 SN369 NECK FLEX. CAL9 RUN NUMBER: 122399.1006.1



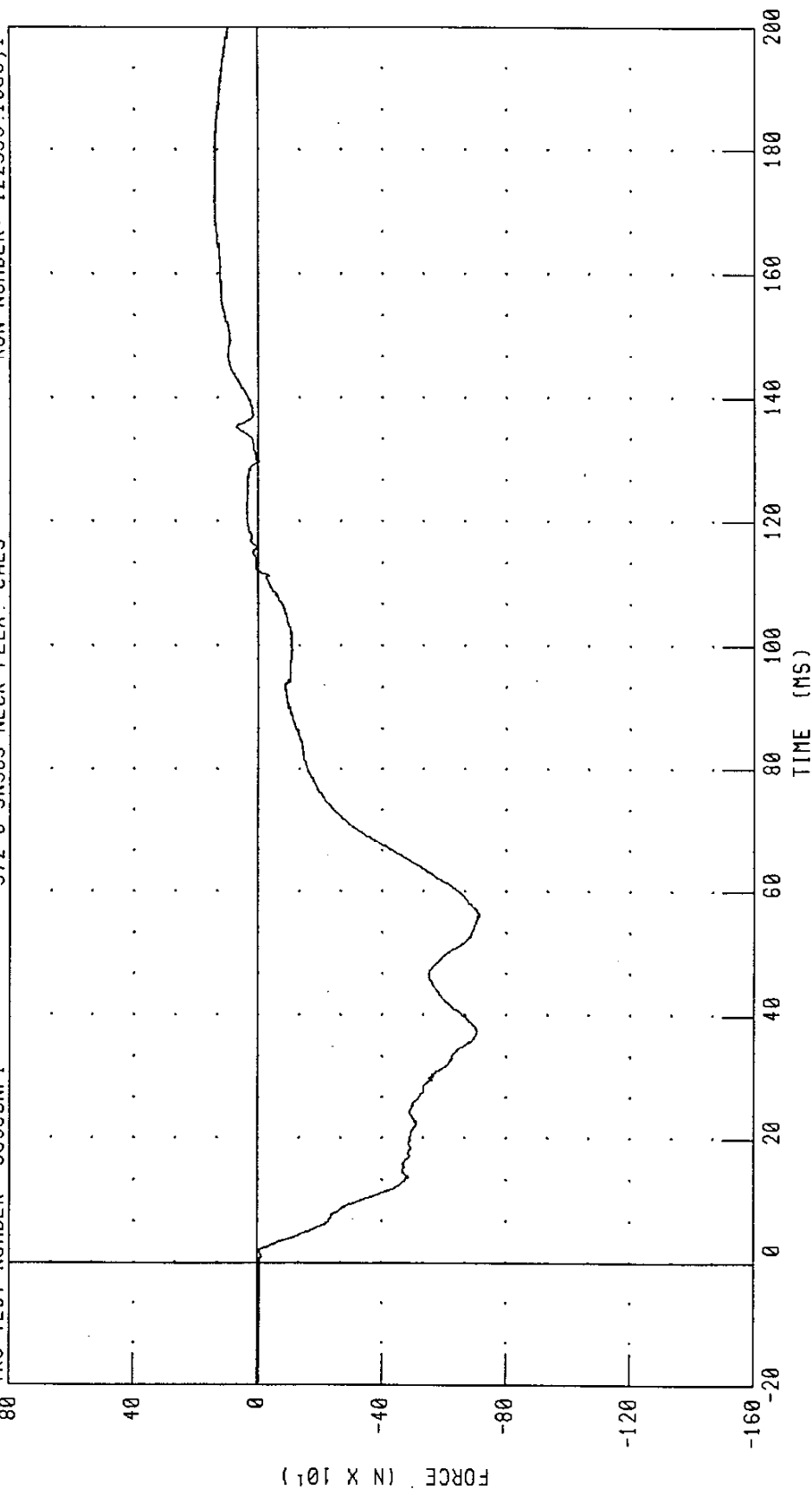
CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 80.06 ° @ 59.20 MS; -54.78 ° @ 185.04 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 36909NF1 572 0 SN369 NECK FLEX. CAL9 RUN NUMBER: 122399.1006;1

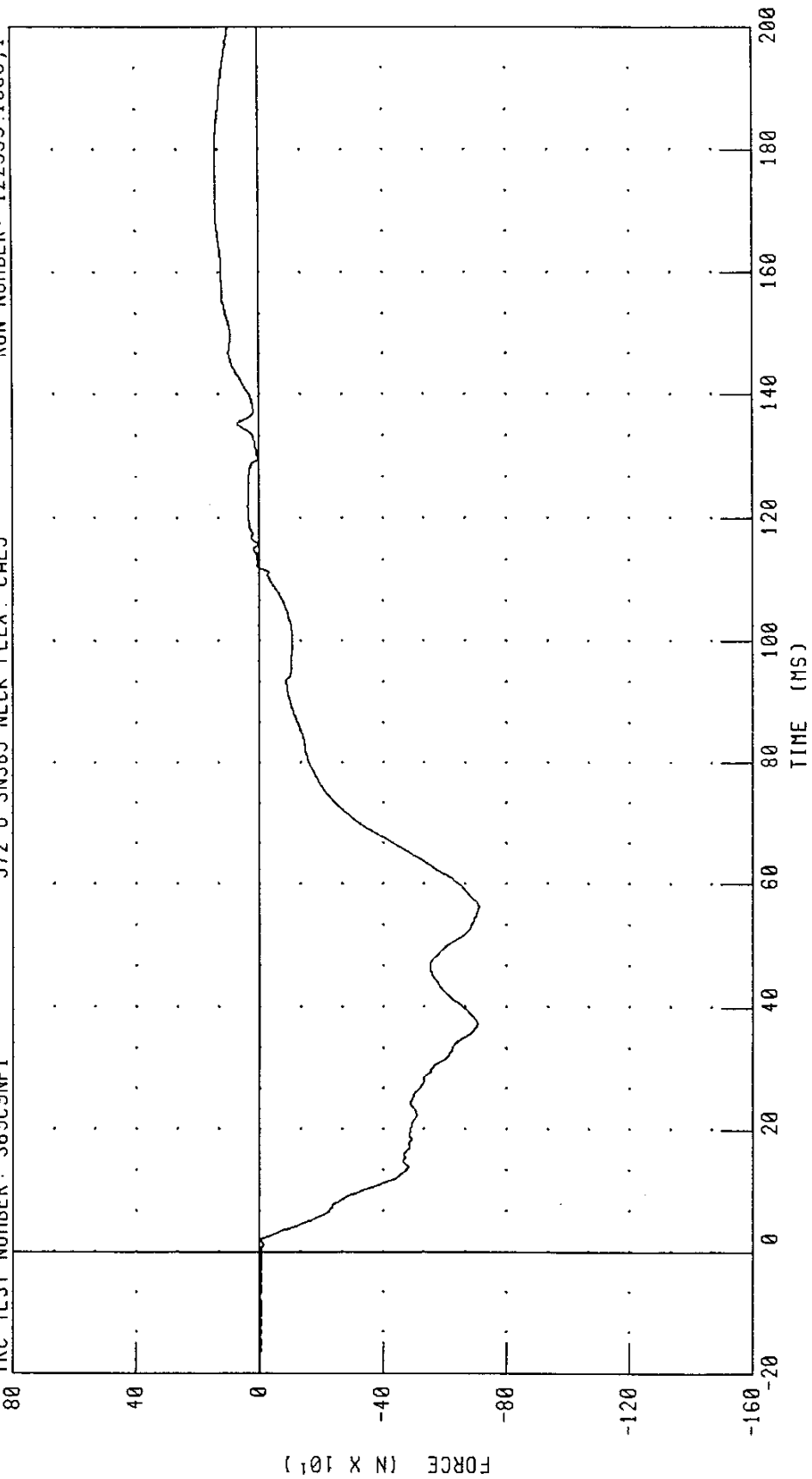


CHANNEL: NEKXF FILTER: CH. CLASS 1000 PEAK DATA: 144.00 N @ 171.44 MS; -711.76 N @ 55.76 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 369C9NF1 572 0 SN369 NECK FLEX CAL9 RUN NUMBER: 122399.1006;1



CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 142.55 N @ 171.60 MS, -711.58 N @ 56.24 MS

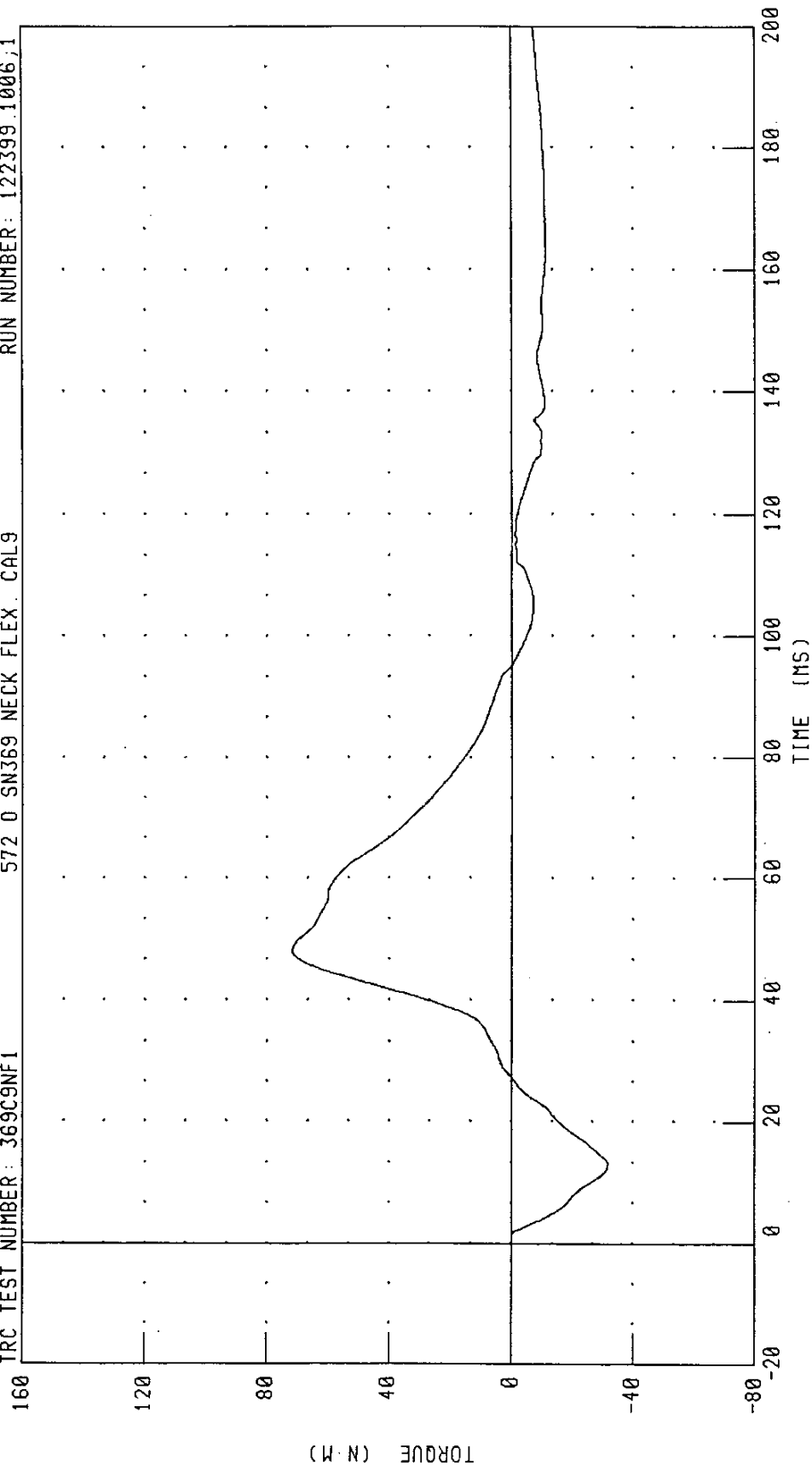
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 369C9NF1

572 0 SN369 NECK FLEX. CAL9

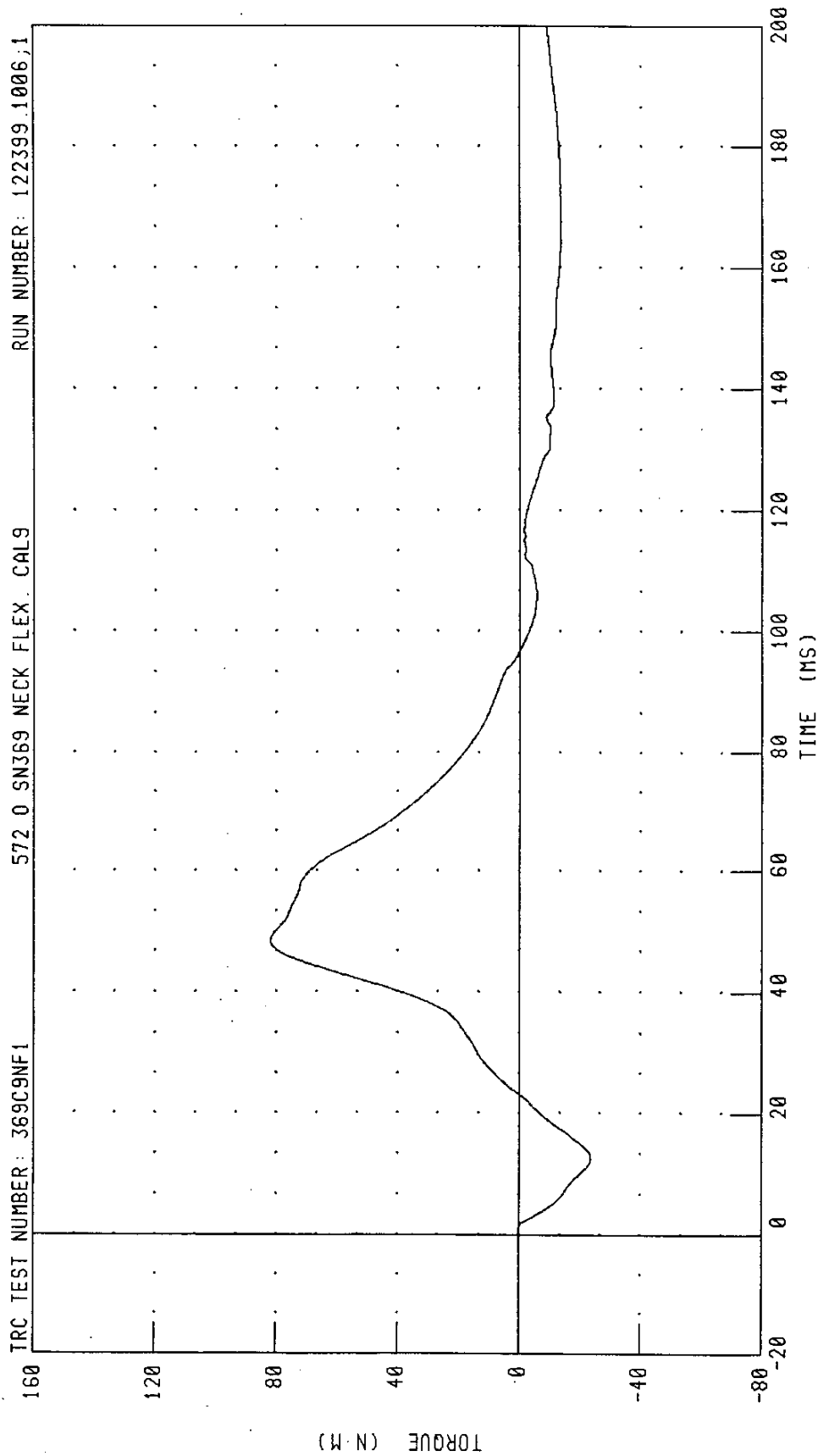
RUN NUMBER: 122399.1006;1



CHANNEL: NEKYM FILTER: CH. CLASS 600

PEAK DATA: 71.61 N-M @ 48.00 MS; -31.81 N-M @ 13.20 MS

PART 572-0 HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE



CHANNEL: NEKOM FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

23-DEC-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 369C9NE1 572 0 SN369 NECK EXT. CAL 9

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
INTEGRATED PENDULUM VELOCITY	10 MS	1.5 - 1.9 M/S	1.62 M/S
	20 MS	3.1 - 3.9 M/S	3.27 M/S
	30 MS	4.6 - 5.6 M/S	4.87 M/S
PEAK D-PLANE ROTATION		97 - 109 DEG.	104.62 DEG.
PEAK MOMENT DURING ROTATION INTERVAL		-55 /-69 NM	-59.42 NM
MOMENT DECAY TIME FROM TO TO -10 NM LEVEL		94 - 114 MS	106.4 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Dustin Wallom RUN NUMBER: 122399.1033;1

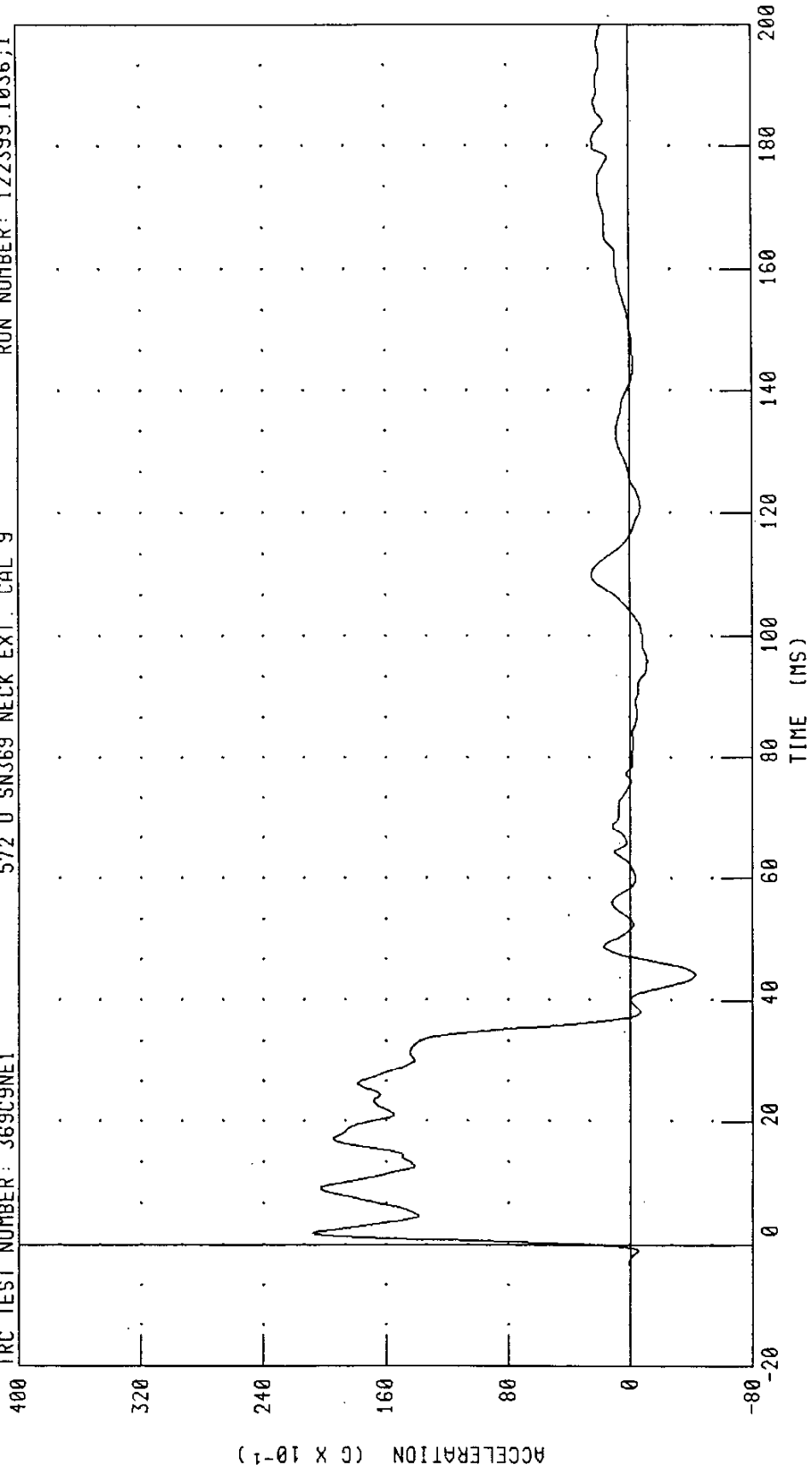
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 369C9NE1

572 0 SN369 NECK EXT. CAL 9

RUN NUMBER: 122399.1036,1



CHANNEL: PENXC FILTER: CH. CLASS 180

PEAK DATA: 20.75 G @ 1.84 MS; -4.27 G @ 44.24 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572 0 SN369 NECK EXT. CAL 9

TRC TEST NUMBER: 369C9NE1

120

90

60

30

0

-30

-60

ANGLE (°)

TIME (MS)

0

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

380

400

420

440

460

480

500

520

540

560

580

600

620

640

660

680

700

720

740

760

780

800

820

840

860

880

900

920

940

960

980

1000

1020

1040

1060

1080

1100

1120

1140

1160

1180

1200

1220

1240

1260

1280

1300

1320

1340

1360

1380

1400

1420

1440

1460

1480

1500

1520

1540

1560

1580

1600

1620

1640

1660

1680

1700

1720

1740

1760

1780

1800

1820

1840

1860

1880

1900

1920

1940

1960

1980

2000

2020

2040

2060

2080

2100

2120

2140

2160

2180

2200

2220

2240

2260

2280

2300

2320

2340

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6220

6240

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6280

6300

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6340

6360

6380

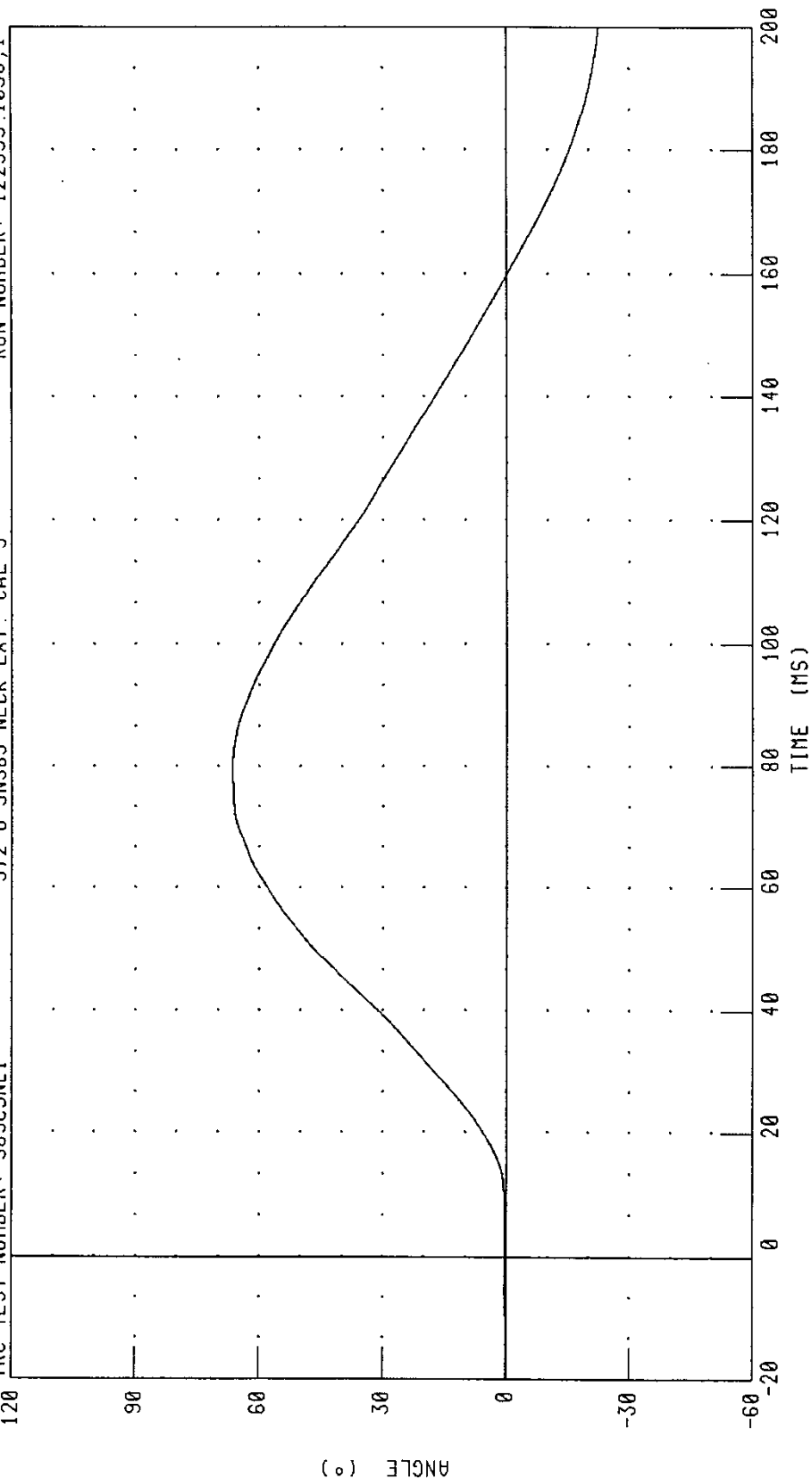
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 369C9NE1

572 0 SN369 NECK EXT. CAL 9

RUN NUMBER: 122399.1036;1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 66.41 ° @ 79.76 MS; -22.54 ° @ 200.00 MS

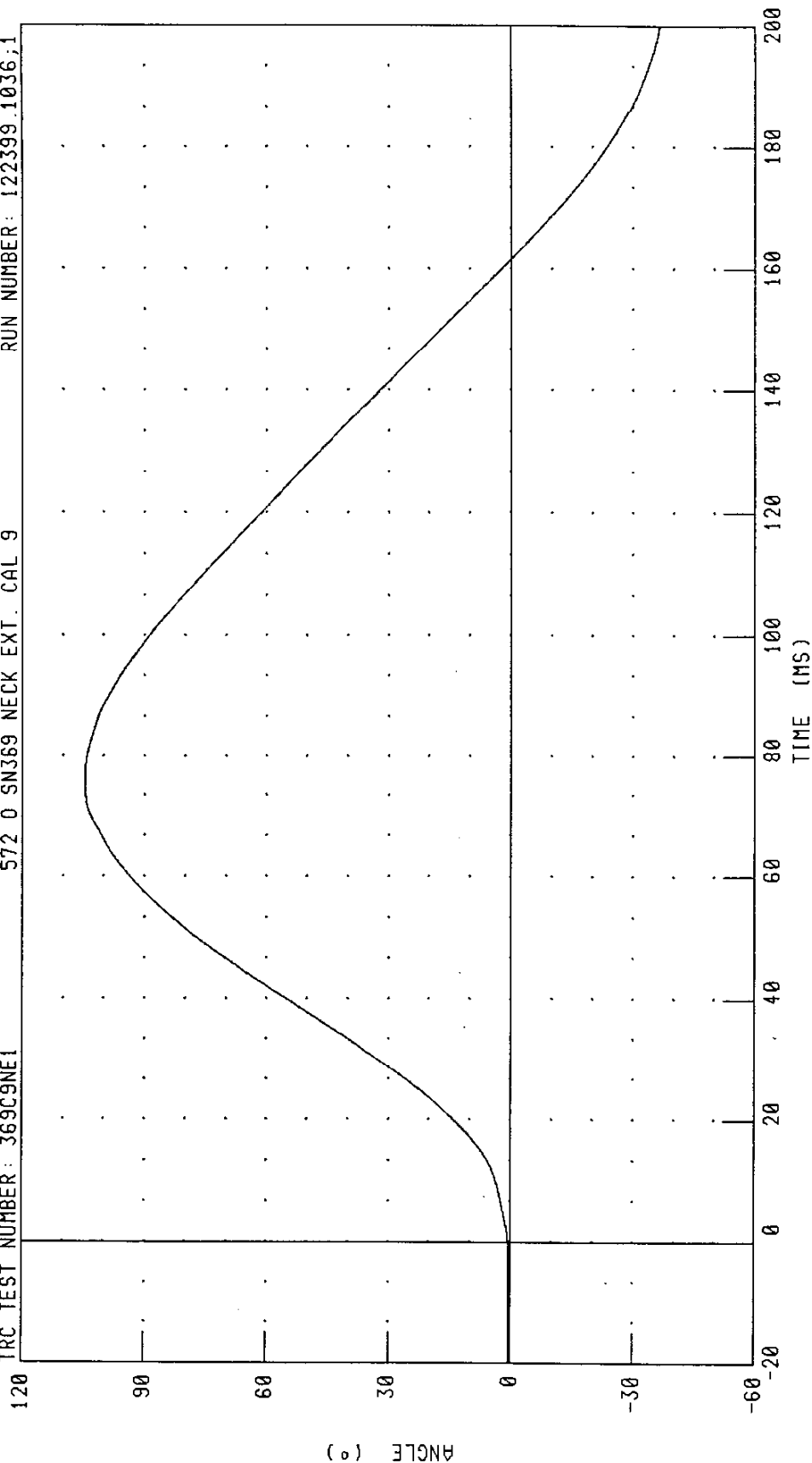
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 369C9NE1

572 0 SN369 NECK EXT. CAL 9

RUN NUMBER: 122399.1036;1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 104.62 ° @ 76.08 MS, -36.64 ° @ 200.00 MS

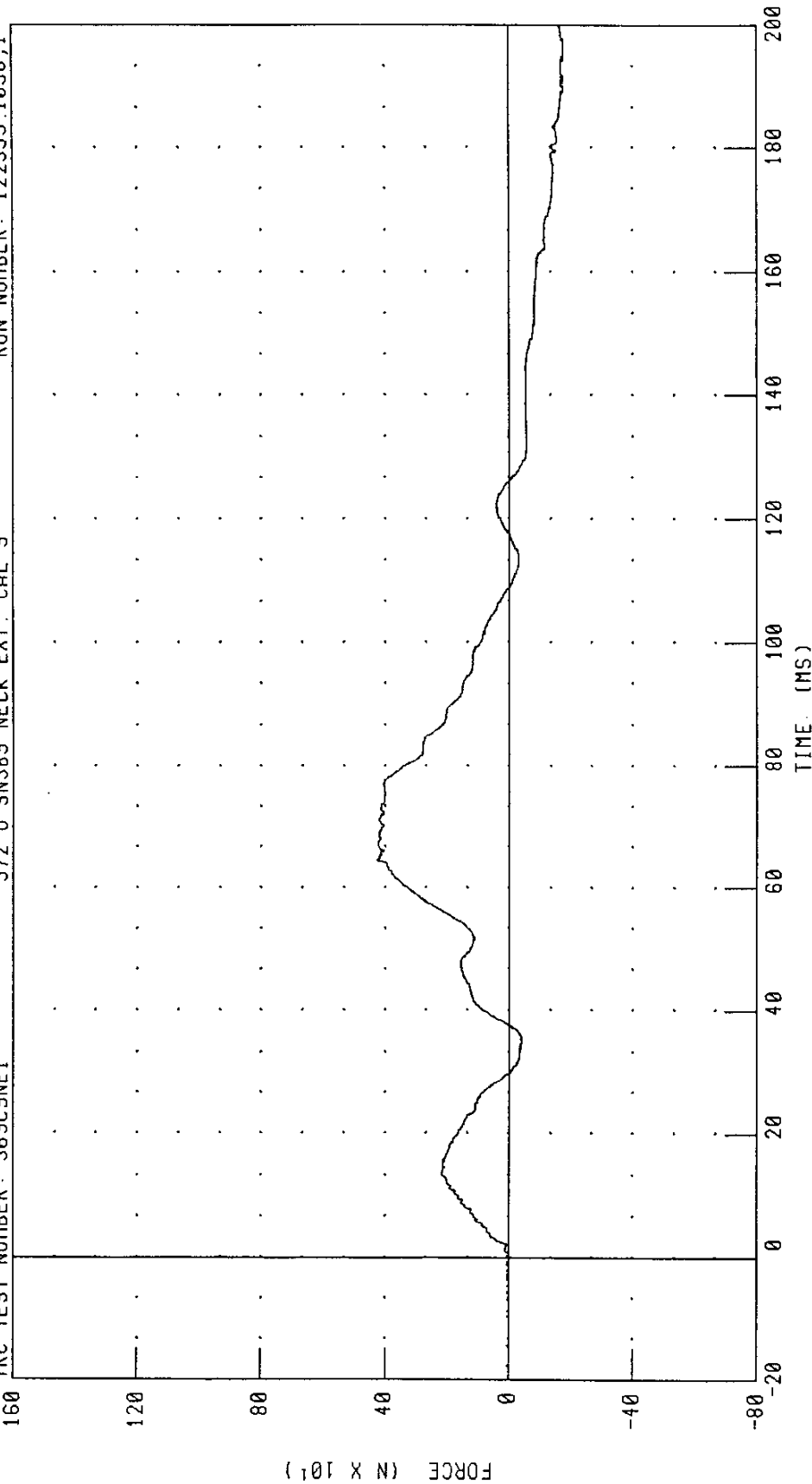
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 369C9NE1

572 0 SN369 NECK EXT. CAL 9

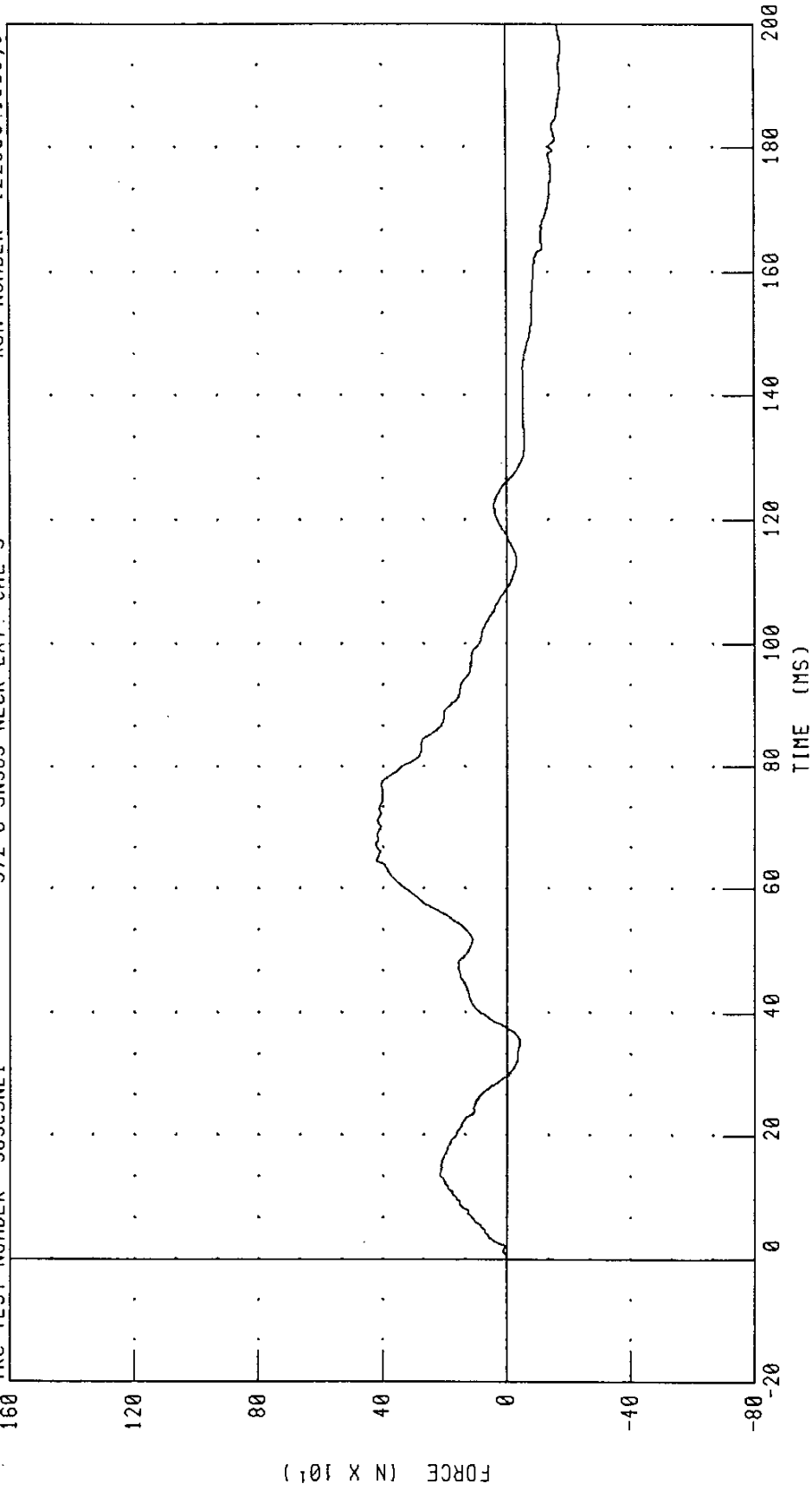
RUN NUMBER: 122399.1036,1



CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 426.00 N @ 64.40 MS, -175.77 N @ 189.04 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION
TRC TEST NUMBER: 369C9NE1 572 0 SN369 NECK EXT. CAL 9 RUN NUMBER: 122399.1036;1



CHANNEL: NEKXFC FILTER: CH. CLASS 600

PEAK DATA: 422.40 N @ 67.12 MS; -175.97 N @ 189.68 MS

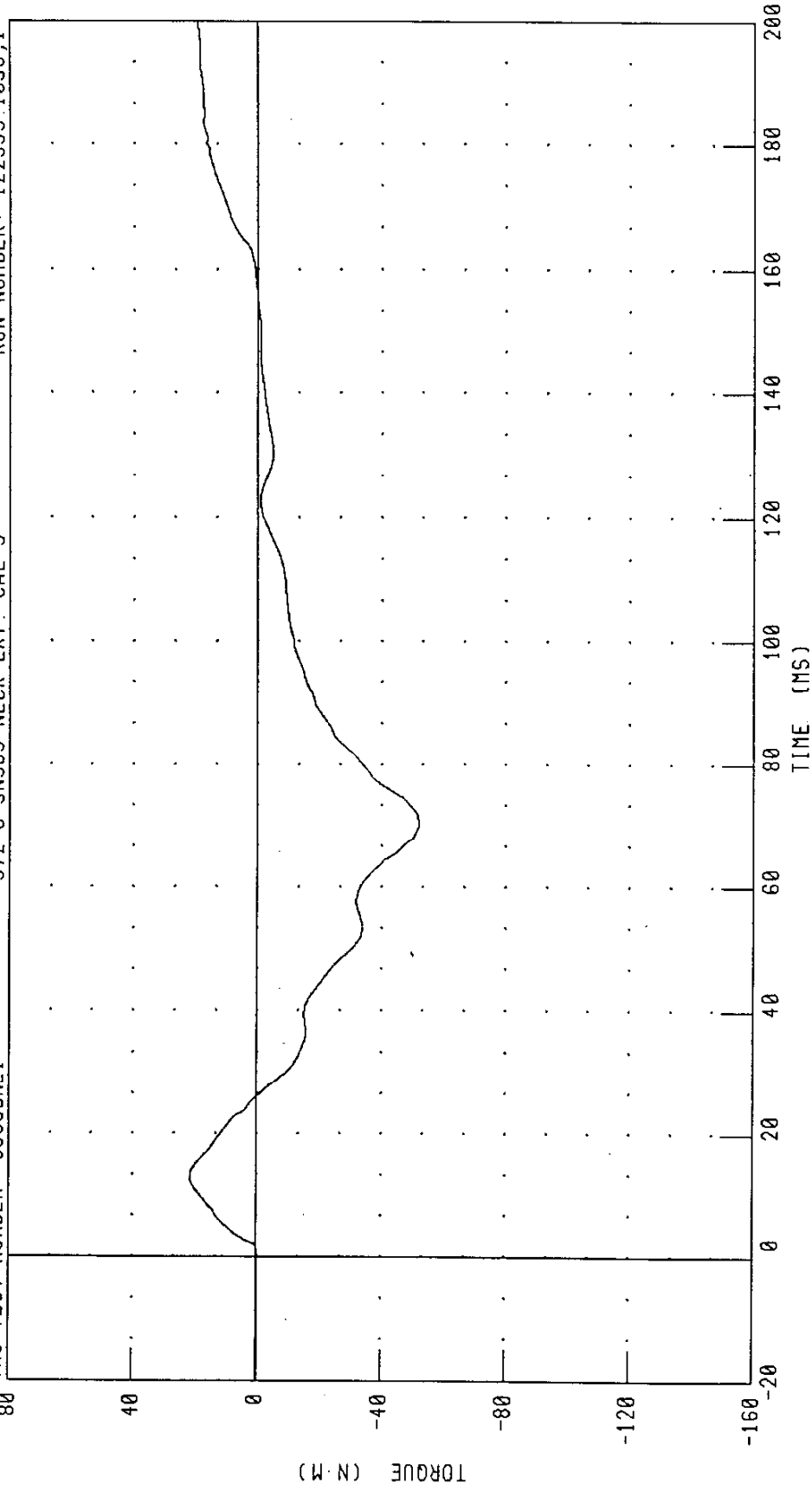
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 369C9NE1

572 0 SN369 NECK EXT. CAL 9

RUN NUMBER: 122399.1036;1

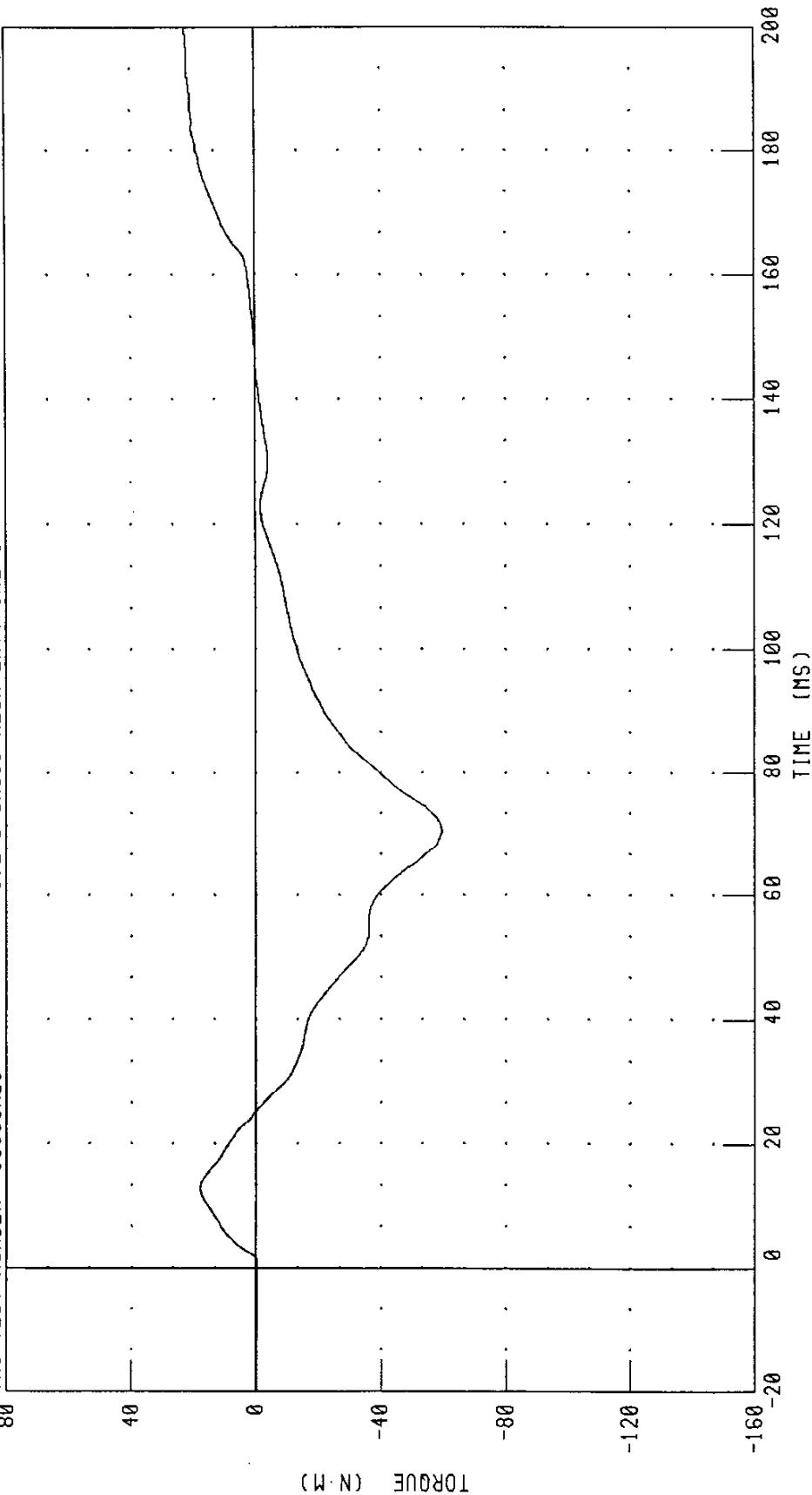


CHANNEL: NEKYM FILTER: CH. CLASS 600

PEAK DATA: 21.64 N·M @ 13.28 MS; -52.15 N·M @ 70.40 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 369C9NE1 572 0 SN369 NECK EXT. CAL 9 RUN NUMBER: 122399.1036;1



CHANNEL: NEKOM FILTER: CH. CLASS 600 PEAK DATA: 22.53 N-M @ 200.00 MS, -59.42 N-M @ 70.48 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE

23-DEC-99

TRC INC.

TEST NO: 369C9TH1

572 0 SN369 THORAX CAL9

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	48 - 55 MM	51.8 MM
MAXIMUM RESISTIVE FORCE	3900 - 4400 N	4279. N
INTERNAL HYSTERESIS	69% - 85%	71.5%

TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Wallam

RUN NUMBER: 122399.1126;1

PART 572-0 HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

572 0 SN369 THORAX CAL9

TRC TEST NUMBER: 369C9TH1

50

40

30

20

10

0

-10

ACCELERATION (G)

50

40

30

20

10

0

-10

TIME (MS)

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

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2990

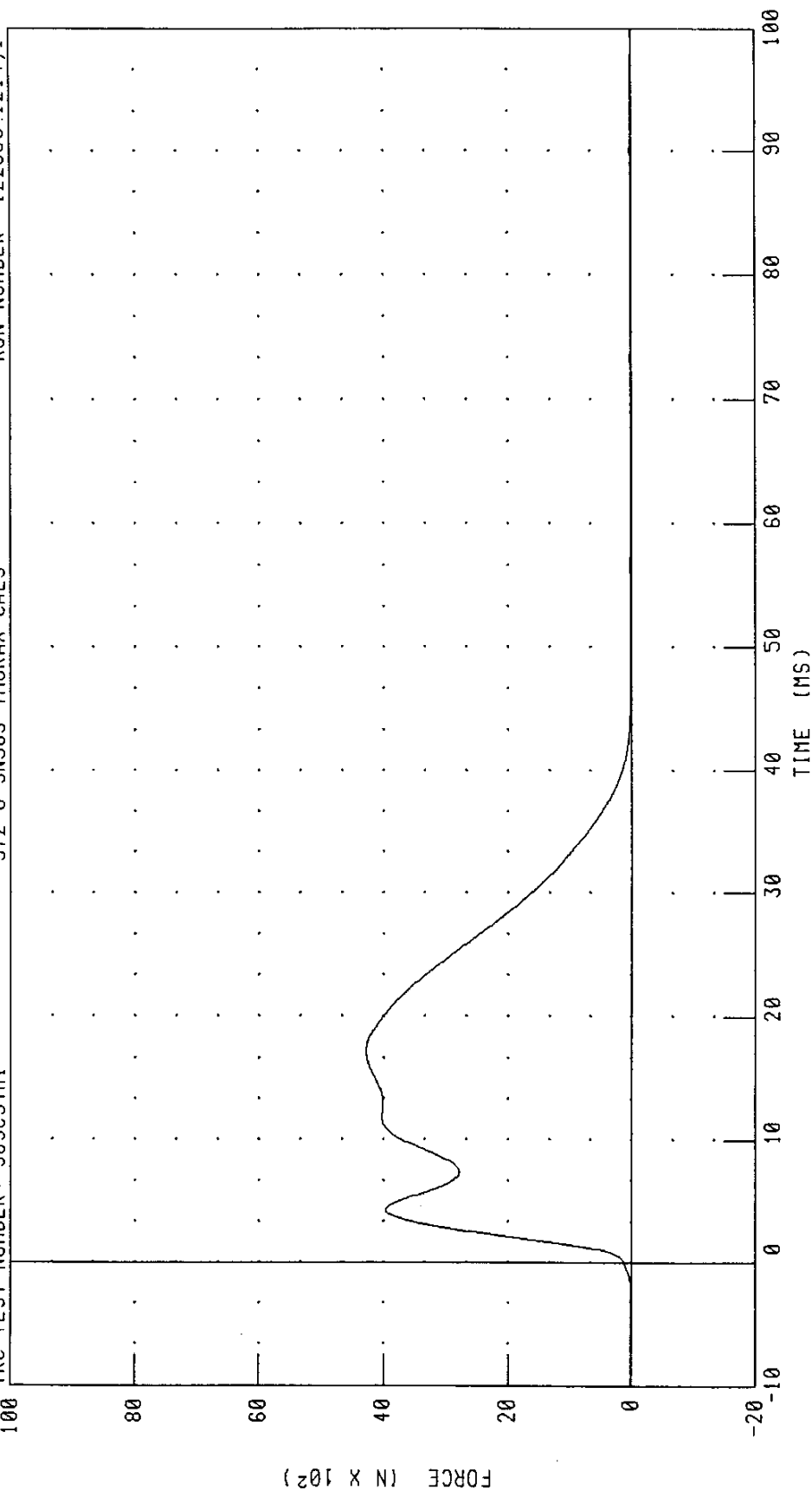
PART 572-0 HYBRID III THORAX CALIBRATION

PENDULUM FORCE

572 0 SN369 THORAX CAL9

TRC TEST NUMBER: 369C9TH1

RUN NUMBER: 122399.1214;1



PEAK DATA: 4279.00 N @ 17.20 MS; -0.11 N @ 98.72 MS

FILTER: CH. CLASS 180

CHANNEL: PENXF

PART 572-0 HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

572 0 SN369 THORAX CAL9

TRC TEST NUMBER: 369C9TH1

150

120

90

60

30

0

-30

-10

0

10

20

30

40

50

60

70

80

90

100

TIME (MS)

PEAK DATA: 51.88 MM @ 19.76 MS, -0.01 MM @ -3.28 MS

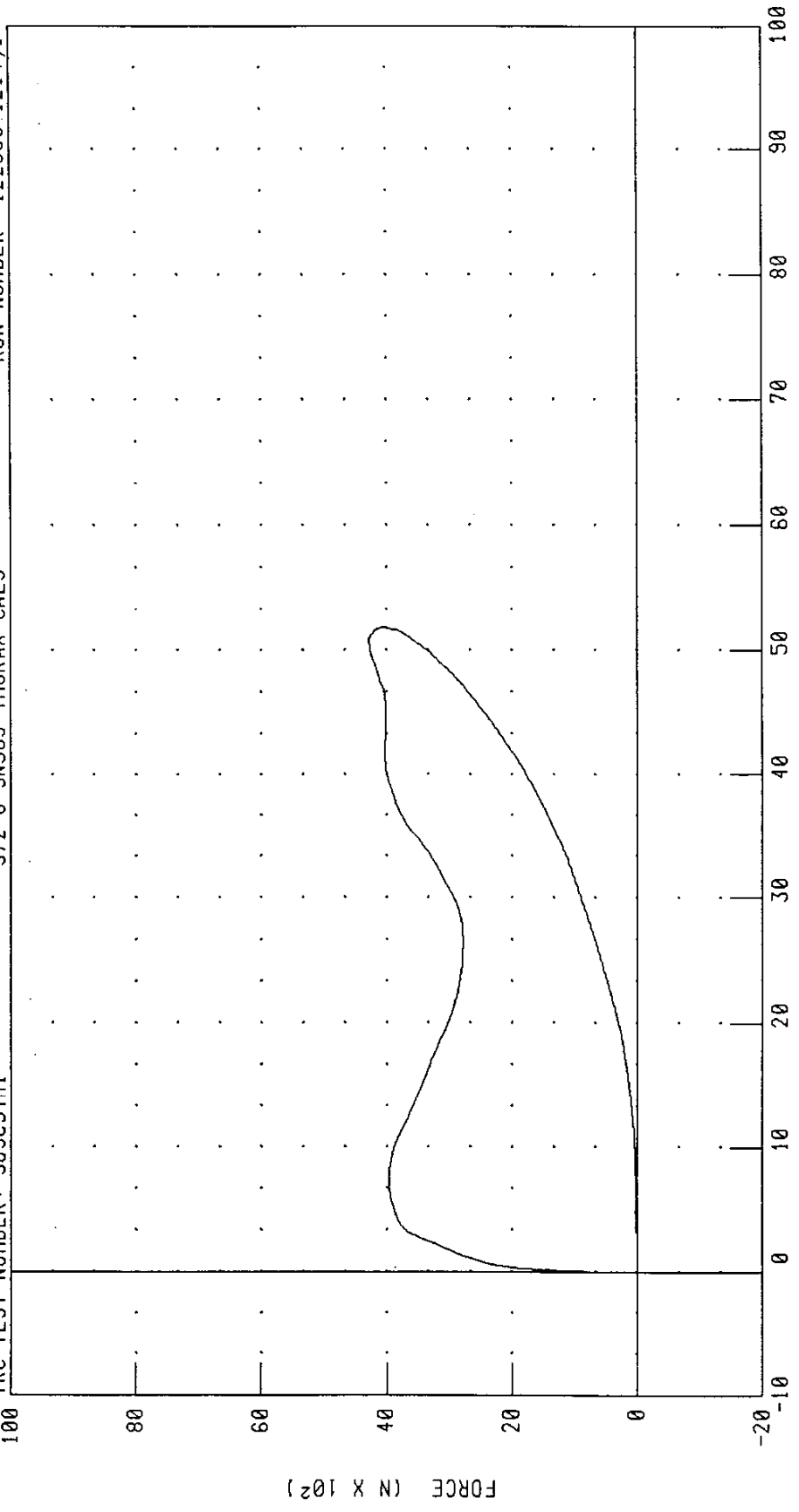
CHANNEL: CSTXD FILTER: CH. CLASS 600

RUN NUMBER: 122399.1214,1

DISPLACEMENT (MM)

PART 572-0 HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER: 369C9TH1 572 0 SN369 THORAX CAL9 RUN NUMBER: 122399.1214,1



CHANNEL: CSTXD FILTER: CH. CLASS 600 PEAK DATA: 51.88 MM @ 19.76 MS; -0.01 MM @ -3.28 MS
PENXF CH. CLASS 180 4279.00 N @ 17.20 MS; -0.11 N @ 98.72 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

23-DEC-99

TRC INC.

TEST NO: 369C9RK1

572 0 SN369 R.KNEE CAL9

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3360 - 4080 N	3791.3 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Vallance

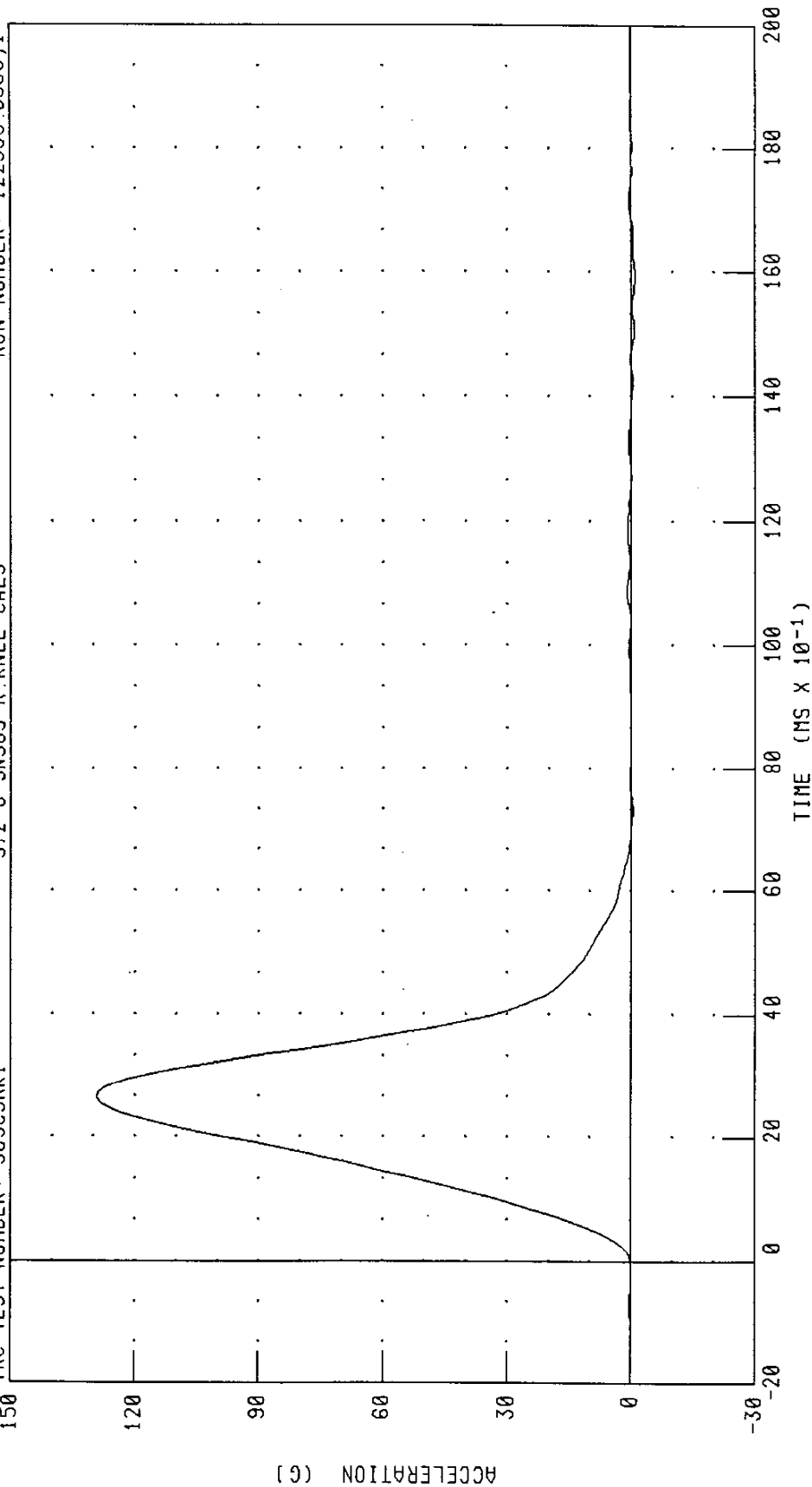
RUN NUMBER: 122399.0900;1

PART 572-0 HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 36909RK1

572 0 SN369 R.KNEE CAL9

RUN NUMBER: 122399.0900,1



CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 129.15 G @ 2.64 MS, -1.08 G @ 15.92 MS

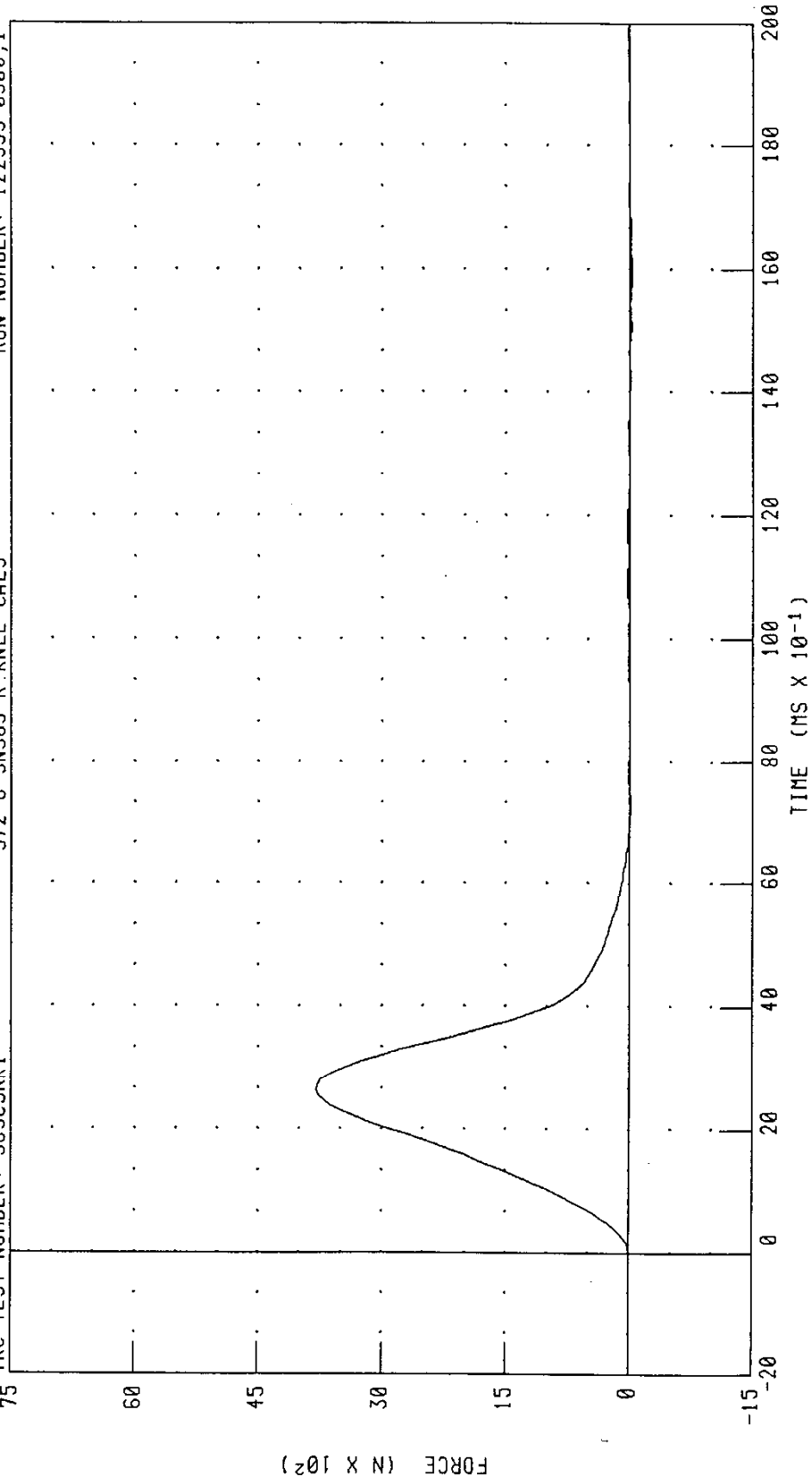
PART 572-0 HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 369C9RK1

572 0 SN369 R.KNEE CAL9

RUN NUMBER: 122399 0900;1



CHANNEL: PENXF

FILTER: CH. CLASS 600

PEAK DATA: 3791.35 N @ 2.64 MS; -31.66 N @ 15.92 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

23-DEC-99

TRC INC.

TEST NO: 369C9LK2

572 0 SN369 LEFT KNEE CAL9

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3360 - 4080 N	3732.9 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

Dustin Walker

RUN NUMBER: 122399.0914;1

PART 572-0 HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 369C9LK2

572 0 SN369 LEFT KNEE CAL9

RUN NUMBER: 122399.0916,1

150

120

90

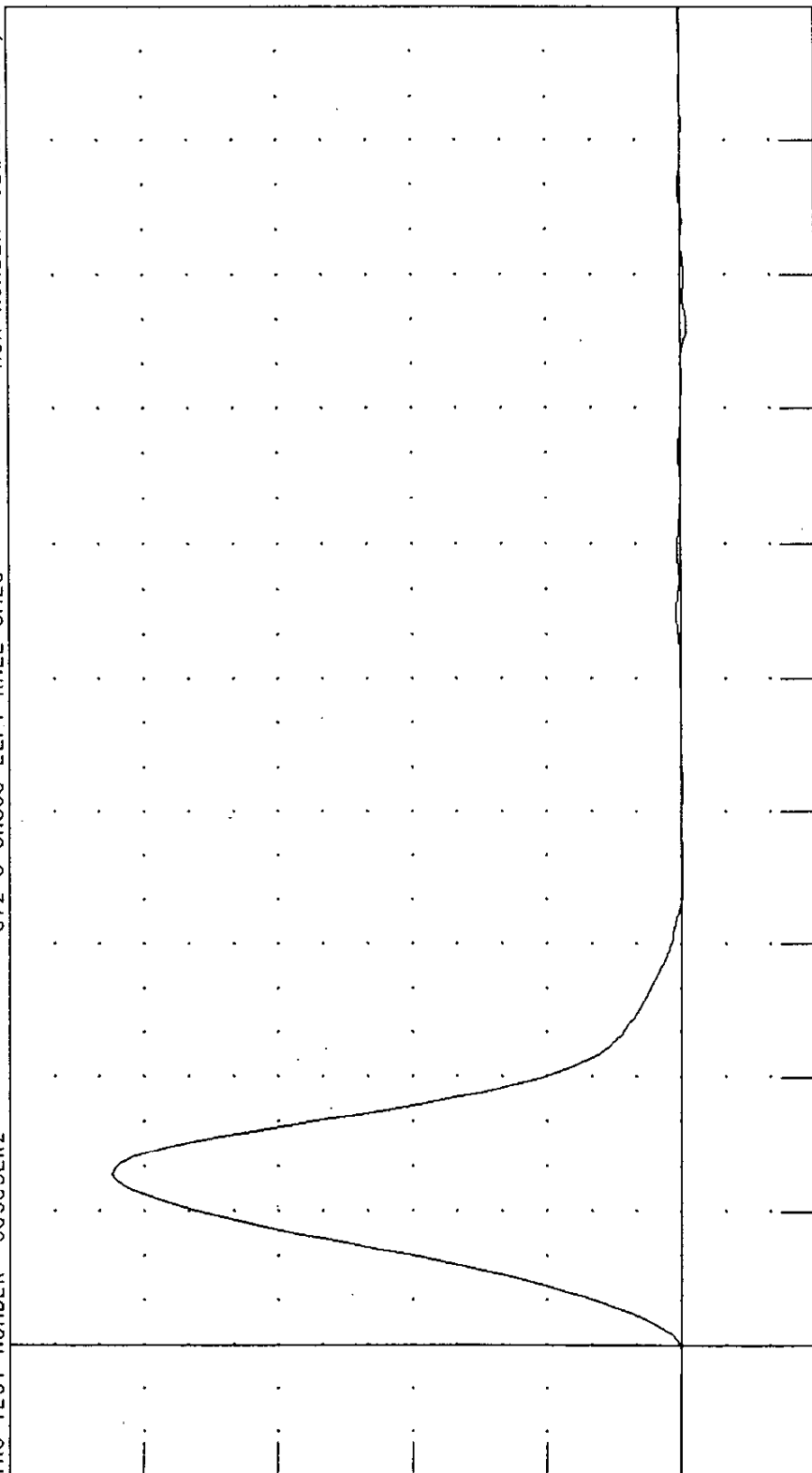
60

30

0

-30

ACCELERATION (G)



TIME (MS X 10⁻¹)

PEAK DATA: 127.16 G @ 2.56 MS, -1.43 G @ 15.28 MS

CHANNEL: PENXC FILTER: CH. CLASS 600

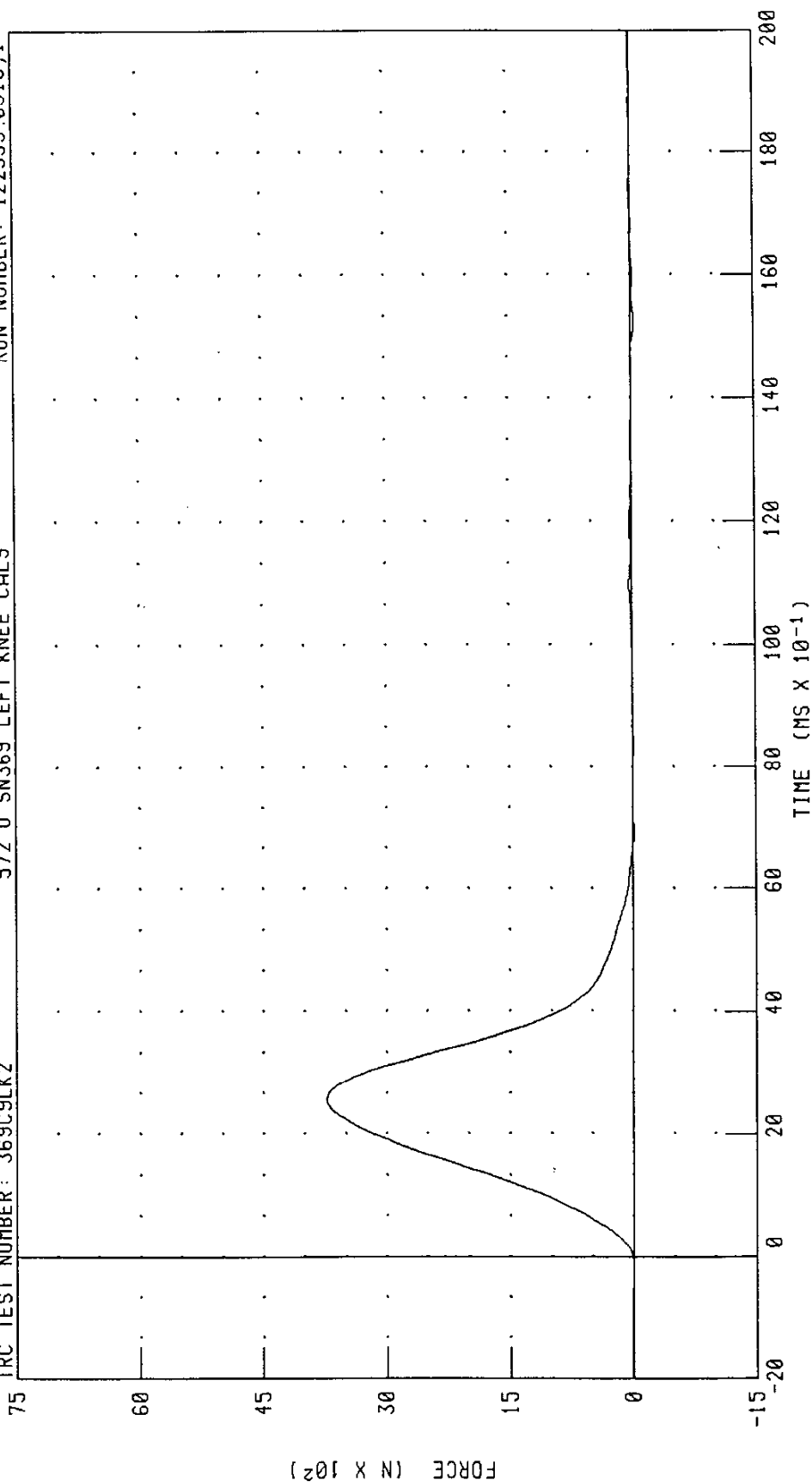
PART 572-0 HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 369C9LK2

572 0 SN369 LEFT KNEE CAL9

RUN NUMBER: 122399.0916.1



CHANNEL: PENXF

FILTER: CH. CLASS 600

PEAK DATA: 3732.95 N @ 2.56 MS, -42.03 N @ 15.28 MS

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III SMALL FEMALE

23-DEC-99

TRC INC.

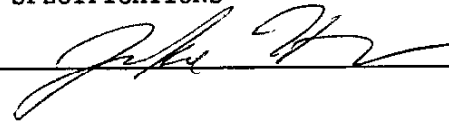
TEST NO: 283C10HD2

572 0 SN283 HEAD DROP CAL 10

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PEAK RESULTANT ACCELERATION	250 - 300 G	293.25 G
PEAK LATERAL ACCELERATION	15 G MAX	5.01 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 122399.1116;1

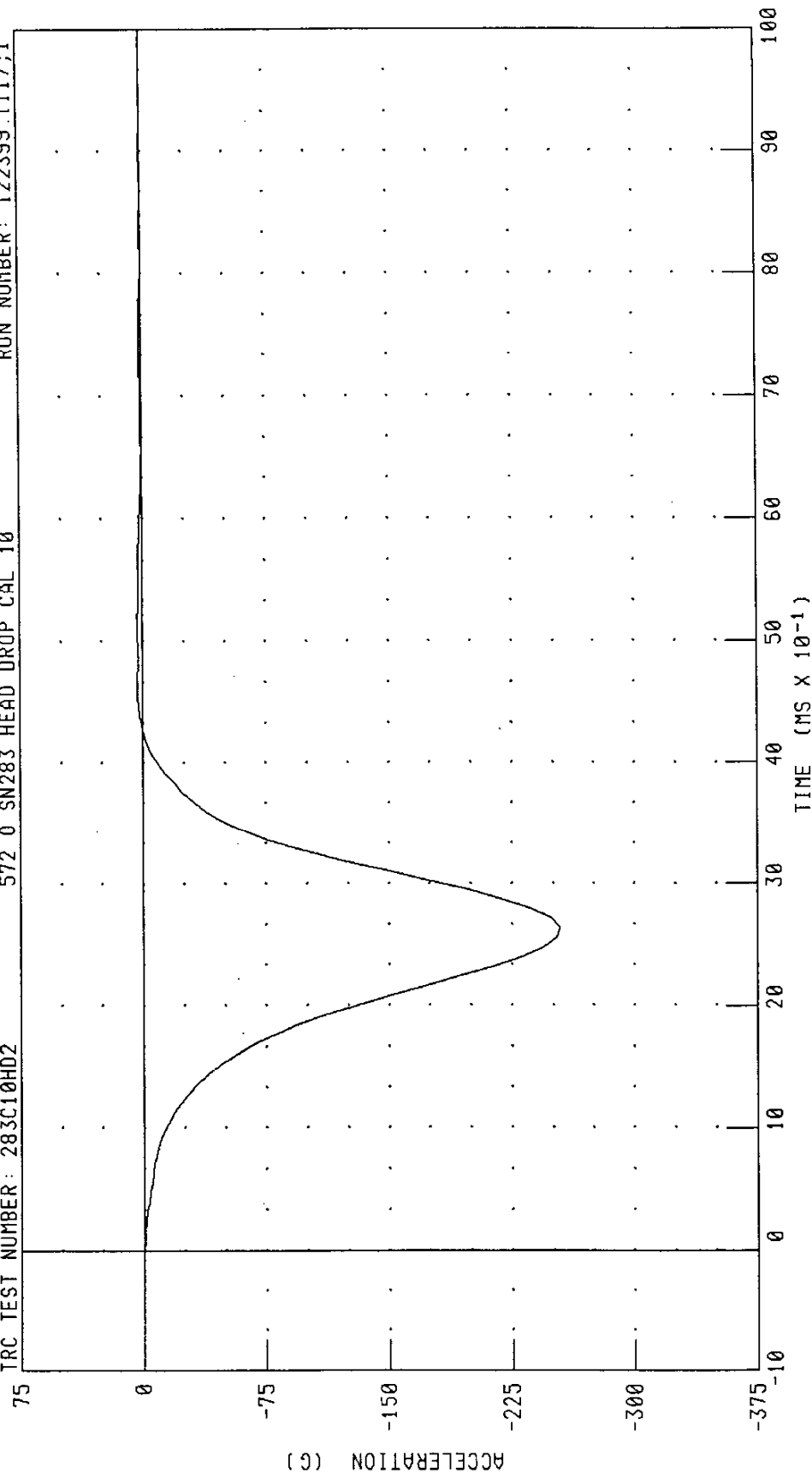
PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER: 283C10HD2

572 0 SN283 HEAD DROP CAL 10

RUN NUMBER: 122399.1117;1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

PEAK DATA: 3.63 G @ 4.64 MS; -254.12 G @ 2.64 MS

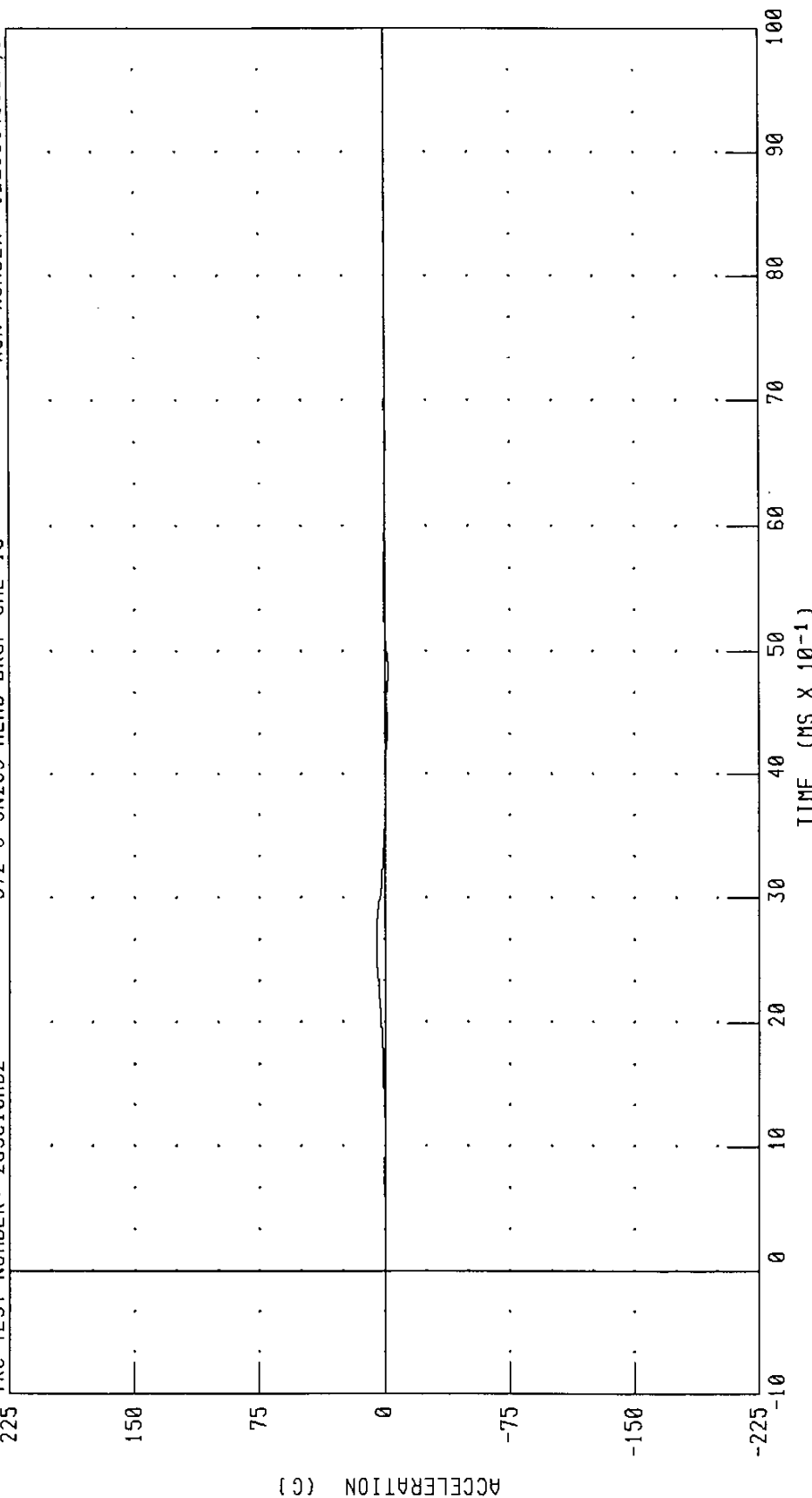
PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 283C10HD2

572 0 SN283 HEAD DROP CAL 10

RUN NUMBER: 122399.1117;1



TIME (MS X 10⁻¹)

CHANNEL: HEDYC FILTER: CH. CLASS 1000

PEAK DATA: 5.01 G @ 2.64 MS; -2.06 G @ 4.80 MS

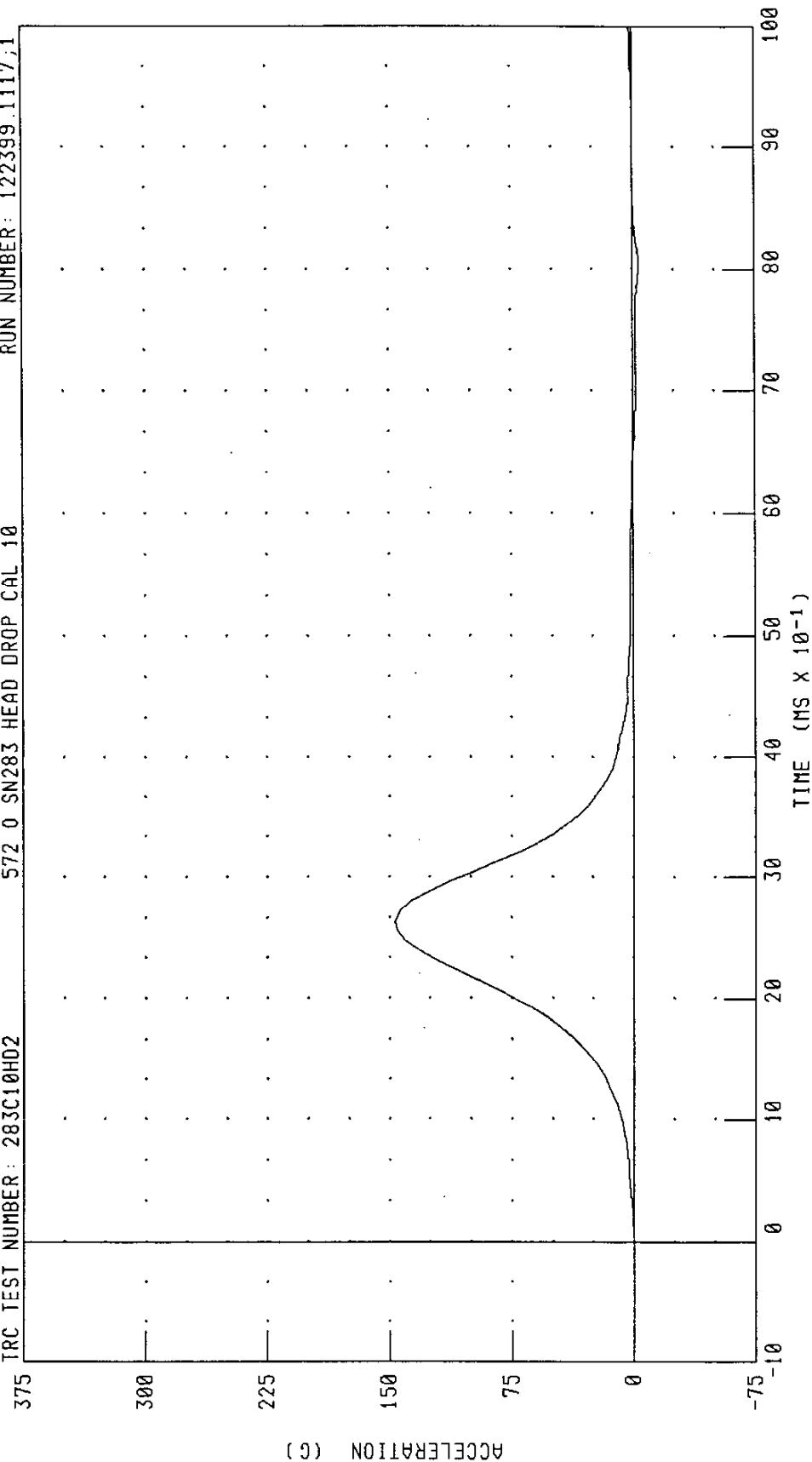
PART 572-0 HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 283C10HD2

572 0 SN283 HEAD DROP CAL 10

RUN NUMBER: 122399.1117,1



CHANNEL: HEDZG FILTER: CH. CLASS 1000 PEAK DATA: 146.29 G @ 2.64 MS, -3.65 G @ 8.00 MS

PART 572-0 HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572 0 SN283 HEAD DROP CAL 10 RUN NUMBER: 122399.1117,1

TRC TEST NUMBER: 283C10HD2

375

300

225

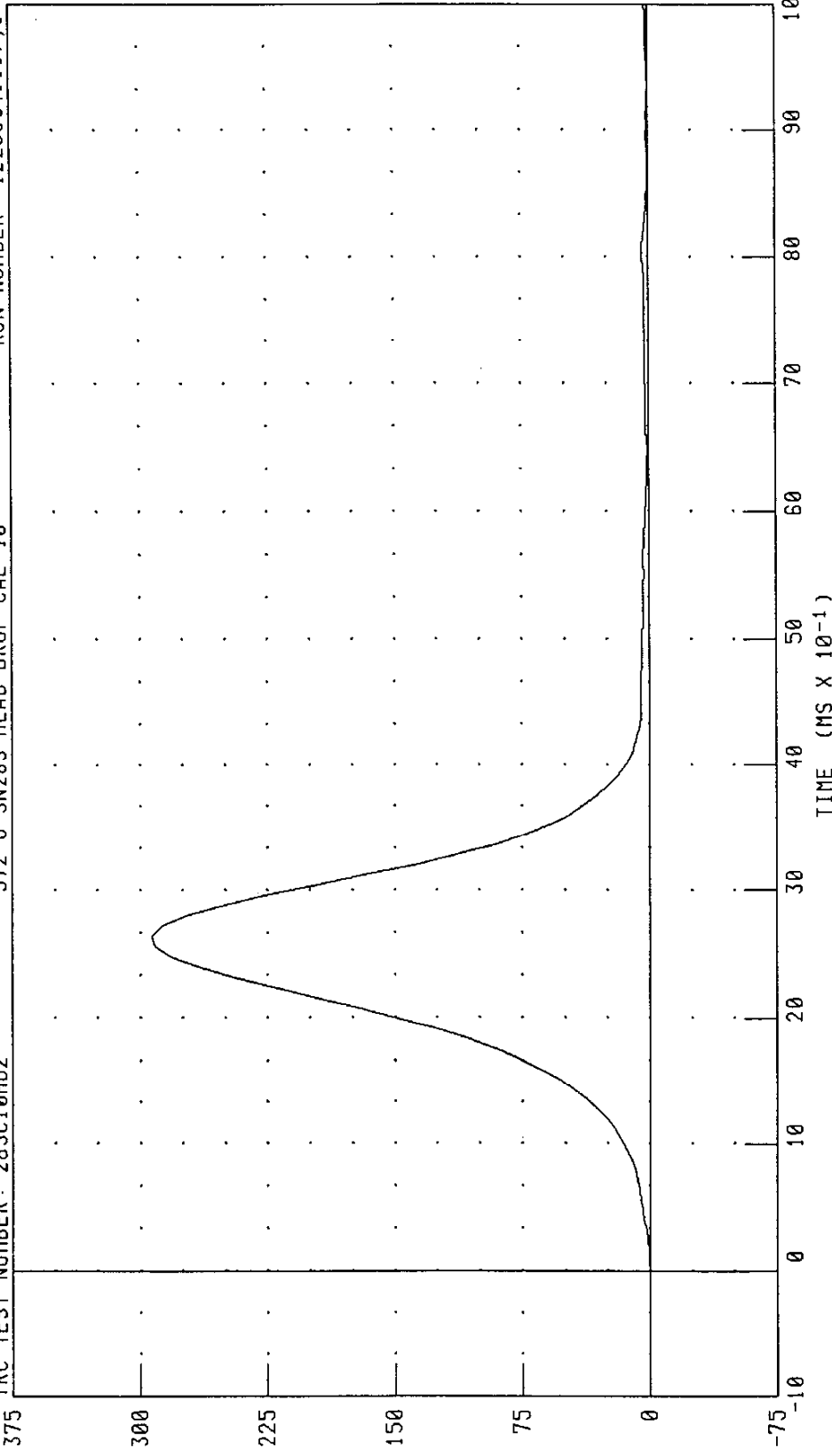
150

75

0

-75

ACCELERATION (G)



TIME (MS X 10⁻¹)

PEAK DATA: 293.26 G @ 2.64 MS; 0.13 G @ -0.72 MS

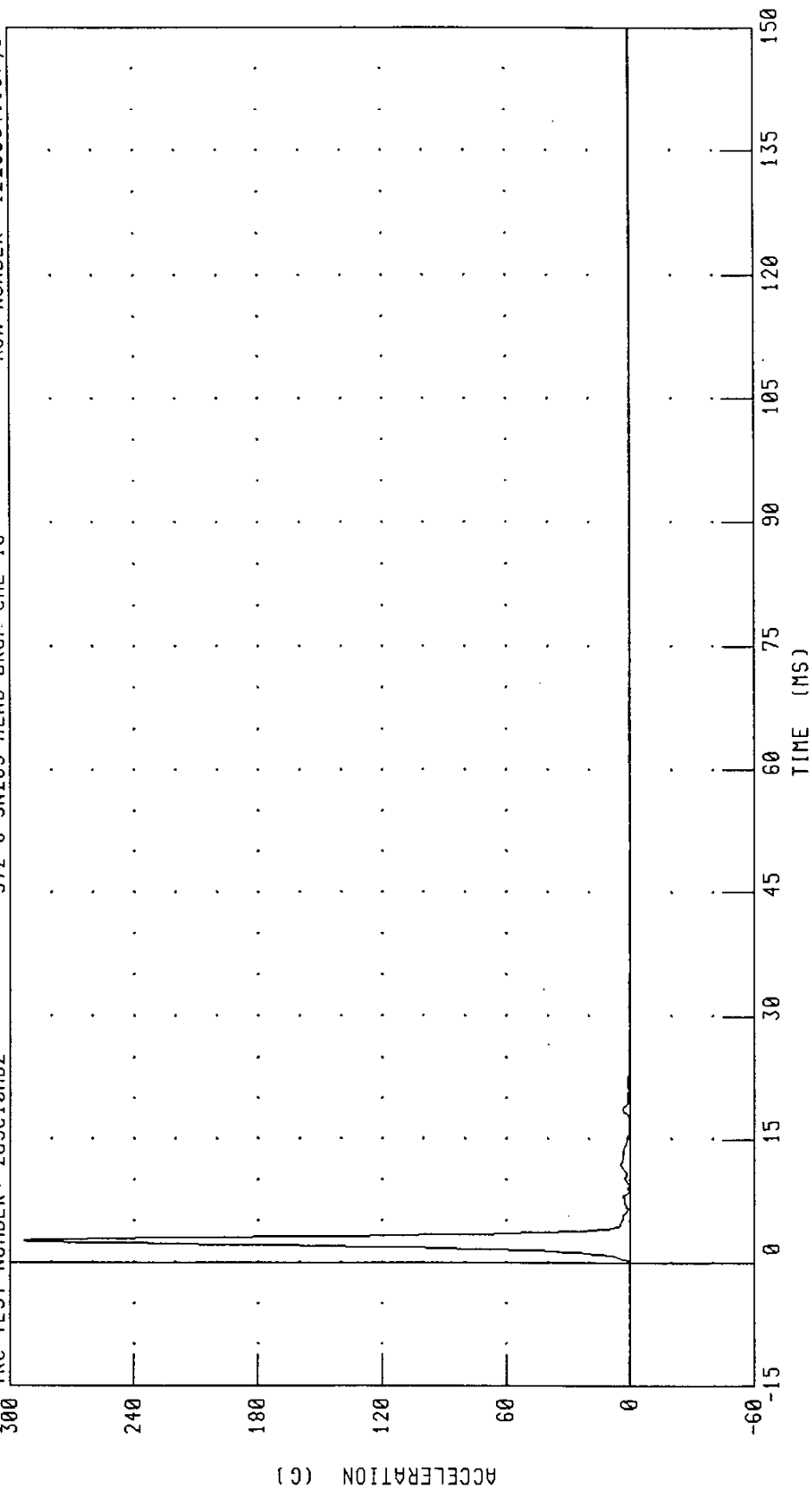
CHANNEL: HEDRC FILTER: CH. CLASS 1000

PART 572-0 HYBRID III HEAD CALIBRATION
CHECK PLOT - HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 283C10HD2

572 0 SN283 HEAD DROP CAL 10

RUN NUMBER: 122399.1117,1



CHANNEL: HEDRC FILTER: CH. CLASS 1000

PEAK DATA: 293.26 G @ 2.64 MS; 0.13 G @ -14.48 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

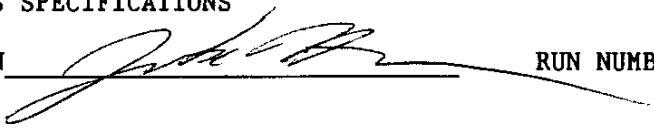
23-DEC-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 283C10NF2 572 0 SN283 NECK FLEX. CAL10

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	44.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	7.12 M/S
INTEGRATED PENDULUM VELOCITY	10 MS	2.1 - 2.5 M/S	2.25 M/S
	20 MS	4.0 - 5.0 M/S	4.36 M/S
	30 MS	5.8 - 7.0 M/S	6.18 M/S
PEAK D-PLANE ROTATION		80 - 92 DEG.	88.30 DEG.
PEAK MOMENT DURING ROTATION INTERVAL		69 - 83 NM	74.55 NM
MOMENT DECAY TIME FROM T0 TO 10NM		80 - 100 MS	90.56 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN 

RUN NUMBER: 122399.1322;1

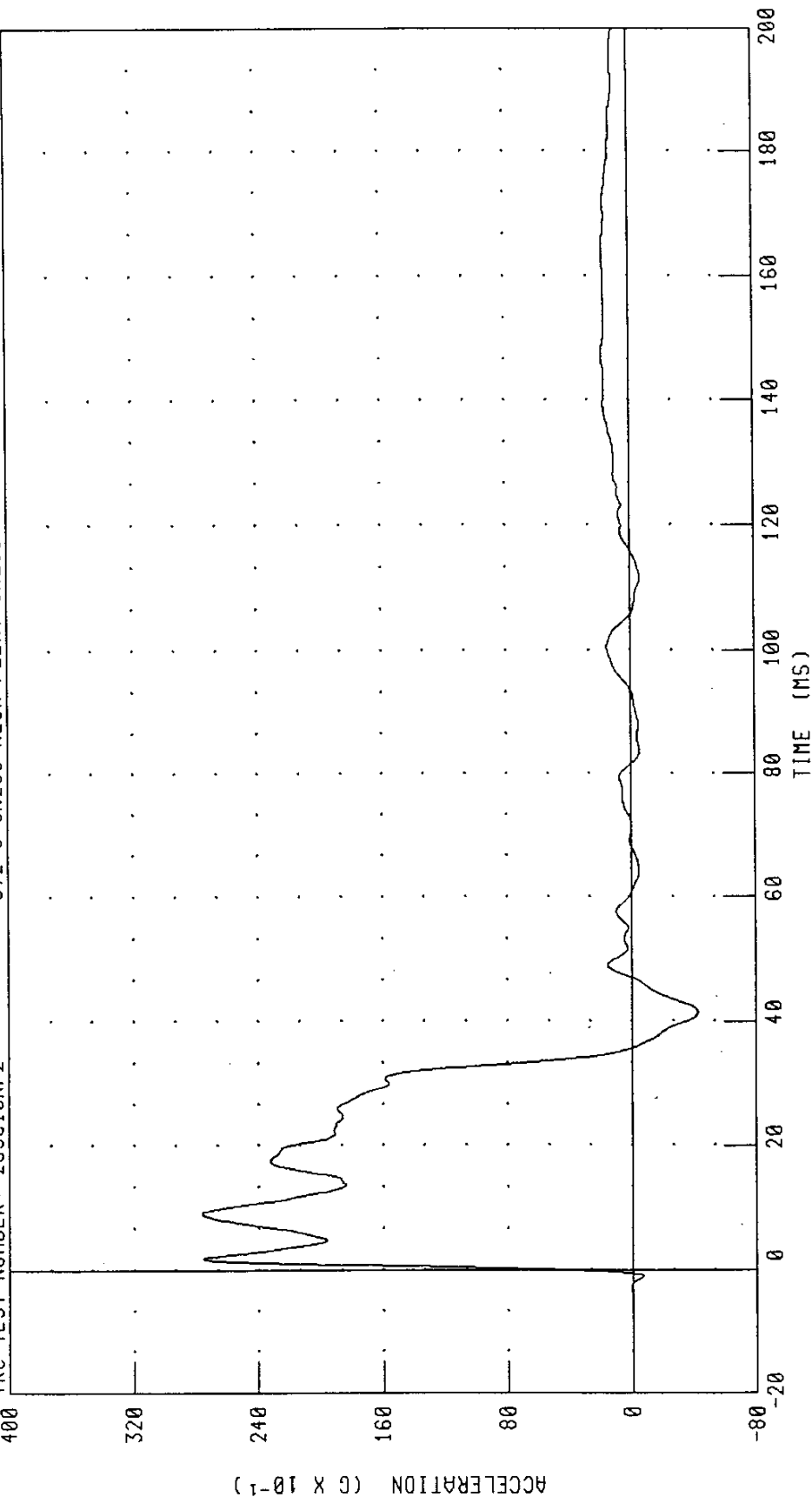
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 283C10NF2

572 0 SN283 NECK FLEX. CAL10

RUN NUMBER: 122399.1327,1



CHANNEL: PENXG FILTER: CH. CLASS 180

PART 572-0 HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 283C10NF2

572 0 SN283 NECK FLEX. CAL10

RUN NUMBER: 122399.1327;1

120

90

60

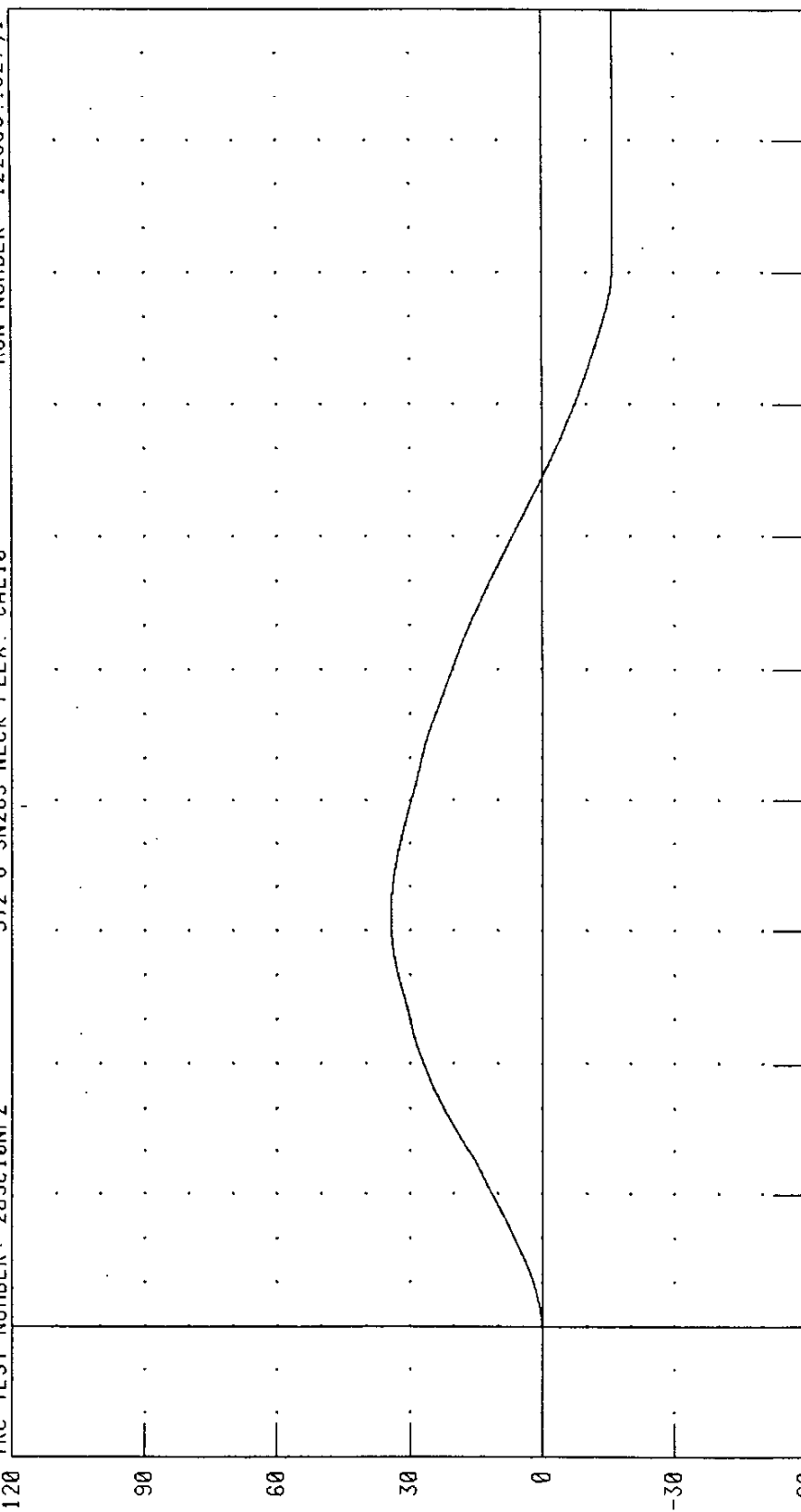
30

0

-30

-60

ANGLE (°)



TIME (MS)

PEAK DATA: 34.25 ° @ 62.40 MS, -16.09 ° @ 162.72 MS

FILTER: CH. CLASS 60

CHANNEL: BETA

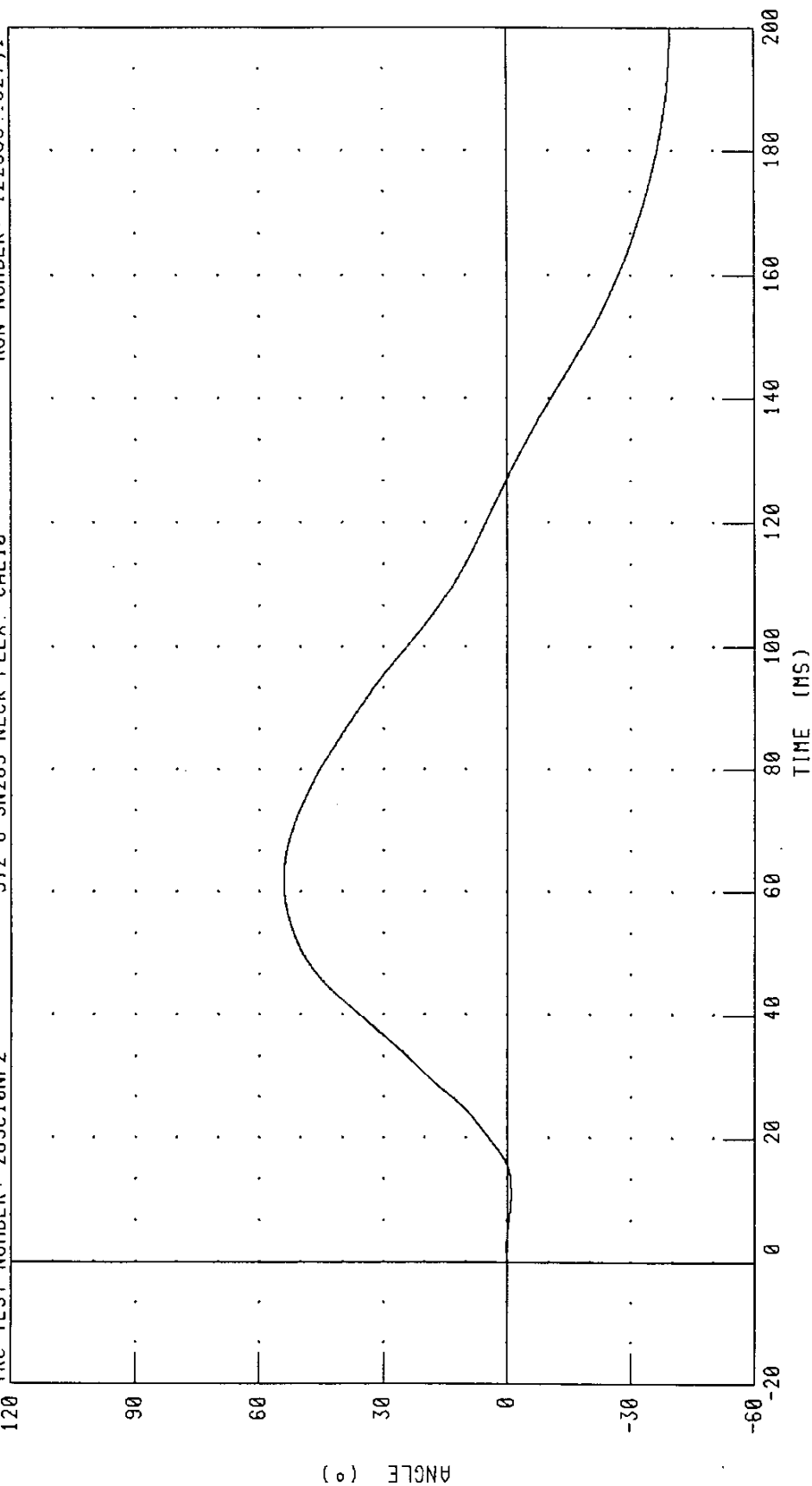
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 283C10NF2

572 0 SN283 NECK FLEX. CAL10

RUN NUMBER: 122399.327,1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 54.05 ° @ 62.16 MS; -39.72 ° @ 200.00 MS

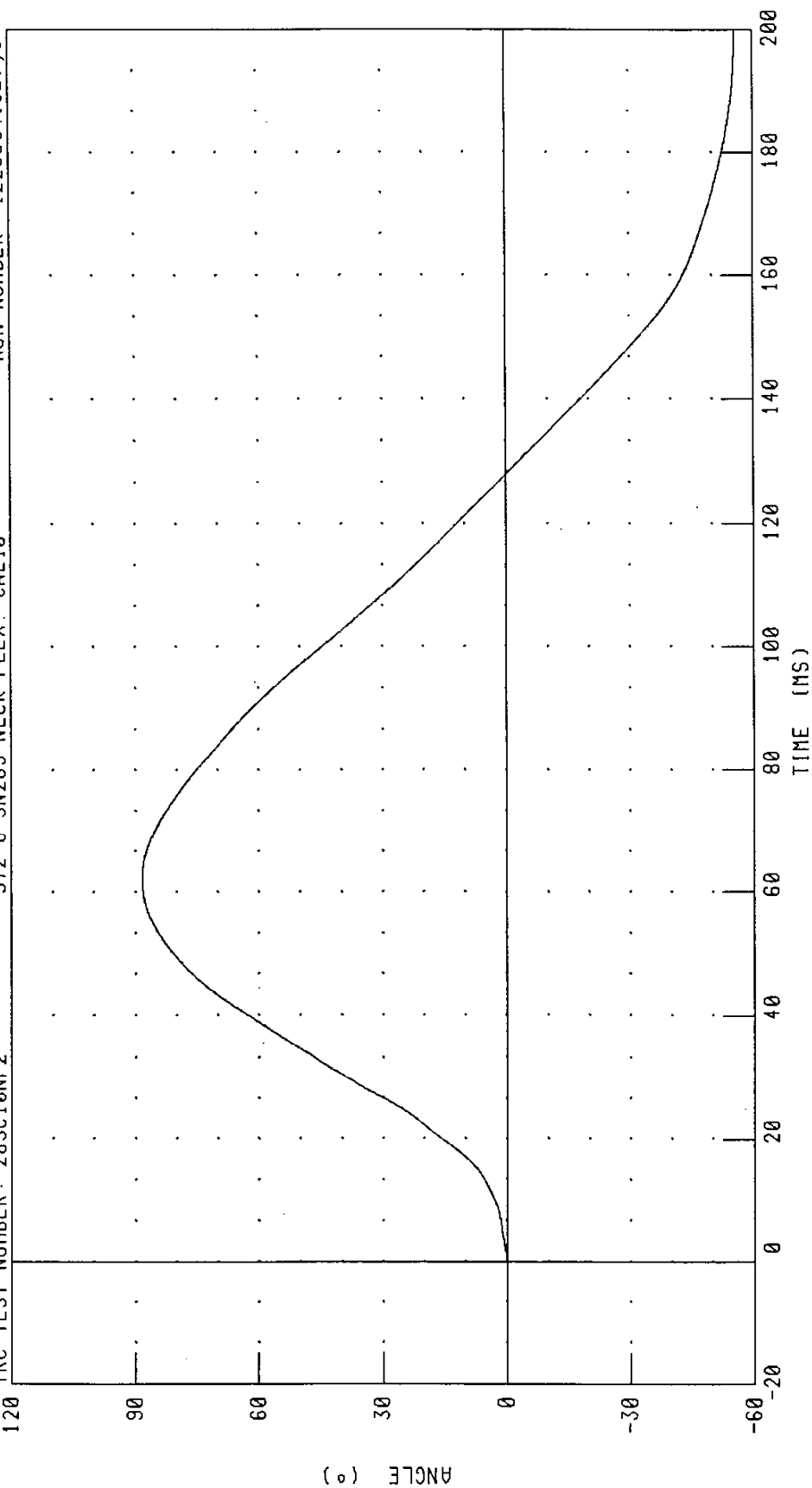
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 283C10NF2

572 0 SN283 NECK FLEX. CAL10

RUN NUMBER: 122399.1327,1



CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 88.30 ° @ 62.24 MS; -55.79 ° @ 200.00 MS

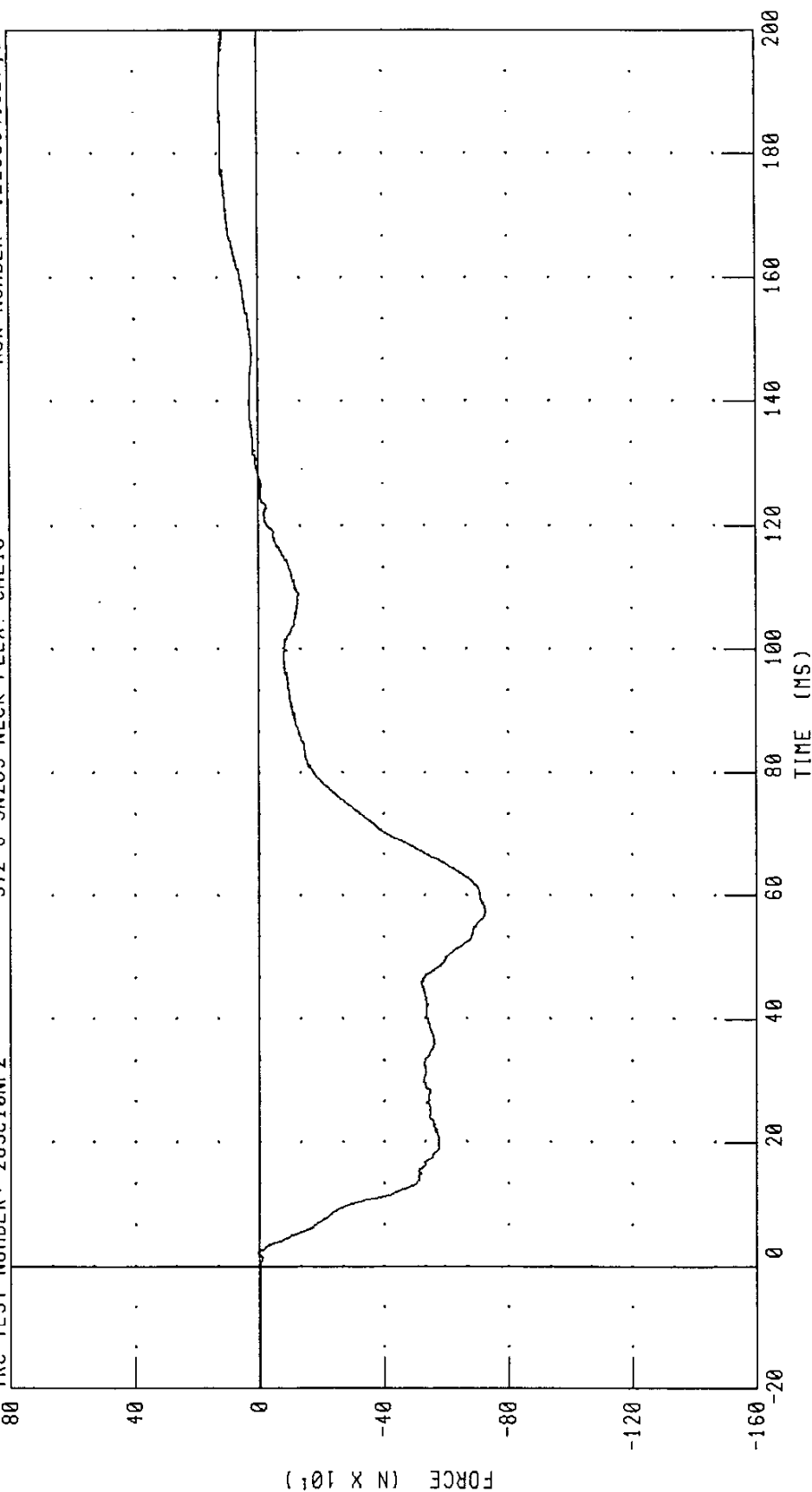
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 283C10NF2

572 0 SN283 NECK FLEX CAL10

RUN NUMBER: 122399.1327,1



CHANNEL: NEKXF FILTER: CH. CLASS 1000

PEAK DATA: 122.73 N @ 184.80 MS, -726.03 N @ 57.12 MS

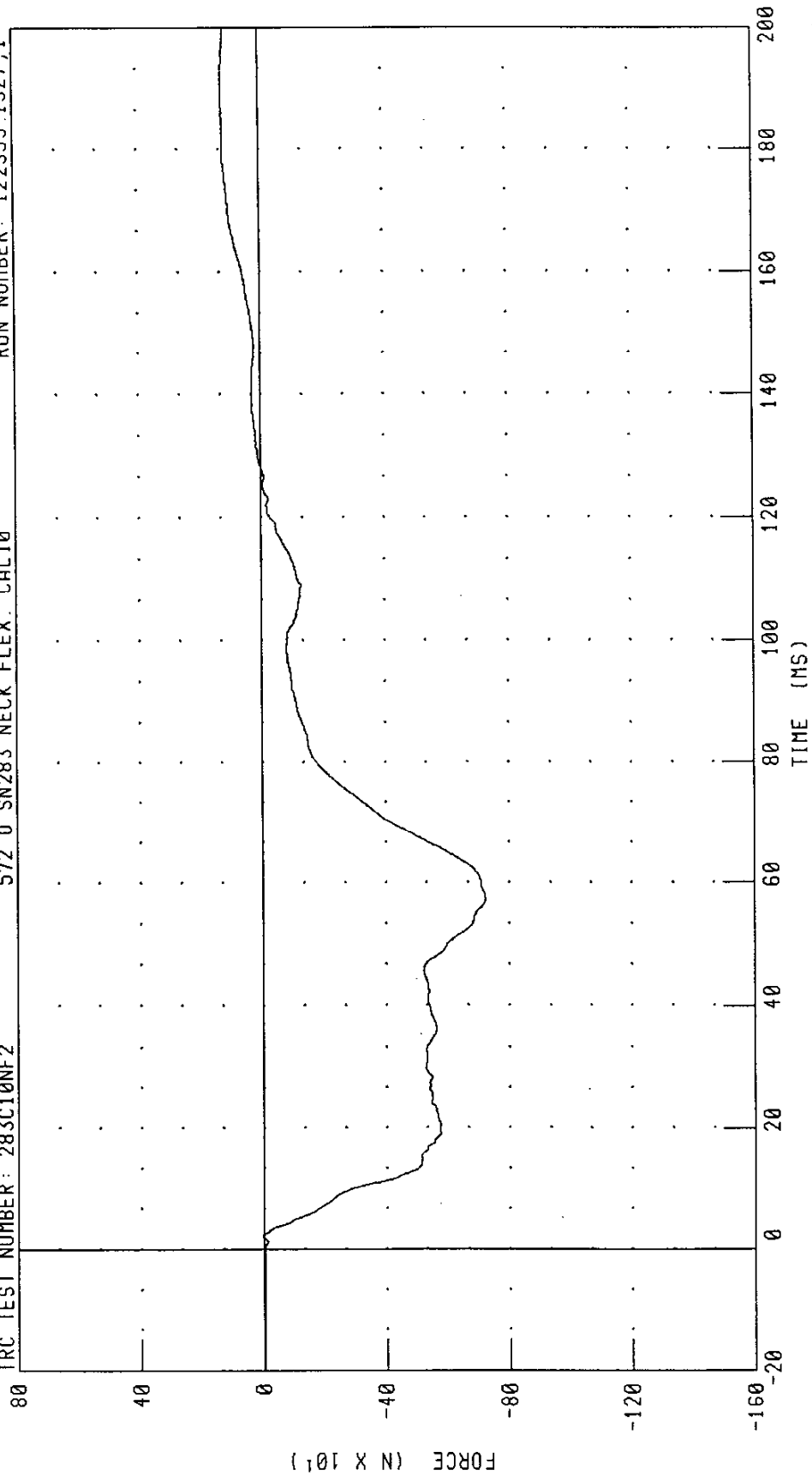
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER: 283C10NF2

572 0 SN283 NECK FLEX. CAL10

RUN NUMBER: 122399.1327;1



PEAK DATA: 122.88 N @ 185.60 MS; -725.35 N @ 57.28 MS

CHANNEL: NEKXFC FILTER: CH. CLASS 600

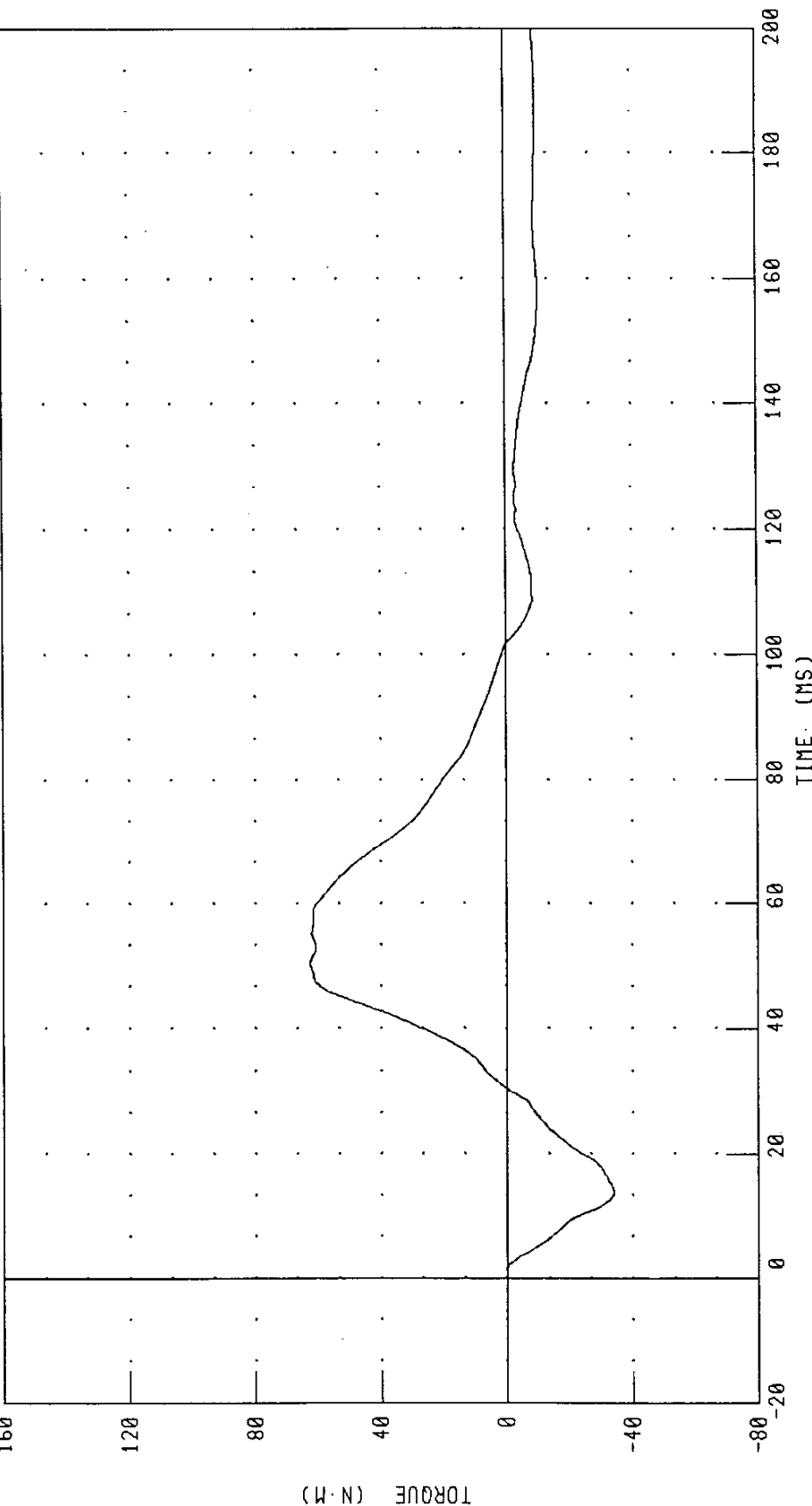
PART 572-0 HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 283C10NF2

572 0 SN283 NECK FLEX. CAL10

RUN NUMBER: 122399 :327;1



PEAK DATA: 62.58 N·M @ 50.24 MS, -33.99 N·M @ 13.76 MS

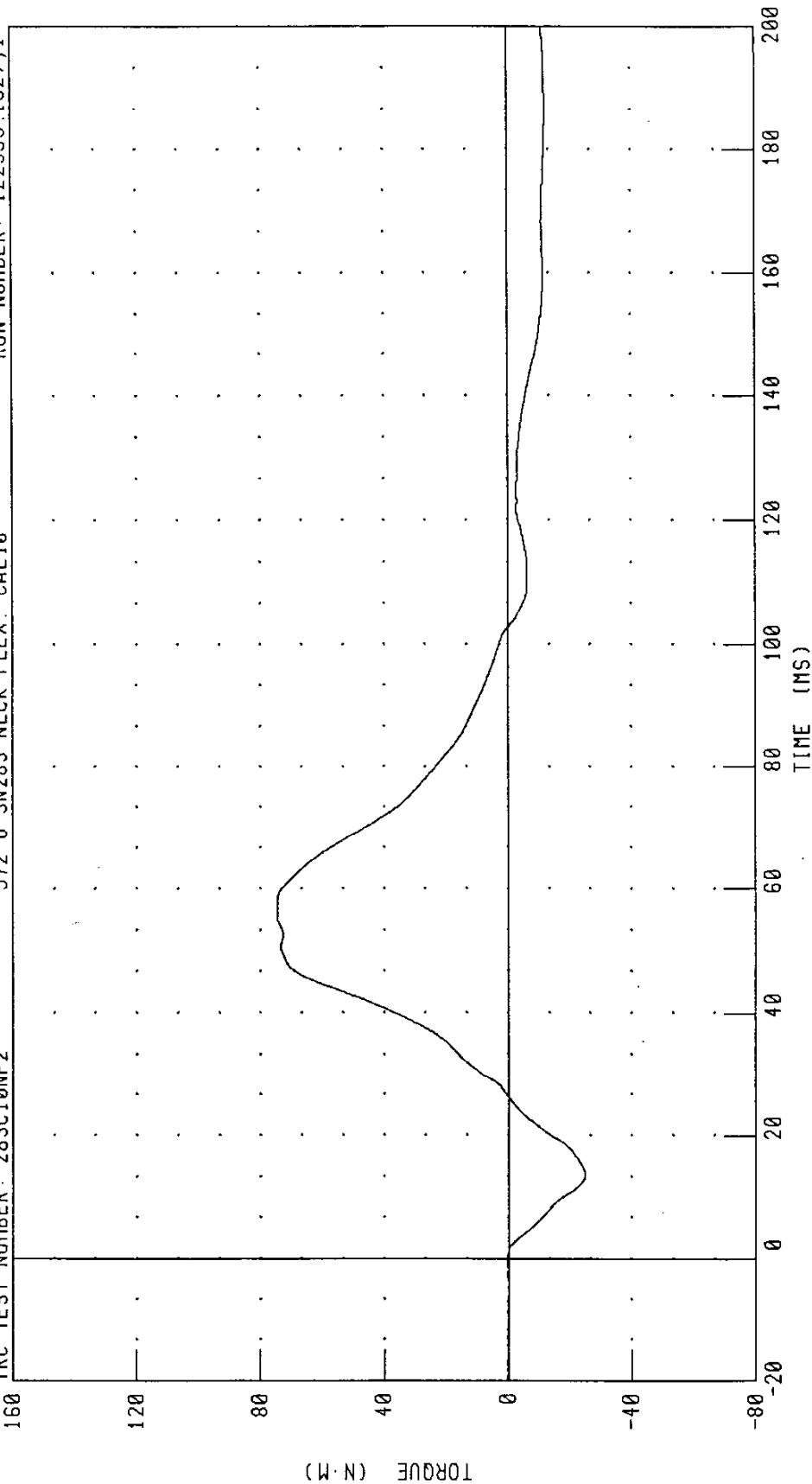
CHANNEL: NEKYM FILTER: CH. CLASS 600

PART 572-0 HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 283C10NF2

572 0 SN283 NECK FLEX. CAL10

RUN NUMBER: 122399.1327,1



CHANNEL: NEKOM FILTER: CH. CLASS 600

PEAK DATA: 74.55 N·M @ 58.00 MS; -24.93 N·M @ 13.60 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III SMALL FEMALE

23-DEC-99

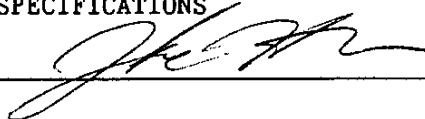
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 283C10NE1 572 0 SN283 NECK EXT. CAL 10

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
IMPACT VELOCITY	5.95 - 6.19 M/S	6.00 M/S
INTEGRATED PENDULUM VELOCITY	10 MS 1.5 - 1.9 M/S	1.65 M/S
	20 MS 3.1 - 3.9 M/S	3.18 M/S
	30 MS 4.6 - 5.6 M/S	4.63 M/S
PEAK D-PLANE ROTATION	97 - 109 DEG.	108.59 DEG.
PEAK MOMENT DURING ROTAION INTERVAL	-55 / -69 NM	-60.60 NM
MOMENT DECAY TIME FROM PEAK TO -10 NM LEVEL	94 - 114 MS	106.32 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

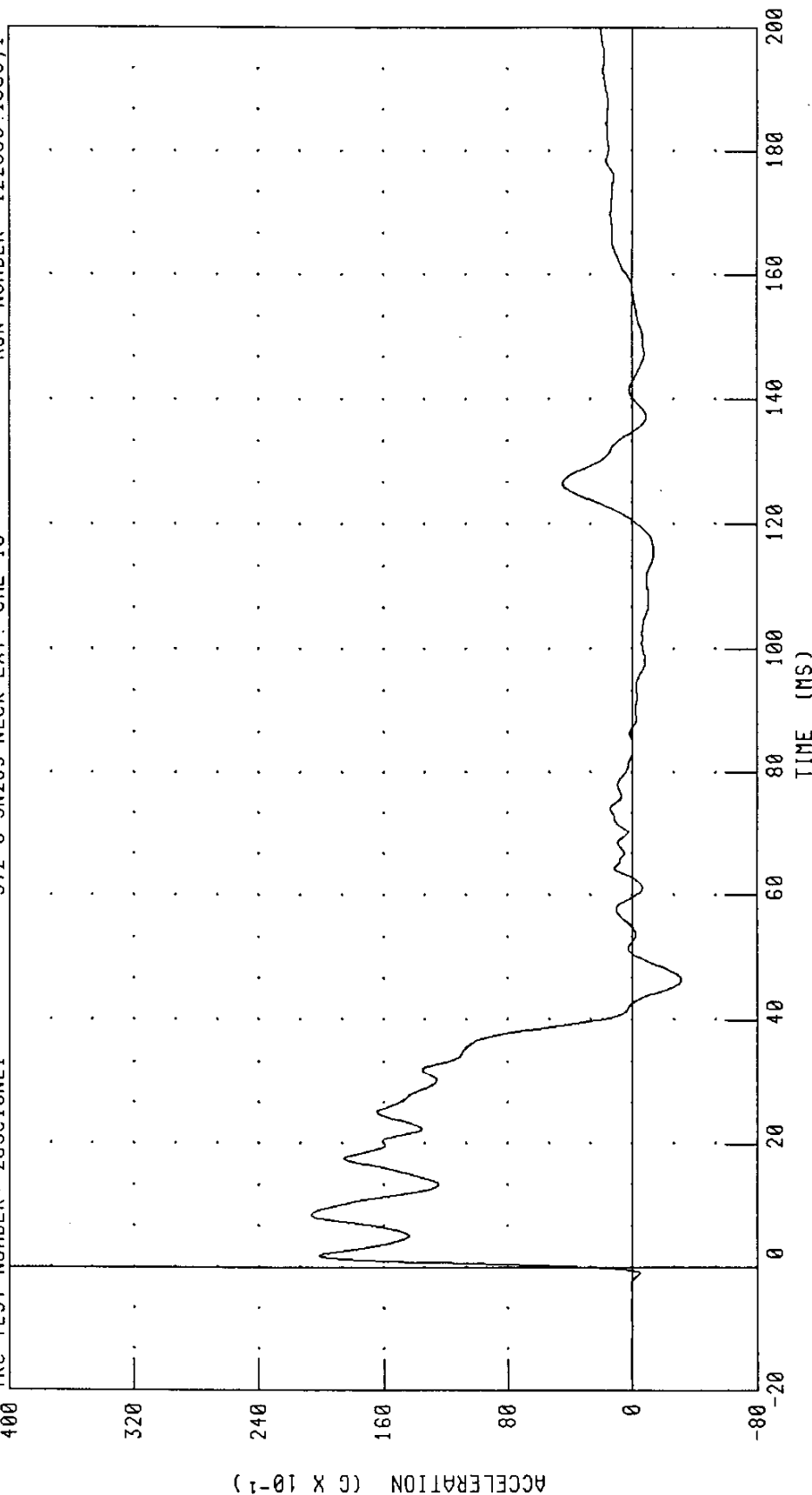


RUN NUMBER: 122399.1345;1

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 283C10NE1 572 0 SN283 NECK EXT. CAL 10 RUN NUMBER: 122399.1350;1



CHANNEL: PENXC FILTER: CH. CLASS 180 PEAK DATA: 20.64 G @ 8.56 MS; -3.14 G @ 46.48 MS

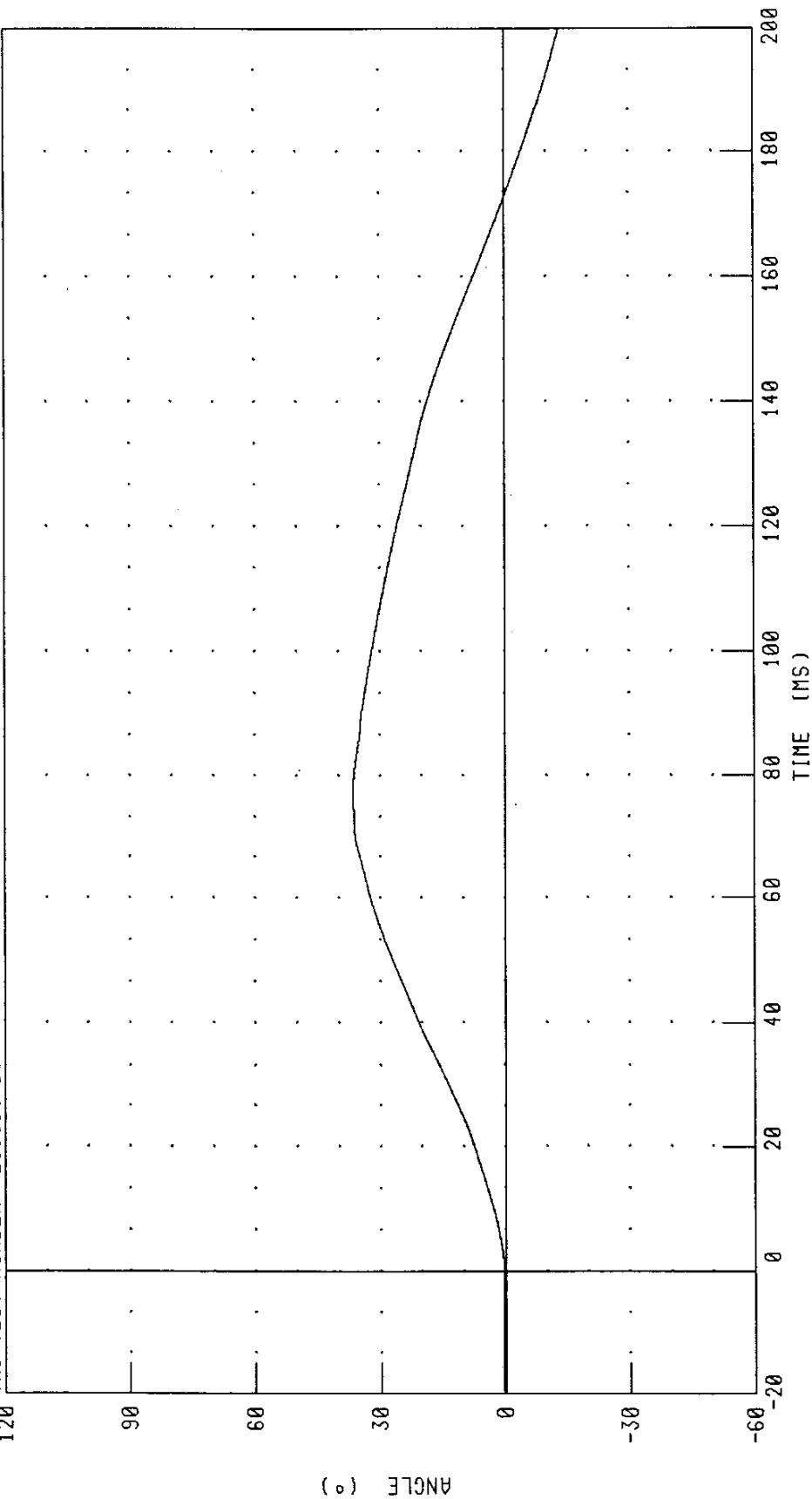
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER: 283C10NE1

572 0 SN283 NECK EXT. CAL 10

RUN NUMBER: 122399.1350;1



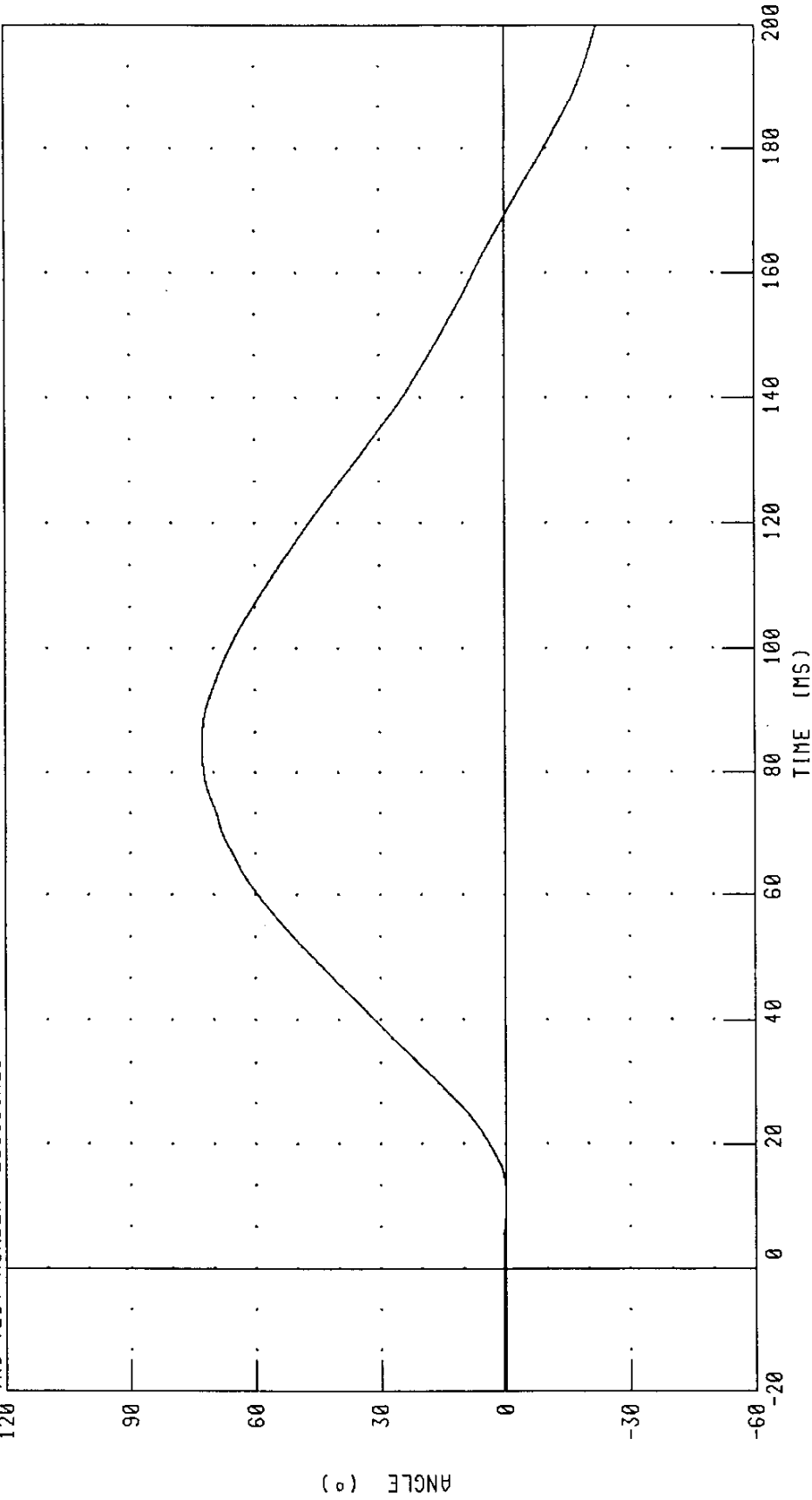
PEAK DATA: 36.48 ° @ 77.36 MS, -13.24 ° @ 200.00 MS

FILTER: CH. CLASS 60

CHANNEL: BETA

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 283C10NE1 572 0 SN283 NECK EXT. CAL 10 RUN NUMBER: 122399.1350,1



CHANNEL: THETA FILTER: CH. CLASS 60 PEAK DATA: 72.62 ° @ 84.40 MS, -22.16 ° @ 200.00 MS

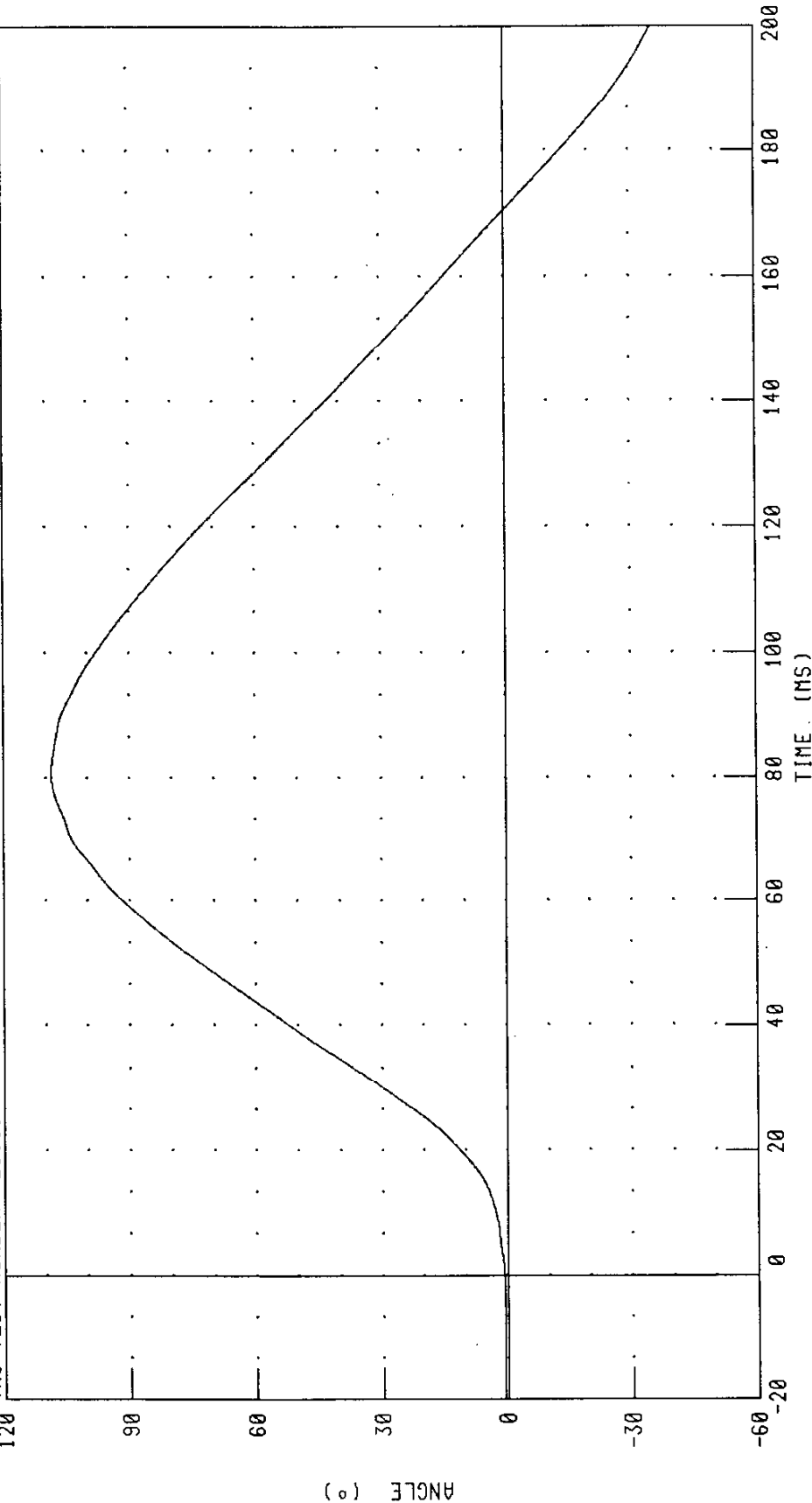
PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 283C10NE1

572 0 SN283 NECK EXT. CAL 10

RUN NUMBER: 122399.1350,1



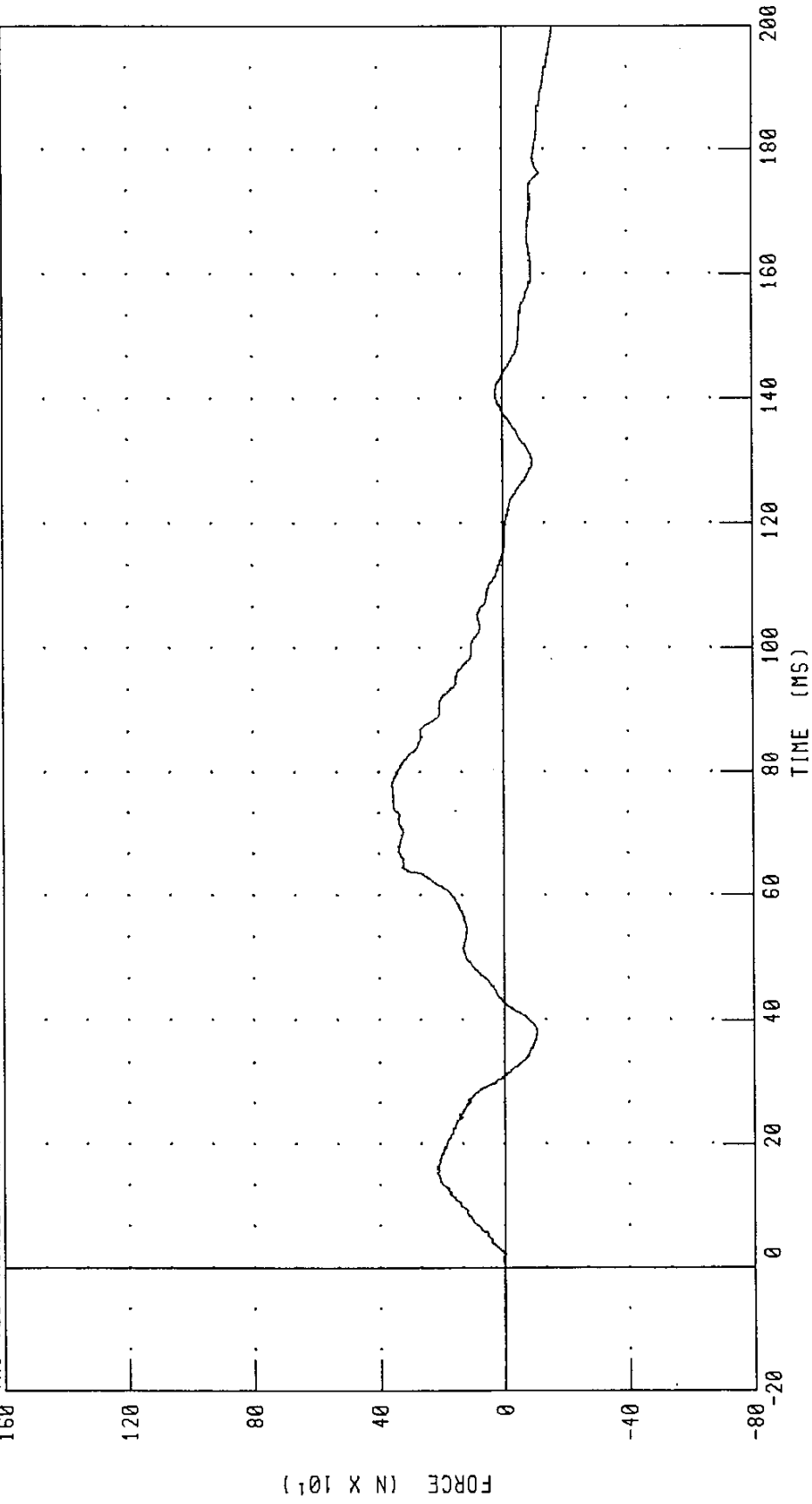
CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 108.60 ° @ 80.64 MS; -35.40 ° @ 200.00 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

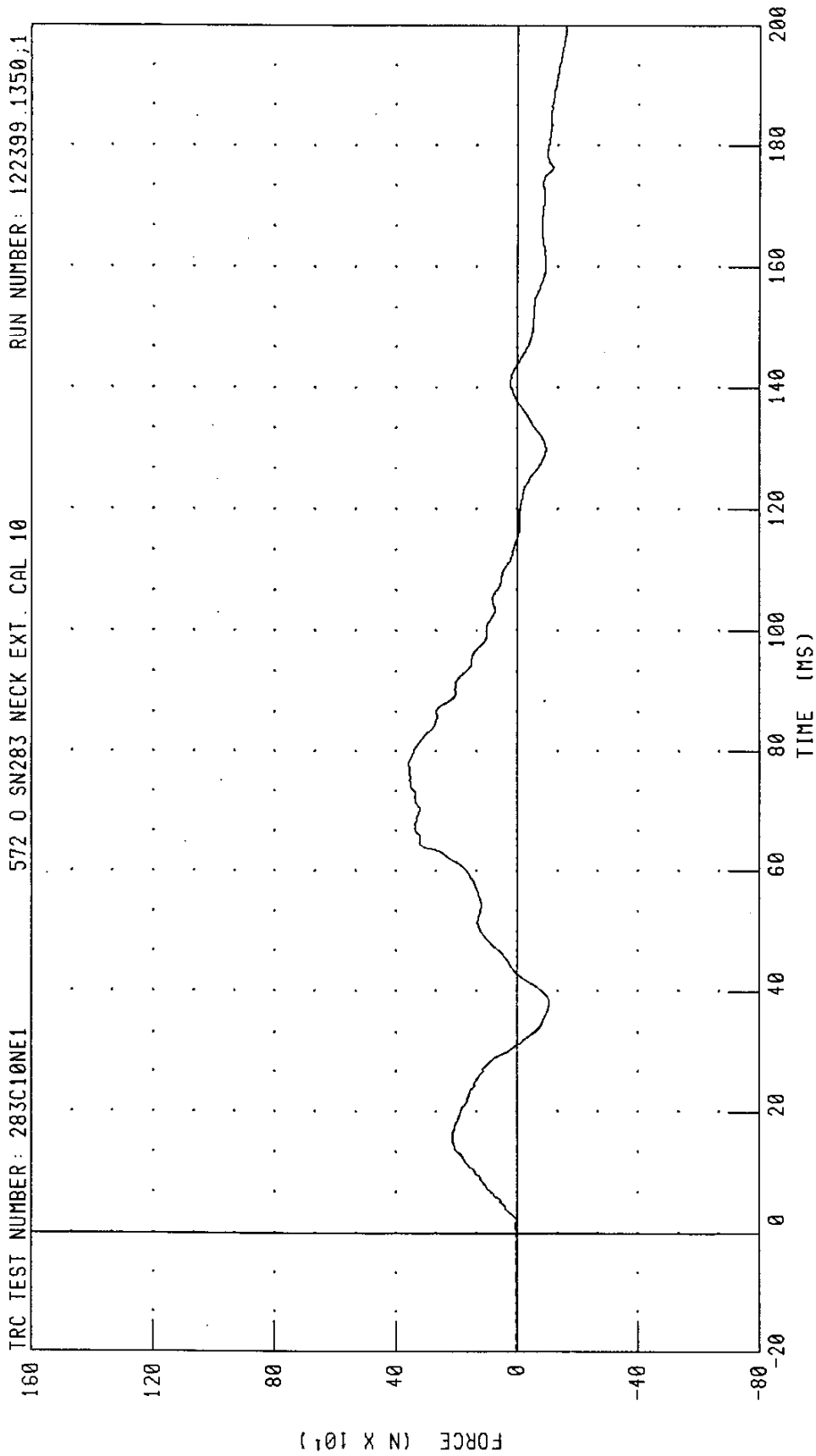
NECK FORCE X AXIS

TRC TEST NUMBER: 283C10NE1 572 0 SN283 NECK EXT. CAL 10 RUN NUMBER: 122399.1350;1



CHANNEL: NEKXF FILTER: CH. CLASS 1000 PEAK DATA: 358.80 N @ 77.60 MS, -161.41 N @ 198.24 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

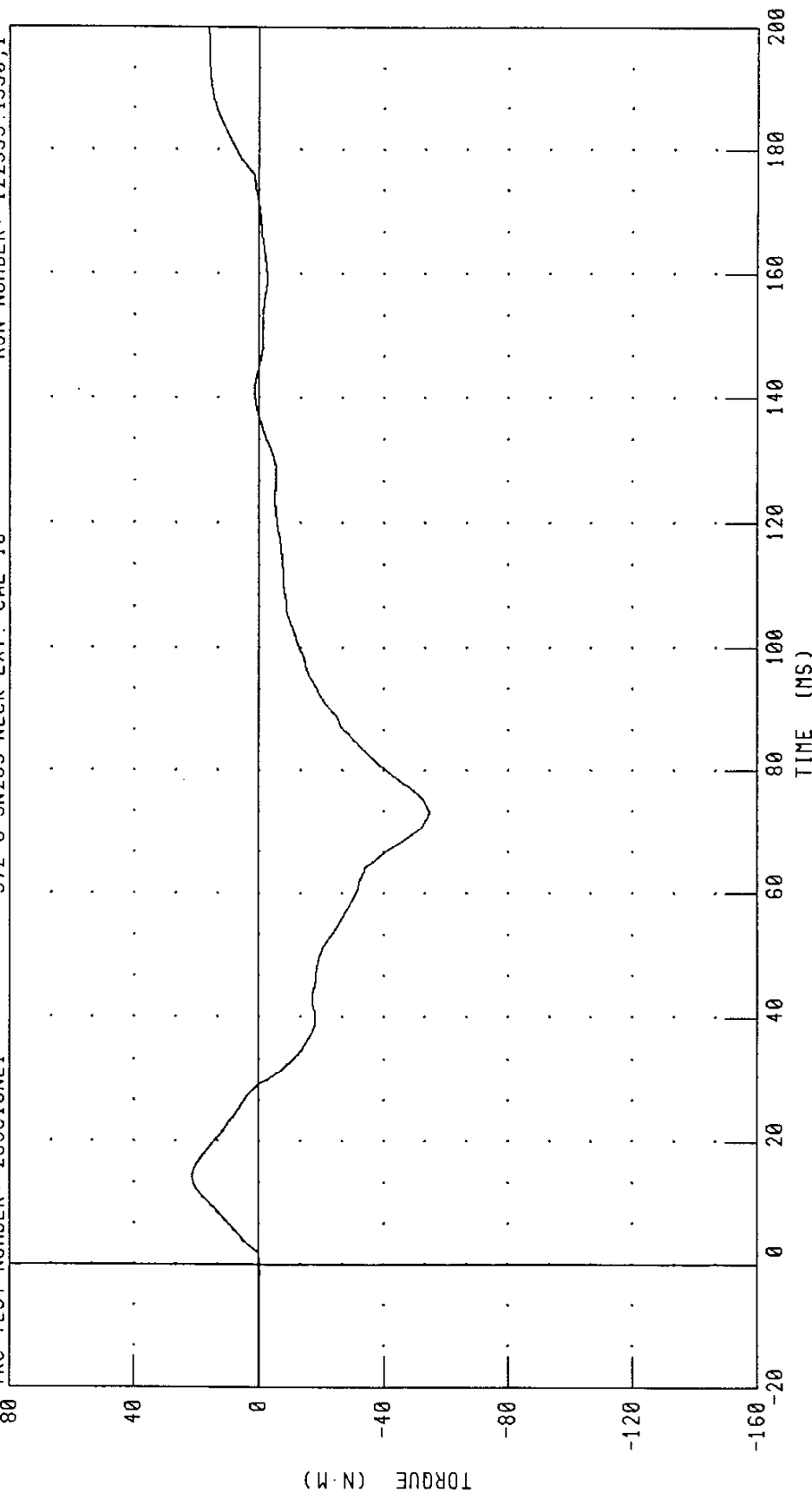


CHANNEL: NEKXFC FILTER: CH. CLASS 600 PEAK DATA: 358.50 N @ 77.92 MS, -162.20 N @ 200.00 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION

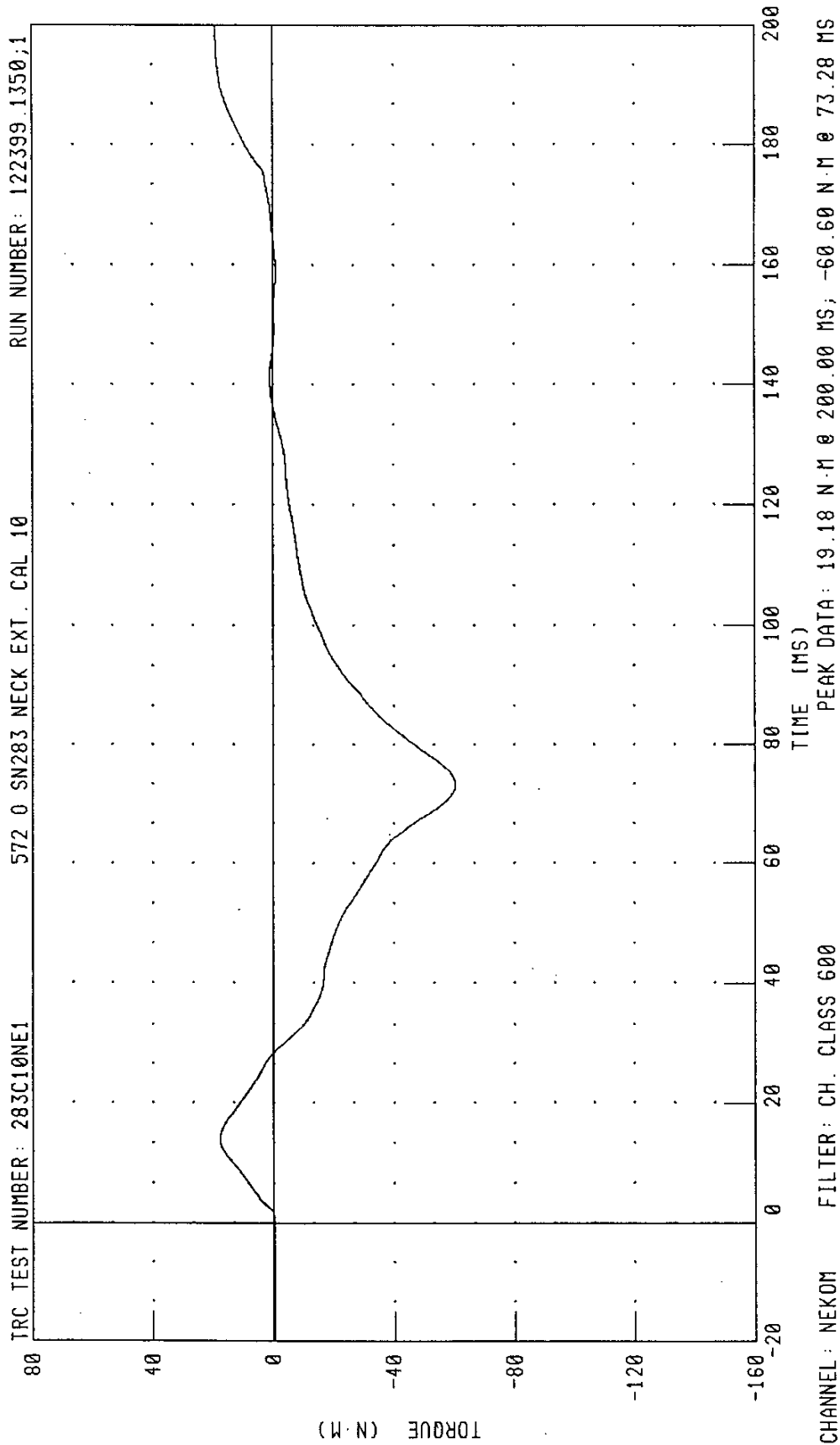
NECK MOMENT Y AXIS

TRC TEST NUMBER: 283C10NE1 572 0 SN283 NECK EXT. CAL 10 RUN NUMBER: 122399.1350.1



CHANNEL: NEKYM FILTER: CH. CLASS 600 PEAK DATA: 21.36 N·M @ 14.08 MS, -54.65 N·M @ 73.20 MS

PART 572-0 HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE



TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE

23-DEC-99

TRC INC.

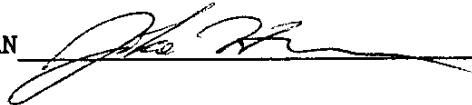
TEST NO: 283C10TH2

572 0 SN283 THORAX CAL10

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	48 - 55 MM	49.2 MM
MAXIMUM RESISTIVE FORCE	3900 - 4400 N	4474. N *
INTERNAL HYSTERESIS	69% - 85%	74.4%

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 122399.1519;1

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III SMALL FEMALE

23-DEC-99

TRC INC.

TEST NO: 283C10TH2

572 0 SN283 THORAX CAL10

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	51 - 58 ⁴⁸⁻⁵⁵ MM	49.2 MM ✓
MAXIMUM RESISTIVE FORCE	3800 - 4300 ^{3900 - 4400} N	4474. N *
INTERNAL HYSTERESIS	69% - 85%	74.4%

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN _____

RUN NUMBER: 122399.1519;1

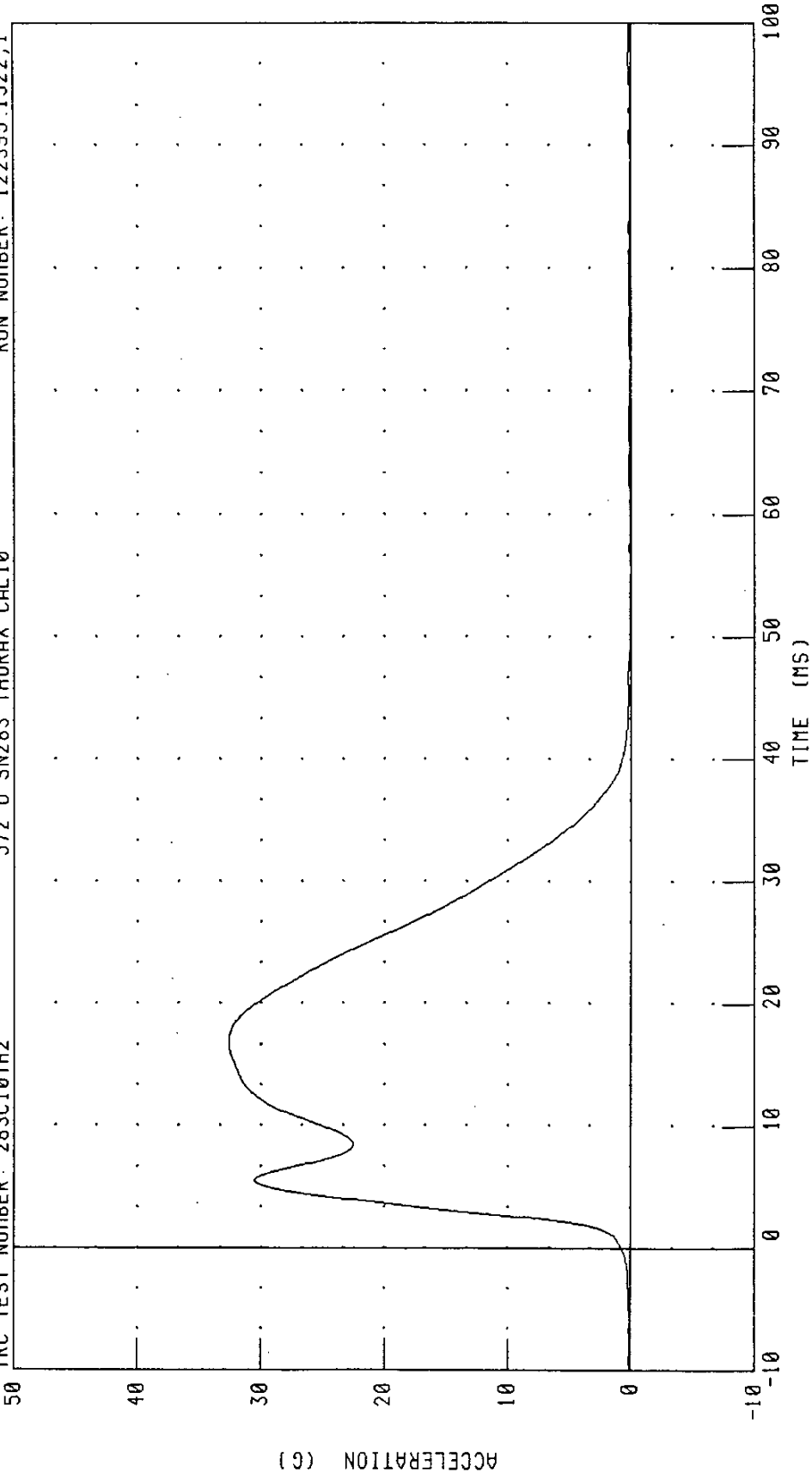
PART 572-0 HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 283C10TH2

572 0 SN283 THORAX CAL10

RUN NUMBER: 122399.1522,1



CHANNEL: PENXC

FILTER: CH. CLASS 180

PEAK DATA: 32.61 G @ 16.88 MS; 0.01 G @ 55.60 MS

PART 572-0 HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 283C10TH2

572 0 SN283 THORAX CAL10

RUN NUMBER: 122399.1522;1

100

80

60

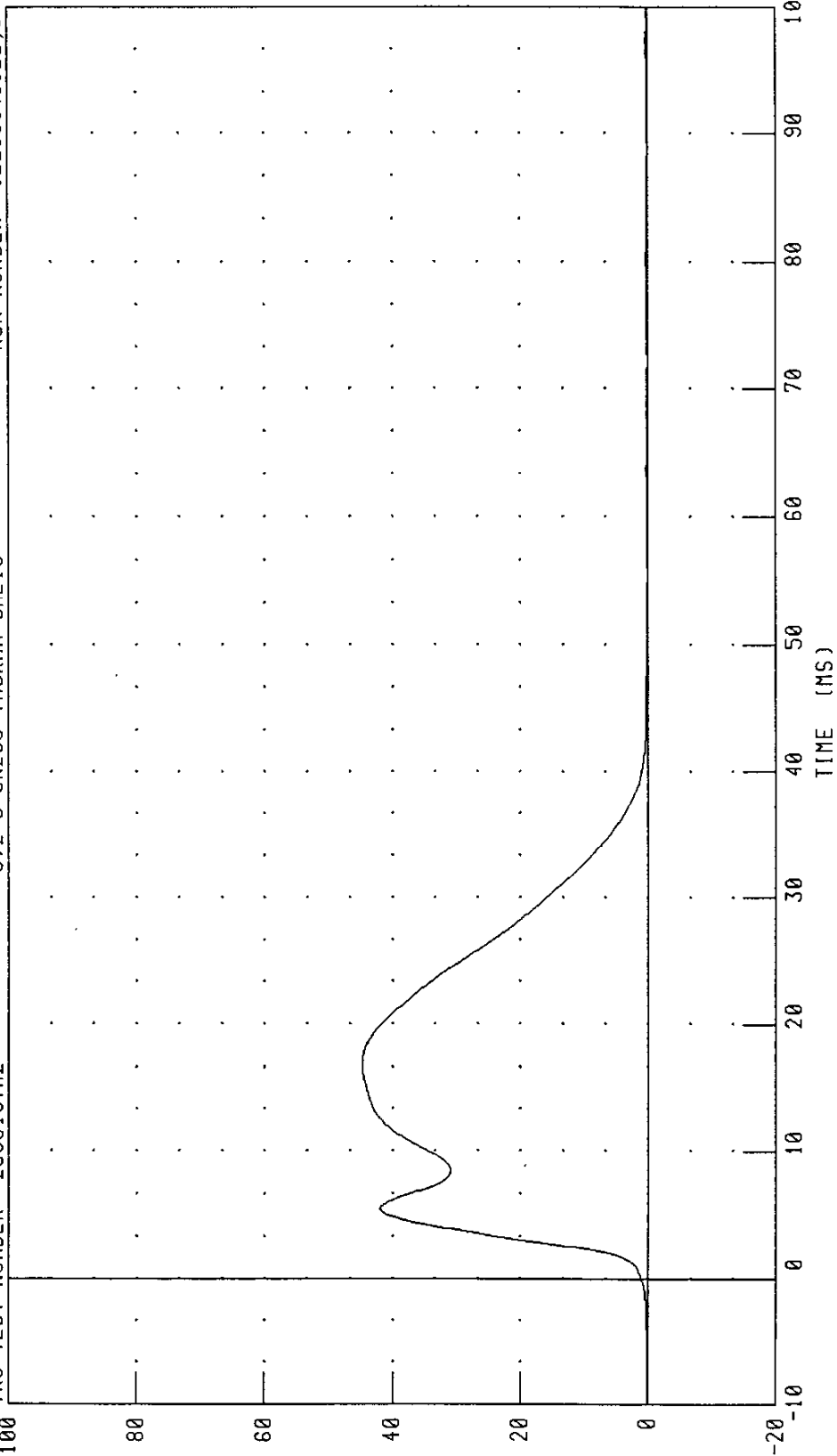
40

20

0

-20

FORCE (N X 10²)



CHANNEL: PENXF FILTER: CH. CLASS 180

PEAK DATA: 4474.85 N @ 16.88 MS; 1.97 N @ 55.60 MS

TIME (MS)

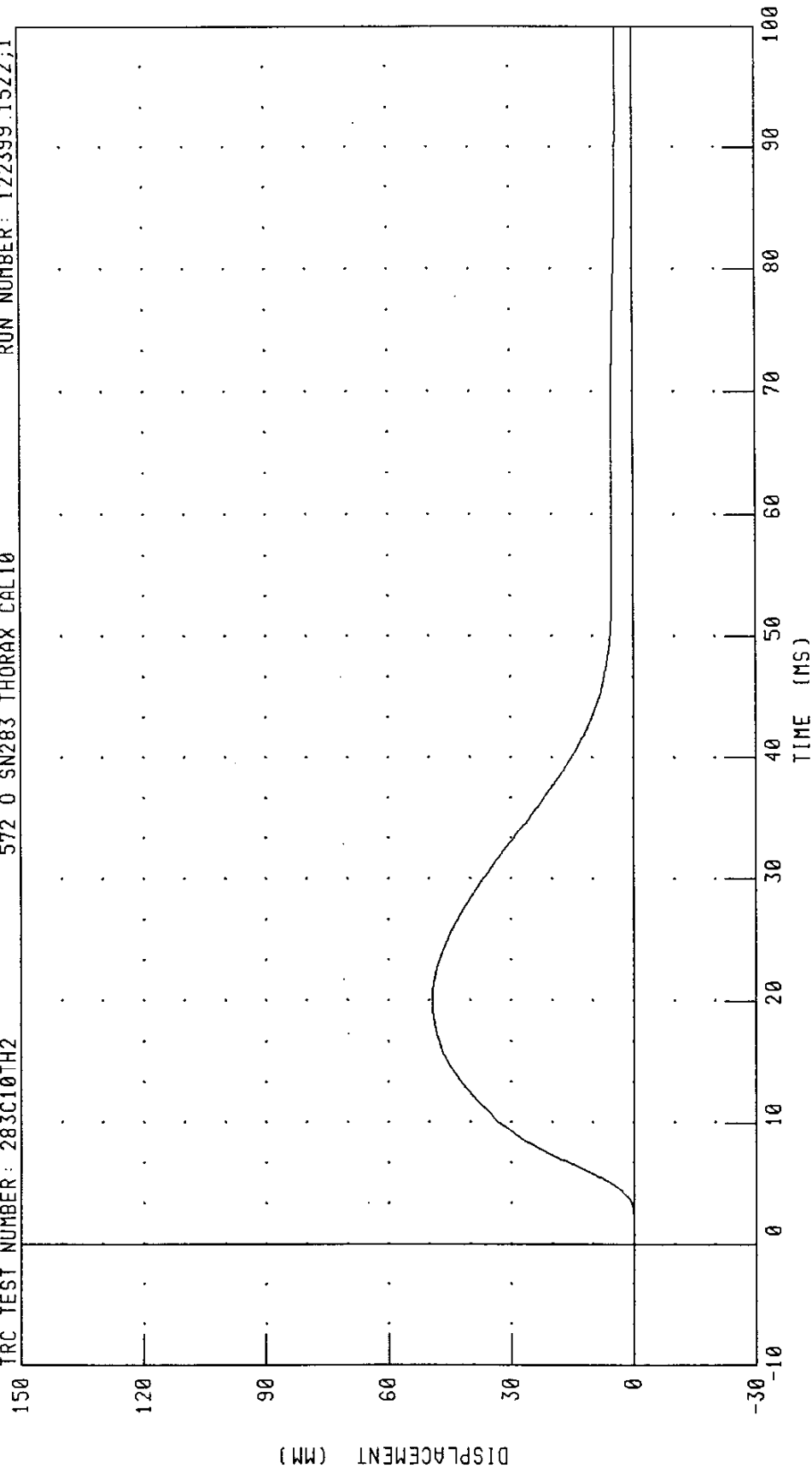
PART 572-0 HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 283C10TH2

572 0 SN283 THORAX CALI0

RUN NUMBER: 122399.1522;1

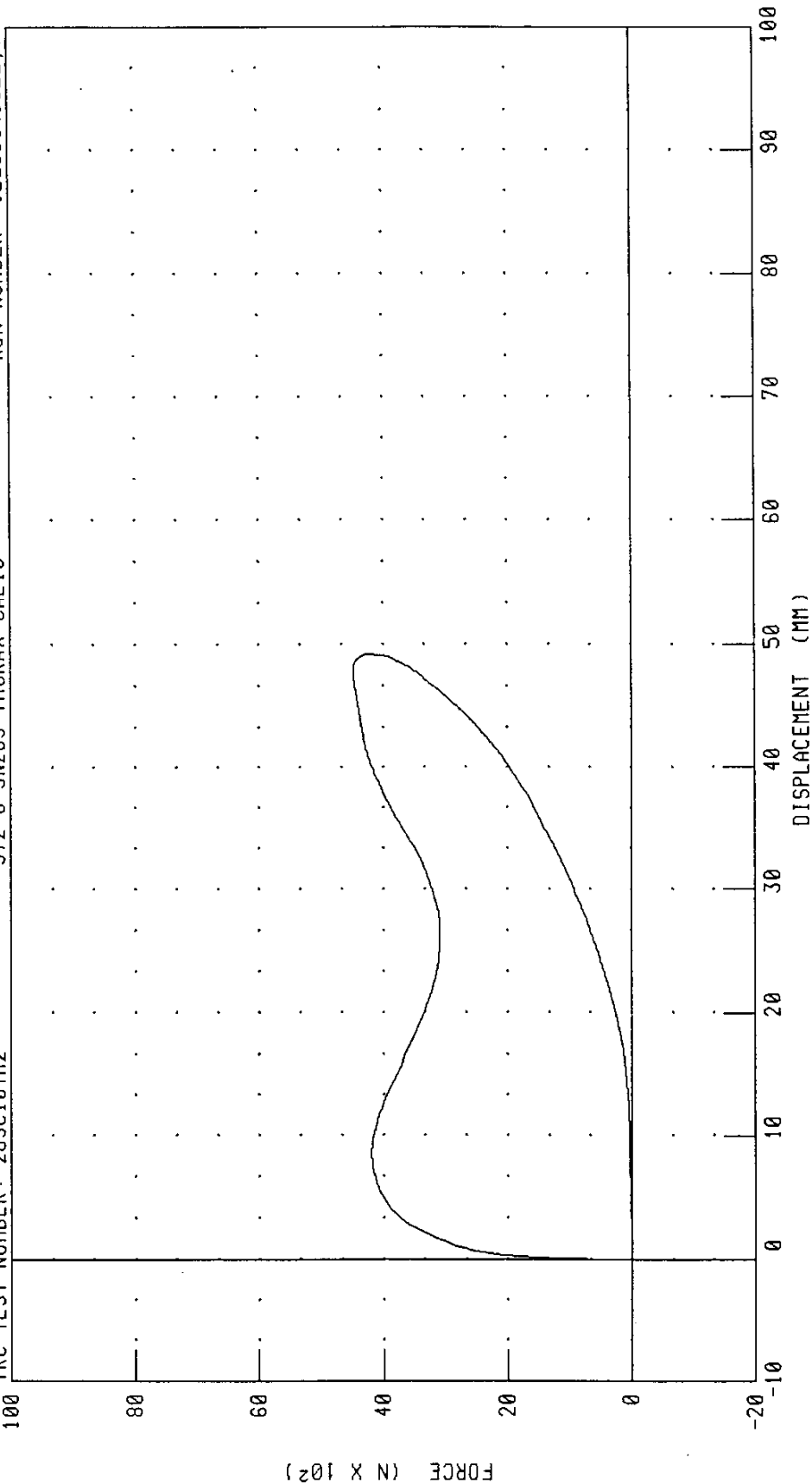


CHANNEL: CSTXD FILTER: CH. CLASS 600

PEAK DATA: 49.25 MM @ 19.68 MS; 0.00 MM @ 1.68 MS

PART 572-0 HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER: 283C10TH2 572 0 SN283 THORAX CAL10 RUN NUMBER: 122399.1522;1



CHANNEL: CSTXD
PENXF
FILTER: CH. CLASS 600
CH. CLASS 180
PEAK DATA: 49.25 MM @ 19.68 MS; 0.00 MM @ 1.68 MS
4474.85 N @ 16.88 MS; 1.97 N @ 55.60 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

23-DEC-99

TRC INC.

TEST NO: 283C10RK1

572 0 SN283 R.KNEE CAL10

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3360 - 4080 N	3513.0 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



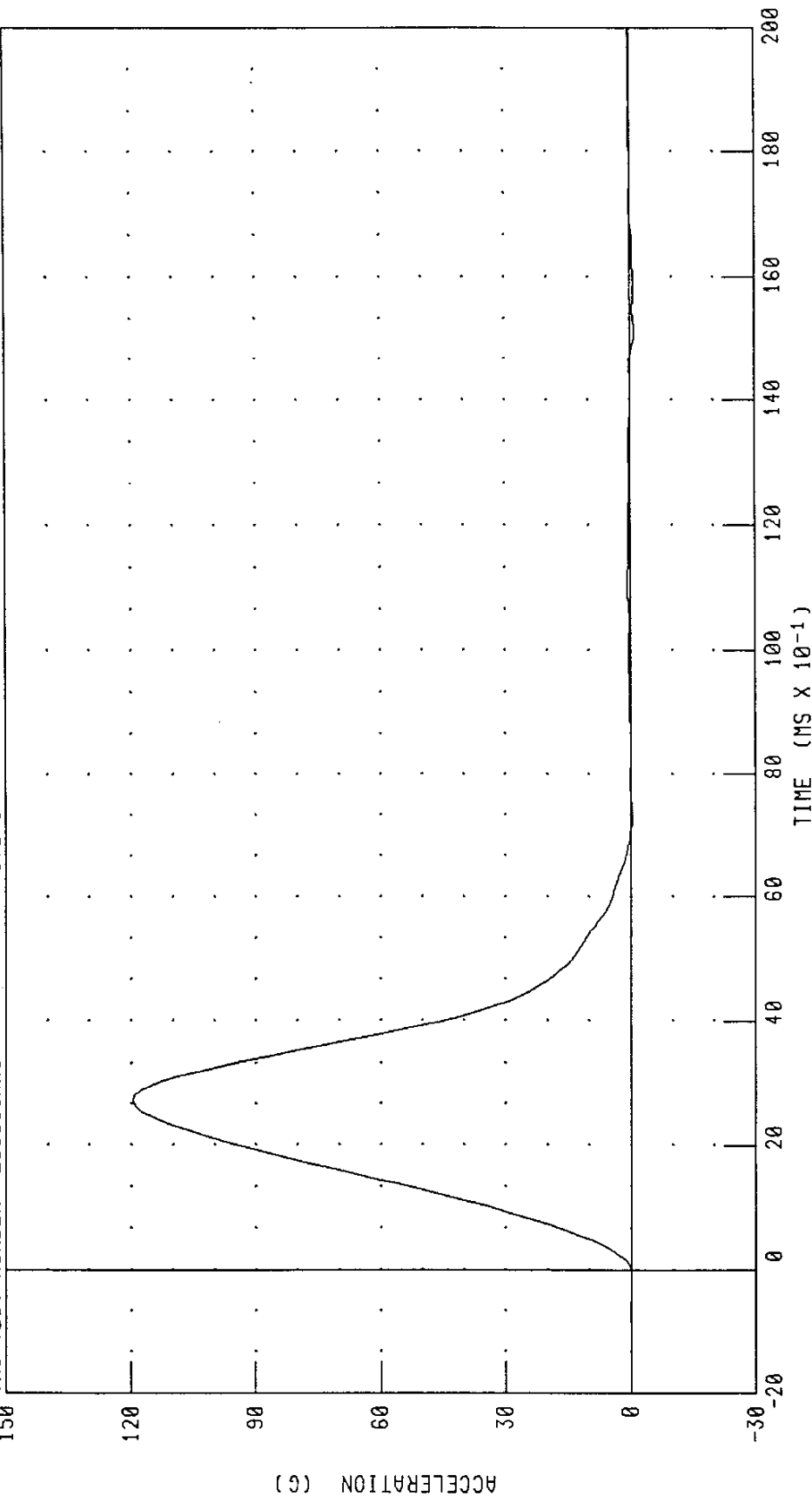
RUN NUMBER: 122399.0845;1

PART 572-0 HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 283C10RK1

572 0 SN283 R KNEE CAL10

RUN NUMBER: 122399 0845,1



CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 119.67 G @ 2.72 MS, -1.10 G @ 15.12 MS

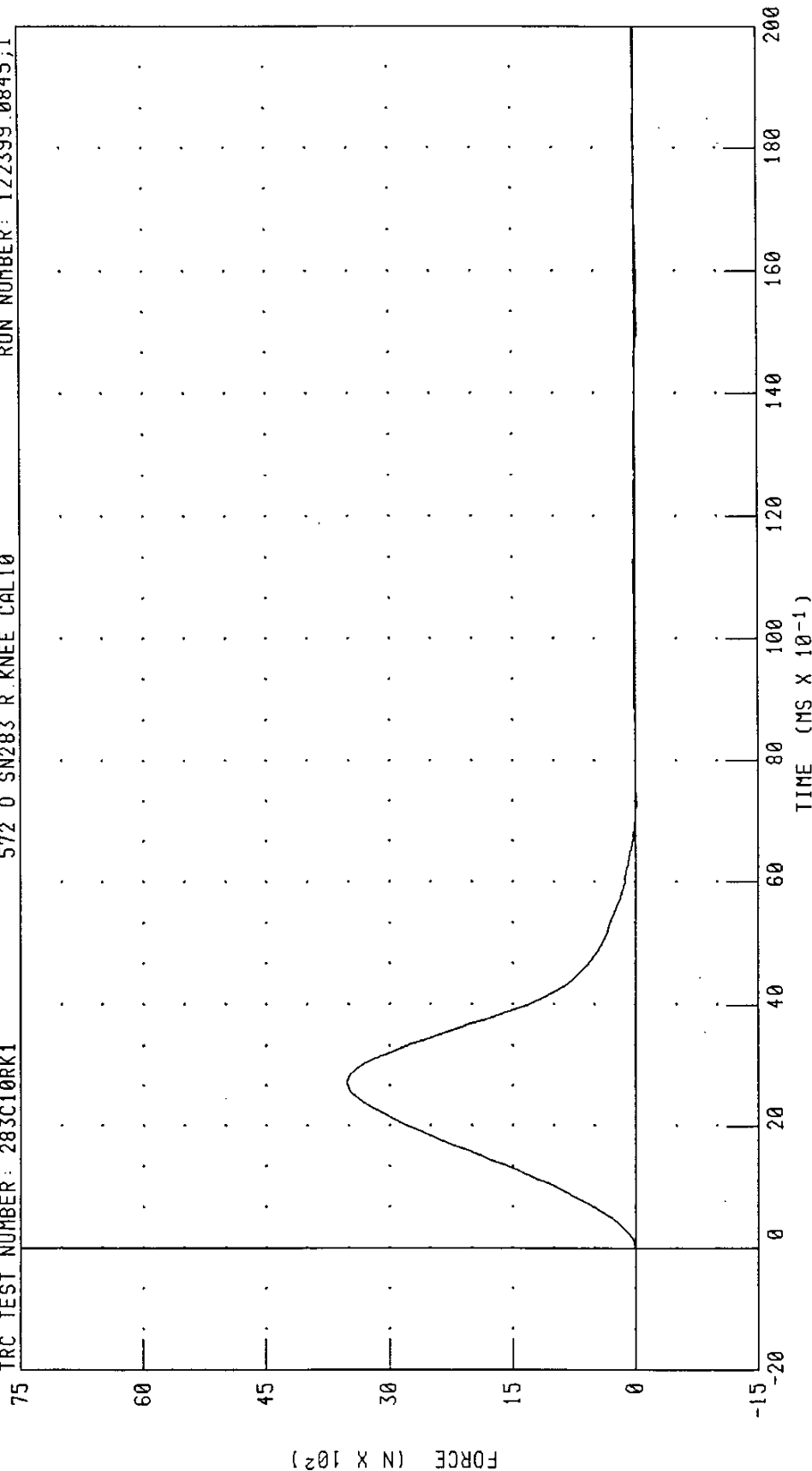
PART 572-0 HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 283C10RK1

572 0 SN283 R KNEE CAL10

RUN NUMBER: 122399.0845.1



CHANNEL: PENXF

FILTER: CH. CLASS 600

PEAK DATA: 3513.01 N @ 2.72 MS; -32.25 N @ 15.12 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III SMALL FEMALE

23-DEC-99

TRC INC.

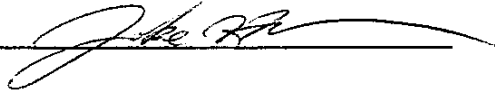
TEST NO: 283C10LK1

572 0 SN283 LEFT KNEE CAL10

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	44.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 3.0 KG PENDULUM	3360 - 4080 N	3984.9 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 122399.0838;1

PART 572-0 HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC TEST NUMBER: 283C10LK1

572 0 SN283 LEFT KNEE CAL10

RUN NUMBER: 122399.0839,1

150

120

90

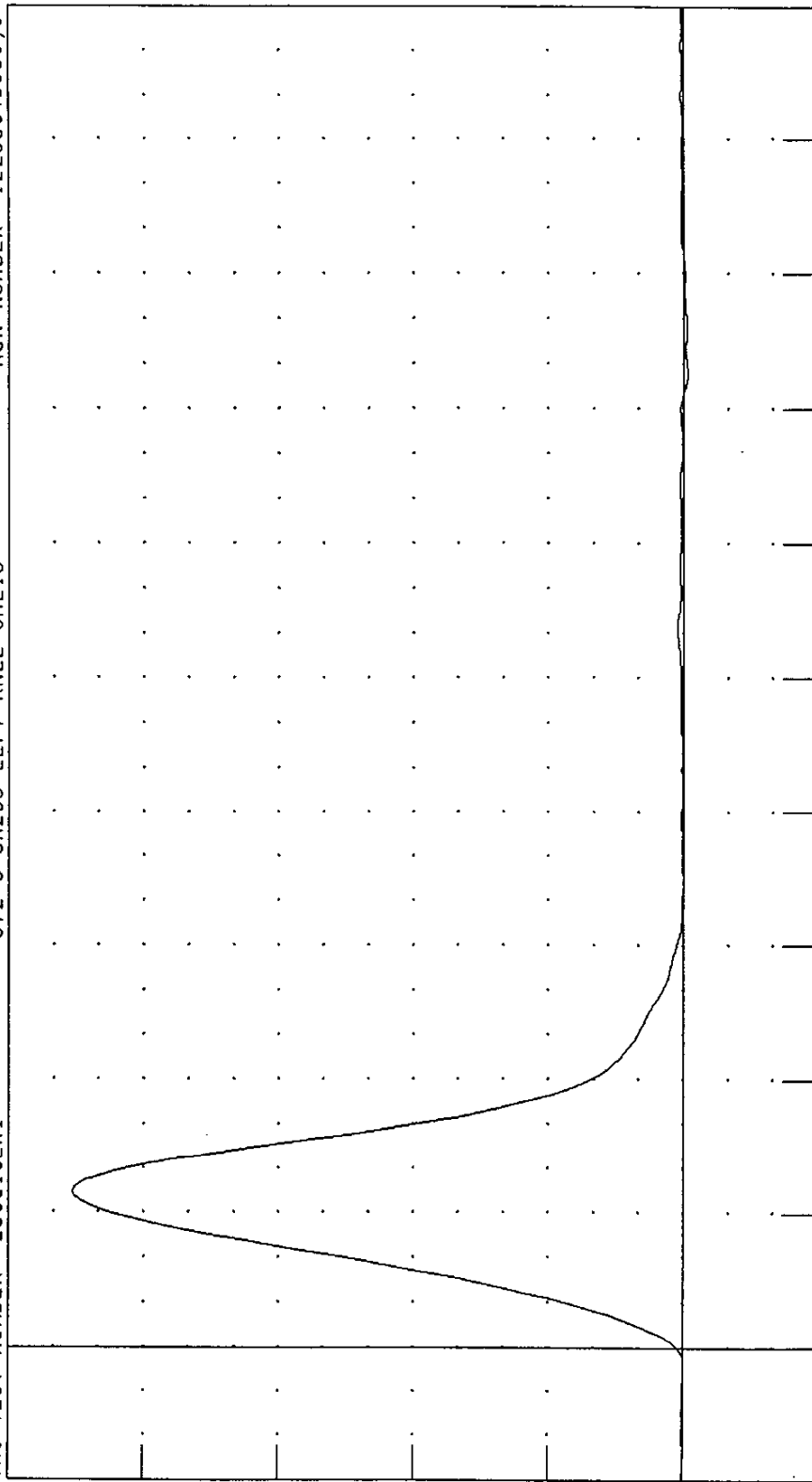
60

30

0

-30

ACCELERATION (G)



TIME (MS X 10⁻¹)

CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 135.74 G @ 2.32 MS; -1.04 G @ 14.56 MS

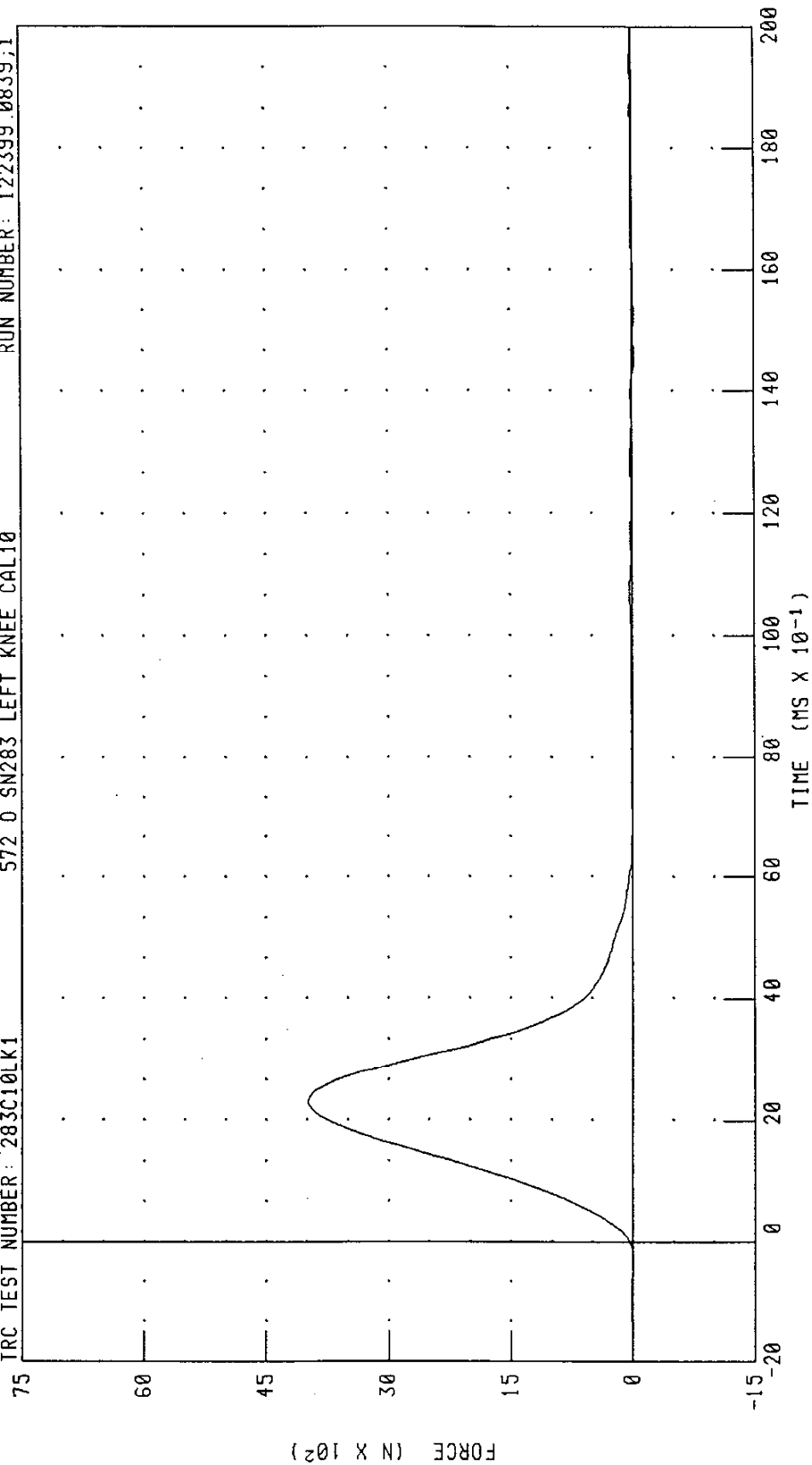
PART 572-0 HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 283C10LK1

572 0 SN283 LEFT KNEE CAL10

RUN NUMBER: 122399.0839,1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 3984.97 N @ 2.32 MS; -30.55 N @ 14.56 MS

Accelerometer Information

Engineer: Jenkins
 Test Date: 12/10/99-1
 Dummy S/N: 369
 Manufacturer: FTSS
 Type: Hybrid III 5th female
 Seating Position: Driver

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity Mv/g @10 Volts	Cal Due Date	Full- Scale Desired G	Direction Of Positive Polarity
HEDXG	Head X	7264	A20FJ	Endevco	0.2563	12/02/99	400	Rear
HEDYG	Head Y	7264	A31FJ	Endevco	0.2683	12/02/99	400	Left
HEDZG	Head Z	7264	CL95H	Endevco	0.2822	12/02/99	400	Up
CSTXG	Chest X	7264	A72JJ	Endevco	0.2773	12/02/99	400	Forward
CSTYG	Chest Y	7264	A69JJ	Endevco	0.2702	12/02/99	400	Left
CSTZG	Chest Z	7264	A34FJ	Endevco	0.2565	12/02/99	400	Up

Accelerometer Information

Engineer: Jenkins
 Test Date: 12/10/99-1
 Dummy S/N: 369
 Manufacturer: FTSS
 Type: Hybrid III 5th female
 Seating Position: Driver

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity (mV/V)	Cal Due Date	Full-Scale Desired	Direction Of Positive Polarity
	Neck Load Cells							
NEKXF	Neck X-force	1716A	0534	Denton	1.7247 @ 2,000 lbs	12/02/99	2000 lbs	Head forward/chest rearward
NEKYF	Neck Y-force	1716A	0534	Denton	1.6643 @ 2,000 lbs	12/02/99	2000 lbs	Head left/chest right
NEKZF	Neck Z-force	1716A	0534	Denton	1.1561 @ 3,000 lbs	12/02/99	3000 lbs	Head up/chest down
NEKXM	Neck X-moment	1716A	0534	Denton	1.6355 @ 2500 in-lbs	12/02/99	200 ft-lbs	Right ear to right shoulder
NEKYM	Neck Y-moment	1716A	0534	Denton	1.6430 @ 2500 in-lbs	12/02/99	200 ft-lbs	Chin forward to sternum
NEKZM	Neck Z-moment	1716A	0534	Denton	2.3186 @ 2500 in-lbs	12/02/99	200 ft-lbs	Chin to left shoulder
	Femur Load Cells							
	Left femur							
LFMF	Left femur force	2430	1006	GSE	0.9459 @ 3000 lbs	12/02/99	3000 lbs	Knee upward/upper femur down
	Right femur							
RFMF	Right femur force	2430	1007	GSE	0.9114 @ 3000 lbs	12/02/99	3000 lbs	Knee upward/upper femur down

Accelerometer Information

Engineer: Jenkins
 Test Date: 12/10/99-1
 Dummy S/N: 369
 Manufacturer: FTSS
 Type: Hybrid III 5th female
 Seating Position: Driver

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity	Cal Due Date	Full- Scale Desired	Direction Of Positive Polarity
CSTXD	Chest Pot Chest deflection	14CB1-2897	1188	Servo	43.6 mV/V/inch	12/02/99	6 inch	Extension

Accelerometer Information

Engineer: Jenkins
 Test Date: 12/10/99-1
 Dummy S/N: 283
 Manufacturer: FTSS
 Type: Hybrid III 5th female
 Seating Position: Passenger

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity Mv/g @10 Volts	Cal Due Date	Full- Scale Desired G	Direction Of Positive Polarity
HEDXG	Head X	7264	J26498	Endevco	0.2385	03/30/00	400	Rear
HEDYG	Head Y	7264	J26491	Endevco	0.2527	03/30/00	400	Left
HEDZG	Head Z	7264	J26499	Endevco	0.2571	03/30/00	400	Up
CSTXG	Chest X	7264	J27111	Endevco	0.2109	03/30/00	400	Forward
CSTYG	Chest Y	7264	J20561	Endevco	0.2433	03/30/00	400	Left
CSTZG	Chest Z	7264	J22046	Endevco	0.2684	03/30/00	400	Up

Accelerometer Information

Engineer: Jenkins
 Test Date: 12/10/99-1
 Dummy S/N: 283
 Manufacturer: FTSS
 Type: Hybrid III 5th female
 Seating Position: Passenger

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity (mV/V)	Cal Due Date	Full-Scale Desired	Direction Of Positive Polarity
Neck Load Cells								
NEKXF	Neck X-force	1716	0235	Denton	1.7310 @ 2,000 lbs	03/30/00	2000 lbs	Head forward/chest rearward
NEKYF	Neck Y-force	1716	0235	Denton	1.6646 @ 2,000 lbs	03/30/00	2000 lbs	Head left/chest right
NEKZF	Neck Z-force	1716	0235	Denton	1.2439 @ 3,000 lbs	03/30/00	3000 lbs	Head up/chest down
NEKXM	Neck X-moment	1716	0235	Denton	1.6240 @ 2500 in-lbs	03/30/00	200 ft-lbs	Right ear to right shoulder
NEKYM	Neck Y-moment	1716	0235	Denton	1.6485 @ 2500 in-lbs	03/30/00	200 ft-lbs	Chin forward to sternum
NEKZM	Neck Z-moment	1716	0235	Denton	2.3120 @ 2500 in-lbs	03/30/00	200 ft-lbs	Chin to left shoulder
Femur Load Cells								
Left femur								
LFMF	Left femur force	2121	0169	GSE	1.3102 @ 3000 lbs	03/30/00	3000 lbs	Knee upward/upper femur down
Right femur								
RFMF	Right femur force	2121	0170	GSE	1.3078 @ 3000 lbs	03/30/00	3000 lbs	Knee upward/upper femur down

Accelerometer Information

Engineer: Jenkins
 Test Date: 12/10/99-1
 Dummy S/N: 283
 Manufacturer: FTSS
 Type: Hybrid III 5th female
 Seating Position: Passenger

Mnemonic Parameter Being Measured	Description	Model Number	Serial Number	Mfr.	Sensitivity	Cal Due Date	Full- Scale Desired	Direction Of Positive Polarity
	Chest Pot							
CSTXD	Chest deflection	14CB1-2897	283	Servo	42.84 mV/V/inch	03/30/00	6 inch	Extension

Dummy Sign Convention

Accelerometers:

+X: Forward
+Y: Rightward
+Z: Downward

Potentiometers:

+Chest longitudinal deflection: Outward

Load cells:

+Femur force: Tension

Neck load cells:

+X force: Head rearward
+Y force: Head leftward
+Z force: Head upward (tension on neck)
+X moment: Left ear rotating toward left shoulder
+Y moment: Chin rotating toward chest
+Z moment: Chin rotating toward left shoulder

Filtering Data

J211 MAR95

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

Vehicle Instrumentation Placement

Test Number 991210-1

Number	Location	Axis	Manufacturer	Model	S/N	Orientation (+ Sensing)
1	Left Brake Caliper	X	Endevco	7264-2000T	J29567	Forward
2	Right Brake Caliper	X	Endevco	7264-2000T	CR63H	Forward
3	Instrument Panel Center	X	Endevco	7264-2000T	J30459	Forward
4	Engine Top	X	Endevco	7264-2000T	J29360	Forward
5	Engine Bottom	X	Endevco	7264-2000T	J28991	Forward
6	Vehicle Rear Center	X Y Z	Endevco Endevco Endevco	7264-2000T 7264-2000T 7264-2000T	AN8Y9 J26942 J27907	Forward Right Up
7	Left Rear Seat Crossmember	X	Endevco	7264-2000T	J30477	Forward
8	Right Rear Seat Crossmember	X	Endevco	7264-2000T	J29035	Forward
9	Vehicle Center of Gravity	X Y	Endevco Endevco	7264-2000T 7264-2000T	J27228 J30471	Forward Left

Report Sign Convention and NHTSA Data Tape Reference Guide

Accelerometers: +X: Forward
 +Y: Leftward
 +Z: Upward

<u>Potentiometers:</u>	+Chest longitudinal deflection:	Outward
	+Chest lateral deflection:	Leftward
	+Seat belt displacement:	Outward
	+Seat belt extension:	Elongation
	+Knee slider displacement:	Distance between femur and tibia increased (in relation to a seated dummy)

<u>Load cells:</u>	+Femur force:	Tension
	+Seat belt force:	Tension
	+Barrier force:	Tension

<u>Neck load cells:</u>	+X force:	Head pushed forward
	+Y force:	Head pushed leftward
	+Z force:	Head pulled 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

Tibia load cells:

+X force:	Ankle forward, knee rearward
+Y force:	Ankle rightward, knee leftward
+Z force:	Tension
+X moment:	Bottom of tibia moving leftward
+Y moment:	Bottom of tibia moving rearward

Description Of Timing Marks On TRC High-Speed Film

All TRC high-speed cameras are equipped with red LEDs 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** LEDs appear in it. These indicate a *millisecond* pulse plus a *hundredth of a second* pulse.
3. Every one hundred frames will have **three** LEDs appear in it. These indicate a *millisecond* pulse, a *hundredth of a second* pulse, and a *tenth of a second* pulse.

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