

Load Cell Barrier Impact Test

**Toyota Motor Corporation
2001 Toyota Echo 4 door sedan
NHTSA Number:
TRC Inc. Test Number: 010924**

**Prepared By:
Transportation Research Center Inc.
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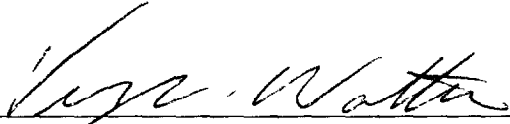
**Final Report
October 5, 2001**

**Prepared For:
U. S. Department of Transportation
Volpe National Transportation Systems Center
55 Broadway, Kendall Square
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16 Abstract A 48 km/h flat frontal load cell barrier impact test was conducted on a 2001 Toyota Echo 4 door sedan, at Transportation Research Center Inc. on September 24, 2001 This test was conducted in accordance with Volpe Task Order No 1, for the evaluation of vehicle and occupant responses. The barrier impact velocity was 47.8 km/h. The vehicle's maximum static crush was 465 millimeters. The ambient temperature was 21° C The driver's 36 millisecond Head Injury Criteria (HIC) was 616 The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 63.7 g. The driver's maximum chest deflection was 66 millimeters. The driver's left and right femur maximum axial compressive forces were 7813 N and 9572 N, respectively. The passenger's 36 millisecond HIC was 261 The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 52.7 g The passenger's maximum chest deflection was 17 millimeters. The passenger's left and right femur maximum axial compressive forces were 6805 N and 7467 N, respectively.		
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Section 1 0

Purpose and Test Procedure

Purpose

This 48 km/h load cell barrier impact test was conducted for the Volpe National Transportation Systems Center (Volpe) by Transportation Research Center Inc. (TRC Inc.).

The purpose of this testing was to evaluate and compare vehicle and occupant responses in frontal rigid barrier crash tests conducted at various impact speeds using model year 2001 vehicles in support of the FMVSS 208 Implementation plan (May 12, 2000 interim rule). For this test, the subject vehicle was a 2001 Toyota Echo 4 door sedan and the barrier wall was equipped with a load cell barrier.

Test Procedure

This test was conducted in accordance with Volpe's instructions for a full frontal car to load cell barrier test. Data was obtained relative to FMVSS 208, "Occupant Crash Protection" performance.

The test vehicle, a 2001 Toyota Echo, was instrumented with ten (10) accelerometers to measure longitudinal axis accelerations and three (3) accelerometers to measure vertical axis accelerations. The driver's and passenger's airbag signals were monitored with inductive pickups. The vehicle impacted a load cell frontal barrier. The vehicle's specified impact velocity range was 47.2 to 48.8 km/h.

The test vehicle contained two (2) Part 572E adult male Hybrid III anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to NHTSA Laboratory Test Procedure TP-208-10. The driver dummy and the passenger dummy were both unbelted and were restrained with front single stage airbags.

Both dummies were instrumented with an array of twelve (12) accelerometers in the head, and three (3) accelerometers in the chest, oriented to measure longitudinal, lateral, and vertical accelerations. The dummies were also instrumented with upper and lower neck moment and force load cells, left and right femur load cells to measure axial forces, and chest deflection potentiometers. Both dummies were also instrumented with upper and lower tibia load cells to measure forces and moments, and knee displacement potentiometers. The driver dummy was equipped with THOR-LX legs, which included longitudinal and lateral tibia accelerometers, three (3) foot accelerometers on each foot to measure accelerations in three (3) axes and three (3) rotary potentiometers at each ankle to measure foot rotations about three (3) axes. The passenger dummy was instrumented with three (3) foot accelerometers to measure accelerations at the heel and toe.

The 171 data channels were digitally sampled and recorded at 12,500 samples per second and processed per SAE J211 March 1995.

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

Section 2.0

Full Frontal Load Cell Barrier Test Summary

Test Results Summary

This full frontal load cell barrier crash test was conducted by TRC Inc. on September 24, 2001.

The test vehicle, a 2001 Toyota Echo 4 door sedan, NHTSA Number (TBD), was equipped with a 1.5-liter transverse engine, automatic transmission, power steering, power brakes and single stage front airbags. The vehicle's test weight was 1157.6 kg. The vehicle's impact speed was 47.8 km/h. The vehicle sustained 465 mm of static crush during the impact.

The driver's 36 millisecond Head Injury Criteria (HIC) was 616. The driver's 15 millisecond HIC was 419. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 63.7 g. The driver's maximum chest deflection was 66 mm. The driver's left and right femur maximum axial compressive forces were 7813 N and 9572 N, respectively. The driver dummy's neck injury calculations were as follows: NTF, 0.17; NTE, 0.55; NCF, 0.16; NCE, 0.91.

The right front passenger's 36 millisecond HIC was 261. The passenger's 15 millisecond HIC was 161. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 52.7 g. The passenger's maximum chest deflection was 17 mm. The passenger's left and right femur maximum axial compressive forces were 6805 N and 7467 N, respectively. The right front passenger's neck injury calculations were as follows: NTF, 0.28; NTE, 0.19; NCF, 0.33; NCE, 0.18.

Data Acquisition Explanations

There were no anomalies to report for this test.

A data spike which occurs in each of the driver's head acceleration data channels appears to coincide with driver head contact with the windshield.

Table 1 Crash Test Summary

Test mode·	Frontal load cell barrier		
Test date·	09/24/01		
Test time·	1537		
Ambient temperature·	21° C		
Vehicle year/make/ model/body style·	2001/Toyota/Echo/4 door sedan		
Vehicle test weight·	1157.6 kg		
Impact angle ¹ ·	0°		
Impact velocity ² ·	47.8 km/h		
Maximum static crush·	465 mm		
Average rebound·	538 mm		
Number of data channels·	171		
Number of cameras·	High-speed	14	Real-time 1
<u>Dummies:</u>	<u>Driver #206</u>		<u>Passenger #202</u>
Type	Part 572E		Part 572E
Location·	Left front		Right front
Restraint·	Airbag		Airbag
<u>Seat track position for test:</u>			
Driver·	Mid		
Passenger·	Mid		
<u>Seat back position for test:</u>			
Driver·	1.8° (measured on headrest post)		
Passenger·	1.8° (measured on headrest post)		
<u>Head restraint position for test:</u>			
Driver·	Full up		
Passenger·	Full up		
Steering column position·	Mid		

¹ With respect to tow track centerline

² Speed trap measurement ($\pm$ 0.8 km/h accuracy)

Table 2 General Test and Vehicle Parameter Data

Vehicle year/make/ model/body style:	2001/Toyota/Echo/4 door sedan
VIN:	JTDBT123810193853
Model year:	2001
Body style:	4-door sedan
Color	Black
Engine data:	
Cylinders:	4
Displacement	1.5 liters
Cylinder placement:	Straight
Engine placement:	Transverse
Transmission data:	<u>4</u> speed, ___ manual, <u>X</u> automatic, ___overdrive
Final drive:	<u>X</u> FWD, ___RWD, ___4WD
Date vehicle received:	09/06/2001
Odometer reading:	79
Dealer's name and address:	Germain Toyota 5777 Scarborough Blvd. Columbus, OH 43232

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	No
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
Other	None	Power door locks	No

Certification data from vehicle's label:

Vehicle manufactured by:	Toyota Motor Corporation
Date of manufacture:	07/01
VIN:	JTDBT123810193853
GVWR:	3010 lbs
GAWR: Front:	1610 lbs.
Rear:	1450 lbs.

Table 2 General Test and Vehicle Parameter Data, Cont'd.

Tires on vehicle (mfr., line, size): Goodyear, Integrity, P175/65R14

Tire pressure with maximum capacity vehicle load:

Front: 44 psi (300 kPa)

Rear: 44 psi (300 kPa)

Spare tire (mfr., line, size): Dunlop, Temporary, T11570D14

Type of seats:

Front Bucket

Rear Bench

Maximum width: 1660 mm

Wheelbase: 2370 mm

Location of "Recommended Tire Pressure" label:

The label was located in the glove box.

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

Recommended tire size: P175/65R14

Recommended cold tire pressure:

Front: 32 psi (220 kPa)

Rear: 32 psi (220 kPa)

Vehicle Capacity Data:

Number of Occupants (Designated seating capacity):

Front 2

Mid N/A

Rear 3

Total 5

Vehicle capacity weight: 351 kg

Rated cargo/luggage weight 11 kg

Test vehicle attitude:

Delivered attitude: LF 653 mm; RF 649 mm; LR 654 mm; RR 648 mm

Fully loaded attitude: LF 624 mm; RF 622 mm; LR 626 mm; RR 622 mm

Pre-test attitude: LF 621 mm; RF 625 mm; LR 613 mm; RR 608 mm

Post-test attitude: LF 635 mm; RF 625 mm; LR 624 mm; RR 596 mm

Table 2 General Test and Vehicle Parameter Data Cont'd

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

Right front	293.0 kg	Right rear	187.5 kg
Left front	309.5 kg	Left rear	181.5 kg
Total front weight	602.5 kg	(65.5 % of total vehicle weight)	
Total rear weight	369.0 kg	(34.5 % of total vehicle weight)	
Total delivered weight	971.5 kg		

Calculation of test vehicle's target test weight:

Total Delivered Weight (UDW) =	971.5 kg
Rated Cargo/Luggage Weight (RCLW) ¹ =	11 kg
Weight of 2 Part 572E Dummies @ 76 kg each =	152 kg
Target test weight =	1134.5 kg

Weight of test vehicle with required dummies and 23.1 kg of cargo weight:

Right front	327.6 kg	Right rear	244.2 kg
Left front	335.2 kg	Left rear	250.6 kg
Total front weight	662.8 kg	(57.3 % of total vehicle weight)	
Total rear weight	494.8 kg	(42.7 % of total vehicle weight)	
Total test weight	1157.6 kg	(2.0 % over target test weight)	

Weight of ballast secured in vehicle: None

Components removed to meet target test weight: Rear window glass, rear bumper and fascia, rear seats and belts, all side windows, rear interior trim and speakers, rear deck, trunk lid, tail lights, spare tire and approximately 3/4ths of Stoddard from fuel tank.

Location of Vehicle's CG: 1013 mm rearward of front wheel centerline

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

Table 3 Post-Impact Data

Test number: 010924
Test date: 09/24/01
Test time: 1537
Test type: Frontal load cell barrier
Impact angle: 0°
Ambient temperature
at impact area: 21° C
Required impact velocity range: 47.2 to 48.8 km/h

Barrier impact velocity:

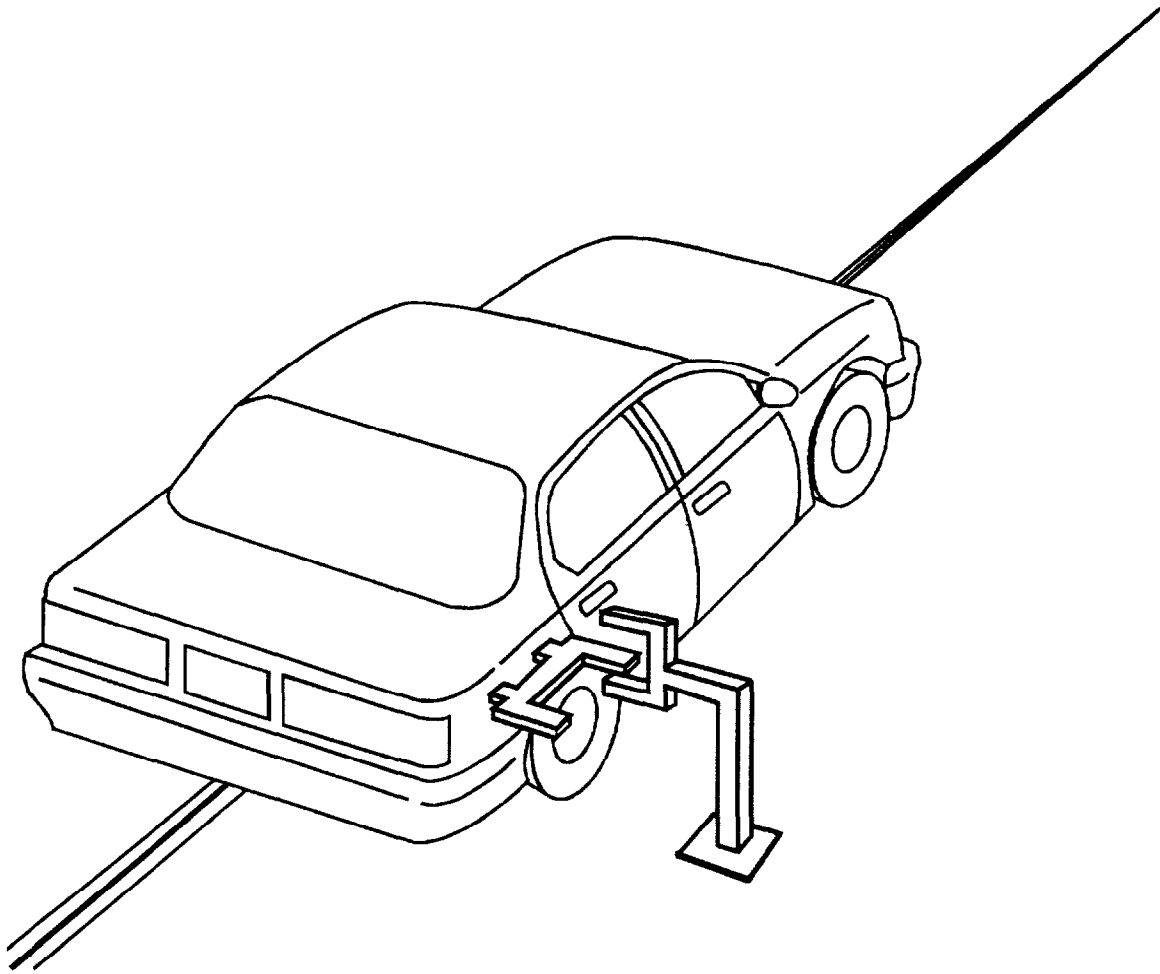
Primary: 47.8 km/h
Secondary: 47.9 km/h
Distance from vehicle to barrier:
Entering velocity trap: 661 mm
Exiting velocity trap: 51 mm

Vehicle rebound from flat rigid barrier:

Distance from test vehicle to barrier impact point:

Post-test: L 539 mm; C 539 mm; R 537 mm
Average rebound: 538 mm

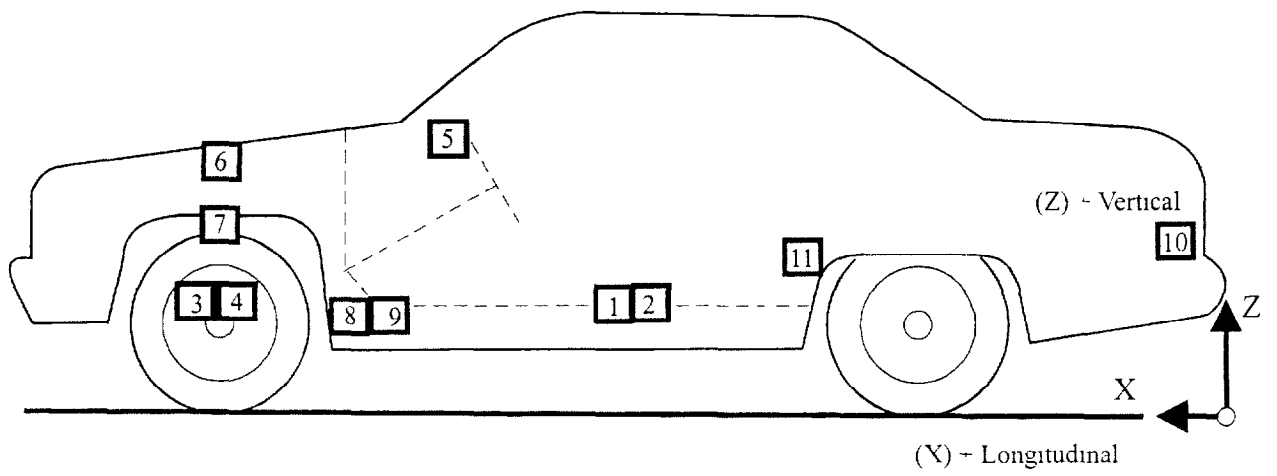
Figure 1 Impact Velocity Measurement System



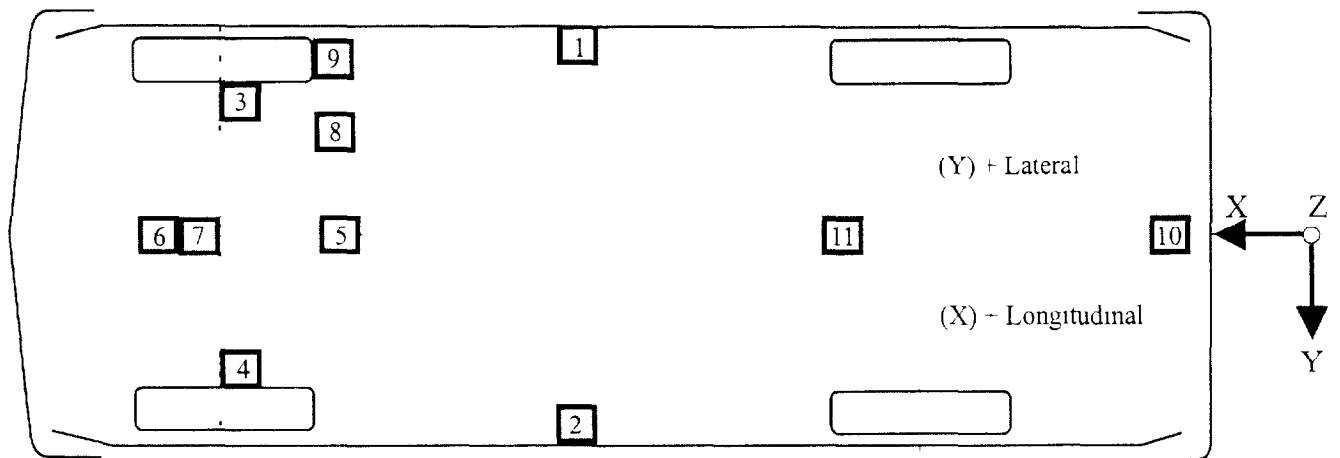
The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 610-millimeter spacing.

Figure 2 Vehicle Accelerometer Placement



Side View



Bottom View

Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 010924 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	1641 mm	-320 mm	430 mm	6.6 g @ 84.9 ms	37.2 g @ 45.4 ms
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	1641 mm	320 mm	420 mm	6.7 g @ 87.2 ms	37.3 g @ 40.9 ms
3 FRONT BRAKE CALIPER LEFT LONGITUDINAL	3480 mm	-630 mm	310 mm	48.7 g @ 55.8 ms	143.5 g @ 41.4 ms
4 FRONT BRAKE CALIPER RIGHT LONGITUDINAL	3480 mm	630 mm	310 mm	29.7 g @ 62.6 ms	73.0 g @ 50.7 ms
5 DASH PANEL CENTER LONGITUDINAL	2921 mm	0 mm	1053 mm	18.8 g @ 107.9 ms	74.5 g @ 51.9 ms
6 ENGINE TOP LONGITUDINAL	3683 mm	590 mm	748 mm	59.0 g @ 45.8 ms	106.7 g @ 32.0 ms
7 ENGINE BOTTOM LONGITUDINAL	3580 mm	300 mm	175 mm	39.3 g @ 38.3 ms	170.5 g @ 31.4 ms

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

TEST NUMBER: 010924 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
8 TOEPAN NEXT TO ACCEL LONGITUDINAL VERTICAL	2851 mm	-210 mm	225 mm	4.9 g	@ 86.0 ms	41.5 g	@ 48.0 ms
				45.8 g	@ 26.3 ms	22.7 g	@ 30.9 ms
9 TOEPAN NEXT TO FOOTREST LONGITUDINAL VERTICAL	2851 mm	-485 mm	215 mm	5.6 g	@ 84.4 ms	41.2 g	@ 36.8 ms
				26.6 g	@ 25.0 ms	18.5 g	@ 67.0 ms
10 REAR DECK VERTICAL	236 mm	0 mm	470 mm	26.8 g	@ 117.6 ms	17.9 g	@ 122.7 ms
11 REAR COMPARTMENT CENTER LONGITUDINAL	1116 mm	0 mm	490 mm	5.9 g	@ 84.8 ms	38.9 g	@ 39.7 ms

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

Section 3.0

Summary of FMVSS 208 Data

Table 5 Dummy Injury Criteria Data

	<u>Maximum Acceleration¹</u>						
	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	-75.6 g	20.0 g	-53.7 g	81.9 g	-70.1 g	15.3 g	31.6 g
Passenger	-41.6 g	-14.0 g	-28.1 g	43.7 g	-51.4 g	-5.1 g	17.2 g

	<u>Maximum Femur Compressive Force</u>	
	Left Femur	Right Femur
Driver	7813 N	9572 N
Passenger	6805 N	7467 N

	<u>Head Injury Criteria²</u>		
	36 millisecond		
	HIC	Time t ₁	Time t ₂
Driver	616	74.2 ms	108.2 ms
Passenger	261	63.9 ms	99.9 ms

	15 millisecond		
	HIC	Time t ₁	Time t ₂
Driver	419	74.4 ms	87.0 ms
Passenger	161	77.0 ms	92.0 ms

	<u>Chest Maximum Resultant Acceleration³</u>		
	Acceleration	Time t ₁	Time t ₂
Driver	63.7 g	88.9 ms	91.9 ms
Passenger	52.7 g	79.3 ms	82.3 ms

Table 5 Dummy Injury Criteria Data, Cont'd

Maximum Chest Deflection

Driver	66 mm
Passenger	17 mm

Neck Injury Calculations (Nij)²

	NTF	NTE	NCF	NCE
Driver	0.17	0.55	0.16	0.91
Passenger	0.28	0.19	0.33	0.18

¹ See Report Sign Convention in Appendix D.

² As defined in FMVSS No. 208.

³ Defined as equal to or exceeding 0.003 sec. duration

Table 6 Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver</u>	<u>Passenger</u>
Head	Airbag, visor, windshield head restraint	Airbag, visor, head restraint
Chest	Airbag, lower steering wheel	Airbag
Abdomen	None	None
Left knee	Instrument panel	Instrument panel
Right knee	Instrument panel	Instrument panel

Door opening:

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

Seat movement:

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

Glazing damage: Shattered

Other notable impact effects: None

Section 4 0

Occupant, Camera, Vehicle, and Barrier Information

Dummy Kinematic Summary

Driver Dummy

Upon impact, the driver dummy translated forward in the seat impacting both knees into the instrument panel. The dummy's head contacted the airbag, windshield, and forward edge of the sun visor and the neck went into extension as the face and chest impacted the airbag. The lower chest contacted the lower steering wheel rim. As the dummy rebounded into the seat back, the dummy's head rotated forward and then rearward, contacting the headrest. The driver dummy came to rest seated in the driver's seat leaning slightly to the right.

Right Front Passenger Dummy

Upon impact, the passenger dummy translated forward in the seat impacting both knees into the instrument panel. The dummy's neck extended rearward as the dummy's face and chest impacted the airbag. The dummy's head also contacted the forward edge of the sun visor. As the dummy rebounded into the seat back, the dummy's head rotated forward and then rearward, contacting the headrest. The dummy came to rest seated in the passenger's seat, leaning slightly to the left.

Figure 3 Dummy Measurement Locations for Front Seat Occupants

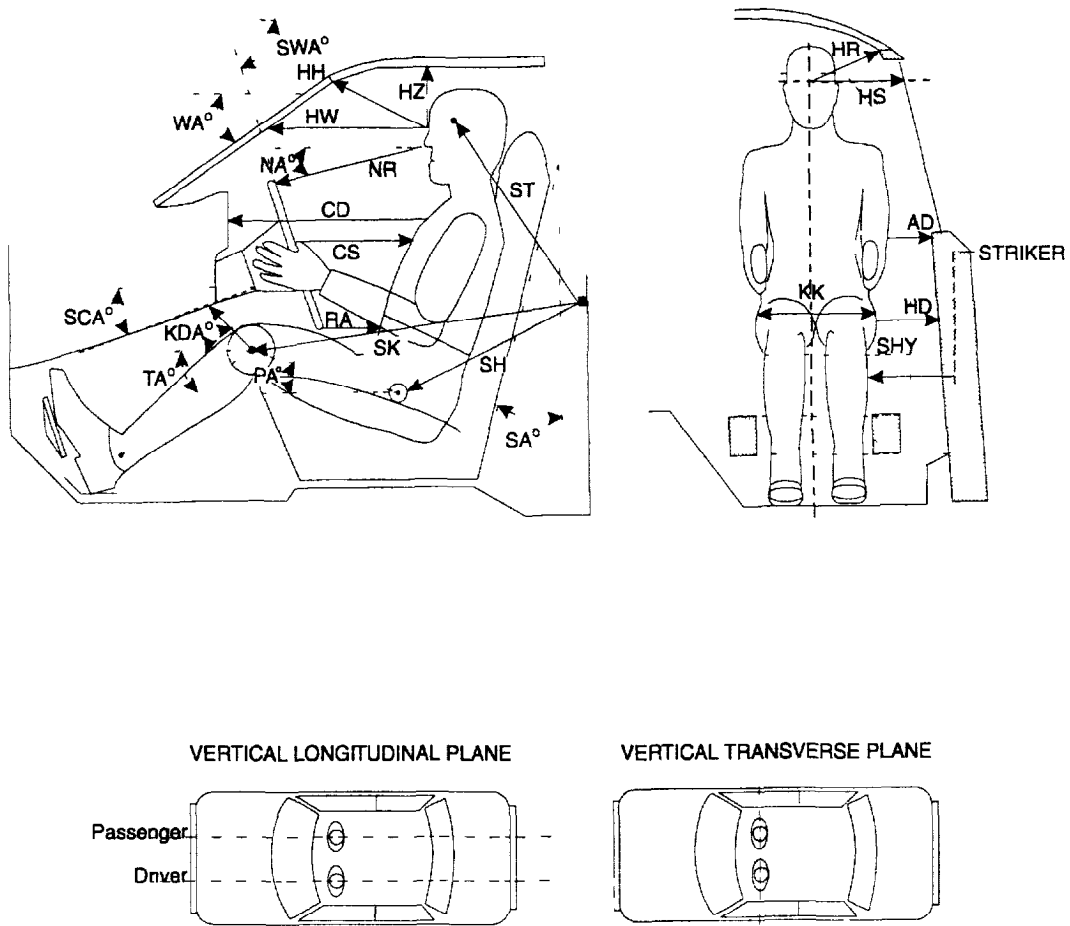


Table 7 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial # 206)	Passenger (Serial # 202)
WA	Windshield angle	29.3°	29.3°
SWA	Steering wheel angle	61.3°	N/A
SCA	Steering column angle	28.7°	N/A
SA ¹	Seat back angle	1.8°	1.8°
HZ	Head to roof	203 mm	204 mm
HH	Head to header	335 mm	343 mm
HW	Head to windshield	523 mm	538 mm
HR	Head to side header	213 mm	250 mm
NR	Nose to rim	428 mm	N/A
NA	Nose to rim angle	15.1°	N/A
CD	Chest to dash	610 mm	588 mm
CS	Steering wheel to chest	340 mm	N/A
RA	Rim to abdomen	205 mm	N/A
KDL	Left knee to dash	139 mm	120 mm
KDR	Right knee to dash	167 mm	143 mm
KDA	Outboard knee to dash angle	65.5°	75.6°
PA	Pelvic angle	21.4°	21.2°
TA	Tibia angle	62.6°	56.8°
KK	Knee to knee	310 mm	300 mm
ST ²	Striker to head	534 mm	540 mm
	Striker to head angle	-78.6°	-75.4°
SK ²	Striker to knee	574 mm	596 mm
	Striker to knee angle	2.5°	5.9°
SH ²	Striker to H-point	228 mm	225 mm
	Striker to H-point angle	37.6°	37.4°
SHY	Striker to H-point (Y dir.)	230 mm	240 mm
HS	Head to side window	250 mm	250 mm
HD	H-point to door	133 mm	123 mm
AD	Arm to door	88 mm	94 mm

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

¹ Measured on the headrest post per manufacturer's instructions.

² A negative angle indicates the measurement point was above the striker.

Descriptions of Dummy Measurements

When a level is to be used, it is to ensure that the line containing the two points described is either parallel or perpendicular to the ground. If a measurement to be made is less than 10 inches ignore the directions to use a level and approximate a level measurement. Also, when a measurement is to be taken to or from the center of a bolt on the dummy, take the measurement from the center of the bolt hole if the bolt is recessed.

The following measurements are to be made within a vertical longitudinal plane.

- * HH Head to Header, taken from the point where the dummy's nose meets his forehead (between his eyes) to the furthest point forward on the header
- * HW Head to Windshield, taken from the point where the dummy's nose meets his forehead (between his eyes) to a point on the windshield Use a level
- HZ Head to Roof, taken from the point where the dummy's nose meets his forehead (between his eyes) to the point on the roof directly above it Use a level
- † CS Steering Wheel to Chest, taken from the center of the steering wheel hub to the dummy's chest. Use a level
- * CD Chest to Dash, place a tape measure on the tip of the dummy's chin and rotate five inches of it downward toward the dummy to the point of contact on the transverse center of the dummy's chest. Then measure from this point to the closest point on the dashboard either between the upper part of the steering wheel between the hub and the rim, or measure to the dashboard placing the tape measure above the rim, whichever is a shorter measurement See diagram.
- RA Steering Wheel Rim to Abdomen, taken from the bottommost point of the steering wheel rim horizontally rearward to the dummy Use a level
- NR Nose to Rim, taken from the tip of the dummy's nose to the closest point on the top of the steering wheel rim. Also indicate the angle this line makes with respect to the horizontal (NA)
- *¹ KDL, Left and Right Knees to Dashboard, taken from the center of the knee pivot bolt's outer surface to the closest point forward acquired by swinging the tape measure in continually larger arcs until it contacts the dashboard Also reference the angle of this measurement with respect to the horizontal for the outboard knee (KDA). See diagram.

* Measurement used in Data Tape Reference Guide

¹ Only outboard measurement is referenced in Data Tape Reference Guide

Descriptions of Dummy Measurements, Cont'd.

SH, Striker to Hip, Knee, and Head, these measurements are to be taken in the X-
SK, Z plane measured from the forward most center point on the striker to the
ST the H-point, outer knee bolt, and head target. When taking this measurement
center of a firm device that can be rigidly connected to the striker should be
used. Use a level. The angles of these measurements with respect to the
horizontal should also be recorded. The measurement in the Y (transverse)
direction from the striker to the H-point should also be taken (SHY). See
diagram.

The following measurements are to be made within a vertical transverse plane.

- HS Head to Side Window, taken from the point where the dummy's nose meets
his forehead (between his eyes) to the outside of the side window. In order to
make this measurement, roll the window down to the exact height which
allows a level measurement. Use a level. See diagram.
- * AD Arm to Door, taken from the outer surface of the elbow pivot bolt on a Hybrid
II dummy to the first point it hits on the door. In the case of a Hybrid III
dummy, measure from the bolt on the outer biceps. When a SID is used make
the measurement from the center of the bottom of the arm segment where it
meets the dummy's torso.
- * HD H-point to Door, taken from the H-point on the dummy to the closest point on
the door. Use a level.
- * HR Head to Side Header, measure the shortest distance from the point where the
dummy's nose meets his forehead (between his eyes) to the side edge of the
header just above the window frame, directly adjacent to the dummy.
- SHY Striker to H-point, taken from a rod rigidly connected to the forward most
center point on the striker to the H-point. Use a level. See diagram.
- KK Knee to Knee, for Hybrid II dummies measure the distance between knee
pivot bolt head outer surfaces. For Hybrid III dummies measure the distance
between the outboard knee clevis flange surfaces. (This measurement may
not be exactly transverse.)

Angles

- SA Seat Back Angle, find this angle using the instructions provided by the
manufacturer. If the manufacturer doesn't provide clear instructions contact
the COTR.

* Measurement used in Data Tape Reference Guide

Descriptions of Dummy Measurements, Cont'd

- PA Pelvic or Femur Angle, taken by inserting the pelvic angle gauge into the H-point gauging hole on the SID or the Hybrid III dummies and taking this angle with respect to the horizontal. Measure the angle of the line connecting the H-point hole and the outer knee pivot bolt hole on a Hybrid II dummy with respect to the horizontal, to find the femur angle
- SWA Steering Wheel Angle, find this by placing a straight edge against the steering wheel rim along the longitudinal plane. Then measure the acute angle of the straight edge with respect to the horizontal.
- SCA Steering Column Angle, measured with respect to the horizontal by placing an inclinometer on the center of the underside of the steering column
- NA Measure the angle made when taking the measurement NR with respect to the horizontal
- KDA Knee to Dash Angle, the angle that the measurement KD is taken at with respect to the horizontal. Only get this angle for the outboard knee. See diagram
- WA Windshield Angle, place an inclinometer along the transverse center of the windshield exterior (measurement is made with respect to horizontal)
- TA Tibia Angle, use a straight edge to connect the dummy's knee and ankle bolts. Then place an inclinometer on the straight edge and measure the angle with respect to the horizontal.

Figure 4 Pre-Test And Post-Test Measurement Points

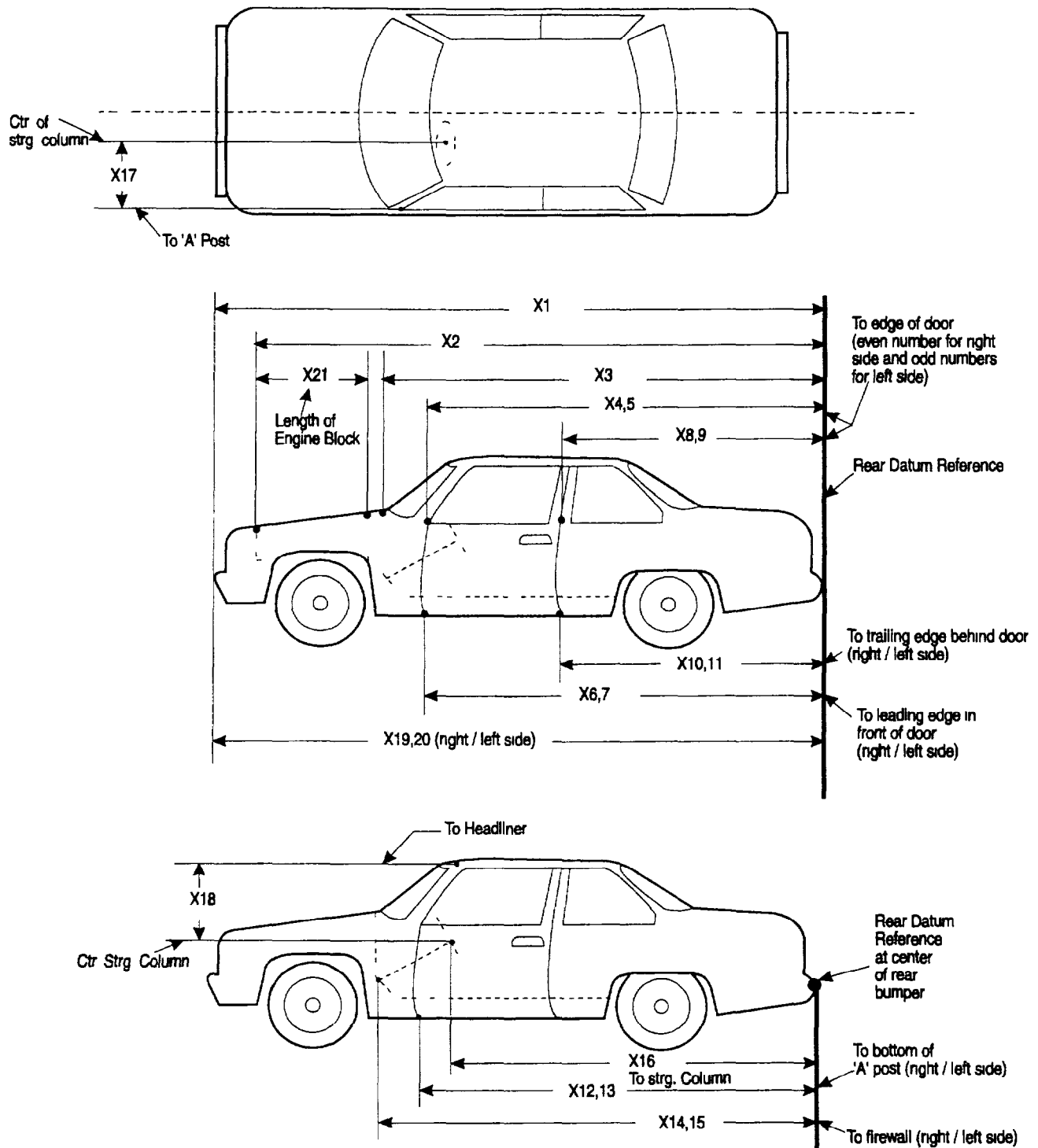


Table 8 Impacted Vehicle Measurements

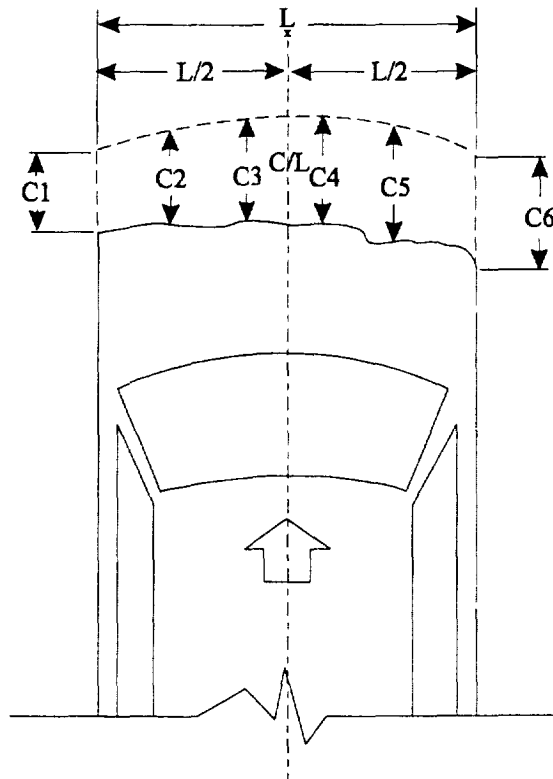
Test number: 010924

Vehicle year/make/model/body style: 2001/Toyota/Echo/4 door sedan

No	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4136	3680	456
X2	Rear Surface of Vehicle to Front of Engine Block	3705	N/A	N/A
X3	Rear Surface of Vehicle to Firewall	3292	N/A	N/A
X4	Rear Surface of Veh to Upper Leading Edge of Right Door	2935	2936	-1
X5	Rear Surface of Veh to Upper Leading Edge of Left Door	2940	2921	19
X6	Rear Surface of Veh to Lower Leading Edge of Right Door	2876	2861	15
X7	Rear Surface of Veh to Lower Leading Edge of Left Door	2886	2860	26
X8	Rear Surface of Veh to Upper Trailing Edge of Right Door	1954	1962	-8
X9	Rear Surface of Veh to Upper Trailing Edge of Left Door	1960	1946	14
X10	Rear Surface of Veh to Lower Trailing Edge of Right Door	1936	1923	13
X11	Rear Surface of Veh to Lower Trailing Edge of Left Door	1941	1916	25
X12	Rear Surface of Veh to Bottom of " A " Post on Right Side	2931	2936	-5
X13	Rear Surface of Veh to Bottom of " A " Post on Left Side	2941	2931	10
X14	Rear Surface of Vehicle to Firewall--Right Side	3273	N/A	N/A
X15	Rear Surface of Vehicle to Firewall --Left Side	3262	N/A	N/A
X16	Rear Surface of Vehicle to Steering Wheel Center	2536	2511	25
X17	Center of Steering Column to " A " Post	270	400	-130
X18	Center of Steering Column to Headliner	424	600	-176
X19	Rear Surface of Vehicle to Right Side of Front Bumper	3964	3676	288
X20	Rear Surface of Vehicle to Left Side of Front Bumper	3946	3656	290
X21	Length of Engine Block	450	450	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2791	2809	-18
CD	Rear Surface of Vehicle to Center of Dash Panel	2770	2786	-16
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2773	2771	2

All distance measurements are in millimeters.

Figure 5 Vehicle Crush



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

Vehicle: 2001 Toyota Echo

Location	Pre-test	Post-test	Difference
L	1525 mm		
C1	3946 mm	3656 mm	290 mm
C2	4082 mm	3676 mm	406 mm
C3	4126 mm	3689 mm	437 mm
C4	4131 mm	3684 mm	447 mm
C5	4083 mm	3689 mm	394 mm
C6	3964 mm	3676 mm	288 mm
CL	4136 mm	3680 mm	456 mm

Table 9 Test Vehicle Frontal Profile Data

Pre-Test Profile							
		Vehicle Left			Vehicle Right		
		Point 1	Point 2	Point 3	Point 4	Point 5	Point 6
Bottom of Front Bumper	X	3961 mm	4093 mm	4136 mm	4133 mm	4094 mm	3968 mm
	Y	765 mm	461 mm	151 mm	155 mm	455 mm	760 mm
	Z	405 mm	395 mm	398 mm	398 mm	404 mm	407 mm
Top of Front Bumper	X	3954 mm	4084 mm	4122 mm	4116 mm	4081 mm	3966 mm
	Y	764 mm	461 mm	155 mm	152 mm	455 mm	761 mm
	Z	525 mm	530 mm	523 mm	527 mm	530 mm	522 mm
Center of Grille	X	3863 mm	3993 mm	4031 mm	4026 mm	3991 mm	3874 mm
	Y	755 mm	456 mm	144 mm	166 mm	445 mm	753 mm
	Z	610 mm	615 mm	610 mm	605 mm	620 mm	610 mm
Front of Hood	X	3816 mm	3937 mm	4031 mm	4026 mm	3932 mm	3813 mm
	Y	652 mm	451 mm	151 mm	149 mm	445 mm	651 mm
	Z	765 mm	725 mm	655 mm	655 mm	725 mm	755 mm

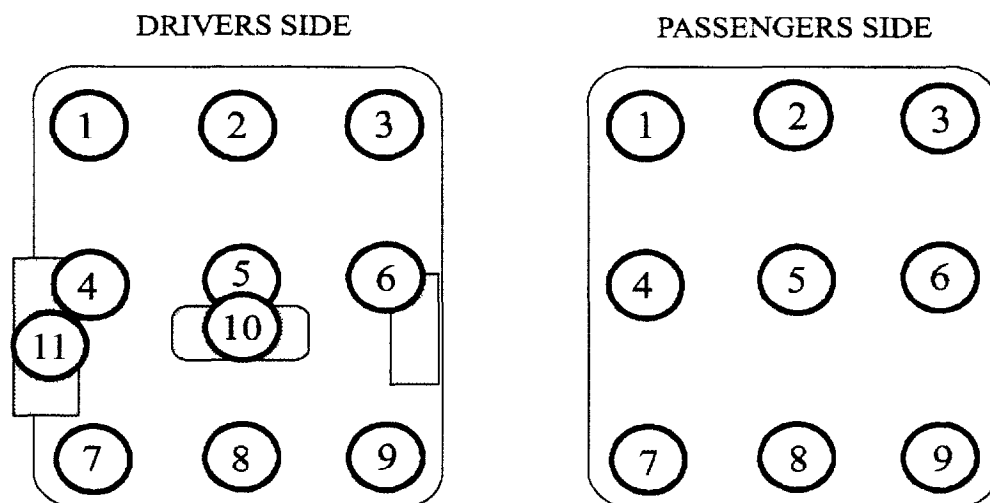
Post-Test Profile							
		Vehicle Left			Vehicle Right		
		Point 1	Point 2	Point 3	Point 4	Point 5	Point 6
Bottom of Front Bumper	X ¹	3660 mm	3683 mm	3673 mm	3668 mm	3677 mm	3655 mm
	Y ¹	748 mm	457 mm	152 mm	154 mm	449 mm	757 mm
	Z	410 mm	430 mm	420 mm	418 mm	428 mm	390 mm
Top of Front Bumper	X	3642 mm	3678 mm	3680 mm	3668 mm	3670 mm	3660 mm
	Y	801 mm	457 mm	152 mm	142 mm	446 mm	797 mm
	Z	521 mm	559 mm	545 mm	551 mm	549 mm	497 mm
Center of Grille	X	N/A	N/A	3663 mm	3661 mm	N/A	N/A
	Y	N/A	N/A	135 mm	163 mm	N/A	N/A
	Z	N/A	N/A	676 mm	665 mm	N/A	N/A
Front of Hood	X	3647 mm	3666 mm	3663 mm	3664 mm	3650 mm	3621 mm
	Y	619 mm	433 mm	144 mm	149 mm	442 mm	656 mm
	Z	935 mm	810 mm	685 mm	673 mm	774 mm	884 mm

Difference							
		Vehicle Left			Vehicle Right		
		Point 1	Point 2	Point 3	Point 4	Point 5	Point 6
Bottom of Front Bumper	X ¹	301 mm	410 mm	463 mm	465 mm	417 mm	313 mm
	Y ¹	17 mm	4 mm	-1 mm	1 mm	6 mm	3 mm
	Z	-5 mm	-35 mm	-22 mm	-20 mm	-24 mm	17 mm
Top of Front Bumper	X	312 mm	406 mm	442 mm	448 mm	411 mm	306 mm
	Y	-37 mm	4 mm	3 mm	10 mm	9 mm	-36 mm
	Z	4 mm	-29 mm	-22 mm	-24 mm	-19 mm	25 mm
Center of Grille	X	N/A	N/A	368 mm	365 mm	N/A	N/A
	Y	N/A	N/A	9 mm	3 mm	N/A	N/A
	Z	N/A	N/A	-66 mm	-60 mm	N/A	N/A
Front of Hood	X	169 mm	271 mm	368 mm	362 mm	282 mm	192 mm
	Y	33 mm	18 mm	7 mm	0 mm	3 mm	-5 mm
	Z	-170 mm	-85 mm	-30 mm	-18 mm	-49 mm	-129 mm

Note X-axis measurements referenced forward of the rear bumper centerline Y-axis measurements are left and right of the original vehicle centerline Y-axis measurements (6 points) divide the width of the car Z-axis (height) measurements are from the ground

1 Hood was removed for post-test photography prior to recording the post-test X and Y profile measurements

Figure 6 Toeboard Measurements



Driver's Side Floorpan Measurements

Floorpan Location	X			Z		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3063 mm	3046 mm	17 mm	358 mm	405 mm	-47 mm
2	3069 mm	3056 mm	13 mm	375 mm	390 mm	-15 mm
3	3051 mm	3001 mm	50 mm	353 mm	402 mm	-49 mm
4	3008 mm	3001 mm	7 mm	285 mm	295 mm	-10 mm
5	2977 mm	2976 mm	1 mm	293 mm	287 mm	6 mm
6	2984 mm	2976 mm	8 mm	265 mm	283 mm	-18 mm
7	2924 mm	2926 mm	-2 mm	215 mm	234 mm	-19 mm
8	2901 mm	2901 mm	0 mm	238 mm	232 mm	6 mm
9	2911 mm	2901 mm	10 mm	215 mm	233 mm	-18 mm
10	2934 mm	2946 mm	-12 mm	390 mm	385 mm	5 mm
11	2946 mm	2936 mm	10 mm	300 mm	305 mm	-5 mm

Passenger's Side Floorpan Measurements

Floorpan Location	X			Z		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3058 mm	3021 mm	37 mm	370 mm	360 mm	10 mm
2	3065 mm	3056 mm	9 mm	385 mm	373 mm	12 mm
3	3066 mm	3021 mm	45 mm	393 mm	396 mm	-3 mm
4	2987 mm	2971 mm	16 mm	325 mm	305 mm	20 mm
5	3006 mm	3001 mm	5 mm	327 mm	305 mm	22 mm
6	3014 mm	3001 mm	13 mm	330 mm	297 mm	33 mm
7	2906 mm	2901 mm	5 mm	220 mm	220 mm	0 mm
8	2901 mm	2901 mm	0 mm	230 mm	235 mm	-5 mm
9	2916 mm	2916 mm	0 mm	220 mm	187 mm	33 mm

Reference: +X forward from rear bumper; +Z upward from ground level

Table 10 Intrusion of Upper Instrument Panel

Pre-Test

	X	Y	Z
Driver Left Knee	2772 mm	591 mm	592 mm
Driver Right Knee	2726 mm	191 mm	603 mm
Passenger Left Knee	2716 mm	160 mm	610 mm
Passenger Right Knee	2721 mm	545 mm	670 mm

Post-Test

Driver Left Knee	2816 mm	500 mm	612 mm
Driver Right Knee	2786 mm	180 mm	645 mm
Passenger Left Knee	2786 mm	155 mm	604 mm
Passenger Right Knee	2741 mm	535 mm	610 mm

Difference

Driver Left Knee	-44 mm	91 mm	-20 mm
Driver Right Knee	-60 mm	11 mm	-42 mm
Passenger Left Knee	-70 mm	5 mm	6 mm
Passenger Right Knee	-20 mm	10 mm	60 mm

Instructions: Mark a point to be measured pre and post which is just above where the four (4) knees would be expected to contact the instrument panel.

+X: Forward from rear bumper

+Y: From centerline

+Z: Upward from ground level

Table 11 Fuel System Data

Usable fuel system capacity:	45.0 liters (from owner's manual)
Test volume range:	41.4 - 42.3 liters (92-94% of usable)
Actual test volume:	10.6 liters (23.6% of usable) ¹
Test fluid type:	Stoddard
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistoke
Test fluid color:	Purple
Type of fuel pump:	Electric
Did electric fuel pump operate with ignition switch "on" and the engine not operating.	Yes
Details of fuel system:	The fuel tank is located under the rear seat. The fuel filler neck comes out to the left rear with the fuel filler cap located behind the rear wheel well. The fuel lines run along the left frame.

¹ Stoddard removed to adjust test weight.

Figure 7 Camera Positions

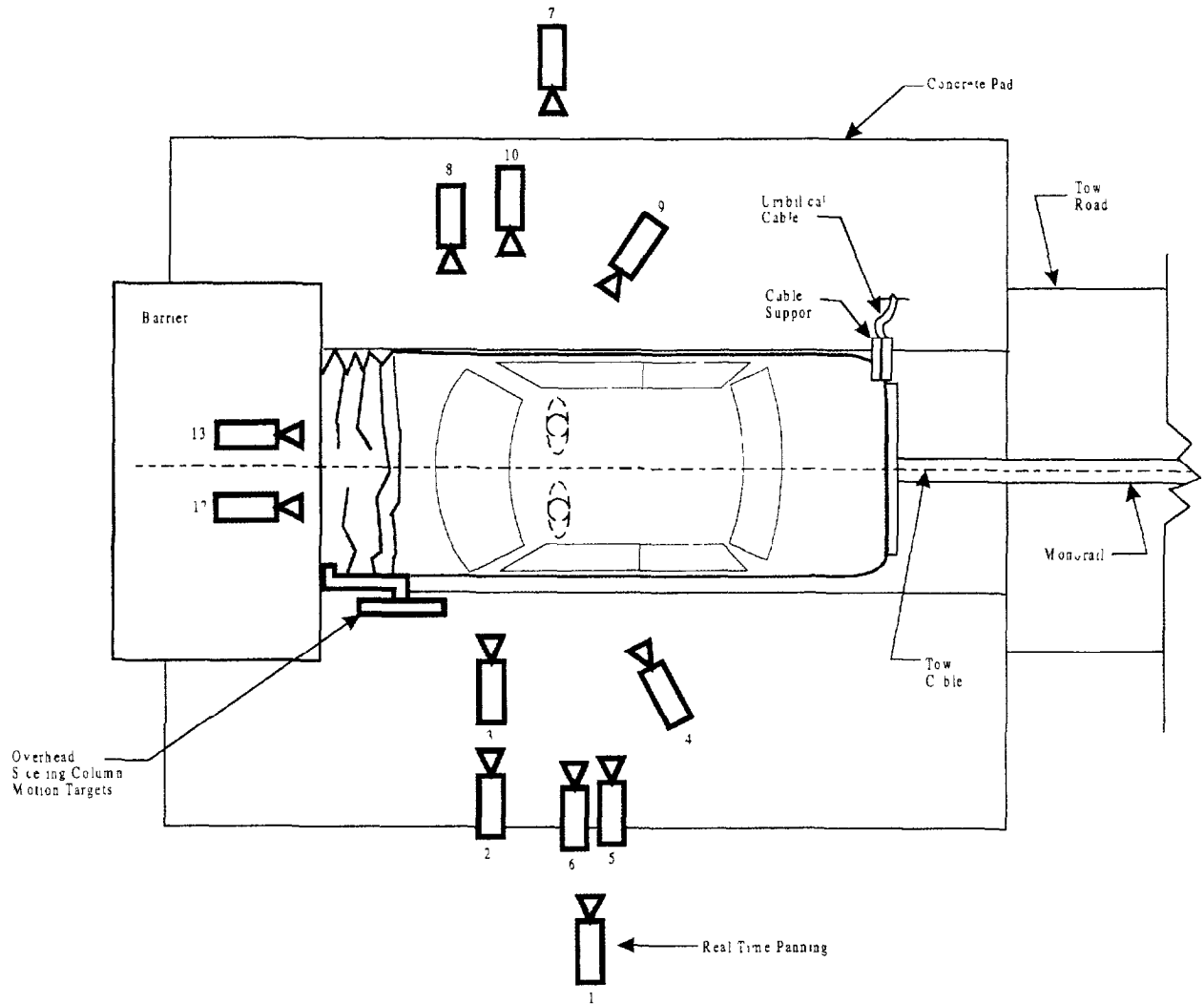


Figure 7 Camera Positions, Cont'd.

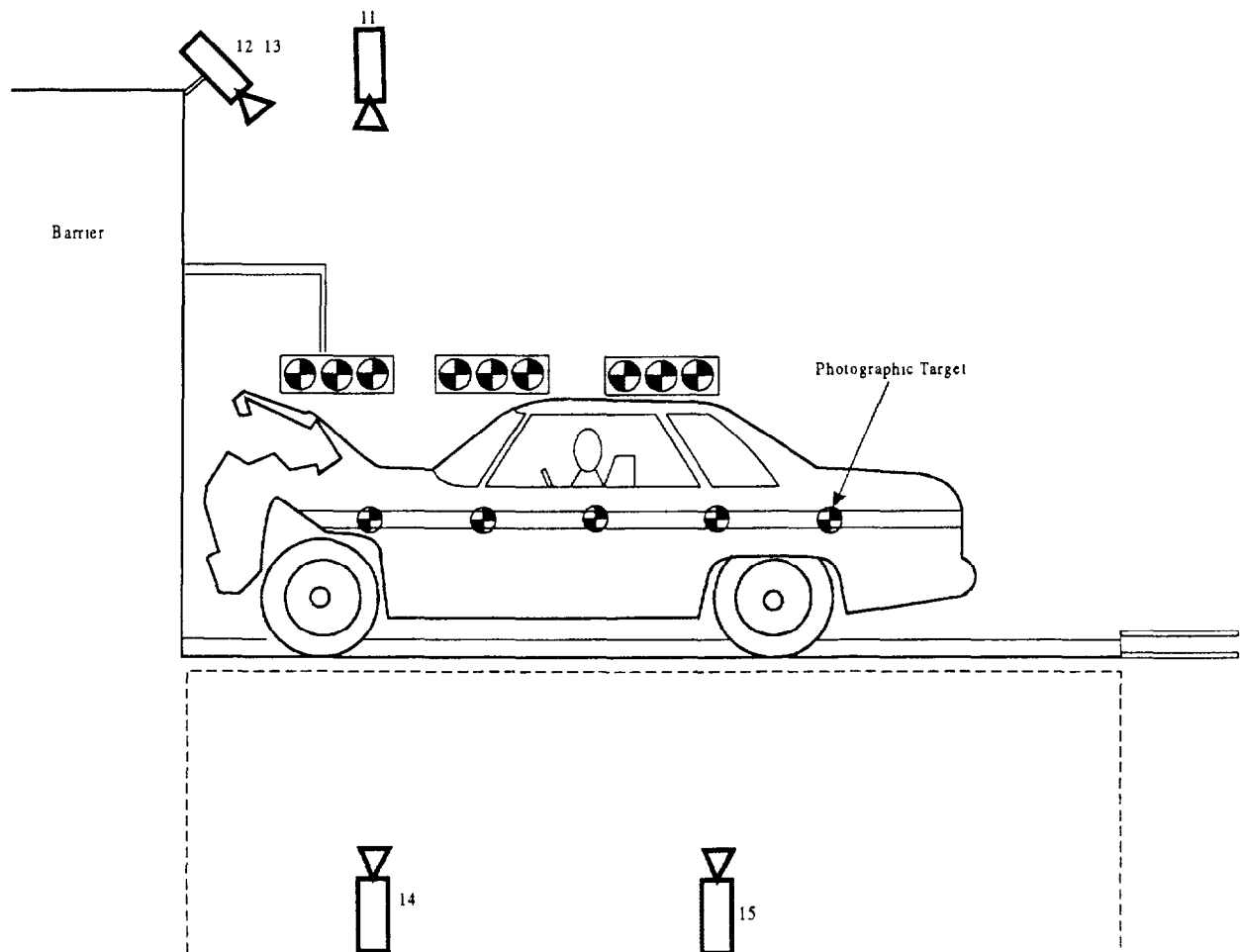


Table 12 Camera Information

No	View	Type	Lens	Film Speed	Camera Positions ¹			Angle ²	Film Plane to Head Target
					X	Y	Z		
1	Real-time panning	Bolex		24 frames/s	N/A	N/A	N/A	N/A	N/A
2	Left side medium tight	Hycam	25 mm	1032 frames/s	1053 mm	-6750 mm	1505 mm	-4 8	6370 mm
3	Left tight dummy	Photosonic	50 mm	880 frames/s	520 mm	-6840 mm	1300 mm	-1 0	6590 mm
4	Left angled on dummy	Photosonic	25 mm	352 frames/s	2740 mm	-2600 mm	2205 mm	-24 4	2420 mm
5	Left steering column upper	Photosonic	25 mm	925 frames/s	1730 mm	-8072 mm	2735 mm	-11 5	7800 mm
6	Left steering column lower	Photosonic	25 mm	465 frames/s	1730 mm	-8072 mm	1670 mm	-4 6	7690 mm
7	Right side overall	Photosonic	13 mm	995 frames/s	2500 mm	8025 mm	1330 mm	-1 6	7603 mm
8	Right tight dummy	Photosonic	50 mm	1000 frames/s	670 mm	6820 mm	1305 mm	-1 7	6520 mm
9	Right angled on dummy	Photosonic	25 mm	997 frames/s	2830 mm	2070 mm	2070 mm	-26 2	1970 mm
10	Right side passenger	Hycam	25 mm	1035 frames/s	1185 mm	6920 mm	1530 mm	-5 3	6540 mm
11	Overhead	Photosonic	8 5 mm	1000 frames/s	80 mm	0 mm	2500 mm	-61 3	2420 mm
12	Barrier driver	Photosonic	17 mm	1002 frames/s	80 mm	-350 mm	2510 mm	-52 7	2350 mm
13	Barrier passenger	Photosonic	17 mm	997 frames/s	80 mm	350 mm	2510 mm	-56 5	2390 mm
14	Pit front	Photosonic	17 mm	465 frames/s	1260 mm	0 mm	940 mm	90 0	N/A
15	Pit rear	Photosonic	17 mm	997 frames/s	1670 mm	0 mm	940 mm	90 0	N/A

- ¹ +X = Film plane in front of (upstream from) barrier face
+Y = Film plane to right of monorail centerline
+Z = Film plane above ground level
- ² +Angle = Film plane angled upward from horizontal plane

Description Of Timing Marks On TRC Inc. High-Speed Film

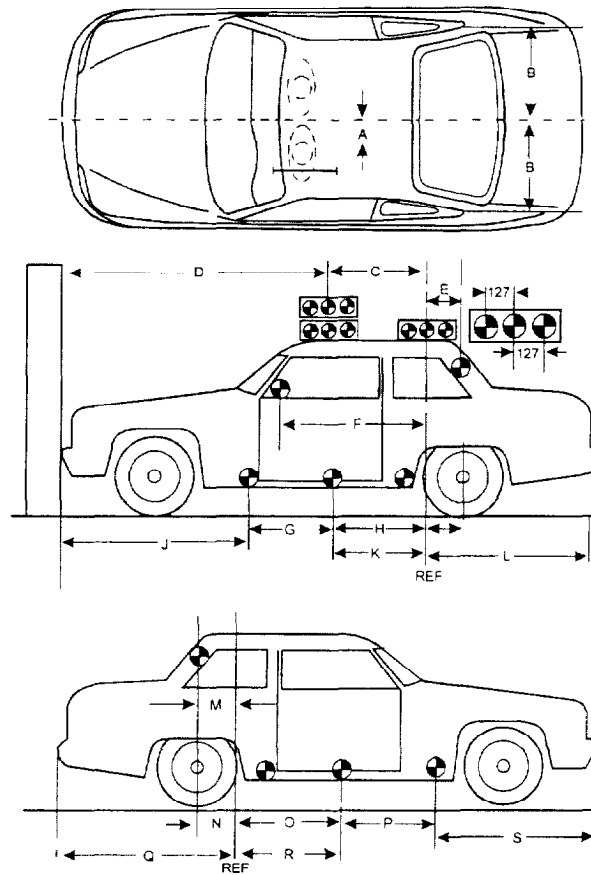
All TRC Inc. high-speed cameras are equipped with red LEDs which put timing marks on the right edge of the film. TRC Inc. uses a single timing generator to generate the timing for all cameras. This allows the timing marks to be common to all cameras. The timing marks can be used to measure camera speed (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 Photosonic 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.

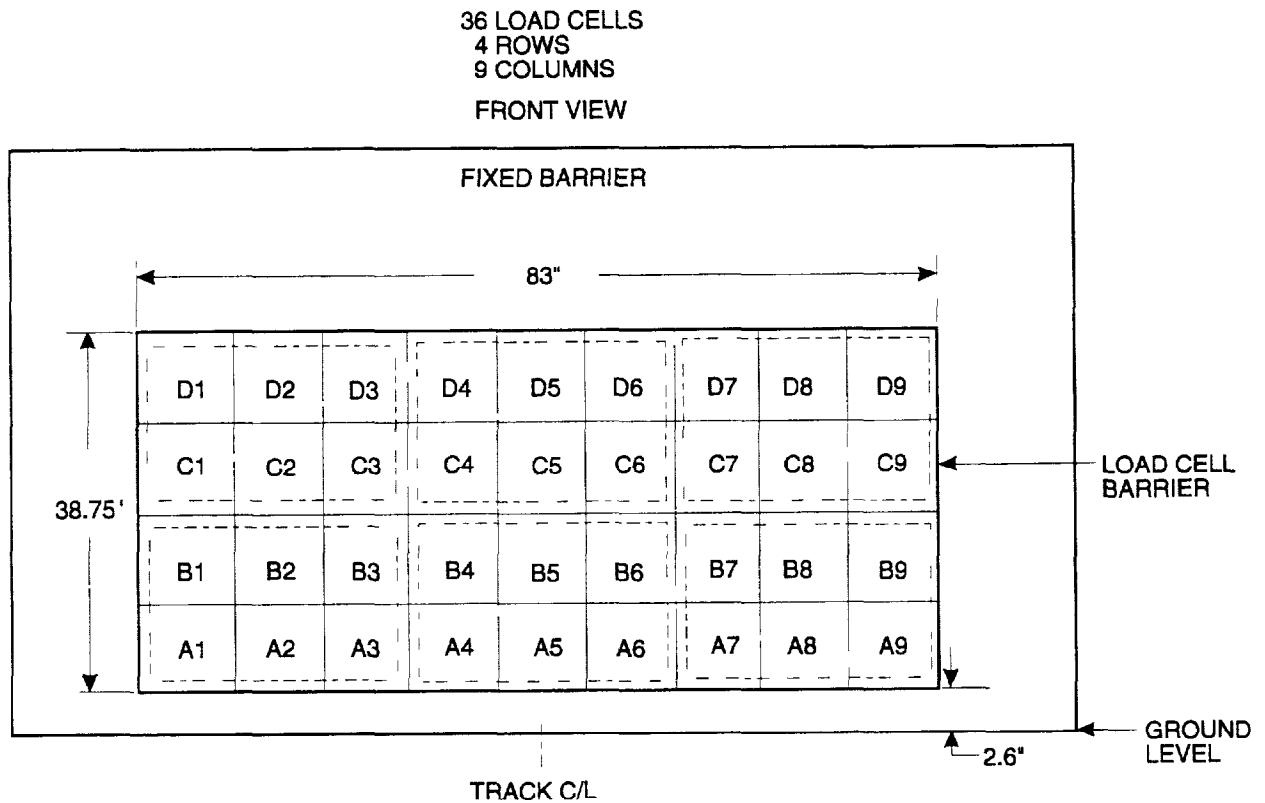
Figure 8 Vehicle Reference Photo Target Locations



Measurement	Pre-Test
A	318 mm
B	610 mm
C	610 mm
D	1170 mm
E	594 mm
F	1670 mm
G	790 mm
H	790 mm
I	1235 mm
J	1195 mm
K	555 mm
L	1601 mm
M	590 mm
N	245 mm
O	790 mm
P	790 mm
Q	1601 mm
R	545 mm
S	1195 mm

Additional targeting
Inch tape along the top
and sides of the vehicle
has targets placed at
300 mm intervals
except the first side
target is placed 600 mm
from front of front
bumper

Figure 9 Load Cell Locations on Fixed Barrier



- Group 1: A1 through B3
- Group 2: A4 through B6
- Group 3: A7 through B9
- Group 4: C1 through D3
- Group 5: C4 through D6
- Group 6: C7 through D9

The following data is presented as data plots at the end of Appendix B:

- 1) Data from 36 individual load cells
- 2) Total of 36 individual load cells
- 3) Data from 6 groupings shown above (6 cells/groups)

Appendix A

Photographs

13806



Figure A-1 Pre-Test Front View

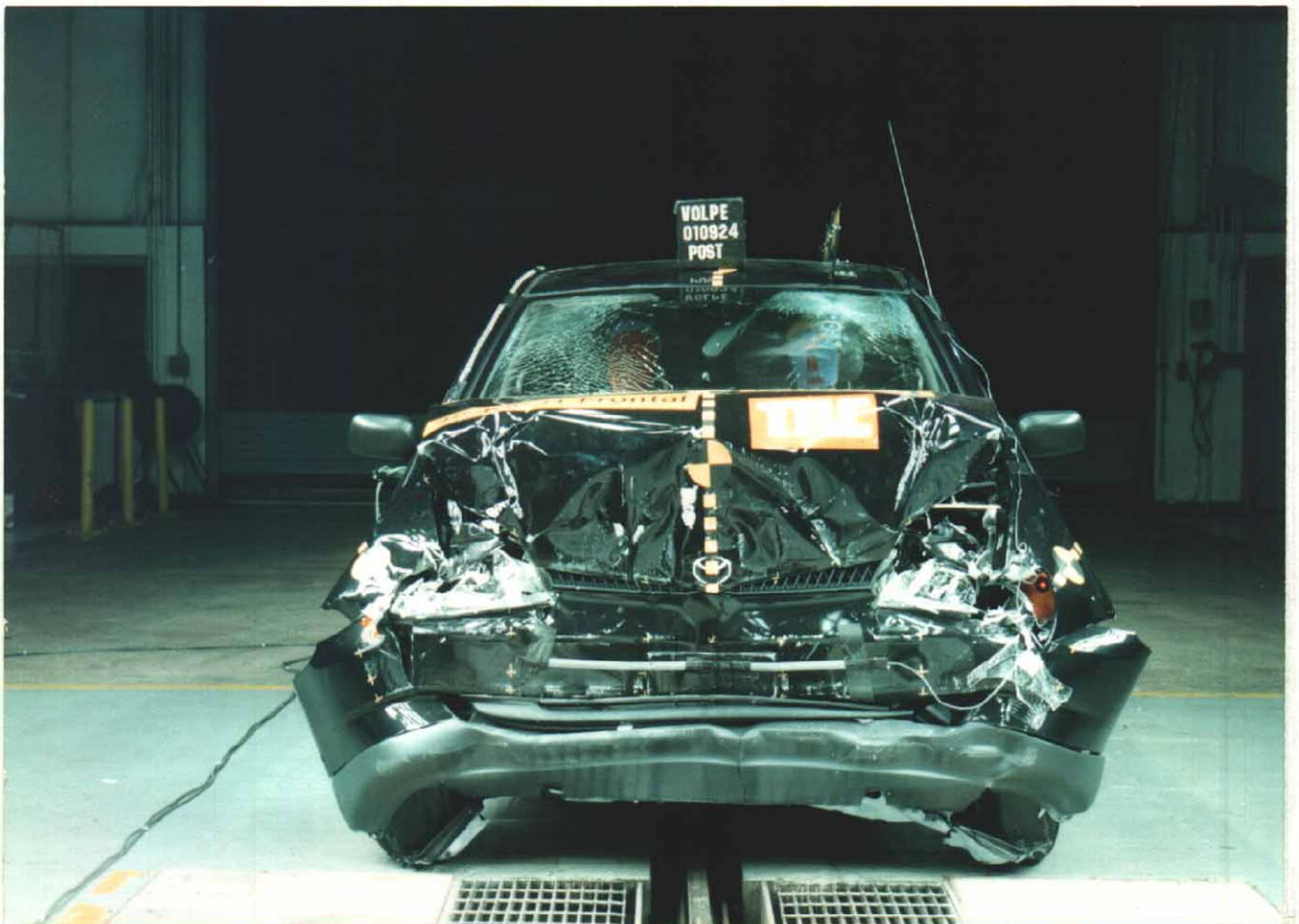


Figure A-2 Post-Test Front View



Figure A-3 Pre-Test Left Front View



Figure A-4 Post-Test Left Front View

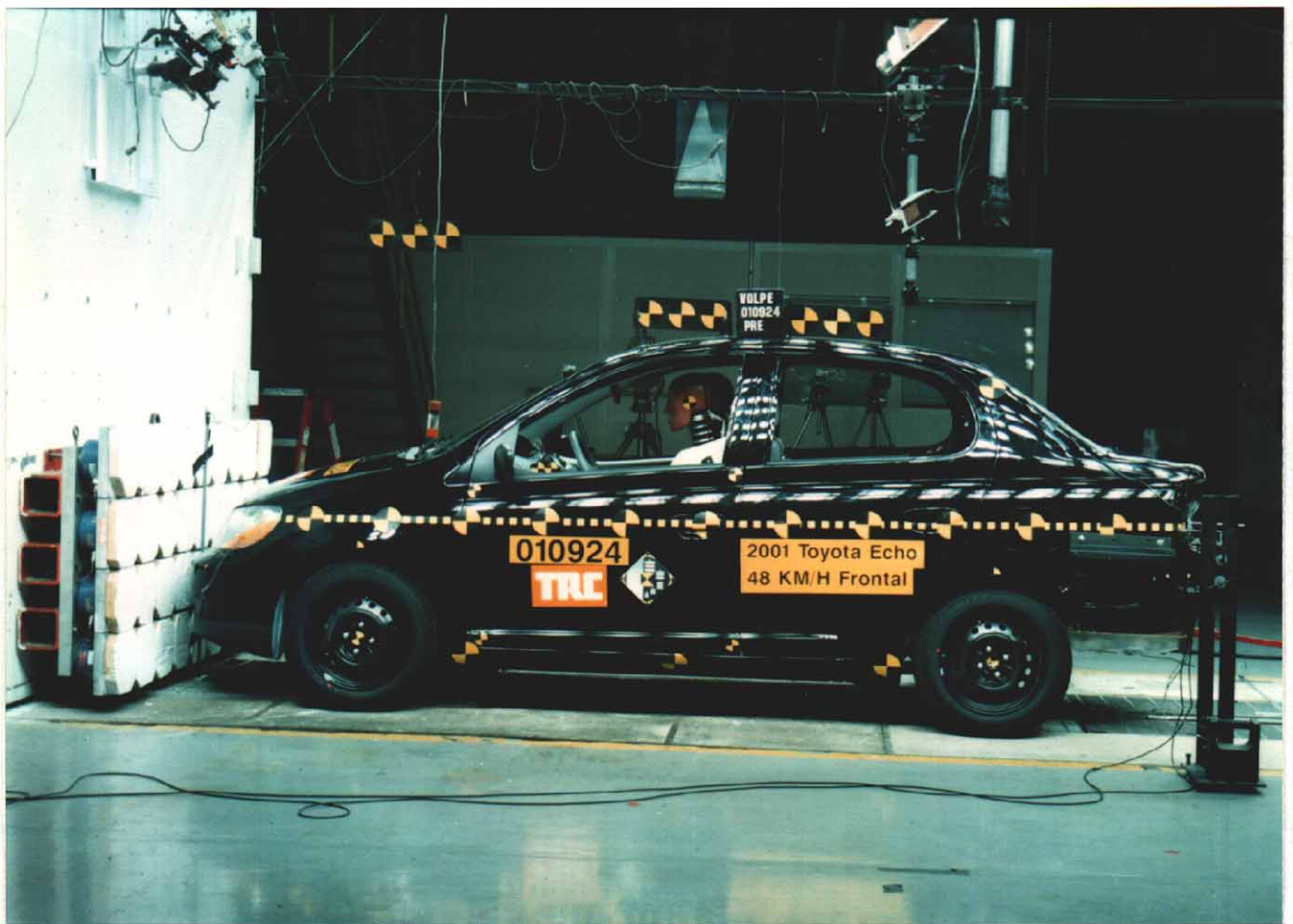


Figure A-5 Pre-Test Left Side View



Figure A-6 Post-Test Left Side View



Figure A-7 Pre-Test Left Rear View



Figure A-8 Post-Test Left Rear View

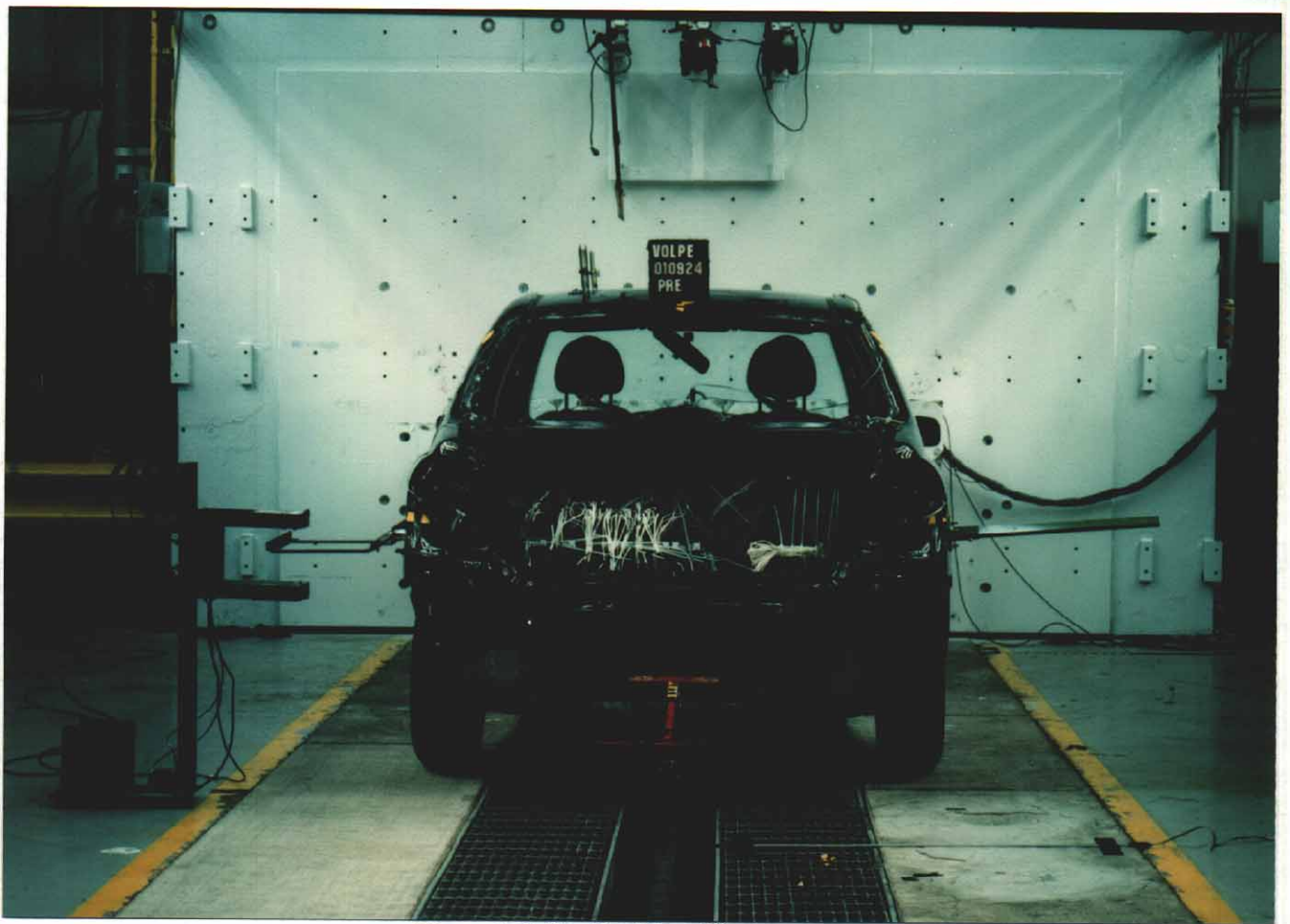


Figure A-9 Pre-Test Rear View



Figure A-10 Post-Test Rear View



Figure A-11 Pre-Test Right Rear View



Figure A-12 Post-Test Right Rear View



Figure A-13 Pre-Test Right Side View



Figure A-14 Post-Test Right Side View



Figure A-15 Pre-Test Right Front View



Figure A-16 Post-Test Right Front View

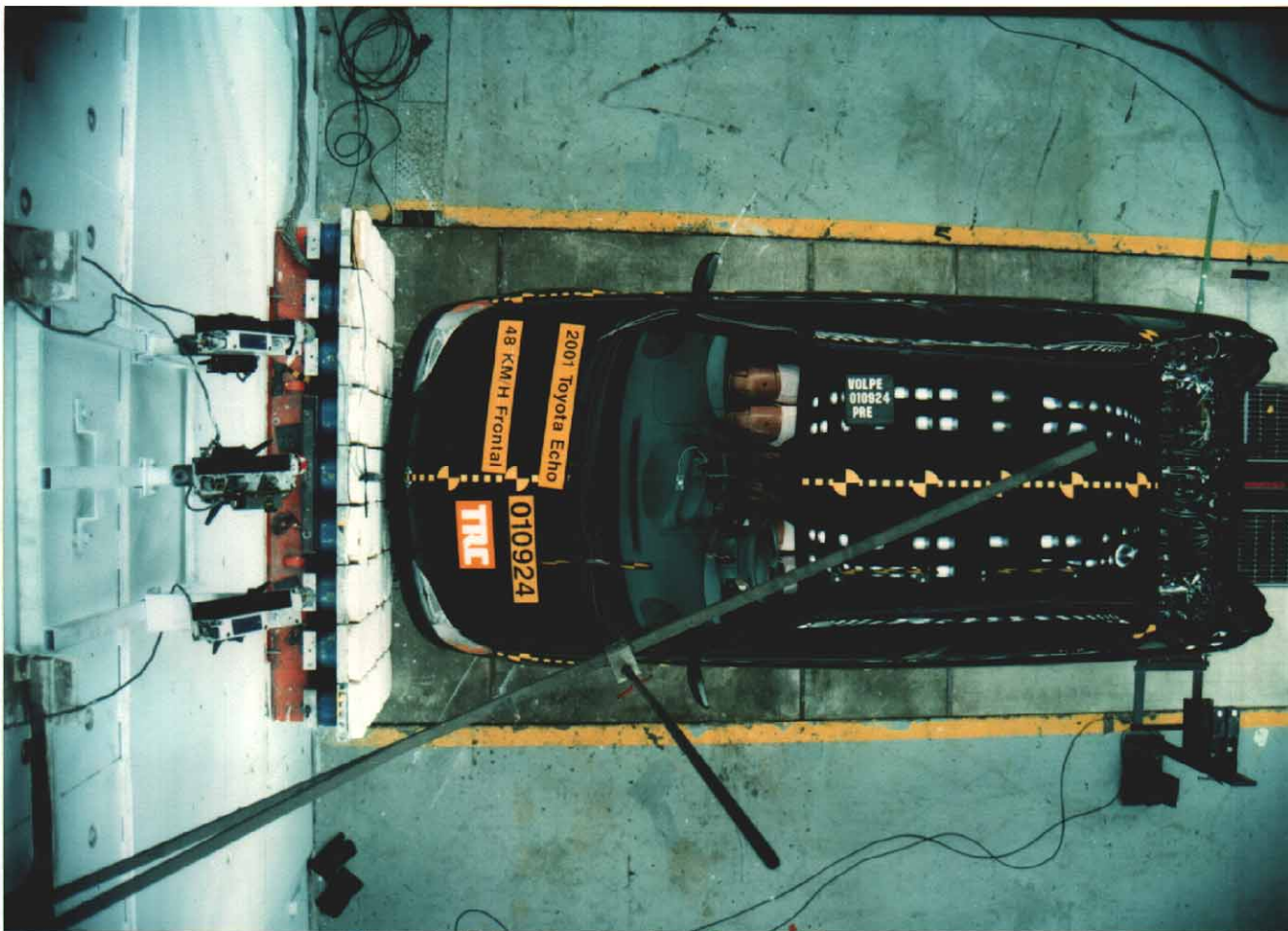


Figure A-17 Pre-Test Overhead Overall View

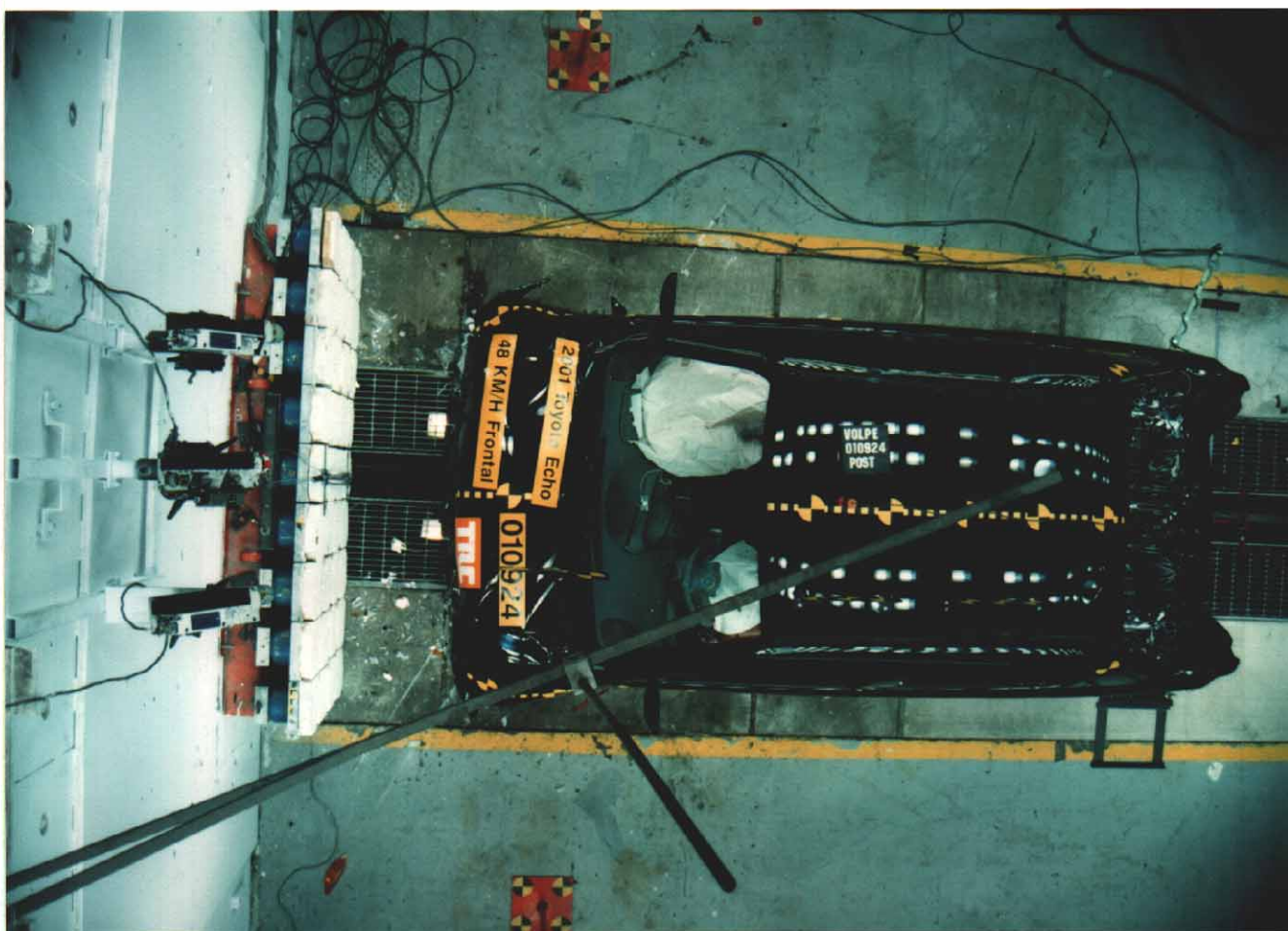


Figure A-18 Post-Test Overhead Overall View



Figure A-19 Pre-Test Overhead Close-up View

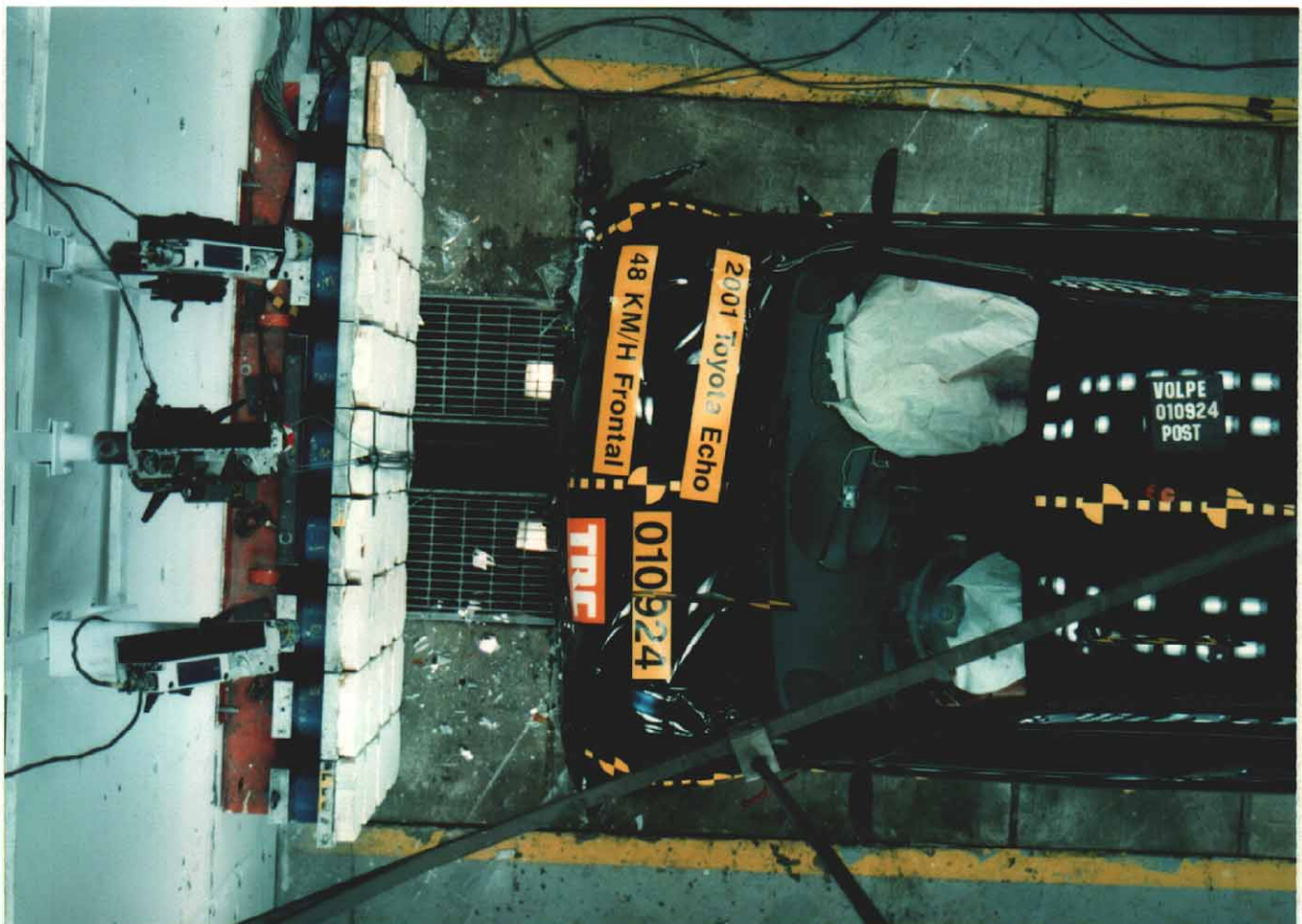


Figure A-20 Post-Test Overhead Close-up View

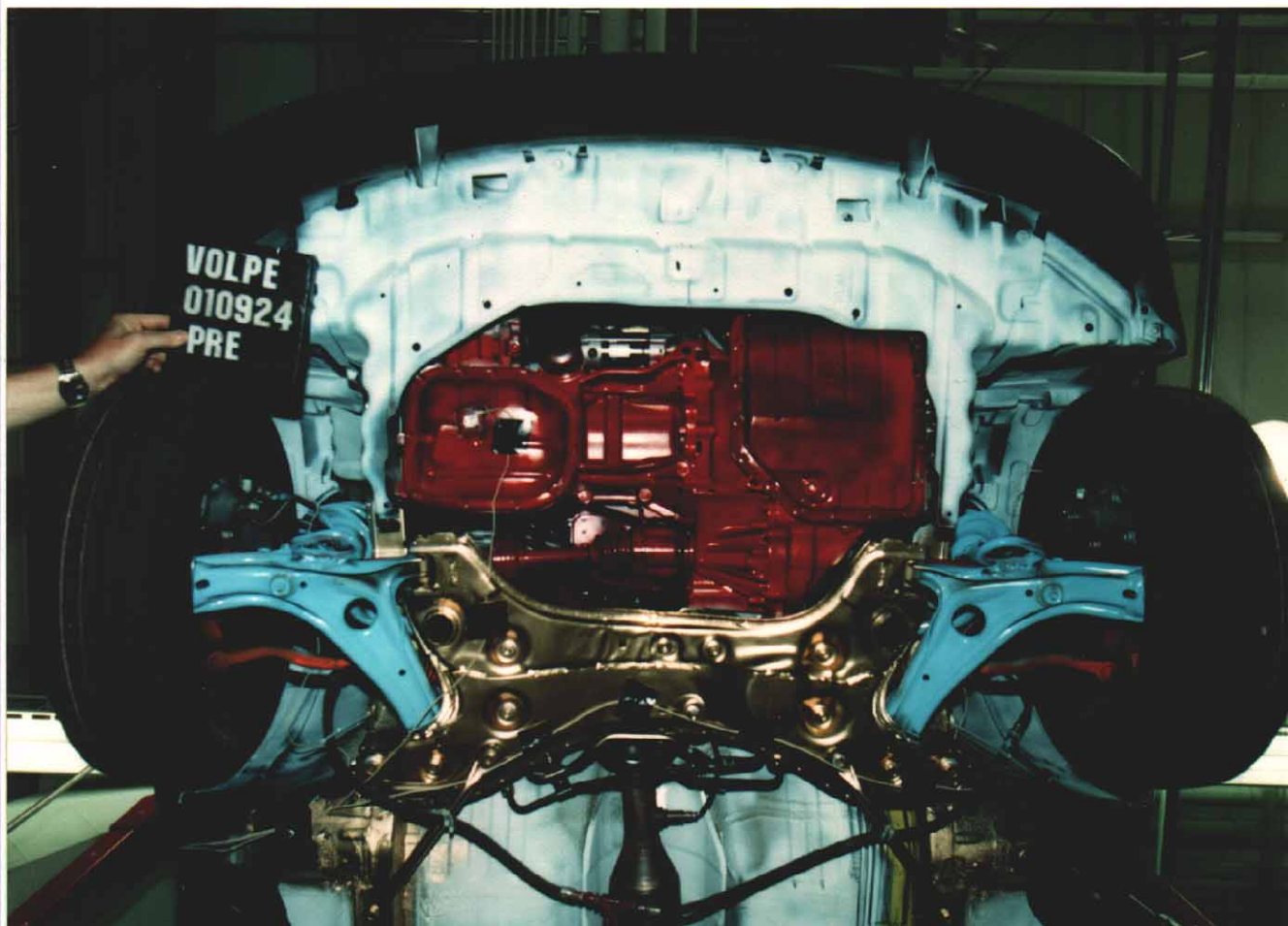


Figure A-21 Pre-Test Front Underbody View

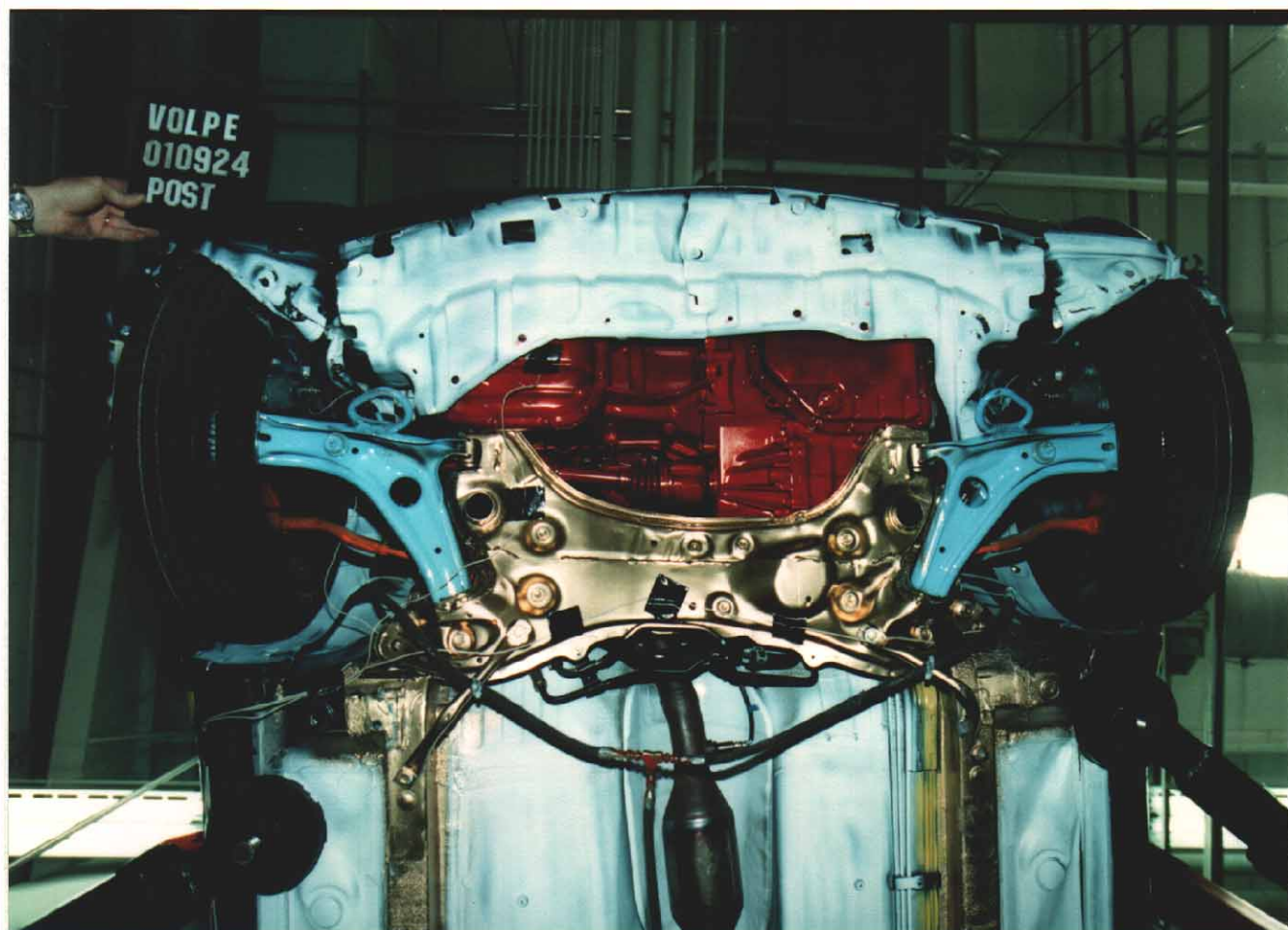


Figure A-22 Post-Test Front Underbody View

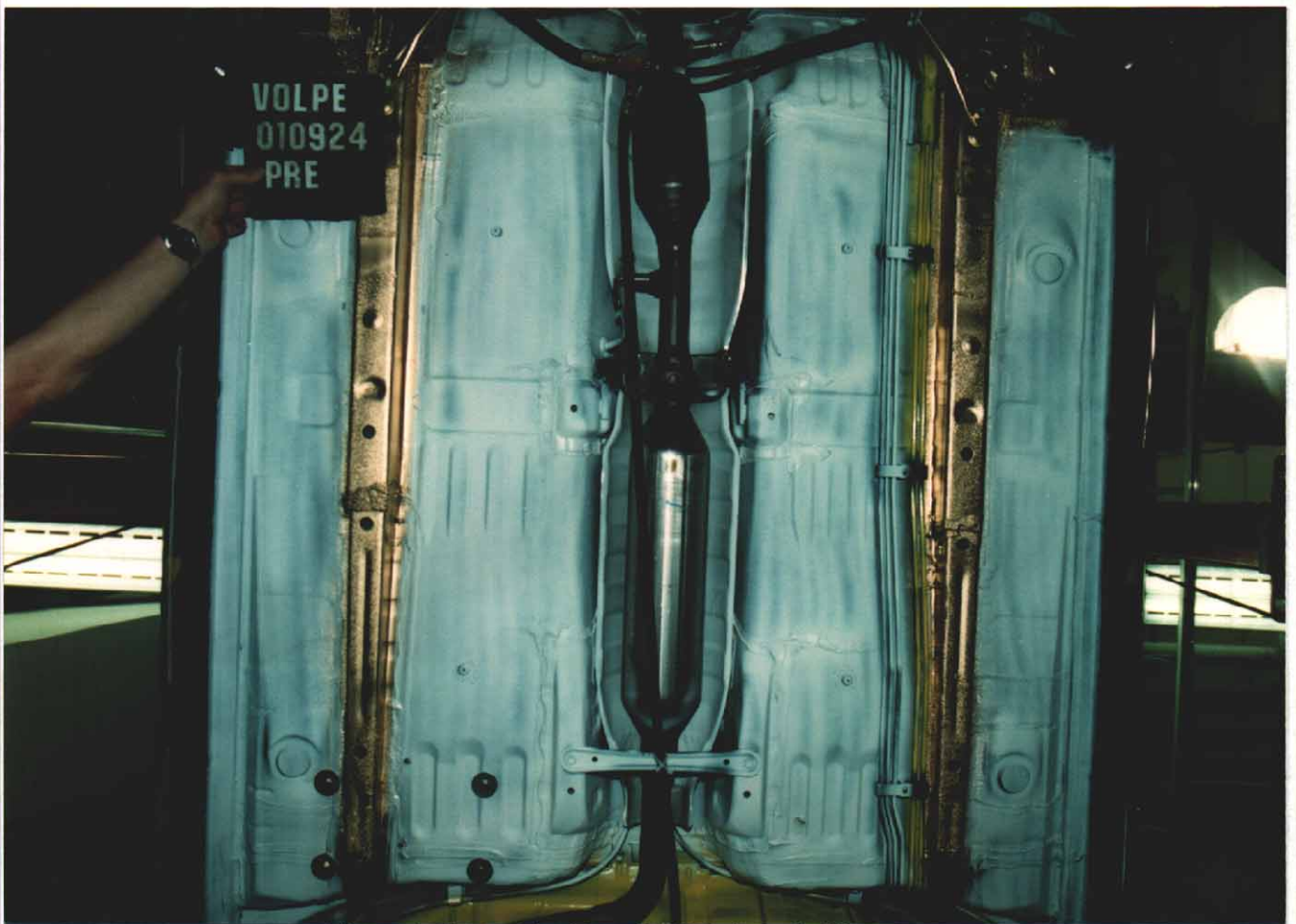


Figure A-23 Pre-Test Front Mid Underbody View

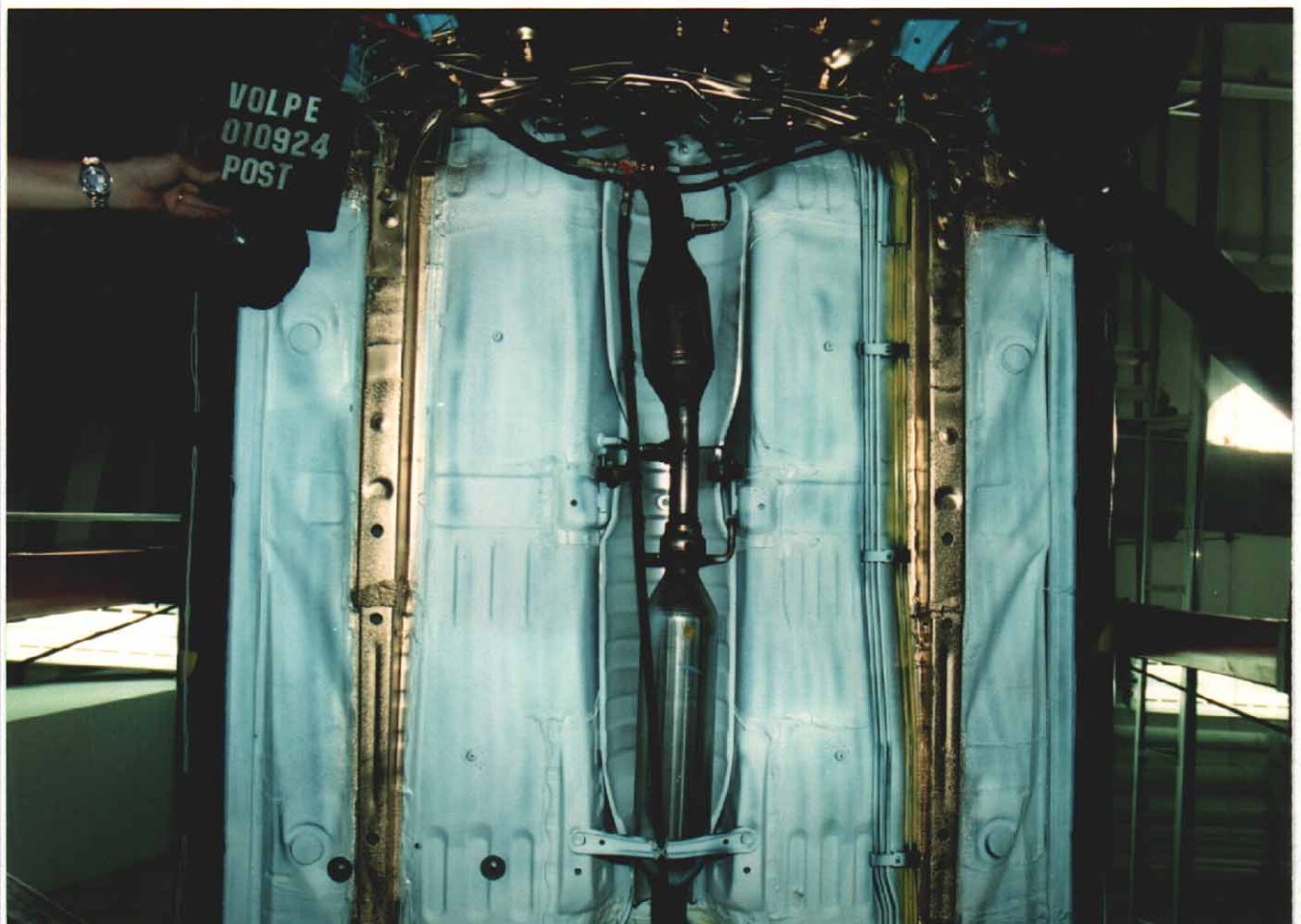


Figure A-24 Post-Test Front Mid Underbody View

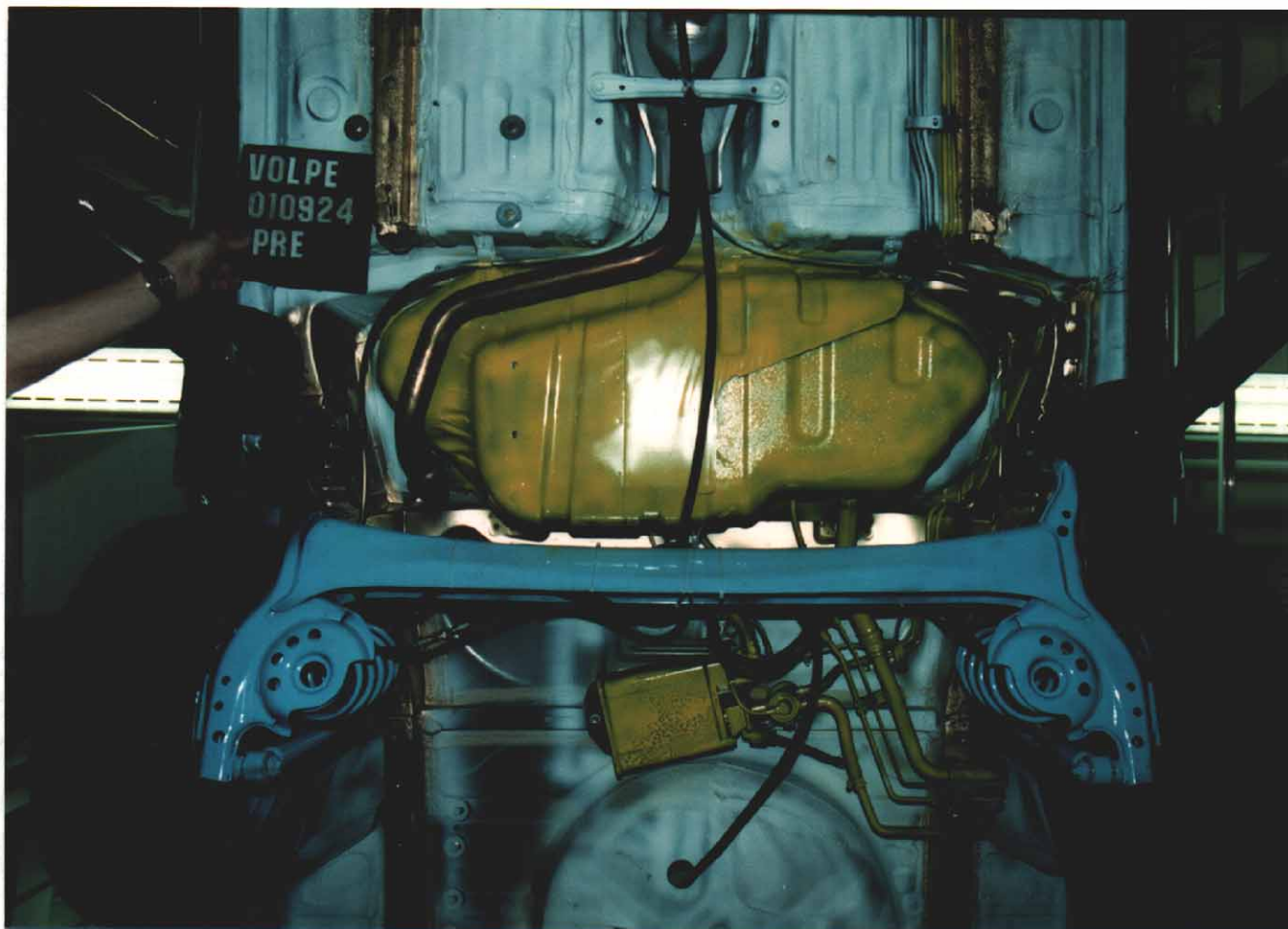


Figure A-25 Pre-Test Rear Mid Underbody View



Figure A-26 Post-Test Rear Mid Underbody View

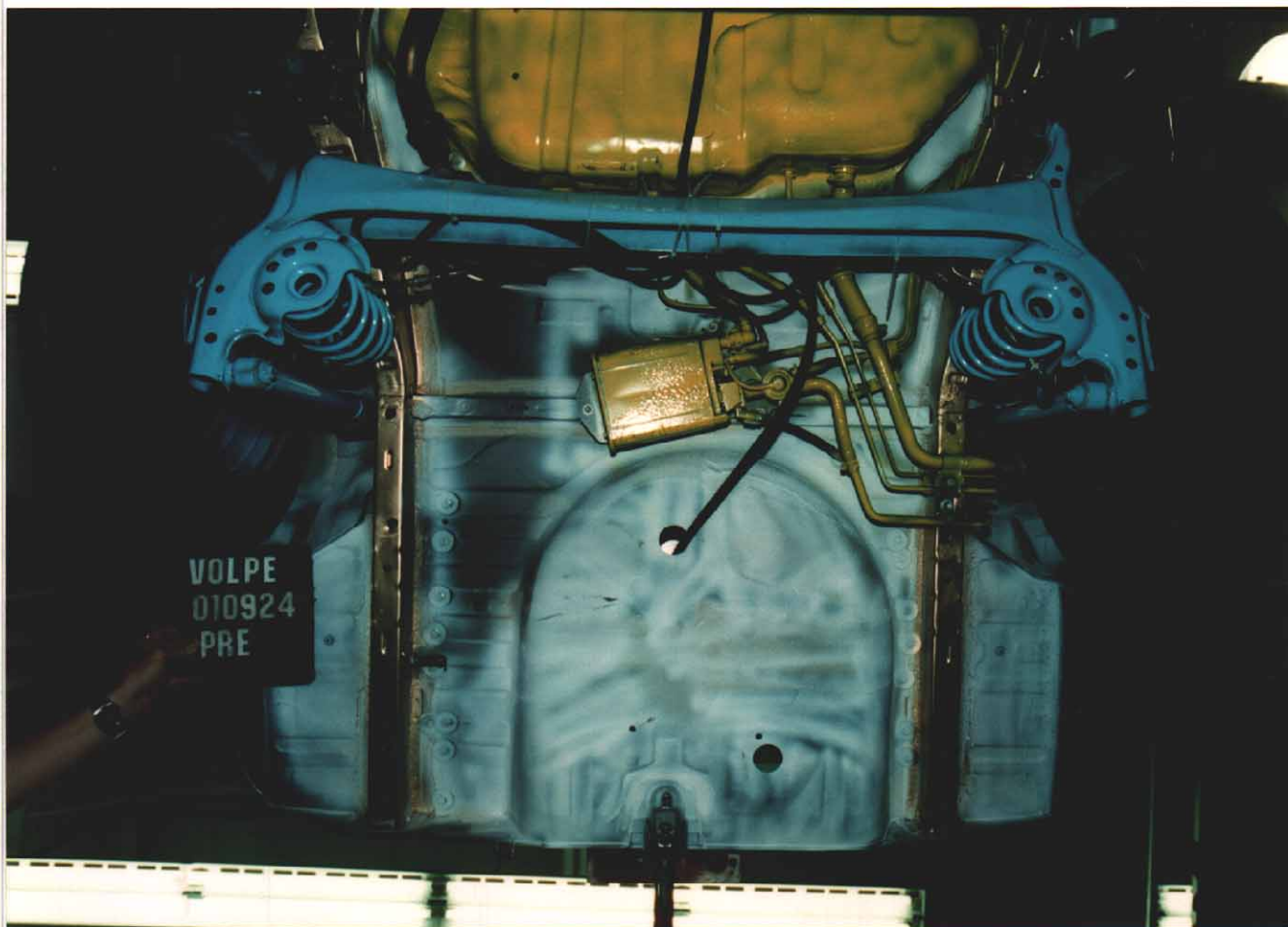


Figure A-27 Pre-Test Rear Underbody View



Figure A-28 Post-Test Rear Underbody View

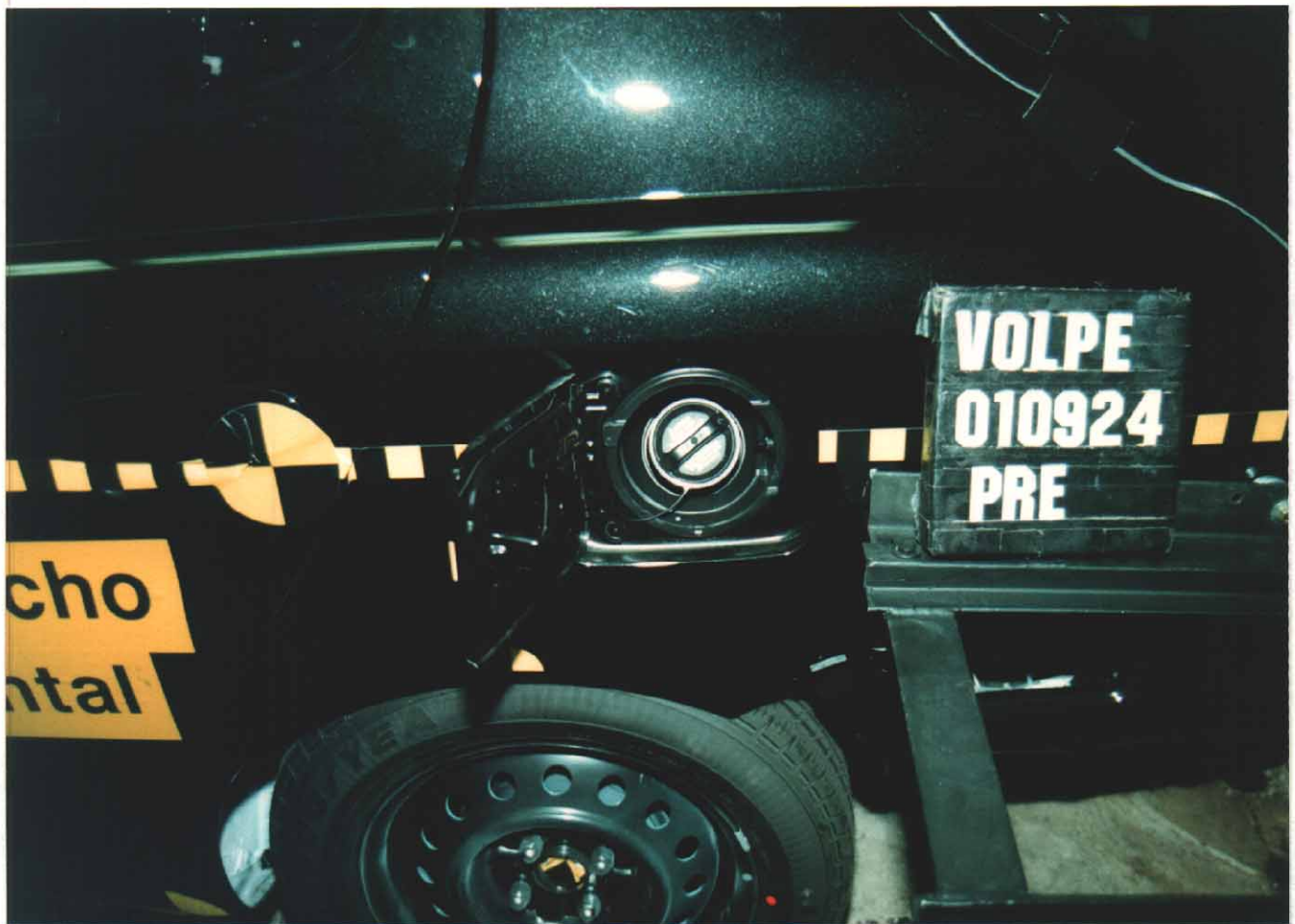


Figure A-29 Pre-Test Fuel Filler Cap View



Figure A-30 Post-Test Fuel Filler Cap View

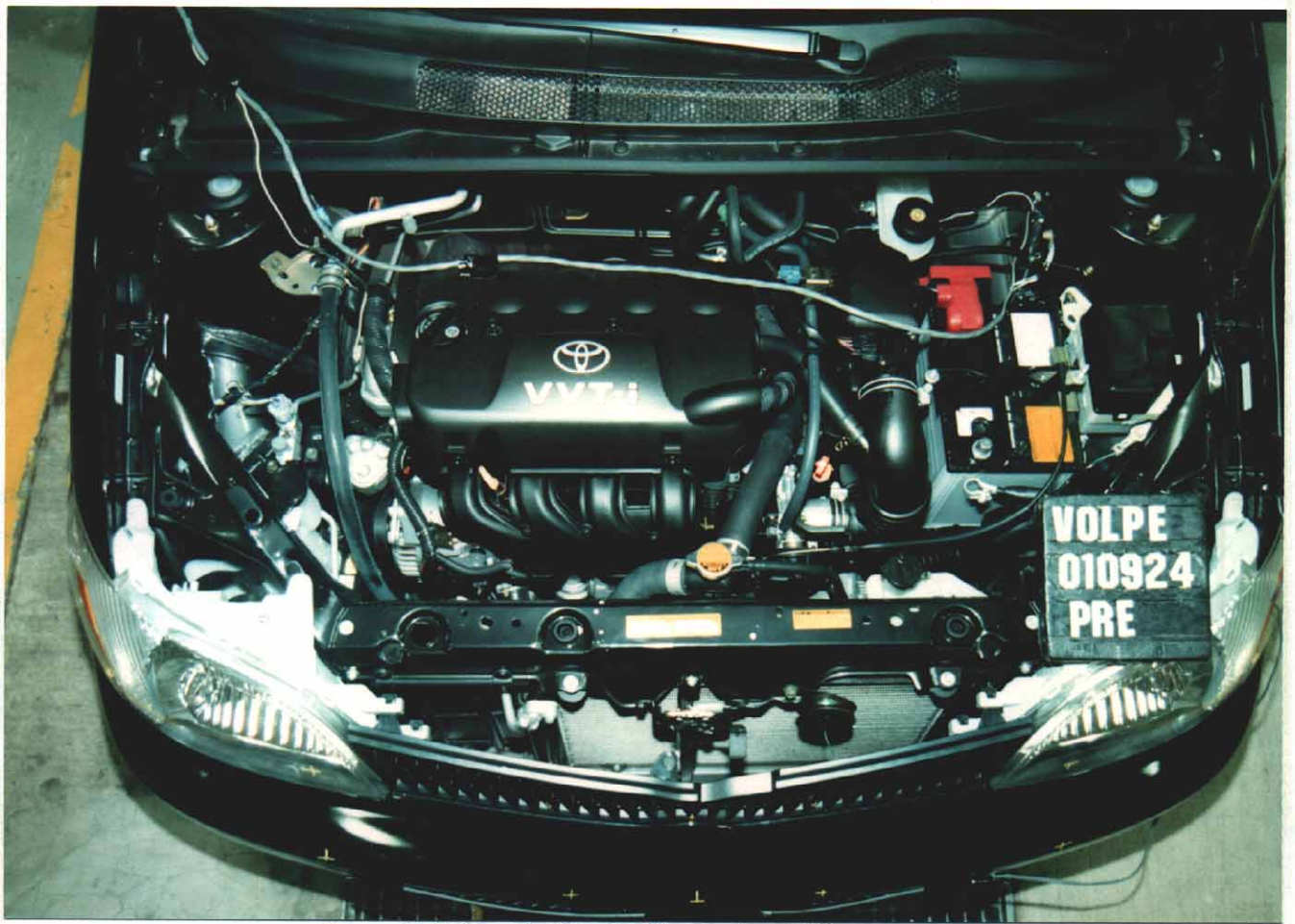


Figure A-31 Pre-Test Engine Compartment View

Intentionally Left Blank



Figure A-32 Pre-Test Windshield View

Intentionally Left Blank

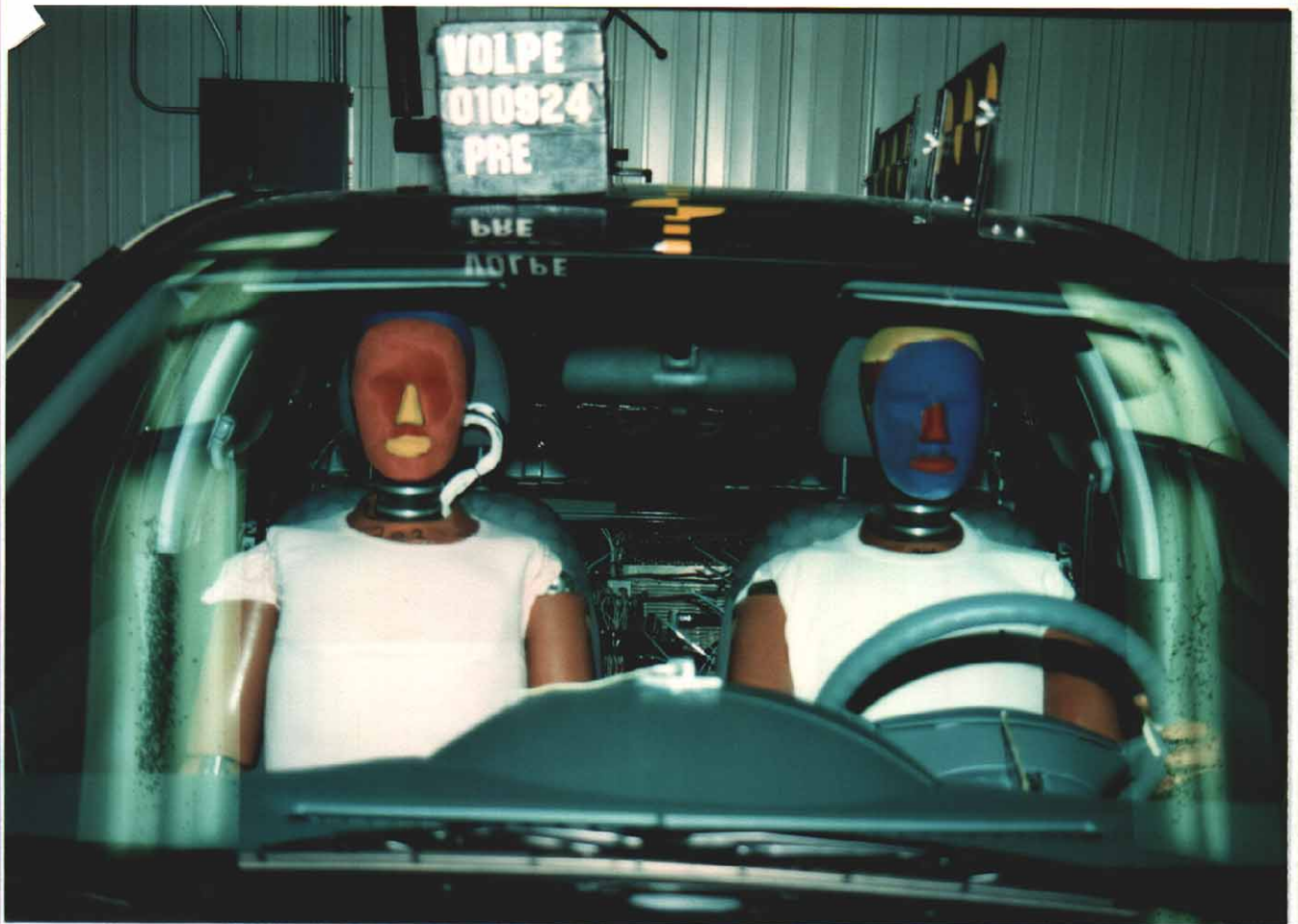


Figure A-33 Pre-Test Driver and Passenger Dummies Front View



Figure A-34 Post-Test Windshield and Driver and Passenger Dummies Front View

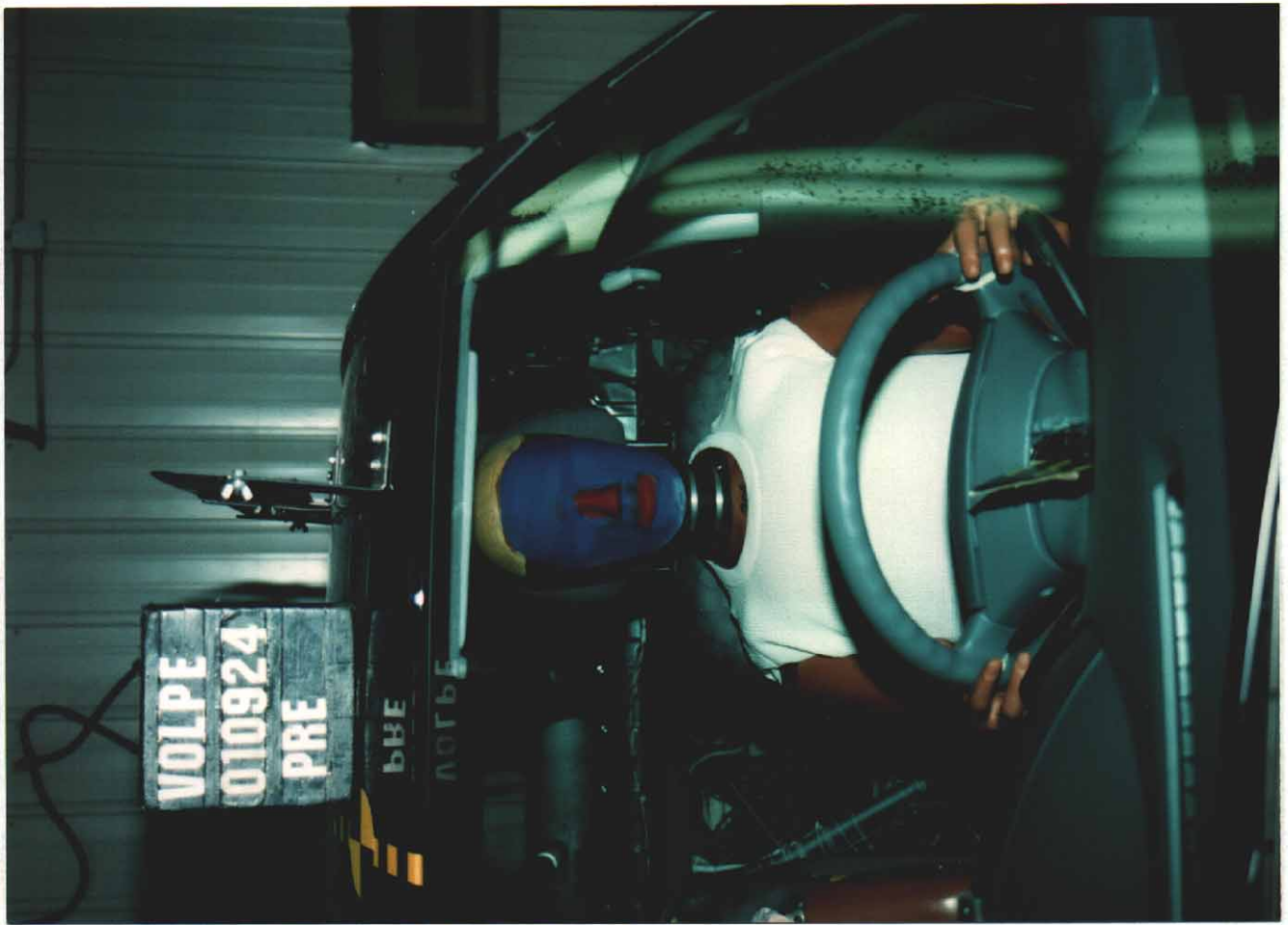


Figure A-35 Pre-Test Driver Dummy Position - View 1



Figure A-36 Post-Test Driver Dummy Position - View 1



Figure A-37 Pre-Test Driver Dummy Position - View 2



Figure A-38 Post-Test Driver Dummy Position - View 2



Figure A-39 Pre-Test Driver Dummy & Vehicle Interior - View 1



Figure A-40 Post-Test Driver Dummy & Vehicle Interior - View 1



Figure A-41 Pre-Test Driver Dummy & Vehicle Interior - View 2



Figure A-42 Post-Test Driver Dummy & Vehicle Interior - View 2



Figure A-43 Pre-Test Driver Dummy Seat Track Position View



Figure A-44 Post-Test Driver Dummy Seat Track Position View



Figure A-45 Pre-Test Passenger Dummy Position - View 1



Figure A-46 Post-Test Passenger Dummy Position - View 1



Figure A-47 Pre-Test Passenger Dummy Position - View 2



Figure A-48 Post-Test Passenger Dummy Position - View 2

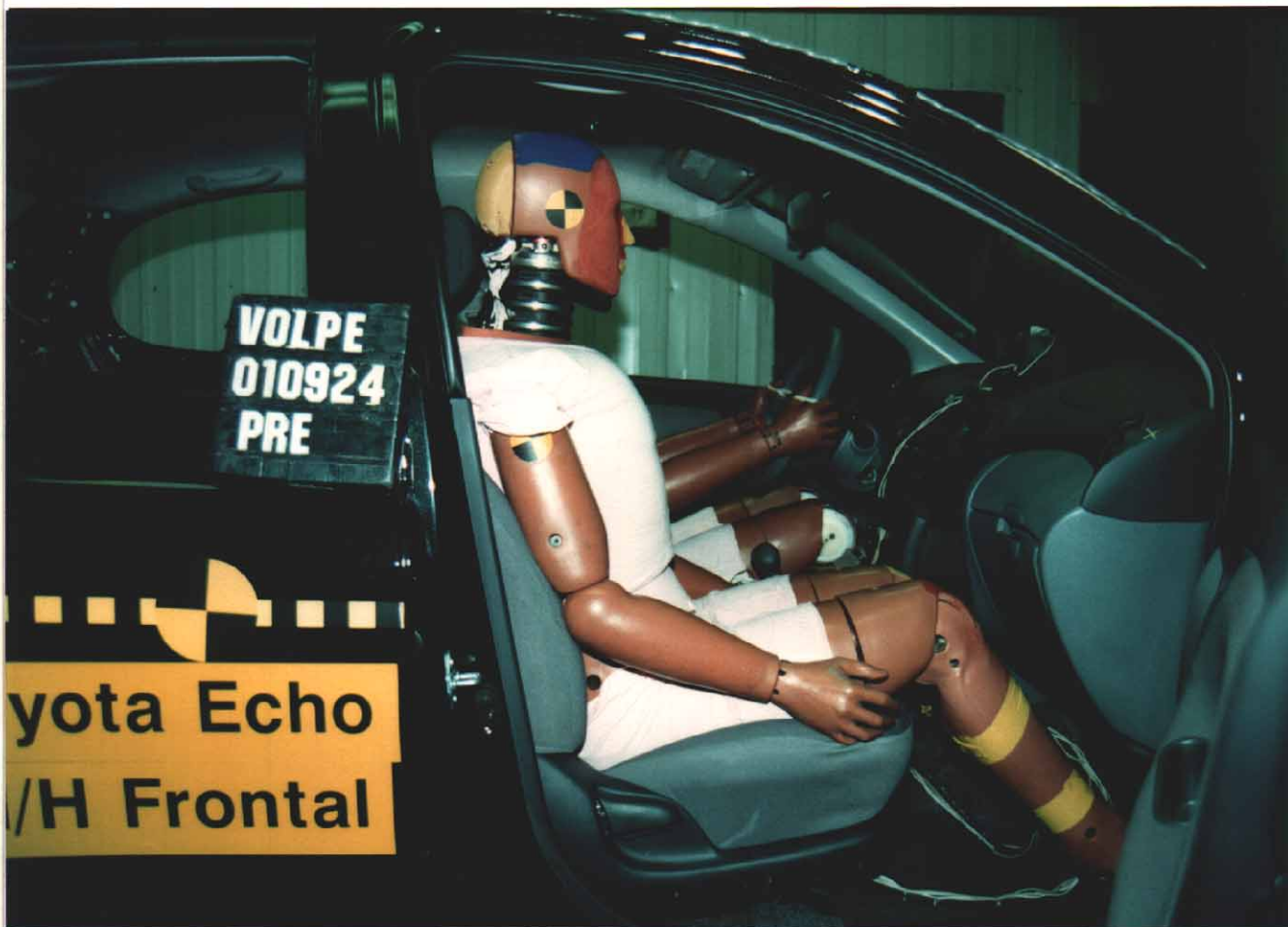


Figure A-49 Pre-Test Passenger Dummy & Vehicle Interior - View 1



Figure A-50 Post-Test Passenger Dummy & Vehicle Interior - View 1



Figure A-51 Pre-Test Passenger Dummy & Vehicle Interior - View 2



Figure A-52 Post-Test Passenger Dummy & Vehicle Interior - View 2



Figure A-53 Pre-Test Passenger Dummy Seat Track Position View



Figure A-54 Post-Test Passenger Dummy Seat Track Position View



Figure A-55 Post-Test Driver Dummy Overall View

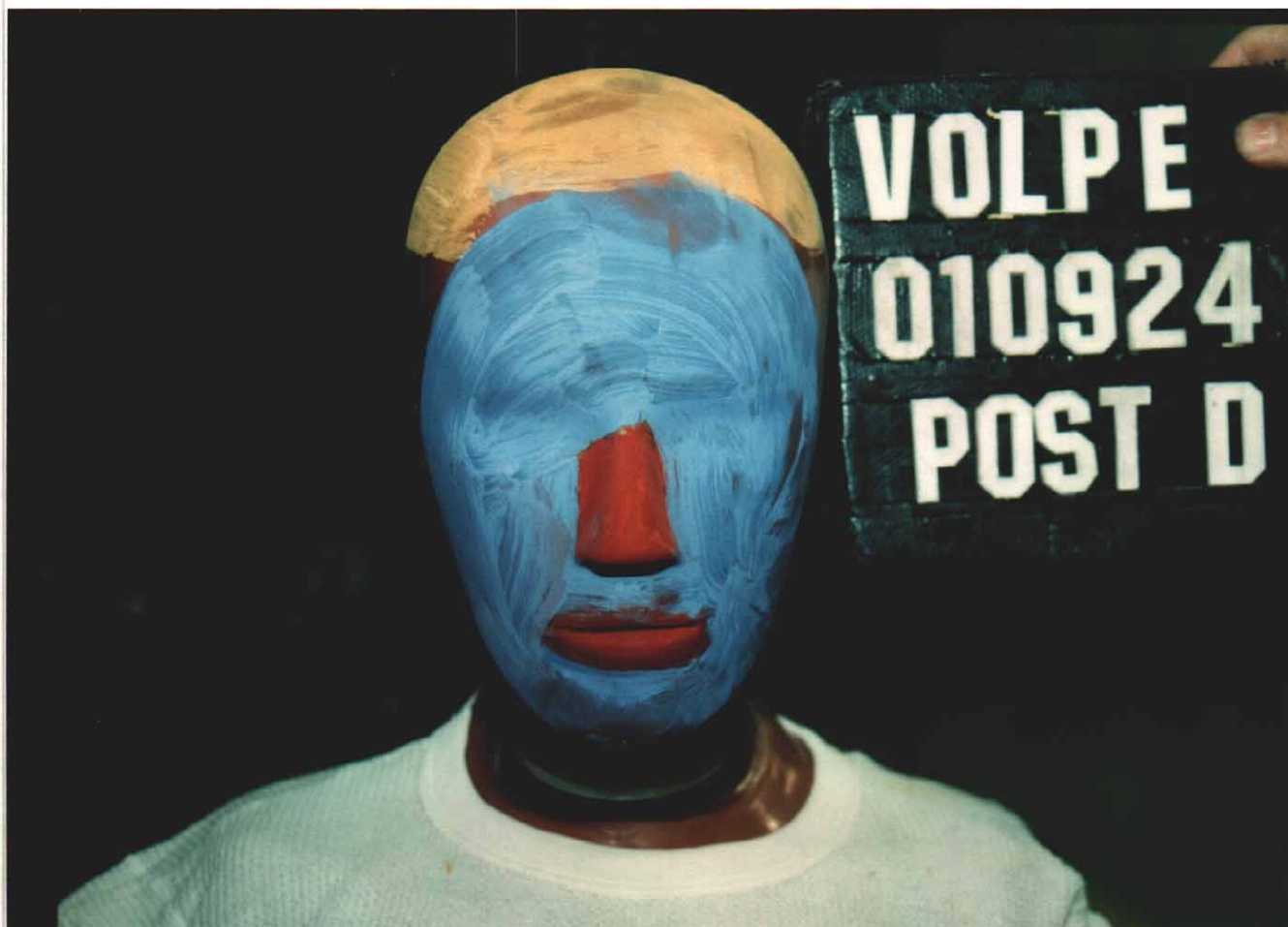


Figure A-56 Post-Test Driver Dummy Head Contact - View 1



Figure A-57 Post-Test Driver Dummy Head Contact - View 2



Figure A-58 Post-Test Driver Dummy Head Contact - View 3



Figure A-59 Post-Test Driver Dummy Head Contact - View 4

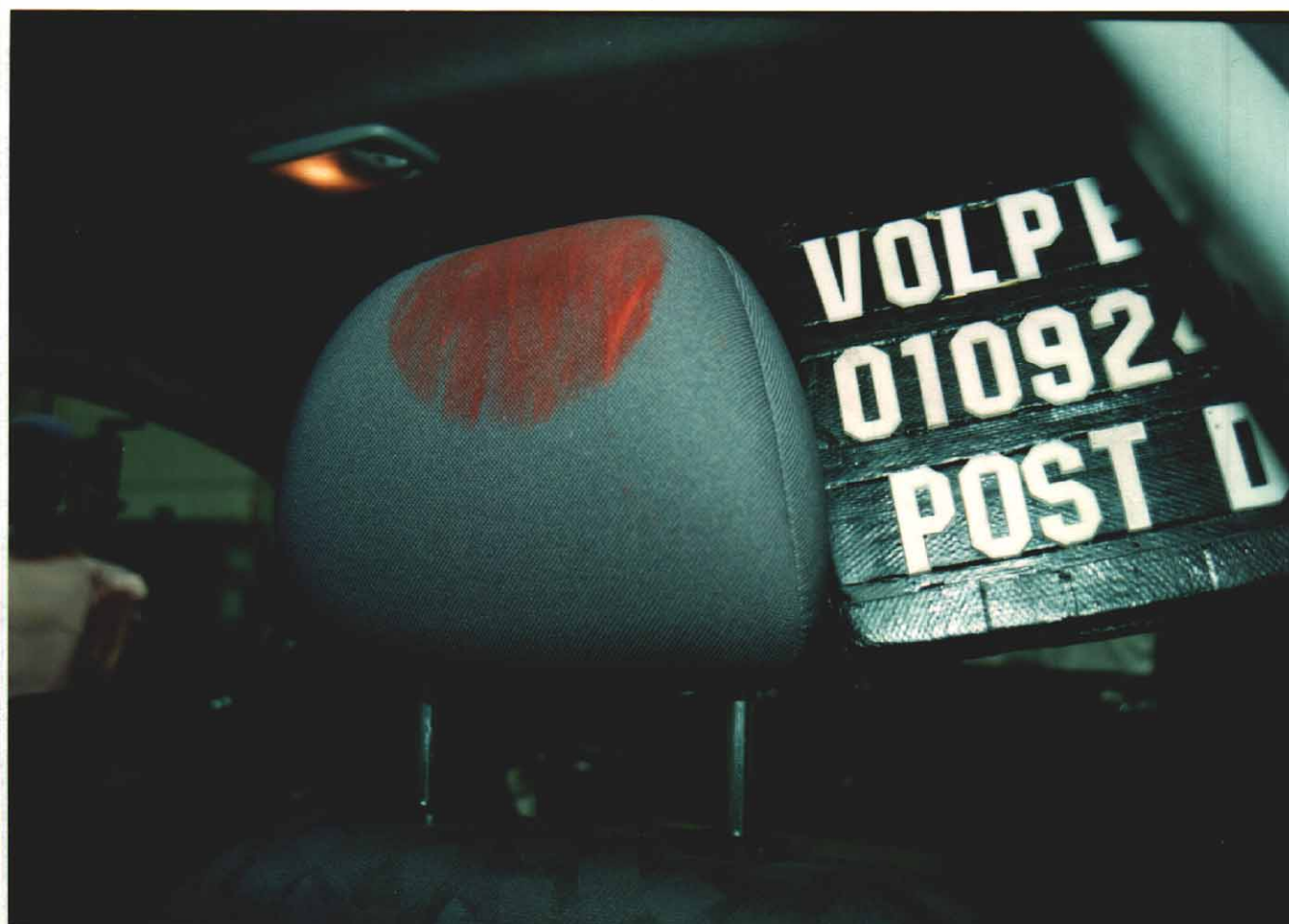


Figure A-60 Post-Test Driver Dummy Head Contact - View 5

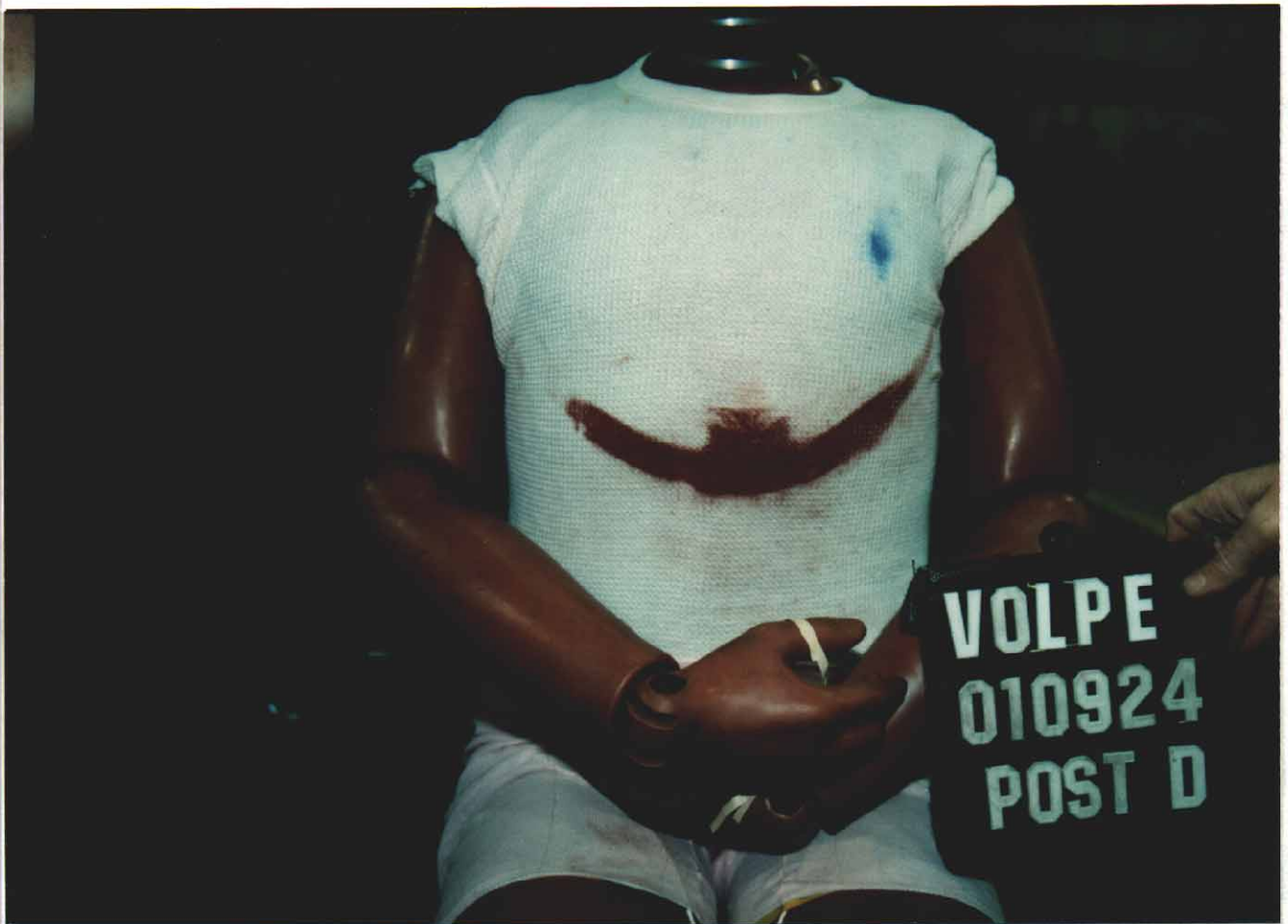


Figure A-61 Post-Test Driver Dummy Chest Contact - View 1



Figure A-62 Post-Test Driver Dummy Chest Contact - View 2



Figure A-63 Post-Test Driver Dummy Knee Contact - View 1



Figure A-64 Post-Test Driver Dummy Knee Contact - View 2



Figure A-65 Post-Test Driver Dummy Knee Contact - View 3



Figure A-66 Post-Test Passenger Dummy Overall View



Figure A-67 Post-Test Passenger Dummy Head Contact - View 1



Figure A-68 Post-Test Passenger Dummy Head Contact - View 2

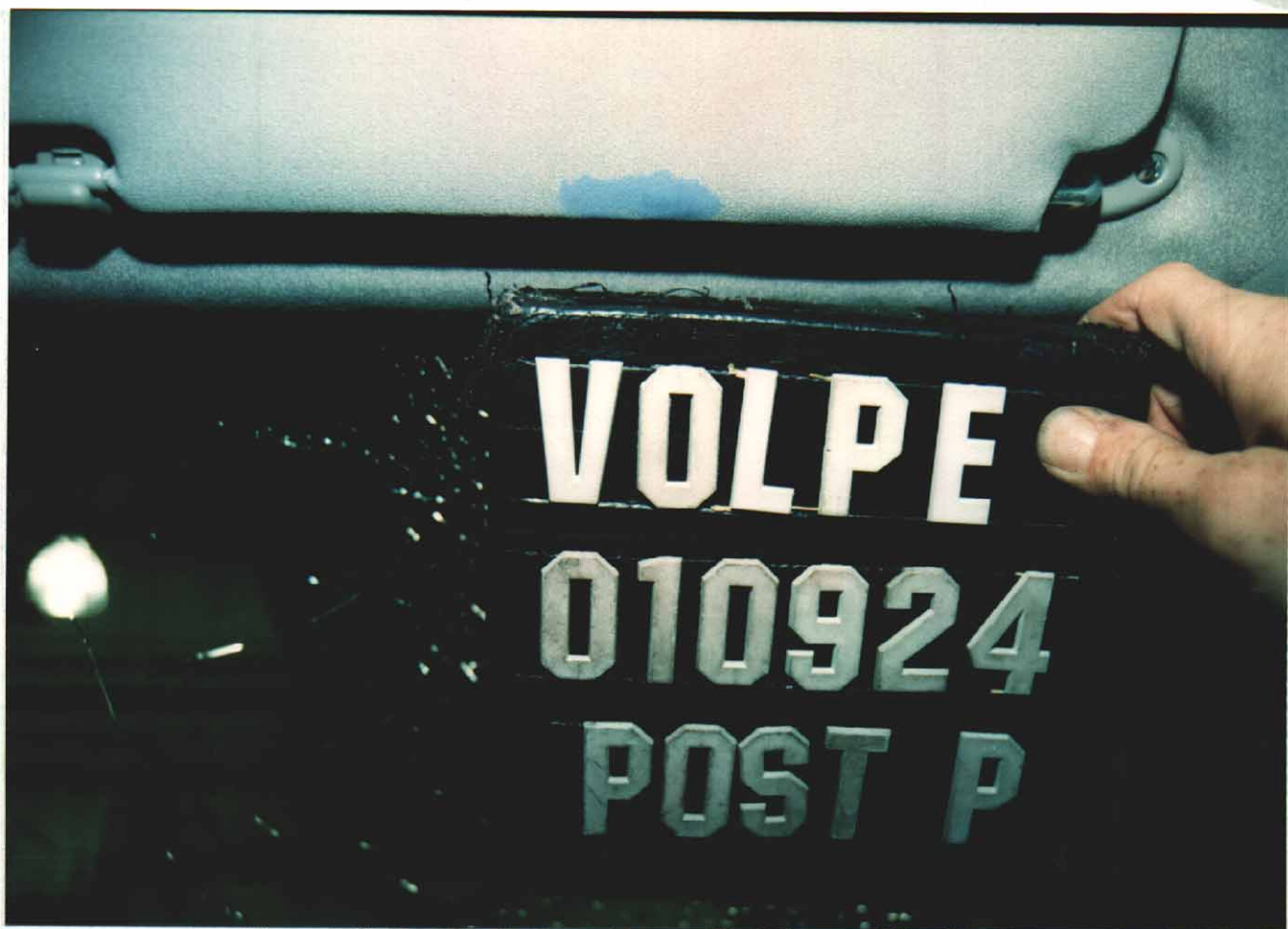


Figure A-69 Post-Test Passenger Dummy Head Contact - View 3

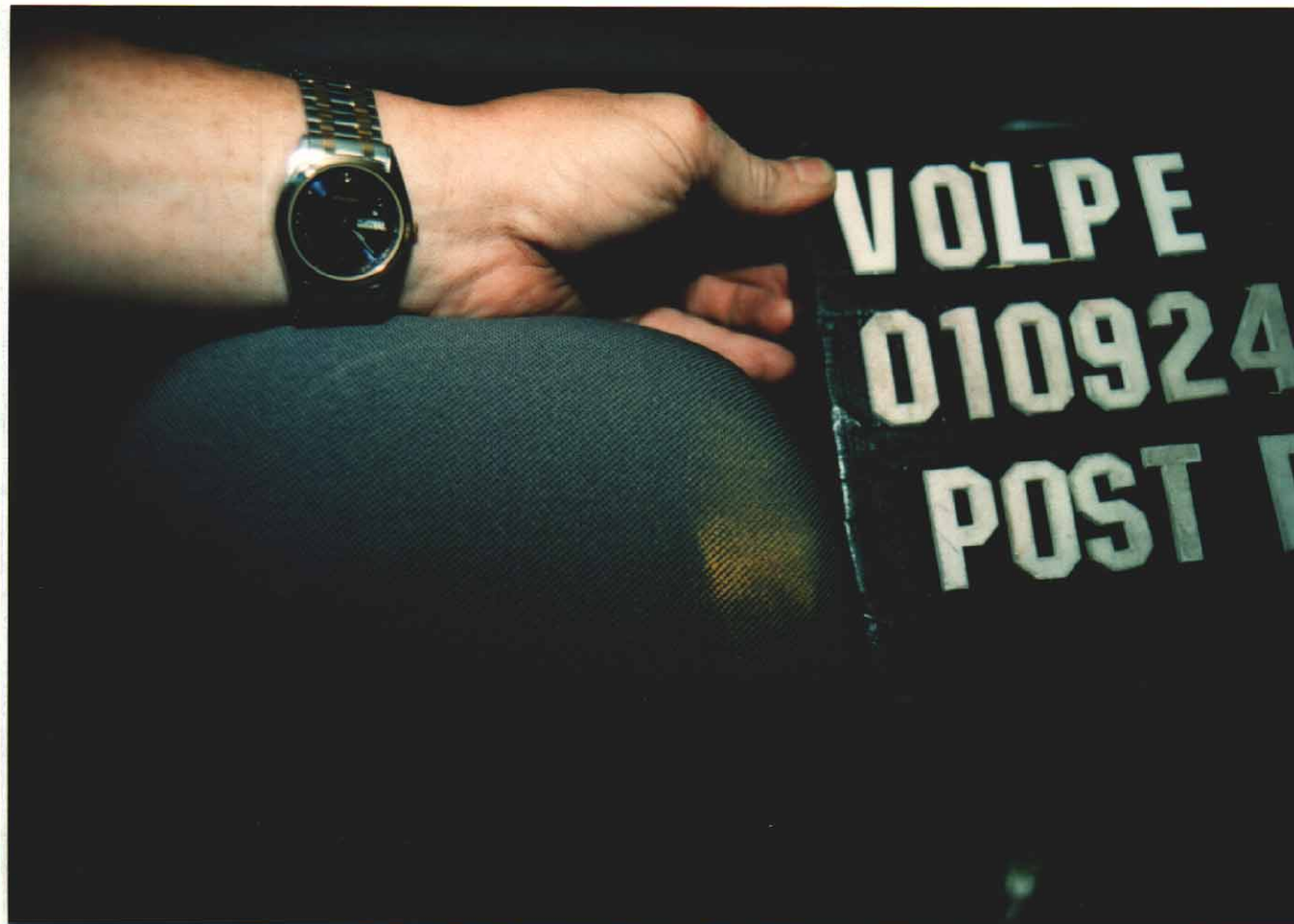


Figure A-70 Post-Test Passenger Dummy Head Contact - View 4

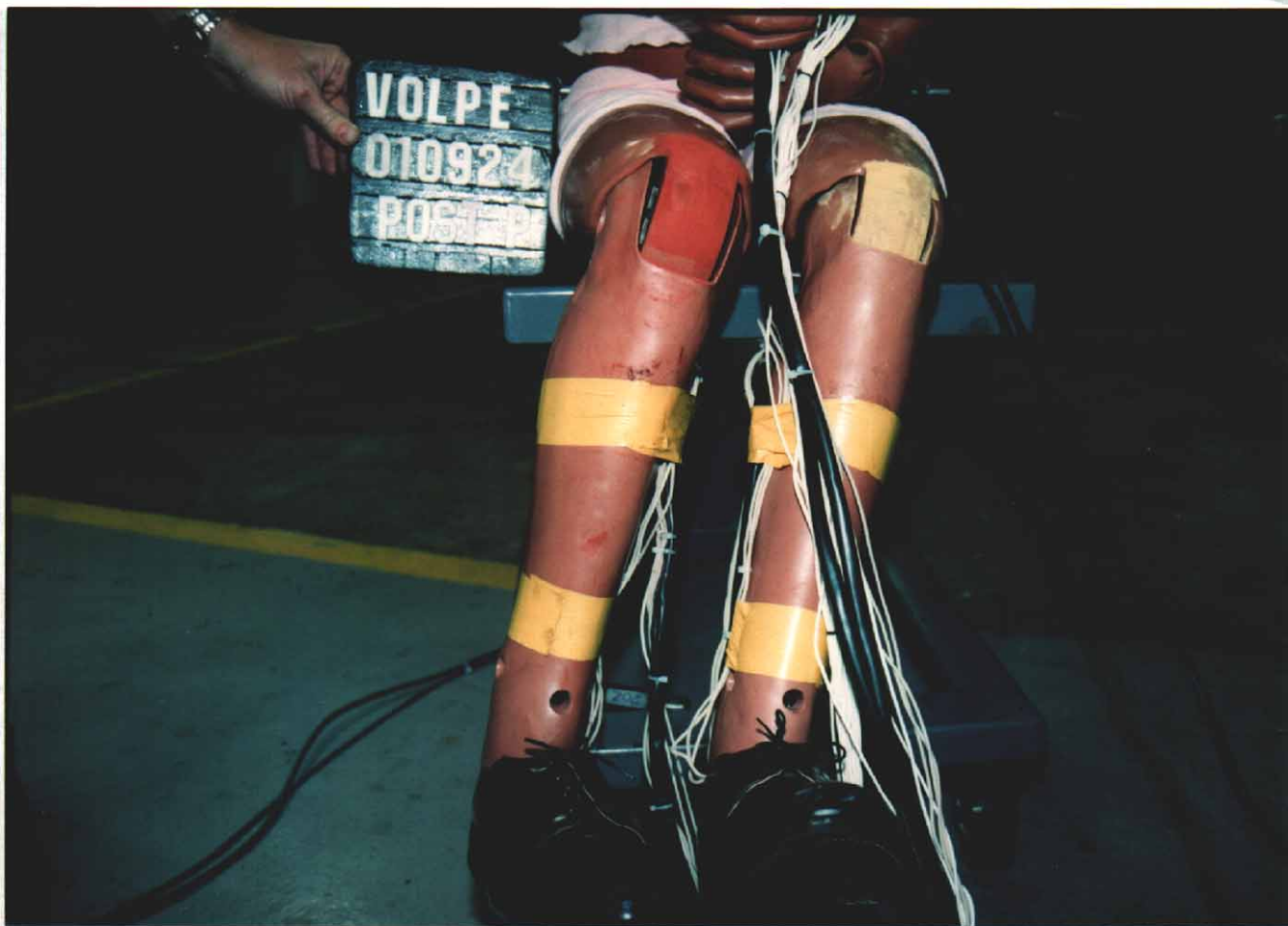


Figure A-71 Post-Test Passenger Dummy Knee Contact - View 1

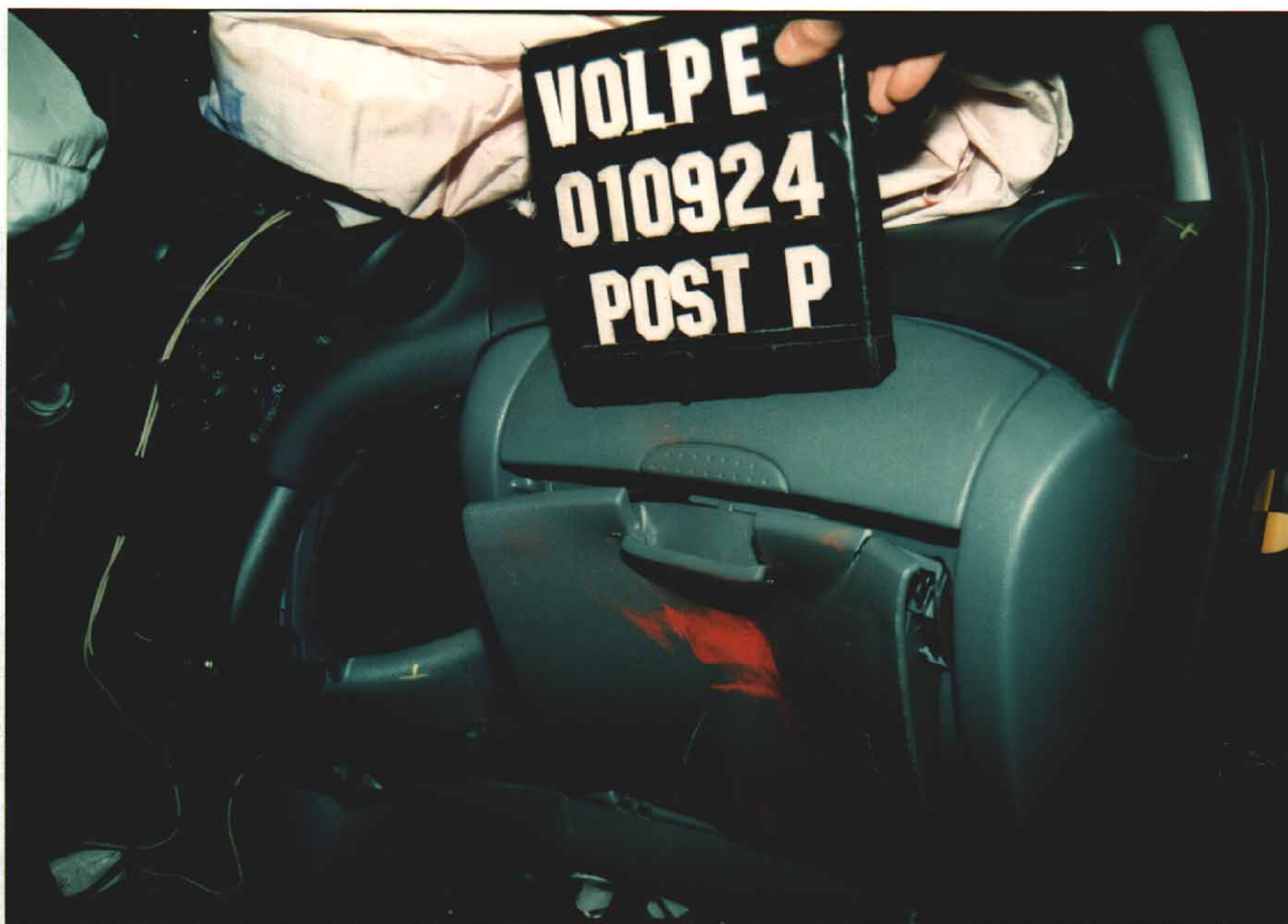


Figure A-72 Post-Test Passenger Dummy Knee Contact - View 2



Figure A-73 Pre-Test Vehicle Certification Label View

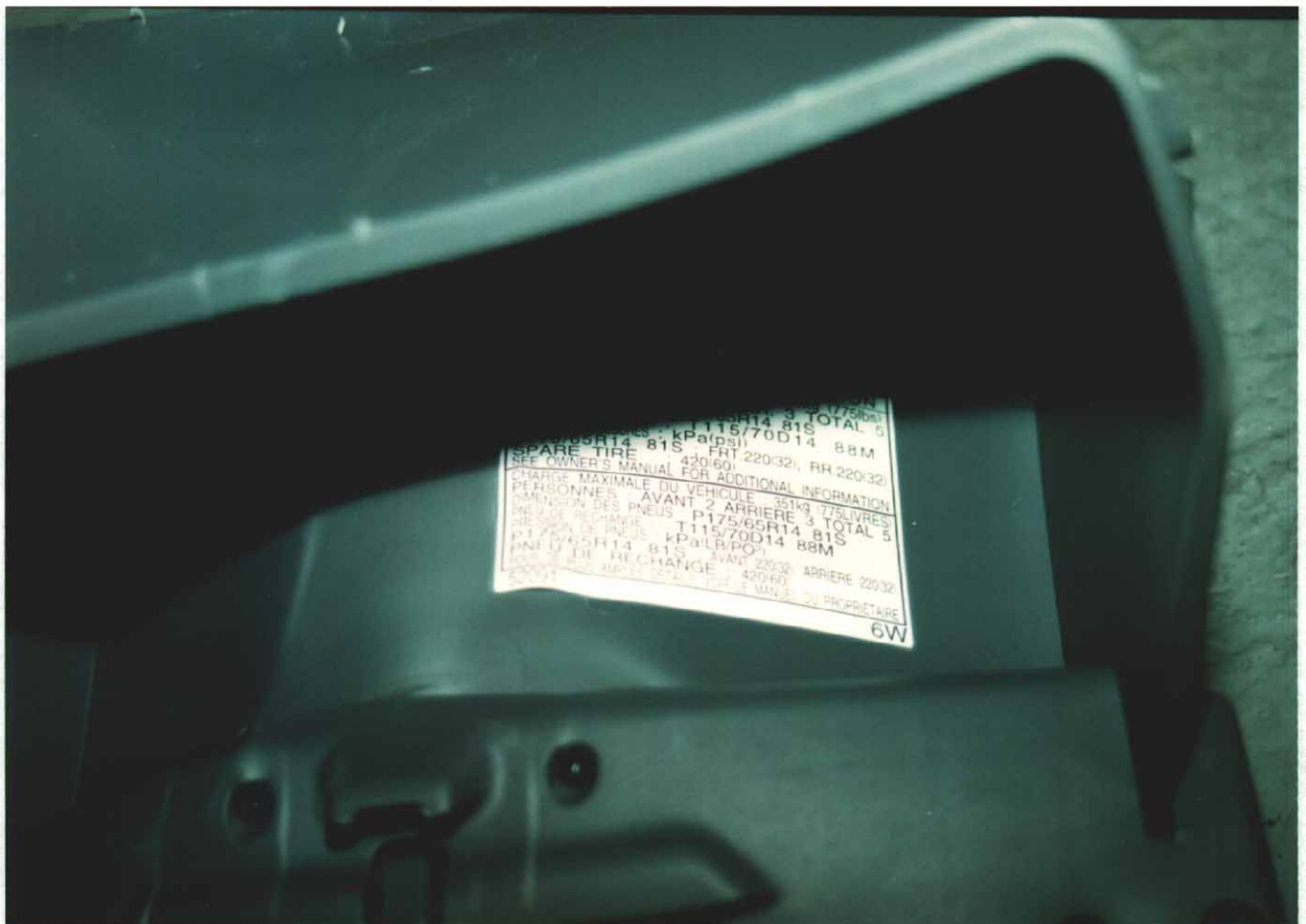


Figure A-74 Pre-Test Tire Load Label View

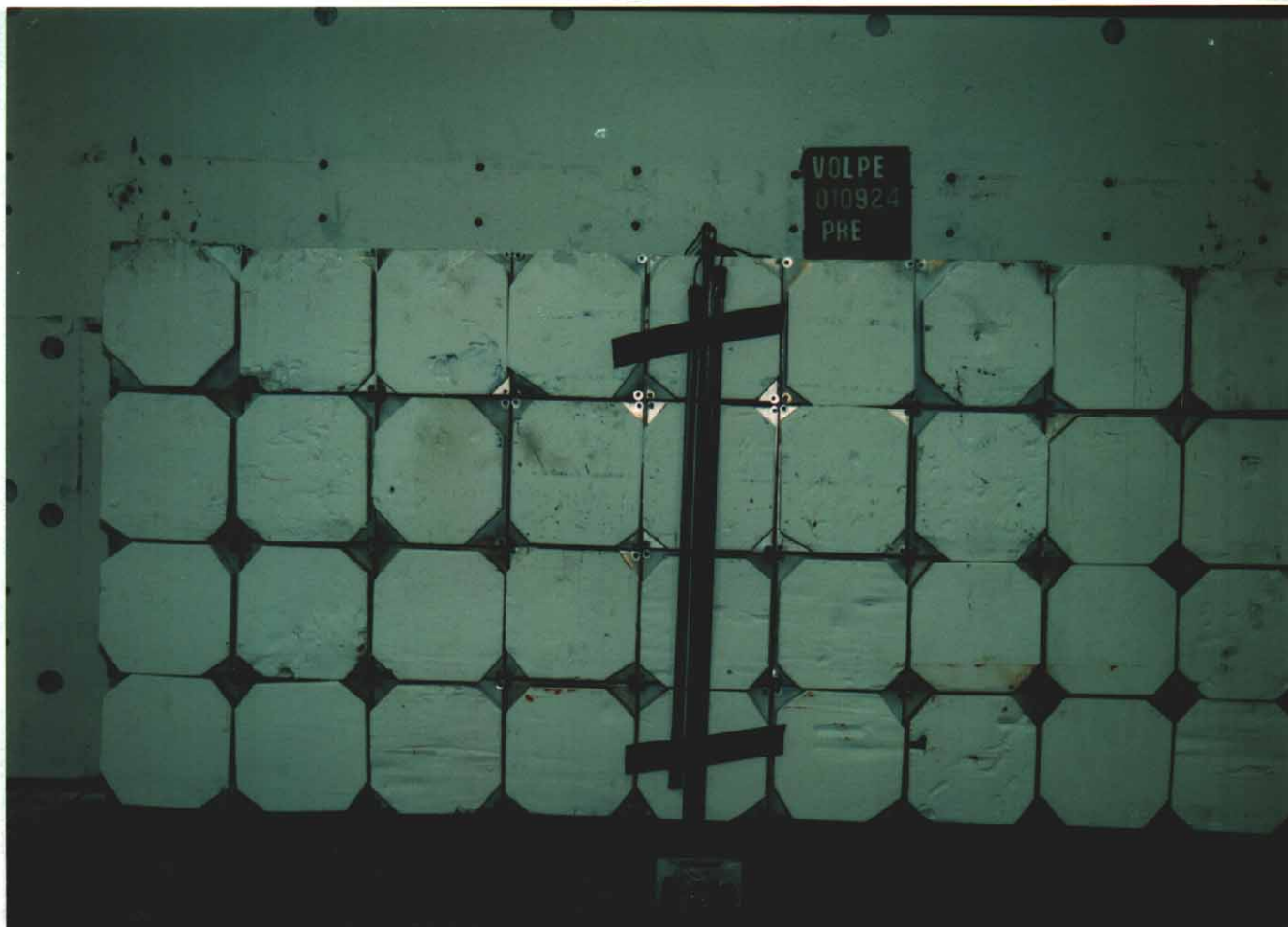


Figure A-75 Pre-Test Barrier Face View

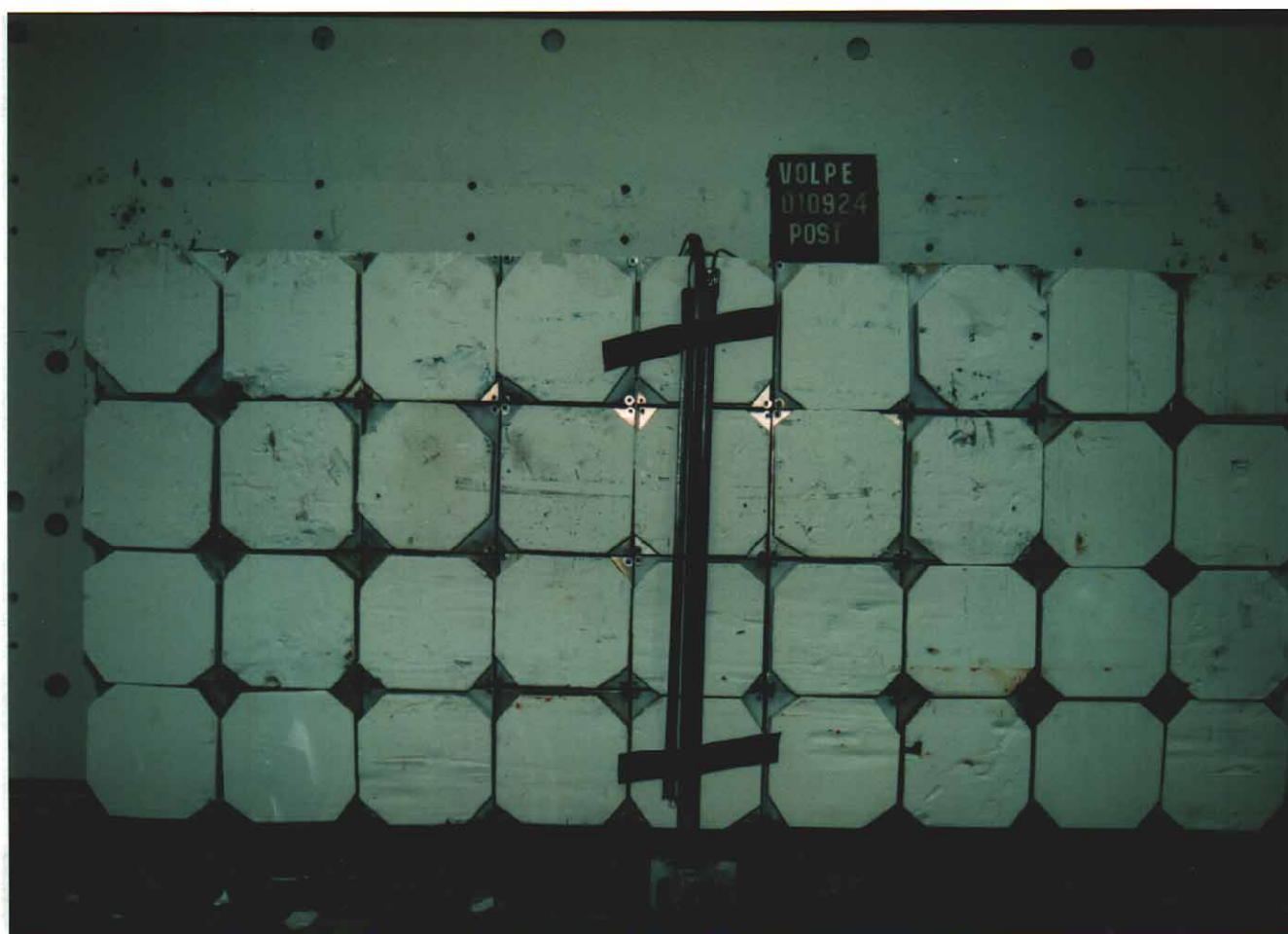
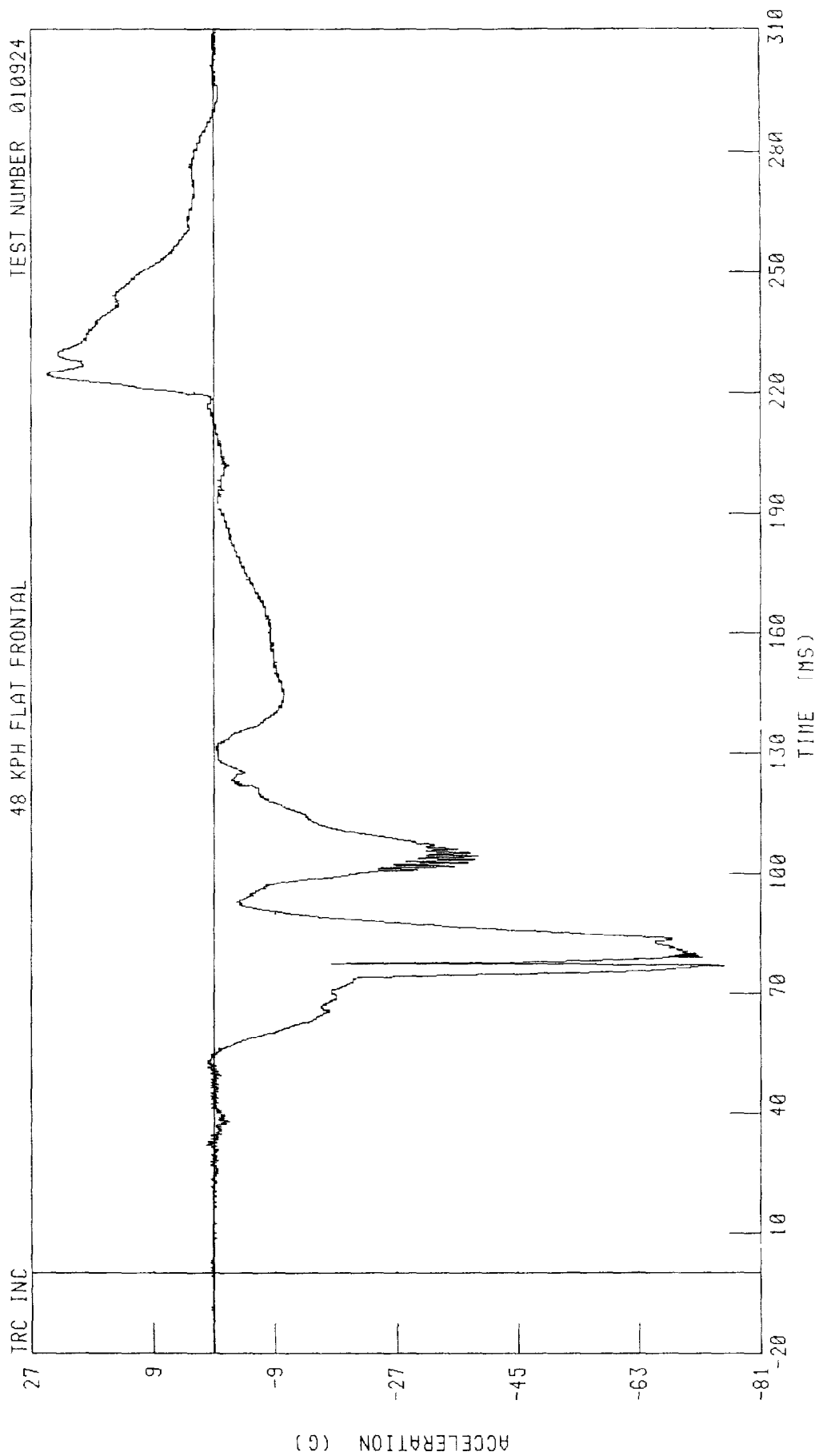


Figure A-76 Post-Test Barrier Face View

Appendix B

Data Plots

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER HEAD X-AXIS ACCELERATION
 48 KPH FLAT FRONTAL



TEST NUMBER 010924

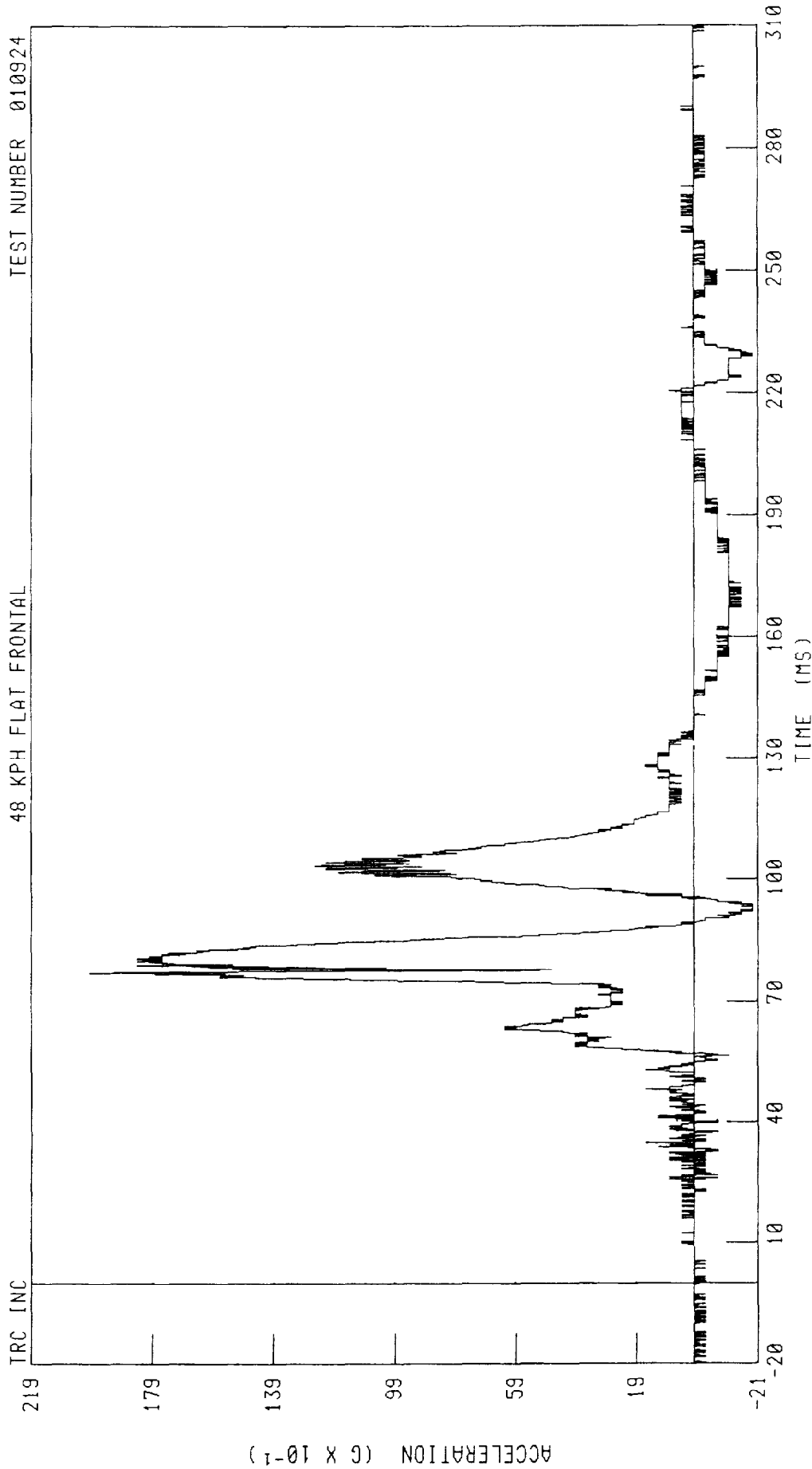
CHANNEL HEDXG1 FILTER CH CLASS 1000 PEAK DATA 24 65 0 224 32 MS, -75 65 0 77 04 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER HEAD Y-AXIS ACCELERATION

48 KPH FLAT FRONTAL

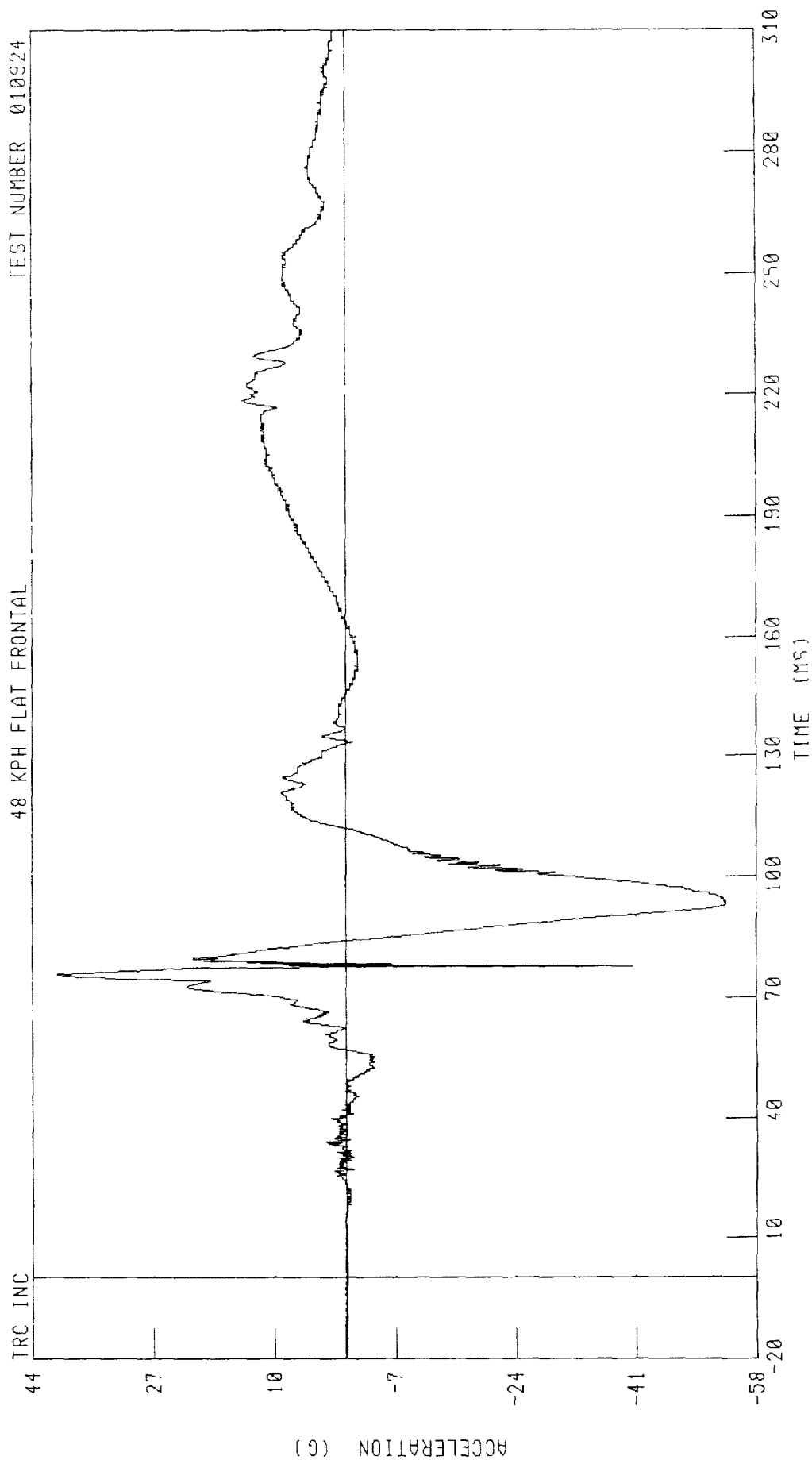
TEST NUMBER 010924



PEAK DATA 19 97 G @ 77 04 MS, -1 94 G @ 92 32 MS

CHANNEL HEDYG1 FILTER CH CLASS 1000

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER HEAD Z-AXIS ACCELERATION
 48 KPH FLAT FRONTAL



TEST NUMBER 010924

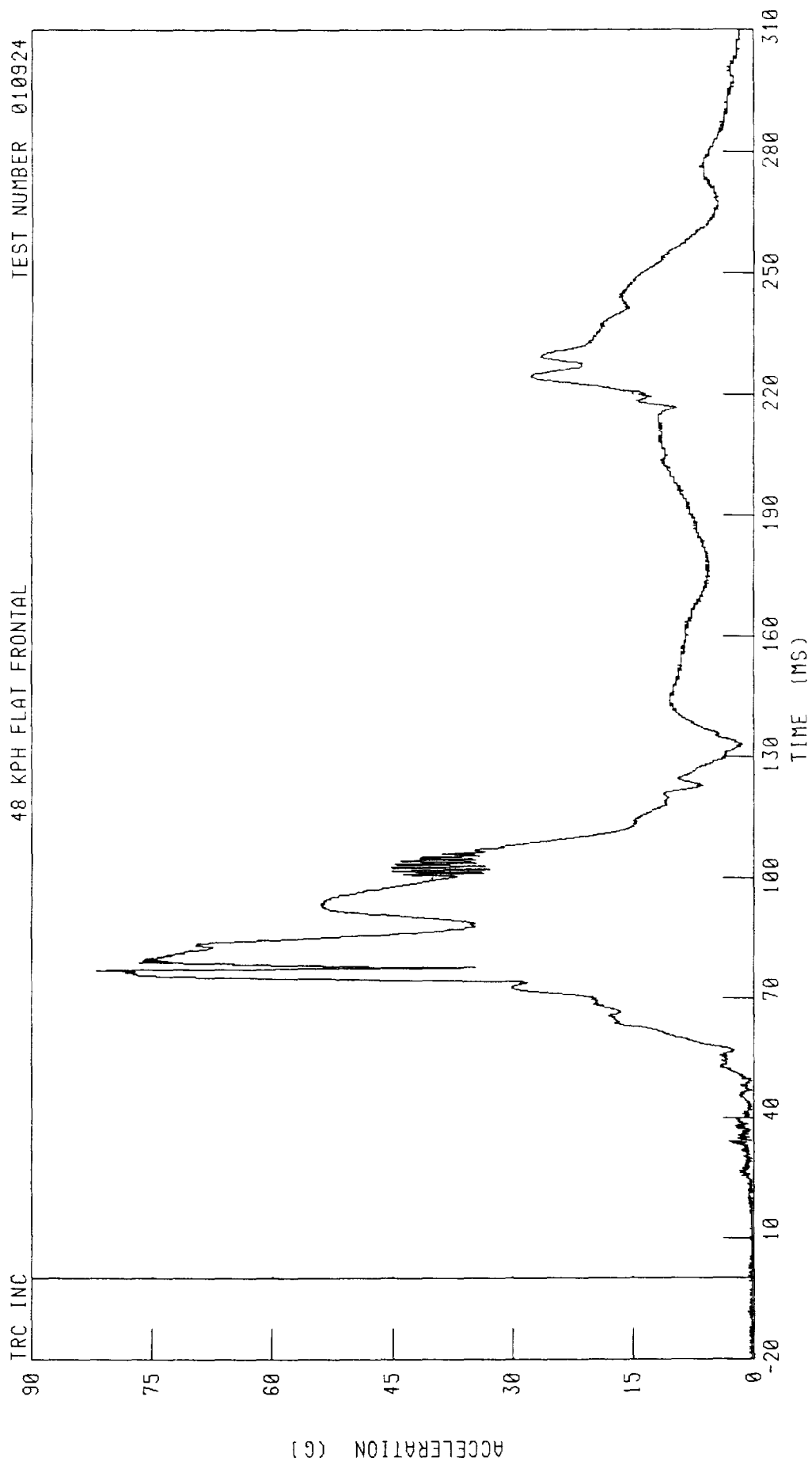
CHANNEL HEDZG1 FILTER CH CLASS 1000 PEAK DATA 40 51 0 75 44 MS 53 73 0 92 88 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER HEAD RESULTANT ACCELERATION

48 KPH FLAT FRONTAL

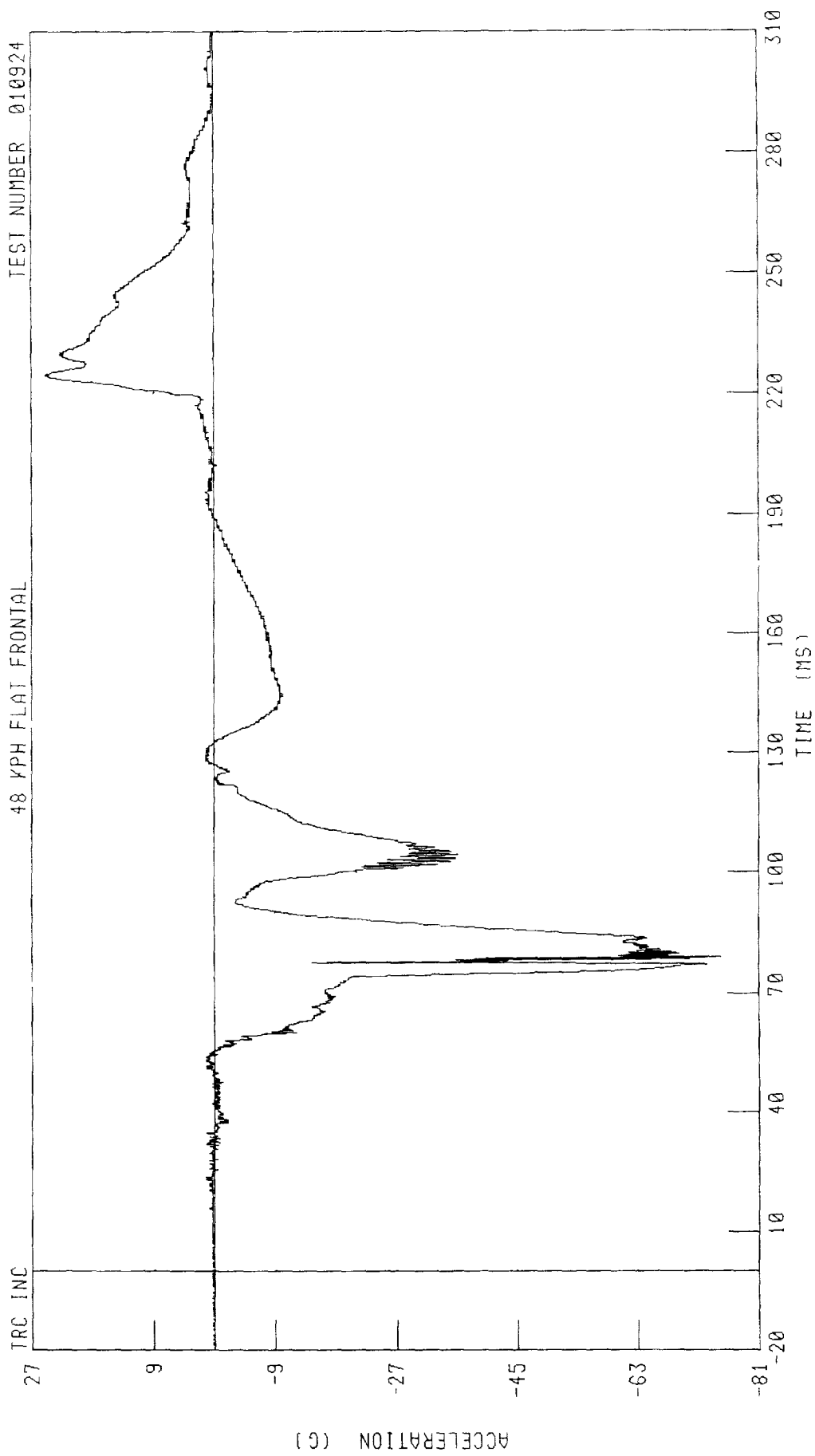
TEST NUMBER 010924



CHANNEL HEDG1 FILTER CH CLASS 1000

PEAK DATA 81 90 G @ 77 04 MS, 0 24 G @ -20 00 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER HEAD X-AXIS ACCELERATION REDUNDANT
48 KPH FLAT FRONTAL



CHANNEL HEDXR1 FILTER CH CLASS 1000 PEAK DATA 25 04 G @ 224 32 MS, -75 32 G @ 78 30 MS

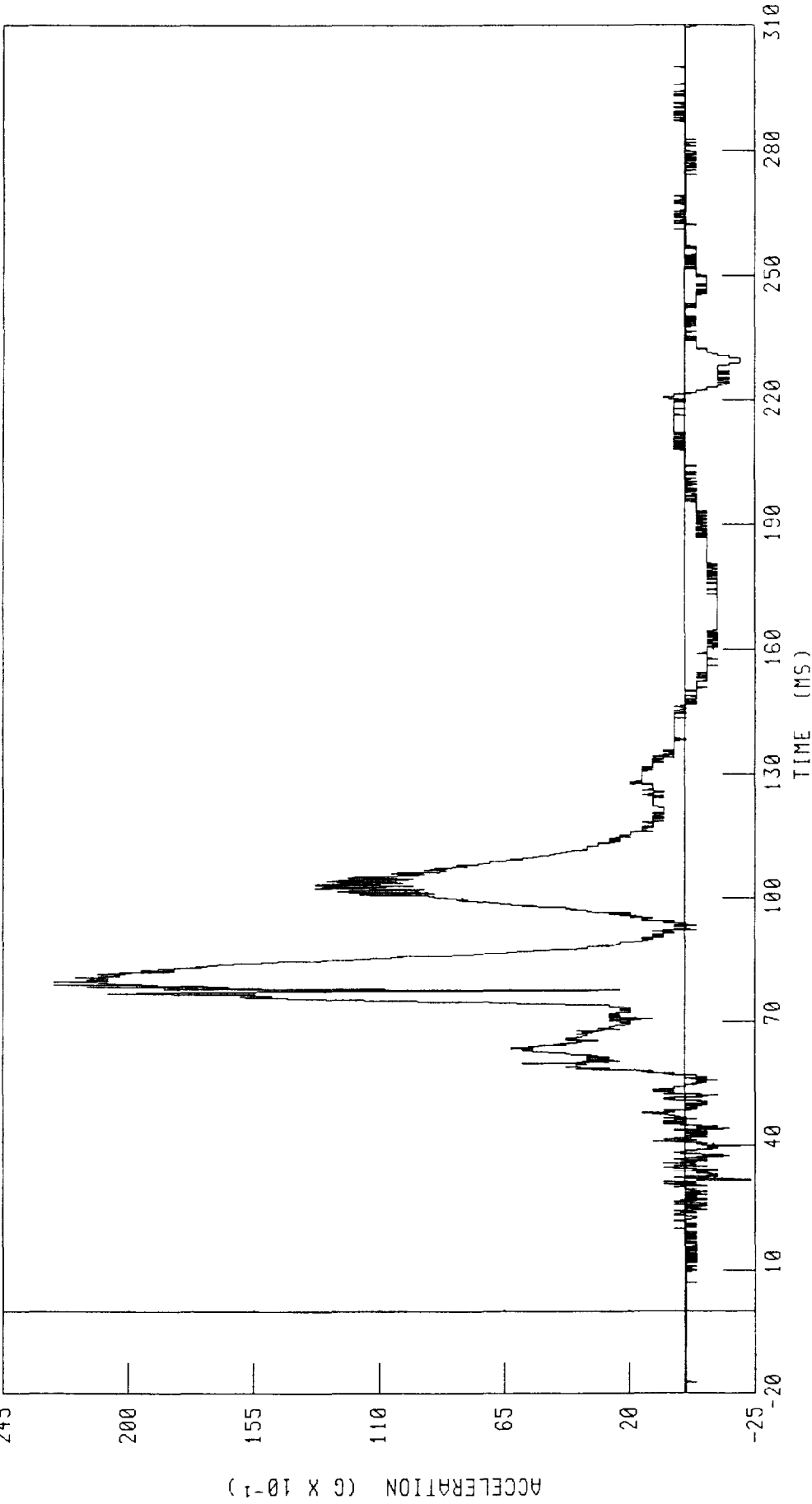
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER HEAD Y-AXIS ACCELERATION REDUNDANT

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



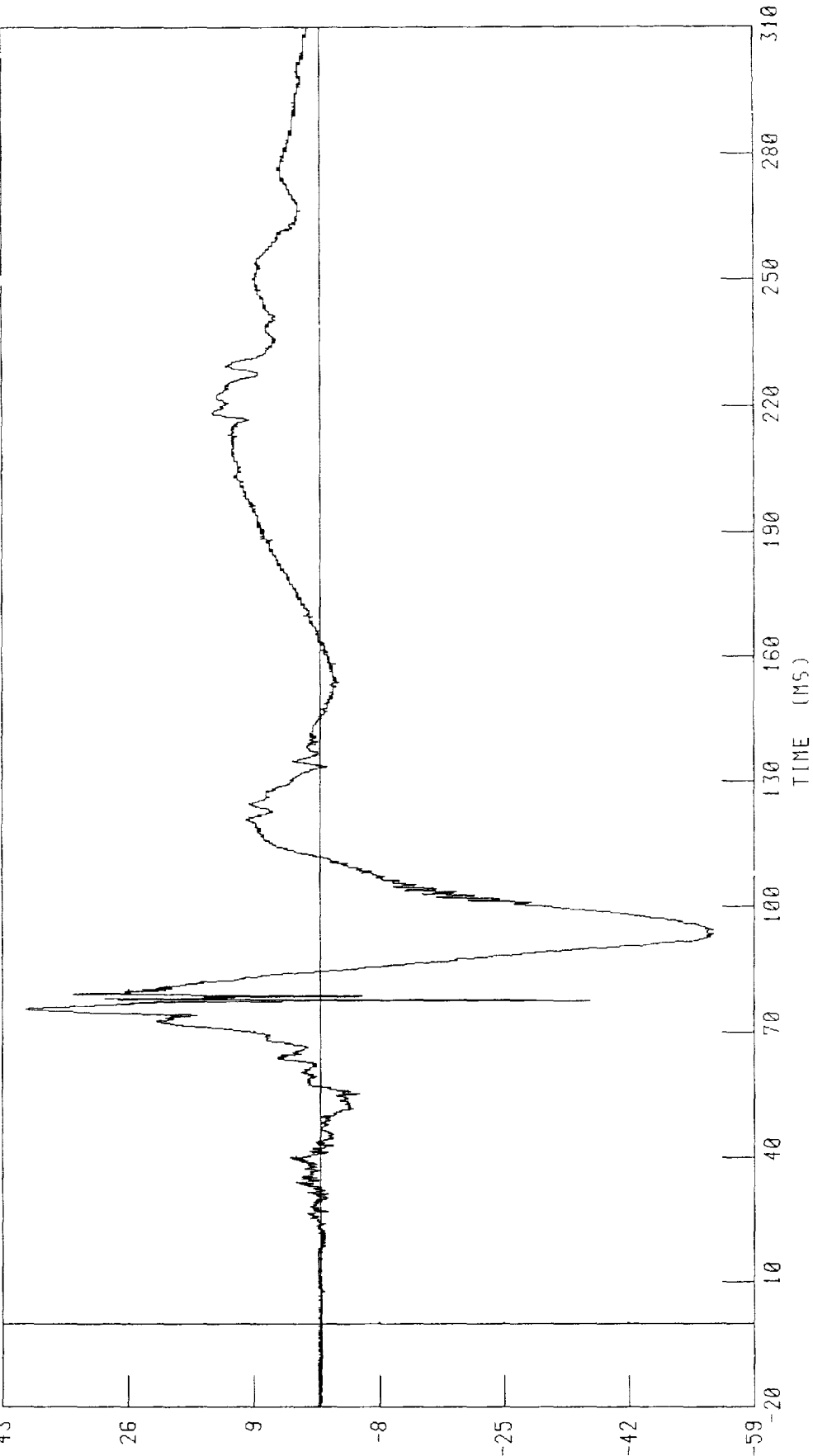
CHANNEL HEDYR1 FILTER CH CLASS 1000

PEAK DATA 22 68 G @ 79 04 MS, -2 36 G @ 31 36 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER HEAD Z-AXIS ACCELERATION REDUNDANT
48 KPH FLAT FRONTAL

TEST NUMBER 010924

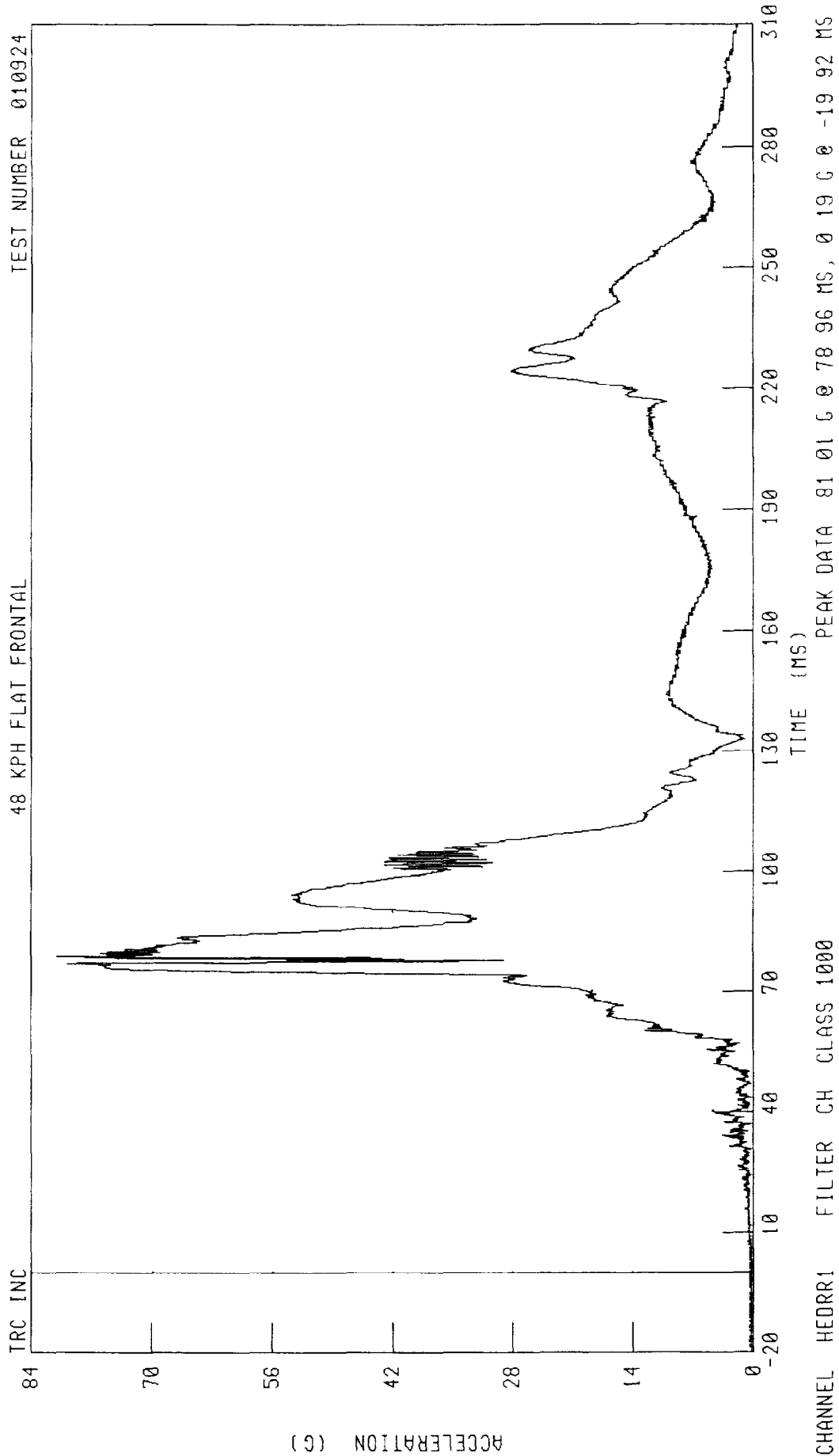
TRC INC



PEAK DATA 39 82 G @ 75 36 MS, -53 51 G @ 93 44 MS

CHANNEL HEDZR1 FILTER CH CLASS 1000

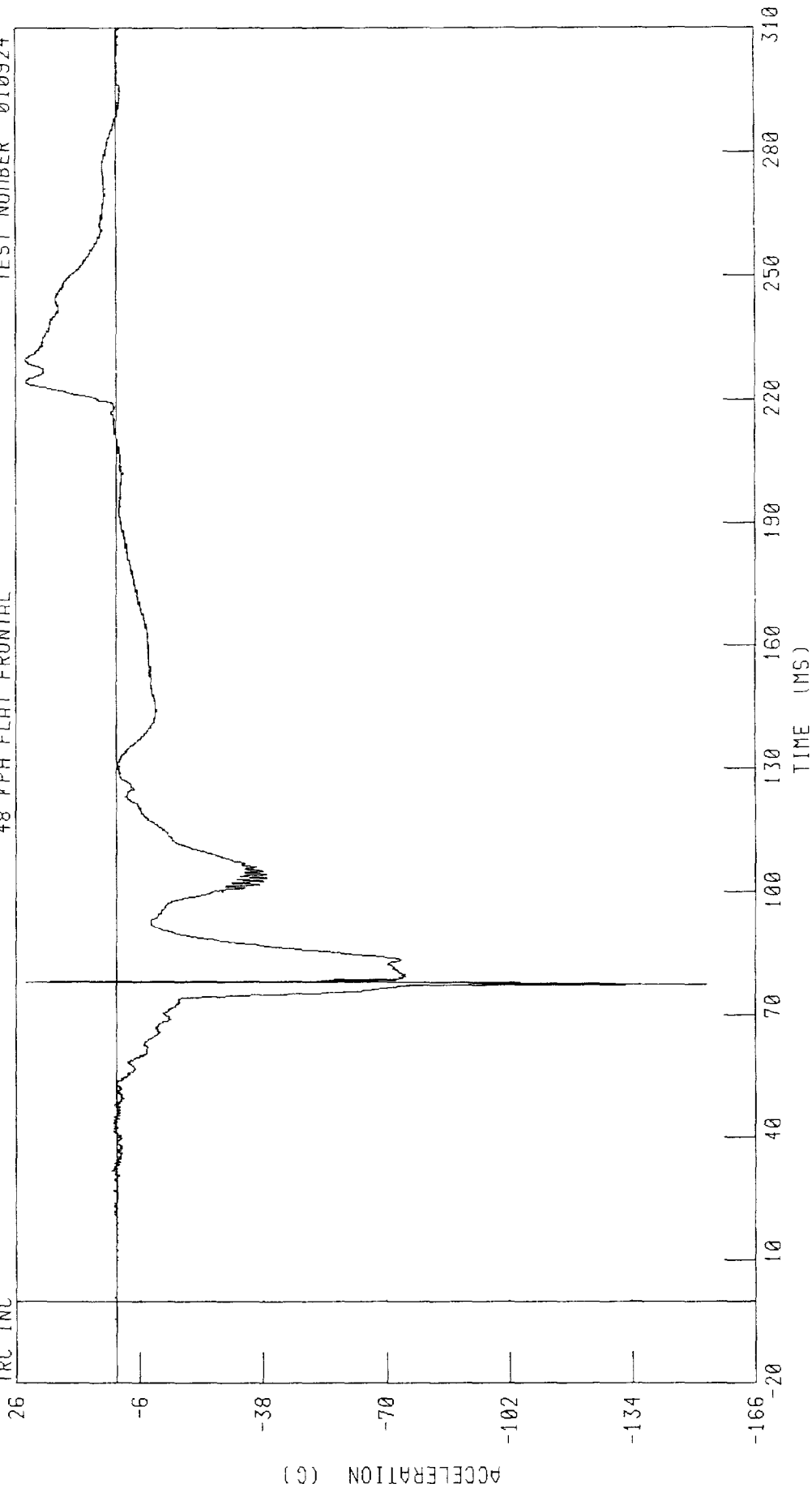
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER HEAD RESULTANT ACCELERATION REDUNDANT



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER HEAD X-AXIS (LT) ACCELERATION
48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



PEAK DATA 23 65 G @ 76 08 MS, -153 39 G @ 77 44 MS

CHANNEL HD1XC1 FILTER CH CLASS 1000

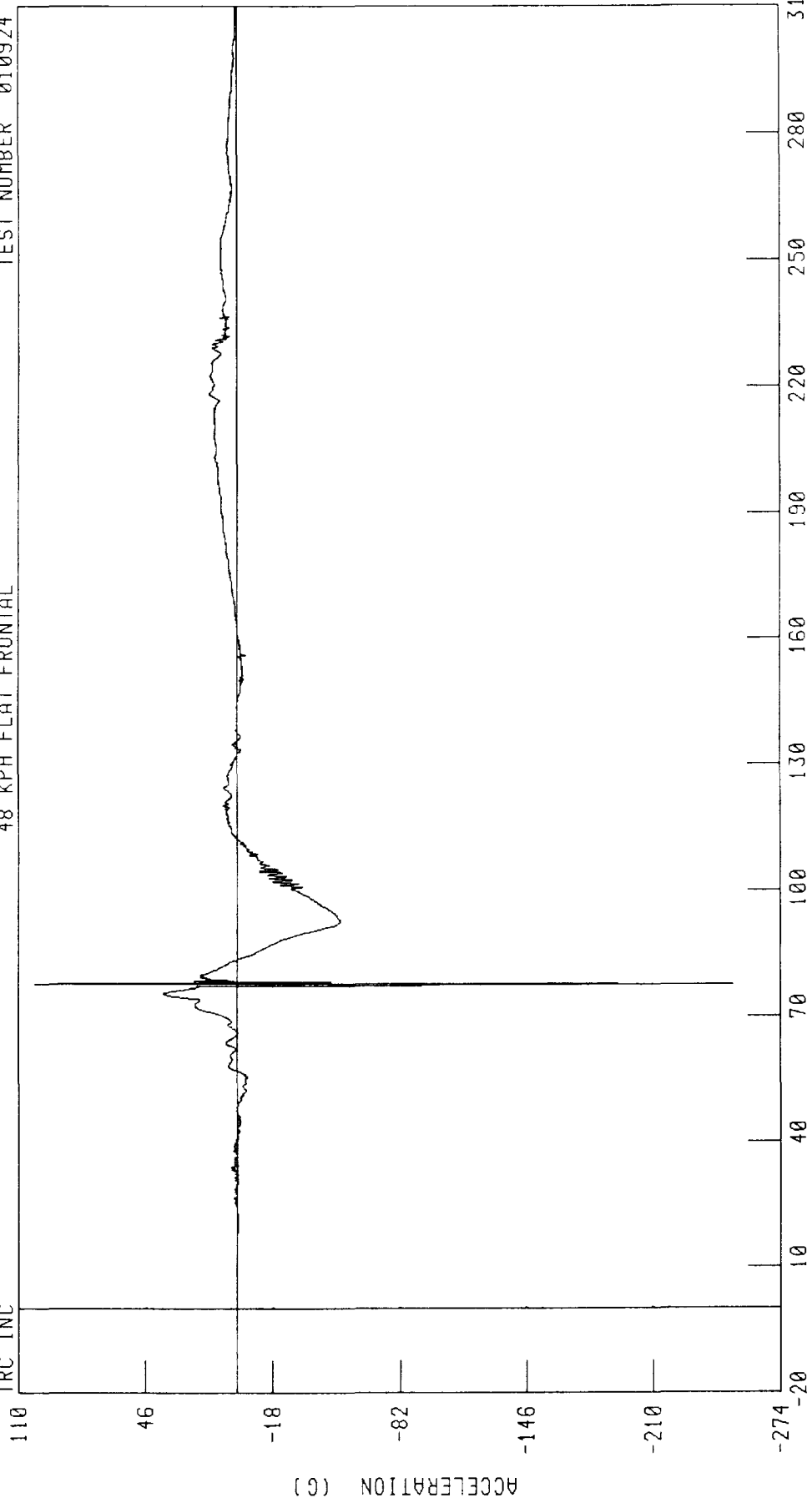
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER HEAD Z-AXIS (LT) ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



TIME (MS)

PEAK DATA 102 17 G @ 77 84 MS, -249 99 G @ 77 60 MS

CHANNEL HD1ZC1 FILTER CH CLASS 1000

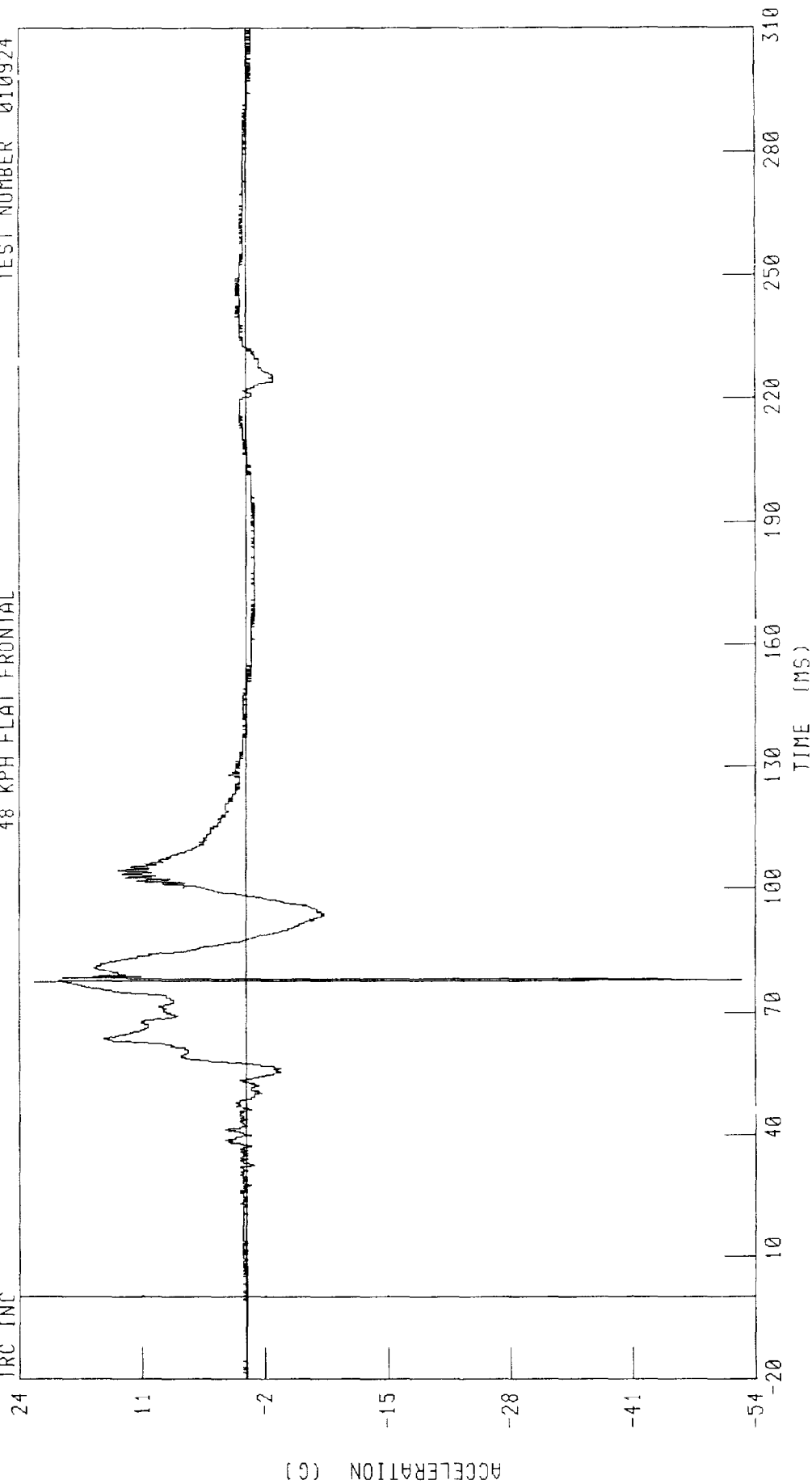
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER HEAD Y-AXIS (FT) ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



PEAK DATA 22 48 0 @ 77 36 MS, -52 61 G @ 17 76 MS

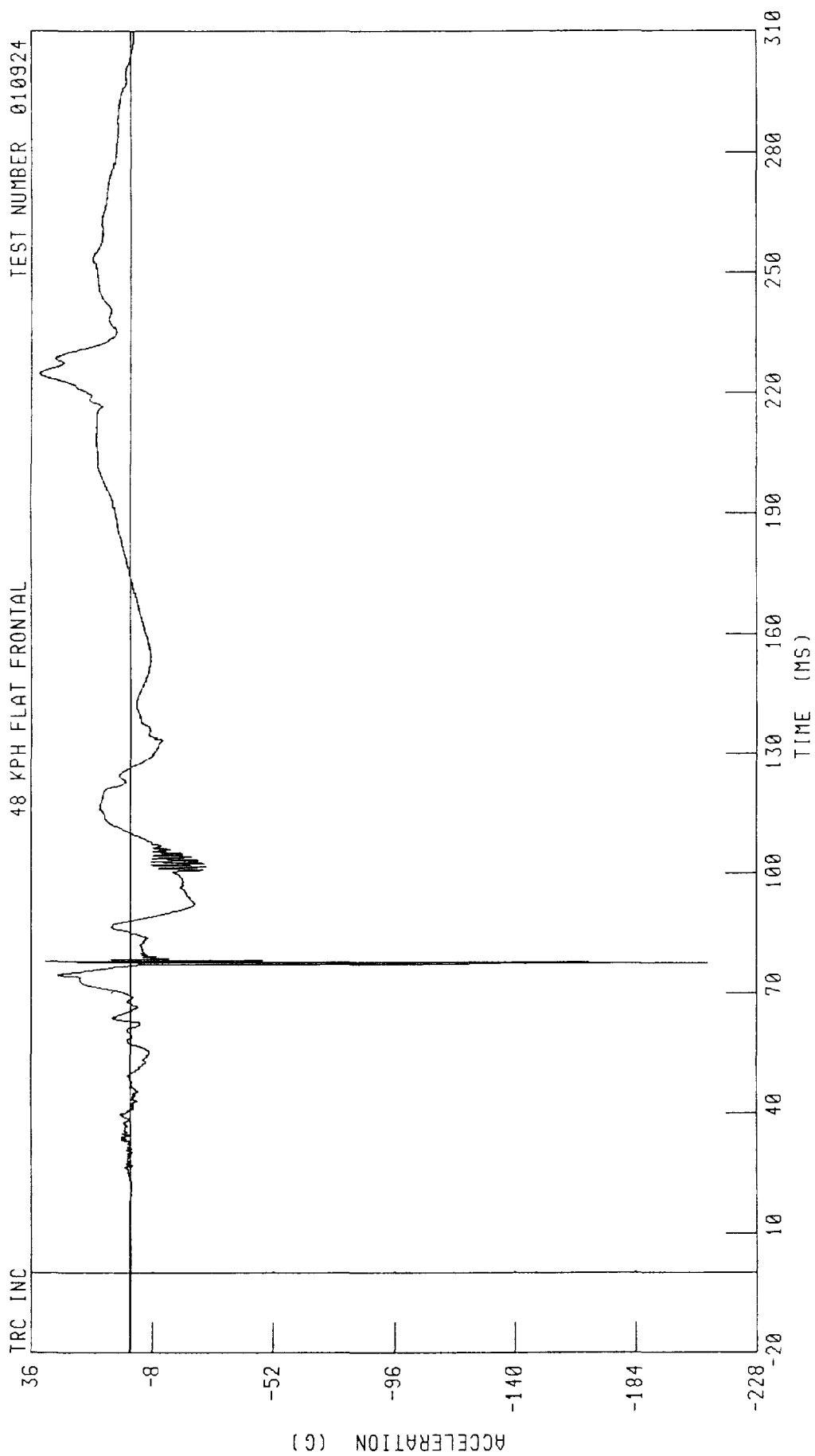
CHANNEL HD2YC1 FILTER CH CLASS 1000

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER HEAD Z-AXIS (FT) ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924



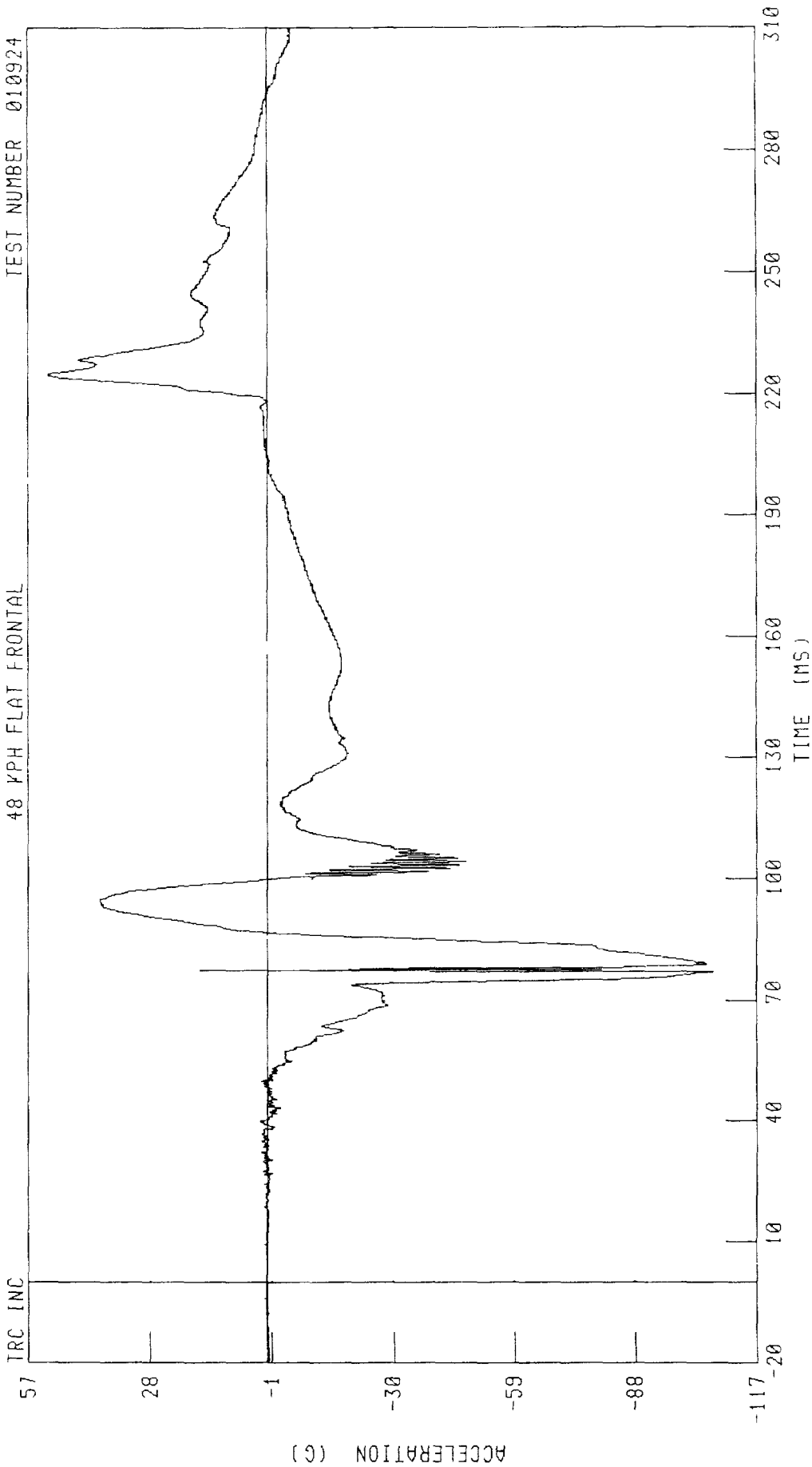
CHANNEL HD2ZG1 FILTER CH CLASS 1000

PEAK DATA 33 19 G @ 224 80 MS, -210 09 G @ 77 52 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER HEAD X-AXIS (TP) ACCELERATION
48 KPH FLAT FRONTAL

TEST NUMBER 010924

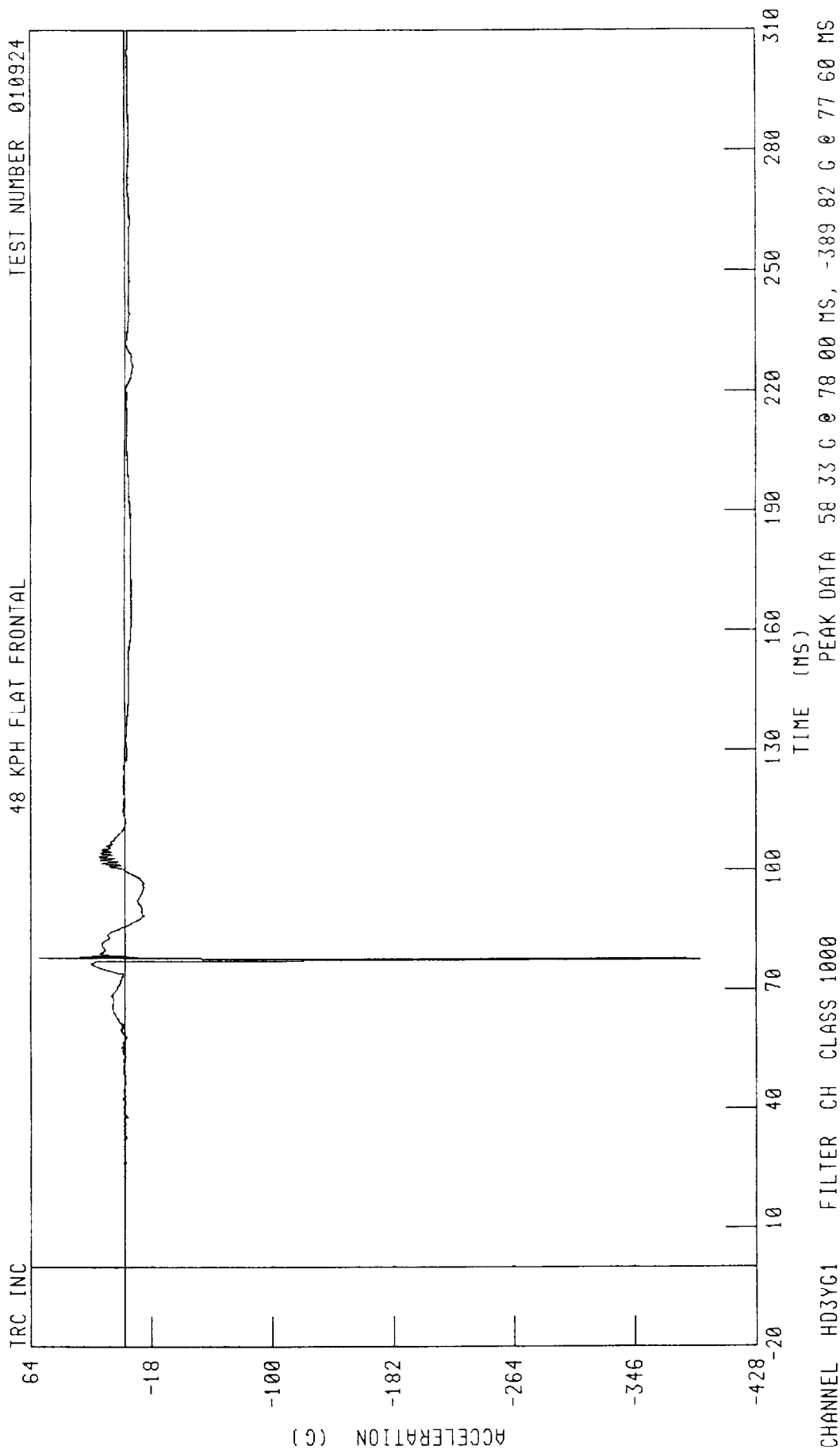
TRC INC



PEAK DATA 52 06 G @ 224 56 MS, -106 59 G @ 77 20 MS

CHANNEL HD3XG1 FILTER CH CLASS 1000

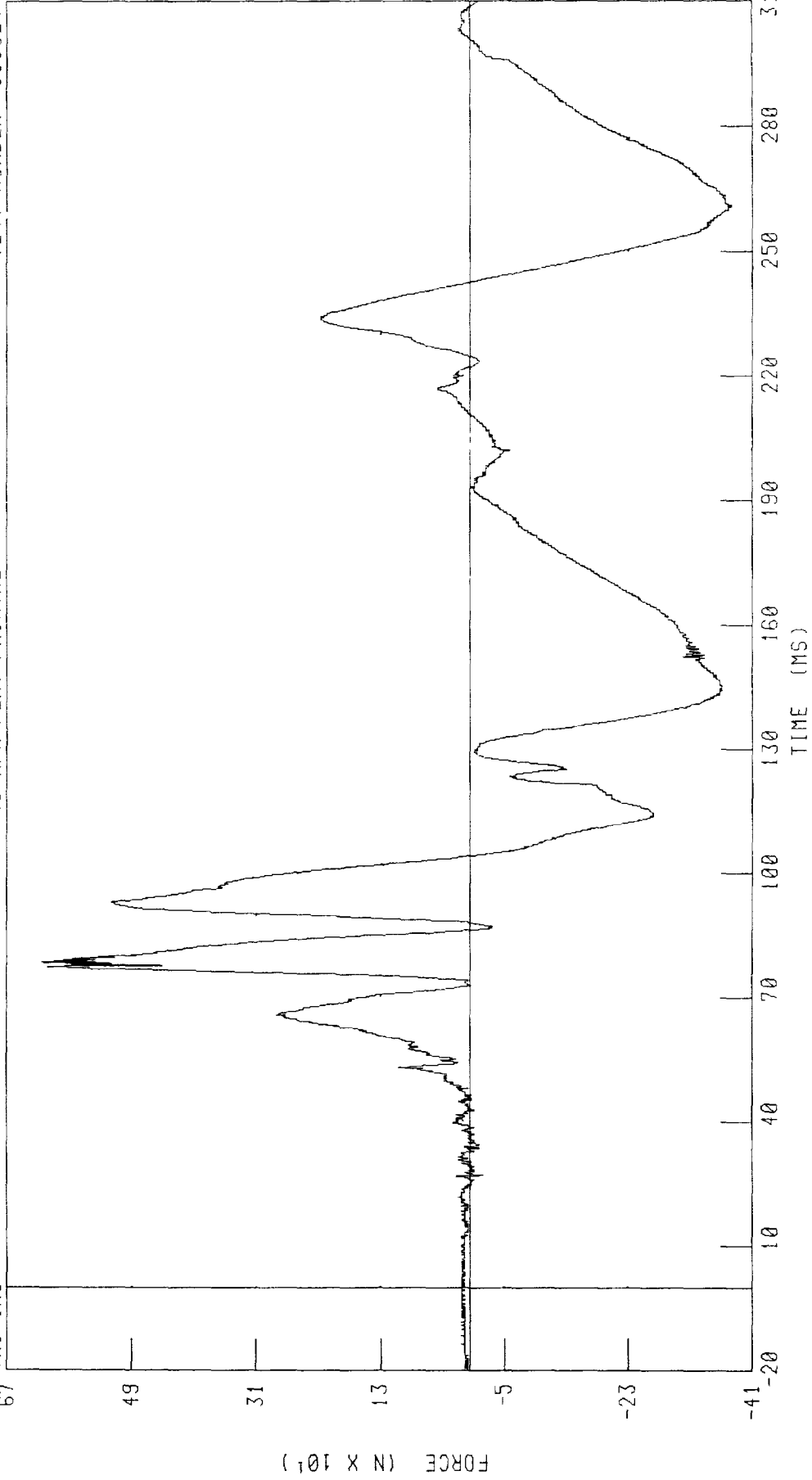
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER HEAD Y-AXIS (TP) ACCELERATION



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER NECK X-AXIS SHEAR FORCE
 48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



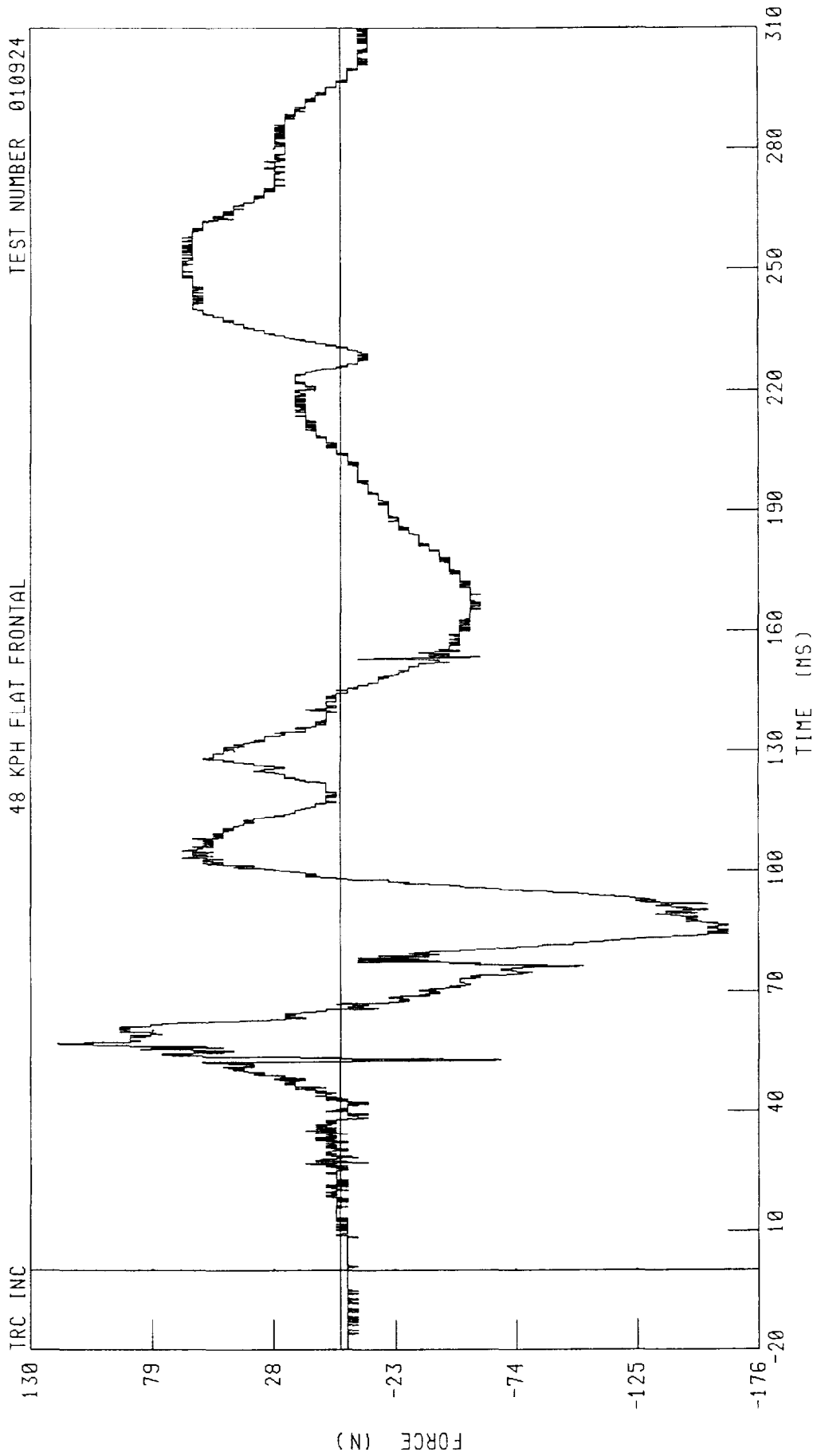
CHANNEL NEKXF1 FILTER CH CLASS 1000 PEAK DATA 619 84 N @ 78 40 MS, -379 56 N @ 260 64 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER NECK Y-AXIS SHEAR FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL NEKYF1 FILTER CH CLASS 1000

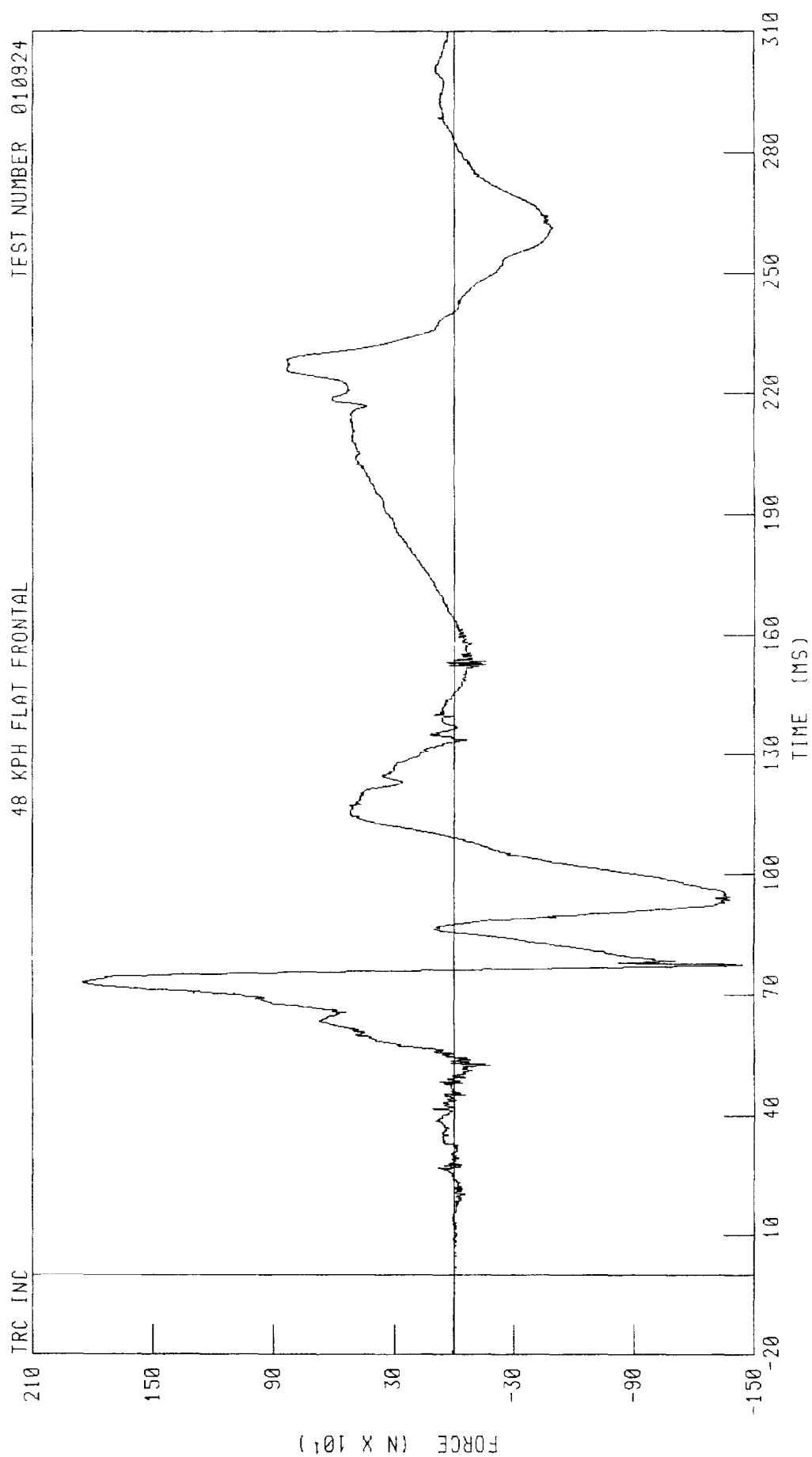
PEAK DATA 118 90 N @ 56 72 MS, -163 38 N @ 84 08 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER NECK Z-AXIS AXIAL FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924



TIME (MS)

PEAK DATA 1853 18 N @ 72 96 MS, -1444 40 N @ 77 36 MS

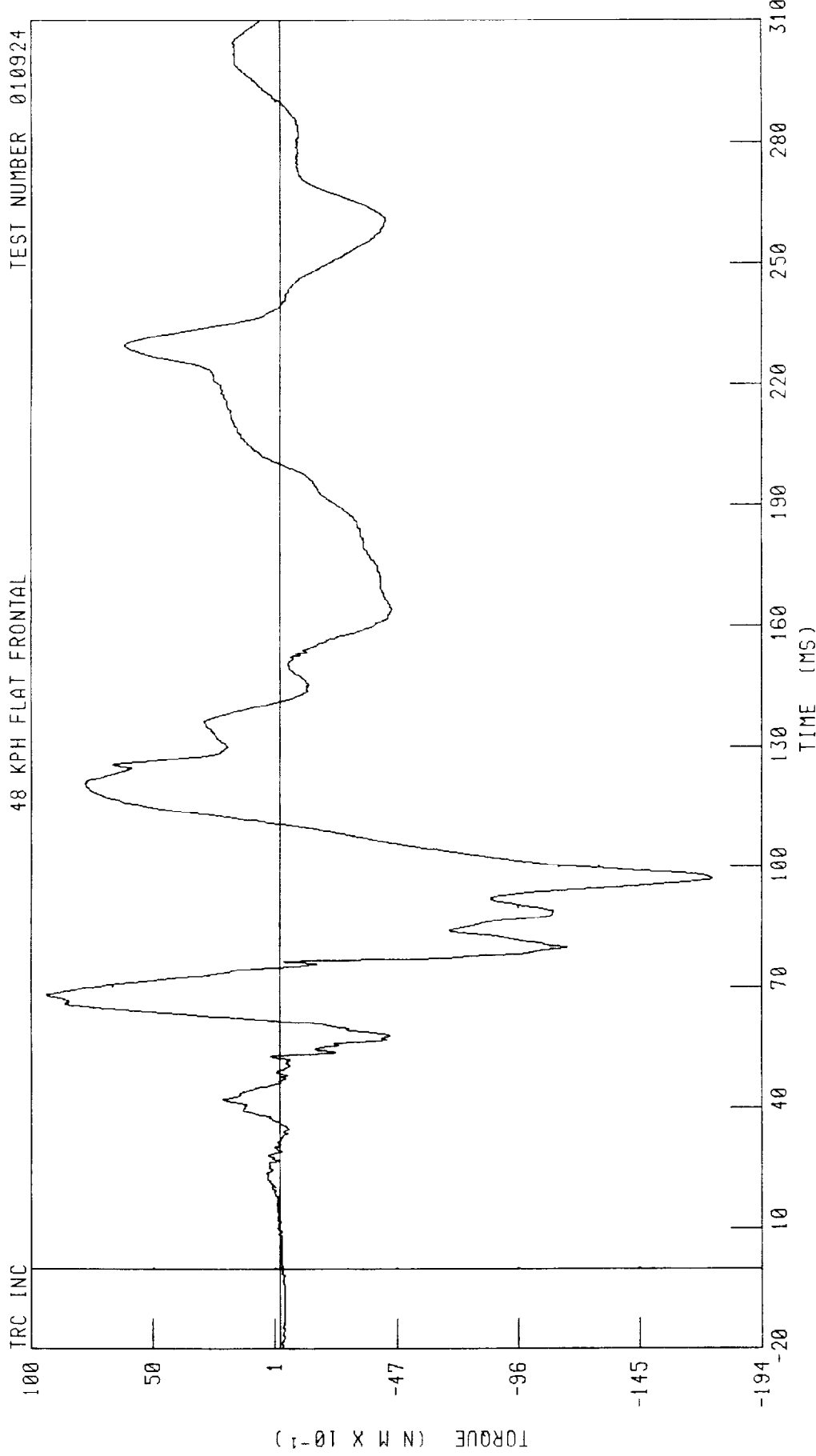
CHANNEL NEKF1 FILTER CH CLASS 1000

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER NECK MOMENT ABOUT X AXIS

48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL NEKX1M1 FILTER CH CLASS 600

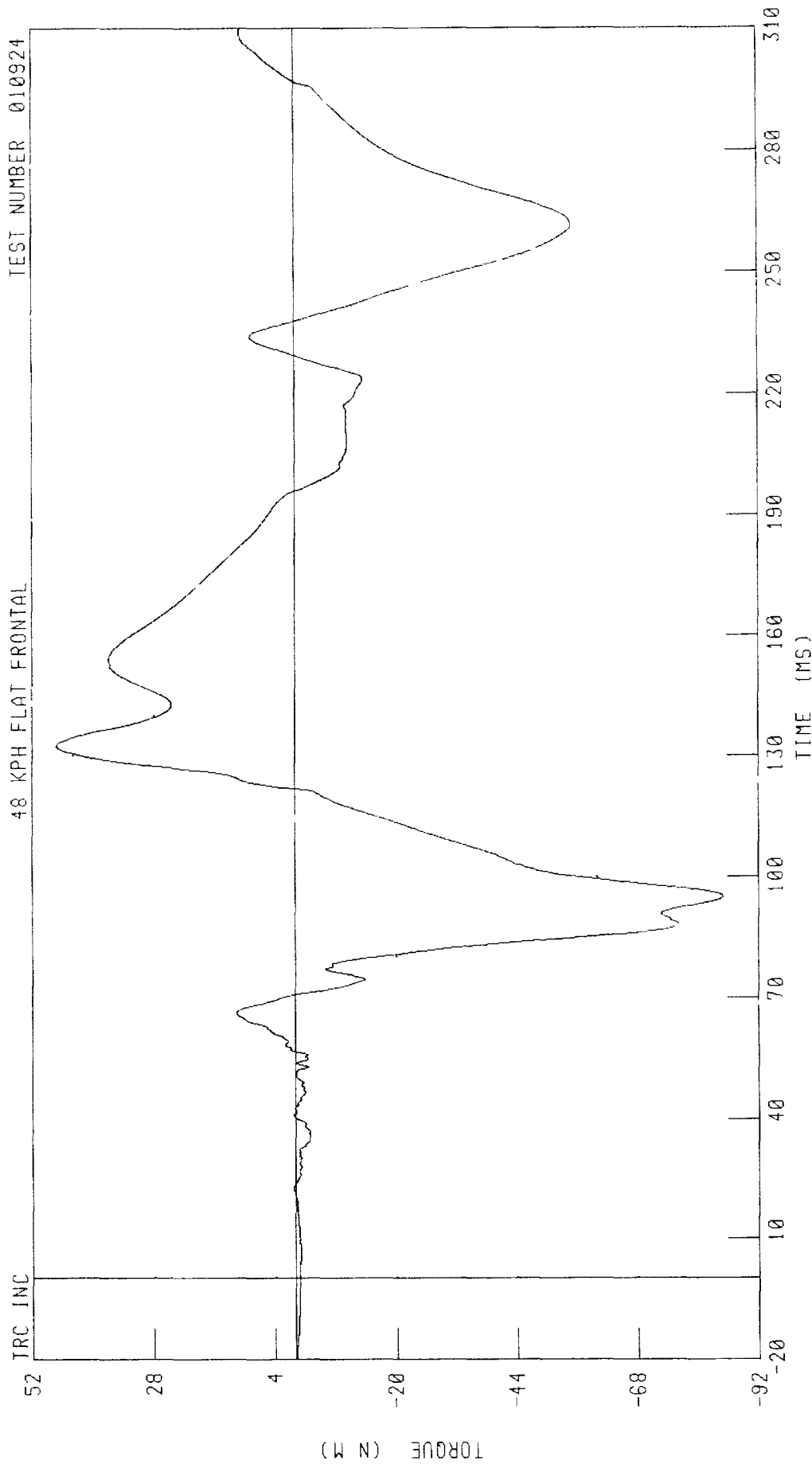
PEAK DATA 9 41 N M 0 68 08 MS, -17 42 N M 0 97 12 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER NECK MOMENT ABOUT Y AXIS

48 KPH FLAT FRONTAL

TEST NUMBER 010924



TIME (MS)

PEAK DATA 47 28 N M 0 132 48 MS, -35 02 N M 0 95 12 MS

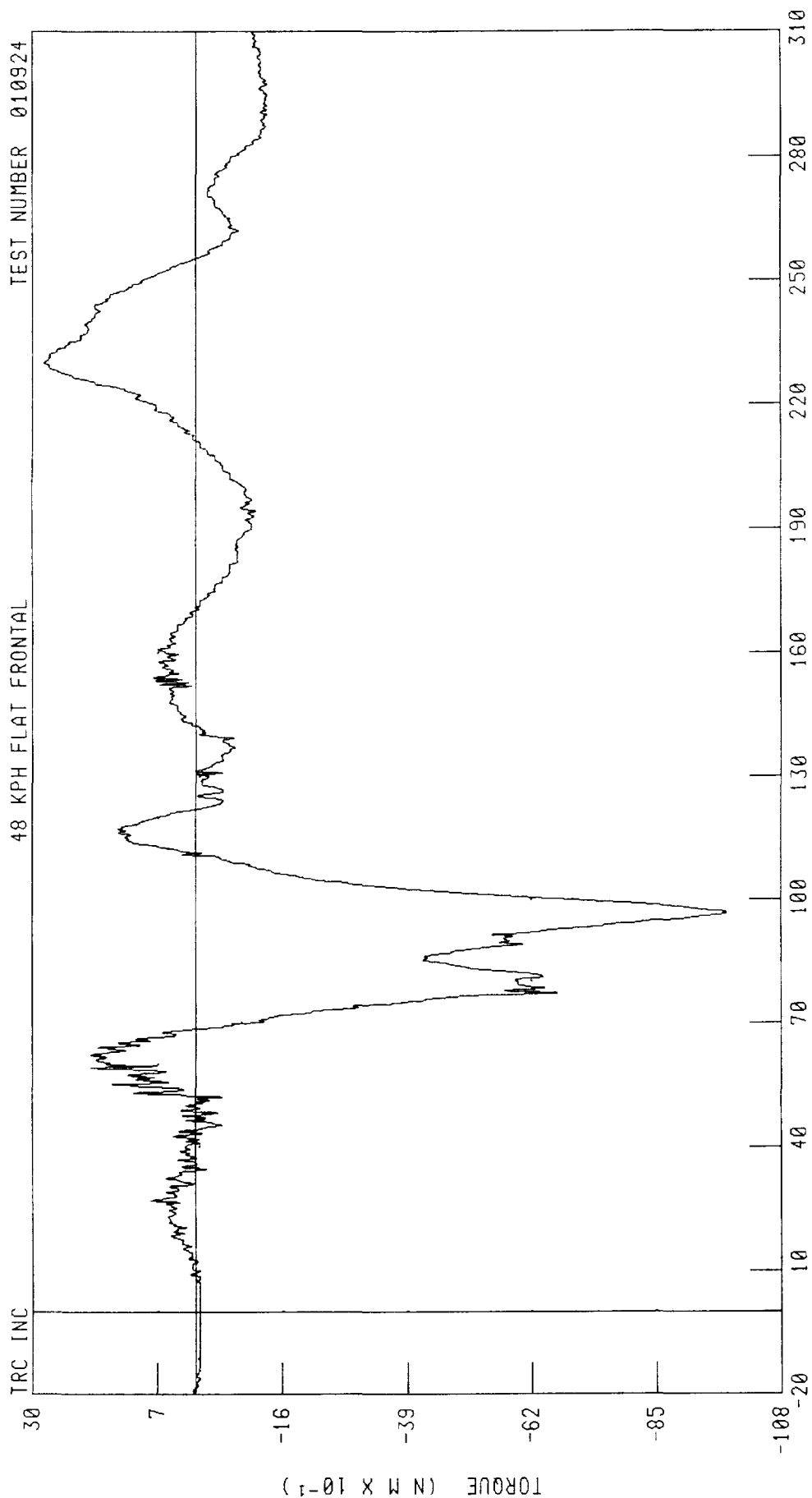
CHANNEL NEKY11 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER NECK MOMENT ABOUT Z AXIS

48 KPH FLAT FRONTAL

TEST NUMBER 010924

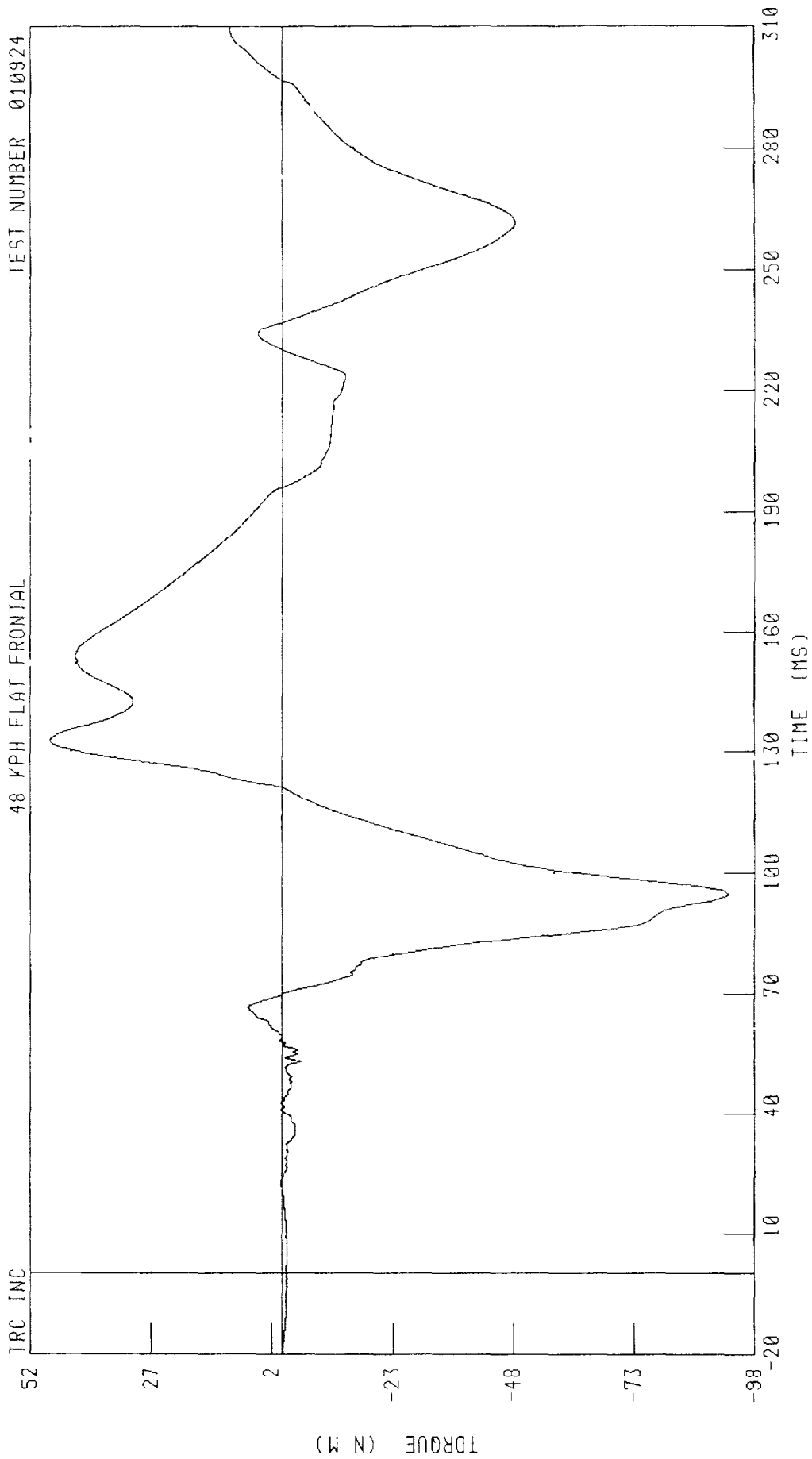


TIME (MS)

PEAK DATA 2 79 N M @ 230 00 MS, -9 79 N M @ 96 96 MS

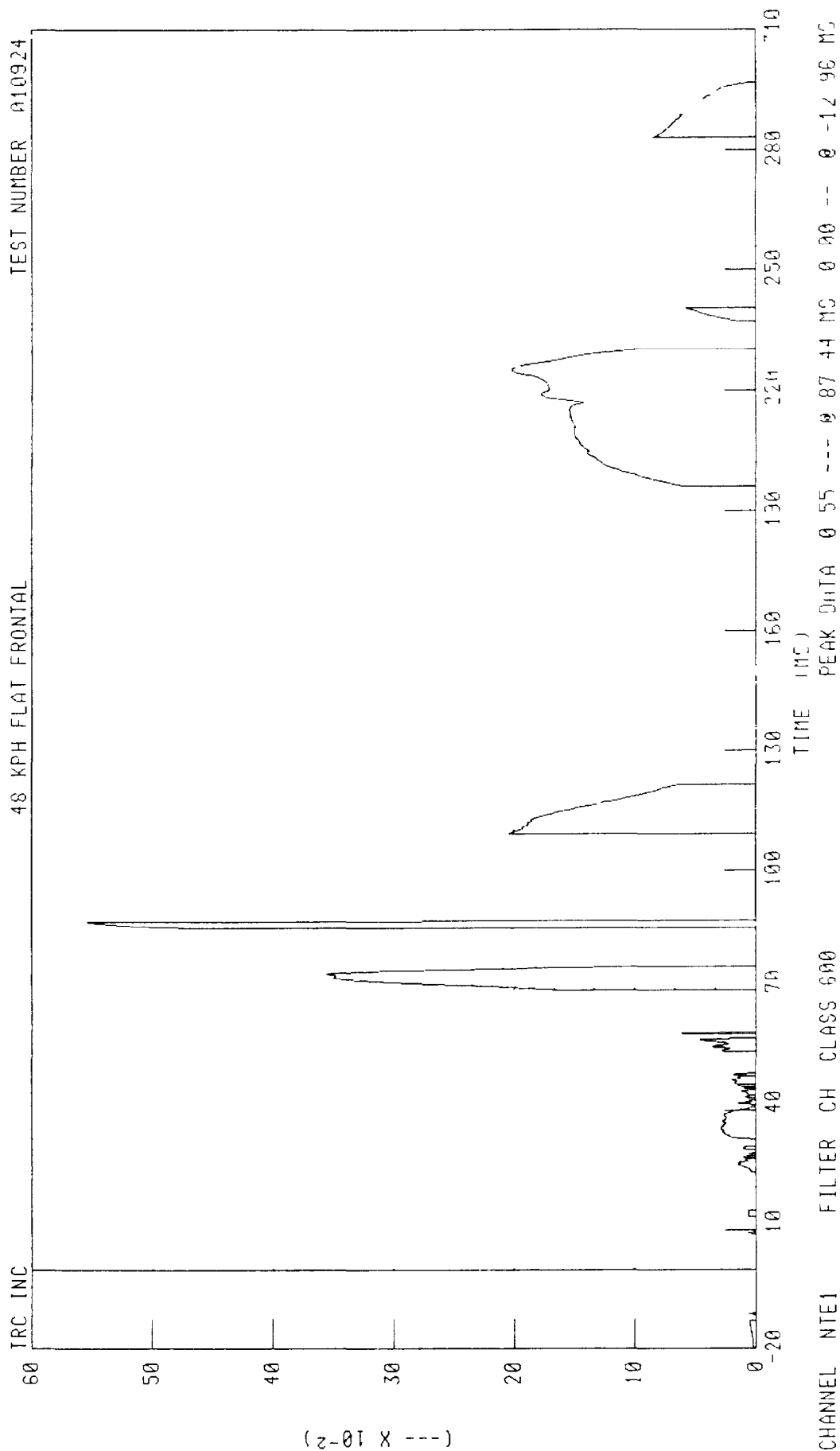
CHANNEL NEKZM1 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER NECK OCCIPITAL CONDYLE MOMENT ABOUT Y AXIS



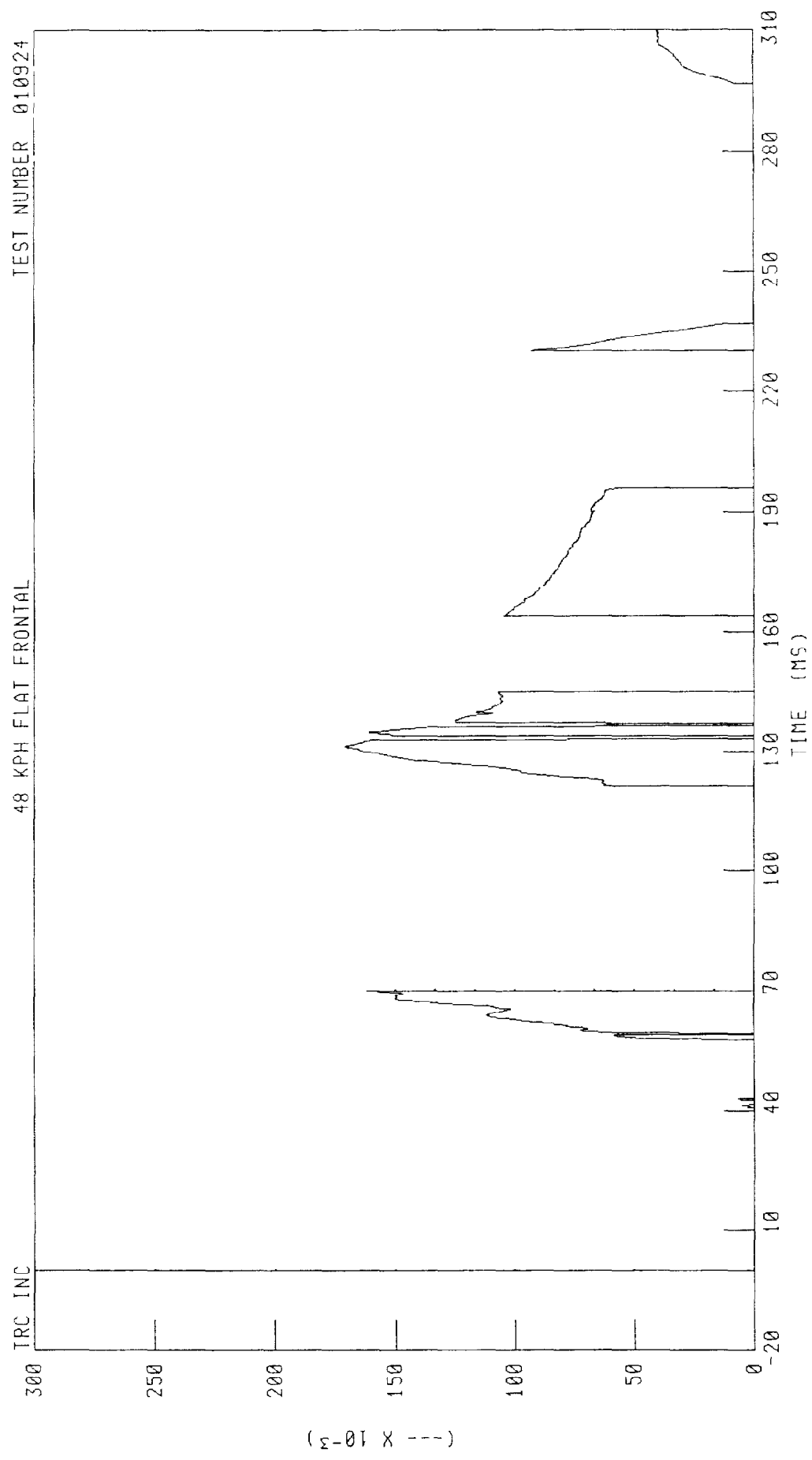
CHANNEL NEKOM1 FILTER CH CLASS 600 PEAK DATA 47 97 N M @ 132 80 MS, -92 59 N M @ 95 04 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER NECK TENSION EXTENSION



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER NECK TENSION/FLEXION
 48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL NTF1 FILTER CH CLASS 600 PEAK DATA 0 17 --- 0 131 44 MS, 0 00 --- 0 -20 00 MS

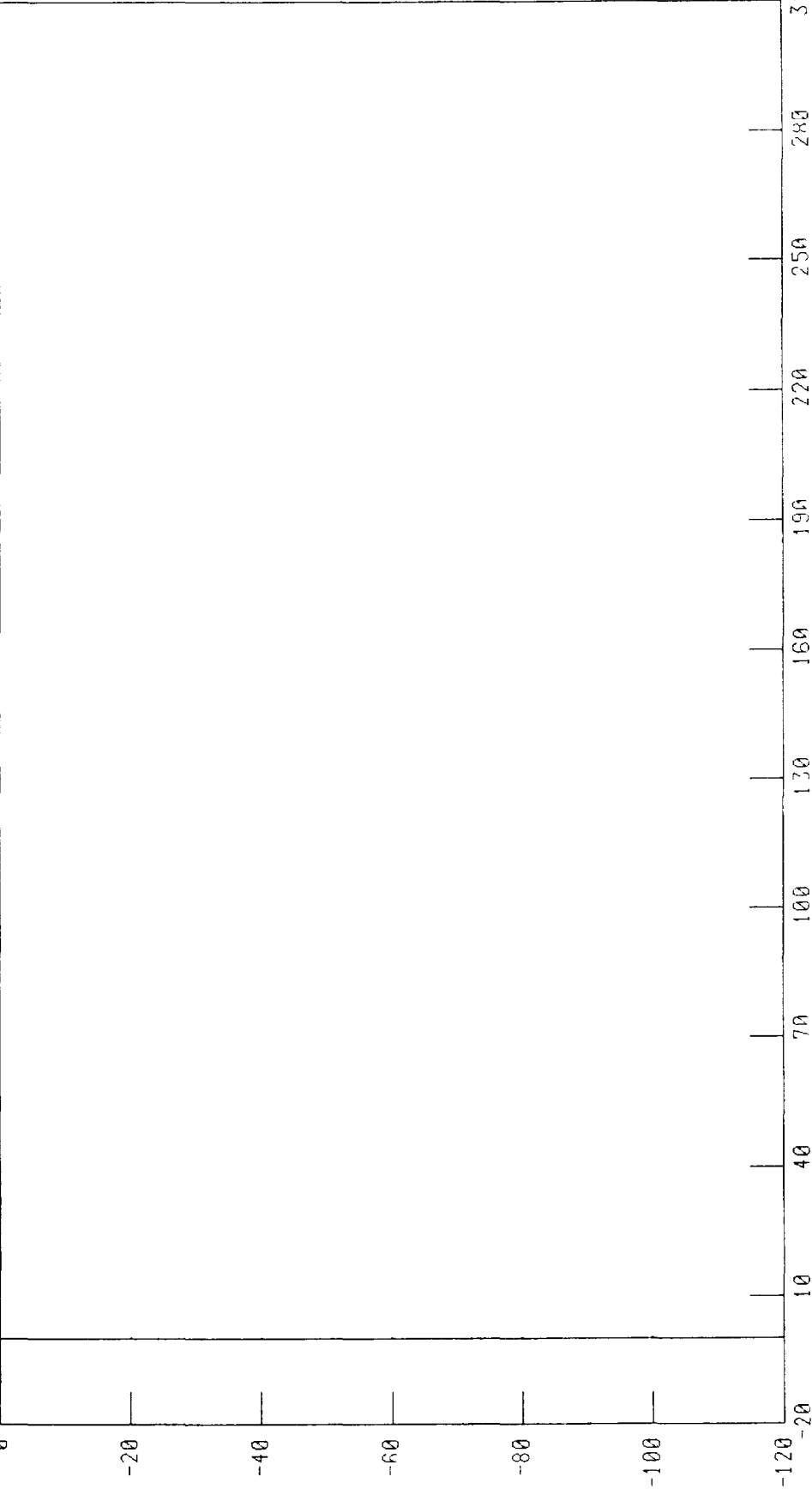
(--- X 10⁻³)

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER NECK COMPRESSION EXTENSION

48 KPH FLAT FRONTAL TEST NUMBER 010924

TRC INC



TIME (MS)

CHANNEL NCE1

FILTER CH CLASS 600

PEAK DATA 0 91 --- 0 95 12 MS, 0 00 --- 0 -20 00 MS

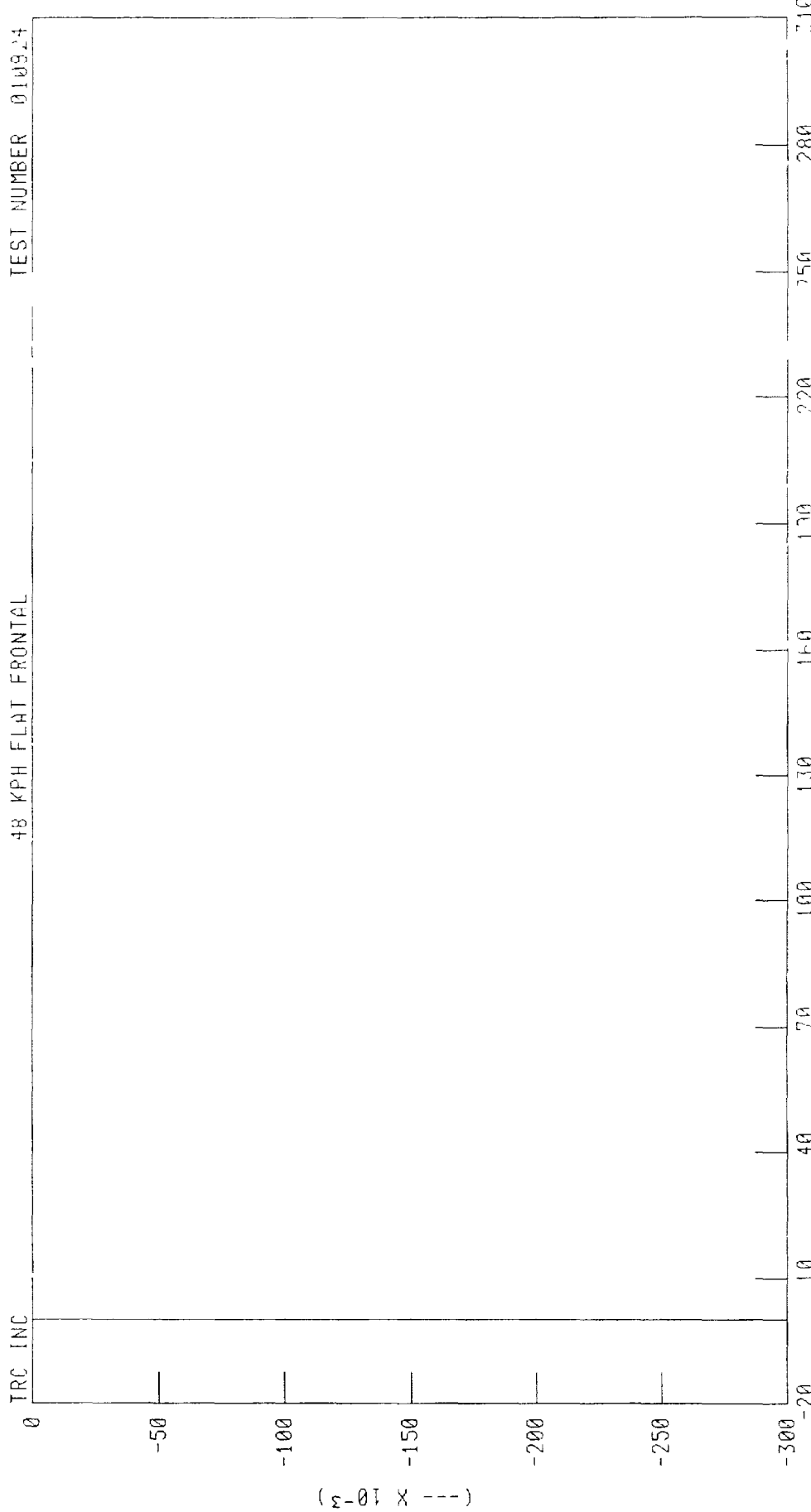
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER NECK COMPRESSION/FLEXION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



TIME (ms)

PEAK DATA 0 10 --- 0 137 14 0 00 --- 0 -20 00 119

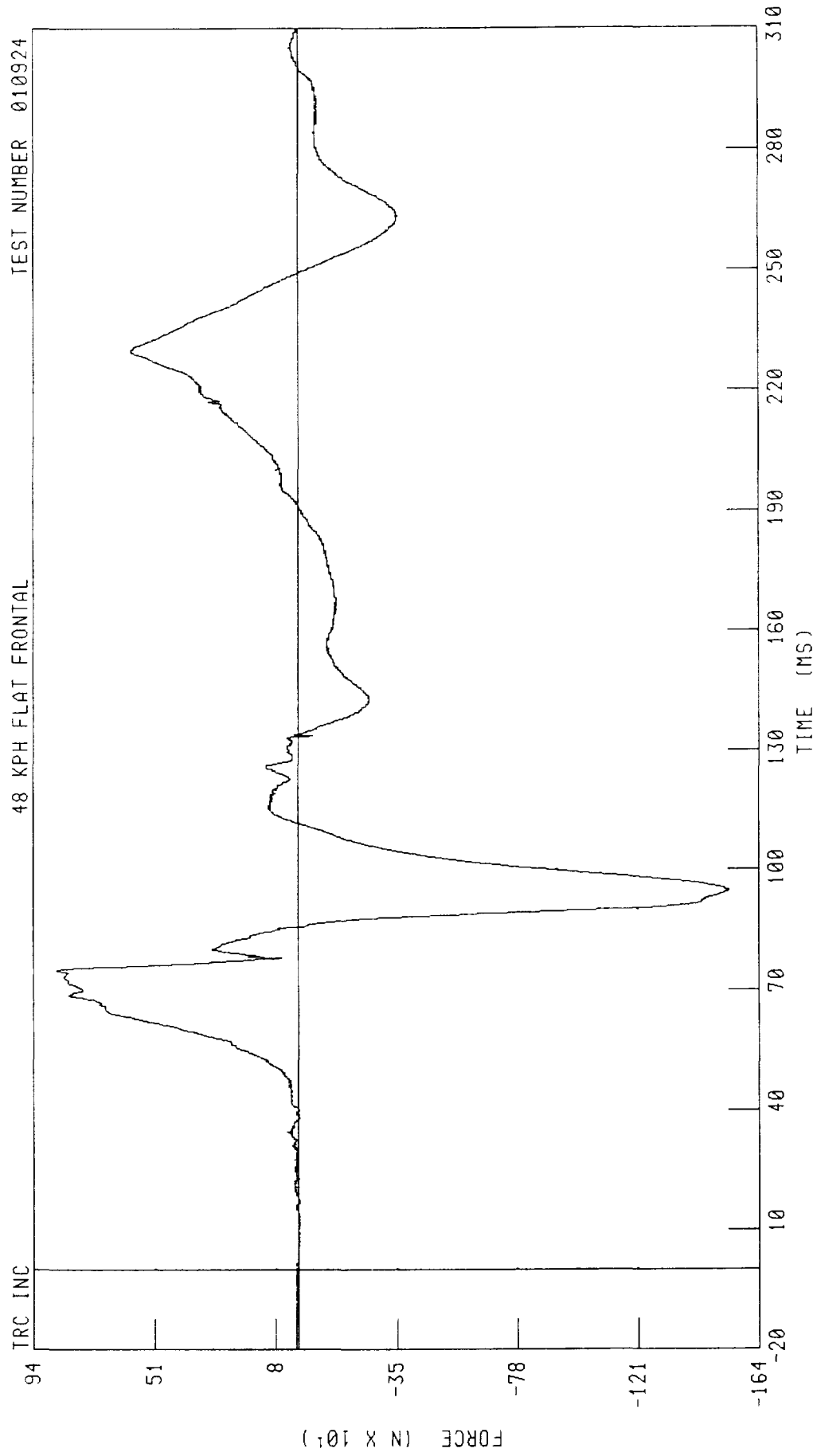
CHANNEL NCF1 FILTER CH CLASS 400

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER NECK LOWER X-AXIS SHEAR FORCE

48 KPH FLAT FRONTAL

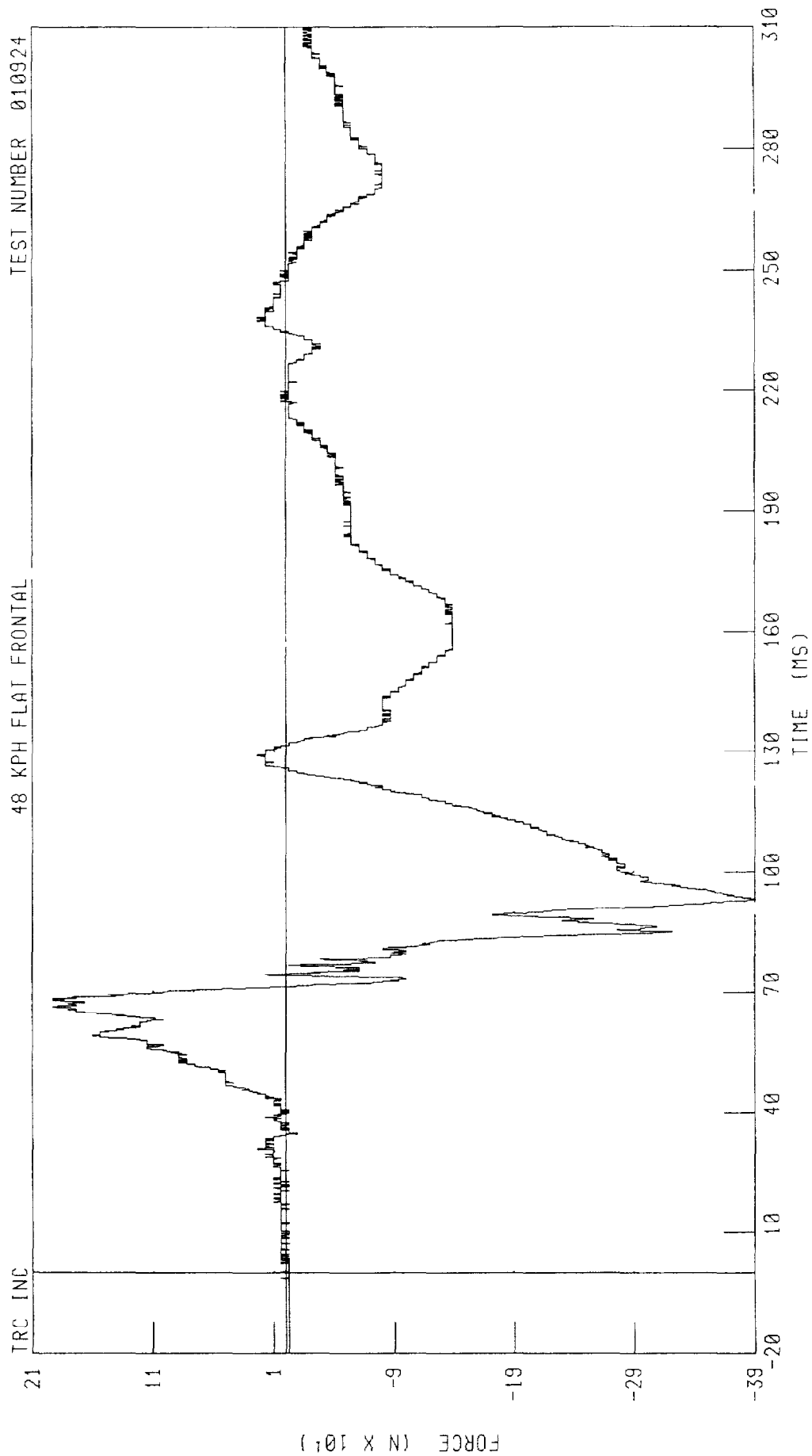
TEST NUMBER 010924



CHANNEL NKLXF1 FILTER CH CLASS 1000

PEAK DATA 856 09 N @ 74 72 MS, -1534 77 N @ 94 72 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER NECK LOWER Y-AXIS SHEAR FORCE



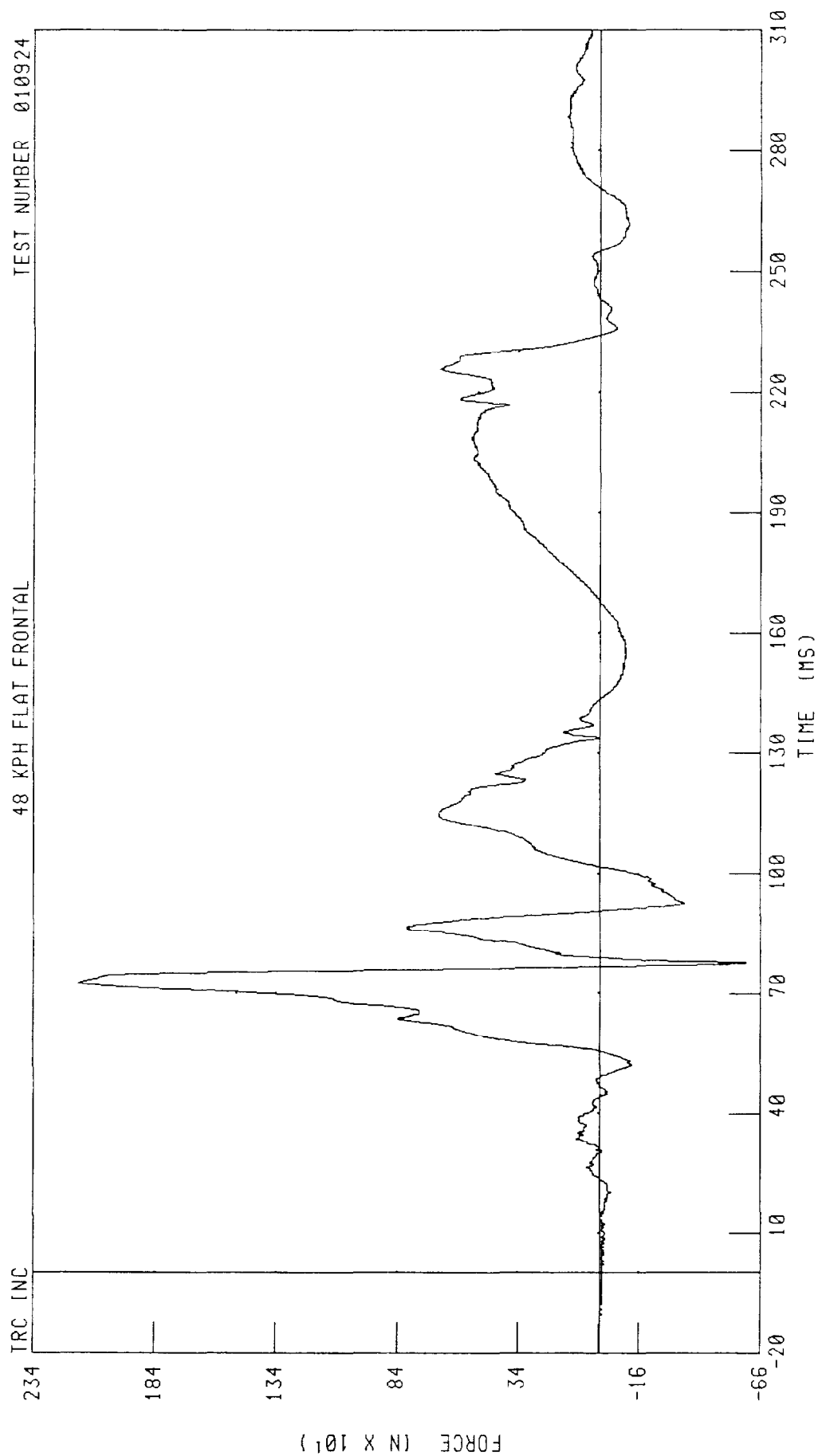
CHANNEL NKLYF1 FILTER CH CLASS 1000 PEAK DATA 193 20 N 0 66 24 MS, -393 12 N 0 93 28 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER NECK LOWER Z-AXIS AXIAL FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924



TIME (MS)

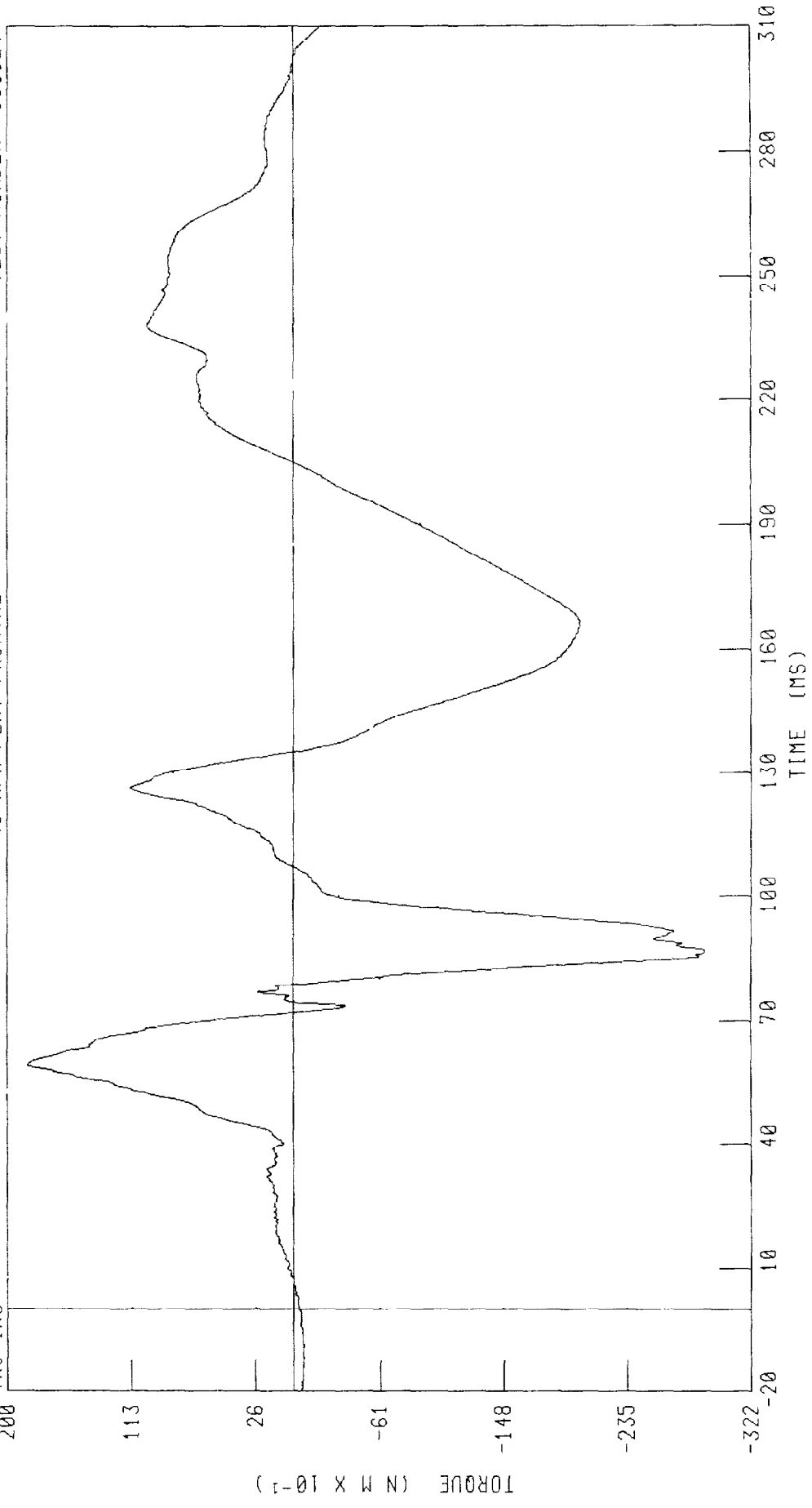
CHANNEL NKLZF1 FILTER CH CLASS 1000

PEAK DATA 2154 44 N @ 72 56 MS, -601 25 N @ 77 60 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER NECK LOWER MOMENT ABOUT X AXIS
48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



PEAK DATA 18 59 N M @ 59 04 MS, -28 97 N M @ 86 48 MS

CHANNEL NKLXM1 FILTER CH CLASS 600

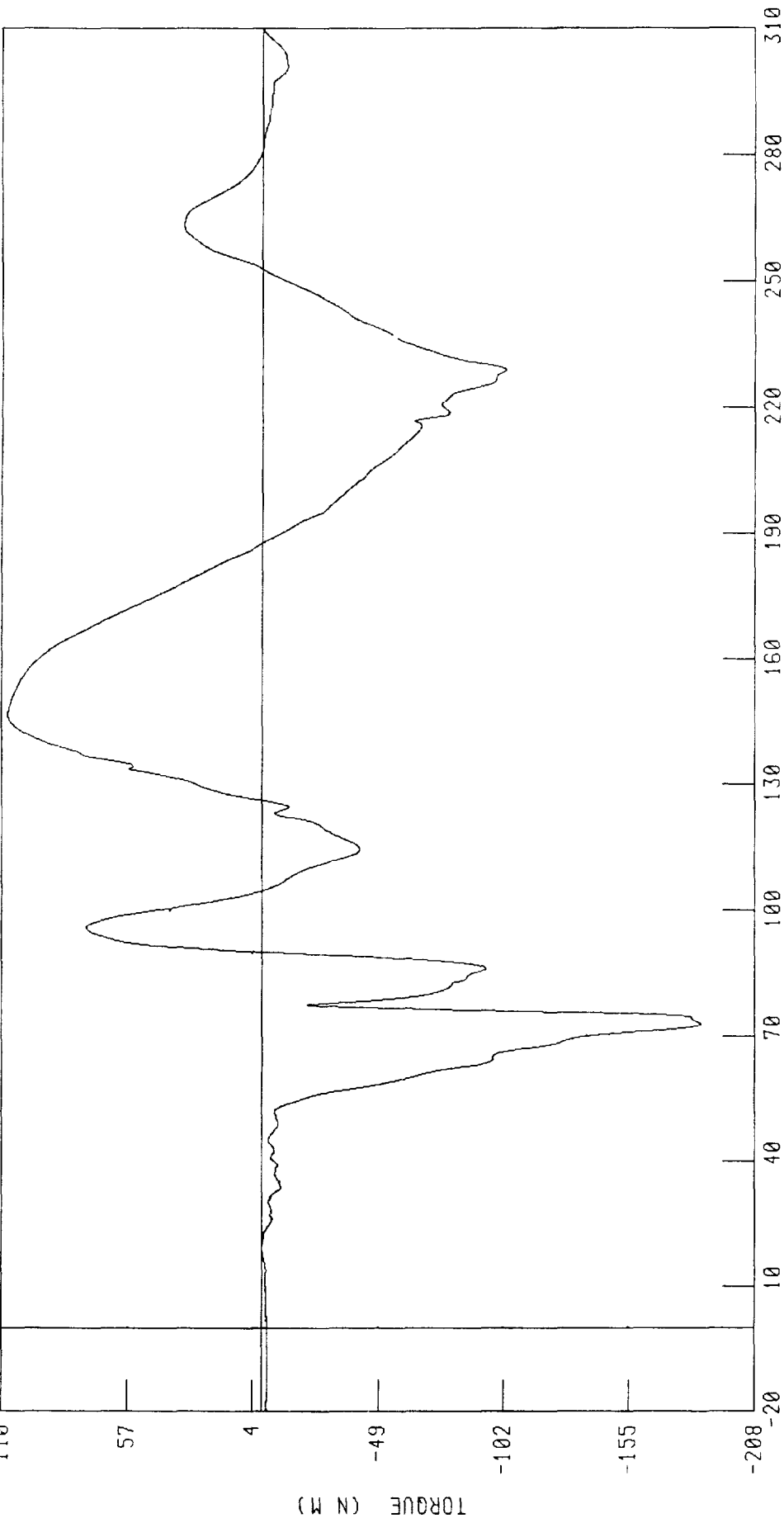
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER NECK LOWER MOMENT ABOUT Y AXIS

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC

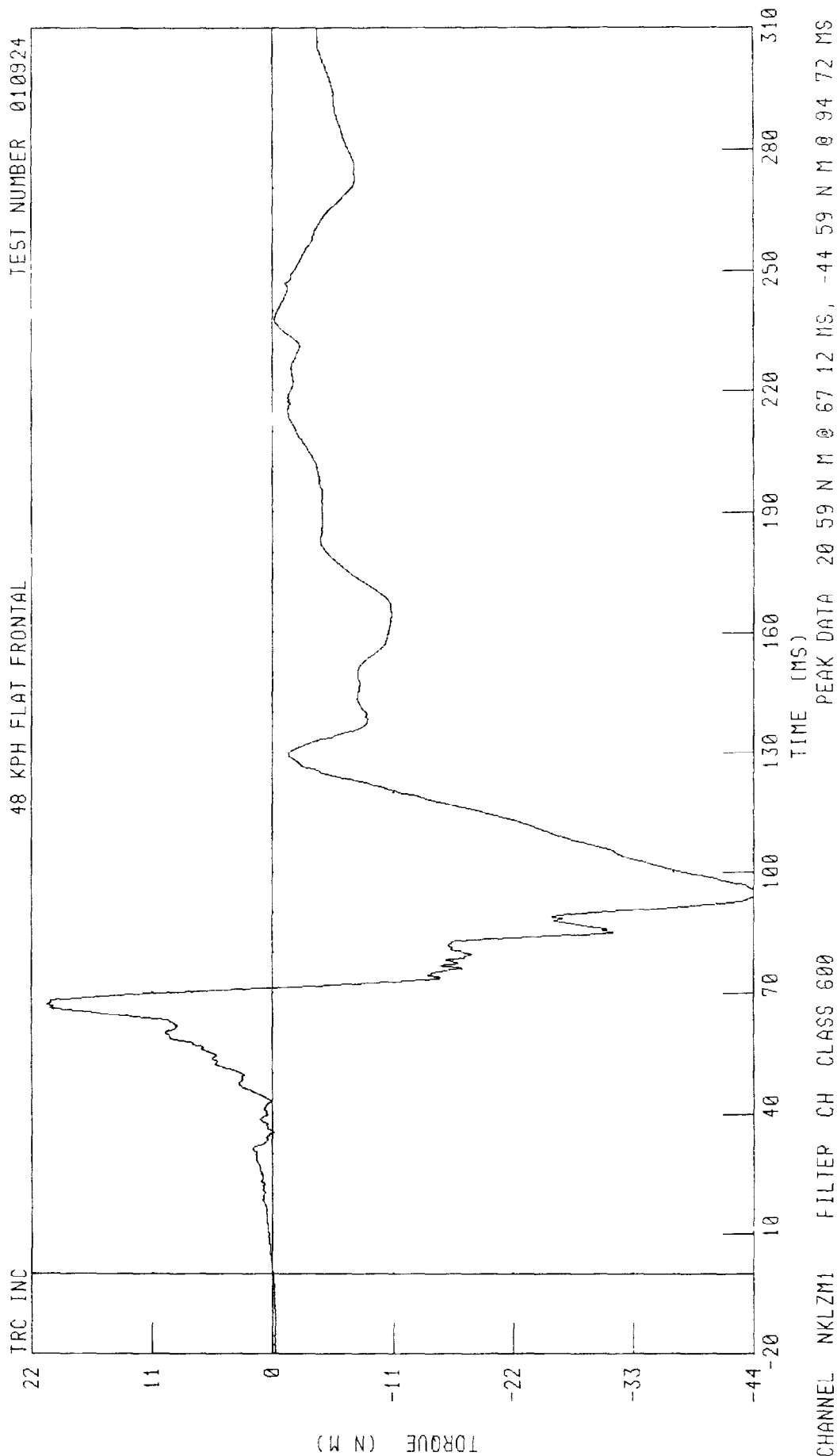


TIME (MS)

PEAK DATA 107 35 N M @ 147 04 MS, -185 45 N M @ 72 88 MS

CHANNEL NKLYM1 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER NECK LOWER MOMENT ABOUT Z AXIS
48 KPH FLAT FRONTAL

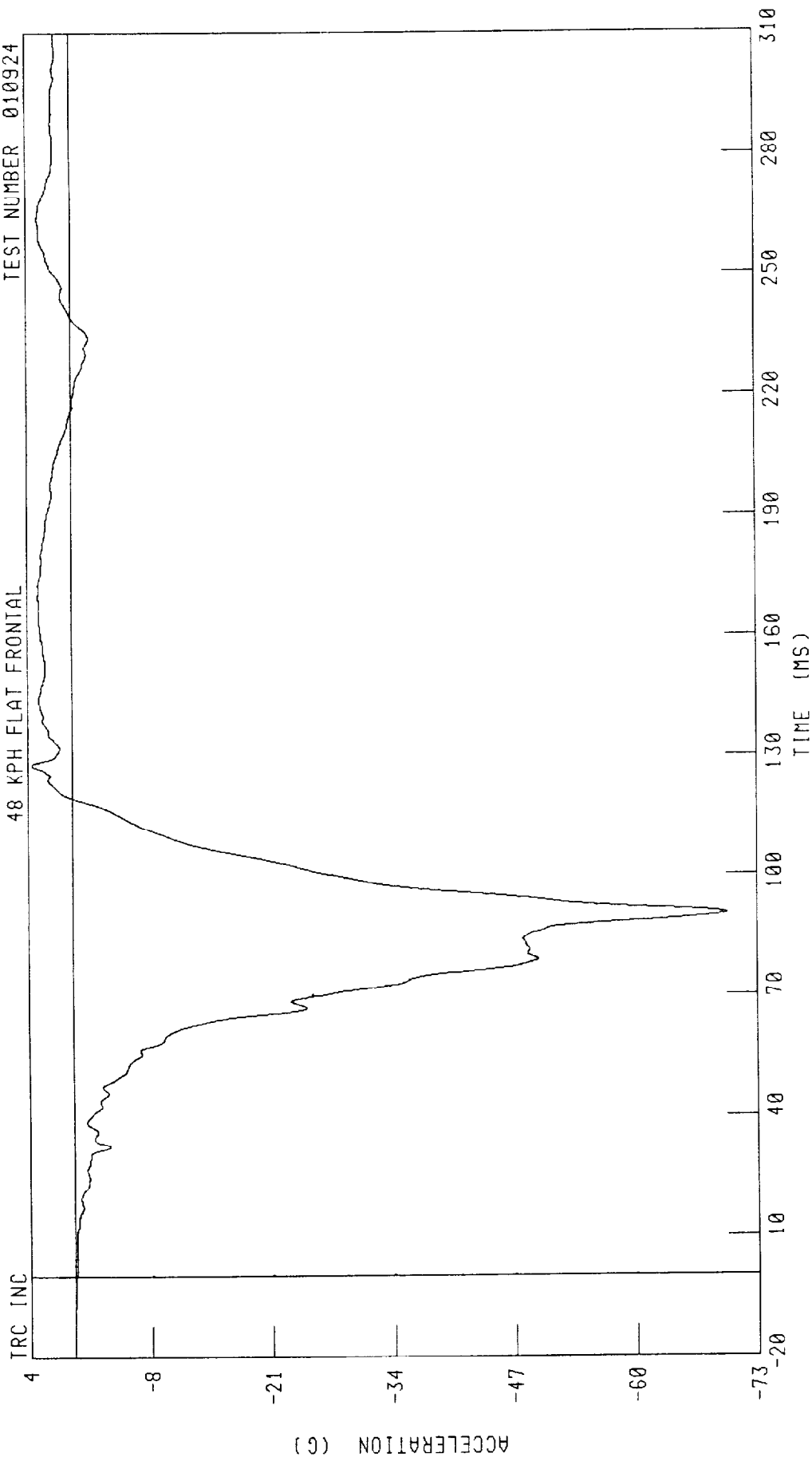


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER CHEST X-AXIS ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL CSTXG1 FILTER CH CLASS 180

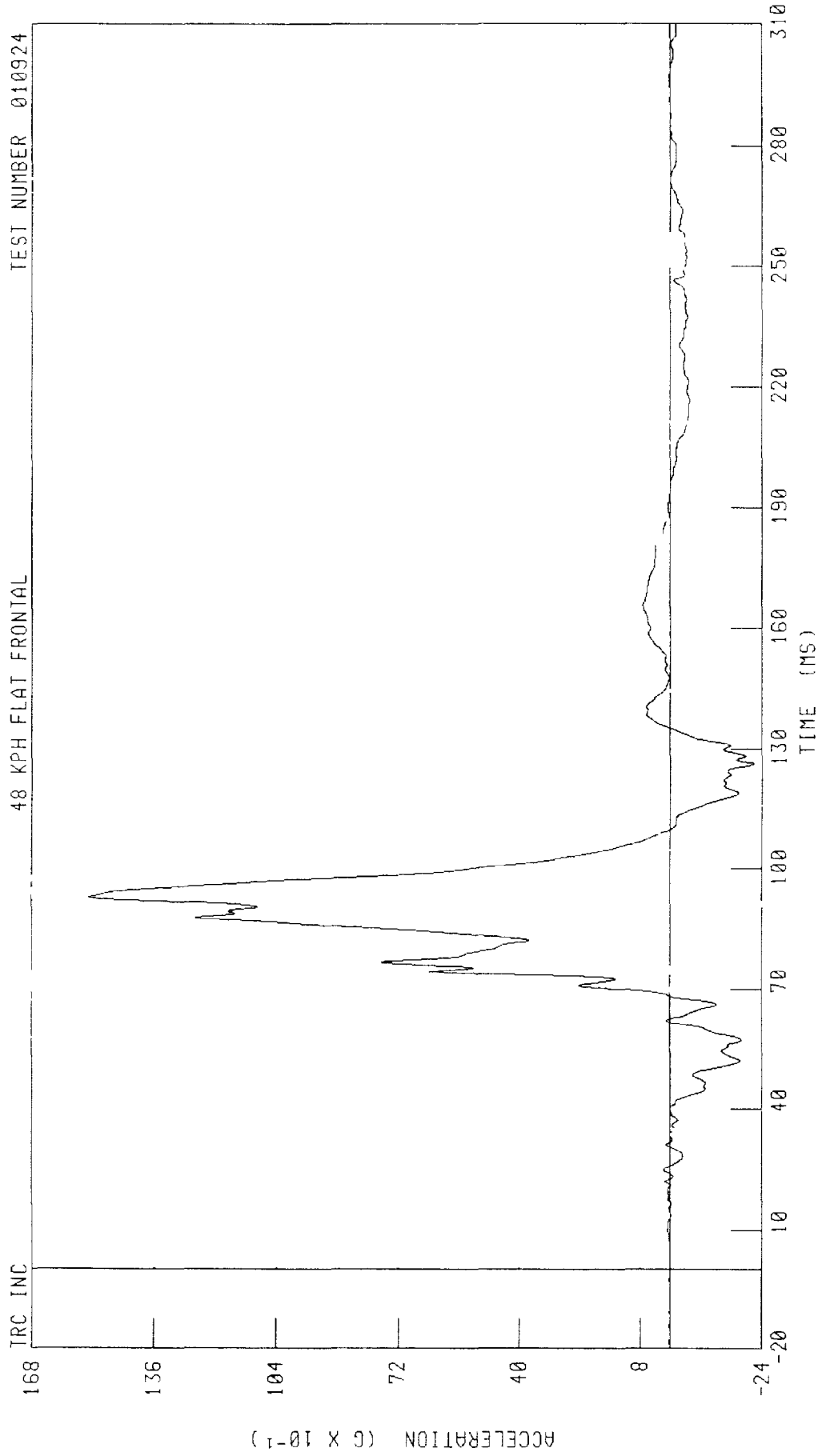
PEAK DATA 4 34 G @ 128 16 MS, -70 09 G @ 90 48 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER CHEST Y-AXIS ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924



PEAK DATA 15 32 0 92 36 MS, -2 18 0 126 24 MS

CHANNEL CSTYG1 FILTER CH CLASS 180

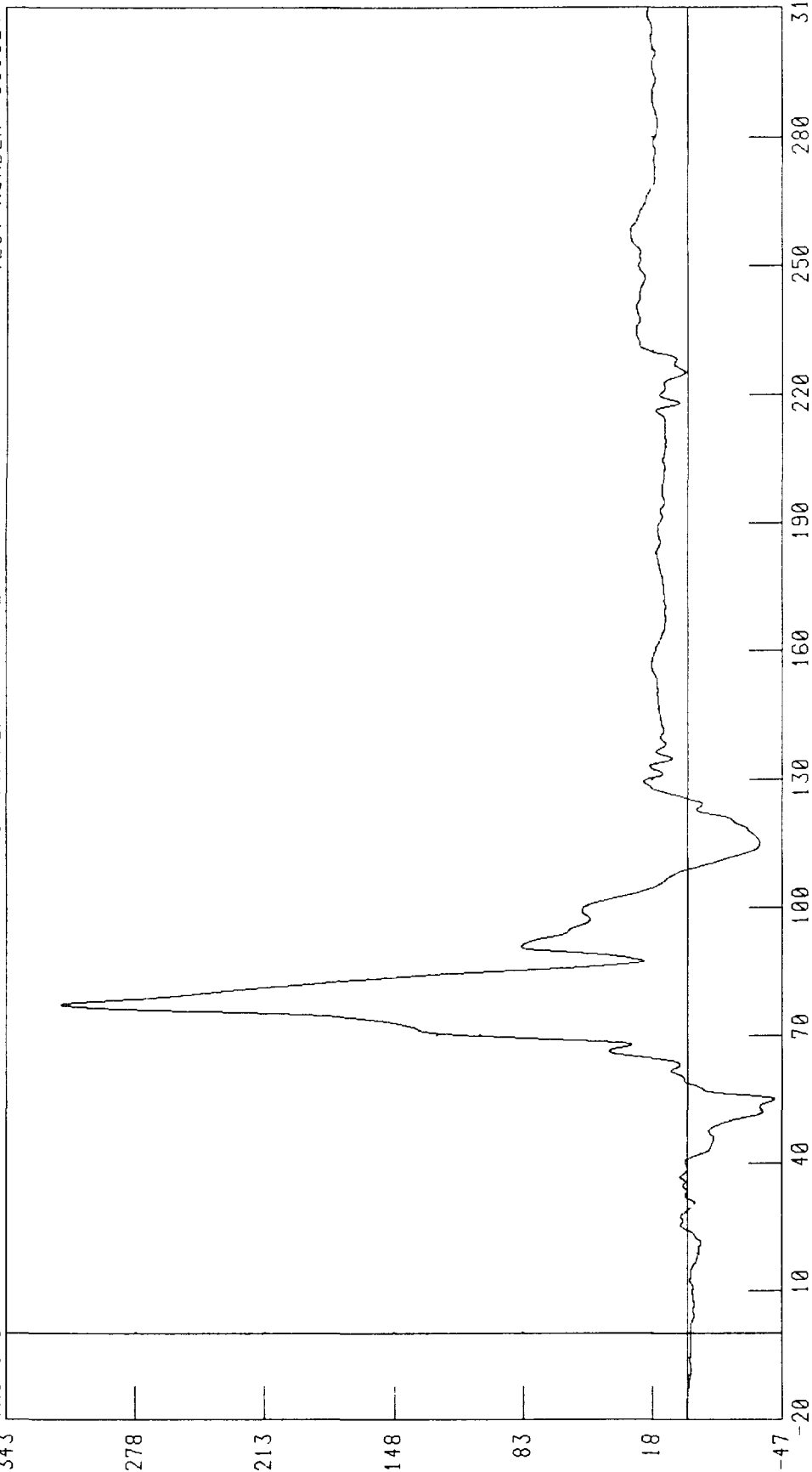
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER CHEST Z-AXIS ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



TIME (MS)

CHANNEL CSTZG1 FILTER CH CLASS 180

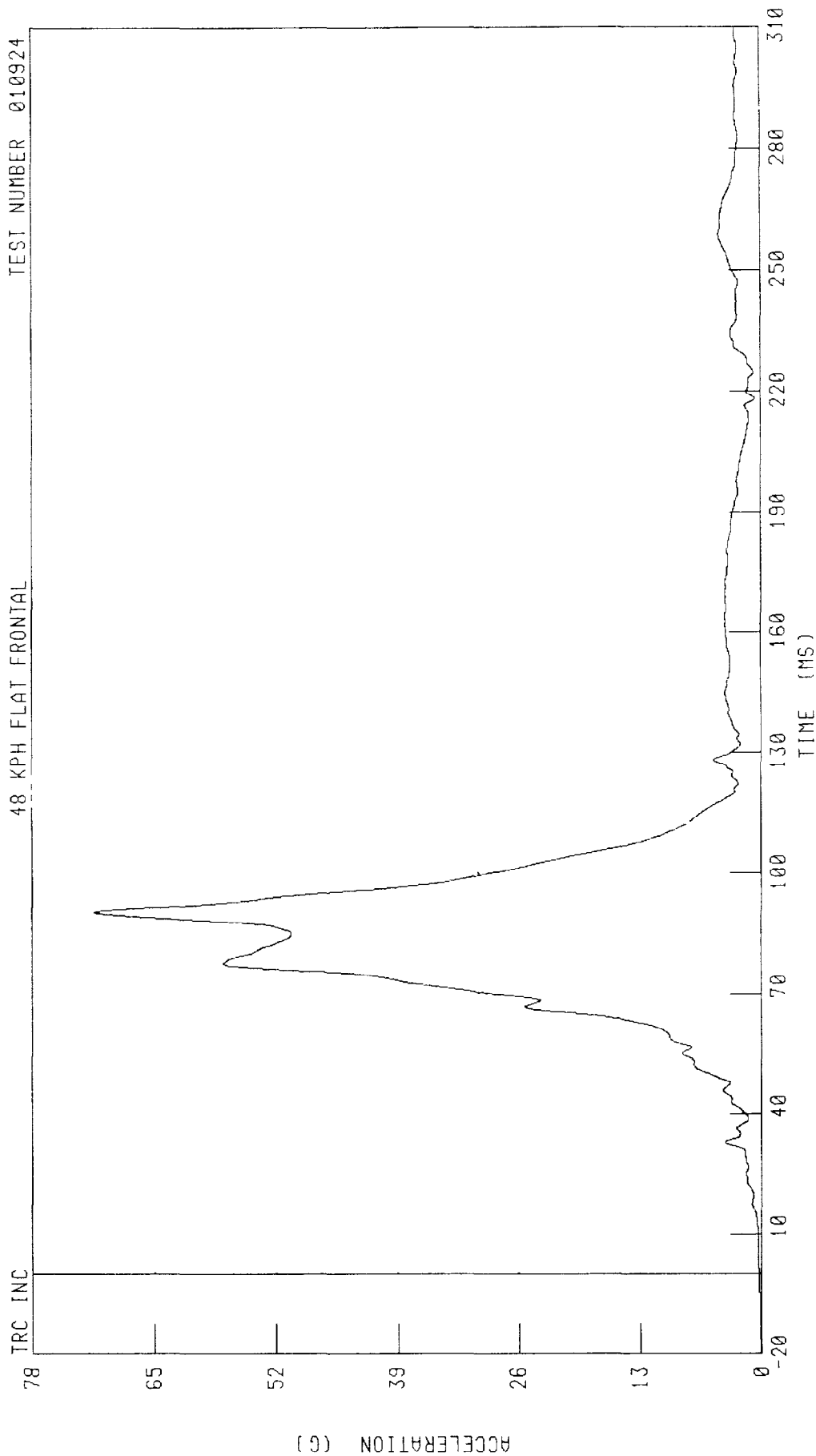
PEAK DATA 31 55 6 0 77 28 MS, -4 33 6 0 54 88 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER CHEST RESULTANT ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924



PEAK DATA 71 38 G @ 90 48 MS, 0 01 G @ -20 00 MS

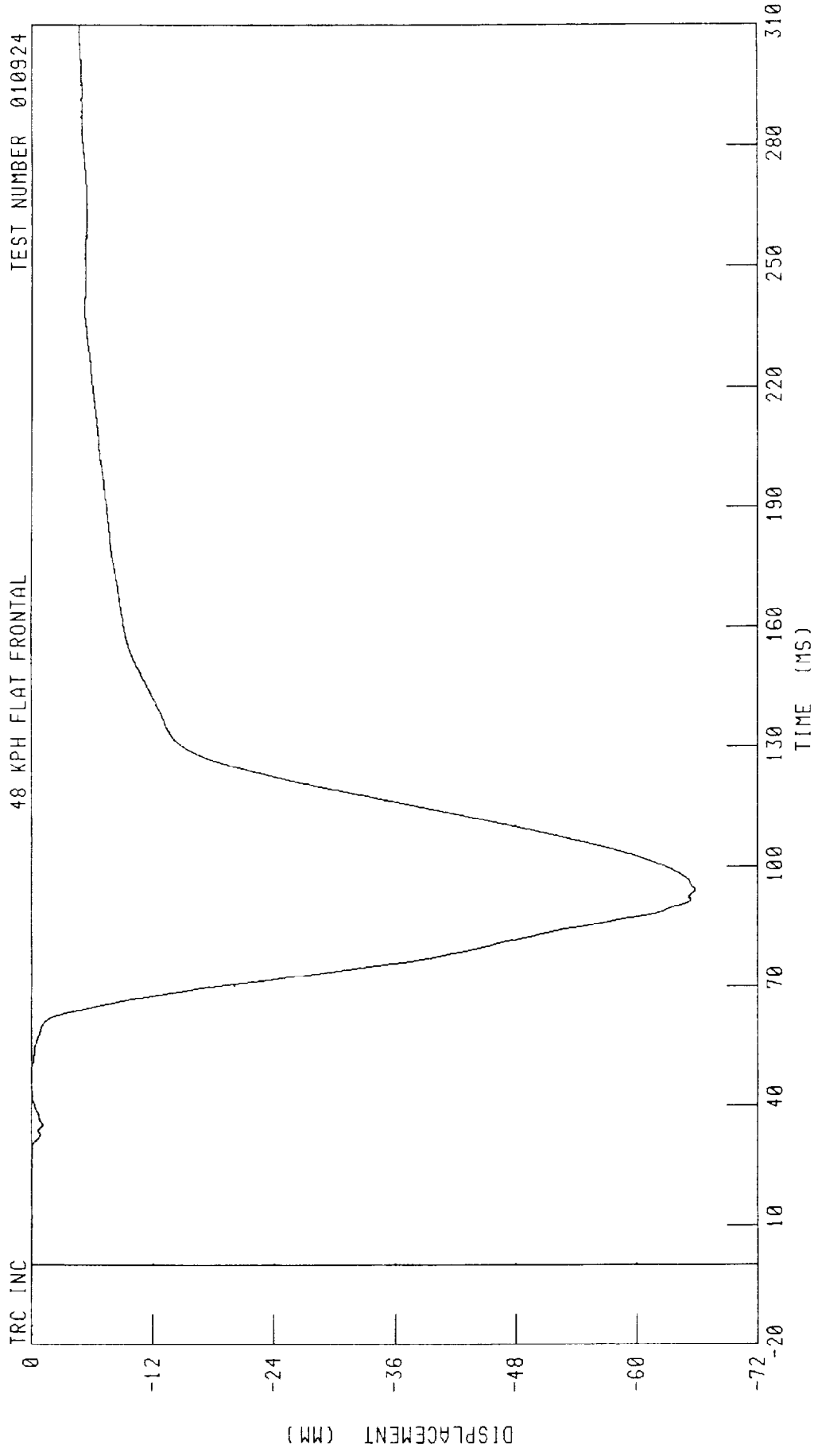
CHANNEL CSTR01 FILTER CH CLASS 130

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER CHEST DEFLECTION

48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL CSTXD1 FILTER CH CLASS 600

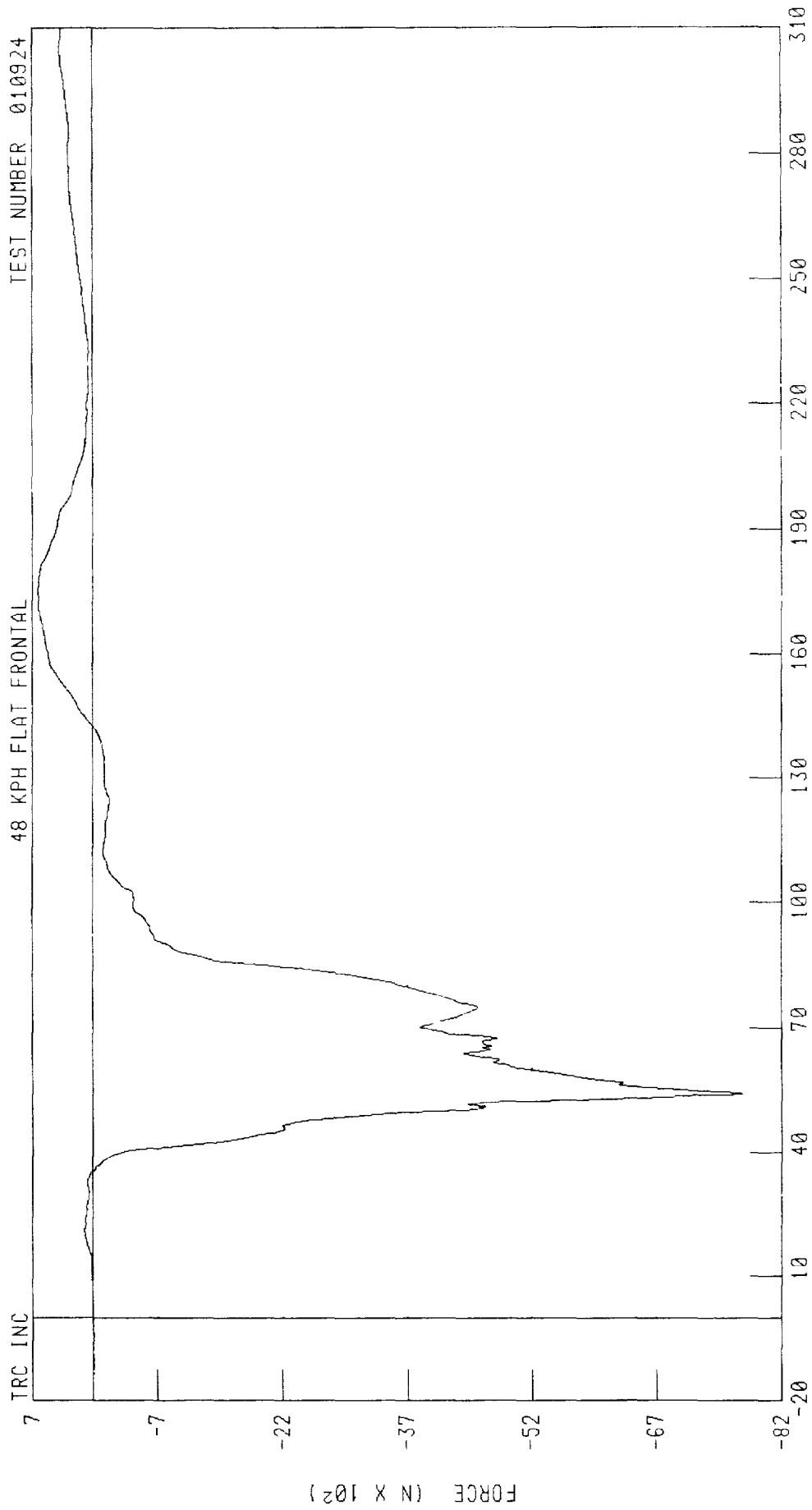
PEAK DATA 0 09 MM @ 47 20 MS, -65 81 MM @ 94 16 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER LEFT FEMUR FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924



TIME (MS)

PEAK DATA 655 19 N @ 175 68 MS, -7812 98 N @ 54 24 MS

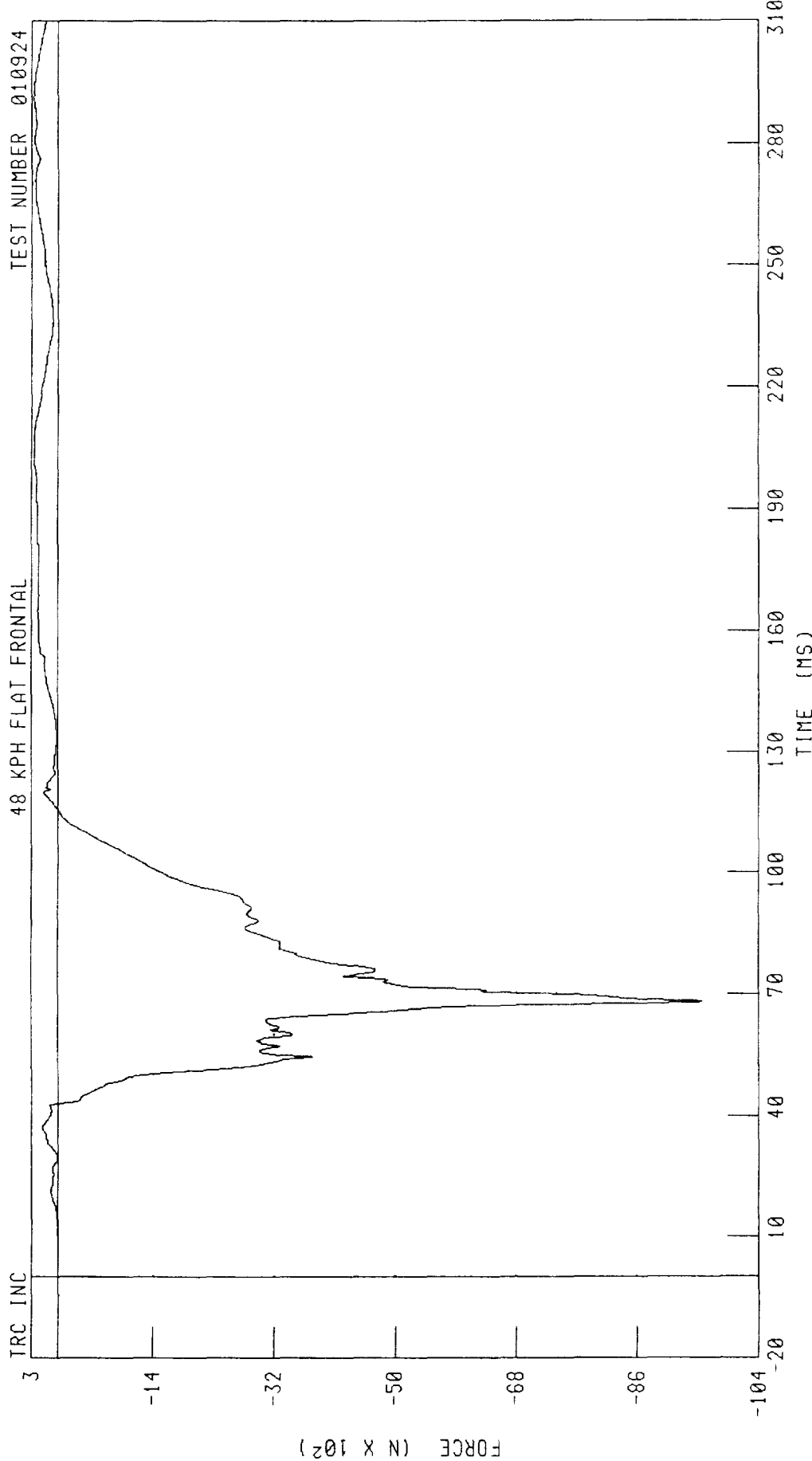
CHANNEL LFMZF1 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER RIGHT FEMUR FORCE

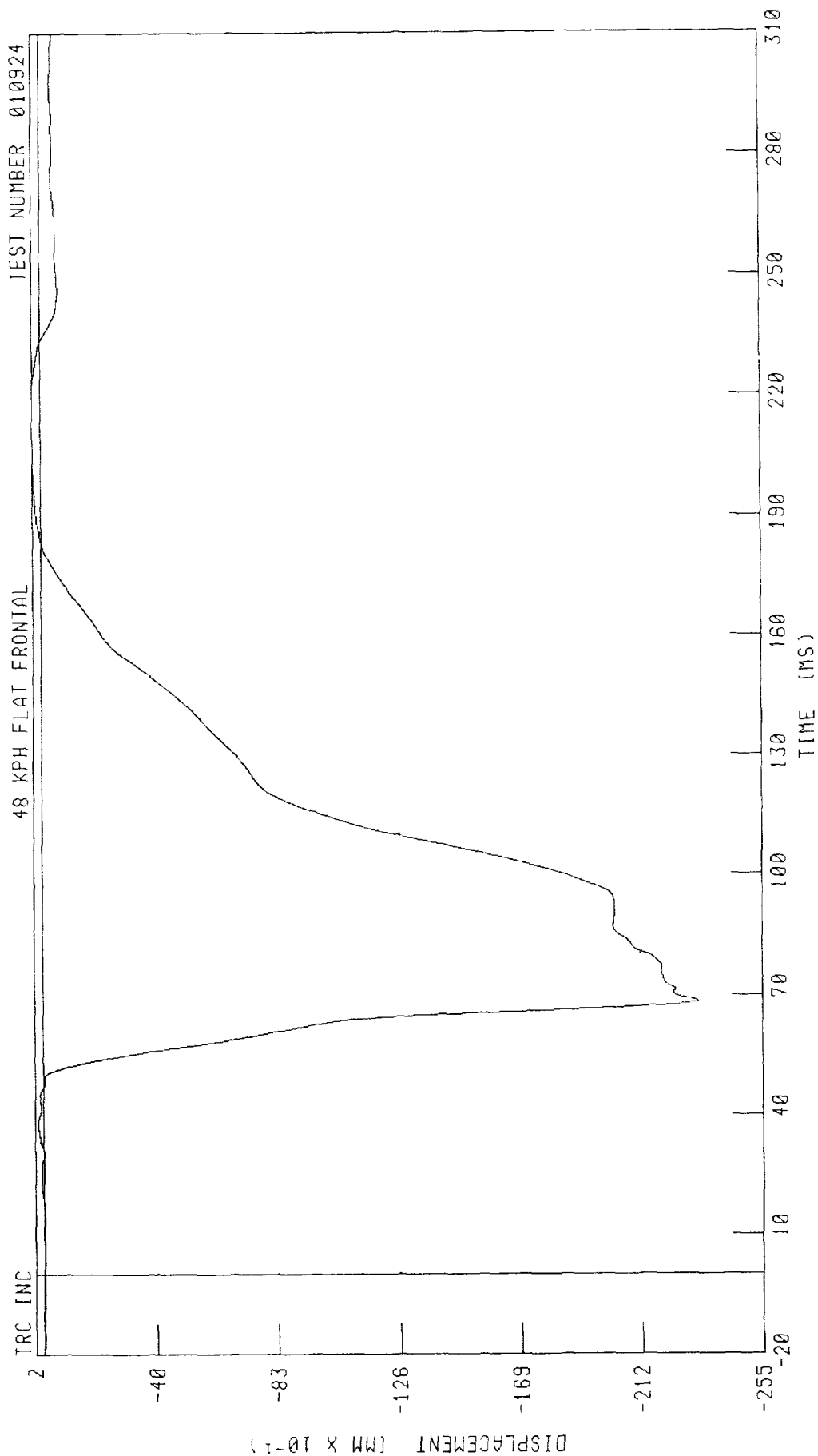
48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL RFMZFI FILTER CH CLASS 600 PEAK DATA 357 94 N @ 291 36 MS, -9572 29 N @ 68 08 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER LEFT KNEE DISPLACEMENT
 48 KPH FLAT FRONTAL



CHANNEL KNLXD1 FILTER CH CLASS 180

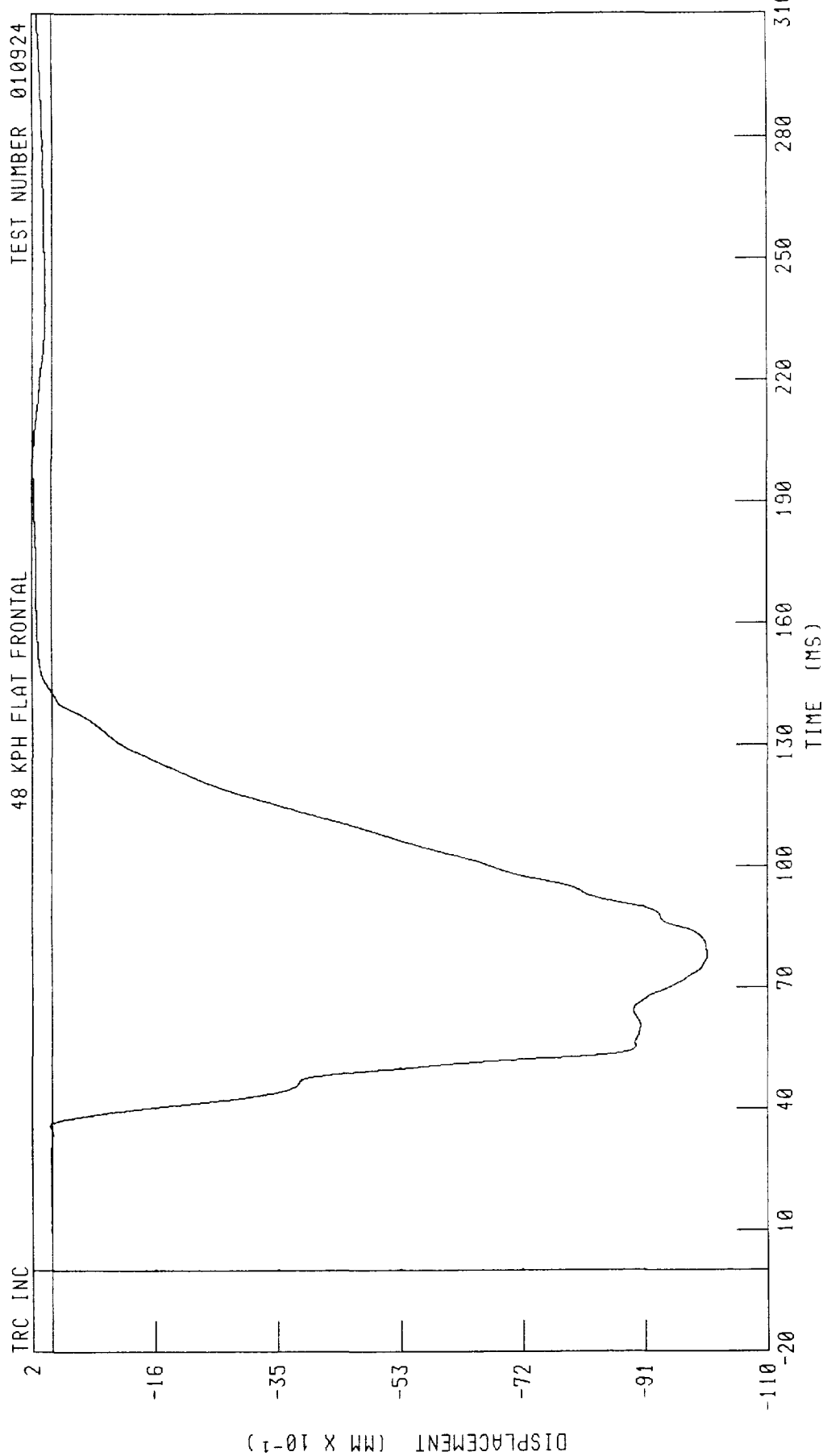
PEAK DATA 0 36 MM @ 214 72 MS, -23 22 MM @ 68 10 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER RIGHT KNEE DISPLACEMENT

48 KPH FLAT FRONTAL

TEST NUMBER 010924



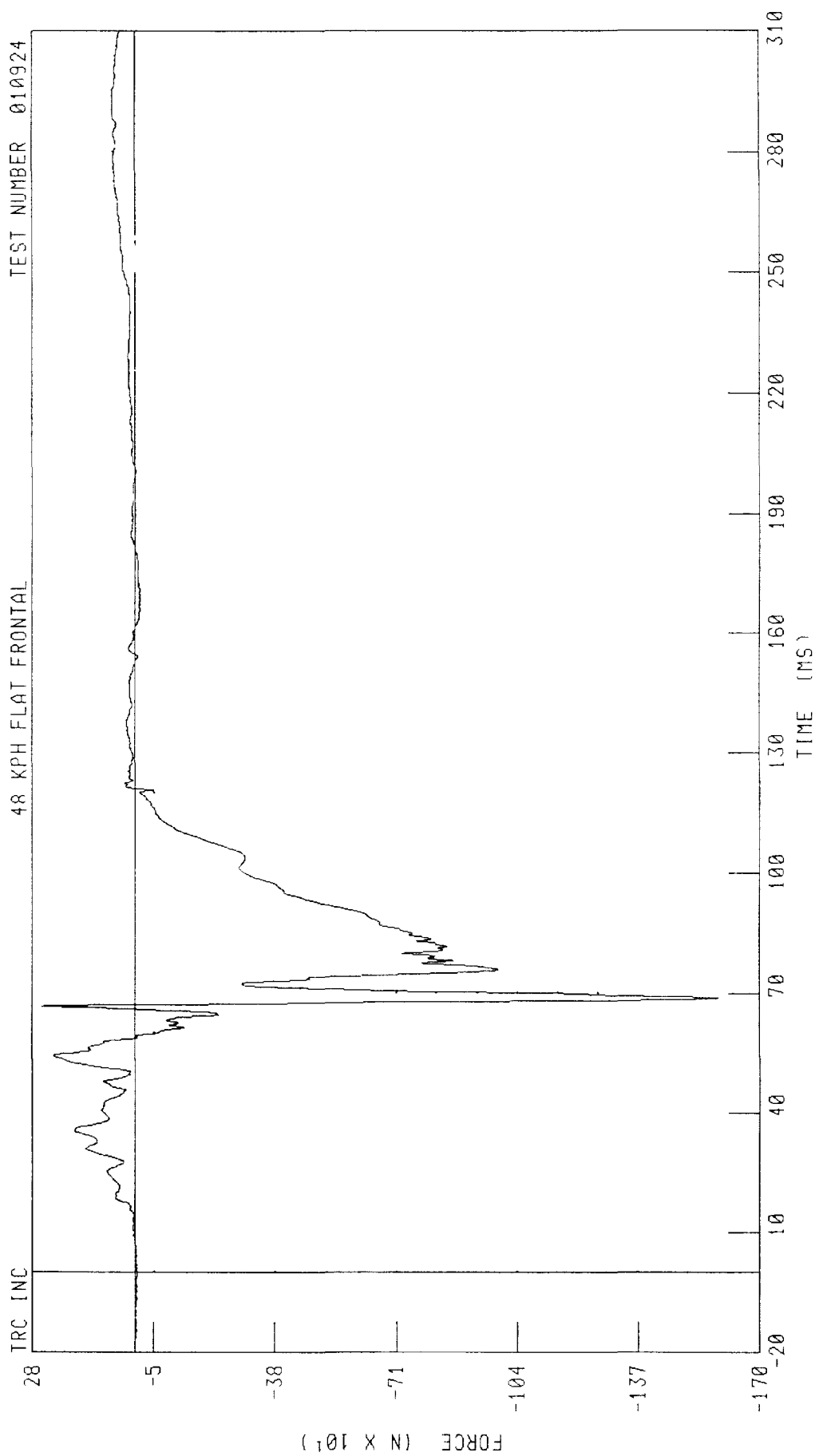
TIME (MS)

PEAK DATA 0 29 MM @ 198 48 MS, -10 17 MM @ 77 76 MS

CHANNEL KNRXD1 FILTER CH CLASS 180

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER LEFT UPPER TIBIA X-AXIS FORCE
 48 KPH FLAT FRONTAL

TEST NUMBER 010924



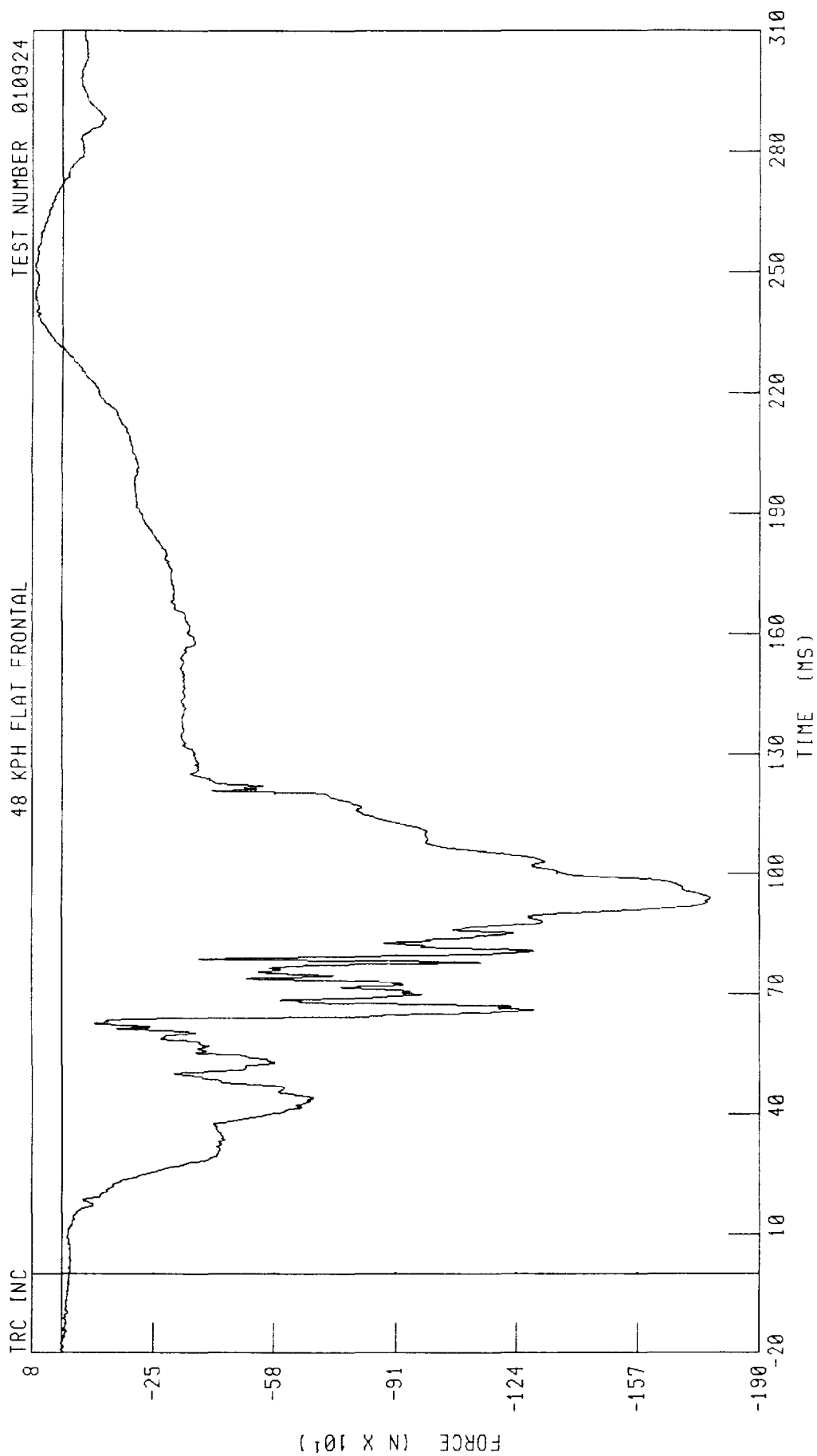
CHANNEL TBLXF1 FILTER CH CLASS 600 PEAK DATA 255 28 N @ 66 64 MS, -1588 57 N @ 68 80 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER LEFT UPPER TIBIA Z-AXIS FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924

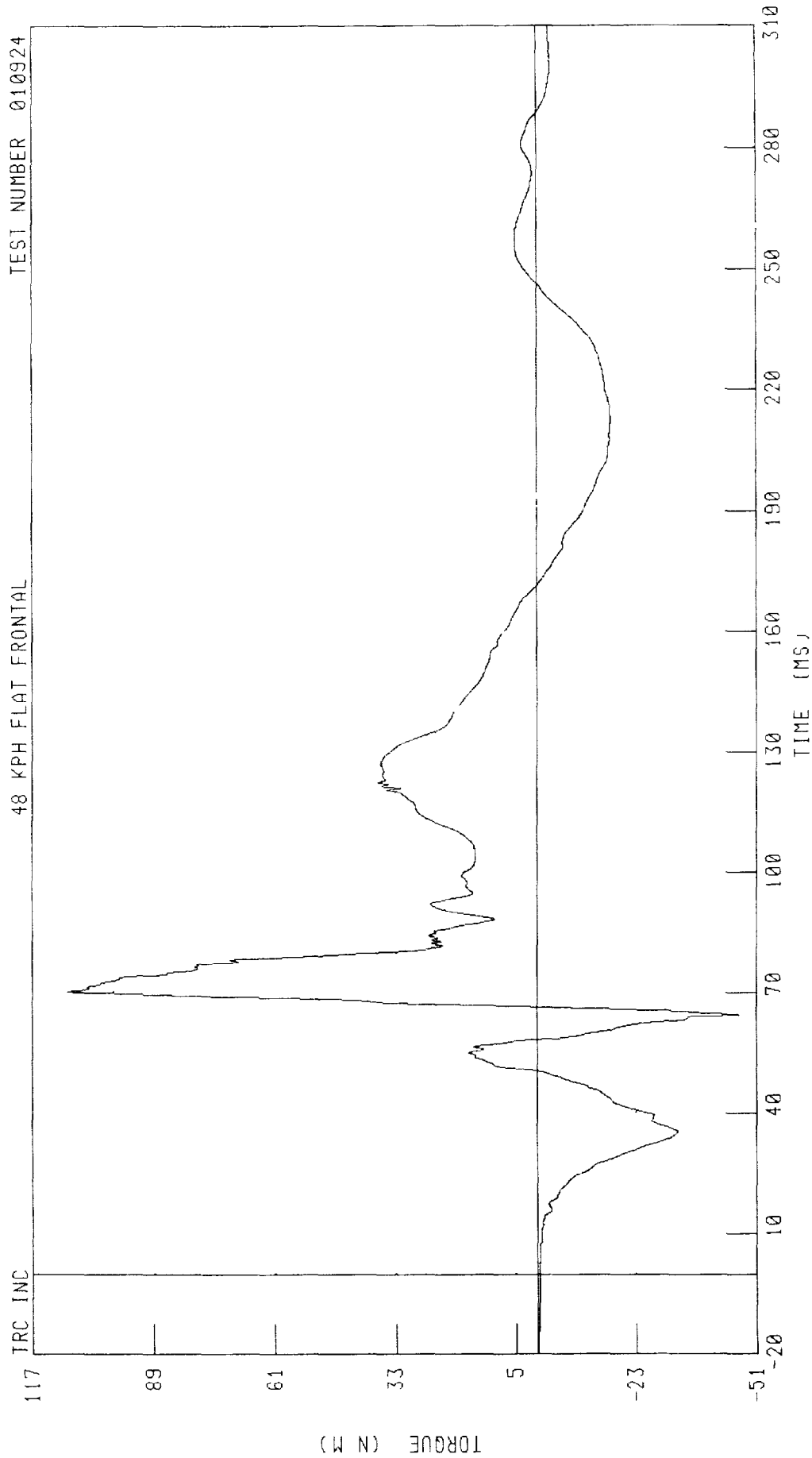


CHANNEL TBLZF1 FILTER CH CLASS 600

PEAK DATA 72 94 N @ 244 32 MS, -1769 87 N @ 93 84 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER LEFT UPPER TIBIA MOMENT ABOUT X AXIS
48 KPH FLAT FRONTAL

TEST NUMBER 010924

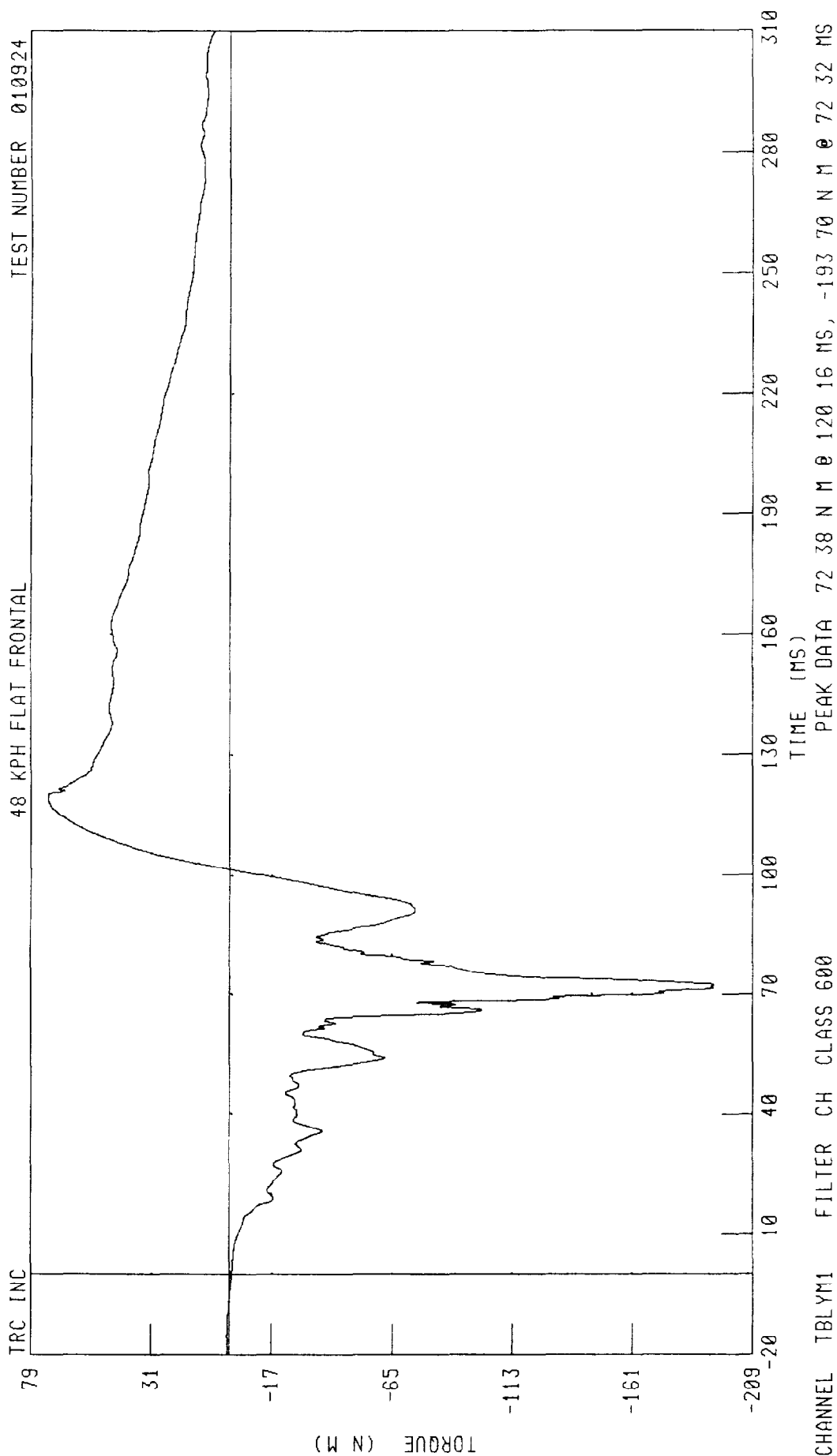


TIME (MS)

PEAK DATA 109 09 N M @ 70 16 MS, 46 93 N M @ 64 40 MS

CHANNEL TBLXM1 FILTER CH CLASS 600

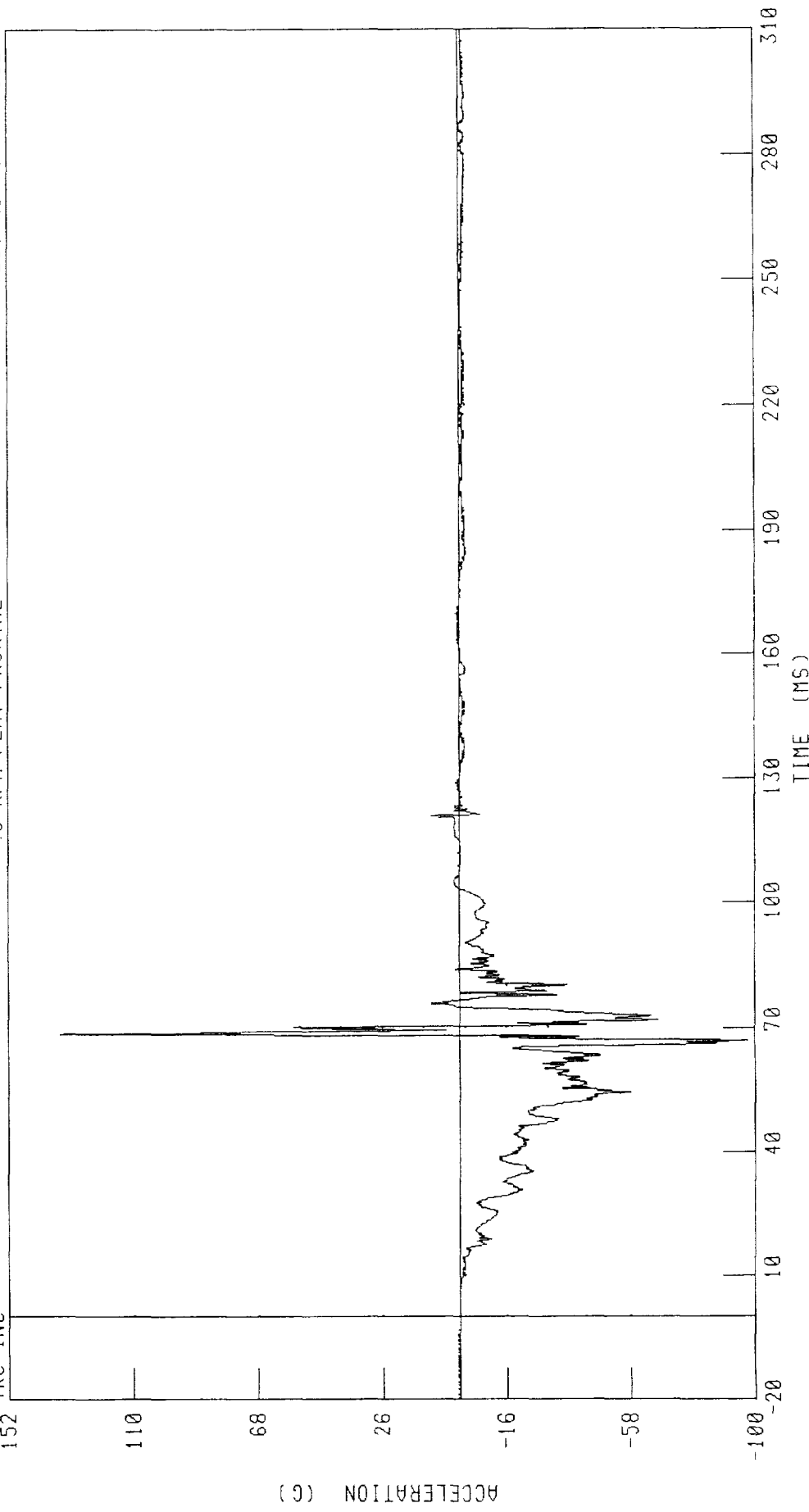
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER LEFT TIBIA X-AXIS ACCELERATION
48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



PEAK DATA 134 55 G @ 68 48 MS, -97 45 G @ 66 80 MS

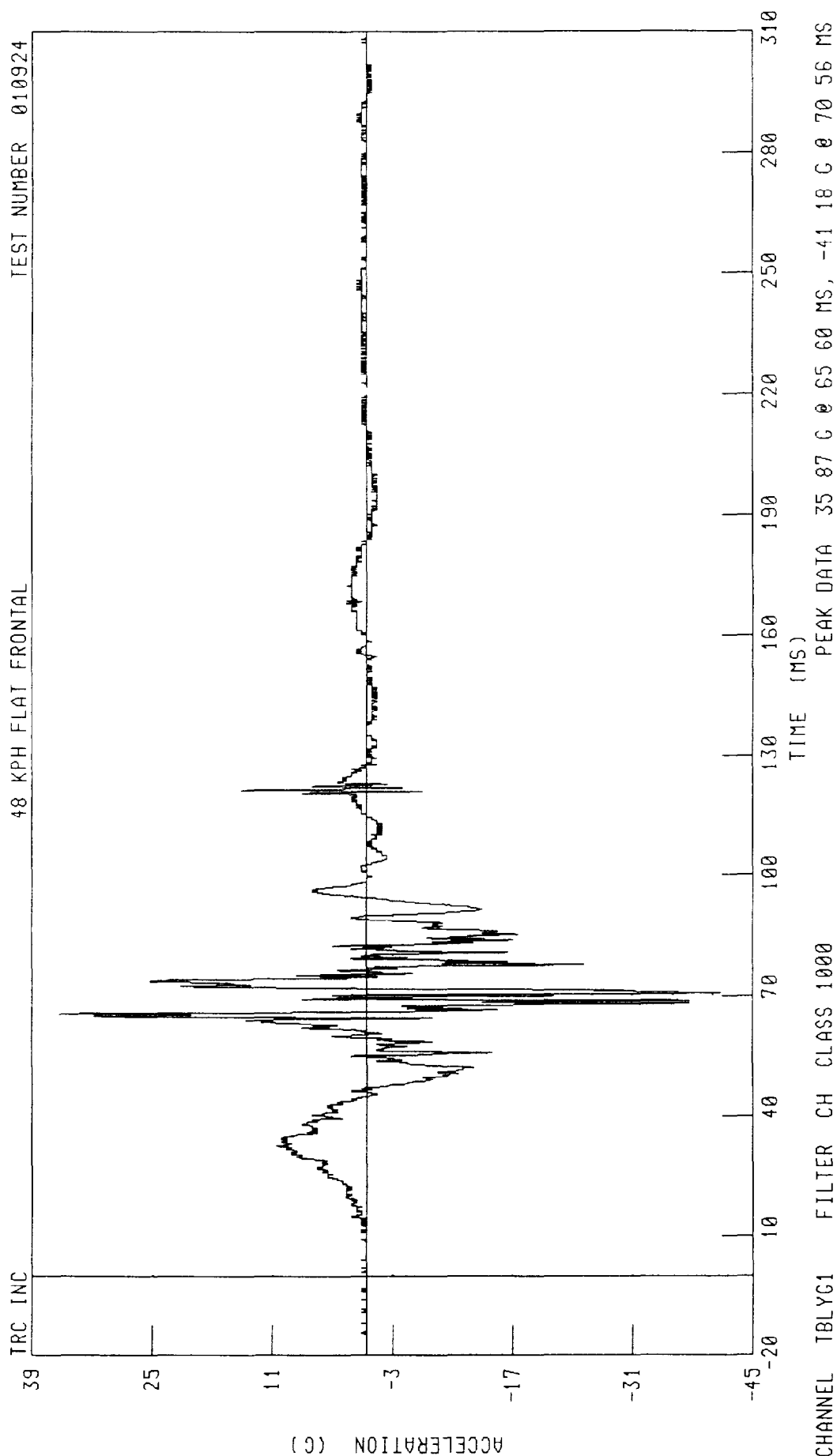
CHANNEL TBLXC1 FILTER CH CLASS 1000

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER LEFT TIBIA Y-AXIS ACCELERATION

48 KPH FLAT FRONTAL

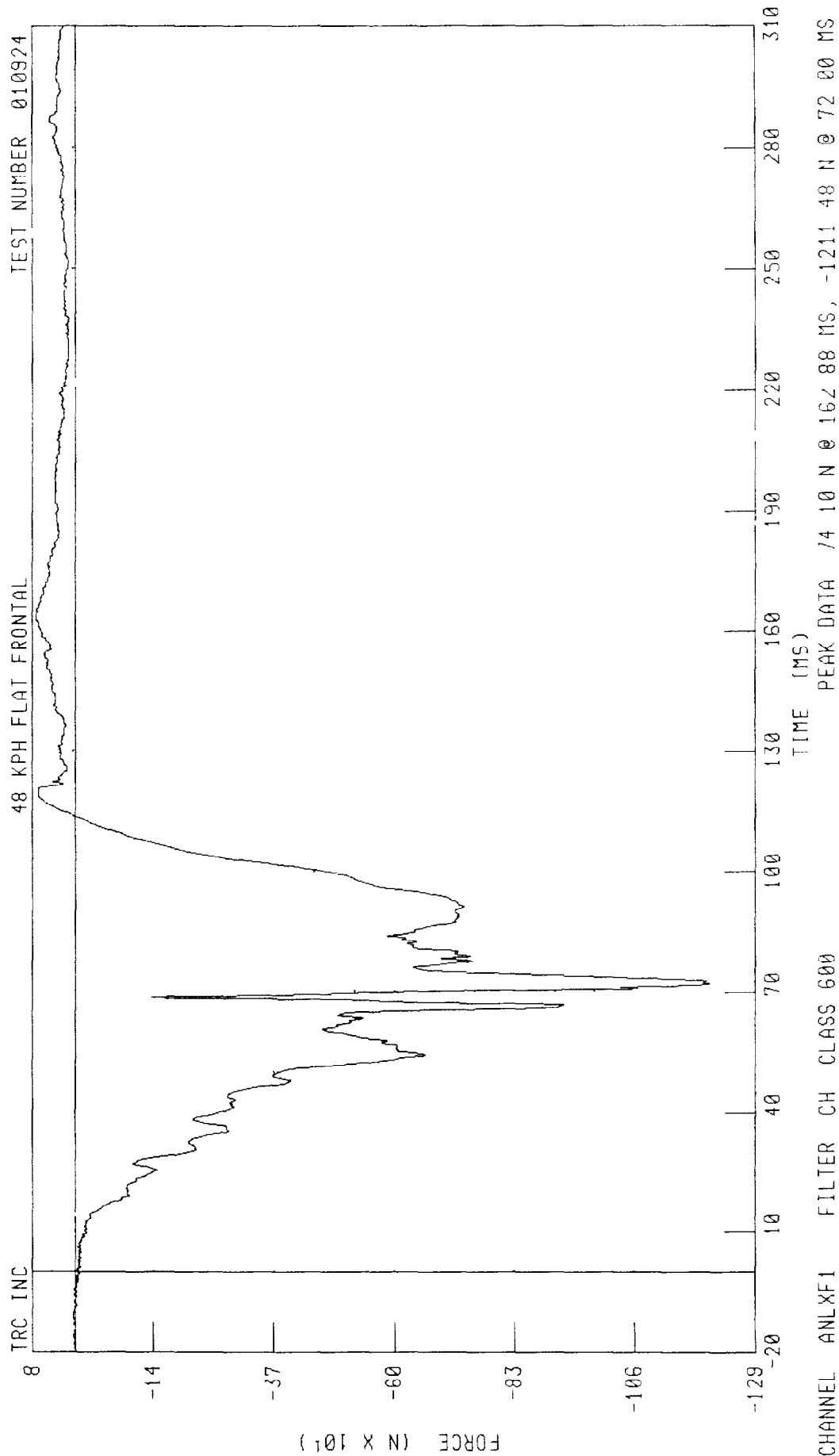
TEST NUMBER 010924



CHANNEL TBLYG1 FILTER CH CLASS 1000

PEAK DATA 35 87 G @ 65 60 MS, -41 18 G @ 70 56 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER LEFT LOWER TIBIA X-AXIS FORCE

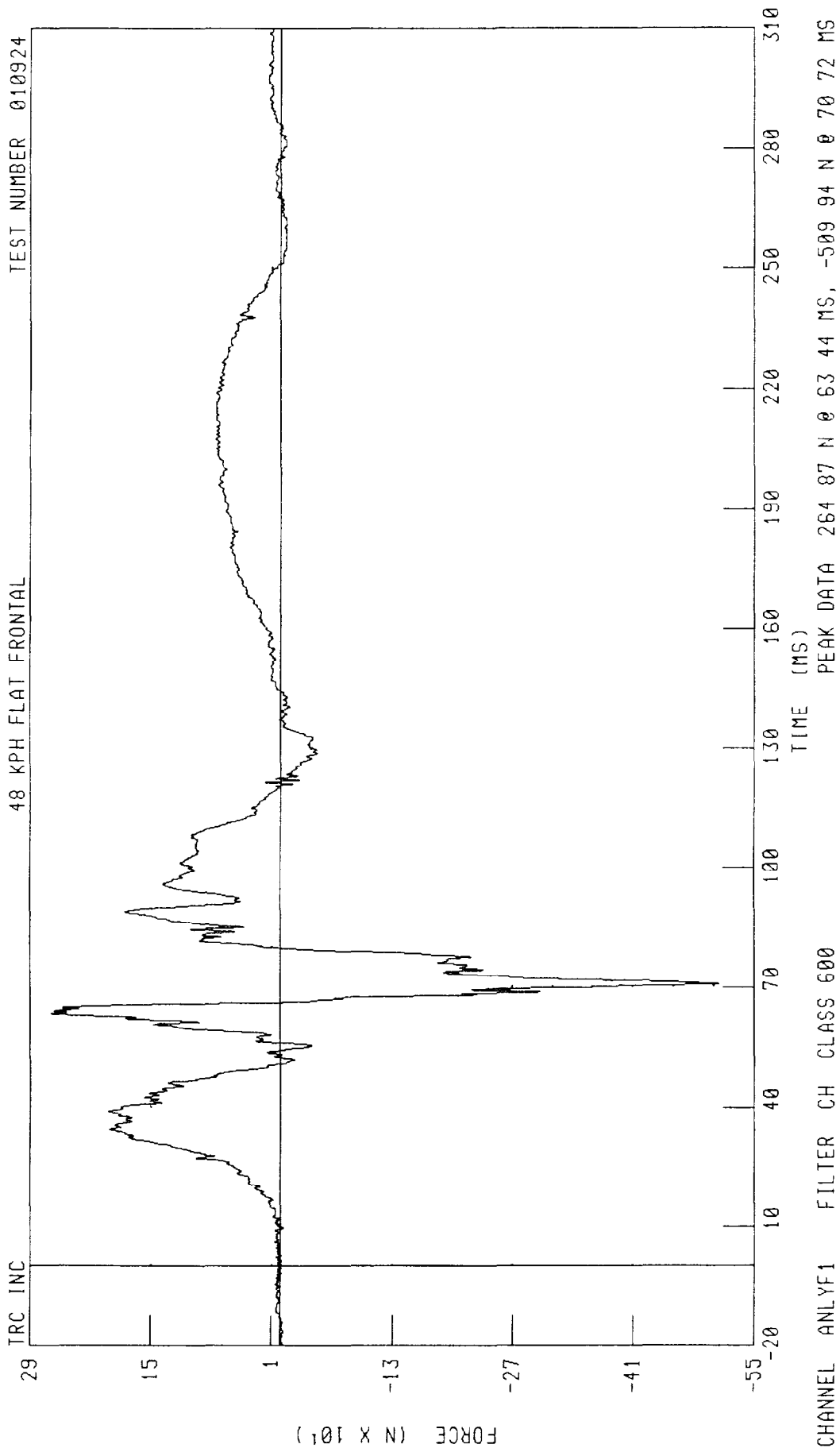


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER LEFT LOWER TIBIA Y-AXIS FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL ANLYF1 FILTER CH CLASS 600

PEAK DATA 264 87 N @ 63 44 MS, -509 94 N @ 70 72 MS

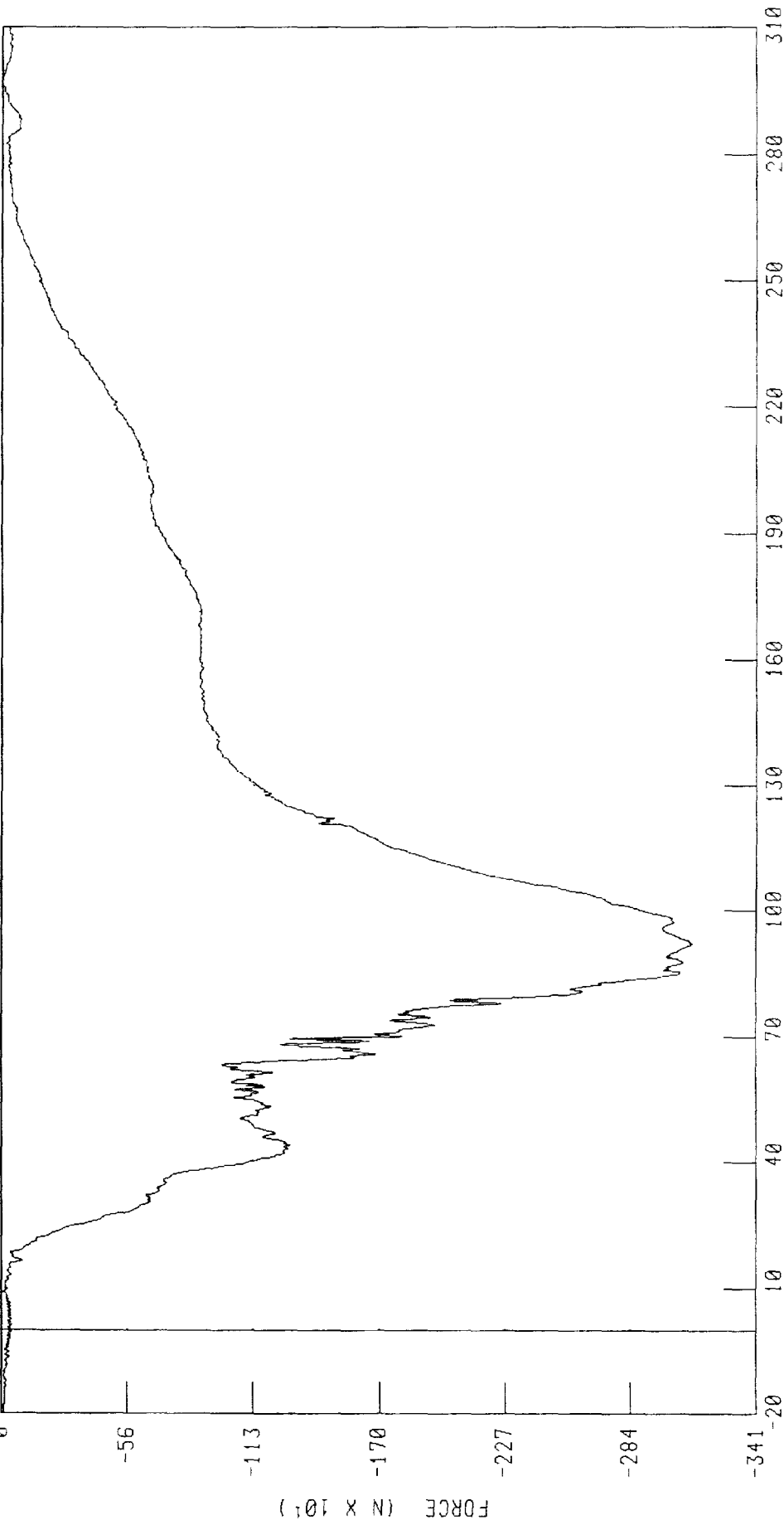
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER LEFT LOWER TIBIA Z-AXIS FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC

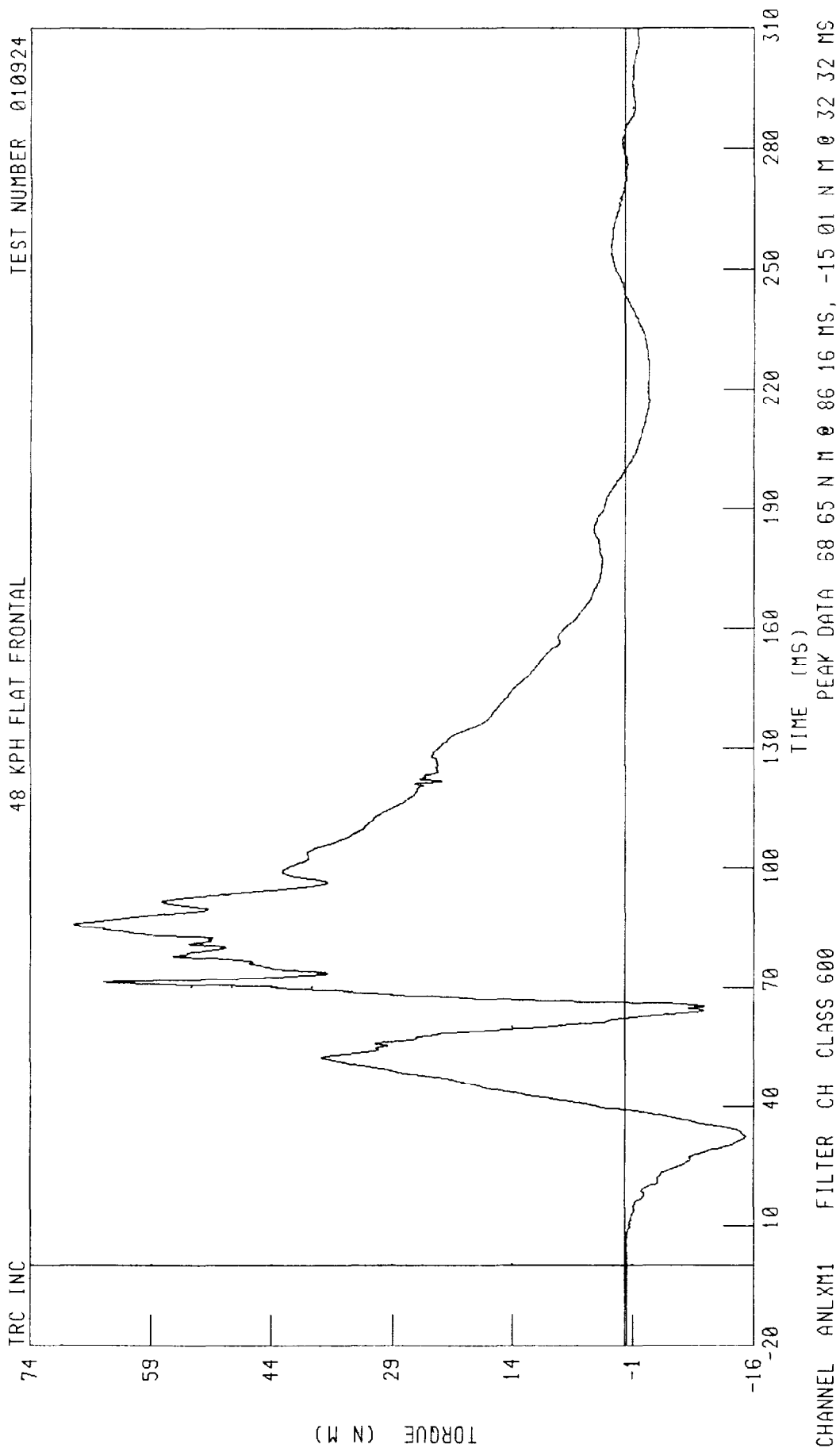


TIME (MS)

PEAK DATA 4 47 N @ 296 72 MS, -3124 00 N @ 92 24 MS

CHANNEL ANLZF1 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER LEFT LOWER TIBIA MOMENT ABOUT X AXIS

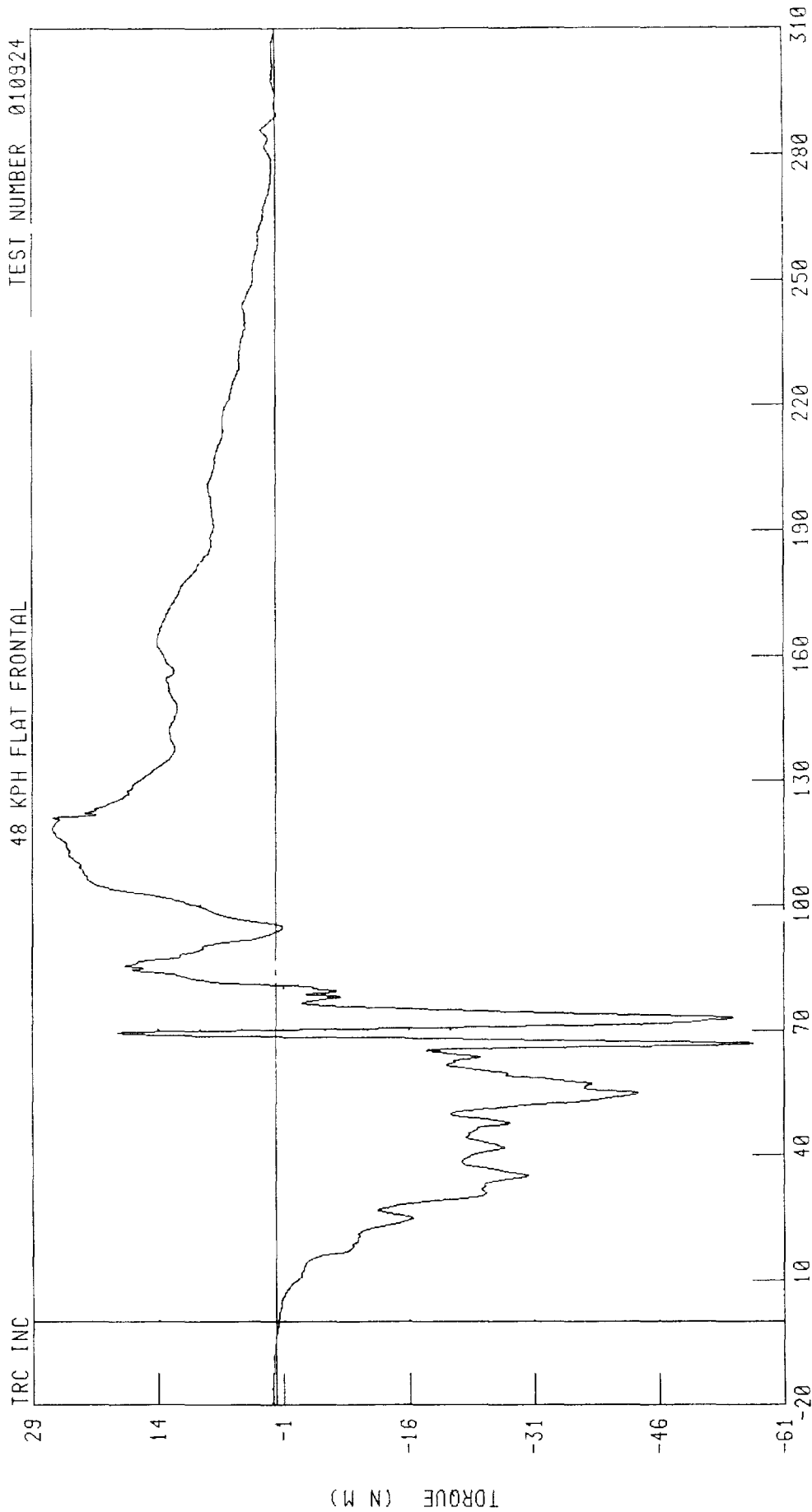


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS

48 KPH FLAT FRONTAL

TEST NUMBER 010924



TIME (MS)

PEAK DATA 26 61 N M @ 121 20 MS, -57 32 N M @ 66 80 MS

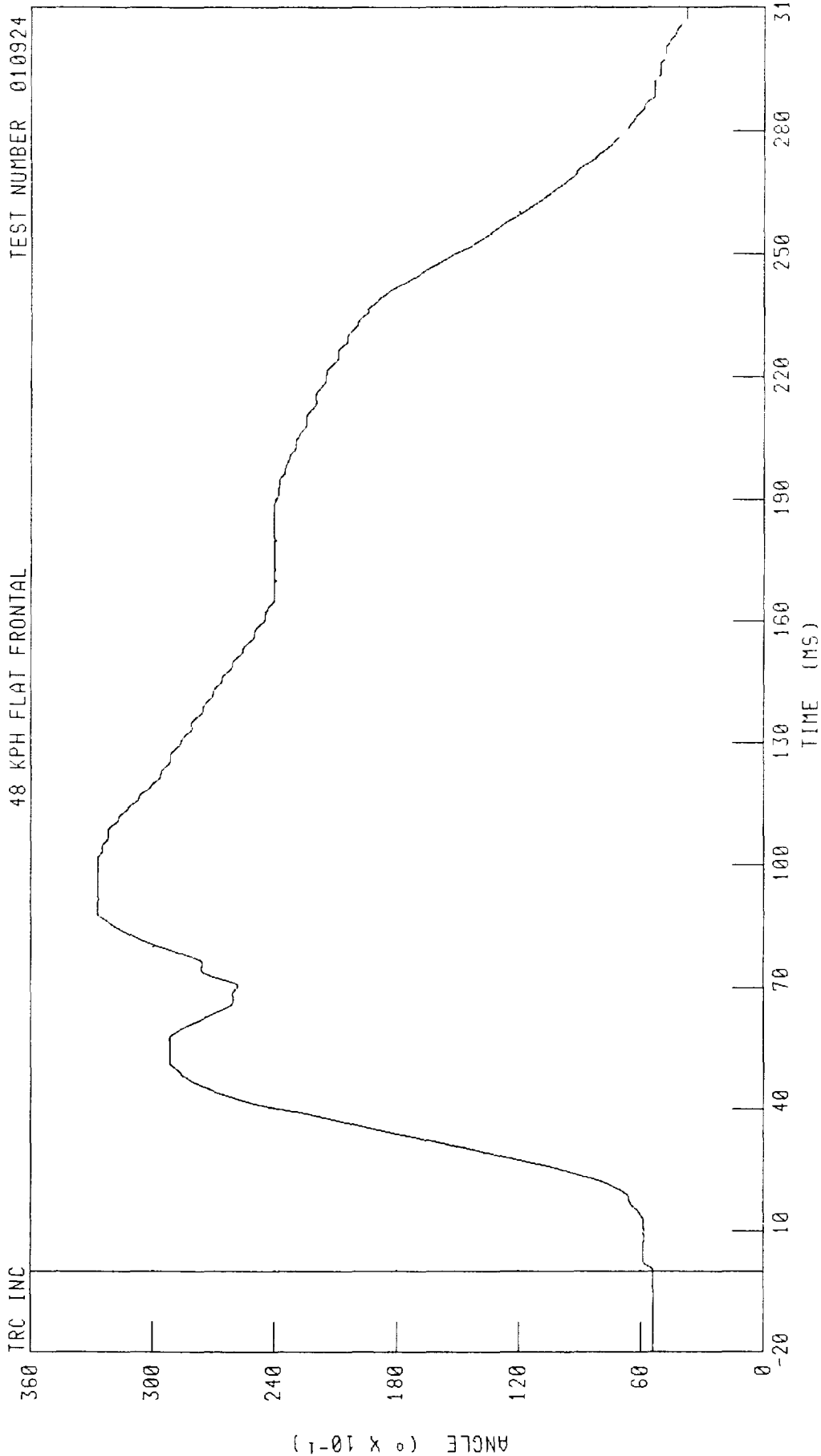
CHANNEL ANLYM1 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER LEFT FOOT TO ANKLE X-AXIS DISPLACEMENT

TEST NUMBER 010924

48 KPH FLAT FRONTAL

TRC INC



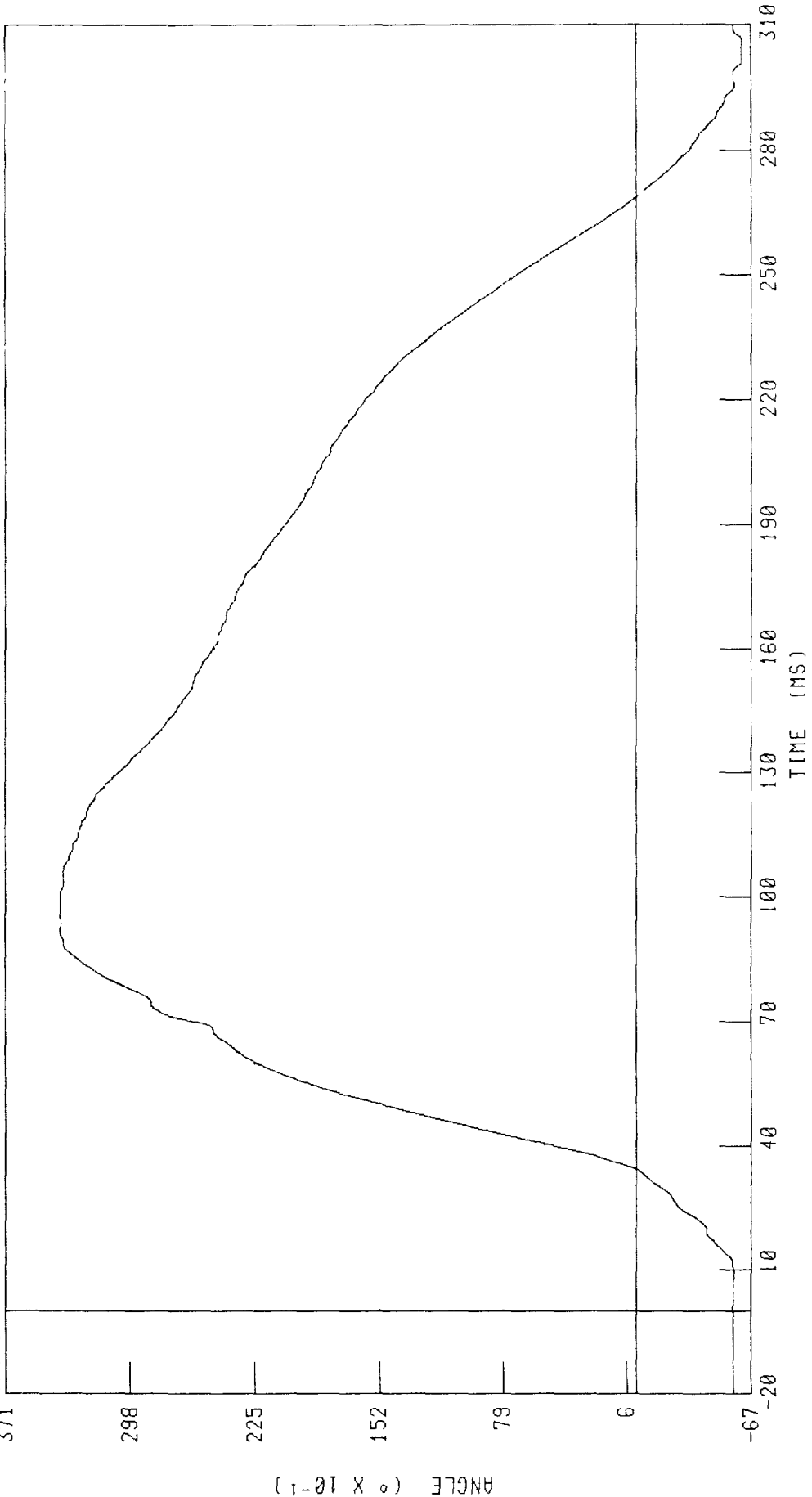
CHANNEL FTLX01 FILTER CH CLASS 180

PEAK DATA 32 73 ° @ 95 12 MS 3 77 ° @ 310 011 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER LEFT FOOT TO ANKLE Y-AXIS DISPLACEMENT
 48 KPH FLAT FRONTAL

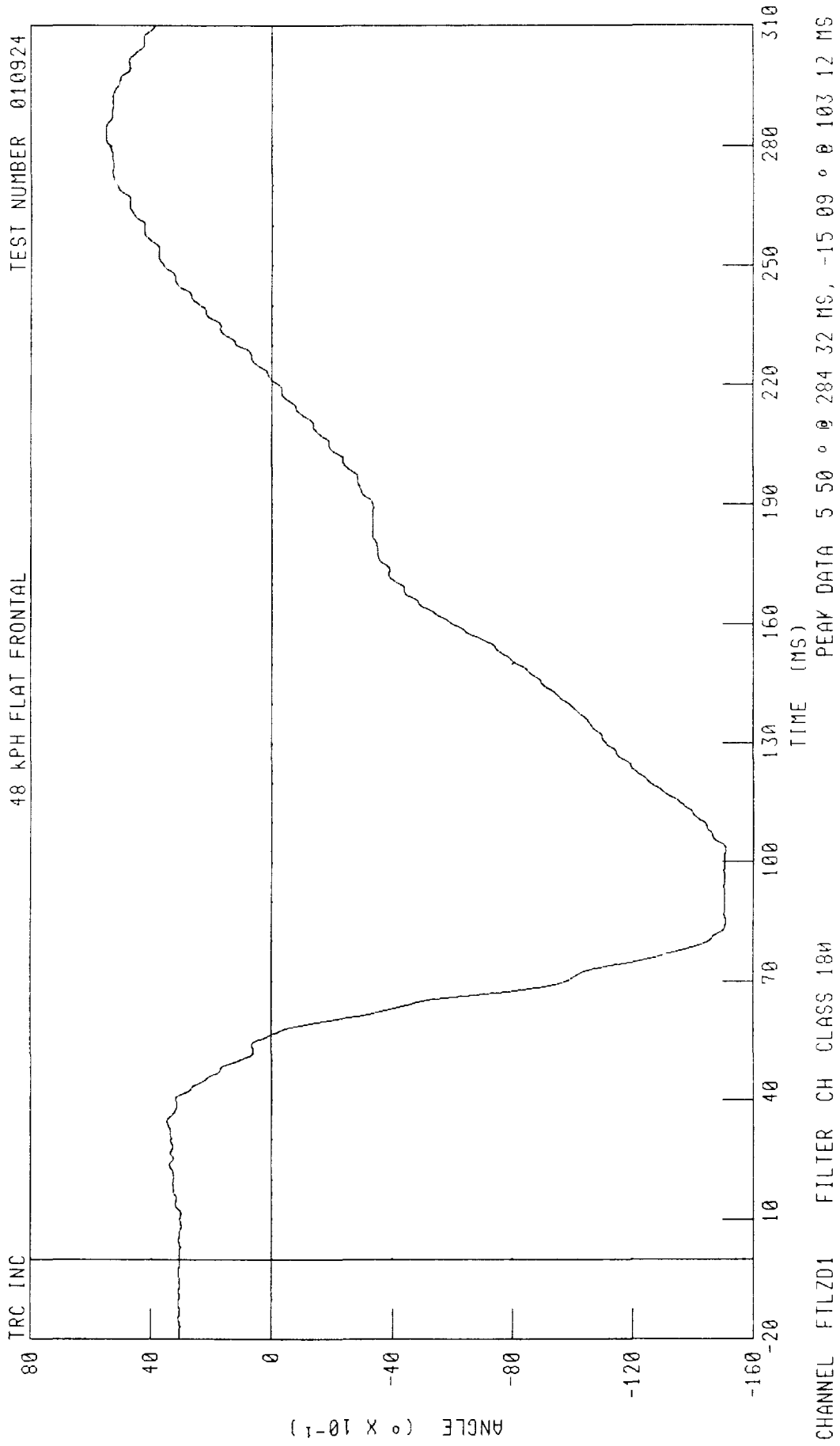
TRC INC

TEST NUMBER 010924



CHANNEL FTLYD1 FILTER CH CLASS 180 PEAK DATA 33 91 ° @ 96 40 MS, -6 18 ° @ 305 92 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER LEFT FOOT TO ANKLE Z-AXIS DISPLACEMENT

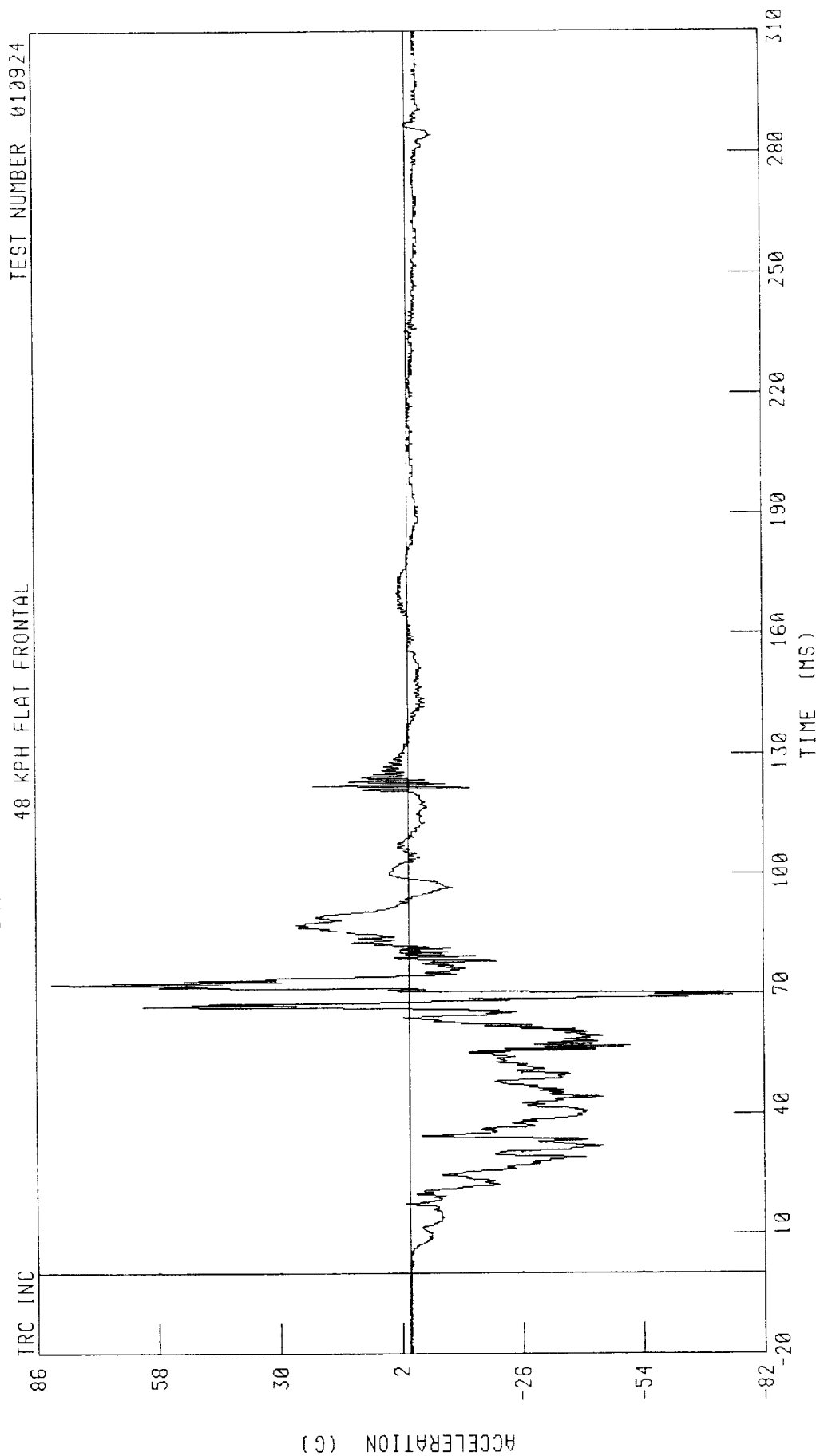


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER LEFT FOOT X-AXIS ACCELERATION

48 KPH FLAT FRONTAL

TRC INC

TEST NUMBER 010924



CHANNEL FTLX01 FILTER CH CLASS 1000

PEAK DATA 32 55 0 72 08 MS, -74 80 0 69 44 MS

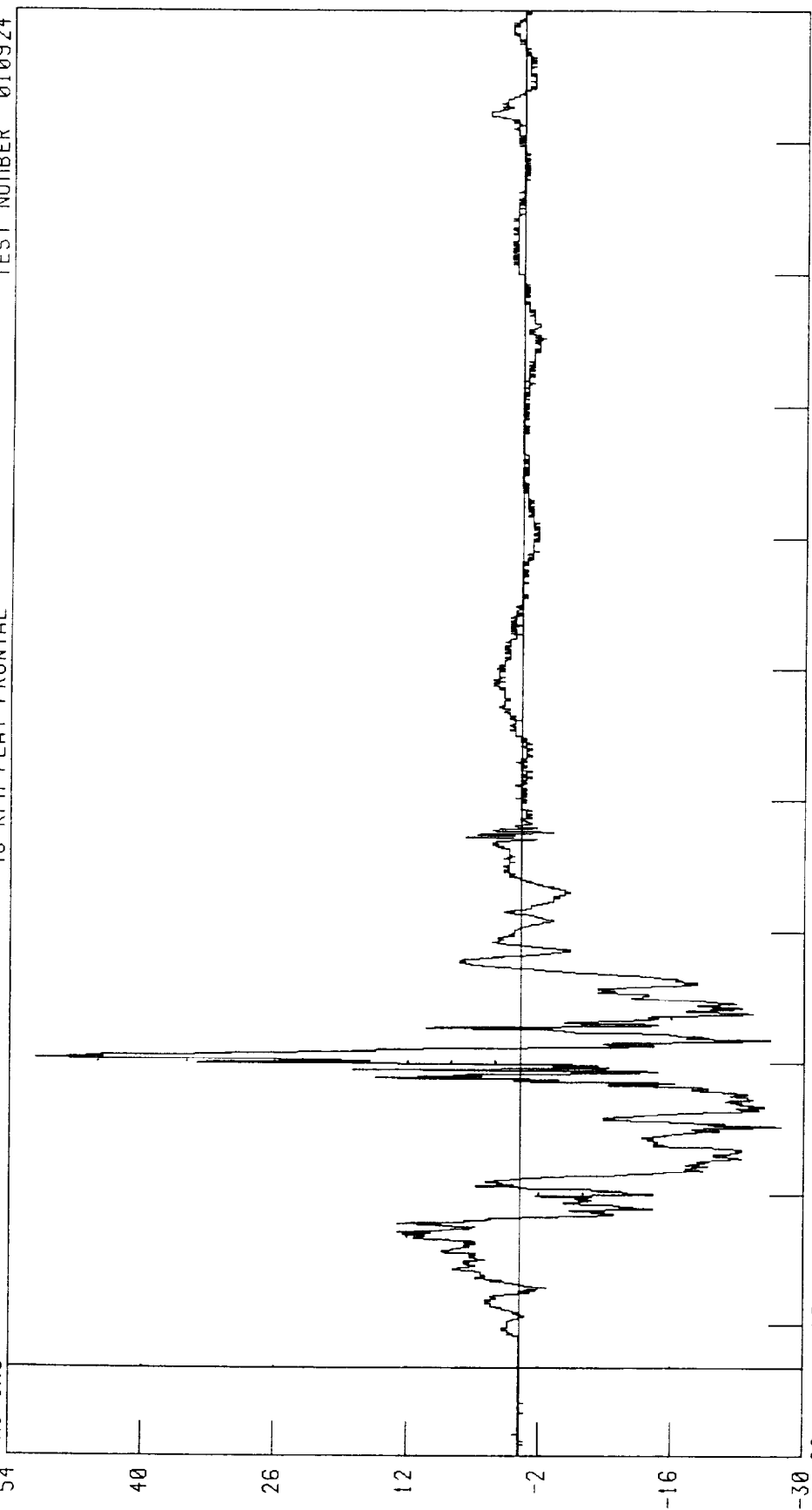
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER LEFT FOOT Y-AXIS ACCELERATION

TRC INC

TEST NUMBER 010924

48 KPH FLAT FRONTAL

ACCELERATION (G)

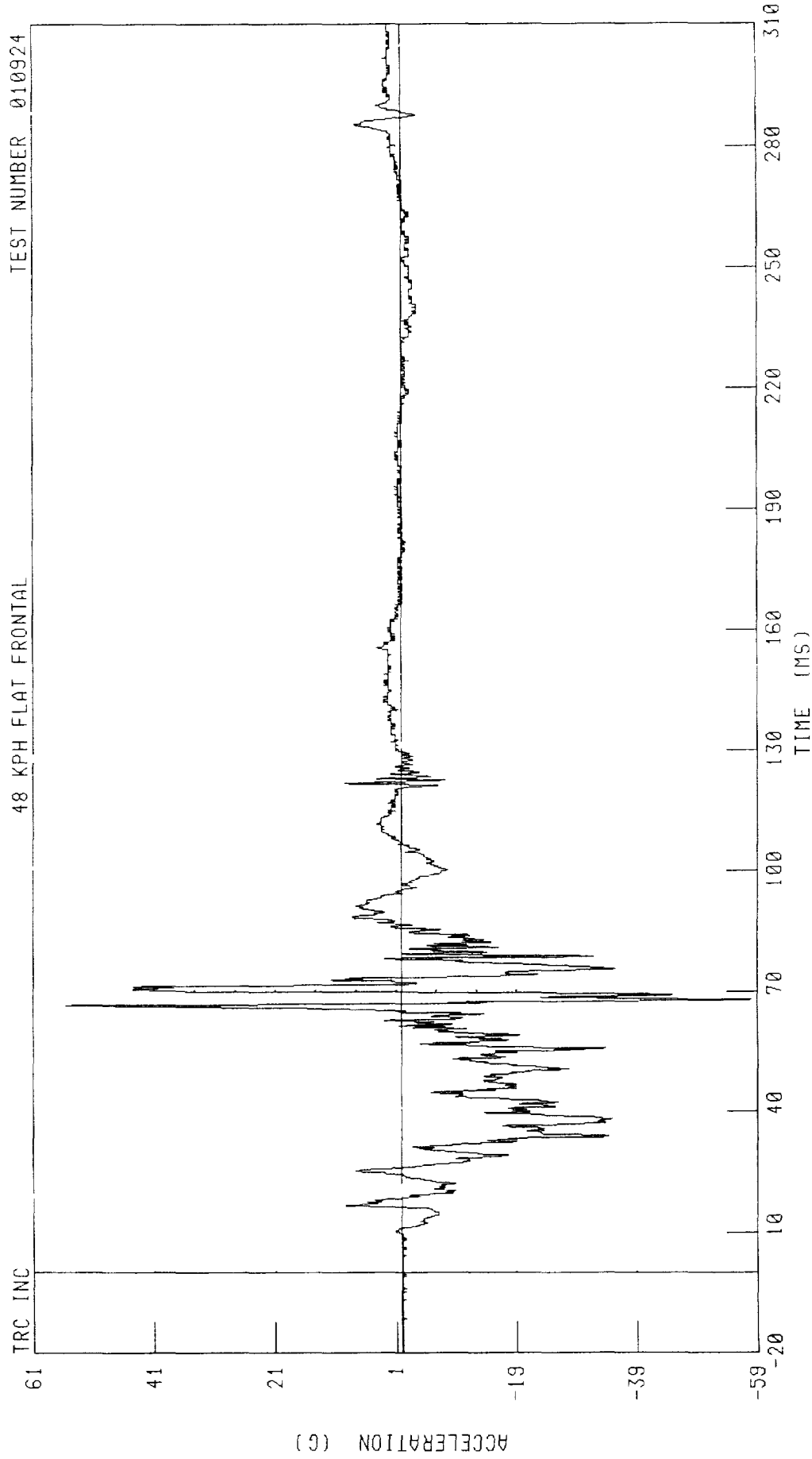


TIME (MS)

CHANNEL FTLG1 FILTER CH CLASS 1000

PEAK DATA 51 29 G @ 71 12 MS, -27 62 G @ 55 52 MS

2001 TOYOTO ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER LEFT FOOT Z-AXIS ACCELERATION
 48 KPH FLAT FRONTAL



CHANNEL FTLZG1 FILTER CH CLASS 1000

PEAK DATA 55 68 G @ 66 40 MS, -58 07 G @ 67 76 MS

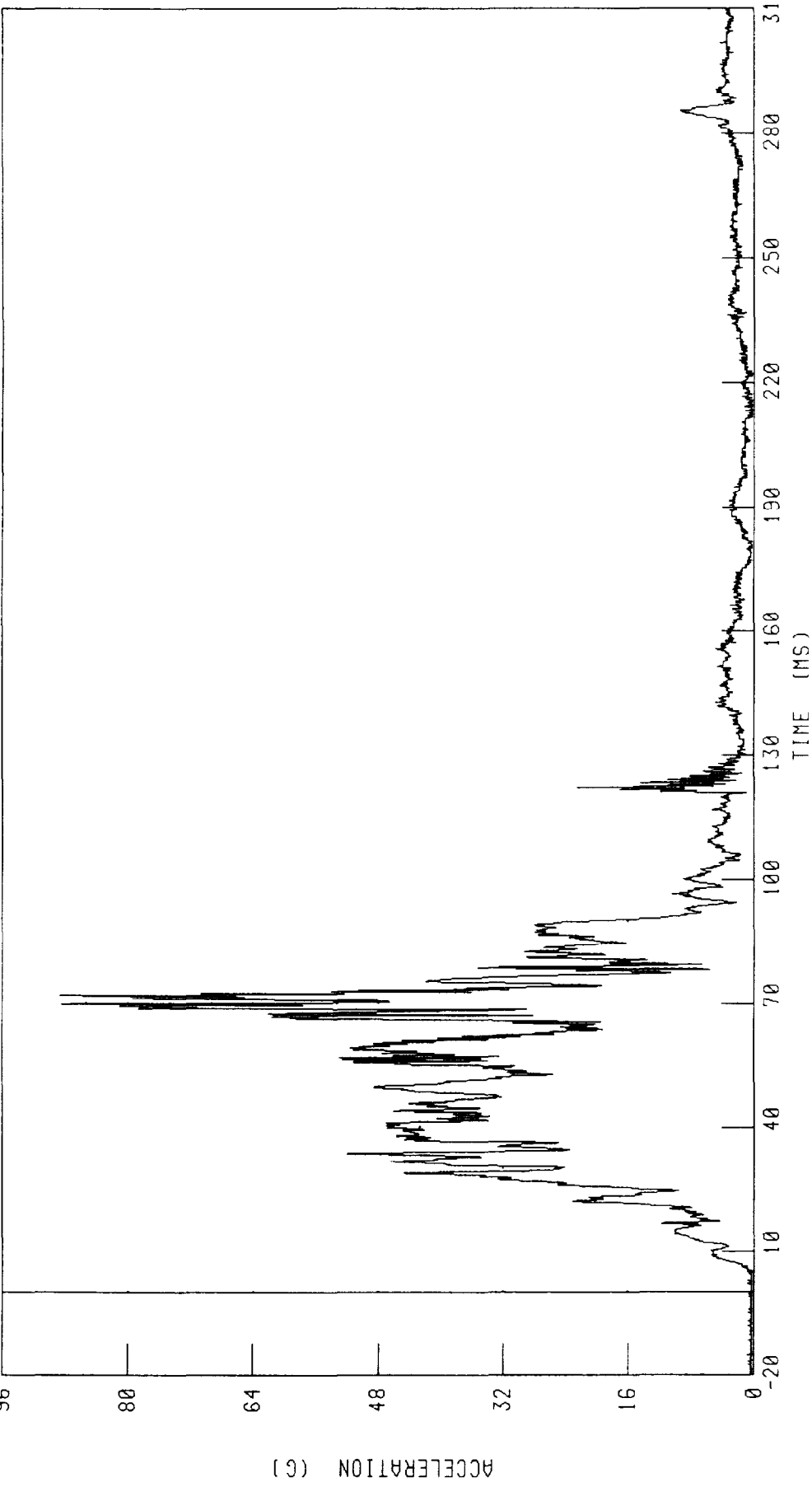
2001 TOYOTO ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER LEFT FOOT RESULTANT ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



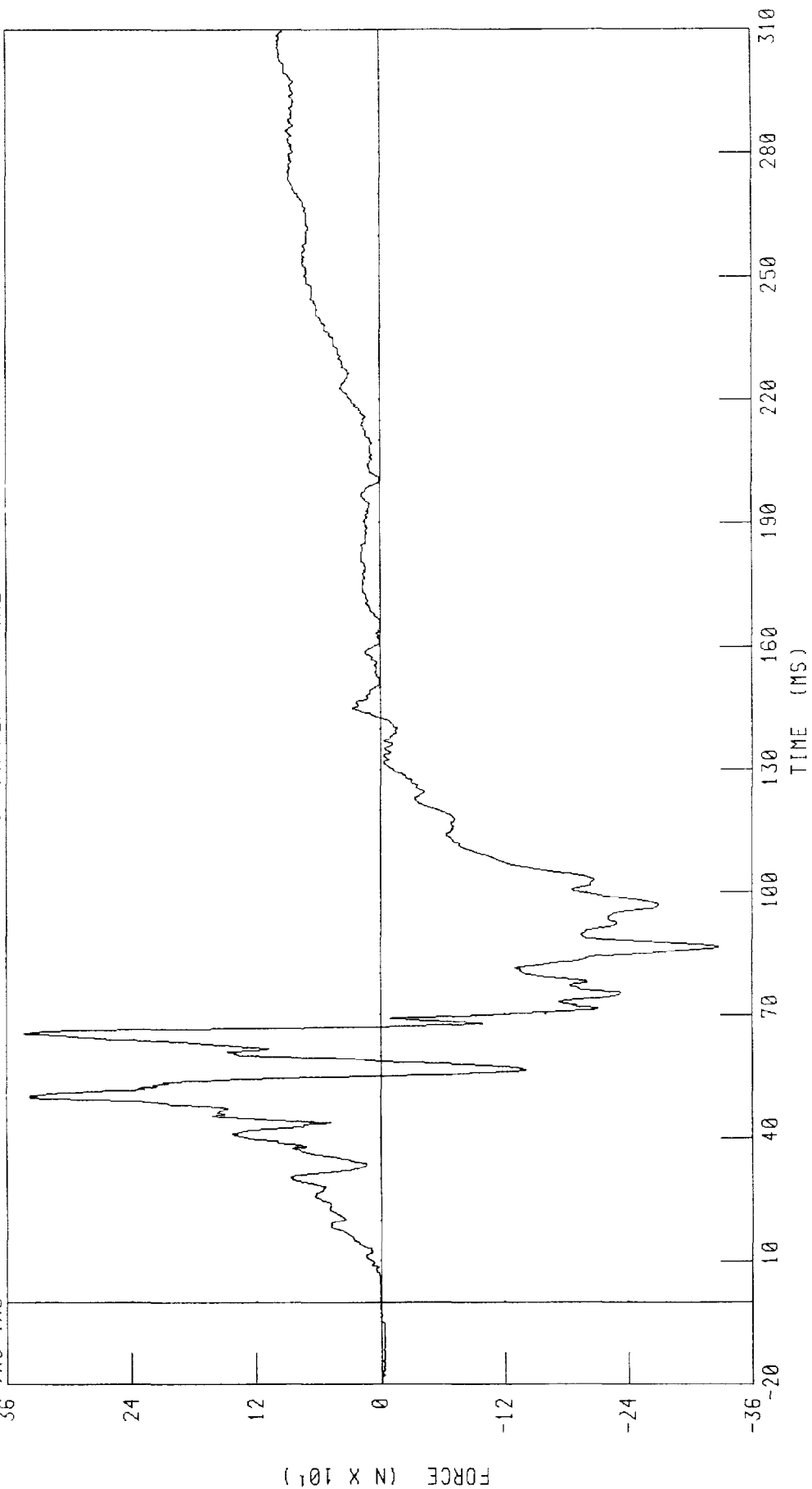
CHANNEL FTLRG1 FILTER CH CLASS 1000

PEAK DATA 88 73 0 72 08 MS, 0 24 0 -20 00 MS

2001 TOYOTO ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT UPPER TIBIA X-AXIS FORCE
48 KPH FLAT FRONTAL

TEST NUMBER 010924

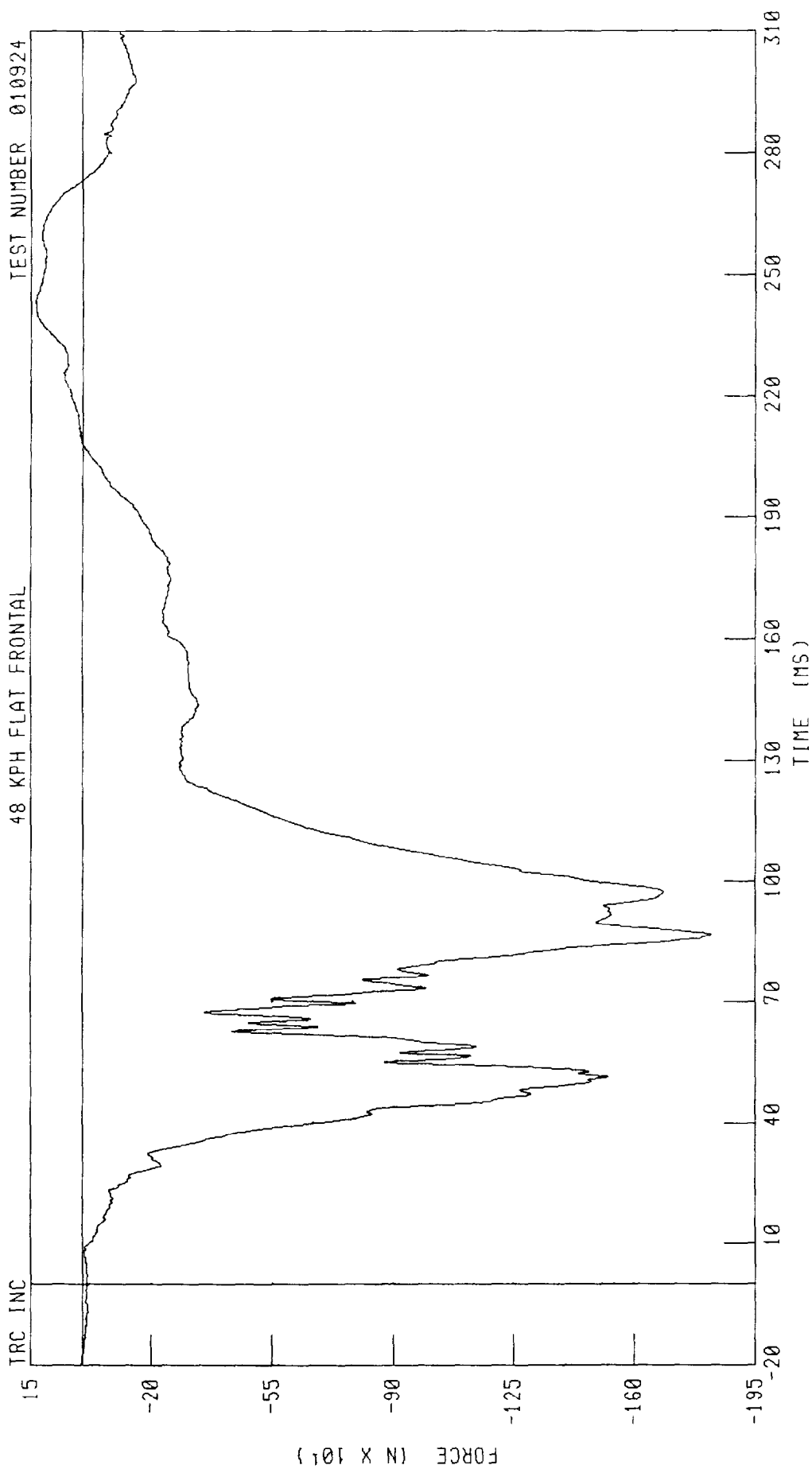
TRC INC



PEAK DATA 344 15 N @ 65 52 MS, -327 65 N @ 86 80 MS

CHANNEL TBRXF1 FILTER CH CLASS 600

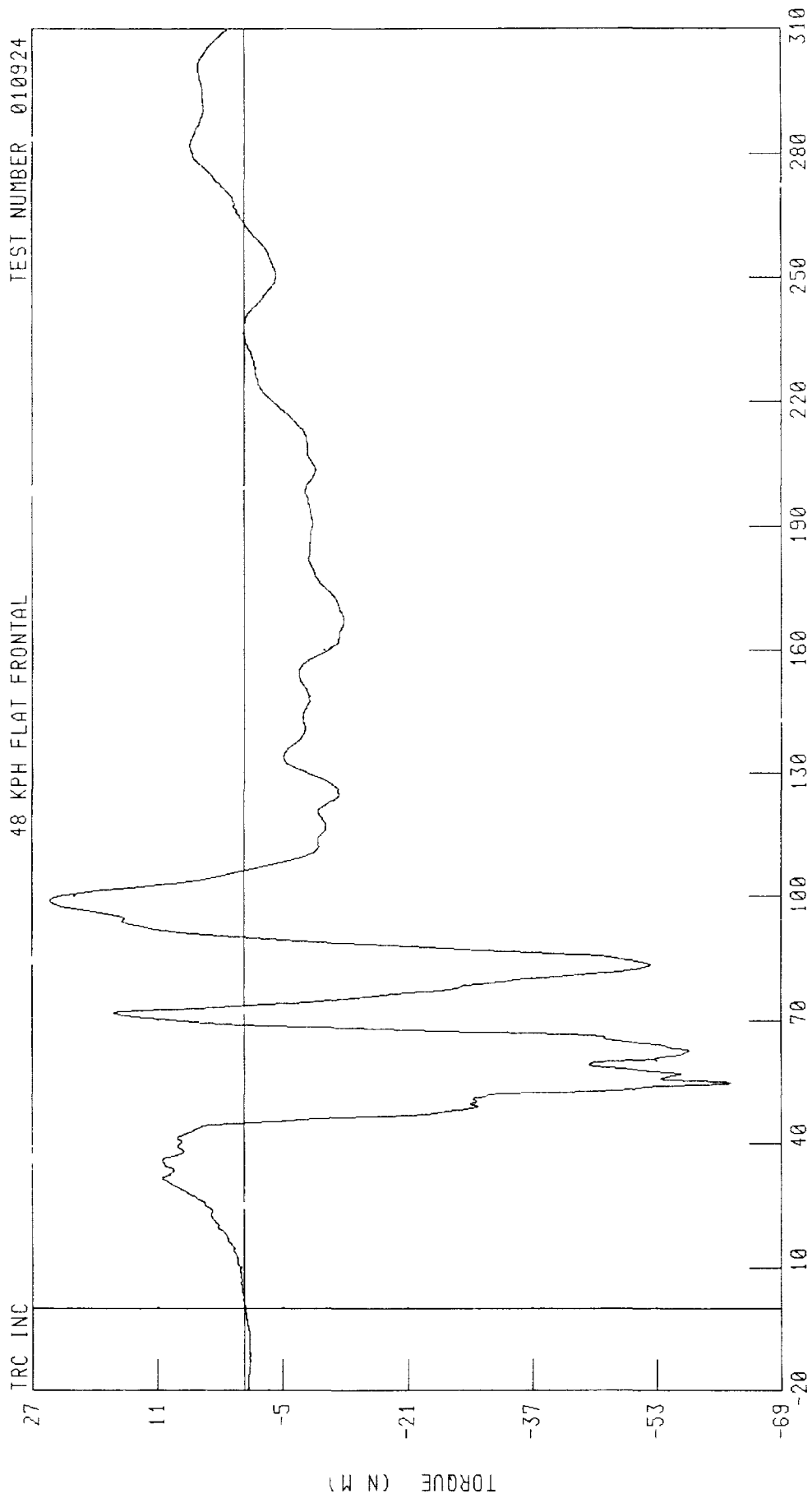
2001 TOYOTO ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT UPPER TIBIA Z-AXIS FORCE



CHANNEL TBRZF1 FILTER CH CLASS 600

PEAK DATA 137 50 N 0 243 28 MS, -1824 10 N 0 86 88 MS

2001 TOYOTO ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS

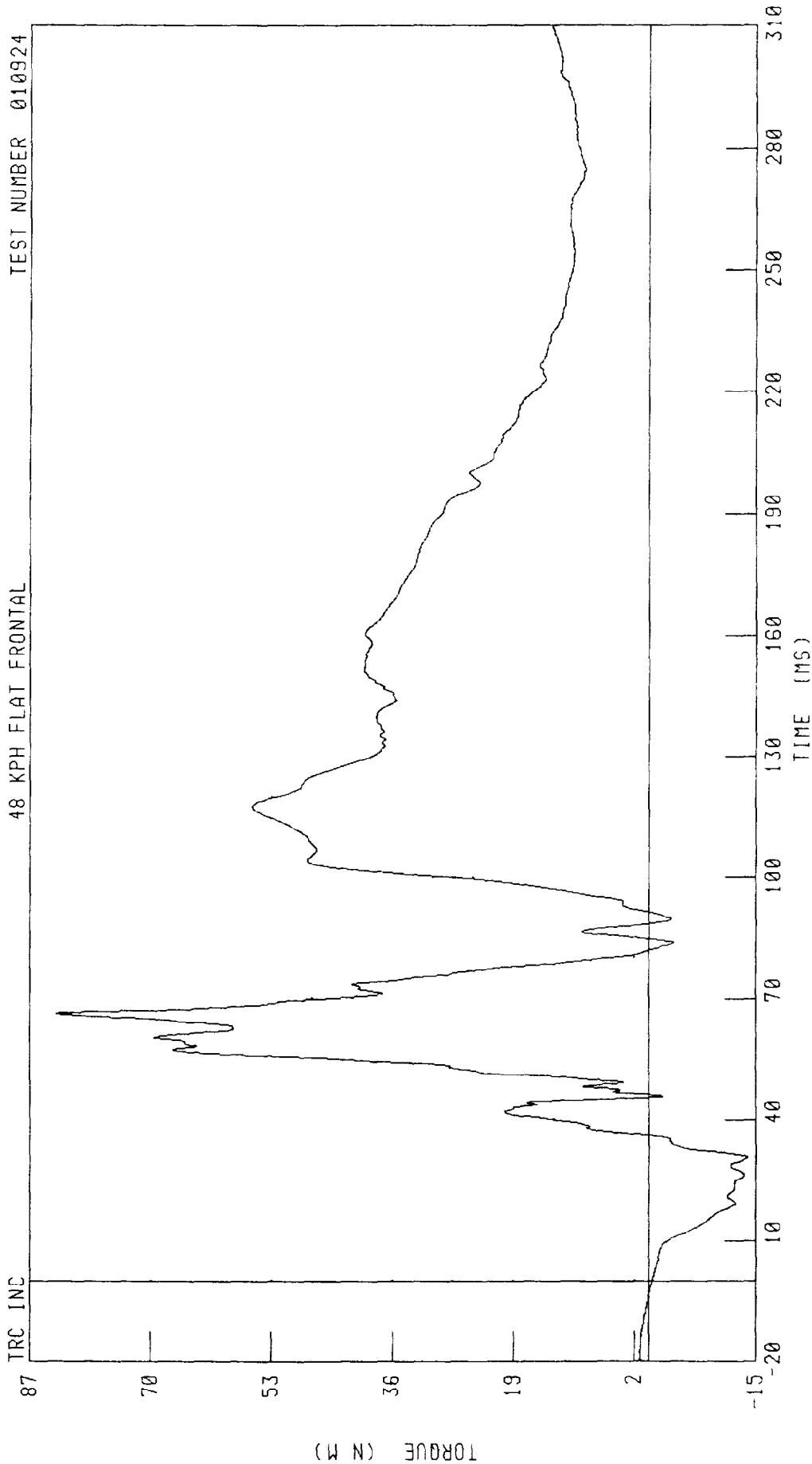


CHANNEL TBRX01 FILTER CH CLASS 600

PEAK DATA 24 78 N M @ 99 04 MS, -62 56 N M @ 54 64 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS

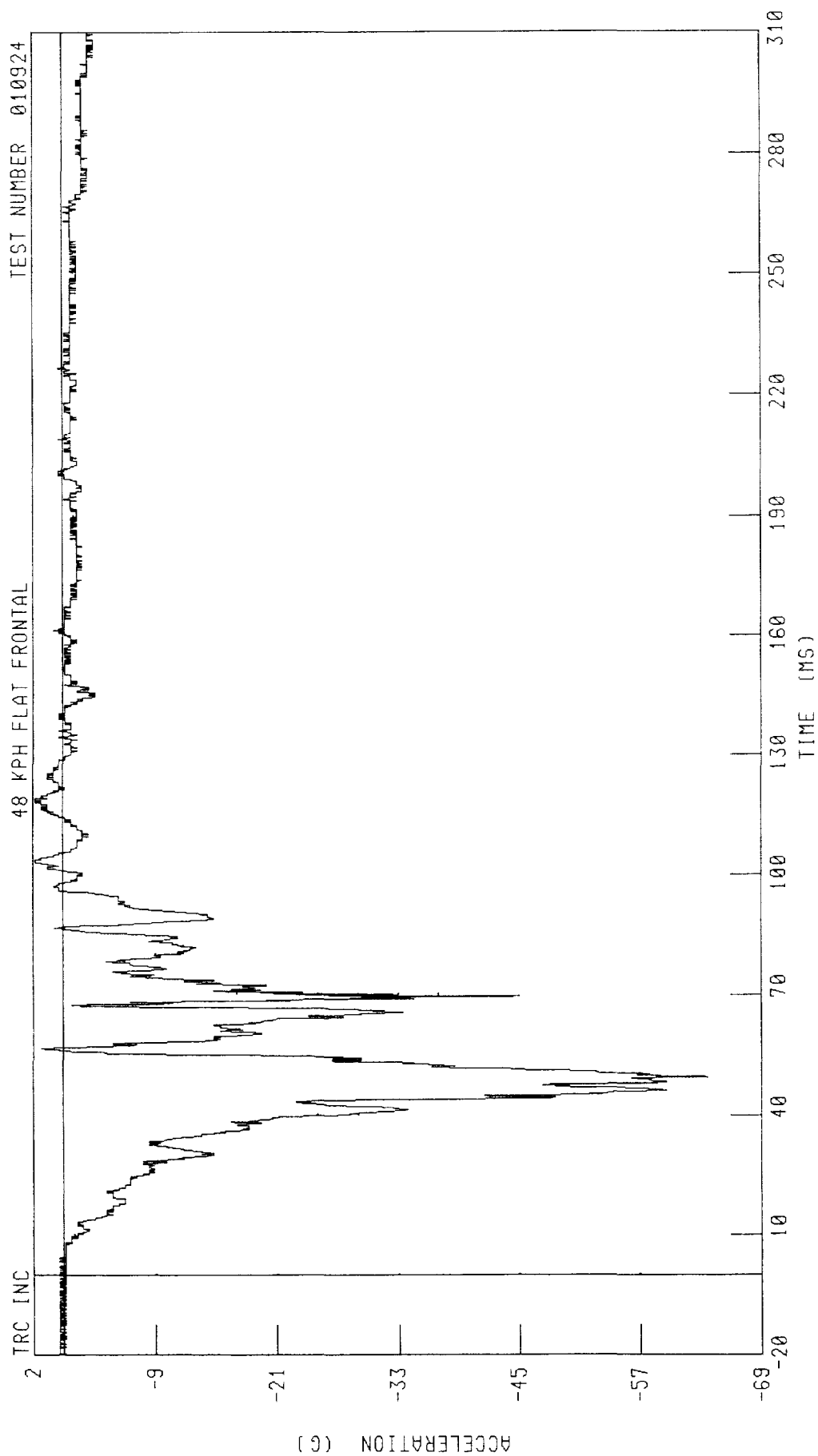
48 KPH FLAT FRONTAL TEST NUMBER 010924



PEAK DATA 83 28 N M @ 66 32 MS, -13 89 N M @ 30 56 MS

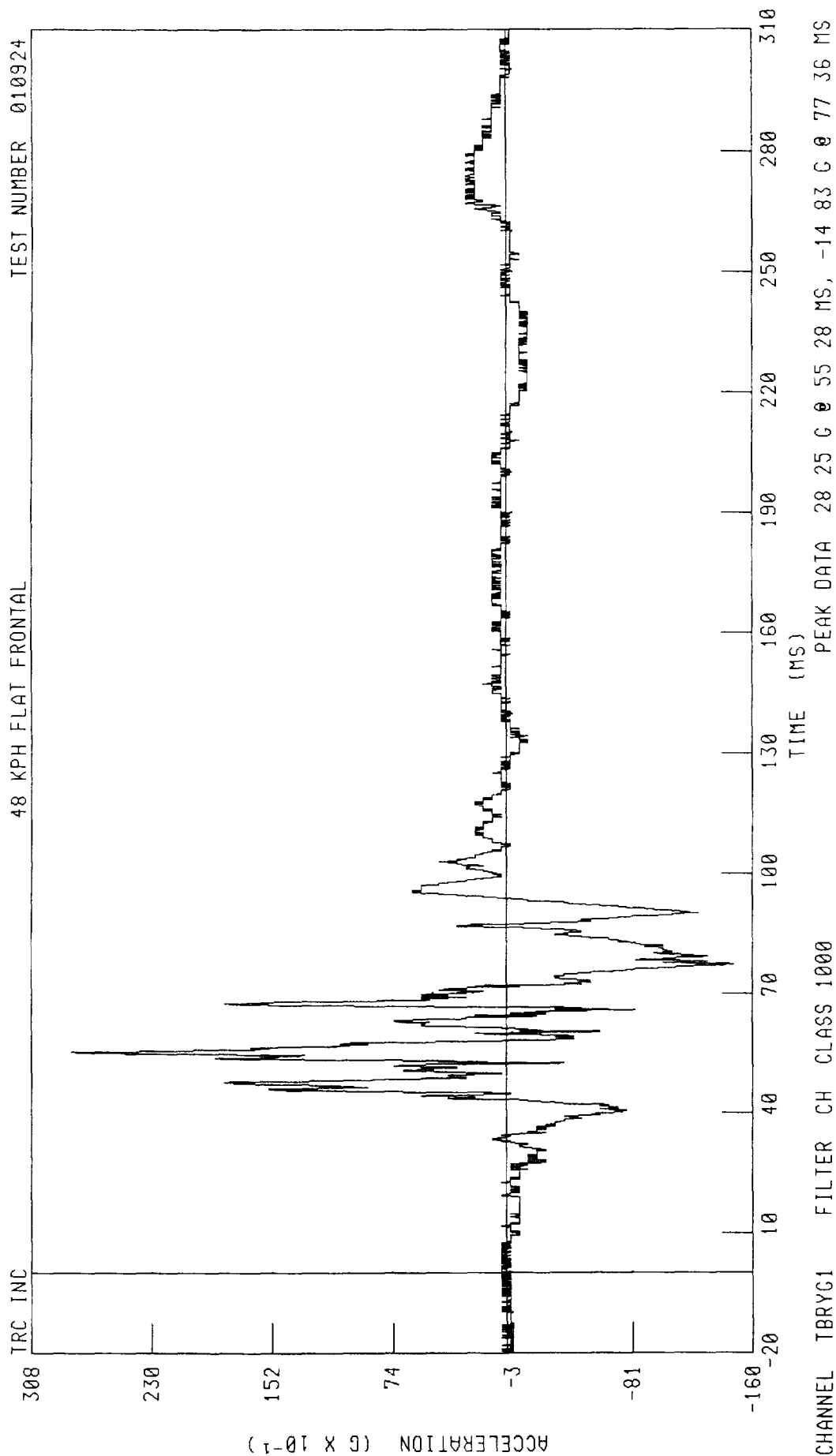
CHANNEL TBRYM1 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT TIBIA X-AXIS ACCELERATION



CHANNEL TBRXG1 FILTER CH CLASS 1000

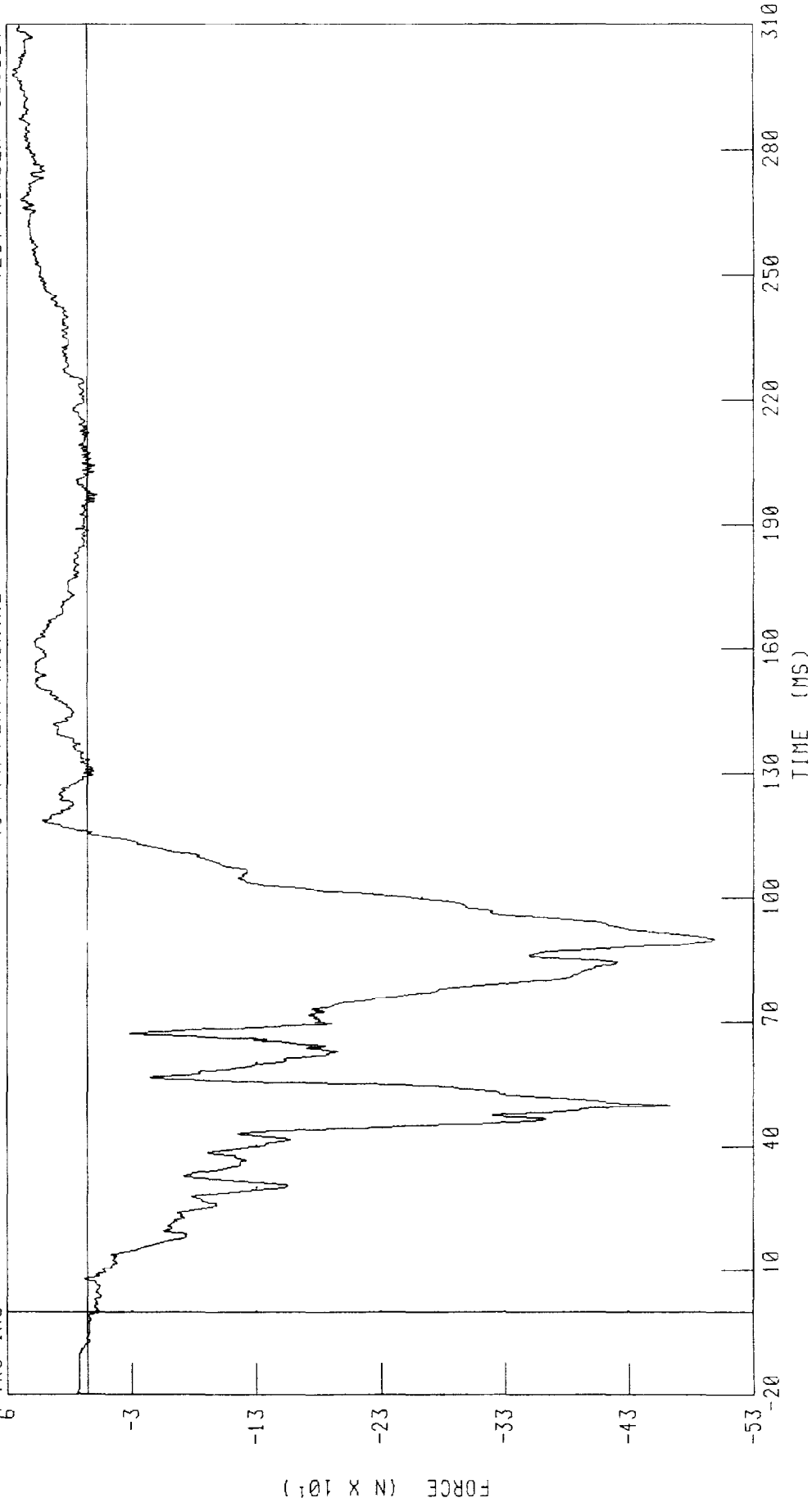
2001 TOYOTO ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT TIBIA Y-AXIS ACCELERATION



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT LOWER TIBIA X-AXIS FORCE
48 KPH FLAT FRONTAL

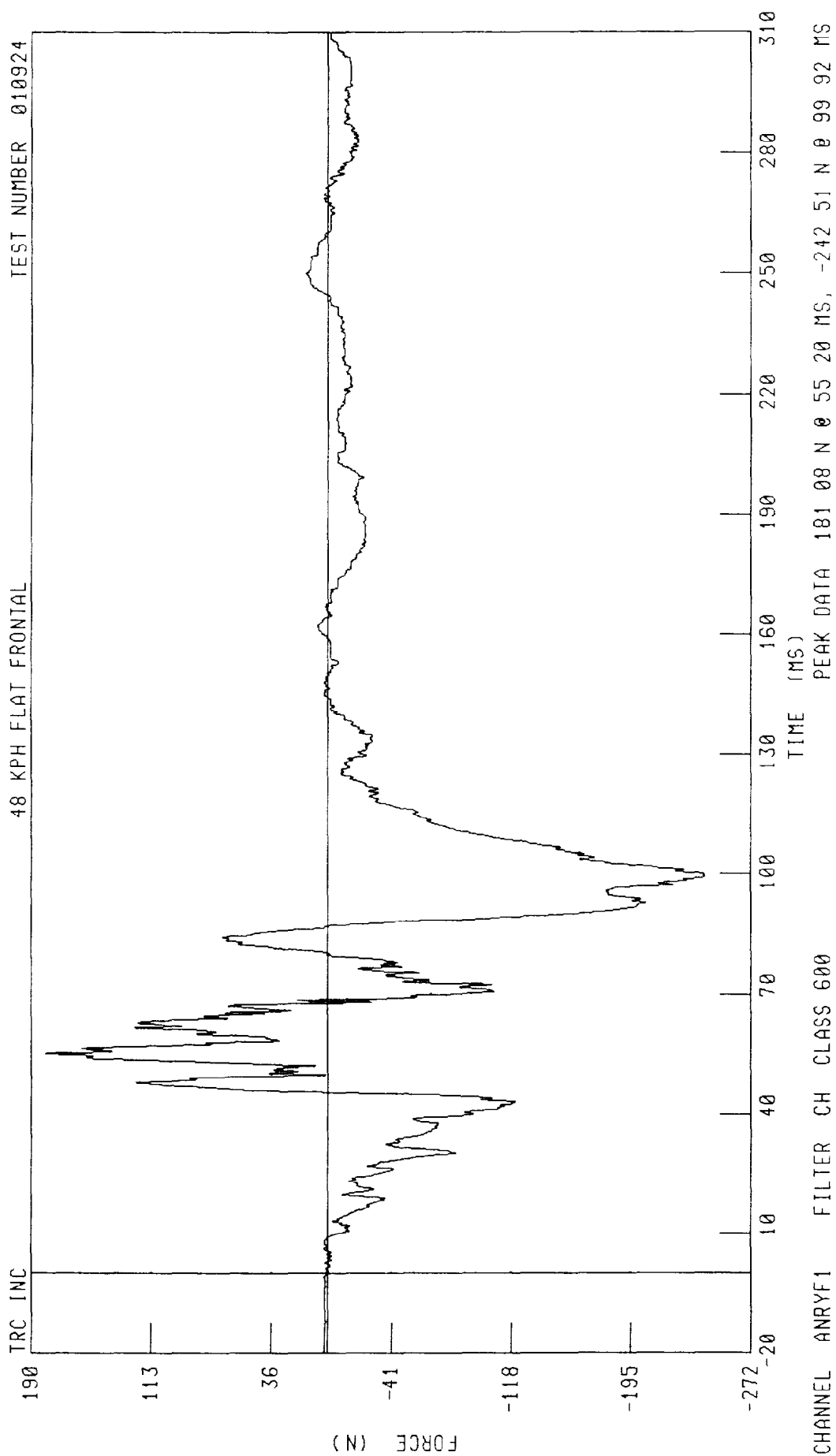
TRC INC

TEST NUMBER 010924

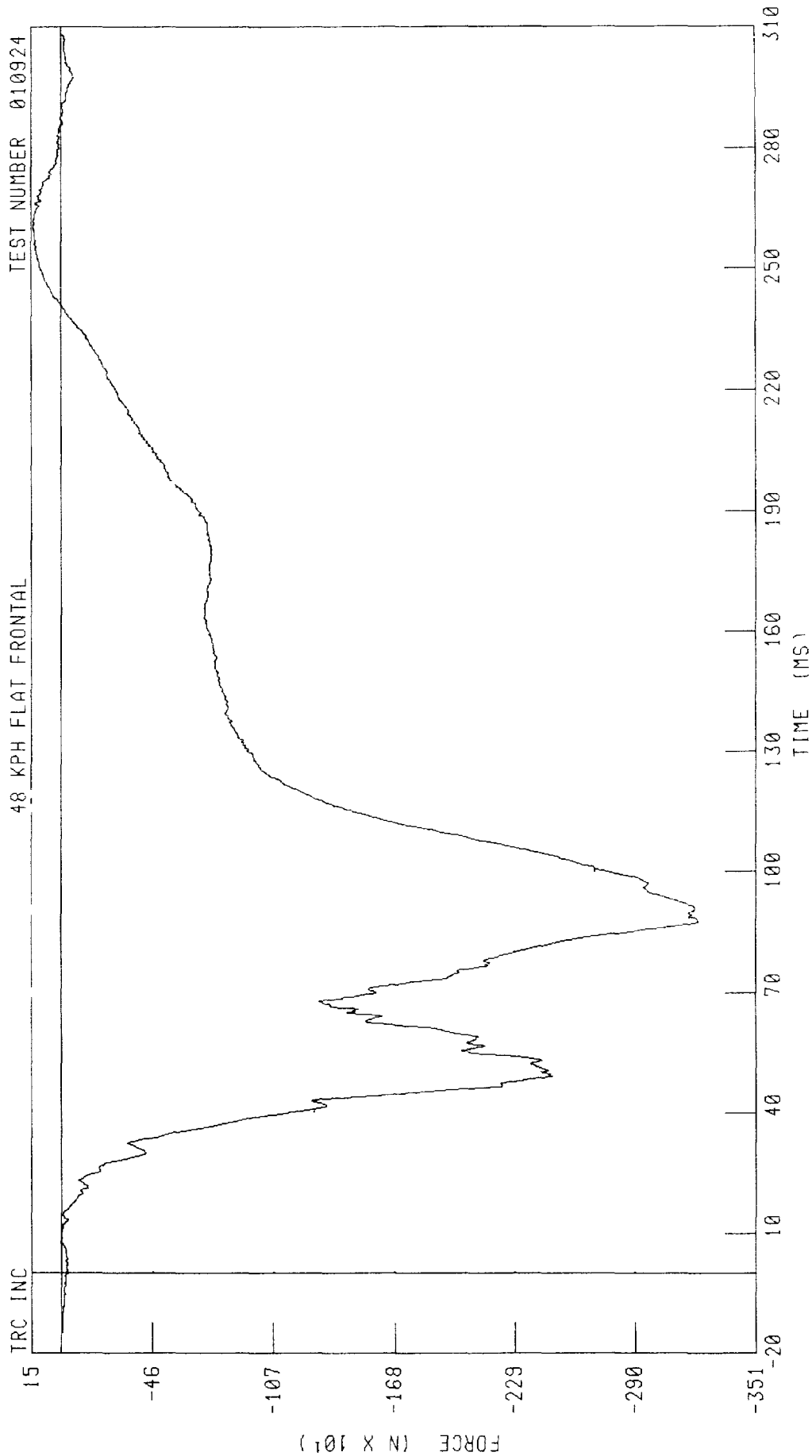


CHANNEL ANRYF1 FILTER CH CLASS 600 PEAK DATA 59 09 N @ 297 68 MS, -504 87 N @ 90 24 MS

2001 TOYOTO ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER RIGHT LOWER TIBIA Y-AXIS FORCE

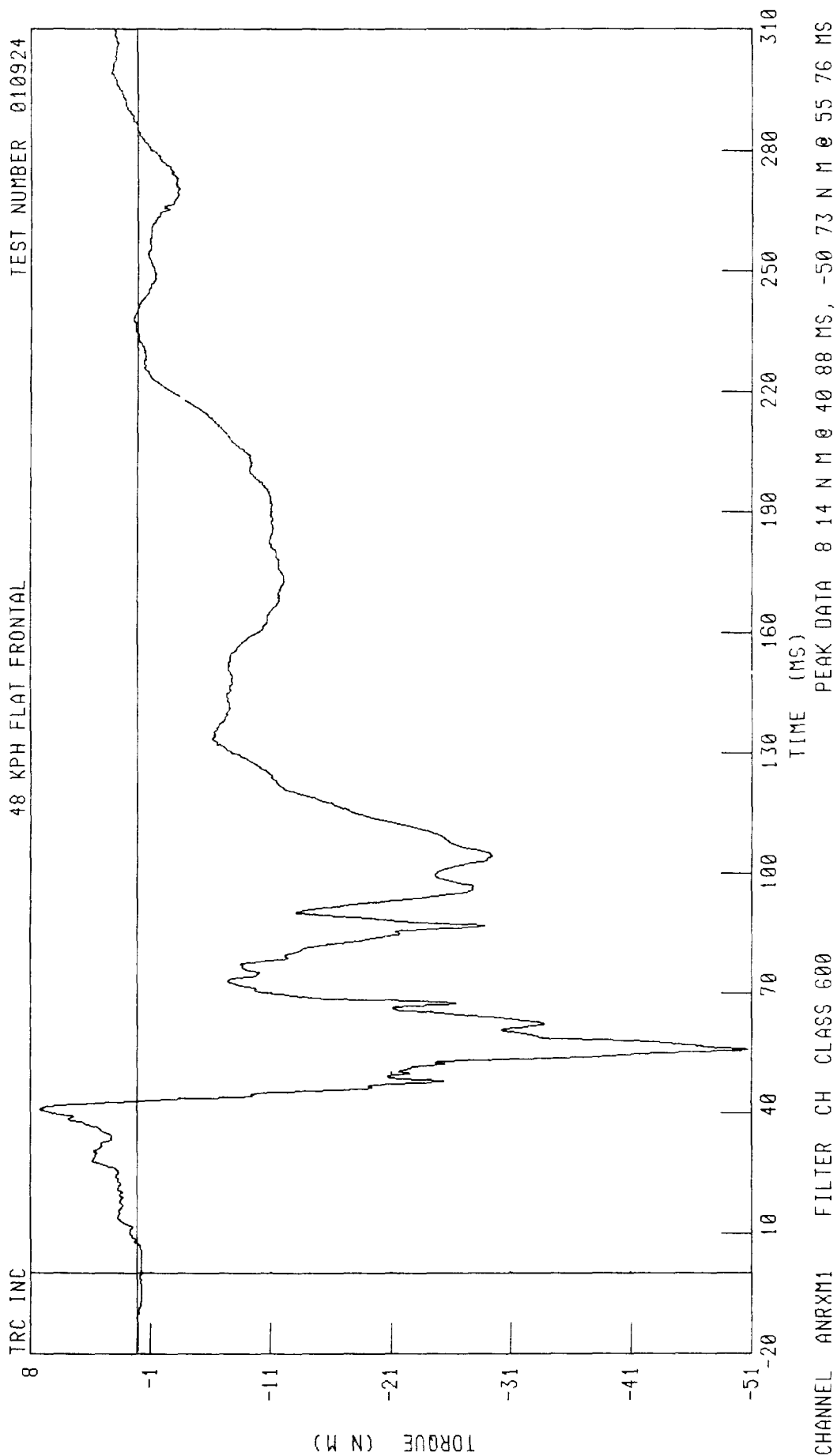


2001 TOYOTO ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER RIGHT LOWER TIBIA Z-AXIS FORCE
 48 KPH FLAT FRONTAL



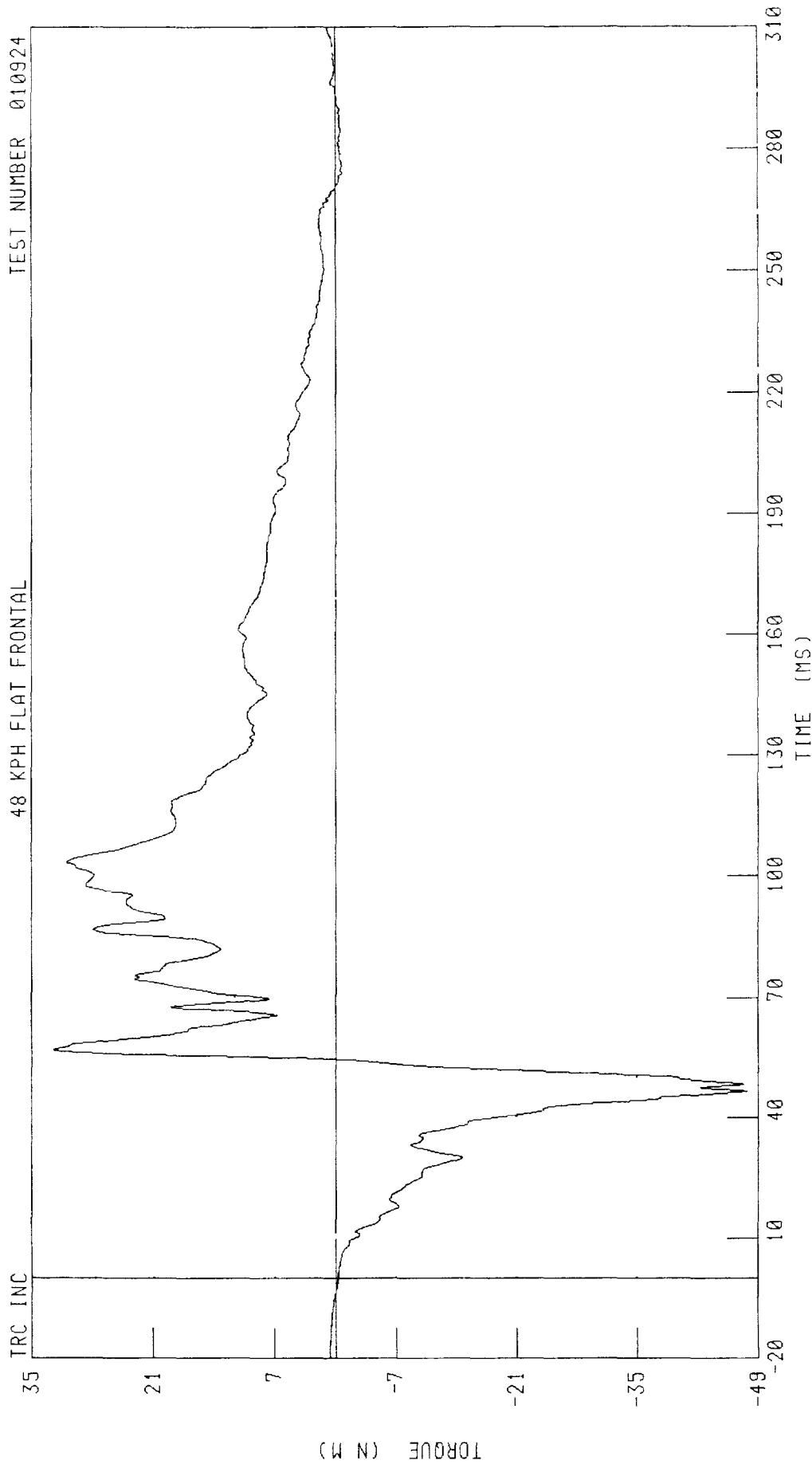
CHANNEL ANRZF1 FILTER CH CLASS 600

2001 TOYOTO ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT LOWER TIBIA MOMENT ABOUT X AXIS



2001 TOYOTO ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS
48 KPH FLAT FRONTAL

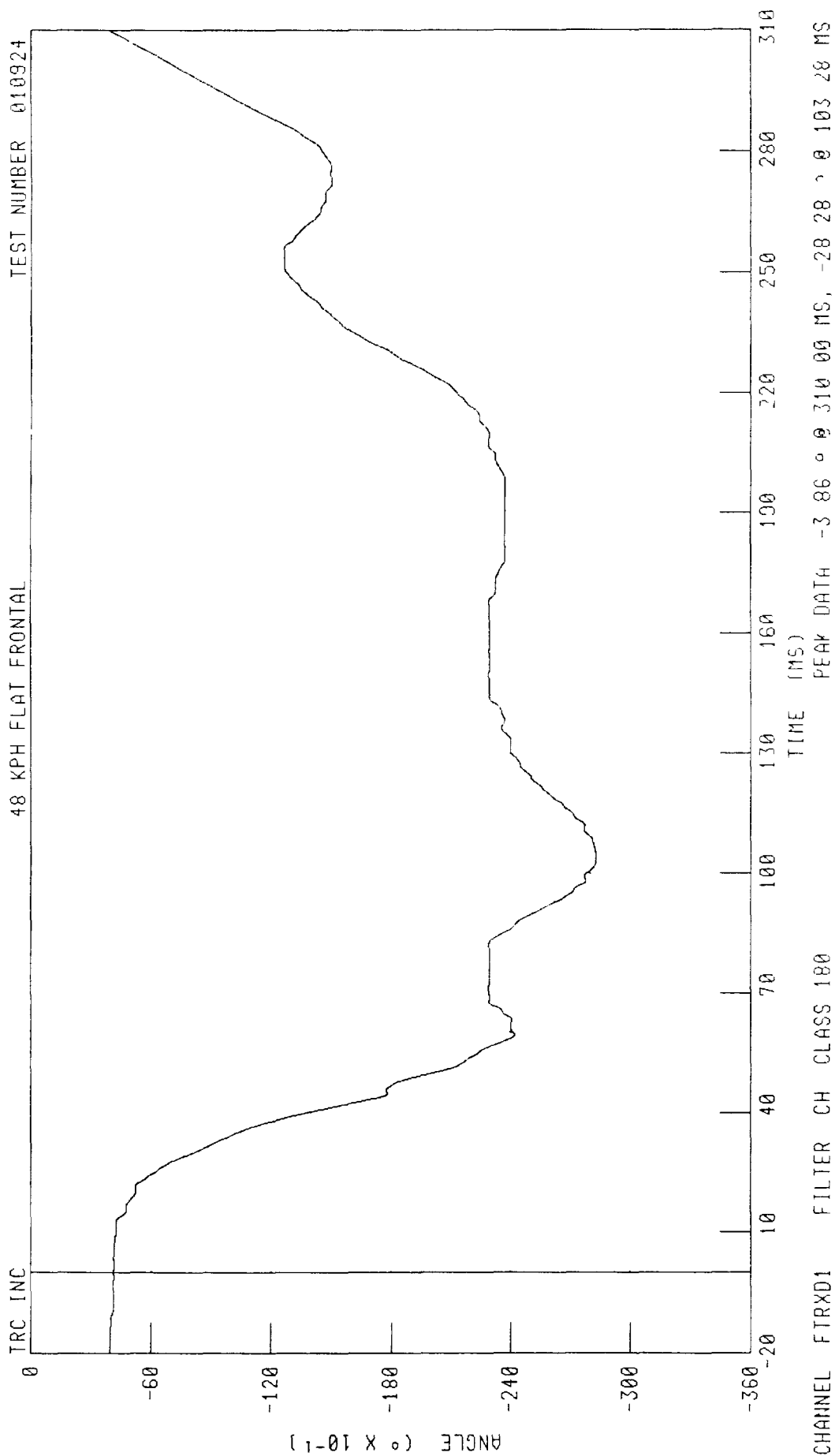
TEST NUMBER 010924



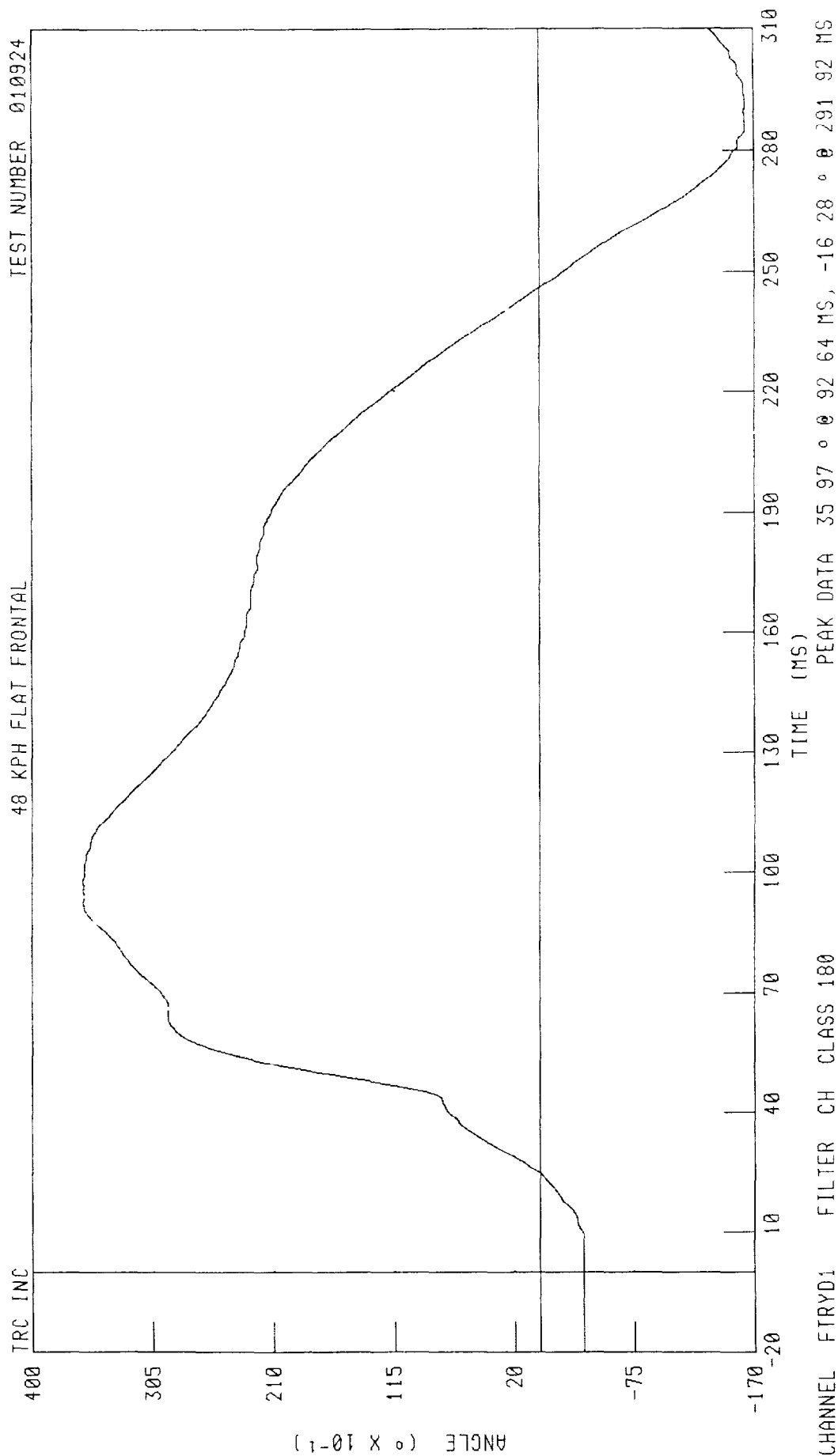
PEAK DATA 32 54 N M @ 56 80 MS, -47 73 N M @ 46 56 MS

CHANNEL ANRYM1 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER RIGHT FOOT TO ANKLE X-AXIS DISPLACEMENT

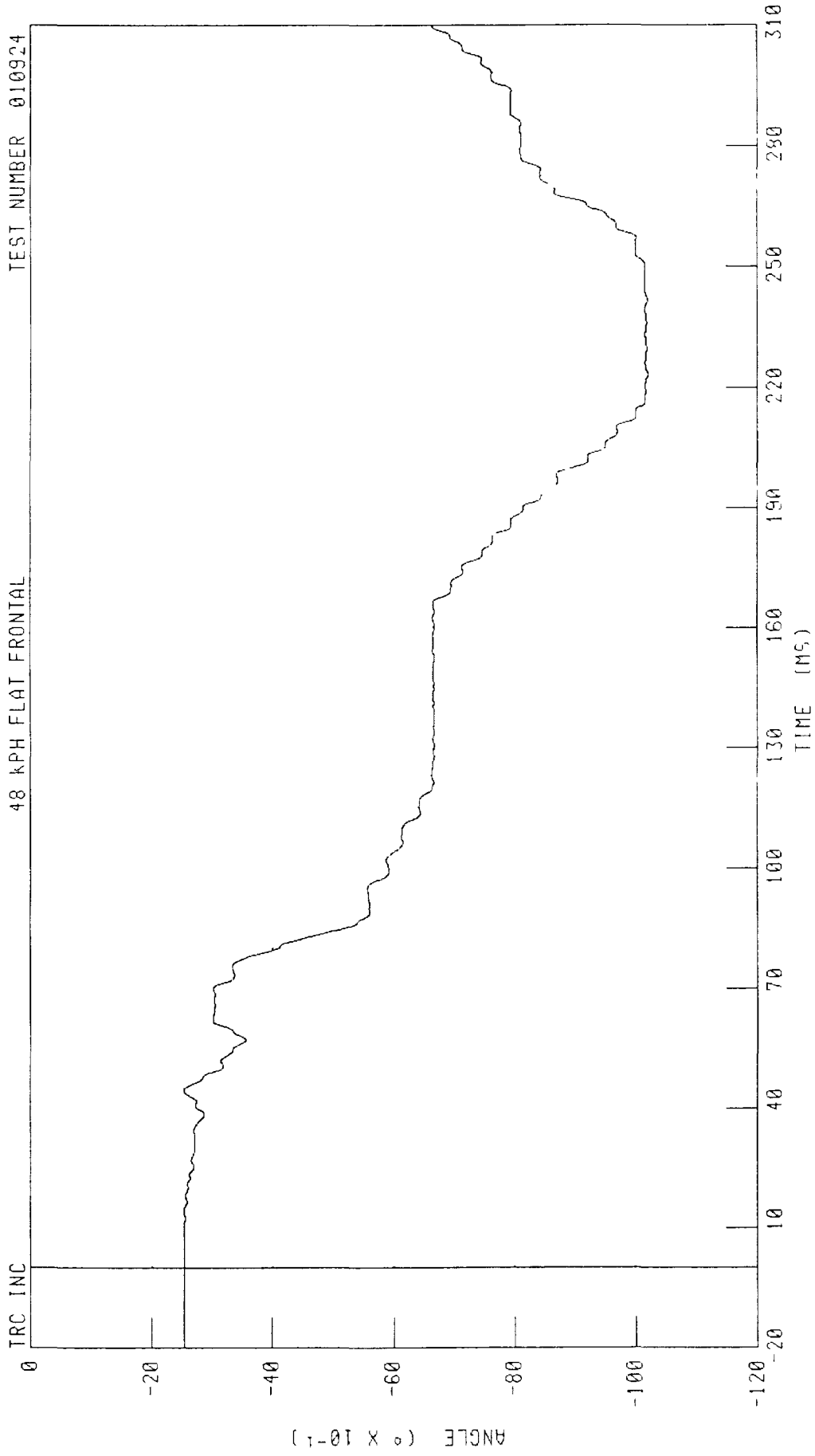


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER RIGHT FOOT TO ANKLE Y-AXIS DISPLACEMENT



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT FOOT TO ANKLE Z-AXIS DISPLACEMENT

48 KPH FLAT FRONTAL TEST NUMBER 010924

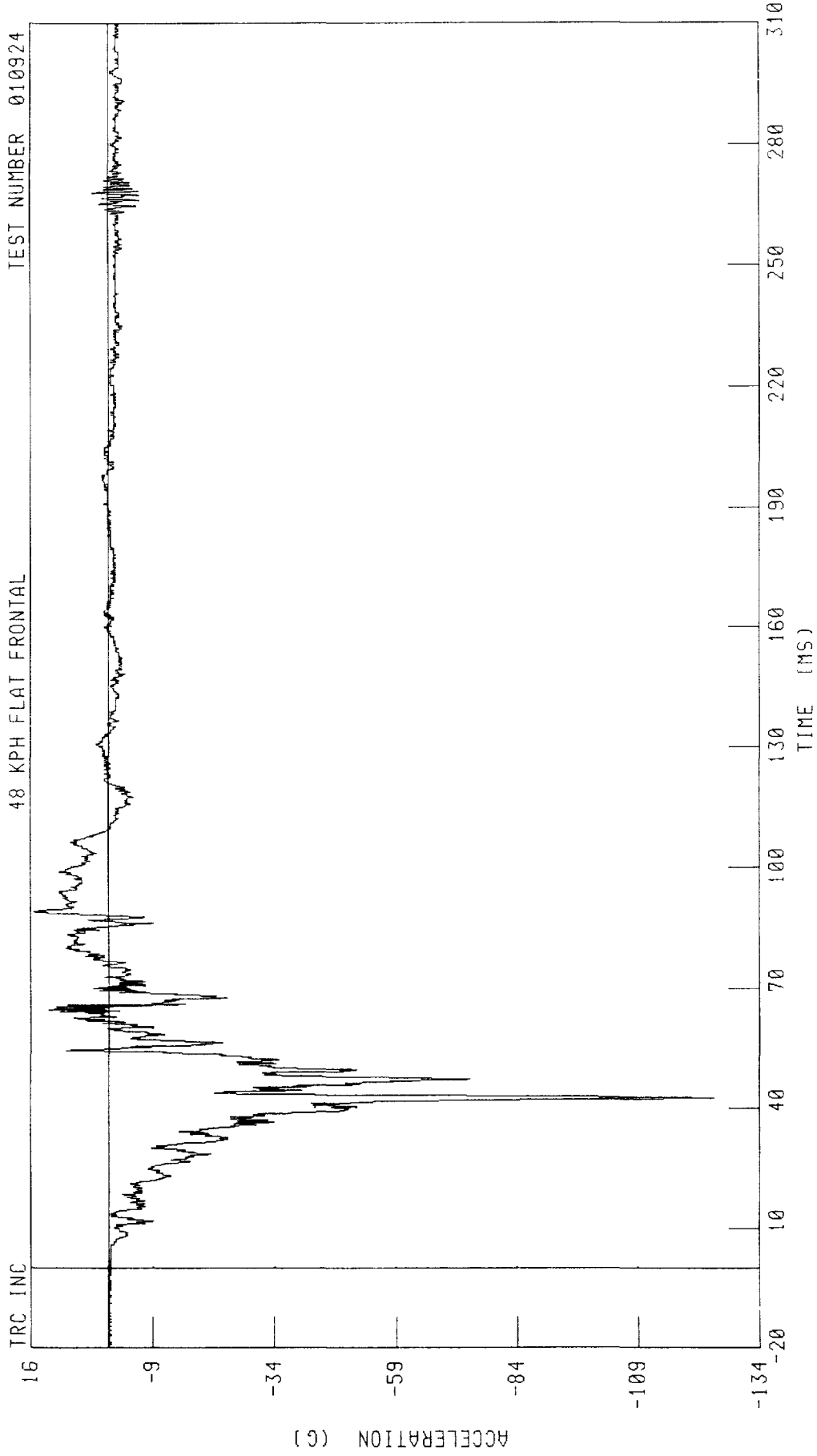


CHANNEL FTRZD1 FILTER CH CLASS 180 PEAK DATA -2.53 @ -12.00 MS, 10.21 @ 223.28 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 DRIVER RIGHT FOOT X-AXIS ACCELERATION
 48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



PEAK DATA 15 39 C @ 89 12 MS, -124 70 C @ 42 48 MS

CHANNEL F1RXG1 FILTER CH CLASS 1000

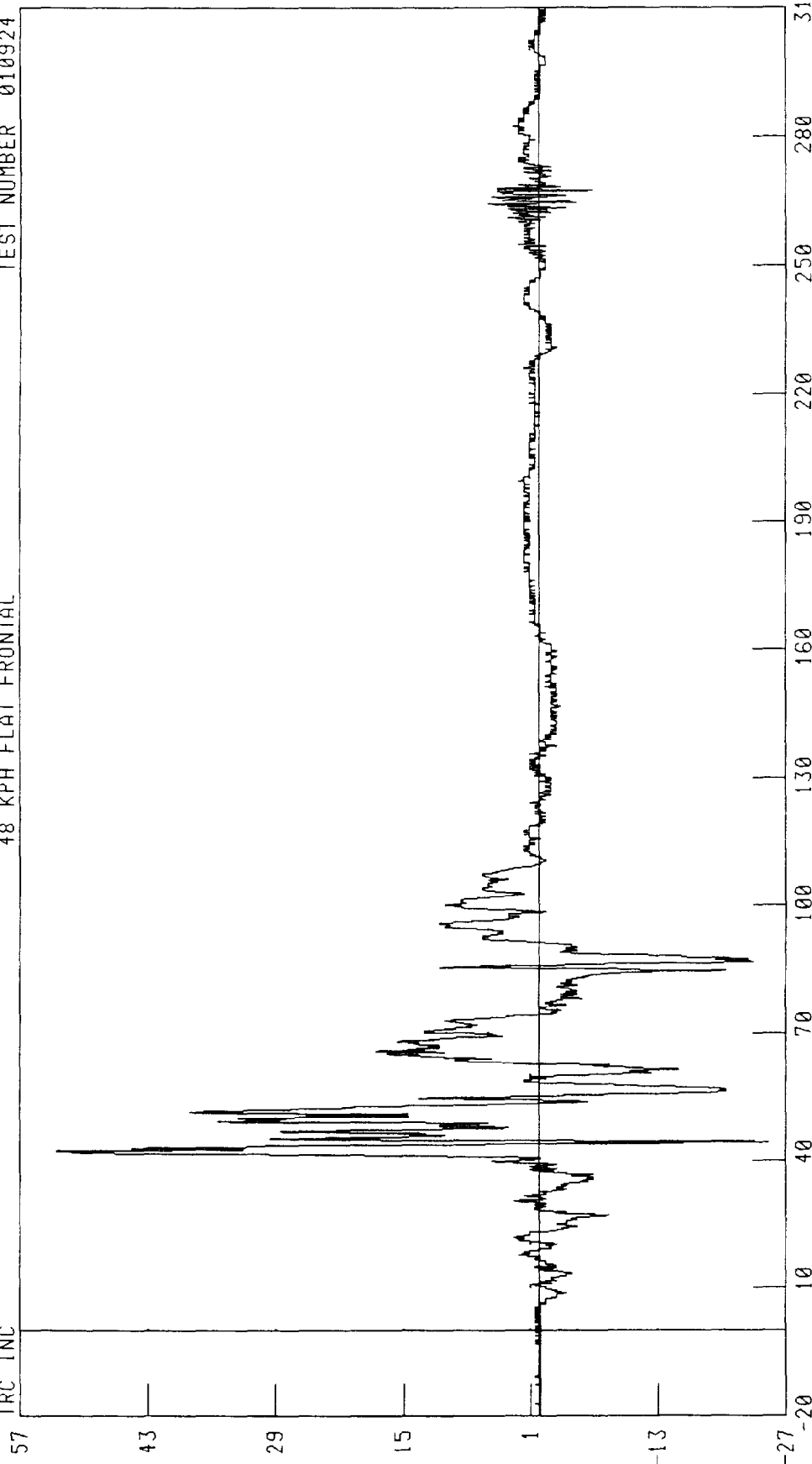
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER RIGHT FOOT Y-AXIS ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



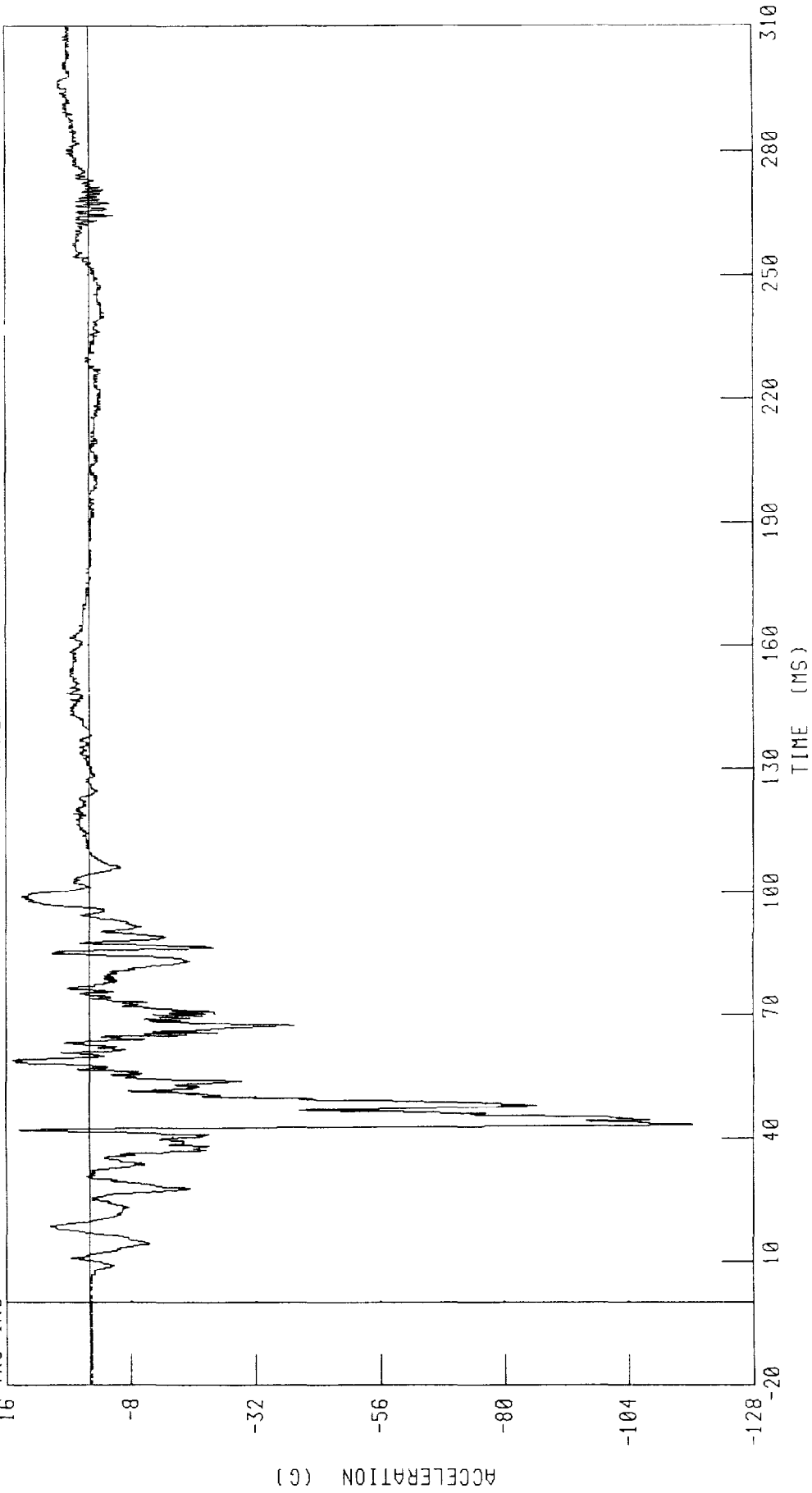
CHANNEL F1RYG1 FILTER CH CLASS 1000

PEAK DATA 53 02 G @ 42 32 MS, -25 17 G @ 44 32 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER RIGHT FOOT Z-AXIS ACCELERATION
48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



PEAK DATA 14 80 G @ 58 72 MS, -116 44 G @ 43 28 MS

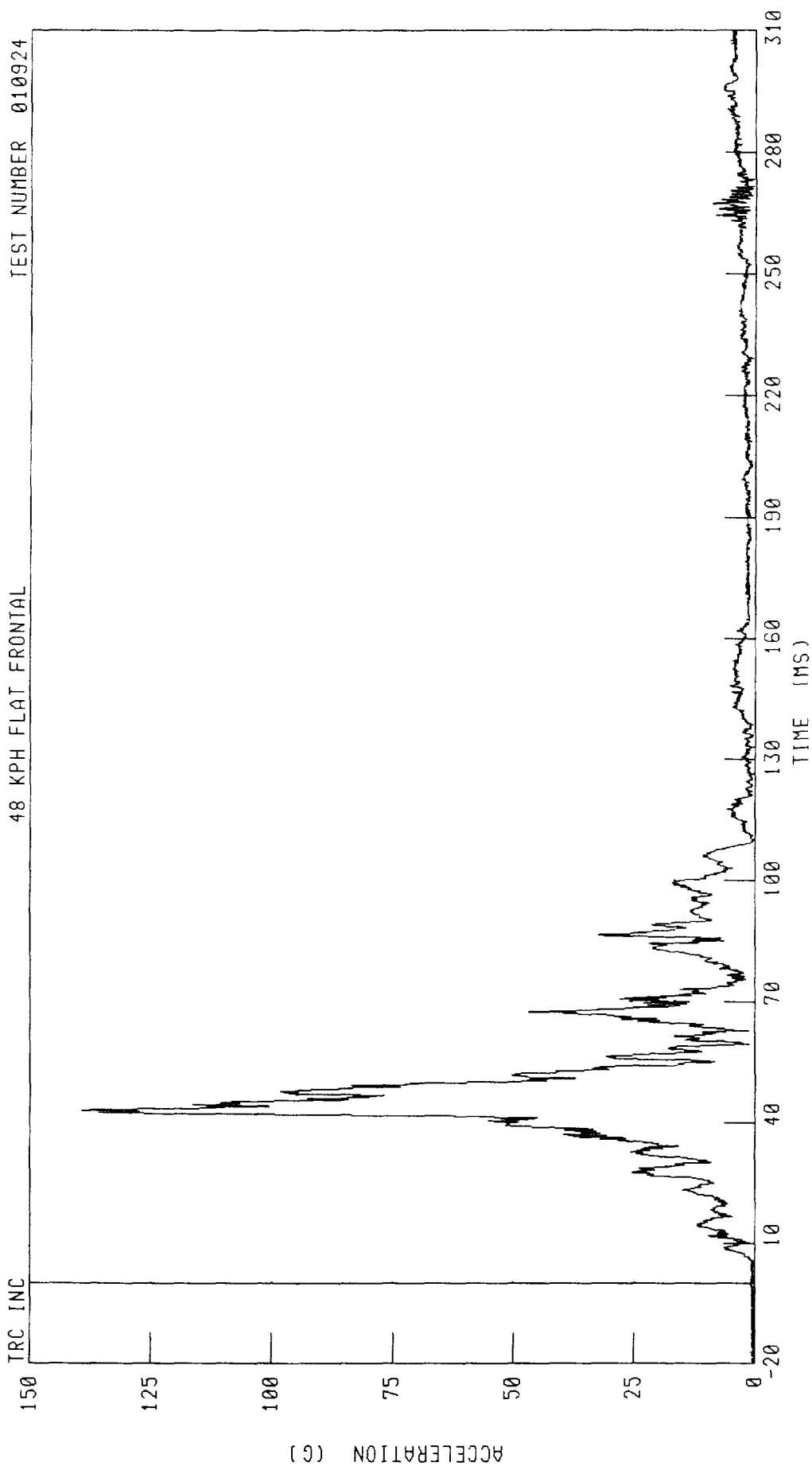
CHANNEL FTRZG1 FILIER CH CLASS 1000

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

DRIVER RIGHT FOOT RESULTANT ACCELERATION

48 KPH FLAT FRONTAL

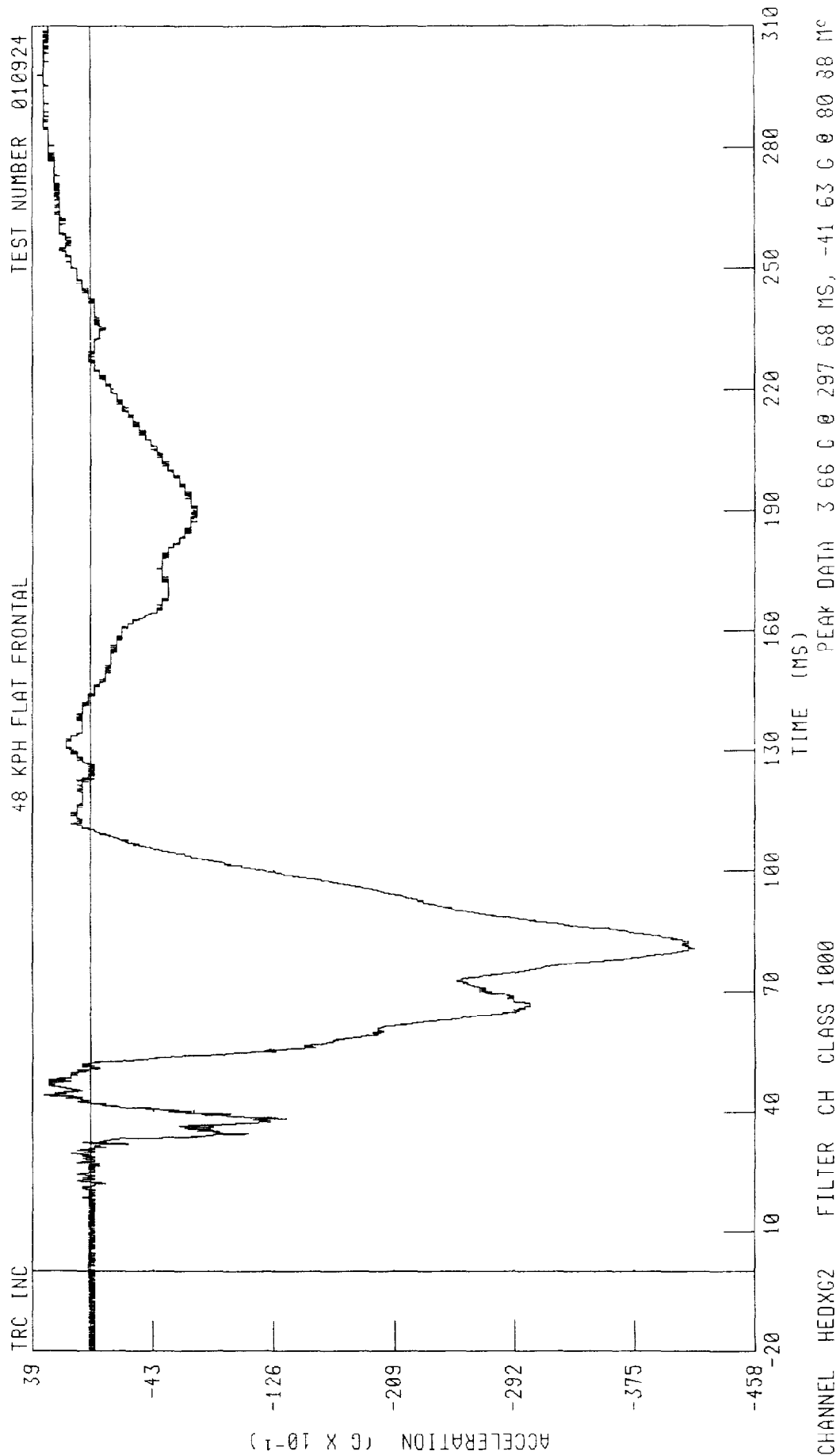
TEST NUMBER 010924



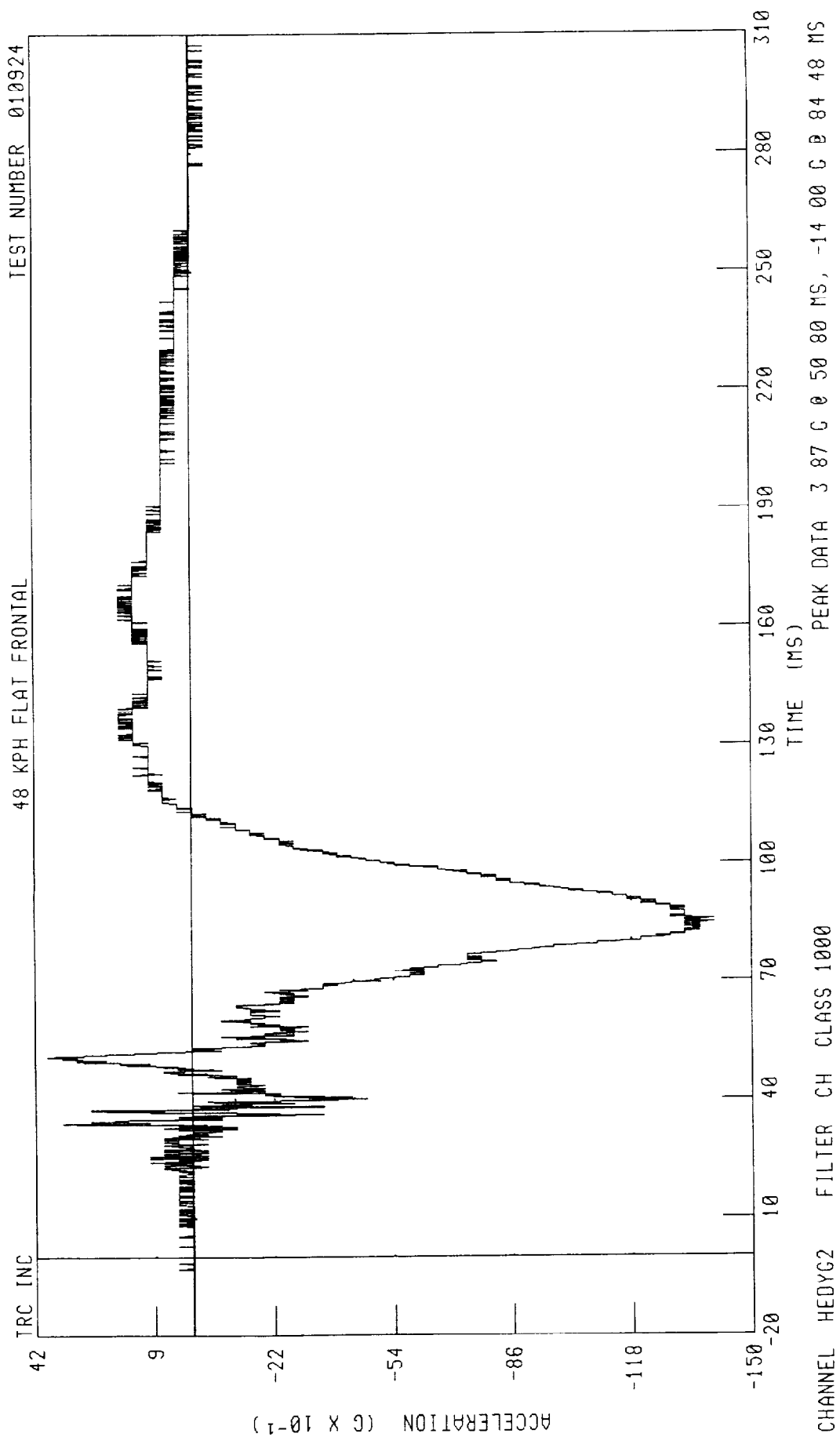
CHANNEL FTRG1 FILTER CH CLASS 1000 PEAK DATA 139 25 C 0 43 04 MS, 0 19 G 0 -20 00 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER HEAD X-AXIS ACCELERATION



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER HEAD Y-AXIS ACCELERATION

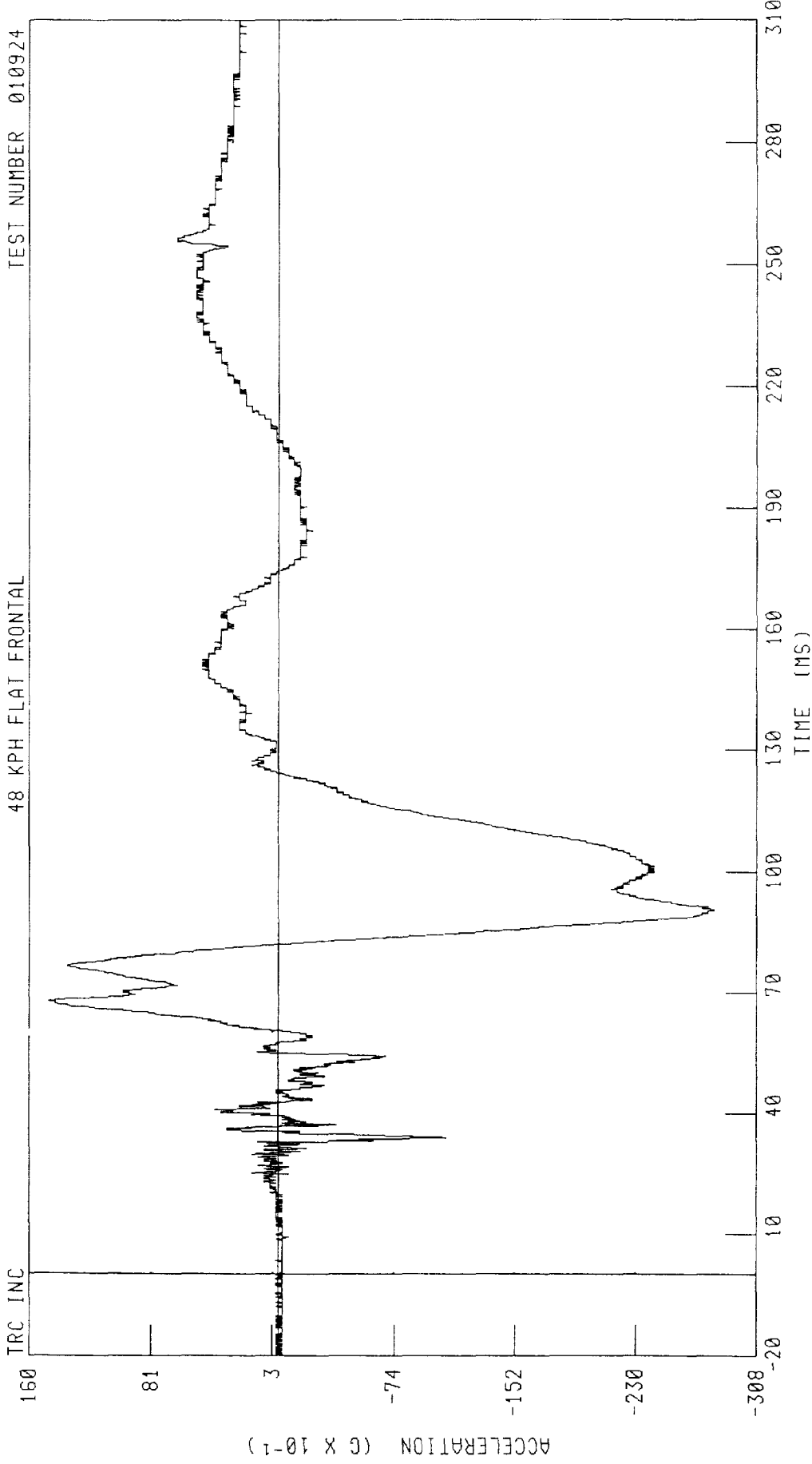


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER HEAD Z-AXIS ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

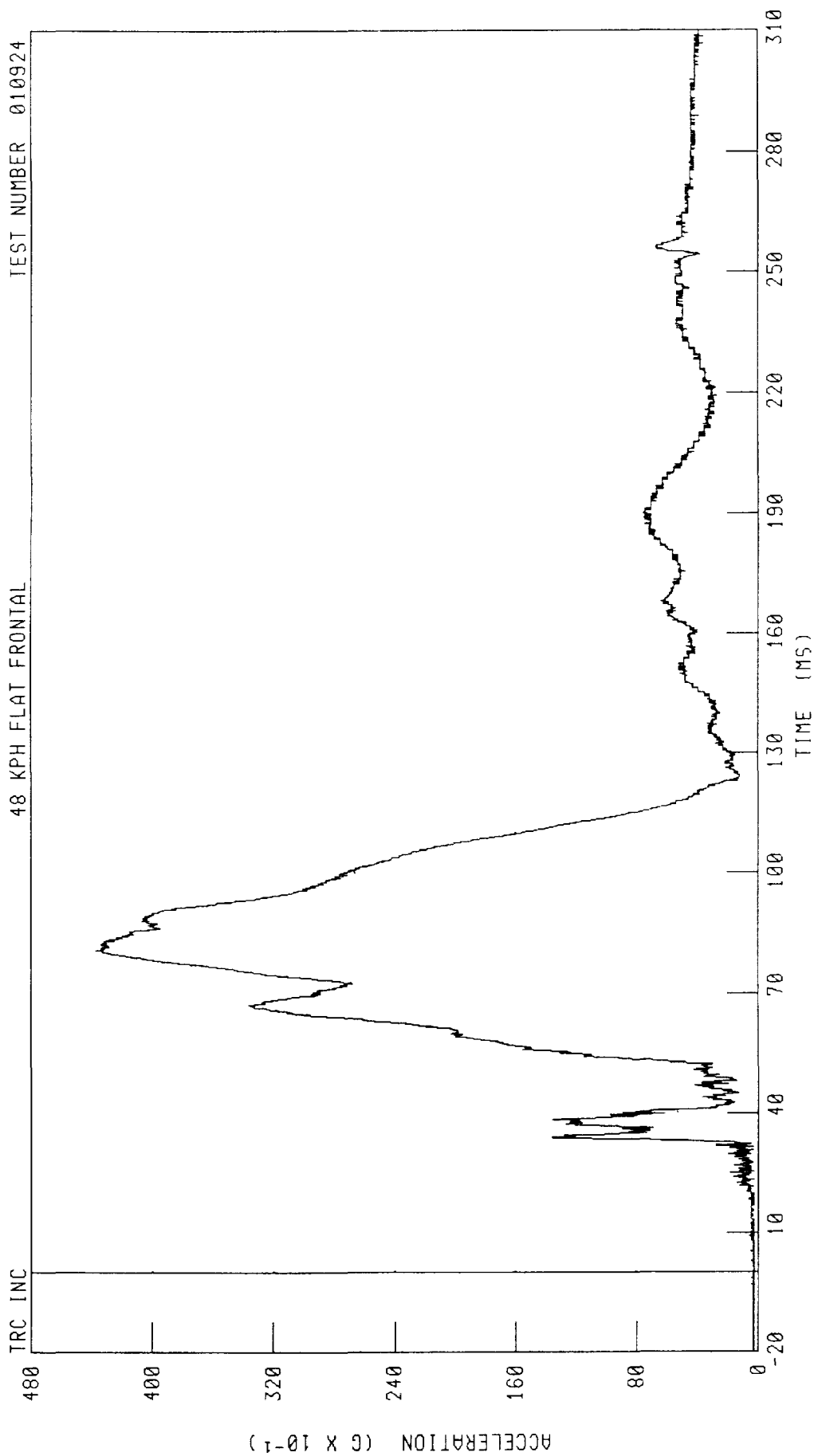


CHANNEL HEDZC2 FILTER CH CLASS 1000

PEAK DATA 14 74 G @ 67 68 MS, -28 11 G @ 90 48 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER HEAD RESULTANT ACCELERATION

48 KPH FLAT FRONTAL TEST NUMBER 010924



CHANNEL HEORG2 FILTER CH CLASS 1000

PEAK DATA 43 72 G @ 80 88 MS, 0 24 G @ -18 80 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER HEAD X-AXIS ACCELERATION REDUNDANT

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC

37

-43

-123

-203

-283

-363

-443

ACCELERATION (C X 10⁻¹)

TIME (MS)

310

280

250

220

190

160

130

100

70

40

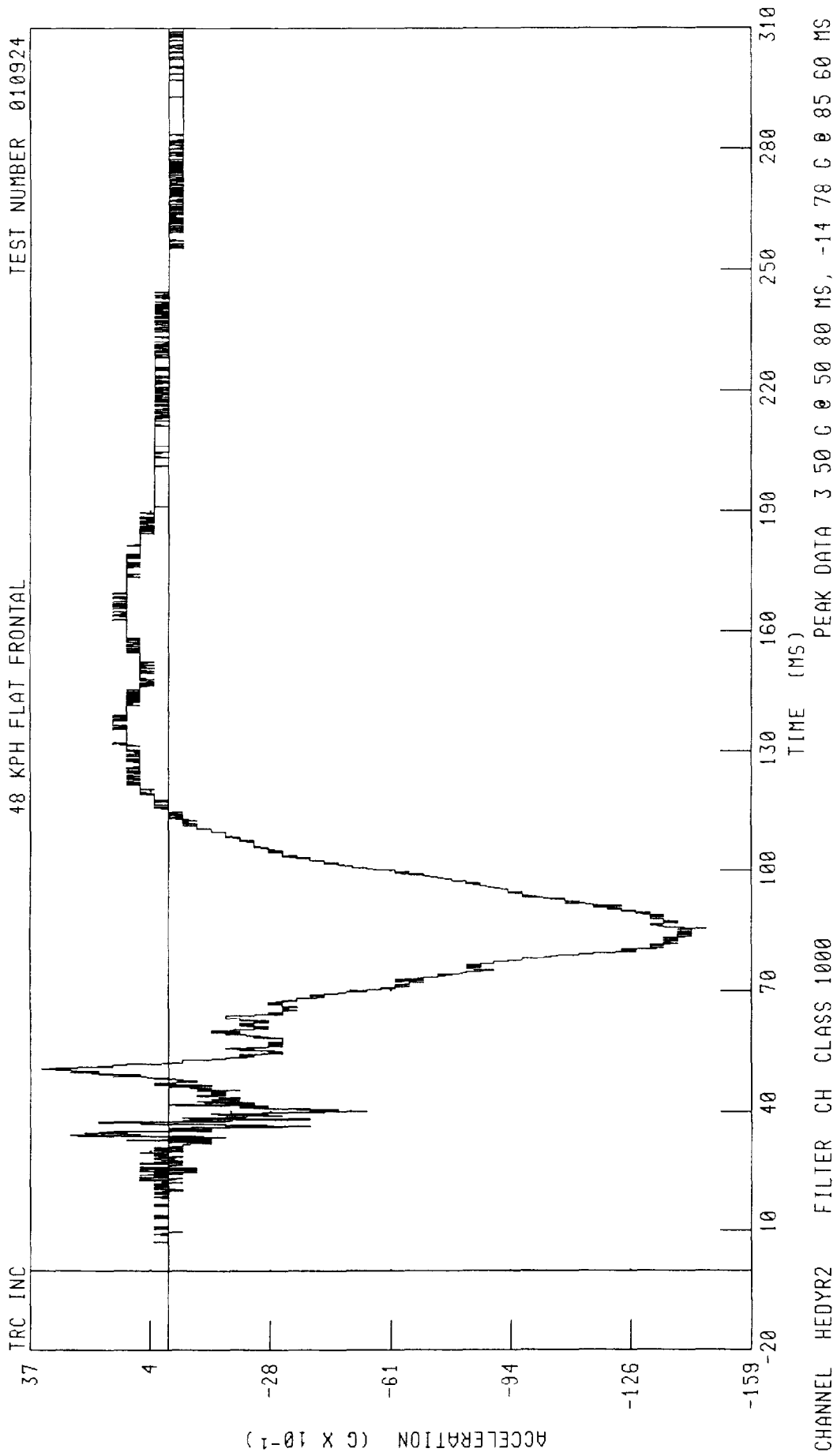
10

-20

CHANNEL HEDXR2 FILTER CH CLASS 1000

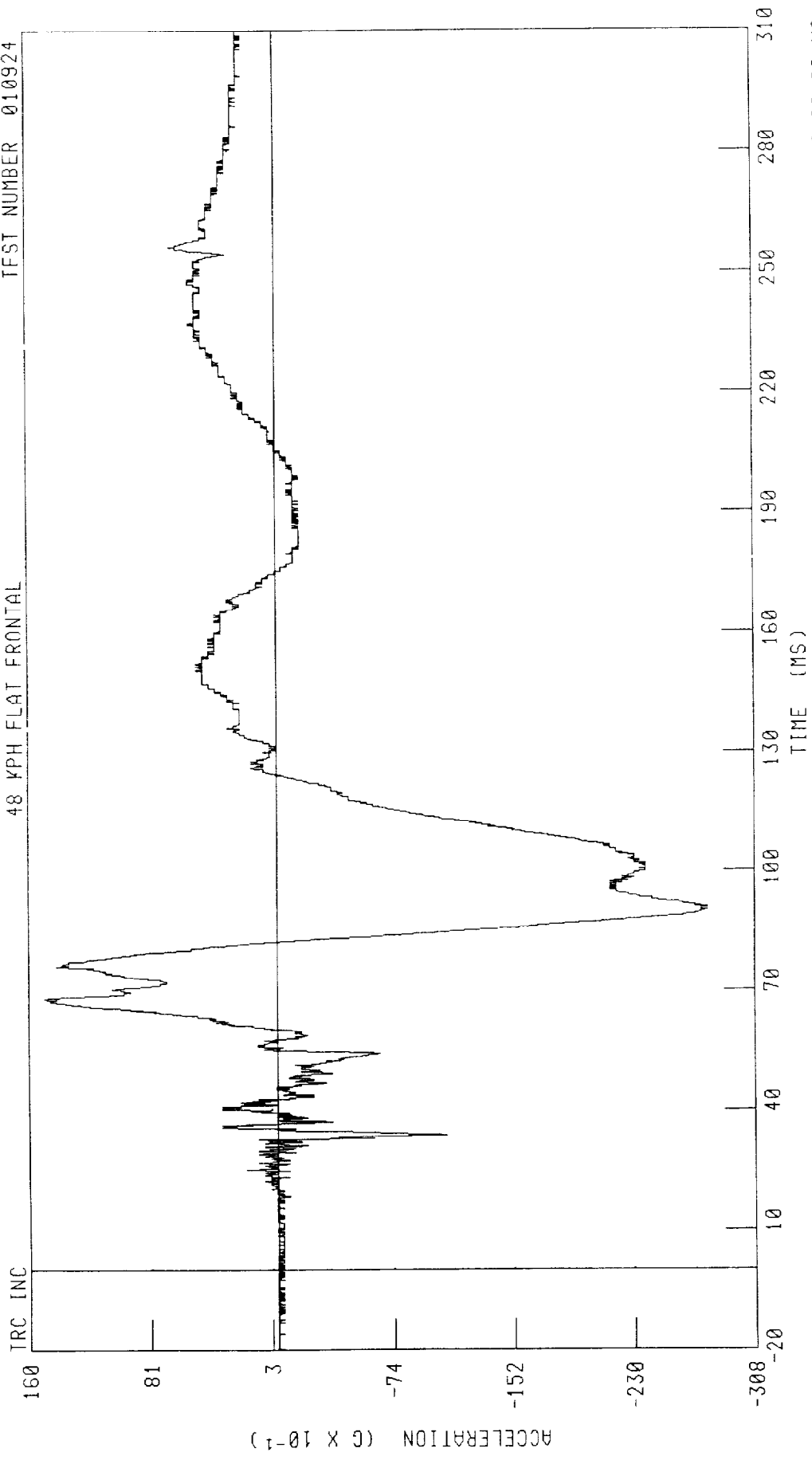
PEAK DATA 3 43 C @ 47 76 MS, -40 44 C @ 80 64 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER HEAD Y-AXIS ACCELERATION REDUNDANT



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER HEAD Z-AXIS ACCELERATION REDUNDANT
48 KPH FLAT FRONTAL

TFST NUMBER 010924



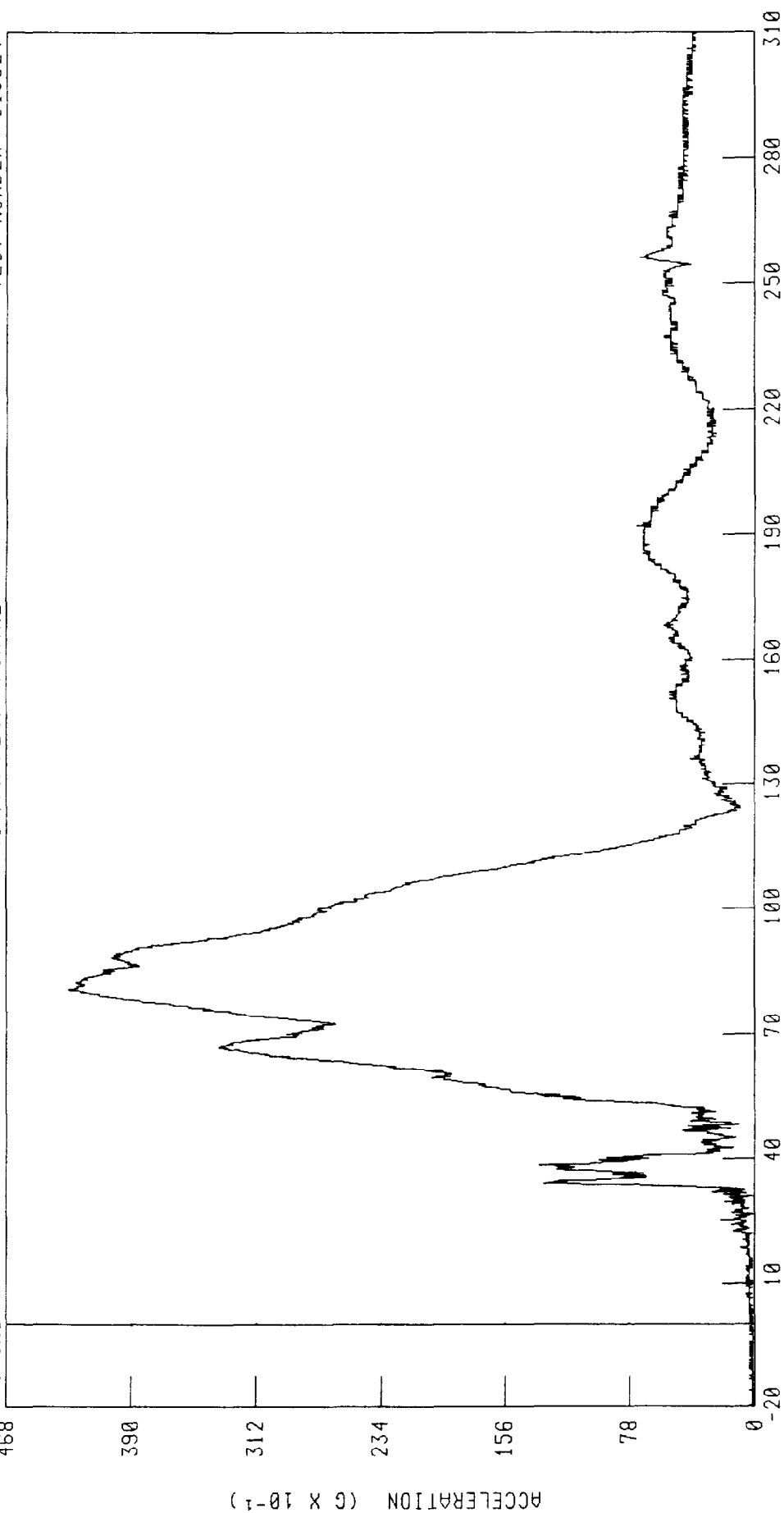
CHANNEL HEDZR2 FILTER CH CLASS 1000
PEAK DATA 14 99 6 0 67 76 MS, -27 75 0 0 90 00 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER HEAD RESULTANT ACCELERATION REDUNDANT

TRC INC

48 KPH FLAT FRONTAL

TEST NUMBER 010924



TIME (MS)

CHANNEL HEORR2 FILTER CH CLASS 1000

PEAK DATA 42 94 G @ 80 72 MS, 0 13 G @ -20 00 MS

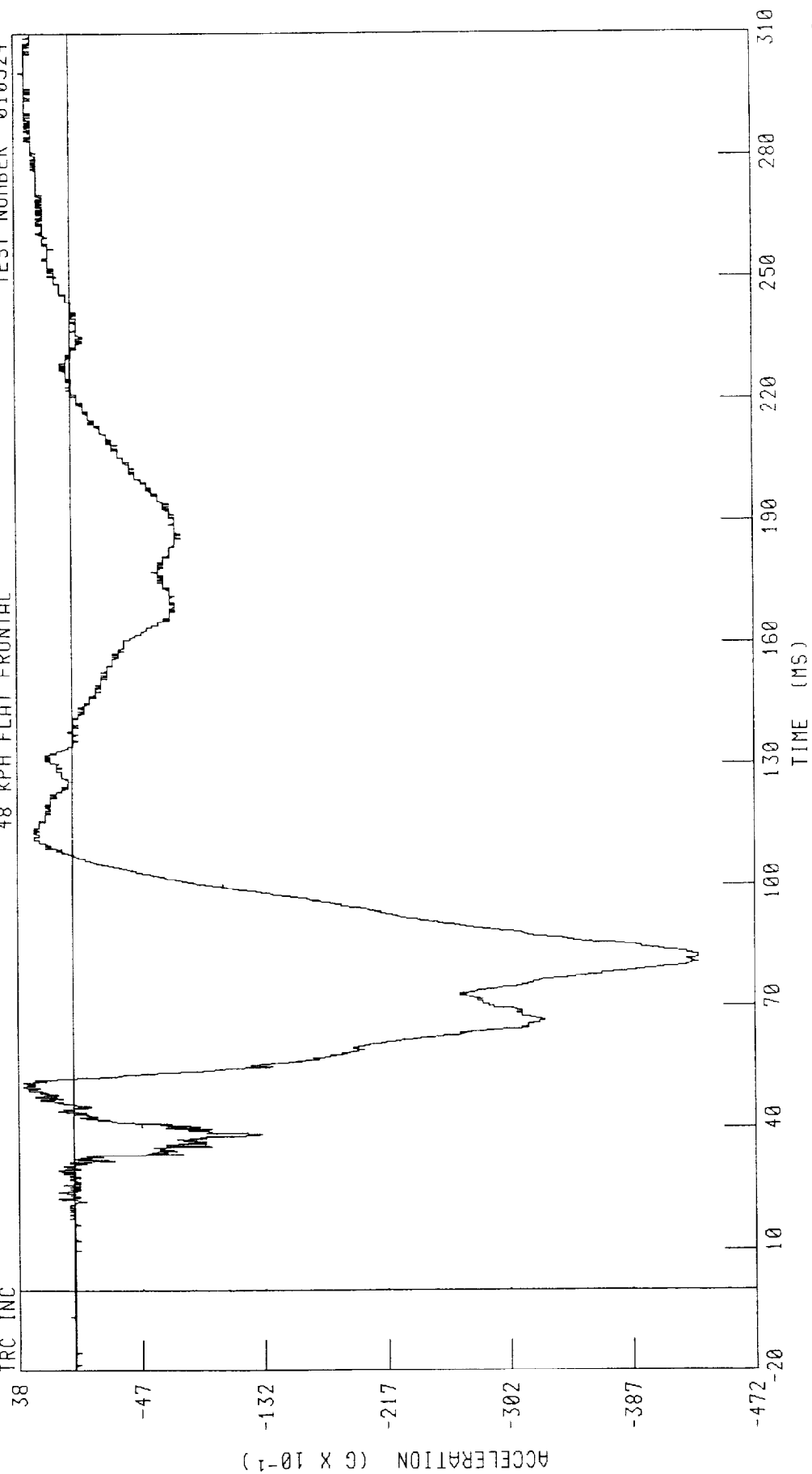
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER HEAD X-AXIS (LT) ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



CHANNEL HD1XC2 FILTER CH CLASS 1000

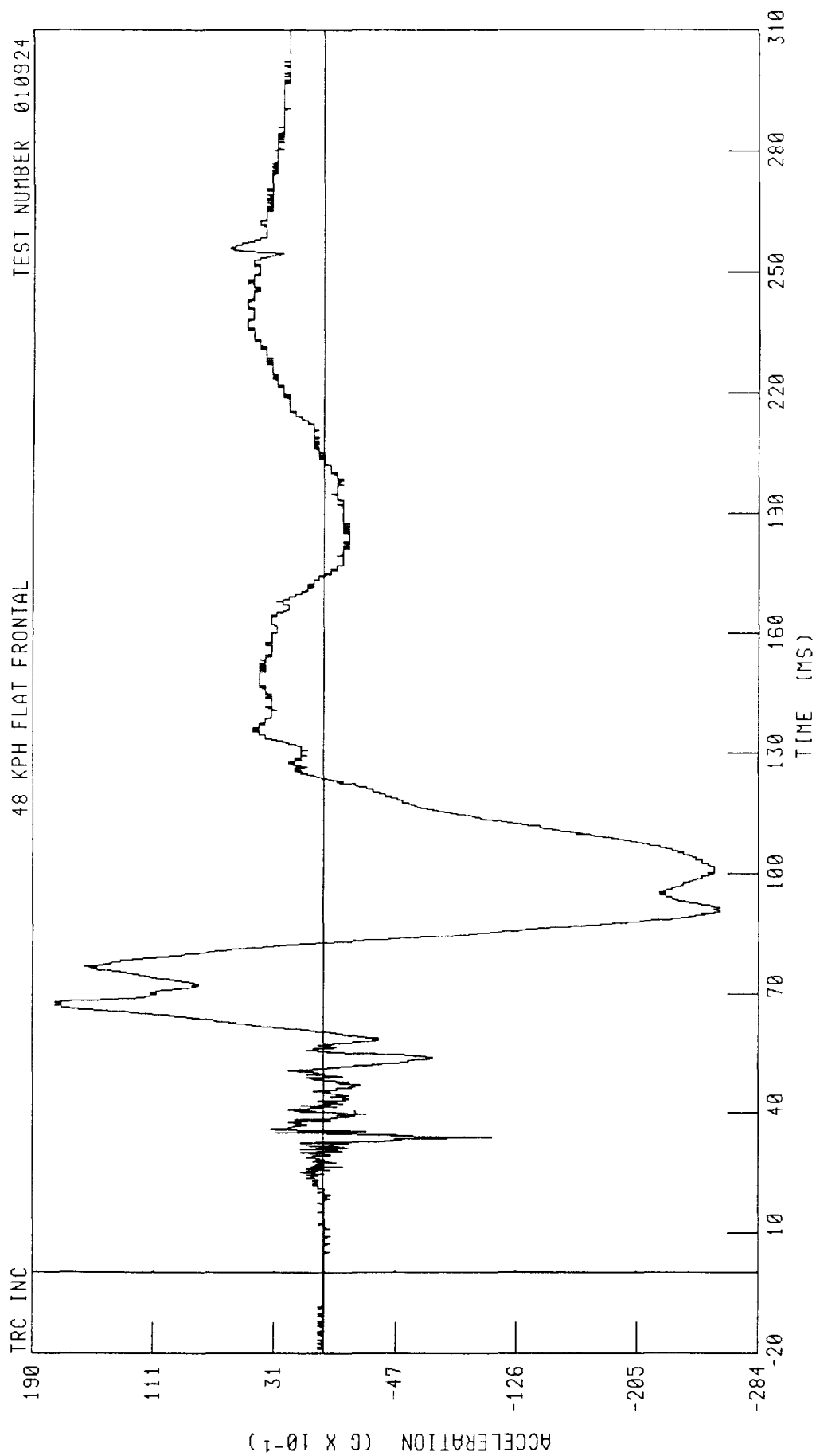
PEAK DATA 3 47 G 0 50 00 MS, -43 31 G 0 80 88 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER HEAD Z-AXIS (LT) ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

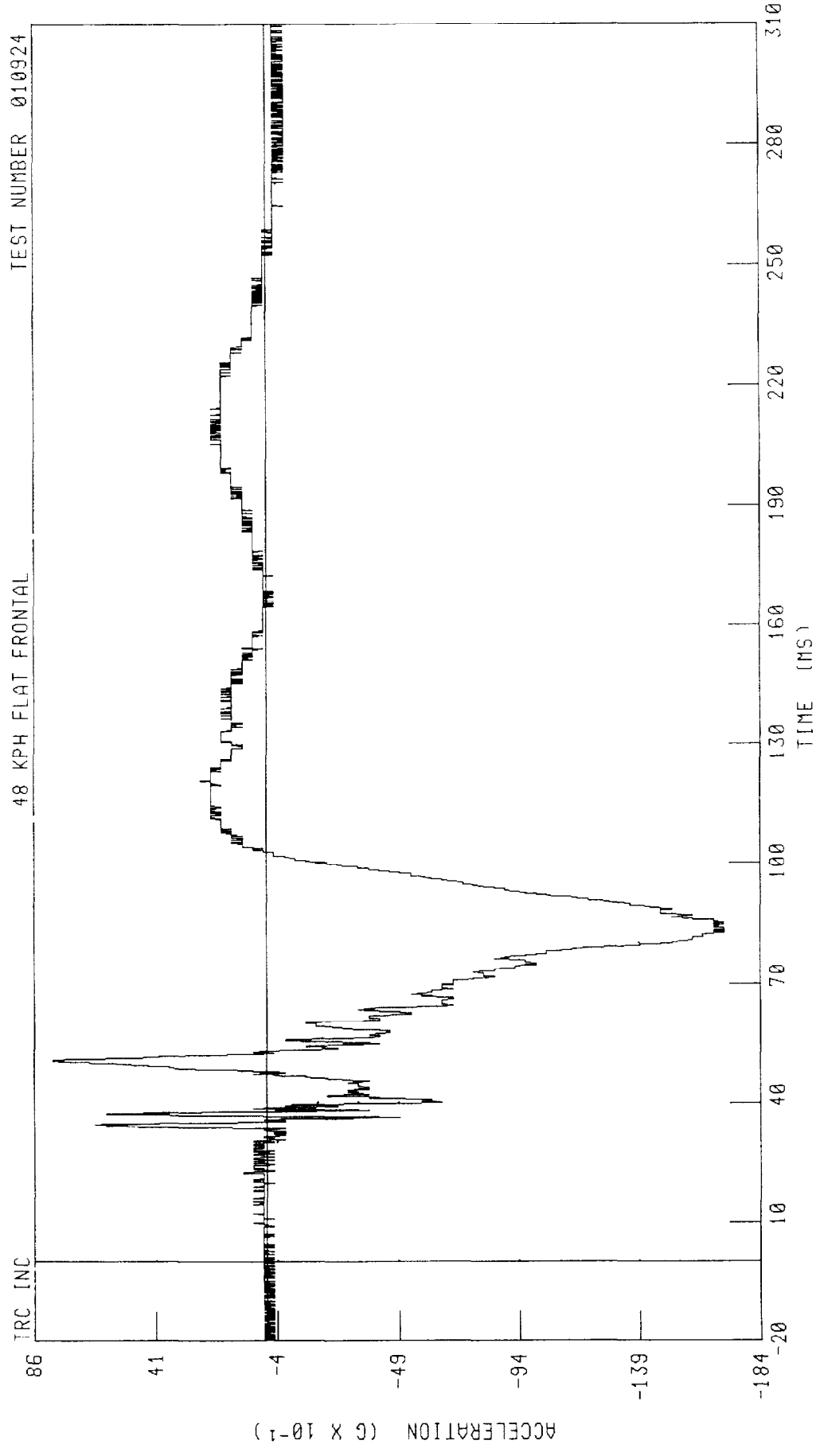


CHANNEL HD1ZG2 FILTER CH CLASS 1000

PEAK DATA 17 55 G 0 67 20 MS, -25 91 G 0 90 48 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER HEAD Y-AXIS (FT) ACCELERATION
48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL HD2YC2 FILTER CH CLASS 1000 PEAK DATA 7 91 G @ 50 48 MS -17 07 G @ 82 56 MS

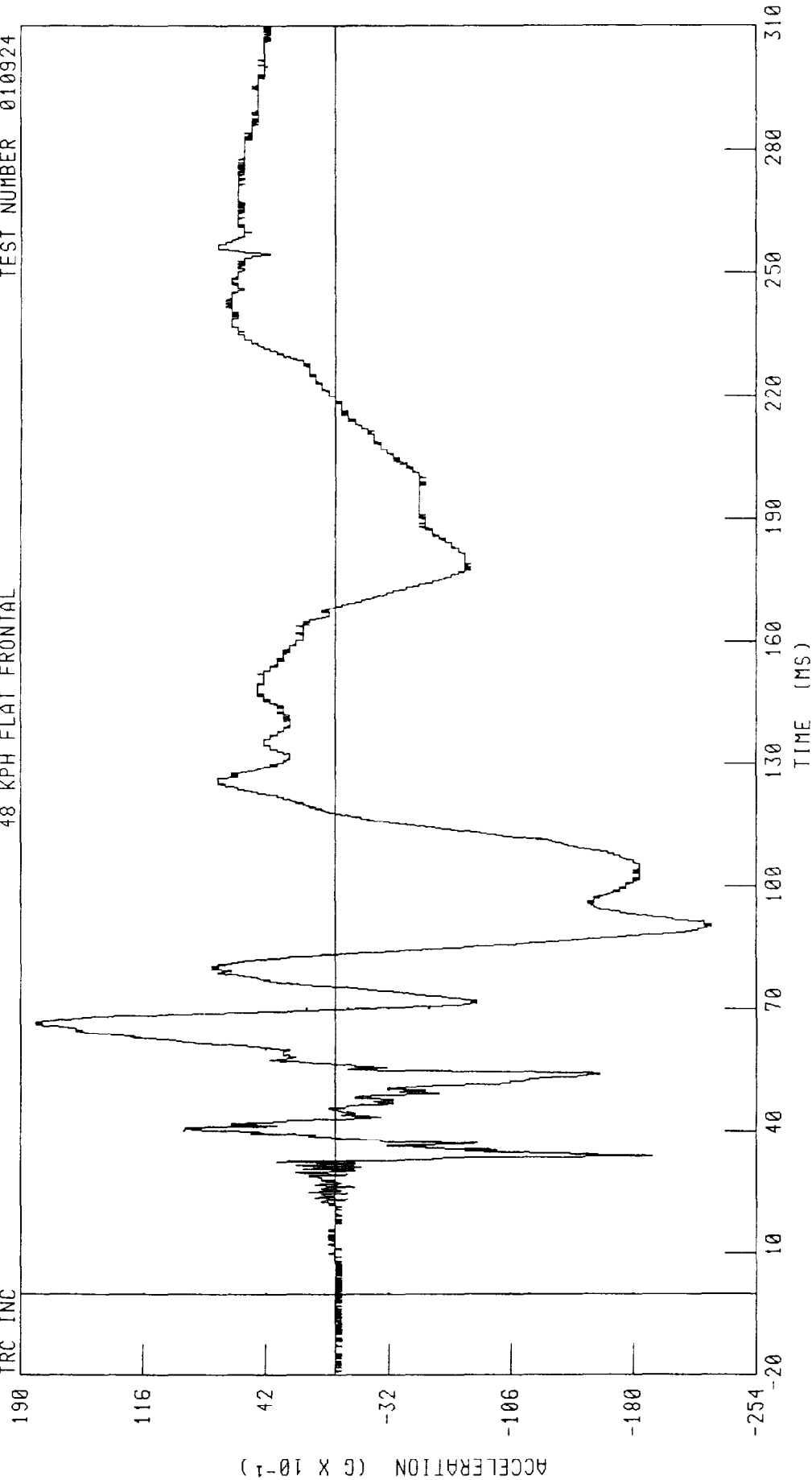
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER HEAD Z-AXIS (FT) ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

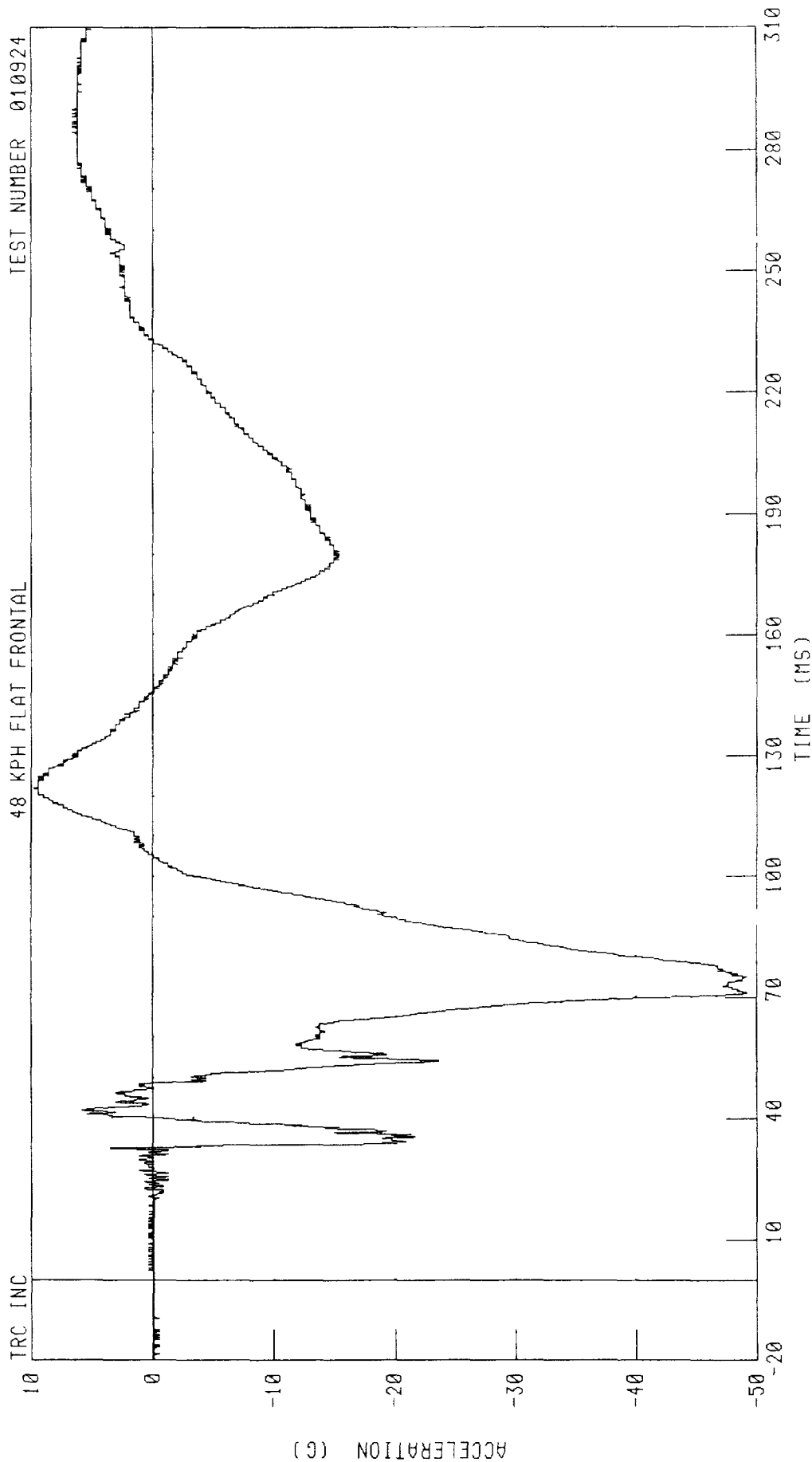
TRC INC



PEAK DATA 18 07 G @ 66 08 MS, -22 69 G @ 90 40 MS

CHANNEL HD2ZG2 FILTER CH CLASS 1000

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 PASSENGER HEAD X-AXIS (TP) ACCELERATION
 48 KPH FLAT FRONTAL



PEAK DATA 9 78 G @ 122 00 MS -49 18 G @ 70 88 MS

CHANNEL HD3XG2 FILTER CH CLASS 1000

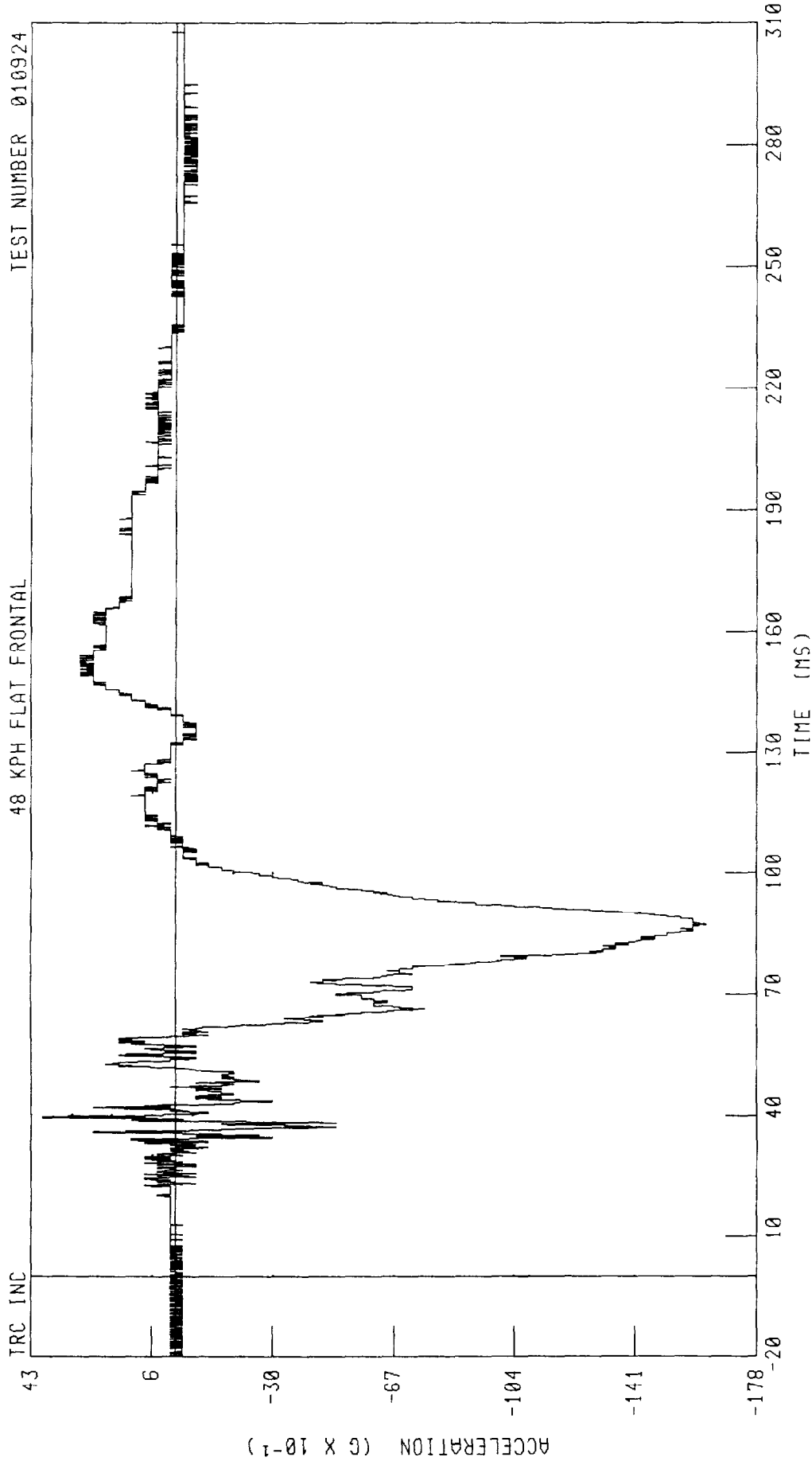
TEST NUMBER 010924

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER HEAD Y-AXIS (TP) ACCELERATION

48 KPH FLAT FRONTAL

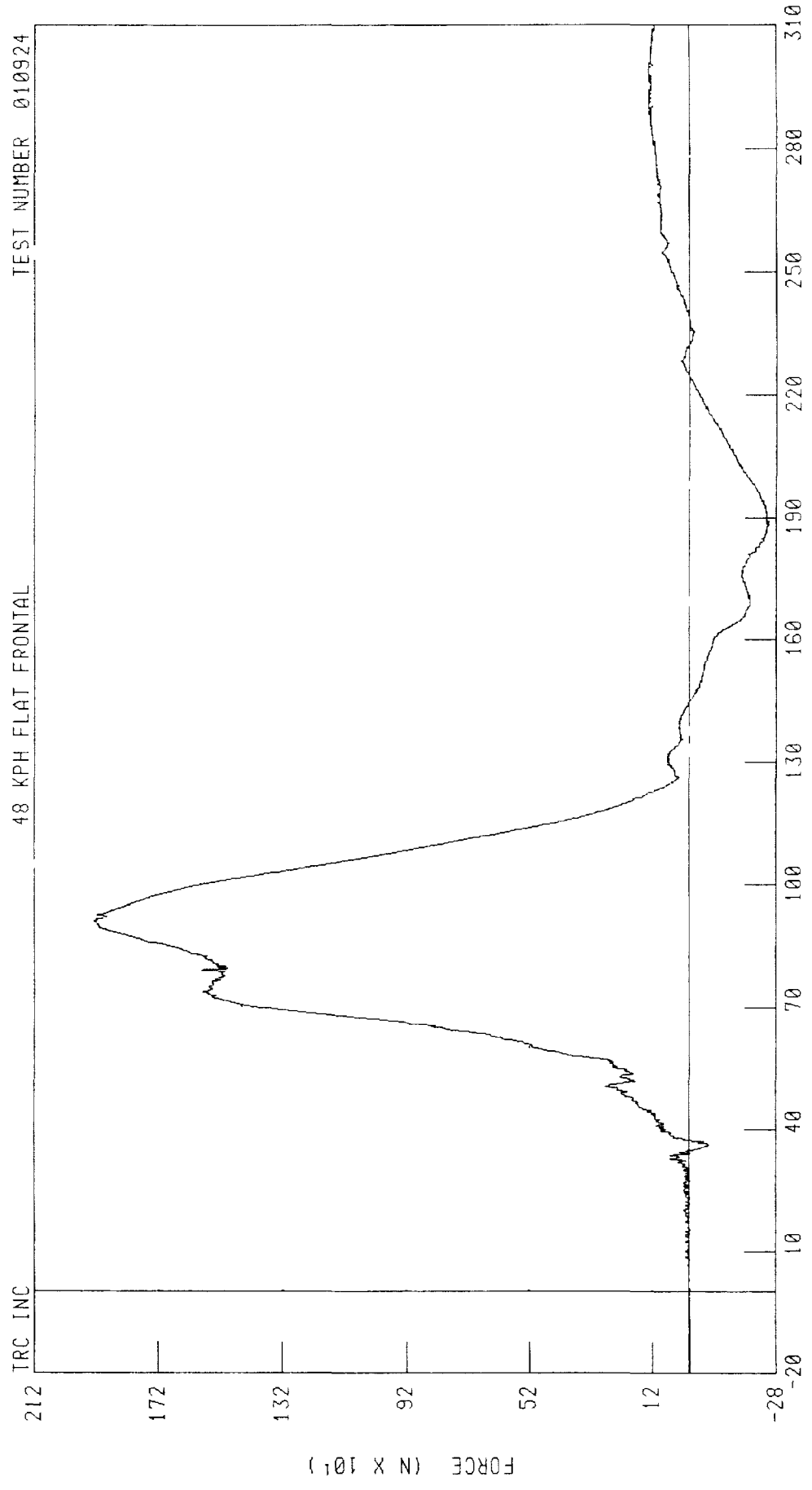
TEST NUMBER 010924



CHANNEL HD3YC2 FILTER CH CLASS 1000 PEAK DATA 4 06 C 0 39 52 MS, -16 26 C 0 87 04 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 PASSENGER NECK X-AXIS SHEAR FORCE
 48 KPH FLAT FRONTAL

TEST NUMBER 010924



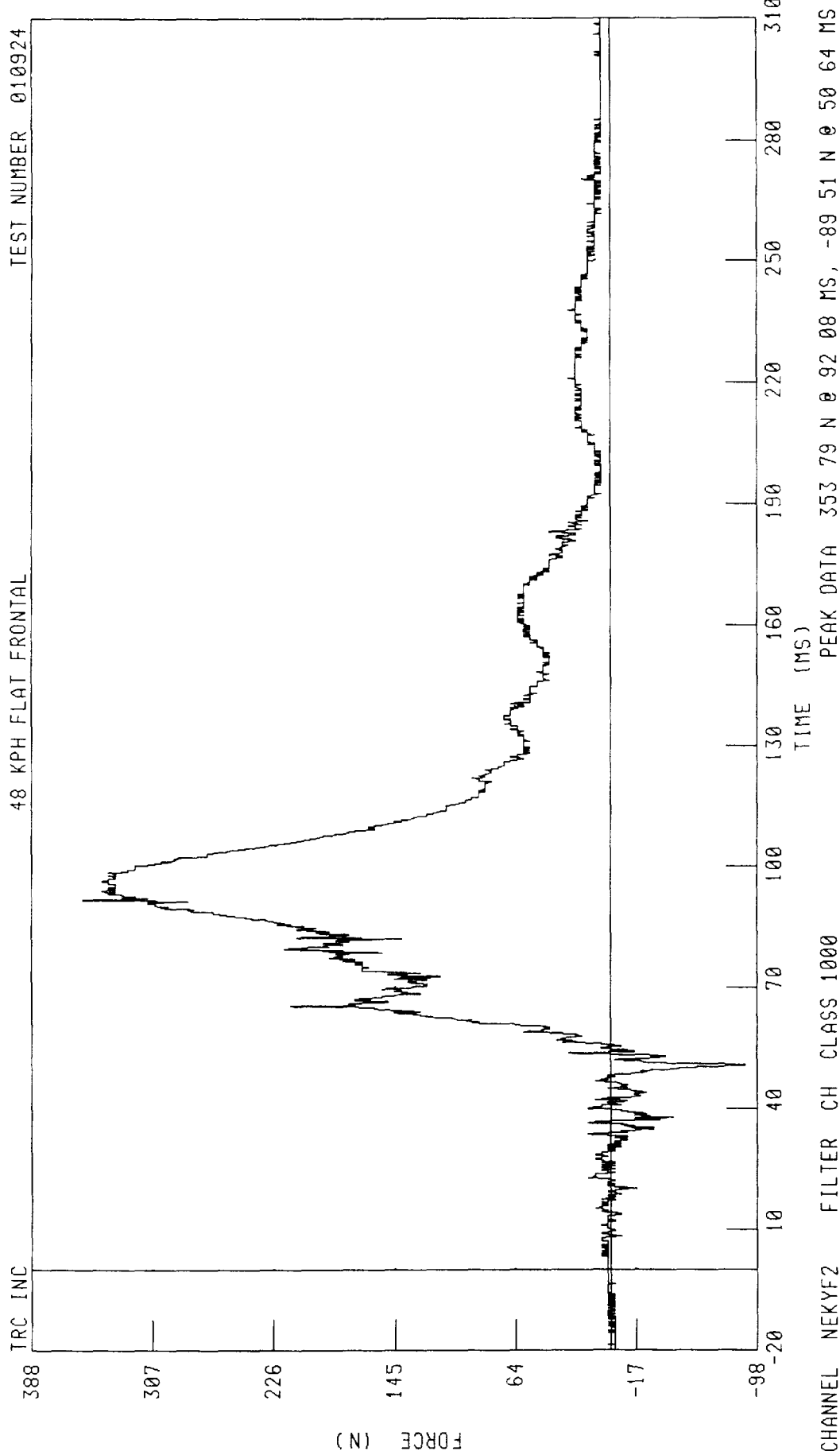
CHANNEL NEKXF2 FILTER CH CLASS 1000 PEAK DATA 1926 47 N @ 90 96 MS, -255 61 N @ 138 16 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER NECK Y-AXIS SHEAR FORCE

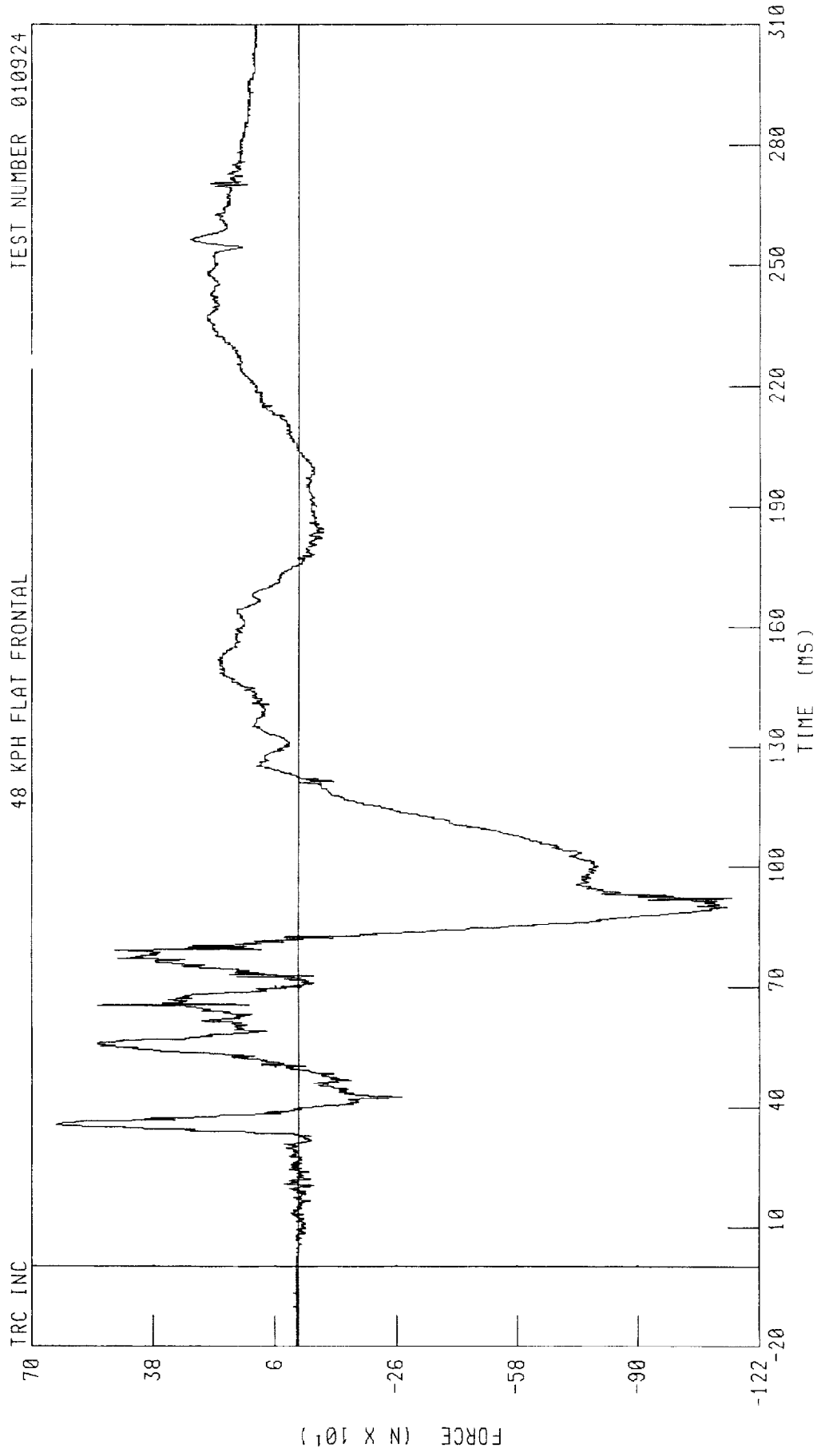
48 KPH FLAT FRONTAL

TEST NUMBER 010924



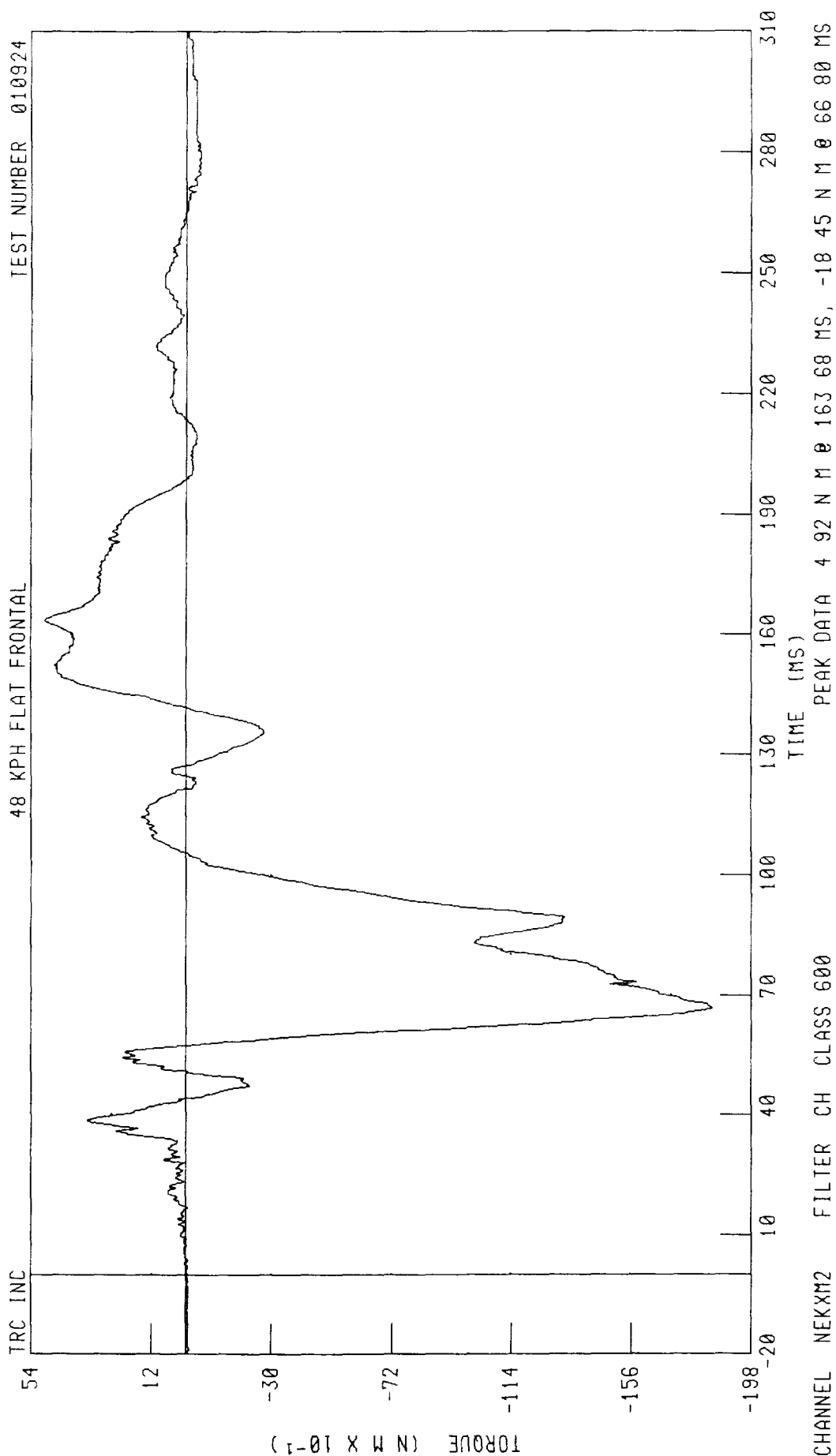
CHANNEL NEKYF2 FILTER CH CLASS 1000 PEAK DATA 353 79 N 0 92 08 MS, -89 51 N 0 50 64 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER NECK Z-AXIS AXIAL FORCE
48 KPH FLAT FRONTAL



CHANNEL NEKZF2 FILTER CH CLASS 1000 PEAK DATA 636 66 N @ 35 68 MS, -1148 21 N @ 92 16 MS

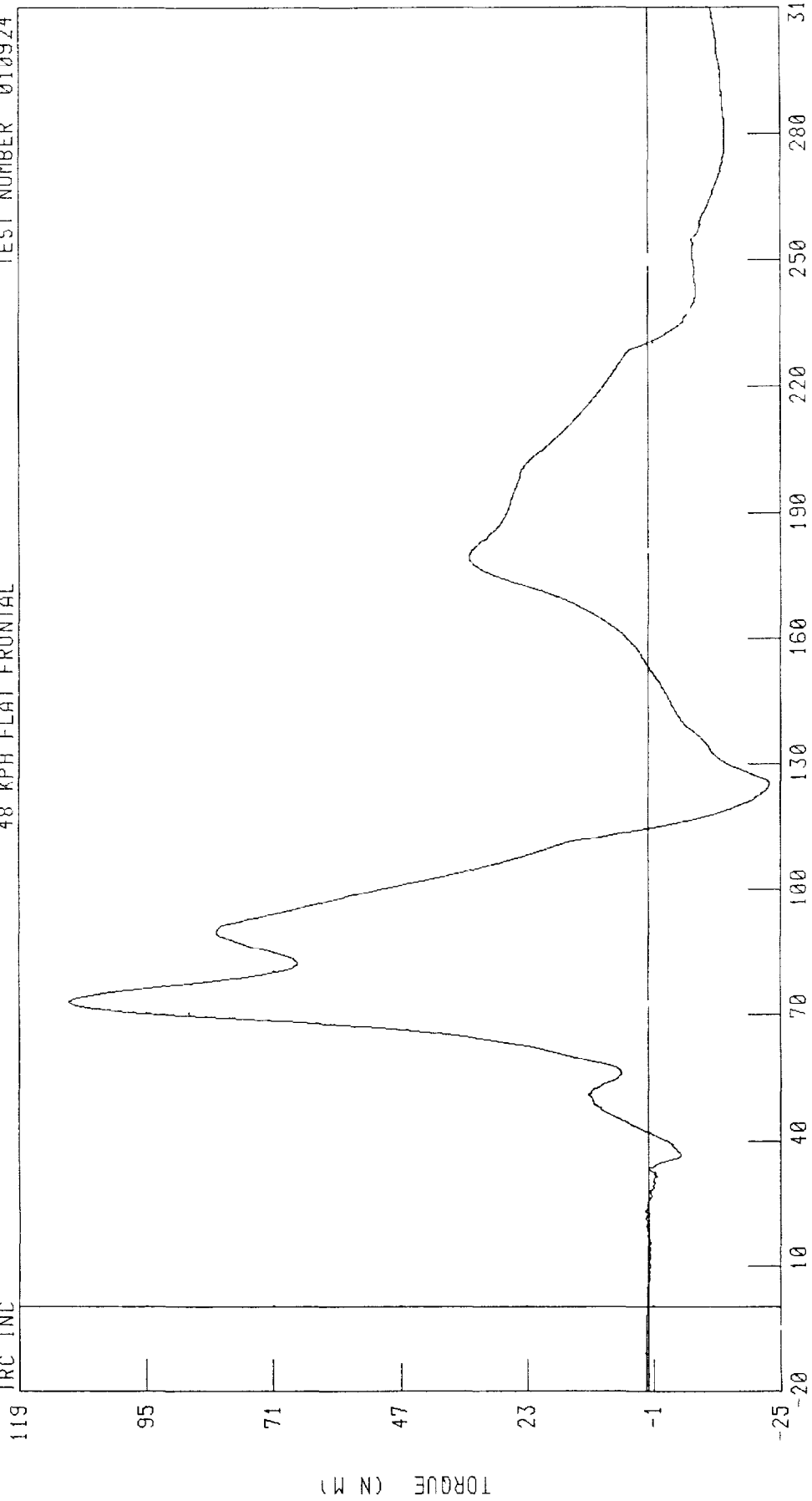
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER NECK MOMENT ABOUT X AXIS



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER NECK MOMENT ABOUT Y AXIS
48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



TIME (MS)

PEAK DATA 109 69 N M @ 72 96 MS, -23 02 N M @ 125 44 MS

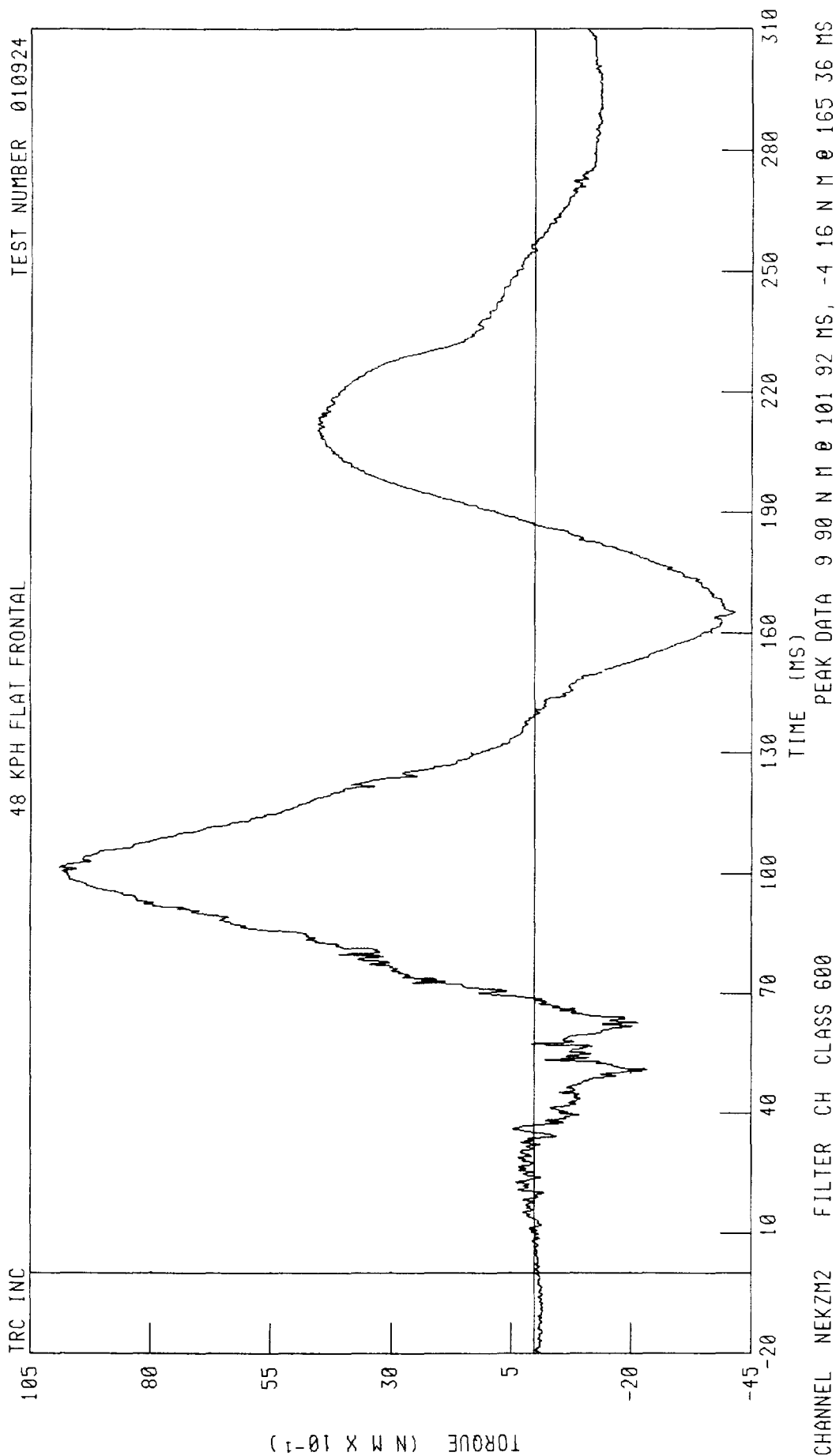
CHANNEL NEKYM2 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER NECK MOMENT ABOUT Z AXIS

48 KPH FLAT FRONTAL

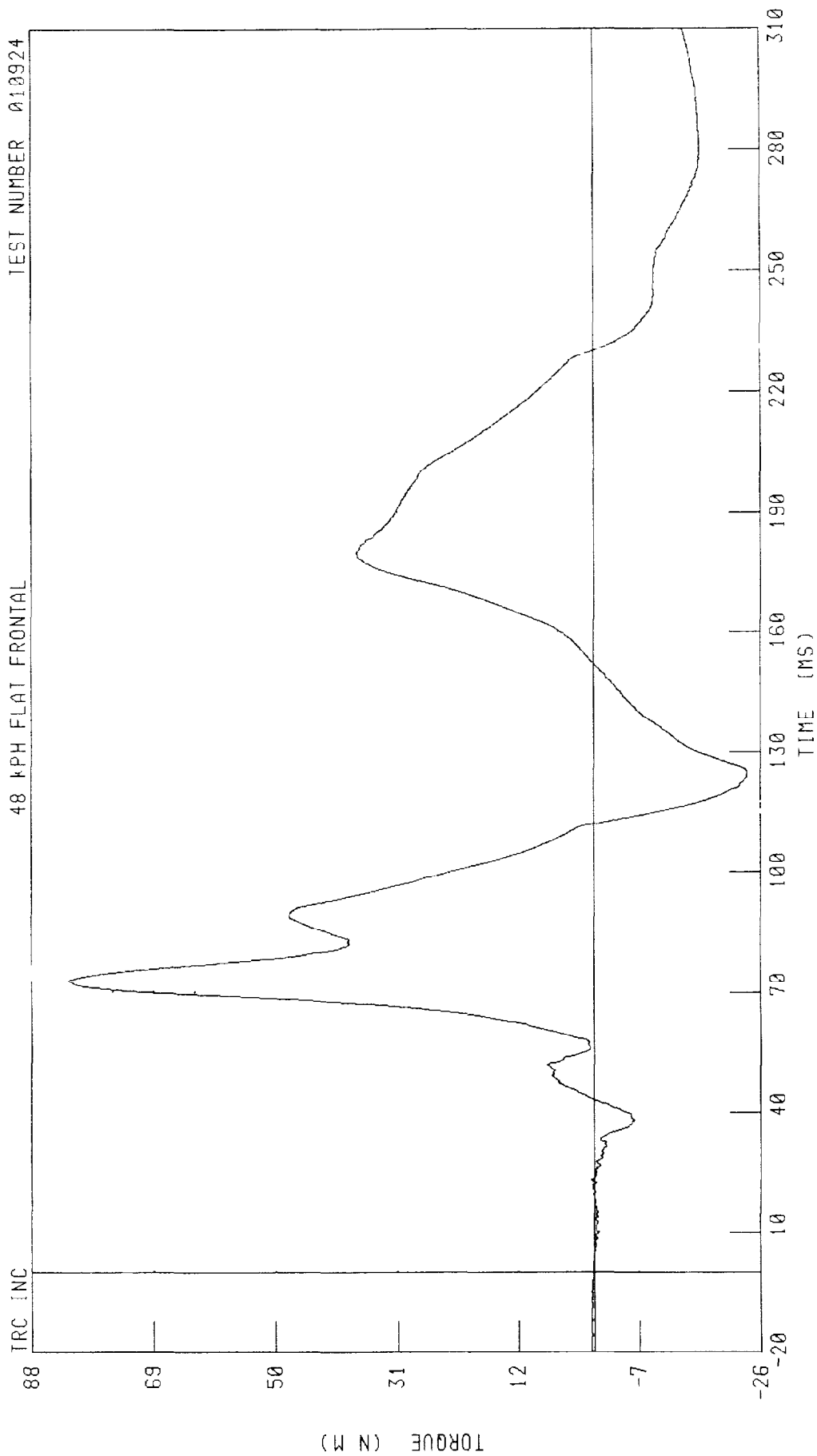
TEST NUMBER 010924



CHANNEL NEKZM2 FILTER CH CLASS 600

PEAK DATA 9 90 N M 0 101 92 MS, -4 16 N M 0 165 36 MS

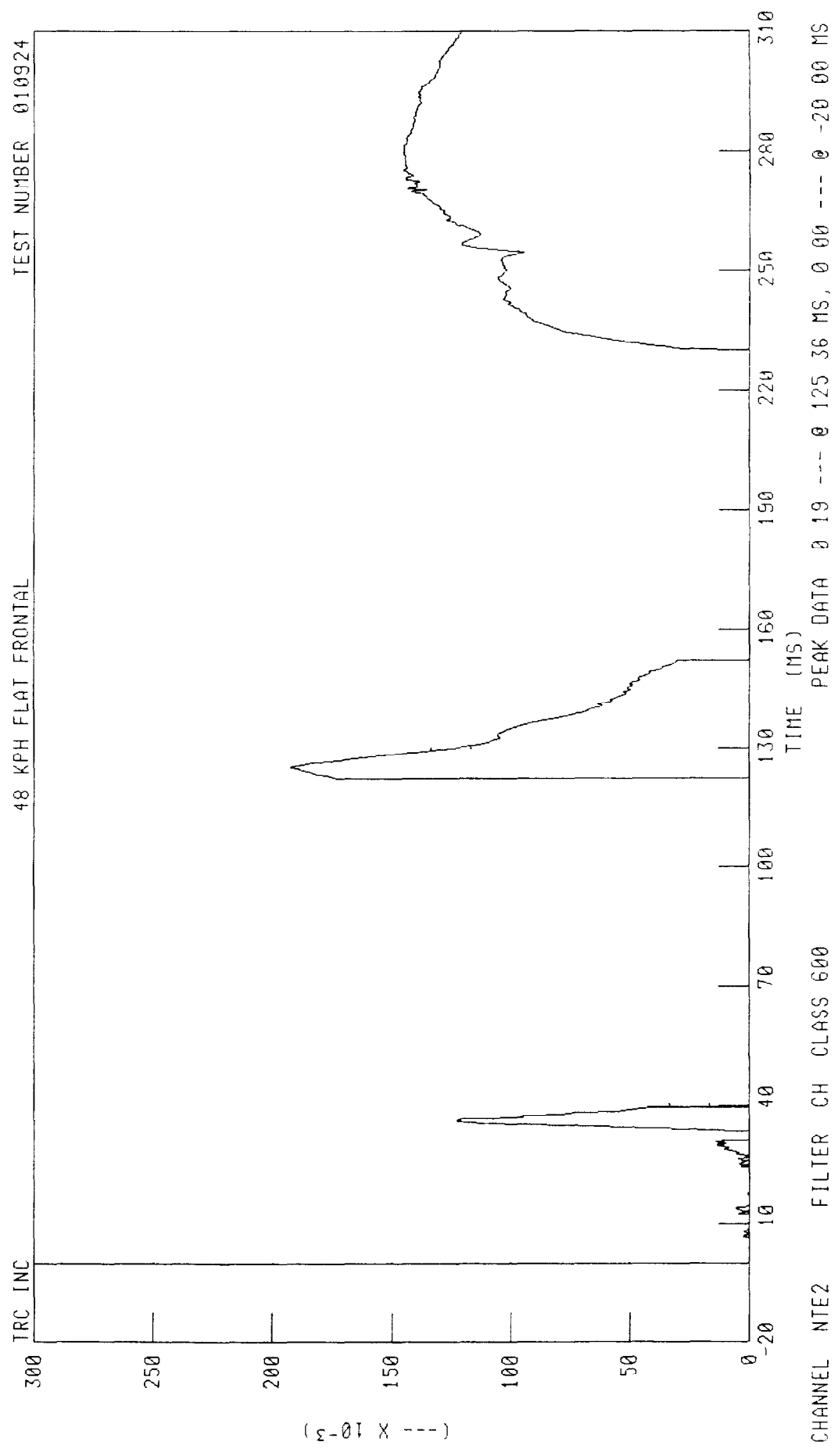
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER NECK OCCIPITAL CONDYLE MOMENT ABOUT Y AXIS



CHANNEL NEKOM2 FILTER CH CLASS 600

PEAK DATA 82 23 N M 0 72 96 MS, -23 98 N M 0 124 56 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 PASSENGER NECK TENSION/EXTENSION



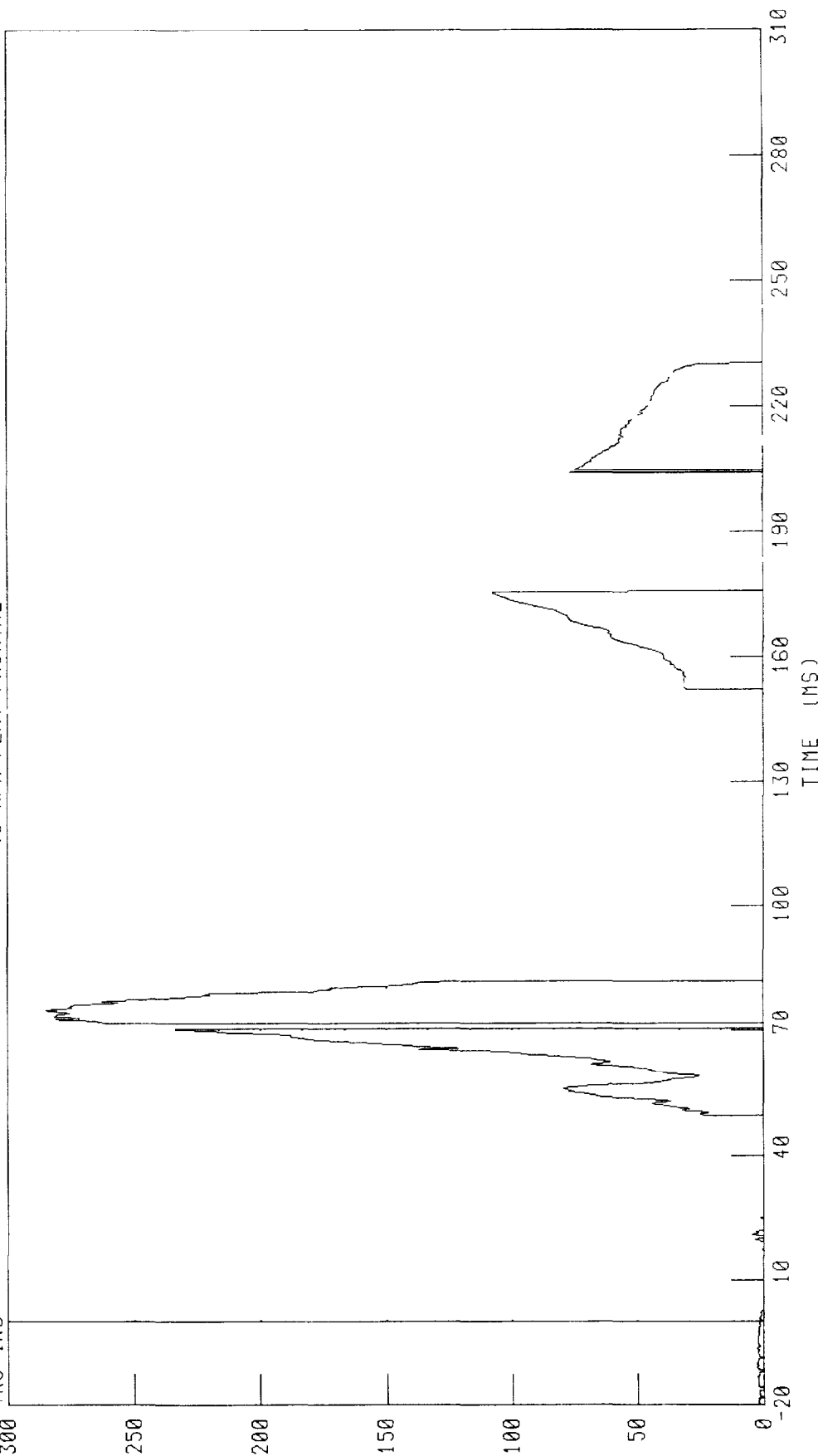
(--- X 10⁻³)

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 PASSENGER NECK TENSION/FLEXION
 48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC

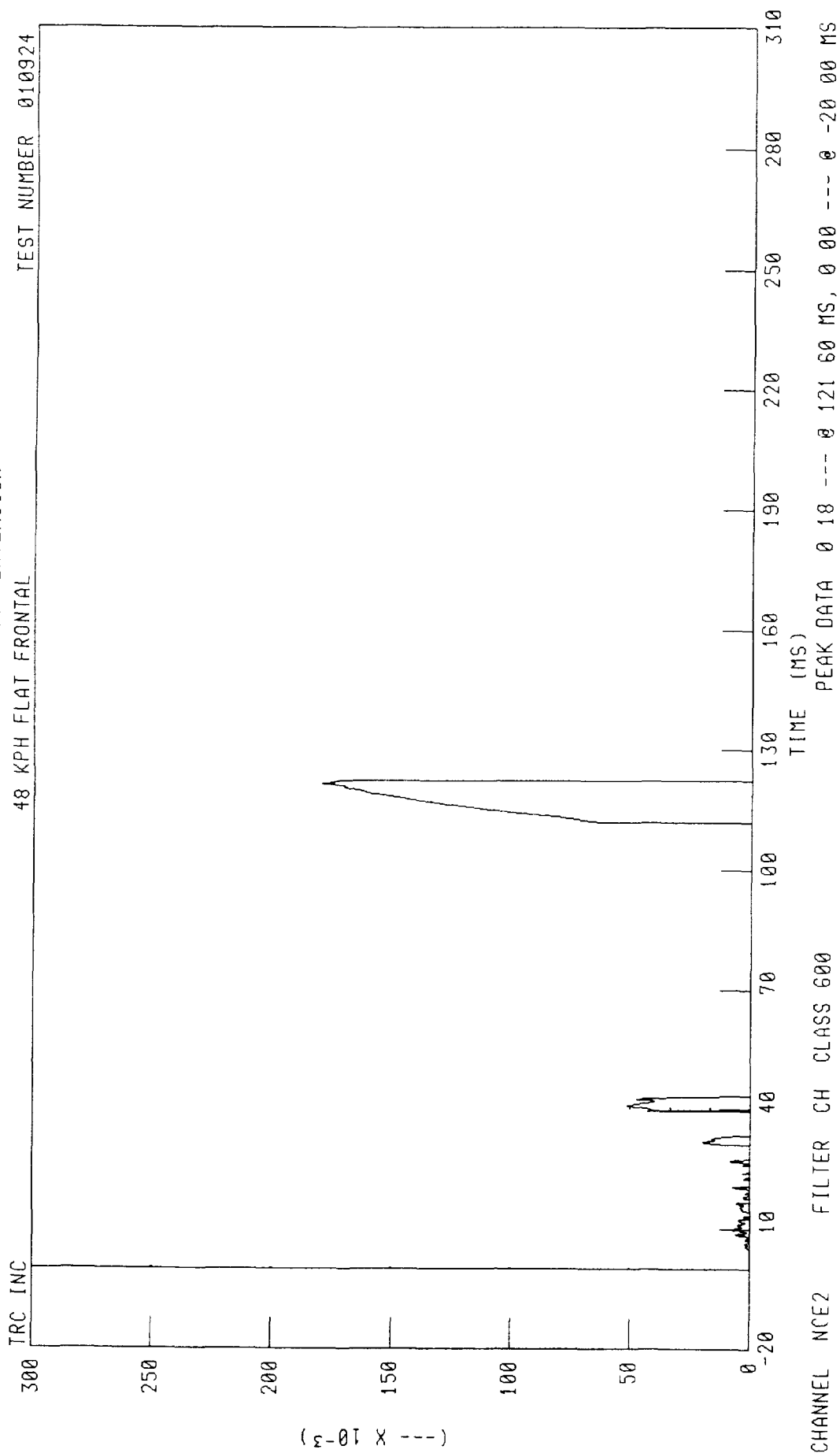
(--- $\times 10^{-3}$)



PEAK DATA 0 28 --- 0 74 96 MS, 0 00 - - 0 -18 08 MS

CHANNEL NTF2 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER NECK COMPRESSION/EXTENSION

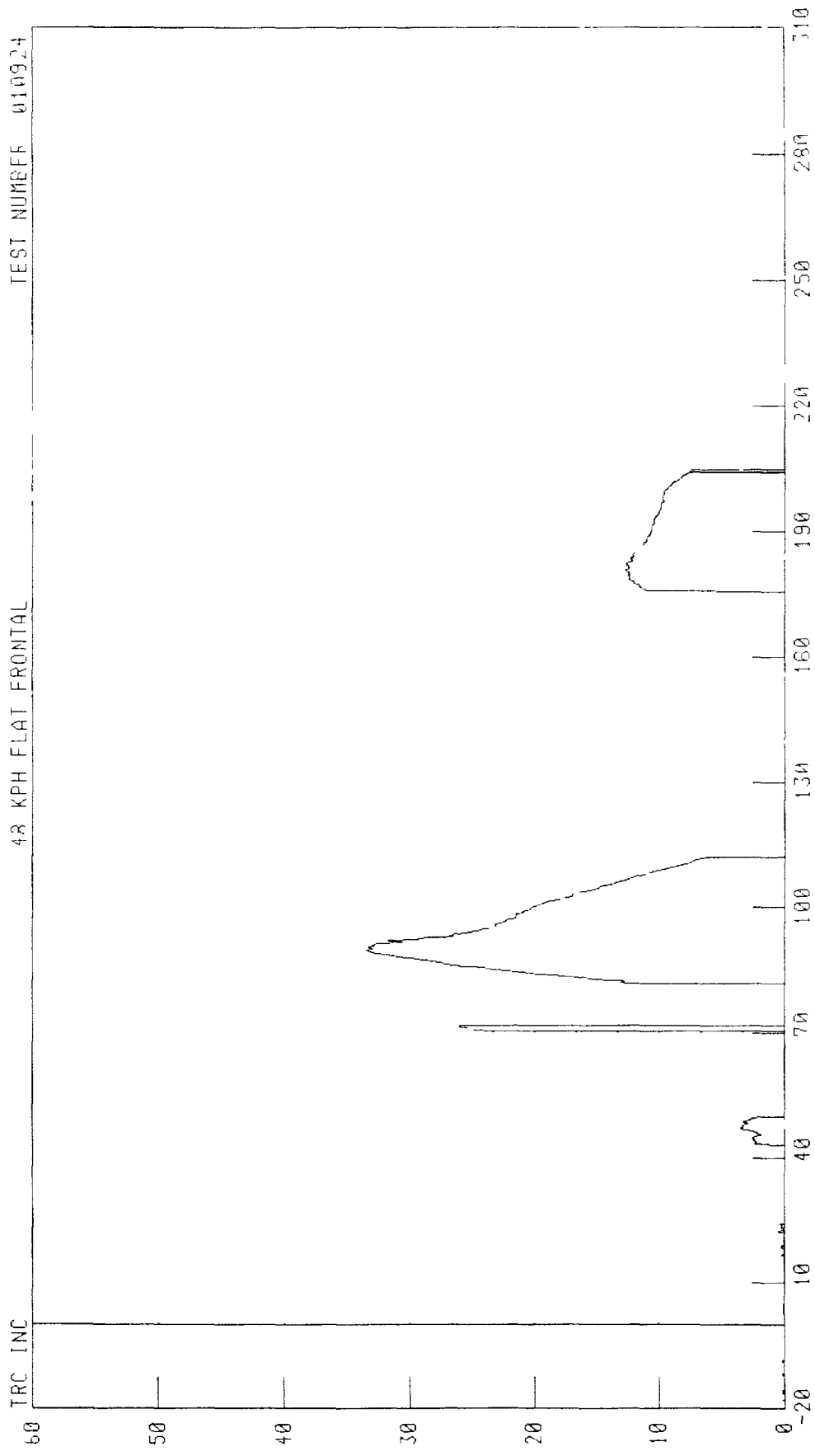


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER NECK COMPRESSION/FLEXION

48 KPH FLAT FRONTAL

TEST NUMBER 010924



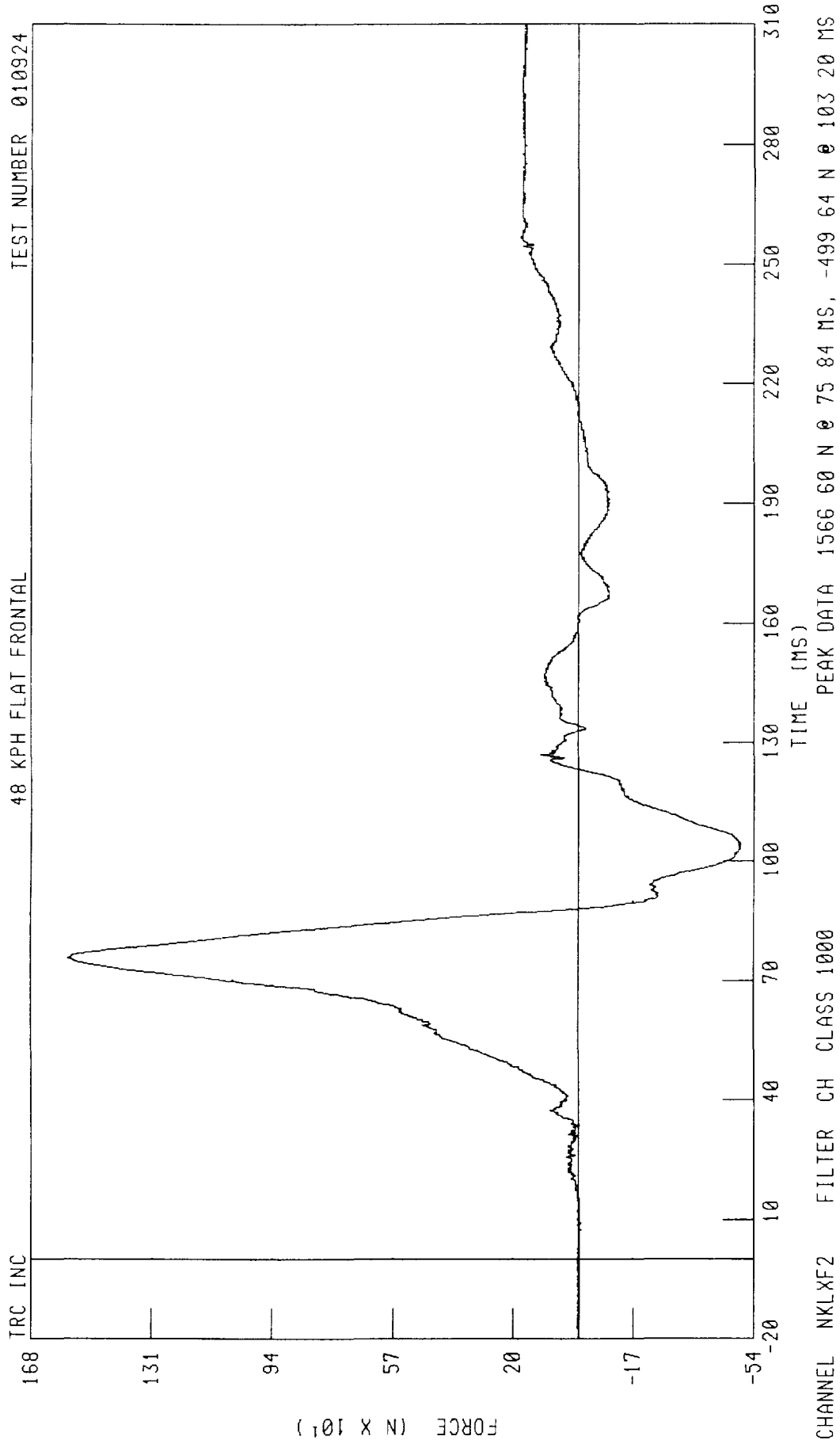
(--- X 10⁻²)

CHANNEL NCF2 FILTER CH CLASS 600

TIME (MS)

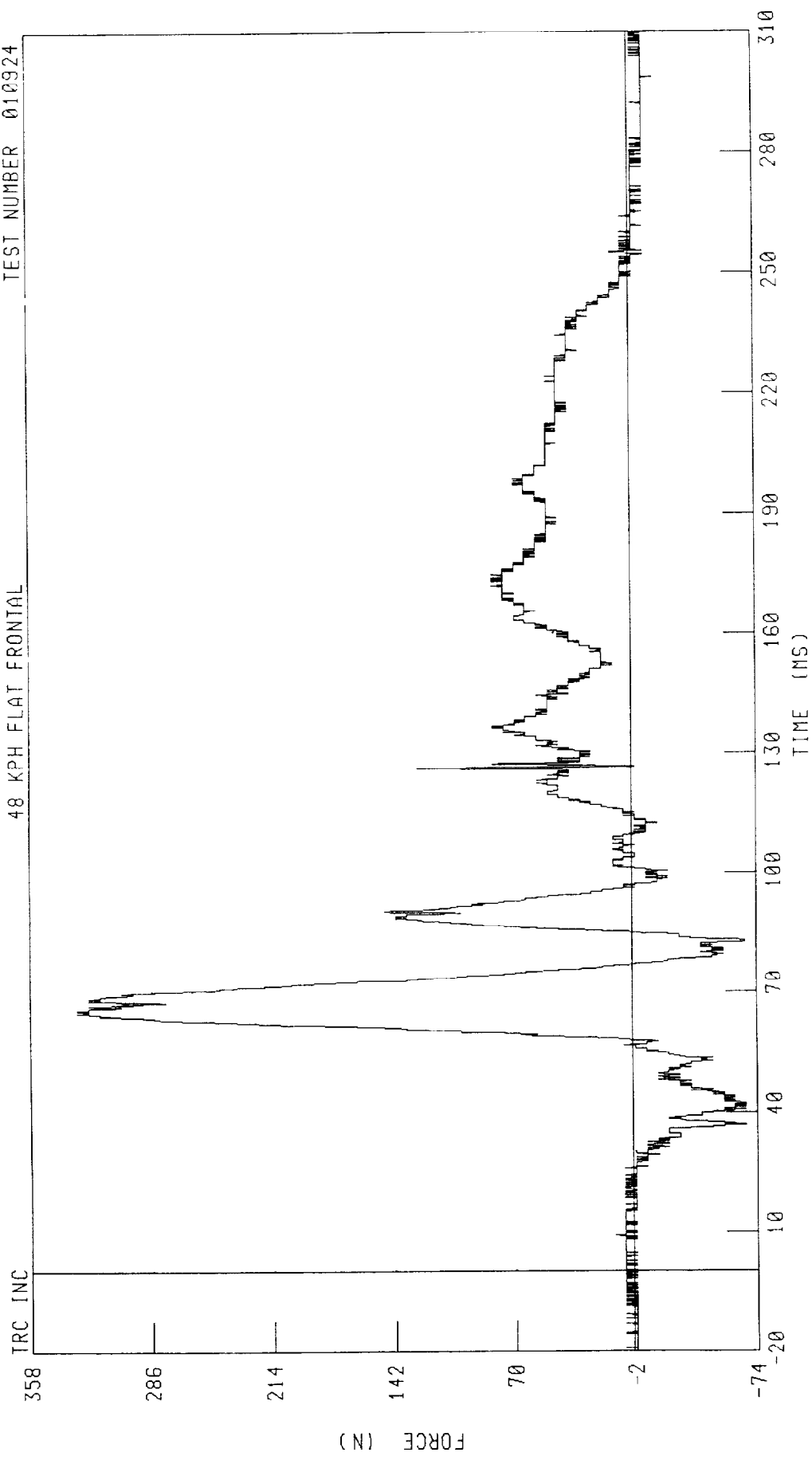
PEAK DATA 0 33 --- 0 0 31 11, 11 00 - 0 -20 110 115

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 PASSENGER NECK LOWER X-AXIS SHEAR FORCE



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER NECK LOWER Y-AXIS SHEAR FORCE
48 KPH FLAT FRONTAL

TEST NUMBER 010924



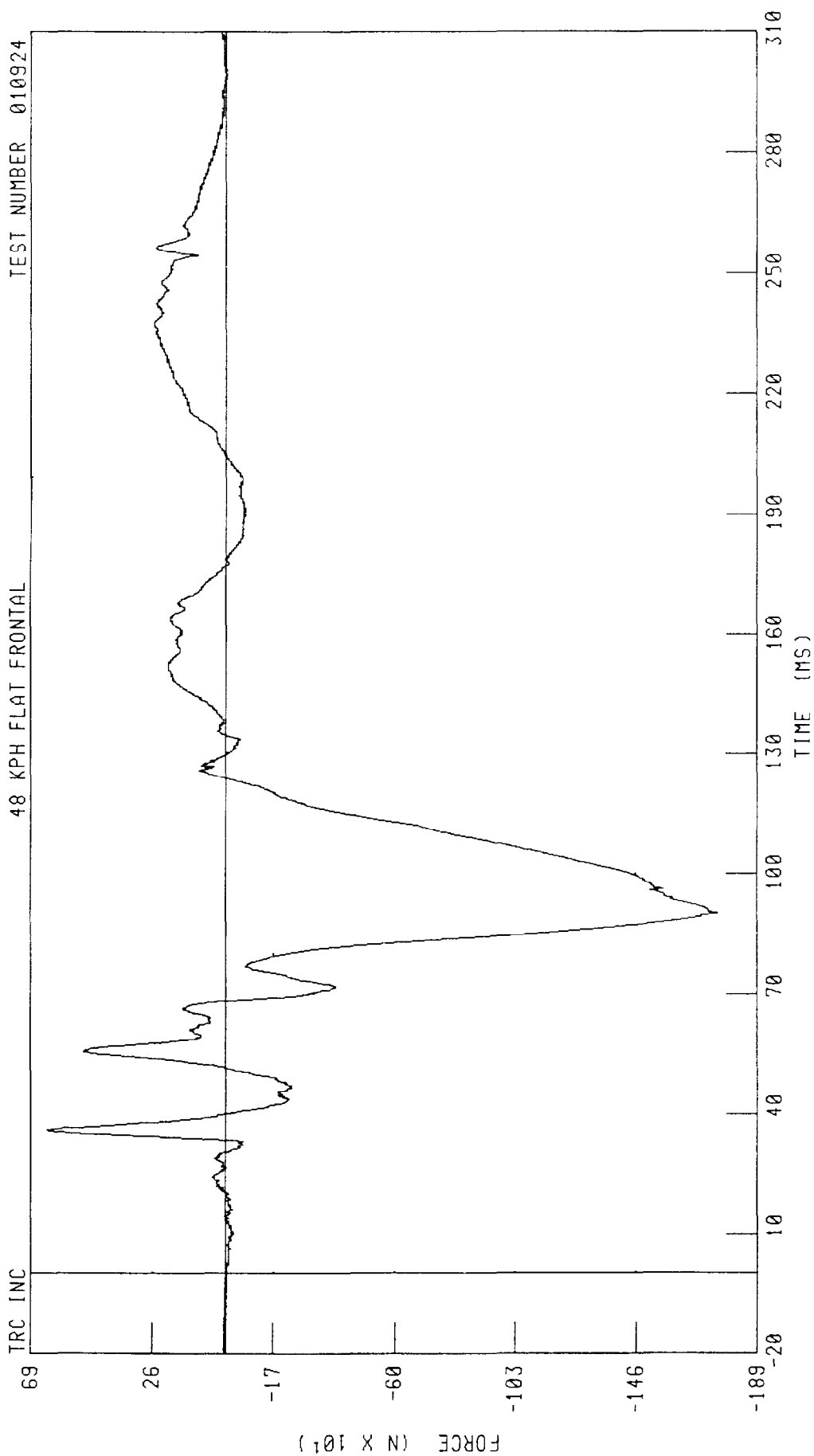
CHANNEL NKLYF2 FILTER CH CLASS 1000
PEAK DATA 329 86 N @ 64 80 MS, -67 35 N @ 36 38 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER NECK LOWER Z-AXIS AXIAL FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924



PEAK DATA 633 42 N @ 36 00 MS, -1753 18 N @ 90 32 MS

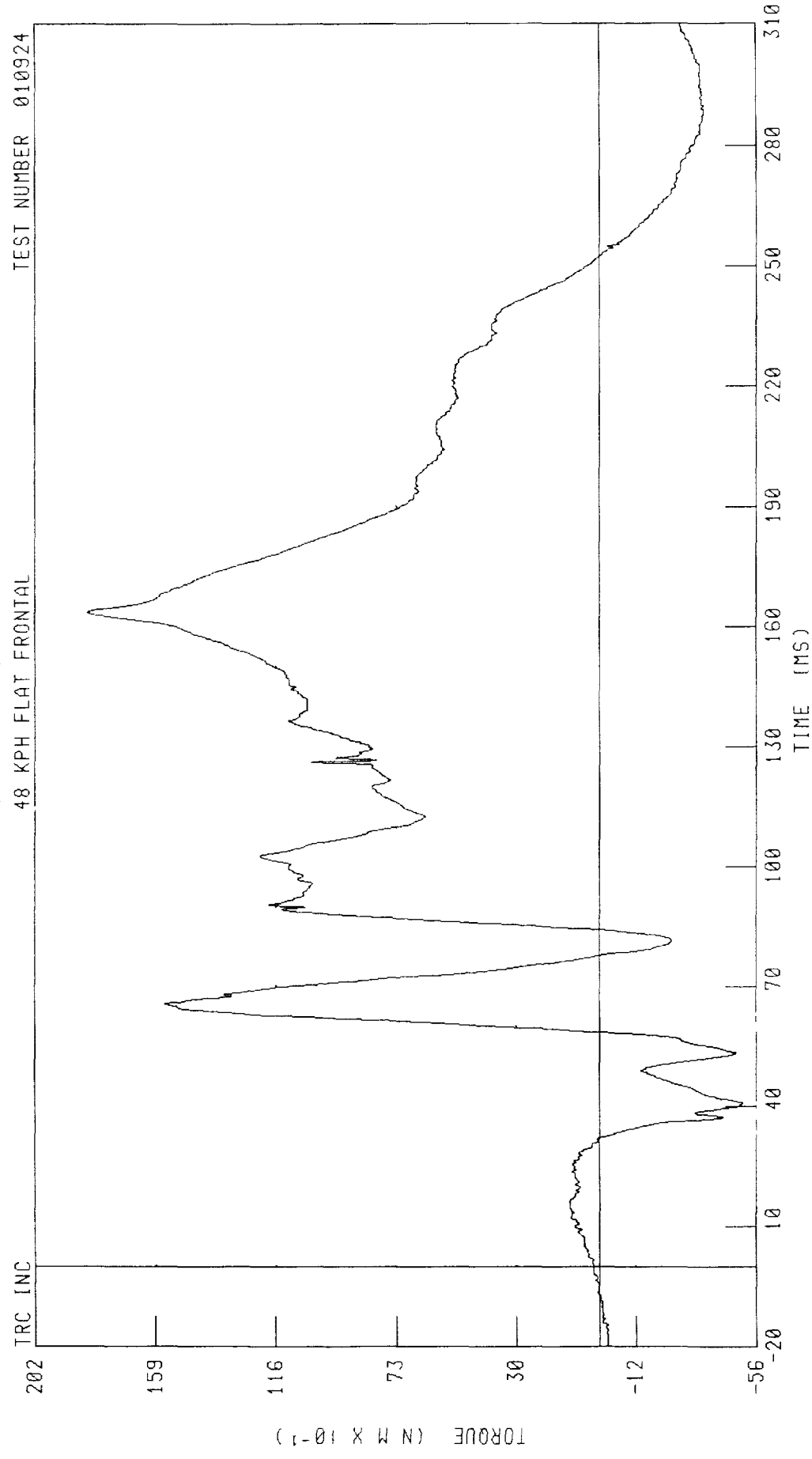
CHANNEL NKLZF2 FILTER CH CLASS 1000

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER NECK LOWER MOMENT ABOUT X AXIS

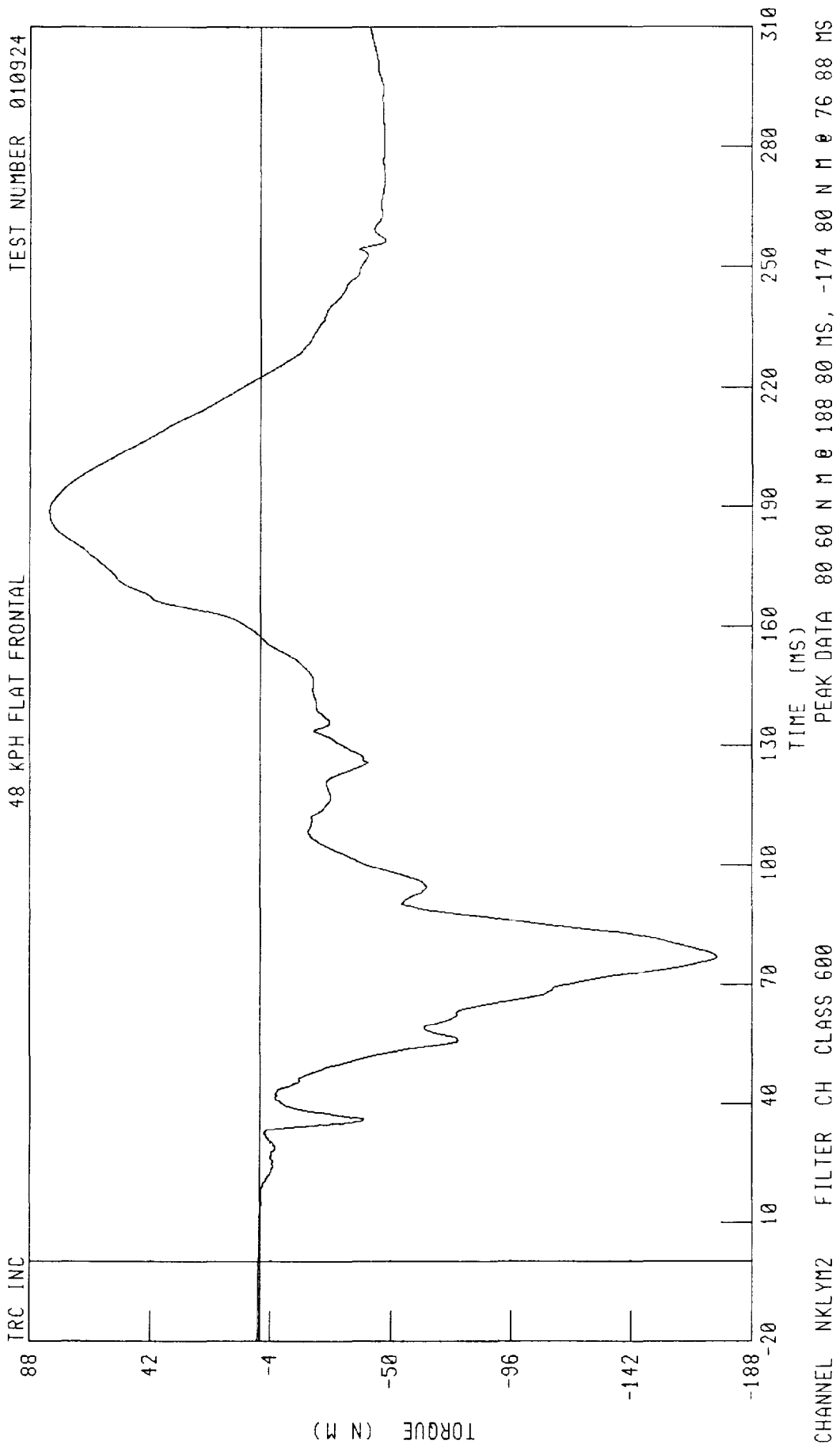
TEST NUMBER 010924

48 KPH FLAT FRONTAL



CHANNEL NKLXM2 FILTER CH CLASS 600 PEAK DATA 18 33 N M @ 163 60 MS, -5 14 N M @ 40 72 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER NECK LOWER MOMENT ABOUT Y AXIS

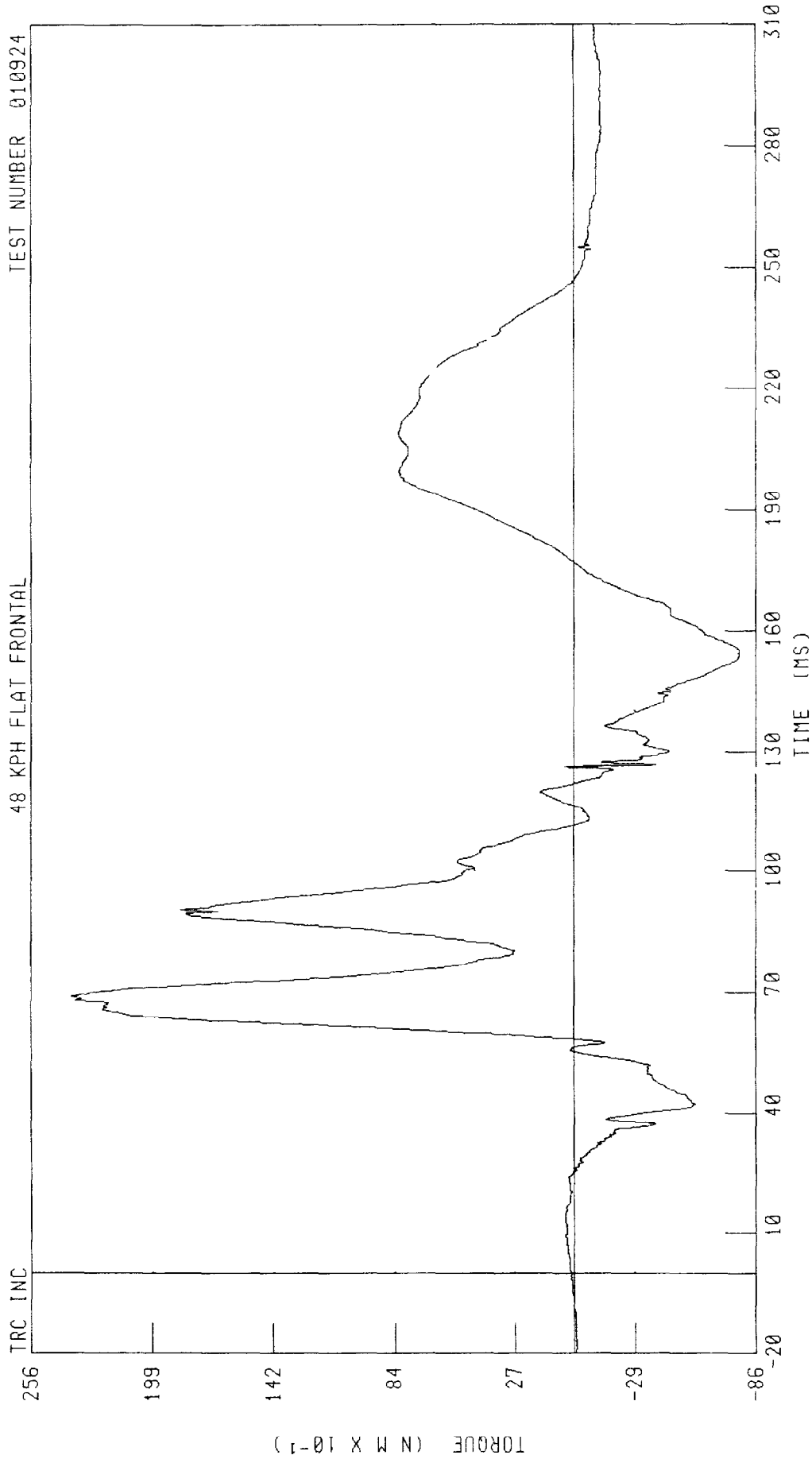


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER NECK LOWER MOMENT ABOUT Z AXIS

48 KPH FLAT FRONTAL

TEST NUMBER 010924



TIME (MS)

PEAK DATA 23 71 N M @ 68 96 MS, -7 85 N M @ 155 04 MS

CHANNEL NKLZM2 FILTER CH CLASS 600

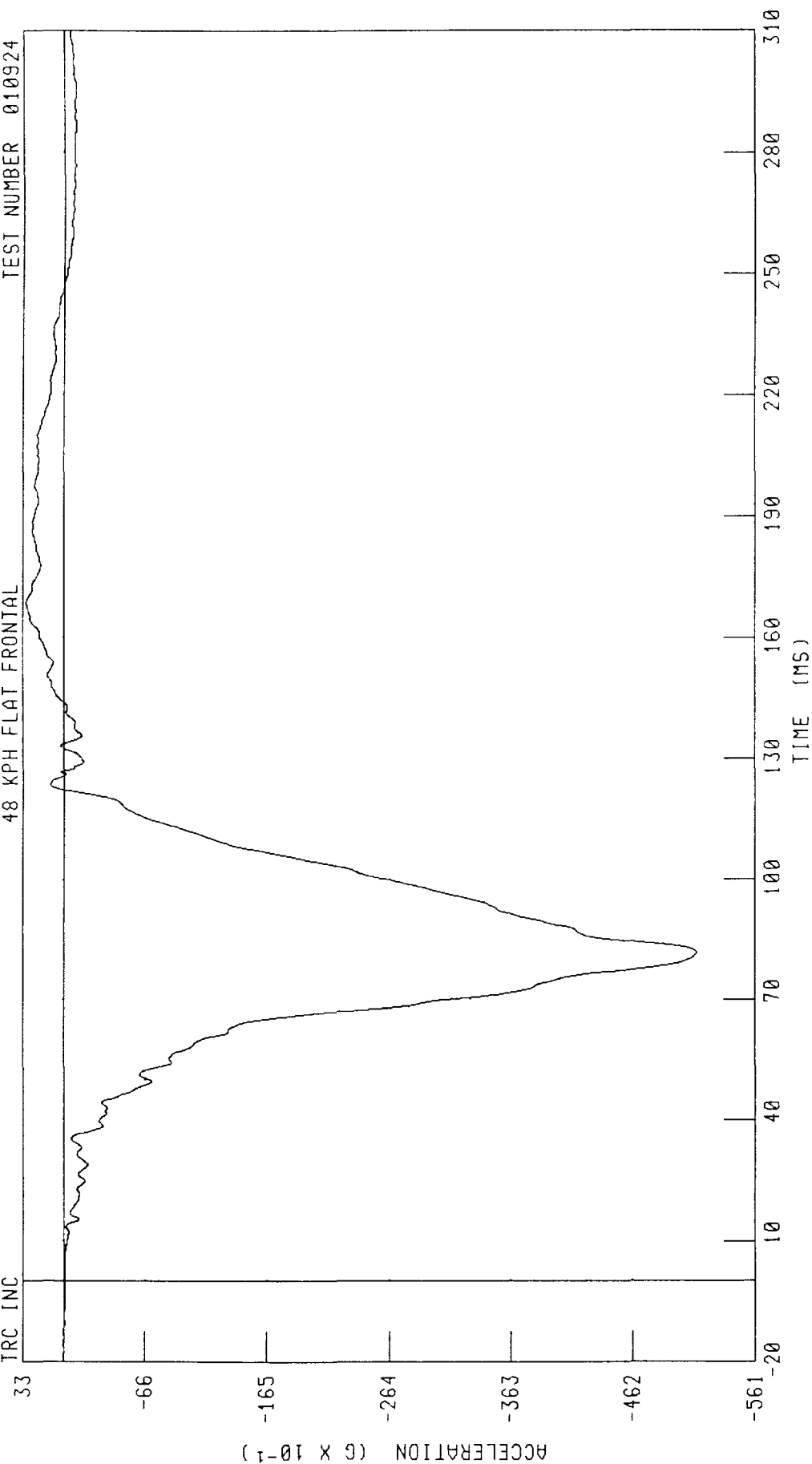
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER CHEST X-AXIS ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



PEAK DATA 3 05 G @ 168 56 MS, -51 40 G @ 81 68 MS

CHANNEL CSTXC2 FILTER CH CLASS 180

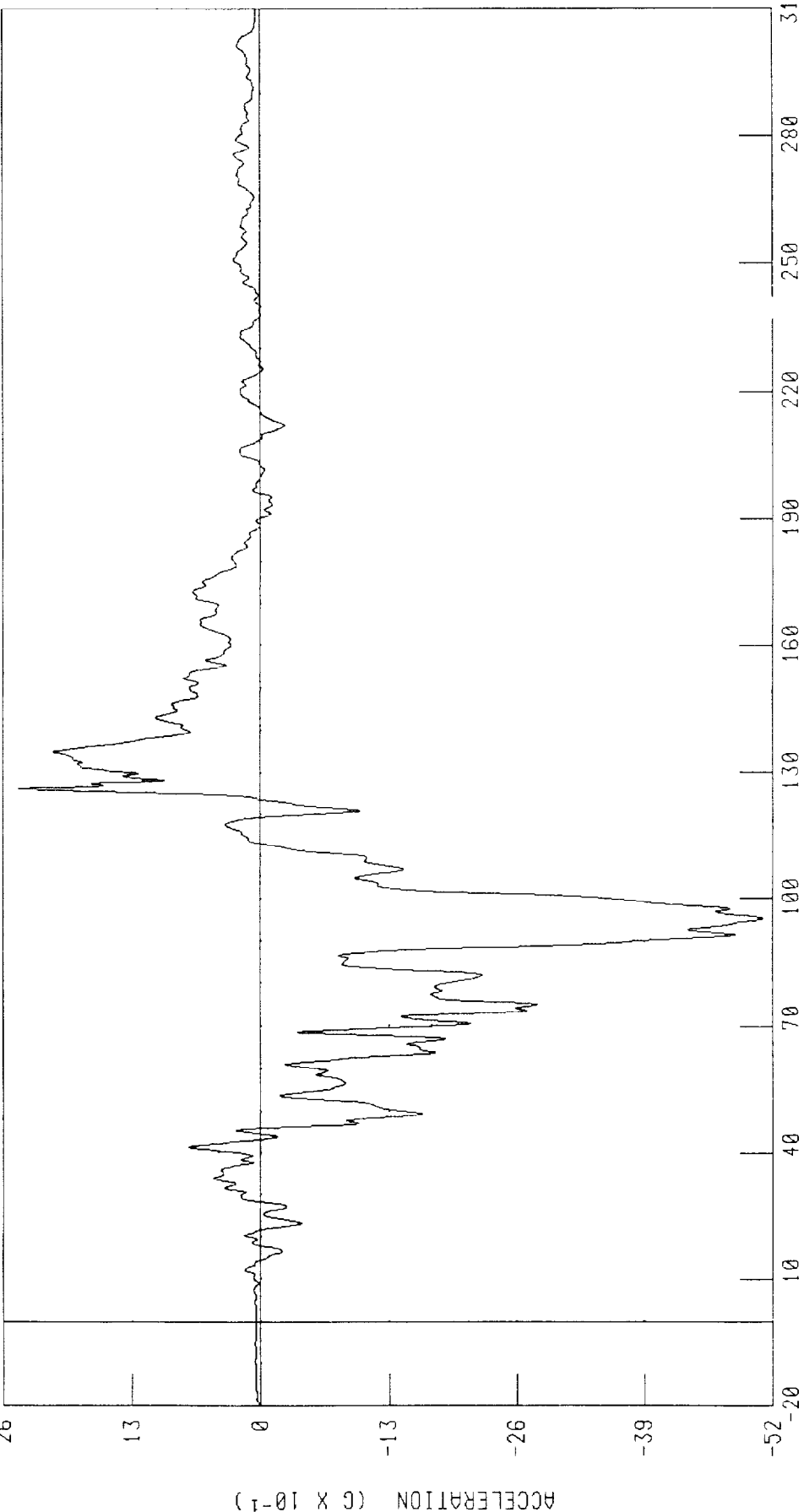
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER CHEST Y-AXIS ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



TIME (MS)

PEAK DATA 2 45 0 126 10 MS, -5 10 0 95 28 MS

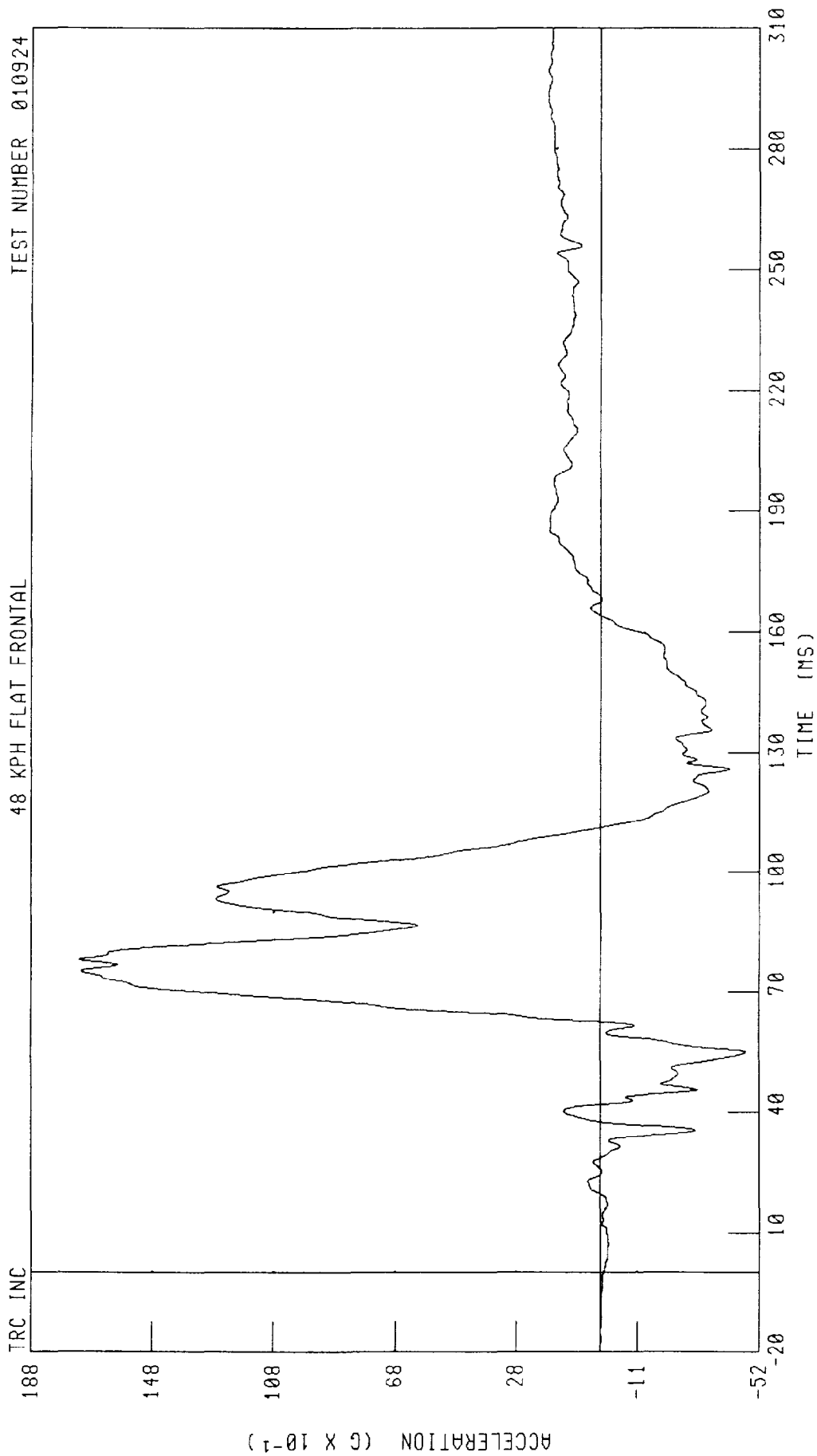
CHANNEL CSTYG2 FILTER CH CLASS 180

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER CHEST Z-AXIS ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924



TIME (MS)

CHANNEL CSTZC2 FILTER CH CLASS 180

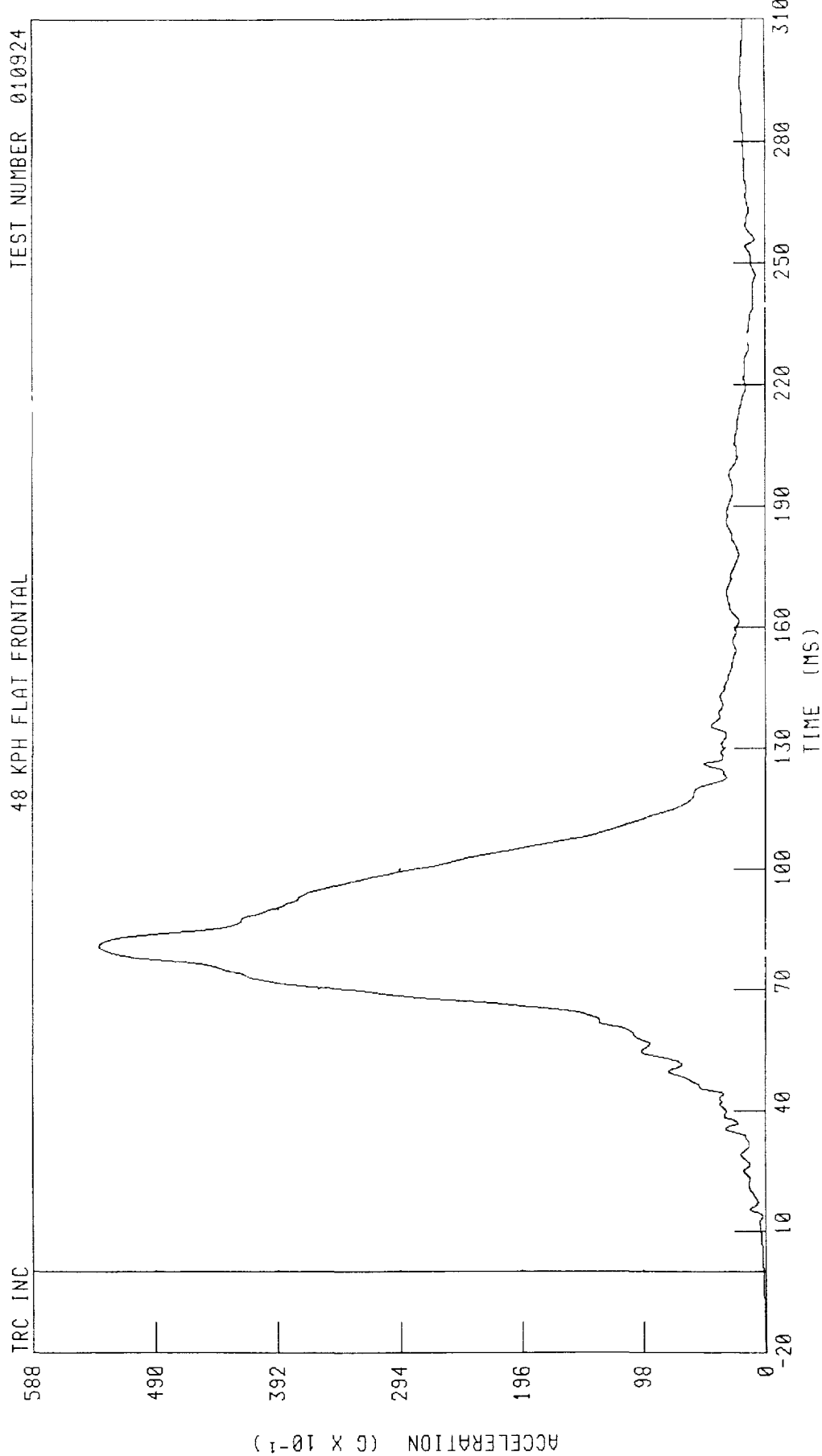
PEAK DATA 17 20 G 78 08 MS, -4 78 G 54 88 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER CHEST RESULTANT ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924



PEAK DATA 53 50 G @ 80 64 MS, 0 00 G @ -20 00 MS

CHANNEL CSTRG2 FILTER CH CLASS 180

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER CHEST DEFLECTION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC

12

-19

-51

-83

-115

-147

-179

DISPLACEMENT (MM X 10⁻¹)

TIME (MS)

10 40 70 100 130 160 190 220 250 280 310

CHANNEL CSTXD2

FILTER CH CLASS 600

PEAK DATA 1 19 MM @ 51 12 MS, -16 73 MM @ 95 36 MS

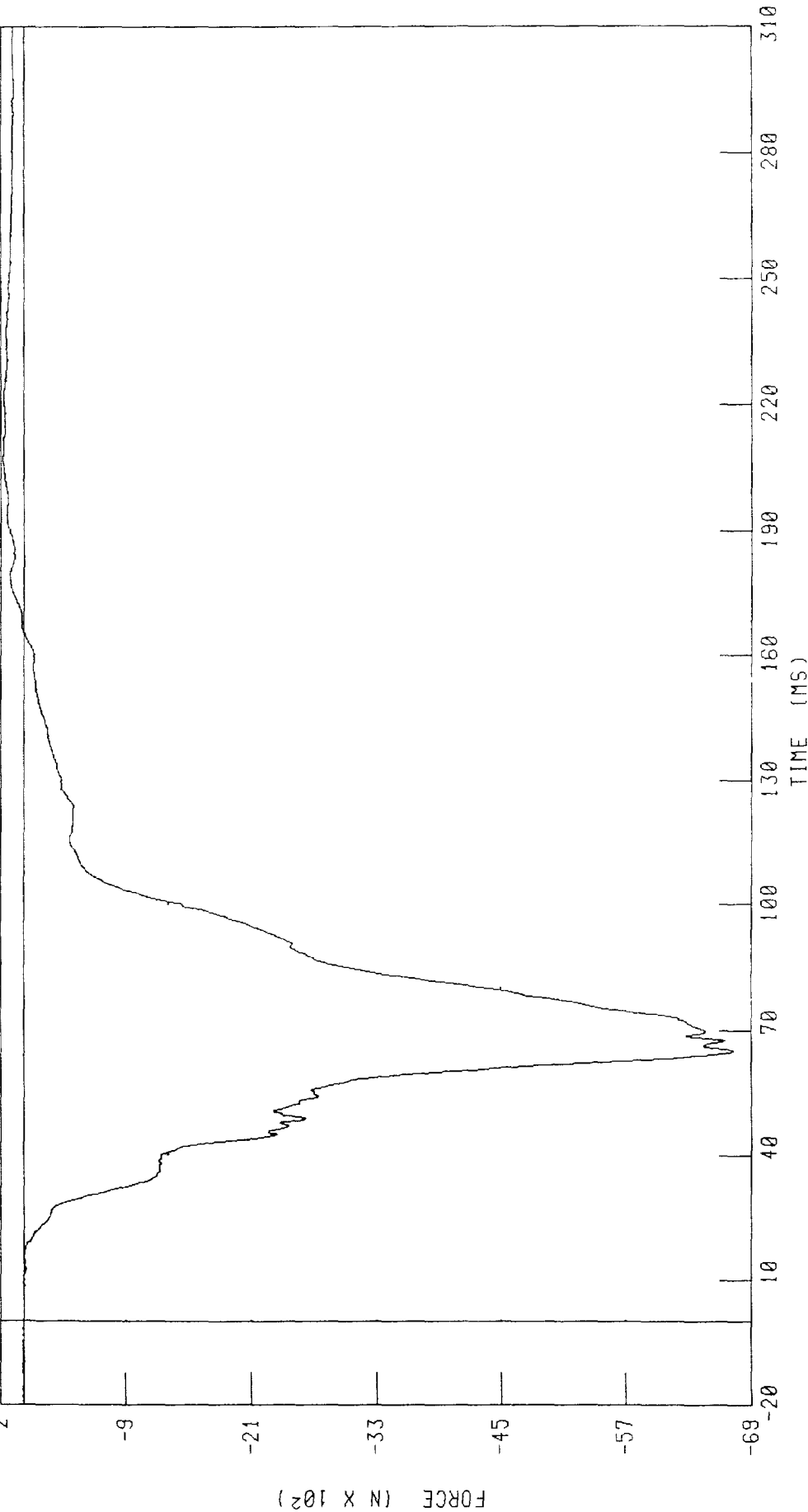
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER LEFT FEMUR FORCE

48 KPH FLAT FRONTAL

TRC INC

TEST NUMBER 010924



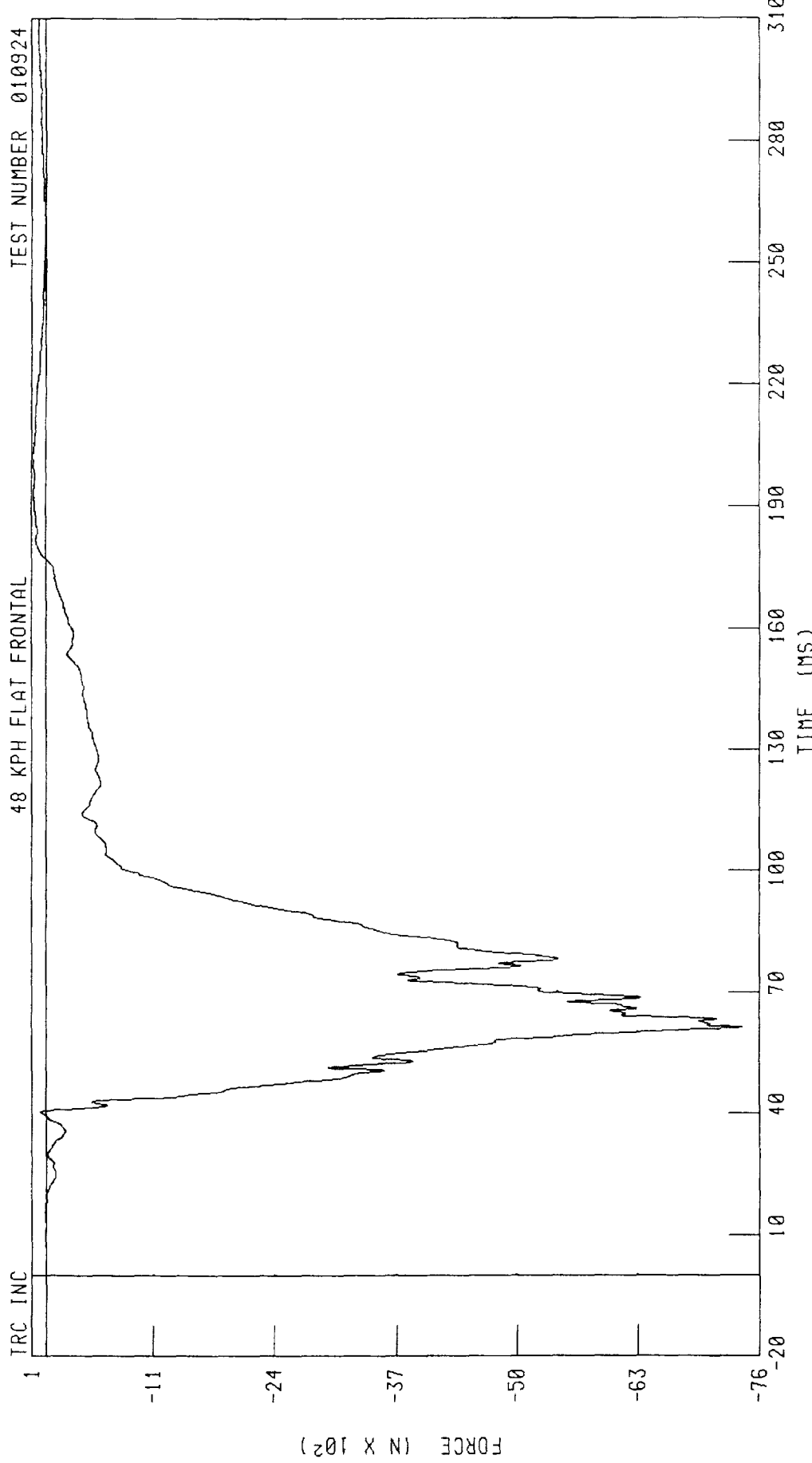
CHANNEL LFMZF2 FILTER CH CLASS 600 PEAK DATA 200 03 N @ 206 32 MS, -6805 14 N @ 65 12 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER RIGHT FEMUR FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924



PEAK DATA 139 42 N @ 202 56 MS, -7467 41 N @ 61 20 MS

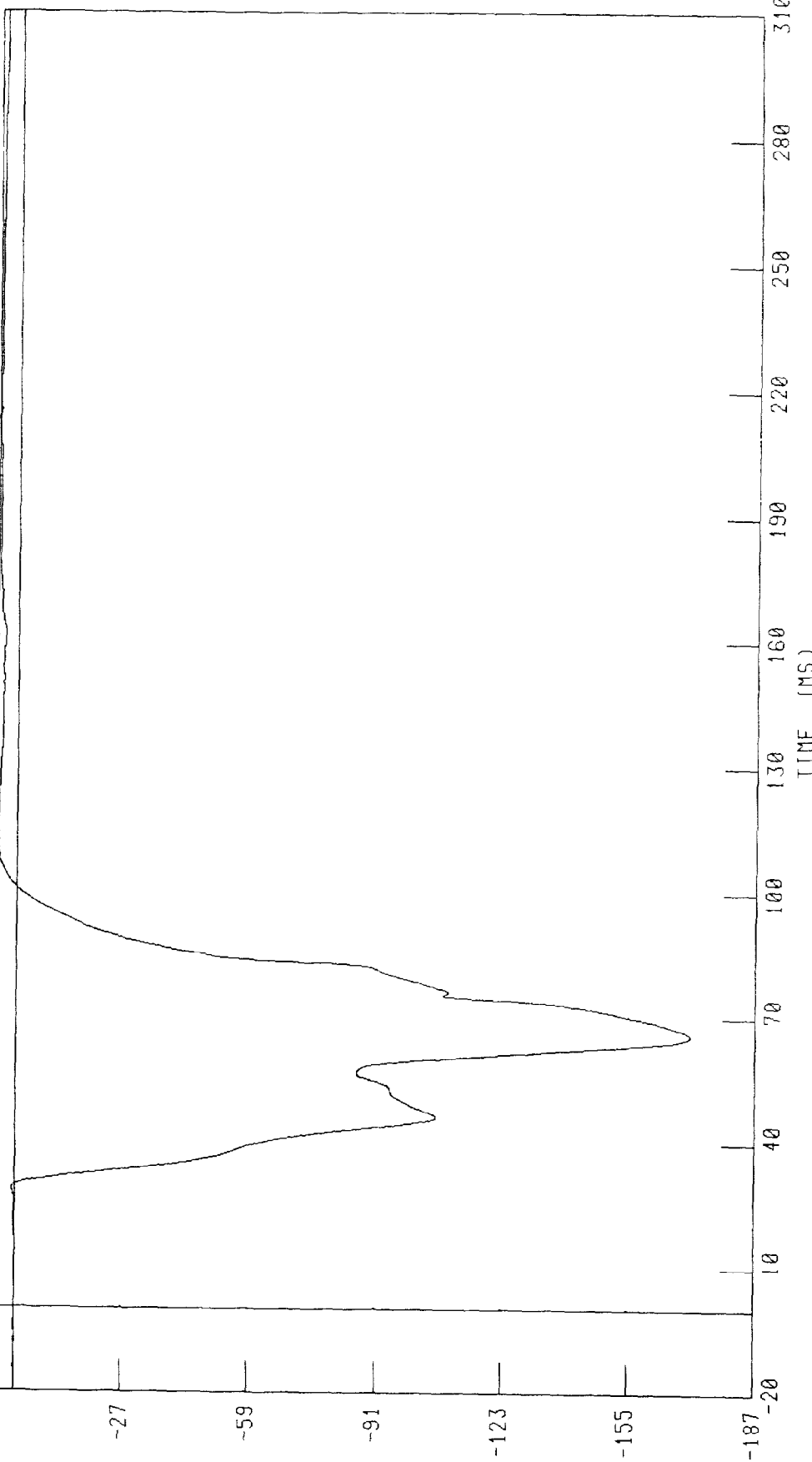
CHANNEL RFMF2 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER LEFT KNEE DISPLACEMENT
48 KPH FLAT FRONTAL

TEST NUMBER 010924

4 IRC INC

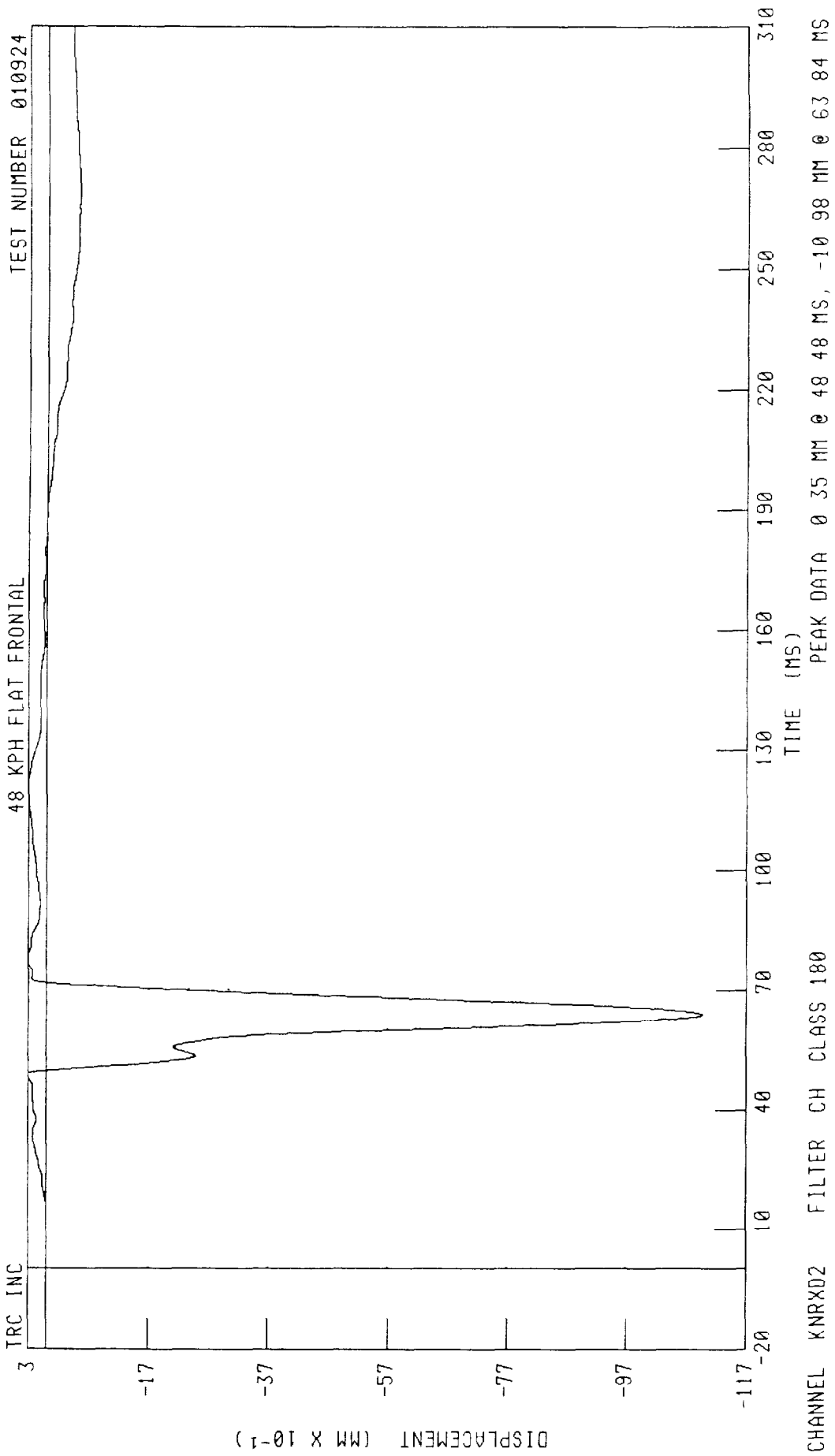
DISPLACEMENT (MM X 10⁻¹)



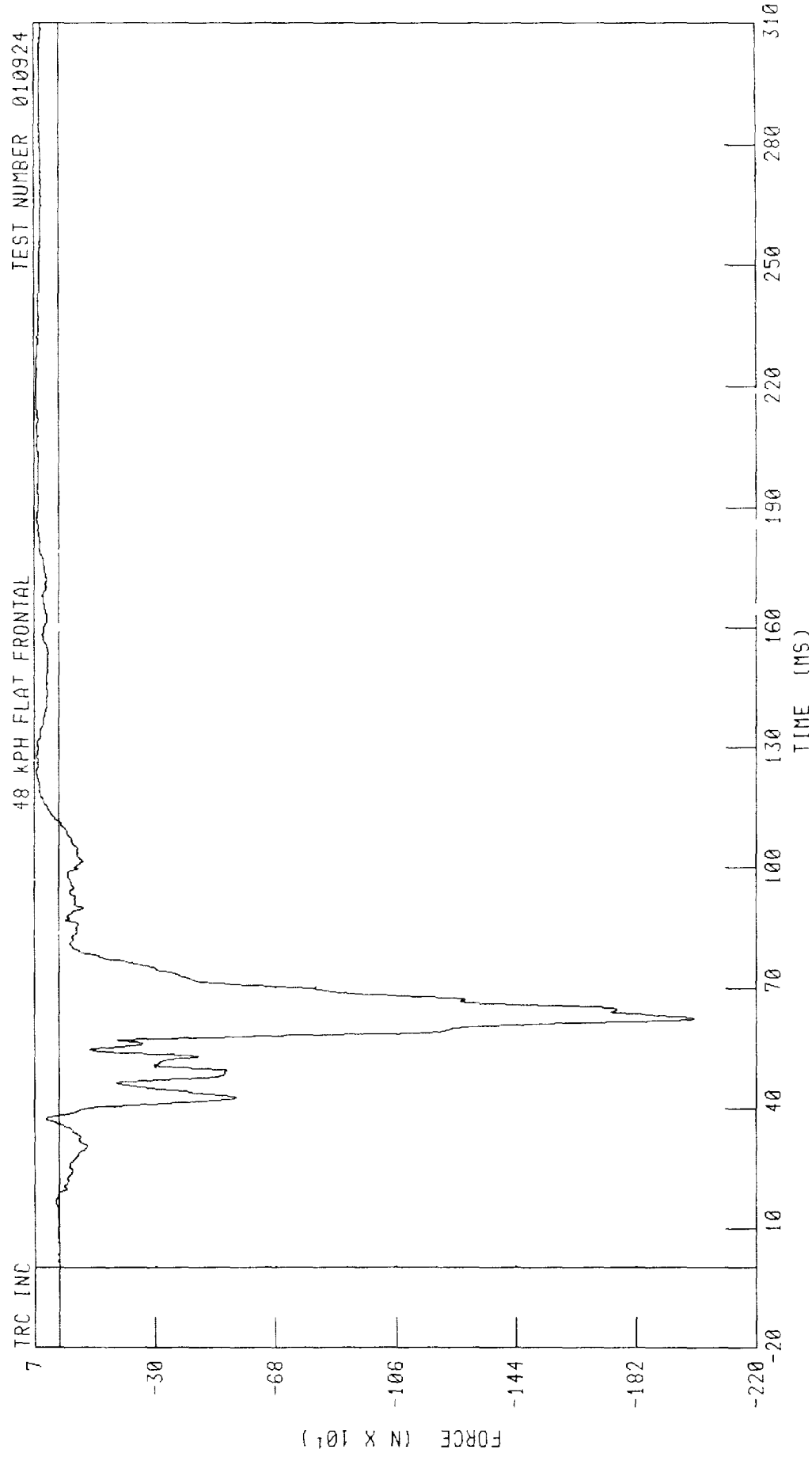
CHANNEL KNLXD2 FILTER CH CLASS 180

PEAK DATA 0 47 MM @ 211 20 MS, -17 07 MM @ 65 76 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER RIGHT KNEE DISPLACEMENT



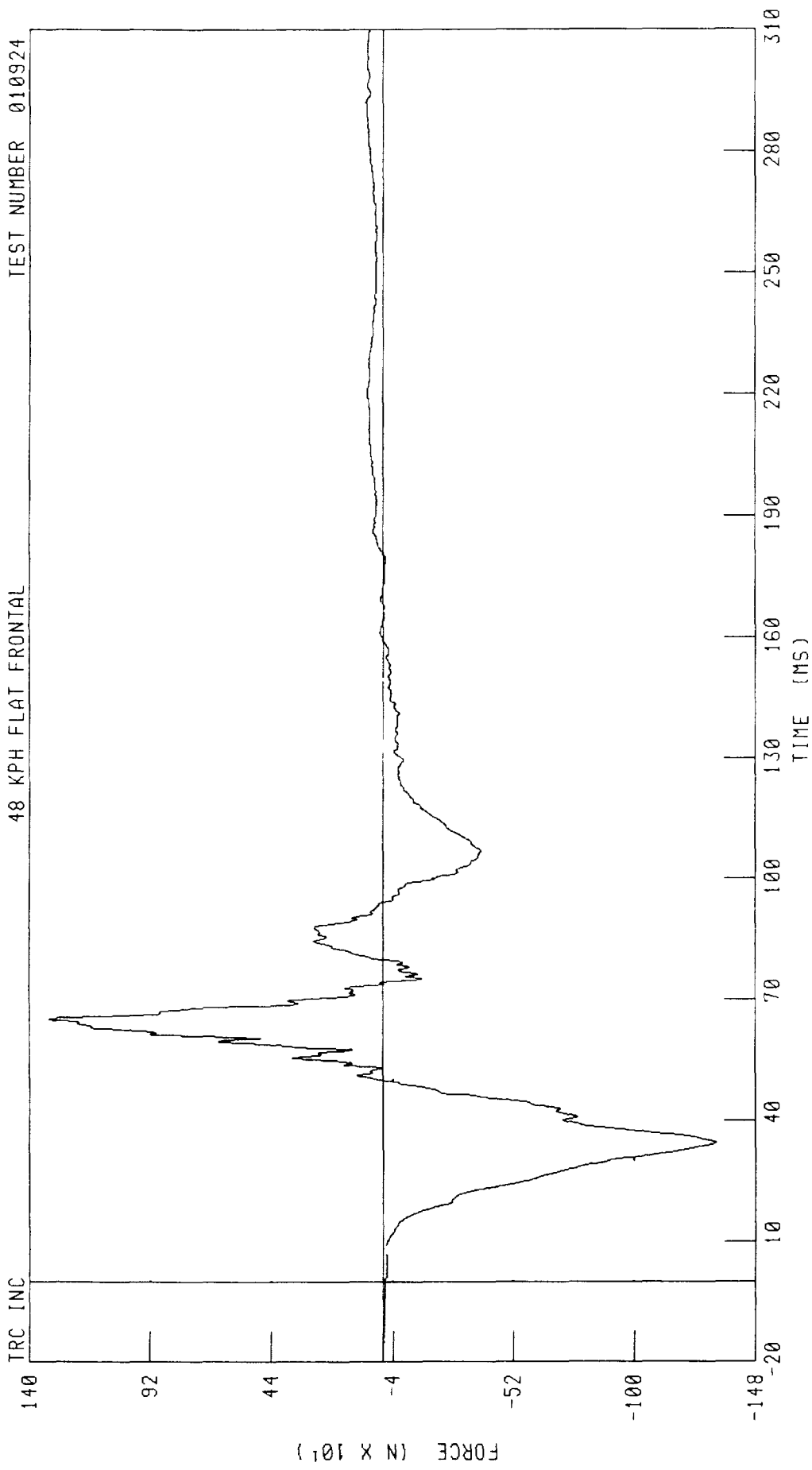
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER LEFT UPPER TIBIA X-AXIS FORCE
48 KPH FLAT FRONTAL



TEST NUMBER 010924

CHANNEL TBLXF2 FILTER CH CLASS 600 PEAK DATA 68 54 N @ 127 68 MS, -2007 62 N @ 62 24 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER LEFT UPPER TIBIA Z-AXIS FORCE

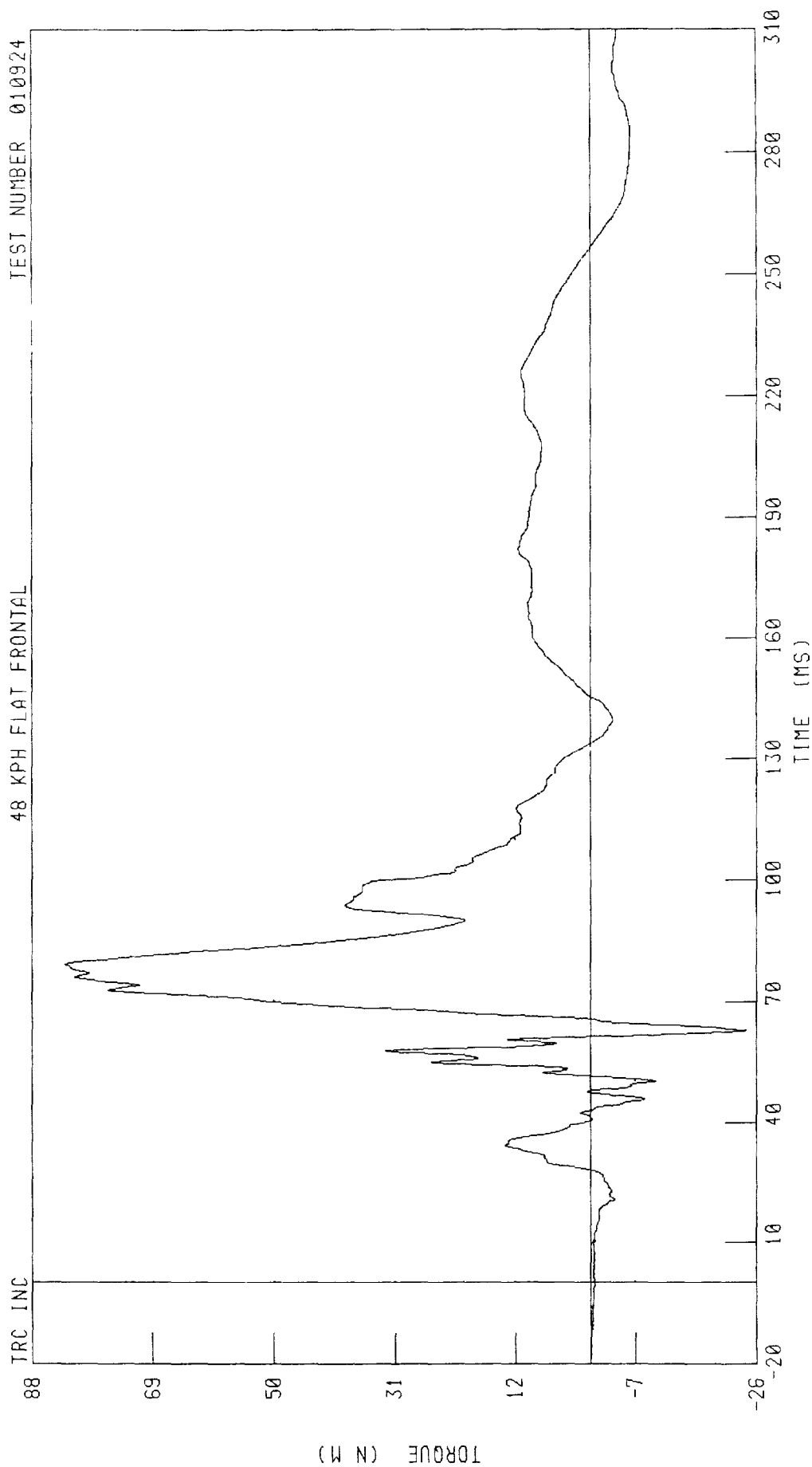


CHANNEL TBLZF2 FILTER CH CLASS 600

PEAK DATA 1324 17 N 0 65 12 MS, -1326 32 N 0 34 48 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER LEFT UPPER TIBIA MOMENT ABOUT X AXIS
48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL TBLX12 FILTER CH CLASS 600 PEAK DATA 82 82 N M 79 20 MS, -24 39 N M 62 64 MS

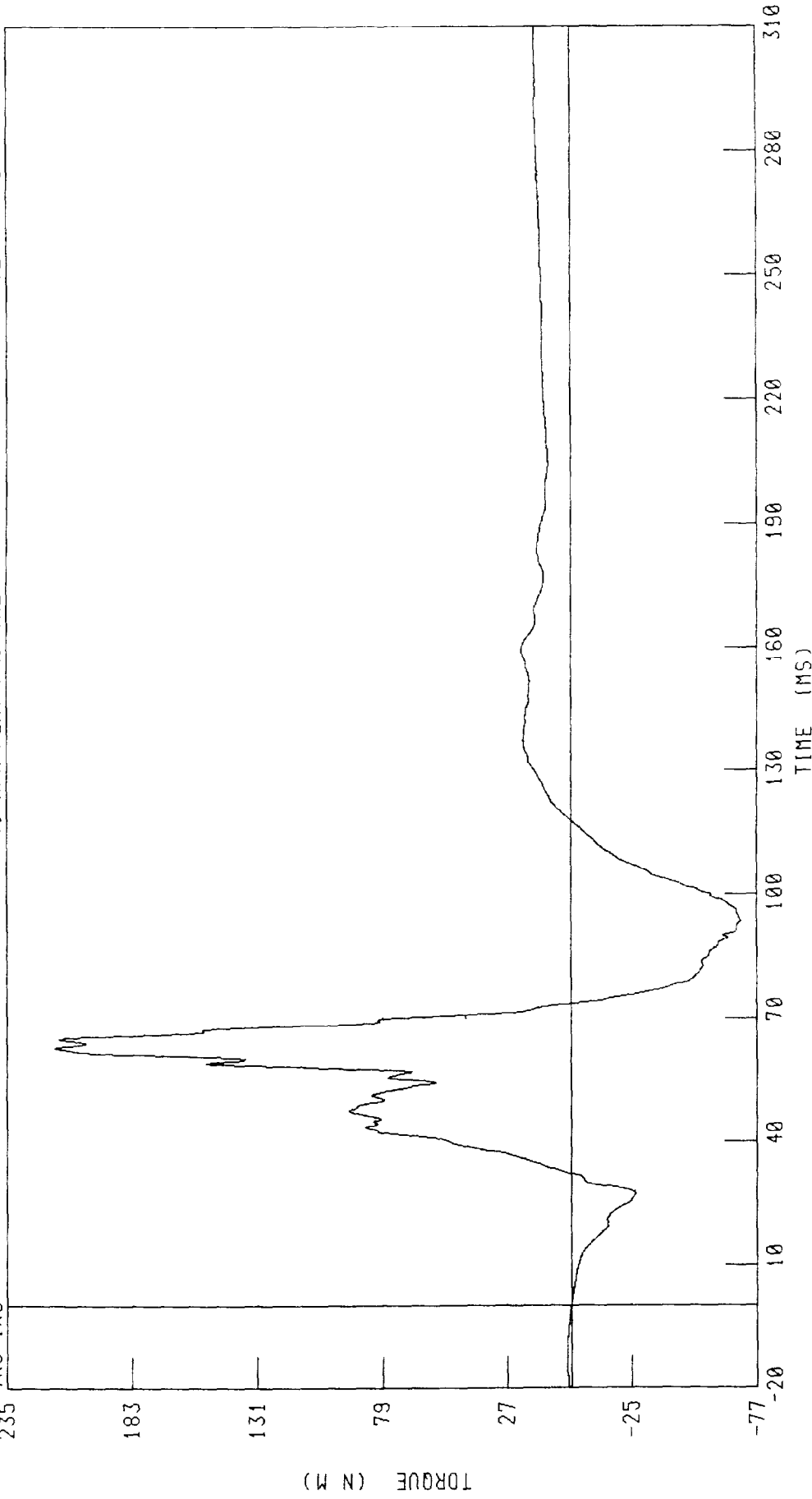
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



TIME (MS)

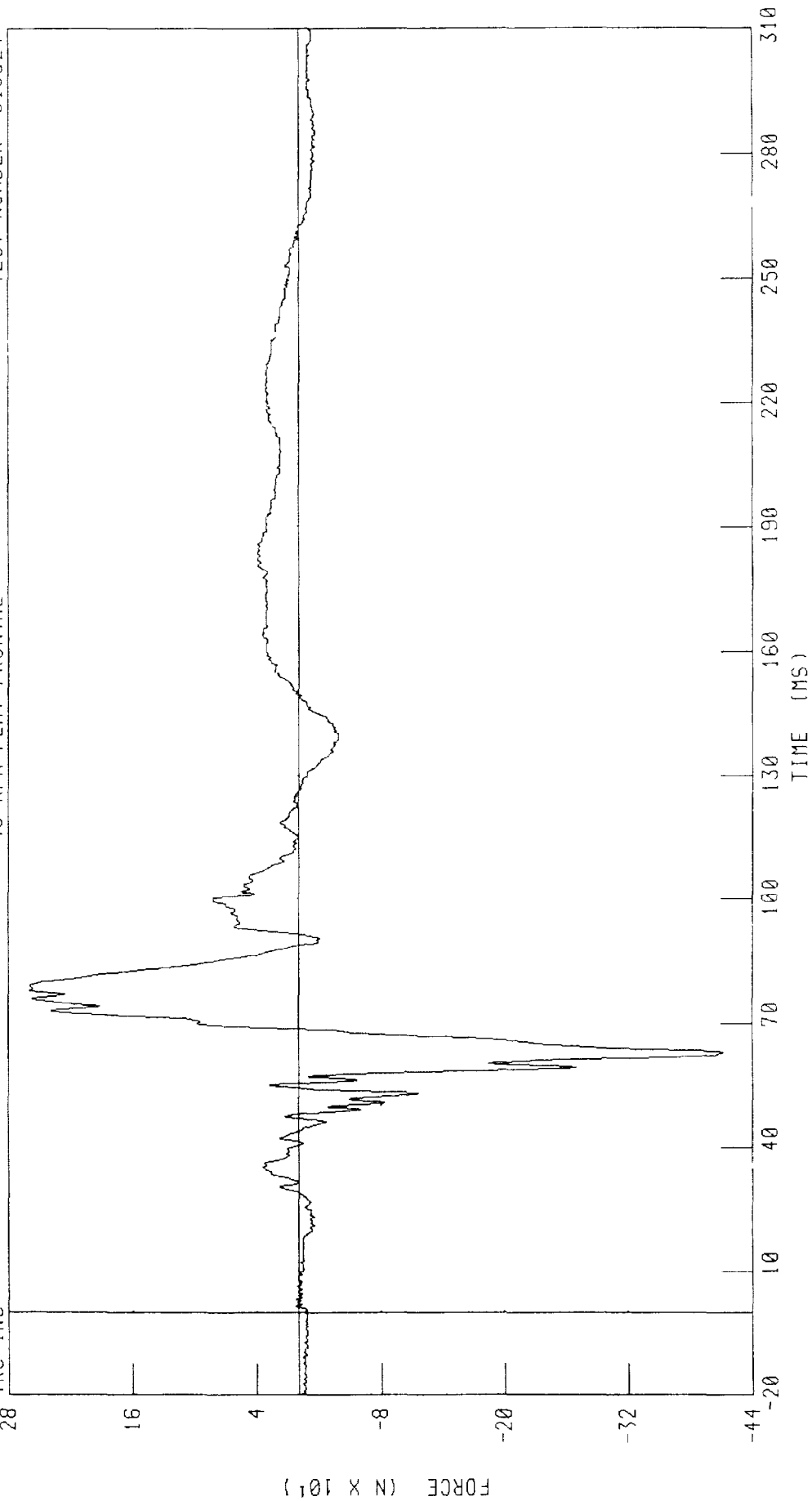
CHANNEL TBLYM2 FILTER CH CLASS 600

PEAK DATA 215 28 N M @ 62 88 MS, -70 24 N M @ 93 68 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER LEFT LOWER TIBIA X-AXIS FORCE
48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



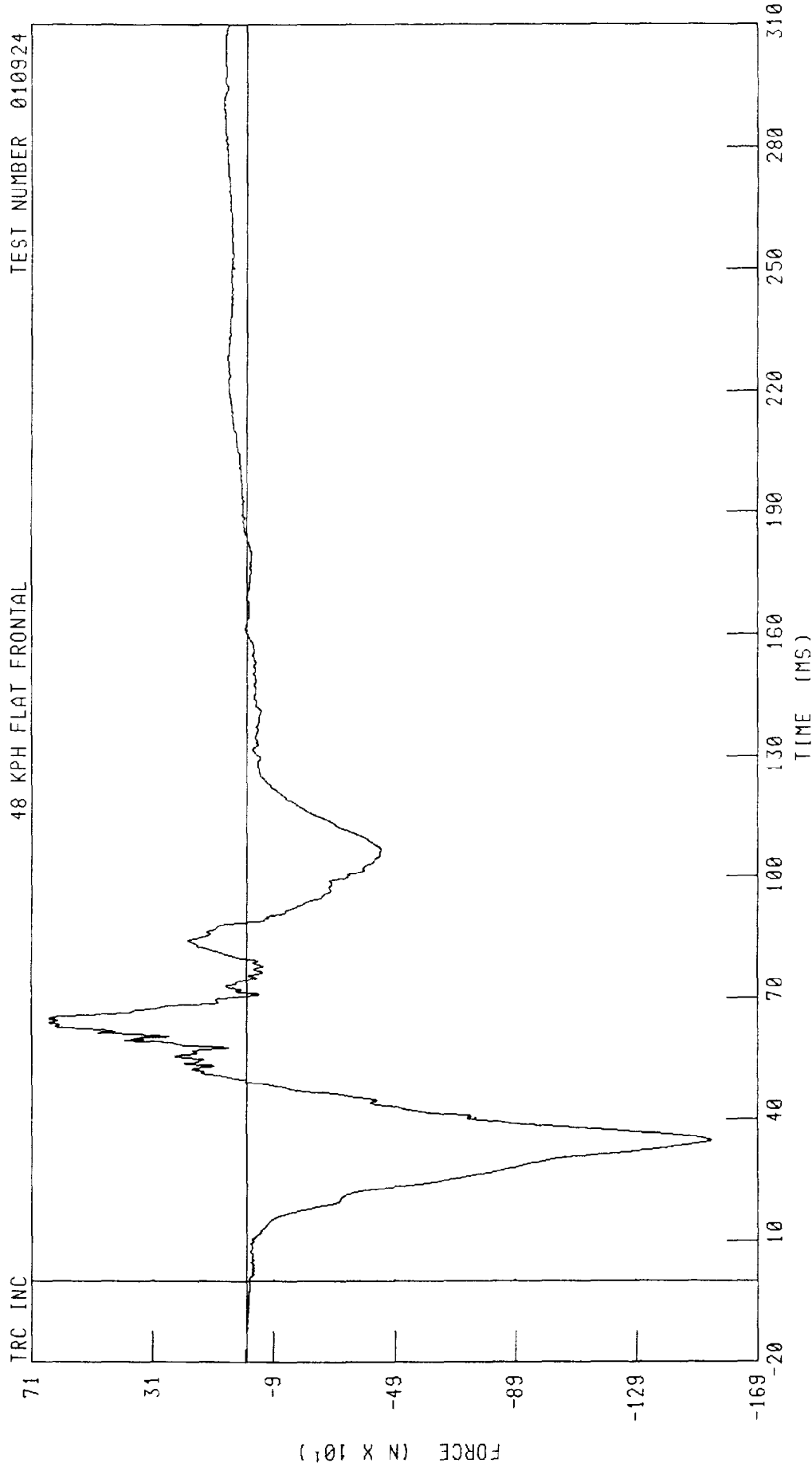
CHANNEL ANLXF2 FILTER CH CLASS 600
TIME (MS) PEAK DATA 259 58 N @ 77 92 MS, -411 46 N @ 63 04 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER LEFT LOWER TIBIA Z-AXIS FORCE

48 KPH FLAT FRONTAL

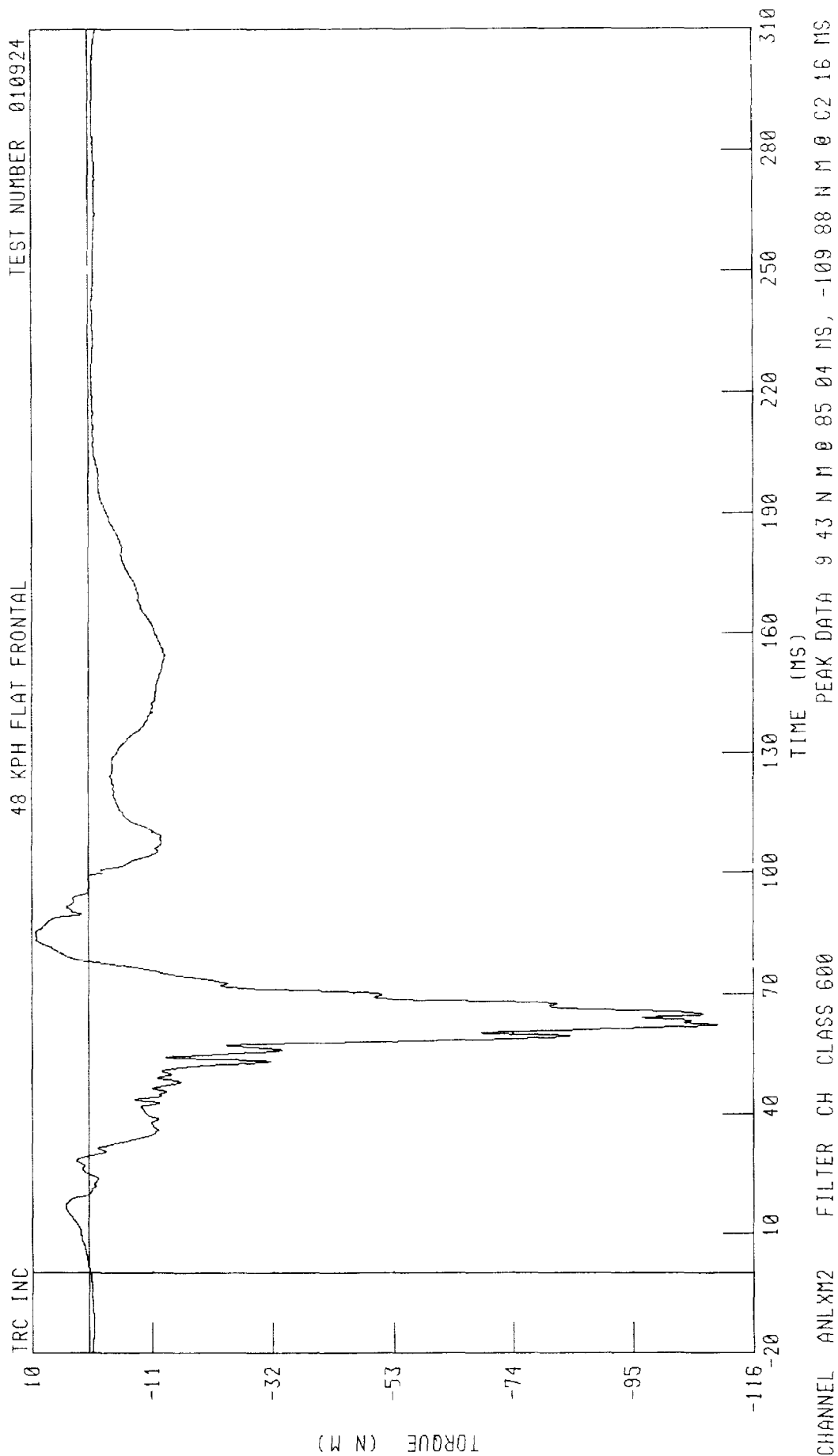
TEST NUMBER 010924



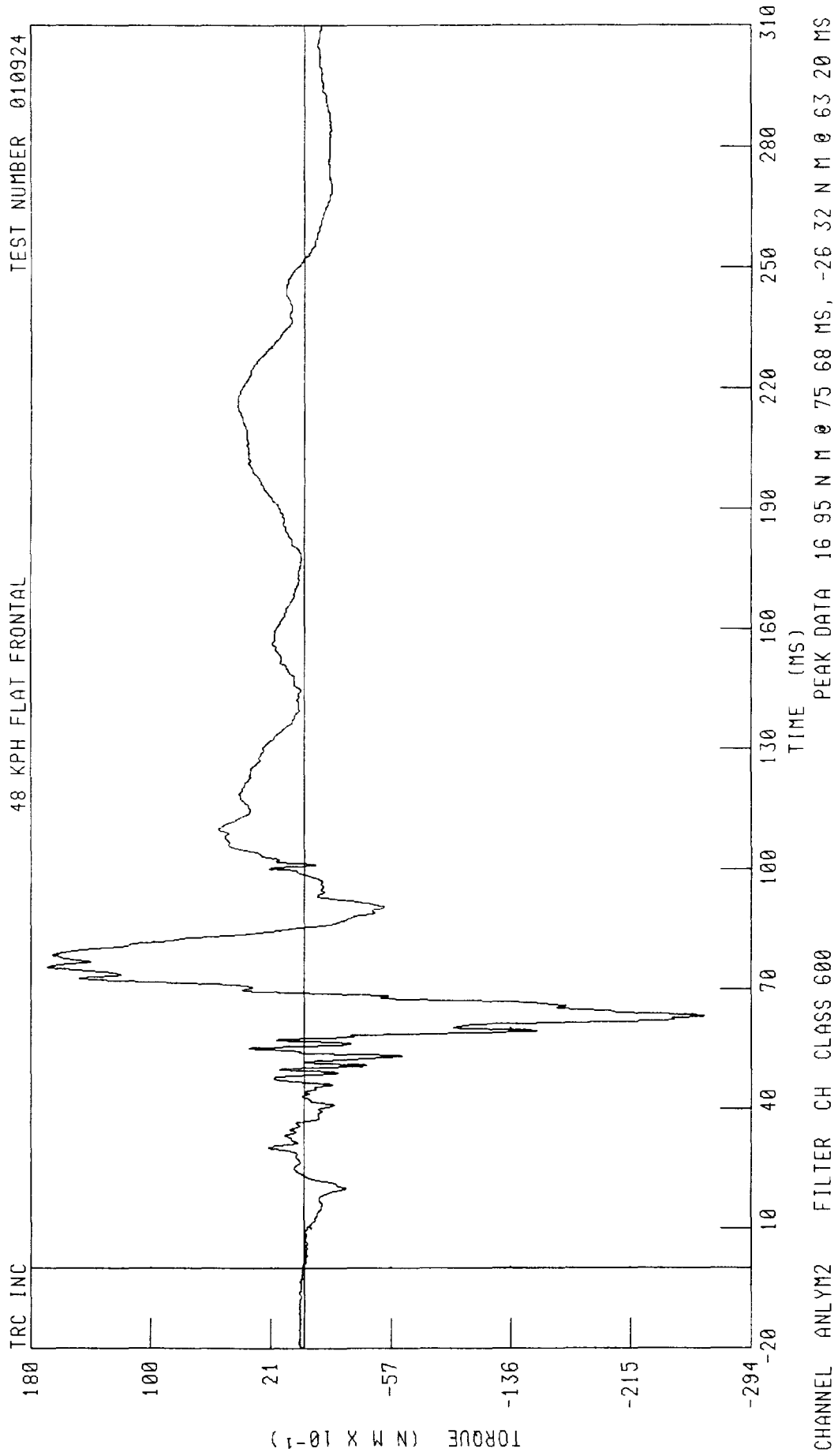
PEAK DATA 653 56 N @ 65 04 MS, -1537 56 N @ 34 56 MS

CHANNEL ANLZF2 FILTER CH CLASS 600

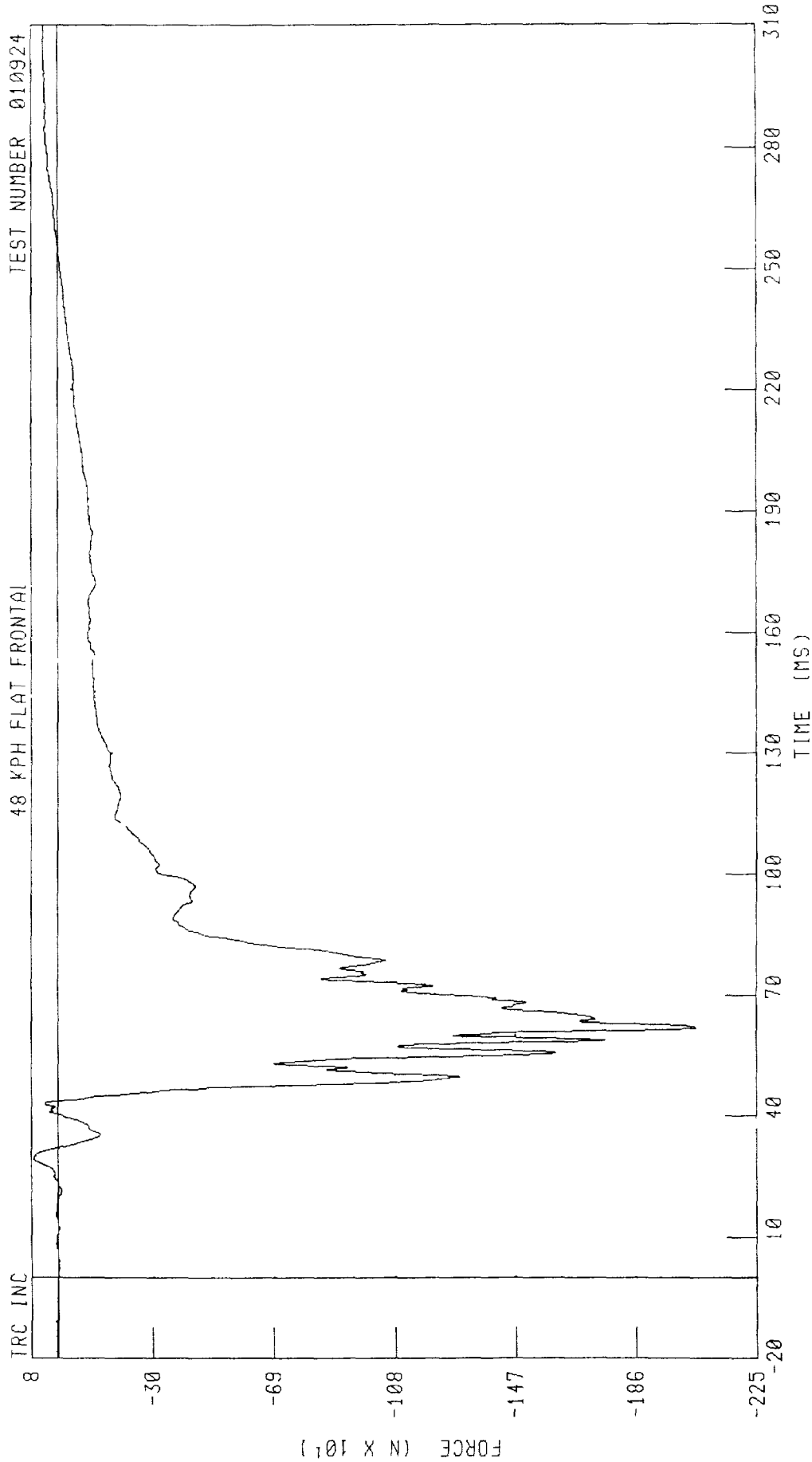
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER LEFT LOWER TIBIA MOMENT ABOUT X AXIS



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS



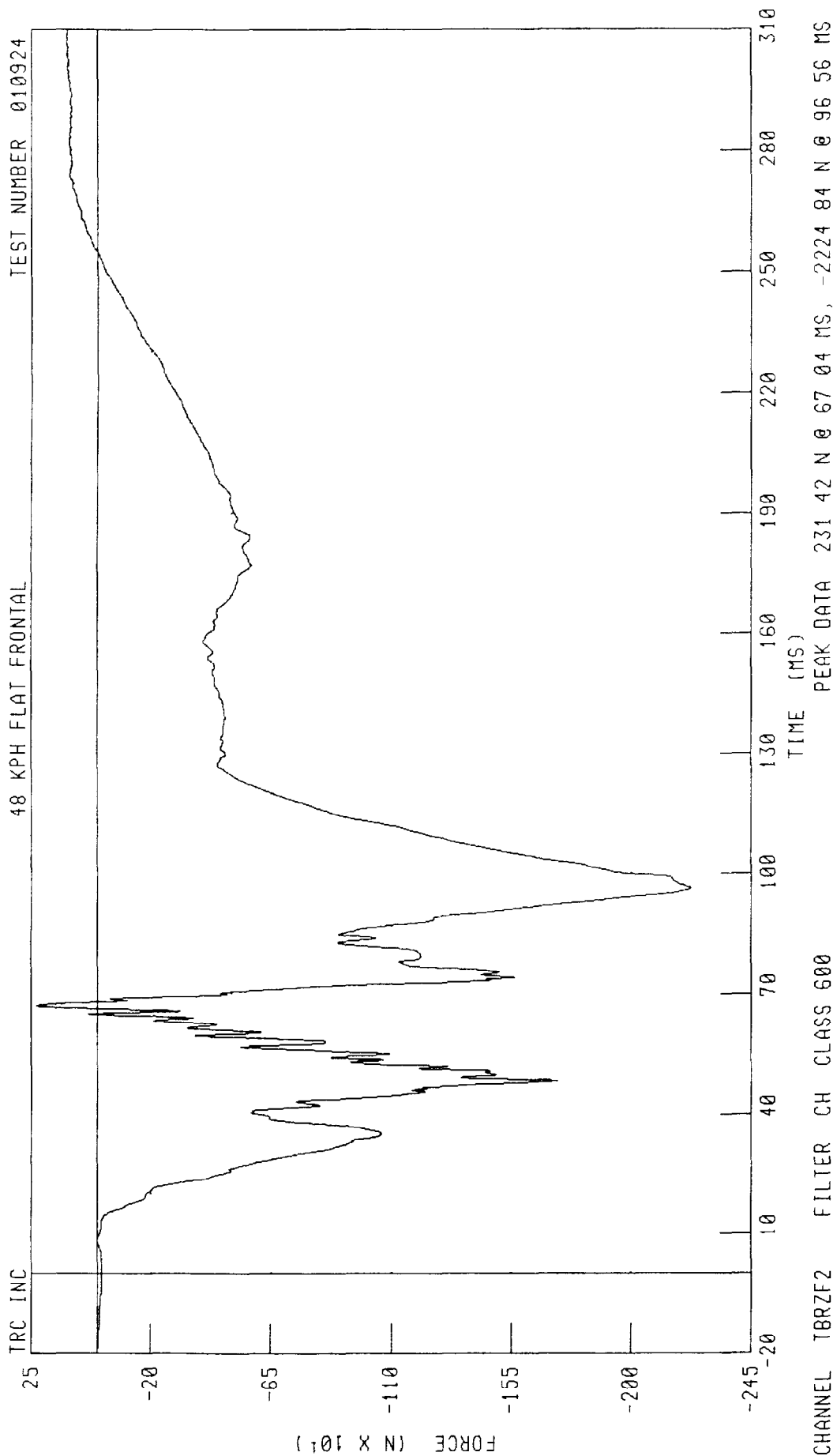
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER RIGHT UPPER TIBIA X-AXIS FORCE
48 KPH FLAT FRONTAL



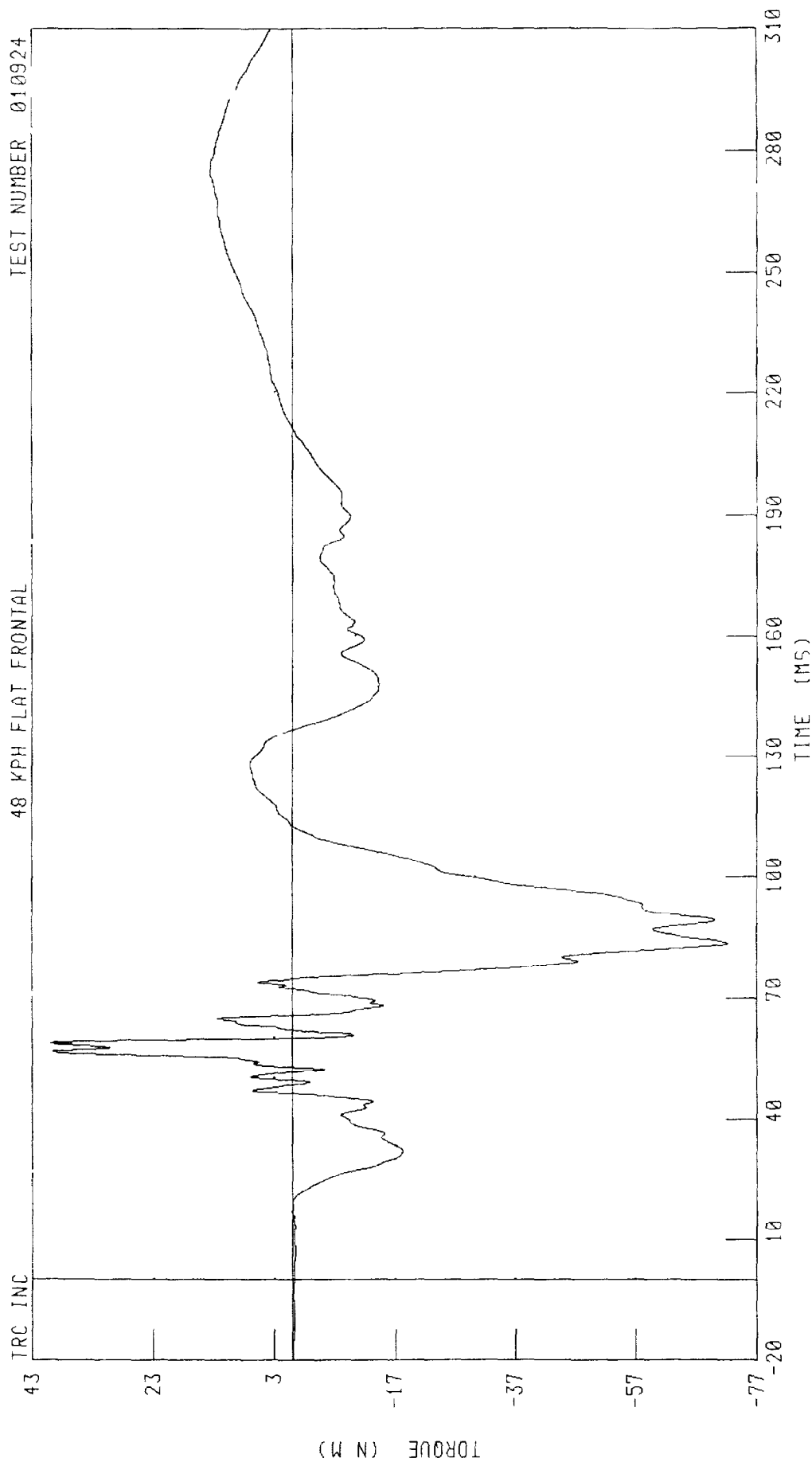
CHANNEL TBRXF2 FILTER CH CLASS 600

PEAK DATA 77 02 N @ 29 20 MS, -2059 82 N @ 61 92 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER RIGHT UPPER TIBIA Z-AXIS FORCE



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS



TEST NUMBER 010924

48 KPH FLAT FRONTAL

PEAK DATA 39 91 N M @ 58 72 MS, -72 22 N M @ 83 60 MS

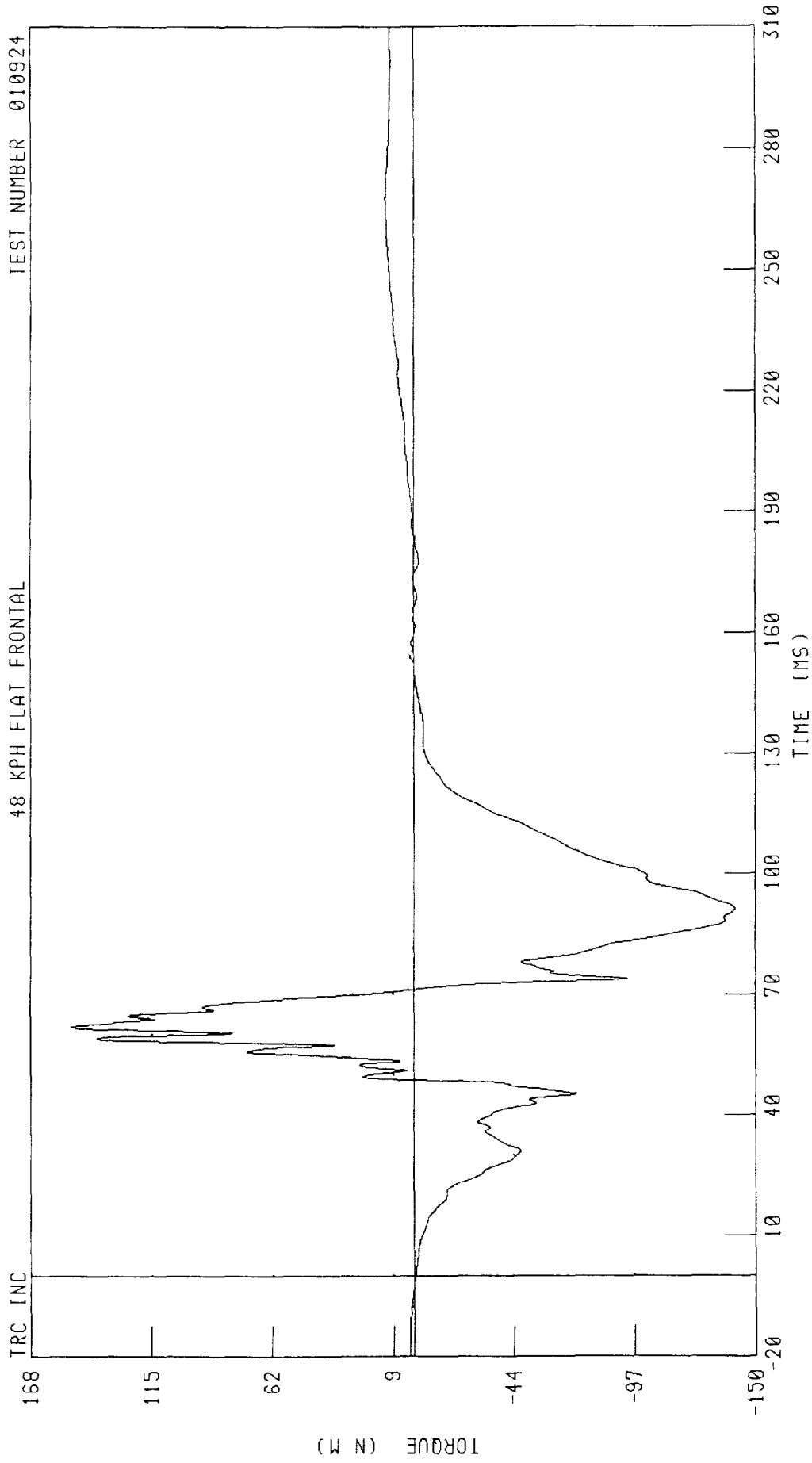
CHANNEL TBRXM2 FILTER CH CLASS 600

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS

48 KPH FLAT FRONTAL

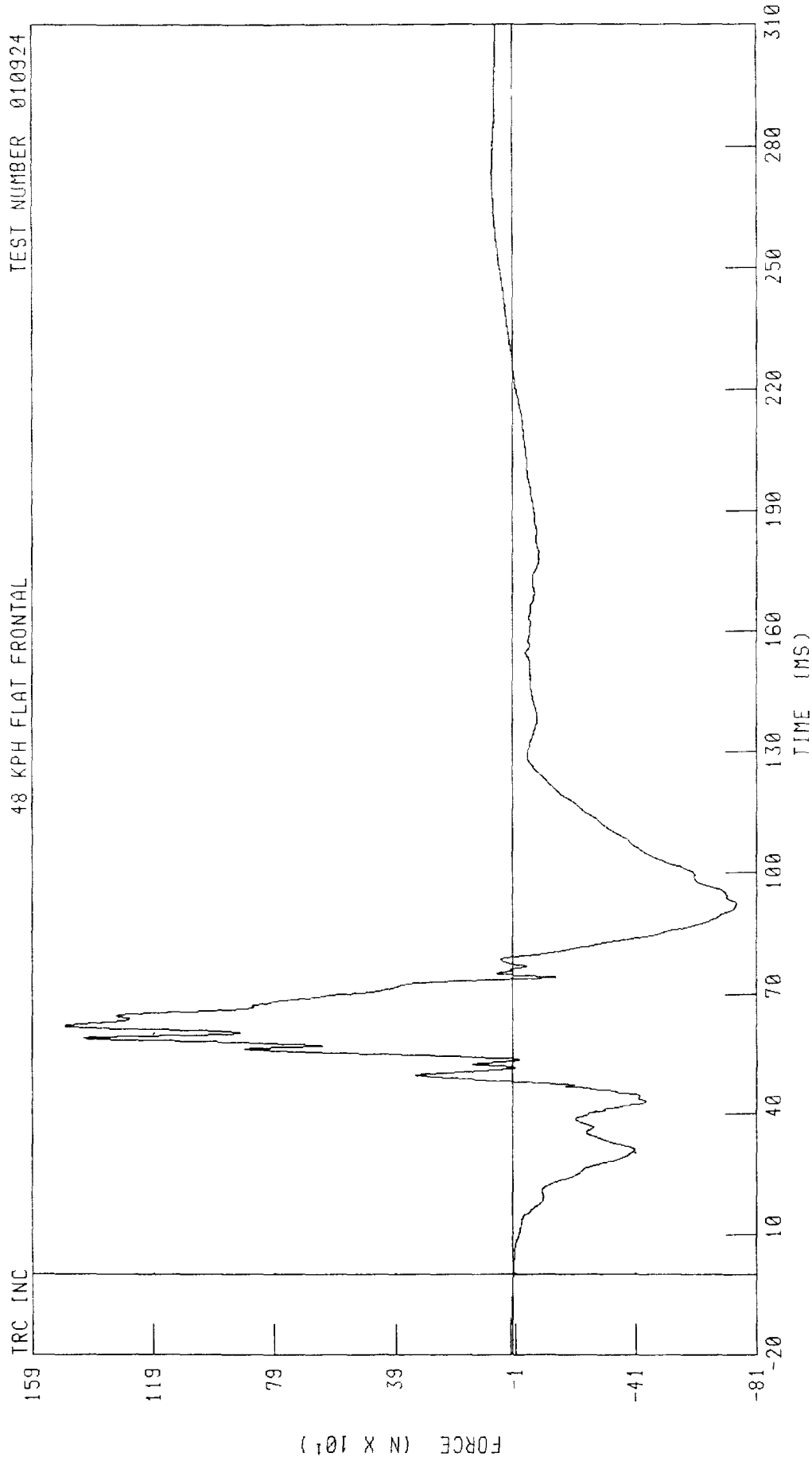
TEST NUMBER 010924



CHANNEL TBRYM2 FILTER CH CLASS 600

PEAK DATA 150 68 N M @ 61 84 MS, -140 91 N M @ 91 52 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER RIGHT LOWER TIBIA X-AXIS FORCE
48 KPH FLAT FRONTAL



CHANNEL ANR2X2 FILTER CH CLASS 600

PEAK DATA 1483 88 N @ 62 00 MS, -745 10 N @ 92 40 MS

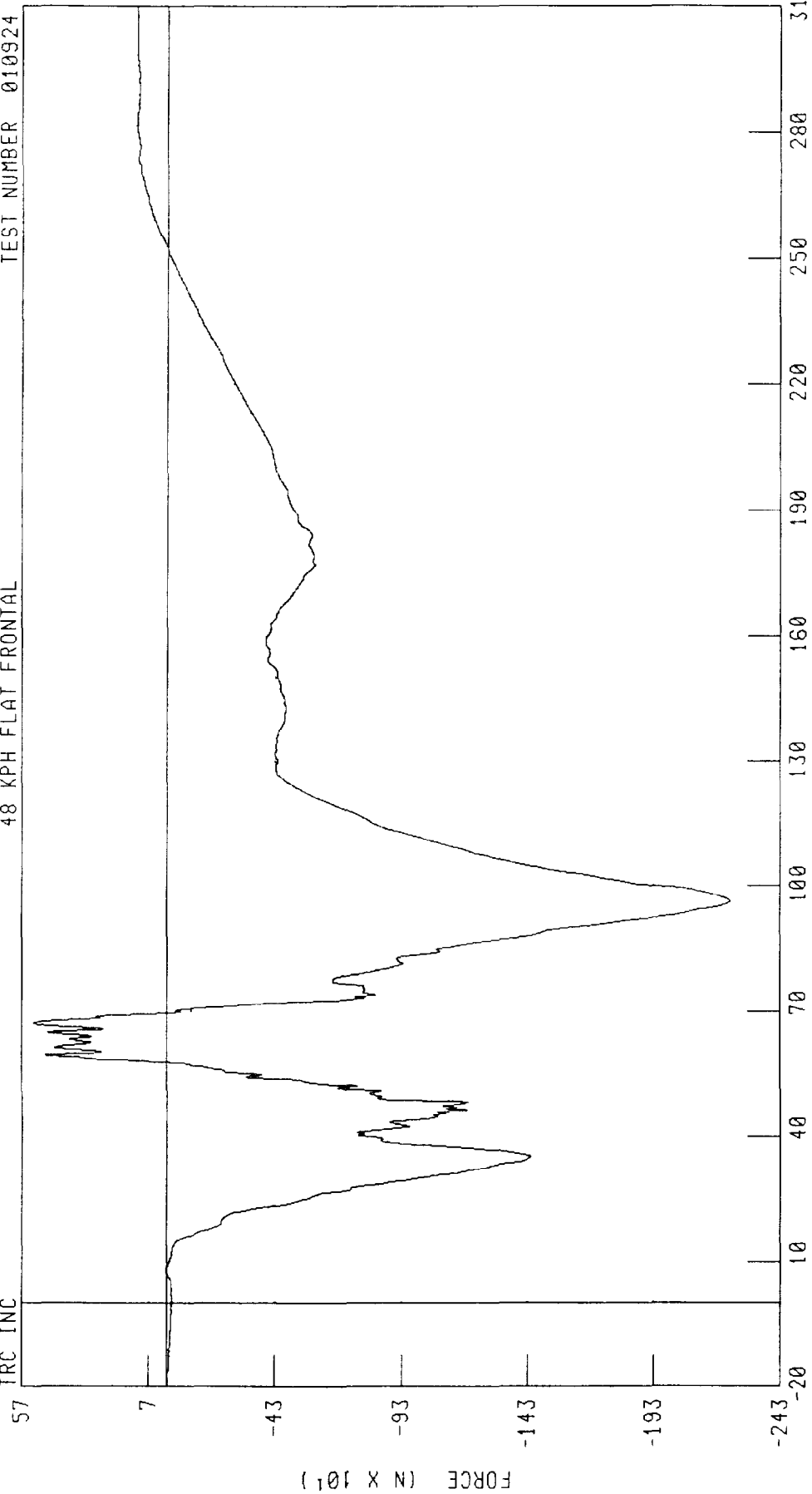
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER RIGHT LOWER TIBIA Z-AXIS FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC

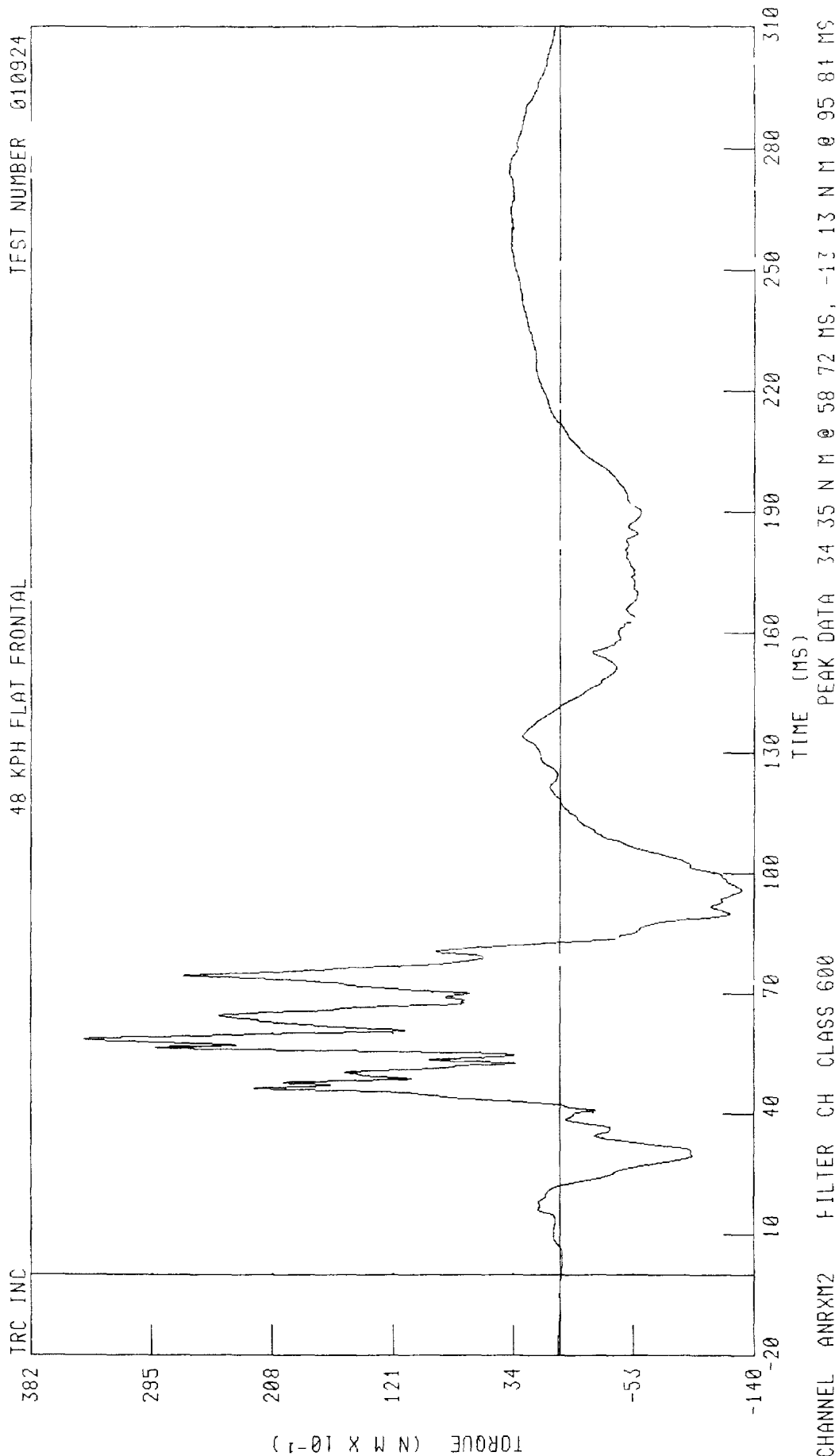


TIME (MS)

CHANNEL ANRZF2 FILTER CH CLASS 600

PEAK DATA 523 24 N @ 67 28 MS, -2234 17 N @ 96 32 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 PASSENGER RIGHT LOWER TIBIA MOMENT ABOUT X AXIS

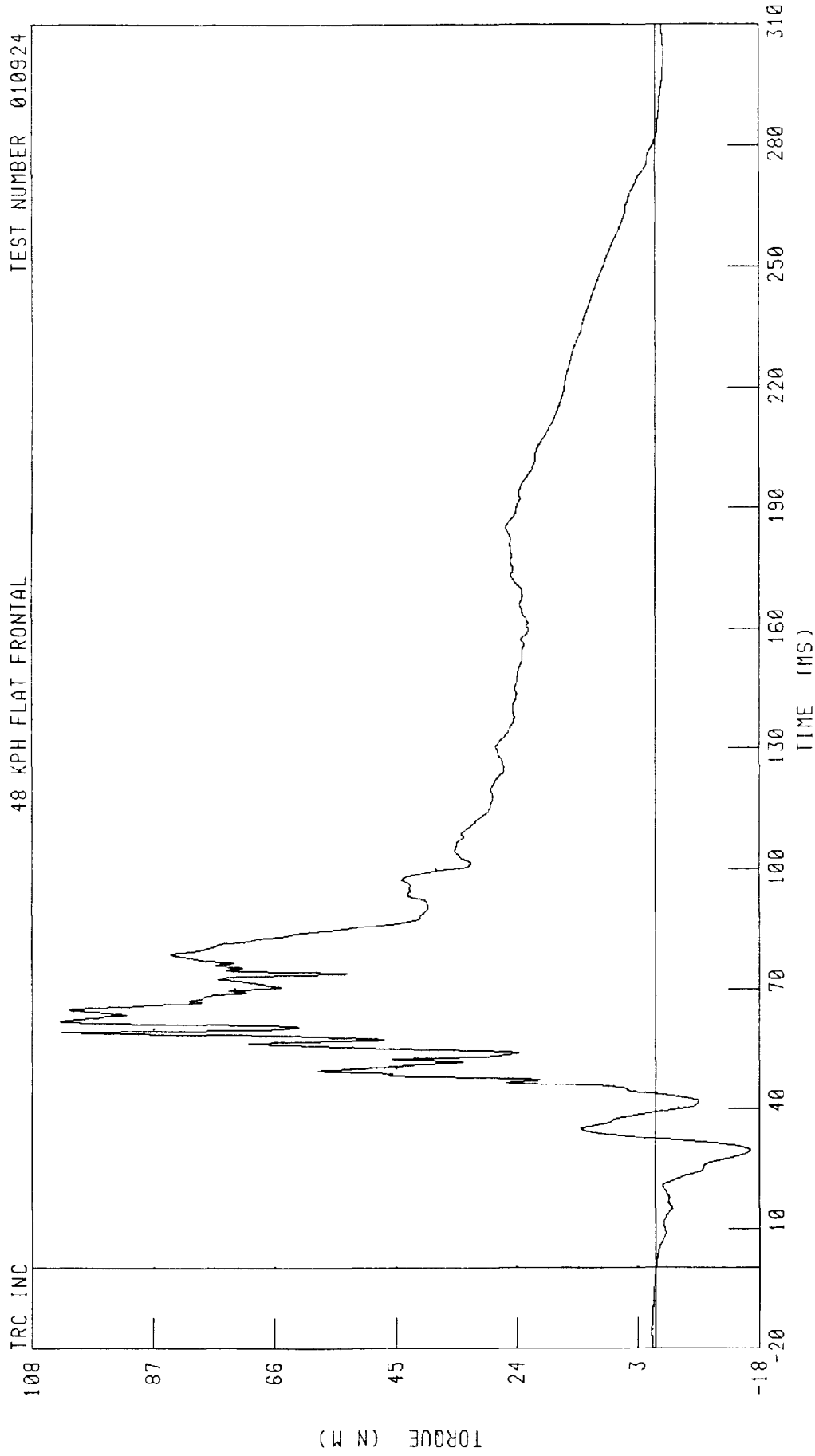


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS

48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL ANR2M2 FILTER CH CLASS 600

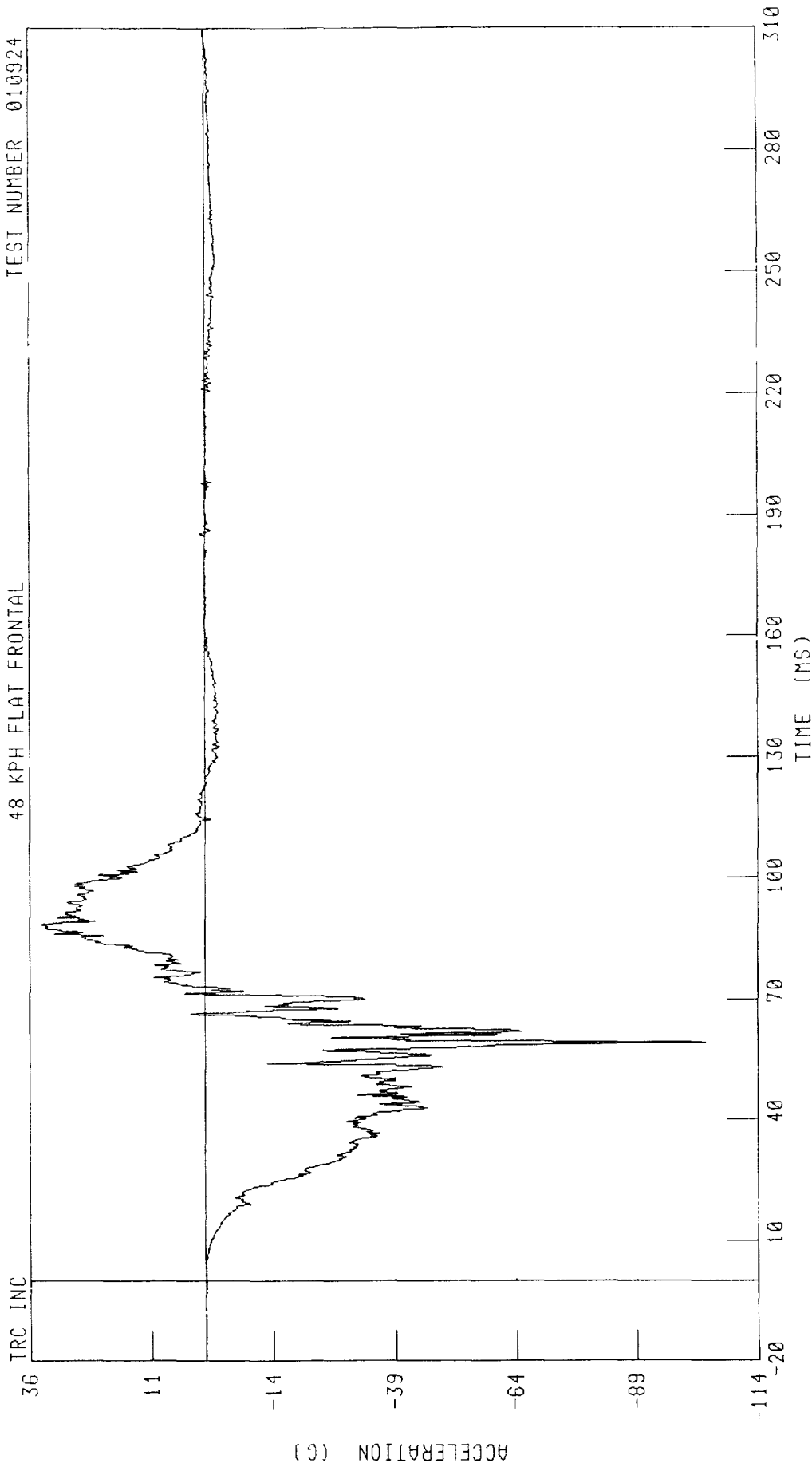
PEAK DATA 103 22 N M @ 61 92 MS, -16 49 N M @ 29 44 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

PASSENGER LEFT FOOT HEEL X-AXIS ACCELERATION

48 KPH FLAT FRONTAL

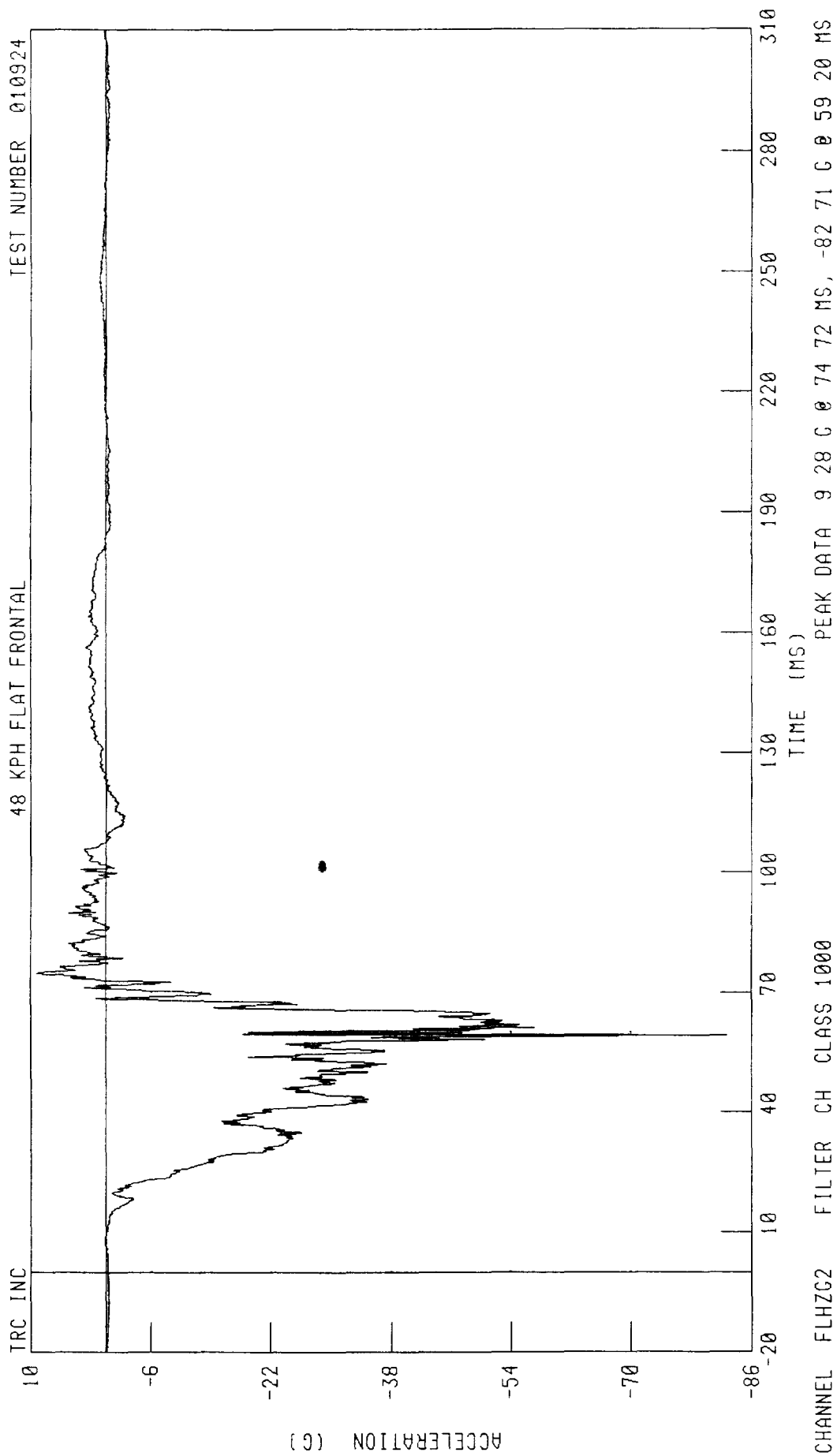
TEST NUMBER 010924



PEAK DATA 33 54 G @ 88 48 MS, -103 26 G @ 59 04 MS

CHANNEL FLHXG2 FILTER CH CLASS 1000

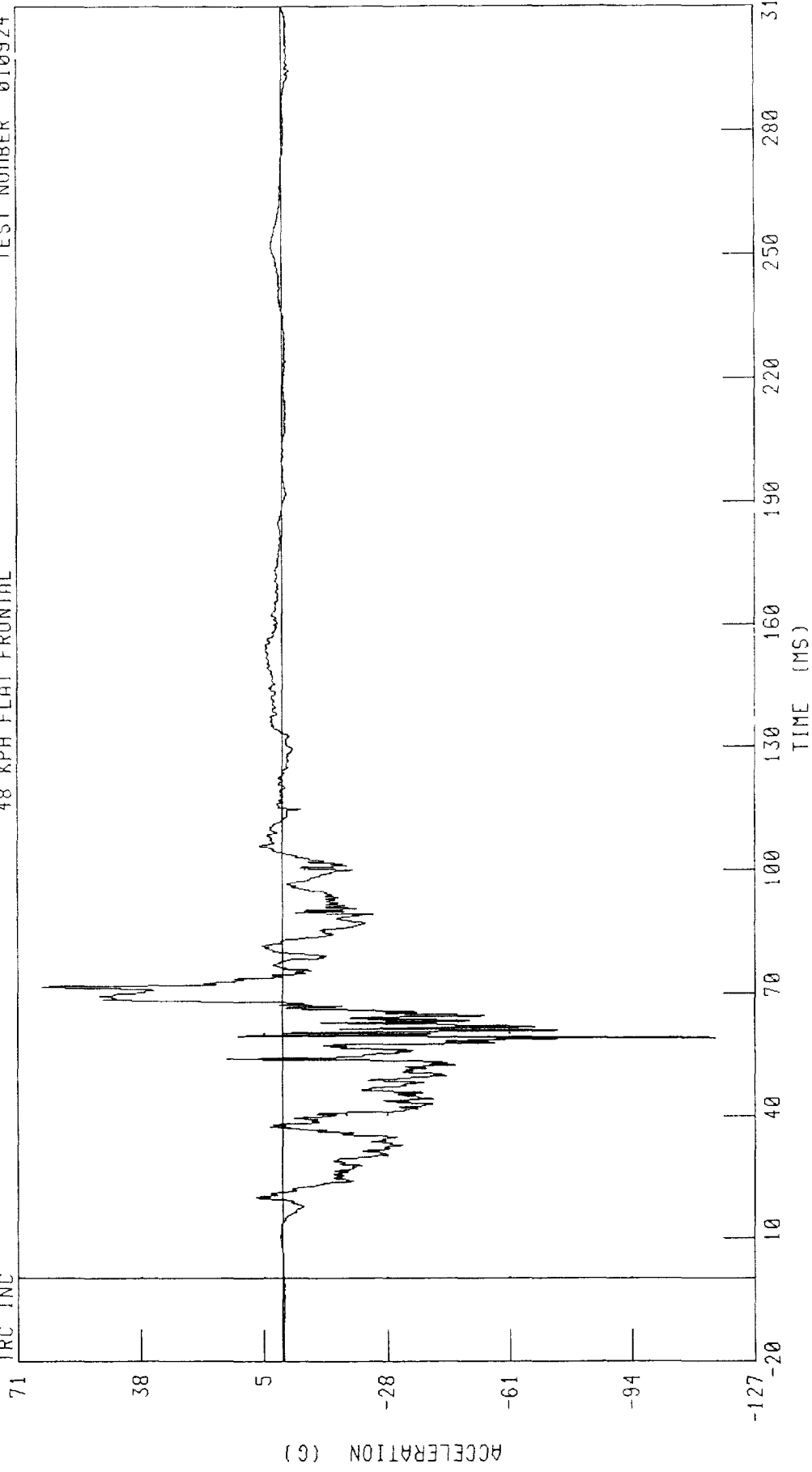
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER LEFT FOOT HEEL Z-AXIS ACCELERATION



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER LEFT FOOT TOE Z-AXIS ACCELERATION
48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC

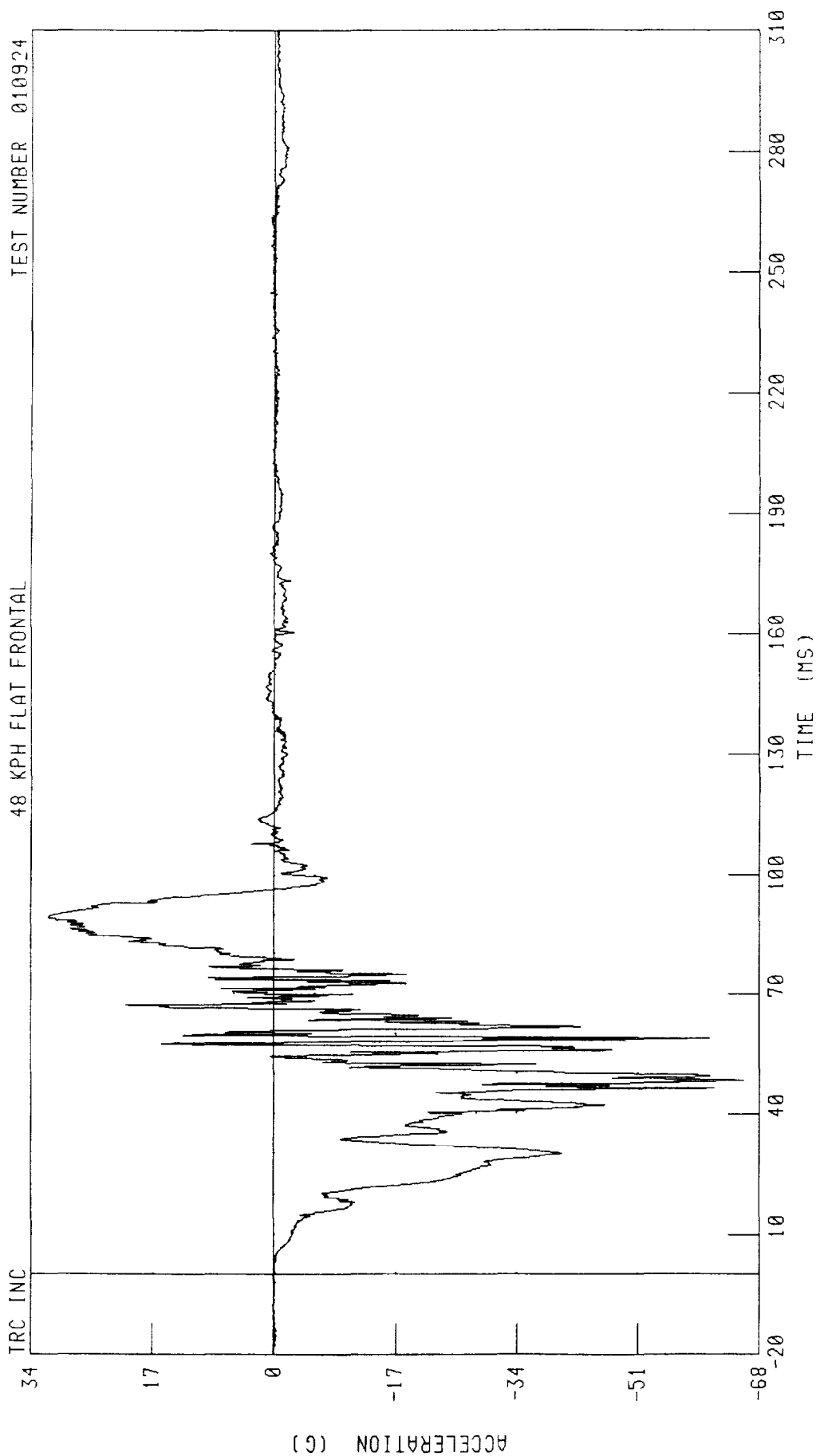


CHANNEL FLT2G2 FILTER CH CLASS 1000

PEAK DATA 64 59 G @ 71 52 MS, -116 32 G @ 59 04 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER RIGHT FOOT HEEL X-AXIS ACCELERATION

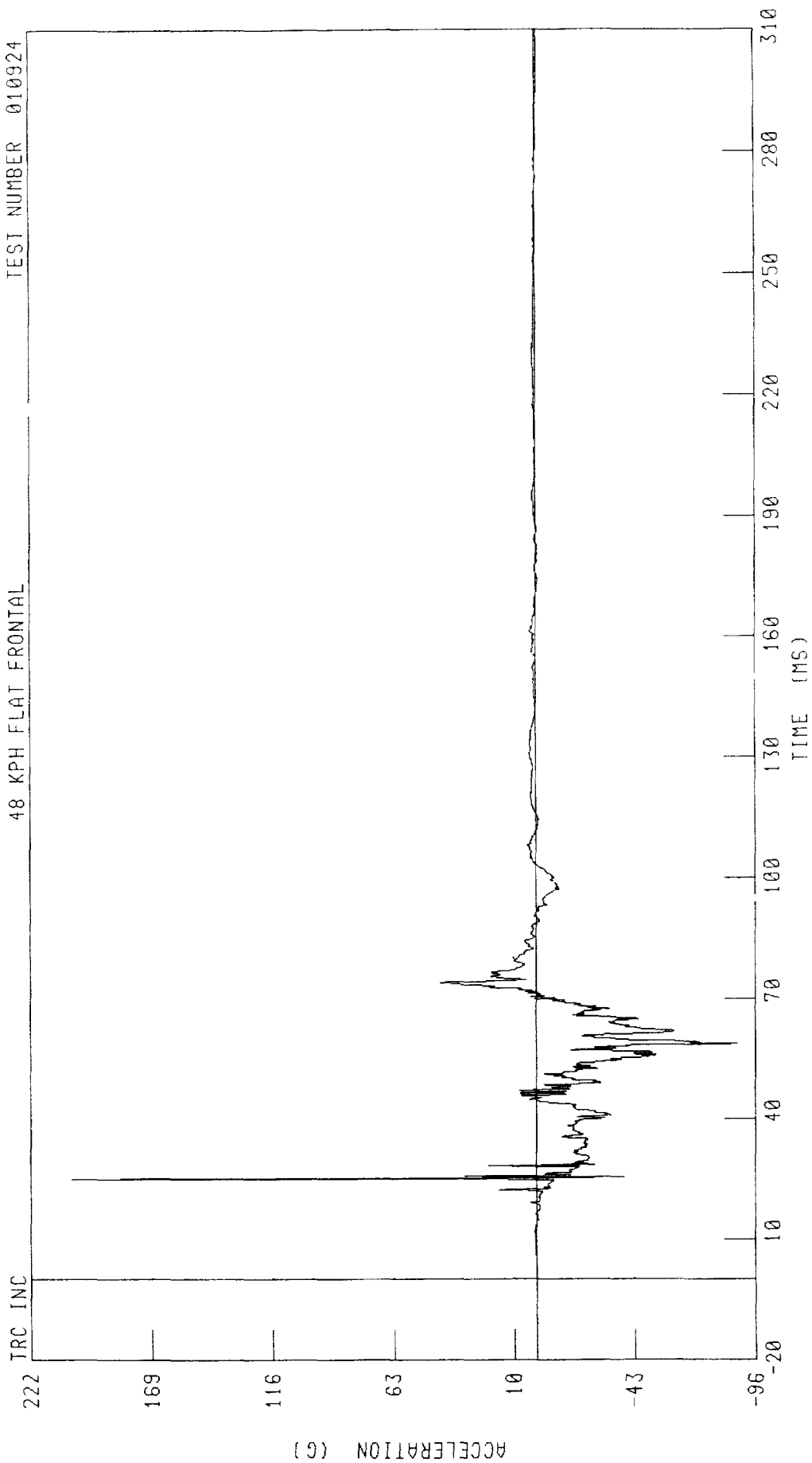
48 KPH FLAT FRONTAL TEST NUMBER 010924



CHANNEL FRHXG2 FILTER CH CLASS 1000 PEAK DATA 31 63 G @ 89 36 MS, -65 79 G @ 48 32 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER RIGHT FOOT HEEL Z-AXIS ACCELERATION
48 KPH FLAT FRONTAL

TEST NUMBER 010924

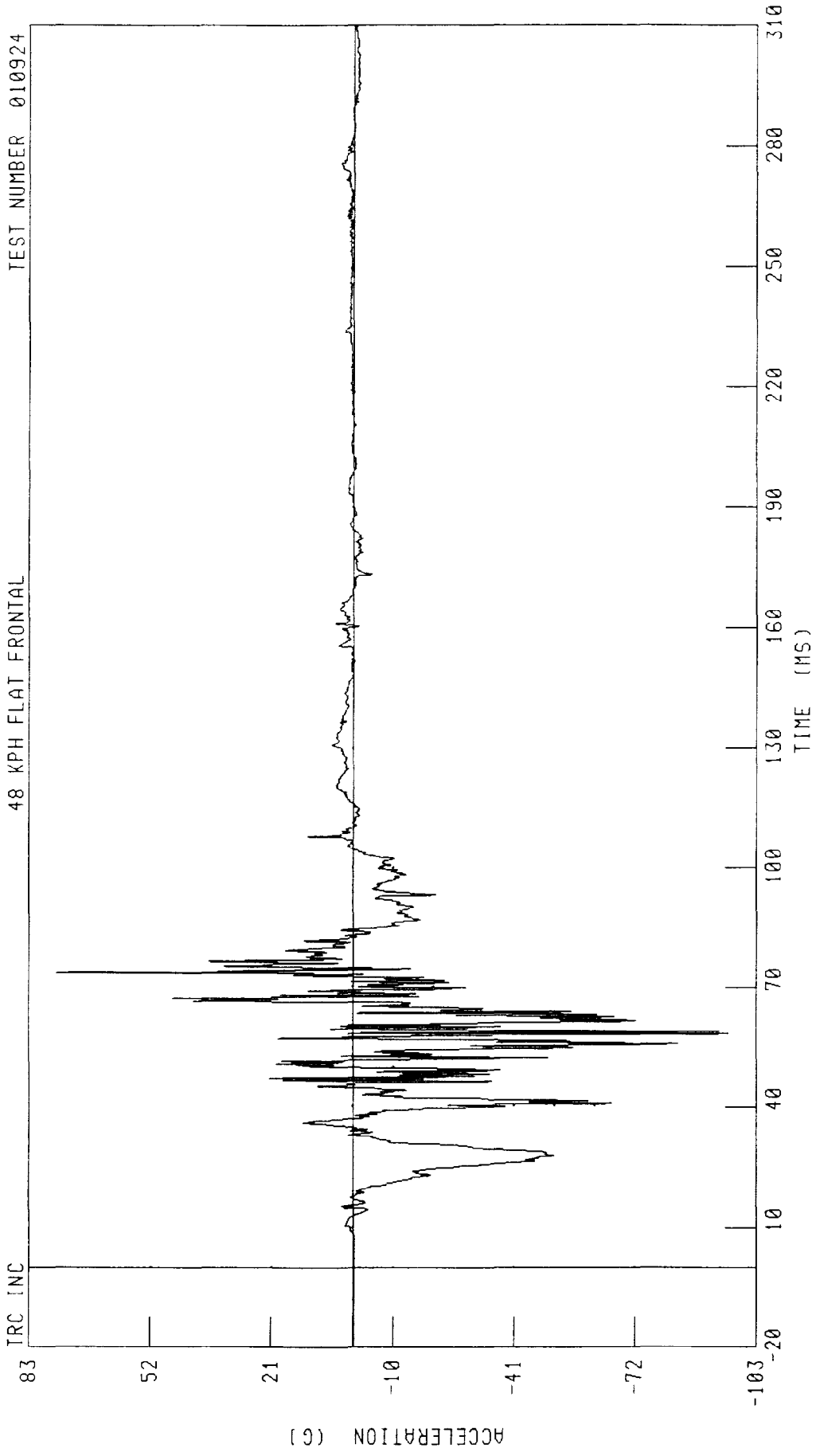


CHANNEL FRHZC2 FILTER CH CLASS 1000

PEAK DATA 204 06 G @ 25 04 MS, -88 01 G @ 58 64 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER RIGHT FOOT TOE Z-AXIS ACCELERATION

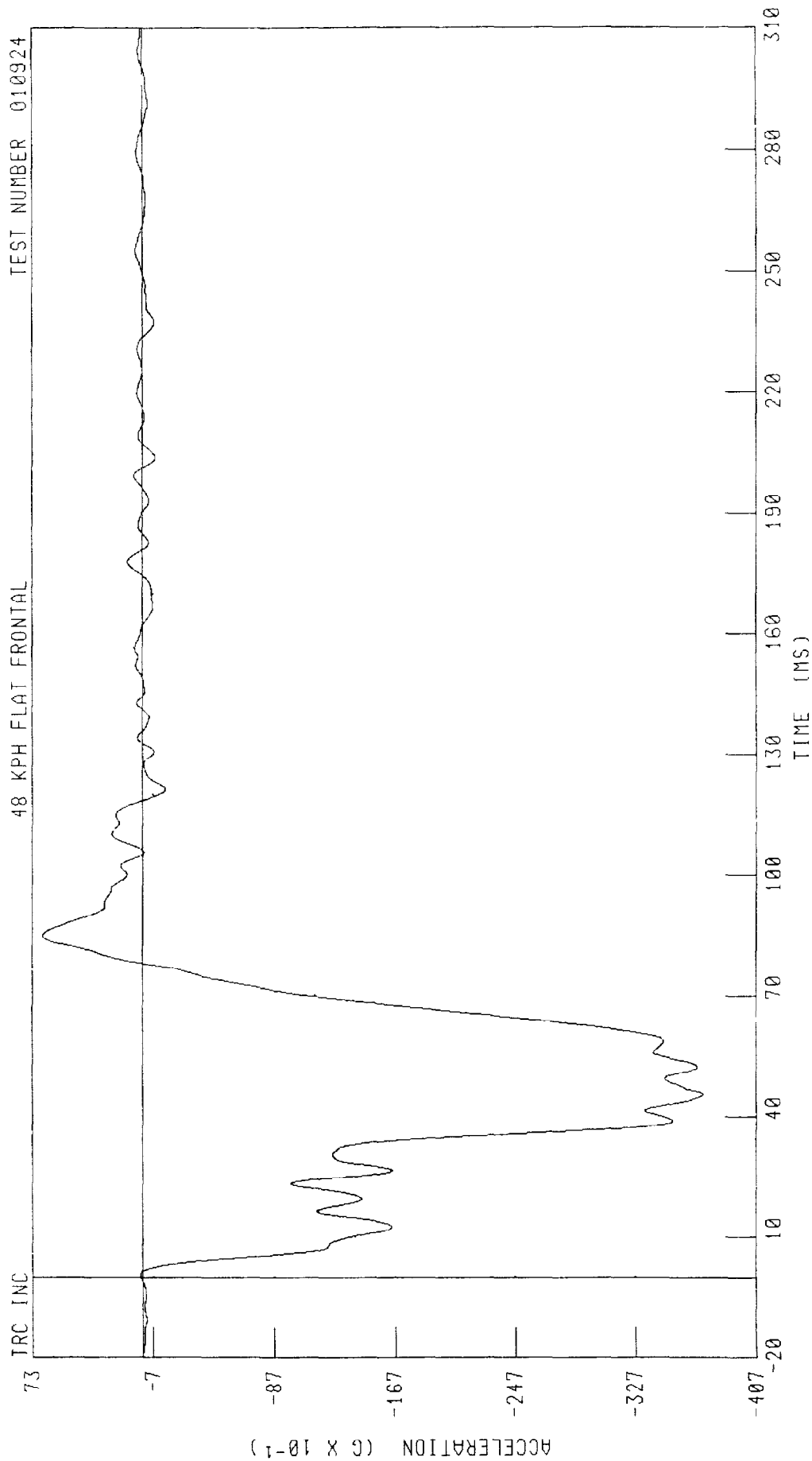
48 KPH FLAT FRONTAL TEST NUMBER 010924



CHANNEL FRTZC2 FILTER CH CLASS 1000

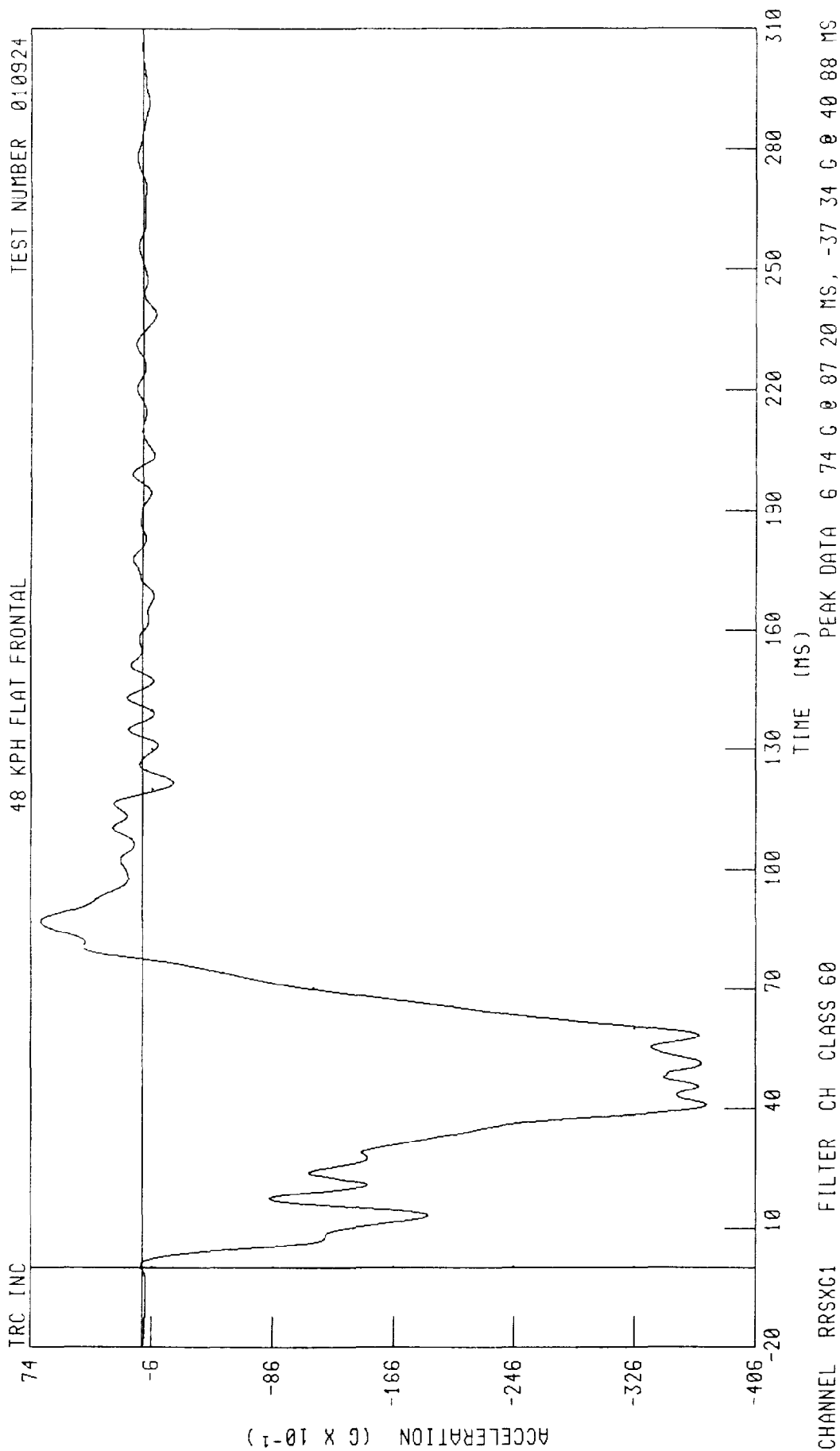
PEAK DATA 75 95 G @ 73 76 MS, -95 88 G @ 58 32 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LEFT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION



CHANNEL LRSXG1 FILTER CH CLASS 60 PEAK DATA 6 65 G @ 84 88 MS, -37 22 G @ 45 44 MS

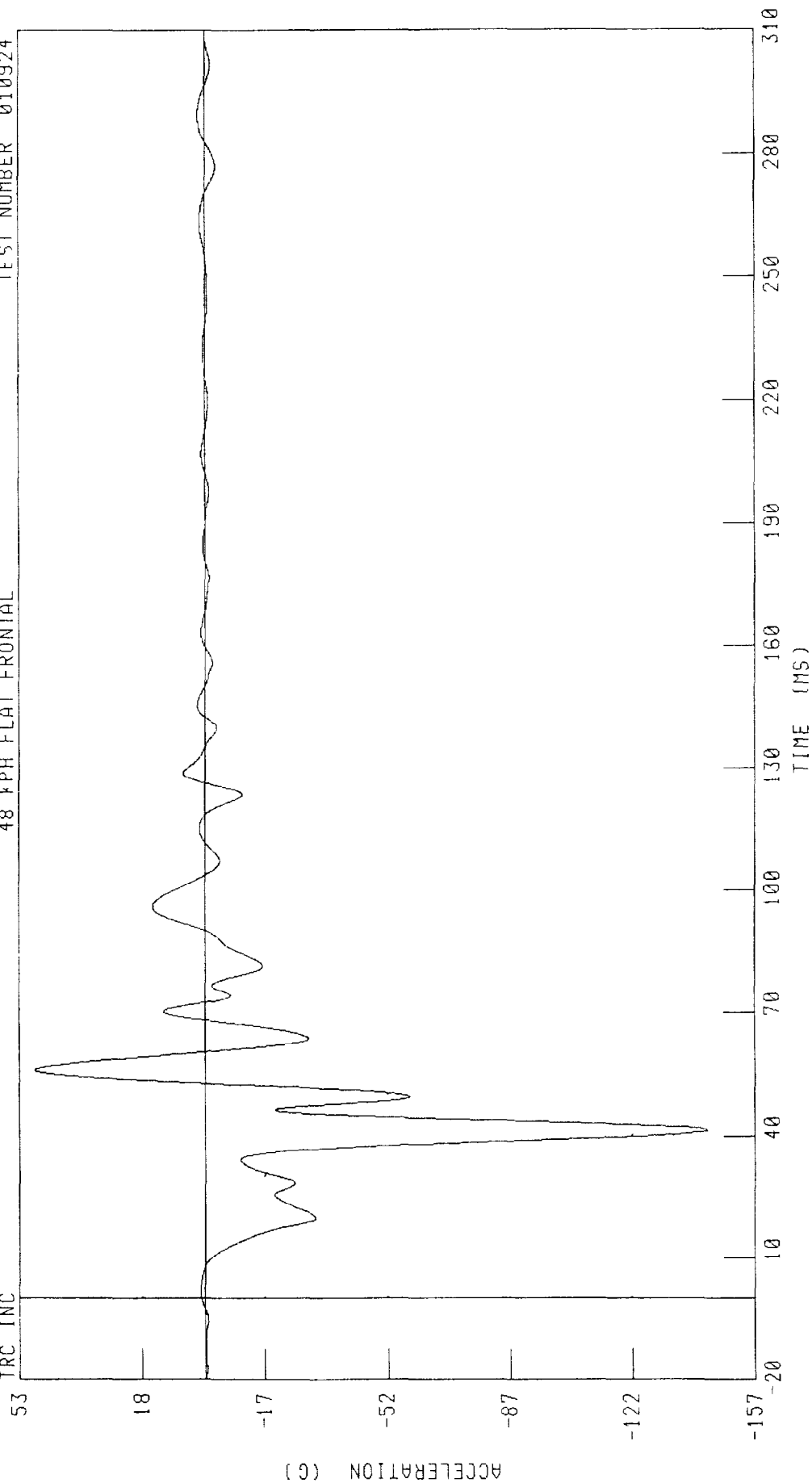
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 RIGHT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 FRONT BRAKE CALIPER LEFT X-AXIS ACCELERATION
 48 KPH FLAT FRONTAL

TEST NUMBER 010924

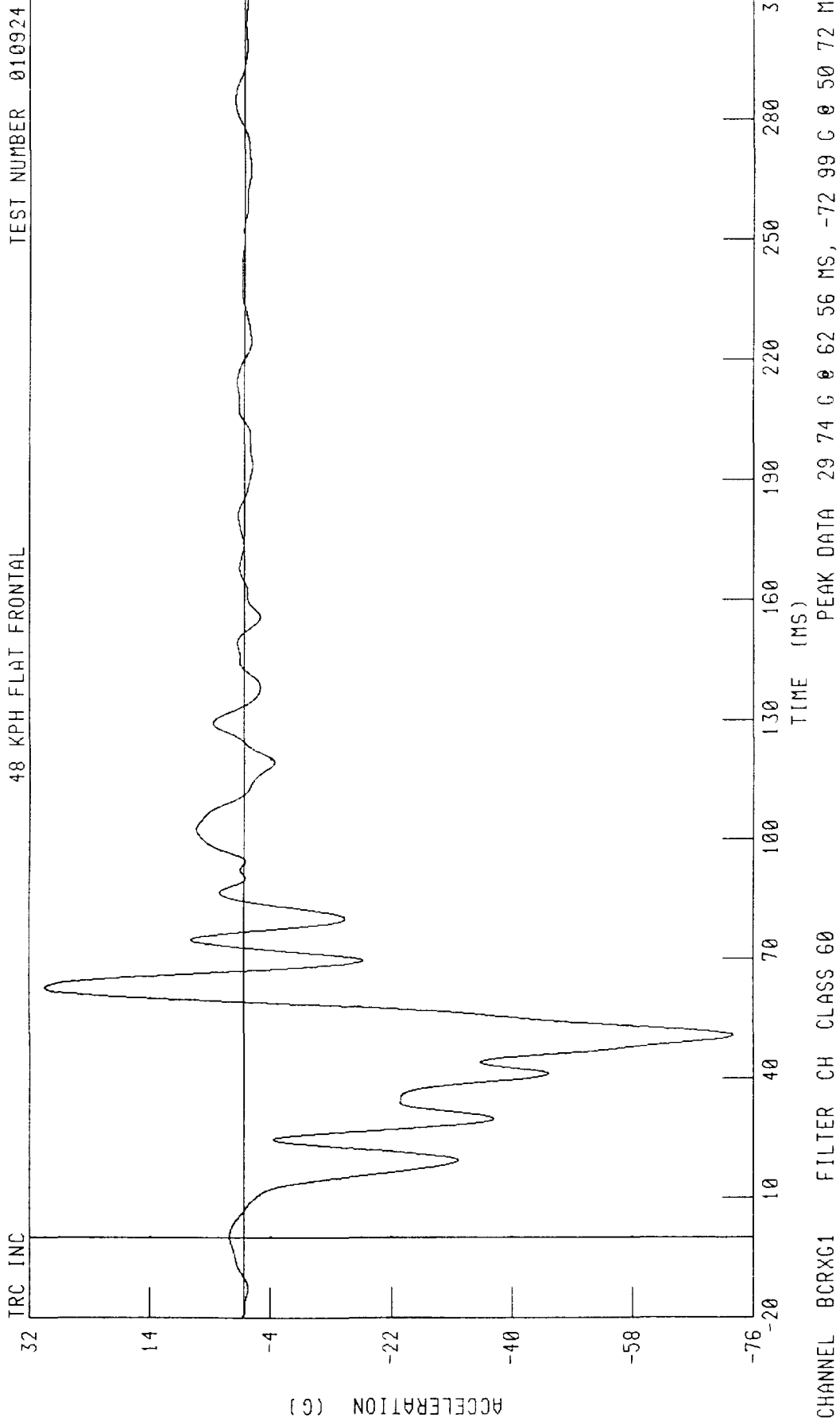
TRC INC



PEAK DATA 48 72 0 55 76 MS, -143 51 0 41 44 MS

CHANNEL BCLXG1 FILTER CH CLASS 60

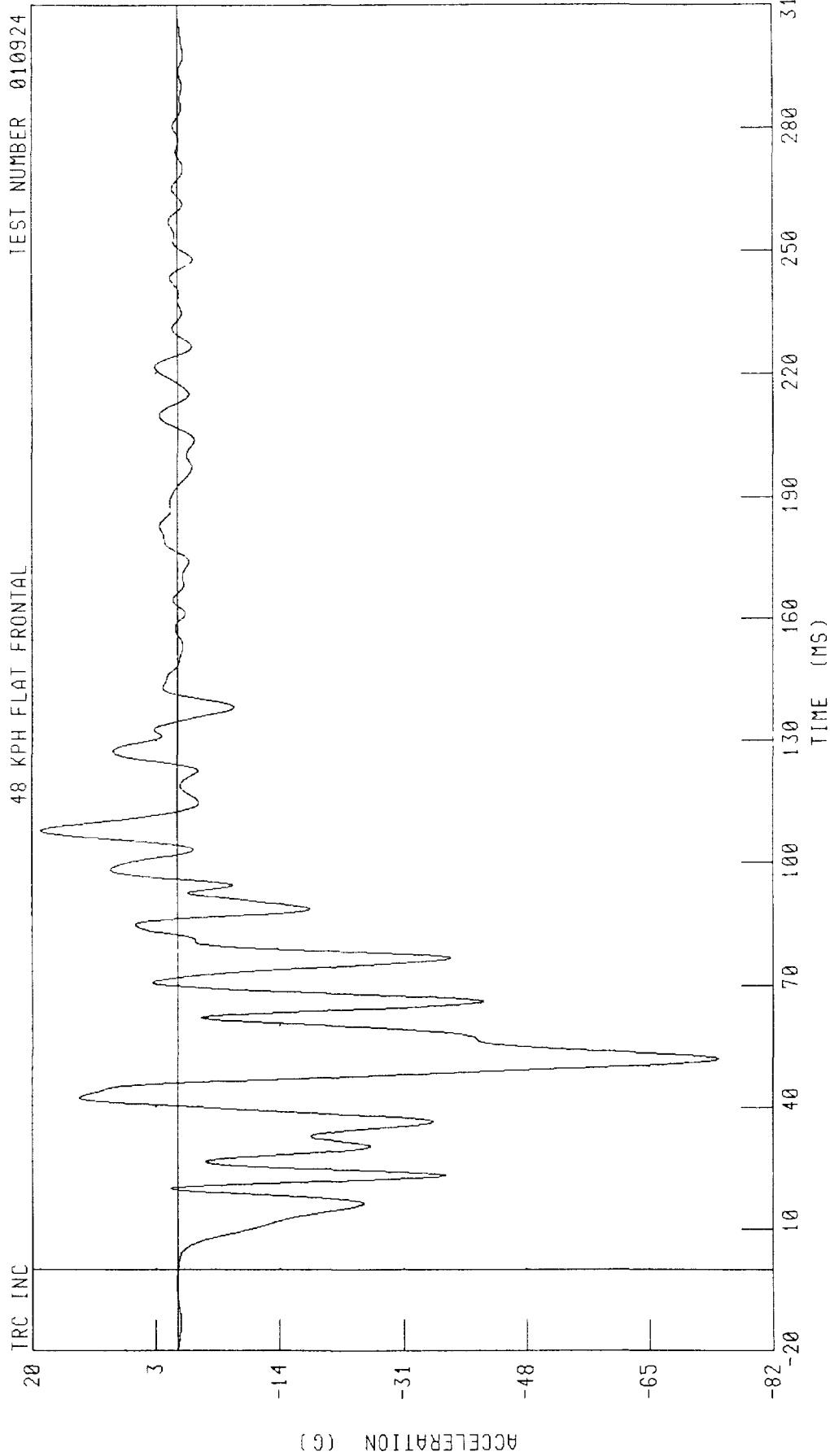
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
FRONT BRAKE CALIPER RIGHT X-AXIS ACCELERATION



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DASH PANEL CENTER X-AXIS ACCELERATION
48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



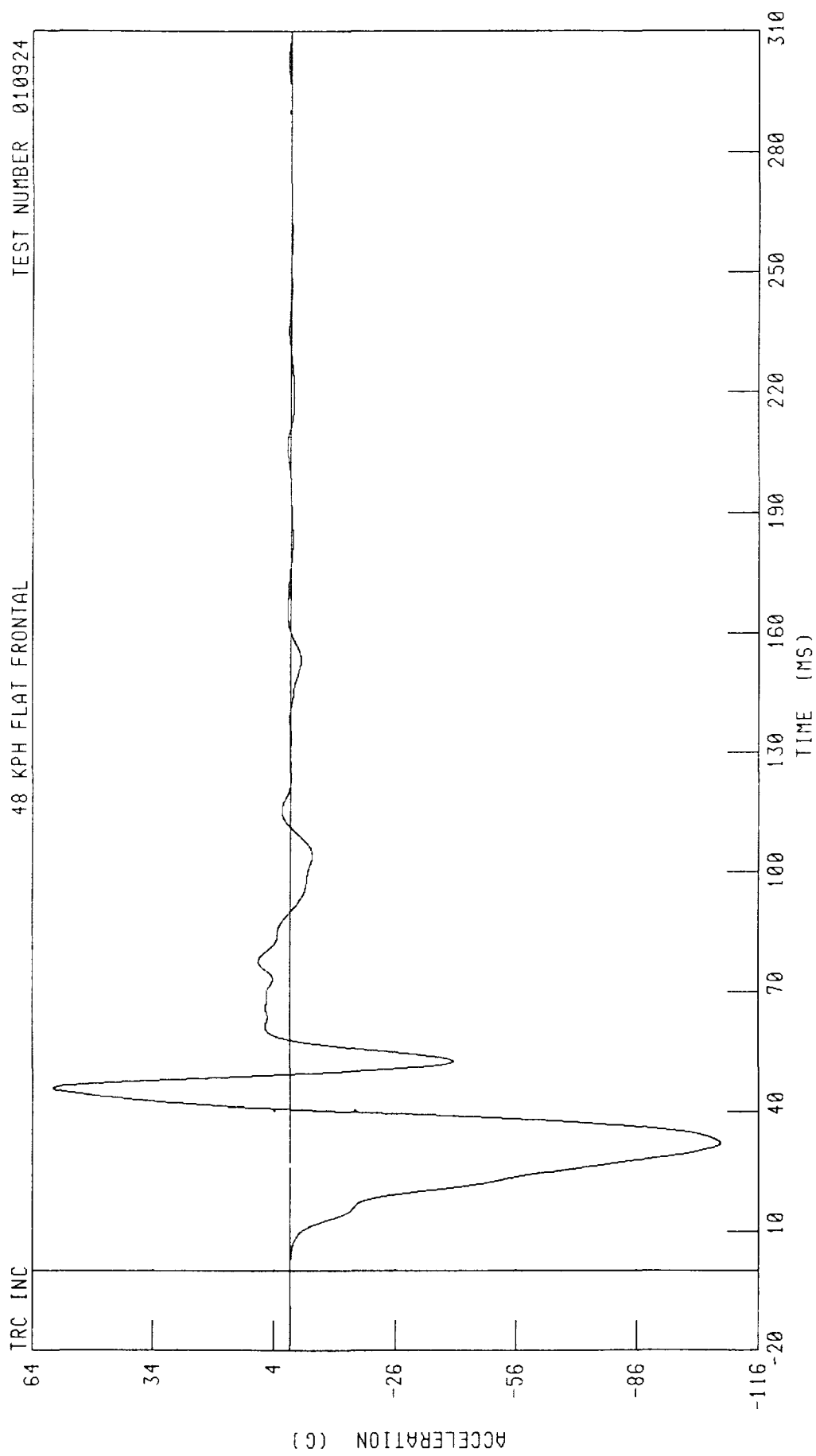
CHANNEL DPCXG1 FILTER CH CLASS 60 PEAK DATA 18 83 G @ 10 / 92 MS, -74 50 G @ 51 92 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

ENGINE TOP X-AXIS ACCELERATION

48 KPH FLAT FRONTAL

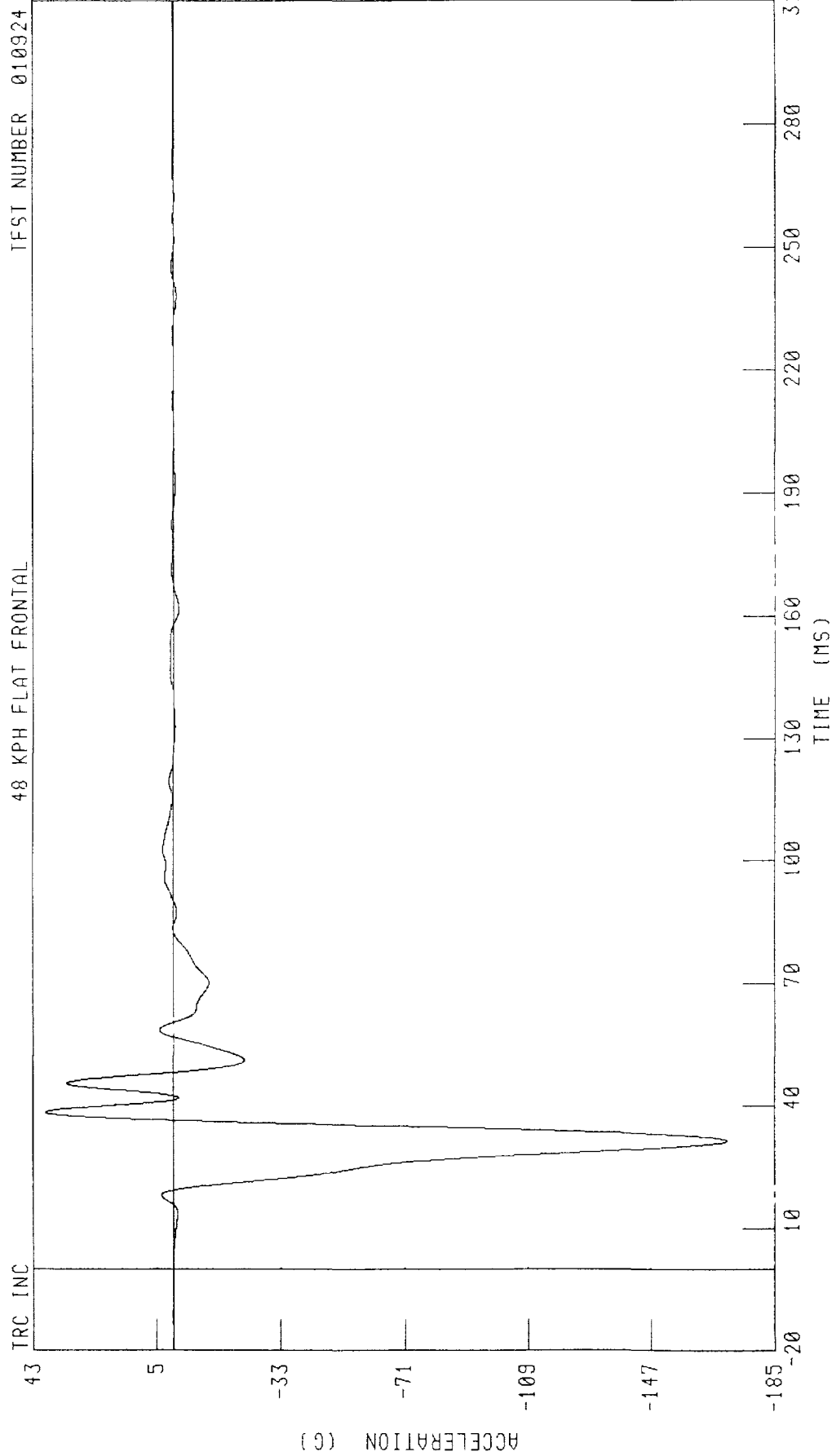
TEST NUMBER 010924



CHANNEL ENCXC1 FILTER CH CLASS 60

PEAK DATA 58 95 0 45 76 MS, -106 69 0 32 00 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
ENGINE BOTTOM X-AXIS ACCELERATION
48 KPH FLAT FRONTAL



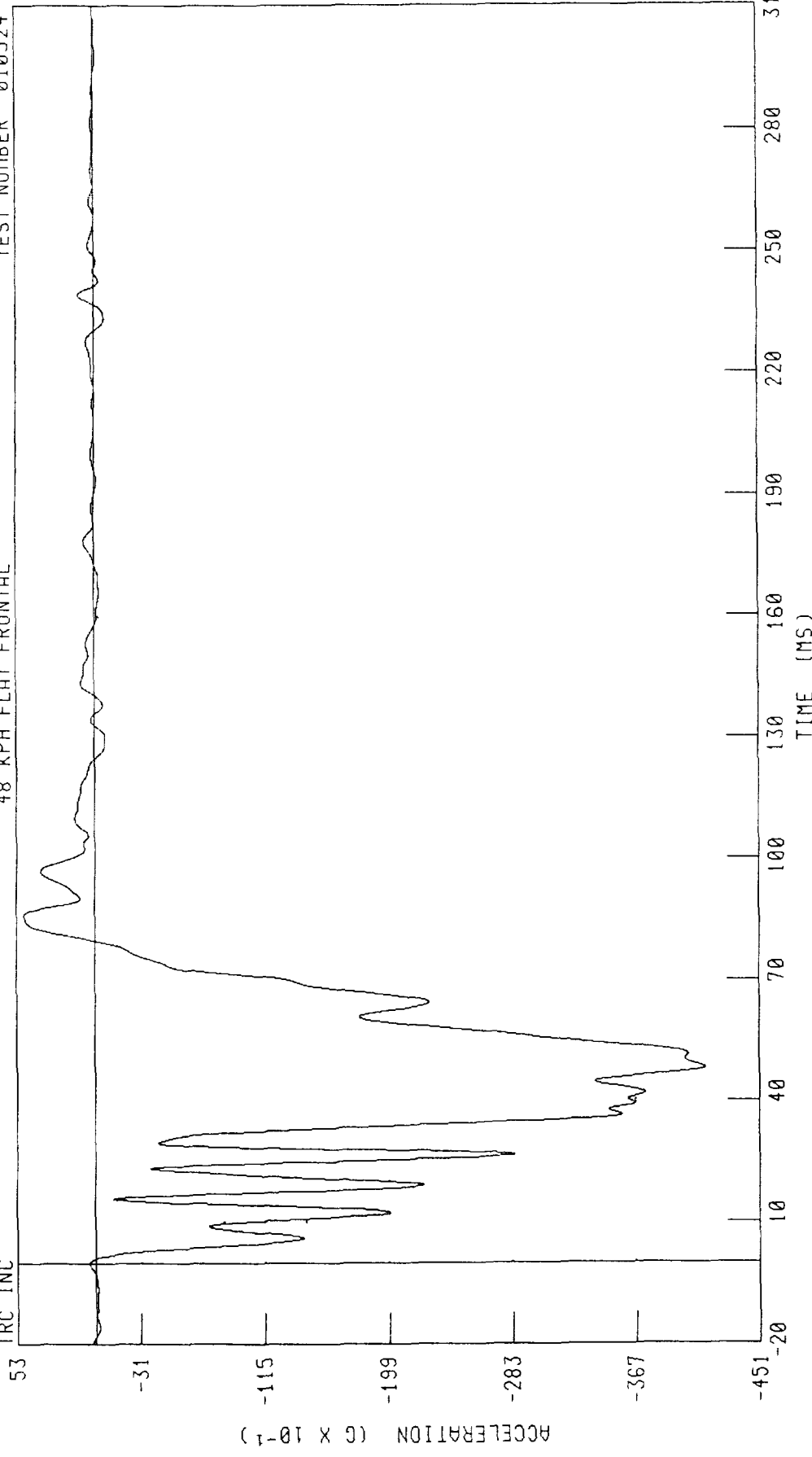
CHANNEL ENG02 FILTER CH CLASS 60 PEAK DATA 39 31 G @ 38 32 MS, 170 48 G @ 31 36 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
TOEPAN NEXT TO ACCELERATOR X-AXIS ACCELERATION

TEST NUMBER 010924

48 KPH FLAT FRONTAL

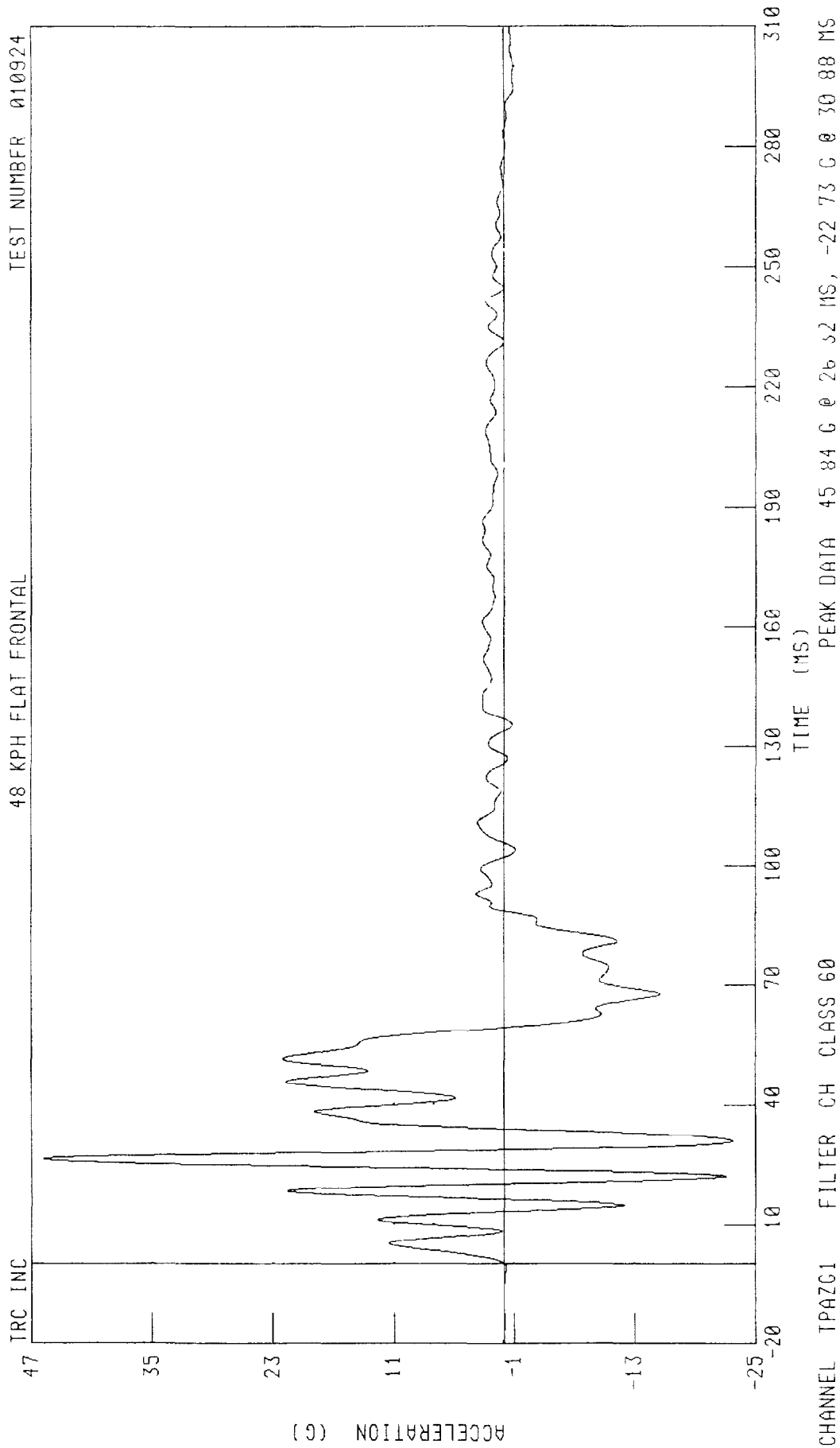
TRC INC



PEAK DATA 4 86 G 0 86 00 MS, -41 49 G 0 48 00 MS

CHANNEL TPXG1 FILTER CH CLASS 60

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
TOEPAN NEXT TO ACCELERATOR Z-AXIS ACCELERATION

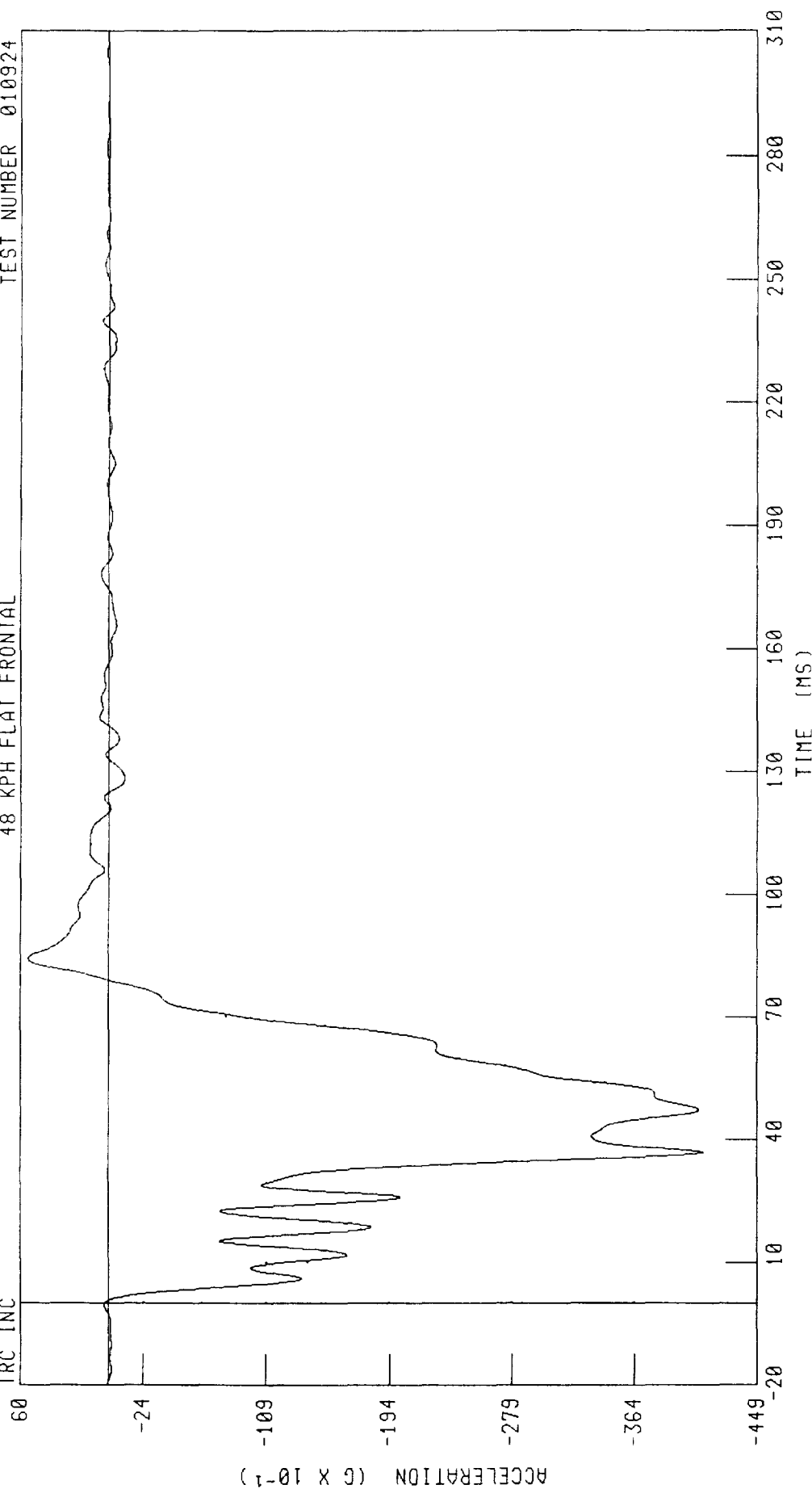


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
TOEPAN NEXT TO FOOTREST X-AXIS ACCELERATION

TEST NUMBER 010924

48 KPH FLAT FRONTAL

TRC INC

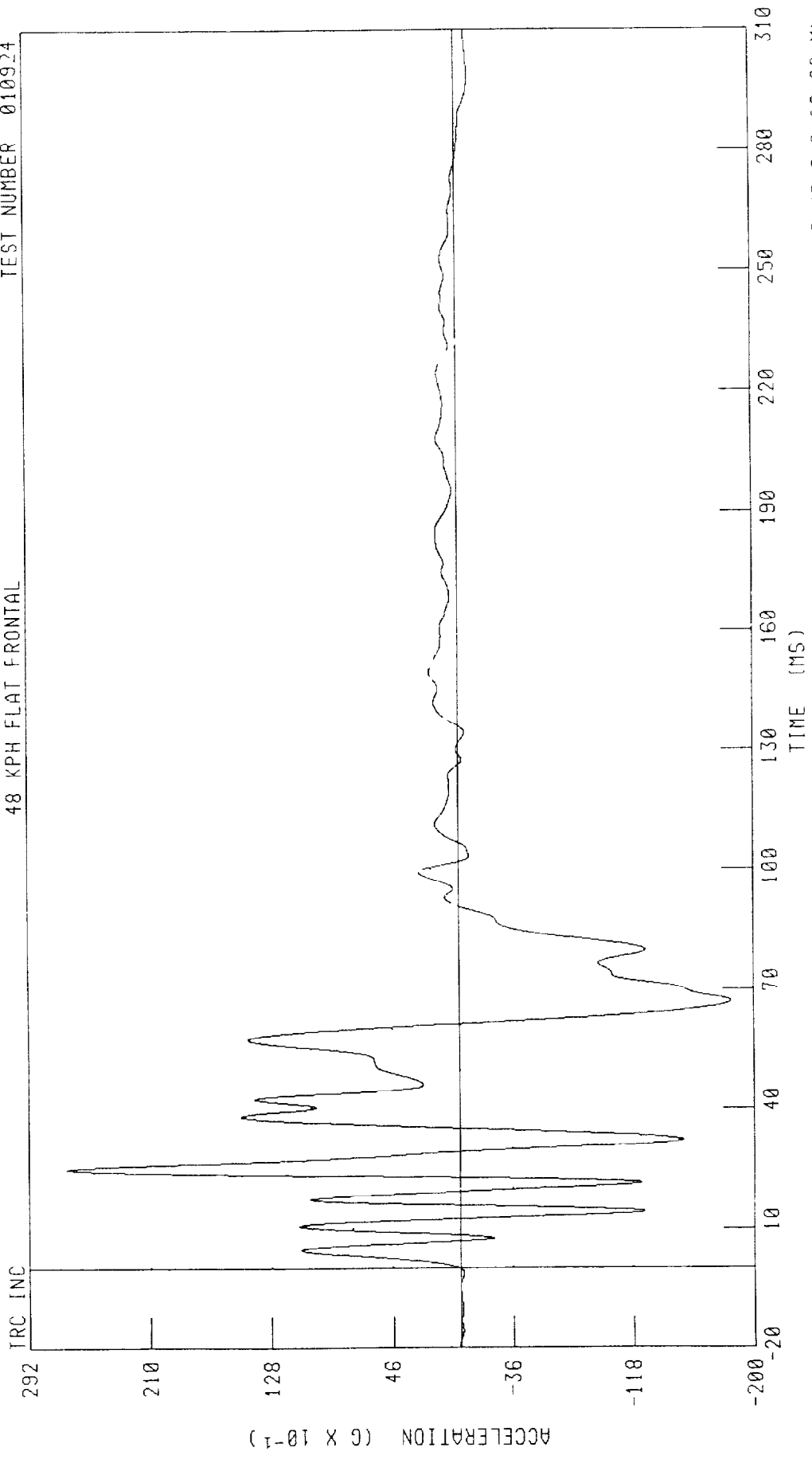


CHANNEL TPFXC1 FILTER CH CLASS 60

PEAK DATA 5 59 G 0 84 40 MS, -41 17 G 0 36 80 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 TOEPAN NEXT TO FOOTREST Z-AXIS ACCELERATION
 48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL TPFZG1 FILTER CH CLASS 60

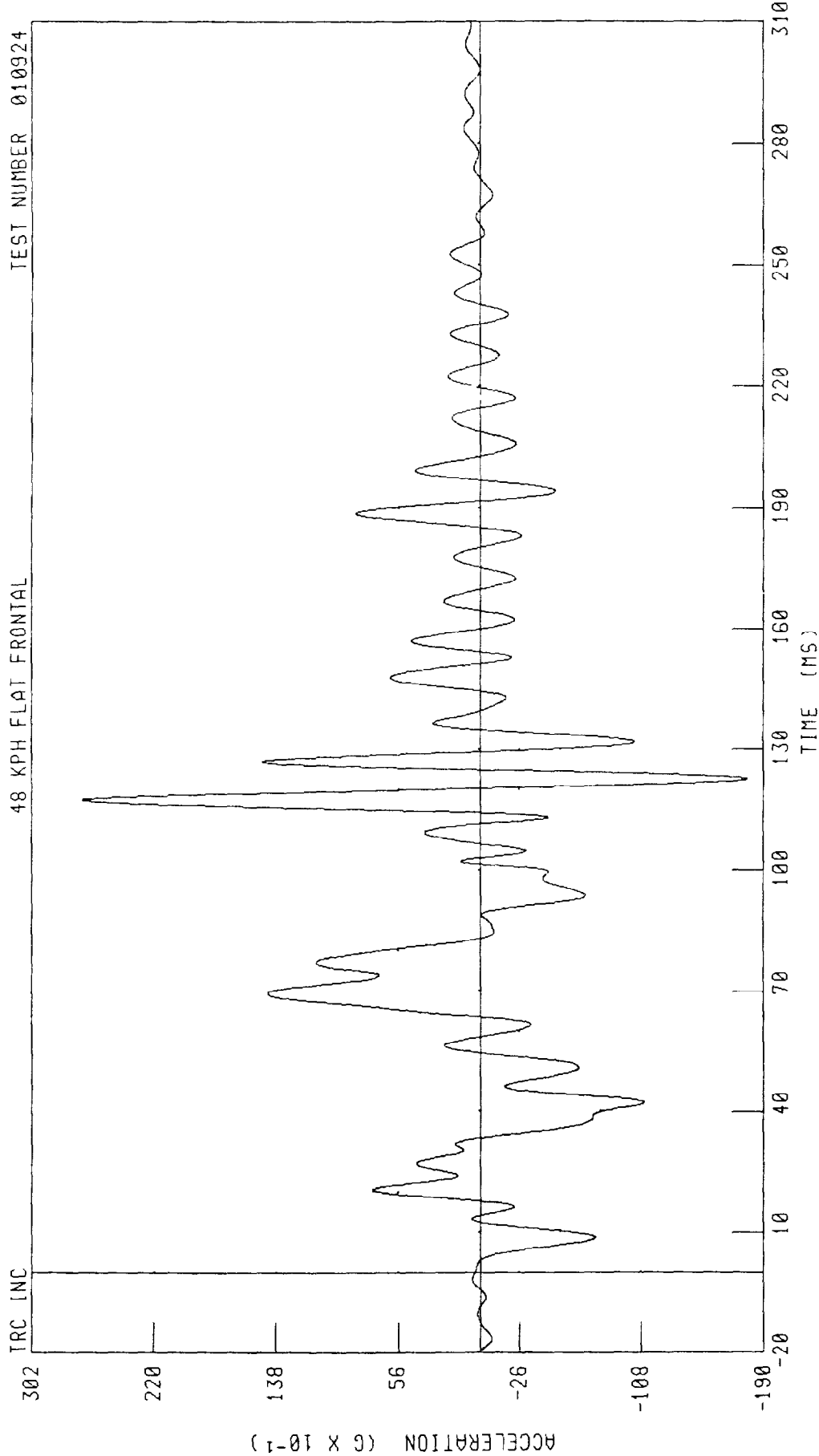
PEAK DATA 26 63 0 24 96 MS, -18 49 0 66 96 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

REAR DECK Z-AXIS ACCELERATION

48 KPH FLAT FRONTAL

TEST NUMBER 010924

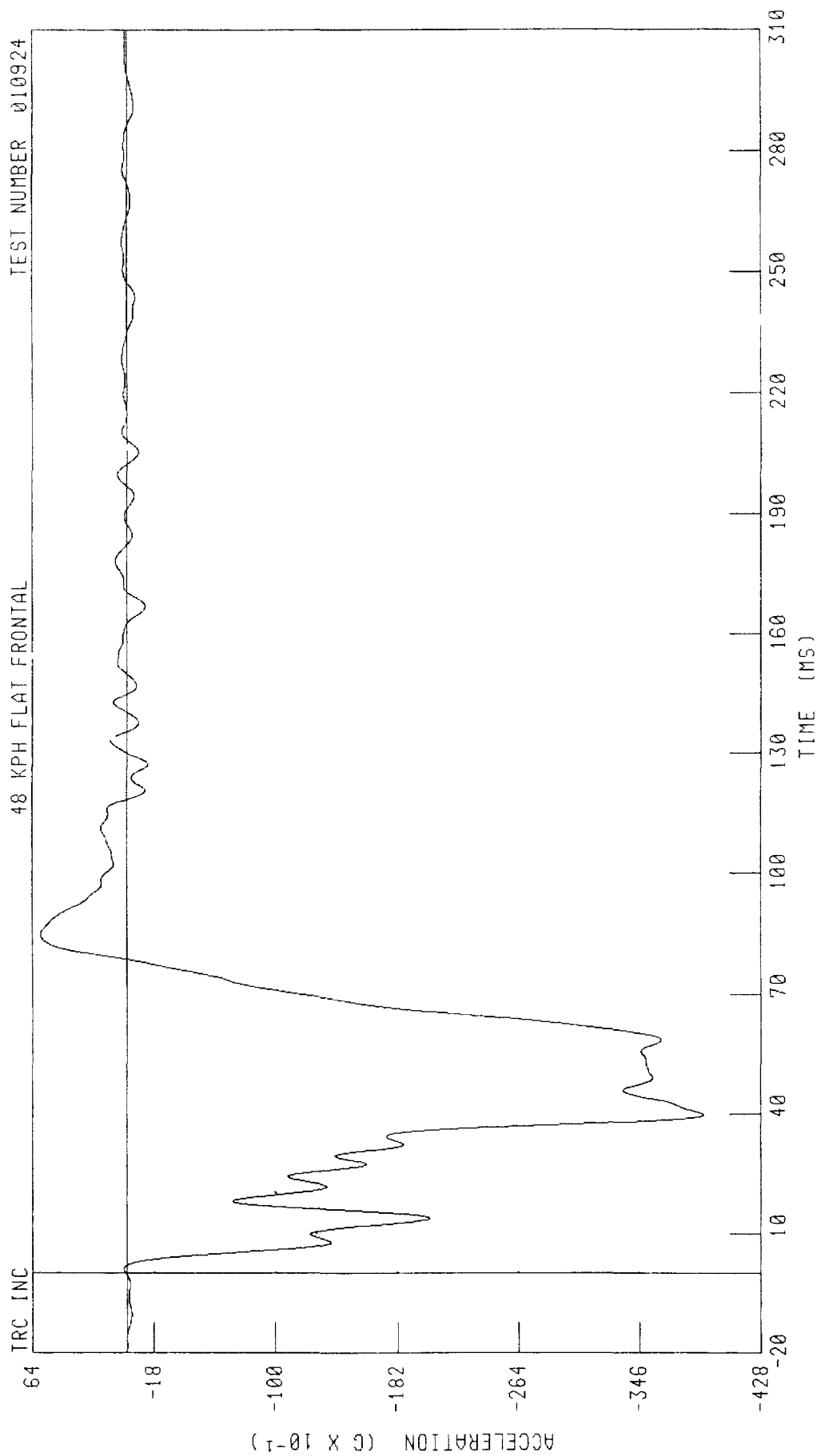


TIME (MS)

PEAK DATA 26 84 G @ 117 60 MS, -17 92 G @ 122 72 MS

CHANNEL RDKZG1 FILTER CH CLASS 60

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 REAR COMPARTMENT CENTER X-AXIS ACCELERATION



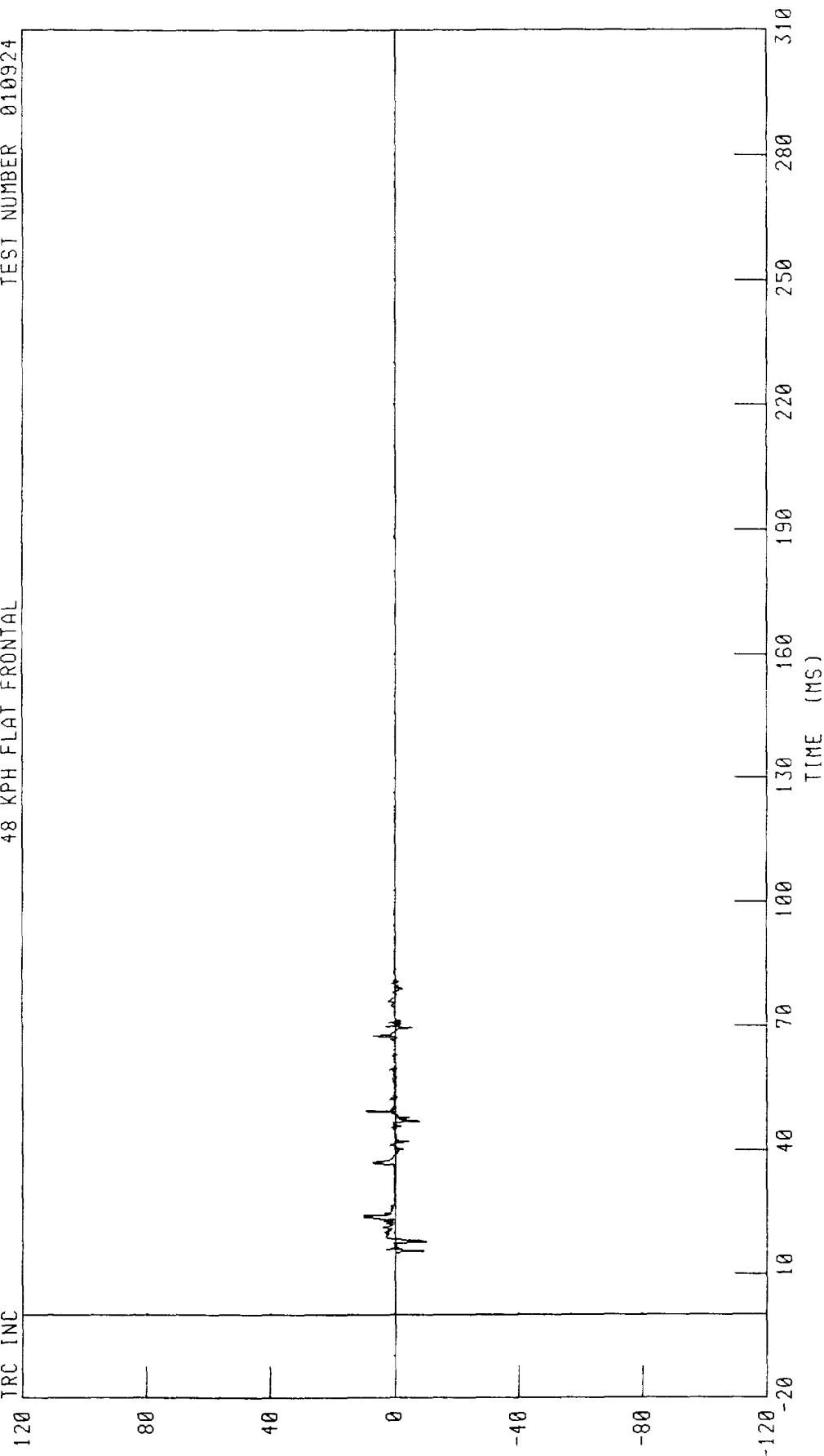
CHANNEL RDCXG1 FILTER CH CLASS 60 PEAK DATA 5 88 C 0 84 80 MS, -38 94 C 0 39 68 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
DRIVER AIRBAG EVENT PRIMARY
48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC

VOLTAGE (V X 10⁻¹)



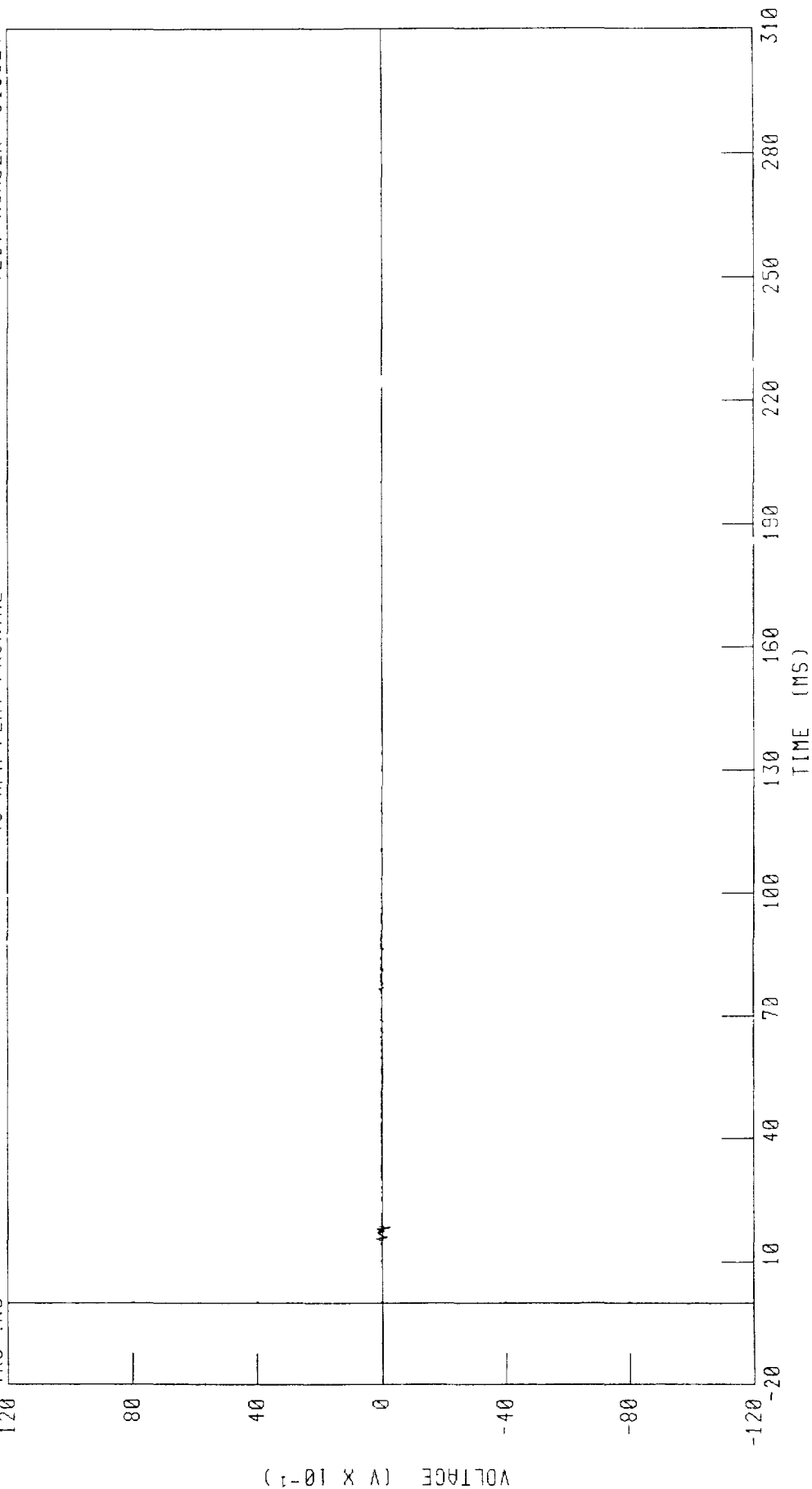
CHANNEL DABET1 FILTER CH CLASS 1000

PEAK DATA 1 00 V @ 23 92 MS, -1 00 V @ 17 92 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
PASSENGER AIRBAG EVENT PRIMARY
48 KPH FLAT FRONTAL

TEST NUMBER 010924

TRC INC



CHANNEL PABET1 FILTER CH CLASS 1000

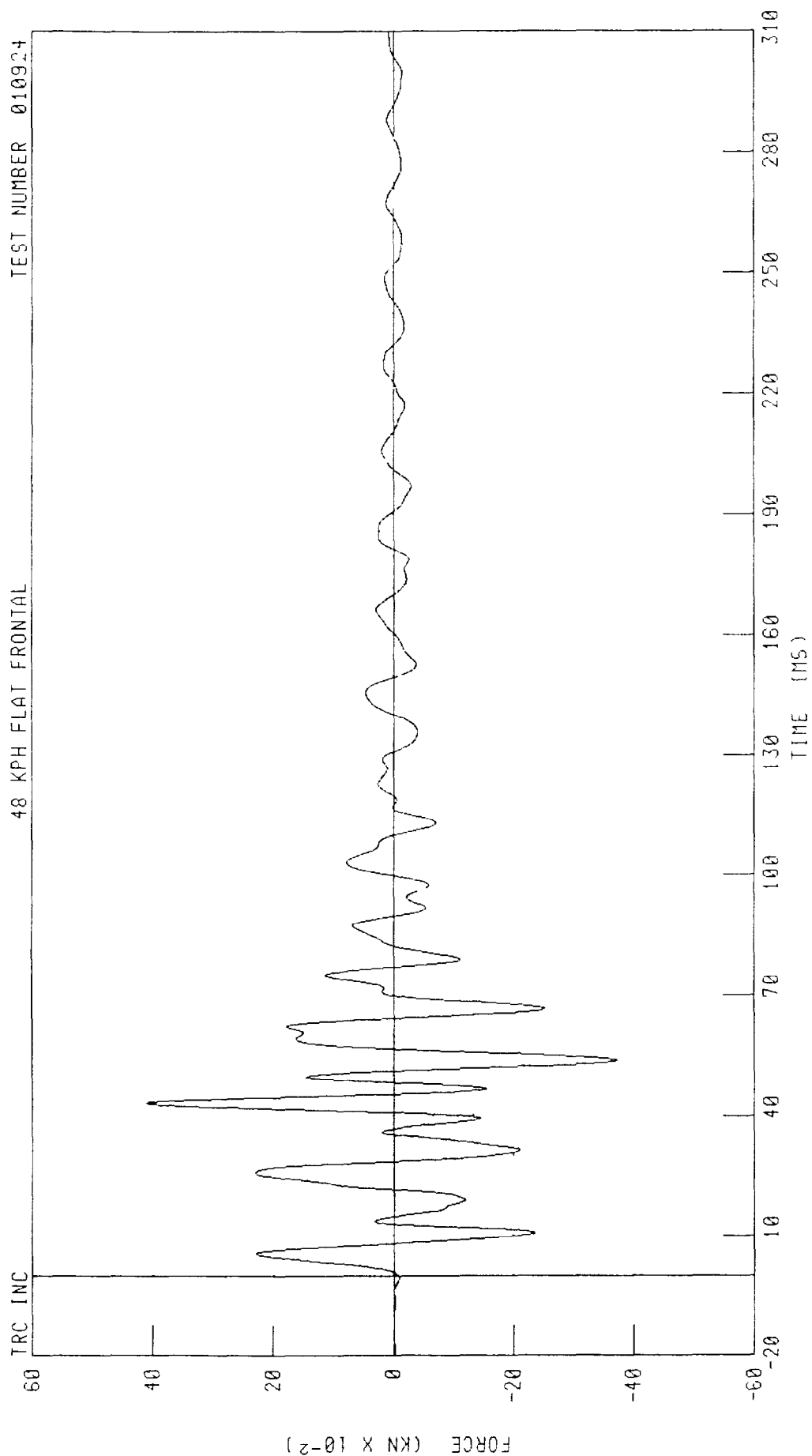
PEAK DATA 0 19 V 0 15 52 MS, -0 25 V 0 18 24 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION A1 FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL BA1F FILTER CH CLASS 60

PEAK DATA 0 11 KN 0 43 20 MS, -0 37 KN 0 53 68 MS

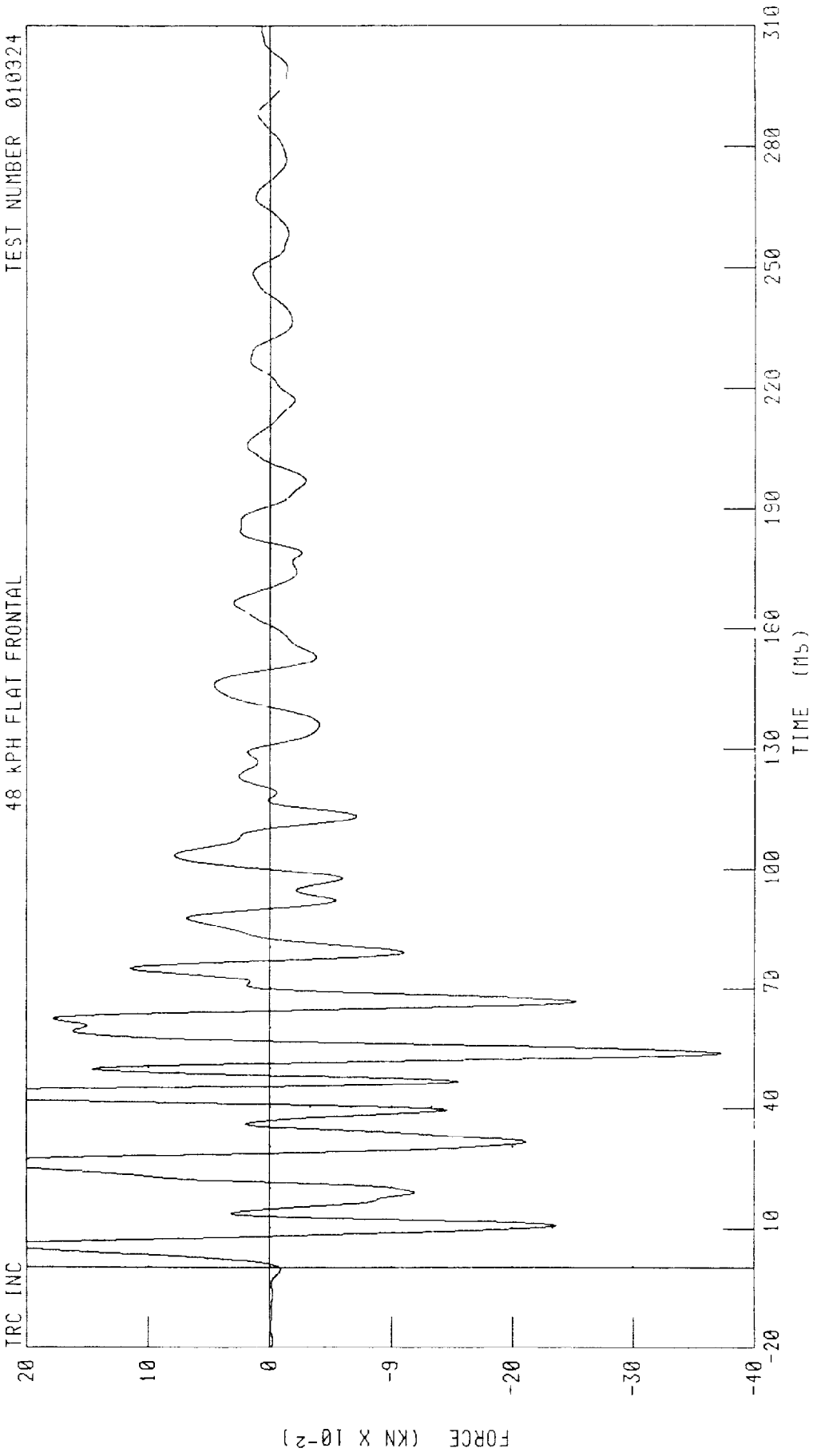
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION A1 FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010324

TRC INC

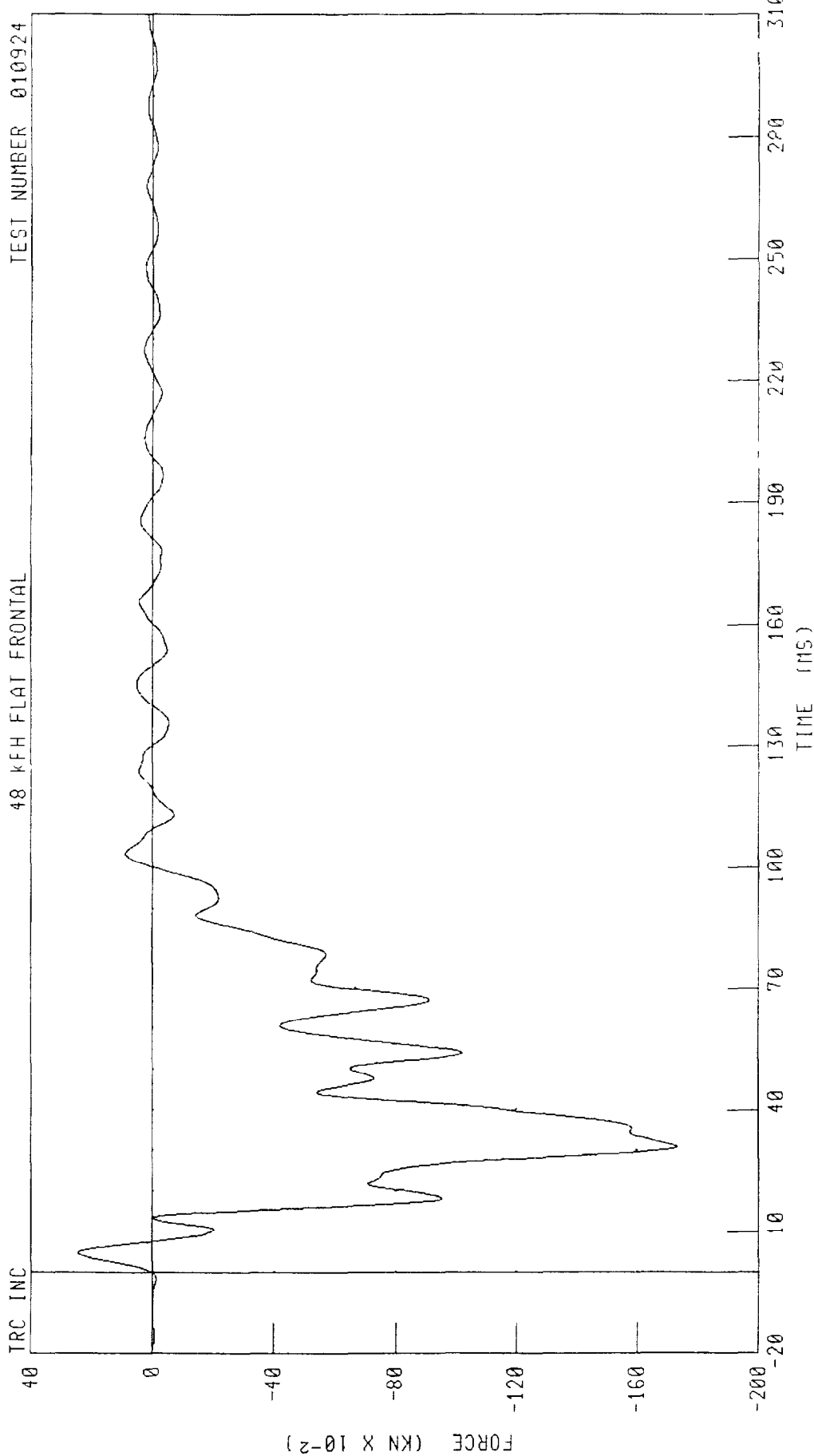


PEAK DATA 0 41 KN @ 43 20 MS, -0 37 KN @ 53 60 MS

CHANNEL BA1F FILTER CH CLASS 60

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION A2 FORCE

48 KPH FLAT FRONTAL TEST NUMBER 010924



CHANNEL BA2F FILTER CH CLASS 60

TIME (MS)

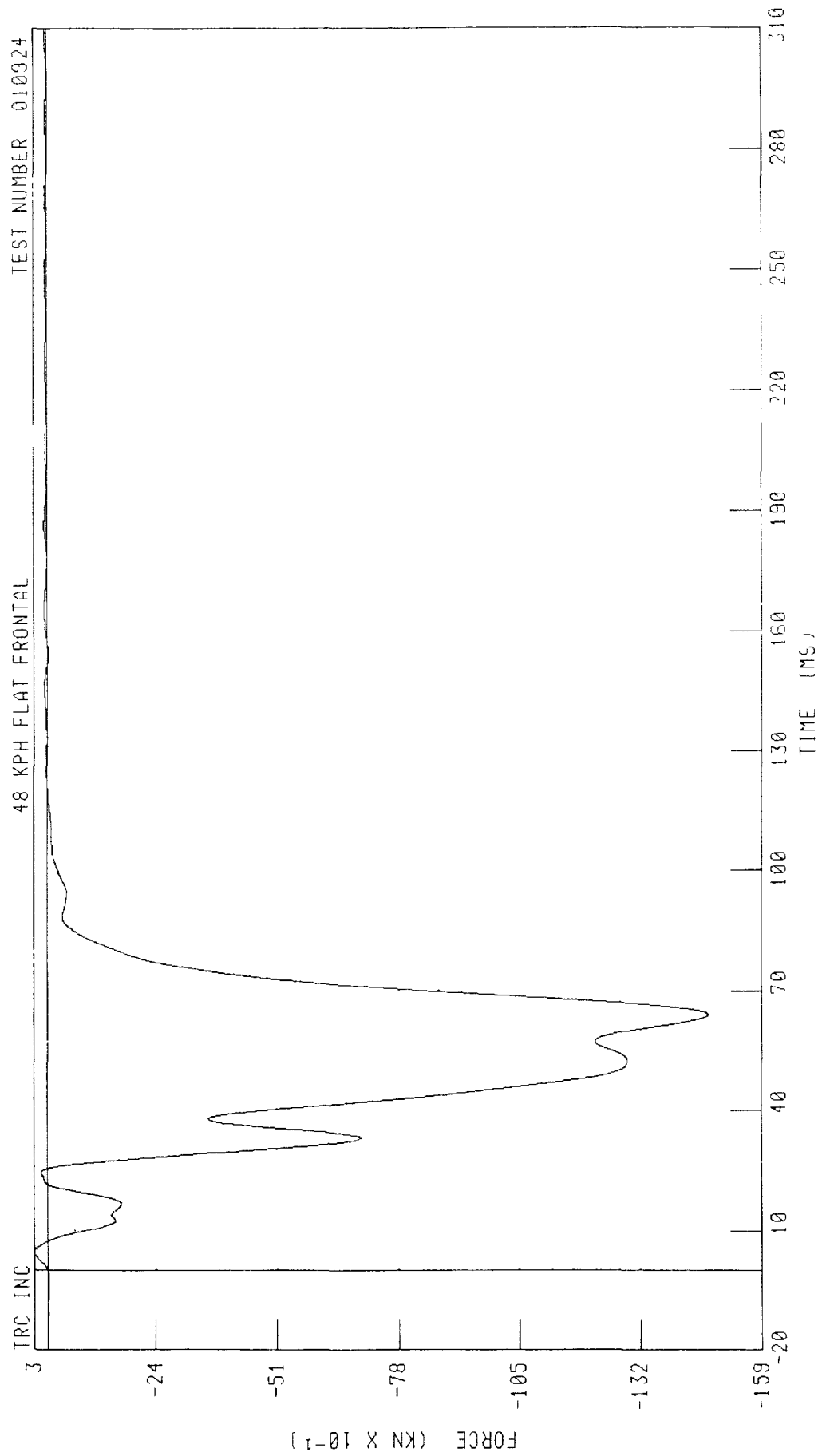
PEAK DATA 0 25 KN @ 4 90 MS, -1 73 KN @ 30 36 11

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION A3 FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010324



TIME (MS)

PEAK DATA 0 51 KN @ 4 43 MS, -14 71 KN @ 64 00 MS

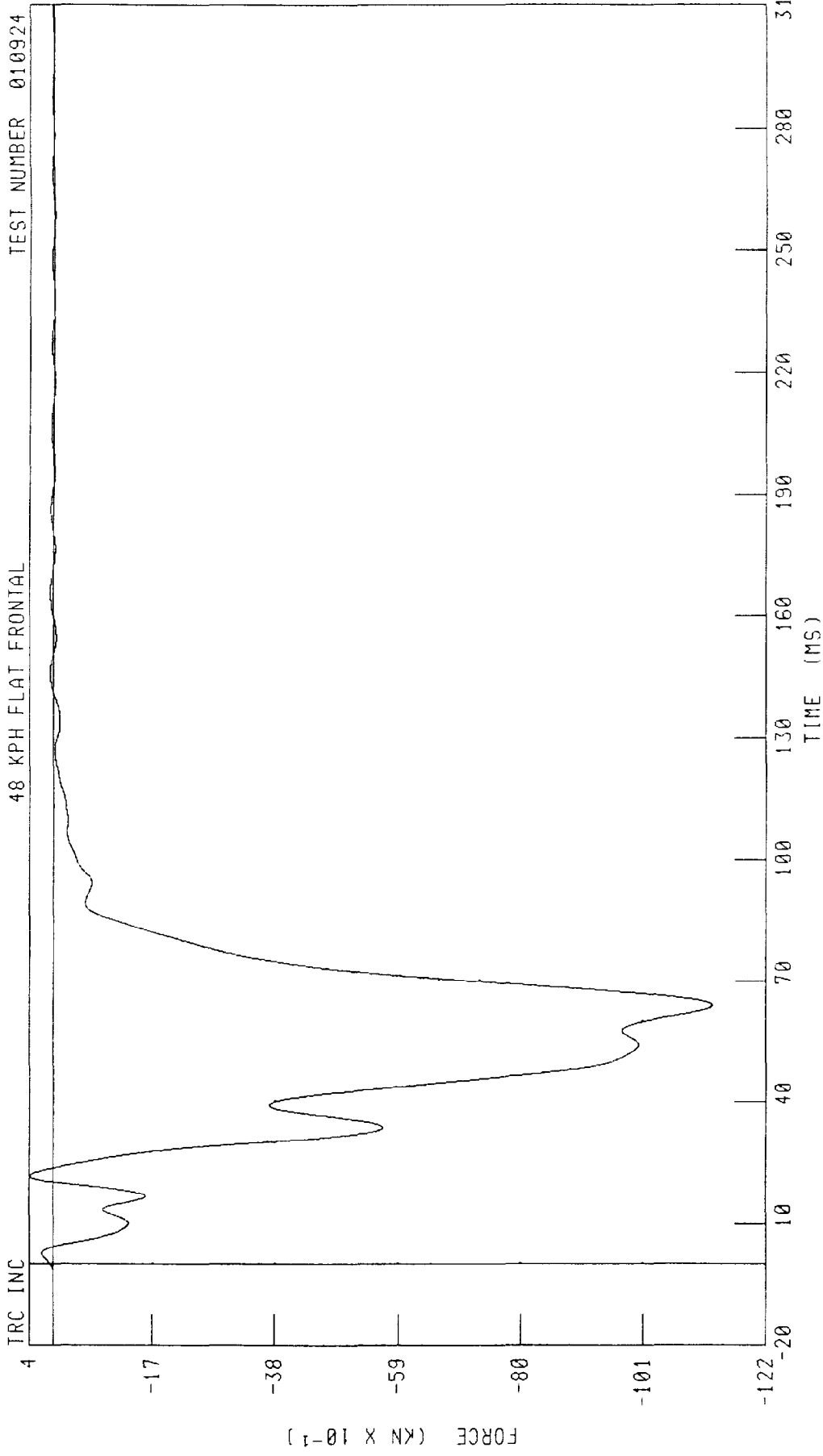
CHANNEL BA3F FILTER CH CLASS 60

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION A4 FORCE

48 KPH FLAT FRONTAL

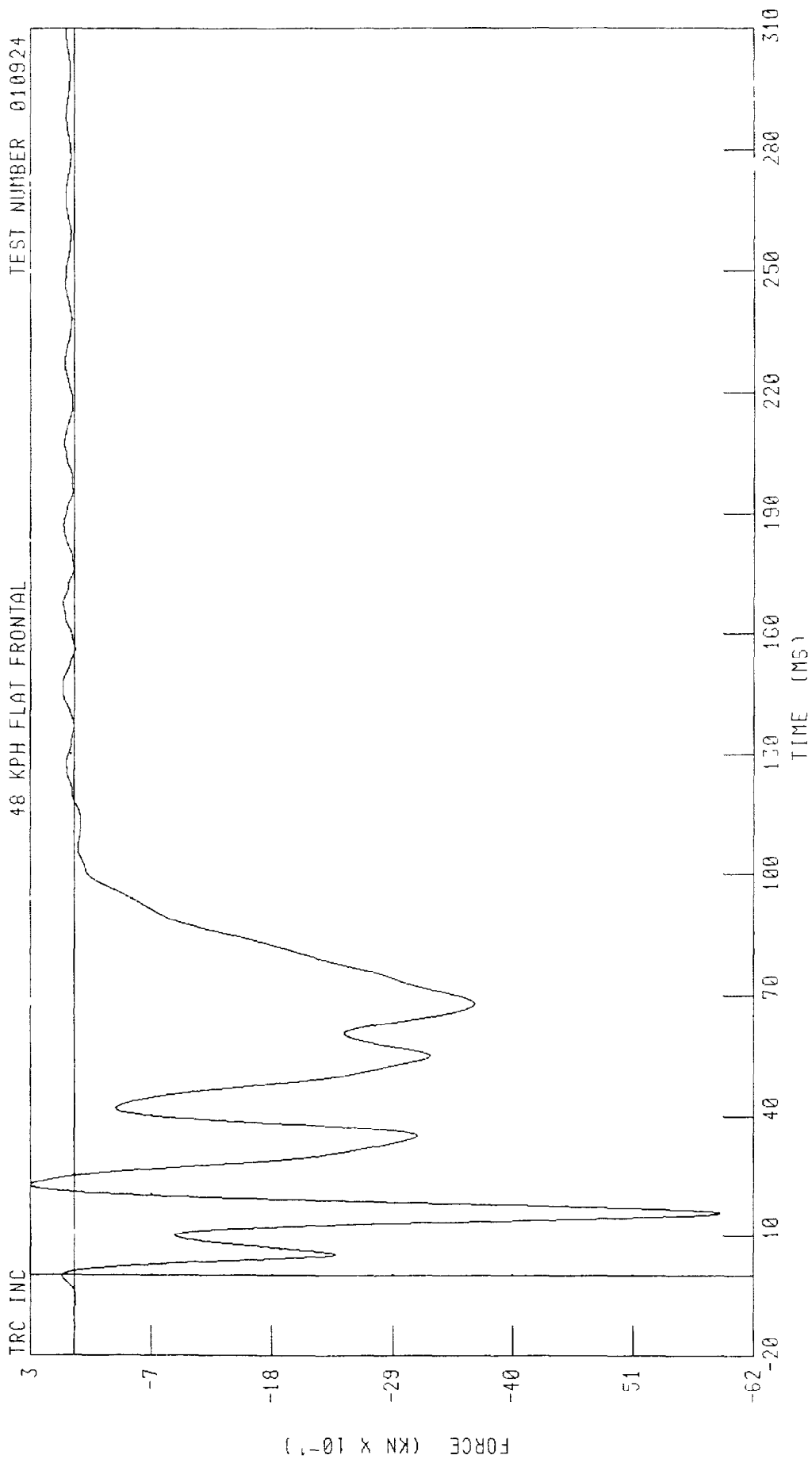
TEST NUMBER 010924



PEAK DATA 0 40 KN @ 21 68 MS, -11 29 KN @ 63 92 MS

CHANNEL BA4F FILTER CH CLASS 60

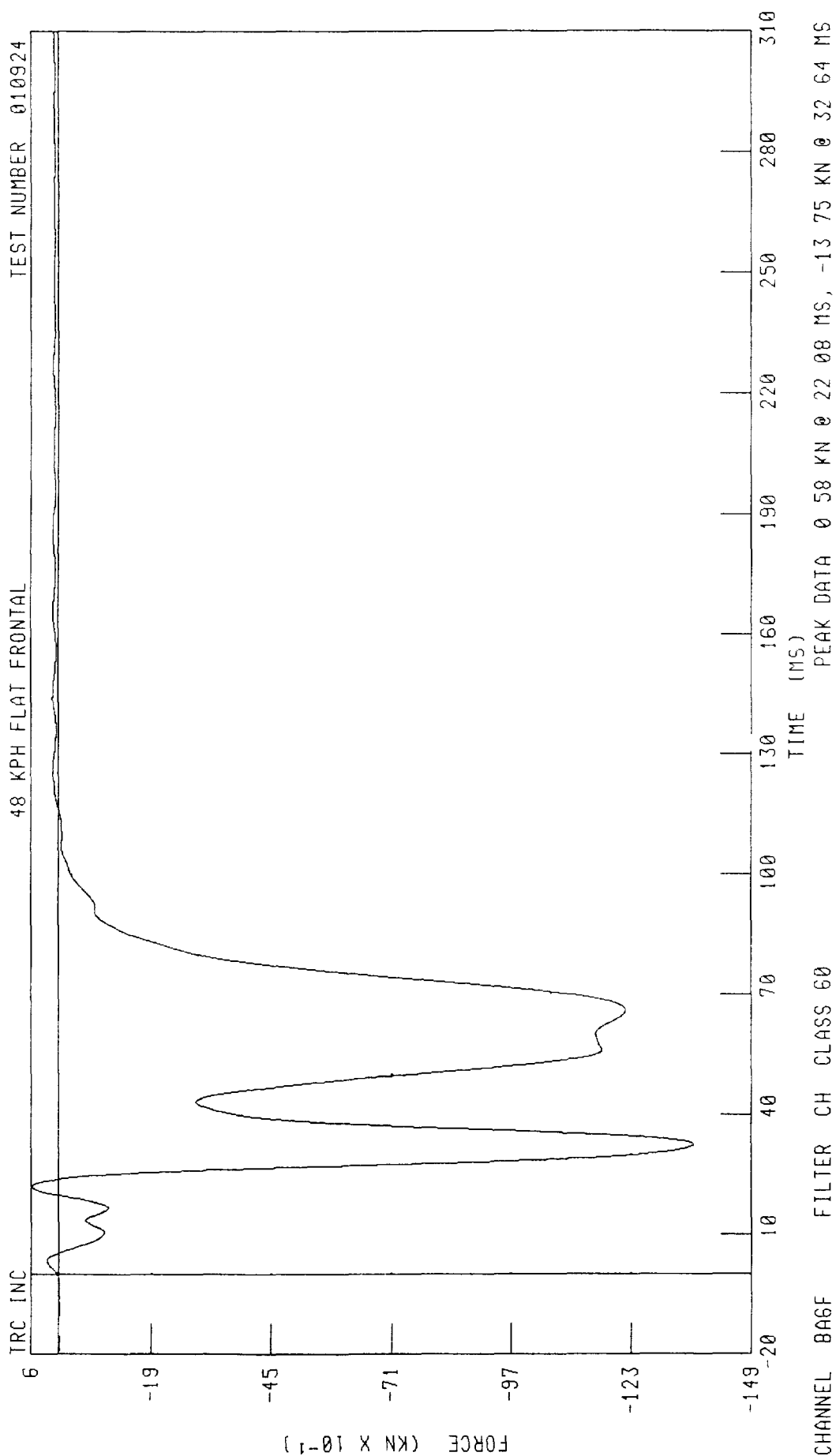
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION A5 FORCE



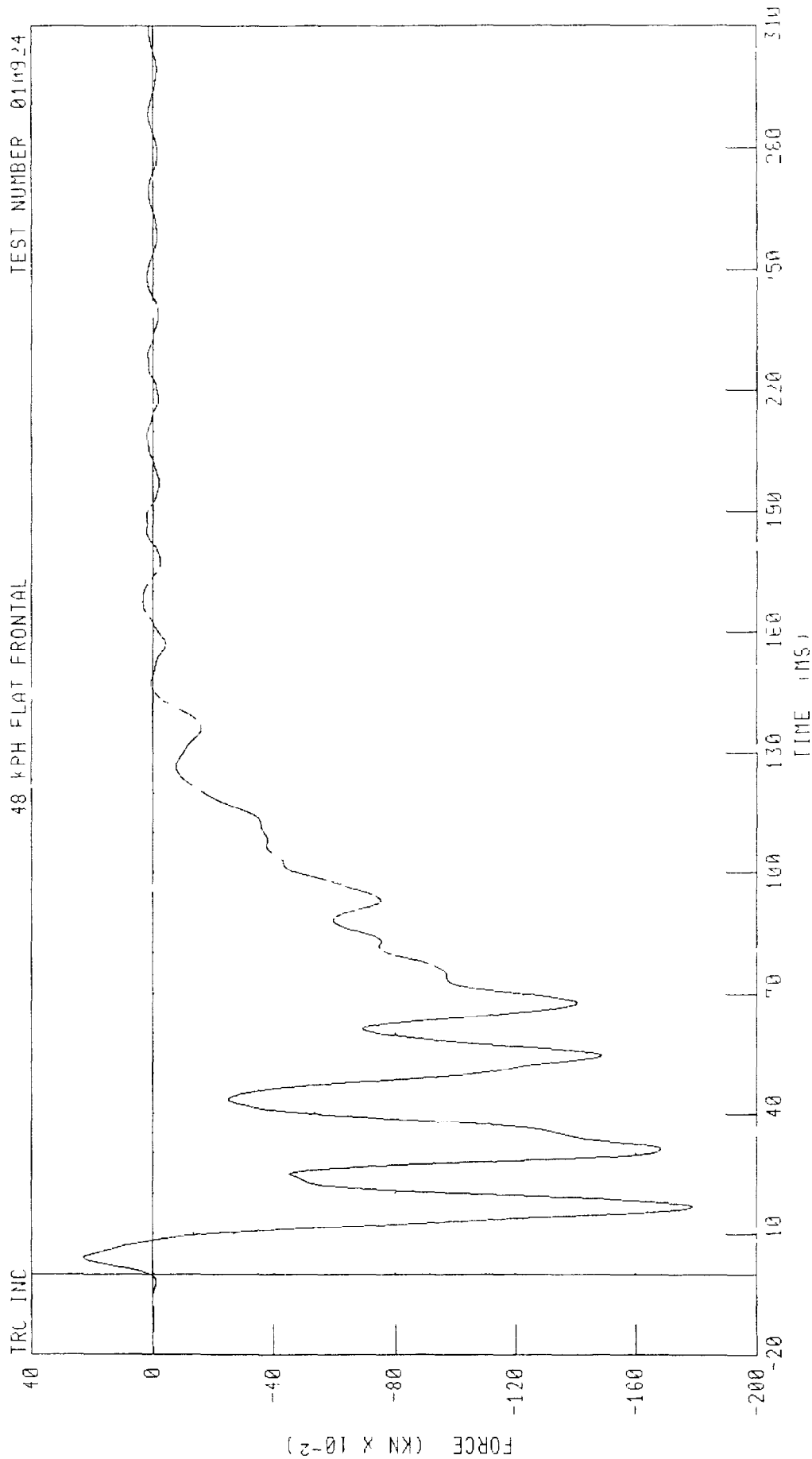
CHANNEL BASF FILTER CH CLASS 60 PEAK DATA 0 41 KN @ 22 32 MS, -5 90 KN @ 15 60 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION A6 FORCE

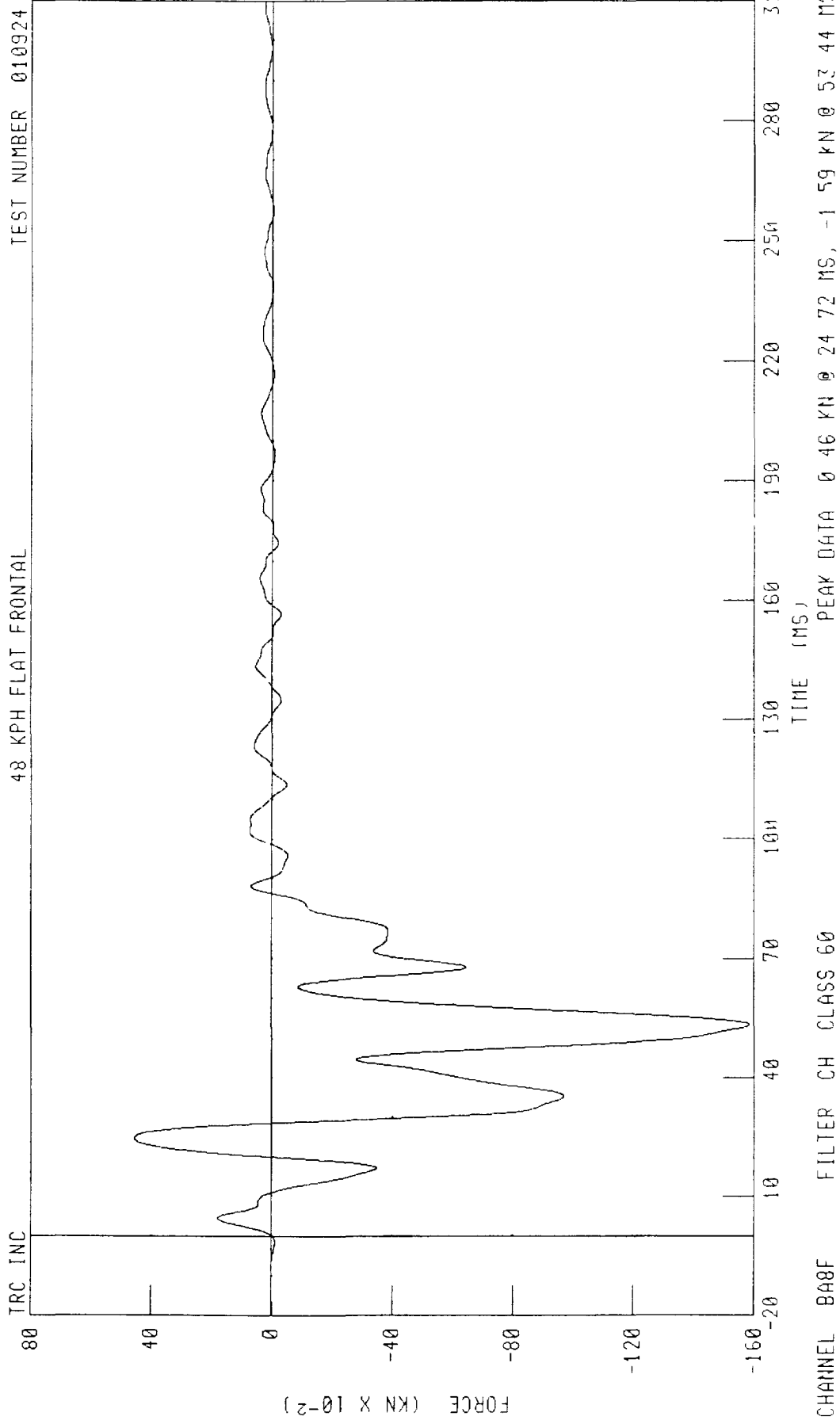


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOAD CELL BARRIER POSITION A7 FORCE
 48 KPH FLAT FRONTAL



CHANNEL BA7F FILTER CH CLASS 00 TIME (MS) PEHV DATA 0 03 KPH 0 4 14 110, -1 53 KPH 0 10 3 11

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOAD CELL BARRIER POSITION A8 FORCE



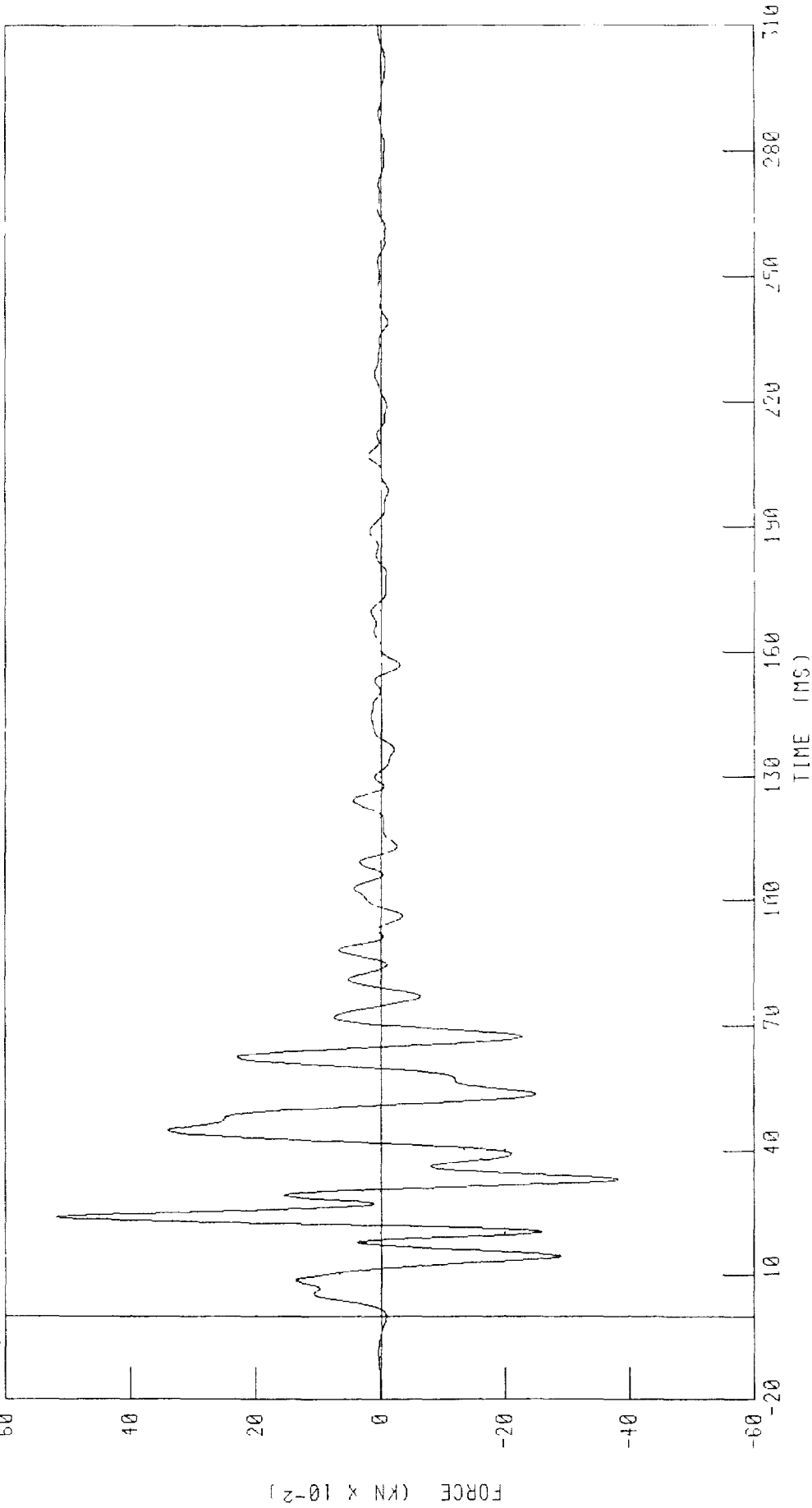
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION A9 FORCE

TRC INC

48 KPH FLAT FRONTAL

TEST NUMBER 010924



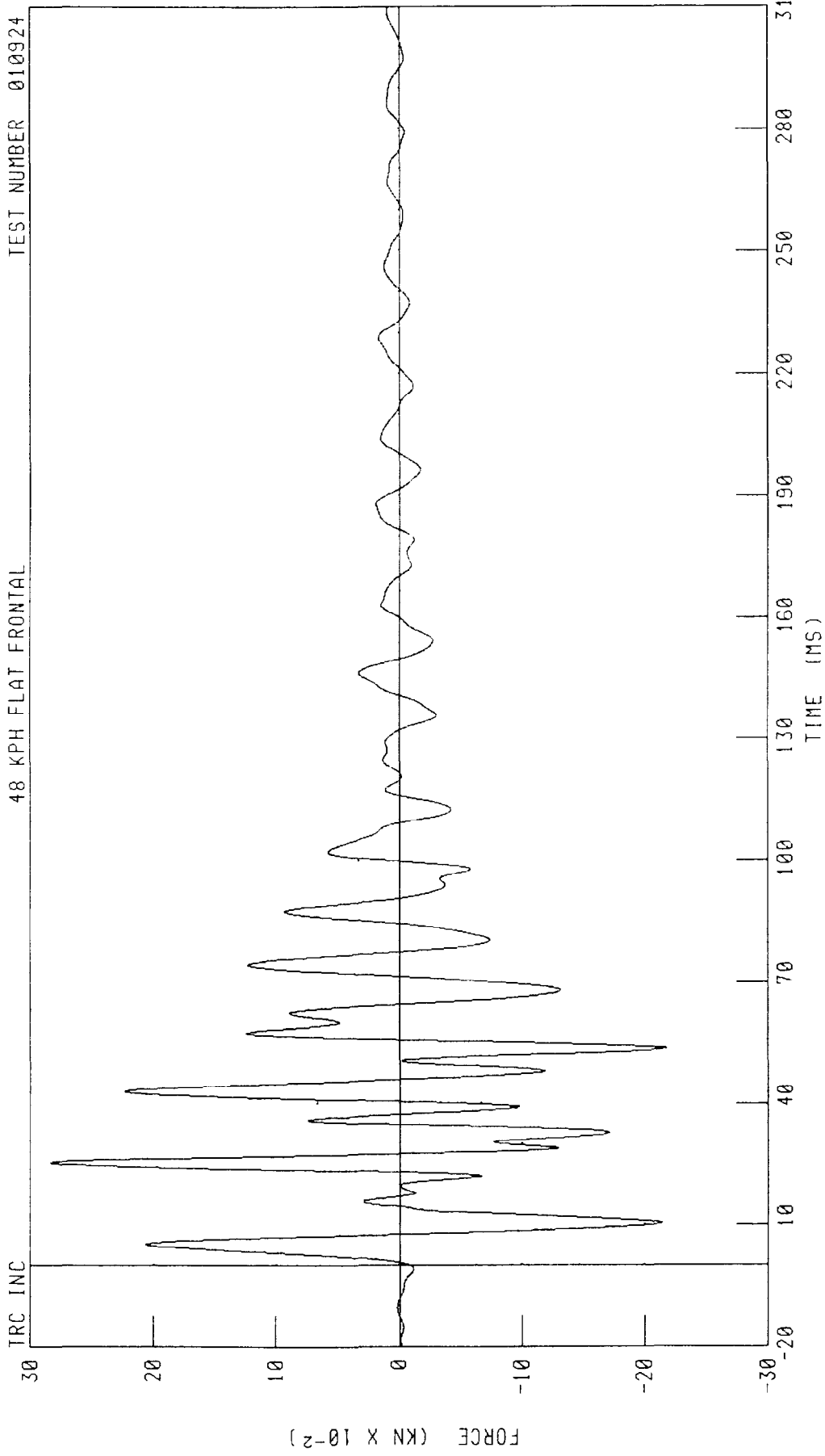
CHANNEL BA9F FILTER CH CLASS F0 PEAK DATA 0 52 KN @ 23 12 MS -0 33 KN @ 23 12 H,

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION B1 FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924



PEAK DATA 0 28 KN @ 25 44 MS, -0 22 KN @ 53 68 MS

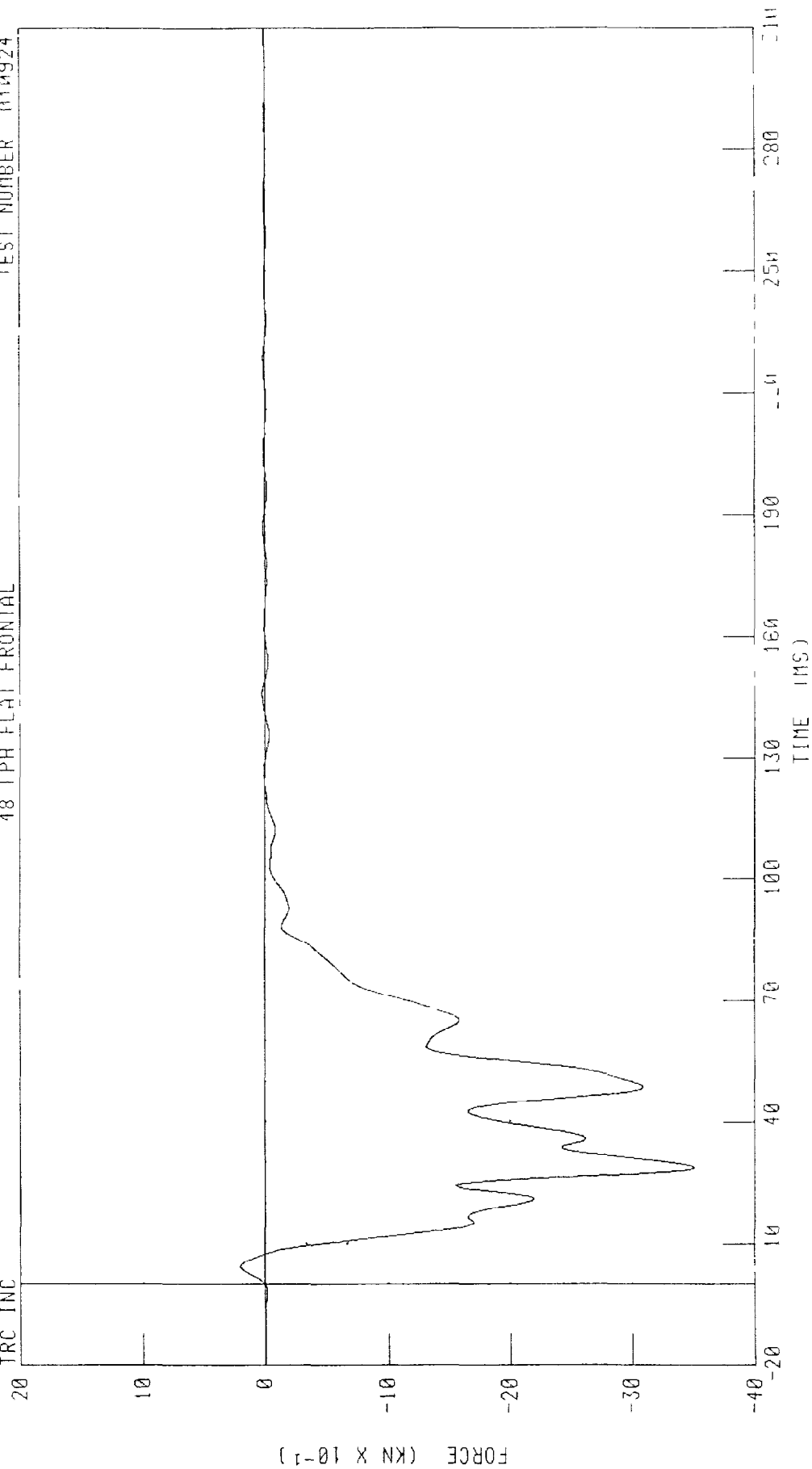
CHANNEL BB1F FILTER CH CLASS 60

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 46 KPH
 LOAD CELL POSITION B2 FORCE

TEST NUMBER 010924

48 MPH FLAT FRONTAL

TRC INC

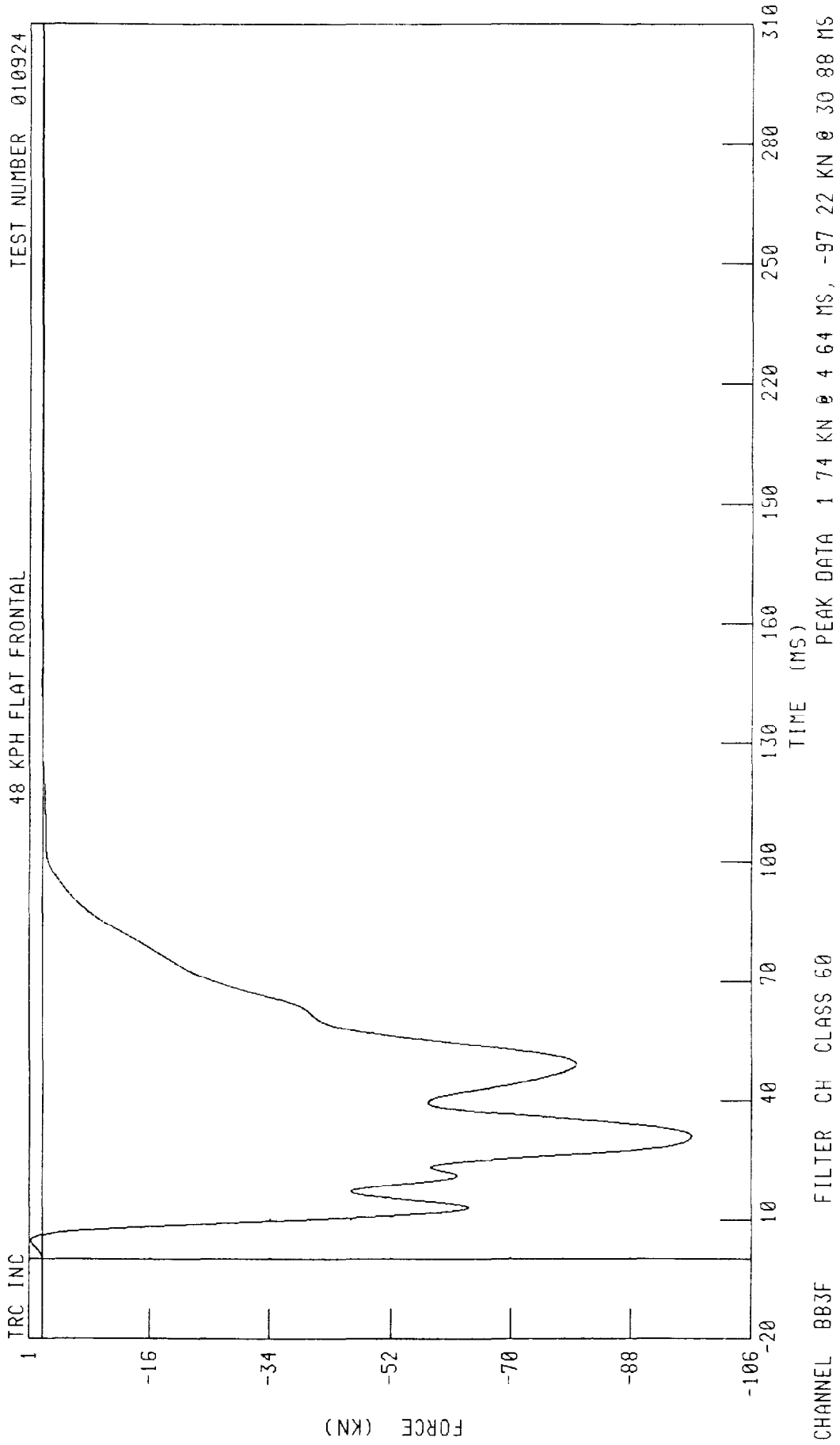


CHANNEL BB2F FILTER CH CLASS 64

TIME (MS)

PEAK DATA 0 21 KN @ 44 MS -3 51 KN @ 28 72 MS

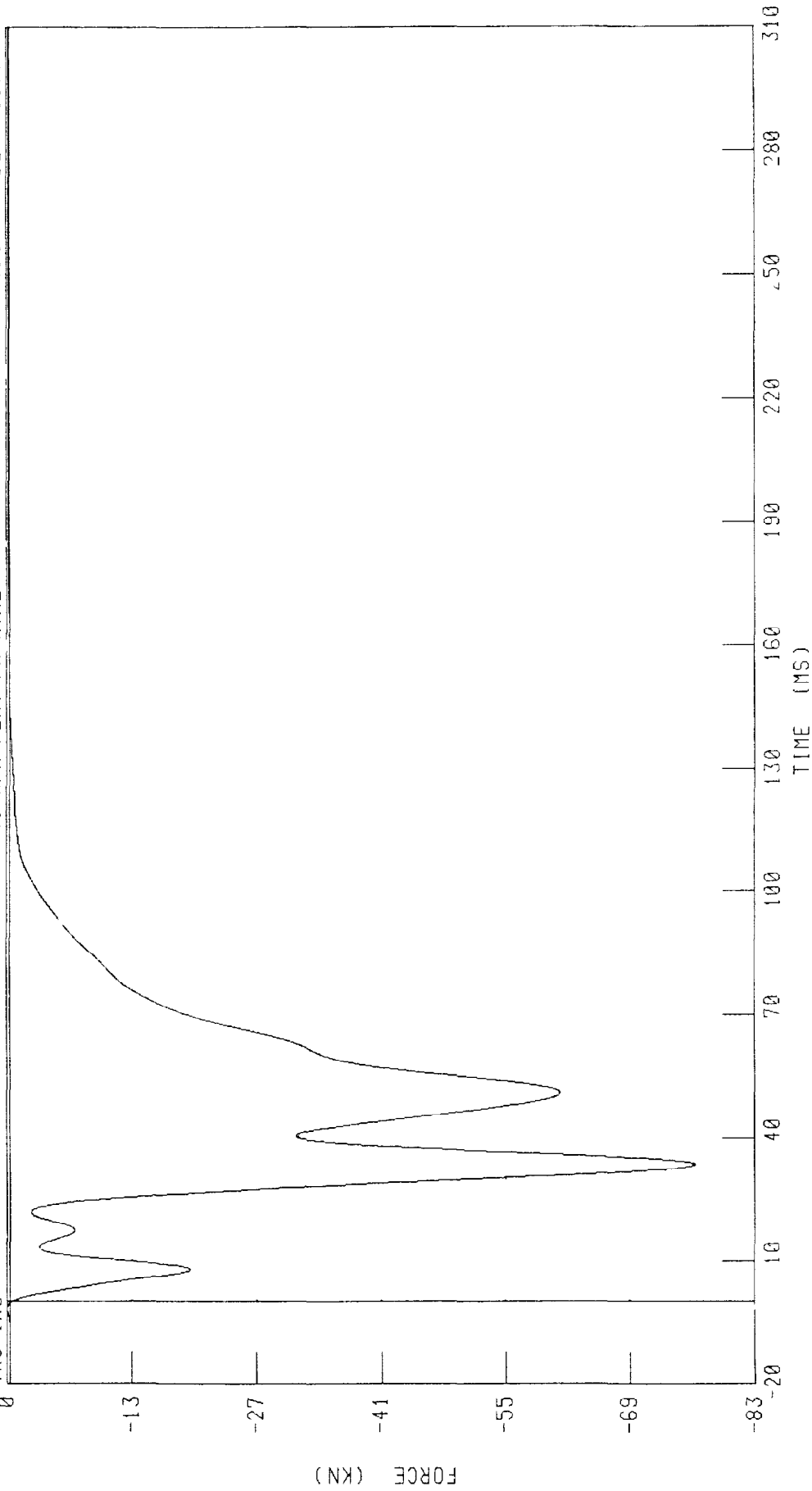
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION B3 FORCE



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION B4 FORCE
48 KPH FLAT FRONTAL

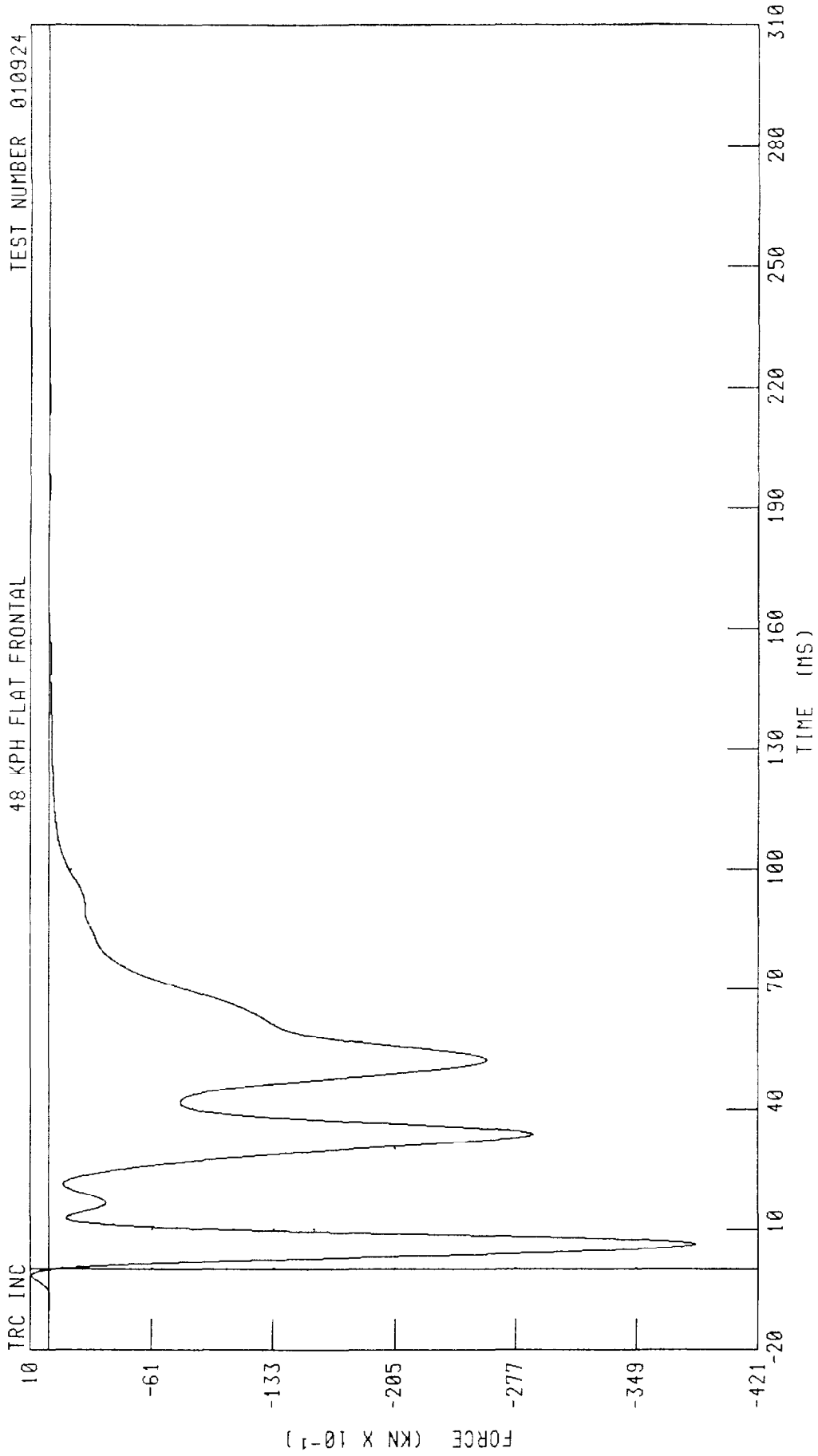
TEST NUMBER 010924

TRC INC



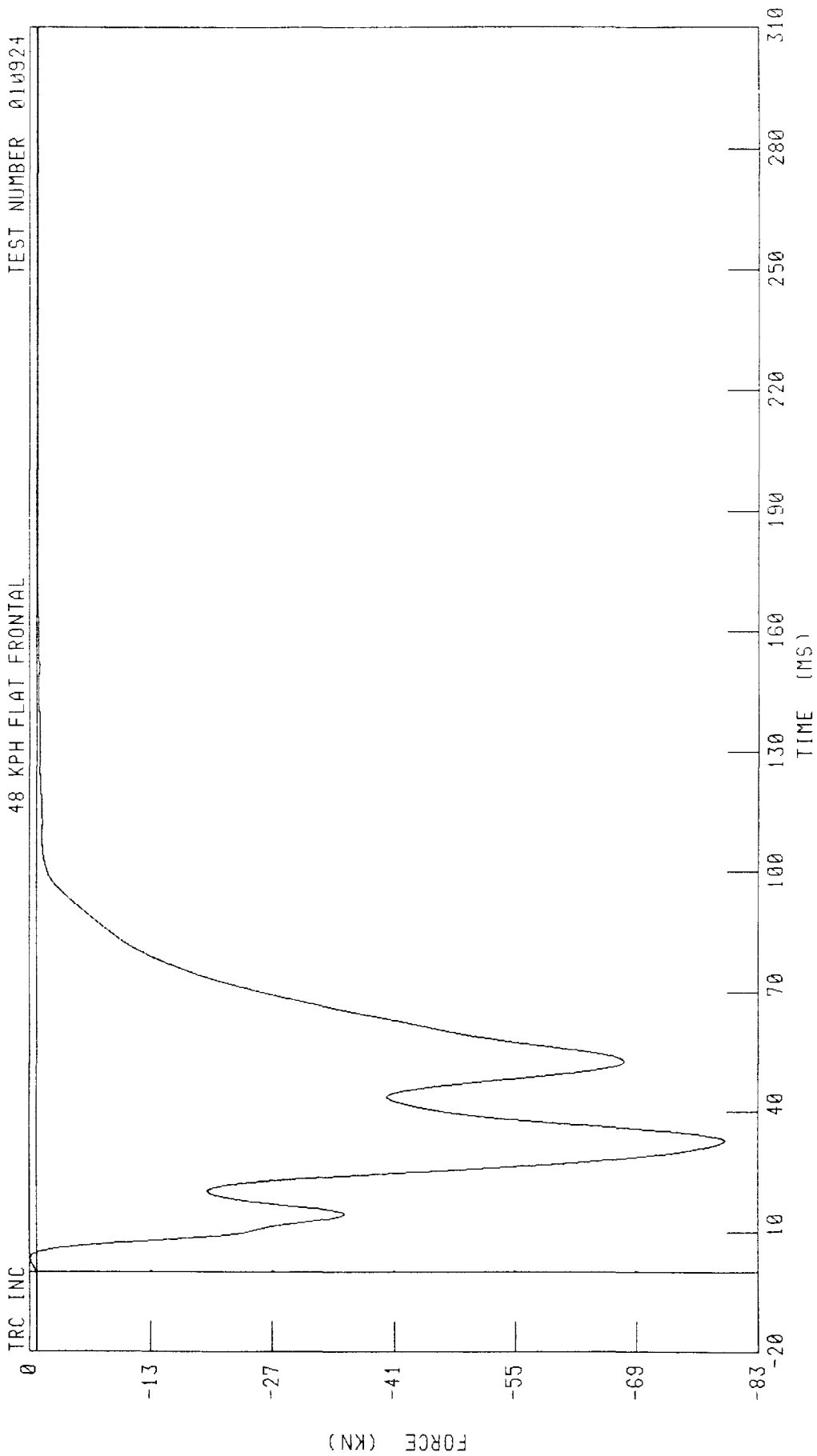
CHANNEL BB4F FILTER CH CLASS 60 PEAK DATA 0 30 KN @ -1 84 MS, -77 05 KN @ 33 52 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION B5 FORCE



CHANNEL BB5F FILTER CH CLASS 60 PEAK DATA 1 05 KN @ -1 60 MS, -38 42 KN @ 6 24 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOAD CELL BARRIER POSITION B6 FORCE
 48 KPH FLAT FRONTAL



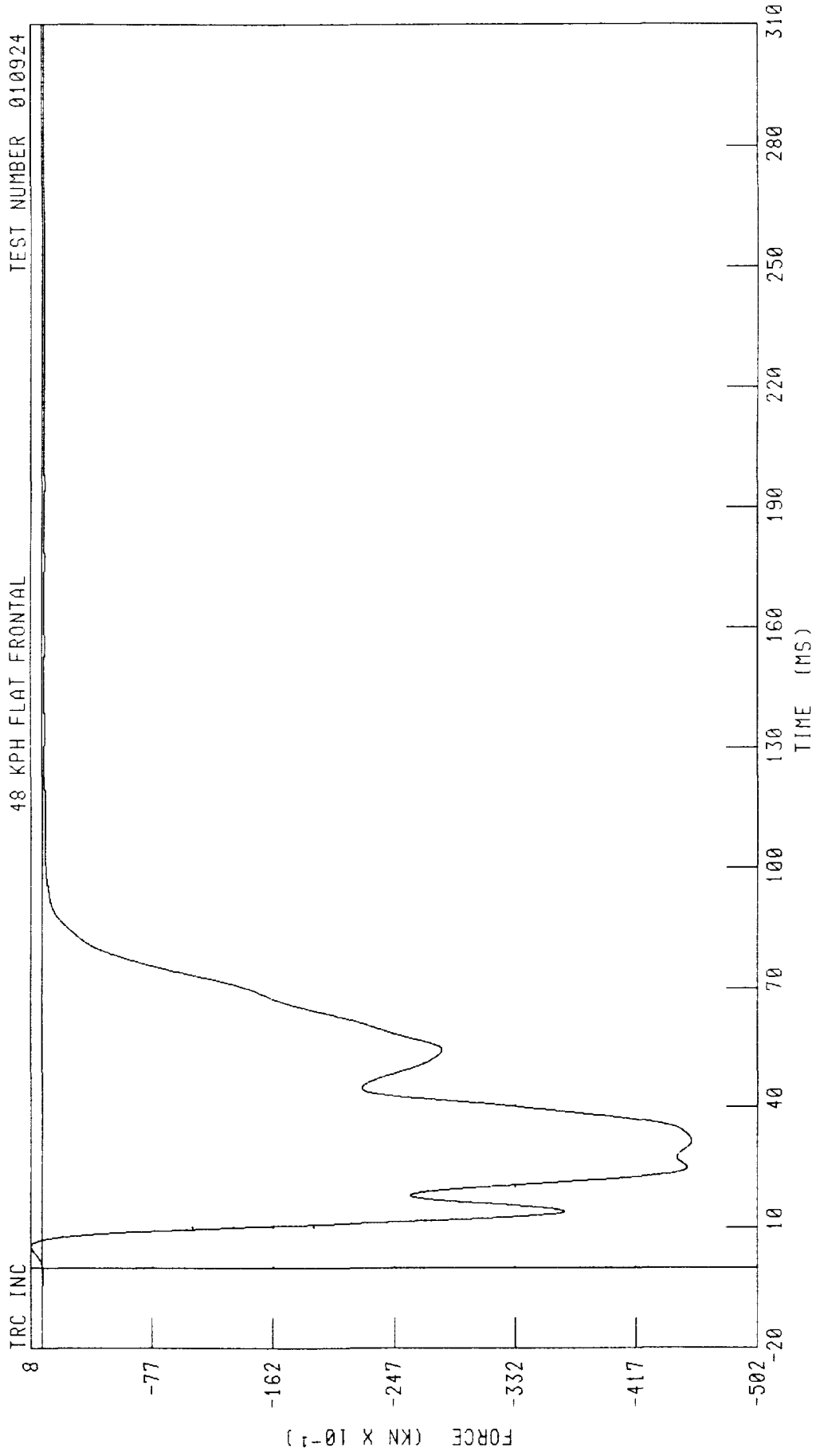
CHANNEL BB6F FILTER CH CLASS 60

PEAK DATA 0 79 KN @ 3 36 ms, -79 40 KN @ 32 64 ms

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION B7 FORCE

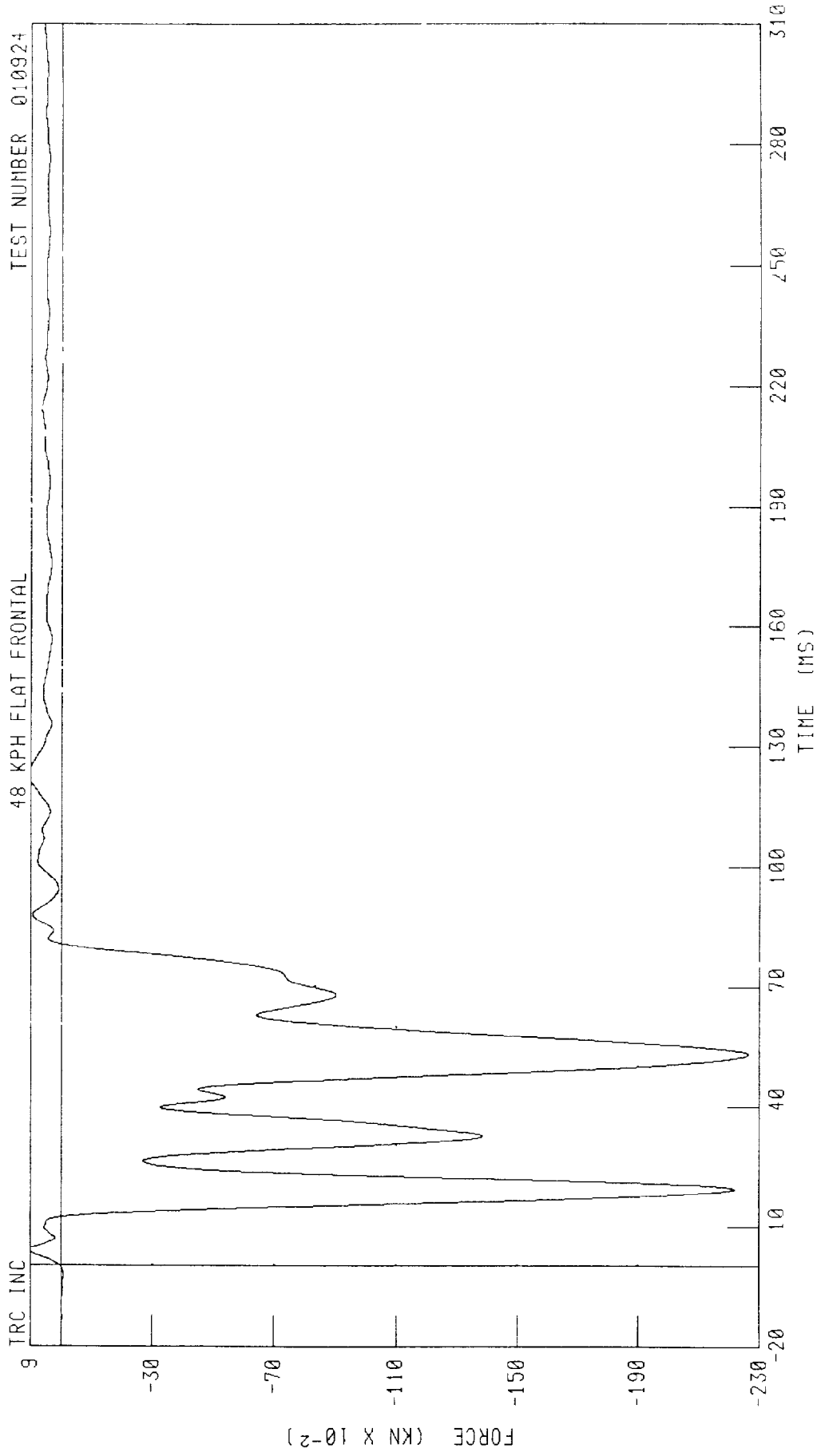
48 KPH FLAT FRONTAL TEST NUMBER 010924



CHANNEL 887F FILTER CH CLASS 60

PEAK DATA 0 80 KN @ 5 36 MS, -45 64 KN @ 31 44 MS

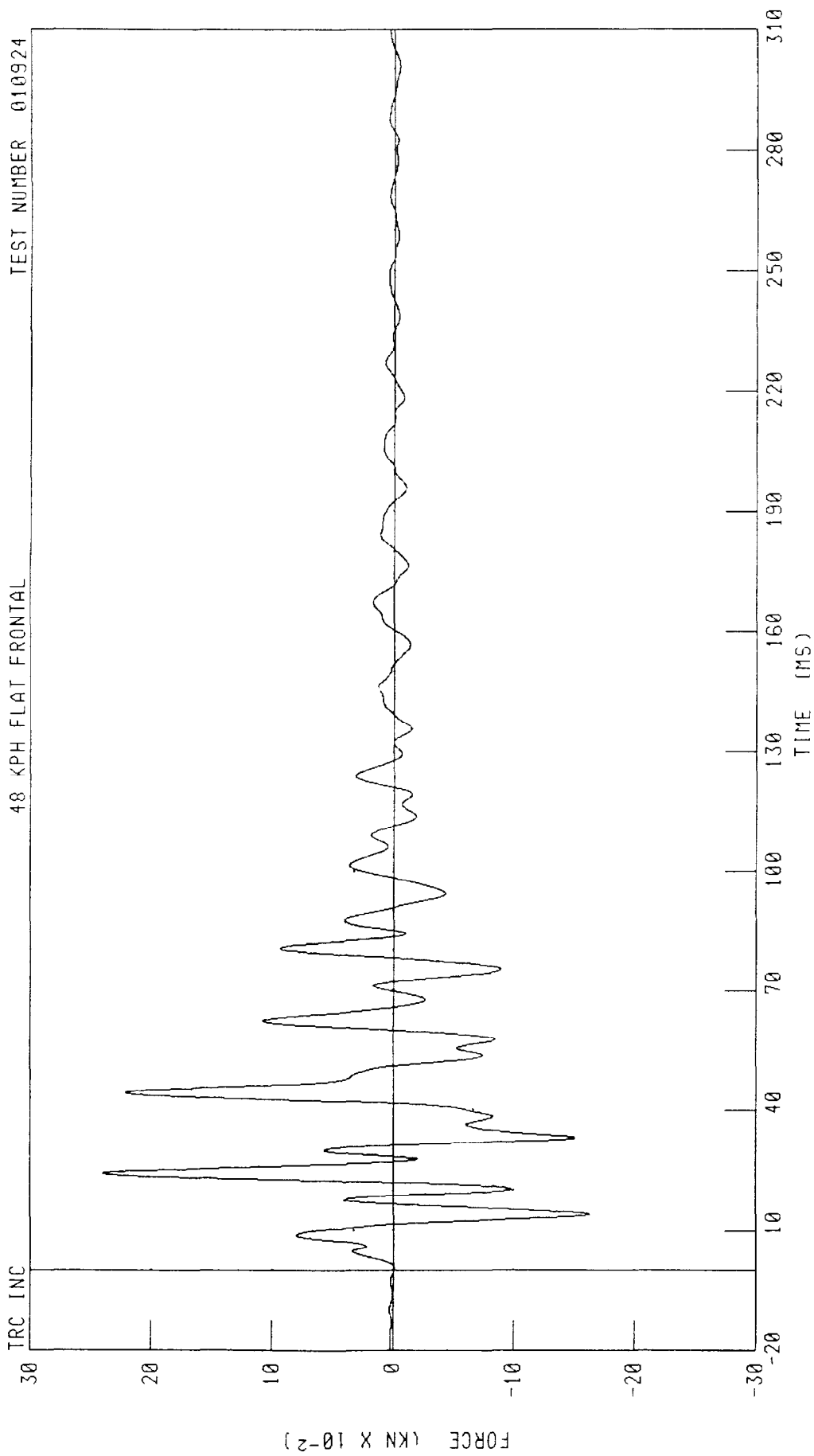
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOAD CELL BARRIER POSITION B8 FORCE



CHANNEL BB8F FILTER CH CLASS 60 PEAK DATA 0 11 KN @ 122 72 MS, -2 26 KN @ 53 12 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION B9 FORCE

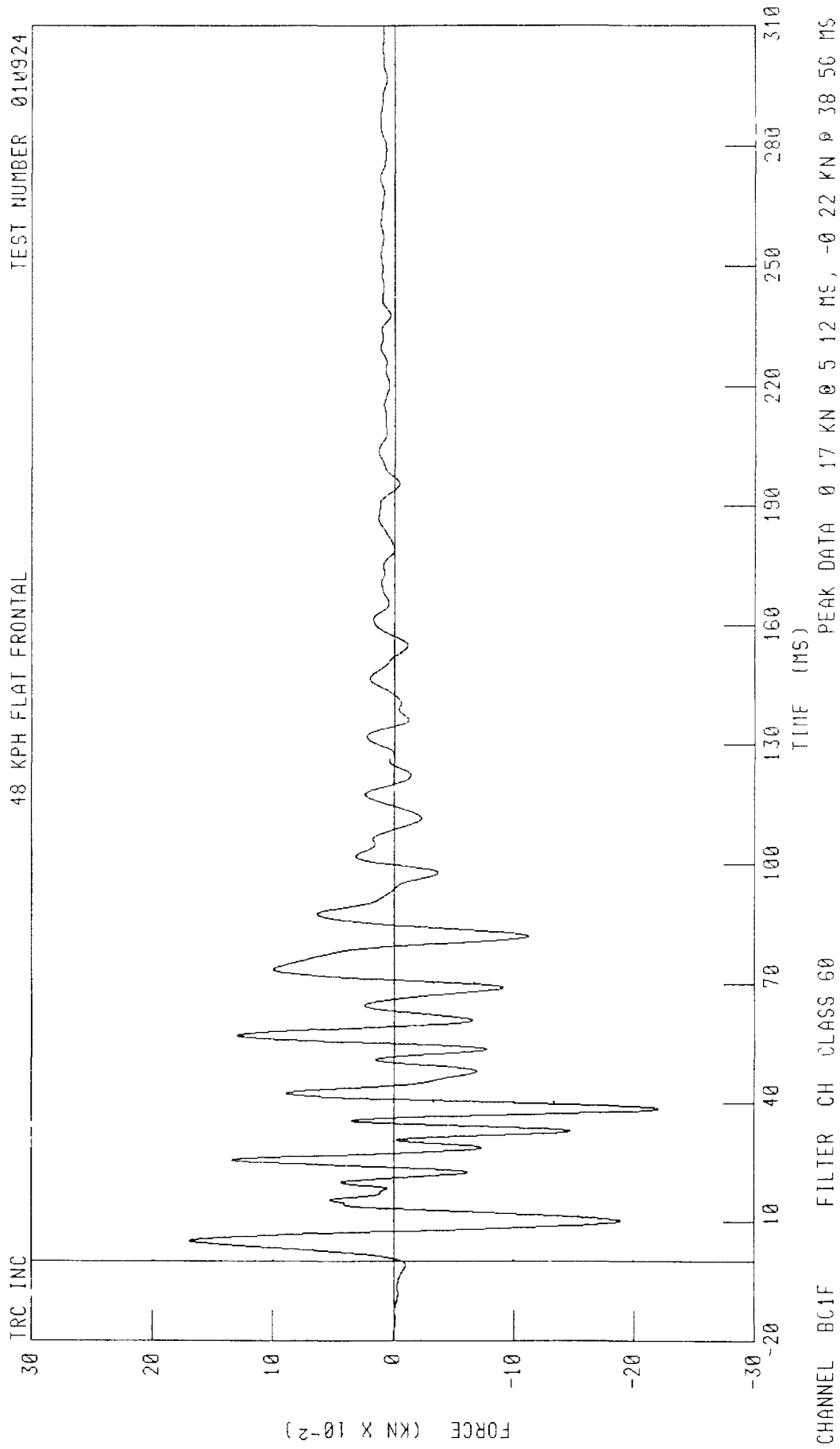
48 KPH FLAT FRONTAL TEST NUMBER 010924



CHANNEL BB9F FILTER CH CLASS 50

PEAK DATA 0 24 KN @ 24 MS, -0 16 KN @ 14 08 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION C1 FORCE

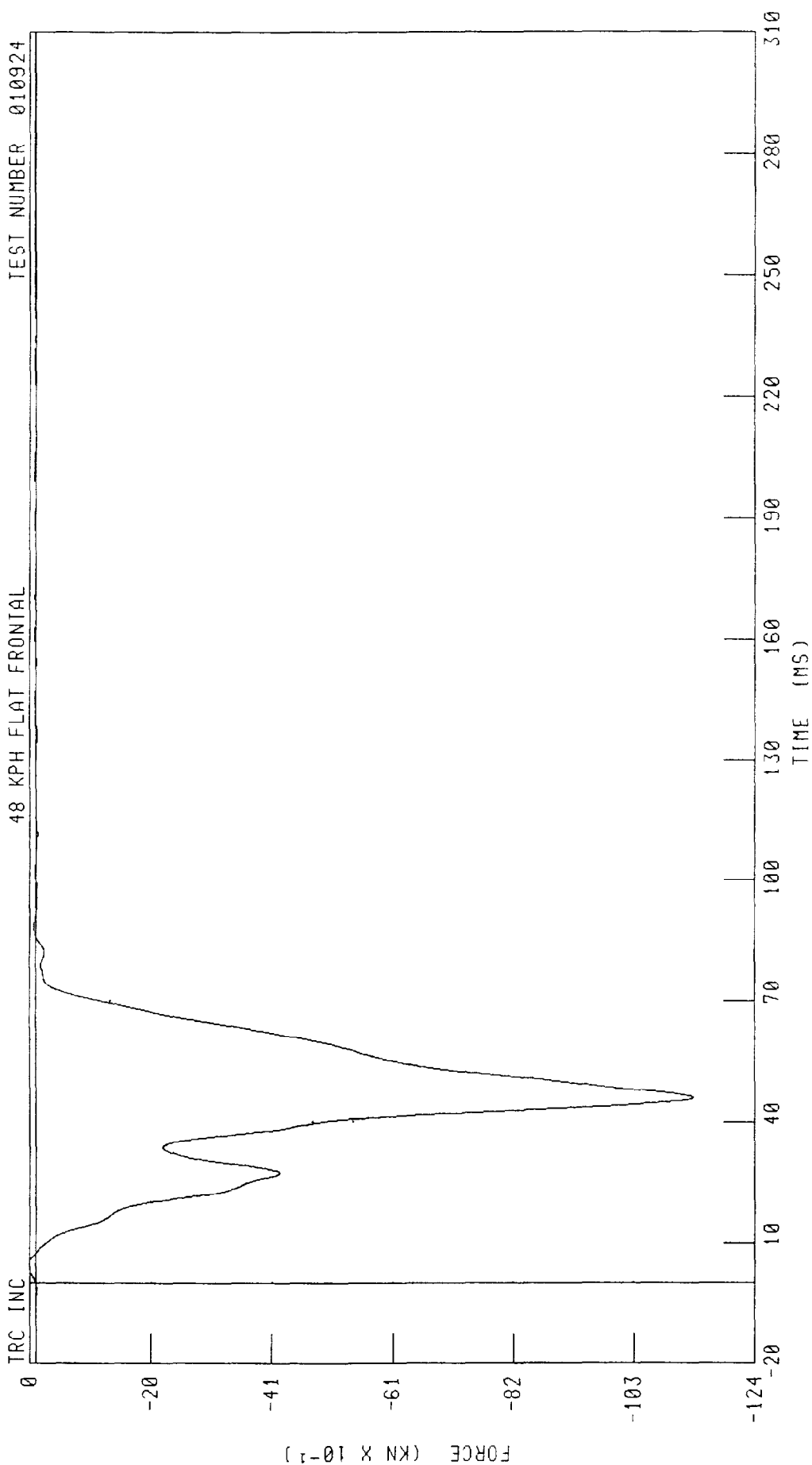


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION C2 FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924



TIME (MS)

PEAK DATA 0 16 KN @ 4 24 MS, -11 44 KN @ 46 08 MS

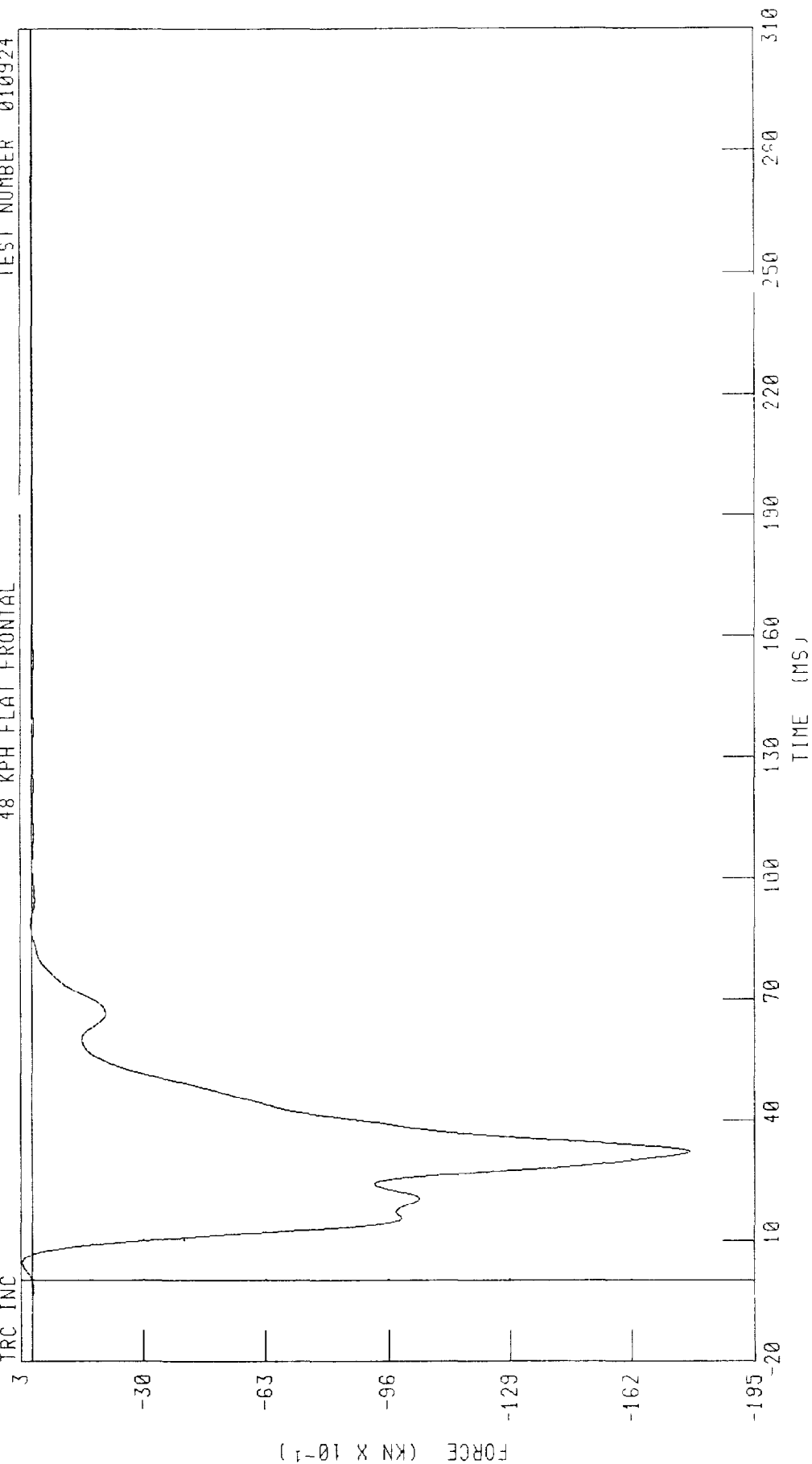
CHANNEL BC2F FILTER CH CLASS 60

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOAD CELL BARRIER POSITION C3 FORCE

TEST NUMBER 010924

48 KPH FLAT FRONTAL

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PEAK DATA 0 27 KPH 0 4 24 MS -17 78 KN 0 22 16 MS

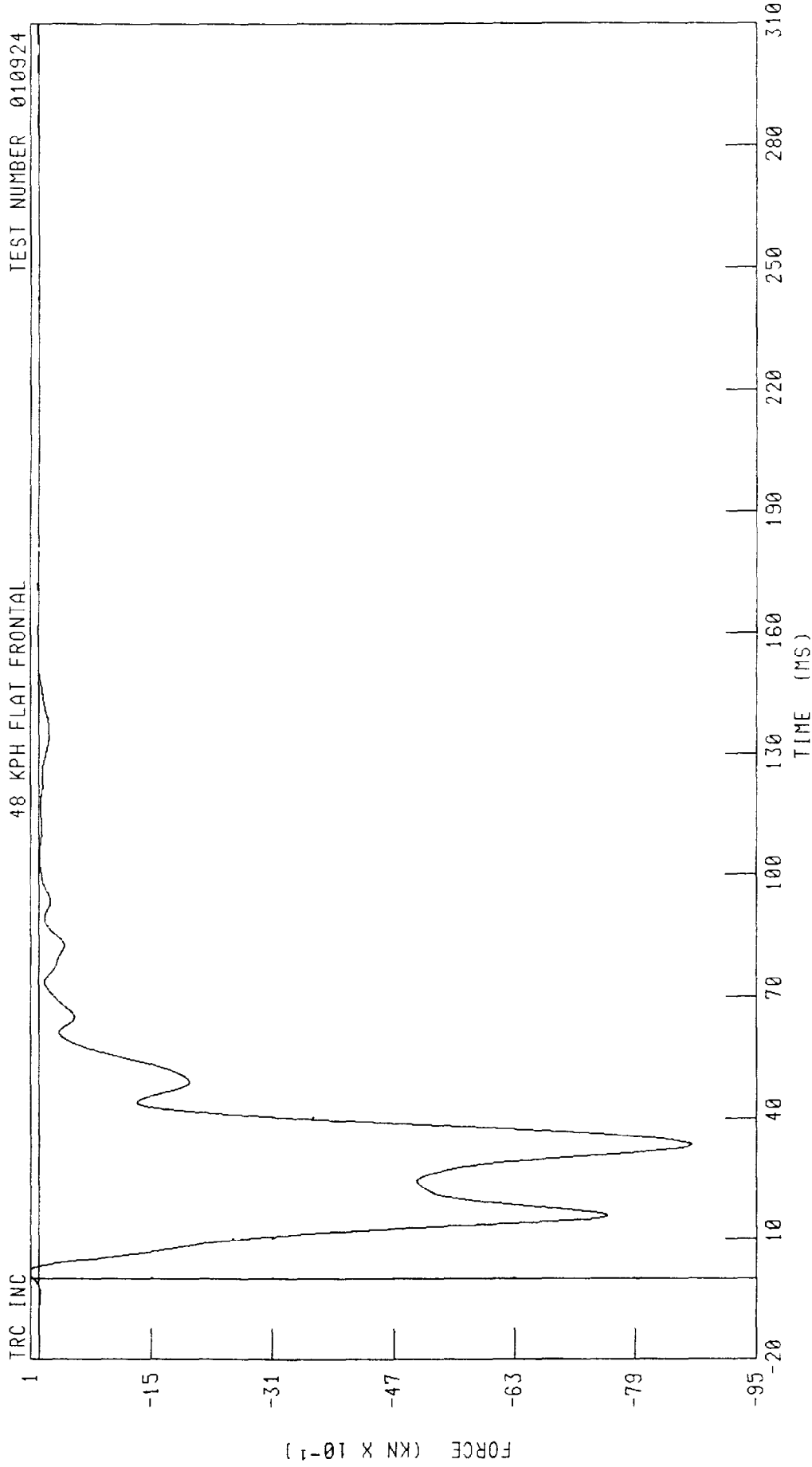
CHANNEL BC3F FILTER CH CLASS 60

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION C4 FORCE

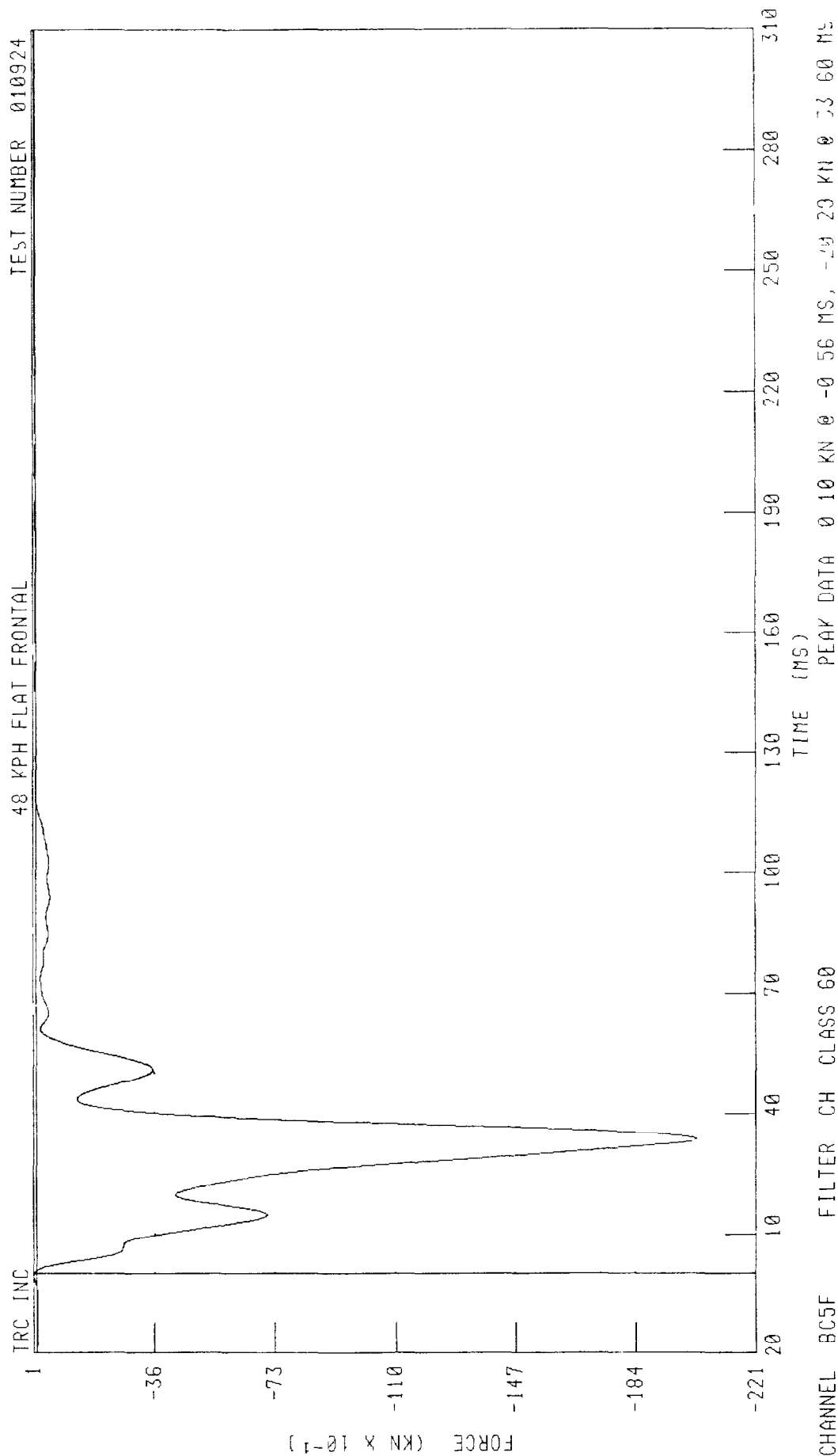
48 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL BC4F FILTER CH CLASS 60 PEAK DATA 0 13 KN @ 1 68 MS, -8 65 KN @ 33 36 MS

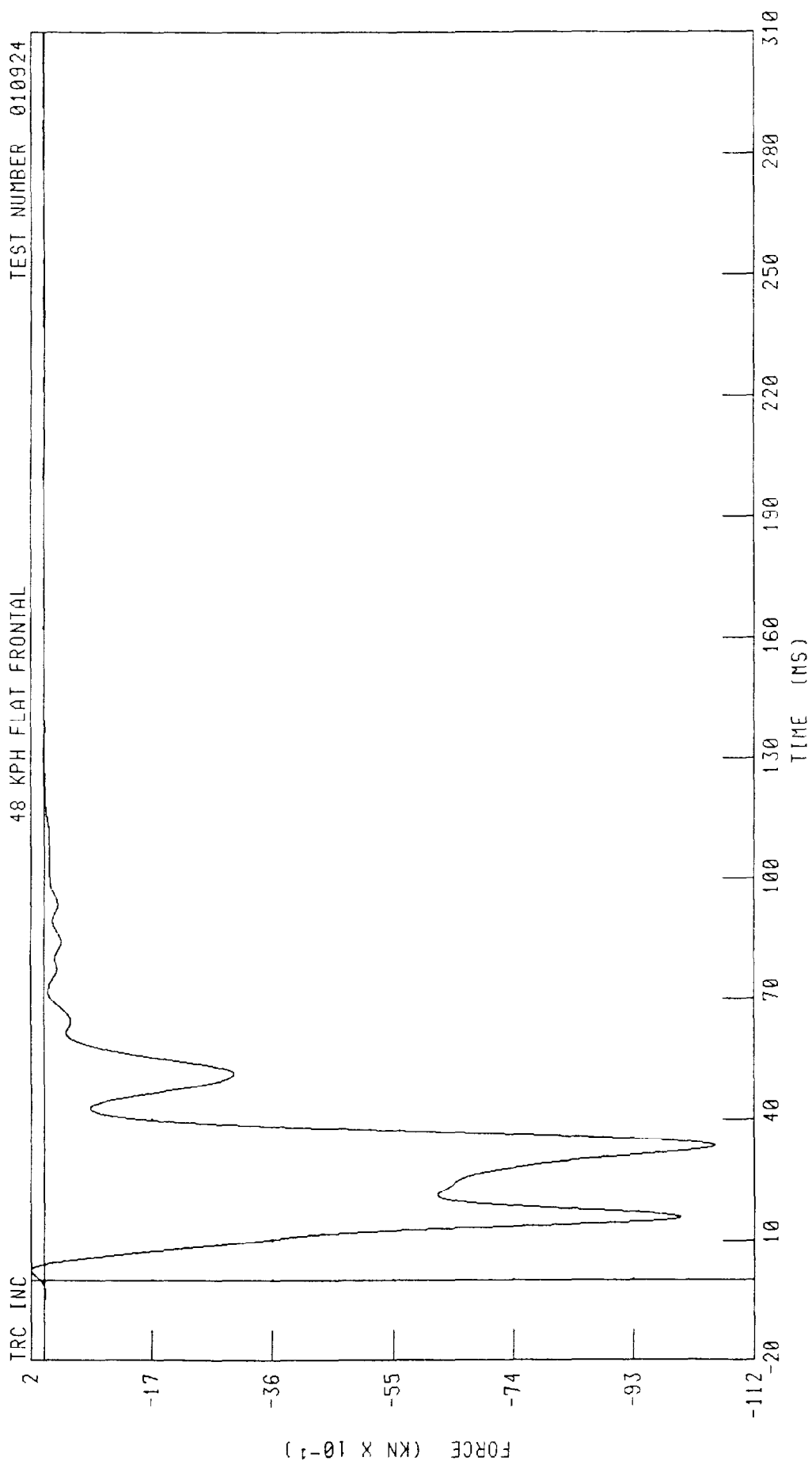
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOAD CELL BARRIER POSITION C5 FORCE
 48 KPH FLAT FRONTAL



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

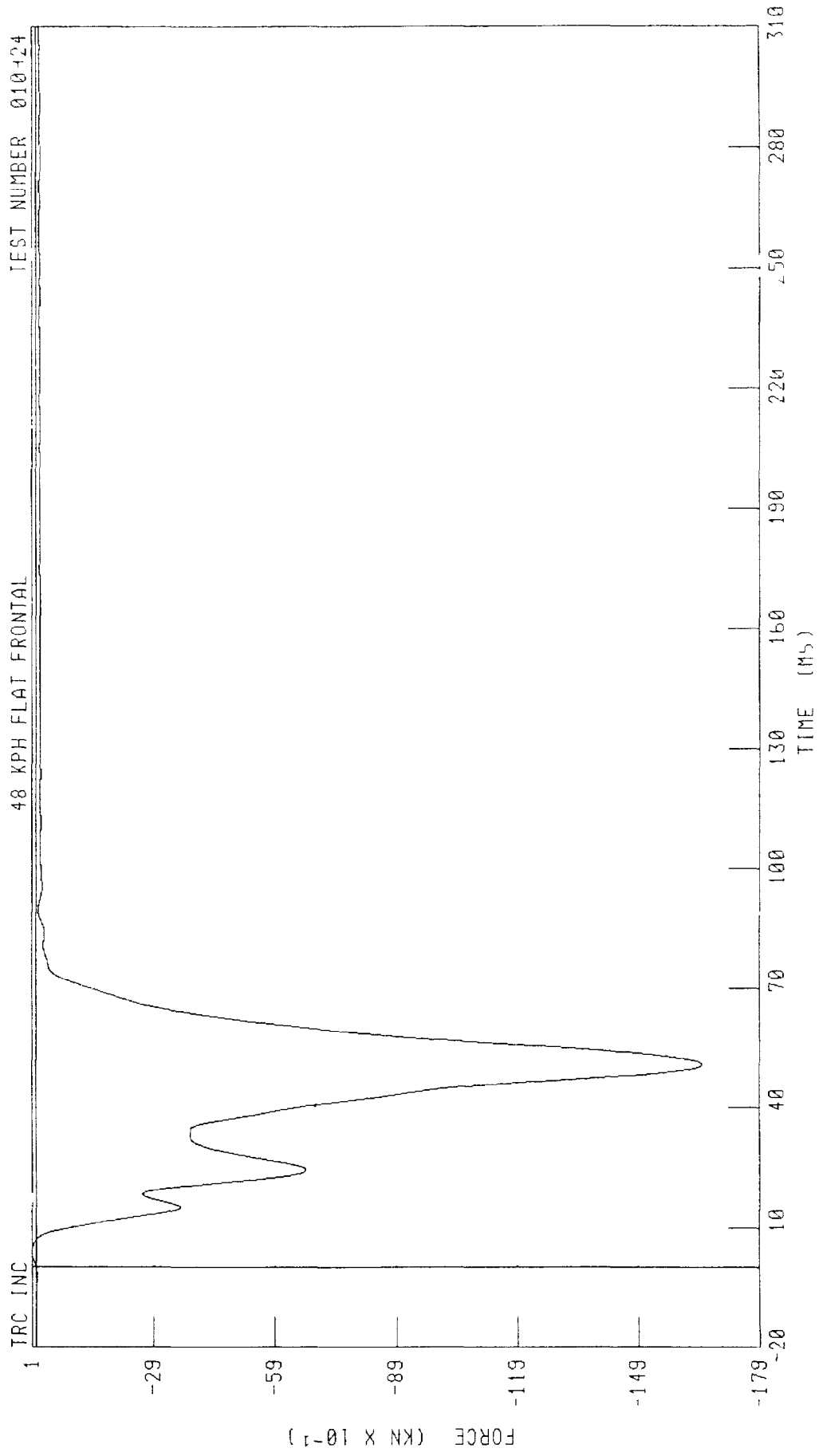
LOAD CELL BARRIER POSITION C6 FORCE

48 KPH FLAT FRONTAL TEST NUMBER 010924



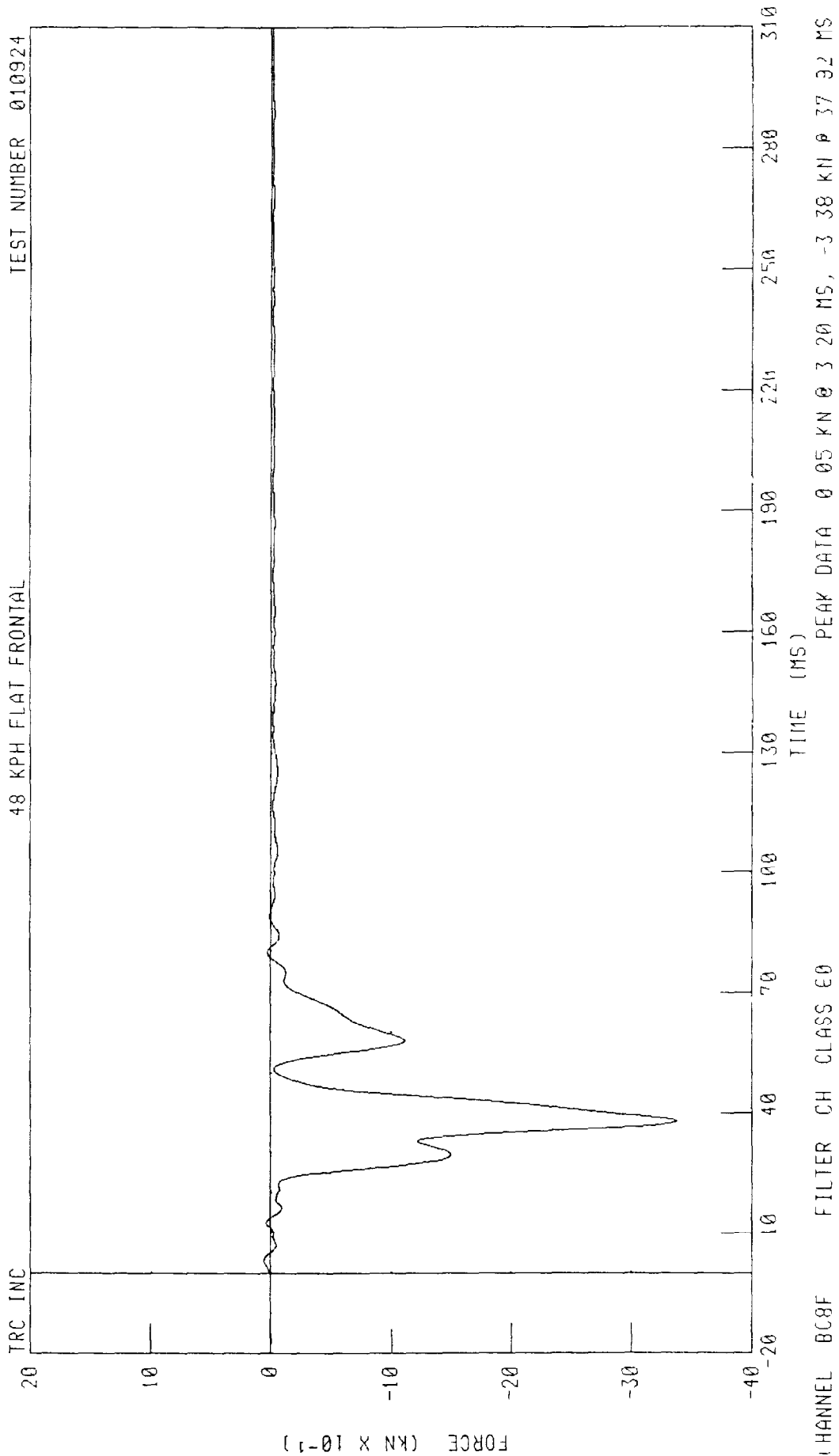
CHANNEL 3C6F FILTER CH CLASS 60 PEAK DATA 0 21 KN @ 2 48 MS, -10 59 KN @ 33 52 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION C7 FORCE



CHANNEL BC7F FILTER CH CLASS 60 PEAK DATA 0 13 KN @ 3 68 MS, -16 49 KN @ 50 80 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOAD CELL BARRIER POSITION C8 FORCE



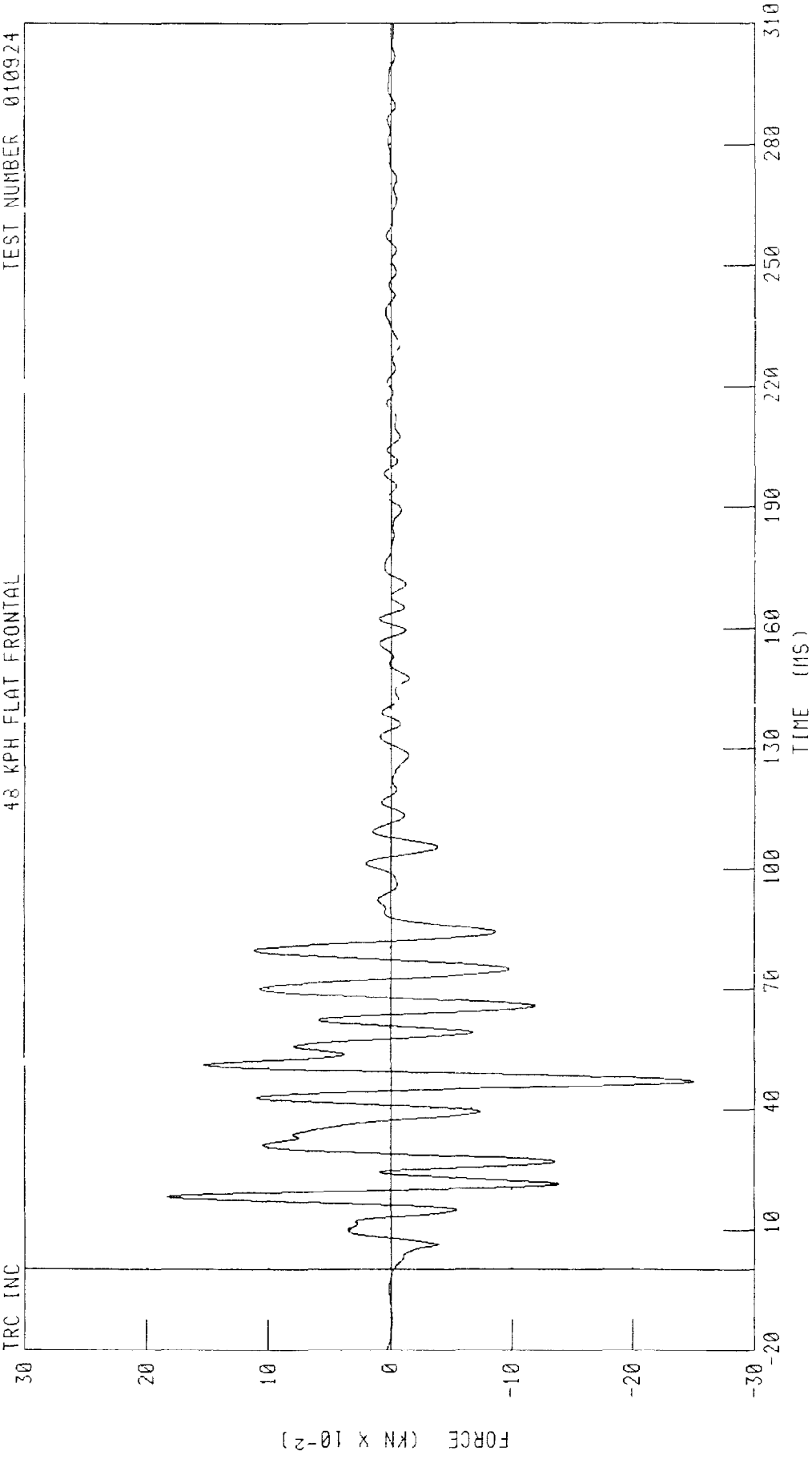
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION C9 FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924

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CHANNEL BC9F FILTER CH CLASS 60

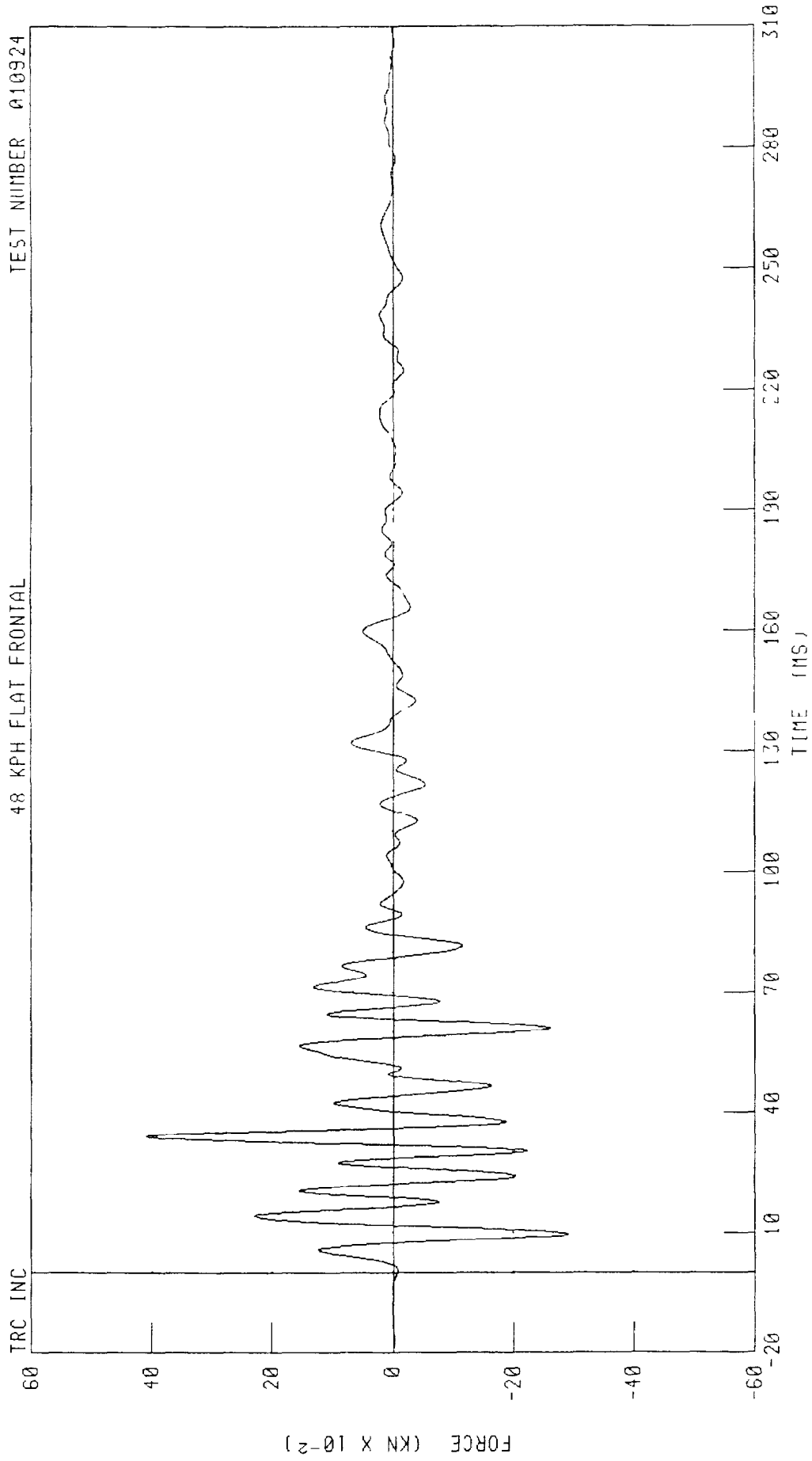
PEAK DATA 0 18 KN @ 19 08 MS, -0 25 KN @ 47 04 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION D1 FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924

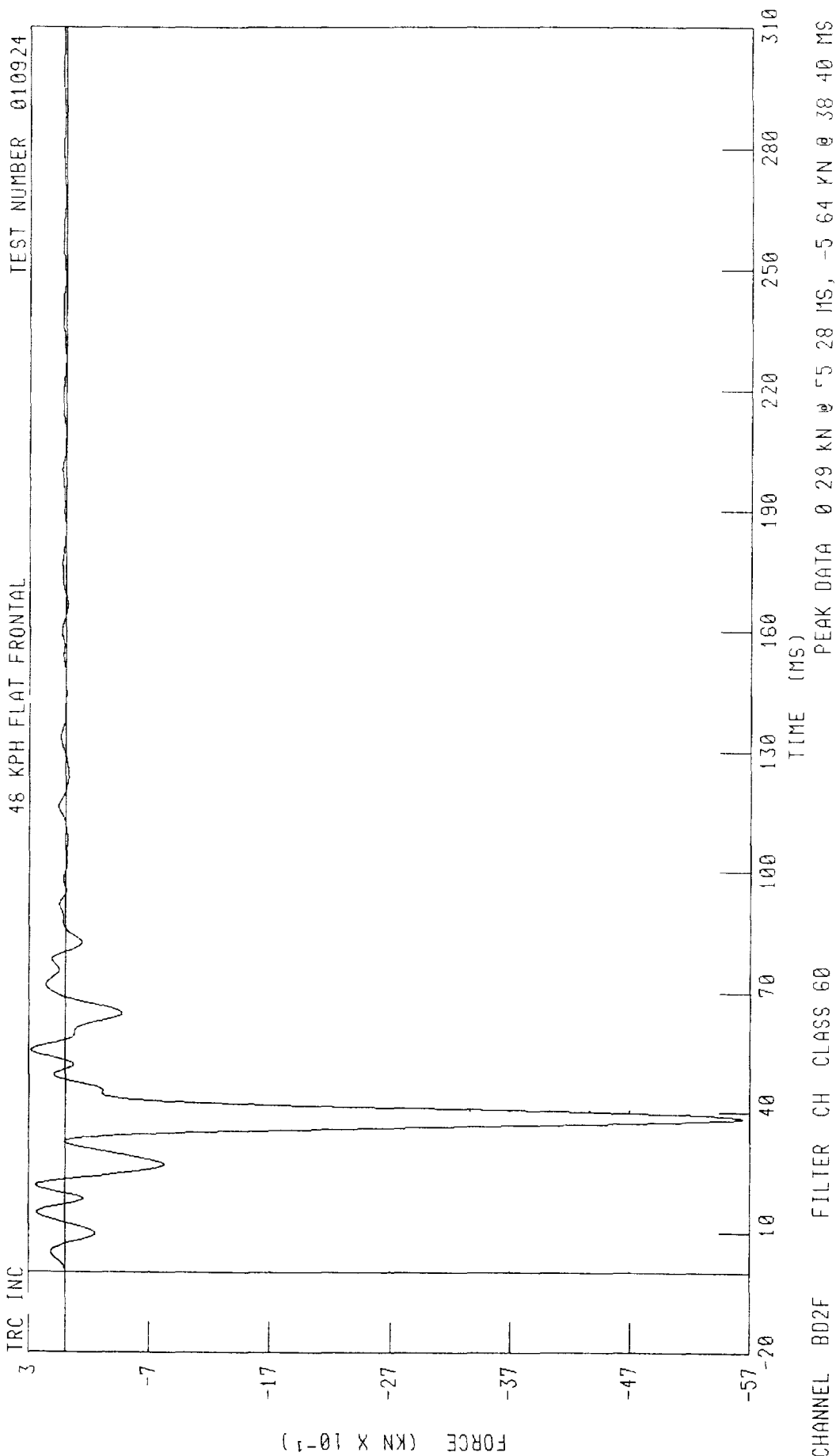


CHANNEL B01F FILTER CH CLASS 60

TIME (MS)

PEAK DATA 0 41 KN @ 34 08 MS, -0 29 KN @ 9 60 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION D2 FORCE
48 KPH FLAT FRONTAL



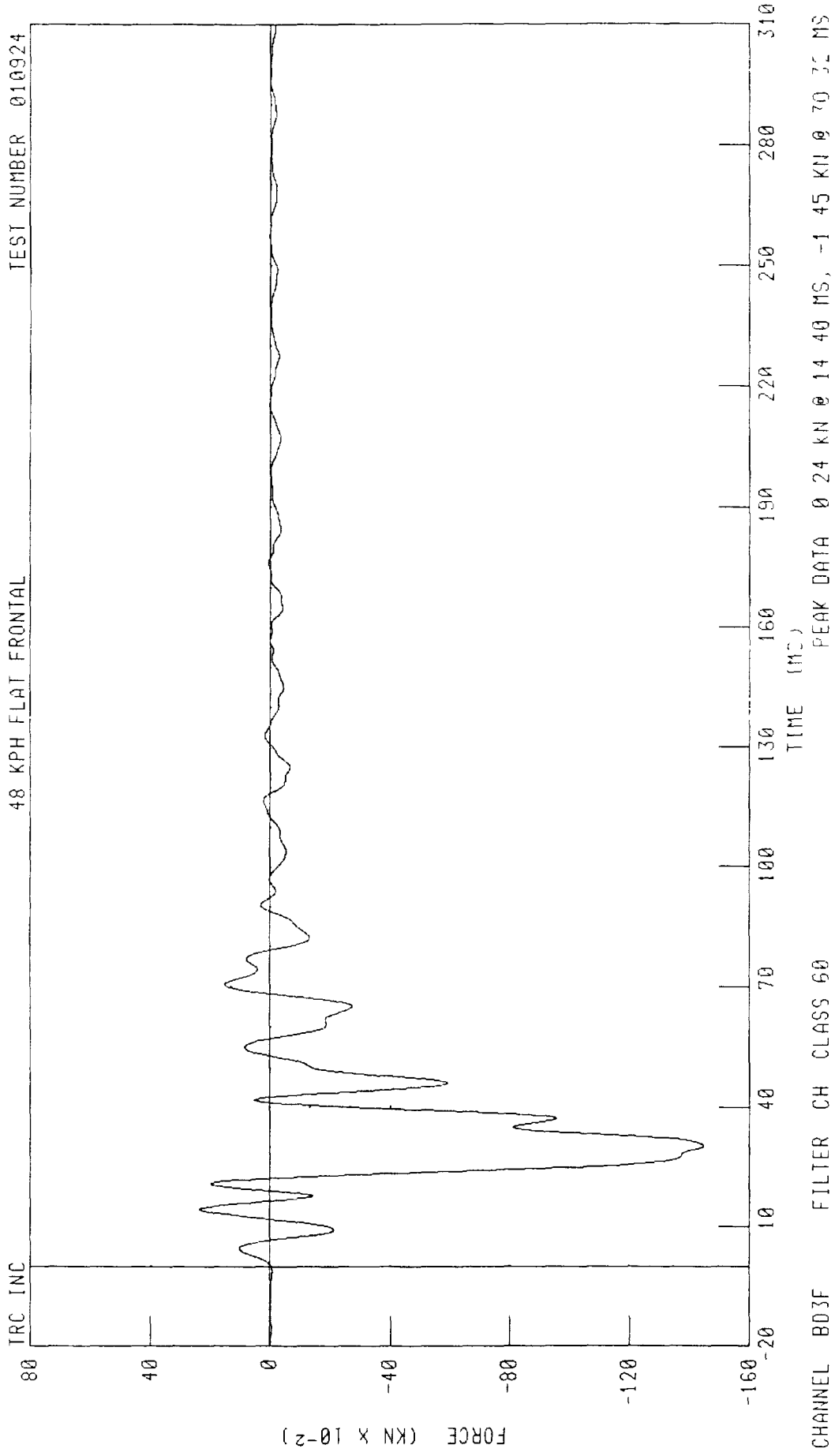
CHANNEL BD2F FILTER CH CLASS 60

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION D3 FORCE

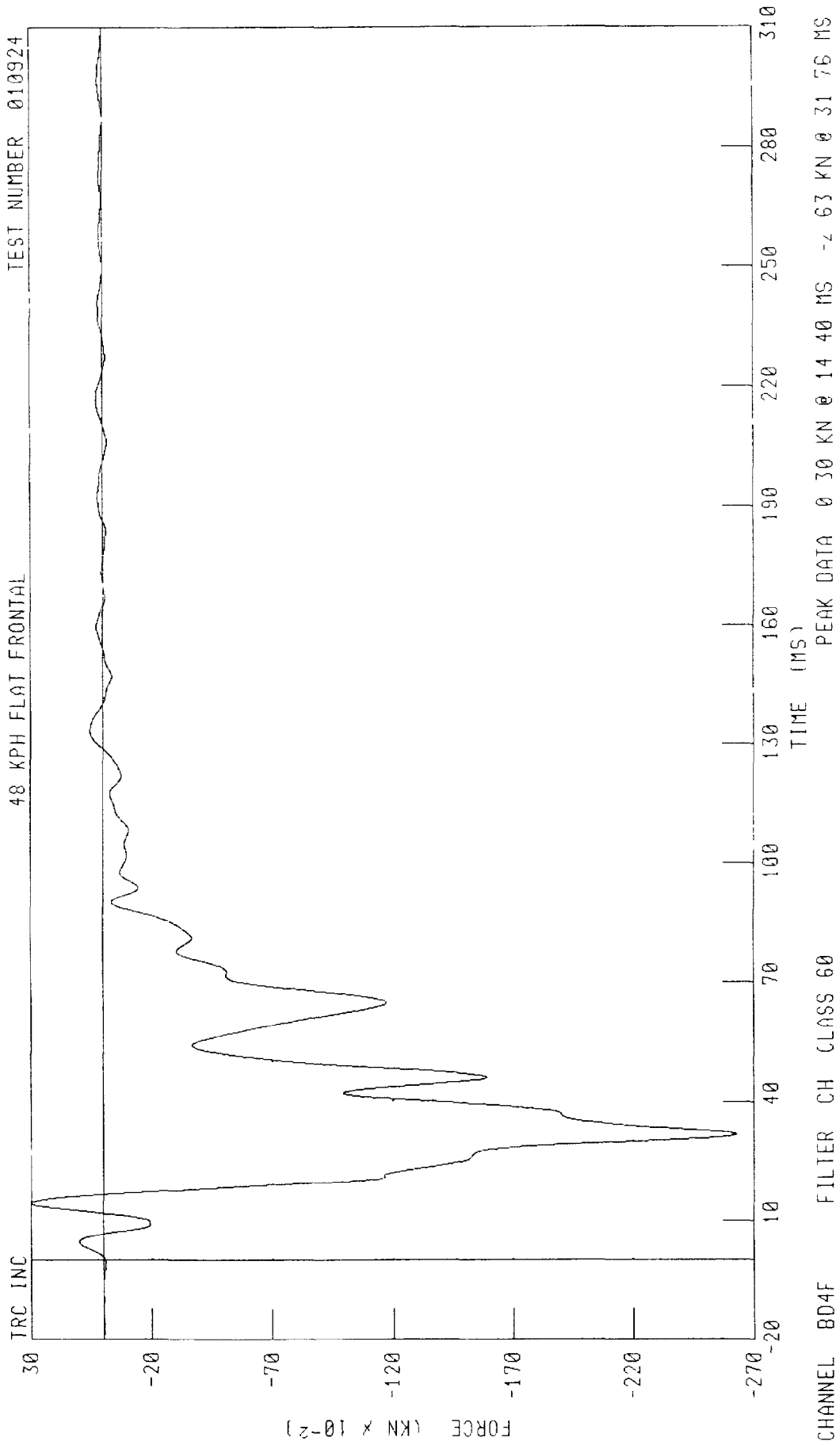
48 KPH FLAT FRONTAL

TEST NUMBER 010924



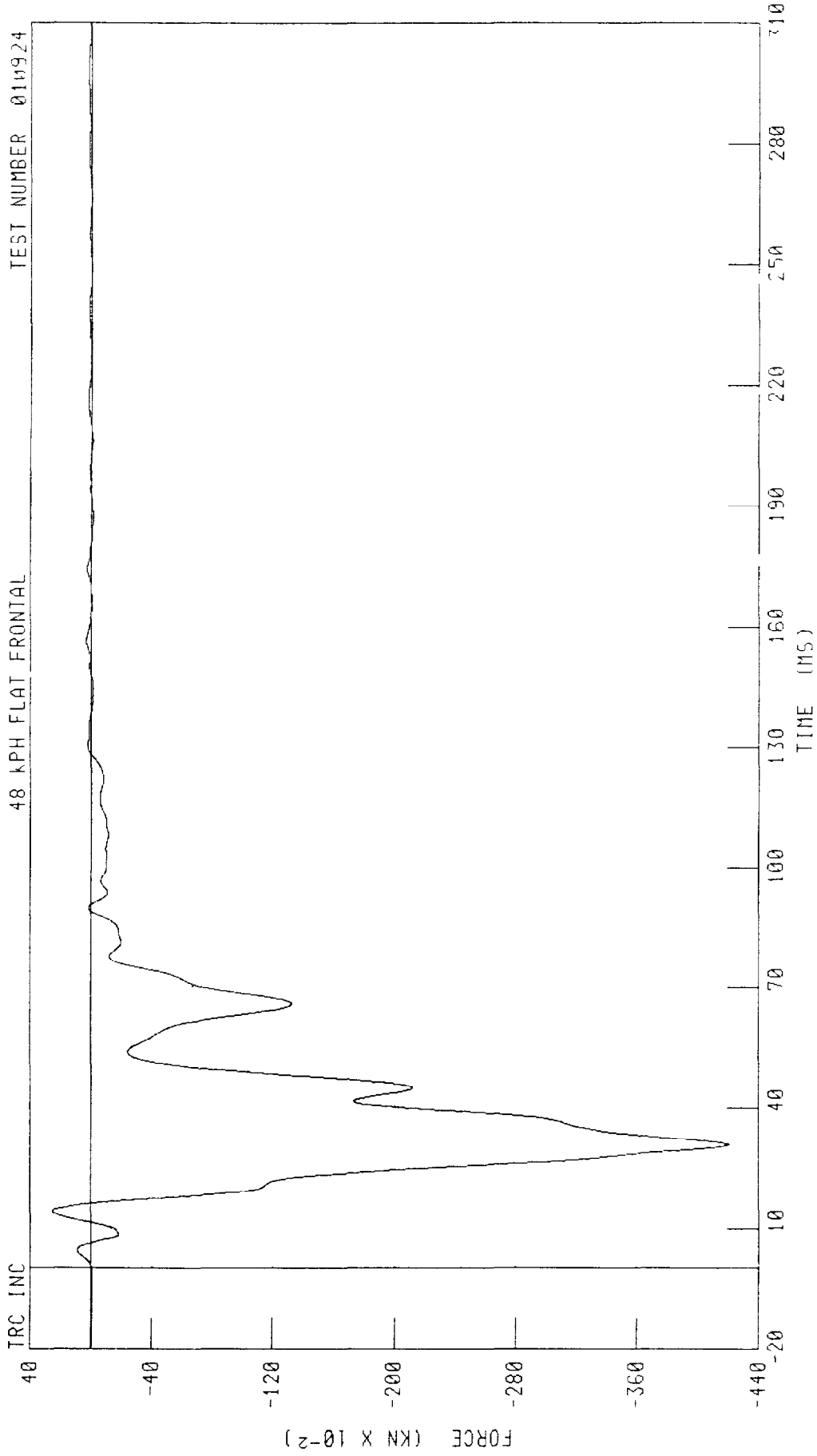
CHANNEL B03F FILTER CH CLASS 60 PEAK DATA 0 24 KN @ 14 40 MS, -1 45 KN @ 70 32 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION D4 FORCE



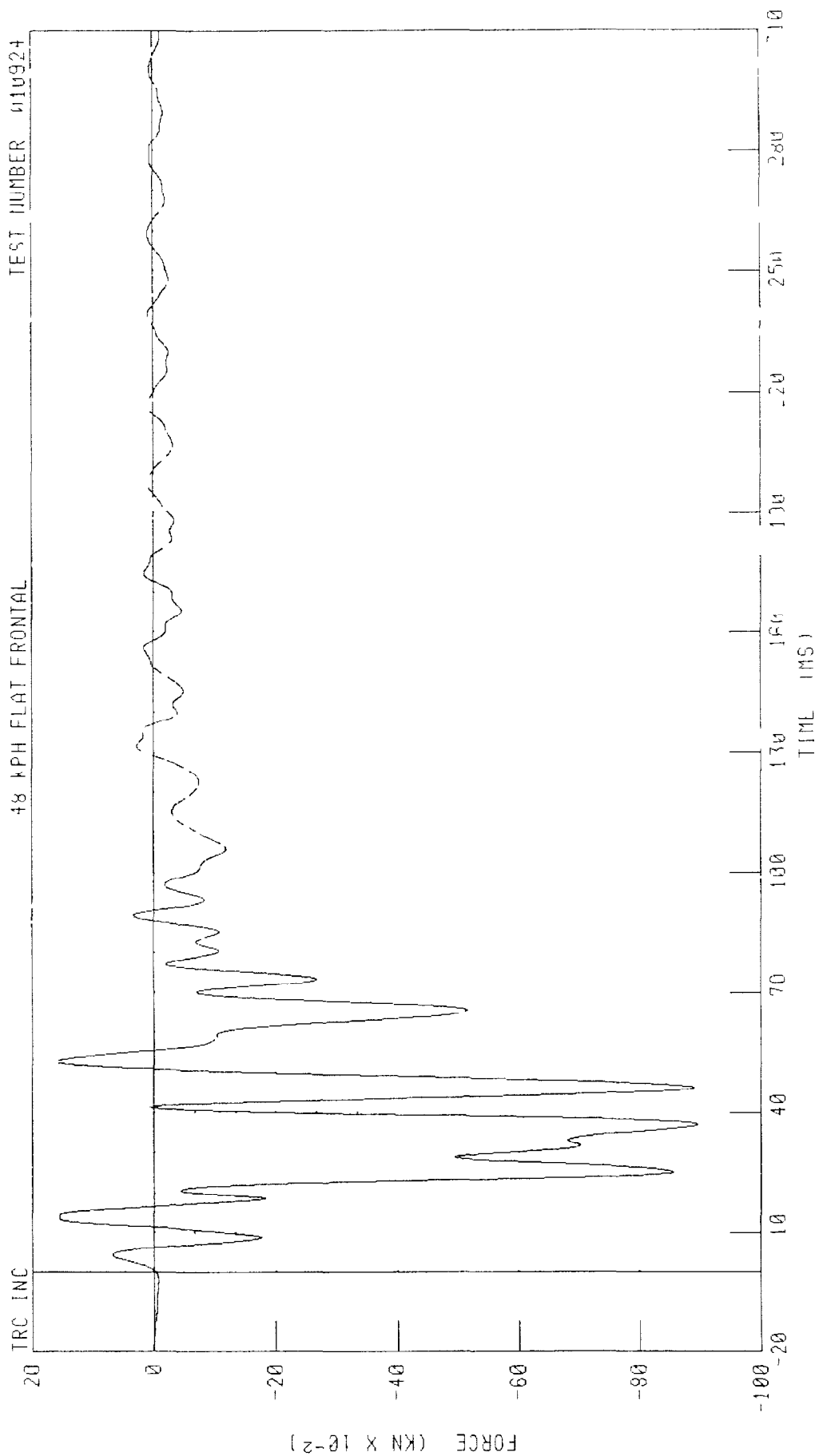
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION D5 FORCE

48 KPH FLAT FRONTAL TEST NUMBER 010924



CHANNEL B05F FILTER CH CLASS 60 PEAK DATA 0 25 KN @ 14 16 MS -4 21 KN @ 30 80 MS

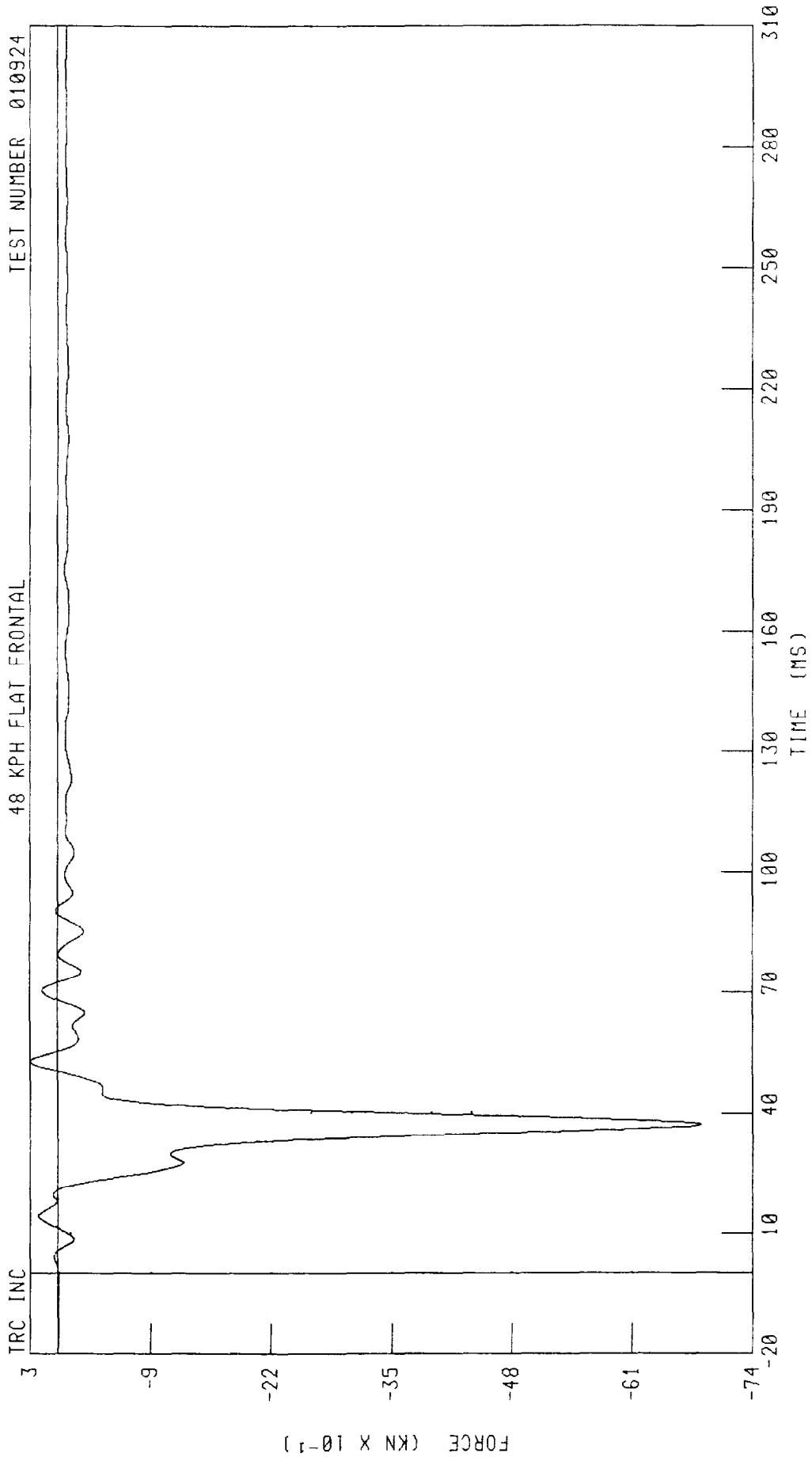
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 40 KPH
 LOAD CELL BARRIER POSITION 06 FORCE



CHANNEL BD6F FILTER CH CLASS 60

FEAR DATA 0 16 KPH @ 52 30 HBS, -0 30 KPH @ 27 04 HBS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER POSITION D7 FORCE

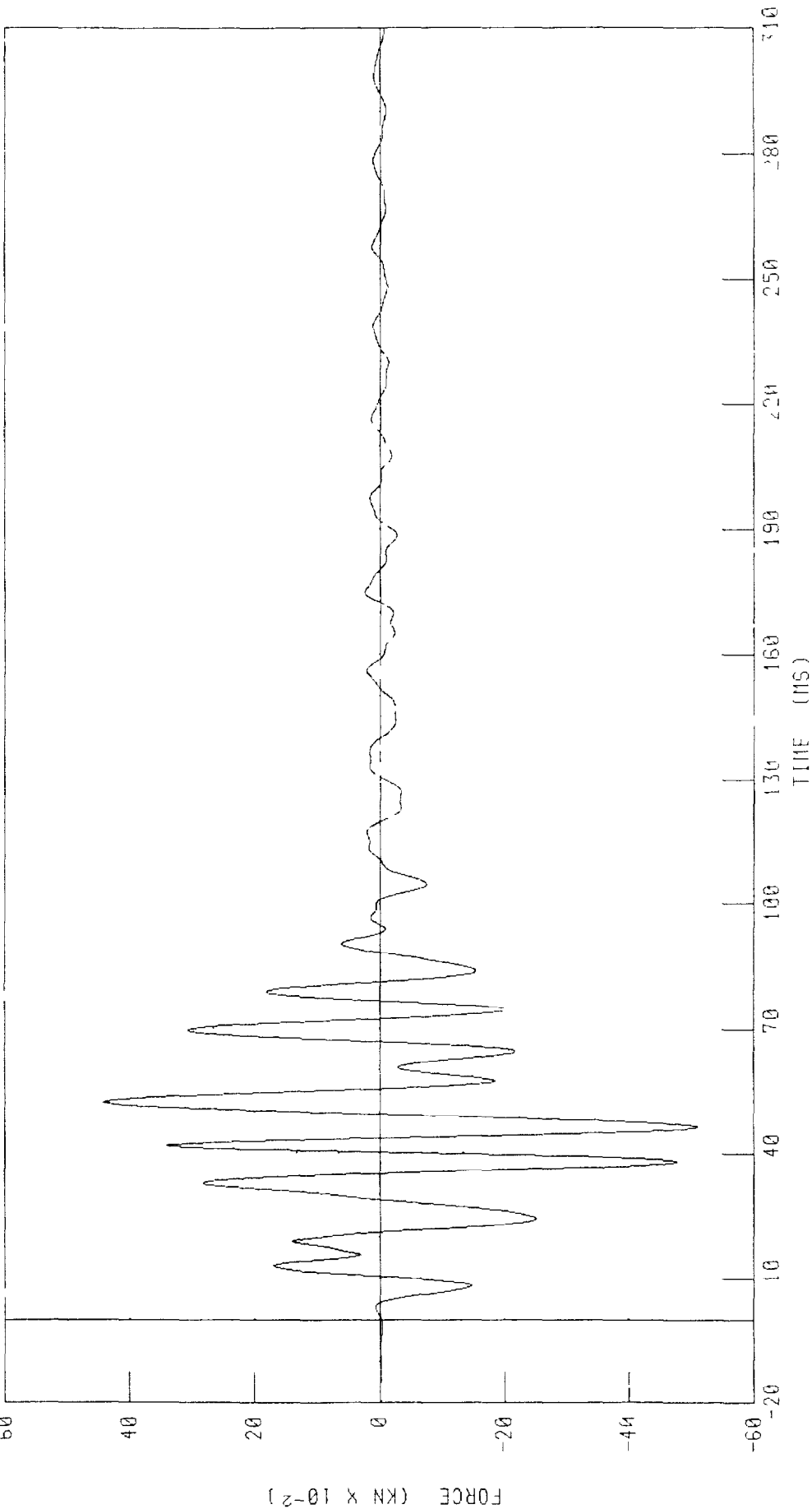


CHANNEL B07F FILTER CH CLASS 60 PEAK DATA 0 30 KN @ 52 80 MS, -6 95 KN @ 37 20 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOAD CELL BARRIER POSITION D3 FORCE
 48 KPH FLWT FRONTAL

IRC INC

TEST NUMBER 010924



TIME (MS)

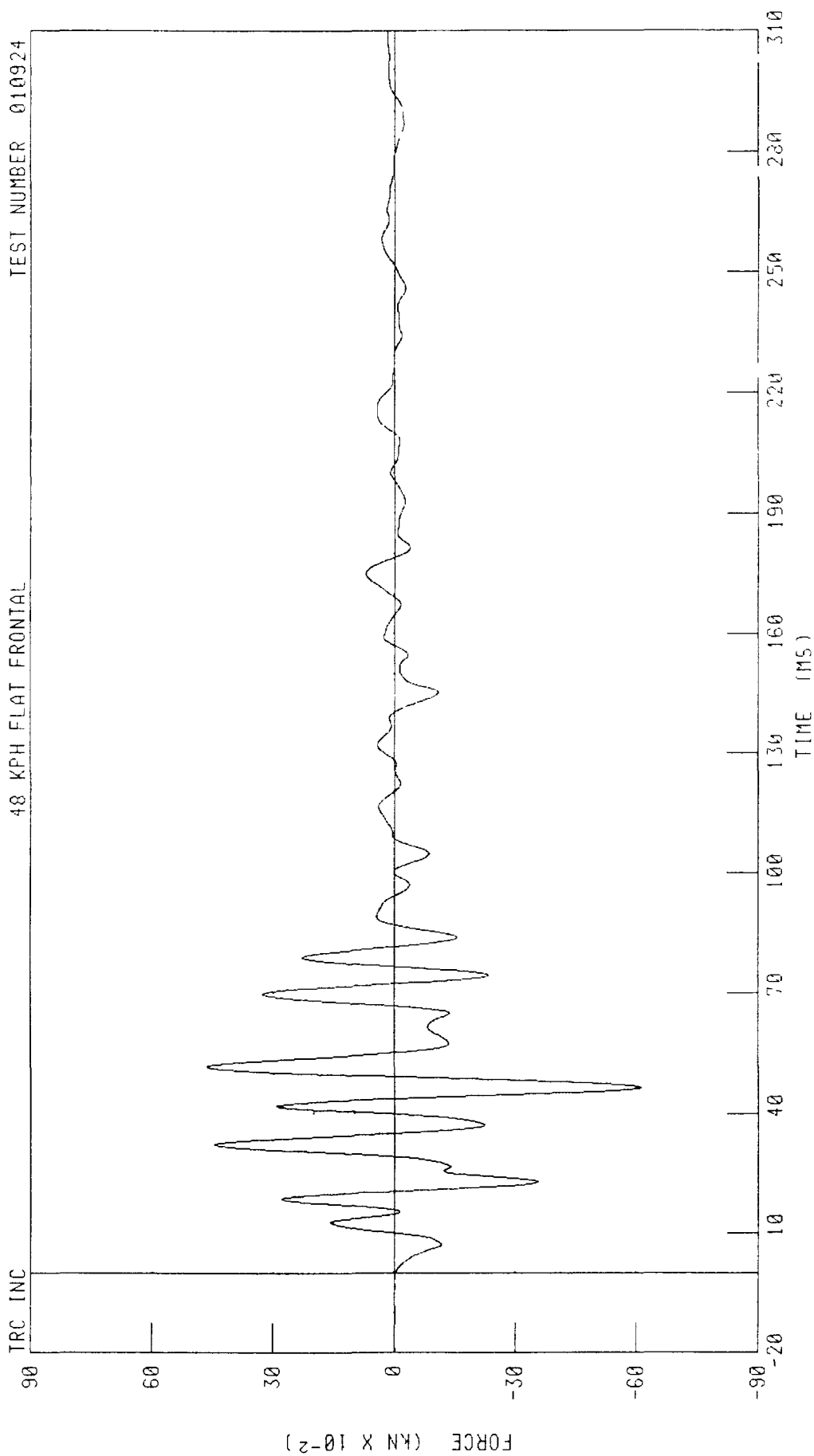
CHANNEL B03F FILTER CH CLASS 10 PEAK DATA 0 41 111 52 40 112 -0 51 111 0 41 7 11,

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER POSITION D9 FORCE

48 KPH FLAT FRONTAL

TEST NUMBER 010924

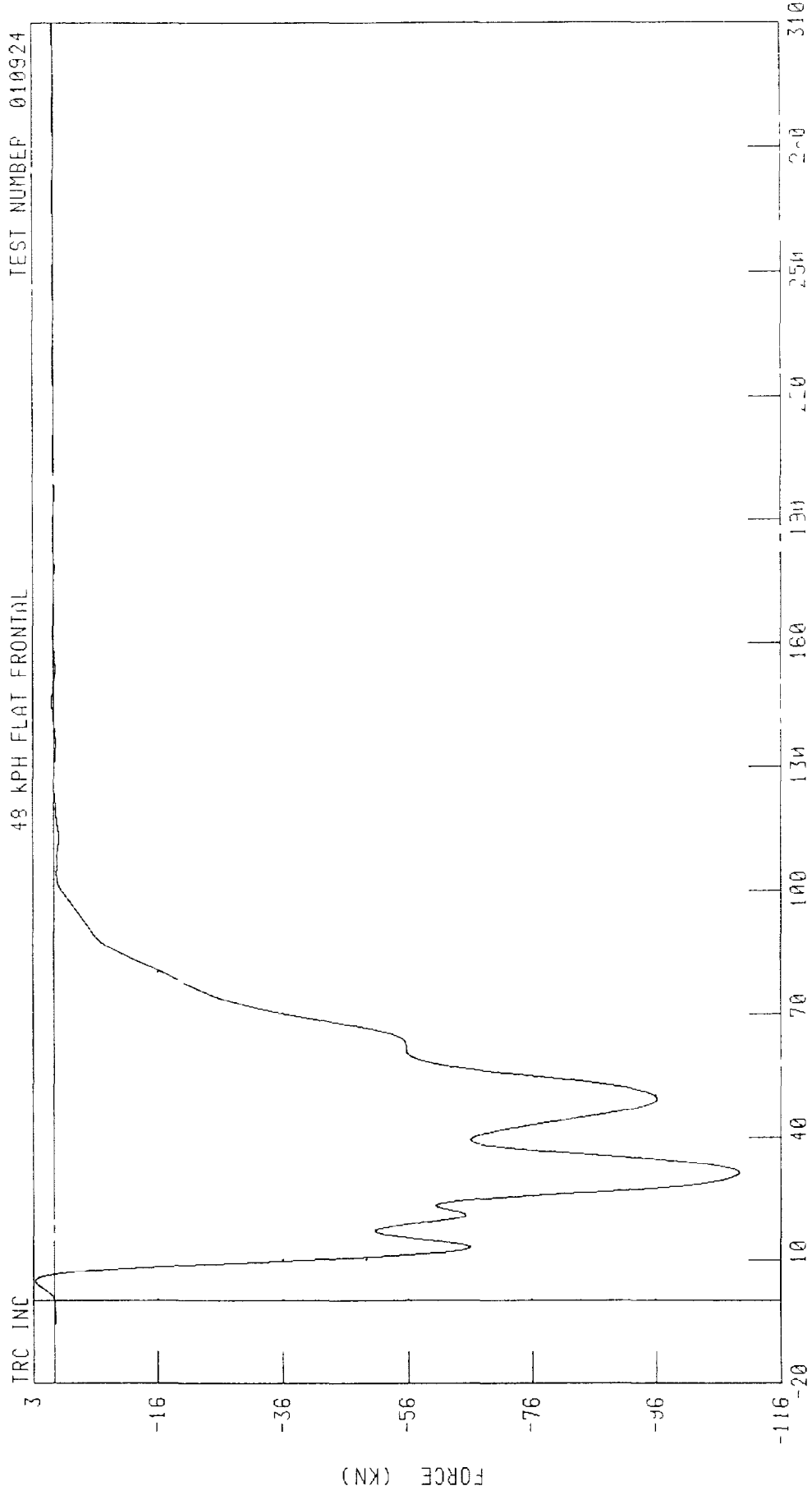


CHANNEL BD9F FILTER CH CLASS 60

PEAK DATA 0 46 V1 0 51 34 MS, -0 61 KN 0 46 56 MS

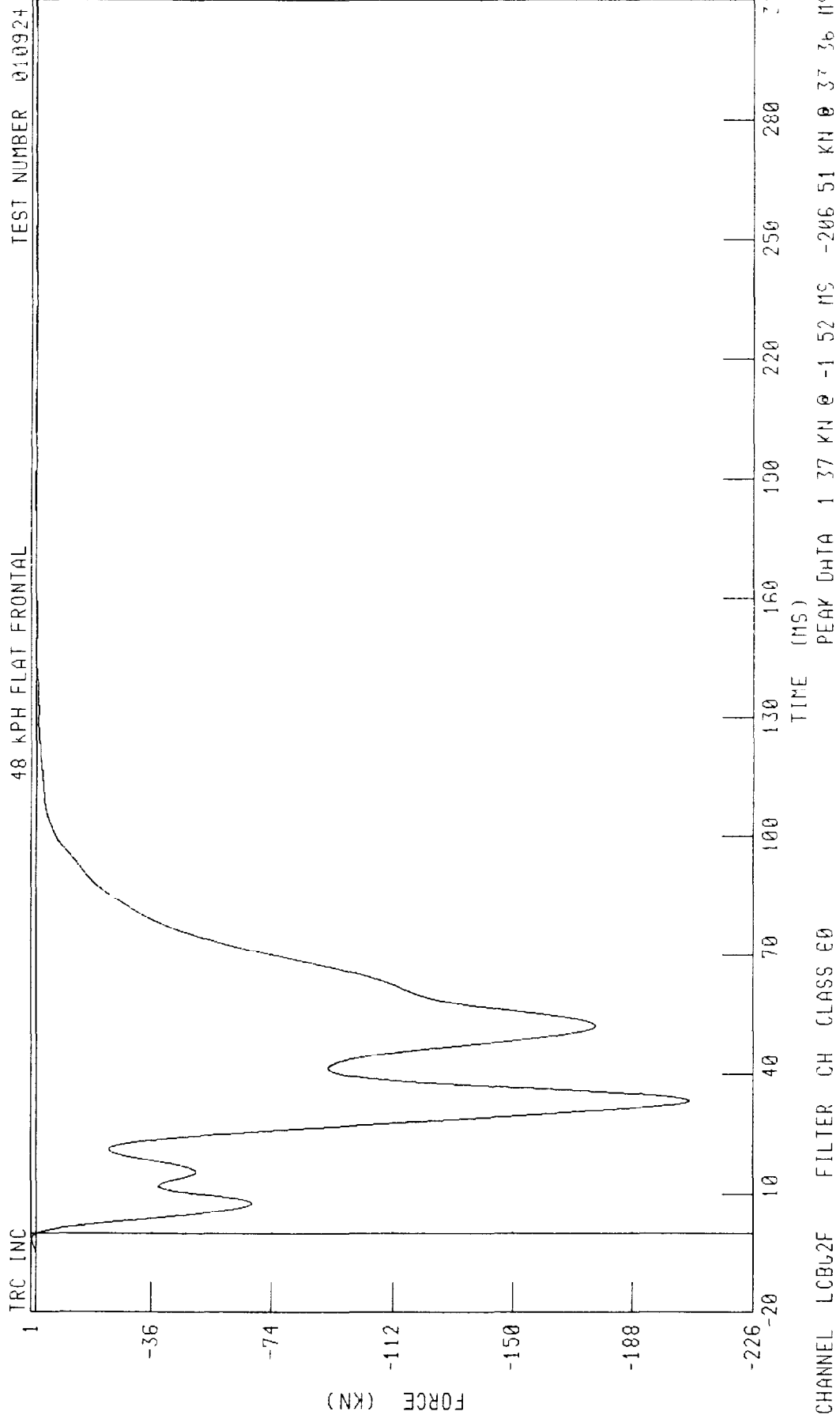
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOWD CELL BARRIER GROUP # 1 FORCE TOTAL

48 KPH FLAT FRONTAL TEST NUMBER 010924

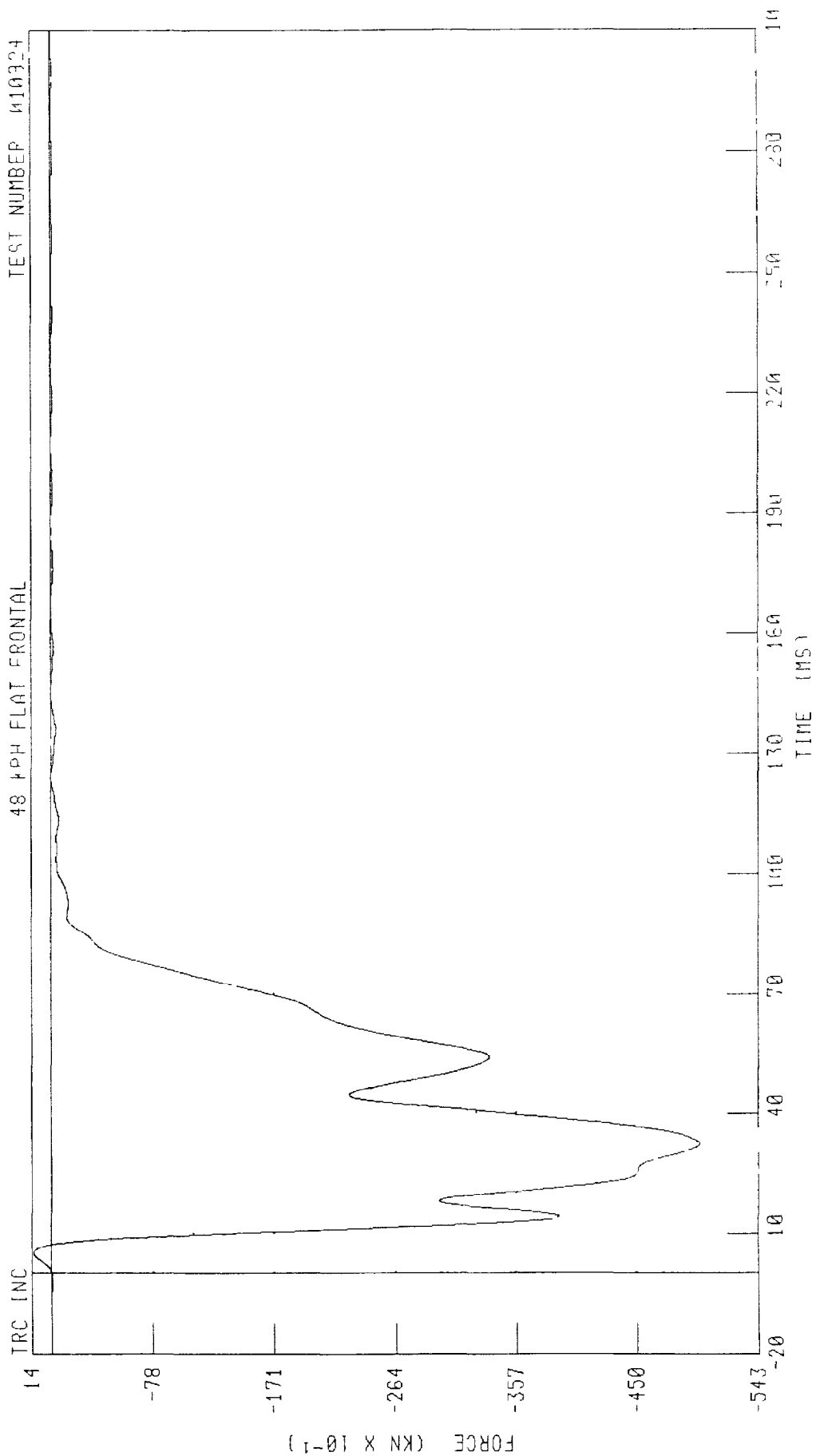


CHANNEL LCBG1F FILTER CH CLASS 60 PEAK [HTH] 13 KN @ 72 MS -109 -9 KPH @ 31 25 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOAD CELL BARRIER GROUP # 2 FORCE TOTAL



2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
 LOAD CELL BARRIER GROUP # 3 FORCE TOTAL



CHANNEL LCBG3F FILTER CH CLASS 60

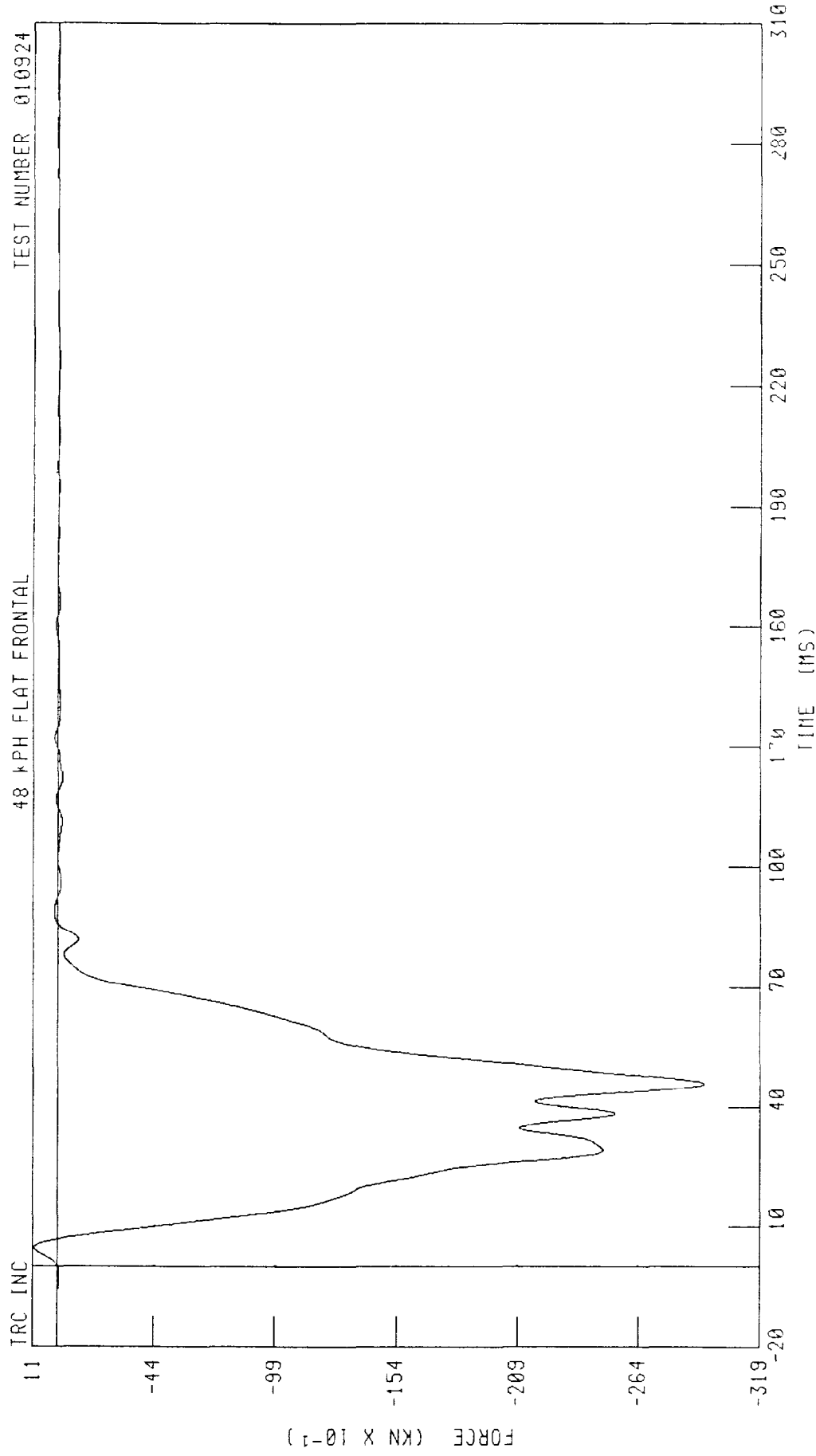
PEAK DATA 1 35 KN @ 46 MS -13 23 KN @ 22 -4 MS

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

LOAD CELL BARRIER GROUP # 4 FORCE TOTAL

48 KPH FLAT FRONTAL

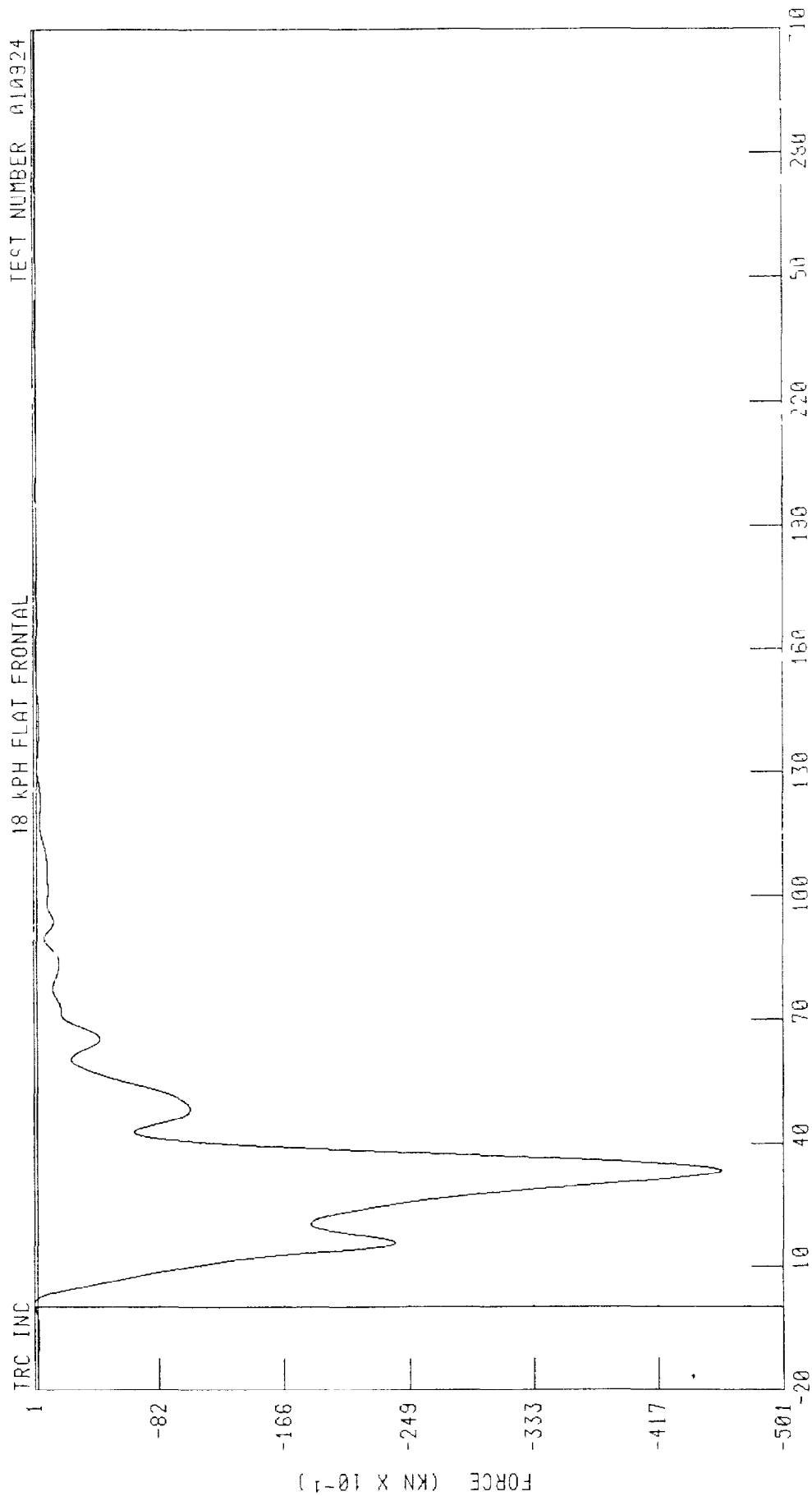
TEST NUMBER 010924



PEAK DATA 1 05 KN @ 4 56 MS -29 40 KN @ 45 94 MS

CHANNEL LCBG4F FILTER CH CLASS 60

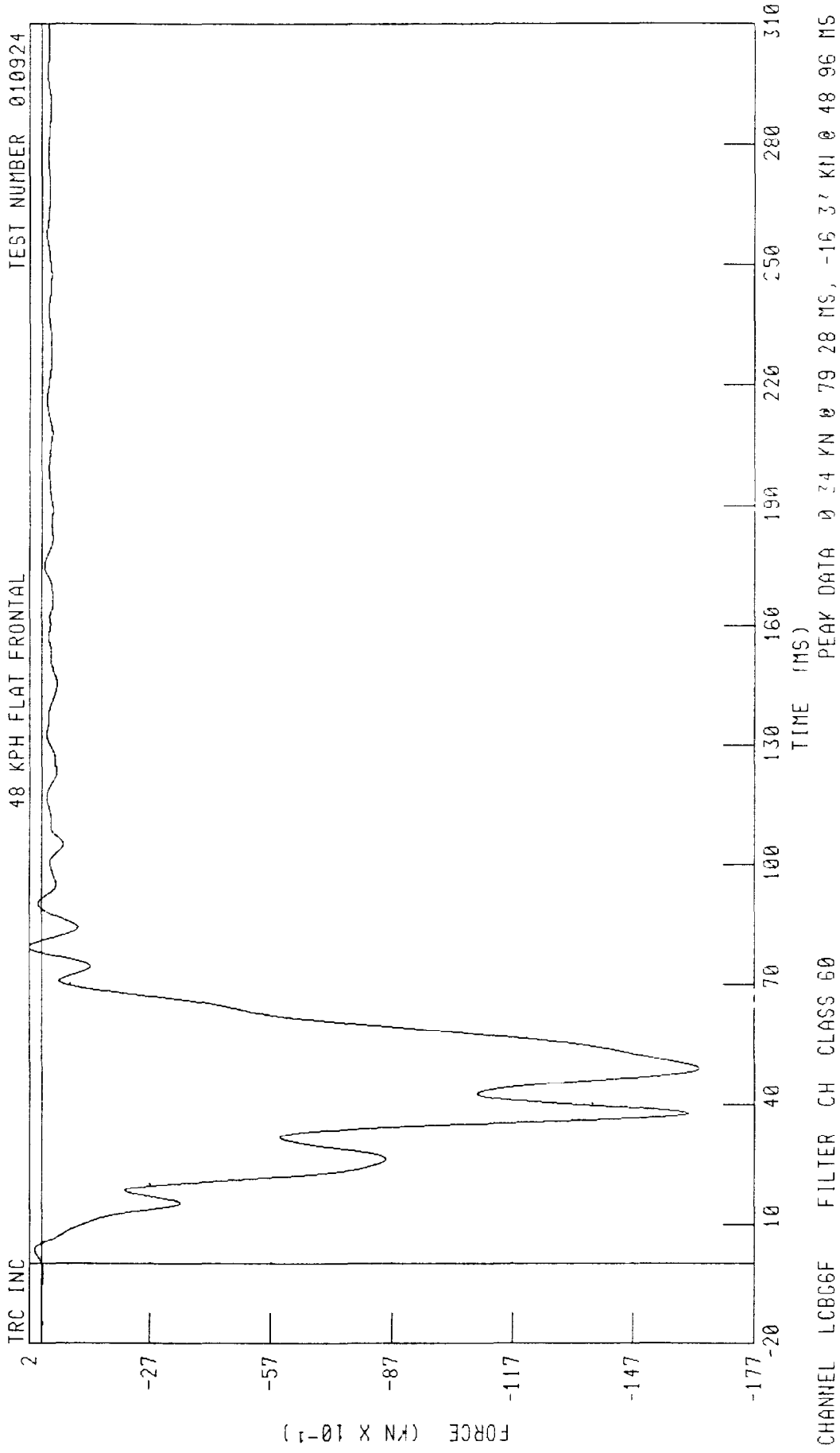
2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 18 KPH
 LOAD CELL BARRIER GROUP # 5 FORCE TOTAL



CHANNEL LCBC5F FILTER CH CLASS 6H

PEAK DATA 6 22 KN @ 0 72 MS, -46 06 KN @ 23 36 H

2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH
LOAD CELL BARRIER GROUP # 6 FORCE TOTAL

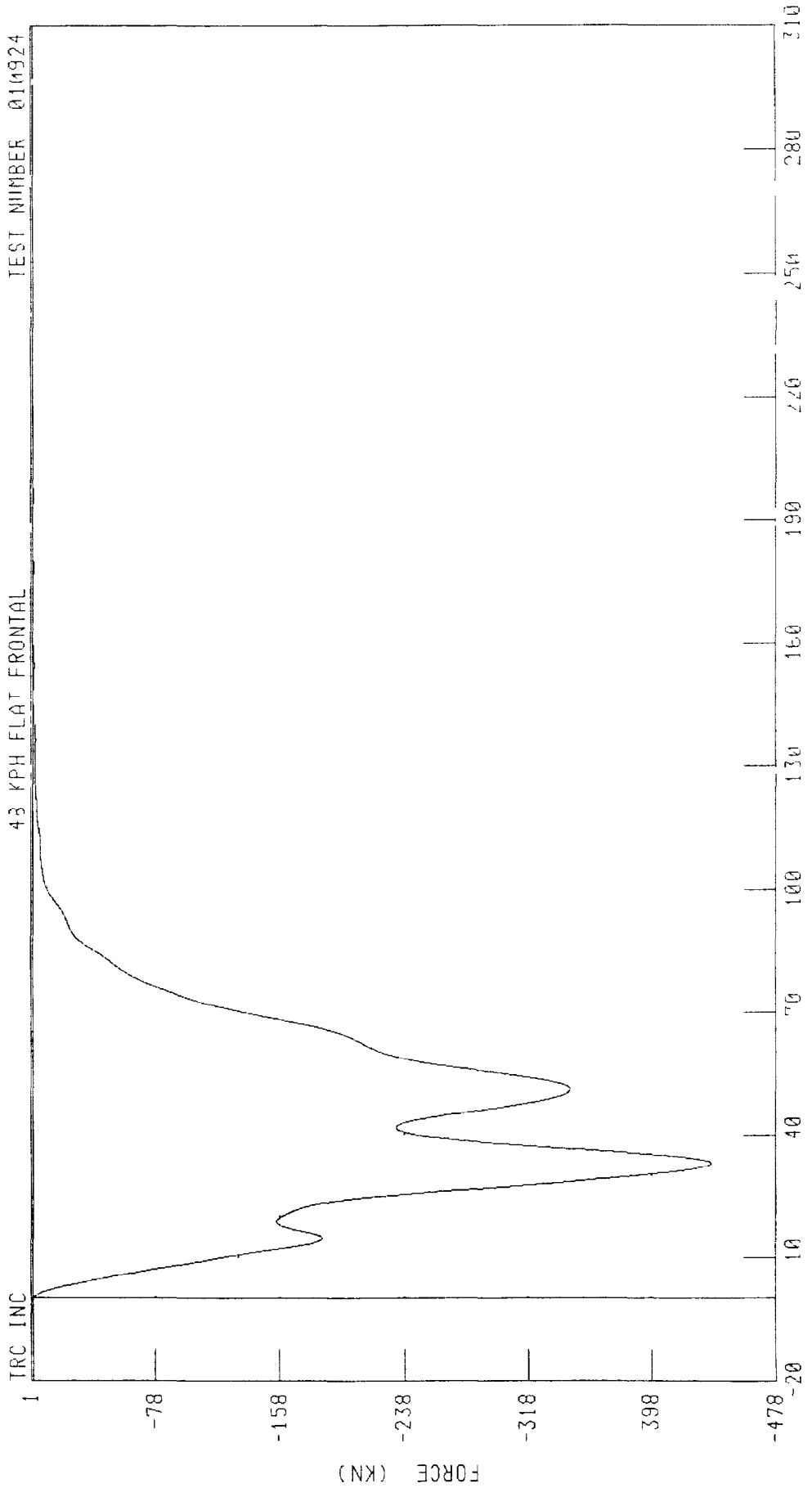


2001 TOYOTA ECHO INTO FLAT FRONTAL BARRIER AT 48 KPH

TOTAL LOAD CELL BARRIER FORCE

43 KPH FLAT FRONTAL

TEST NUMBER 010924



CHANNEL LCBGT FILTER LH CLASS 60

PEAK DATA 1 12 KN @ -1 44 MS -43/ 10 KN @ 73 04 MS

Appendix C

Dummy Configuration and Performance Verification Data

Pre-Test Dummy Configuration and Performance Verification Data

Driver Dummy S/N: 206

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS

206

09-21-01

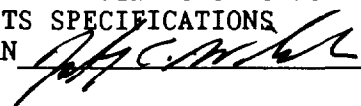
TRC INC. TEST NO: 206C03ED1 572E SN206 EXT.DIMENSION CAL03

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970 -1001 MM	993. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	853. MM
CHEST DEPTH (O)		213 - 229 MM	224. MM
H-POINT HEIGHT (C)		84 - 89 MM	86. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	137. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	886. MM
THIGH CLEARANCE (F)		140 - 155 MM	147. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	599. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	475. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	445. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	490. MM
FOOT LENGTH (P)		252 - 267 MM	254. MM
FOOT BREADTH (W)		91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	84. MM
SHOULDER BREADTH (V)		422 - 437 MM	434. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	516. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	206. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	345. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	297. MM

572E SN206 EXT.DIMENSION CAL03

DUMMY MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092801.1420

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

19-SEP-01

TRC INC.

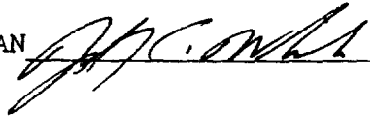
TEST NO: 206C03HD1

572E SN206 HEAD DROP CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	64.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	273.46 G
PEAK LATERAL ACCELERATION	15 G MAX	6.10 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 091901.0812;1

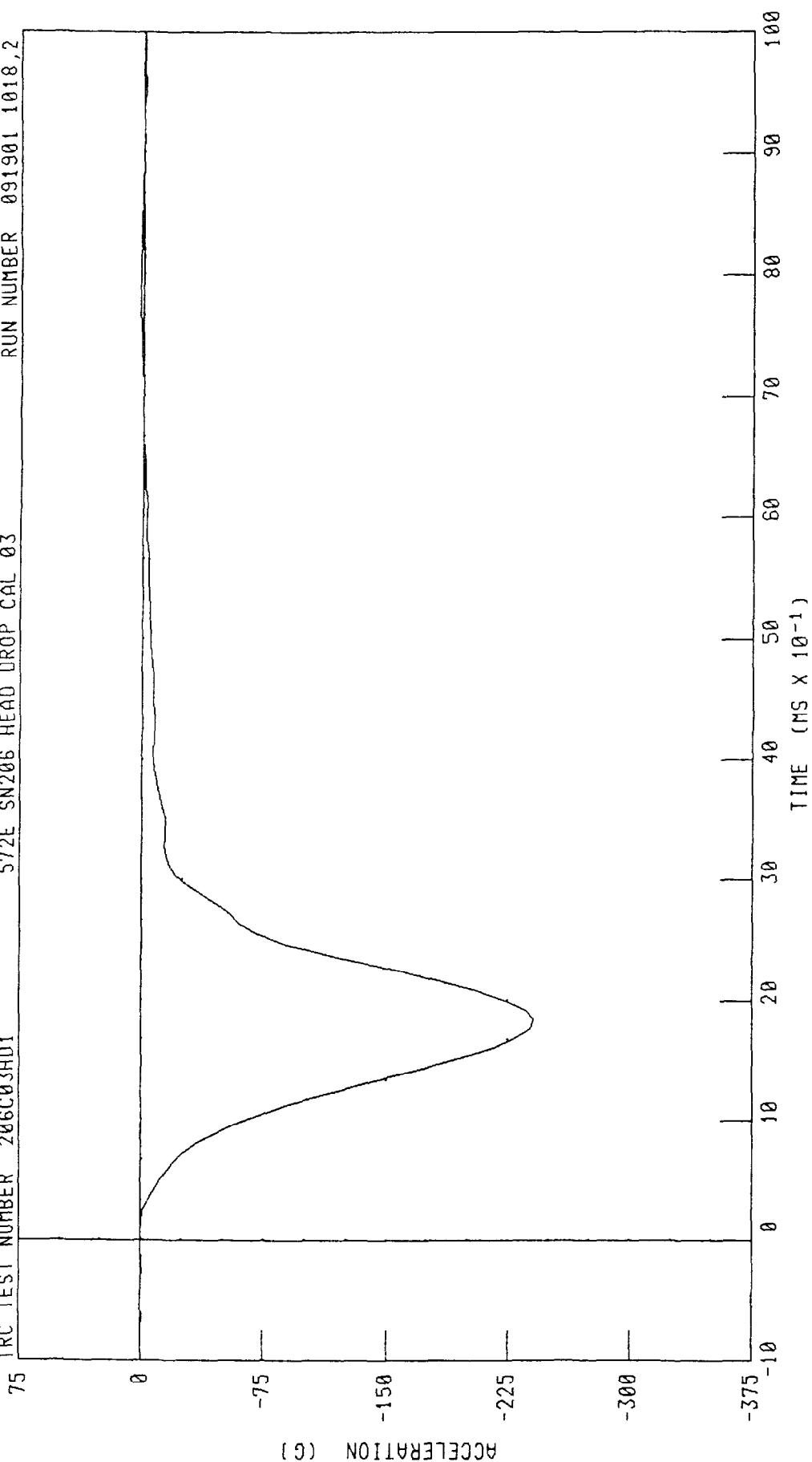
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER 206C03H01

572E SN206 HEAD DROP CAL 03

RUN NUMBER 091901 1018,2



CHANNEL HEDXC FILTER CH CLASS 1000

PEAK DATA 2 20 G 0 7 76 MS, -241 07 G 0 1 84 MS

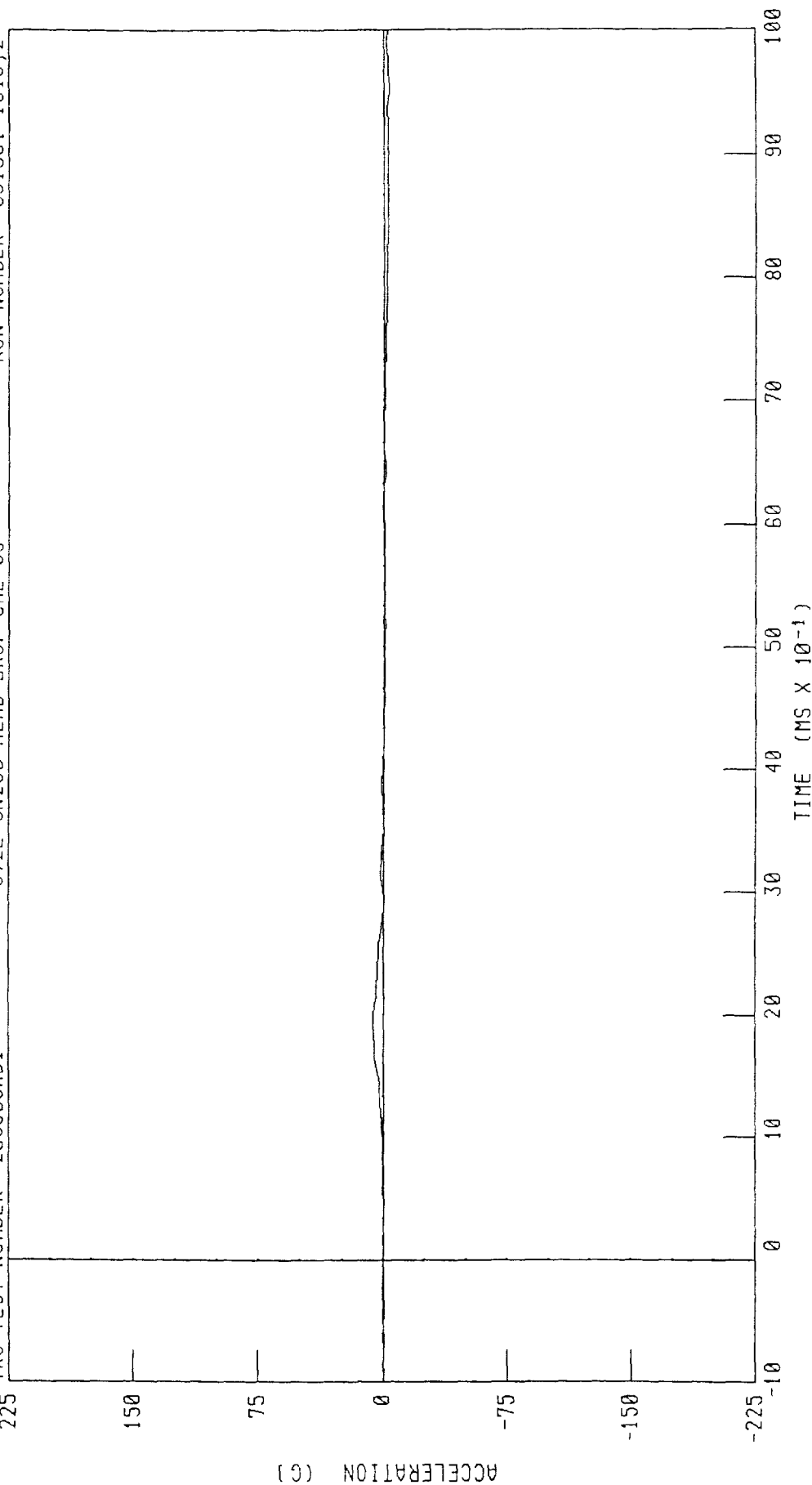
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER 206C03HD1

572E SN206 HEAD DROP CAL 03

RUN NUMBER 091901 1018,2



PEAK DATA 6 11 C 0 1 92 MS, -3 39 C 0 9 52 MS

CHANNEL HEDYC FILTER CH CLASS 1000

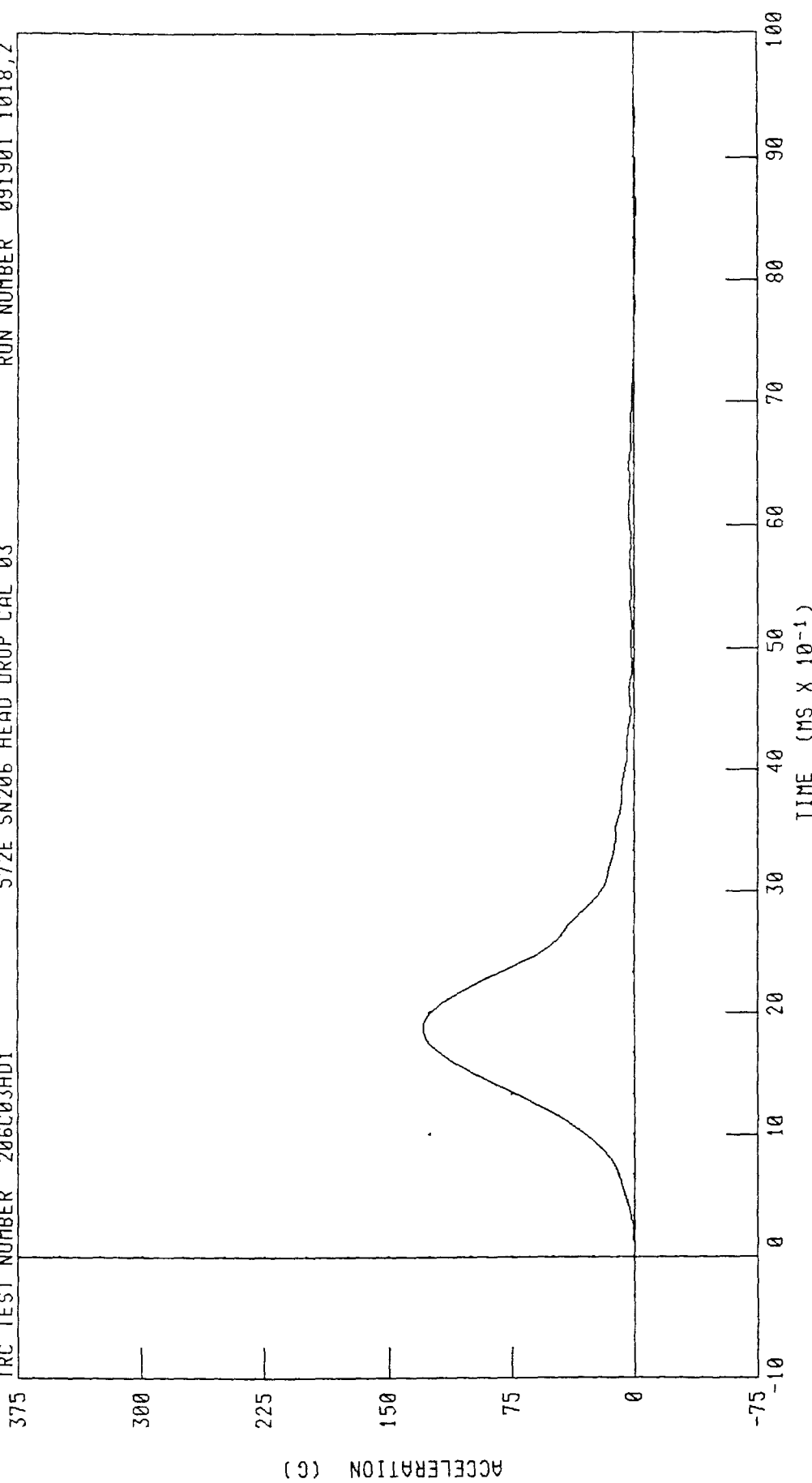
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER 206C03HD1

572E SN206 HEAD DROP CAL 03

RUN NUMBER 091901 1018,2



CHANNEL HEDZC FILTER CH CLASS 1000

PEAK DATA 128 98 G 0 1 84 MS, -1 25 G 0 8 56 MS

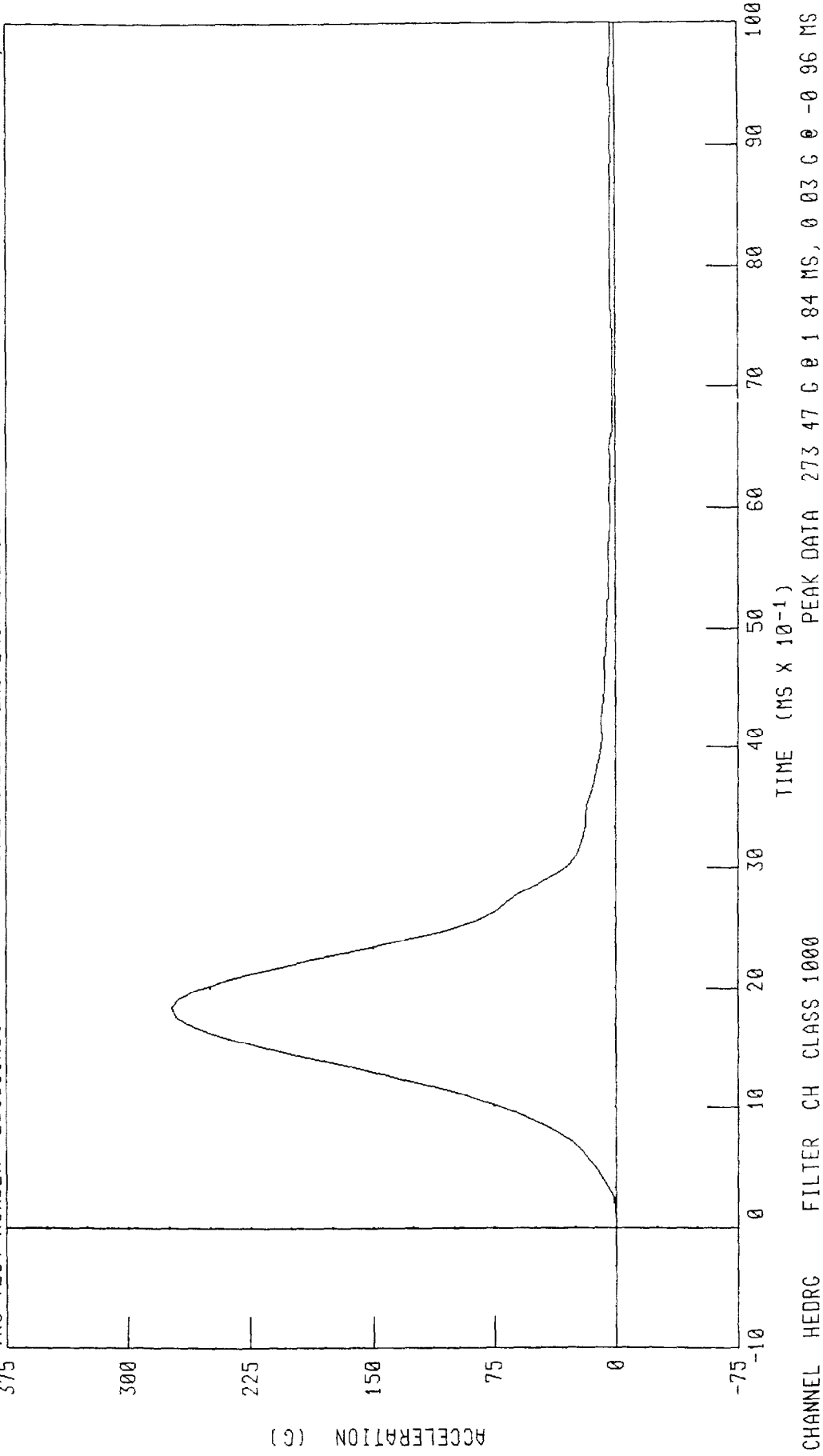
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER 206C03H01

572E SN206 HEAD DROP CAL 03

RUN NUMBER 091901 1018,2



CHANNEL HEDRC FILTER CH CLASS 1000

PEAK DATA 273 47 G @ 1 84 MS, 0 03 G @ -0 96 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

19-SEP-01

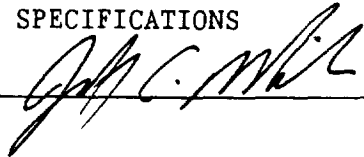
NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 206C03NF1 572E SN206 NECK FLEXION CAL03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	62 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	24.74 G
	20 MS	17.60 - 22.60 G	21.67 G
	30 MS	12.50 - 18.50 G	17.75 G
MAX PENDULUM G		29 G MAX	25.02 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.66 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.72 MS
D PLANE	MAX	64 - 78 DEG.	72.29 DEG.
ROTATION	TIME	57 - 64 MS	62.48 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	98.92 NM
	TIME	47 - 58 MS	52.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	121.68 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.72 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 091901.1436;1

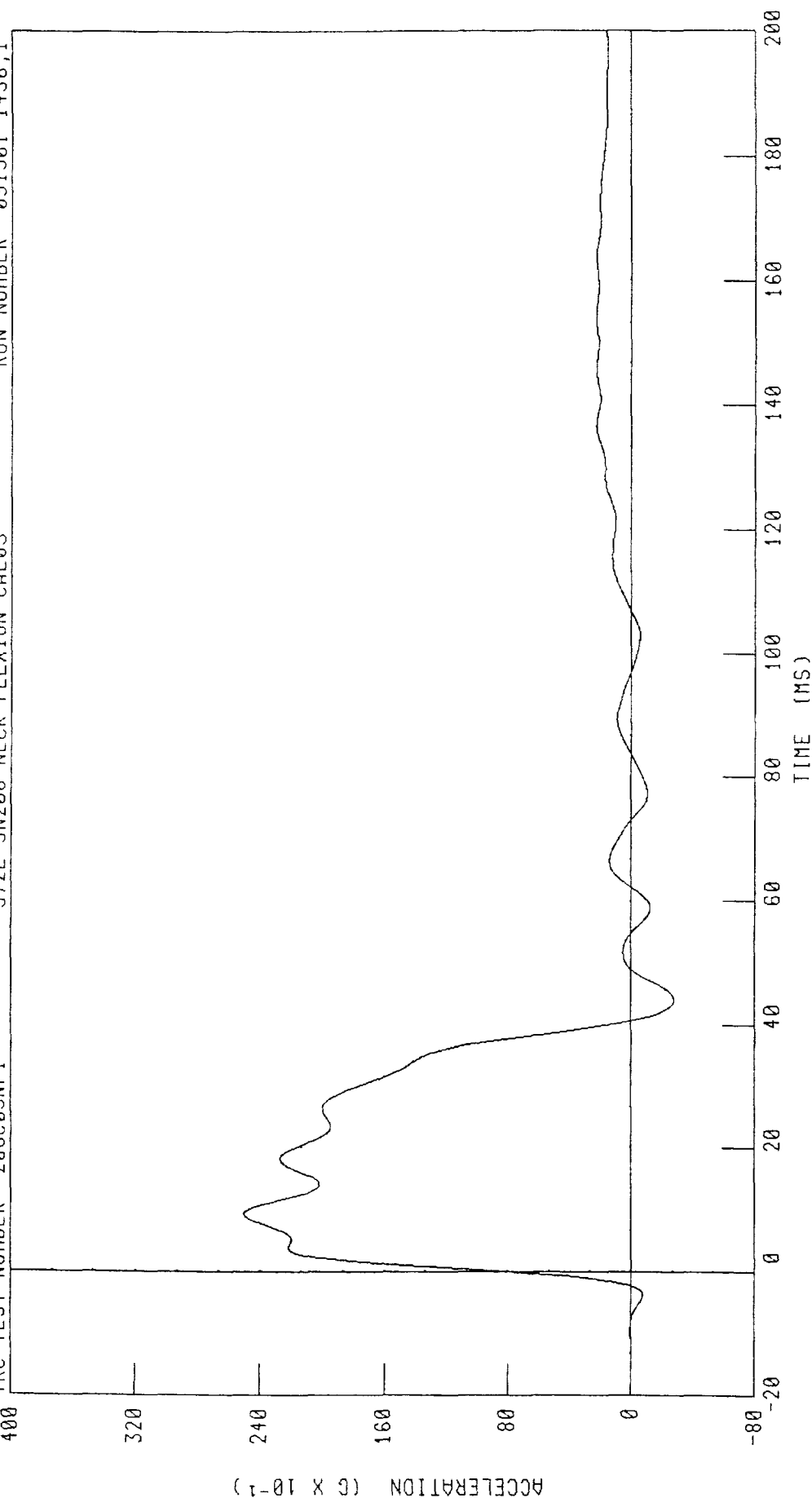
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER 206C03NF1

572E SN206 NECK FLEXION CAL03

RUN NUMBER 091901 1436.1



CHANNEL PENXC FILTER CH CLASS 60

PEAK DATA 25 02 G 9 28 MS, -2 79 G 0 43 92 MS

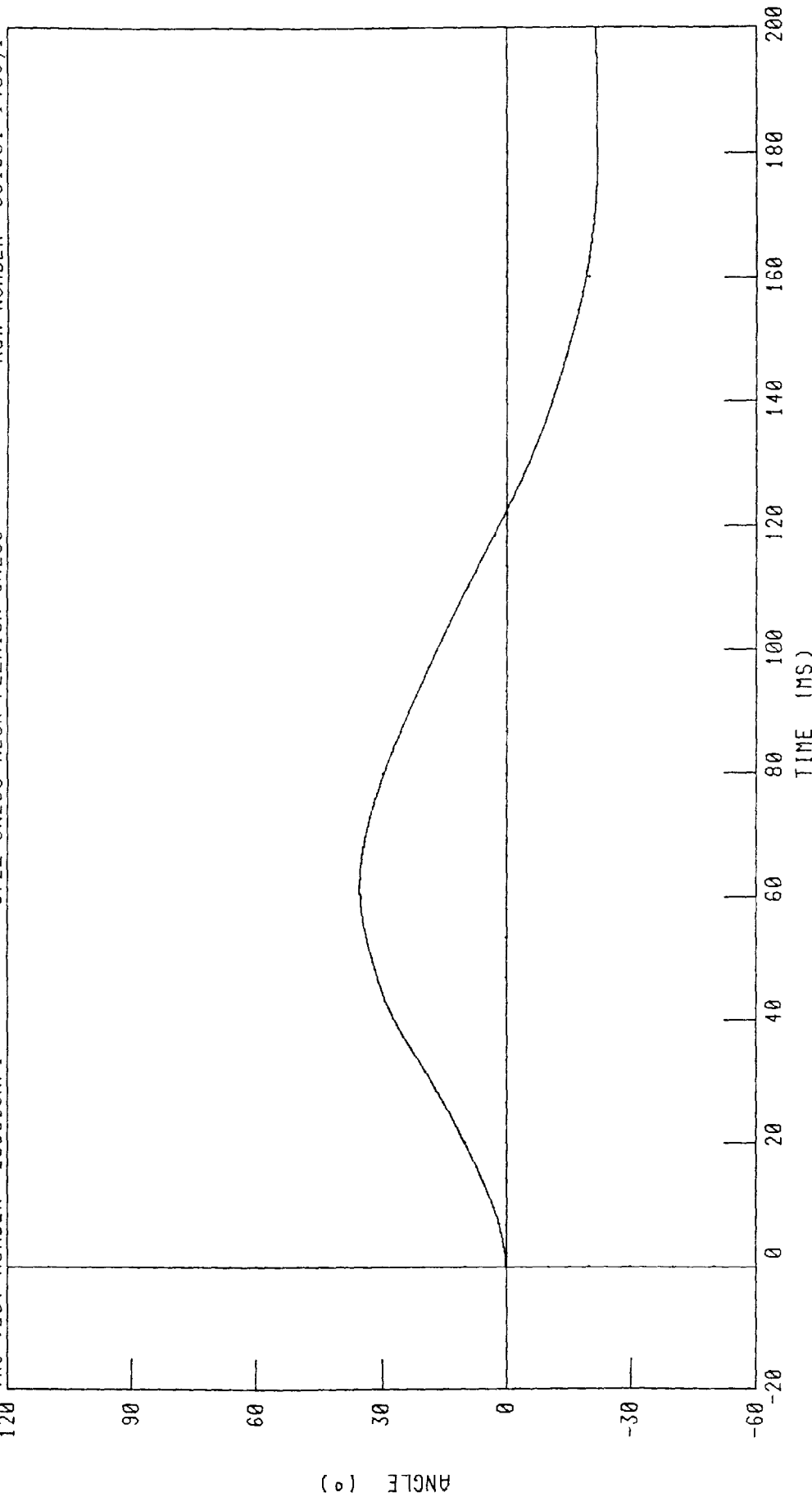
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER 206C03NF1

572E SN206 NECK FLEXION CAL03

RUN NUMBER 091901 1436,1



CHANNEL BETA FILTER CH CLASS 60

PEAK DATA 35 38 ° @ 61 92 MS, -21 96 ° @ 181 20 MS

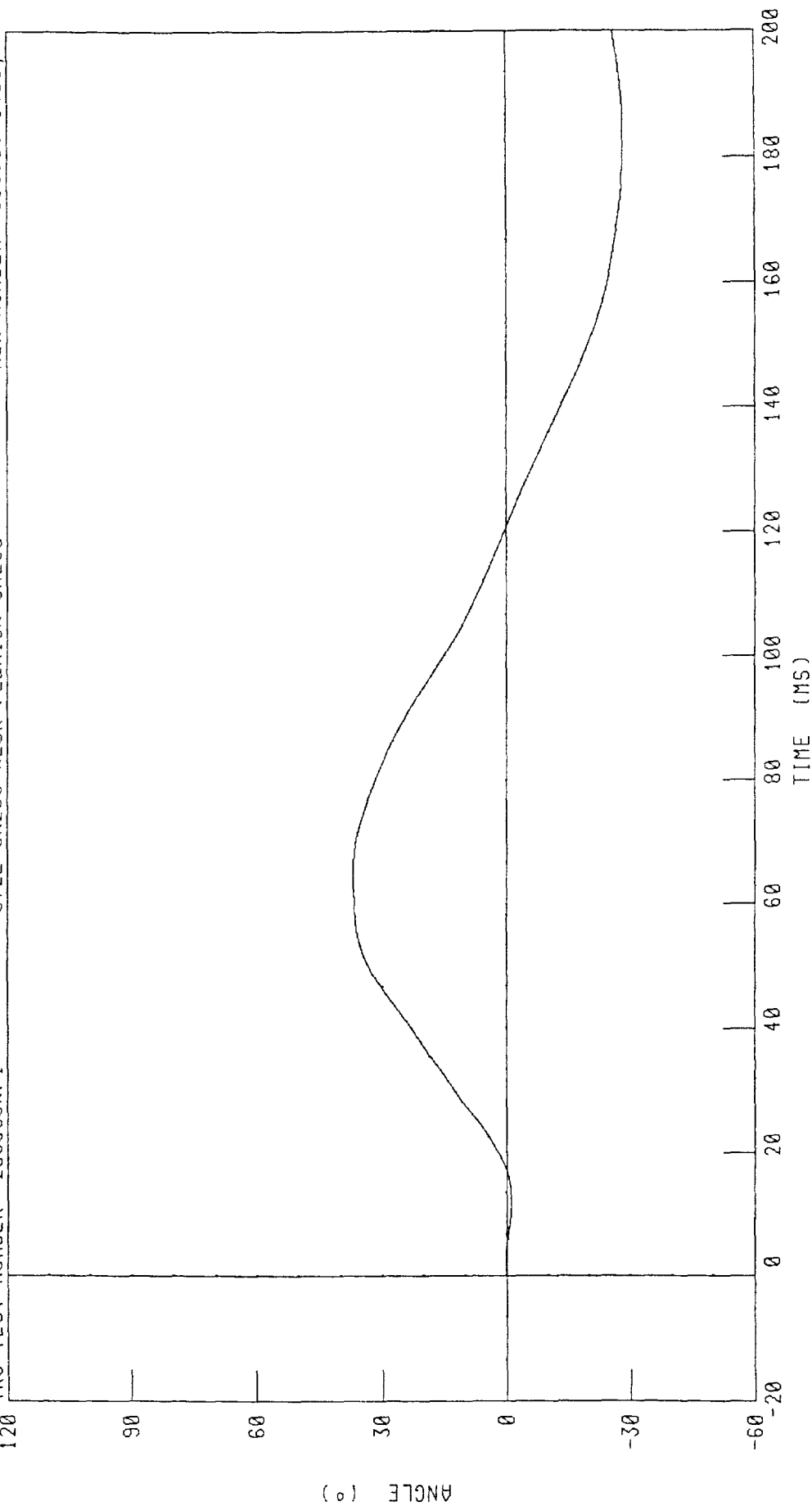
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 206C03NF1

572E SN206 NECK FLEXION CAL03

RUN NUMBER 091901 1436,1



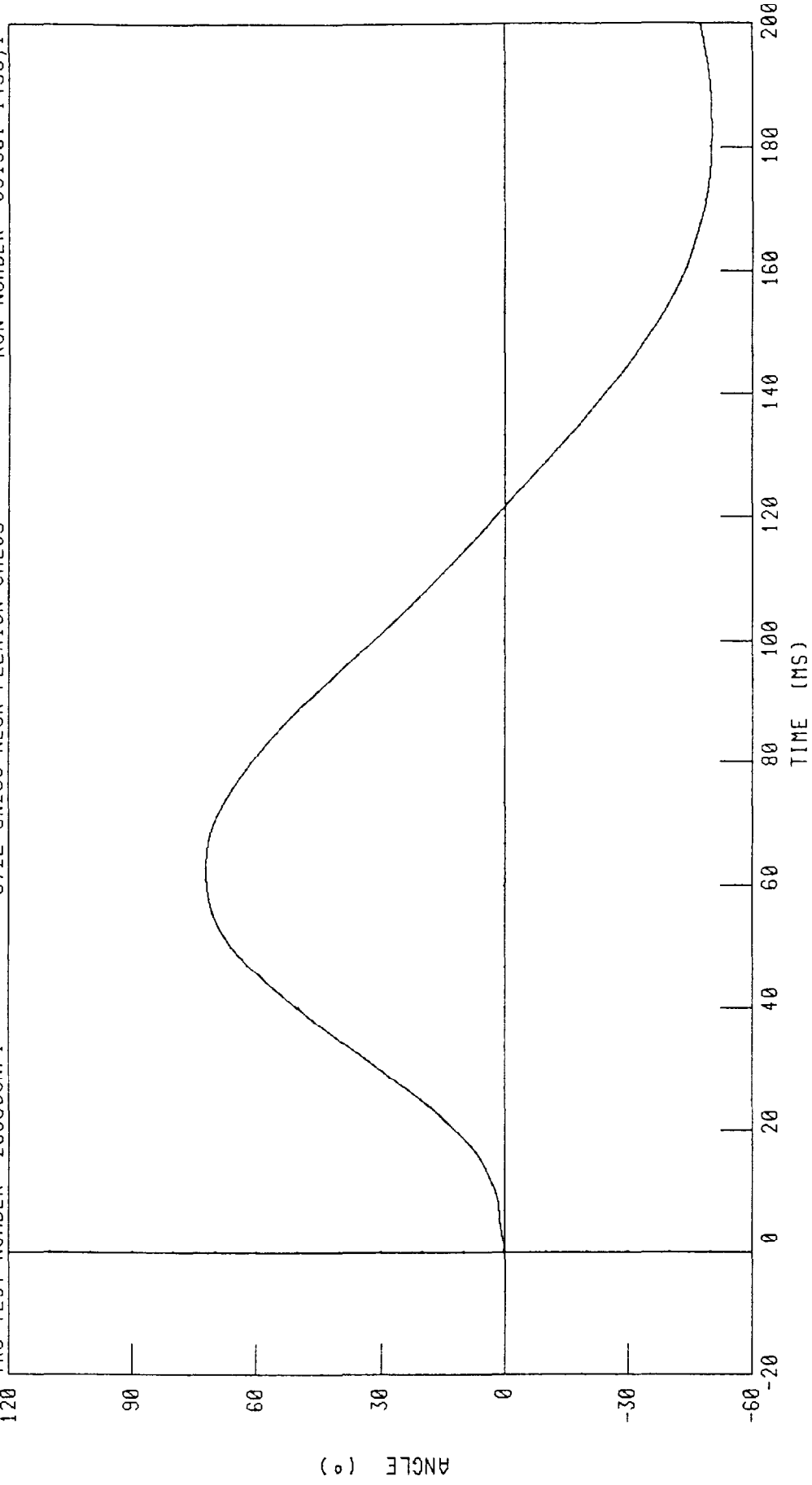
PEAK DATA 36 95 ° @ 64 96 MS, -28 32 ° @ 182 88 MS

CHANNEL THETA FILTER CH CLASS 60

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER 206C03NF1 572E SN206 NECK FLEXION CAL03 RUN NUMBER 091901 1436,1



CHANNEL TOTAL FILTER CH CLASS 60 PEAK DATA 72 29 ° 0 62 48 MS, -50 27 ° 0 182 64 MS

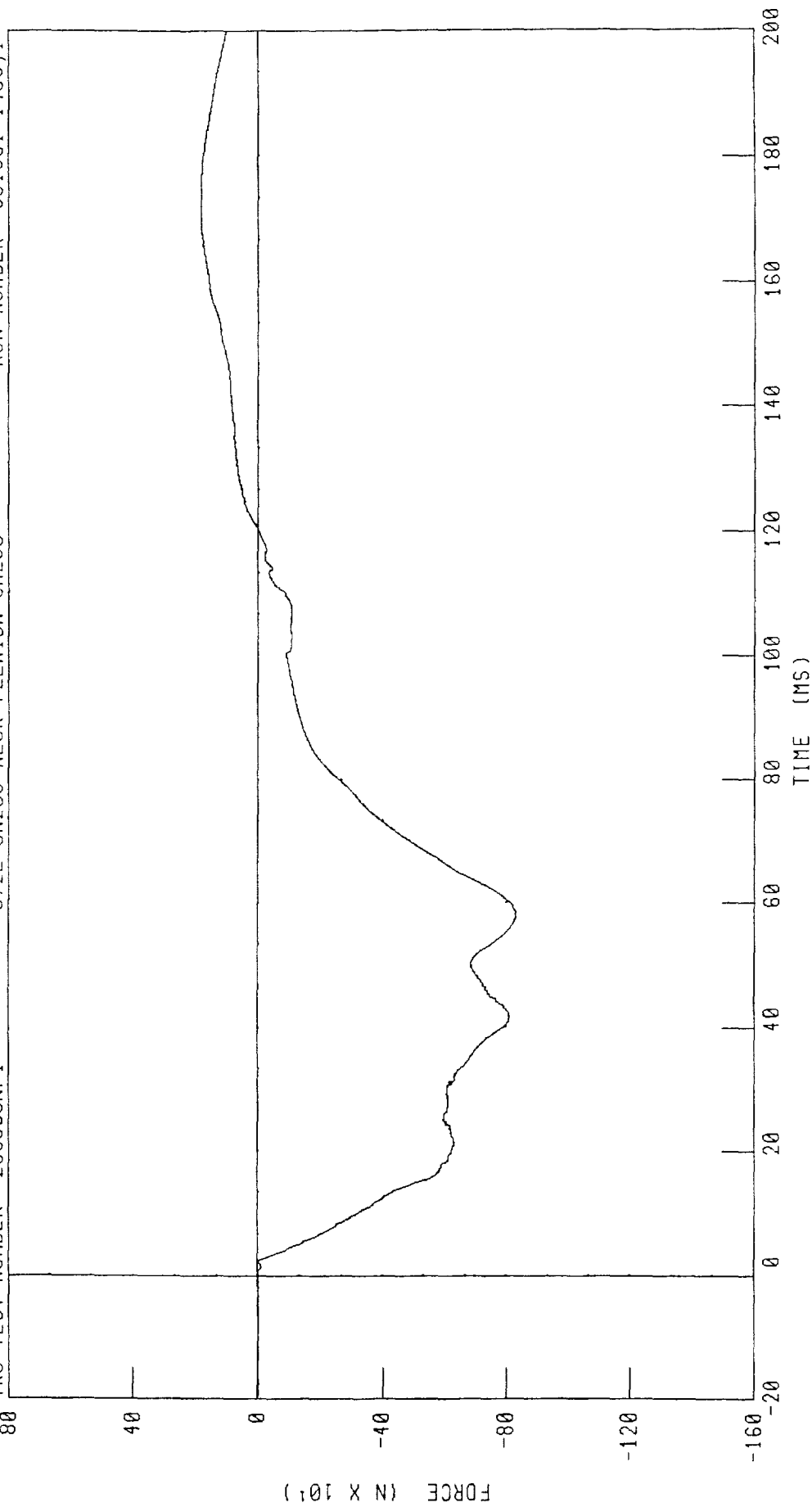
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER 206C03NF1

572E SN206 NECK FLEXION CAL03

RUN NUMBER 091901 1436,1



CHANNEL NEKXF FILTER CH CLASS 1000

PEAK DATA 185 69 N @ 169 76 MS, -833 54 N @ 58 56 MS

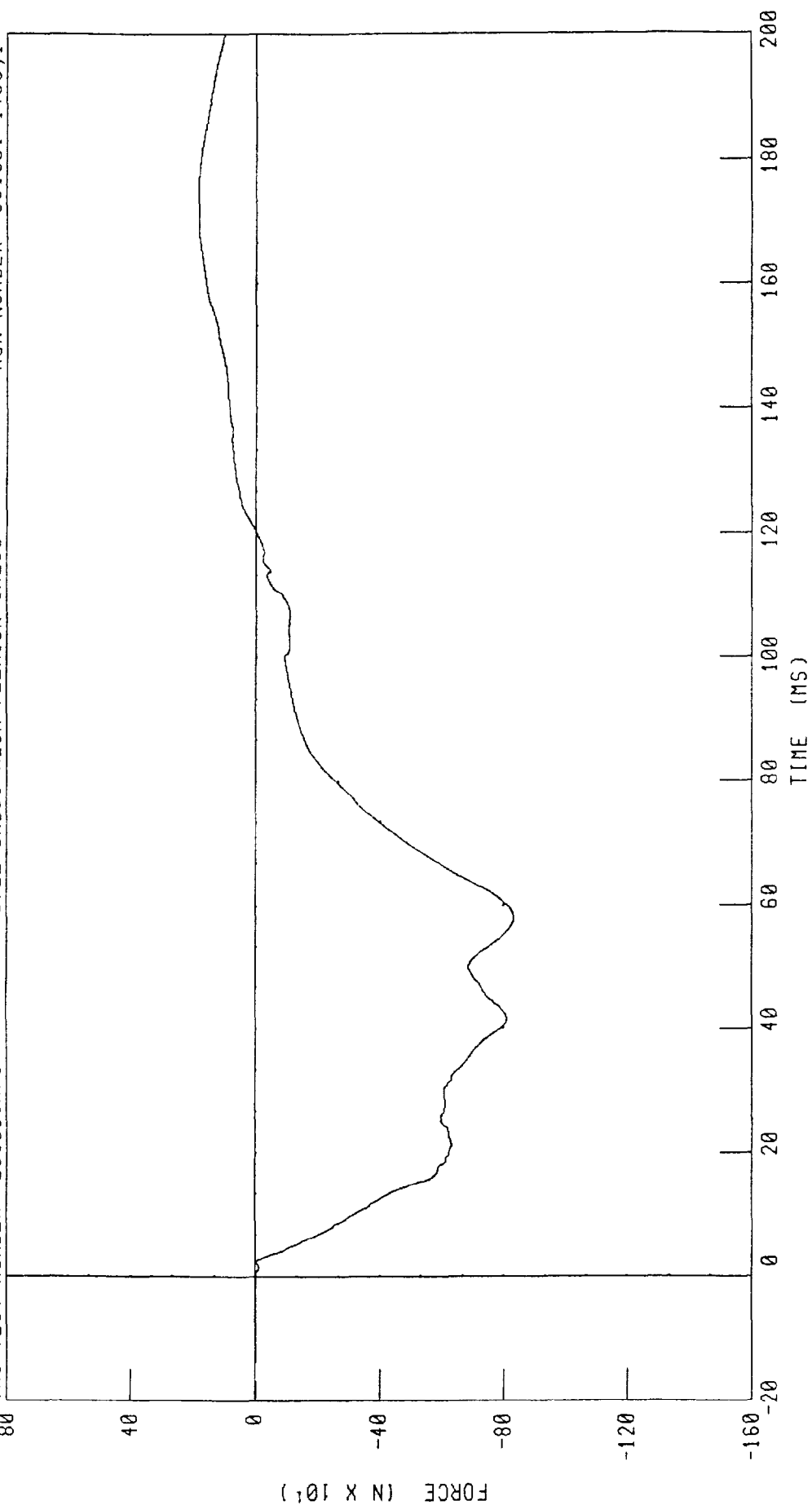
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER 206C03NF1

572E SN206 NECK FLEXION CAL03

RUN NUMBER 091901 1436,1



CHANNEL NEKXFC FILTER CH CLASS 600

PEAK DATA 185 55 N @ 170 48 MS, -833 02 N @ 58 48 MS

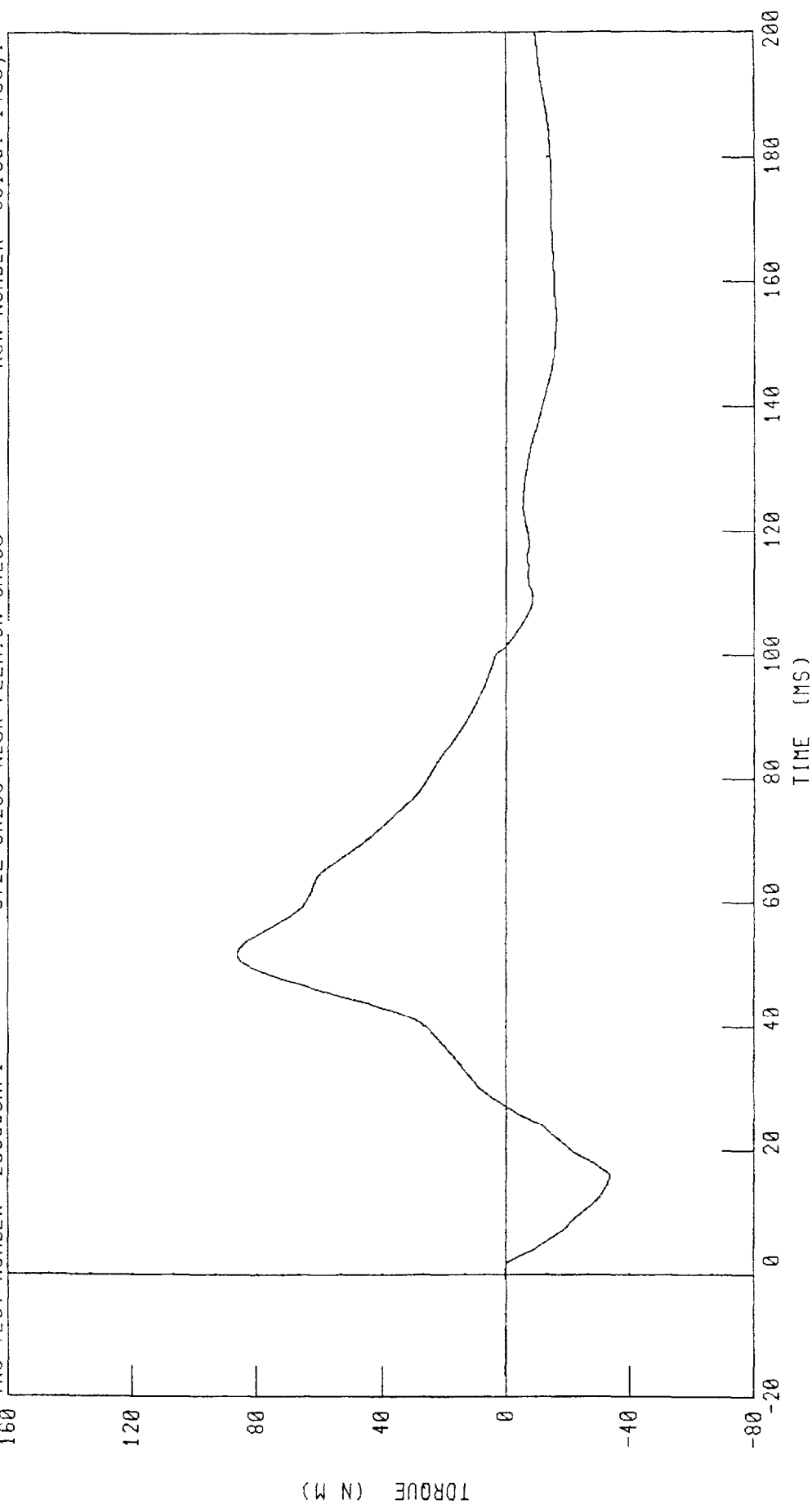
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER 206C03NF1

572E SN206 NECK FLEXION CAL03

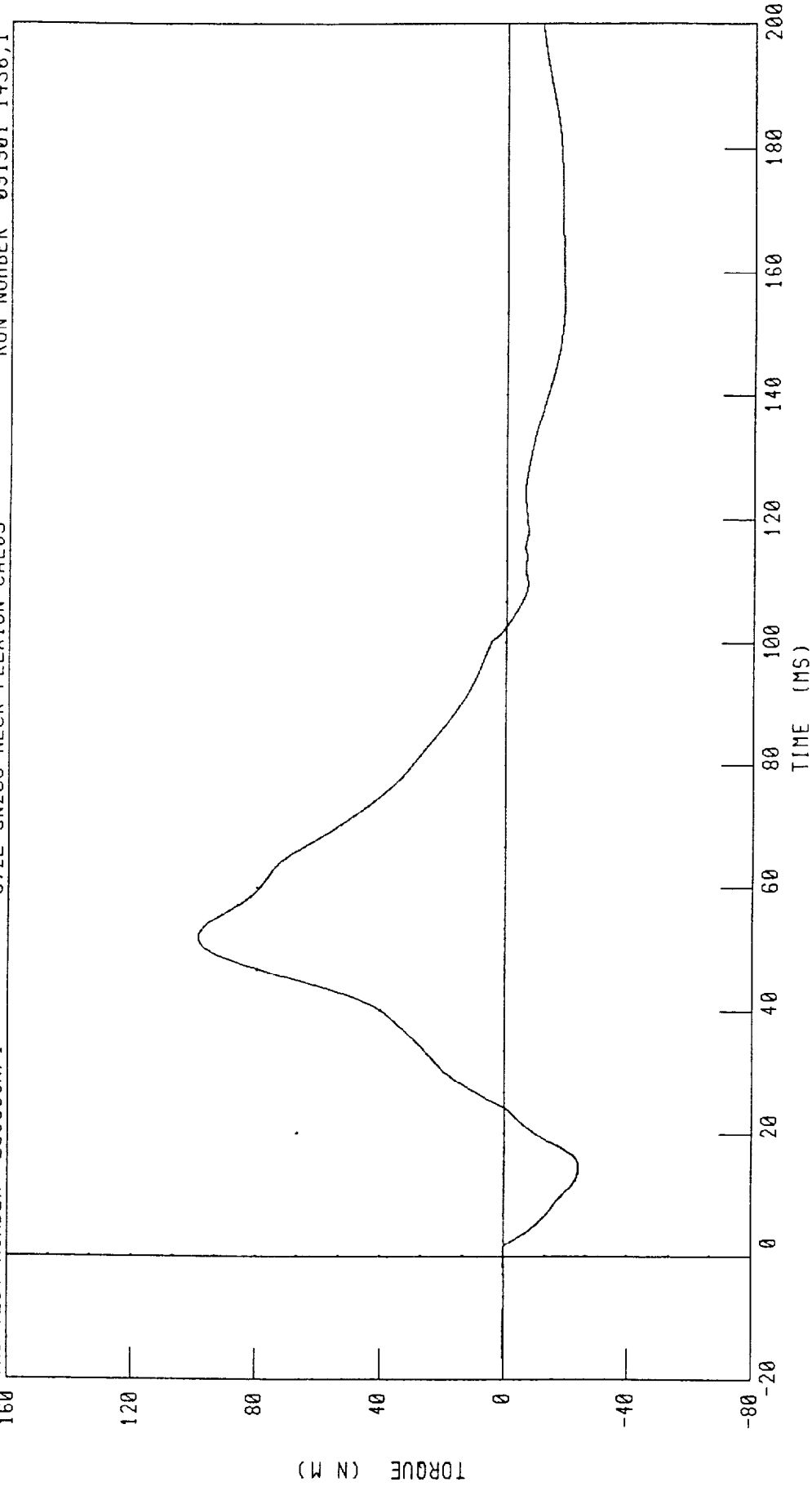
RUN NUMBER 091901 1436,1



CHANNEL NEKYM FILTER CH CLASS 600 PEAK DATA 86 28 N M @ 51 84 MS, -33 71 N M @ 15 60 MS

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

TRC TEST NUMBER 206C03NF1 572E SN206 NECK FLEXION CAL03 RUN NUMBER 091901 1436,1



CHANNEL NEKOM FILTER CH CLASS 600 PEAK DATA 98 92 N M @ 52 00 MS, -24 25 N M @ 14 56 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

20-SEP-01

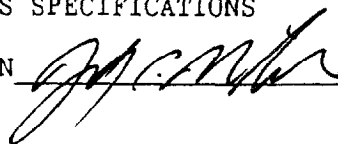
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 206C03NE4 572E SN206 NECK EXT CAL03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	60.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	20.17 G
	20 MS	14.00 - 19.00 G	18.62 G
	30 MS	11.00 - 16.00 G	14.68 G
MAX PENDULUM G		22 G MAX	20.63 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.62 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	39.68 MS
D PLANE	MAX	81 - 106 DEG.	99.33 DEG.
ROTATION	TIME	72 - 82 MS	75.84 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-77.97 NM
	TIME	65 - 79 MS	71.04 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.40 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	143.60 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092001.2003;1

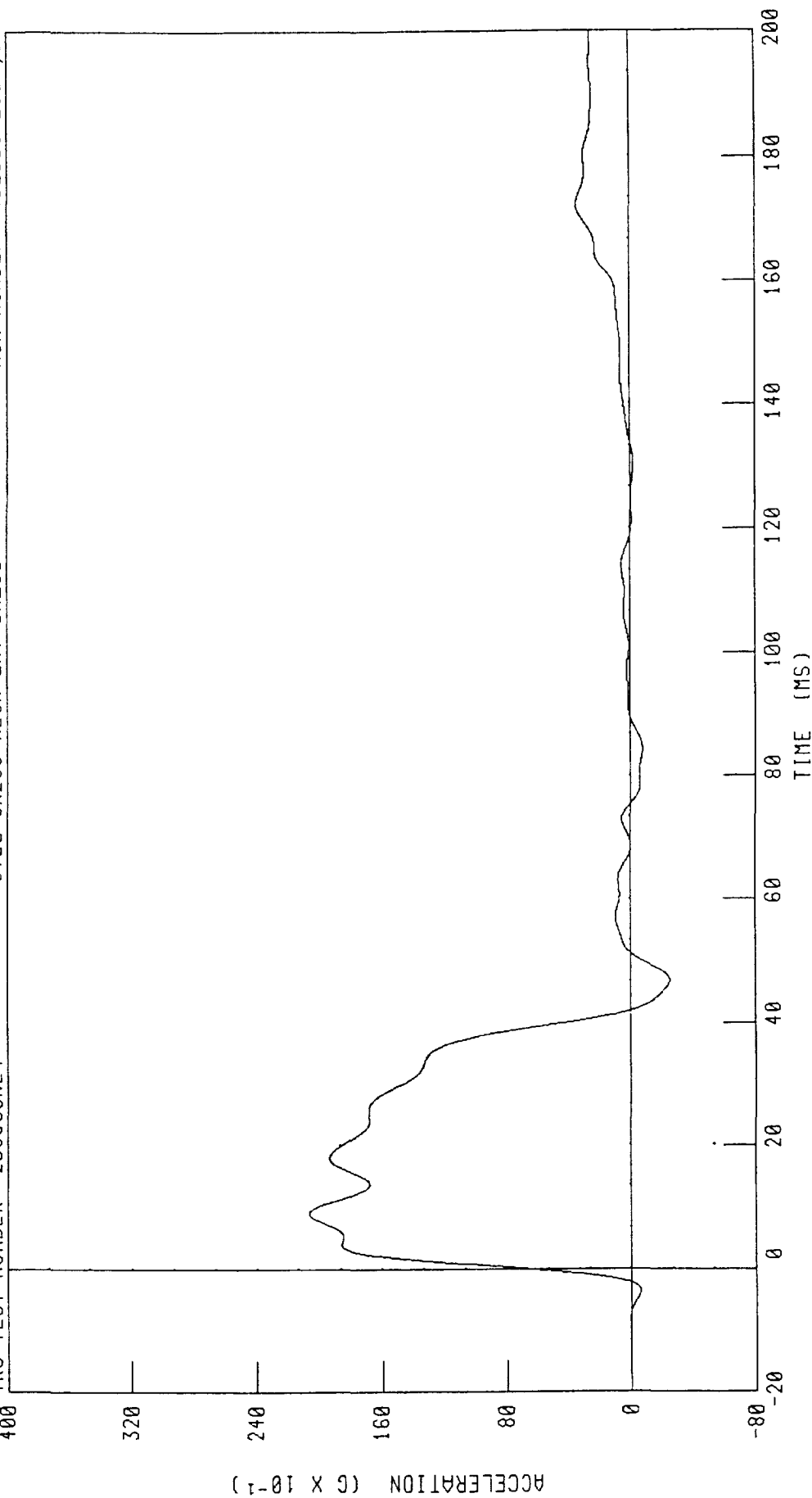
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER 206C03NE4

572E SN206 NECK EXT CAL03

RUN NUMBER 092001 2004,1



CHANNEL PENXC FILTER CH CLASS 60

PEAK DATA 20 64 G 0 8 96 MS, -2 50 G 0 46 88 MS

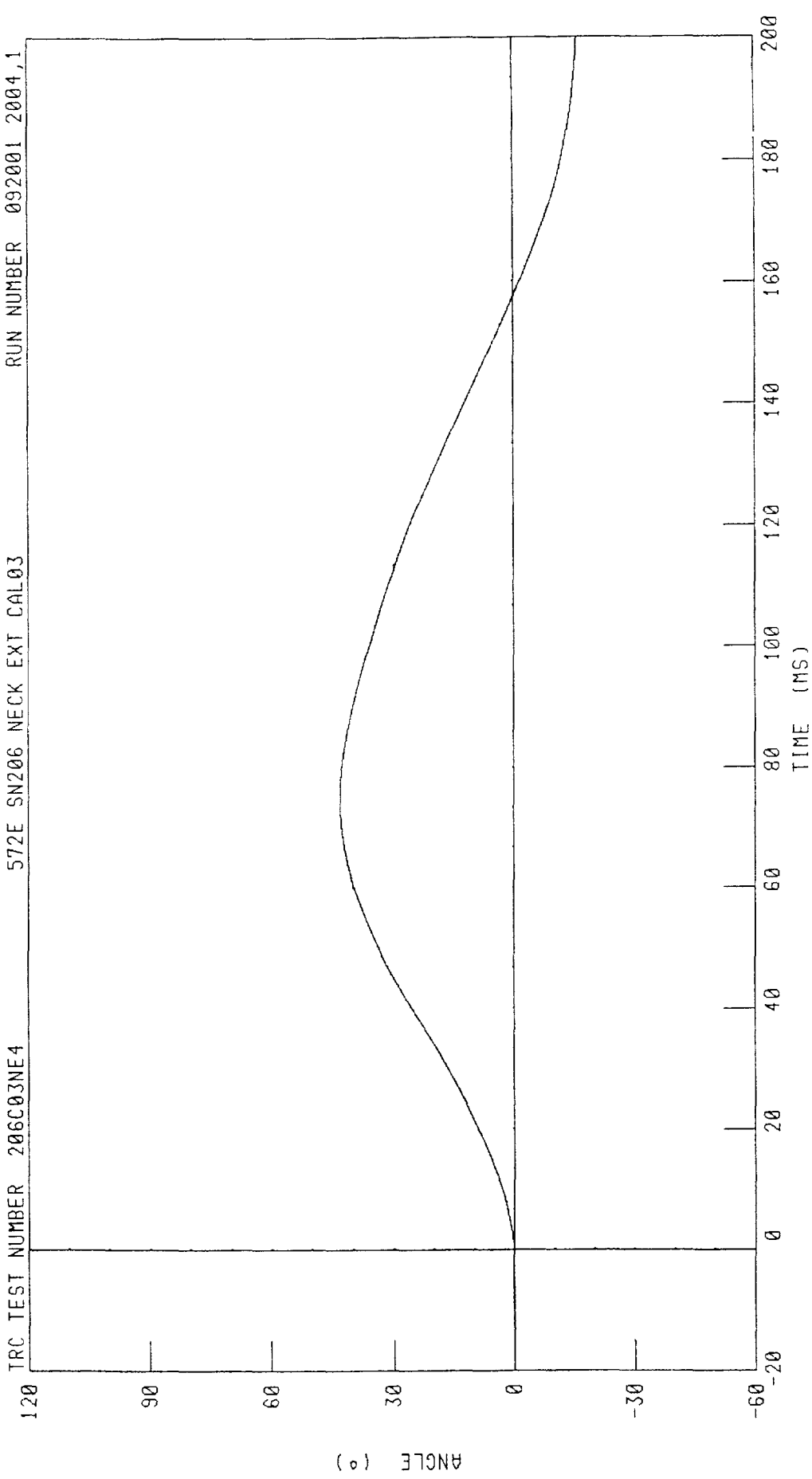
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER 206C03NE4

572E SN206 NECK EXT CAL03

RUN NUMBER 092001 2004,1



CHANNEL BETA FILTER CH CLASS 60 PEAK DATA 43 15 ° 0 75 12 MS, -16 22 ° 0 200 00 MS

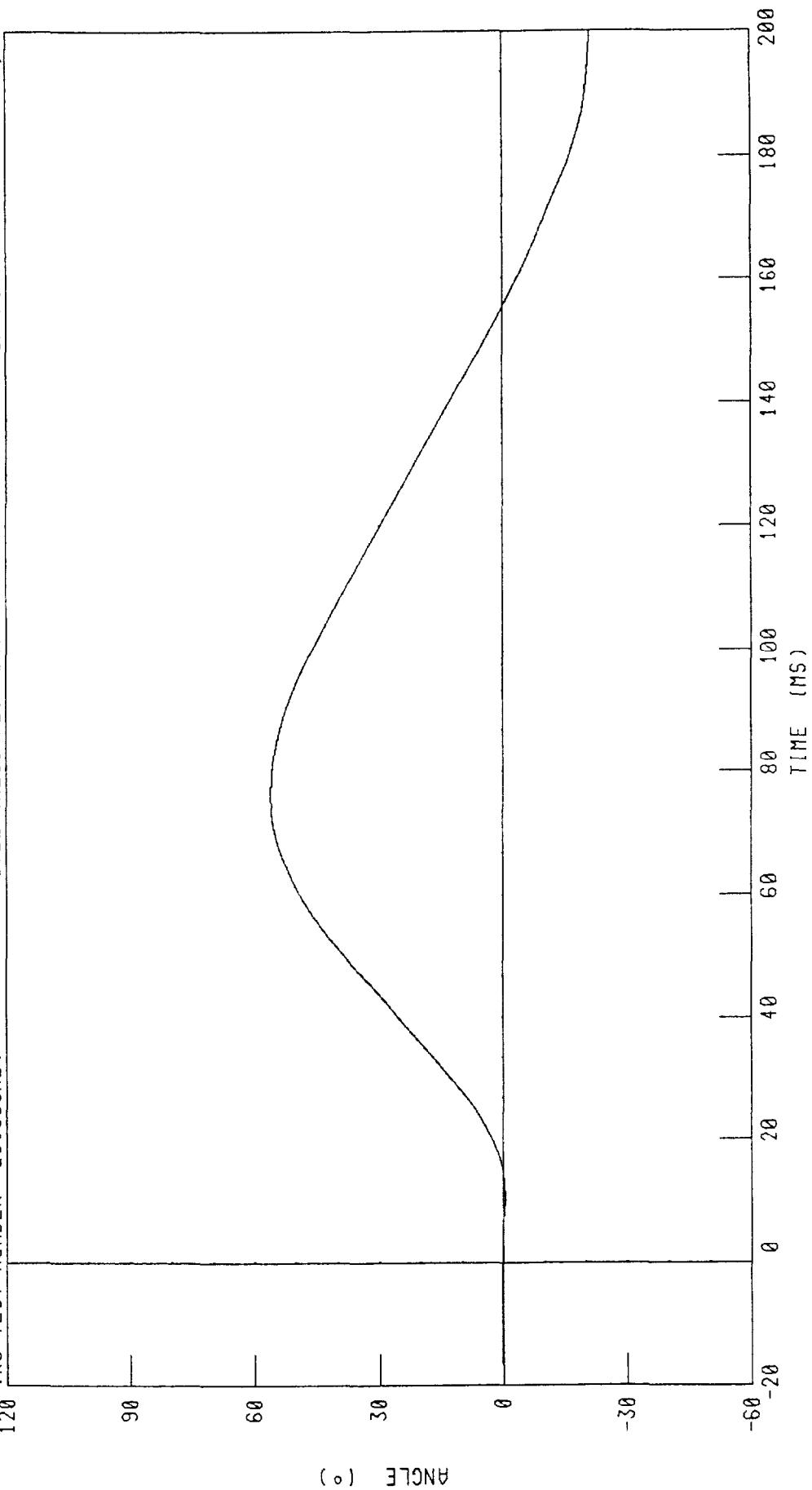
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 206C03NE4

572E SN206 NECK EXT CAL03

RUN NUMBER 092001 2004,1



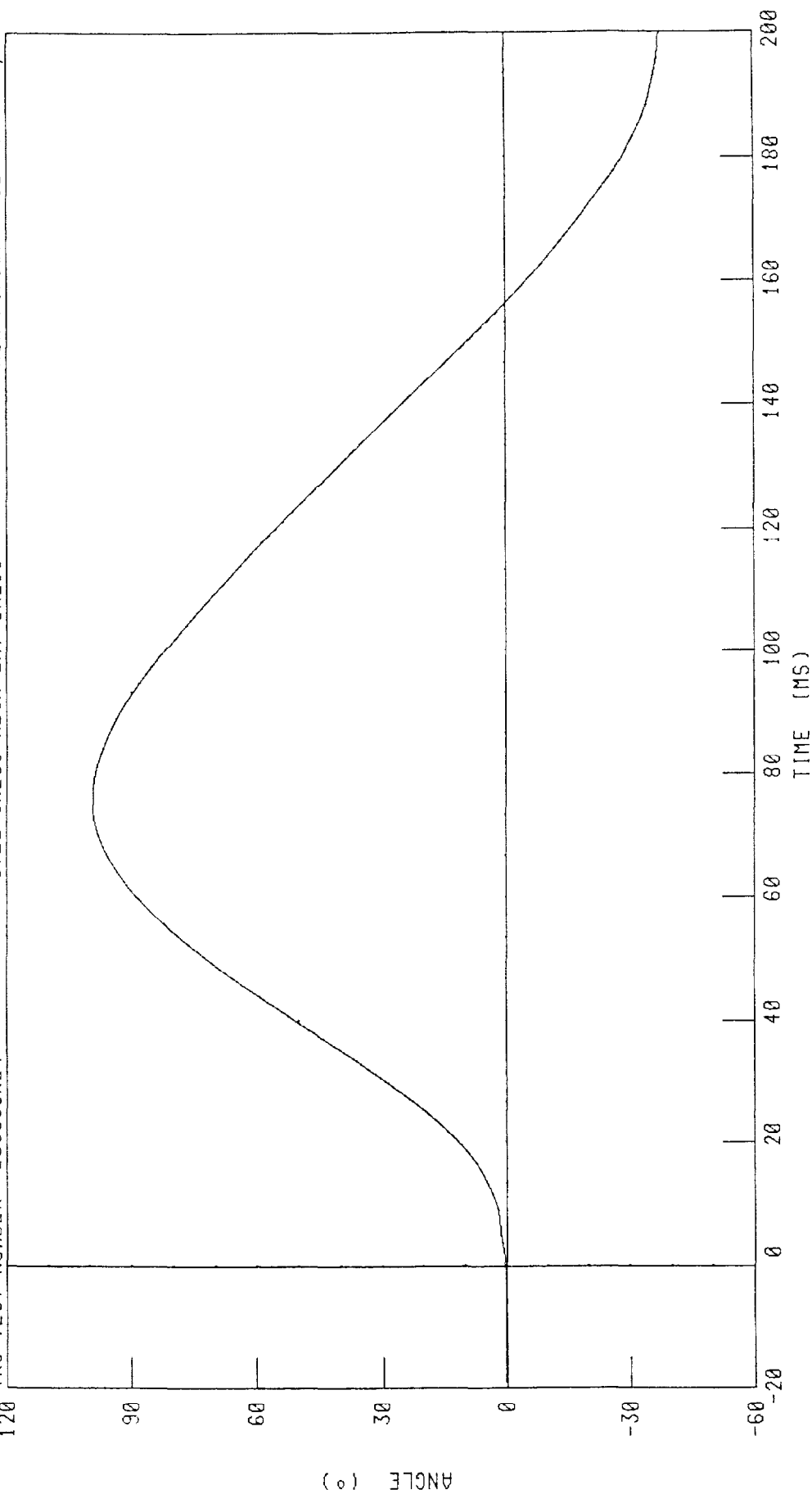
CHANNEL THETA FILTER CH CLASS 60

PEAK DATA 56 20 ° @ 76 48 MS, -21 35 ° @ 200 00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER 206C03NE4 572E SN206 NECK EXT CAL03 RUN NUMBER 092001 2004,1



CHANNEL TOTAL FILTER CH CLASS 60 PEAK DATA 99 34 ° 0 75 84 MS, -37 57 ° 0 200 00 MS

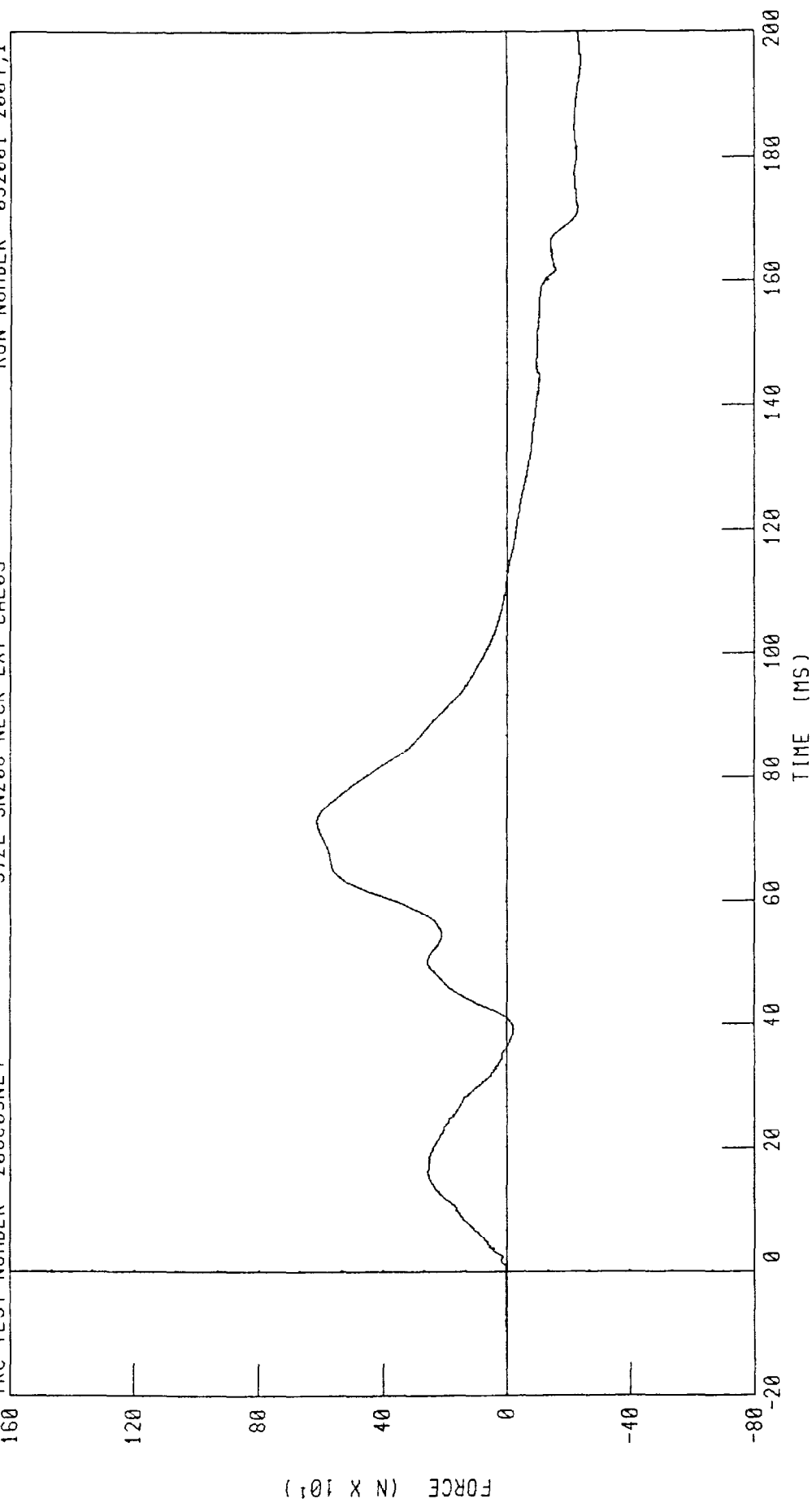
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER 206C03NE4

572E SN206 NECK EXT CAL03

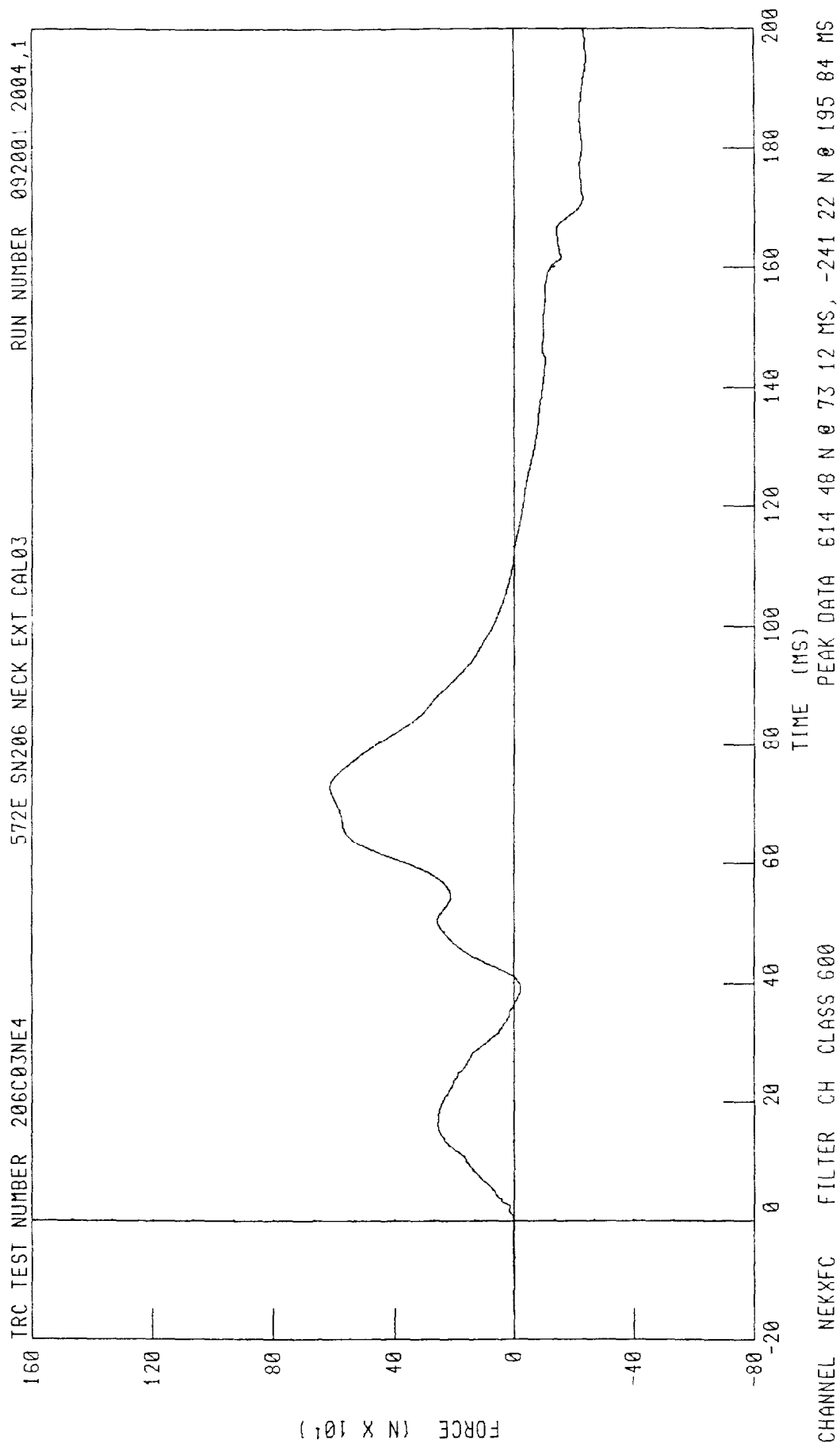
RUN NUMBER 092001 2004,1



CHANNEL NEKXF FILTER CH CLASS 1000

PEAK DATA 615 13 N @ 73 12 MS, -241 42 N @ 194 88 MS

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



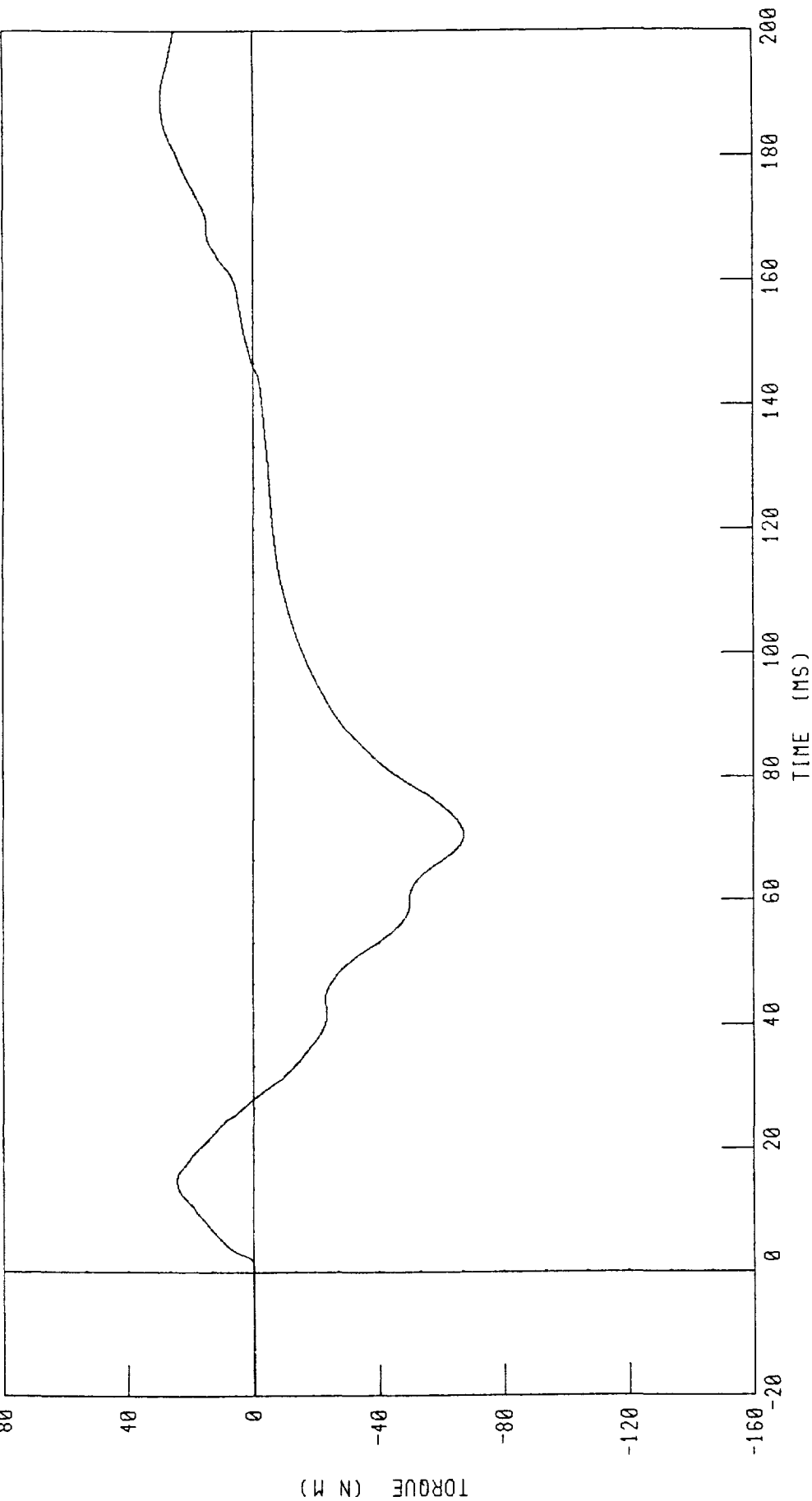
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER 206C03NE4

572E SN206 NECK EXT CAL03

RUN NUMBER 092001 2004,1



CHANNEL NEKYM FILTER CH CLASS 600

PEAK DATA 29 73 N M 188 80 MS, -67 27 N M 180 80 MS

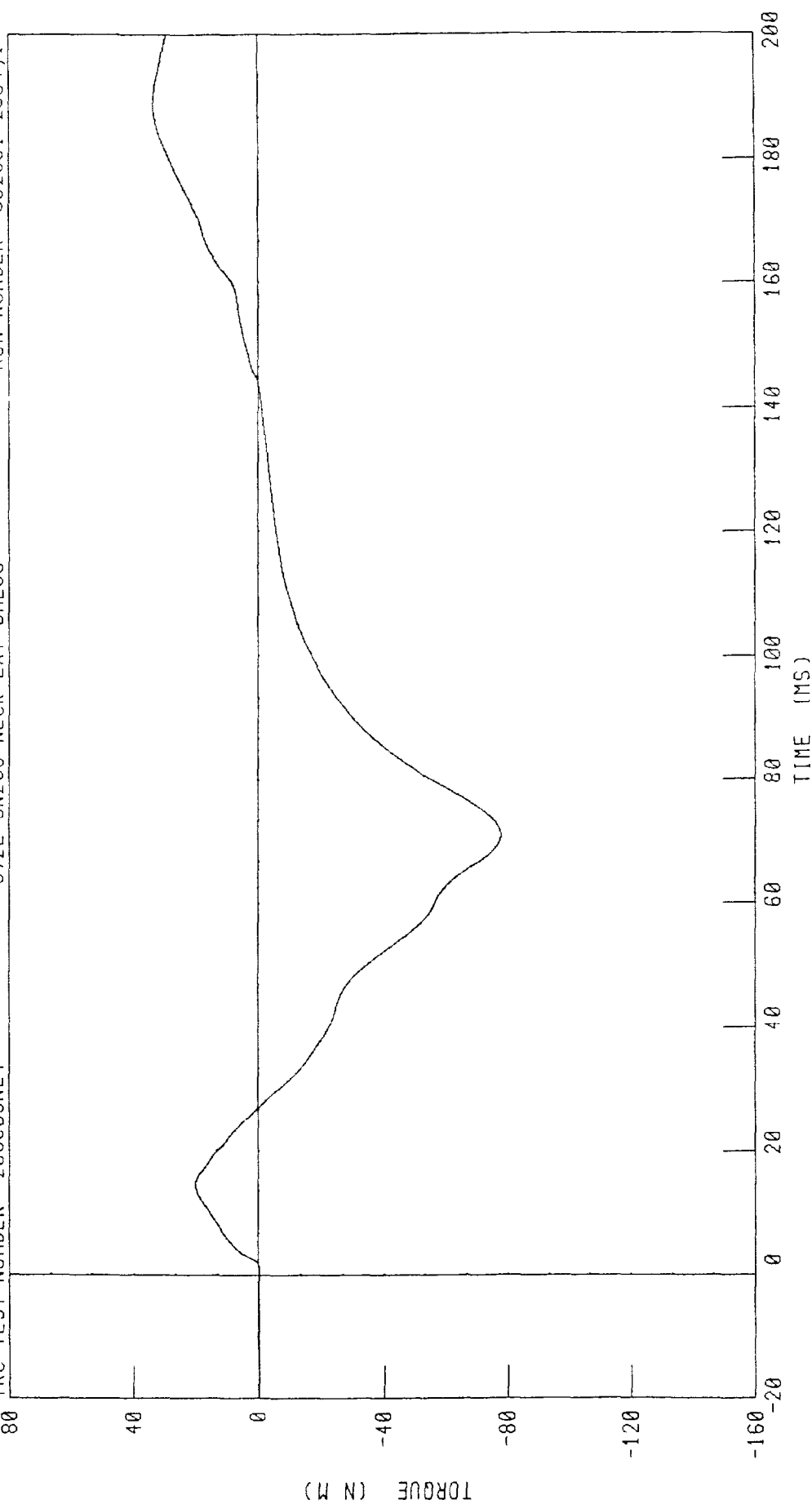
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 206C03NE4

572E SN206 NECK EXT CAL03

RUN NUMBER 092001 2004,1



CHANNEL NEKOM FILTER CH CLASS 600

TIME (MS)

PEAK DATA 33 74 N M @ 188 88 MS, -77 97 N M @ 71 04 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

21-SEP-01

TRC INC.

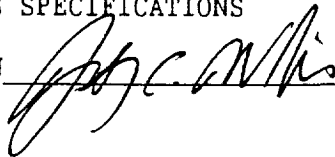
TEST NO: 206C03TH1

572E SN206 H.S.THORAX CAL03

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	60.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	71.0 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5690. N
INTERNAL HYSTERESIS	69% - 85%	69.2%

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092101.1327;1

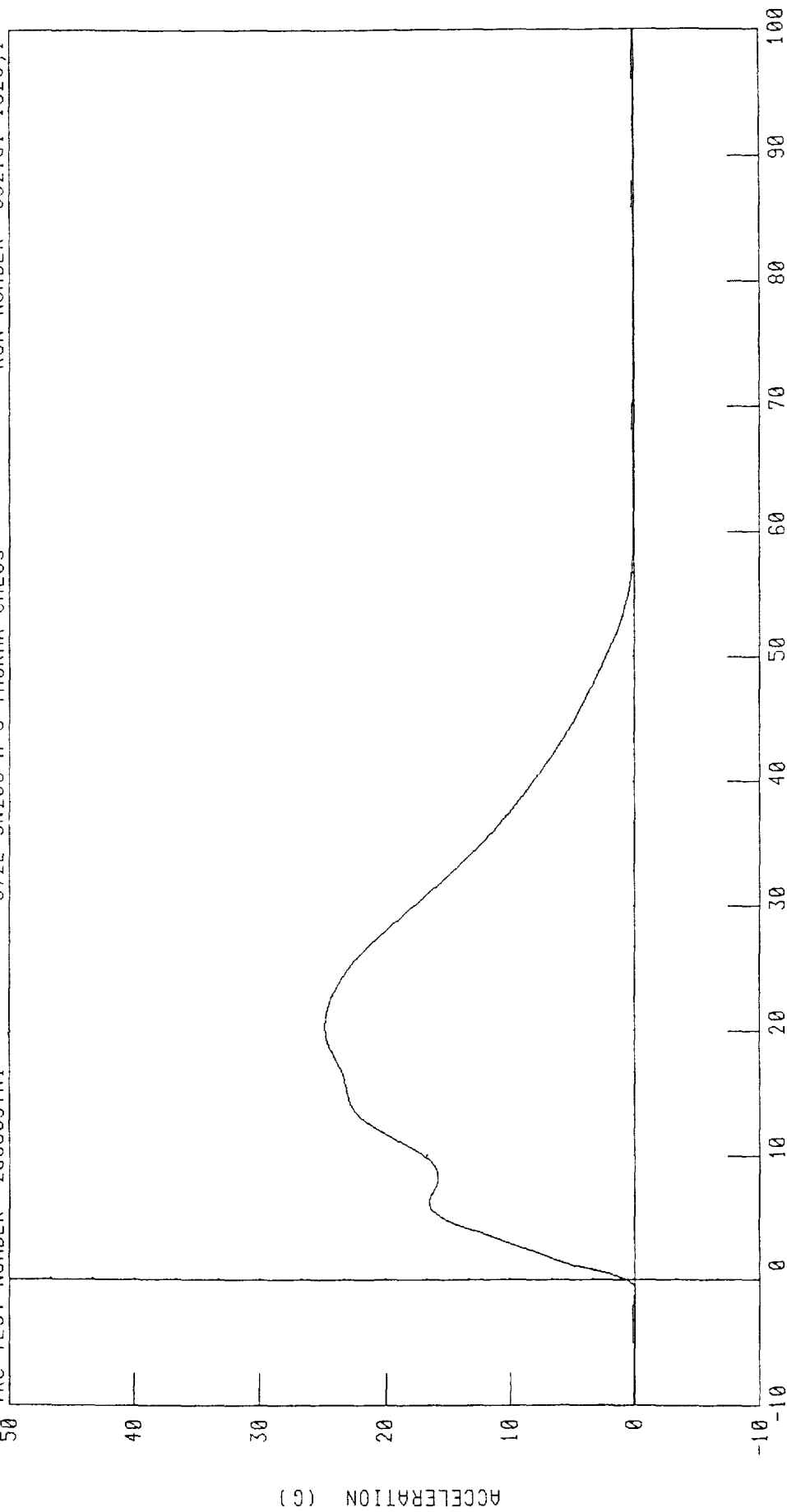
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER 206C03TH1

572E SN206 H S THORAX CAL03

RUN NUMBER 092101 1328,1



TIME (MS)

CHANNEL PENXC FILTER CH CLASS 180

PEAK DATA 24 84 0 20 40 MS, -0 01 0 0 -0 88 MS

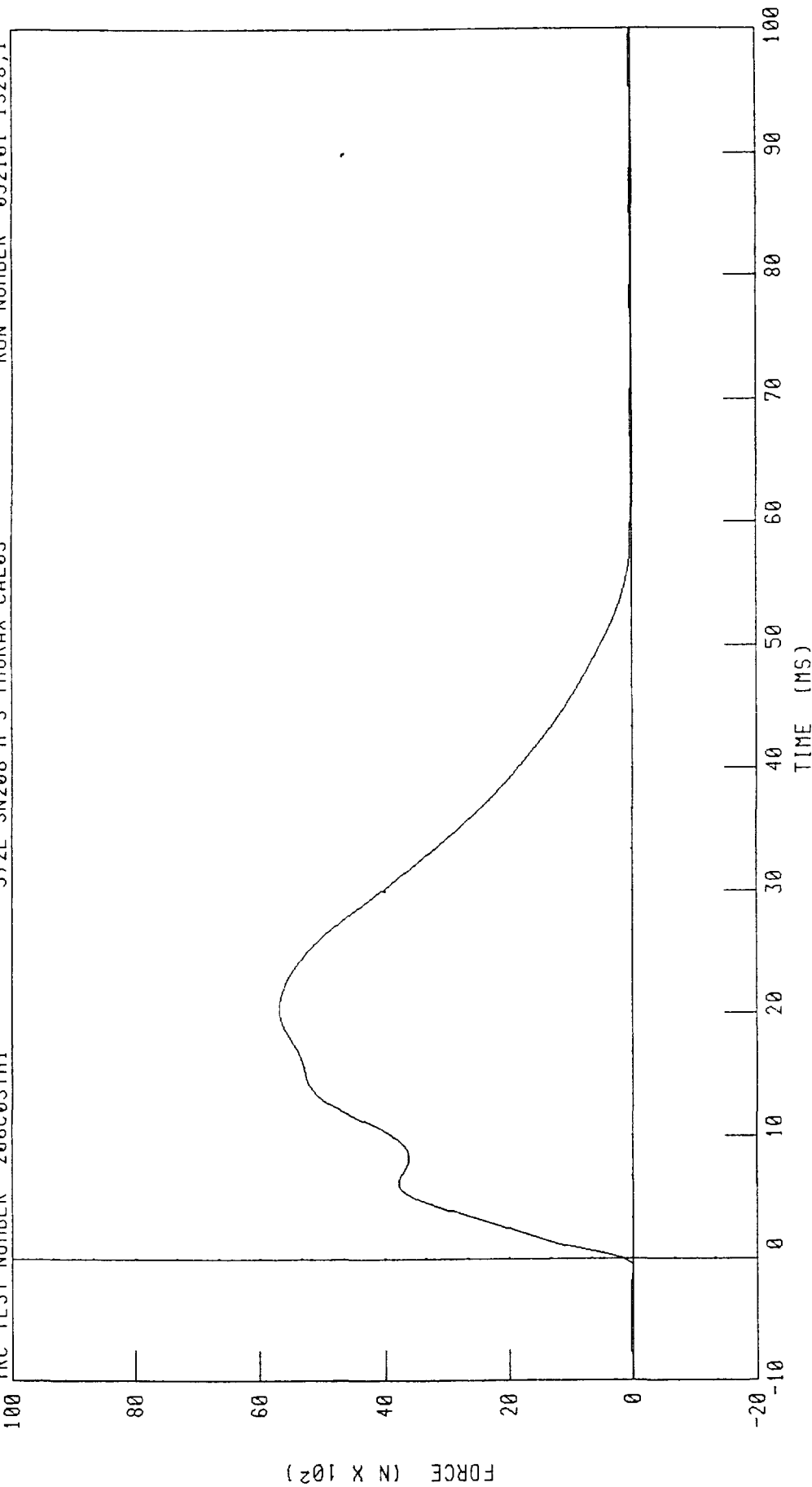
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER 206C03TH1

572E SN206 H S THORAX CAL03

RUN NUMBER 092101 1328,1



CHANNEL PENXF FILTER CH CLASS 180

PEAK DATA 5690 90 N 0 20 40 MS, -1 84 N 0 -0 88 MS

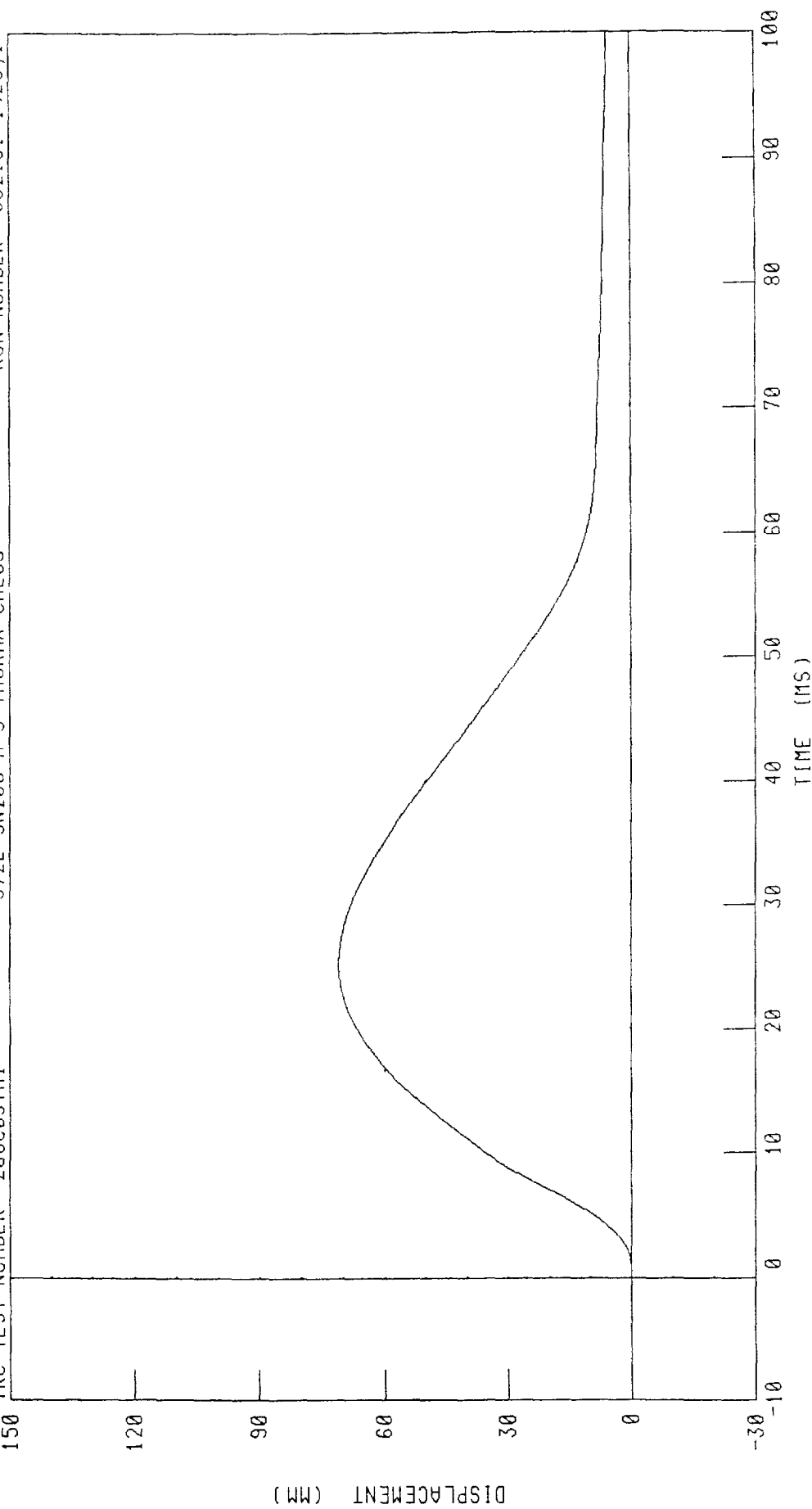
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

IRC TEST NUMBER 206C03TH1

572E SN206 H S THORAX CAL03

RUN NUMBER 092101 1328,1



PEAK DATA 71 01 MM @ 25 28 MS, -0 01 MM @ 0 32 MS

CHANNEL CSTXD FILTER CH CLASS 180

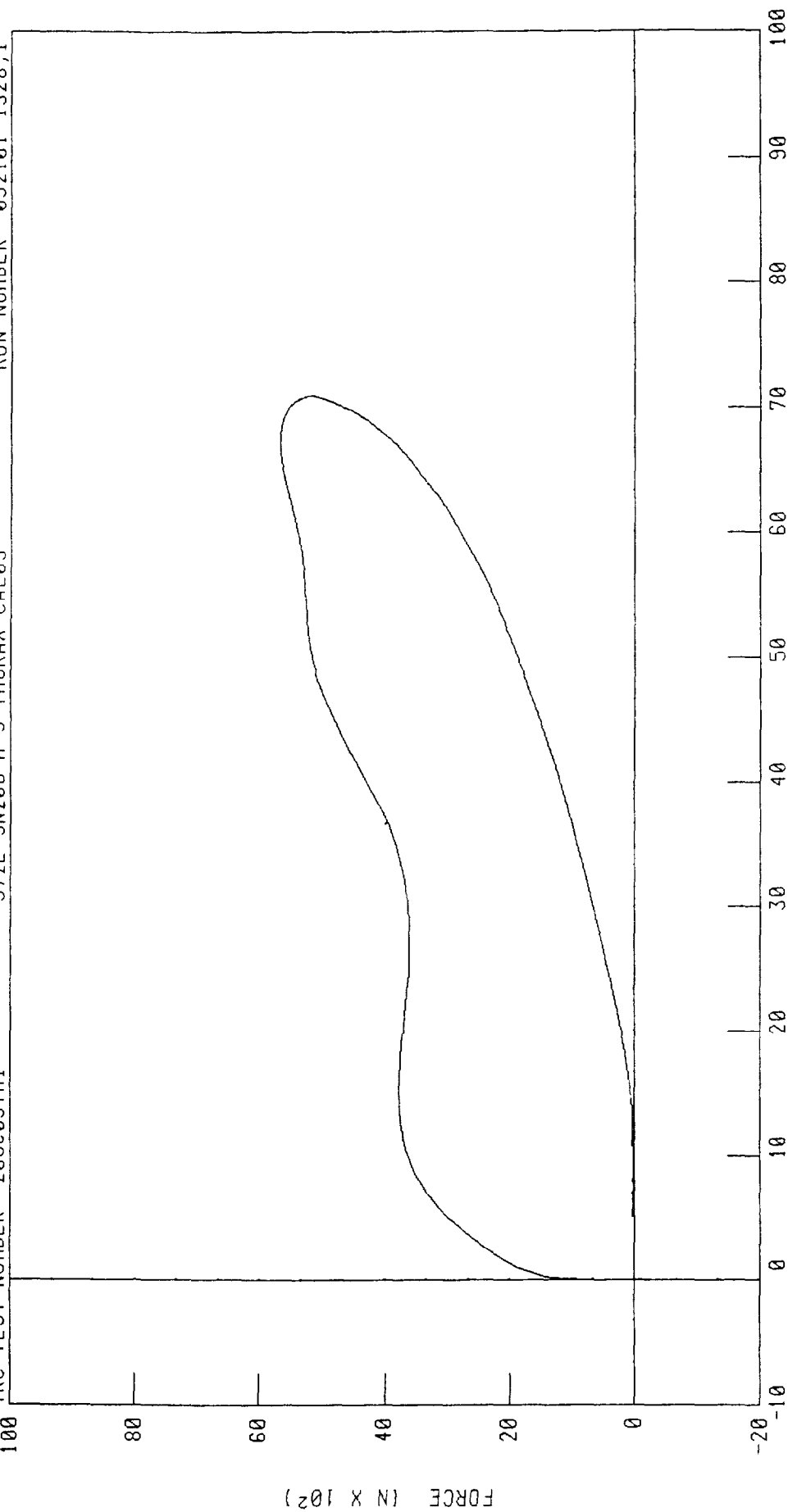
PART 572-E HYBRID III THORAX CALIBRATION

CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER 206C03TH1

572E SN206 H S THORAX CAL03

RUN NUMBER 092101 1328,1



DISPLACEMENT (MM)

CHANNEL CSTXD
PENXF

PEAK DATA

71 01 MM @ 25 28 MS, -0 01 MM @ 0 32 MS
5690 90 N @ 20 40 MS, -1 84 N @ -0 88 MS

Transportation Research Center Inc

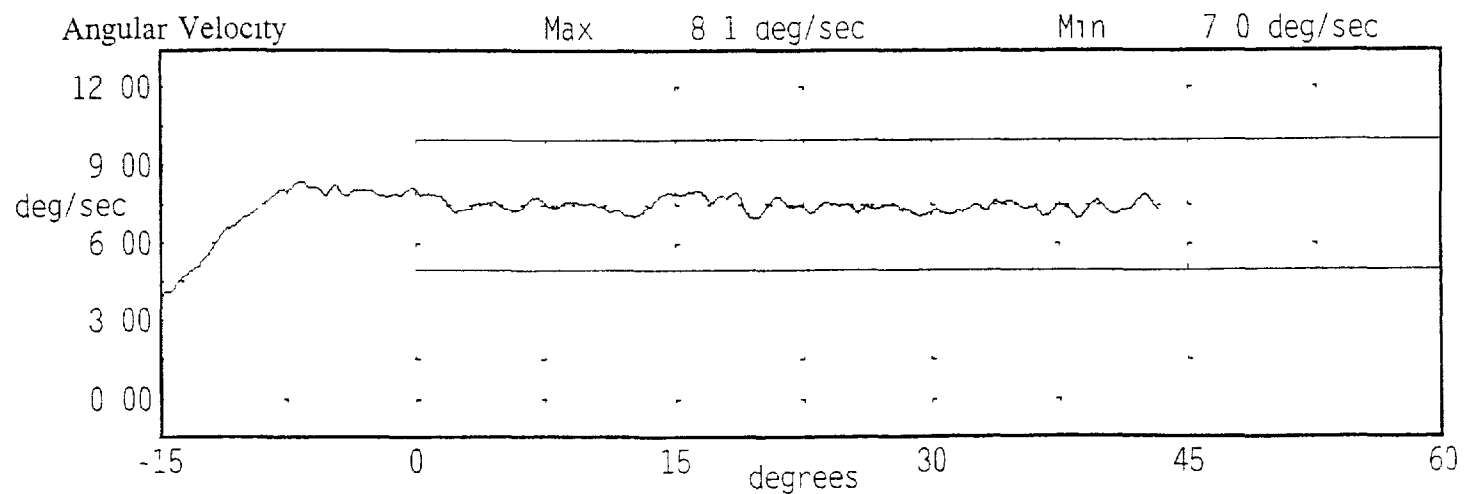
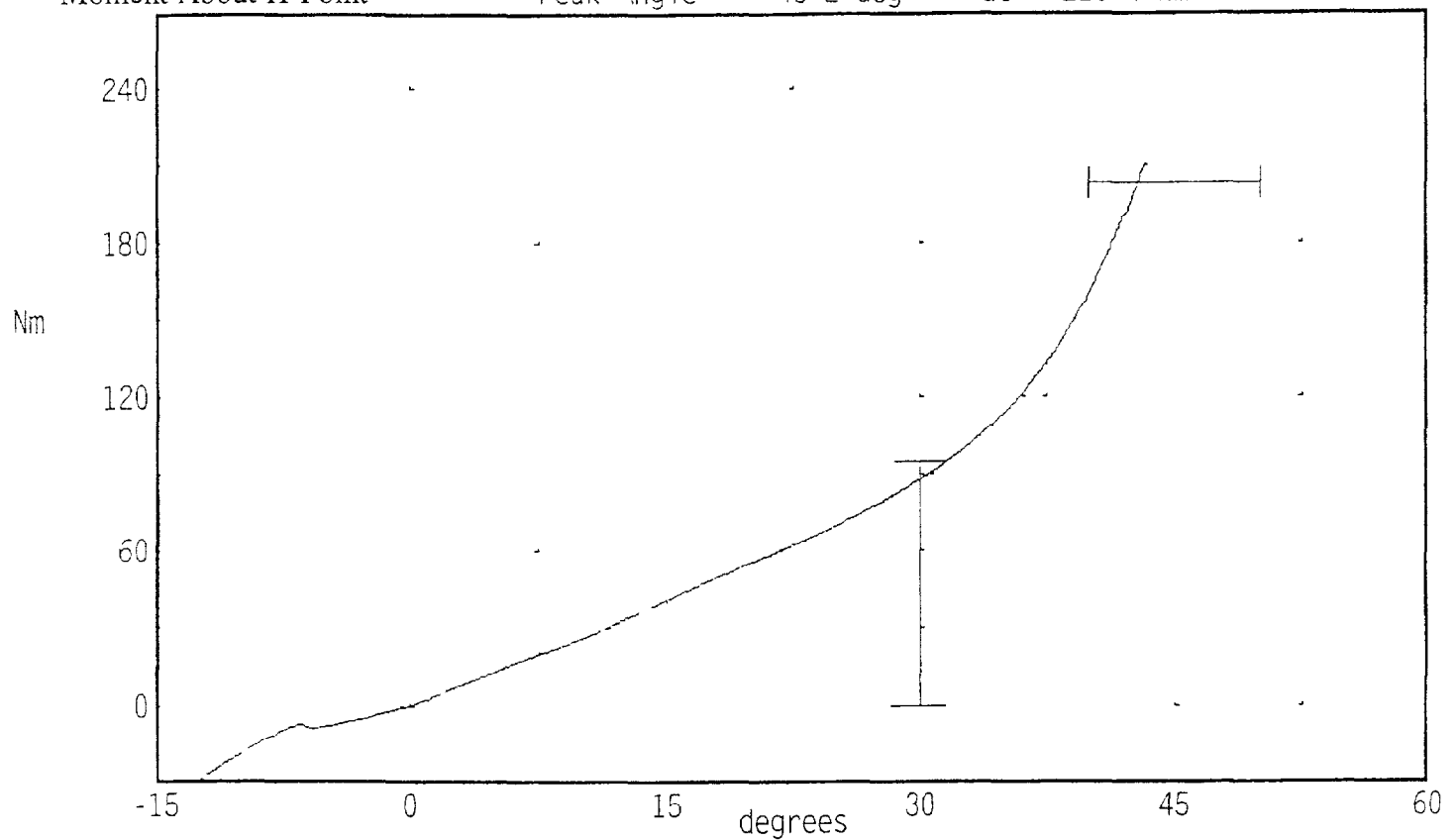
Hybrid III Hip Range of Motion

Serial Number 206L
Test Number 206C03
Comments

Date 09/19/2001
Time 09 23

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.7 °C Pass
Humidity	10 - 70	67 % Pass
Moment at 30 deg	<= 94.9	87.9 Nm Pass
Angle at 203 Nm	40.0 - 50.0	42.8 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment 210.4 Nm at 43.2 deg
Peak Angle 43.2 deg at 210.4 Nm



Transportation Research Center Inc

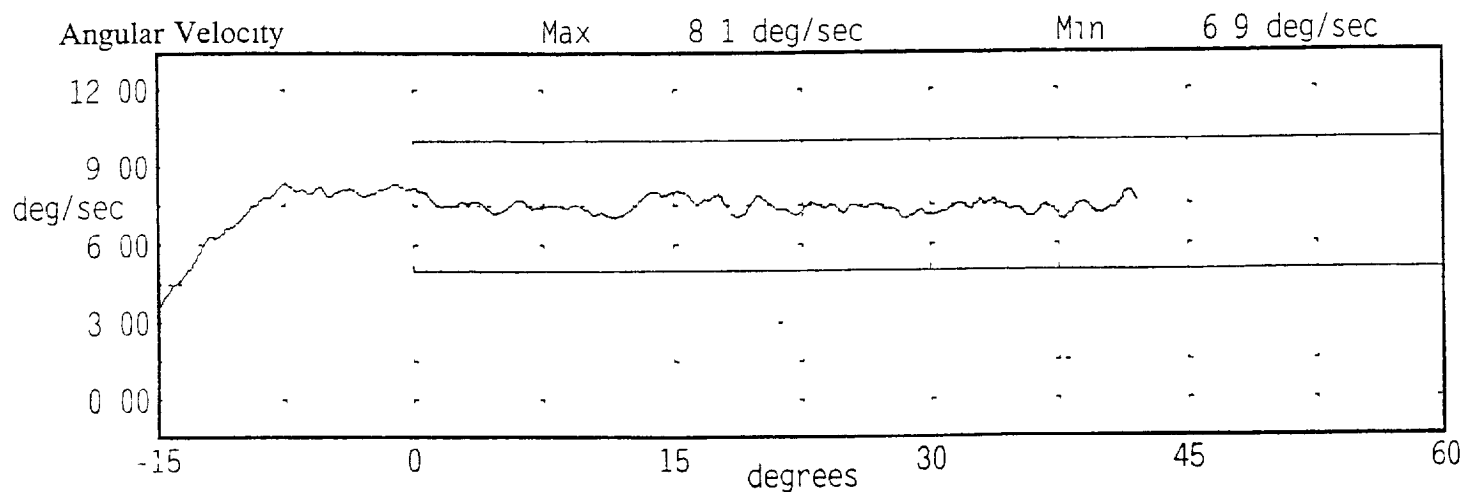
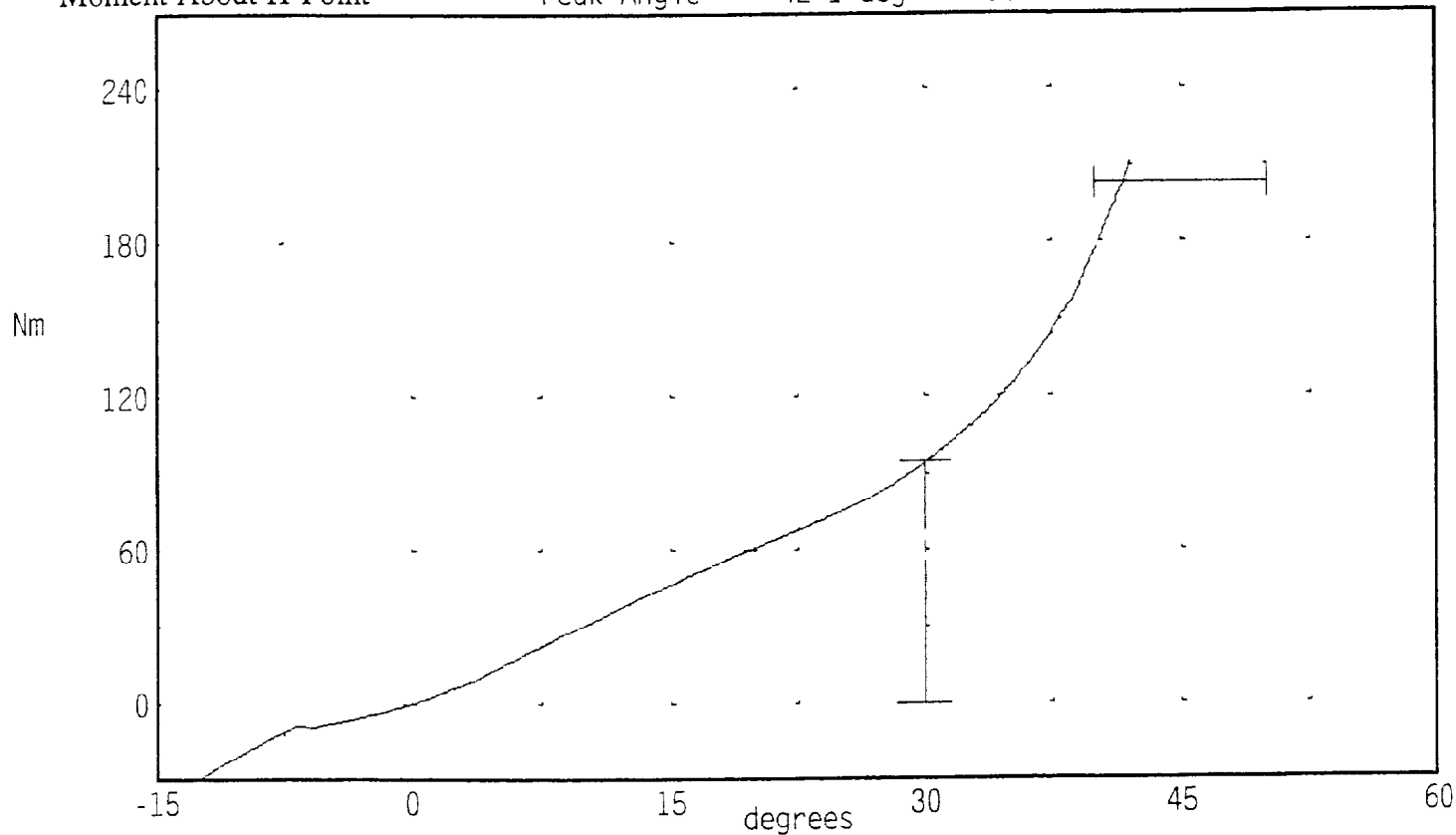
Hybrid III Hip Range of Motion

Serial Number 206R
Test Number 206C03
Comments

Date 09/19/2001
Time 09:36

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.7 °C Pass
Humidity	10 - 70	67 % Pass
Moment at 30 deg	<= 94.9	94.7 Nm Pass
Angle at 203 Nm	40.0 - 50.0	41.7 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment 210.9 Nm at 42.1 deg
Peak Angle 42.1 deg at 210.9 Nm



TRANSPORTATION RESEARCH CENTER INC.

KNEE SLIDER TEST

HYBRID III 50th

19-SEP-01

RIGHT KNEE

TRC INC.

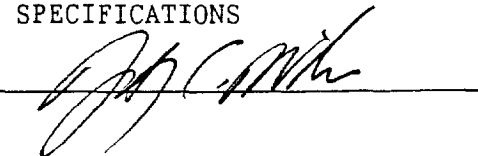
TEST NO: 206C03RS1

572E SN206 RIGHT SLIDER CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	64.0 %
PENDULUM VELOCITY	2.70-2.80 M/S	2.78 M/S
FORCE AT 10.0 MM DISPLACEMENT	1259 - 1721 N	1565. N
FORCE AT 18.0 MM DISPLACEMENT	2268 - 3096 N	2913. N

TEST MEETS SPECIFICATIONS

TECHNICIAN

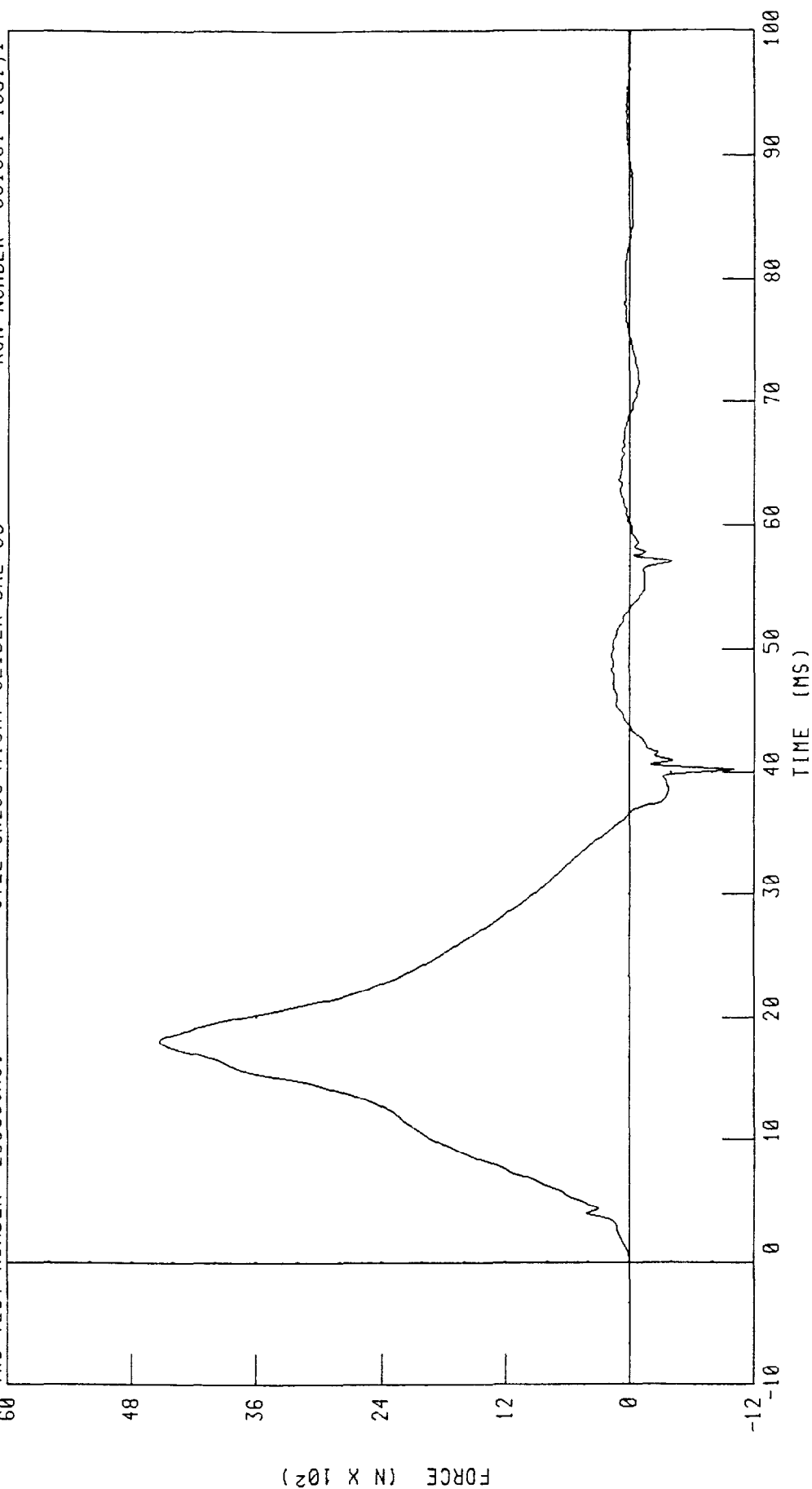


RUN NUMBER: 091901.1030;1

PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION

RIGHT FEMUR FORCE

TRC TEST NUMBER 206C03RS1 572E SN206 RIGHT SLIDER CAL 03 RUN NUMBER 091901 1031,1



CHANNEL RFMF FILTER CH CLASS 600

PEAK DATA 4531 68 N @ 18 08 MS, -1003 45 N @ 40 24 MS

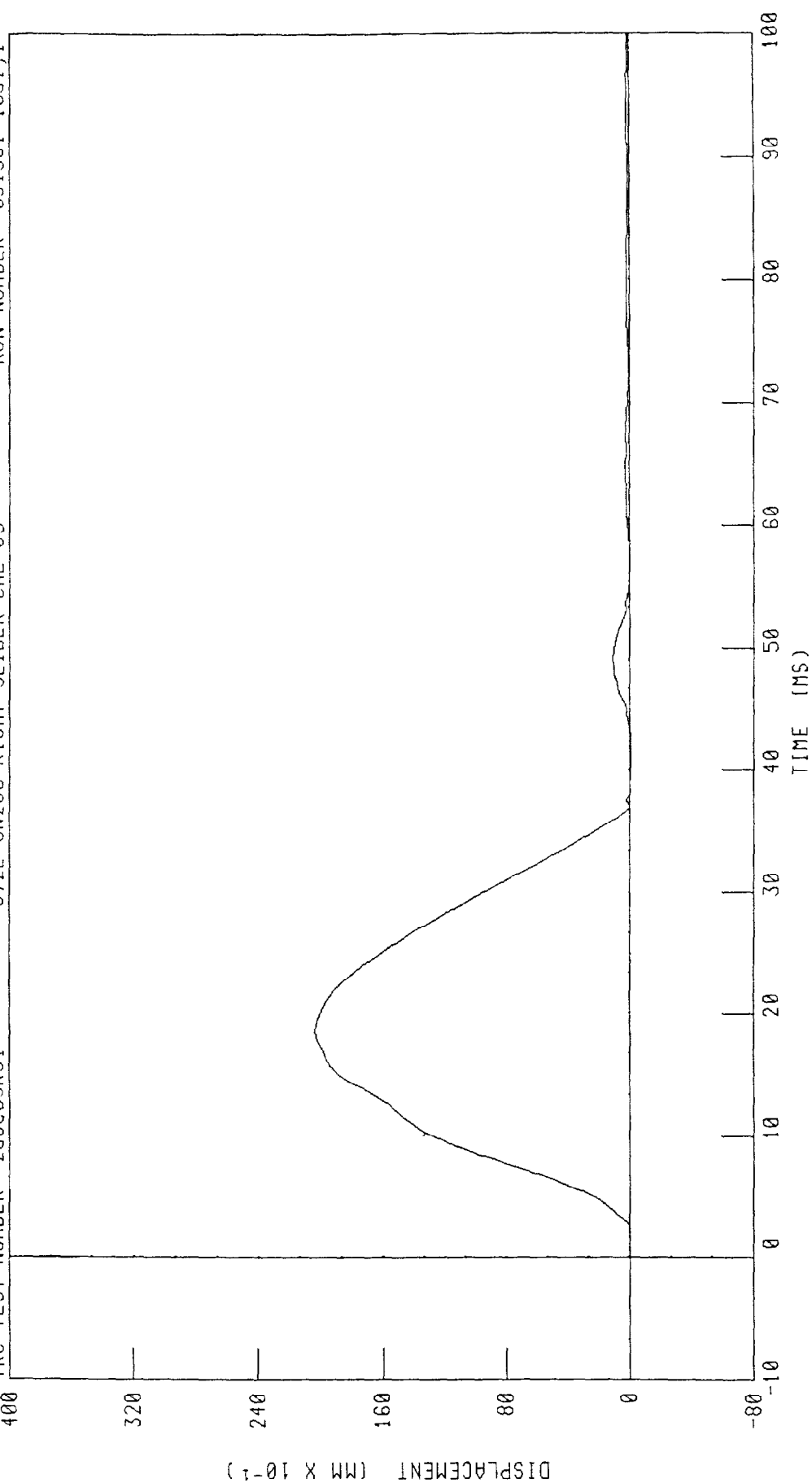
PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION

RIGHT KNEE DISPLACEMENT

TRC TEST NUMBER 206C03RS1

572E SN206 RIGHT SLIDER CAL 03

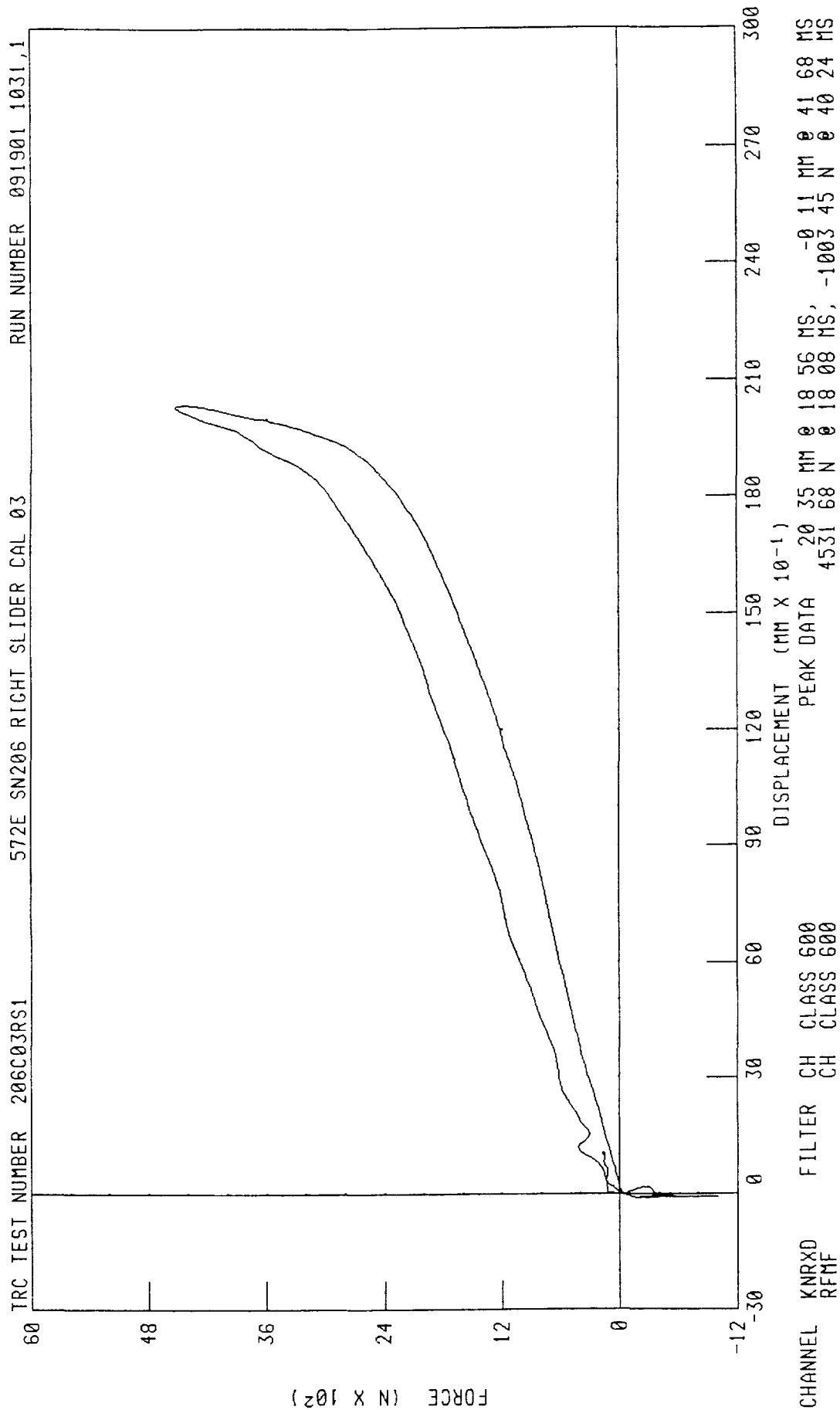
RUN NUMBER 091901 1031,1



CHANNEL KNRXD FILTER CH CLASS 600

PEAK DATA 20 35 MM @ 18 56 MS, -0 11 MM @ 41 68 MS

PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION
 RIGHT KNEE DISPLACEMENT VS FEMUR FORCE



TRANSPORTATION RESEARCH CENTER INC.

KNEE SLIDER TEST

HYBRID III 50th

19-SEP-01

LEFT KNEE

TRC INC.

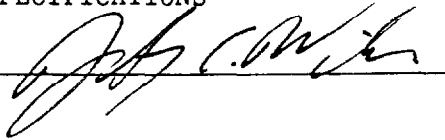
TEST NO: 206C03LS1

572E SN206 LEFT SLIDER CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	65.0 %
PENDULUM VELOCITY	2.70-2.80 M/S	2.77 M/S
FORCE AT 10.0 MM DISPLACEMENT	1259 - 1721 N	1383. N
FORCE AT 18.0 MM DISPLACEMENT	2268 - 3096 N	2494. N

TEST MEETS SPECIFICATIONS

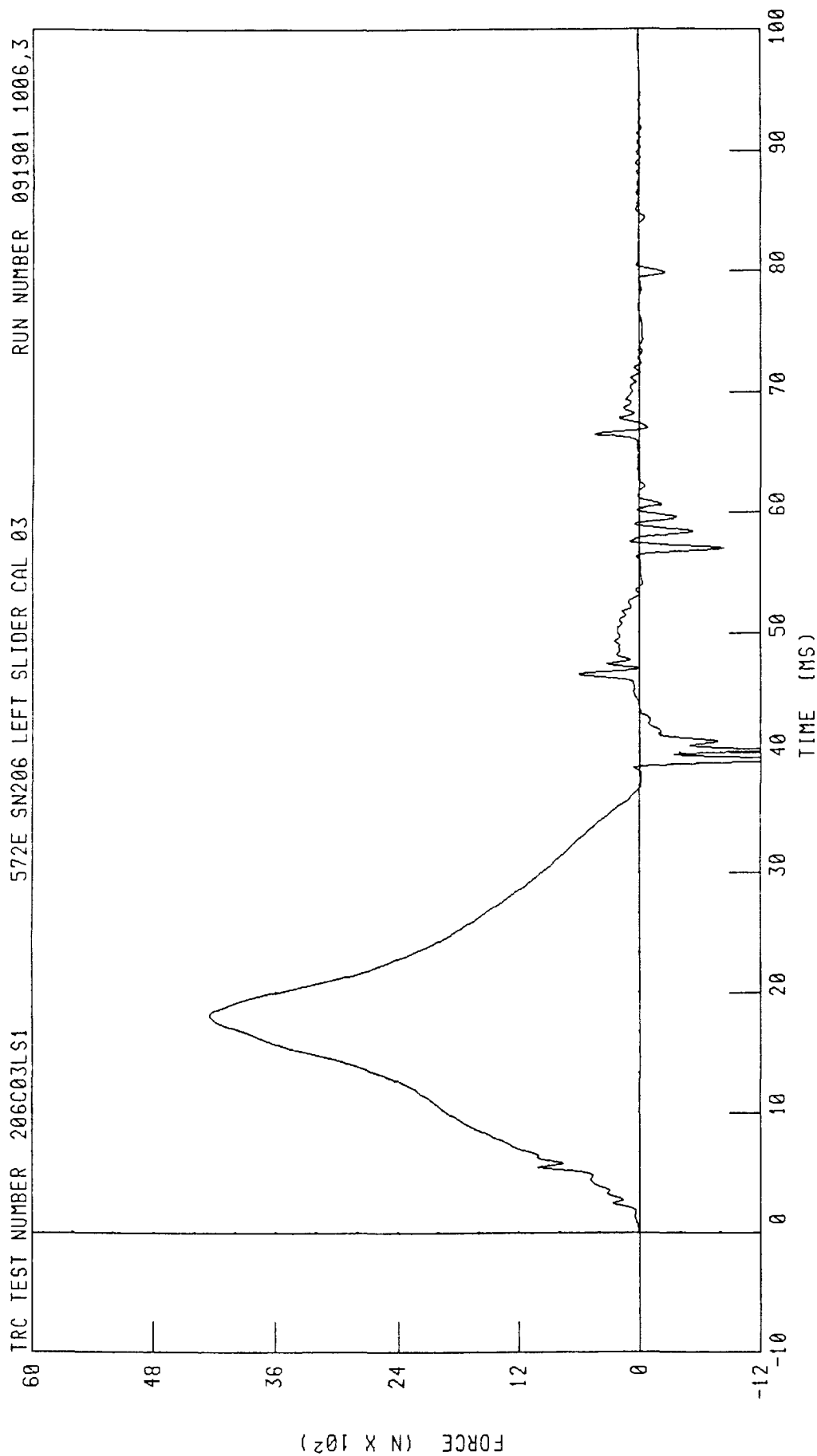
TECHNICIAN



RUN NUMBER: 091901.1006;3

PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION

LEFT FEMUR FORCE



CHANNEL LFHF FILTER CH CLASS 600

PEAK DATA 4257 25 N 0 18 08 MS, -1566 46 N 0 39 44 MS

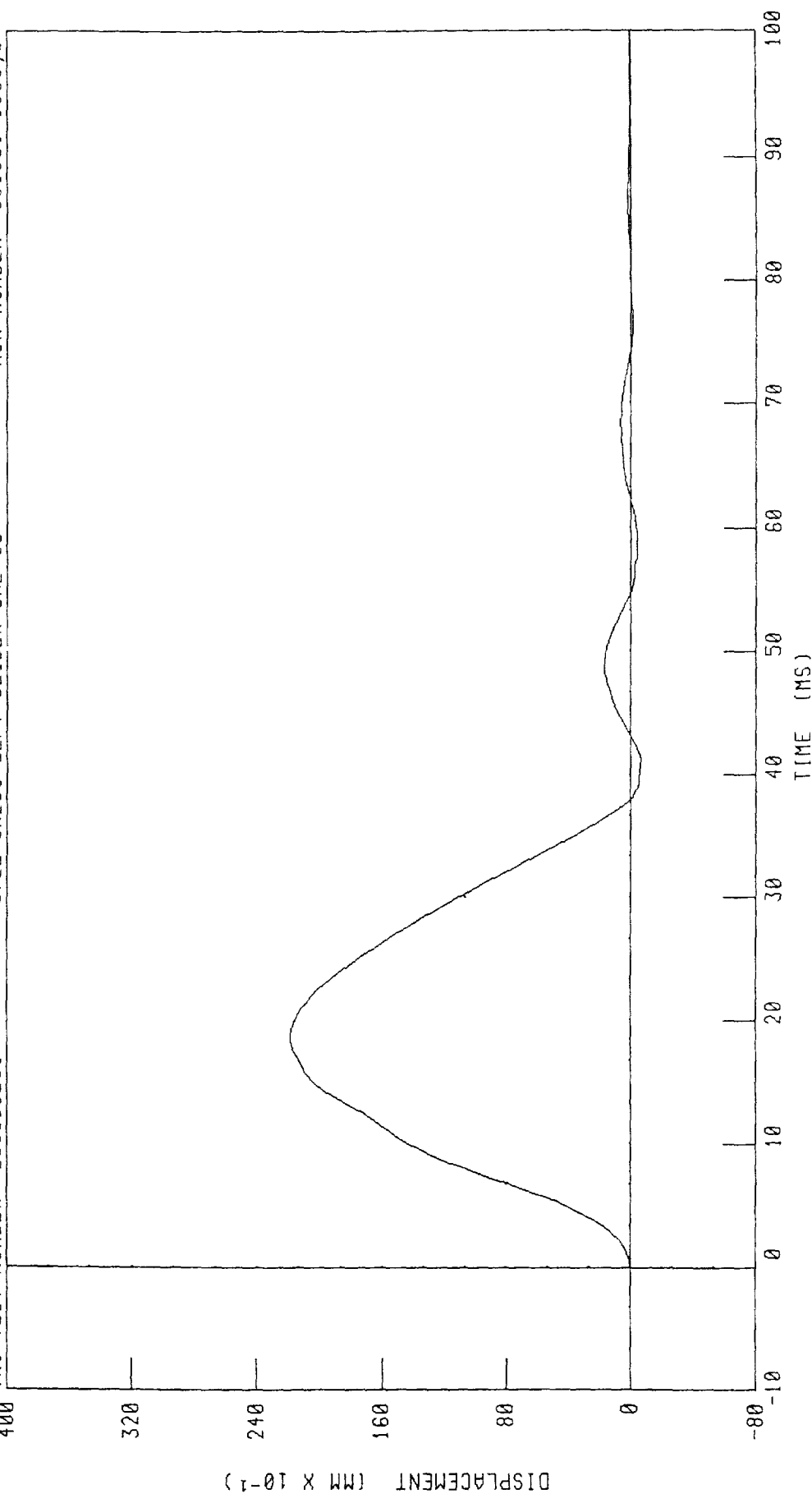
PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION

LEFT KNEE DISPLACEMENT

IRC TEST NUMBER 206C03LS1

572E SN206 LEFT SLIDER CAL 03

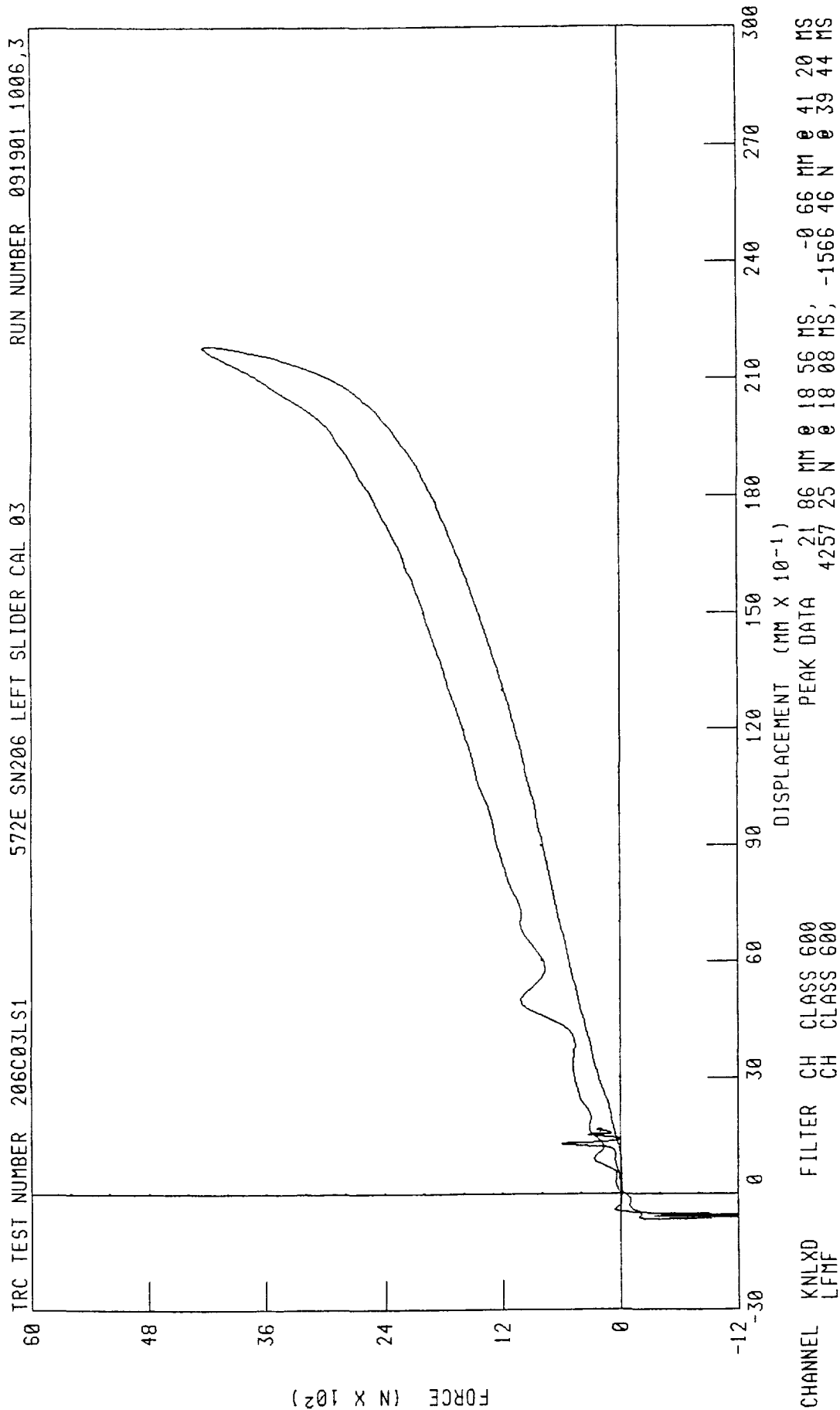
RUN NUMBER 091901 1006,3



CHANNEL KNLXD FILTER CH CLASS 600

PEAK DATA 21 86 MM @ 18 56 MS, -0 66 MM @ 41 20 MS

PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION
 LEFT KNEE DISPLACEMENT VS FEMUR FORCE



TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

20-SEP-01

TRC INC.

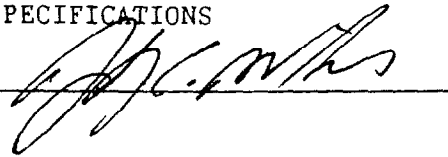
TEST NO: 206C03LK1

572E SN206 LEFT KNEE CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	64.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5640.5 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



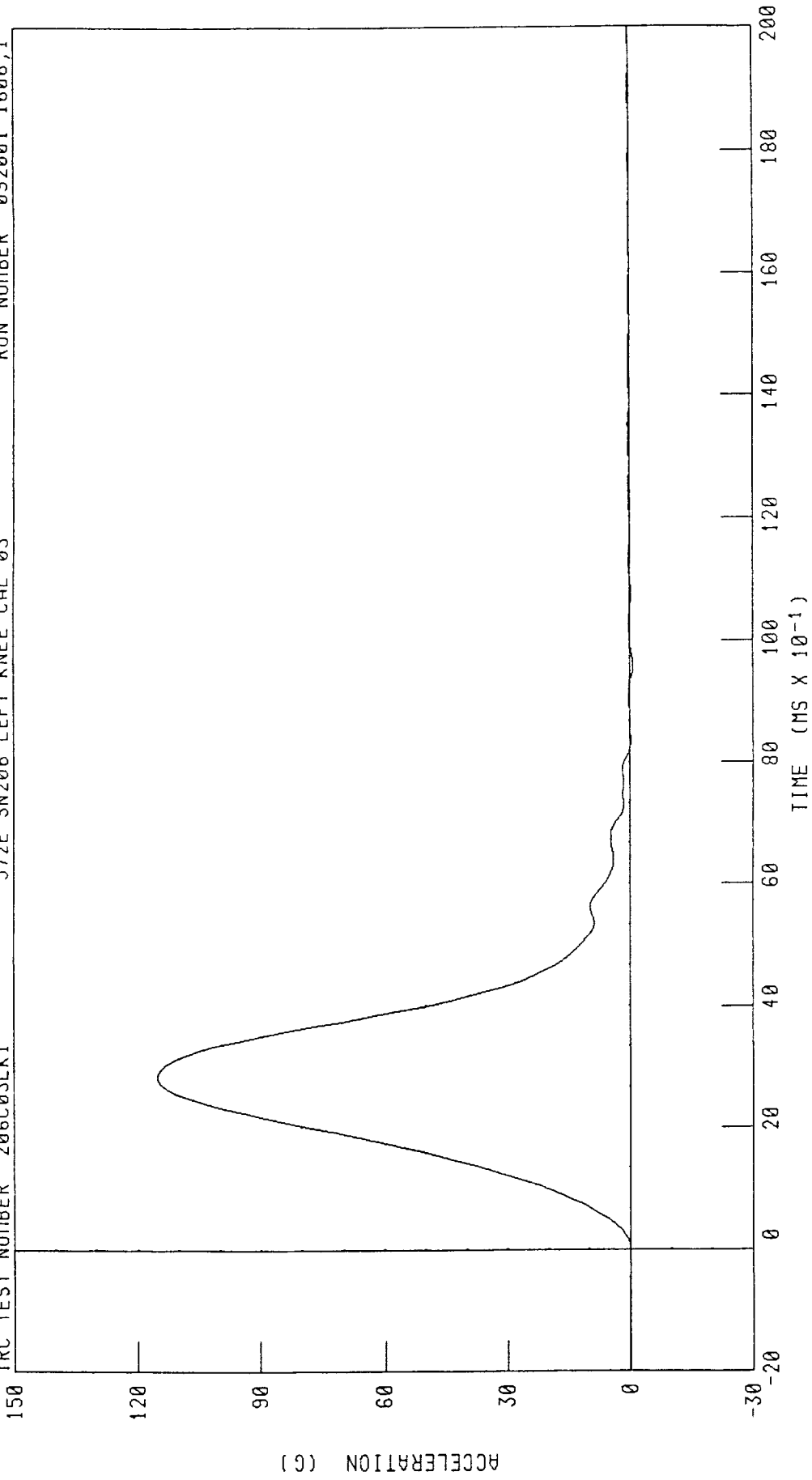
RUN NUMBER: 092001.1606;1

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

TRC TEST NUMBER 206C03LK1

572E SN206 LEFT KNEE CAL 03

RUN NUMBER 092001 1606,1



CHANNEL PENXC FILTER CH CLASS 600

PEAK DATA 115 28 G 2 88 MS, -0 83 G 0 9 60 MS

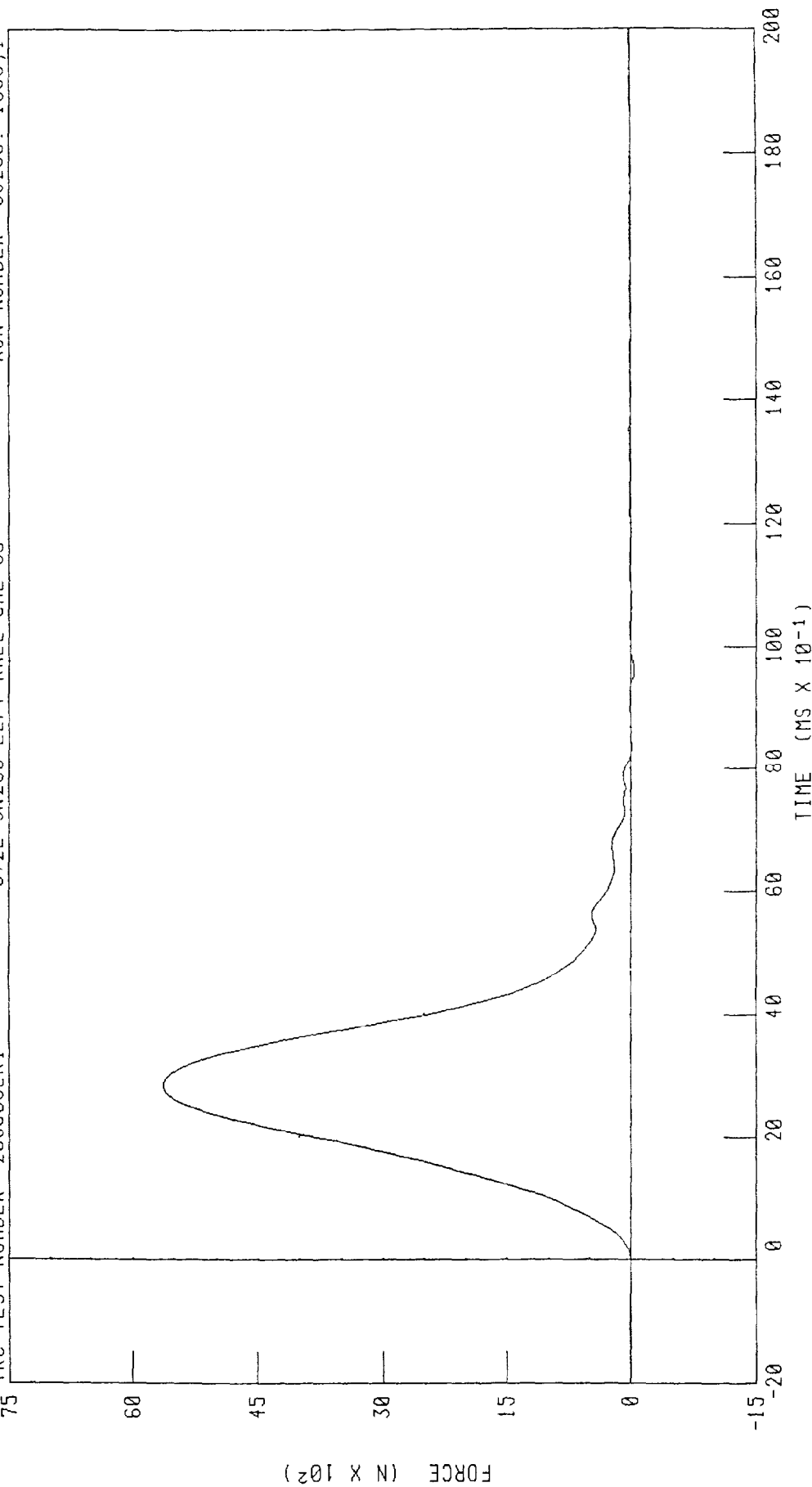
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND)

TRC TEST NUMBER 206C03LK1

572E SN206 LEFT KNEE CAL 03

RUN NUMBER 092001 1606,1



CHANNEL PENXF FILTER CH CLASS 600

PEAK DATA 5640 58 N @ 2 88 MS, -40 79 N @ 9 60 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

20-SEP-01

TRC INC.

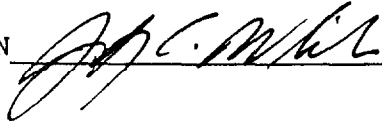
TEST NO: 206C03RK1

572E SN206 RIGHT KNEE CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	64.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4753.7 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092001.1608;1

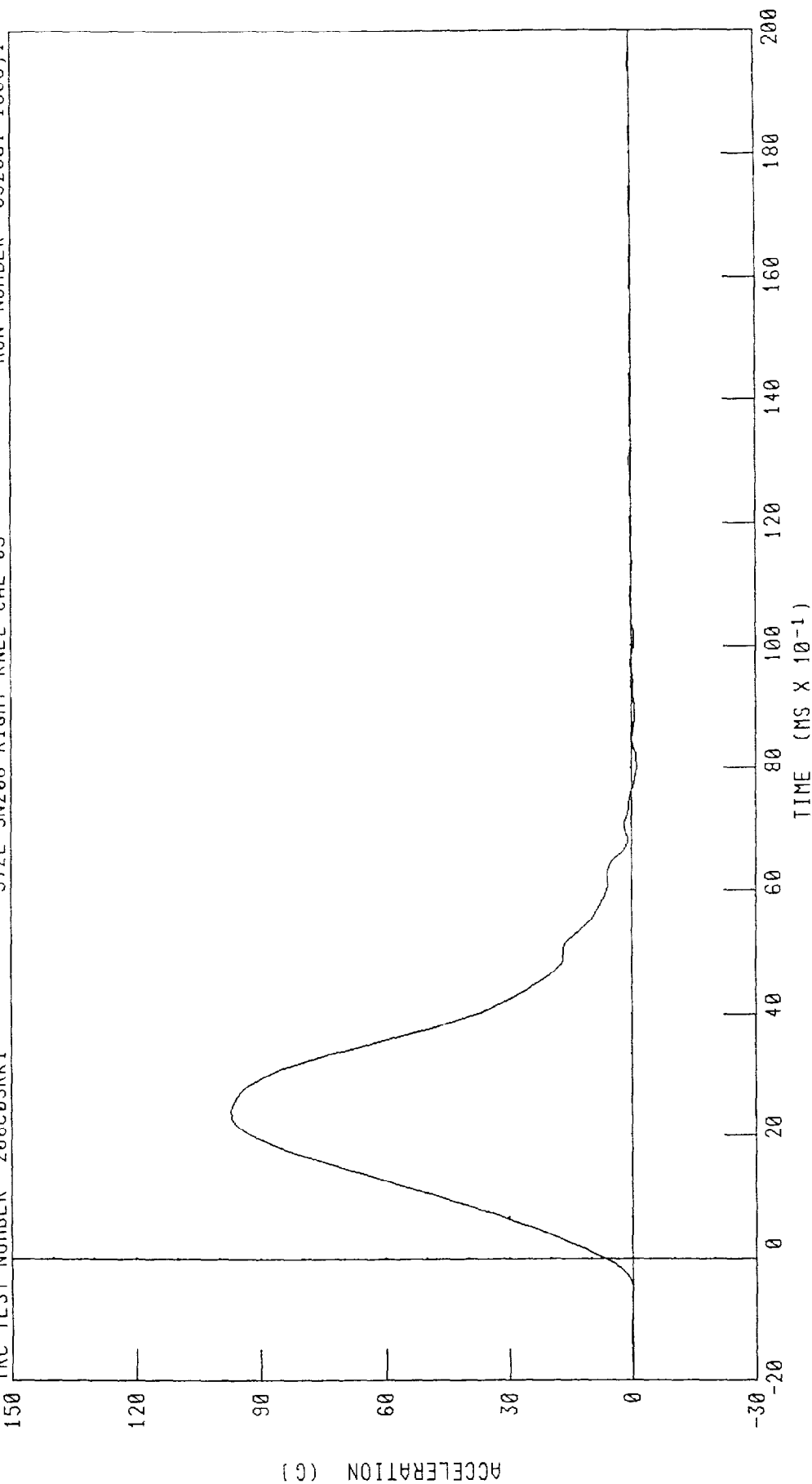
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND)

TRC TEST NUMBER 206C03RK1

572E SN206 RIGHT KNEE CAL 03

RUN NUMBER 092001 1608.1



CHANNEL PENXC FILTER CH CLASS 600

PEAK DATA 97 16 G @ 2 40 MS, -1 25 G @ 8 08 MS

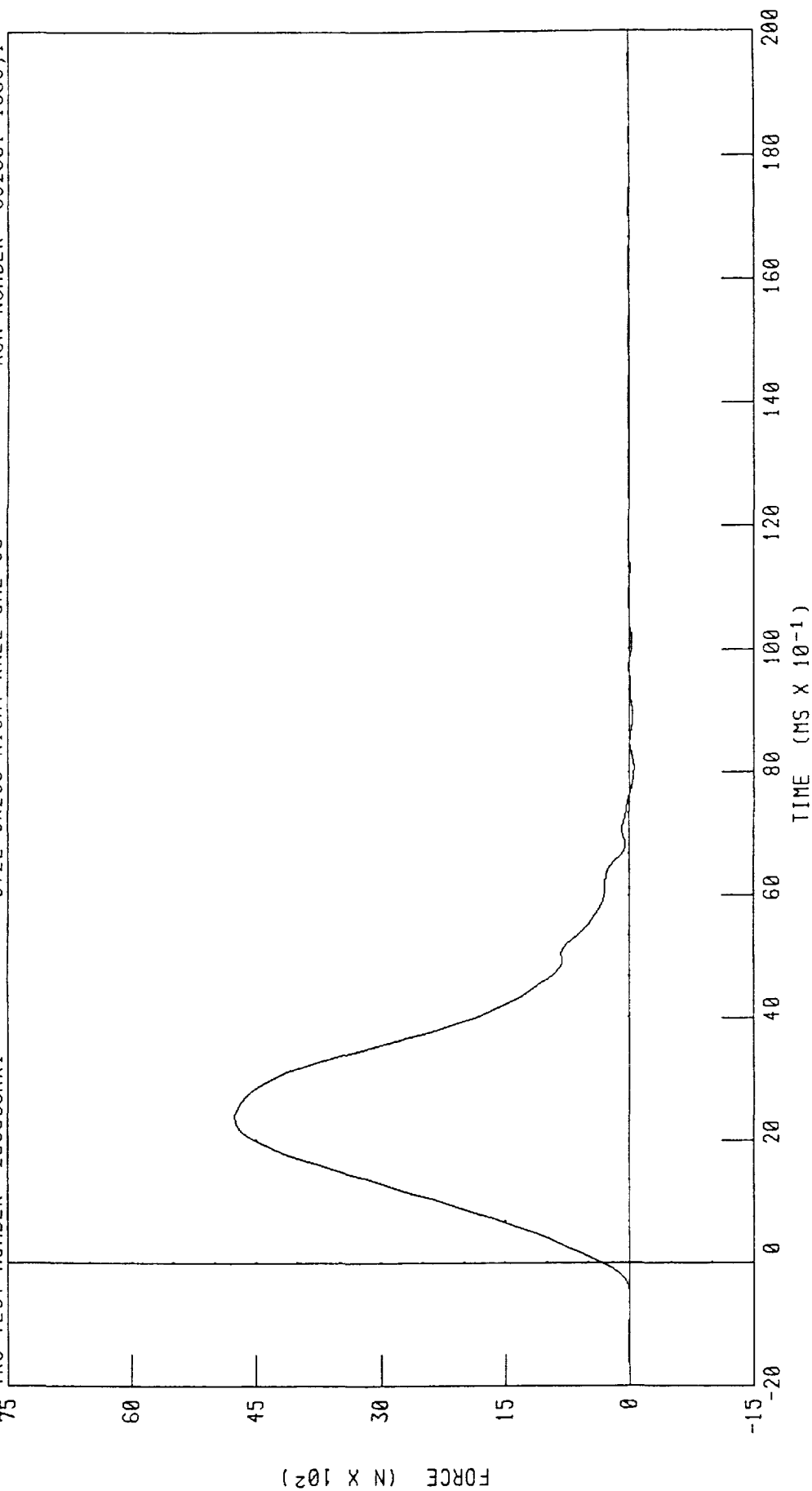
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND)

TRC TEST NUMBER 206C03RK1

572E SN206 RIGHT KNEE CAL 03

RUN NUMBER 092001 1608,1



CHANNEL PENXF FILTER CH CLASS 600

PEAK DATA 4753 71 N 0 2 40 MS, -61 24 N 0 8 08 MS

Pre-Test Dummy Configuration and Performance Verification Data

Passenger Dummy S/N: 202

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS

202

09-21-01

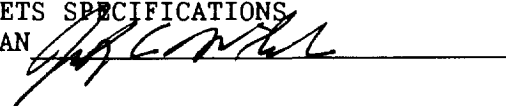
TRC INC. TEST NO: 202C04ED1 572E SN202 EXT.DIMENSION CAL04

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE	(Y)	970 -1001 MM	975. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	864. MM
CHEST DEPTH	(O)	213 - 229 MM	218. MM
H-POINT HEIGHT	(C)	84 - 89 MM	84. MM
H-POINT FROM SEATBACK	(D)	135 - 140 MM	135. MM
SKULL CAP TO BACKLINE	(H)	41 - 46 MM	43. MM
TOTAL SITTING HEIGHT	(A)	879 - 889 MM	881. MM
THIGH CLEARANCE	(F)	140 - 155 MM	145. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	597. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	462. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	447. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	488. MM
FOOT LENGTH	(P)	252 - 267 MM	254. MM
FOOT BREADTH	(W)	91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84 - 94 MM	89. MM
SHOULDER BREADTH	(V)	422 - 437 MM	424. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	511. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	198. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	335. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	297. MM

572E SN202 EXT.DIMENSION CAL04

DUMMY MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092801.1418

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

19-SEP-01

TRC INC.

TEST NO: 202C04HD1

572E SN202 HEAD DROP CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	246.35 G
PEAK LATERAL ACCELERATION	15 G MAX	5.10 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 091901.1341;1

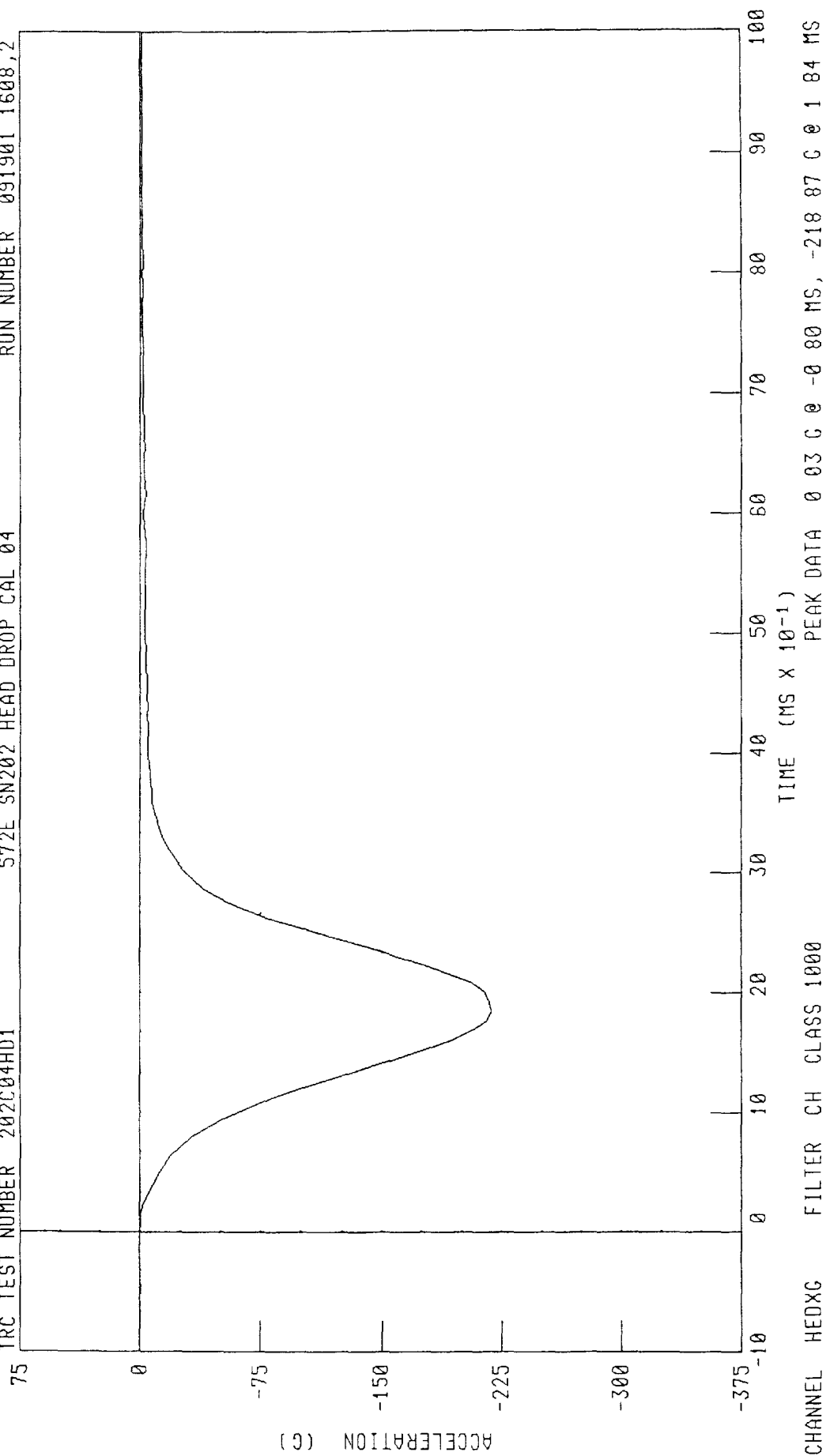
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER 202004HD1

572E SN202 HEAD DROP CAL 04

RUN NUMBER 091901 1608,2



CHANNEL HEDXC FILTER CH CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION

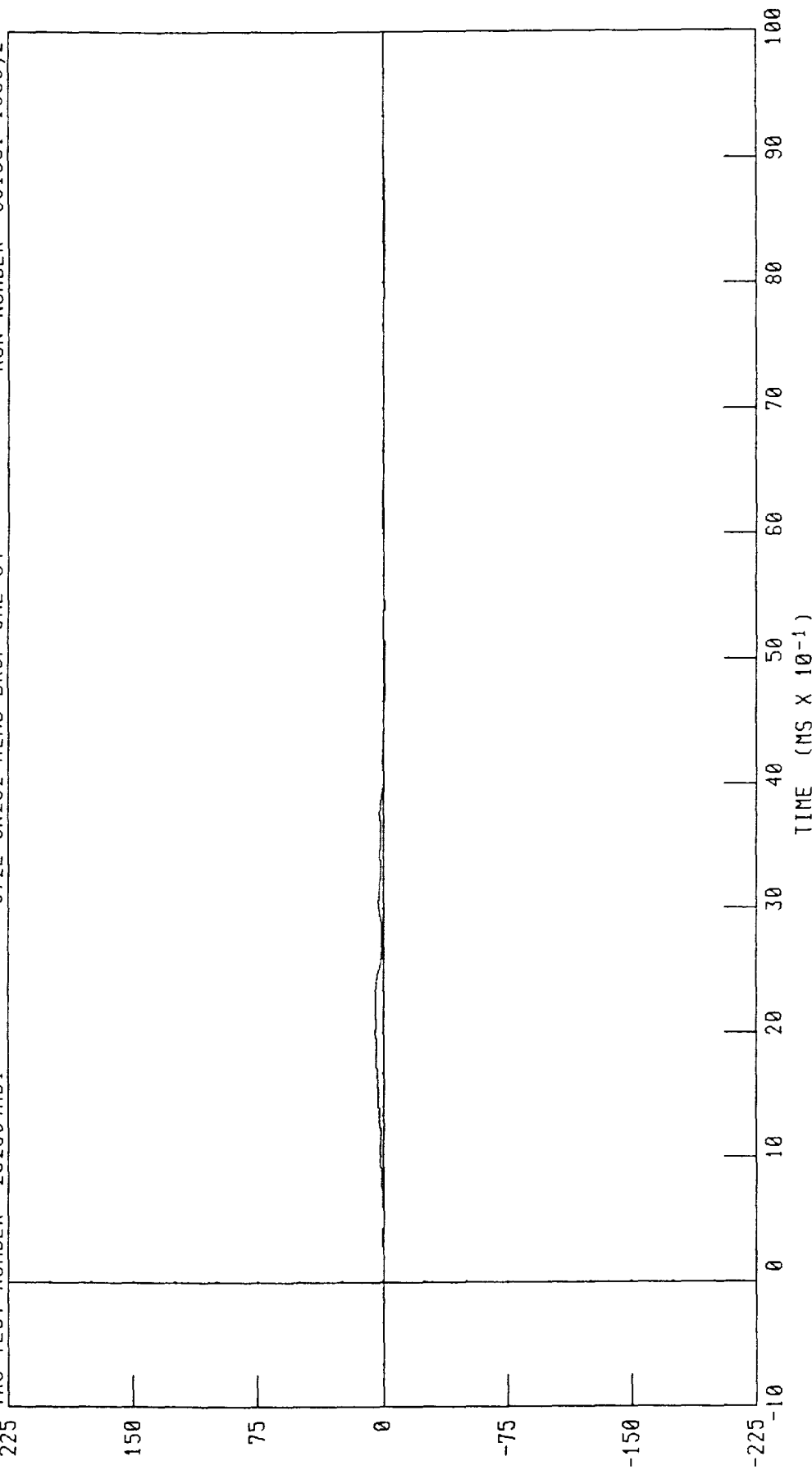
HEAD ACCELERATION Y AXIS

TRC TEST NUMBER 202C04HD1

572E SN202 HEAD DROP CAL 04

RUN NUMBER 091901 1608,2

ACCELERATION (G)



CHANNEL HEDYC

FILTER CH CLASS 1000

PEAK DATA 5 10 C 0 2 24 MS, -0 99 C 0 8 16 MS

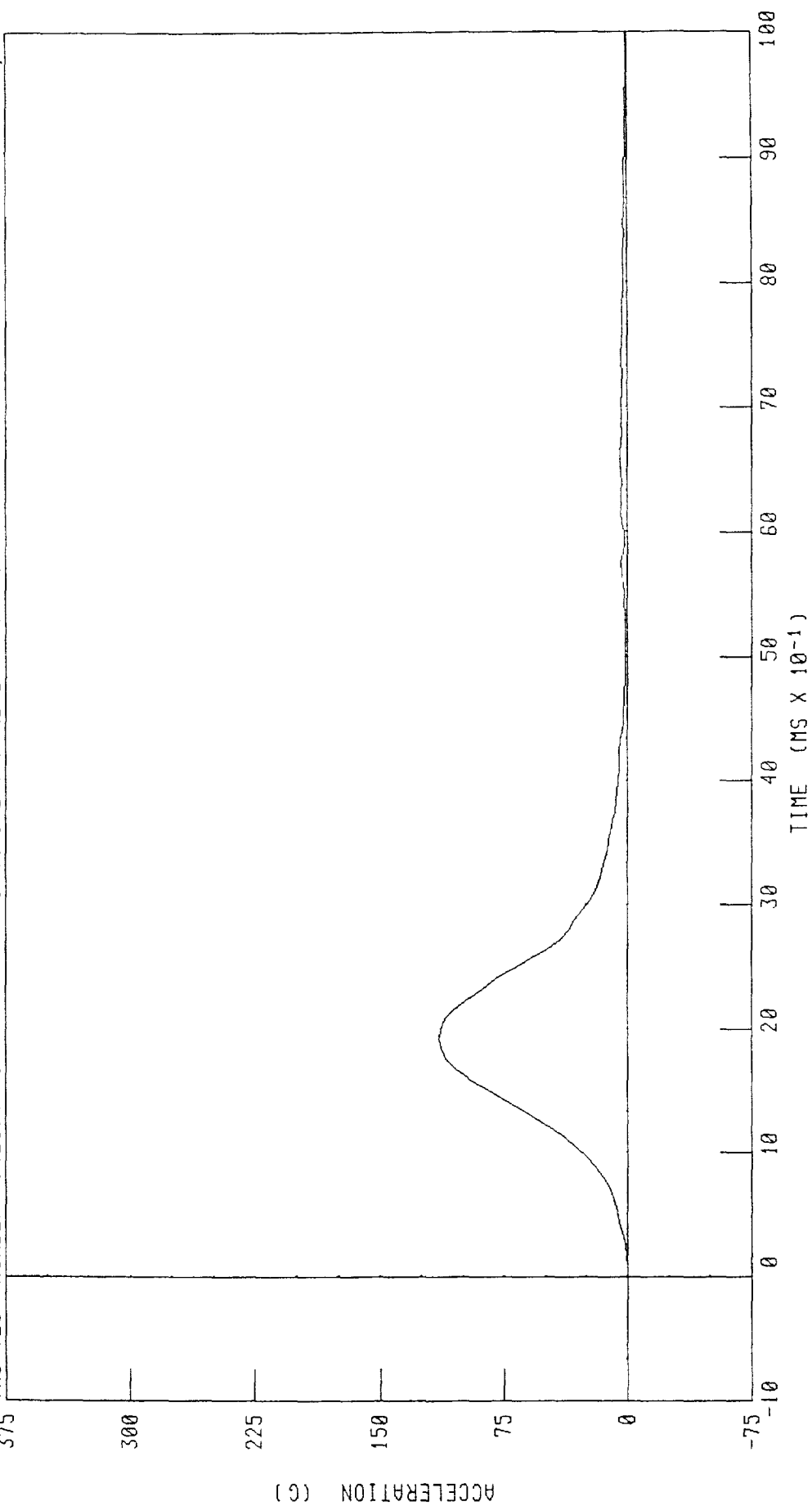
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER 202C04HD1

572E SN202 HEAD DROP CAL 04

RUN NUMBER 091901 1608,2



PEAK DATA 114 04 G 0 1 92 MS, -0 07 G 0 -0 88 MS

CHANNEL HEDZG FILTER CH CLASS 1000

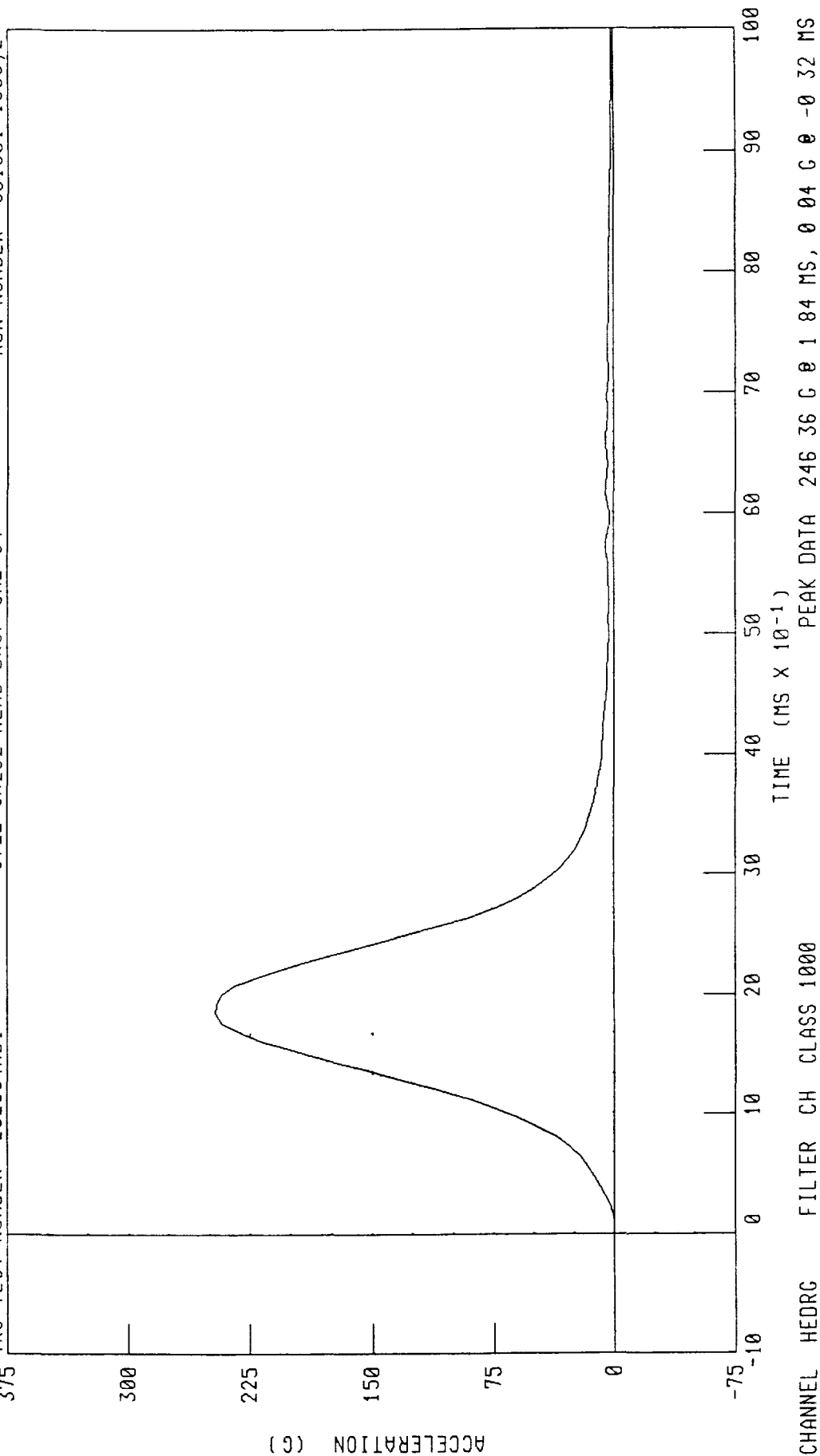
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER 202C04HD1

572E SN202 HEAD DROP CAL 04

RUN NUMBER 091901 1608,2



CHANNEL HEDRC FILTER CH CLASS 1000

PEAK DATA 246 36 G @ 1 84 MS, 0 04 G @ -0 32 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

21-SEP-01

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 202C04NF1 572E SN202 NECK FLEXION CAL04

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	60.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.97 G
	20 MS	17.60 - 22.60 G	21.51 G
	30 MS	12.50 - 18.50 G	18.02 G
MAX PENDULUM G		29 G MAX	24.55 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.96 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.80 MS
D PLANE	MAX	64 - 78 DEG.	71.72 DEG.
ROTATION	TIME	57 - 64 MS	62.48 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	102.34 NM
	TIME	47 - 58 MS	51.76 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	117.12 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	100.48 MS

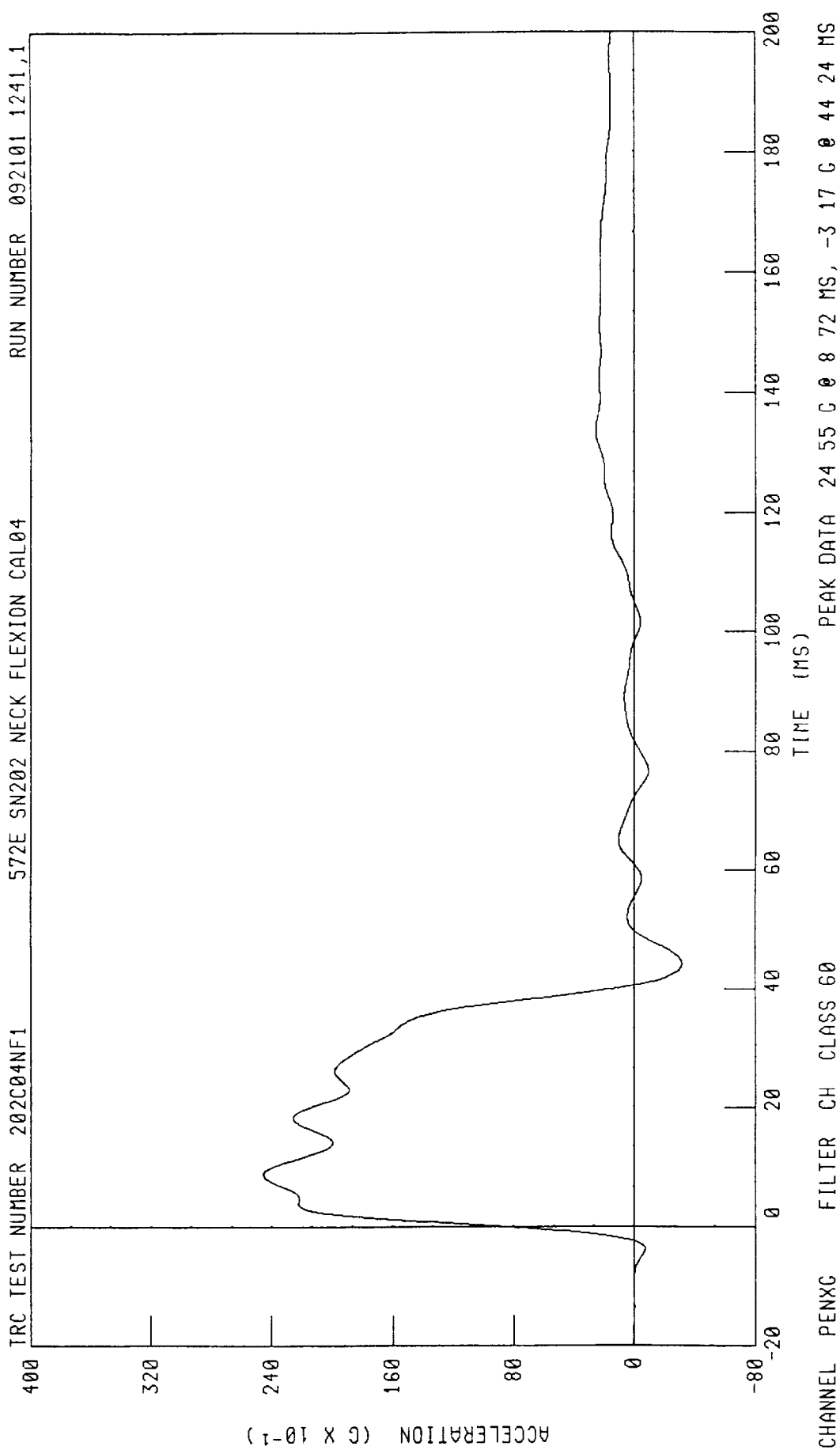
TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092101.1241;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION



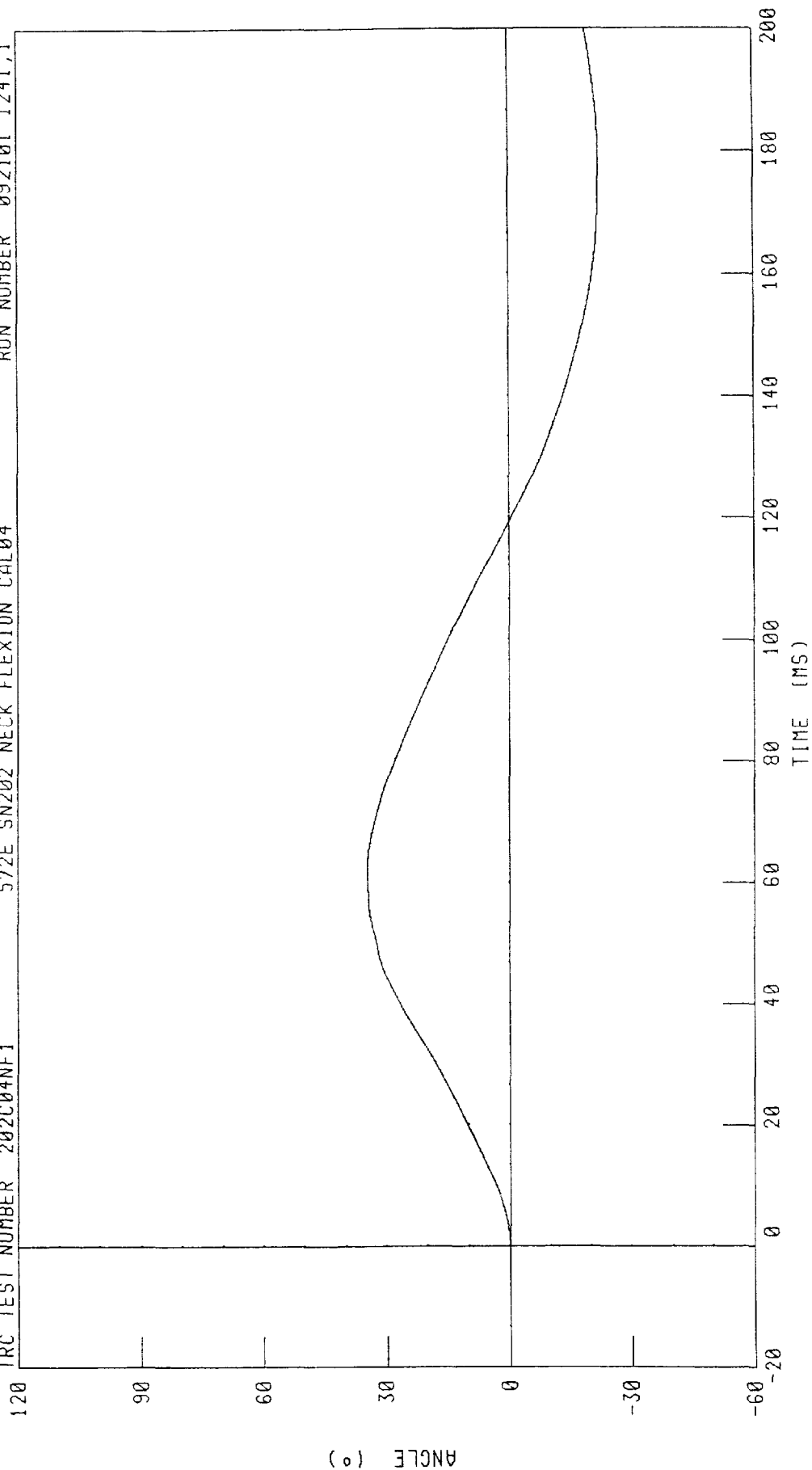
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN202 NECK FLEXION CAL04

RUN NUMBER 092101 1241,1

IRC TEST NUMBER 202C04NF1



PEAK DATA 34 69 ° @ 62 08 MS, -22 23 ° @ 175 12 MS

CHANNEL BETA FILTER CH CLASS 60

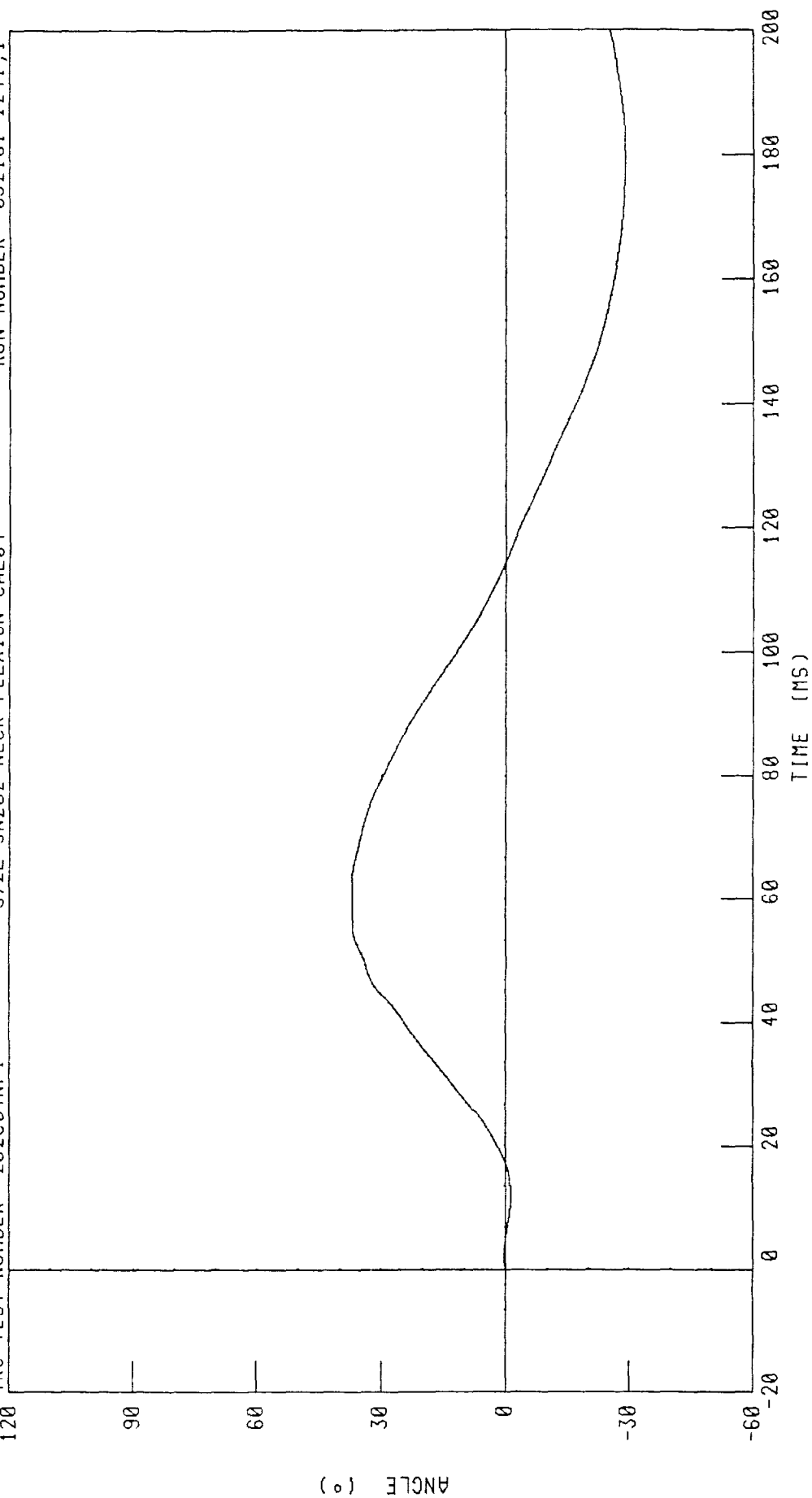
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 202C04NF1

572E SN202 NECK FLEXION CAL04

RUN NUMBER 092101 1241,1



CHANNEL THETA FILTER CH CLASS 60

PEAK DATA 37 06 ° @ 56 24 MS, -29 04 ° @ 180 80 MS

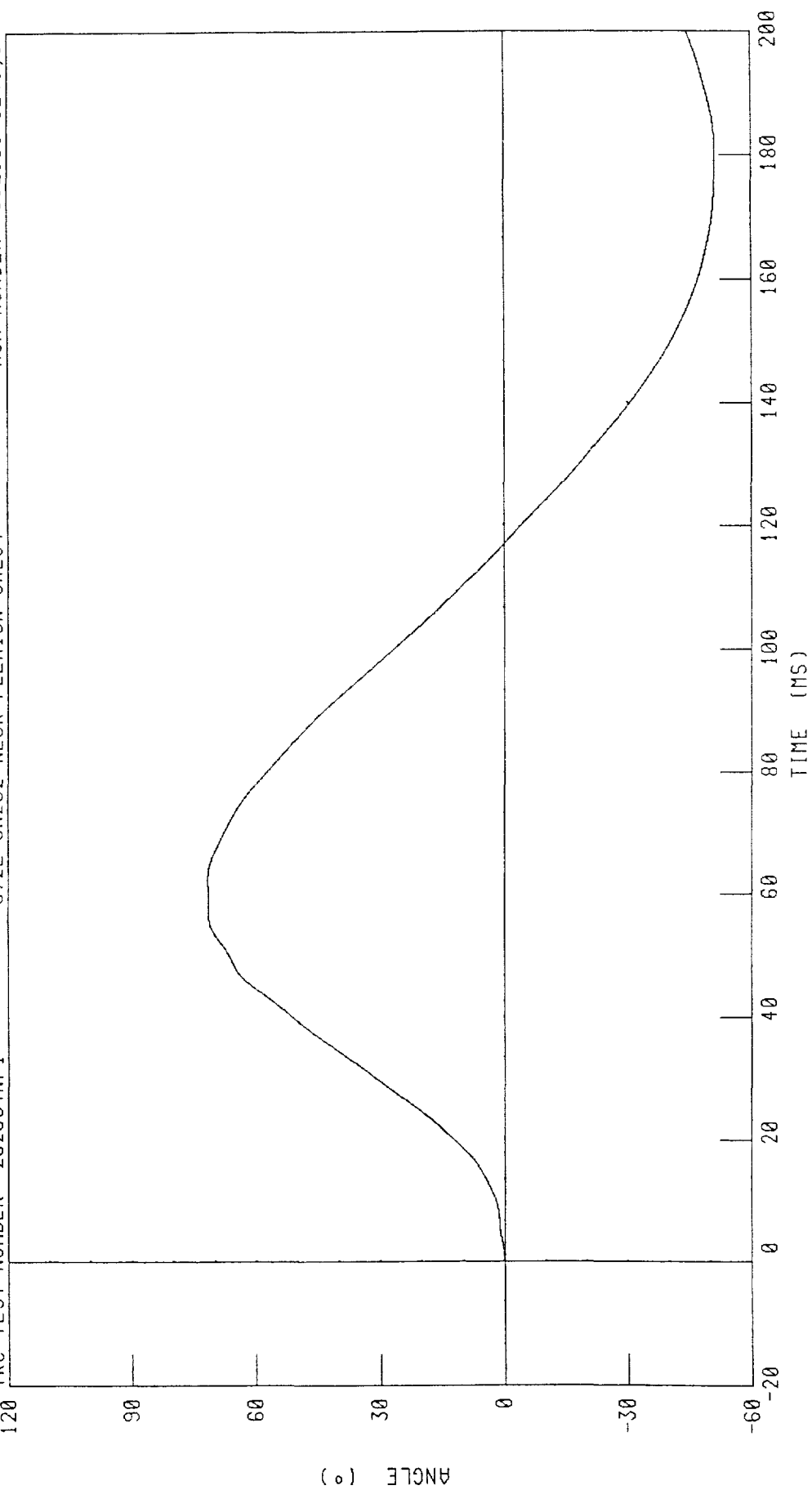
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER 202C04NF1

572E SN202 NECK FLEXION CAL04

RUN NUMBER 092101 1241,1



CHANNEL TOTAL FILTER CH CLASS 60

PEAK DATA 71 73 ° 0 62 48 MS, -51 22 ° 0 178 88 MS

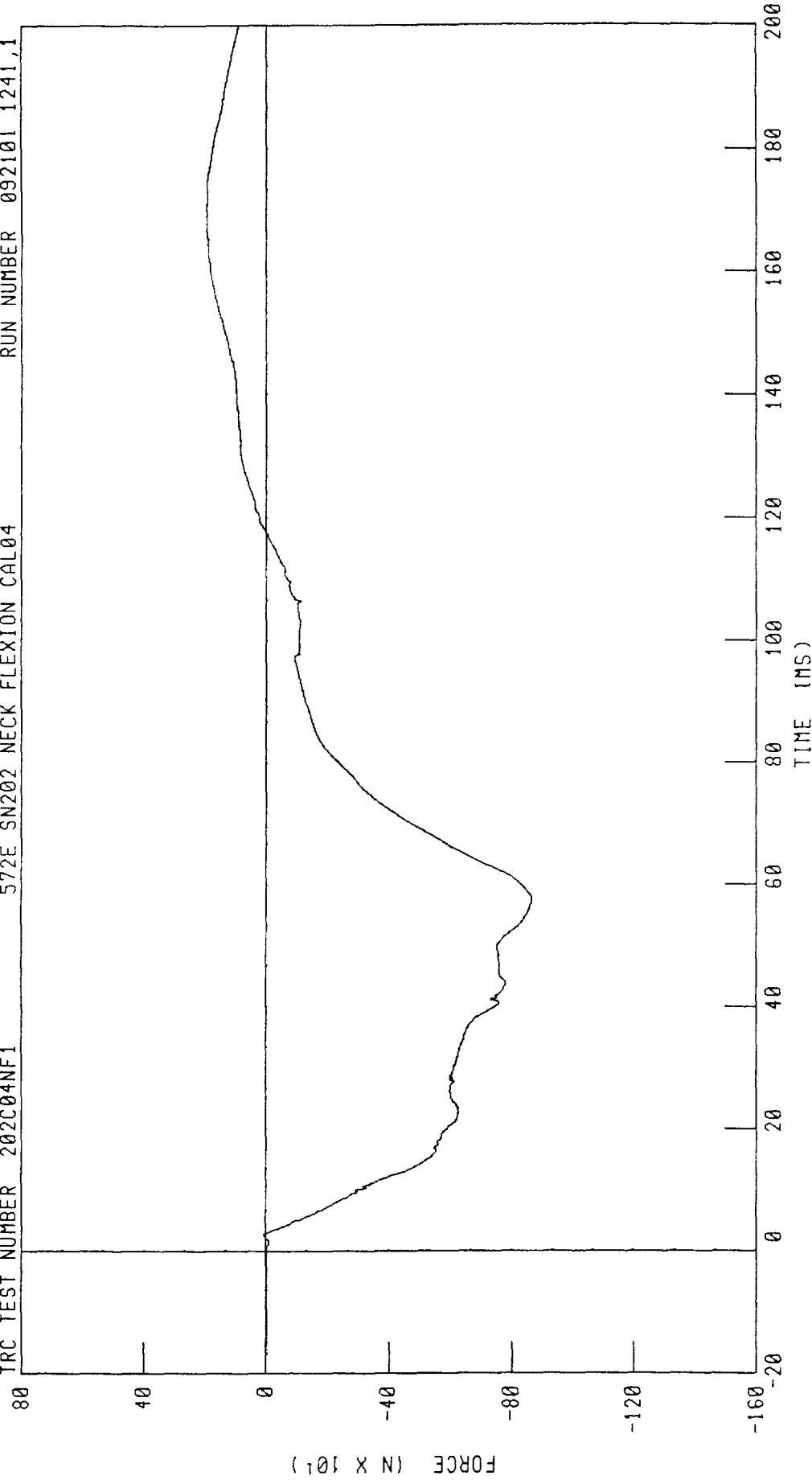
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER 202C04NF1

572E SN202 NECK FLEXION CAL04

RUN NUMBER 092101 1241,1



CHANNEL NEKXF FILTER CH CLASS 1000

PEAK DATA 196 64 N @ 170 40 MS, -867 11 N @ 57 36 MS

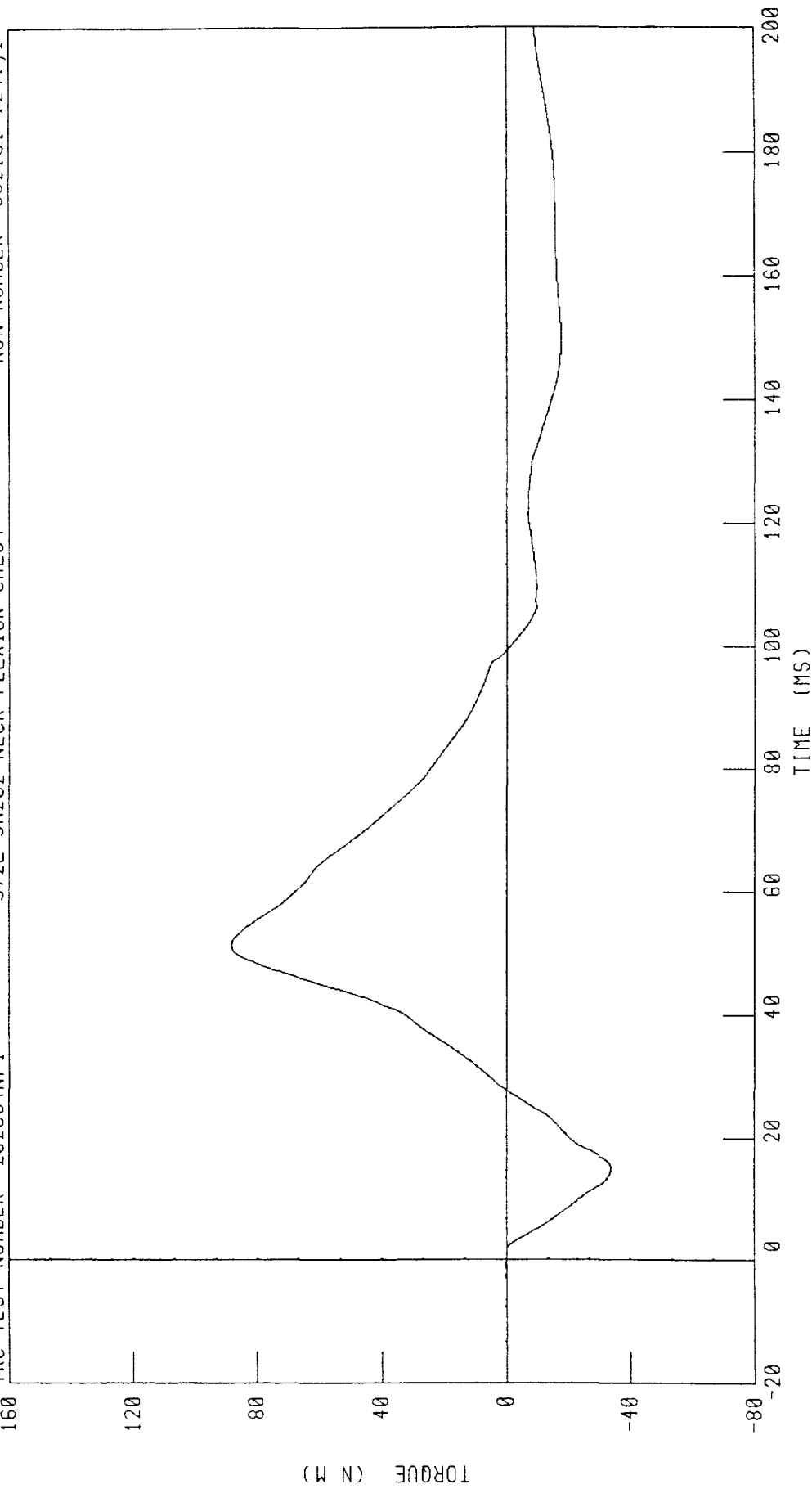
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER 202C04NF1

572E SN202 NECK FLEXION CAL04

RUN NUMBER 092101 1241,1



TIME (MS)

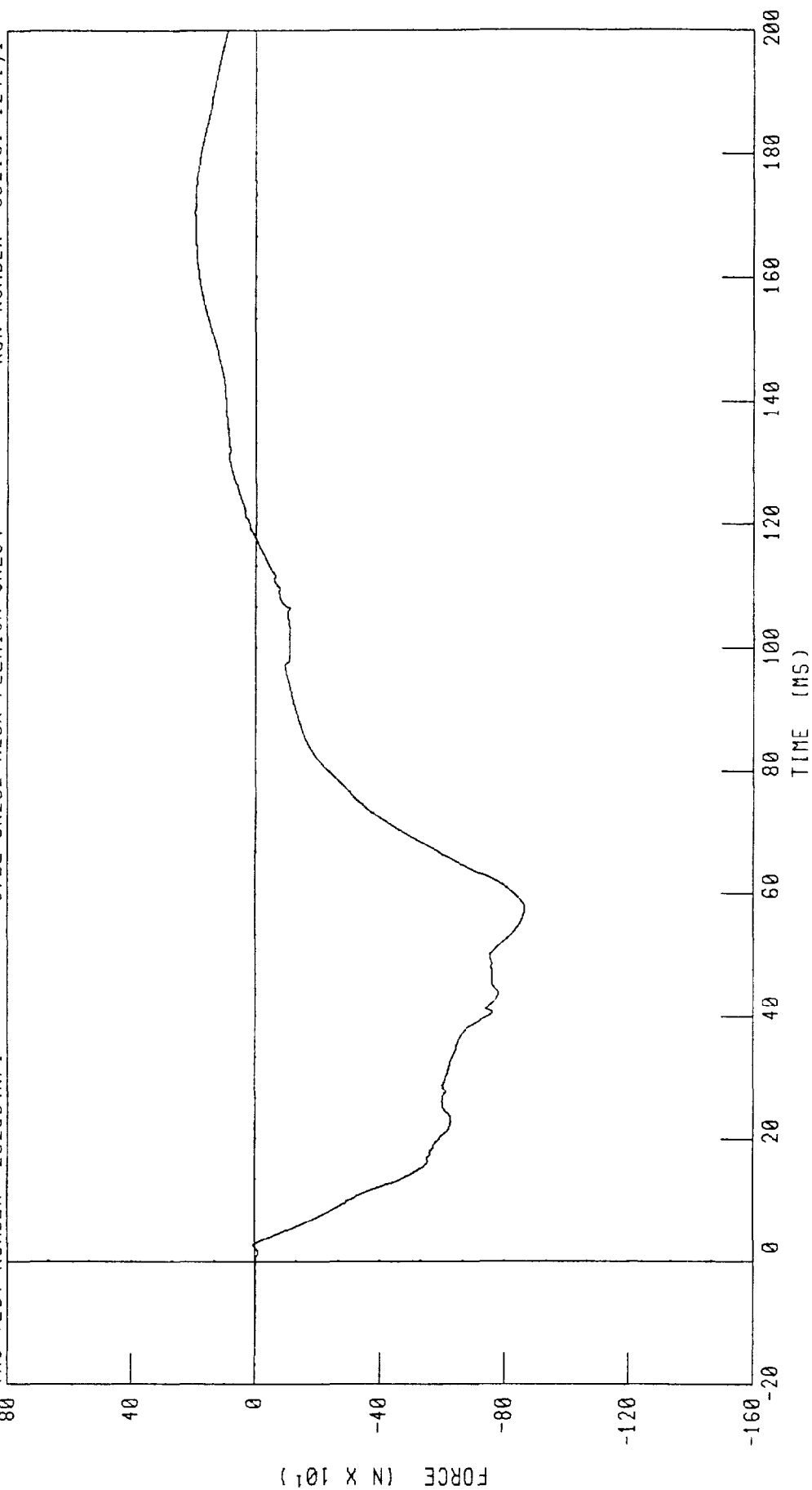
CHANNEL NEKYM FILTER CH CLASS 600

PEAK DATA 88 47 N M @ 51 44 MS, -33 73 N M @ 15 04 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER 202C04NF1 572E SN202 NECK FLEXION CAL04 RUN NUMBER 092101 1241,1



CHANNEL NEKXFC FILTER CH CLASS 600

PEAK DATA 196 49 N @ 170 40 MS, -866 87 N @ 57 68 MS

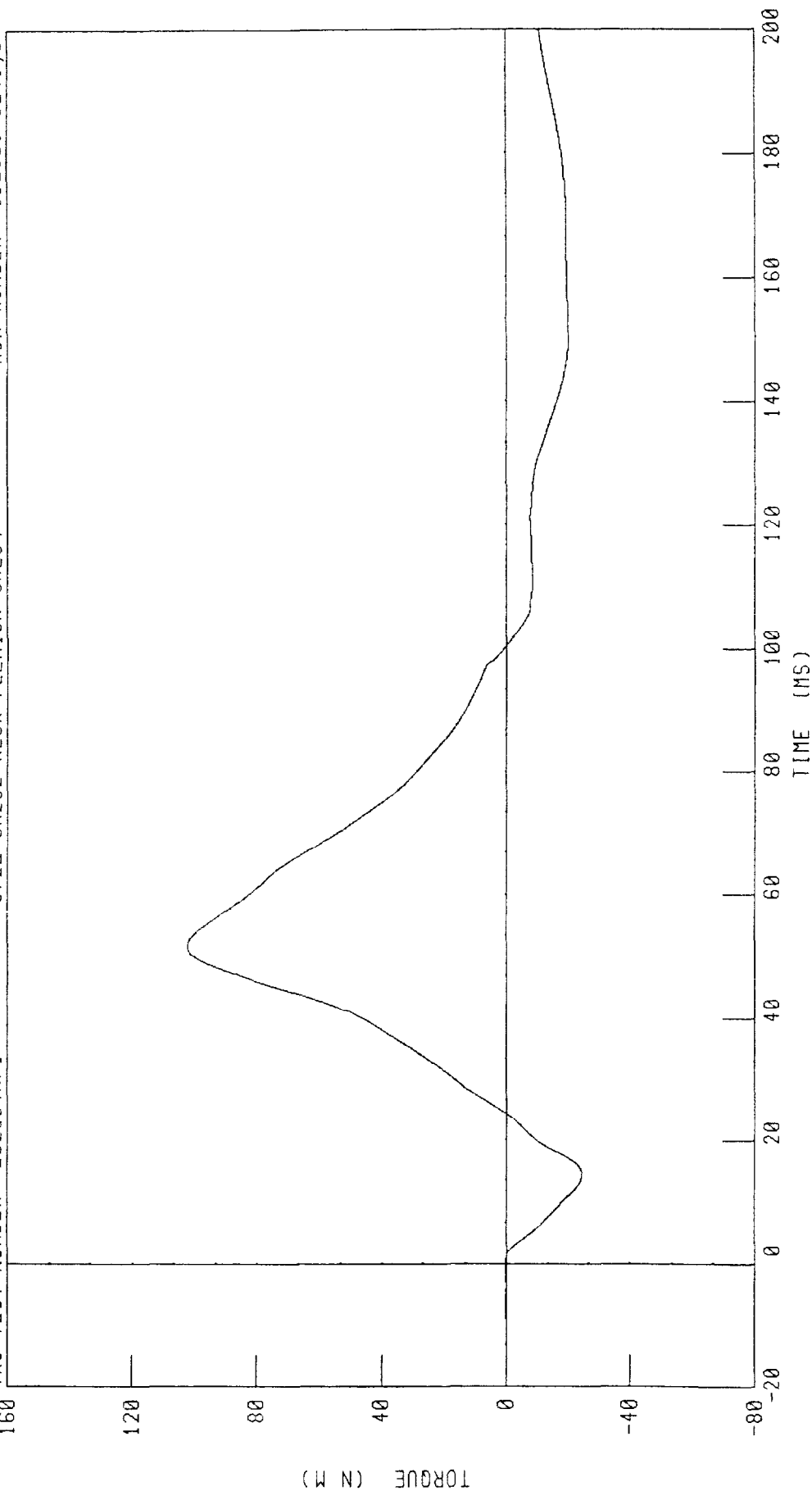
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 202C04NF1

572E SN202 NECK FLEXION CAL04

RUN NUMBER 092101 1241,1



CHANNEL NEKOM FILTER CH CLASS 600 PEAK DATA 102 34 N M 0 51 76 MS, -24 46 N M 0 14 48 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

21-SEP-01

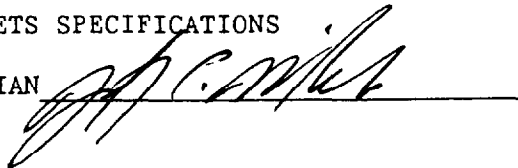
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 202C04NE2 572E SN202 NECK EXT CAL04

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	61.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.05 G
	20 MS	14.00 - 19.00 G	18.28 G
	30 MS	11.00 - 16.00 G	14.55 G
MAX PENDULUM G		22 G MAX	19.11 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.50 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	42.00 MS
D PLANE	MAX	81 - 106 DEG.	96.73 DEG.
ROTATION	TIME	72 - 82 MS	77.92 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-71.55 NM
	TIME	65 - 79 MS	72.96 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	157.12 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	141.12 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092101.1408;1

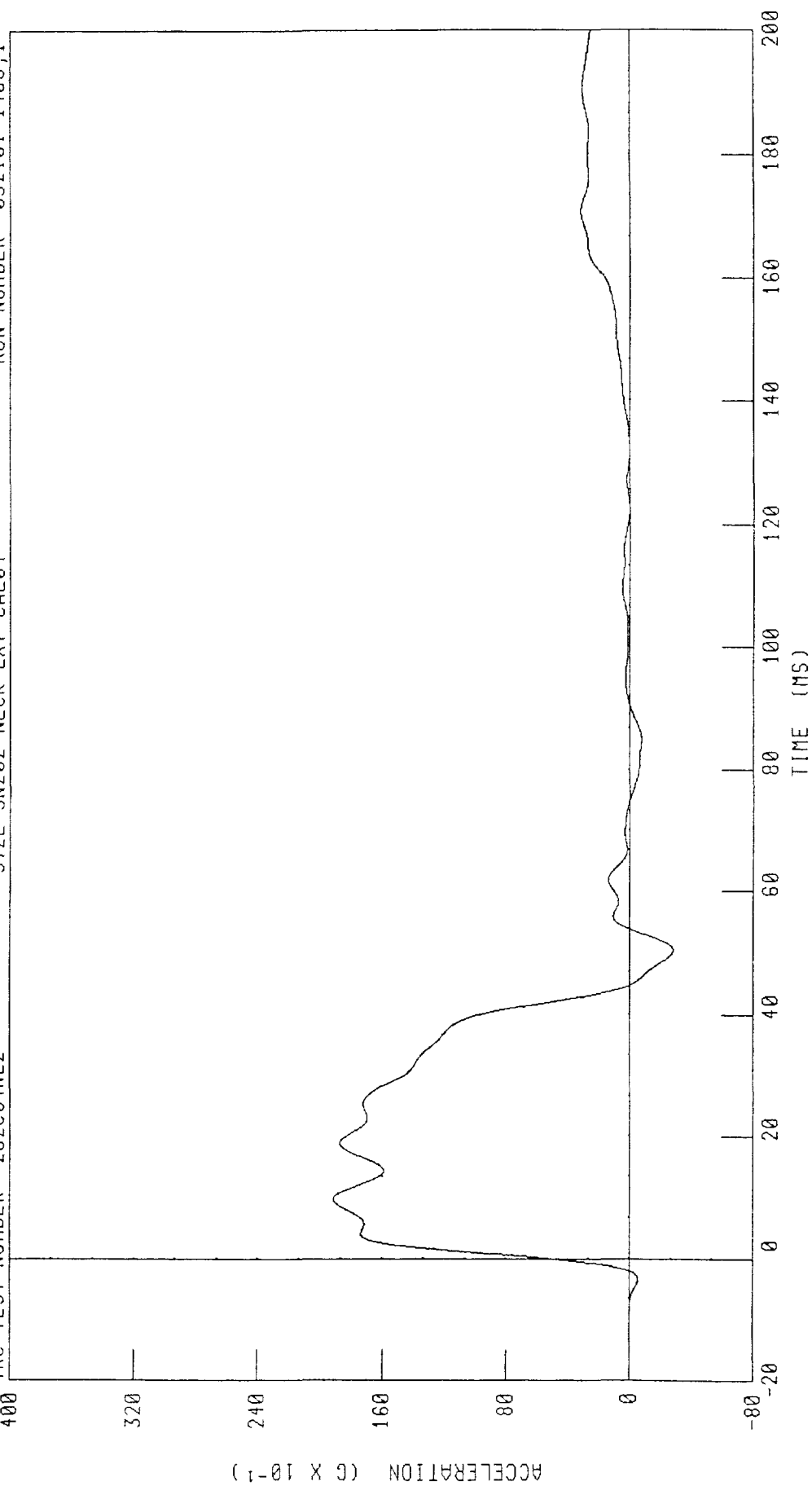
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER 202C04NE2

572E SN202 NECK EXT CAL04

RUN NUMBER 092101 1408,1



CHANNEL PENXC FILTER CH CLASS 60 PEAK DATA 19 11 G 0 9 60 MS, -2 85 G 0 50 32 MS

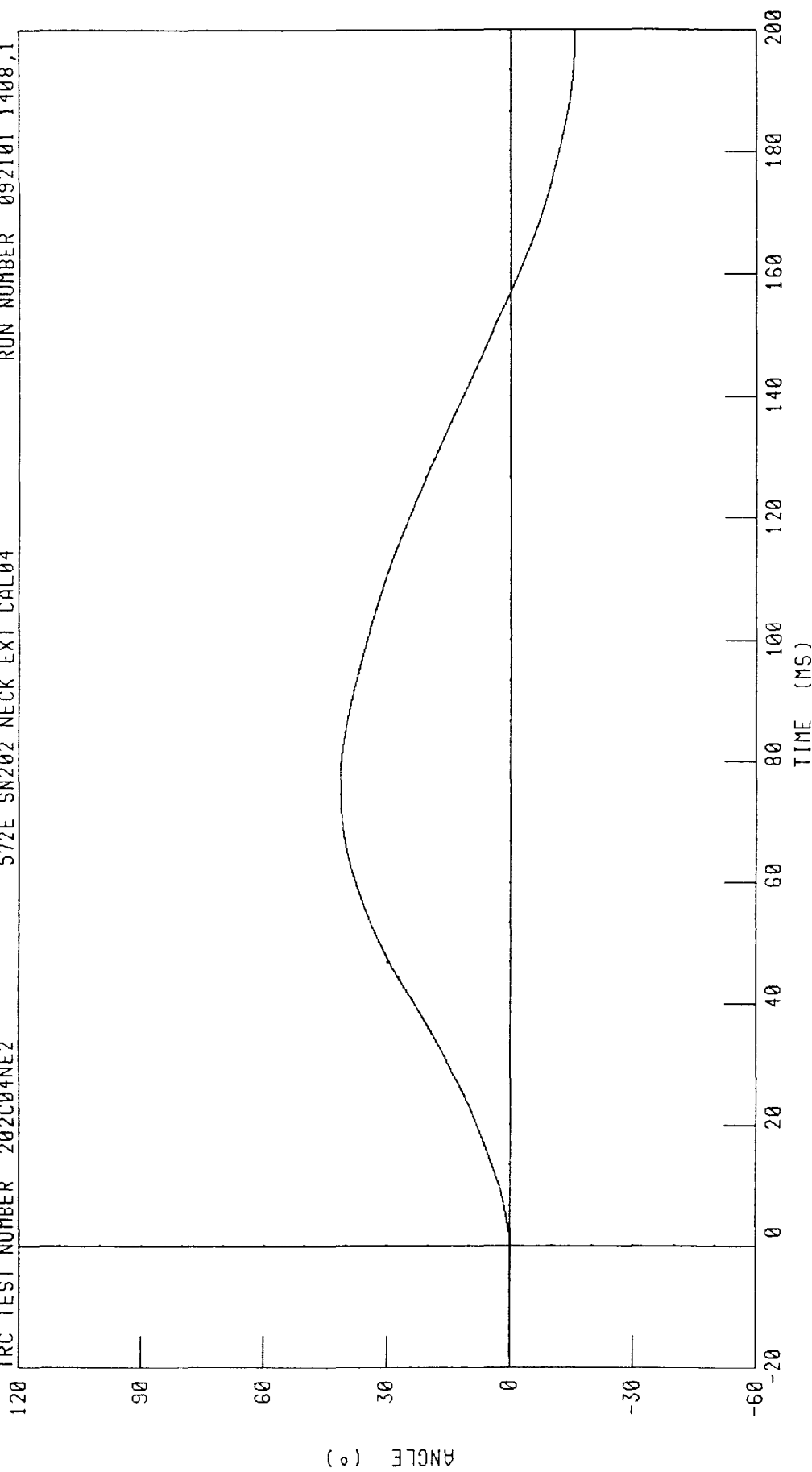
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER 202C04NE2

572E SN202 NECK EXT CAL04

RUN NUMBER 092101 1408,1



CHANNEL BETA FILTER CH CLASS 60

PEAK DATA 41 43 ° @ 76 24 MS, -15 91 ° @ 200 00 MS

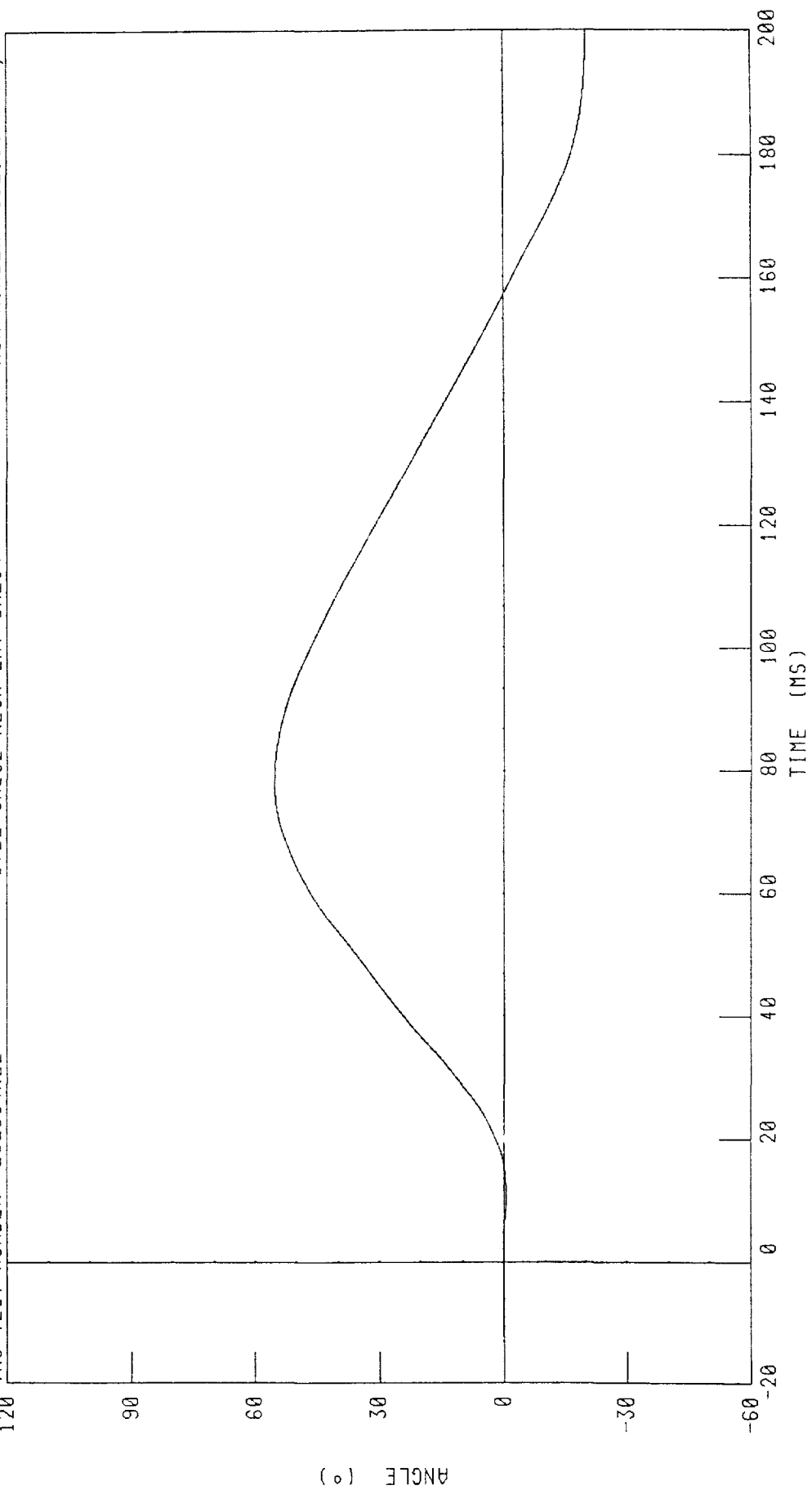
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

IRC TEST NUMBER 202C04NE2

572E SN202 NECK EXT CAL04

RUN NUMBER 092101 1408,1



CHANNEL THETA FILTER CH CLASS 60 PEAK DATA 55 38 ° @ 79 04 MS, -20 22 ° @ 200 00 MS

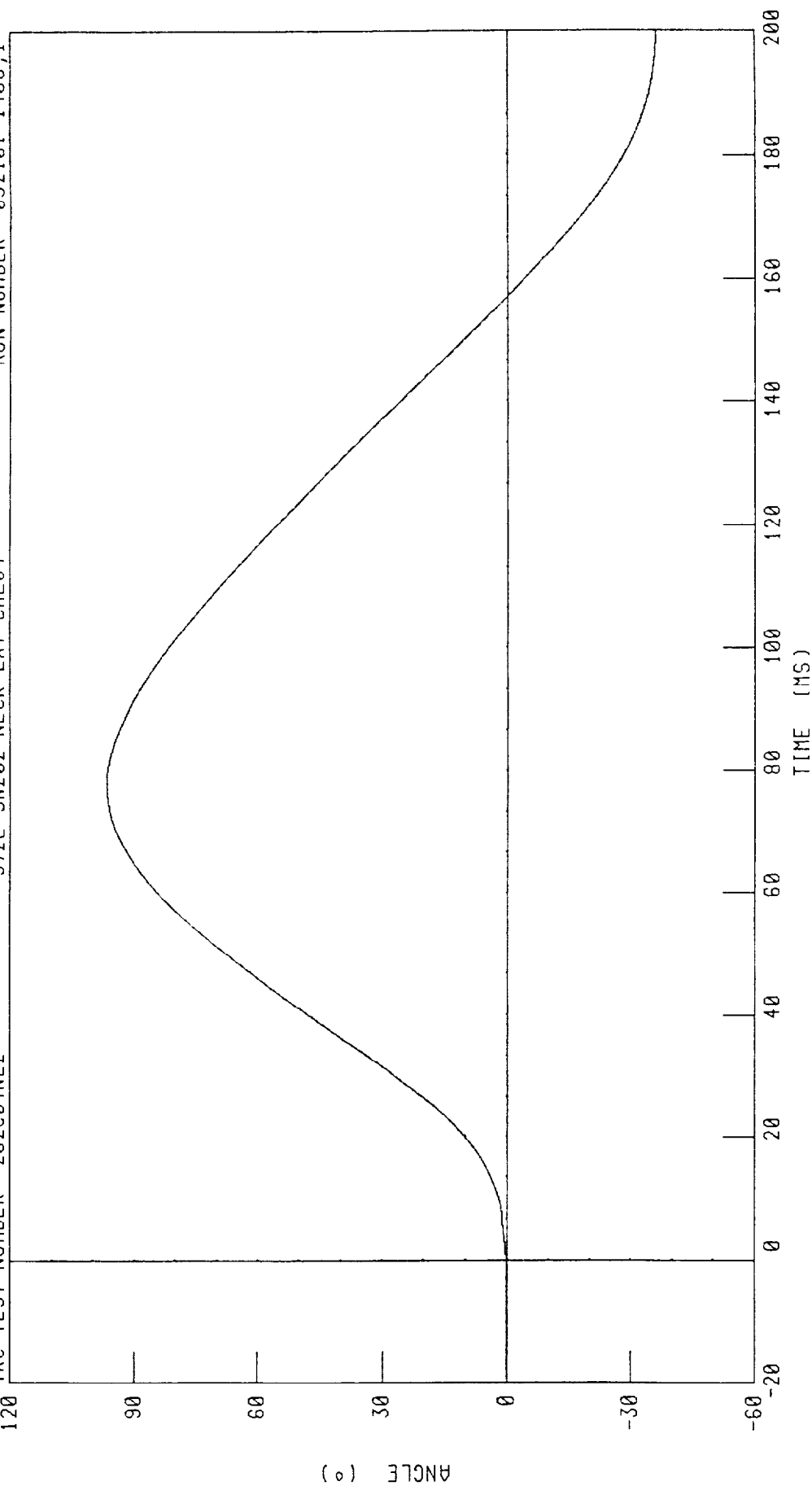
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER 202C04NE2

572E SN202 NECK EXT CAL04

RUN NUMBER 092101 1408,1

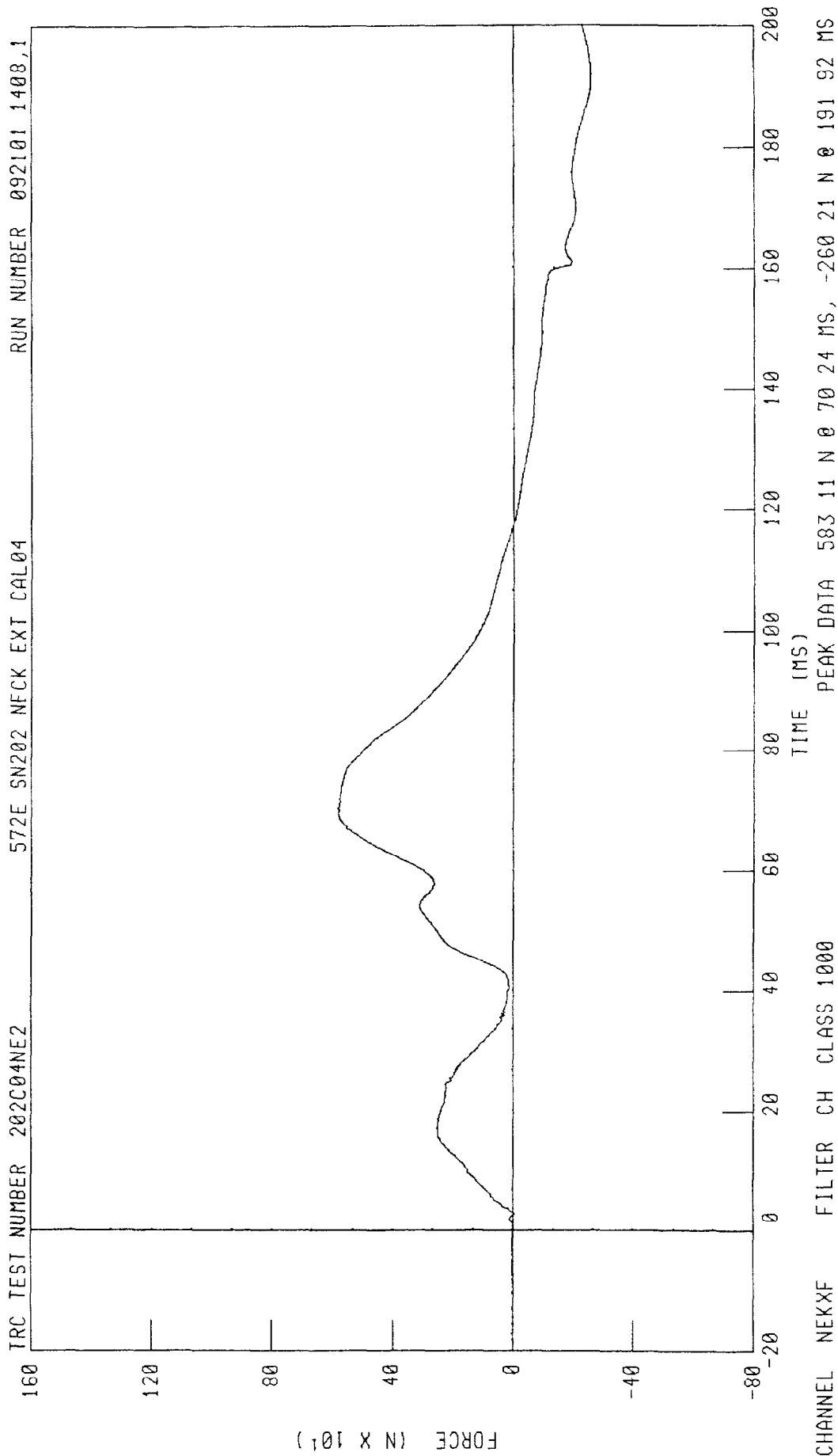


CHANNEL TOTAL FILTER CH CLASS 60

PEAK DATA 96 73 ° 0 77 92 MS, -36 13 ° 0 200 00 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

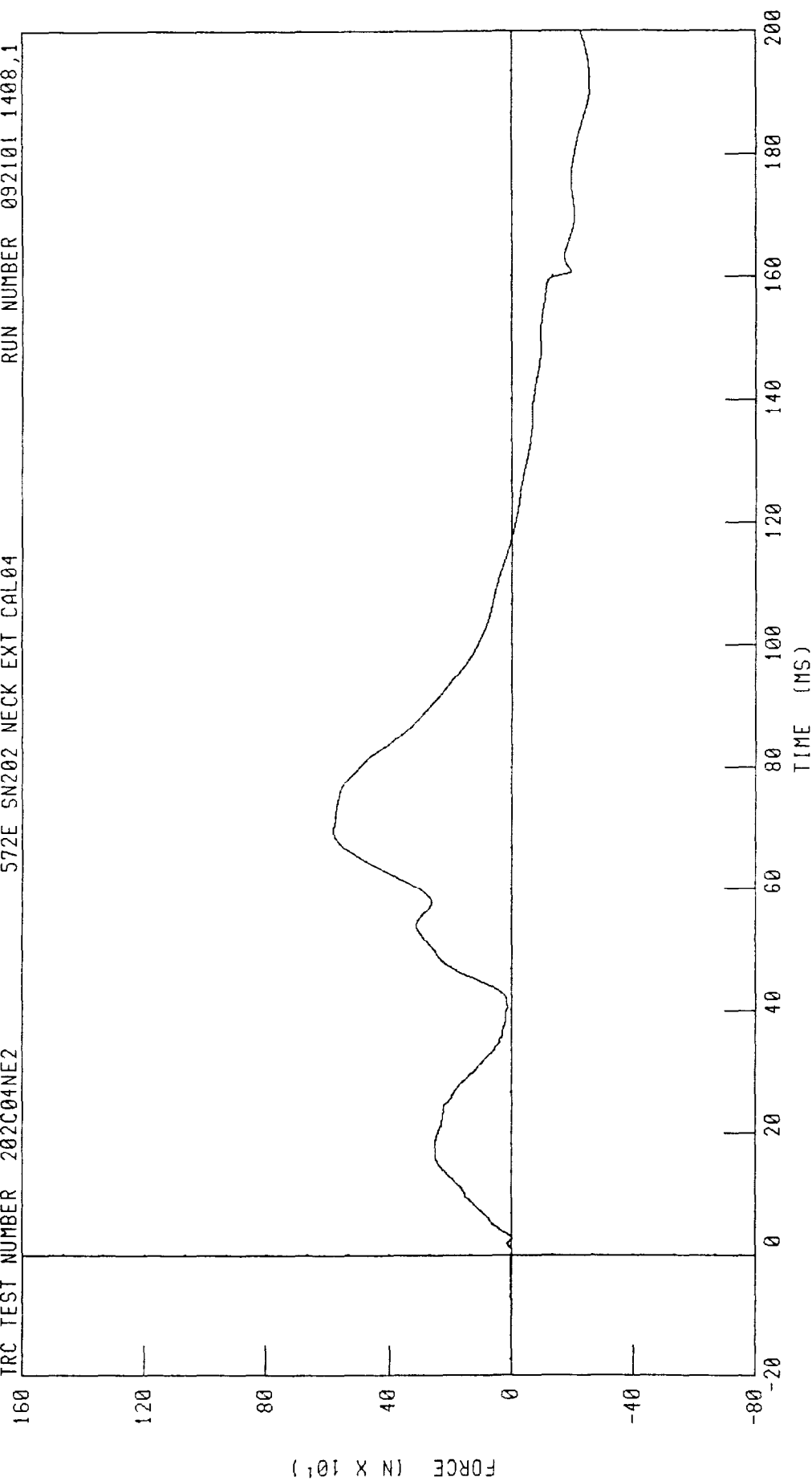
NECK FORCE X AXIS



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER 202C04NE2 572E SN202 NECK EXT CAL04 RUN NUMBER 092101 1408,1



CHANNEL NEKXFC FILTER CH CLASS 600

PEAK DATA 581 37 N @ 70 16 MS, -259 34 N @ 191 20 MS

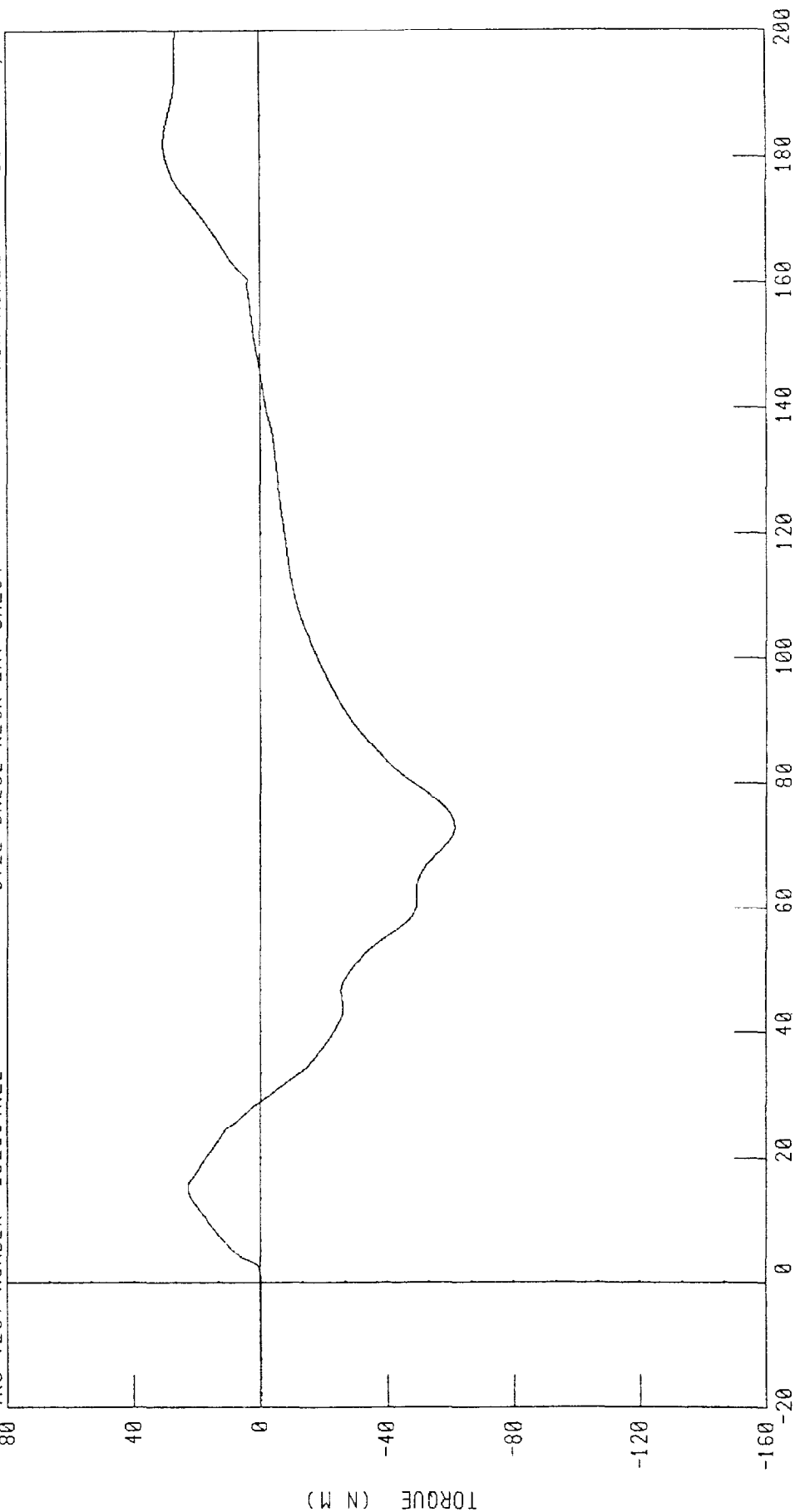
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER 202C04NE2

572E SN202 NECK EXT CAL04

RUN NUMBER 092101 1408,1



TIME (MS)

PEAK DATA 30 52 N M @ 182 00 MS, -61 36 N M @ 73 04 MS

CHANNEL NEKYM FILTER CH CLASS 600

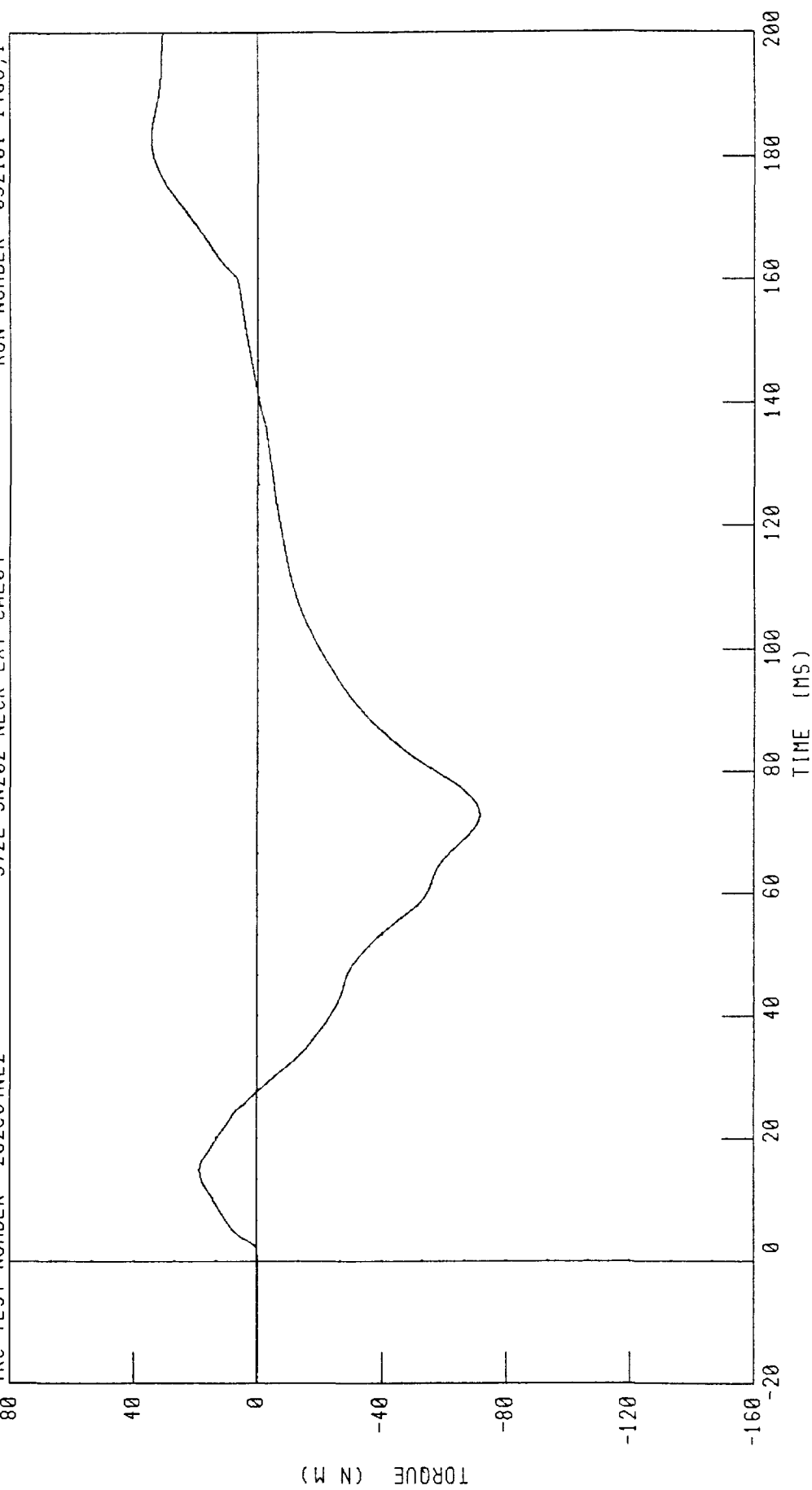
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 202C04NE2

572E SN202 NECK EXT CAL04

RUN NUMBER 092101 1408,1



CHANNEL NEKOM FILTER CH CLASS 600

PEAK DATA 34 40 N M @ 182 80 MS, -71 55 N M @ 72 96 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

21-SEP-01

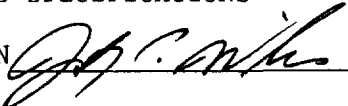
TRC INC.

TEST NO: 202C04TH1

572E SN202 H.S.THORAX CAL04

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	64.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	67.8 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5710. N
INTERNAL HYSTERESIS	69% - 85%	72.1%

TEST MEETS SPECIFICATIONS

TECHNICIAN 

RUN NUMBER: 092101.1822;1

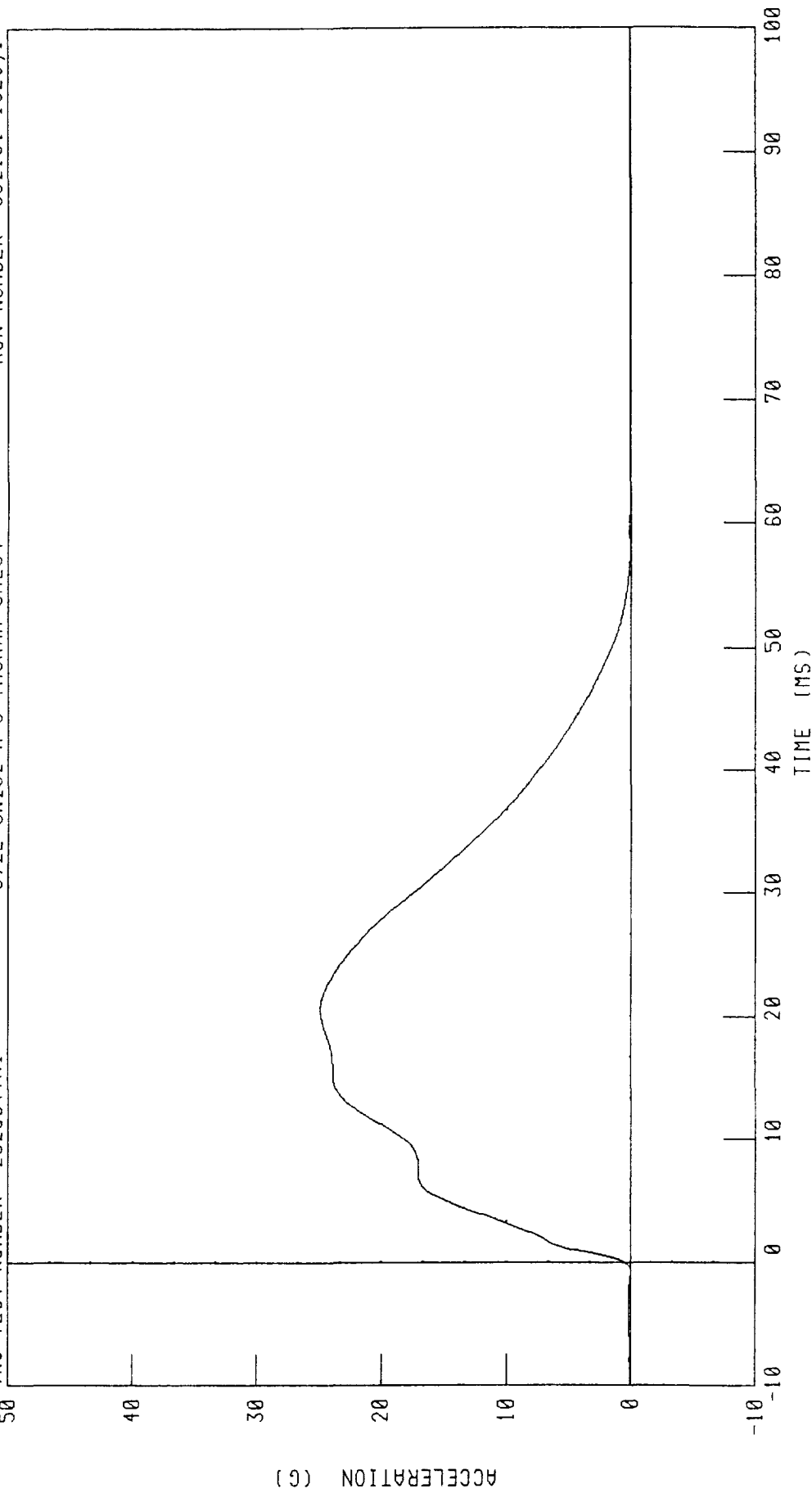
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER 202C04TH1

572E SN202 H S THORAX CAL04

RUN NUMBER 092101 1823,1



CHANNEL PENXG FILTER CH CLASS 180

PEAK DATA 24 93 G 0 20 64 MS, -0 01 G 0 -0 72 MS

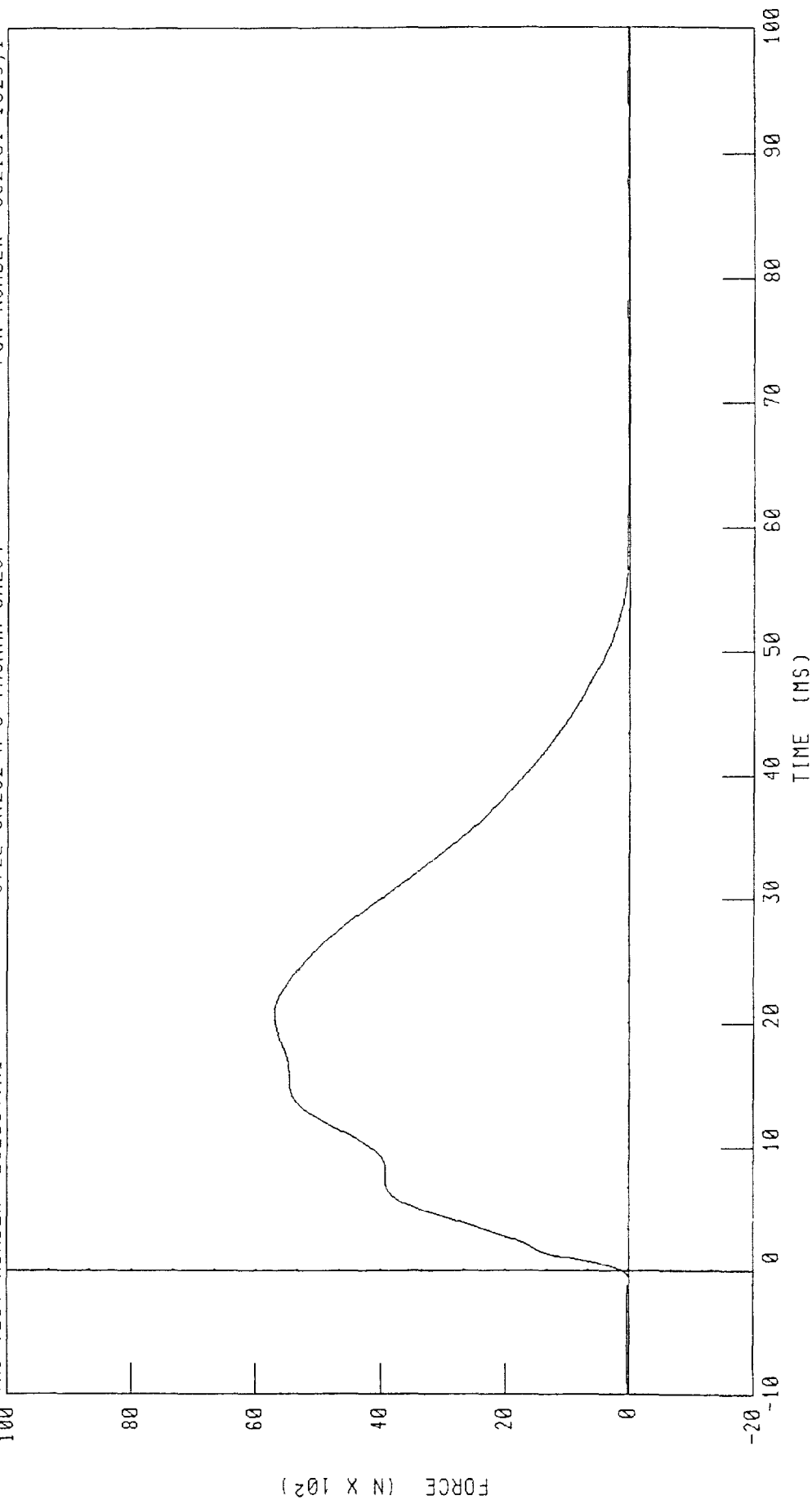
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER 202C04TH1

572E SN202 H S THORAX CAL04

RUN NUMBER 092101 1823,1



CHANNEL PENXF FILTER CH CLASS 180 PEAK DATA 5710 71 N 0 20 64 MS, -2 67 N 0 -0 72 MS

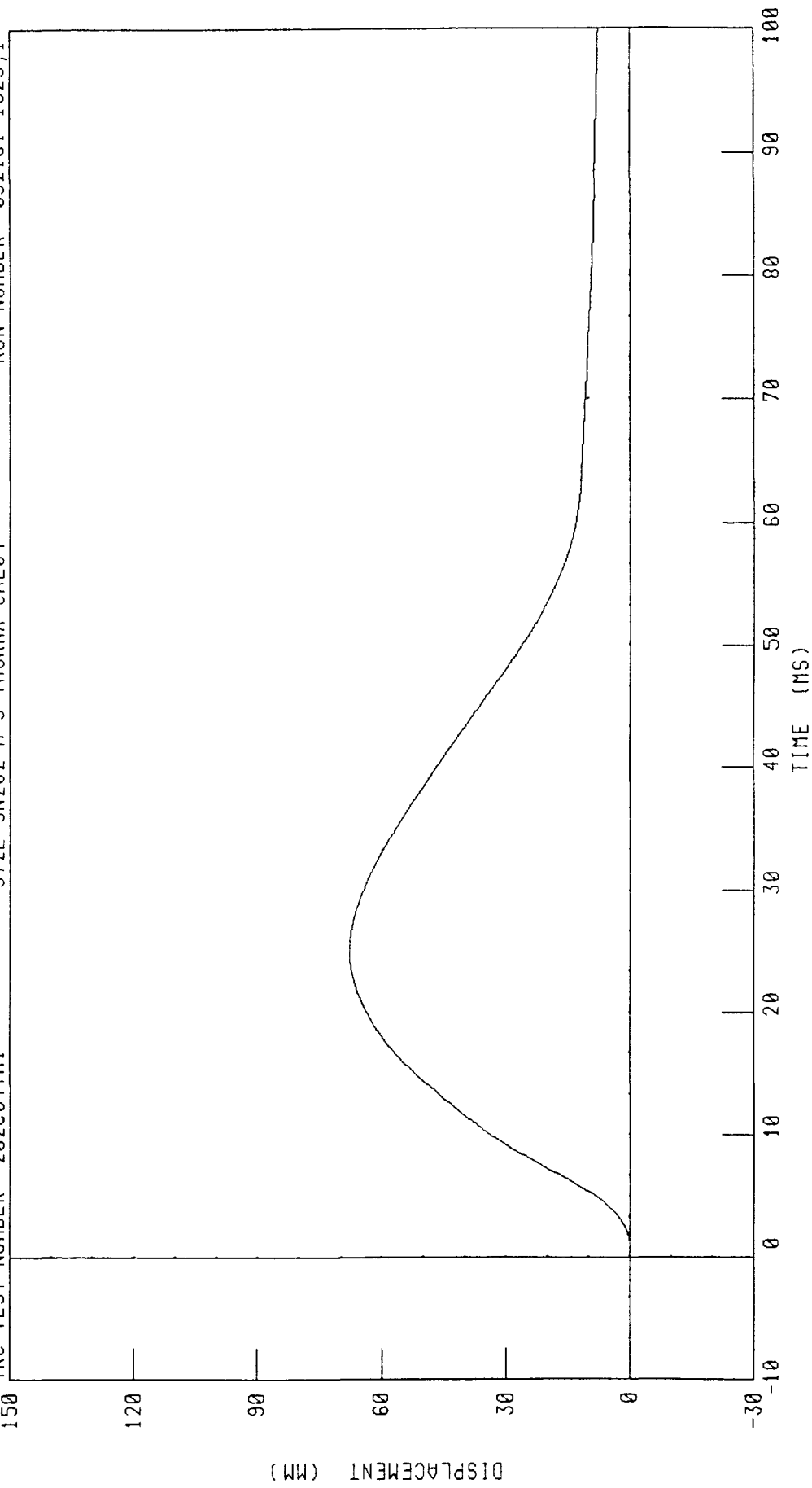
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER 202C04TH1

572E SN202 H S THORAX CAL04

RUN NUMBER 092101 1823,1



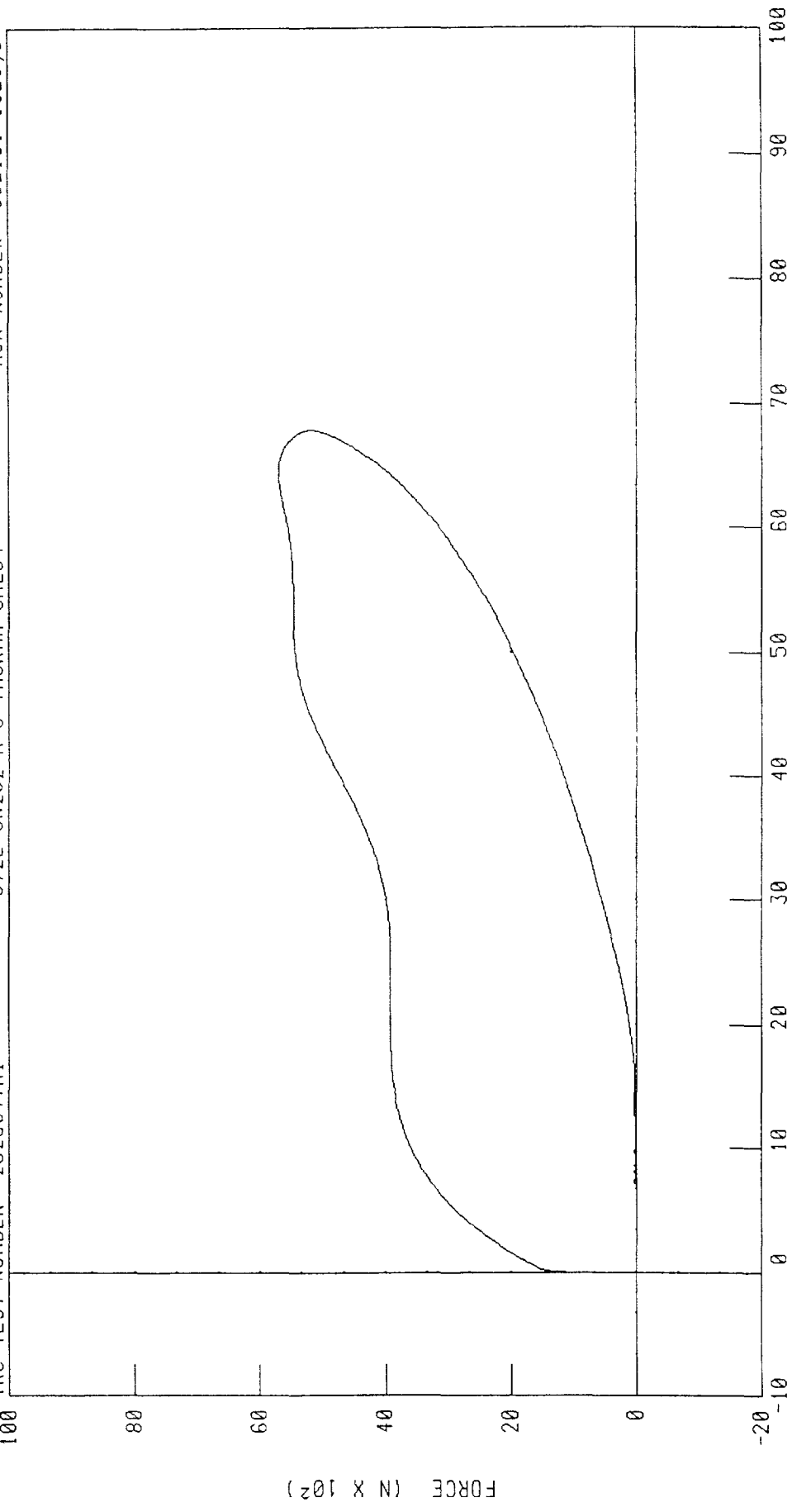
CHANNEL CSTXD FILTER CH CLASS 180 PEAK DATA 67 85 MM @ 25 12 MS, -0 02 MM @ 0 64 MS

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

572E SN202 H S THORAX CAL04

TRC TEST NUMBER 202C04TH1

RUN NUMBER 092101 1823,1



CHANNEL CSTXD FILTER CH CLASS 180
 PENXF CH CLASS 180

DISPLACEMENT (MM) PEAK DATA 67 85 MM @ 25 12 MS, -0 02 MM @ 0 64 MS
 5710 71 N @ 20 64 MS, -2 67 N @ -0 72 MS

Transportation Research Center Inc

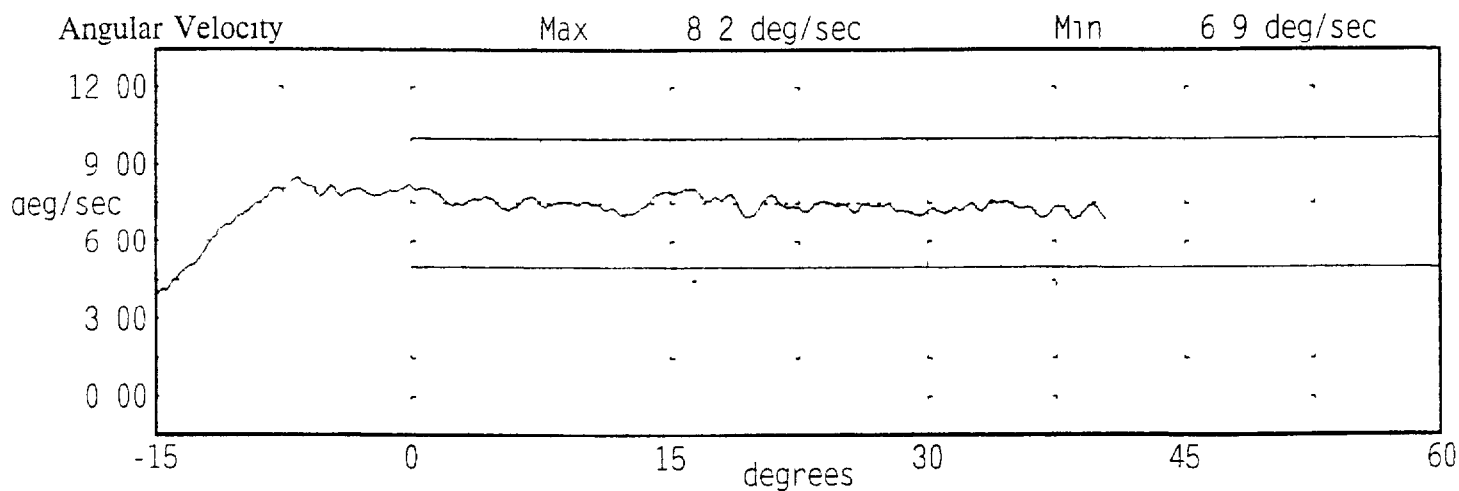
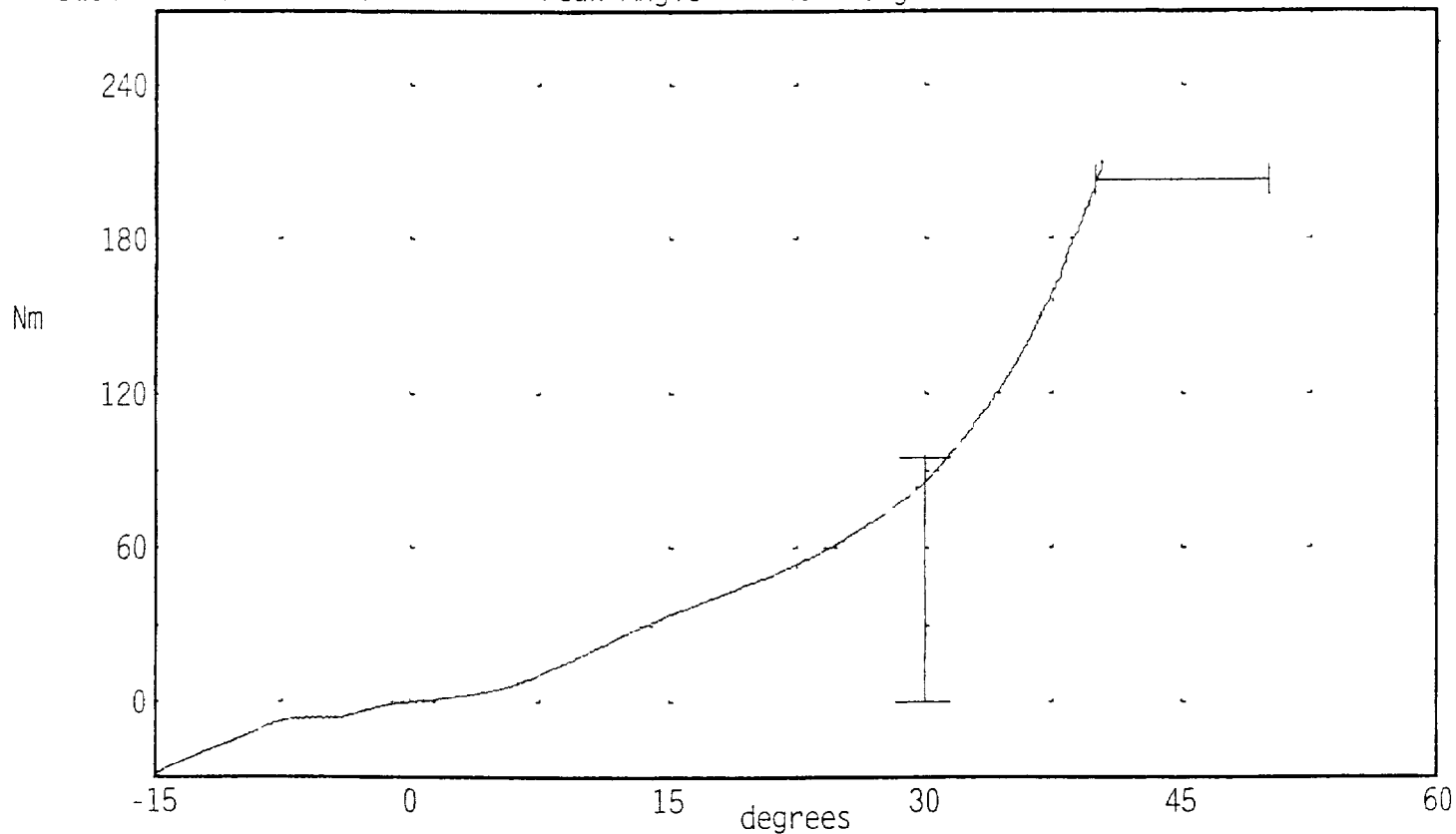
Hybrid III Hip Range of Motion

Serial Number 202L
Test Number 202C03
Comments

Date. 09/13/2001
Time 08 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.7 °C	Pass
Humidity	10 - 70	61 %	Pass
Moment at 30 deg	<= 94.9	85.6 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	40.1 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point
Peak Moment 210.5 Nm at 40.4 deg
Peak Angle 40.4 deg at 210.5 Nm



Transportation Research Center Inc

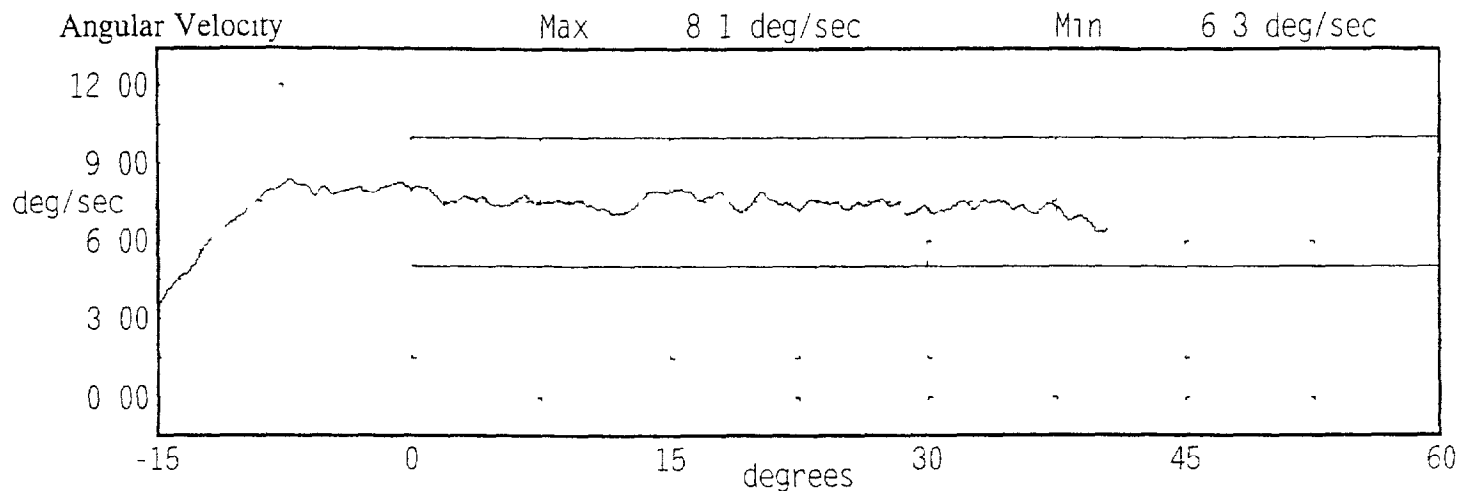
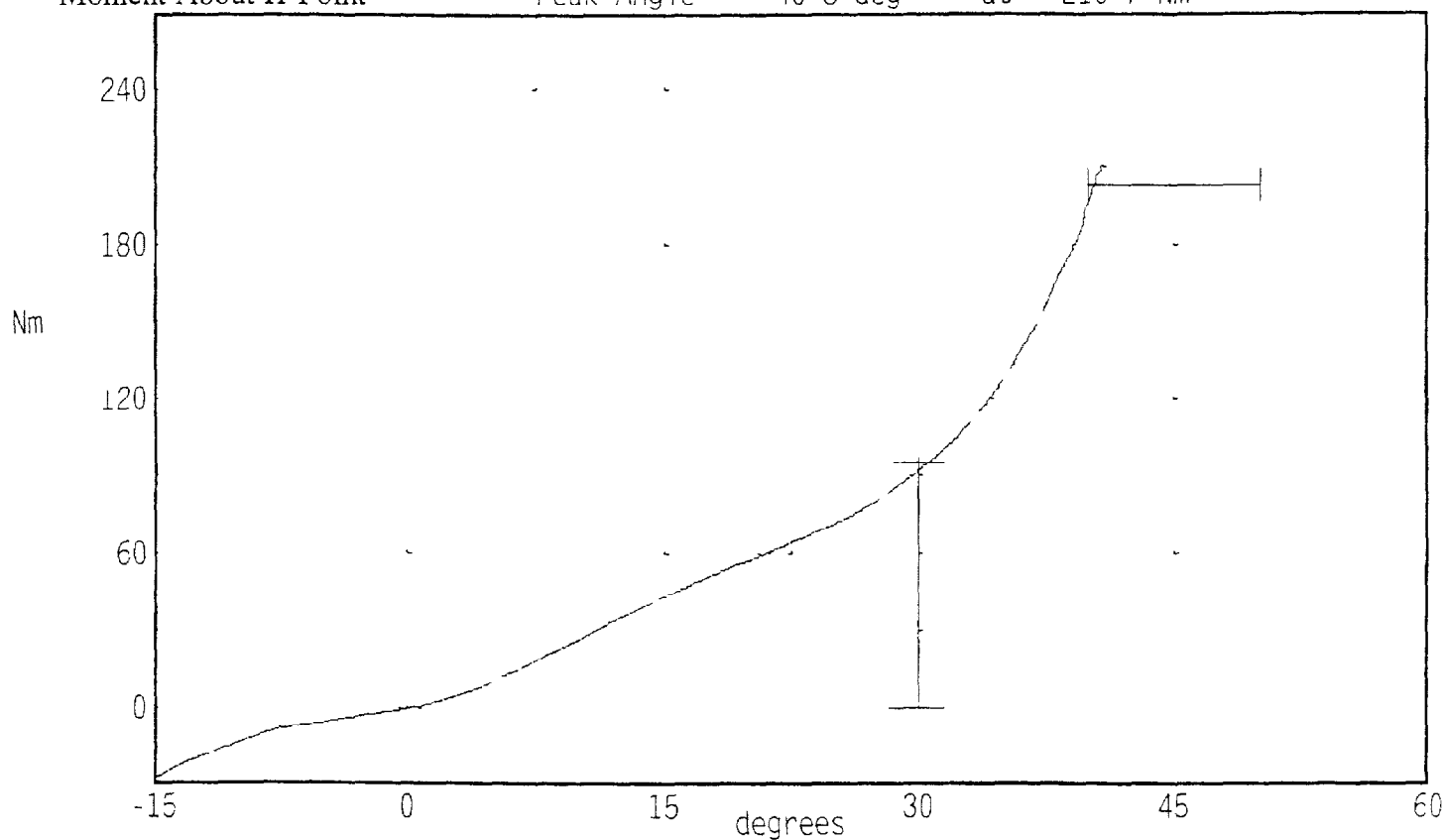
Hybrid III Hip Range of Motion

Serial Number 202R
Test Number 202C03
Comments

Date 09/13/2001
Time 08 02

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.7 °C	Pass
Humidity	10 - 70	61 %	Pass
Moment at 30 deg	<= 94.9	92.1 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	40.4 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point
Peak Moment 210.7 Nm at 40.8 deg
Peak Angle 40.8 deg at 210.7 Nm



TRANSPORTATION RESEARCH CENTER INC.

KNEE SLIDER TEST

HYBRID III 50th

19-SEP-01

LEFT KNEE

TRC INC.

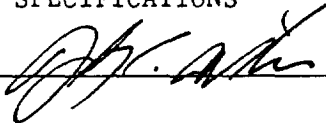
TEST NO: 202C04LS1

572E SN202 LEFT SLIDER CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	62.0 %
PENDULUM VELOCITY	2.70-2.80 M/S	2.78 M/S
FORCE AT 10.0 MM DISPLACEMENT	1259 - 1721 N	1443. N
FORCE AT 18.0 MM DISPLACEMENT	2268 - 3096 N	2668. N

TEST MEETS SPECIFICATIONS

TECHNICIAN

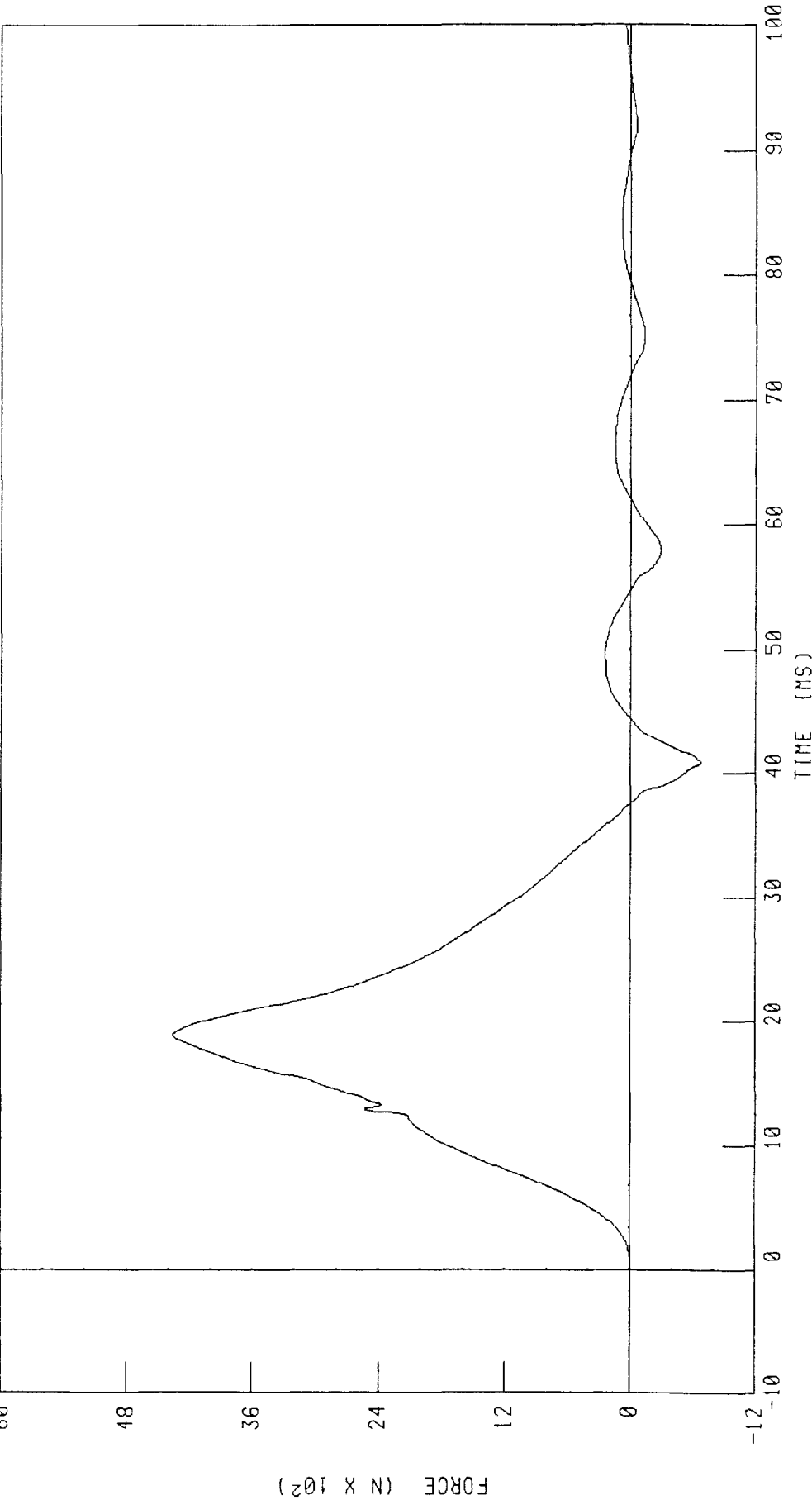


RUN NUMBER: 091901.1115;1

PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION

LEFT FEMUR FORCE

IRC TEST NUMBER 202C04LS1 572E SN202 LEFT SLIDER CAL 04 RUN NUMBER 091901 1115,1



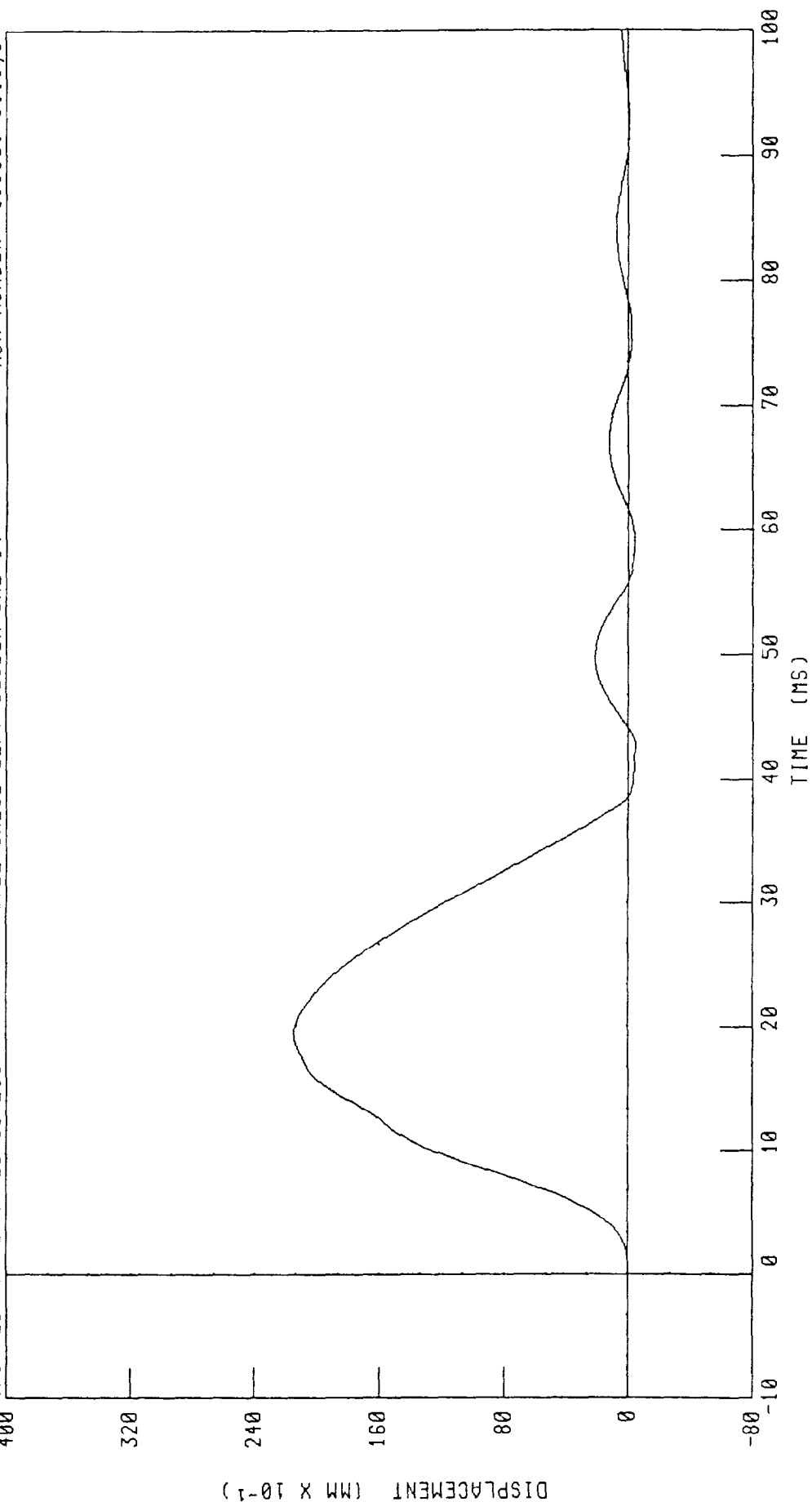
CHANNEL LFMF FILTER CH CLASS 600

PEAK DATA 4359 14 N 0 18 88 MS, -687 69 N 0 40 88 MS

PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION

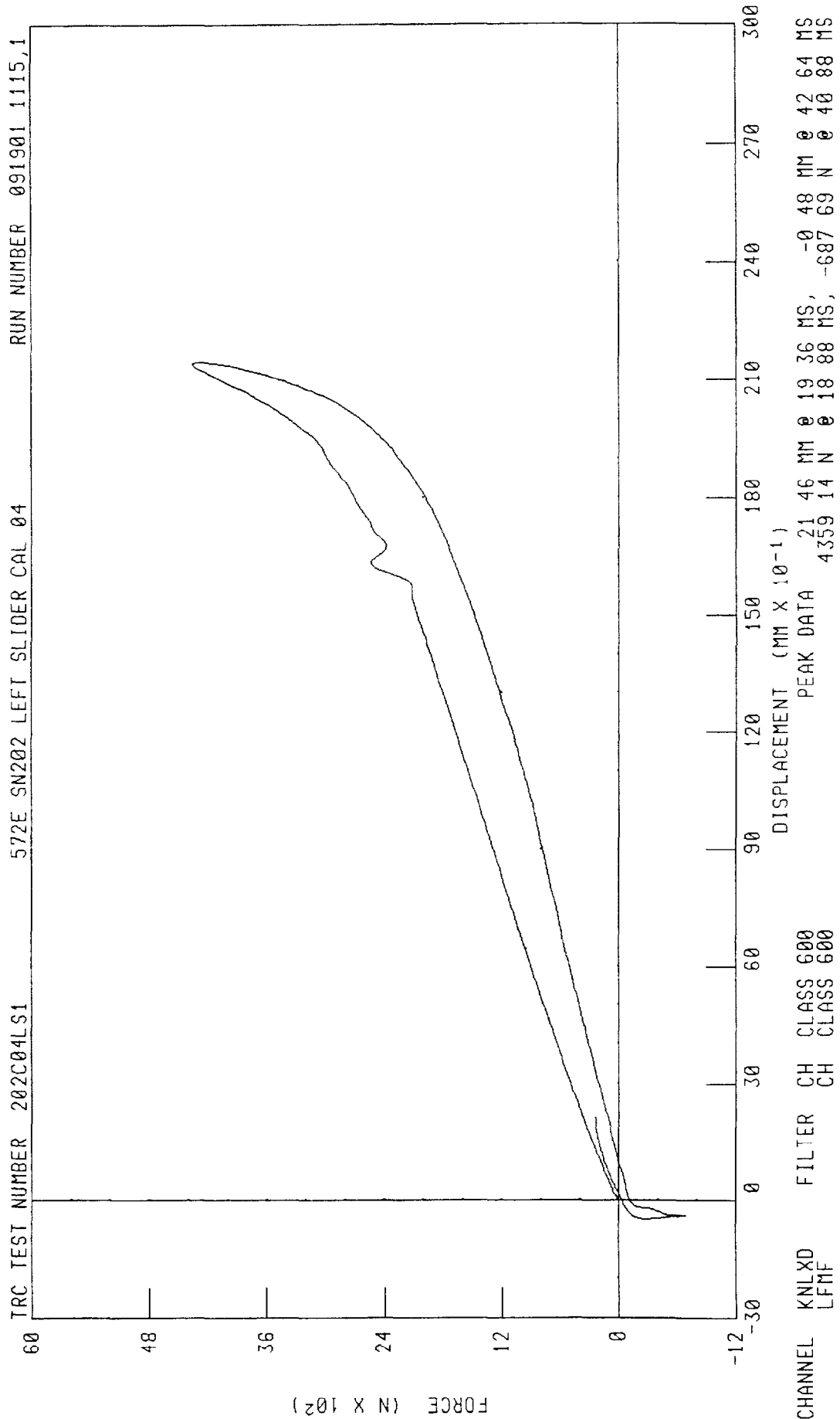
LEFT KNEE DISPLACEMENT

TRC TEST NUMBER 202C04LS1 572E SN202 LEFT SLIDER CAL 04 RUN NUMBER 091901 1115,1



CHANNEL KNLXD FILTER CH CLASS 600 PEAK DATA 21 46 MM @ 19 36 MS, -0 48 MM @ 42 64 MS

PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION
LEFT KNEE DISPLACEMENT VS FEMUR FORCE



TRANSPORTATION RESEARCH CENTER INC.

KNEE SLIDER TEST

HYBRID III 50th

19-SEP-01

RIGHT KNEE

TRC INC.

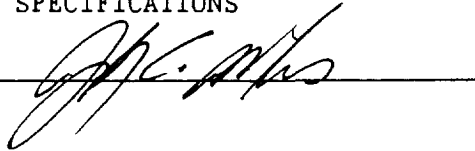
TEST NO: 202C04RS1

572E SN202 RIGHT SLIDER CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	67.0 %
PENDULUM VELOCITY	2.70-2.80 M/S	2.78 M/S
FORCE AT 10.0 MM DISPLACEMENT	1259 - 1721 N	1405. N
FORCE AT 18.0 MM DISPLACEMENT	2268 - 3096 N	2645. N

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 091901.1222;1

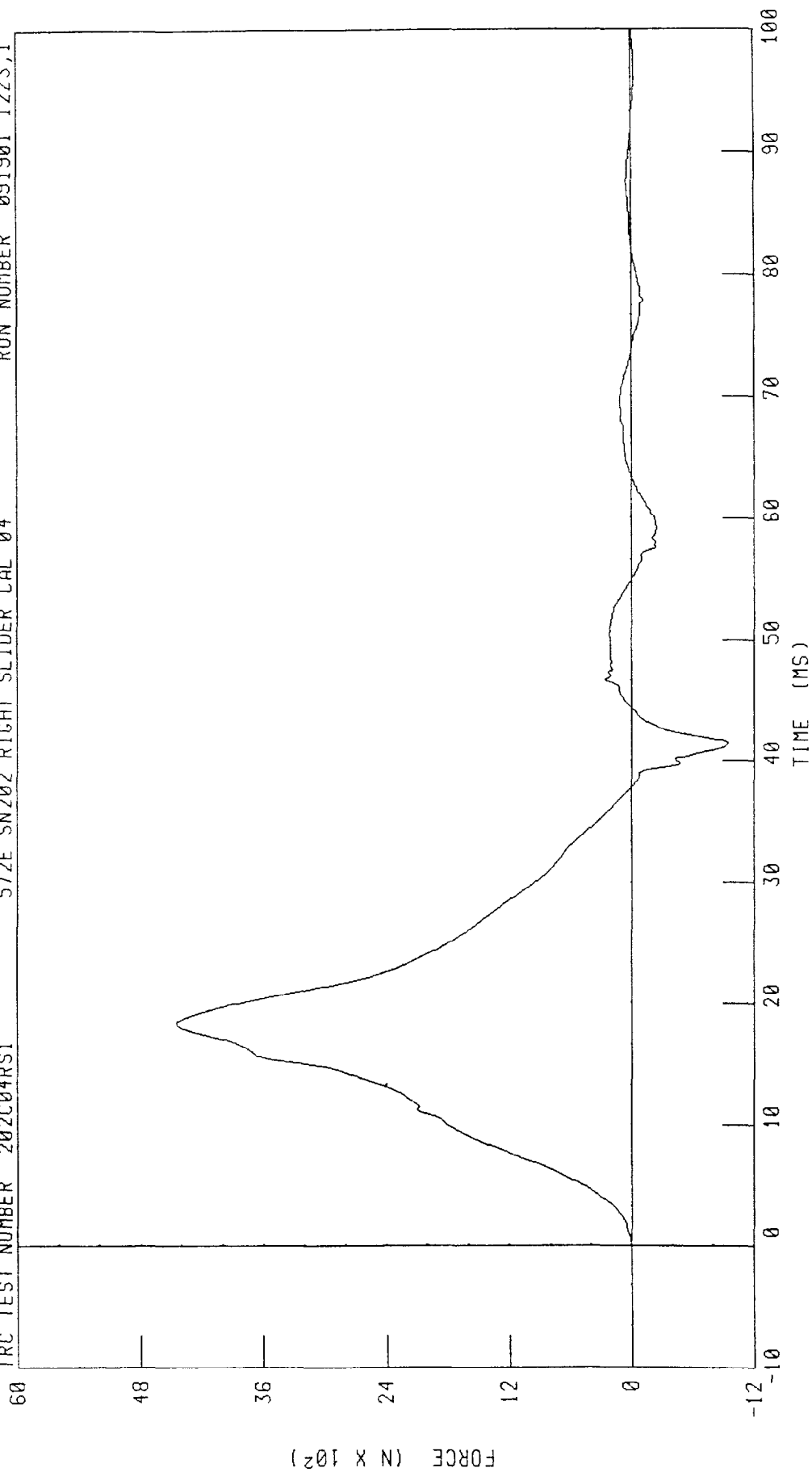
PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION

RIGHT FEMUR FORCE

TRC TEST NUMBER 202C04RS1

572E SN202 RIGHT SLIDER CAL 04

RUN NUMBER 091901 1223,1



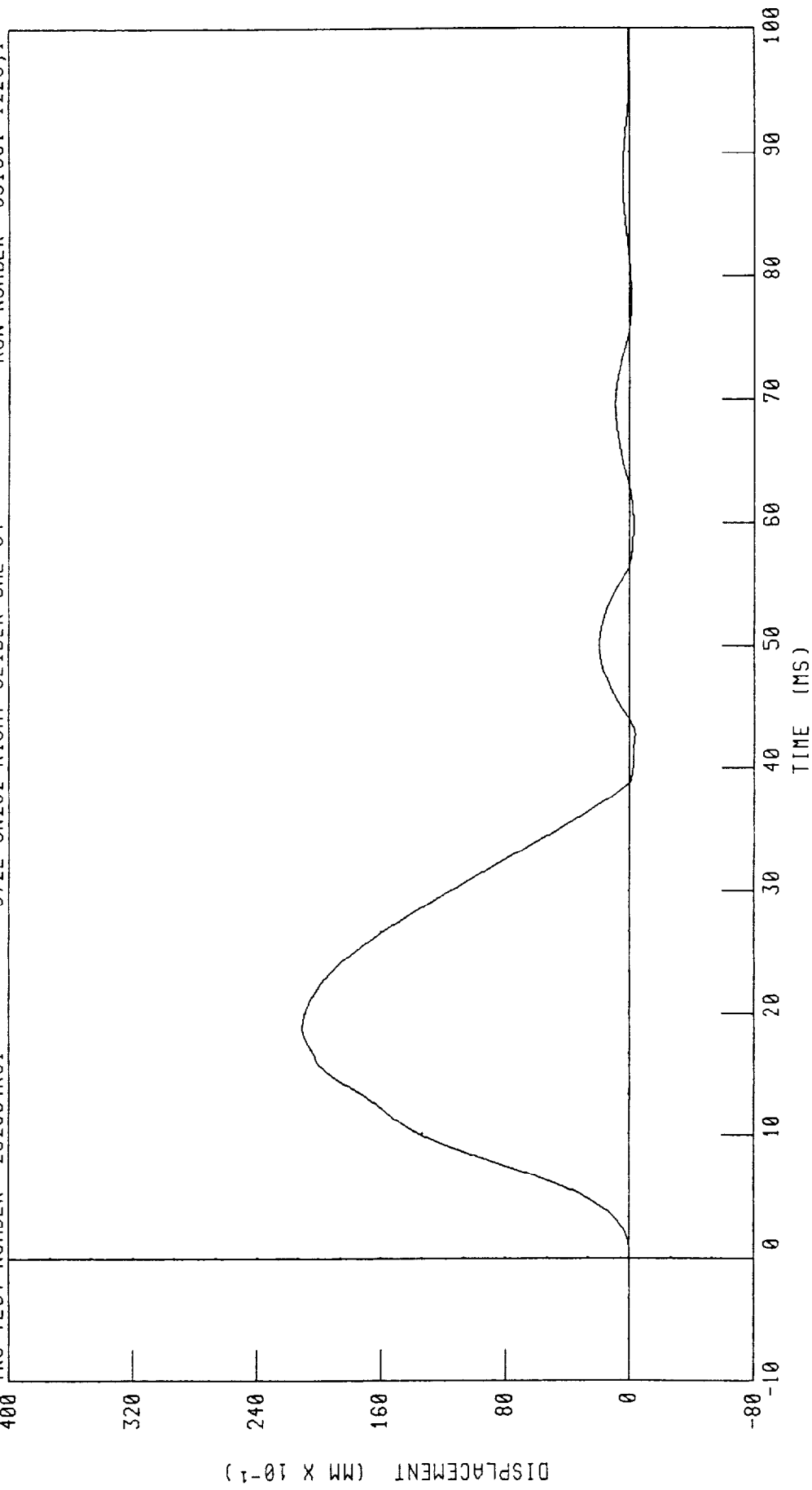
PEAK DATA 4452 56 N @ 18 32 MS, -946 68 N @ 41 44 MS

CHANNEL RFMF FILTER CH CLASS 600

PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION

RIGHT KNEE DISPLACEMENT

TRC TEST NUMBER 202C04RS1 572E SN202 RIGHT SLIDER CAL 04 RUN NUMBER 091901 1223,1



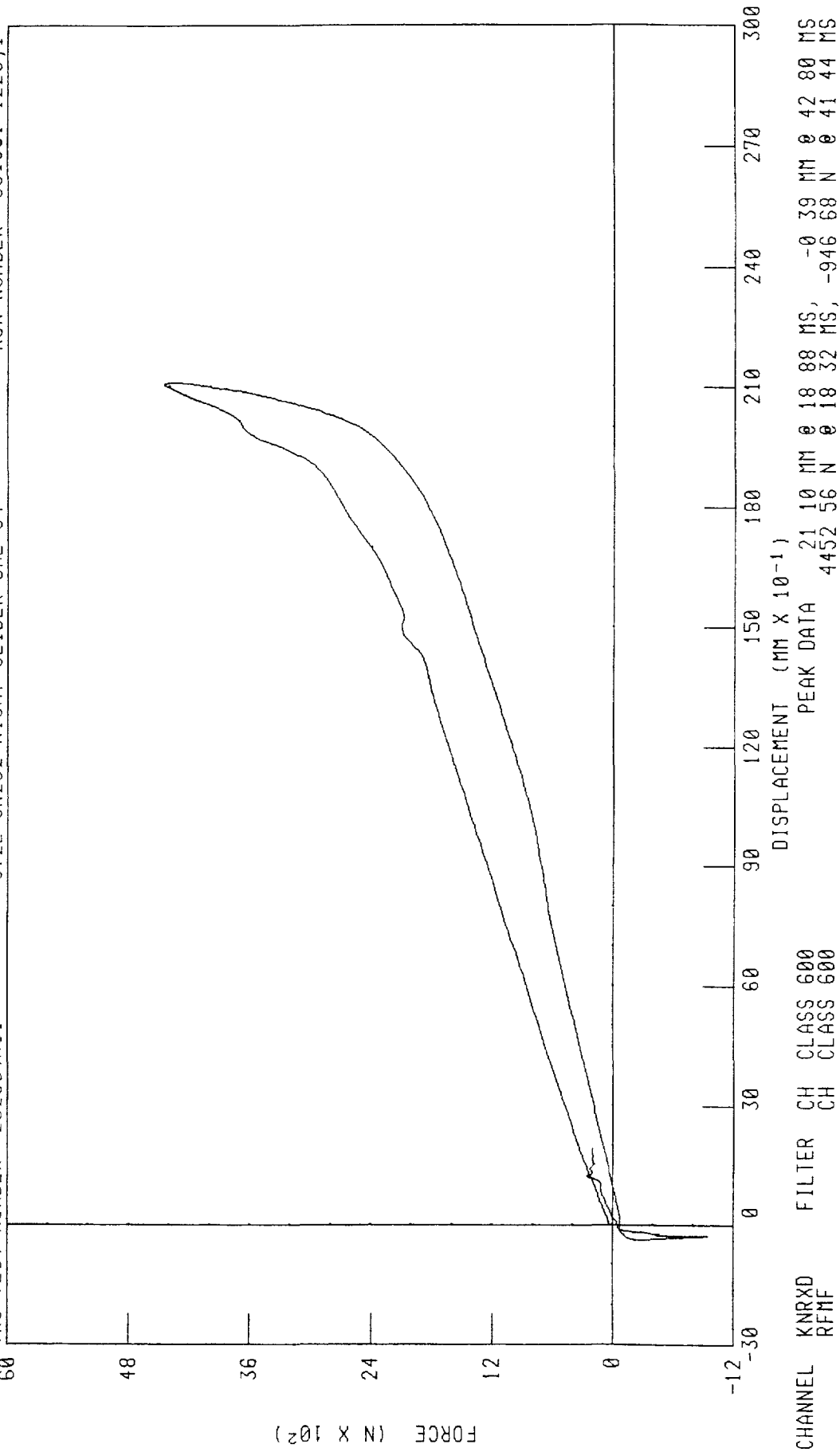
CHANNEL KNRXD FILTER CH CLASS 600

PEAK DATA 21 10 MM @ 18 88 MS, -0 39 MM @ 42 80 MS

PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION

RIGHT KNEE DISPLACEMENT VS FEMUR FORCE

TRC TEST NUMBER 202C04RS1 572E SN202 RIGHT SLIDER CAL 04 RUN NUMBER 091901 1223,1



TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

20-SEP-01

TRC INC.

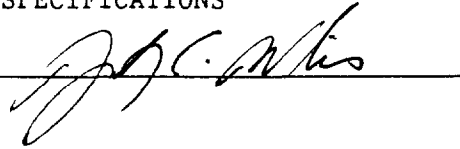
TEST NO: 202C04LK1

572E SN202 LEFT KNEE CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	64.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5129.7 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



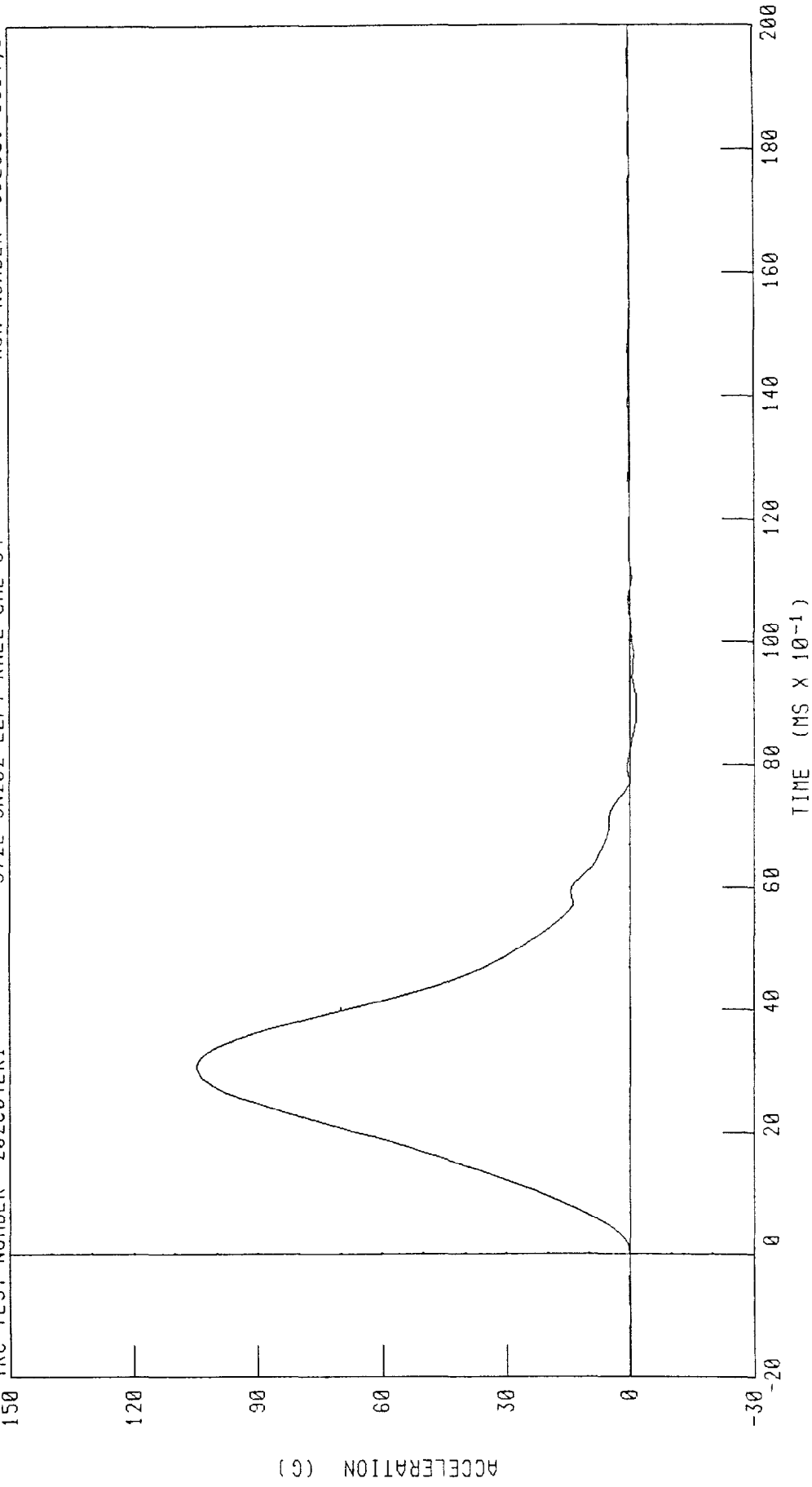
RUN NUMBER: 092001.1612;1

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

TRC TEST NUMBER 202C04LK1

572E SN202 LEFT KNEE CAL 04

RUN NUMBER 092001 1614,1



CHANNEL PENXG FILTER CH CLASS 600 PEAK DATA 104 84 G 0 3 04 MS, -1 70 G 0 8 96 MS

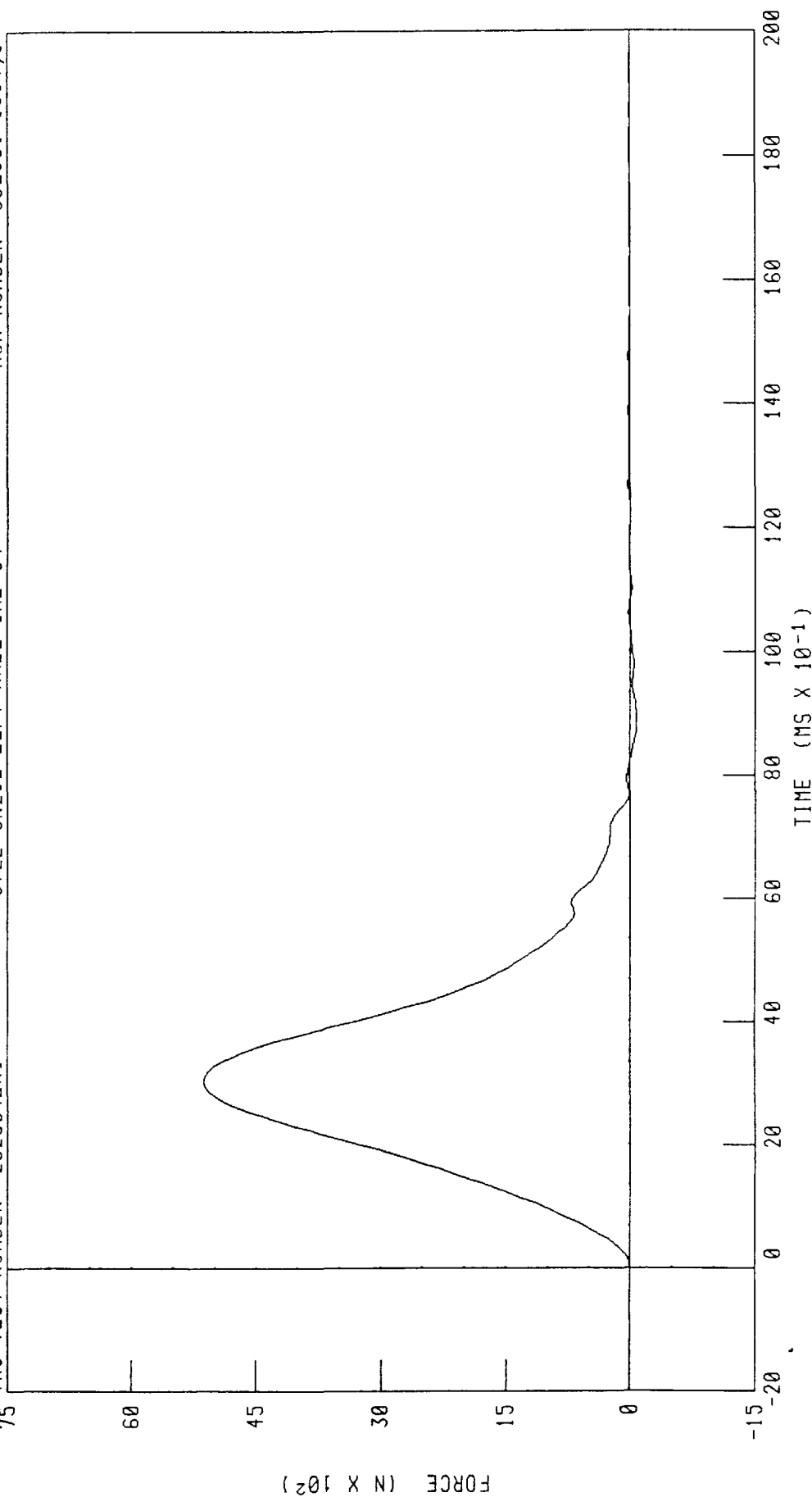
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND)

TRC TEST NUMBER 202C04LK1

572E SN202 LEFT KNEE CAL 04

RUN NUMBER 092001 1614,1



CHANNEL PENXF FILTER CH CLASS 600

PEAK DATA 5129 77 N 0 3 04 MS, -82 96 N 0 8 96 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

20-SEP-01

TRC INC.

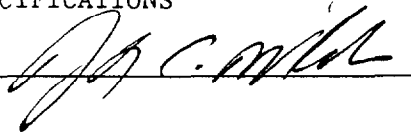
TEST NO: 202C04RK1

572E SN202 RIGHT KNEE CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	64.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5432.8 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092101.1848;1

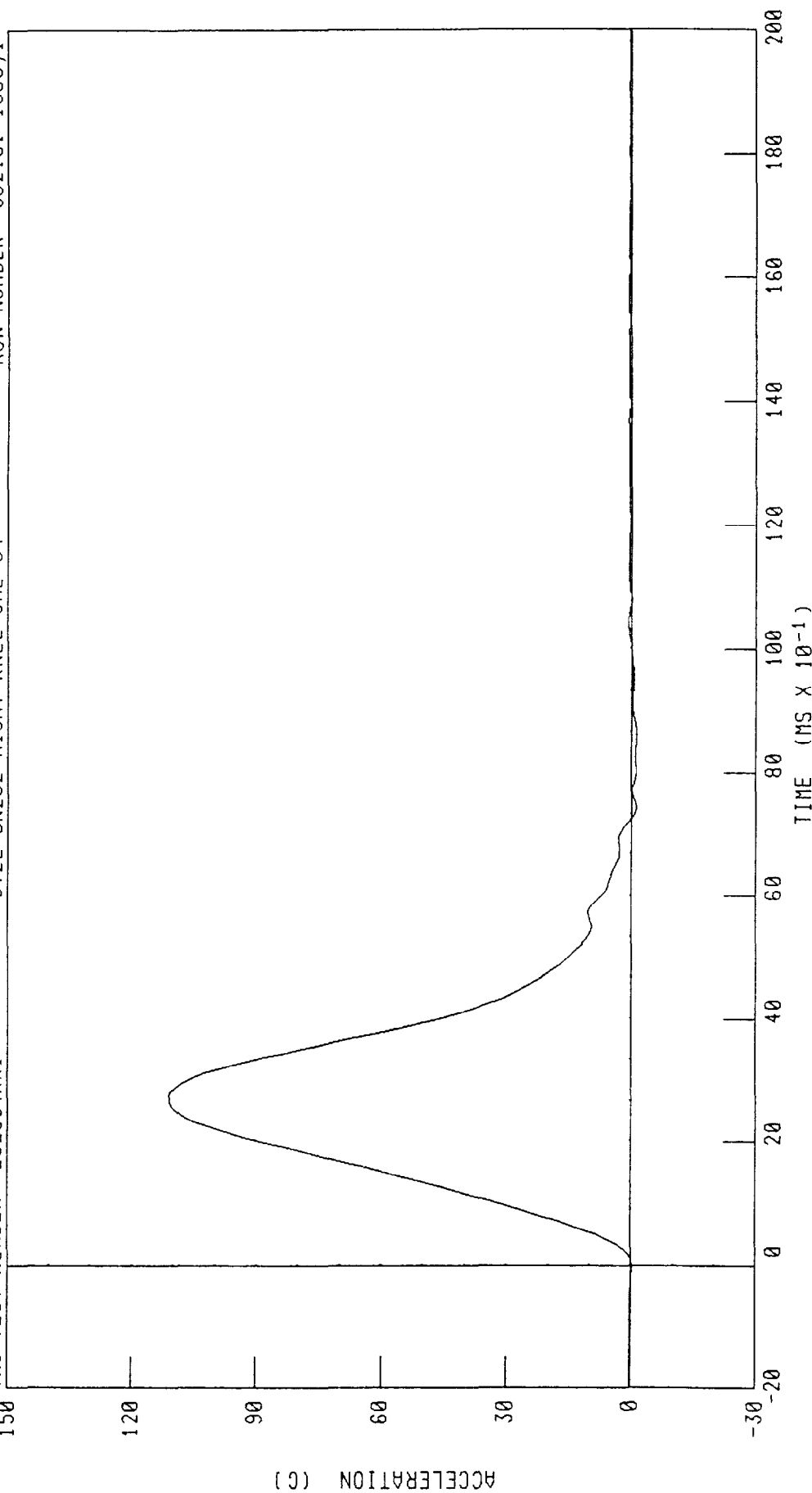
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND)

TRC TEST NUMBER 202C04RK1

572E SN202 RIGHT KNEE CAL 04

RUN NUMBER 092101 1956,1



CHANNEL PENXC FILTER CH CLASS 600

TIME (MS X 10⁻¹)

PEAK DATA 111 04 C 0 2 72 MS, -1 36 C 0 8 56 MS

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

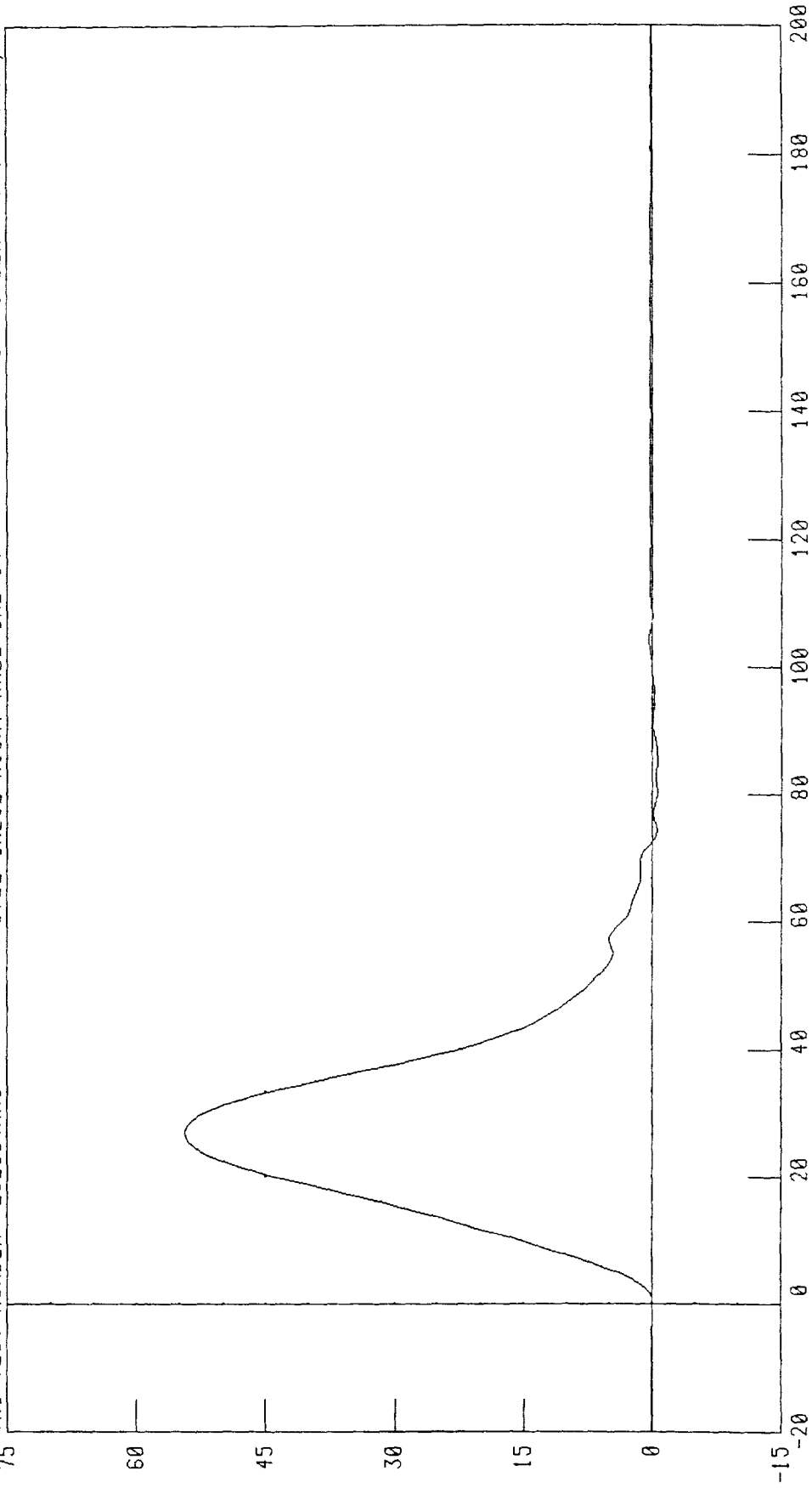
PENDULUM FORCE (5 KG PEND)

572E SN202 RIGHT KNEE CAL 04

RUN NUMBER 092101 1956,1

TRC TEST NUMBER 202C04RK1

75



TIME (MS X 10⁻¹)

PEAK DATA 5432 81 N 0 2 72 MS, -66 51 N 0 8 56 MS

CHANNEL PENXF FILTER CH CLASS 600

Post-Test Dummy Configuration and Performance Verification Data

Driver Dummy S/N: 206

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS

206

27-SEP-01

TRC INC. TEST NO: 206C04ED1 572E SN206 EXT.DIMENSION CAL04

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970 -1001 MM	993. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	848. MM
CHEST DEPTH (O)		213 - 229 MM	224. MM
H-POINT HEIGHT (C)		84 - 89 MM	86. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	135. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	879. MM
THIGH CLEARANCE (F)		140 - 155 MM	145. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	597. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	462. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	447. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	488. MM
FOOT LENGTH (P)		252 - 267 MM	254. MM
FOOT BREADTH (W)		91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	84. MM
SHOULDER BREADTH (V)		422 - 437 MM	434. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	518. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	203. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	343. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	300. MM

572E SN206 EXT.DIMENSION CAL04

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

RUN NUMBER: 092701.0747

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

25-SEP-01

TRC INC.

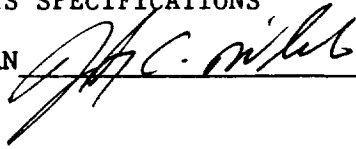
TEST NO: 206C04HD2

572E SN206 HEAD DROP CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	42.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	225.84 G
PEAK LATERAL ACCELERATION	15 G MAX	7.18 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092601.1228;1

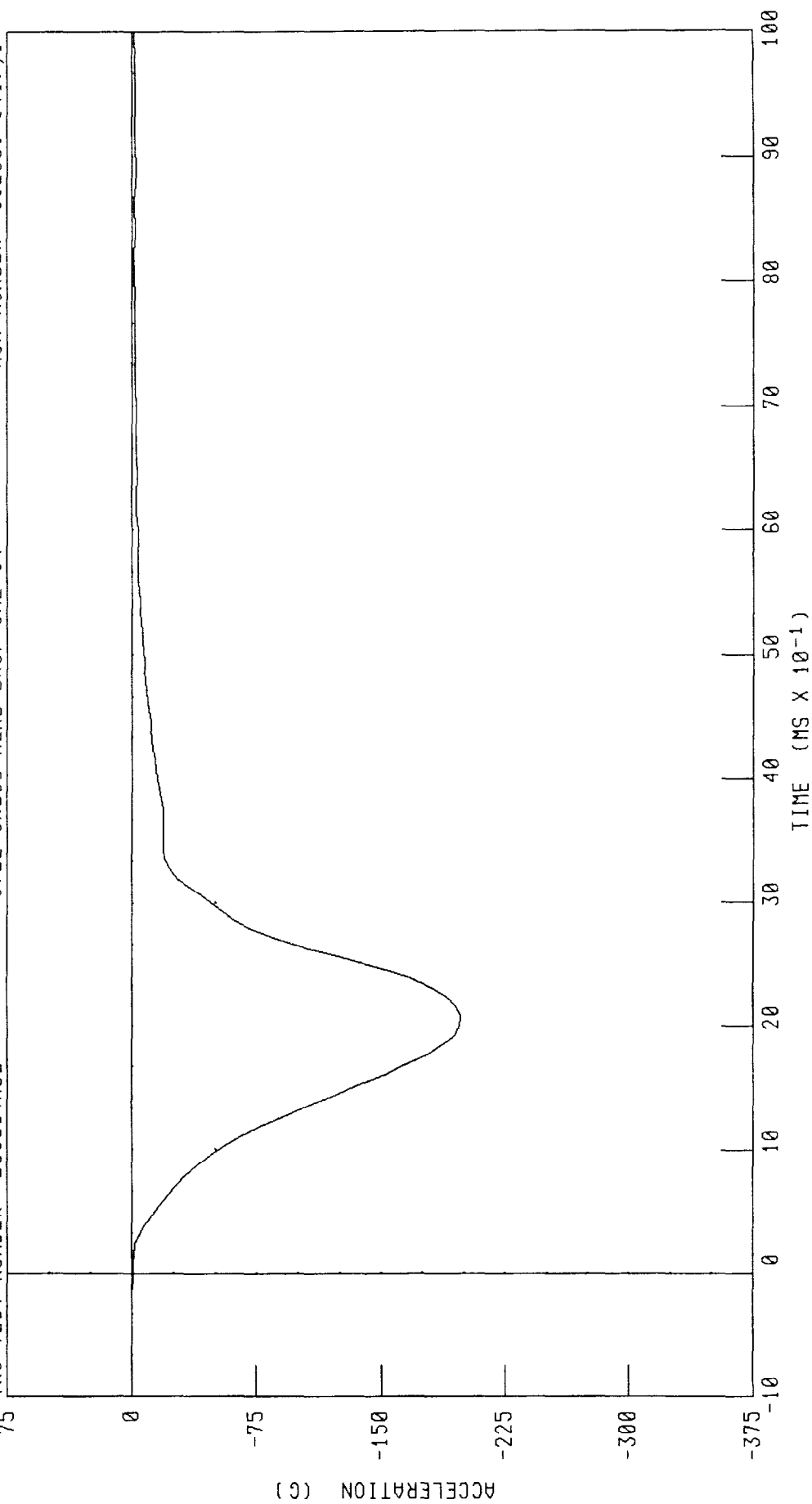
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

TRC TEST NUMBER 206C04HD2

572E SN206 HEAD DROP CAL 04

RUN NUMBER 092601 1417,1



CHANNEL HEDXC FILTER CH CLASS 1000 PEAK DATA 0 04 G 0 -0 96 MS, -198 21 G 0 2 08 MS

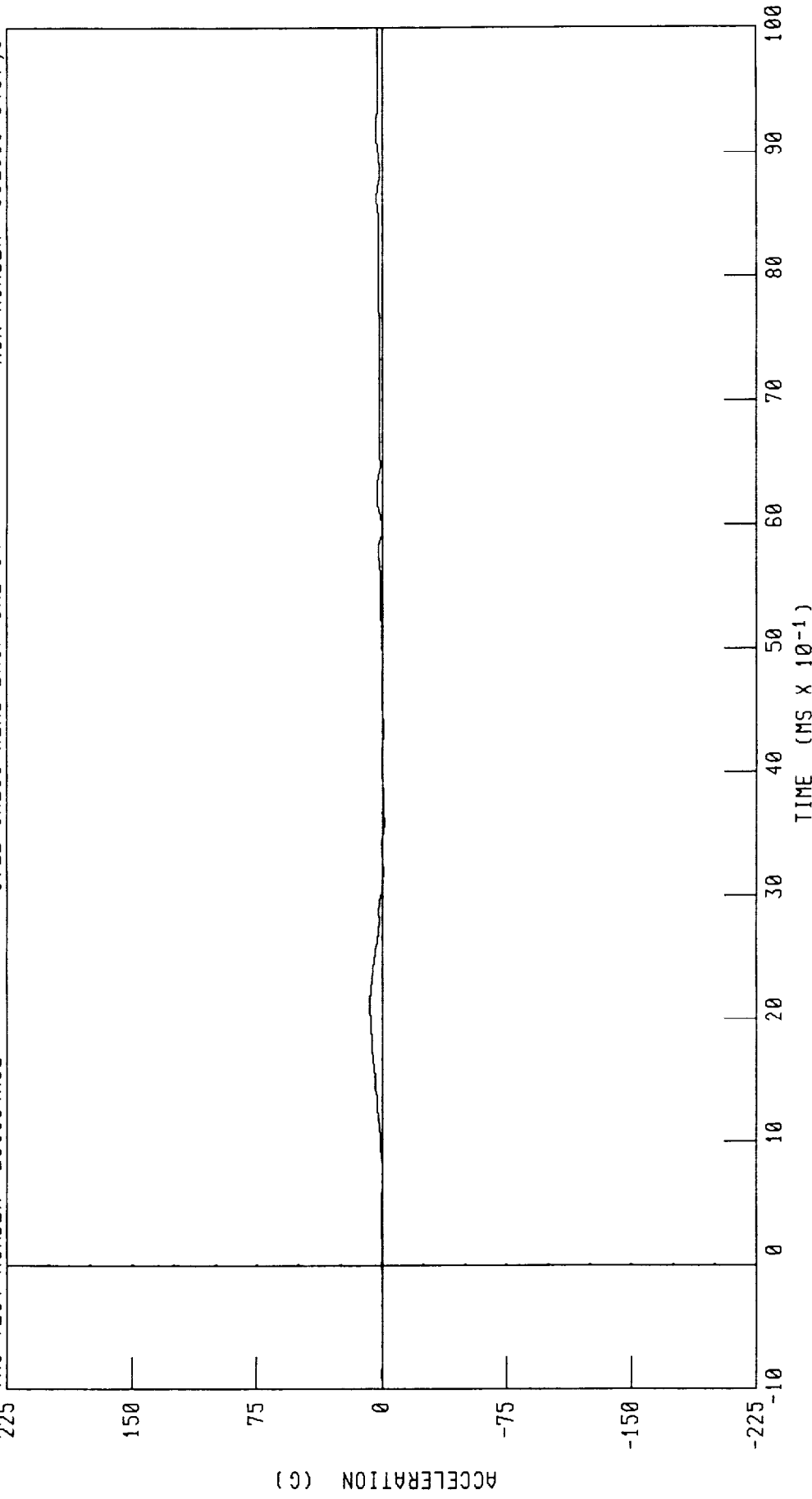
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

TRC TEST NUMBER 206C04HD2

572E SN206 HEAD DROP CAL 04

RUN NUMBER 092601 1417,1



CHANNEL HEDYC FILTER CH CLASS 1000

PEAK DATA 7 18 C 0 2 08 MS, -1 43 C 0 3 60 MS

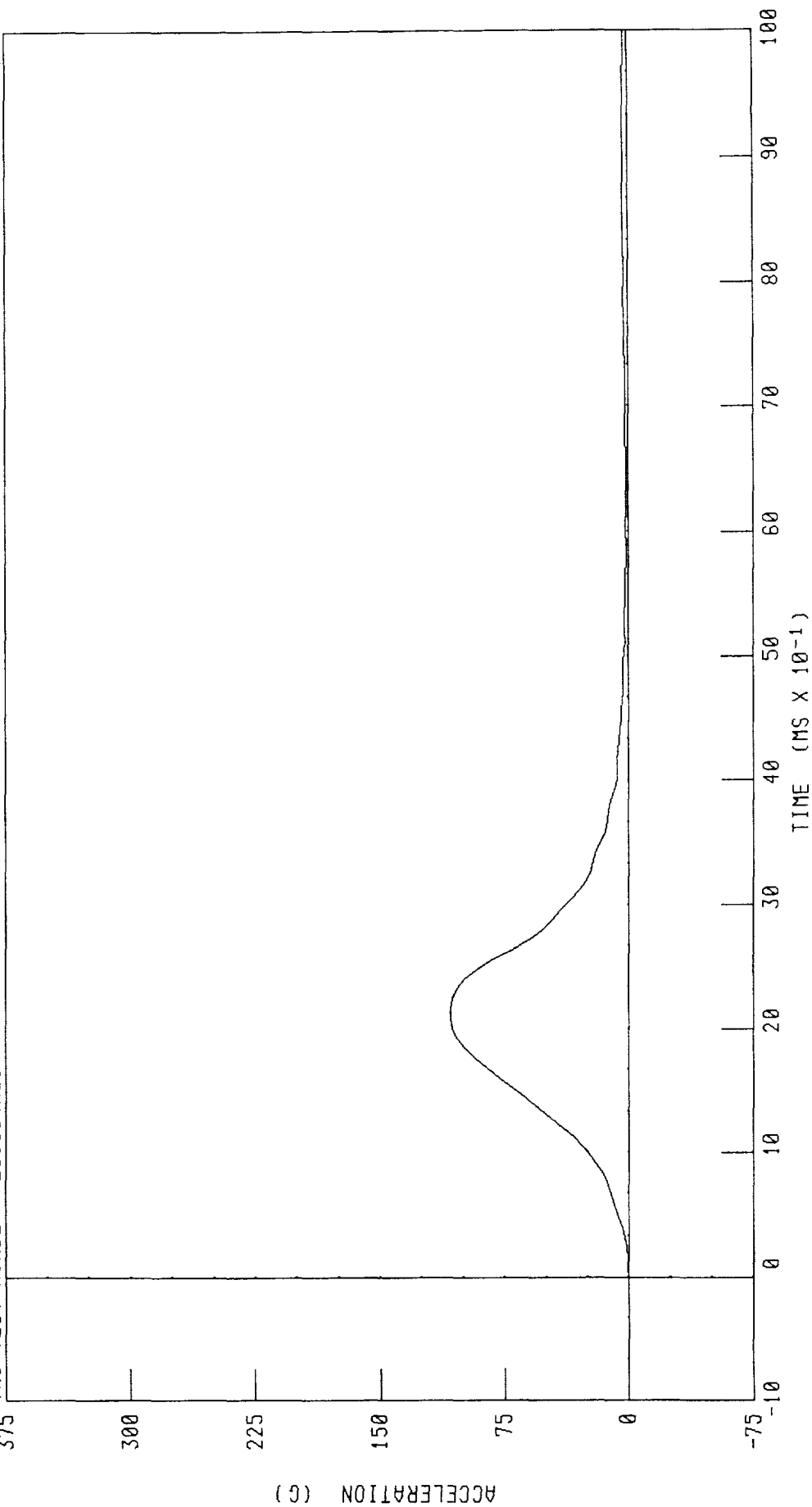
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

IRC TEST NUMBER 206C04HD2

572E SN206 HEAD DROP CAL 04

RUN NUMBER 092601 1417,1



CHANNEL HEDZC FILTER CH CLASS 1000 PEAK DATA 100 02 G 0 2 08 MS, -0 08 G 0 -0 88 MS

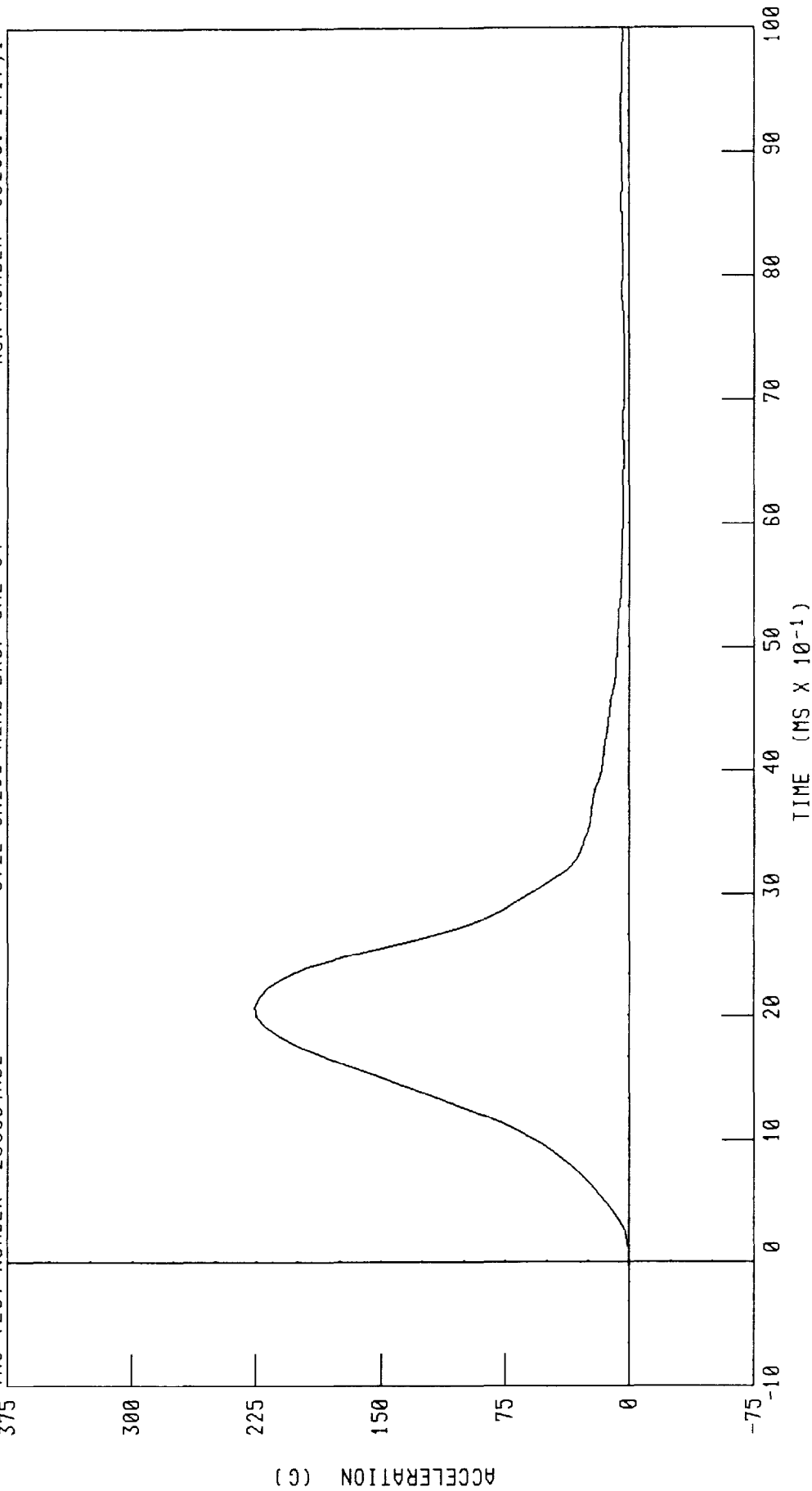
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER 206C04HD2

572E SN206 HEAD DROP CAL 04

RUN NUMBER 092601 1417,1



CHANNEL HEDRC FILTER CH CLASS 1000

PEAK DATA 225 85 G 2 08 MS, 0 05 G 0 -0 96 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

26-SEP-01

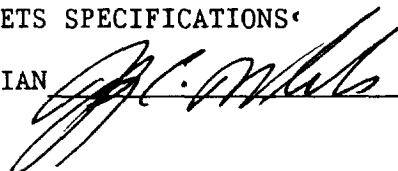
NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 206C04NF1 572E SN206 NECK FLEXION CAL04

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	37.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.93 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.38 G
	20 MS	17.60 - 22.60 G	22.16 G
	30 MS	12.50 - 18.50 G	18.30 G
MAX PENDULUM G		29 G MAX	23.70 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	18.24 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.64 MS
D PLANE	MAX	64 - 78 DEG.	72.29 DEG.
ROTATION	TIME	57 - 64 MS	62.40 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	102.18 NM
	TIME	47 - 58 MS	51.44 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	118.96 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.08 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092601.1123;1

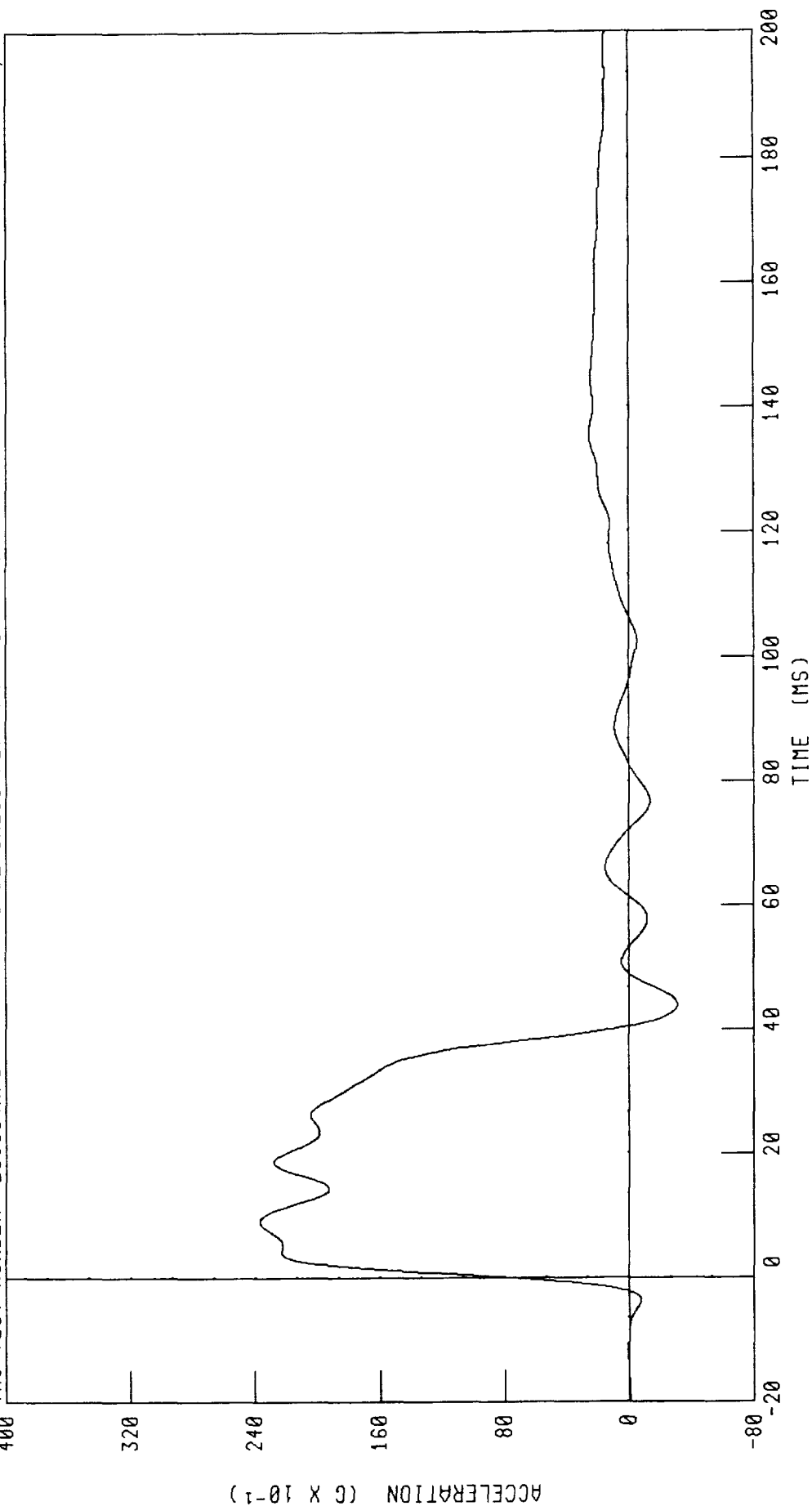
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER 206C04NF1

572E SN206 NECK FLEXION CAL04

RUN NUMBER 092601 1124,1



CHANNEL PENXC FILTER CH CLASS 60 PEAK DATA 23 71 C 0 9 04 MS, -3 12 C 0 43 92 MS

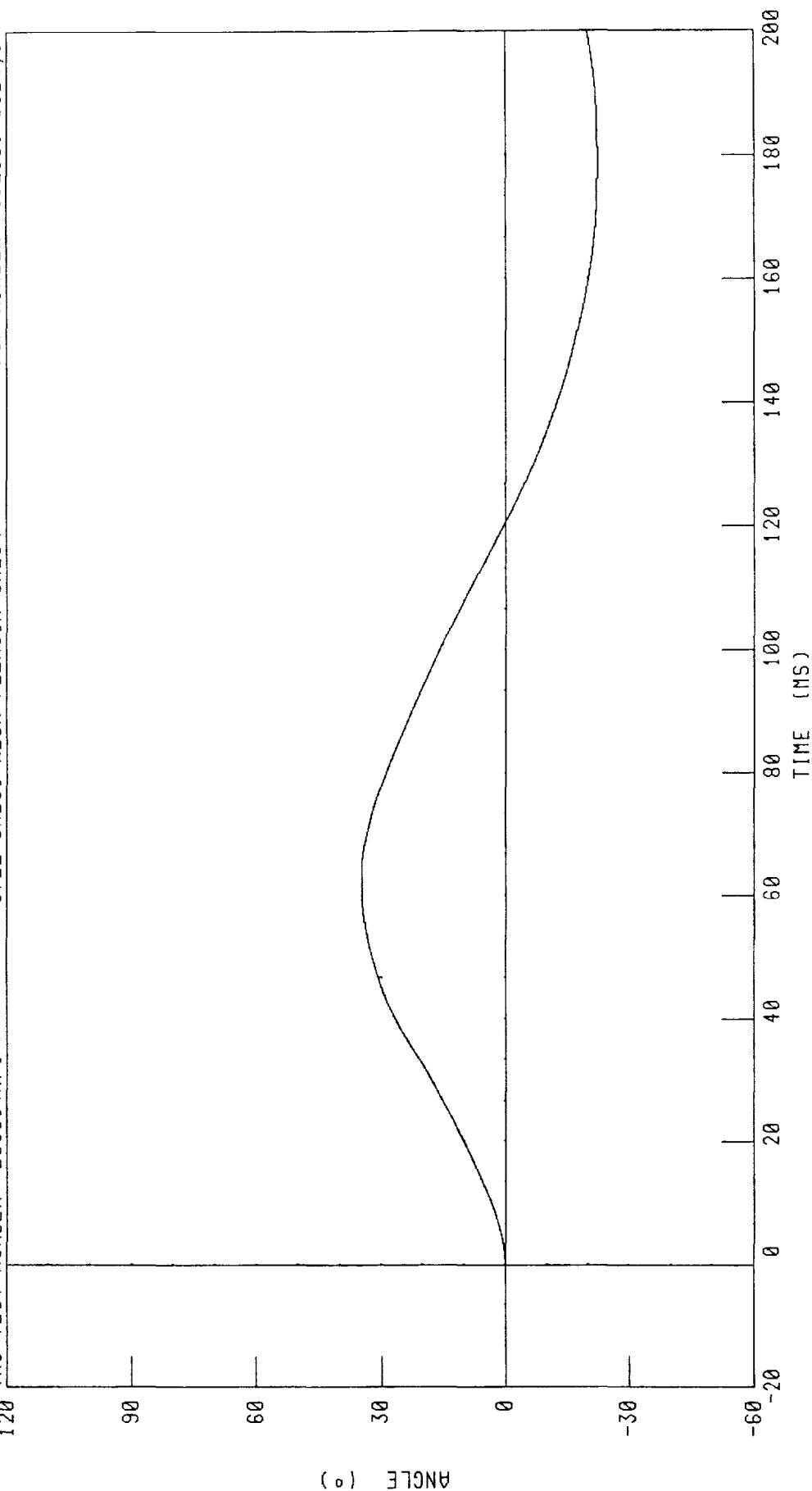
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER 206C04NF1

572E SN206 NECK FLEXION CAL04

RUN NUMBER 092601 1124,1



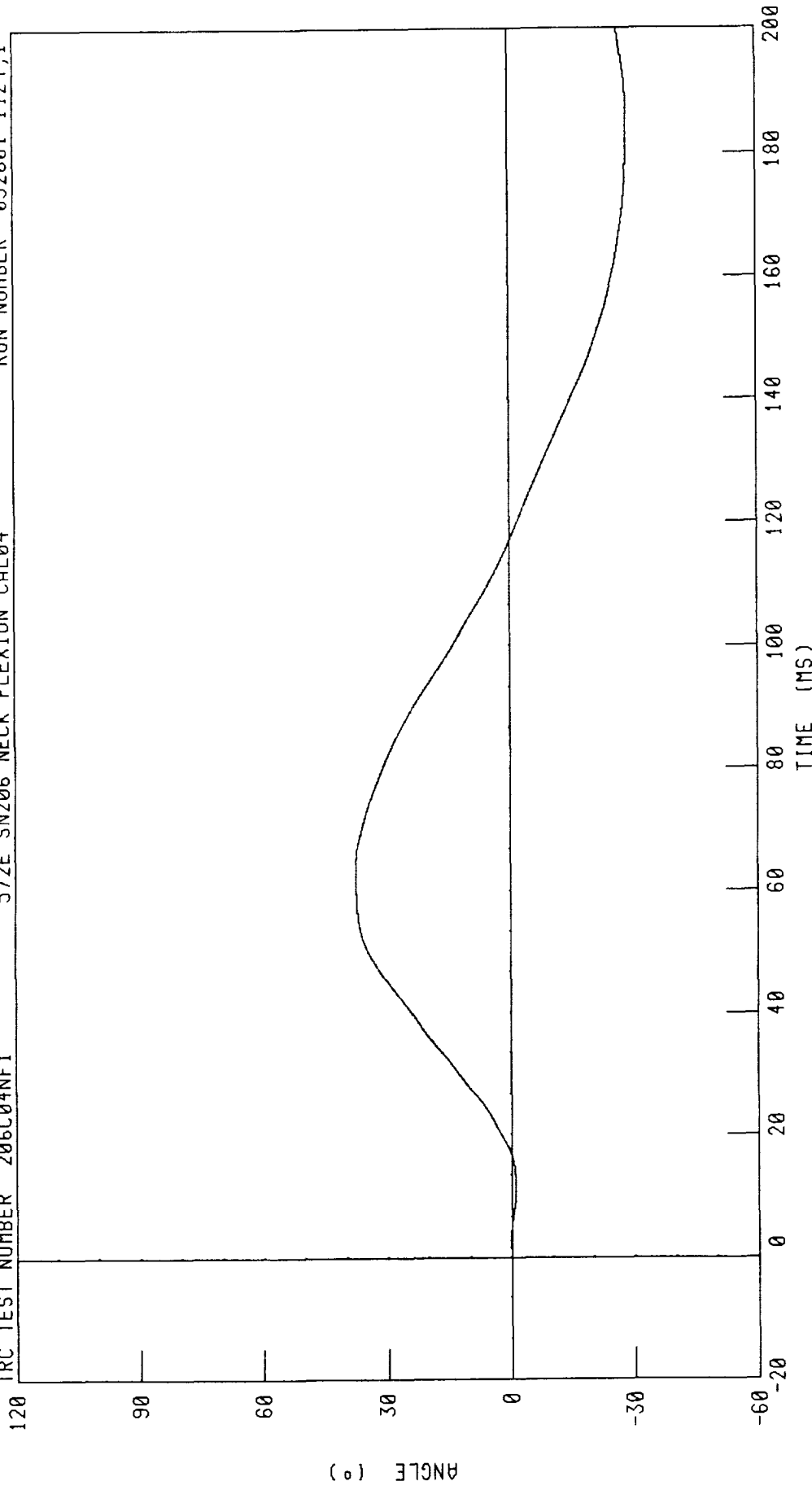
CHANNEL BETA FILTER CH CLASS 60

PEAK DATA 34 84 ° @ 62 00 MS, -22 33 ° @ 178 56 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 206C04NF1 572E SN206 NECK FLEXION CAL04 RUN NUMBER 092601 1124,1



CHANNEL THETA FILTER CH CLASS 60 PEAK DATA 37 46 ° @ 63 12 MS, -28 80 ° @ 184 16 MS

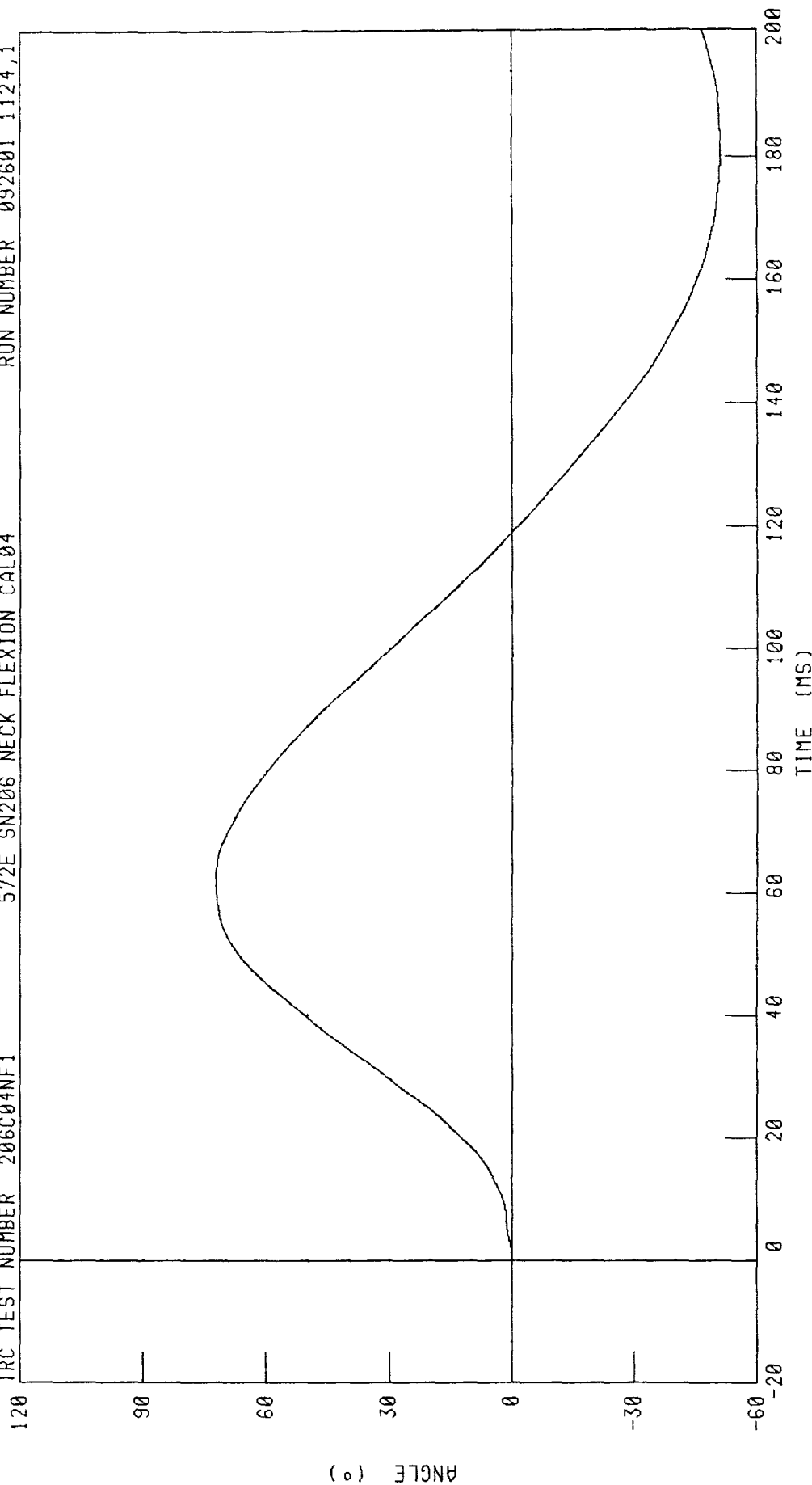
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER 206C04NF1

572E SN206 NECK FLEXION CAL04

RUN NUMBER 092601 1124,1



PEAK DATA 72 29 ° @ 62 40 MS, -51 08 ° @ 181 20 MS

CHANNEL TOTAL FILTER CH CLASS 60

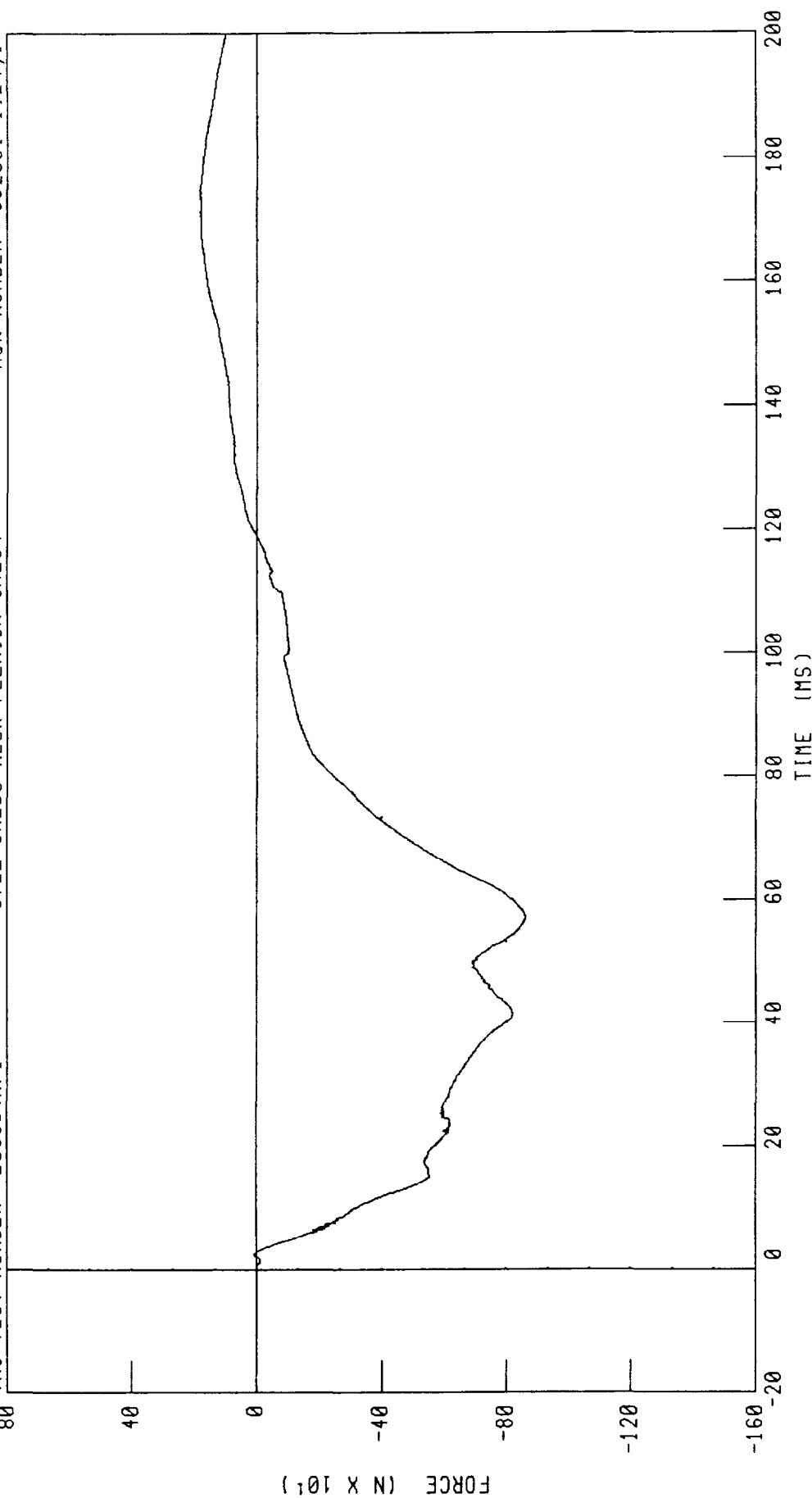
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER 206C04NF1

572E SN206 NECK FLEXION CAL04

RUN NUMBER 092601 1124,1



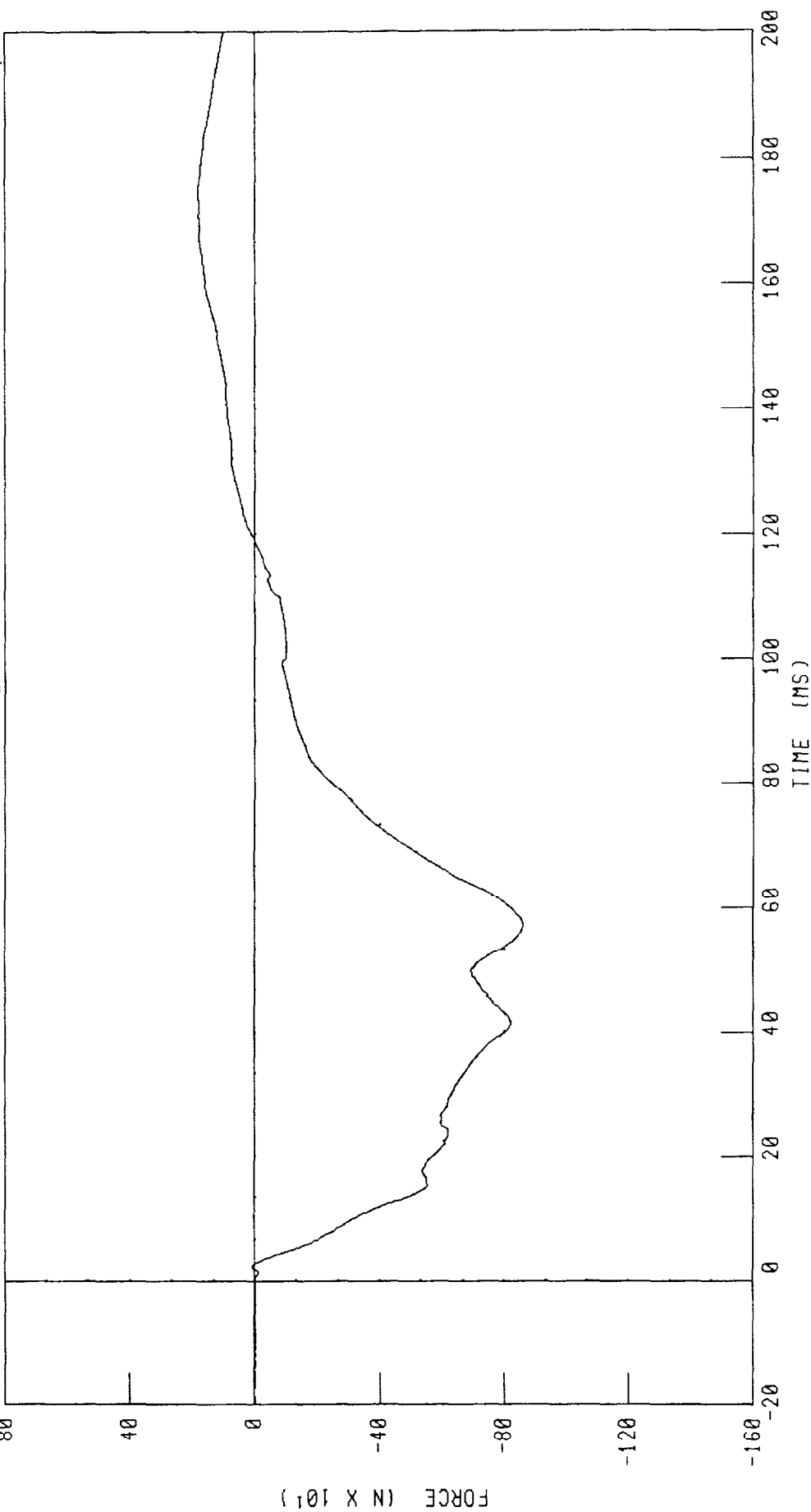
CHANNEL NEKXF FILTER CH CLASS 1000

PEAK DATA 184 13 N @ 175 12 MS, -860 89 N @ 57 04 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

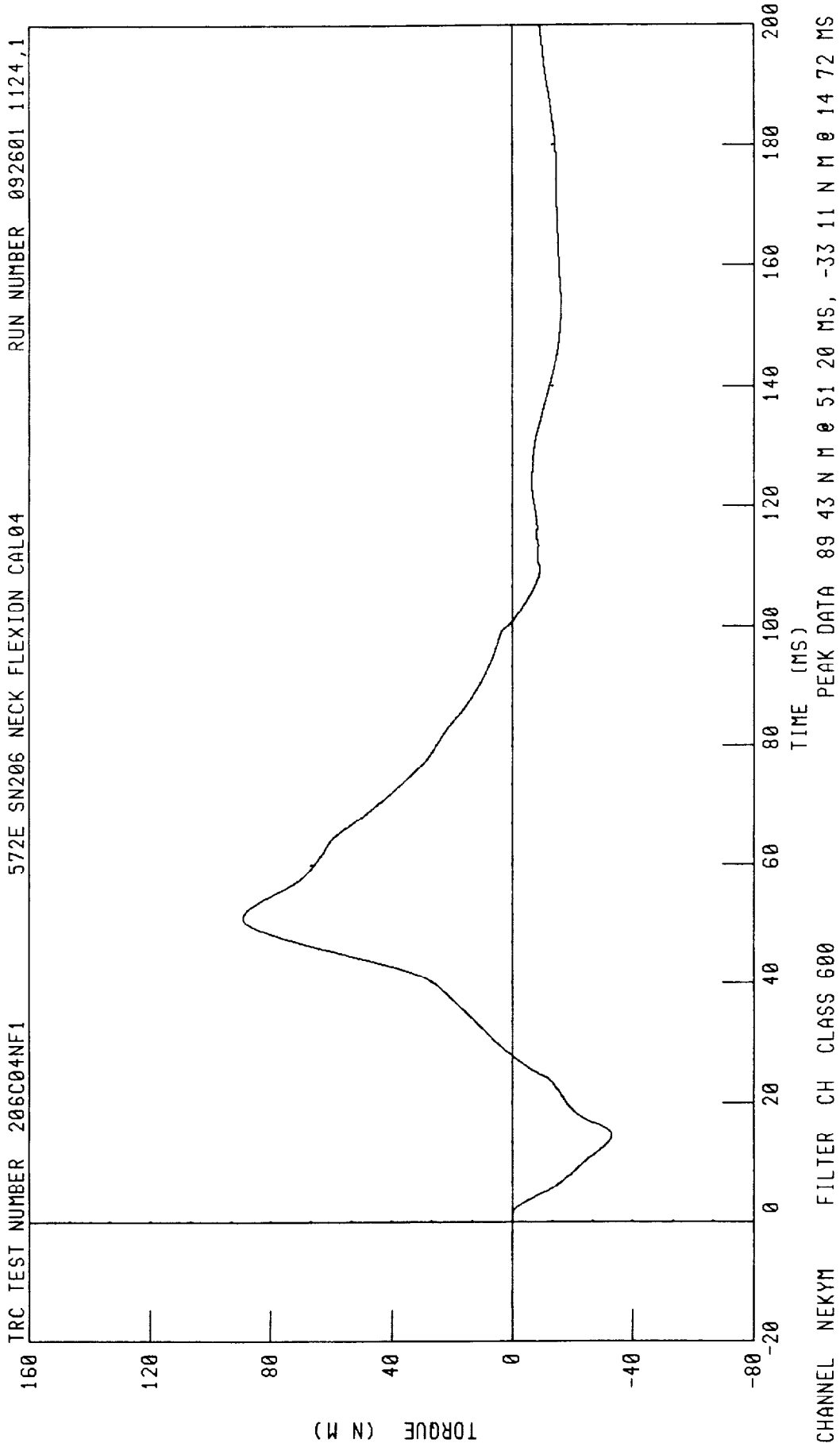
TRC TEST NUMBER 206C04NF1 572E SN206 NECK FLEXION CAL04 RUN NUMBER 092601 1124,1



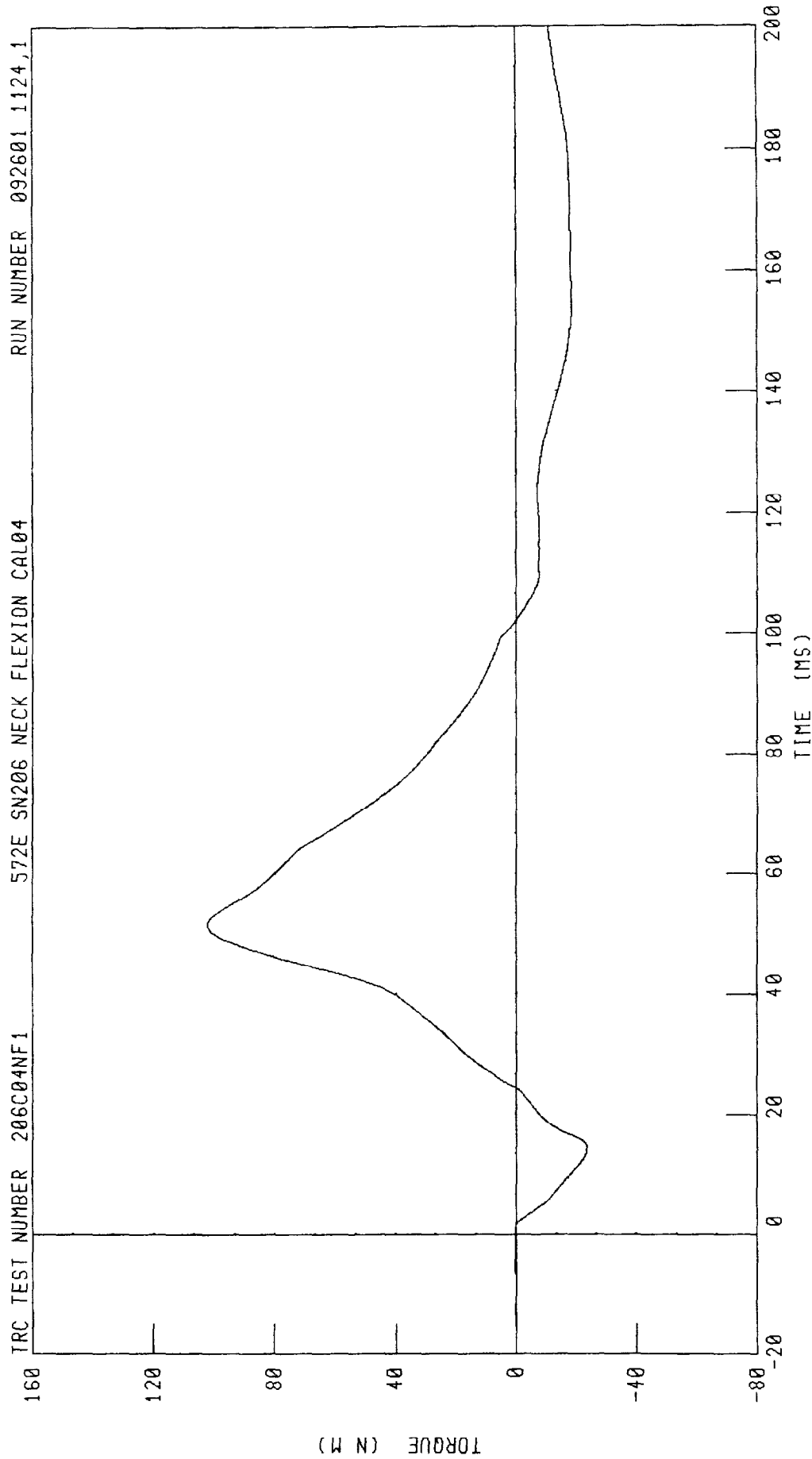
CHANNEL NEKXFC FILTER CH CLASS 600 PEAK DATA 183 59 N @ 175 04 MS, -860 82 N @ 57 20 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS



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



CHANNEL NEKOM FILTER CH CLASS 600 PEAK DATA 102 18 N M @ 51 44 MS, -23 62 N M @ 14 16 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

26-SEP-01

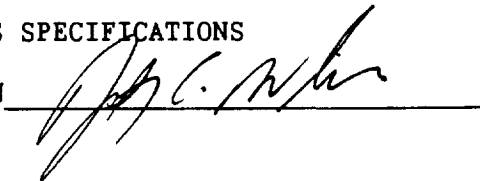
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 206C04NE1 572E SN206 NECK EXT CAL04

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	37.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.25 G
	20 MS	14.00 - 19.00 G	17.35 G
	30 MS	11.00 - 16.00 G	14.50 G
MAX PENDULUM G		22 G MAX	18.34 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.45 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	42.96 MS
D PLANE	MAX	81 - 106 DEG.	96.90 DEG.
ROTATION	TIME	72 - 82 MS	79.84 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-65.96 NM
	TIME	65 - 79 MS	73.84 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	161.44 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	146.16 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092601.1239;1

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

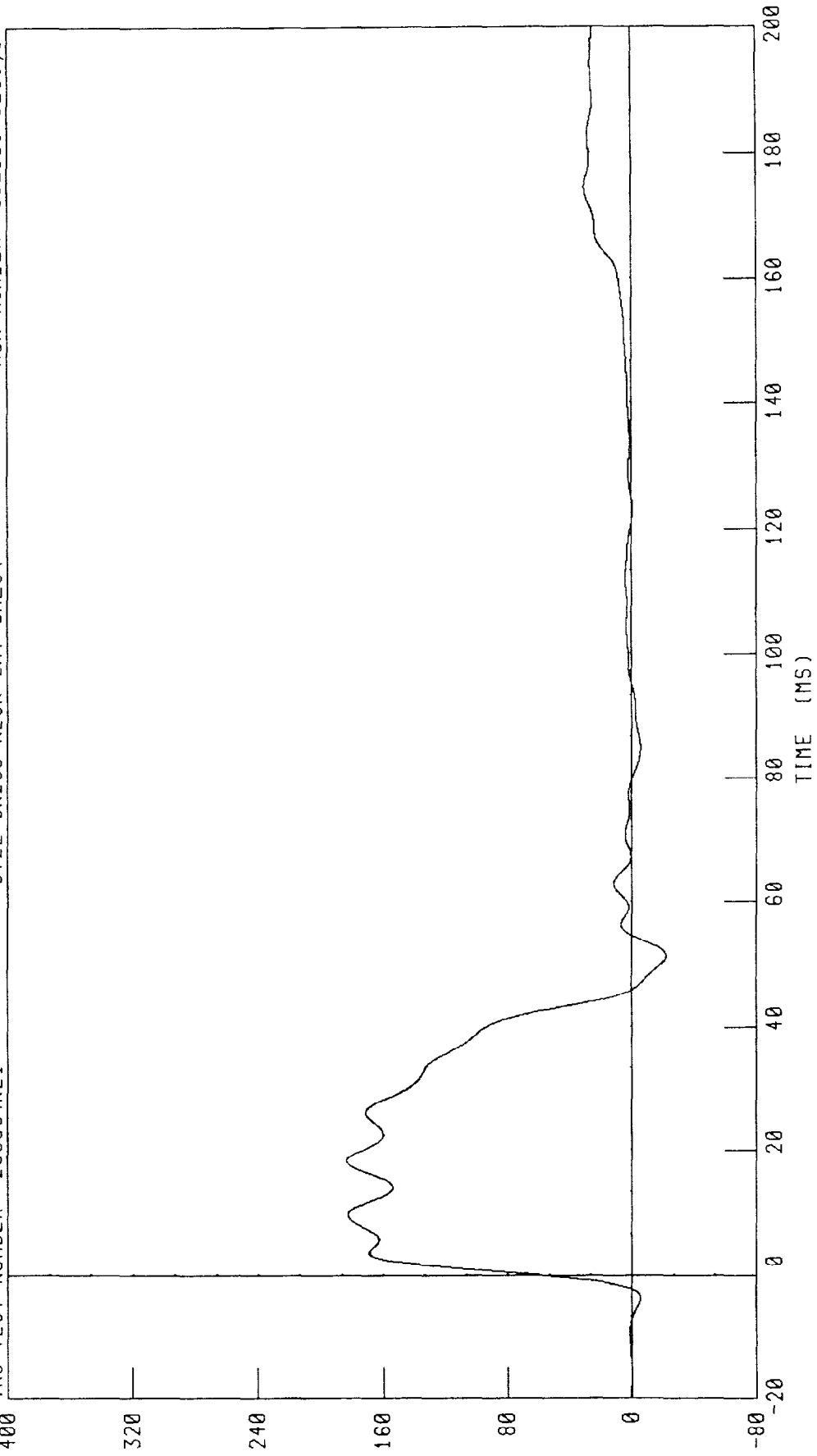
PENDULUM DECELERATION

TRC TEST NUMBER 206C04NE1

572E SN206 NECK EXT CAL04

RUN NUMBER 092601 1239,1

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



CHANNEL PENXC FILTER CH CLASS 60 PEAK DATA 18 34 G @ 18 24 MS, -2 22 G @ 51 36 MS

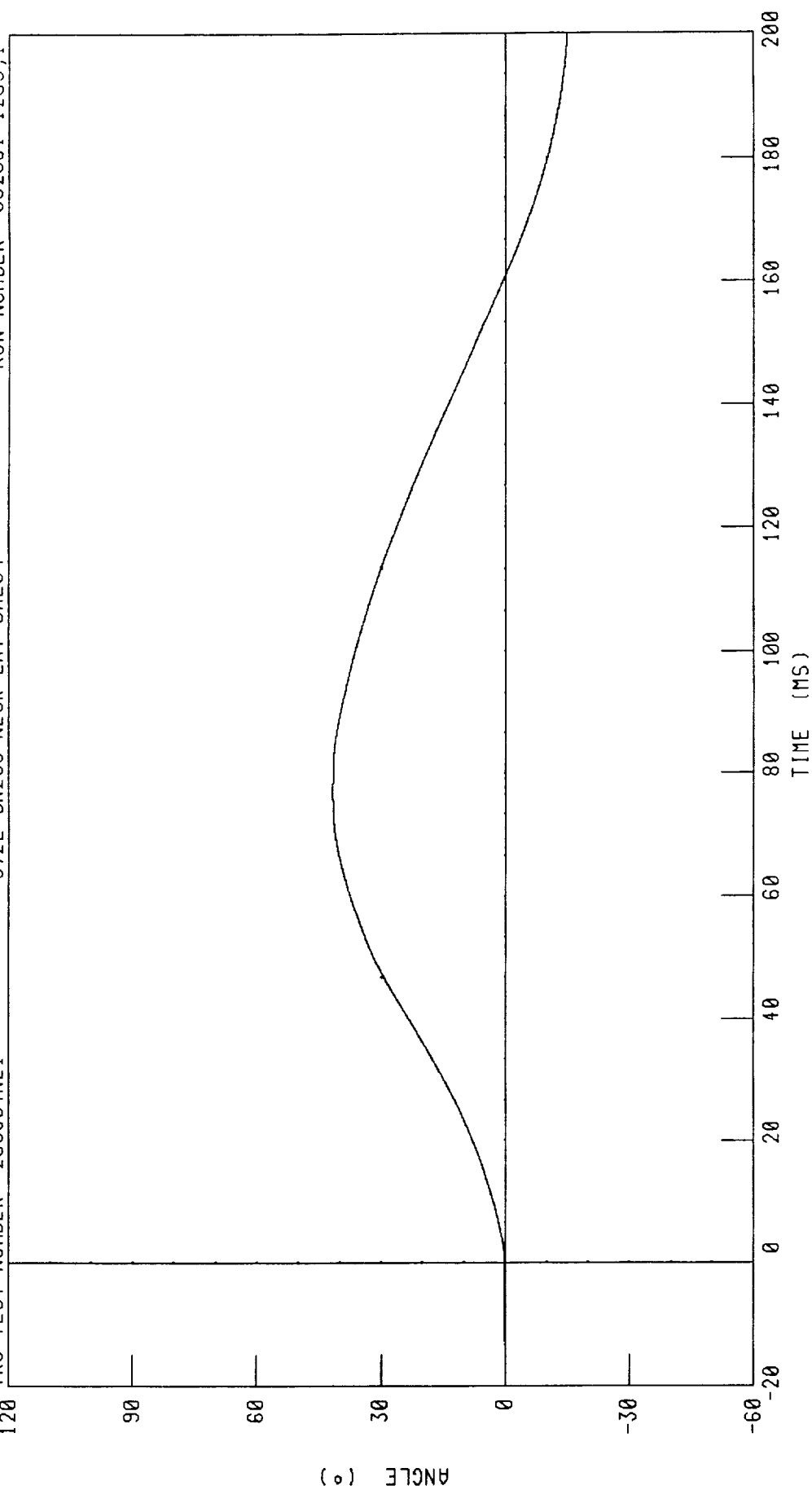
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER 206C04NE1

572E SN206 NECK EXT CAL04

RUN NUMBER 092601 1239,1



CHANNEL BETA FILTER CH CLASS 60

PEAK DATA 41 72 ° 0 77 12 MS, -15 13 ° 0 200 00 MS

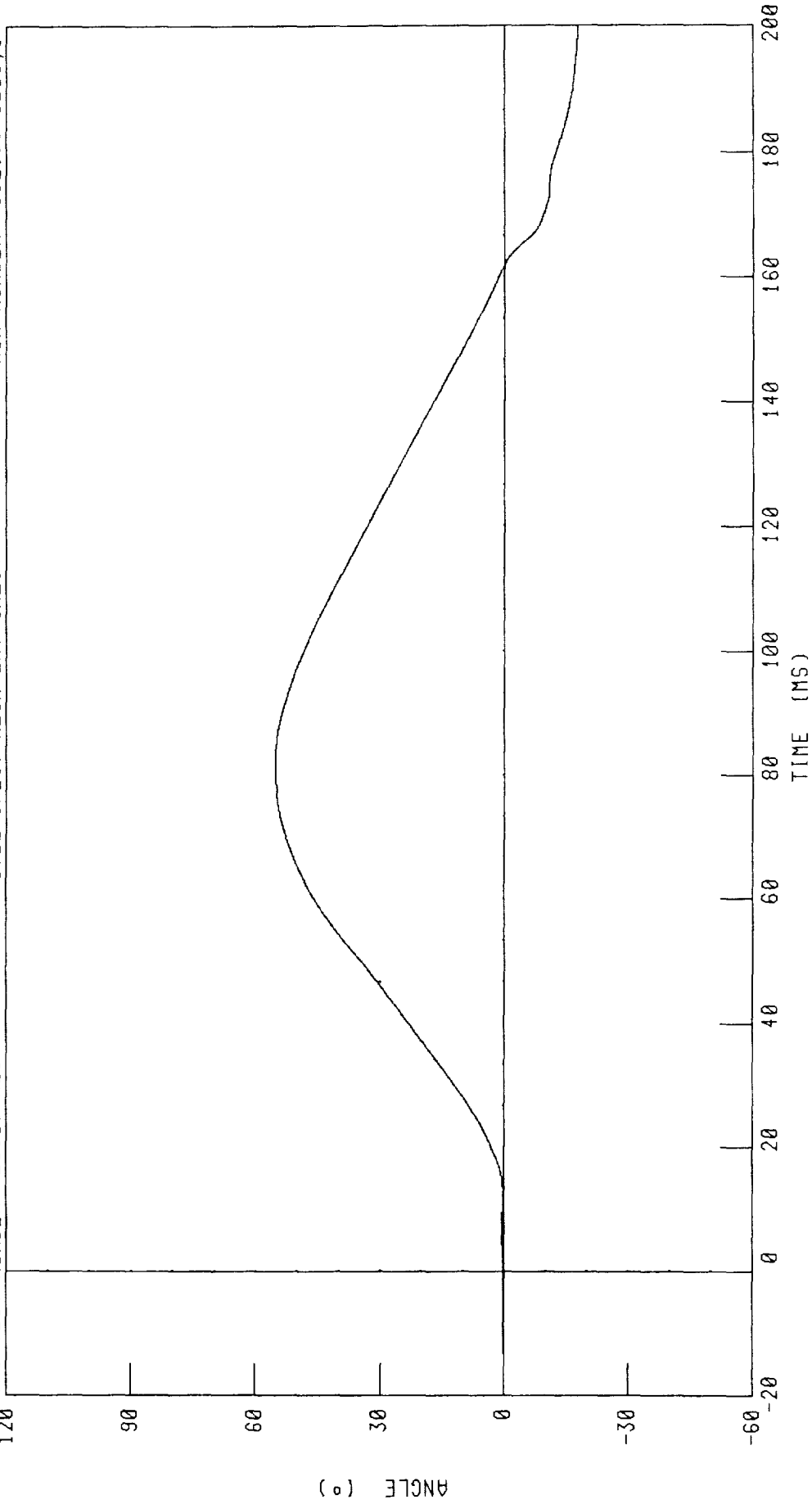
PART 572-E HYBRID I11 NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

IRC TEST NUMBER 206C04NE1

572E SN206 NECK EXT CAL04

RUN NUMBER 092601 1239,1



PEAK DATA 55 26 ° @ 82 24 MS, -17 87 ° @ 200 00 MS

CHANNEL THETA FILTER CH CLASS 60

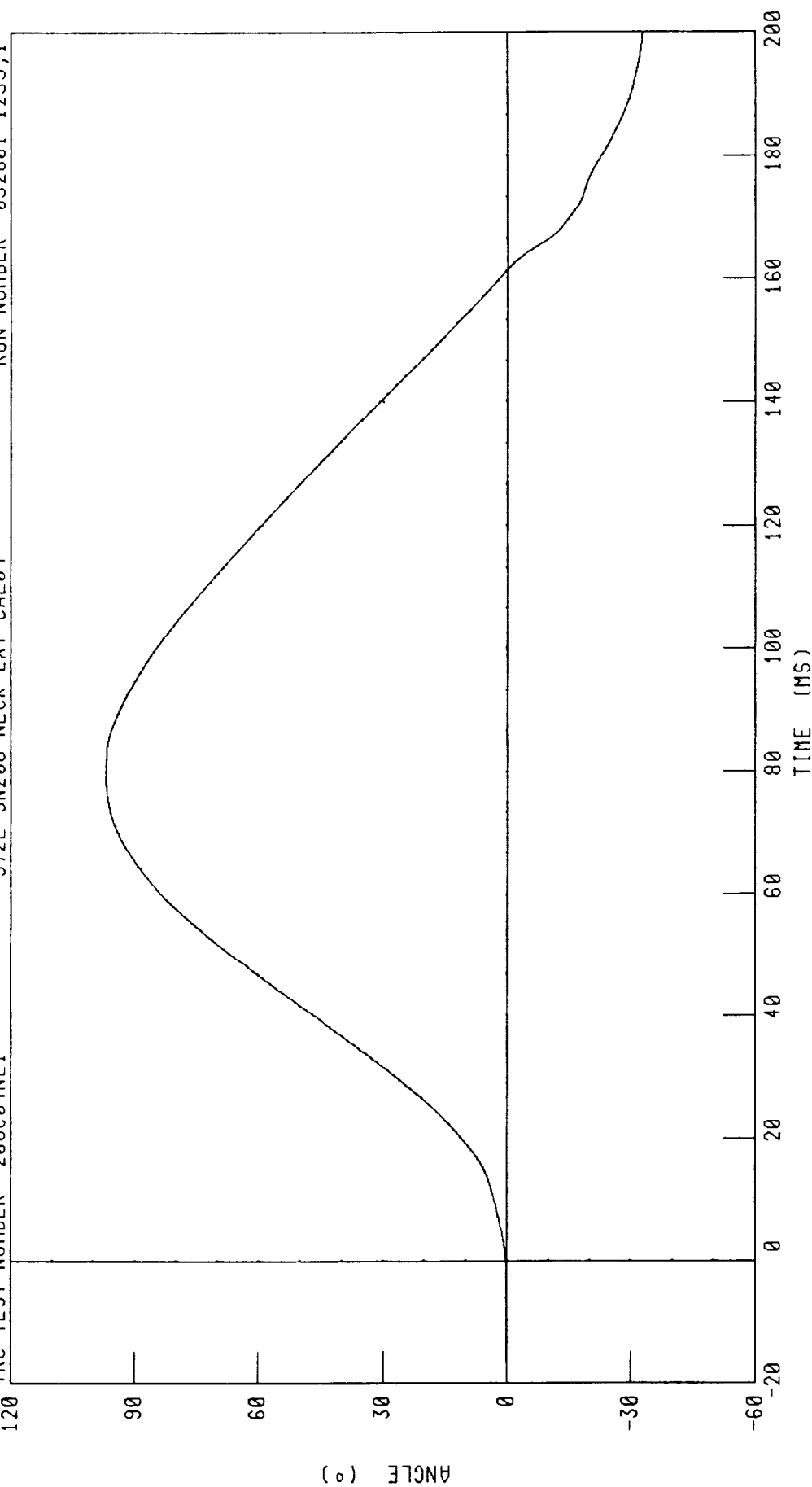
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER 206C04NE1

572E SN206 NECK EXT CAL04

RUN NUMBER 092601 1239,1



CHANNEL TOTAL FILTER CH CLASS 60

PEAK DATA 96 90 ° @ 79 84 MS, -33 00 ° @ 200 00 MS

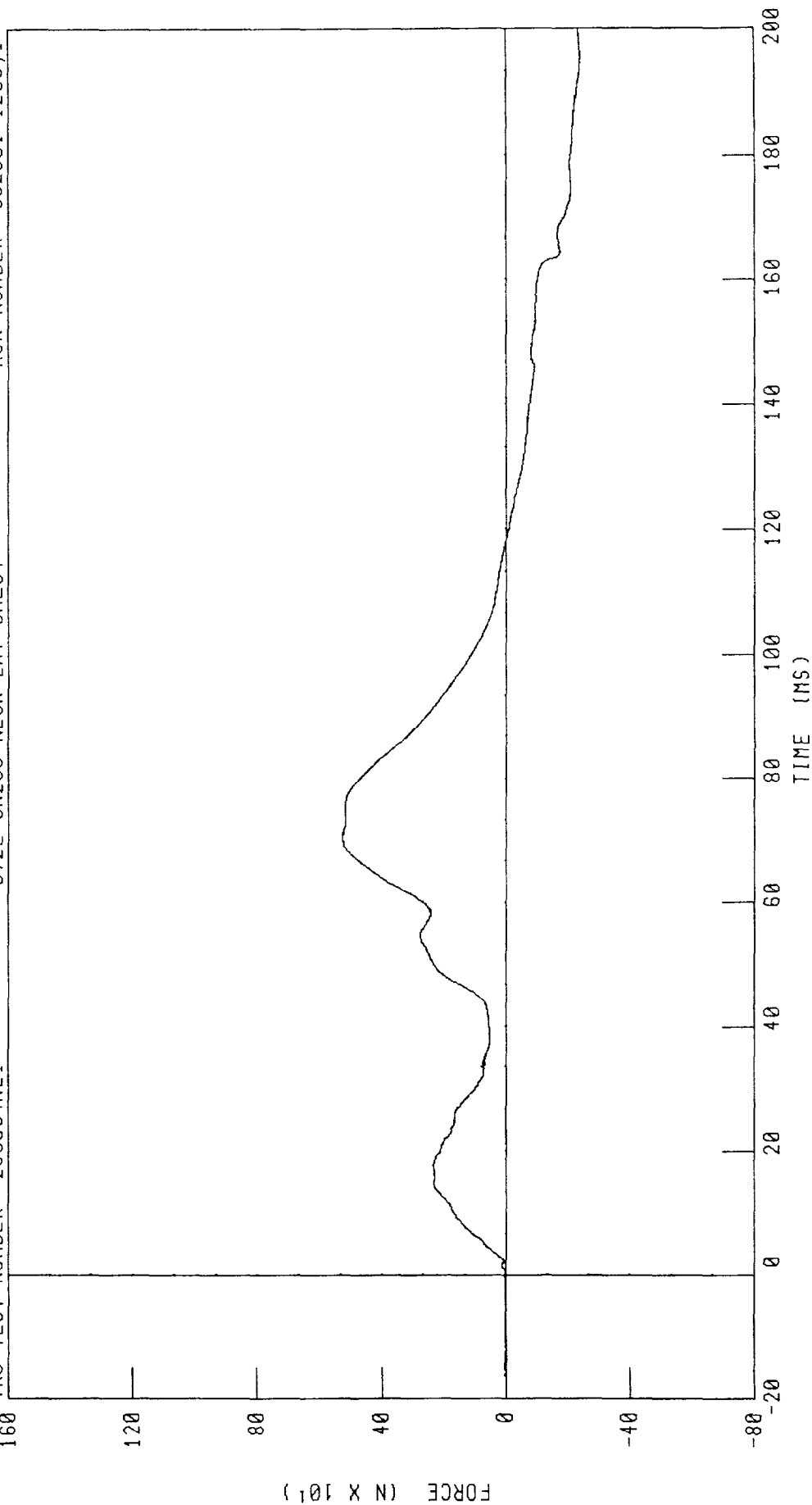
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER 206C04NE1

572E SN206 NECK EXT CAL04

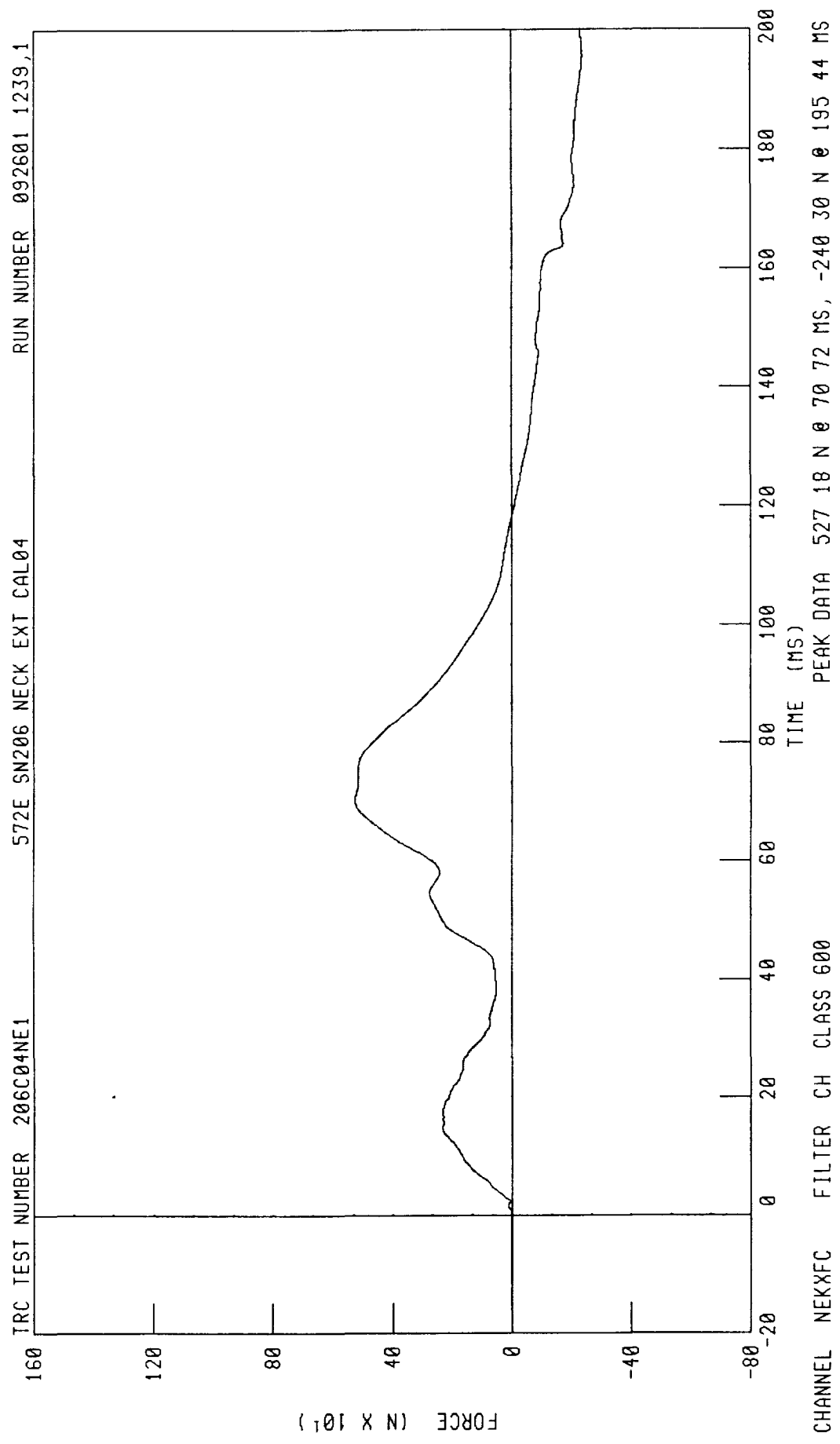
RUN NUMBER 092601 1239,1



PEAK DATA 527 98 N @ 70 00 MS, -240 58 N @ 195 36 MS

CHANNEL NEKXF FILTER CH CLASS 1000

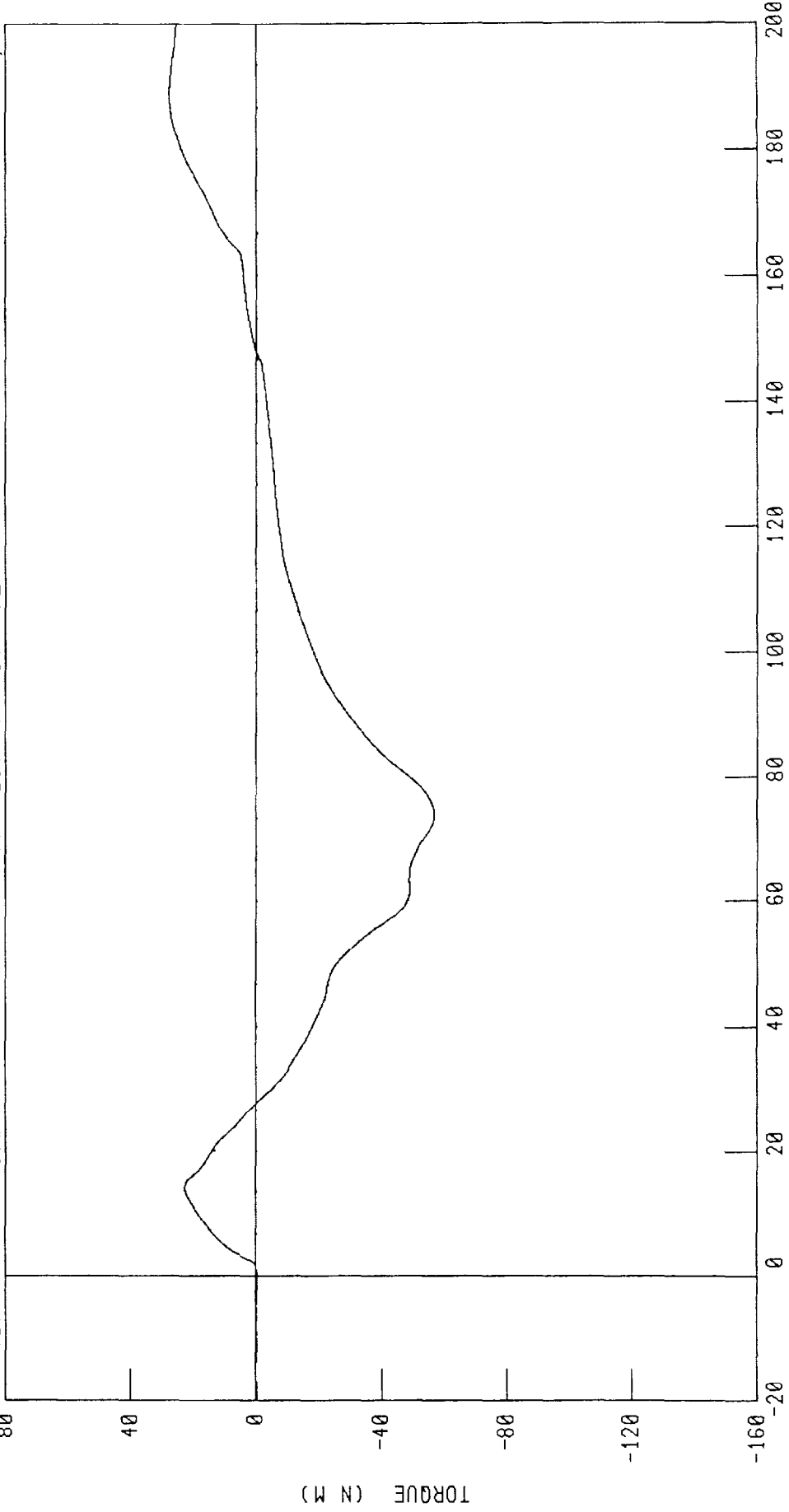
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER 206C04NE1 572E SN206 NECK EXT CAL04 RUN NUMBER 092601 1239,1

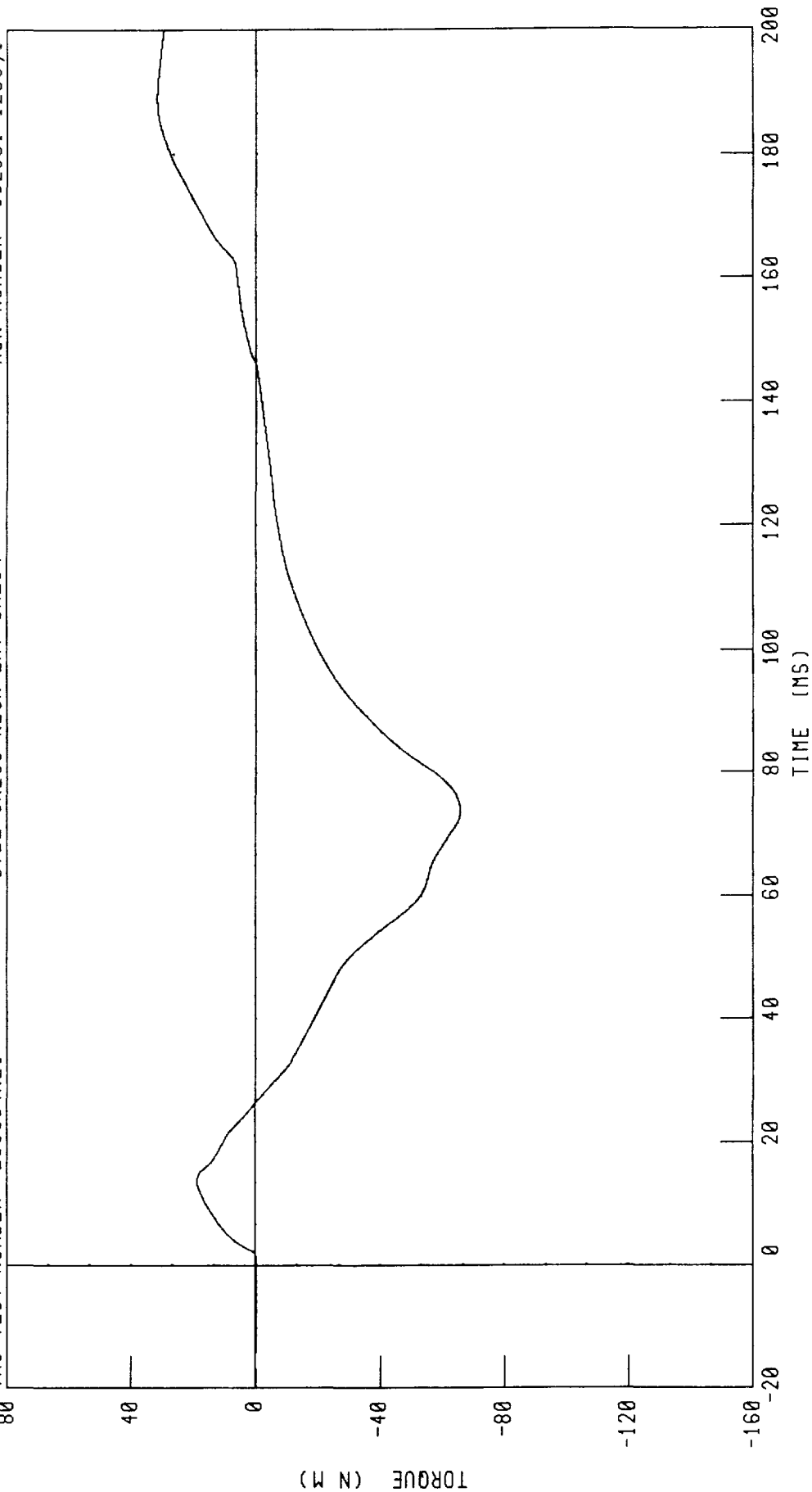


TIME (MS)

CHANNEL NEKYM FILTER CH CLASS 600 PEAK DATA 27 86 N M 0 188 64 MS, -56 77 N M 0 73 76 MS

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

TRC TEST NUMBER 206C04NE1 572E SN206 NECK EXT CAL04 RUN NUMBER 092601 1239,1



CHANNEL NEKOM FILTER CH CLASS 600

PEAK DATA 31 85 N M @ 189 20 MS, -65 96 N M @ 73 84 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

26-SEP-01

TRC INC.

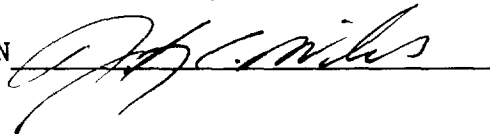
TEST NO: 206C04TH1

572E SN206 H.S.THORAX CAL04

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	65.6 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5669. N
INTERNAL HYSTERESIS	69% - 85%	71.5%

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092601.1446;1

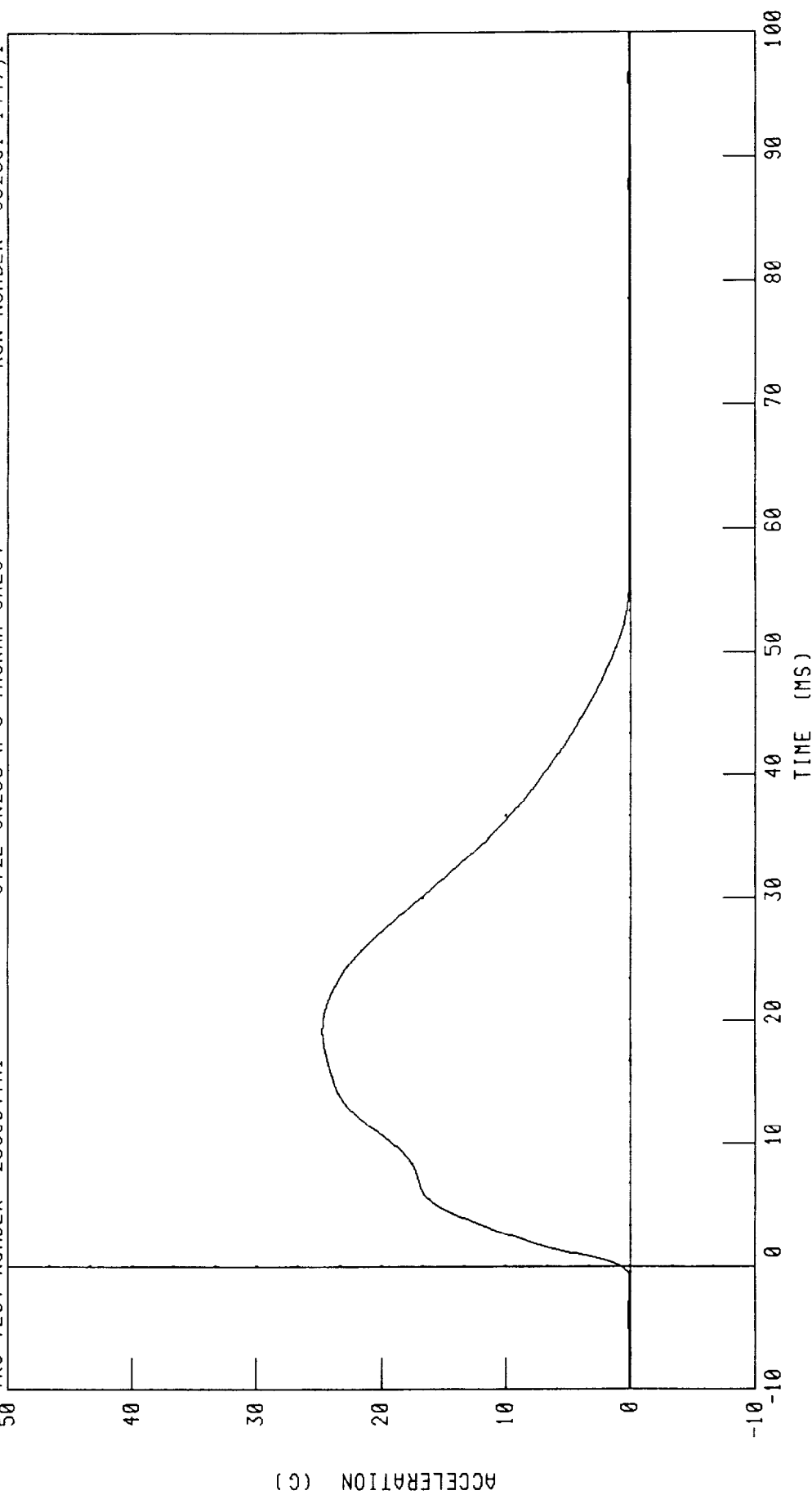
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER 206004TH1

572E SN206 H S THORAX CAL04

RUN NUMBER 092601 1447,1



CHANNEL PENXC FILTER CH CLASS 180

TIME (MS)

PEAK DATA 24 75 G @ 19 20 MS, 0 04 G @ 64 24 MS

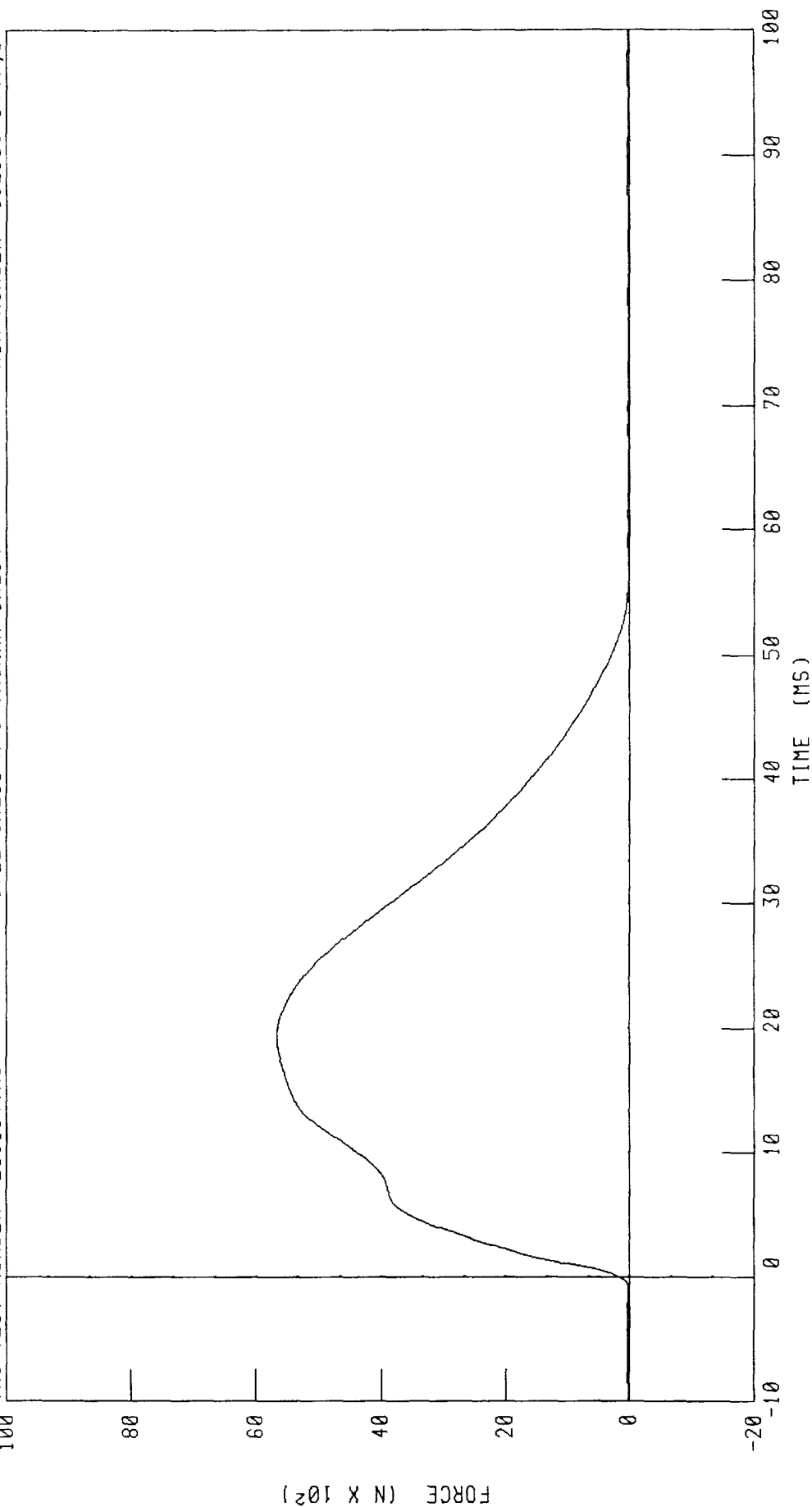
PART 572-E HYBRID III THORAX CALIBRATION

PENDULUM FORCE

TRC TEST NUMBER 206C04TH1

572E SN206 H S THORAX CAL04

RUN NUMBER 092601 1447,1

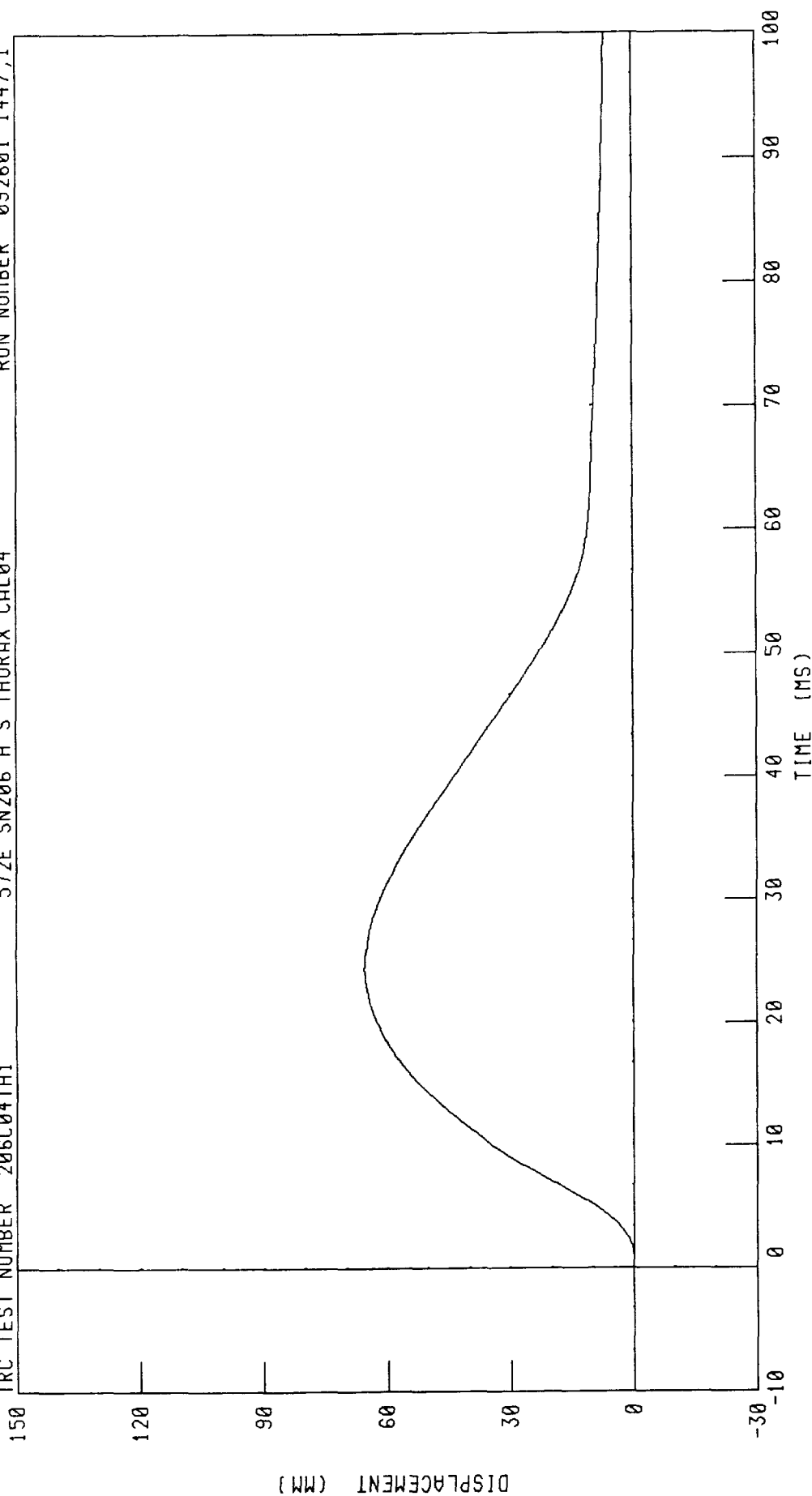


CHANNEL PENXF FILTER CH CLASS 180 PEAK DATA 5669 84 N @ 19 20 MS, 8 23 N @ 64 24 MS

PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER 206C04TH1 572E SN206 H S THORAX CAL04 RUN NUMBER 092601 1447,1

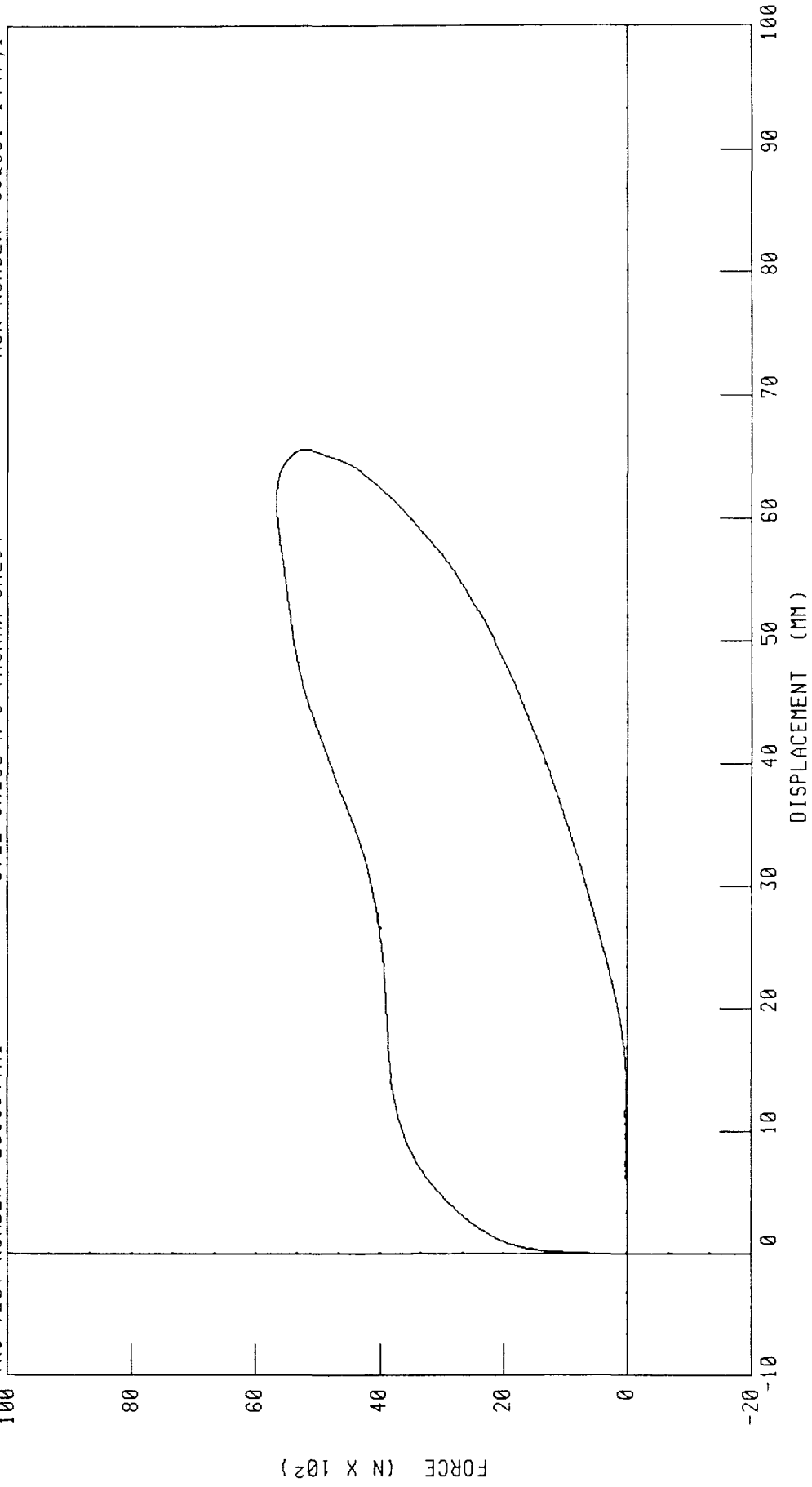


CHANNEL CSTXD FILTER CH CLASS 180 PEAK DATA 65 61 MM @ 24 40 MS, 0 00 MM @ 0 08 MS

PART 572-E HYBRID III THORAX CALIBRATION

CHEST DISPLACEMENT VS PENDULUM FORCE

TRC TEST NUMBER 206C04TH1 572E SN206 H S THORAX CAL04 RUN NUMBER 092601 1447,1



CHANNEL CSTXD PENXF FILTER CH CLASS 180 CH CLASS 180
 PEAK DATA 5669 84 N 65 61 MM 24 40 MS, 0 00 MM 0 0 08 MS
 19 20 MS, 8 23 N 0 64 24 MS

Transportation Research Center Inc

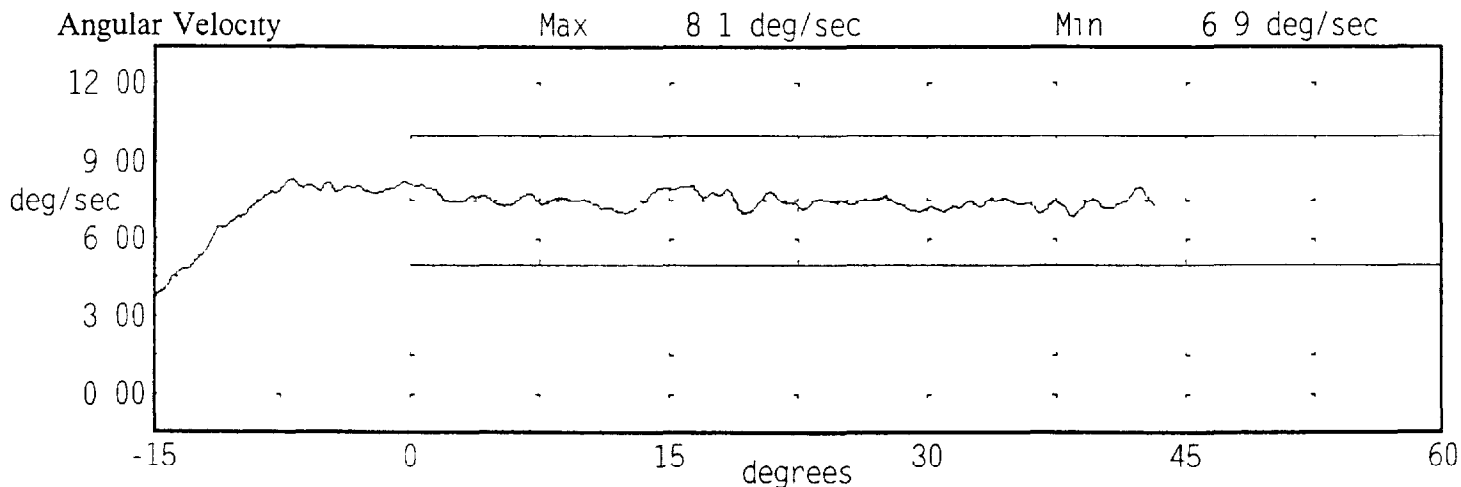
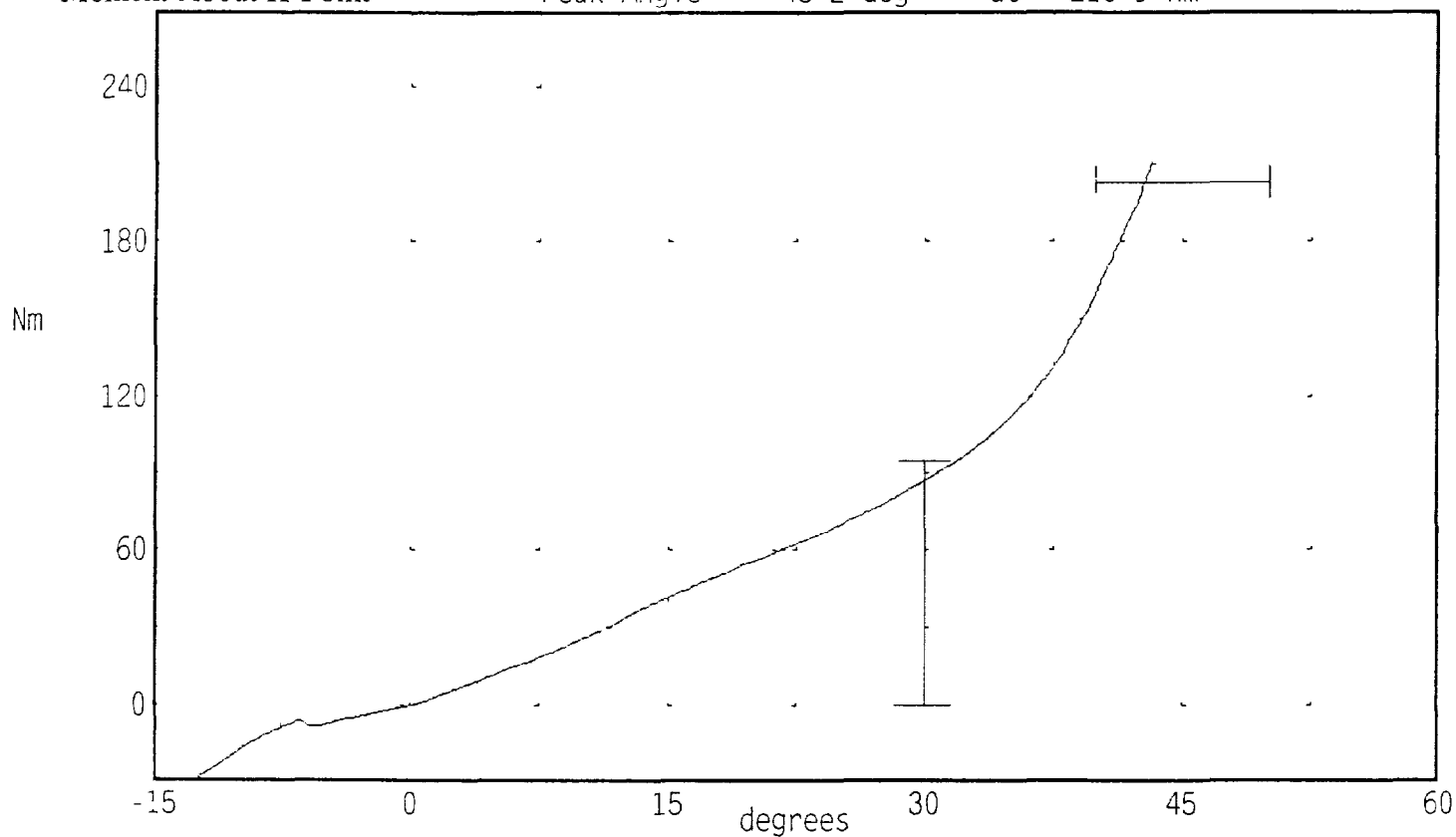
Hybrid III Hip Range of Motion

Serial Number 206L
Test Number 206C04
Comments

Date 09/26/2001
Time 09 42

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.7 °C	Pass
Humidity	10 - 70	37 %	Pass
Moment at 30 deg	<= 94.9	87.0 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	42.9 deg	Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec	Pass

Moment About H-Point
Peak Moment 210.9 Nm at 43.2 deg
Peak Angle 43.2 deg at 210.9 Nm



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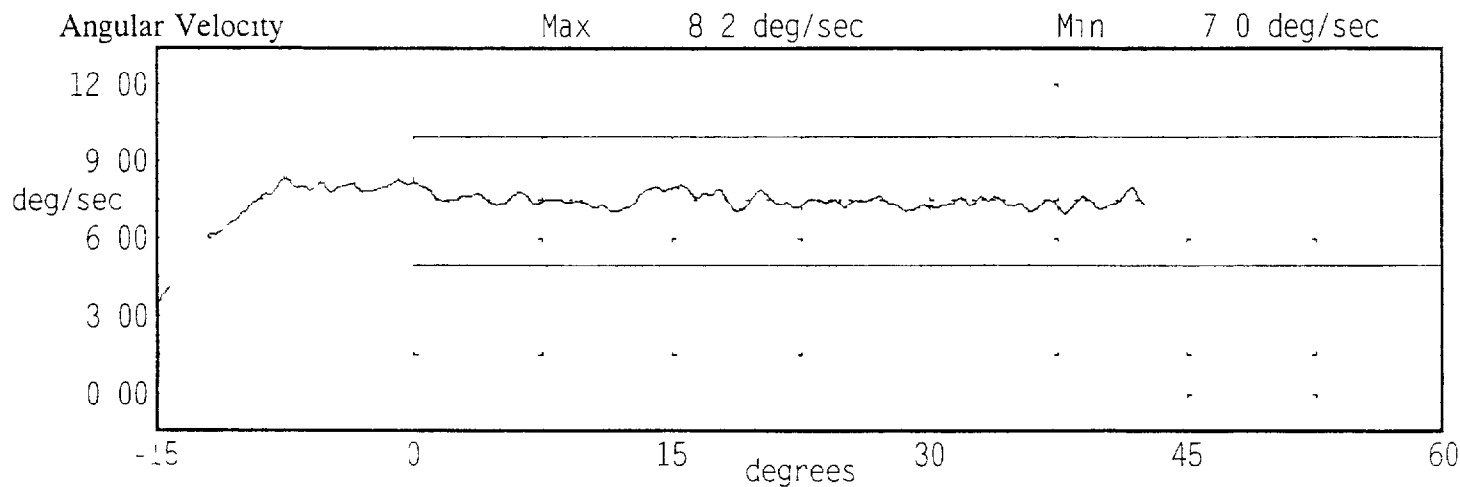
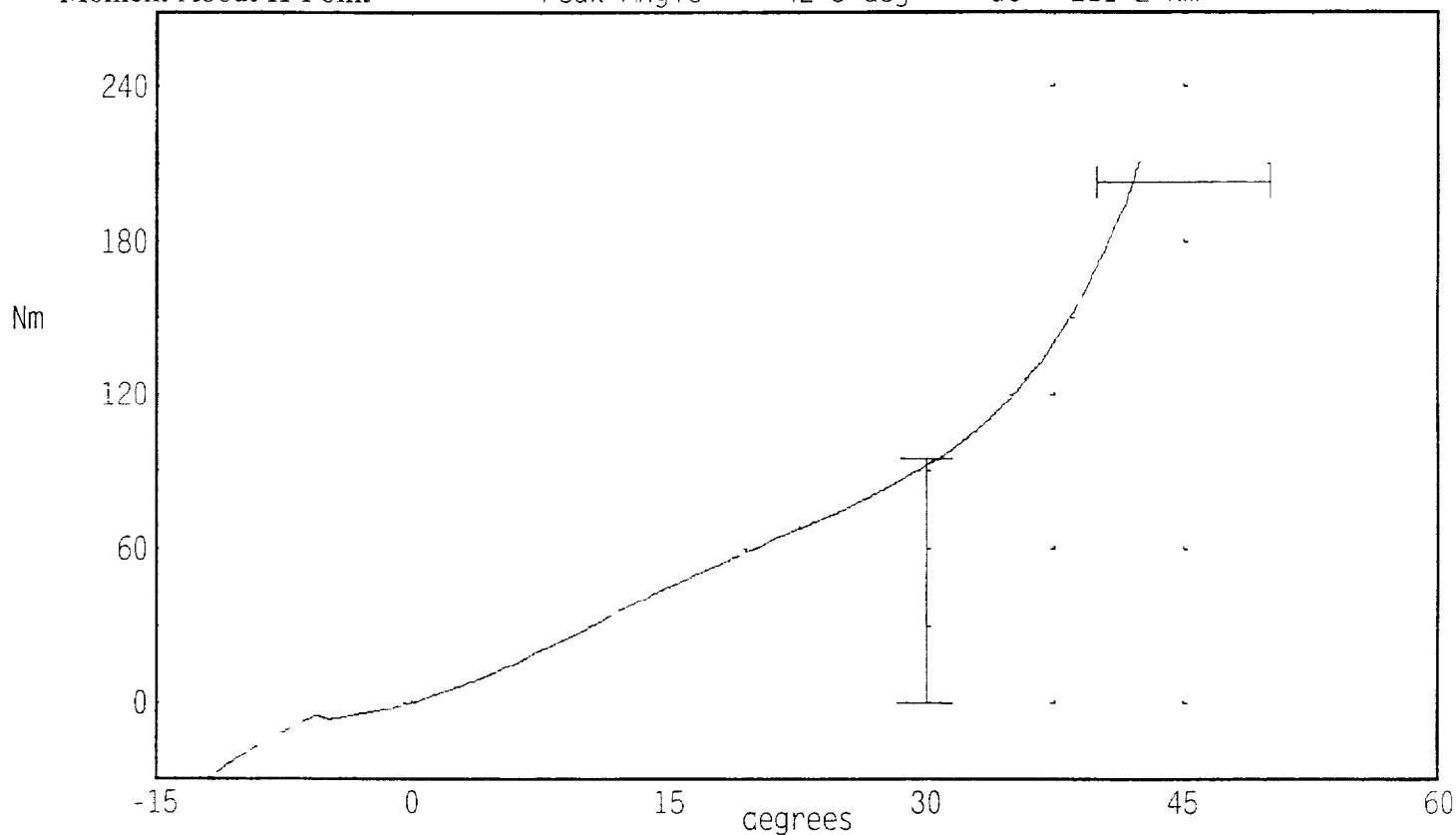
Hybrid III Hip Range of Motion

Serial Number 206R
Test Number 206C04
Comments

Date 09/26/2001
Time 09 37

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.7 °C	Pass
Humidity	10 - 70	37 %	Pass
Moment at 30 deg	<= 94.9	93.1 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	42.1 deg	Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec	Pass

Moment About H-Point
Peak Moment 211.2 Nm at 42.5 deg
Peak Angle 42.5 deg at 211.2 Nm



TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

25-SEP-01

TRC INC.

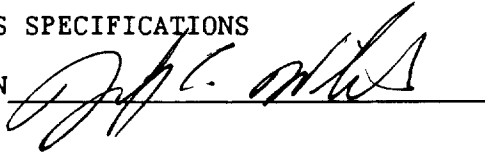
TEST NO: 206C04LK1

572E SN206 LEFT KNEE CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	40.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5364.7 N

TEST MEETS SPECIFICATIONS

TECHNICIAN



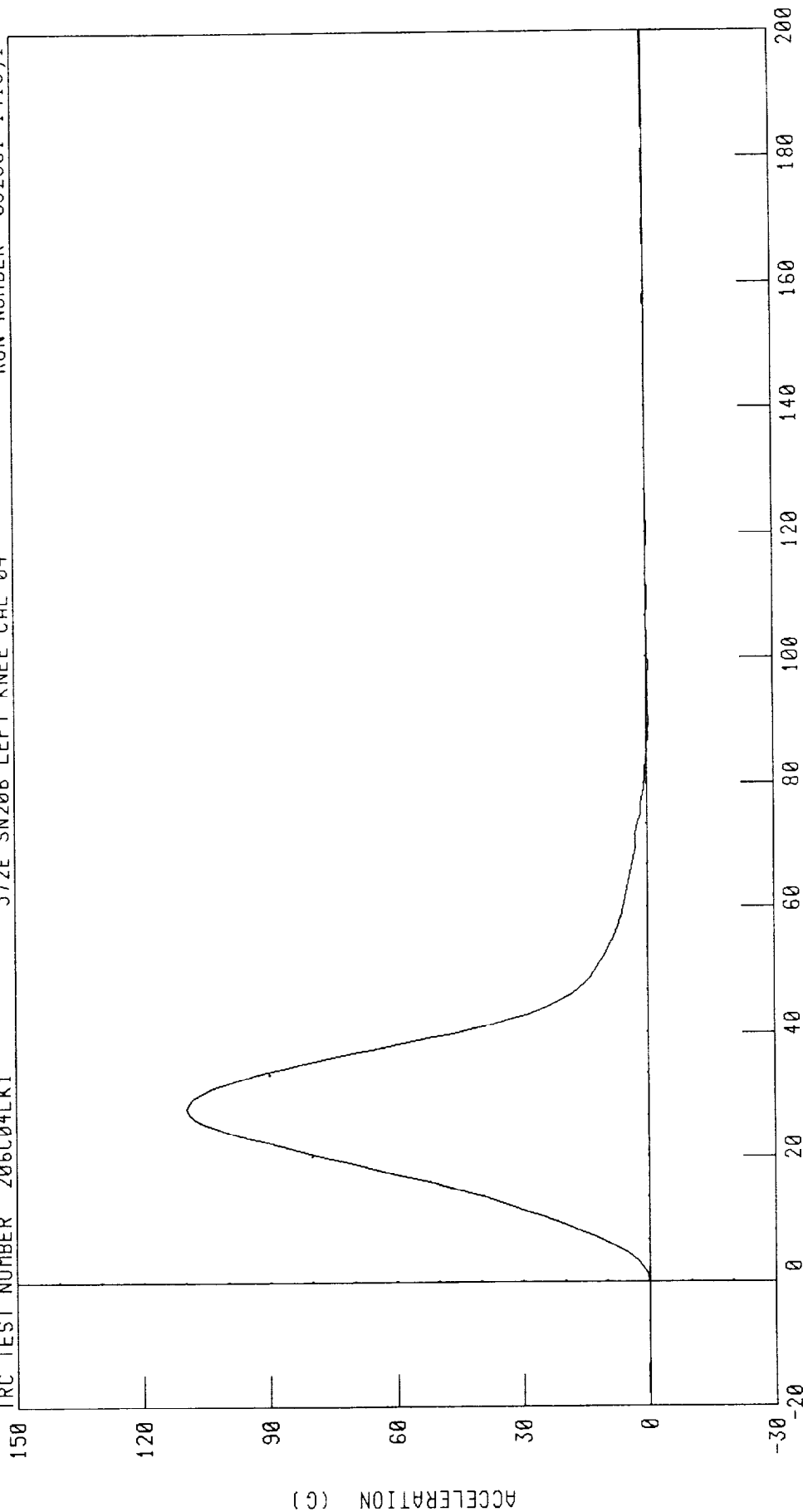
RUN NUMBER: 092501.1823;1

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

TRC TEST NUMBER 206C04LK1

572E SN206 LEFT KNEE CAL 04

RUN NUMBER 092601 1415,1



PEAK DATA 109 65 G @ 2 80 MS, -0 46 G @ 9 84 MS

CHANNEL PENXC FILTER CH CLASS 600

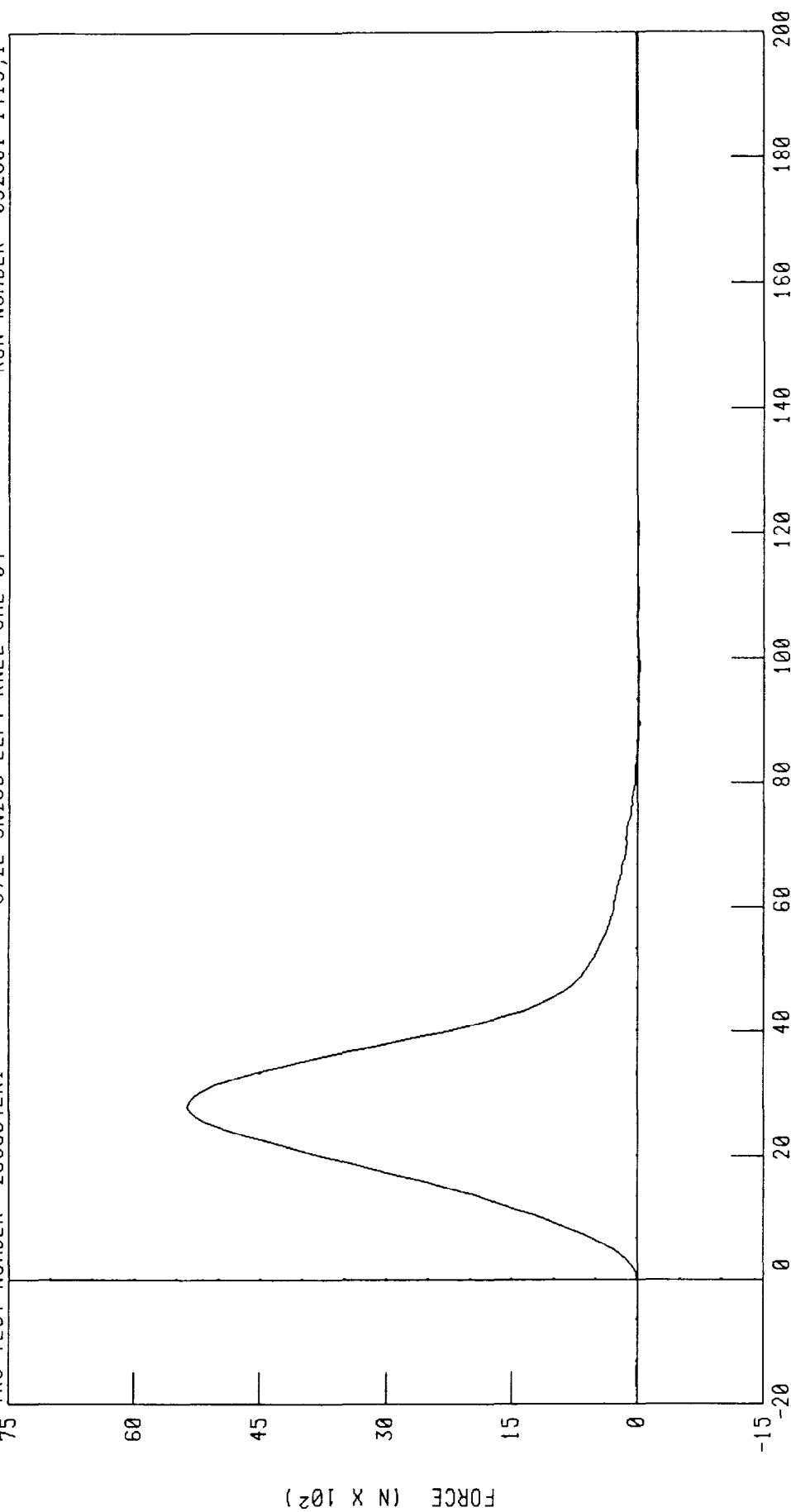
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND)

TRC TEST NUMBER 206C04LK1

572E SN206 LEFT KNEE CAL 04

RUN NUMBER 092601 1415,1



CHANNEL PENXF FILTER CH CLASS 600

PEAK DATA 5364 75 N 0 2 80 MS, -22 46 N 0 9 84 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

25-SEP-01

TRC INC.

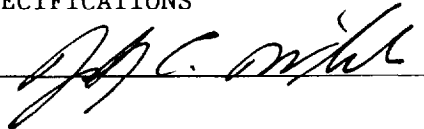
TEST NO: 206C04RK1

572E SN206 RIGHT KNEE CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	40.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4754.0 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

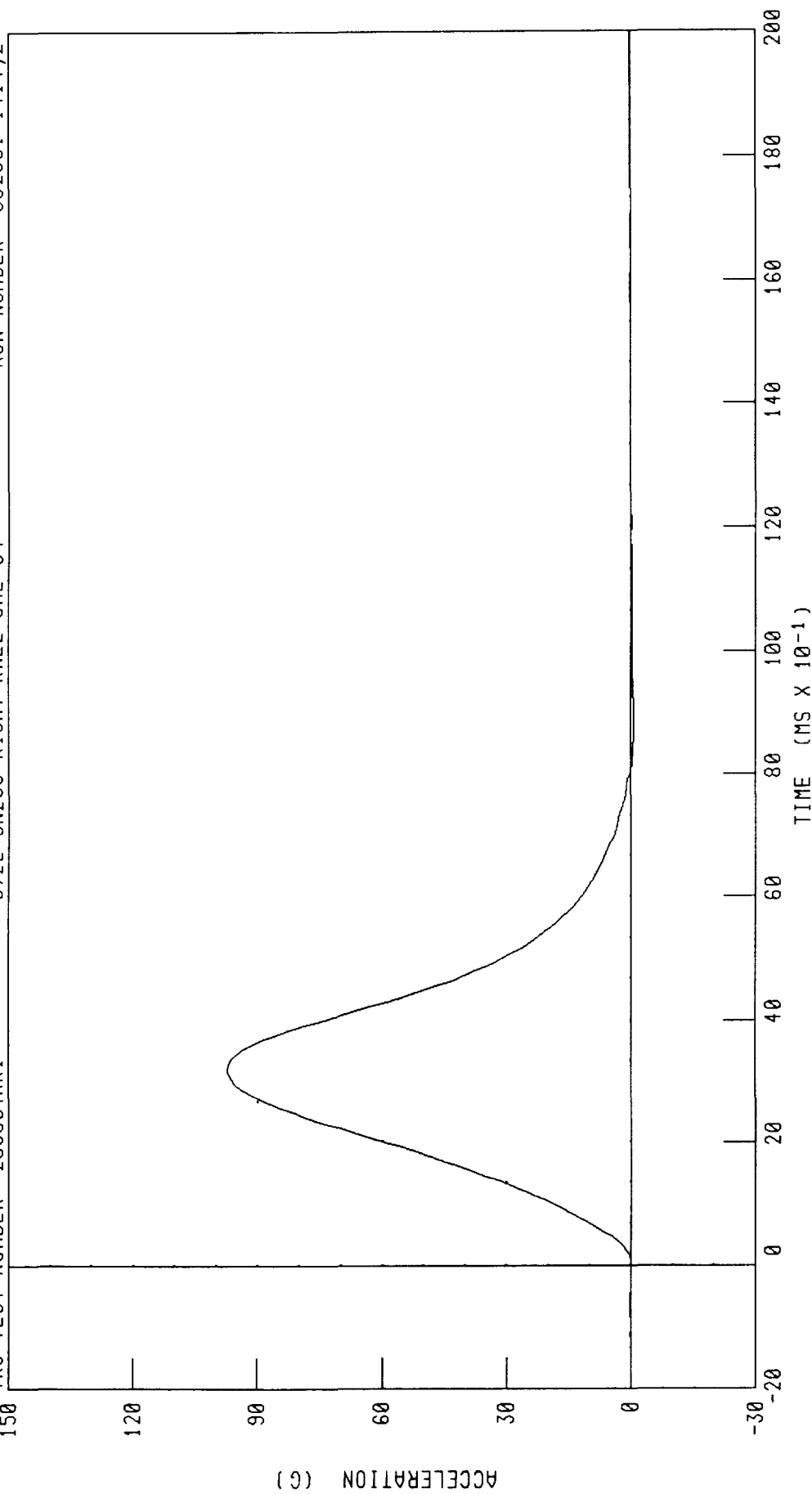


RUN NUMBER: 092501.1842;2

PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND)

TRC TEST NUMBER 206C04RK1 572E SN206 RIGHT KNEE CAL 04 RUN NUMBER 092601 1414,2



CHANNEL PENXC FILTER CH CLASS 600

PEAK DATA 97 16 C 0 3 20 MS, -0 88 C 0 9 04 MS

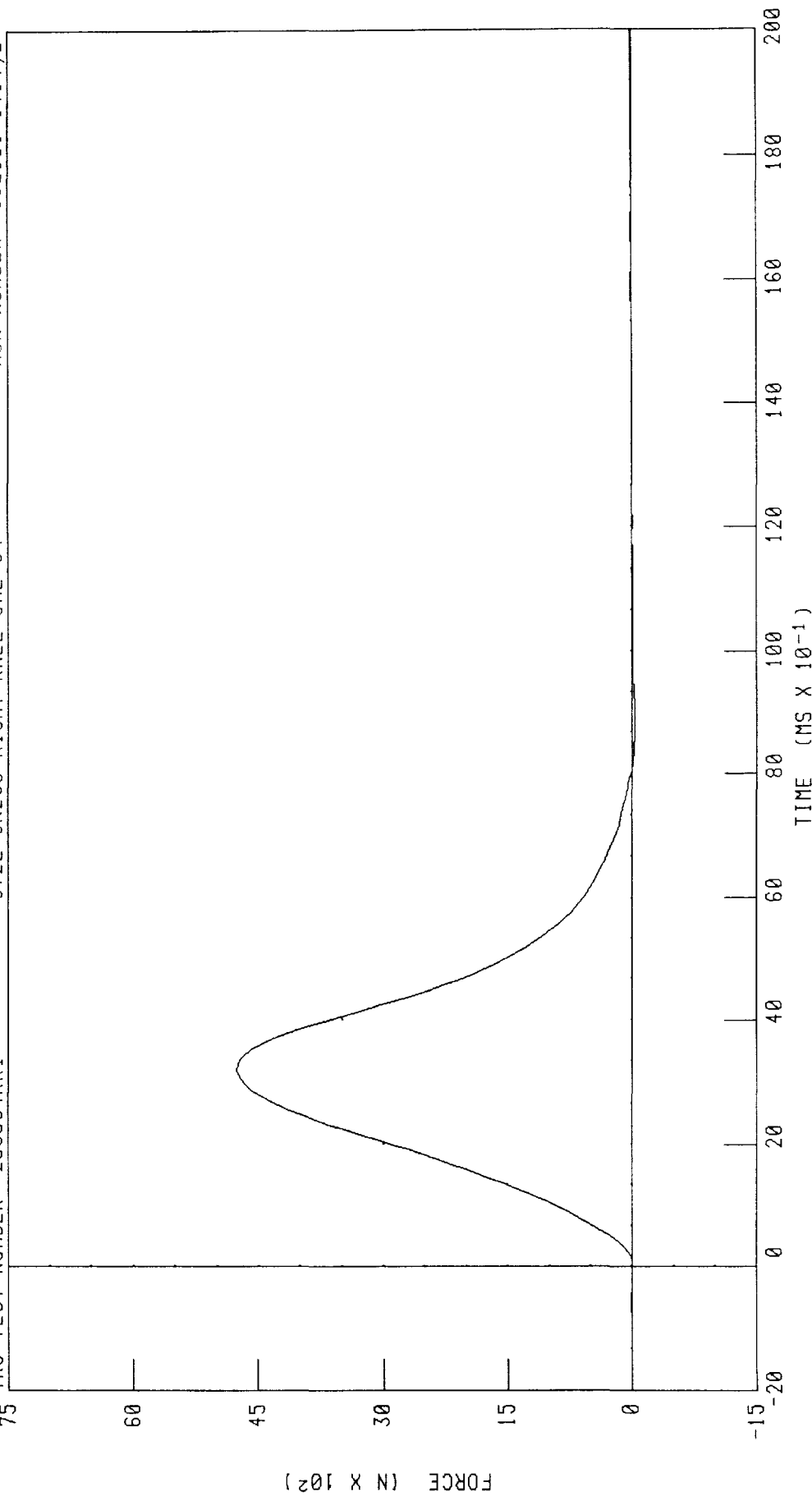
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND)

TRC TEST NUMBER 206C04RK1

572E SN206 RIGHT KNEE CAL 04

RUN NUMBER 092601 1414,2



CHANNEL PENXF FILTER CH CLASS 600

PEAK DATA 4754 01 N 0 3 20 MS, -43 08 N 0 9 04 MS

TRANSPORTATION RESEARCH CENTER INC.

KNEE SLIDER TEST

HYBRID III 50th

25-SEP-01

LEFT KNEE

TRC INC.

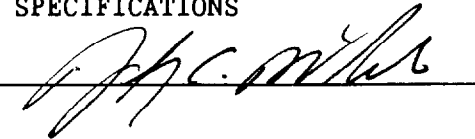
TEST NO: 206C04LS1

572E SN206 LEFT SLIDER CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	42.0 %
PENDULUM VELOCITY	2.70-2.80 M/S	2.75 M/S
FORCE AT 10.0 MM DISPLACEMENT	1259 - 1721 N	1382. N
FORCE AT 18.0 MM DISPLACEMENT	2268 - 3096 N	2485. N

TEST MEETS SPECIFICATIONS

TECHNICIAN

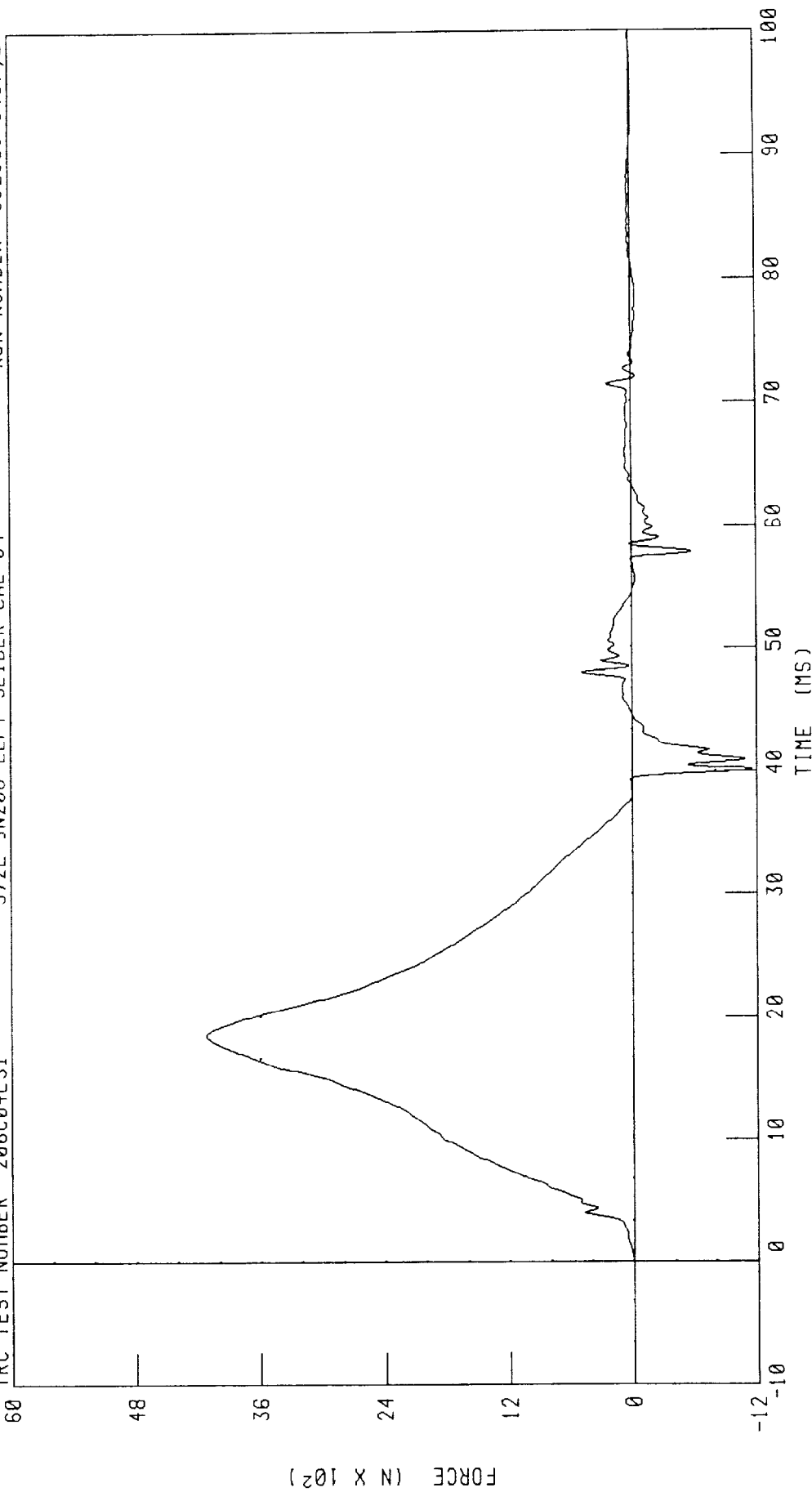


RUN NUMBER: 092601.1225;2

PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION

LEFT FEMUR FORCE

TRC TEST NUMBER 206C04LS1 572E SN206 LEFT SLIDER CAL 04 RUN NUMBER 092601 1417,2

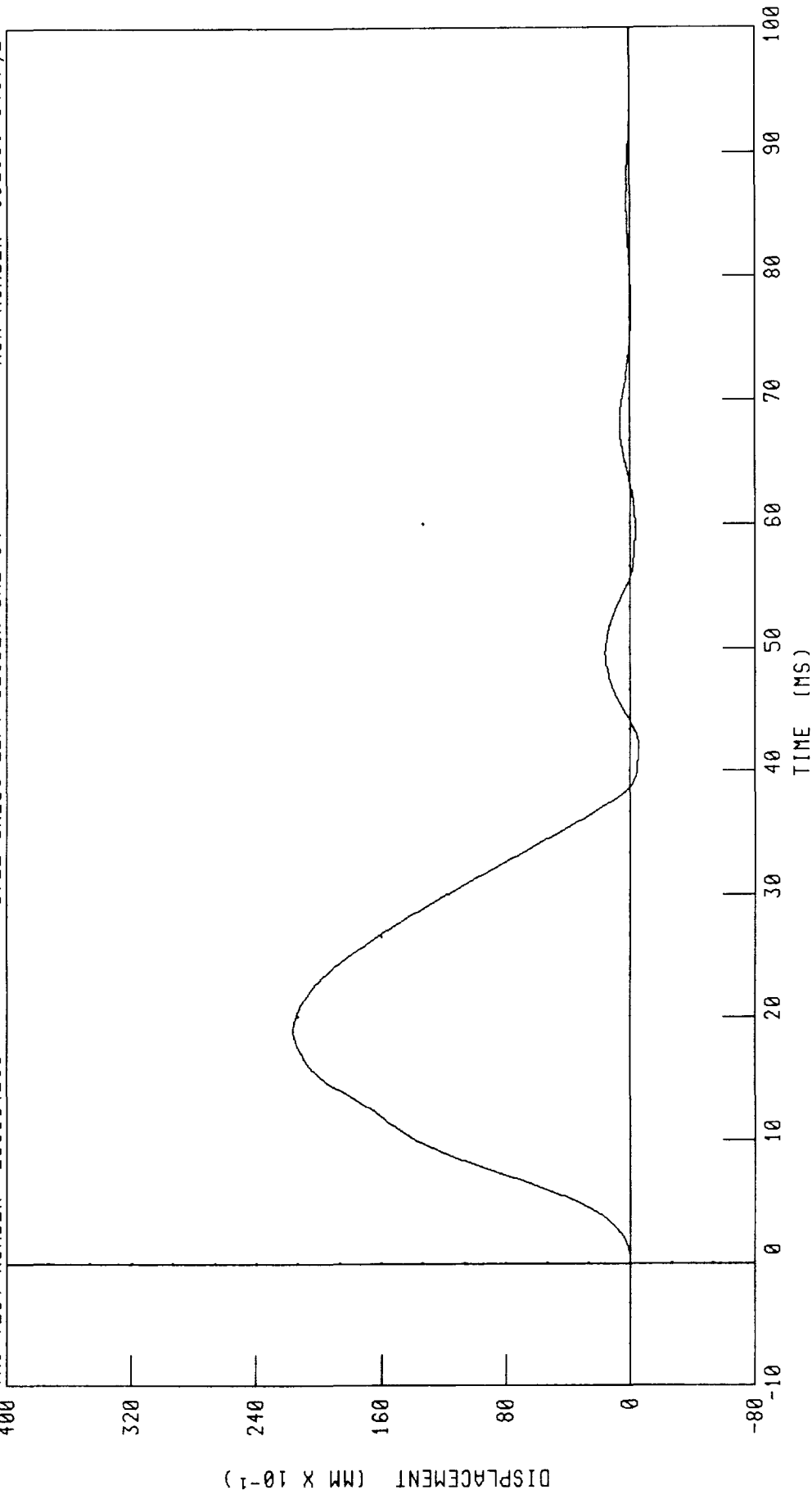


CHANNEL LFMF FILTER CH CLASS 600 PEAK DATA 4123 58 N 0 18 48 MS, -1150 92 N 0 40 08 MS

PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION

LEFT KNEE DISPLACEMENT

IRC TEST NUMBER 206C04LS1 572E SN206 LEFT SLIDER CAL 04 RUN NUMBER 092601 1417,2

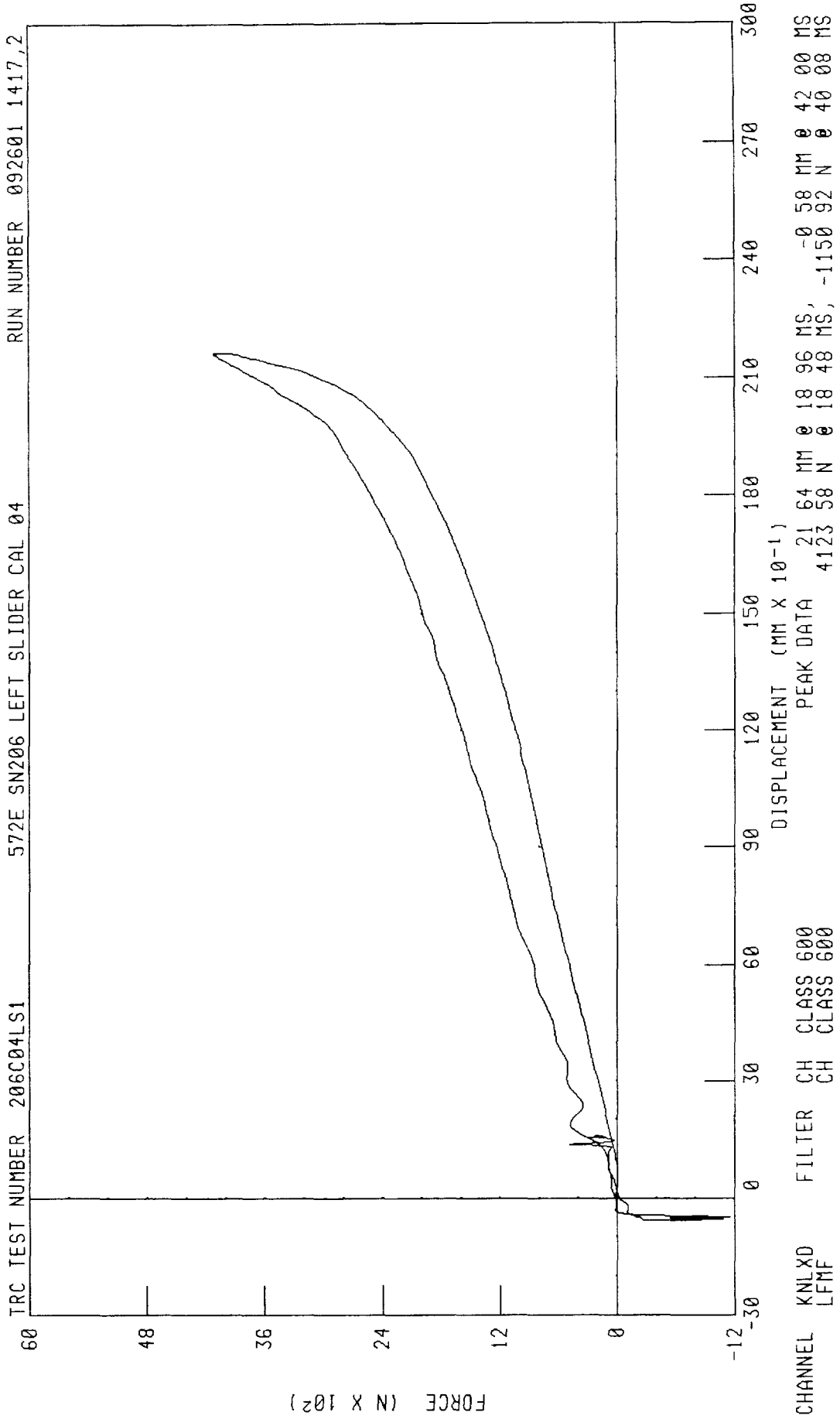


CHANNEL KNLXD FILTER CH CLASS 600

PEAK DATA 21 64 MM @ 18 96 MS, -0 58 MM @ 42 00 MS

PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION

LEFT KNEE DISPLACEMENT VS FEMUR FORCE



TRANSPORTATION RESEARCH CENTER INC.

KNEE SLIDER TEST

HYBRID III 50th

25-SEP-01

RIGHT KNEE

TRC INC.

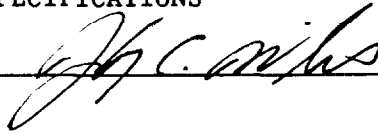
TEST NO: 206C04RS1

572E SN206 RIGHT SLIDER CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	40.0 %
PENDULUM VELOCITY	2.70-2.80 M/S	2.73 M/S
FORCE AT 10.0 MM DISPLACEMENT	1259 - 1721 N	1545. N
FORCE AT 18.0 MM DISPLACEMENT	2268 - 3096 N	2880. N

TEST MEETS SPECIFICATIONS

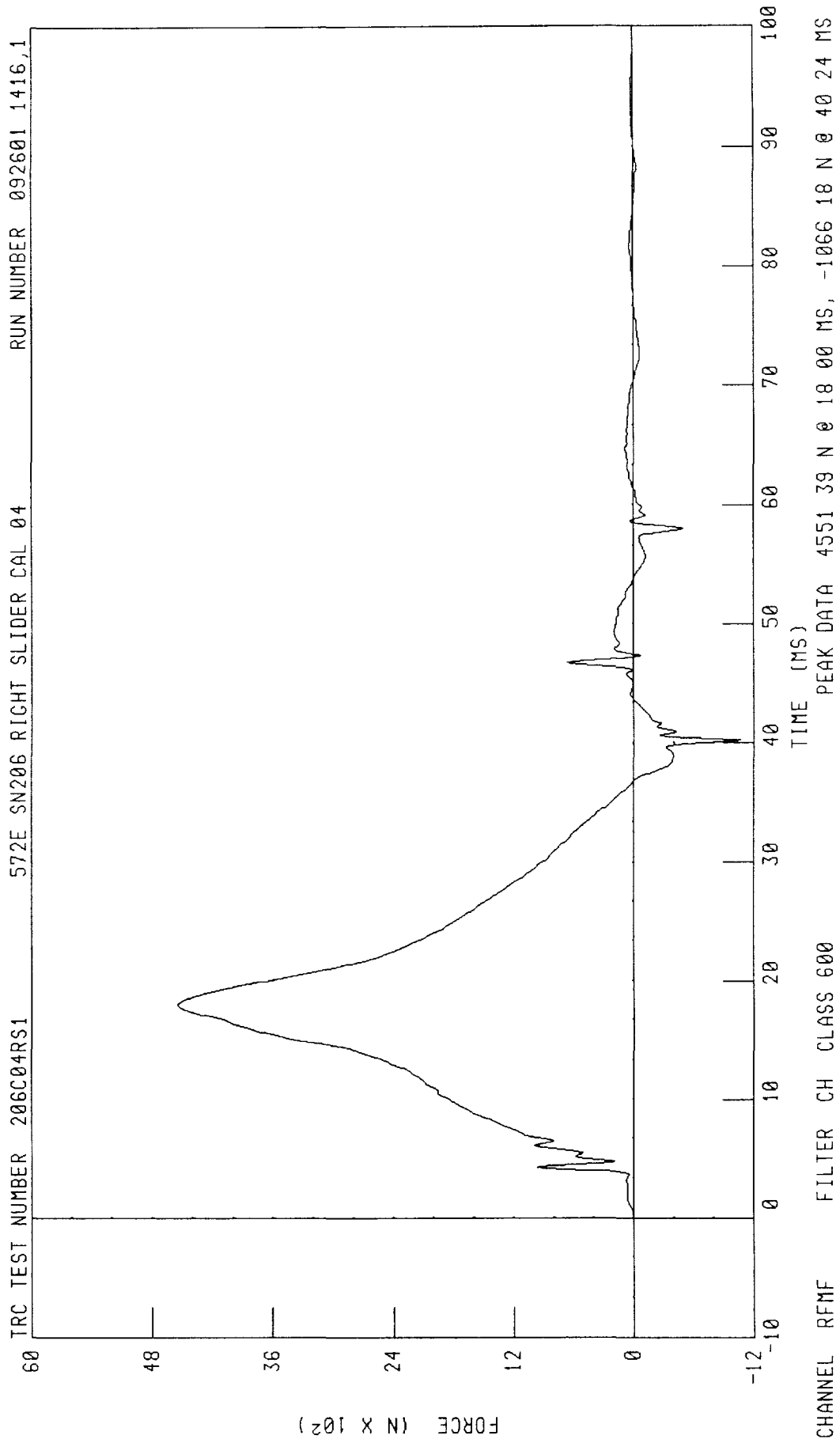
TECHNICIAN



RUN NUMBER: 092501.1951;1

PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION

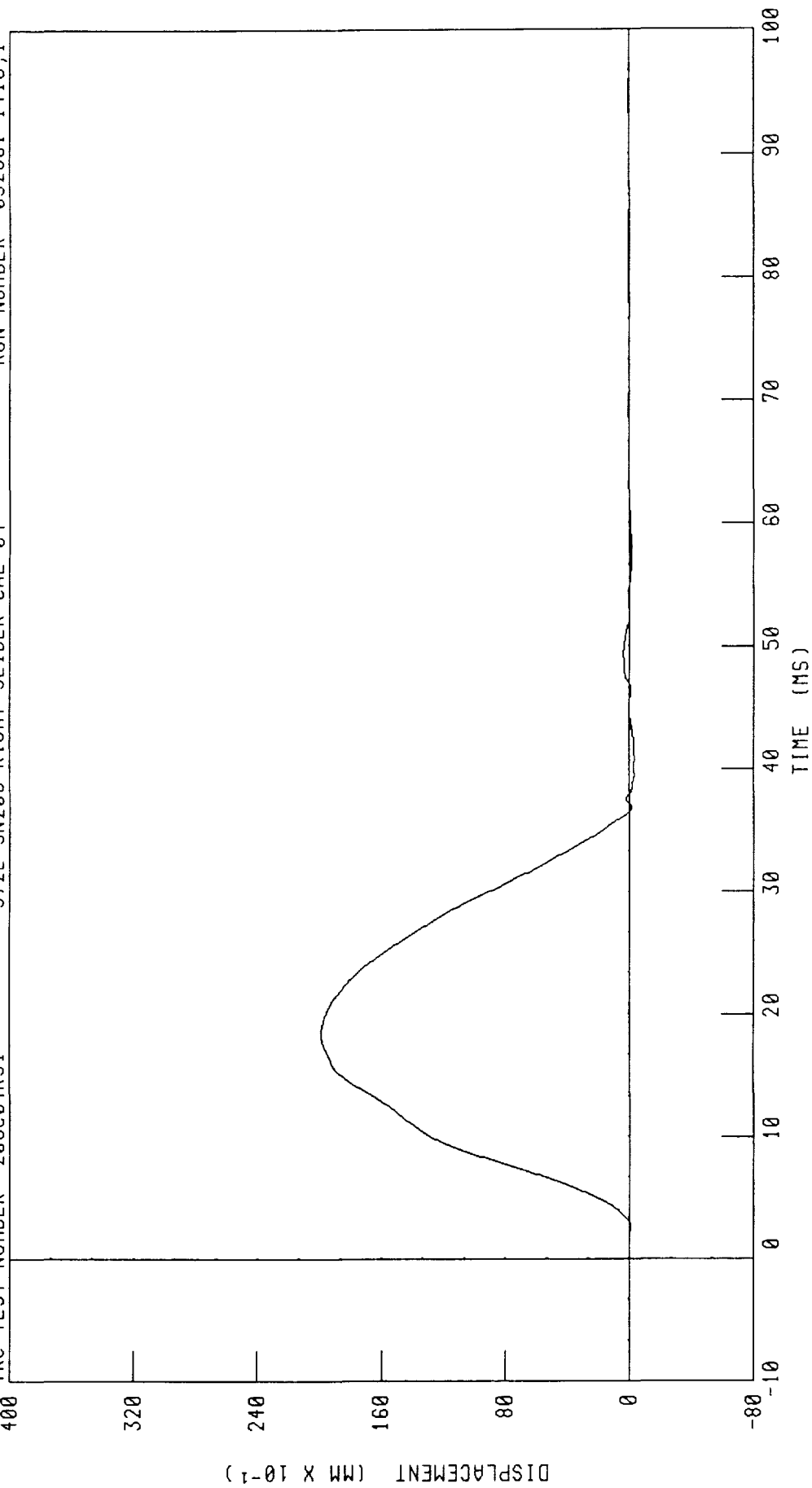
RIGHT FEMUR FORCE



PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION

RIGHT KNEE DISPLACEMENT

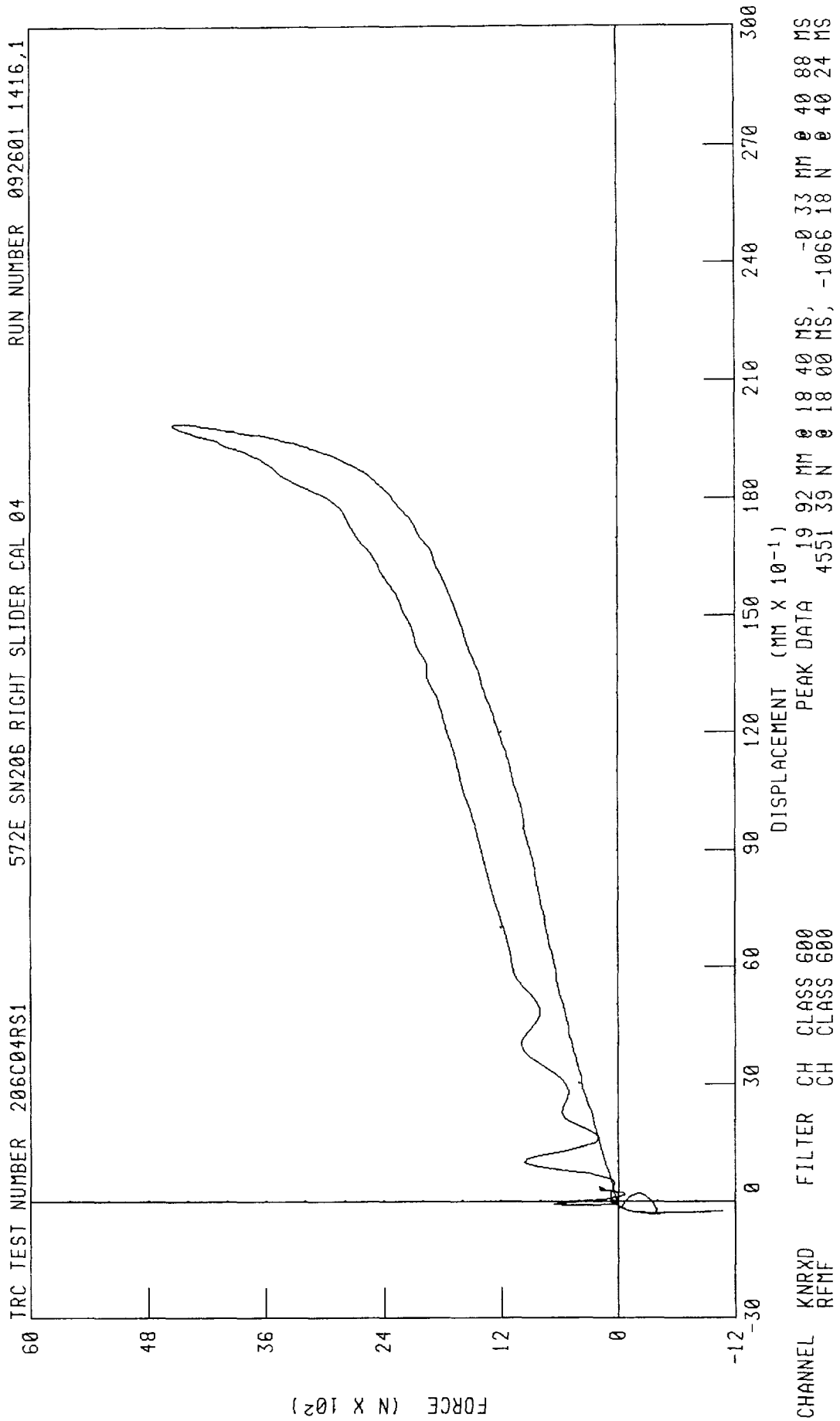
TRC TEST NUMBER 206C04RS1 572E SN206 RIGHT SLIDER CAL 04 RUN NUMBER 092601 1416,1



CHANNEL KNRXD FILTER CH CLASS 600 PEAK DATA 19 92 MM @ 18 40 MS, -0 33 MM @ 40 88 MS

PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION

RIGHT KNEE DISPLACEMENT VS FEMUR FORCE



Post-Test Dummy Configuration and Performance Verification Data

Passenger Dummy S/N: 202

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS

202

26-SEP-01

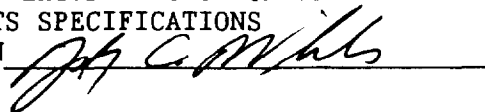
TRC INC. TEST NO: 202C05ED1 572E SN202 EXT.DIMENSION CAL05

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970 -1001 MM	996. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	853. MM
CHEST DEPTH (O)		213 - 229 MM	224. MM
H-POINT HEIGHT (C)		84 - 89 MM	86. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	137. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	886. MM
THIGH CLEARANCE (F)		140 - 155 MM	145. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	599. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	470. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	447. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	488. MM
FOOT LENGTH (P)		252 - 267 MM	254. MM
FOOT BREADTH (W)		91 - 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	94. MM
SHOULDER BREADTH (V)		422 - 437 MM	434. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	508. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	206. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	340. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	300. MM

572E SN202 EXT.DIMENSION CAL05

DUMMY MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092601.1240

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III 50th

25-SEP-01

TRC INC.

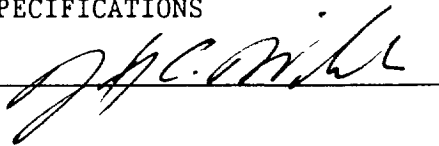
TEST NO: 202C05HD1

572E SN202 HEAD DROP CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	42.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	241.67 G
PEAK LATERAL ACCELERATION	15 G MAX	4.32 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092501.1533;1

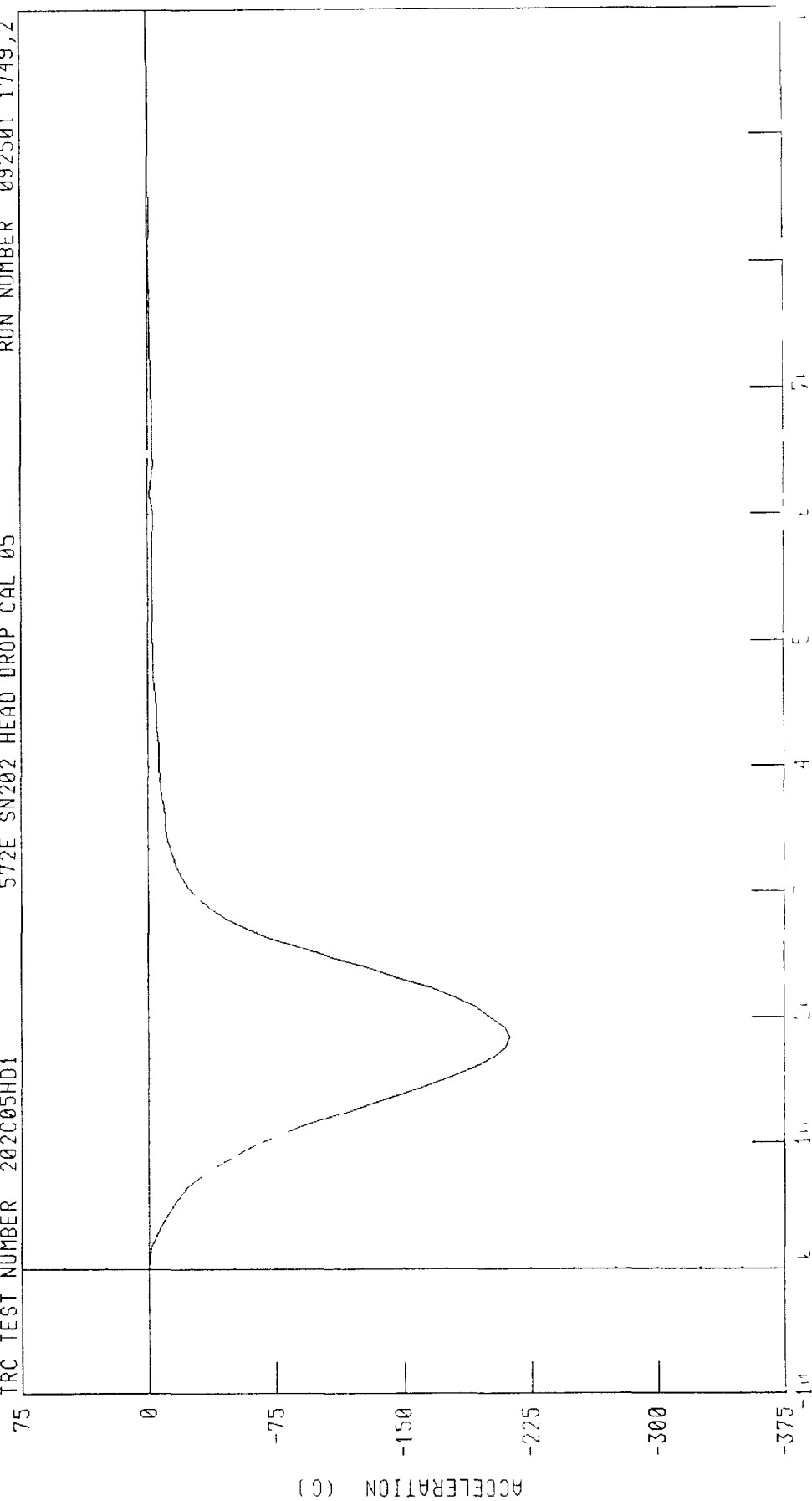
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X AXIS

572E SN202 HEAD DROP CAL 05

TRC TEST NUMBER 202C05HD1

RUN NUMBER 092501 1749,2



TIME (sec)

PEAK DATA 0 16 0 0 0 16 10, -212 37 0 0 1 04 10

CHANNEL HEDXG FILTER CH CLASS 1000

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

572E SN202 HEAD DROP CAL 05

TRC TEST NUMBER 202C05HD1

225

RUN NUMBER 092501 1749,2

150

75

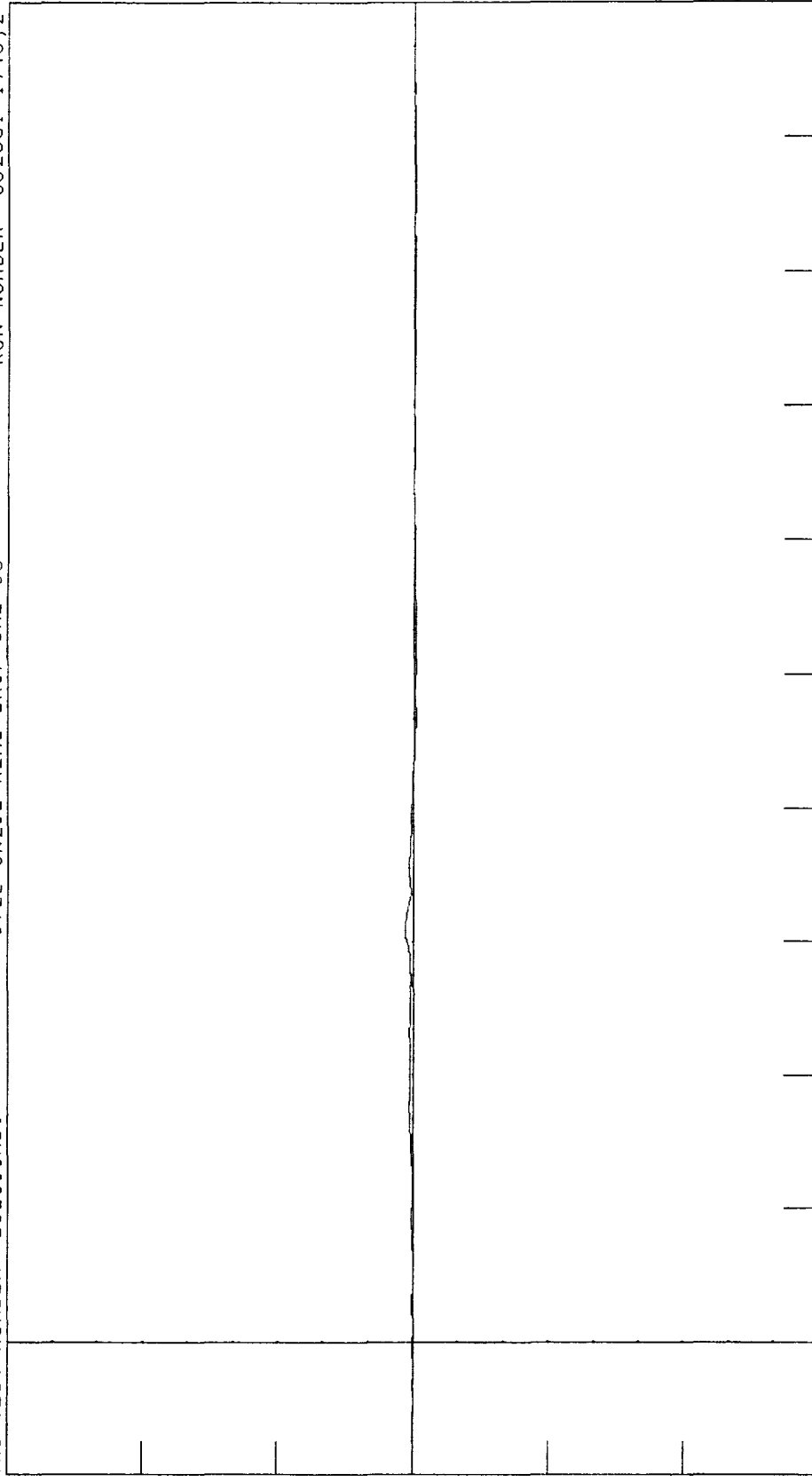
0

-75

-150

-225

ACCELERATION (G)



TIME (s)

CHANNEL HEDYC FILTER CH CLASS 1000

PERF DMIN 4 0 0 3 12 115, -1 10 6 0 5 0 1 NS

PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

TRC TEST NUMBER 202C05HD1

572E SN202 HEAD DROP CAL 05

RUN NUMBER 092501 1749,2



TIME (Sec)

CHANNEL HEDZG

FILTER CH CLASS 10K

PEH DATA 115 40 G 1 0.2 Hz, -0 13 6 0 -0 0 Hz

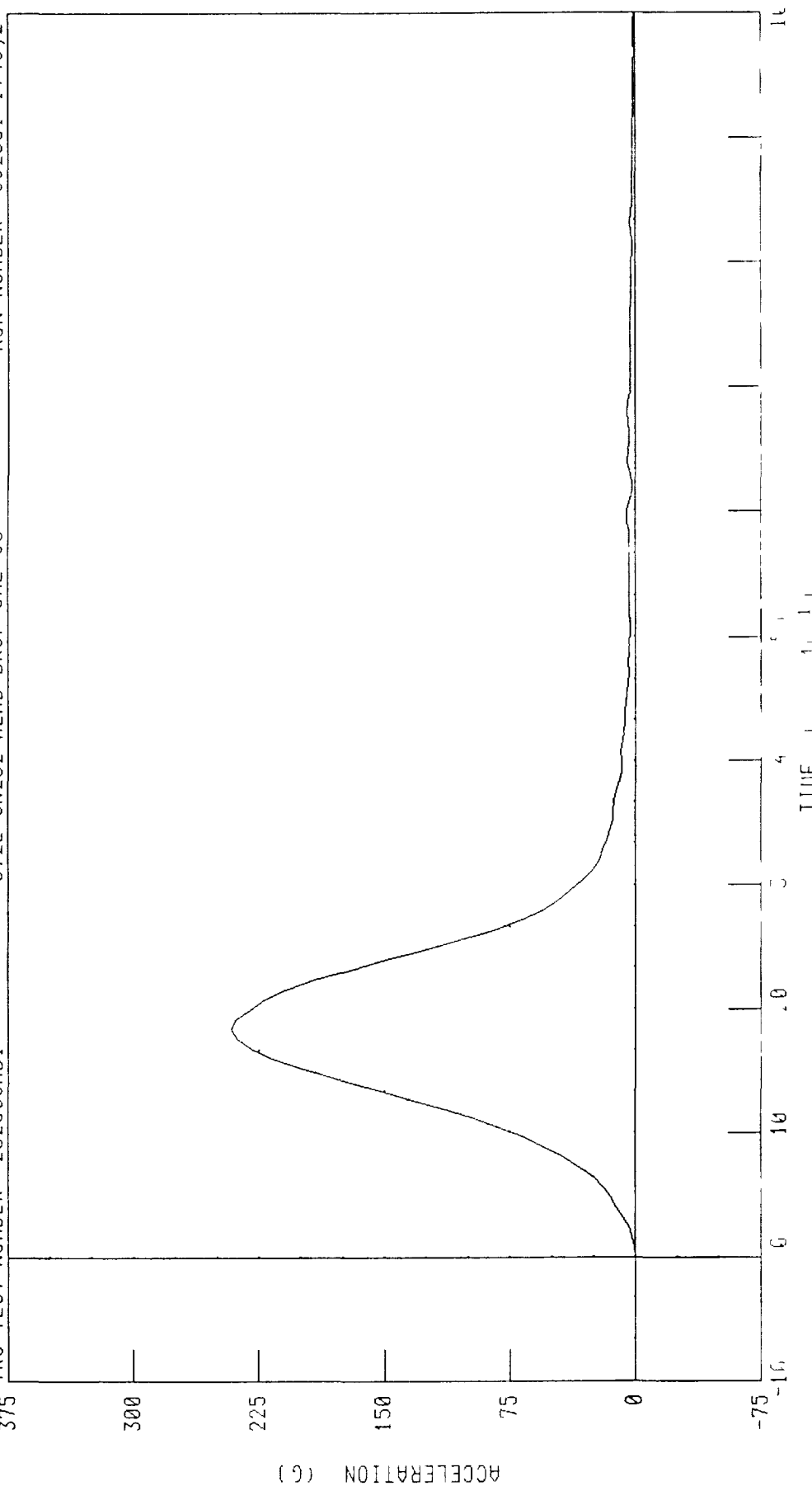
PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

TRC TEST NUMBER 202C05HD1

572E SN202 HEAD DROP CAL 05

RUN NUMBER 092501 1749,2



CHANNEL HEDRG FILTER CH CLFLO 1000

PEAK DATA 2+1 68 6 0 1 84 M., 0 06 6 0 -0 8. MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

25-SEP-01

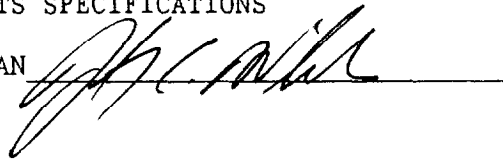
NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 202C05NF1 572E SN202 NECK FLEXION CAL05

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10 - 70 %	41.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.93 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.94 G
	20 MS	17.60 - 22.60 G	21.43 G
	30 MS	12.50 - 18.50 G	16.09 G
MAX PENDULUM G		29 G MAX	23.44 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.99 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	41.84 MS
D PLANE	MAX	64 - 78 DEG.	68.79 DEG.
ROTATION	TIME	57 - 64 MS	62.32 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	101.45 NM
	TIME	47 - 58 MS	54.96 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	116.48 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	101.52 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



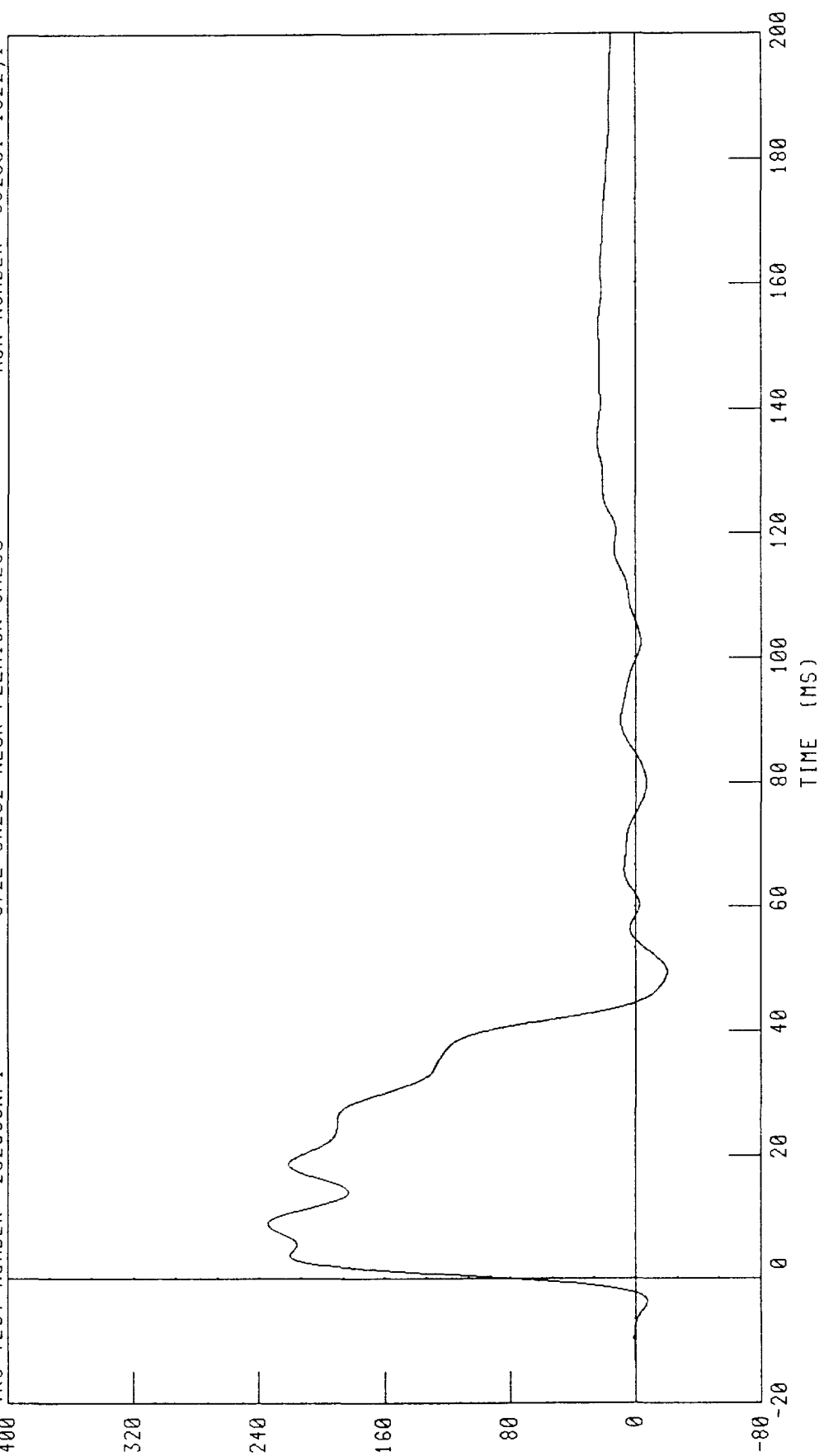
RUN NUMBER: 092501.1622;1

PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER 202C05NF1 572E SN202 NECK FLEXION CAL05 RUN NUMBER 092501 1622,1

ACCELERATION (G X 10⁻¹)



CHANNEL PENXC FILTER CH CLASS 60 PEAK DATA 23 45 G 8 96 MS, -2 03 G 0 49 52 MS

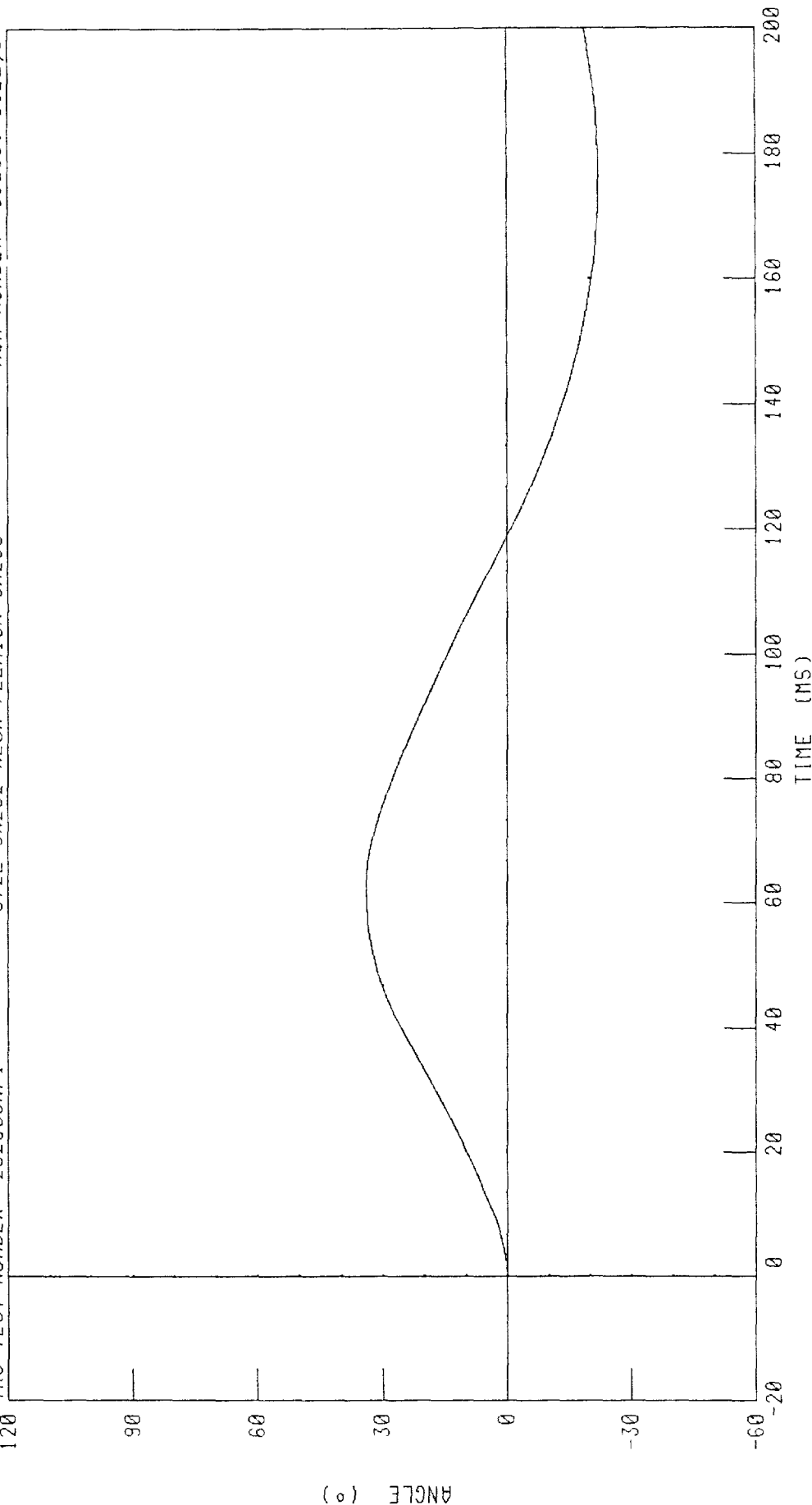
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT BASE OF NECK

572E SN202 NECK FLEXION CAL05

TRC TEST NUMBER 202C05NF1

RUN NUMBER 092501 1622,1

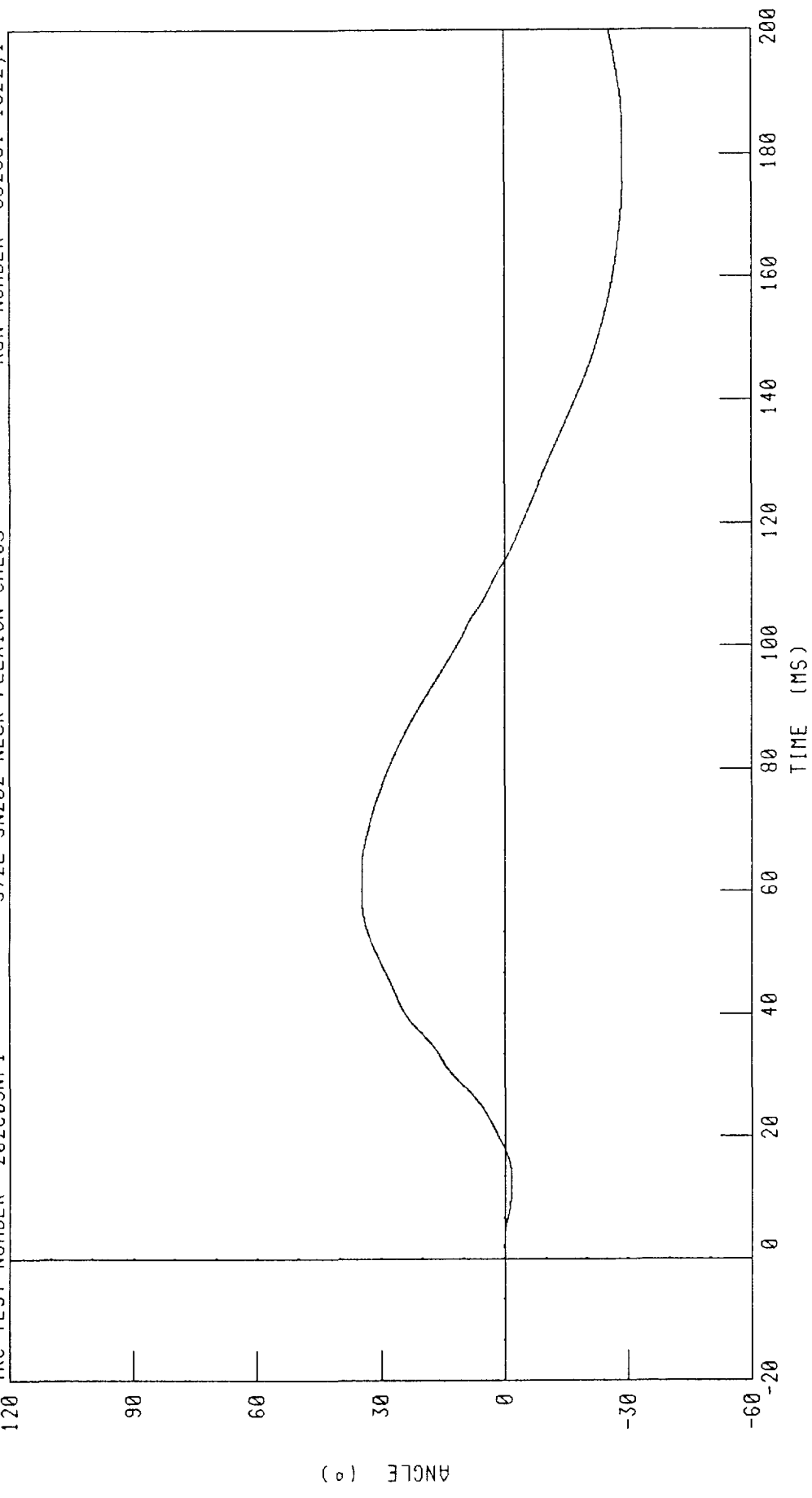


CHANNEL BETA FILTER CH CLASS 60 PEAK DATA 34 00 ° 0 62 40 MS, -22 20 ° 0 175 69 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 202C05NF1 572E SN202 NECK FLEXION CAL05 RUN NUMBER 092501 1622,1



CHANNEL THETA FILTER CH CLASS 60 PEAK DATA 34 80 ° 62 08 MS, -28 85 ° 179 84 MS

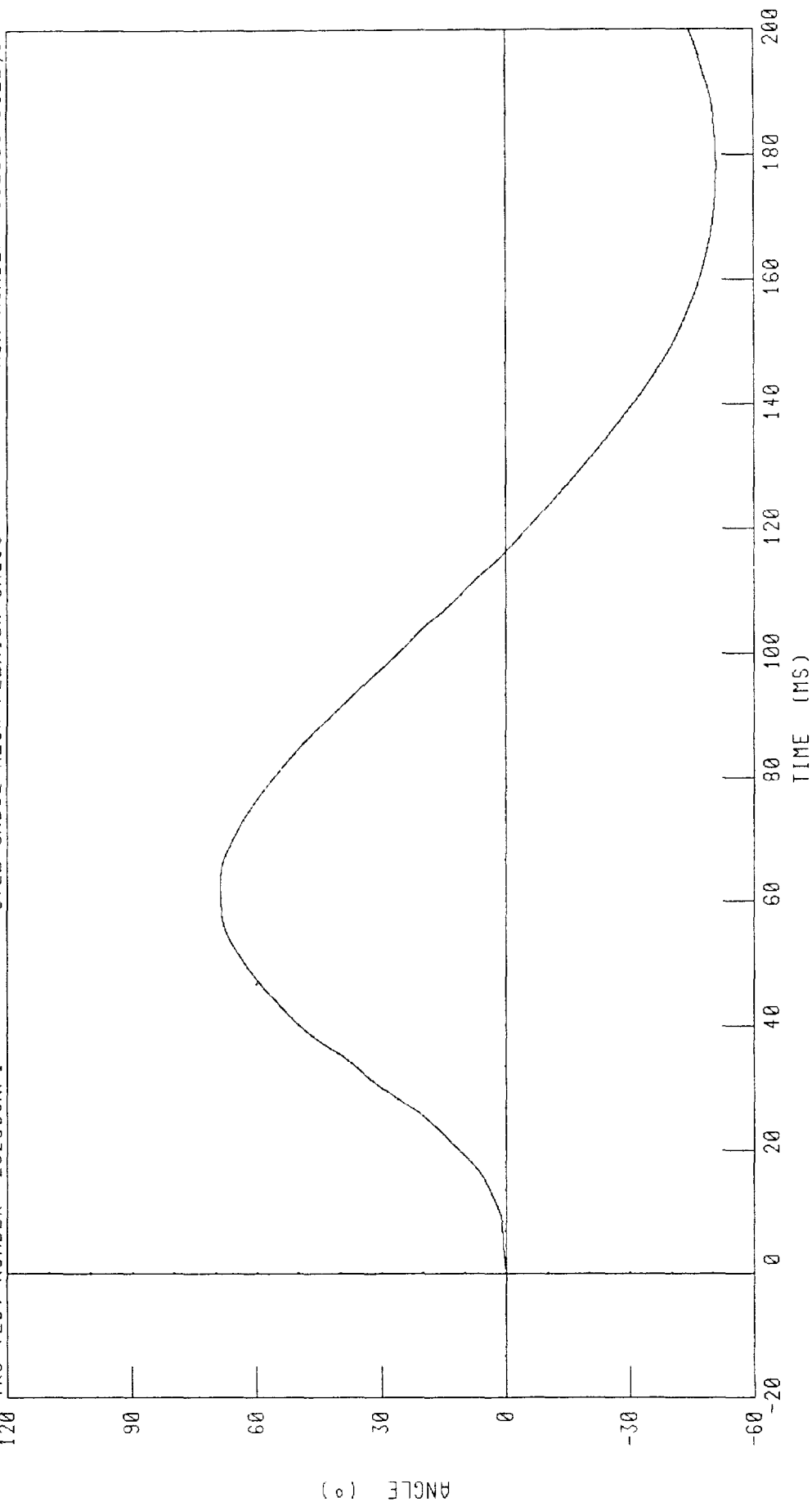
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER 202C05NF1

572E SN202 NECK FLEXION CAL05

RUN NUMBER 092501 1622.1



PEAK DATA 68 80 ° @ 62 32 MS, -51 02 ° @ 178 24 MS

CHANNEL TOTALAN FILTER CH CLASS 60

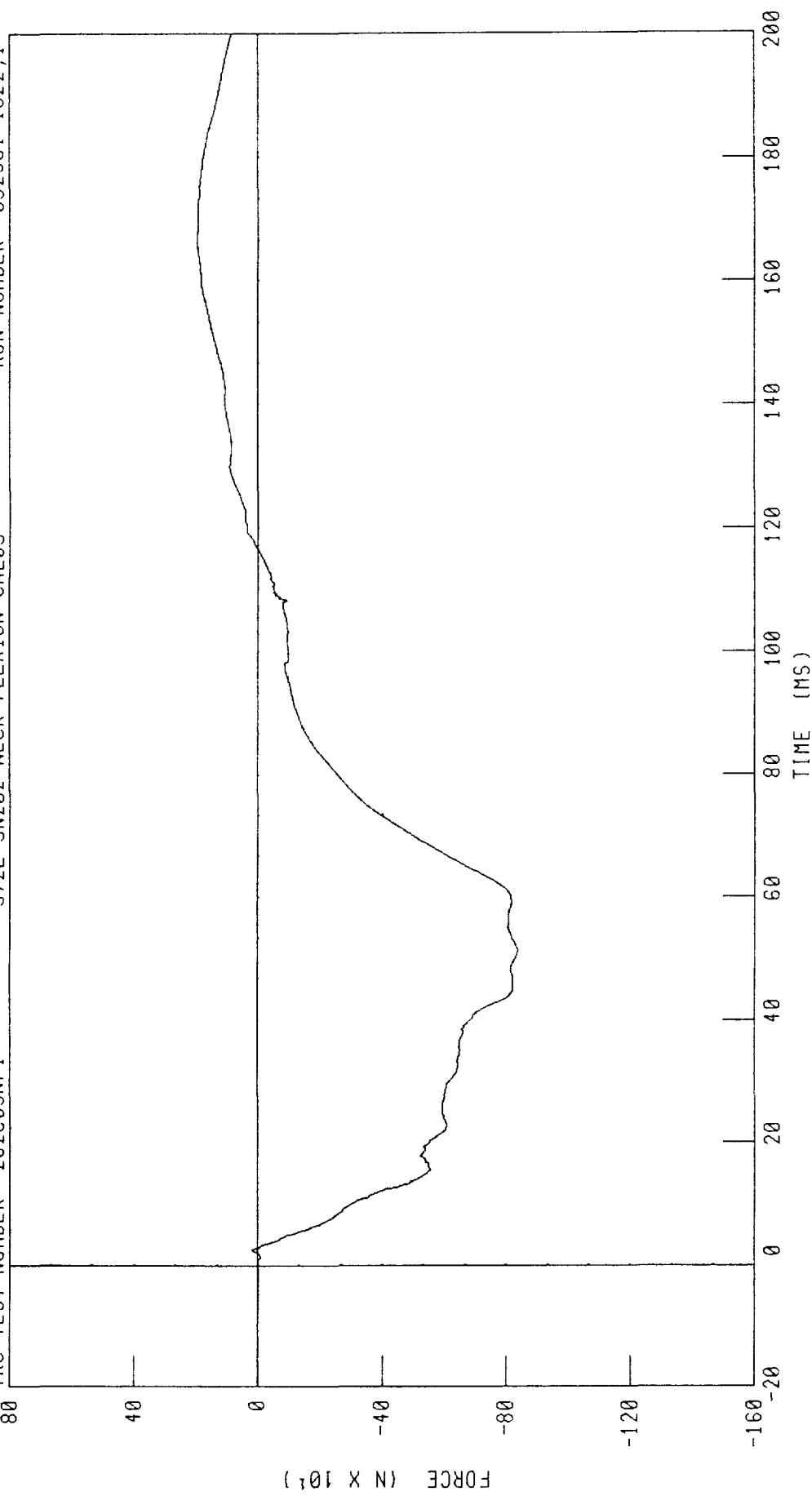
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

TRC TEST NUMBER 202C05NF1

572E SN202 NECK FLEXION CAL05

RUN NUMBER 092501 1622,1



CHANNEL NEKXF FILTER CH CLASS 1000

PEAK DATA 198 14 N @ 166 32 MS, -837 31 N @ 51 12 MS

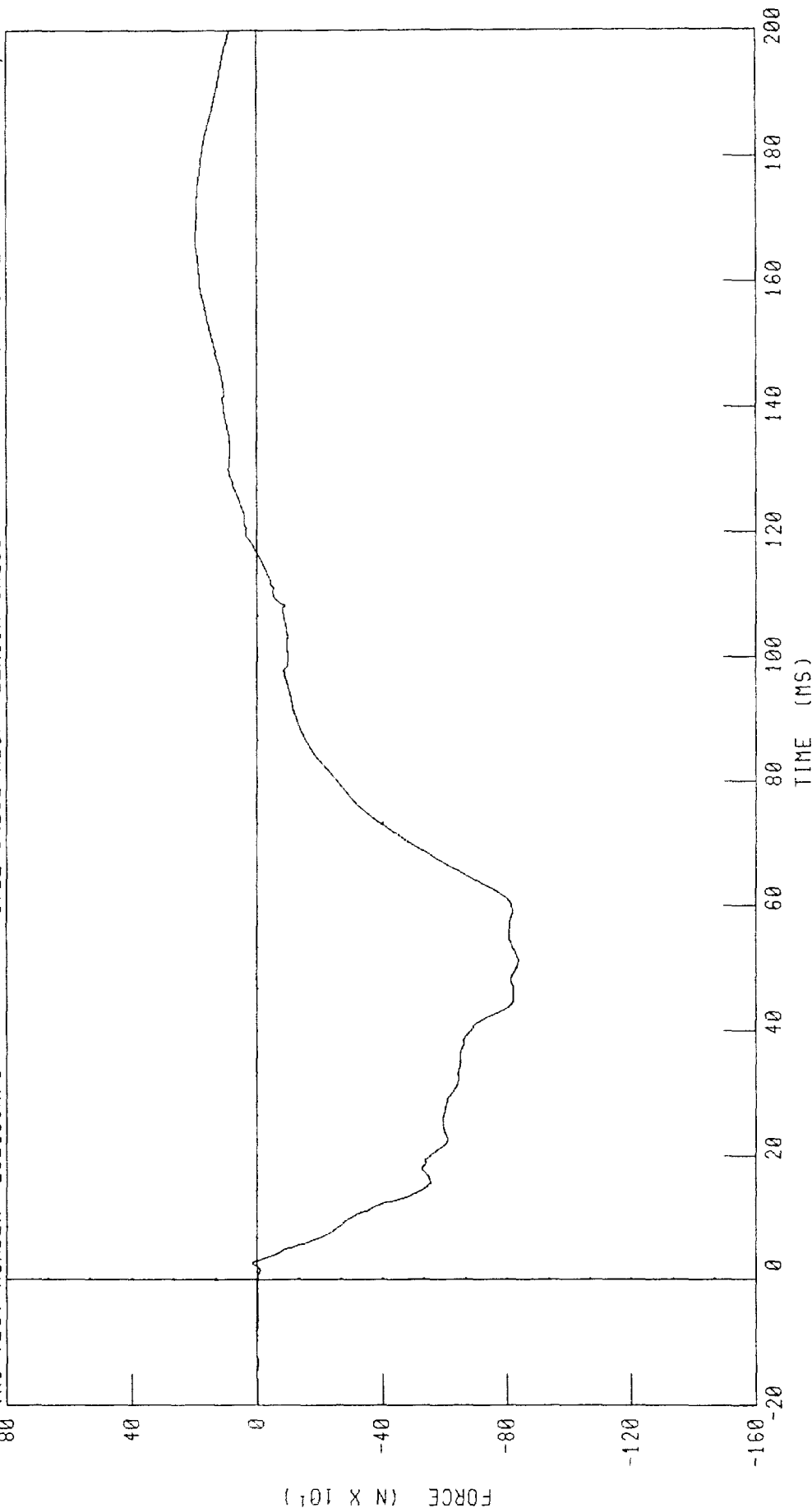
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS FILTERED FOR USE IN OCCIPITAL MOMENT CALCULATION

TRC TEST NUMBER 202C05NF1

572E SN202 NECK FLEXION CAL05

RUN NUMBER 092501 1622,1



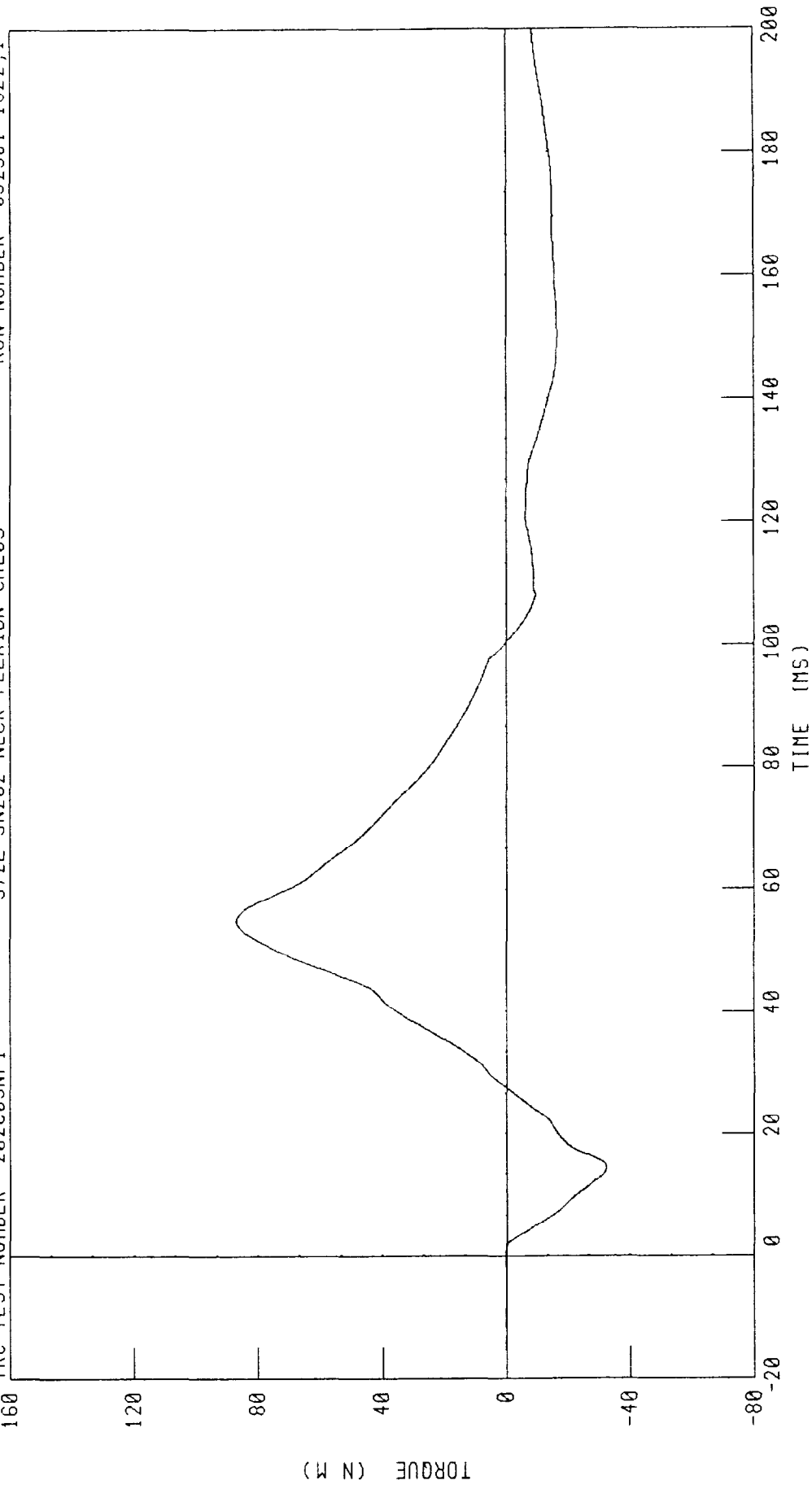
CHANNEL NEKXFC FILTER CH CLASS 600

PEAK DATA 197 85 N 0 166 40 MS, -837 21 N 0 51 28 MS

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER 202C05NF1 572E SN202 NECK FLEXION CAL05 RUN NUMBER 092501 1622,1



CHANNEL NEKYM FILTER CH CLASS 600 PEAK DATA 87 11 N M 0 54 96 MS, -32 27 N M 0 14 56 MS

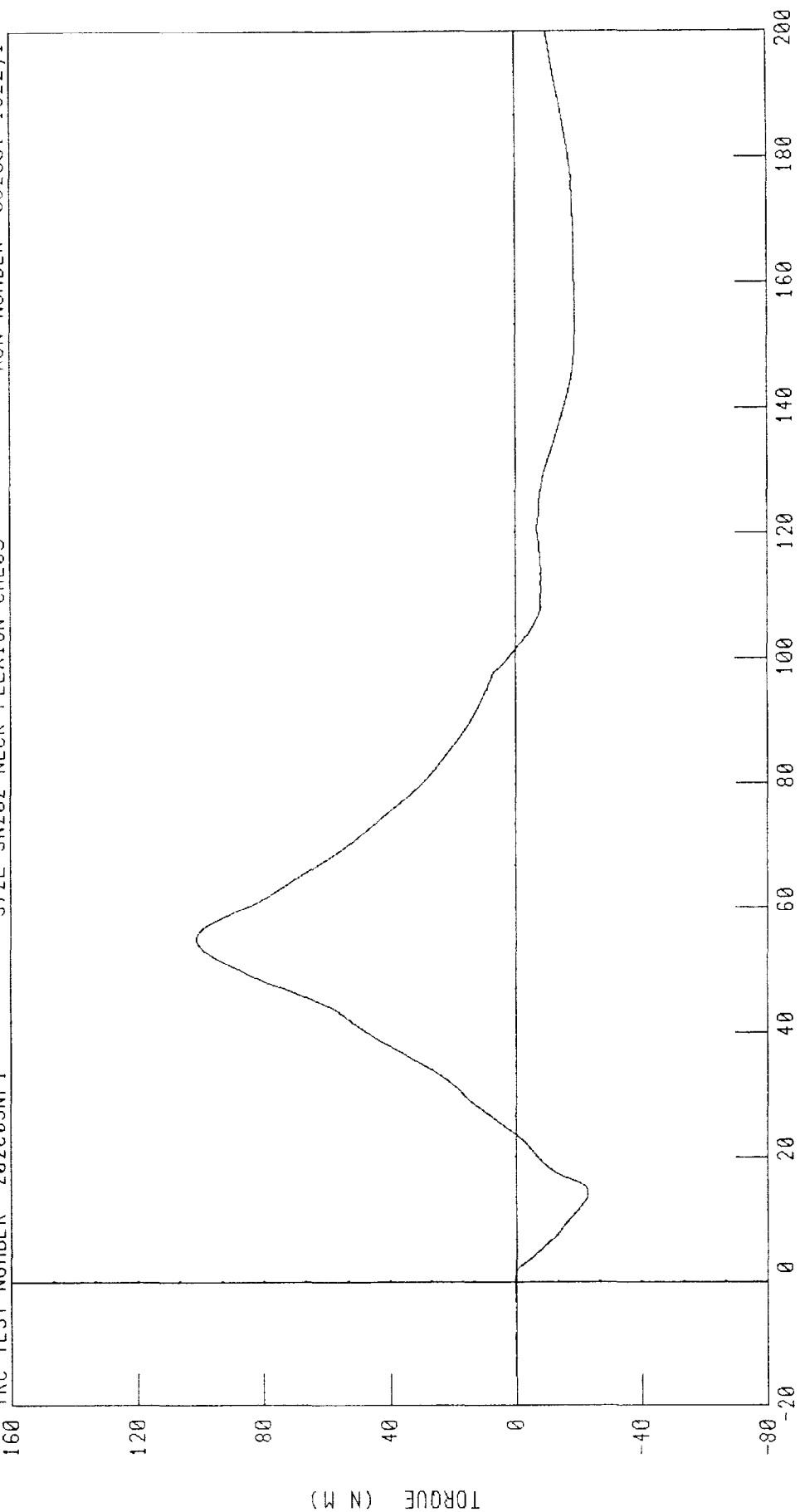
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 202C05NF1

572E SN202 NECK FLEXION CAL05

RUN NUMBER 092501 1622,1



TIME (MS)

CHANNEL NEKOM FILTER CH CLASS 600

PEAK DATA 101 45 N M @ 54 96 MS, -22 96 N M @ 13 92 MS

TRANSPORTATION RESEARCH CENTER INC.

HYBRID III 50th

25-SEP-01

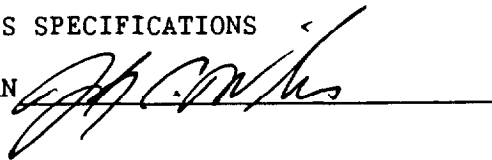
NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 202C05NE1 572E SN202 NECK EXT CAL05

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY		10 - 70 %	40.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	20.76 G
	20 MS	14.00 - 19.00 G	18.19 G
	30 MS	11.00 - 16.00 G	15.81 G
MAX PENDULUM G		22 G MAX	20.80 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	15.75 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	39.76 MS
D PLANE	MAX	81 - 106 DEG.	95.22 DEG.
ROTATION	TIME	72 - 82 MS	76.88 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-71.90 NM
	TIME	65 - 79 MS	71.28 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	155.84 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	139.76 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092501.1759;1

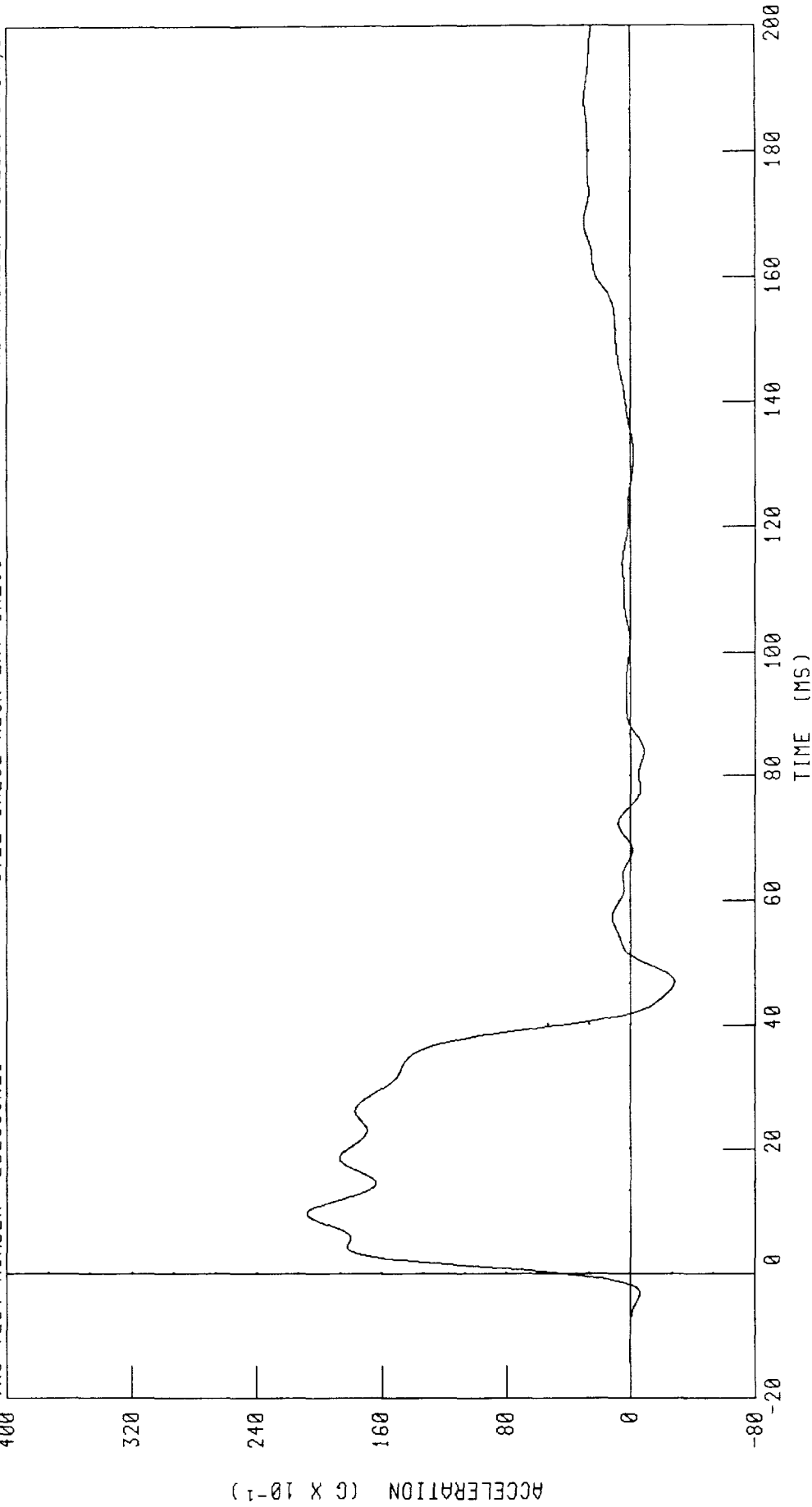
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

TRC TEST NUMBER 202C05NE1

572E SN202 NECK EXT CAL05

RUN NUMBER 092601 1414,1



CHANNEL PENXC FILTER CH CLASS 60

PEAK DATA 20 81 G 0 9 68 MS, -2 83 G 0 47 04 MS

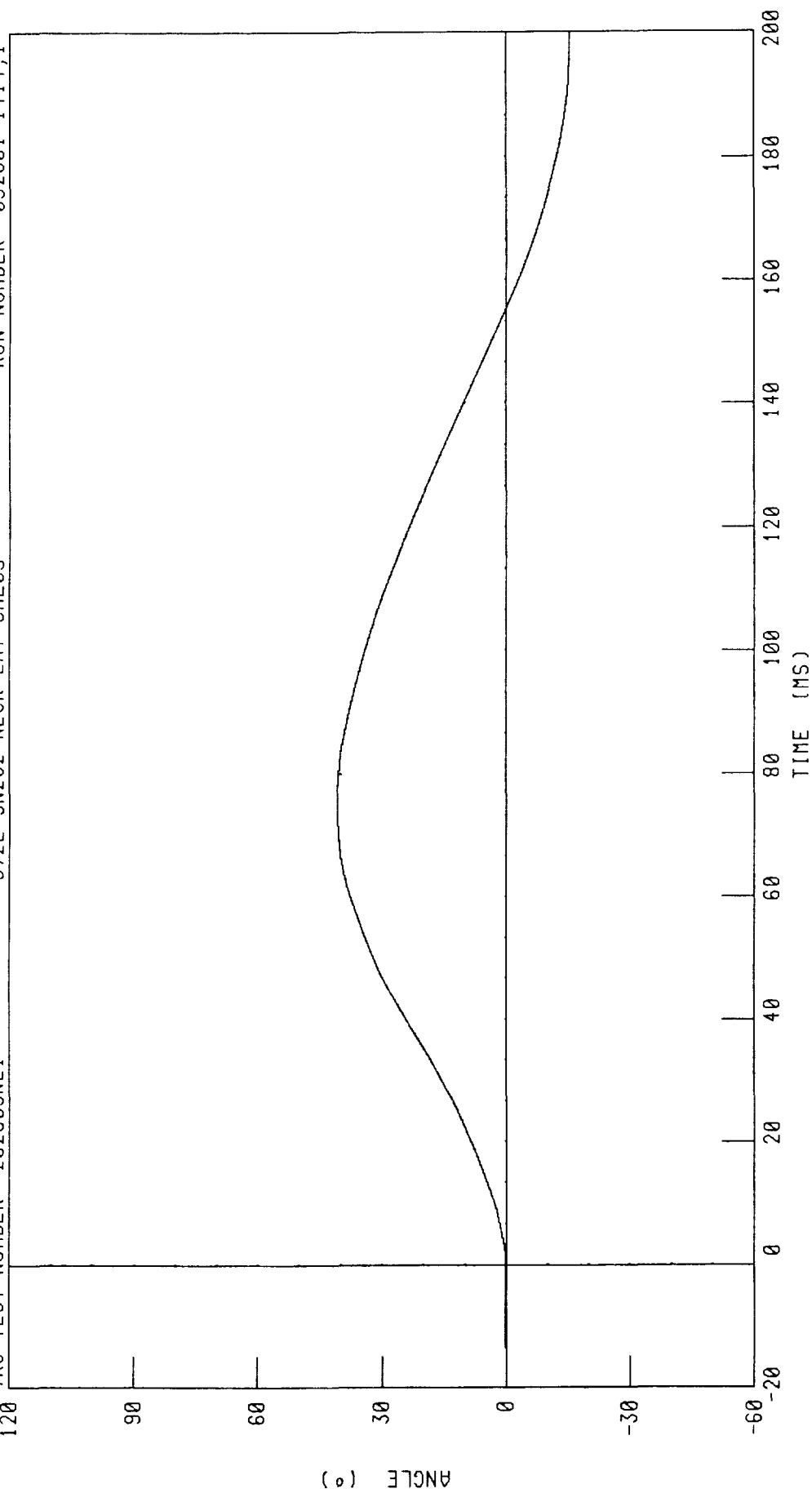
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ABOUT BASE OF NECK

TRC TEST NUMBER 202C05NE1

572E SN202 NECK EXT CAL05

RUN NUMBER 092601 1414,1



CHANNEL BETA FILTER CH CLASS 60 PEAK DATA 40 80 ° 74 88 MS, -15 57 ° 198 80 MS

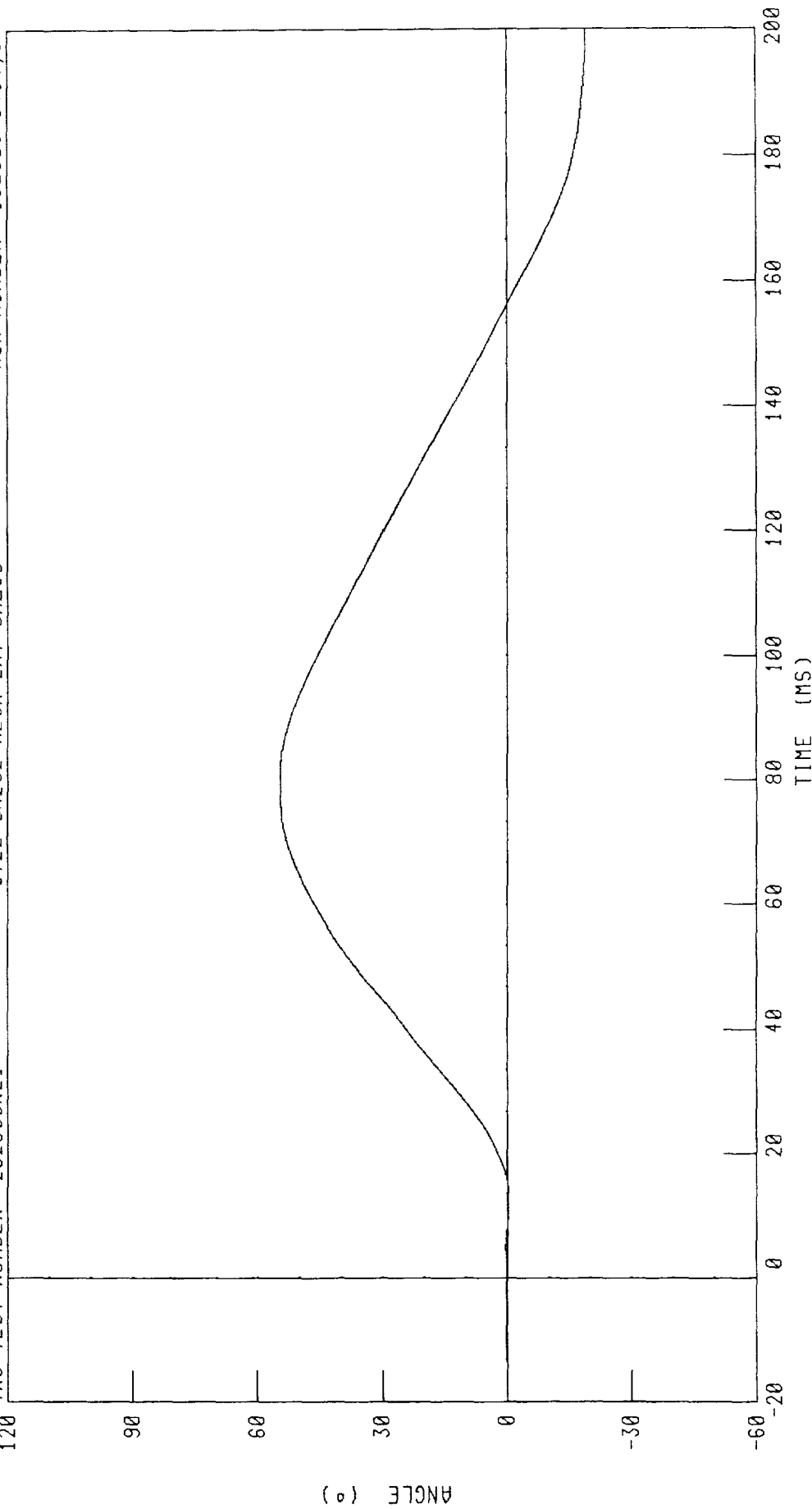
PART 572-E HYBRID I11 NECK EXTENSION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 202C05NE1

572E SN202 NECK EXT CAL05

RUN NUMBER 0926001 1414,1



CHANNEL THETA FILTER CH CLASS 60 PEAK DATA 54 50 ° @ 79 68 MS, -19 15 ° @ 198 40 MS

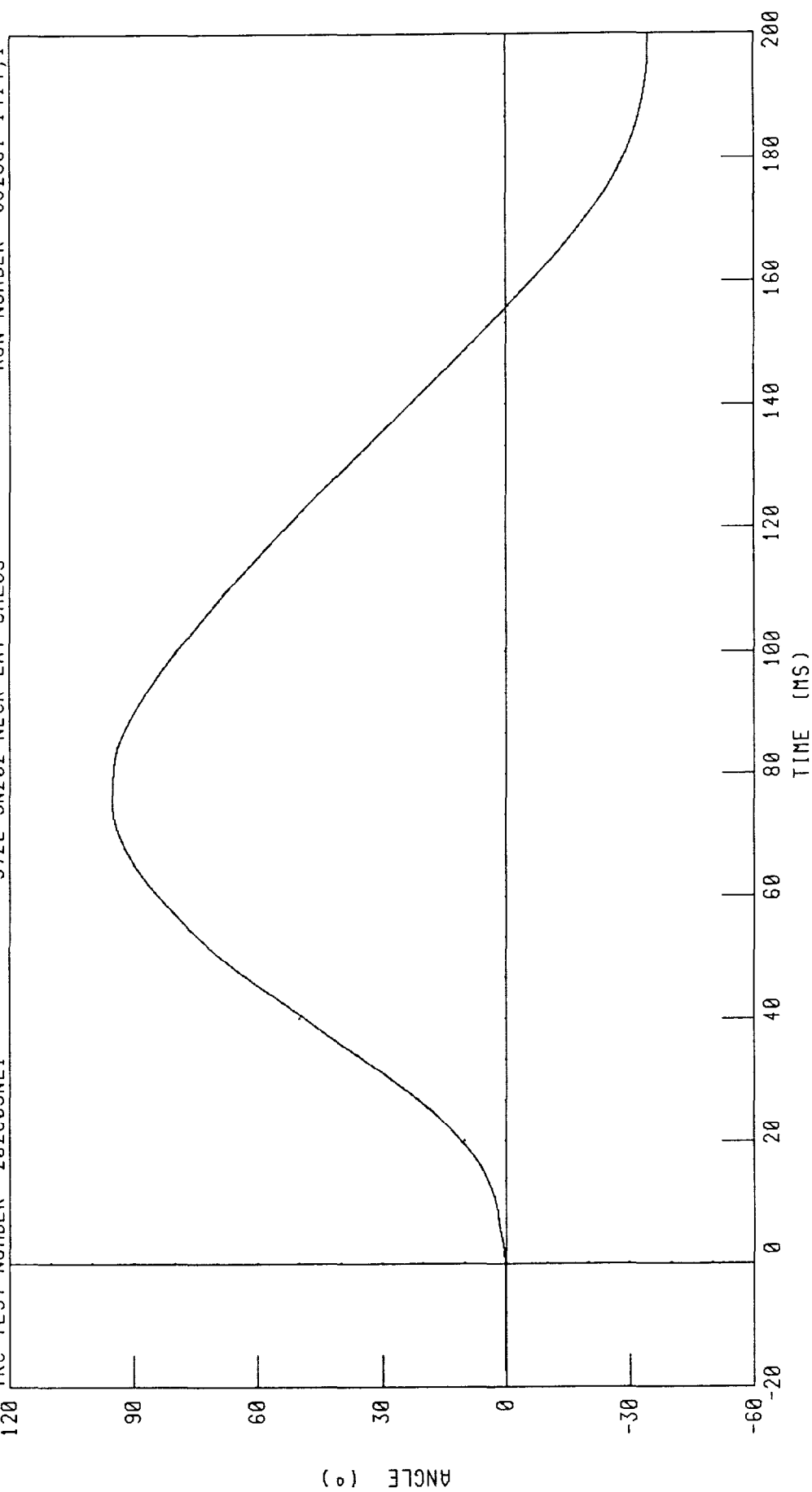
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

TRC TEST NUMBER 202C05NE1

572E SN202 NECK EXT CAL05

RUN NUMBER 092601 1414,1



CHANNEL TOTAL FILTER CH CLASS 60

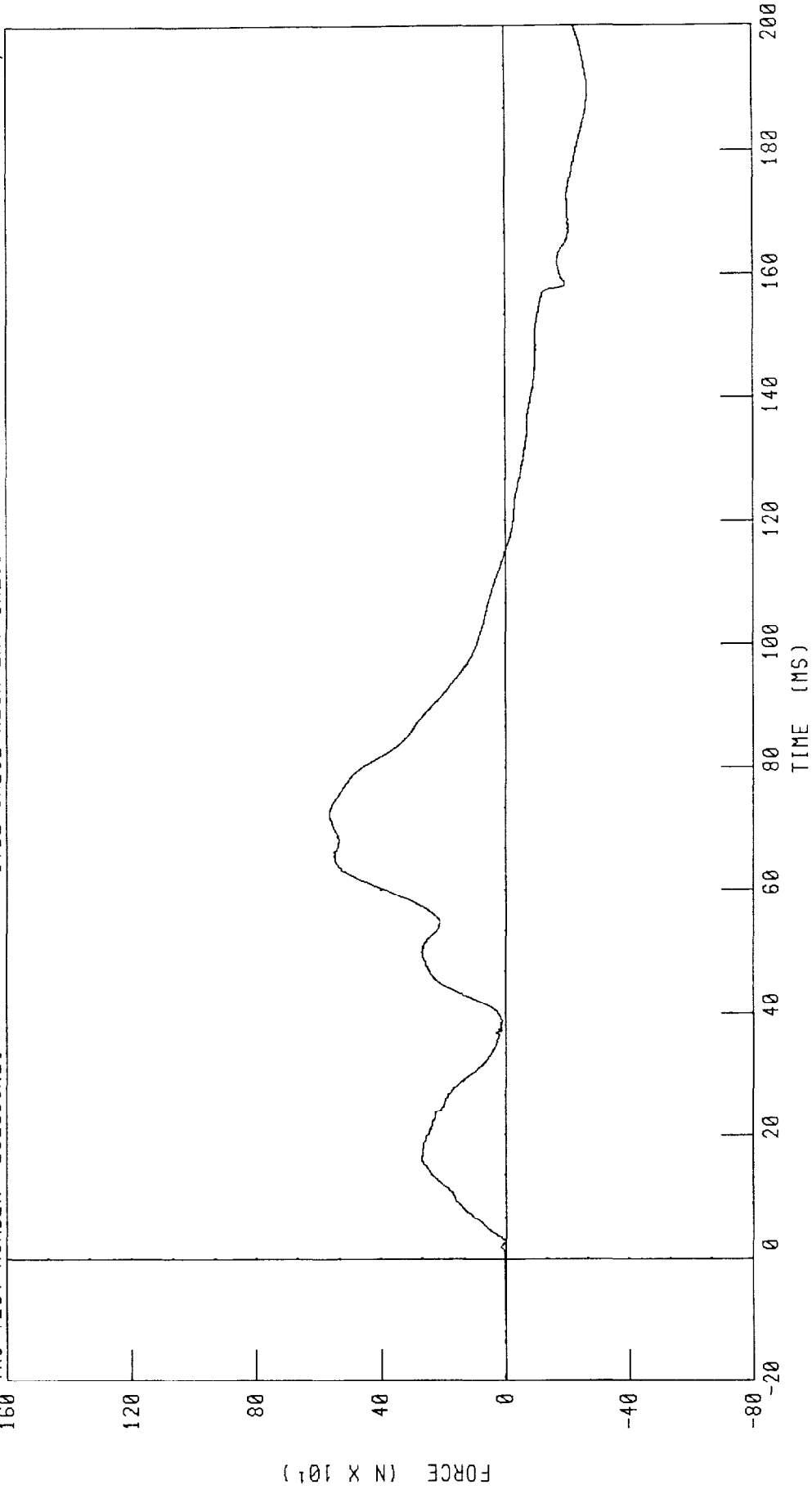
TIME (MS)

PEAK DATA 95 23 ° 76 88 MS, -34 72 ° 198 64 MS

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

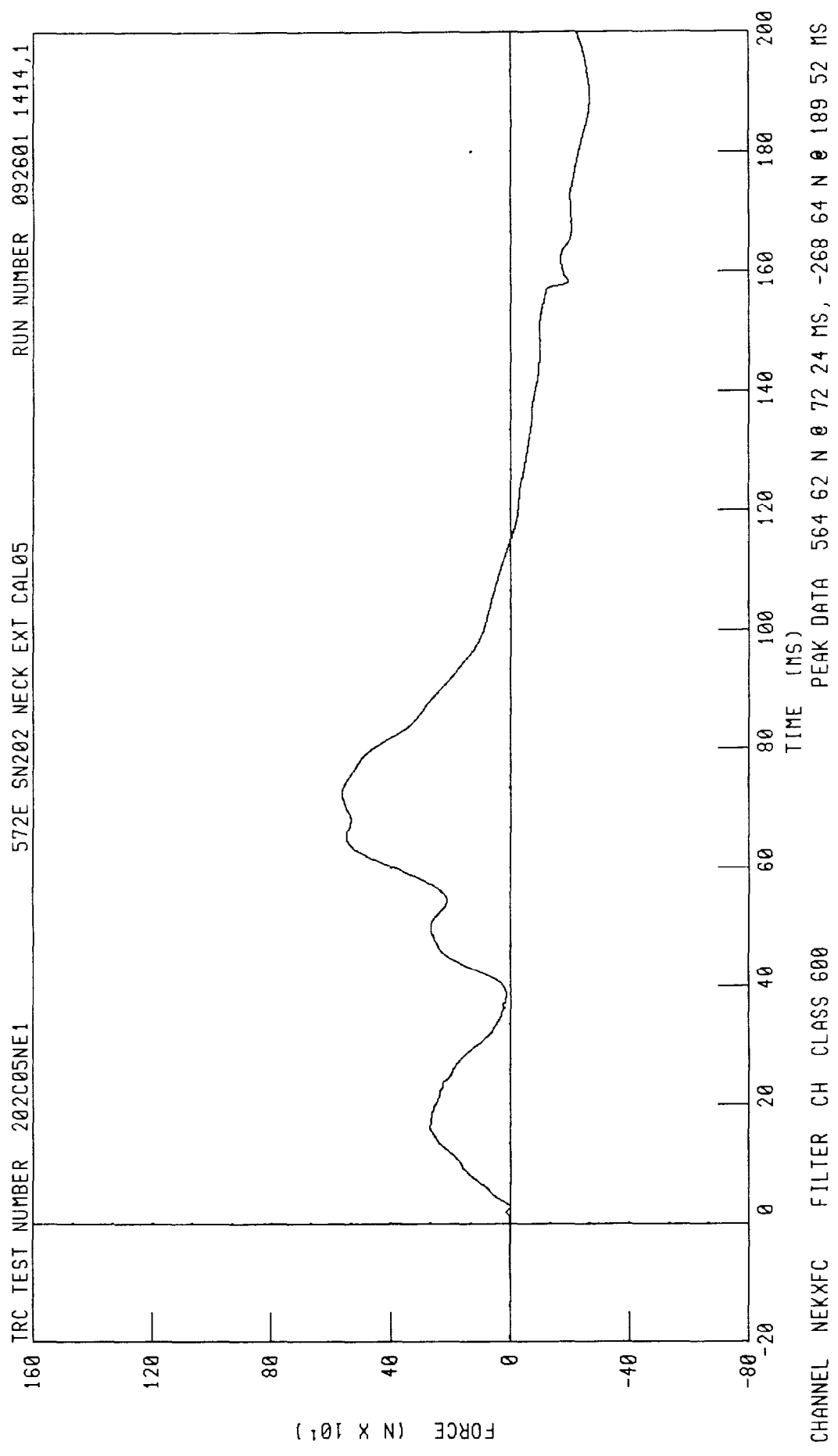
NECK FORCE X AXIS

TRC TEST NUMBER 202C05NE1 572E SN202 NECK EXT CAL05 RUN NUMBER 092601 1414,1



CHANNEL NEKXF FILTER CH CLASS 1000 PEAK DATA 564 78 N @ 72 08 MS, -263 02 N @ 188 48 MS

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



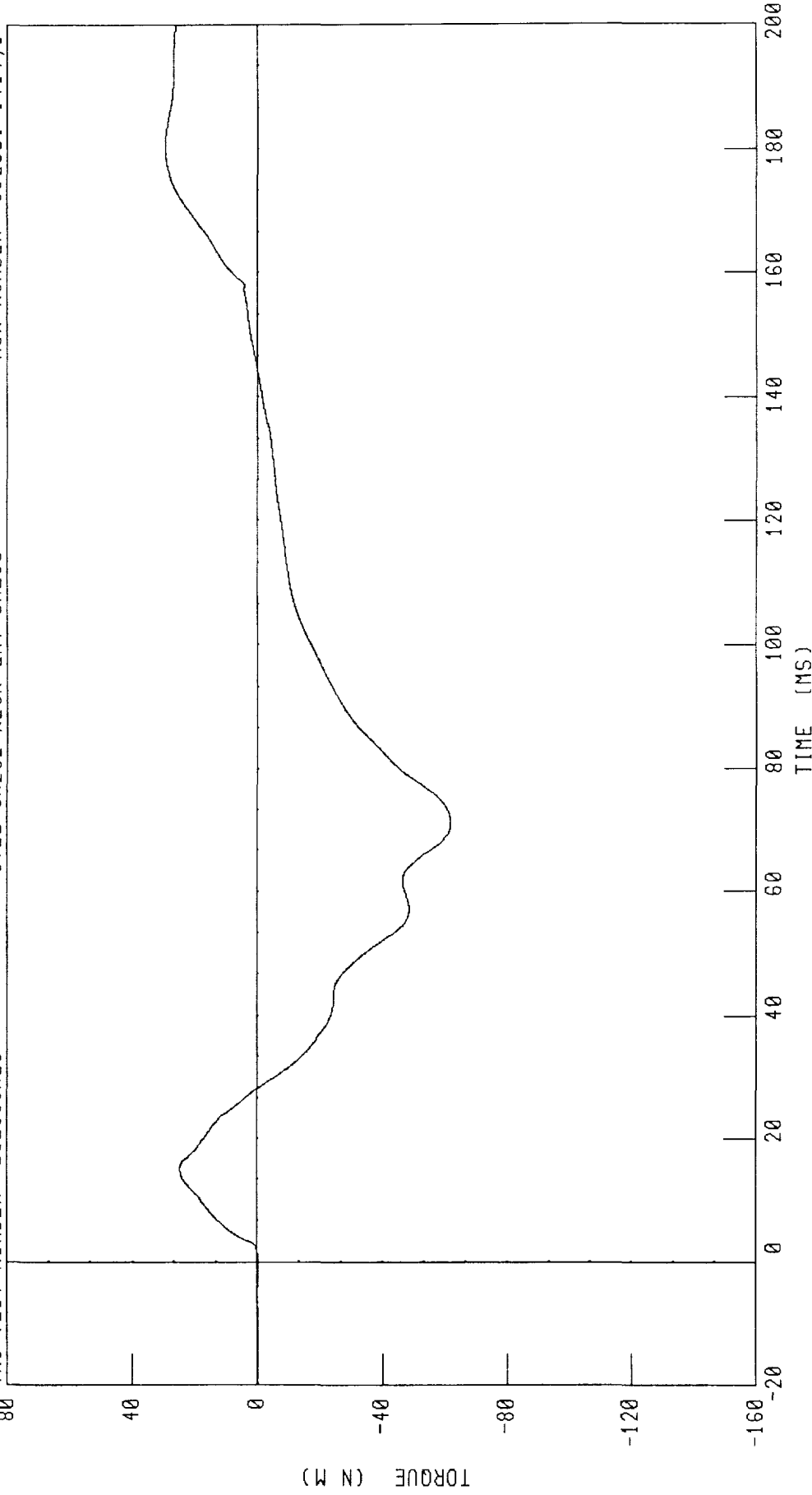
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y AXIS

TRC TEST NUMBER 202C05NE1

572E SN202 NECK EXT CAL05

RUN NUMBER 092601 1414,1



PEAK DATA 29 69 N M @ 180 48 MS, -61 99 N M @ 71 04 MS

CHANNEL NEKYM FILTER CH CLASS 600

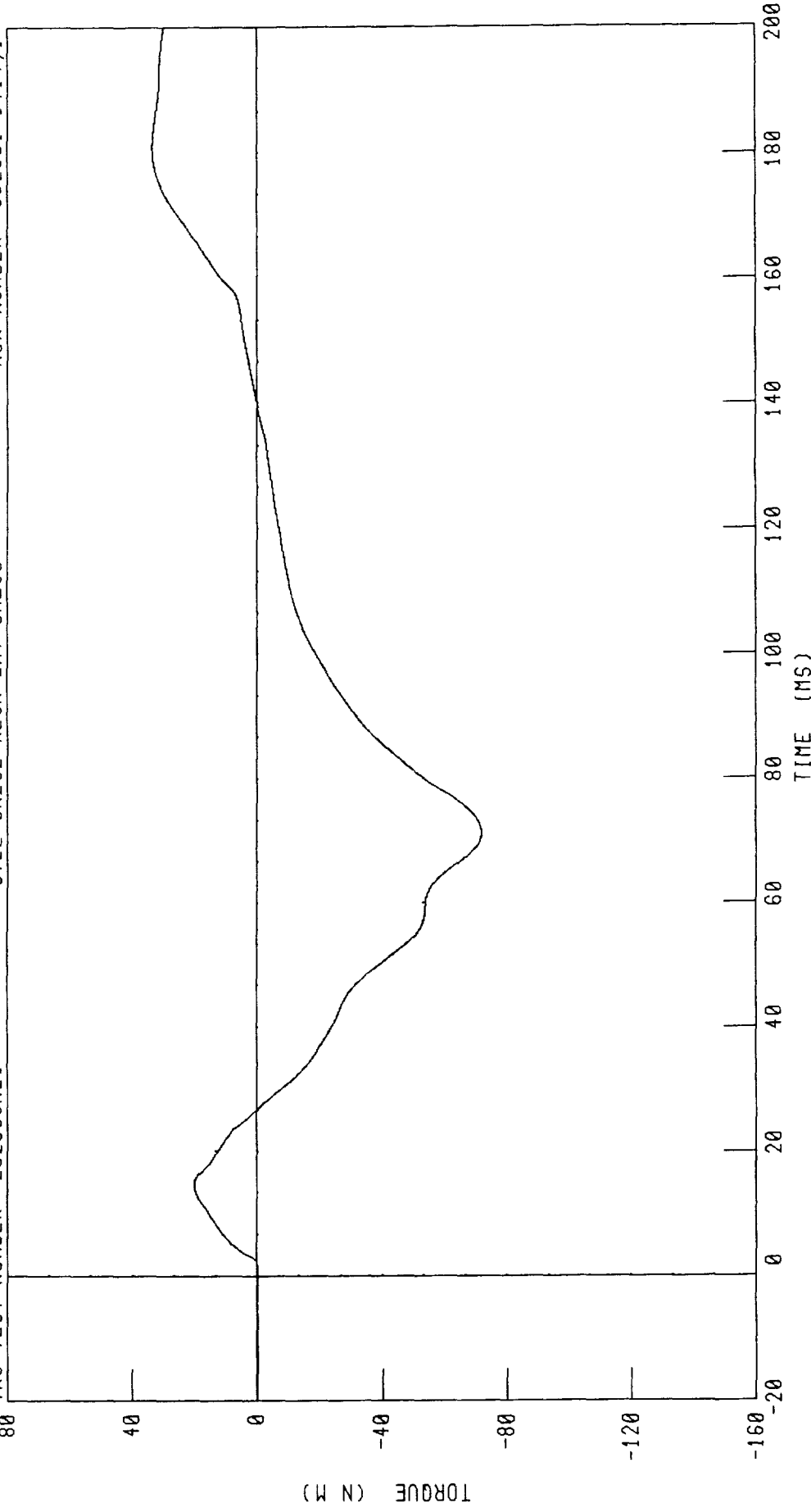
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRC TEST NUMBER 202C05NE1

572E SN202 NECK EXT CAL05

RUN NUMBER 092601 1414,1



PEAK DATA 33 85 N M @ 180 64 MS, -71 90 N M @ 71 28 MS

CHANNEL NEKOM FILTER CH CLASS 600

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III 50th

26-SEP-01

TRC INC.

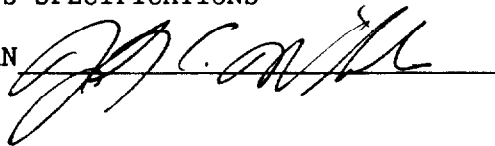
TEST NO: 202C05TH1

572E SN202 H.S.THORAX CAL05

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	37.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.59 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	67.4 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5780. N
INTERNAL HYSTERESIS	69% - 85%	71.4%

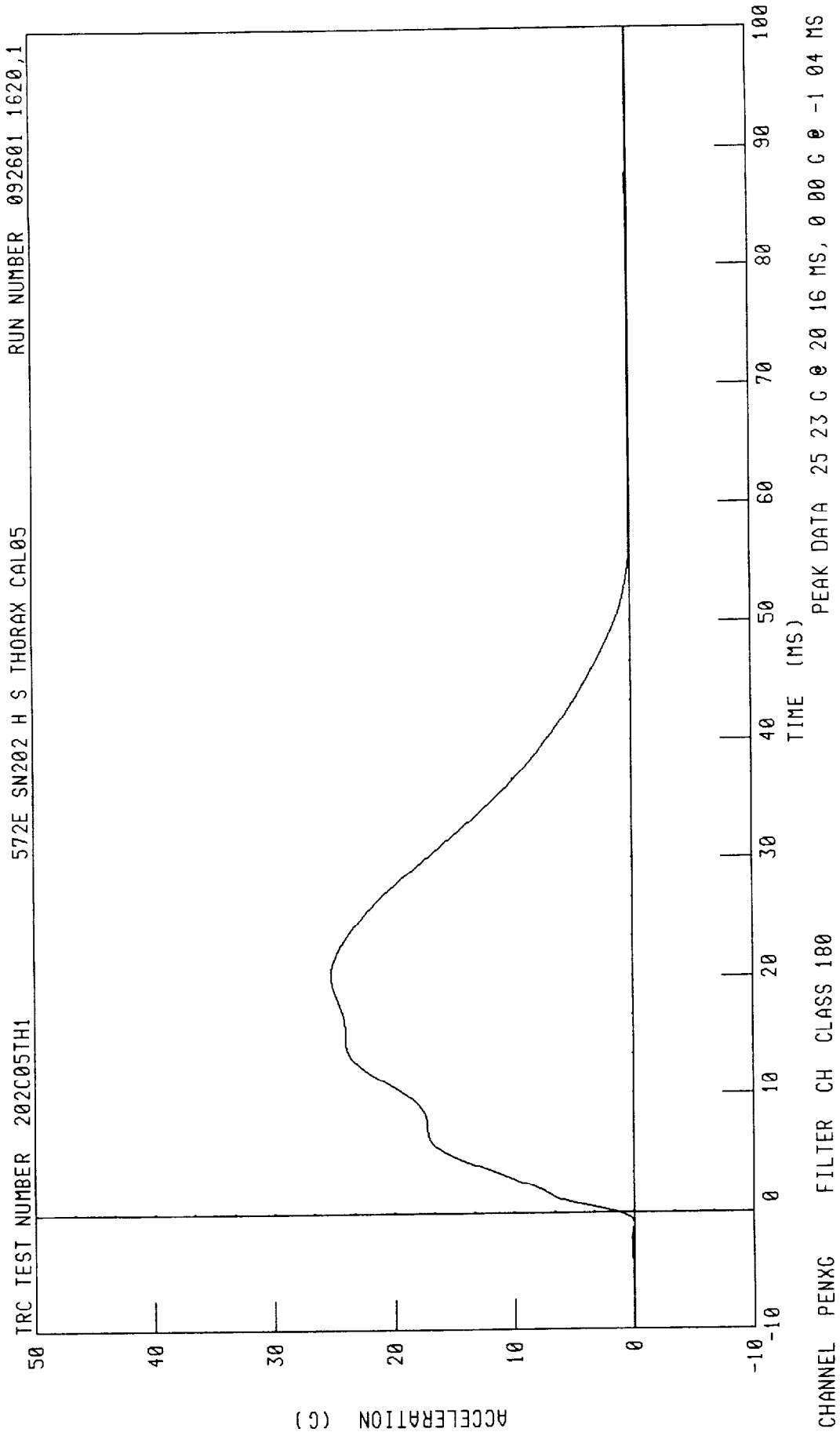
TEST MEETS SPECIFICATIONS

TECHNICIAN



RUN NUMBER: 092601.1617;1

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

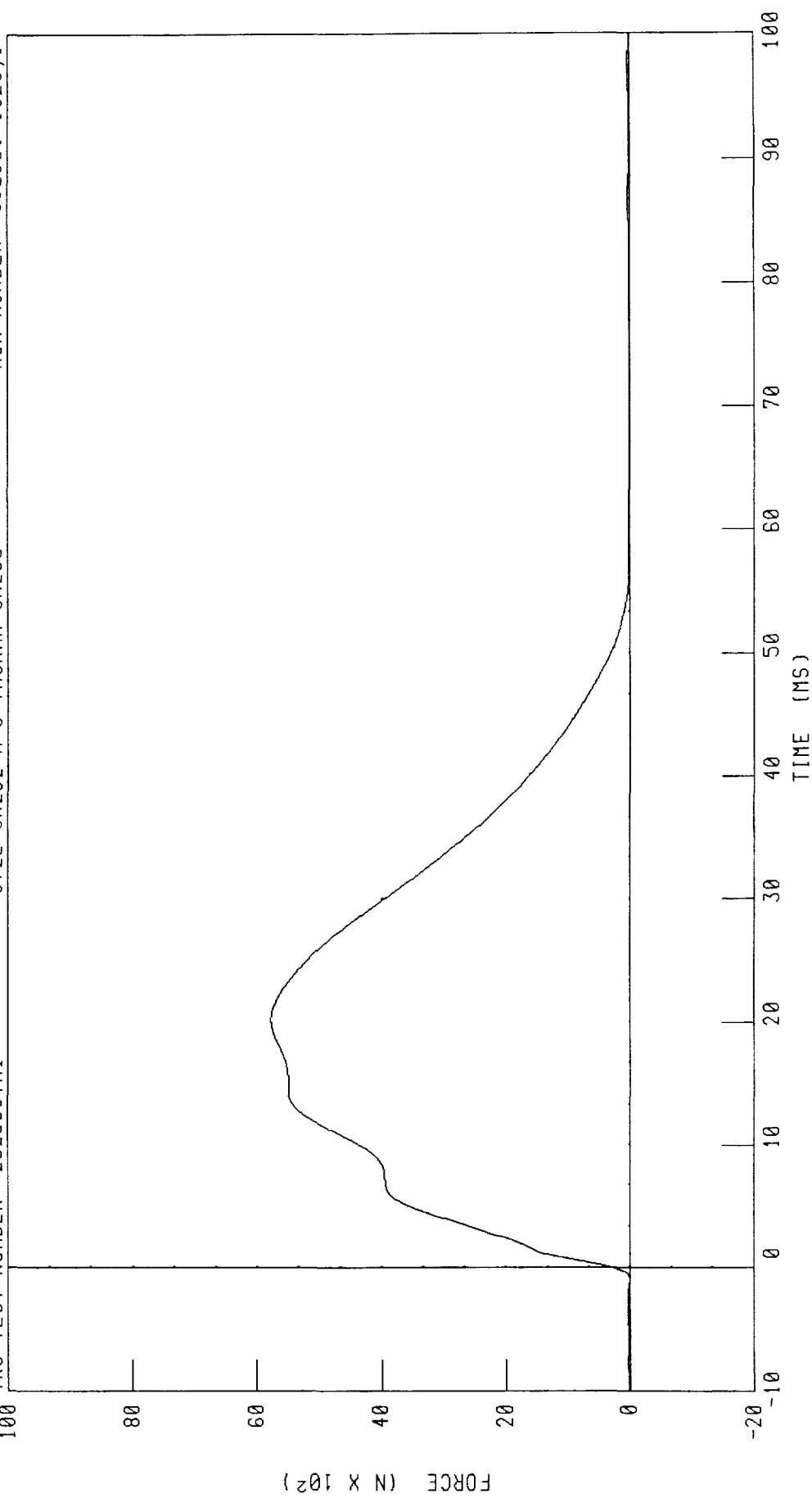


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

TRC TEST NUMBER 202C05TH1

572E SN202 H S THORAX CAL05

RUN NUMBER 092601 1620,1



CHANNEL PENXF FILTER CH CLASS 180

PEAK DATA 5780 76 N @ 20 16 MS, 0 31 N @ -1 04 MS

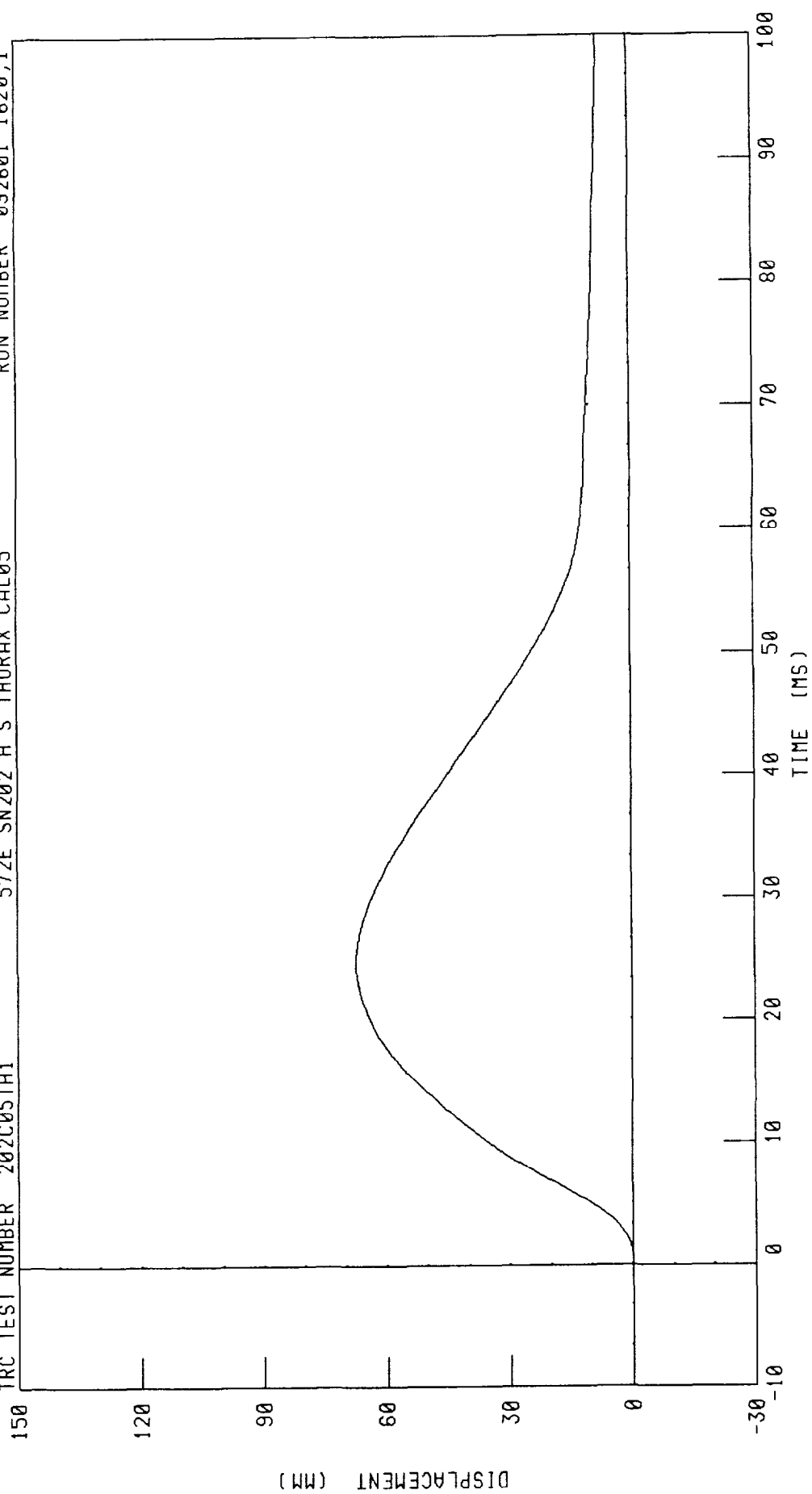
PART 572-E HYBRID III THORAX CALIBRATION

STERNUM DISPLACEMENT

TRC TEST NUMBER 202C05TH1

572E SN202 H S THORAX CAL05

RUN NUMBER 092601 1620,1

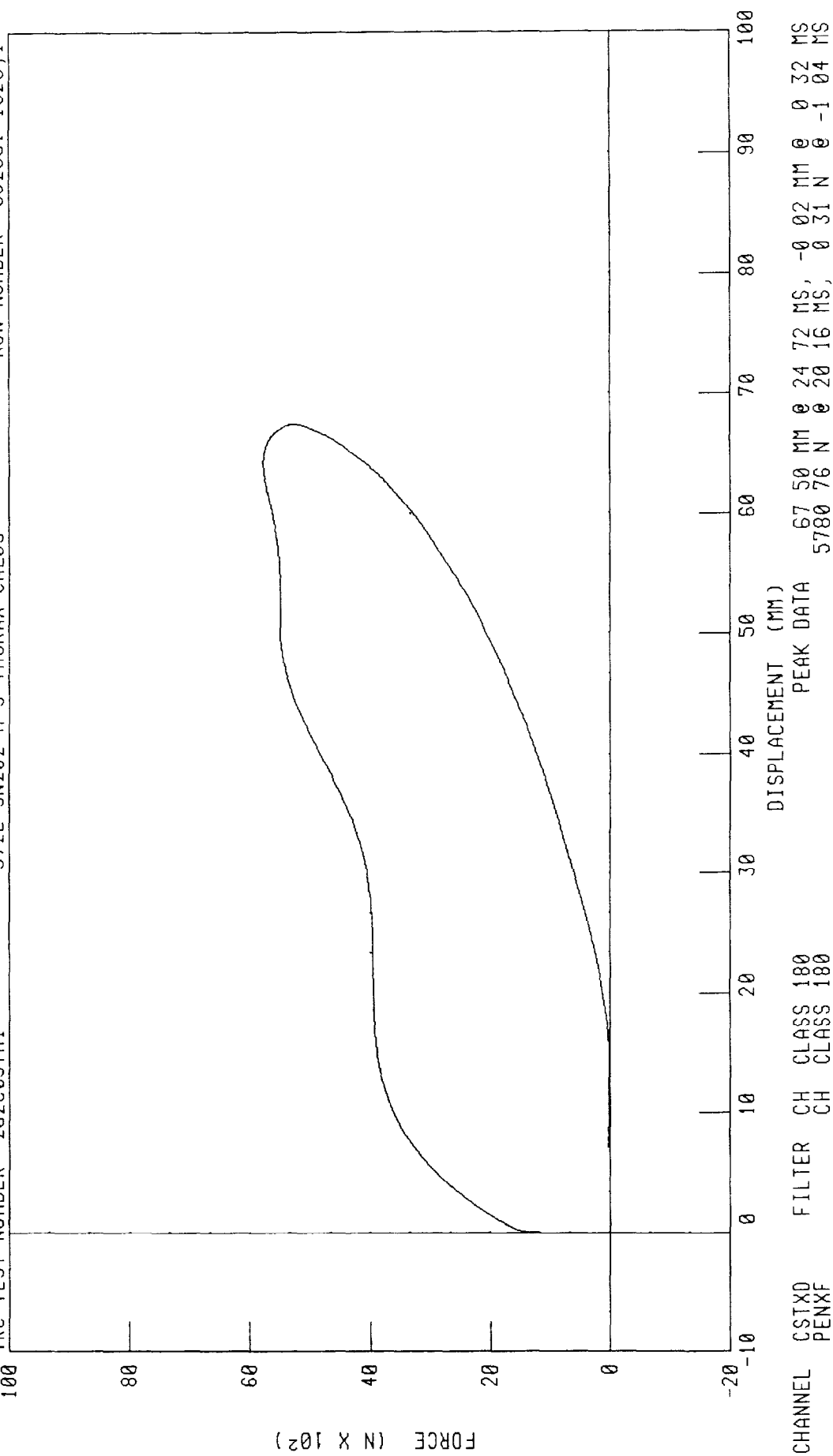


CHANNEL CSTXD FILTER CH CLASS 180

TIME (MS)

PEAK DATA 67 50 MM 0 24 72 MS, -0 02 MM 0 0 32 MS

RUN NUMBER 092601 1620,1



Transportation Research Center Inc

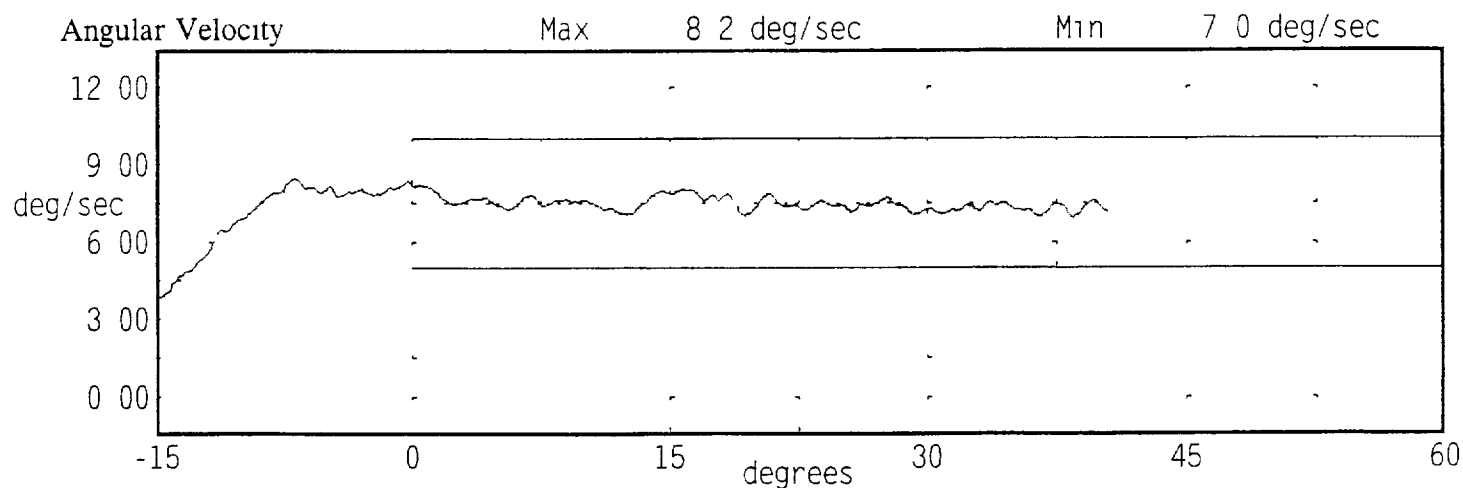
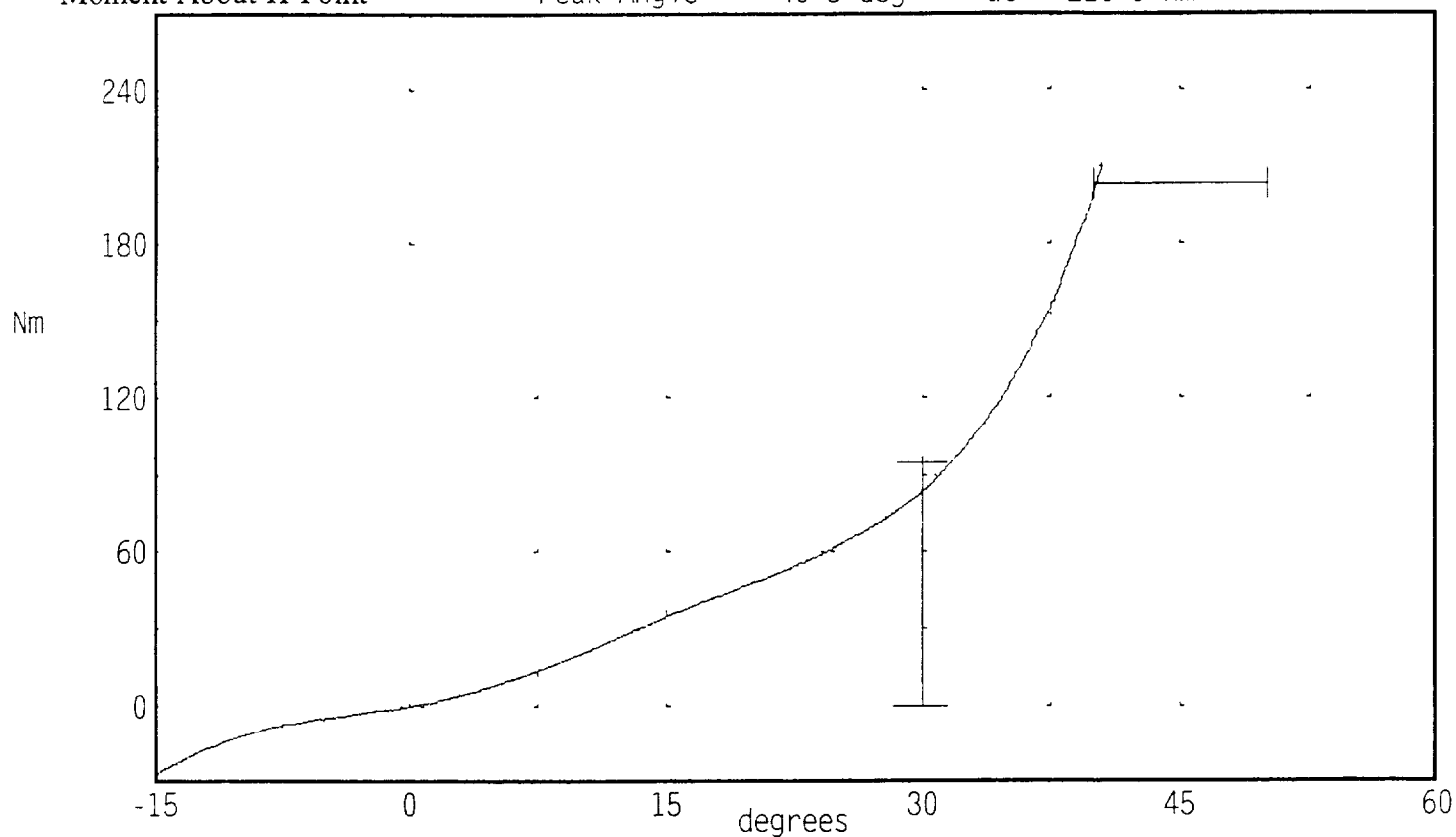
Hybrid III Hip Range of Motion

Serial Number 202L
Test Number 202C05
Comments

Date 09/25/2001
Time 08 42

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18 9 - 25 6	20 6 °C	Pass
Humidity	10 - 70	43 %	Pass
Moment at 30 deg	<= 94 9	83 4 Nm	Pass
Angle at 203 Nm	40 0 - 50 0	40 1 deg	Pass
Average Velocity	5 0 - 10 0	7 5 deg/sec	Pass

Moment About H-Point
Peak Moment 210 9 Nm at 40 5 deg
Peak Angle 40 5 deg at 210 9 Nm



Transportation Research Center Inc

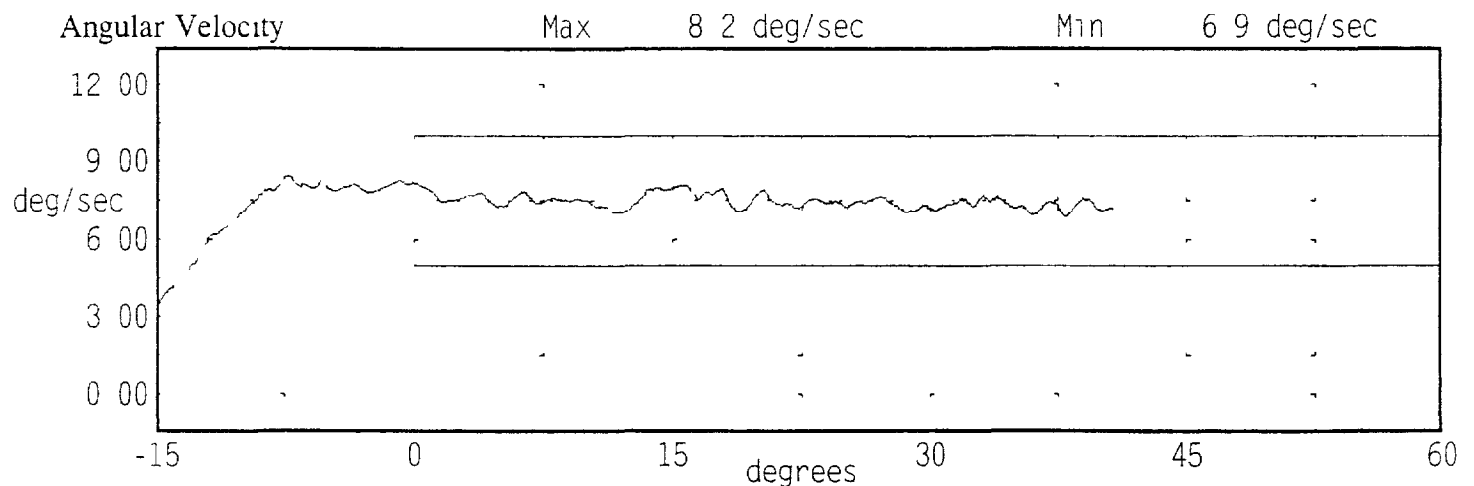
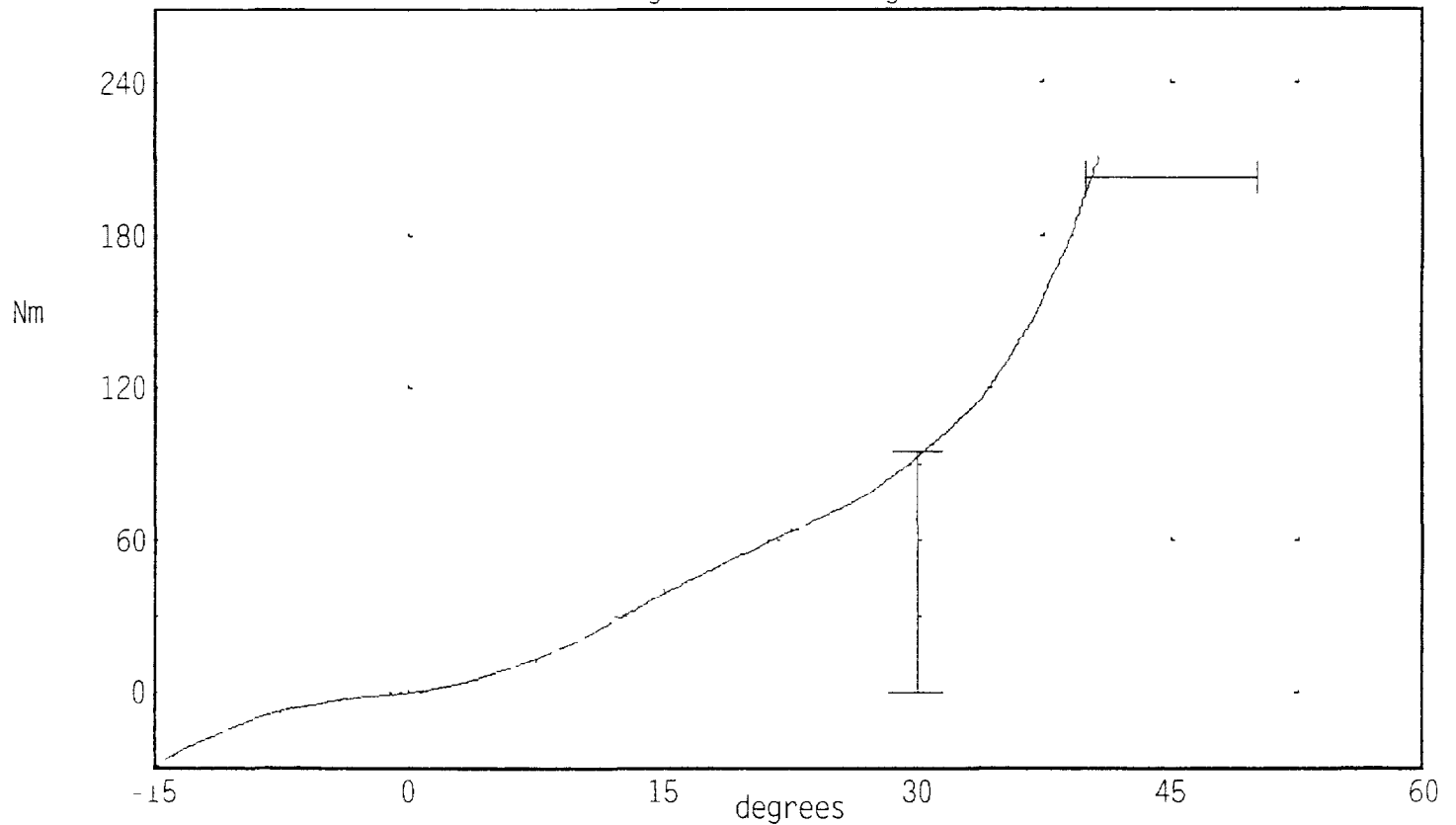
Hybrid III Hip Range of Motion

Serial Number 202R
Test Number 202C05
Comments

Date 09/25/2001
Time 08 50

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	20.6 °C	Pass
Humidity	10 - 70	43 %	Pass
Moment at 30 deg	<= 94.9	92.8 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	40.3 deg	Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec	Pass

Moment About H-Point
Peak Moment 210.8 Nm at 40.8 deg
Peak Angle 40.8 deg at 210.8 Nm



TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 50th

25-SEP-01

TRC INC.

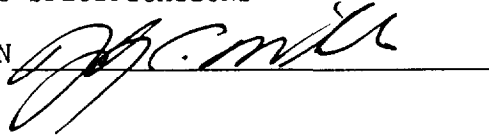
TEST NO: 202C05LK1

572E SN202 LEFT KNEE CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	41.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5301.2 N

TEST MEETS SPECIFICATIONS

TECHNICIAN

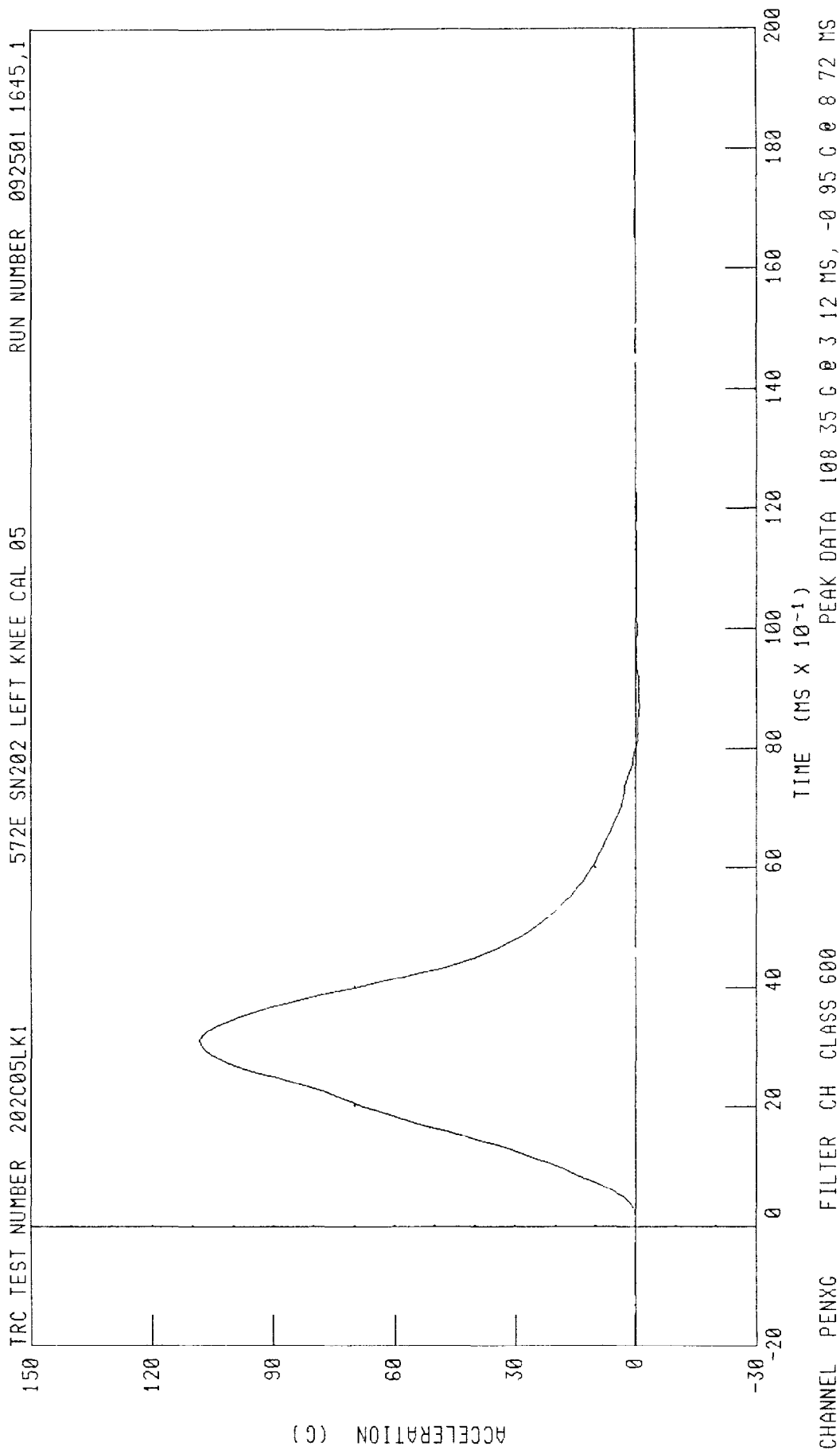


RUN NUMBER: 092501.1644;1

PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND)

TRC TEST NUMBER 202C05LK1 572E SN202 LEFT KNEE CAL 05 RUN NUMBER 092501 1645,1



CHANNEL PENXC FILTER CH CLASS 600 PEAK DATA 108 35 G 0 3 12 MS, -0 95 G 0 8 72 MS

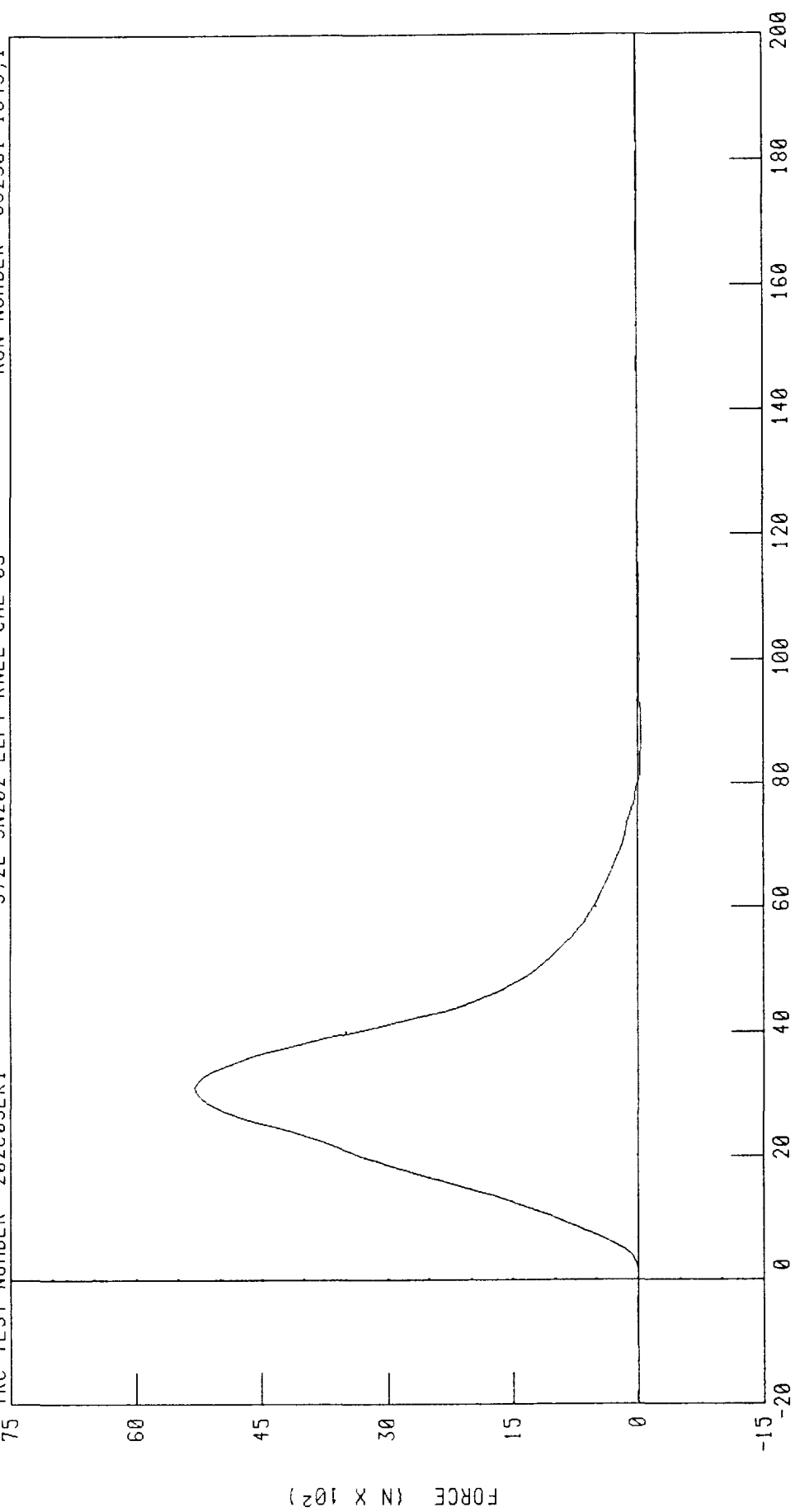
PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND)

TRC TEST NUMBER 202C05LK1

572E SN202 LEFT KNEE CAL 05

RUN NUMBER 092501 1645,1



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

CHANNEL PENXF FILTER CH CLASS 600

PEAK DATA 5301 20 N 0 3 12 MS, -46 63 N 0 8 72 MS

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

HYBRID III 50th

25-SEP-01

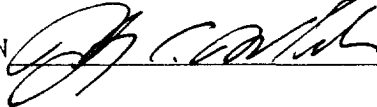
TRC INC.

TEST NO: 202C05RK1

572E SN202 RIGHT KNEE CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	41.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.13 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5696.4 N

TEST MEETS SPECIFICATIONS ✓

TECHNICIAN 

RUN NUMBER: 092501.1645;1

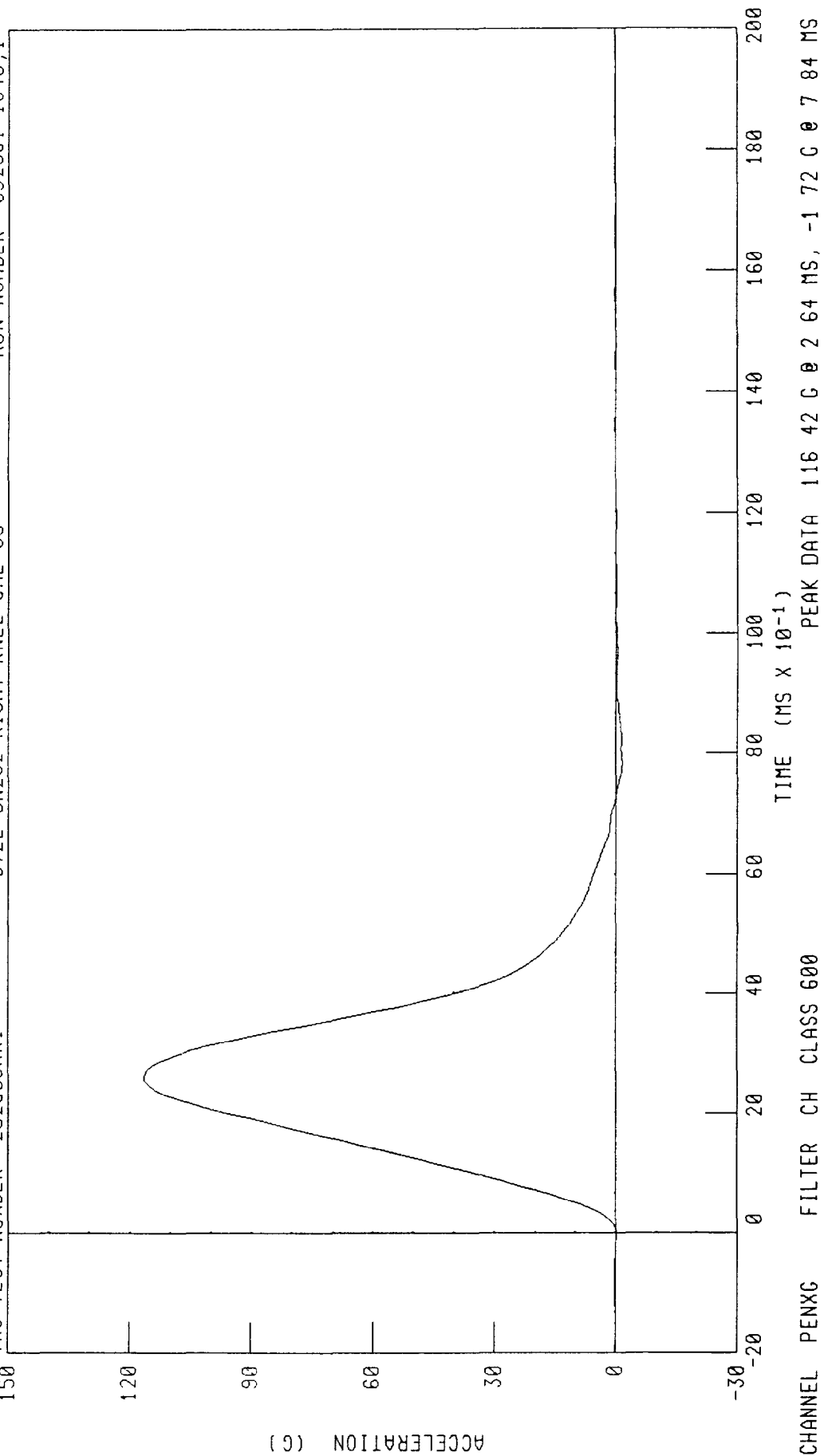
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND)

TRC TEST NUMBER 202C05RK1

572E SN202 RIGHT KNEE CAL 05

RUN NUMBER 092501 1646,1



CHANNEL PENXC FILTER CH CLASS 600

PEAK DATA 116 42 G @ 2 64 MS, -1 72 G @ 7 84 MS

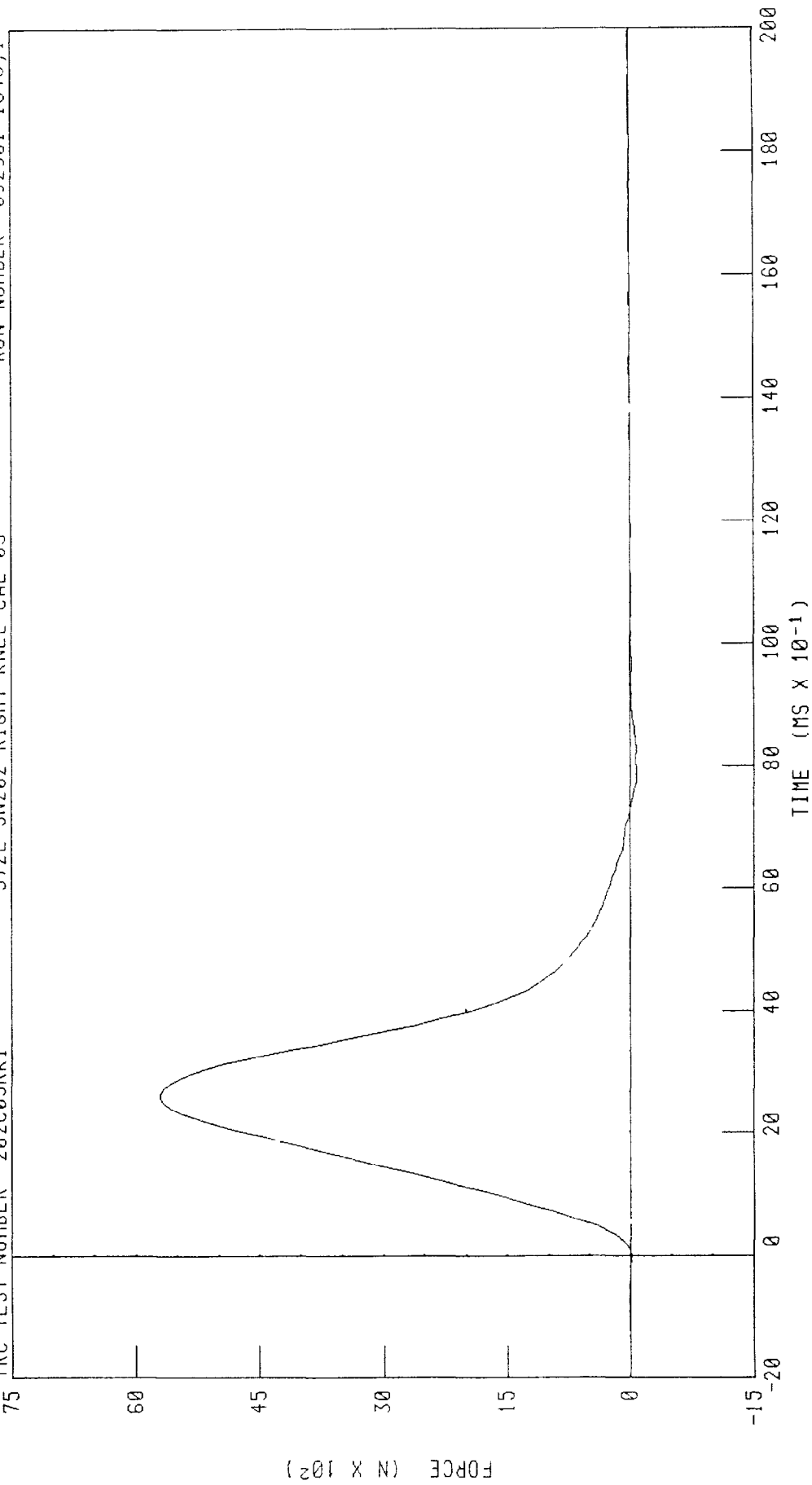
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE (5 KG PEND)

TRC TEST NUMBER 202C05RK1

572E SN202 RIGHT KNEE CAL 05

RUN NUMBER 092501 1646.1



CHANNEL PENXF FILTER CH CLASS 600 PEAK DATA 5696 42 N 0 2 64 MS, -84 35 N 0 7 84 MS

TRANSPORTATION RESEARCH CENTER INC.

KNEE SLIDER TEST

HYBRID III 50th

26-SEP-01

LEFT KNEE

TRC INC.

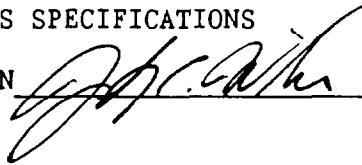
TEST NO: 202C05LS1

572E SN202 LEFT SLIDER CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	36.0 %
PENDULUM VELOCITY	2.70-2.80 M/S	2.76 M/S
FORCE AT 10.0 MM DISPLACEMENT	1259 - 1721 N	1429. N
FORCE AT 18.0 MM DISPLACEMENT	2268 - 3096 N	2615. N

TEST MEETS SPECIFICATIONS

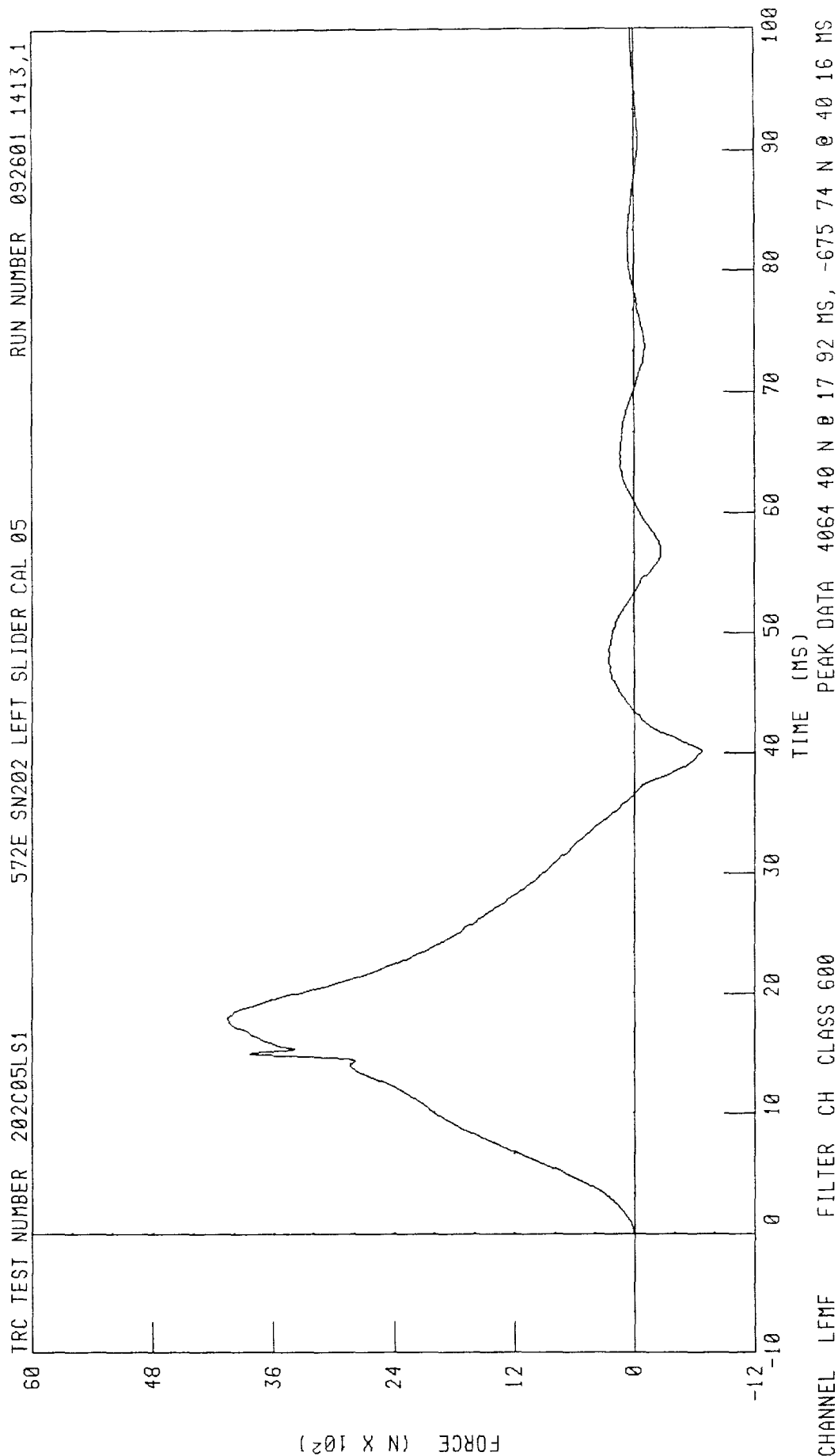
TECHNICIAN



RUN NUMBER: 092601.1412;1

PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION

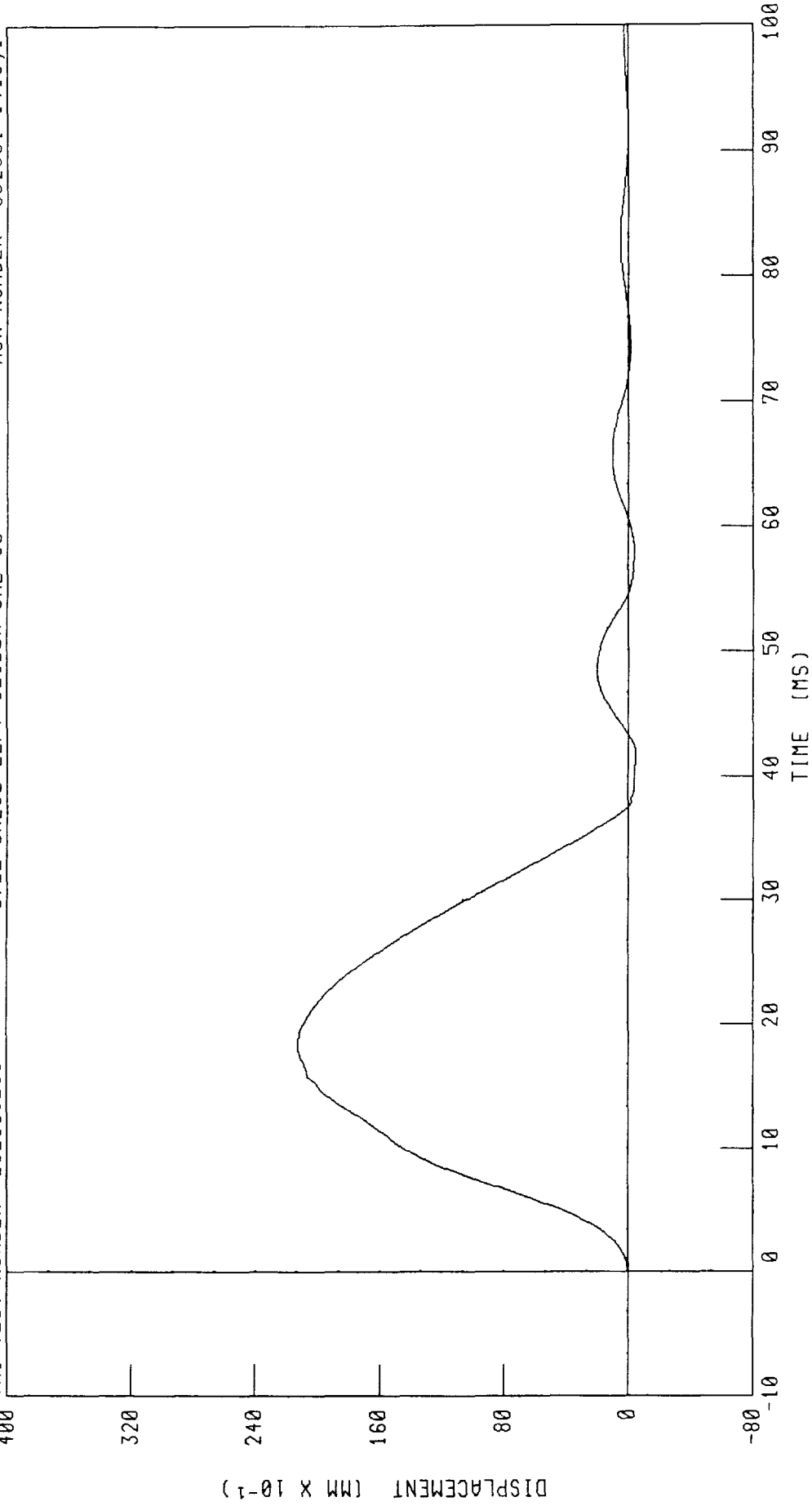
LEFT FEMUR FORCE



PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION

LEFT KNEE DISPLACEMENT

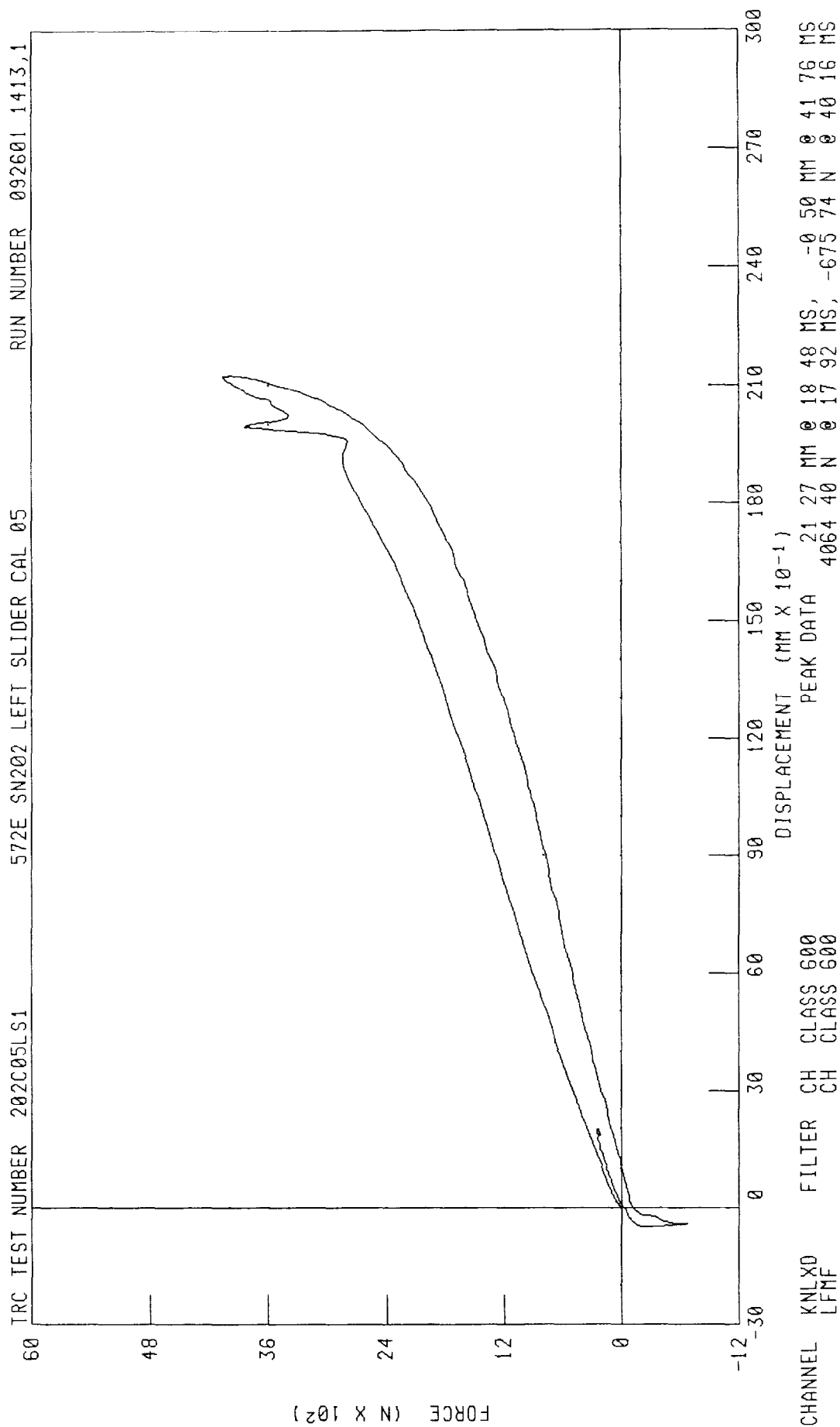
TRC TEST NUMBER 202C05LS1 572E SN202 LEFT SLIDER CAL 05 RUN NUMBER 092601 1413,1



CHANNEL KNLXD FILTER CH CLASS 600

PEAK DATA 21 27 MM @ 18 48 MS, -0 50 MM @ 41 76 MS

PART 572-E HYBRID III LEFT KNEE SLIDER CALIBRATION
LEFT KNEE DISPLACEMENT VS FEMUR FORCE



TRANSPORTATION RESEARCH CENTER INC.

KNEE SLIDER TEST

HYBRID III 50th

26-SEP-01

RIGHT KNEE

TRC INC.

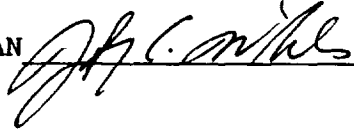
TEST NO: 202C05RS1

572E SN202 RIGHT SLIDER CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10 - 70 %	36.0 %
PENDULUM VELOCITY	2.70-2.80 M/S	2.70 M/S
FORCE AT 10.0 MM DISPLACEMENT	1259 - 1721 N	1273. N
FORCE AT 18.0 MM DISPLACEMENT	2268 - 3096 N	2307. N

TEST MEETS SPECIFICATIONS

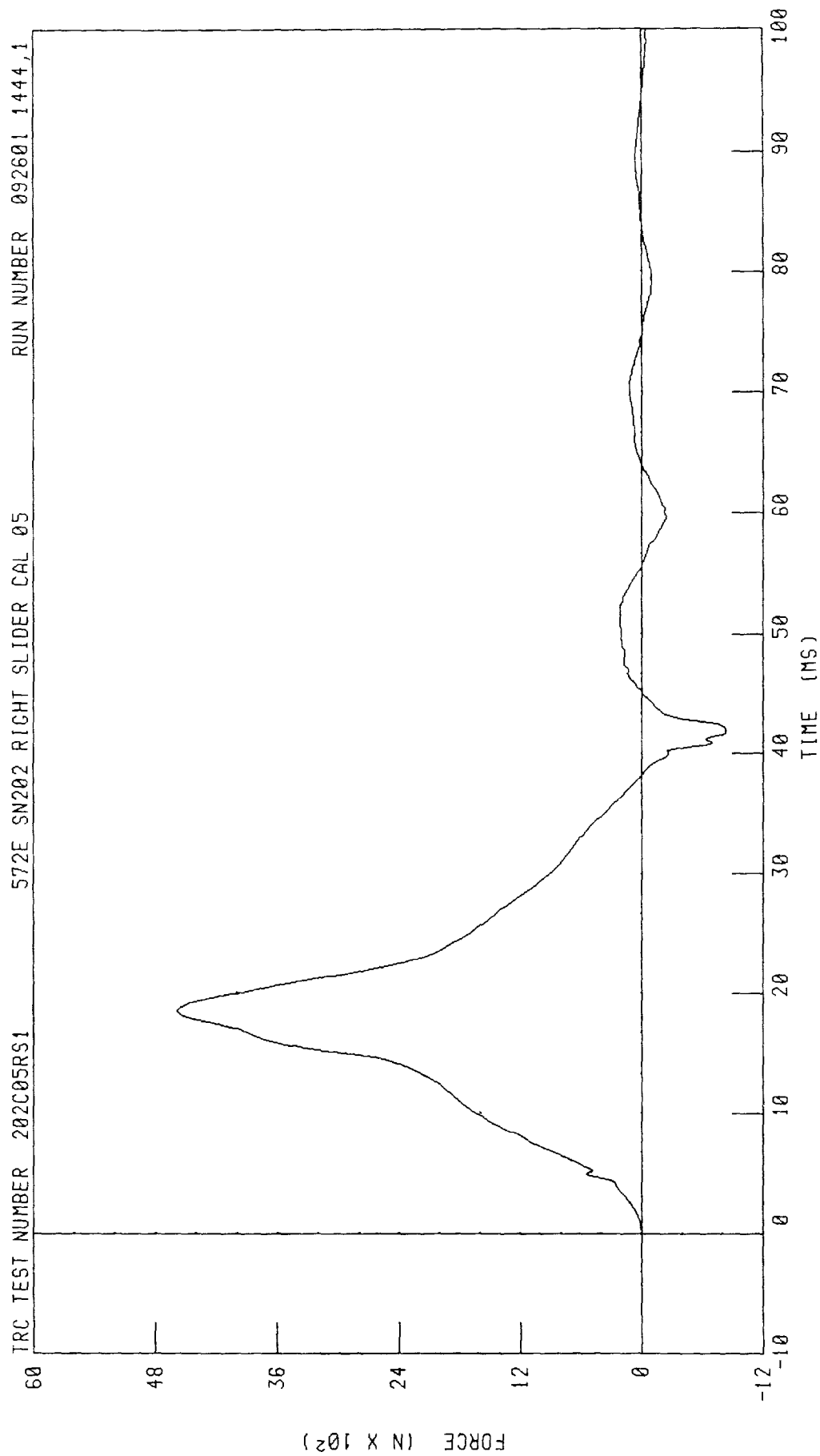
TECHNICIAN



RUN NUMBER: 092601.1443;1

PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION

RIGHT FEMUR FORCE



CHANNEL RFMF FILTER CH CLASS 600

PEAK DATA 4586 53 N @ 18 56 MS, -840 14 N @ 41 76 MS

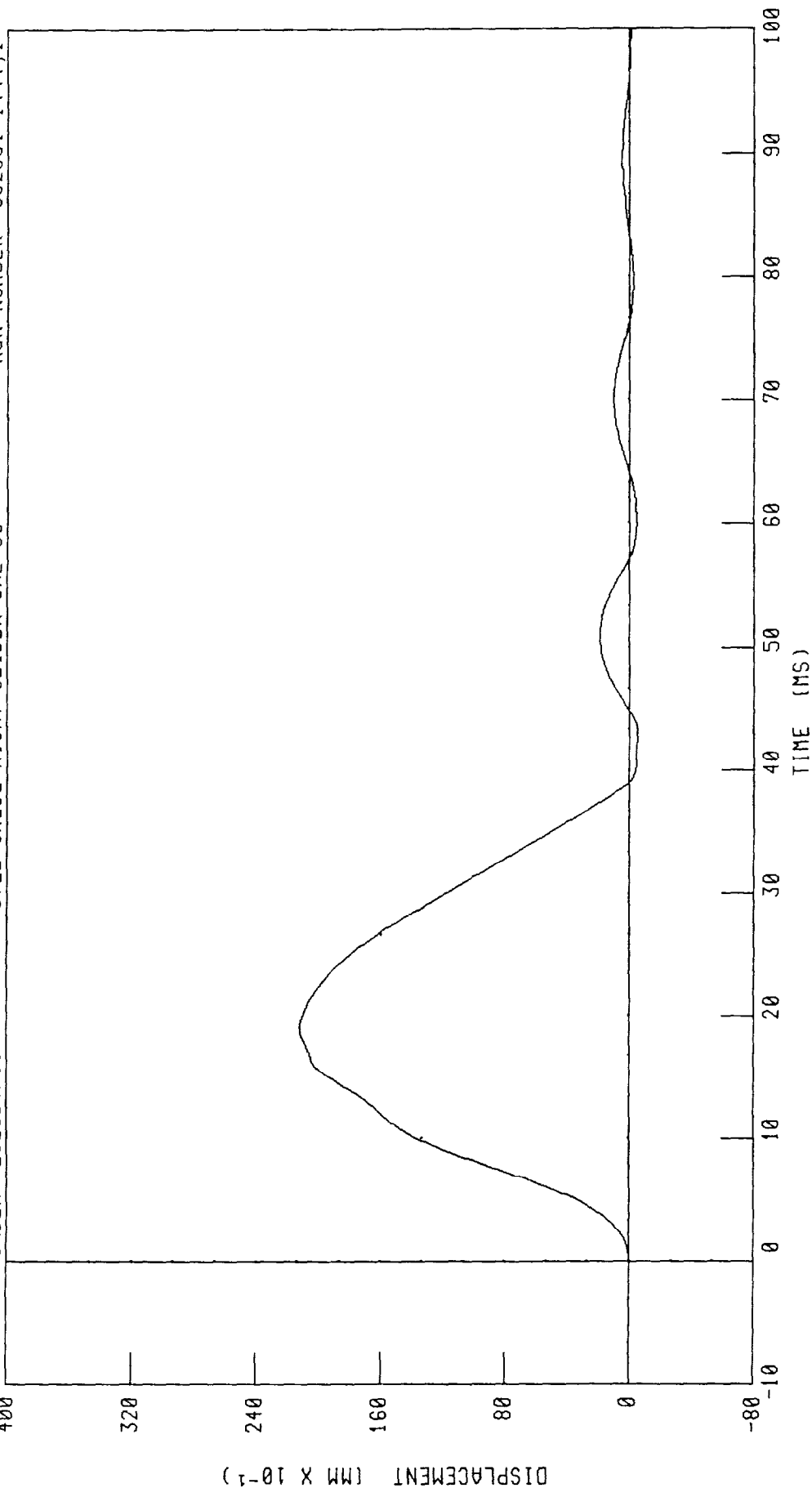
PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION

RIGHT KNEE DISPLACEMENT

TRC TEST NUMBER 202C05RS1

572E SN202 RIGHT SLIDER CAL 05

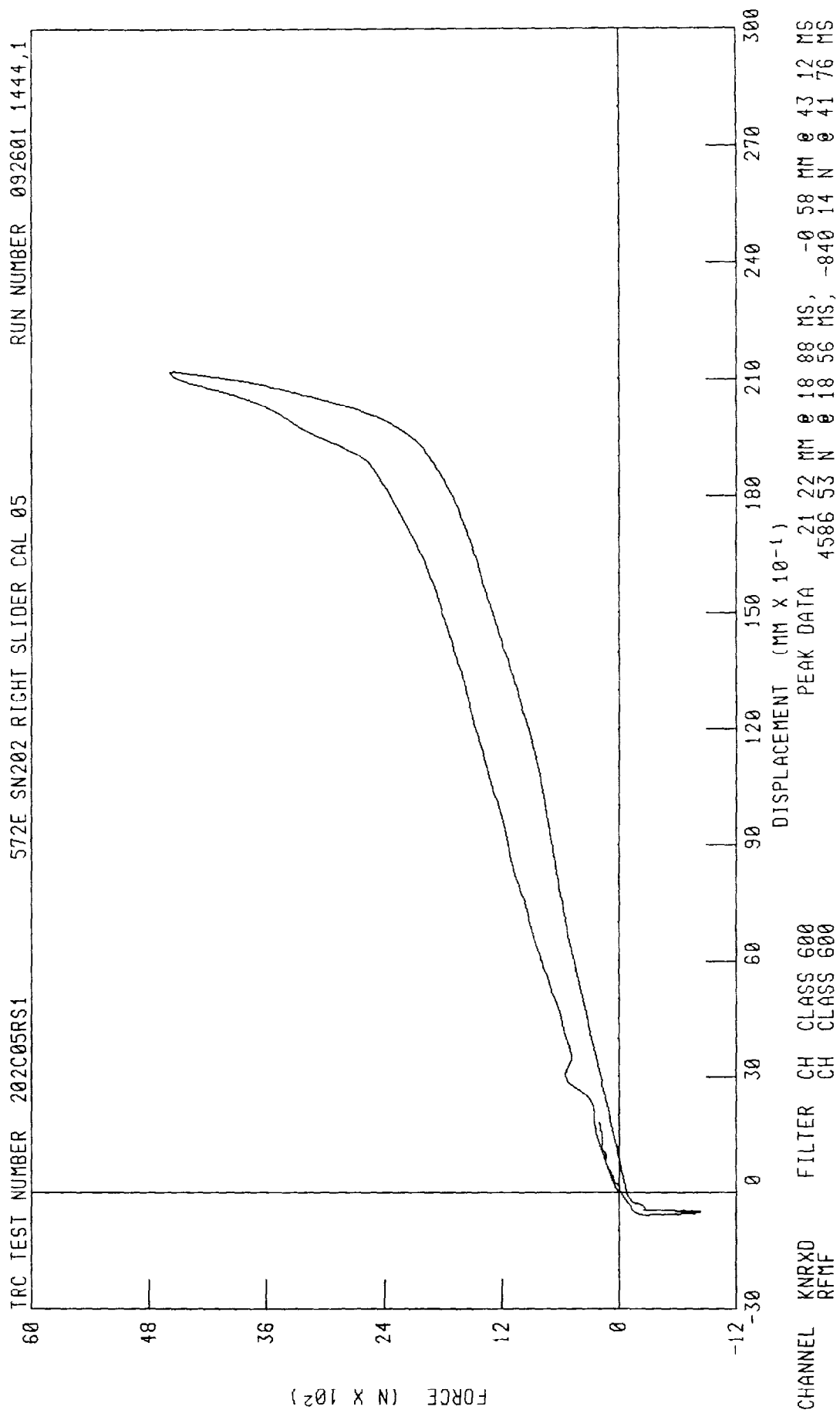
RUN NUMBER 092601 1444,1



CHANNEL KNRXD FILTER CH CLASS 600

PEAK DATA 21 22 MM @ 18 88 MS, -0 58 MM @ 43 12 MS

PART 572-E HYBRID III RIGHT KNEE SLIDER CALIBRATION
 RIGHT KNEE DISPLACEMENT VS FEMUR FORCE



Appendix D

Test Equipment and Instrumentation Calibration Information

Report Sign Convention
SAE J211 MAR95

<u>Accelerometers:</u>	+X: Forward	
	+Y: Rightward	
	+Z: Downward	
<u>Potentiometers:</u>	+Chest longitudinal deflection:	Outward
	+Chest lateral deflection:	Leftward
	+Seat belt displacement:	Outward
	+Seat belt extension:	Elongation
	+Knee slider displacement:	Distance between femur and tibia increased (in relation to a seated dummy)
<u>Rotation potentiometers:</u>	+About the X-axis:	Left foot-eversion Right foot-inversion
	+About the Y-axis:	Left/right foot-dorsiflexion
	+About the Z-axis:	Left foot-internal Right foot-external
<u>Load cells:</u>	+Femur force:	Tension
	+Seat belt force:	Tension
	+Barrier force:	Tension
<u>Neck load cells:</u>	+X force:	Head pushed rearward
	+Y force:	Head pushed leftward
	+Z force:	Head pulled 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
<u>Tibia load cells:</u>	+X force:	Ankle forward, knee rearward
	+Y force:	Ankle rightward, knee leftward
	+Z force:	Tension
	+X moment:	Bottom of tibia moving leftward
	+Y moment:	Bottom of tibia moving rearward

¹ The chest deflection and knee slider displacement presented in the dummy certification in Appendix C are opposite of J211 polarity.

Frequency Response Classes
SAE J211 MAR95

<u>Typical Test Measurements</u>	<u>Channel Class</u>
Vehicle Structural Accelerations for use in:	
Total vehicle comparison	60
Collision simulation input	60
Component analysis	600
Integration for velocity or displacement	180
Barrier Face Forces	60
Belt Restraint System Loads	60
Anthropomorphic Test Device	
Head accelerations (linear and angular)	1000
Neck	
Forces	1000
Moments	600
Thorax	
Spine accelerations	180
Rib accelerations	1000
Sternum accelerations	1000
Deflections	180
Lumbar	
Forces	1000
Moments	1000
Pelvis	
Accelerations	1000
Forces	1000
Moments	1000
Femur/Knee/Tibia/Ankle	
Forces	600
Moments	600
Displacements	180
Sled Accelerations	60
Steering Column Loads	600
Head form Accelerations	1000

The direction column on the following sheets describes the transducer output as mounted and wired in the test location. See Report Sign Convention sheet for description of data output as presented in the report: channels were adjusted in post-acquisition processing to conform to J211 MAR95

Dummy 202v **Type** HIII 50TH **Description** VOLPE (NHTSA) - 202 HYBRID III 50TH (DKS 9-26-01) J211

Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/U	Fullscale	Caldate	Pos Output	Flip
HEDXG	Head Accel X	EGE-73B6Q-20	01G25 N07	Entran	0.02208 G	2000	08/10/2001	Fwd	0
HEDYG	Head Accel Y	EGE-73B6Q-20	01G25 N20	Entran	0.02011 G	2000	08/10/2001	Lft	1
HEDZG	Head Accel Z	EGE-73B6Q-20	01G25 N17	Entran	0.01957 G	2000	08/10/2001	Up	1
HEDXR	Head Accel Red X	VRTC10		Endevco	0.01358 G	2000	08/28/2001	Rwd	1
HEDYR	Head Accel Red Y	VRTC3	7264C 2KLC 2 P16328	Endevco	0.01461 G	2000	08/28/2001	Rgt	0
HEDZR	Head Accel Red Z	VRTC9	7264C 2KLC-2- P16899	Endevco	0.015 G	2000	08/28/2001	Up	1
HD1XG	Head (LT) Accel X		EGE-73B6Q-20 01G19 F03	Entran	0.02156 G	2000	08/10/2001	Fwd	0
HD1ZG	Head (LT) Accel Z		EGE-73B6Q-20 01G25 N18	Entran	0.01906 G	2000	08/10/2001	Up	1
HD2YG	Head (FT) Accel Y		EGE-73B6Q-20 01G25 N10	Entran	0.02248 G	2000	08/10/2001	Lft	1
HD2ZG	Head (FT) Accel Z		EGE-73B6Q-20 01G25-N03	Entran	0.01933 G	2000	08/10/2001	Up	1
HD3XG	Head (TP) Accel X		EGE-73B6Q 20 01G25-N15	Entran	0.02019 G	2000	08/10/2001	Fwd	0
HD3YG	Head (TP) Accel Y		EGE-73B6Q-20 01G25-N02	Entran	0.01968 G	2000	08/10/2001	Lft	1
NEKXF	Neck Force X	1716	1716-0628 FX	Denton	0.000192033 N	8896 4	08/16/2001	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716	1716-0628-FY	Denton	0.000184075 N	8896 4	08/16/2001	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716	1716 0628 FZ	Denton	0.00008605 N	13344 6	08/16/2001	Hd Up,Cst Dn	0
NEXXM	Neck Moment X	1716	1716 0628-MX	Denton	0.005770973 NM	282 5	08/16/2001	Rt Ear to Rt Shld	1
NEXYM	Neck Moment Y	1716	1716 0628-MY	Denton	0.005887788 NM	282 5	08/16/2001	Chn to Strmm	0
NEKZM	Neck Moment Z	1716	1716 0628 MZ	Denton	0.008187257 NM	282 5	08/16/2001	Chn to Lt Shld	0
NKLXF	Lwr Neck Force X	1794A	1794A 215 FX	Denton	0.000140236 N	13344 6	07/05/2001	Hd Fd,Cst Rr	1
NKLYF	Lwr Neck Force Y	1794A	1794A 215-FY	Denton	0.000137853 N	13344 6	07/05/2001	Hd Lt,Cst Rt	0
NKLZF	Lwr Neck Force Z	1794A	1794A 215 FZ	Denton	0.000069204 N	13344 6	07/05/2001	Hd Up,Cst Dn	0
NKLXM	Lwr Neck Moment X	1794A	1794A-215 MX	Denton	0.003864601 NM	452	07/05/2001	Rt Ear to Rt Shld	1
NKLYM	Lwr Neck Moment Y	1794A	1794A-215 MY	Denton	0.003795796 NM	452	07/05/2001	Chn to Strmm	0
NKLZM	Lwr Neck Moment Z	1794A	1794A 215-MZ	Denton	0.006828982 NM	452	07/05/2001	Chn to Lt Shld	0
CSTXG	Chest Accel X	7264-2000TZ	AJ460	Endevco	0.02863 G	2000	08/24/2001	Fwd	0
CSTYG	Chest Accel Y	7264-2000TZ	J14404	Endevco	0.028 G	2000	08/24/2001	Lft	1

Chsnam	Location	Model	Name	Manufacturer	Sens./m V/V/U	Fullscale	Caldate	Pos Output	Flip
CSTZG	Chest Accel Z	7264 2000TZ	J14144	Endevco	0 03795 G	2000	08/24/2001	Up	1
CSTXD	Chest Deflection X	14CB1 2847	14CB1 2847 0137	Servo	1 1347019 MM	100	09/07/2001	Strmm Away Firm Spn	0
LFMZP	Left Femur Force Z	2121	2121-0226	Denton	0 000098729 N	1334 6	08/24/2001	Knee Fd,Pel Rr	0
RFMZF	Right Femur Force Z	2121	2121 0227	Denton	0 000098759 N	13344 6	08/24/2001	Knee Fd,Pel Rrxt	0
KNLXD	Left Knee Displacement	150-0121VR	150 0121VR 13739	SpaceAge	23 10643 MM	40	11/30/2000	Tib Rr,Hld Fem	1
TBLXF	Left Upper Tibia Force X	3115	3115 199 FX	Denton	0 000172571 N	11120	03/02/2001	Tib Rr,Knee Fd	1
TBLZF	Left Upper Tibia Force Z	3115	3115-199-FZ	Denton	0 000095782 N	11120 5	03/02/2001	Tib Dn,Knee Up	0
TBLXM	Left Upper Tibia Moment X	3115	3115 199 MX	Denton	0 0007356348 NM	395 5	03/02/2001	Tib Rr,Hld Knee	1
TBLYM	Left Upper Tibia Moment Y	3115	3115-199 MY	Denton	0 0007476226 NM	395 5	03/02/2001	Tib Fd,Hld Knee	0
ANLXF	Left Lower Tibia Force X	3287	3287-128 FX	Denton	0 000174361 N	11120 5	03/05/2001	Ank Rr,Knee Fd	1
ANLZF	Left Lower Tibia Force Z	3287	3287 128-FZ	Denton	0 000096879 N	11120 5	03/05/2001	Ank Dn,Knee Up	0
ANLXM	Left Lower Tibia Moment X	3287	3287 128-MX	Denton	0 0007693474 NM	395 4	03/05/2001	Ank Rt,Hld Knee	1
ANLYM	Left Lower Tibia Moment Y	3287	3287-128-MY	Denton	0 0007630753 NM	395 4	03/05/2001	Ank Fd,Hld Knee	0
FLHXG	Left Foot Heel Accel X	7264-2KM5T	J27387	Endevco	0 0241 G	2000	08/24/2001	Fwd	0
FLHZG	Left Foot Heel Accel Z	7264-2KM5T	J27553	Endevco	0 02754 G	2000	08/24/2001	Dwn	0
FLTZG	Left Foot Toe Accel Z	7264 2KM5T	J27474	Endevco	0 02712 G	2000	08/24/2001	Up	1
KNRXd	Right Knee Displacement	150 0121VL	150-0121VL 13723	SpaceAge	23 5714 MM	40	11/30/2000	Tib Rr,Hld Fem	1
TBRXF	Right Upper Tibia Force X	3115	3115 200-FX	Denton	0 000170179 N	11120	03/05/2001	Tib Rr,Knee Fd	1
TBRZF	Right Upper Tibia Force Z	3115	3115 200 FZ	Denton	0 000094433 N	11120	03/05/2001	Tib Dn,Knee Up	0
TBRXM	Right Upper Tibia Moment X	3115	3115 200 MX	Denton	0 0007369499 NM	395 5	03/05/2001	Tib Rr,Hld Knee	1
TBRYM	Right Upper Tibia Moment Y	3115	3115-200-MY	Denton	0 0007401618 NM	395 5	03/05/2001	Tib Fd,Hld Knee	0
ANRXF	Right Lower Tibia Force X	3287	3287 129 FX	Denton	0 000173435 N	11120 5	03/07/2001	Ank Rr,Knee Fd	1
ANRZF	Right Lower Tibia Force Z	3287	3287-129-FZ	Denton	0 000096573 N	11120 5	03/07/2001	Ank Dn,Knee Up	0
ANRXM	Right Lower Tibia Moment X	3287	3287 129-MX	Denton	0 0007584977 NM	395 4	03/07/2001	Ank Rt,Hld Knee	1
ANRYM	Right Lower Tibia Moment Y	3287	3287-129 MY	Denton	0 0007643146 NM	395 4	03/07/2001	Ank Fd,Hld Knee	0
FRHXG	Right Foot-Heel Accel X	7264-2000T	J17976	Endevco	0 02777 G	2000	08/24/2001	Fwd	0
FRHZG	Right Foot Heel Accel Z	7264 2000TZ	J38801	Endevco	0 02707 G	2000	05/23/2001	Dwn	0
FRTZG	Right Foot Toe Accel Z	7264 2KM5T	J28727	Endevco	0 02393 G	2000	08/24/2001	Up	1

Dummy 206v **Type** HIII 50TH **Description** VOLPE (NHTSA) - 206 HYBRID III 50TH (DKS 9-26-01) J211

Chsnam	Location	Model	Name	Manufacturer	Sens,mV/V/U	Fullscale	Caldate	Pos Output	Flip
HEDXG	Head Accel X	EGE-73B6Q-20	01G25 N01	Entran	0 01864 G	2000	08/10/2001	Fwd	0
HEDYG	Head Accel Y	EGE-73B6Q-20	01G25 N14	Entran	0 01879 G	2000	08/10/2001	Lft	1
HEDZG	Head Accel Z	EGE-73B6Q-20	01G25 N08	Entran	0 02344 G	2000	08/10/2001	Up	1
HEDXR	Head Accel Red X 1014	7264C-2K-2-18	P12566	Endevco	0 0194 G	2000	08/28/2001	Rwd	1
HEDYR	Head Accel Red Y M1	7264C-2KLC-2-	P17196	Endevco	0 02095 G	2000	08/28/2001	Rgt	0
HEDZR	Head Accel Red Z 1018	7264C-2KLC-2-	P17858	Endevco	0 01301 G	2000	08/28/2001	Up	1
HD1XG	Head (LT) Accel X	EGE-73B6Q-20	01G25 N06	Entran	0 02364 G	2000	08/10/2001	Fwd	0
HD1ZG	Head (LT) Accel Z	EGE-73B6Q-20	01G25 N05	Entran	0 01955 G	2000	08/10/2001	Up	1
HD2YG	Head (FT) Accel Y	EGE-73B6Q-20	01G25 N04	Entran	0 01977 G	2000	08/10/2001	Lft	1
HD2ZG	Head (FT) Accel Z	EGE-73B6Q-20	01G25 N13	Entran	0 01991 G	2000	08/10/2001	Up	1
HD3XG	Head (TP) Accel X	EGE-73B6Q-20	01G25 N09	Entran	0 01934 G	2000	08/10/2001	Fwd	0
HD3YG	Head (TP) Accel Y	EGE-73B6Q-20	01G25-N16	Entran	0 01877 G	2000	08/10/2001	Lft	1
NEKXF	Neck Force X	1716A	1716A-858-FX	Denton	0 000193719 N	8896 4	08/16/2001	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716A	1716A-858-FY	Denton	0 000186907 N	8896 4	08/16/2001	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716A	1716A-858-FZ	Denton	0 000096144 N	13344 6	08/16/2001	Hd Up,Cst Dn	0
NEKXM	Neck Moment X	1716A	1716A-858-MX	Denton	0 005827965 NM	282 5	08/16/2001	Rt Ear to Rt Shld	1
NEKYM	Neck Moment Y	1716A	1716A-858-MY	Denton	0 005966726 NM	282 5	08/16/2001	Chn to Strmm	0
NEKZM	Neck Moment Z	1716A	1716A-858-MZ	Denton	0 008246372 NM	282 5	08/16/2001	Chn to Lt Shld	0
NKLXF	Lwr Neck Force X	1794A	1794A-216-FX	Denton	0 000140056 N	13344 6	07/05/2001	Hd Fd,Cst Rr	1
NKLYF	Lwr Neck Force Y	1794A	1794A-216-FY	Denton	0 000137546 N	13344 6	07/05/2001	Hd Lt,Cst Rt	0
NKLZF	Lwr Neck Force Z	1794A	1794A-216-FZ	Denton	0 000069773 N	13344 6	07/05/2001	Hd Up,Cst Dn	0
NKLXM	Lwr Neck Moment X	1794A	1794A-216-MX	Denton	0 00389115 NM	452	07/05/2001	Rt Ear to Rt Shld	1
NKLYM	Lwr Neck Moment Y	1794A	1794A-216-MY	Denton	0 003775 NM	452	07/05/2001	Chn to Strmm	0
NKLZM	Lwr Neck Moment Z	1794A	1794A-216-MZ	Denton	0 006764823 NM	452	07/05/2001	Chn to Lt Shld	0
CSTXG	Chest Accel X	7264 2000TZ	ACCM9	Endevco	0 02826 G	2000	08/24/2001	Fwd	0
CSTYG	Chest Accel Y	7264-2000TZ	J15368	Endevco	0 03531 G	2000	08/24/2001	Lft	1

Thursday, October 04, 200 206v

Chsnam	Location	Model	Name	Manufacturer	Sens./m V/V/U	Fullscale	Caldate	Pos Output	Flip
CSTZG	Chest Accel Z	7264 2000TZ	J20184	Endevco	0 02521 G	2000	08/24/2001	Up	1
CSTXD	Chest Deflection X	14CB1-2847	14CB1 2847-206	Servo	1 1403262 MM	100	09/07/2001	Strmm Away Frm Spn	0
LFMZP	Left Femur Force Z	2121	2121 0160	Denton	0 000098324 N	13344 6	08/24/2001	Knee Fd,Pel Rr	0
RFMZP	Right Femur Force Z	2121	2121-0161	Denton	0 000099718 N	13344 6	08/24/2001	Knee Fd,Pel Rrxt	0
KNLXD	Left Knee Displacement	150 0121VR	150-0121VR 13741	SpaceAge	23 39429 MM	40	11/30/2000	Tib Rr,Hld Fem	1
FBLXF	Left Upper Tibia Force X LC8	4353J	4353J-82 FX	Denton	0 00017107 N	11120	08/03/2001	Tib Fd,Knee Rr	0
TBLZF	Left Upper Tibia Force Z LC15	4353J	4353J-82 FZ	Denton	0 000095631 N	11120	08/03/2001	Tib Dn,Knee Up	0
TBLXM	Left Upper Tibia Moment X LC17	4353J	4353J-82 MX	Denton	0 0075411 NM	395 4	08/03/2001	Ank Lt,Hld Knee	0
TBLYM	Left Upper Tibia Moment Y LC01	4353J	4353J 82 MY	Denton	0 0075411 NM	395 4	08/03/2001	Ank Fd,Hld Knee	0
TBLXG	Left Tibia Accel X	EGE-73B6Q 20	01G19 F02	Entran	0 01925 G	2000	08/21/2001	Fwd	0
TBLYG	Left Tibia Accel Y	EGE 73B6Q 20	01H02-N02	Entran	0 02125 G	2000	08/21/2001	Rt	0
ANLXF	Left Lower Tibia Force X LC23	4929J	4929J 87-FX	Denton	0 00017264 N	11120	12/22/2000	Ank Fd,Knee Rr	0
ANLYF	Left Lower Tibia Force Y LC16	4929J	4929J 87 FY	Denton	0 00017608 N	11120	12/22/2000	Ank Rt,Knee Lft	0
ANLZF	Left Lower Tibia Force Z LC19	4929J	4929J 87 FZ	Denton	0 000095856 N	11120	12/22/2000	Ank Dn,Knee Up	0
ANLXM	Left Lower Tibia Moment X LC26	4929J	4929J 87-MX	Denton	0 0075904 NM	395 4	12/22/2000	Ank Lt,Hld Knee	0
ANLYM	Left Lower Tibia Moment Y LC18	4929J	4929J-87 MY	Denton	0 0075879 NM	395 4	12/22/2000	Ank Fd,Hld Knee	0
FTLXD	Left Foot Disp X POT4	PD210-4B	PD210-4B AK 060	CONTELEC	3 1541 DE	318	07/31/2001	Eversion	0
FILYD	Left Foot Disp Y POT5	PD210-4B	PD210-4B-AK-061	CONTELEC	3 1679 DE	318	07/31/2001	Dorsiflexion	0
FTLZD	Left Foot Disp Z POT6	PD210-4B	PD210-4B-AK 062	CONTELEC	3 1819 DE	318	07/31/2001	Internal Rotation	0
FTLXG	Left Foot Accel X	F-GLE 73B6Q 20	01H02 N05	Entran	0 02077 G	2000	08/21/2001	Fwd	0
FTLYG	Left Foot Accel Y	7264-2000TZ	J38856	Endevco	0 02426 G	2000	05/23/2001	Rt	0
FTLZG	Left Foot Accel Z	EGE 73B6Q 20	01H02-N01	Entran	0 02164 G	2000	08/21/2001	Dn	0
KNRXd	Right Knee Displacement	150 0121VL	150-0121VL-18123	SpaceAge	23 66 MM	40	04/26/2001	Tib Rr,Hld Fem	1
IBRXXF	Right Upper Tibia Force X LC10	4353J	4353J 81 FX	Denton	0 00016929 N	11120	08/03/2001	Tib Fd,Knee Rr	0
TBRZFF	Right Upper Tibia Force Z LC14	4353J	4353J 81-FZ	Denton	0 000094724 N	11120	08/03/2001	Tib Dn,Knee Up	0
IBRXXM	Right Upper Tibia Moment X LC13	4353J	4353J 81 MX	Denton	0 0073122 NM	395 4	08/03/2001	Ank Lt,Hld Knee	0
TBRYM	Right Upper Tibia Moment Y LC22	4353J	4353J 81 MY	Denton	0 0073572 NM	395 4	08/03/2001	Ank Fd,Hld Knee	0
TBRXG	Right Tibia Accel X	EGE 73B6Q 20	01H02 N07	Entran	0 02142 G	2000	08/21/2001	Fwd	0

Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/U	Fullscale	Caldate	Pos Output	Flip
TBRYG	Right Tibia Accel Y	EGE-73B6Q-20	01H02-N03	Entran	0.02147 G	2000	08/21/2001	Rt	0
ANRXF	Right Lower Tibia Force X	4929J	4929J-86-FX	Denton	0.0001716 N	11120	12/22/2000	Ank Fd, Knee Rr	0
ANRYF	Right Lower Tibia Force Y	4929J	4929J-86-FY	Denton	0.0001746 N	11120	12/22/2000	Ank Rt, Knee Lft	0
ANRZF	Right Lower Tibia Force Z	4929J	4929J-86-FZ	Denton	0.000095461 N	11120	12/22/2000	Ank Dn, Knee Up	0
ANRXM	Right Lower Tibia Moment X	4929J	4929J-86-MX	Denton	0.0074837 NM	395.4	12/22/2000	Ank Lt, Hld Knee	0
ANRYM	Right Lower Tibia Moment Y	4929J	4929J-86-MY	Denton	0.0073843 NM	395.4	12/22/2000	Ank Fd, Hld Knee	0
FTRXD	Right Foot Disp X	POT1	PD210-4B	CONTELEC	3.1631 DE	318	07/31/2001	Inertion	0
FTRYD	Right Foot Disp Y	POT2	PD210-4B	CONTELEC	3.1586 DE	318	07/31/2001	Dorsiflexion	0
FTRZD	Right Foot Disp Z	POT3	PD210-4B	CONTELEC	3.1497 DE	318	07/31/2001	External Rotation	0
FTRXG	Right Foot Accel X	EGE-73B6Q-20	01G19-F06	Entran	0.02031 G	2000	08/21/2001	Fwd	0
FTRYG	Right Foot Accel Y	7264-2000TZ	J38787	Endevco	0.02316 G	2000	05/24/2001	Rt	0
FTRZG	Right Foot Accel Z	EGE-73B6Q-20	01G19-F05	Entran	0.0177 G	2000	08/21/2001	Dn	0

Channel Report

Name of Test		010924		System		K3600		Name of DAU			DAU1	
Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal. Date/Status	Group	Mfg.	Model		
1000	EVENT1	BACKUP	BACKUP EVENT		10 24	V						
1001	01G25-N01	HEDXG1	DRIVER HEAD X-AXIS	Fwd	796 1684393 G	+	06/29/2000	-1	TRC	Event		
1002	01G25-N14	HEDYG1	DRIVER HEAD Y-AXIS	Lft	801 4275428 G	+	08/10/2001	OK	Entran	EGE-73B6Q-2000J		
1003	01G25-N08	HEDZG1	DRIVER HEAD Z-AXIS	Up	794 2910331 G	+	08/10/2001	OK	Entran	LGE-73B6Q-2000J		
1004	P12566	HEDXR1	DRIVER HEAD X-AXIS	Rwd	799 7500781 G	+	08/28/2001	OK	Endevco	7264C-2K-2-180		
1005	P17196	HEDYR1	DRIVER HEAD Y-AXIS	Rgt	801 2833052 G	+	08/28/2001	OK	Endevco	7264C-2KLC-2-24		
1006	P17858	HEDZR1	DRIVER HEAD Z-AXIS	Up	803 1498533 G	+	08/28/2001	OK	Endevco	7264C-2KI C-2-24		
1007	01G25-N06	HD1XG1	DRIVER HEAD X-AXIS (LT)	Fwd	802 1557936 G	+	08/10/2001	OK	Entran	EGE-73B6Q-2000J		
1008	01G25-N05	HD1ZG1	DRIVER HEAD Z-AXIS (LT)	Up	805 8233326 G	+	08/10/2001	OK	Entran	EGE-73B6Q-2000J		
1009	01G25-N04	HD2YG1	DRIVER HEAD Y-AXIS (FT)	Lft	796 8561534 G	+	08/10/2001	OK	Entran	EGE-73B6Q-2000J		
1010	01G25-N13	HD2ZG1	DRIVER HEAD Z-AXIS (FT)	Up	803 6162732 G	+	08/10/2001	OK	Entran	EGE-73B6Q-2000J		
1011	01G25-N09	HD3XG1	DRIVER HEAD X-AXIS (TP)	Fwd	802 2312055 G	+	08/10/2001	OK	Entran	EGE-73B6Q-2000J		
1012	01G25-N16	HD3YG1	DRIVER HEAD Y-AXIS (TP)	Lft	802 2814879 G	+	08/16/2001	OK	Denton	1716A		
1013	1716A-858-FX	NEKXF1	DRIVER NECK X-AXIS SHEAR	Hd	8899 001770N	+	08/16/2001	OK	Denton	1716A		
1014	1716A-858-FY	NEKYF1	DRIVER NECK Y-AXIS SHEAR	Hd	8893 929399N	+	08/16/2001	OK	Denton	1716A		
1015	1716A-858-FZ	NEKZF1	DRIVER NECK Z-AXIS AXIAL	Hd	13346 73011N	+	08/16/2001	OK	Denton	1716A		
1016	1716A-858-MX	NEKXM1	DRIVER NECK MOMENT	Rt Ear	282 4832082 NM	+	08/16/2001	OK	Denton	1716A		
1017	1716A-858-MY	NFKYM1	DRIVER NECK MOMENT	Chn	282 7321336 NM	+	08/16/2001	OK	Denton	1716A		
1018	1716A-858-MZ	NEKZM1	DRIVER NECK MOMENT	Chn	282 2177713 NM	+	08/16/2001	OK	Denton	1716A		
1019	1794A-216-FX	NKLXF1	DRIVER NECK LOWER X-AXIS	Hd	13341 89994N	+	07/05/2001	OK	Denton	1794A		
1020	1794A-216-FY	NKLYF1	DRIVER NECK LOWER Y-AXIS	Hd	13341 90342N	+	07/05/2001	OK	Denton	1794A		
1021	1794A-216-FZ	NKLZF1	DRIVER NECK LOWER Z-AXIS	Hd	13341 96739N	+	07/05/2001	OK	Denton	1794A		
1022	1794A-216-MX	NKLXM1	DRIVER NECK LOWER	Rt Ear	339 1253559 NM	+	07/05/2001	OK	Denton	1794A		
1023	1794A-216-MY	NKLXM1	DRIVER NECK LOWER	Chn	339 0728476 NM	+	07/05/2001	OK	Denton	1794A		
1024	1794A-216-MZ	NKLZM1	DRIVER NECK LOWER	Chn	181 0661391 NM	+	07/05/2001	OK	Denton	1794A		
1025	ACCM9	CSTXG1	DRIVER CHEST X-AXIS	Fwd	398 1863854 G	+	08/24/2001	OK	Endevco	7264-2000TZ		
1026	J15368	CSTYG1	DRIVER CHEST Y-AXIS	Lft	397 2641535 G	+	08/24/2001	OK	Endevco	7264-2000TZ		
1027	J20184	CSTZG1	DRIVER CHEST Z-AXIS	Up	398 2235496 G	+	08/24/2001	OK	Endevco	7264-2000TZ		
1028	14CB1-2847-206	CSTXD1	DRIVER CHEST DEFFLECTION	Strm	111 9724477 MM	+	09/07/2001	OK	Servo	14CB1-2847		
1029	2121-0160	LFMZFI	DRIVER L1-F1 FEMUR FORCE	Knee	13351 98438 N	+	08/24/2001	OK	Denton	2121		

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1100	3115-199-FZ	TBLZF2	PASSENGER LEFT UPPER	Tib	8894 296188 N	+	03/02/2001	OK	202v	Denton	3115
1101	3115-199-MX	TBLXM2	PASSENGER LEFT UPPER	Tib	281 7803744 NM	+	03/02/2001	OK	202v	Denton	3115
1102	3115-199-MY	TBLYM2	PASSENGER LEFT UPPER	Tib	281 8261359 NM	+	03/02/2001	OK	202v	Denton	3115
1103	3287-128-FX	ANLXF2	PASSENGER LEFT LOWER	Ank	8898 292344 N	+	03/05/2001	OK	202v	Denton	3287
1104	3287-128-FZ	ANLZF2	PASSENGER LEFT LOWER	Ank	8897 210561 N	+	03/05/2001	OK	202v	Denton	3287
1105	3287-128-MX	ANLXM2	PASSENGER LEFT LOWER	Ank	281 9911428 NM	+	03/05/2001	OK	202v	Denton	3287
1106	3287-128-MY	ANLYM2	PASSENGER LEFT LOWER	Ank	281 9198189 NM	+	03/05/2001	OK	202v	Denton	3287
1107	J22047	ENGXG1	TOP ENGINE X-AXIS	FWD	1009 523433 G	+	08/13/2001	OK	-1	Endevco	7264-2000TZ

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Name of Test 010924

Name of DAU DAU6

System MINIDAU

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal. Date/Status	Group	Mfg.	Model
6001	J27387	FLHXG2	PASSENGER LEFT FOOT HEEL	Fwd	1180 267404G	+	08/24/2001	OK	Endevco	7264-2KM5T
6002	J27553	FLHLG2	PASSENGER LEFT FOOT HEEL	Dwn	1239 409343G	+	08/24/2001	OK	Endevco	7264-2KM5T
6003	J27474	FLTZG2	PASSENGER LEFT FOOT TOE	Up	1179 941002G	+	08/24/2001	OK	Endevco	7264-2KM5T
6004	3115-200-FX	IBRXF2	PASSENGER RIGHT UPPER	Tib	8901 174054N	+	03/05/2001	OK	Denton	3115
6005	3115-200-FZ	IBRZF2	PASSENGER RIGHT UPPER	Tib	8902 846419N	+	03/05/2001	OK	Denton	3115
6006	3115-200-MX	TBRXM2	PASSENGER RIGHT UPPER	Tib	282 4209370NM	+	03/05/2001	OK	Denton	3115
6007	3115-200-MY	IBRYM2	PASSENGER RIGHT LOWER	1b	282 3431198NM	+	03/05/2001	OK	Denton	3115
6008	3287-129-FX	ANRXF2	PASSENGER RIGHT LOWER	Ank	8891 911521N	+	03/07/2001	OK	Denton	3287
6009	3287-129-FZ	ANRZF2	PASSENGER RIGHT LOWER	Ank	8895 451137N	+	03/07/2001	OK	Denton	3287
6010	3287-129-MX	ANRXM2	PASSENGER RIGHT LOWER	Ank	282 4345300NM	+	03/07/2001	OK	Denton	3287
6011	3287-129-MY	ANRYM2	PASSENGER RIGHT LOWER	Ank	281 4626992NM	+	03/07/2001	OK	Denton	3287
6012	J17976	FRHXG2	PASSENGER RIGHT FOOT HEEL	Fwd	1229 144160G	+	08/24/2001	OK	Endevco	7264-2000TZ
6013	J38801	FRHZG2	PASSENGER RIGHT FOOT HEEL	Dwn	1182 120428G	+	05/23/2001	OK	Endevco	7264-2000TZ
6014	J28727	FRTZG2	PASSENGER RIGHT FOOT TOE	Up	1188 652087G	+	08/24/2001	OK	Endevco	7264-2000TZ
6015	J35536	LRXSG	LEFT REAR SFAT	FWD	974 1248097G	+	09/07/2001	OK	Endevco	7264-2000TZ
6016	J39645	RRXSG	RIGHT REAR SFAT	FWD	988 2834366G	+	08/13/2001	OK	Endevco	7264-2000TZ
6017	J39615	BCLXG	FRONT BRAKE CALIPER LEFT	FWD	984 2368319G	+	04/20/2001	OK	Endevco	7264-2000TZ
6018	J38432	BCRXG	FRONT BRAKE CALIPER	RR	977 8456837G	+	05/14/2001	OK	Endevco	7264-2000TZ
6019	J36205	DPCXG	DASHBOARD CENTER X-AXIS	FWD	986 7216558G	+	09/20/2001	OK	Endevco	7264-2000TZ
6020	J40044	ENGXG2	BOTTOM ENGINE X-AXIS	FWD	984 5207191G	+	04/20/2001	OK	Endevco	7264-2000TZ
6021	J35696	IPAXG	FOEPAN(NEXT TO	FWD	1006 625641G	+	04/10/2001	OK	Endevco	7264-2000TZ
6022	J36229	TPAZG	FOEPAN(NEXT TO	UP	1029 269861G	+	04/10/2001	OK	Endevco	7264-2000TZ
6023	J35748	TPFXG	FOEPAN(NEXT TO FOOT	FWD	1024 409763G	+	06/20/2001	OK	Endevco	7264-2000TZ
6024	J30421	TPFZG	TOEPAN(NEXT TO FOOT	UP	1006 823589G	+	06/19/2001	OK	Endevco	7264-2000TZ
6025	J31017	RDKZG	REAR DECK Z-AXIS	UP	1000 156274G	+	06/13/2001	OK	Endevco	7264-2000TZ
6026	J39421	RDCXG	REAR COMPARTMENT	FWD	1001 956947G	+	04/20/2001	OK	Endevco	7264-2000TZ
6027	IP1	DABET1	DRIVER AIRBAG EVENT	J	1 003921568V	+	06/15/2000	---	FLUKE	Y8101A
6028	IP3	PABET1	PASSENGER AIRBAG EVENT	H	1 003921568V	+	06/15/2000	---	FLUKE	Y8101A

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Name of Test 010924

System MINIDAU

Name of DAU DAU7

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal. Date/Status	Group	Mfg.	Model
7001	EVENT	EVENT	EVENT		5 12	+	11/20/2000	OK	TRC	Event
7002	62467	BA1F	ROW A CELL 1		221595 2346N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7003	68056	BA2F	ROW A CELL 2		223064 9118N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7004	68054	BA3F	ROW A CELL 3		223239 2008N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7005	68061	BA4F	ROW A CELL 4		221706 6388N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7006	68058	BA5F	ROW A CELL 5		221558 1248N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7007	68042	BA6F	ROW A CELL 6		222915 7378N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7008	68032	BA7F	ROW A CELL 7		221657 1120N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7009	68026	BA8F	ROW A CELL 8		221669 4916N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7010	68045	BA9F	ROW A CELL 9		221842 9516N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7011	68027	BB1F	ROW B CELL 1		221929 7834N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7012	68055	BB2F	ROW B CELL 2		221694 2550N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7013	68046	BB3F	ROW B CELL 3		221681 8726N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7014	68068	BB4F	ROW B CELL 4		223164 4722N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7015	68024	BB5F	ROW B CELL 5		223251 6604N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7016	68044	BB6F	ROW B CELL 6		223139 5738N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7017	68069	BB7F	ROW B CELL 7		222358 1077N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7018	68034	BB8F	ROW B CELL 8		223264 1214N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7019	68047	BB9F	ROW B CELL 9		221570 4933N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7020	62466	BC1F	ROW C CELL 1		221570 4933N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7021	62510	BC2F	ROW C CELL 2		221681 8726N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7022	68052	BC3F	ROW C CELL 3		222679 9532N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7023	68028	BC4F	ROW C CELL 4		221644 7337N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7024	68064	BC5F	ROW C CELL 5		223152 0223N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7025	68012	BC6F	ROW C CELL 6		221892 5615N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7026	68063	BC7F	ROW C CELL 7		221681 8726N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7027	68015	BC8F	ROW C CELL 8		221917 3747N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7028	62453	BC9F	ROW C CELL 9		221892 5615N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7029	68050	BD1F	ROW D CELL 1		222053 9469N	+	08/15/2001	OK	TRC LCB	1220TX-50K
7030	68021	BD2F	ROW D CELL 2		222041 5243N	+	08/15/2001	OK	TRC LCB	1220TX-50K

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7031	68039	BD3F	ROW D CELL 3	221768 5784N	+	08/15/2001	OK	TRC ICB	Interface	1220TX-50K
7032	68018	BD4F	ROW D CELL 4	221880 1569N	+	08/15/2001	OK	TRC ICB	Interface	1220TX-50K

Channel Report

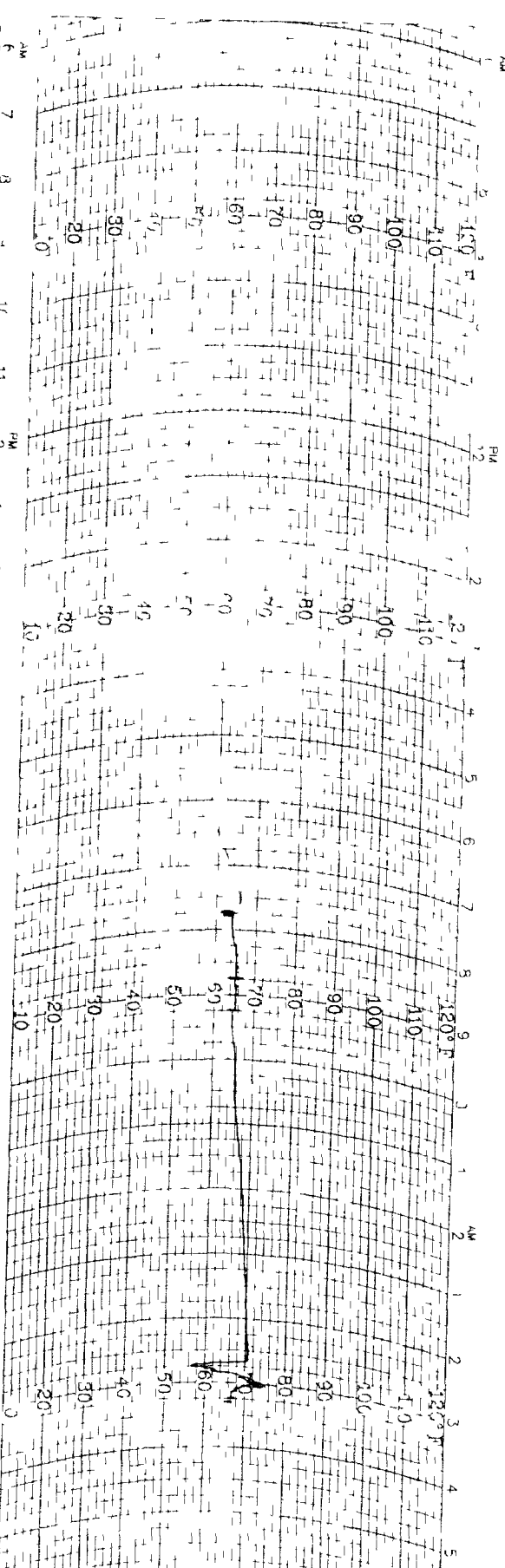
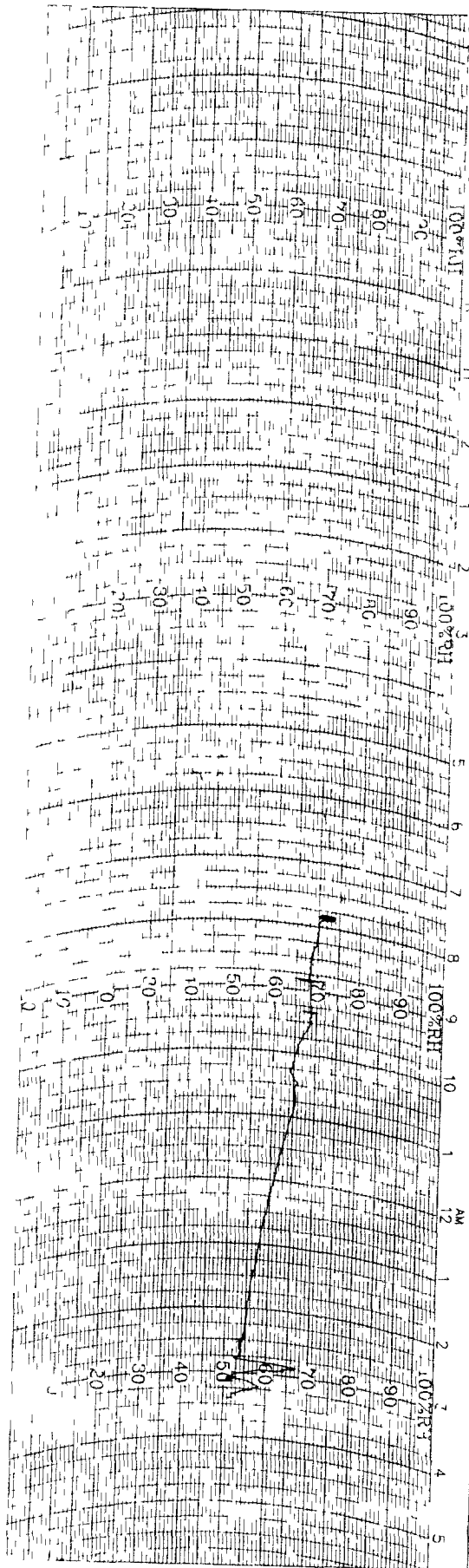
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Name of Test		010924	System	MINIDAU	Name of DAU		DAU8			
Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal. Date/Status	Group	Mfg.	Model
8001	68067	BD5F	ROW D CELL 5		223152 0223N	+	08/15/2001	OK	TRC ICB	Interface
8002	62456	BD6F	ROW D CELL 6		221545 7576N	+	08/15/2001	OK	TRC ICB	Interface
8003	68014	BD7F	ROW D CELL 7		221595 2346N	+	08/15/2001	OK	TRC ICB	Interface
8004	68051	BD8F	ROW D CELL 8		222866 0574N	+	08/15/2001	OK	TRC ICB	Interface
8005	68033	BD9F	ROW D CELL 9		221855 3520N	+	08/15/2001	OK	TRC ICB	Interface
										1220TX-50K
										1220TX-50K
										12201X-50K
										1220TX-50K
										1220TX-50K

Digital and System Channel Report

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Name of Test	010924	System	K3600	Name of DAU	DAU1	description	
enabled Channel		Short Name	Type	Data File	Module Type	KM3650 Sequencer	
Yes	1500	DIG0	dig0	DAT11500			
bit position	bit selector	short name	long name				description
MSB = bit 15	0		EVENT				
bit 14	1						
bit 13	0						
bit 12	0						
bit 11	0						
bit 10	0						
bit 09	0						
bit 08	0						
bit 07	0						
bit 06	0						
bit 05	0						
bit 04	0						
bit 03	0						
bit 02	0						
bit 01	0						
LSB = bit 00	0						



WeatherMeasure P.O. BOX 41039
 WEATHFRtrronics SACRAMENTO CA 95841
 DIV. OF METRIC INC. PHONE (916) 923-0035

HYGROTHERMOGRAPH
 1 DAY

H RT NO ME99121
 JUN 27 1987
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STATION USLPE DATE ON 7/24/87 DATE OFF 7/24/87