

V3127

**1999 Saturn SL1 4-Door Sedan
into a Flat Frontal Barrier
TRC Test Number: 990218-2**

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Section 1.0

Purpose and Test Procedure

Purpose and Test Summary

This 30 mph flat frontal barrier impact test has 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 Saturn SL1 4-door sedan that impacted a flat frontal barrier. The test vehicle contained two instrumented Hybrid III 50th percentile adult male dummies.

Section 2.0

Frontal Barrier Impact Test Summary

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 eight (8) accelerometers to measure longitudinal, lateral, and vertical axis accelerations. The vehicle's specified impact velocity range was 47.5 to 49.1 kph. The vehicle impacted a flat frontal barrier.

The test vehicle contained two (2) Hybrid III 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the FMVSS 208 laboratory 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 thirty-eight (38) 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.

Test Results Summary

This flat frontal barrier test was conducted at TRC on February 18, 1999.

The test vehicle, a 1999 Saturn SL1 4-door sedan, was equipped with airbags at the driver's and right front passenger's seating positions. The vehicle's test weight was 1242.0 kilograms. The vehicle's impact speed was 48.1 kph. The vehicle's maximum static crush was 525 millimeters.

The driver's 36-millisecond HIC was 225. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 36.8 g. The driver's chest deflection was 46.8 millimeters. The driver's left and right femur maximum compressive forces were 4933 N and 5288 N, respectively.

The right front passenger's 36-millisecond HIC was 331. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.2 g. The passenger's chest deflection was 9.2 millimeters. The right front passenger's left and right femur maximum compressive forces were 6374 N and 5155 N, respectively.

Data Acquisition Explanations

The right front passenger dummy's X-axis shear force data channel, NEKXF2, produced data spikes between approximately 30 and 42 milliseconds.

The right front passenger dummy's Y-axis shear force data channel, NEKYF2, produced data spikes between approximately 30 and 42 milliseconds.

The right front passenger dummy's Z-axis axial force data channel, NEKZF2, produced data spikes between approximately 30 and 42 milliseconds.

Table 1 Crash Test Summary

Test type:	Frontal barrier impact
Test date:	02/18/99
Test time:	2221
Ambient temperature at impact area:	22° C
Vehicle year/make/ model/body style:	1999/Saturn/SL1/4-door Sedan
Vehicle test weight:	1242.0 kg
Impact angle ¹ :	0°
Impact velocity ² :	
Primary:	48.1 kph
Secondary:	48.1 kph
Maximum static crush:	525 mm
Average rebound:	910 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:	<u>Driver #169</u>	<u>Passenger #168</u>
Type:	Hybrid III 50 th percentile adult male	Hybrid III 50th percentile adult male
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	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/Saturn/SL1/4-door Sedan

Color: Black/Plum

VIN: 1G8ZG5282XZ224390

Engine data:

Placement: Transverse

Cylinders: 4

Displacement: 1.9 liters

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

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

Date vehicle received: 02/15/99

Odometer reading: 39

Dealer's name and address: N/A

Accessories:

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

Certification data from vehicle's label:

Vehicle manufactured by: Saturn Corporation

Date of manufacture: 12/98

VIN: 1G8ZG5282XZ224390

GVWR: 1475 kg

GAWR: Front: 747 kg

Rear: 728 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle:	P175/70R14
Spare tire:	Space saver
Type of front seats:	Bucket, manually adjustable

Tire & capacity data from vehicle's label:

Recommended tire size:	P175/70R14
Recommended cold tire pressure:	
Front:	210 kPa
Rear:	180 kPa
Designated Seating Capacity:	
Front	2
Rear	3
Total	5
Vehicle Cargo Weight:	385 kg

Test vehicle attitudes:

Delivered attitude:	LF: 679 mm	RF: 679 mm	LR: 675 mm	RR: 670 mm
Fully loaded attitude:	LF: 657 mm	RF: 655 mm	LR: 643 mm	RR: 637 mm
Pre-test attitude:	LF: 655 mm	RF: 646 mm	LR: 635 mm	RR: 632 mm
Post-test attitude:	LF: 622 mm	RF: 648 mm	LR: 629 mm	RR: 635 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	310.3 kg	Right rear	208.6 kg
Left front	324.3 kg	Left rear	207.3 kg
Total front weight	634.6 kg	(60.4% of total vehicle weight)	
Total rear weight	415.9 kg	(39.6% of total vehicle weight)	
Total delivered weight	1050.5 kg		

Calculation of test vehicle's target test weight:

RCLW¹ = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1050.5 kg)

VCW = Vehicle Capacity Weight (385 kg)

DSC² = Designated Seating Capacity (5)

RCLW³ = 44.9 kg

Target test weight = UDW + RCLW + (number of Hybrid III Dummies x 75.7 kg per dummy)

Target test weight = 1050.5 + 44.9 + 151.4 = 1246.8 kg

Weight of test vehicle with required dummies and 40.1 kg of cargo weight:

Right front	342.9 kg	Right rear	274.1 kg
Left front	352.9 kg	Left rear	272.2 kg
Total front weight	695.8 kg	(56.0% of total vehicle weight)	
Total rear weight	546.2 kg	(44.0% of total vehicle weight)	
Total test weight	1242.0 kg	(0.4% under target test weight)	

Weight of ballast secured in vehicle: None

Components removed to meet target test weight: Rear seat, rear seat belts, speakers, muffler, spare tire and jack, C-pillar trim panels, and rear bumper fascia.

CG rearward of front wheel centerline: 1142 mm

Vehicle Wheelbase: 2595 mm

¹ Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's calculated cargo and luggage weight or 136.1 kg, whichever is less.

² The designated seating capacity is determined by counting the number of seat belts installed in the vehicle.

³ From vehicle's tire label.

Table 3 Post-Impact Data

Test number: 990218-2
Test date: 02/18/99
Test time: 2221
Test type: Frontal Barrier Impact
Impact angle: 0°
Ambient temperature
at impact area: 22° C
Temperature in
occupant compartment: 21° C

Impact velocity:
Primary: 48.1 kph
Secondary: 48.1 kph
Specified range: 47.5 to 49.1 kph

Distance from vehicle to barrier:

Entering velocity trap: 305 mm
Exiting velocity trap: 51 mm

Test vehicle static crush:

Overall length of test vehicle:

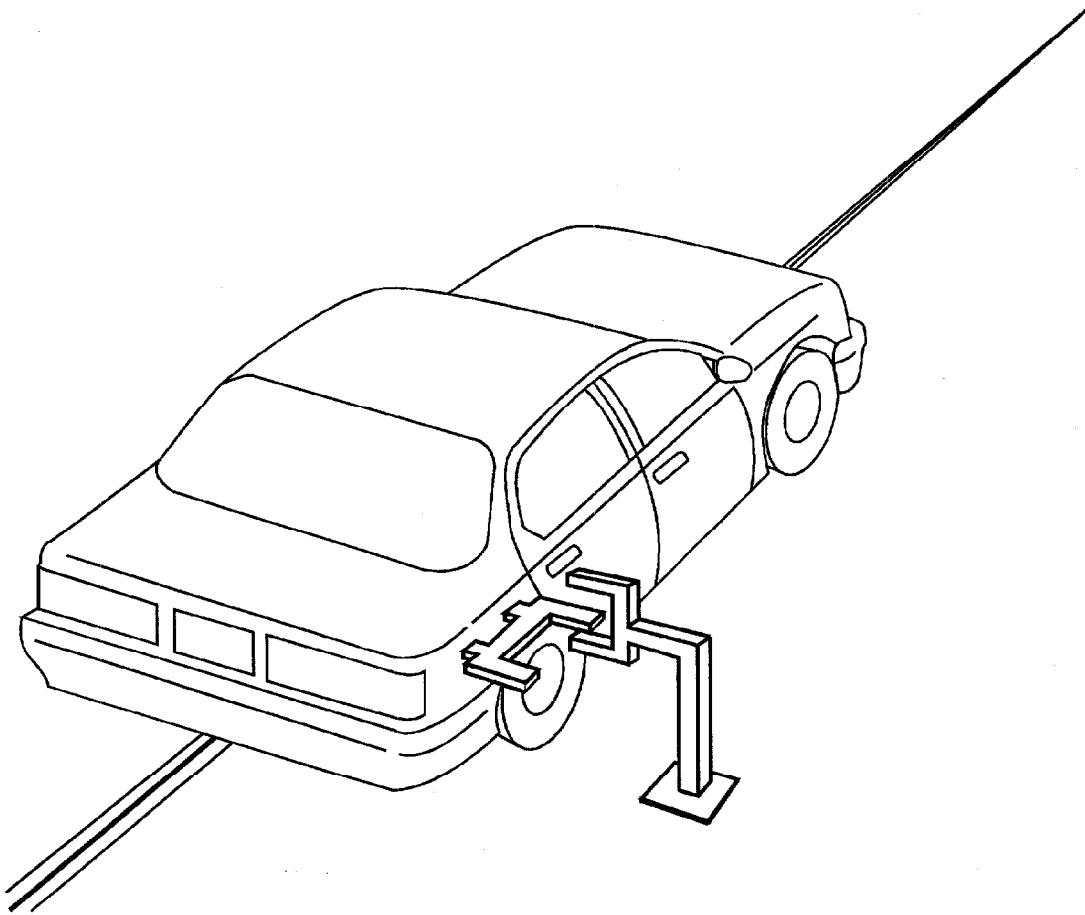
Pre-test:	L: 4405 mm	C: 4585 mm	R: 4390 mm
Post-test:	L: 3990 mm	C: 4060 mm	R: 3967 mm
Total crush:	L: 415 mm	C: 525 mm	R: 423 mm
Average crush:	454 mm		

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L: 908 mm	C: 903 mm	R: 919 mm
Average rebound:	910 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: 02/18/99
Vehicle year/make/
model/body style: 1999/Saturn/SL1/4-door Sedan
VIN: 1G8ZG5282XZ224390
Build date: 12/98
Test weight: 1242.0 kg
Vehicle wheelbase: 2595 mm
Maximum width: 1685 mm
Front overhang: 958 mm

Collision Deformation
Classification (CDC) Code: 12FDEW3

Crush depth
measurements: C1: 415 mm
C2: 480 mm
C3: 506 mm
C4: 512 mm
C5: 472 mm
C6: 423 mm

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged
region: L: 1525 mm

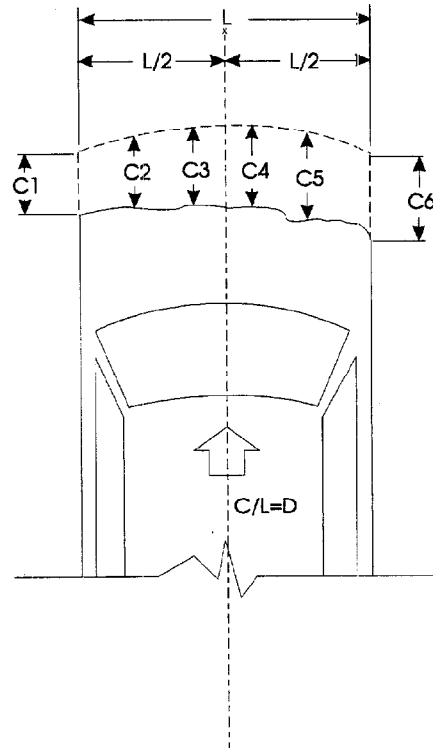
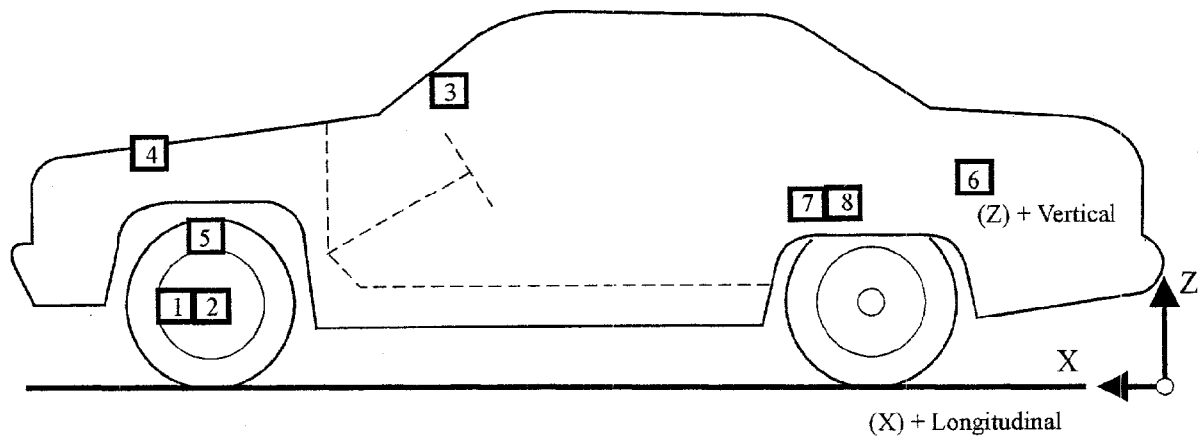
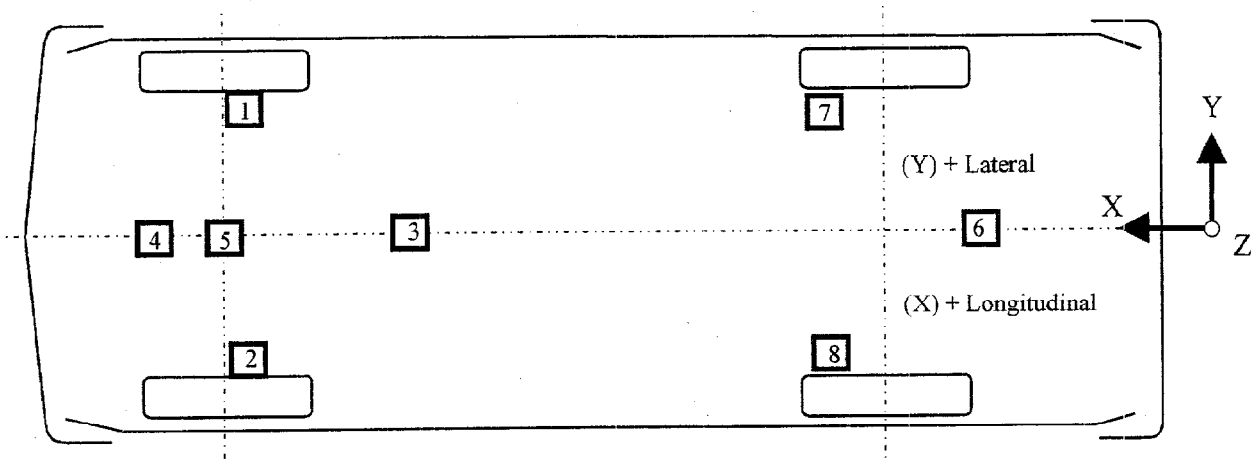


Figure 3 Vehicle Accelerometer Placement



Side View



Bottom View

Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 990218 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT BRAKE CALIPER	PRE 3636 mm POST 3593 mm	635 mm 590 mm	327 mm 305 mm	42.8 g @ 79.4 ms	45.8 g @ 56.5 ms
LONGITUDINAL					
2 RIGHT BRAKE CALIPER	PRE 3636 mm POST 3600 mm	635 mm 680 mm	322 mm 307 mm	17.3 g @ 81.7 ms	58.3 g @ 65.2 ms
LONGITUDINAL					
3 INSTRUMENT PANEL CENTER	PRE 3115 mm POST 3104 mm	0 mm 10 mm	846 mm 872 mm	11.7 g @ 46.3 ms	37.4 g @ 51.4 ms
LONGITUDINAL					
4 ENGINE TOP	PRE 3743 mm POST 3544 mm	30 mm 46 mm	800 mm 780 mm	15.5 g @ 65.2 ms	61.3 g @ 26.8 ms
LONGITUDINAL					
5 ENGINE BOTTOM	PRE 3711 mm POST 3500 mm	211 mm 230 mm	168 mm 150 mm	41.7 g @ 59.8 ms	65.5 g @ 40.1 ms
LONGITUDINAL					

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

TEST NUMBER: 990218 No. LOCATION	X		Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
6 REAR VEHICLE CENTERLINE VERTICAL	PRE	340 mm	0 mm	495 mm				
	POST	340 mm	0 mm	500 mm	7.4 g	@ 9.3 ms	9.8 g	@ 37.3 ms
7 LEFT REAR SEAT LONGITUDINAL	PRE	1715 mm	420 mm	315 mm				
	POST	1715 mm	420 mm	300 mm	1.5 g	@ 154.7 ms	22.8 g	@ 86.8 ms
8 RIGHT REAR SEAT LONGITUDINAL	PRE	1715 mm	460 mm	320 mm				
	POST	1715 mm	460 mm	205 mm	1.4 g	@ 141.0 ms	23.1 g	@ 80.9 ms

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

Section 3.0

FMVSS 208 Data

Table 5 Dummy Injury Criteria

<u>Maximum Acceleration</u>							
	<u>Head</u>				<u>Chest</u>		
	X	Y	Z	R	X	Y	Z
Driver	-35.1 g	-5.2 g	18.6 g	39.6 g	-37.2 g	3.2 g	-7.6 g
Passenger	-45.4 g	-15.5 g	17.3 g	47.1 g	-36.8 g	4.2 g	20.7 g

<u>Maximum Femur Compressive Force</u>		
	<u>Left Femur</u>	<u>Right Femur</u>
Driver	4933 N	5288 N
Passenger	6374 N	5155 N

<u>Head Injury Criteria¹</u>			
	<u>HIC</u>	<u>Time t₁</u>	<u>Time t₂</u>
Driver	225	67.7 ms	103.7 ms
Passenger	331	74.1 ms	110.1 ms

<u>Chest Maximum Resultant Acceleration²</u>			
	<u>Acceleration</u>	<u>Time t₁</u>	<u>Time t₂</u>
Driver	36.8 g	84.4 ms	87.4 ms
Passenger	40.2 g	87.8 ms	90.9 ms

<u>Maximum Chest Deflection</u>	
Driver	46.8 mm
Passenger	9.2 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 head and chest impacted the airbag. The dummy's head and chest were restrained by the airbag. The dummy's head and upper torso rotated rearward as the dummy rebounded into the seat back. The driver dummy came to rest seated in the driver's seat.

Right Front Passenger Dummy

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

Section 4.0

Vehicle, Occupant, and Camera Measurements

Figure 4 Pre-test and Post-test Measurement Points

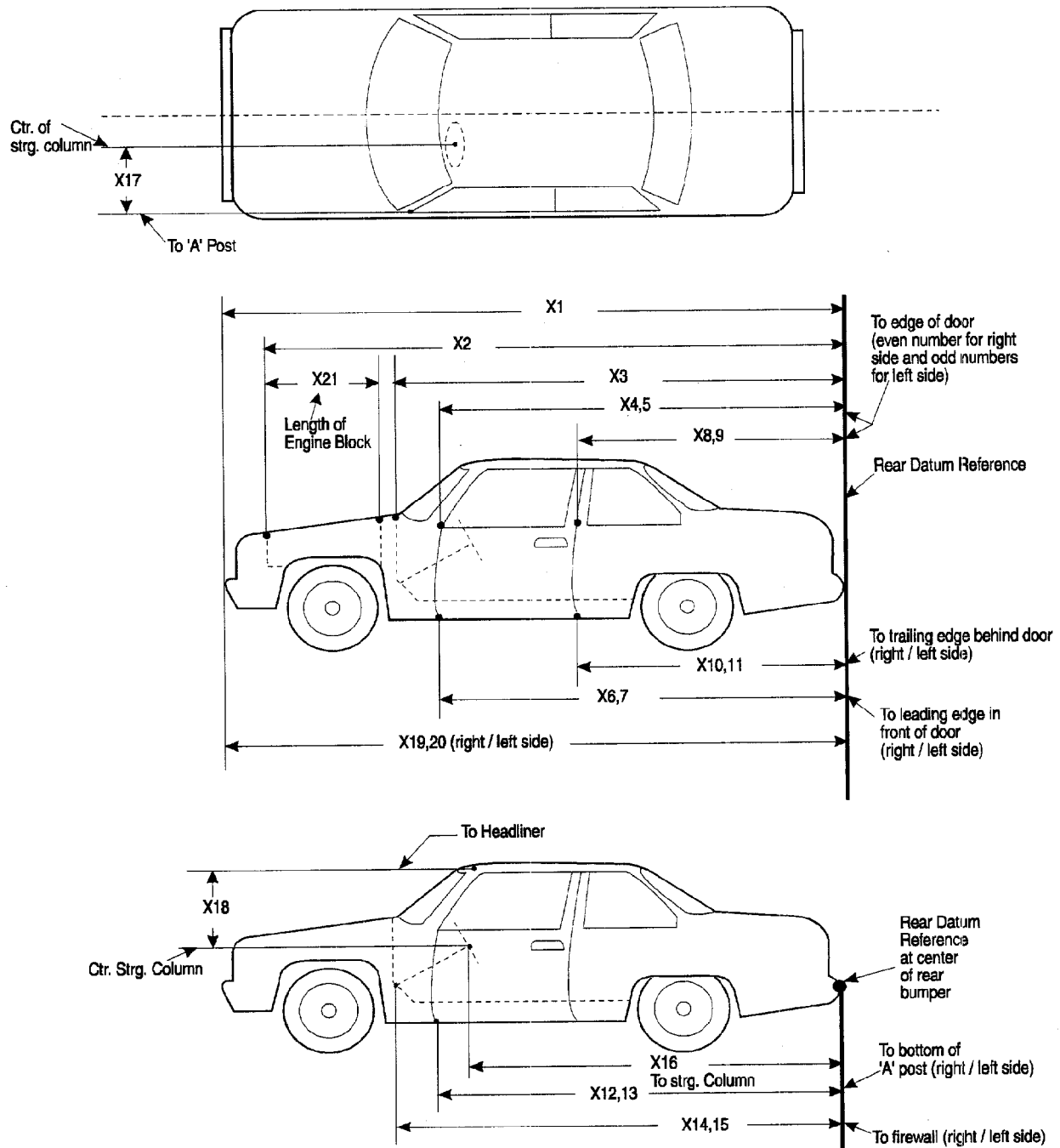


Table 6 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1999/Saturn/SL1/4-door Sedan

Test Number: 990218-2

No.	Type of measurement	Pre-test	Post-test	Difference
X1	Total length of vehicle at centerline	4585 mm	4060 mm	525 mm
X2	Rear surface of vehicle to front of engine block	3877 mm	3680 mm	197 mm
X3	Rear surface of vehicle to firewall	3530 mm	3454 mm	76 mm
X4	Rear surface of vehicle to upper leading edge of right door	3073 mm	3073 mm	0 mm
X5	Rear surface of vehicle to upper leading edge of left door	3080 mm	3085 mm	-5 mm
X6	Rear surface of vehicle to lower leading edge of right door	3074 mm	3065 mm	9 mm
X7	Rear surface of vehicle to lower leading edge of left door	3077 mm	3060 mm	17 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2116 mm	2118 mm	-2 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2125 mm	2131 mm	-6 mm
X10	Rear surface of vehicle to lower trailing edge of right door	2149 mm	2137 mm	12 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2150 mm	2134 mm	16 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	3080 mm	3080 mm	0 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	3090 mm	3080 mm	10 mm
X14	Rear surface of vehicle to firewall - right side	3505 mm	3473 mm	32 mm
X15	Rear surface of vehicle to firewall - left side	3511 mm	3494 mm	17 mm
X16	Rear surface of vehicle to steering wheel center	2680 mm	2697 mm	-17 mm
X17	Center of steering column to "A" post	295 mm	298 mm	-3 mm
X18	Center of steering column to headliner	435 mm	405 mm	30 mm
X19	Rear surface of vehicle to right side of front bumper	4390 mm	3967 mm	423 mm
X20	Rear surface of vehicle to left side of front bumper	4405 mm	3990 mm	415 mm
X21	Length of engine block	450 mm	450 mm	0 mm

Figure 5 Vehicle Target Locations

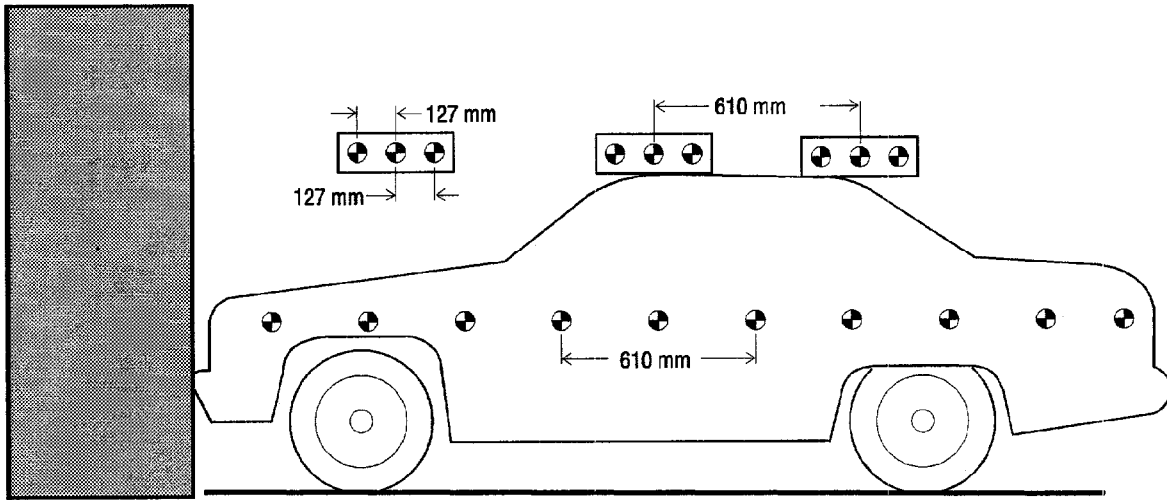


Figure 6 Dummy Measurement Locations for Front Seat Occupants

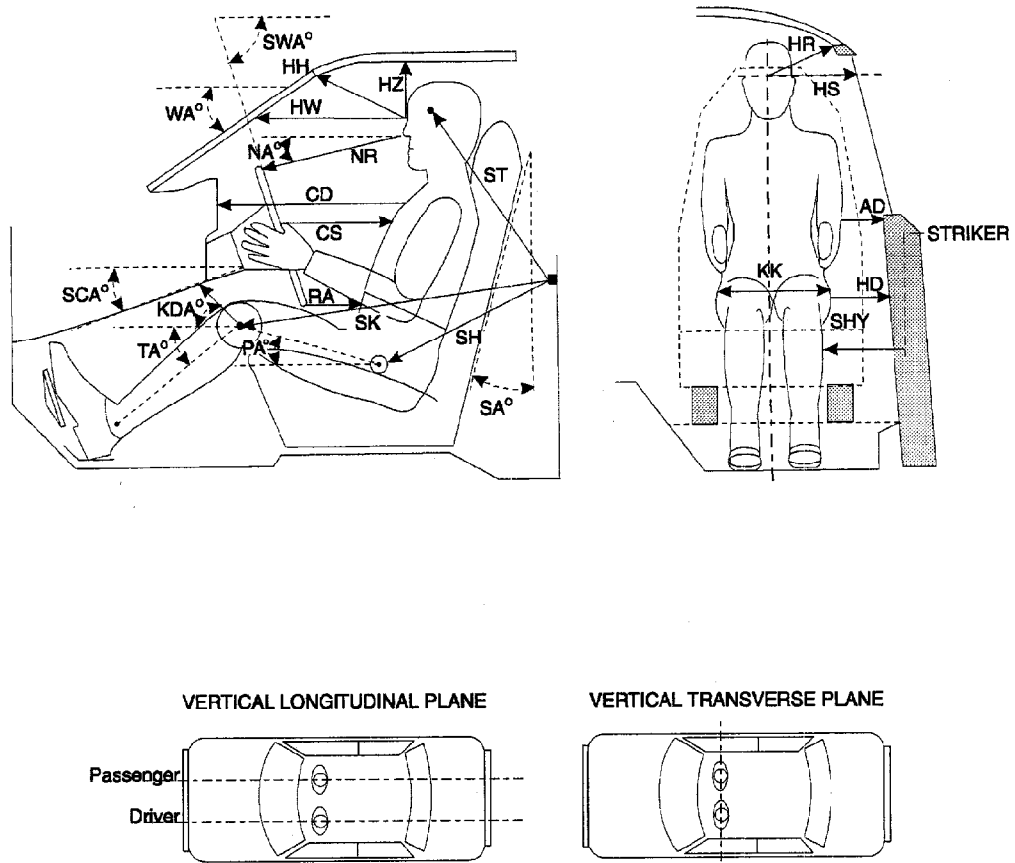


Table 7 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #169)	Passenger (Serial #168)
WA	Windshield angle	24°	24°
SWA	Steering wheel angle	72°	NA
SCA	Steering column angle	18°	NA
SA	Seat back angle	30°	23°
HZ	Head to roof	181 mm	165 mm
HH	Head to header	348 mm	313 mm
HW	Head to windshield	634 mm	560 mm
HR	Head to side header	176 mm	192 mm
NR	Nose to rim	405 mm	N/A
NA	Nose to rim angle	10°	N/A
CD	Chest to dash	521 mm	466 mm
CS	Steering wheel to chest	350 mm	N/A
RA	Rim to abdomen	213 mm	N/A
KDL	Left knee to dash	187 mm	167 mm
KDR	Right knee to dash	175 mm	155 mm
KDA	Outboard knee to dash angle	42°	32°
PA	Pelvic angle	25°	24°
TA	Tibial angle	35°	34°
KK	Knee to knee	365 mm	270 mm
ST ¹	Striker to head	480 mm	530 mm
	Striker to head angle	-87°	-81°
SK	Striker to knee	543 mm	585 mm
	Striker to knee angle	0°	4°
SH ¹	Striker to H-point	245 mm	248 mm
	Striker to H-point angle	41.5°	37°
SHY	Striker to H-point (Y dir.)	221 mm	222 mm
HS	Head to side window	275 mm	300 mm
HD	H-point to door	133 mm	125 mm
AD	Arm to door	90 mm	97 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

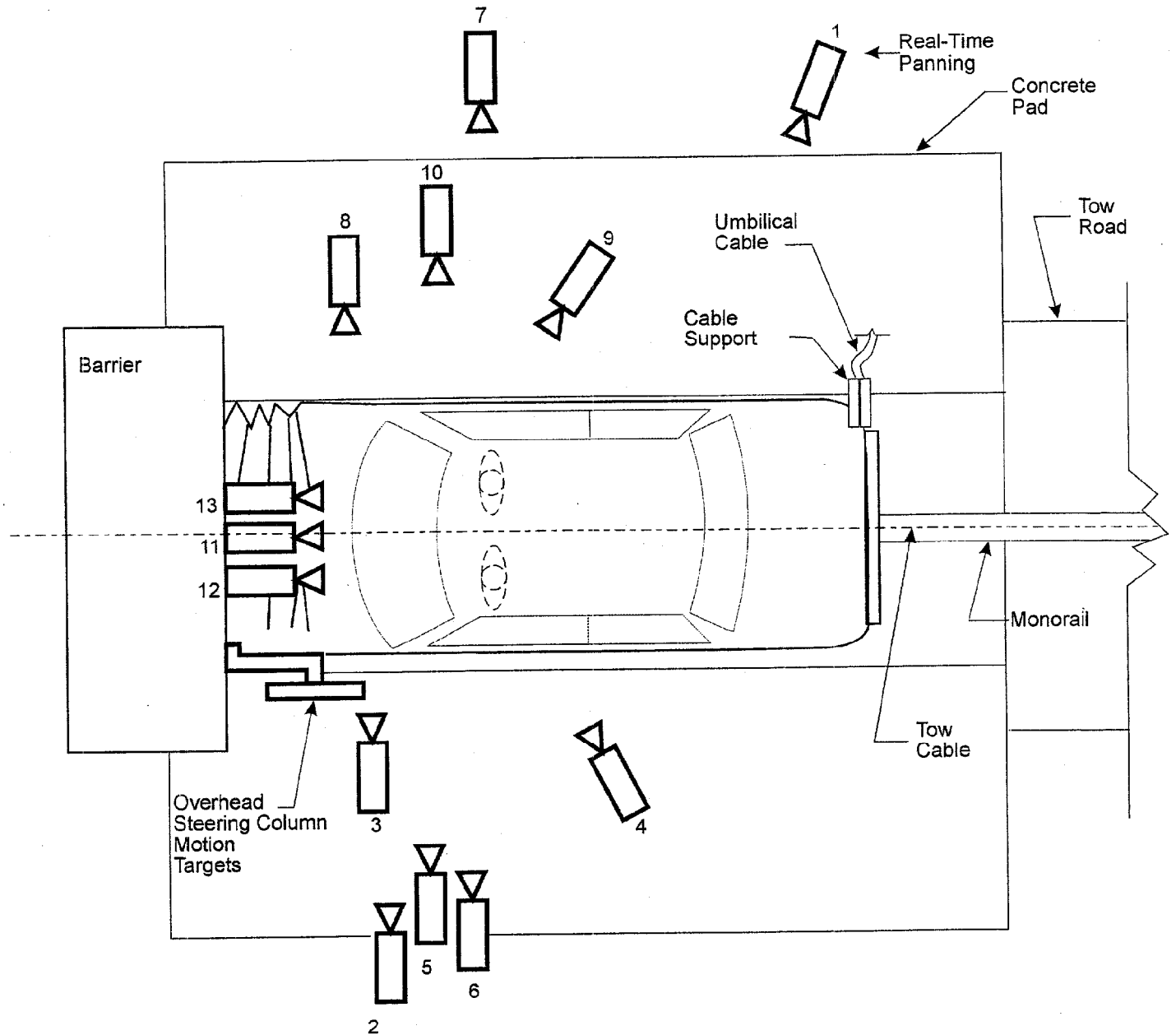


Figure 7 Camera Positions, Cont'd.

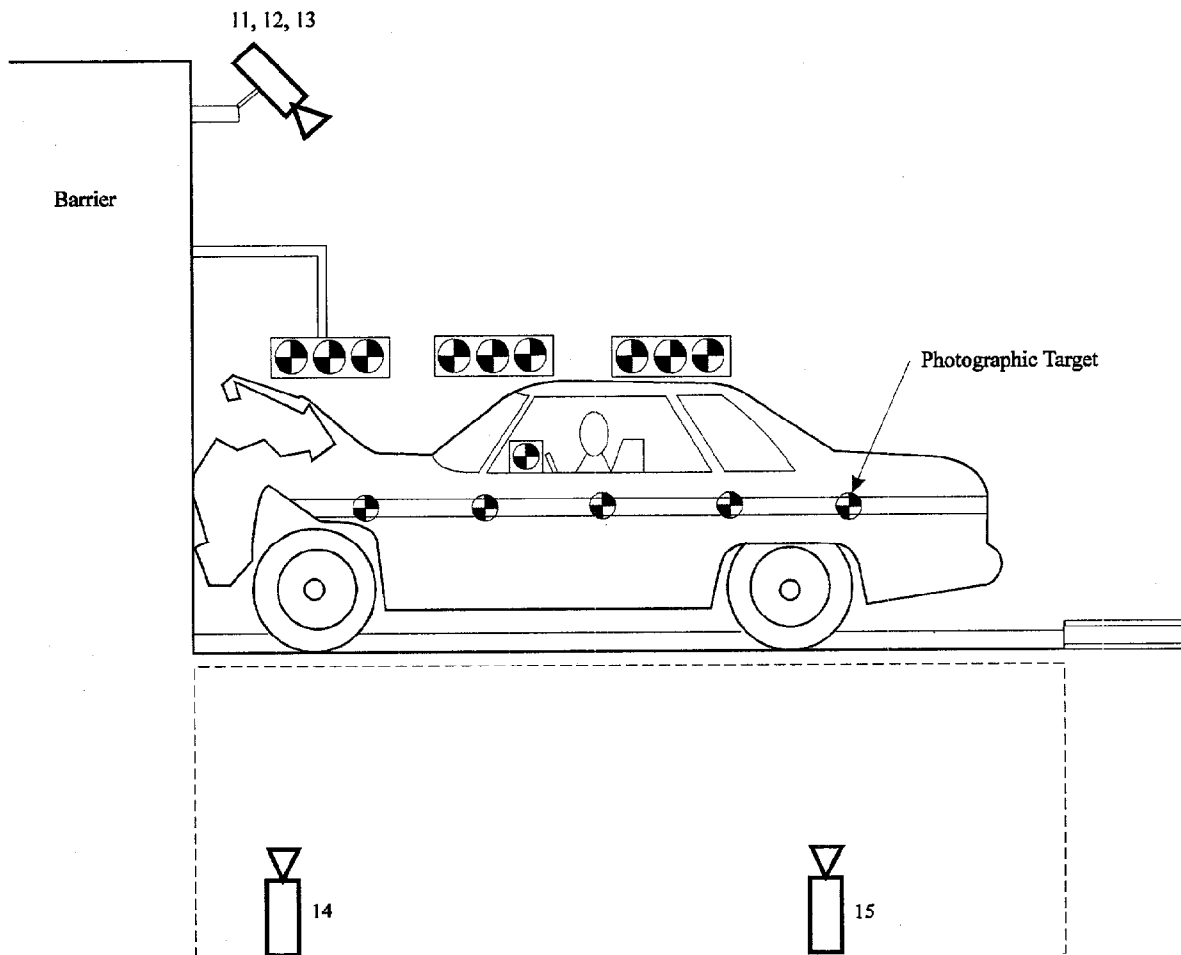


Table 8 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1999/Saturn/SL1/4-door Sedan

Test number: 990218-2

Camera Number	View	Camera Positions ¹			Camera Angle ²	Film Plane		Camera Lens	Film Speed
		X	Y	Z		to Head Target			
1	Real-time panning	NA	NA	NA	NA	NA		16 mm	24 frames/s
2	Left vehicle crush	-1460 mm	7136 mm	820 mm	-4°	7569 mm		25 mm	995 frames/s
3	Left windshield intrusion	-730 mm	7759 mm	1090 mm	0°	NA		50 mm	DNR frames/s
4	Driver kinematics	-3962 mm	2109 mm	2060 mm	-27°	2438 mm		25 mm	1000 frames/s
5	Steering column motion	-2347 mm	7106 mm	2775 mm	-14°	NA		25 mm	1000 frames/s
6	Steering column motion	-2347 mm	7106 mm	1845 mm	-9°	NA		25 mm	992 frames/s
7	Right overall	-2300 mm	-7830 mm	800 mm	-2°	NA		13 mm	1002 frames/s
8	Right windshield intrusion	-1310 mm	-7990 mm	1084 mm	0°	NA		50 mm	DNR frames/s
9	Passenger kinematics	-1640 mm	-6850 mm	1344 mm	-26°	2286 mm		25 mm	1000 frames/s
10	Passenger kinematics	-4030 mm	-2035 mm	2100 mm	-4°	5944 mm		25 mm	990 frames/s
11	Windshield front view	-423 mm	0 mm	2300 mm	-40°	NA		8.5 mm	505 frames/s
12	Driver - front view	-503 mm	380 mm	2250 mm	-50°	NA		17 mm	990 frames/s
13	Passenger - front view	-423 mm	-340 mm	2300 mm	-50°	NA		17 mm	968 frames/s
14	Pit - front position	-1300 mm	0 mm	-1220 mm	90°	NA		13 mm	995 frames/s
15	Pit - rear position	-3340 mm	0 mm	-1220 mm	90°	NA		13 mm	1005 frames/s
	Real-time documentation	NA	NA	NA	NA	NA		12-120 mm	24 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

Appendix A

Photographs



Figure A-1 Pre-Test Front View



Figure A-2 Post-Test Front View



Figure A-3 Pre-Test Left Side View

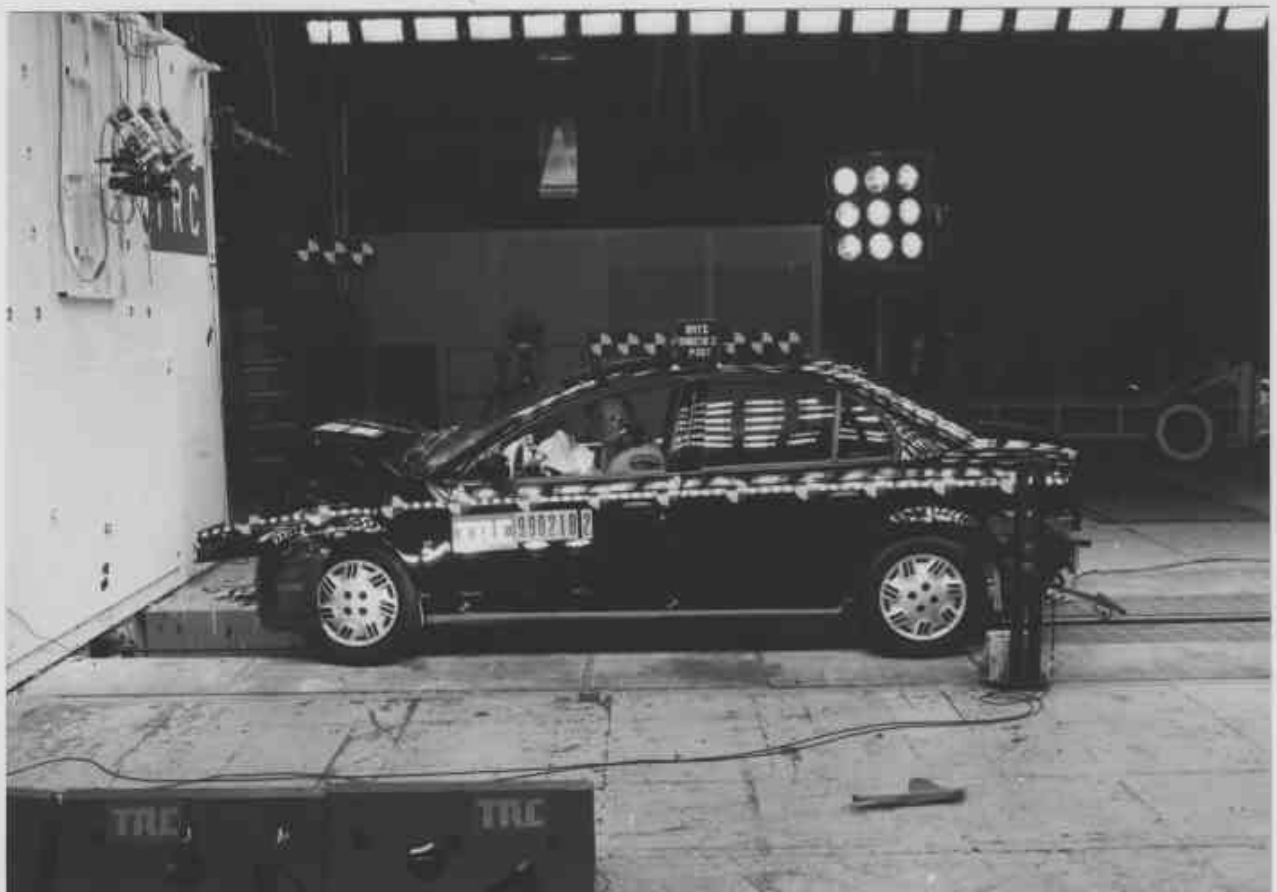


Figure A-4 Post-Test Left Side View



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

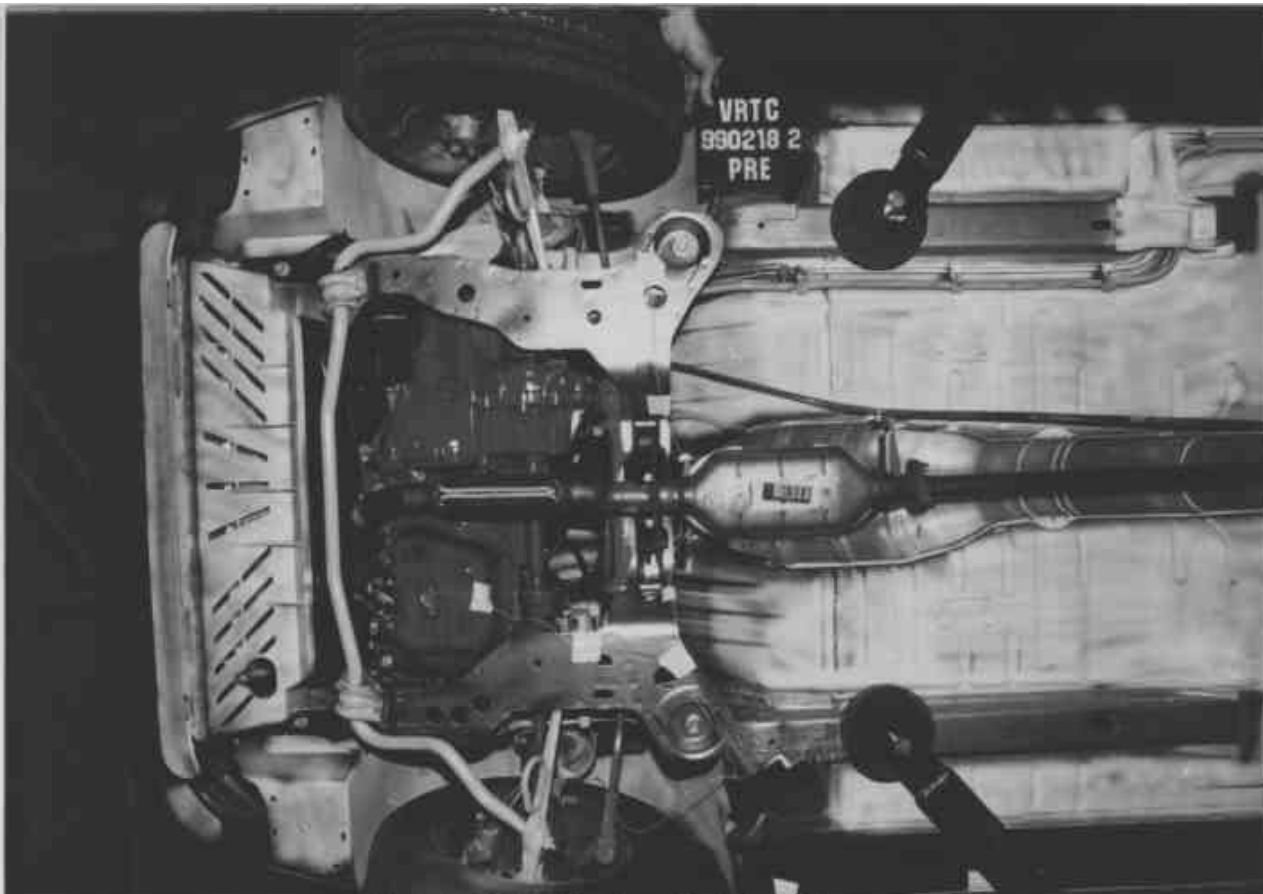


Figure A-13 Pre-Test Front Underbody View

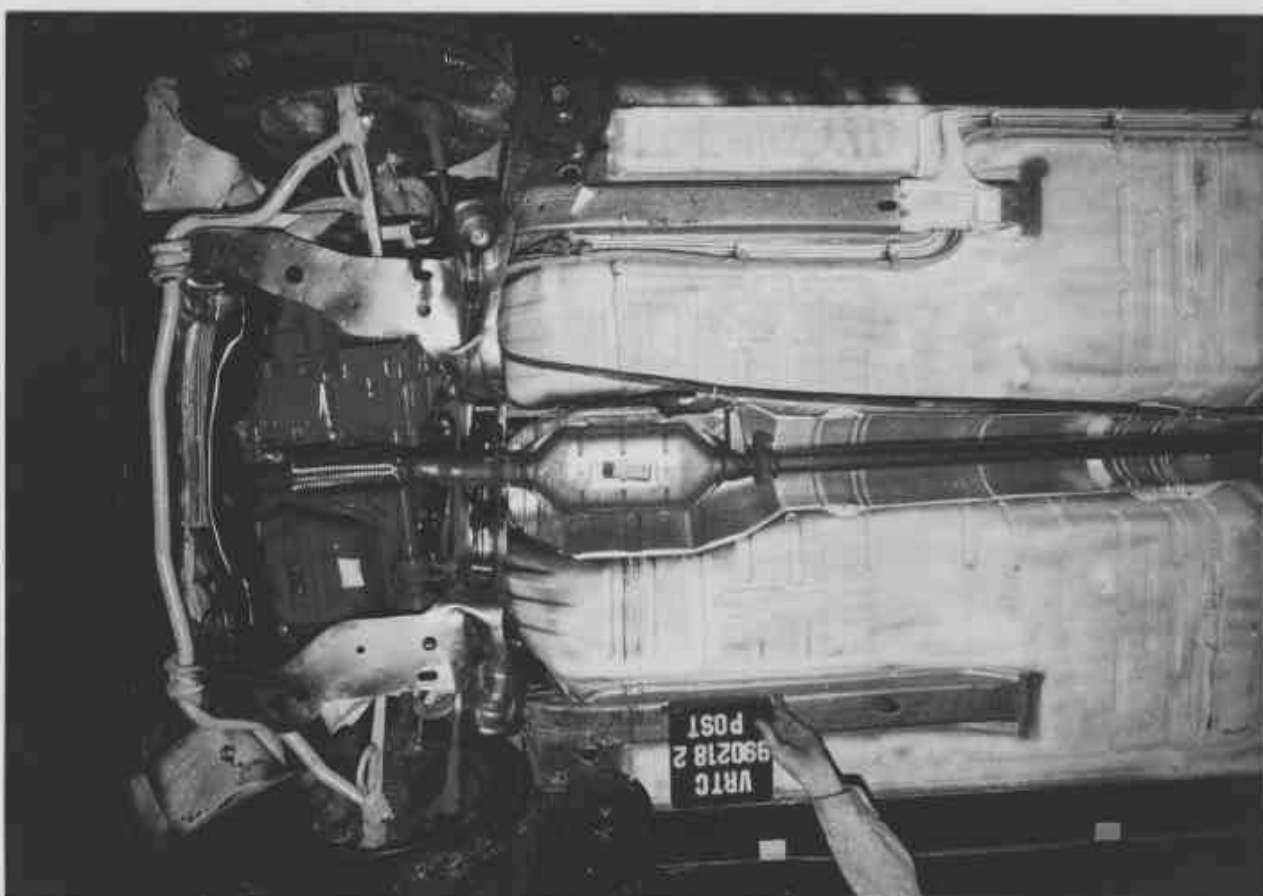


Figure A-14 Post-Test Front Underbody View

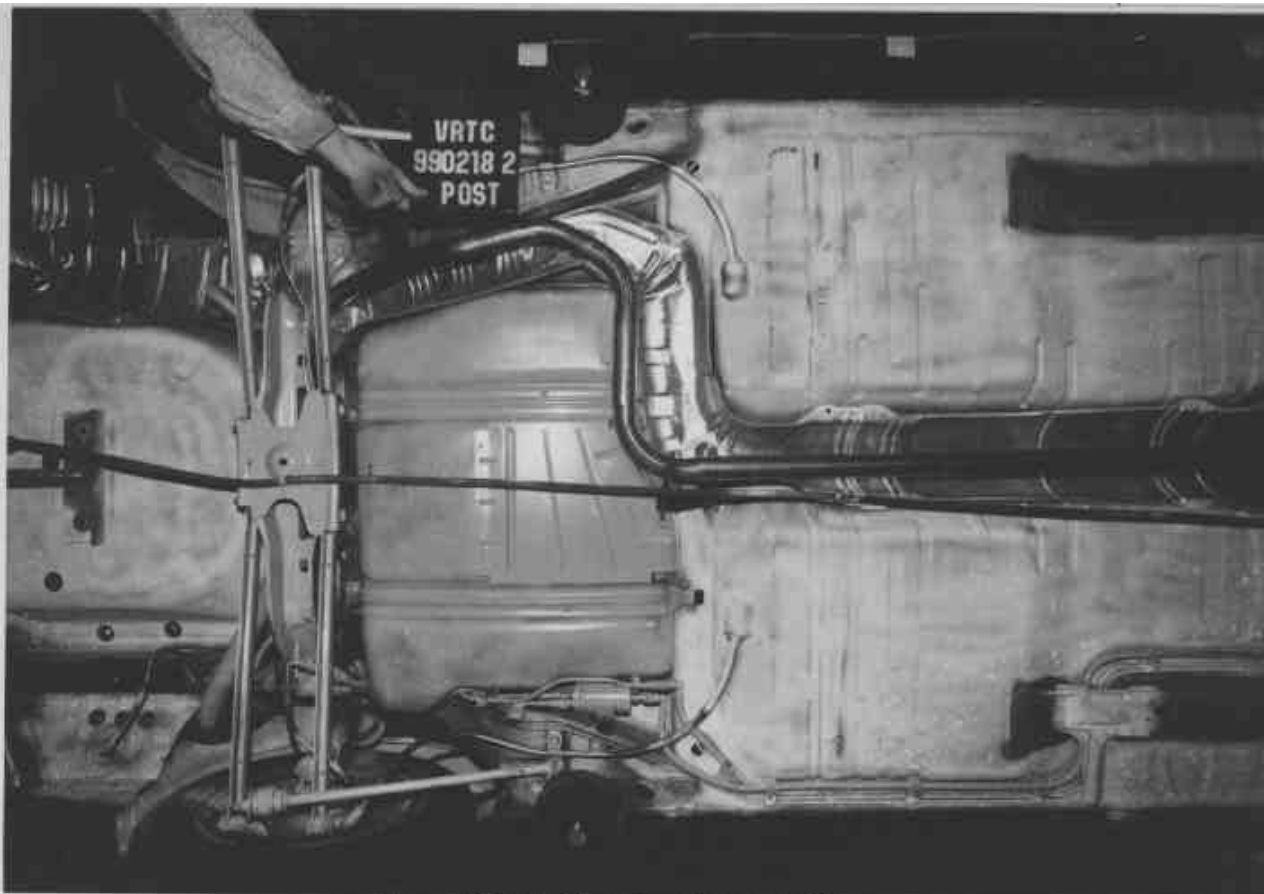


Figure A-15 Pre-Test Rear Underbody View

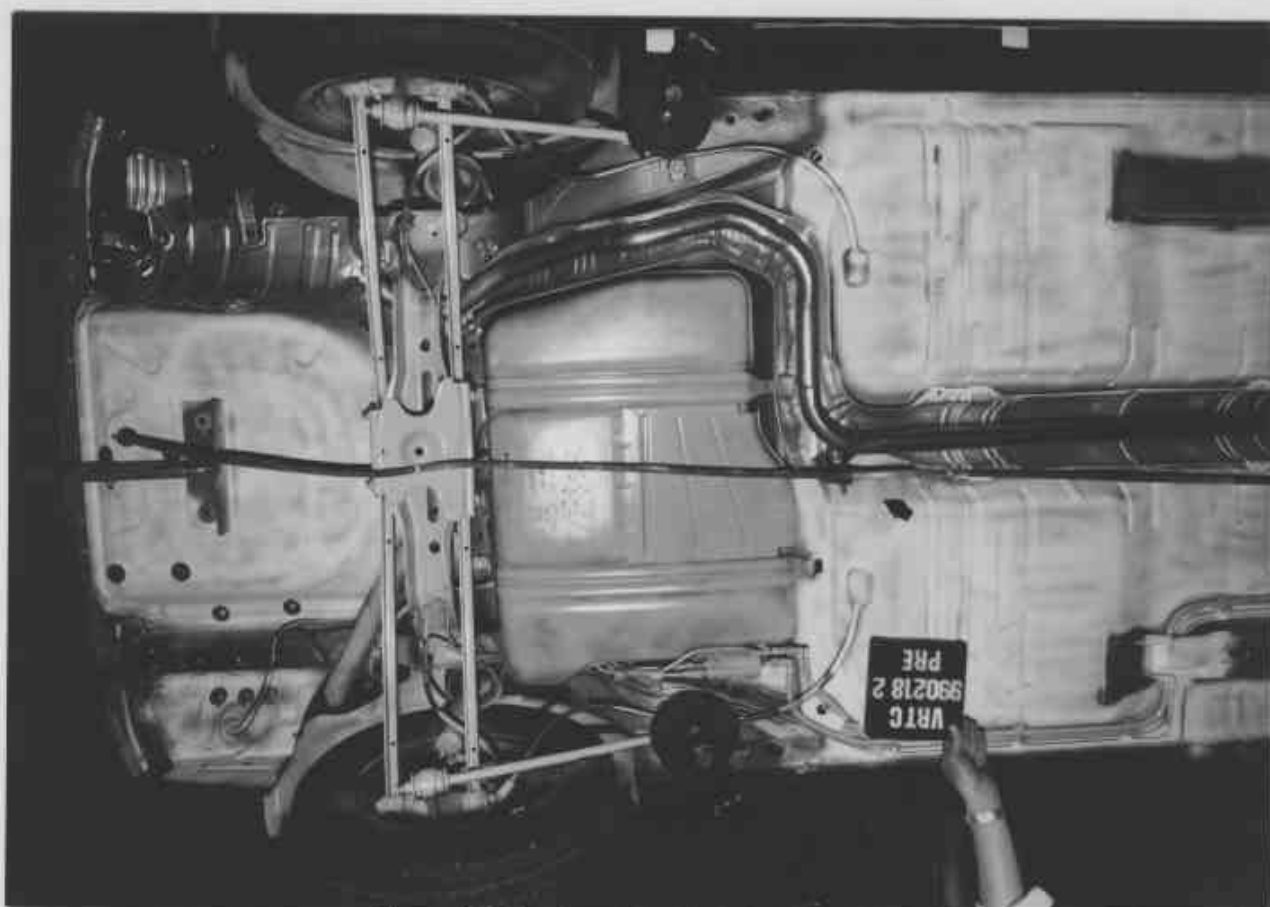


Figure A-16 Post-Test Rear Underbody View



Figure A-17 Pre-Test Engine Compartment View



Figure A-18 Post-Test Engine Compartment View

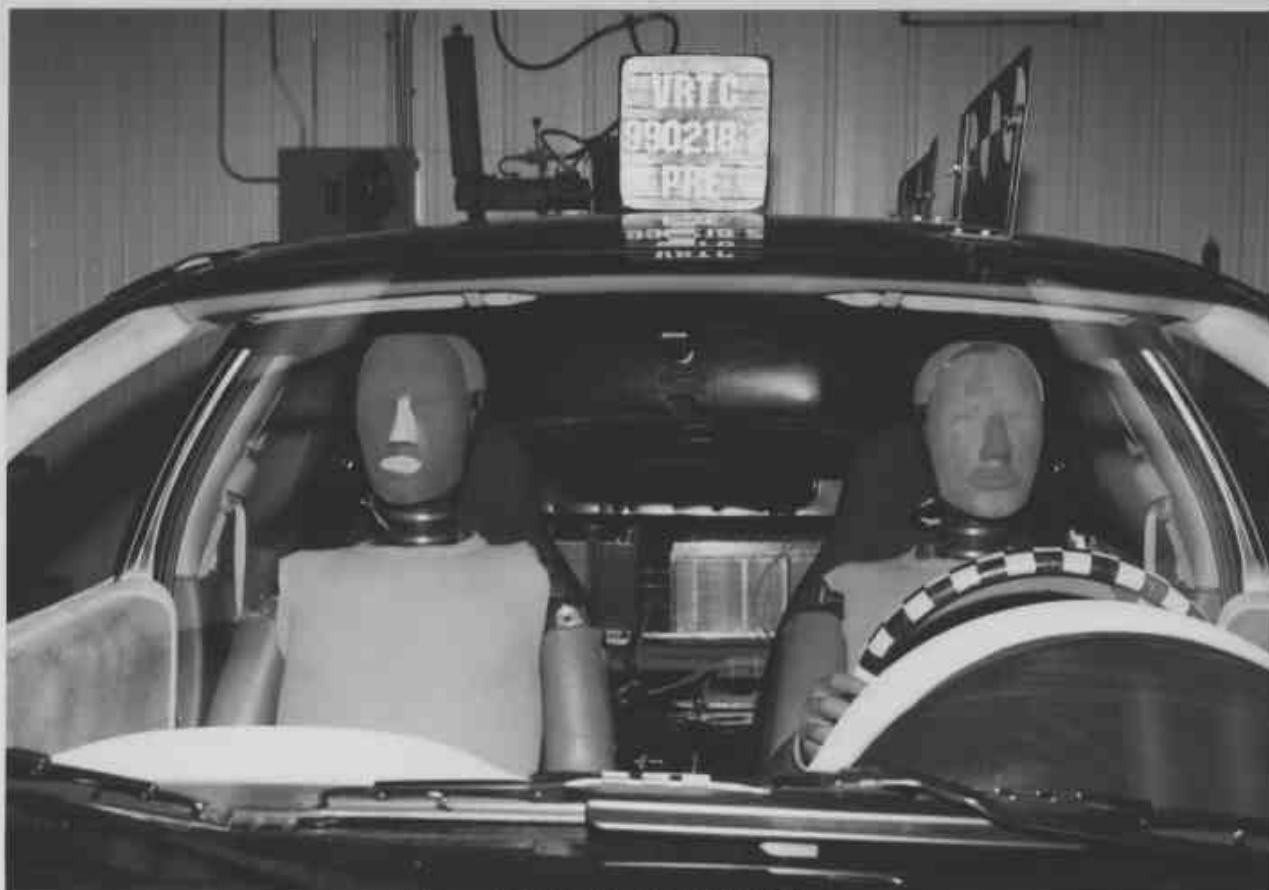


Figure A-19 Pre-Test Windshield View



Figure A-20 Post-Test Windshield View



Figure A-21 Pre-Test Driver Dummy Windshield View

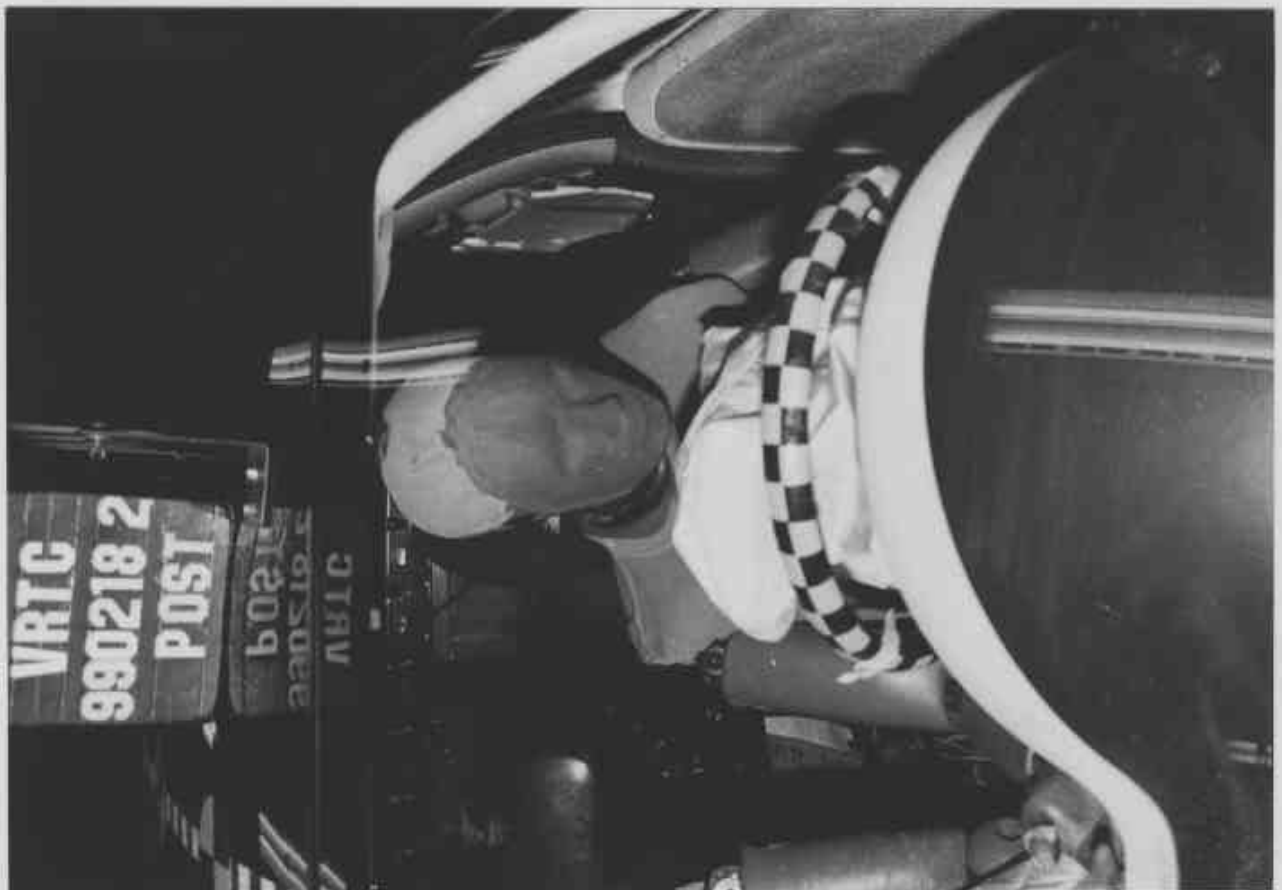


Figure A-22 Post-Test Driver Dummy Windshield View



Figure A-23 Pre-Test Passenger Dummy Windshield View



Figure A-24 Post-Test Passenger Dummy Windshield View



Figure A-25 Pre-Test Driver Dummy Position - View 1



Figure A-26 Post-Test Driver Dummy Position - View 1



Figure A-27 Pre-Test Driver Dummy Position -View 2



Figure A-28 Post-Test Driver Dummy Position - View 2



Figure A-29 Pre-Test Driver Dummy Position -View 3



Figure A-30 Post-Test Driver Dummy Position - View 3



Figure A-31 Pre-Test Passenger Dummy Position - View 1



Figure A-32 Post-Test Passenger Dummy Position - View 1



Figure A-33 Pre-Test Passenger Dummy Position - View 2



Figure A-34 Post-Test Passenger Dummy Position - View 2



Figure A-35 Pre-Test Passenger Dummy Position - View 3



Figure A-36 Post-Test Passenger Dummy Position - View 3



Figure A-37 Post-Test Driver Dummy View



Figure A-38 Post-Test Driver Dummy Head Contact - View 1



Figure A-39 Post-Test Driver Dummy Head Contact - View 2



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



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



Figure A-42 Post-Test Driver Footwell Deformation View



Figure A-43 Post-Test Passenger Dummy View



Figure A-44 Post-Test Passenger Dummy Head Contact - View 1



Figure A-45 Post-Test Passenger Dummy Head Contact - View 2



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



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



Figure A-48 Post-Test Passenger Footwell Deformation View



Figure A-49 Pre-Test Vehicle Certification Label View



Figure A-50 Pre-Test Vehicle Tire Information Label View

Appendix B

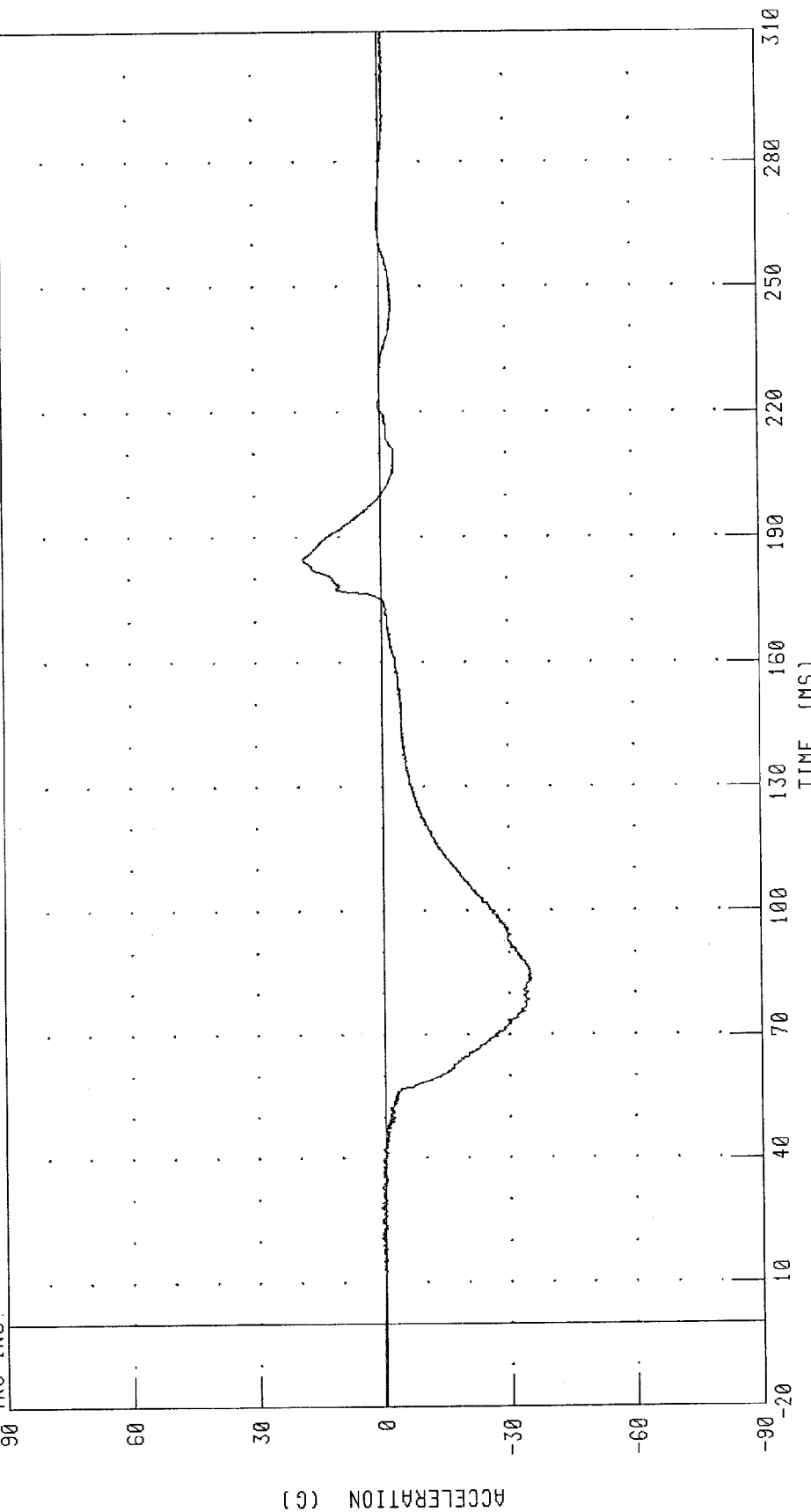
Data Plots

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD X-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

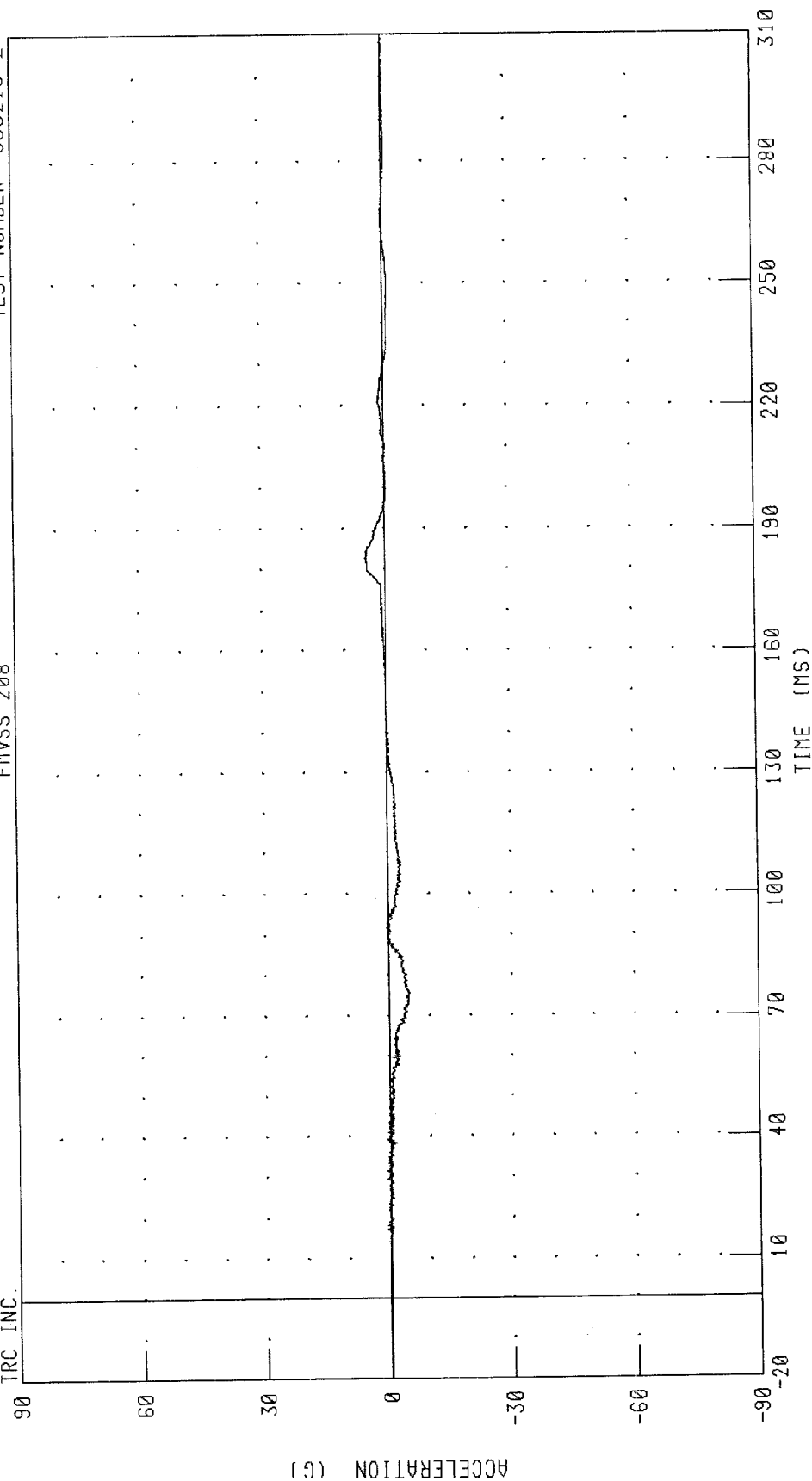
PEAK DATA: 18.70 G @ 184.64 MS; -35.15 G @ 83.20 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 4.69 G @ 182.64 MS; -5.22 G @ 75.76 MS

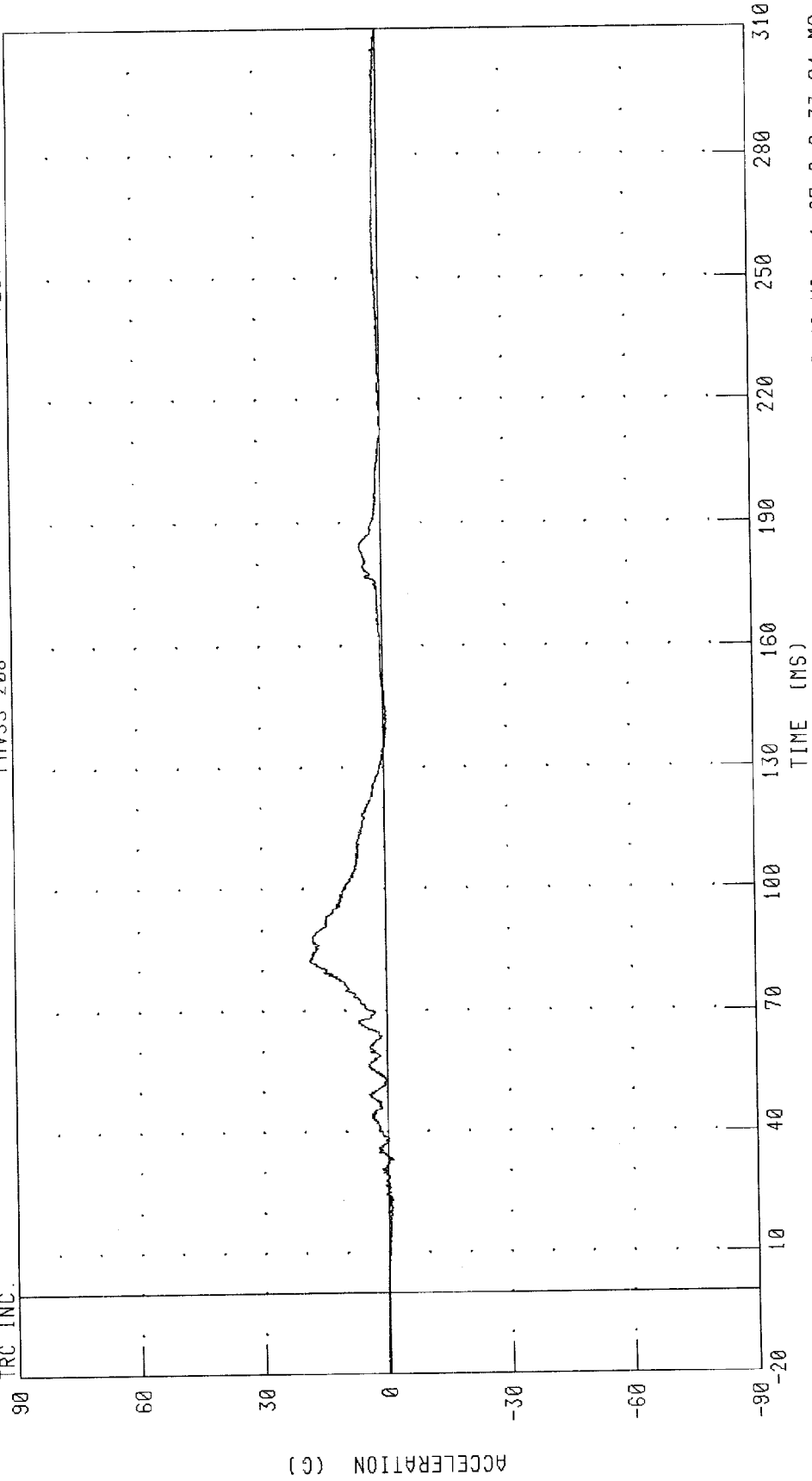
CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 18.56 G @ 82.48 MS; -1.27 G @ 33.04 MS

CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.

120

100

80

60

40

20

0

ACCELERATION (G)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

10

PEAK DATA: 39.61 G @ 83.20 MS; 0.13 G @ -19.76 MS

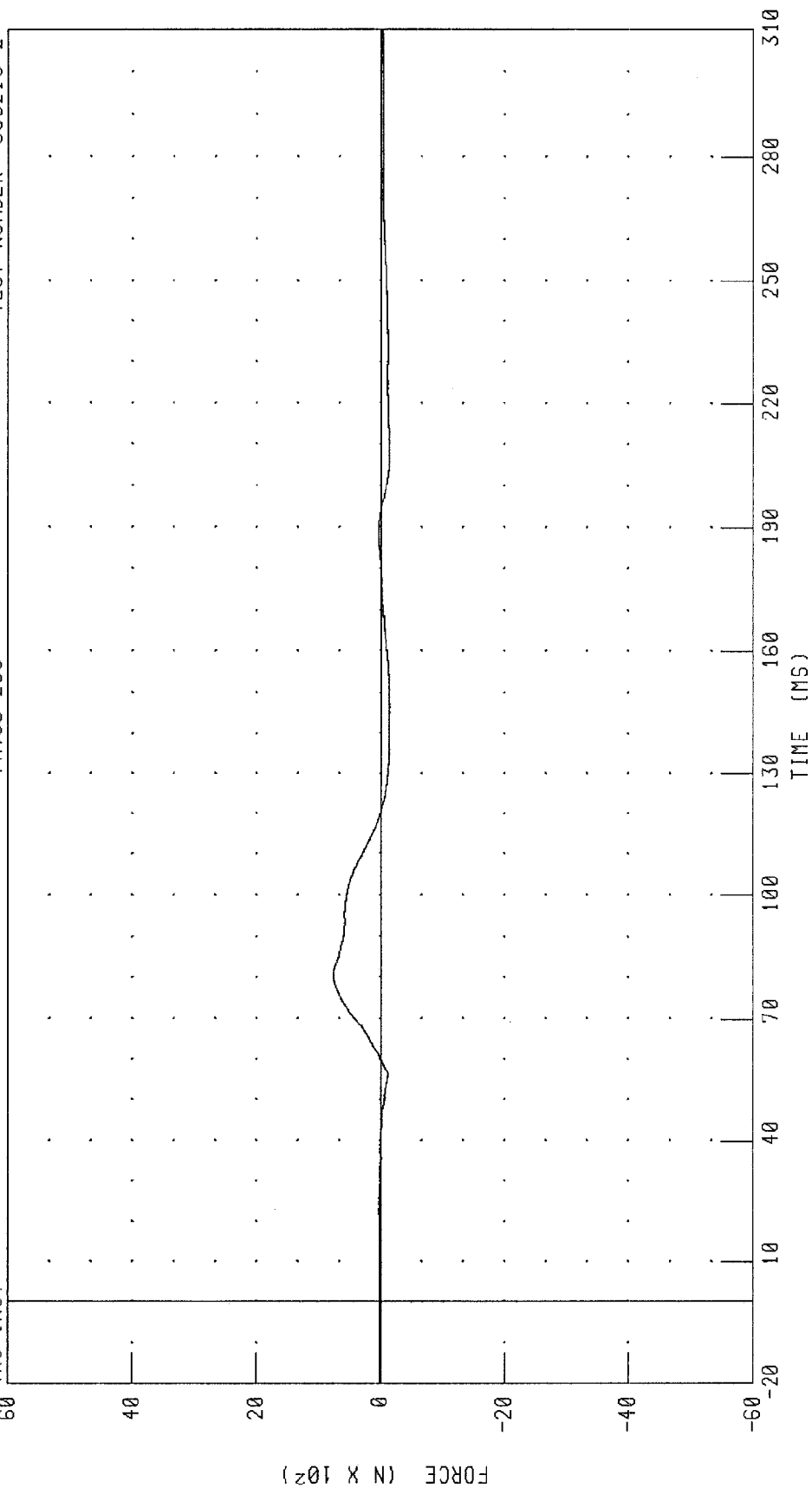
CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

PEAK DATA: 761.51 N @ 80.00 MS, -154.49 N @ 145.36 MS

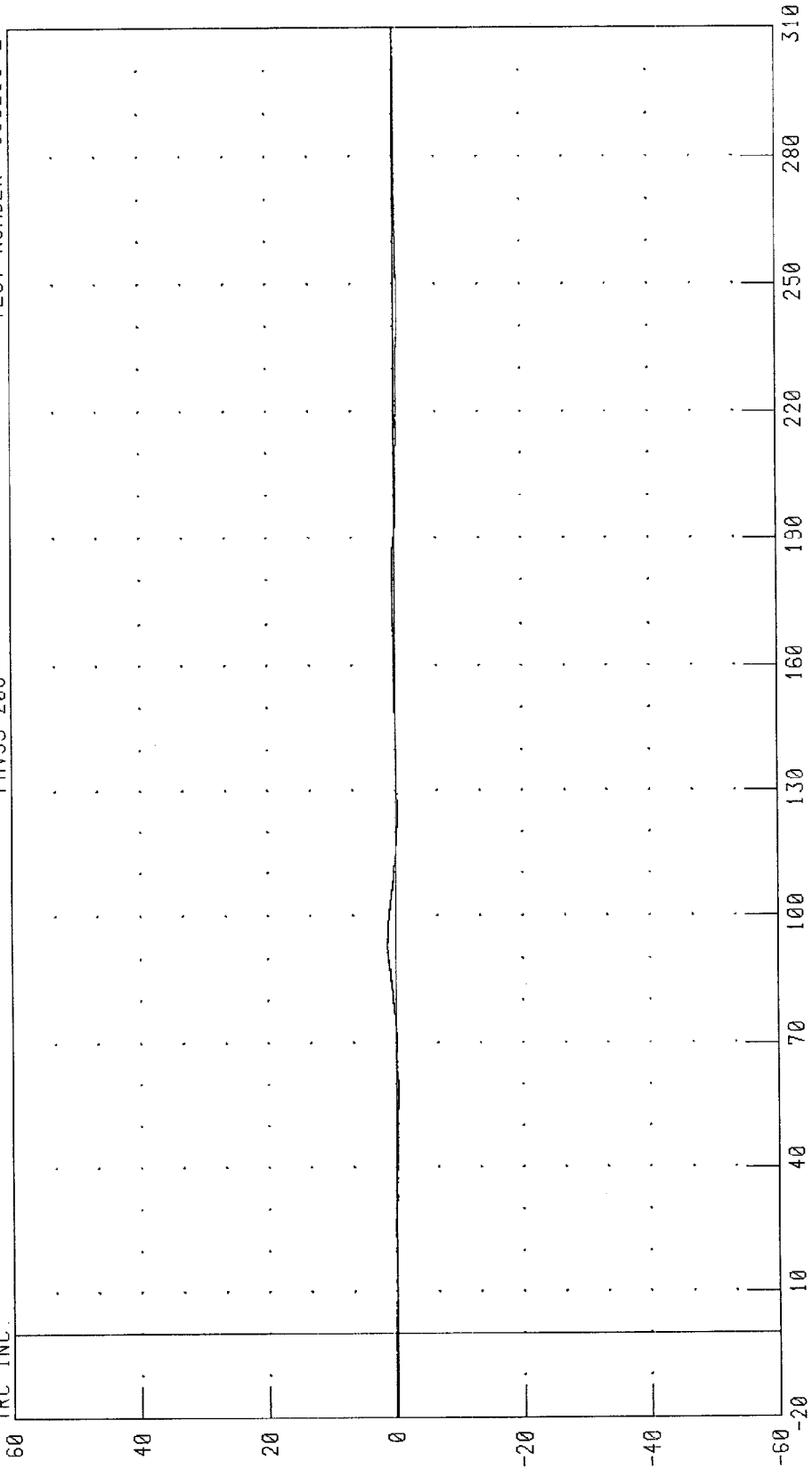
1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.

FORCE (N X 10²)



TIME (MS)

PEAK DATA: 126.28 N @ 92.64 MS; -55.30 N @ 240.00 MS

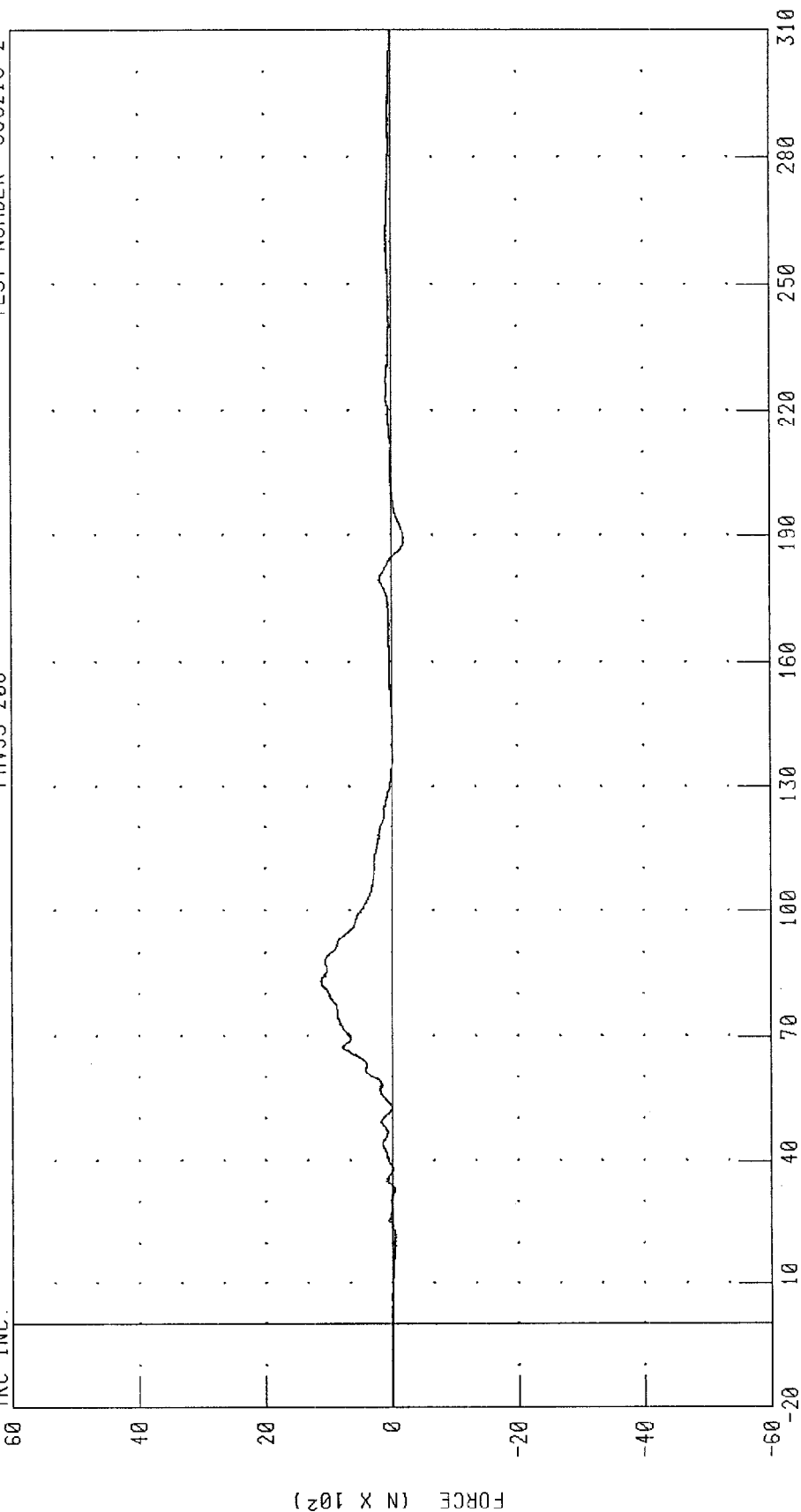
CHANNEL: NEKYF1 FILTER: CH CLASS 1000

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
 DRIVER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.

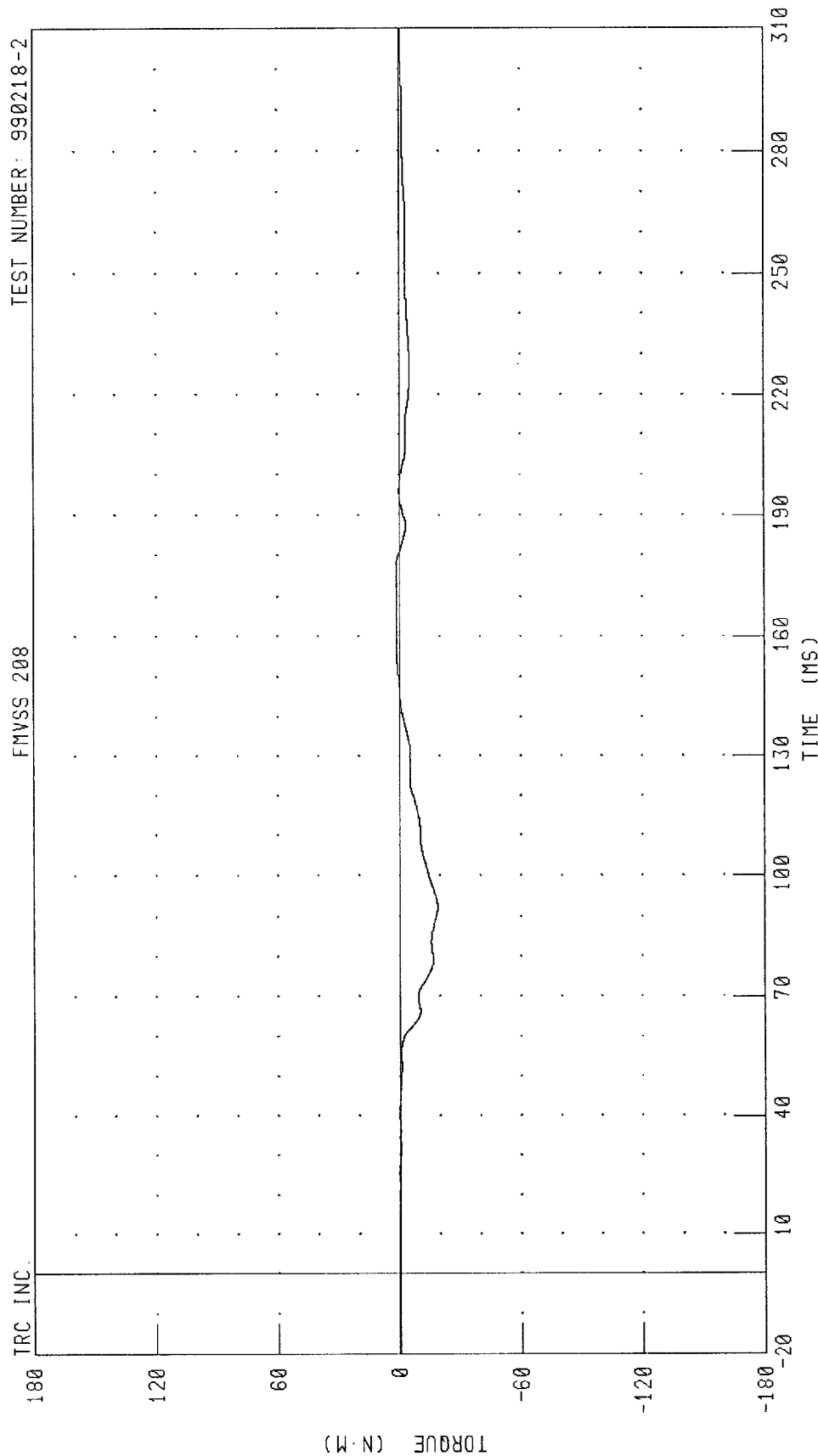


TIME (MS)

PEAK DATA: 1122.73 N @ 82.96 MS, -206.80 N @ 188.32 MS

CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK MOMENT ABOUT X AXIS



CHANNEL: NEKXM1 FILTER: CH. CLASS 600

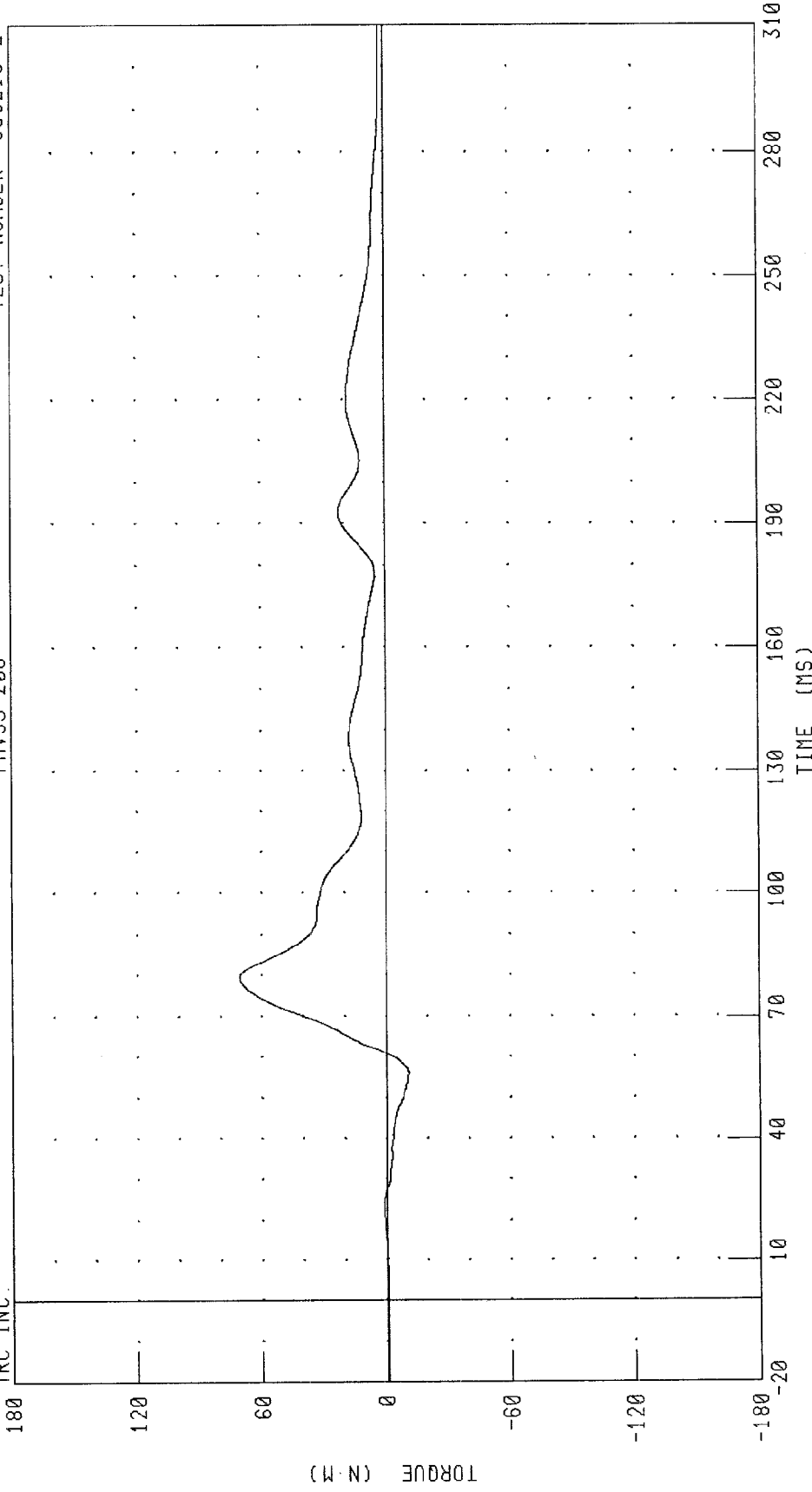
PEAK DATA: 1.51 N-M @ 162.64 MS; -18.97 N-M @ 92.48 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: NEKYM1 FILTER: CH. CLASS 600

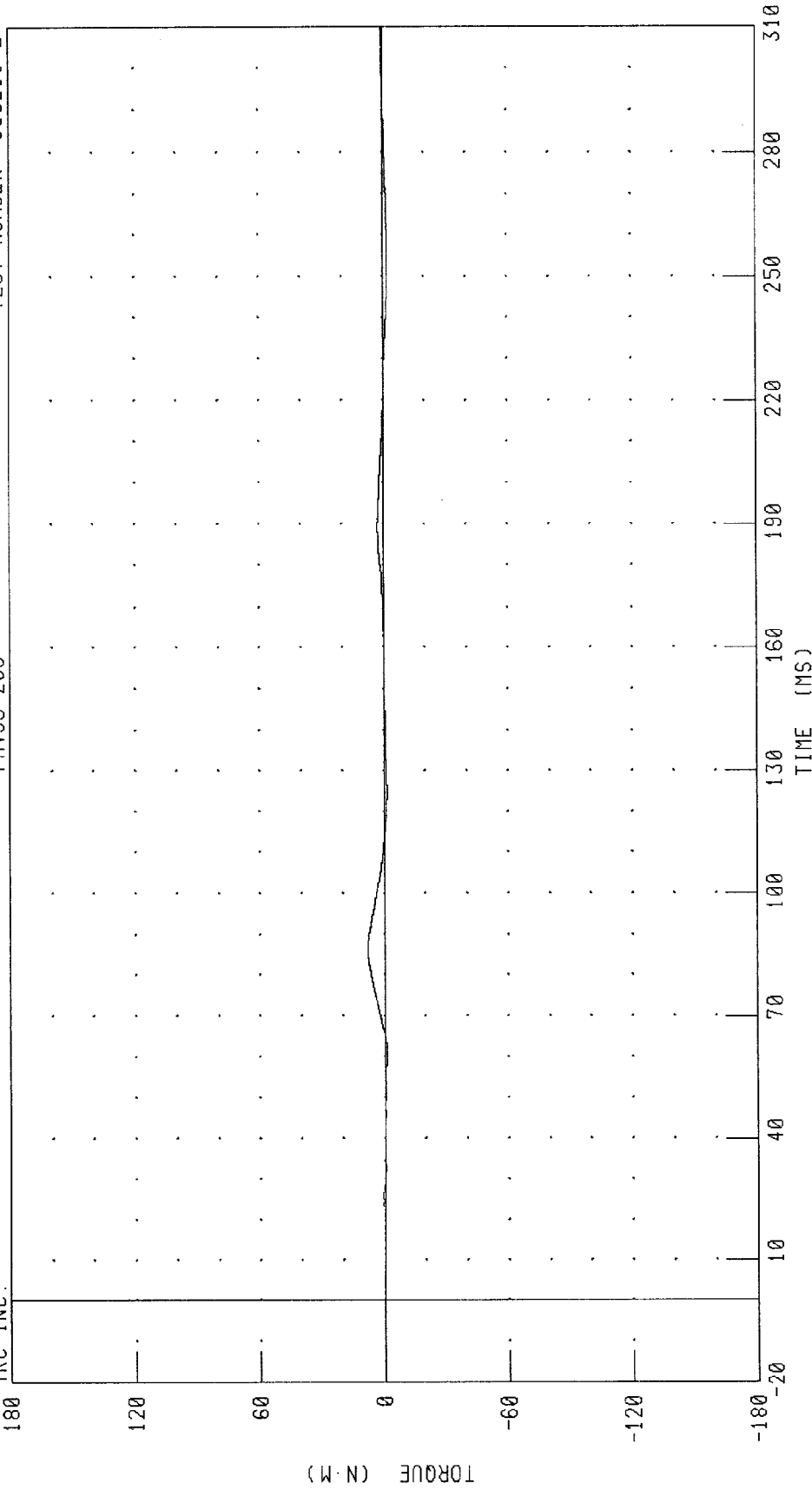
PEAK DATA: 70.61 N-M @ 79.52 MS; -10.73 N-M @ 56.00 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.

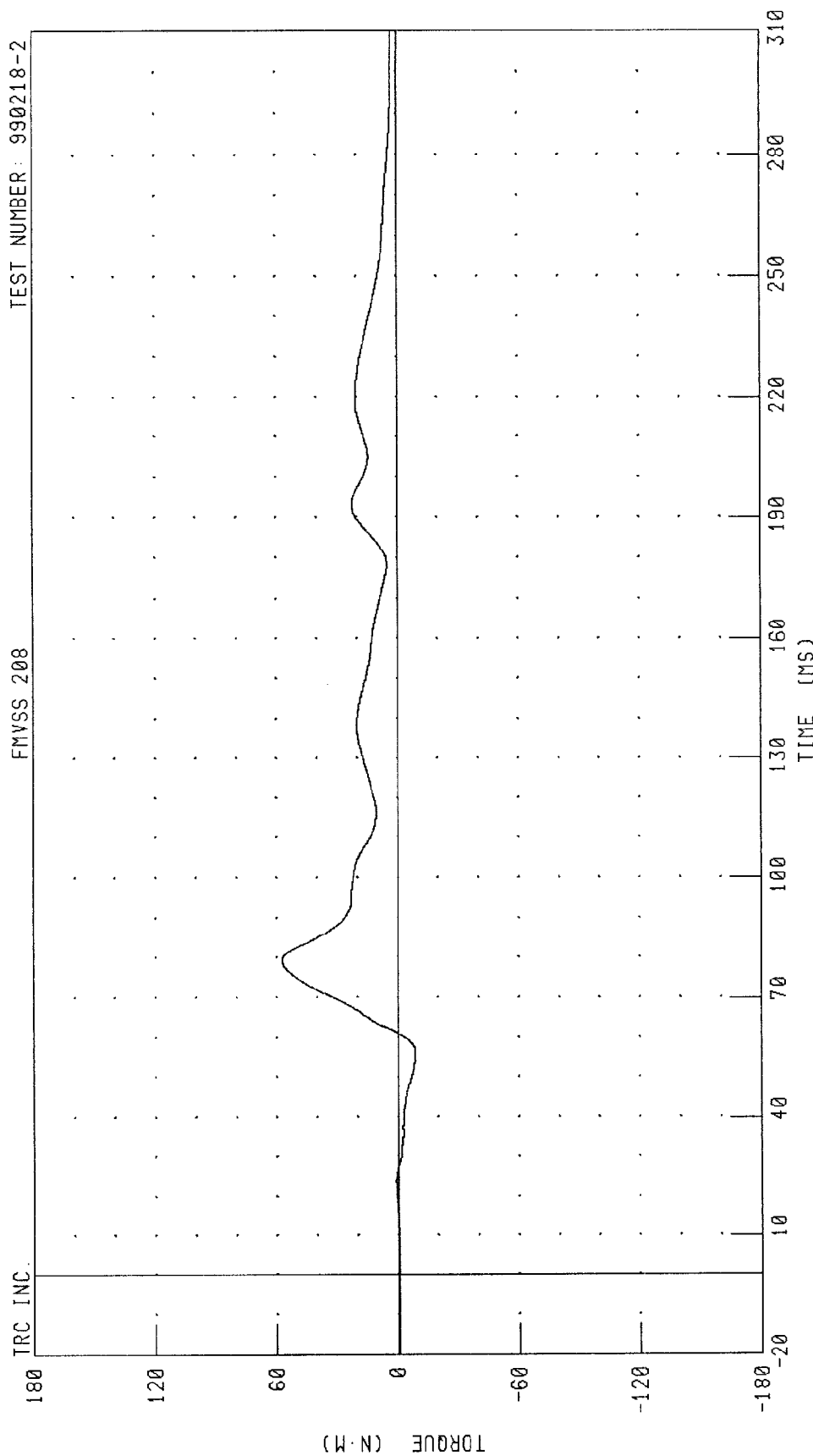


PEAK DATA: 7.89 N.M @ 86.64 MS; -2.30 N.M @ 253.20 MS

FILTER: CH. CLASS 600

CHANNEL: NEKZM1

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER NECK OCCIPITAL CONDYLE



CHANNEL: NEKOM1 FILTER: CH. CLASS 600

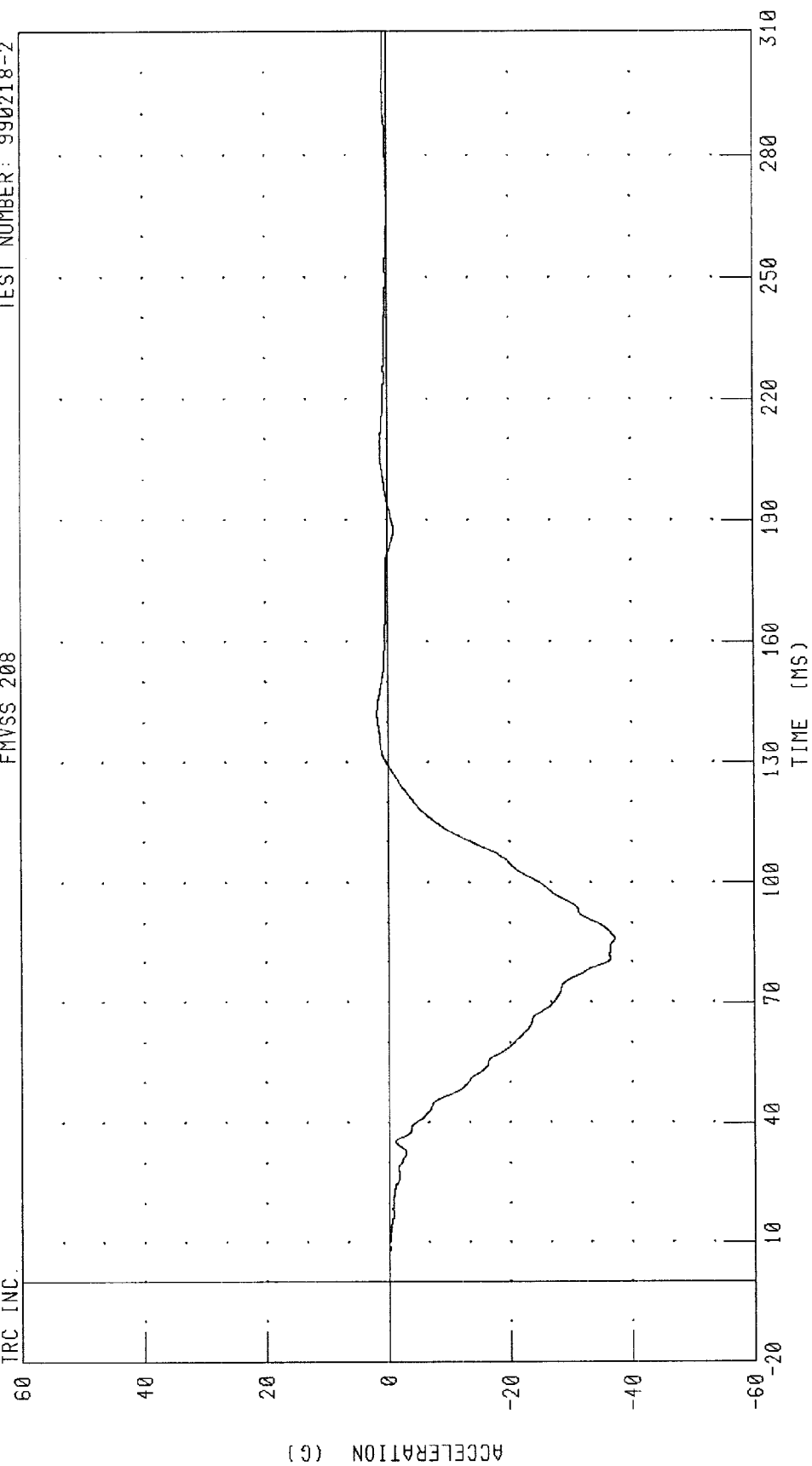
PEAK DATA: 57.24 N·M @ 79.04 MS; -8.71 N·M @ 53.92 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST X-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

IRC INC.



CHANNEL: CSTXG1 FILTER: CH. CLASS 180

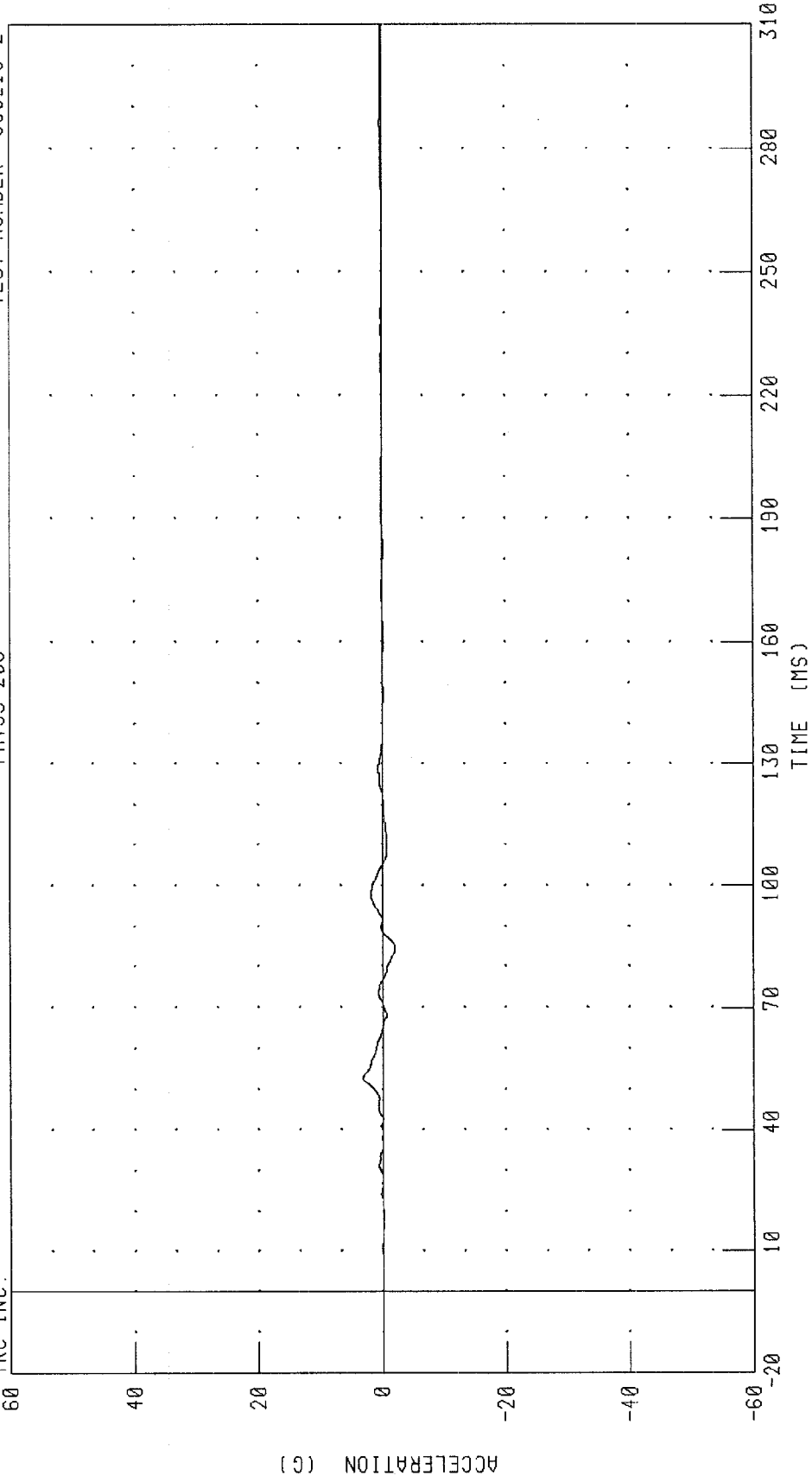
PEAK DATA: 1.77 G @ 142.08 MS; -37.23 G @ 86.00 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

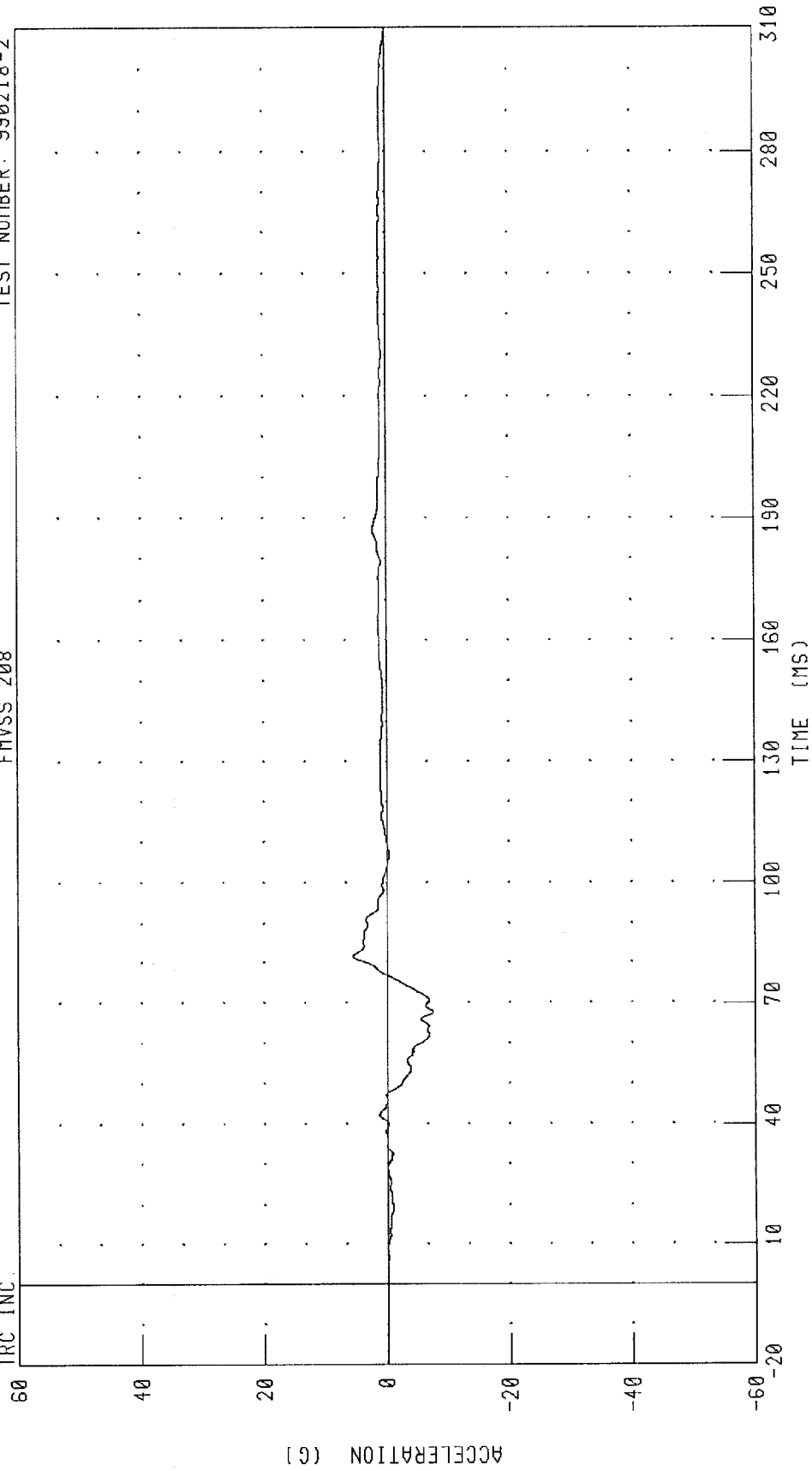
PEAK DATA: 3.20 G @ 52.56 MS; -2.05 G @ 85.04 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 5.53 G @ 81.52 MS; -7.59 G @ 67.84 MS

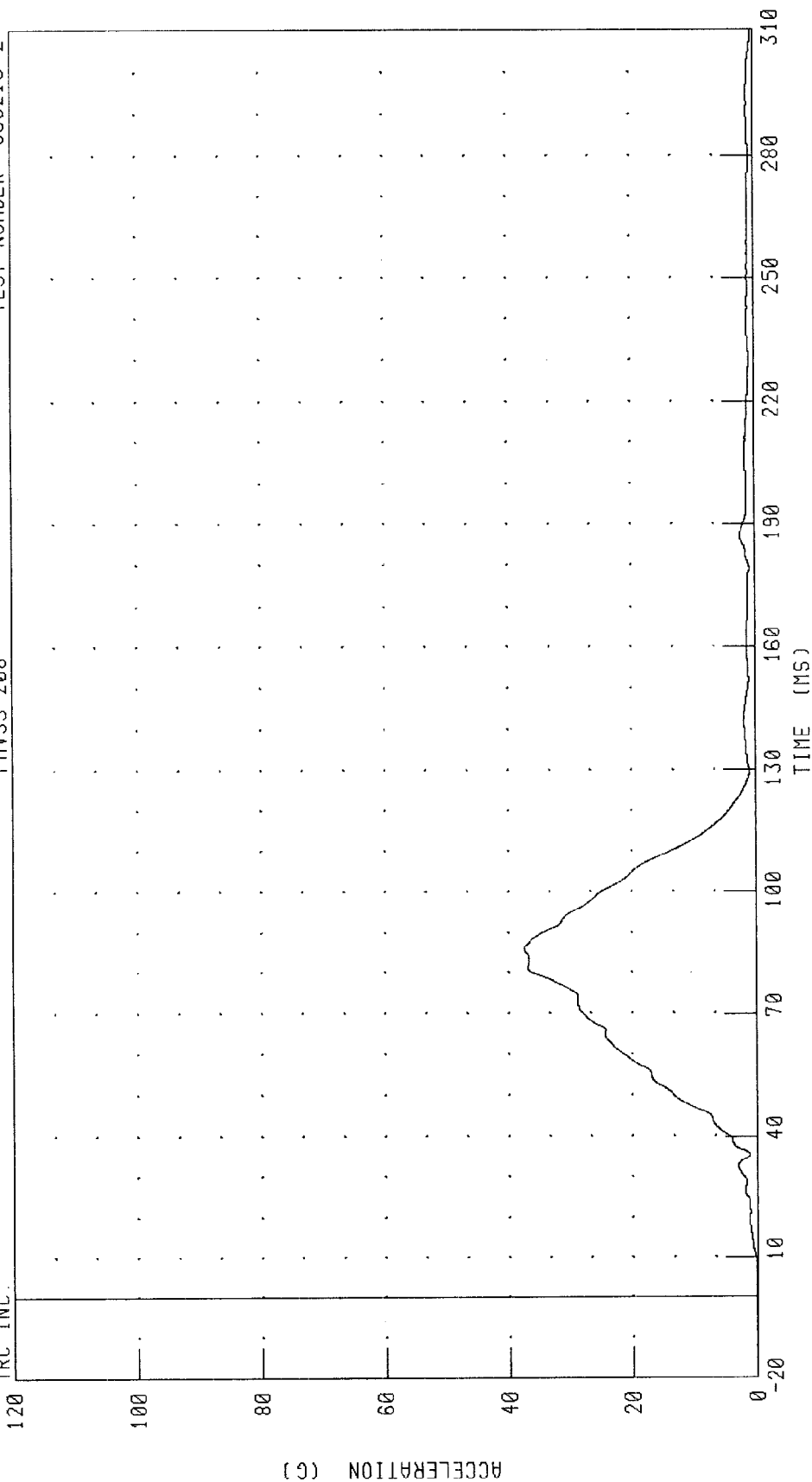
CHANNEL: CSTZG1 FILTER: CH. CLASS 180

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST RESULTANT ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 37.45 G @ 86.00 MS; 0.01 G @ -20.00 MS

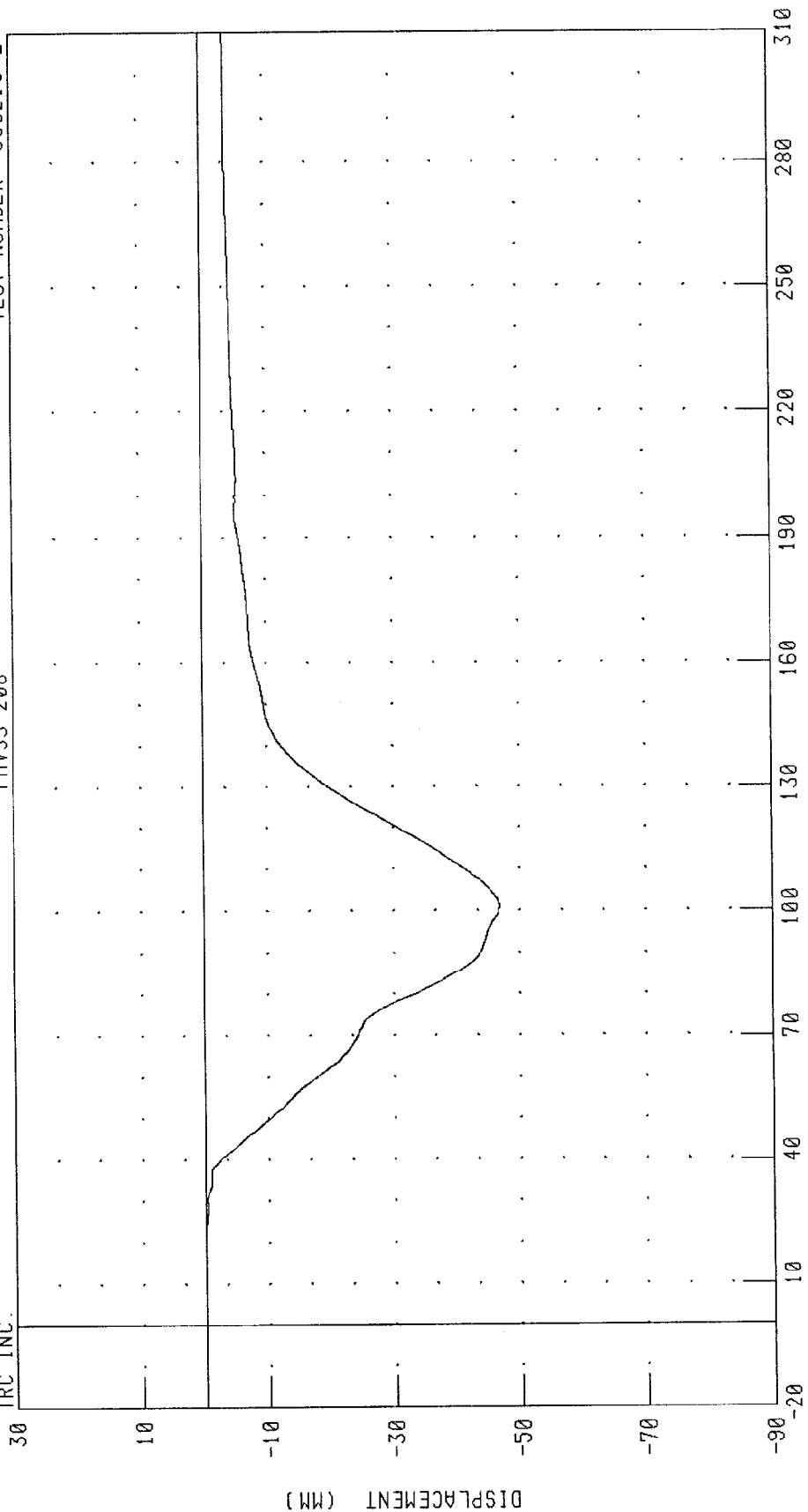
CHANNEL: CSTRC1 FILTER: CH. CLASS 180

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER CHEST DEFLECTION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



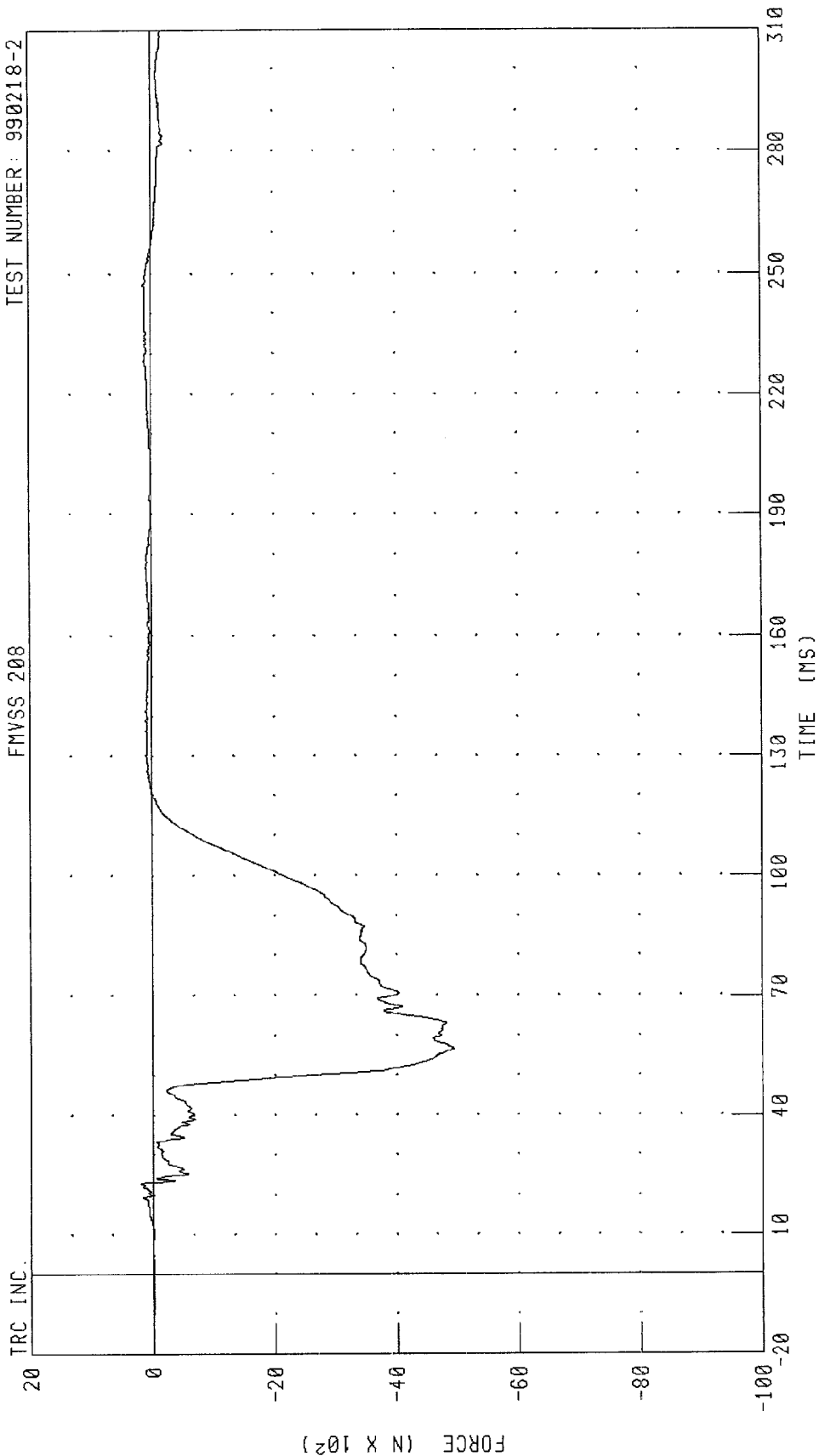
TIME (MS)

PEAK DATA: 0.10 MM @ 19.68 MS, -46.79 MM @ 101.28 MS

CHANNEL: CSTXD1 FILTER: CH. CLASS 180

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER LEFT FEMUR FORCE
FMVSS 208

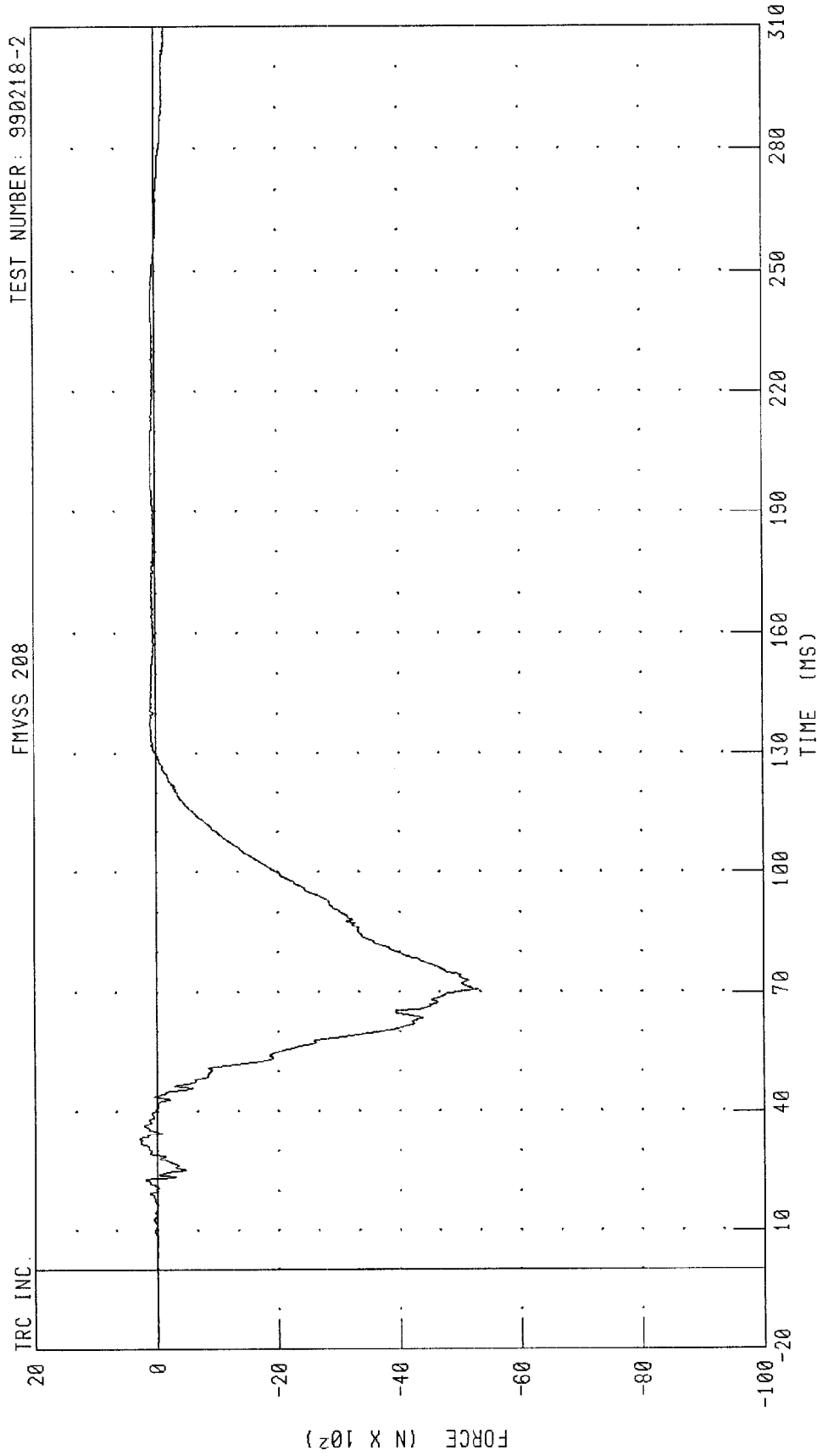
TEST NUMBER: 990218-2



CHANNEL: LFMF1 FILTER: CH. CLASS 600

PEAK DATA: 215.06 N @ 23.04 MS; -4932.74 N @ 56.56 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DRIVER RIGHT FEMUR FORCE



CHANNEL: RFMF1 FILTER: CH. CLASS 600

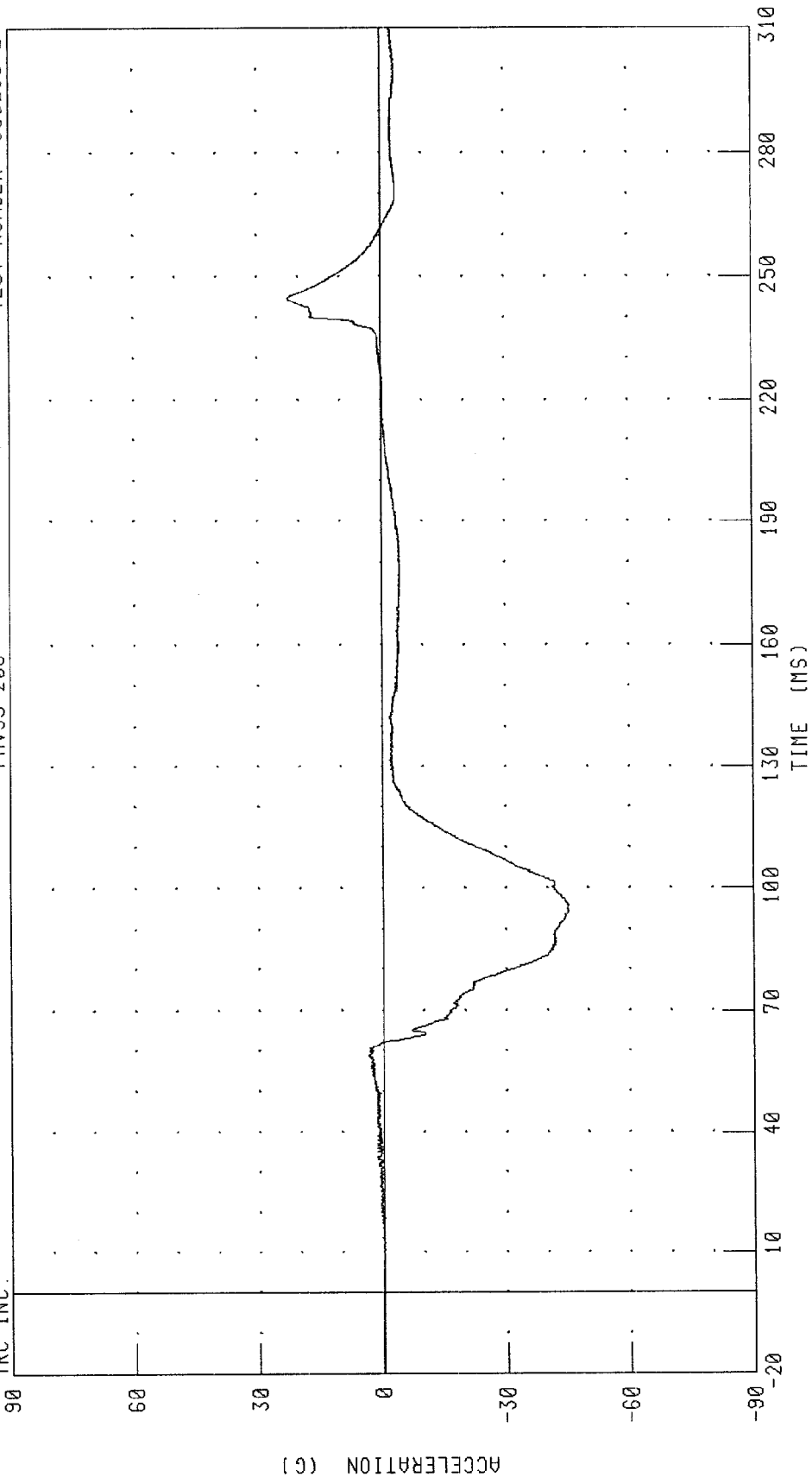
PEAK DATA: 293.92 N @ 33.20 MS; -5288.34 N @ 70.80 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: HEDXG2 FILTER: CH. CLASS 1000

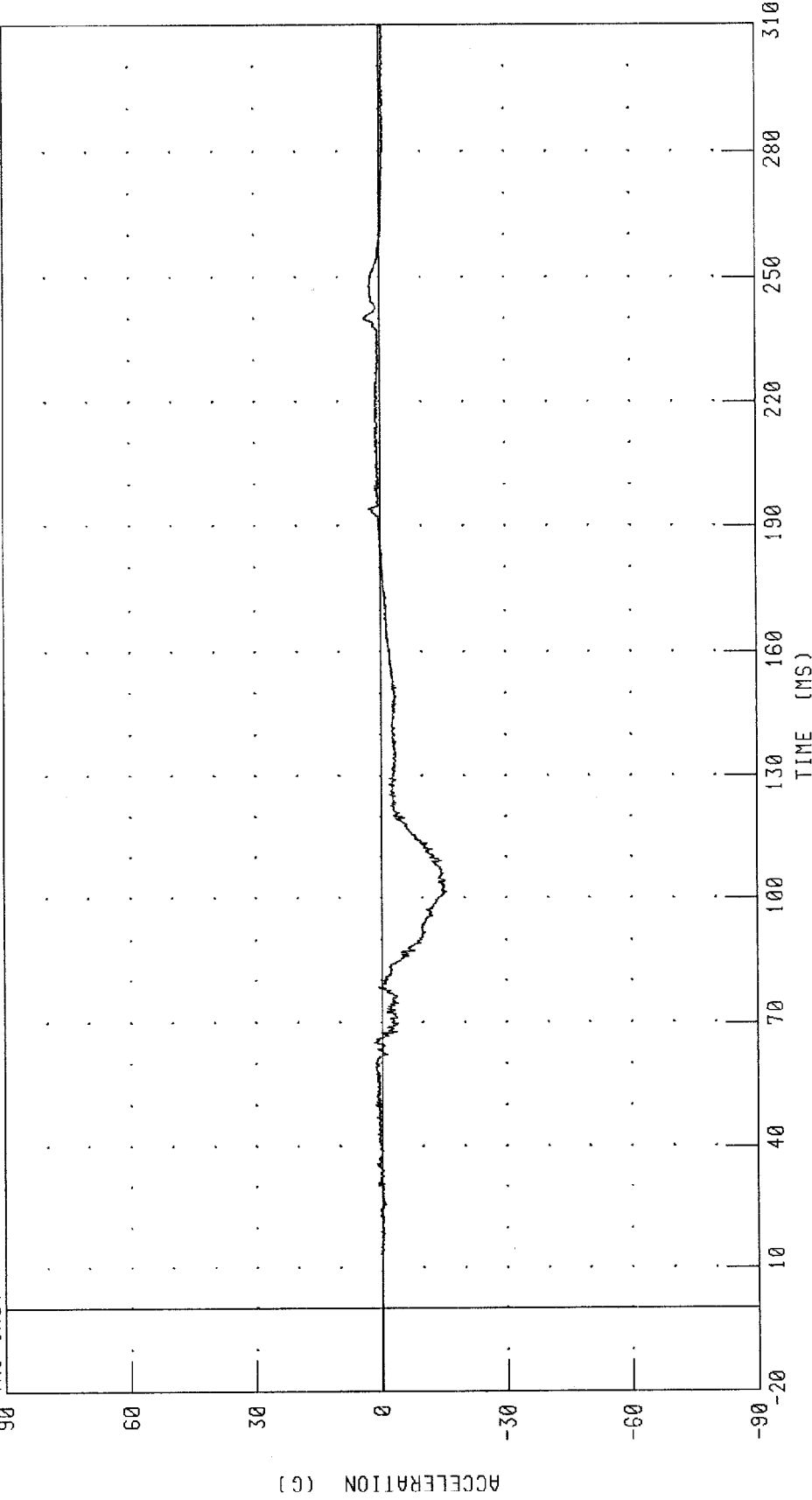
PEAK DATA: 22.53 G @ 244.00 MS; -45.38 G @ 94.40 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

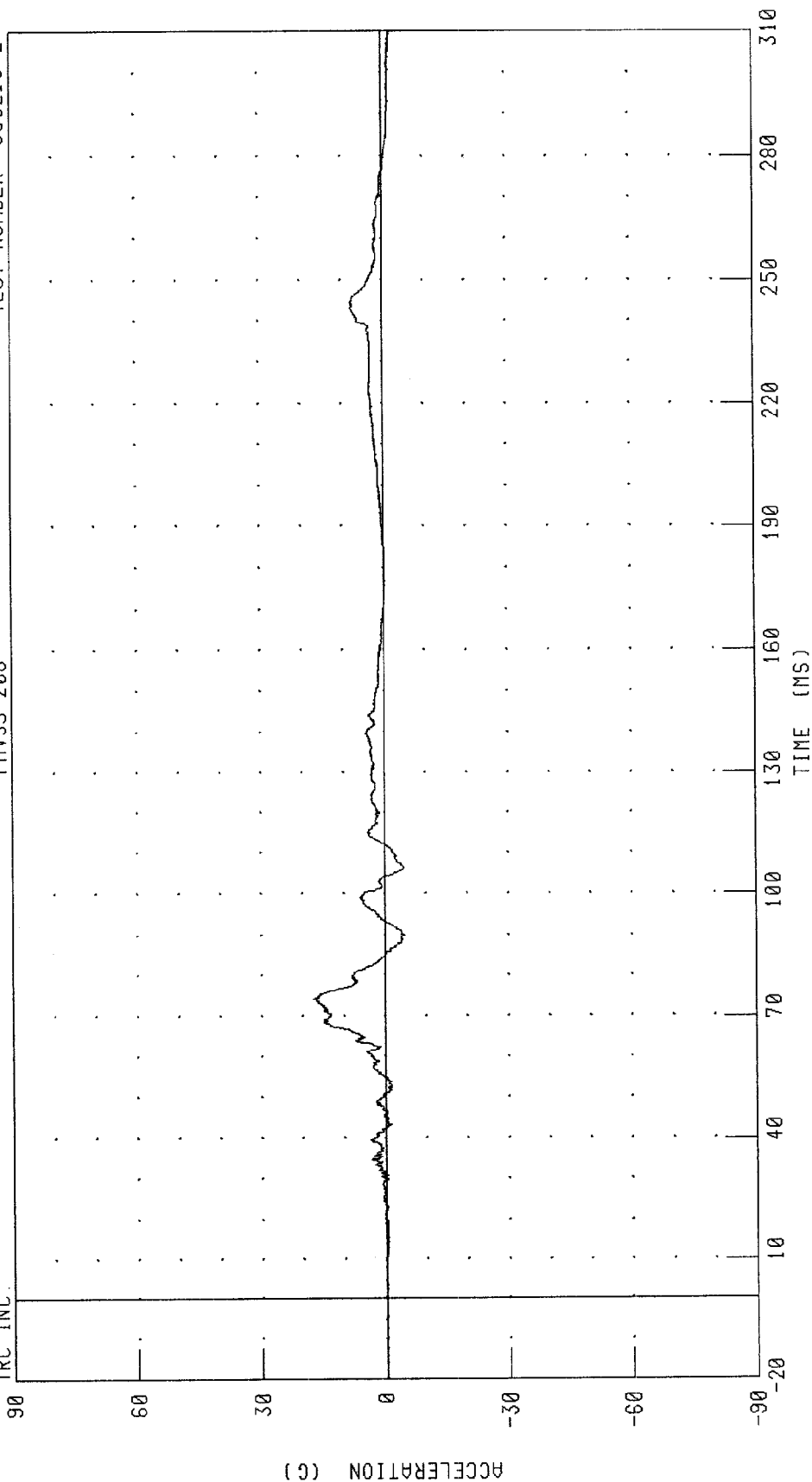
PEAK DATA: 3.62 G @ 239.92 MS, -15.49 G @ 101.68 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

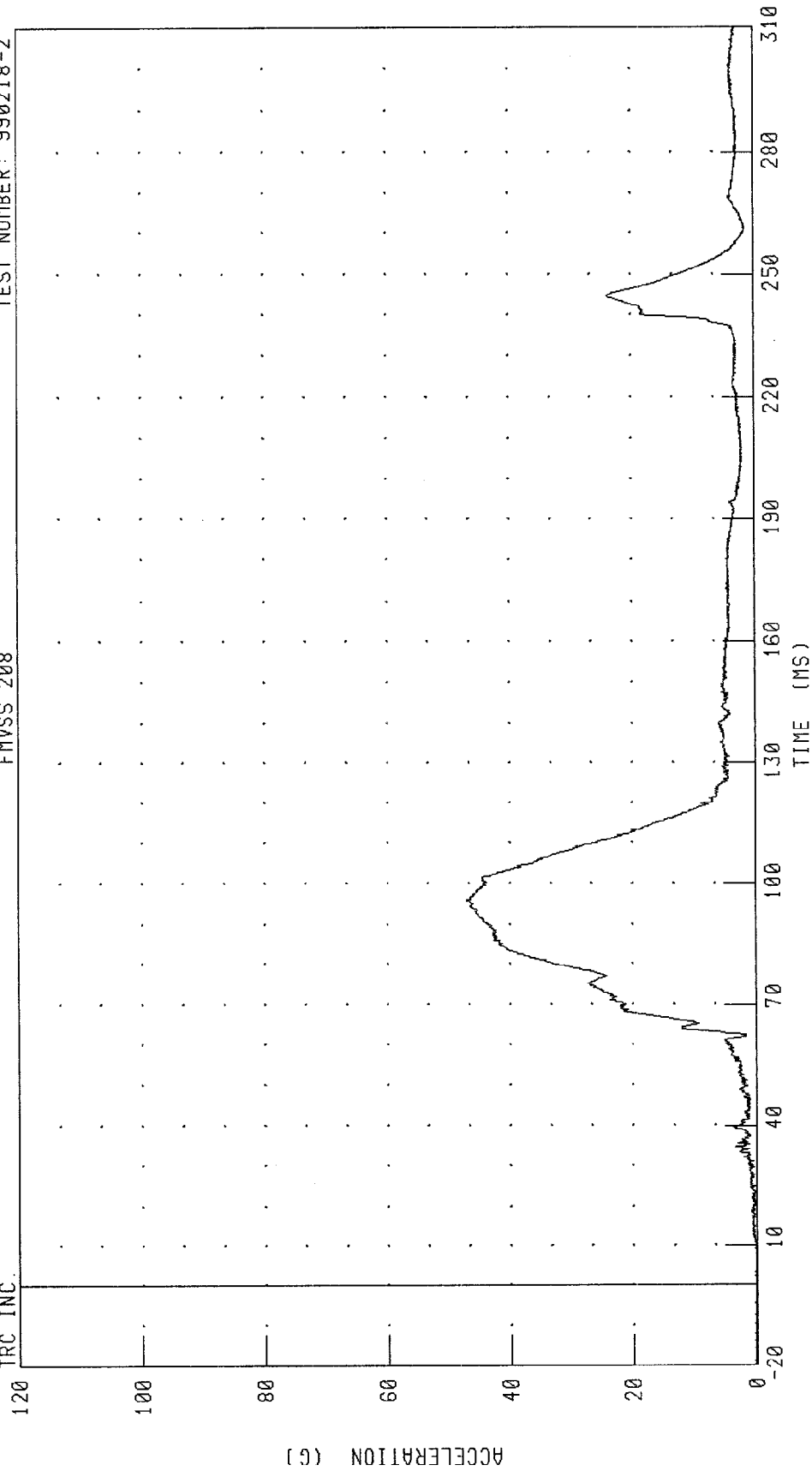
PEAK DATA: 17.34 G @ 74.24 MS, -4.99 G @ 90.00 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: HEDRC2 FILTER: CH. CLASS 1000

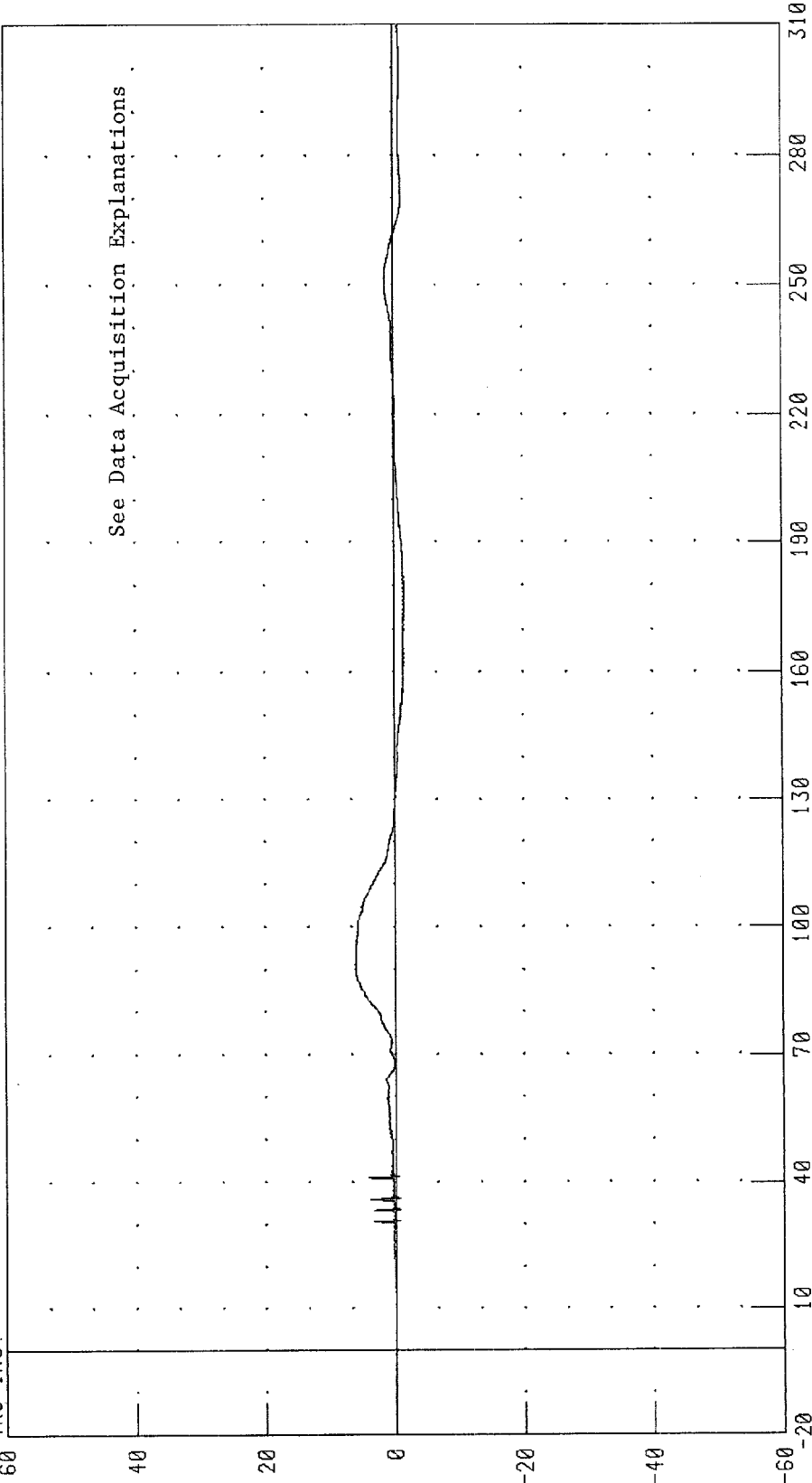
PEAK DATA: 47.11 G @ 95.92 MS; 0.14 G @ -4.88 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
 RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

TIME (MS)

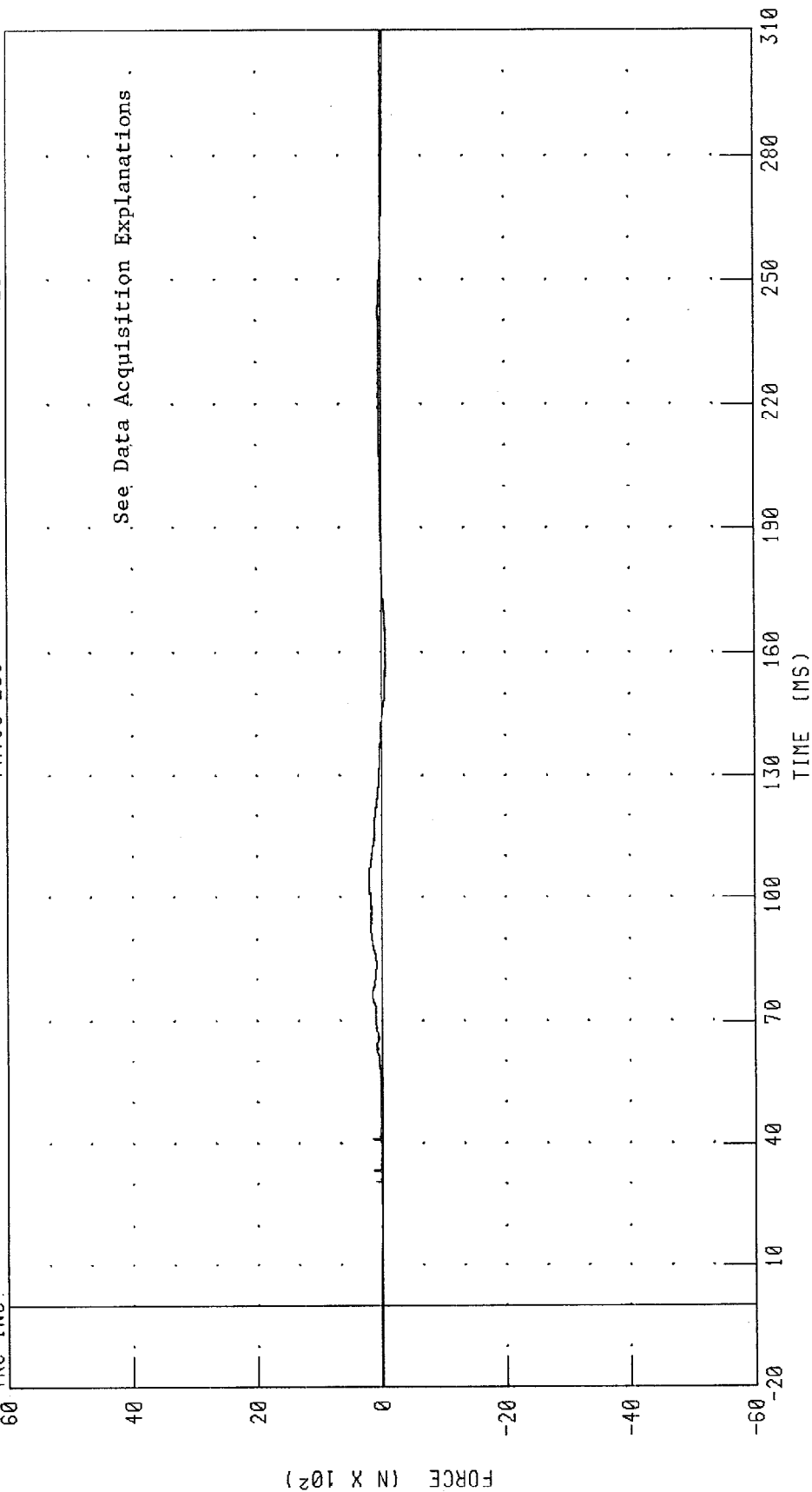
PEAK DATA: 613.20 N @ 90.08 MS, -159.95 N @ 170.08 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 201.90 N @ 102.96 MS, -71.92 N @ 157.92 MS

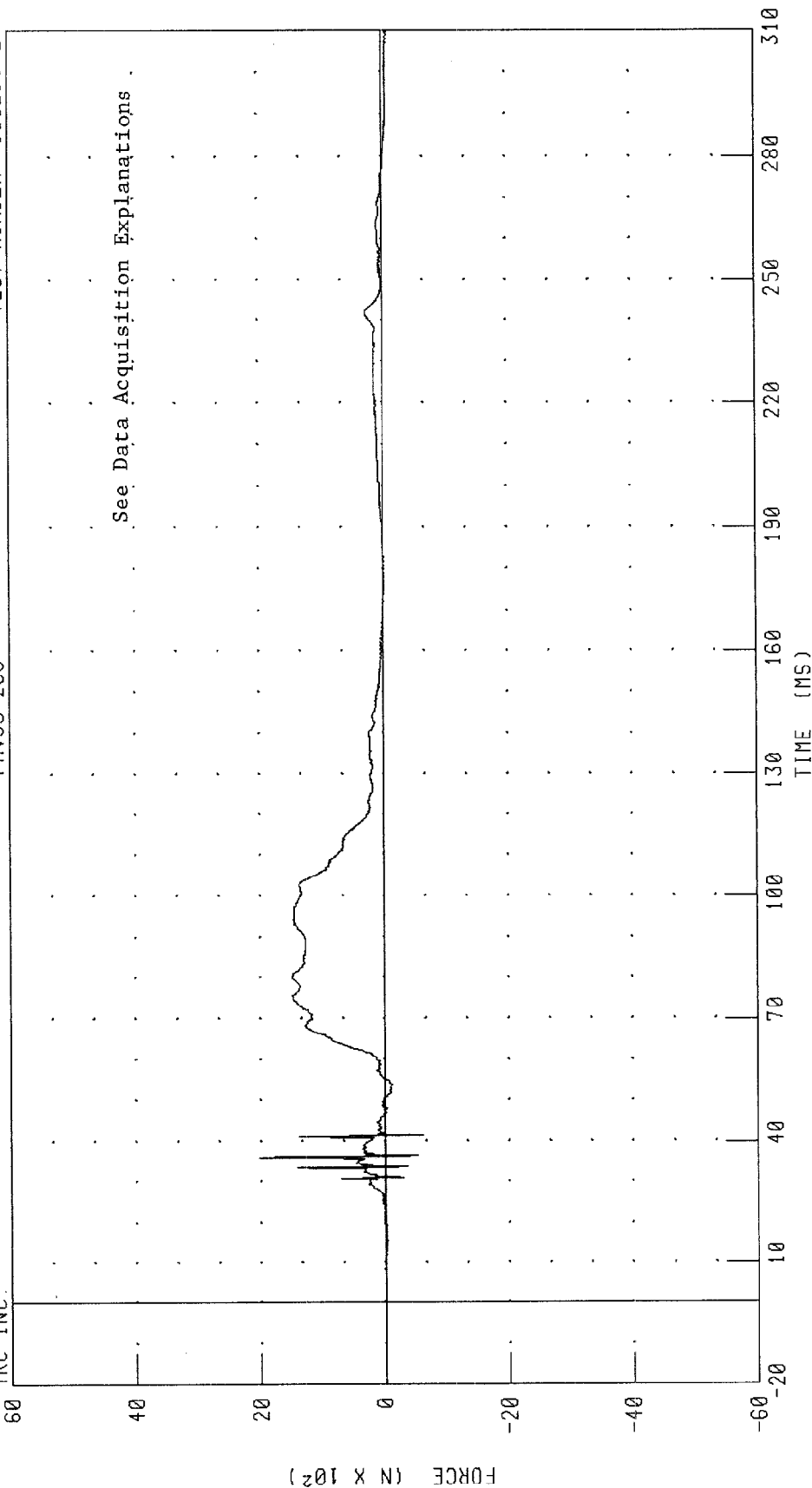
CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 2022.72 N @ 36.16 MS, -615.01 N @ 41.52 MS

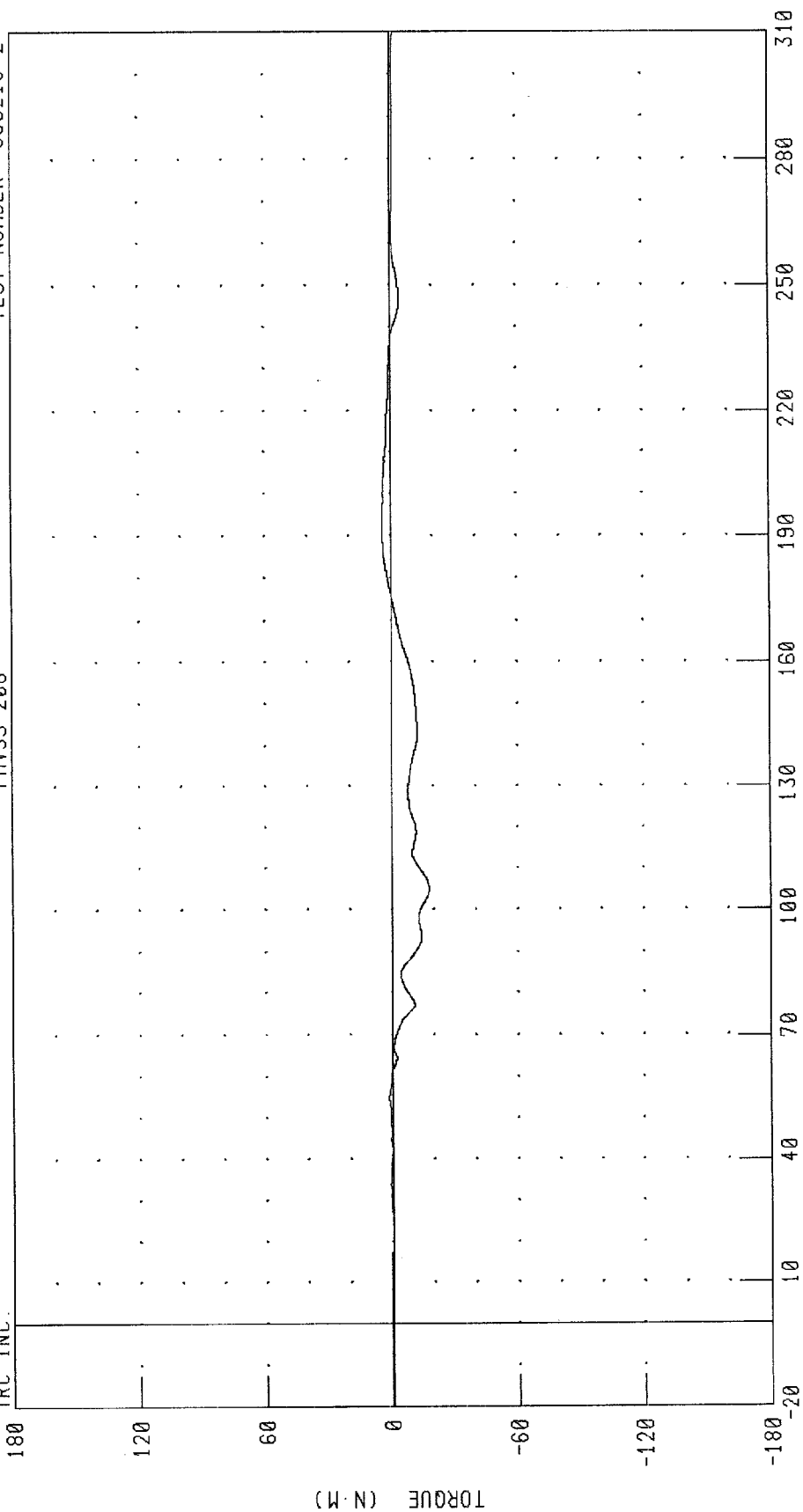
CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 3.78 N-M @ 194.24 MS; -17.97 N-M @ 104.96 MS

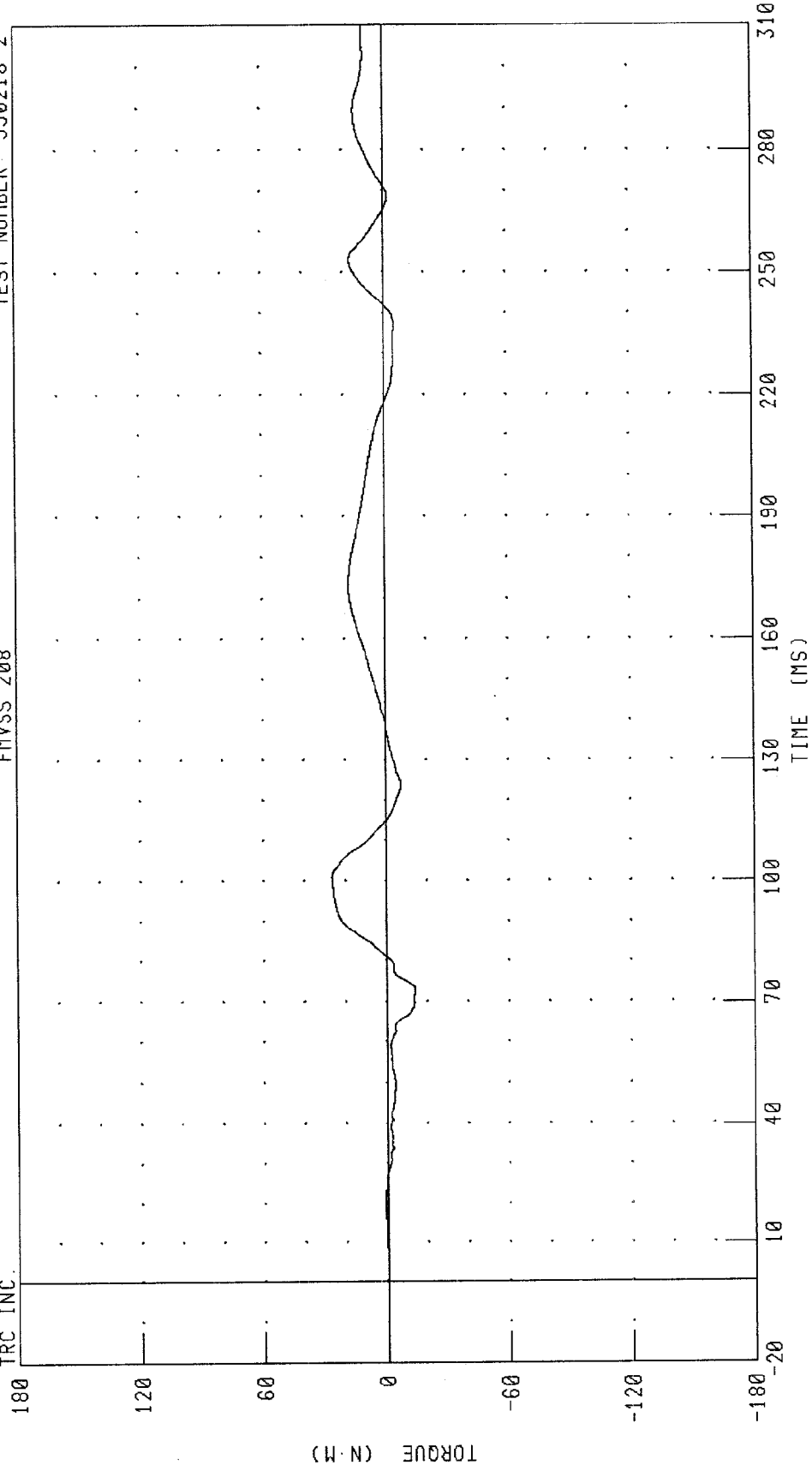
CHANNEL: NEKX2 FILTER: CH. CLASS 600

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

TIME (MS)

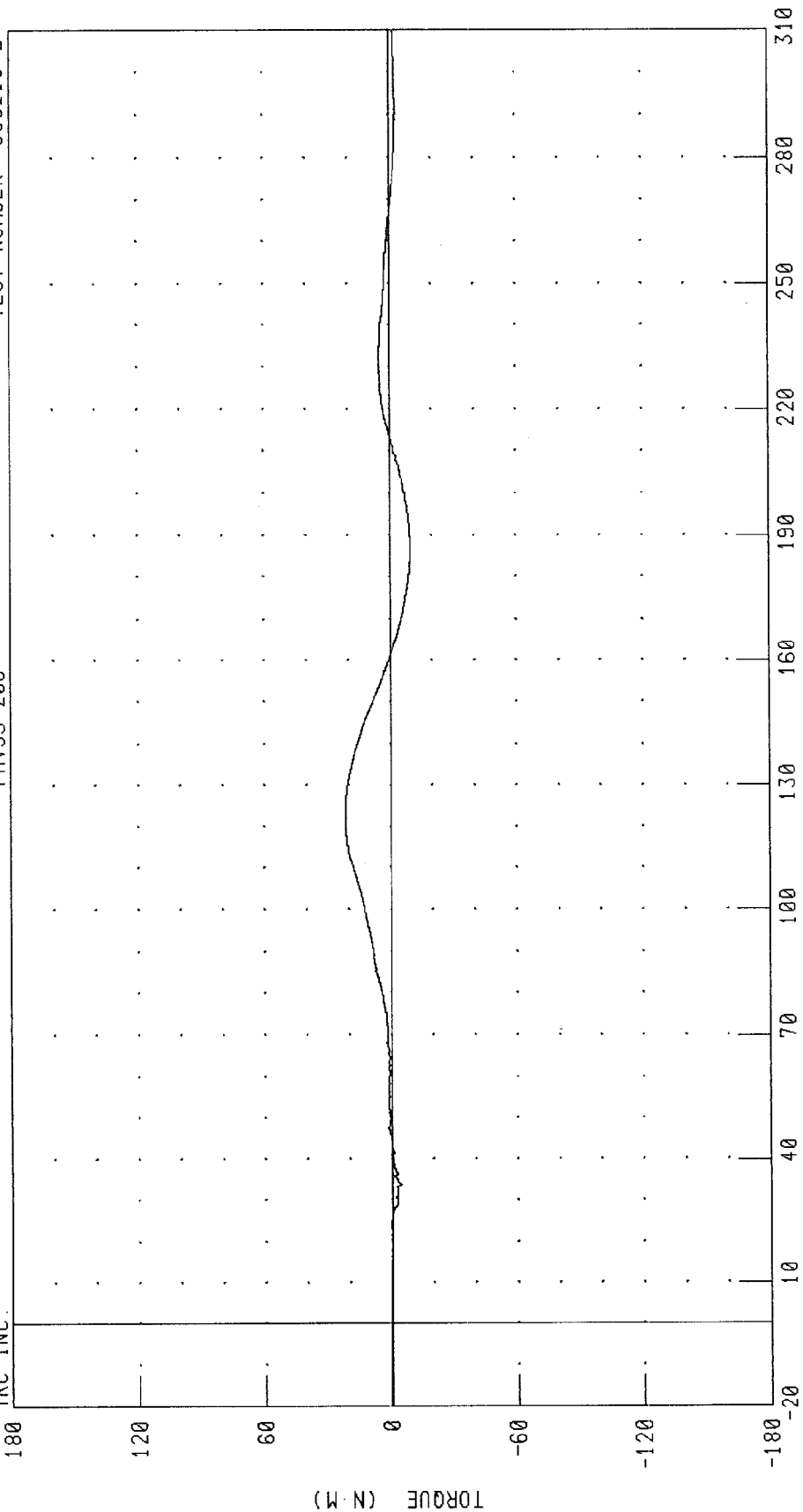
PEAK DATA: 26.46 N·m @ 100.96 ms; -14.01 N·m @ 72.96 ms

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: NEKZM2 FILTER: CH. CLASS 600

TIME (MS)

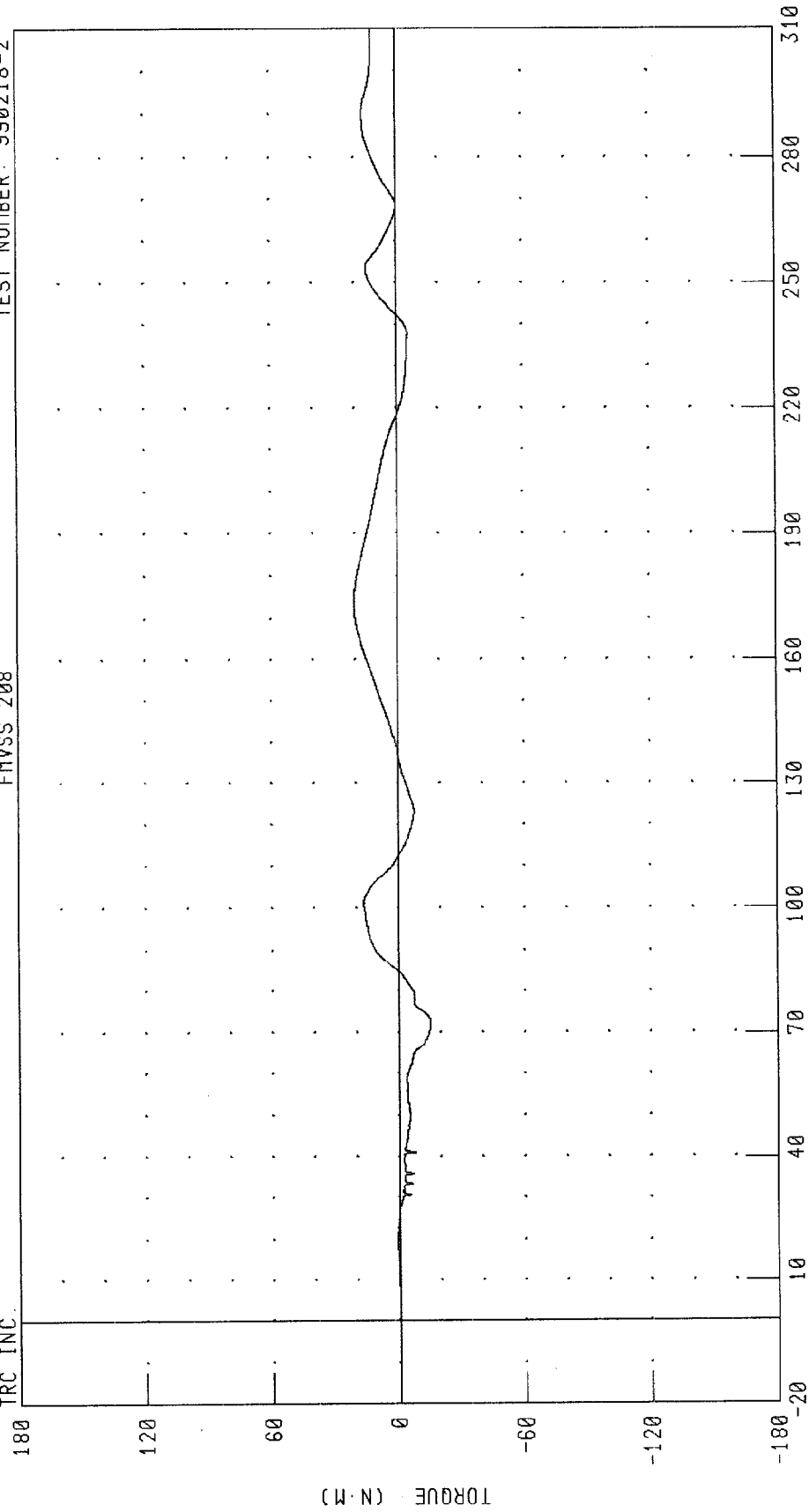
PEAK DATA: 21.29 N-M @ 123.84 MS; -9.75 N-M @ 185.12 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER NECK OCCIPITAL CONDYLE

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 20.30 N·m @ 173.28 ms; -15.03 N·m @ 72.08 ms

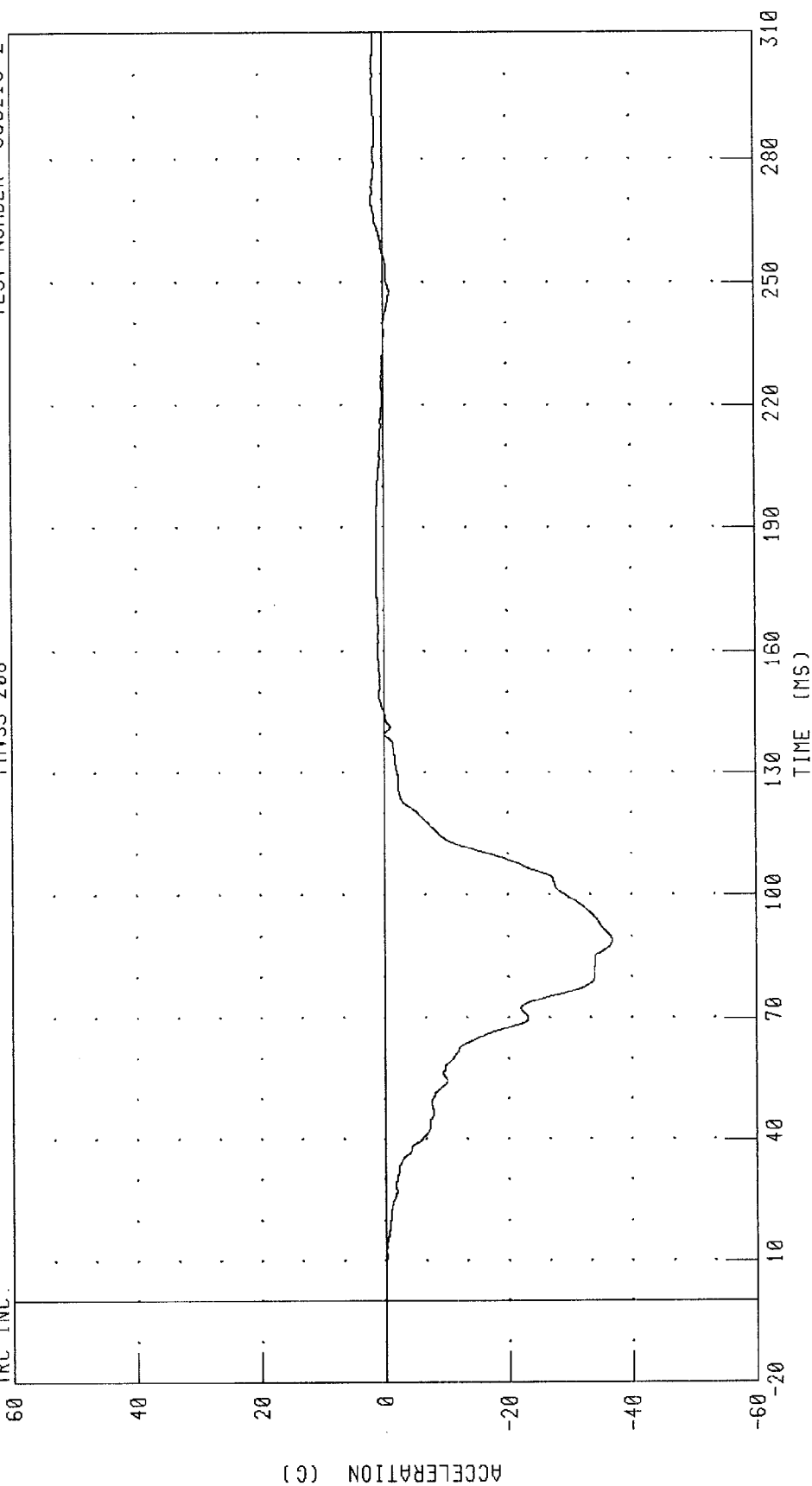
CHANNEL: NEKOM2 FILTER: CH. CLASS 600

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: CSTXG2 FILTER: CH. CLASS 180

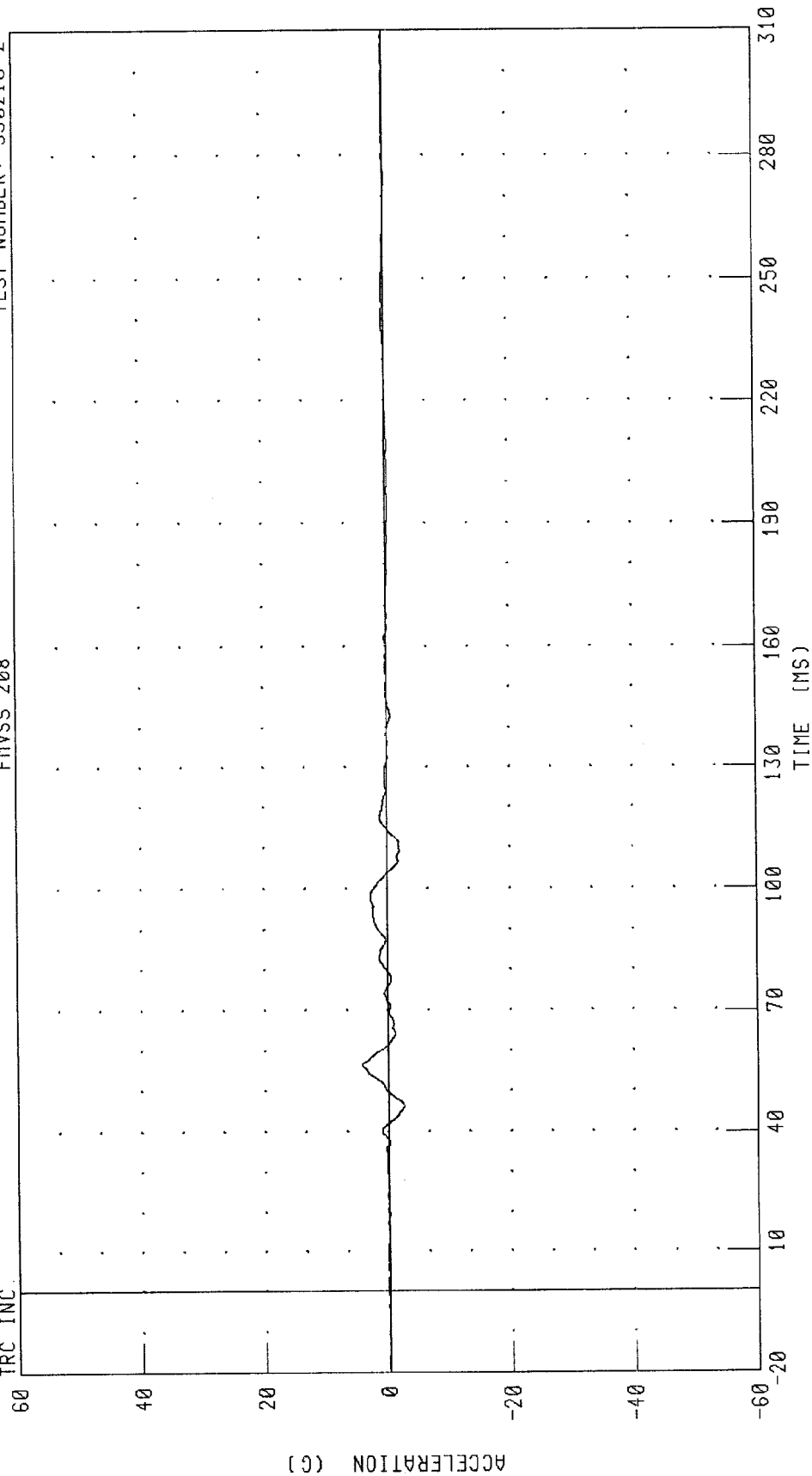
PEAK DATA: 1.77 G @ 270.32 MS; -36.80 G @ 89.04 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 4.20 G @ 56.48 MS; -2.59 G @ 46.32 MS

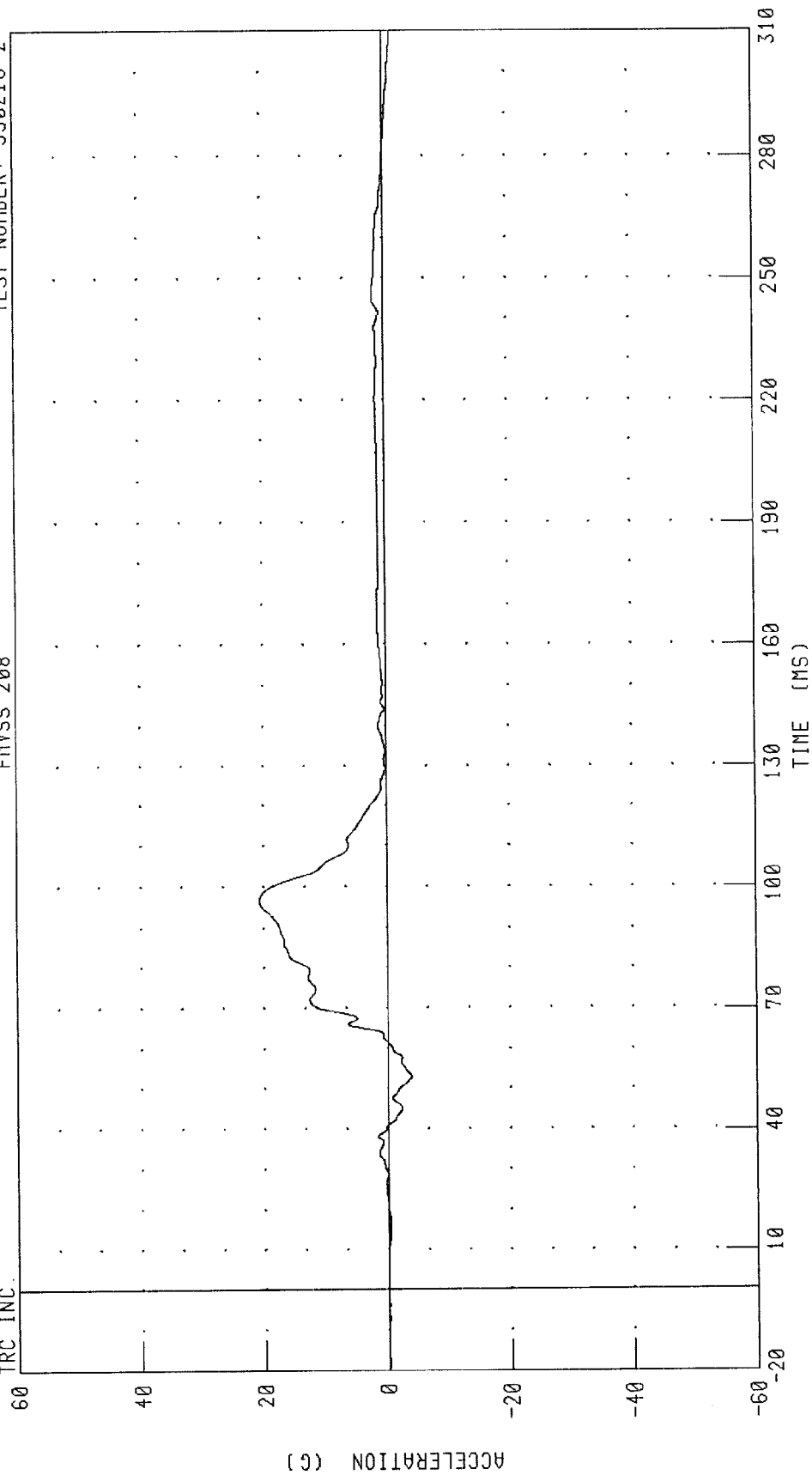
CHANNEL: CSTYG2 FILTER: CH. CLASS 180

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 990218-2

ENVSS 208

TRC INC.



PEAK DATA: 20.75 G @ 96.64 MS; -3.90 G @ 53.04 MS

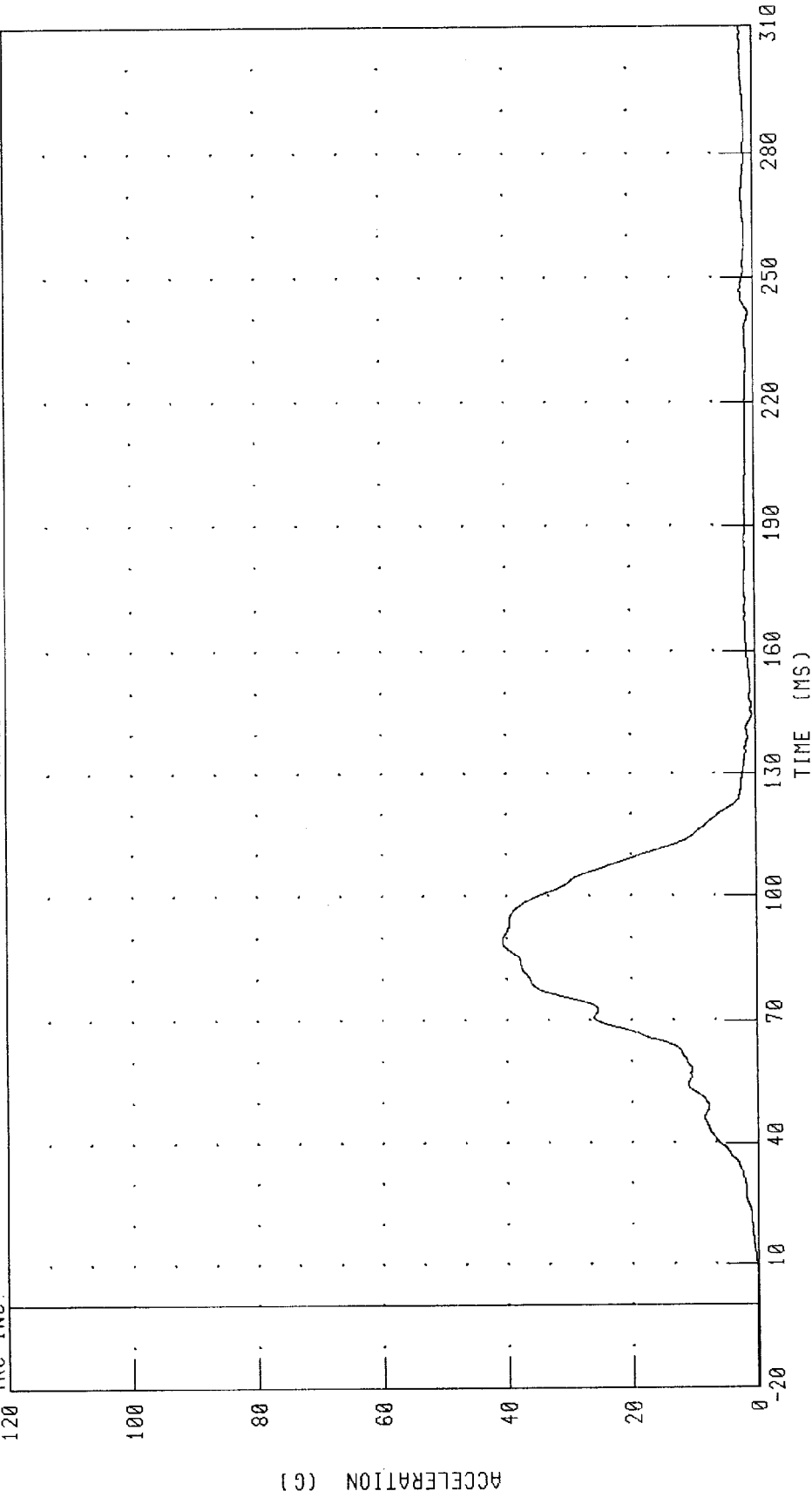
CHANNEL: CSTZG2 FILTER: CH. CLASS 180

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 40.66 G @ 89.28 MS; 0.01 G @ -20.00 MS

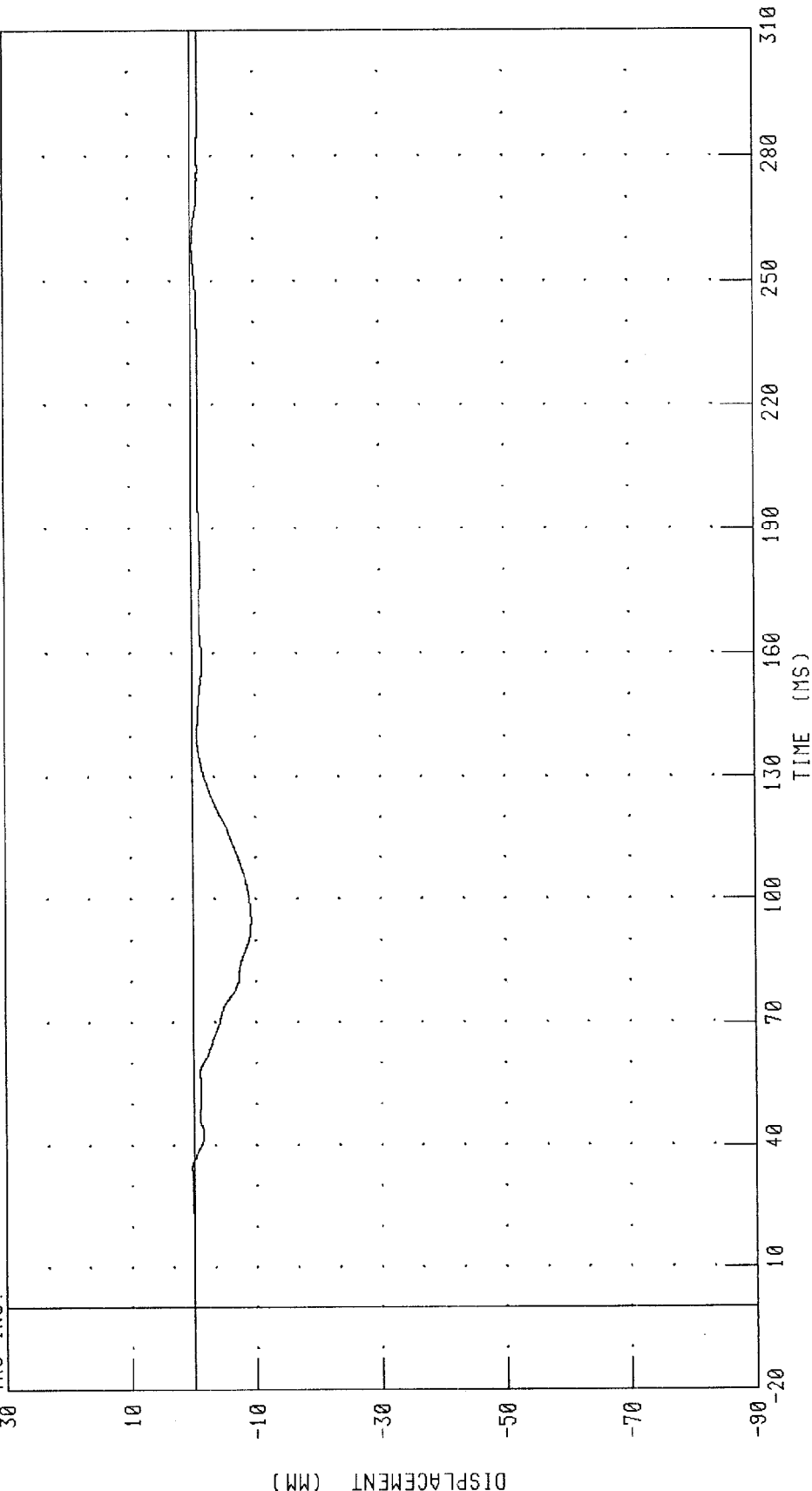
CHANNEL: CSTRG2 FILTER: CH CLASS 180

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER CHEST DEFLECTION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 0.34 MM @ 34.80 MS, -9.19 MM @ 94.96 MS

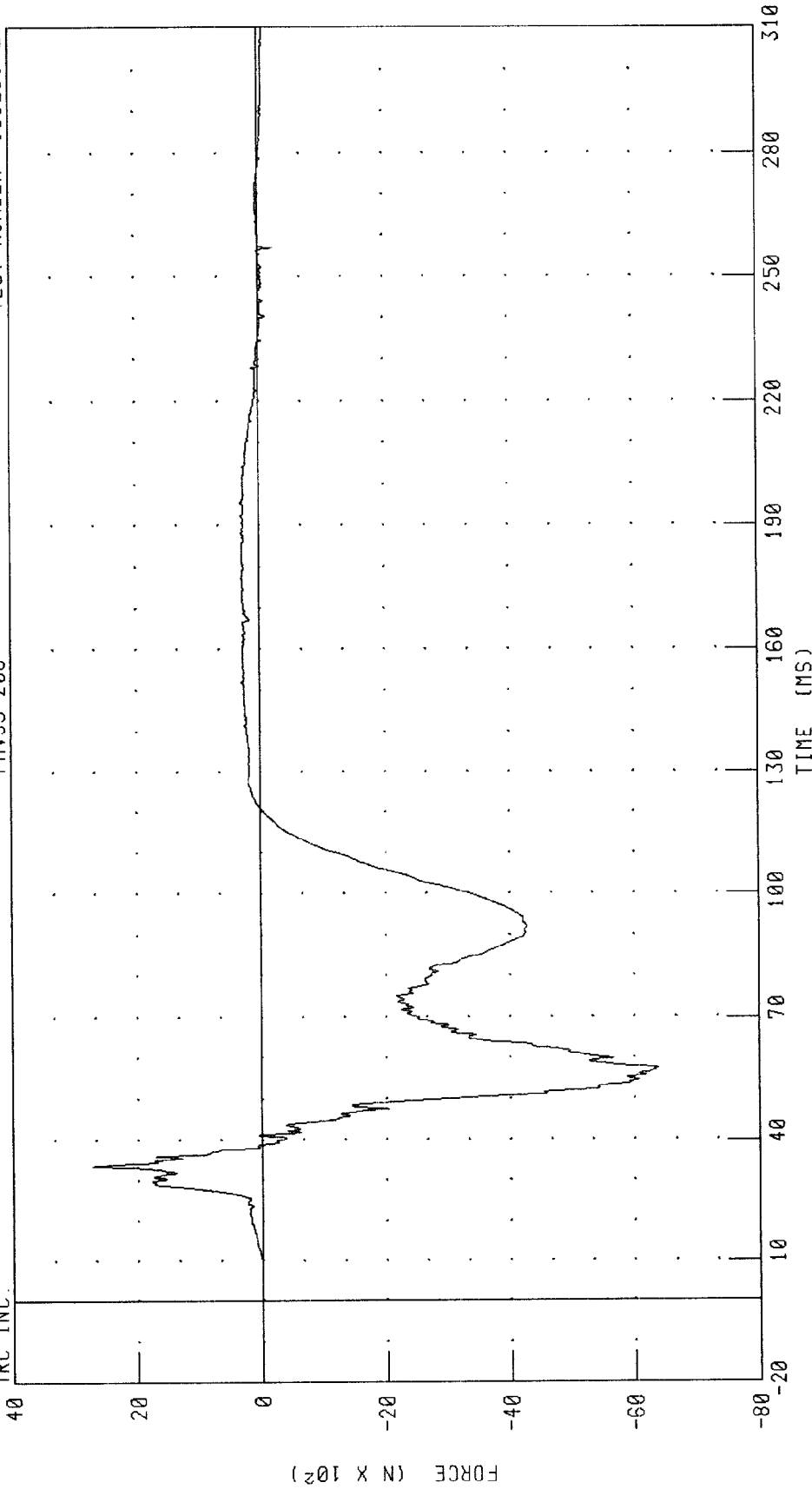
CHANNEL: CSTX02 FILTER: CH. CLASS 180

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 2741.88 N @ 33.60 MS, -6374.04 N @ 57.52 MS

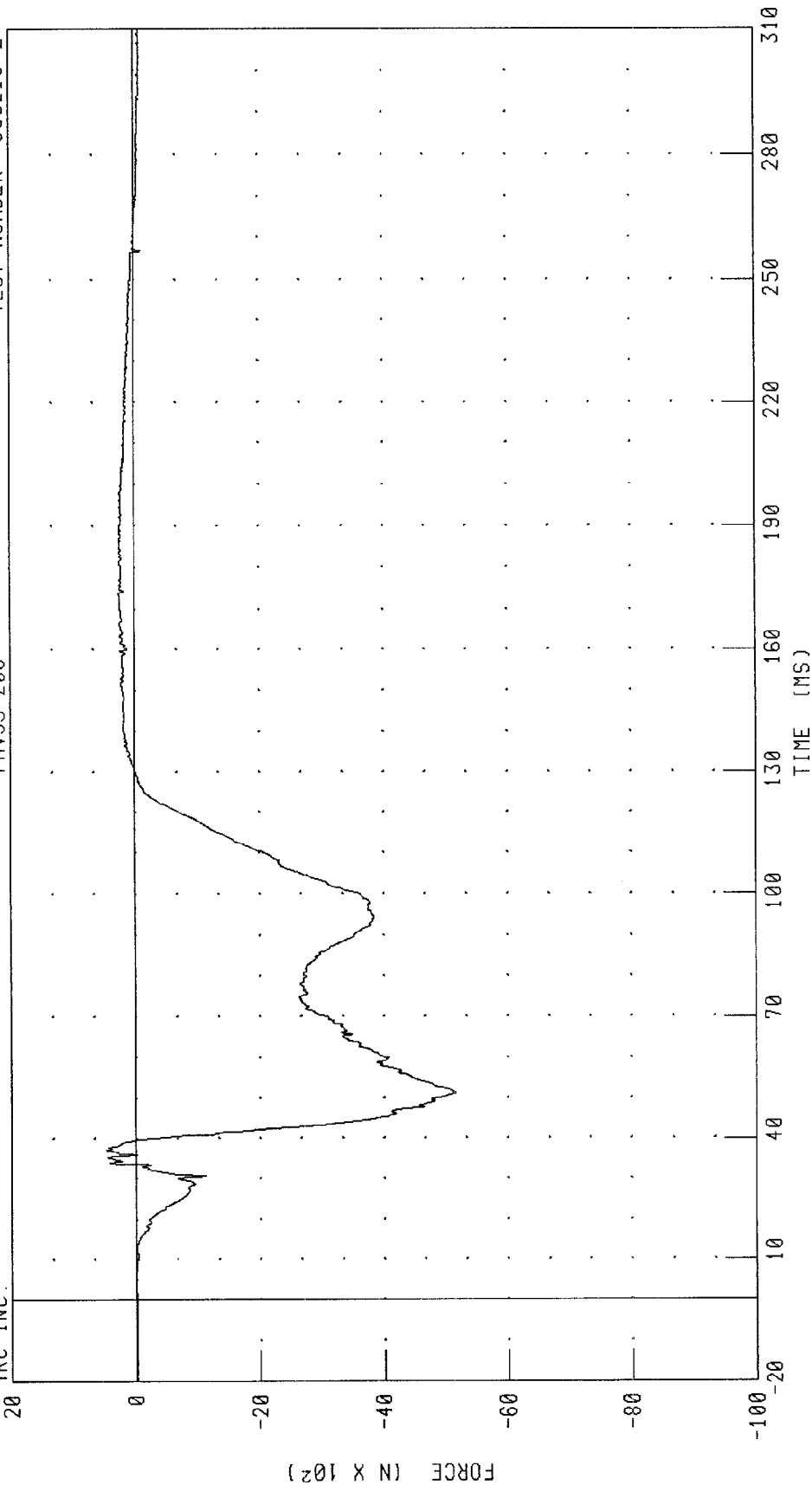
CHANNEL: LFMF2 FILTER: CH. CLASS 600

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: RFMF2 FILTER: CH. CLASS 600

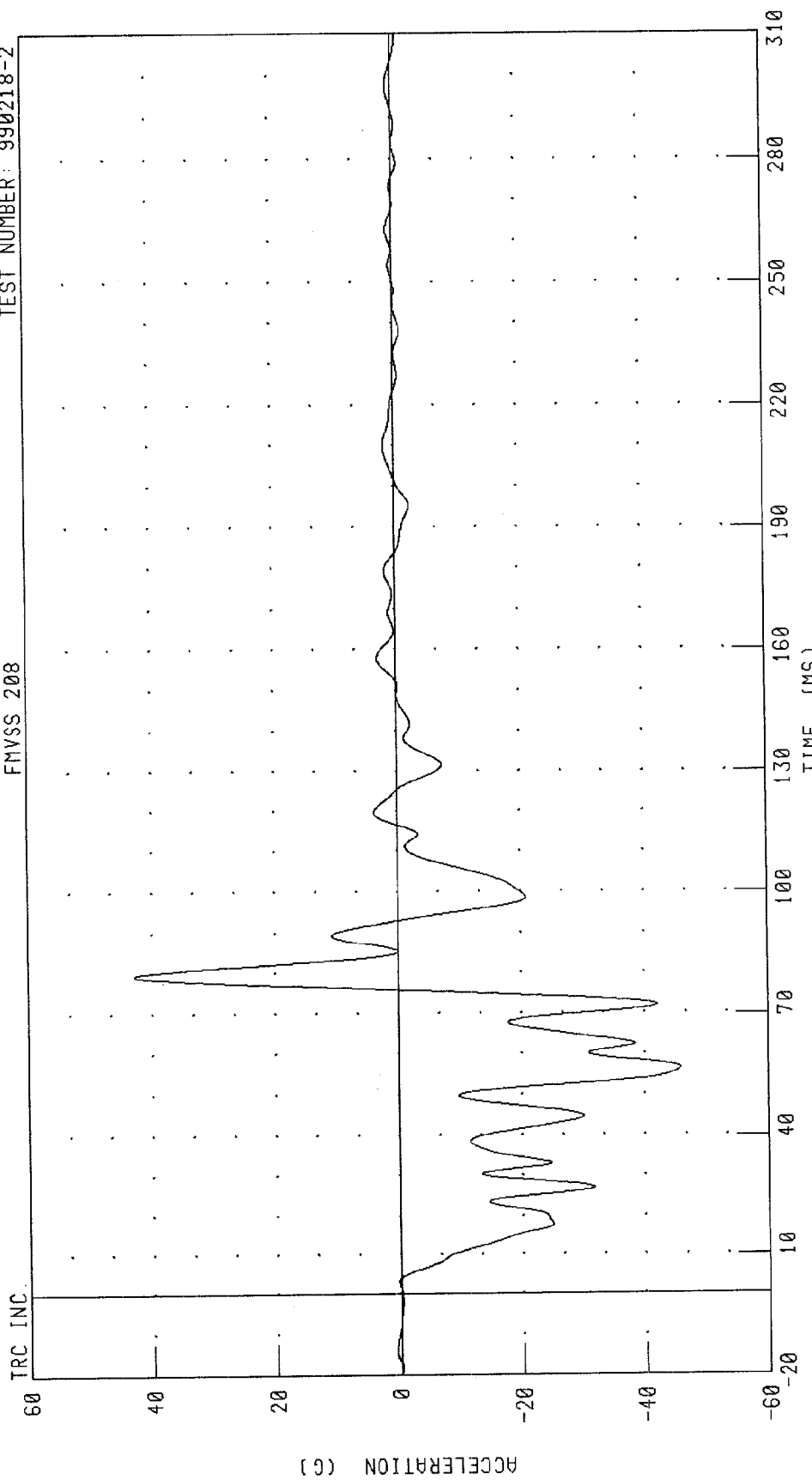
PEAK DATA: 481.97 N @ 37.28 MS; -5155.31 N @ 51.28 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: BCLXG1 FILTER: CH. CLASS 60

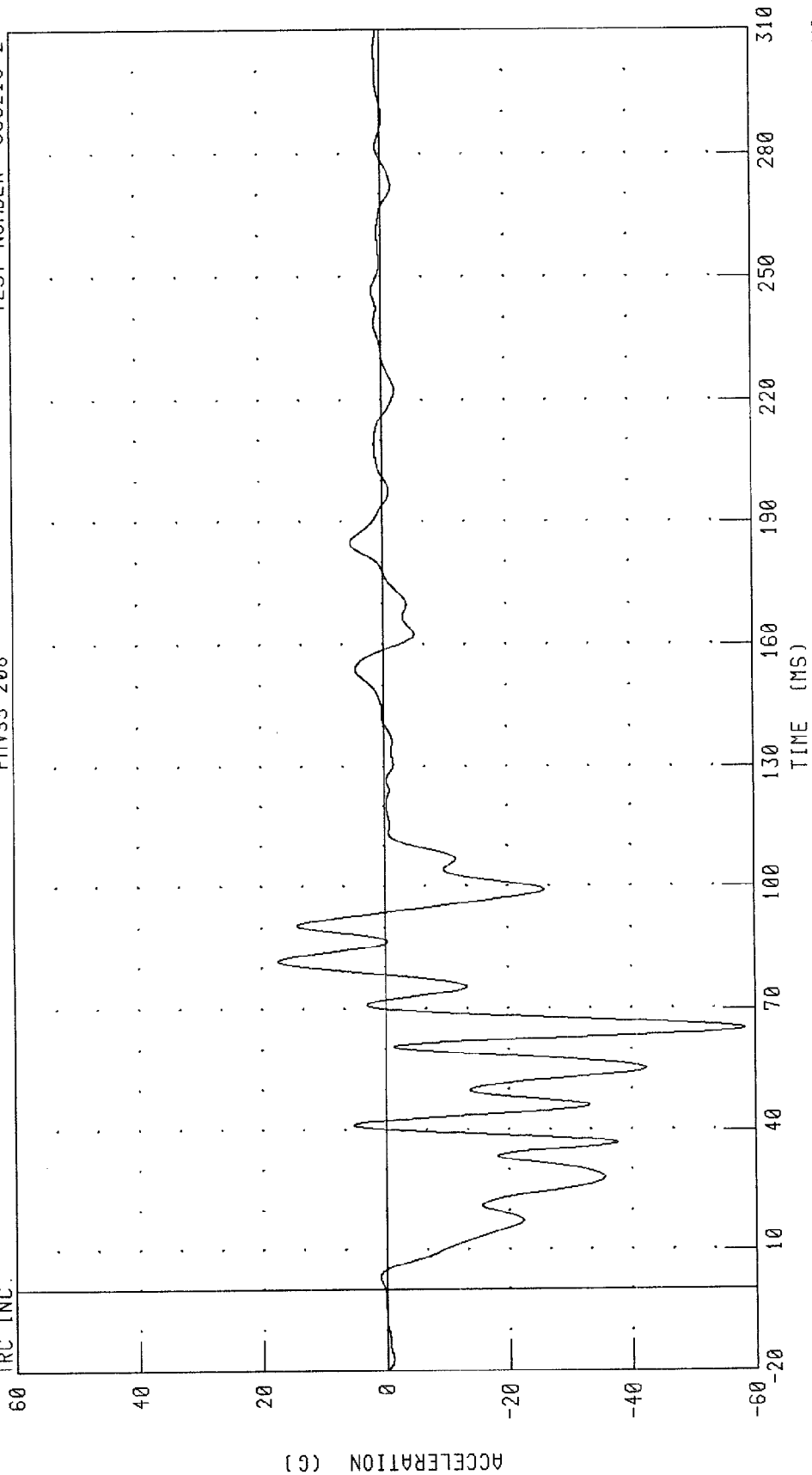
PEAK DATA: 42.81 G @ 79.44 MS, -45.79 G @ 56.48 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



PEAK DATA: 17.32 G @ 81.68 MS; -58.29 G @ 65.20 MS

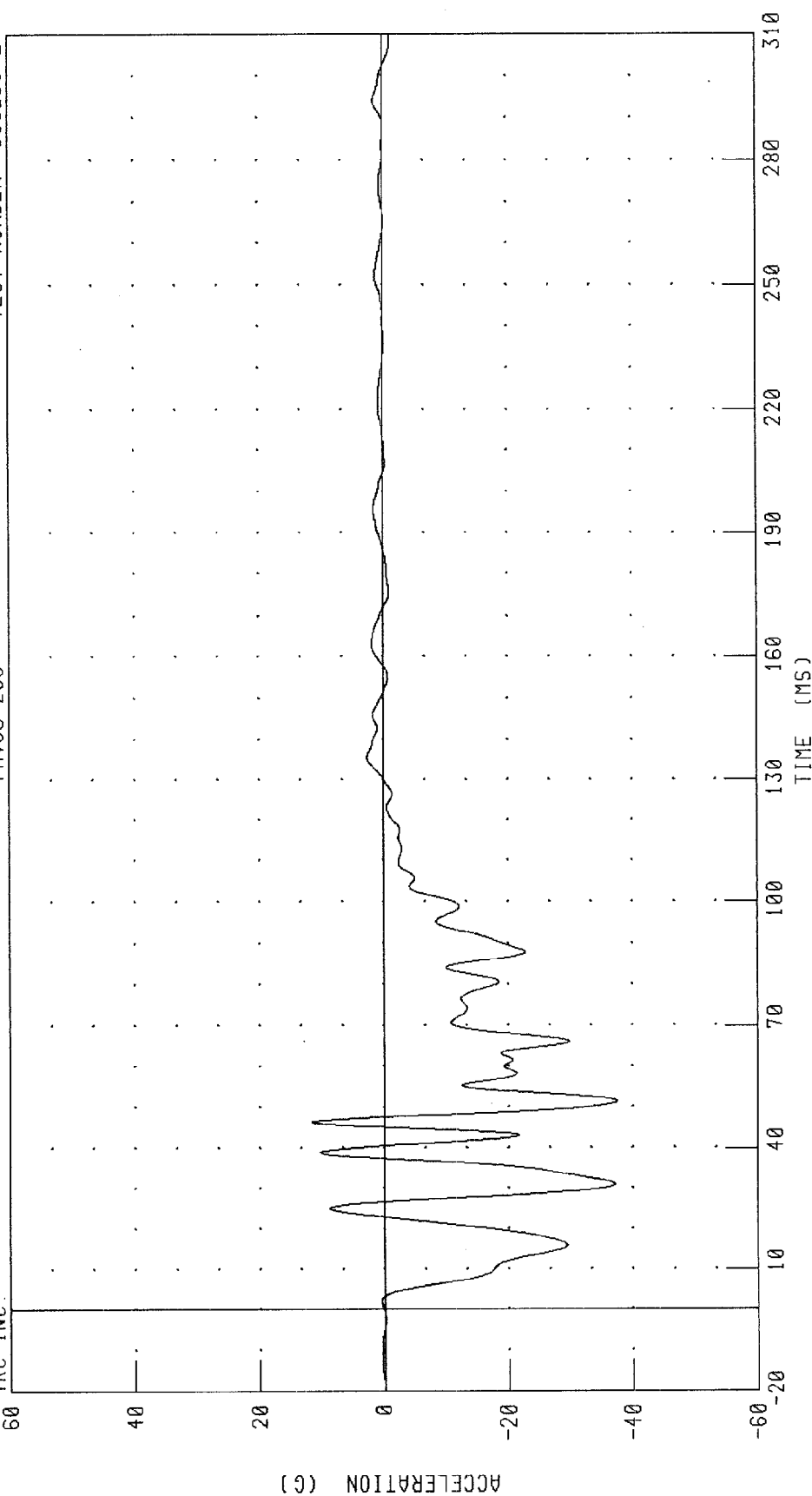
CHANNEL: BCRXG1 FILTER: CH. CLASS 60

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
DASH PANEL CENTER X-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

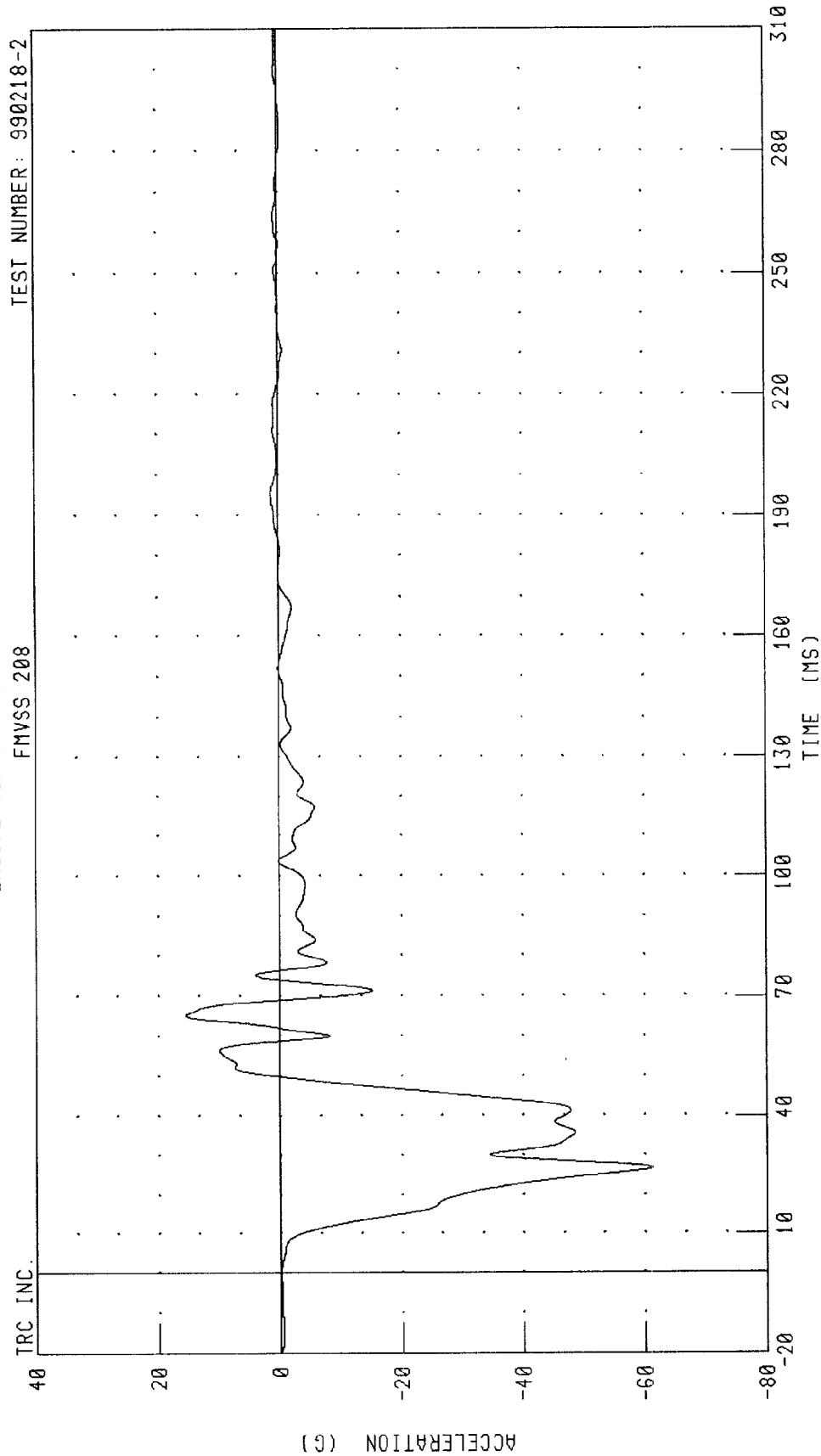
TRC INC.



CHANNEL: DPCXG1 FILTER: CH. CLASS 60

PEAK DATA: 11.65 G @ 46.32 MS; -37.44 G @ 51.44 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
ENGINE TOP X-AXIS ACCELERATION



CHANNEL: ENGXC1 FILTER: CH. CLASS 60

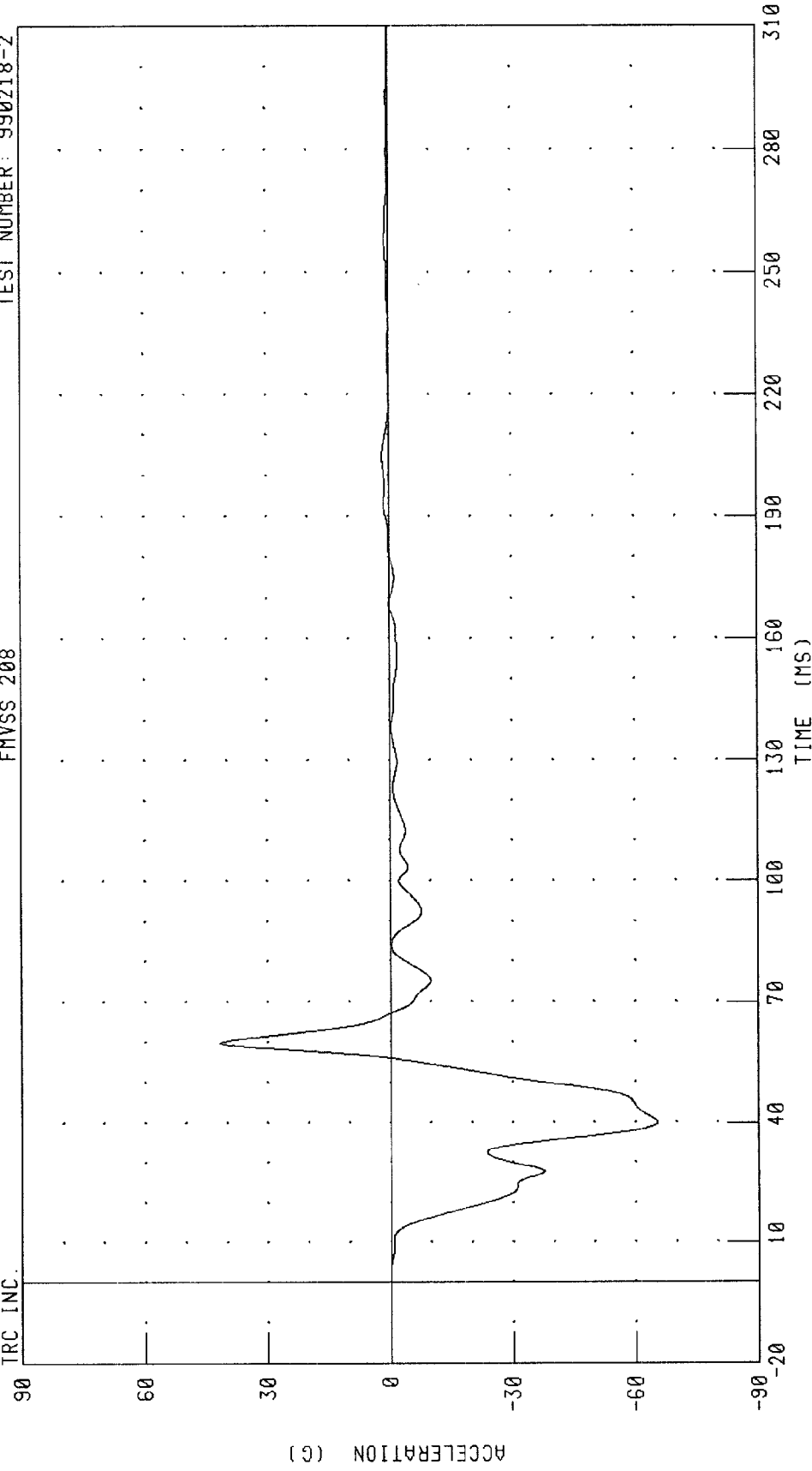
PEAK DATA: 15.55 G @ 65.20 MS, -61.29 G @ 26.80 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
ENGINE BOTTOM X-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: ENGXC2 FILTER: CH. CLASS 60

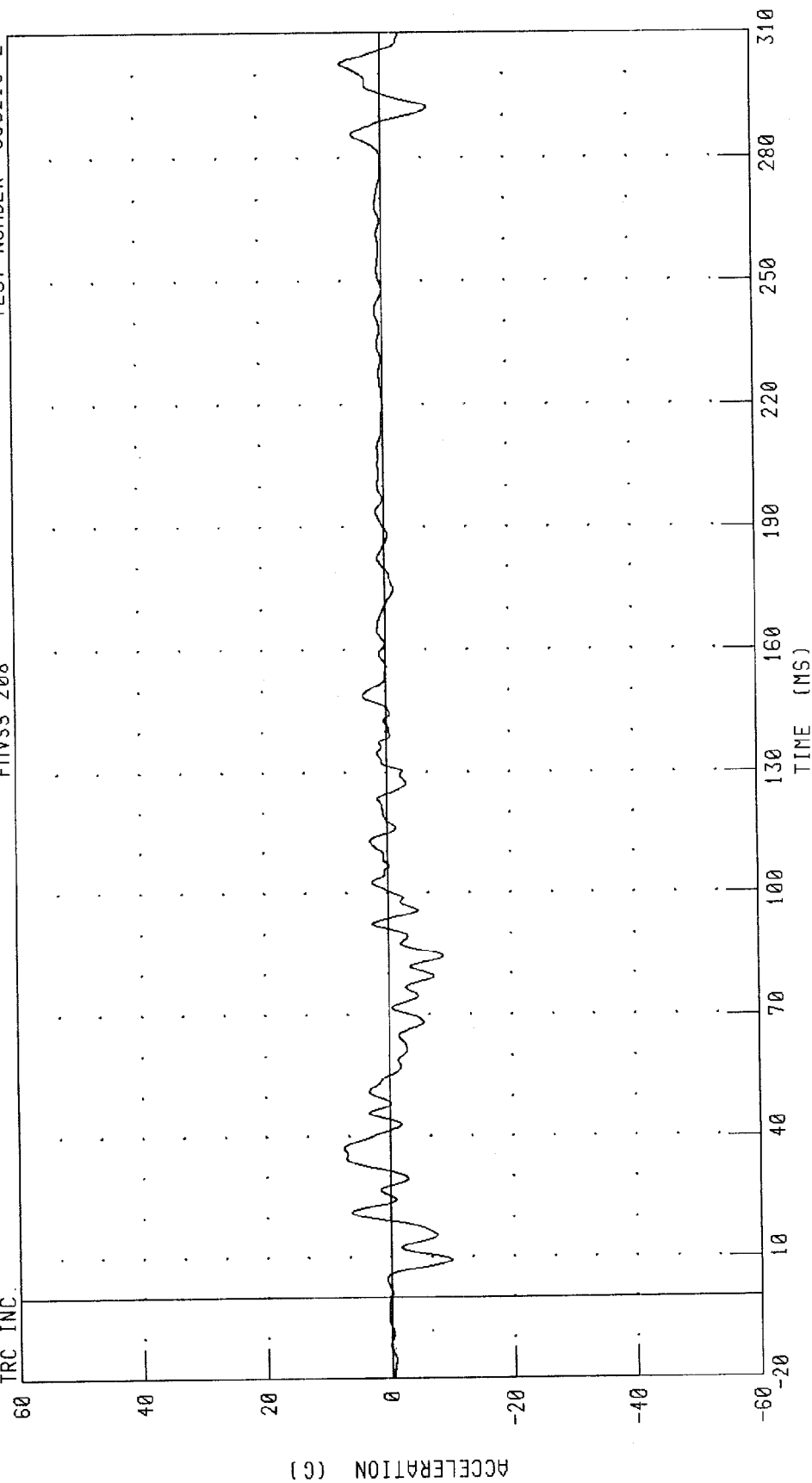
PEAK DATA: 41.69 G @ 59.84 MS; -65.47 G @ 40.00 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
VEHICLE REAR CENTER Z-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: RDKZG1 FILTER: CH. CLASS 60

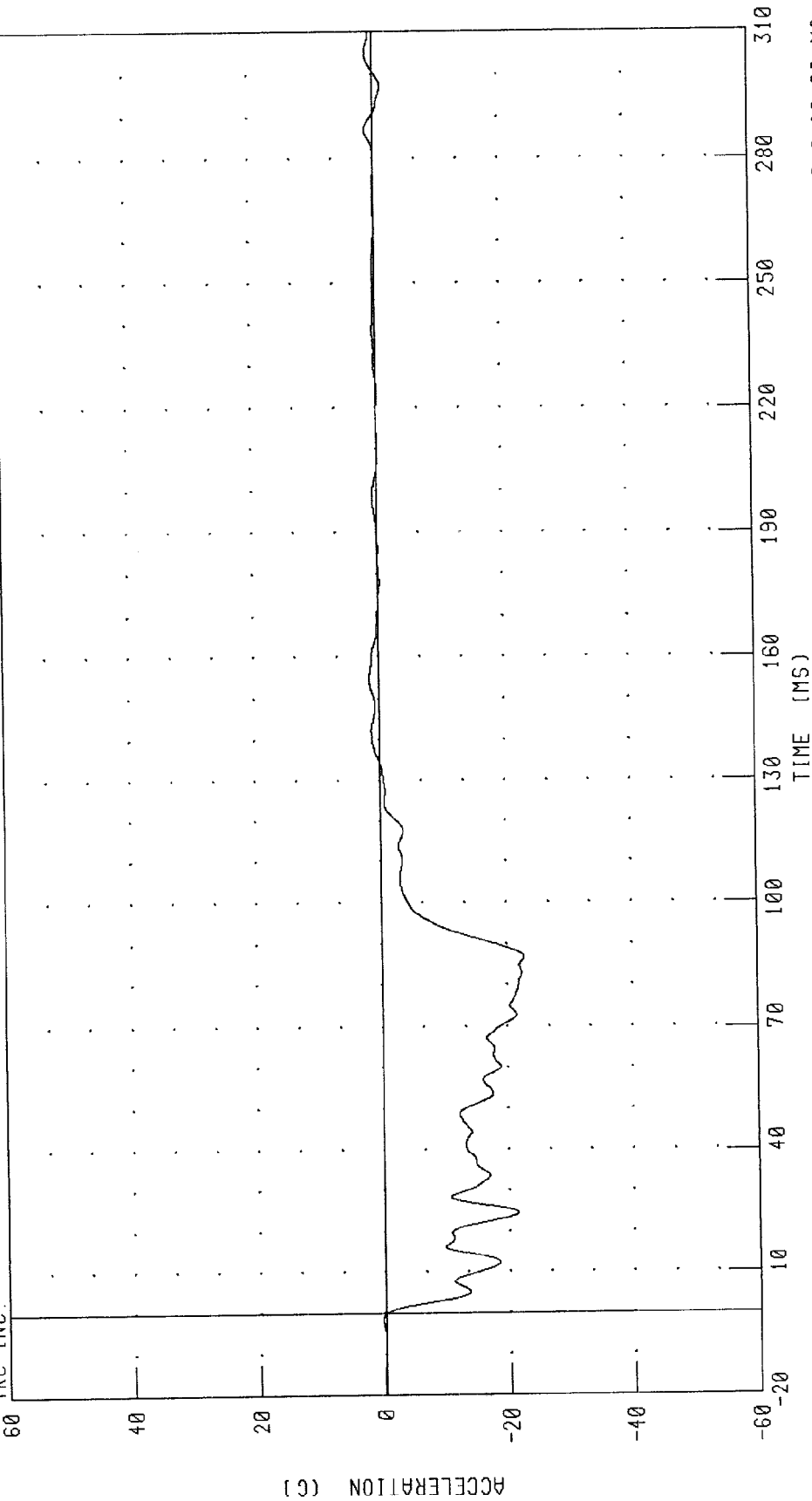
PEAK DATA: 7.44 G @ 37.28 MS; -9.84 G @ 9.28 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
LEFT REAR SEAT X-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: TLRXG1 FILTER: CH. CLASS 60

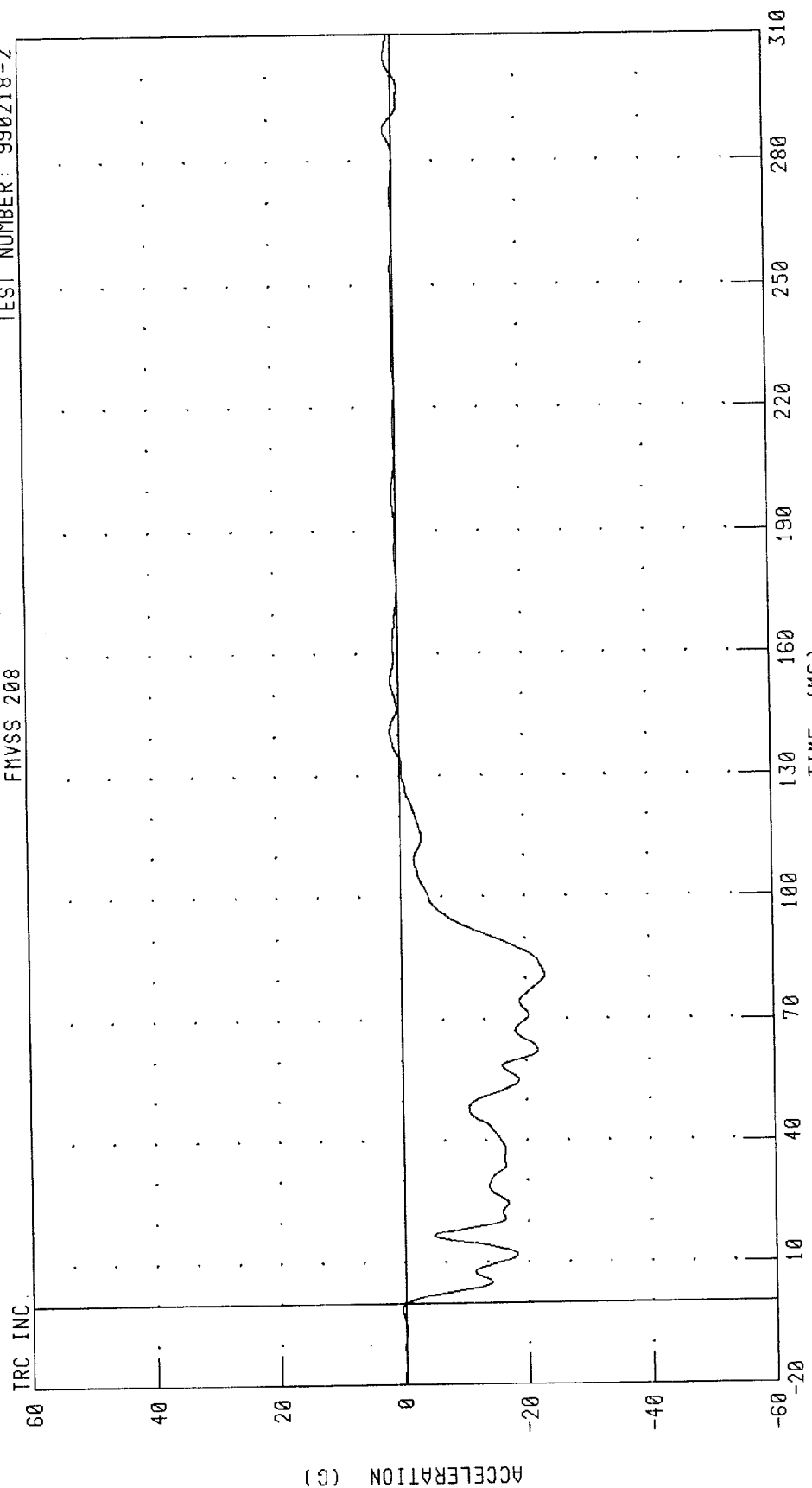
PEAK DATA: 1.45 G @ 154.72 MS; -22.85 G @ 86.80 MS

1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH
RIGHT REAR SEAT X-AXIS ACCELERATION

TEST NUMBER: 990218-2

FMVSS 208

TRC INC.



CHANNEL: TRRXG1 FILTER: CH. CLASS 60

Appendix C

Dummy Certification

Pre-Test Dummy Certification

Driver Dummy S/N 169

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

05-FEB-99

TRC INC.

TEST NO: 169C4HD1

572E SN169 HEAD DROP CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	245.33 G
PEAK LATERAL ACCELERATION	15 G MAX	0.78 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 020599.1105;1

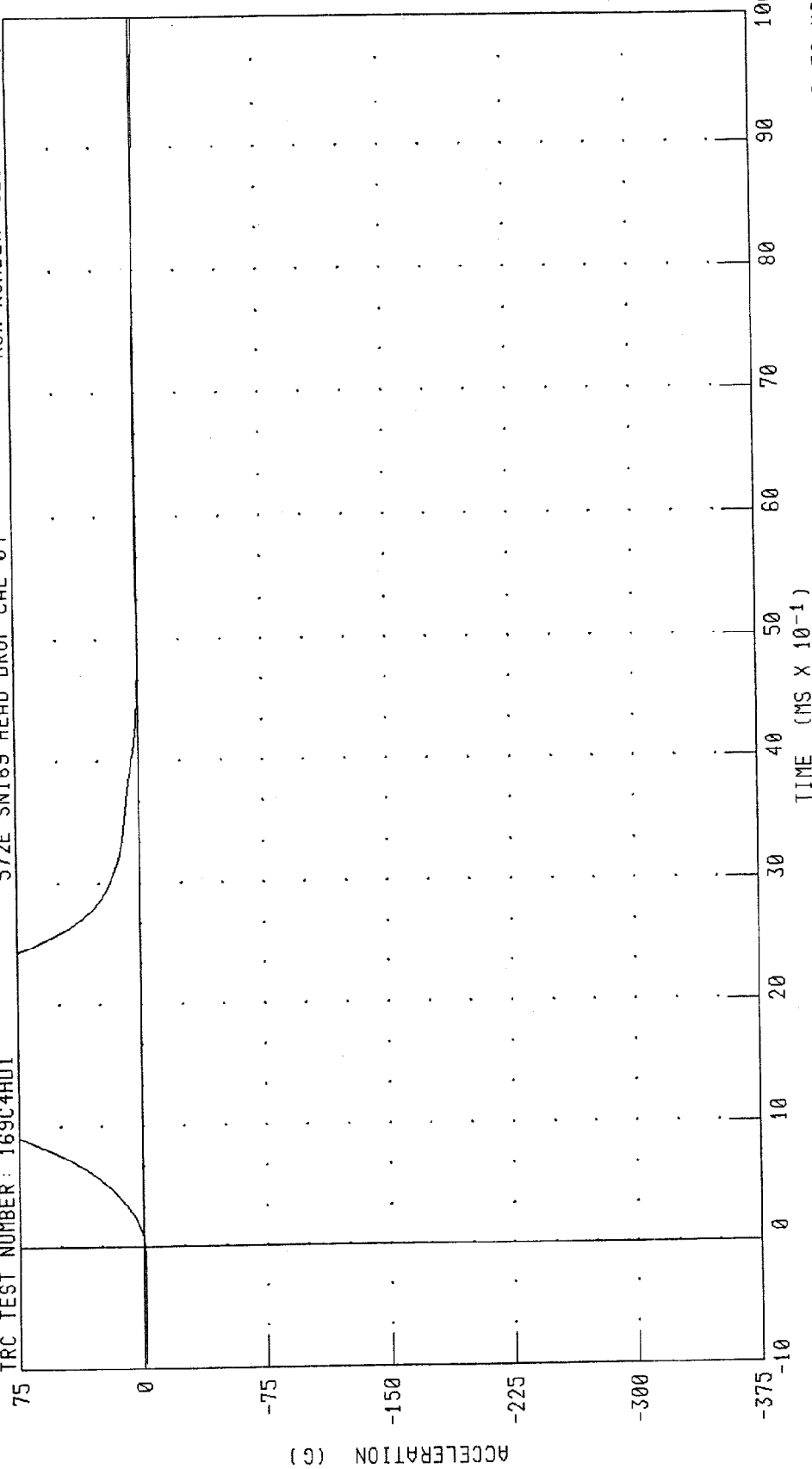
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN169 HEAD DROP CAL 04

RUN NUMBER: 020599.1105;1

TRC TEST NUMBER: 169C4HD1



CHANNEL: HEDXC

FILTER: CH. CLASS 1000

PEAK DATA: 214.80 G @ 1.68 MS, -1.37 G @ 9.76 MS

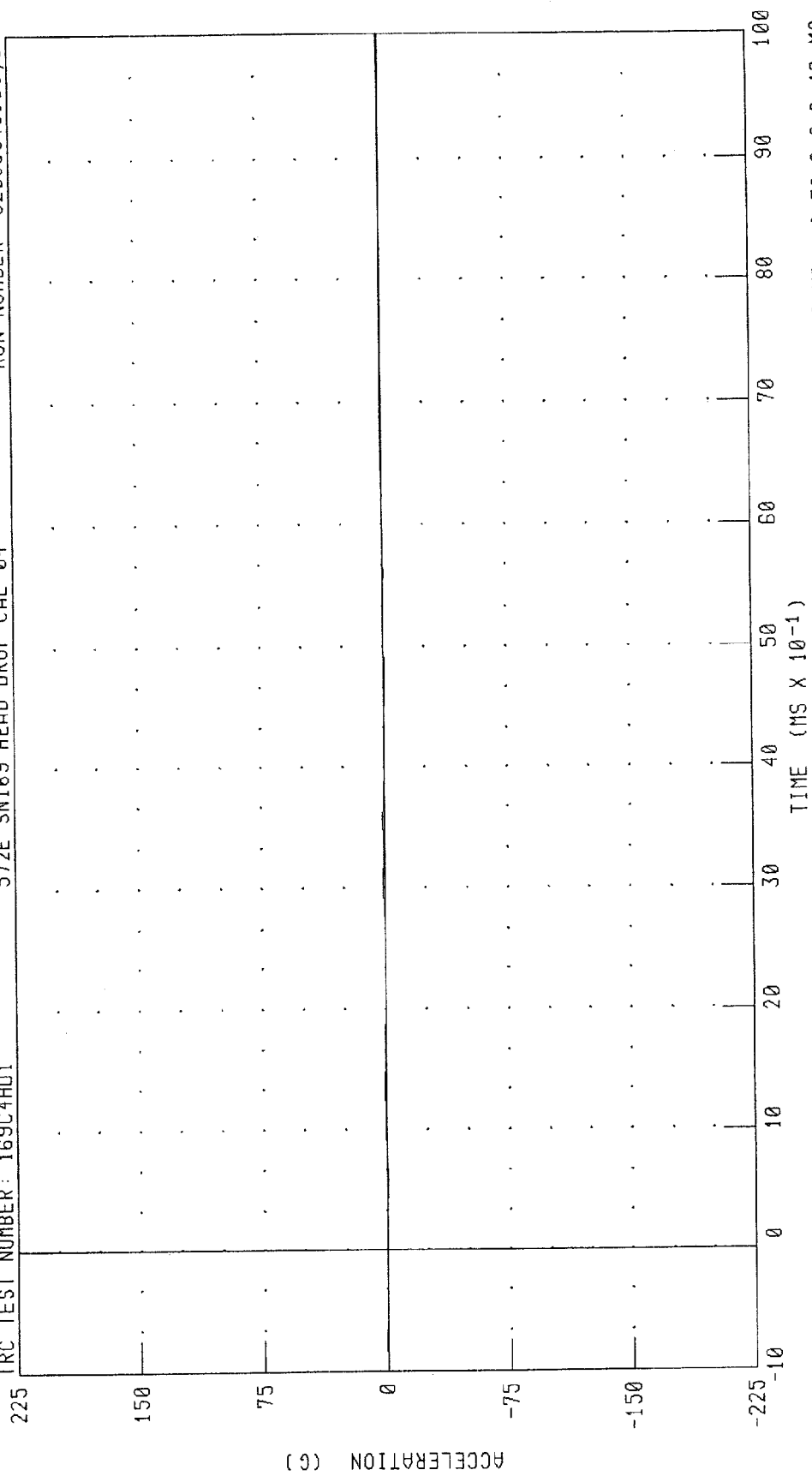
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 169C4HD1

572E SN169 HEAD DROP CAL 04

RUN NUMBER: 020599.1105;1



CHANNEL: HEDYG

FILTER: CH. CLASS 1000

TIME (MS X 10⁻¹)

PEAK DATA: 0.79 G @ 1.28 MS; -0.59 G @ 0.48 MS

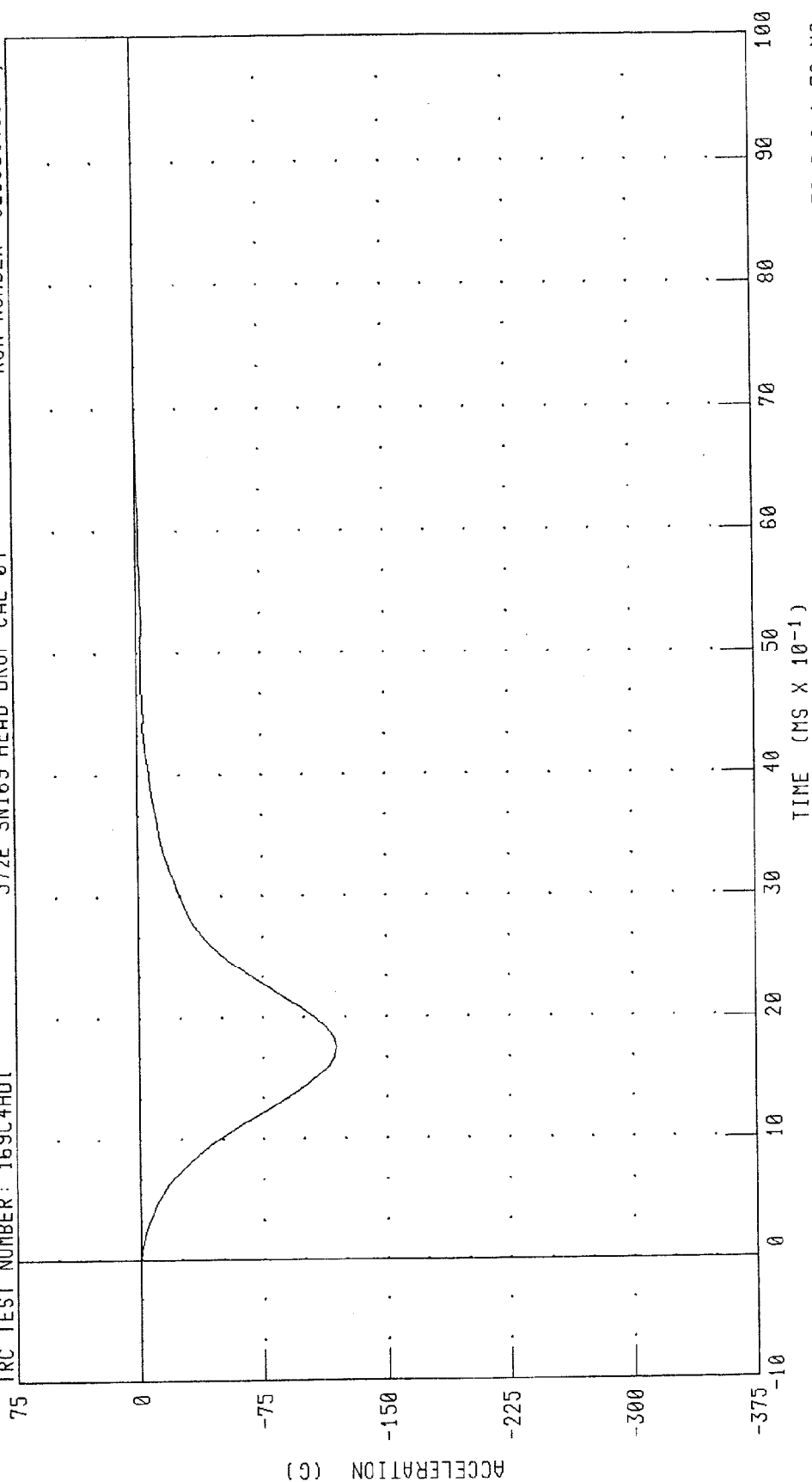
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

572E SN169 HEAD DROP CAL 04

RUN NUMBER: 020599.1105;1

TRC TEST NUMBER: 169C4HD1



CHANNEL: HEDZC FILTER: CH. CLASS 1000

TIME (MS X 10⁻¹)

PEAK DATA: 0.39 G @ 7.12 MS; -119.52 G @ 1.76 MS

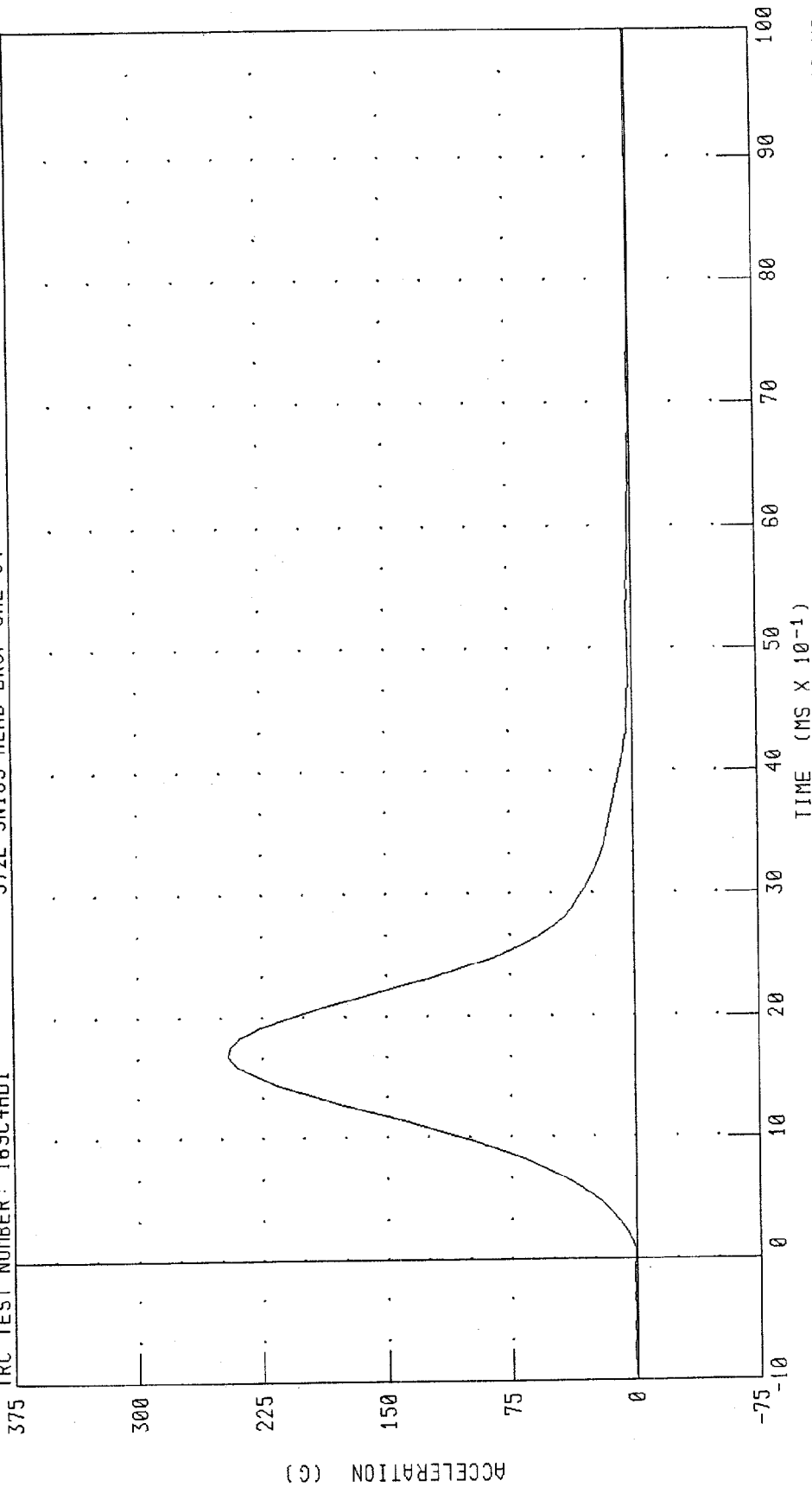
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN169 HEAD DROP CAL 04

RUN NUMBER: 020599.1105,1

TRC TEST NUMBER: 169C4HD1



CHANNEL: HEDRC

FILTER: CH. CLASS 1000

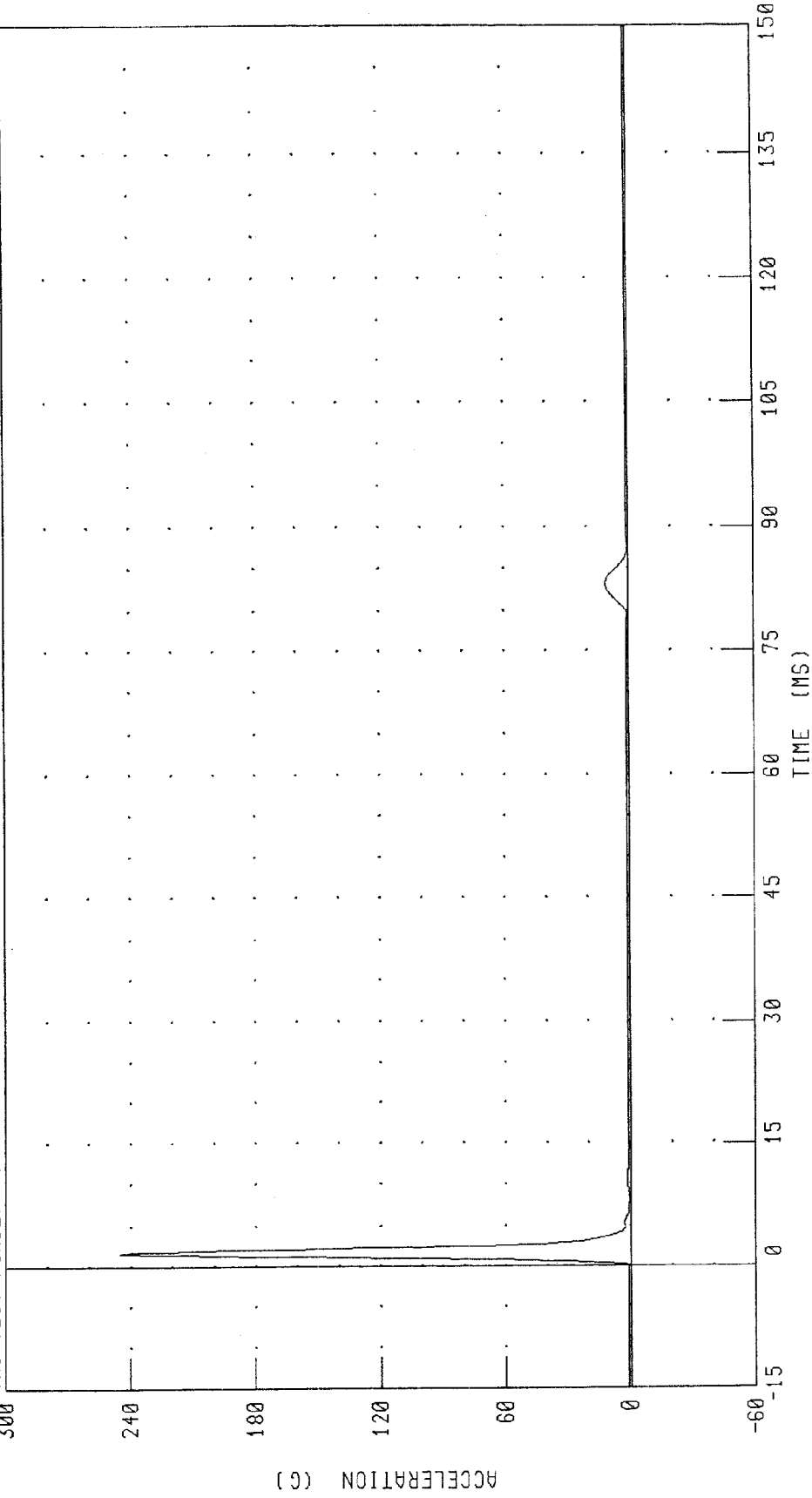
PEAK DATA: 245.34 G @ 1.68 MS; 0.28 G @ 8.32 MS

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

TRC TEST NUMBER: 169C4HD1

572E SN169 HEAD DROP CAL 04

RUN NUMBER: 020599.1105;1



CHANNEL: HEDRG FILTER: CH. CLASS 1000

PEAK DATA: 245.34 G @ 1.68 MS; 0 00 G @ 79.44 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

12-FEB-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 169C4NF2 572E SN169 NECK FLEXION CAL4

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.43 G
	20 MS	17.60 - 22.60 G	21.83 G
	30 MS	12.50 - 18.50 G	16.02 G
MAX PENDULUM G		29 G MAX	24.07 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.97 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	39.52 MS
D PLANE	MAX	64 - 78 DEG.	66.44 DEG.
ROTATION	TIME	57 - 64 MS	57.20 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	97.97 NM
	TIME	47 - 58 MS	52.48 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	113.28 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	104.48 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

B. Calt

RUN NUMBER: 021299.0918;2

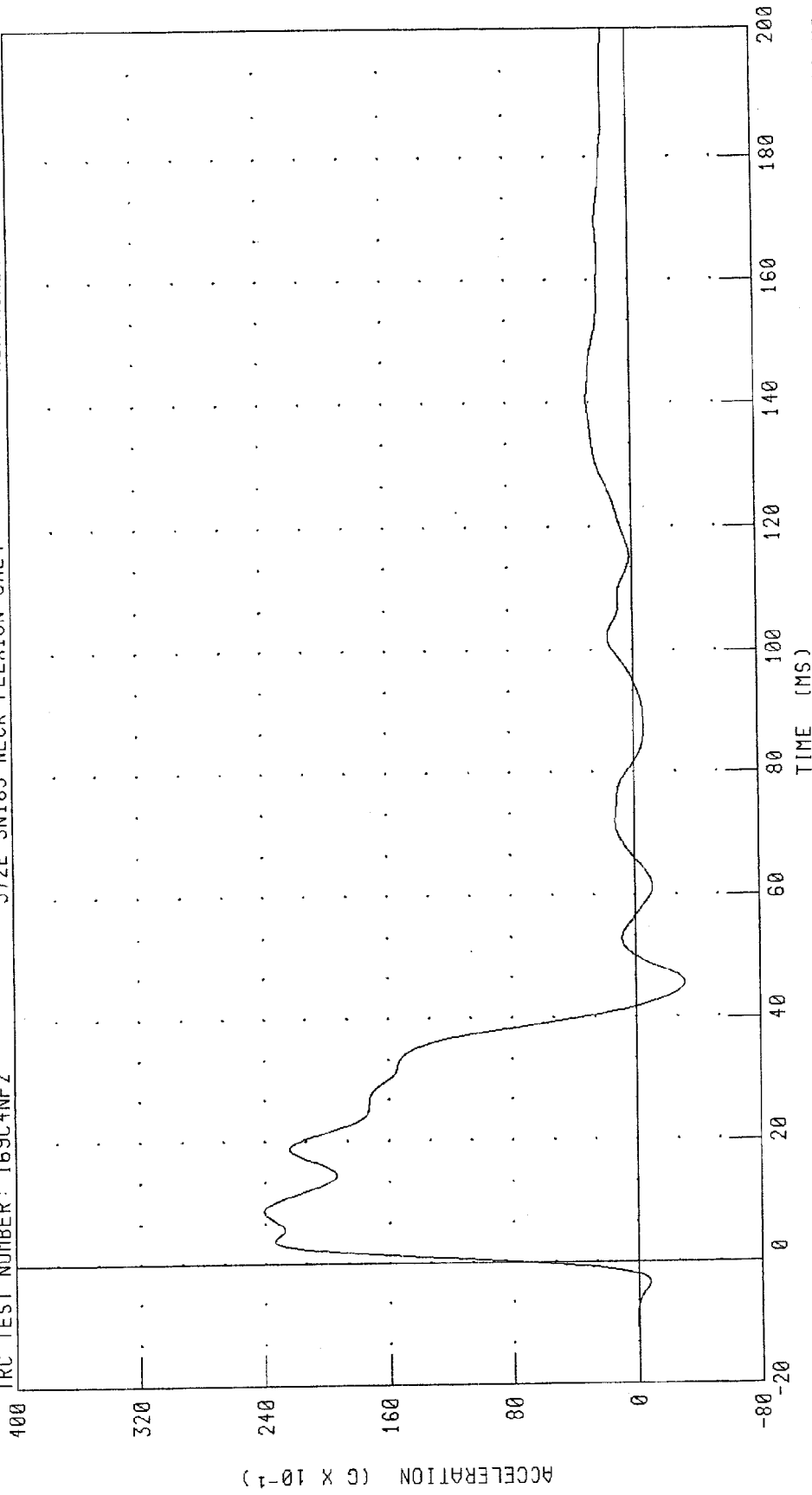
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 169C4NF2

572E SN169 NECK FLEXION CAL4

RUN NUMBER: 021299.0919;2



PEAK DATA: 24.07 G @ 8.72 MS, -3.18 G @ 45.68 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

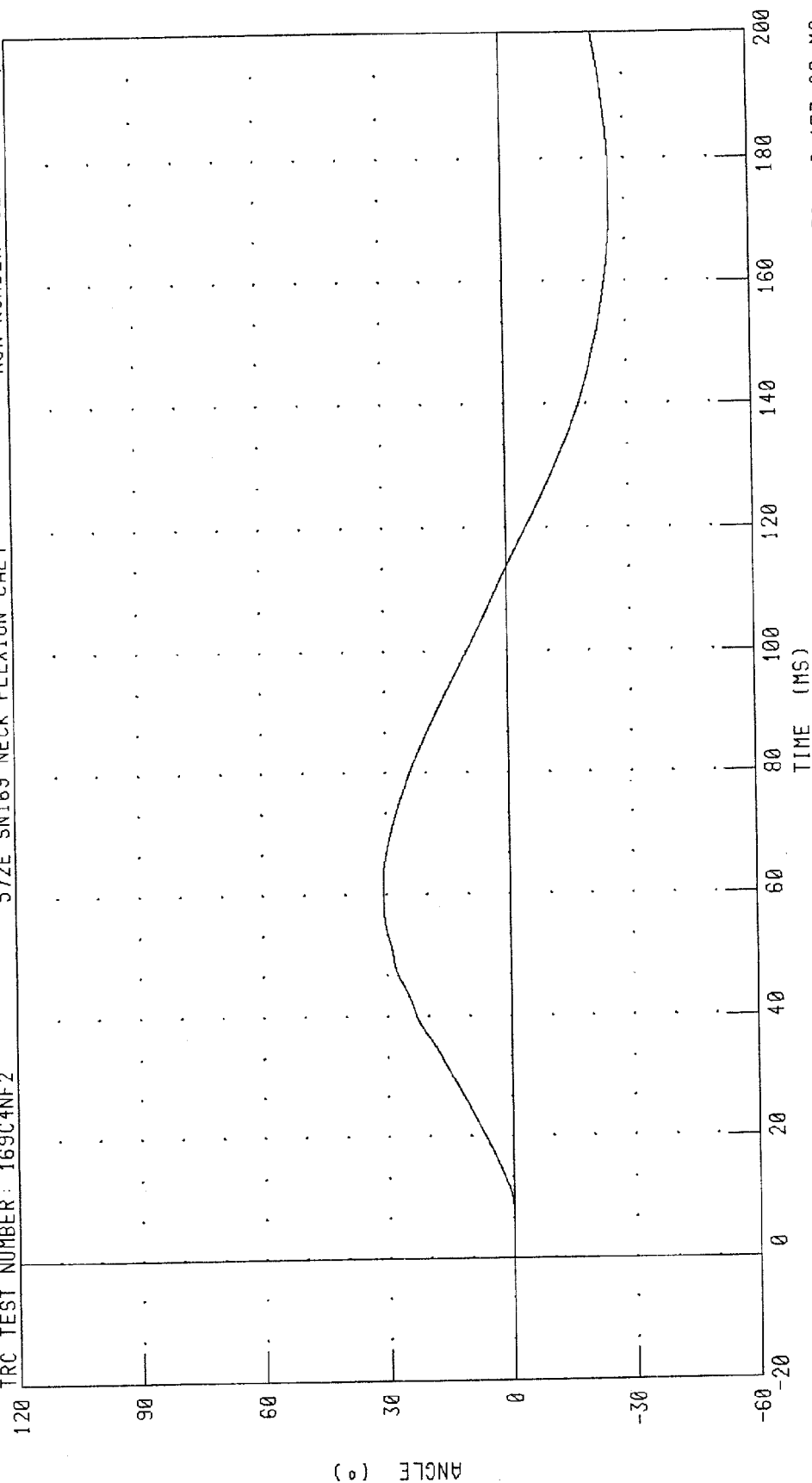
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN169 NECK FLEXION CAL4

RUN NUMBER: 021299.0919;2

TRC TEST NUMBER: 169C4NF2



PEAK DATA: 30.68 ° @ 62.48 MS; -26.36 ° @ 173.68 MS

FILTER: CH. CLASS 60

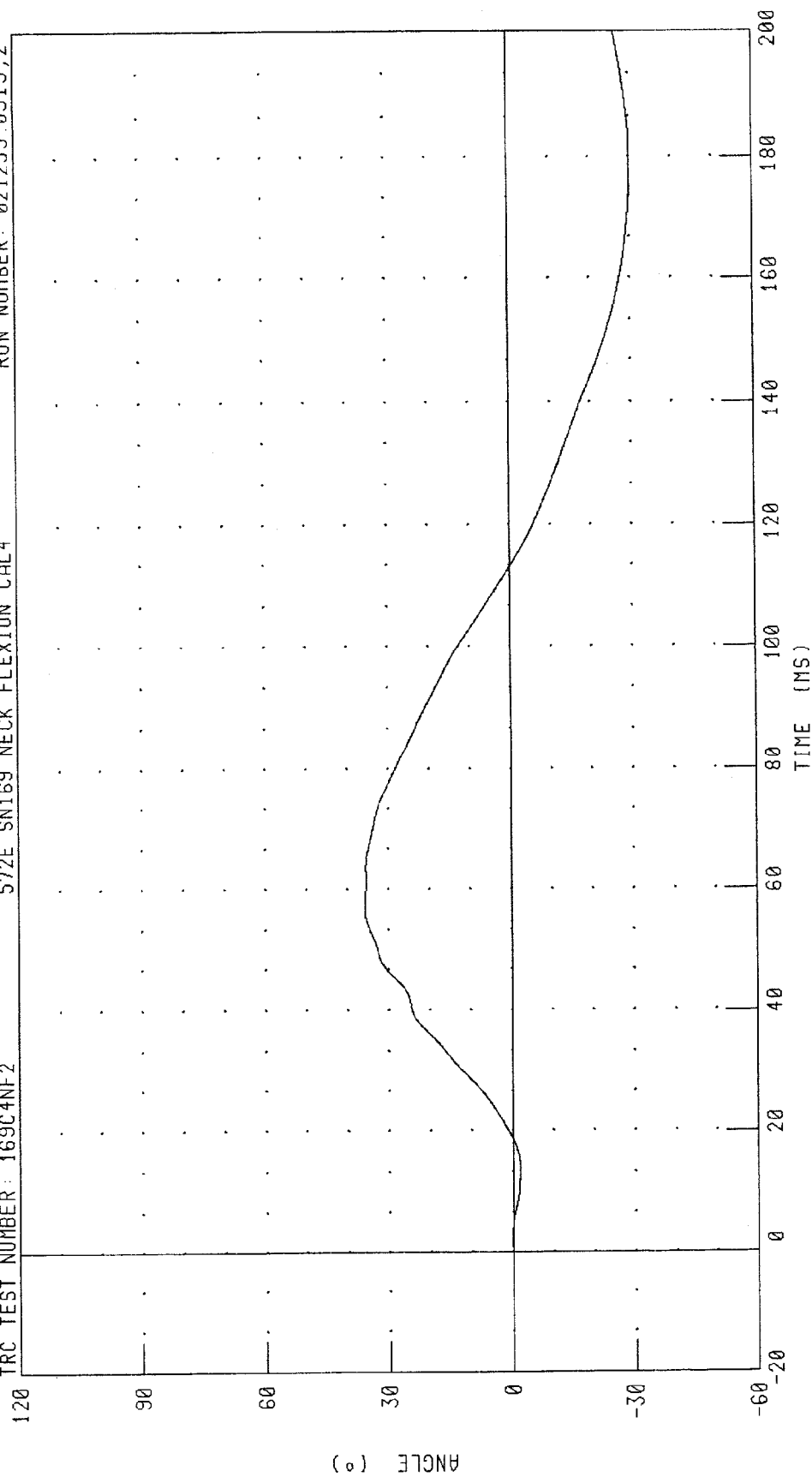
CHANNEL: BETA

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

TRC TEST NUMBER: 169C4NF2

572E SN169 NECK FLEXION CAL4

RUN NUMBER: 021299.0919;2



PEAK DATA: 35.85 ° @ 56.96 MS; -30.16 ° @ 180.48 MS

CHANNEL: THETA FILTER: CH. CLASS 60

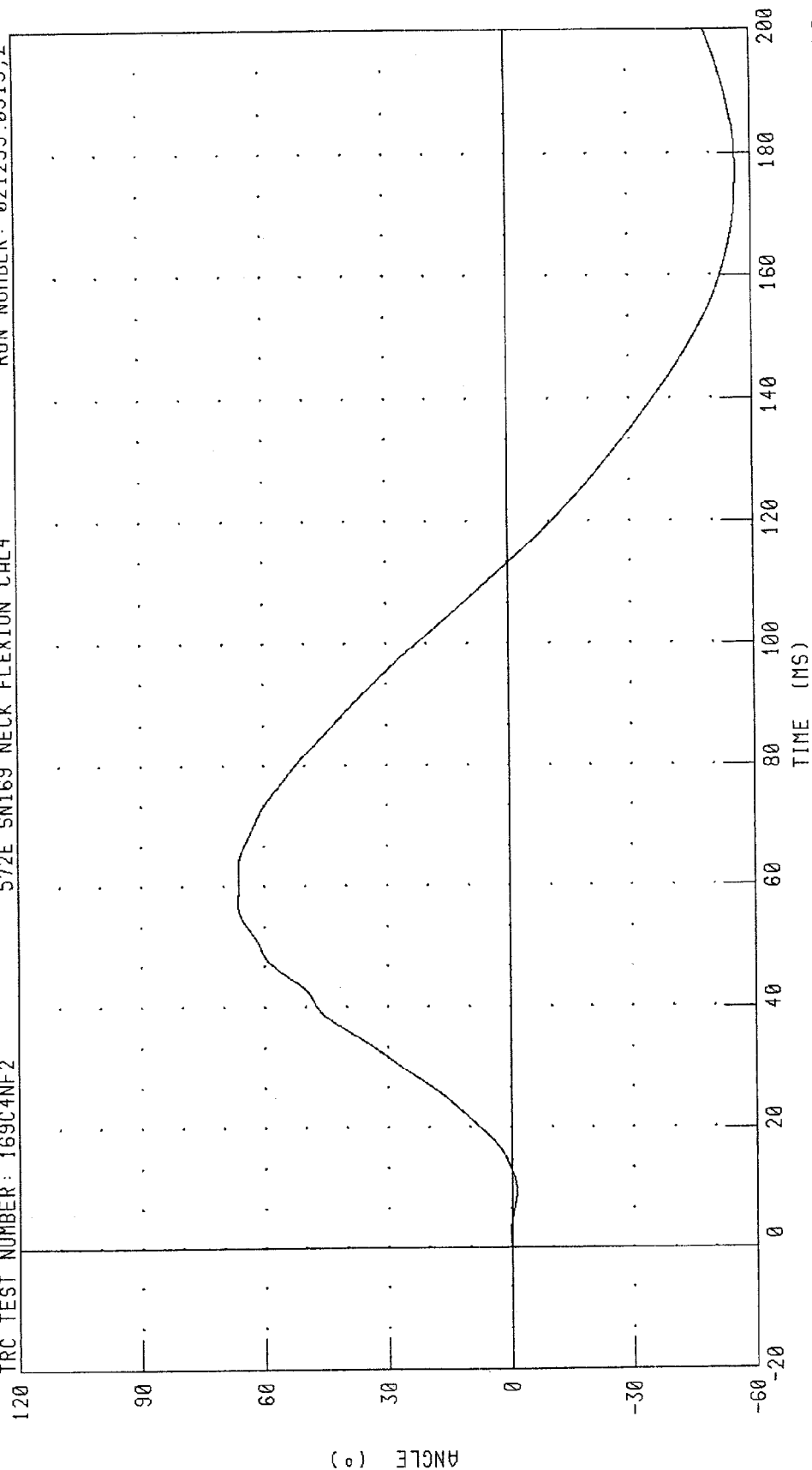
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 169C4NF2

572E SN169 NECK FLEXION CAL4

RUN NUMBER: 021299.0919;2



PEAK DATA: 66.44 ° @ 57.20 MS; -56.38 ° @ 177.12 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

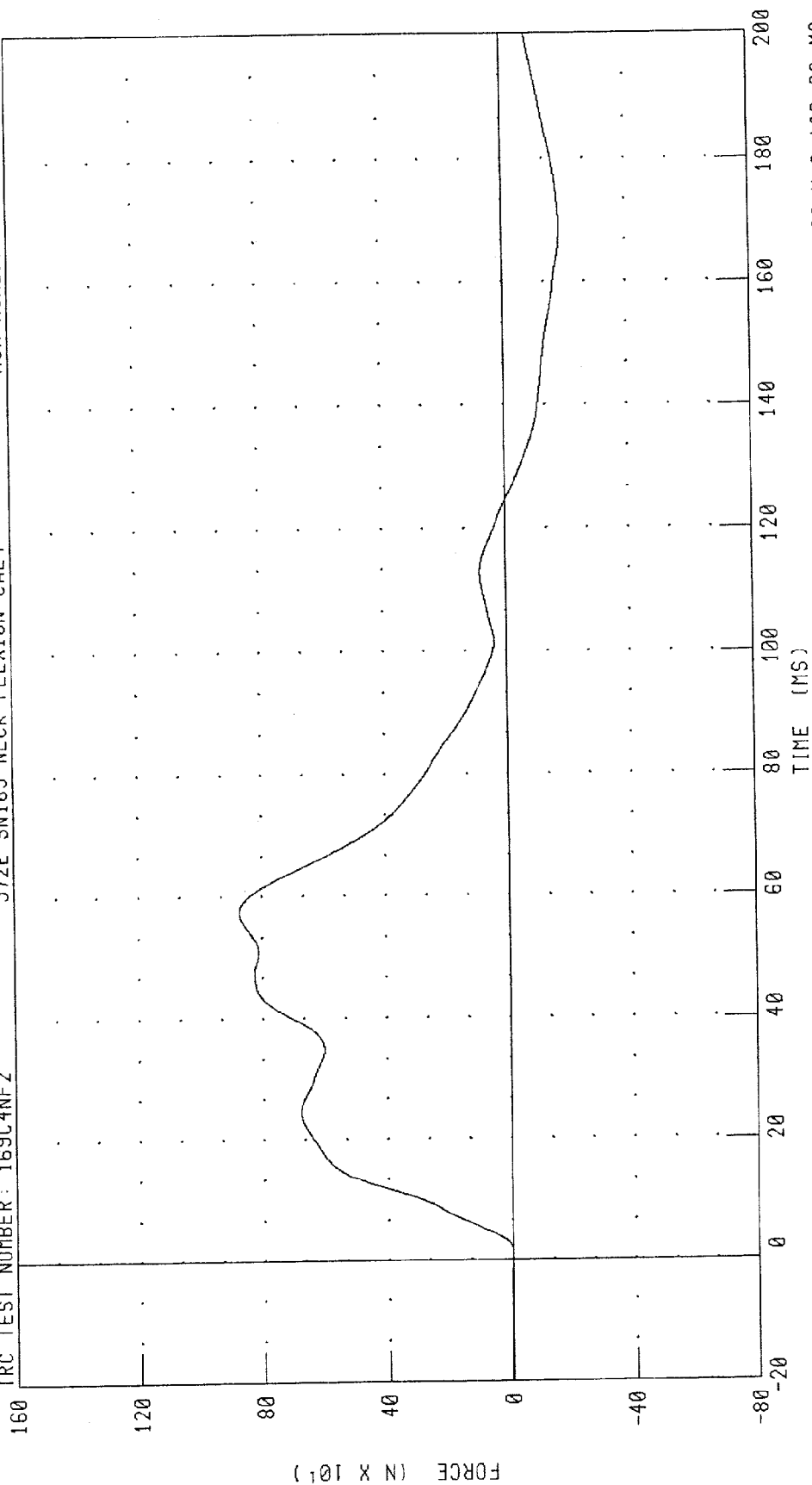
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 021299.0919;2

TRC TEST NUMBER: 169C4NF2

572E SN169 NECK FLEXION CAL4



PEAK DATA: 872.00 N @ 57.44 MS, -186.80 N @ 168.88 MS

CHANNEL: NEKXF FILTER: CH CLASS 60

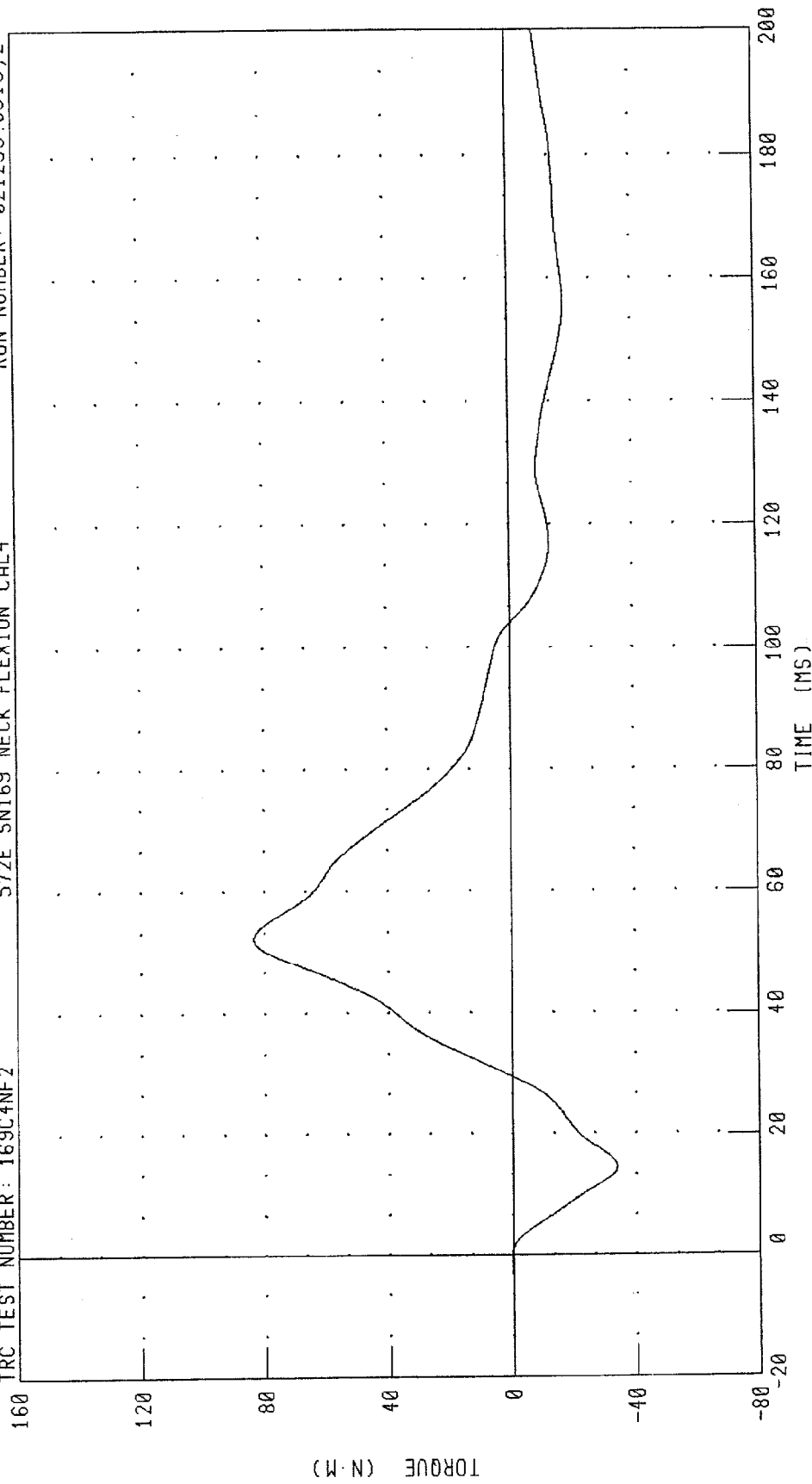
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 169C4NF2

572E SN169 NECK FLEXION CAL4

RUN NUMBER: 021299.0919;2



CHANNEL: NEKYM

FILTER: CH. CLASS 60

PEAK DATA: 83.43 N·M @ 52.40 MS; -33.88 N·M @ 14.64 MS

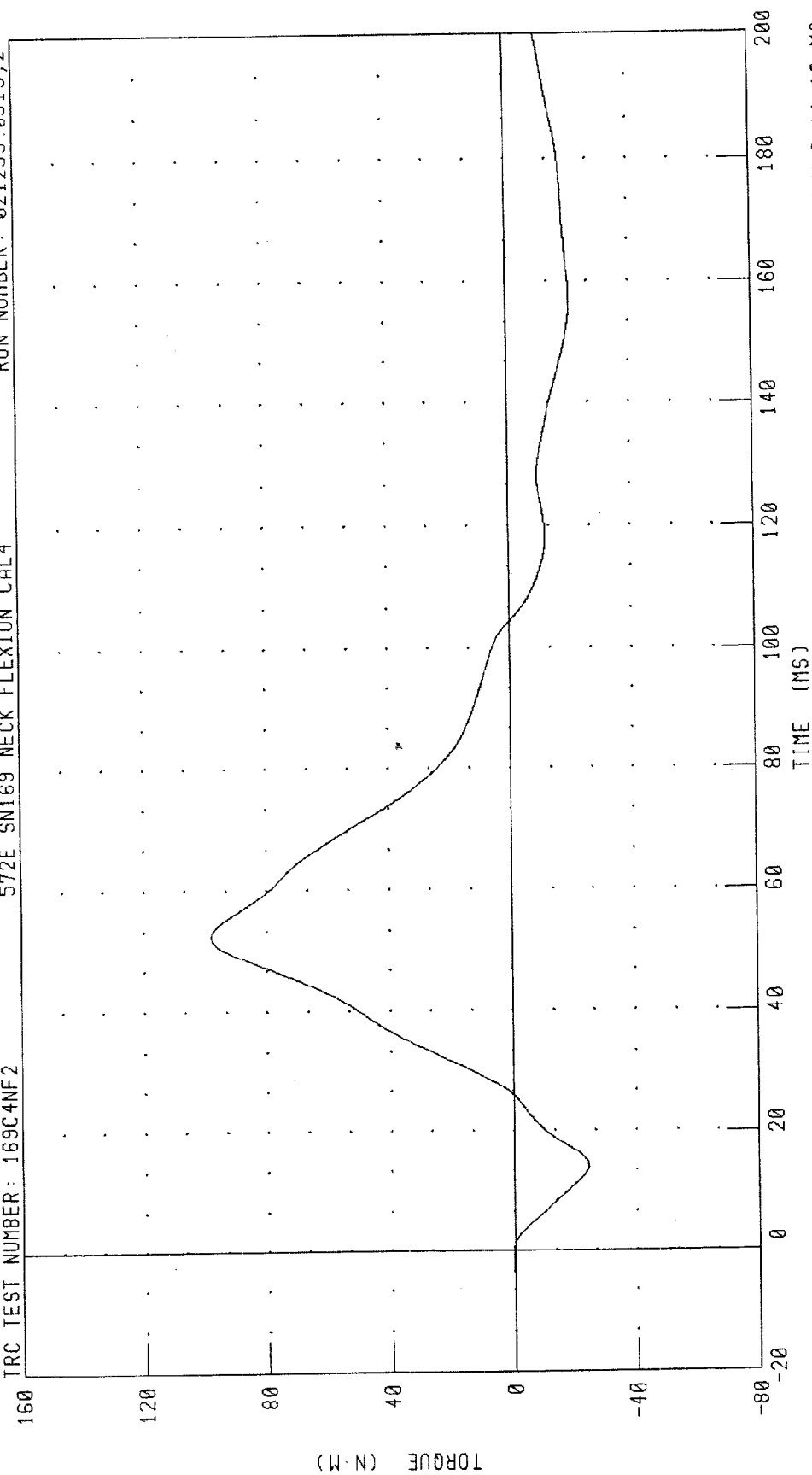
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

572E SN169 NECK FLEXION CAL4

TRC TEST NUMBER: 169C4NF2

RUN NUMBER: 021299.0919;2



CHANNEL: NEKOM

FILTER: CH. CLASS 60

PEAK DATA: 97.97 N-M @ 52.48 MS; -24.35 N-M @ 14.16 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

12-FEB-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 169C4NE1 572E SN 169 NECK EXT CAL4

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.05 G
	20 MS	14.00 - 19.00 G	17.16 G
	30 MS	11.00 - 16.00 G	15.82 G
MAX PENDULUM G		22 G MAX	19.38 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.78 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	38.72 MS
D PLANE	MAX	81 - 106 DEG.	98.72 DEG.
ROTATION	TIME	72 - 82 MS	76.64 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-68.58 NM
	TIME	65 - 79 MS	70.08 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	158.24 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	144.48 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN B. cult

RUN NUMBER: 021299.1024;1

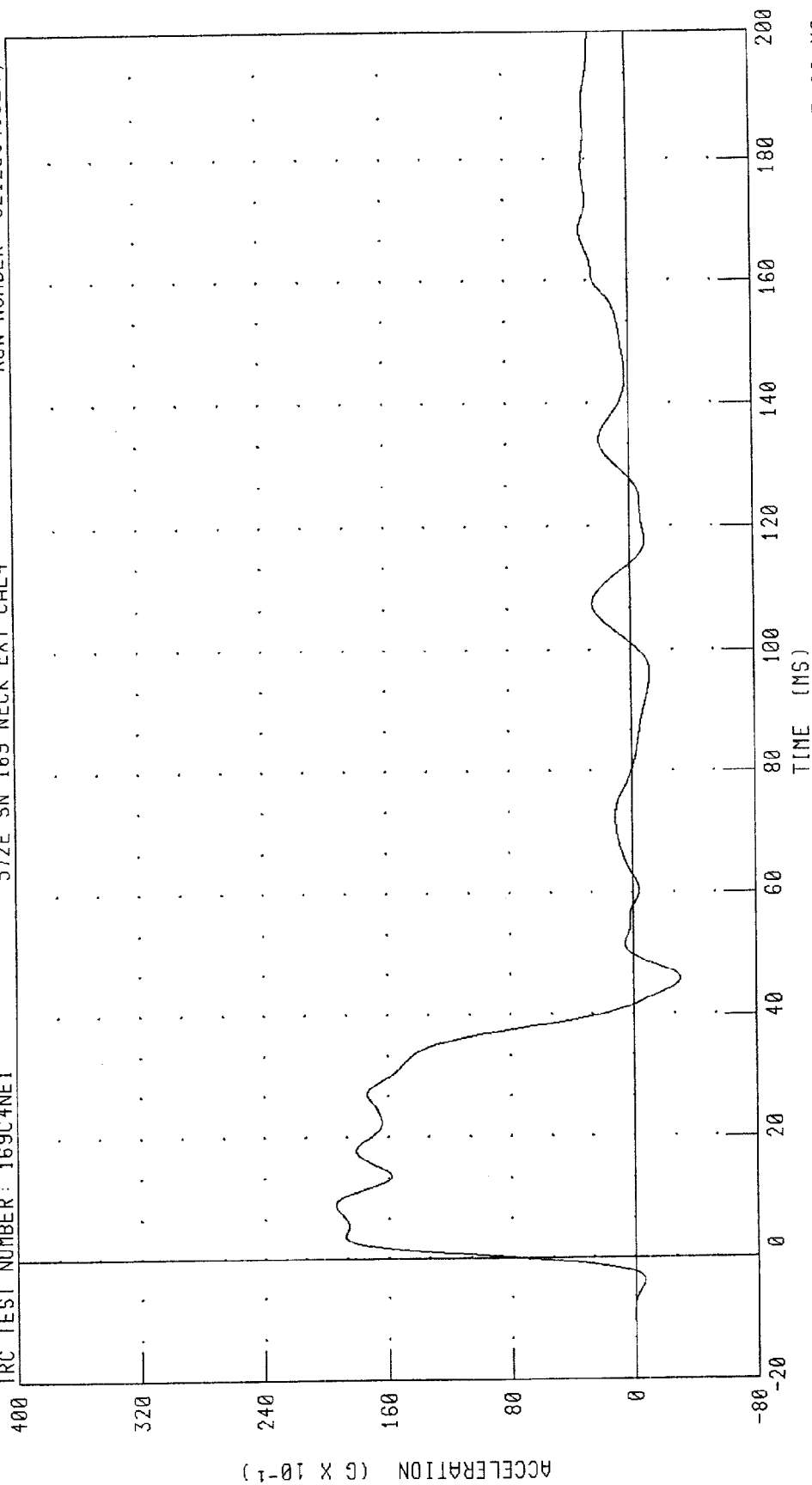
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

RUN NUMBER: 021299.1024;1

572E SN 169 NECK EXT CAL4

TRC TEST NUMBER: 169C4NE1



PEAK DATA: 19.39 G @ 8.96 MS; -3.05 G @ 45.92 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

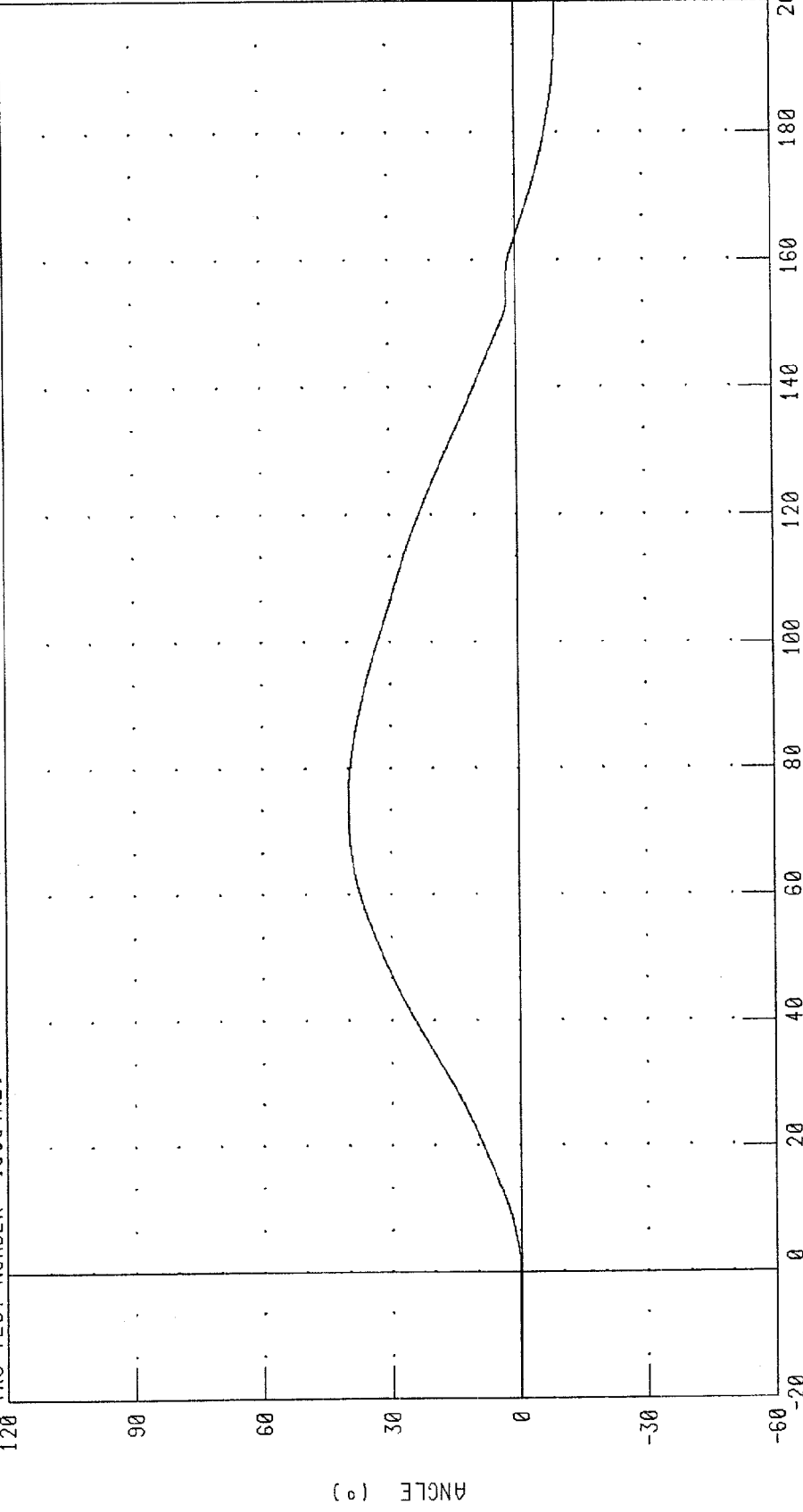
ROTATION ABOUT BASE OF NECK

RUN NUMBER: 021299.1024;1

TRC TEST NUMBER: 169C4NE1

572E SN 169 NECK EXT CAL4

120



TIME (MS)

PEAK DATA: 39.82 ° @ 74.16 MS; -9.65 ° @ 198.00 MS

CHANNEL: BETA FILTER: CH. CLASS 60

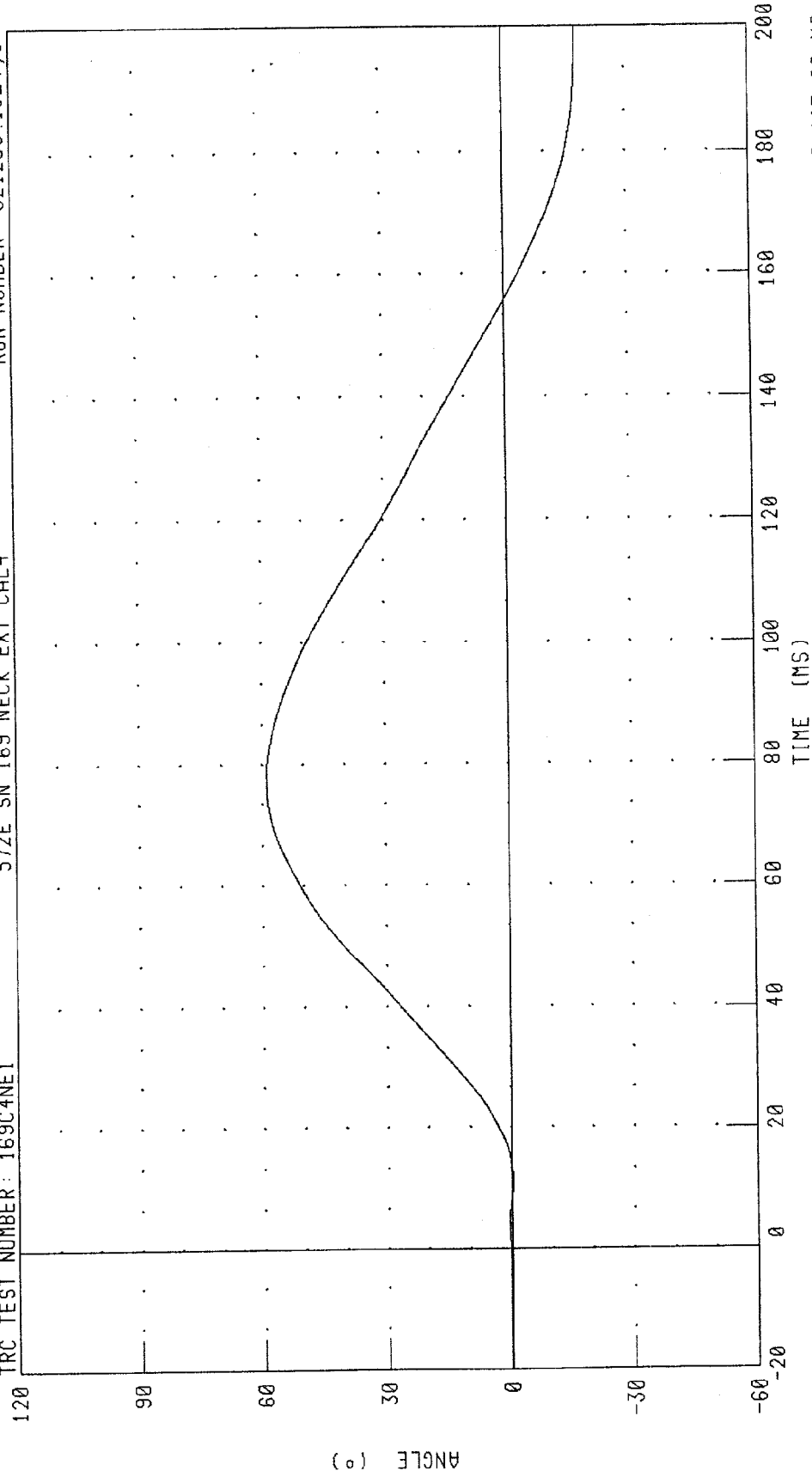
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

RUN NUMBER: 021299.1024;1

572E SN 169 NECK EXT CAL4

TRC TEST NUMBER: 169C4NE1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 58.96 ° @ 77.44 MS; -17.80 ° @ 197.20 MS

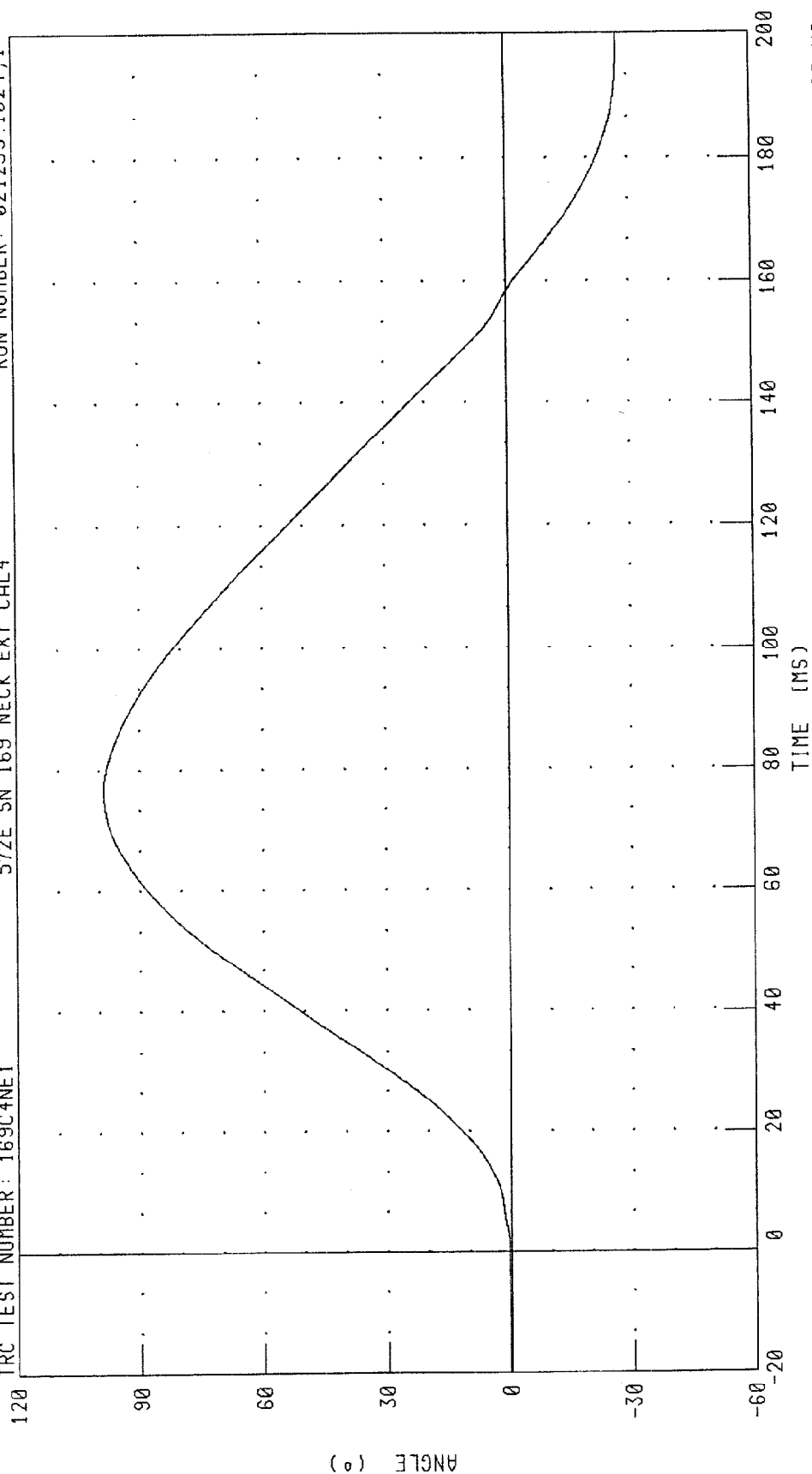
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 169C4NE1

572E SN 169 NECK EXT CAL4

RUN NUMBER: 021299.1024;1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 98.72 ° @ 76.64 MS; -27.45 ° @ 197.68 MS

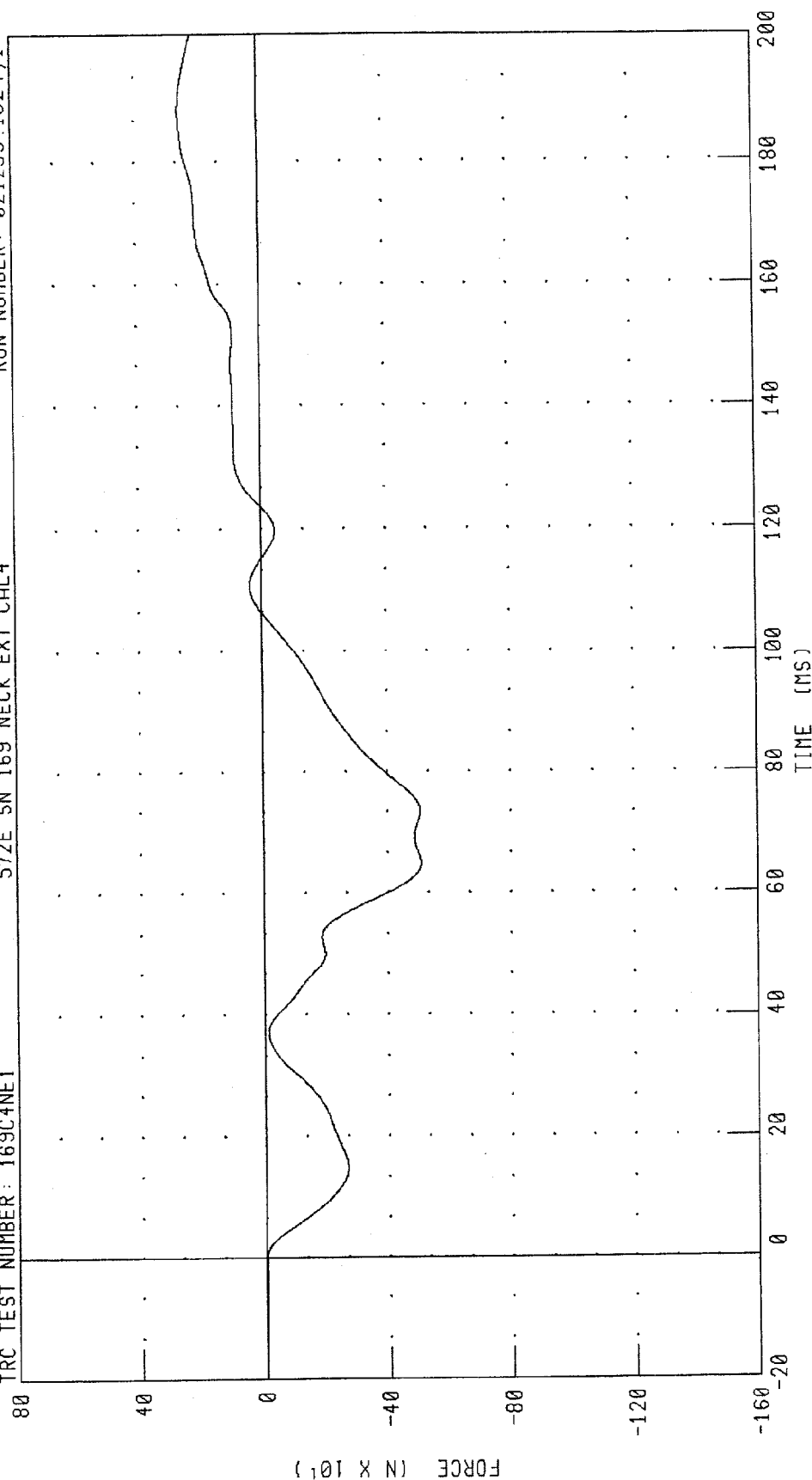
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 169C4NE1

572E SN 169 NECK EXT CAL4

RUN NUMBER: 021299.1024,1



PEAK DATA: 257.56 N @ 188.24 MS; -509.11 N @ 64.88 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

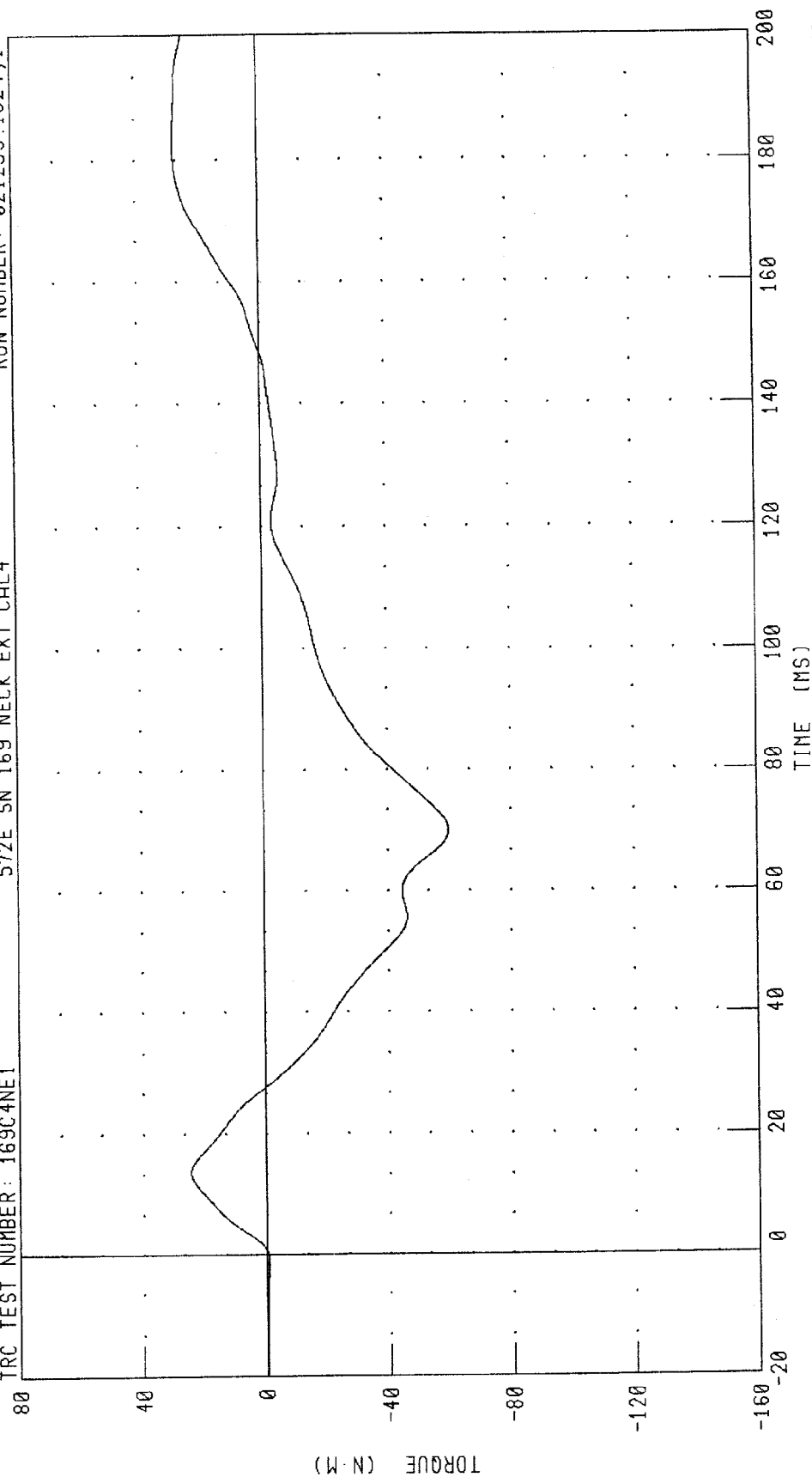
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 021299.1024;1

TRC TEST NUMBER: 169C4NE1

572E SN 169 NECK EXT CAL4



PEAK DATA: 27.67 N-M @ 182.88 MS, -59.86 N-M @ 70.00 MS

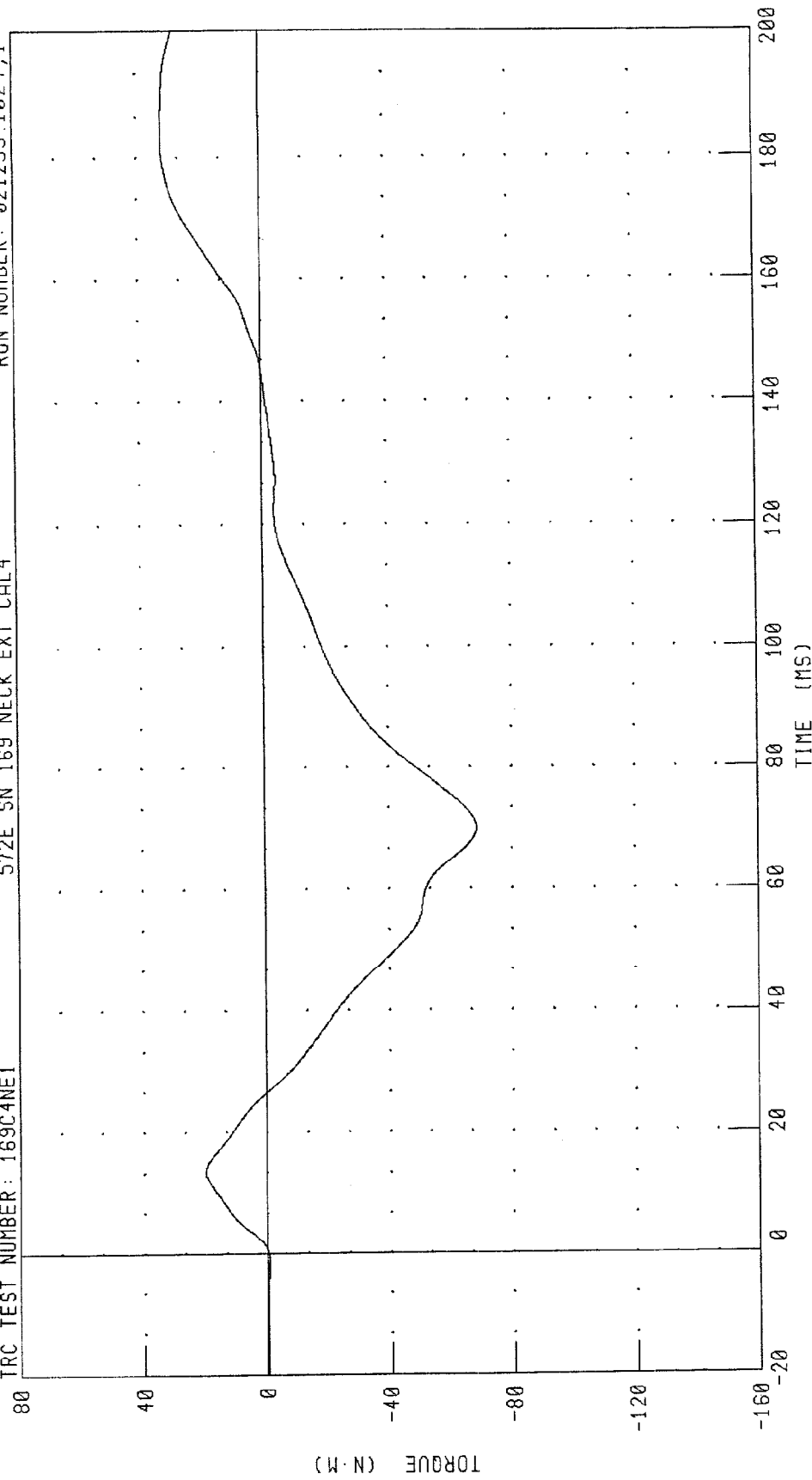
CHANNEL: NEKYN FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 169C4NE1

572E SN 169 NECK EXT CAL4

RUN NUMBER: 021299.1024;1



PEAK DATA: 32.12 N-M @ 183.76 MS; -68.58 N-M @ 70.08 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

15-FEB-99

TRC INC.

TEST NO: 169C4TH2

572E SN169 H.S.THORAX CAL04

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	22.2 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.74 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	63.8 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5751. N
INTERNAL HYSTERESIS	69% - 85%	71.0%

TEST MEETS SPECIFICATIONS

TECHNICIAN

[Signature]

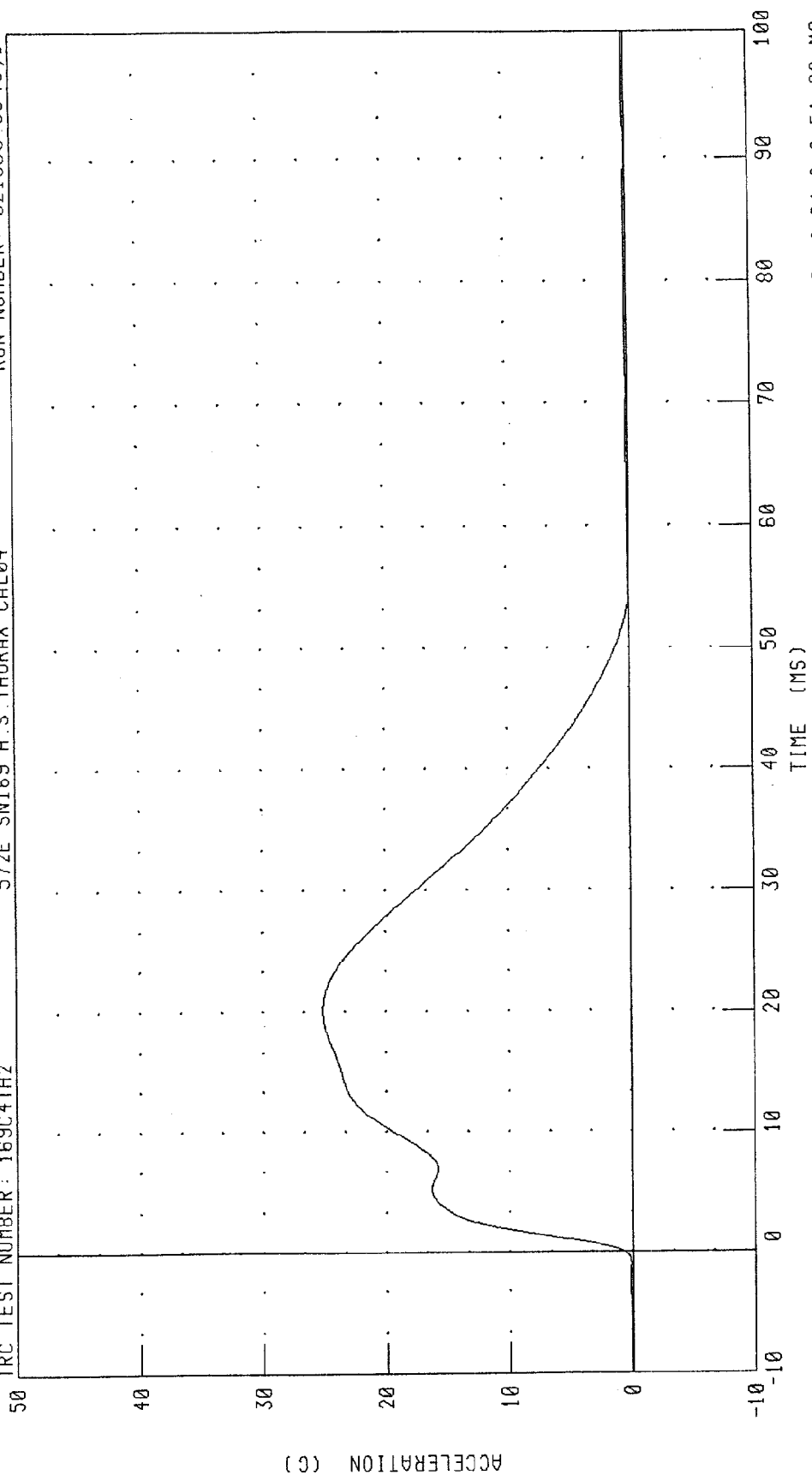
RUN NUMBER: 021599.0846;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 169C4TH2

572E SN169 H.S. THORAX CAL04

RUN NUMBER: 021599 0846;1



CHANNEL: PENXG FILTER: CH CLASS 180

PEAK DATA: 25.11 G @ 20.24 MS; 0.04 G @ 54.88 MS

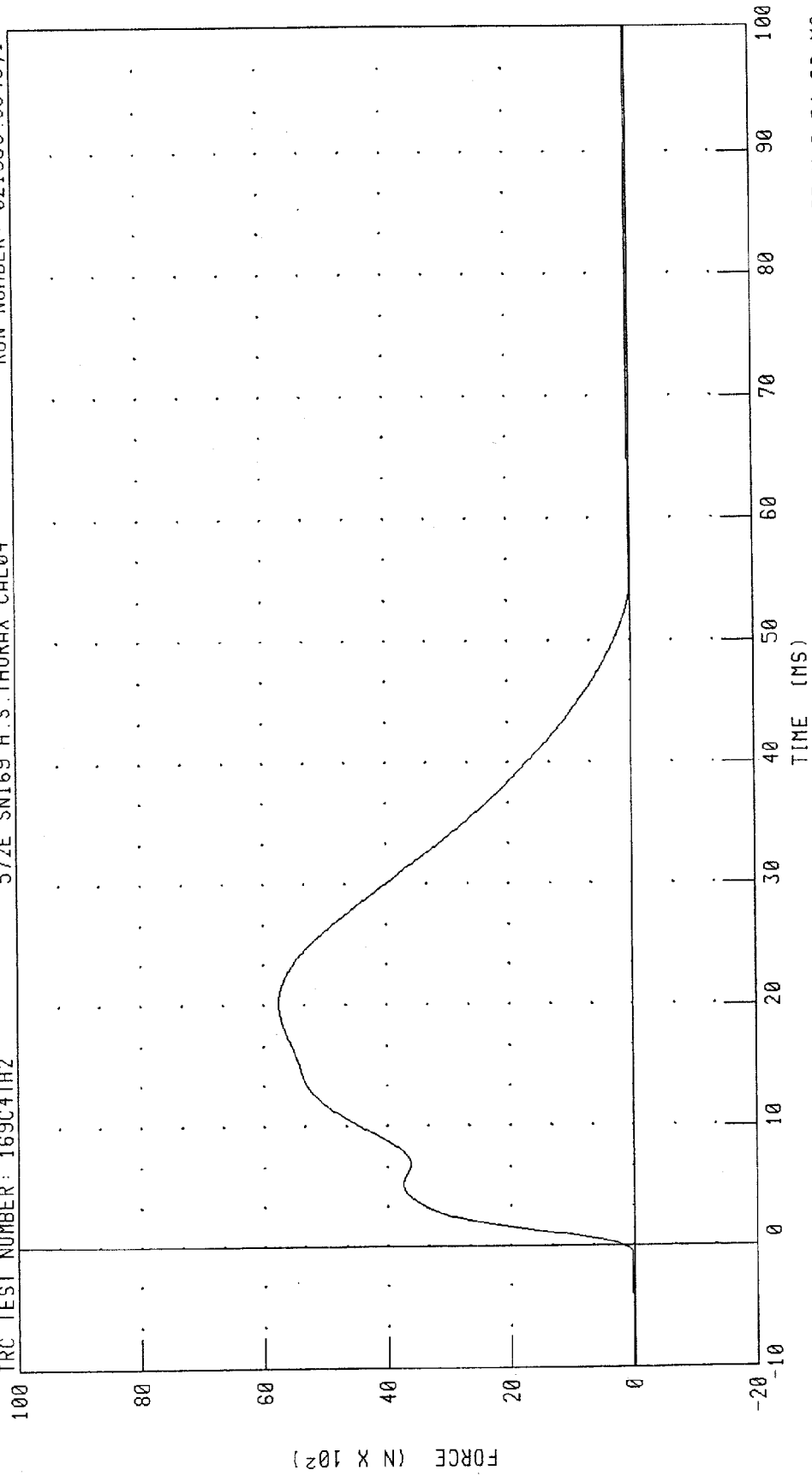
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 169C4TH2

572E SN169 H.S. THORAX CAL04

RUN NUMBER: 021599.0846;1



CHANNEL: PENXF FILTER: CH CLASS 180 PEAK DATA: 5751.42 N @ 20.24 MS; 9.35 N @ 54.88 MS

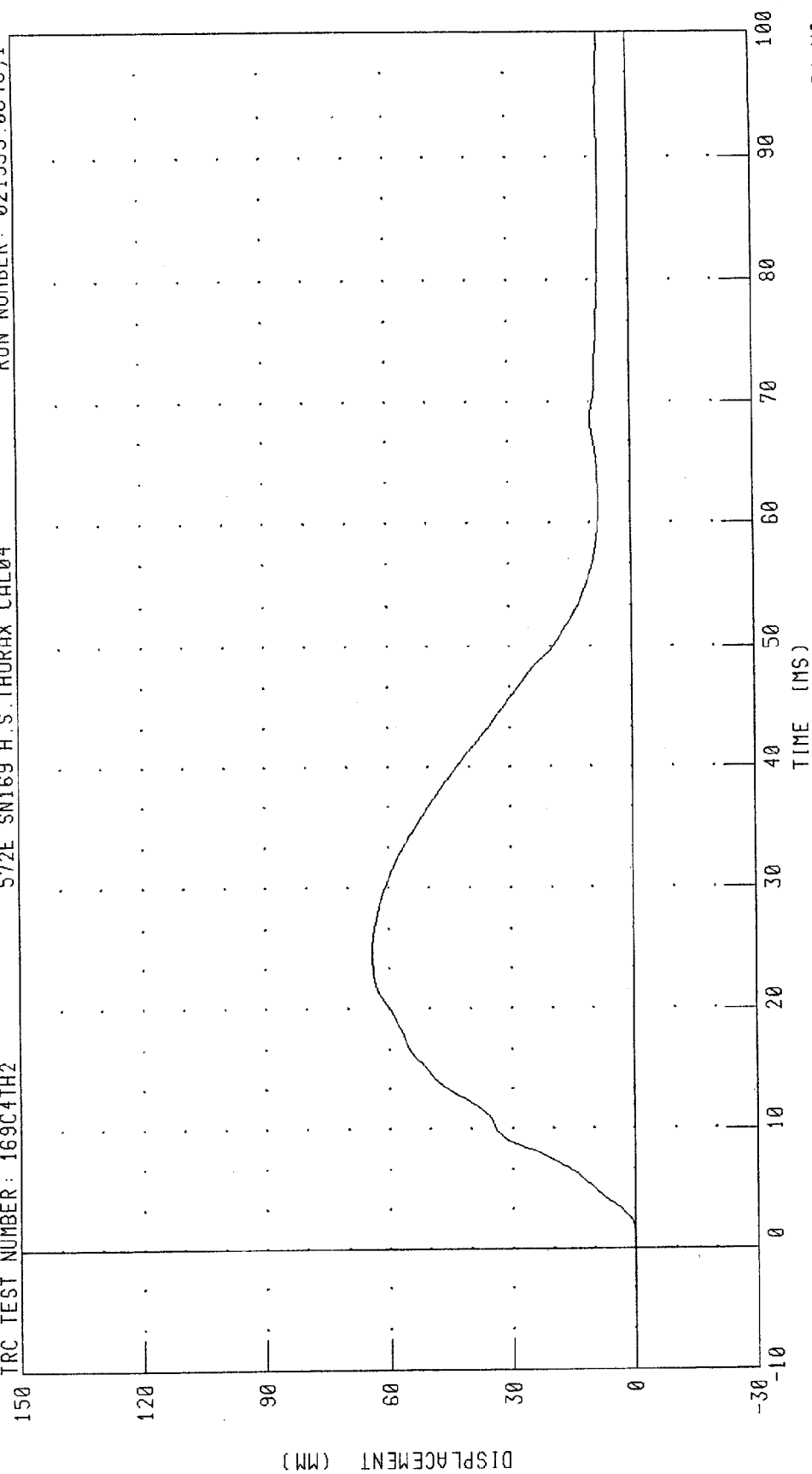
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 169C4TH2

572E SN169 H.S. THORAX CAL04

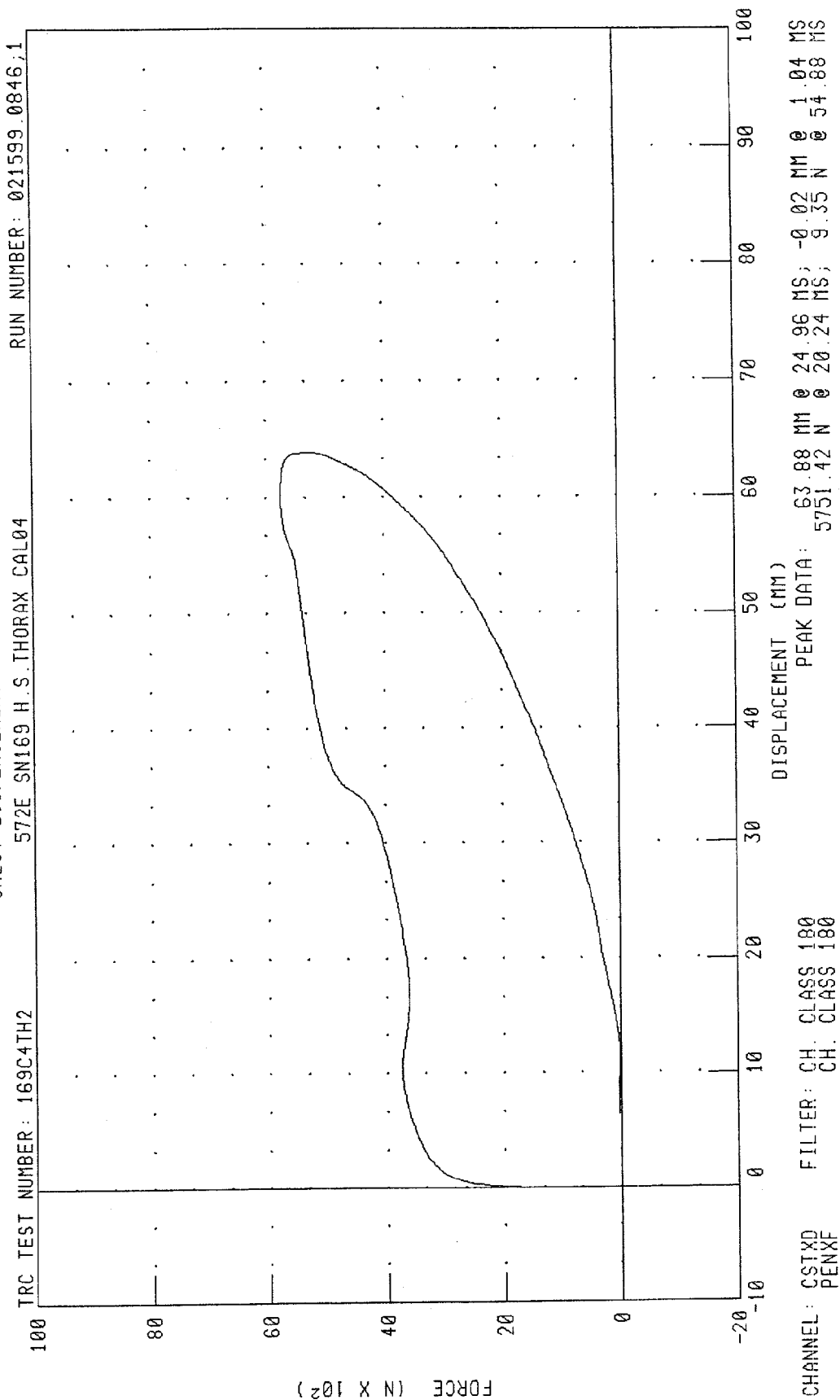
RUN NUMBER: 021599 0846,1



CHANNEL: CSTXD FILTER: CH. CLASS 180

PEAK DATA: 63.88 MM @ 24.96 MS; -0.02 MM @ 1.04 MS

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



TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

12-FEB-99

TRC INC.

TEST NO: 169C4HR1

572E SN 169 HIPFLEX CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	68.7 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.4 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN

Ry Calt

RUN NUMBER: 021299.1057;1

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

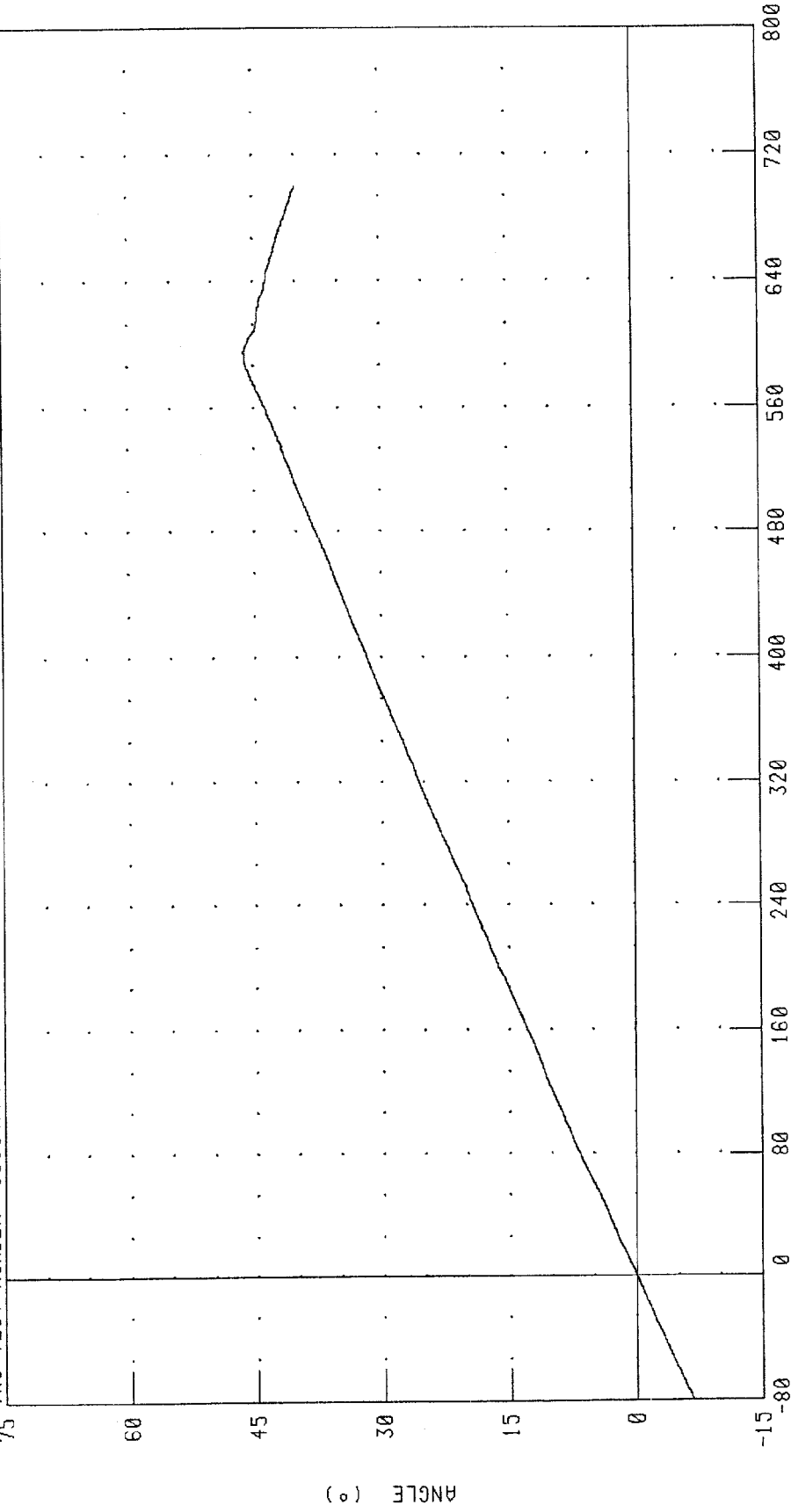
RIGHT HIP FLEXION ROTATION

572E SN 169 HIPFLEX CAL 04

RUN NUMBER: 021299.1057;1

TRC TEST NUMBER: 169C4HR1

75



PEAK DATA: 46.18 ° @ 5.95 S; -9.79 ° @ -1.00 S

CHANNEL: RHPXD FILTER: CH. CLASS 60

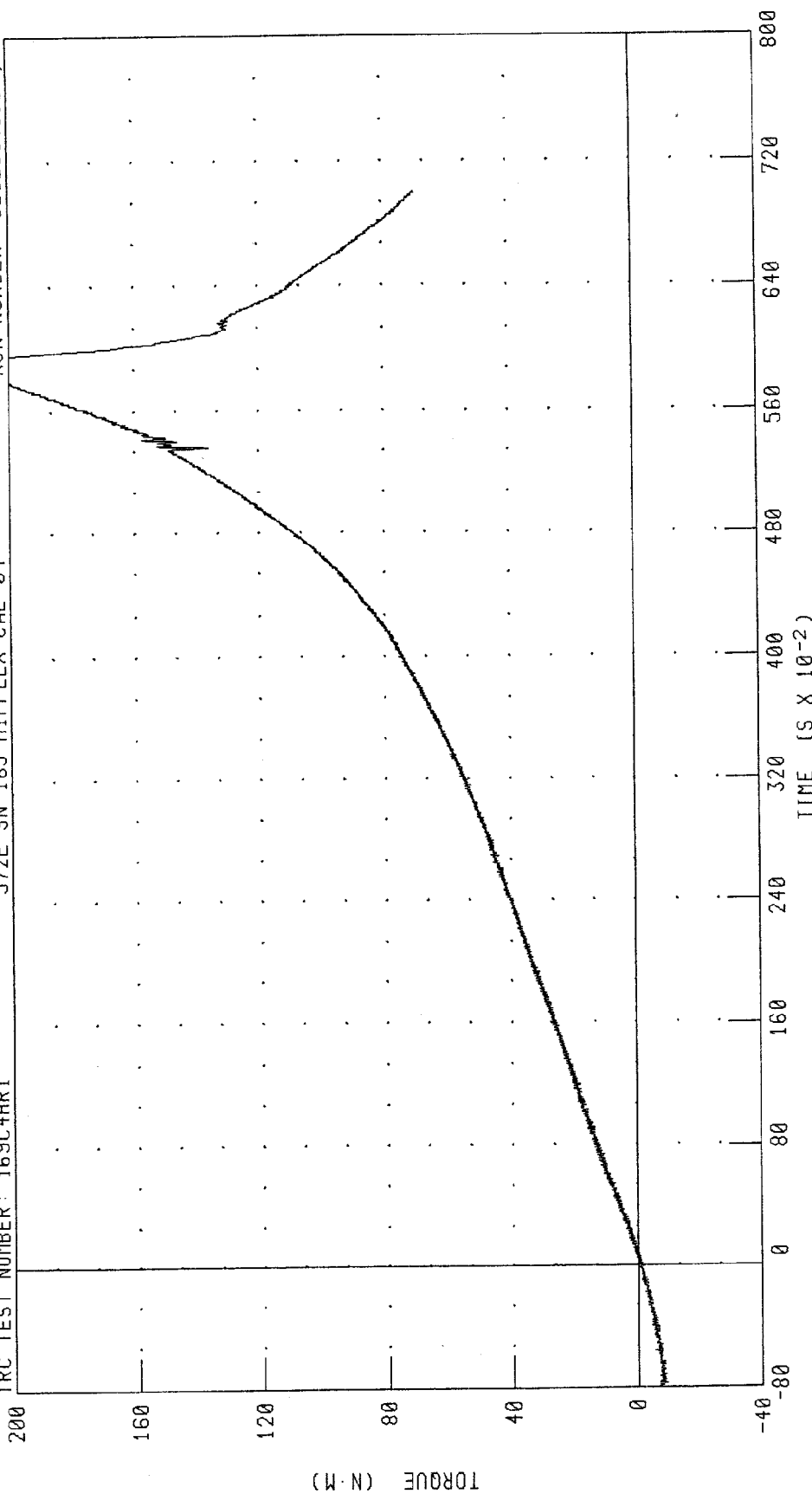
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

572E SN 169 HIPFLEX CAL 04

TRC TEST NUMBER: 169C4HR1

RUN NUMBER: 021299.1057,1



PEAK DATA: 216.16 N·M @ 5.91 S; -11.13 N·M @ -1.00 S

CHANNEL: RHPYH FILTER: CH. CLASS 60

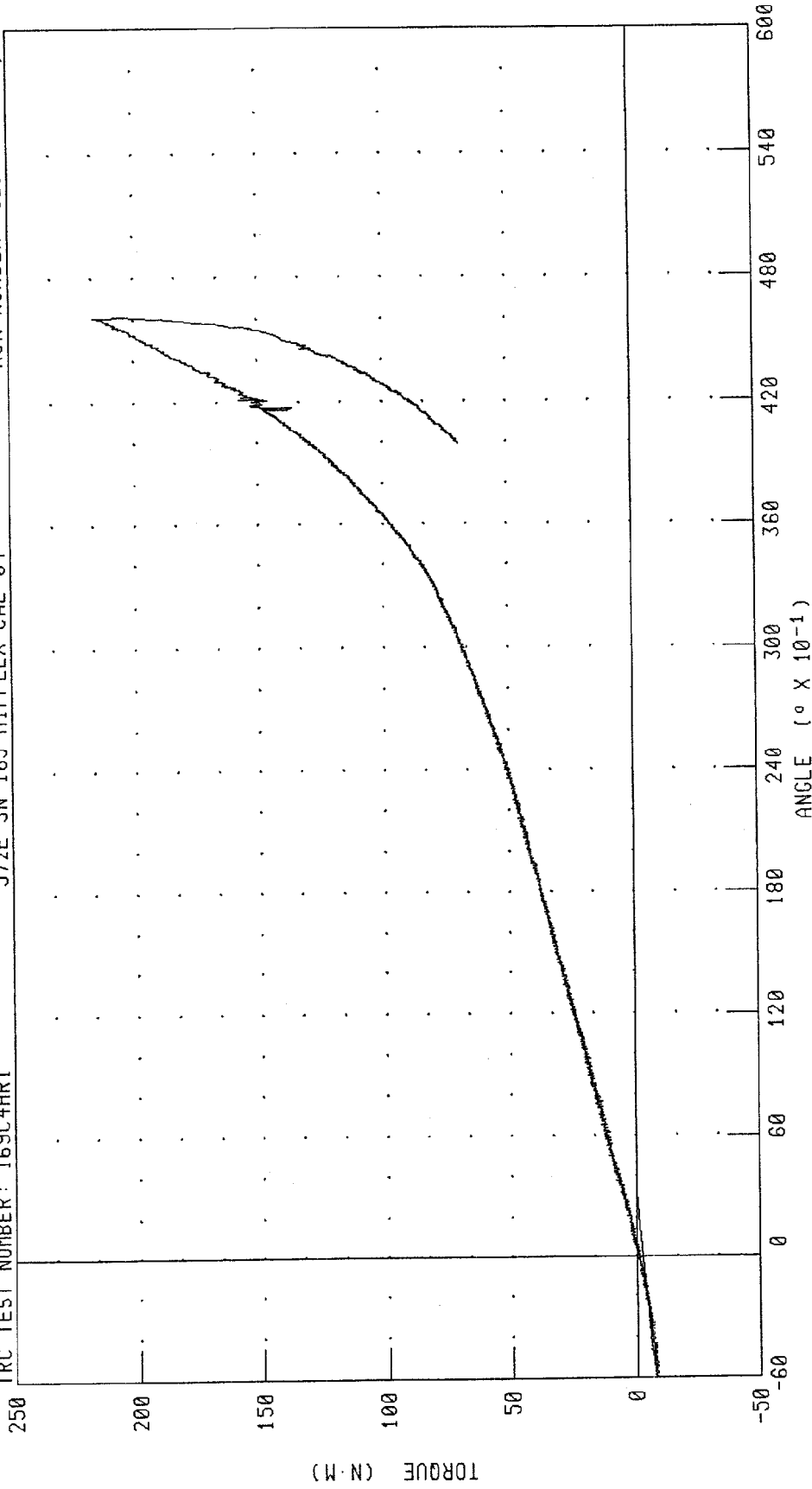
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT VS ROTATION ANGLE

TRC TEST NUMBER: 169C4HR1

572E SN 169 HIPFLEX CAL 04

RUN NUMBER: 021299.1057,1



CHANNEL: RHPXD
RHPYM
FILTER: CH. CLASS 60
CH. CLASS 60
PEAK DATA: 46.18 ° @ 5.95 S; -9.79 ° @ -1.00 S
216.16 N-M @ 5.91 S; -11.13 N-M @ -1.00 S

TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

12-FEB-99

TRC INC.

TEST NO: 169C4HL1

572E SN 169 HIPFLEX CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	65.7 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	44.8 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN B. C. C.

RUN NUMBER: 021299.1048;1

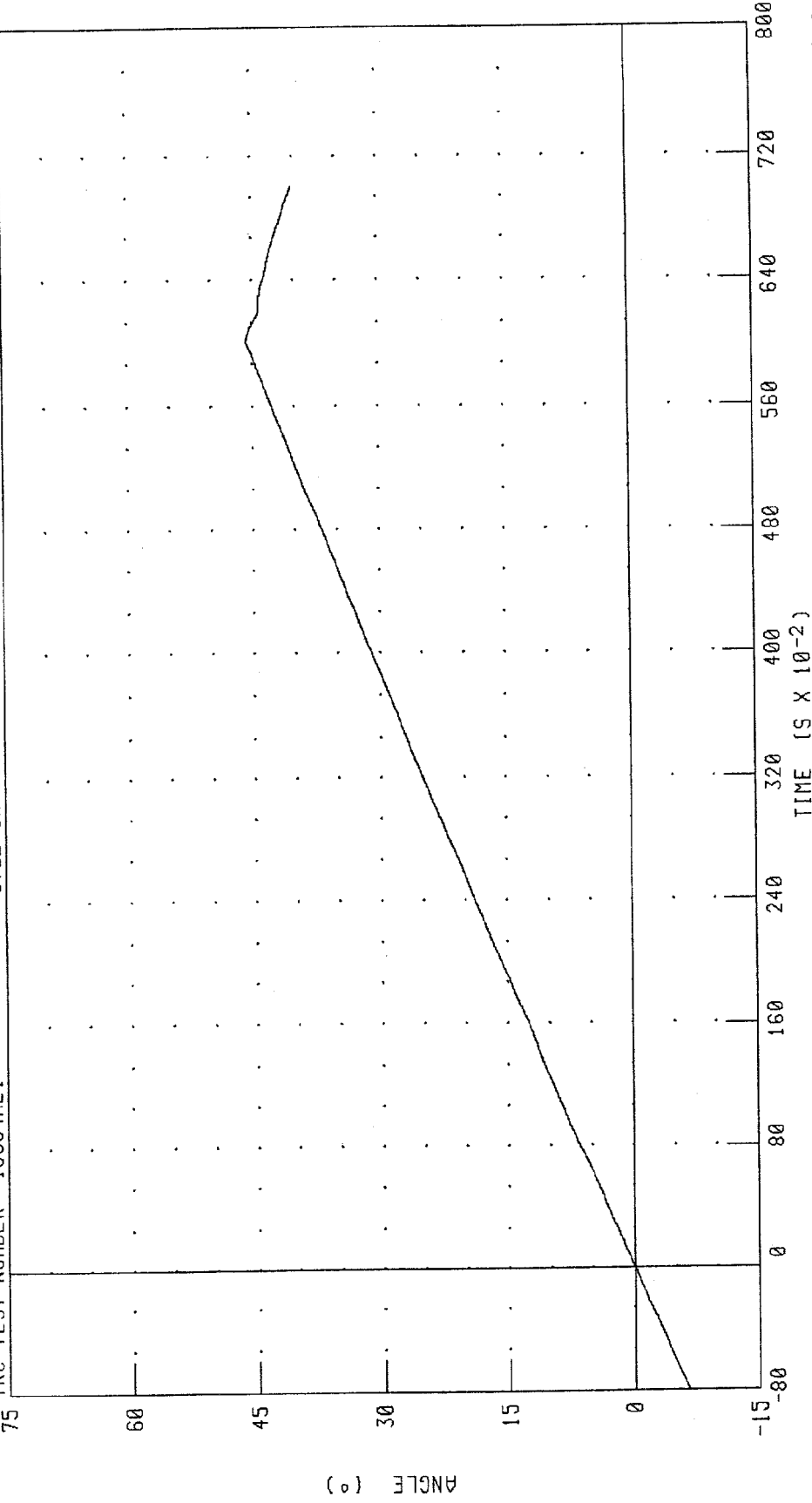
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION ROTATION

572E SN 169 HIPFLEX CAL 04

TRC TEST NUMBER: 169C4HL1

RUN NUMBER: 021299.1049,1



CHANNEL: LHPXD FILTER: CH. CLASS 60

PEAK DATA: 45.71 ° @ 6.01 S; -9.44 ° @ -1.00 S

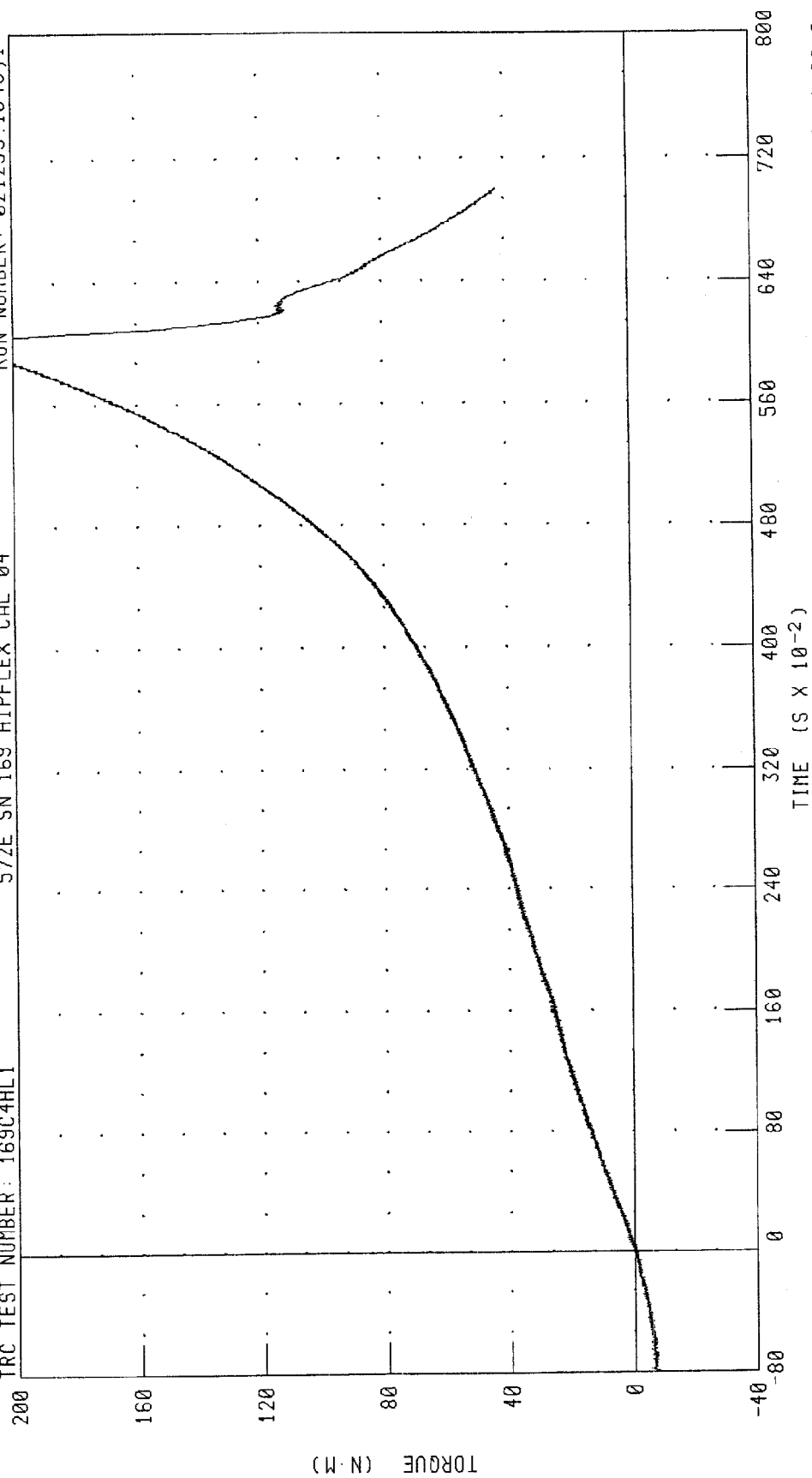
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT

TRC TEST NUMBER: 169C4HL1

572E SN 169 HIPELEX CAL 04

RUN NUMBER: 021299.1049,1



CHANNEL: LHPYM

FILTER: CH CLASS 60

TIME (S X 10⁻²)

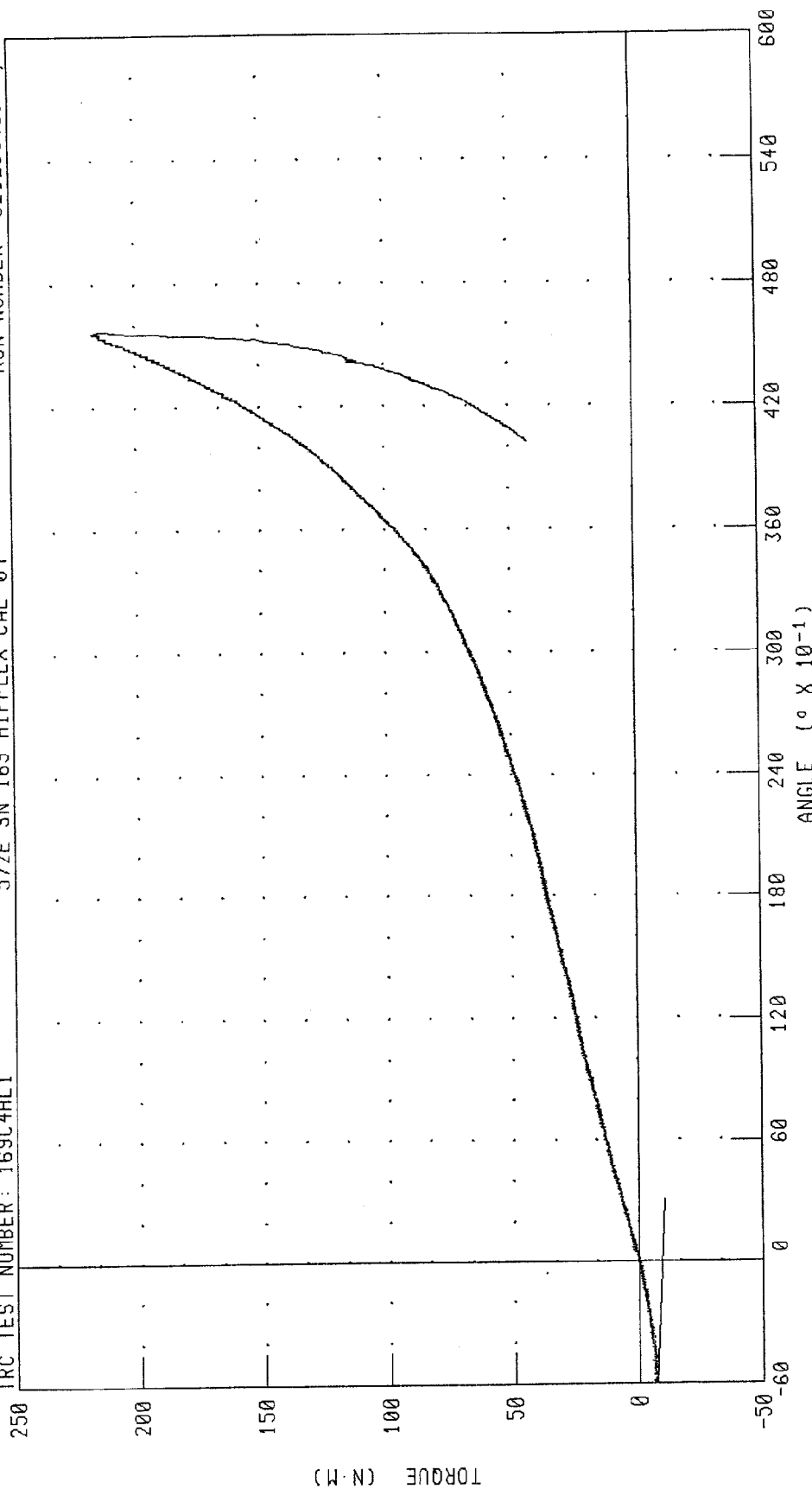
PEAK DATA: 217.58 N.M @ 5.99 S; -10.47 N.M @ -1.00 S

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES LEFT HIP FLEXION MOMENT VS ROTATION ANGLE

TRC TEST NUMBER: 169C4HL1

572E SN 169 HIPFLEX CAL 04

RUN NUMBER: 021299.1049;1



CHANNEL: LHPXD
LHPYM

FILTER: CH: CLASS 60
CH: CLASS 60

ANGLE (° X 10⁻¹)

PEAK DATA: 45.71 ° 0 5.01 S; -9.44 ° 0 -1.00 S
217.58 N·M 0 5.99 S; -10.47 N·M 0 -1.00 S

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

12-FEB-99

TRC INC.

TEST NO: 169C4RK1

572E SN169 RIGHT KNEE CAL 4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5758.5 N

TEST MEETS SPECIFICATIONS

TECHNICIAN By *elt*

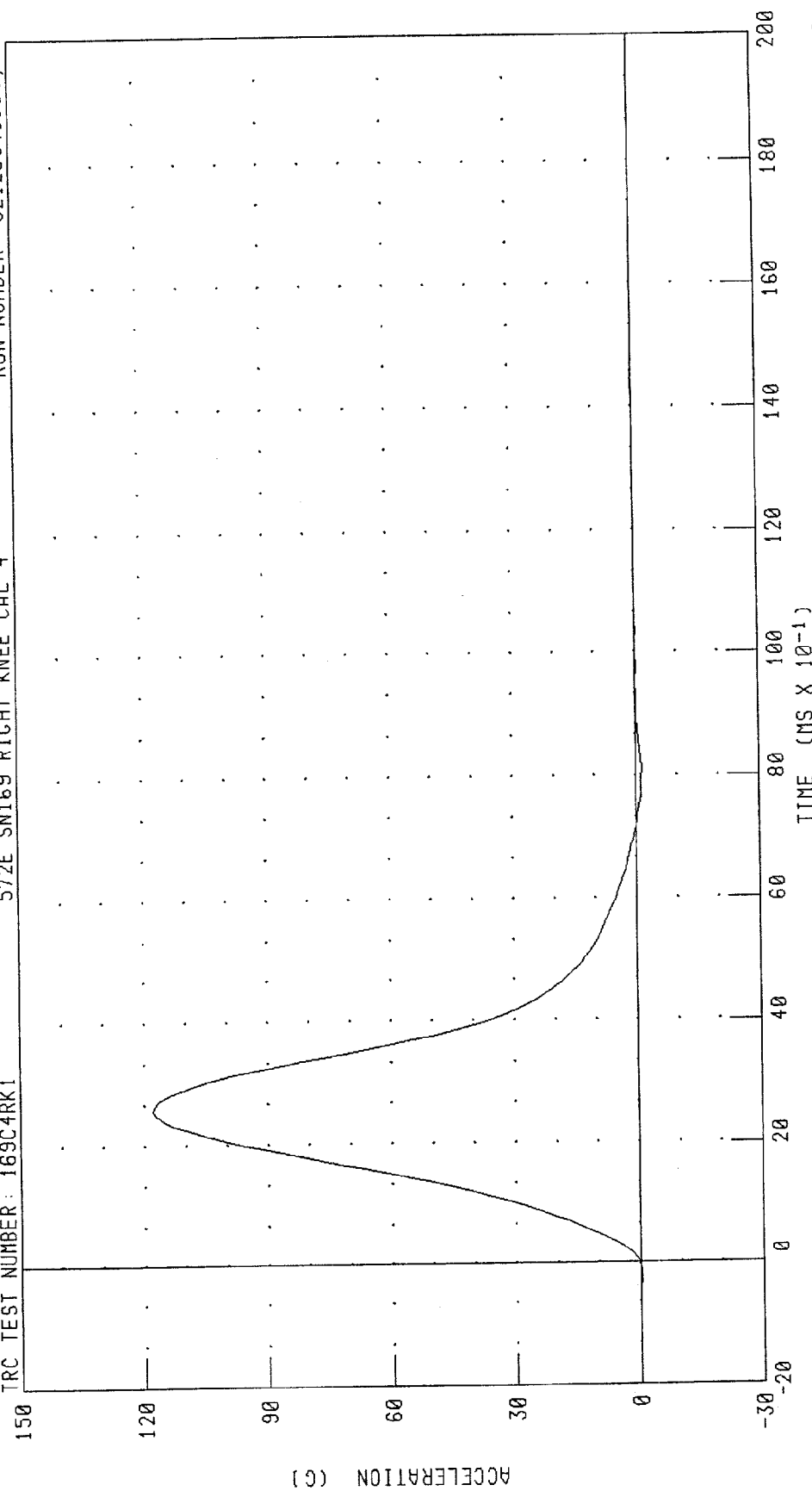
RUN NUMBER: 021299.1009;1

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

RUN NUMBER: 021299.1009.1

TRC TEST NUMBER: 169C4RK1

572E SN169 RIGHT KNEE CAL 4



CHANNEL: PENXC FILTER: CH CLASS 600

PEAK DATA: 117.69 G @ 2.56 MS, -1.52 G @ 8.16 MS

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN169 RIGHT KNEE CAL 4

RUN NUMBER: 021299.1009;1

TRC TEST NUMBER: 169C4RK1

75

60

45

30

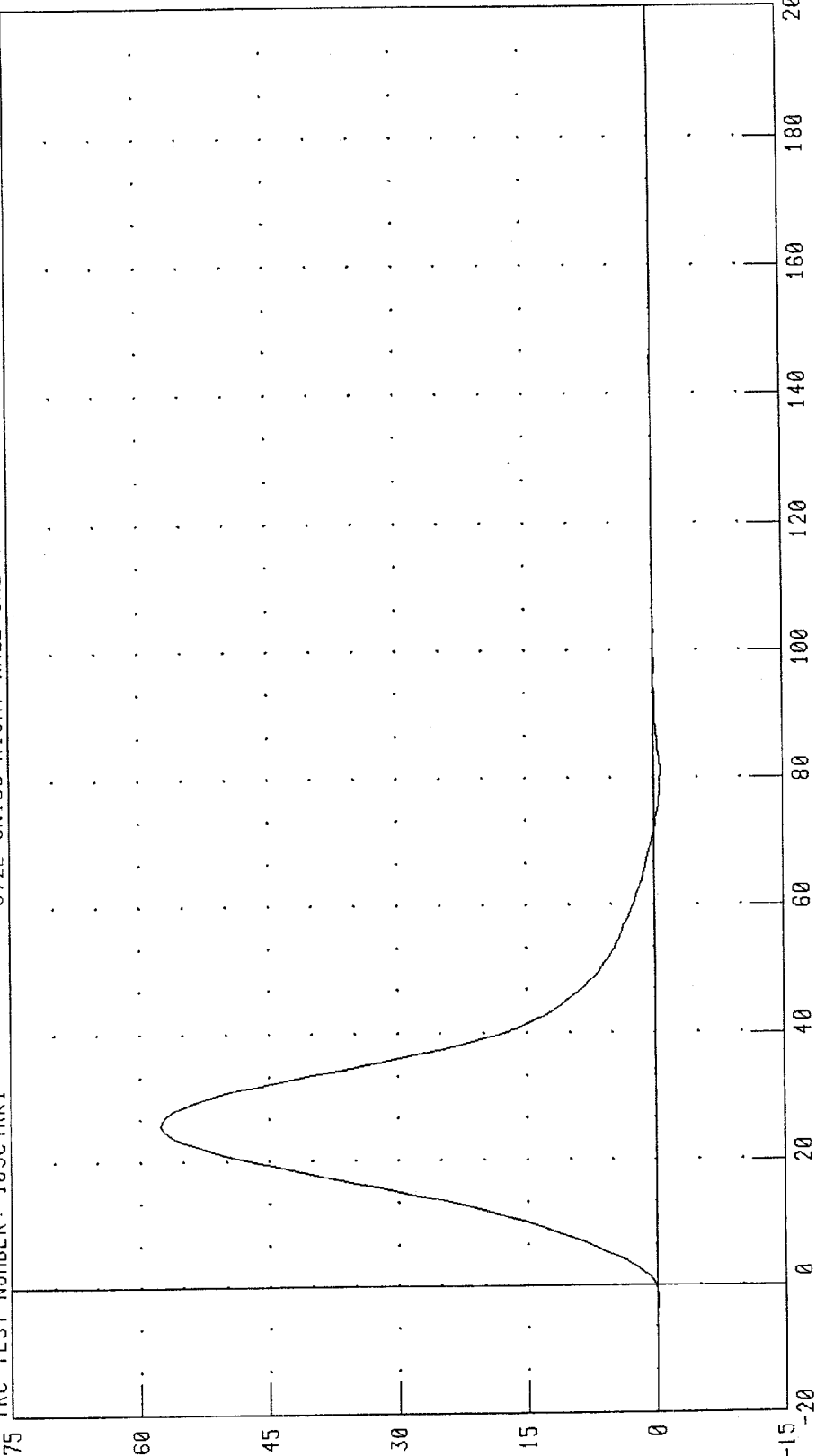
15

0

-15

-20

FORCE (N X 10²)



TIME (MS X 10⁻¹)

CHANNEL: PENXF

FILTER: CH. CLASS 600

PEAK DATA: 5758.52 N @ 2.56 MS; -74.36 N @ 8.16 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

12-FEB-99

TRC INC.

TEST NO: 169C4LK1

572E SN169 LEFT KNEE CAL 4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5704.2 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

B. C. K.

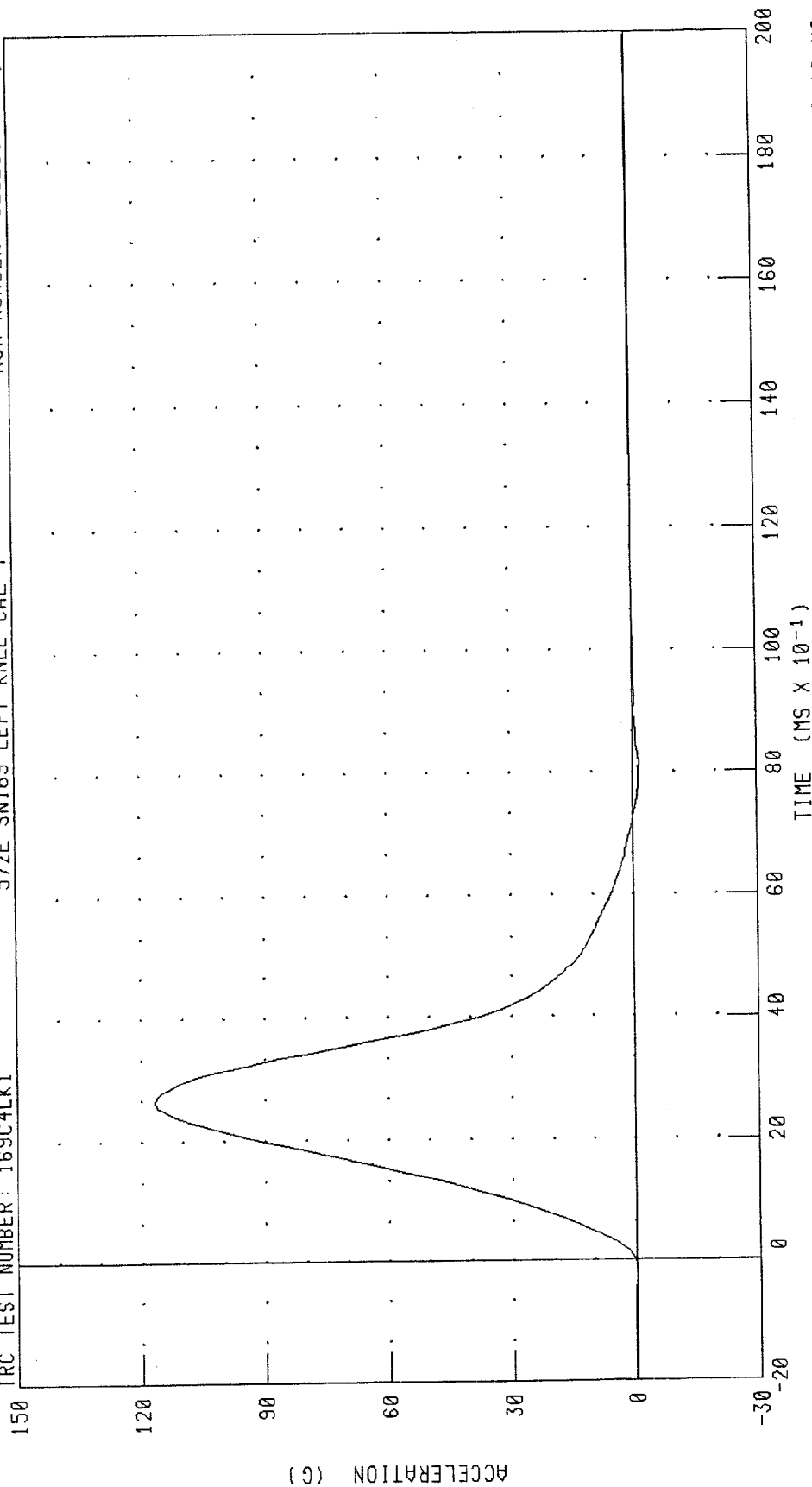
RUN NUMBER: 021299.1003;1

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

TRC TEST NUMBER: 169C4LK1

572E SN169 LEFT KNEE CAL 4

RUN NUMBER: 021299.1004;1



CHANNEL: PENXC

FILTER: CH. CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA: 116.59 G @ 2.64 MS, -1.46 G @ 8.16 MS

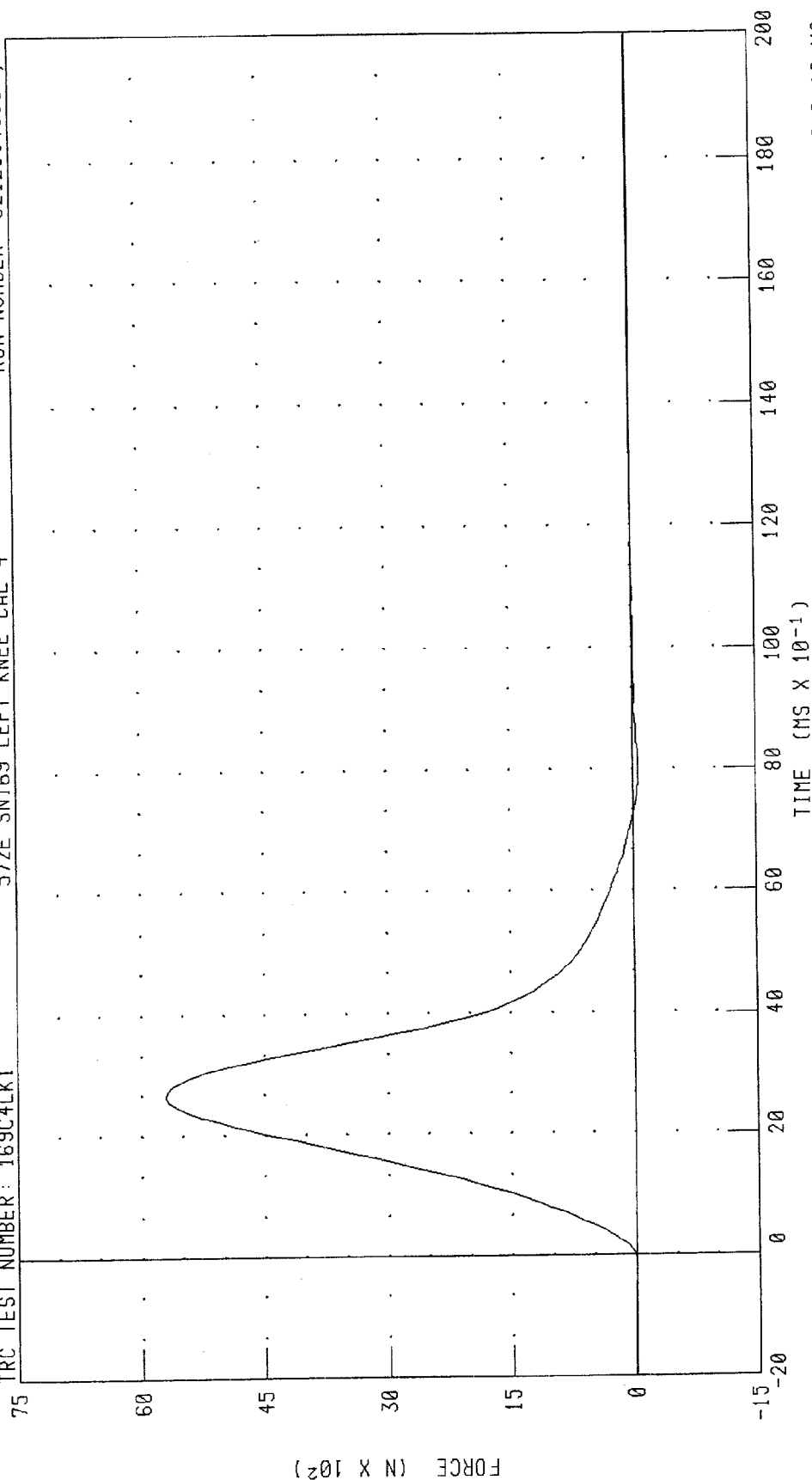
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN169 LEFT KNEE CAL 4

RUN NUMBER: 021299.1004;1

TRC TEST NUMBER: 169C4LK1



PEAK DATA: 5704.30 N @ 2.64 MS; -71.32 N @ 8.16 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Pre-Test Dummy Certification

Passenger Dummy S/N 168

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

05-FEB-99

TRC INC.

TEST NO: 168C6HD1

572E SN168 HEAD DROP CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	260.95 G
PEAK LATERAL ACCELERATION	15 G MAX	4.32 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

By [Signature]

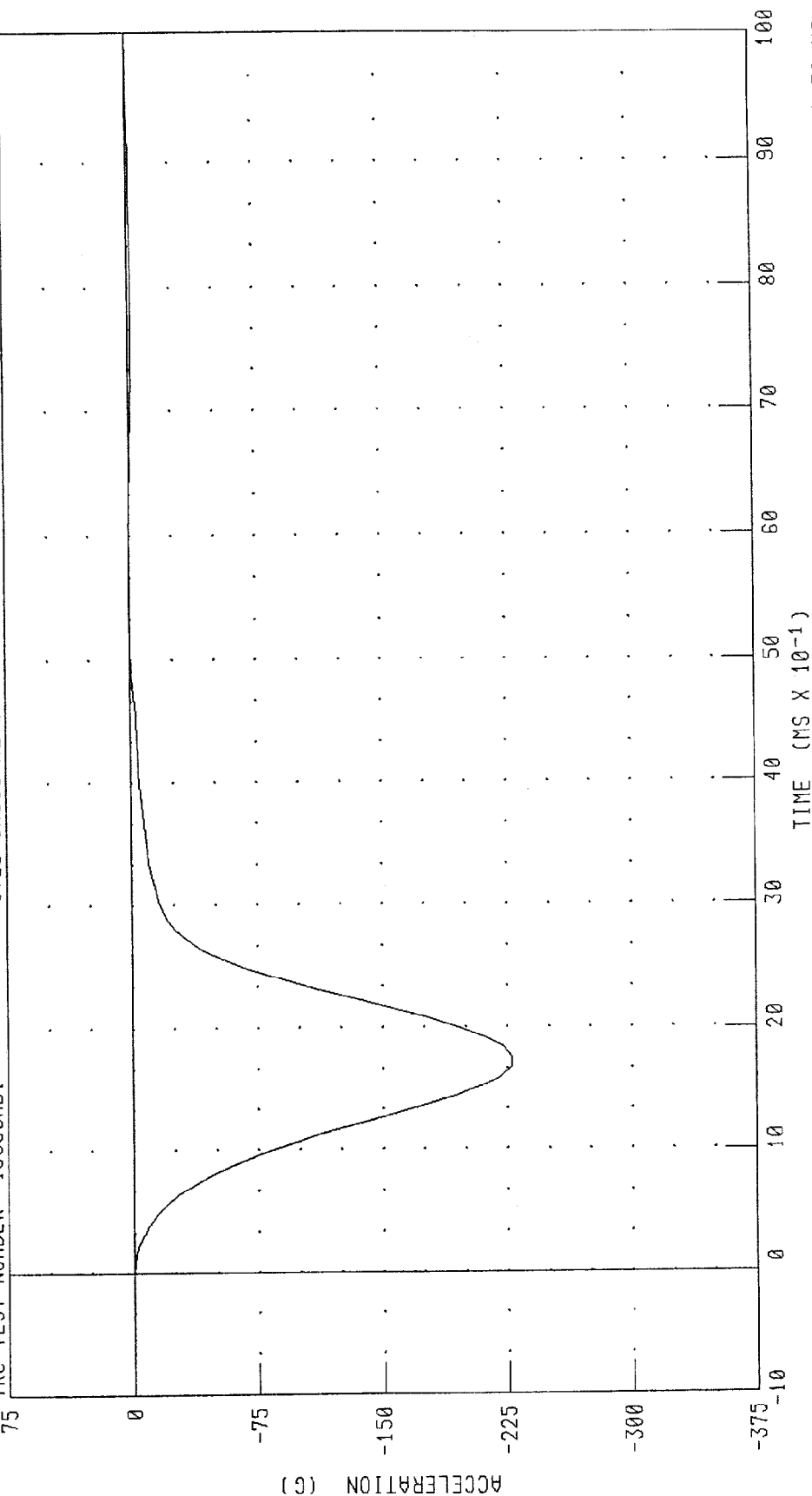
RUN NUMBER: 020599.0805;1

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN168 HEAD DROP CAL 06 RUN NUMBER: 020599.0805;1

TRC TEST NUMBER: 168C6HD1



CHANNEL: HEDXC FILTER: CH. CLASS 1000

PEAK DATA: 0.79 G @ 5.60 MS; -228.07 G @ 1.76 MS

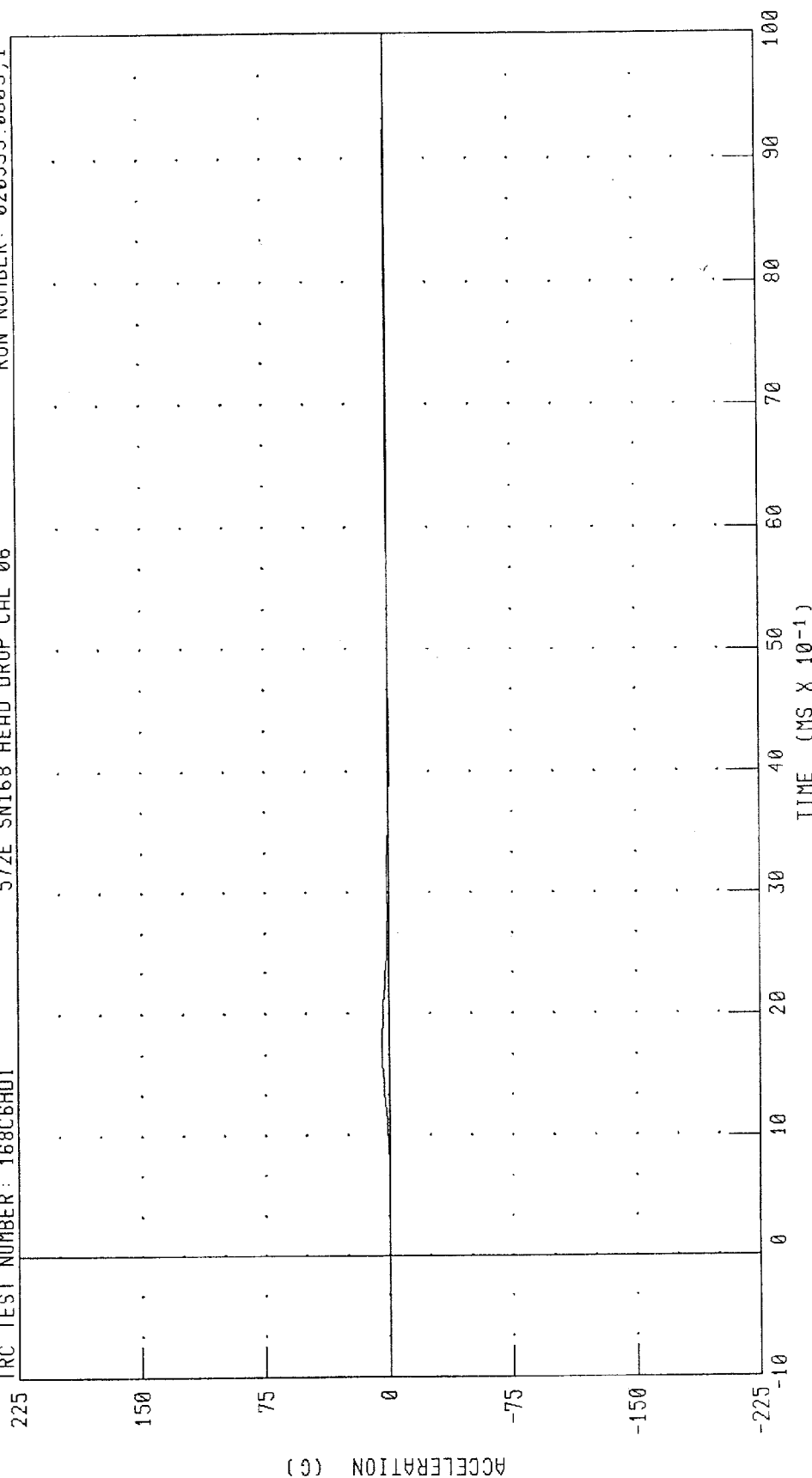
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 168C6HD1

572E SN168 HEAD DROP CAL 06

RUN NUMBER: 020599.0805;1



PEAK DATA: 4.33 G @ 1.68 MS; -0.78 G @ 4.00 MS

CHANNEL: HEDYC FILTER: CH. CLASS 1000

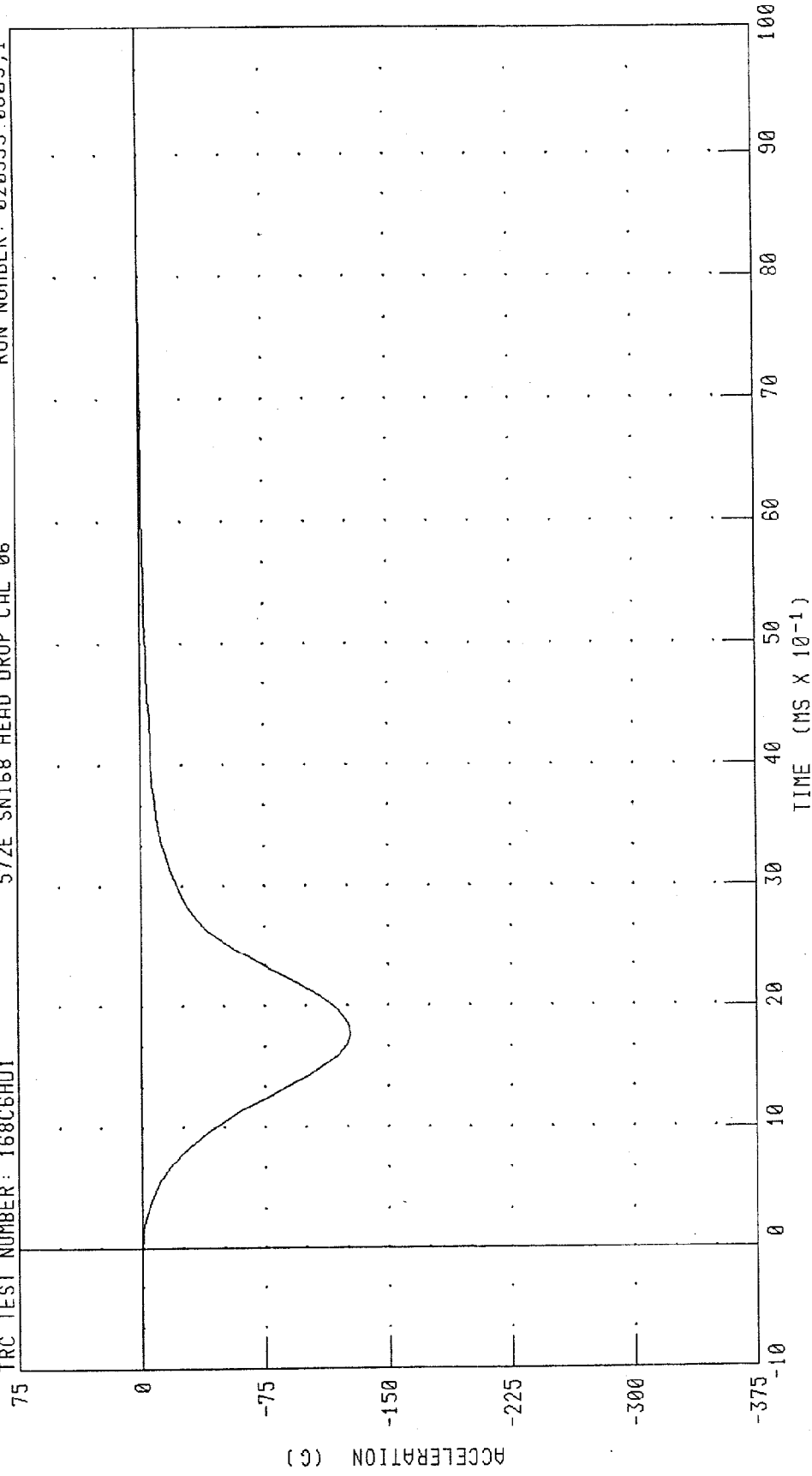
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 168C6HD1

572E SN168 HEAD DROP CAL 06

RUN NUMBER: 020599.0805,1



CHANNEL: HEDZG FILTER: CH CLASS 1000

PEAK DATA: 0.20 G @ 10.00 MS; -126.75 G @ 1.76 MS

PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN168 HEAD DROP CAL 06

RUN NUMBER: 020599.0805;1

TRC TEST NUMBER: 168C6HD1

375

300

ACCELERATION (G)

225

150

75

0

-75

-10

0

10

20

30

40

50

60

70

80

90

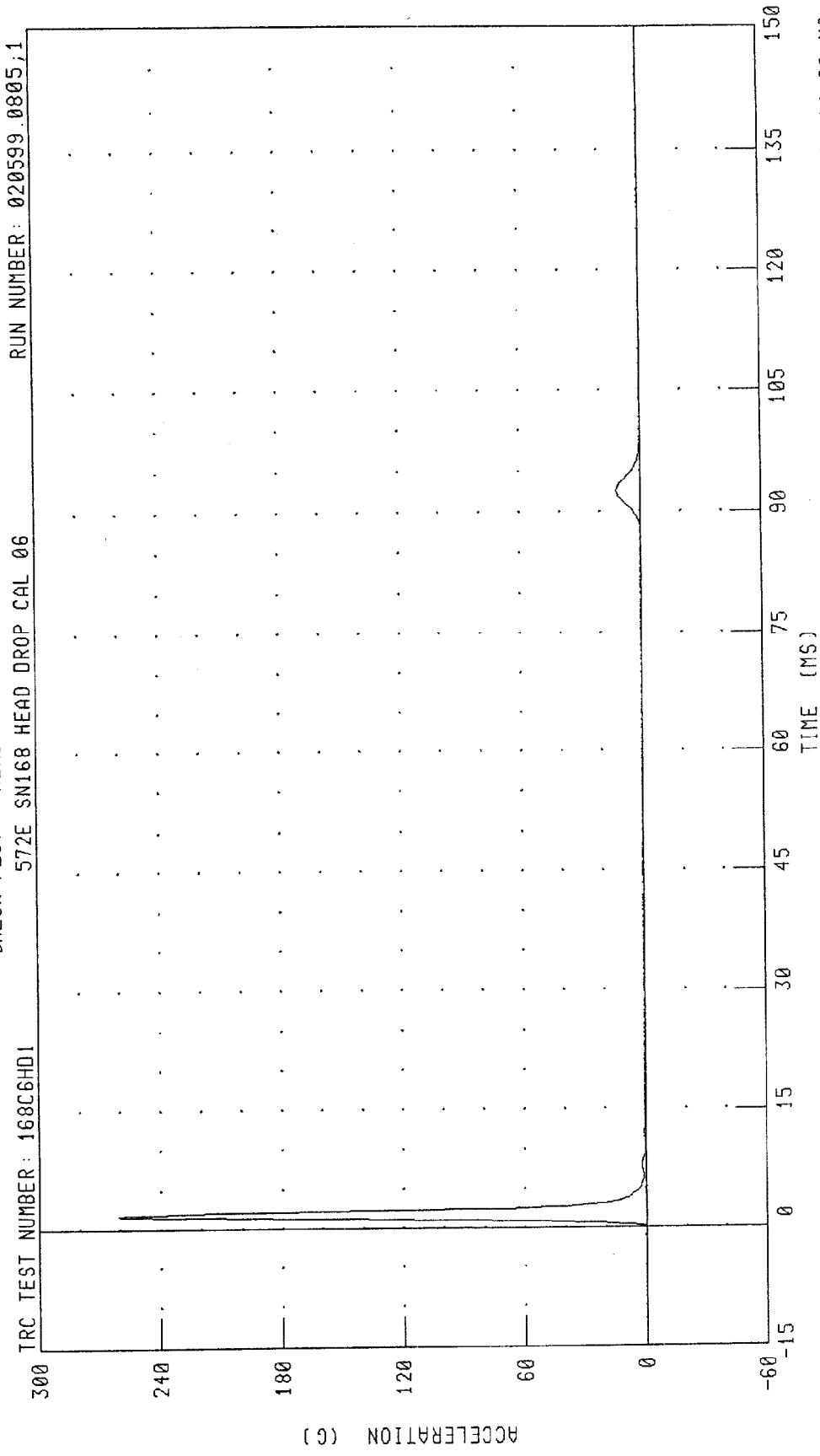
100

TIME (MS X 10⁻¹)

PEAK DATA: 260.95 G @ 1.76 MS; 0.01 G @ -0.96 MS

CHANNEL: HEDRC FILTER: CH. CLASS 1000

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



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

12-FEB-99

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C6NF2 572E SN168 NECK FLEXION CAL06

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.66 G
	20 MS	17.60 - 22.60 G	21.42 G
	30 MS	12.50 - 18.50 G	16.49 G
MAX PENDULUM G		29 G MAX	24.44 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.45 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.16 MS
D PLANE	MAX	64 - 78 DEG.	68.16 DEG.
ROTATION	TIME	57 - 64 MS	60.00 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	96.91 NM
	TIME	47 - 58 MS	50.56 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	114.48 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.24 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Ryalt

RUN NUMBER: 021299.1302;1

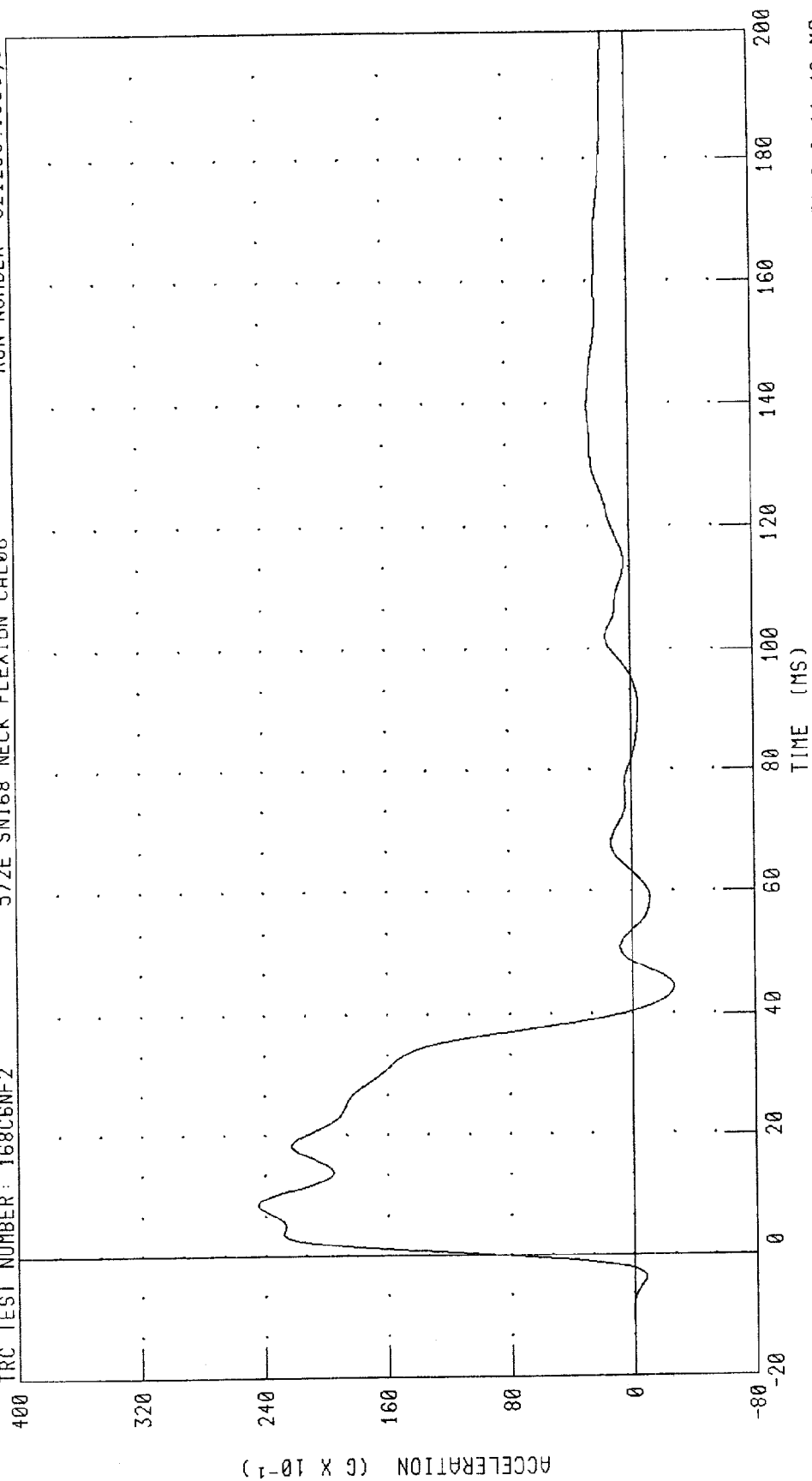
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C6NF2

572E SN168 NECK FLEXION CAL06

RUN NUMBER: 021299.1309;1



CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 24.45 G @ 8.72 MS; -2.71 G @ 44.40 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN168 NECK FLEXION CAL06

TRC TEST NUMBER: 168C6NF2

120

90

60

30

0

-30

-60

-90

-120

ANGLE (°)

0

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

TIME (MS)

0

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

CHANNEL: BETA

FILTER: CH. CLASS 60

PEAK DATA: 33.64 ° @ 59.92 MS, -21.65 ° @ 170.96 MS

RUN NUMBER: 021299 1309,1

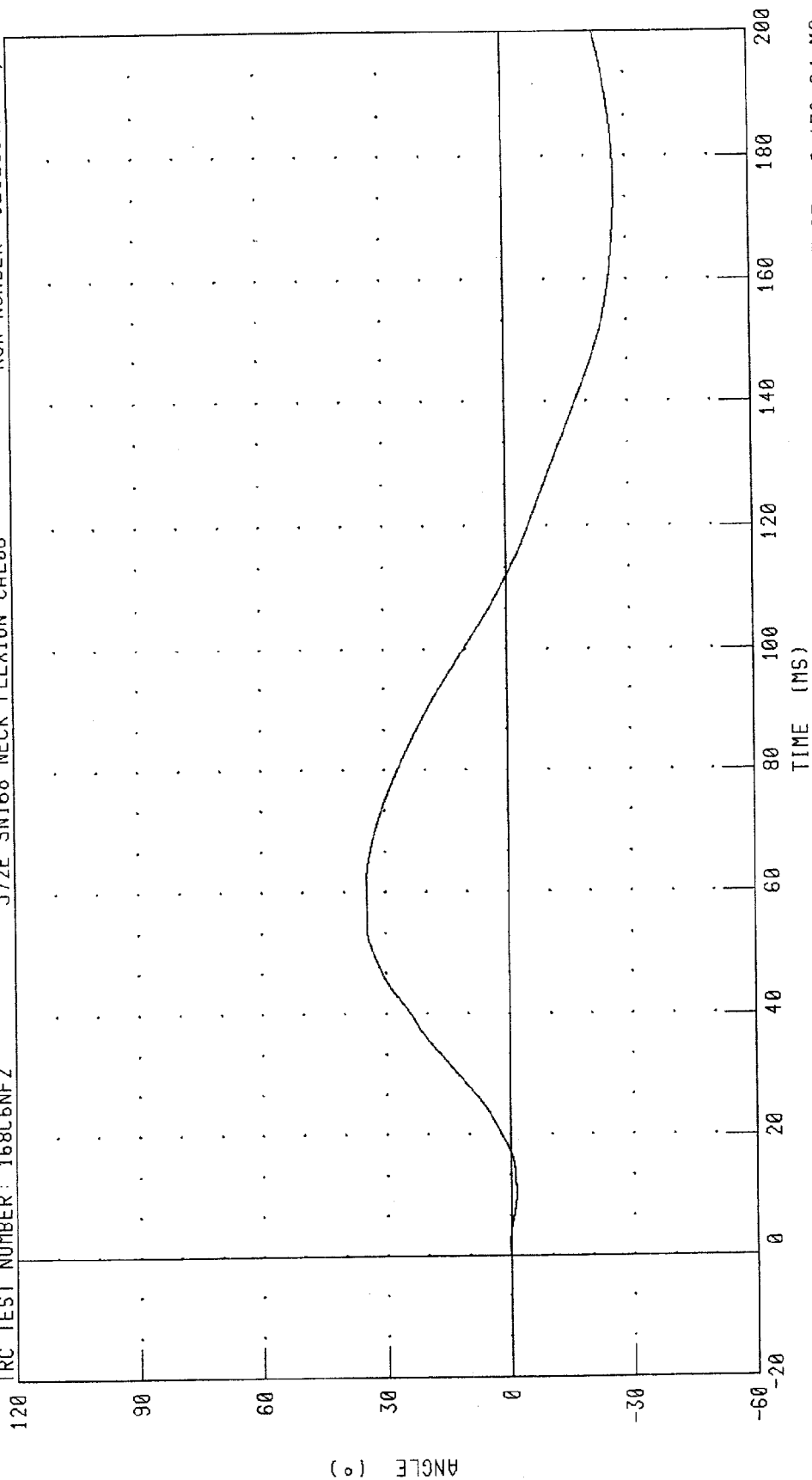
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER: 168C6NF2

572E SN168 NECK FLEXION CAL06

RUN NUMBER: 021299.1309;1



PEAK DATA: 34.57 ° @ 55.12 MS; -27.27 ° @ 176.24 MS

CHANNEL: THETA FILTER: CH. CLASS 60

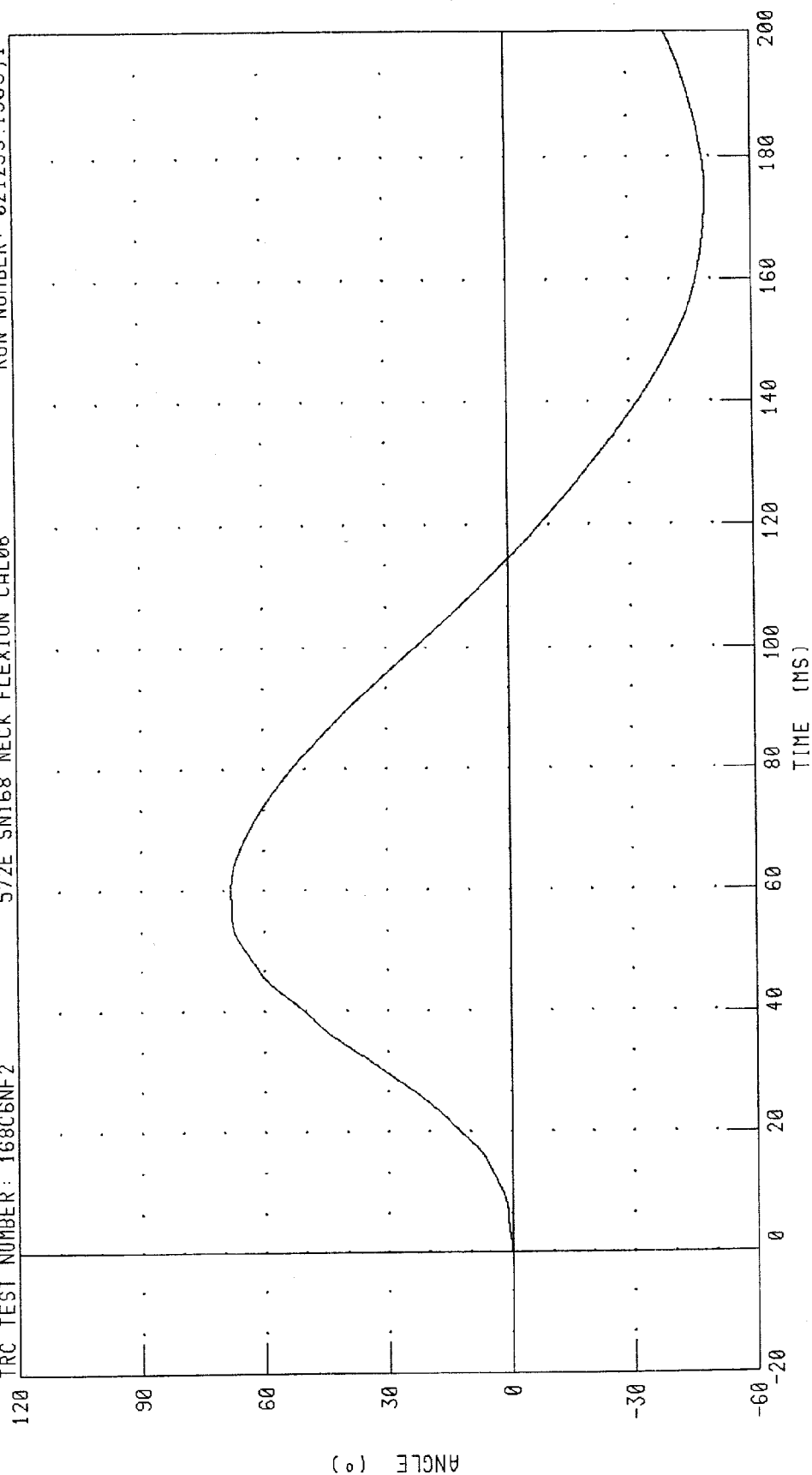
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 168C6NF2

572E SN168 NECK FLEXION CAL06

RUN NUMBER: 021299.1309,1



PEAK DATA: 68.16 ° @ 60.00 MS, -48.84 ° @ 174.40 MS

CHANNEL: TOTAL FILTER: CH. CLASS 60

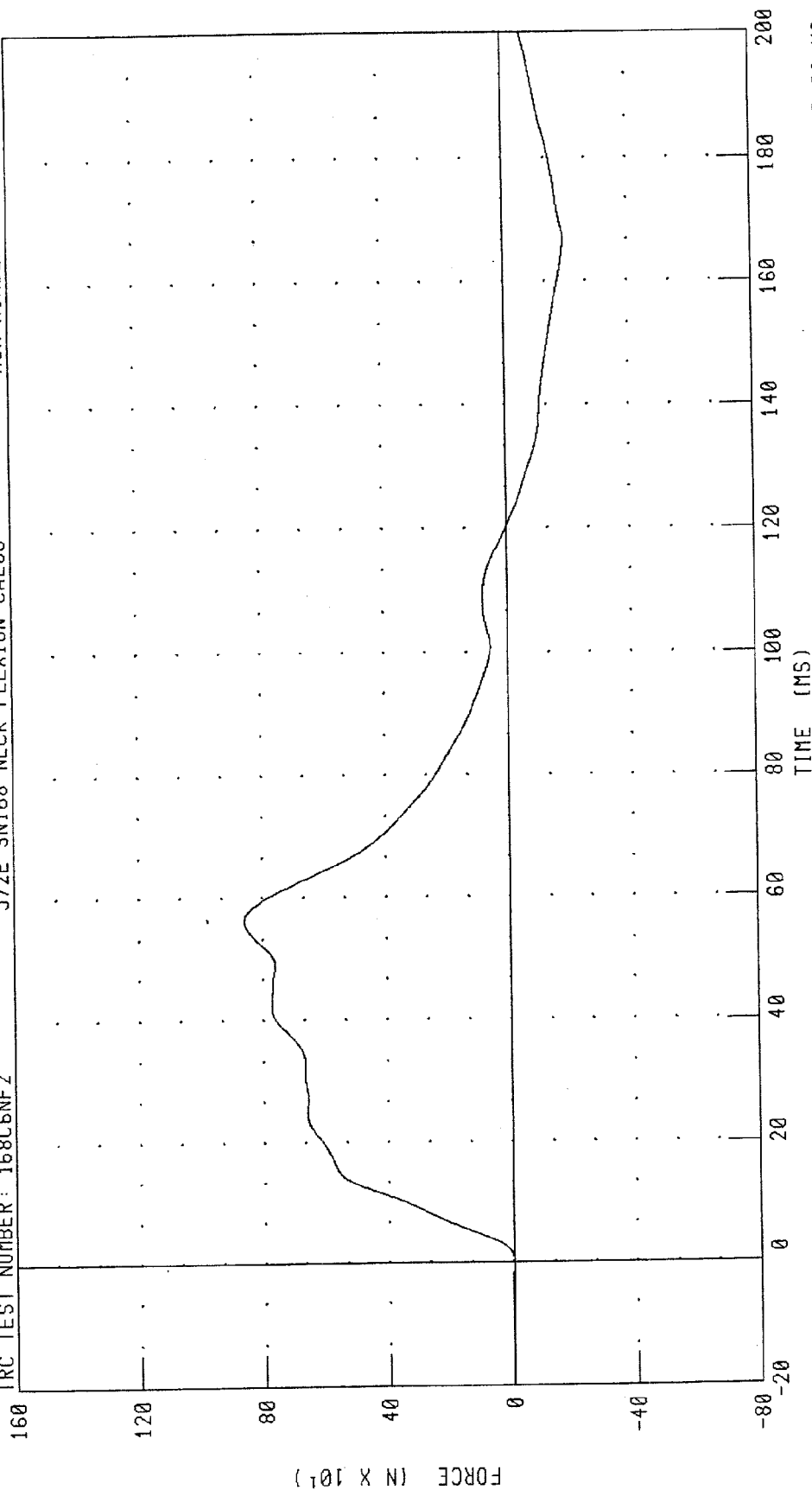
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 021299.1309;1

572E SN168 NECK FLEXION CAL06

TRC TEST NUMBER: 168C6NF2



PEAK DATA: 857.74 N @ 56.32 MS, -194.14 N @ 166.96 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

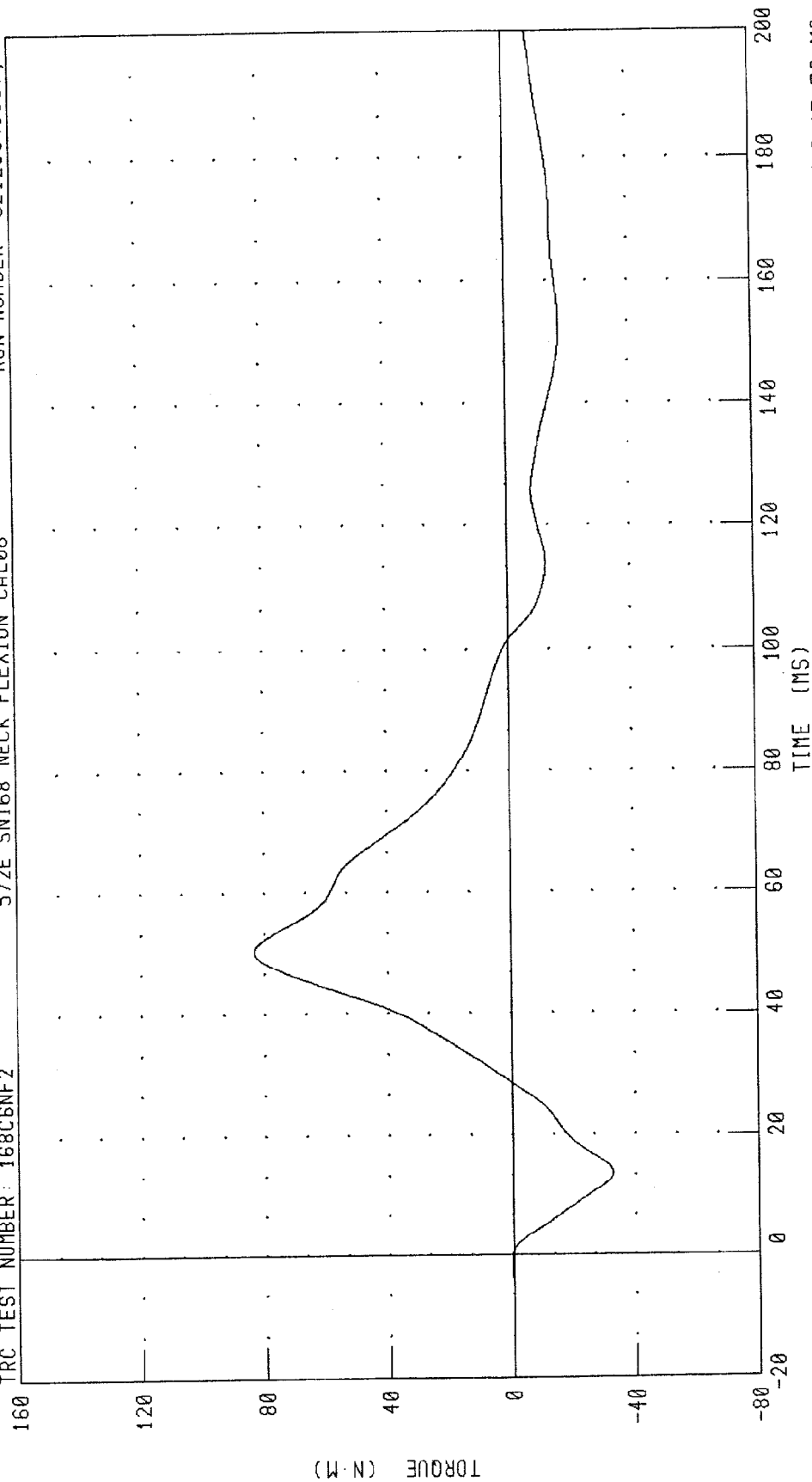
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 021299.1309;1

TRC TEST NUMBER: 168C6NF2

572E SN168 NECK FLEXION CAL06



PEAK DATA: 83.25 N·M @ 50.48 MS, -32.47 N·M @ 13.76 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

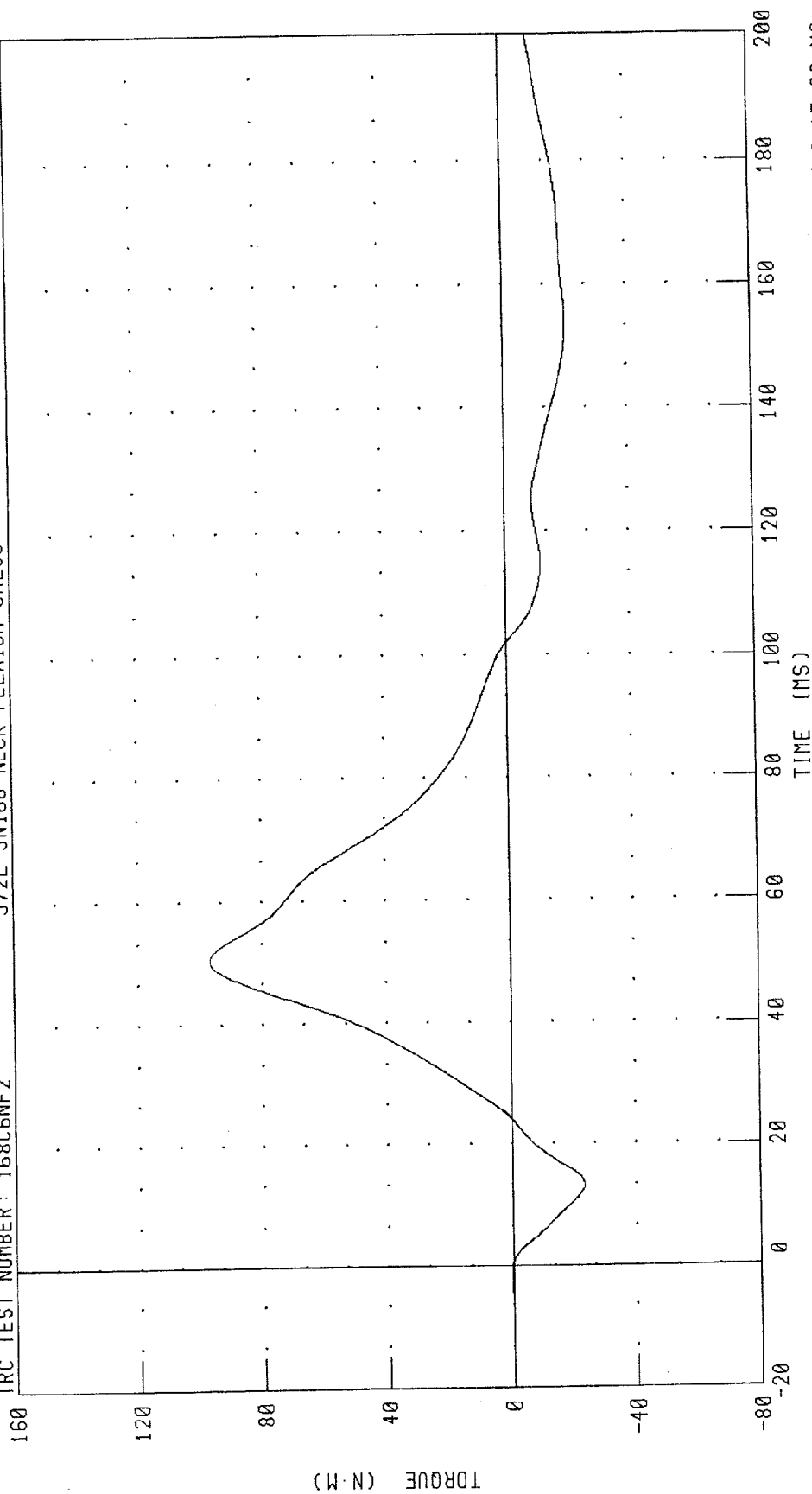
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

RUN NUMBER: 021299.1309;1

TRC TEST NUMBER: 168C6NF2

572E SN168 NECK FLEXION CAL06



PEAK DATA: 96.91 N-M @ 50.56 MS; -23.21 N-M @ 13.28 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

12-FEB-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C6NE1 572E SN168 NECK EXT CAL06

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.38 G
	20 MS	14.00 - 19.00 G	17.77 G
	30 MS	11.00 - 16.00 G	14.06 G
MAX PENDULUM G		22 G MAX	18.92 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.03 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	41.28 MS
D PLANE	MAX	81 - 106 DEG.	94.83 DEG.
ROTATION	TIME	72 - 82 MS	76.72 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-64.42 NM
	TIME	65 - 79 MS	71.12 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	155.92 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	143.20 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

B. J. Carlt

RUN NUMBER: 021299.1336;1

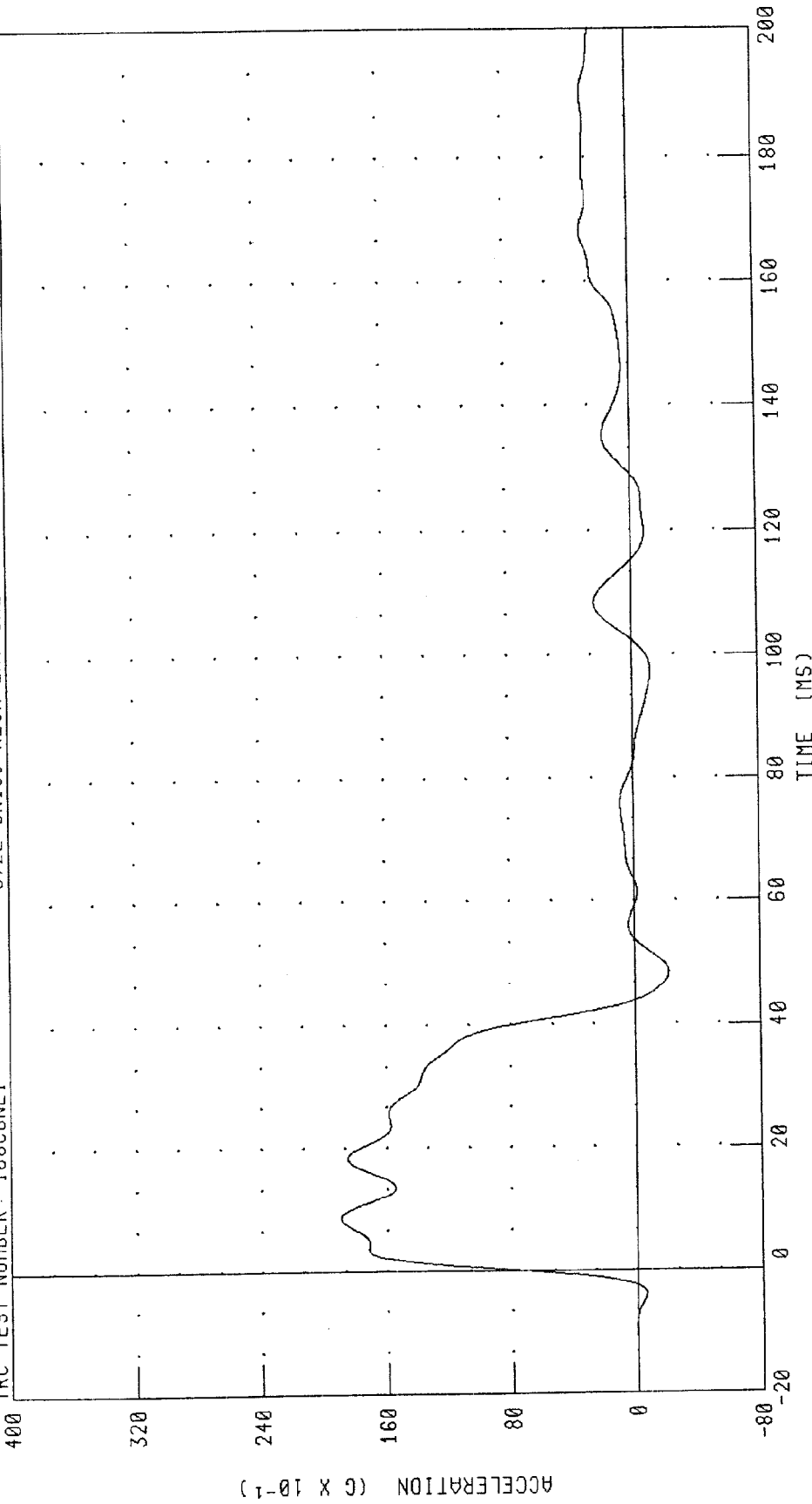
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C6NE1

572E SN168 NECK EXT CAL06

RUN NUMBER: 021299.1336.1



PEAK DATA: 18.93 G @ 8.72 MS; -2.22 G @ 48.48 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

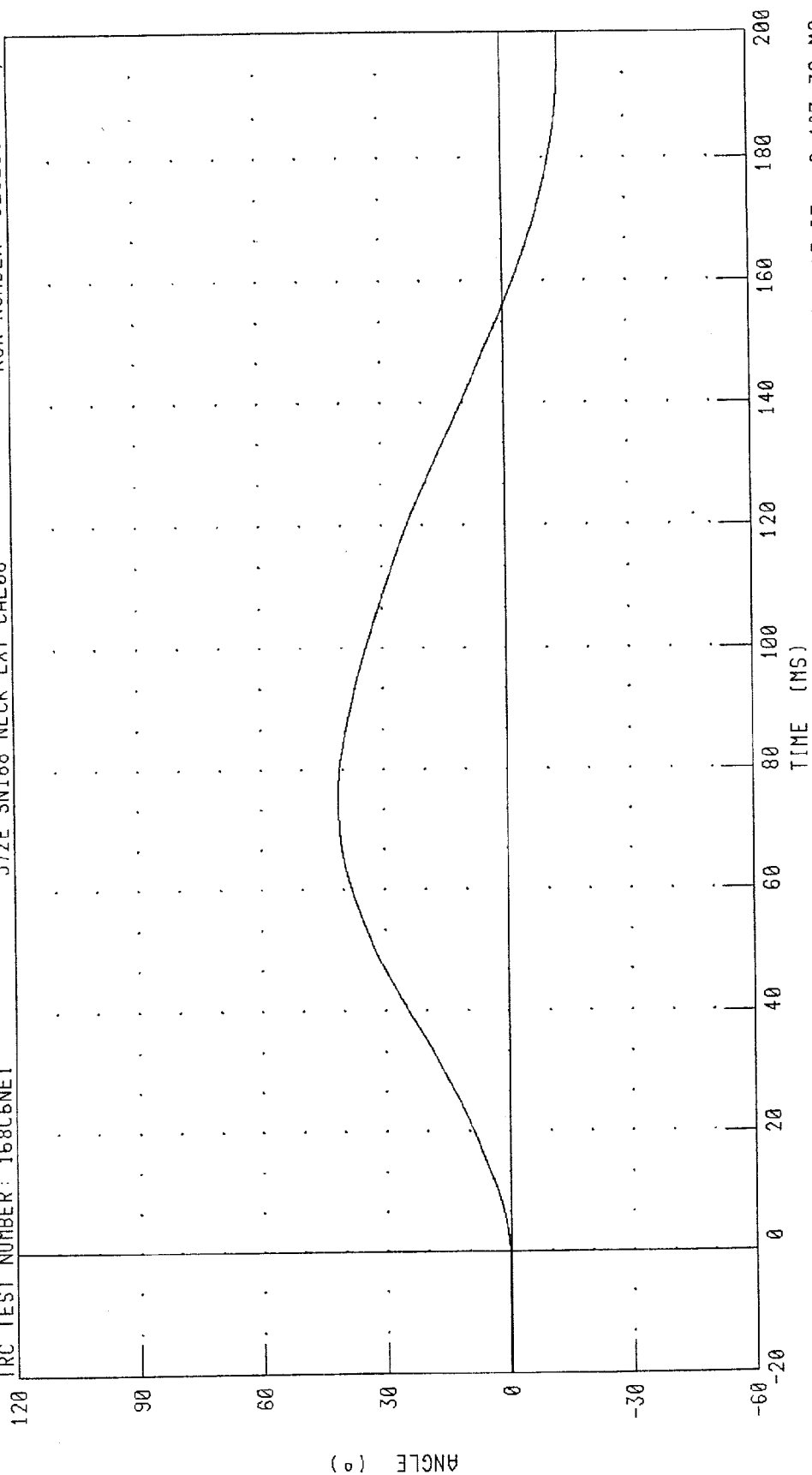
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

RUN NUMBER: 021299.1336;1

572E SN168 NECK EXT CAL06

TRC TEST NUMBER: 168C6NE1



PEAK DATA: 41.08 ° @ 75.04 MS; -13.97 ° @ 197.36 MS

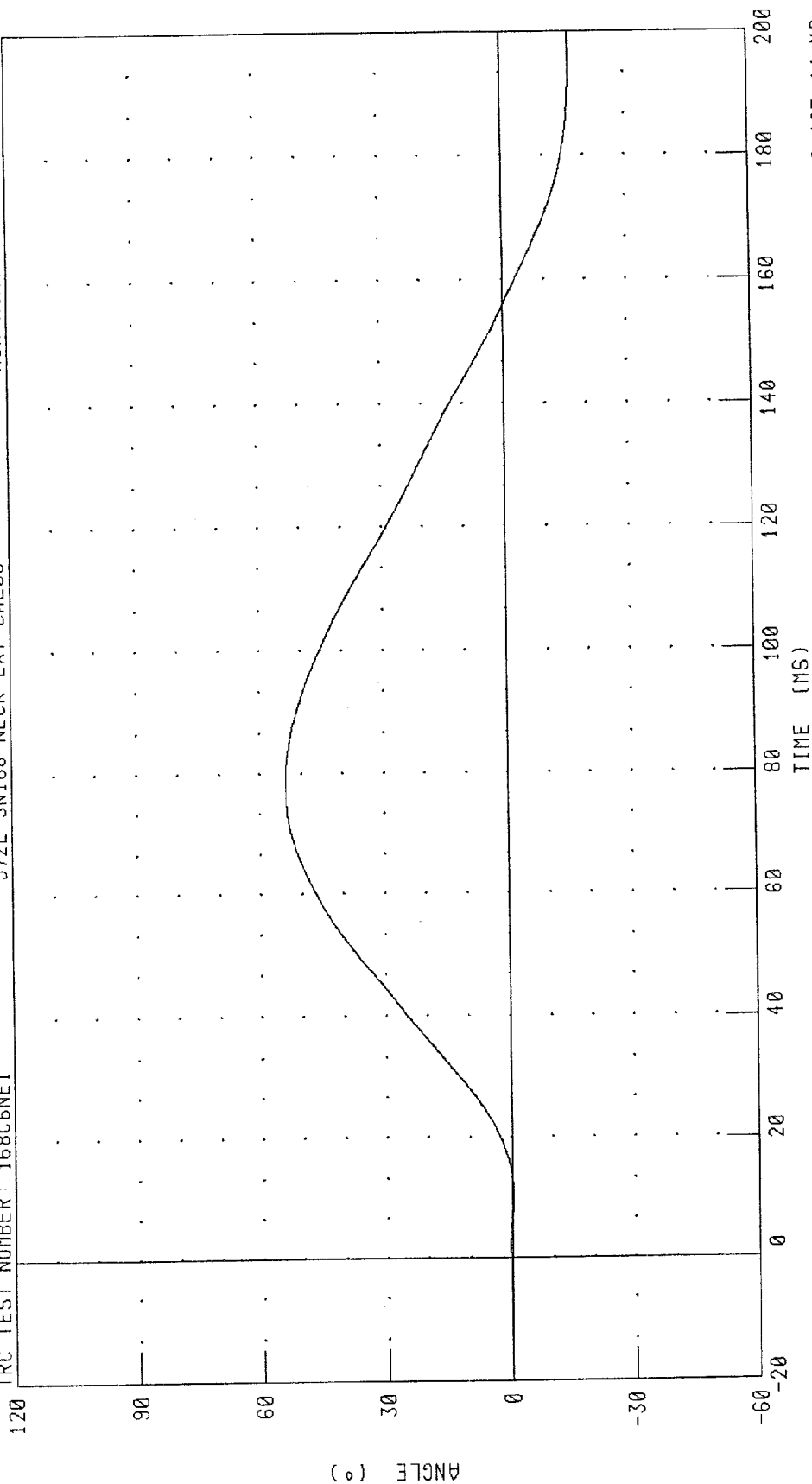
CHANNEL: BETA FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C6NE1

572E SN168 NECK EXT CAL06

RUN NUMBER: 021299.1336;1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 53.84 ° @ 78.40 MS; -16.61 ° @ 195.44 MS

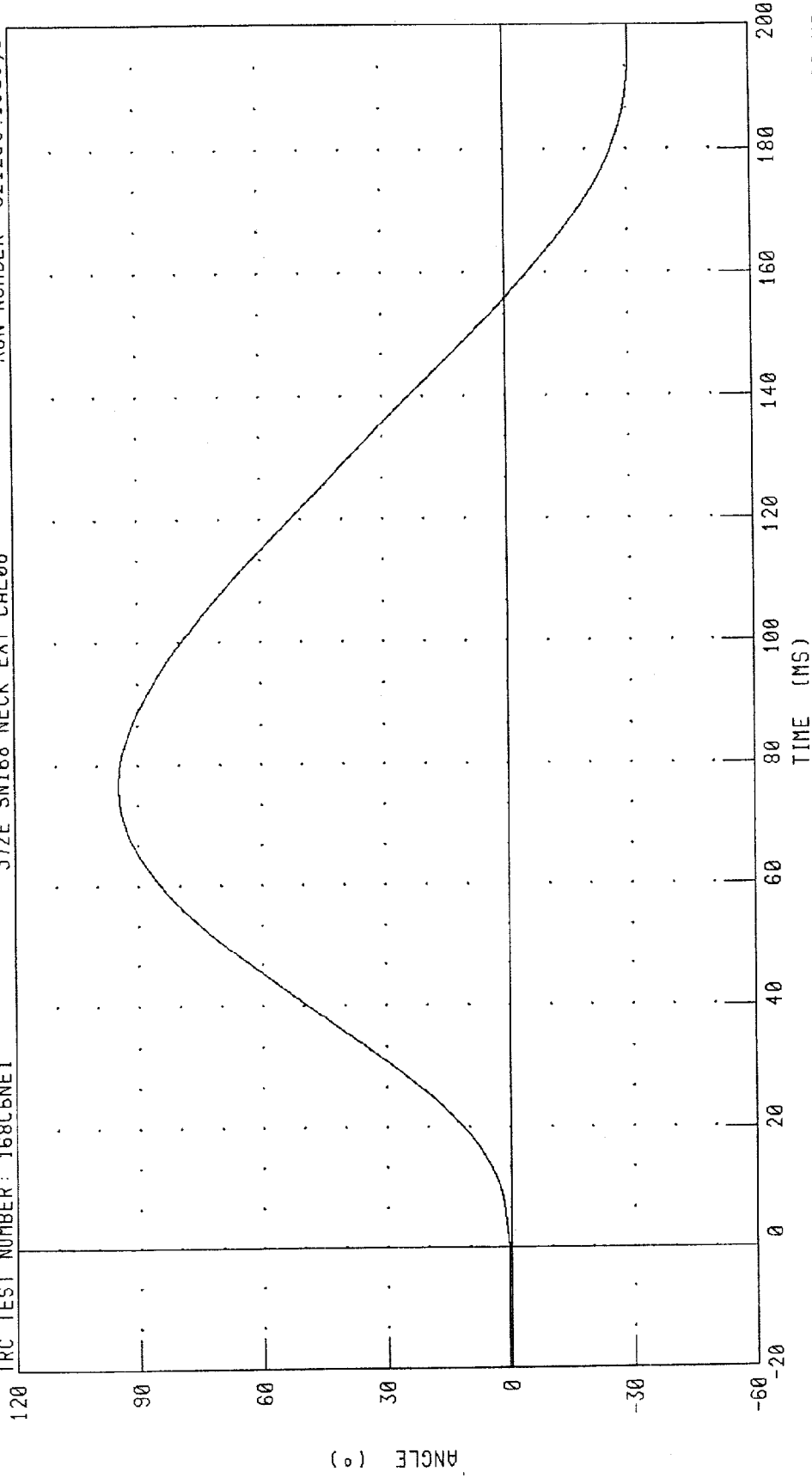
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 168C6NE1

572E SN168 NECK EXT CAL06

RUN NUMBER: 021299.1336;1



PEAK DATA: 94.84 ° @ 76.72 MS; -30.57 ° @ 196.08 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

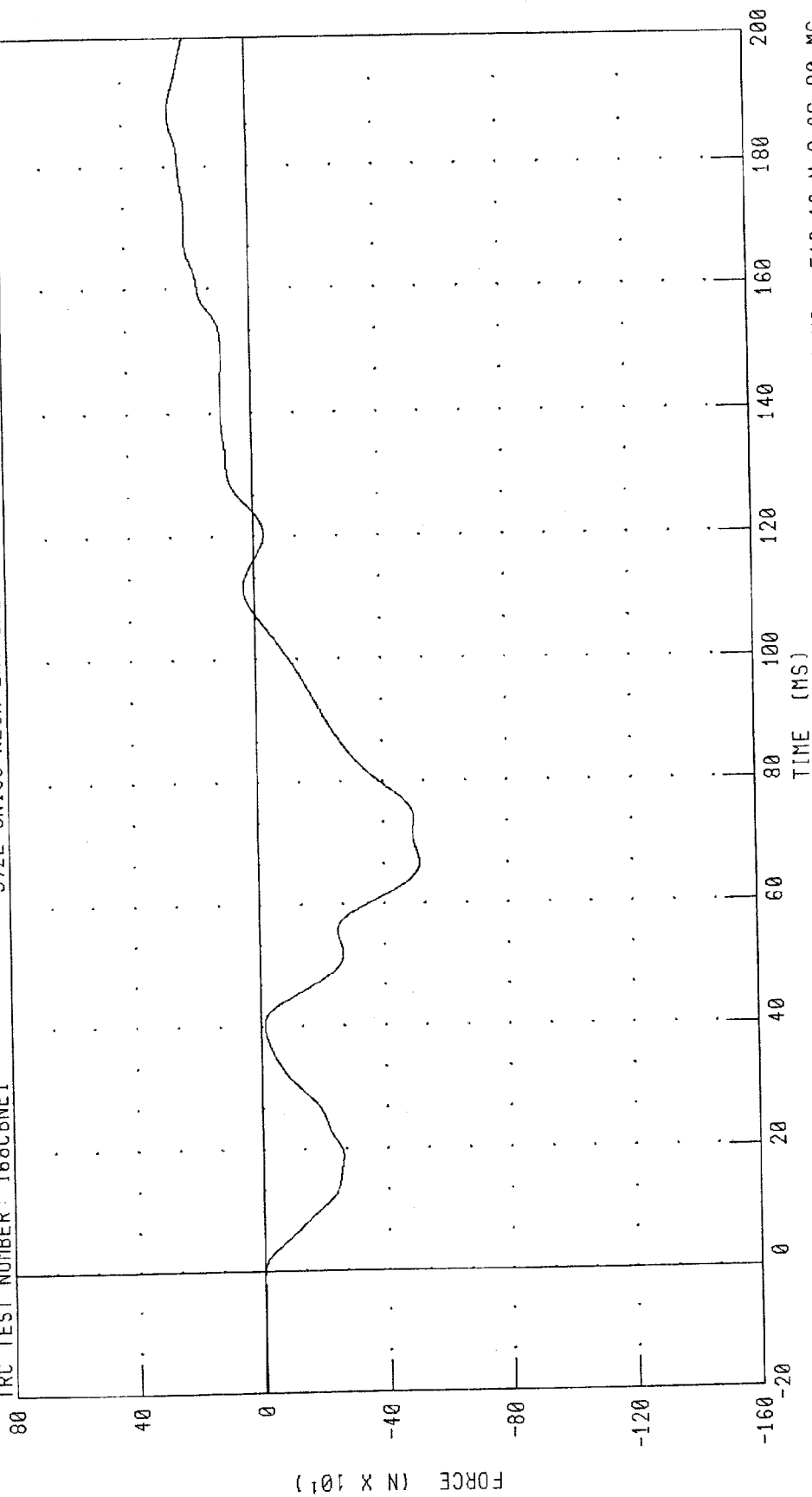
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 021299.1336;1

TRC TEST NUMBER: 168CGNE1

572E SN168 NECK EXT CAL06



PEAK DATA: 252.80 N @ 188.56 MS; -516.19 N @ 66.80 MS

CHANNEL: NEKXF FILTER: CH. CLASS 68

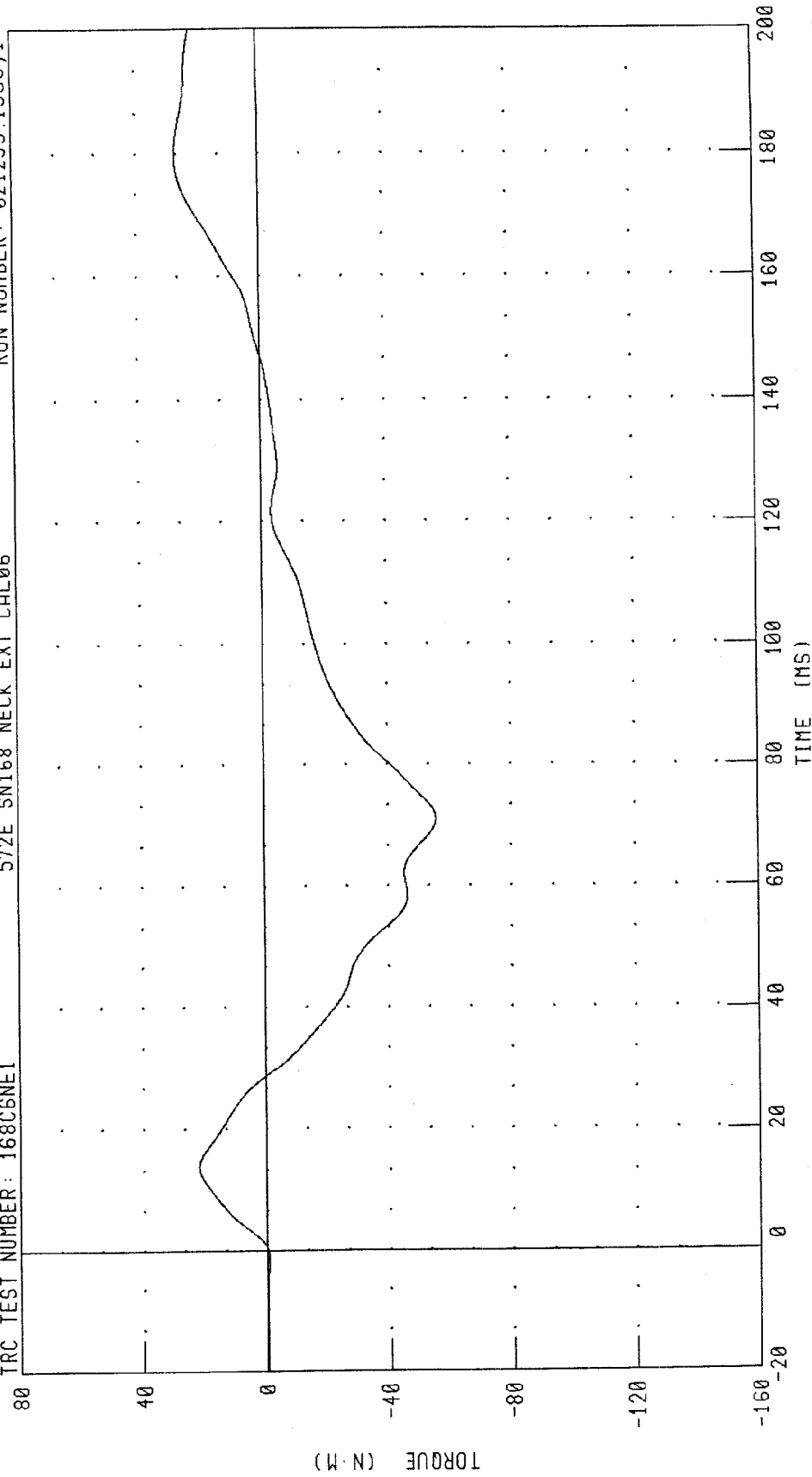
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 021299.1336;1

572E SN168 NECK EXT CAL06

TRC TEST NUMBER: 168CSNE1



PEAK DATA: 27.24 N·M @ 179.68 MS, -55.60 N·M @ 71.12 MS

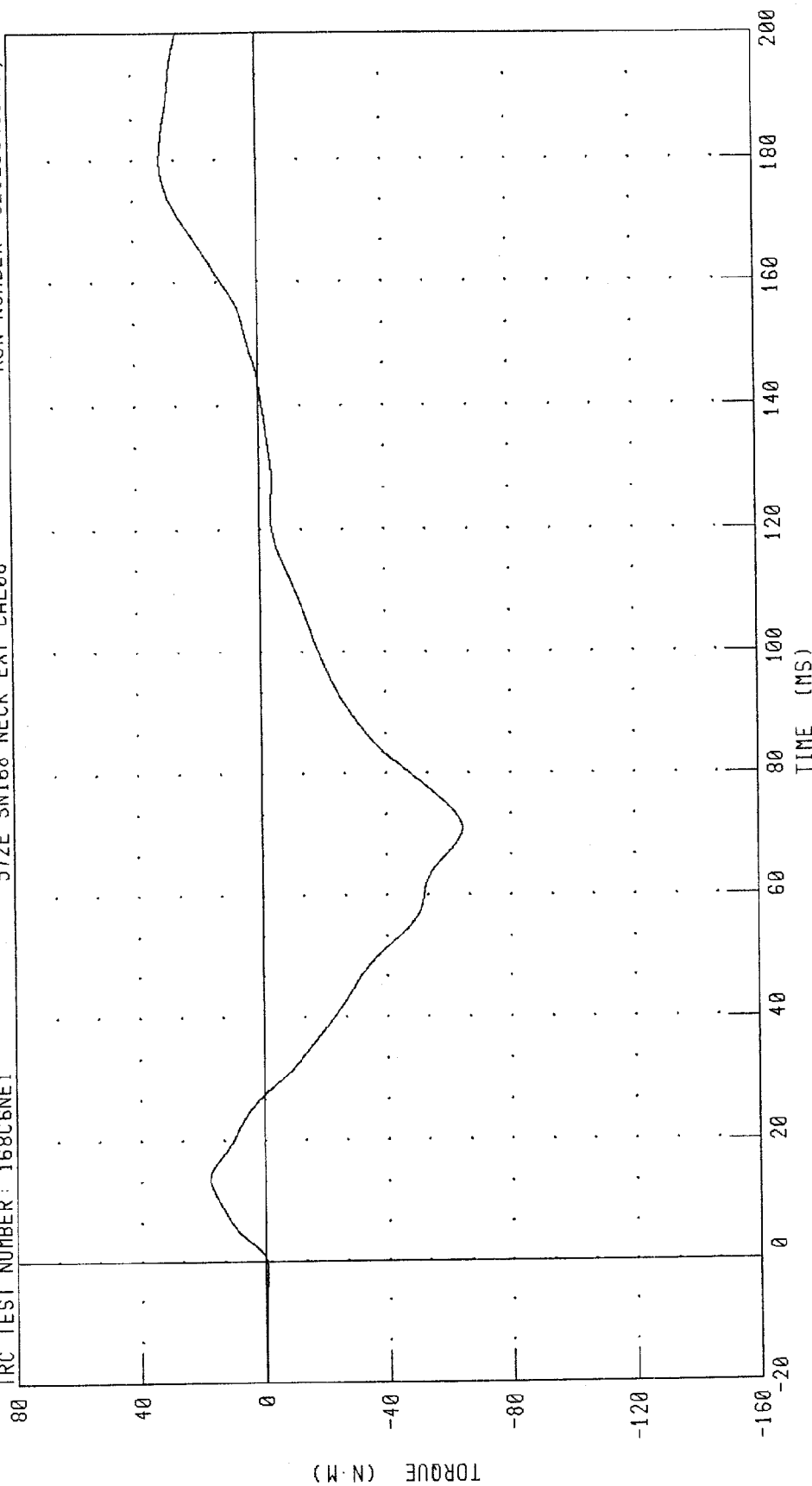
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C6NE1

572E SN168 NECK EXT CAL06

RUN NUMBER: 021299.1336;1



PEAK DATA: 31.20 N-M @ 180.00 MS; -64.42 N-M @ 71.12 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

15-FEB-99

TRC INC.

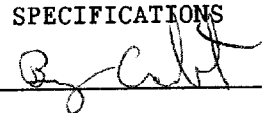
TEST NO: 168C6TH3

572E SN168 H.S.THORAX CAL06

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	22.2 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	66.4 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5805. N
INTERNAL HYSTERESIS	69% - 85%	69.8%

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 021599.1436;1

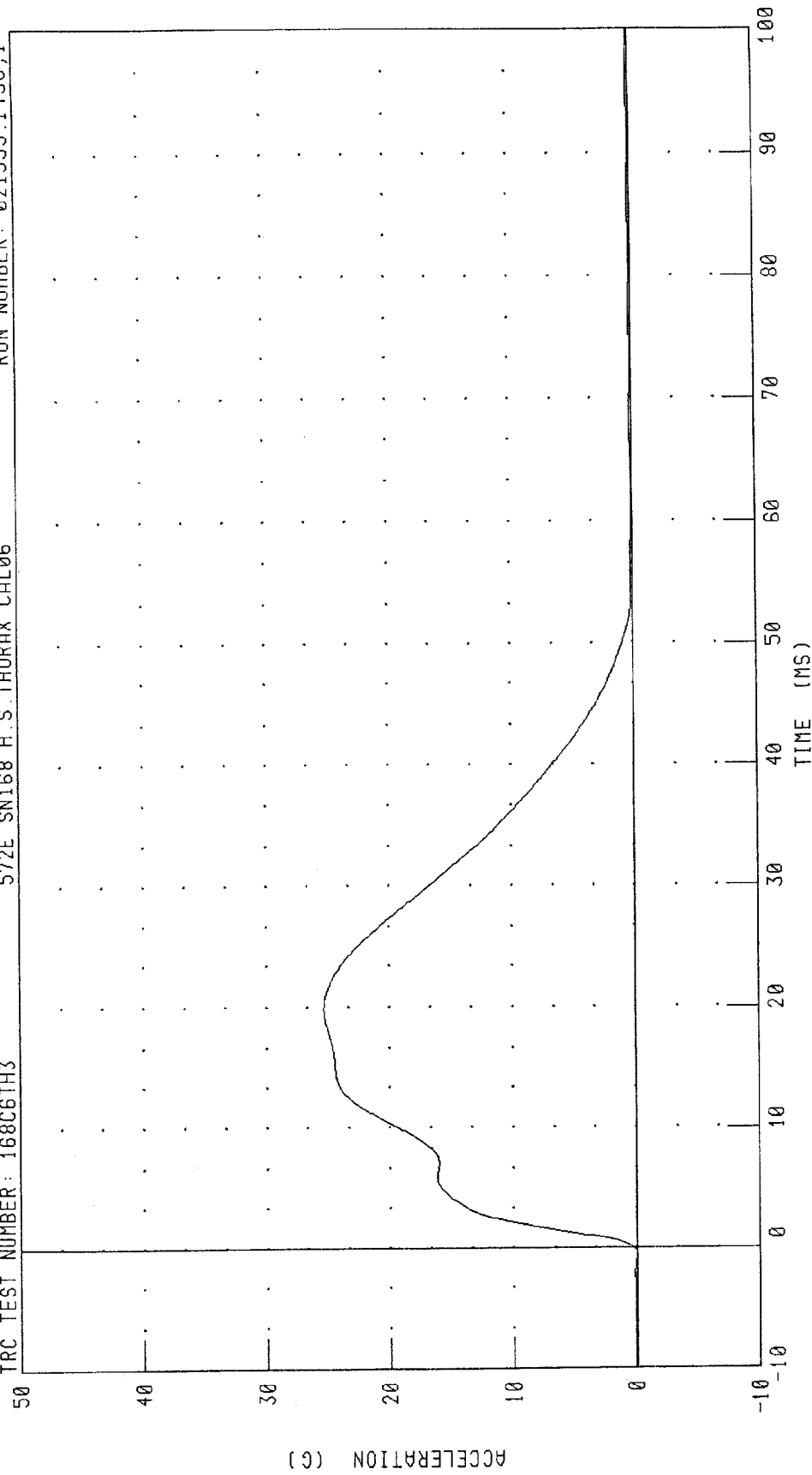
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C6TH3

572E SN168 H.S. THORAX CAL06

RUN NUMBER: 021599.1436;1



CHANNEL: PENXG FILTER: CH. CLASS 180

PEAK DATA: 25.34 G @ 19.92 MS; -0.03 G @ -0.56 MS

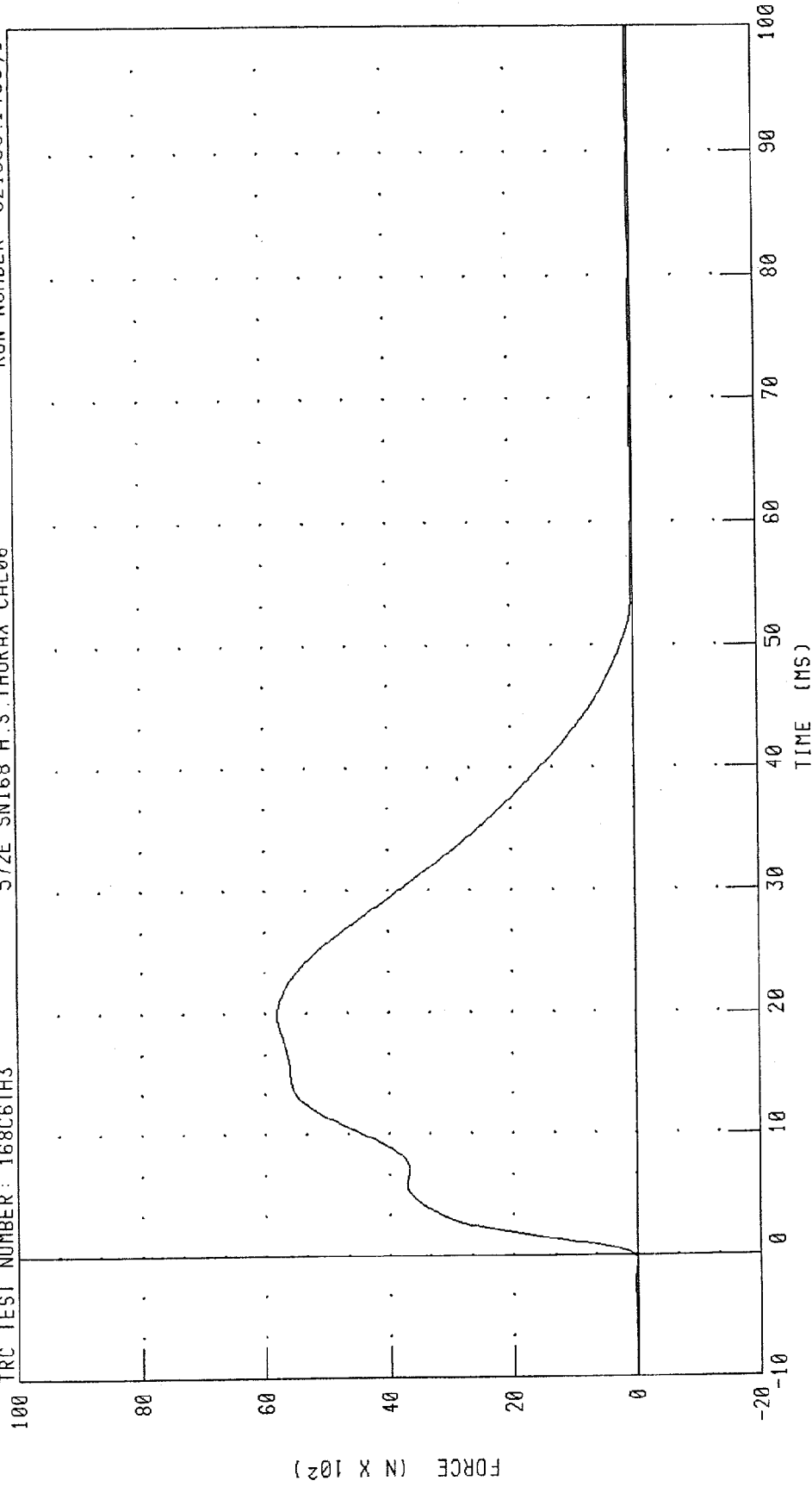
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER: 168C6TH3

572E SN168 H.S. THORAX CAL06

RUN NUMBER: 021599.1436,1



CHANNEL: PENXF

FILTER: CH. CLASS 180

PEAK DATA: 5805.87 N @ 19.92 MS; -7.94 N @ -0.56 MS

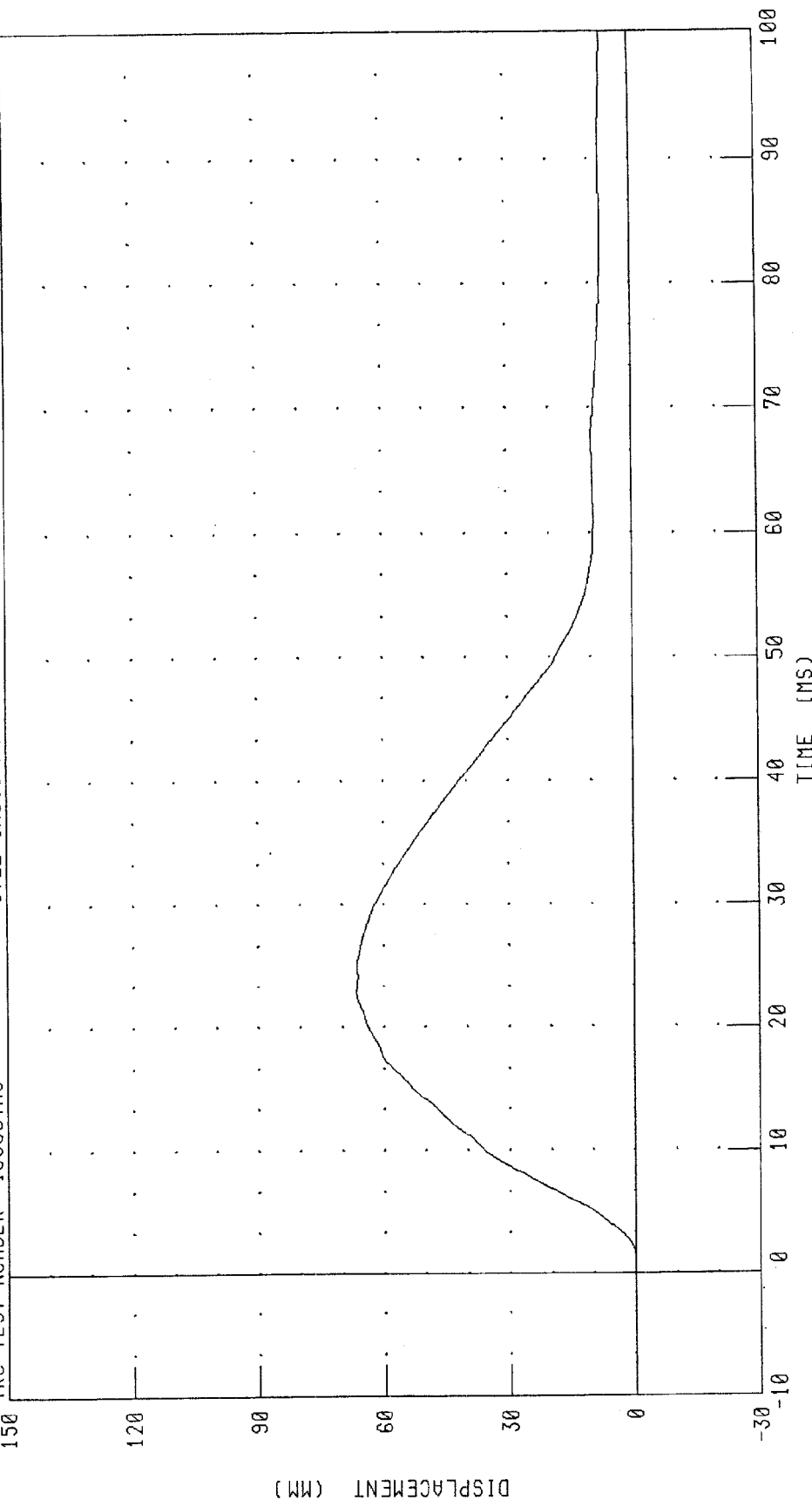
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 168C6TH3

572E SN168 H.S. THORAX CAL06

RUN NUMBER: 021599.1436;1



CHANNEL: CSTXD FILTER: CH. CLASS 180

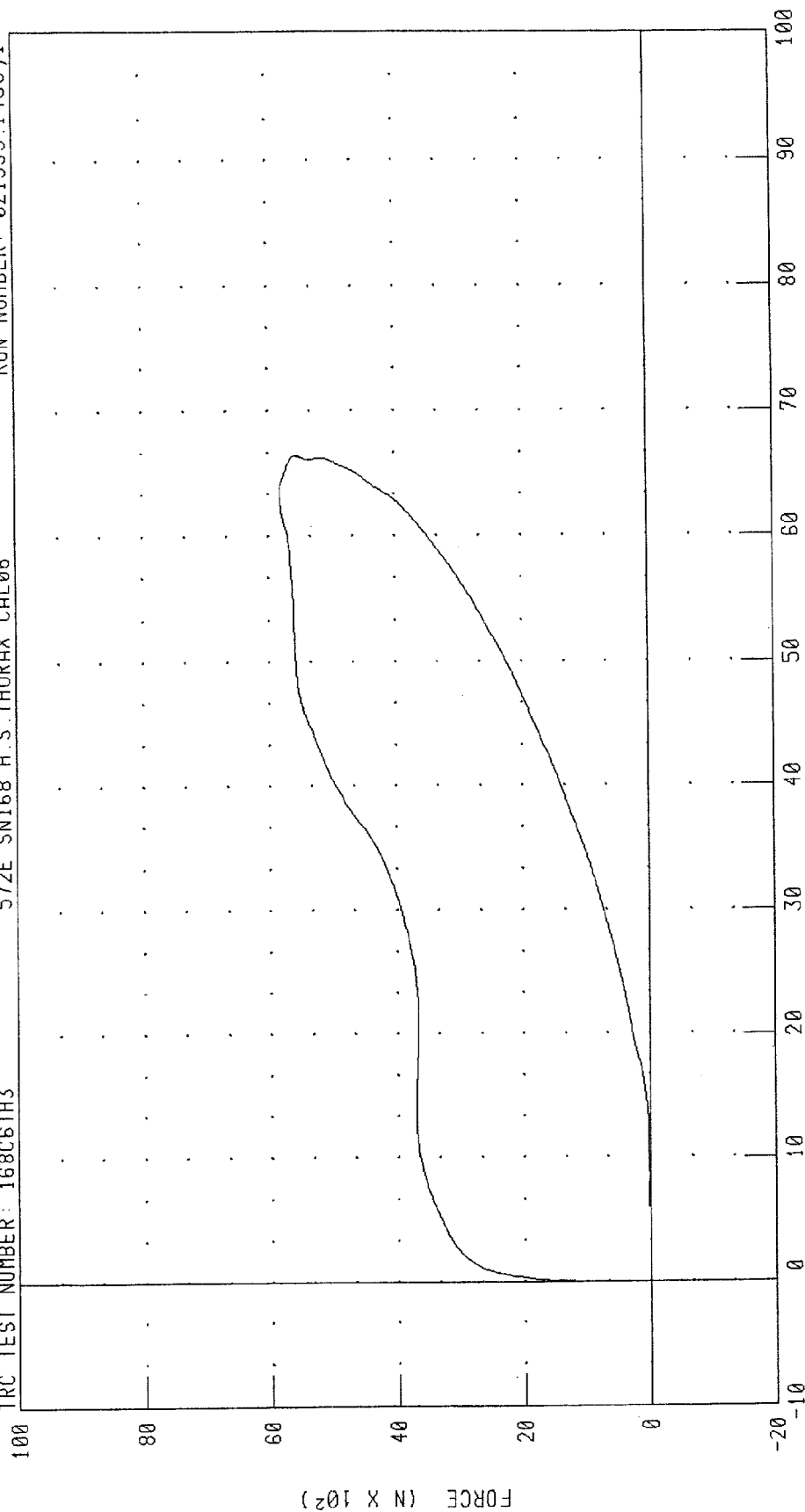
PEAK DATA: 66.40 MM @ 22.96 MS; -0.02 MM @ 0.80 MS

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

TRC TEST NUMBER: 168C6TH3

572E SN168 H.S. THORAX CAL06

RUN NUMBER: 021599.1436;1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

PEAK DATA:

66.40 MM @ 22.96 MS; -0.02 MM @ 0.80 MS
5805.87 N @ 19.92 MS; -7.94 N @ -0.56 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

12-FEB-99

TRC 3NC.

TEST NO: 168C6HR1

572E SN 168 HIPFLEX CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	65.9 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	46.3 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN B. cult

RUN NUMBER: 021299.1216;1

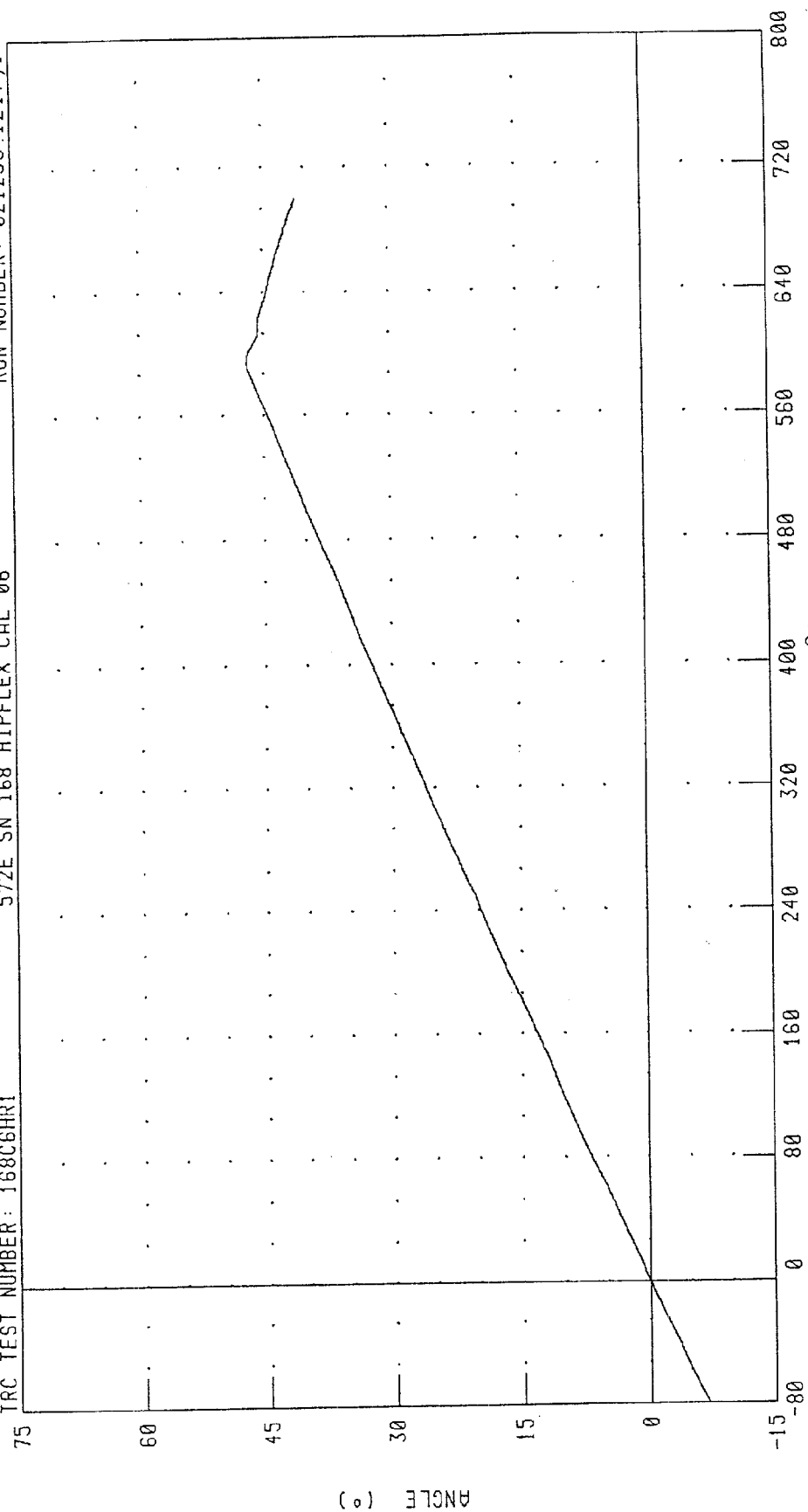
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION ROTATION

RUN NUMBER: 021299.1217,1

572E SN 168 HIPFLEX CAL 06

TRC TEST NUMBER: 168C6HR1



PEAK DATA: 47.09 ° @ 5.94 S; -9.95 ° @ -1.00 S

CHANNEL: RHPXD

FILTER: CH CLASS 60

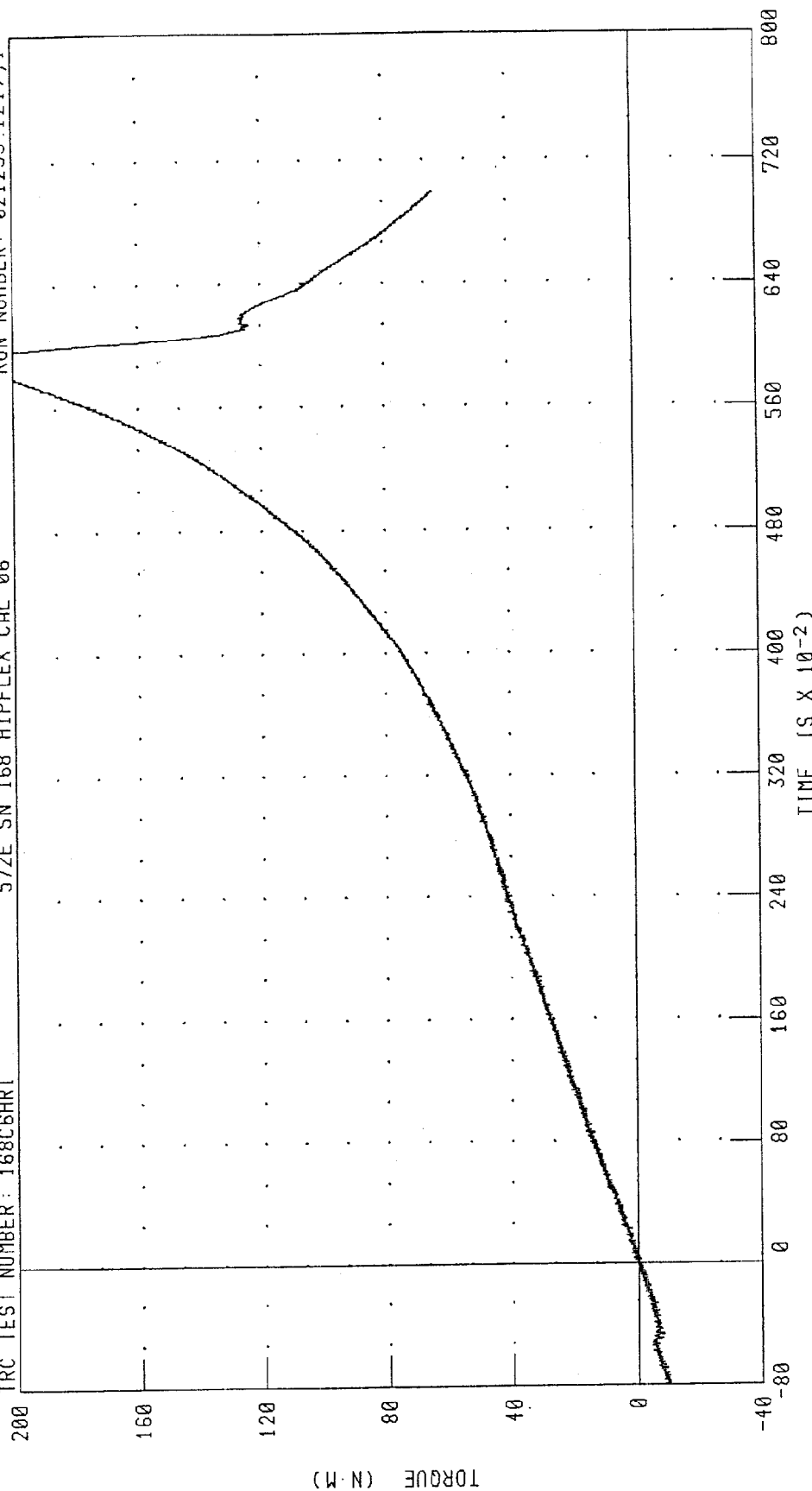
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

572E SN 168 HIPFLEX CAL 06

RUN NUMBER: 021299.1217.1

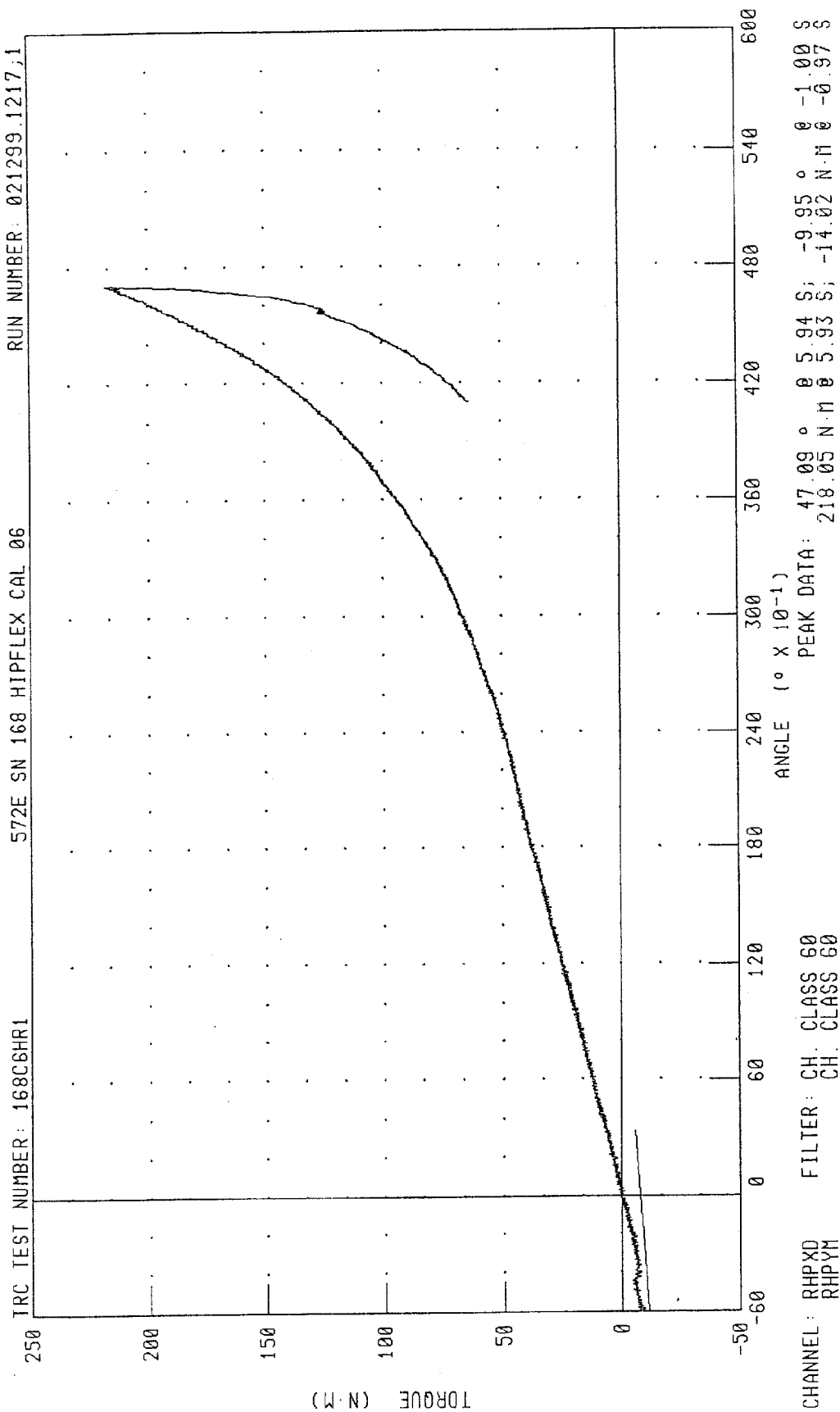
TRC TEST NUMBER: 168C6HRI



PEAK DATA: 218.05 N-M @ 5.93 S; -14.02 N-M @ -0.97 S

CHANNEL: RHPYH FILTER: CH. CLASS 60

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES RIGHT HIP FLEXION MOMENT VS. ROTATION ANGLE



TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

12-FEB-99

TRC INC.

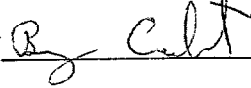
TEST NO: 168C6HL1

572E SN 168 HIPFLEX CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	68.4 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	44.2 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 021299.1213;1

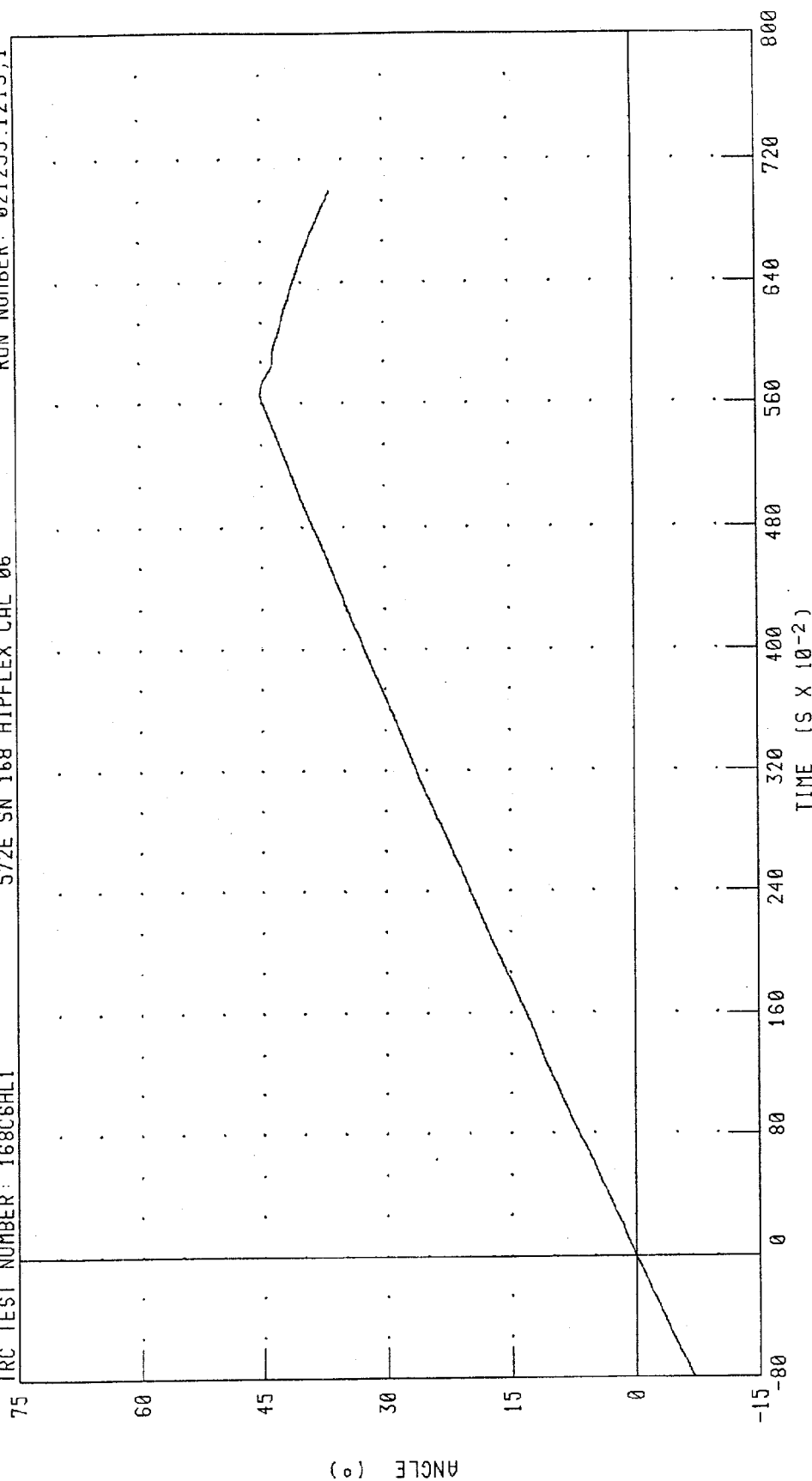
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION ROTATION

572E SN 168 HIPFLEX CAL 06

RUN NUMBER: 021299.1213,1

TRC TEST NUMBER: 168C6HL1



PEAK DATA: 45.18 ° @ 5.66 S; -10.10 ° @ -1.00 S

CHANNEL: LHPXD FILTER: CH. CLASS 60

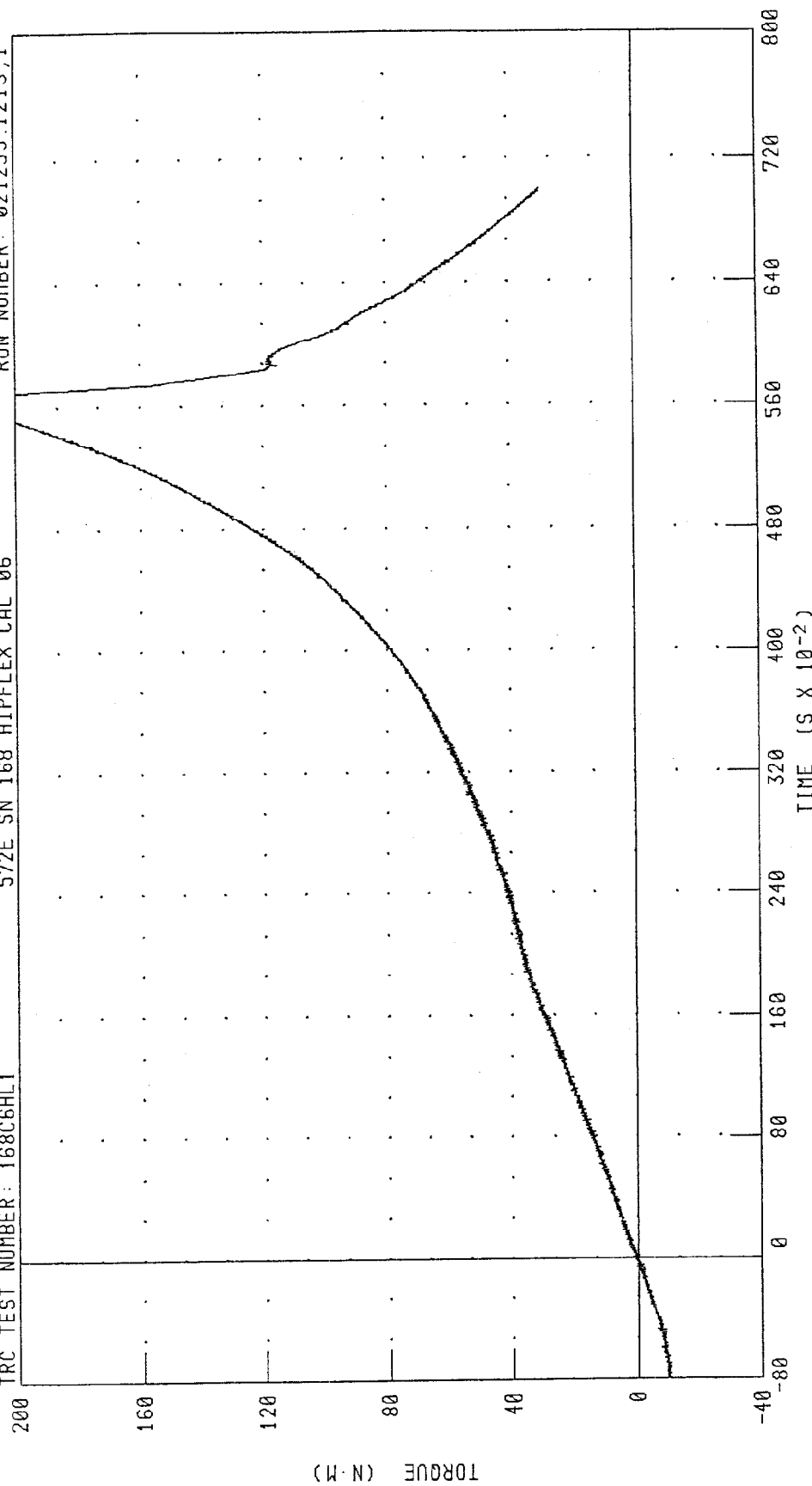
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT

TRC TEST NUMBER: 168C6HL1

572E SN 168 HIPFLEX CAL 06

RUN NUMBER: 021299.1213;1



PEAK DATA: 221.11 N·M @ 5.64 S; -10.91 N·M @ -0.97 S

CHANNEL: LHPYH FILTER: CH. CLASS 60

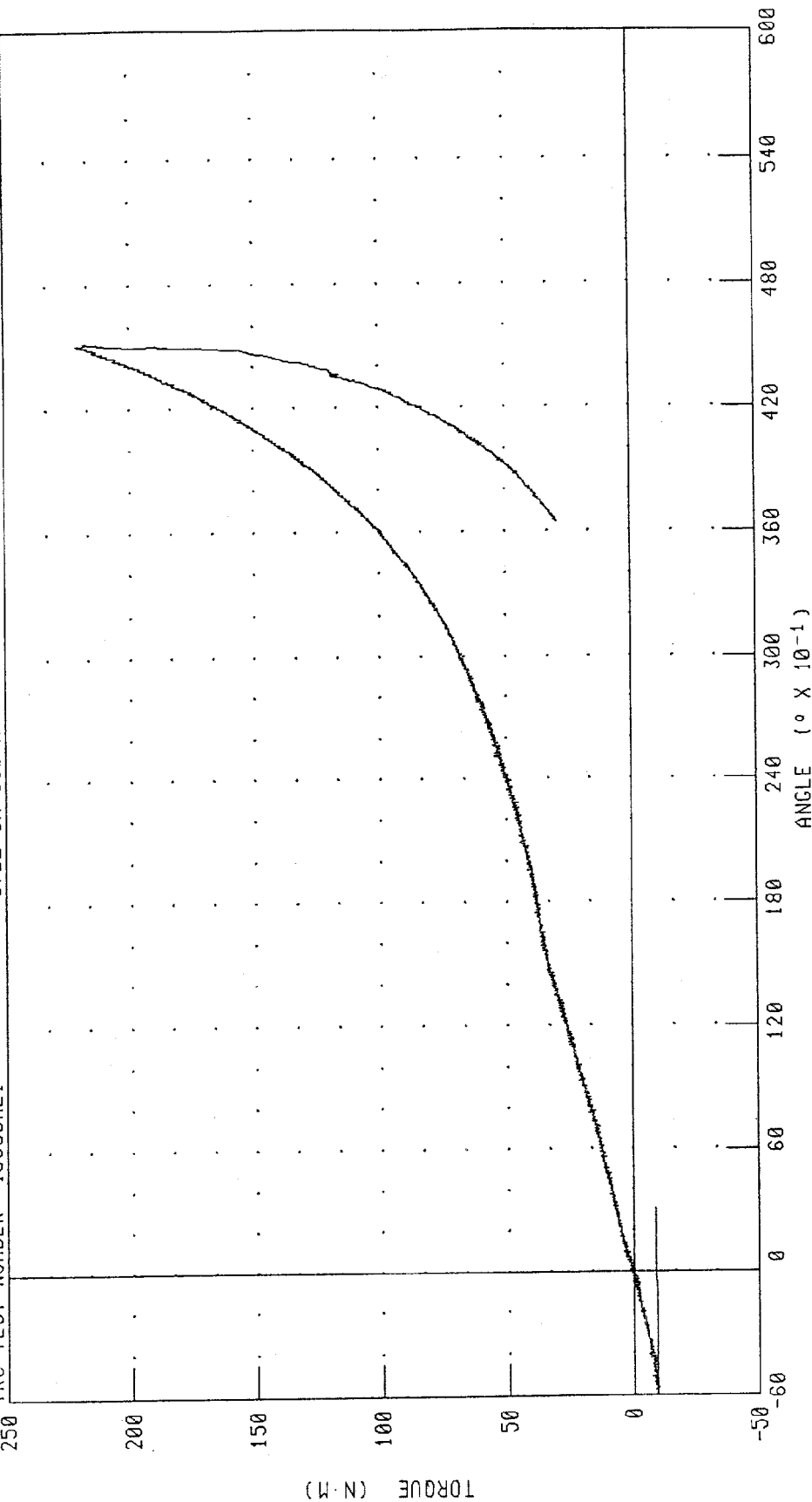
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT VS ROTATION ANGLE

TRC TEST NUMBER: 168C6HL1

572E SN 168 HIPFLEX CAL 06

RUN NUMBER: 021299.1213,1



CHANNEL: LHPXD
LHPYM

FILTER: CH. CLASS 60
CH. CLASS 60

PEAK DATA: 45.18 °

221.11 N·M @ 5.66 S;
-10.91 N·M @ -0.97 S

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

12-FEB-99

TRC INC.

TEST NO: 168C6RK1

572E SN168 RIGHT KNEE CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5376.5 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Bj clt

RUN NUMBER: 021299.1017;1

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

TRC TEST NUMBER: 168C6RK1

572E SN168 RIGHT KNEE CAL 06

RUN NUMBER: 021299.1017,1

150

120

90

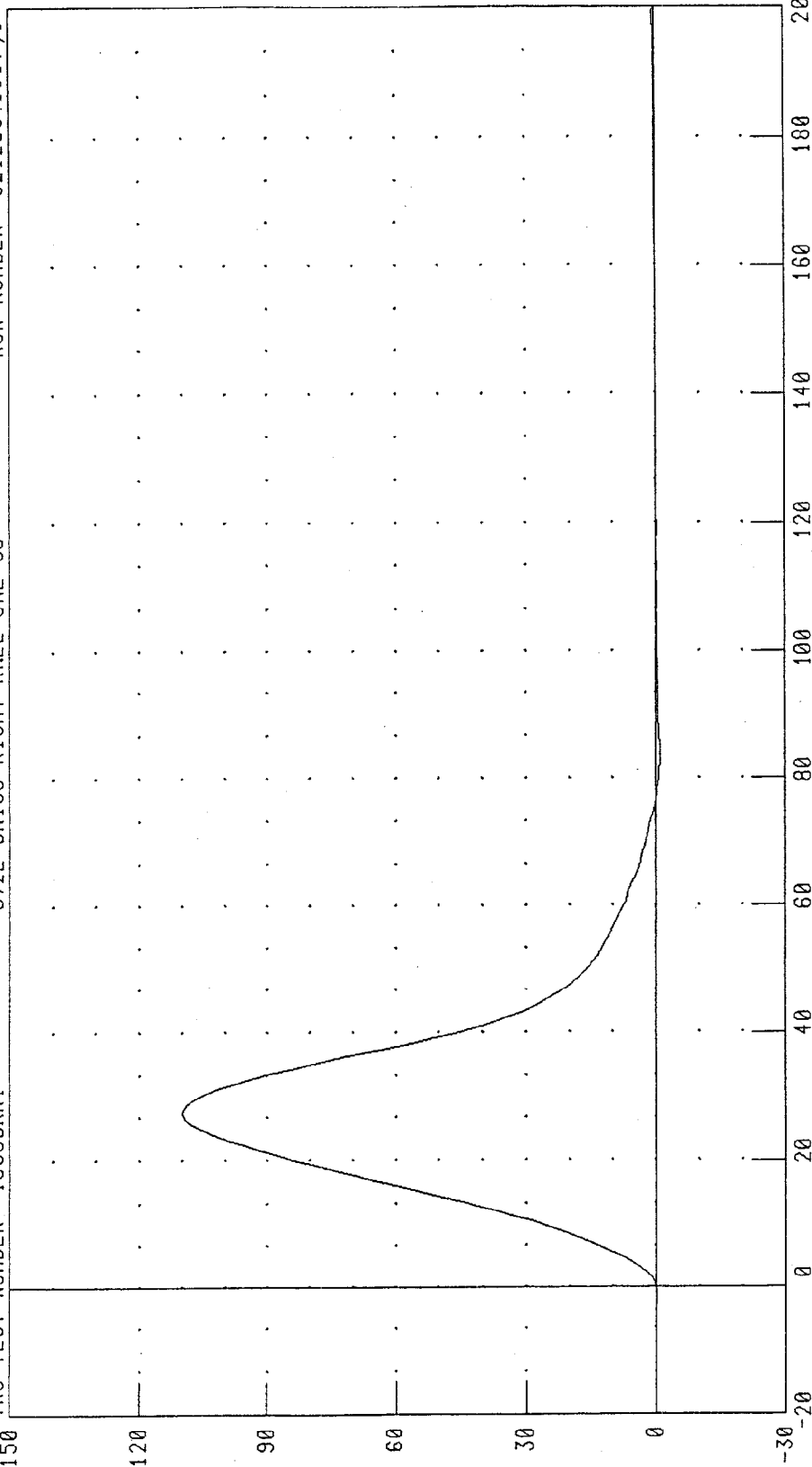
60

30

0

-30

ACCELERATION (G)



TIME (MS X 10⁻¹)

CHANNEL: PENXG

FILTER: CH. CLASS 600

PEAK DATA: 109.89 G @ 2.72 MS, -0.99 G @ 8.32 MS

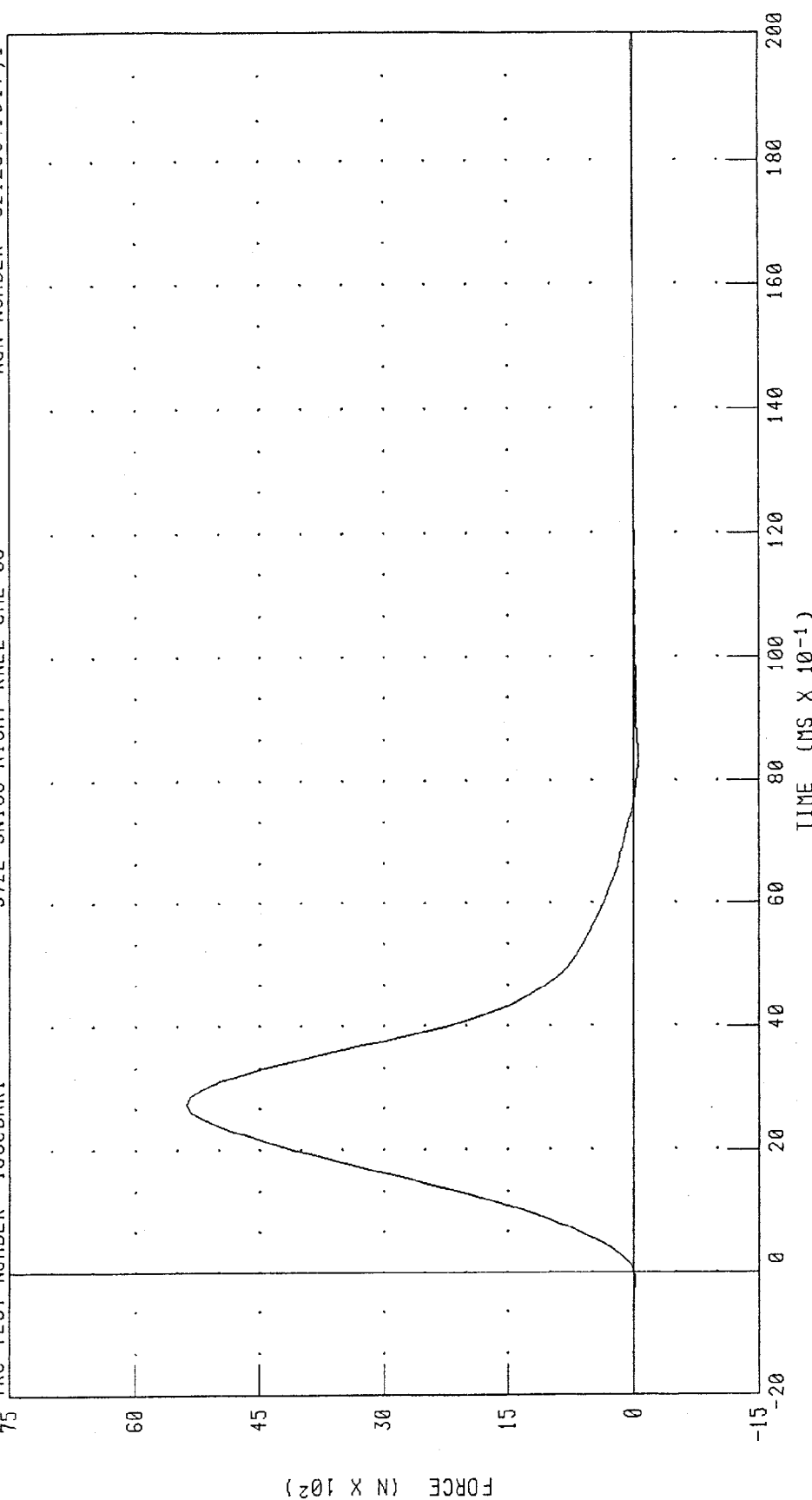
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

TRC TEST NUMBER: 168C6RK1

572E SN168 RIGHT KNEE CAL 06

RUN NUMBER: 021299.1017,1



CHANNEL: PENXF FILTER: CH. CLASS 600

PEAK DATA: 5376.51 N @ 2.72 MS; -48.32 N @ 8.32 MS

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

12-FEB-99

TRC INC.

TEST NO: 168C6LK1

572E SN168 LEFT KNEE CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5652.8 N

TEST MEETS SPECIFICATIONS

TECHNICIAN B. C. L.

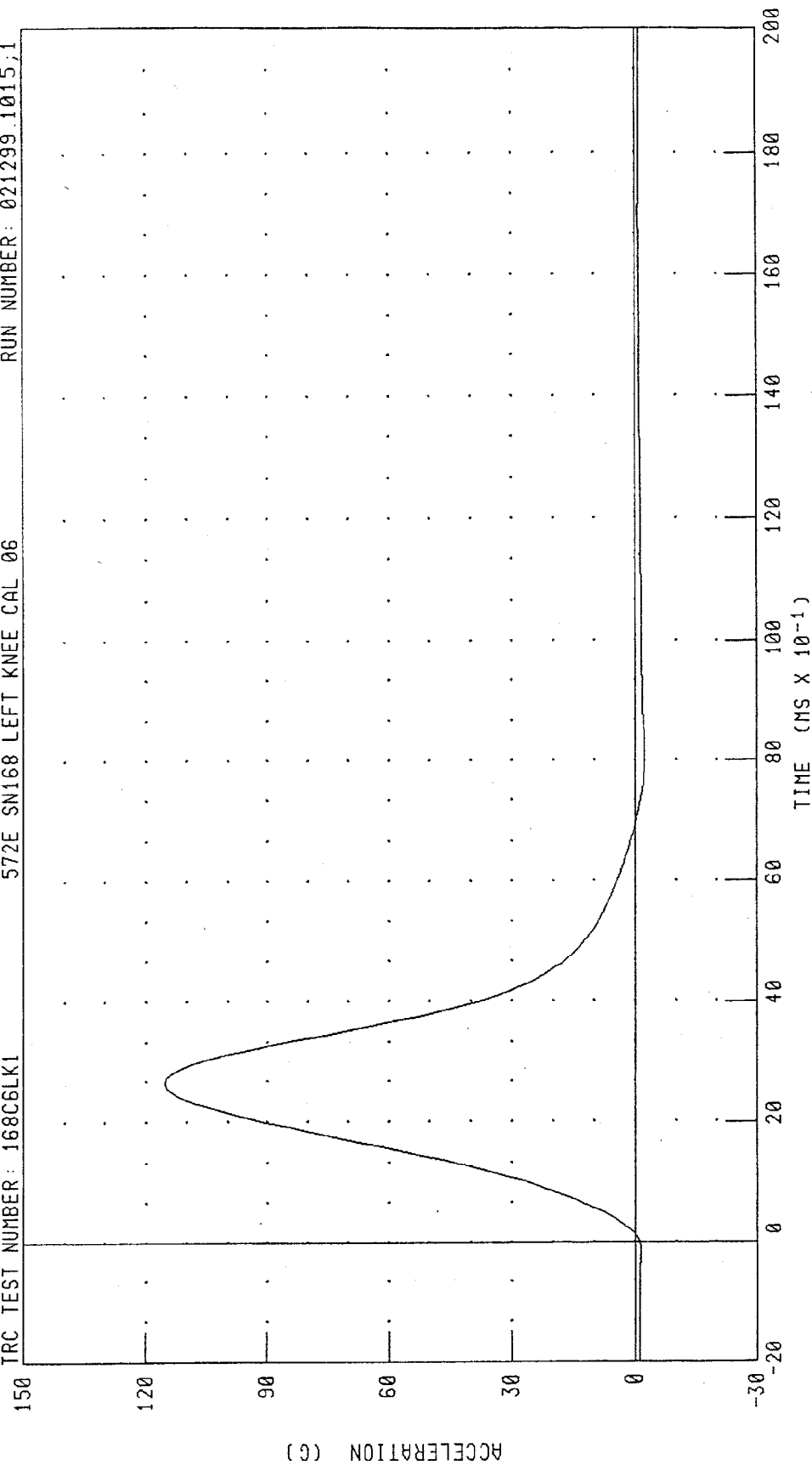
RUN NUMBER: 021299.1014;1

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

TRC TEST NUMBER: 168CGLK1

572E SN168 LEFT KNEE CAL 06

RUN NUMBER: 021299.1015;1



CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 115.53 G @ 2.64 MS; -2.41 G @ 8.16 MS

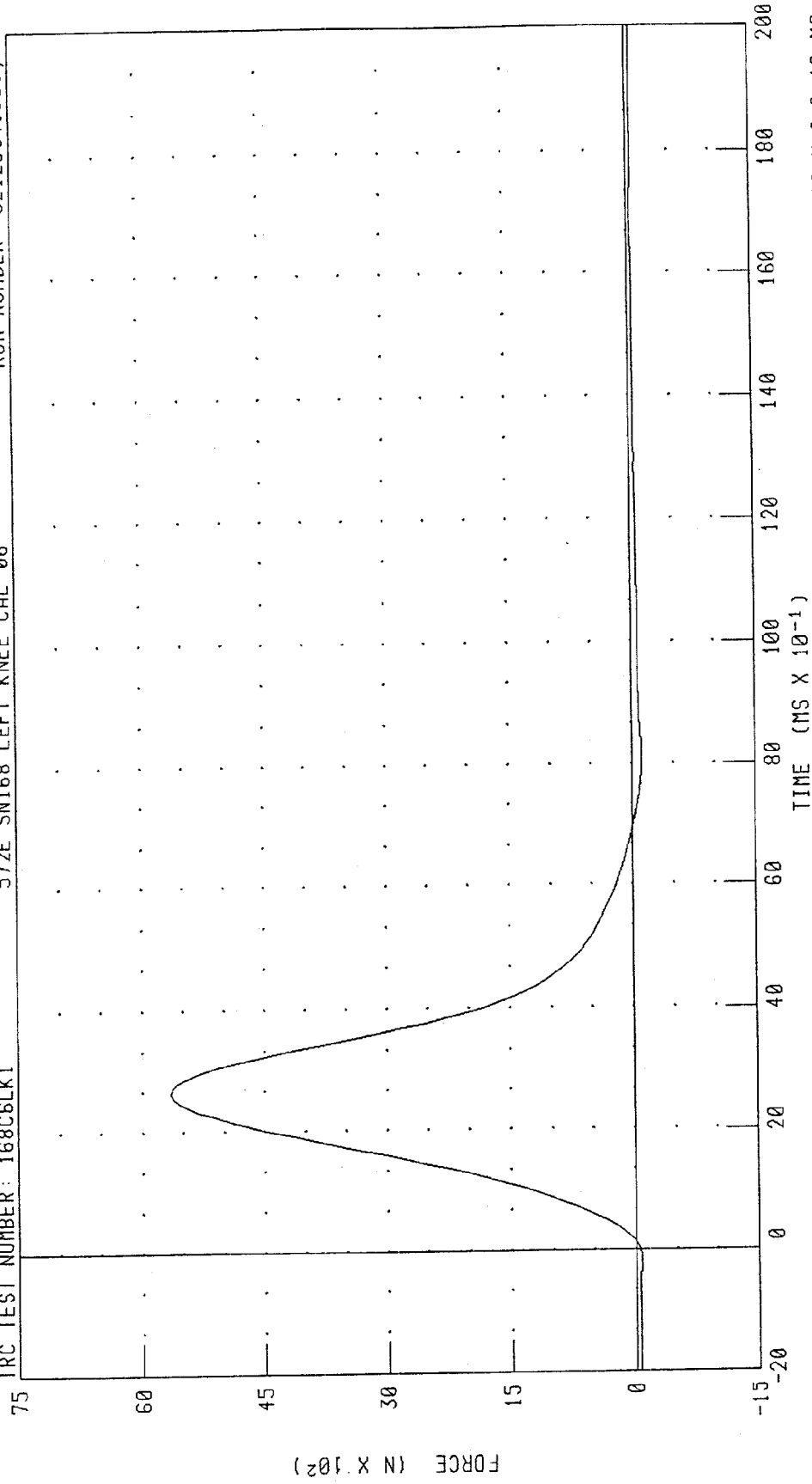
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN168 LEFT KNEE CAL 06

RUN NUMBER: 021299.1015;1

TRC TEST NUMBER: 168C6LK1



PEAK DATA: 5652.81 N @ 2.64 MS; -118.16 N @ 8.16 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Post-Test Dummy Certification

Driver Dummy S/N 169

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

22-FEB-99

TRC INC.

TEST NO: 169C5HD1

572E SN169 HEAD DROP CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	246.25 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.69 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

By Calt

RUN NUMBER: 022299.1306;1

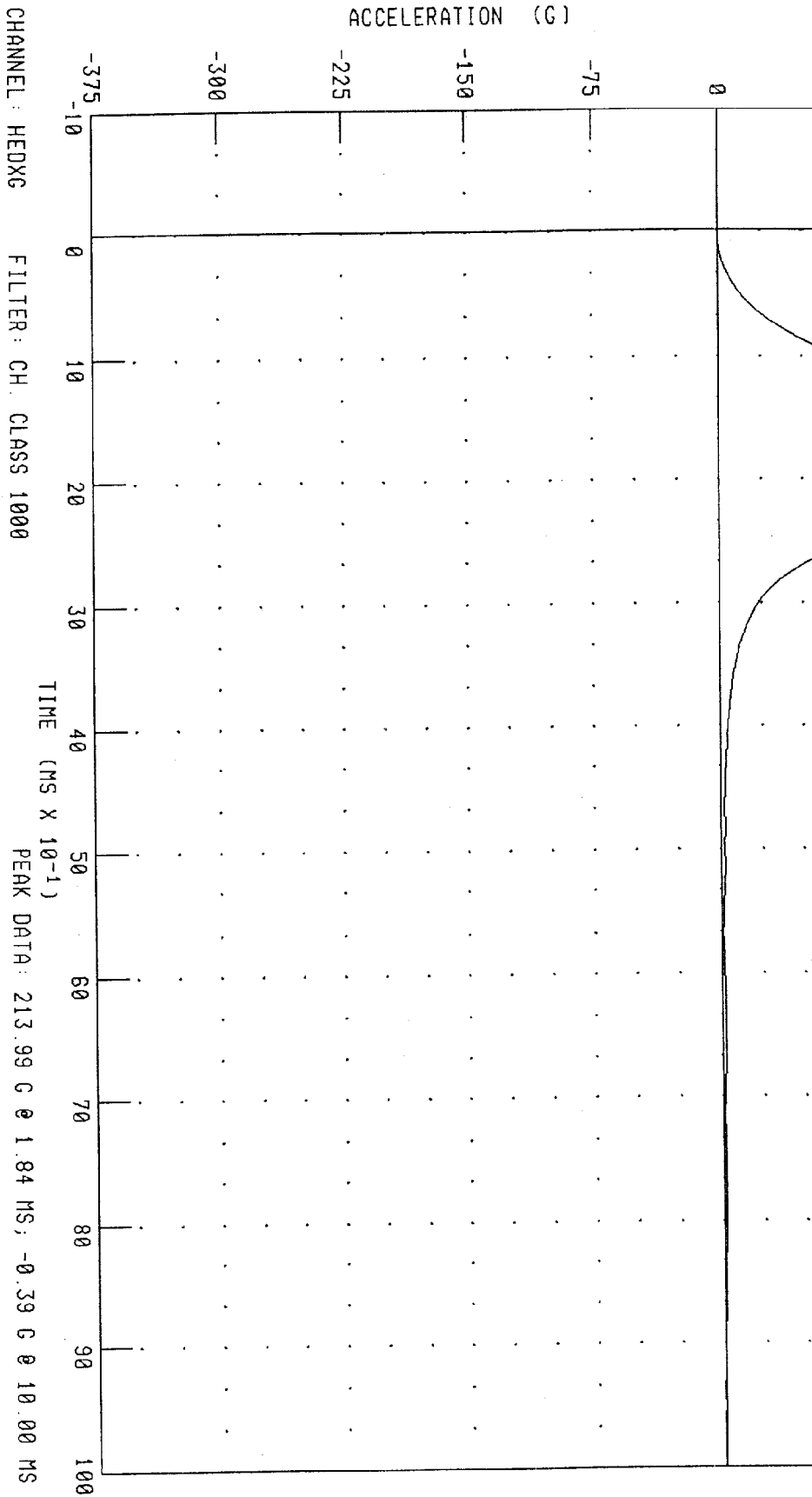
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN169 HEAD DROP CAL 05

RUN NUMBER: 022299.1307.1

TRC TEST NUMBER: 169C5HD1



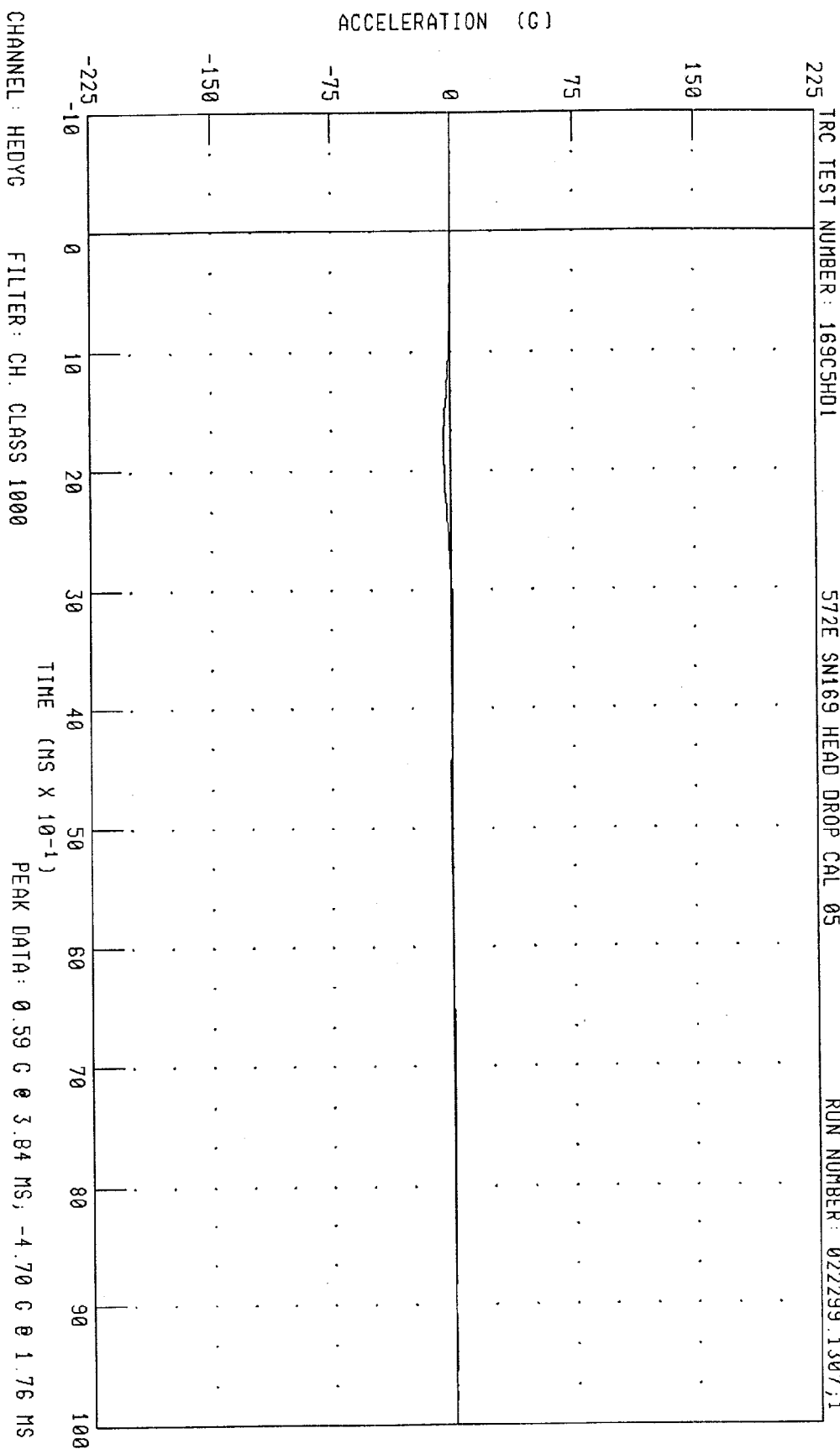
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER: 169C5H01

572E SM169 HEAD DROP CAL 05

RUN NUMBER: 022299.1307.1



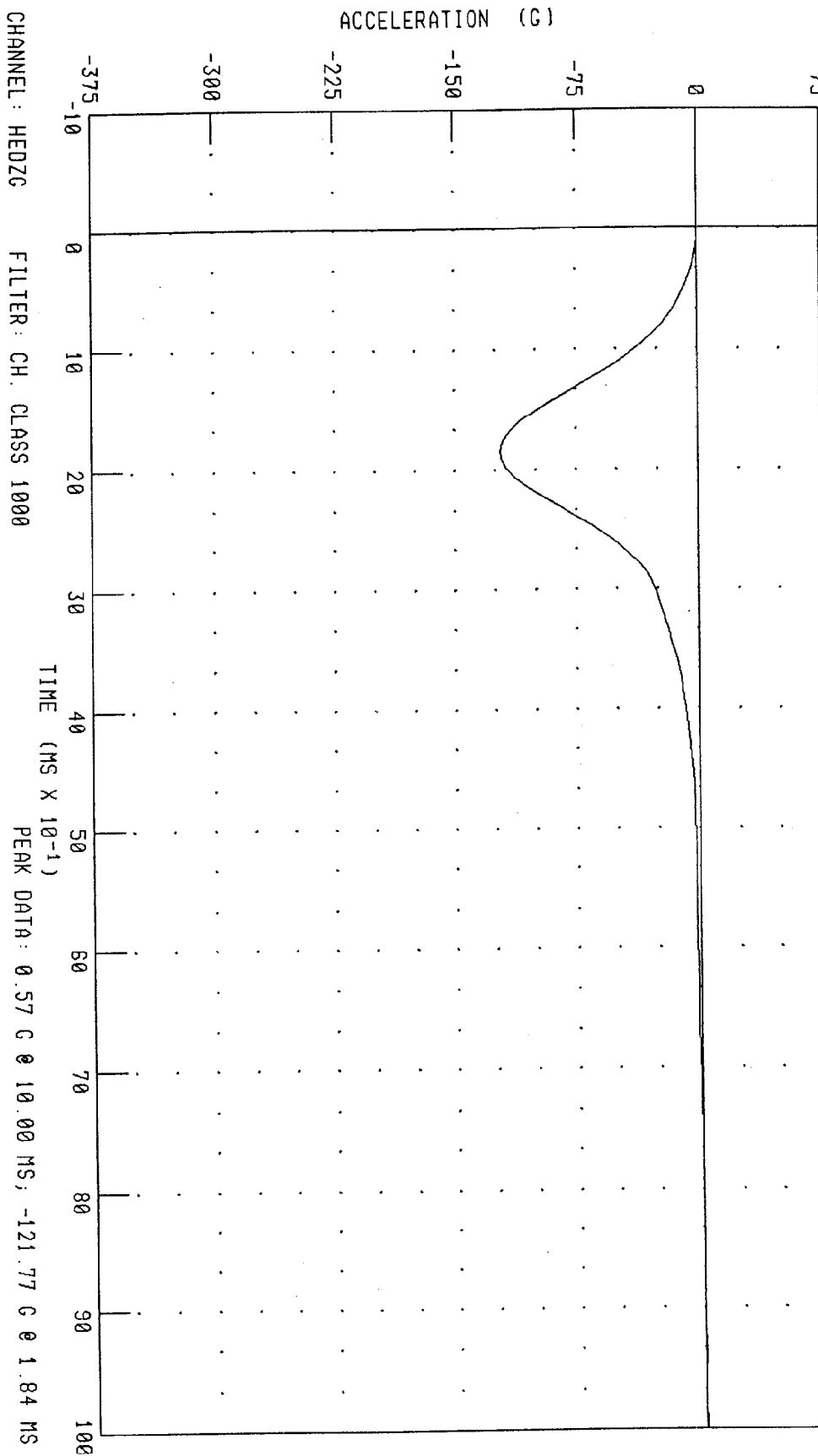
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER: 169CSHD1

572E SN169 HEAD DROP CAL 05

RUN NUMBER: 022299.1307.1



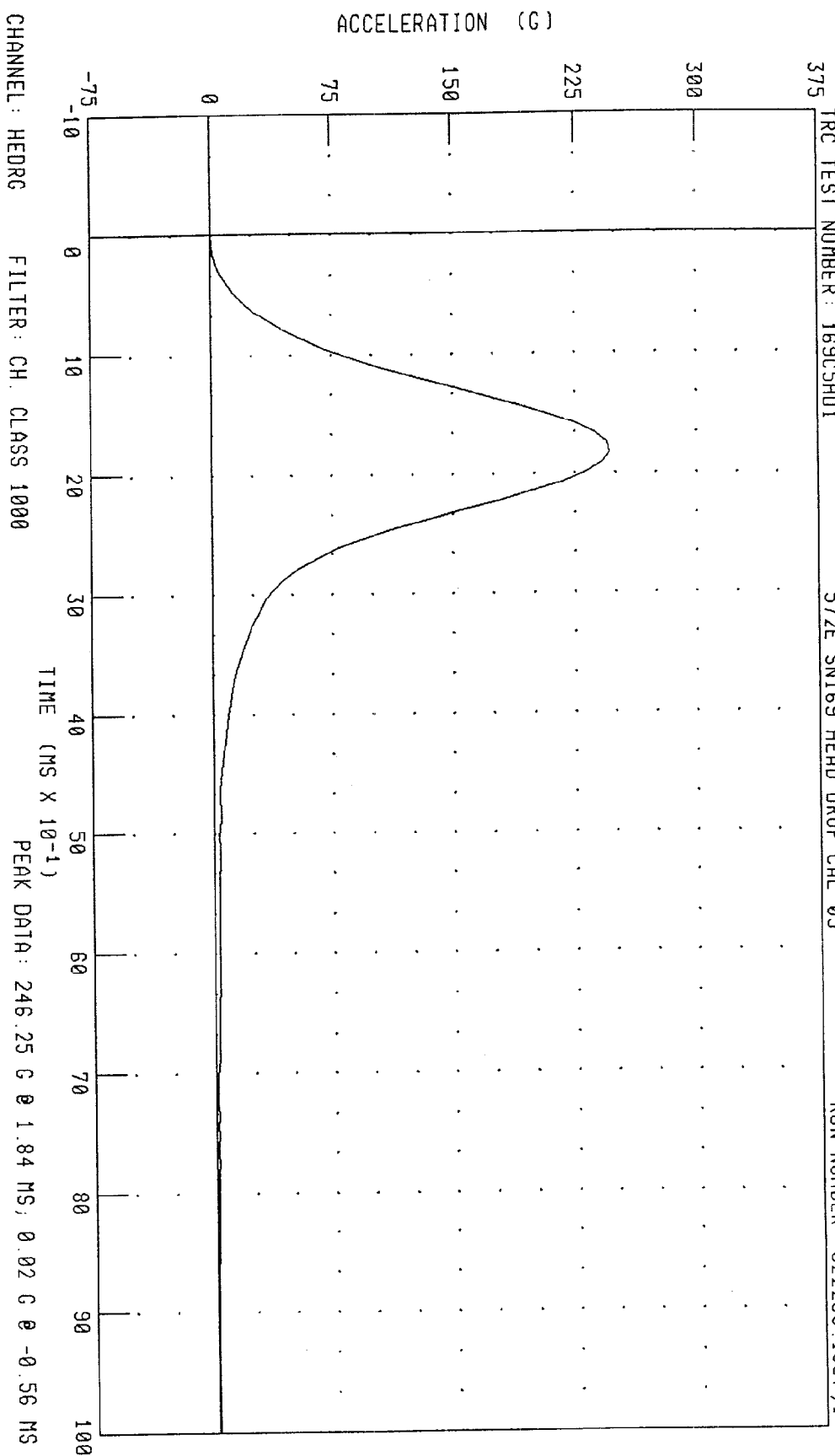
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN169 HEAD DROP CAL 05

RUN NUMBER: 022299.1307.1

TRC TEST NUMBER: 169C5HD1

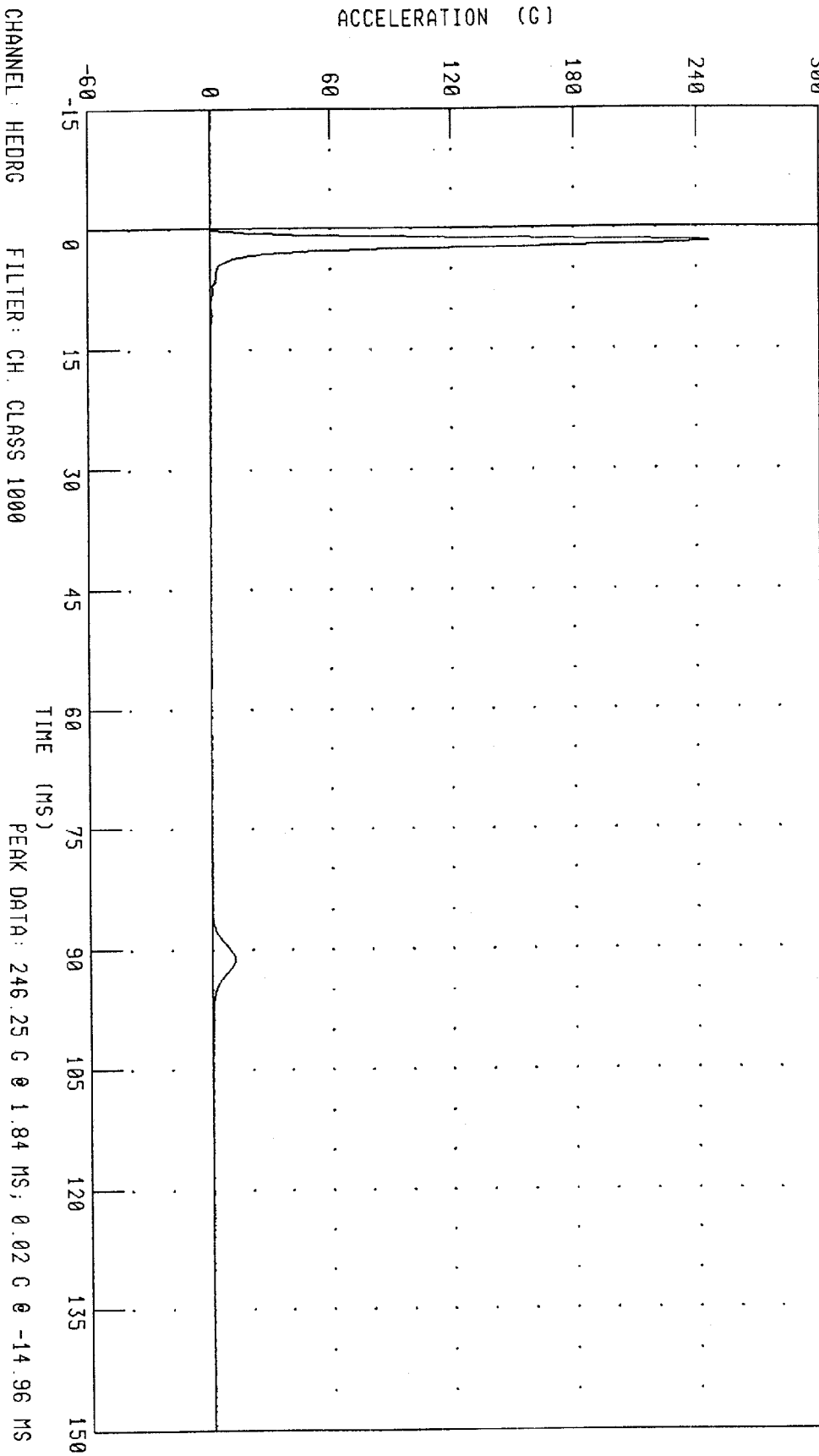


PART 572-E HYBRID III HEAD CALIBRATION
CHECK PLOT - HEAD RESULTANT ACCELERATION

TRC TEST NUMBER: 169CSHD1

572E SN169 HEAD DROP CAL 05

RUN NUMBER: 022299.1307.1



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-FEB-99

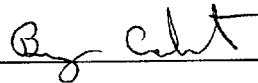
NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 169C5NF1 572E SN169 NECK FLEXION CAL5

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.62 G
	20 MS	17.60 - 22.60 G	20.78 G
	30 MS	12.50 - 18.50 G	16.40 G
MAX PENDULUM G		29 G MAX	24.25 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.37 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	39.28 MS
D PLANE	MAX	64 - 78 DEG.	74.81 DEG.
ROTATION	TIME	57 - 64 MS	59.52 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	90.55 NM
	TIME	47 - 58 MS	52.80 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	118.88 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	106.24 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



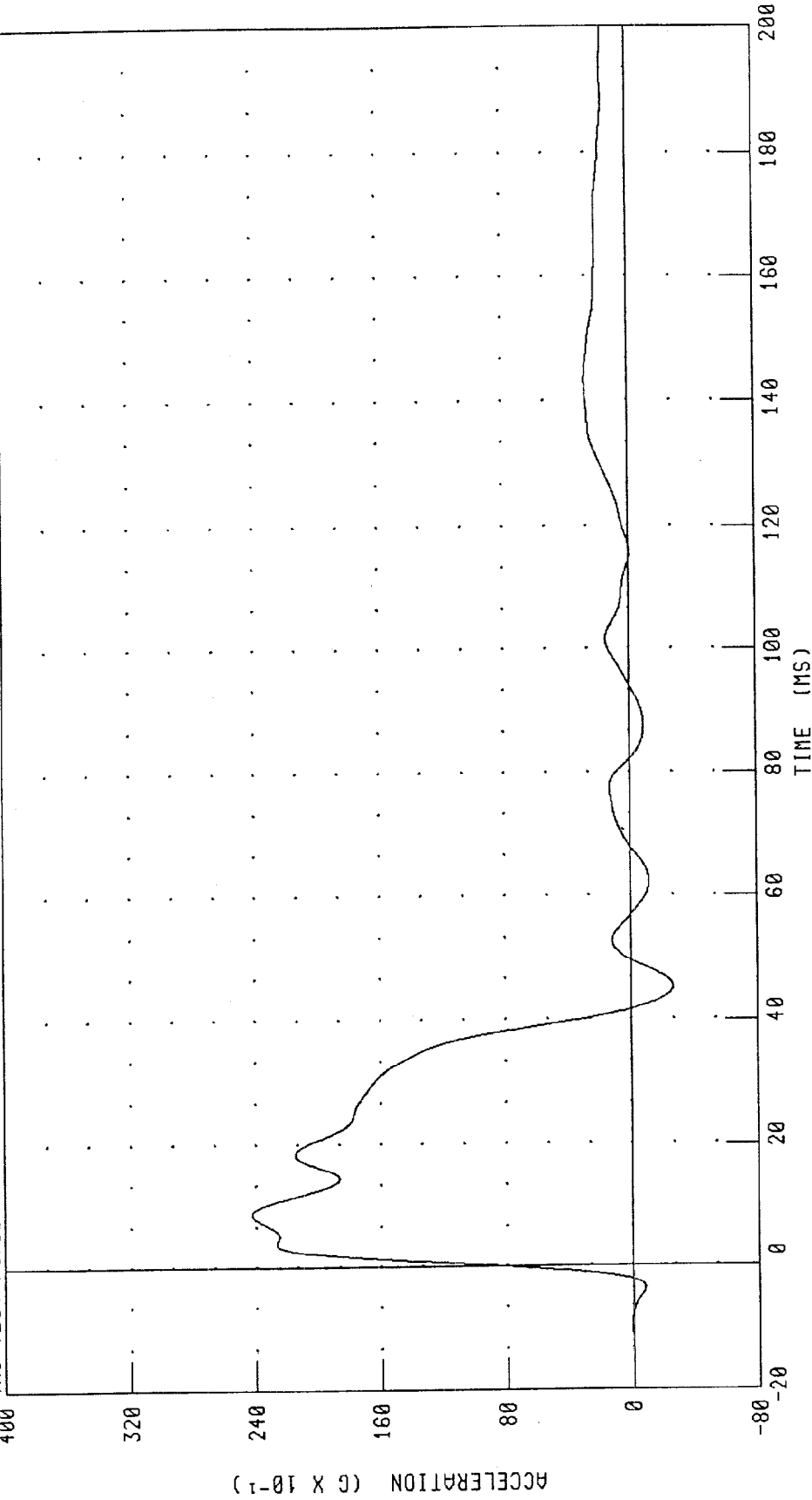
RUN NUMBER: 022299.1500;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 169C5NF1

572E SNI69 NECK FLEXION CAL5

RUN NUMBER: 022299.1501;1



CHANNEL: PENXC FILTER: CH. CLASS 60

PEAK DATA: 24.26 G @ 8.80 MS, -2.67 G @ 45.28 MS

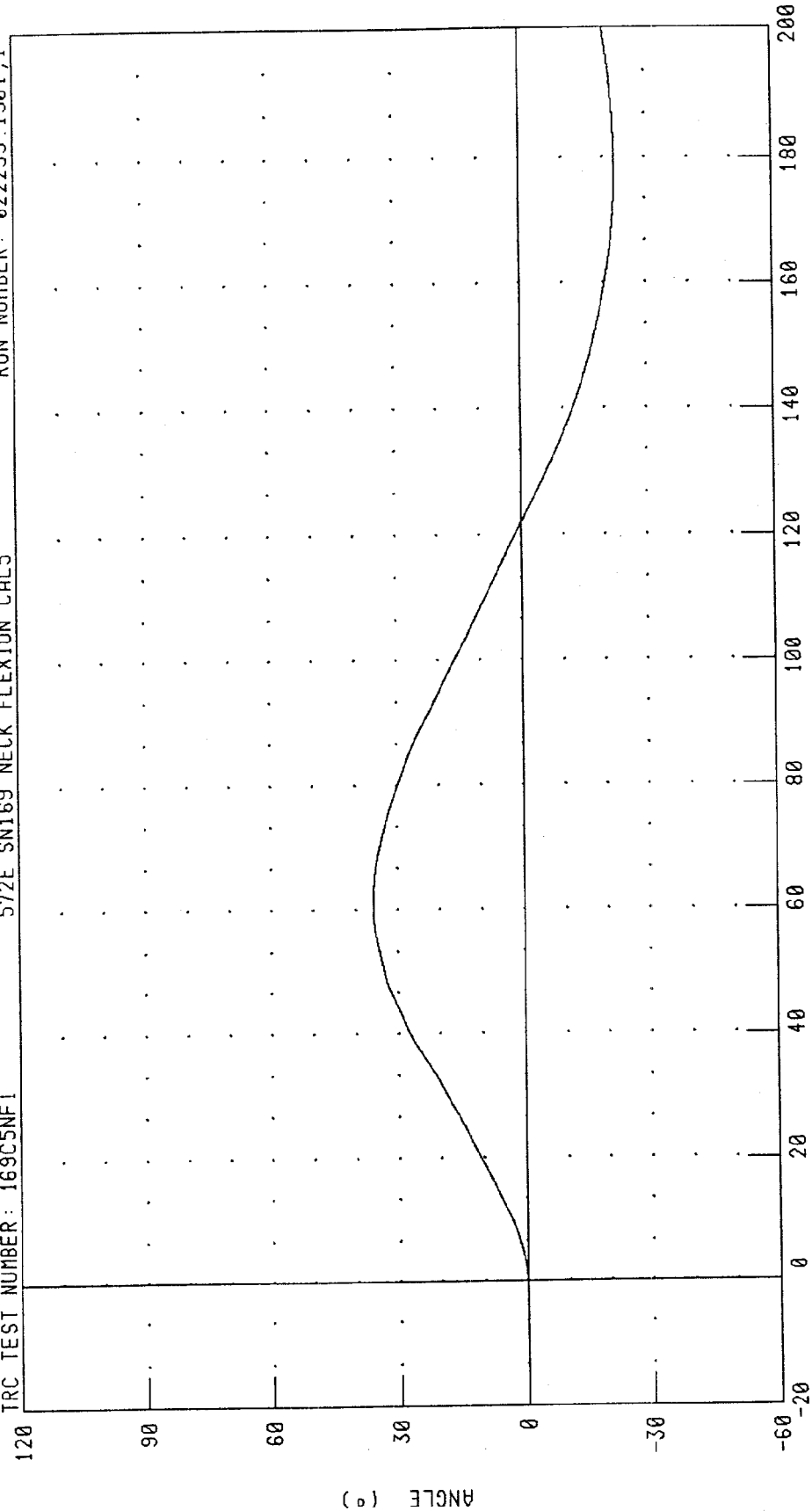
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN169 NECK FLEXION CALS

RUN NUMBER: 022299.1501;1

TRC TEST NUMBER: 169C5NF1



PEAK DATA: 35.79 ° @ 60.40 MS; -22.75 ° @ 178.16 MS

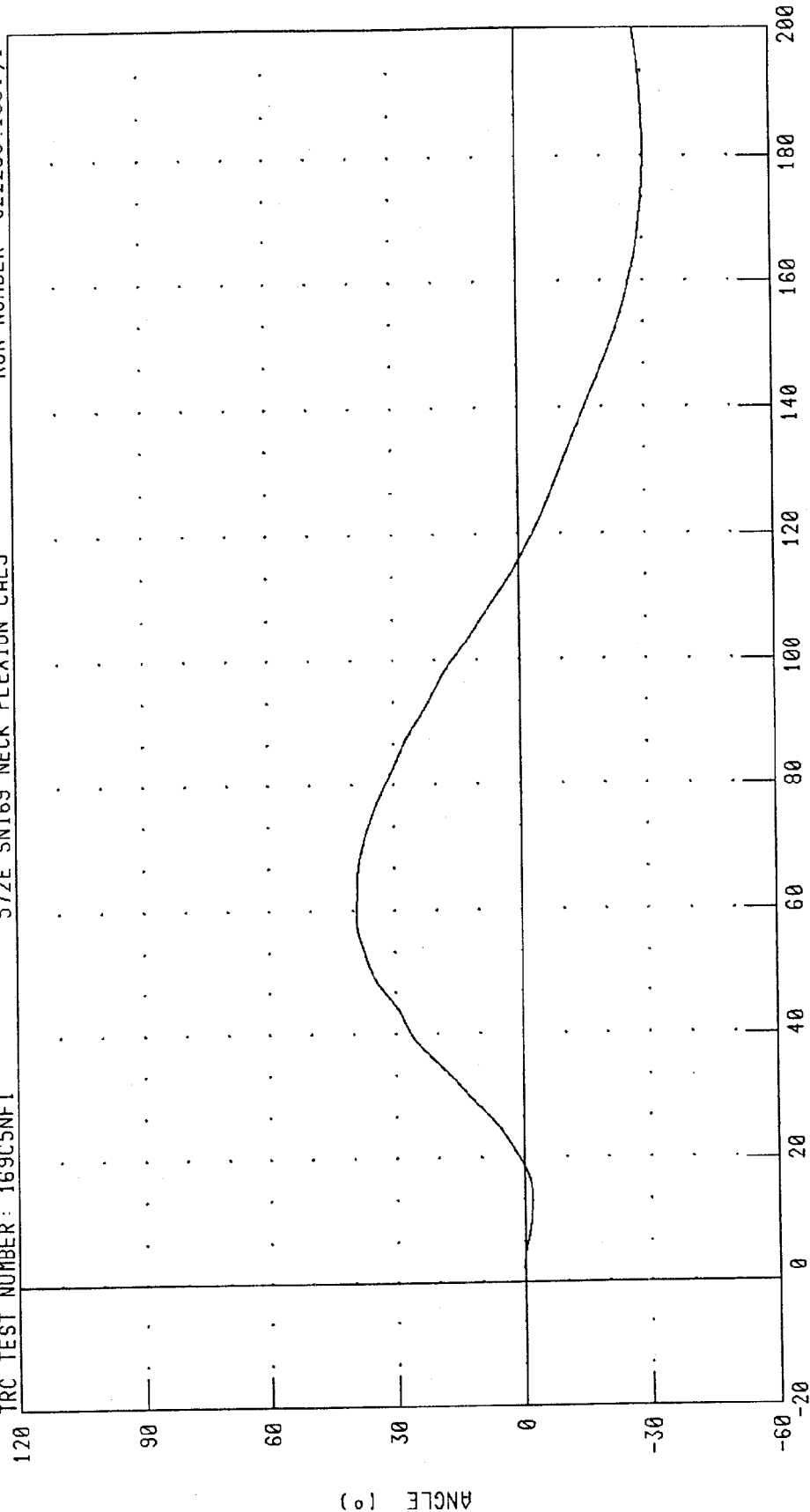
FILTER: CH. CLASS 60

CHANNEL: BETA

PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
572E SN169 NECK FLEXION CAL5

RUN NUMBER: 022299.1501;1

TRC TEST NUMBER: 169C5NF1



PEAK DATA: 39.05 ° @ 58.96 MS; -30.34 ° @ 181.20 MS

FILTER: CH. CLASS 60

CHANNEL: THETA

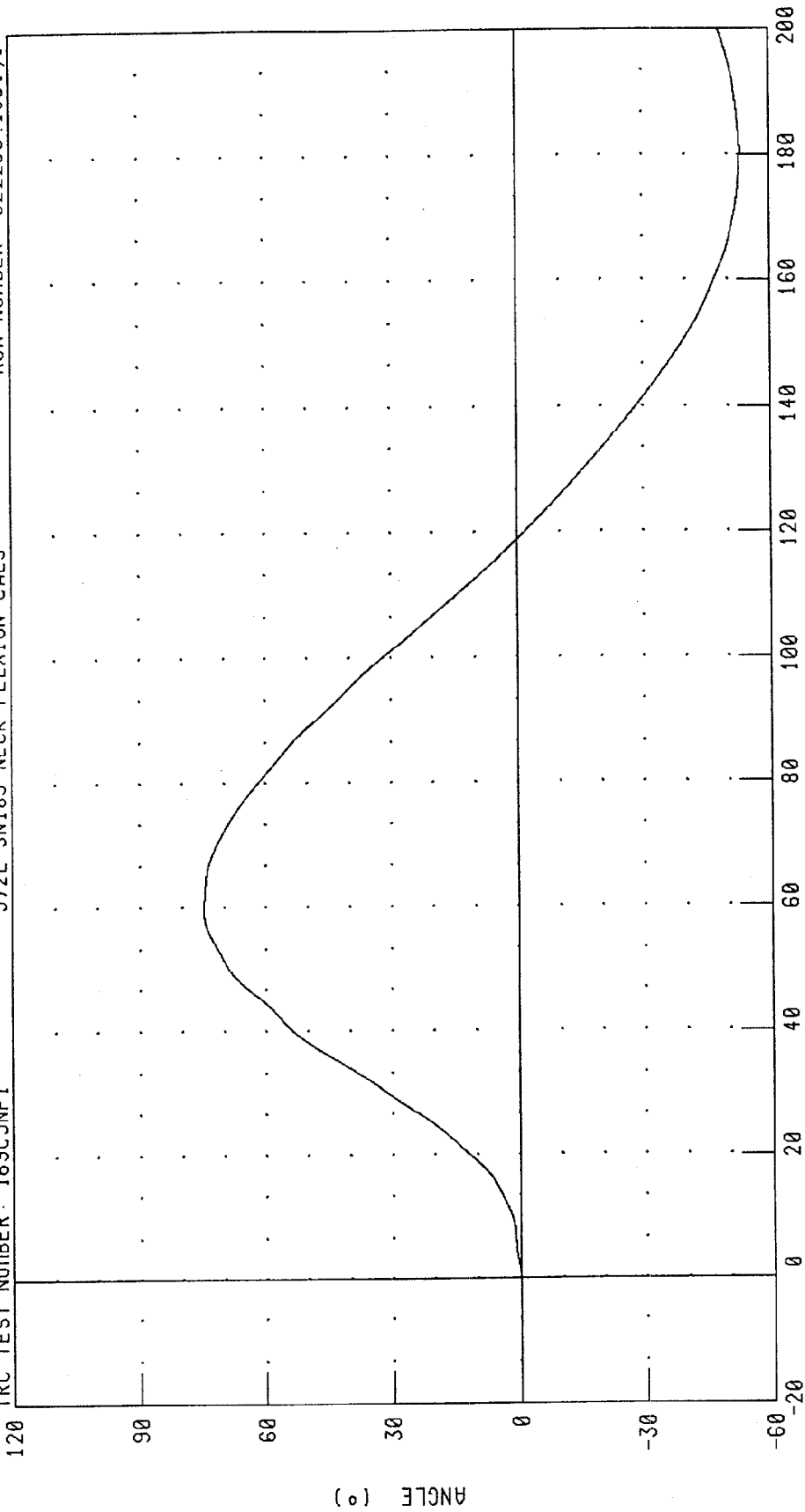
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 169CSNF1

572E SN169 NECK FLEXION CAL5

RUN NUMBER: 022299.1501;1



CHANNEL: TOTAL FILTER: CH. CLASS 60

PEAK DATA: 74.81 ° @ 59.52 MS, -53.05 ° @ 180.64 MS

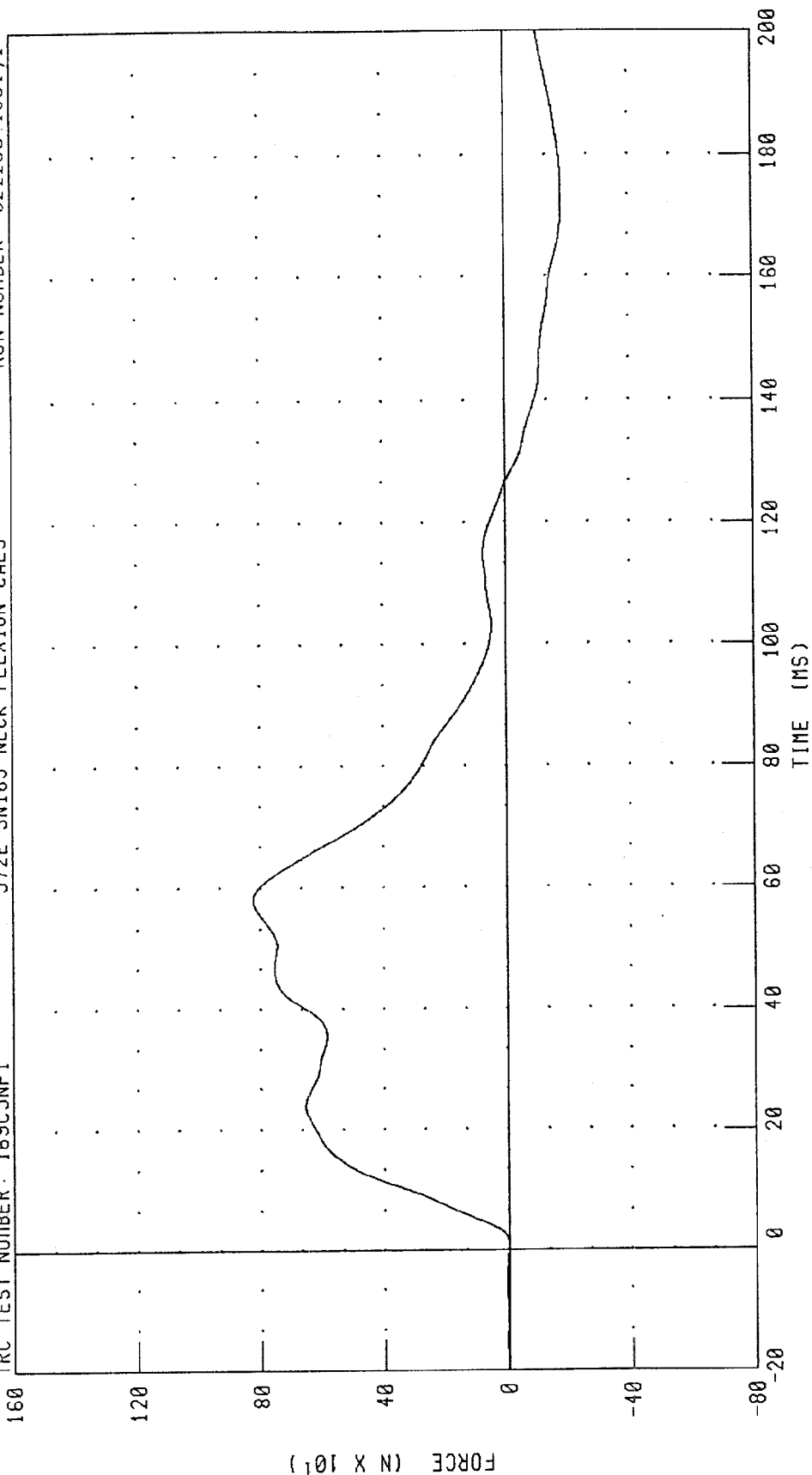
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 169C5NF1

572E SN169 NECK FLEXION CAL5

RUN NUMBER: 022299.1501;1



PEAK DATA: 823.33 N @ 58.08 MS; -183.47 N @ 170.56 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

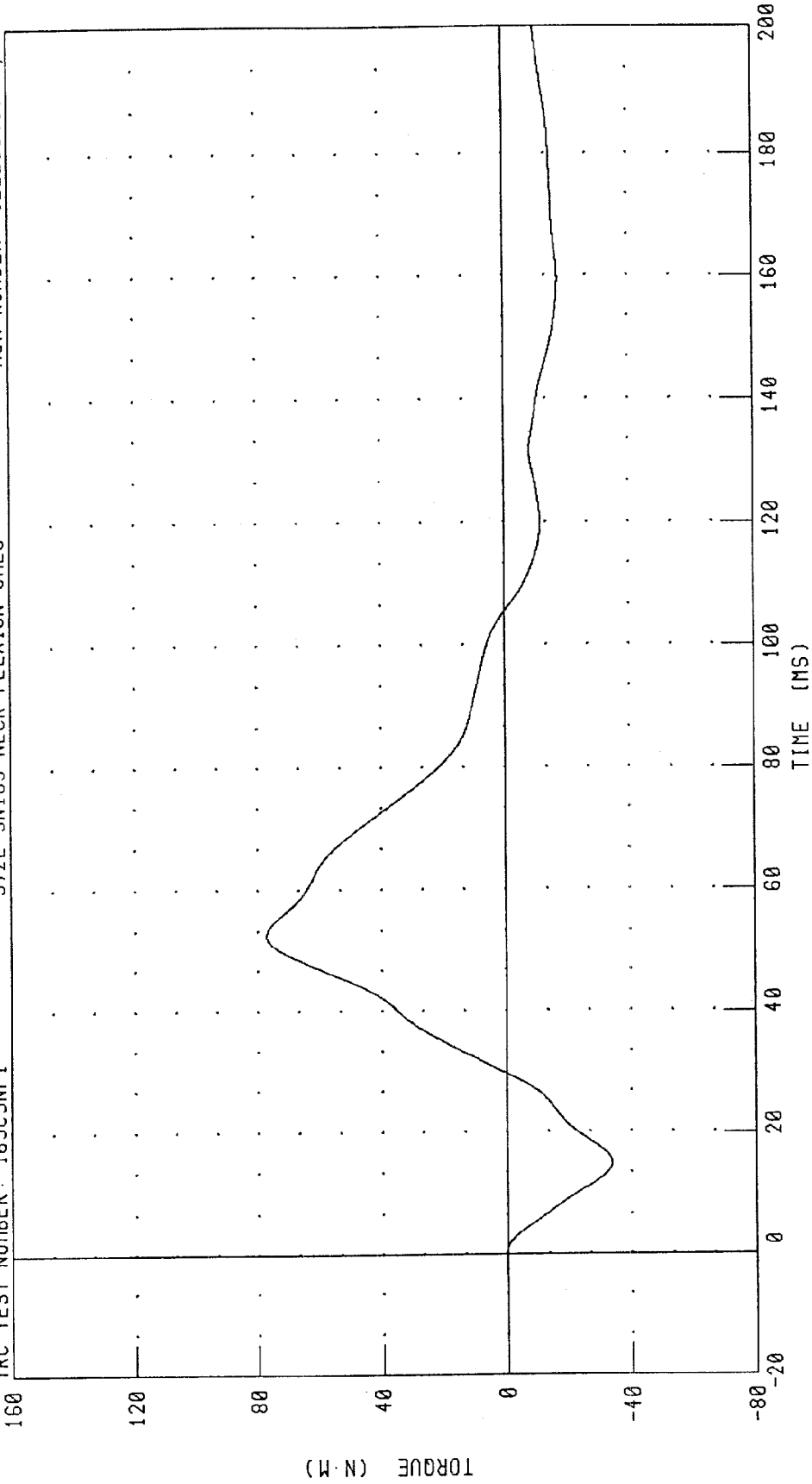
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 169C5NF1

572E SN169 NECK FLEXION CAL5

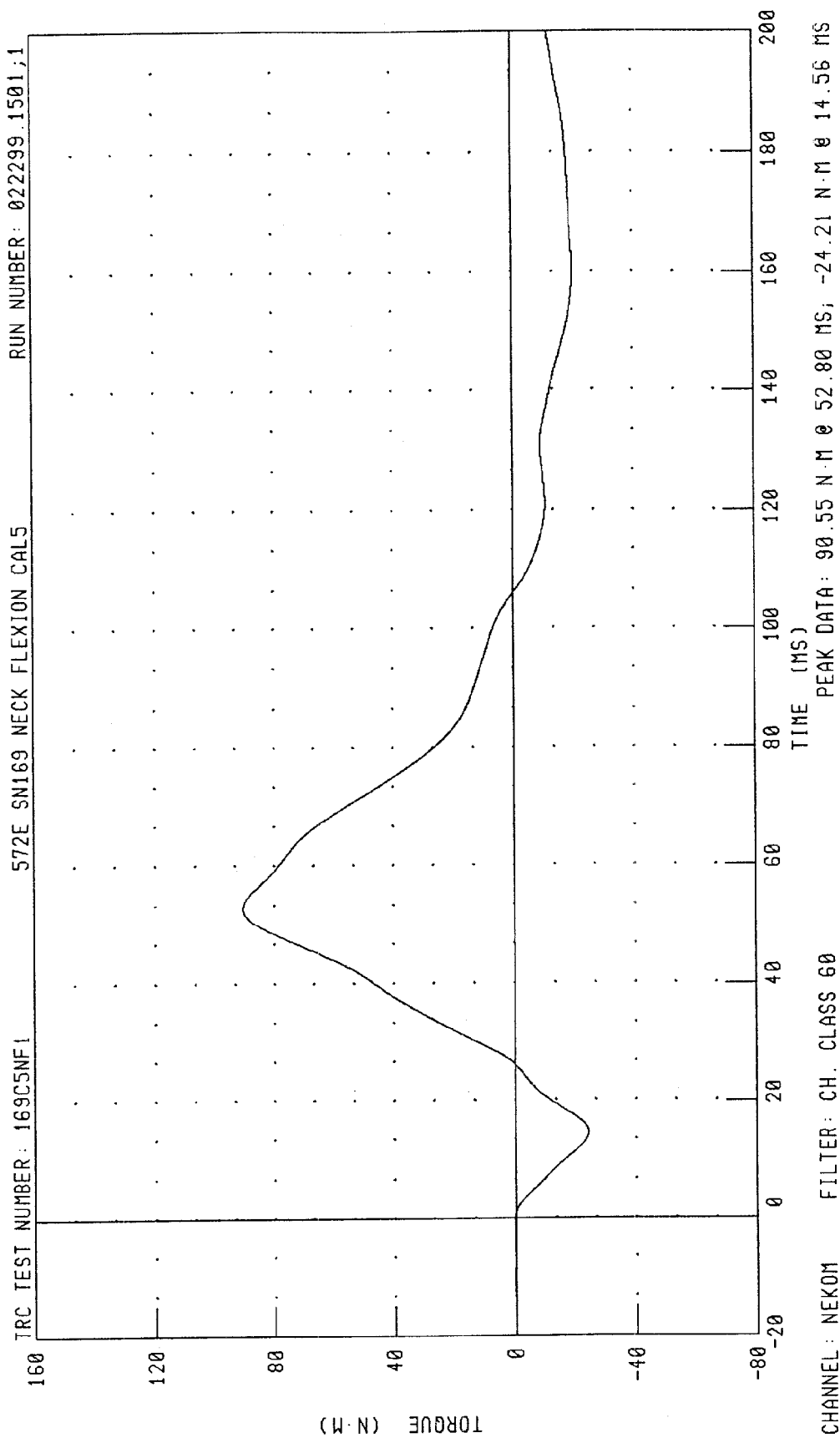
RUN NUMBER: 022299.1501;1



PEAK DATA: 77.05 N·M @ 52.64 MS, -33.73 N·M @ 14.96 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

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



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-FEB-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 169C5NE3 572E SN 169 NECK EXT CAL5

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.21 G
	20 MS	14.00 - 19.00 G	17.55 G
	30 MS	11.00 - 16.00 G	14.23 G
MAX PENDULUM G		22 G MAX	19.25 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.48 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	38.72 MS
D PLANE	MAX	81 - 106 DEG.	103.66 DEG.
ROTATION	TIME	72 - 82 MS	76.72 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-72.77 NM
	TIME	65 - 79 MS	70.64 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	159.60 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	148.00 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN

B. Calt

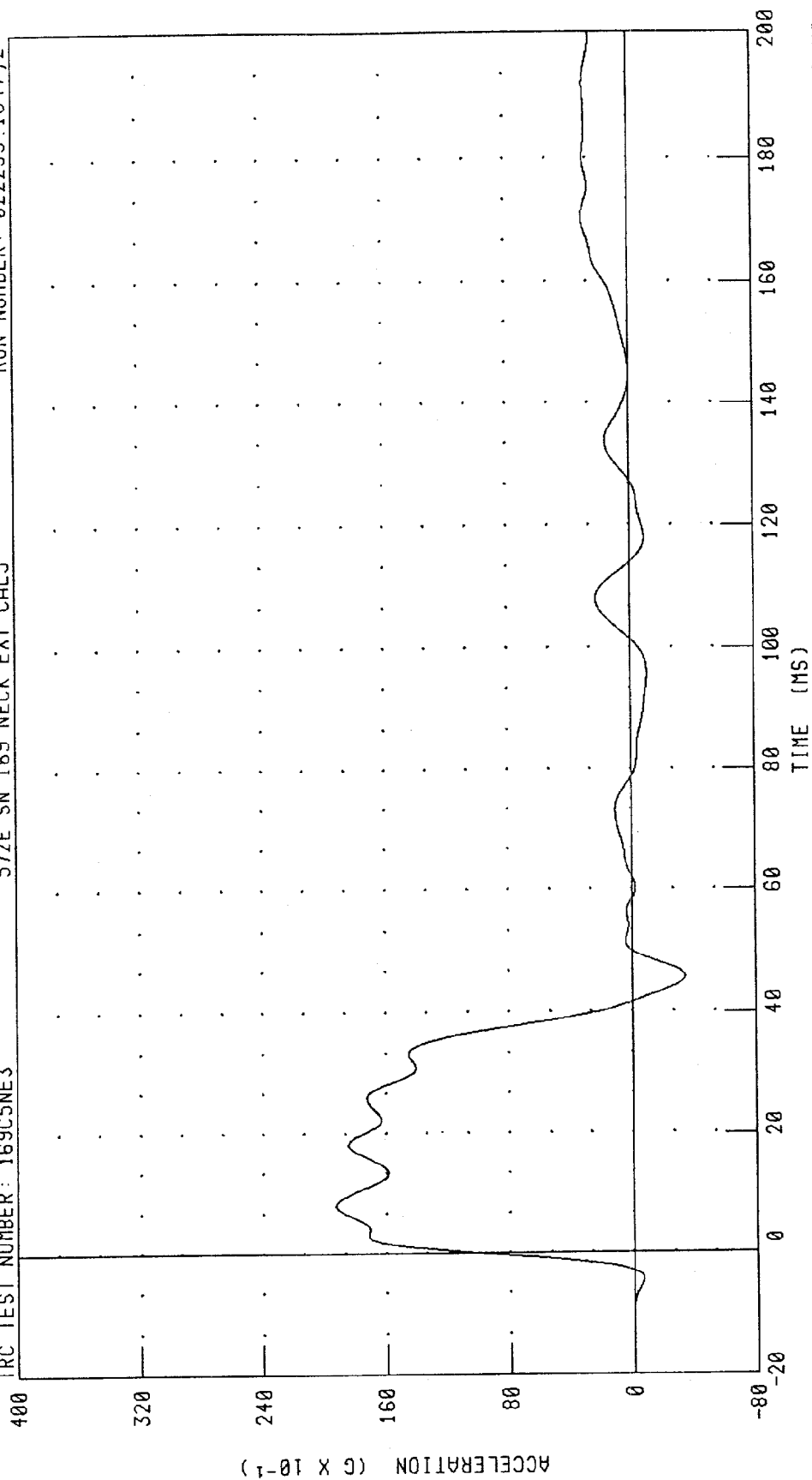
RUN NUMBER: 022299.1647;2

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 169C5NE3

572E SN 169 NECK EXT CAL5

RUN NUMBER: 022299.1647;2



PEAK DATA: 19.26 G 8.08 MS; -3.44 G 45.68 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

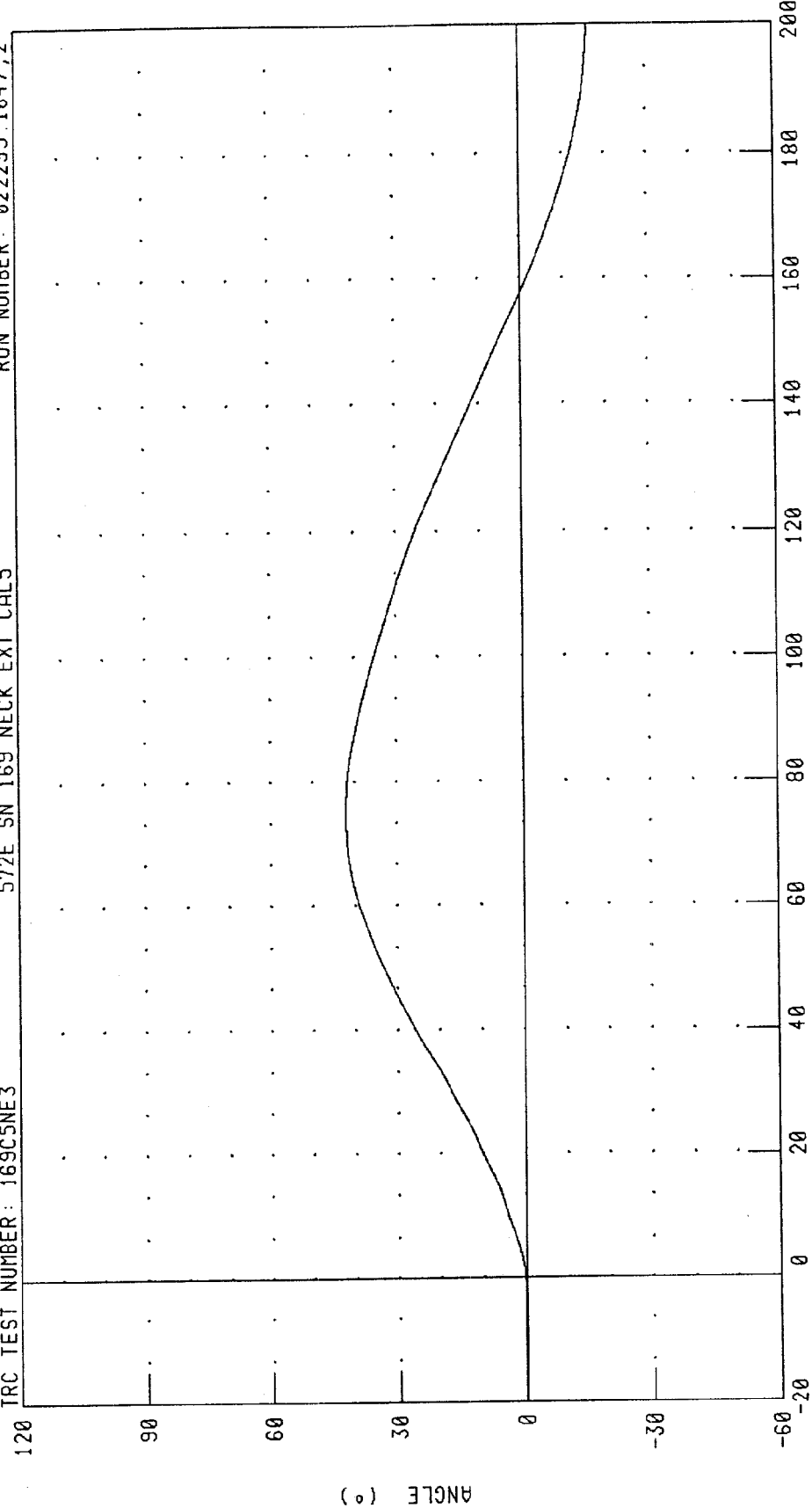
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN 169 NECK EXT CAL5

RUN NUMBER: 022299.1647;2

TRC TEST NUMBER: 169C5NE3



PEAK DATA: 42.03 ° @ 75.20 MS; -16.28 ° @ 200.00 MS

FILTER: CH. CLASS 60

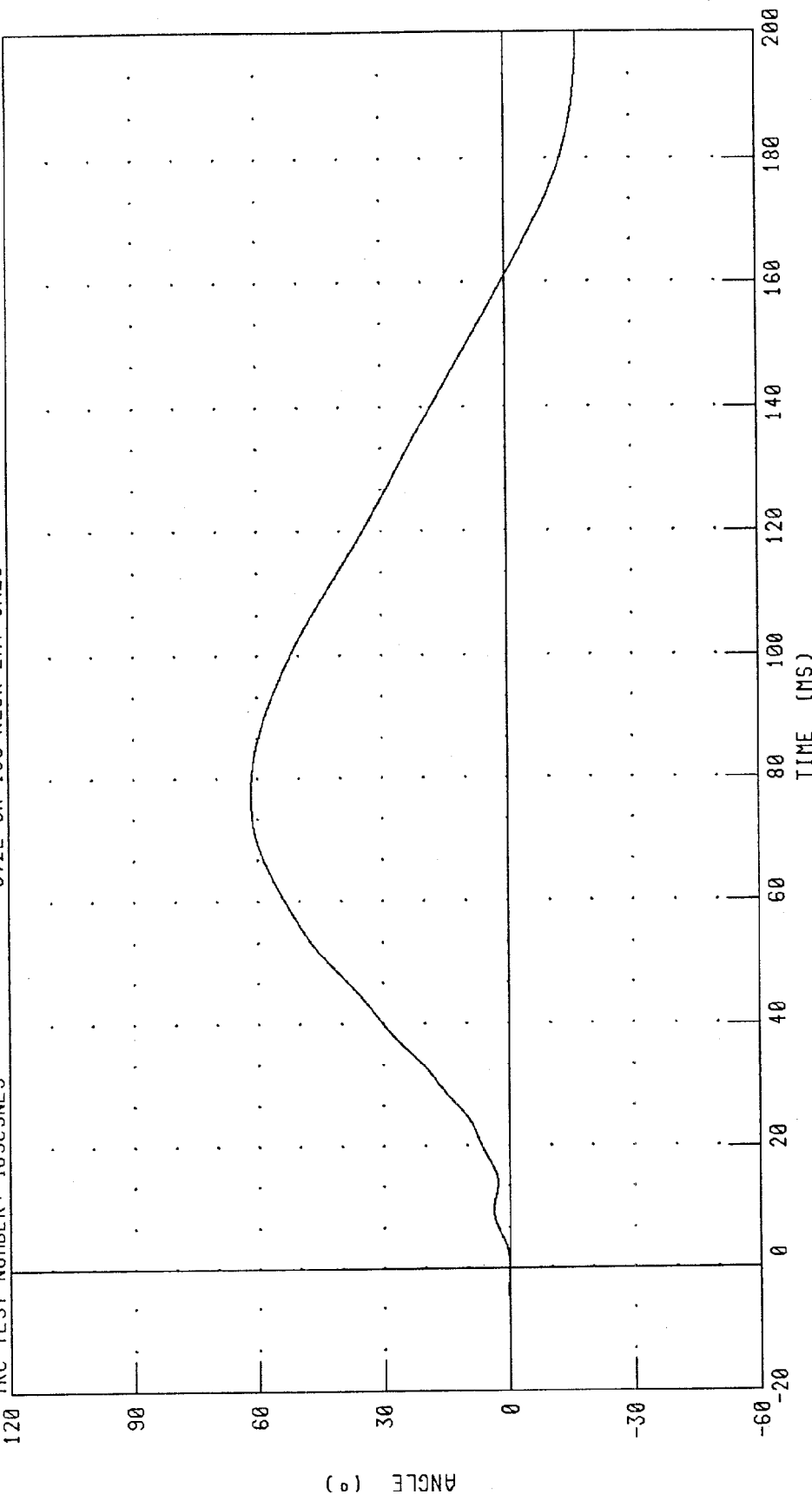
CHANNEL: BETA

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

TRC TEST NUMBER: 169C5NE3

572E SN 169 NECK EXT CAL5

RUN NUMBER: 022299.1647;2



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 61.67 ° @ 77.28 MS; -17.40 ° @ 200.00 MS

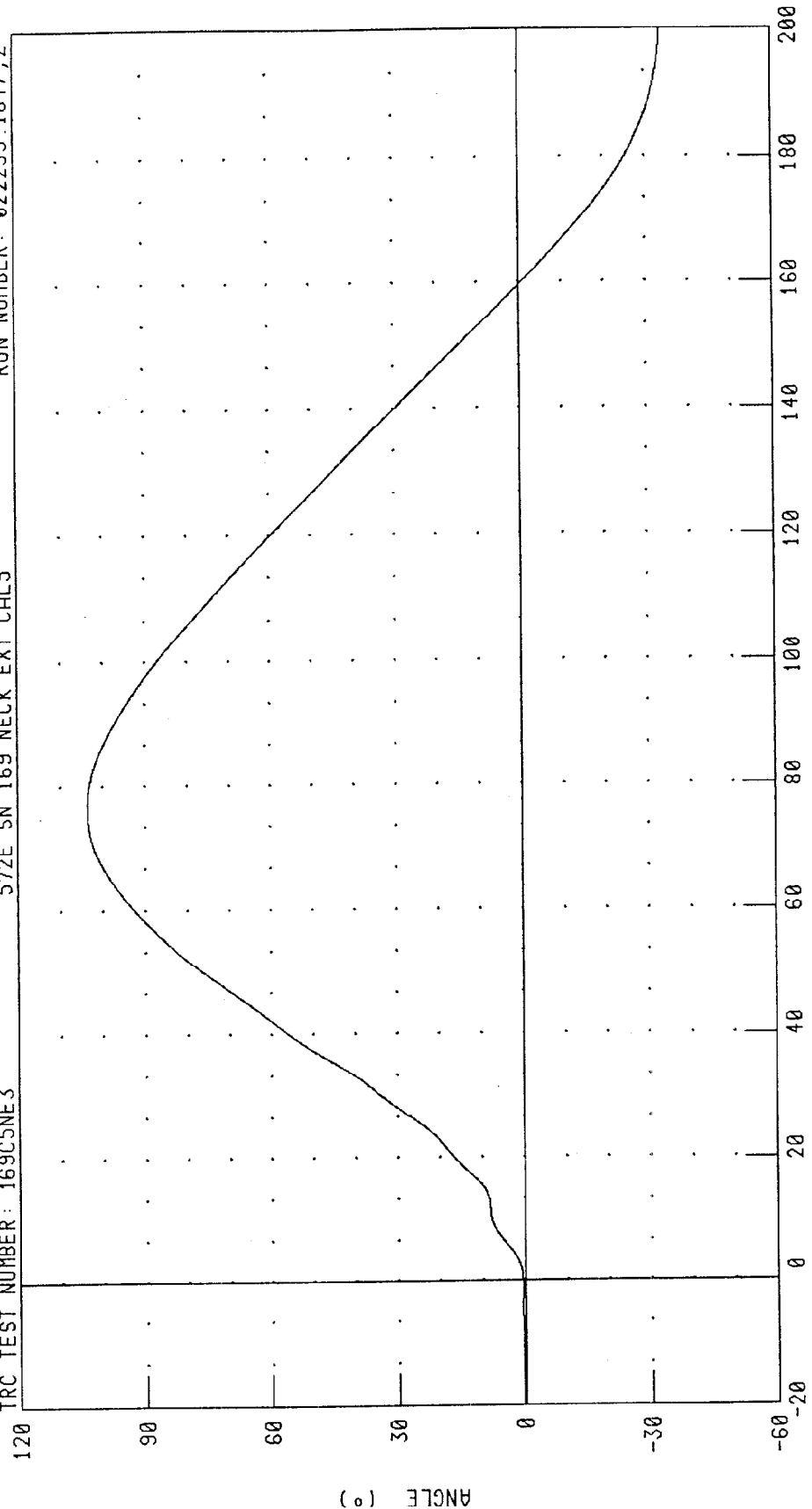
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

RUN NUMBER: 022299.1647;2

572E SN 169 NECK EXT CAL5

TRC TEST NUMBER: 169C5NE3



PEAK DATA: 103.66 ° @ 76.72 MS; -33.68 ° @ 200.00 MS

FILTER: CH. CLASS 60

CHANNEL: TOTAN

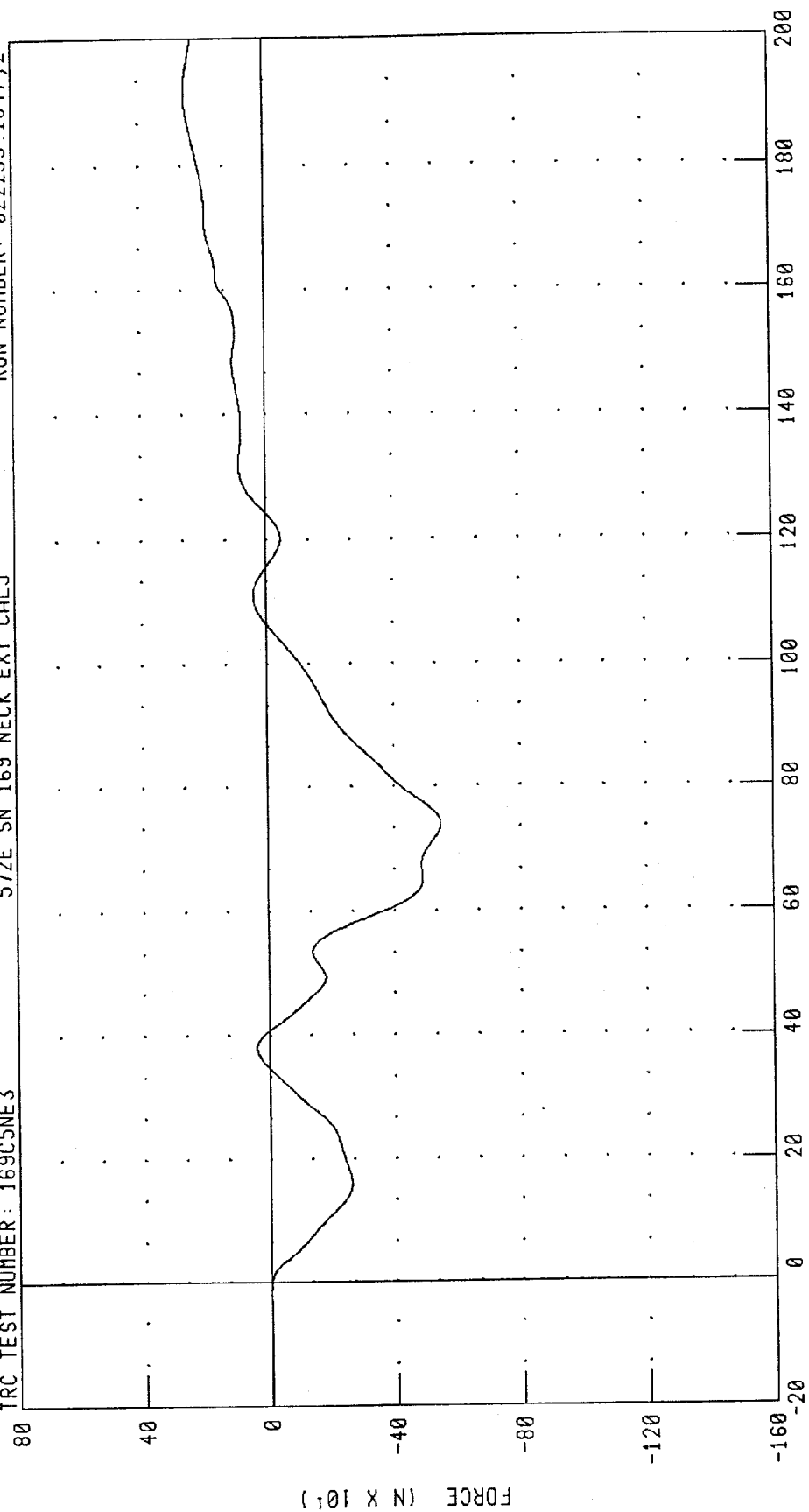
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 022299.1647;2

572E SN 169 NECK EXT CAL5

TRC TEST NUMBER: 169C5NE3



TIME (MS)

PEAK DATA: 253.49 N @ 191.60 MS; -548.59 N @ 73.92 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

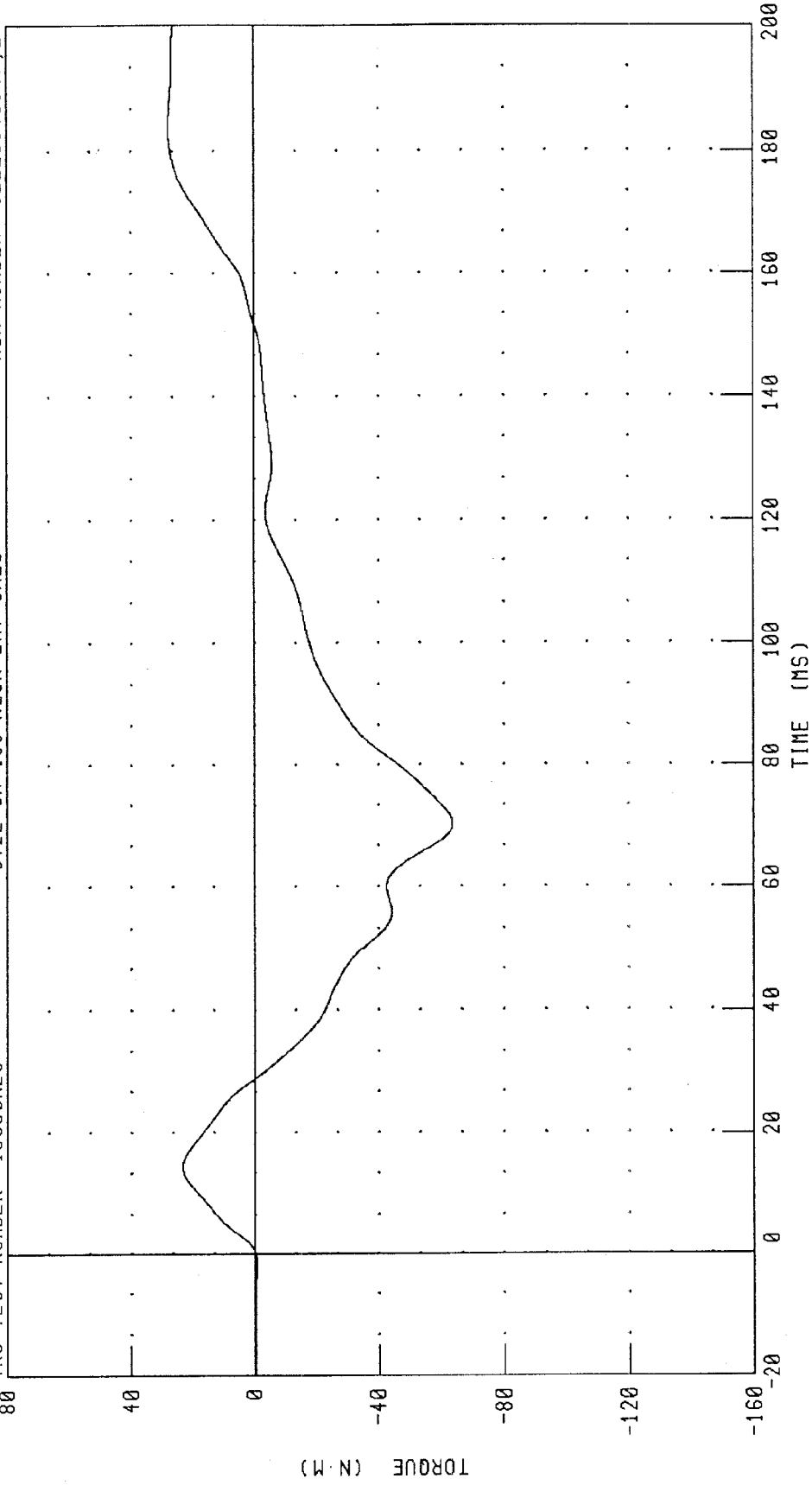
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER: 169C5NE3

572E SN 169 NECK EXT CAL5

RUN NUMBER: 022299.1647;2



PEAK DATA: 27.88 N·M @ 183.76 MS; -63.68 N·M @ 70.32 MS

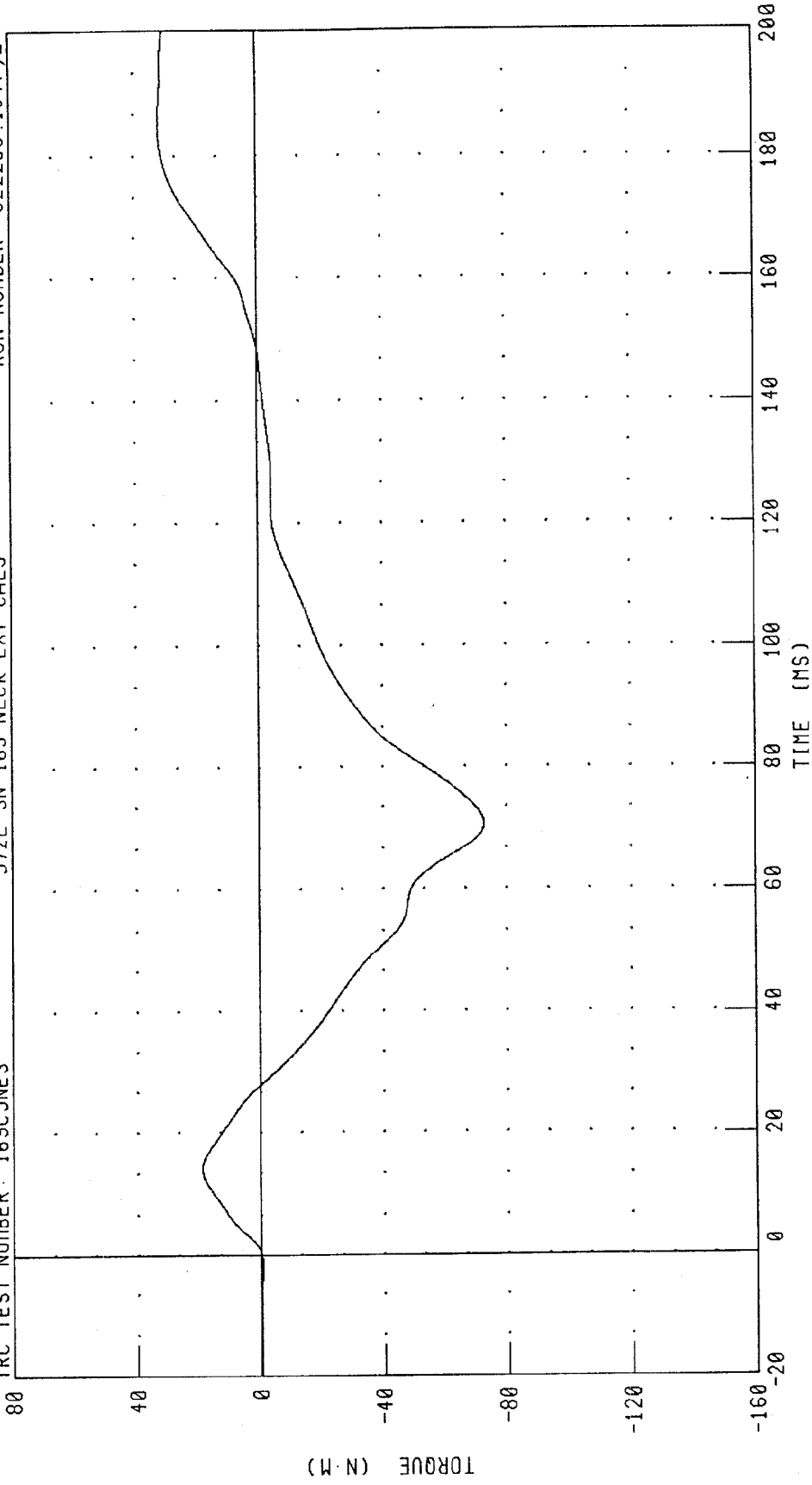
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 169C5NE3

572E SN 169 NECK EXT CAL5

RUN NUMBER: 022299.1647;2



PEAK DATA: 32.00 N·M @ 185.12 MS, -72.77 N·M @ 70.64 MS

CHANNEL: NEKOM FILTER: CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

23-FEB-99

TRC INC.

TEST NO: 169C5TH3

572E SN169 H.S.THORAX CAL05

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	22.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.71 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	61.1 MM *
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5818. N
INTERNAL HYSTERESIS	69% - 85%	70.7%

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN Kevin Watkins

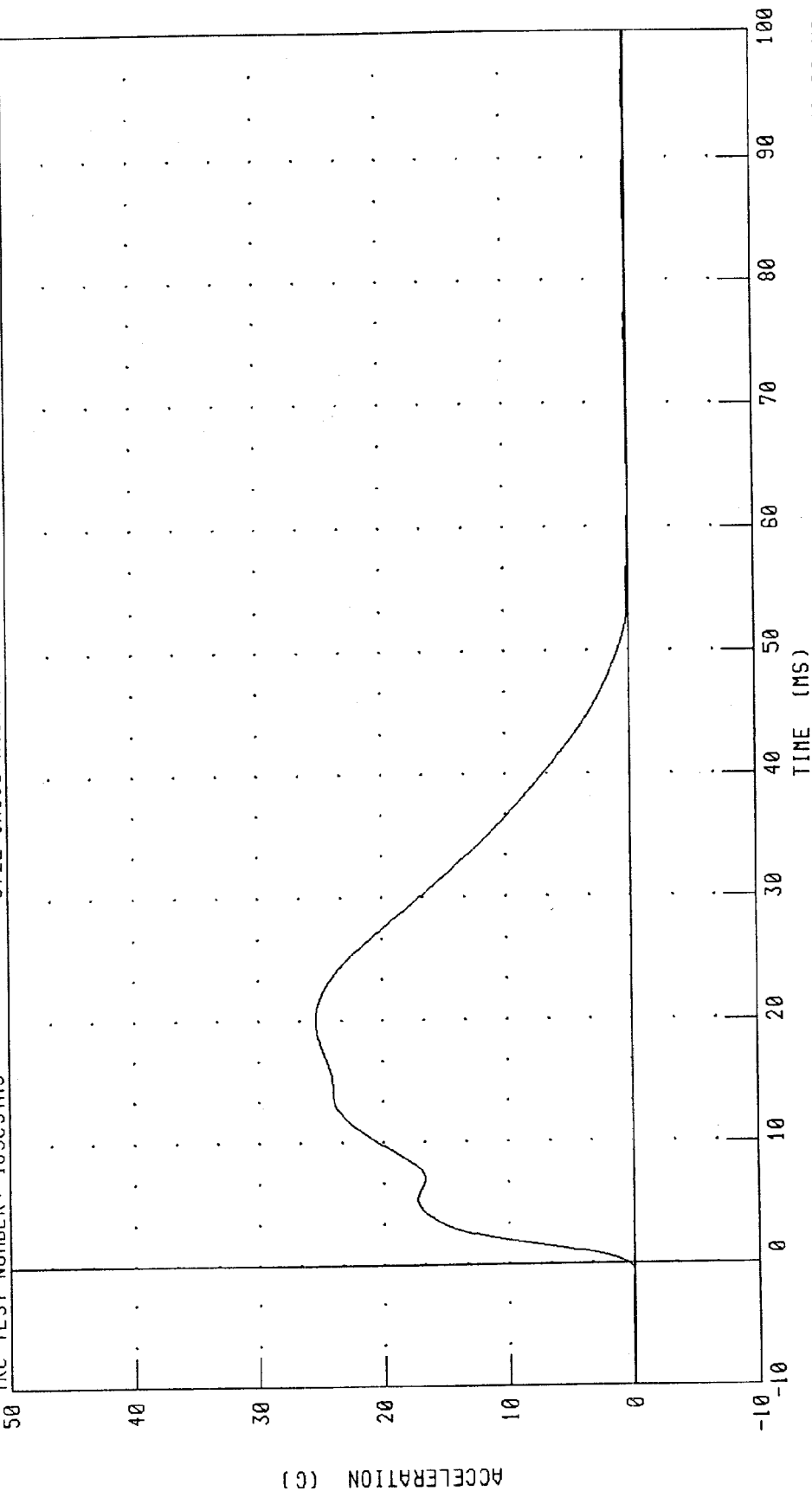
RUN NUMBER: 022399.0719;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 169C5TH3

572E SN169 H.S. THORAX CAL05

RUN NUMBER: 022399.0734;1

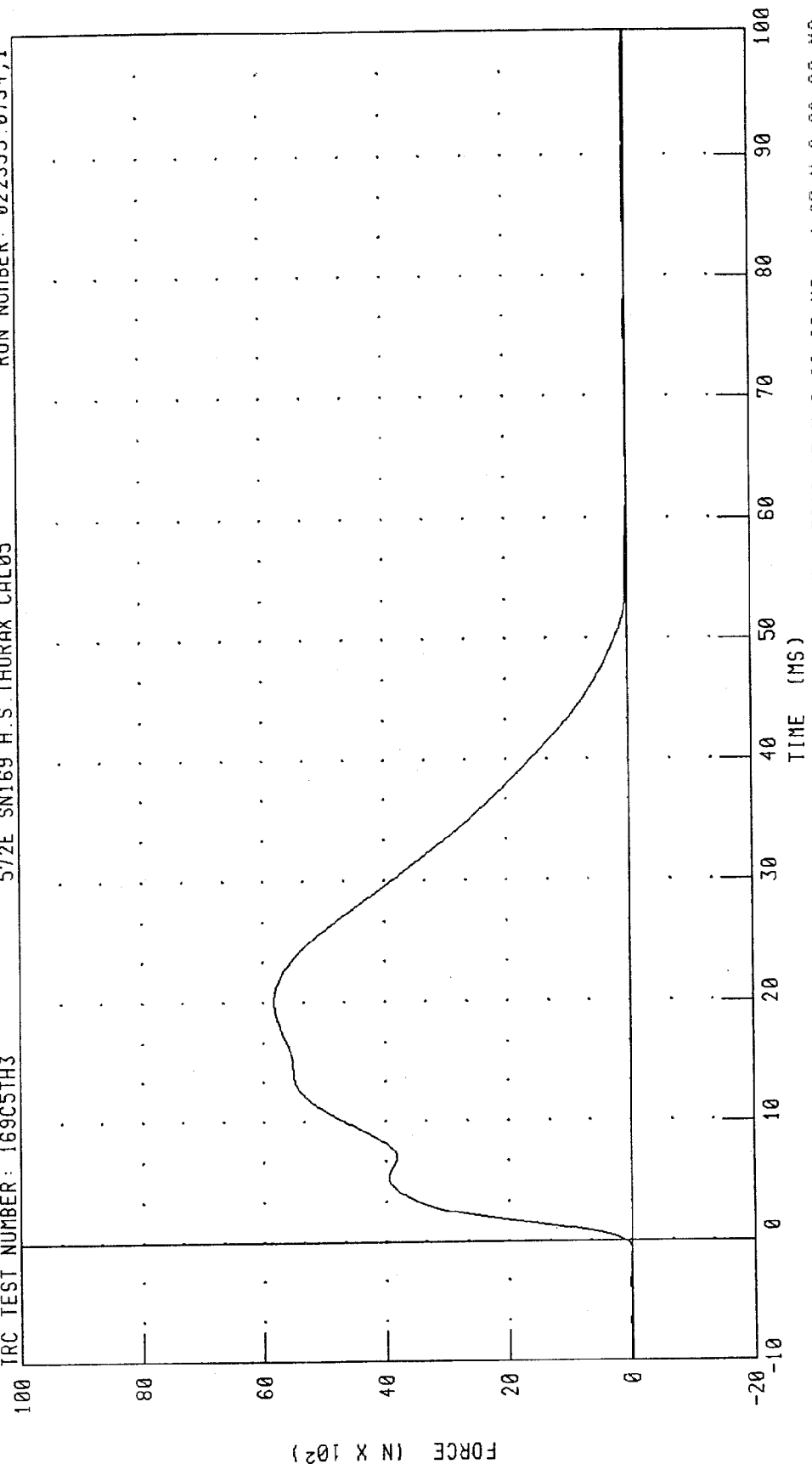


CHANNEL: PENXC FILTER: CH. CLASS 180

PEAK DATA: 25.40 G @ 20.08 MS; -0.02 G @ 62.96 MS

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

IRC TEST NUMBER: 169C5TH3 572E SN169 H.S. THORAX CAL05 RUN NUMBER: 022399.0734;1



CHANNEL: PENXF FILTER: CH. CLASS 180 PEAK DATA: 5818.15 N @ 20.08 MS; -4.67 N @ 62.96 MS

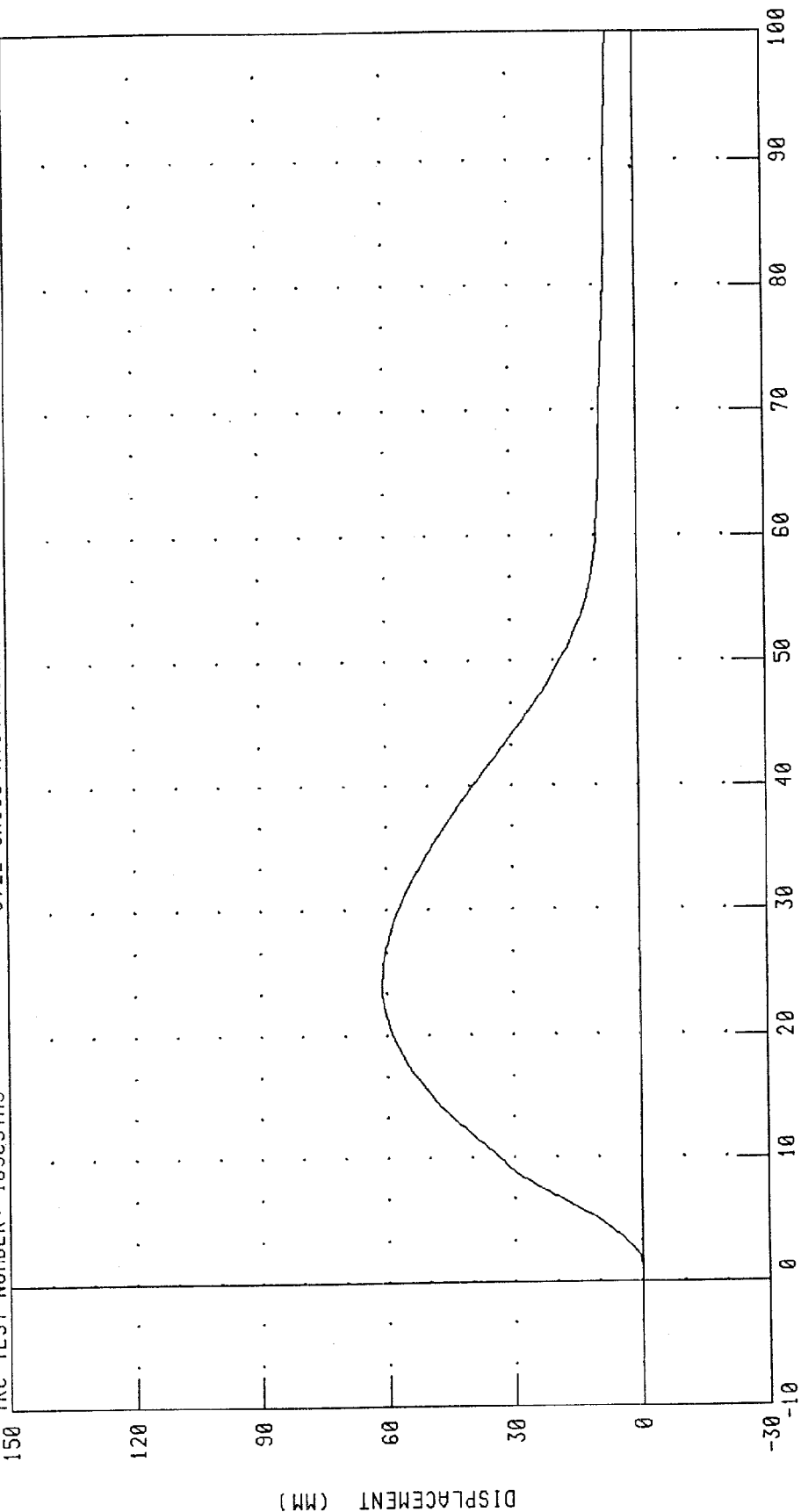
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER: 169C5TH3

572E SN169 H.S. THORAX CAL05

RUN NUMBER: 022399 0734;1



CHANNEL: CSTXD FILTER: CH. CLASS 180

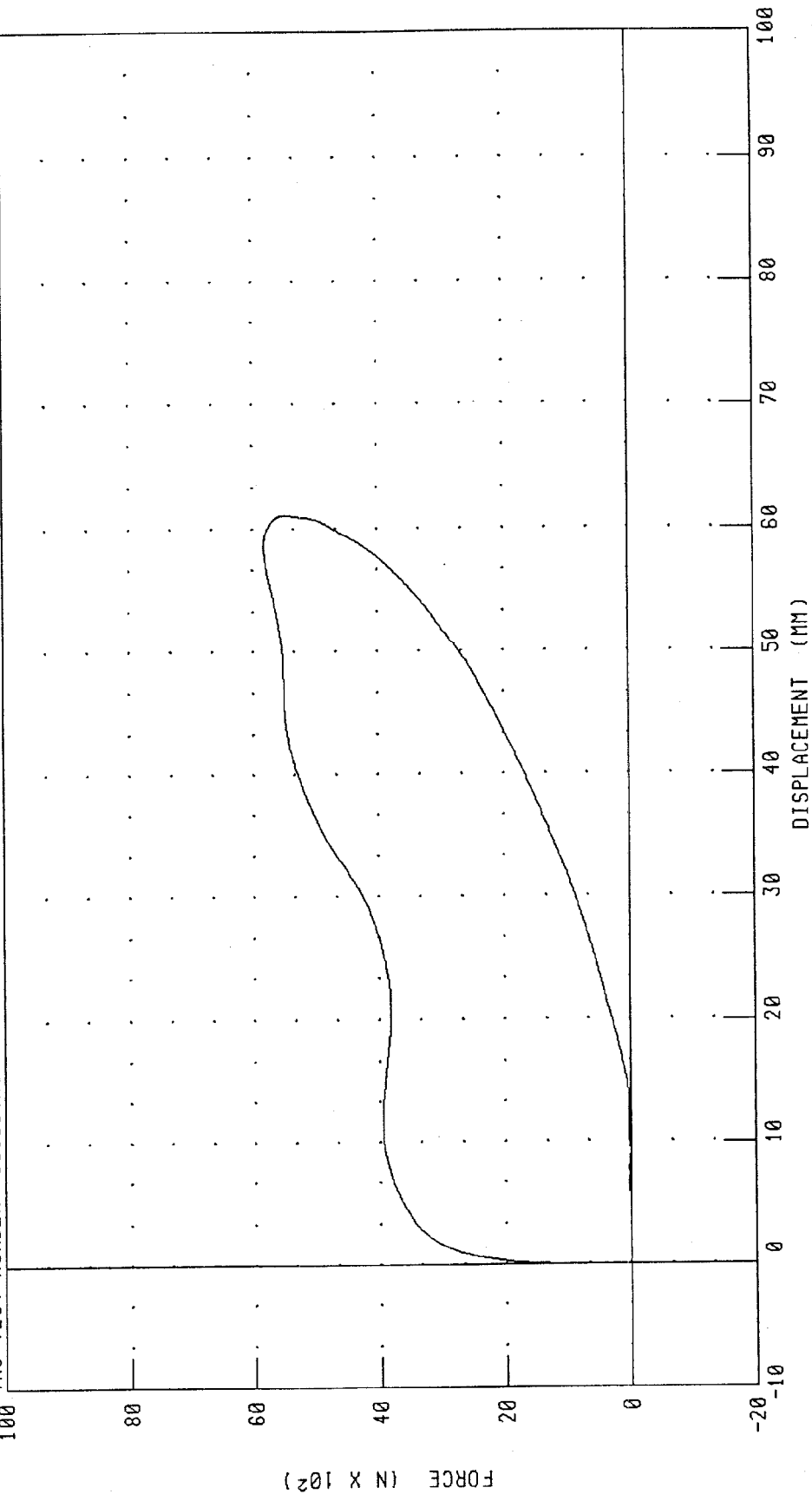
PEAK DATA: 61.12 MM @ 23.68 MS; -0.02 MM @ 0.80 MS

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

TRC TEST NUMBER: 169C5TH3

572E SN169 H.S. THORAX CAL05

RUN NUMBER: 022399 0734;1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180

CH. CLASS 180

PEAK DATA: 61.12 MM @ 23.68 MS; -0.02 MM @ 0.80 MS
5818.15 N @ 20.08 MS; -4.67 N @ 62.96 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

22-FEB-99

TRC INC.

TEST NO: 169C5HR1

572E SN 169 HIPFLEX CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	67.3 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.7 deg.

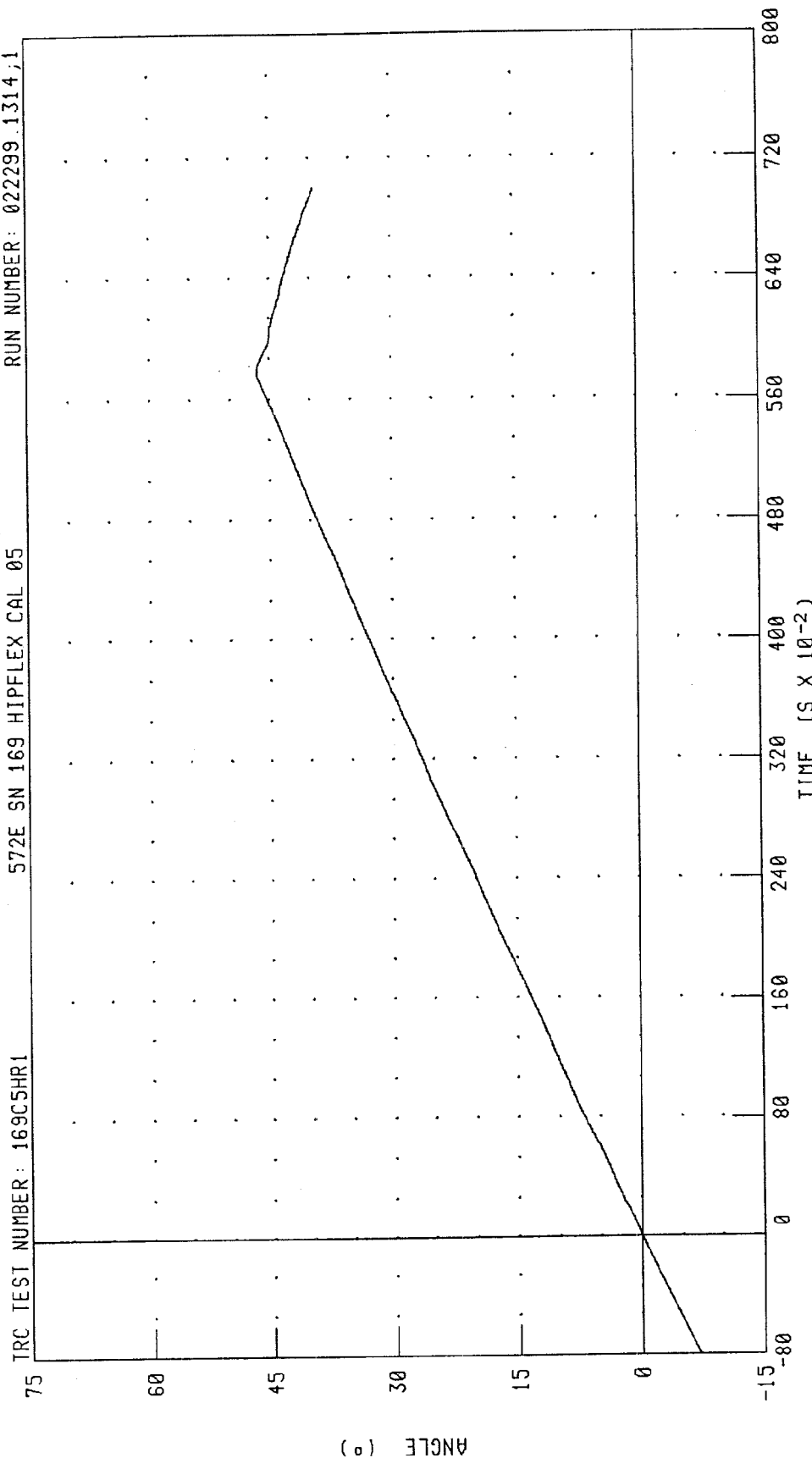
TEST MEETS SPECIFICATIONS

TECHNICIAN Ray Calt

RUN NUMBER: 022299.1314;1

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES RIGHT HIP FLEXION ROTATION

TRC TEST NUMBER: 169C5HR1 572E SN 169 HIPELEX CAL 05 RUN NUMBER: 022299.1314;1



PEAK DATA: 46.54 ° @ 5.80 S; -10.15 ° @ -1.00 S

CHANNEL: RHPXD FILTER: CH. CLASS 60

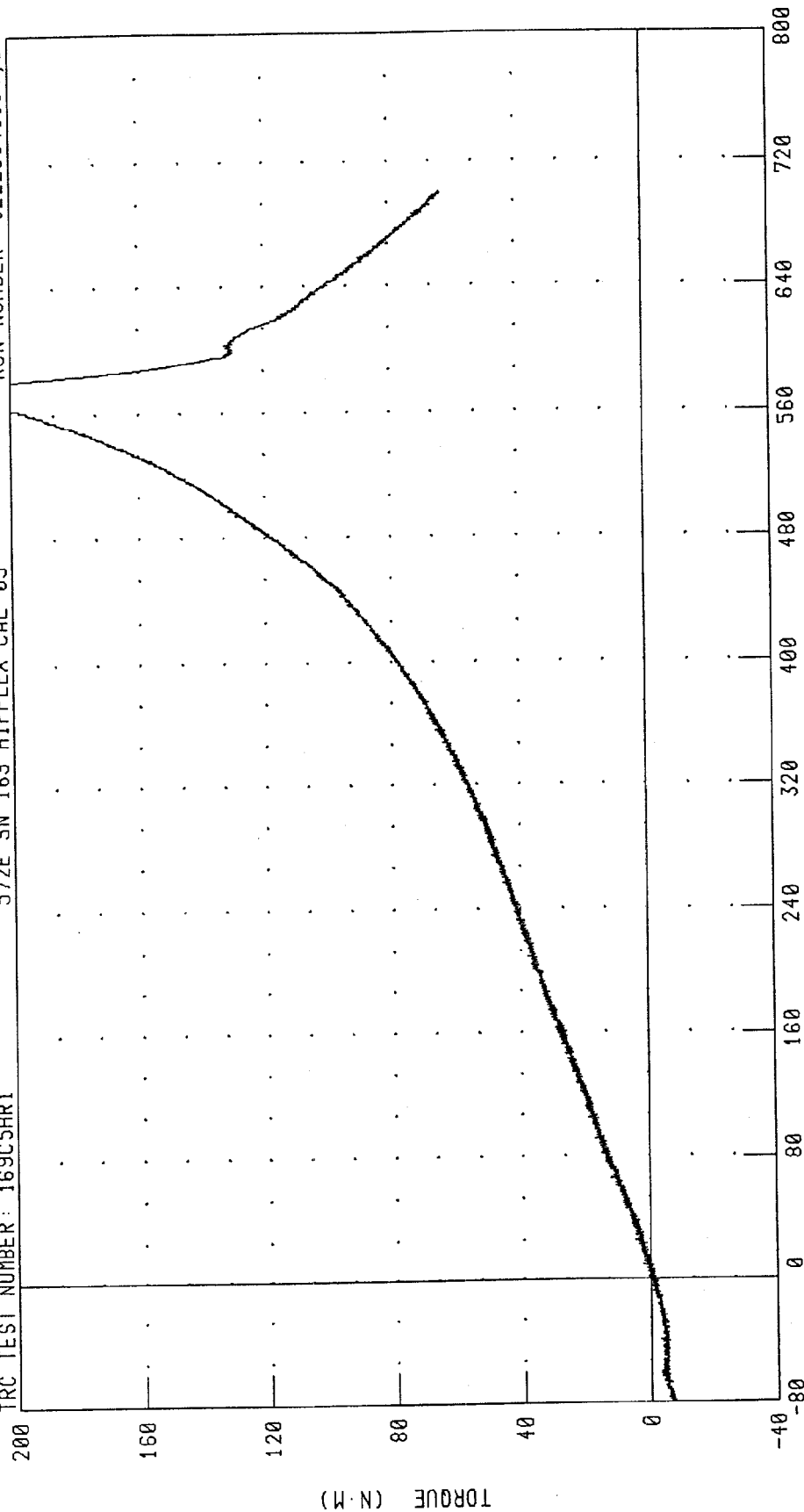
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

572E SN 169 HIPFLEX CAL 05

RUN NUMBER: 022299.1314;1

TRC TEST NUMBER: 169C5HR1



PEAK DATA: 218.97 N·M @ 5.76 S; -11.32 N·M @ -1.00 S

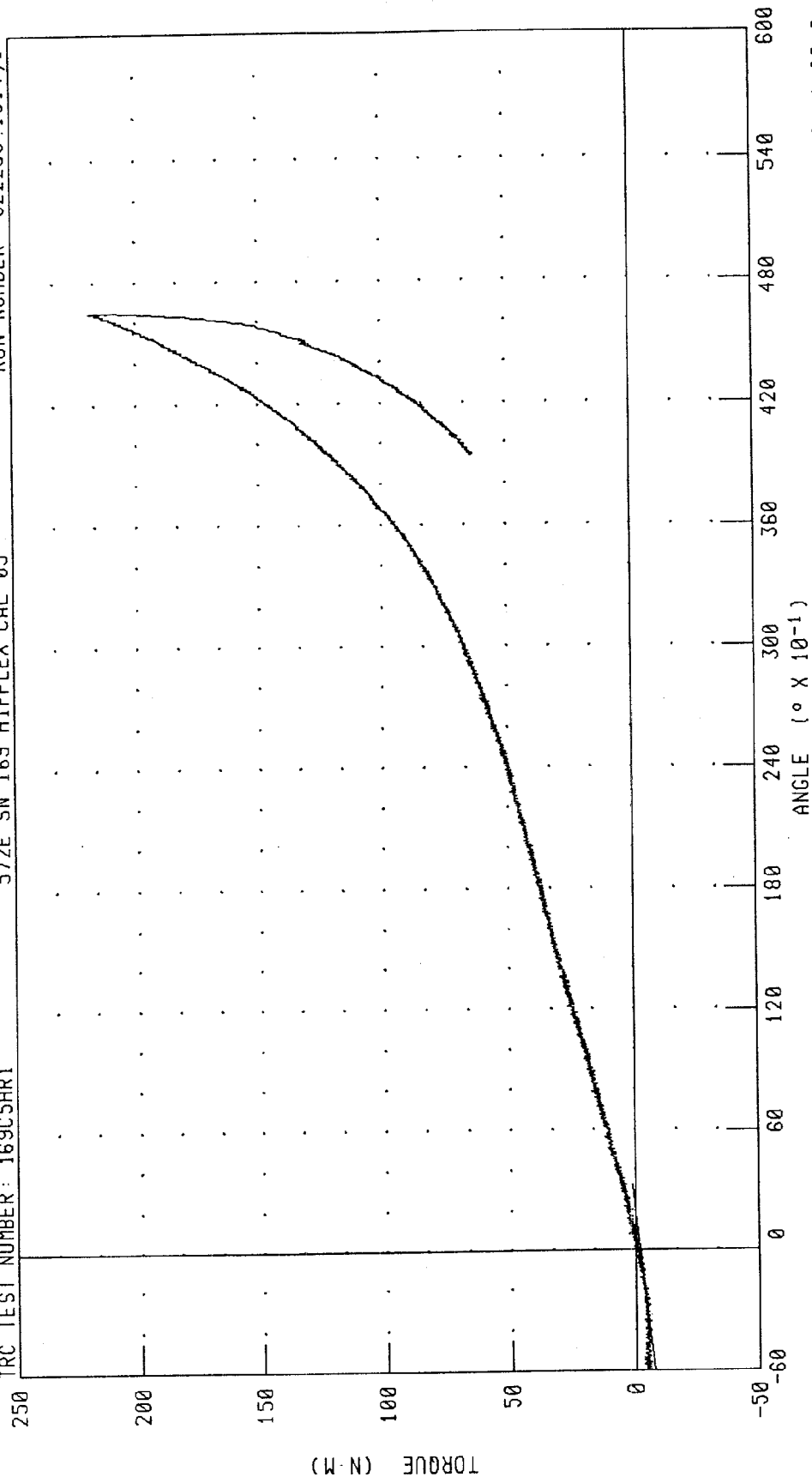
CHANNEL: RHPYM FILTER: CH. CLASS 60

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
 RIGHT HIP FLEXION MOMENT VS ROTATION ANGLE

TRC TEST NUMBER: 169C5HR1

572E SN 169 HIPFLEX CAL 05

RUN NUMBER: 022299.1314;1



CHANNEL: RHPXD FILTER: CH. CLASS 60
 RHPYM CH. CLASS 60
 PEAK DATA: 46.54 ° 210.97 N-M 5.80 S; -10.15 ° -11.32 N-M 5.76 S; -1.00 S

TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

22-FEB-99

TRC INC.

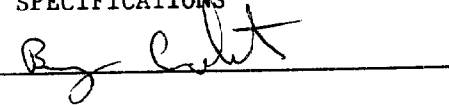
TEST NO: 169C5HL1

572E SN 169 HIPFLEX CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	64.3 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.4 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 022299.1311;1

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION ROTATION

572E SN 169 HIPFLEX CAL 05

TRC TEST NUMBER: 169C5HLI

75

60

45

30

15

0

-15

-80

0

80

160

240

320

400

480

560

640

720

800

TIME (S X 10⁻²)

PEAK DATA: 46.31 ° @ 5.74 S; -10.22 ° @ -1.00 S

CHANNEL: LHPXD

FILTER: CH. CLASS 60

ANGLE (°)

RUN NUMBER: 022299.1311,1

75

60

45

30

15

0

-15

-80

0

80

160

240

320

400

480

560

640

720

800

TIME (S X 10⁻²)

PEAK DATA: 46.31 ° @ 5.74 S; -10.22 ° @ -1.00 S

CHANNEL: LHPXD

FILTER: CH. CLASS 60

ANGLE (°)

RUN NUMBER: 022299.1311,1

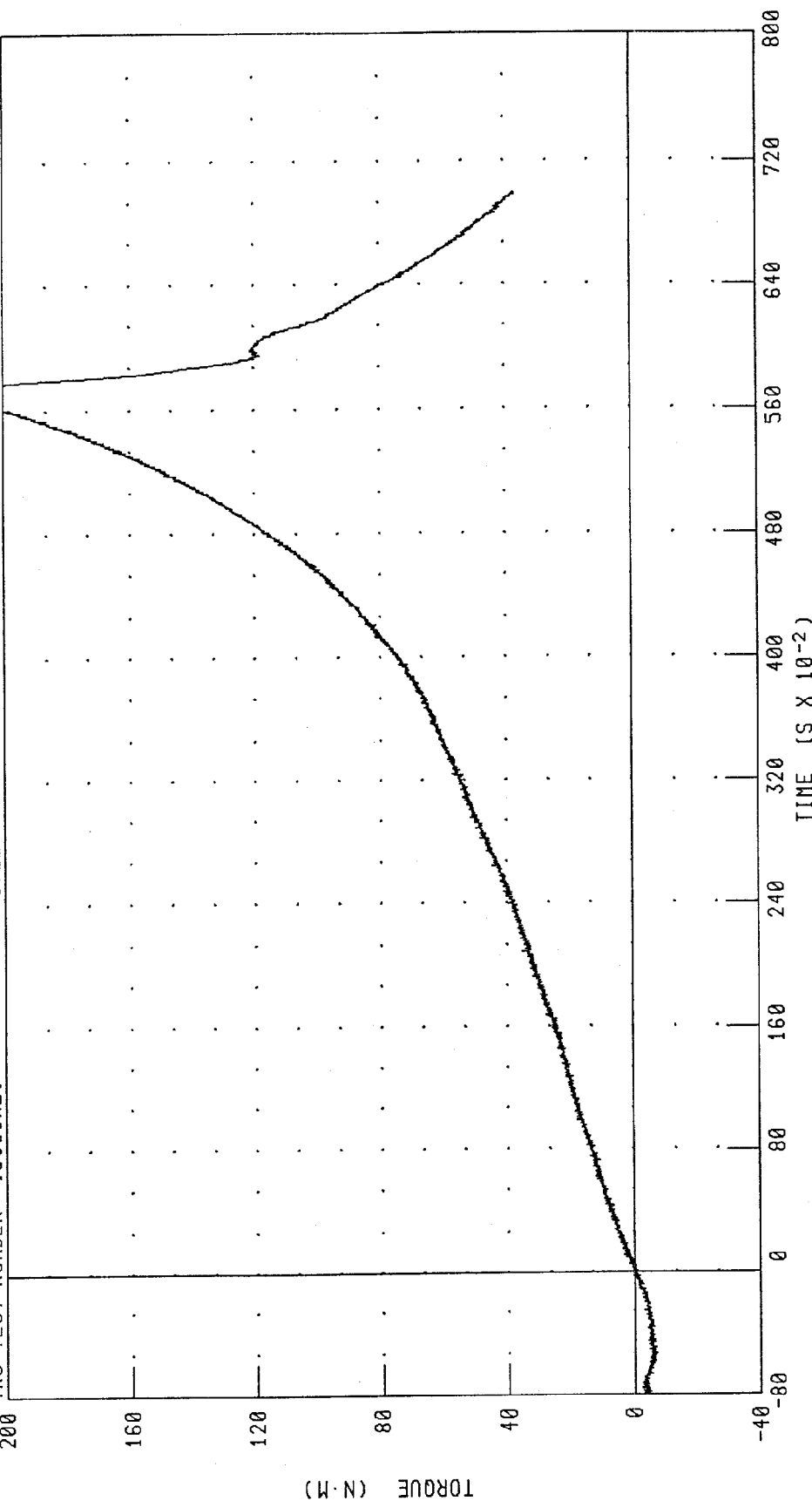
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

LEFT HIP FLEXION MOMENT

TRC TEST NUMBER: 169C5HL1

572E SN 169 HIPFLEX CAL 05

RUN NUMBER: 022299.1311;1



PEAK DATA: 218.34 N·M @ 5.72 S; -7.42 N·M @ -1.00 S

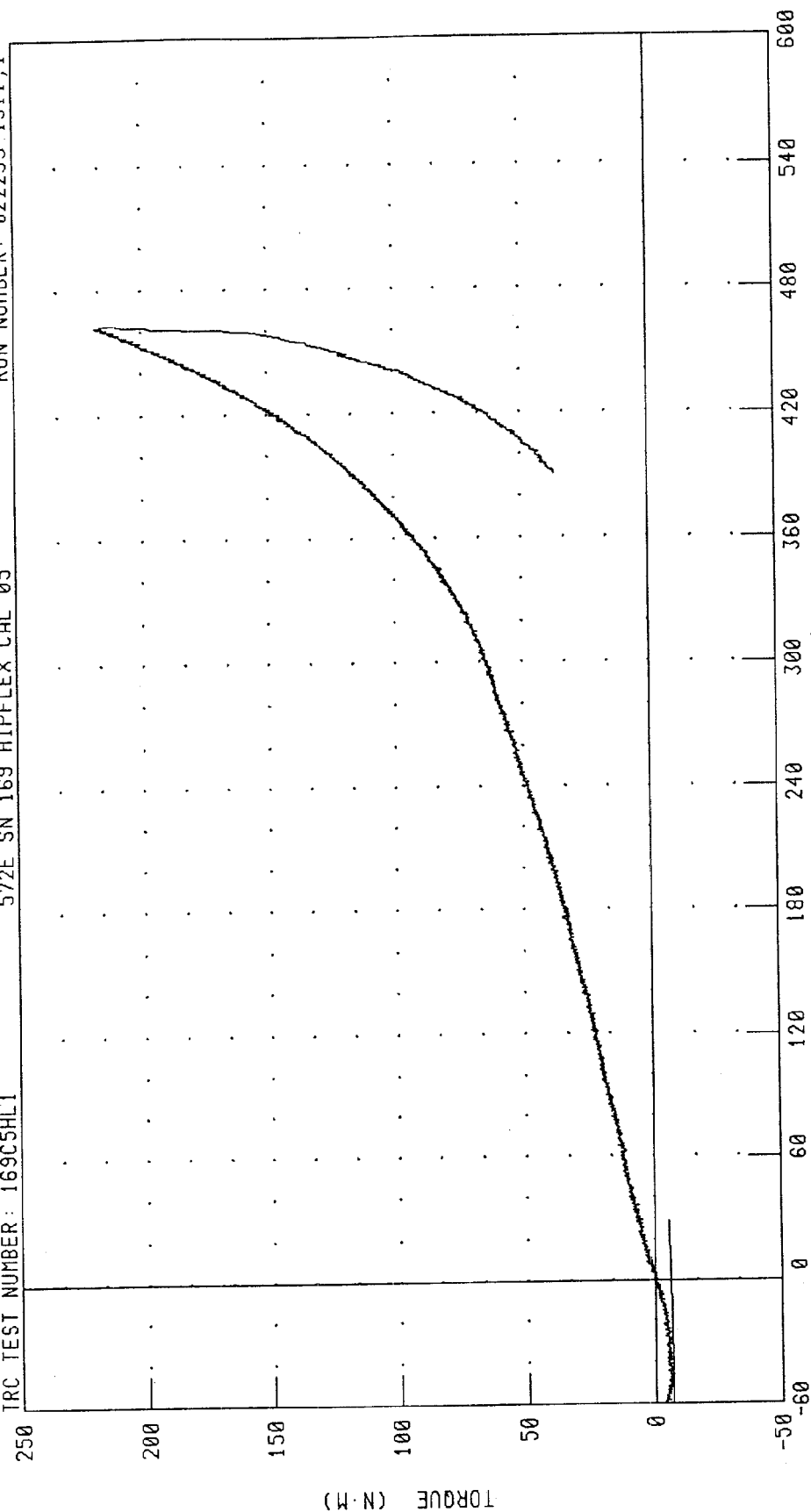
CHANNEL: LHPYM FILTER: CH. CLASS 60

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES LEFT HIP FLEXION MOMENT VS ROTATION ANGLE

TRC TEST NUMBER: 169C5HL1

572E SN 169 HIPFLEX CAL 05

RUN NUMBER: 022299 1311;1



PEAK DATA: 46.31 ° @ 5.74 S; -10.22 ° @ -1.00 S

218.34 N·M @ 5.72 S; -7.42 N·M @ -1.00 S

CHANNEL: LHPXD FILTER: CH. CLASS 60
LHPYM CH. CLASS 60

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

20-FEB-99

TRC INC.

TEST NO: 169C5RK1

572E SN169 RIGHT KNEE CAL 5

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5820.8 N *

* TEST DOES NOT MEET SPECIFICATIONS

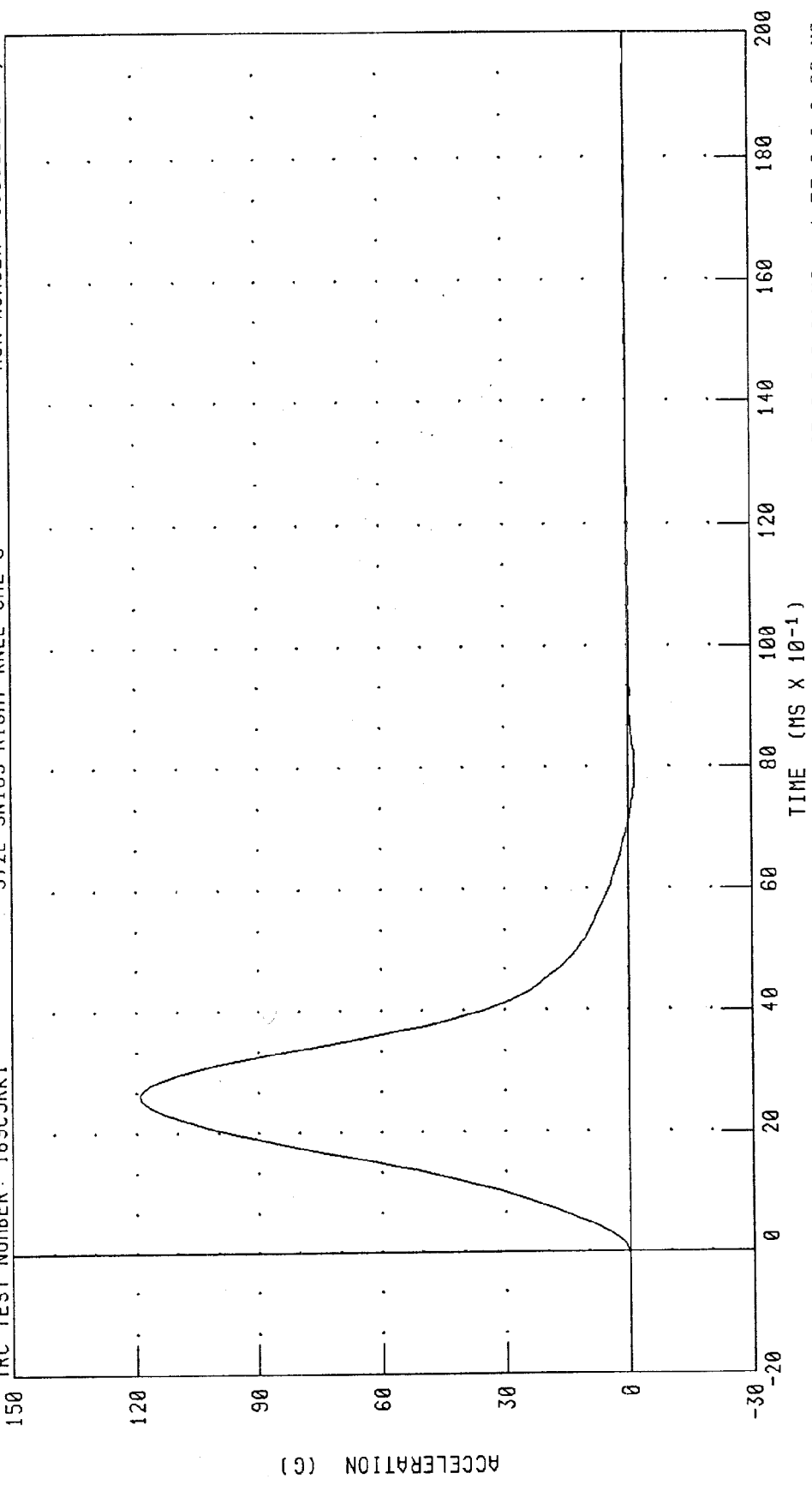
TECHNICIAN

Kevin Watkins

RUN NUMBER: 022099.1103;1

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

TRC TEST NUMBER: 169C5RK1 572E SN169 RIGHT KNEE CAL 5 RUN NUMBER: 030899.1029;1



CHANNEL: PENXC FILTER: CH. CLASS 600 PEAK DATA: 118.97 G @ 2.64 MS; -1.57 G @ 8.08 MS

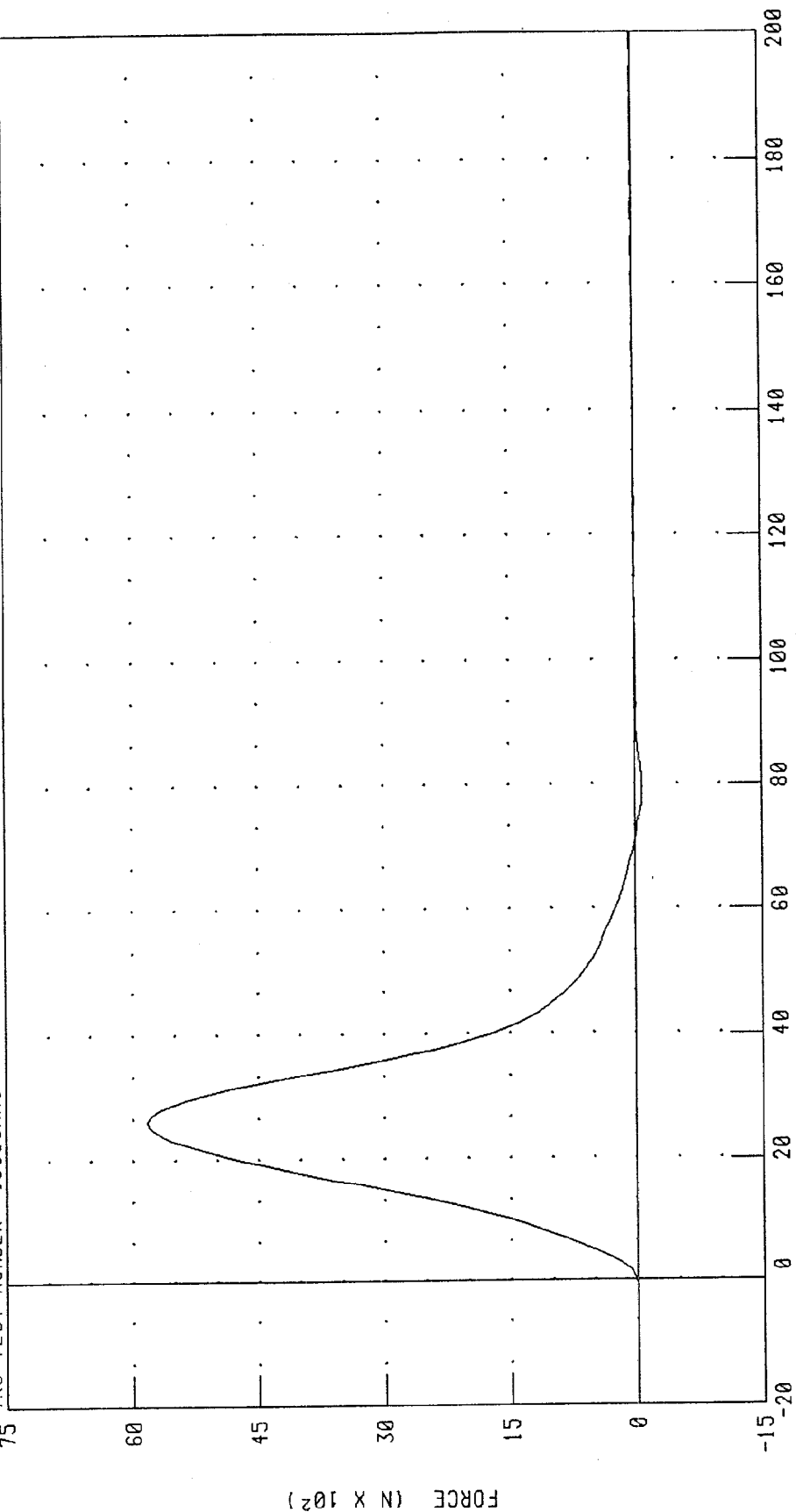
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN169 RIGHT KNEE CAL 5

RUN NUMBER: 030899.1029,1

TRC TEST NUMBER: 169C5RK1



PEAK DATA: 5820.88 N @ 2.64 MS; -76.76 N @ 8.08 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

20-FEB-99

TRC INC.

TEST NO: 169C5LK1

572E SN169 LEFT KNEE CAL 5

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5670.1 N

TEST MEETS SPECIFICATIONS

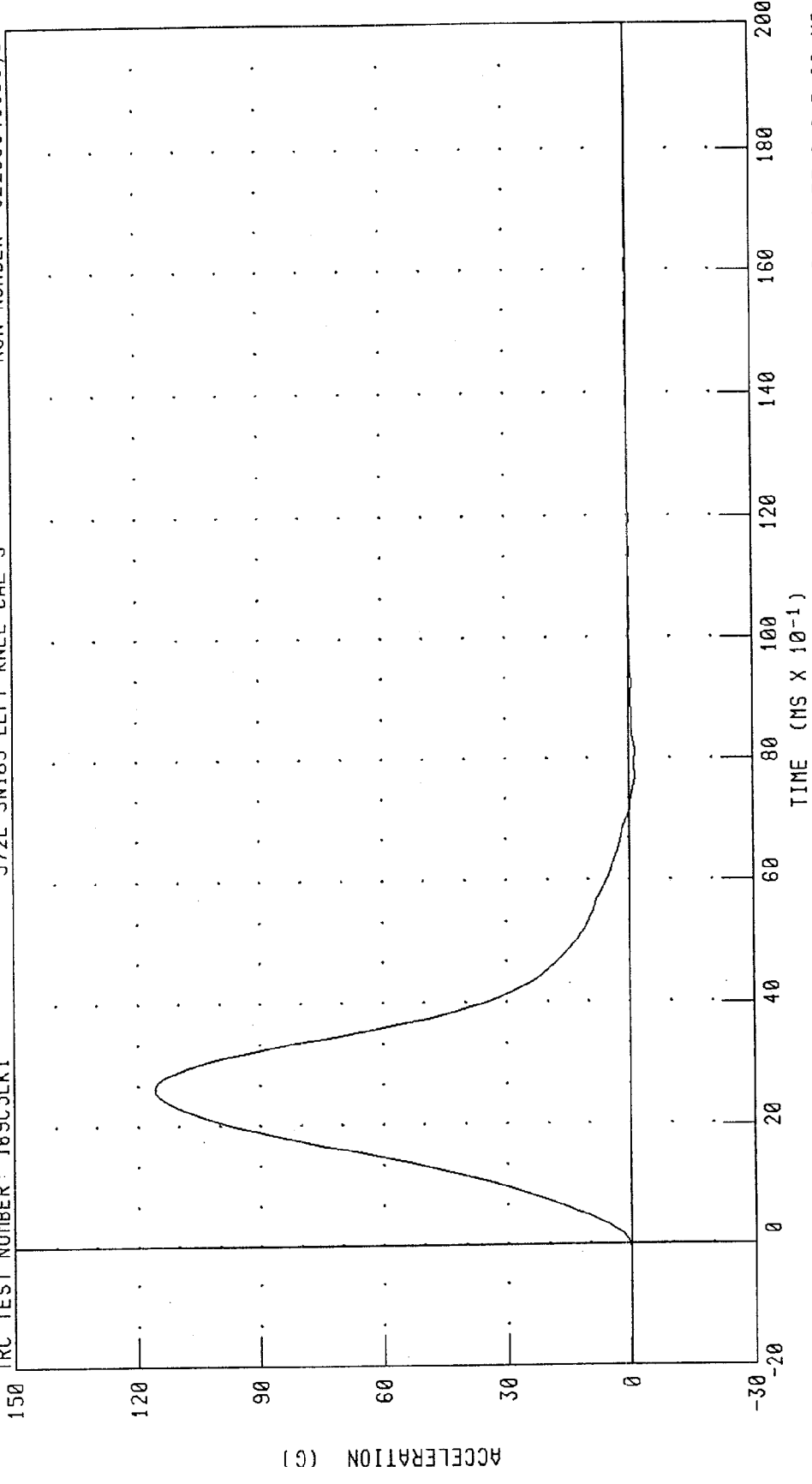
TECHNICIAN

B. J. Calt

RUN NUMBER: 022099.1100;1

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

TRC TEST NUMBER: 169C5LK1 572E SN169 LEFT KNEE CAL 5 RUN NUMBER: 022099.1101;1



CHANNEL: PENXC FILTER: CH. CLASS 600 PEAK DATA: 115.89 G @ 2.64 MS; -1.55 G @ 7.68 MS

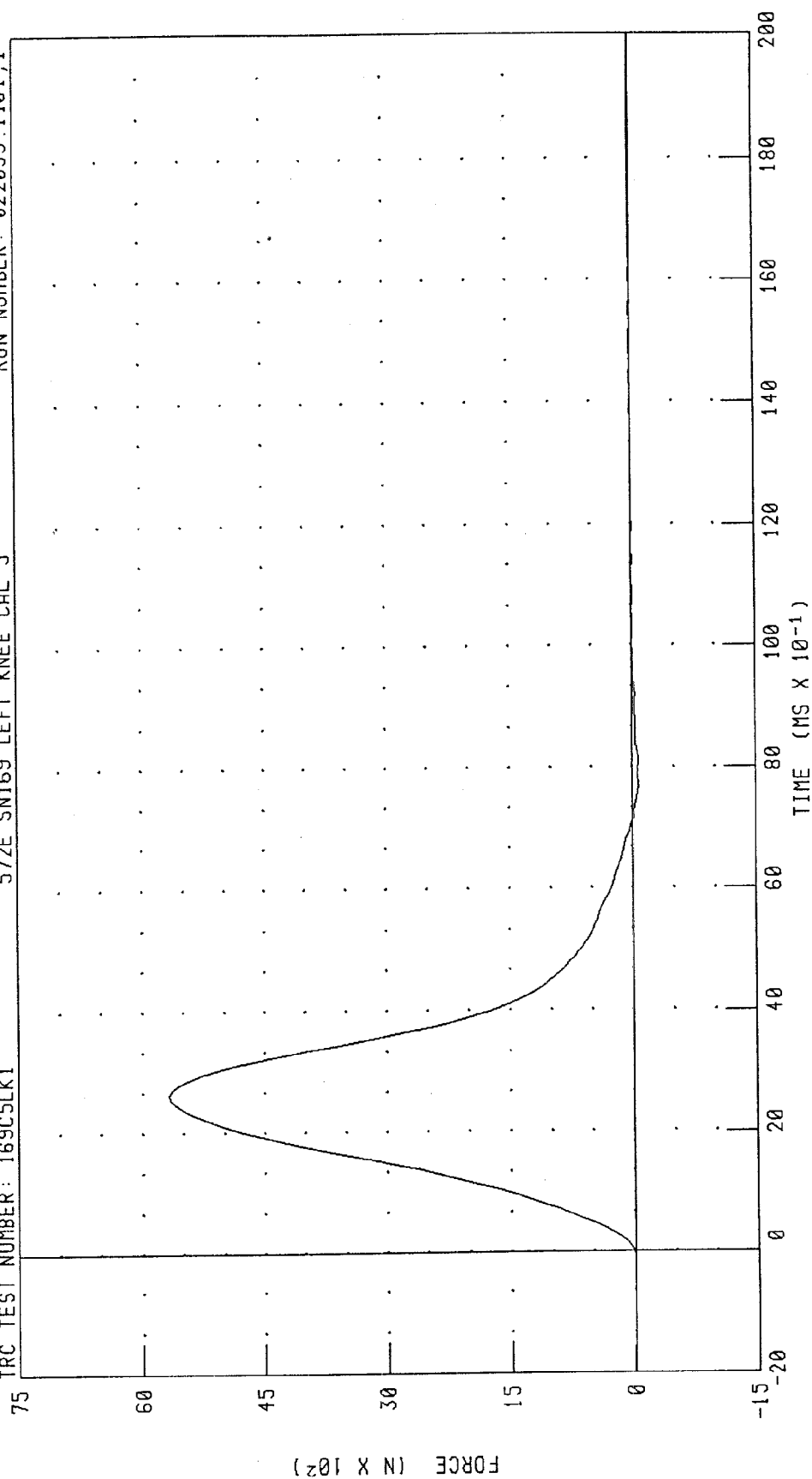
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

572E SN169 LEFT KNEE CAL 5

TRC TEST NUMBER: 169C5LK1

RUN NUMBER: 022099.1101;1



PEAK DATA: 5670.14 N @ 2.64 MS; -76.02 N @ 7.68 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Post-Test Dummy Certification

Passenger Dummy S/N 168

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

20-FEB-99

TRC INC.

TEST NO: 168C7HD1

572E SN168 HEAD DROP CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	260.95 G
PEAK LATERAL ACCELERATION	15 G MAX	4.32 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

By [Signature]

RUN NUMBER: 022099.1150;1

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

RUN NUMBER: 022099.1150;1

572E SN168 HEAD DROP CAL 07

TRC TEST NUMBER: 168C7HD1

75

0

-75

-150

-225

-300

-375

ACCELERATION (G)

TIME (MS X 10⁻¹)

100

90

80

70

60

50

40

30

20

10

0

-10

PEAK DATA: 0.79 G @ 5.52 MS; -228.07 G @ 1.68 MS

CHANNEL: HEDXC FILTER: CH. CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION

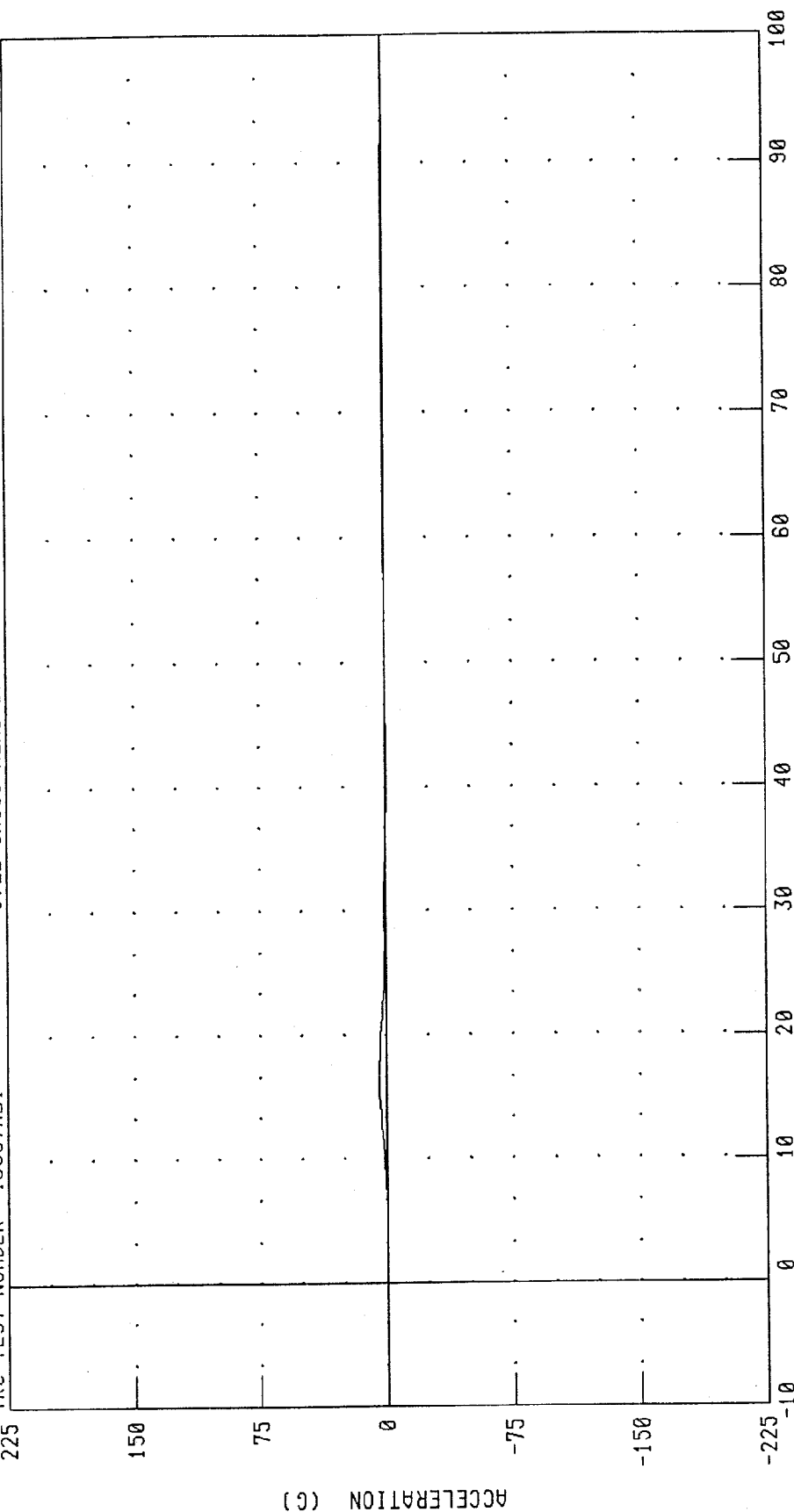
HEAD ACCELERATION Y AXIS

572E SN168 HEAD DROP CAL 07

TRC TEST NUMBER: 168C7HD1

225

RUN NUMBER: 022099.1150;1



TIME (MS X 10⁻¹)

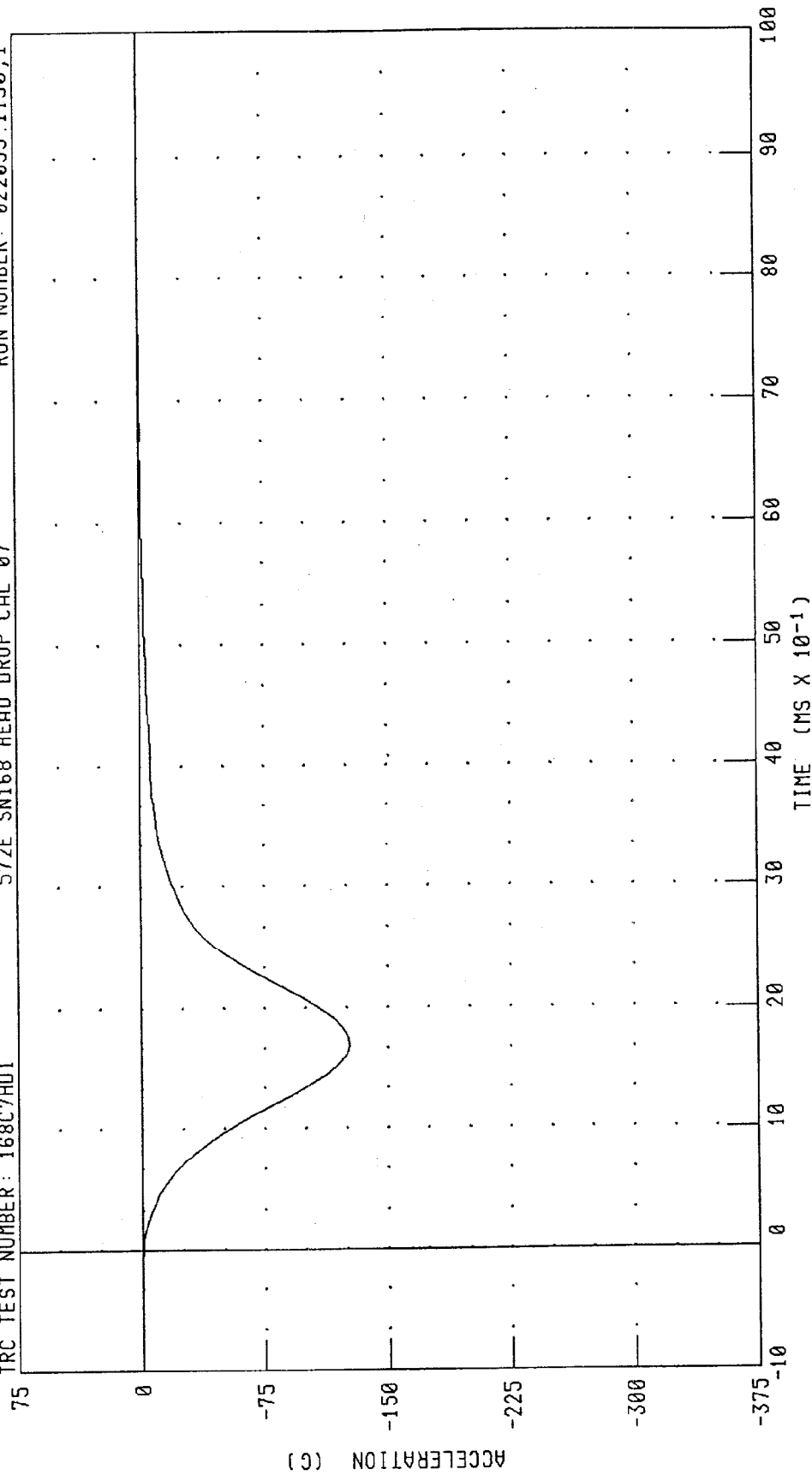
PEAK DATA: 4.33 G @ 1.60 MS; -0.78 G @ 3.92 MS

CHANNEL: HEDYC FILTER: CH. CLASS 1000

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

572E SN168 HEAD DROP CAL 07 RUN NUMBER: 022099.1150;1

TRC TEST NUMBER: 168C7HD1



PEAK DATA: 0.20 G @ 10.00 MS, -126.75 G @ 1.68 MS

CHANNEL: HEDZG FILTER: CH. CLASS 1000

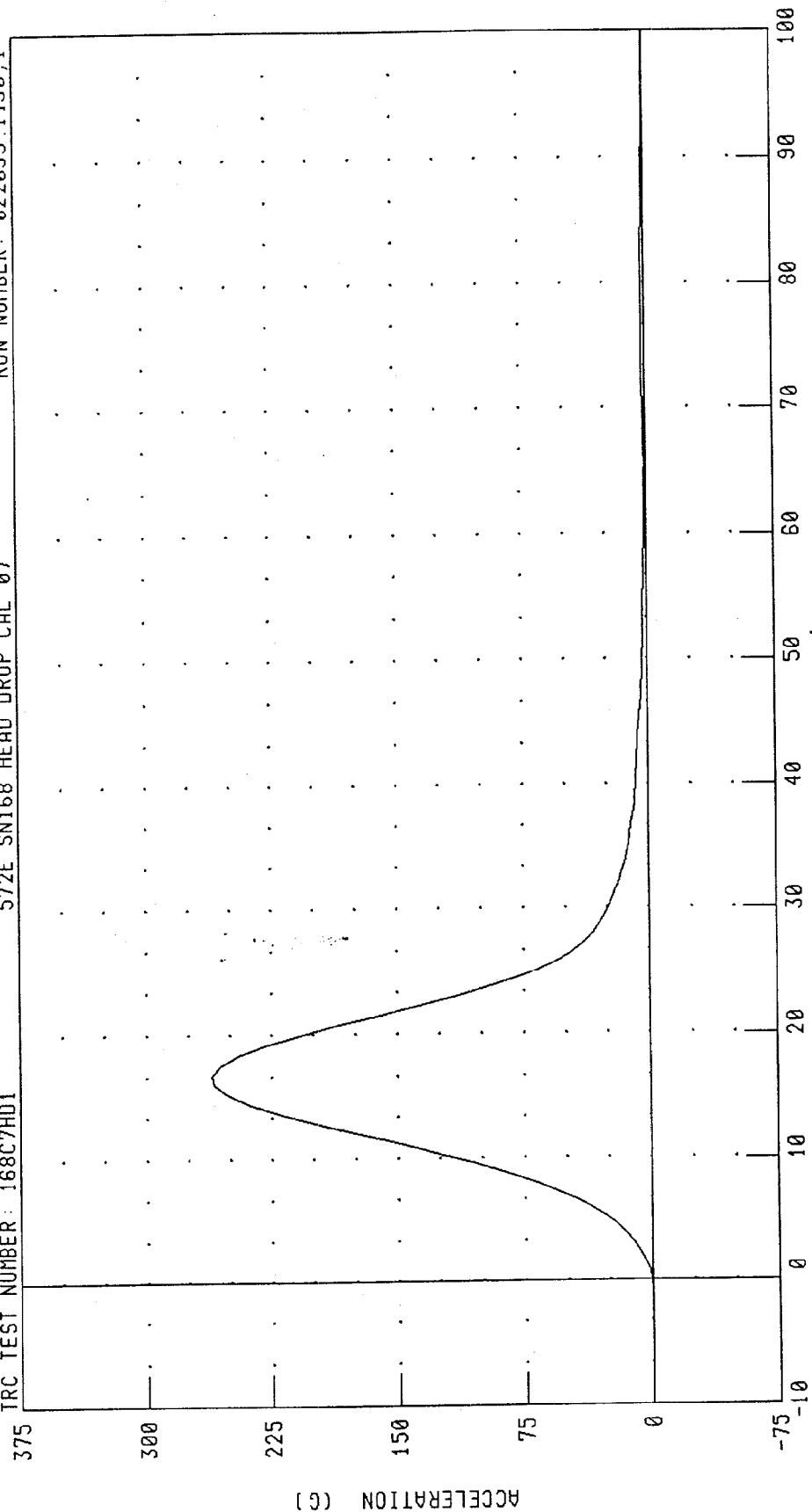
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

572E SN168 HEAD DROP CAL 07

RUN NUMBER: 022099.1150;1

TRC TEST NUMBER: 168C7HD1



PEAK DATA: 260.95 G @ 1.68 MS; 0.01 G @ -0.96 MS

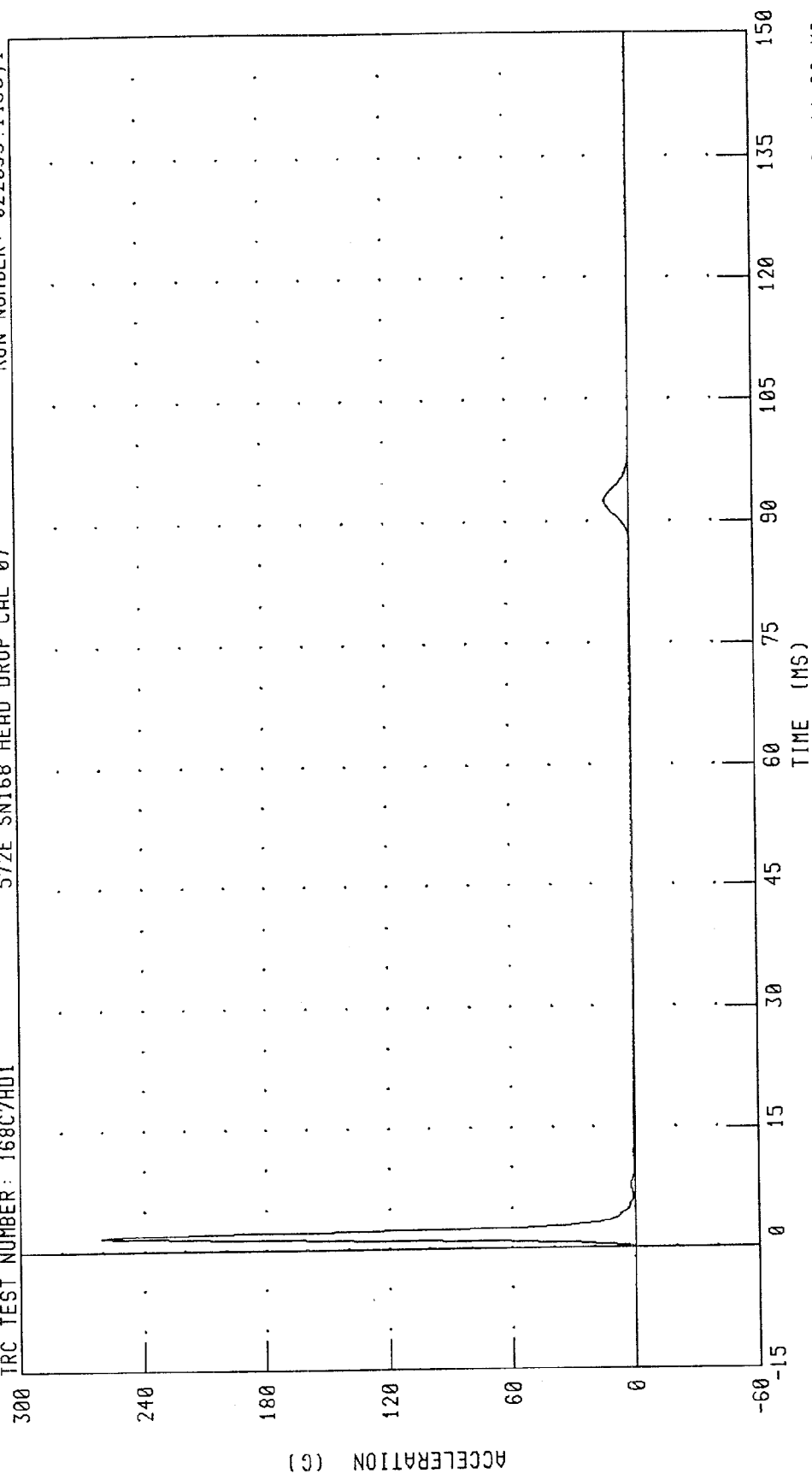
CHANNEL: HEDRC FILTER: CH. CLASS 1000

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

572E SN168 HEAD DROP CAL 07

TRC TEST NUMBER: 168C7HD1

RUN NUMBER: 022099.1150;1



CHANNEL: HEDRG FILTER: CH. CLASS 1000

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-FEB-99

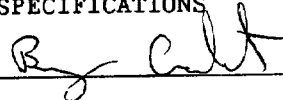
NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C7NF1 572E SN168 NECK FLEXION CAL07

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.87 G
	20 MS	17.60 - 22.60 G	21.33 G
	30 MS	12.50 - 18.50 G	13.41 G
MAX PENDULUM G		29 G MAX	24.38 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	13.38 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	40.88 MS
D PLANE	MAX	64 - 78 DEG.	72.71 DEG.
ROTATION	TIME	57 - 64 MS	60.64 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	90.95 NM
	TIME	47 - 58 MS	54.24 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	117.52 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	103.84 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 022299.1318;1

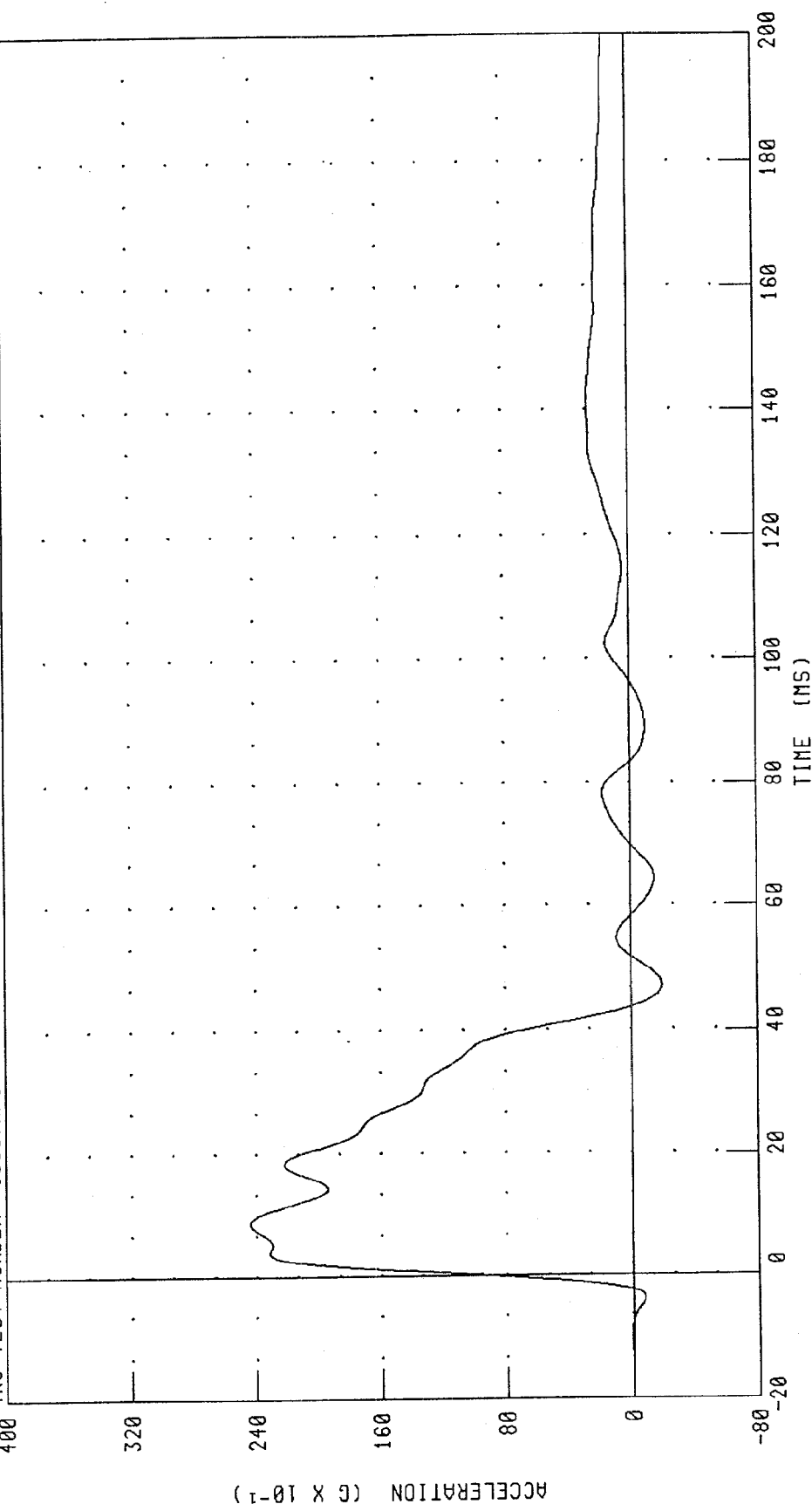
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER: 168C7NF1

572E SN168 NECK FLEXION CAL07

RUN NUMBER: 022299.1318;1



PEAK DATA: 24.38 G @ 8.72 MS; -1.95 G @ 47.12 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

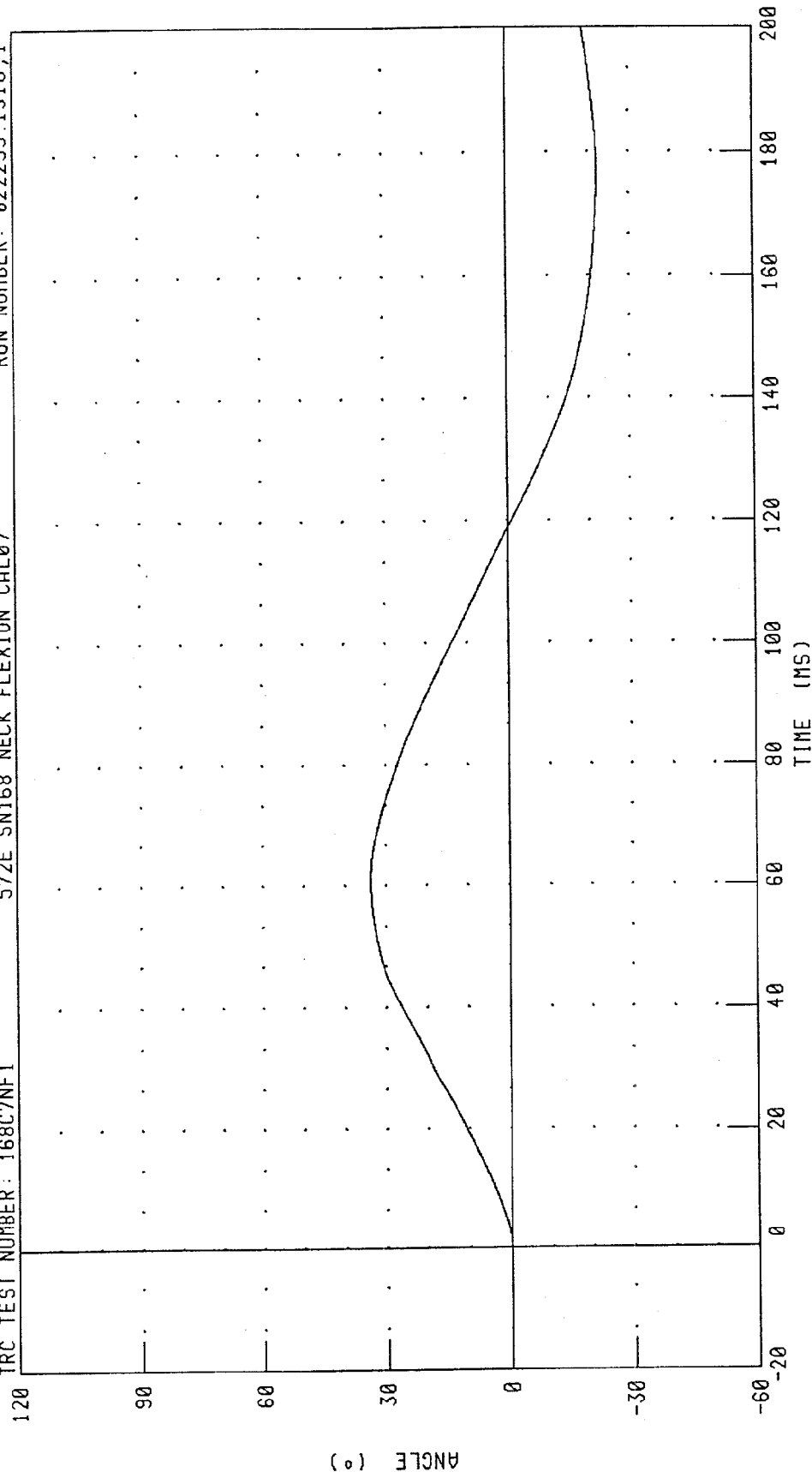
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN168 NECK FLEXION CAL07

RUN NUMBER: 022299.1318;1

TRC TEST NUMBER: 168C7NF1



PEAK DATA: 33.64 ° @ 60.72 MS; -22.19 ° @ 176.80 MS

FILTER: CH. CLASS 60

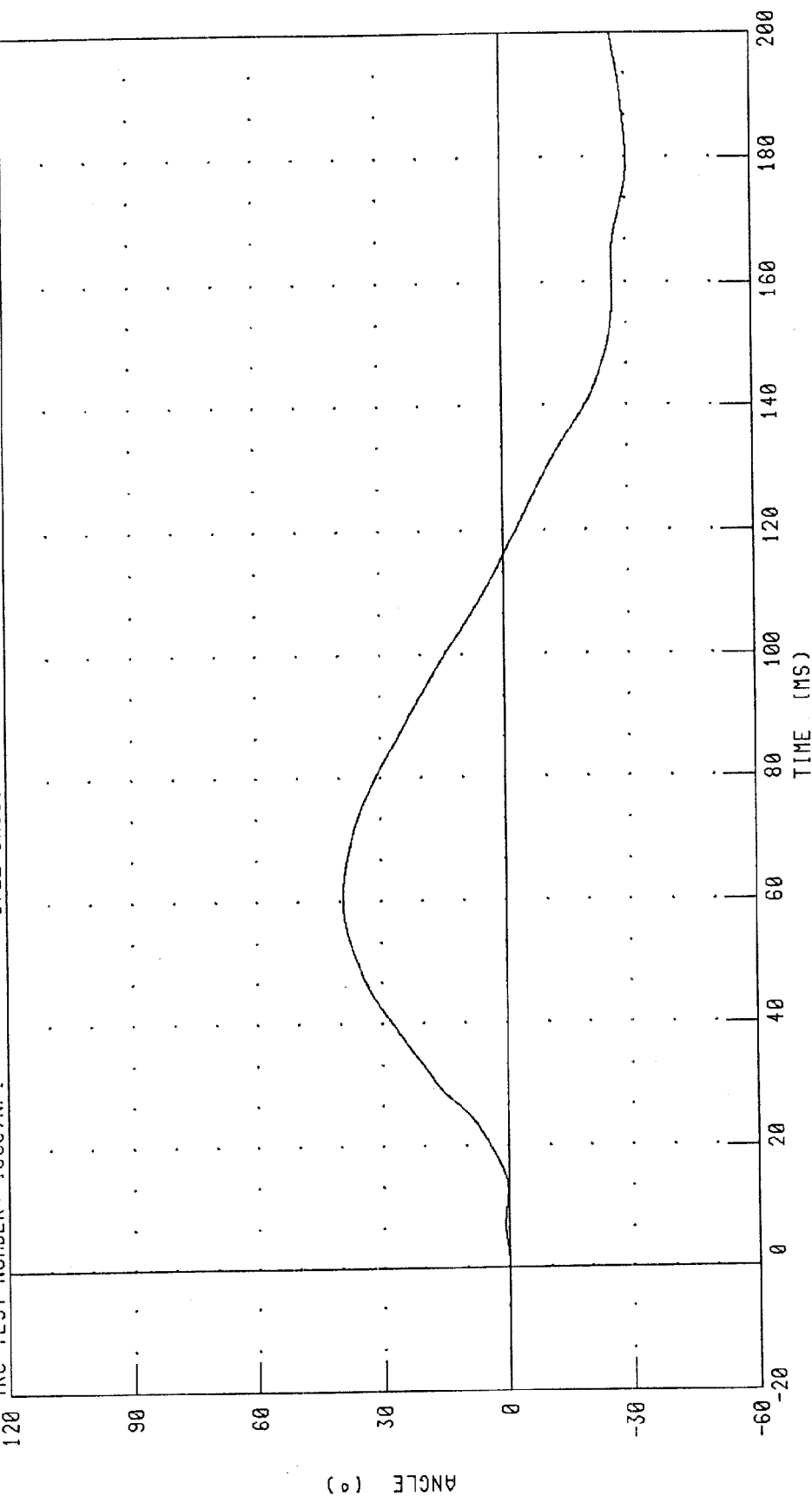
CHANNEL: BETA

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

TRC TEST NUMBER: 168C7NF1

572E SN168 NECK FLEXION CAL07

RUN NUMBER: 022299.1318;1



PEAK DATA: 39.08 ° @ 60.56 MS; -30.27 ° @ 179.76 MS

CHANNEL: THETA FILTER: CH. CLASS 60

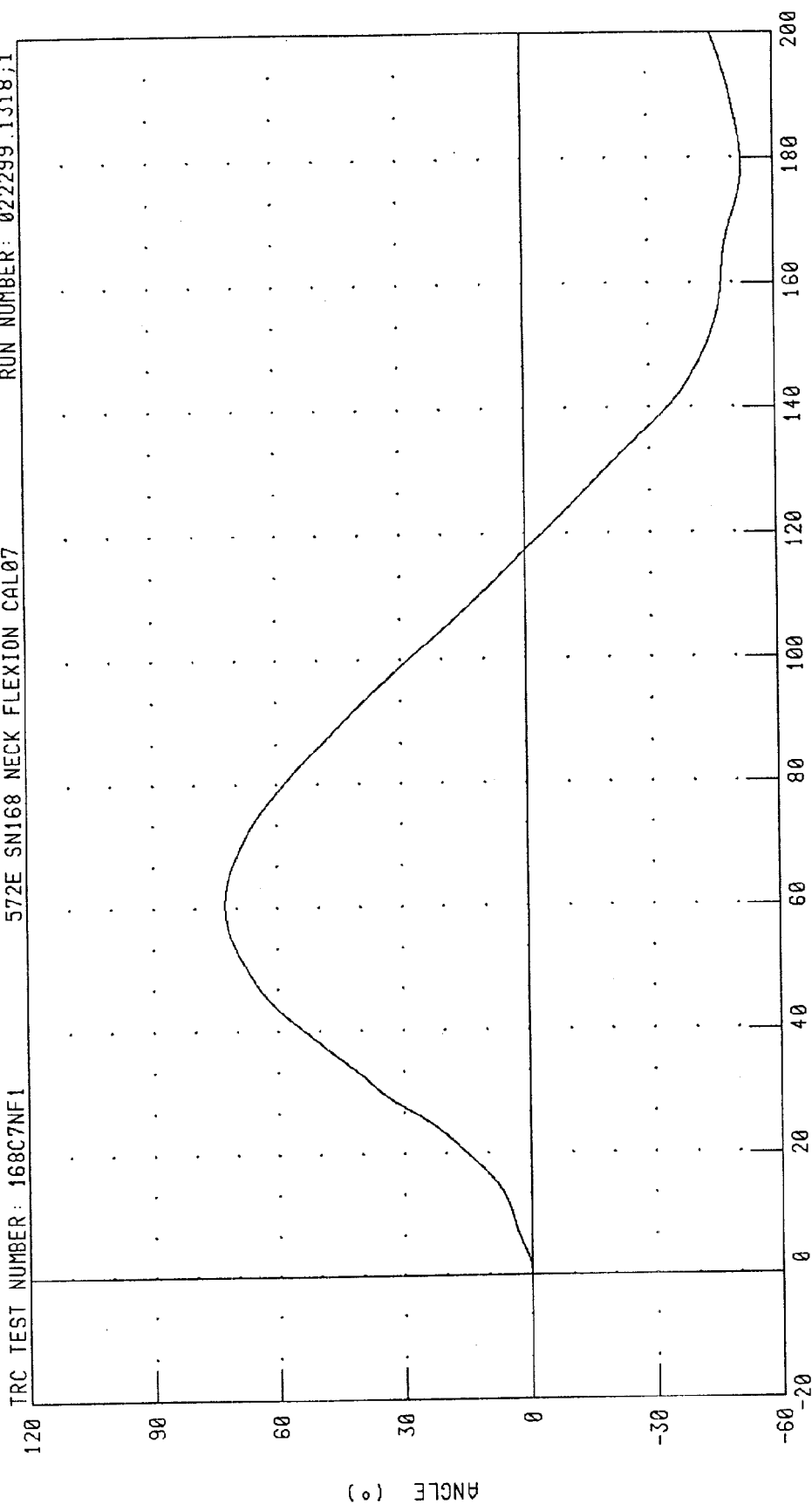
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER: 168C7NF1

572E SN168 NECK FLEXION CAL07

RUN NUMBER: 022299.1318;1



CHANNEL: TOTAN FILTER: CH. CLASS 60

PEAK DATA: 72.72 ° @ 60.64 MS, -52.41 ° @ 178.80 MS

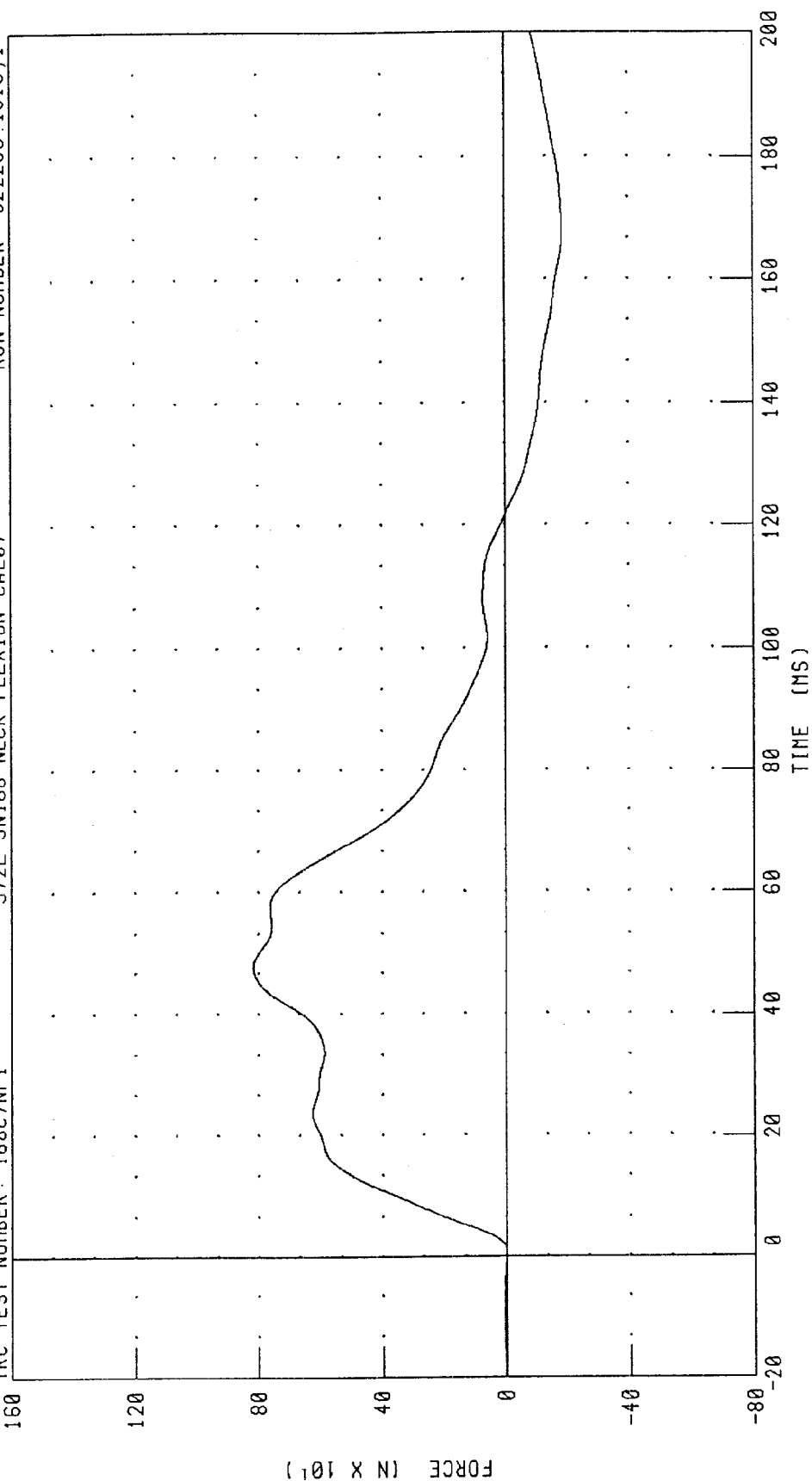
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER: 168C7NF1

572E SN168 NECK FLEXION CAL07

RUN NUMBER: 022299.1318,1



CHANNEL: NEKXF FILTER: CH. CLASS 60

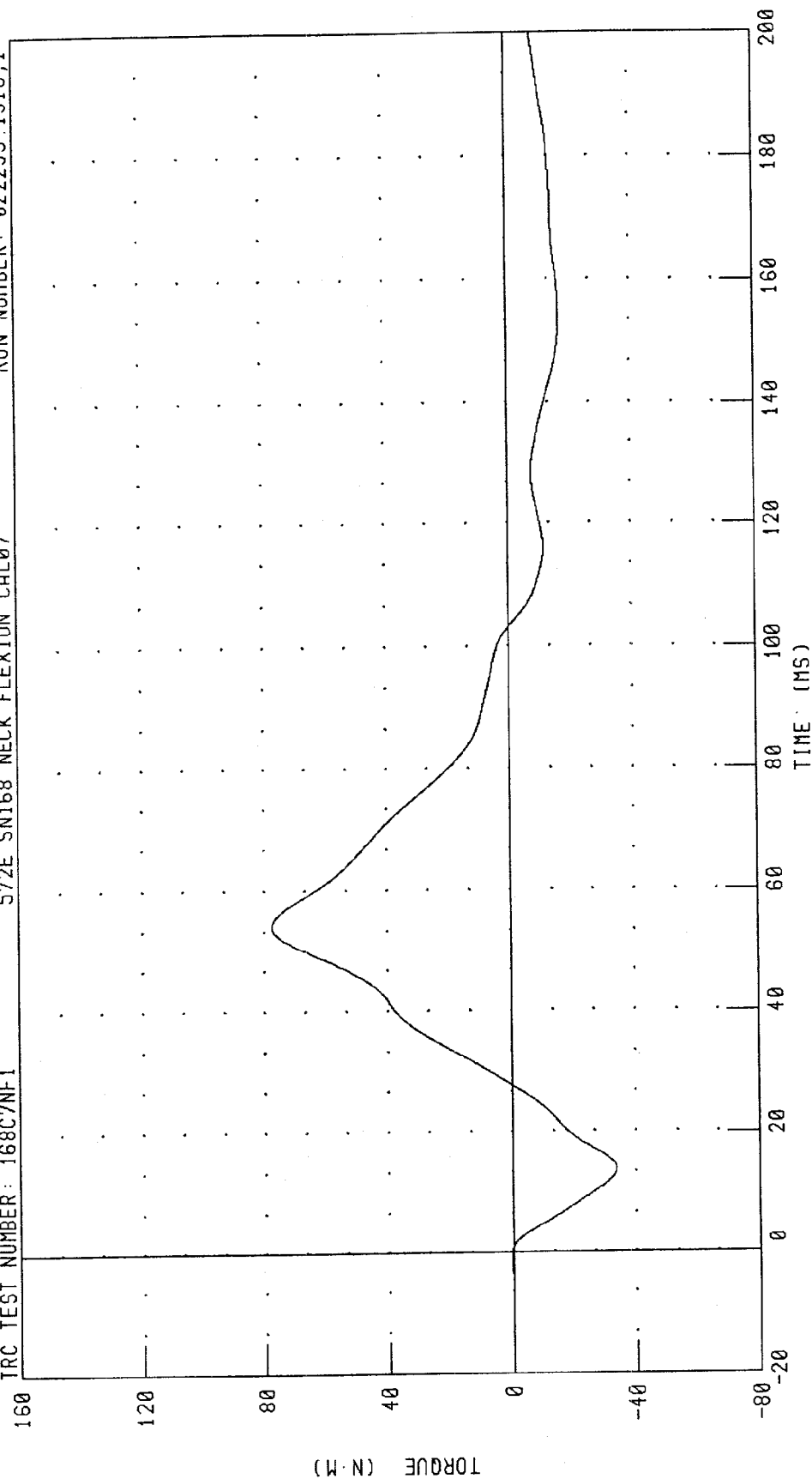
PEAK DATA: 816.79 N @ 47.68 MS, -187.42 N @ 167.60 MS

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

TRC TEST NUMBER: 168C7NF1

572E SN168 NECK FLEXION CAL07

RUN NUMBER: 022299.1318;1

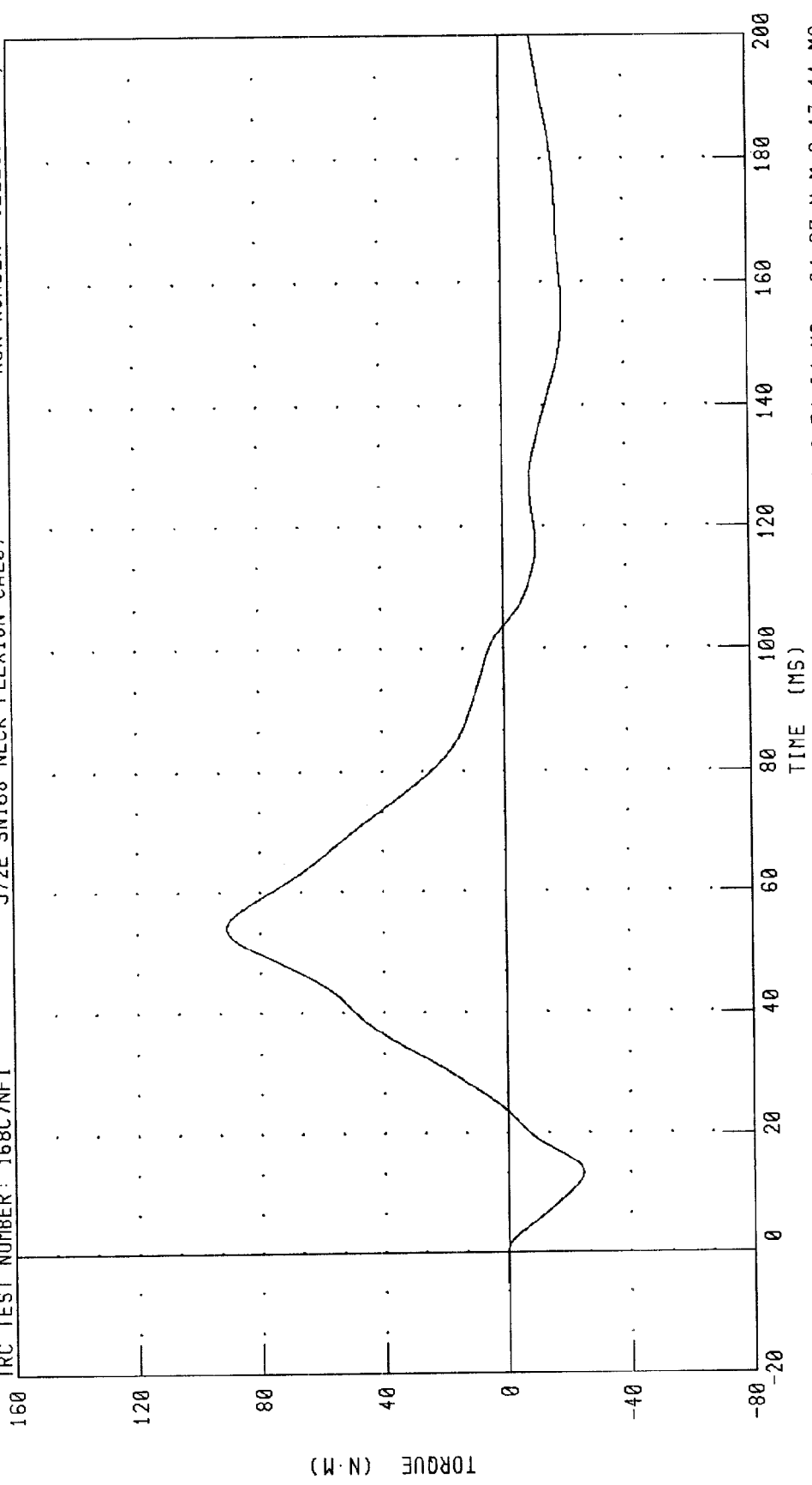


PEAK DATA: 77.50 N·M @ 54.24 MS; -33.74 N·M @ 13.84 MS

CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C7NF1 572E SN168 NECK FLEXION CAL07 RUN NUMBER: 022299.1318;1



CHANNEL: NEKOM FILTER: CH. CLASS 60 PEAK DATA: 90.95 N·M @ 54.24 MS, -24.67 N·M @ 13.44 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

22-FEB-99

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 168C7NE2 572E SN168 NECK EXT CAL07

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	22.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.71 G
	20 MS	14.00 - 19.00 G	17.20 G
	30 MS	11.00 - 16.00 G	15.45 G
MAX PENDULUM G		22 G MAX	18.99 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.45 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.88 MS
D PLANE	MAX	81 - 106 DEG.	98.22 DEG.
ROTATION	TIME	72 - 82 MS	77.28 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-67.56 NM
	TIME	65 - 79 MS	72.24 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	160.24 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	144.64 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

RUN NUMBER: 022299.1403;1

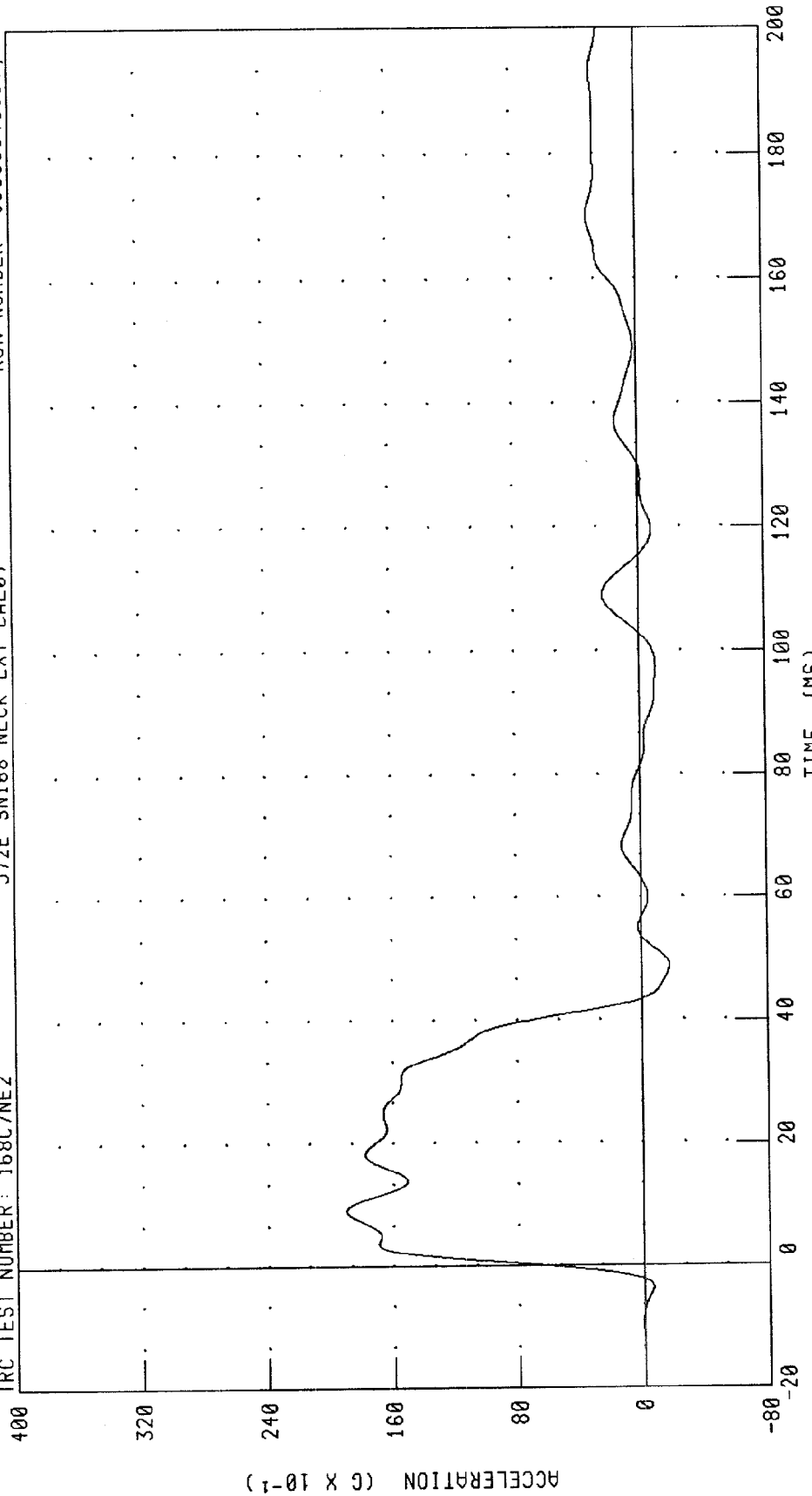
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

RUN NUMBER: 030899.1031,1

572E SN168 NECK EXT CAL07

TRC TEST NUMBER: 168C7NE2



PEAK DATA: 18.99 G @ 9.20 MS, -1.78 G @ 48.88 MS

CHANNEL: PENXC FILTER: CH. CLASS 60

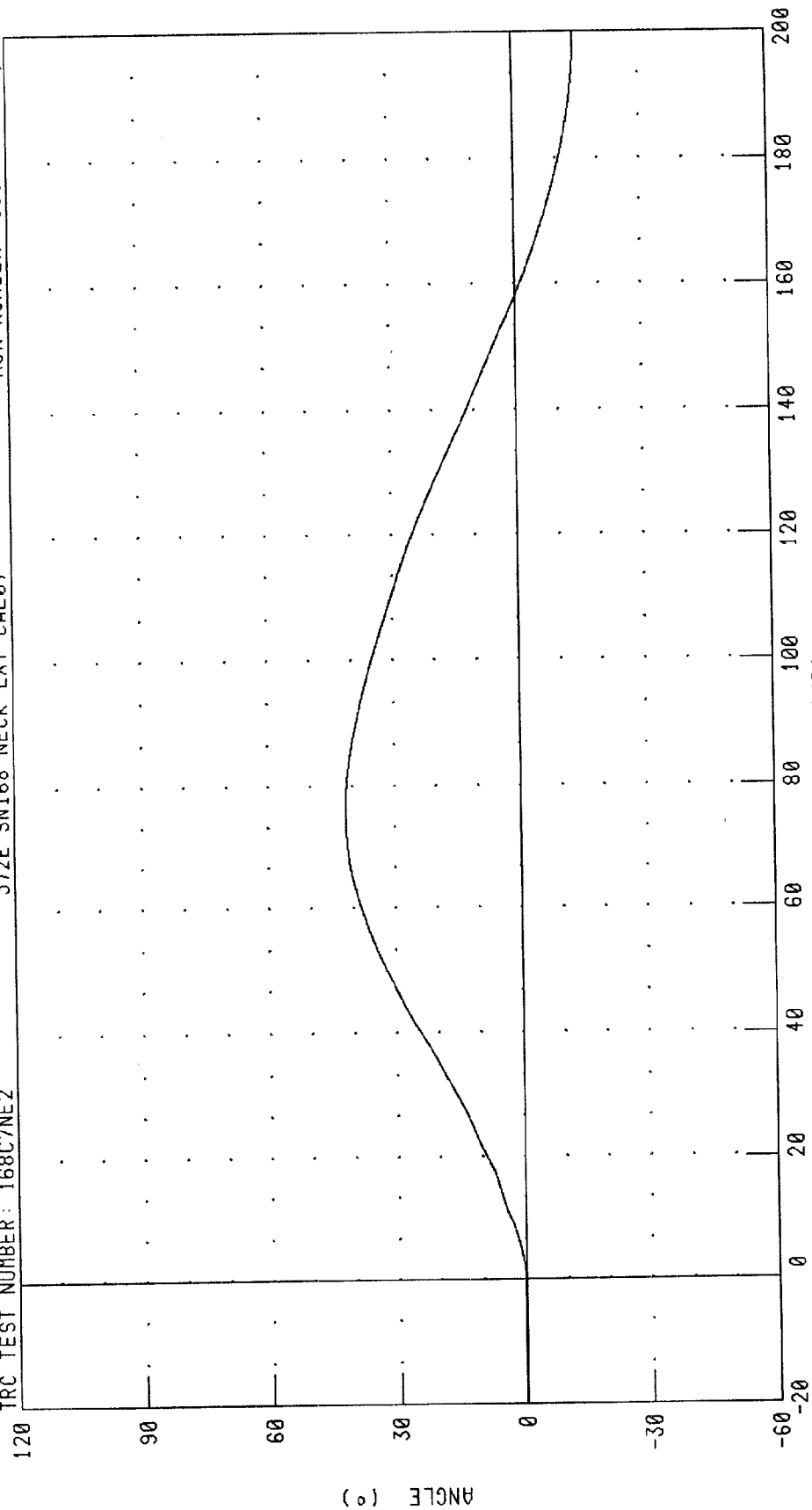
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

RUN NUMBER: 030899.1031,1

572E SN168 NECK EXT CAL07

TRC TEST NUMBER: 168C7NE2



PEAK DATA: 41.65 ° @ 75.76 MS, -14.59 ° @ 199.20 MS

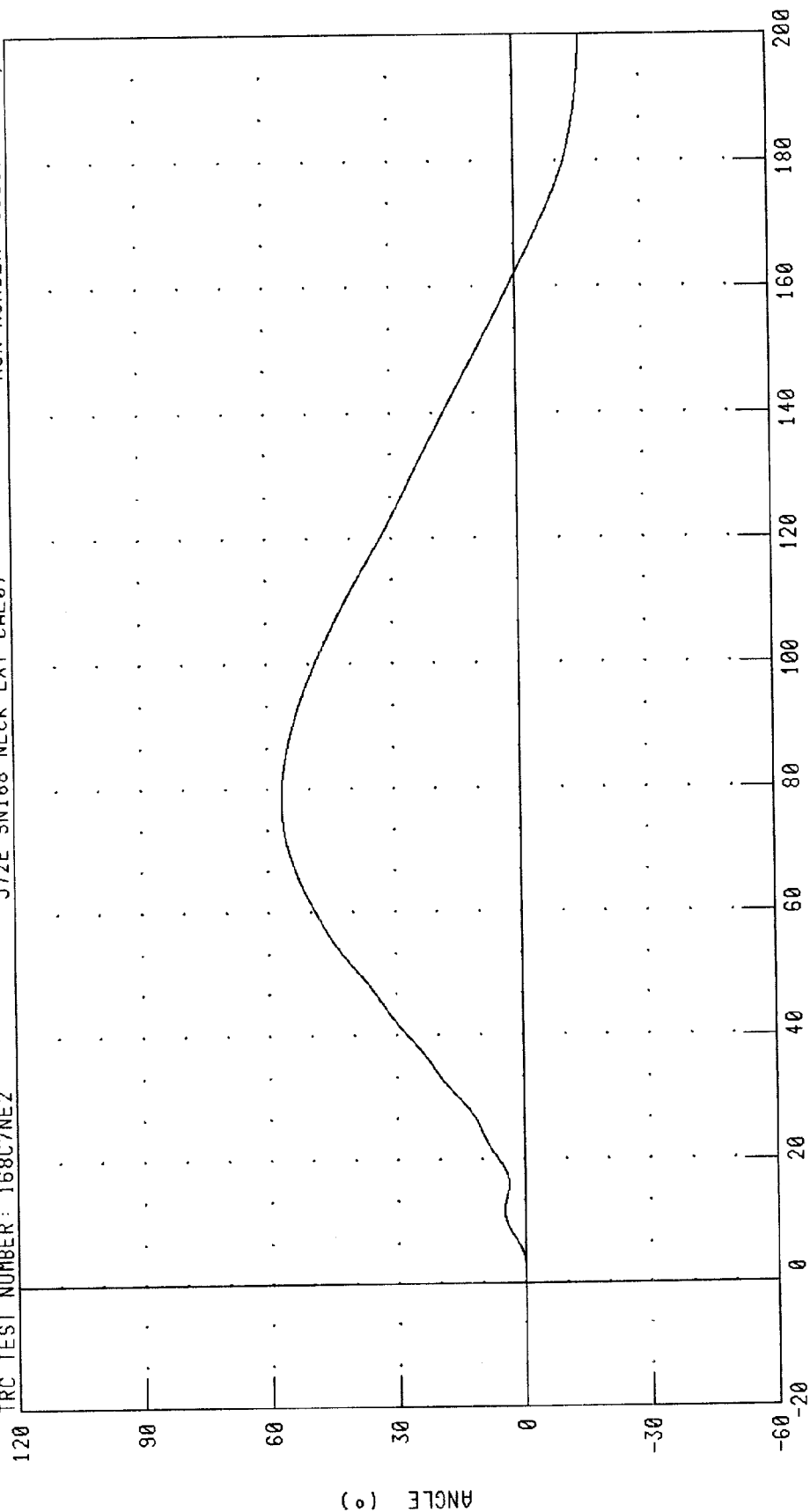
CHANNEL: BETA FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C7NE2

572E SN168 NECK EXT CAL07

RUN NUMBER: 030899.1031;1



CHANNEL: THETA FILTER: CH. CLASS 60

PEAK DATA: 56.64 ° @ 78.64 MS, -15.98 ° @ 200.00 MS

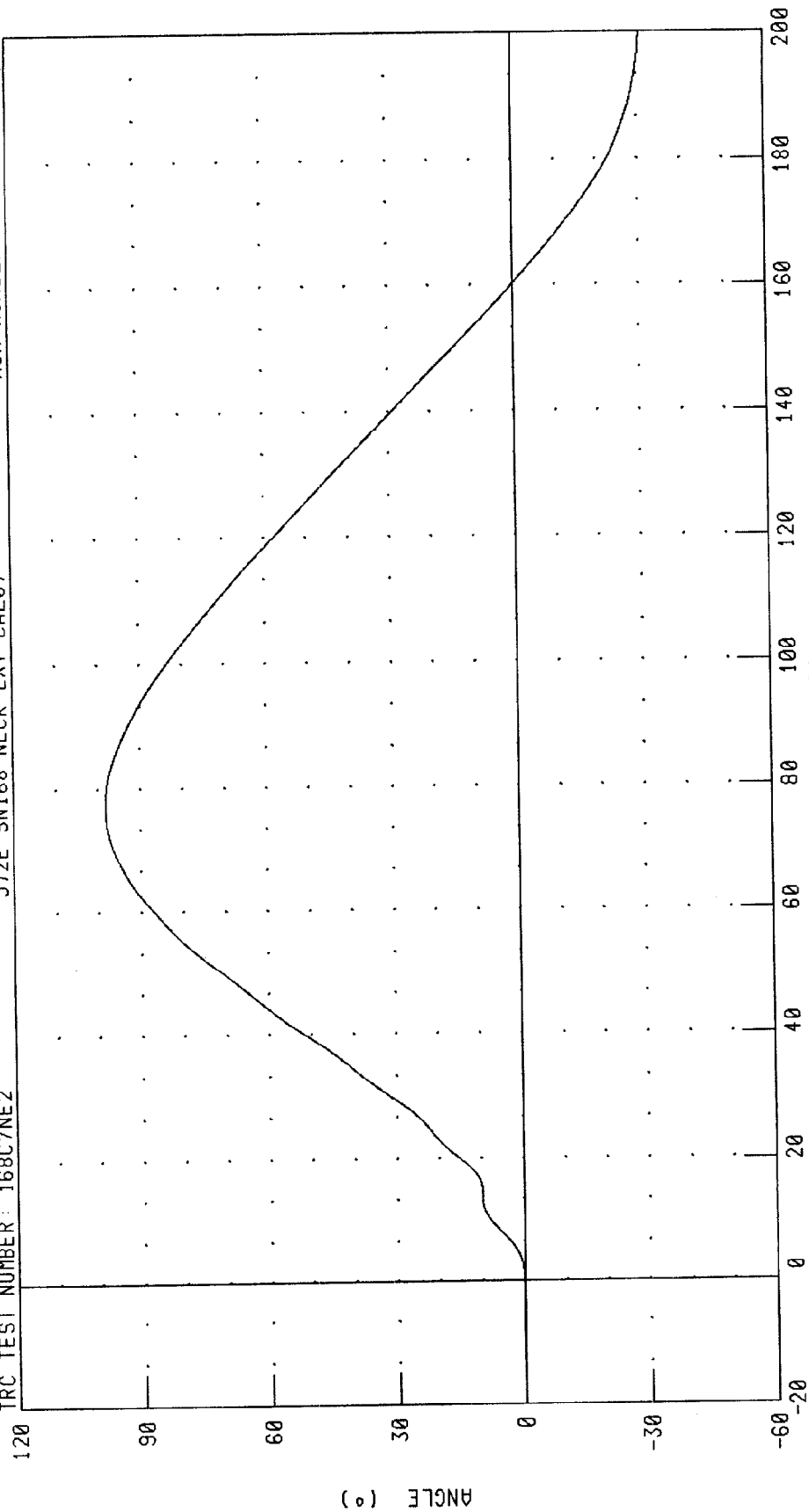
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

RUN NUMBER: 030899.1031;1

572E SN168 NECK EXT CAL07

TRC TEST NUMBER: 168C7NE2



PEAK DATA: 98.23 ° @ 77.28 MS; -30.46 ° @ 200.00 MS

CHANNEL: TOTAN FILTER: CH. CLASS 60

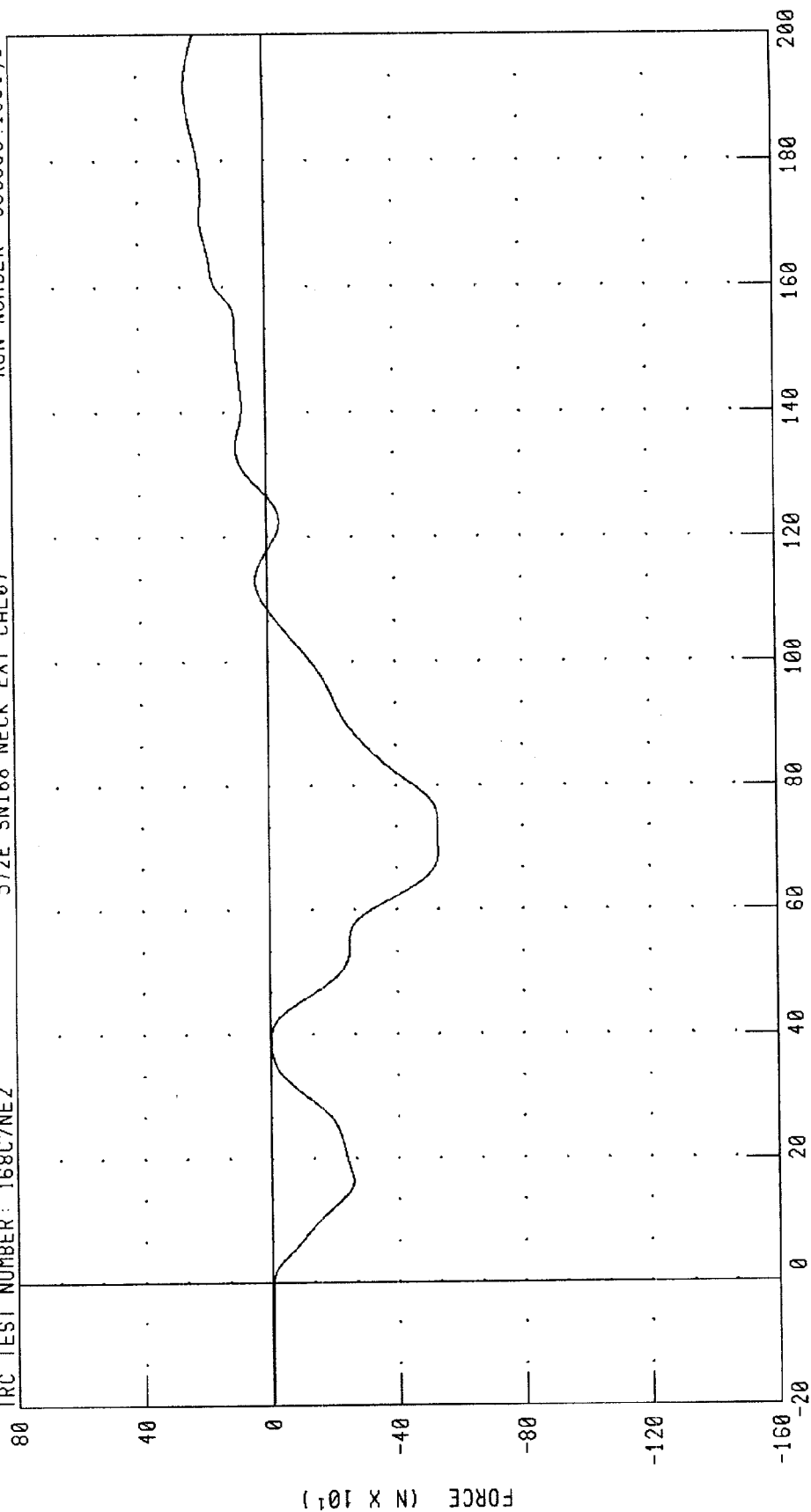
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

RUN NUMBER: 030899.1031;1

572E SN168 NECK EXT CAL07

TRC TEST NUMBER: 168C7NE2



PEAK DATA: 250.98 N @ 191.84 MS, -532.77 N @ 69.36 MS

CHANNEL: NEKXF FILTER: CH. CLASS 60

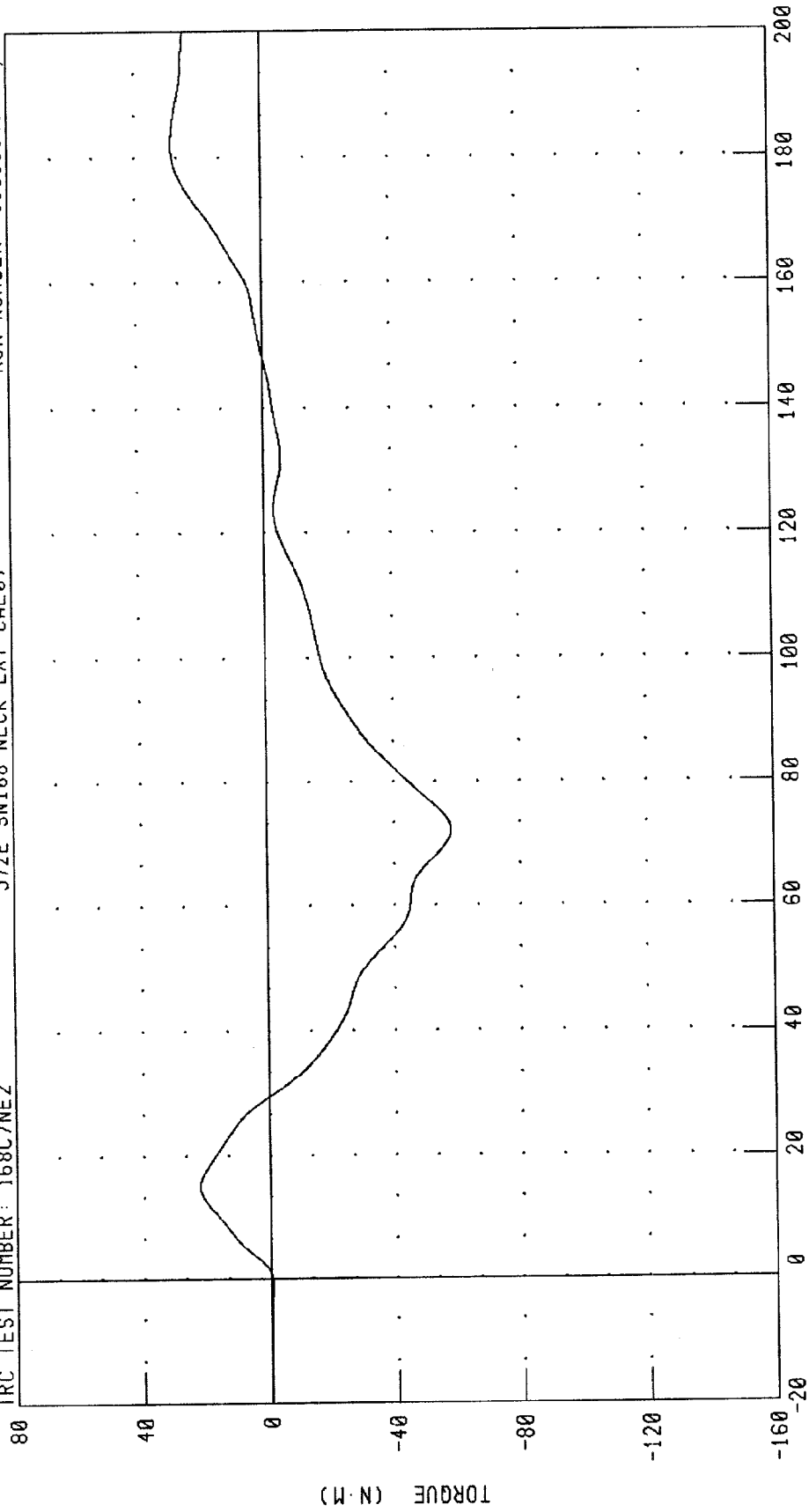
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

RUN NUMBER: 030899.1031;1

572E SN168 NECK EXT CAL07

TRC TEST NUMBER: 168C7NE2



PEAK DATA: 28.55 N·M @ 162.16 MS, -58.15 N·M @ 72.24 MS

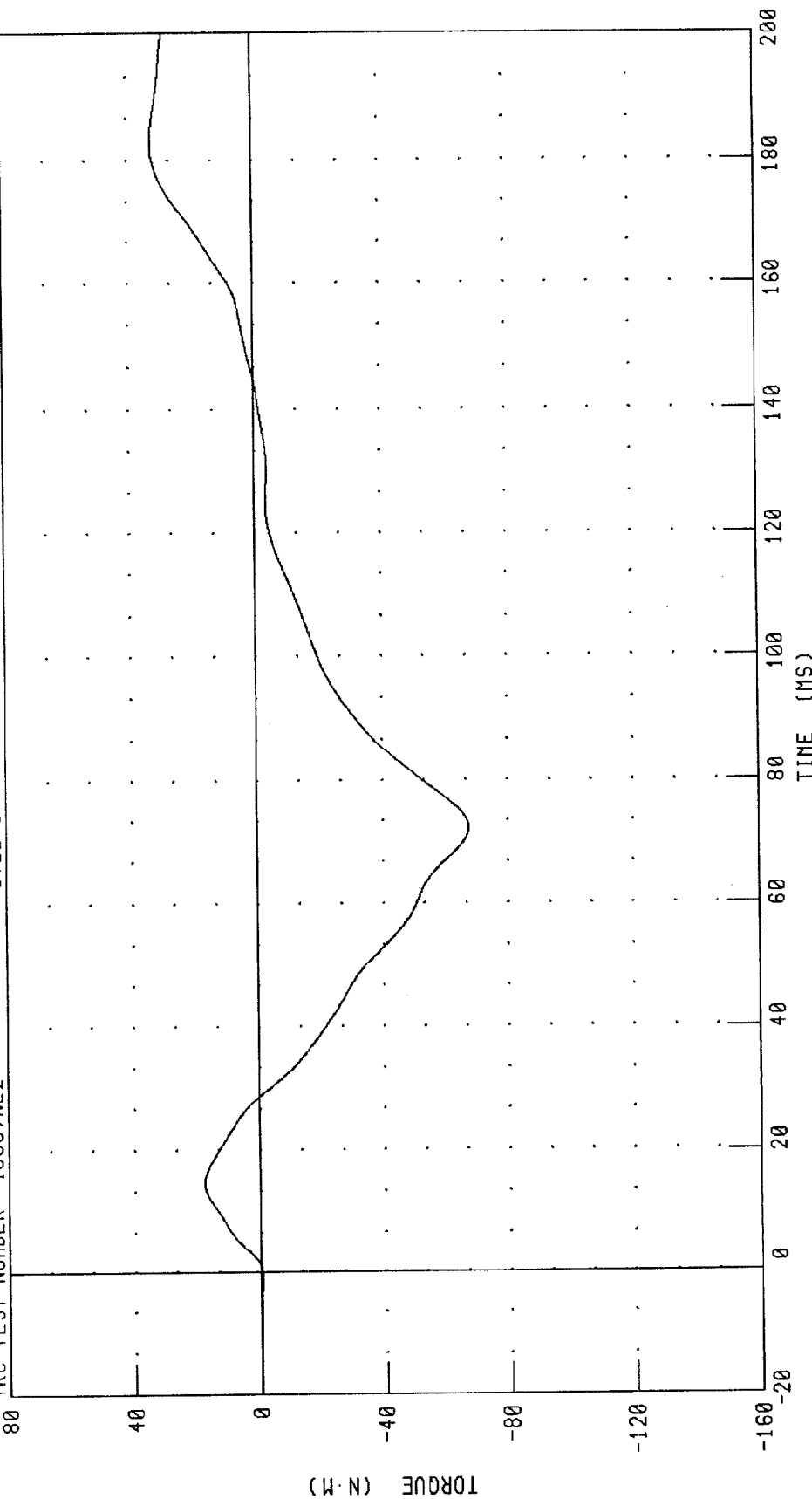
CHANNEL: NEKYM FILTER: CH. CLASS 60

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

TRC TEST NUMBER: 168C7NE2

572E SN168 NECK EXT CAL07

RUN NUMBER: 030899.1031;1



CHANNEL: NEKOM FILTER: CH. CLASS 60

PEAK DATA: 32.47 N·M @ 162.80 MS, -67.56 N·M @ 72.24 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

22-FEB-99

TRC INC.

TEST NO: 168C7TH1

572E SN168 H.S.THORAX CAL07

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	22.2 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	67.2 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5773. N
INTERNAL HYSTERESIS	69% - 85%	69.0%

TEST MEETS SPECIFICATIONS

TECHNICIAN Bj. C. H.

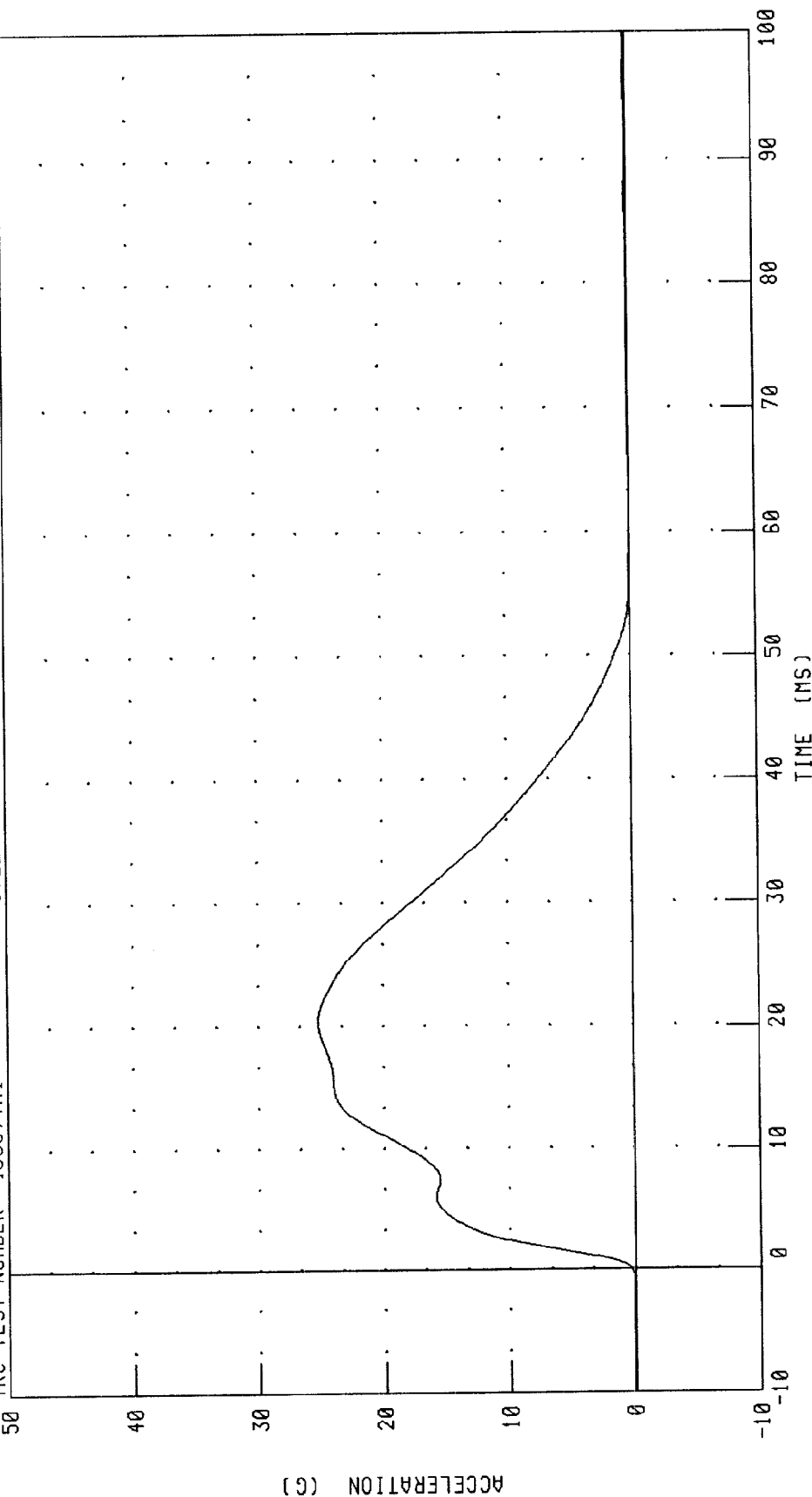
RUN NUMBER: 022299.1601;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC TEST NUMBER: 168C7TH1

572E SN168 H.S.THORAX CAL07

RUN NUMBER: 022299.1602,1



CHANNEL: PENXC FILTER: CH. CLASS 180

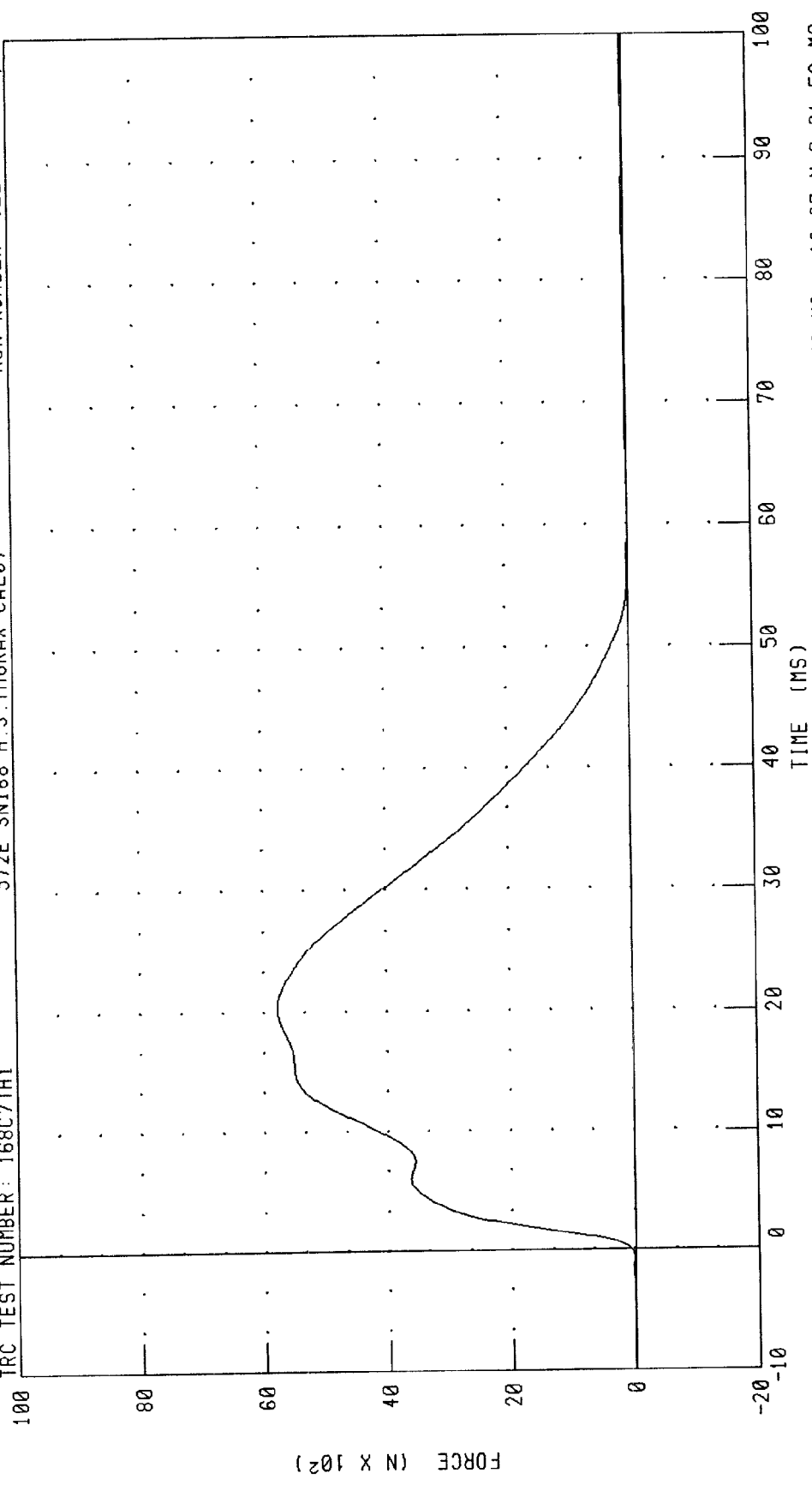
PEAK DATA: 25.20 G @ 20.40 MS; -0.05 G @ 61.52 MS

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

TRC TEST NUMBER: 168C7TH1

572E SN168 H.S. THORAX CAL07

RUN NUMBER: 022299.1602;1



PEAK DATA: 5773.94 N @ 20.40 MS; -10.07 N @ 61.52 MS

CHANNEL: PENXF FILTER: CH. CLASS 180

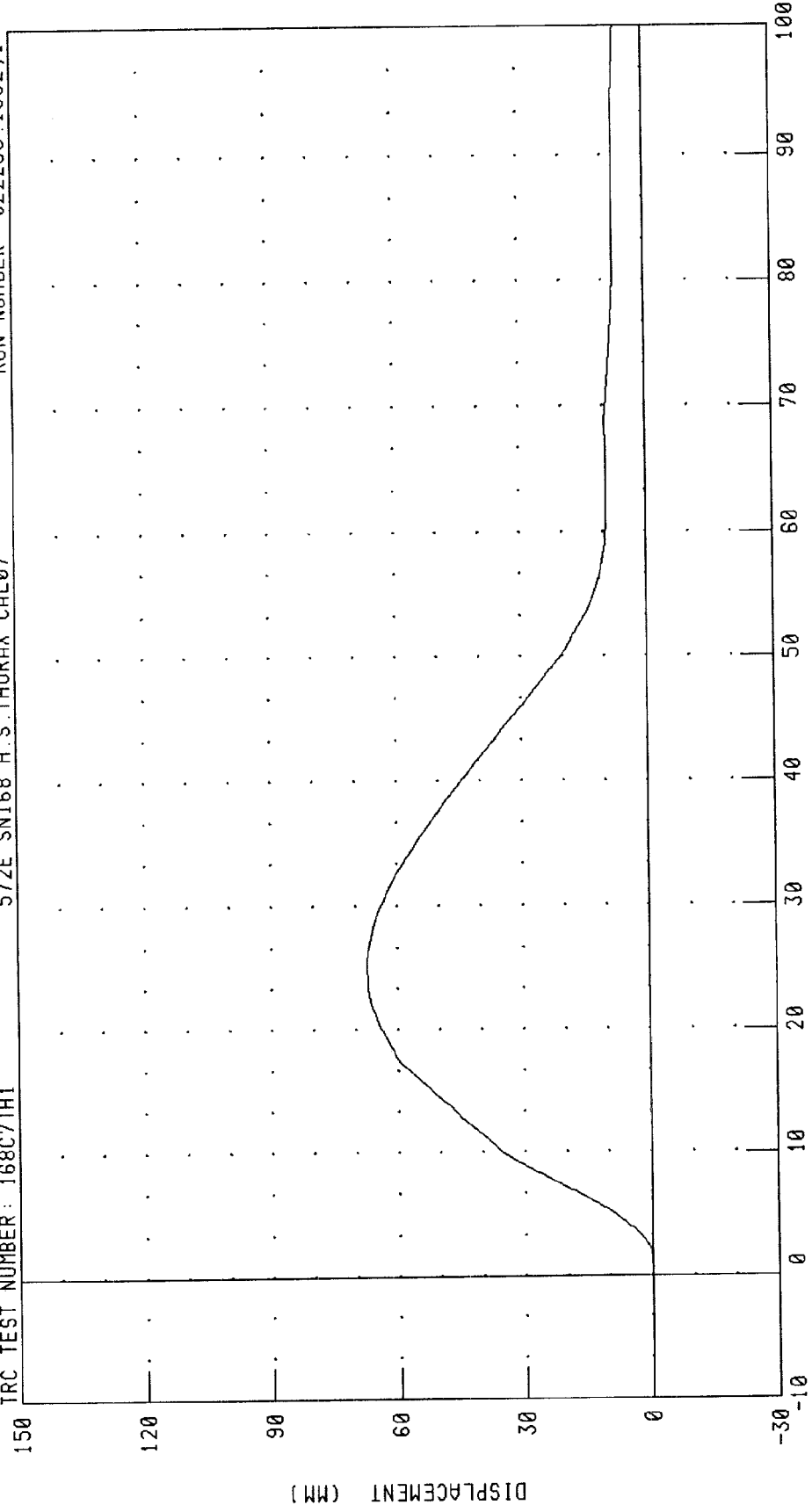
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

RUN NUMBER: 022299.1602;1

572E SN168 H.S. THORAX CAL07

TRC TEST NUMBER: 168C7TH1



PEAK DATA: 67.23 MM @ 25.36 MS; -0.03 MM @ 0.96 MS

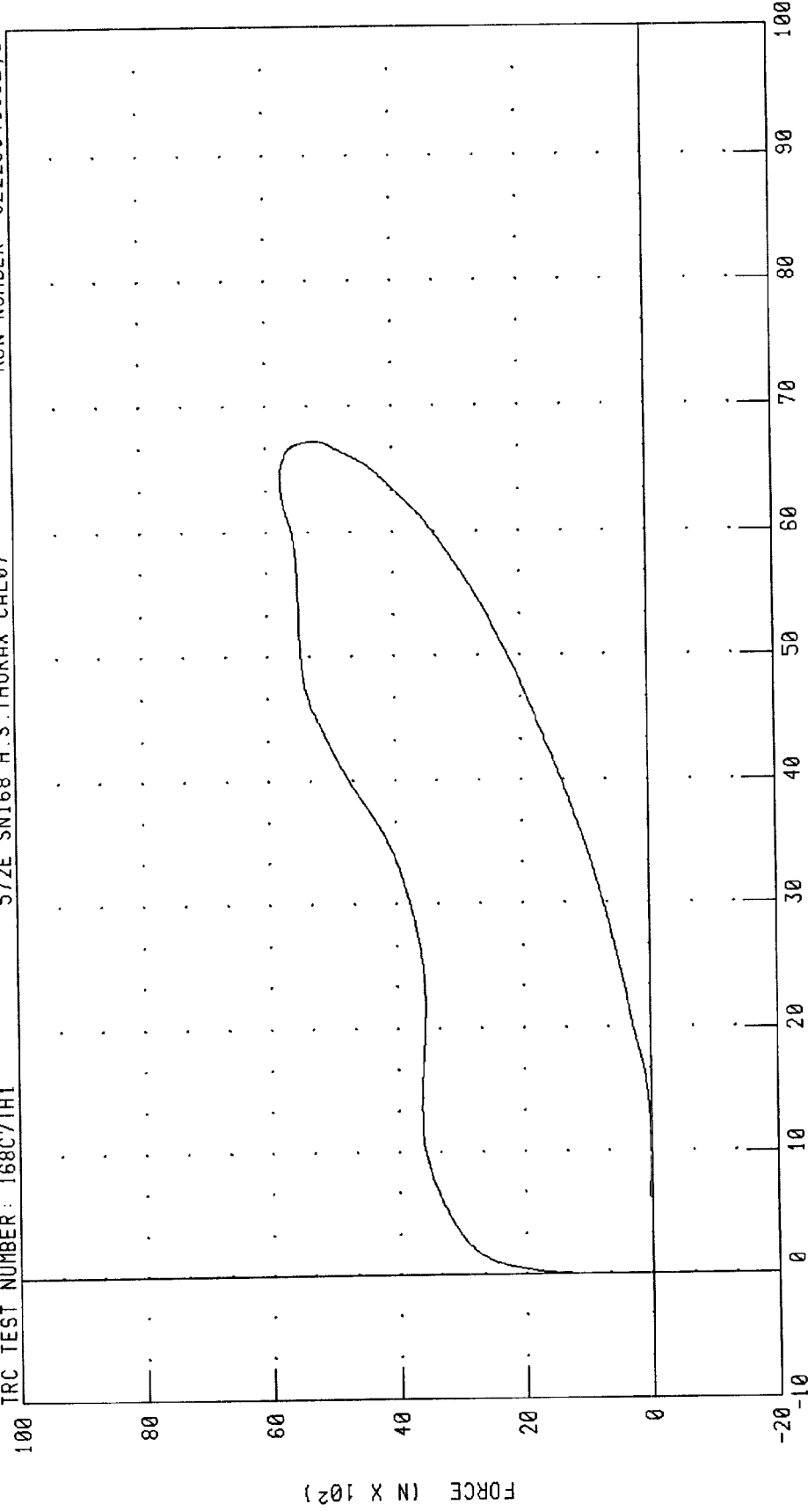
CHANNEL: CSTXD FILTER: CH. CLASS 180

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

TRC TEST NUMBER: 168C7TH1

572E SN168 H.S.THORAX CAL07

RUN NUMBER: 022299.1602;1



CHANNEL: CSTXD
PENXF

FILTER: CH. CLASS 180
CH. CLASS 180

PEAK DATA: 67.23 MM @ 25.36 MS; -0.03 MM @ 0.96 MS
5773.94 N @ 20.40 MS; -10.87 N @ 61.52 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

20-FEB-99

TRC 3NC.

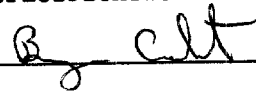
TEST NO: 168C7HR1

572E SN 168 HIPFLEX CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	64.3 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.1 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 022099.1203;3

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

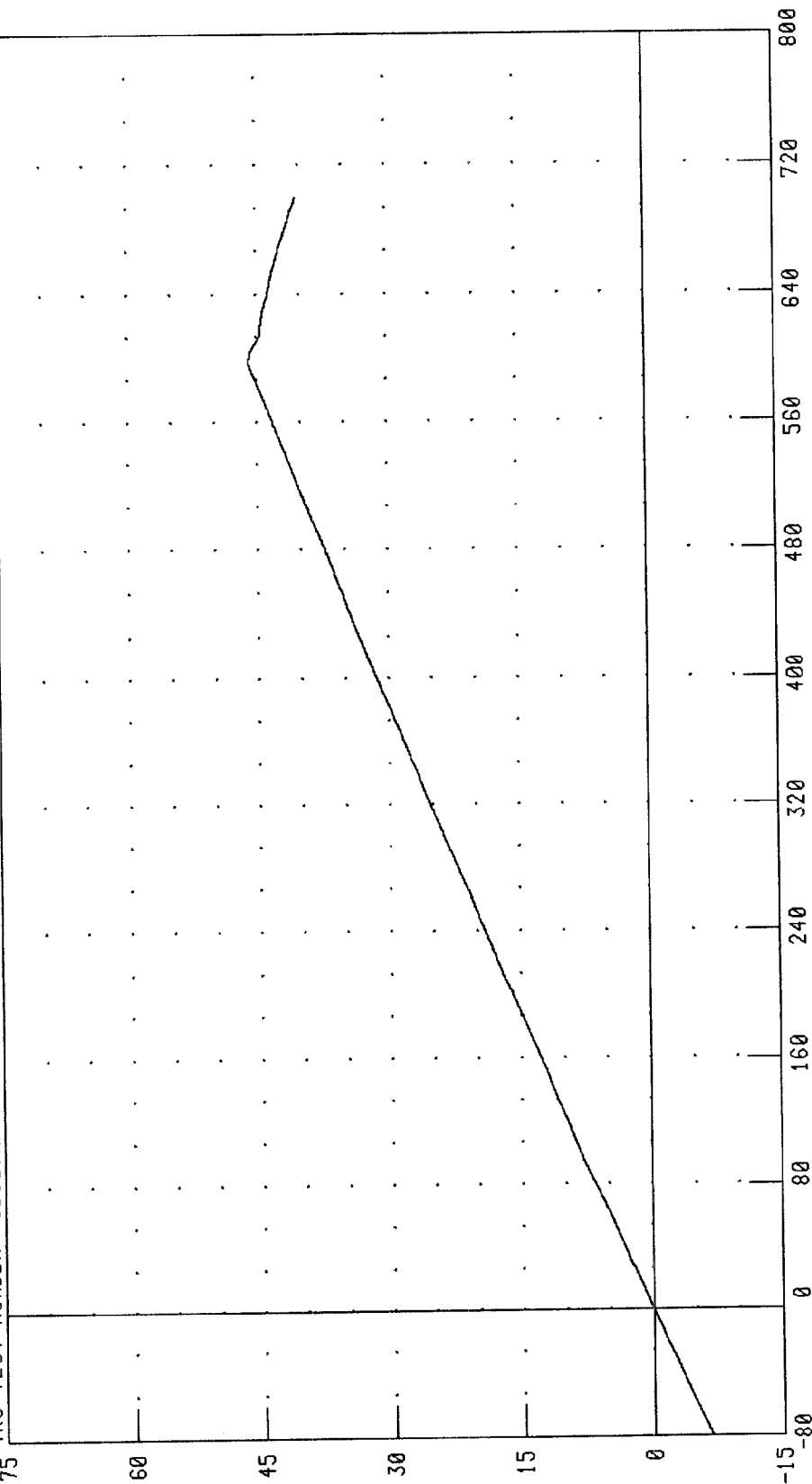
RIGHT HIP FLEXION ROTATION

572E SN 168 HIPFLEX CAL 07

RUN NUMBER: 022099.1203;3

TRC TEST NUMBER: 168C7HR1

75



PEAK DATA: 45.97 ° @ 5.99 S; -9.74 ° @ -1.00 S

CHANNEL: RHPXD FILTER: CH. CLASS 60

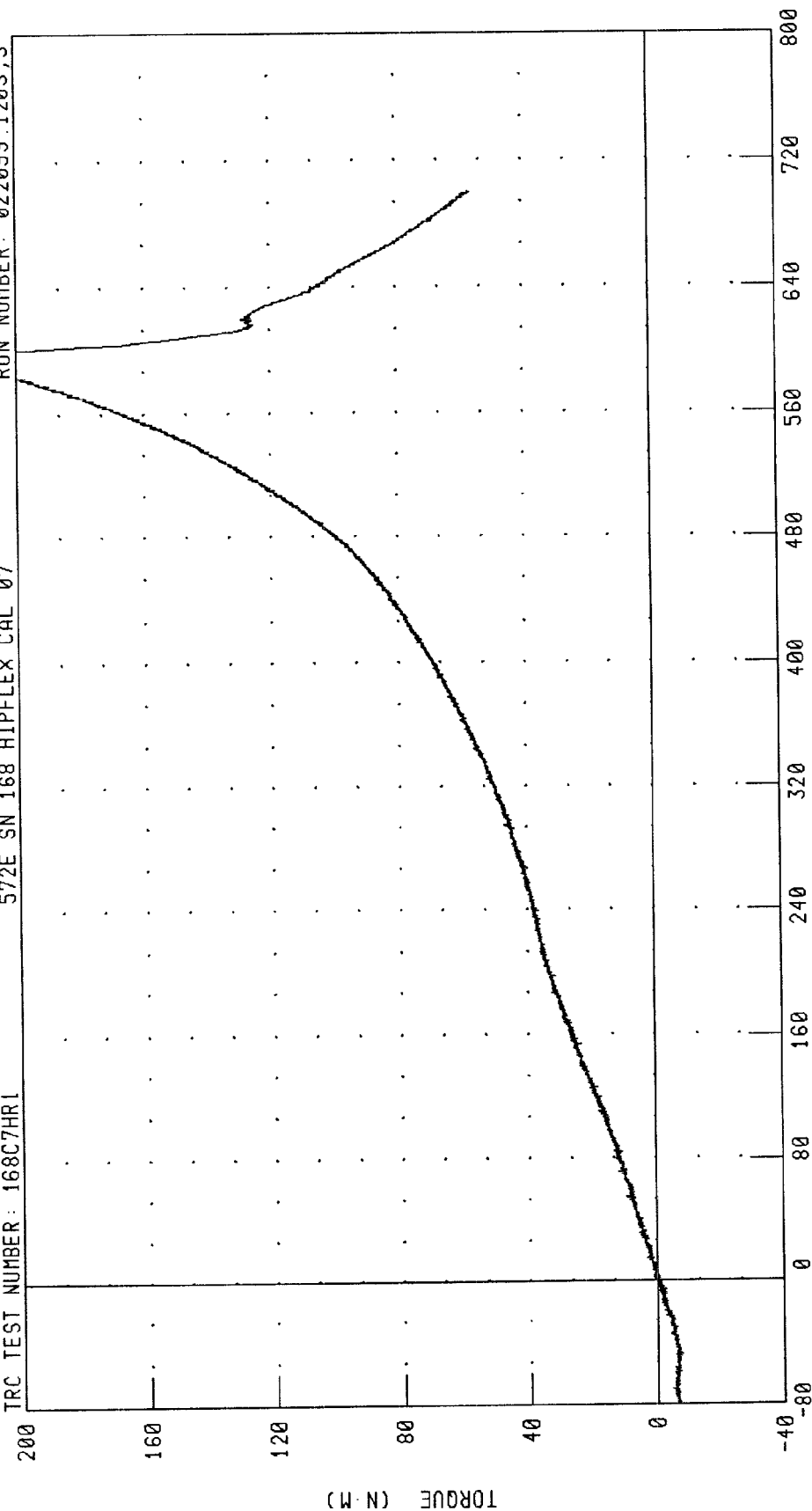
HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES

RIGHT HIP FLEXION MOMENT

572E SN 168 HIPFLEX CAL 07

RUN NUMBER: 022099.1203,3

TRC TEST NUMBER: 168C7HR1



TIME (S X 10⁻²)

PEAK DATA: 220.58 N·M @ 5.96 S; -9.85 N·M @ -0.99 S

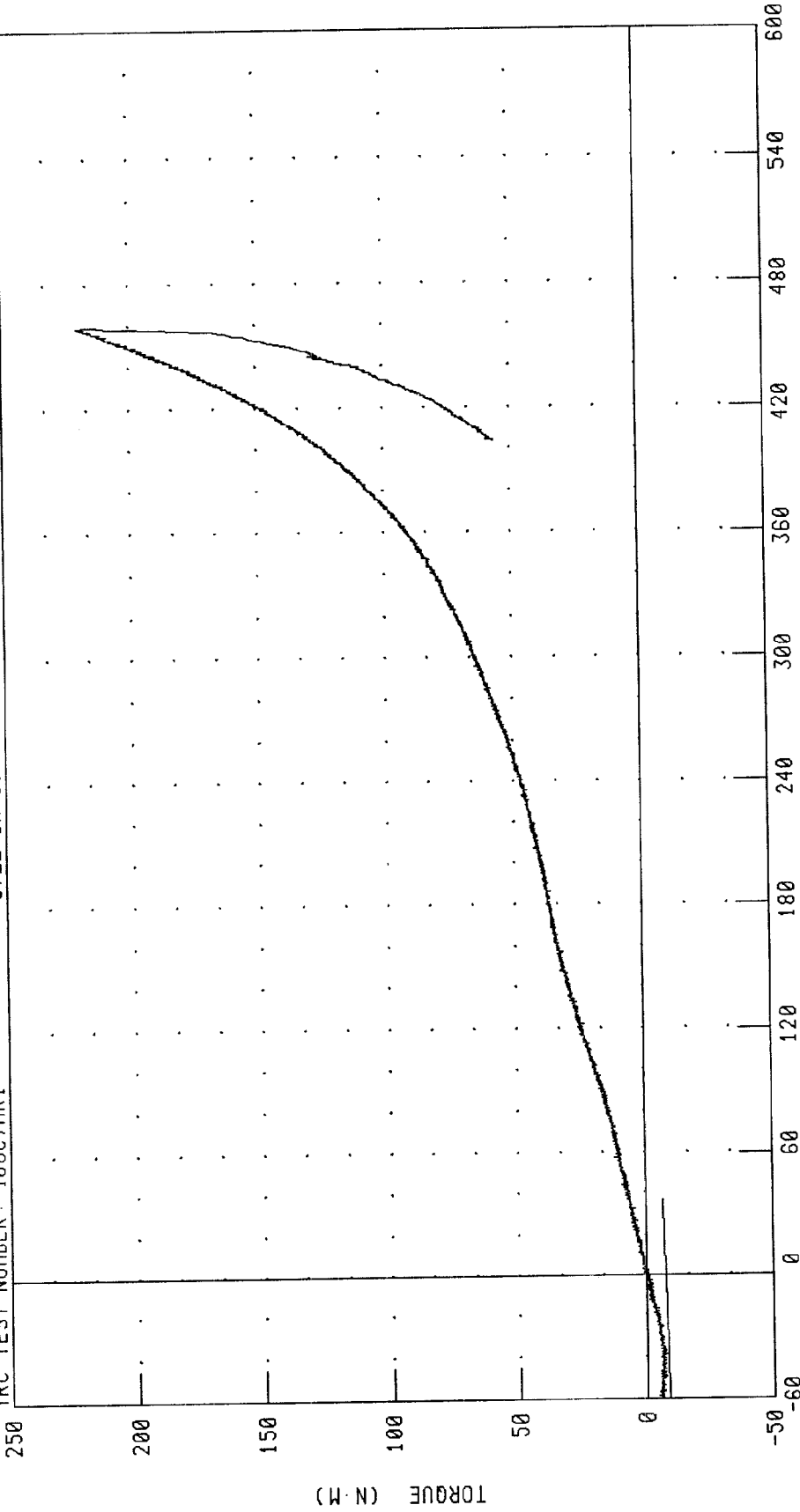
CHANNEL: RHPYM FILTER: CH. CLASS 60

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
 RIGHT HIP FLEXION MOMENT VS ROTATION ANGLE

TRC TEST NUMBER: 168C7HR1

572E SN 168 HIPFLEX CAL 07

RUN NUMBER: 022099.1203;3



CHANNEL: RHPXD
 RHPYM
 FILTER: CH. CLASS 60
 CH. CLASS 60
 PEAK DATA: 45.97 ° 0 5.99 S; -9.74 ° 0 -1.00 S
 220.58 N·M 0 5.96 S; -9.85 N·M 0 -0.99 S

TRANSPORTATION RESEARCH CENTER INC.

LEFT HIP JOINT FEMUR FLEXION TEST

HYBRID III PART 572E

20-FEB-99

TRC INC.

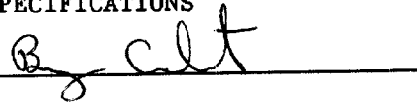
TEST NO: 168C7HL1

572E SN 168 HIPFLEX CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
ROTATION RATE	5 - 10 deg/sec	YES
TORQUE @ 30 deg ROTATION	<= 94.9 Nm	64.3 Nm
ROTATION @ 203.4 Nm TORQUE	40 - 50 deg.	45.1 deg.

TEST MEETS SPECIFICATIONS

TECHNICIAN



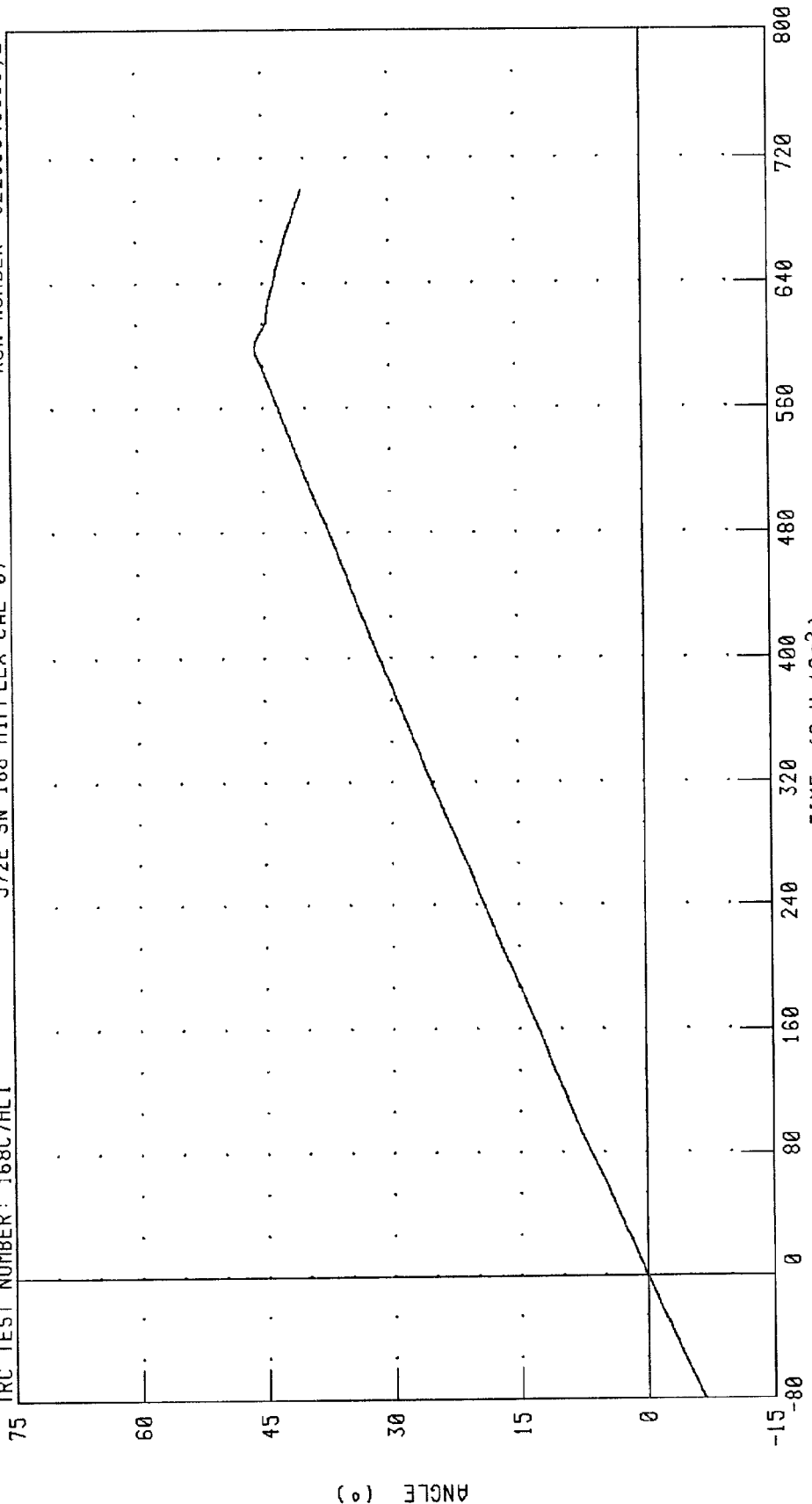
RUN NUMBER: 022099.1155;2

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES LEFT HIP FLEXION ROTATION

TRC TEST NUMBER: 168C7HL1

572E SN 168 HIPFLEX CAL 07

RUN NUMBER: 022099.1155;2



PEAK DATA: 45.97 ° @ 5.99 S; -9.67 ° @ -1.00 S

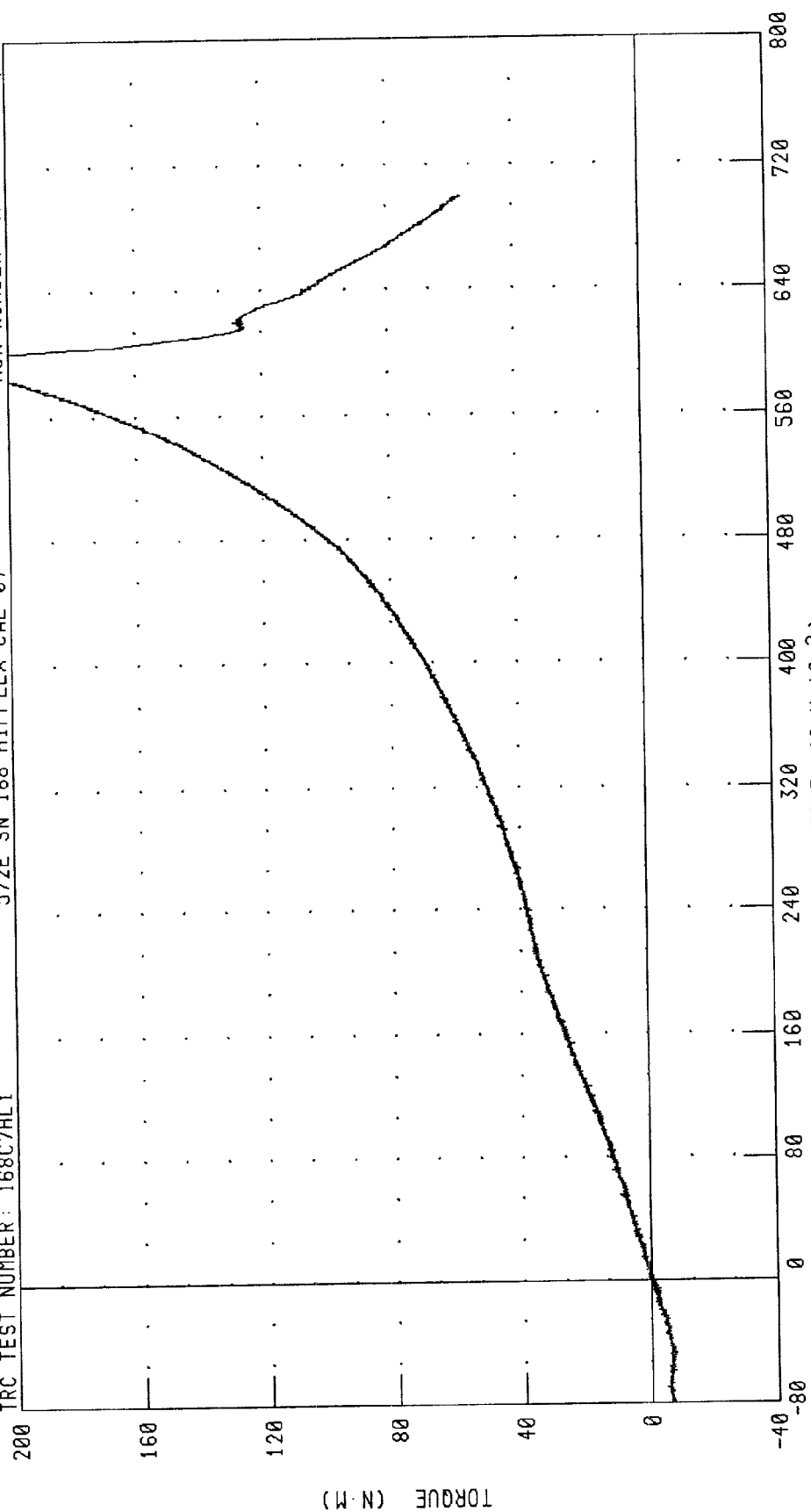
CHANNEL: LHPXD FILTER: CH. CLASS 60

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES
LEFT HIP FLEXION MOMENT

TRC TEST NUMBER: 168C7HL1

572E SN 168 HIPFLEX CAL 07

RUN NUMBER: 022099.1155;2



PEAK DATA: 220.58 N·M @ 5.96 S; -9.85 N·M @ -0.99 S

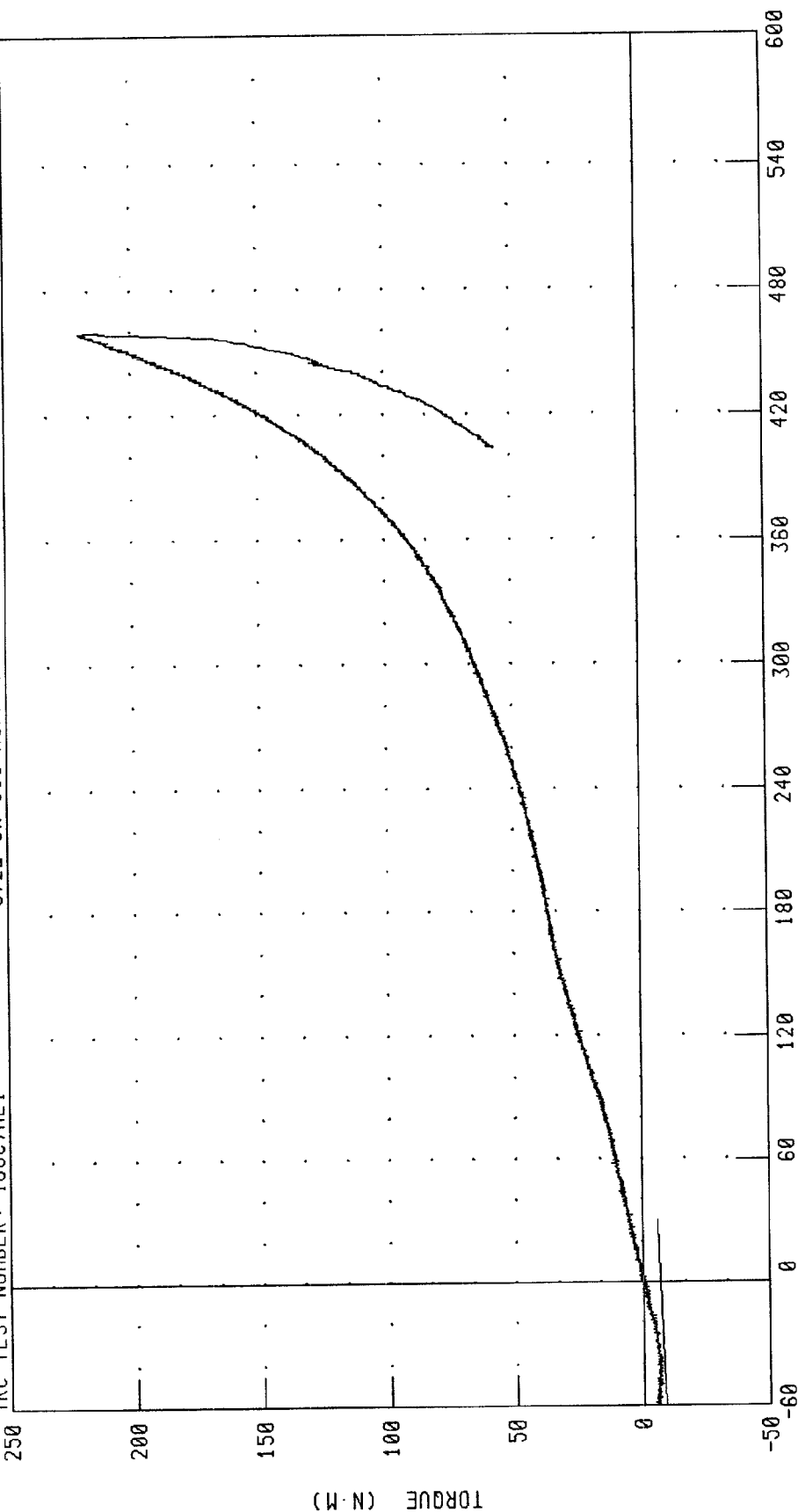
CHANNEL: LHPYM FILTER: CH. CLASS 60

HYBRID III HIP FLEXION VERIFICATION - 0 DEGREES LEFT HIP FLEXION MOMENT VS ROTATION ANGLE

TRC TEST NUMBER: 168C7HL1

572E SN 168 HIPFLEX CAL 07

RUN NUMBER: 022099.1155;2



CHANNEL: LHPXD
LHPYM

FILTER: CH: CLASS 60
CH: CLASS 60

PEAK DATA: 45.97 ° 0 5.99 S; -9.67 ° 0 -1.00 S
220.58 N·M 0 5.96 S; -9.85 N·M 0 -0.99 S

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

20-FEB-99

TRC INC.

TEST NO: 168C7RK1

572E SN168 RIGHT KNEE CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5249.8 N

TEST MEETS SPECIFICATIONS

TECHNICIAN By Cult

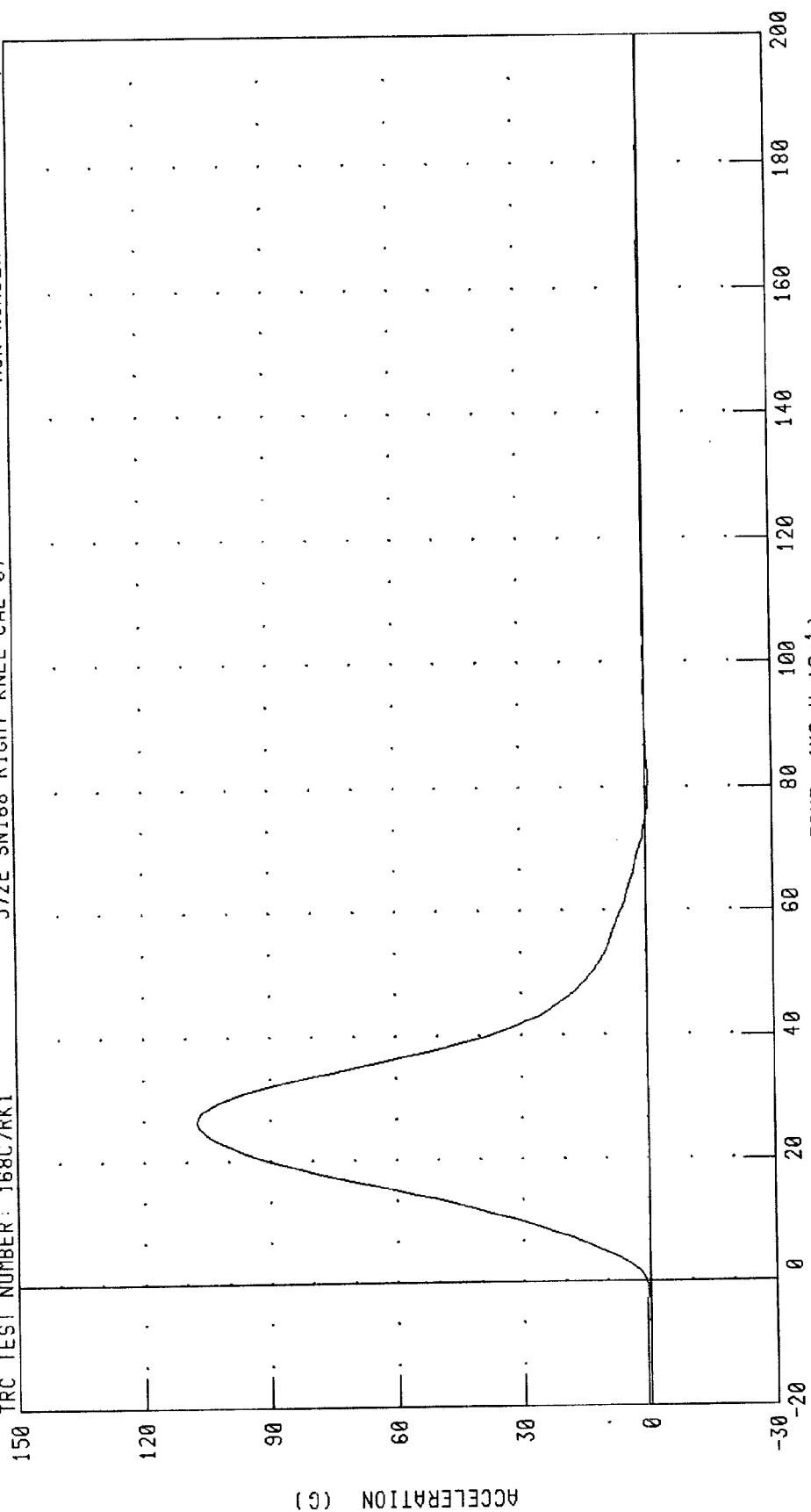
RUN NUMBER: 022099.1057;1

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

RUN NUMBER: 022099.1057;1

572E SN168 RIGHT KNEE CAL 07

TRC TEST NUMBER: 168C7RK1



PEAK DATA: 107.30 G @ 2.64 MS; -0.76 G @ 8.16 MS

CHANNEL: PENXC FILTER: CH. CLASS 600

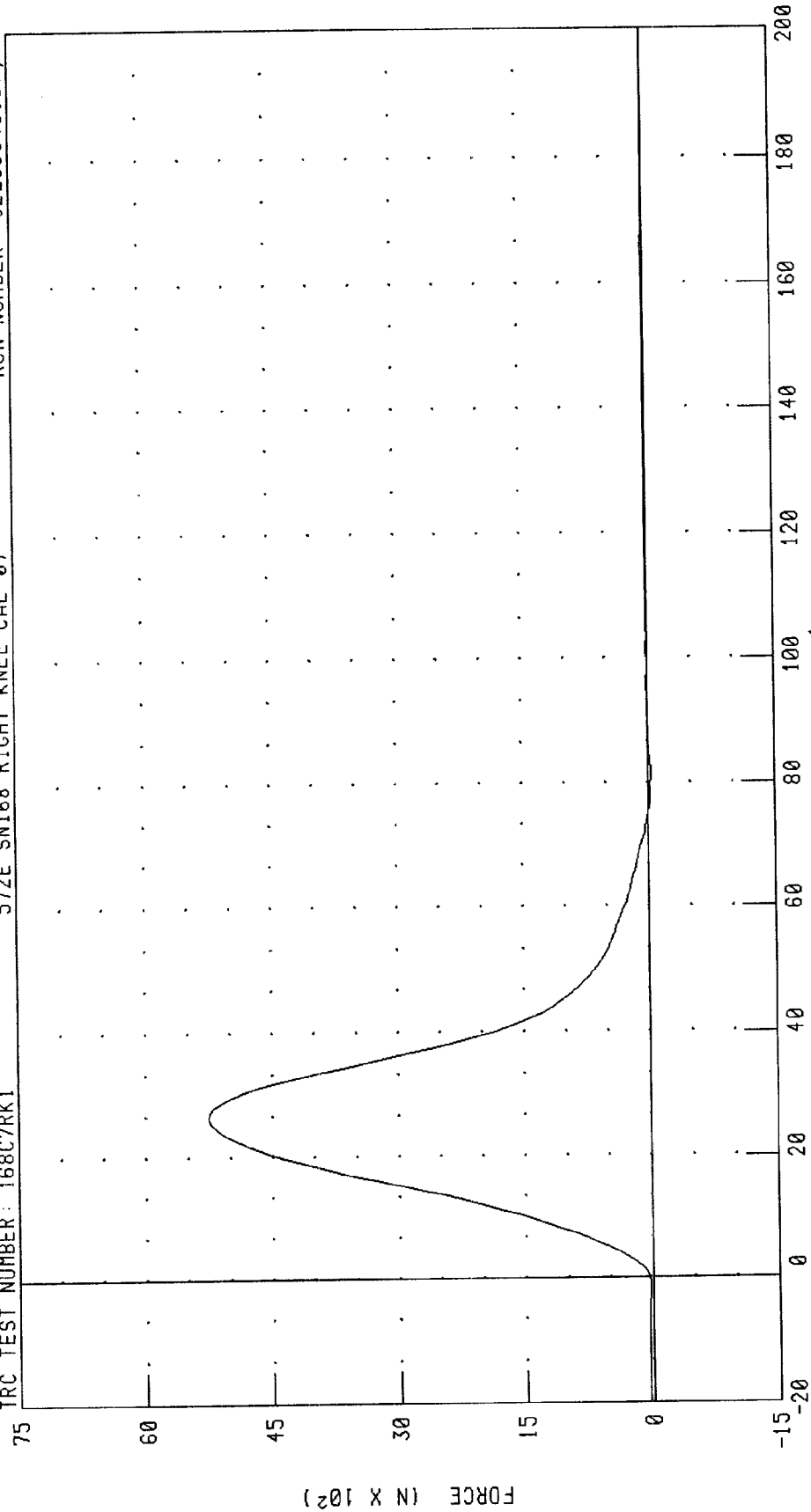
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 022099.1057,1

572E SN168 RIGHT KNEE CAL 07

TRC TEST NUMBER: 168C7RK1



PEAK DATA: 5249.88 N @ 2.64 MS, -37.40 N @ 8.16 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

20-FEB-99

TRC INC.

TEST NO: 168C7LK1

572E SN168 LEFT KNEE CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	22.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.12 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5838.0 N *

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN Kevin Watkins

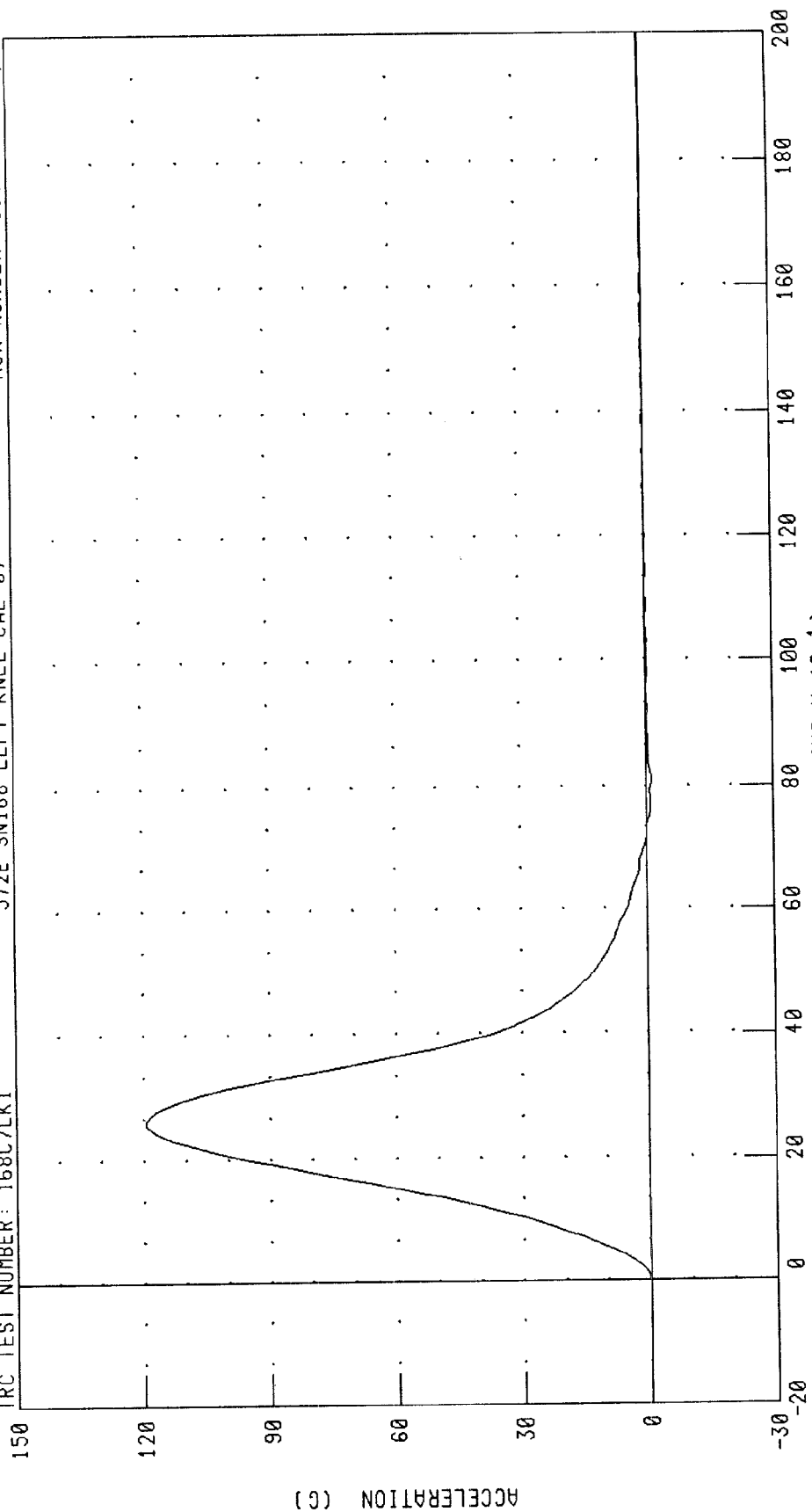
RUN NUMBER: 022099.1054;1

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

TRC TEST NUMBER: 168C7LK1

572E SN168 LEFT KNEE CAL 07

RUN NUMBER: 030899.1032;1



CHANNEL: PENXC FILTER: CH. CLASS 600

PEAK DATA: 119.32 G @ 2.64 MS, -1.28 G @ 8.16 MS

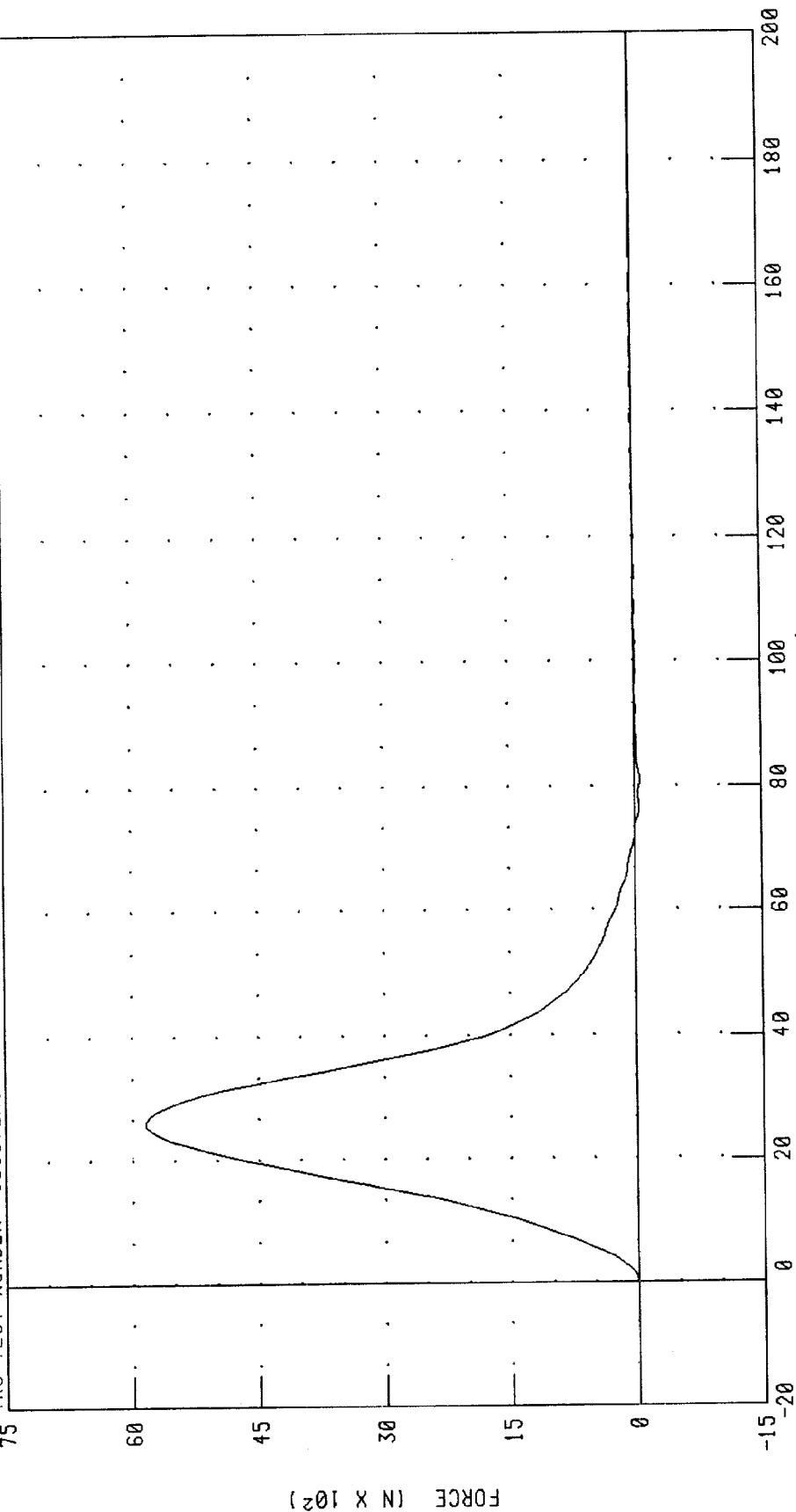
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND.)

RUN NUMBER: 030899.1032;1

TRC TEST NUMBER: 16807LK1

572E SN168 LEFT KNEE CAL 07



PEAK DATA: 5838.04 N @ 2.64 MS; -62.83 N @ 8.16 MS

CHANNEL: PENXF FILTER: CH. CLASS 600

Appendix D

Miscellaneous Test Information

Vehicle Instrumentation Placement

Test Number 990218-2

<u>Number</u>	<u>Location</u>	<u>Axis</u>	<u>Manufacturer</u>	<u>Model</u>	<u>S/N</u>	<u>Orientation (+ Sensing)</u>
1	Left Brake Caliper	X	Endevco	7264	J22210	Forward
2	Right Brake Caliper	X	Endevco	7264	J26513	Rearward
3	Instrument Panel Center	X	Endevco	7264	J25971	Forward
4	Engine Top	X	Endevco	7264	J22677	Forward
5	Engine Bottom	X	Endevco	7264	J22676	Forward
6	Vehicle Rear Center	Z	Endevco	7264	J25018	Up
7	Left Rear Seat Crossmember	X	Endevco	7264	J21823	Forward
8	Right Rear Seat Crossmember	X	Endevco	7264	J26485	Forward

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

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

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.

TRANSDUCER INFORMATION

HYBRID III DUMMY SERIAL NO.: 169v ; MFR.: HUM ; SEATING POSITION: DR ;
 PROJECT-SEGMENT NO.: 096017-7100 ; ENGINEER: ; TEST DATE: 18-FEB-99

MNEMONIC PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NO.	SERIAL NO.	MFR.	SENSITIVITY	CAL DUE DATE	FULL SCALE (ENGR. UNITS)		DIRECTION OF POSITIVE POLARITY	CABLE NO.
							DESIRED	ACTUAL		
HEDXG HAP	HEAD X-AXIS ACCEL.	7264	J21935	End.	.2409 mv/g at 10 volts	8-3- 1999	400 g		Rear	J21935
HEDYG HLR	HEAD Y-AXIS ACCEL.	"	J23912	"	.2827 mv/g at 10 volts	"	400 g		Left	J23912
HEDZG HIS	HEAD Z-AXIS ACCEL.	"	J23810	"	.2826 mv/g at 10 volts	"	400 g		Up	J23810
NEKXF NFX*	NECK X-AXIS SHEAR FORCE	1716	0106	Dento n.	1.7167 MV/V @ 2000 LBS	8-3- 1999	900 Kg 2,000 lbs. 9,000 N			FX
NEKYF NFY*	NECK Y-AXIS SHEAR FORCE	"	"	"	1.6802 MV/V @2000 LBS	"	900 Kg 2,000 lbs. 9,000 N			FY
NEKZF NFZ*	NECK Z-AXIS AXIAL FORCE	"	"	"	1.2943 MV/V @3000 LBS	"	1300 Kg 3,000 lbs. 13,500 N			FZ
NEKXM NMX*	NECK MOMENT ABOUT X AXIS	"	"	"	1.6148 MV/V @2500 IN- LBS	"	30 Kgm 200 ft-lbs 275 N-m			MX
NEKYM NMY*	NECK MOMENT ABOUT Y AXIS	"	"	"	1.6205 MV/V @2500 IN-LBS	"	30 Kgm 200 ft-lbs 275 N-m			MY
NEKZM NMZ*	NECK MOMENT ABOUT Z AXIS	"	"	"	2.2982 MV/V @2500 IN-LBS	"	30 Kgm 200 ft-lbs 275 N-m			MZ

TRANSDUCER INFORMATION

HYBRID III DUMMY SERIAL NO.: 169v; MFR.: HUM; SEATING POSITION: DR

PROJECT-SEGMENT NO.: 096017-7001; ENGINEER: ; TEST DATE: 18-FEB-99

MNEMONIC PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NO.	SERIAL NO.	MFR.	SENSITIVITY	CAL DUE DATE	FULL SCALE (ENGR. UNITS) DESIRED ACTUAL	DIRECTION OF POSITIVE POLARITY	CABLE NO.
CSTXG CAP	CHEST X-AXIS ACCEL.	7264	J23914	End.	.2528 mv/g at 10 volts	8-3- 1999	400 g	Forward	J23914
CSTYG CLR	CHEST Y-AXIS ACCEL.	"	J23808	"	.2843 mv/g at 10 volts	"	400 g	Left	J23808
CSTZG CIS	CHEST Z-AXIS ACCEL.	"	J23774	"	.2405 mv/g at 10 volts	"	400 g	Up	J23774
CSTXD CAPD	CHEST DEFLECTION	14CB1- 2847	169	SERV	mv/v /in	8-3- 1999	6 inch 150 mm		169
PEVXG PAP	PELVIS X-AXIS ACCEL.						400 g		
PEVYG PLR	PELVIS Y-AXIS ACCEL.						400 g		
PEVZG PIS	PELVIS Z-AXIS ACCEL.						400 g		
LFMF LF	LEFT FEMUR FORCE	2430	96661	GSE	0.8816 mv/v at 3000 lbs.	8-3- 1999	1300 Kg 3,000 lbs. 13,500 N		D105
RFMF RF	RIGHT FEMUR FORCE	"	96662	"	0.8605 mv/v at 3000 lbs.	"	1300 Kg 3,000 lbs. 13,500 N		709

TRANSDUCER INFORMATION

HYBRID III DUMMY SERIAL NO.: 168v; MFR.: HUM; SEATING POSITION: PA

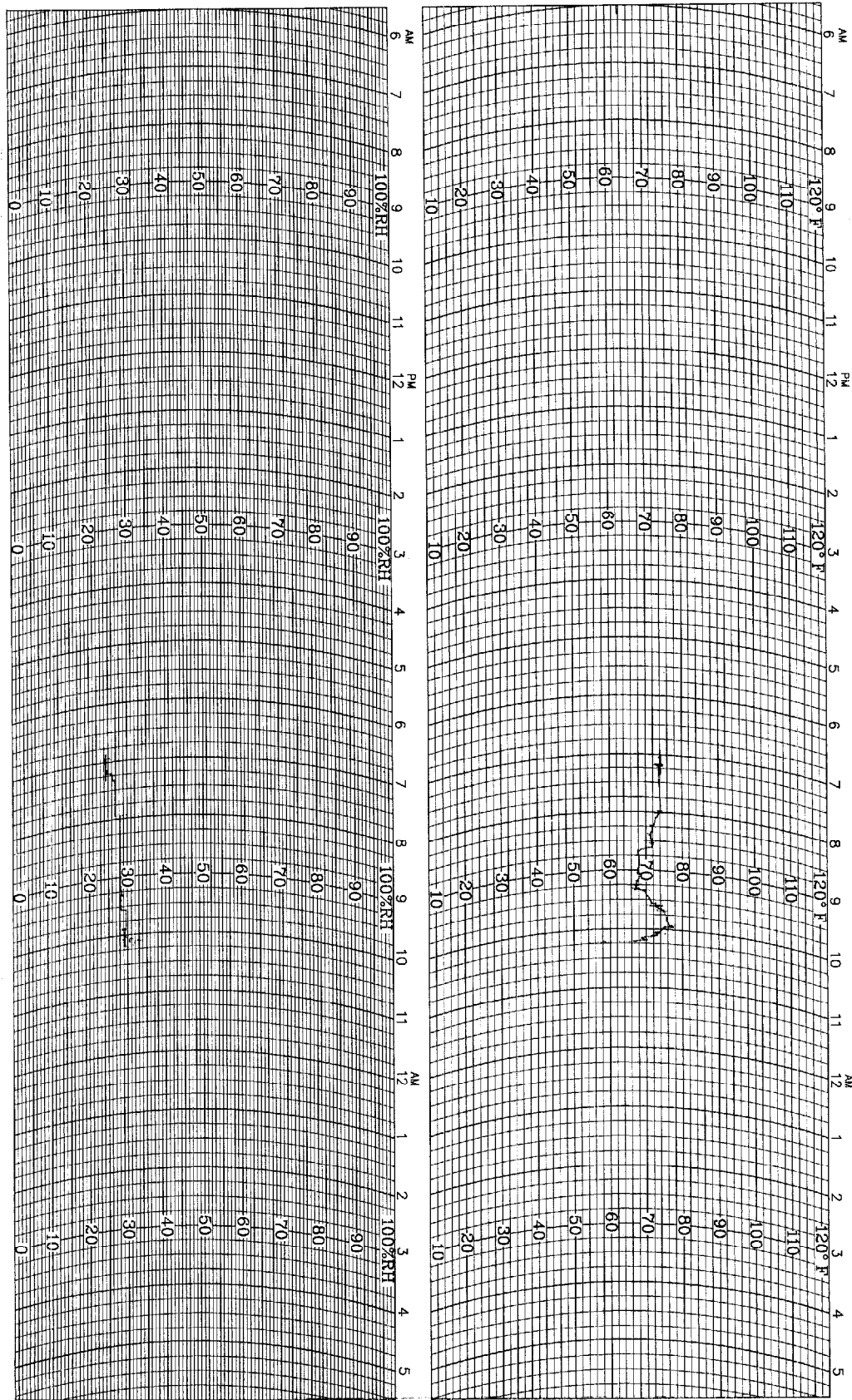
PROJECT-SEGMENT NO.: 096017-7100; ENGINEER: ; TEST DATE: 18-FEB-99

MNEMONIC PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NO.	SERIAL NO.	MFR.	SENSITIVITY	CAL DUE DATE	FULL SCALE (ENGR. UNITS)		DIRECTION OF POSITIVE POLARITY	CABLE NO.
							DESIRED	ACTUAL		
HEDXG HAP	HEAD X-AXIS ACCEL.	7264	J19535	End.	.2649 mv/g at 10 volts	8-3- 1999	400 g		Rear	J19535
HEDYG HLR	HEAD Y-AXIS ACCEL.	"	J19548	"	.2192 mv/g at 10 volts	"	400 g		Left	J19548
HEDZG HIS	HEAD Z-AXIS ACCEL.	"	J20026	"	.2527 mv/g at 10 volts	"	400 g		Up	J20026
NEKXF NFX*	NECK X-AXIS SHEAR FORCE	1716A	0853	Dento n.	1.7387 MV/V @ 2000 LBS	"	900 Kg 2,000 lbs. 9,000 N			FX
NEKYF NFY*	NECK Y-AXIS SHEAR FORCE	"	"	"	1.6587 MV/V @2000 LBS	"	900 Kg 2,000 lbs. 9,000 N			FY
NEKZF NFZ*	NECK Z-AXIS AXIAL FORCE	"	"	"	1.2806 MV/V @3000 LBS	"	1300 Kg 3,000 lbs. 13,500 N			FZ
NEKXM NMX*	NECK MOMENT ABOUT X AXIS	"	"	"	1.6595 MV/V @2500 IN- LBS	"	30 Kgm 200 ft-lbs 275 N-m			MX
NEKYM NMY*	NECK MOMENT ABOUT Y AXIS	"	"	"	1.6596 MV/V @2500 IN-LBS	"	30 Kgm 200 ft-lbs 275 N-m			MY
NEKZM NMZ*	NECK MOMENT ABOUT Z AXIS	"	"	"	2.3663 MV/V @2500 IN-LBS	"	30 Kgm 200 ft-lbs 275 N-m			MZ

TRANSDUCER INFORMATION

HYBRID III DUMMY SERIAL NO.: 168v _____; MFR.: HUM _____; SEATING POSITION: PA _____
 PROJECT-SEGMENT NO.: 096017-7001 _____; ENGINEER: _____; TEST DATE: 18-FEB-99 _____

MNEMONIC PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NO.	SERIAL NO.	MFR.	SENSITIVITY	CAL DUE DATE	FULL SCALE (ENGR. UNITS)		DIRECTION OF POSITIVE POLARITY	CABLE NO.
							DESIRED	ACTUAL		
CSTXG CAP	CHEST X-AXIS ACCEL.	7264	J20011	End.	.2324 mv/g at 10 volts	8-3- 1999	400 g		Forward	J20011
CSTYG CLR	CHEST Y-AXIS ACCEL.	"	J20001	"	.2709 mv/g at 10 volts	"	400 g		Left	J20001
CSTZG CIS	CHEST Z-AXIS ACCEL.	"	J20438	"	.2313 mv/g at 10 volts	"	400 g		Up	J20438
CSTXD CAPD	CHEST DEFLECTION	14CB1- 2847	168	SERV	mv/v /in	8-3- 1999	6 inch 150 mm			168
PEVXG PAP	PELVIS X-AXIS ACCEL.						400 g			
PEVYG PLR	PELVIS Y-AXIS ACCEL.						400 g			
PEVZG PIS	PELVIS Z-AXIS ACCEL.						400 g			
LFMF LF	LEFT FEMUR FORCE	2430	726	DENT	0.9495 mv/v at 3000 lbs.	8-3- 1999	1300 Kg 3,000 lbs. 13,500 N			726
RFMF RF	RIGHT FEMUR FORCE	"	741	"	0.9030 mv/v at 3000 lbs.	"	1300 Kg 3,000 lbs. 13,500 N			741



Weather Measure
WEATHERtronics
 Division of QUALIMETRICS, Inc.

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HYGROTHERMOGRAPH
 1 DAY

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

STATION _____ DATE ON _____ DATE OFF _____