

Frontal Barrier Impact Test

Saturn Corporation

2002 Saturn Vue

NHTSA Number: R20152

TRC Inc. Test Number: 030805-1

Prepared By:

Transportation Research Center Inc.

10820 State Route 347

East Liberty, OH 43319



Final Report

August 18, 2003

Prepared For:

U. S. Department of Transportation

Volpe National Transportation Systems Center

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FINAL REPORT ACCEPTANCE BY COTR:

Date

Contracting Officer's Technical Representative (COTR),
USDOT, Volpe National Transportation Systems Center

1. Report No. DTS-TRC-03-009	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of a Frontal Barrier Impact Test of a 2002 Saturn Vue MPV, NHTSA No. R20152		5. Report Date 08/18/03	6. Performing Organization Code TRC Inc.
		8. Performing Organization Report No. 030805-1	
7. Author(s) Walter D. Dudek, Project Manager		10. Work Unit No. (TRAIS)	
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319-0367		11. Contract or Grant No. DTRS57-98-D-00042	
		13. Type of Report and Period Covered Final Report August 2003	
12. Sponsoring Agency Name and Address U. S. Department of Transportation Volpe National Transportation Systems Center 55 Broadway, Kendall Square Cambridge, MA 02142		14. Sponsoring Agency Code DTS-85	
		15. Supplemental Notes	
16. Abstract <p>A 48.0 km/h flat frontal rigid barrier impact test was conducted on a 2002 Saturn Vue MPV, NHTSA No. R20152, at Transportation Research Center Inc. on August 5, 2003. This test was conducted in accordance with Volpe Task Order No. 2, for the evaluation of vehicle and occupant responses. The barrier impact velocity was 47.8 km/h. The vehicle's maximum static crush was 732 millimeters. The ambient temperature was 21° C.</p> <p>The driver's 15 millisecond Head Injury Criteria (HIC) was 87. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.2 g. The driver's maximum chest deflection was 54 millimeters. The driver's left and right femur maximum axial compressive forces were 7104 N and 5743 N, respectively.</p> <p>The passenger's 15 millisecond HIC was 854. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 58.8 g. The passenger's maximum chest deflection was 19 millimeters. The passenger's left and right femur maximum axial compressive forces were 9676 N and 10026 N, respectively.</p>			
17. Key Words Frontal Barrier Impact Test		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. NHTSA Technical Reference Division 400 Seventh Street, S. W., Room 5108 Washington, DC 20590	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. Number of Pages 432	22. Price

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Section 1.0

Purpose and Test Procedure

Purpose

This 48 km/h frontal 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 using model year 2002 and 2003 vehicles in support of the FMVSS 208 Implementation plan (May 12, 2000 interim rule). Pairs of matching vehicles will be tested and evaluated with the 50th and 95th percentile dummies seated in alternate front seating positions. For this test, the subject vehicle was a 2002 Saturn Vue with a 50th percentile driver dummy and a 95th percentile passenger dummy. The barrier wall was equipped with a load cell barrier.

Test Procedure

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

The test vehicle, a 2002 Saturn Vue, 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 rigid load cell barrier instrumented with thirty-six (36) load cells to measure longitudinal forces. The vehicle's specified impact velocity range was 47.2 to 48.8 km/h.

The test vehicle contained one (1) Part 572E 50th percentile adult male Hybrid III anthropomorphic test device (dummy) in the driver position and one (1) large male 95th percentile Hybrid III dummy in the passenger position. The 50th percentile dummy was positioned in the front outboard designated seating position according to NHTSA Laboratory Test Procedure TP-208-11. The 95th percentile dummy was positioned according to instructions provided by Volpe. The instructions are outlined in Appendix D. The driver and passenger dummies 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 six (6) accelerometers in the chest, oriented to measure longitudinal, lateral, and vertical accelerations. The dummies were also instrumented with 6-channel 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 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 175 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 frontal 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, and vehicle measurements are presented in Section 4.0. Appendix A contains the still photographs. Appendix B contains the dummy, vehicle, and barrier data plots. Appendix C contains the dummy configuration and performance verification data. Appendix D contains test equipment and instrumentation calibration information.

Section 2.0

Full Frontal Barrier Test Summary

Test Results Summary

This full frontal rigid load cell barrier crash test was conducted by TRC Inc. on August 5, 2003.

The test vehicle, a 2002 Saturn Vue MPV, NHTSA Number R20152, was equipped with a 3.0-liter transverse engine, automatic transmission, power steering, power brakes and single stage front airbags. The vehicle's test weight was 1875.6 kg. The vehicle's impact speed was 47.8 km/h. The vehicle sustained 732 mm of static crush during the impact.

The driver's 36 millisecond Head Injury Criteria (HIC) was 180. The driver's 15 millisecond HIC was 87. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.2 g (See Data Acquisition Explanations). The driver's maximum chest deflection was 54 mm. The driver's left and right femur maximum axial compressive forces were 7104 N and 5743 N, respectively. The driver dummy's neck injury calculations were as follows: NTF, 0.25; NTE, 0.19; NCF, 0.08; NCE, 0.12. The driver's upper neck maximum tension force was 1230 N and maximum compression force was 398 N.

The right front passenger's 36 millisecond HIC was 854. The passenger's 15 millisecond HIC was 854. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 58.8 g. The passenger's maximum chest deflection was 19 mm. The passenger's left and right femur maximum axial compressive forces were 9676 N and 10026 N, respectively. The right front passenger's neck injury calculations were as follows: NTF, 0.22; NTE, 1.07; NCF, 0.14; NCE, 0.75. The right front passenger's upper neck maximum tension force was 1836 N and maximum compression force was 2656 N.

Data Acquisition Explanations

The driver's Z-axis chest acceleration channel, CSTZG1, recorded questionable data throughout the test. The resultant chest acceleration was also affected. The driver's maximum chest acceleration with 3 millisecond minimum duration was calculated using the redundant chest acceleration channels.

The driver's inductive air bag pickup channel, DABETA, recorded no useful data throughout the test.

The passenger's left and right knee displacement channels, KNLXD2 and KNRXD2, recorded questionable data throughout the test.

The vehicle's top of engine X-axis acceleration channel, ENGXG1, recorded no valid data between approximately 73 and 150 ms.

The vehicle's left front brake caliper X-axis acceleration channel, BCLXG1, recorded no valid data after approximately 58 ms.

Table 1 Crash Test Summary

Test mode:	Flat frontal load cell barrier		
Test date:	08/05/03		
Test time:	11:27		
Ambient temperature:	21° C		
Vehicle year/make/ model/body style:	2002/Saturn/Vue/MPV		
Vehicle test weight:	1875.6 kg		
Impact angle ¹ :	0°		
Impact velocity ² :	47.8 km/h		
Maximum static crush:	732 mm		
Average rebound:	958 mm		
Number of data channels:	175		
Number of cameras:	High-speed	14	Real-time 1
<u>Dummies:</u>	<u>Driver #090</u>		<u>Passenger #083</u>
Type:	Part 572E (HIII-50) with THOR-LX legs		Large Male (HIII-95) with Denton legs
Location:	Left front		Right front
Restraint:	Single stage airbag		Single stage airbag
<u>Seat track position for test:</u>			
Driver:	Mid; 13 th of 25 positions		
Passenger:	Full rear		
<u>Seat back position for test:</u>			
Driver:	4.9°; measured at the headrest support post		
Passenger:	6.0°; measured at the headrest support post		
<u>Head restraint position for test:</u>			
Driver:	Full up		
Passenger:	Full up		
<u>Steering column position:</u>	Middle of geometric range of travel of steering column		
<u>Large male H-point position relative to position established by SAE J826 H-point machine:</u>			
Large male H-point:	109 mm rearward, 19 mm above the HIII-50 target established by the J826 H-point machine		

¹ With respect to tow track centerline.

² Speed trap measurement (± .08 km/h accuracy)

Table 2 General Test and Vehicle Parameter Data

Vehicle year/make/
model/body style: 2002/Saturn/Vue/MPV

VIN: 5GZCZ63B52S821295

Model year: 2002

Body style: MPV

Color: Silver

Engine data:

 Cylinders: 6

 Displacement 3.0-liters

 Cylinder placement: V

 Engine placement: Transverse

Transmission data: 3 speed, ___ manual, X automatic, ___ overdrive

 Final drive: ___ FWD, ___ RWD, X 4WD

Date vehicle received: 03/01/2003

Odometer reading: 11837

Dealer's name
and address: N/A

Accessories:

Power steering	Yes	Automatic transmission	Yes
Power brakes	Yes	Automatic speed control	Yes
Power seats	No	Tilting steering wheel	Yes
Power windows	Yes	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	No
Clock	Yes	Rear window defroster	Yes
Other	Yes	Power door locks	Yes

Certification data from vehicle's label:

Vehicle manufactured by: Saturn Corporation

Date of manufacture: 04/02

VIN: 5GZCZ63B52S821295

GVWR: 4839 lbs. (2195 kg)

GAWR: Front: 2425 lbs. (1100 kg)

 Rear: 2414 lbs. (1095 kg)

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

Tires on vehicle (mfr., line, size): Bridgestone, Dueler HT, P235/65R16
 Load index and speed symbol: 101S
 Treadwear grade: 360
 Traction grade: B
 Temperature grade: B

Tire pressure with maximum capacity vehicle load:
 Front: 35 psi (240 kPa)
 Rear: 35 psi (240 kPa)

Spare tire (mfr., line, size): Firestone, Tempa Spare, T155/90R16

Type of seats:
 Front Bucket
 Rear Split bench

Maximum width: 1775 mm

Wheelbase: 2705 mm

Location of “Recommended Tire Pressure” label:

The label was located on driver door.

Data from vehicle’s “Recommended Tire Pressure” label”:

Recommended tire size: P235/65R16
 Recommended cold tire pressure:
 Front: 30 psi (210 kPa)
 Rear: 30 psi (210 kPa)

Vehicle Capacity Data:

Number of Occupants (Designated seating capacity):

Front	2
Rear	3
Total	5

Vehicle capacity weight: 628 kg

Rated cargo/luggage weight:¹ 136 kg

Test vehicle attitude:

Delivered attitude:	LF	815 mm;	RF	820 mm;	LR	840 mm;	RR	840 mm
Fully loaded attitude:	LF	794 mm;	RF	798 mm;	LR	787 mm;	RR	788 mm
Pre-test attitude:	LF	795 mm;	RF	794 mm;	LR	775 mm;	RR	796 mm
Post-test attitude:	LF	828 mm;	RF	812 mm;	LR	767 mm;	RR	773 mm

¹ RCLW is set at a maximum of 136 kg for target test weight determination.

Table 2 General Test and Vehicle Parameter Data Cont'd

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

Right front	447.5 kg	Right rear	320.0 kg
Left front	469.0 kg	Left rear	330.5 kg
Total front weight	916.5 kg	(58.5 % of total vehicle weight)	
Total rear weight	650.5 kg	(41.5 % of total vehicle weight)	
Total delivered weight	1567.0 kg		

Calculation of test vehicle's target test weight:

Total Delivered Weight (UDW) =	1567.0 kg
Rated Cargo/Luggage Weight (RCLW) ¹ =	136.0 kg
Weight of 1 Part 572E Dummy @ 76 kg	
And 1 Large Male Dummy @ 102 kg =	178.0 kg
Target test weight =	1881.0 kg

Weight of test vehicle with required dummies and 130.4 kg of cargo weight:

Right front	505.0 kg	Right rear	434.4 kg
Left front	516.2 kg	Left rear	419.8 kg
Total front weight	1021.2 kg	(54.5% of total vehicle weight)	
Total rear weight	854.2 kg	(45.5% of total vehicle weight)	
Total test weight	1875.4 kg	(0.3% under target test weight)	

Weight of ballast secured in vehicle: 25.4 kg steel plate behind passenger seat.

Components removed to meet target test weight: None

Location of Vehicle's CG: 1232 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: 030805-1
Test date: 08/05/03
Test time: 11:27
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

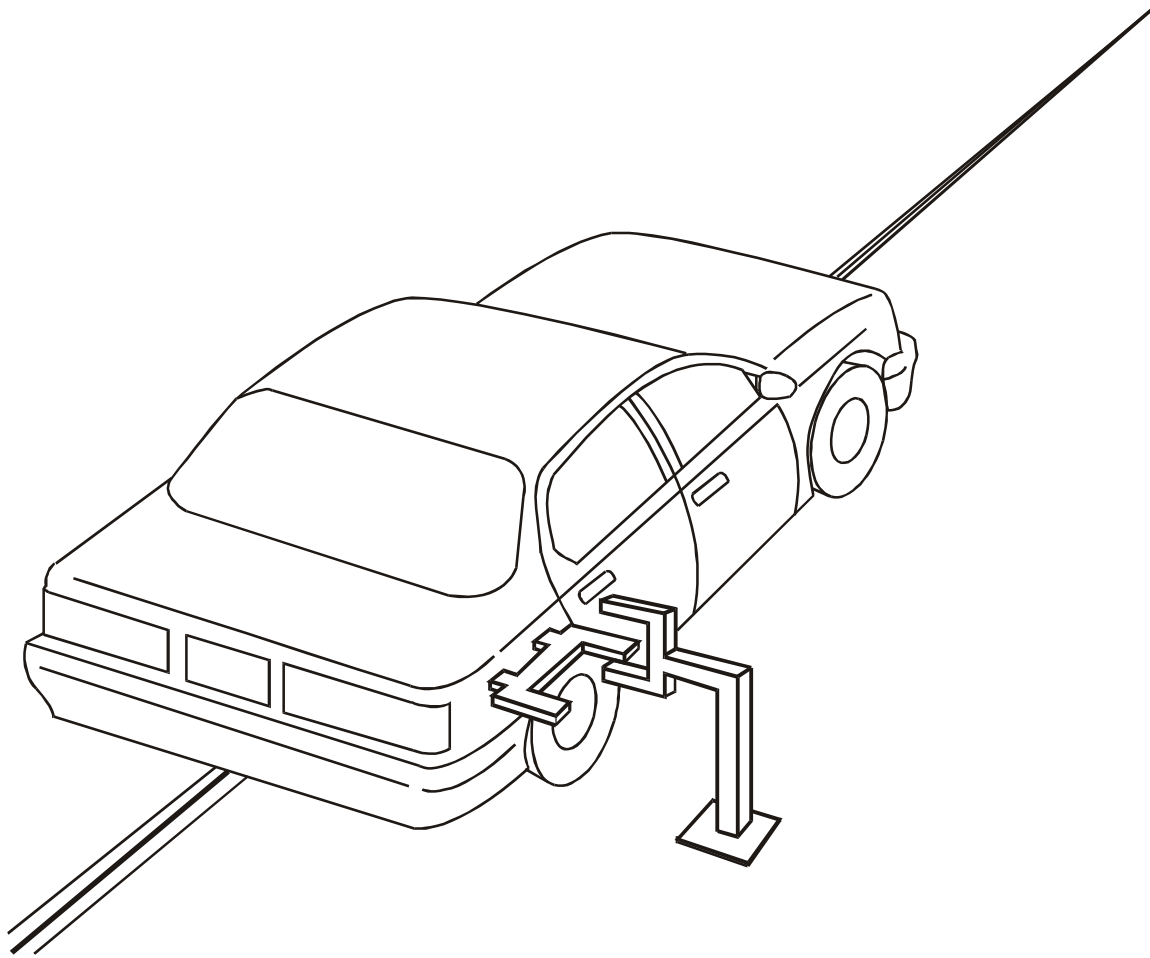
Barrier impact velocity:

Primary: 47.8 km/h
Secondary: 47.8 km/h
Distance from vehicle to barrier:
Entering velocity trap: 356 mm
Exiting velocity trap: 51 mm

Vehicle rebound from flat rigid barrier:

Distance from test vehicle to barrier impact point:
Post-test: L 1007 mm; C 905 mm; R 963 mm
Average rebound: 958 mm

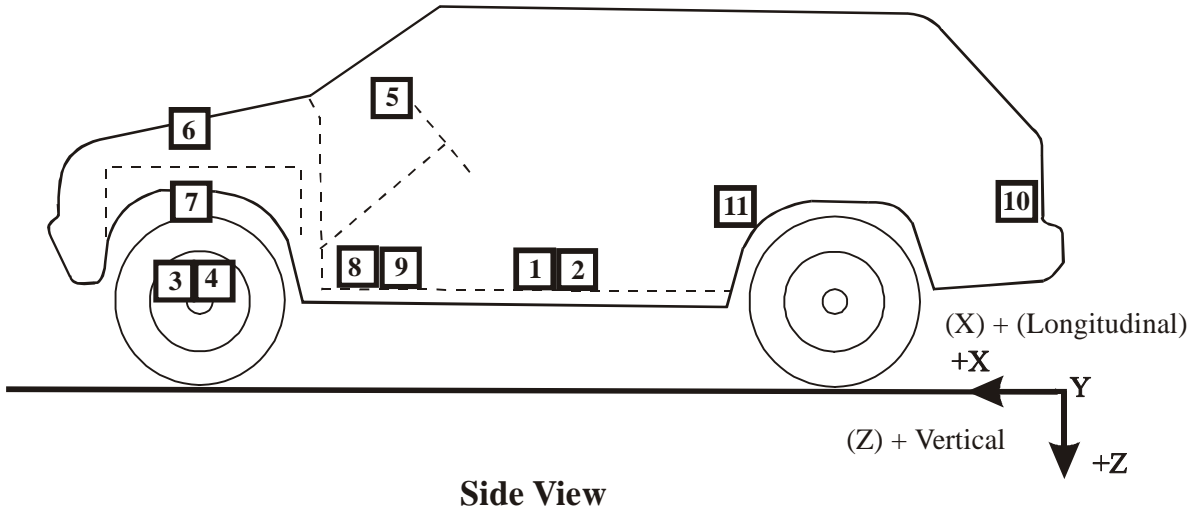
Figure 1 Impact Velocity Measurement System



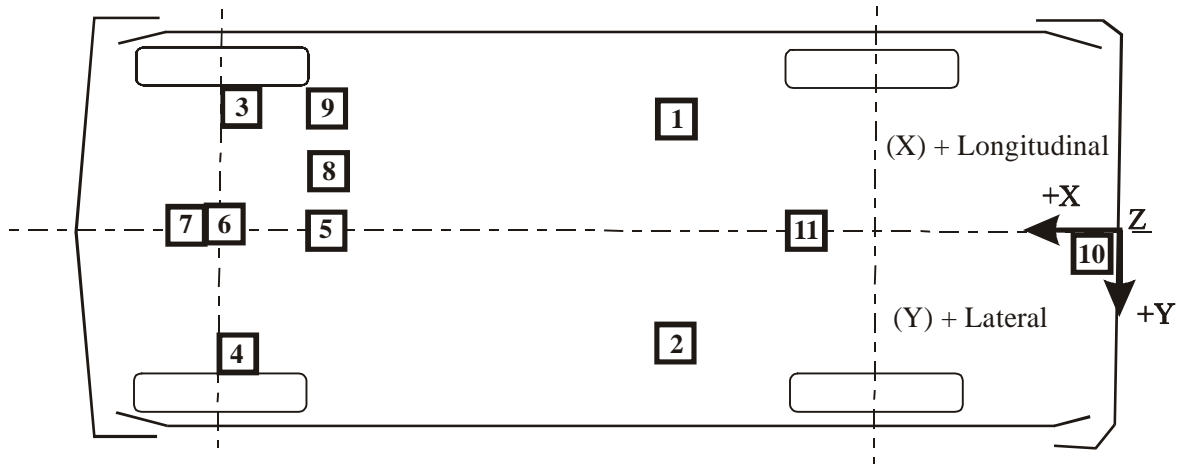
The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 305-millimeter spacing.

Figure 2 Vehicle Accelerometer Placement



Side View



Bottom View

Reference:

- X: + Forward from rear bumper
- Y: + Rightward from vehicle centerline
- Z: + Downward from ground level

Table 4 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 030805-1 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	1645 mm	-557 mm	-450 mm	1.2 g	@ 118.5 ms	28.3 g	@ 62.9 ms
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	1645 mm	557 mm	-445 mm	1.2 g	@ 117.7 ms	31.7 g	@ 50.9 ms
3 FRONT BRAKE CALIPER LEFT LONGITUDINAL ¹	850 mm	-682 mm	-325 mm	1.0 g	@ 117.7 ms	1053.1 g	@ 63.0 ms
4 FRONT BRAKE CALIPER RIGHT LONGITUDINAL	850 mm	682 mm	-323 mm	27.2 g	@ 82.9 ms	47.0 g	@ 61.0 ms
5 DASH PANEL CENTER LONGITUDINAL	2978 mm	0 mm	-1120 mm	31.0 g	@ 102.1 ms	57.1 g	@ 97.0 ms
6 ENGINE TOP LONGITUDINAL ¹	3914 mm	0 mm	-883 mm	12.1 g	@ 58.2 ms	129.7 g	@ 41.9 ms
7 ENGINE BOTTOM LONGITUDINAL	769 mm	0 mm	-183 mm	20.7 g	@ 52.9 ms	61.2 g	@ 39.5 ms

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

TEST NUMBER: 030805-1 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
8 TOEPAN NEXT TO ACCELERATOR	3115 mm	-282 mm	-342 mm				
LONGITUDINAL				0.9 g	@ 118.0 ms	31.2 g	@ 51.7 ms
VERTICAL				13.3 g	@ 63.3 ms	12.1 g	@ 35.5 ms
9 TOEPAN NEXT TO FOOTREST	3030 mm	-503 mm	-342 mm				
LONGITUDINAL				0.9 g	@ 118.2 ms	31.0 g	@ 51.7 ms
VERTICAL				13.9 g	@ 64.0 ms	10.5 g	@ 47.1 ms
10 REAR DECK VERTICAL	340 mm	0 mm	-615 mm				
				8.0 g	@ 95.7 ms	13.1 g	@ 62.6 ms
11 REAR COMPARTMENT CENTER	990 mm	0 mm	-490 mm				
LONGITUDINAL				1.9 g	@ 101.4 ms	28.5 g	@ 50.7 ms

REFERENCE: X: + FORWARD FROM REAR BUMPER
 Y: + RIGHTWARD FROM VEHICLE CENTERLINE
 Z: + DOWNWARD FROM GROUND LEVEL

¹ See Data Acquisition Explanations

Section 3.0

Summary of FMVSS 208 Data

Table 5 Dummy Injury Criteria Data

VOLPE TO002		
Injury Criteria and Performance Limits		
Parameter	Driver	
	H3-50 w/THOR-LX Limit	H3-50 w/THOR-LX Test Value
HIC (15 ms)	700	87
NIJ (Compression Flexion)	1.0	0.08
NIJ (Compression Extension)	1.0	0.12
NIJ (Tension Flexion)	1.0	0.25
NIJ (Tension Extension)	1.0	0.19
Peak Upper Neck Tension (N)	4170	1230
Peak Upper Neck Compression (N)	4000	398
3 ms Chest Acceleration (g)	60	48.2 ¹
Chest Deflection (mm)	63	54
Left Femur Load (N)	9040	7104
Right Femur Load (N)	9040	5743
Left Tibia to Femur Displacement (mm)	15	11
Right Tibia to Femur Displacement (mm)	15	4
Left Upper Tibia Index	0.91*	0.63
Right Upper Tibia Index	0.91*	0.47
Left Lower Tibia Index	0.91*	0.38
Right Lower Tibia Index	0.91*	0.47
Left Upper Tibia Compression FZ (N)	5600	1453
Right Upper Tibia Compression FZ (N)	5600	2217
Left Lower Tibia Compression FZ (N)	5200	1712
Right Lower Tibia Compression FZ (N)	5200	3504
Left Foot XL Rotation (degrees)	35	30
Right Foot XL Rotation (degrees)	35	-29
Left Foot YL Rotation (degrees)	35	-49
Right Foot YL Rotation (degrees)	35	29

* Revised Tibia Index

¹ See Data Acquisition Explanations

Table 5 Dummy Injury Criteria Data, Cont'd.

VOLPE TO002		
Injury Criteria and Performance Limits		
	Passenger	
Parameter	H3-95 w/Denton Limit	H3-95 w/Denton Test Value
HIC (15 ms)	700	854
NIJ (Compression Flexion)	1.0	0.14
NIJ (Compression Extension)	1.0	0.75
NIJ (Tension Flexion)	1.0	0.22
NIJ (Tension Extension)	1.0	1.07
Peak Upper Neck Tension (N)	5030	1836
Peak Upper Neck Compression (N)	4830	2656
3 ms Chest Acceleration (g)	55	58.8
Chest Deflection (mm)	70	19
Left Femur Load (N)	11,500	9676
Right Femur Load (N)	11,500	10026
Left Tibia to Femur Displacement (mm)	17	N/A ¹
Right Tibia to Femur Displacement (mm)	17	N/A ¹
Left Upper Tibia Index	1.0	0.51
Right Upper Tibia Index	1.0	1.34
Left Lower Tibia Index	1.0	0.62
Right Lower Tibia Index	1.0	0.69
Left Upper Tibia Compression FZ (N)	9840	4146
Right Upper Tibia Compression FZ (N)	9840	8903
Left Lower Tibia Compression FZ (N)	9840	4260
Right Lower Tibia Compression FZ (N)	9840	9370
Left Foot XL Rotation (degrees)	N/A	N/A
Right Foot XL Rotation (degrees)	N/A	N/A
Left Foot YL Rotation (degrees)	N/A	N/A
Right Foot YL Rotation (degrees)	N/A	N/A

¹ See Data Acquisition Explanations

Table 6 Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver</u>	<u>Passenger</u>
Head	Airbag, sun visor bracket, header	Airbag, sun visor
Chest	Airbag	Airbag
Abdomen	None	None
Left knee	Knee bolster	Glove box
Right knee	Knee bolster	Glove box

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

Glazing damage: Windshield cracked slightly along the bottom.

Other notable impact effects: All four doors locked on impact.

Section 4.0

Occupant, Camera, and Vehicle Information

Dummy Kinematic Summary

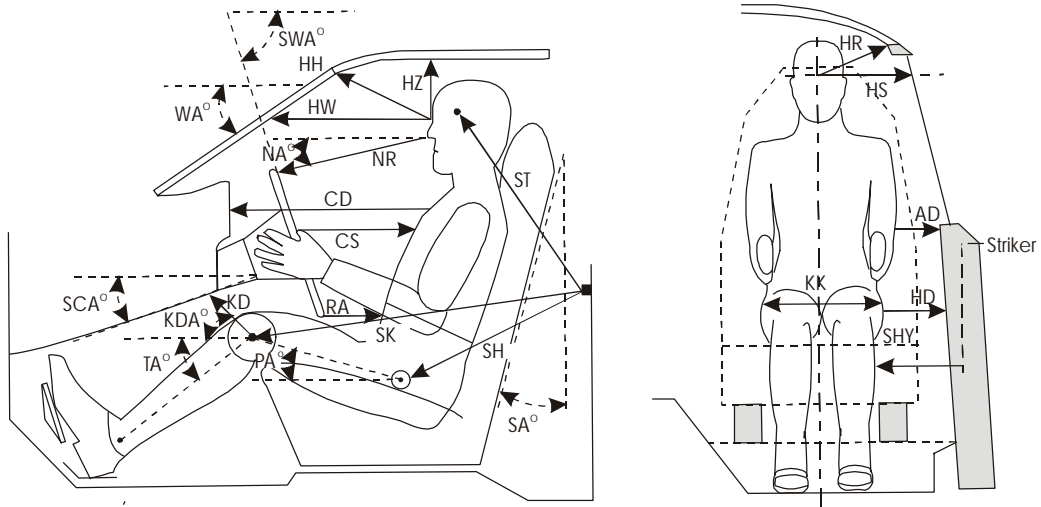
Driver Dummy

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest went straight into the air bag. The dummy's head rotated forward and contacted the header and sun visor bracket as the dummy rebounded into the seat back. The driver dummy came to rest seated in the driver's seat leaning forward.

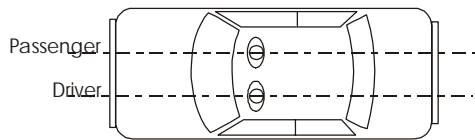
Right Front Passenger Dummy

Upon impact, the passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy contacted the header and sun visor extending the head and neck back before going into the air bag. The dummy's pelvis hit the midway up the seatback on rebound. The dummy came to rest seated in the passenger's seat leaning forward.

Figure 3 Dummy Measurement Locations for Front Seat Occupants



VERTICAL LONGITUDINAL PLANE



VERTICAL TRANSVERSE PLANE

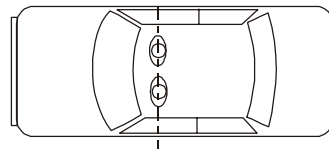


Table 7 Dummy Measurement Data For Front Seat Occupants

<u>Designation</u>	<u>Type of Measurement</u>	<u>Driver (Serial # 090)</u>	<u>Passenger (Serial # 083)</u>
WA	Windshield angle	35.8°	35.8°
SWA	Steering wheel angle	24.0°	N/A
SCA	Steering column angle	66.0°	N/A
SA	Seat back angle	4.9°	6.0°
HZ	Head to roof	230 mm	172 mm
HH	Head to header	402 mm	490 mm
HW	Head to windshield	729 mm	732 mm
HR	Head to side header	281 mm	224 mm
NR	Nose to rim	424 mm	N/A
NA	Nose to rim angle	9.9°	N/A
CD	Chest to dash	565 mm	661 mm
CS	Steering wheel to chest	356 mm	N/A
RA	Rim to abdomen	222 mm	N/A
KDL	Left knee to dash	179 mm	254 mm
KDR	Right knee to dash	140 mm	257 mm
KDA	Outboard knee to dash angle	27.2°	19.3°
PA	Pelvic angle	21.7°	20.4°
TA	Tibia angle	52.1°	50.1°
KK	Knee to knee	N/A	307 mm
ST ¹	Striker to head	584 mm	646 mm
	Striker to head angle	-85.4°	-107.5°
SK ¹	Striker to knee	535 mm	458 mm
	Striker to knee angle	-3.7°	-10.0°
SH ¹	Striker to H-point	186 mm	102 mm
	Striker to H-point angle	22.7°	16.9°
SHY	Striker to H-point (Y dir.)	201 mm	195 mm
HS	Head to side window	348 mm	326 mm
HD	H-point to door	134 mm	98 mm
AD	Arm to door	104 mm	0 mm

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

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

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, KDR 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, SK, ST Striker to Hip, Knee, and Head, these measurements are to be taken in the X-Z plane measured from the forward most center point on the striker to the center of the H-point, outer knee bolt, and head target. When taking this measurement 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

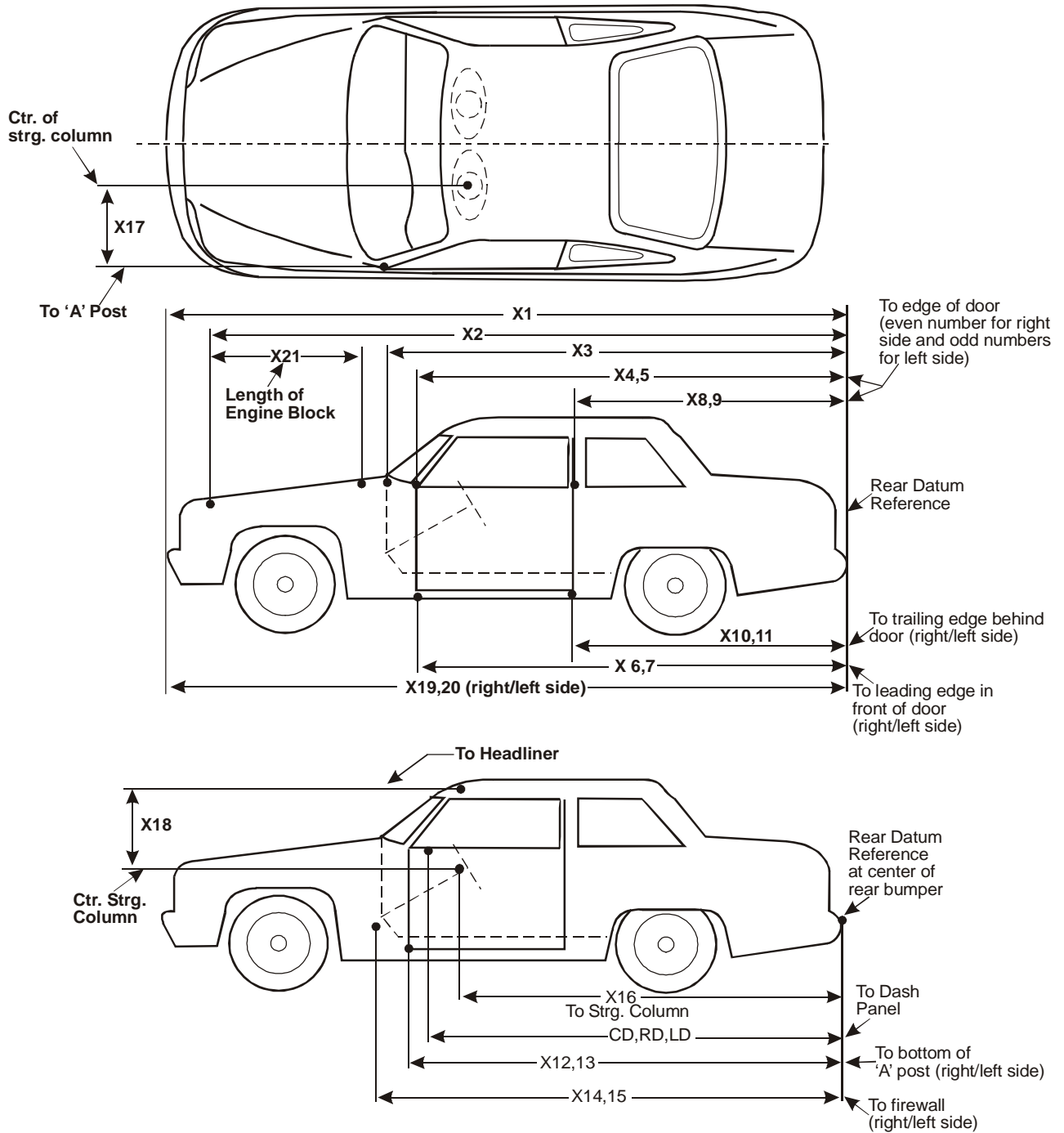


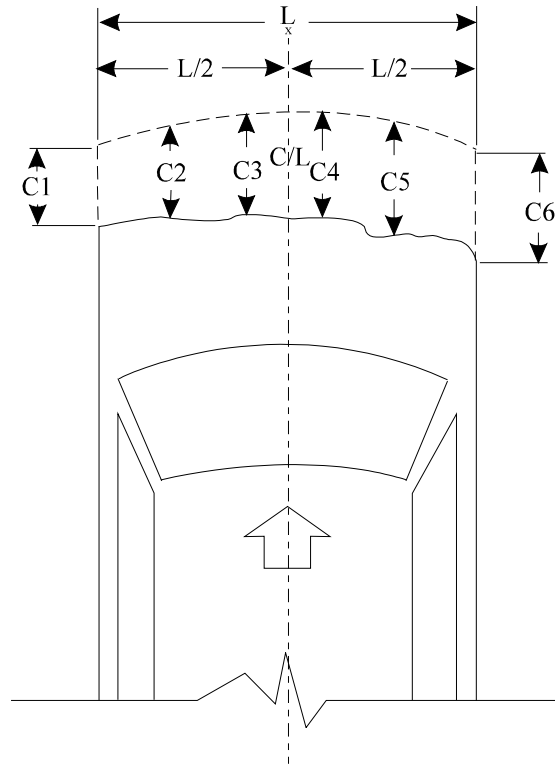
Table 8 Impacted Vehicle Measurements
 Test number: 030805-1

Vehicle year/make/model/body style: 2002/Saturn/Vue/MPV

No.	Type of measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4605	4223	382
X2	Rear Surface of Vehicle to Front of Engine Block	4065	3808	257
X3	Rear Surface of Vehicle to Firewall	3615	3598	17
X4	Rear Surface of Veh. to Upper Leading Edge of Right Door	3057	3076	-19
X5	Rear Surface of Veh. to Upper Leading Edge of Left Door	3058	3048	10
X6	Rear Surface of Veh. to Lower Leading Edge of Right Door	3044	3063	-19
X7	Rear Surface of Veh. to Lower Leading Edge of Left Door	3045	3051	-6
X8	Rear Surface of Veh. to Upper Trailing Edge of Right Door	2075	2093	-18
X9	Rear Surface of Veh. to Upper Trailing Edge of Left Door	2069	2065	4
X10	Rear Surface of Veh. to Lower Trailing Edge of Right Door	2098	2116	-18
X11	Rear Surface of Veh. to Lower Trailing Edge of Left Door	2103	2103	0
X12	Rear Surface of Veh. to Bottom of " A " Post on Right Side	3065	3088	-23
X13	Rear Surface of Veh. to Bottom of " A " Post on Left Side	3059	3053	6
X14	Rear Surface of Vehicle to Firewall--Right Side	3522	3573	-51
X15	Rear Surface of Vehicle to Firewall --Left Side	3541	3533	8
X16	Rear Surface of Vehicle to Steering Wheel Center	2663	2683	-20
X17	Center of Steering Column to " A " Post	288	349	-61
X18	Center of Steering Column to Headliner	450	445	5
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4418	4006	412
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4416	3944	472
X21	Length of Engine Block	420	420	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2934	2953	-19
CD	Rear Surface of Vehicle to Center of Dash Panel	2878	2883	-5
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2907	2903	4

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: 2002 Saturn Vue

Location	Pre-test	Post-test	Difference
L	1525 mm		
C1	4416 mm	3944 mm	472 mm
C2	4539 mm	4082 mm	457 mm
C3	4593 mm	4188 mm	405 mm
C4	4594 mm	3862 mm	732 mm ¹
C5	4551 mm	4155 mm	396 mm
C6	4418 mm	4006 mm	412 mm
CL	4605 mm	4223 mm	382 mm

¹ The difference for point C4, measured with the bumper fascia, is included in the NHTSA database submission as Damage Profile Distance 4.

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	4410 mm	4558 mm	4608 mm	4608 mm	4552 mm	4408 mm
	Y	-750 mm	-447 mm	-149 mm	150 mm	458 mm	757 mm
	Z	-537 mm	-530 mm	-527 mm	-521 mm	-534 mm	-560 mm
Top of Front Bumper	X	4417 mm	4548 mm	4608 mm	4610 mm	4554 mm	4422 mm
	Y	-767 mm	-461 mm	-152 mm	152 mm	455 mm	761 mm
	Z	-403 mm	-417 mm	-414 mm	-421 mm	-417 mm	-404 mm
Center of Grille	X	4413 mm	4538 mm	4578 mm	4578 mm	4538 mm	4418 mm
	Y	-760 mm	-451 mm	-150 mm	150 mm	456 mm	763 mm
	Z	-621 mm	-618 mm	-603 mm	-604 mm	-609 mm	-610 mm
Front of Hood	X	4243 mm	4371 mm	4434 mm	4438 mm	4366 mm	4253 mm
	Y	-760 mm	-455 mm	-151 mm	150 mm	455 mm	762 mm
	Z	-903 mm	-912 mm	-911 mm	-909 mm	-908 mm	-913 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	3944 mm	4068 mm	4075 mm	4208 mm	4026 mm	4001 mm
	Y	-667 mm	-442 mm	-150 mm	155 mm	460 mm	690 mm
	Z	-470 mm	-462 mm	-440 mm	-430 mm	-444 mm	-445 mm
Top of Front Bumper	X	3940 mm	4107 mm	4133 mm	4152 mm	4164 mm	3984 mm
	Y	-722 mm	-460 mm	-155 mm	155 mm	452 mm	740 mm
	Z	-597 mm	-564 mm	-533 mm	-525 mm	-550 mm	-585 mm
Center of Grille	X	3943 mm	4113 mm	4203 mm	3918 mm	4163 mm	3968 mm
	Y	-740 mm	-450 mm	-152 mm	150 mm	452 mm	752 mm
	Z	-684 mm	-650 mm	-623 mm	-616 mm	-630 mm	-644 mm
Front of Hood	X	3583 mm	3753 mm	3941 mm	3951 mm	3736 mm	3610 mm
	Y	-720 mm	-437 mm	-154 mm	140 mm	439 mm	717 mm
	Z	-1057 mm	-994 mm	-989 mm	-1009 mm	-1080 mm	-1200 mm

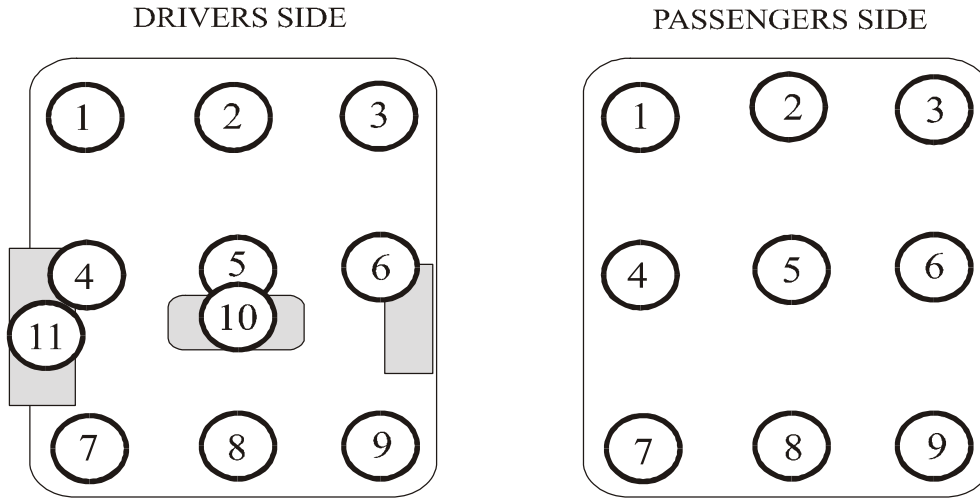
		Difference					
		Vehicle Left			Vehicle Right		
		Point 1	Point 2	Point 3	Point 4	Point 5	Point 6
Bottom of Front Bumper ¹	X	466 mm	490 mm	533 mm	400 mm	526 mm	407 mm
	Y	83 mm	5 mm	-1 mm	-5 mm	-2 mm	67 mm
	Z	67 mm	68 mm	87 mm	91 mm	90 mm	115 mm
Top of Front Bumper	X	477 mm	441 mm	475 mm	458 mm	390 mm	438 mm
	Y	45 mm	1 mm	-3 mm	-3 mm	3 mm	21 mm
	Z	-194 mm	-147 mm	-119 mm	-104 mm	-133 mm	-181 mm
Center of Grille	X	660 mm	618 mm	493 mm	487 mm	630 mm	643 mm
	Y	20 mm	1 mm	-2 mm	0 mm	4 mm	11 mm
	Z	-63 mm	-32 mm	-20 mm	-12 mm	-21 mm	-34 mm
Front of Hood ²	X	660 mm	618 mm	493 mm	487 mm	630 mm	643 mm
	Y	40 mm	18 mm	-3 mm	10 mm	16 mm	45 mm
	Z	-154 mm	-82 mm	-78 mm	-100 mm	-172 mm	-287 mm

Note: Six points divide the width of the car. Pre-test and post-test measurement references: +X, forward of rear bumper; +Y, rightward from vehicle centerline; +Z, downward from ground level.

¹ The difference for point 3, measured at the bottom of front bumper, is included in the NHTSA database submission as Damage Profile Distance 3.

² The difference for points 1,2,5,&6, measured at the front of hood, are included in the NHTSA database submission as Damage Profile Distance 1,2,5,&6.

Figure 6 Toeboard Measurements



Driver Toe Pan			
Pre-Test			
Index	Xmm	Ymm	Zmm
1	3286	-563	109
2	3309	-357	122
3	3305	-187	132
4	3214	-570	195
5	3217	-366	193
6	3237	-165	211
7	3115	-572	266
8	3114	-370	268
9	3120	-167	286
10	3132	-349	51
11	3246	-598	165

Driver Toe Pan			
Post-Test			
Xmm	Ymm	Zmm	
3283	-552	108	
3302	-343	121	
3292	-173	131	
3212	-559	194	
3214	-354	196	
3230	-152	216	
3115	-563	266	
3112	-360	272	
3119	-157	296	
3112	-354	37	
3242	-588	161	

Difference			
Xmm	Ymm	Zmm	
3	-11	1	
7	-14	1	
13	-14	1	
2	-11	1	
3	-12	-3	
7	-13	-5	
0	-9	0	
2	-10	-4	
1	-10	-10	
20	5	14	
4	-10	4	

Passenger Toe Pan			
Pre-Test			
Index	Xmm	Ymm	Zmm
1	3307	184	126
2	3308	371	127
3	3284	551	89
4	3205	183	201
5	3211	368	200
6	3211	558	212
7	3095	183	277
8	3103	369	277
9	3110	566	276

Passenger Toe Pan			
Post-Test			
Xmm	Ymm	Zmm	
3293	192	126	
3297	375	125	
3285	555	92	
3203	192	209	
3214	376	212	
3213	568	214	
3096	193	290	
3104	381	284	
3110	576	278	

Difference			
Xmm	Ymm	Zmm	
14	-8	0	
11	-4	2	
-1	-4	-3	
2	-9	-8	
-3	-8	-12	
-2	-10	-2	
-1	-10	-13	
-1	-12	-7	
0	-10	-2	

Reference: +X forward from rear bumper; +Y rightward from vehicle centerline; +Z downward from vehicle reference point

Table 10 Intrusion of Upper Instrument Panel

Driver Instrument Panel - Lower

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
Left	2887	-486	-174	2897	-472	-169	-10	-14	-5
Right	2894	-190	-164	2936	-180	-133	-42	-10	-31

Driver Knees

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
Left	2846	-539	-239	2863	-539	-243	-17	0	4
Right	2854	-243	-222	2890	-228	-191	-36	-15	-31

Passenger Knees

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
Left	2854	223	-241	2872	218	-252	-18	5	11
Right	2861	473	-241	2872	470	-253	-11	3	12

Steering Wheel

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
1	2659	-388	-415	2689	-394	-427	-30	6	12

Driver Front Outboard Seat Attachment Bolt

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
1	2520	-613	156	2521	-606	163	-1	-7	-7

Passenger Front Outboard Seat Attachment Bolt

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
1	2530	573	164	2532	584	171	-2	-11	-7

Knee intrusions are points measured pre and post, which are located just above where the four knees would be expected to contact the instrument panel.

+X: Forward from rear measurement reference point at striker

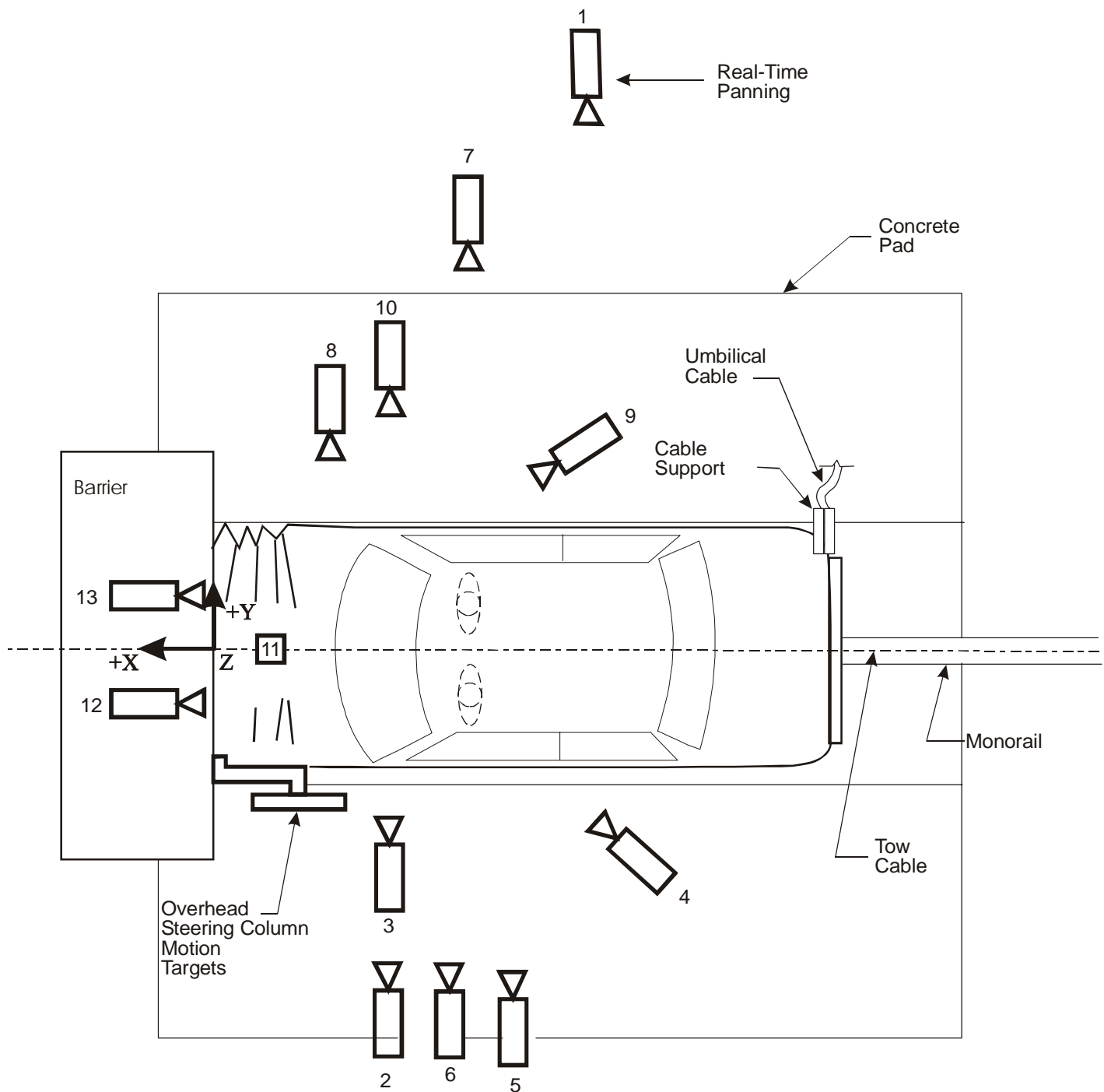
+Y: Rightward from centerline

+Z: Downward from vehicle reference point

Table 11 Fuel System Data

Usable fuel system capacity:	59.4 liters (from owner's manual)
Test volume range:	55.5 - 54.3 liters (92-94% of usable)
Actual test volume:	56.1 liters (95% of usable)
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.	No
Details of fuel system:	The fuel tank is located under the second row seat area. The Fuel filler neck exits the left rear area of the tank, running towards the right rear quarter panel with the fuel filler cap on the end. The fuel lines run forward inside the left frame rail.

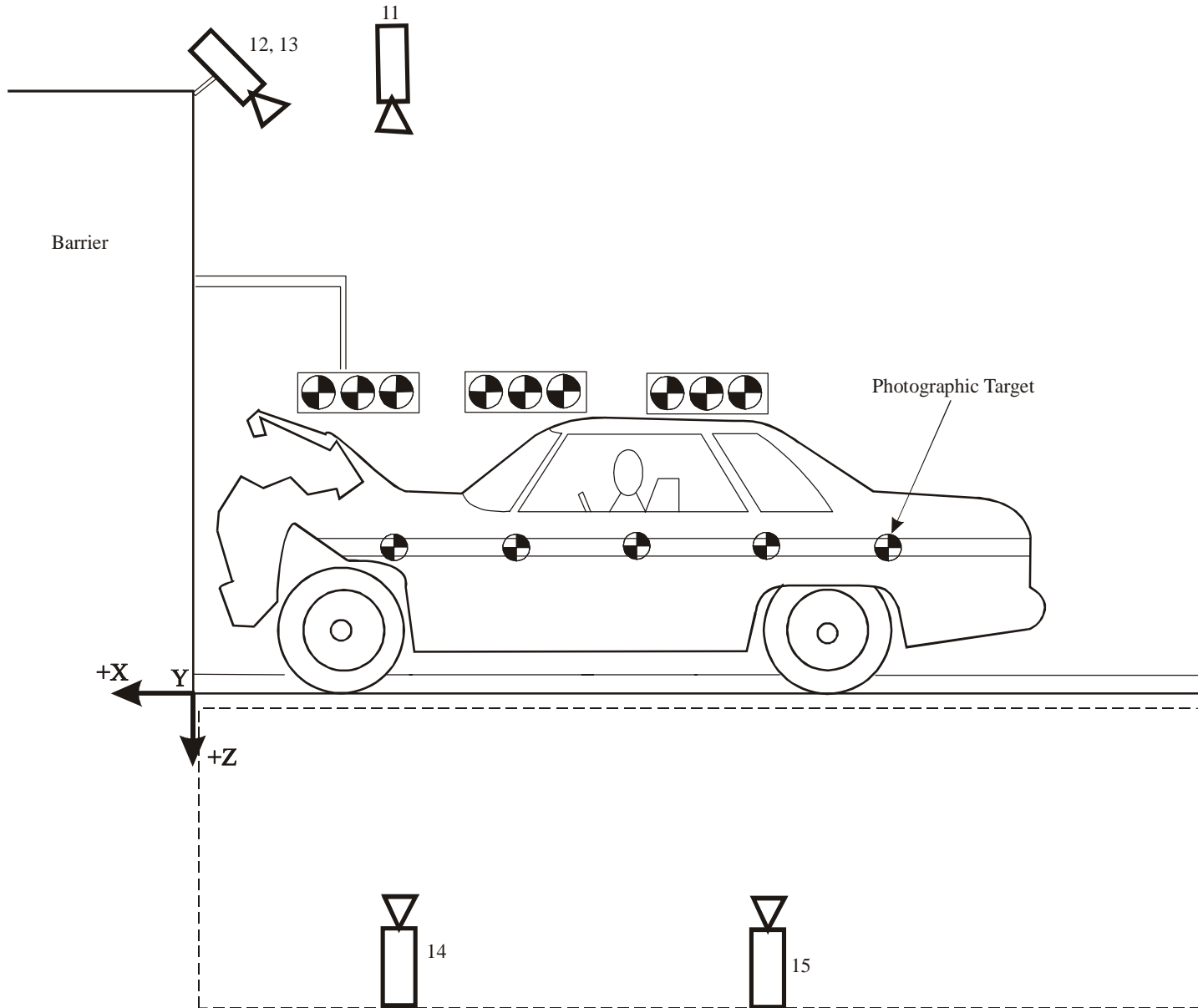
Figure 7 Camera Positions



Reference:

- +X = Film plane forward of barrier face
- +Y = Film plane to right of monorail centerline
- +Z = Film plane below ground level
- +Angle = Film plane angled upward from horizontal plane

Figure 7 Camera Positions, Cont'd.



Reference:

- +X = Film plane forward of barrier face
- +Y = Film plane to right of monorail centerline
- +Z = Film plane below ground level
- +Angle = Film plane angled upward from horizontal plane

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	Zoom	24 frames/s	N/A	N/A	N/A	N/A	N/A
2	Left side overall	Photosonic	25 mm	1000 frames/s	1115 mm	-7530 mm	-905 mm	0.3	7320 mm
3	Left tight dummy	Photosonic	25 mm	3296 frames/s	1815 mm	-7310 mm	-1595 mm	1.2	6920 mm
4	Left angled on dummy	Photosonic	25 mm	935 frames/s	4555 mm	-3730 mm	-2255 mm	-15.7	4100 mm
5	Left steering column upper	Photosonic	25 mm	N/A ³	----	----	----	----	----
6	Left steering column lower	Photosonic	25 mm	1000 frames/s	N/A ⁴	N/A ⁴	N/A ⁴	N/A ⁴	N/A ⁴
7	Right side overall	Photosonic	25 mm	N/A ³	----	----	----	----	----
8	Right tight dummy	Photosonic	25 mm	1045 frames/s	2065 mm	6805 mm	-1500 mm	6.1	6395 mm
9	Right angled on dummy	Photosonic	25 mm	N/A ³	----	----	----	----	----
10	Right side passenger	Photosonic	25 mm	1000 frames/s	1610 mm	8020 mm	-935 mm	0.6	7642 mm
11	Overhead	Photosonic	17 mm	997 frames/s	1400 mm		-5690 mm	-88.4	N/A
12	Barrier driver	Photosonic	17 mm	1000 frames/s	0 mm	-430 mm	-2495 mm	-47.6	1990 mm
13	Barrier passenger	Photosonic	17 mm	1007 frames/s	0 mm	395 mm	-2420 mm	-49.2	1995 mm
14	Pit front	Photosonic	17 mm	N/A ³	----	----	----	----	----
15	Pit rear	Photosonic	17 mm	N/A ³	----	----	----	----	----

¹ +X = Film plane forward of barrier face
+Y = Film plane to right of monorail centerline
+Z = Film plane below ground level

² +Angle = Film plane angled upward from horizontal plane

³ Camera did not run.

⁴ Not recorded

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

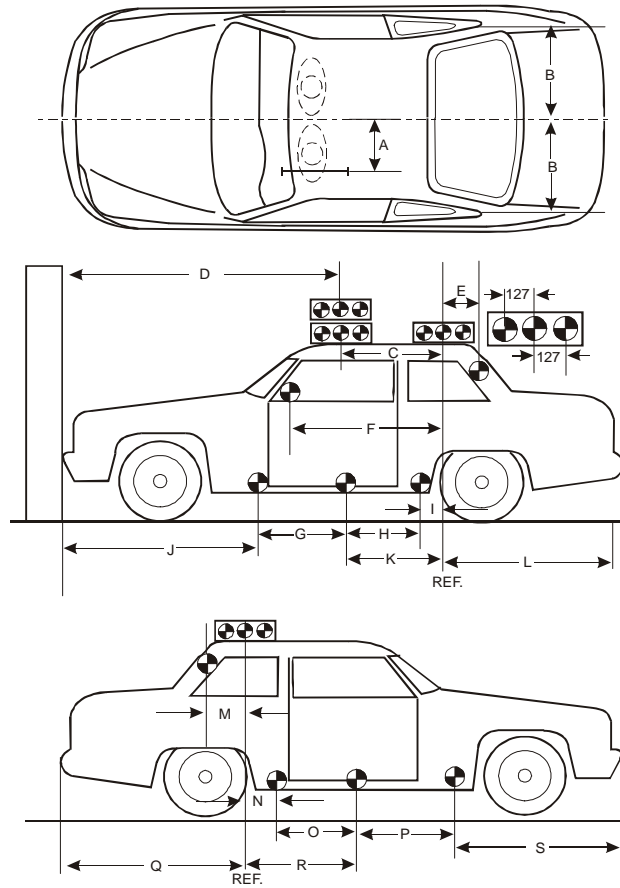
All TRC Inc. high-speed cameras are equipped with red LEDs which put timing marks on the right edge of the film. TRC Inc. uses a single timing generator to generate the timing for all cameras. This allows the timing marks to be common to all cameras. The timing marks can be used to measure camera speed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

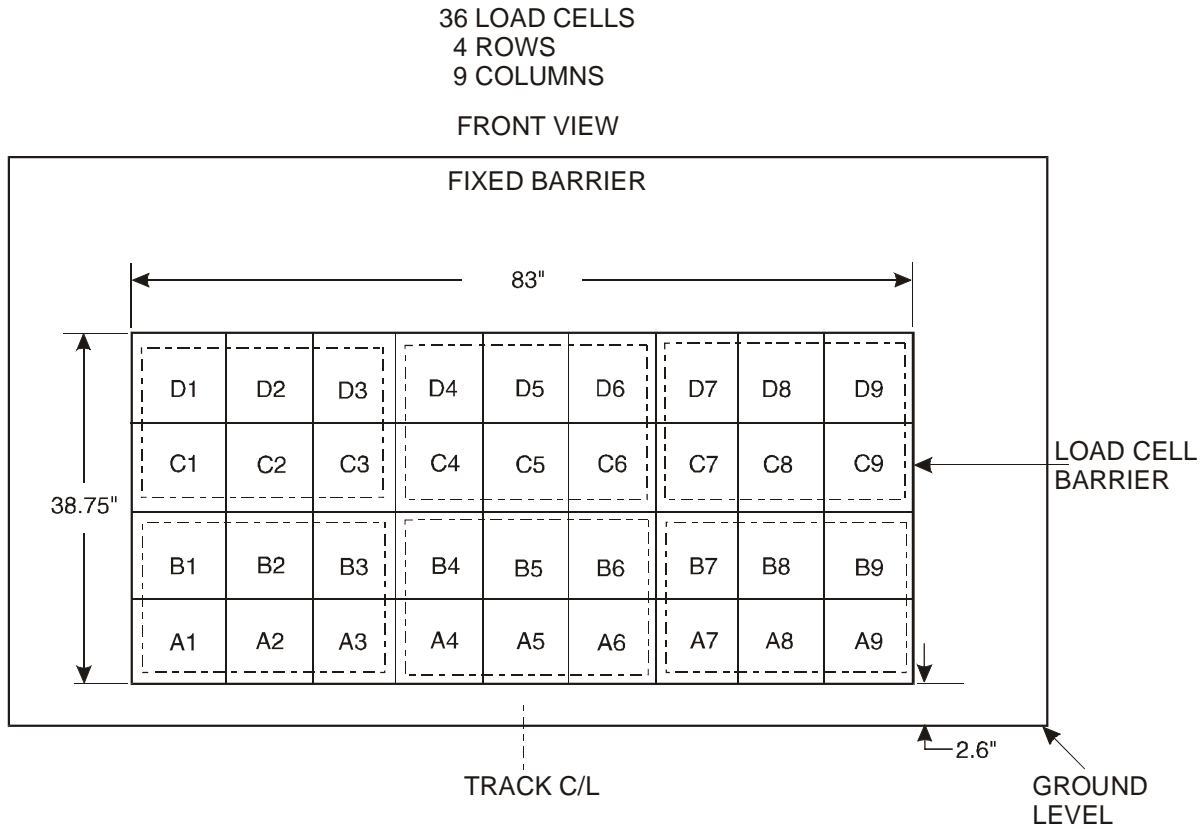
Figure 8 Vehicle Reference Photo Target Locations



Measurement	Pre-Test
A	495 mm
B	735 mm
C	610 mm
D	1920 mm
E	423 mm
F	1329 mm
G	801 mm
H	845 mm
I	-85 mm
J	1310 mm
K	764 mm
L	1541 mm
M	449 mm
N	-117 mm
O	848 mm
P	787 mm
Q	1567 mm
R	738 mm
S	1326 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 thru B3
- Group 2: A4 thru B6
- Group 3: A7 thru B9
- Group 4: C1 thru D3
- Group 5: C4 thru D6
- Group 6: C7 thru 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

List of Photographs

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Post-Test Passenger Dummy Knee Contact View	A-57
Pre-Test Passenger Seat Position View	A-58
Post-Test Passenger Seat Position View	A-59
Vehicle Certification/Tire Load Label View	A-60
Pre-Test Load Cell Barrier View	A-61
Post-Test Load Cell Barrier View	A-62
Pre-Test Fuel Cap View	A-63
Post-Test Fuel Cap View	A-64
Pre-Test Vehicle Ballast View	A-65



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 Right Rear View



Figure A-10 Post-Test Right Rear View



Figure A-11 Pre-Test Right Side View



Figure A-12 Post-Test Right Side View



Figure A-13 Pre-Test Right Front View



Figure A-14 Post-Test Right Front View



Figure A-15 Pre-Test Front Underbody View



Figure A-16 Post-Test Front Underbody View



Figure A-17 Pre-Test Front Mid Underbody View

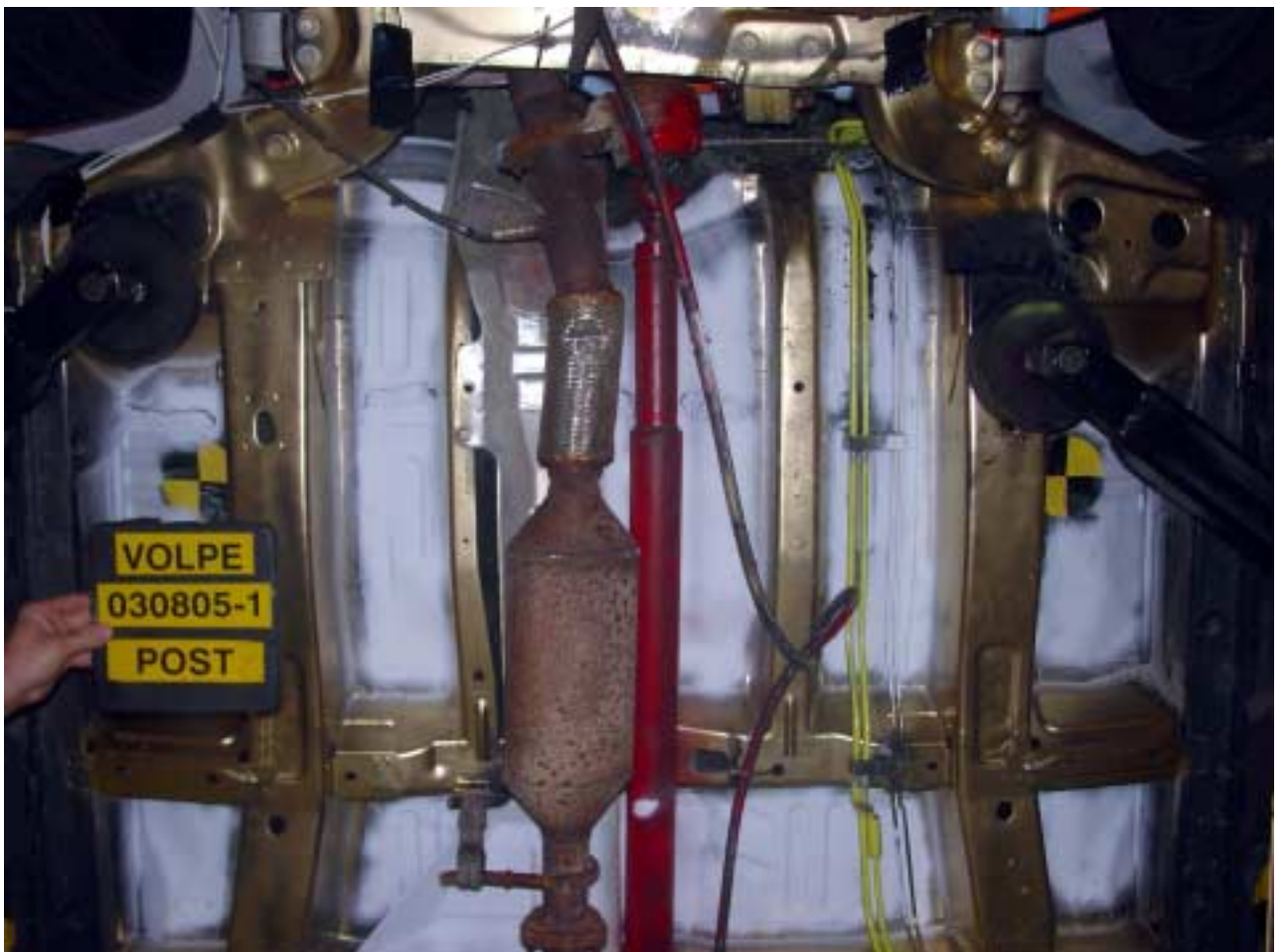


Figure A-18 Post-Test Front Mid Underbody View

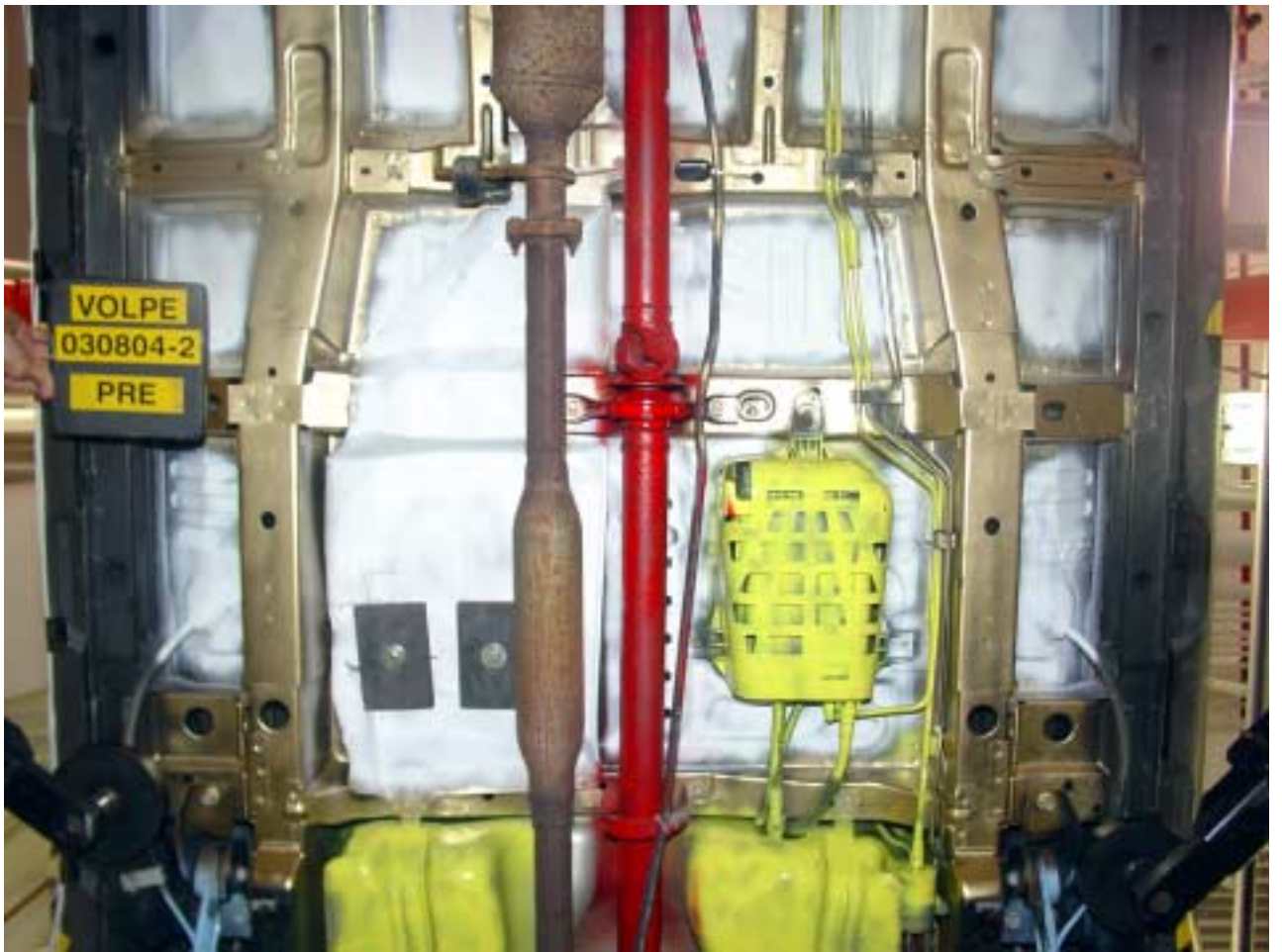


Figure A-19 Pre-Test Mid Underbody View



Figure A-20 Post-Test Mid Underbody View



Figure A-21 Pre-Test Rear Mid Underbody View



Figure A-22 Post-Test Rear Mid Underbody View

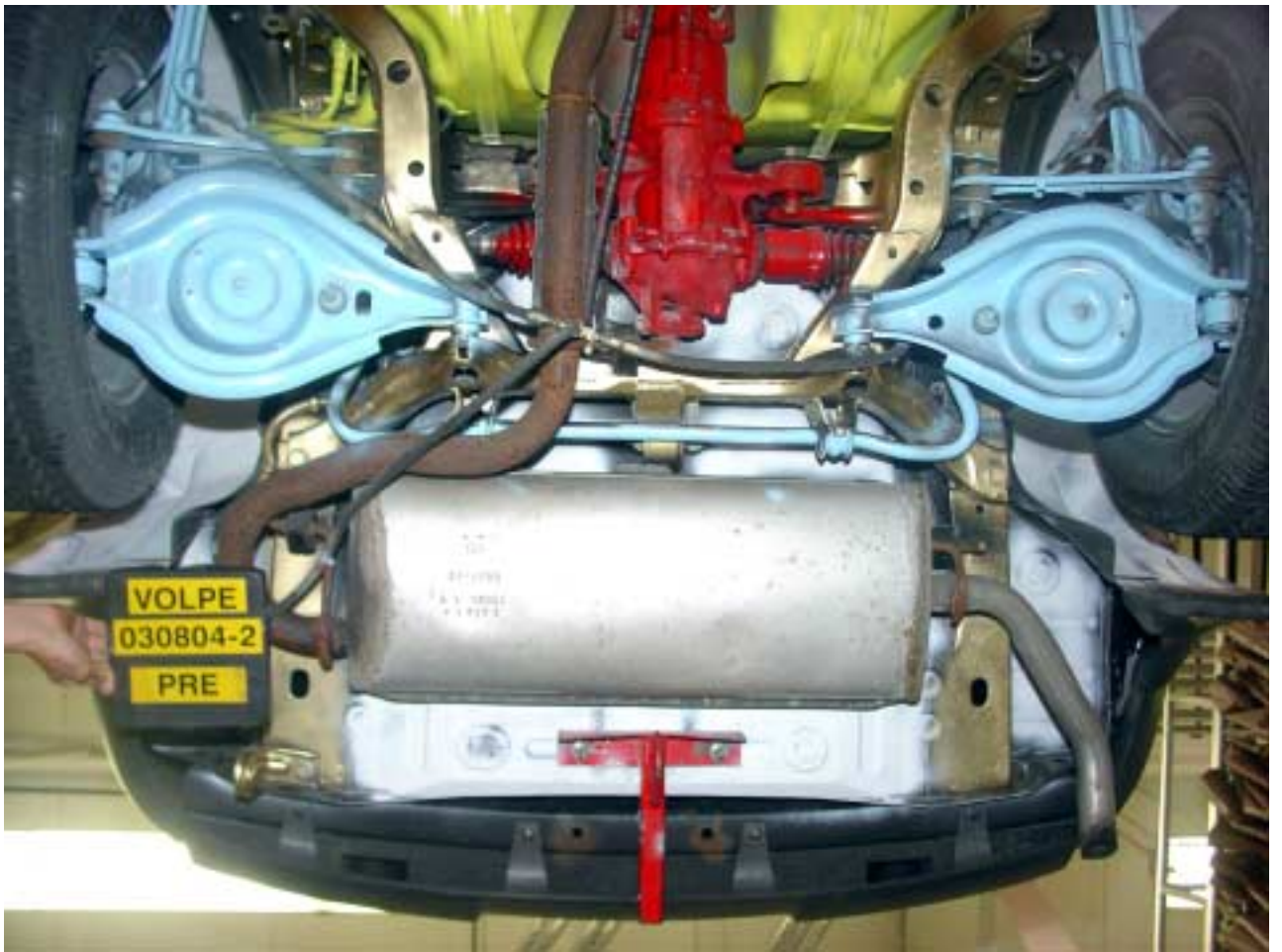


Figure A-23 Pre-Test Rear Underbody View



Figure A-24 Post-Test Rear Underbody View



Figure A-25 Pre-Test Engine Compartment View

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Figure A-26 Pre-Test Driver and Passenger Dummies Front View



Figure A-27 Post-Test Driver and Passenger Dummies Front View

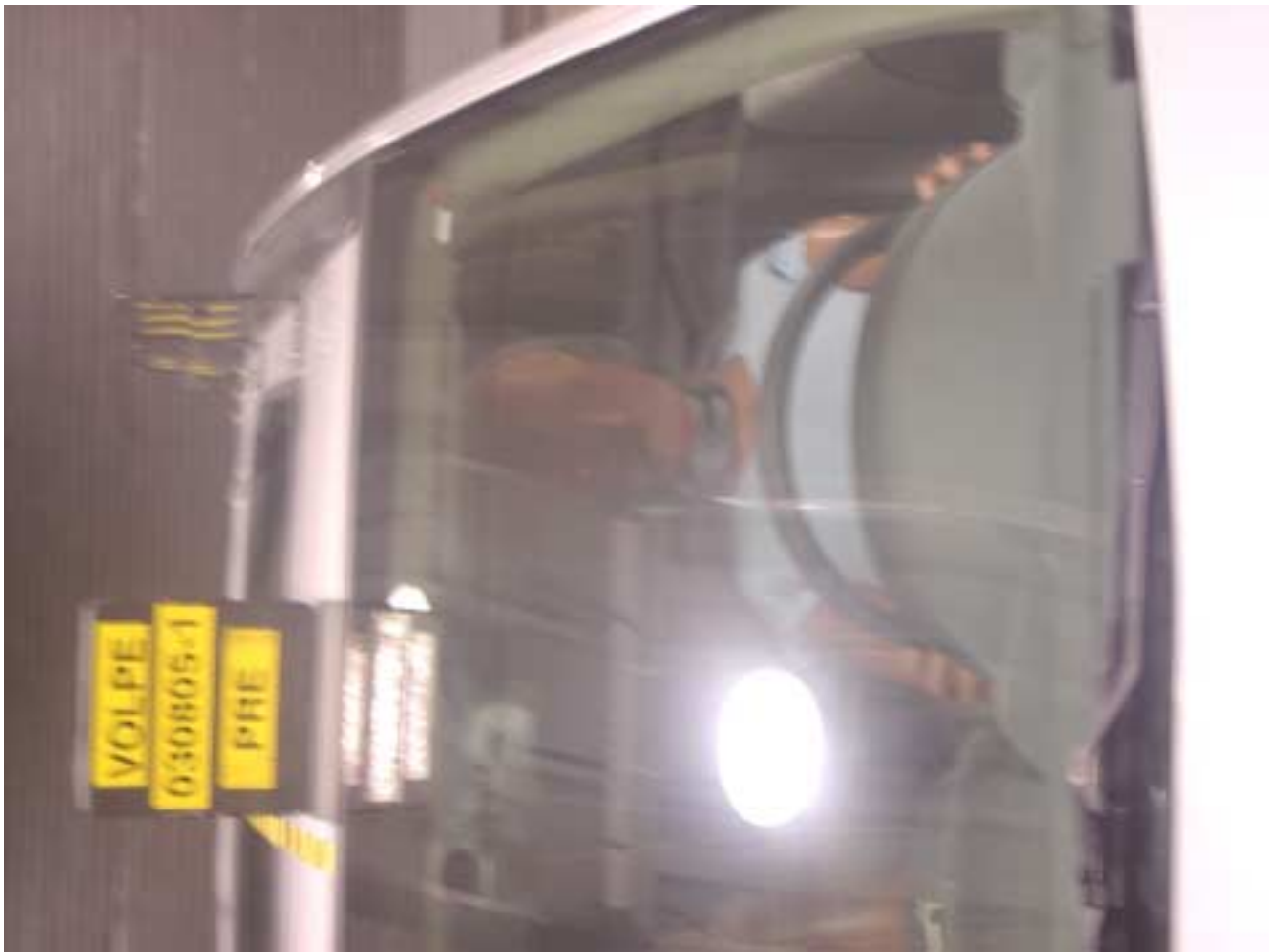


Figure A-28 Pre-Test Driver Dummy Position - View 1



Figure A-29 Post-Test Driver Dummy Position - View 1



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



Figure A-31 Post-Test Driver Dummy Position - View 2



Figure A-32 Pre-Test Driver Dummy & Vehicle Interior - View 1



Figure A-33 Post-Test Driver Dummy & Vehicle Interior - View 1



Figure A-34 Pre-Test Driver Dummy & Vehicle Interior - View 2



Figure A-35 Post-Test Driver Dummy & Vehicle Interior - View 2



Figure A-36 Pre-Test Driver Dummy & Vehicle Interior - View 3



Figure A-37 Post-Test Driver Dummy & Vehicle Interior - View 3



Figure A-38 Pre-Test Passenger Dummy Position - View 1



Figure A-39 Post-Test Passenger Dummy Position - View 1



Figure A-40 Pre-Test Passenger Dummy Position - View 2



Figure A-41 Post-Test Passenger Dummy Position - View 2



Figure A-42 Pre-Test Passenger Dummy & Vehicle Interior - View 1



Figure A-43 Post-Test Passenger Dummy & Vehicle Interior - View 1



Figure A-44 Pre-Test Passenger Dummy & Vehicle Interior - View 2



Figure A-45 Post-Test Passenger Dummy & Vehicle Interior - View 2



Figure A-46 Pre-Test Passenger Dummy & Vehicle Interior - View 3



Figure A-47 Post-Test Passenger Dummy & Vehicle Interior - View 3



Figure A-48 Post-Test Driver Dummy Overall View



Figure A-49 Post-Test Driver Dummy Head Contact - View 1



Figure A-50 Post-Test Driver Dummy Head Contact - View 2



Figure A-51 Post-Test Driver Dummy Knee Contact View



Figure A-52 Pre-Test Driver Seat Position View



Figure A-53 Post-Test Driver Seat Position View

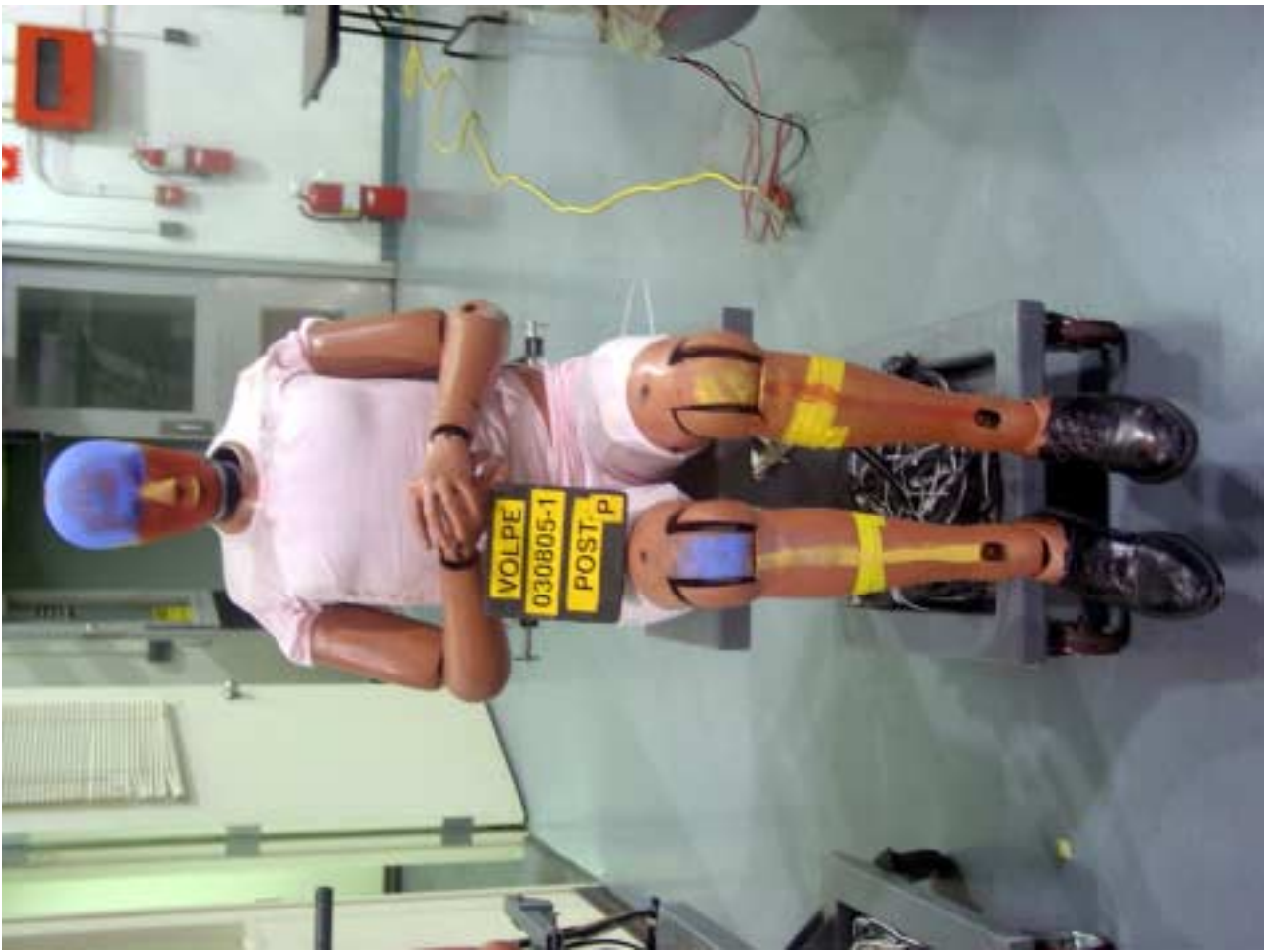


Figure A-54 Post-Test Passenger Dummy Overall View



Figure A-55 Post-Test Passenger Dummy Head Contact - View 1



Figure A-56 Post-Test Passenger Dummy Head Contact - View 2



Figure A-57 Post-Test Passenger Dummy Knee Contact View



Figure A-58 Pre-Test Passenger Seat Position View



Figure A-59 Post-Test Passenger Seat Position View



MFD BY SATURN CORPORATION

04/02

GVWR GAWR FRT GAWR RR
2195KG(4839LB) 1100KG(2425LB) 1095KG(2414LB)

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

5GZCZ63B52S821295 TYPE: M.P.V.

MODEL: ZLE26

LPRD	TIRE SIZE	SPEED RTG	RIM	COLD TIRE PRESSURE
FRT	P235/65R16	S	16X6.5J	210KPA(30PSI)
RR	P235/65R16	S	16X6.5J	210KPA(30PSI)
SPA	T155/90D16	M	16X4T	420KPA(60PSI)

SEE OWNER'S MANUAL FOR MORE INFORMATION.

Figure A-60 Vehicle Certification/Tire Load Label View

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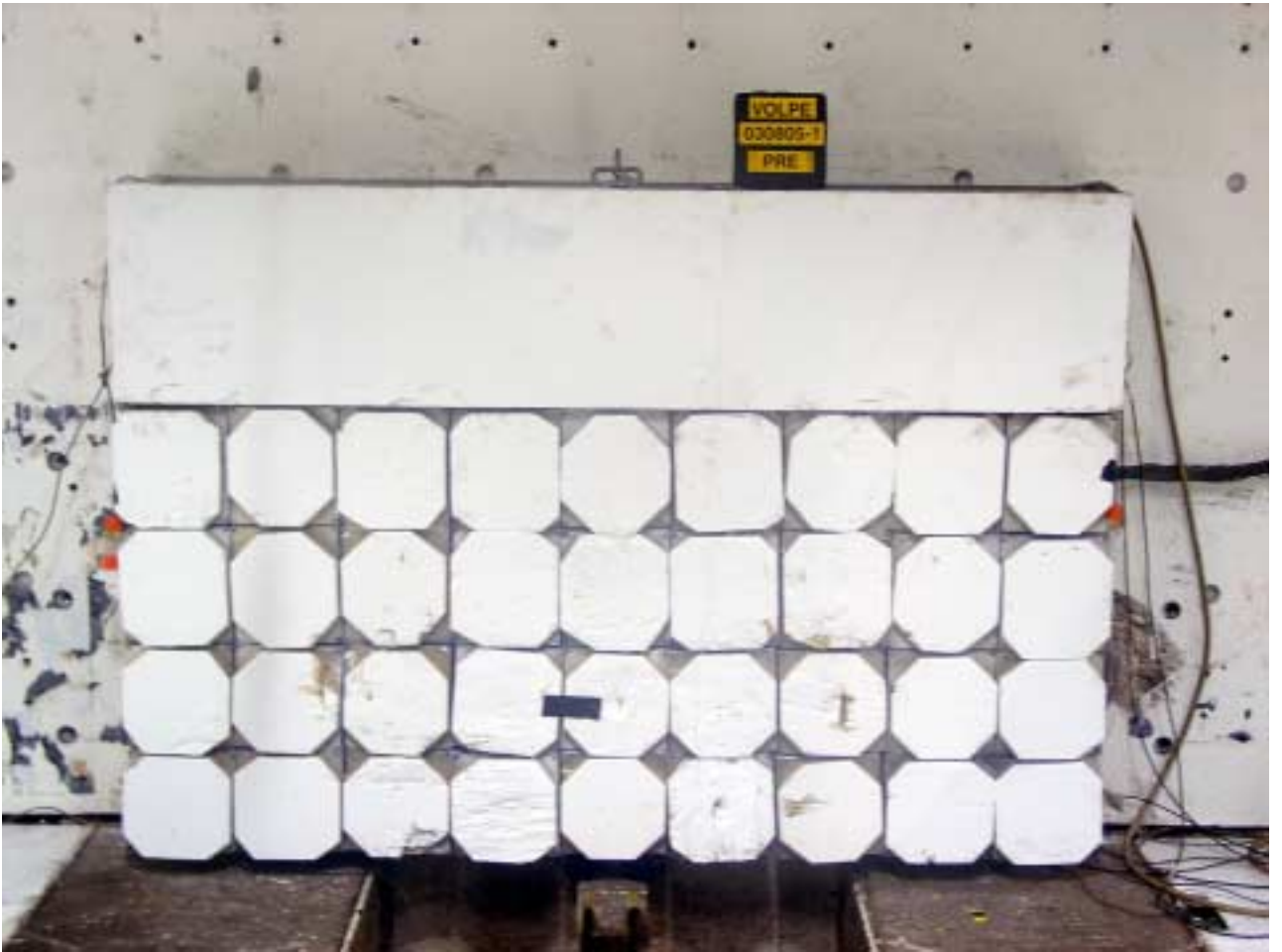


Figure A-61 Pre-Test Load Cell Barrier View

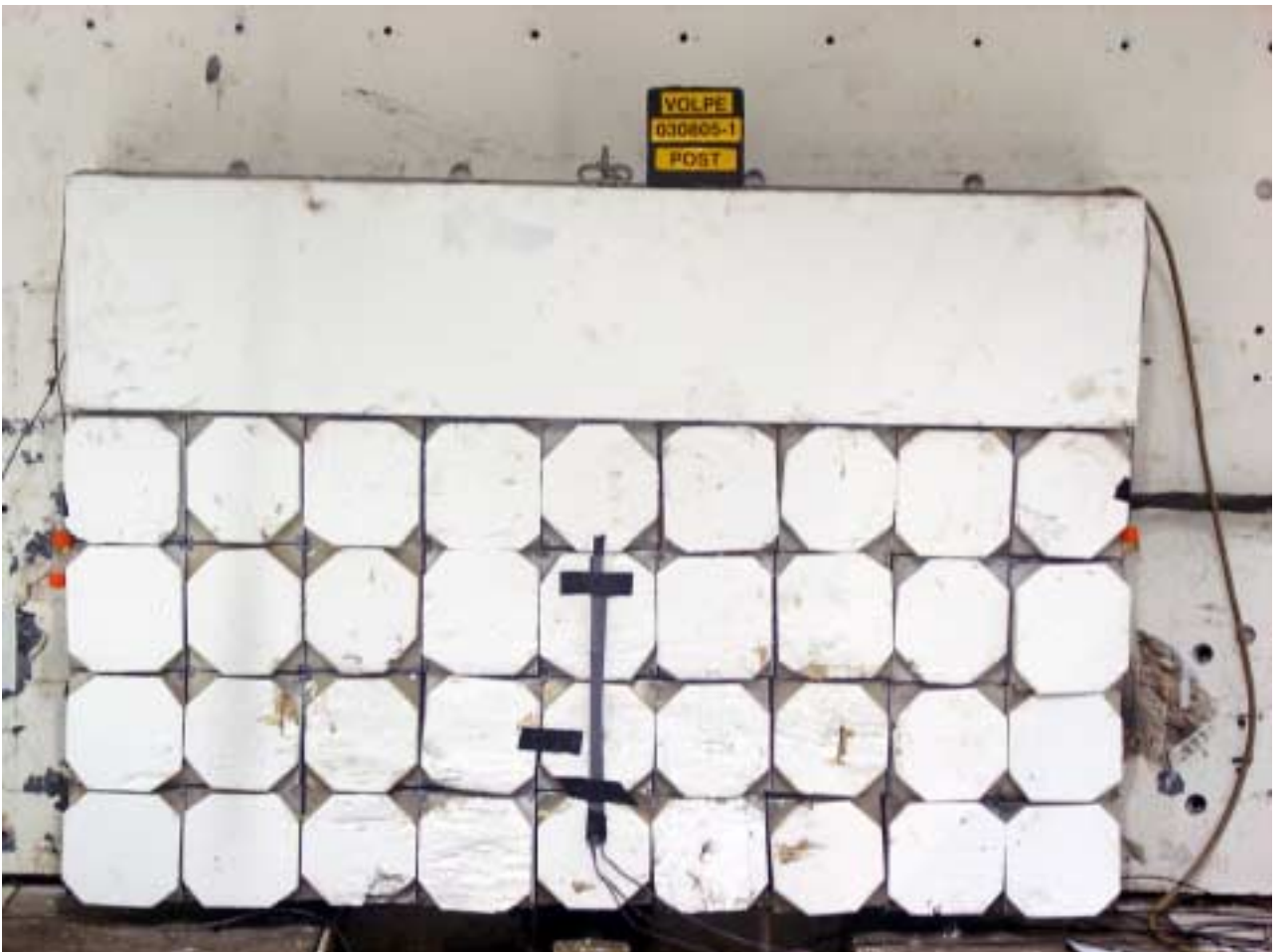


Figure A-62 Post-Test Load Cell Barrier View



Figure A-63 Pre-Test Fuel Cap View



Figure A-64 Post-Test Fuel Cap View



Figure A-65 Pre-Test Vehicle Ballast View

Appendix B

Dummy, Vehicle, and Barrier Data Plots

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6	Driver Head Z-Axis Acceleration Redundant	B-15
--- ¹	Driver Head Resultant Acceleration Redundant	B-16
7	Driver Head X-Axis (LT) Acceleration	B-17
8	Driver Head Z-Axis (LT) Acceleration	B-18
9	Driver Head Y-Axis (FT) Acceleration	B-19
10	Driver Head Z-Axis (FT) Acceleration	B-20
11	Driver Head X-Axis (TP) Acceleration	B-21
12	Driver Head Y-Axis (TP) Acceleration	B-22
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14	Driver Neck Y-Axis Shear Force	B-24
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17	Driver Neck Moment About Y Axis	B-27
18	Driver Neck Moment About Z Axis	B-28
--- ¹	Driver Neck Occipital Condyle Moment About Y Axis	B-29
--- ¹	Driver Neck Tension/Extension	B-30
--- ¹	Driver Neck Tension/Flexion	B-31
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--- ¹	Driver Chest Resultant Acceleration	B-43
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33	Driver Right Femur Force	B-50
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--- ¹	Passenger Head Resultant Acceleration Redundant	B-96
76	Passenger Head X-Axis (LT) Acceleration	B-97
77	Passenger Head Z-Axis (LT) Acceleration	B-98
78	Passenger Head Y-Axis (FT) Acceleration	B-99
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--- ¹	Passenger Neck Occipital Condyle Moment About Y Axis	B-109
--- ¹	Right Front Passenger Neck Tension/Extension	B-110
--- ¹	Right Front Passenger Neck Tension/Flexion	B-111
--- ¹	Right Front Passenger Neck Compression/Extension	B-112
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--- ¹	Passenger Chest Resultant Acceleration	B-123
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--- ¹	Passenger Chest Resultant Acceleration Redundant	B-127
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101	Passenger Left Femur Force	B-129
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132	Toepan Next to Accelerator X-Axis Acceleration	B-160
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134	Toepan Next to Footrest X-Axis Acceleration	B-162
135	Toepan Next to Footrest Z-Axis Acceleration	B-163
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137	Rear Compartment Center X-Axis Acceleration	B-165
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139	Passenger Airbag Event Wire A	B-167
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142	Load Cell Barrier Position A3 Force	B-170
143	Load Cell Barrier Position A4 Force	B-171
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168	Load Cell Barrier Position D2 Force	B-196
169	Load Cell Barrier Position D3 Force	B-197
170	Load Cell Barrier Position D4 Force	B-198
171	Load Cell Barrier Position D5 Force	B-199
172	Load Cell Barrier Position D6 Force	B-200
173	Load Cell Barrier Position D7 Force	B-201

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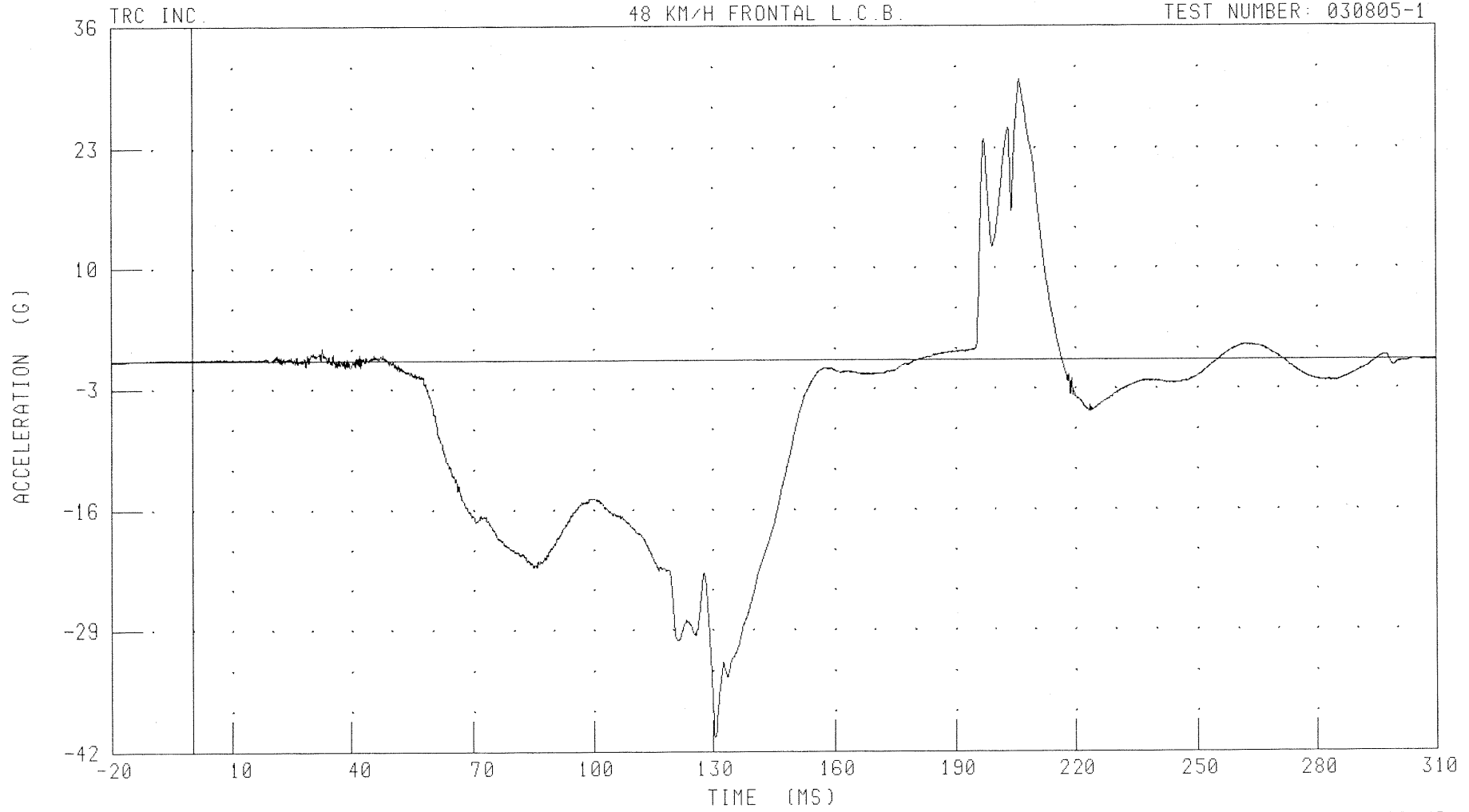
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174	Load Cell Barrier Position D8 Force	B-202
175	Load Cell Barrier Position D9 Force	B-203
--- ¹	Load Cell Barrier Group #1 Force Total	B-204
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--- ¹	Load Cell Barrier Group #3 Force Total	B-206
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--- ¹	Load Cell Barrier Group #5 Force Total	B-208
--- ¹	Load Cell Barrier Group #6 Force Total	B-209
--- ¹	Total Load Cell Barrier Force	B-210

¹ Curve is not included in NHTSA database.

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



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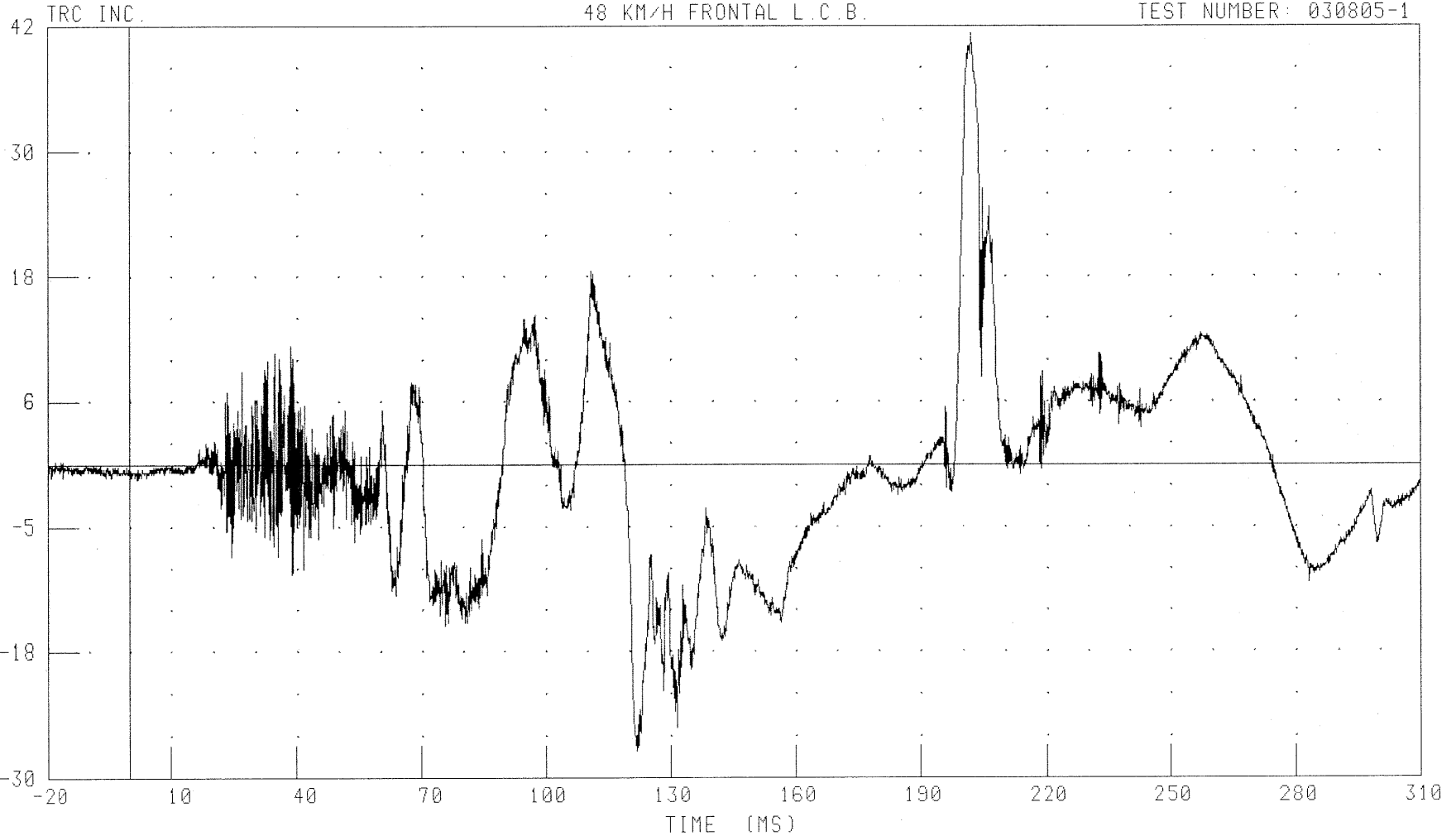
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B-9

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD Y-AXIS ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



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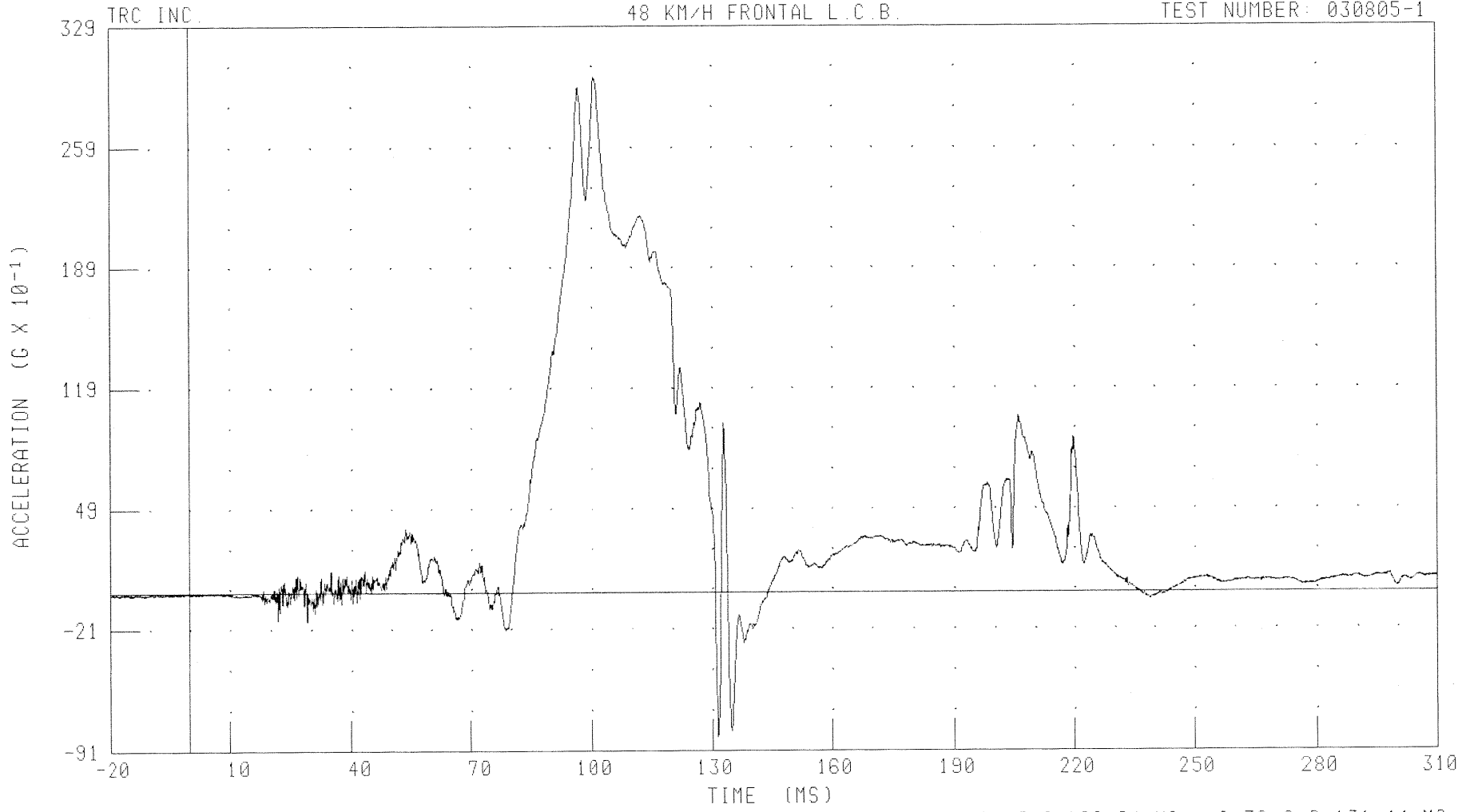
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030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD Z-AXIS ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



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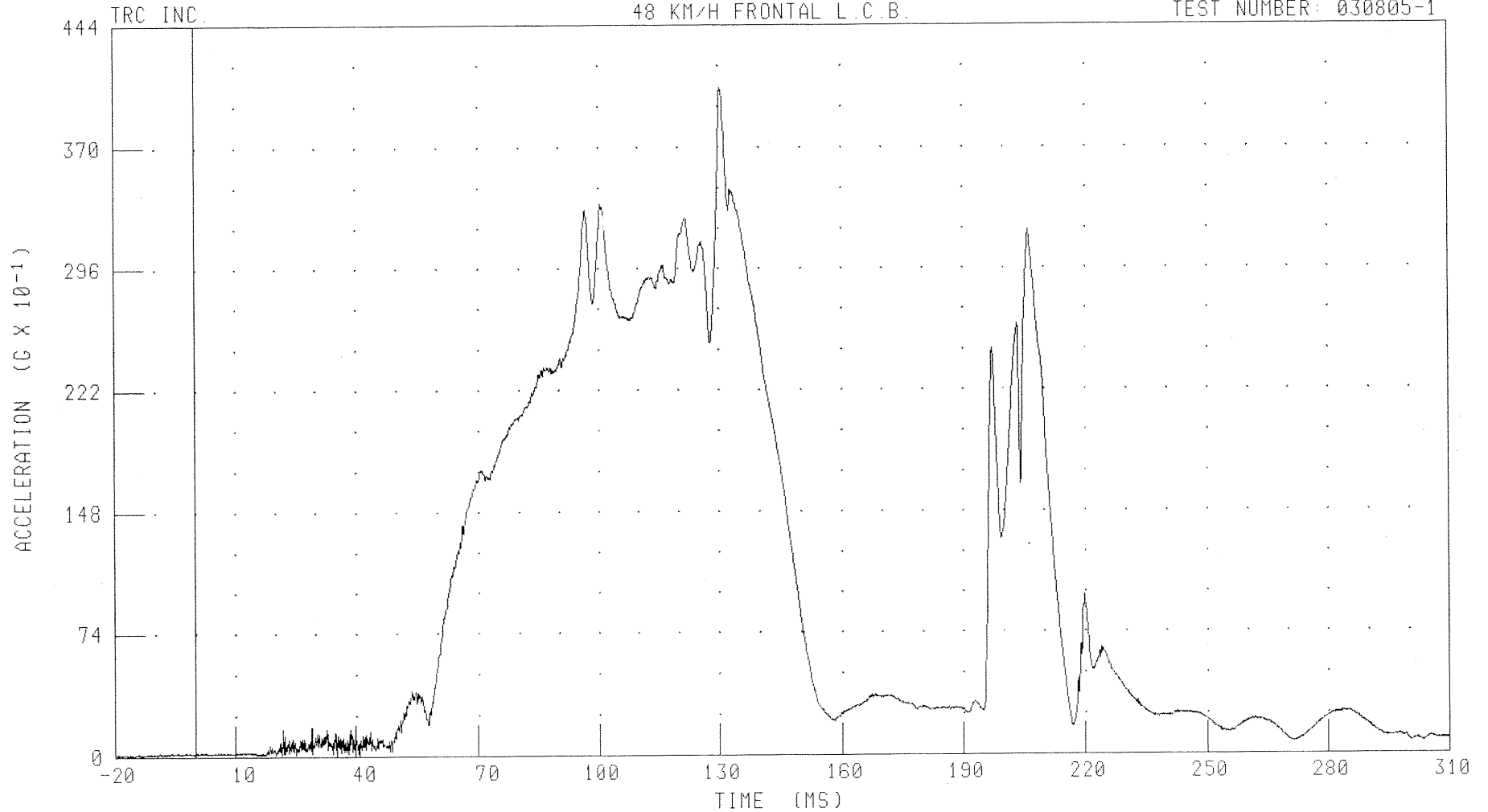
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030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD RESULTANT ACCELERATION
48 KM/H FRONTAL L.C.B.

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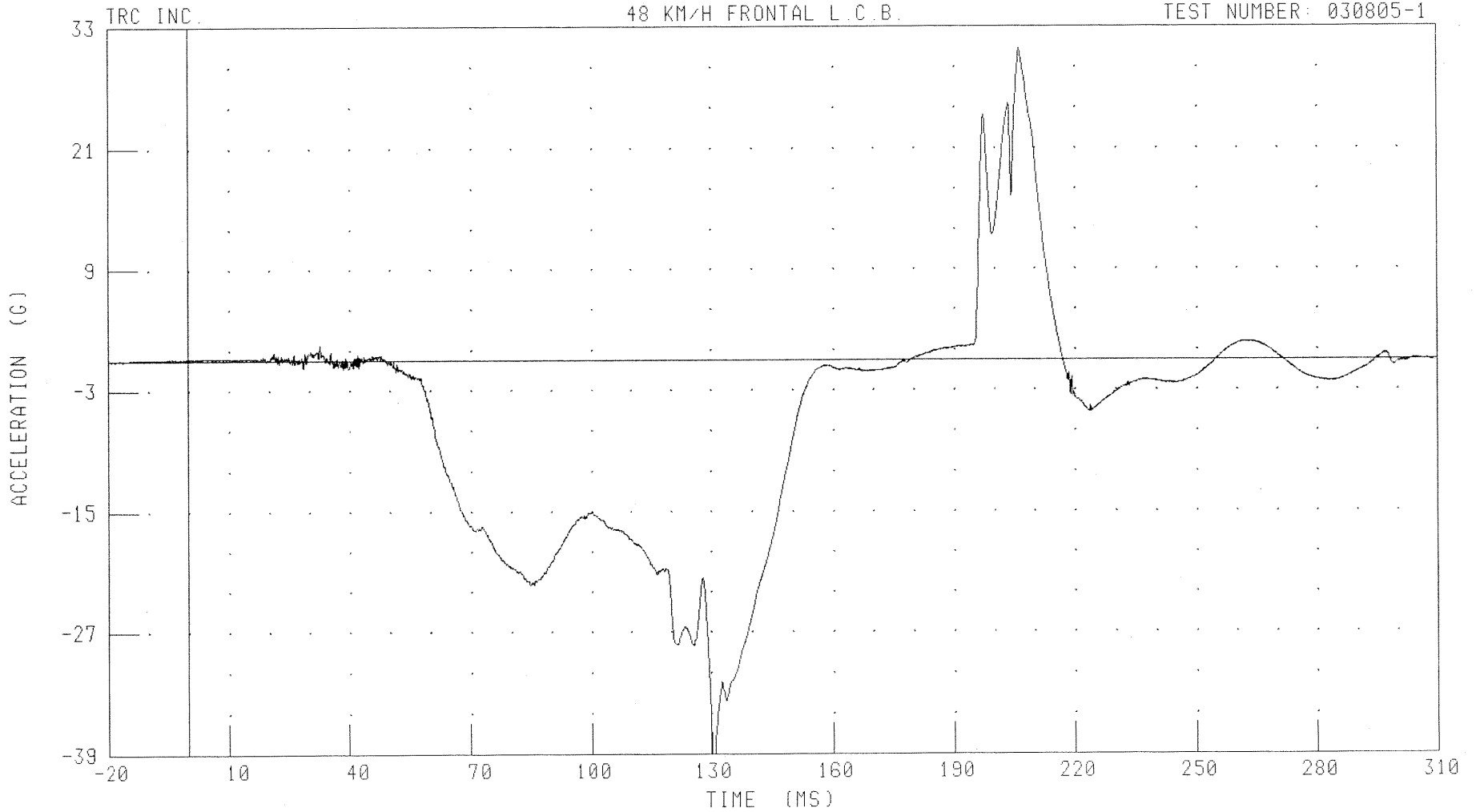
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030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD X-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



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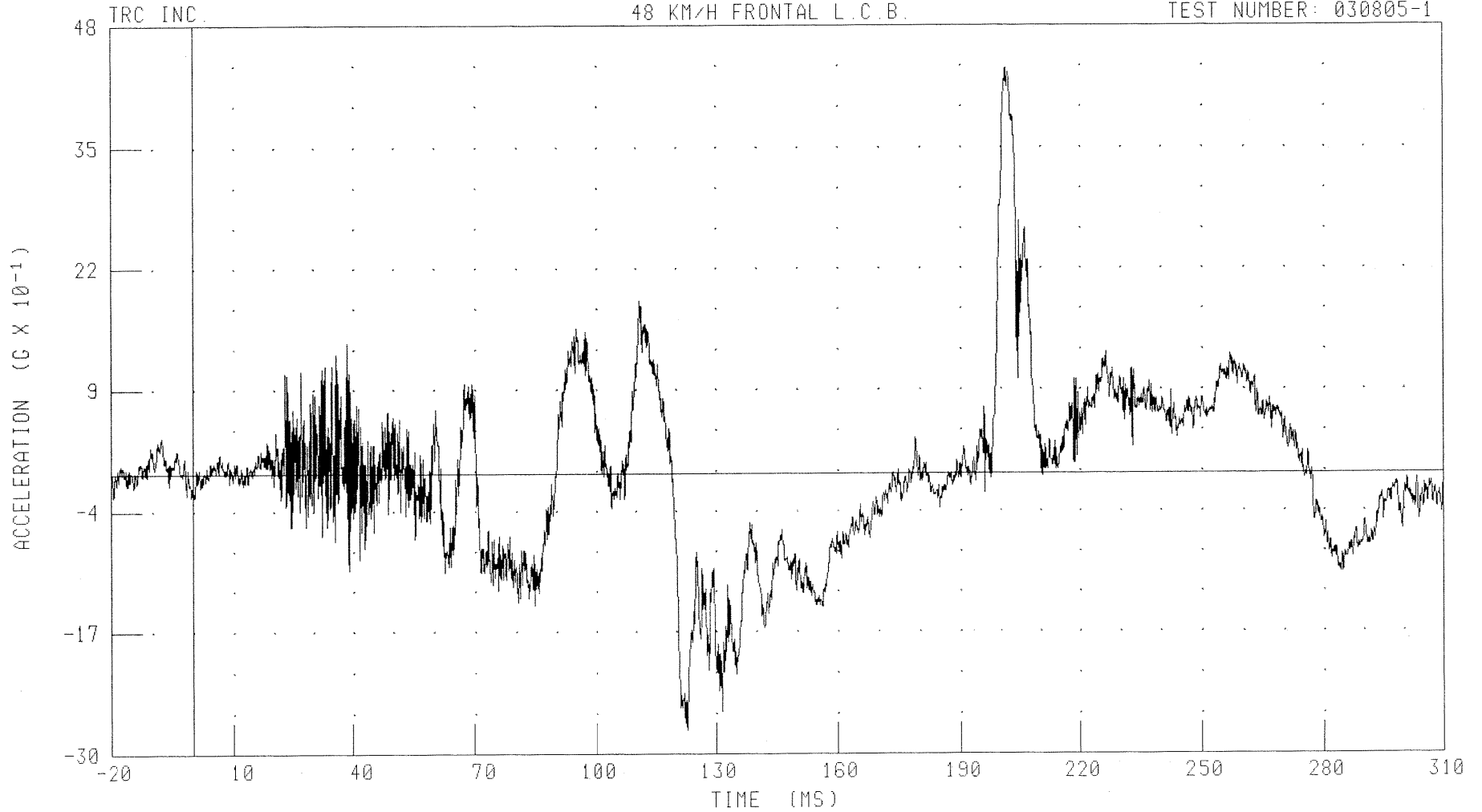
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030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD Y-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



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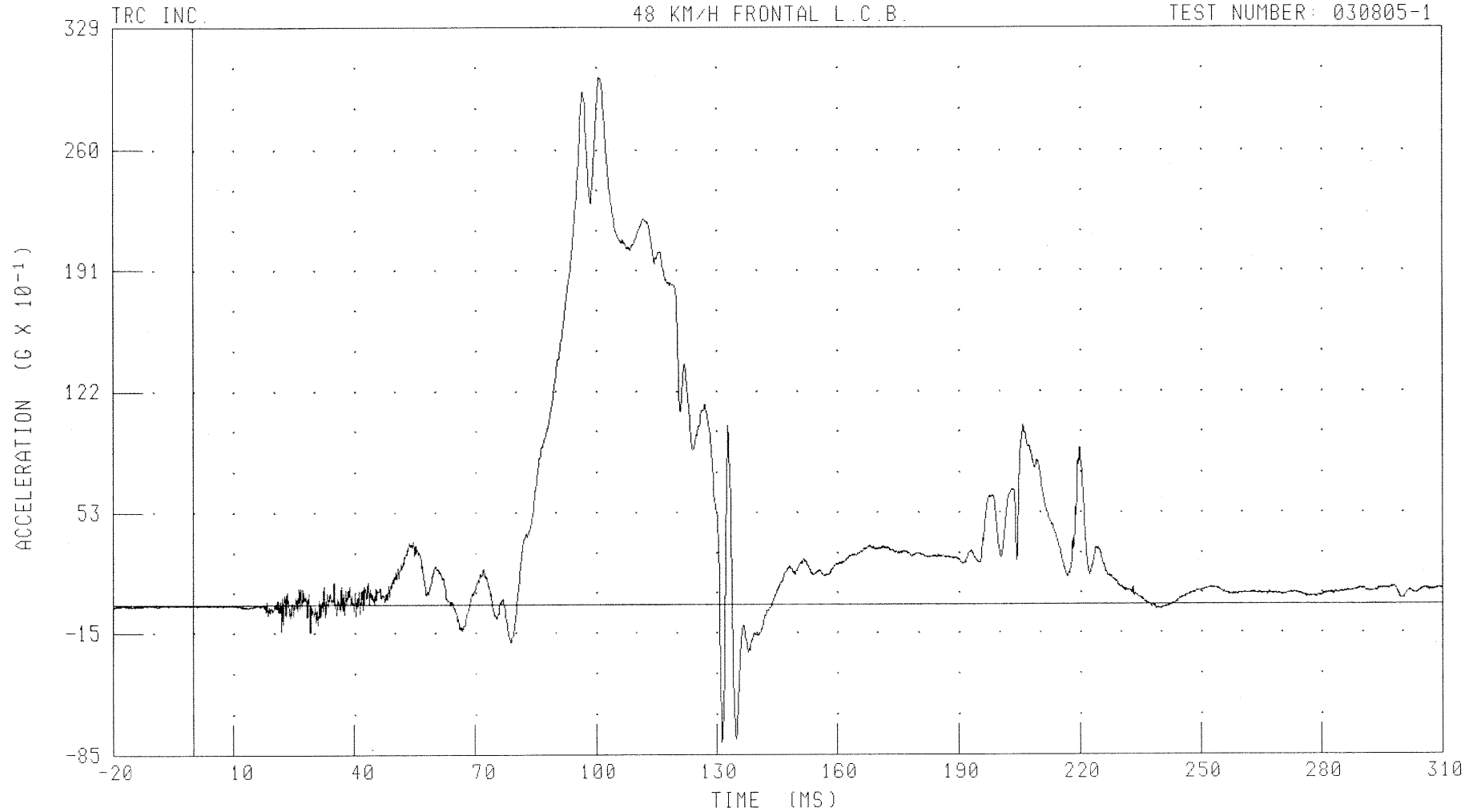
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030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD Z-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HEDZR1 FILTER: CH. CLASS 1000

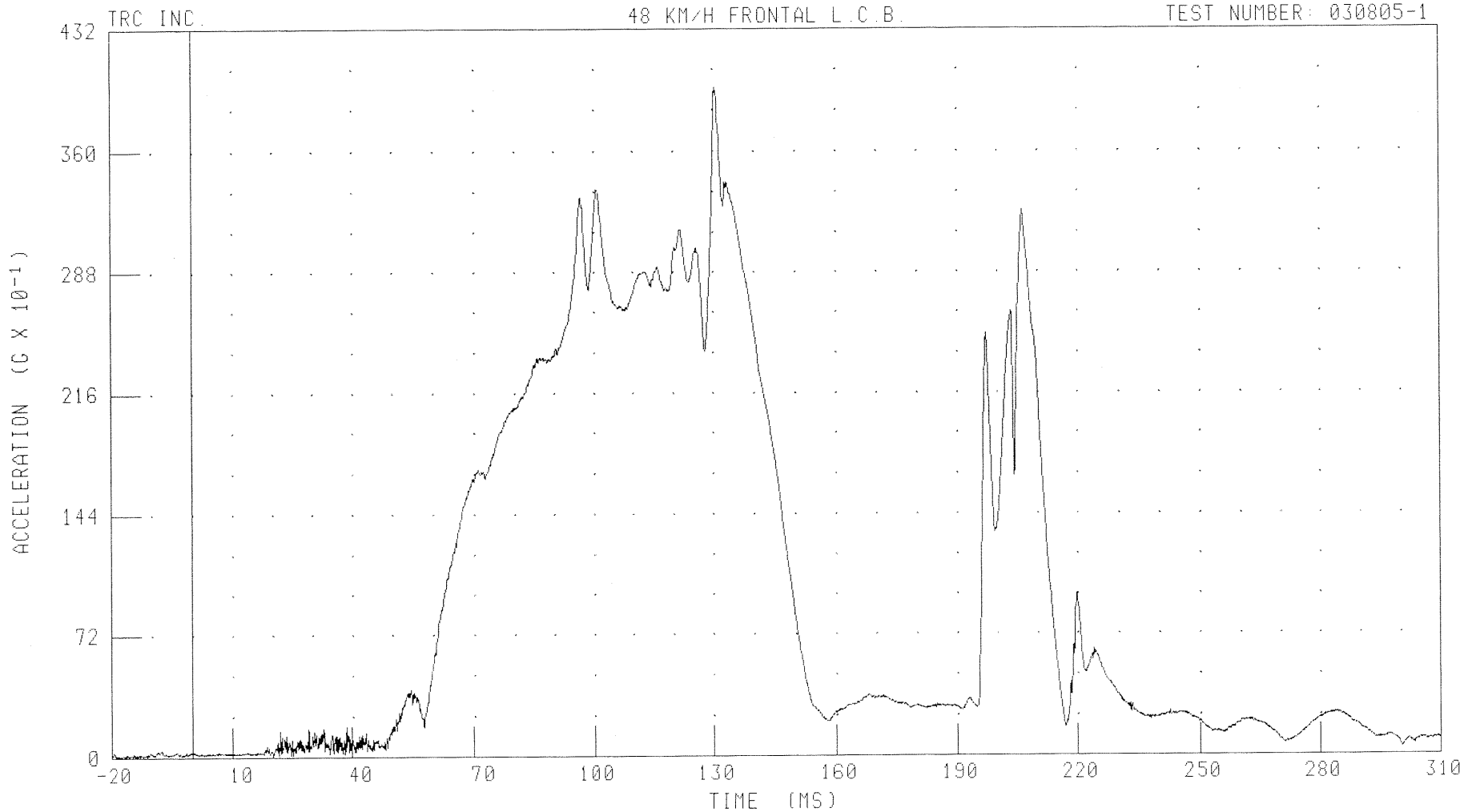
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B-15

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD RESULTANT ACCELERATION REDUNDANT
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



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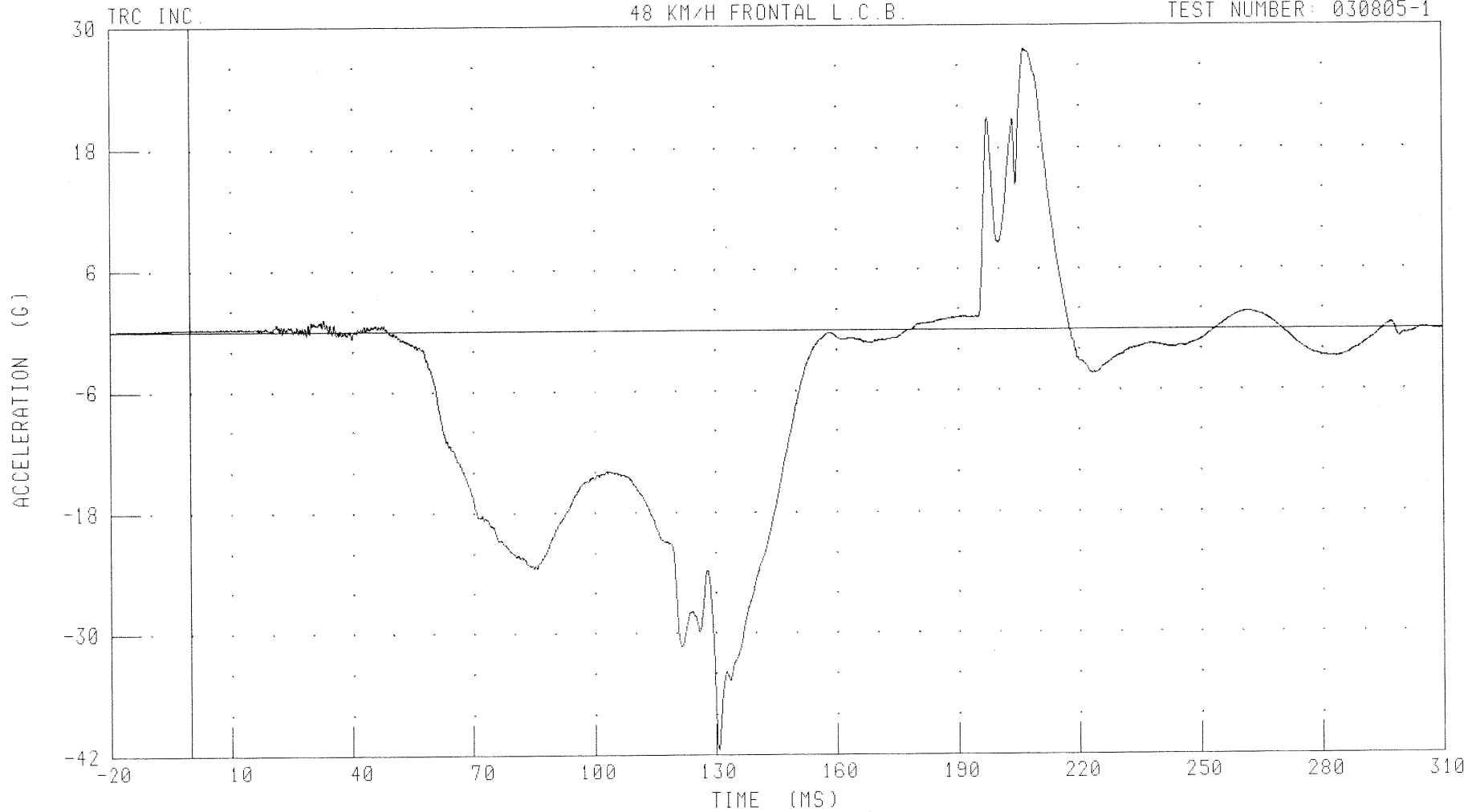
B-16

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD X-AXIS (LT) ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



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B-17

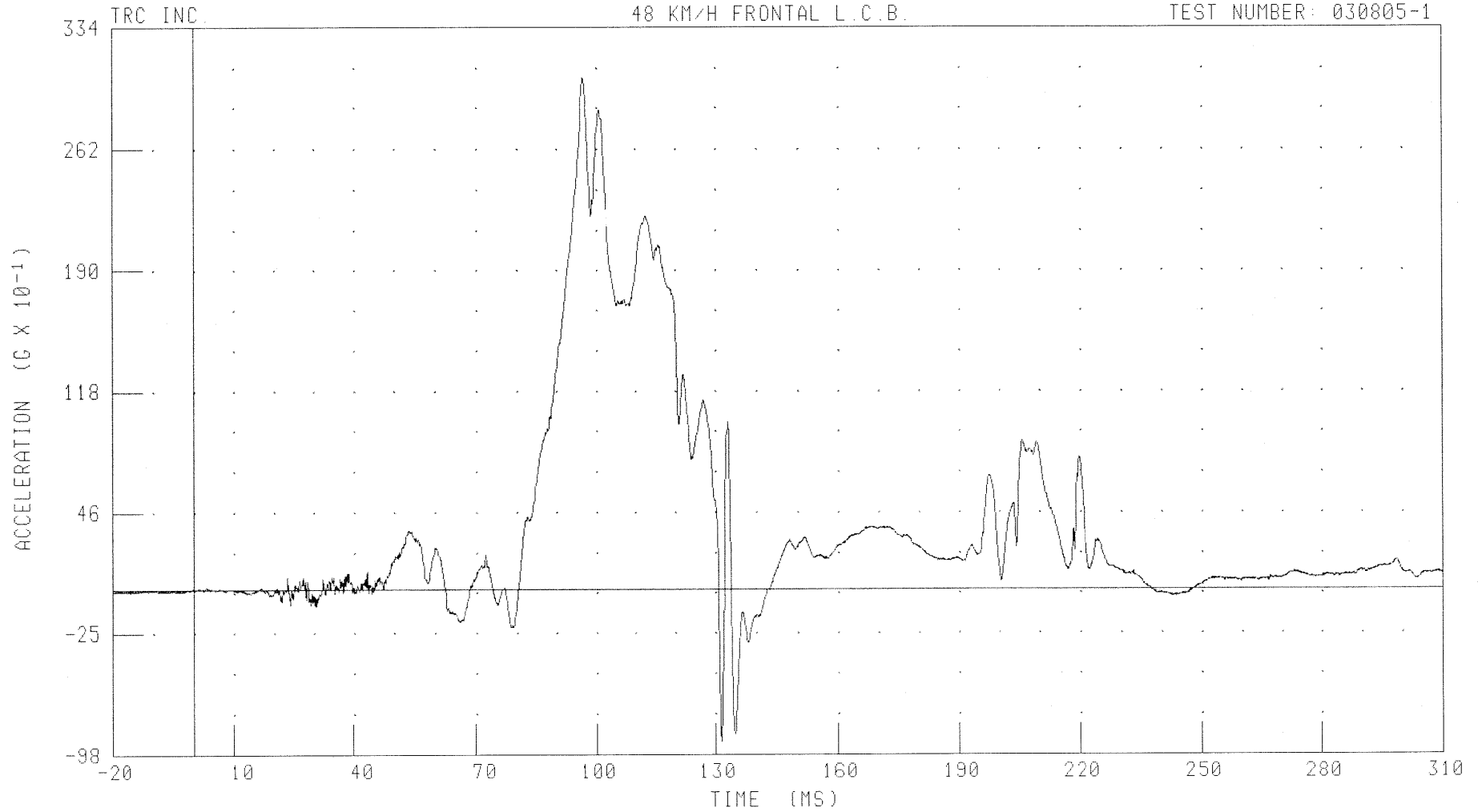
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2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER HEAD Z-AXIS (LT) ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



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B-18

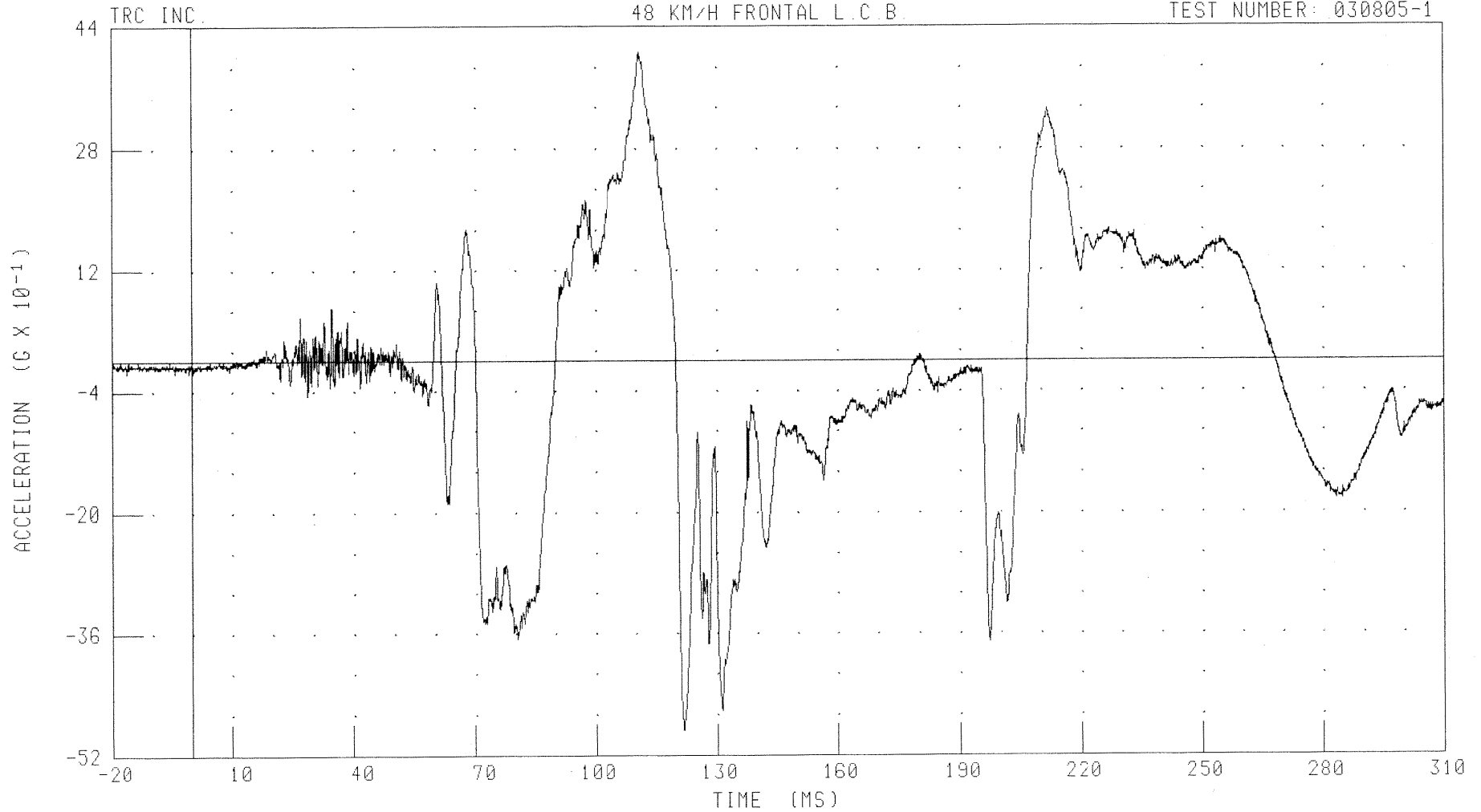
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER HEAD Y-AXIS (FT) ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



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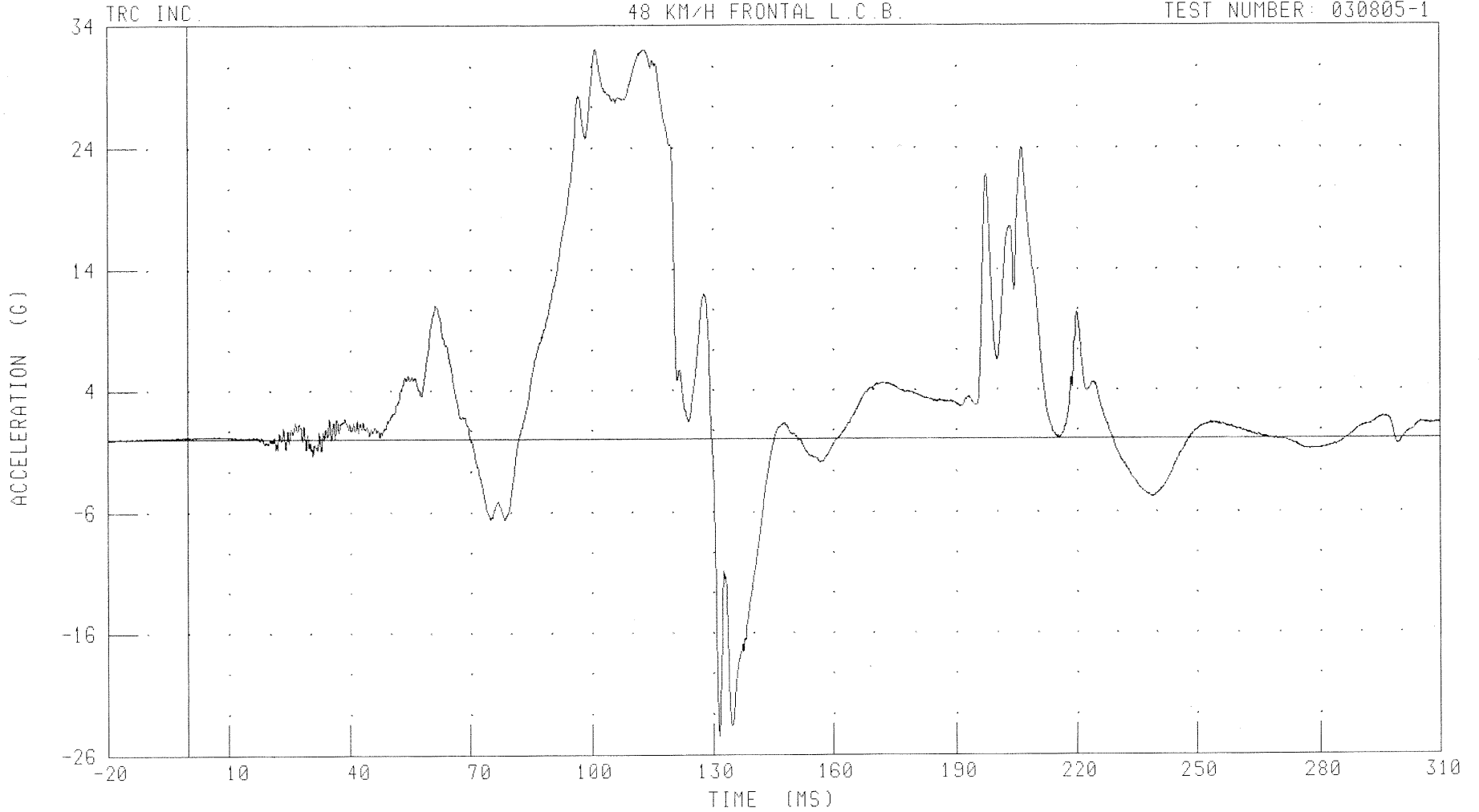
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B-19

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD Z-AXIS (FT) ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HD2ZG1

FILTER: CH. CLASS 1000

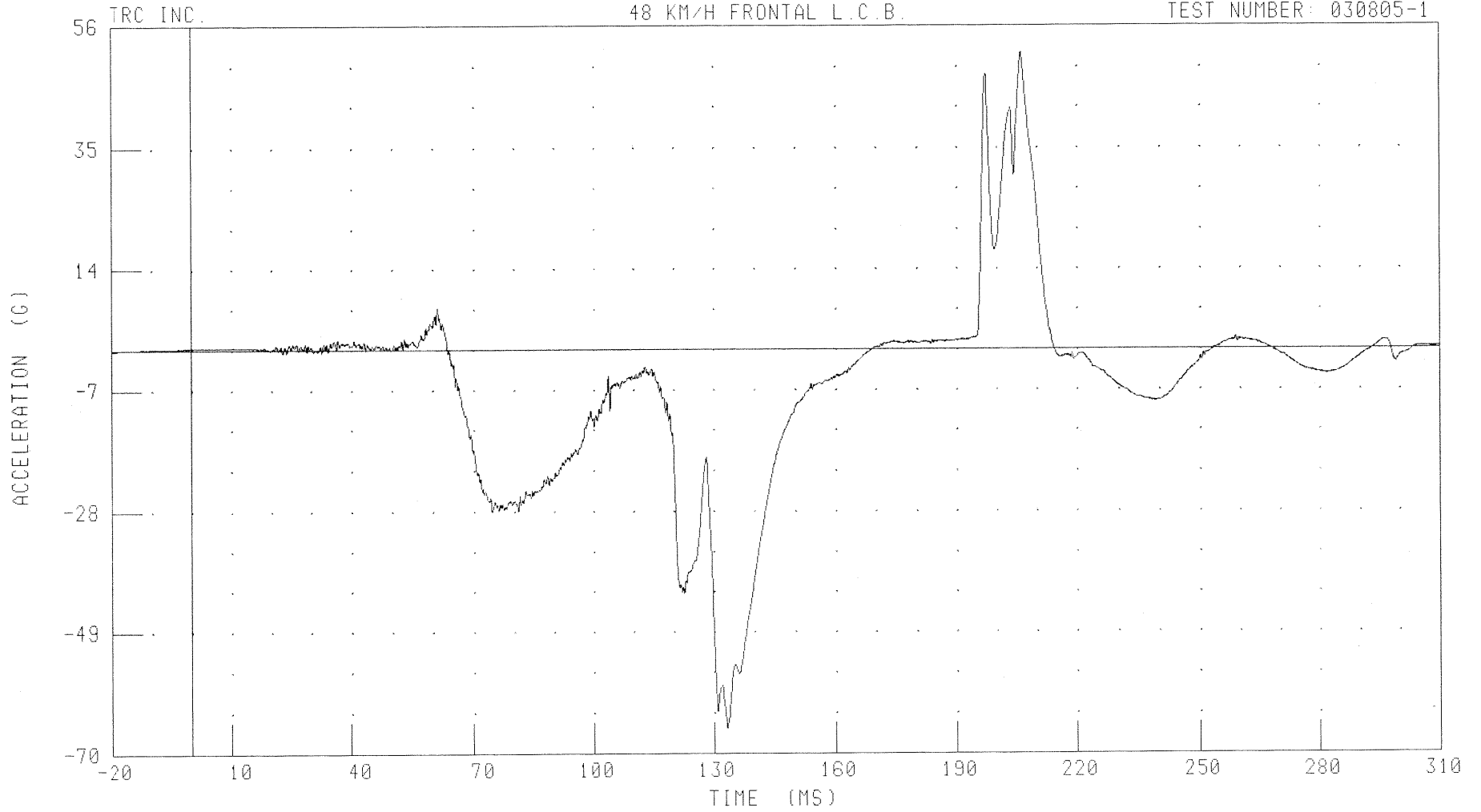
PEAK DATA: 32.06 G @ 101.04 MS; -24.46 G @ 131.60 MS

B-20

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD X-AXIS (TP) ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HD3XG1 FILTER: CH. CLASS 1000

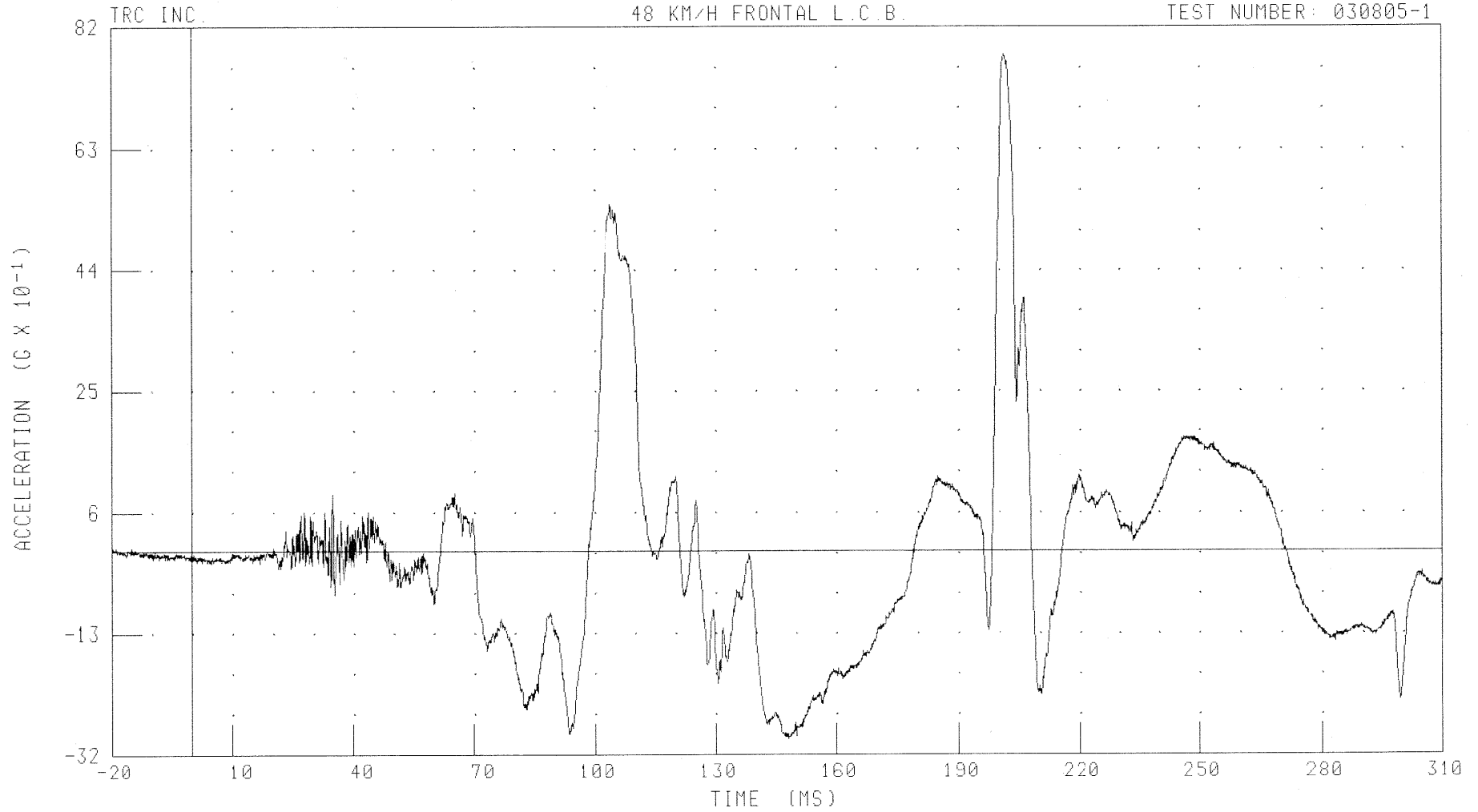
PEAK DATA: 51.47 G @ 206.24 MS; -65.73 G @ 133.28 MS

B-21

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER HEAD Y-AXIS (TP) ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HD3YG1 FILTER: CH. CLASS 1000

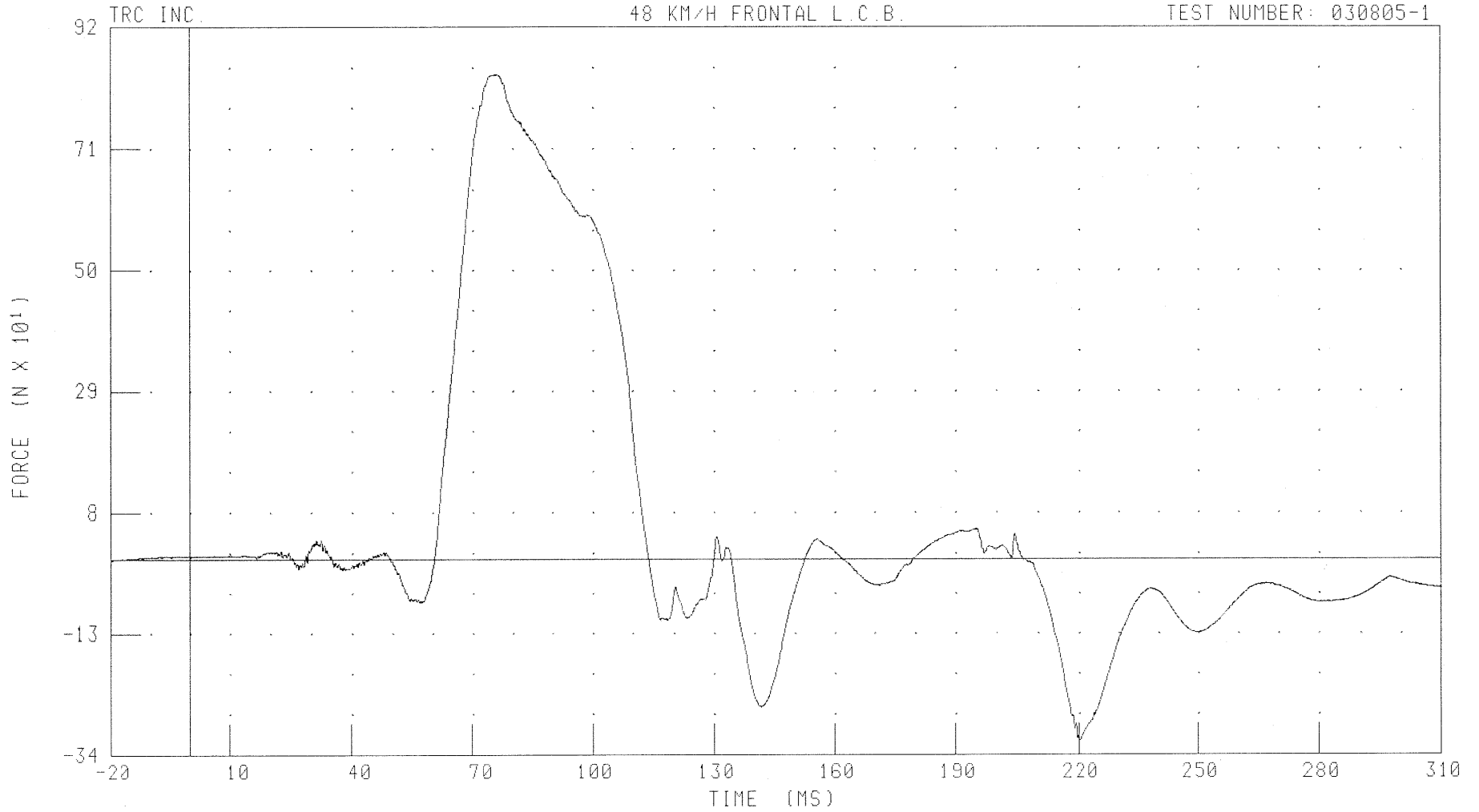
PEAK DATA: 7.78 G @ 201.28 MS; -2.96 G @ 148.16 MS

B-22

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK X-AXIS SHEAR FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

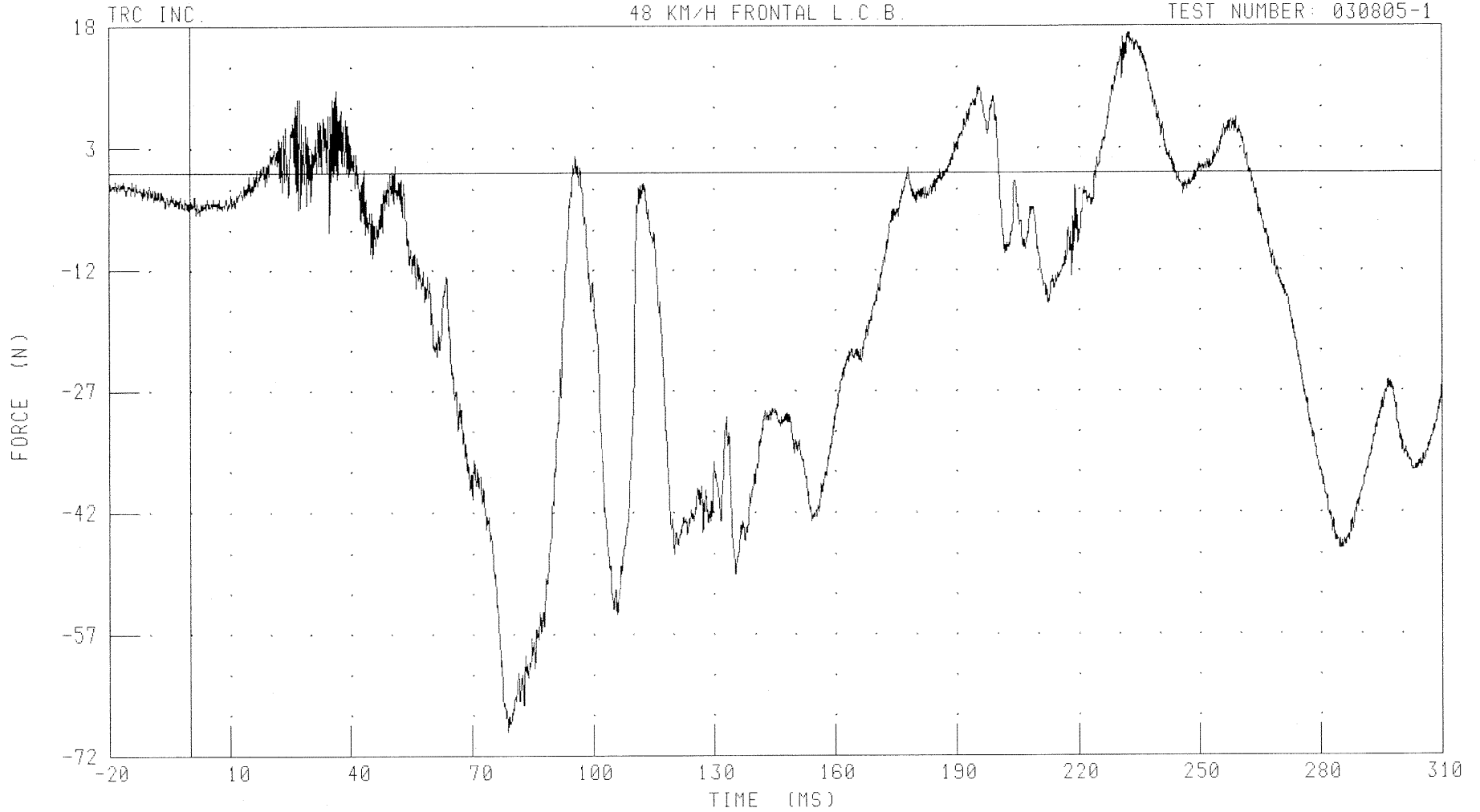
PEAK DATA: 839.09 N @ 76.16 MS; -315.08 N @ 220.16 MS

B-23

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK Y-AXIS SHEAR FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

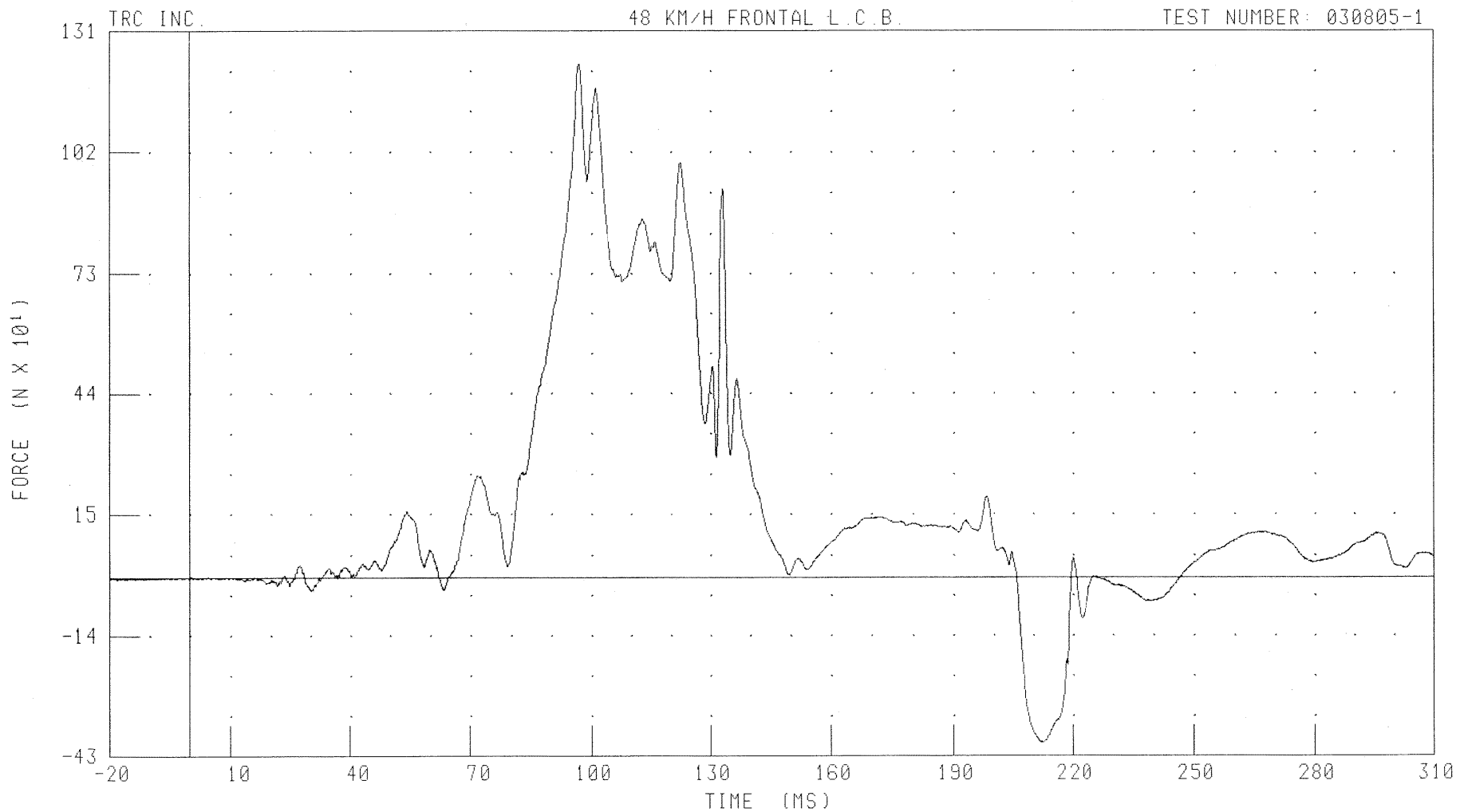
PEAK DATA: 17.20 N @ 232.08 MS; -69.10 N @ 78.88 MS

B-24

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK Z-AXIS AXIAL FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

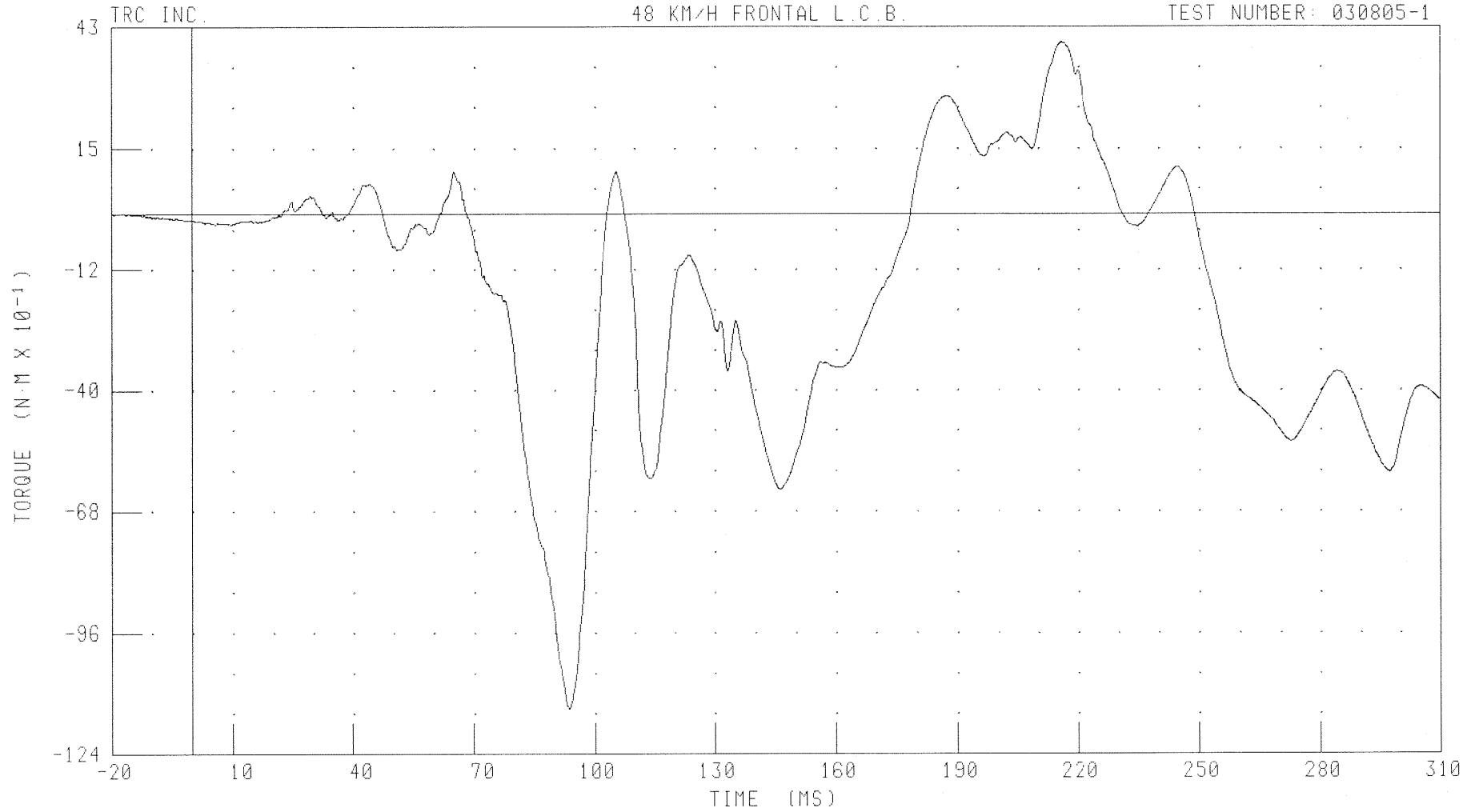
PEAK DATA: 1230.47 N @ 96.88 MS; -397.60 N @ 211.84 MS

B-25

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK MOMENT ABOUT X AXIS
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKXM1 FILTER: CH. CLASS 600

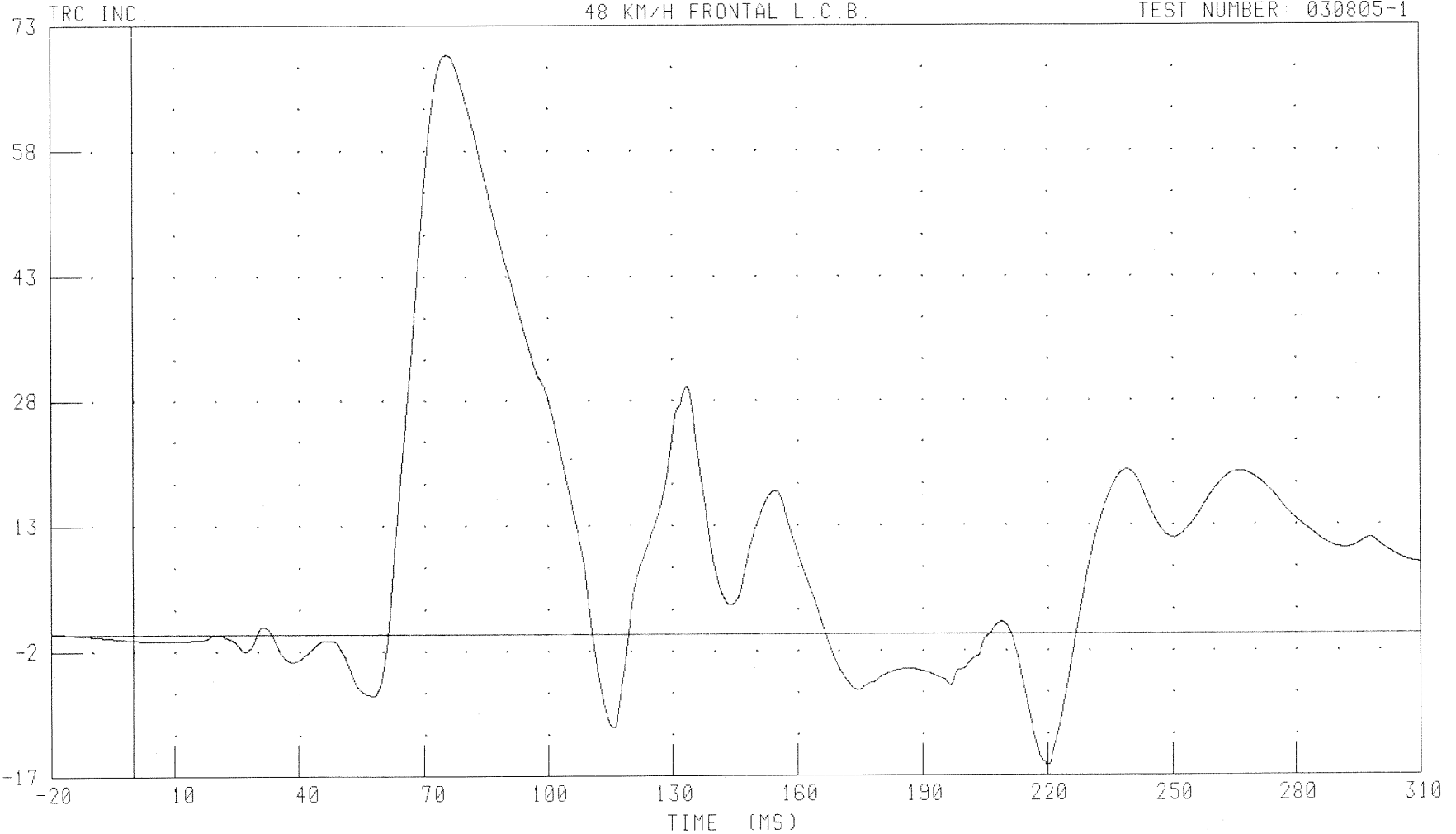
PEAK DATA: 3.94 N·M @ 215.76 MS; -11.45 N·M @ 93.68 MS

B-26

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK MOMENT ABOUT Y AXIS
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKYM1 FILTER: CH. CLASS 600

PEAK DATA: 69.44 N·M @ 75.76 MS; -15.83 N·M @ 219.84 MS

B-27

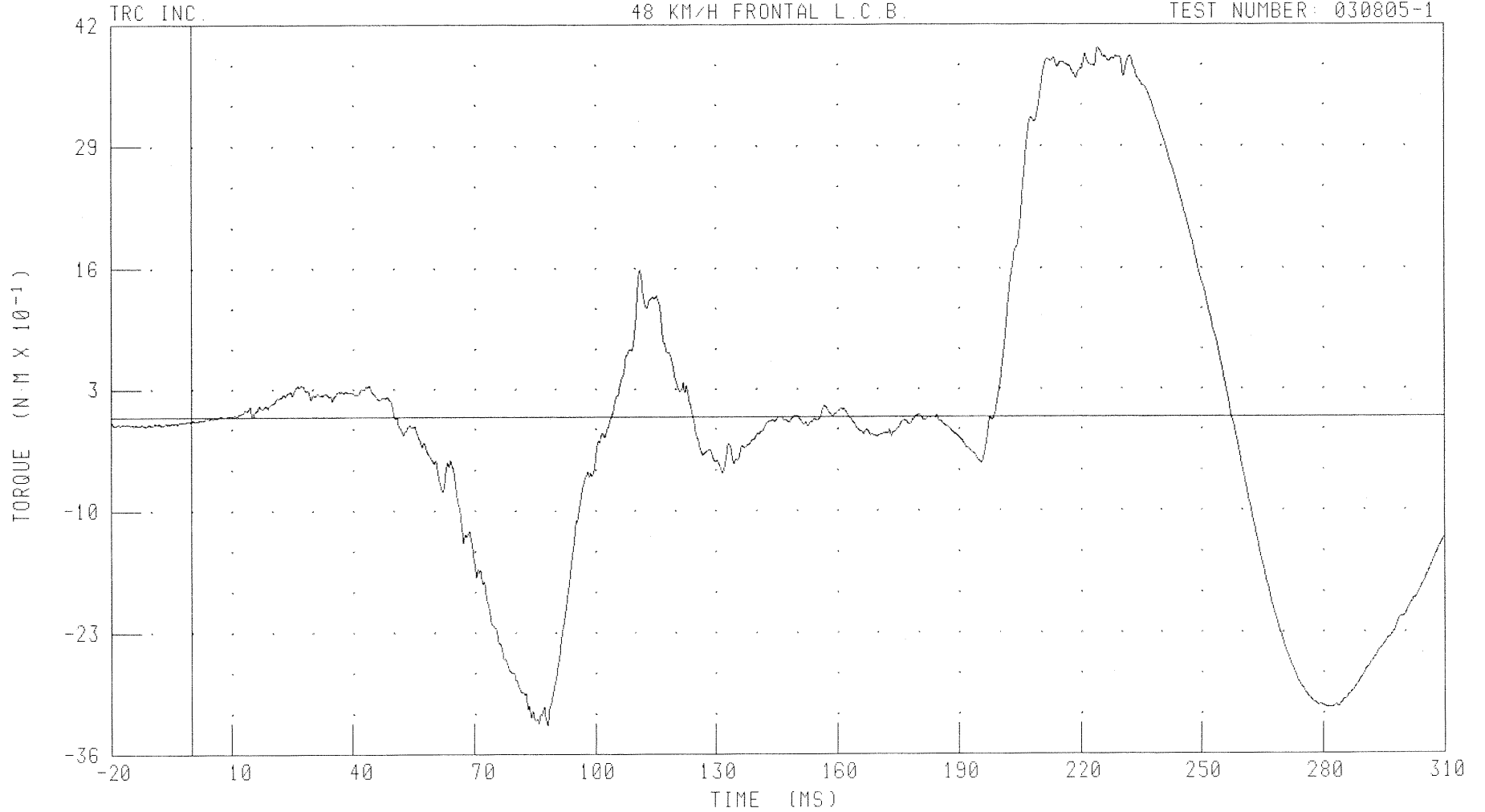
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER NECK MOMENT ABOUT Z AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKZM1 FILTER: CH. CLASS 600

PEAK DATA: 3.95 N-M @ 224.32 MS; -3.30 N-M @ 88.08 MS

B-28

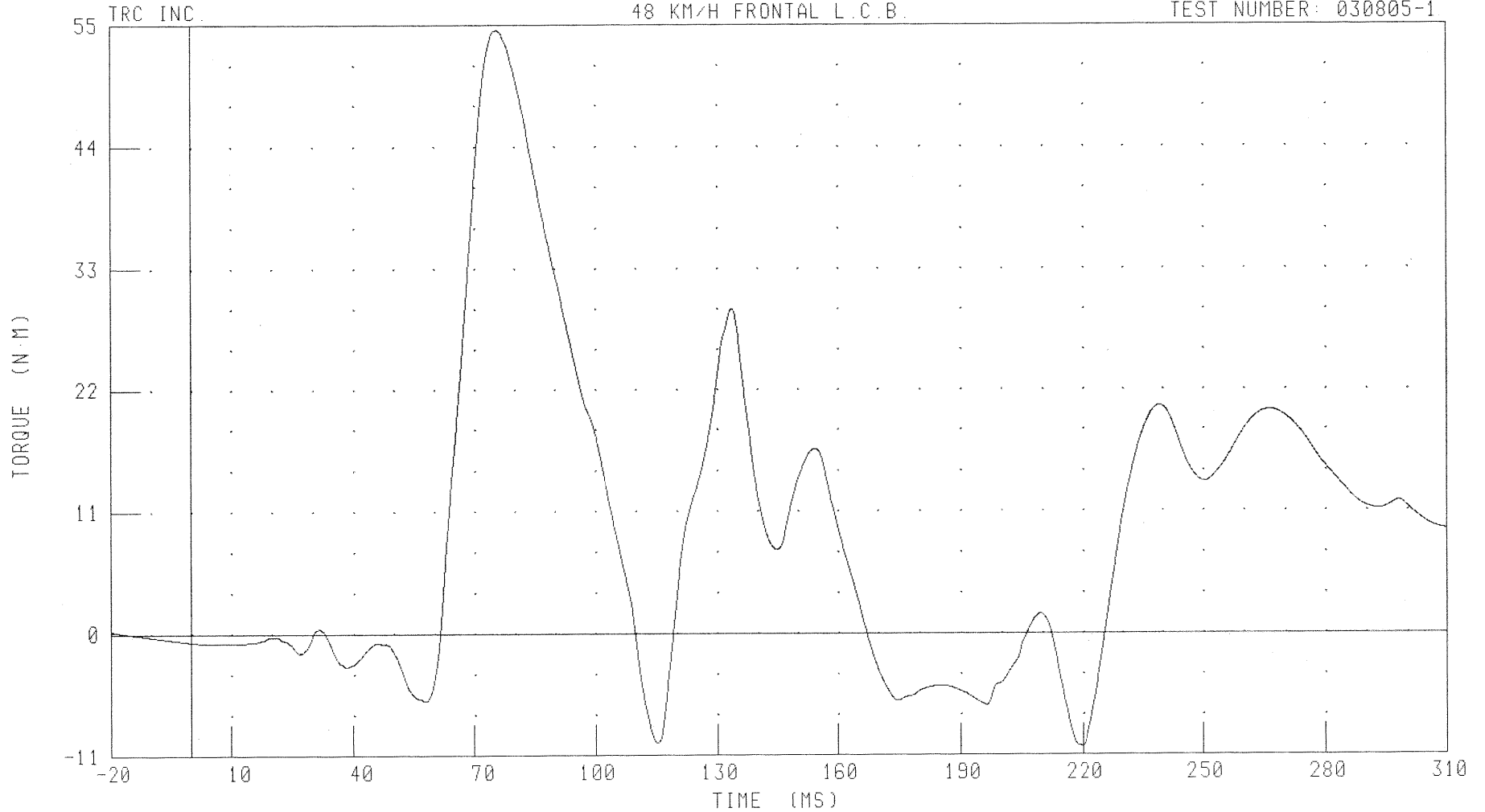
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER NECK OCCIPITAL CONDYLE MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKOM1 FILTER: CH. CLASS 600

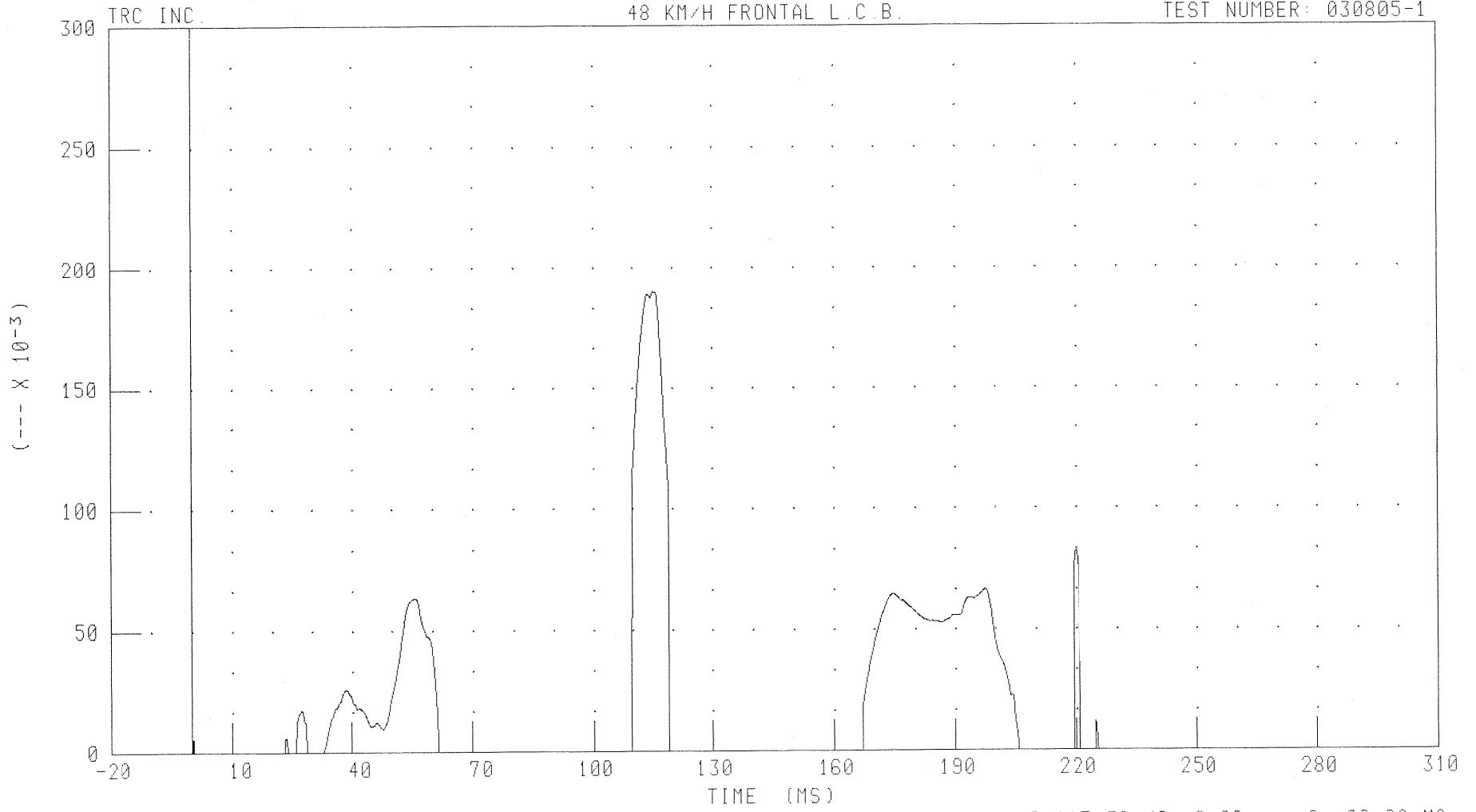
PEAK DATA: 54.54 N·M @ 75.76 MS; -10.30 N·M @ 219.76 MS

B-29

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK TENSION/EXTENSION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NTE1

FILTER: CH. CLASS 600

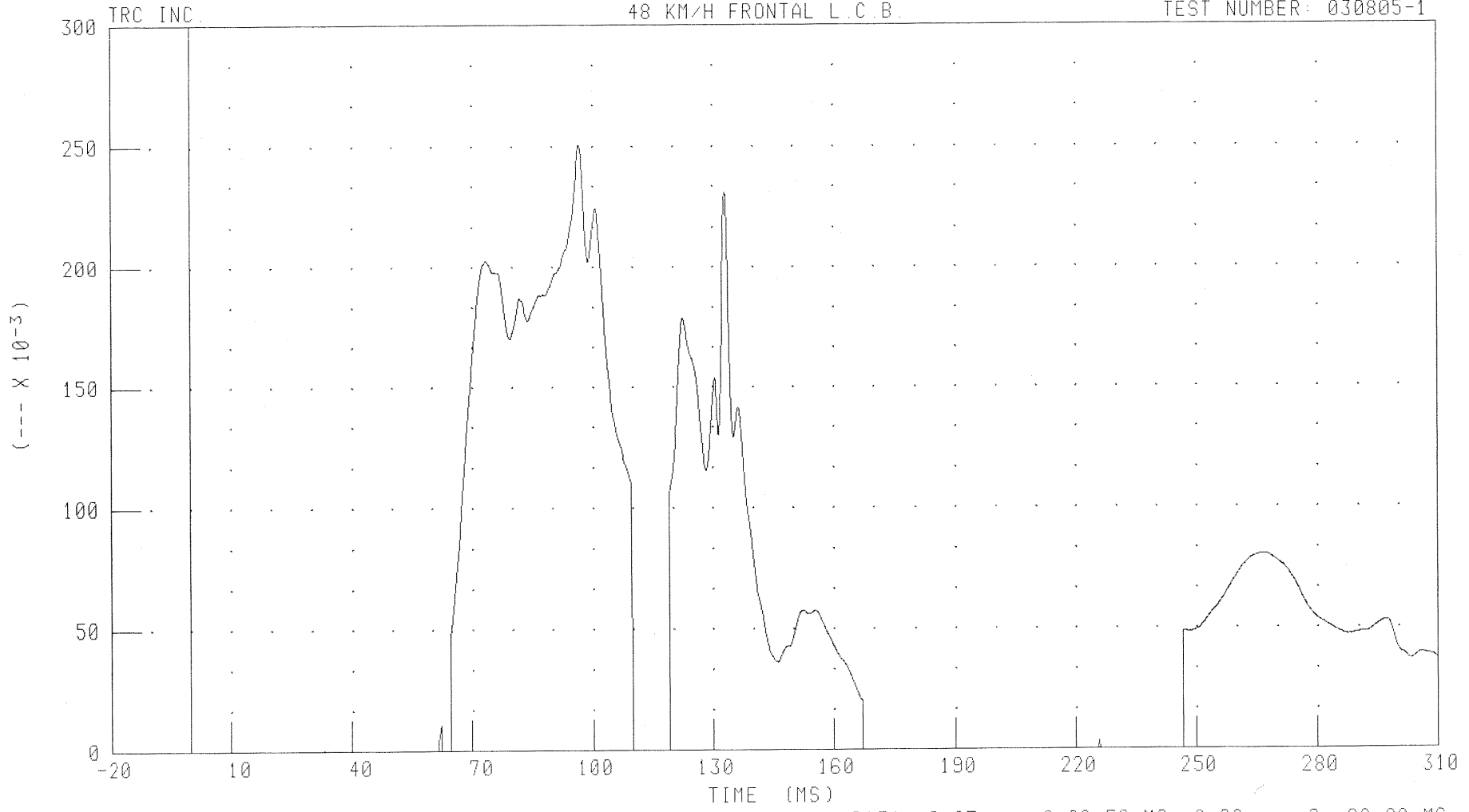
PEAK DATA: 0.19 --- @ 115.36 MS; 0.00 --- @ -20.00 MS

B-30

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK TENSION/FLEXION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NTF1

FILTER: CH. CLASS 600

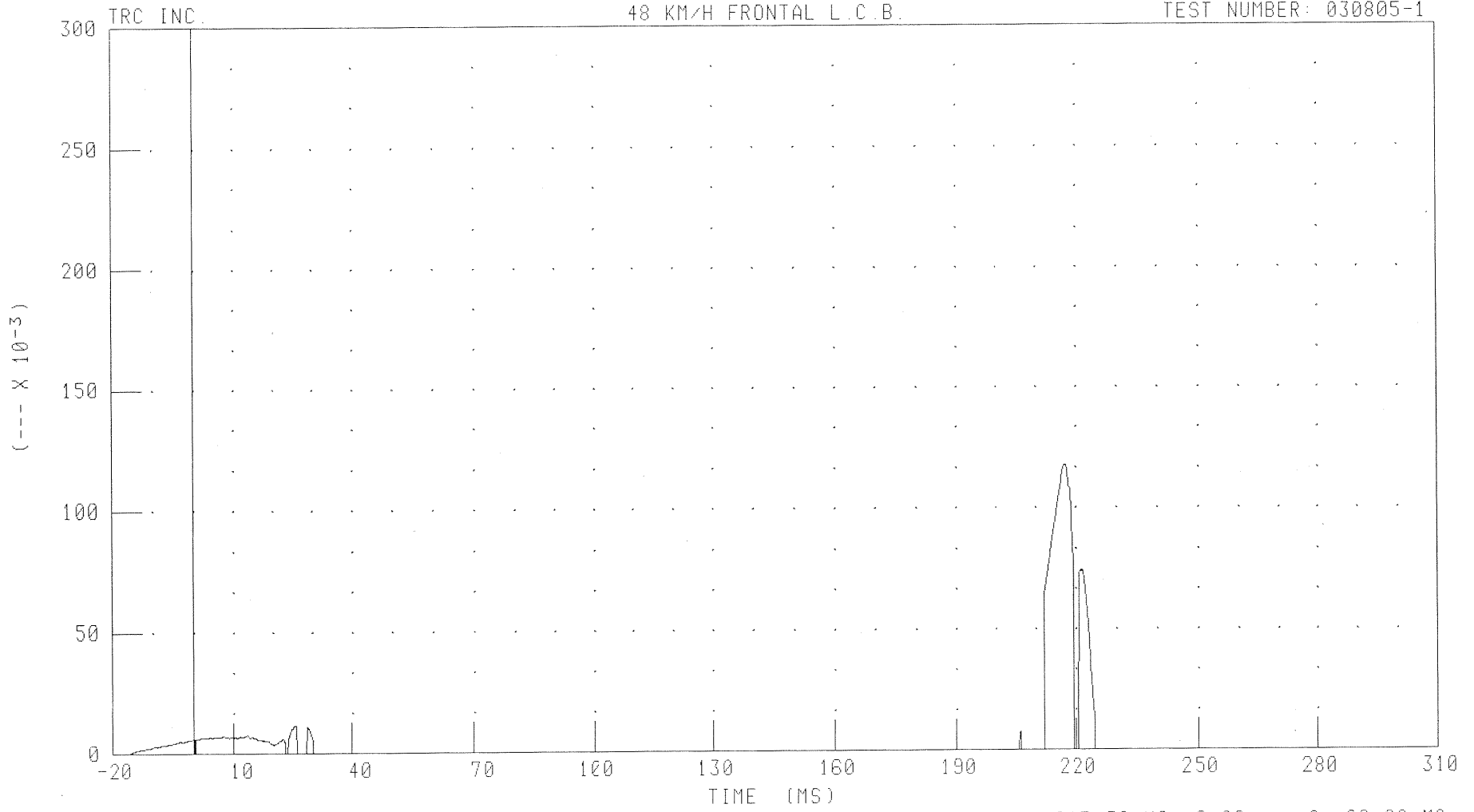
PEAK DATA: 0.25 --- @ 96.72 MS; 0.00 --- @ -20.00 MS

B-31

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK COMPRESSION/EXTENSION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NCE1

FILTER: CH. CLASS 600

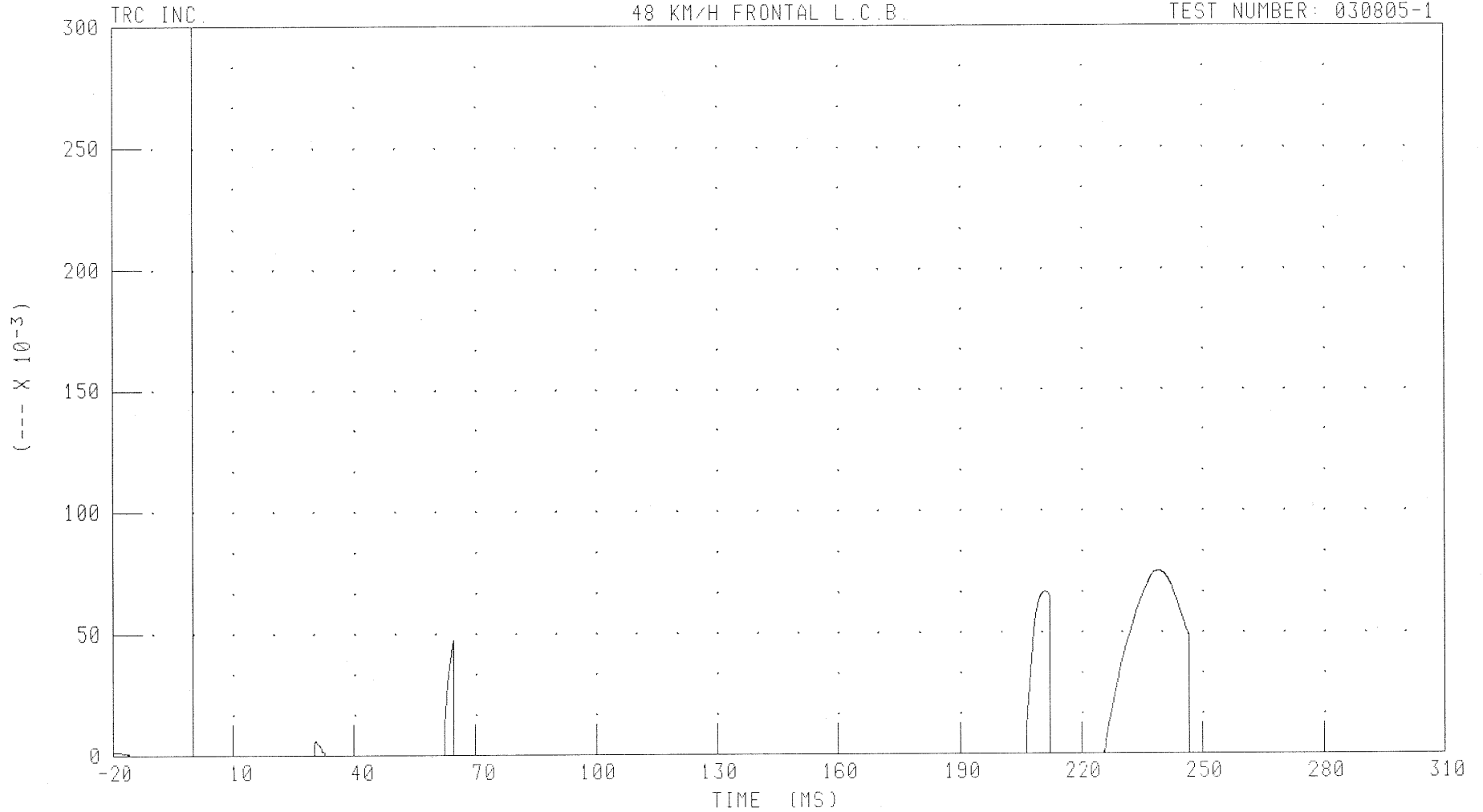
PEAK DATA: 0.12 --- @ 217.36 MS; 0.00 --- @ -20.00 MS

B-32

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK COMPRESSION/FLEXION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NCF1

FILTER: CH. CLASS 600

PEAK DATA: 0.08 --- @ 239.52 MS; 0.00 --- @ -15.52 MS

B-33

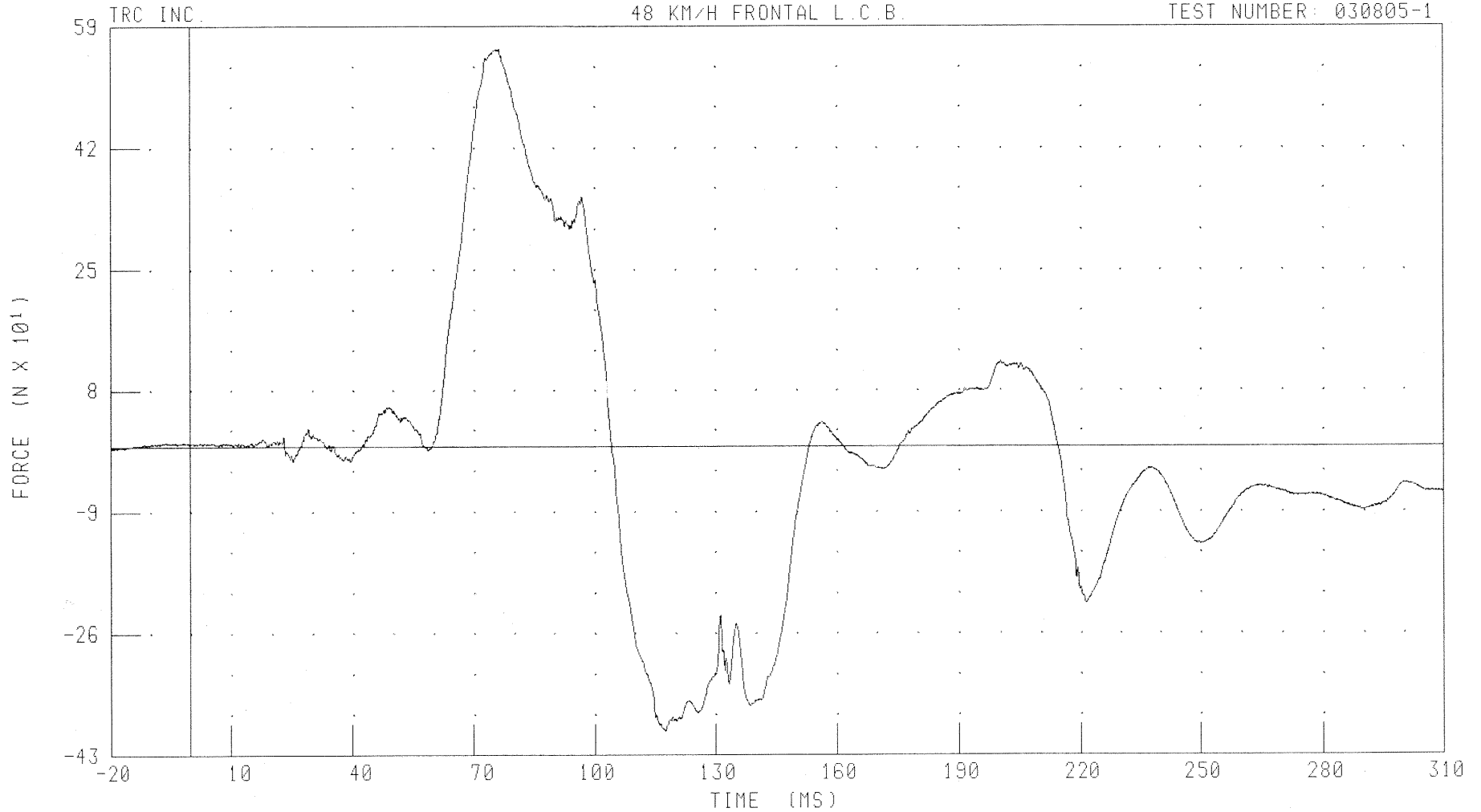
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER NECK LOWER X-AXIS SHEAR FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLXF1 FILTER: CH. CLASS 1000

PEAK DATA: 558.90 N @ 76.40 MS; -396.78 N @ 117.60 MS

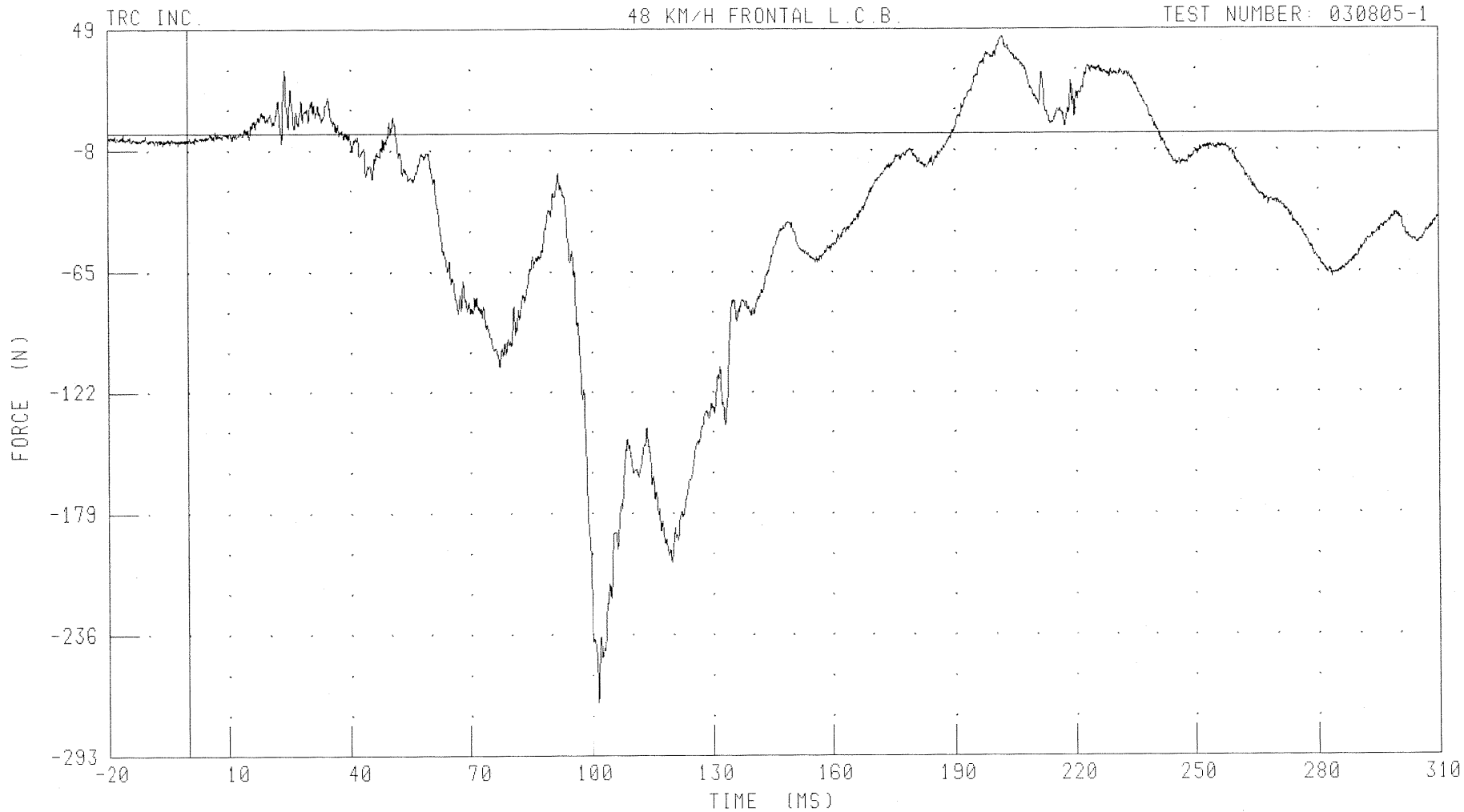
B-34

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK LOWER Y-AXIS SHEAR FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLYF1

FILTER: CH. CLASS 1000

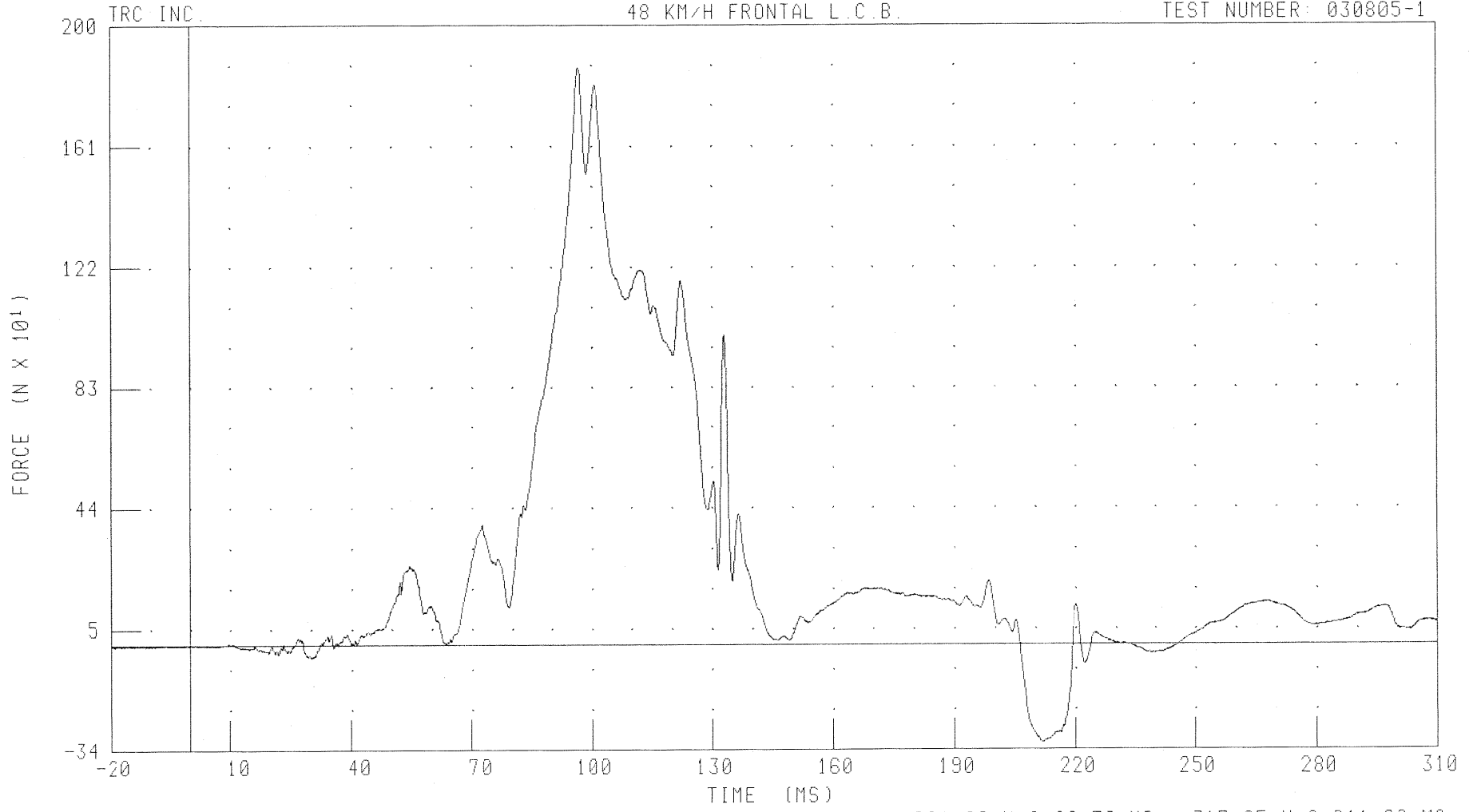
PEAK DATA: 45.27 N @ 201.60 MS, -267.97 N @ 101.76 MS

B-35

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK LOWER Z-AXIS AXIAL FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLZF1 FILTER: CH. CLASS 1000

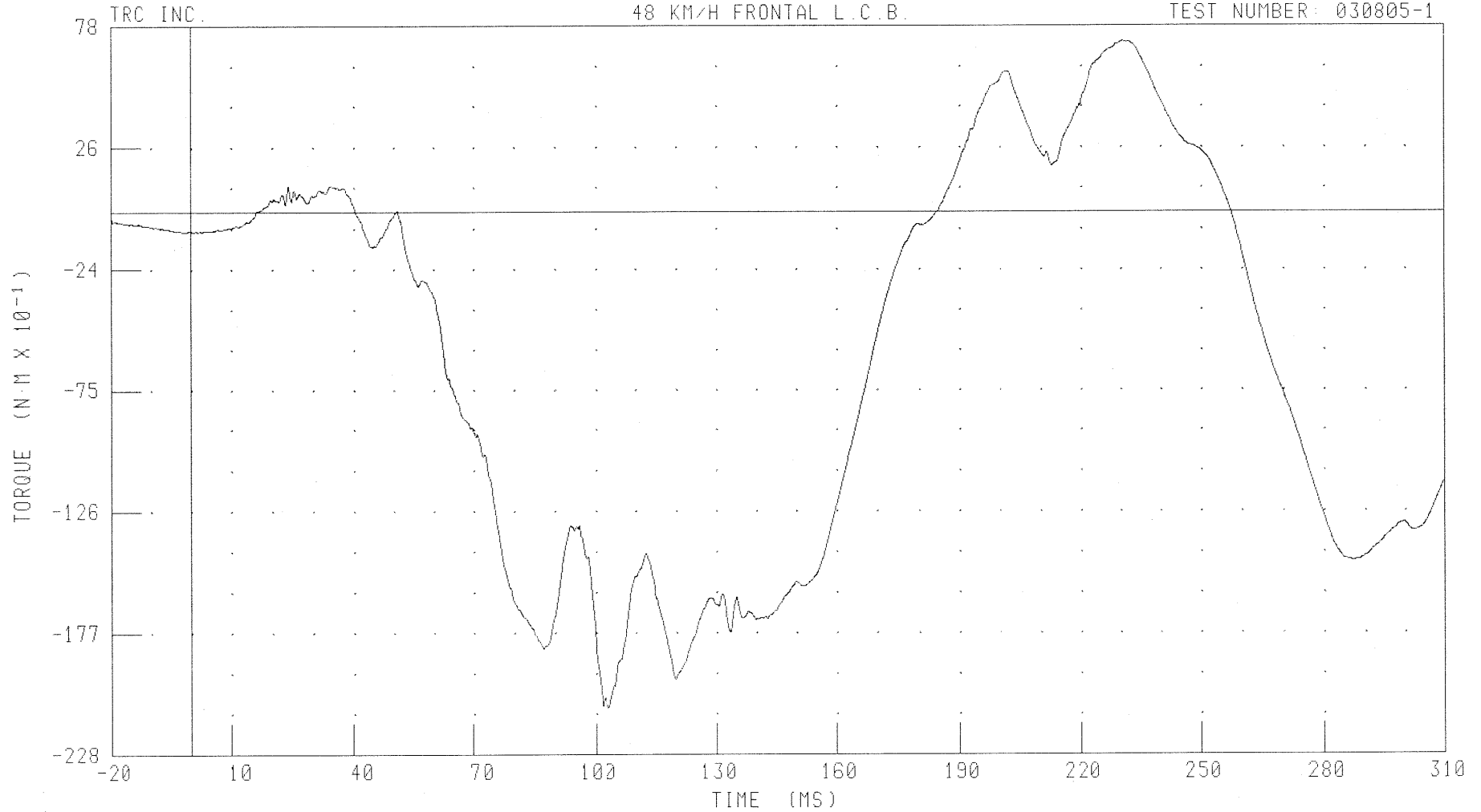
PEAK DATA: 1861.08 N @ 96.72 MS; -317.05 N @ 211.68 MS

B-36

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK LOWER MOMENT ABOUT X AXIS
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLXM1 FILTER: CH. CLASS 600

PEAK DATA: 7.15 N·M @ 230.56 MS; -20.85 N·M @ 103.28 MS

B-37

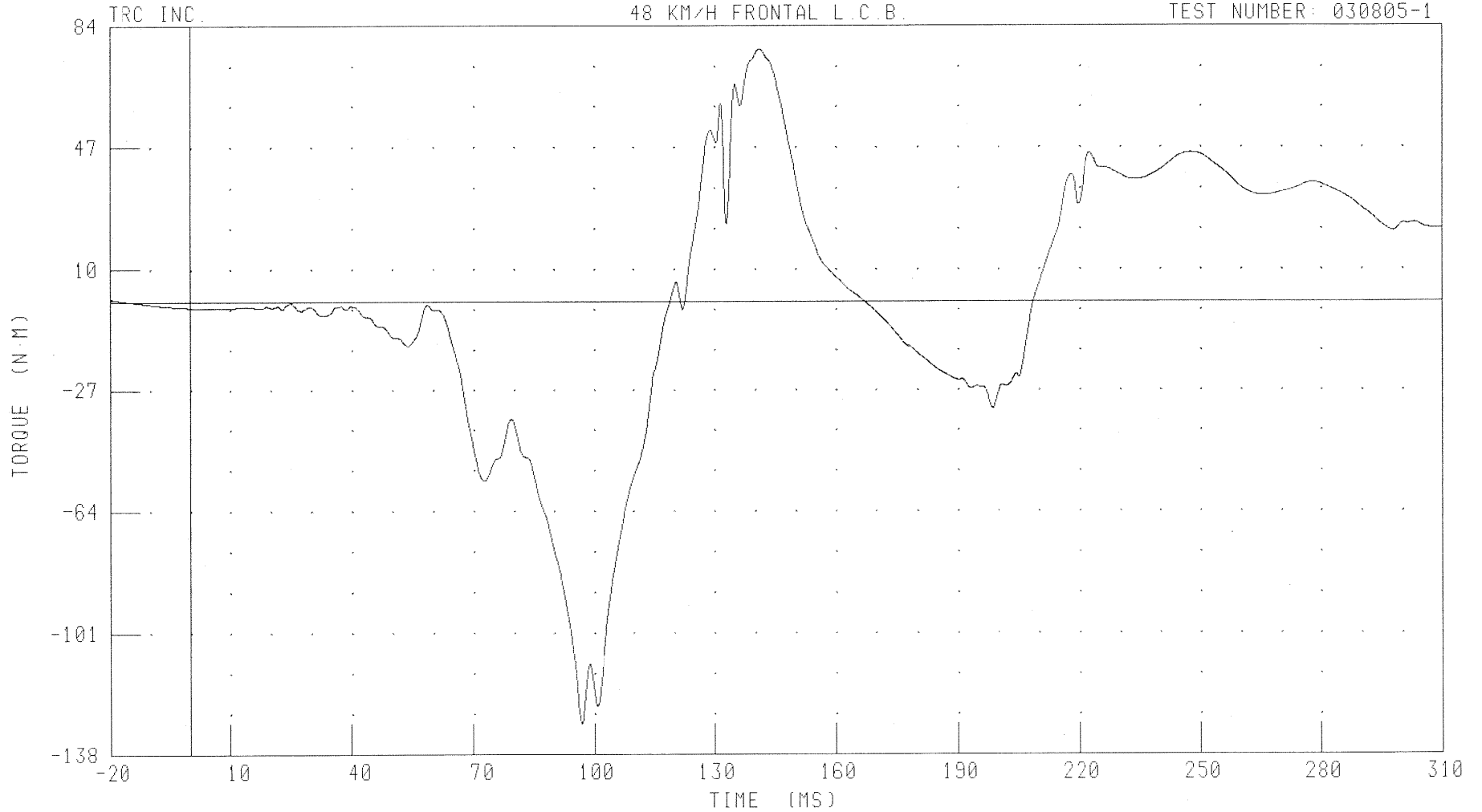
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER NECK LOWER MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLYM1 FILTER: CH. CLASS 600

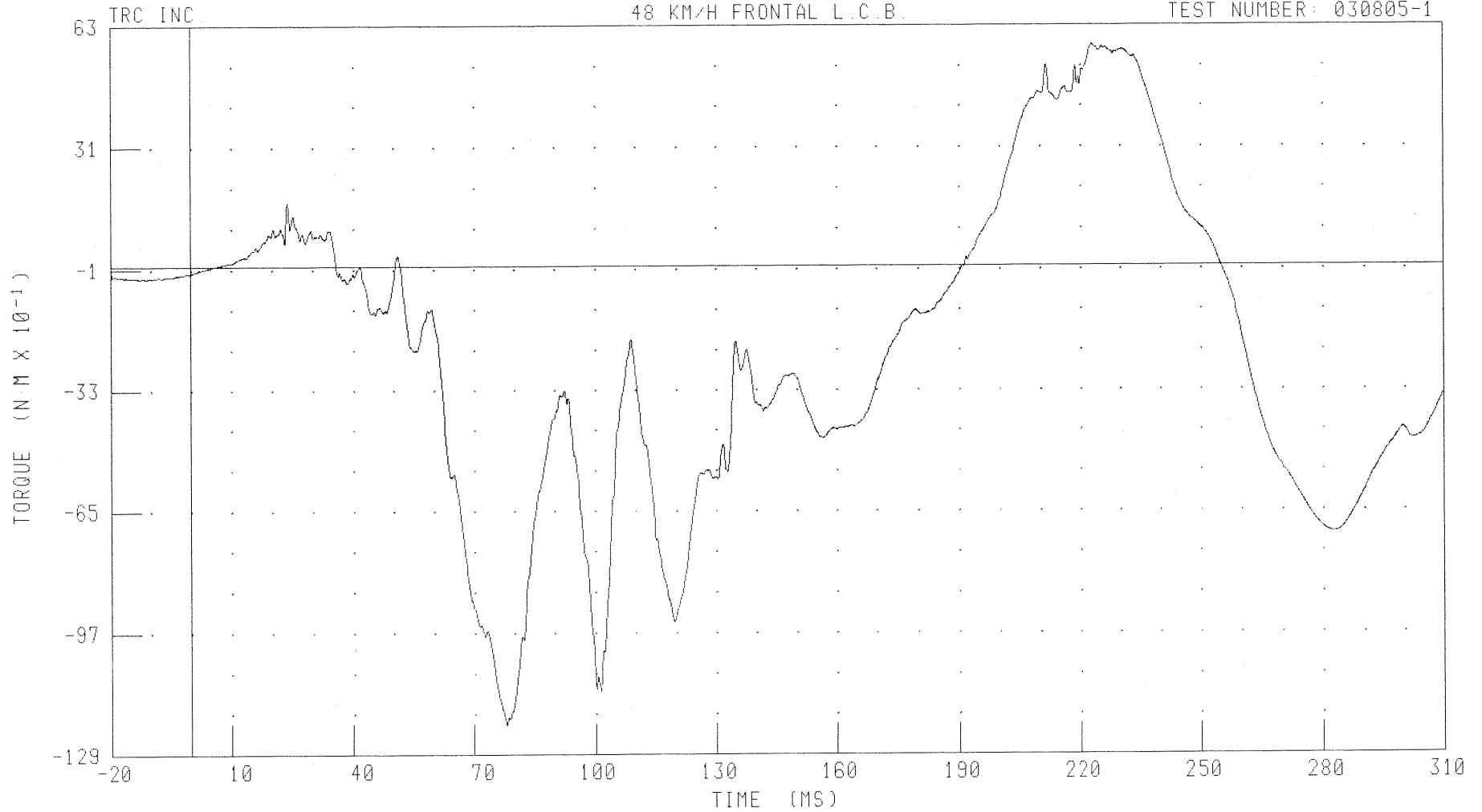
PEAK DATA: 76.94 N·M @ 141.04 MS; -128.53 N·M @ 96.96 MS

B-38

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER NECK LOWER MOMENT ABOUT Z AXIS
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLZM1 FILTER: CH. CLASS 600

PEAK DATA: 5.80 N·M @ 223.20 MS; -12.12 N·M @ 78.16 MS

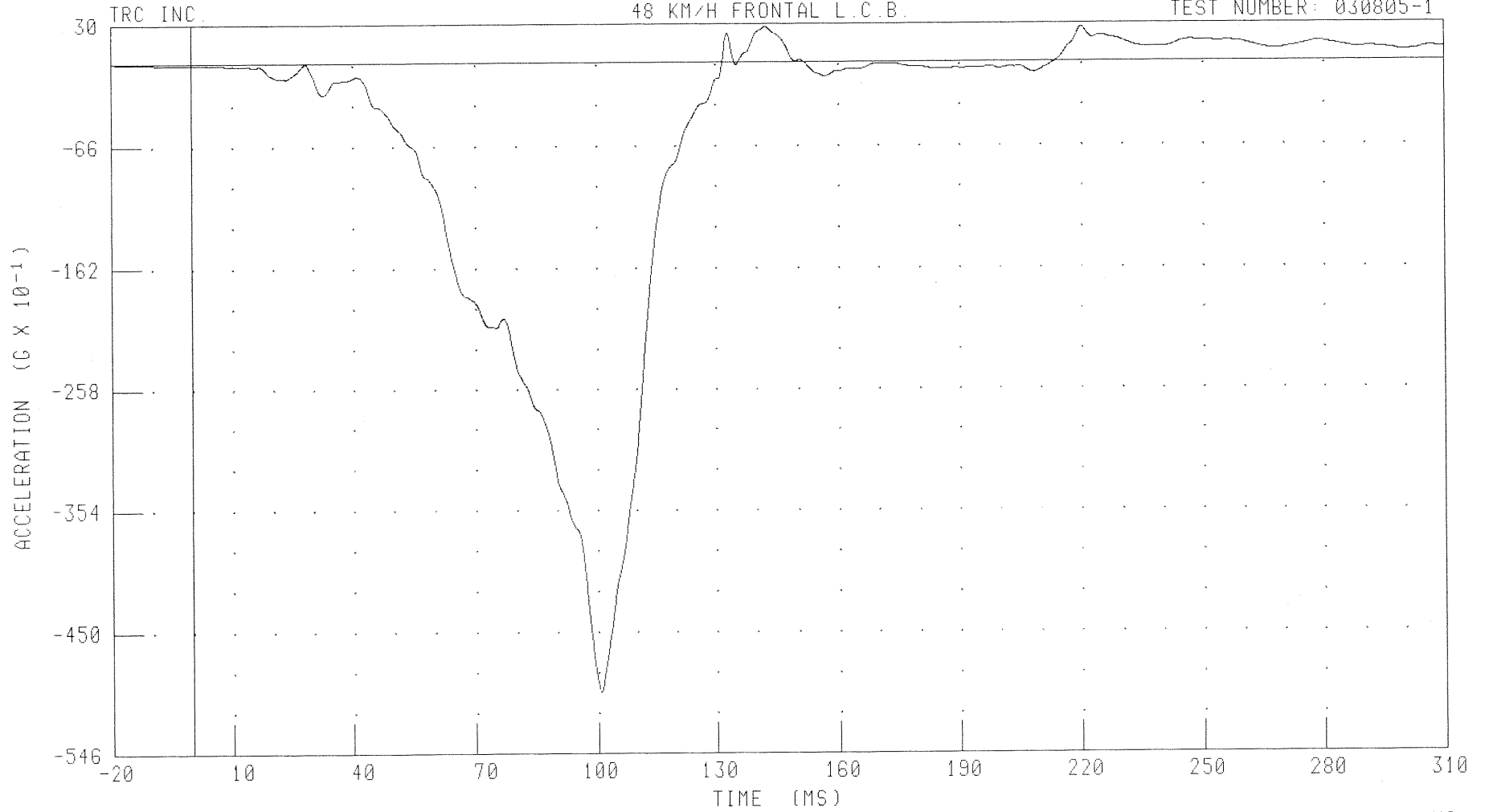
B-39

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER CHEST X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTXC1

FILTER: CH. CLASS 180

PEAK DATA: 2.81 G @ 142.48 MS; -49.75 G @ 100.88 MS

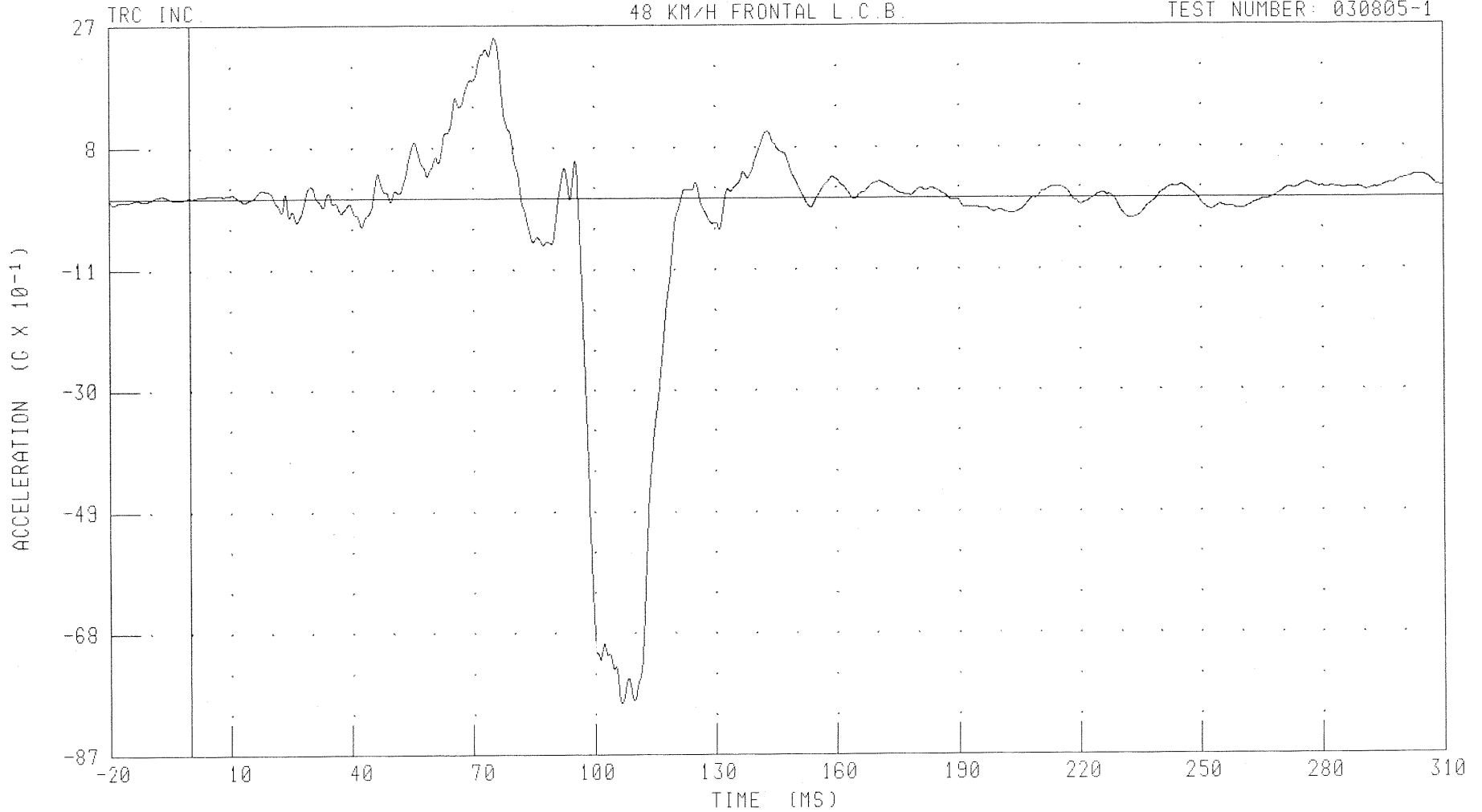
B-40

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER CHEST Y-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTYG1

FILTER: CH. CLASS 180

PEAK DATA: 2.51 G @ 75.44 MS; -7.89 G @ 106.80 MS

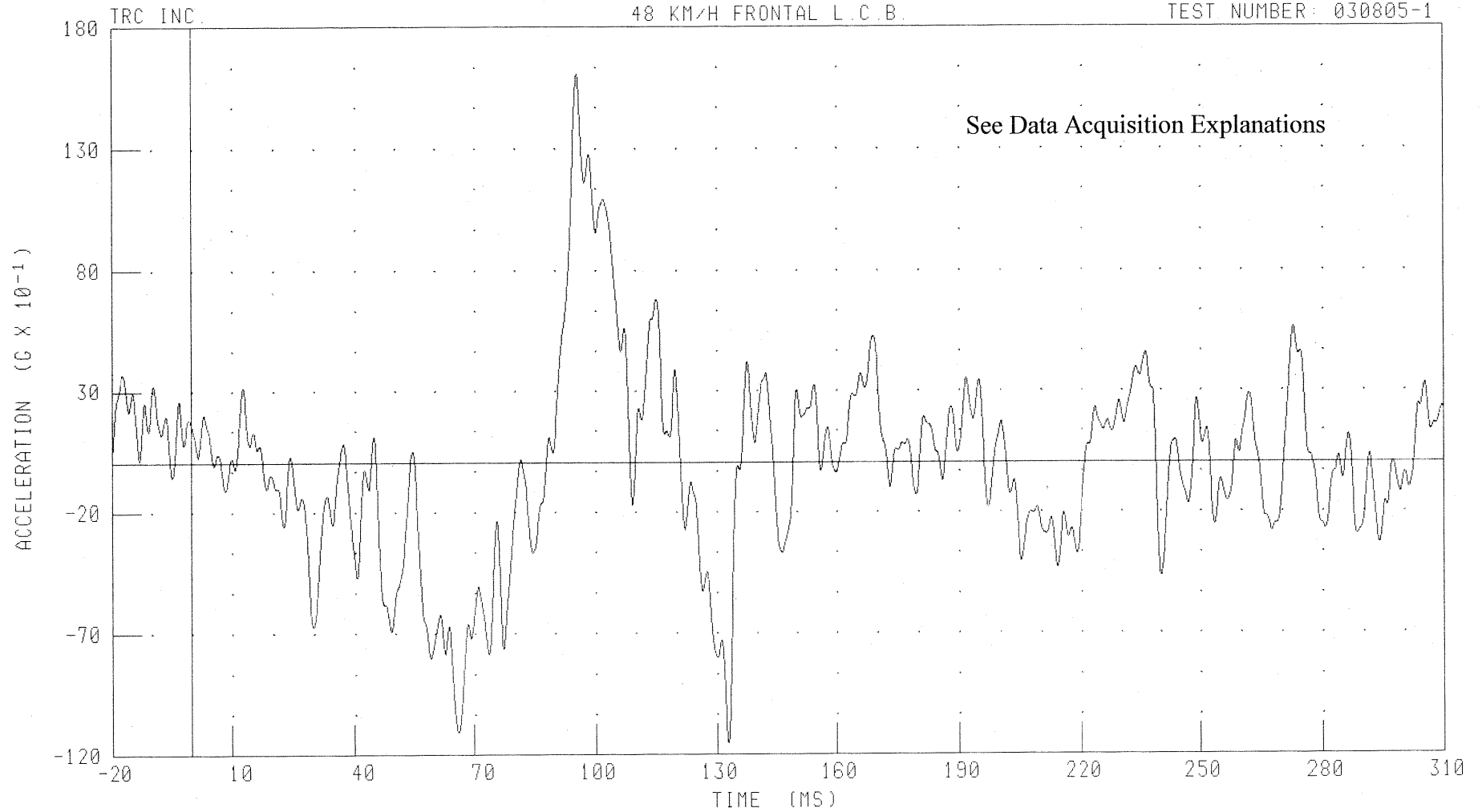
B41

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER CHEST Z-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTZG1

FILTER: CH. CLASS 180

PEAK DATA: 16.06 G @ 95.52 MS; -11.52 G @ 132.88 MS

B-42

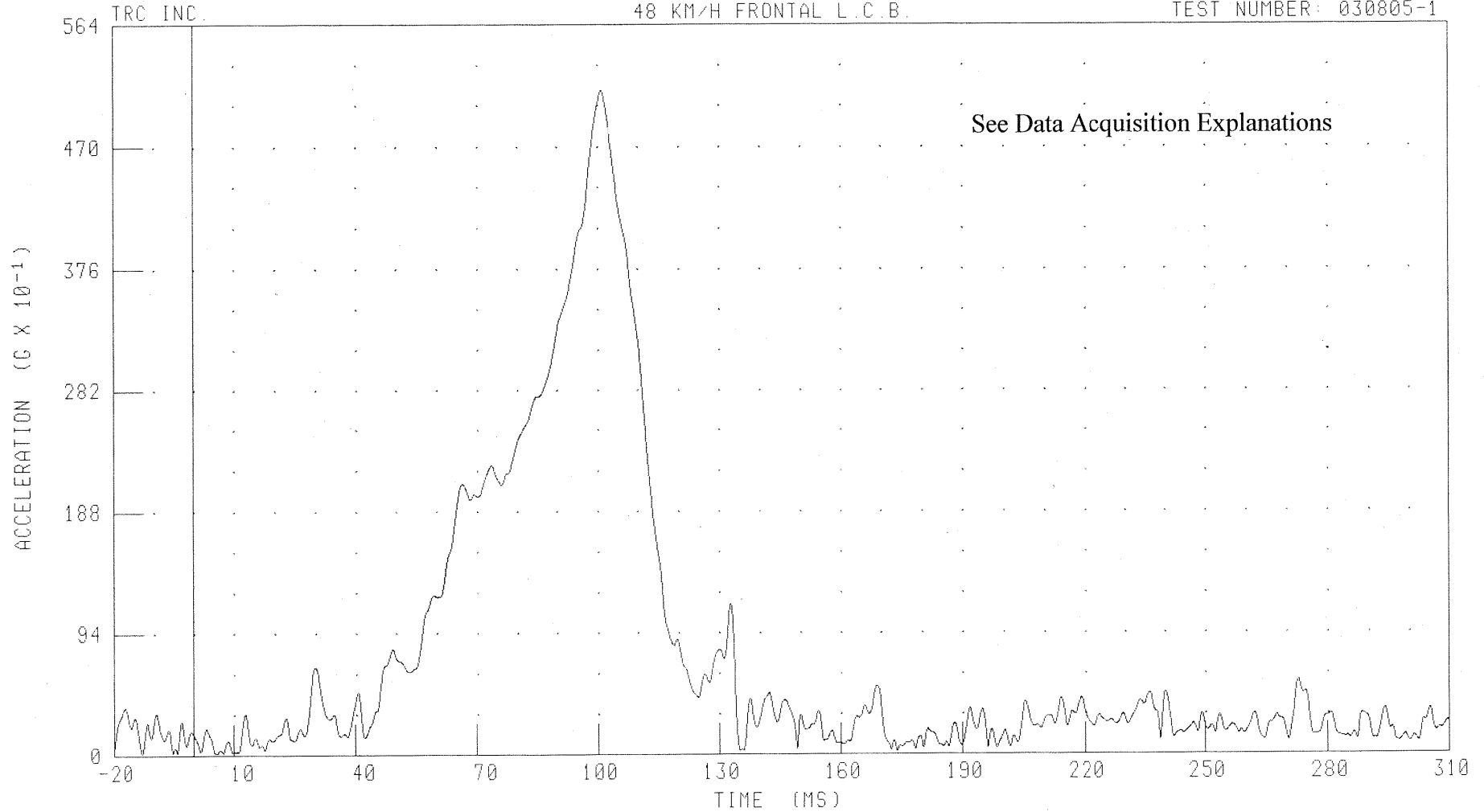
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER CHEST RESULTANT ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1

See Data Acquisition Explanations



CHANNEL: CSTRG1 FILTER: CH. CLASS 180

PEAK DATA: 51.31 G @ 100.96 MS; 0.13 G @ -4.08 MS

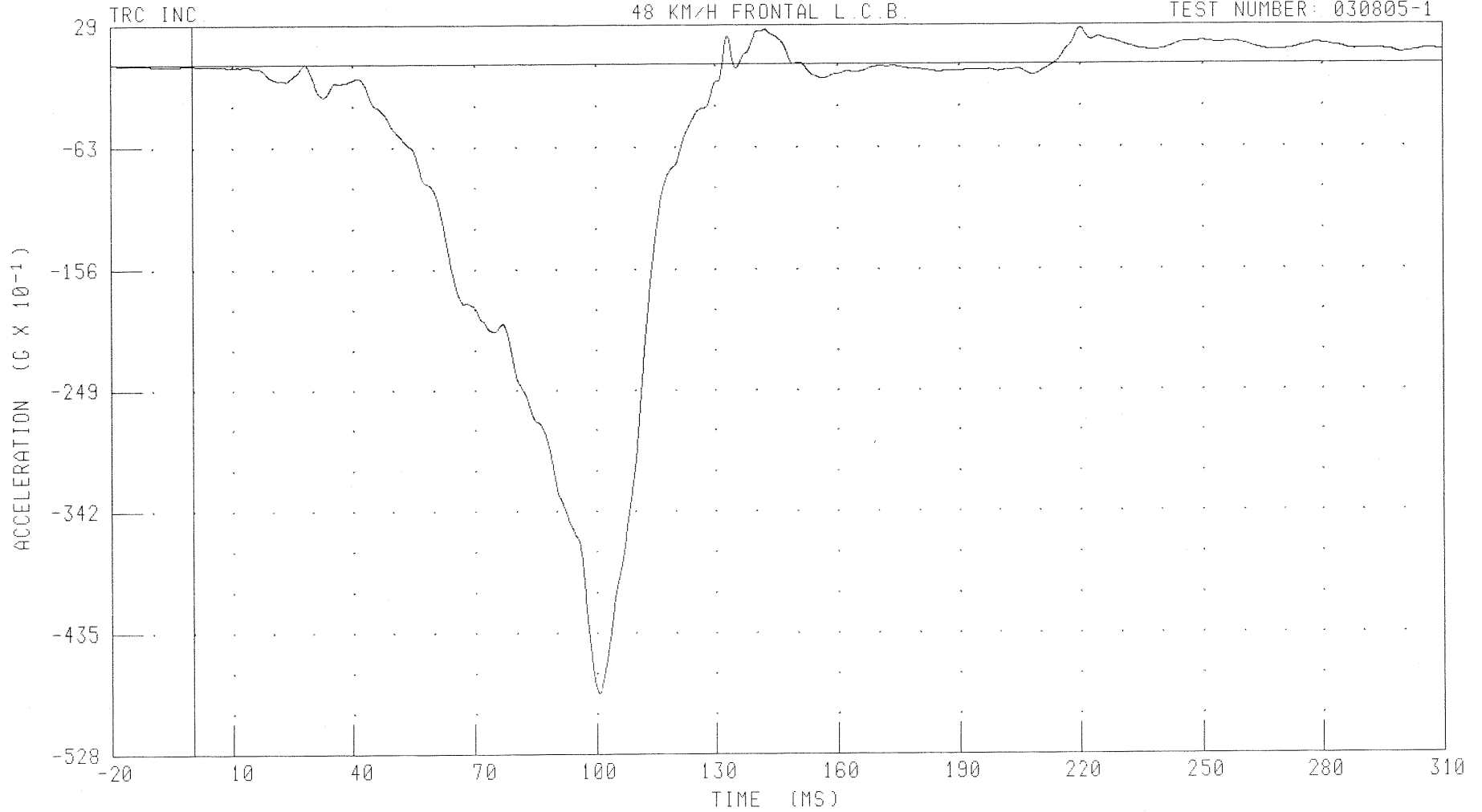
B-43

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER CHEST X-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTXR1 FILTER: CH. CLASS 180

PEAK DATA: 2.75 G @ 220.16 MS; -48.16 G @ 100.80 MS

B-44

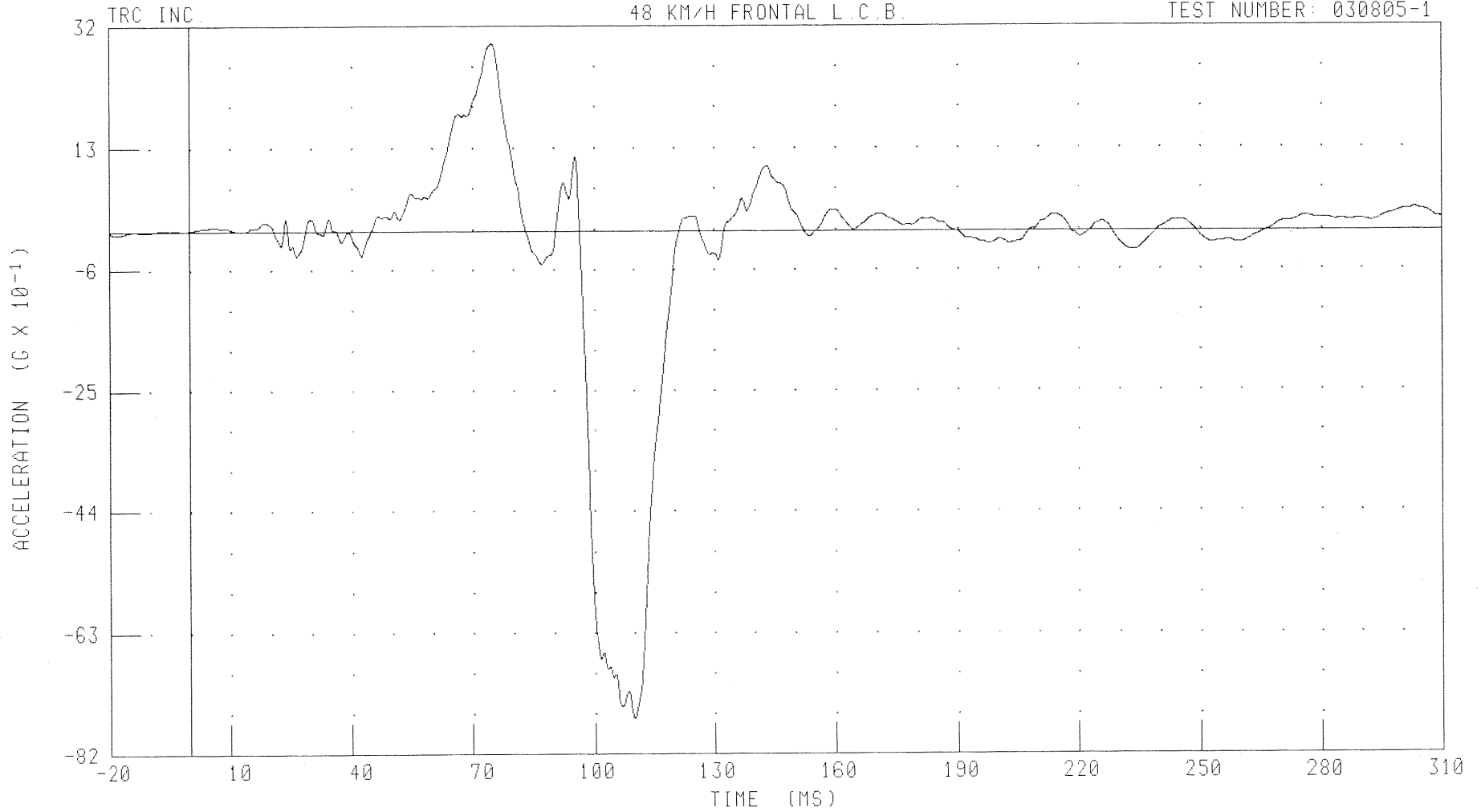
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER CHEST Y-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTYR1 FILTER: CH. CLASS 180

PEAK DATA: 2.92 G @ 74.88 MS; -7.64 G @ 110.08 MS

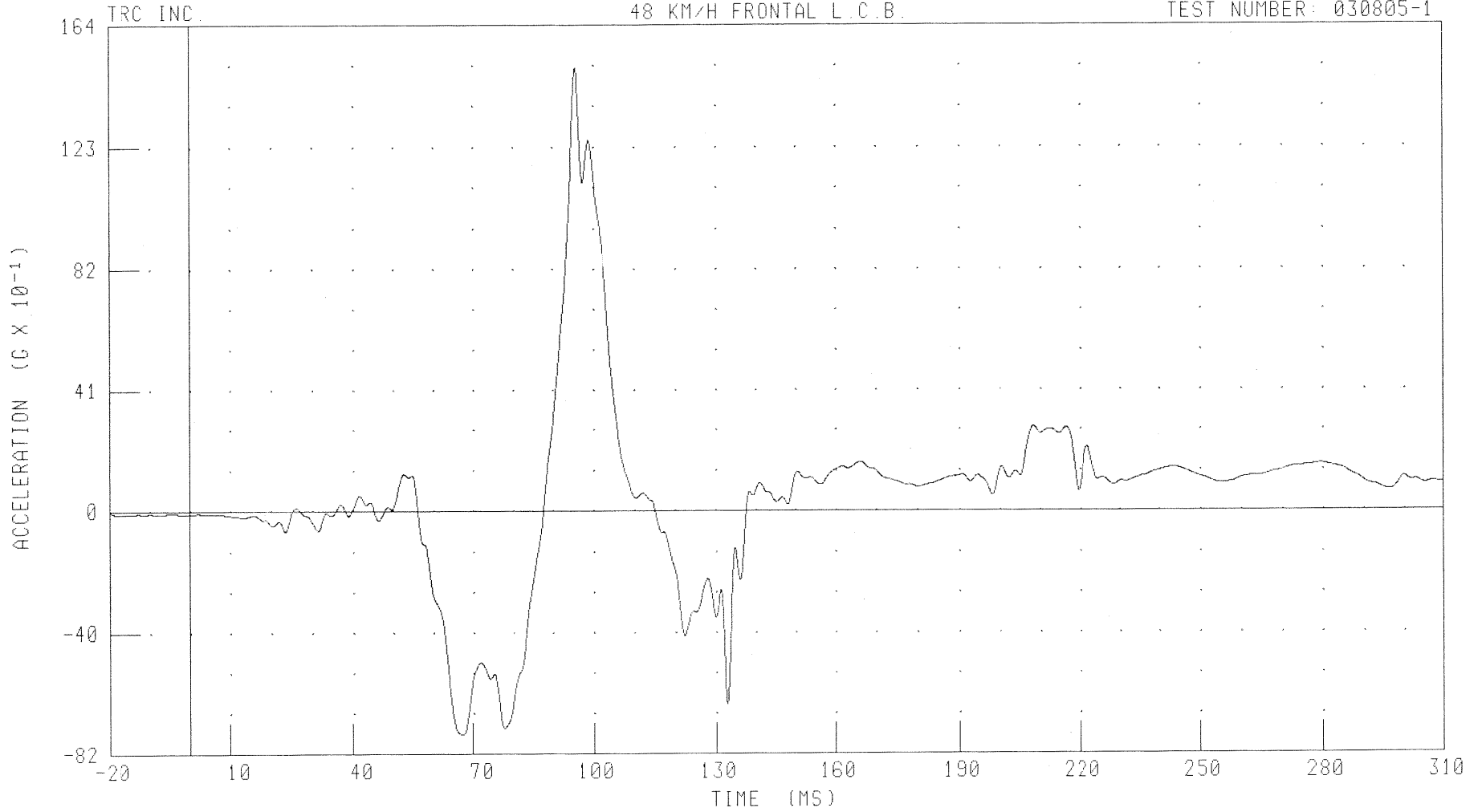
B-45

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER CHEST Z-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTZR1 FILTER: CH. CLASS 180

PEAK DATA: 14.95 G @ 95.68 MS; -7.55 G @ 67.36 MS

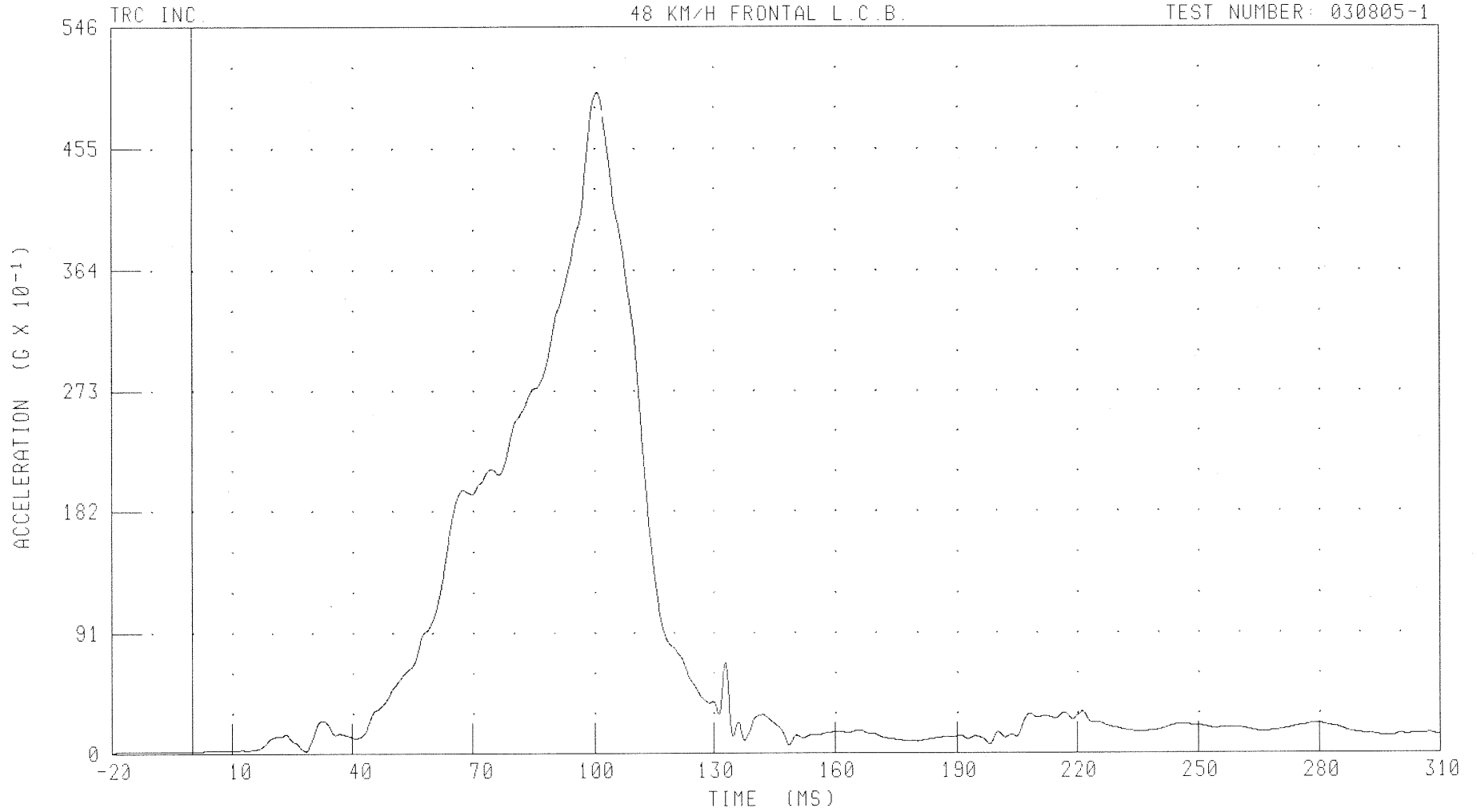
B-46

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER CHEST RESULTANT ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTRR1 FILTER: CH. CLASS 180

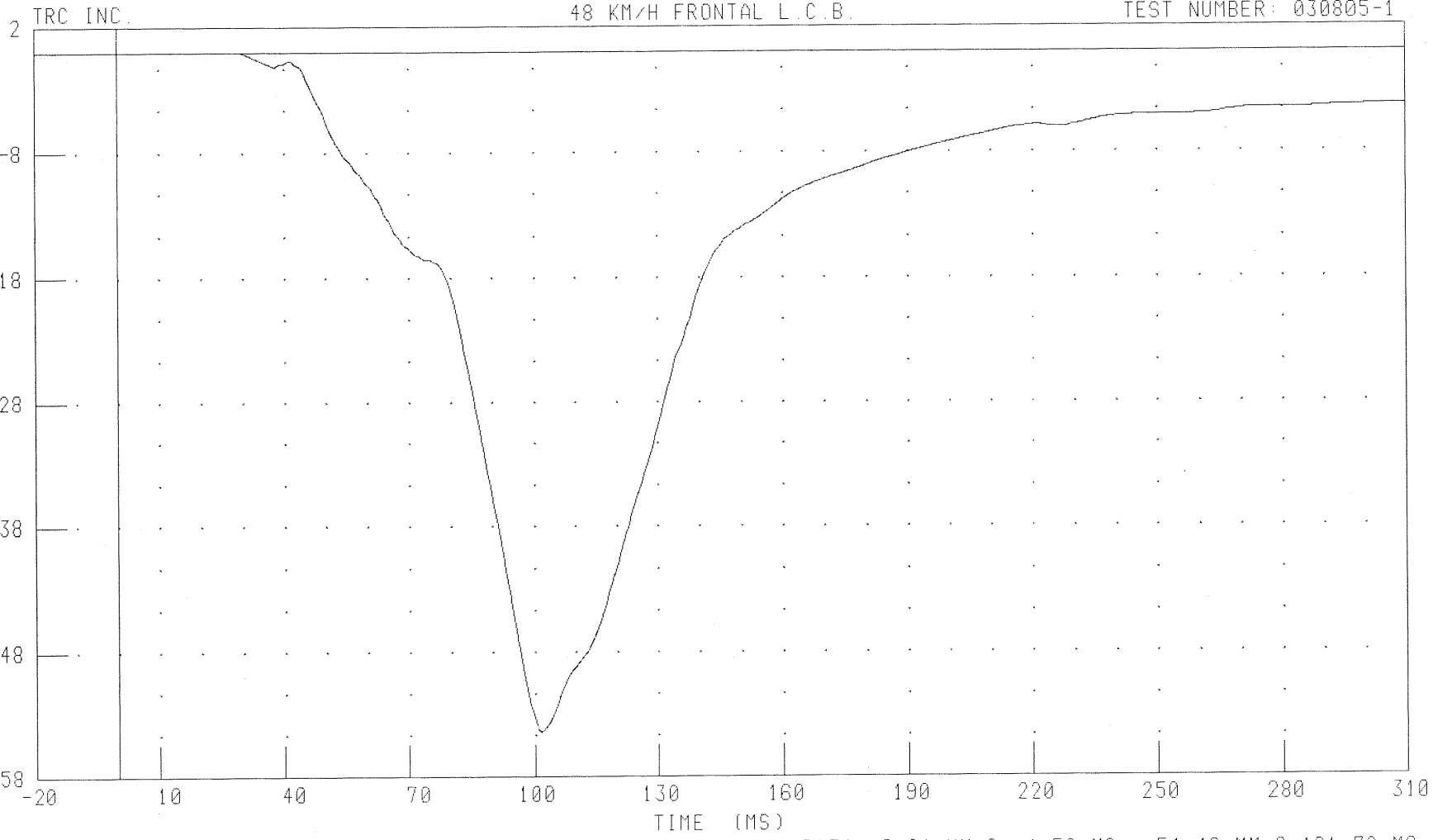
PEAK DATA: 49.66 G @ 100.72 MS; 0.01 G @ -20.00 MS

B-47

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER CHEST DEFLECTION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTXD1 FILTER: CH. CLASS 600

PEAK DATA: 0.01 MM @ -4.56 MS; -54.42 MM @ 101.76 MS

B-48

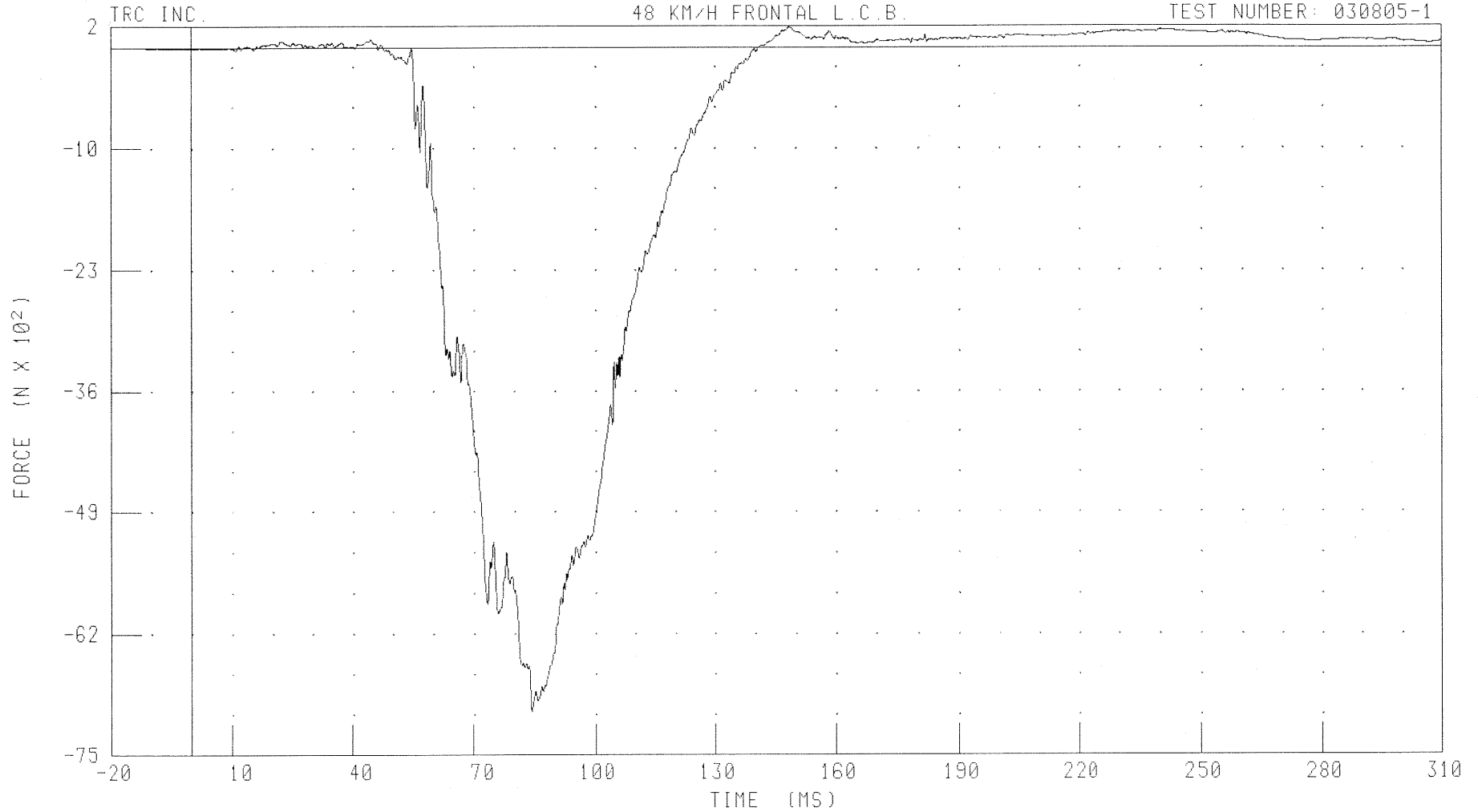
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER LEFT FEMUR FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: LFMZF1 FILTER: CH. CLASS 600

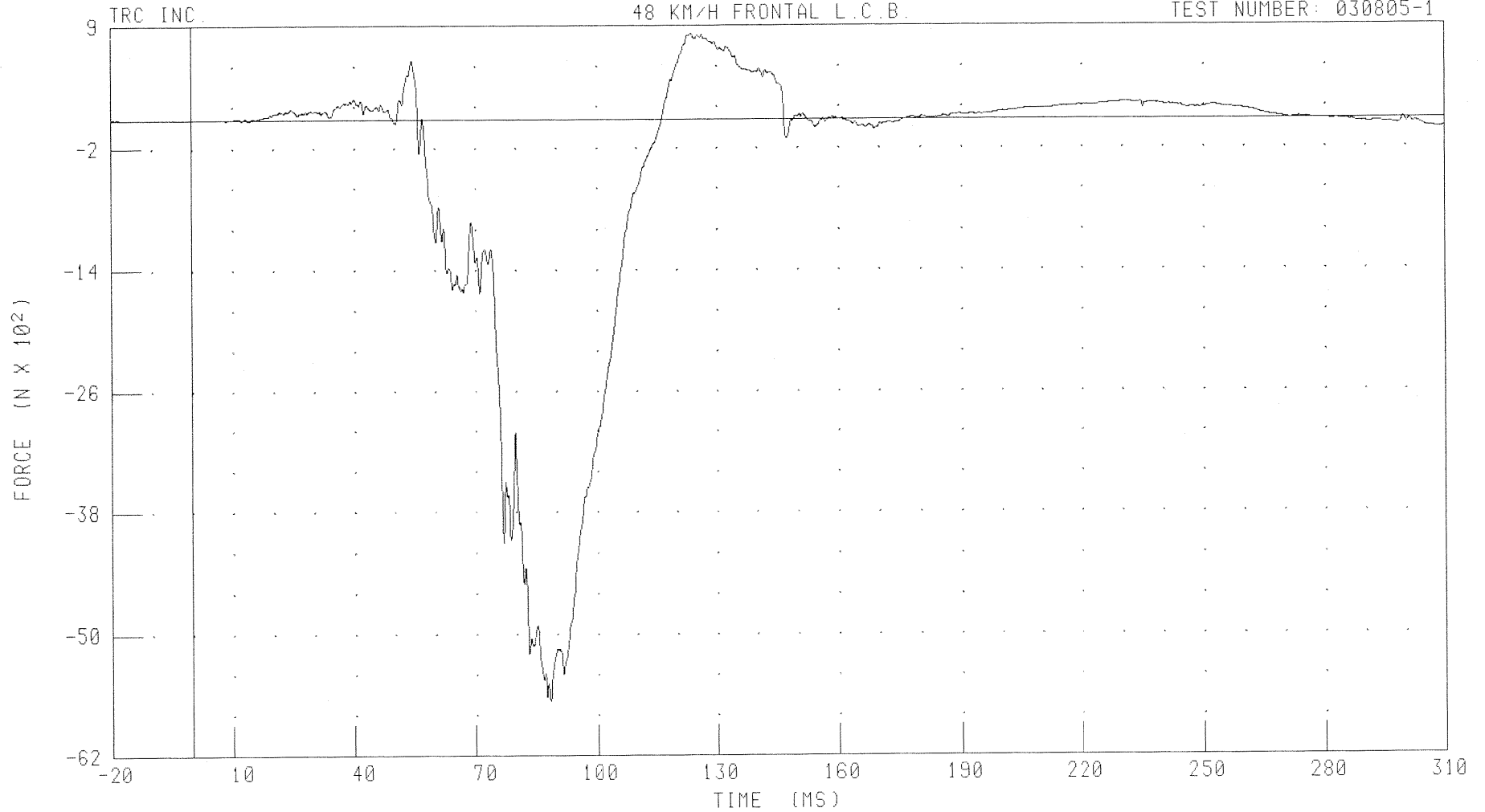
PEAK DATA: 217.98 N @ 148.56 MS, -7103.90 N @ 84.24 MS

B-49

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT FEMUR FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: RFMZ1 FILTER: CH. CLASS 600

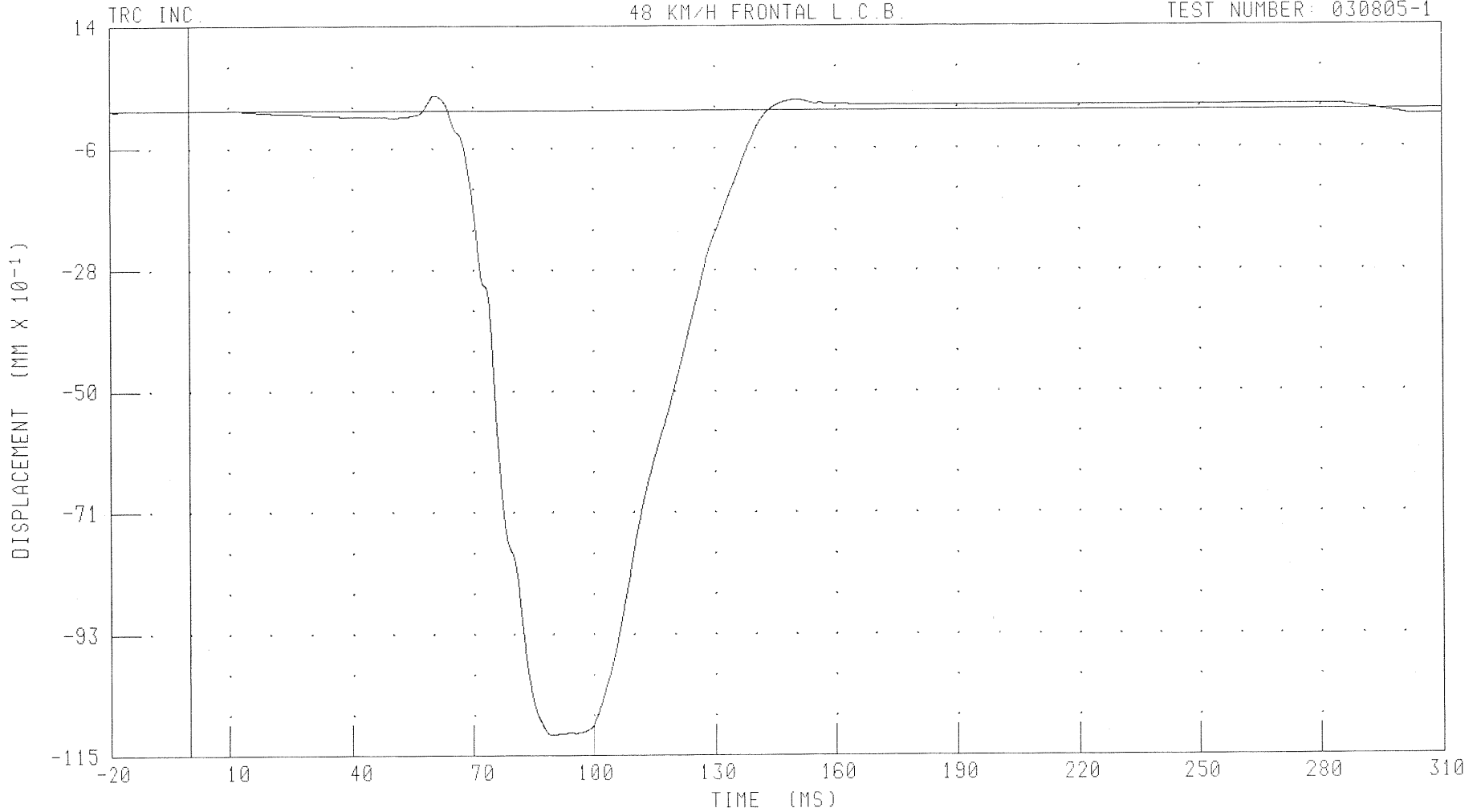
PEAK DATA: 839.43 N @ 123.76 MS; -5743.13 N @ 88.40 MS

B-50

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT KNEE DISPLACEMENT
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: KNLXD1 FILTER: CH. CLASS 180

PEAK DATA: 0.27 MM @ 60.64 MS; -11.14 MM @ 89.84 MS

B-51

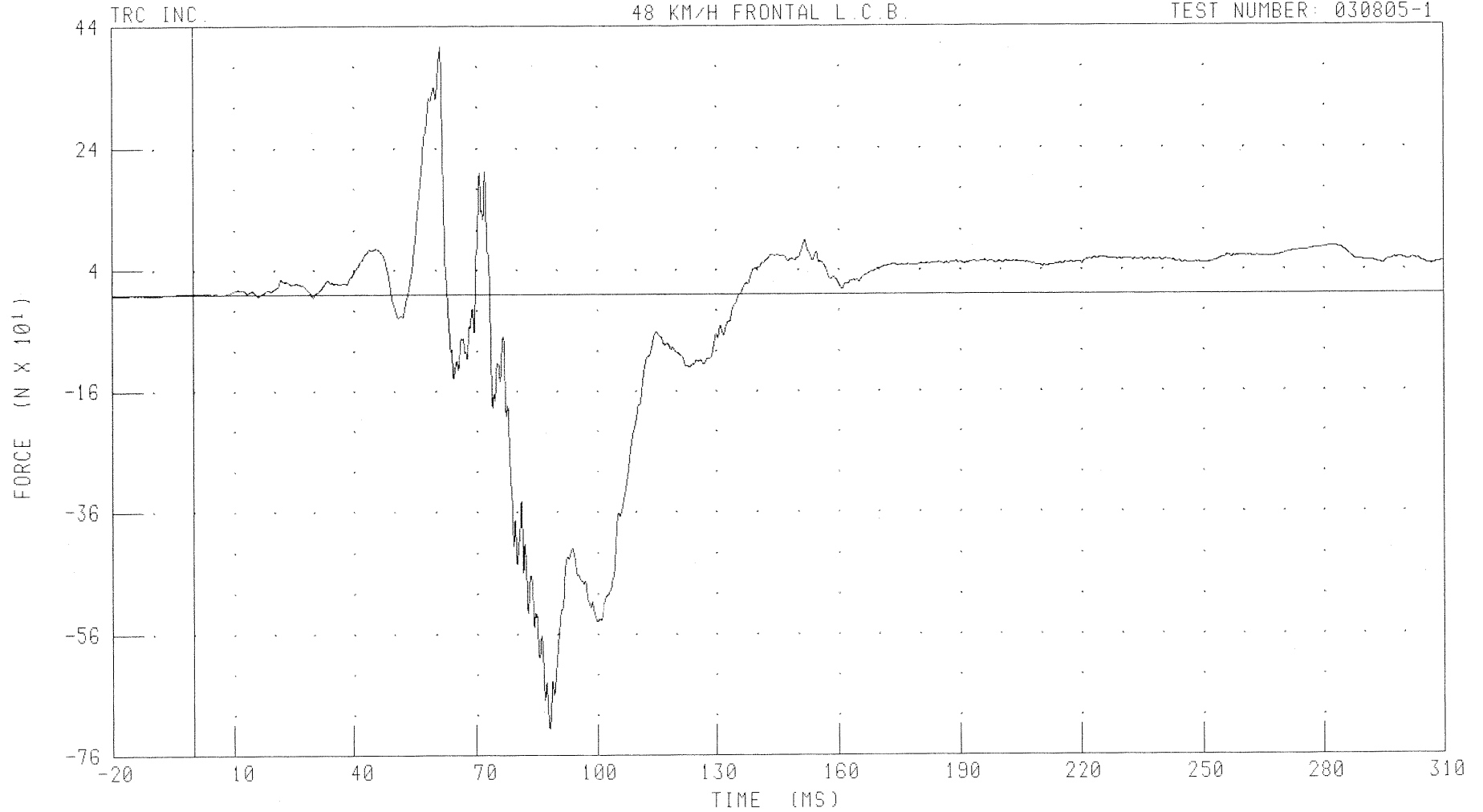
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER LEFT UPPER TIBIA X-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLXF1 FILTER: CH. CLASS 600

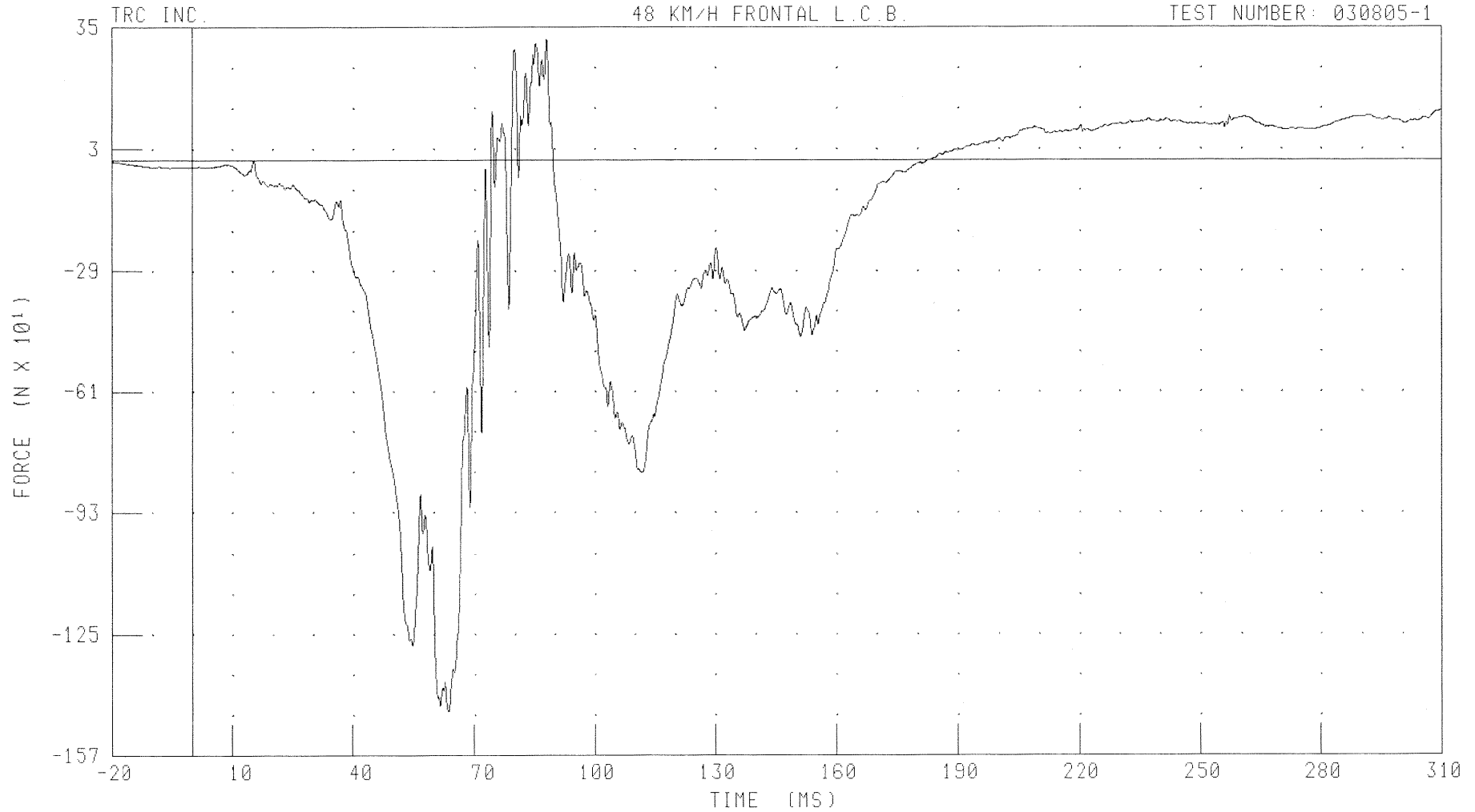
PEAK DATA: 405.71 N @ 61.20 MS; -715.77 N @ 88.08 MS

B-52

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT UPPER TIBIA Z-AXIS FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLZF1 FILTER: CH. CLASS 600

PEAK DATA: 319.11 N @ 88.00 MS; -1453.40 N @ 63.68 MS

B-53

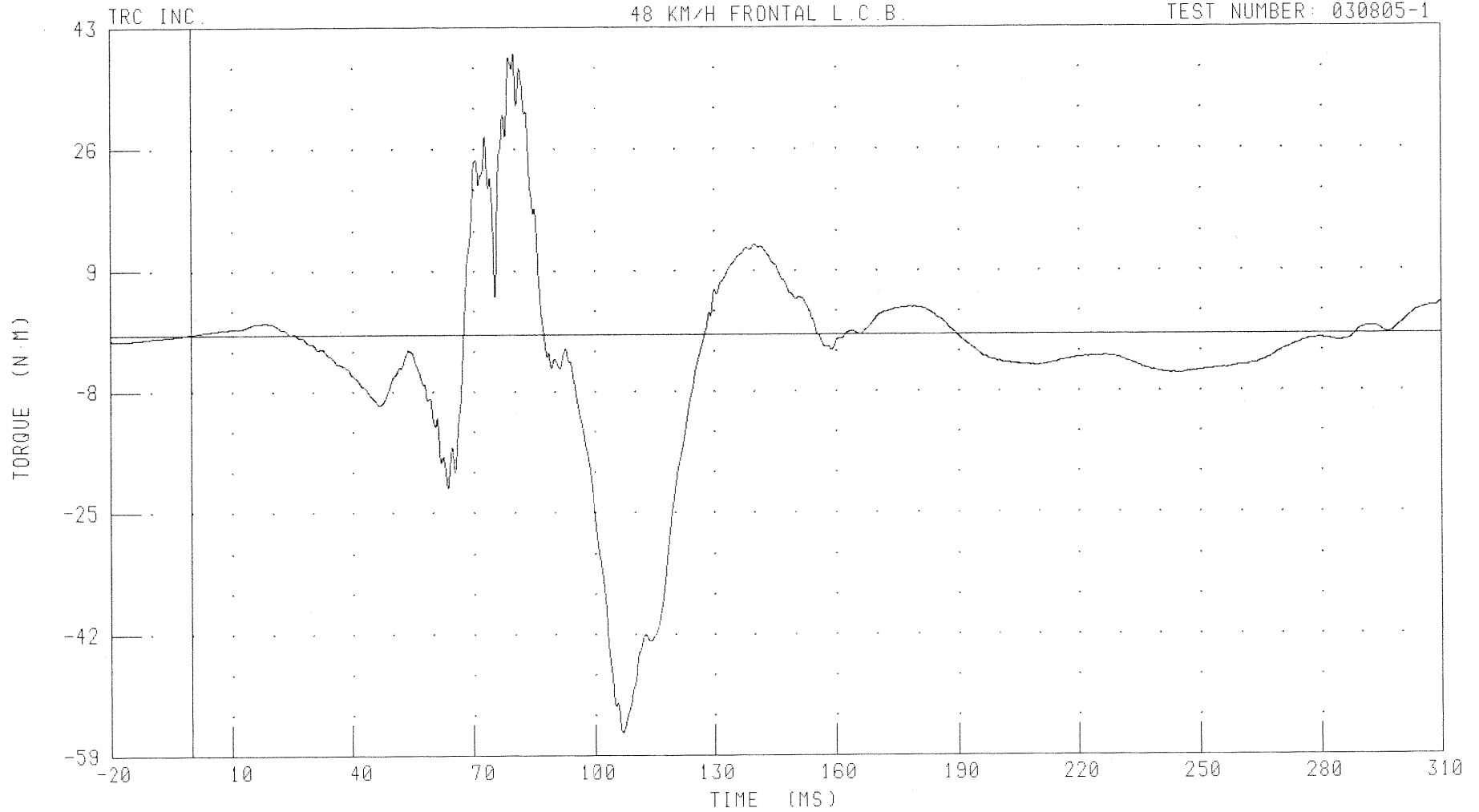
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER LEFT UPPER TIBIA MOMENT ABOUT X AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLXM1 FILTER: CH. CLASS 600

PEAK DATA: 39.23 N·M @ 79.84 MS; -55.80 N·M @ 106.88 MS

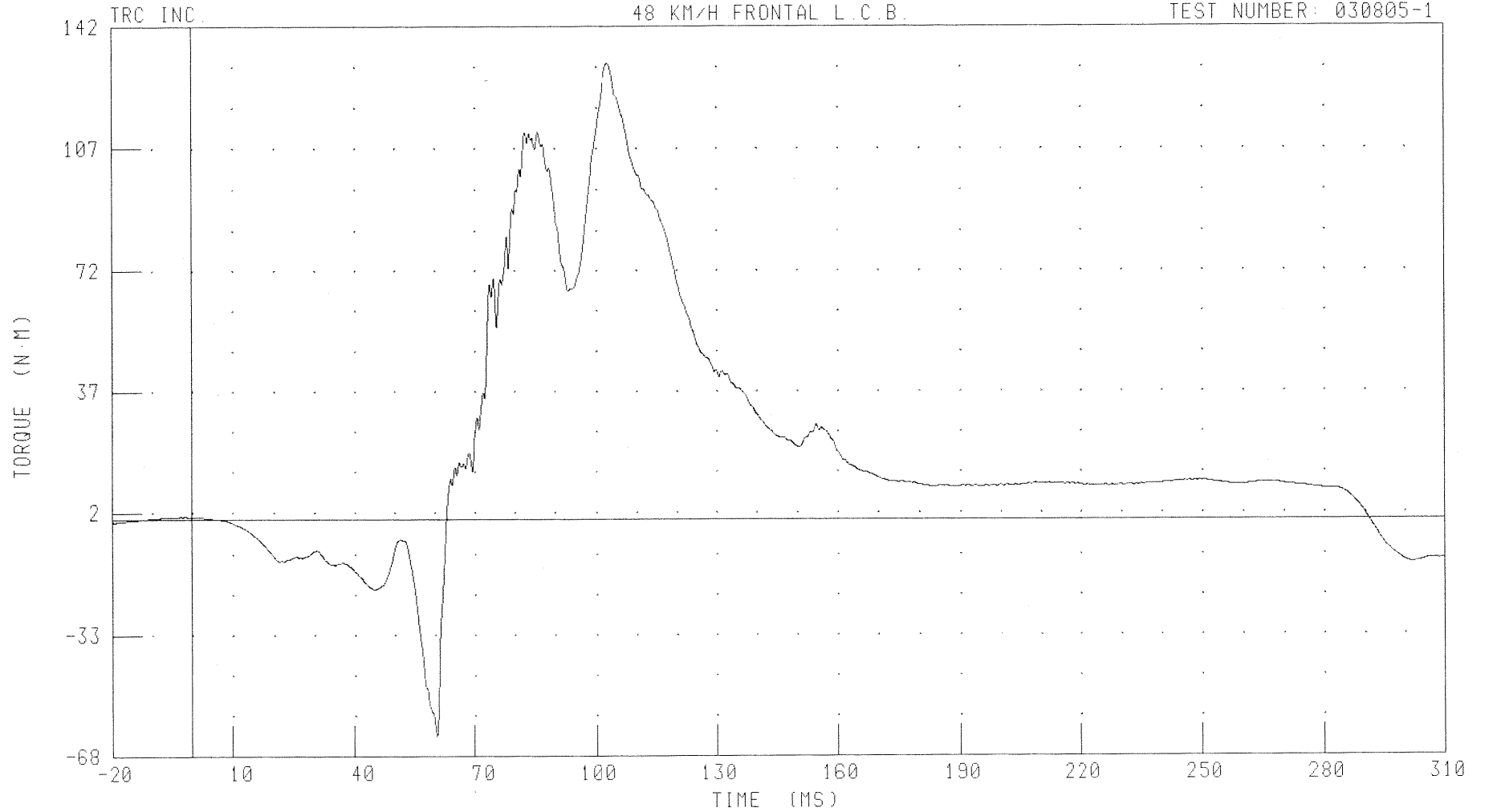
B-54

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLYM1 FILTER: CH. CLASS 600

PEAK DATA: 131.40 N·M @ 103.12 MS; -62.27 N·M @ 60.56 MS

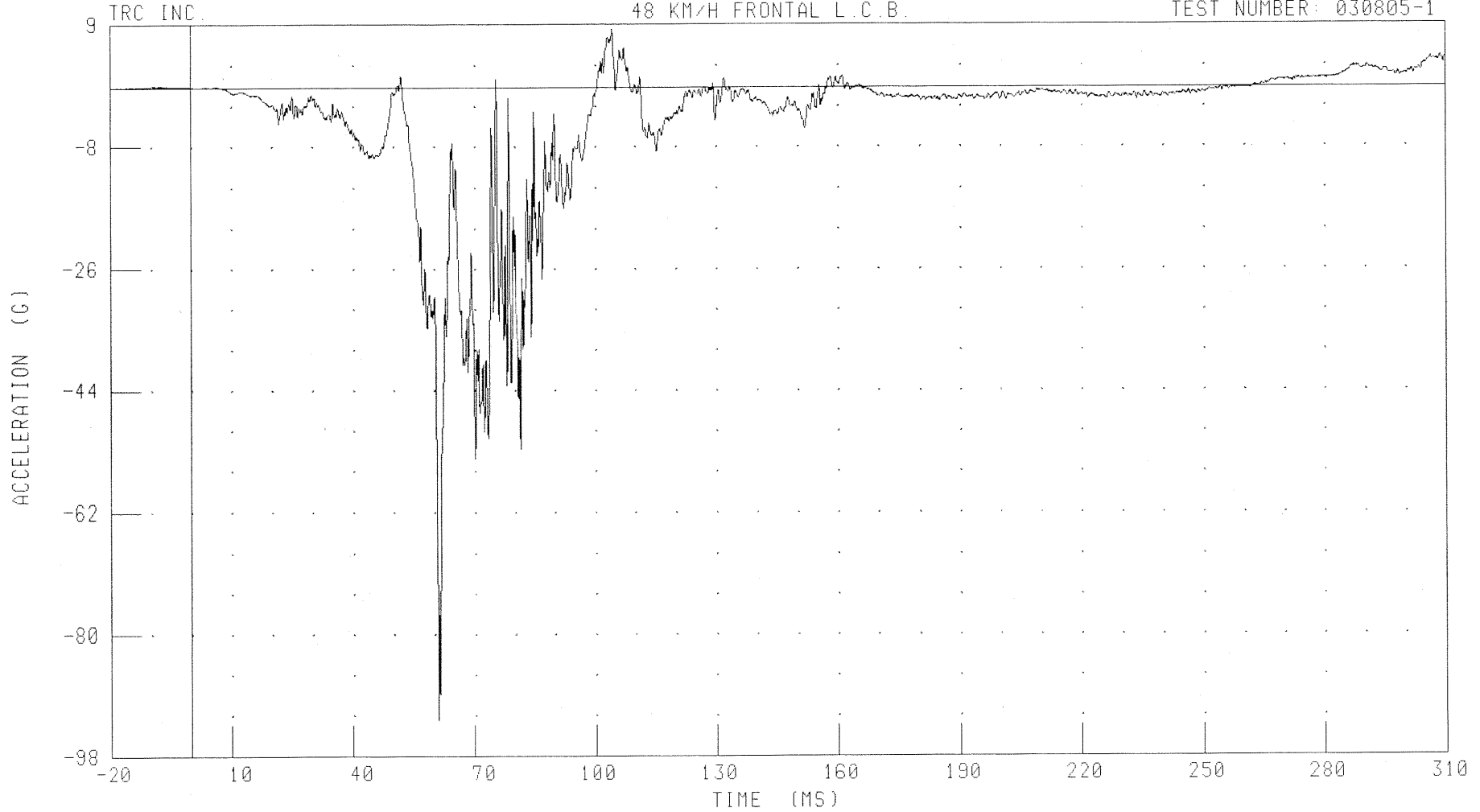
B-55

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT TIBIA X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLXC1

FILTER: CH. CLASS 1000

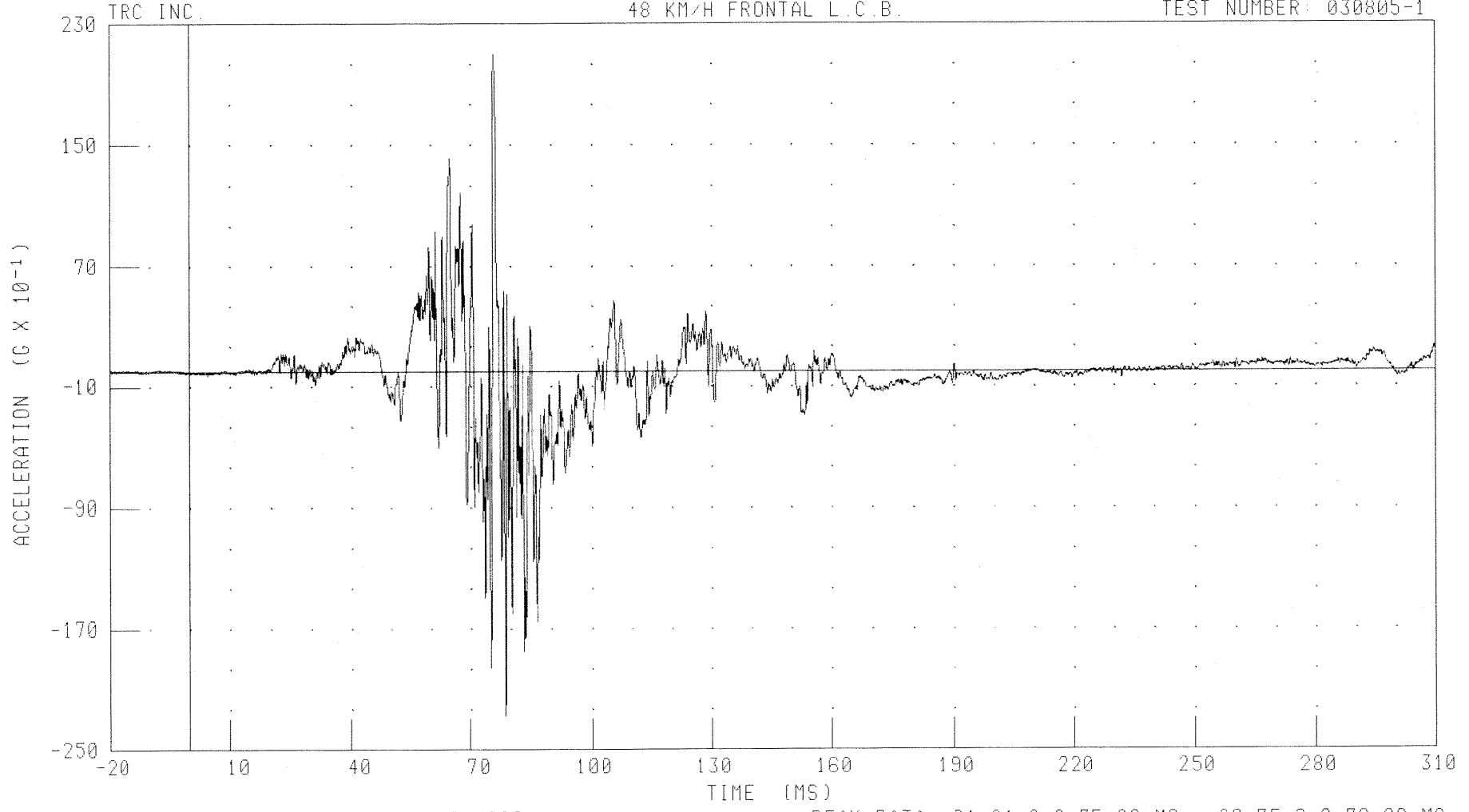
PEAK DATA: 8.42 G @ 104.40 MS; -93.54 G @ 61.04 MS

B-56

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT TIBIA Y-AXIS ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLYG1 FILTER: CH. CLASS 1000

PEAK DATA: 21.01 G @ 75.92 MS; -22.75 G @ 78.88 MS

B-57

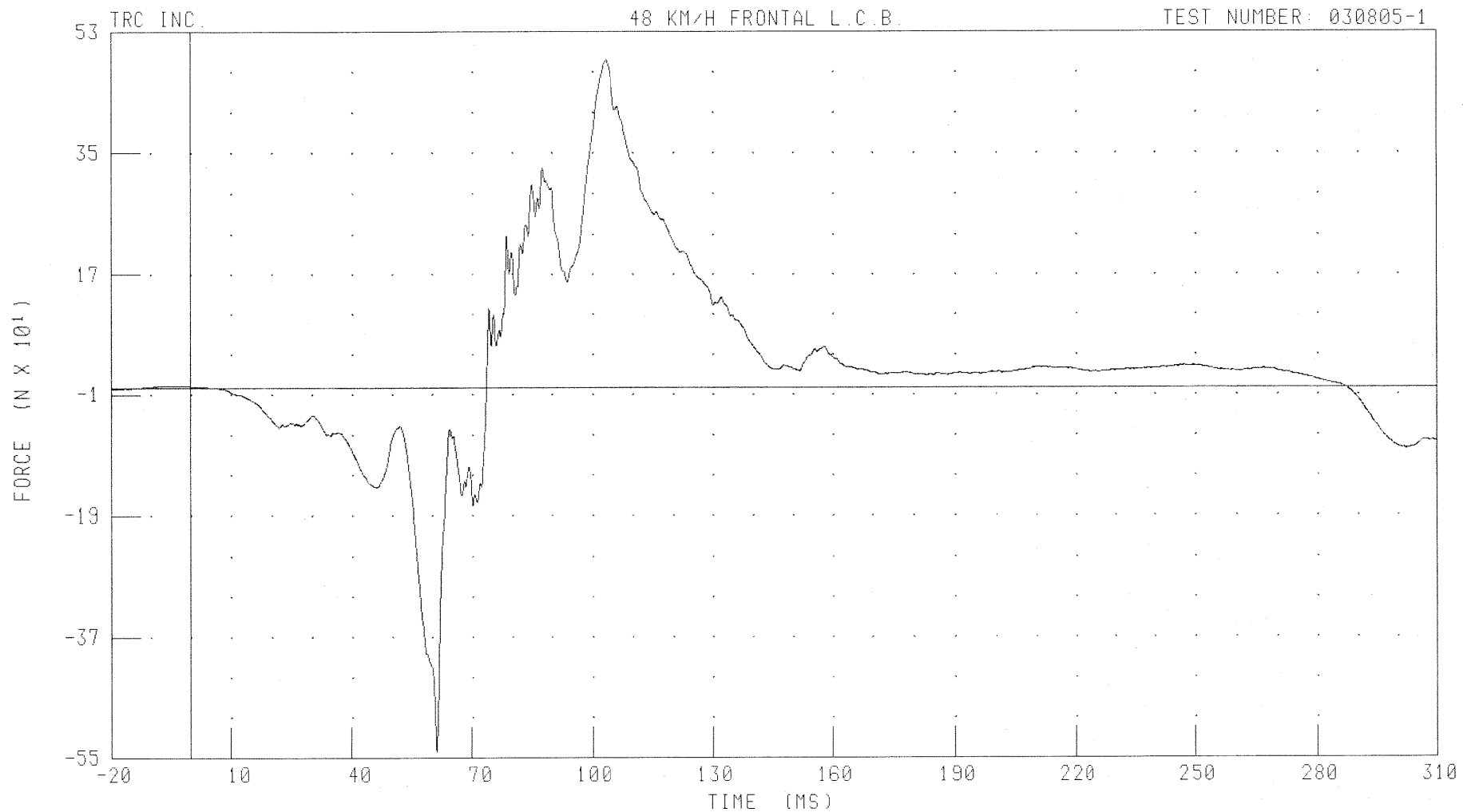
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER LEFT LOWER TIBIA X-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANLXF1

FILTER: CH. CLASS 600

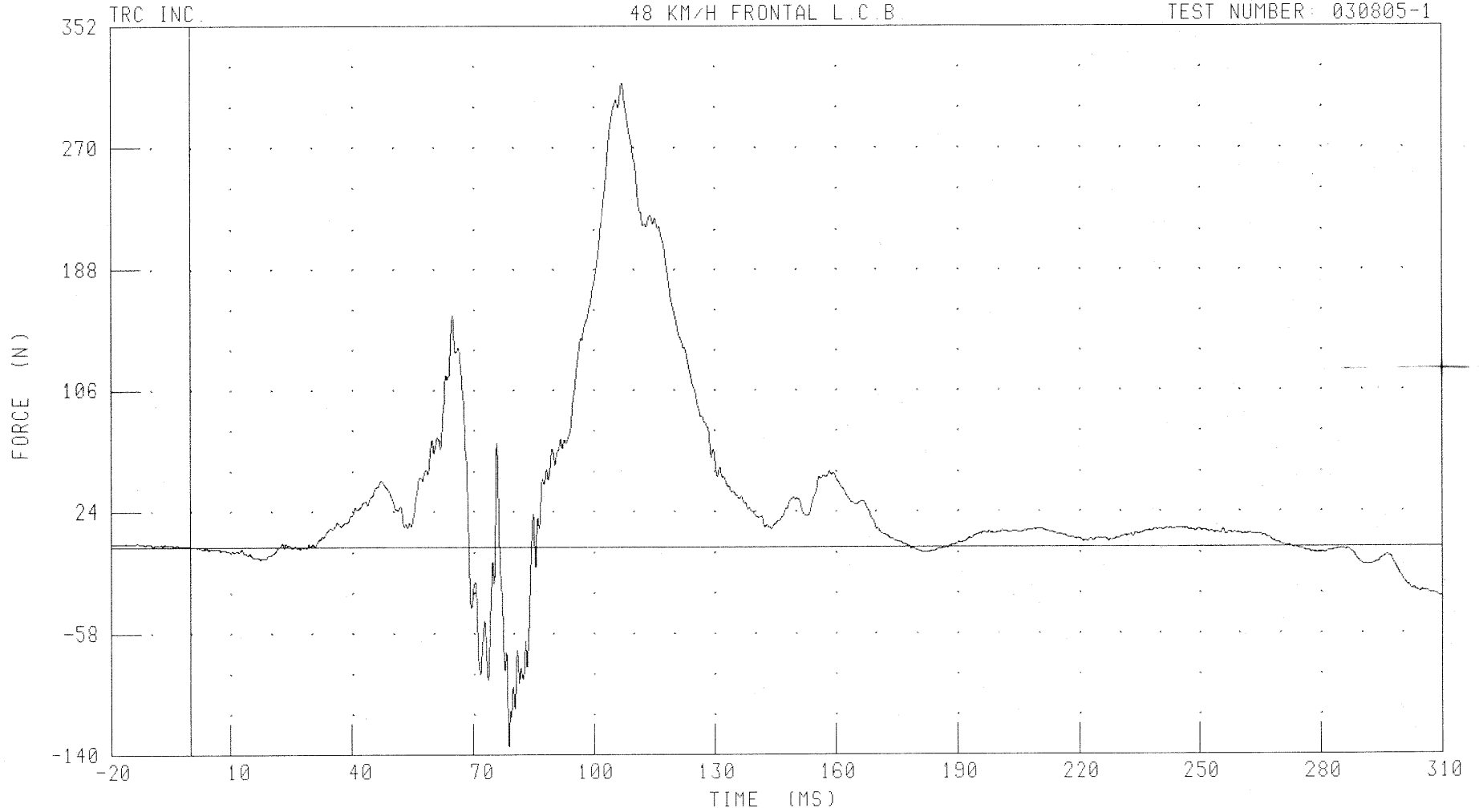
PEAK DATA: 487.51 N @ 103.44 MS; -541.79 N @ 61.12 MS

B-58

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT LOWER TIBIA Y-AXIS FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANLYF1 FILTER: CH. CLASS 600

PEAK DATA: 313.55 N @ 107.28 MS; -134.23 N @ 78.96 MS

B-59

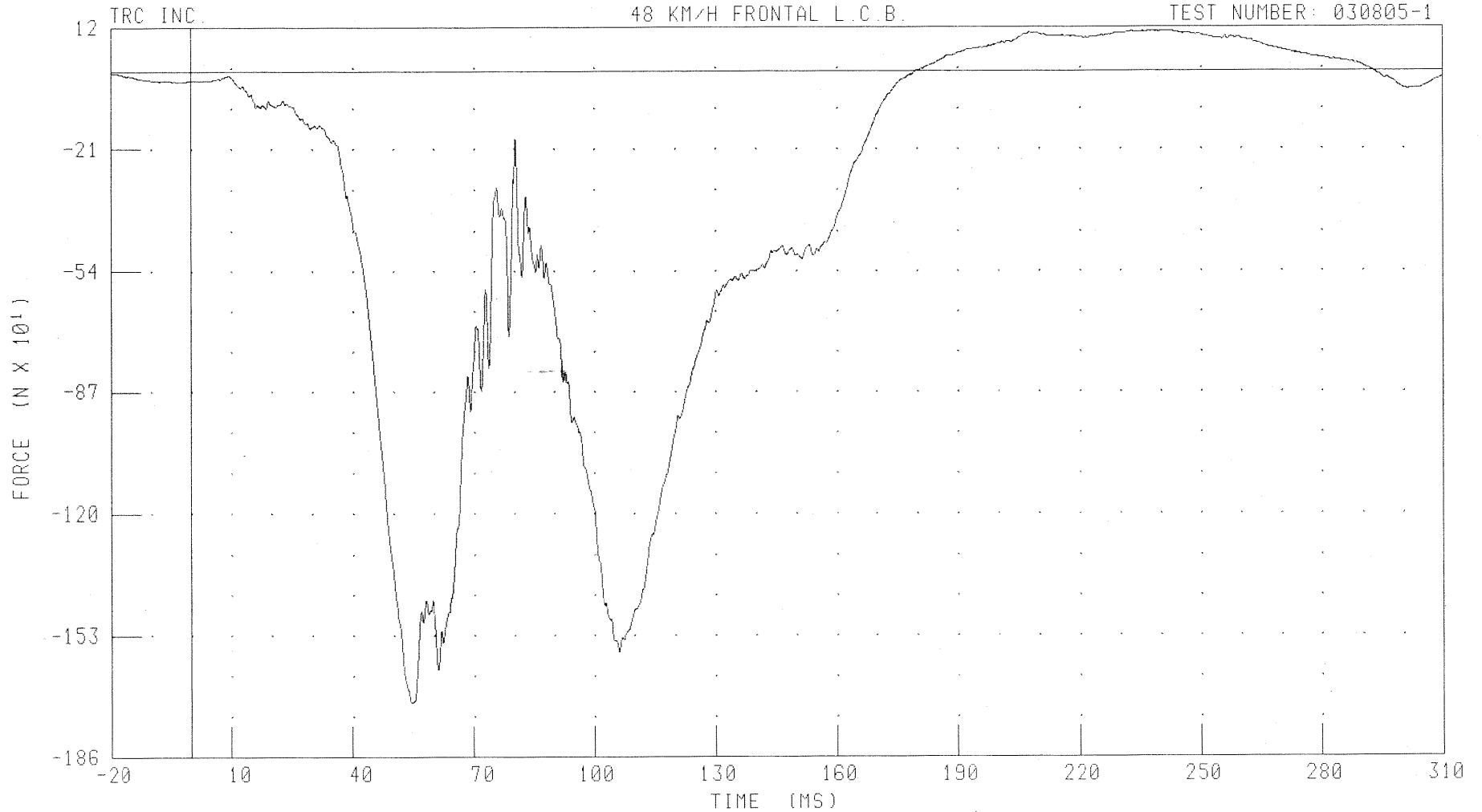
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER LEFT LOWER TIBIA Z-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANLZF1 FILTER: CH. CLASS 600

PEAK DATA: 109.80 N @ 241.92 MS; -1712.07 N @ 54.72 MS

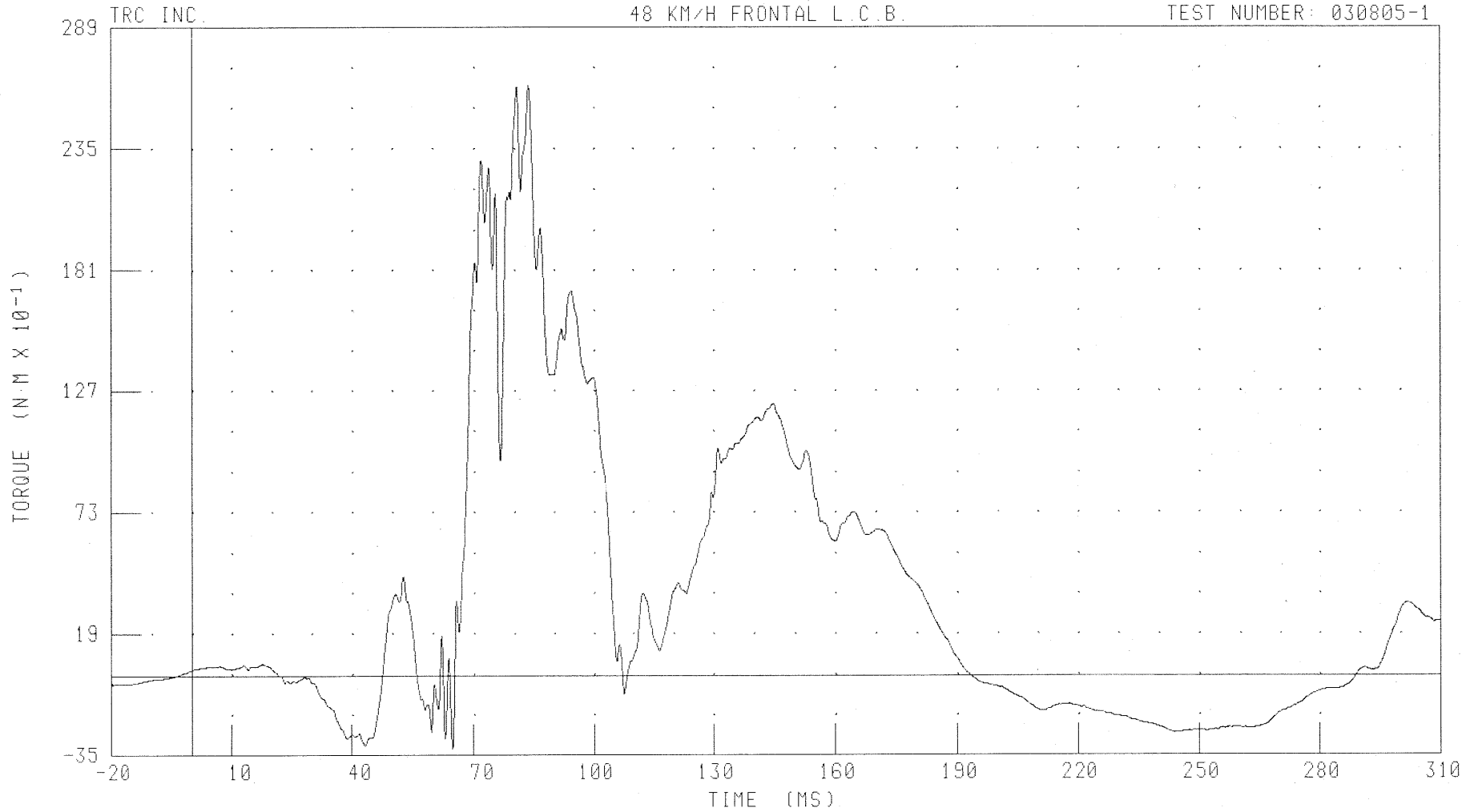
B-60

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT LOWER TIBIA MOMENT ABOUT X AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANLXM1

FILTER: CH. CLASS 600

PEAK DATA: 26.29 N·M @ 83.60 MS; -3.21 N·M @ 64.88 MS

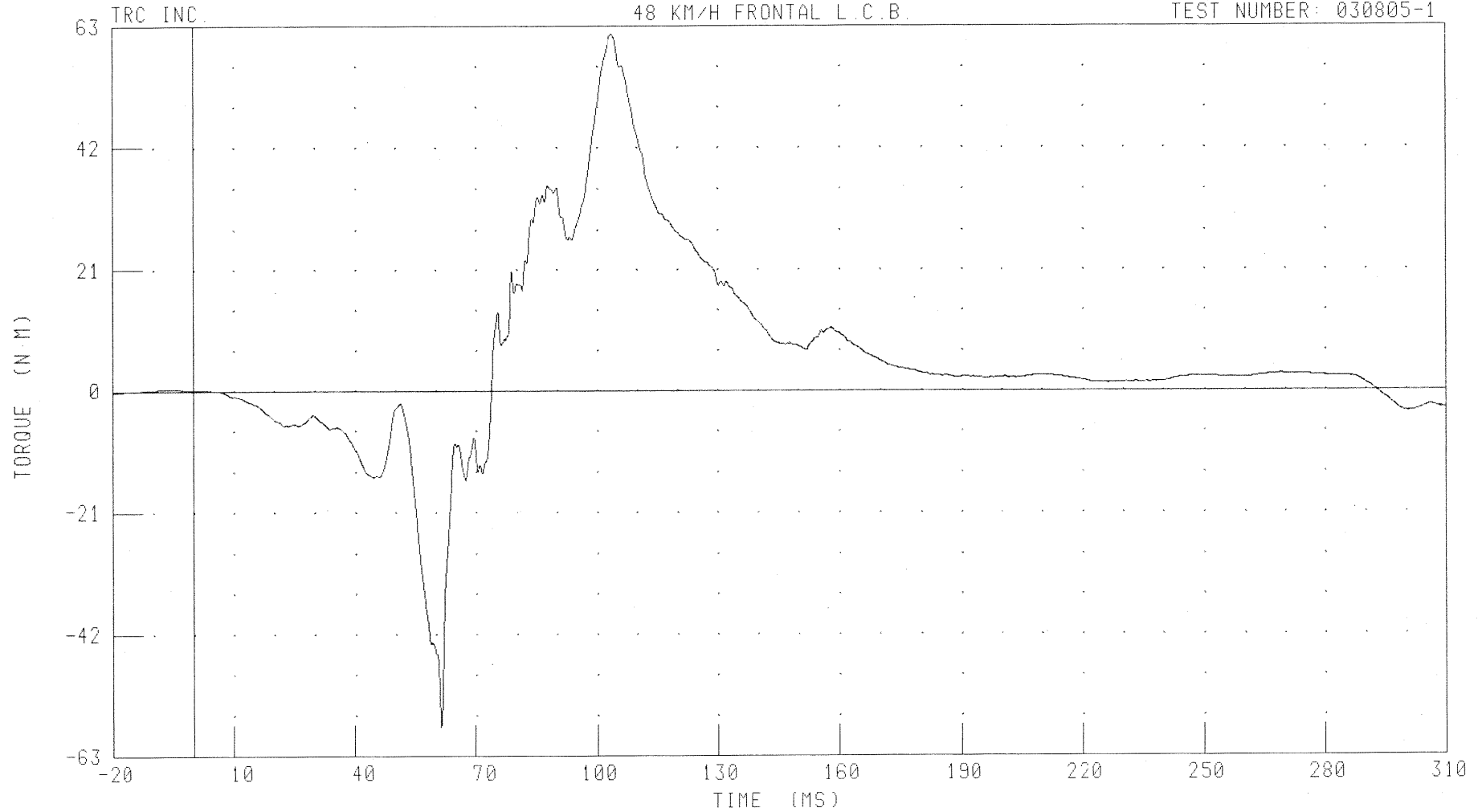
B-61

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANLYM1 FILTER: CH. CLASS 600

PEAK DATA: 61.60 N·M @ 103.68 MS; -57.97 N·M @ 61.36 MS

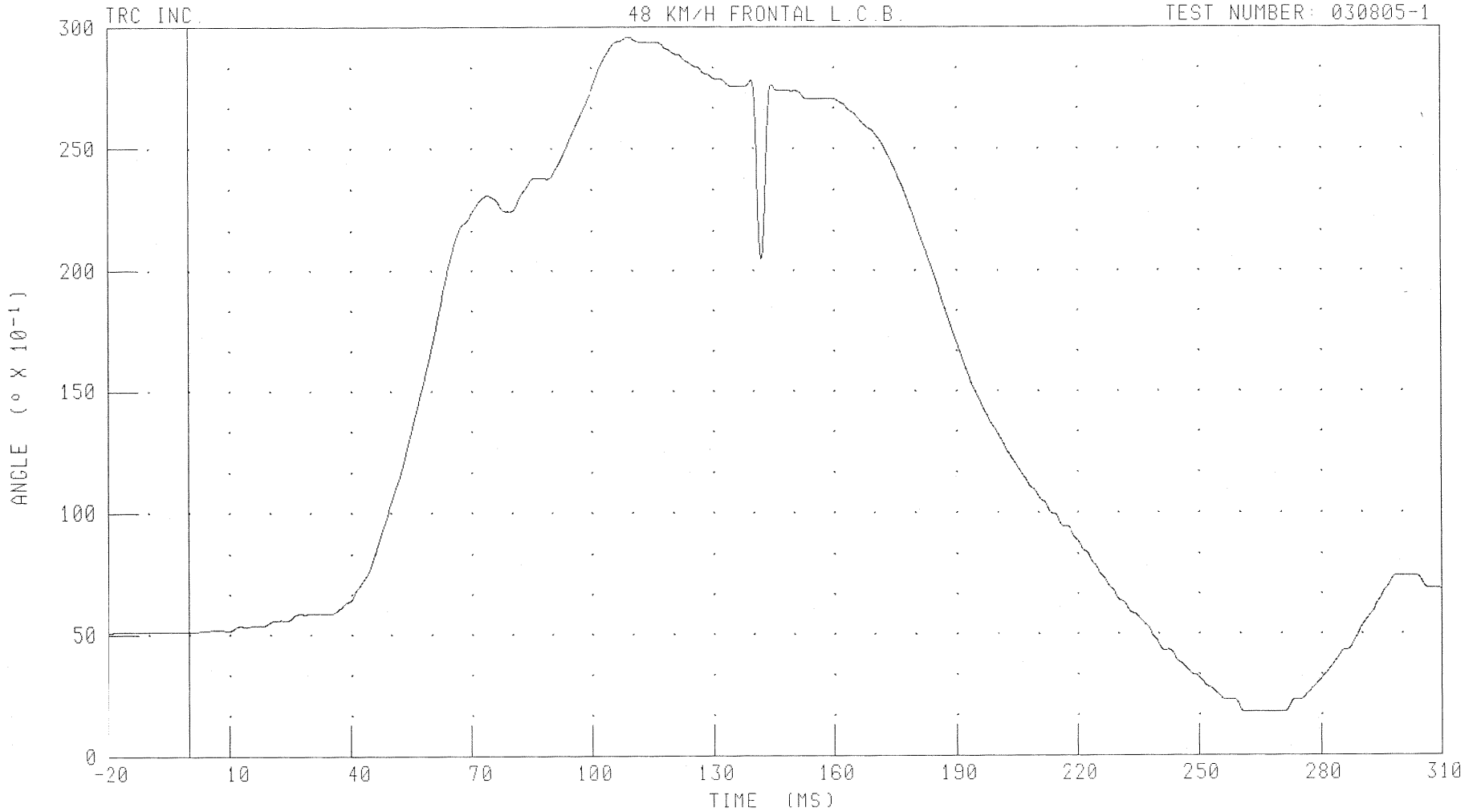
B-62

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT FOOT TO ANKLE X-AXIS ROTATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTLXD1

FILTER: CH. CLASS 180

PEAK DATA: 29.60 ° @ 109.28 MS; 1.76 ° @ 261.36 MS

B-63

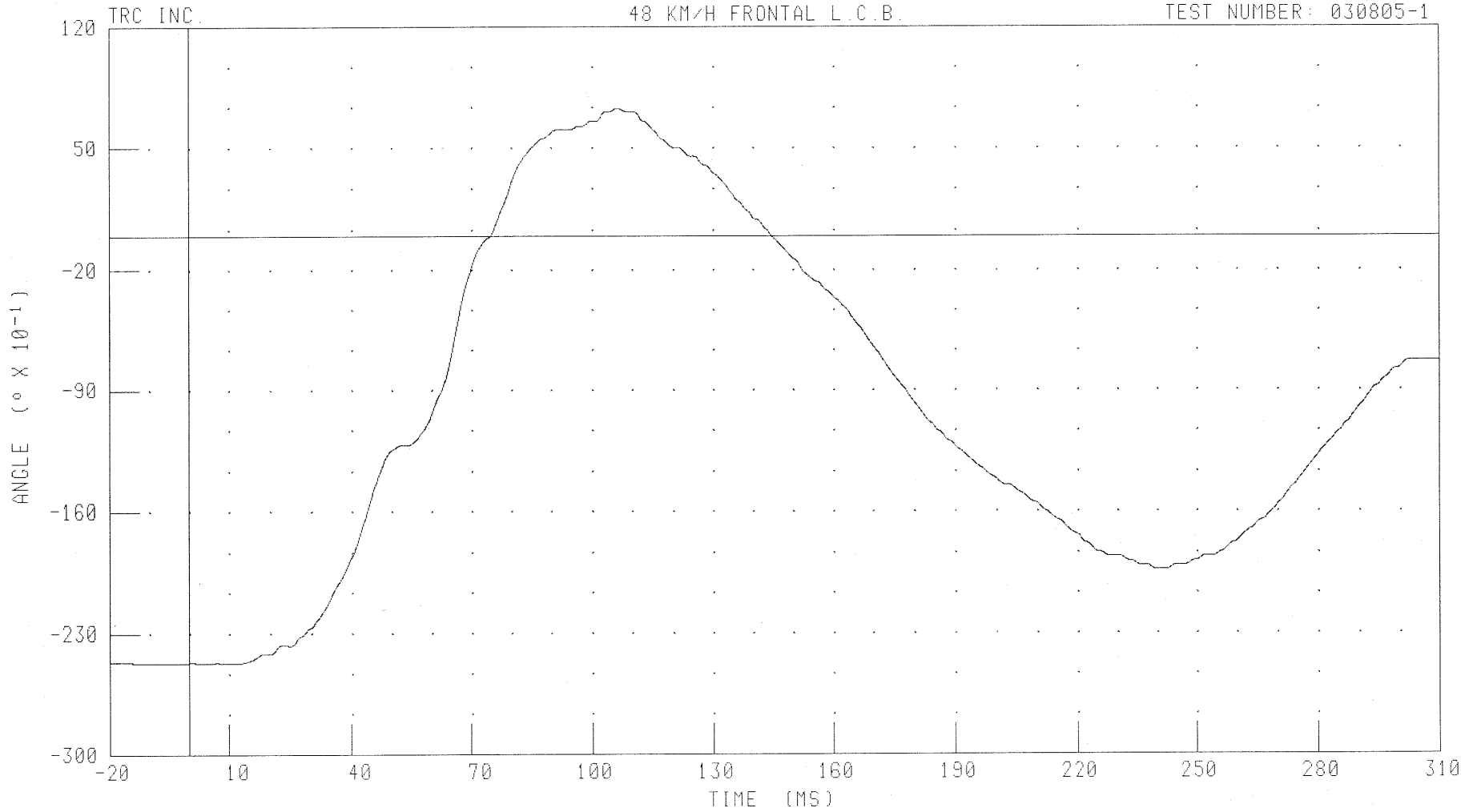
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER LEFT FOOT TO ANKLE Y-AXIS ROTATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTLYD1 FILTER: CH. CLASS 100

PEAK DATA: 7.30 $^{\circ}$ @ 106.40 MS; -24.71 $^{\circ}$ @ 248.00 MS

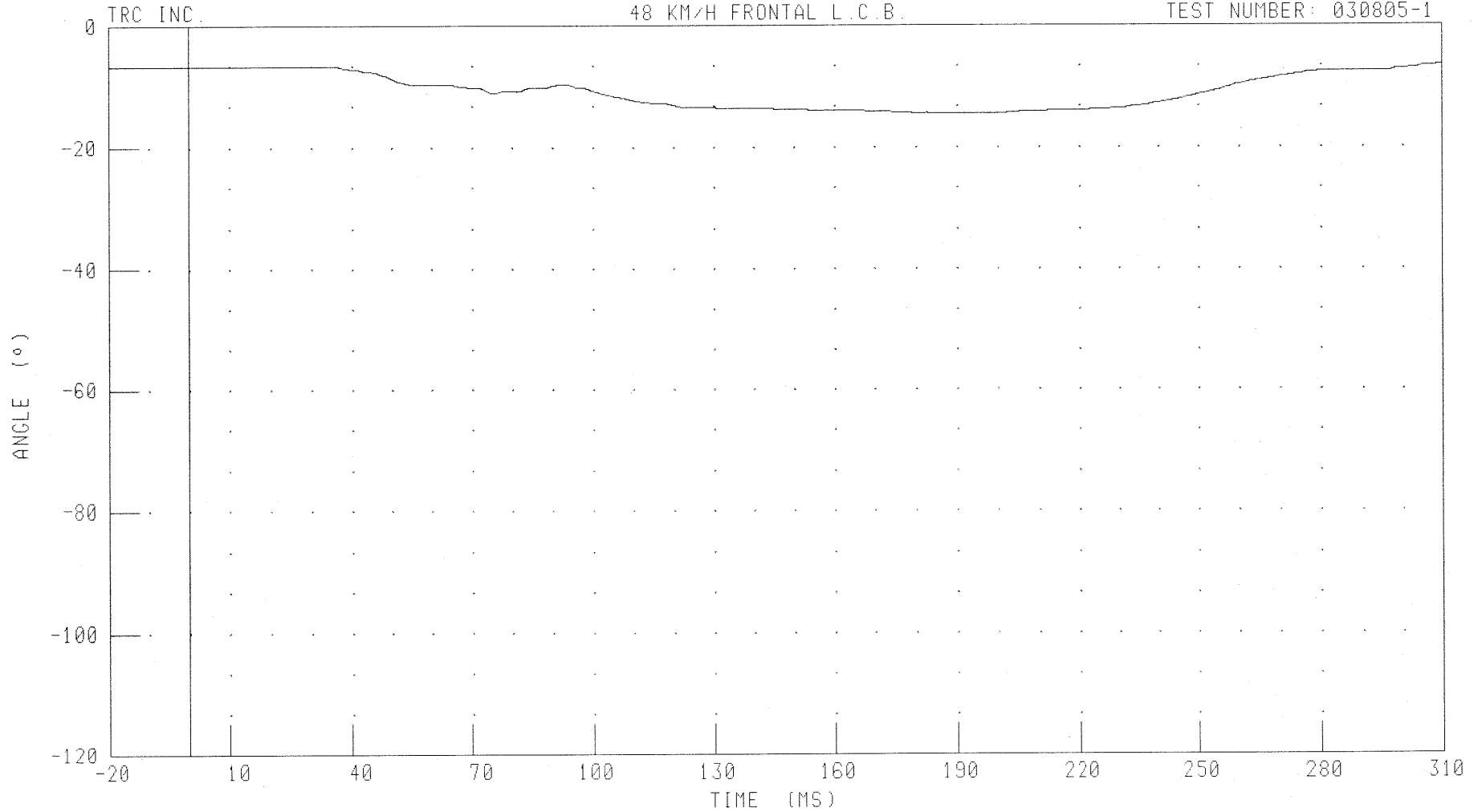
B-64

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT FOOT TO ANKLE Z-AXIS ROTATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTLZD1 FILTER: CH. CLASS 100

PEAK DATA: -6.46 ° @ 310.00 MS; -14.45 ° @ 193.44 MS

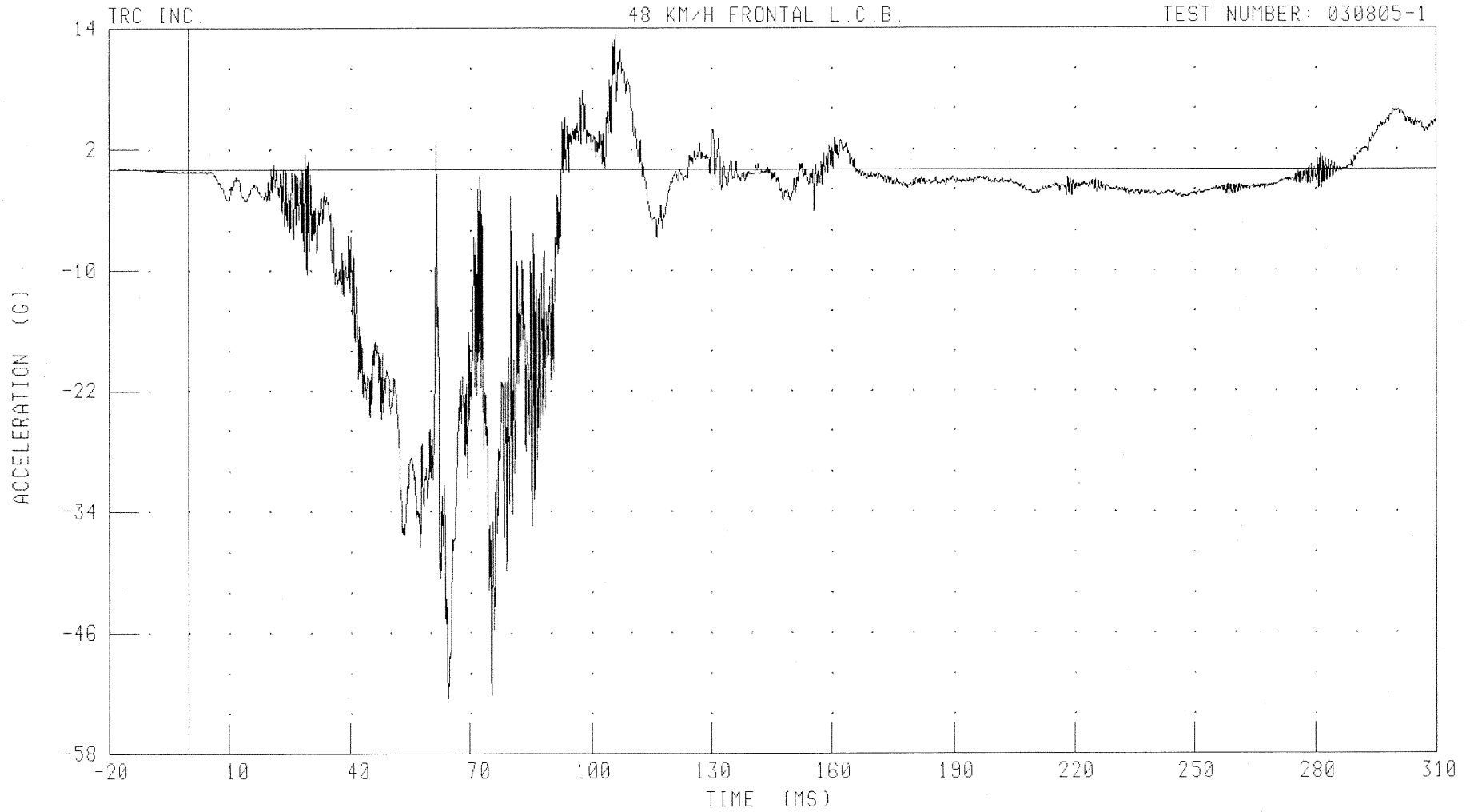
B-65

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT FOOT X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTLXG1

FILTER: CH. CLASS 1000

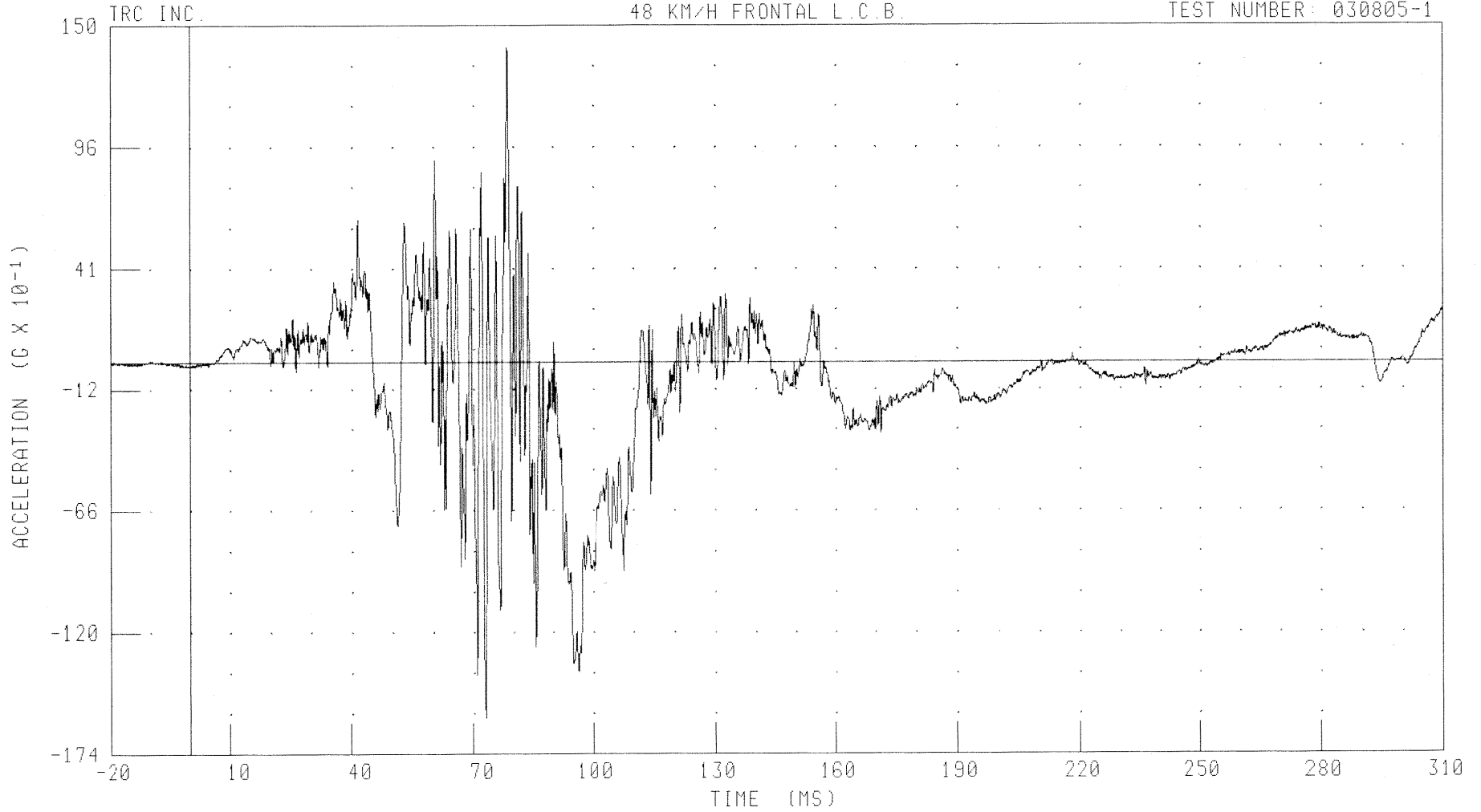
PEAK DATA: 13.43 G @ 106.08 MS; -52.55 G @ 64.56 MS

B-66

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT FOOT Y-AXIS ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTLYG1

FILTER: CH. CLASS 1000

PEAK DATA: 13.99 G @ 78.64 MS; -15.82 G @ 73.12 MS

B-67

030805-1

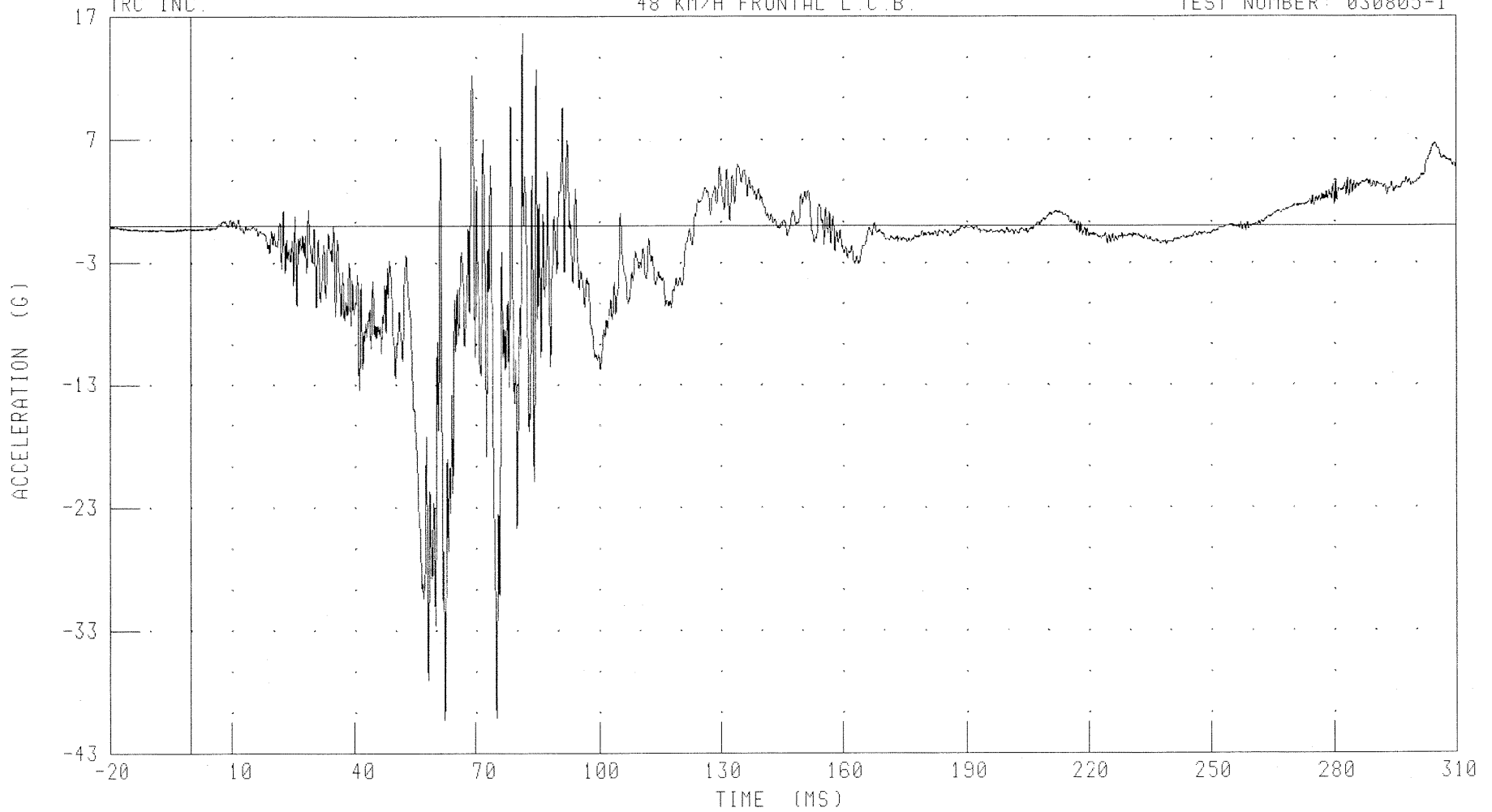
2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER LEFT FOOT Z-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1

TRC INC.



CHANNEL: FTLZG1 FILTER: CH. CLASS 1000

PEAK DATA: 15.65 G @ 81.44 MS; -40.34 G @ 62.32 MS

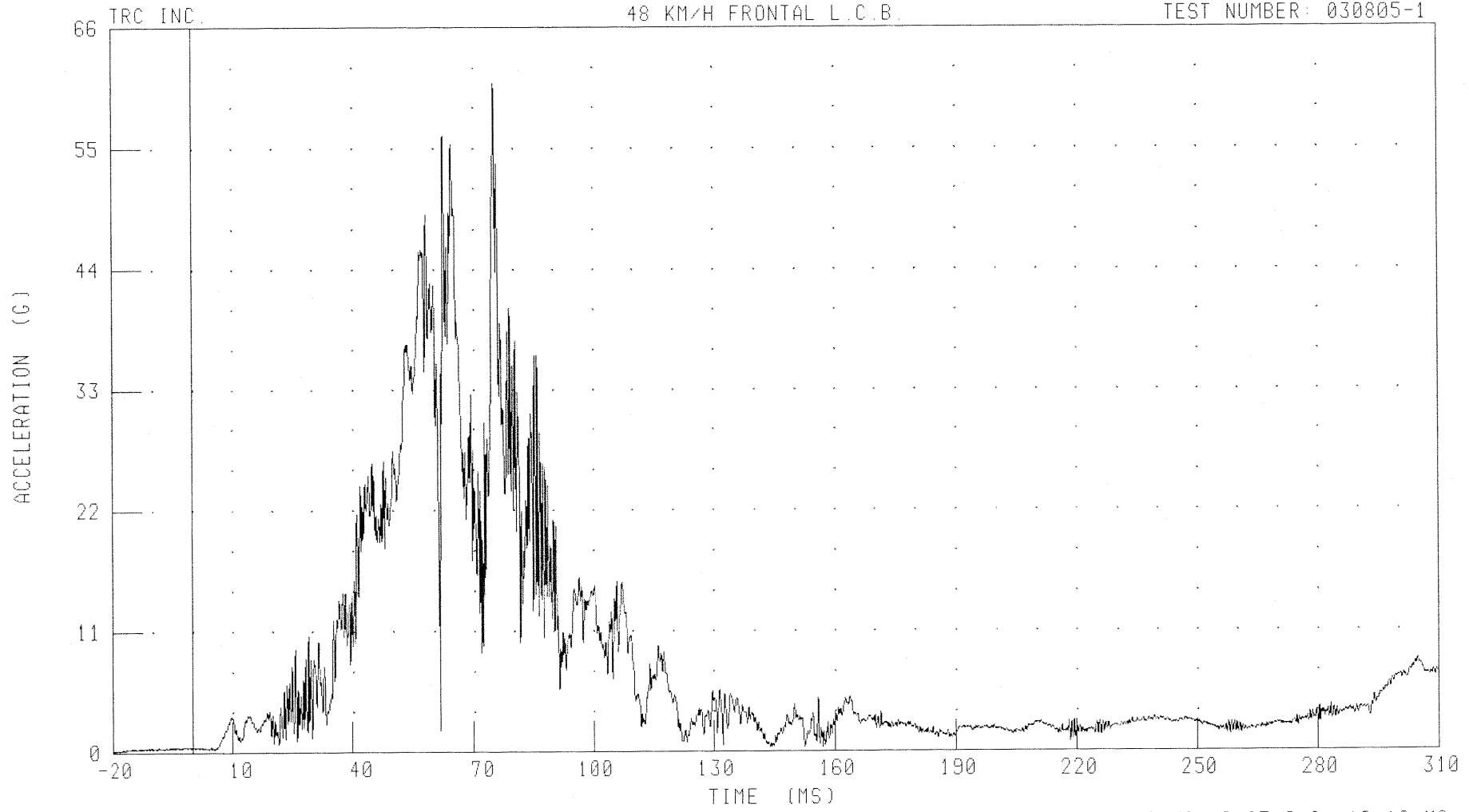
B-68

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER LEFT FOOT RESULTANT ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTLRG1 FILTER: CH. CLASS 1000

PEAK DATA: 60.86 G @ 75.28 MS; 0.05 G @ -19.12 MS

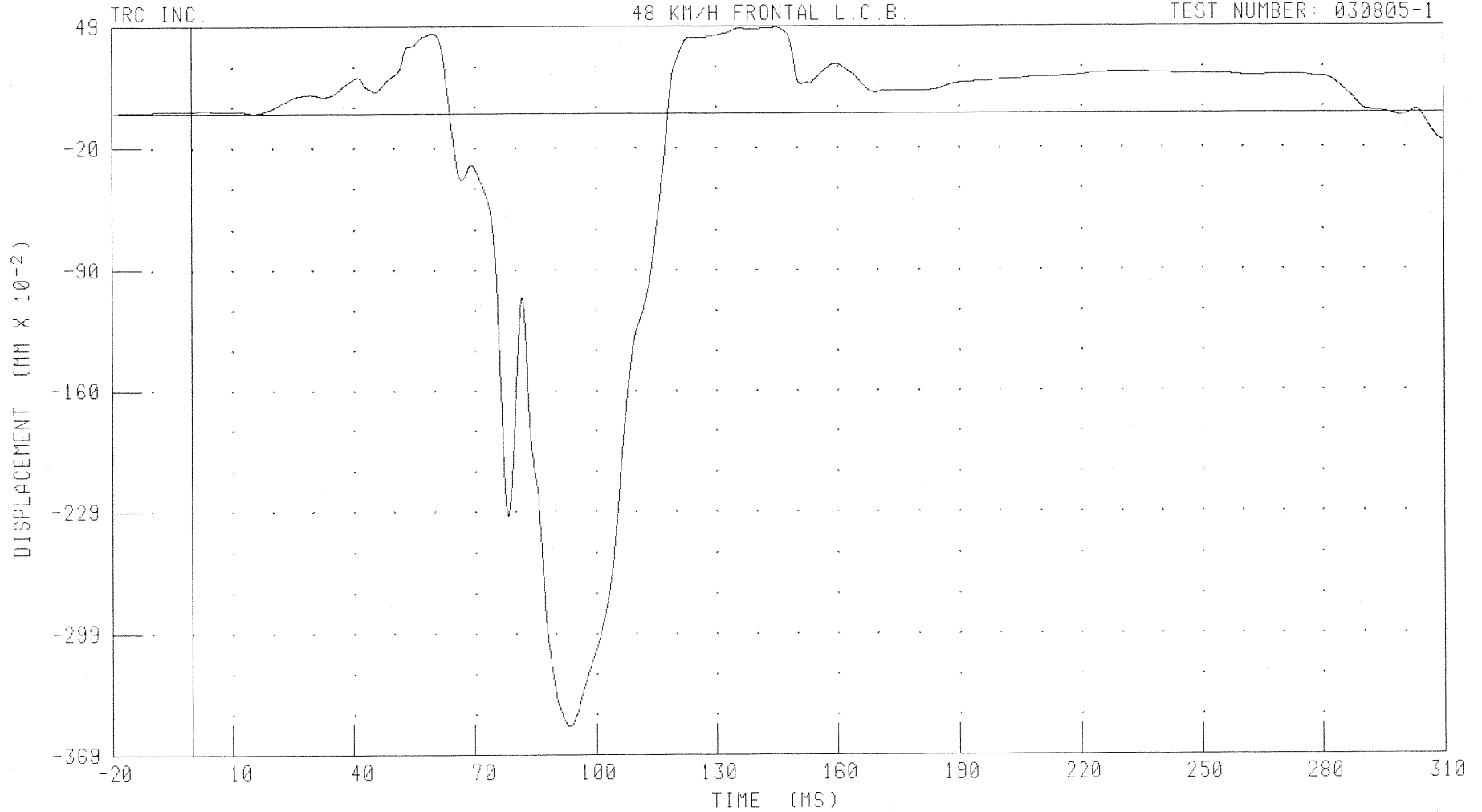
B-69

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT KNEE DISPLACEMENT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: KNRXD1 FILTER: CH. CLASS 180

PEAK DATA: 0.49 MM @ 144.88 MS; -3.54 MM @ 93.52 MS

B-70

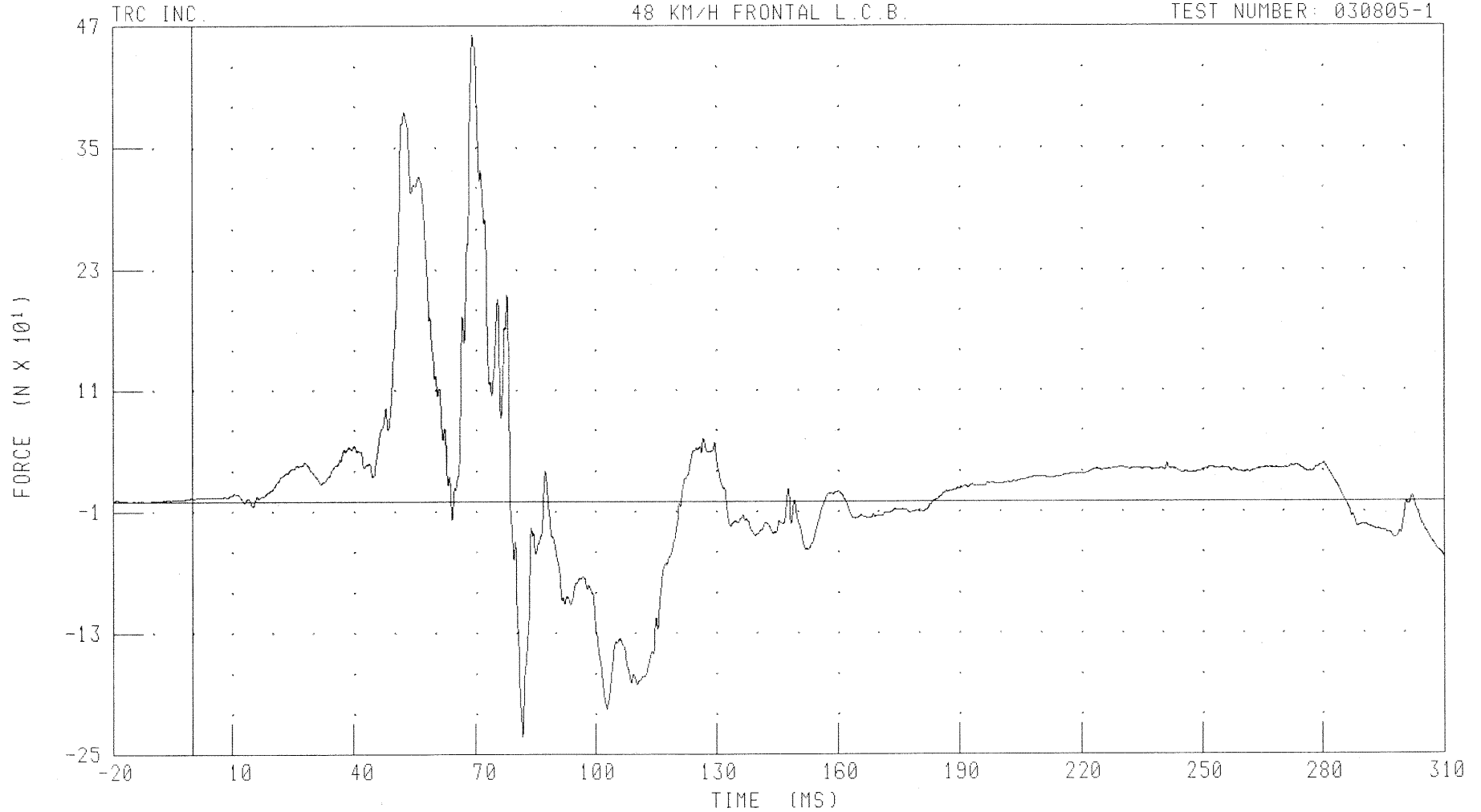
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER RIGHT UPPER TIBIA X-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRXF1 FILTER: CH. CLASS 600

PEAK DATA: 461.22 N @ 69.20 MS; -232.43 N @ 81.68 MS

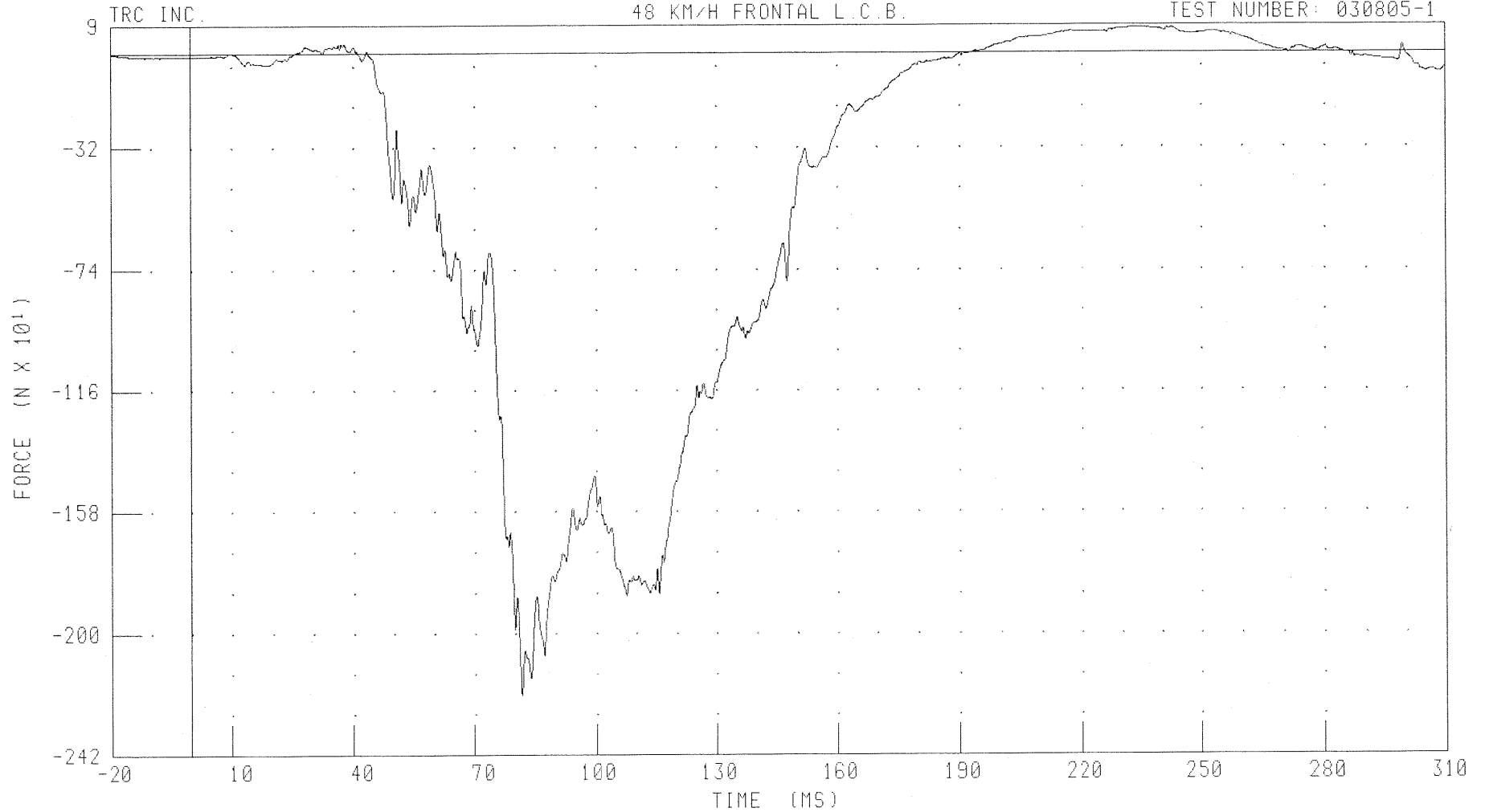
B-71

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT UPPER TIBIA Z-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRZF1 FILTER: CH. CLASS 600

PEAK DATA: 88.92 N @ 241.44 MS; -2217.07 N @ 81.76 MS

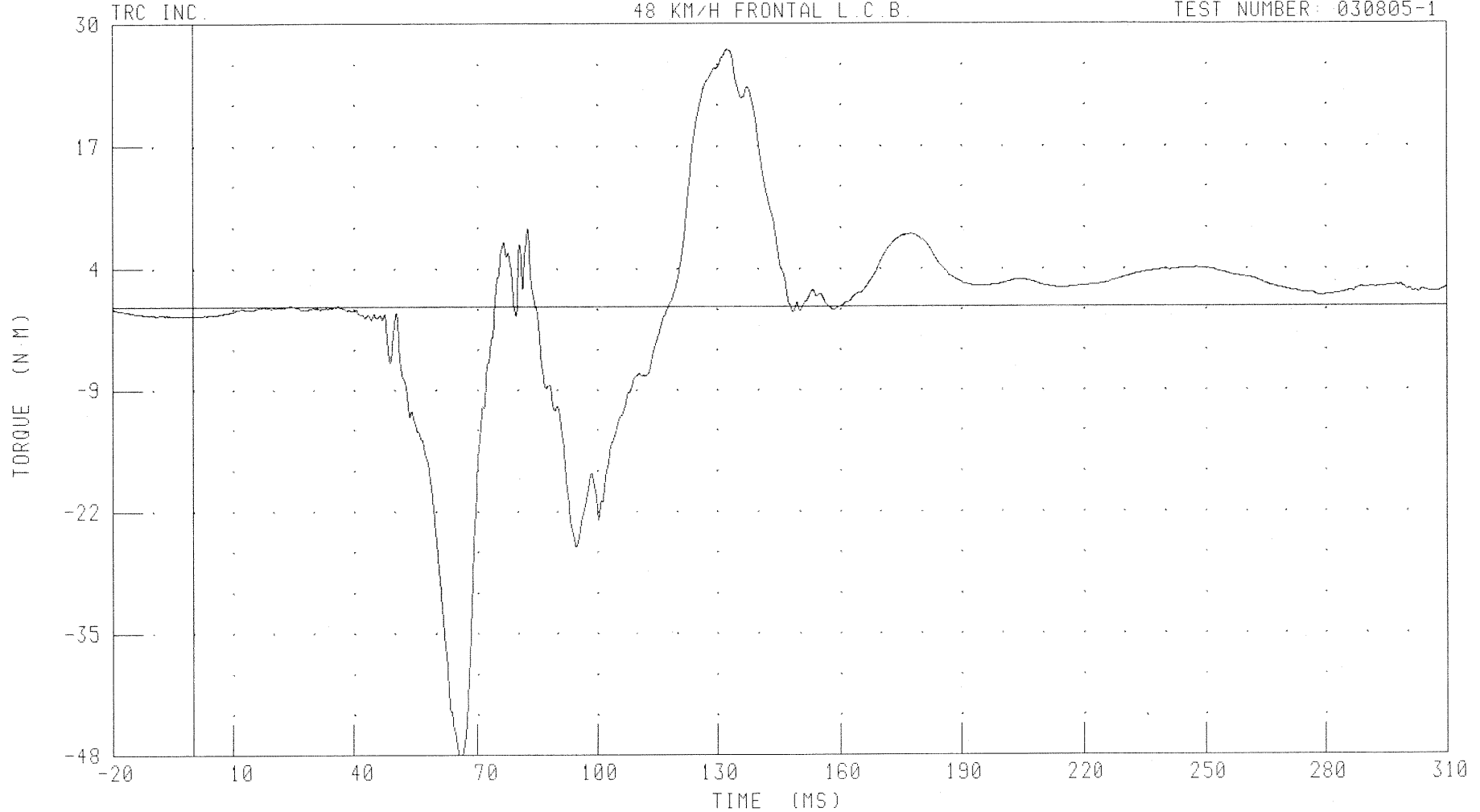
B-72

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRXM1

FILTER: CH. CLASS 600

PEAK DATA: 27.28 N·M @ 132.48 MS; -48.56 N·M @ 65.84 MS

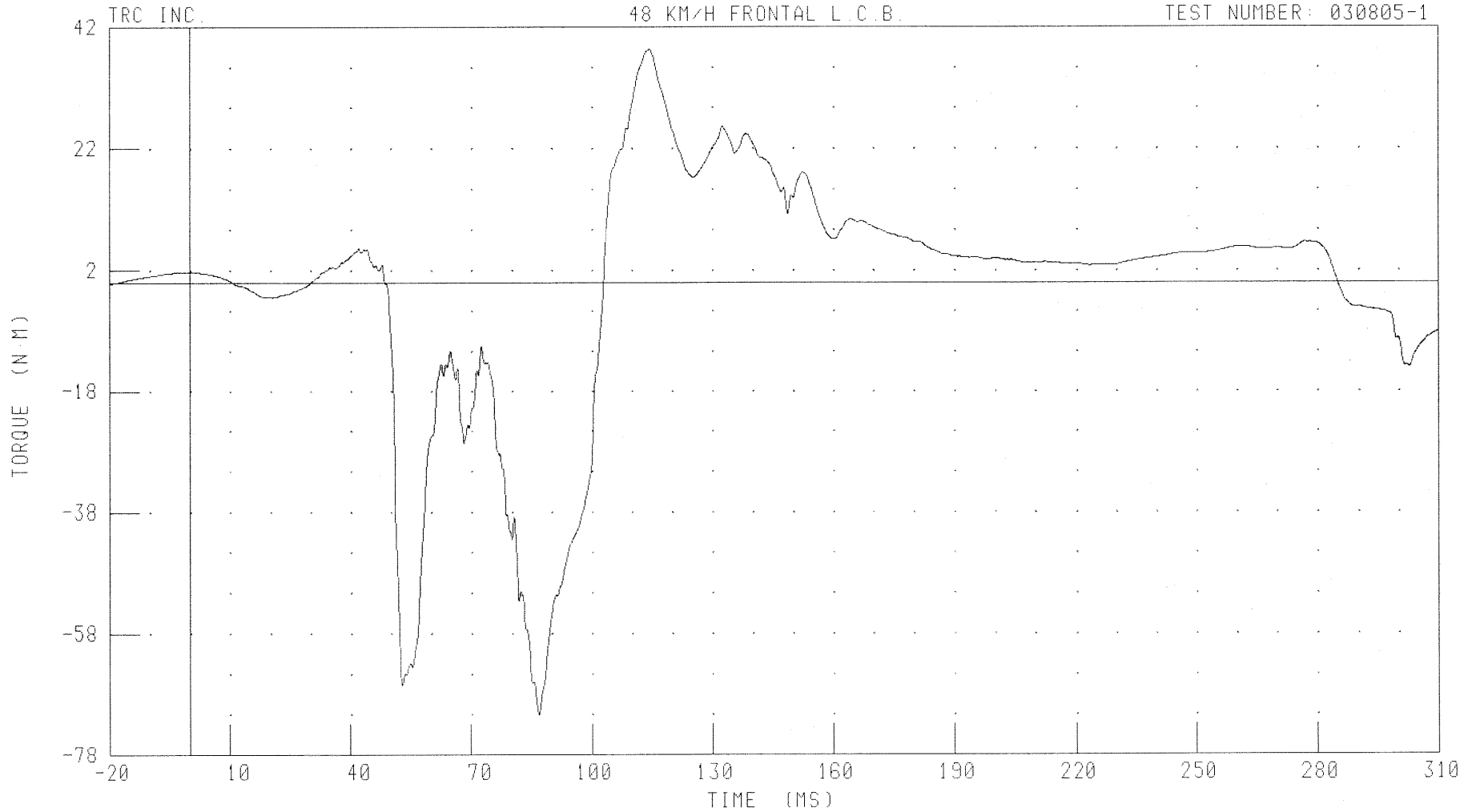
B-73

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRYM1

FILTER: CH. CLASS 600

PEAK DATA: 38.27 N·M @ 114.56 MS; -71.47 N·M @ 86.72 MS

B-74

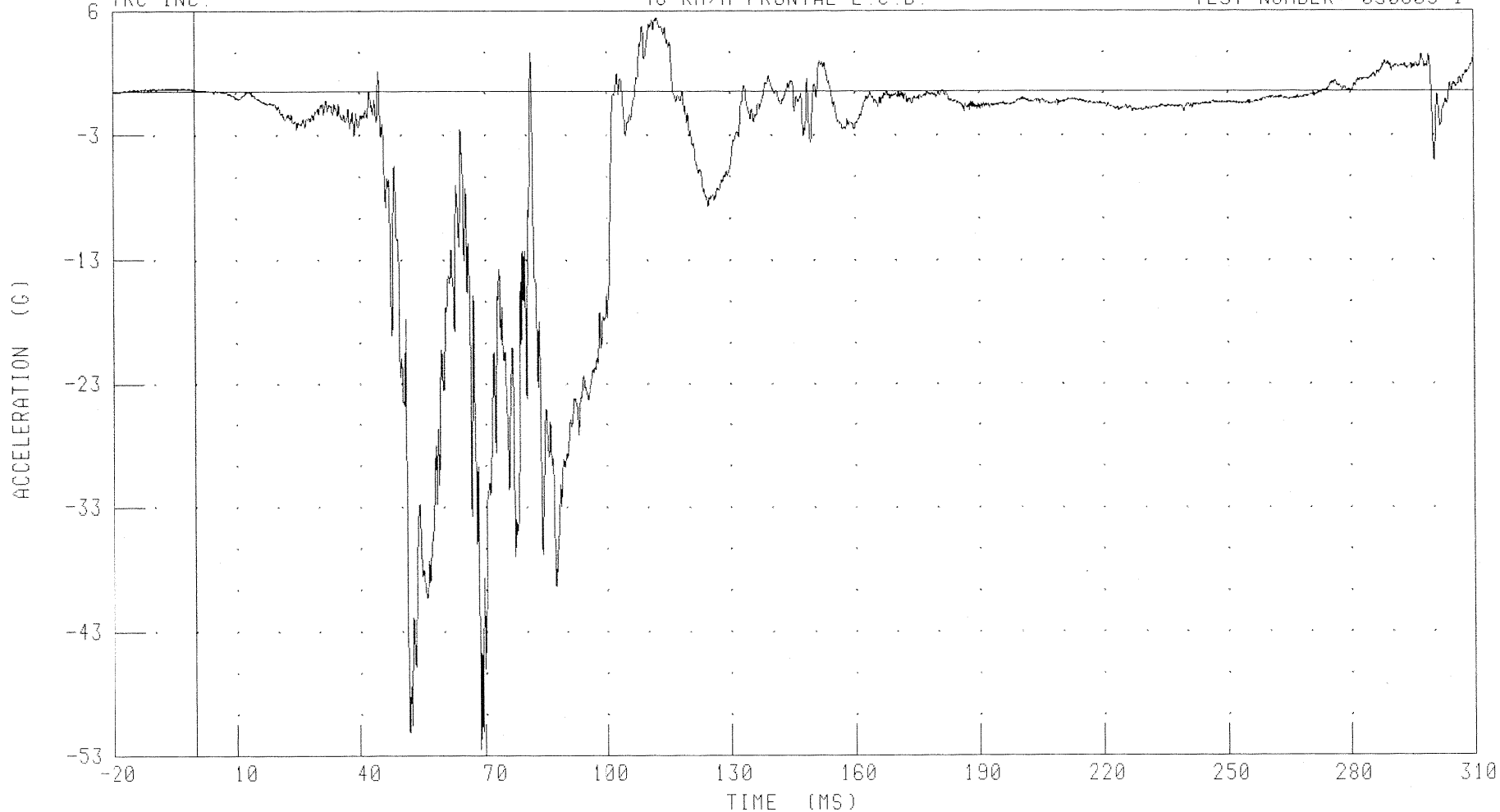
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT TIBIA X-AXIS ACCELERATION

TRC INC.

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRXG1

FILTER: CH. CLASS 1000

PEAK DATA: 5.96 G @ 112.48 MS; -53.02 G @ 68.72 MS

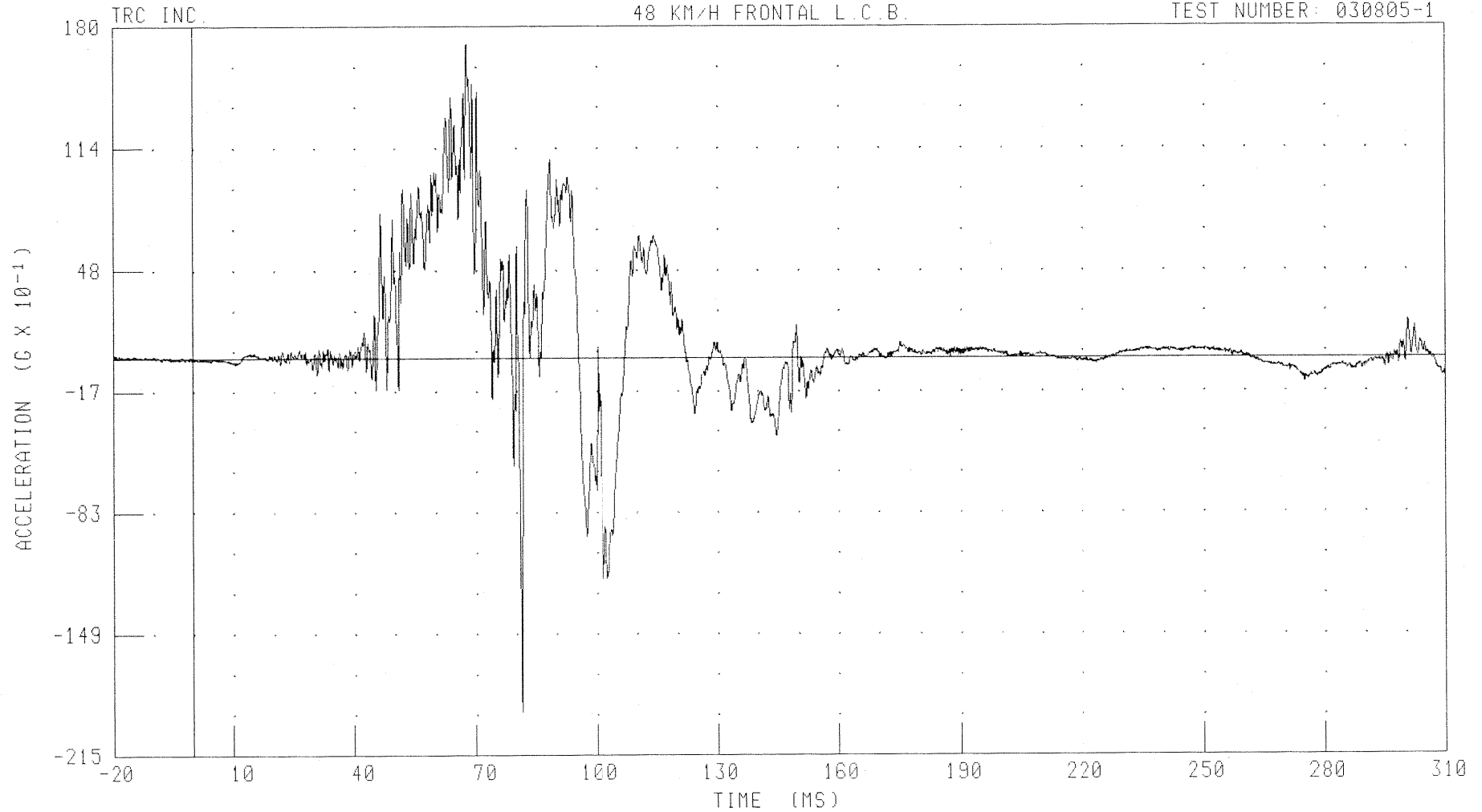
B-75

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT TIBIA Y-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRYG1

FILTER: CH. CLASS 1000

PEAK DATA: 17.06 G @ 67.76 MS; -19.27 G @ 81.44 MS

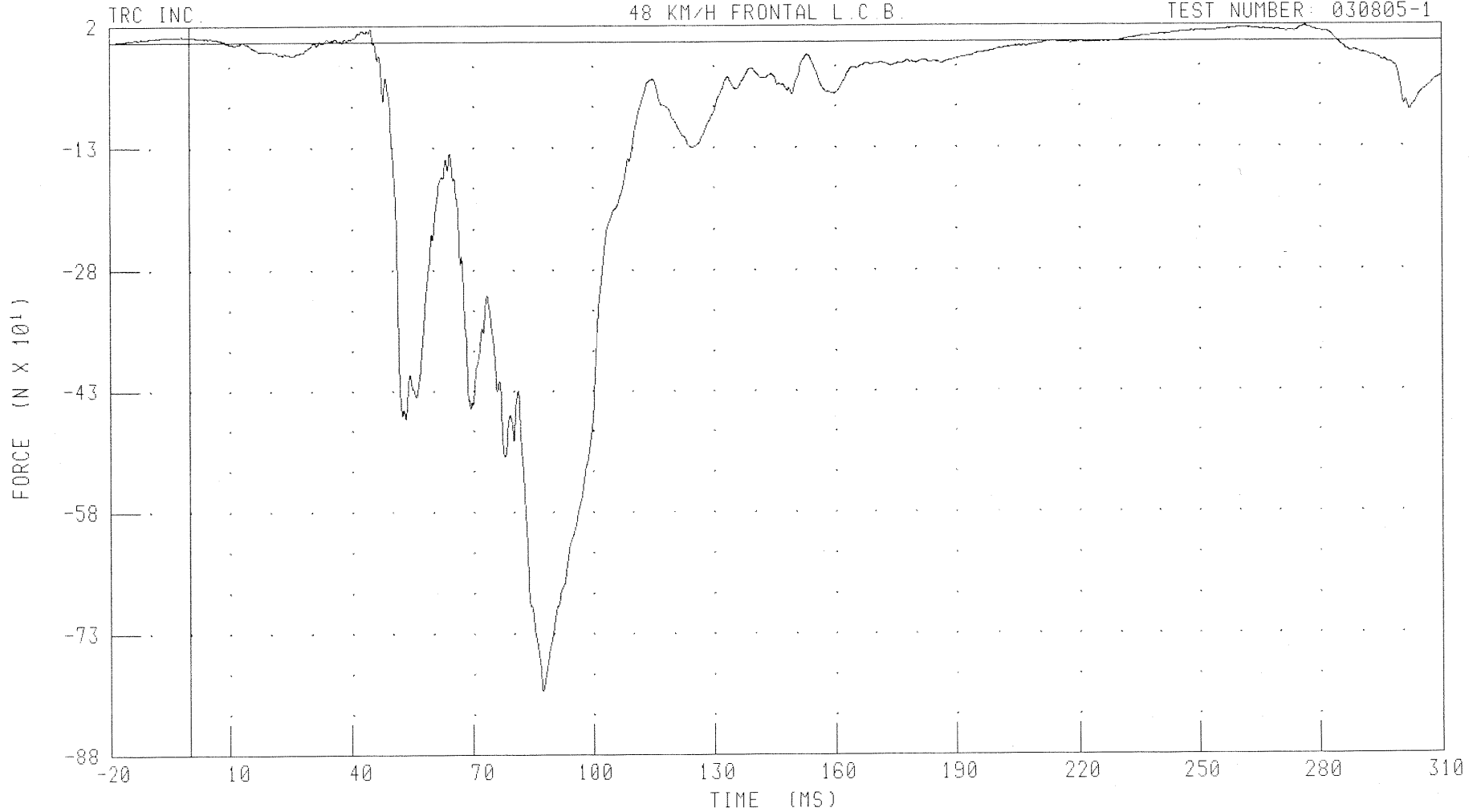
B-76

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT LOWER TIBIA X-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANRXF1

FILTER: CH. CLASS 600

PEAK DATA: 18.52 N @ 276.56 MS; -800.91 N @ 87.36 MS

B-77

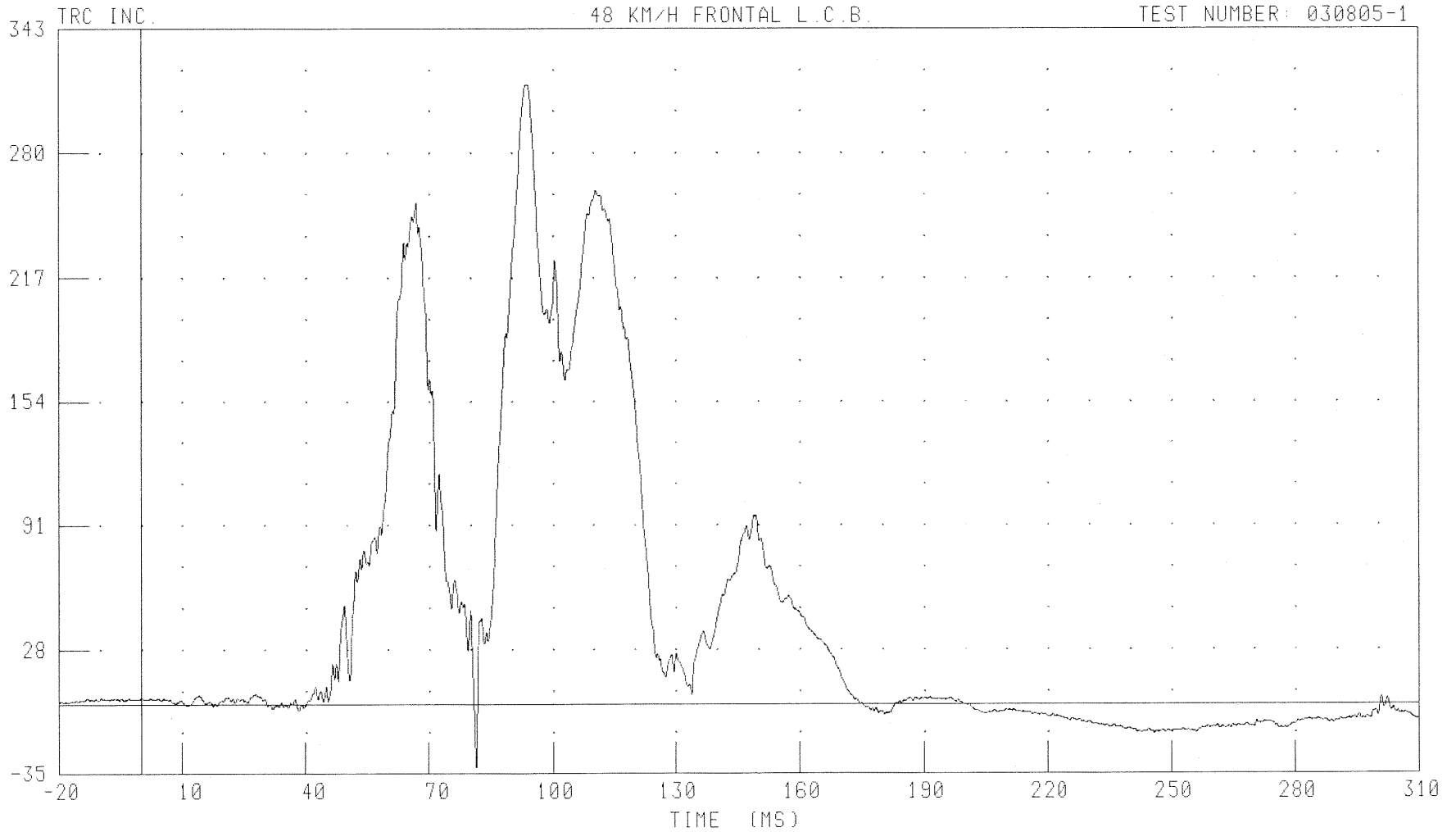
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER RIGHT LOWER TIBIA Y-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANRYF1

FILTER: CH. CLASS 600

PEAK DATA: 314.59 N @ 93.60 MS; -32.00 N @ 81.36 MS

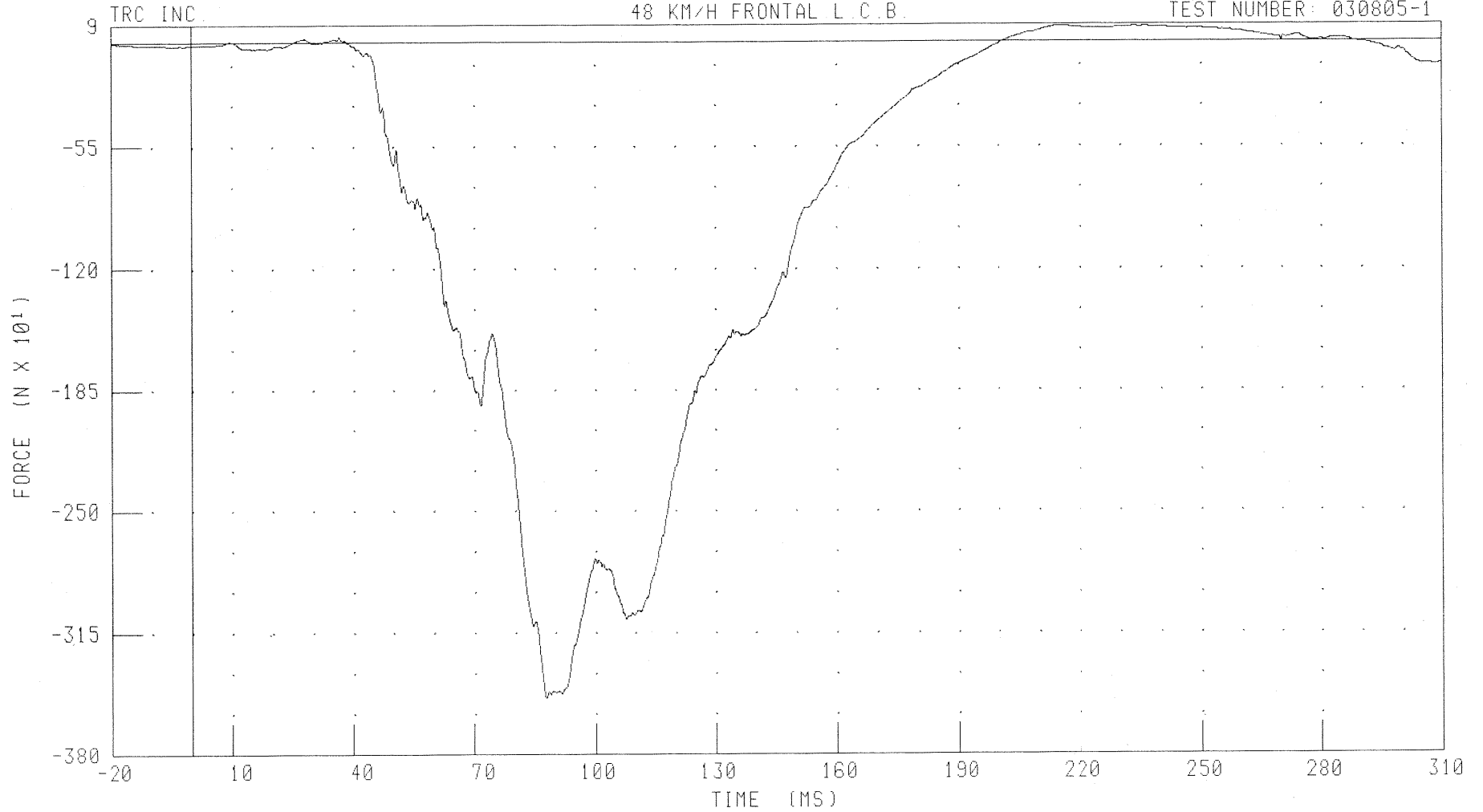
B-78

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT LOWER TIBIA Z-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANRZF1 FILTER: CH. CLASS 600

PEAK DATA: 85.83 N @ 215.84 MS; -3504.26 N @ 87.76 MS

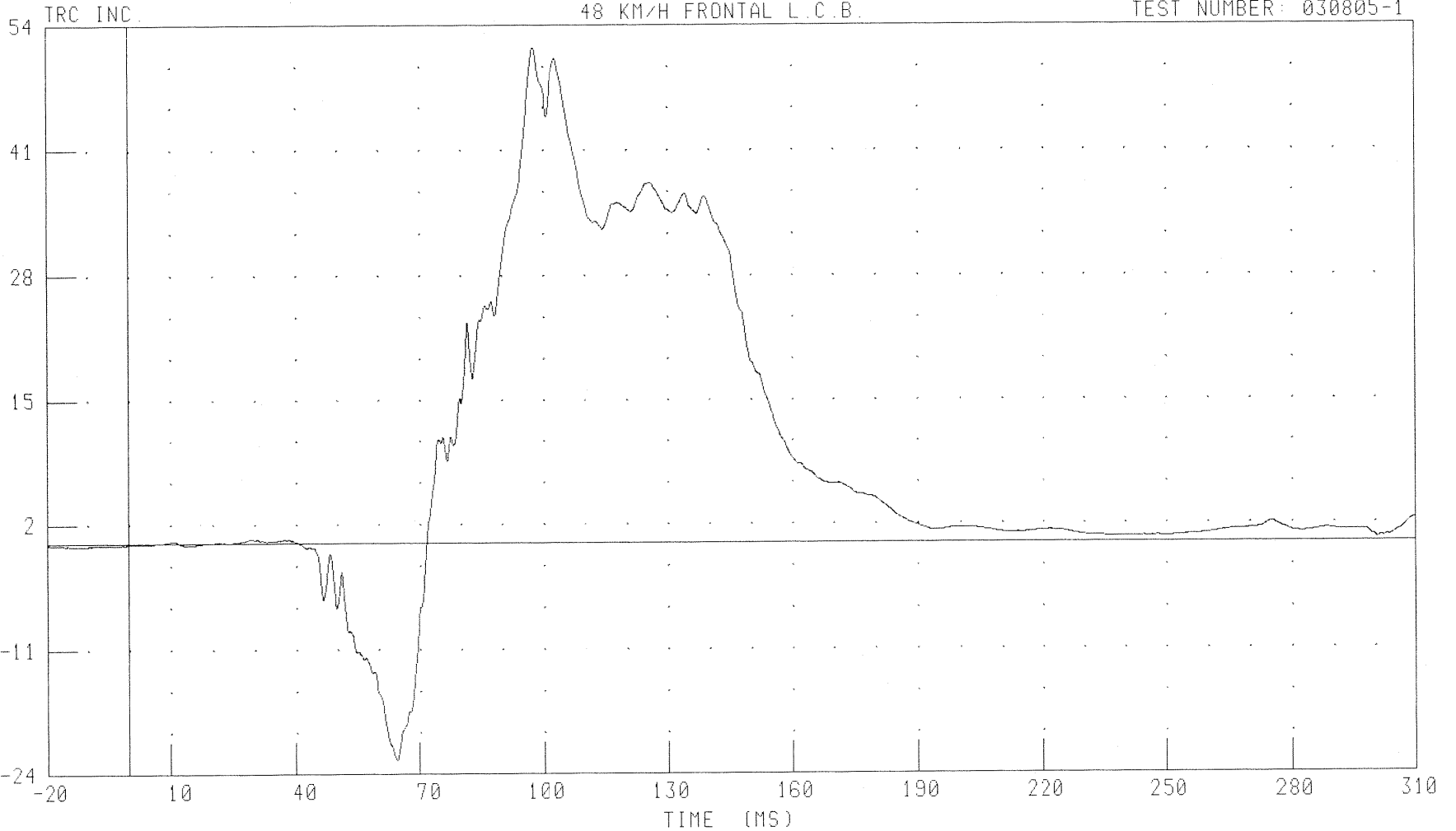
B-79

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT LOWER TIBIA MOMENT ABOUT X AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANRXM1 FILTER: CH. CLASS 600

PEAK DATA: 51.60 N·M @ 97.76 MS; -22.58 N·M @ 64.56 MS

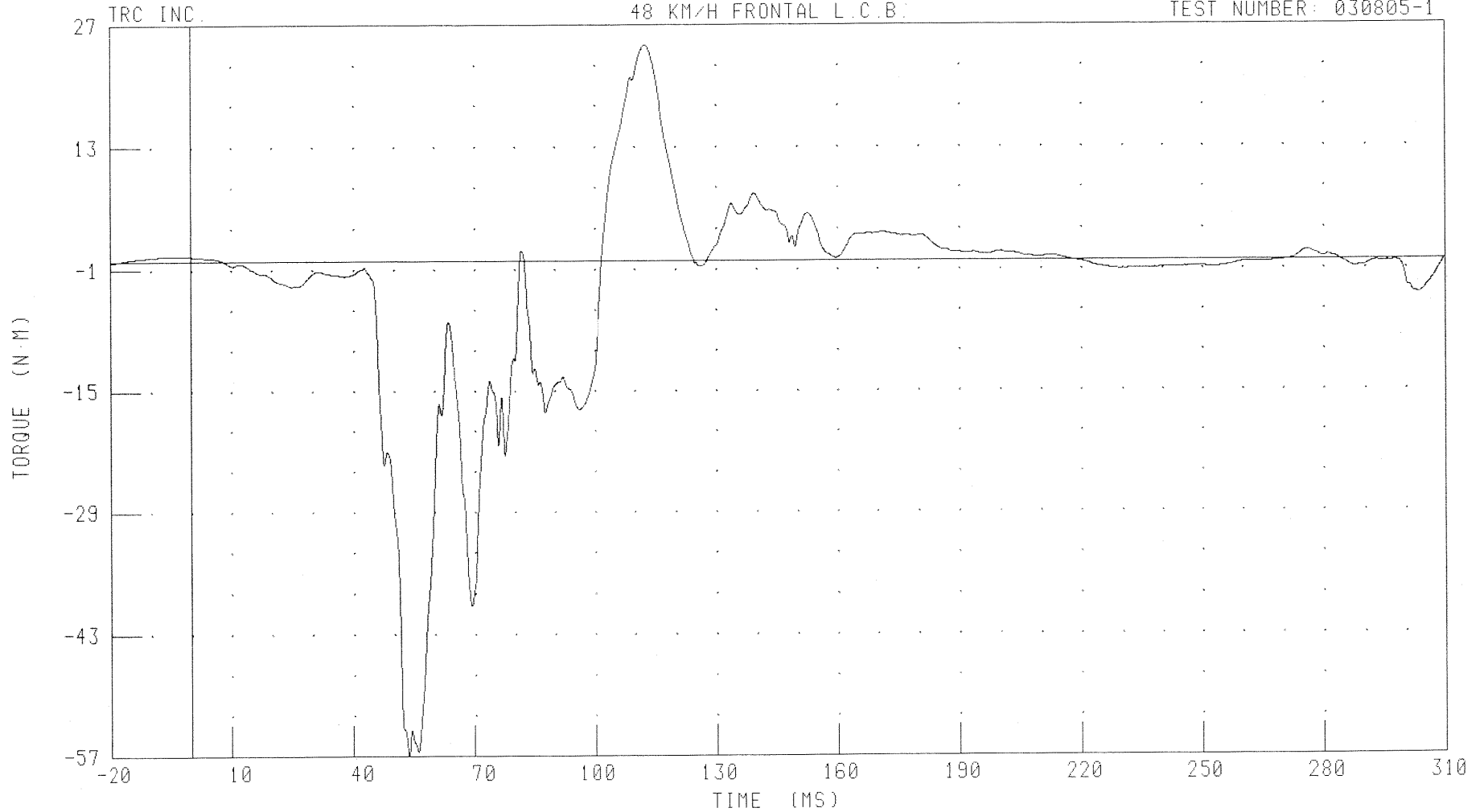
B-80

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANRYM1 FILTER: CH. CLASS 600

PEAK DATA: 24.68 N·M @ 112.72 MS; -56.95 N·M @ 53.52 MS

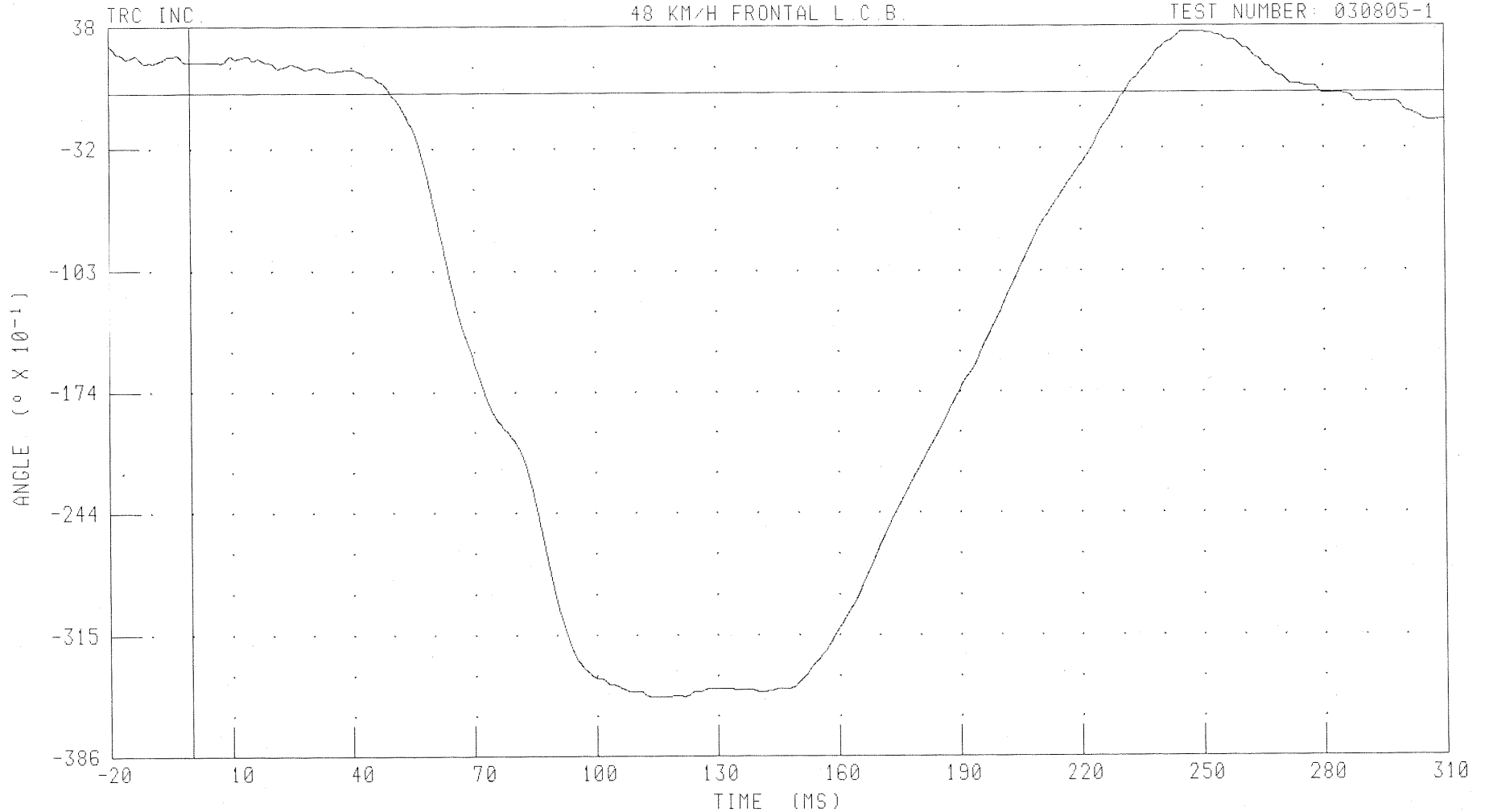
B-81

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT FOOT TO ANKLE X-AXIS ROTATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTRXD1

FILTER: CH. CLASS 100

PEAK DATA: 3.57 ° @ 248.72 MS; -35.21 ° @ 116.32 MS

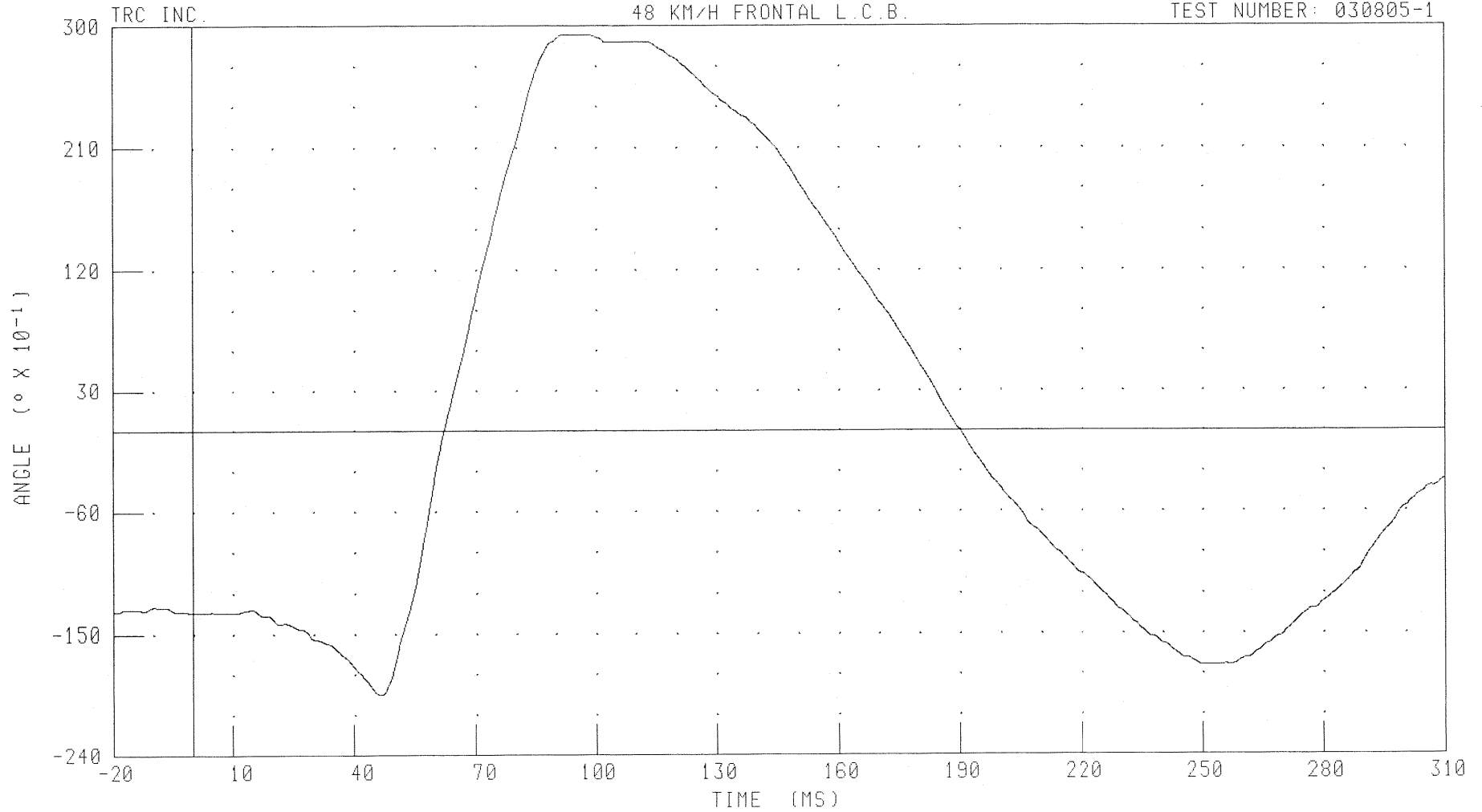
B-82

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT FOOT TO ANKLE Y-AXIS ROTATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTRYD1 FILTER: CH. CLASS 180

PEAK DATA: 29.32 $^{\circ}$ @ 92.00 MS, -19.54 $^{\circ}$ @ 46.72 MS

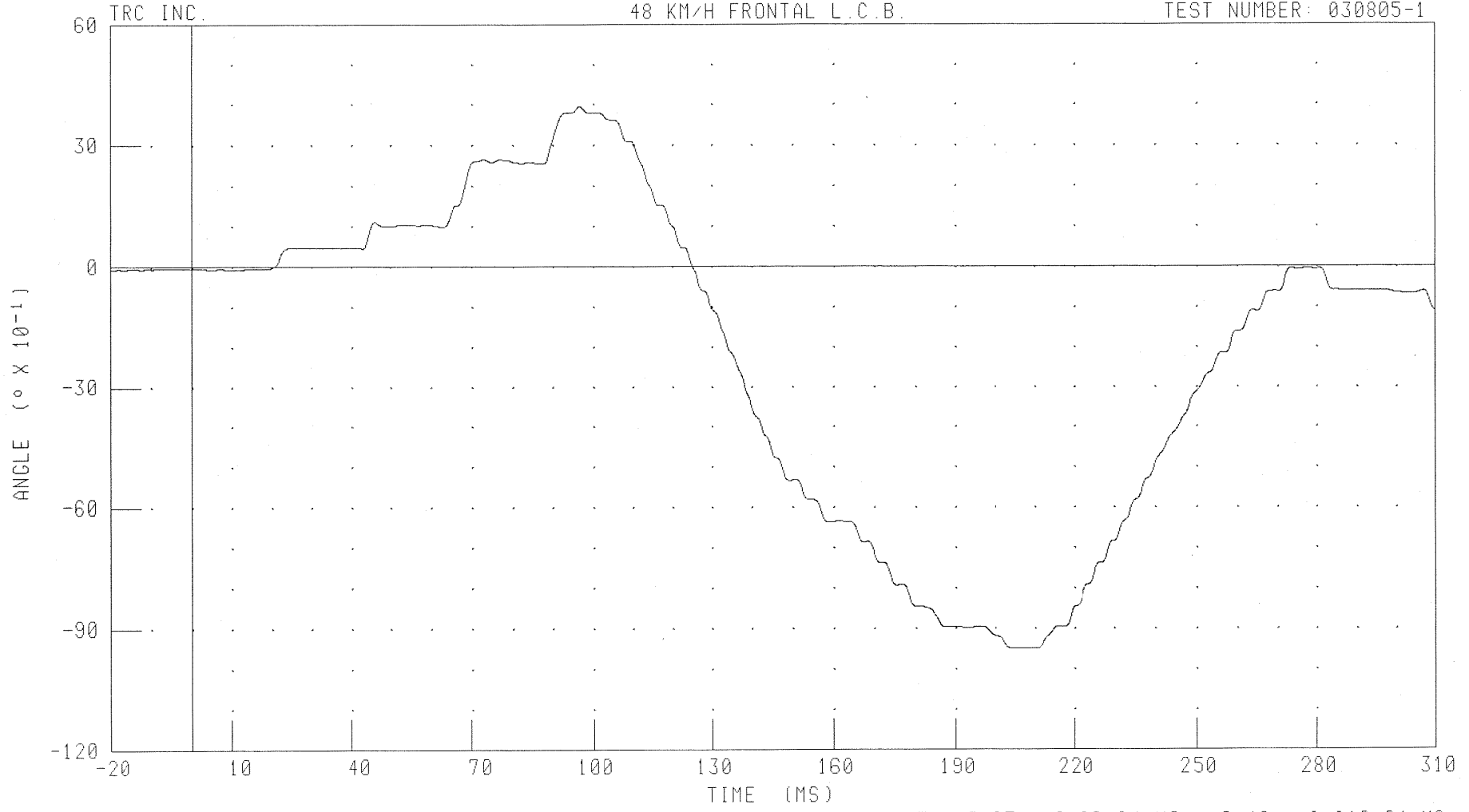
B-83

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT FOOT TO ANKLE Z-AXIS ROTATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTRZD1 FILTER: CH. CLASS 180

PEAK DATA: 3.95 ° @ 96.64 MS; -9.49 ° @ 210.64 MS

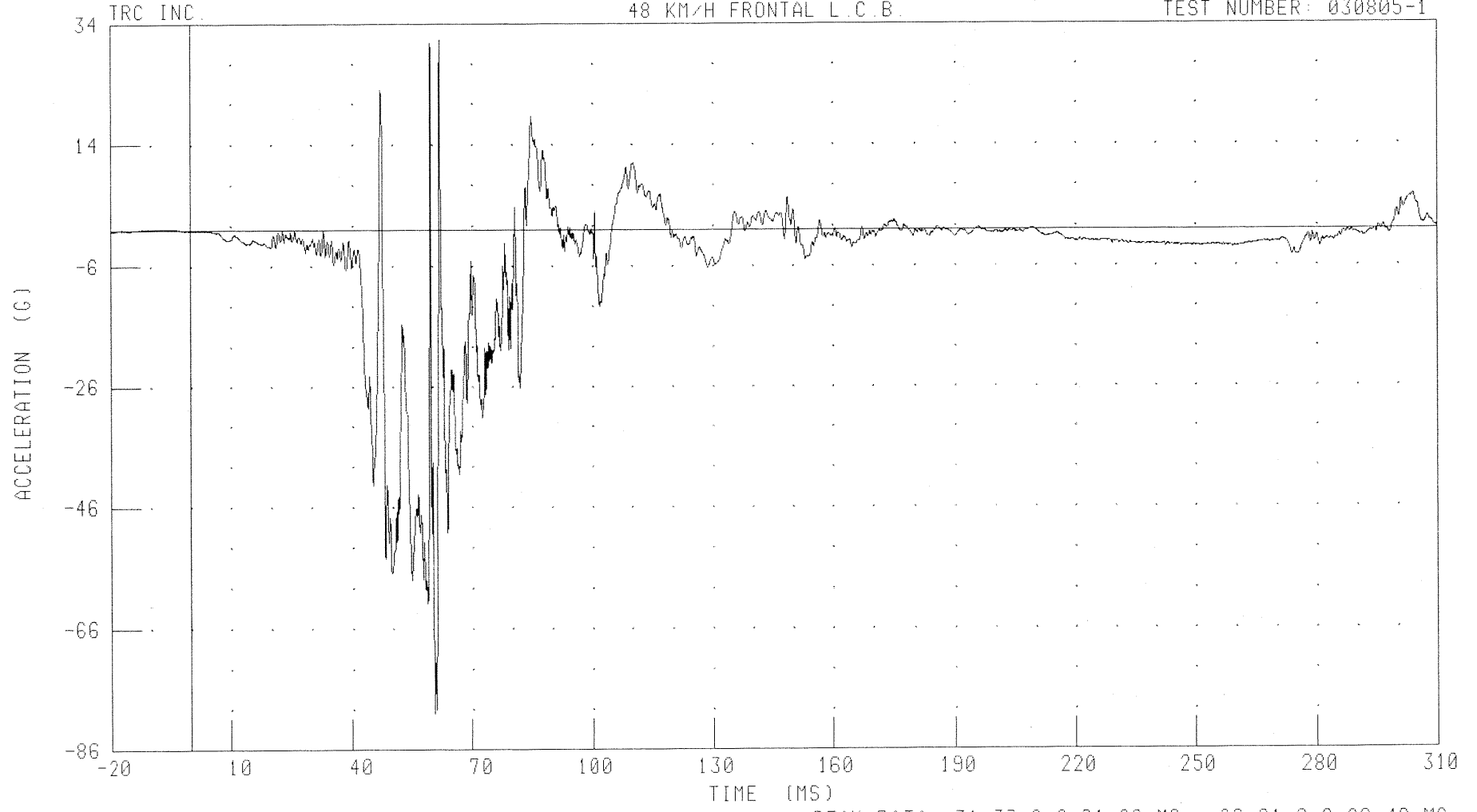
B-84

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT FOOT X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTRXC1

FILTER: CH. CLASS 1000

PEAK DATA: 31.33 G @ 61.92 MS, -80.01 G @ 60.48 MS

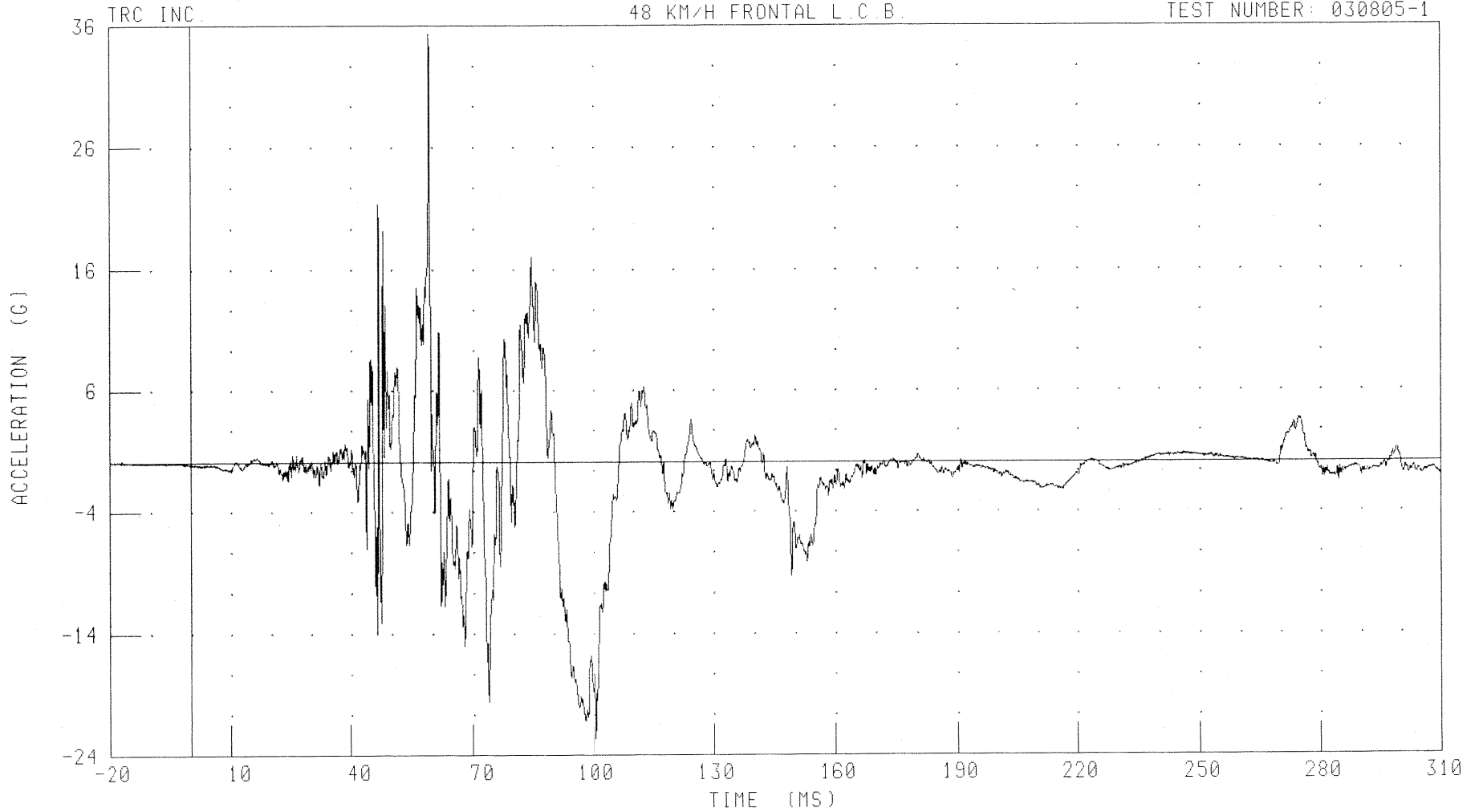
B-85

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT FOOT Y-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTRYG1

FILTER: CH. CLASS 1000

PEAK DATA: 35.36 G @ 59.28 MS; -22.65 G @ 100.72 MS

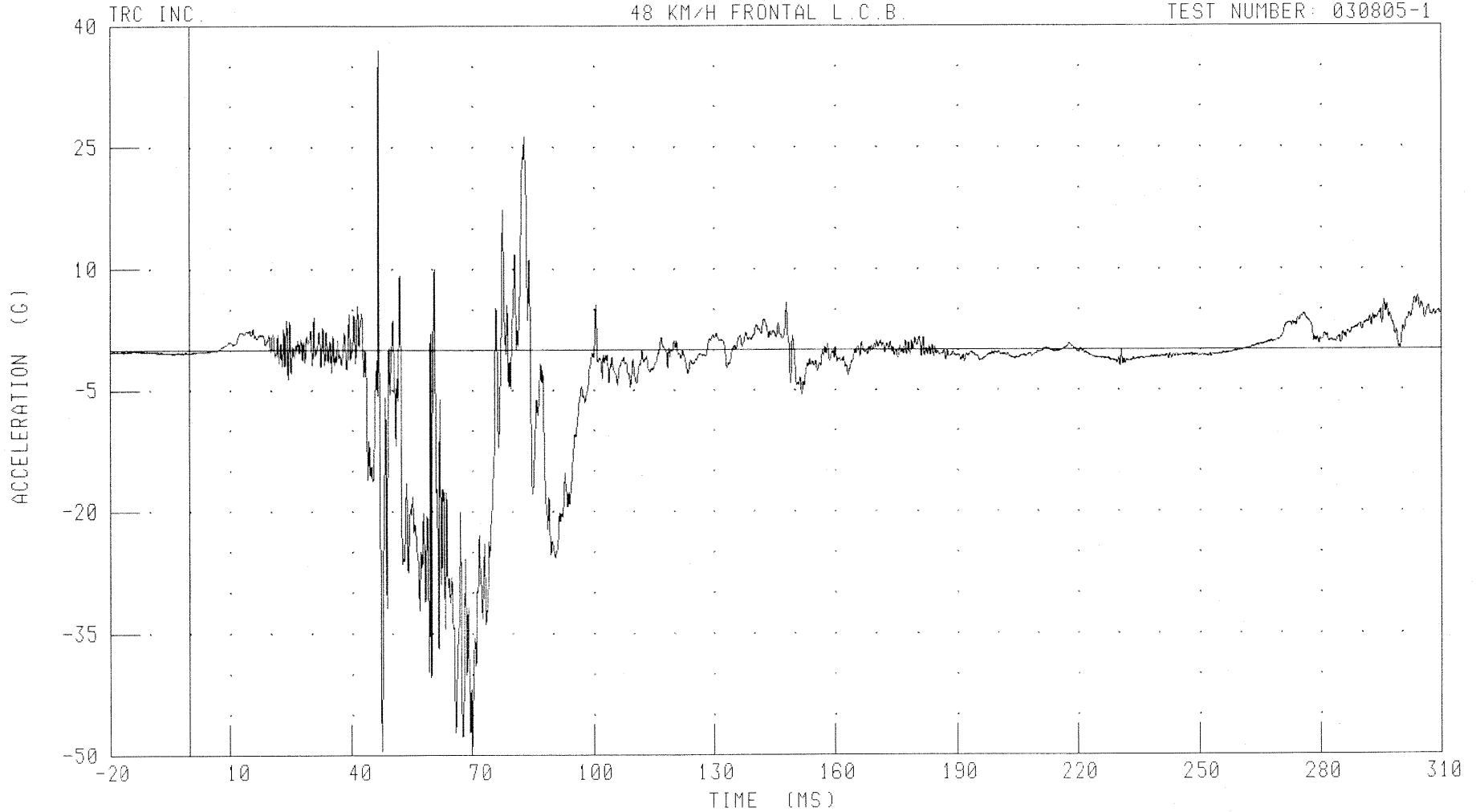
B-86

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT FOOT Z-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTRZG1 FILTER: CH. CLASS 1000

PEAK DATA: 36.96 G @ 46.72 MS; -49.49 G @ 47.52 MS

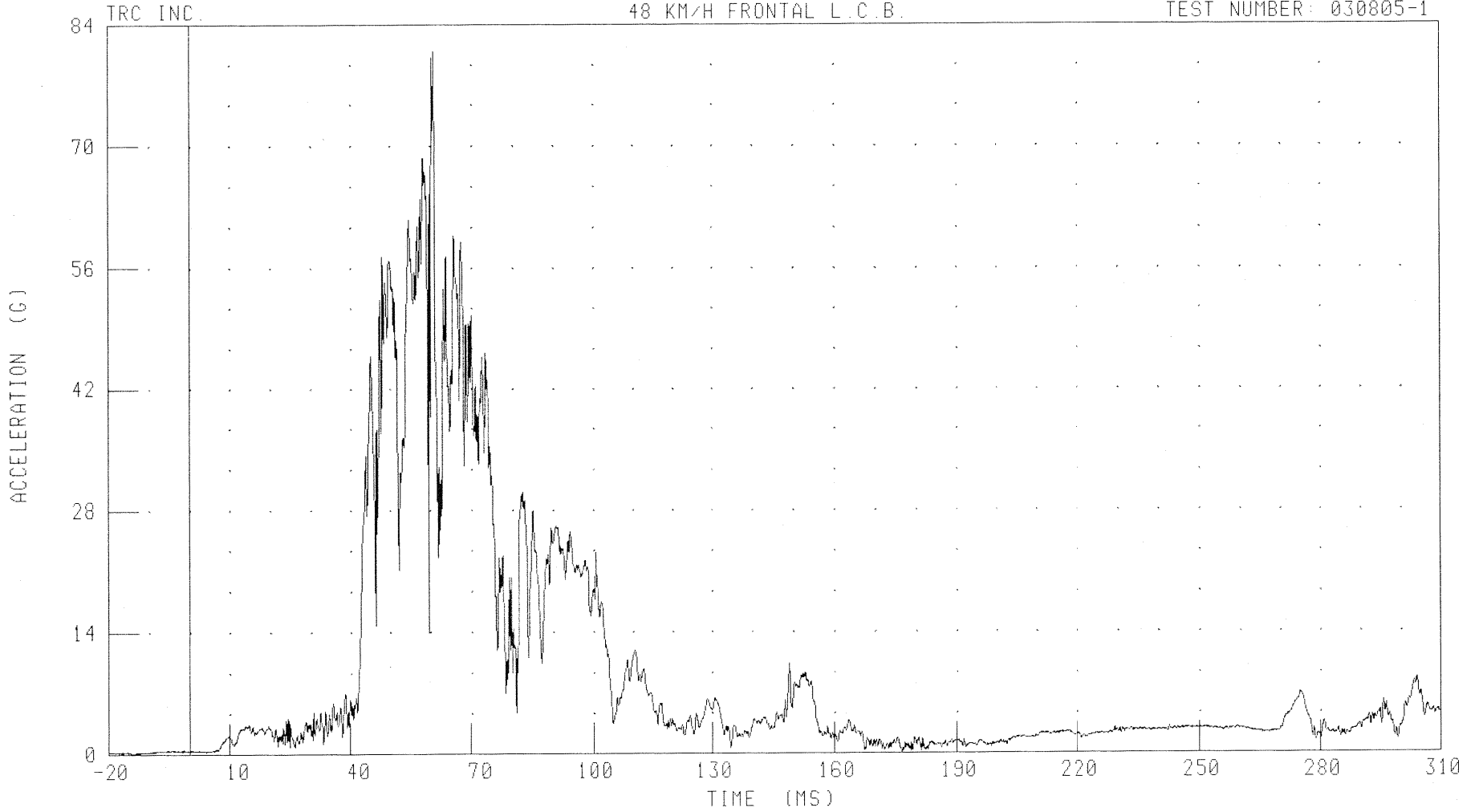
B-87

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DRIVER RIGHT FOOT RESULTANT ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: FTTRG1

FILTER: CH. CLASS 1000

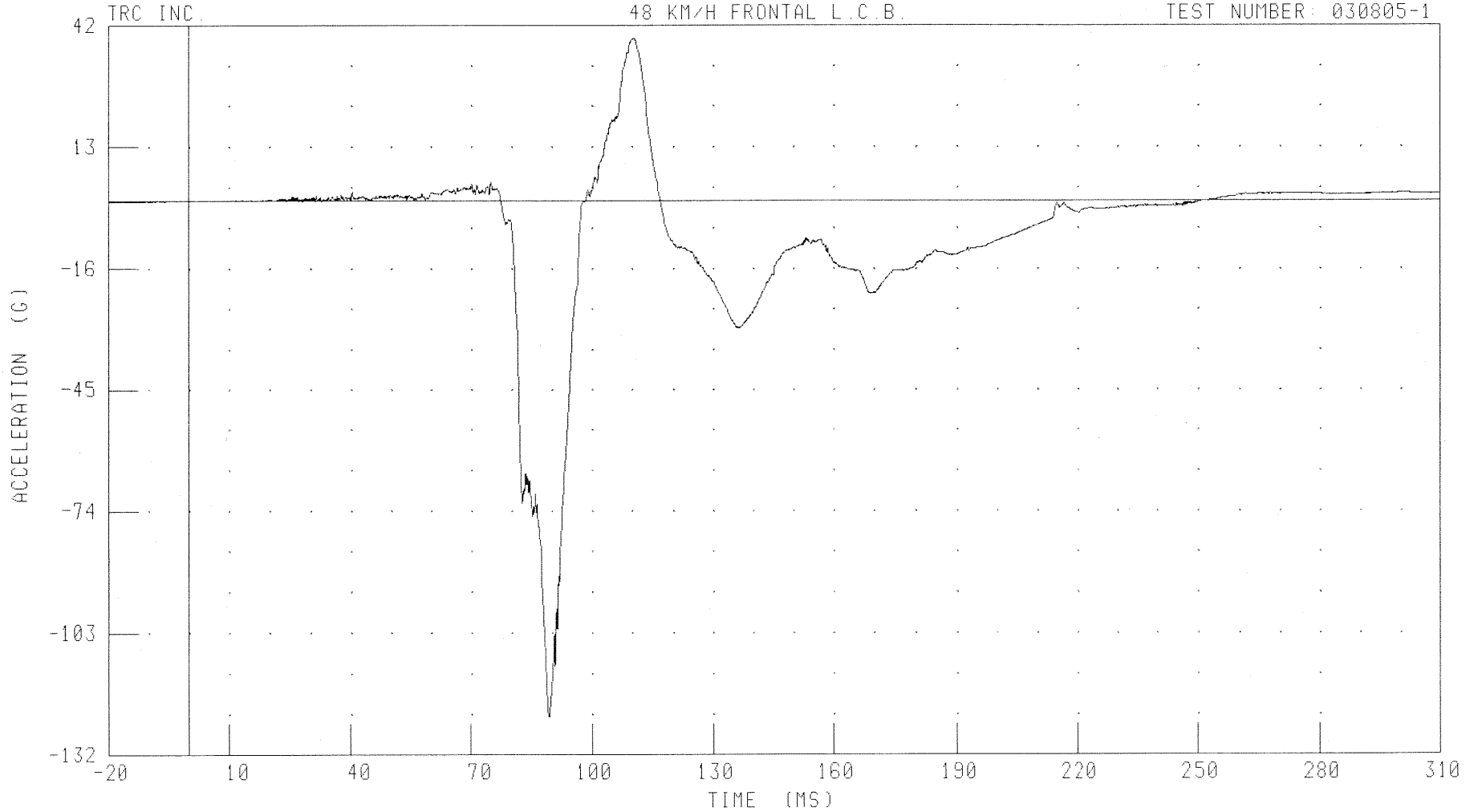
PEAK DATA: 80.90 G @ 60.96 MS; 0.06 G @ -14.16 MS

B-88

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD X-AXIS ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HEDXC2

FILTER: CH. CLASS 1000

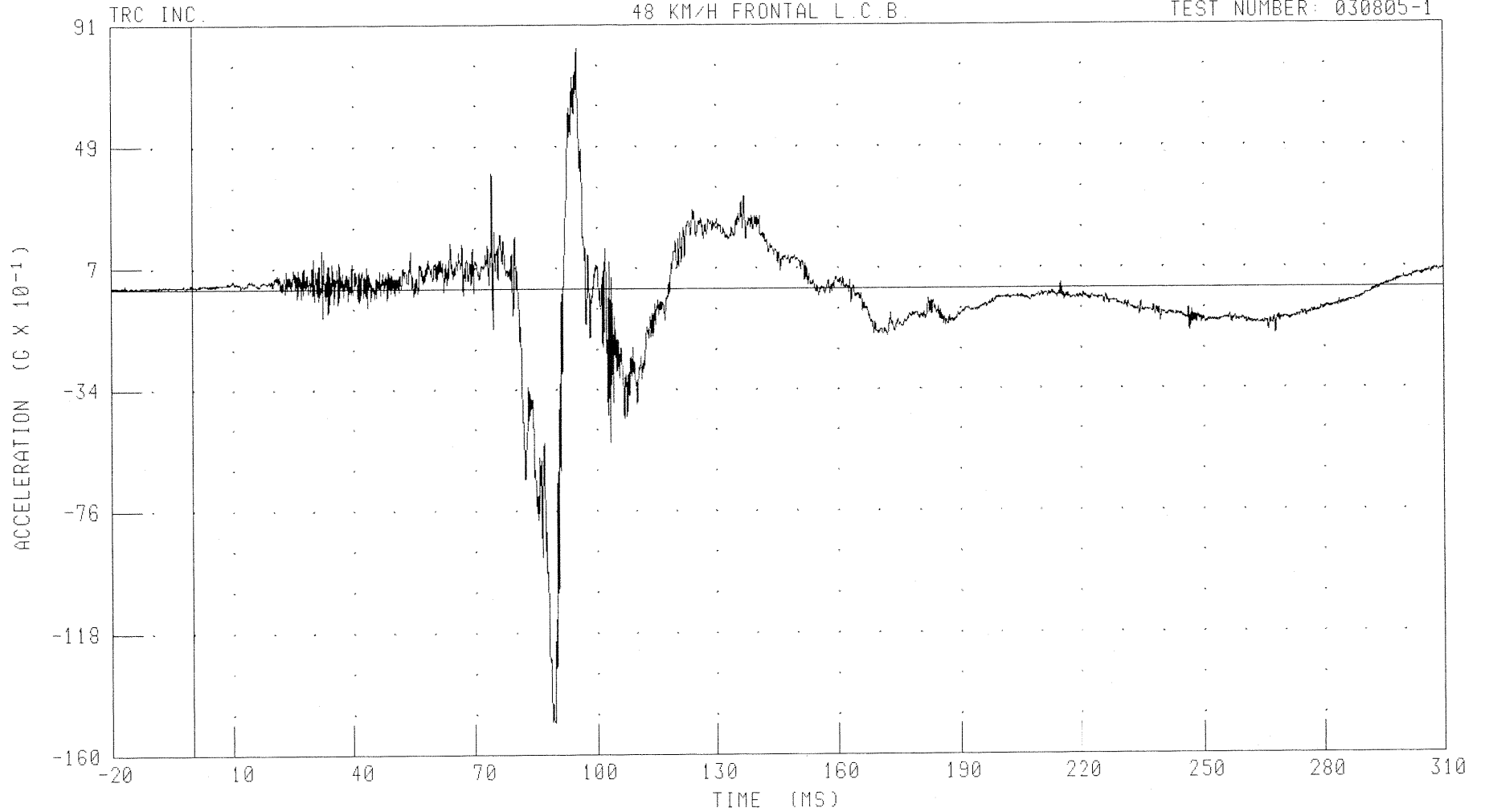
PEAK DATA: 38.99 G @ 110.64 MS; -123.06 G @ 89.28 MS

B-89

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD Y-AXIS ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HEDYG2

FILTER: CH. CLASS 1000

PEAK DATA: 8.28 G @ 95.20 MS; -14.99 G @ 89.60 MS

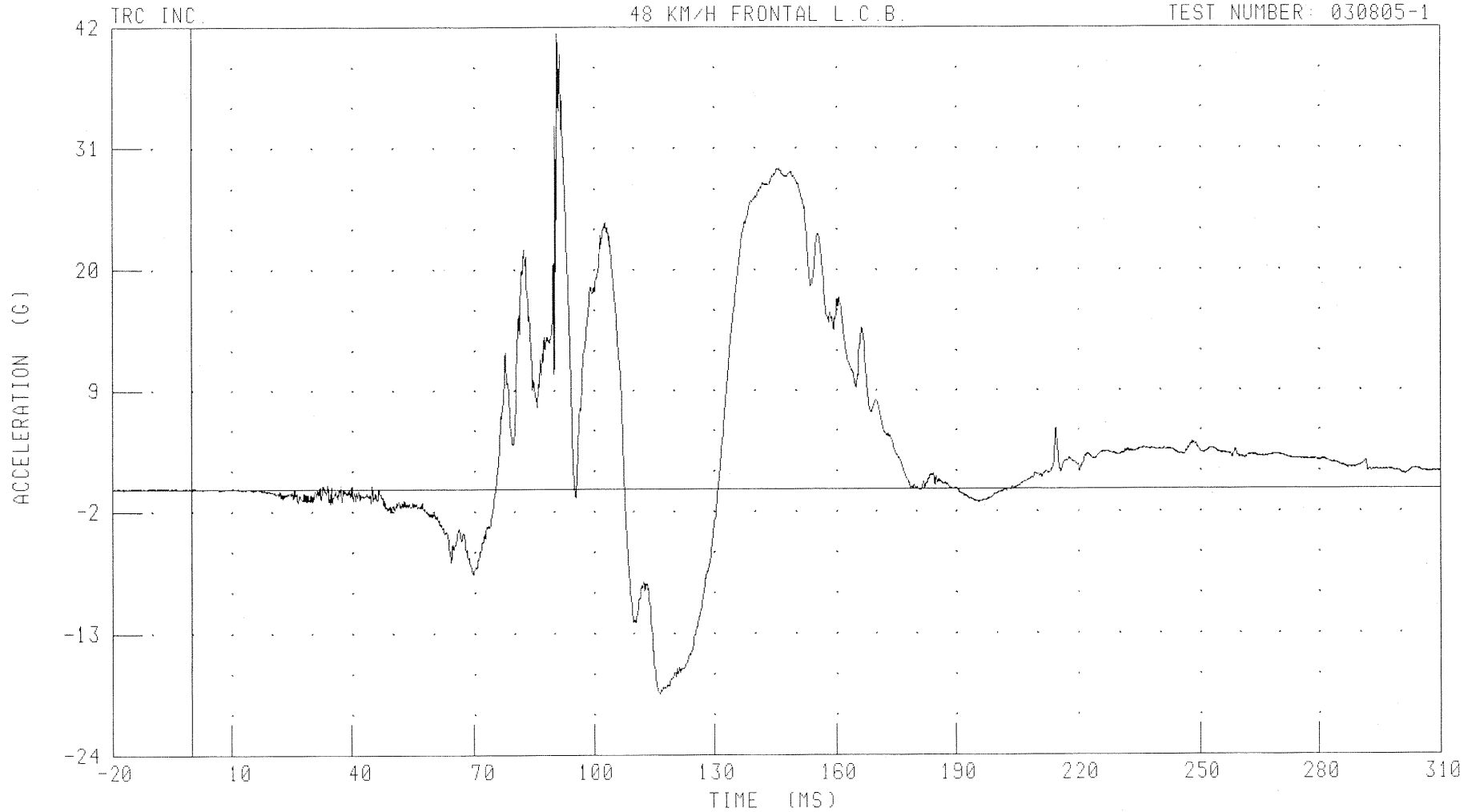
B-90

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD Z-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

PEAK DATA: 41.45 G @ 90.80 MS; -18.54 G @ 116.72 MS

B-91

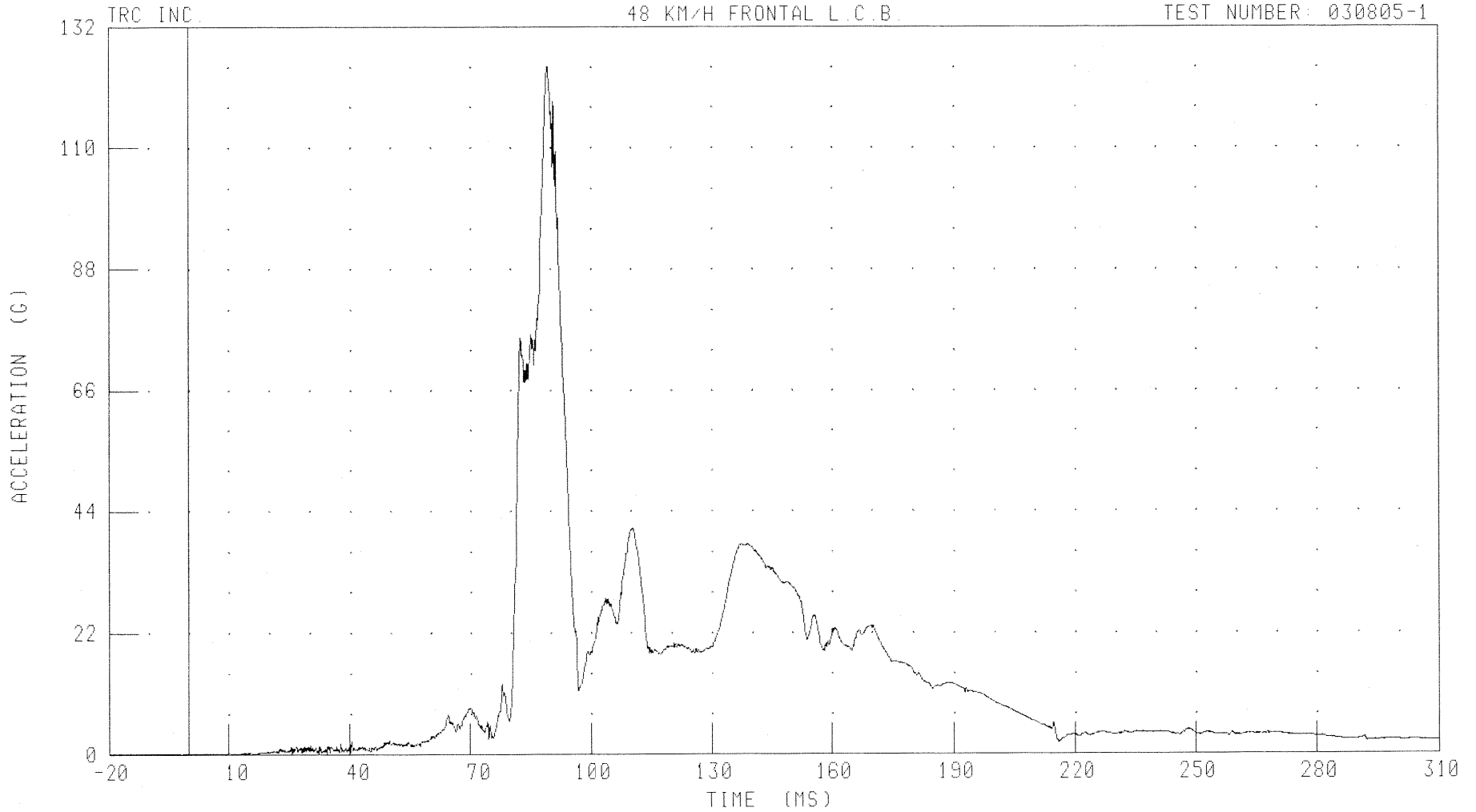
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

PASSENGER HEAD RESULTANT ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HEDRG2

FILTER: CH. CLASS 1000

PEAK DATA: 124.72 G @ 89.28 MS; 0.03 G @ -5.68 MS

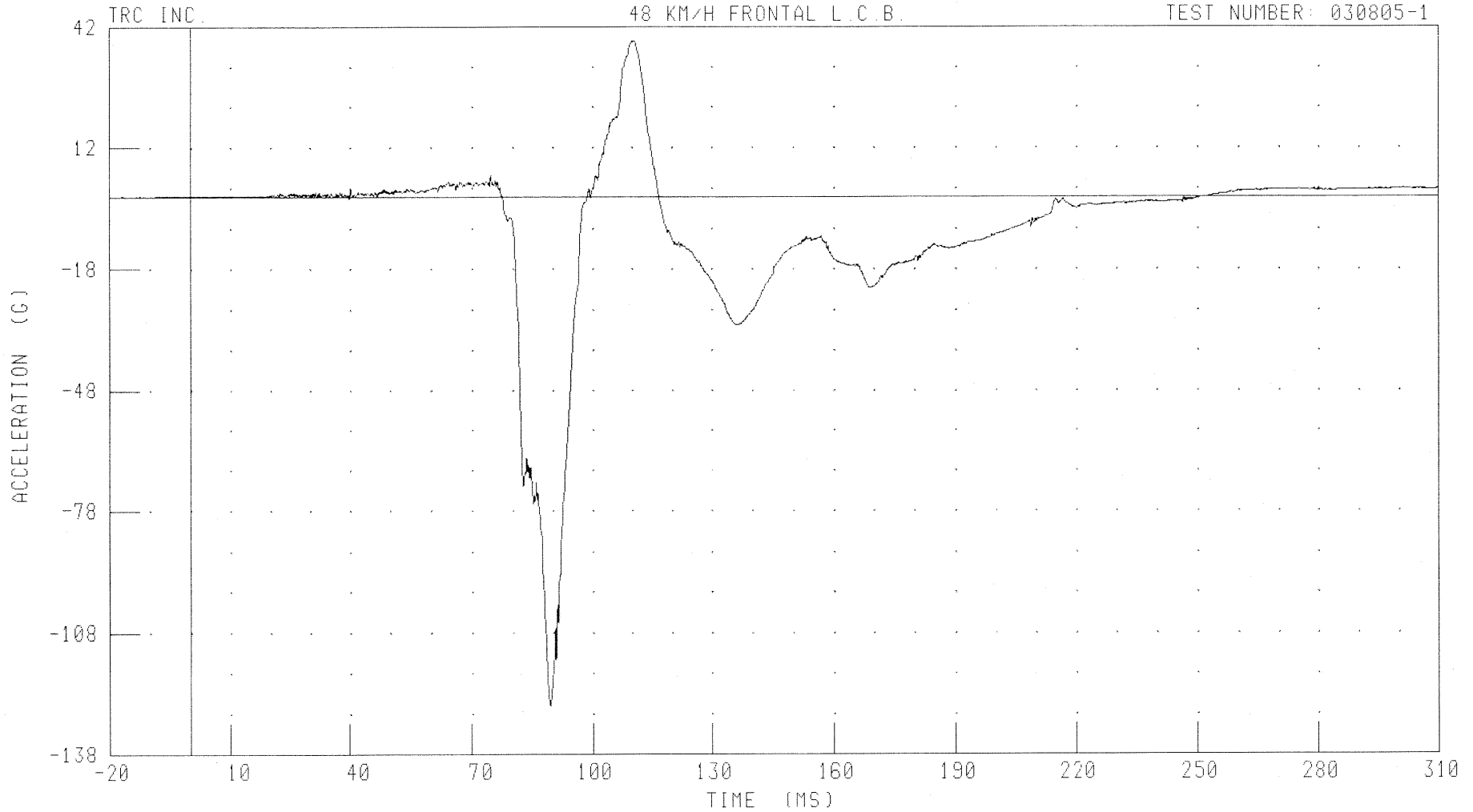
B-92

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD X-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HEDXR2 FILTER: CH. CLASS 1000

PEAK DATA: 38.59 G @ 110.72 MS; -125.98 G @ 89.36 MS

B-93

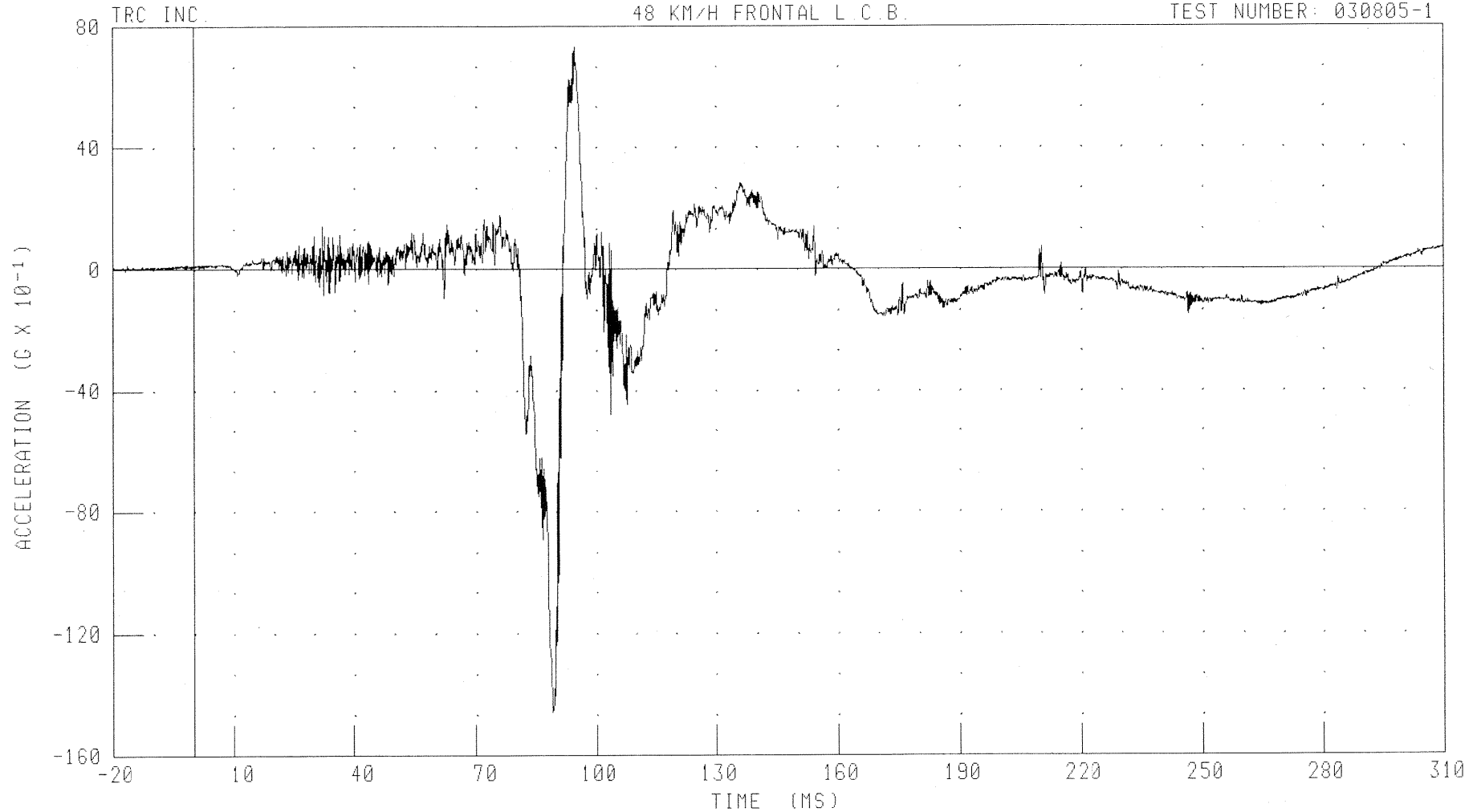
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

PASSENGER HEAD Y-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HEDYR2 FILTER: CH. CLASS 1000

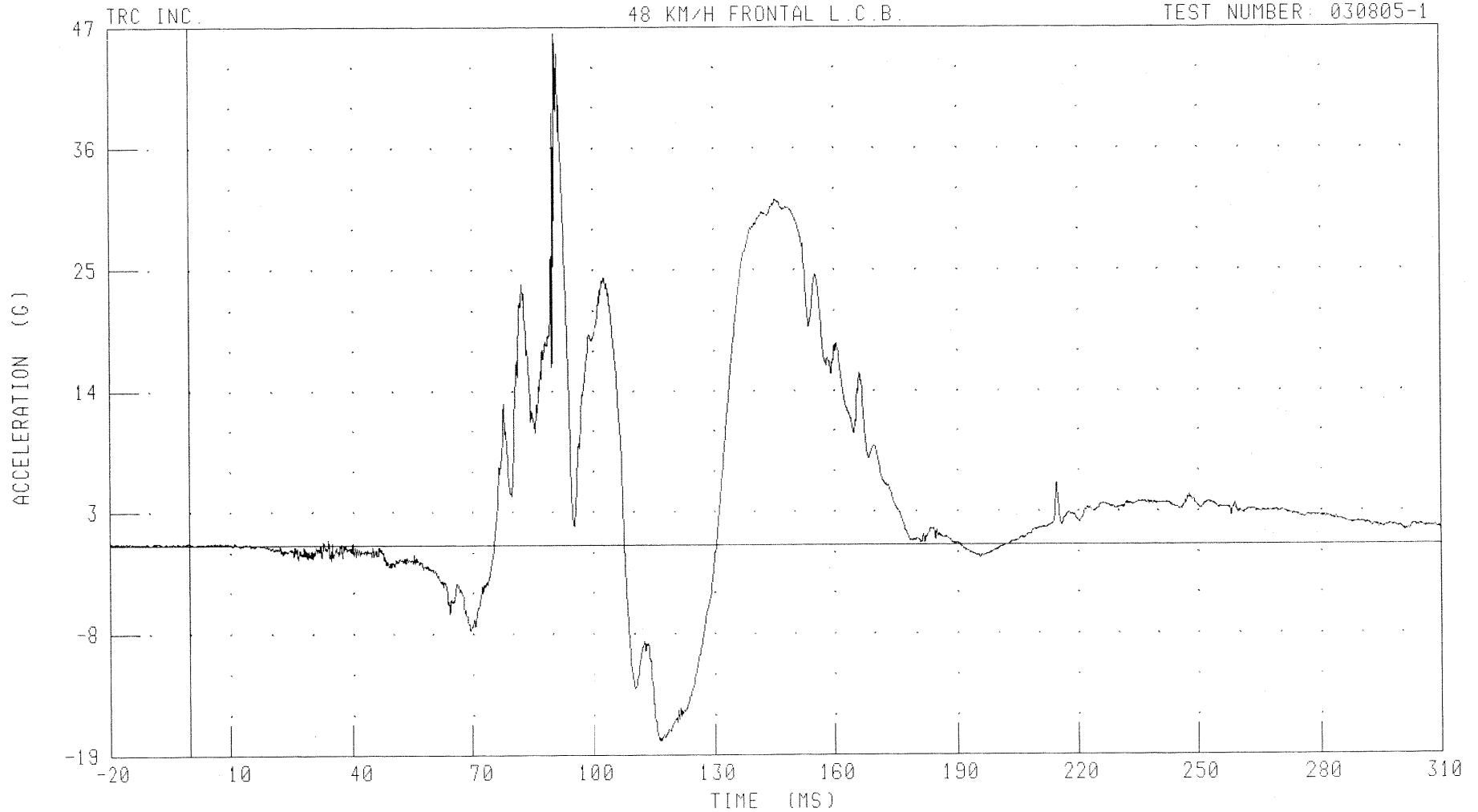
PEAK DATA: 7.32 G @ 94.72 MS; -14.57 G @ 88.96 MS

B-94

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD Z-AXIS ACCELERATION REDUNDANT
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HEDZR2 FILTER: CH. CLASS 1000

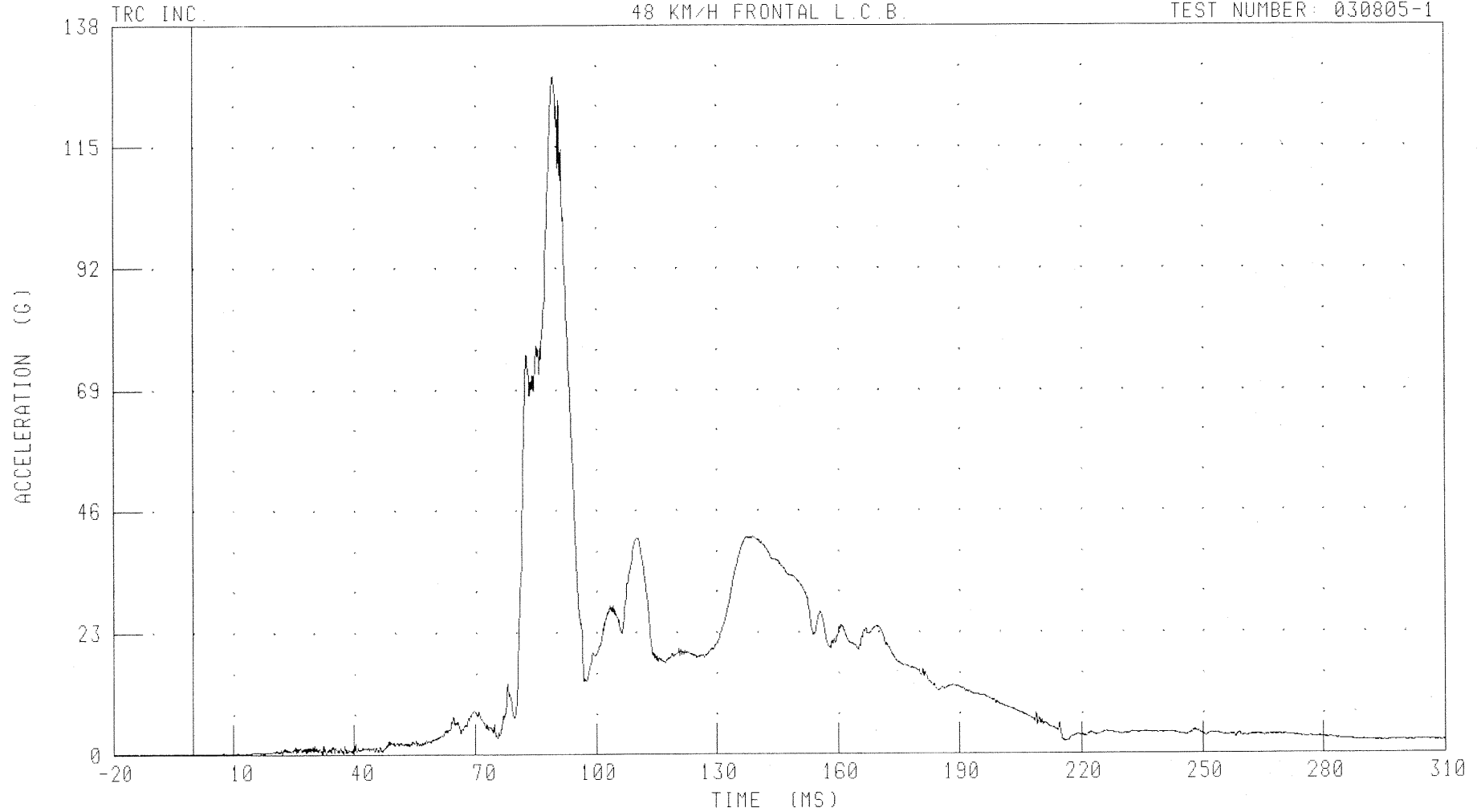
PEAK DATA: 46.45 G @ 90.80 MS, -17.71 G @ 116.72 MS

B-95

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD RESULTANT ACCELERATION REDUNDANT
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HEDRR2 FILTER: CH. CLASS 1000

PEAK DATA 128.22 G @ 89.36 MS; 0.03 G @ -16.80 MS

B-96

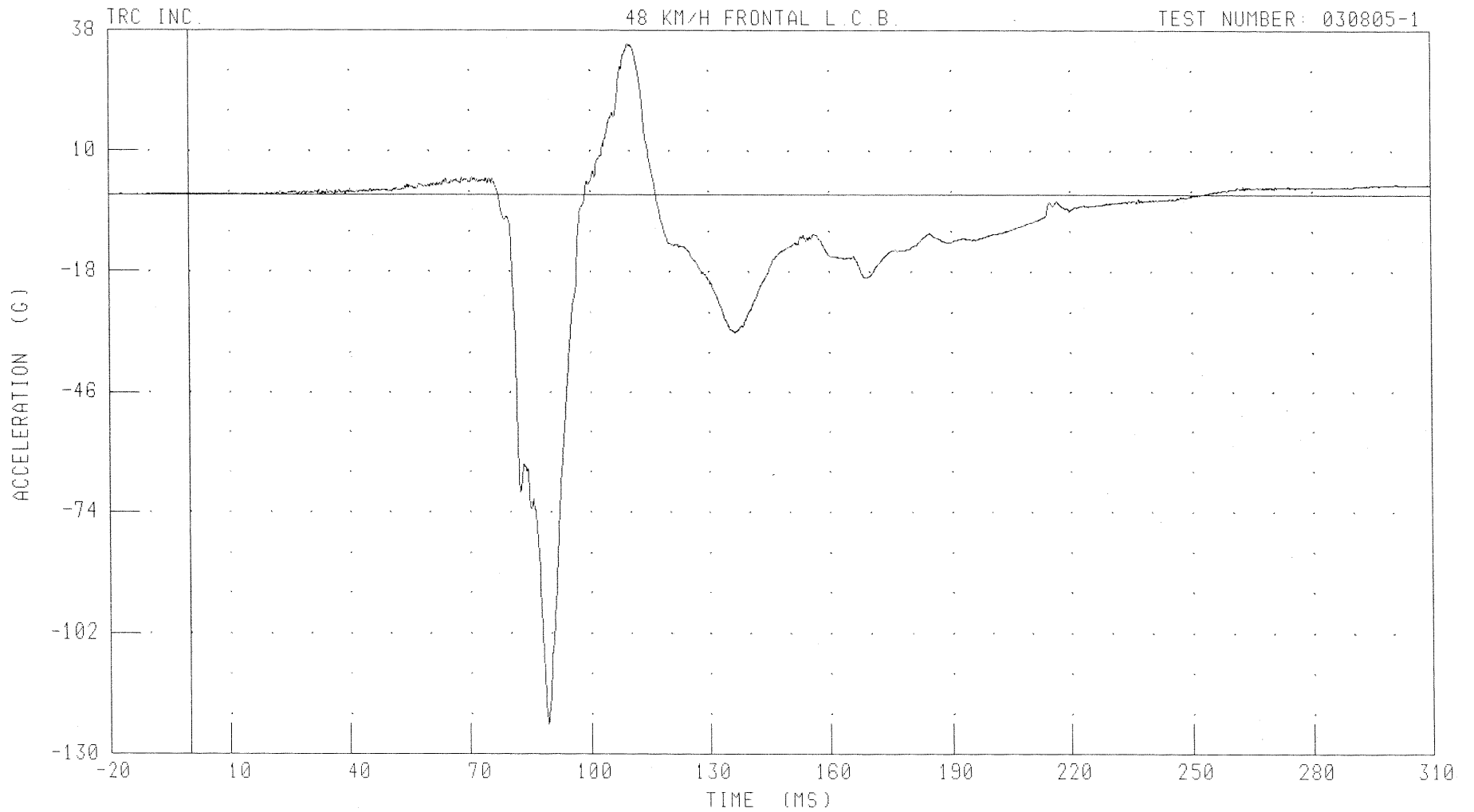
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

PASSENGER HEAD X-AXIS (LT) ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HD1XG2 FILTER: CH. CLASS 1000

PEAK DATA: 35.03 G @ 109.76 MS; -123.07 G @ 89.28 MS

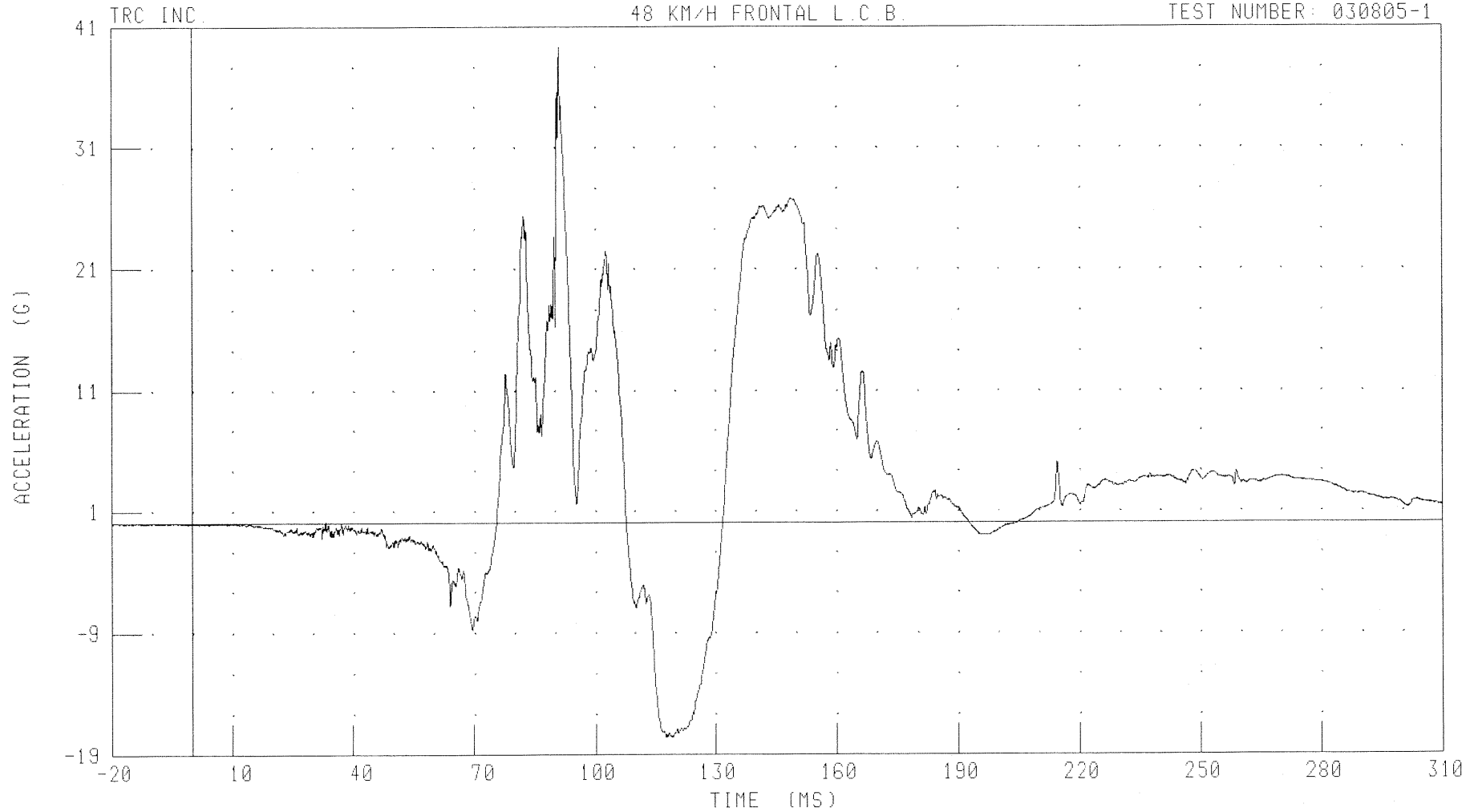
B-97

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD Z-AXIS (LT) ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HD1ZG2 FILTER: CH. CLASS 1000

PEAK DATA: 39.30 G @ 91.12 MS; -17.59 G @ 118.24 MS

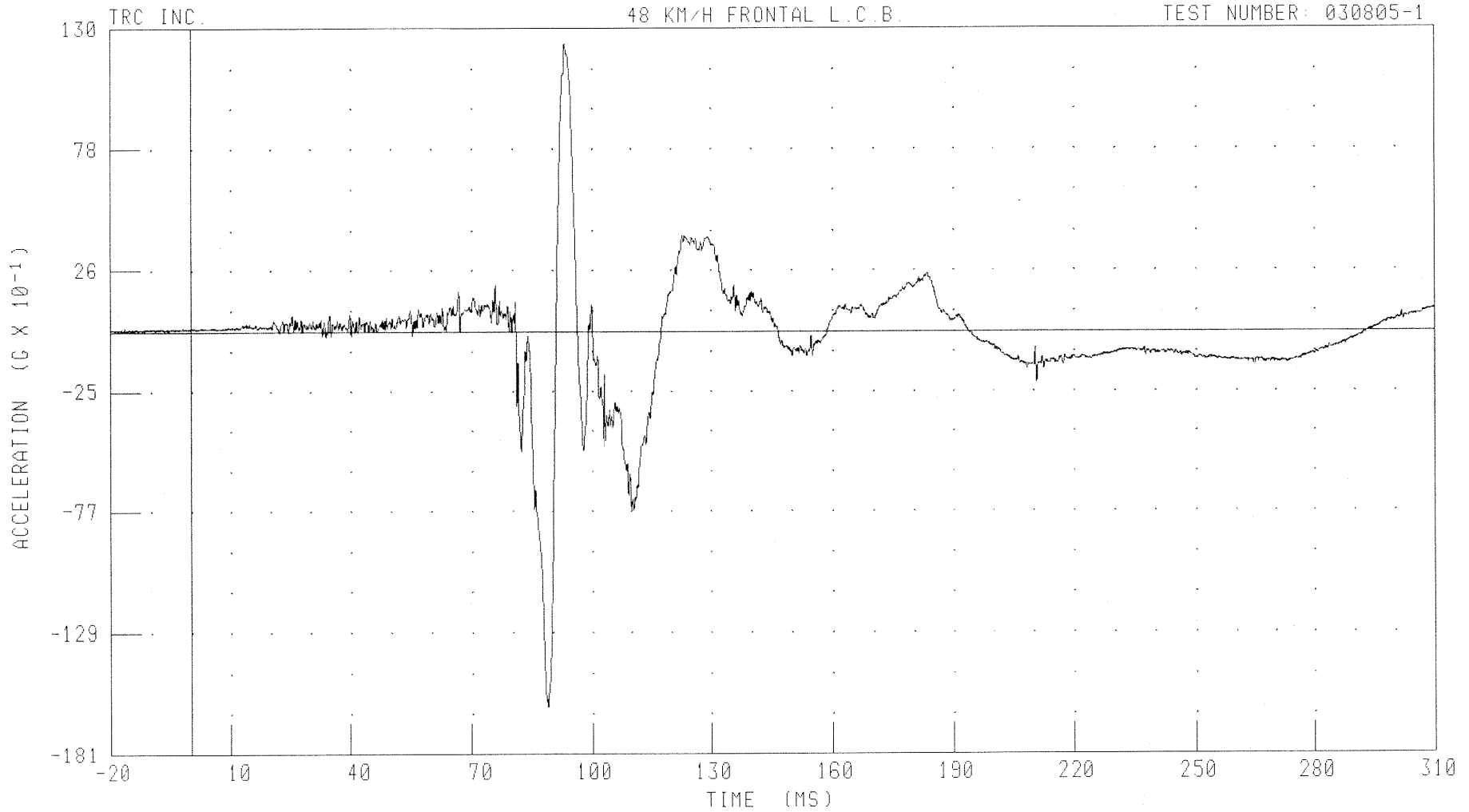
B-98

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD Y-AXIS (FT) ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HD2YG2 FILTER: CH. CLASS 1000

PEAK DATA: 12.37 G @ 93.20 MS; -16.20 G @ 88.88 MS

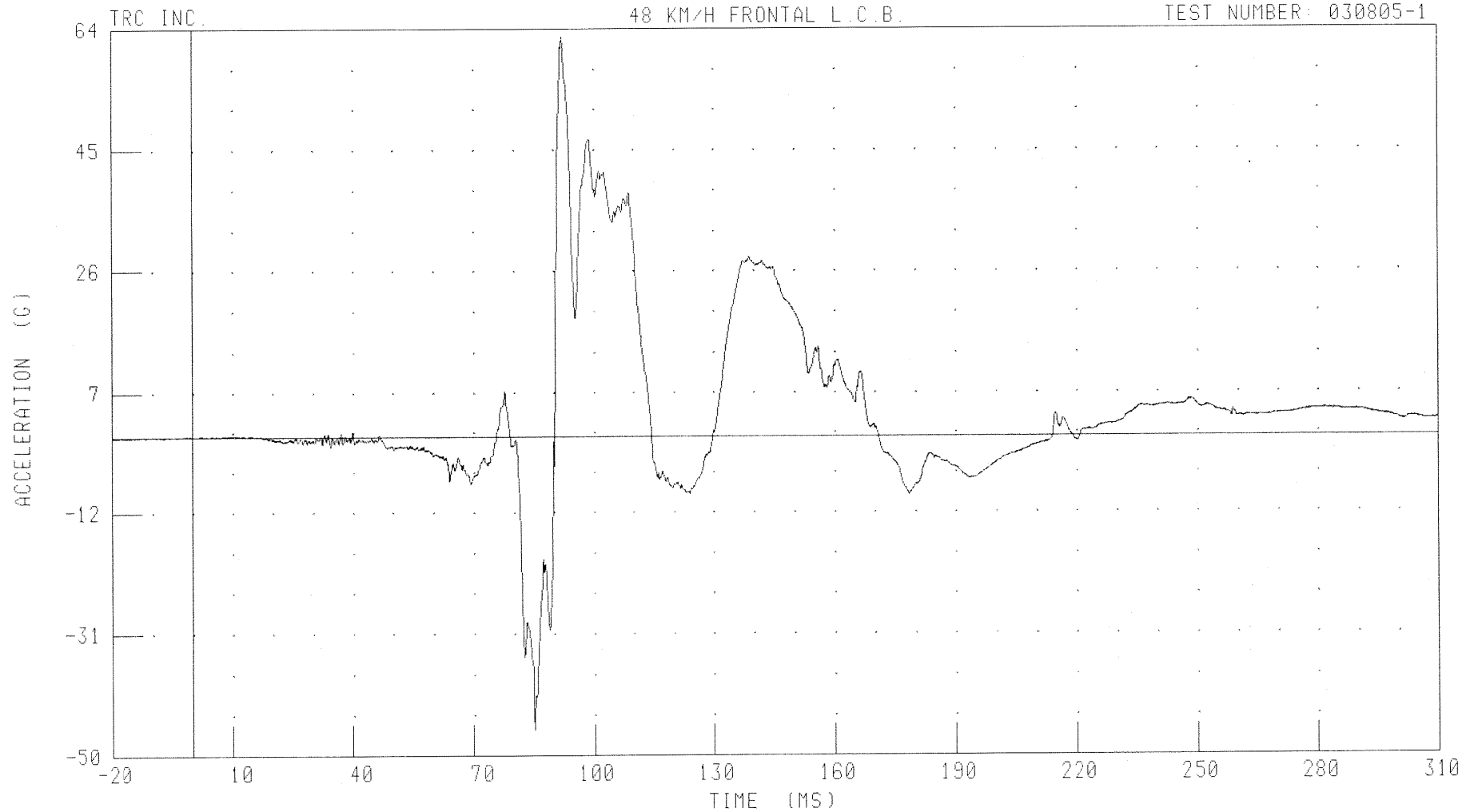
B-99

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD Z-AXIS (FT) ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HD2ZG2 FILTER: CH. CLASS 1000

PEAK DATA: 62.73 G @ 92.24 MS, -45.97 G @ 85.04 MS

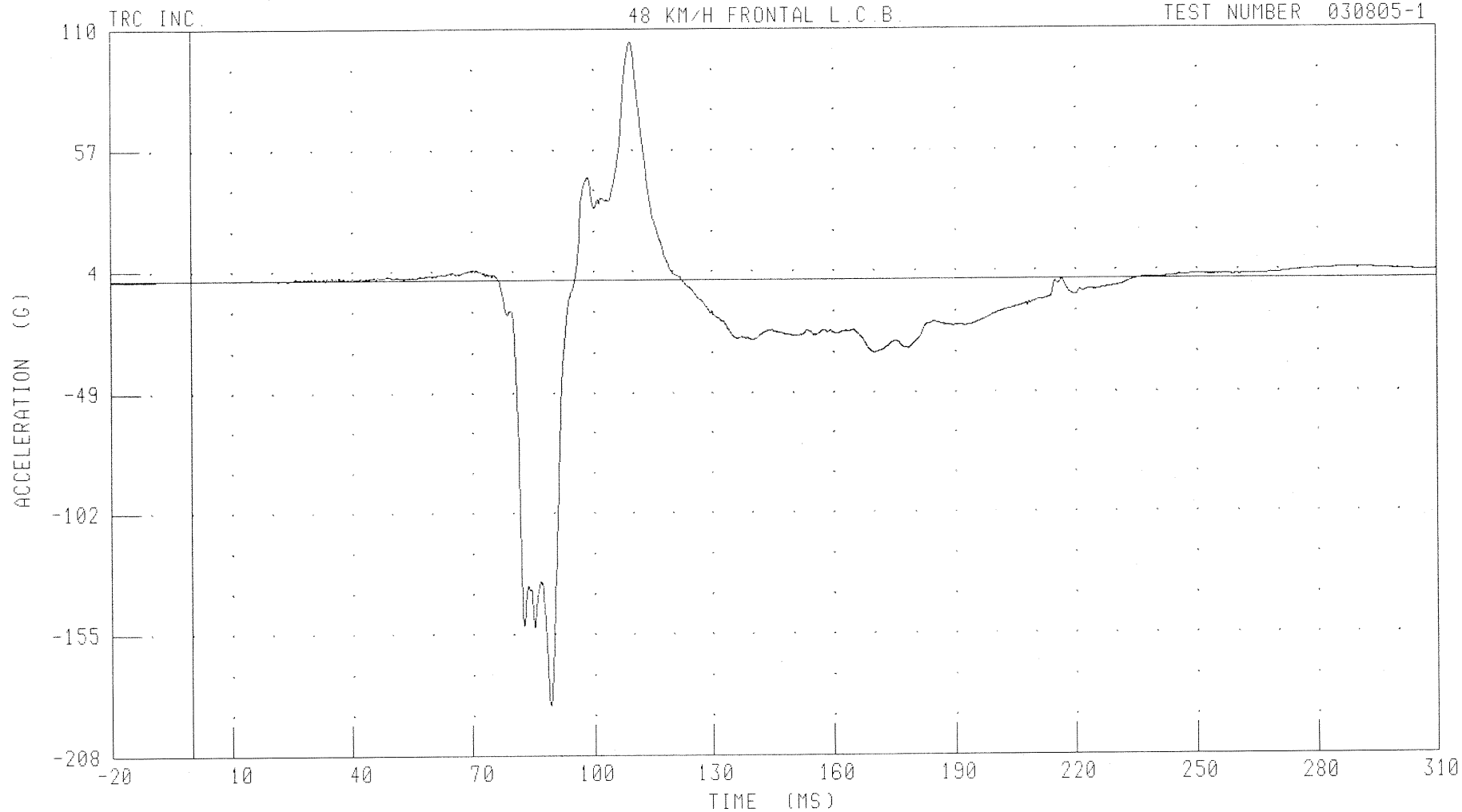
B-100

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD X-AXIS (TP) ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER 030805-1



CHANNEL: HD3XG2 FILTER: CH. CLASS 1000

PEAK DATA: 104.45 G @ 109.60 MS; -186.07 G @ 89.20 MS

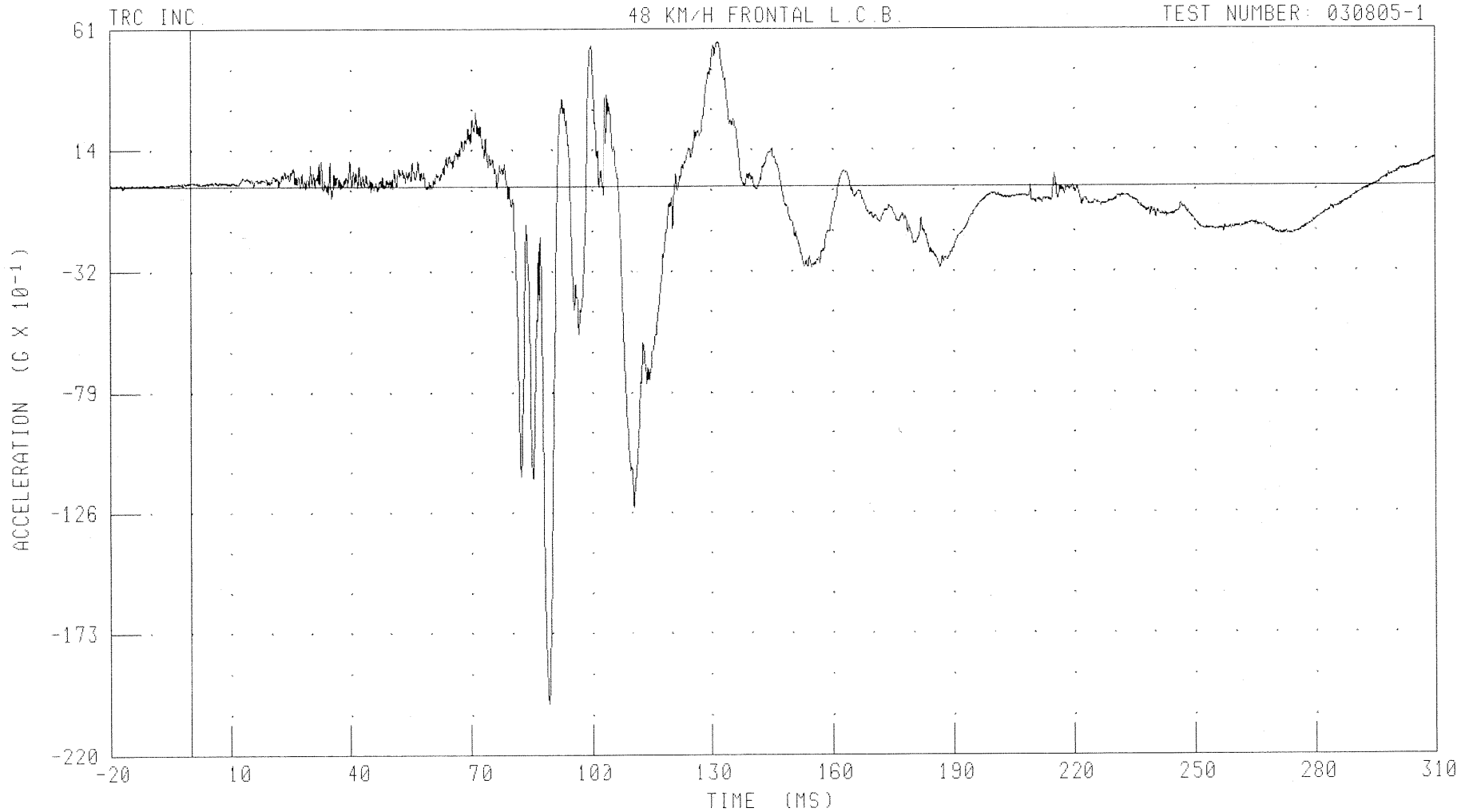
B-101

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER HEAD Y-AXIS (TP) ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: HD3YG2 FILTER: CH. CLASS 1000

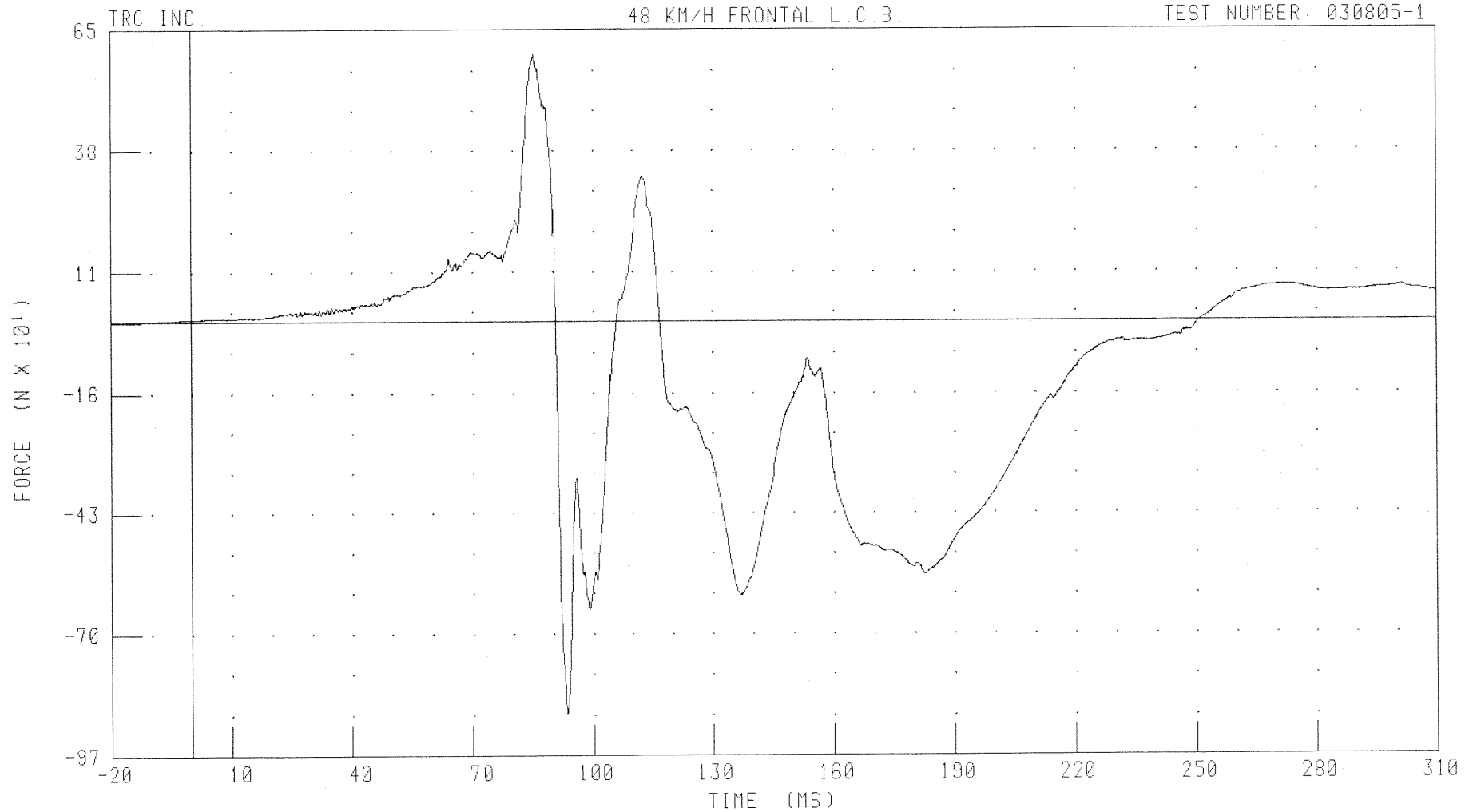
PEAK DATA: 5.60 G @ 131.76 MS; -20.11 G @ 89.20 MS

B-102

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK X-AXIS SHEAR FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

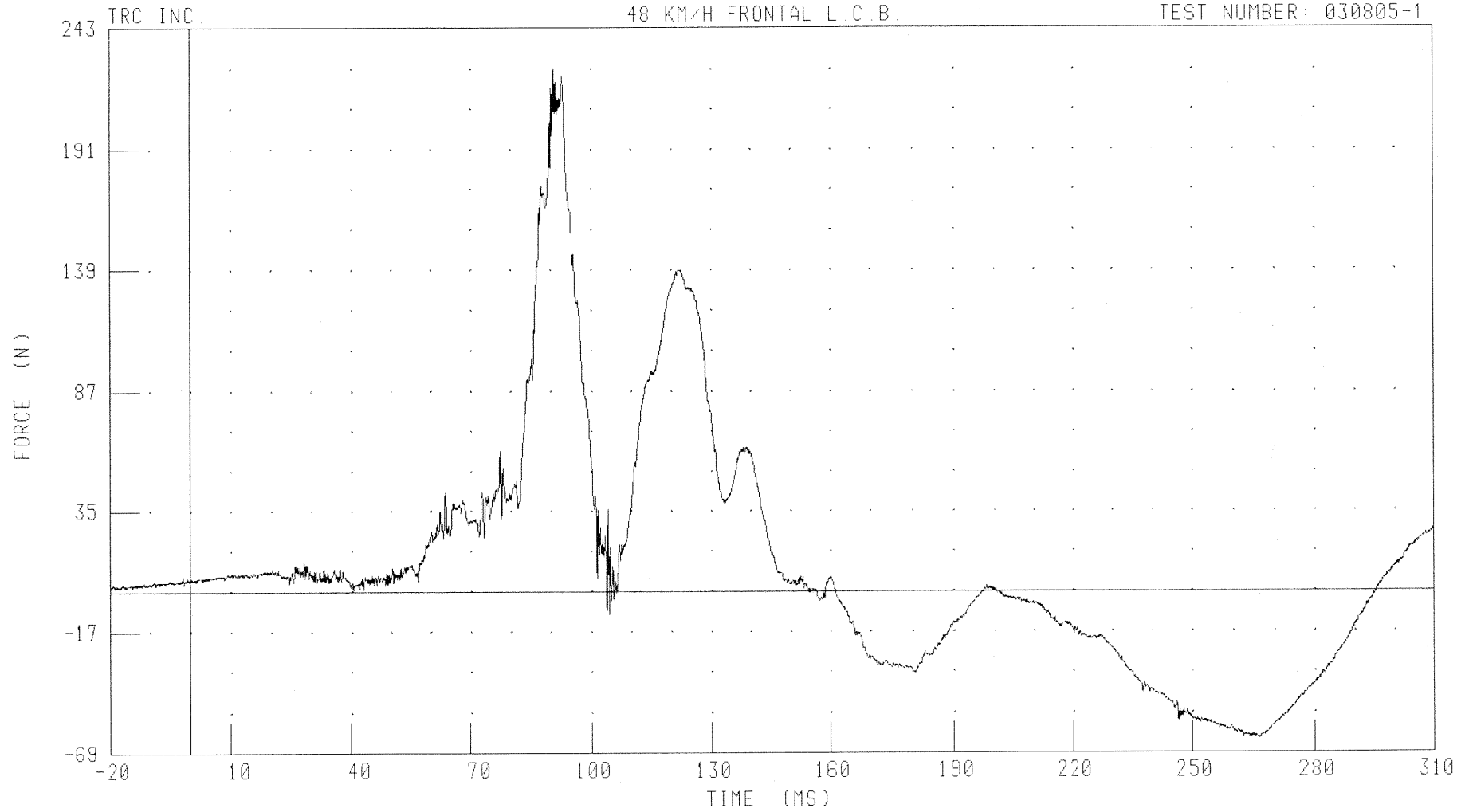
PEAK DATA: 595.22 N @ 85.36 MS; -877.56 N @ 93.44 MS

B-103

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK Y-AXIS SHEAR FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

PEAK DATA: 225.71 N @ 90.88 MS, -62.85 N @ 266.16 MS

B-104

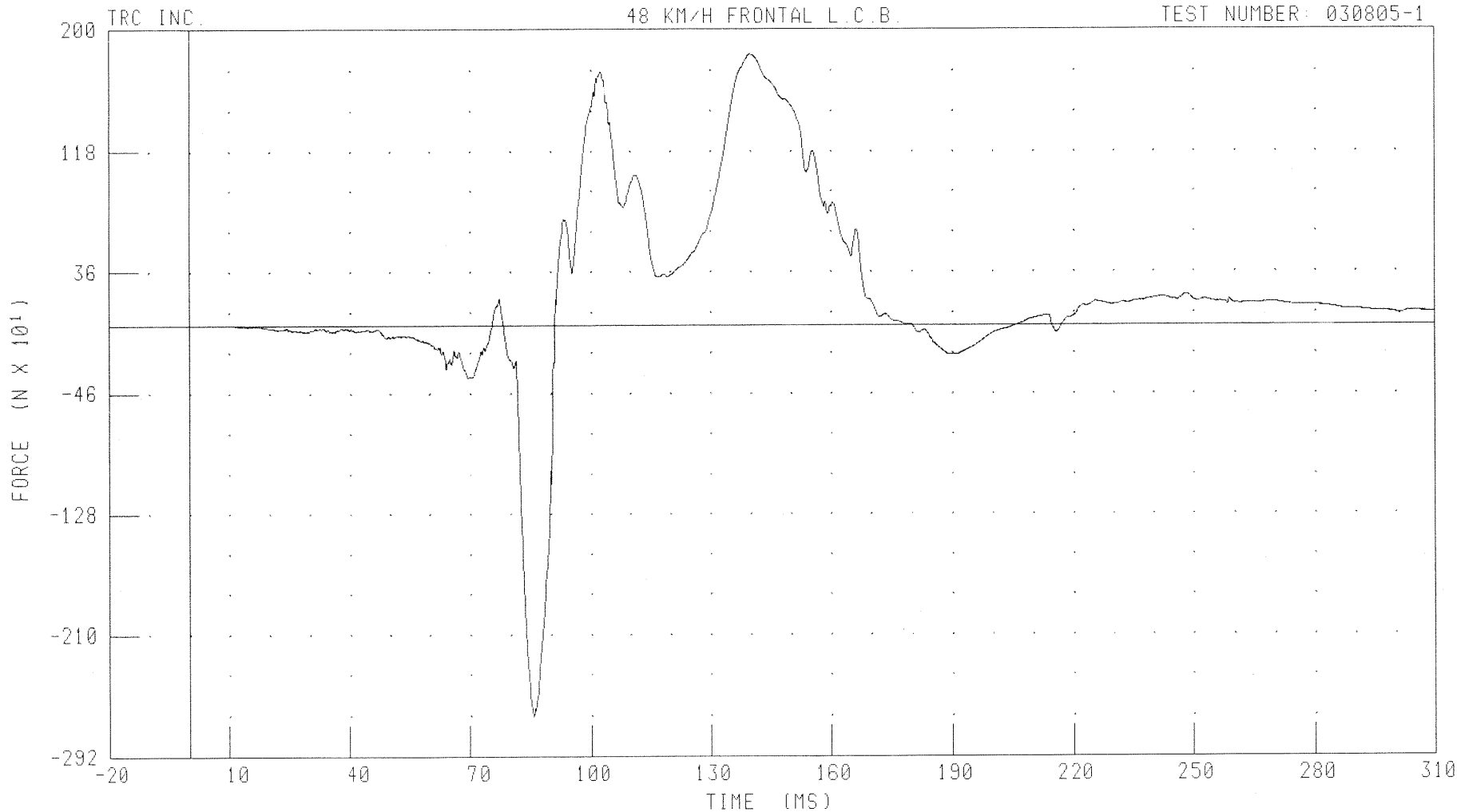
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

PASSENGER NECK Z-AXIS AXIAL FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

PEAK DATA: 1835.74 N @ 139.84 MS; -2656.44 N @ 85.60 MS

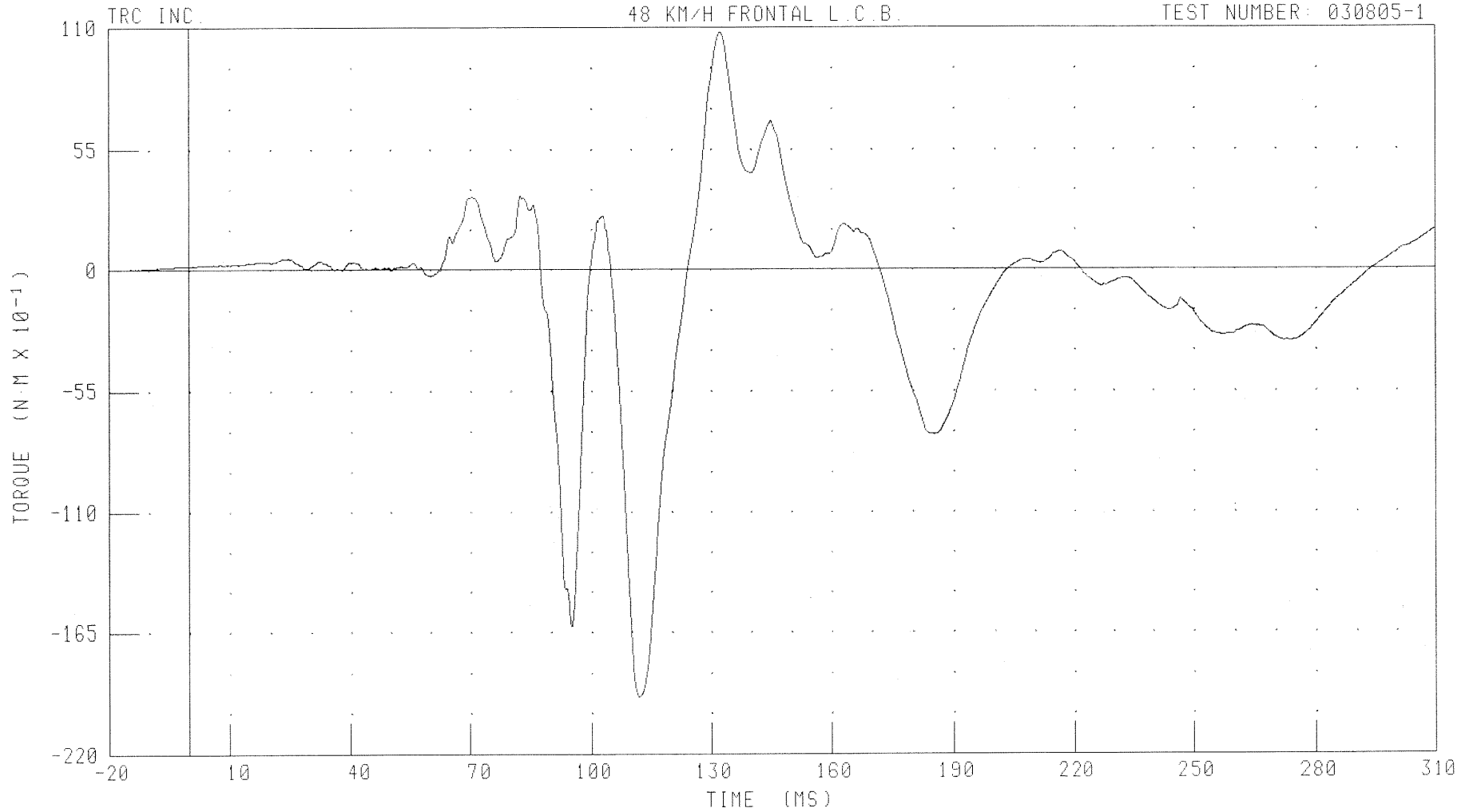
B-105

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK MOMENT ABOUT X AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKXM2 FILTER: CH. CLASS 600

PEAK DATA: 10 80 N.M @ 132.40 MS; -19.43 N.M @ 112.00 MS

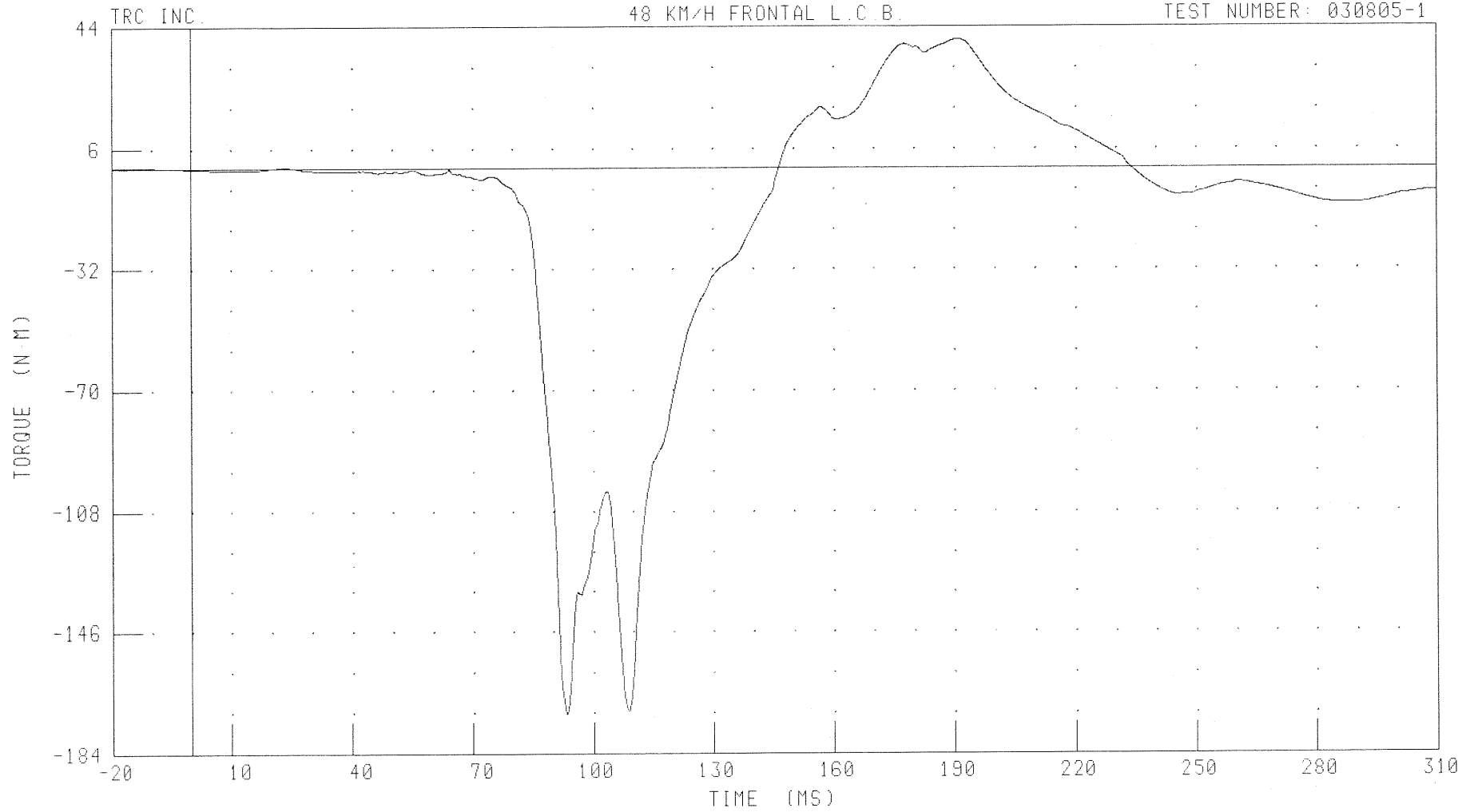
B-106

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

PEAK DATA: 40.02 N·M @ 191.20 MS; -171.77 N·M @ 93.44 MS

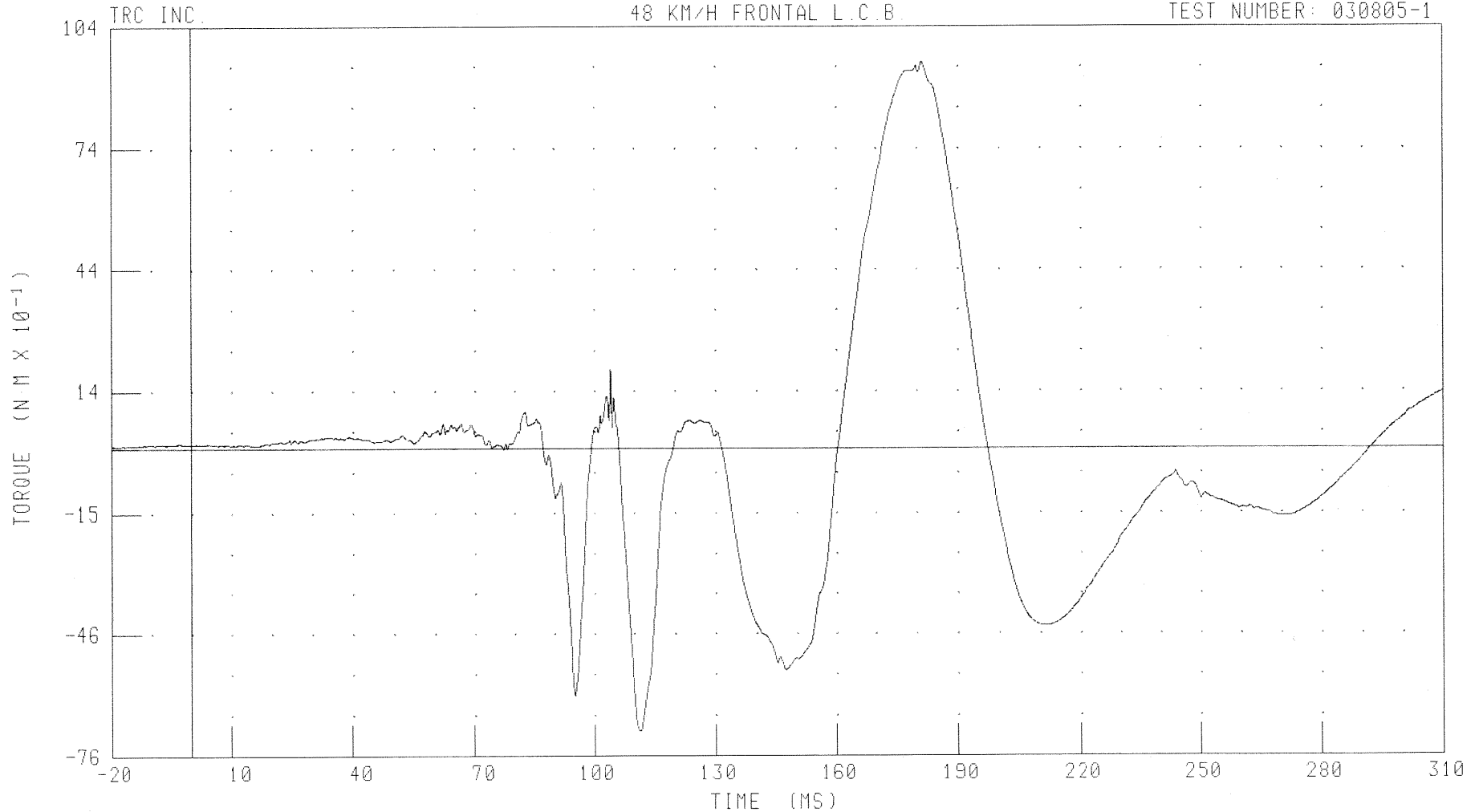
B-107

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK MOMENT ABOUT Z AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKZM2 FILTER: CH. CLASS 600

PEAK DATA: 9.51 N·M @ 181.44 MS; -6.99 N·M @ 111.60 MS

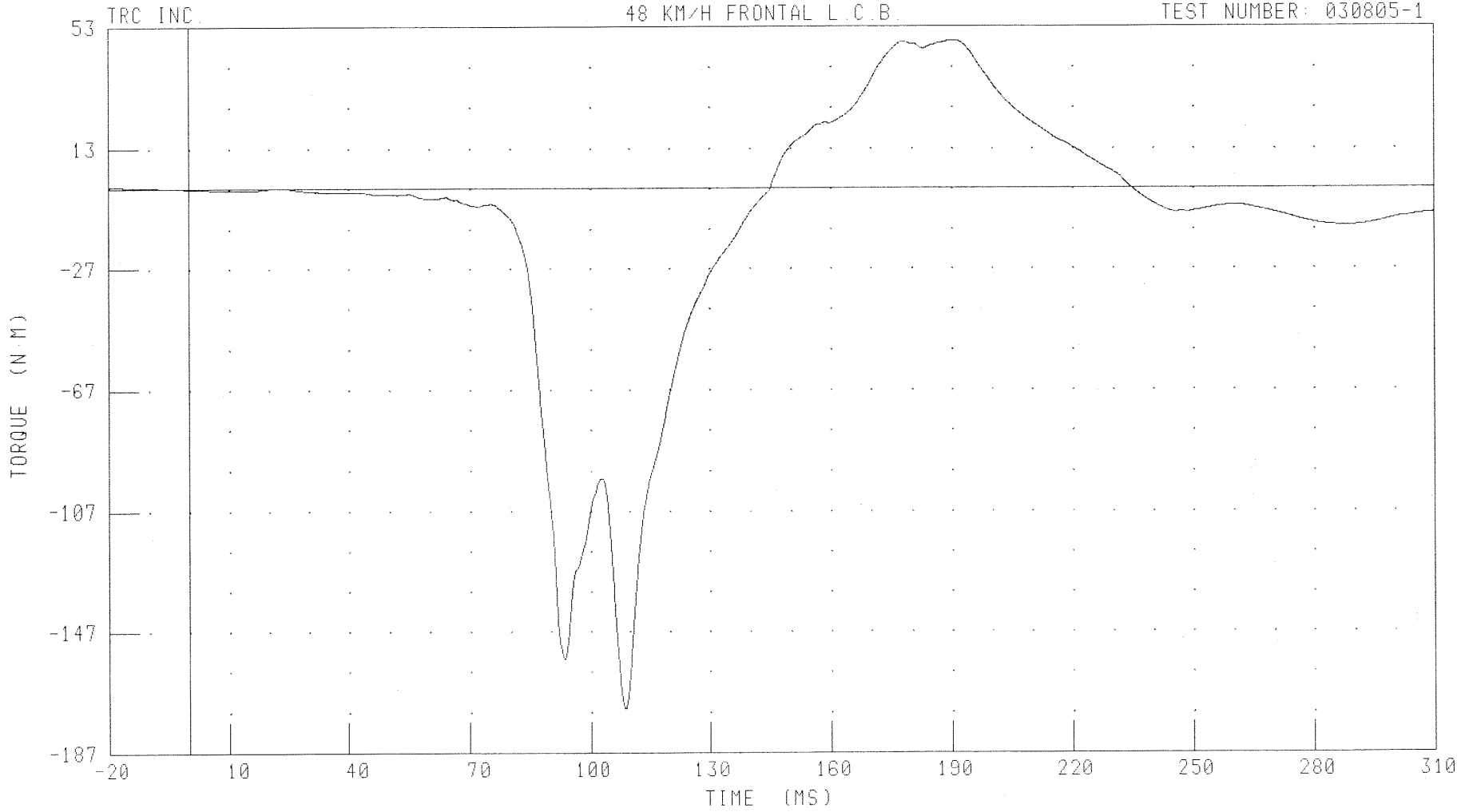
B-108

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK OCCIPITAL CONDYLE MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NEKOM2 FILTER: CH. CLASS 600

PEAK DATA: 48.50 N.M @ 190.64 MS; -172.62 N.M @ 108.96 MS

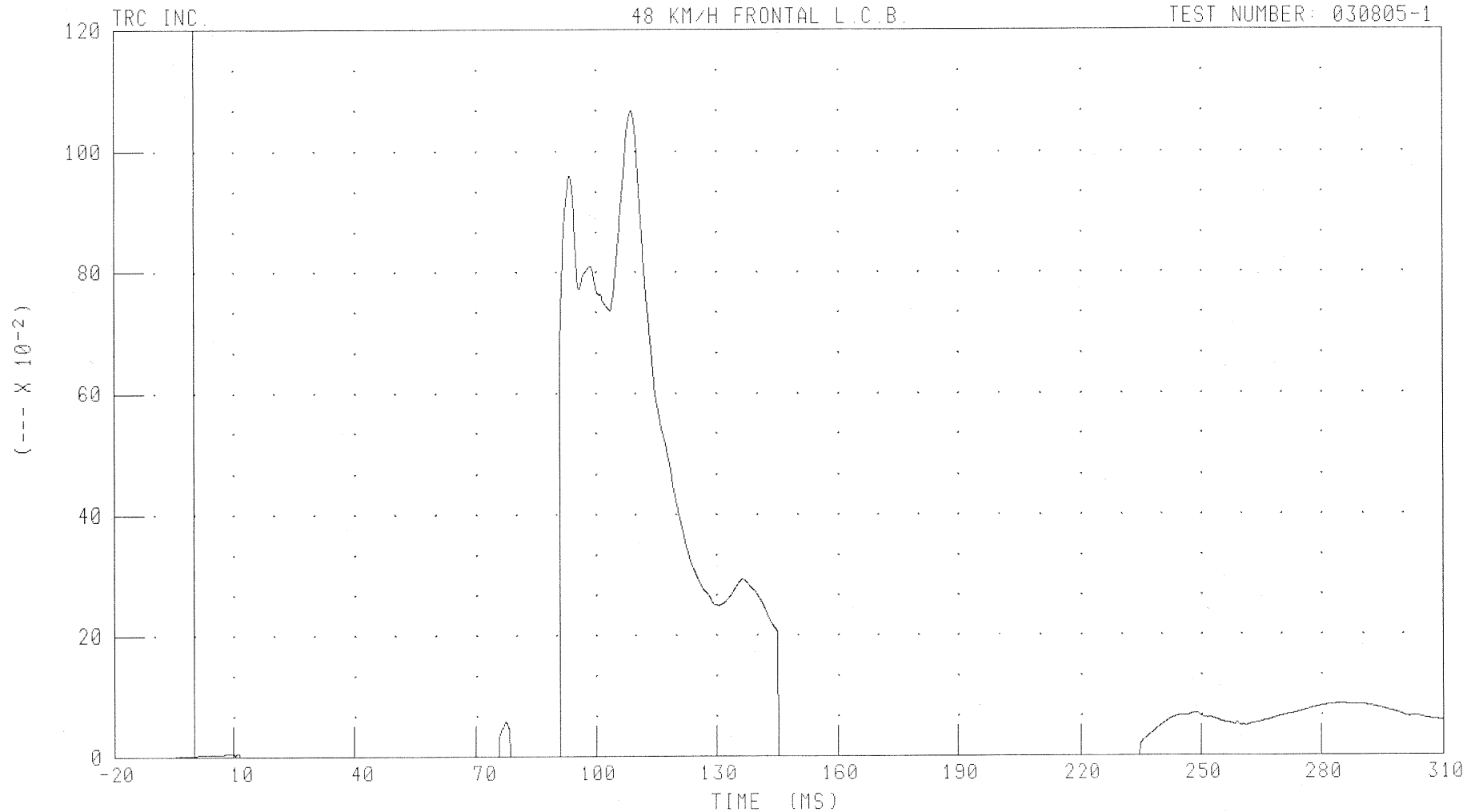
B-109

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
RIGHT FRONT PASSENGER NECK TENSION/EXTENSION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NTE2

FILTER: CH. CLASS 600

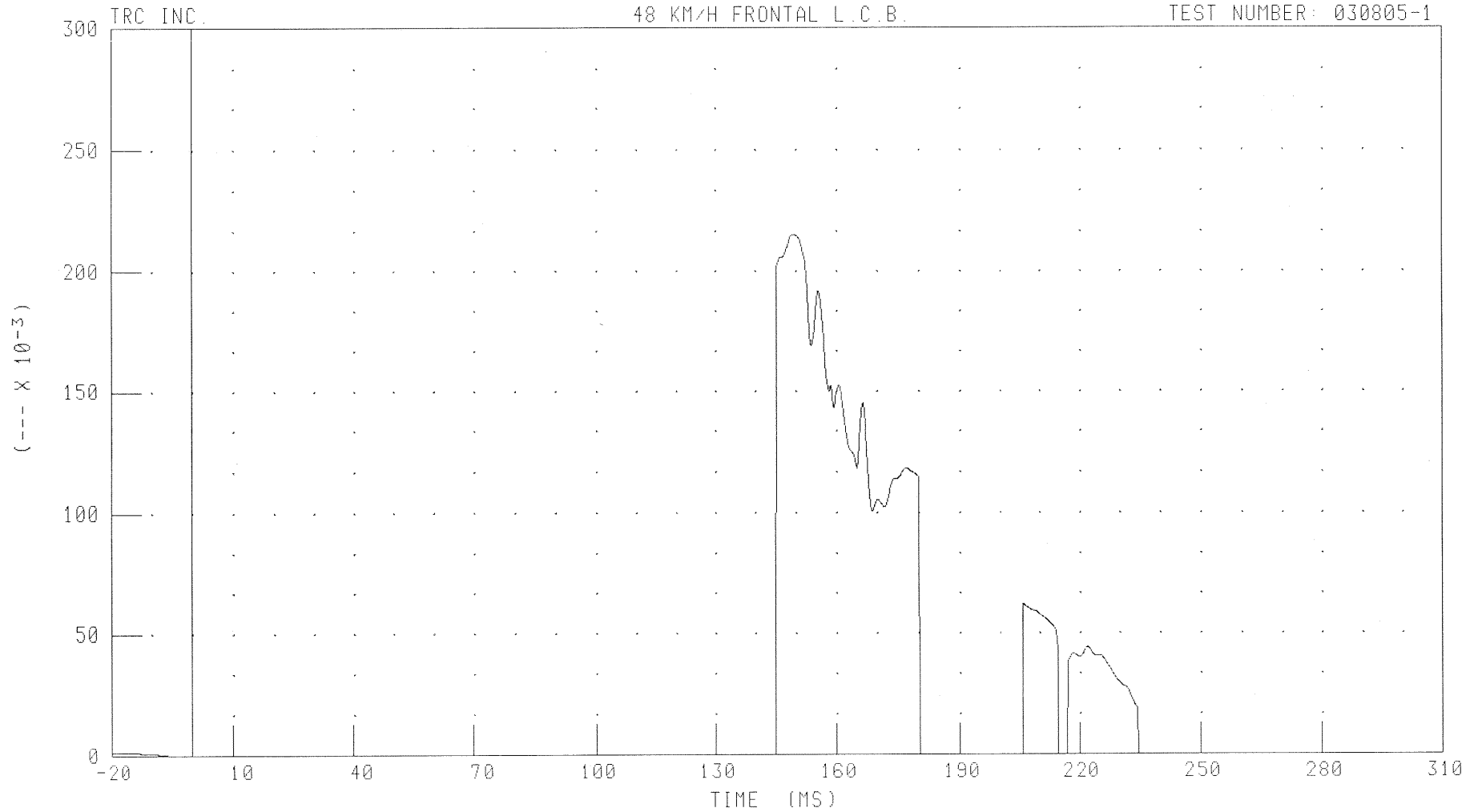
PEAK DATA: 1.07 --- @ 109.20 MS; 0.00 --- @ -20.00 MS

B-110

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
RIGHT FRONT PASSENGER NECK TENSION/FLEXION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NTF2

FILTER: CH. CLASS 600

PEAK DATA: 0.22 --- @ 149.76 MS; 0.00 --- @ -5.92 MS

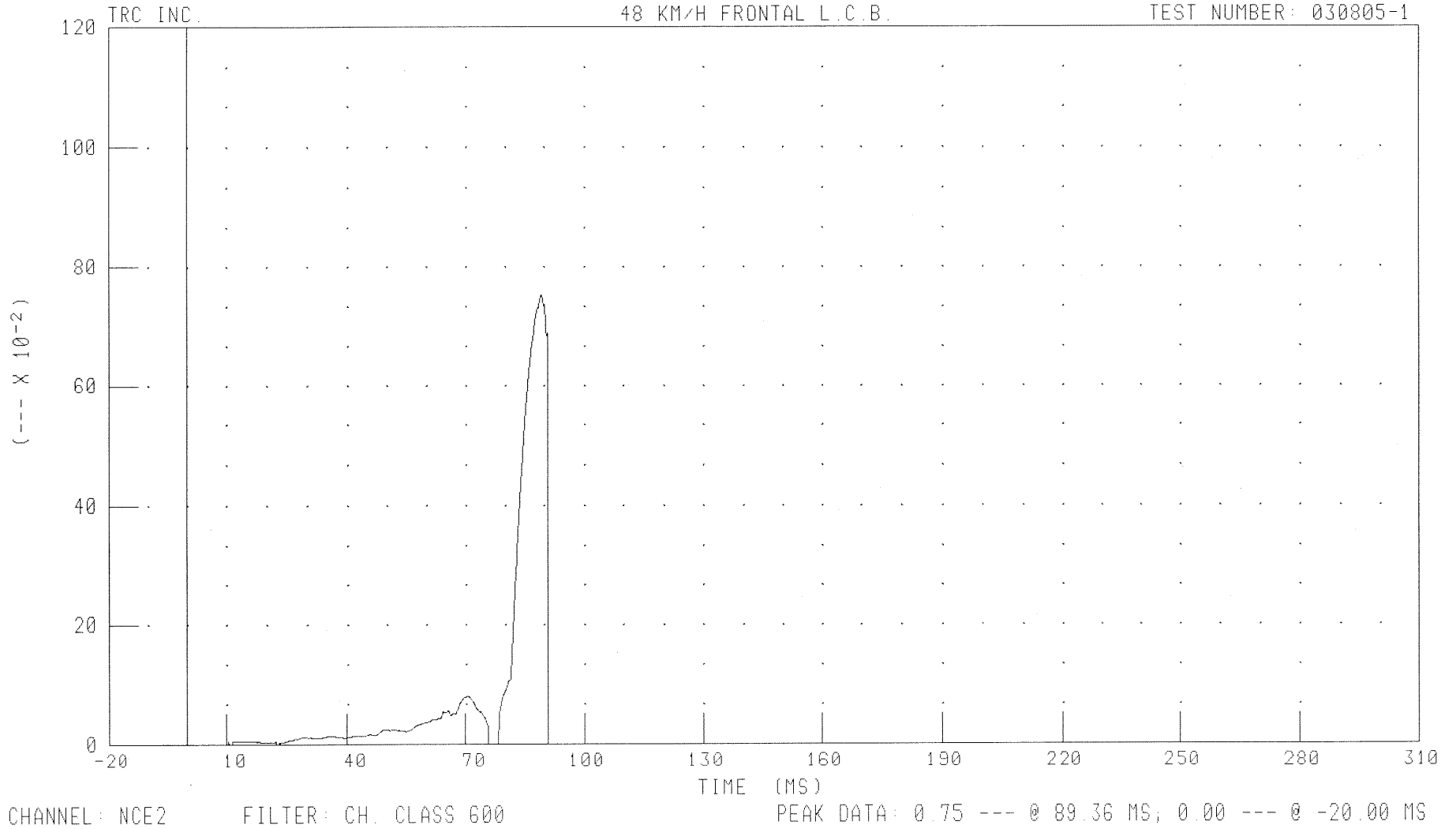
B-111

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
RIGHT FRONT PASSENGER NECK COMPRESSION/EXTENSION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



B-112

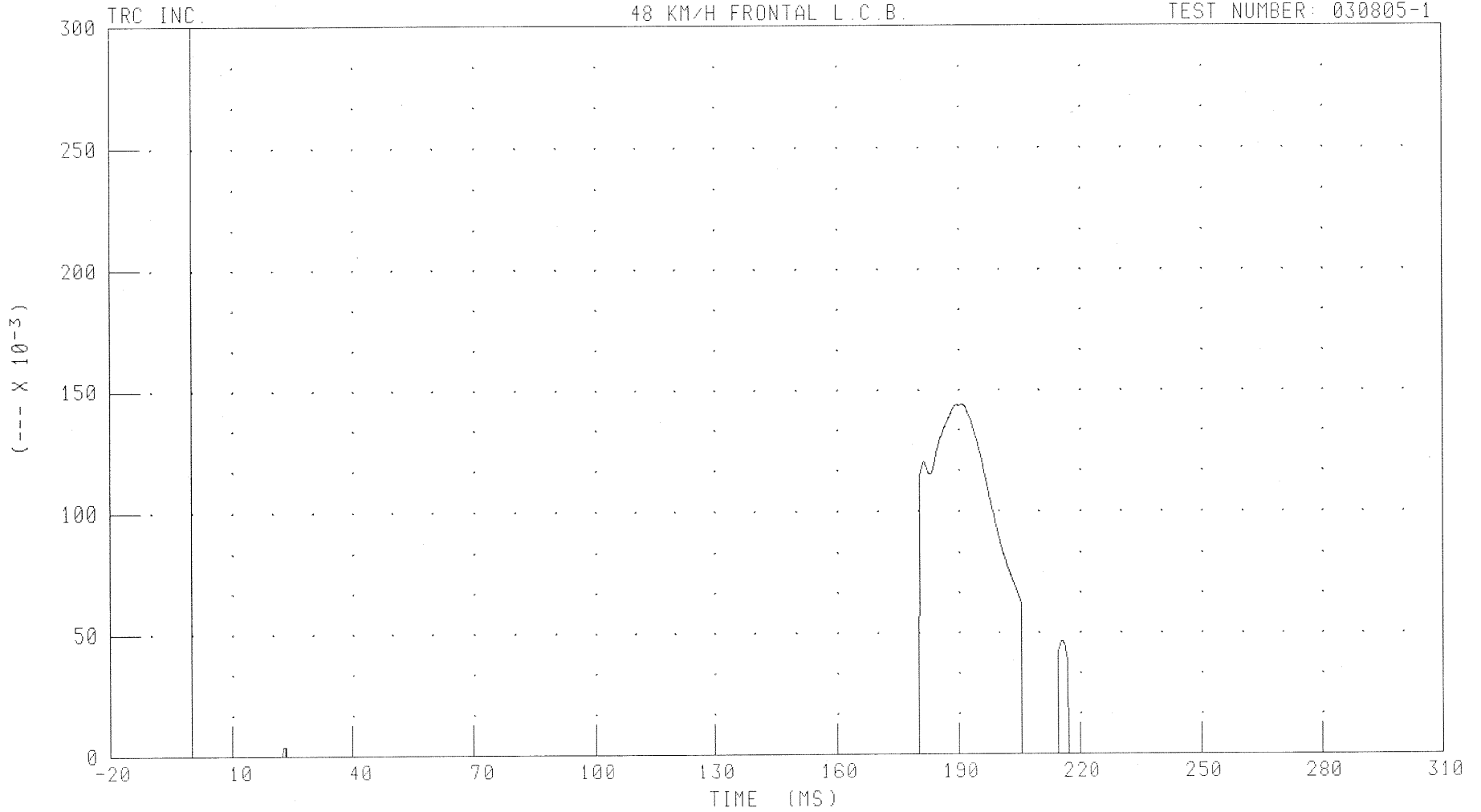
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

RIGHT FRONT PASSENGER NECK COMPRESSION/FLEXION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NCF2

FILTER: CH. CLASS 600

PEAK DATA: 0.14 --- @ 190.80 MS; 0.00 --- @ -20.00 MS

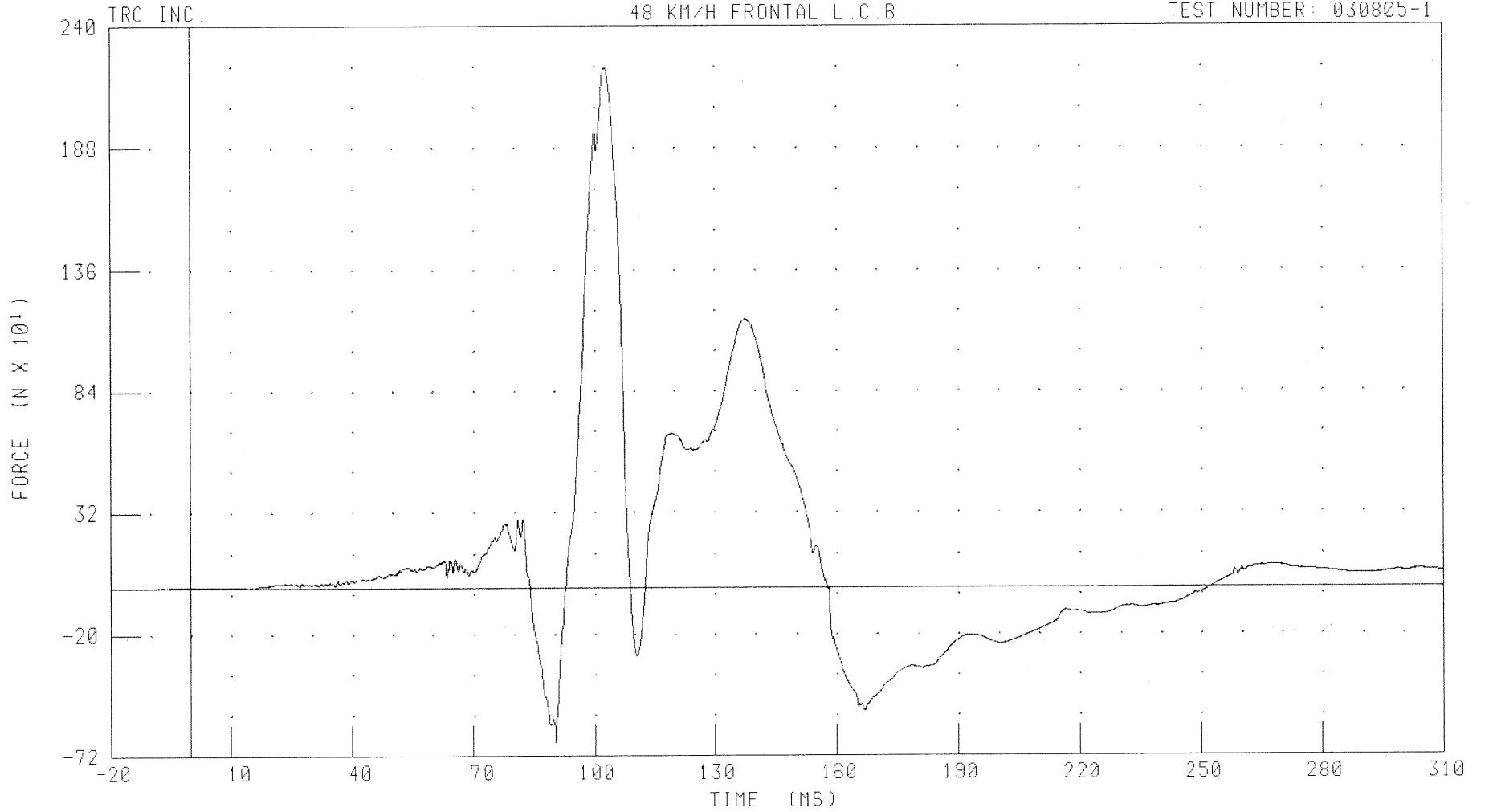
B-113

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK LOWER X-AXIS SHEAR FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLXF2 FILTER: CH. CLASS 1000

PEAK DATA: 2220.57 N @ 102.88 MS; -662.45 N @ 90.32 MS

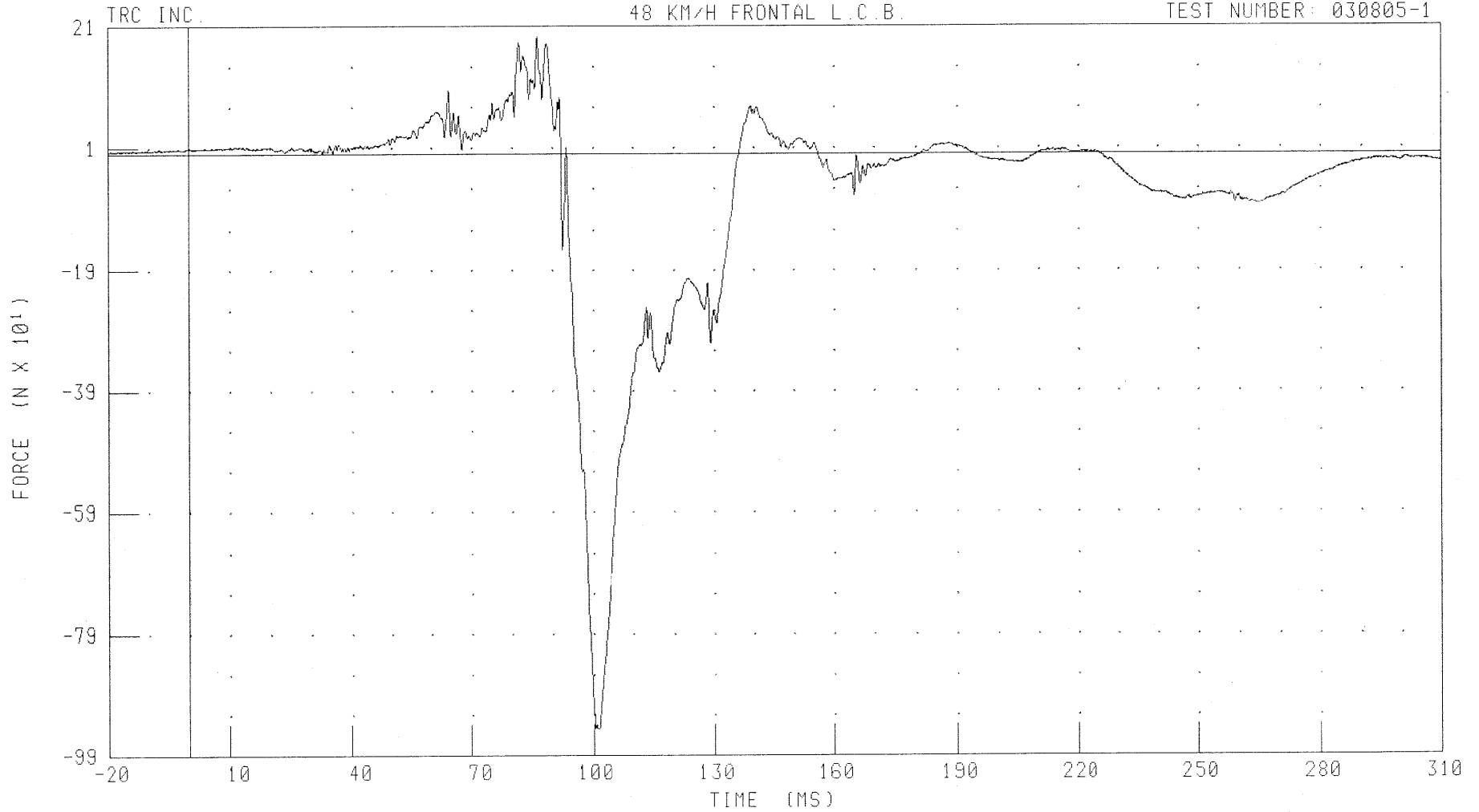
B-114

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK LOWER Y-AXIS SHEAR FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLYF2 FILTER: CH. CLASS 1000

PEAK DATA: 192.90 N @ 86.32 MS; -946.35 N @ 101.28 MS

B-115

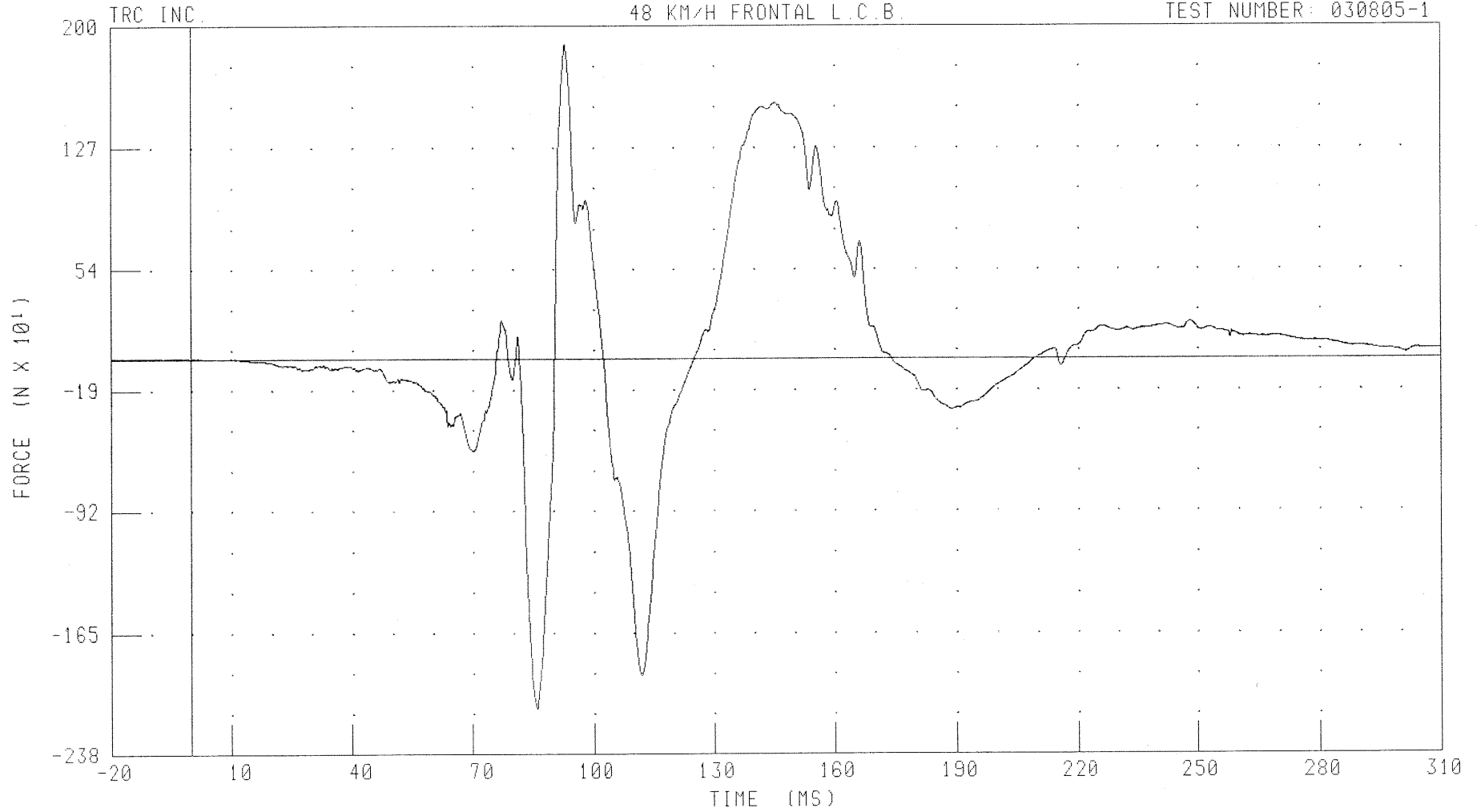
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

PASSENGER NECK LOWER Z-AXIS AXIAL FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLZF2 FILTER: CH. CLASS 1000

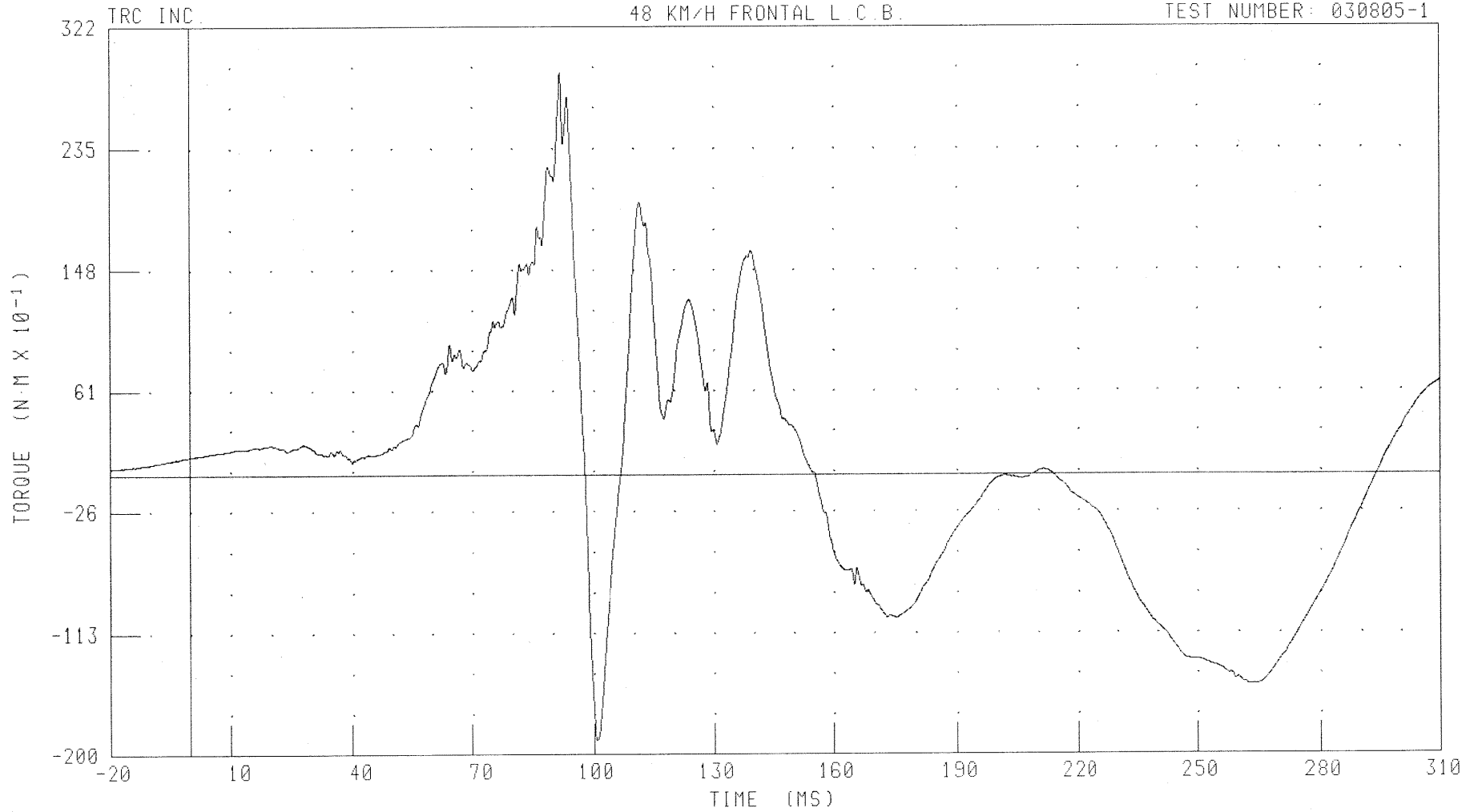
PEAK DATA: 1891.40 N @ 92.88 MS; -2109.38 N @ 86.00 MS

B-116

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK LOWER MOMENT ABOUT X AXIS
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLXM2 FILTER: CH. CLASS 600

PEAK DATA: 28.89 N·M @ 91.92 MS; -18.96 N·M @ 100.88 MS

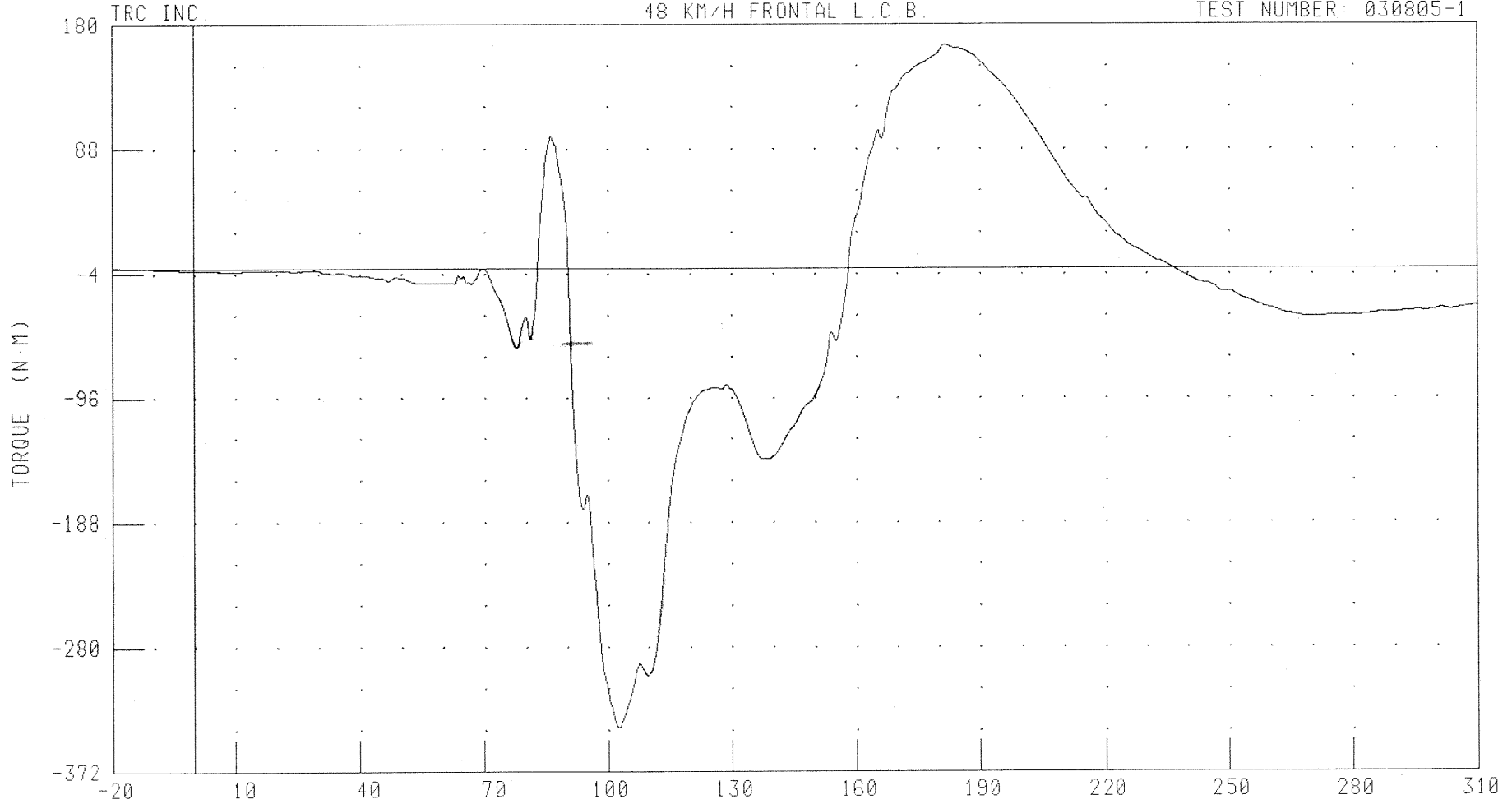
B-117

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK LOWER MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL NKLYM2 FILTER: CH. CLASS 600

PEAK DATA: 164.61 N.M @ 181.60 MS; -339.57 N.M @ 102.72 MS

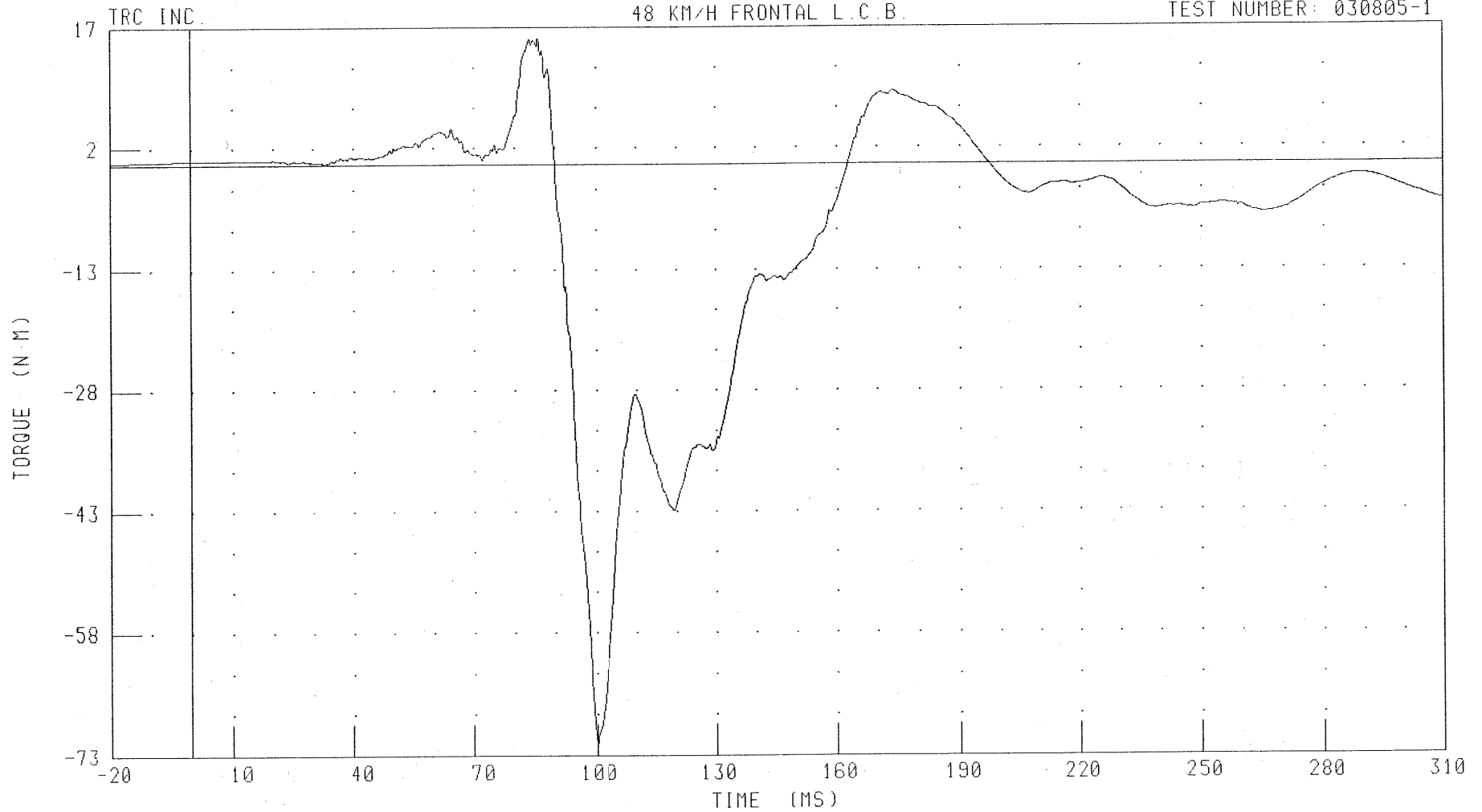
B-118

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER NECK LOWER MOMENT ABOUT Z AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: NKLZM2 FILTER: CH. CLASS 600

PEAK DATA: 15.66 N.M @ 86.16 MS; -71.59 N.M @ 100.16 MS

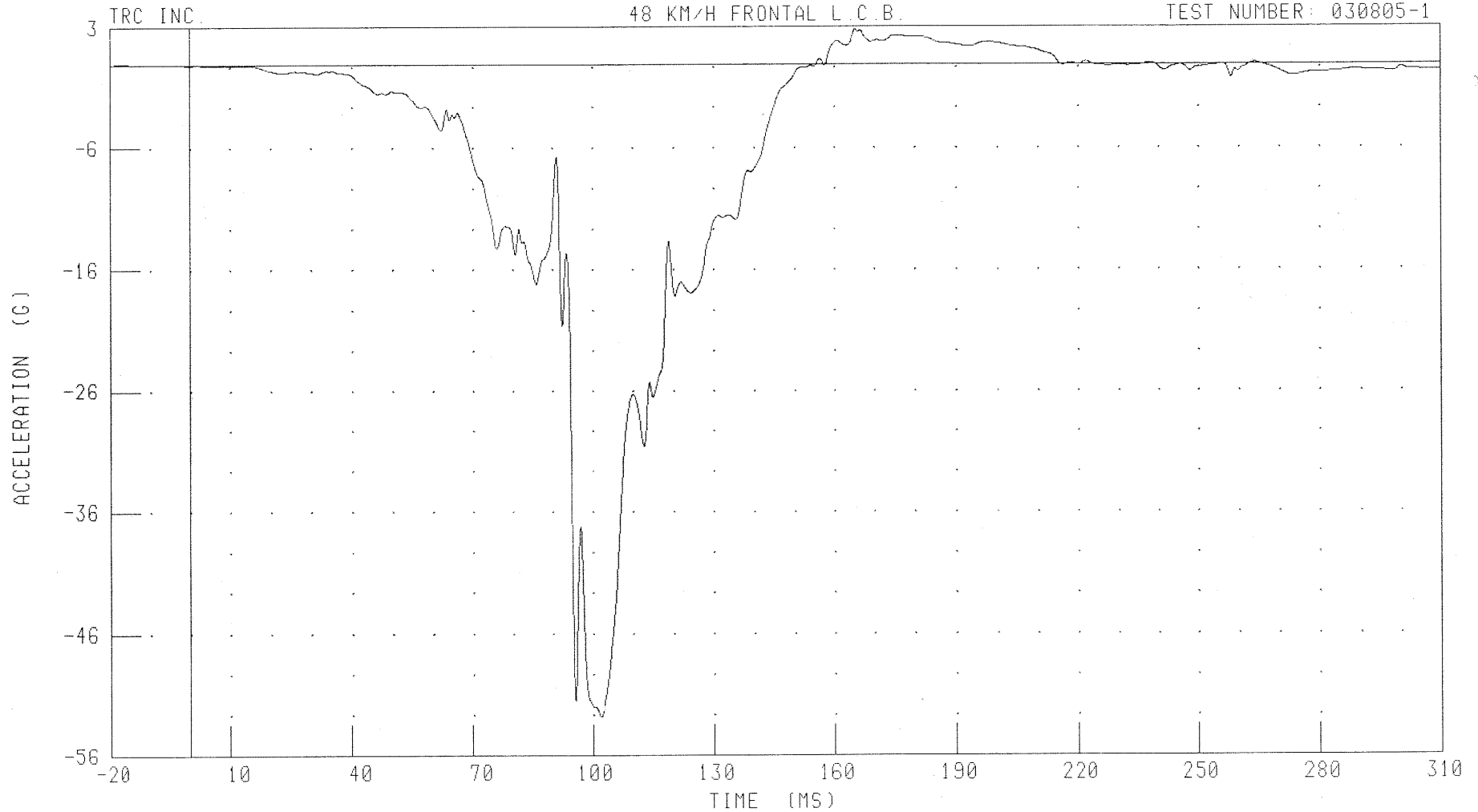
B-119

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER CHEST X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTXG2

FILTER: CH. CLASS 180

PEAK DATA: 2.86 G @ 165.36 MS; -53.73 G @ 102.08 MS

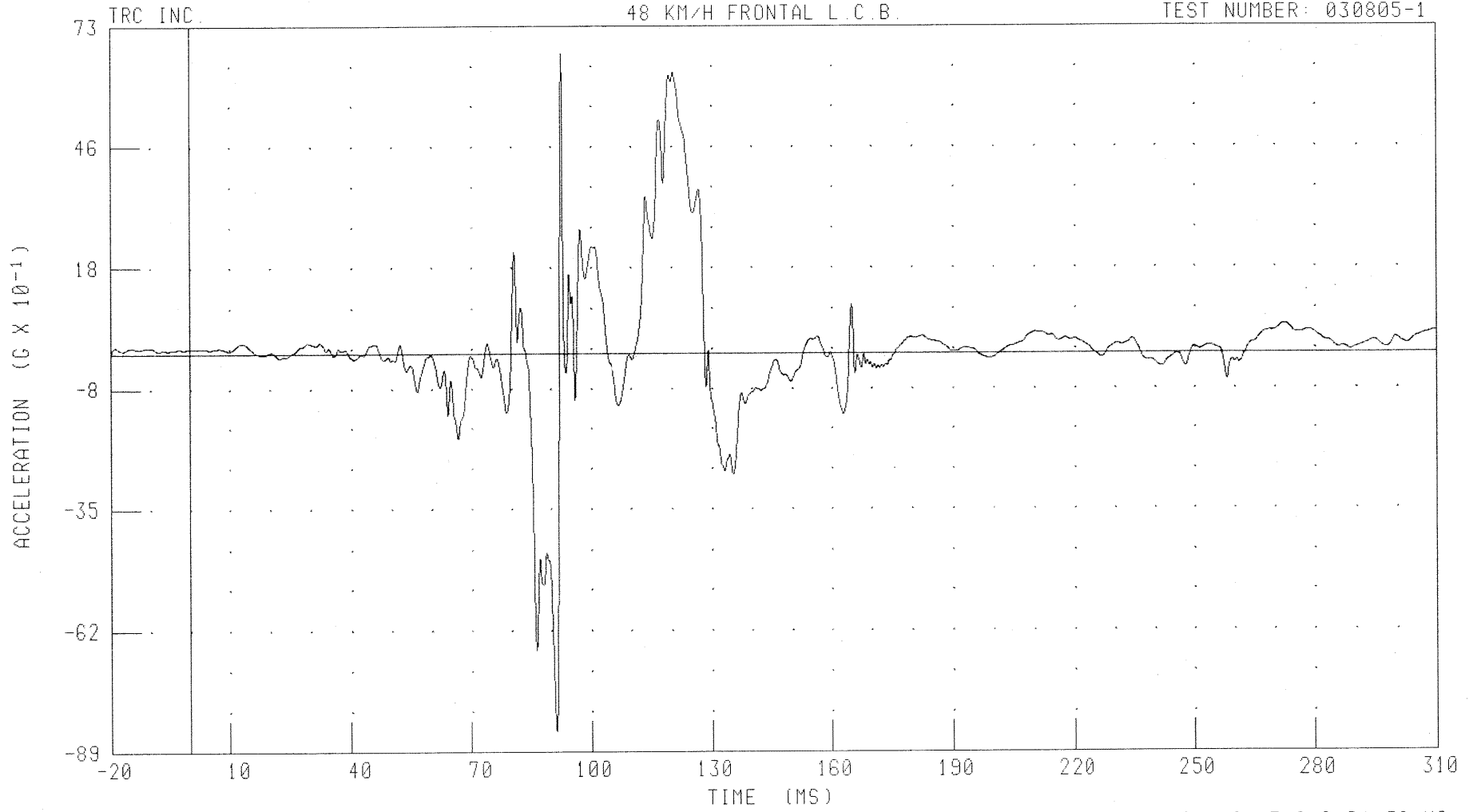
B-120

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER CHEST Y-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTYG2

FILTER: CH. CLASS 100

PEAK DATA: 6.69 G @ 92.72 MS; -8.45 G @ 91.36 MS

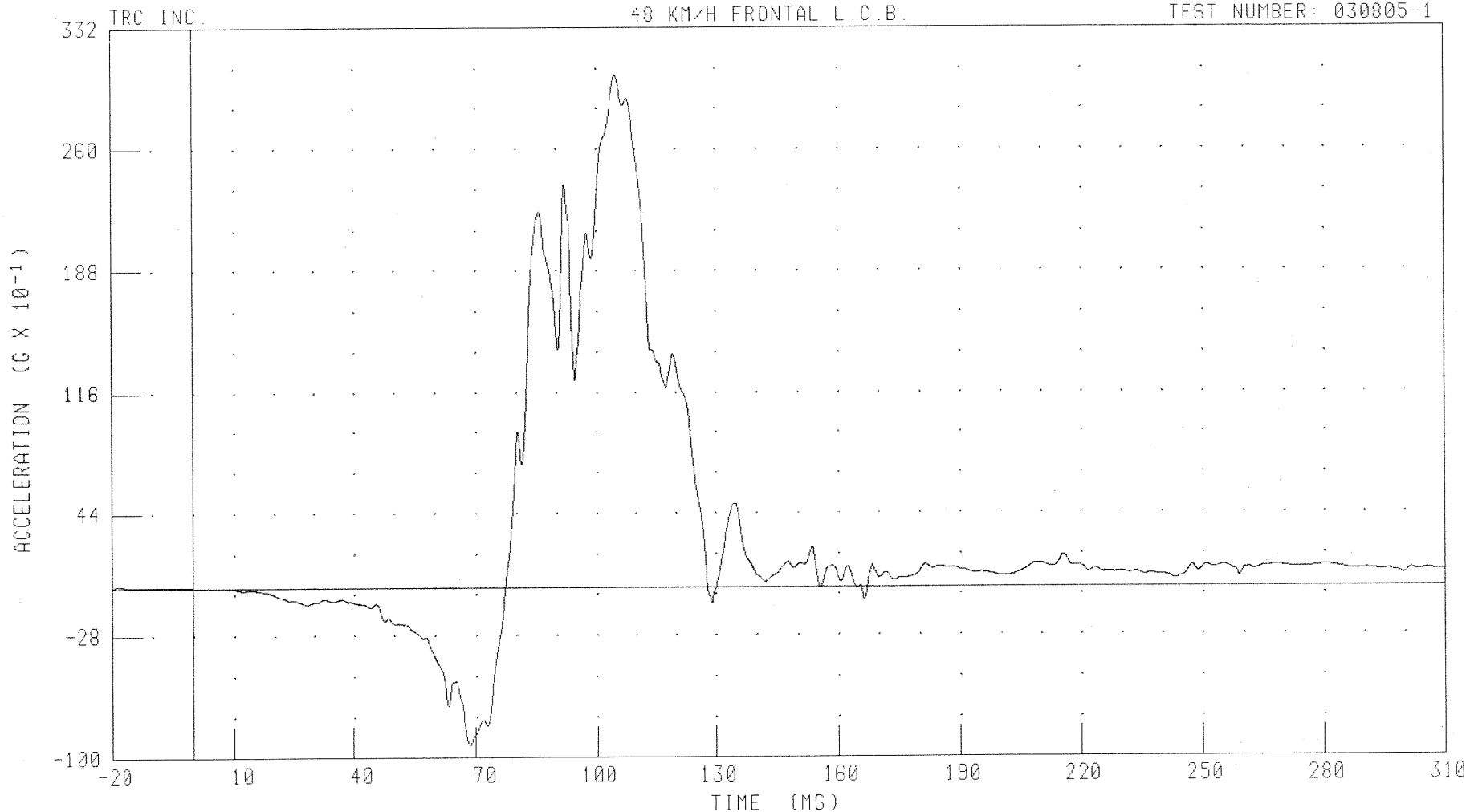
B-121

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER CHEST Z-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTZG2 FILTER: CH. CLASS 180

PEAK DATA: 30.40 G @ 105.12 MS, -9.30 G @ 68.56 MS

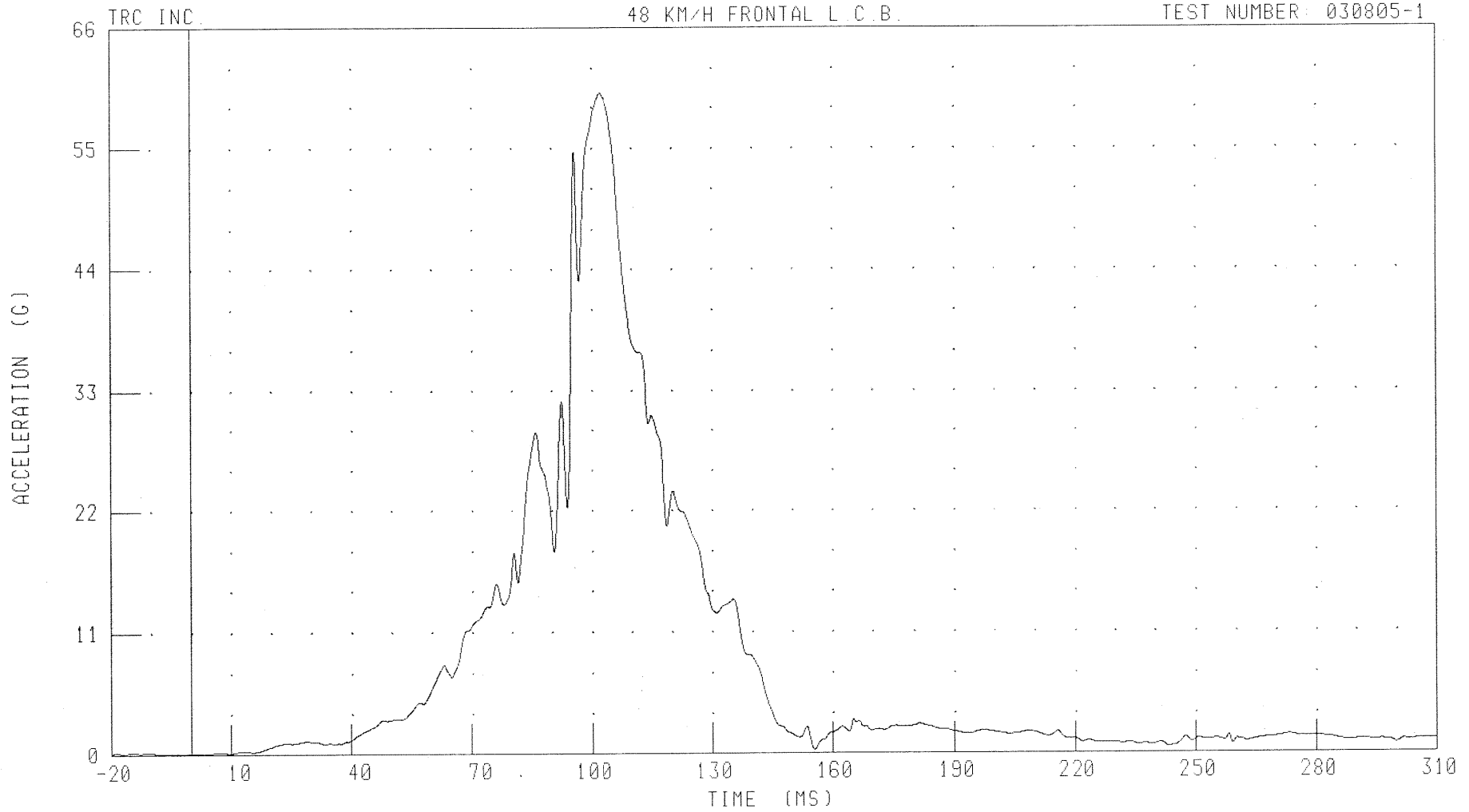
B-122

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER CHEST RESULTANT ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTRG2 FILTER: CH. CLASS 180

PEAK DATA: 60.03 G @ 102.16 MS; 0.01 G @ -20.00 MS

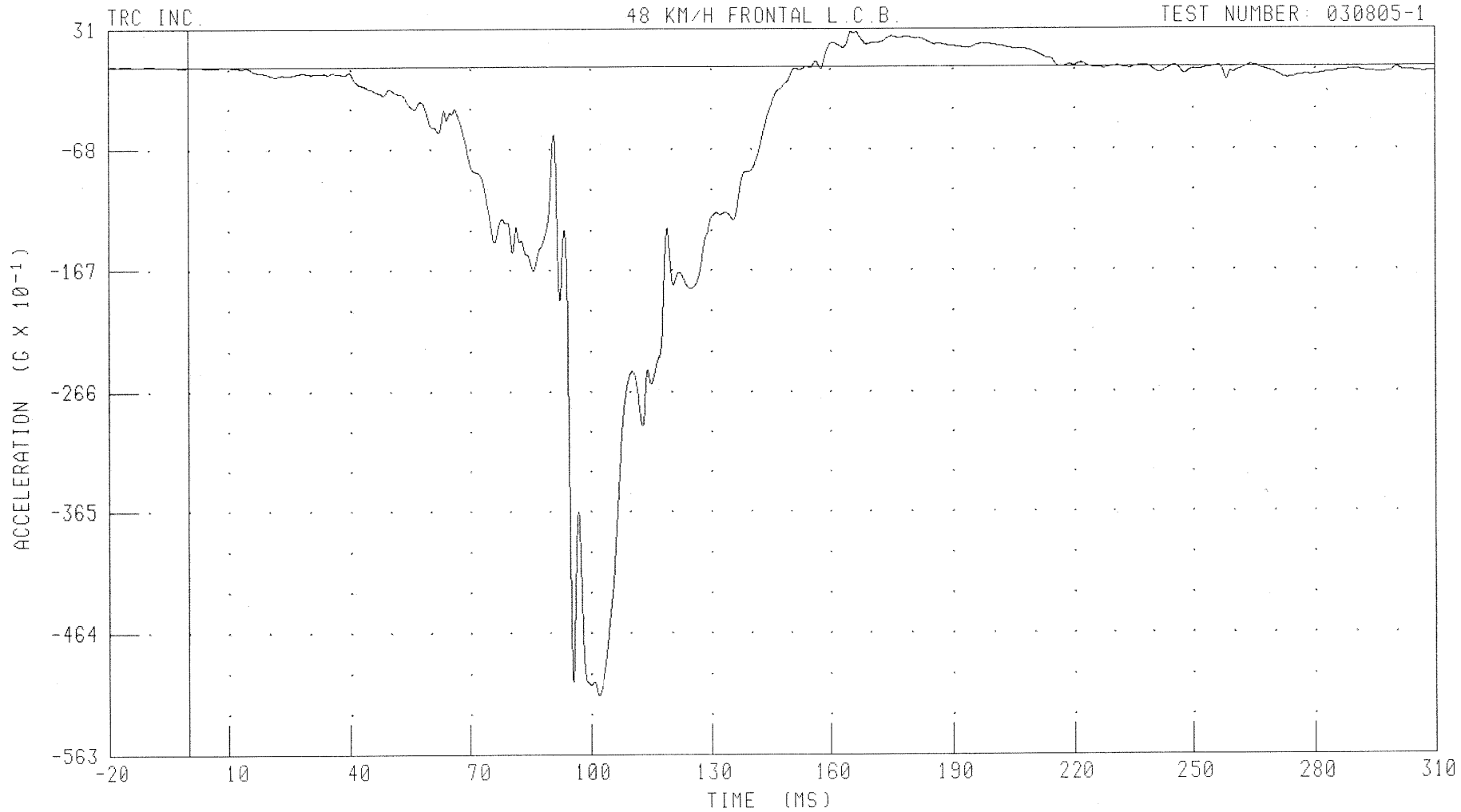
B-123

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER CHEST X-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTXR2 FILTER: CH. CLASS 180

PEAK DATA: 2.91 G @ 165.36 MS; -51.48 G @ 102.16 MS

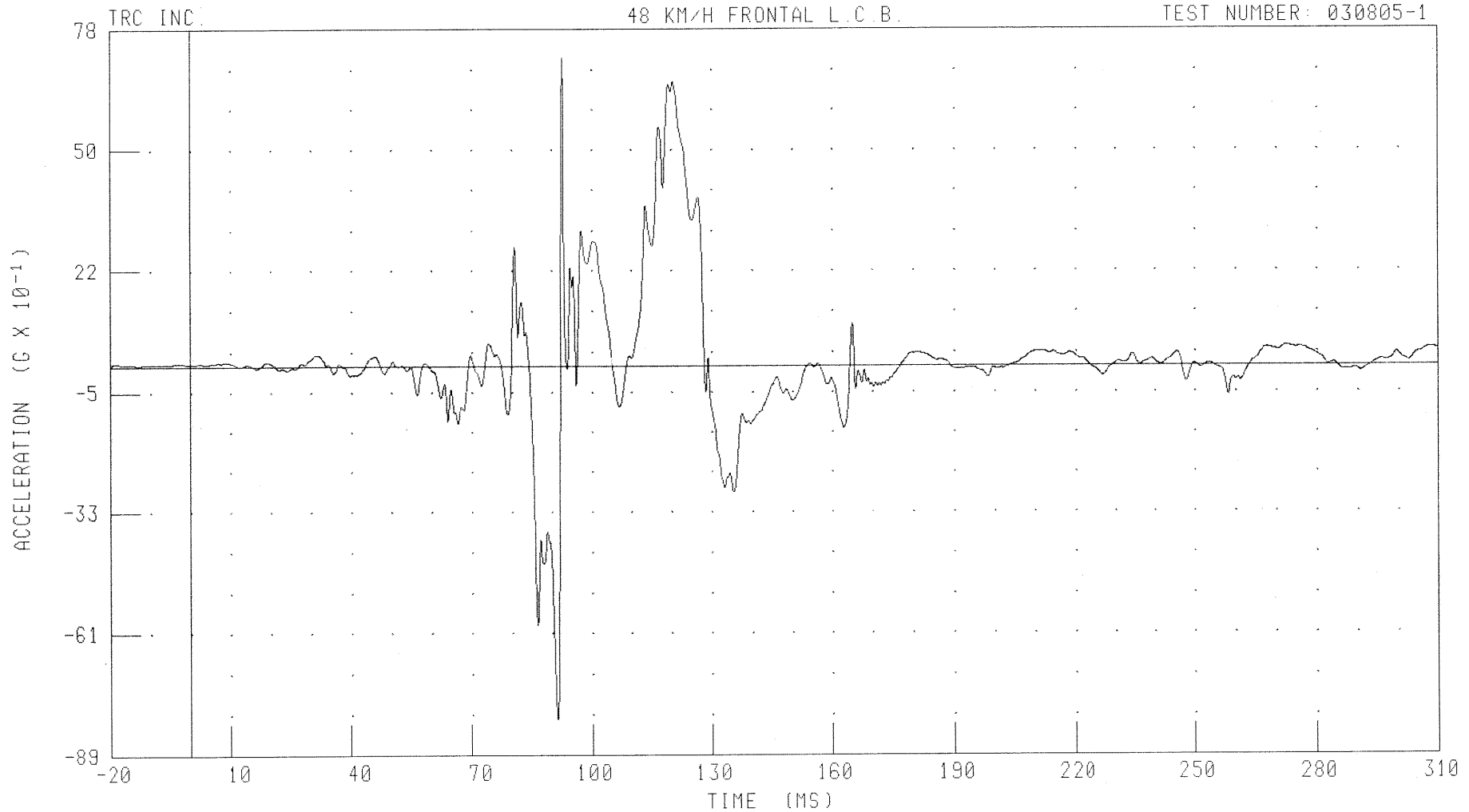
B-124

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER CHEST Y-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTYR2

FILTER: CH. CLASS 180

PEAK DATA: 7.13 G @ 92.72 MS; -8.18 G @ 91.36 MS

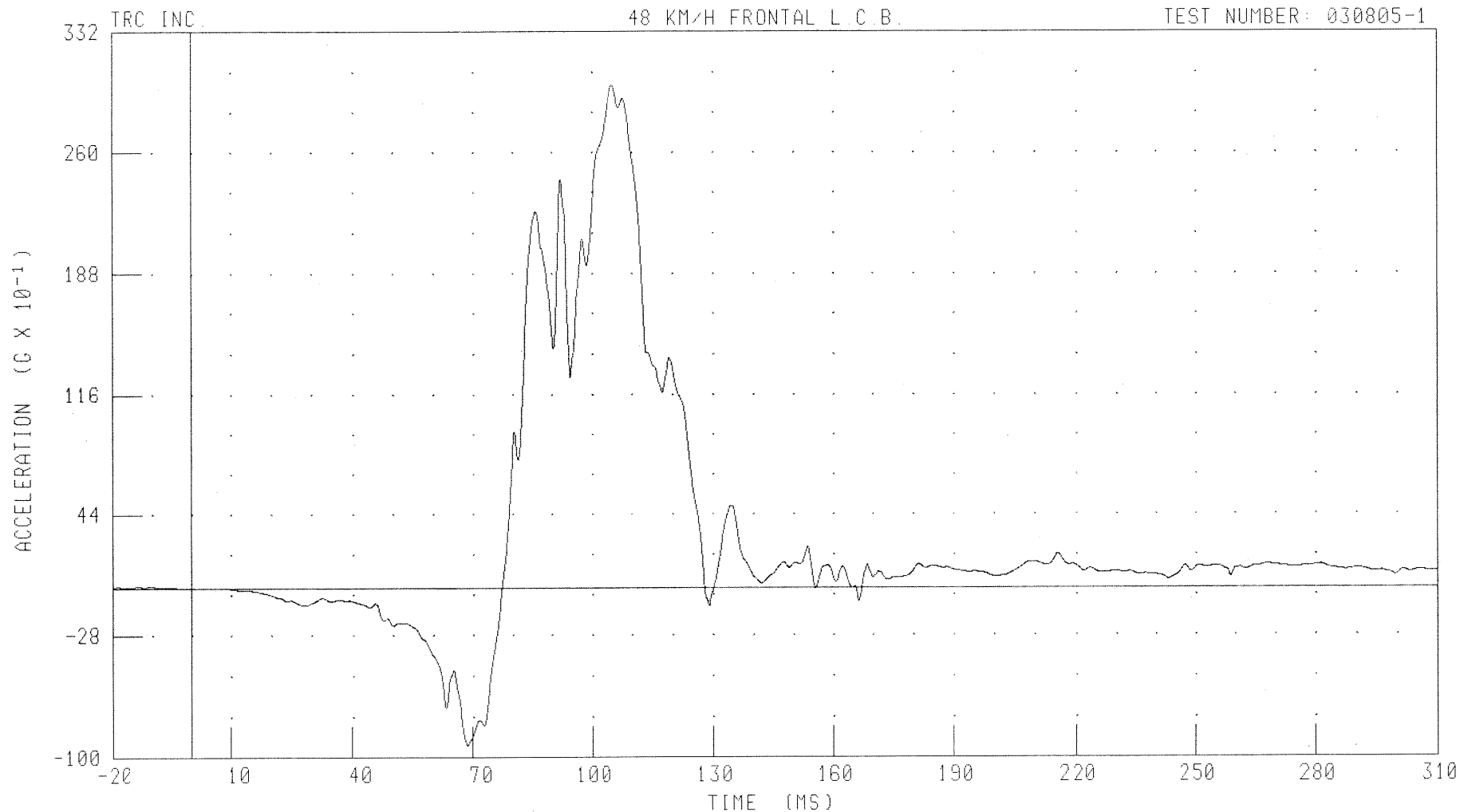
B-125

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER CHEST Z-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTZR2 FILTER: CH. CLASS 180

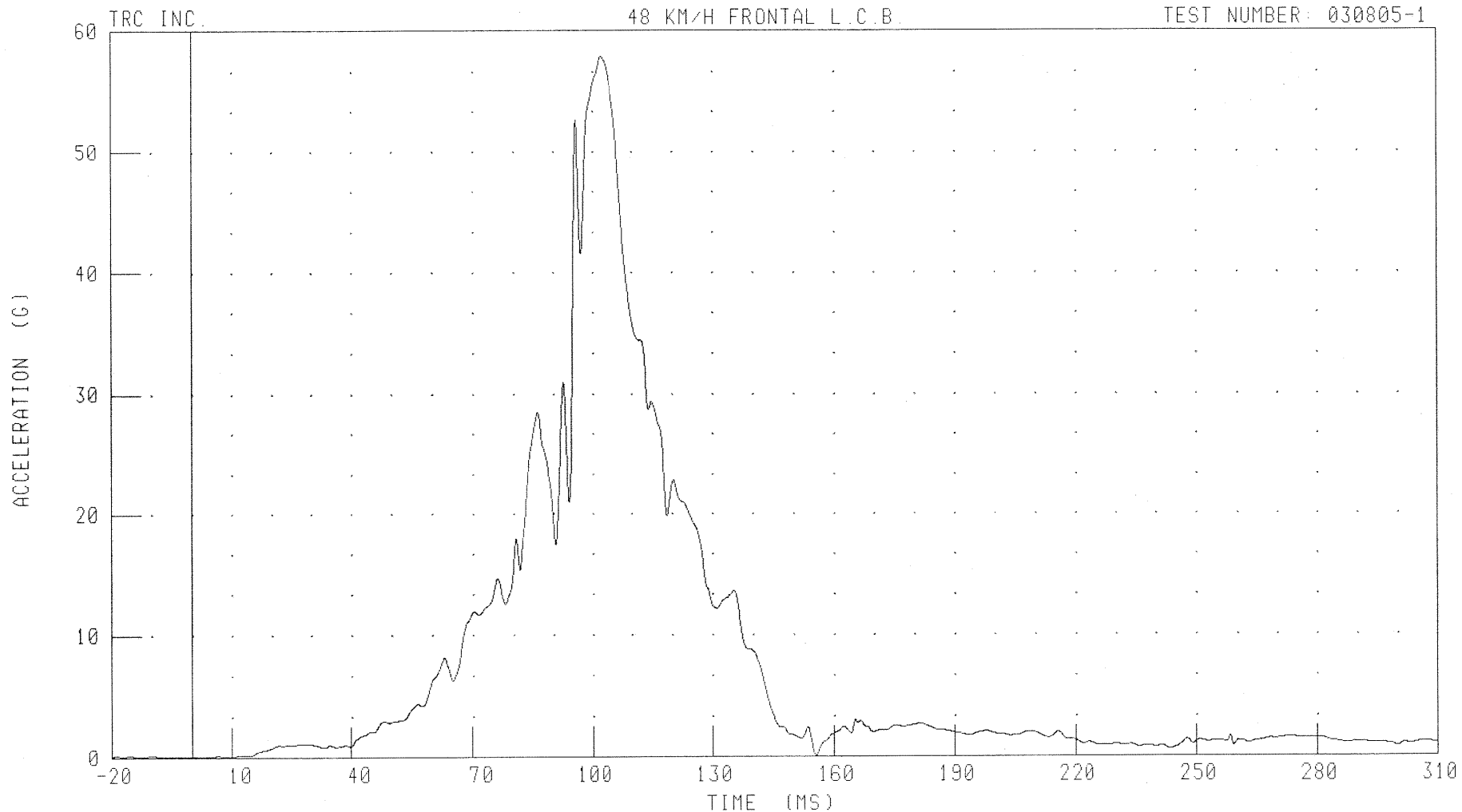
PEAK DATA: 30.03 G @ 105.20 MS; -9.31 G @ 68.72 MS

B-126

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER CHEST RESULTANT ACCELERATION REDUNDANT
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTRR2

FILTER: CH. CLASS 180

PEAK DATA: 57.93 G @ 102.24 MS; 0.01 G @ -20.00 MS

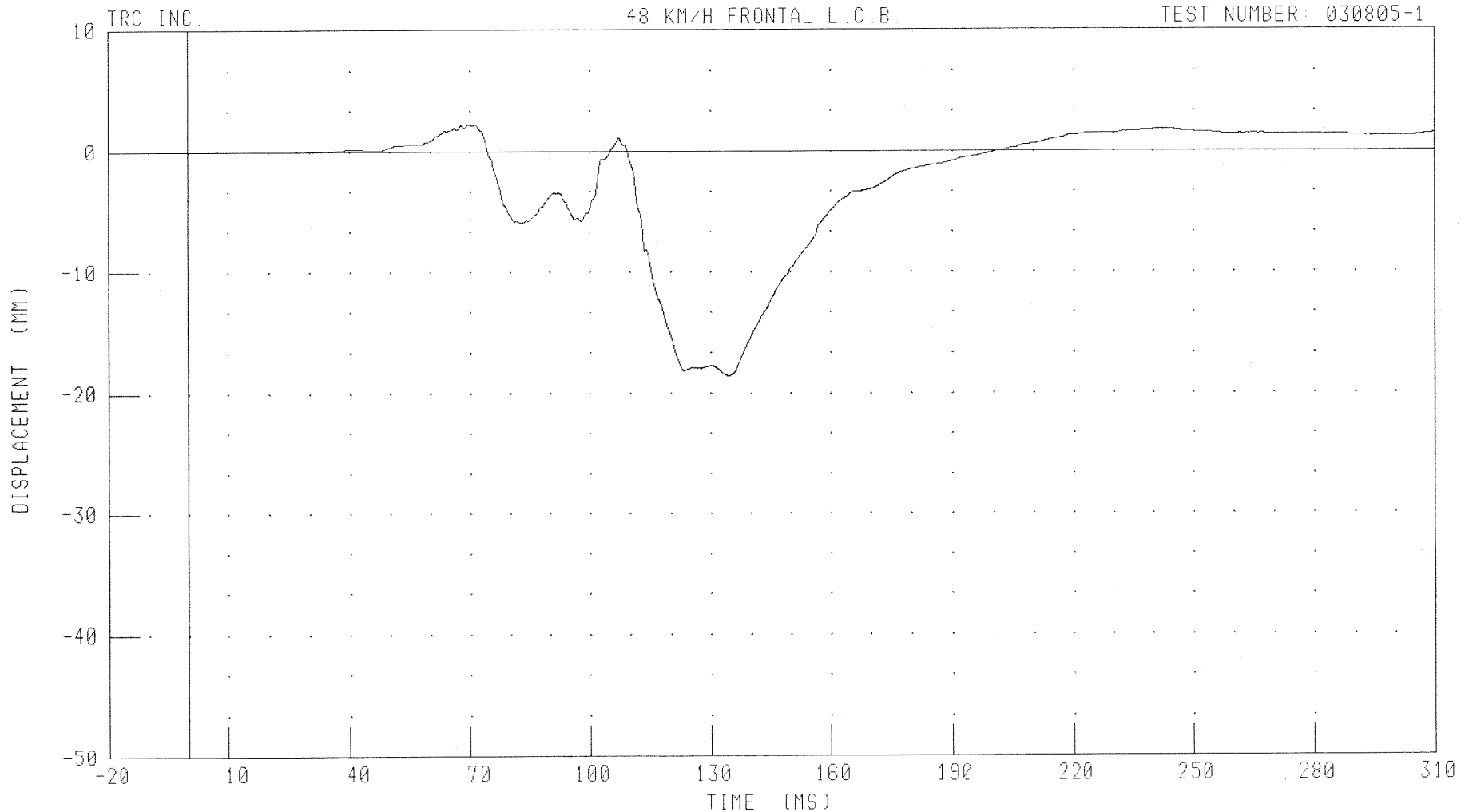
B-127

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER CHEST DEFLECTION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: CSTXD2 FILTER: CH. CLASS 600

PEAK DATA: 2.26 MM @ 69.68 MS, -18.57 MM @ 134.56 MS

B-128

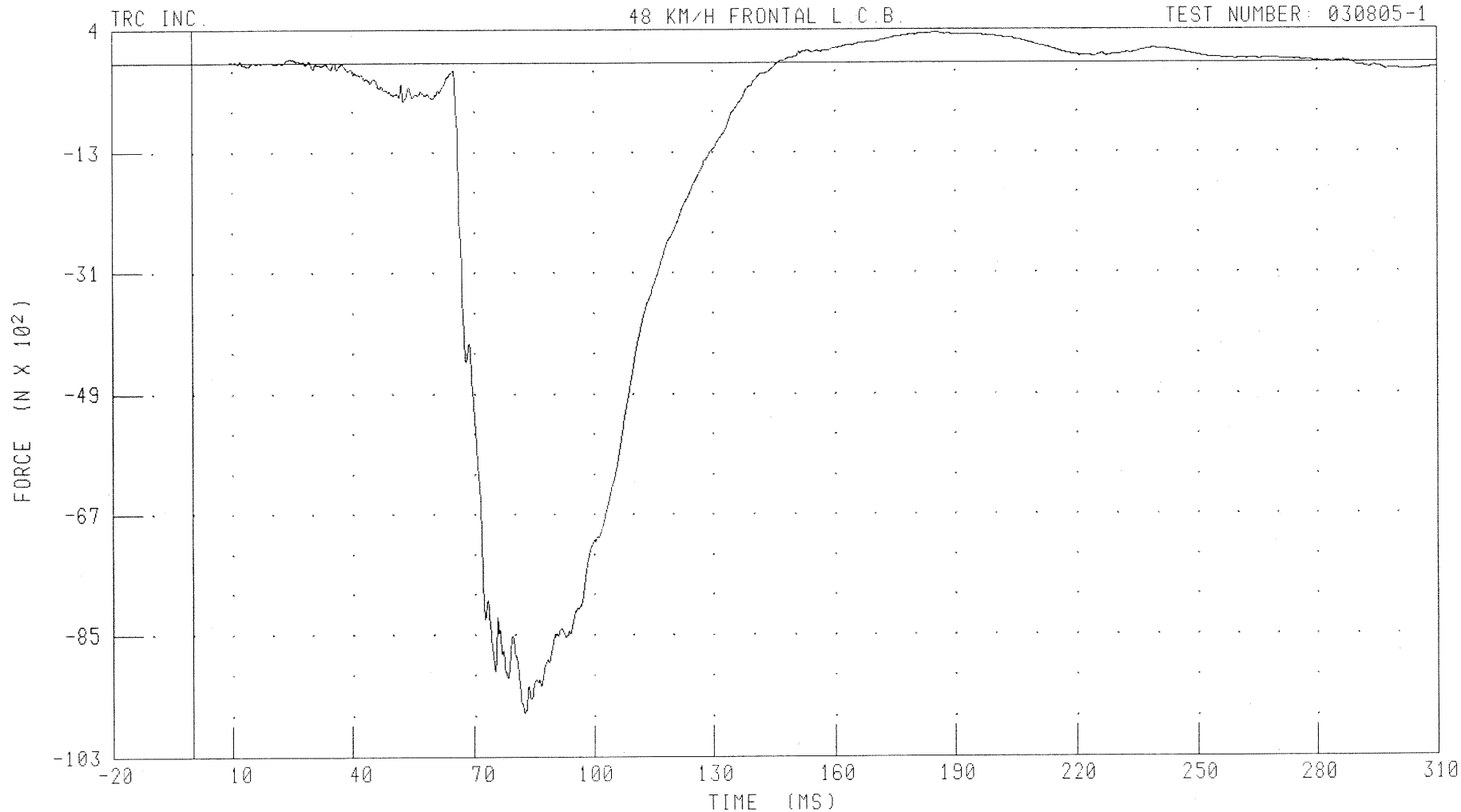
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

PASSENGER LEFT FEMUR FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: LFMZF2 FILTER: CH. CLASS 600

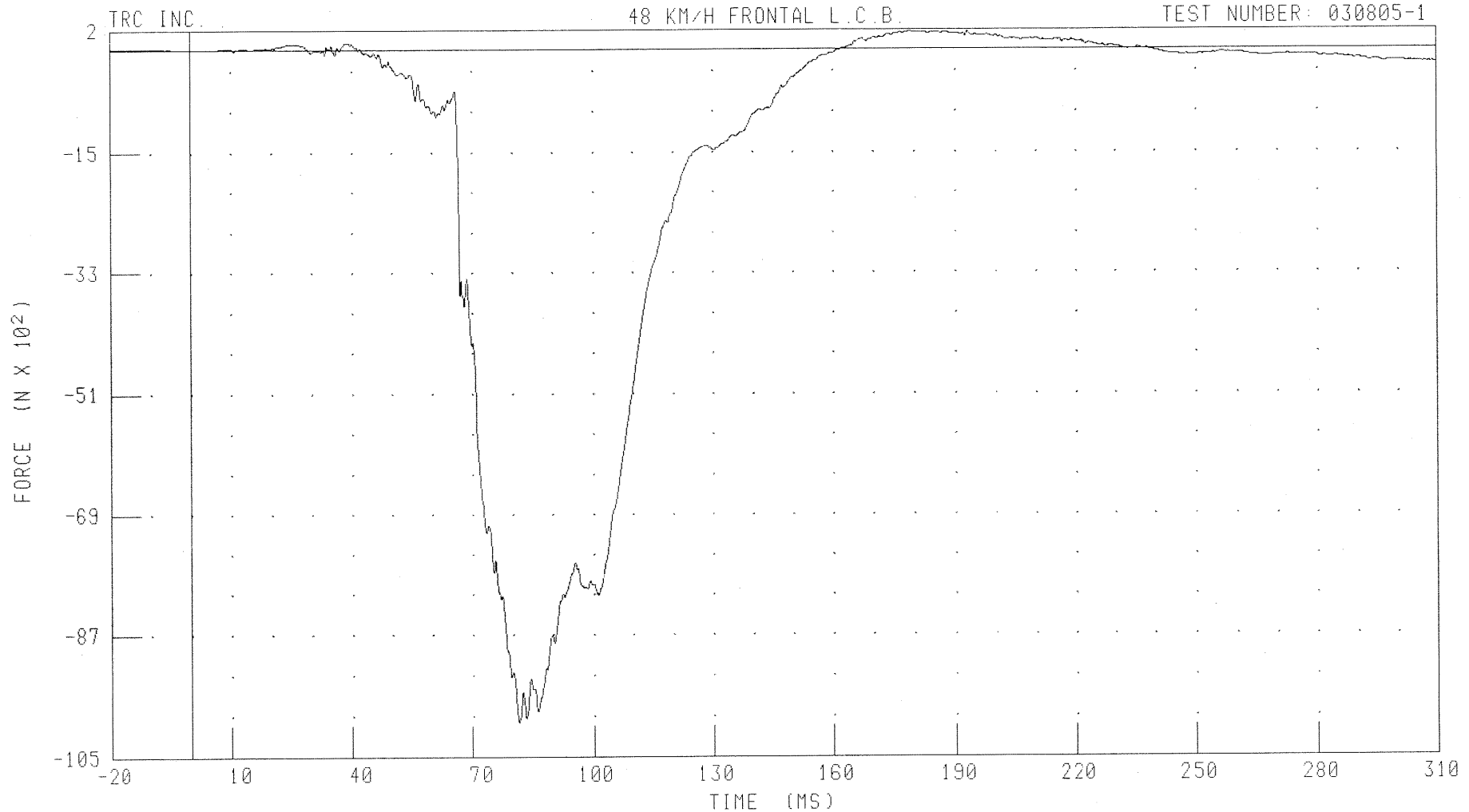
PEAK DATA: 436.52 N @ 184.80 MS; -9675.53 N @ 82.48 MS

B-129

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT FEMUR FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: RFMZ F2 FILTER: CH. CLASS 600

PEAK DATA: 254.64 N @ 179.04 MS; -10025.59 N @ 81.52 MS

B-130

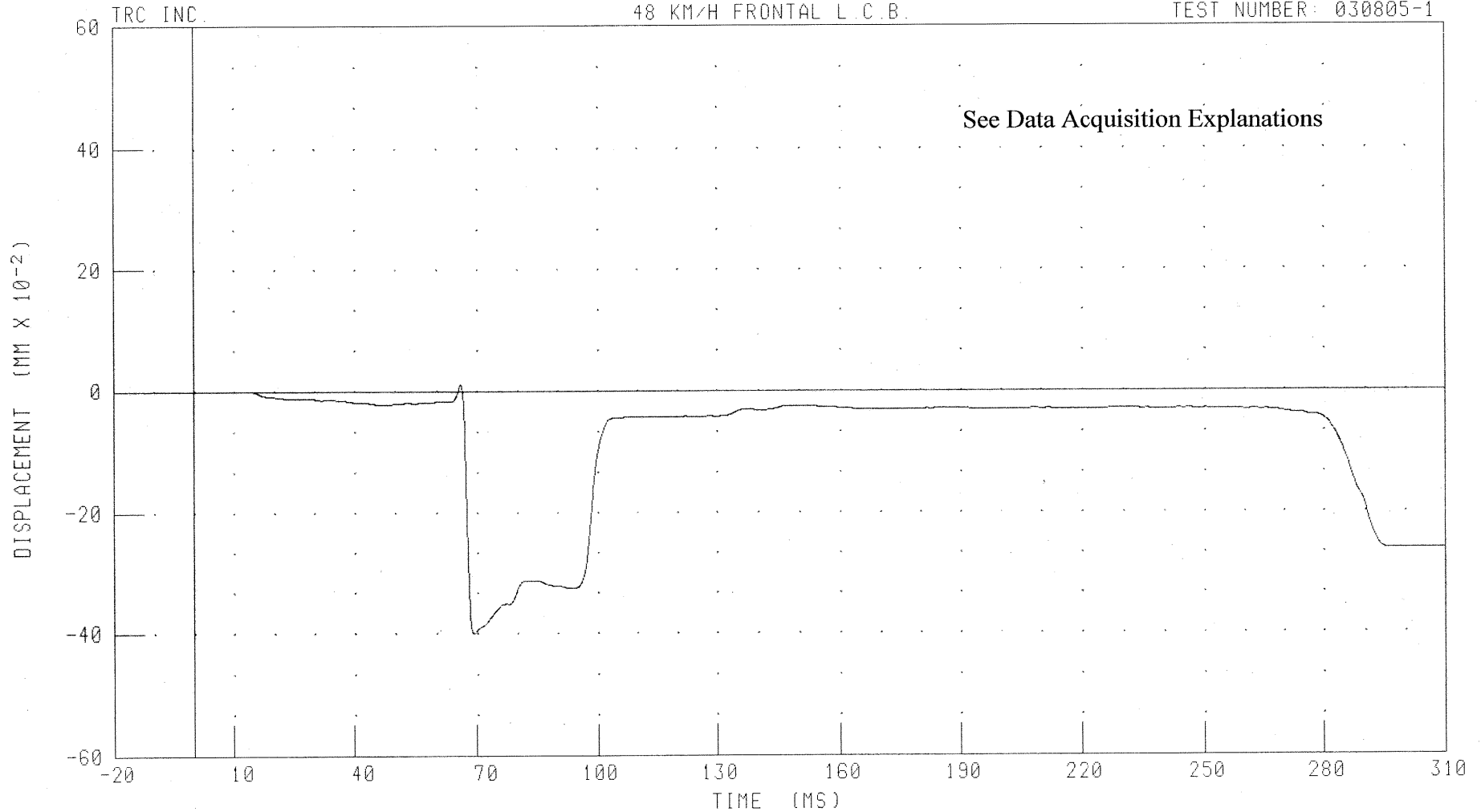
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

PASSENGER LEFT KNEE DISPLACEMENT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



See Data Acquisition Explanations

CHANNEL: KNLXD2 FILTER: CH. CLASS 180

PEAK DATA: 0.01 MM @ 66.08 MS; -0.40 MM @ 69.28 MS

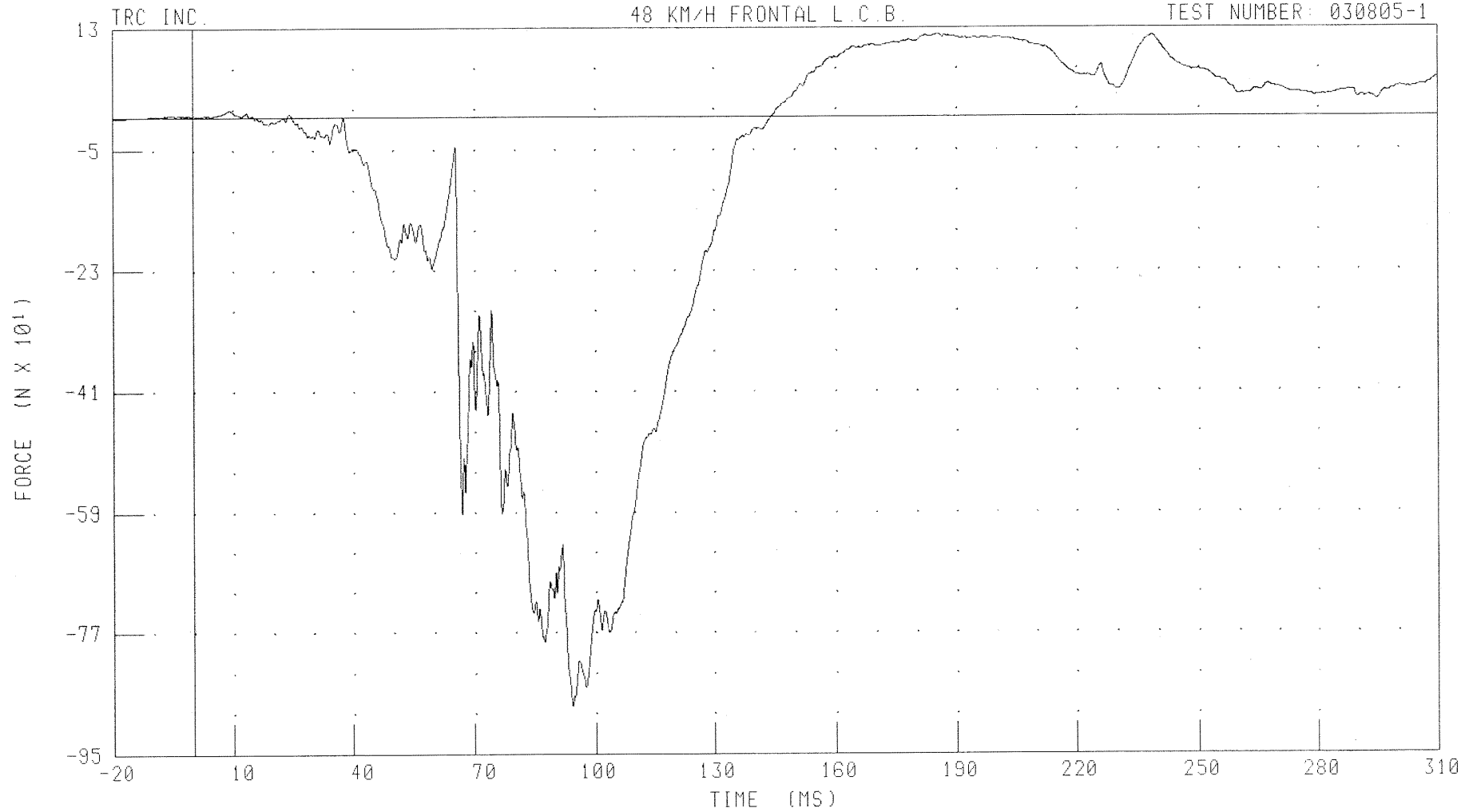
B-131

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER LEFT UPPER TIBIA X-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLXF2 FILTER: CH. CLASS 600

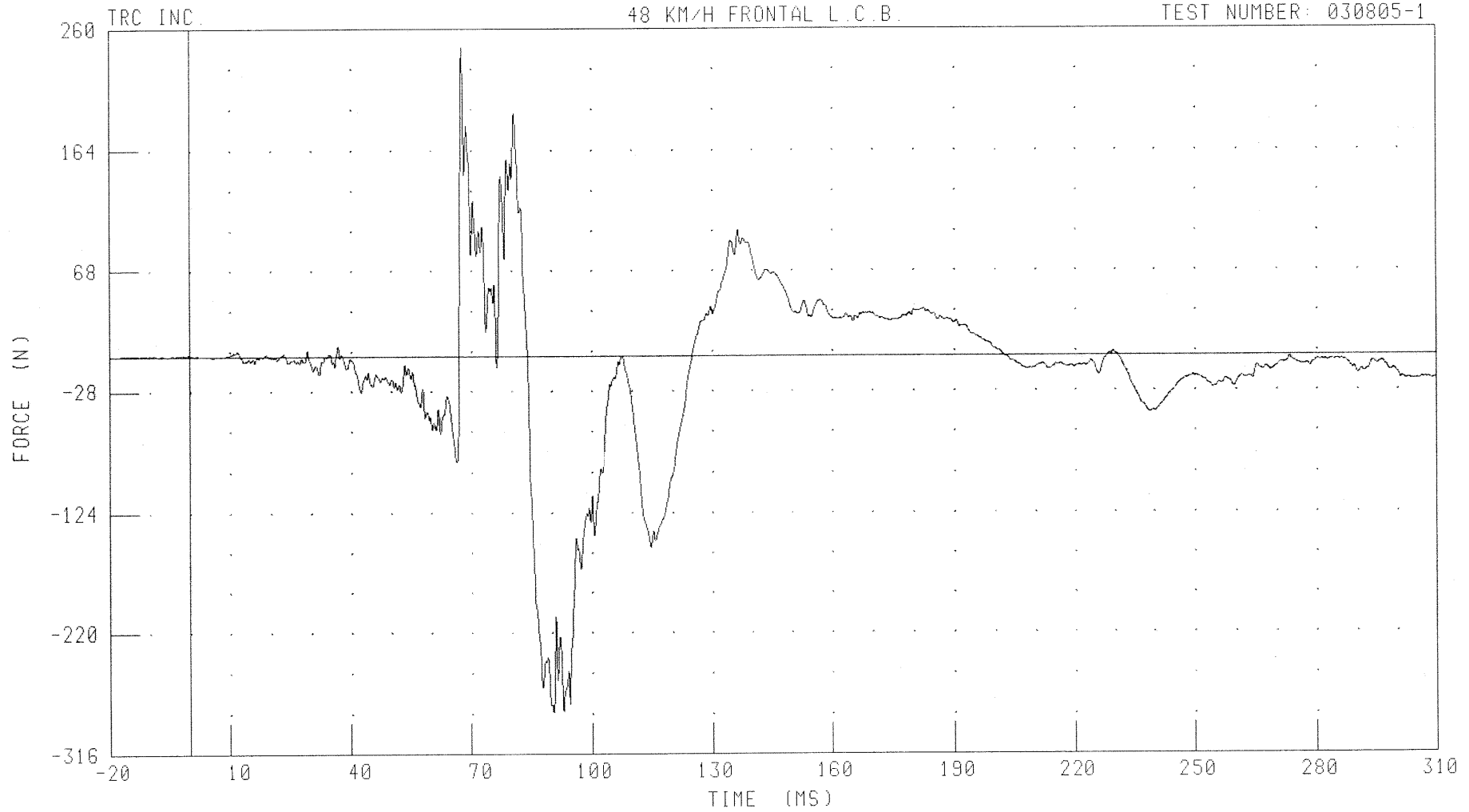
PEAK DATA: 120.21 N @ 185.84 MS; -87.923 N @ 94.16 MS

B-132

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER LEFT UPPER TIBIA Y-AXIS FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLYF2 FILTER: CH. CLASS 600

PEAK DATA: 244.63 N @ 67.84 MS; -282.82 N @ 90.40 MS

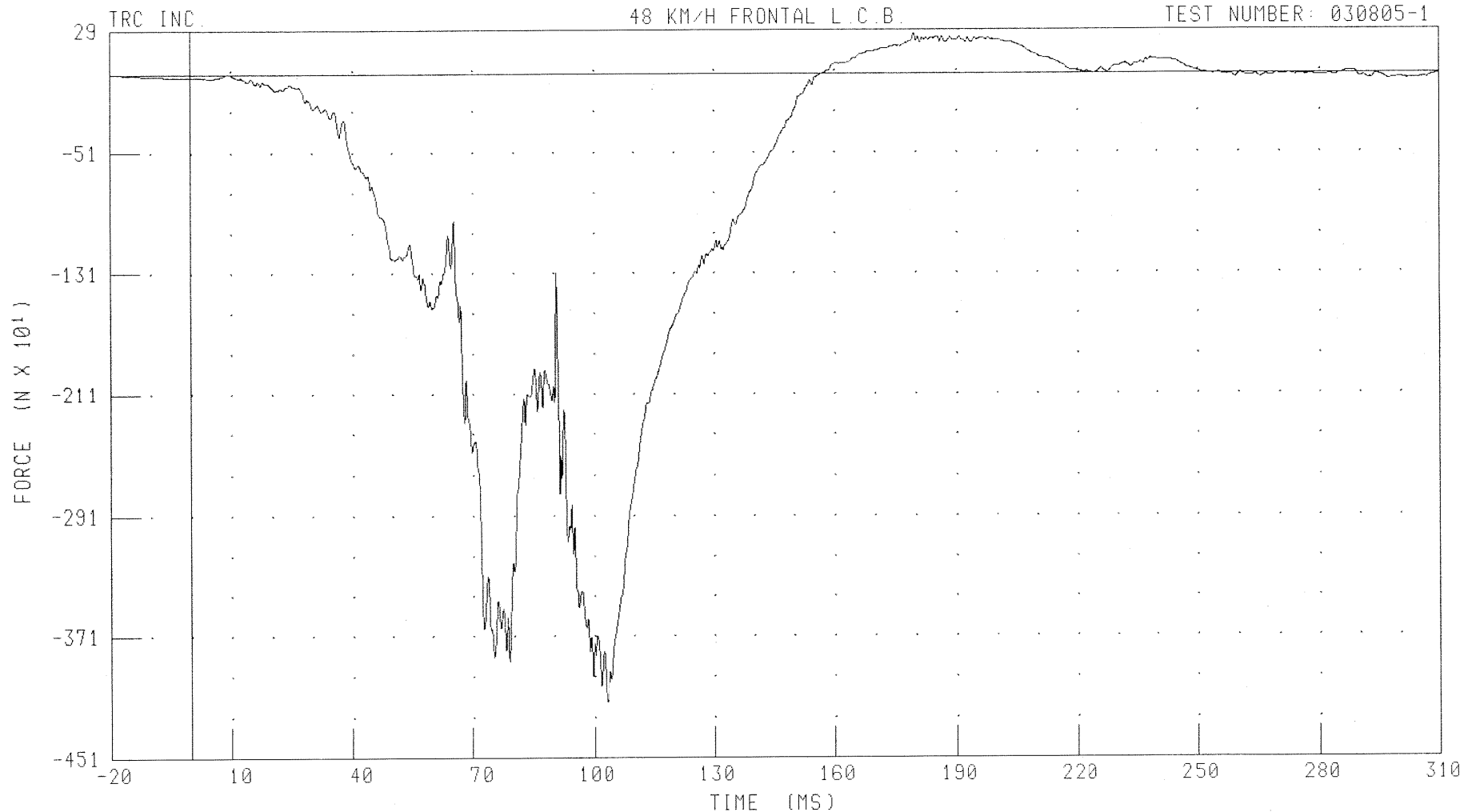
B-133

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER LEFT UPPER TIBIA Z-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLZF2 FILTER: CH. CLASS 600

PEAK DATA: 267.57 N @ 179.68 MS; -415.53 N @ 103.36 MS

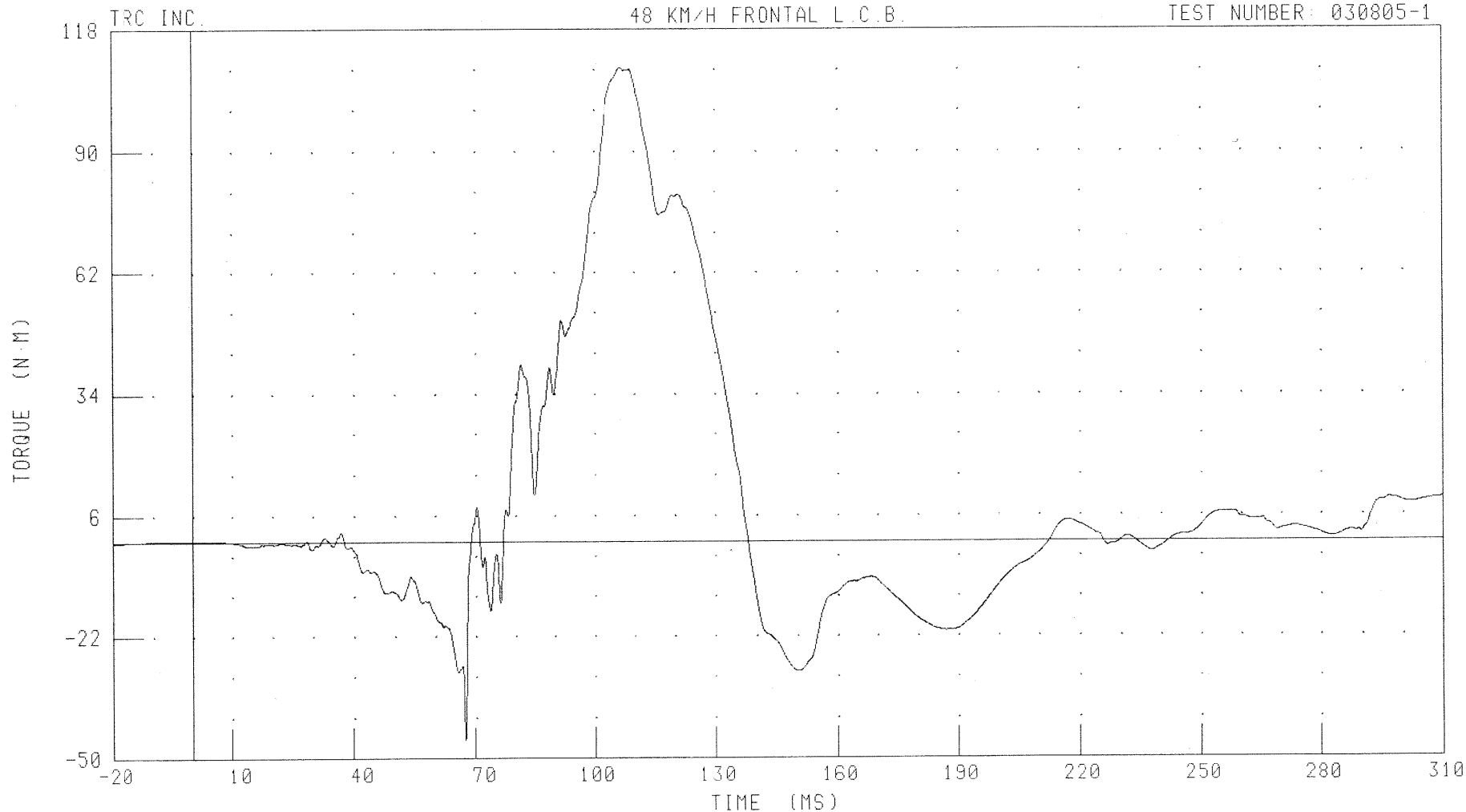
B-134

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER LEFT UPPER TIBIA MOMENT ABOUT X AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLXM2 FILTER: CH. CLASS 600

PEAK DATA: 109.07 N.M @ 106.72 MS, -45.71 N.M @ 67.44 MS

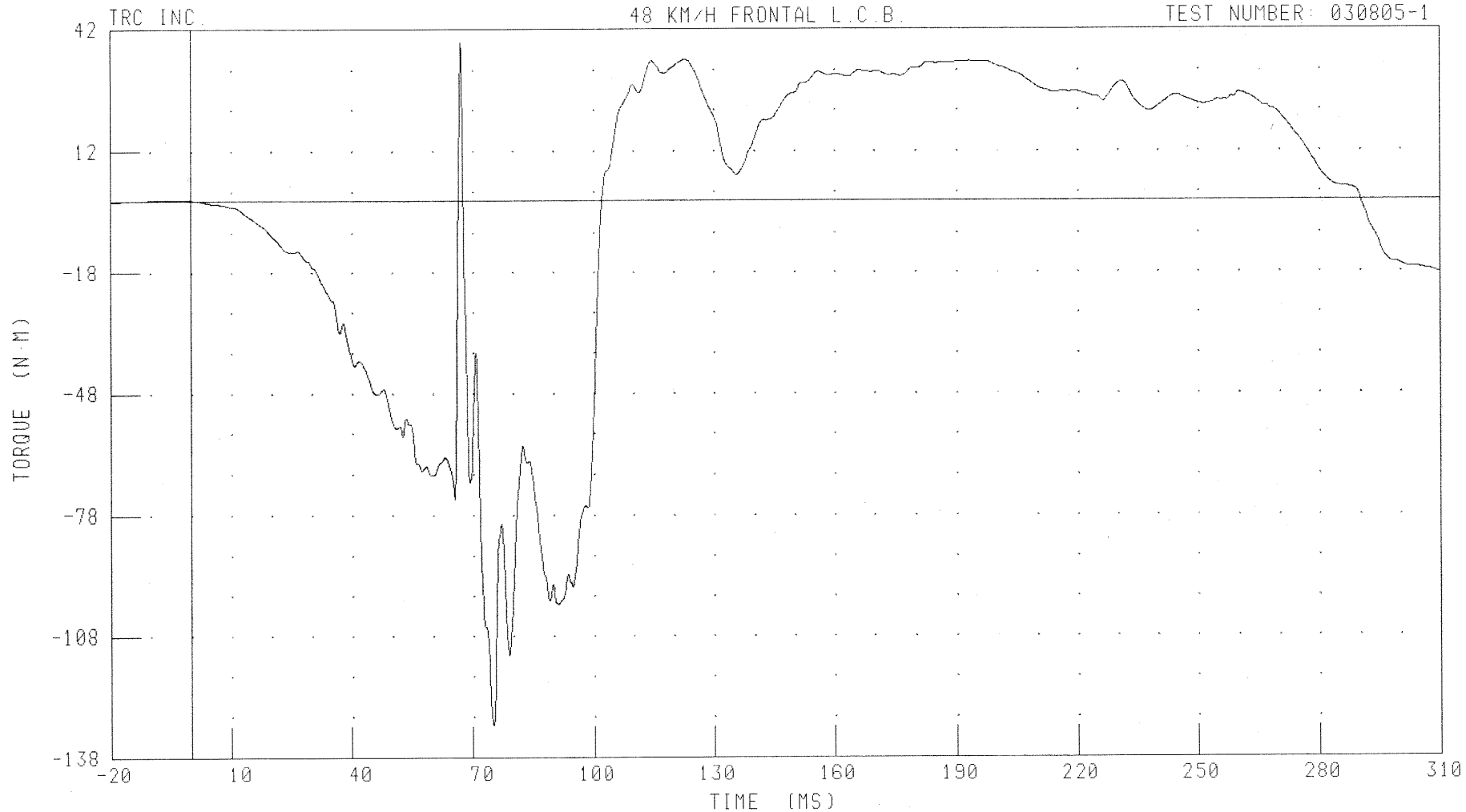
B-135

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER LEFT UPPER TIBIA MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBLYM2

FILTER: CH. CLASS 600

PEAK DATA: 38.83 N.M @ 67.12 MS; -130.13 N.M @ 75.12 MS

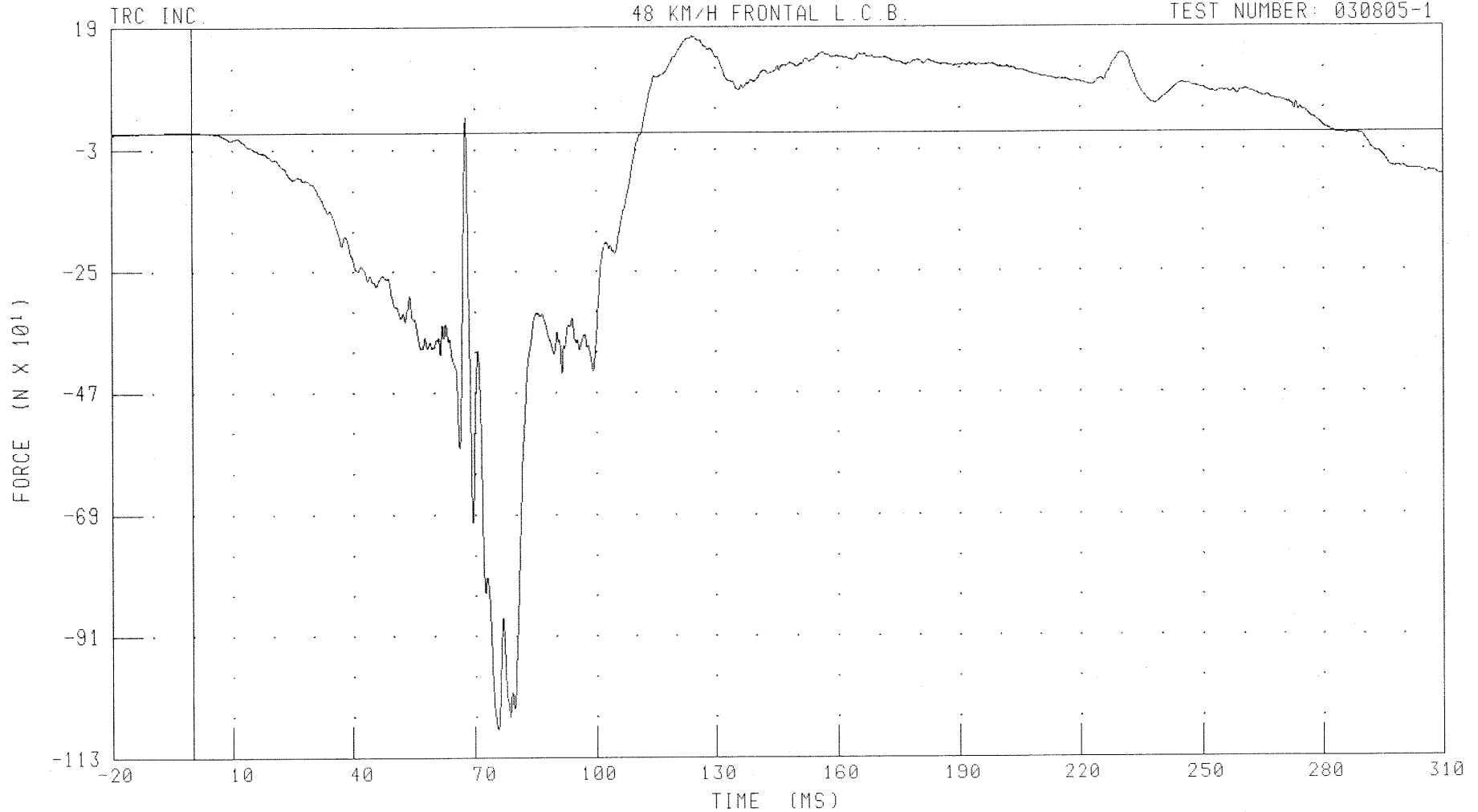
B-136

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER LEFT LOWER TIBIA X-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANLXF2 FILTER: CH. CLASS 600

PEAK DATA: 173.24 N @ 124.32 MS; -1080.19 N @ 75.68 MS

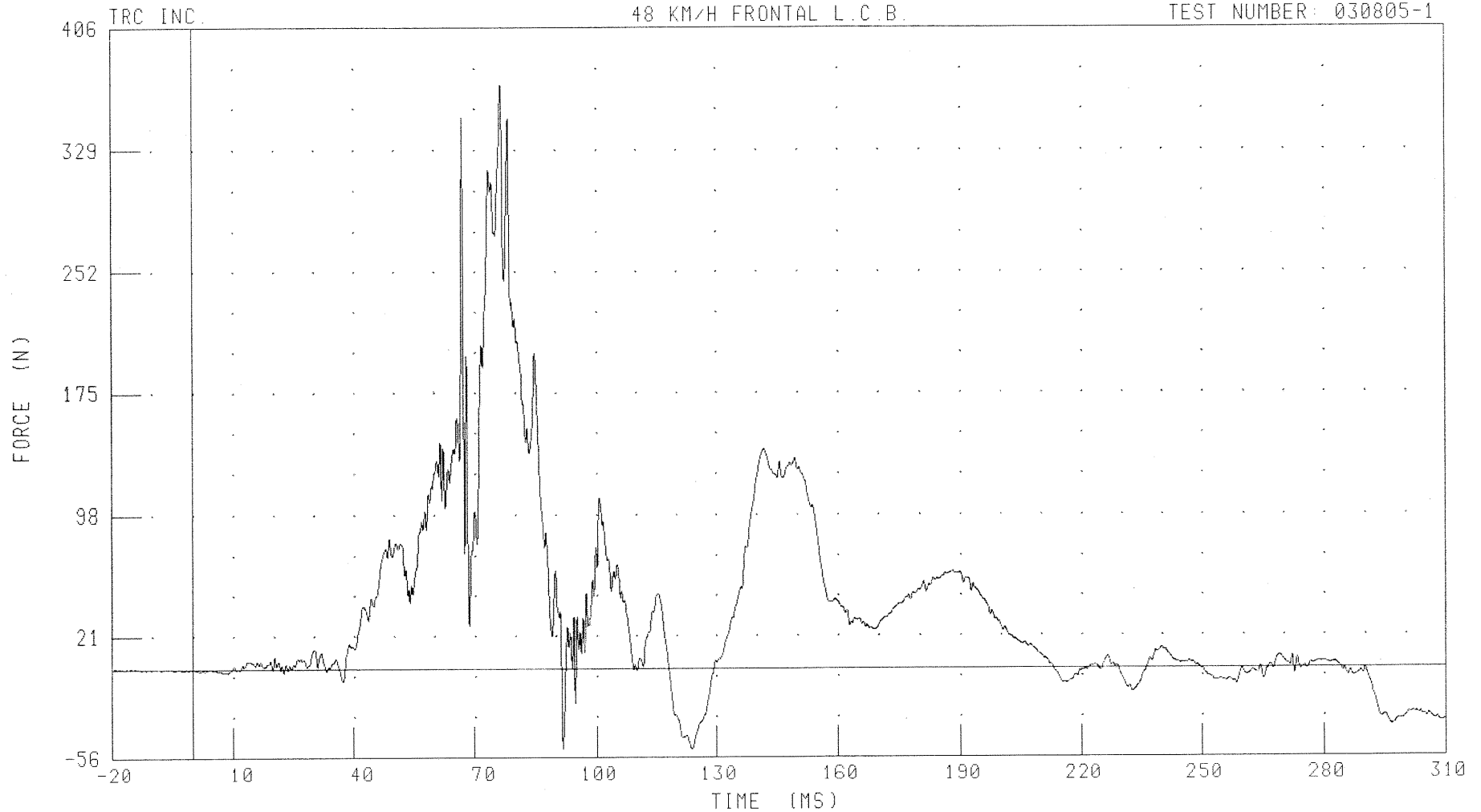
B-137

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER LEFT LOWER TIBIA Y-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANLYF2 FILTER: CH. CLASS 600

PEAK DATA: 370.44 N @ 76.56 MS; -51.06 N @ 123.92 MS

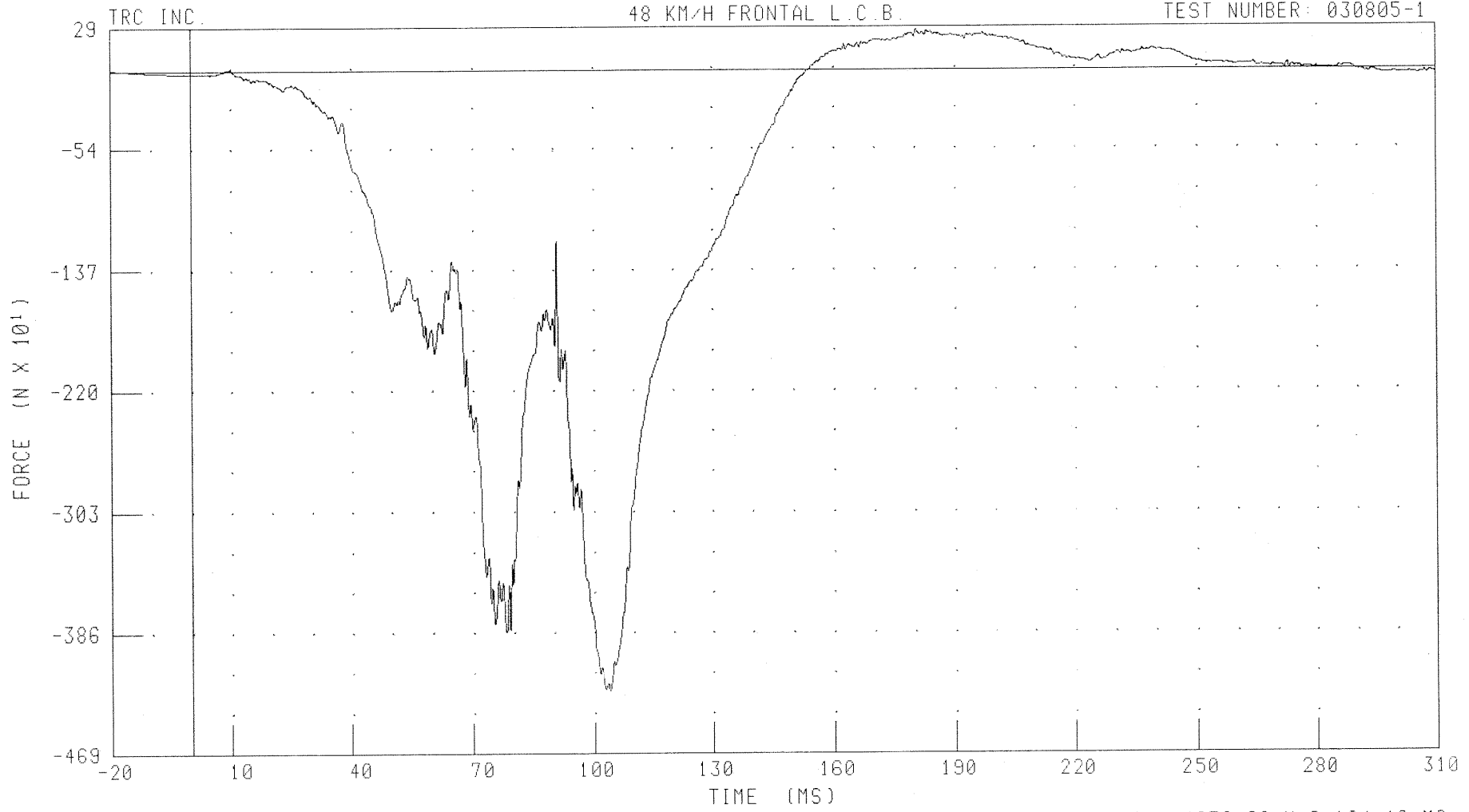
B-138

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER LEFT LOWER TIBIA Z-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANLZF2 FILTER CH. CLASS 600

PEAK DATA: 268.67 N @ 180.64 MS; -4259.69 N @ 104.16 MS

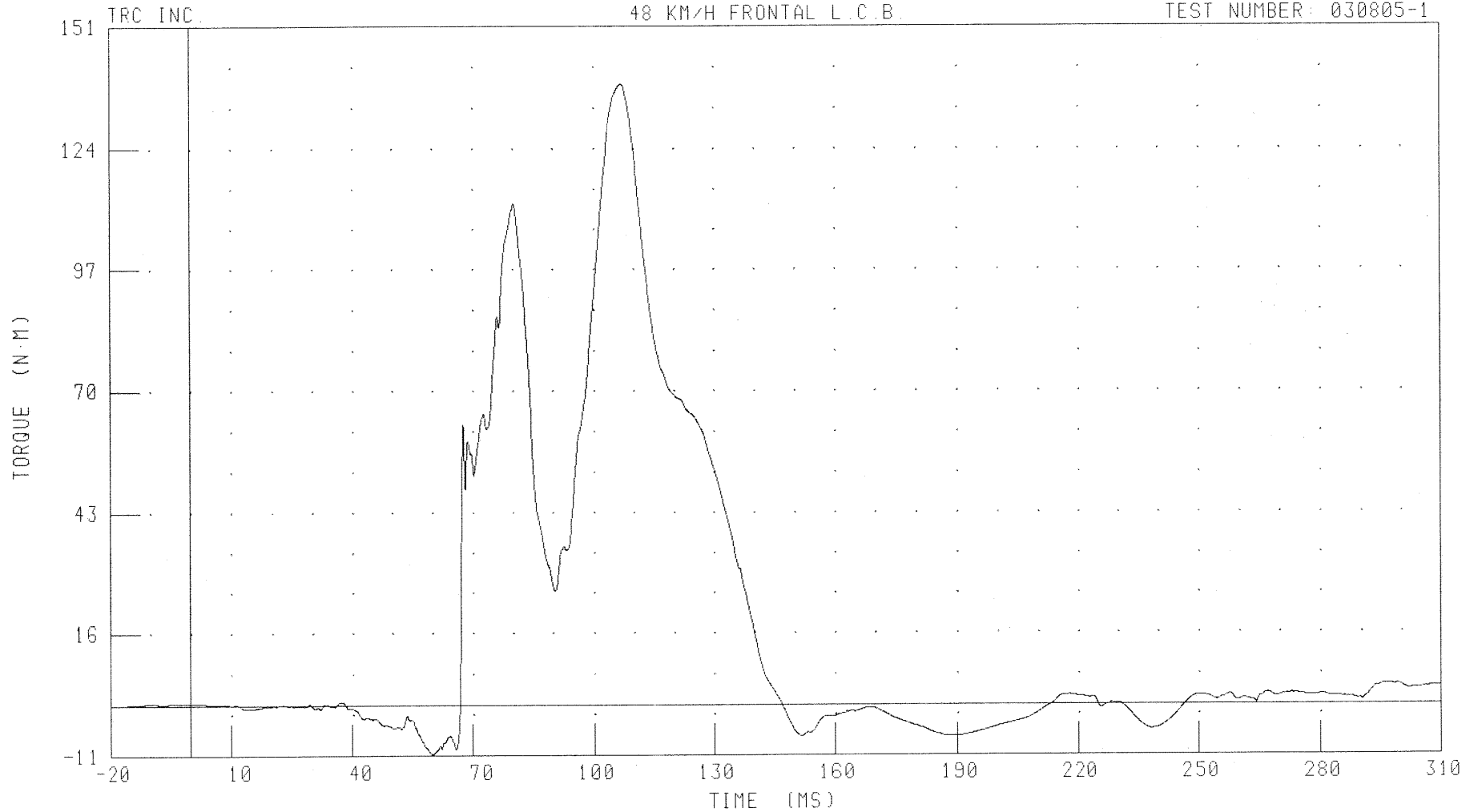
B-139

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER LEFT LOWER TIBIA MOMENT ABOUT X AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANLXM2 FILTER: CH. CLASS 600

PEAK DATA: 138.21 N.M @ 106.96 MS; -10.84 N.M @ 60.00 MS

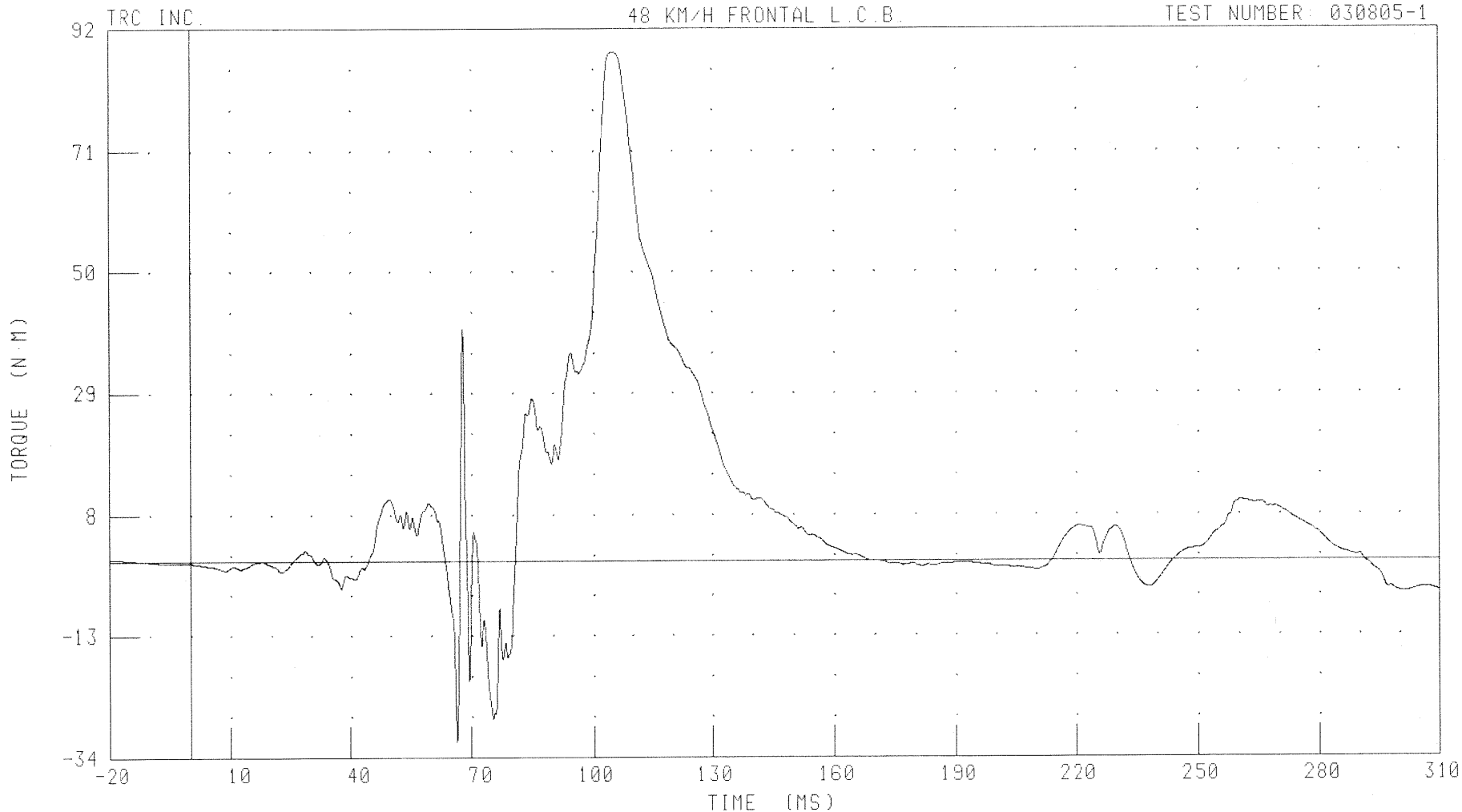
B-140

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER LEFT LOWER TIBIA MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANLYM2 FILTER: CH. CLASS 600

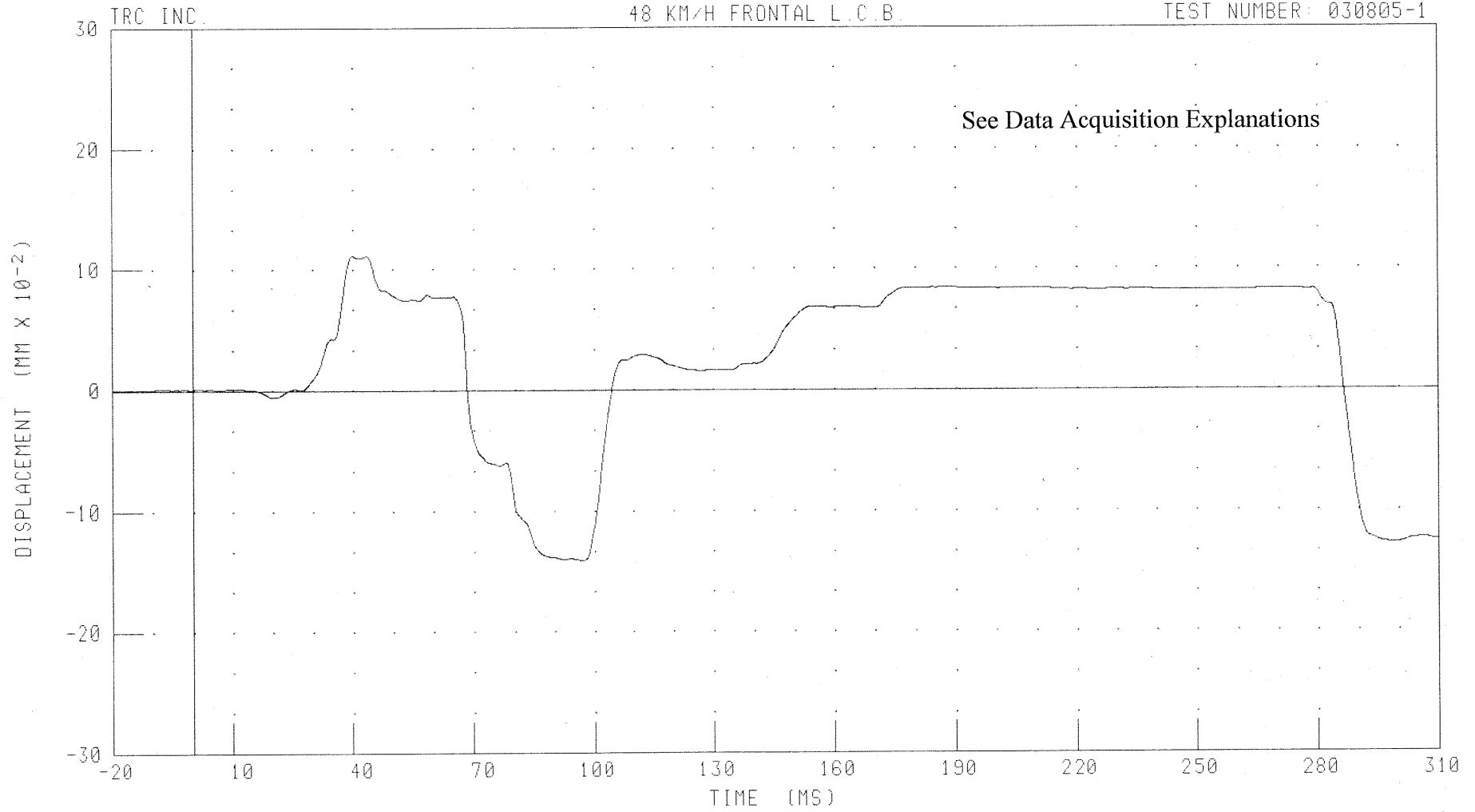
PEAK DATA: 87.99 N.M @ 105.20 MS, -31.30 N.M @ 66.40 MS

B-141

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT KNEE DISPLACEMENT
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: KNRXD2 FILTER: CH. CLASS 180

PEAK DATA: 0.11 MM @ 40.08 MS; -0.14 MM @ 97.12 MS

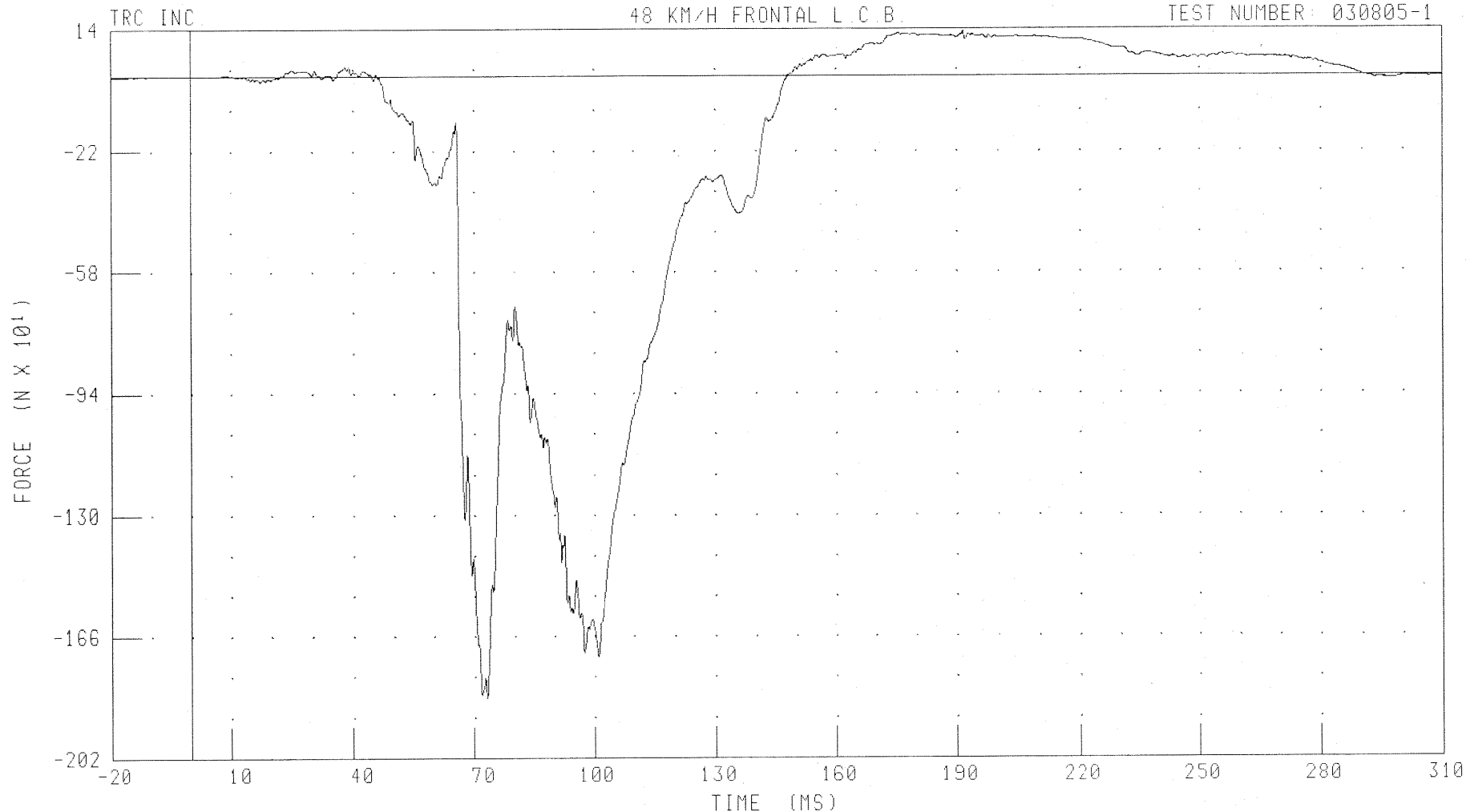
B-142

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT UPPER TIBIA X-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRXF2 FILTER: CH. CLASS 600

PEAK DATA: 133.31 N @ 191.68 MS; -1844.42 N @ 73.20 MS

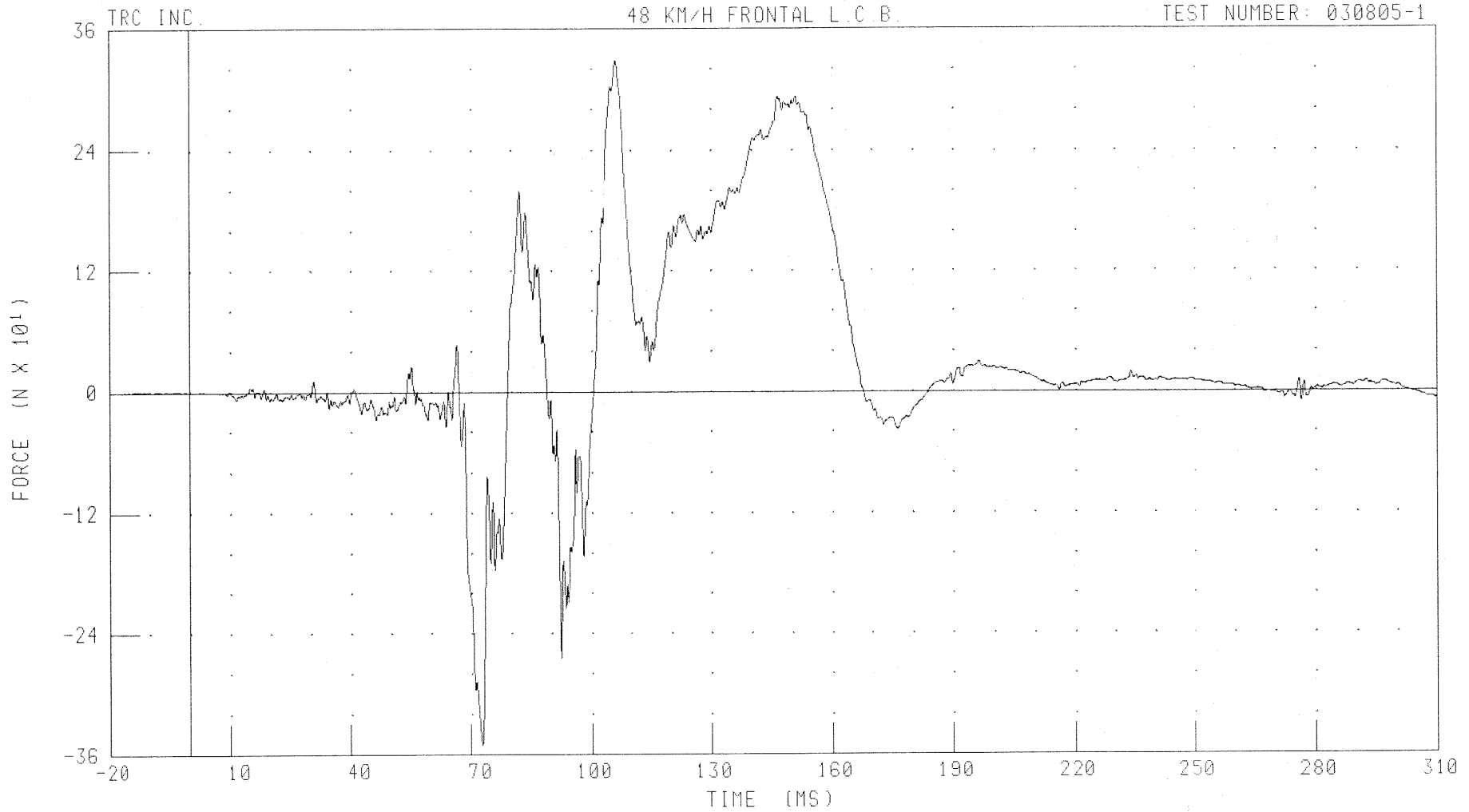
B-143

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT UPPER TIBIA Y-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRYF2 FILTER: CH. CLASS 600

PEAK DATA: 329.13 N @ 106.24 MS; -350.81 N @ 72.72 MS

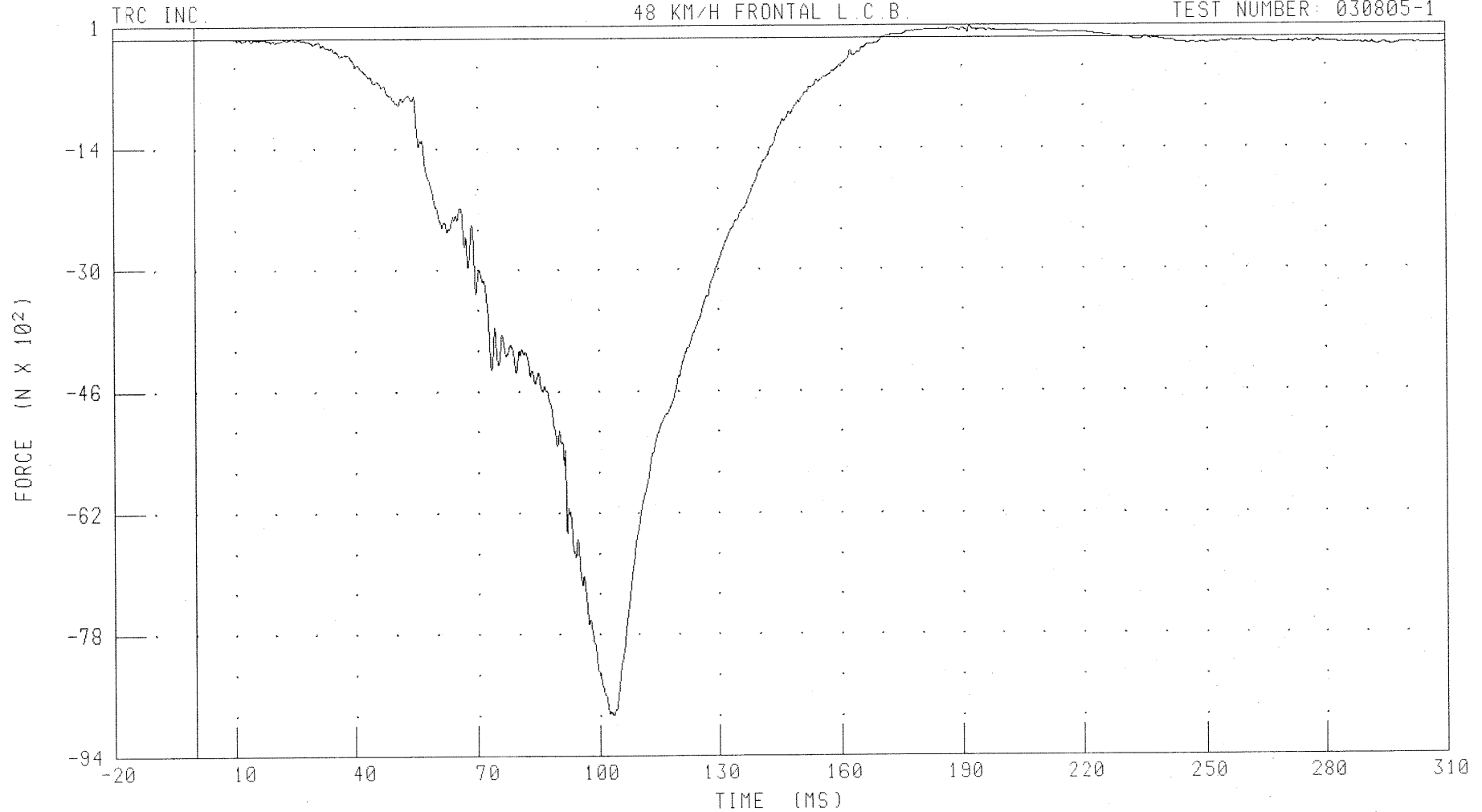
B-144

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT UPPER TIBIA Z-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRZF2 FILTER: CH. CLASS 600

PEAK DATA: 152.50 N @ 192.16 MS; -8903.29 N @ 103.68 MS

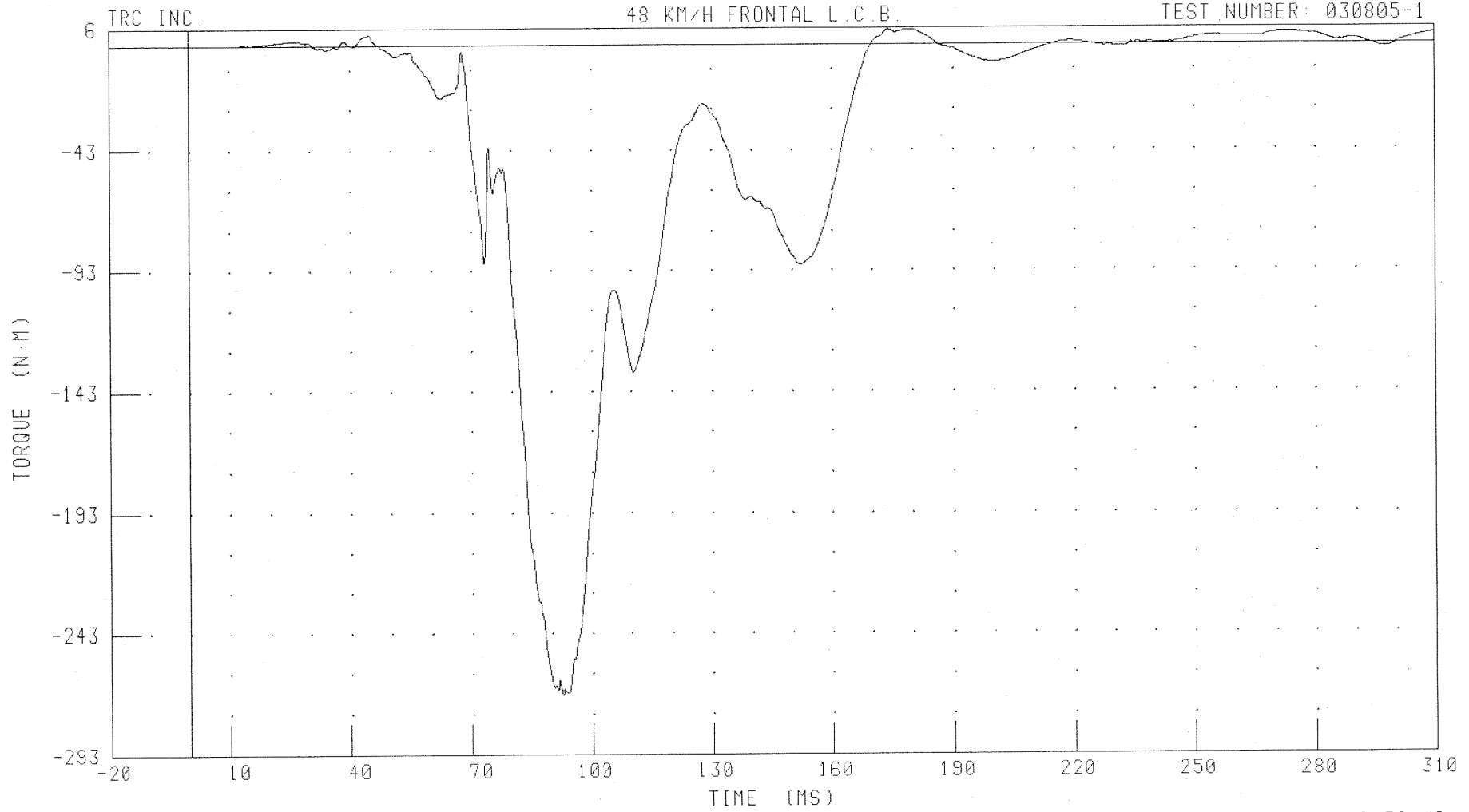
B-145

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT UPPER TIBIA MOMENT ABOUT X AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRXM2 FILTER: CH. CLASS 600

PEAK DATA: 6.16 N.M @ 174.32 MS; -269.12 N.M @ 92.72 MS

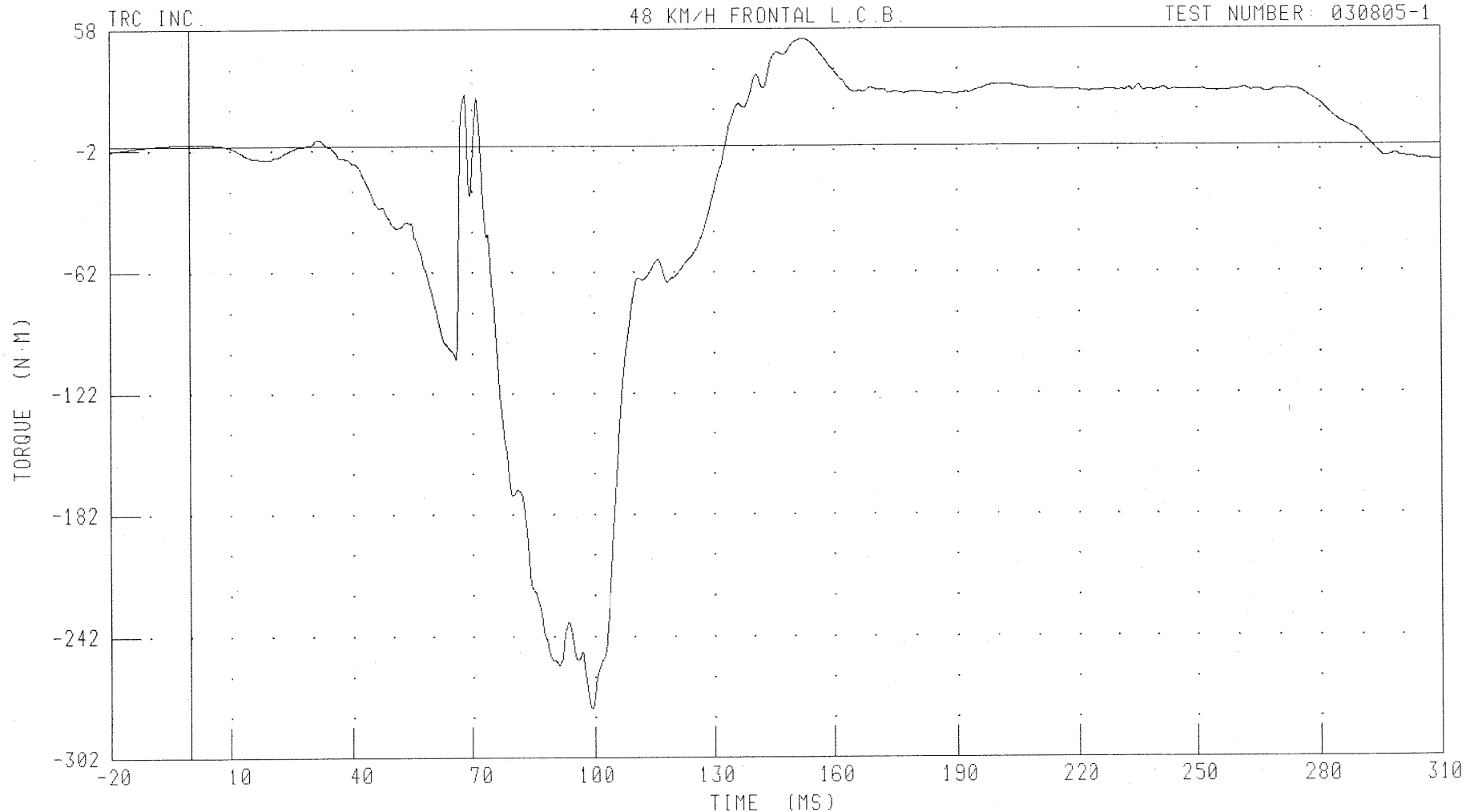
B-146

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT UPPER TIBIA MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TBRYM2 FILTER: CH. CLASS 600

PEAK DATA: 53.02 N.M @ 152.16 MS; -277.78 N.M @ 99.44 MS

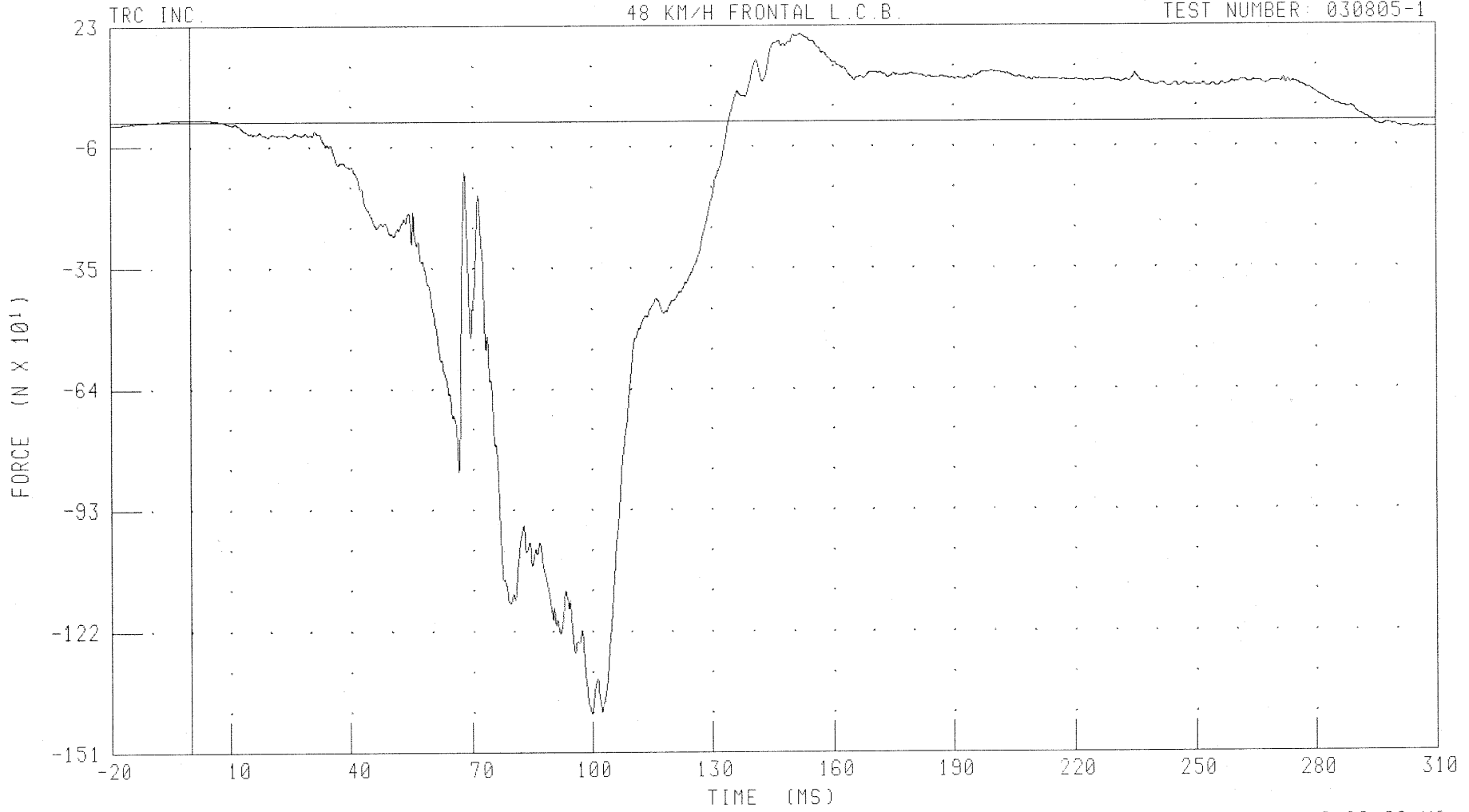
B-147

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT LOWER TIBIA X-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANRXF2 FILTER: CH. CLASS 600

PEAK DATA: 210.45 N @ 152.08 MS; -1417.43 N @ 99.92 MS

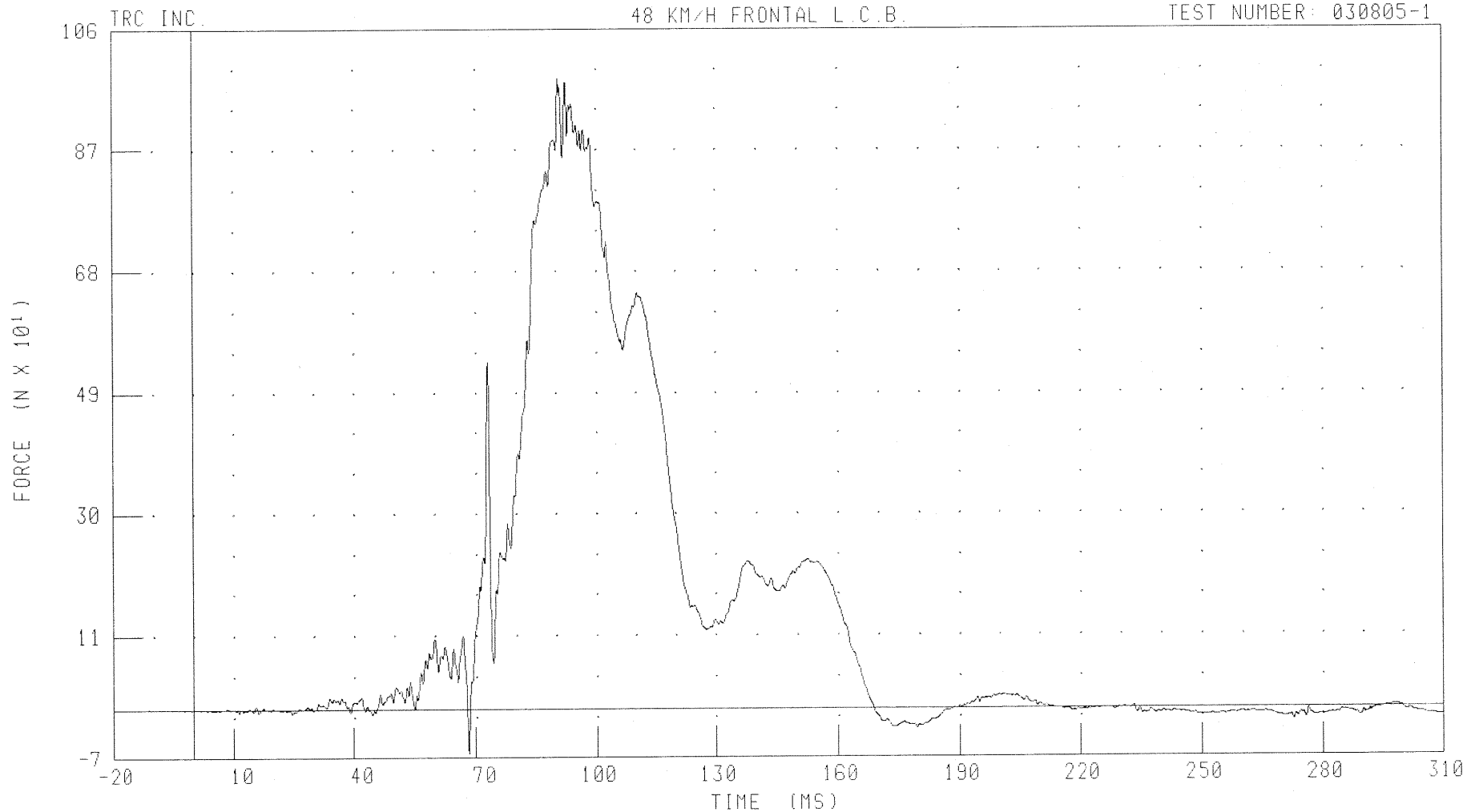
B-148

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT LOWER TIBIA Y-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANRYF2 FILTER: CH. CLASS 600

PEAK DATA: 986.01 N @ 90.72 MS, -68.84 N @ 68.24 MS

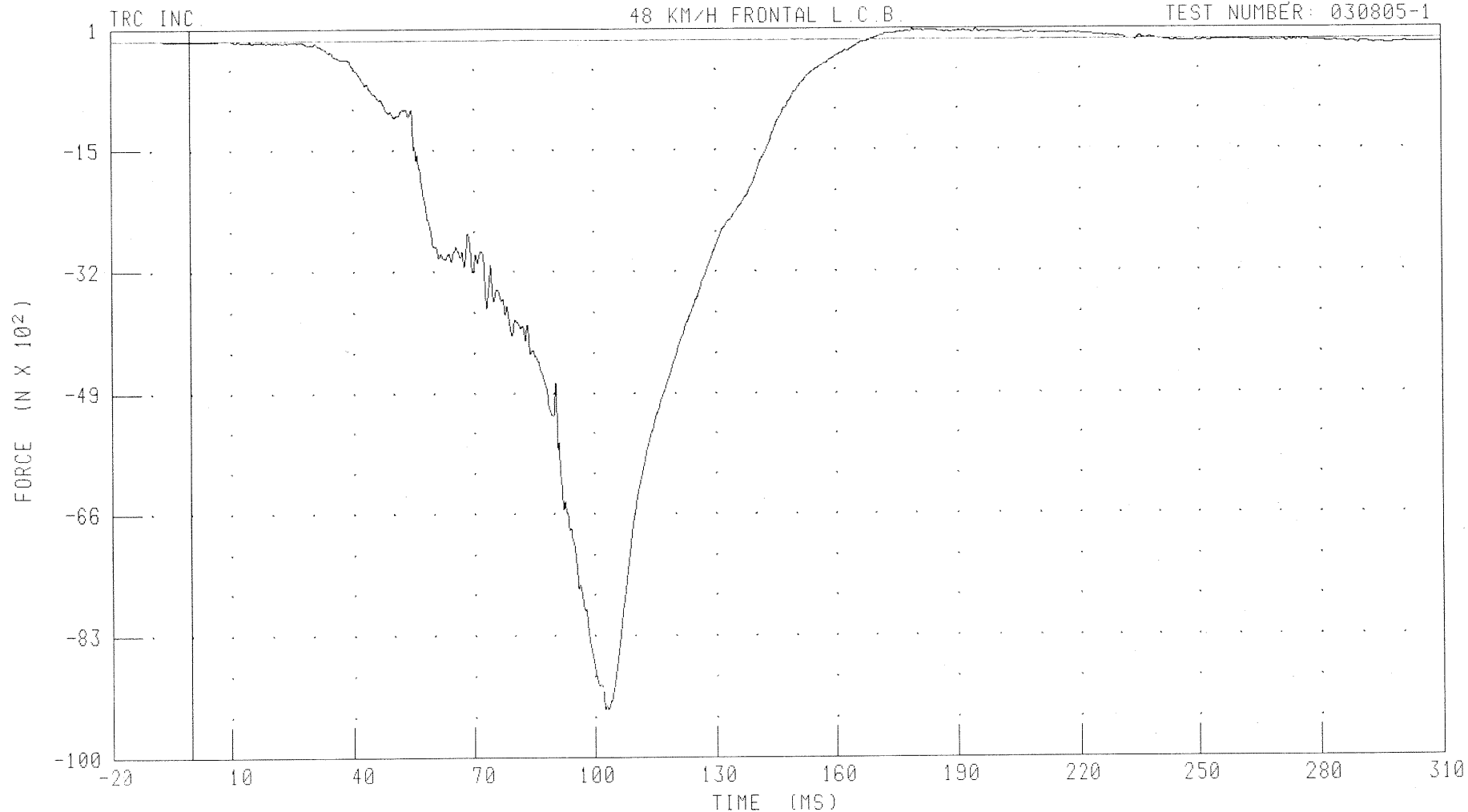
B-149

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT LOWER TIBIA Z-AXIS FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANRZF2 FILTER: CH. CLASS 600

PEAK DATA: 146.69 N @ 194.80 MS, -9369.92 N @ 103.60 MS

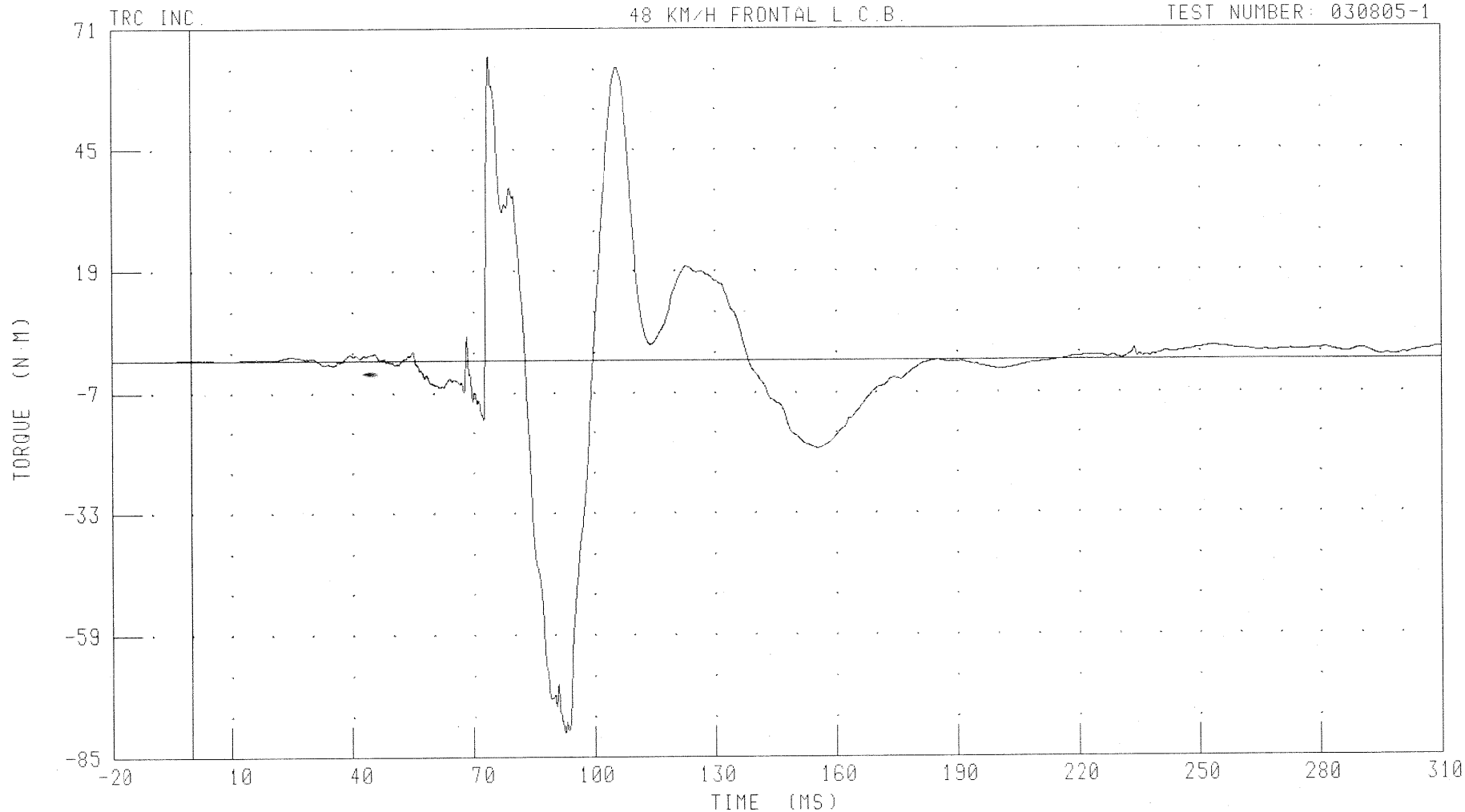
B-150

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT LOWER TIBIA MOMENT ABOUT X AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANRXM2 FILTER: CH CLASS 600

PEAK DATA: 65.01 N.M @ 73.84 MS; -79.83 N.M @ 92.56 MS

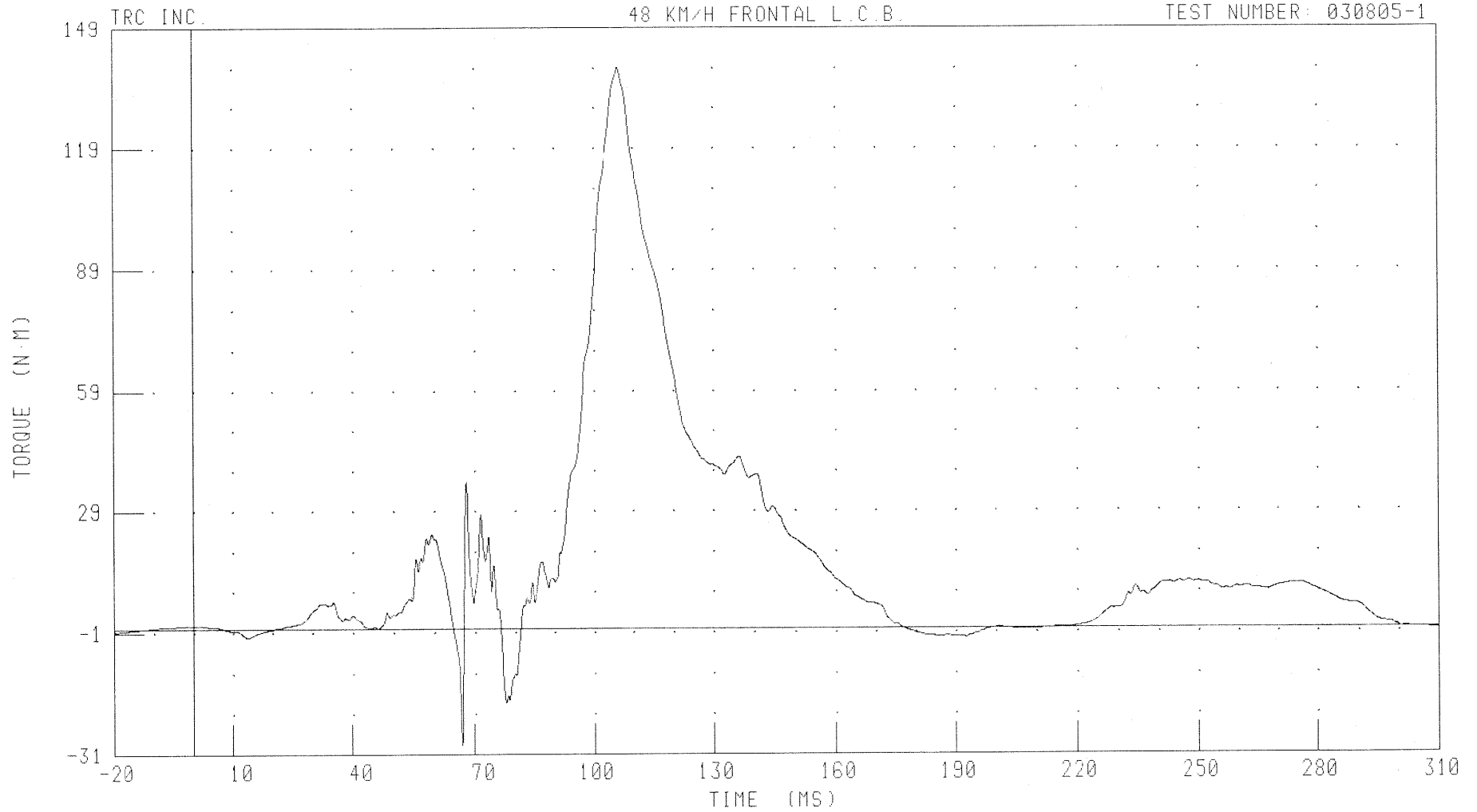
B-151

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER RIGHT LOWER TIBIA MOMENT ABOUT Y AXIS

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ANRYM2 FILTER: CH CLASS 600

PEAK DATA: 139.04 N.M @ 106.40 MS, -28.82 N.M @ 66.88 MS

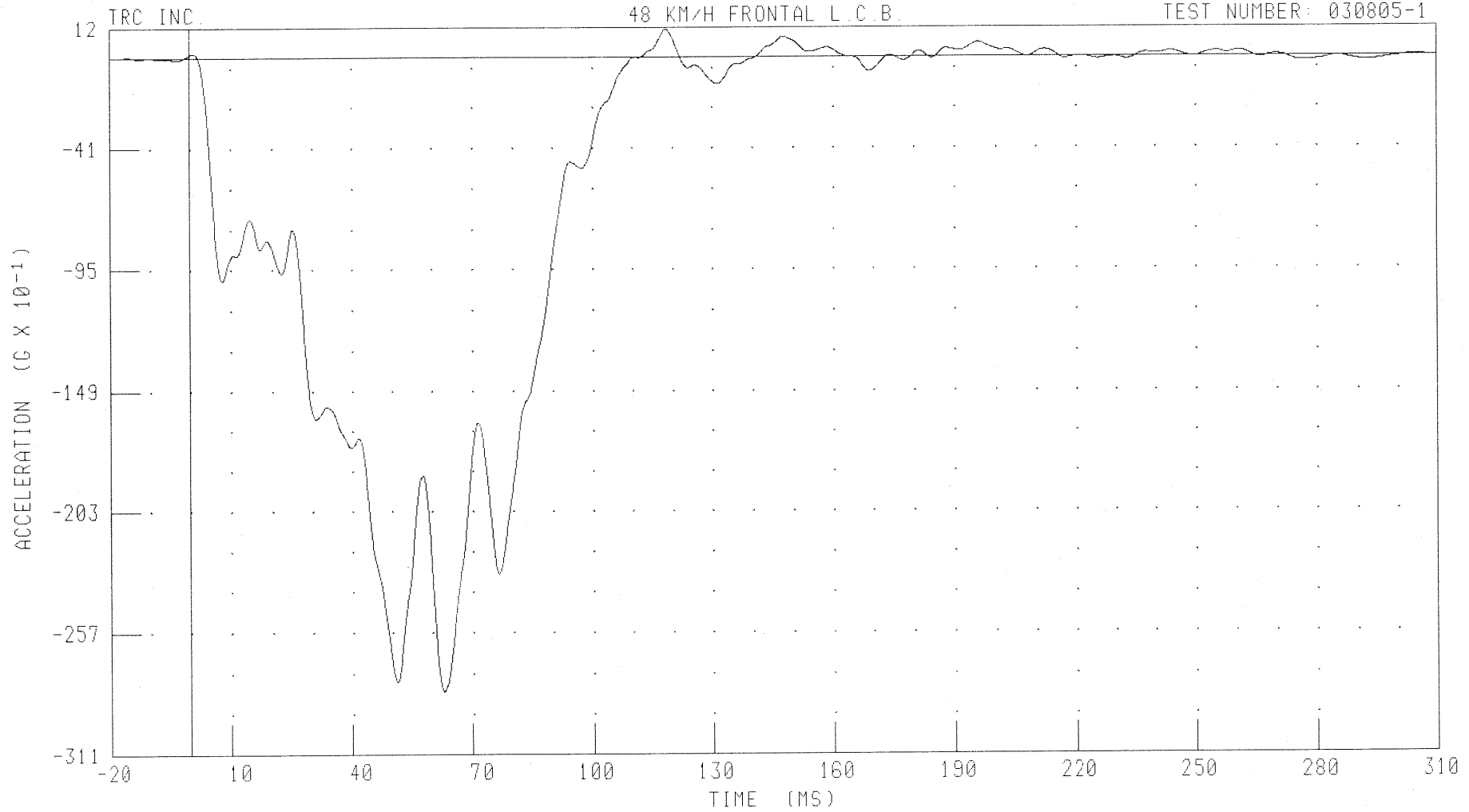
B-152

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LEFT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: LRSXG1 FILTER: CH. CLASS 60

PEAK DATA: 1.23 G @ 118.48 MS, -28.30 G @ 62.88 MS

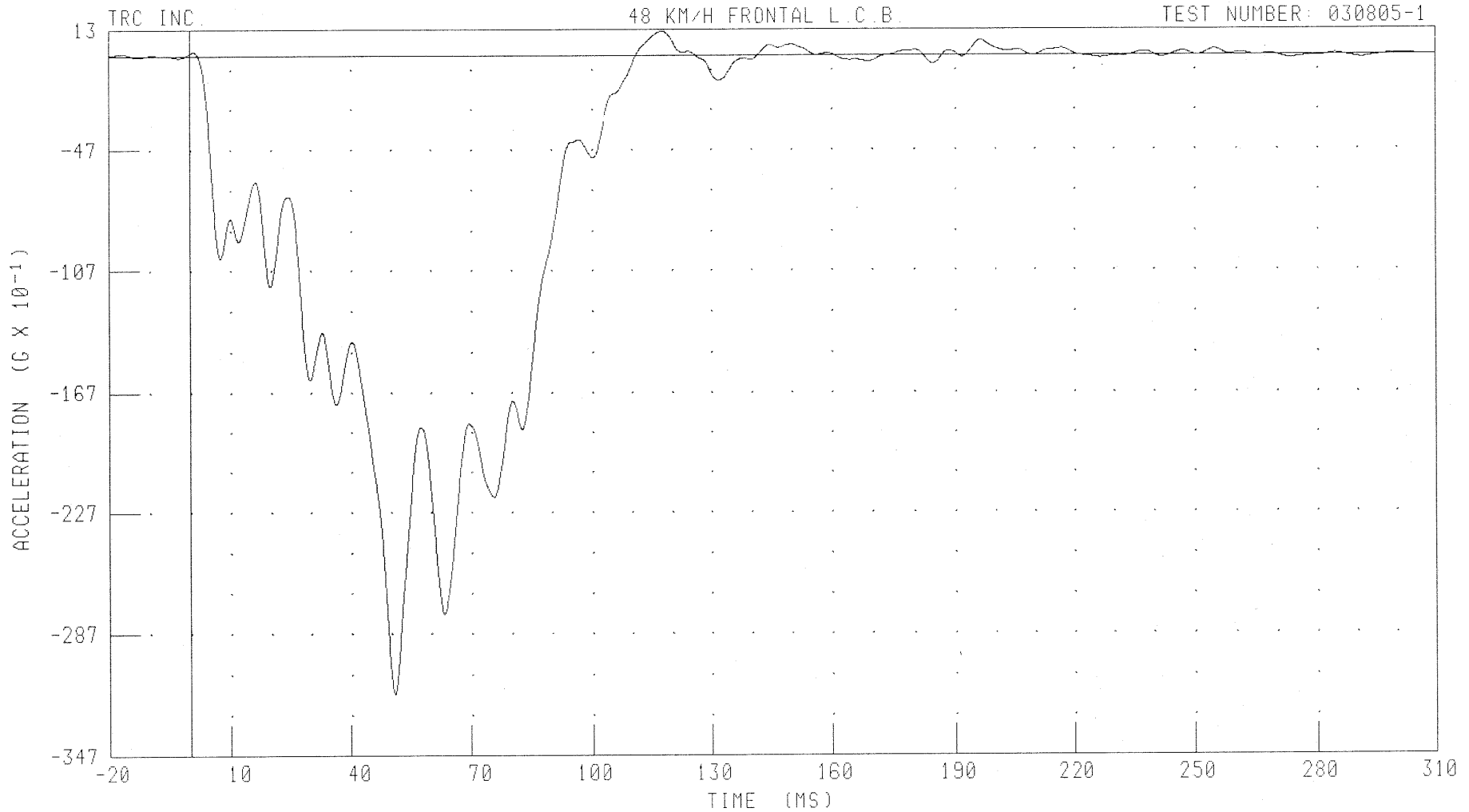
B-153

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
RIGHT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: RRSXG1 FILTER: CH. CLASS 60

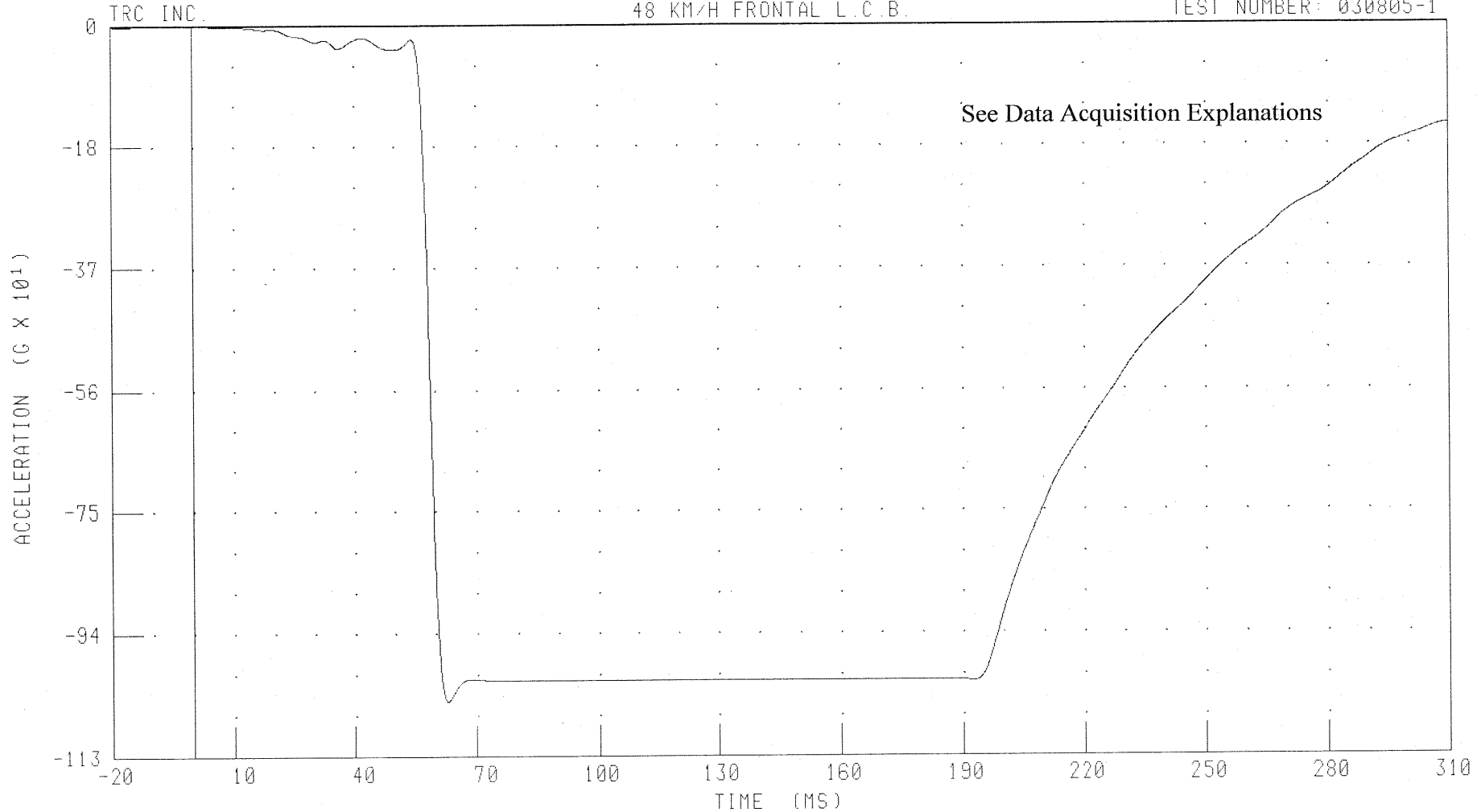
PEAK DATA: 1.21 G @ 117.68 MS; -31.66 G @ 50.88 MS

B-154

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
FRONT BRAKE CALIPER LEFT X-AXIS ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



See Data Acquisition Explanations

CHANNEL: BCLXG1 FILTER: CH CLASS 60

PEAK DATA 1.39 G @ -1.84 MS; -1053.06 G @ 63.04 MS

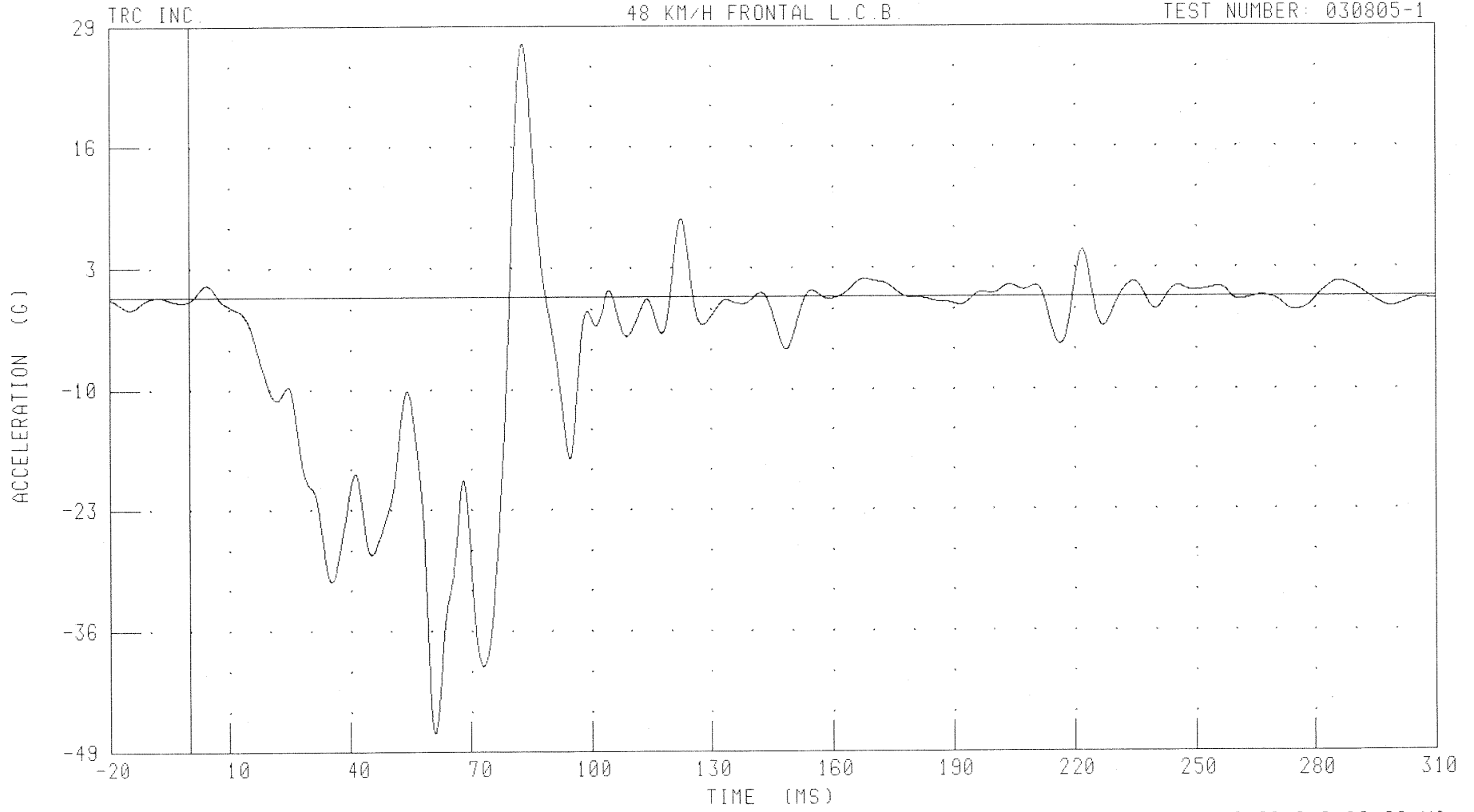
B-155

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
FRONT BRAKE CALIPER RIGHT X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BCRXG1 FILTER: CH. CLASS 60

PEAK DATA: 27.19 G @ 82.88 MS; -46.98 G @ 60.96 MS

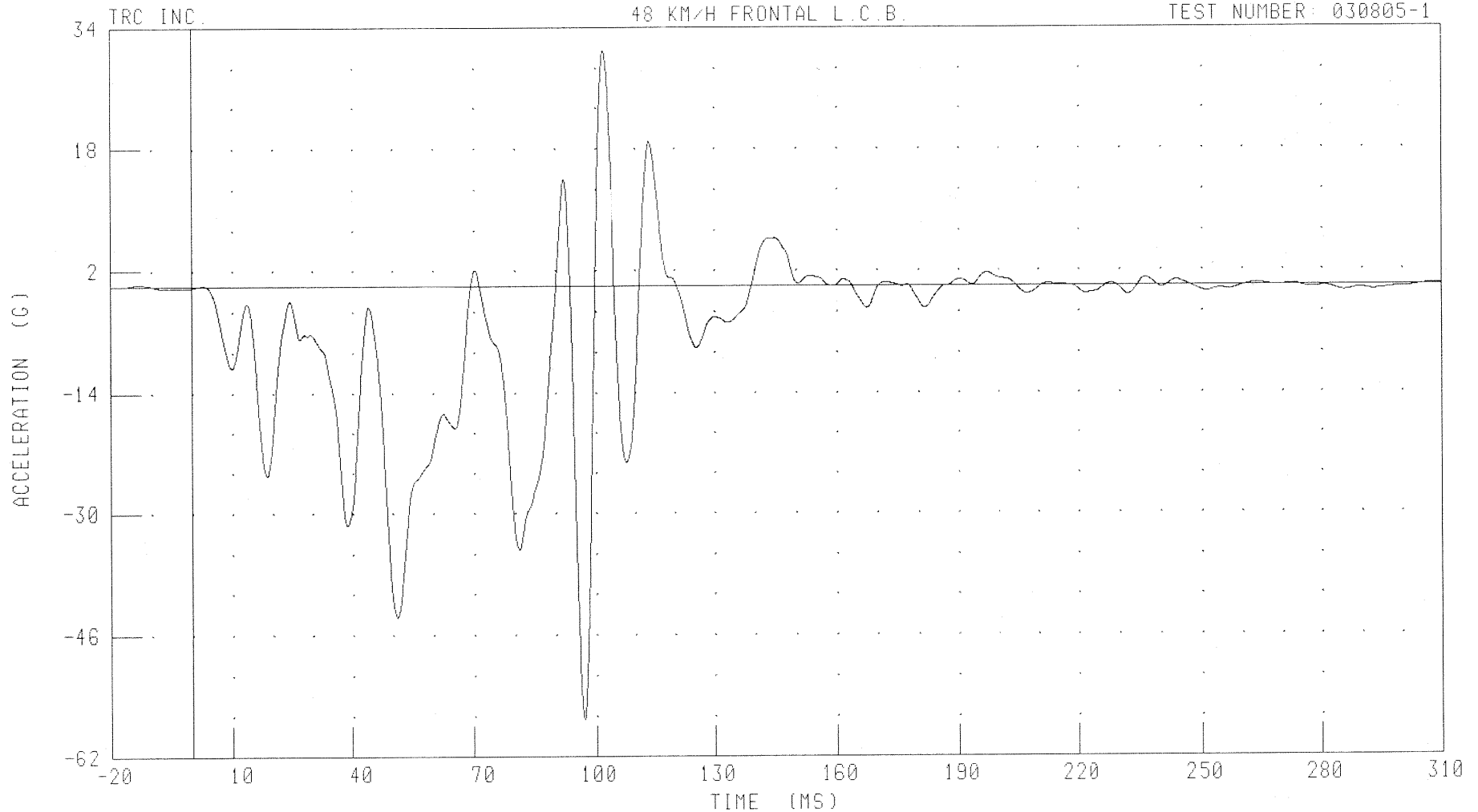
B-156

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
DASH PANEL CENTER X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: DPCXG1

FILTER: CH. CLASS 60

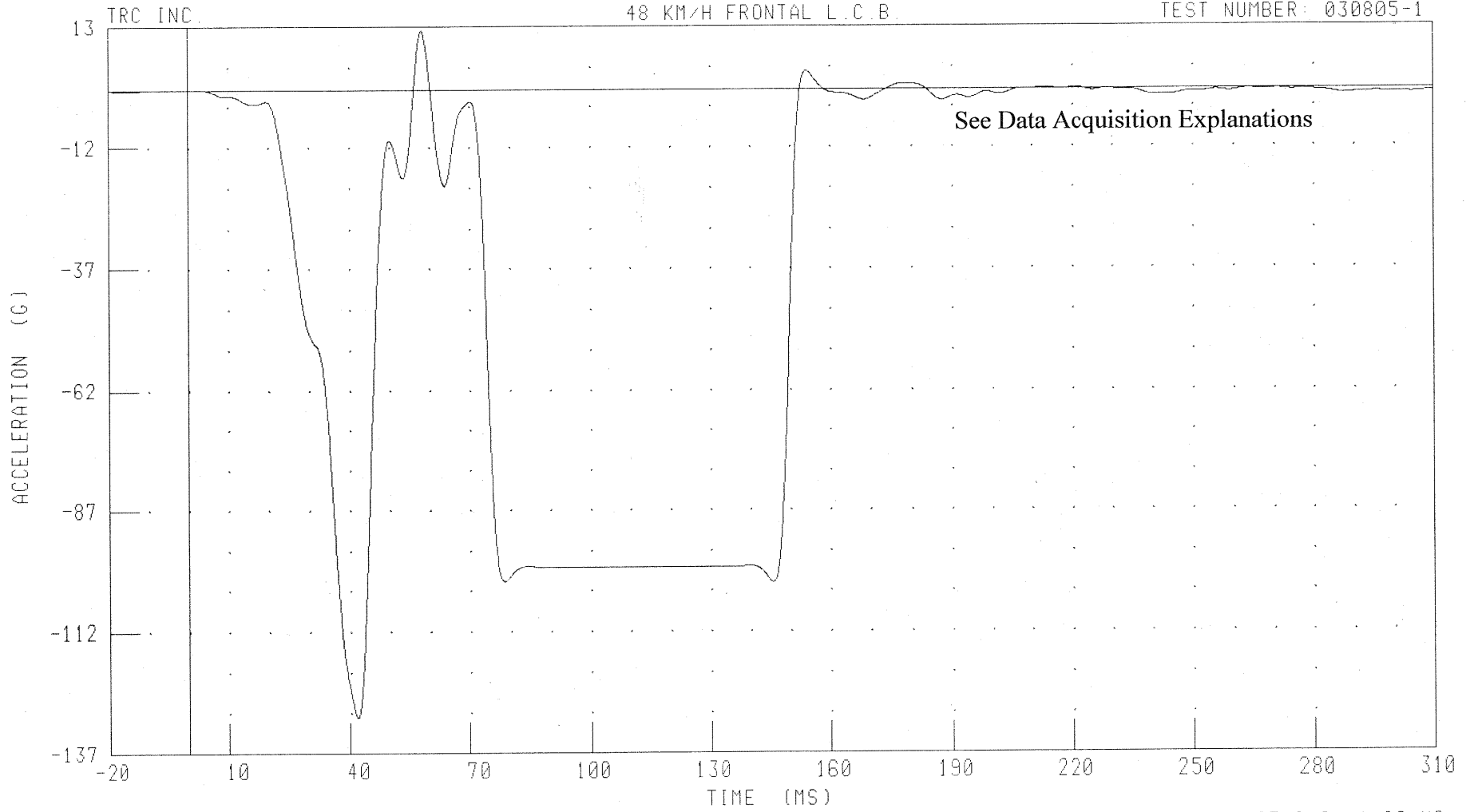
PEAK DATA: 30.97 G @ 102.08 MS; -57.07 G @ 97.04 MS

B-157

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
ENGINE TOP X-AXIS ACCELERATION
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ENGX01 FILTER: CH CLASS 60

PEAK DATA: 12.15 G @ 58.16 MS, -129.67 G @ 41.92 MS

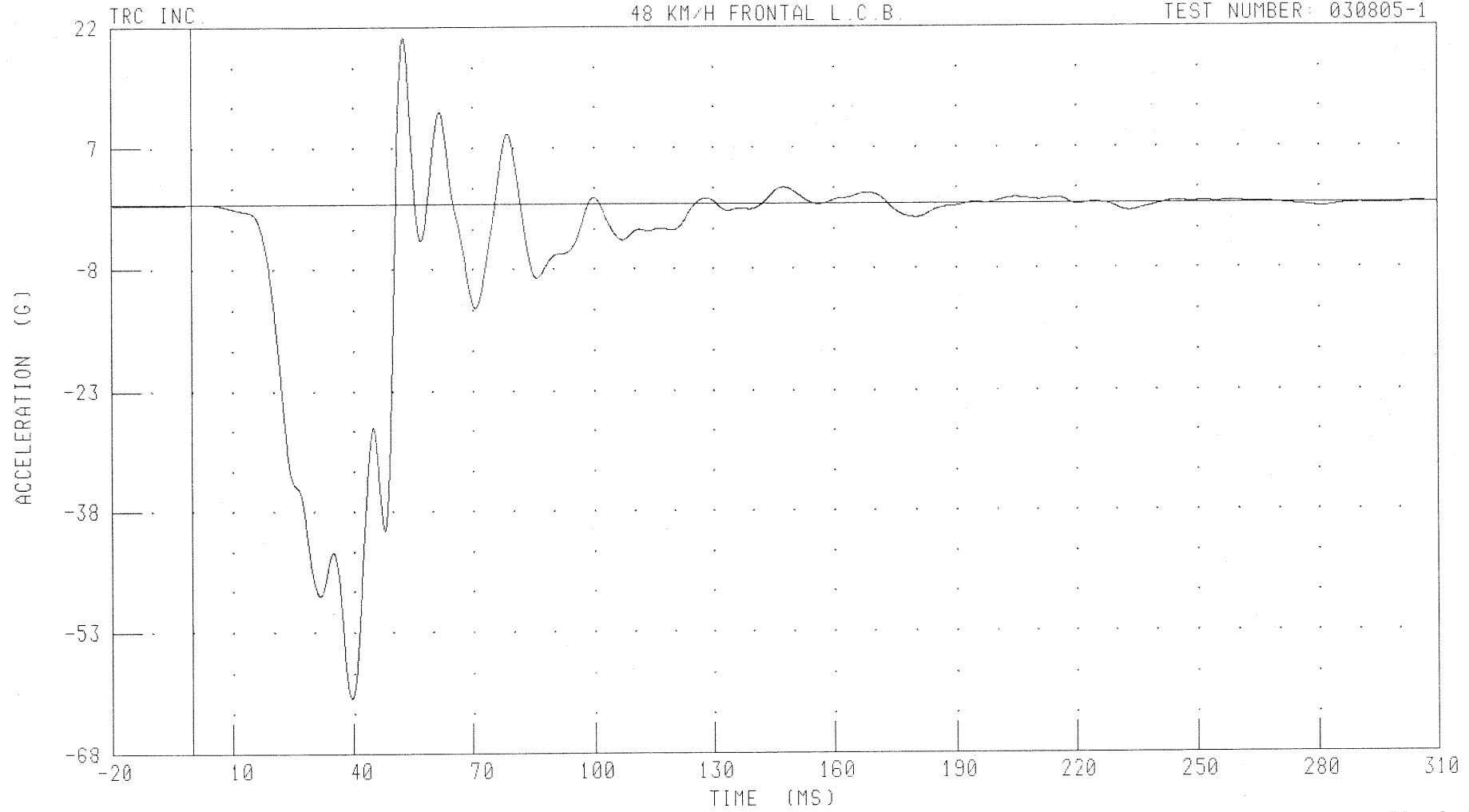
B-158

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
ENGINE BOTTOM X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: ENGXC2 FILTER: CH. CLASS 60

PEAK DATA: 20.75 G @ 52.88 MS; -61.18 G @ 39.52 MS

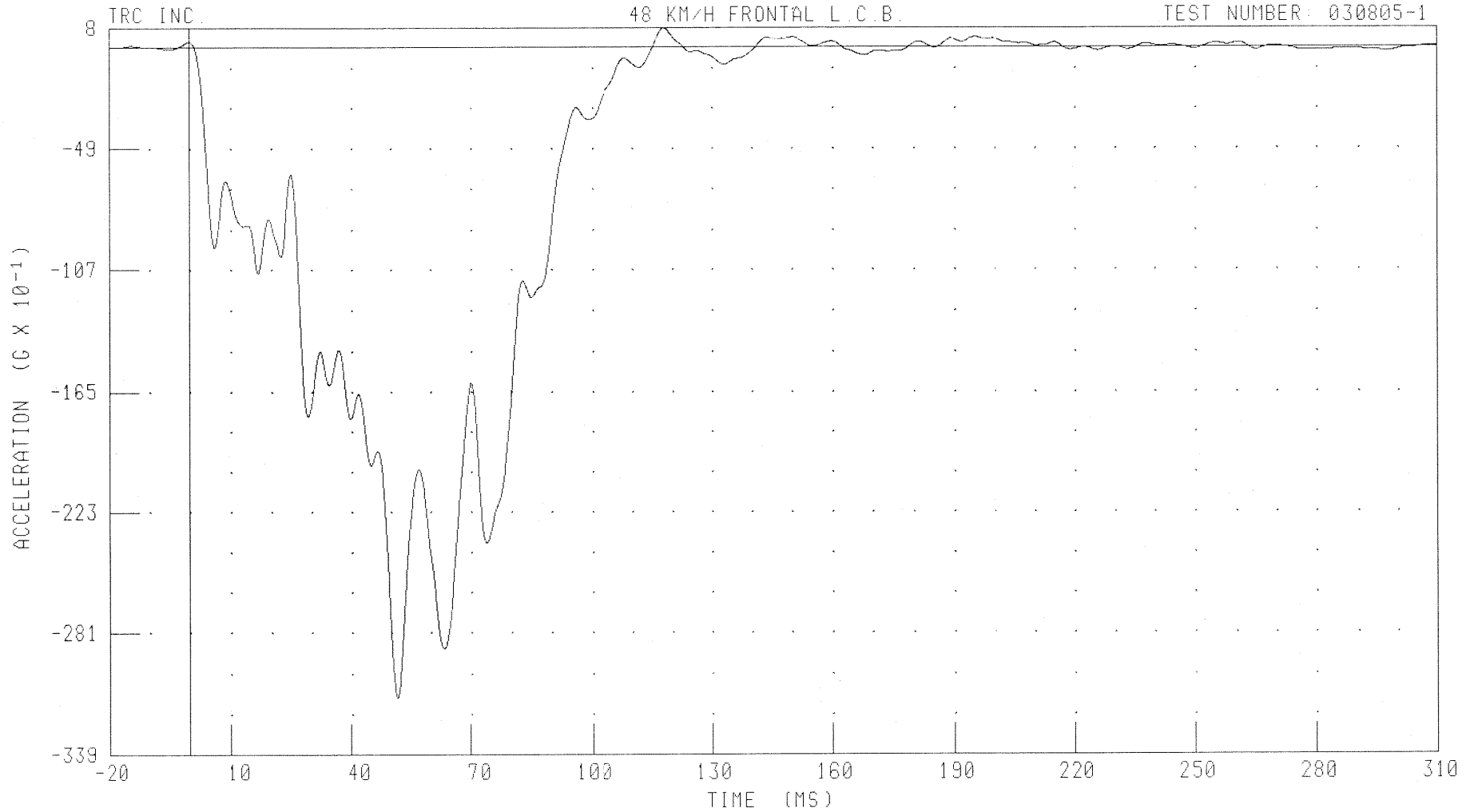
B-159

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
TOEPAN NEXT TO ACCELERATOR X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TPAXG1

FILTER: CH. CLASS 60

PEAK DATA: 0.90 G @ 118.00 MS; -31.19 G @ 51.68 MS

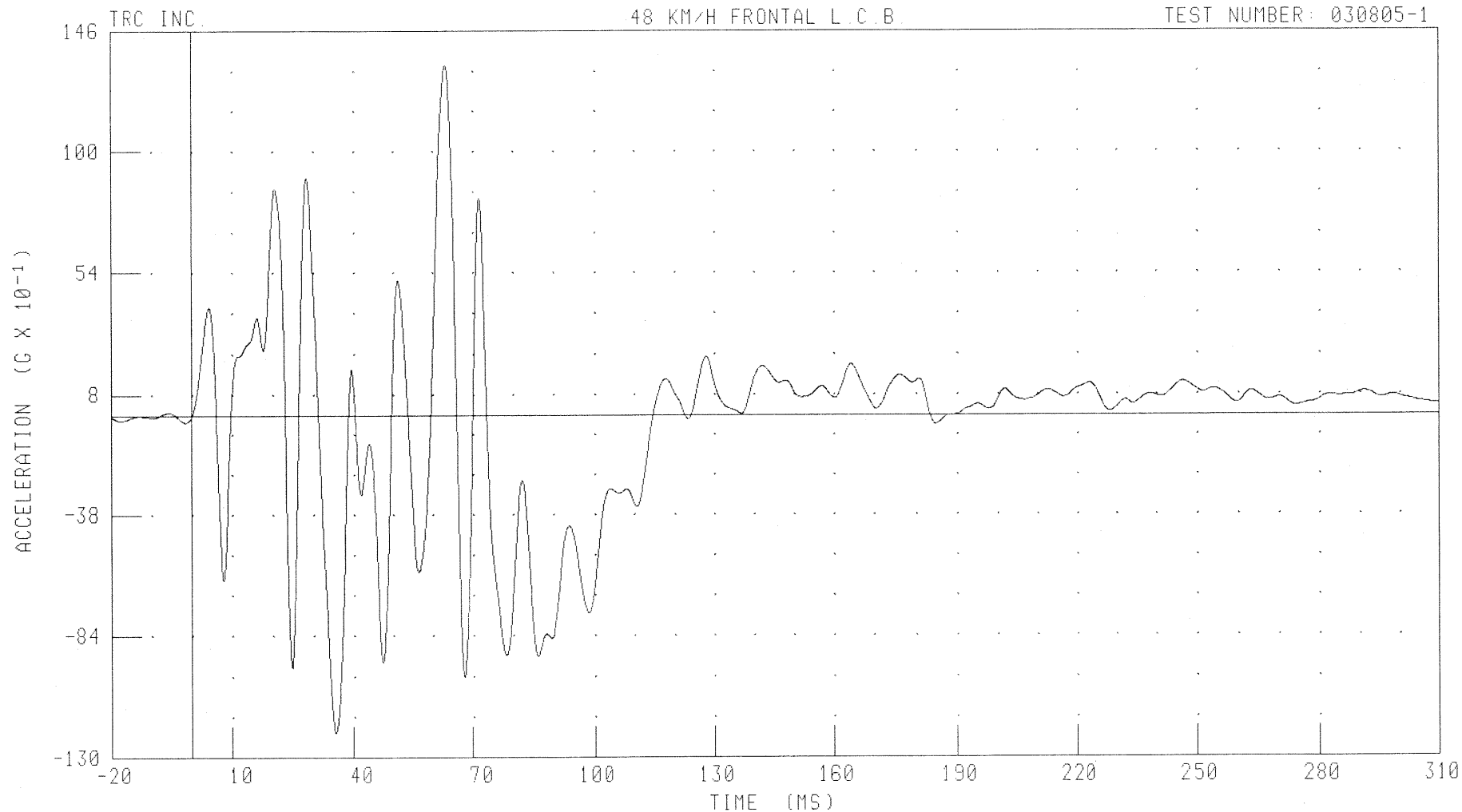
B-160

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
TOEPAN NEXT TO ACCELERATOR Z-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TPAZG1 FILTER: CH CLASS 60

PEAK DATA: 13.30 G @ 63.28 MS; -12.06 G @ 35.52 MS

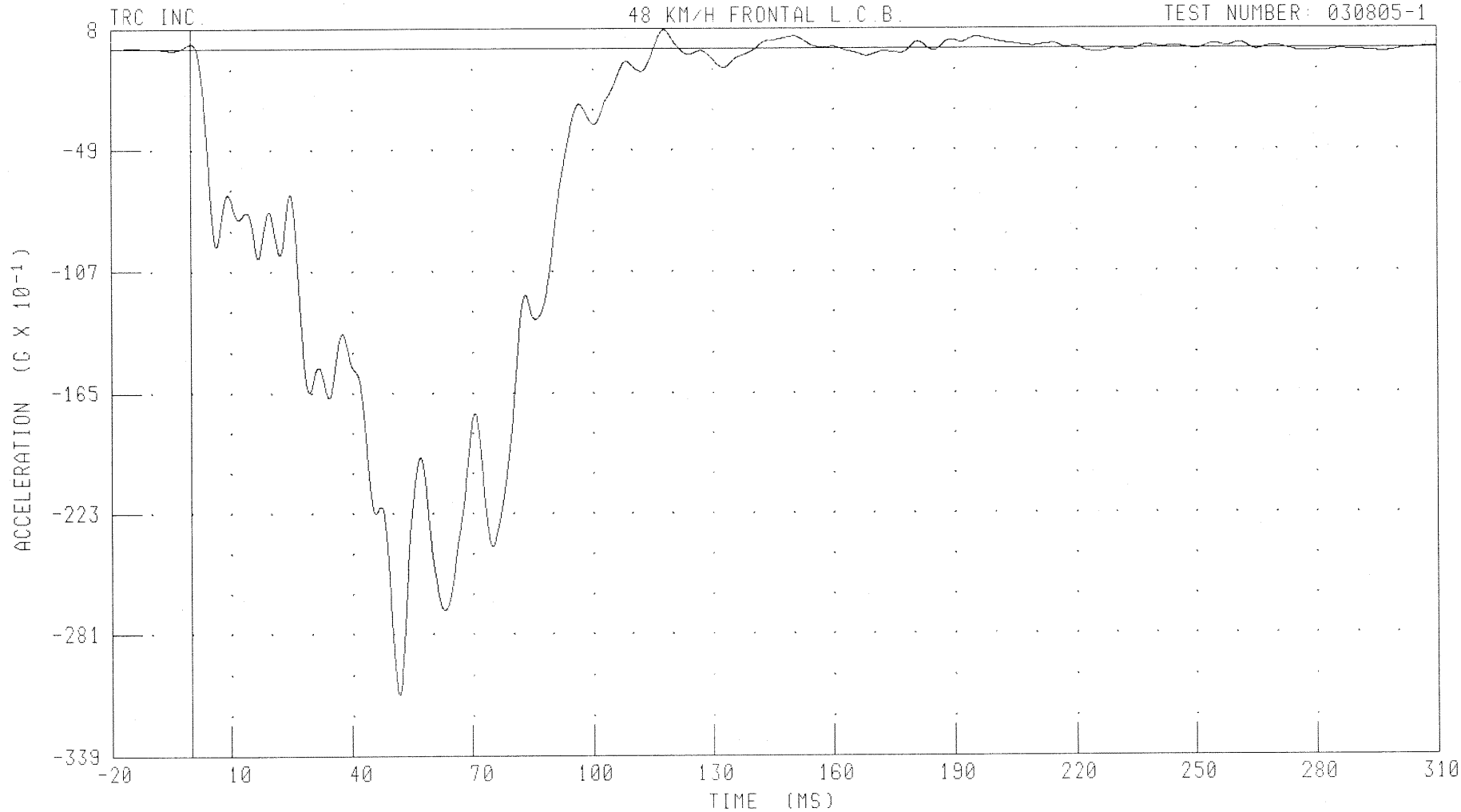
B-161

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
TOEPAN NEXT TO FOOTREST X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TPFXG1 FILTER: CH. CLASS 60

PEAK DATA: 0.86 G @ 118.16 MS; -30.97 G @ 51.68 MS

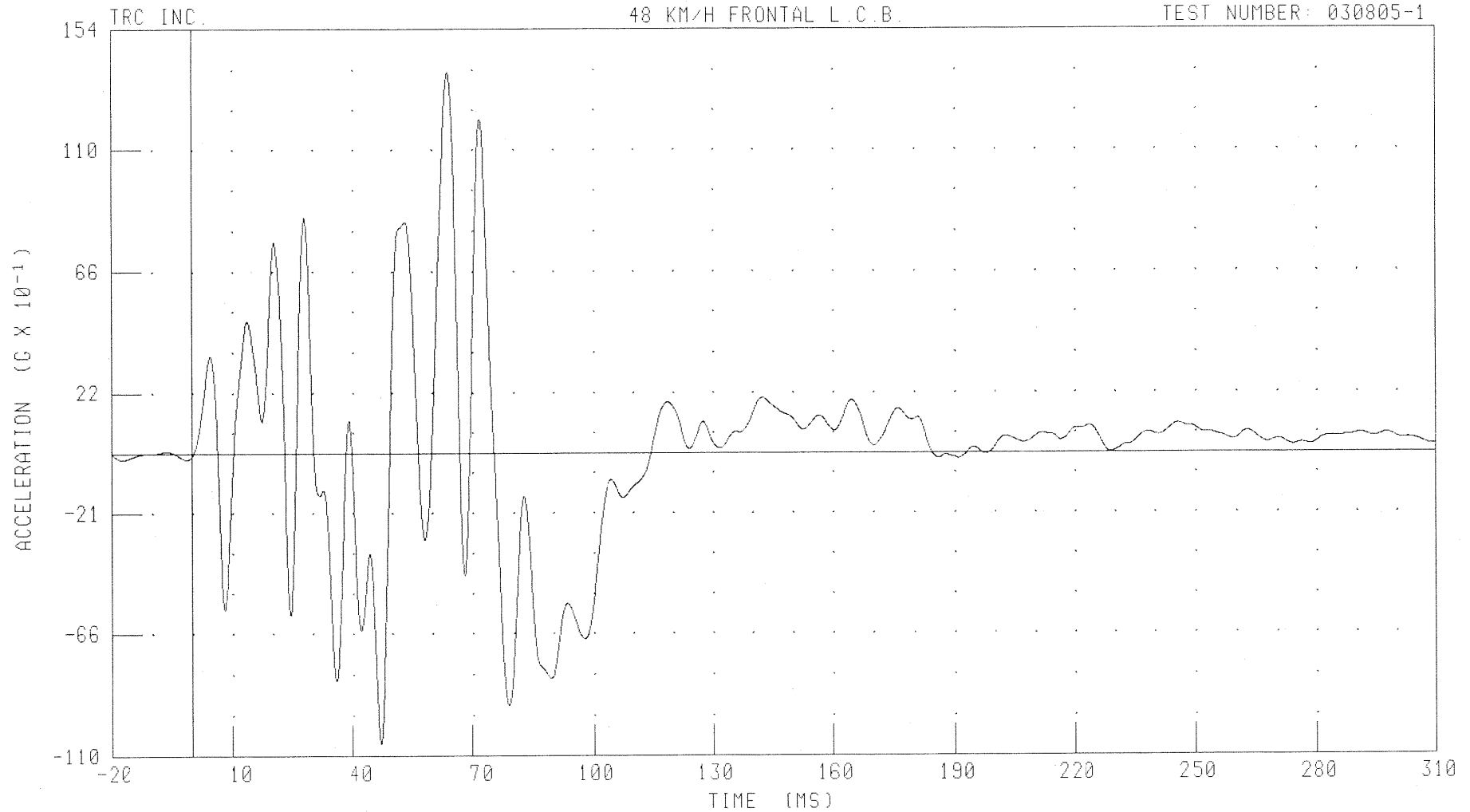
B-162

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
TOEPAN NEXT TO FOOTREST Z-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: TPFZG1 FILTER: CH. CLASS 60

PEAK DATA: 13.85 G @ 64.00 MS; -10.55 G @ 47.12 MS

B-163

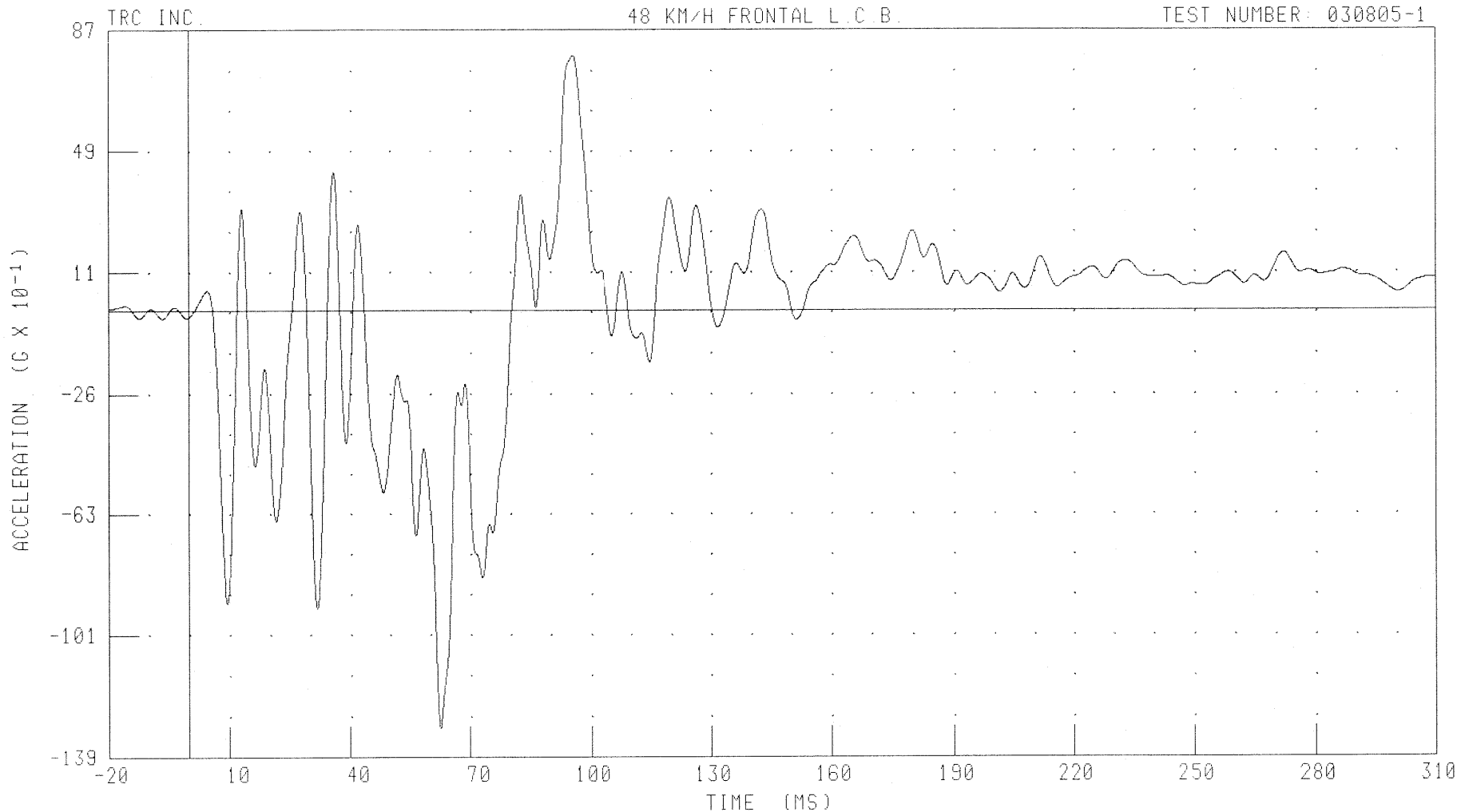
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

REAR DECK Z-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: RDKZG1

FILTER: CH. CLASS 60

PEAK DATA: 8.01 G @ 95.68 MS; -13.11 G @ 62.56 MS

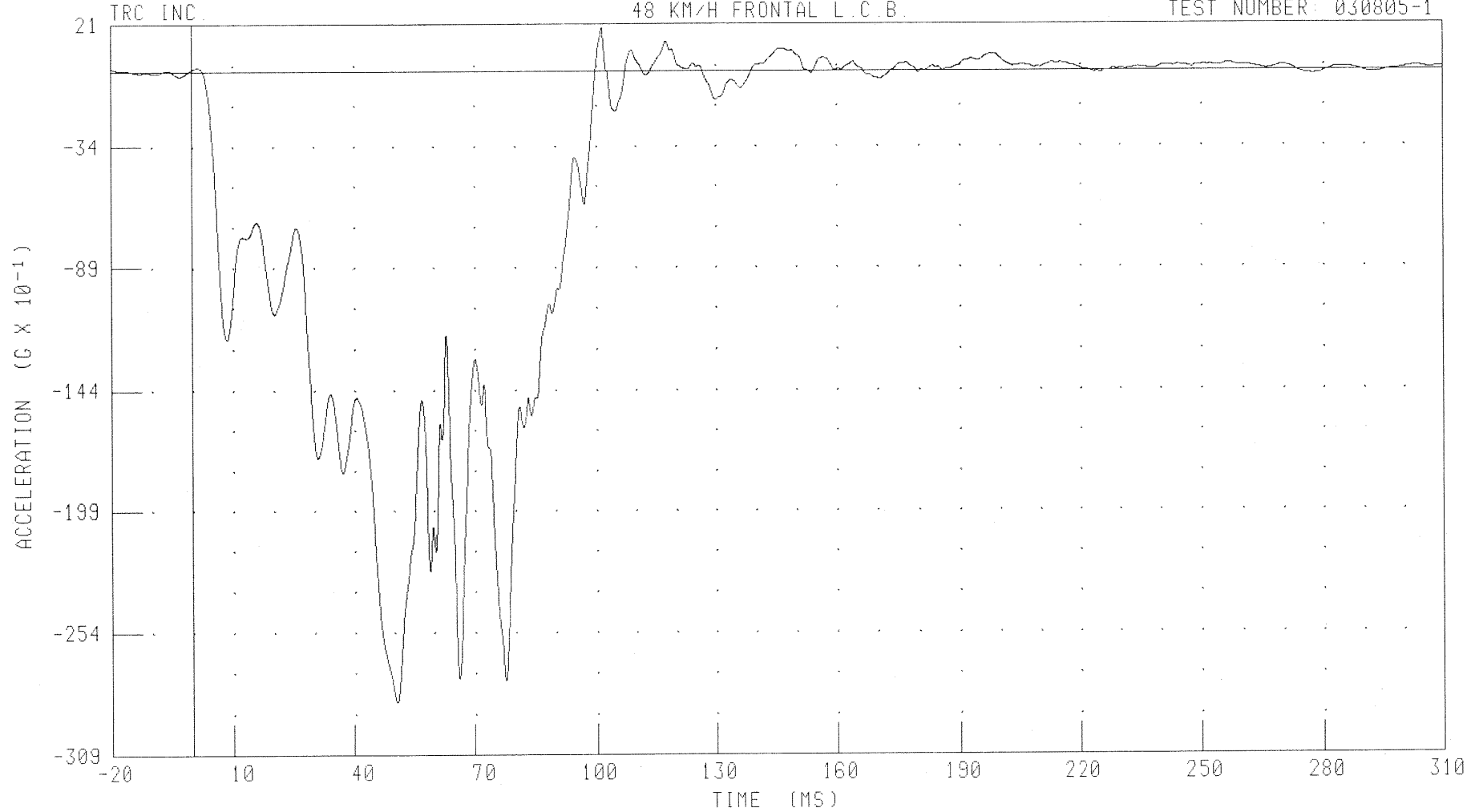
B-164

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
REAR COMPARTMENT CENTER X-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: RCCXG1

FILTER: CH. CLASS 60

PEAK DATA: 1.93 G @ 101.44 MS; -28.54 G @ 50.72 MS

B-165

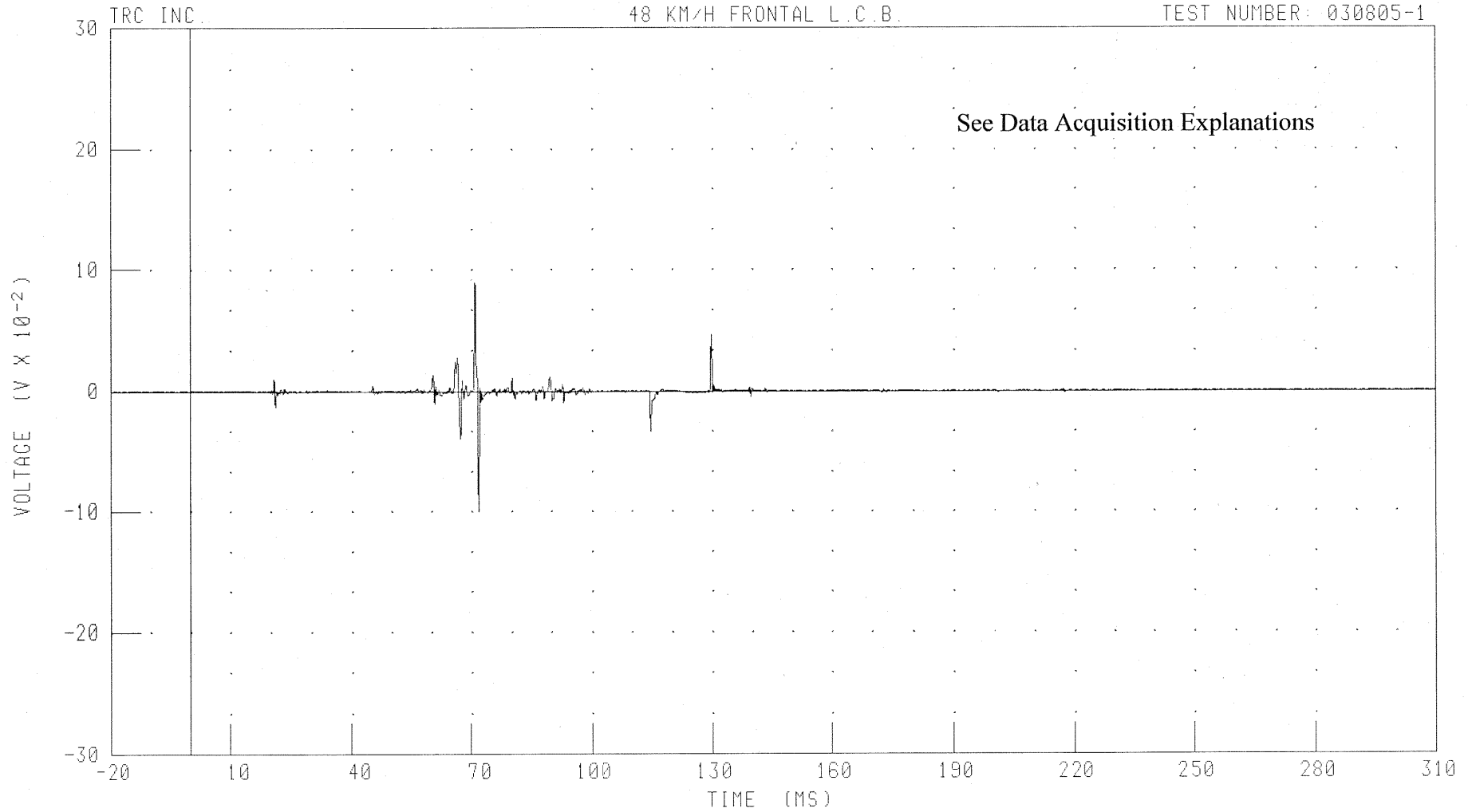
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER AIRBAG EVENT - WIRE A

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



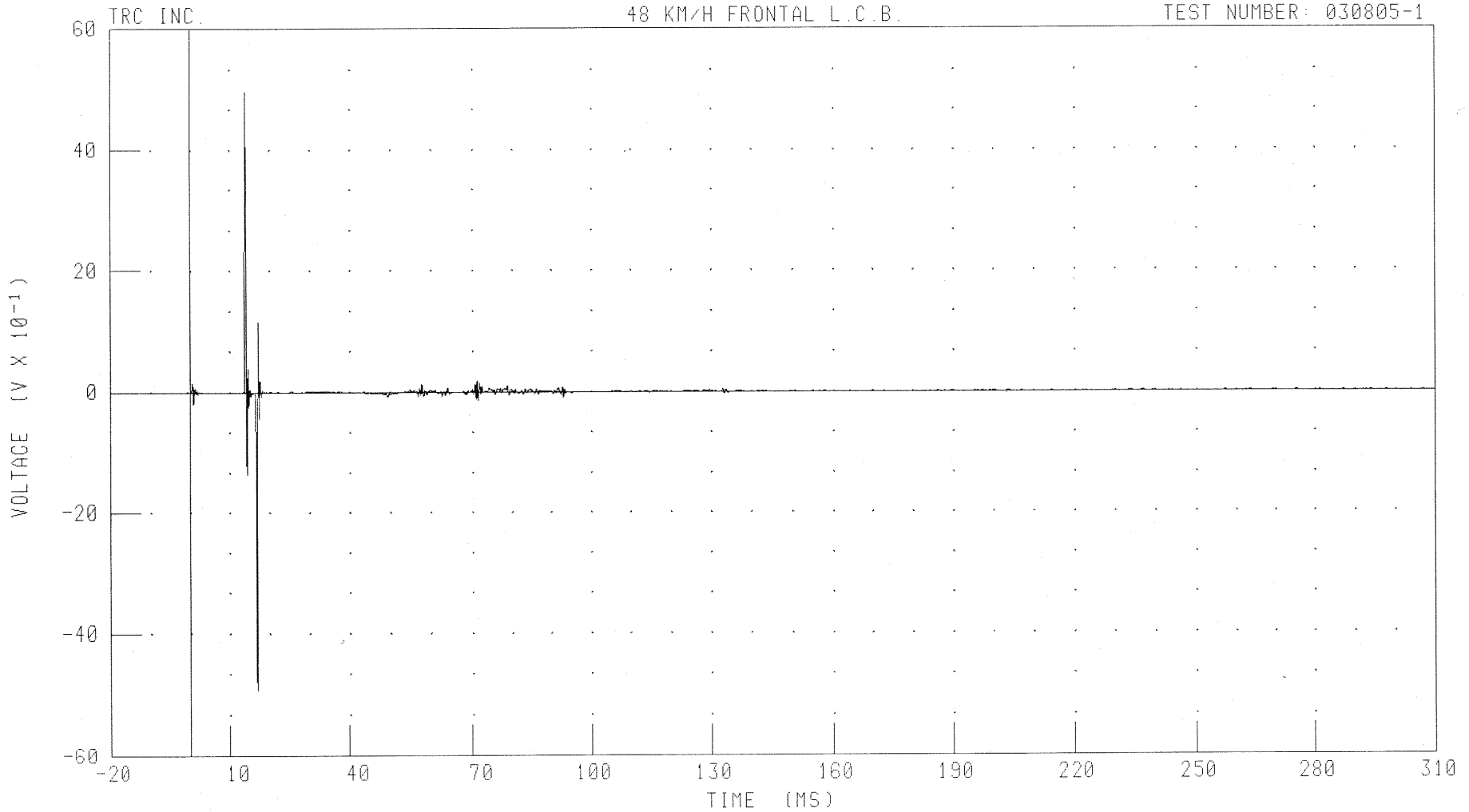
PEAK DATA: 0.09 V @ 70.96 MS; -0.10 V @ 71.84 MS

B-166

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
PASSENGER AIRBAG EVENT - WIRE A
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: PABET1 FILTER: CH. CLASS 1000

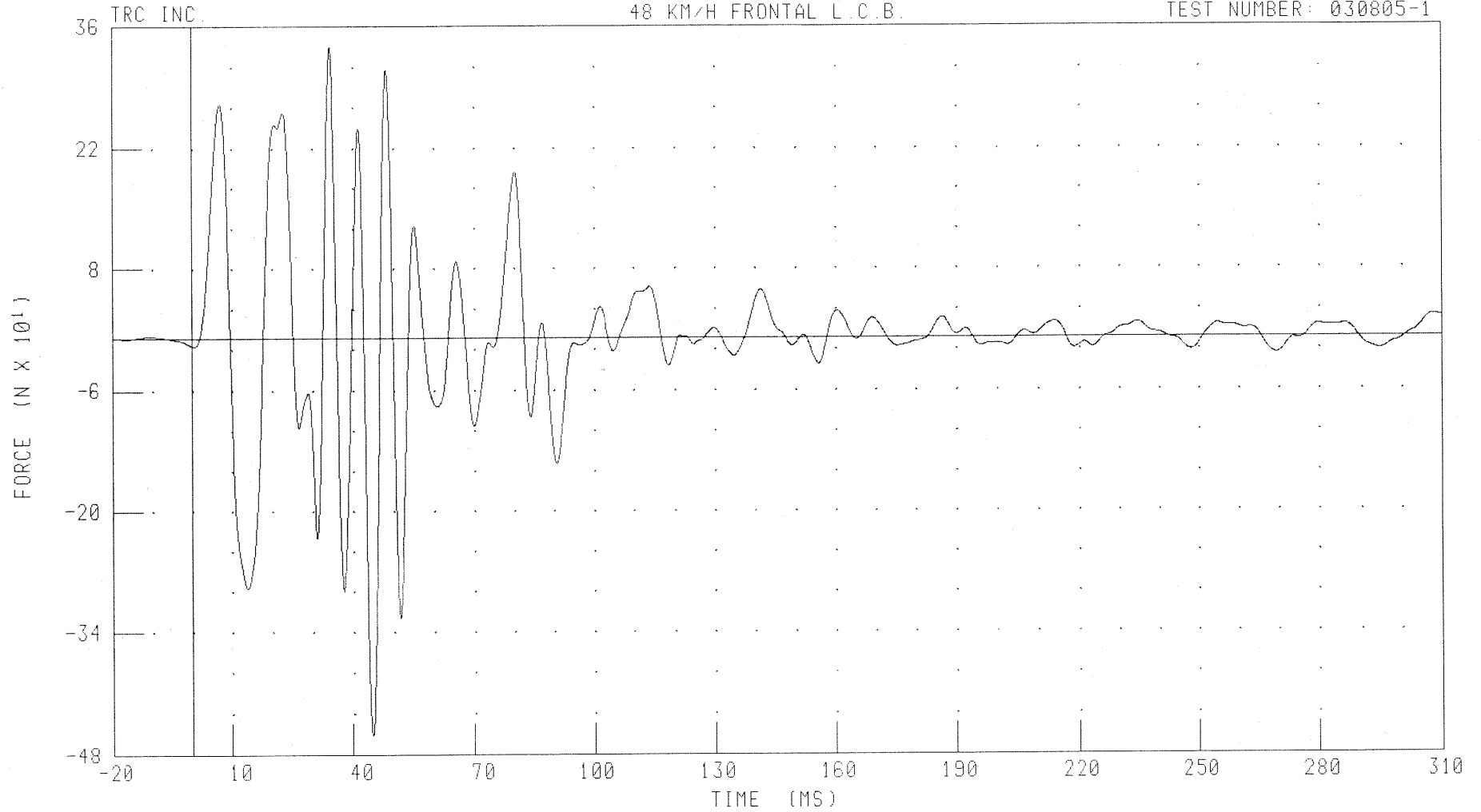
PEAK DATA: 4.98 V @ 14.08 MS; -4.93 V @ 16.96 MS

B-167

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION A1 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BA1F

FILTER: CH. CLASS 60

PEAK DATA: 336.18 N @ 34.48 MS; -457.95 N @ 44.80 MS

B-168

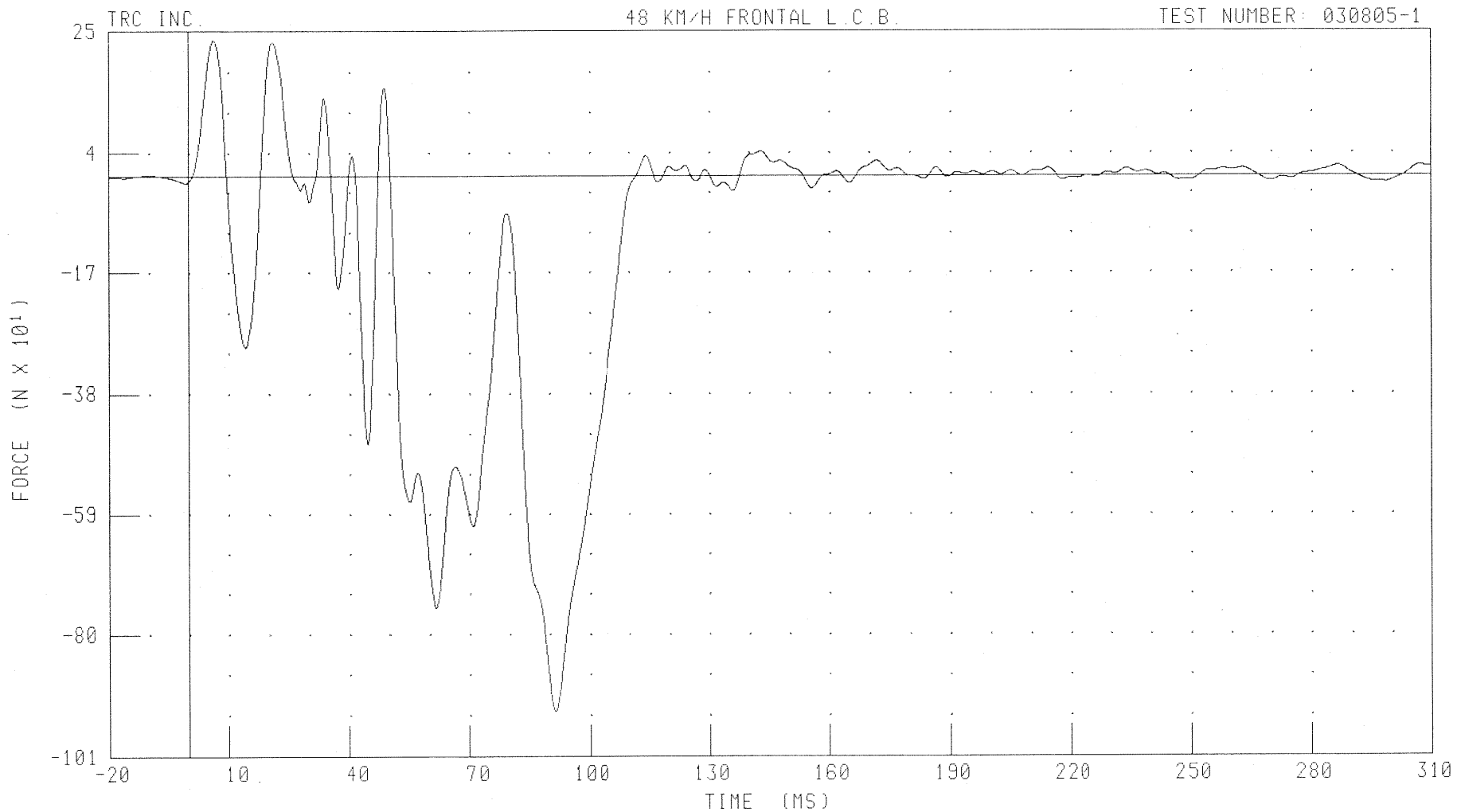
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER POSITION A2 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BA2F

FILTER: CH. CLASS 60

PEAK DATA: 234 08 N @ 6.32 MS; -933.51 N @ 91.44 MS

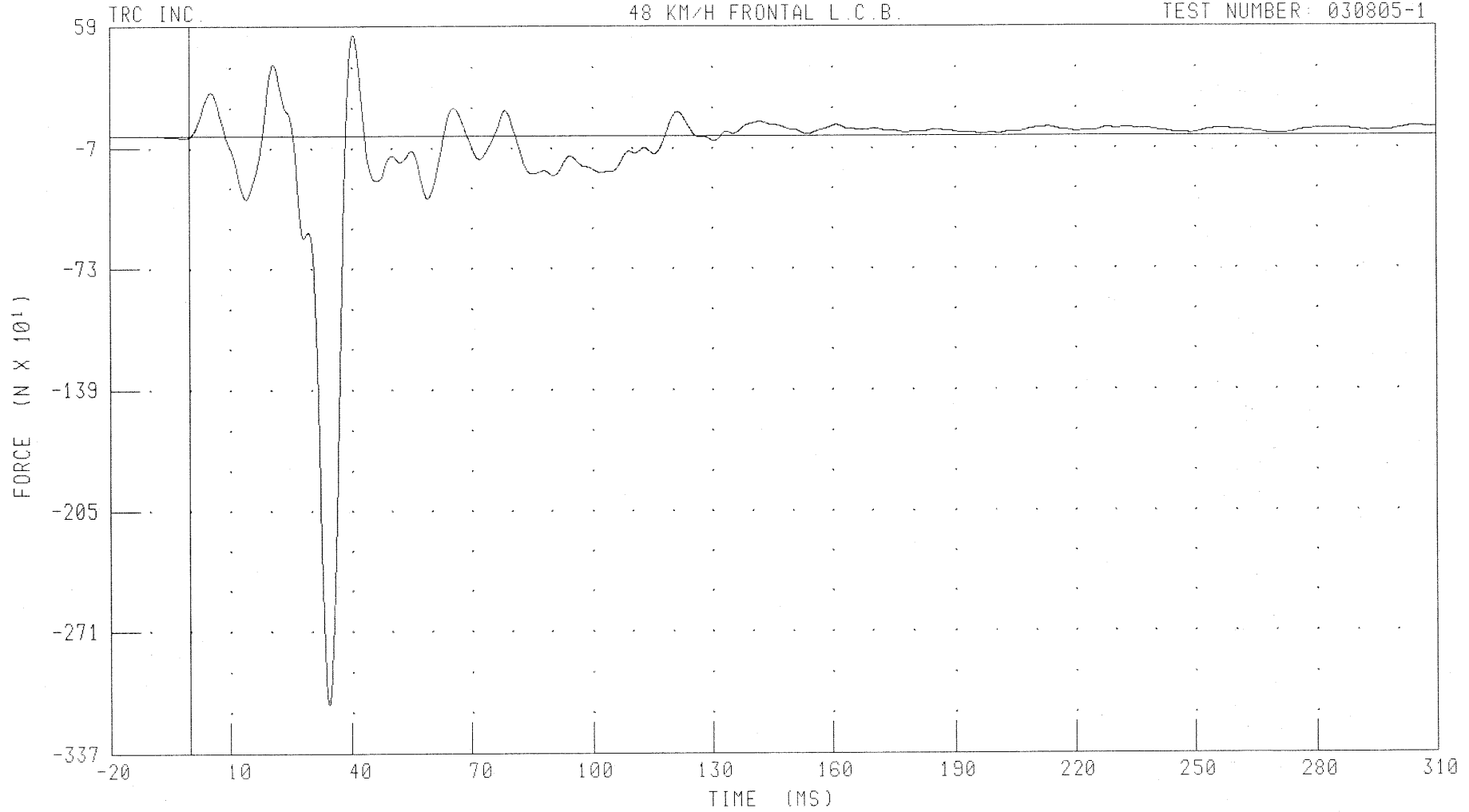
B-169

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION A3 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BA3F

FILTER: CH. CLASS 60

PEAK DATA: 542.96 N @ 40.48 MS; -3109.59 N @ 34.32 MS

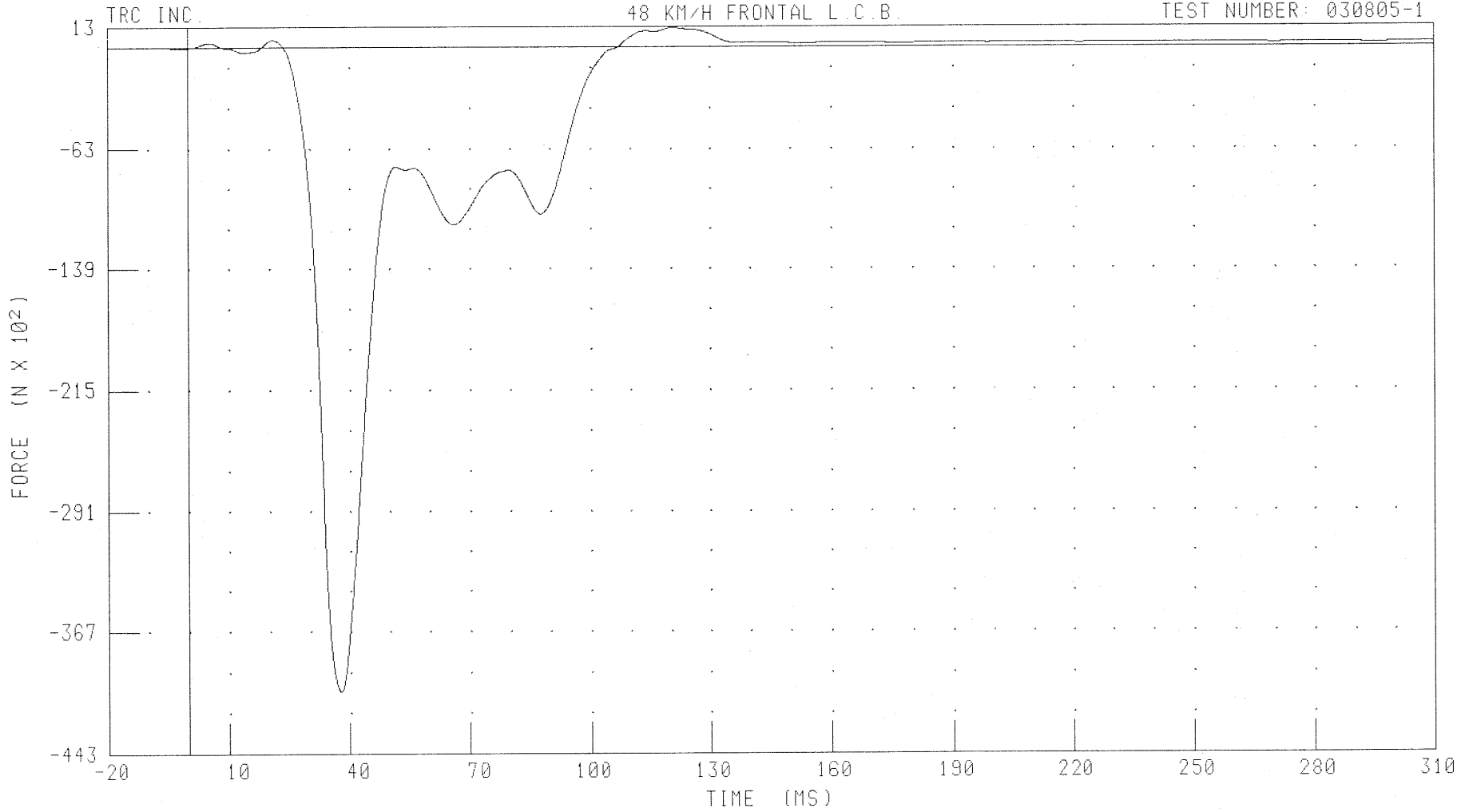
B-170

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION A4 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BA4F

FILTER: CH. CLASS 60

TIME (MS)

PEAK DATA: 1248.27 N @ 120.72 MS; -40471.34 N @ 37.76 MS

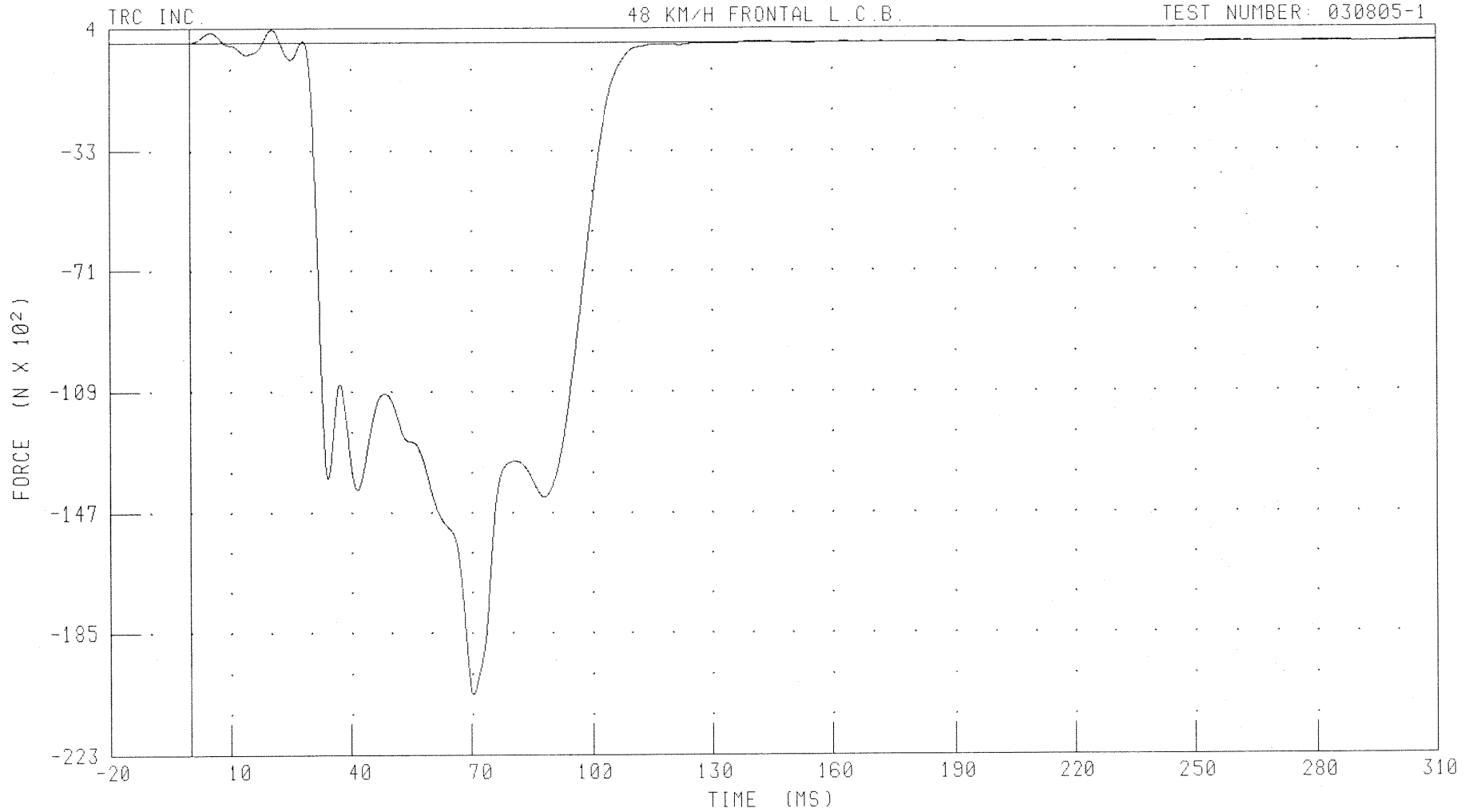
B-171

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION A5 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BA5F

FILTER: CH. CLASS 60

PEAK DATA: 404.04 N @ 20.56 MS; -2047.13 N @ 70.40 MS

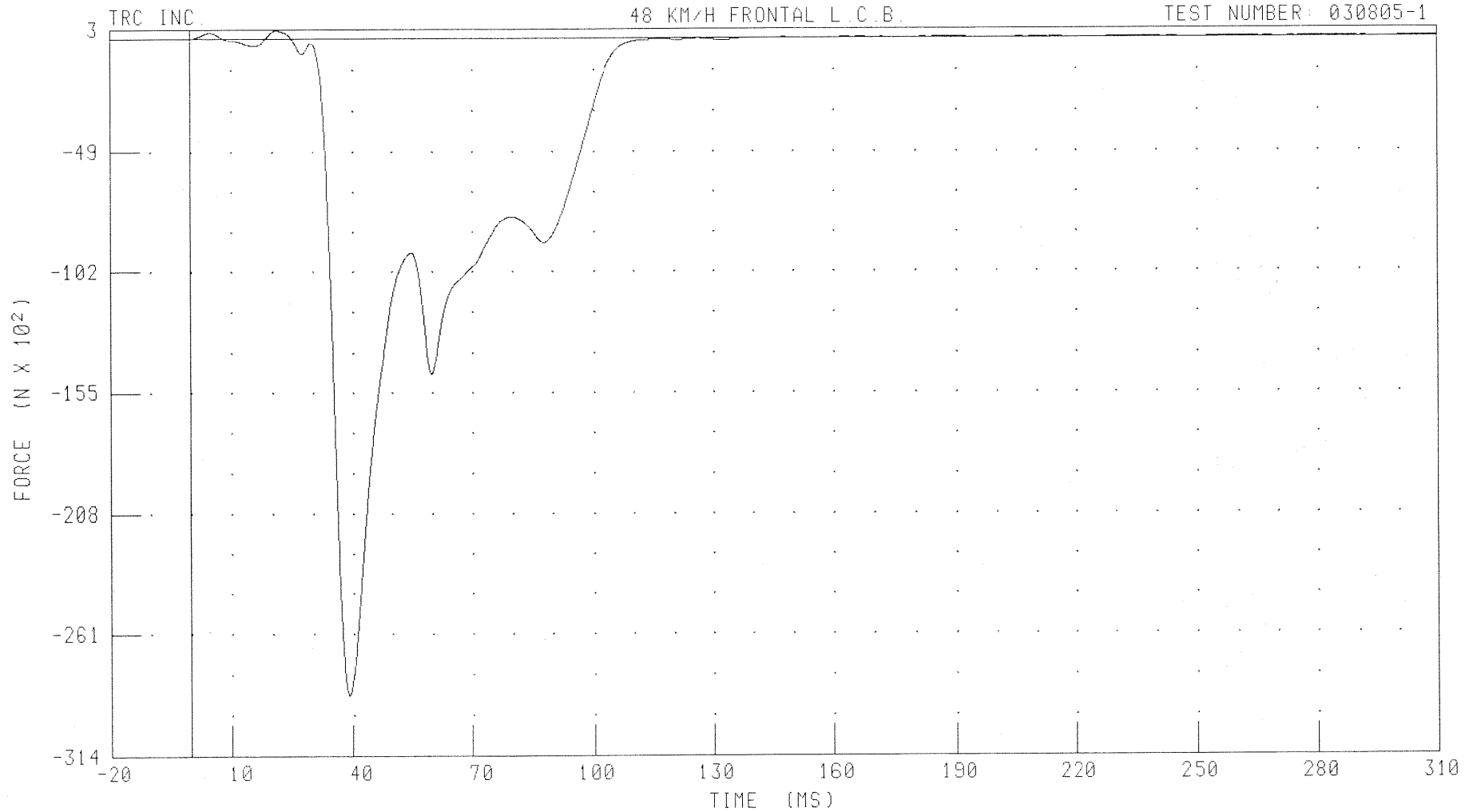
B-172

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION A6 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BA6F

FILTER: CH. CLASS 60

PEAK DATA: 356.88 N @ 21.20 MS; -28768.36 N @ 39.12 MS

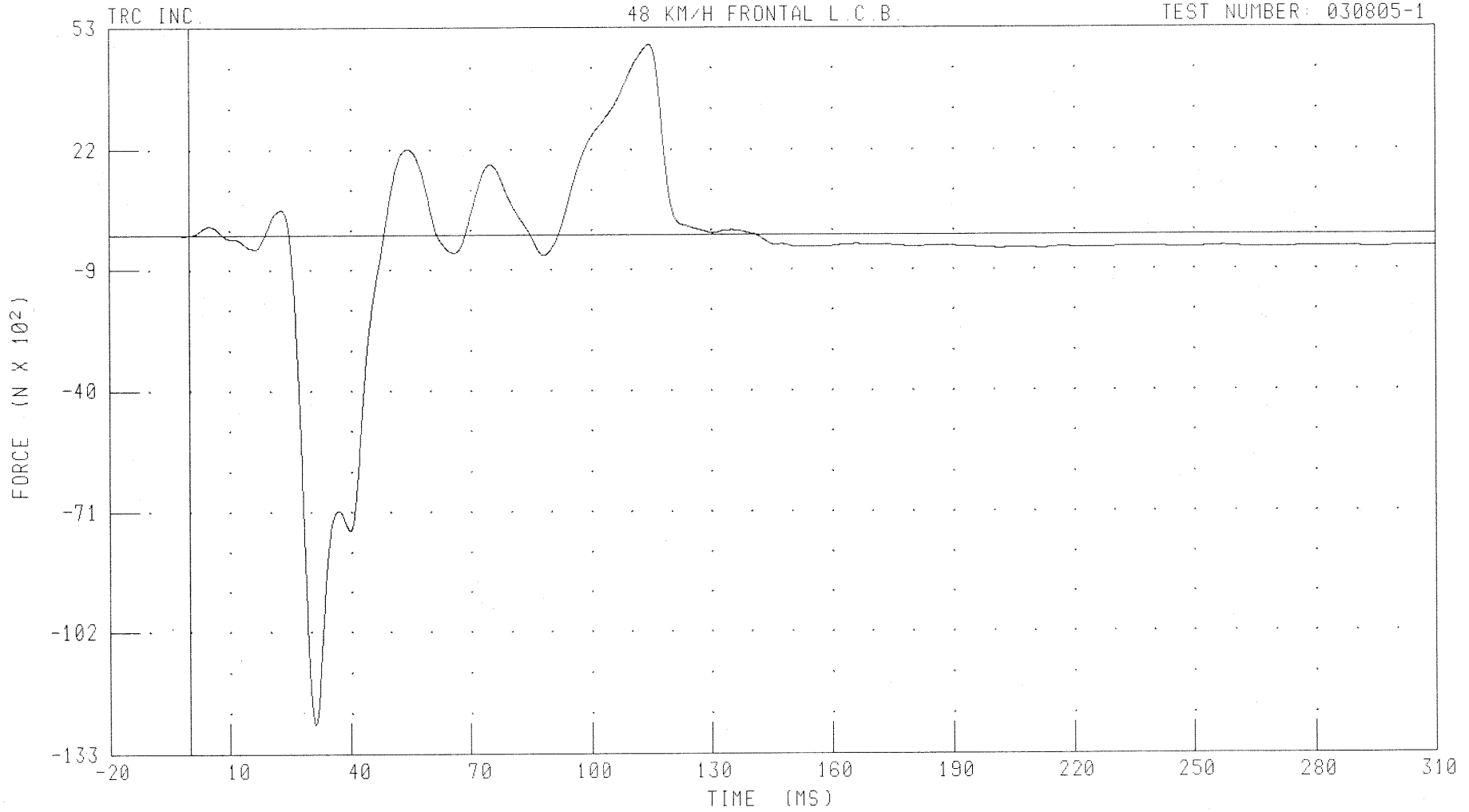
B-173

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION A7 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BA7F

FILTER: CH. CLASS 60

TIME (MS)

PEAK DATA: 4852.58 N @ 114.56 MS; -1257.65 N @ 31.12 MS

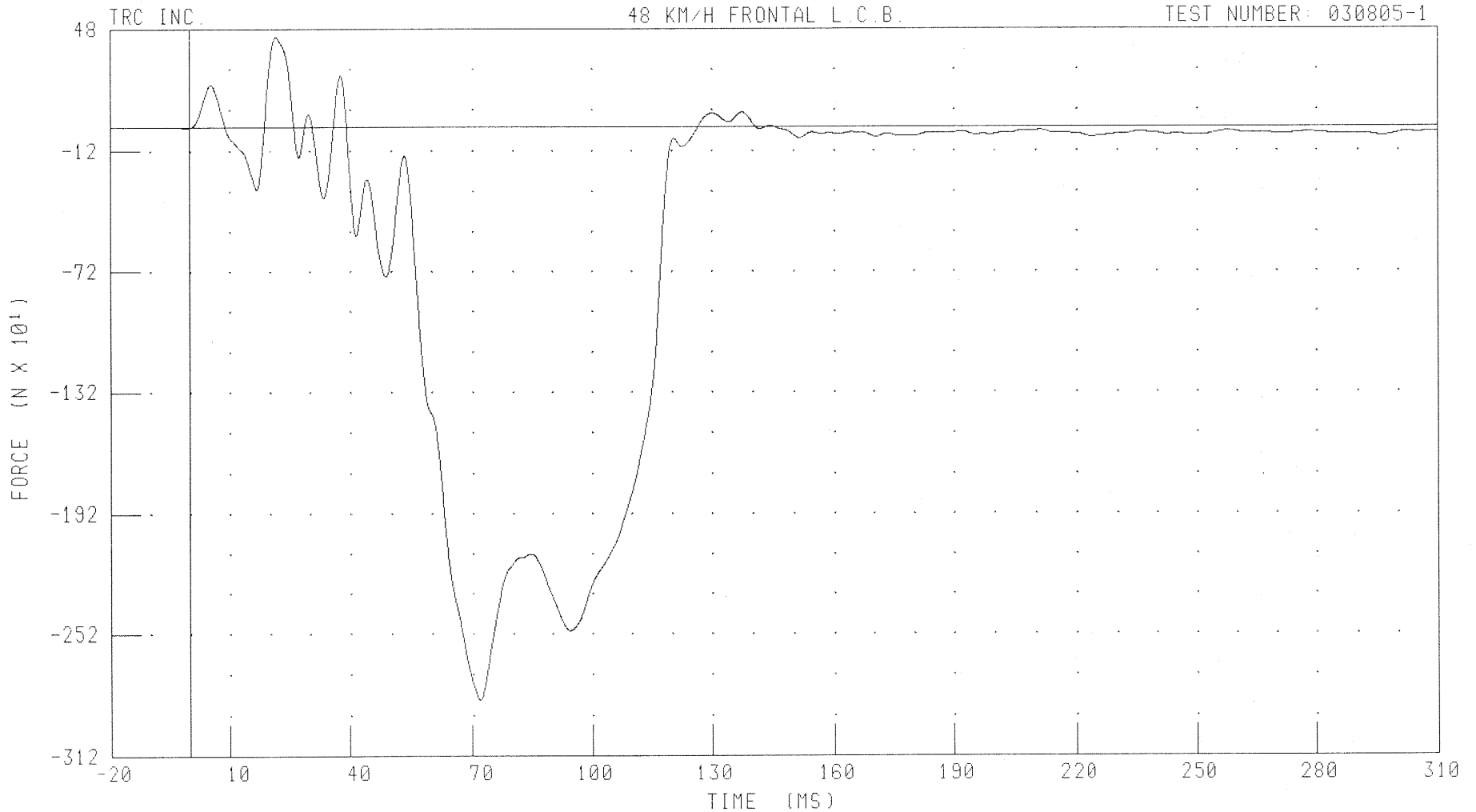
B-174

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION A8 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BA8F

FILTER: CH. CLASS 60

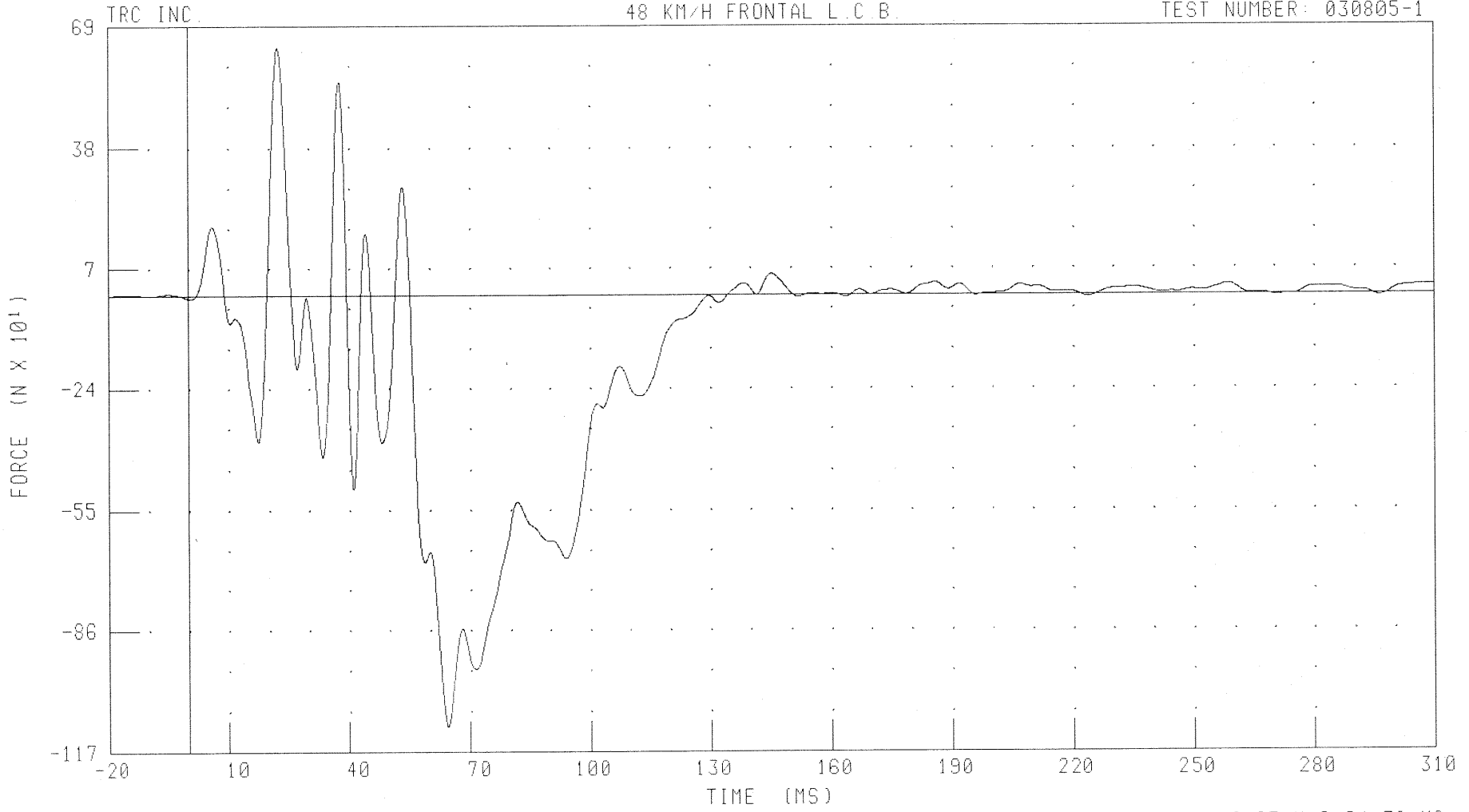
PEAK DATA: 442.86 N @ 21.60 MS; -2844.62 N @ 71.92 MS

B-175

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION A9 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BA9F

FILTER: CH. CLASS 60

PEAK DATA: 634.60 N @ 22.32 MS; -1106.07 N @ 64.32 MS

B-176

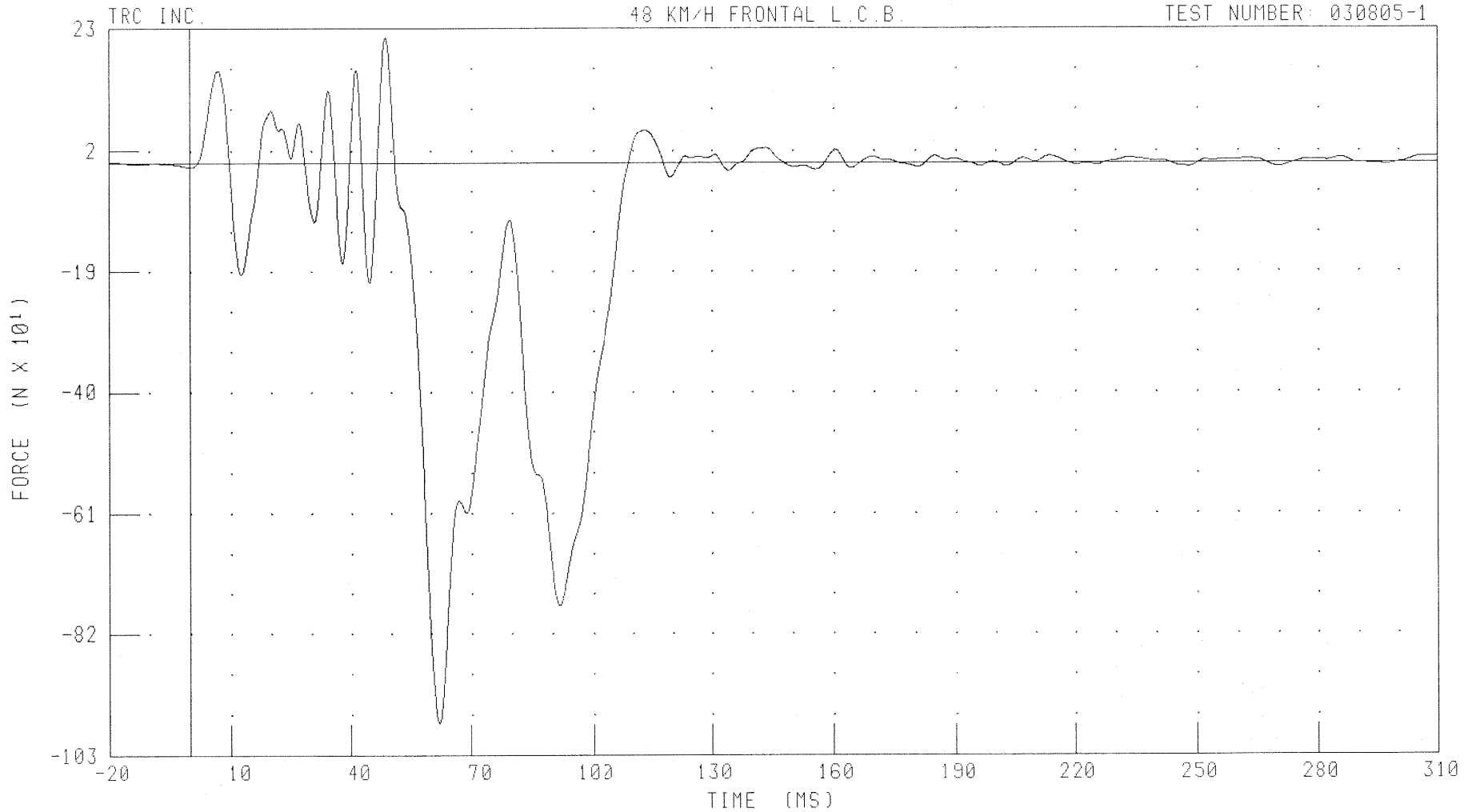
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER POSITION B1 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BB1F

FILTER: CH. CLASS 60

PEAK DATA: 214.25 N @ 48.80 MS; -974.26 N @ 62.16 MS

B-177

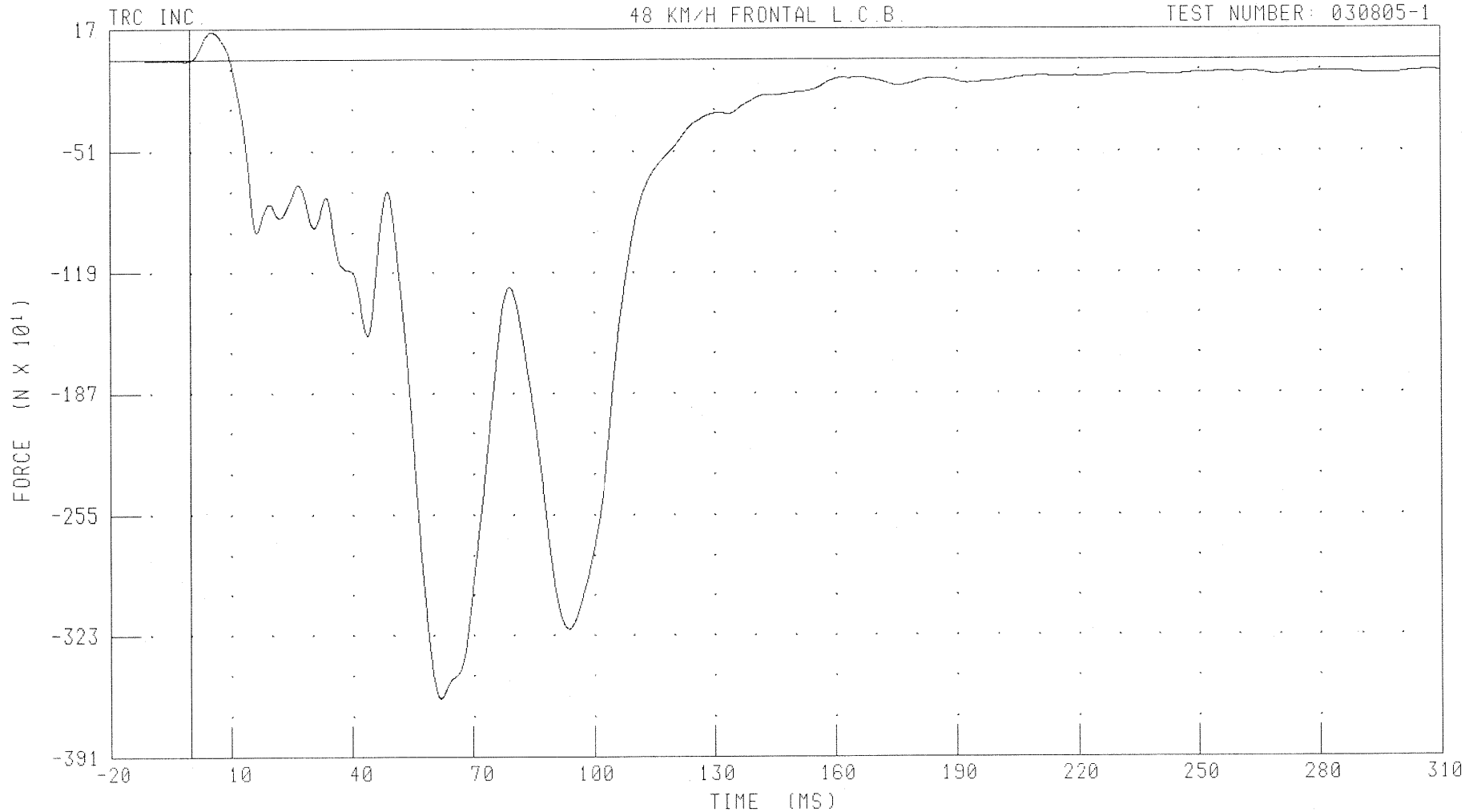
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER POSITION B2 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BB2F

FILTER: CH. CLASS 60

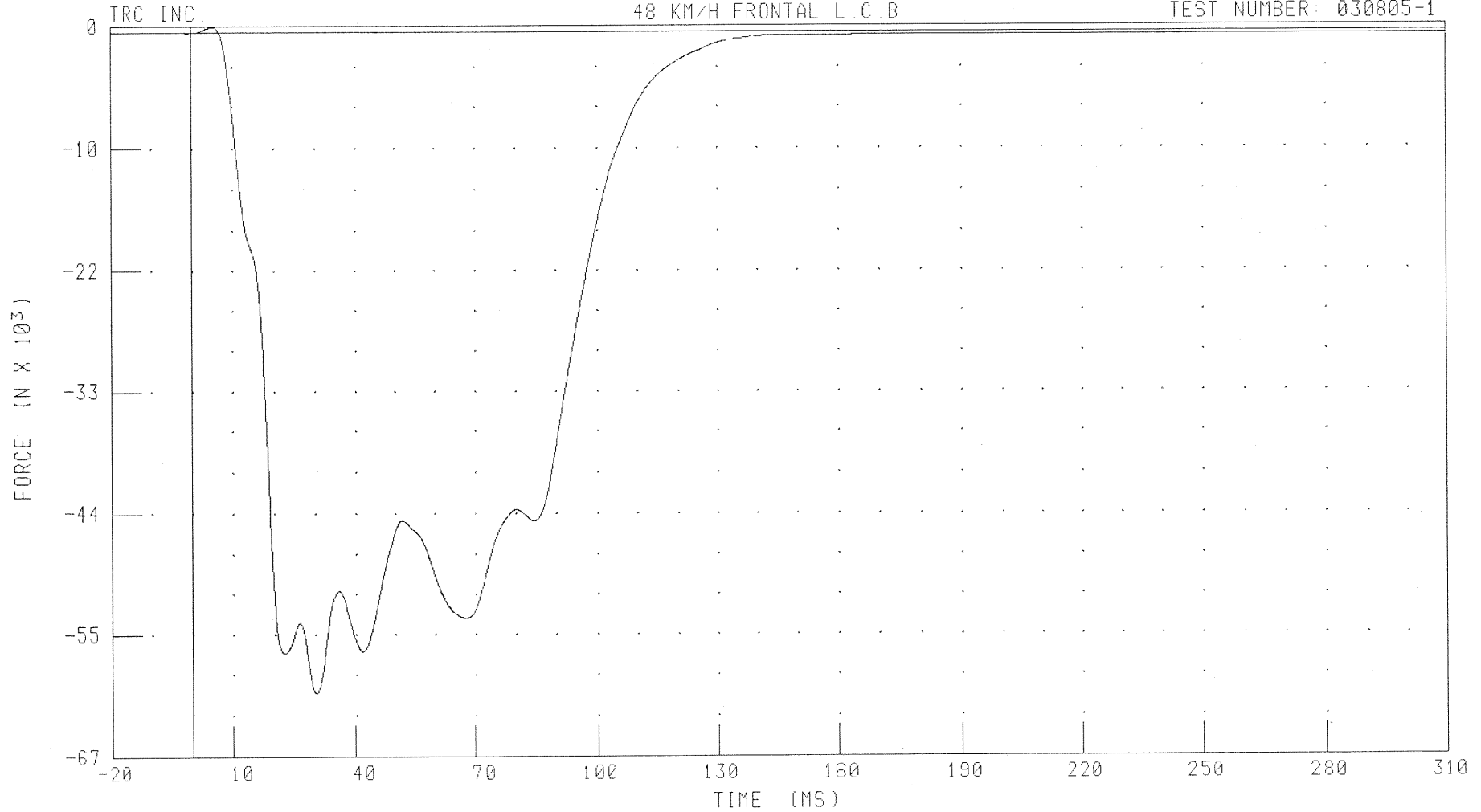
PEAK DATA: 155.38 N @ 5.28 MS; -358.07 N @ 61.84 MS

B-178

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION B3 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: 3B3F

FILTER: CH. CLASS 60

PEAK DATA: 522.44 N @ 5.20 MS; -61427.63 N @ 30.24 MS

B-179

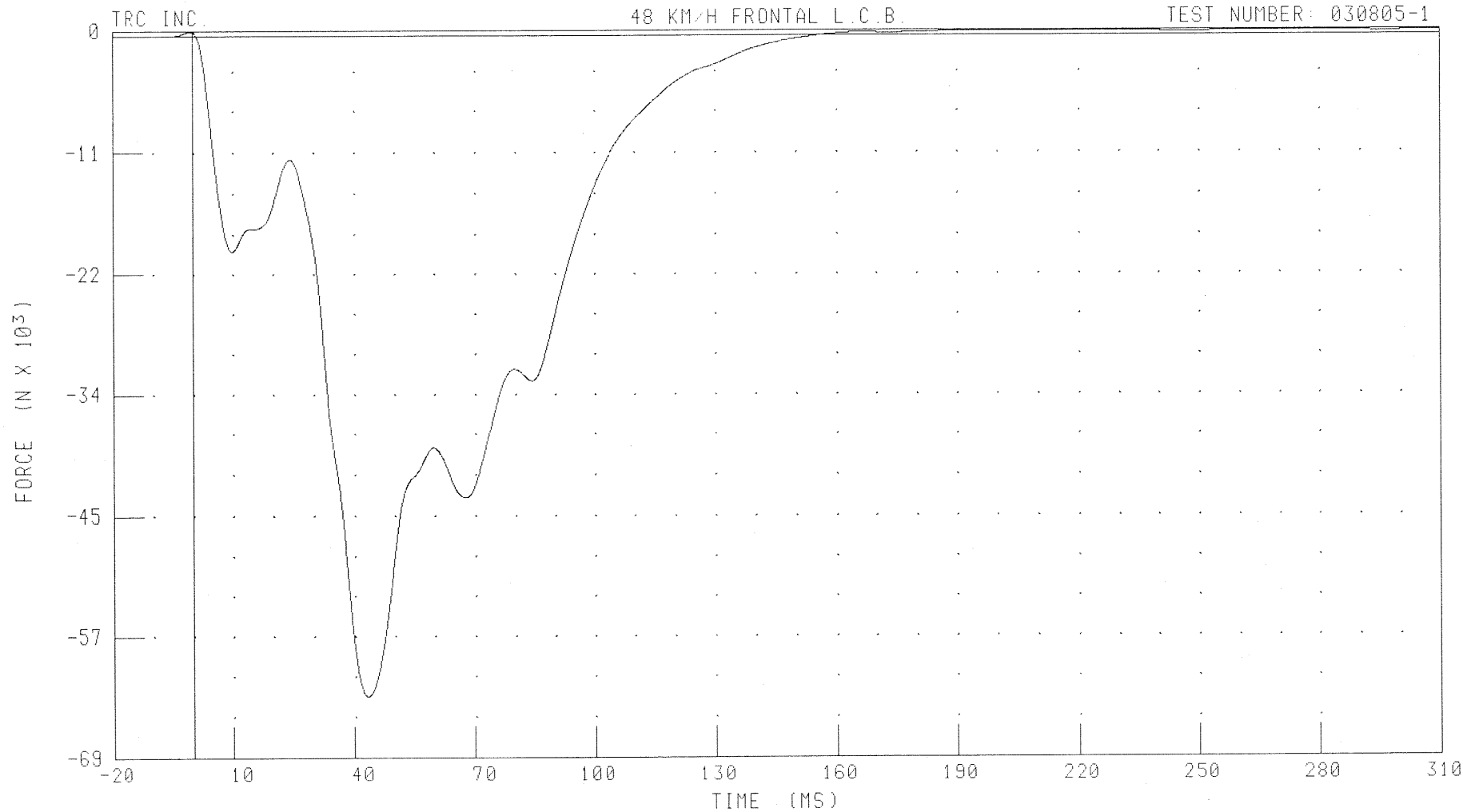
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER POSITION B4 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BB4F

FILTER: CH. CLASS 60

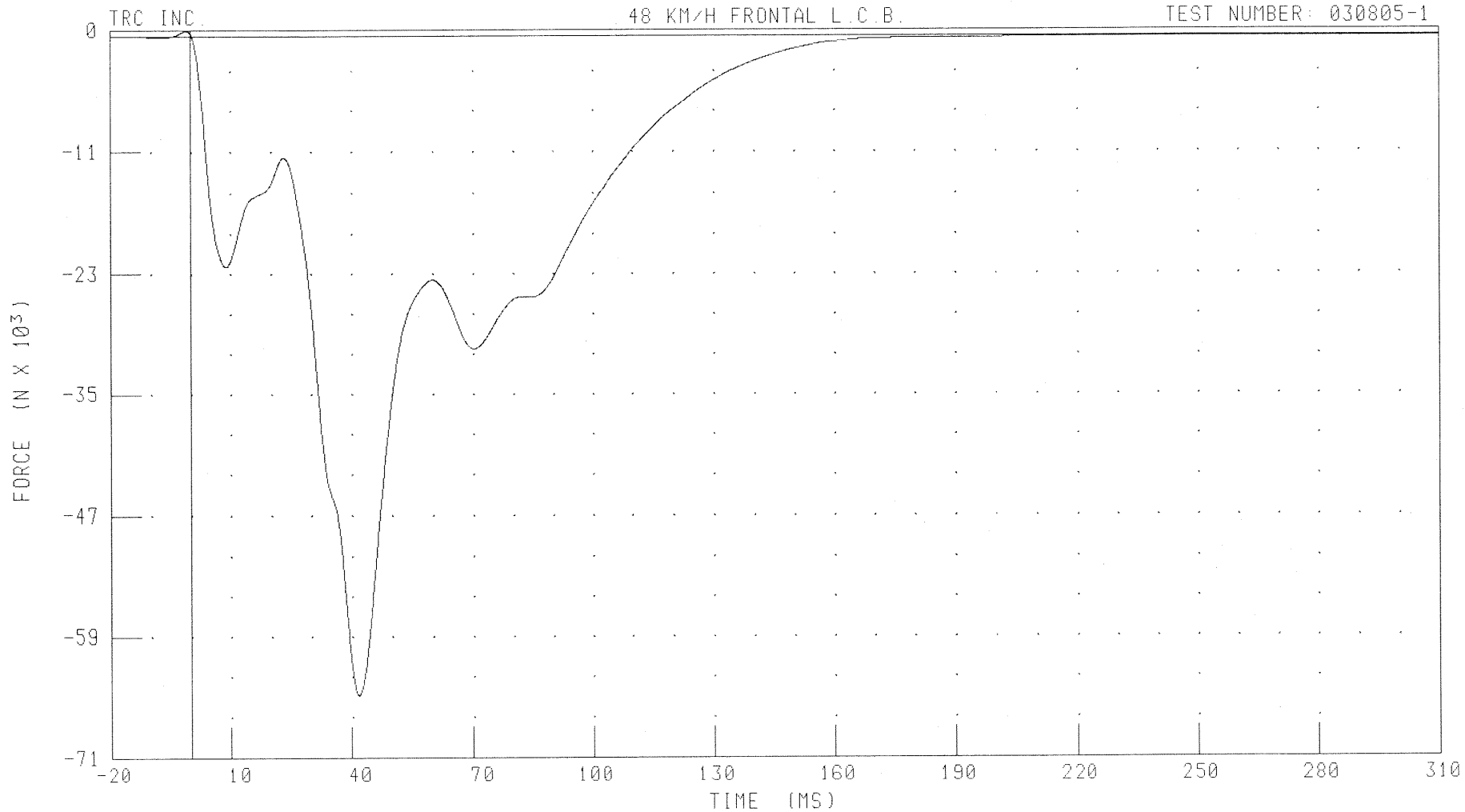
PEAK DATA: 397.41 N @ -0.56 MS; -63381.15 N @ 43.36 MS

B-180

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION B5 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BB5F

FILTER CH. CLASS 60

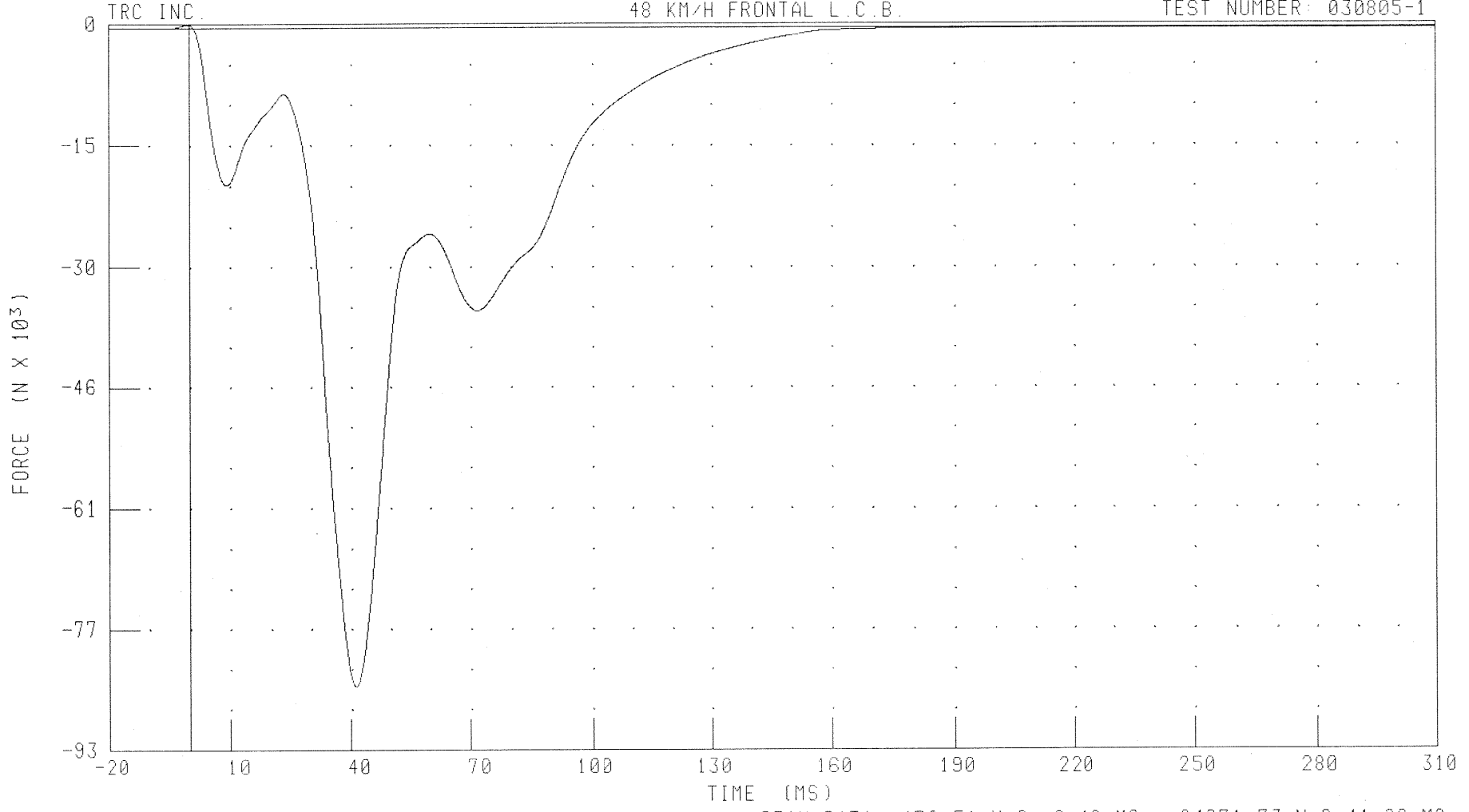
PEAK DATA: 576.78 N @ -1.04 MS; -65246.55 N @ 41.84 MS

B-181

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION B6 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BB6F

FILTER: CH. CLASS 60

PEAK DATA: 472.51 N @ -0.40 MS; -84971.73 N @ 41.20 MS

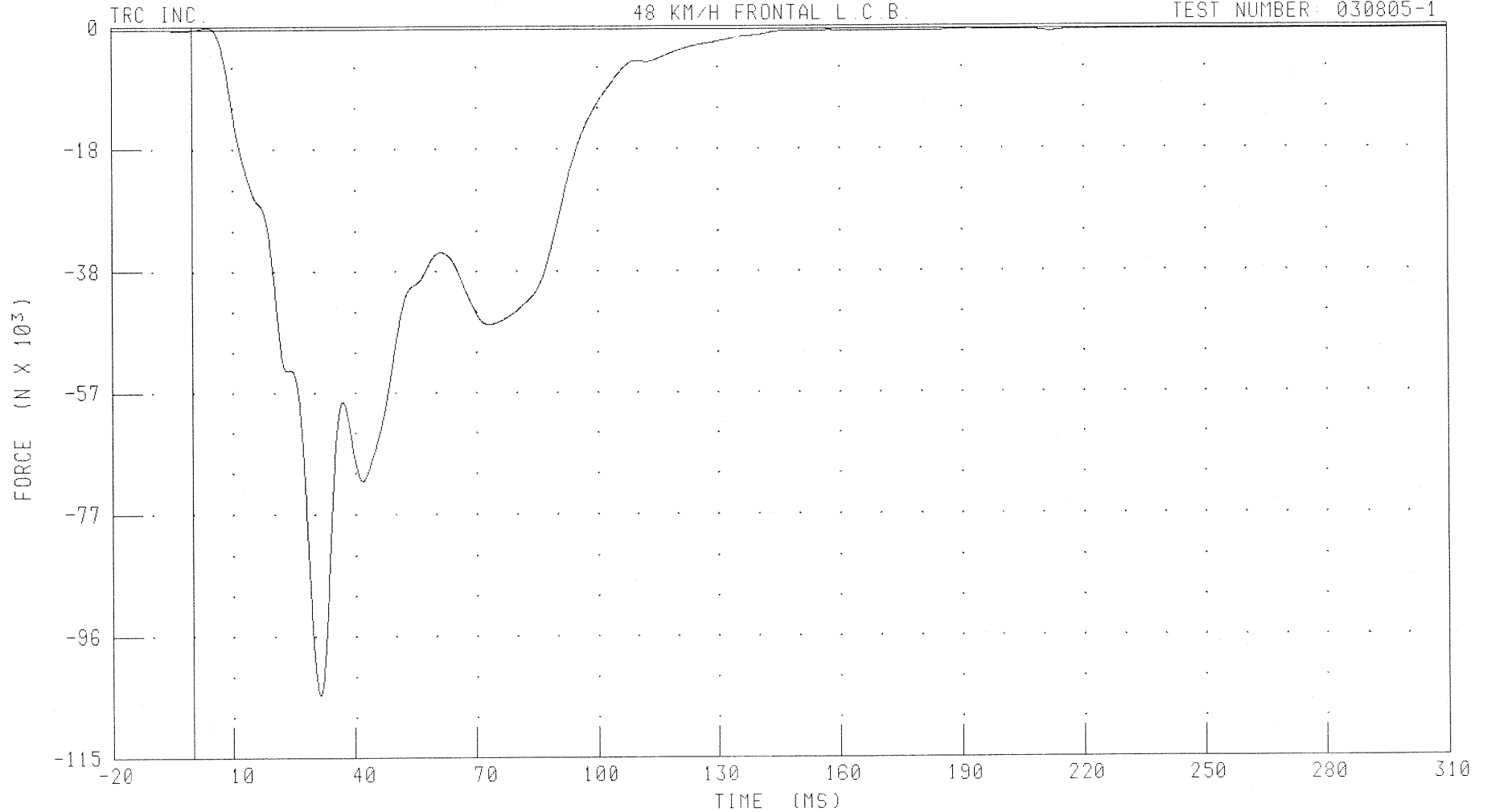
B-182

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION B7 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BB7F

FILTER: CH CLASS 60

PEAK DATA: 488.62 N @ 3.84 MS; -105811.86 N @ 31.36 MS

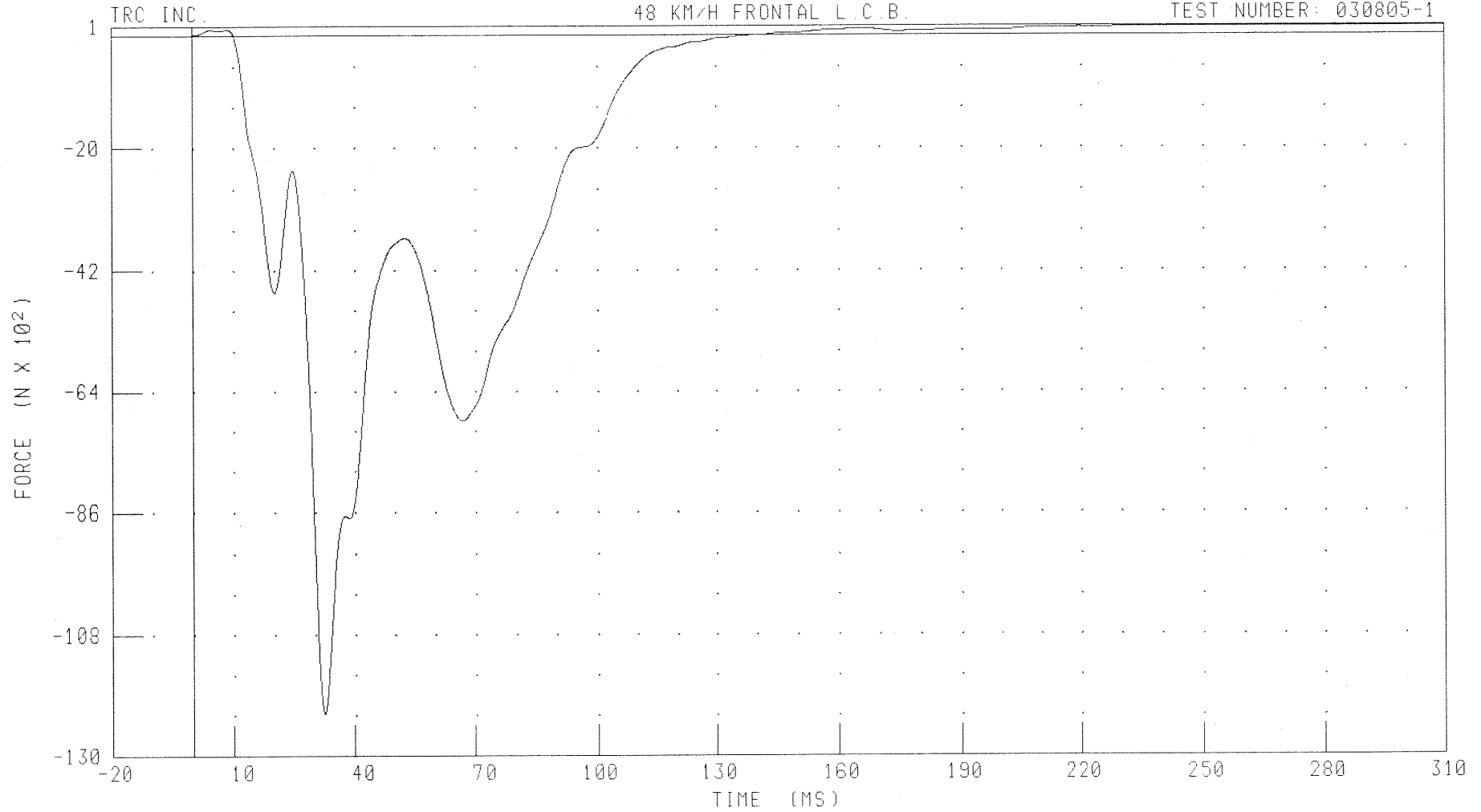
B-183

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION B8 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BB8F

FILTER: CH. CLASS 60

PEAK DATA: 15275 N @ 258.16 MS; -12270.93 N @ 32.40 MS

B-184

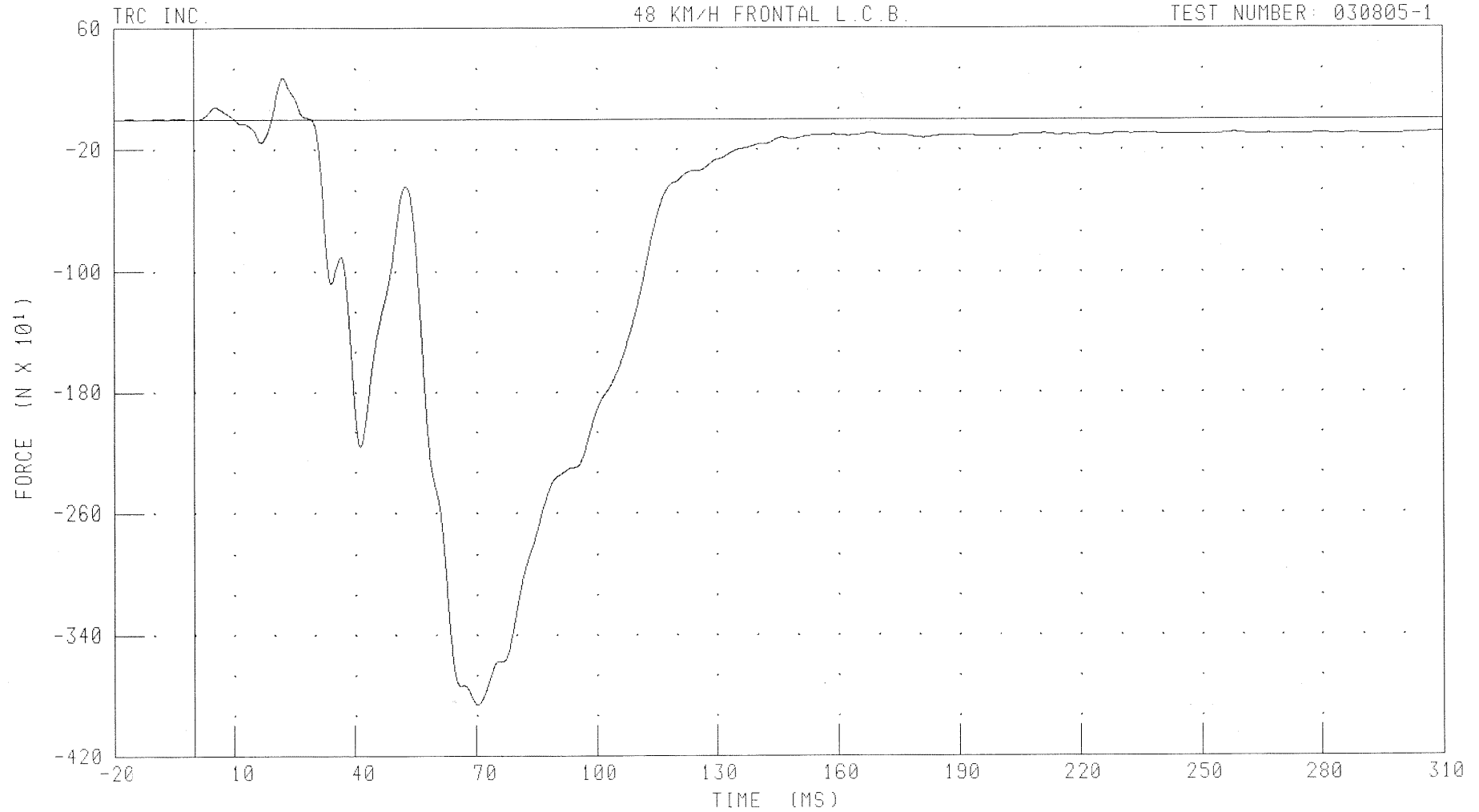
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER POSITION B9 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BB9F

FILTER: CH. CLASS 60

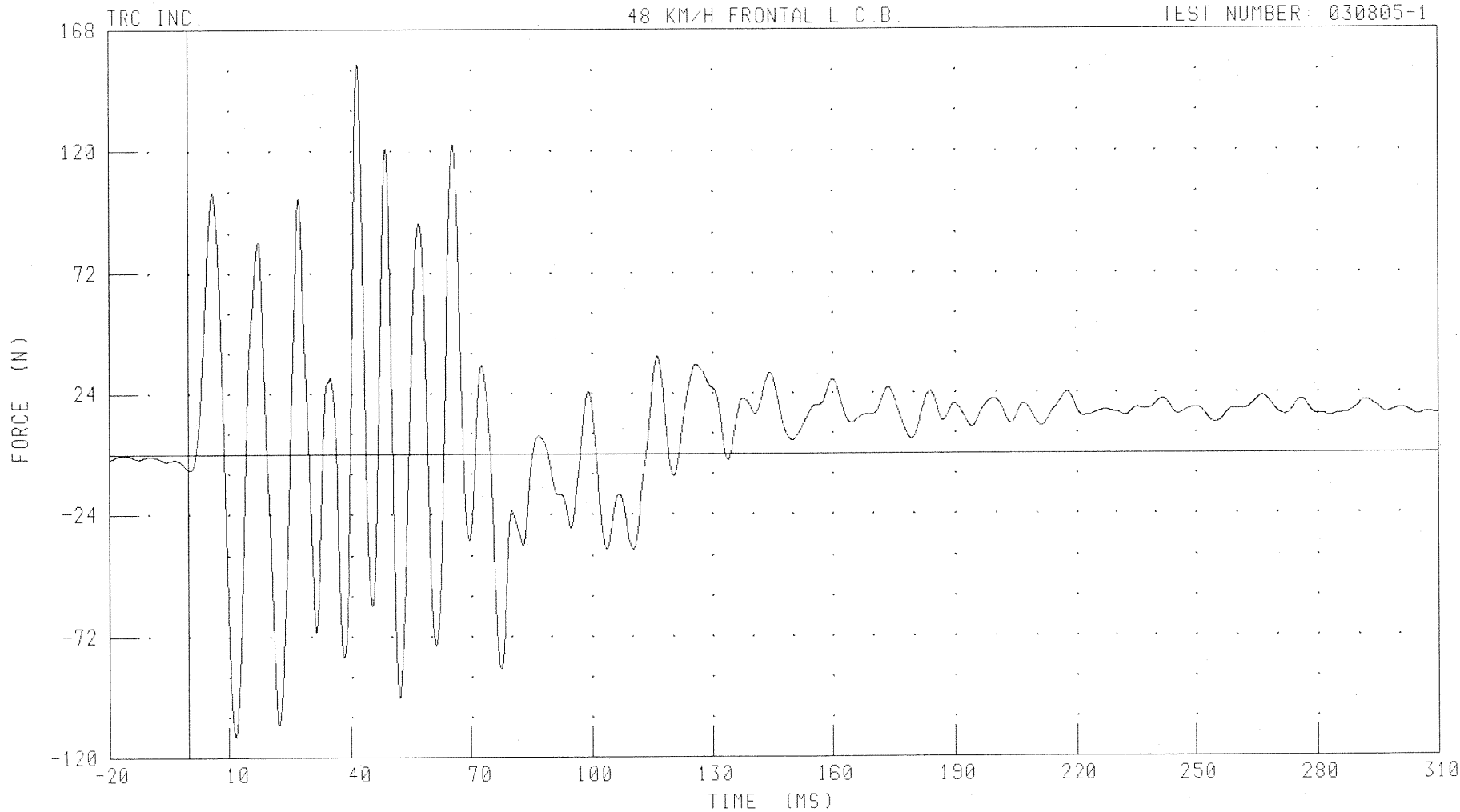
PEAK DATA: 271.40 N @ 22.32 MS; -3864.23 N @ 70.32 MS

B-185

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION C1 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BC1F

FILTER: CH. CLASS 60

PEAK DATA: 154.21 N @ 41.68 MS; -112.03 N @ 11.68 MS

B-186

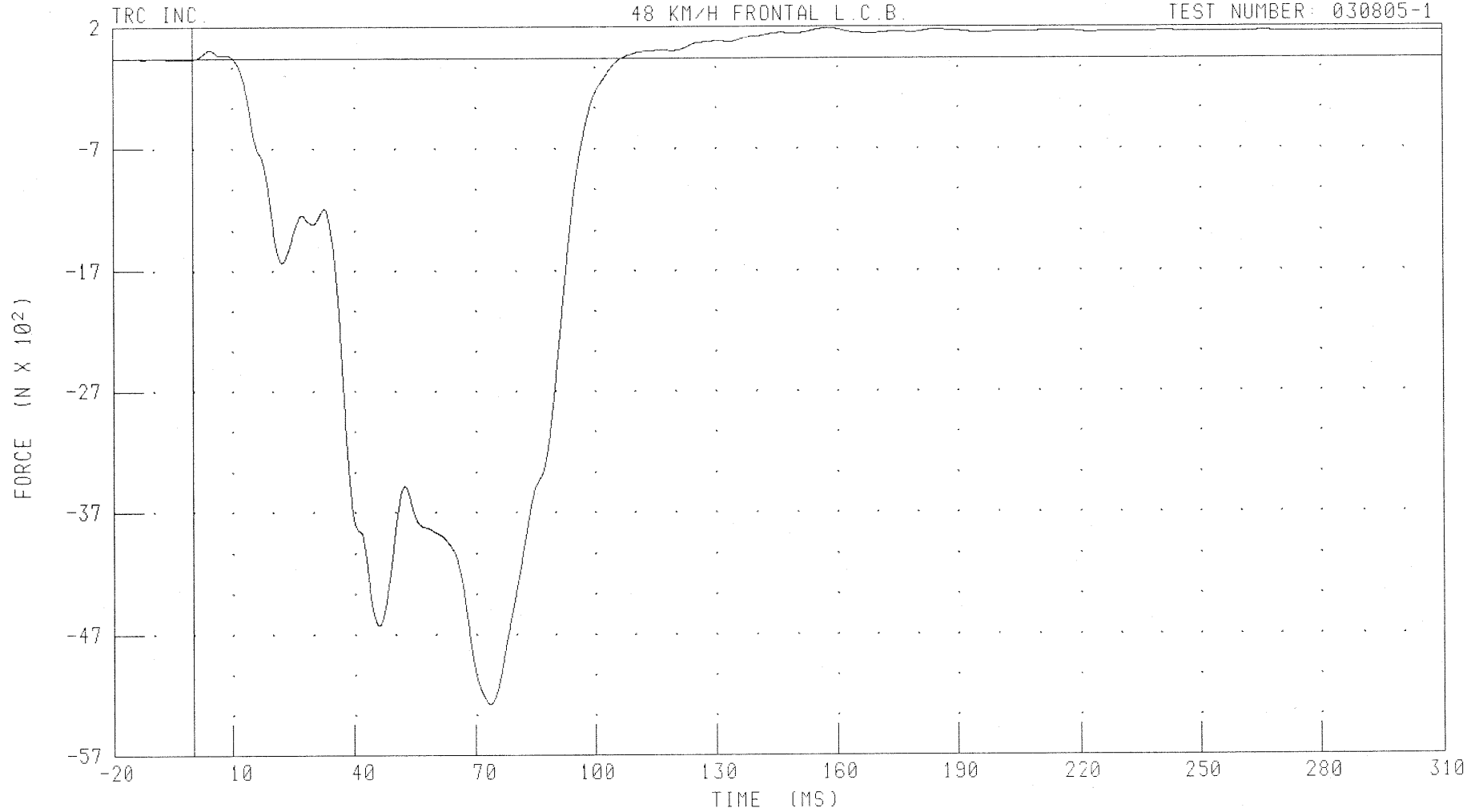
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER POSITION C2 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BC2F

FILTER: CH. CLASS 60

PEAK DATA: 244.07 N @ 158.24 MS; -5319.09 N @ 73.60 MS

B-187

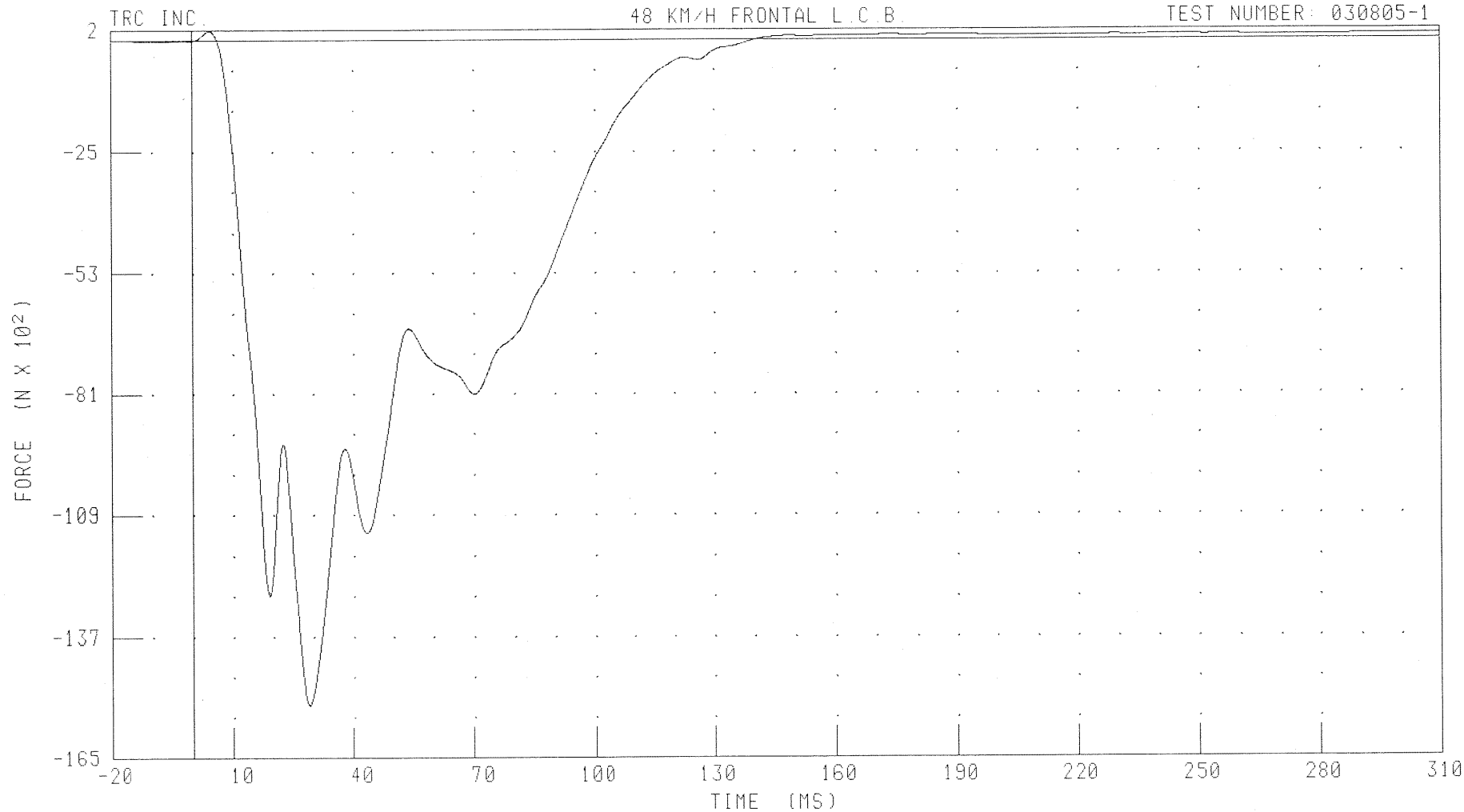
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER POSITION C3 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BC3F

FILTER: CH. CLASS 60

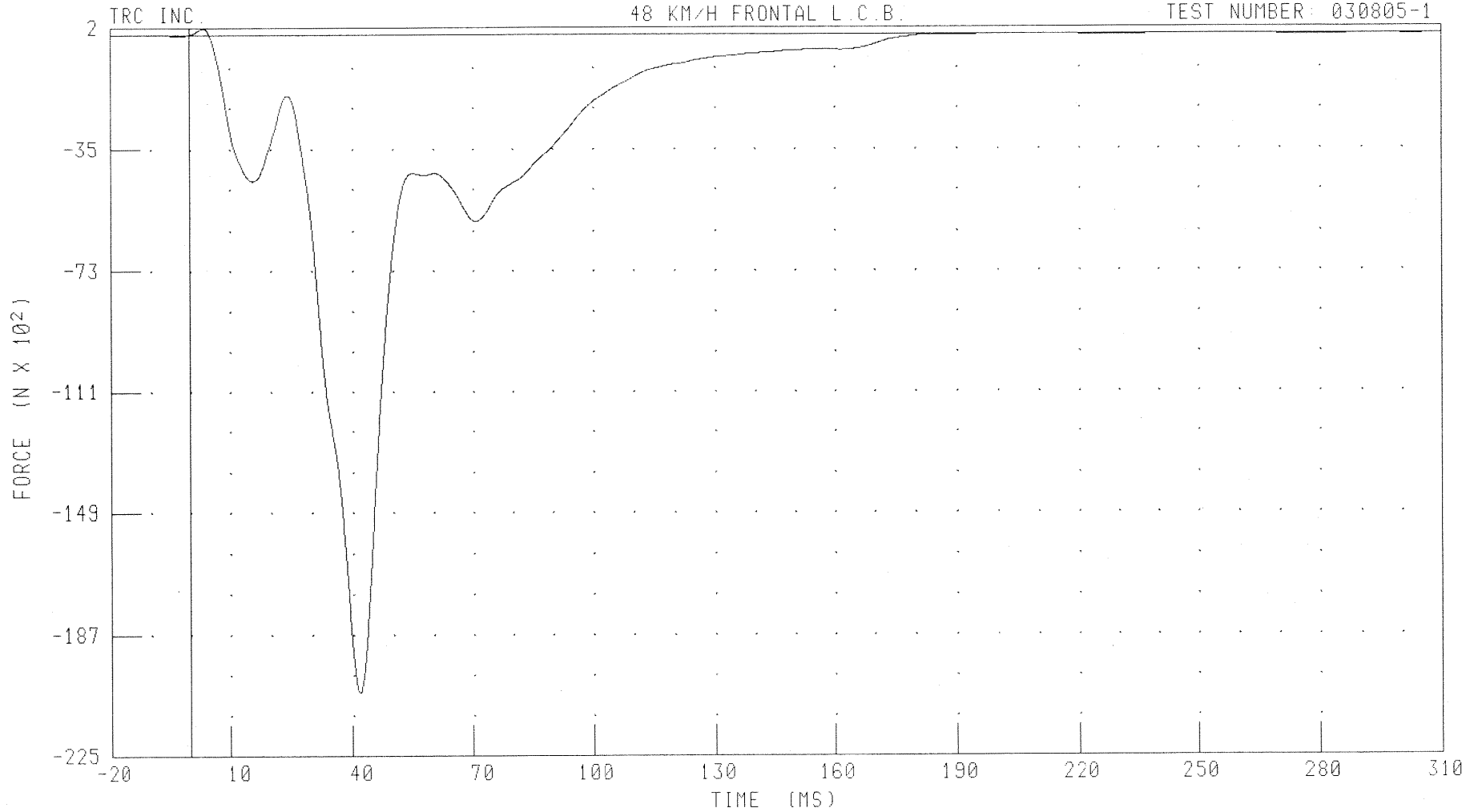
PEAK DATA: 225.28 N @ 4.24 MS; -15349.26 N @ 29.04 MS

B-188

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION C4 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BC4F

FILTER: CH CLASS 60

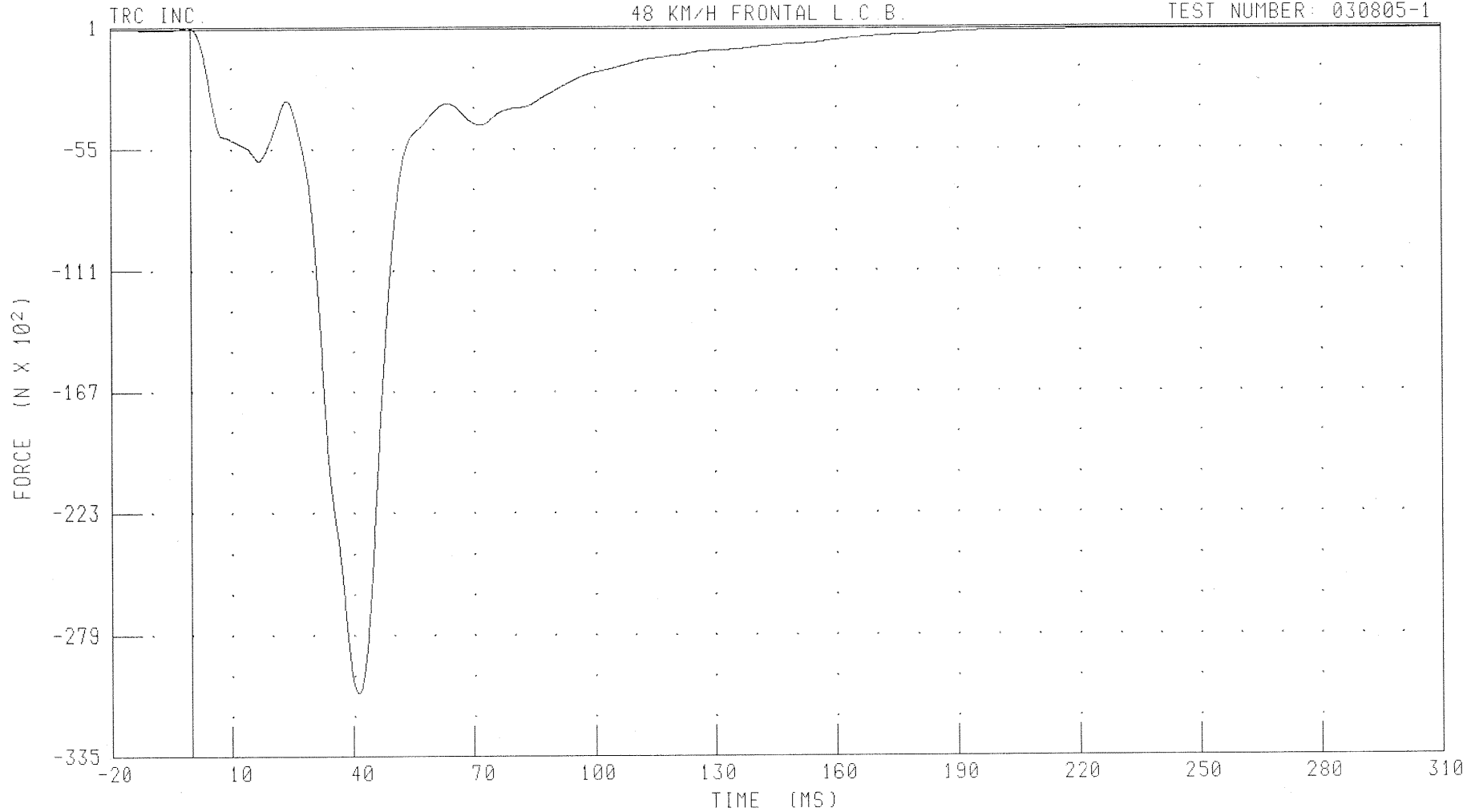
PEAK DATA: 207.52 N @ 3.44 MS; -20601.13 N @ 41.76 MS

B-189

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION C5 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BC5F

FILTER: CH. CLASS 60

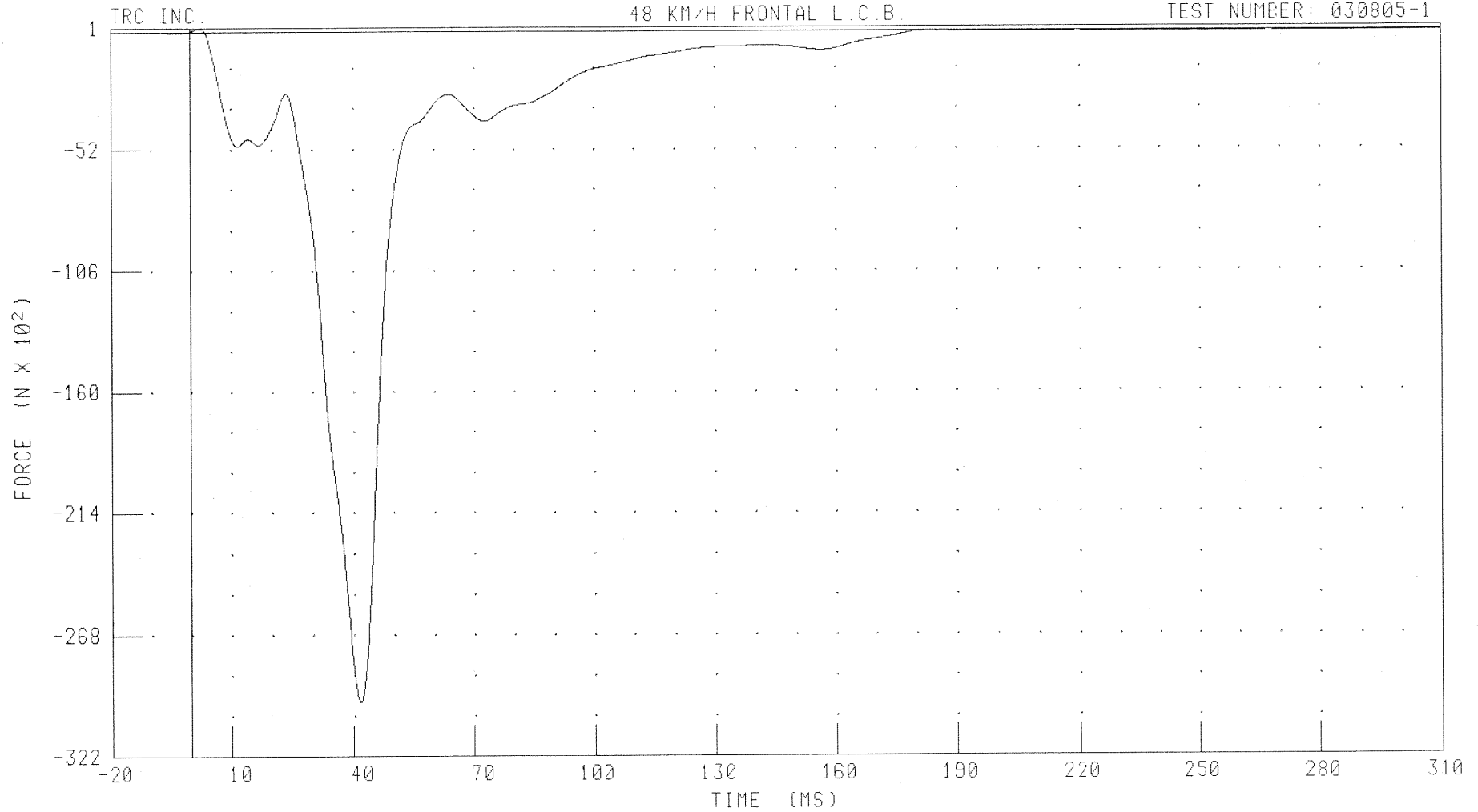
PEAK DATA: 93.96 N @ -0.64 MS; -3057.58 N @ 41.20 MS

B-190

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION C6 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BCGF

FILTER: CH CLASS 60

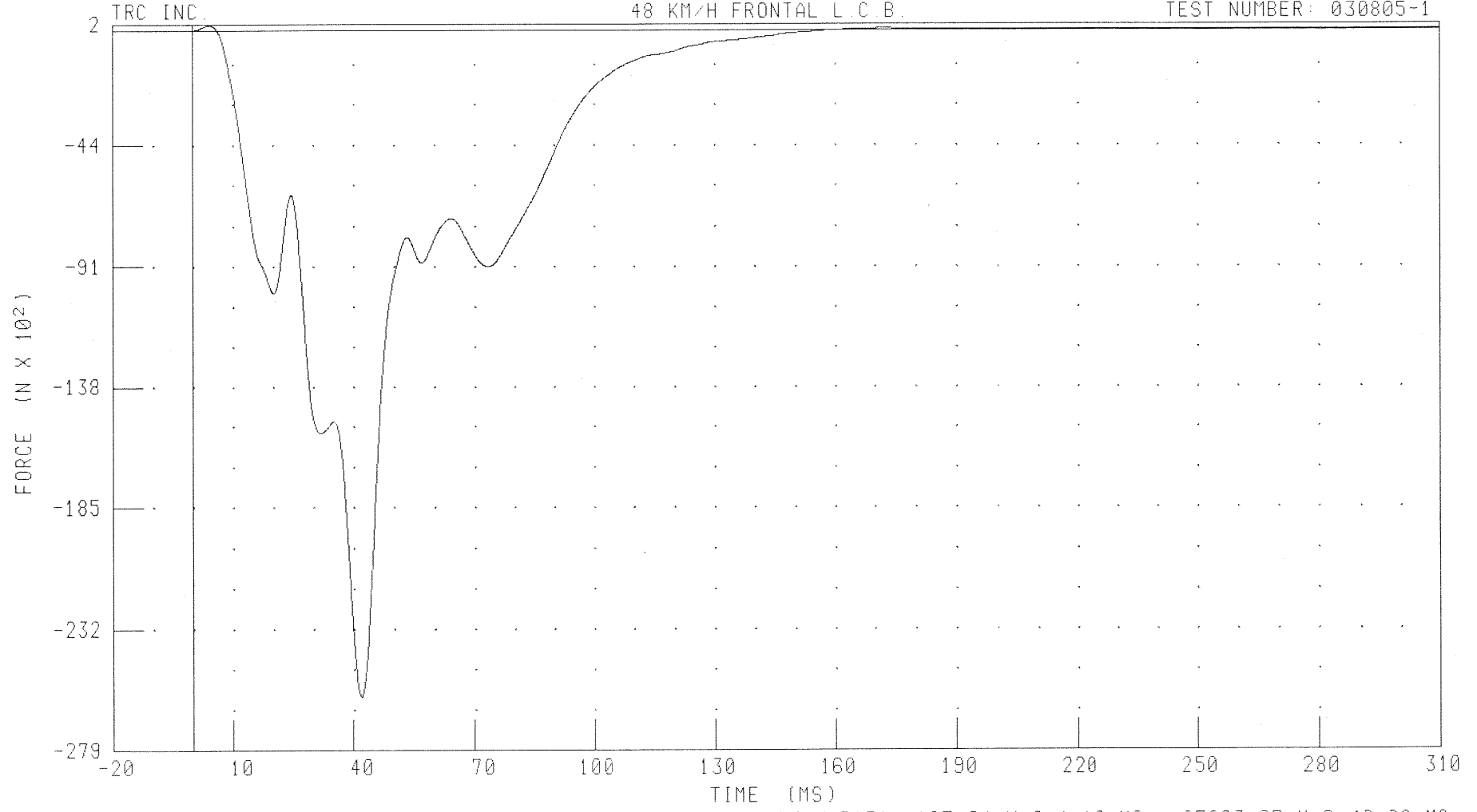
PEAK DATA: 169.75 N @ 2.40 MS; -29807.54 N @ 41.76 MS

B-191

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION C7 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BC7F

FILTER: CH. CLASS 60

PEAK DATA: 197.84 N @ 4.16 MS, -25923.27 N @ 42.00 MS

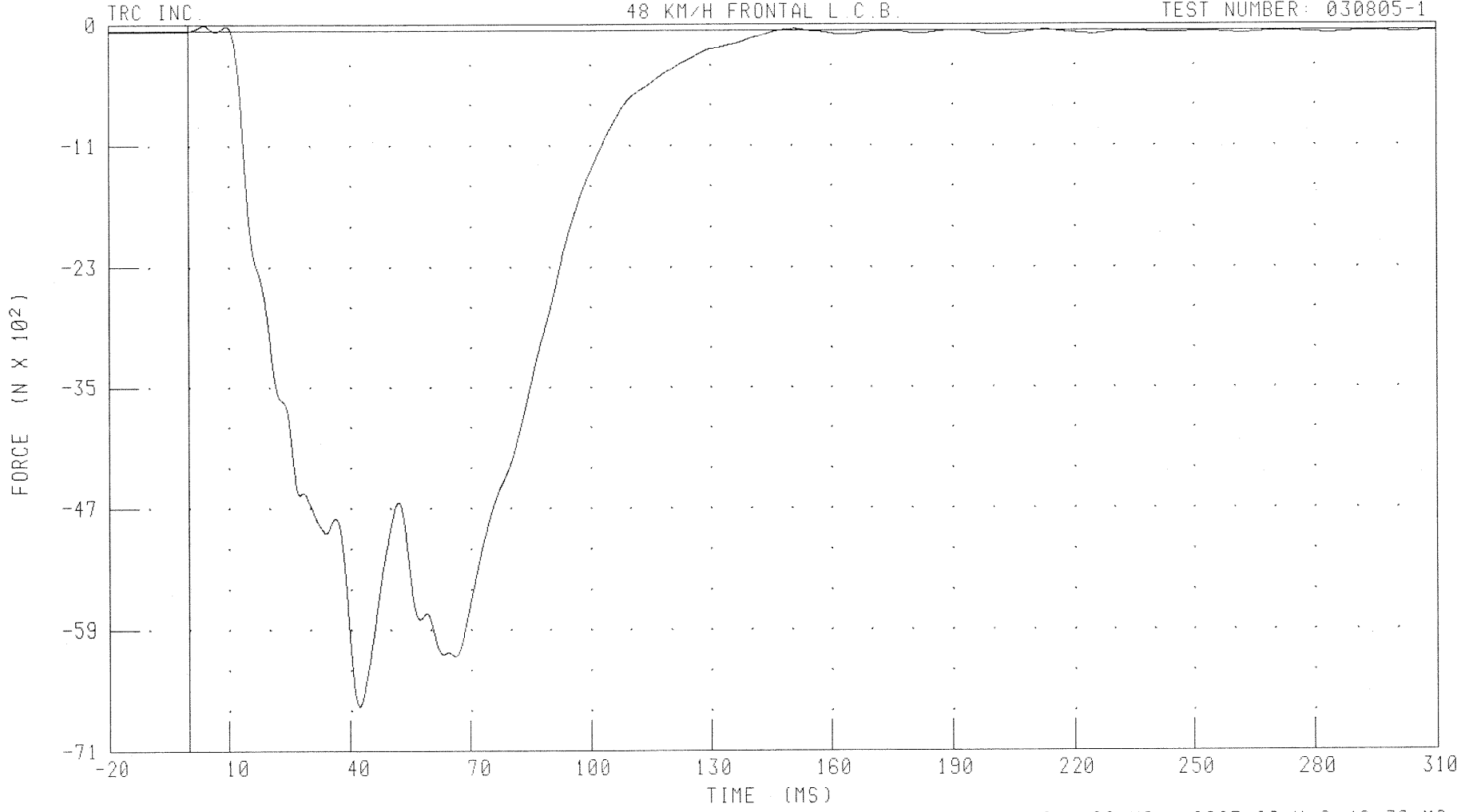
B-192

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION C8 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BC8F

FILTER: CH. CLASS 60

PEAK DATA: 57.39 N @ 4.00 MS; -6697.08 N @ 42.32 MS

B-193

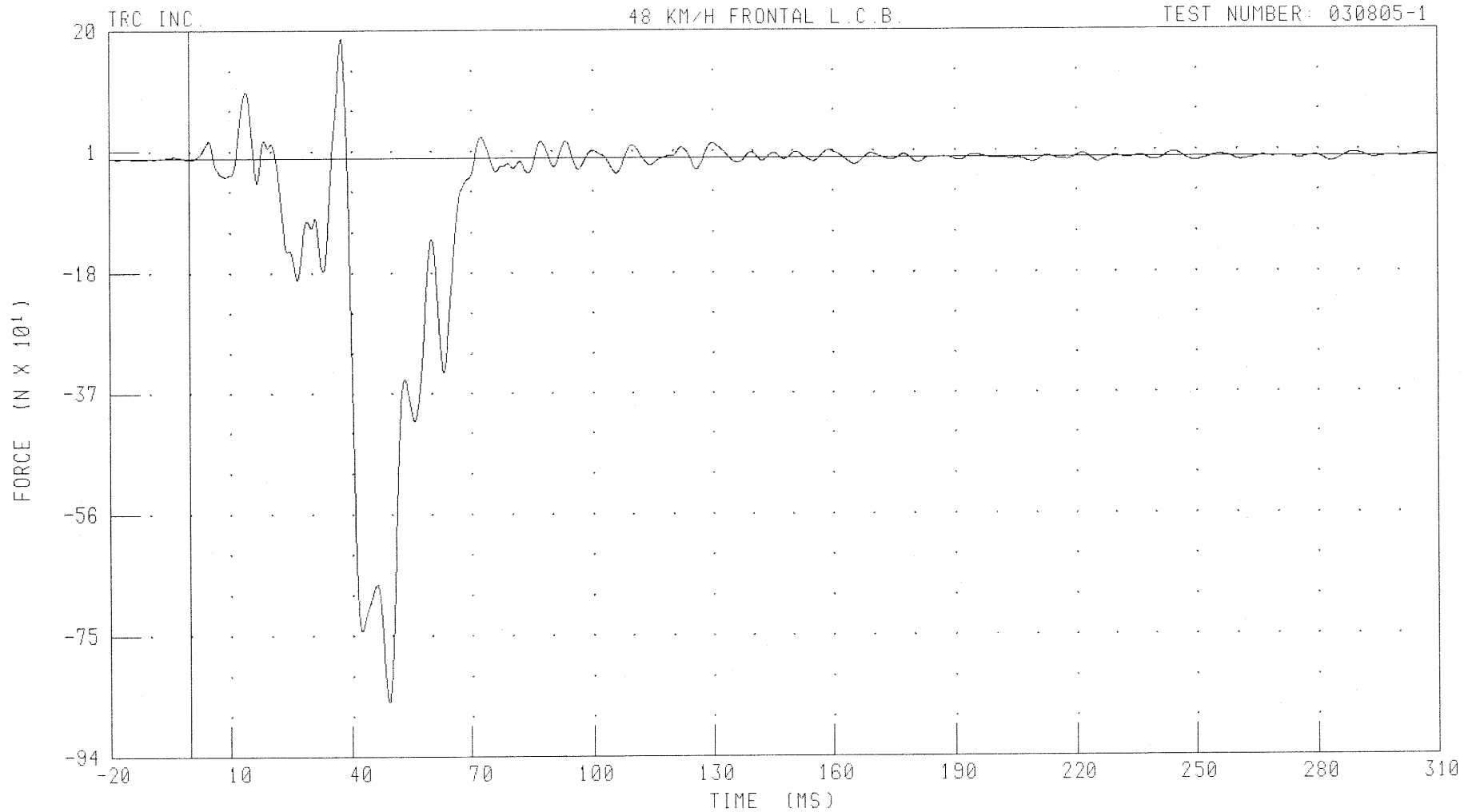
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER POSITION C9 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BC9F

FILTER: CH. CLASS 60

PEAK DATA: 186.93 N @ 37.52 MS; -855.57 N @ 49.28 MS

B-194

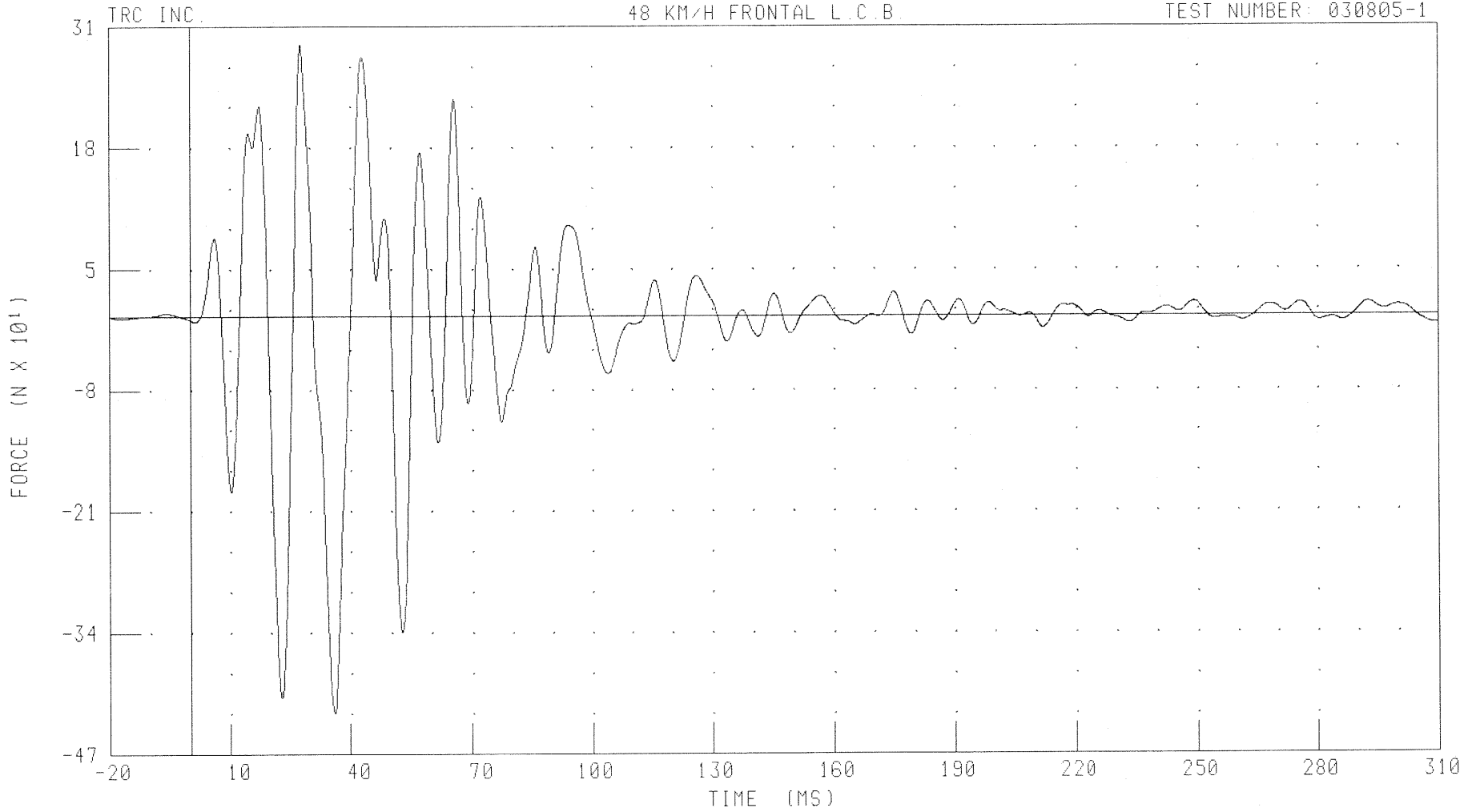
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER POSITION D1 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BD1F

FILTER: CH. CLASS 60

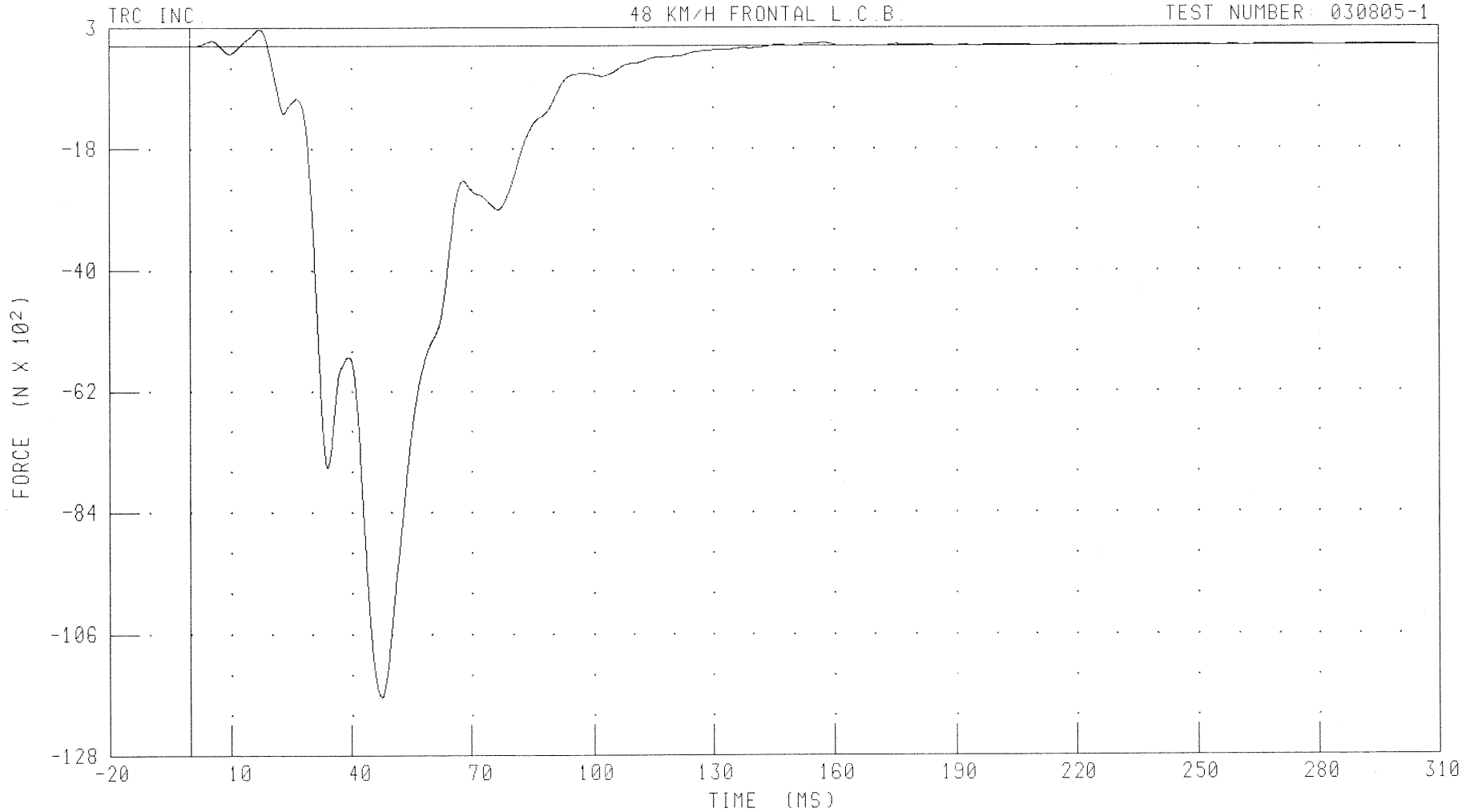
PEAK DATA: 290.16 N @ 27.84 MS, -426.46 N @ 36.16 MS

B-195

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION D2 FORCE
48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BD2F

FILTER: CH. CLASS 60

PEAK DATA: 301.06 N @ 17.12 MS; -11806.36 N @ 47.60 MS

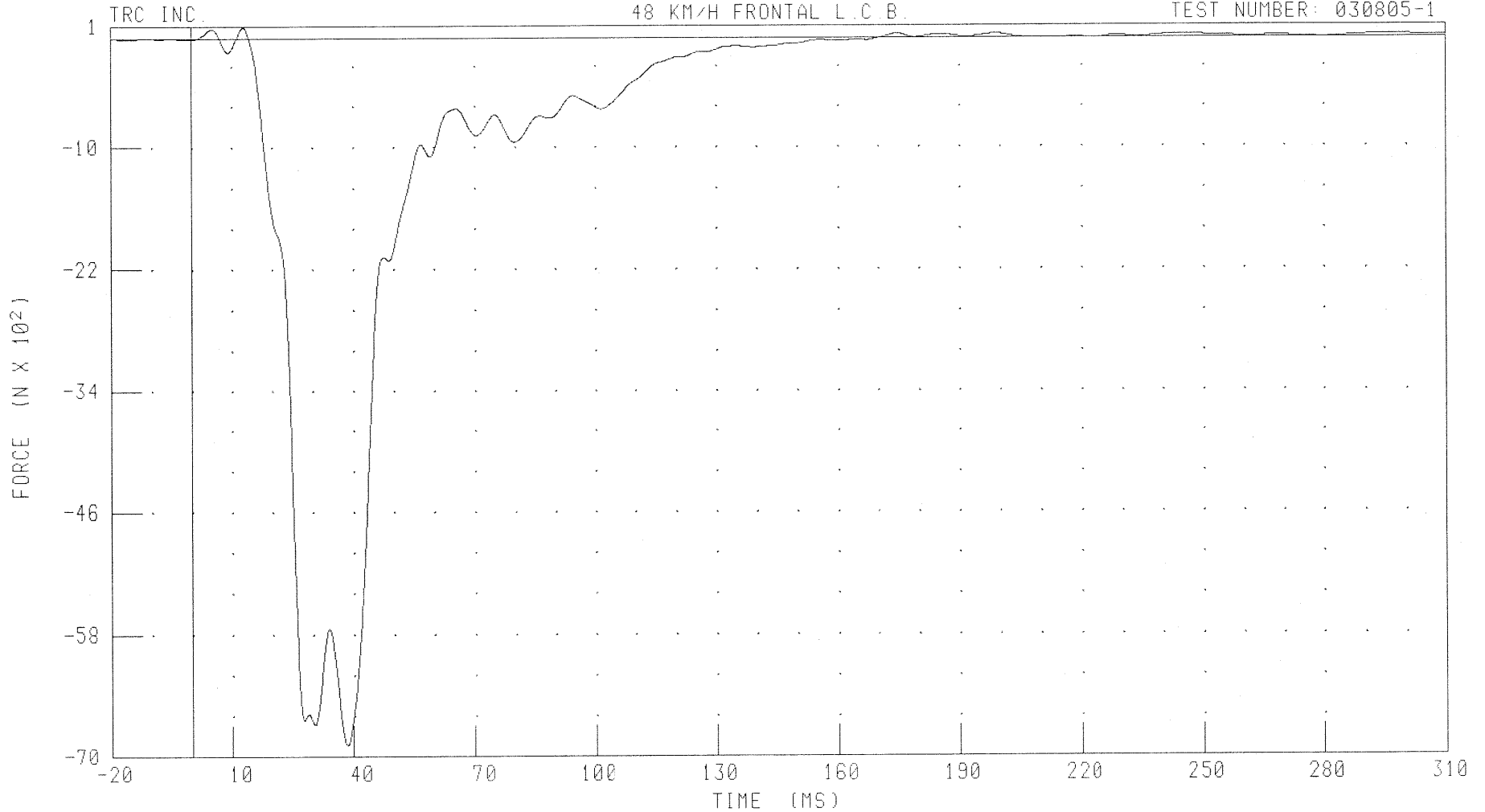
B-196

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION D3 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BD3F

FILTER: CH. CLASS 60

PEAK DATA: 112.89 N @ 12.96 MS; -6972.01 N @ 38.48 MS

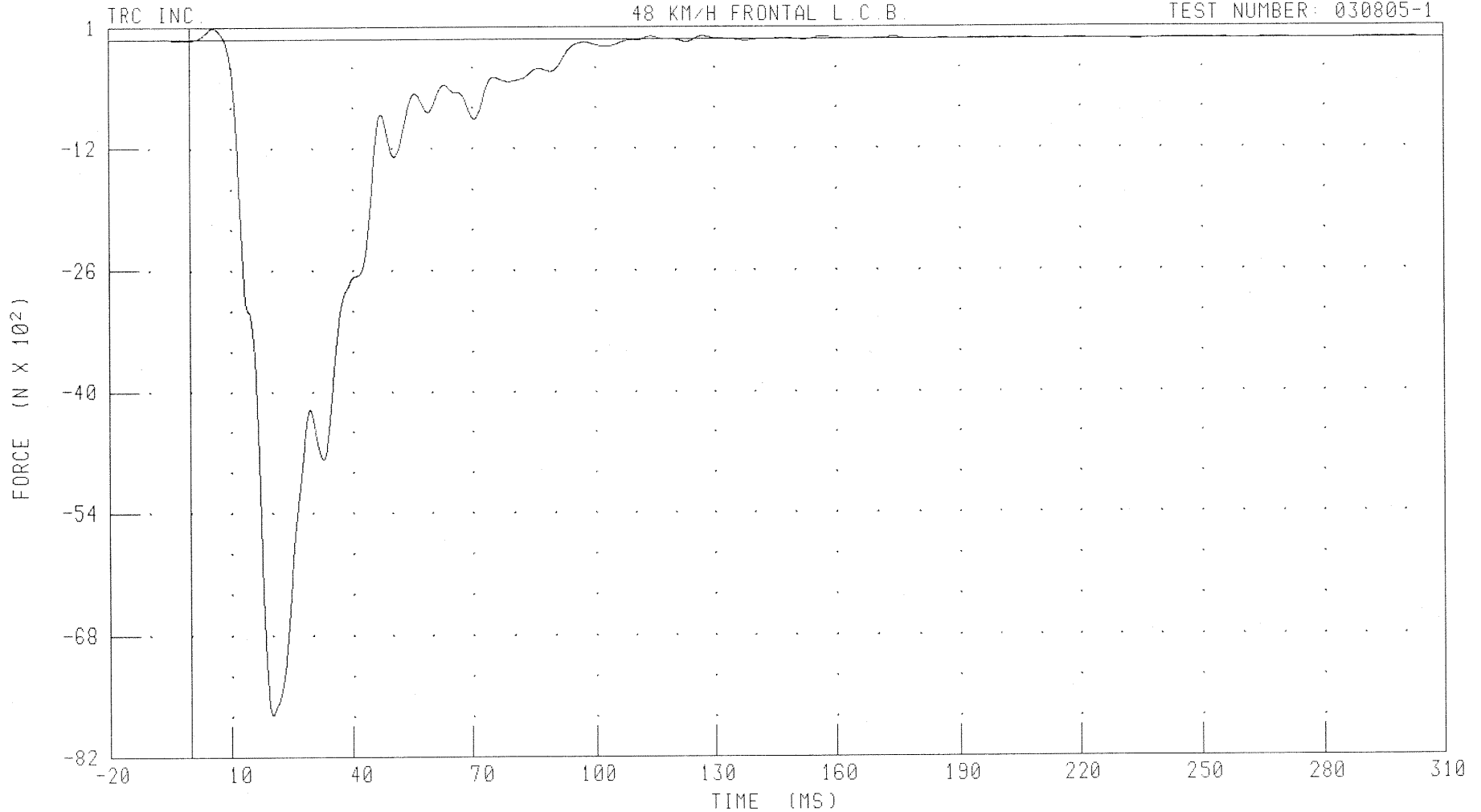
B-197

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION D4 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BD4F

FILTER: CH. CLASS 60

PEAK DATA: 131.80 N @ 5.68 MS; -7779.38 N @ 20.08 MS

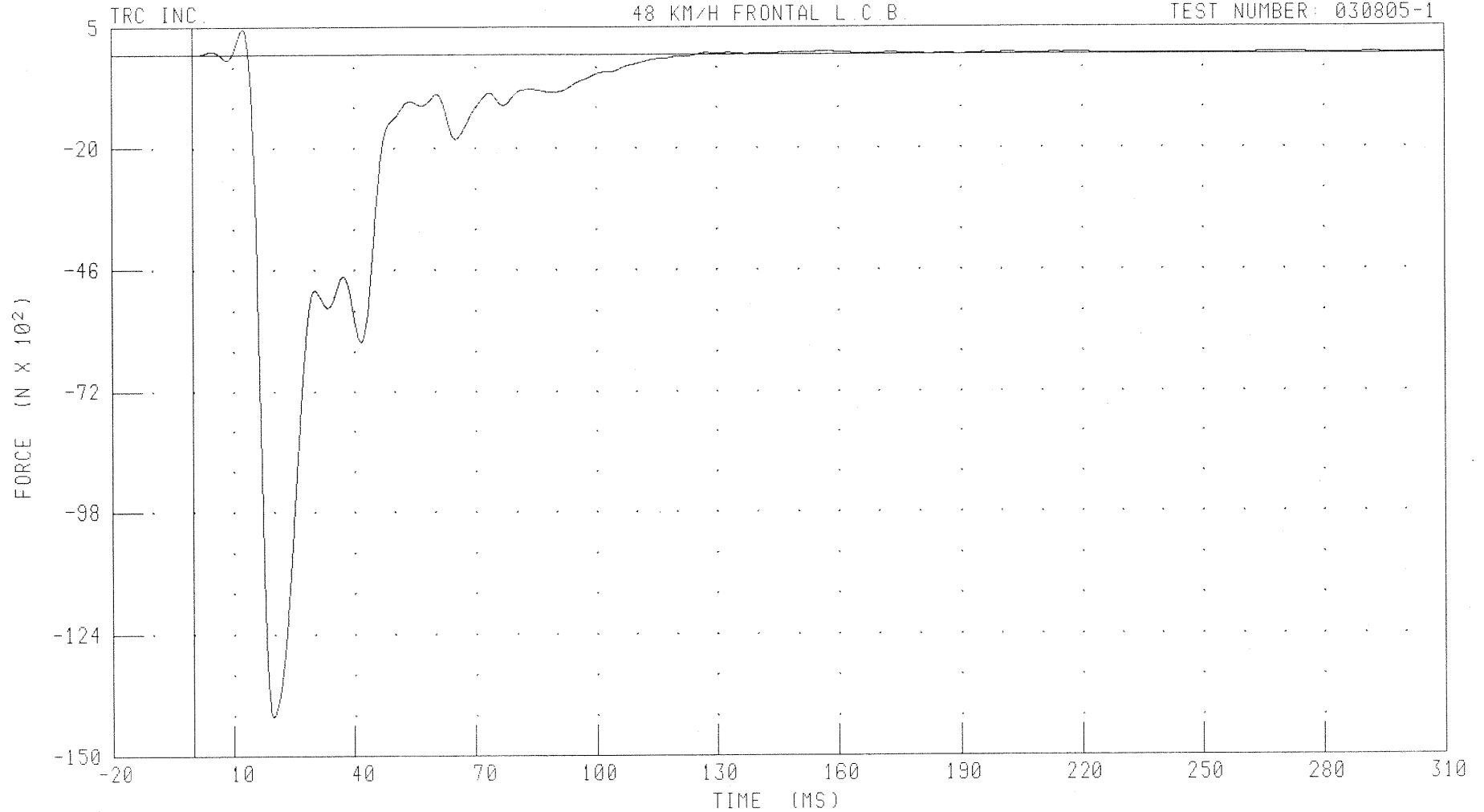
B-198

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION D5 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BD5F

FILTER: CH. CLASS 60

PEAK DATA: 543.73 N @ 12.48 MS; -14169.89 N @ 19.76 MS

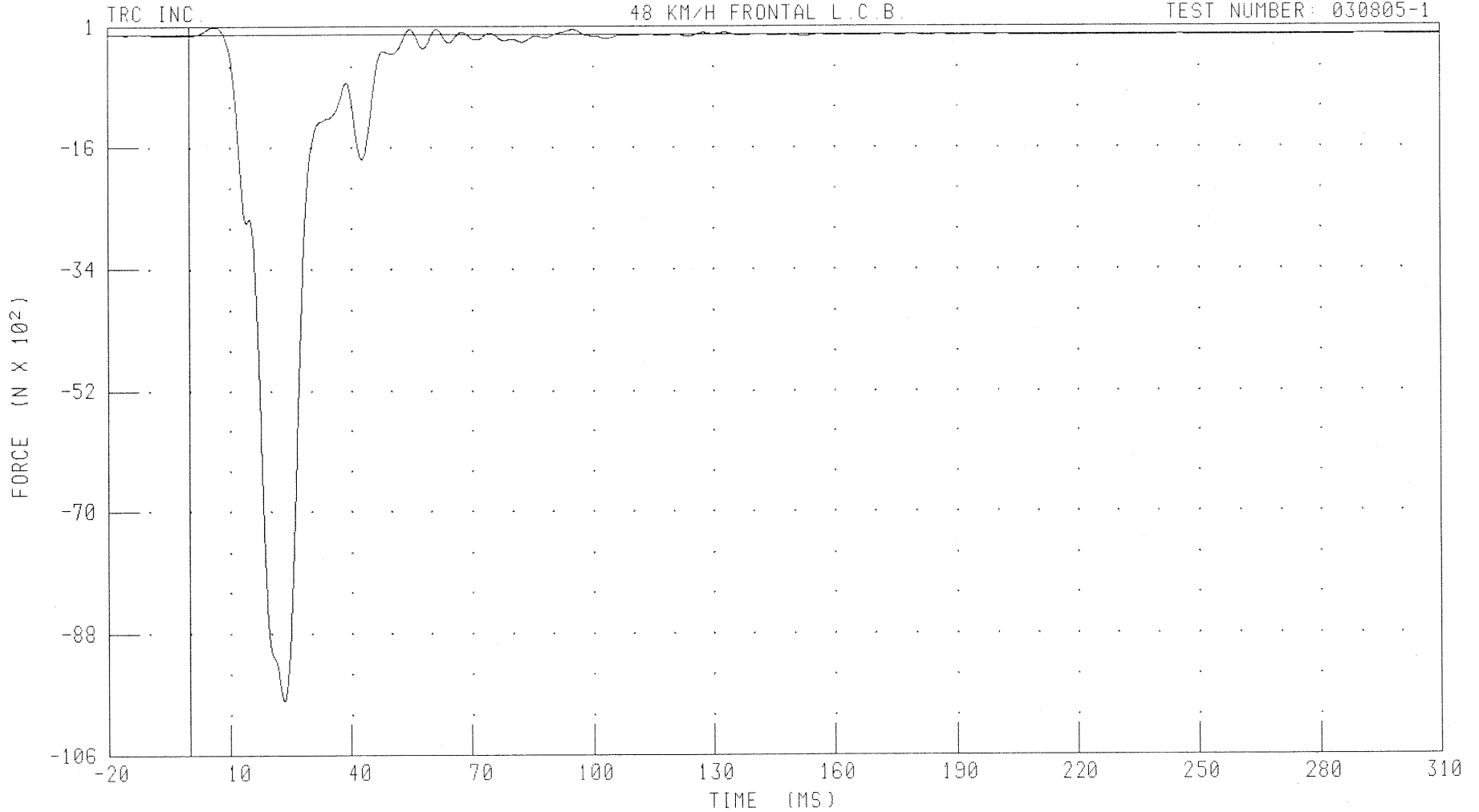
B-199

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION D6 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BD6F

FILTER: CH. CLASS 60

PEAK DATA: 115.32 N @ 6.24 MS, -9881.58 N @ 23.28 MS

B-200

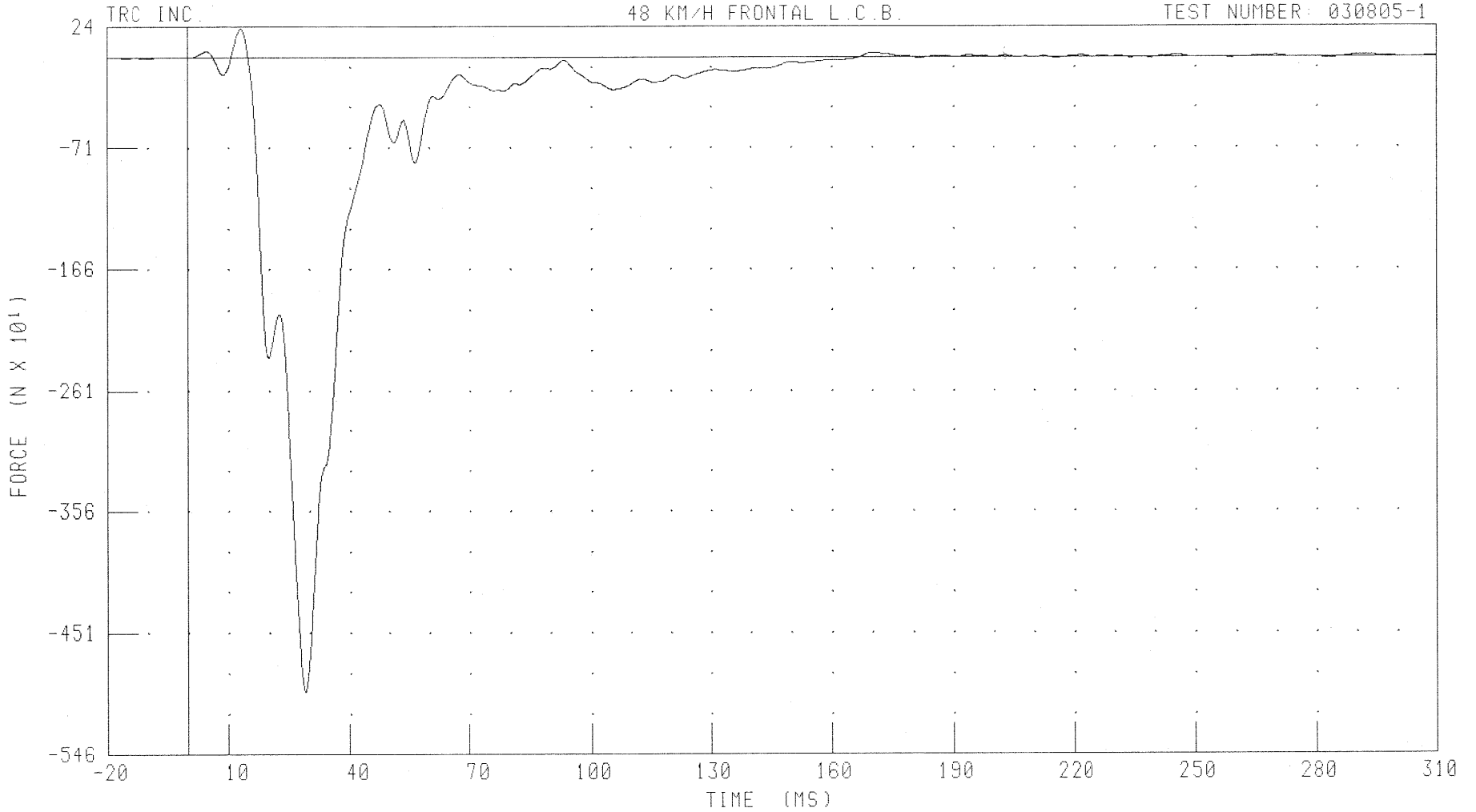
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER POSITION D7 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BD7F

FILTER: CH. CLASS 60

PEAK DATA: 226.62 N @ 13.12 MS, -4969.68 N @ 29.04 MS

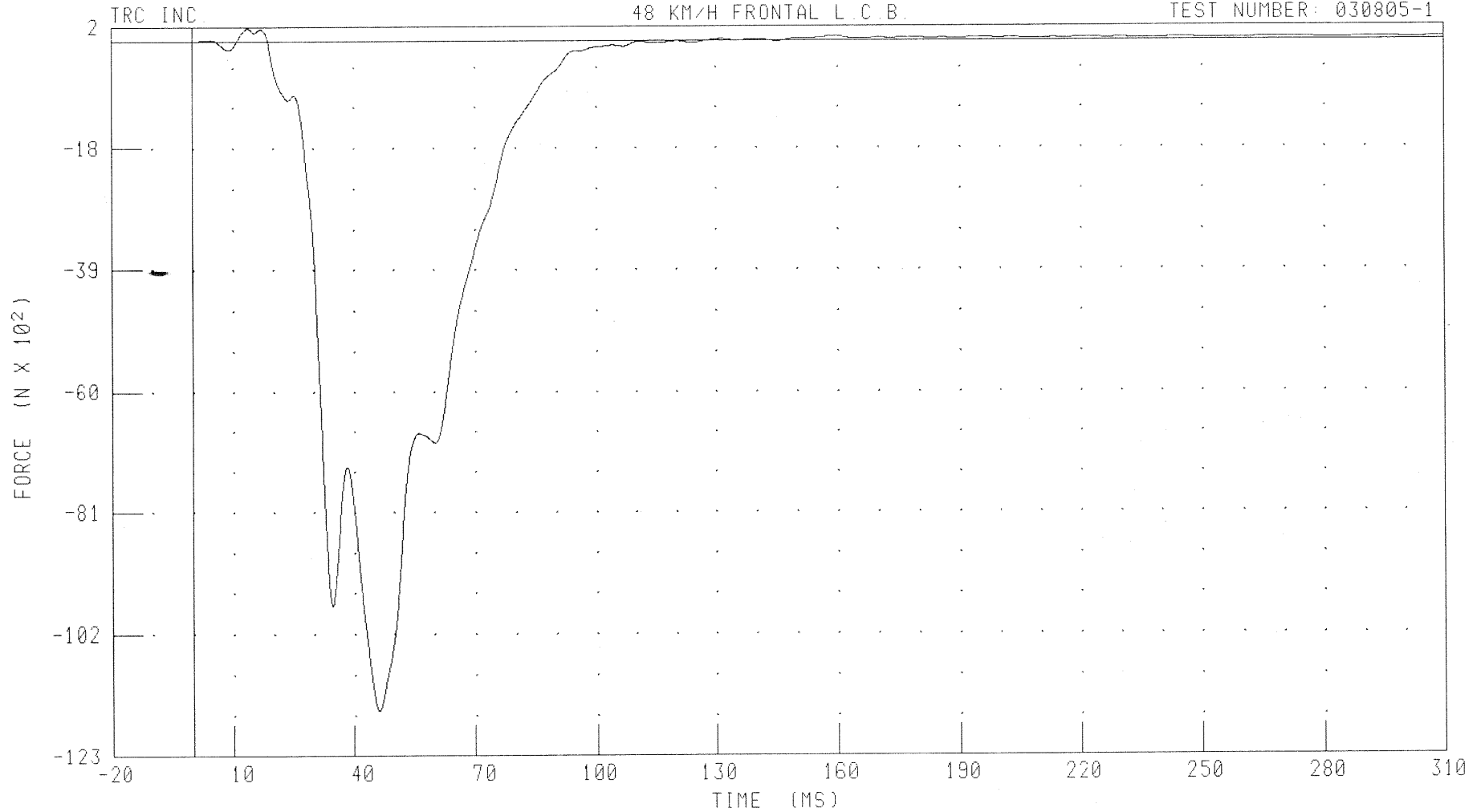
B-201

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION D8 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BD8F

FILTER: CH. CLASS 60

PEAK DATA: 221.31 N @ 13.76 MS; -11582.40 N @ 46.32 MS

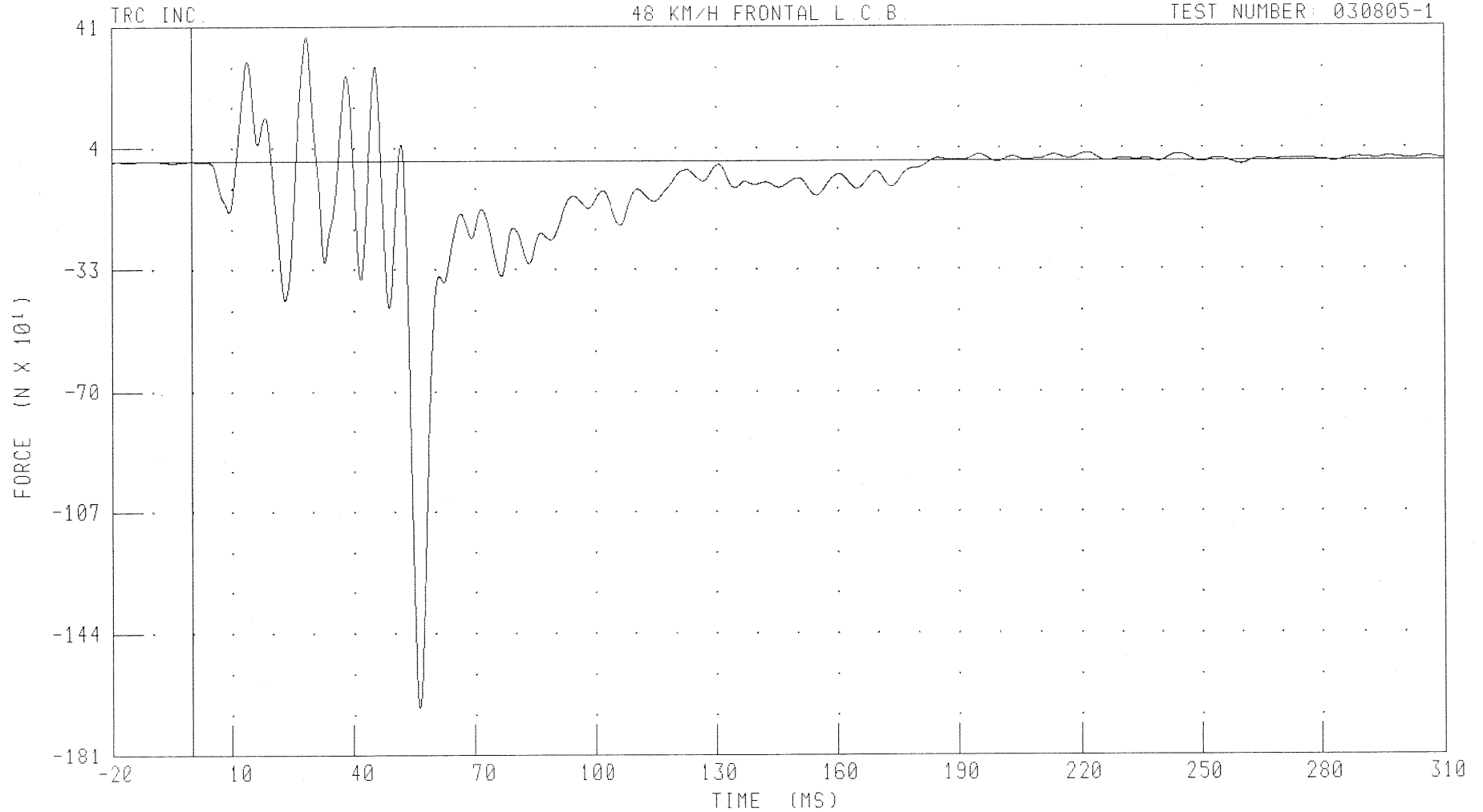
B-202

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER POSITION D9 FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: BD9F

FILTER: CH. CLASS 60

PEAK DATA: 380.60 N @ 28.56 MS; -1667.19 N @ 56.16 MS

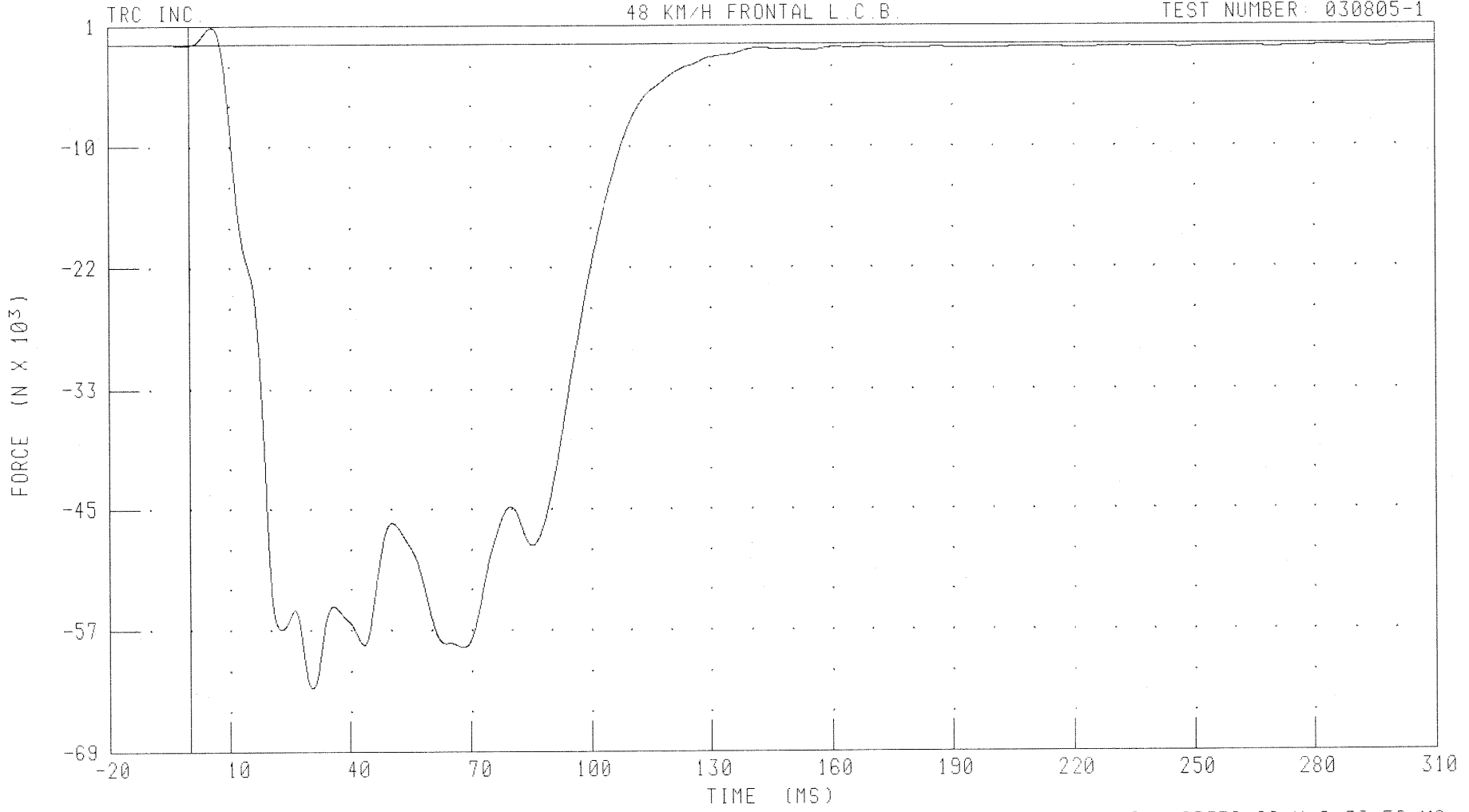
B-203

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER GROUP # 1 FORCE TOTAL

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: LCBG1F

FILTER: CH. CLASS 60

PEAK DATA: 1677.57 N @ 5.68 MS; -63370.00 N @ 30.56 MS

B-204

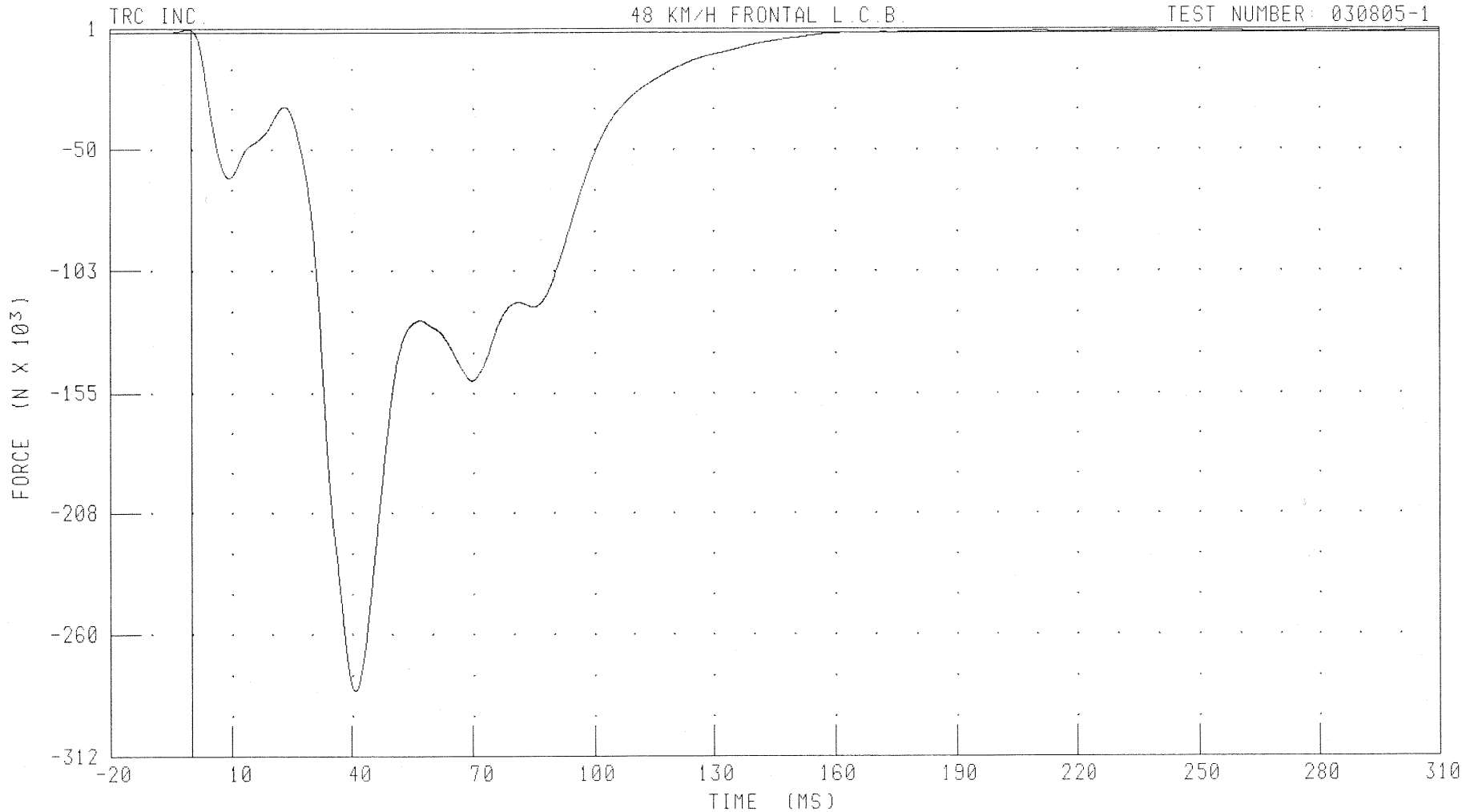
030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

LOAD CELL BARRIER GROUP # 2 FORCE TOTAL

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: LCBG2F FILTER: CH. CLASS 60

PEAK DATA: 1374.95 N @ -0.72 MS; -284757.22 N @ 40.88 MS

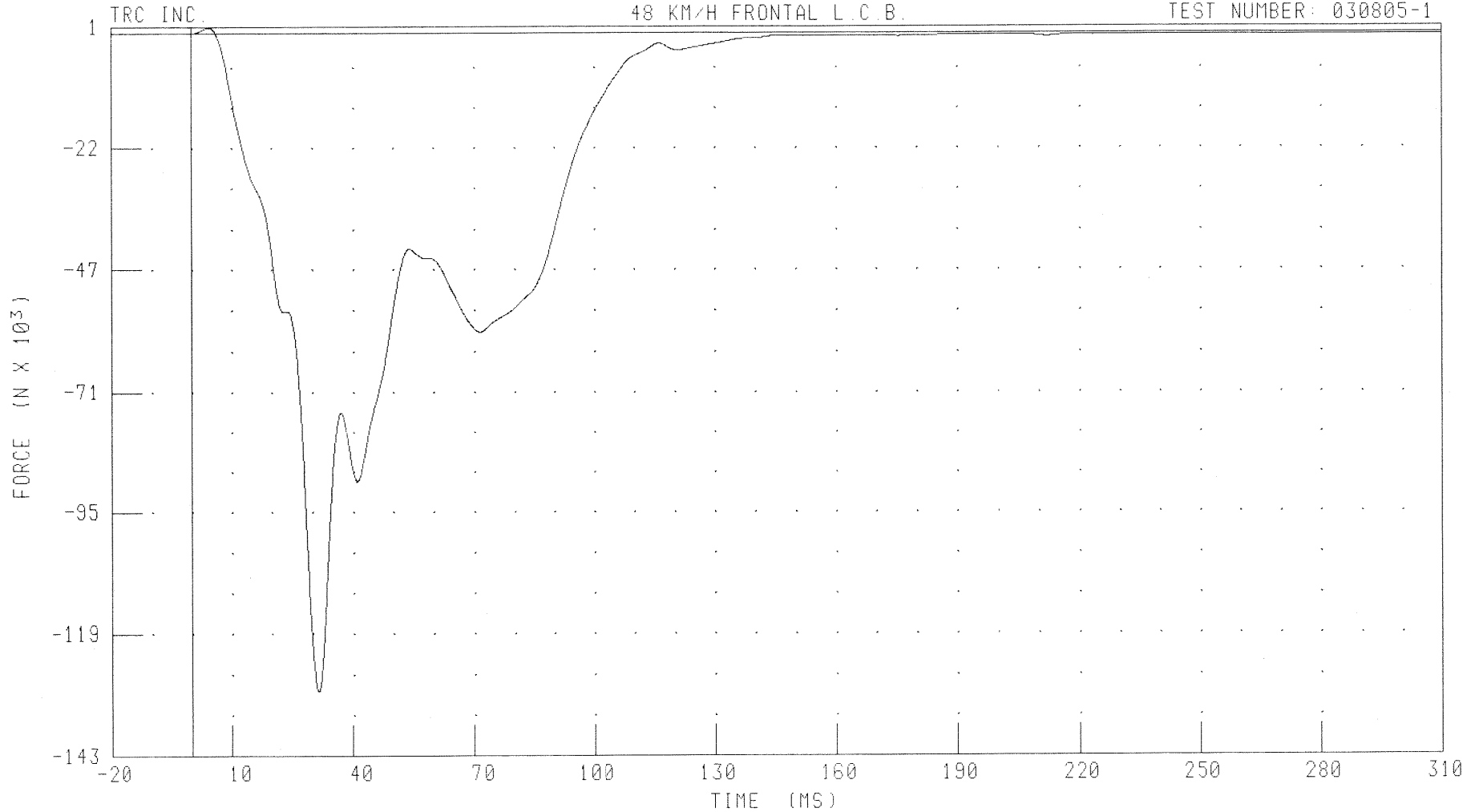
B-205

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER GROUP # 3 FORCE TOTAL

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: LCBG3F FILTER: CH. CLASS 60

PEAK DATA: 1101.06 N @ 4.32 MS; -130606.35 N @ 31.52 MS

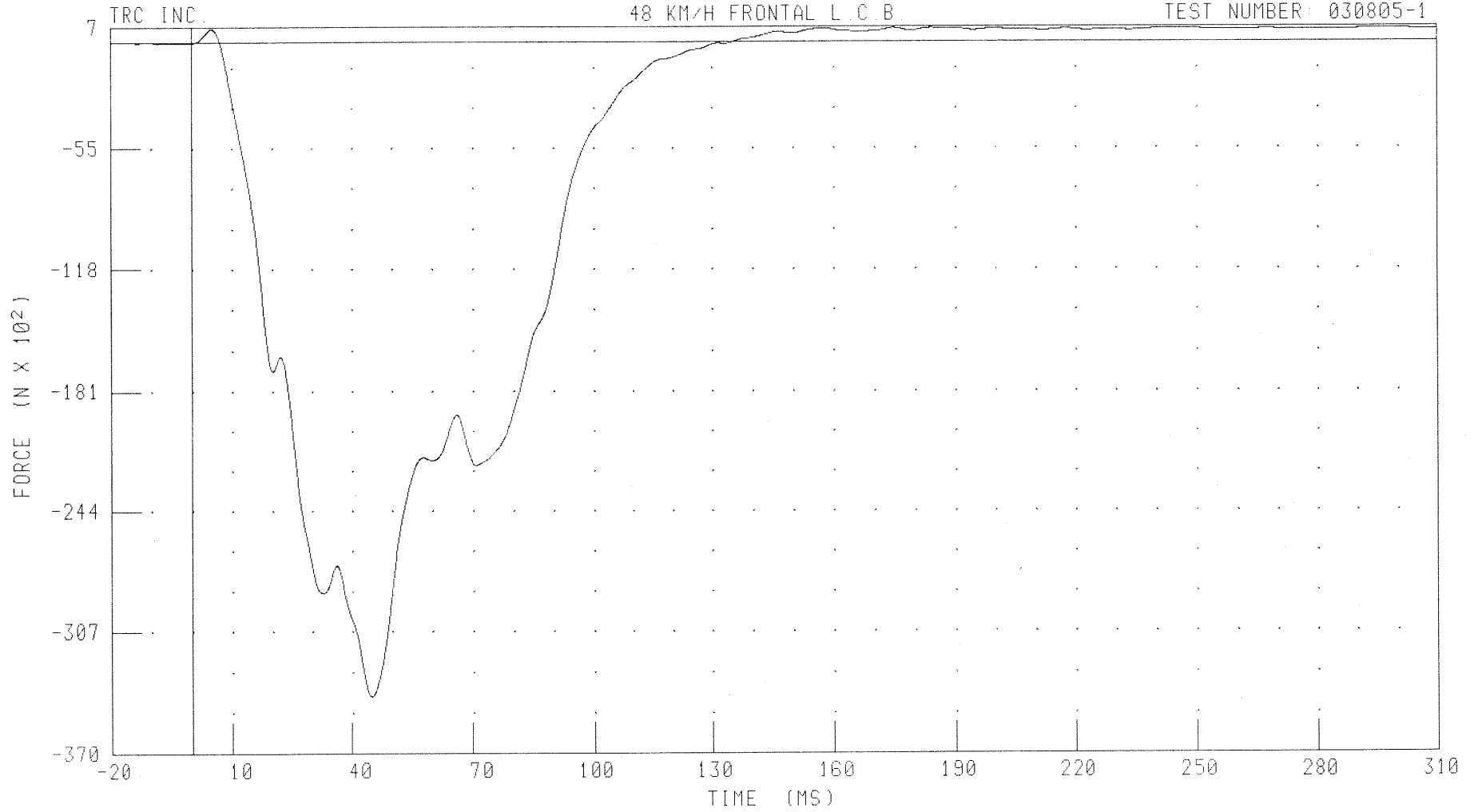
B-206

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER GROUP # 4 FORCE TOTAL

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: LCBG4F FILTER: CH. CLASS 60

PEAK DATA: 673.70 N @ 184.08 MS; -34109.10 N @ 44.88 MS

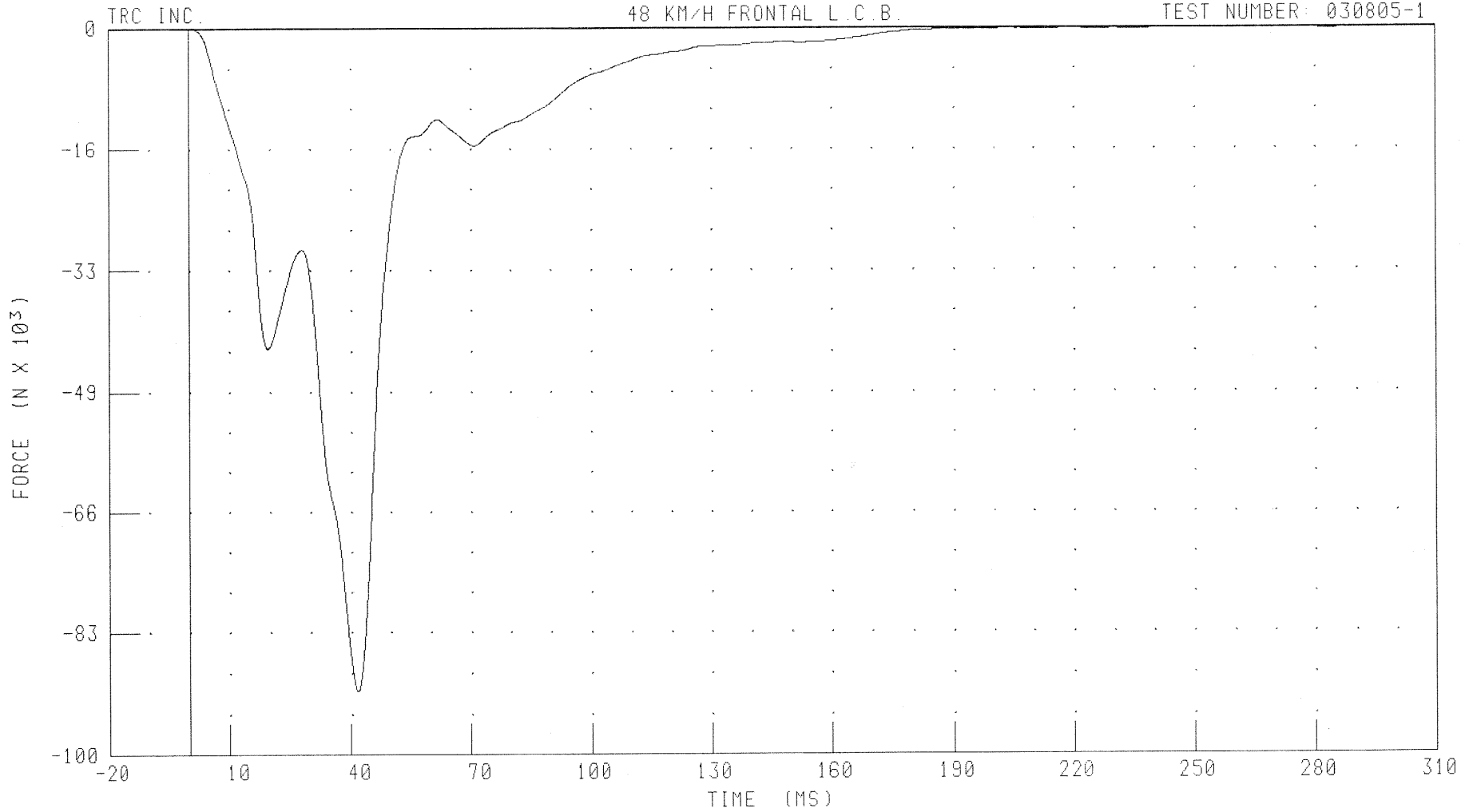
B-207

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER GROUP # 5 FORCE TOTAL

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: LCBG5F FILTER: CH. CLASS 60

PEAK DATA: 100.87 N @ 0.40 MS; -91405.09 N @ 41.76 MS

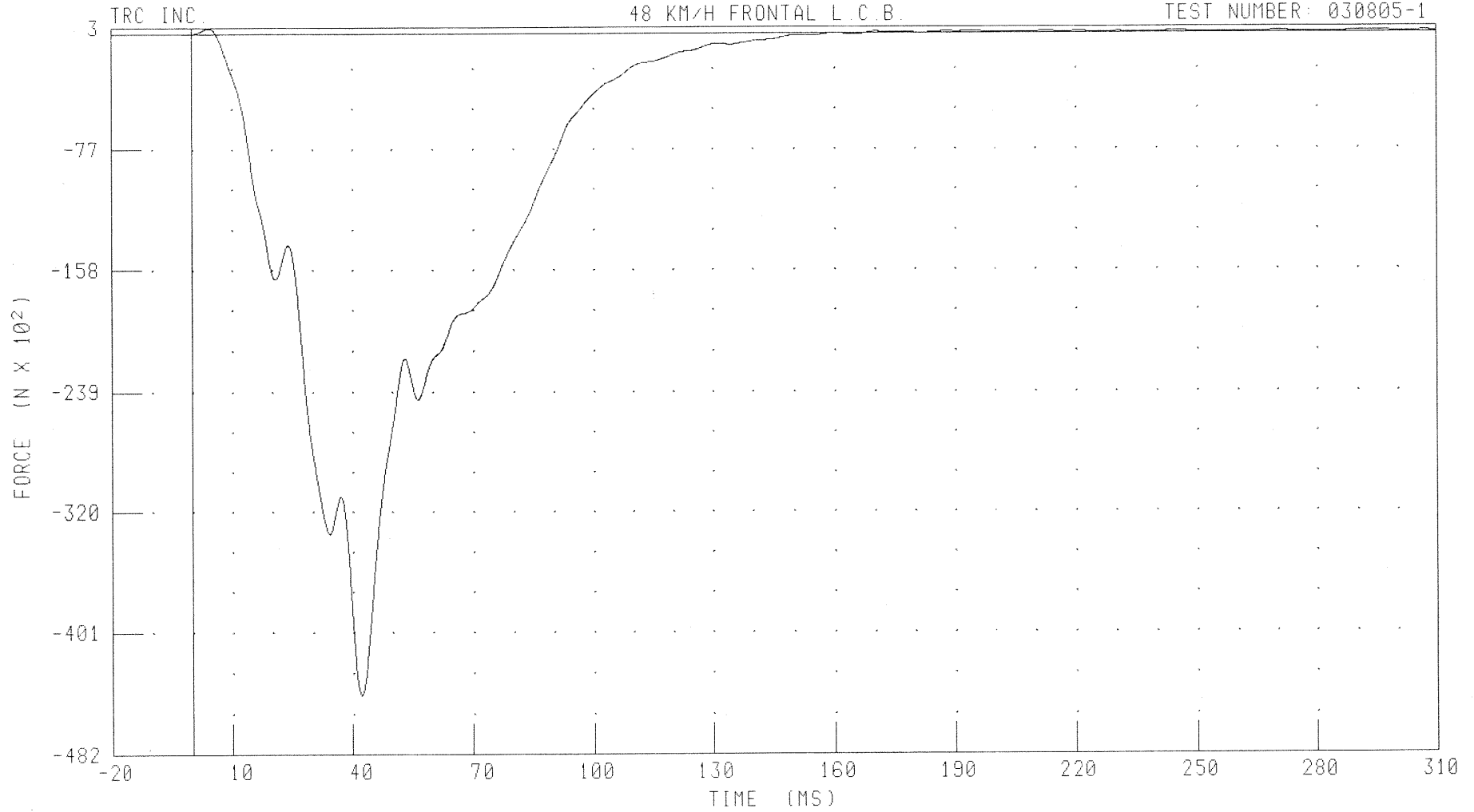
B-208

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
LOAD CELL BARRIER GROUP # 6 FORCE TOTAL

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



CHANNEL: LCBG6F FILTER: CH. CLASS 60

PEAK DATA: 338.76 N @ 4.24 MS; -44298.89 N @ 42.24 MS

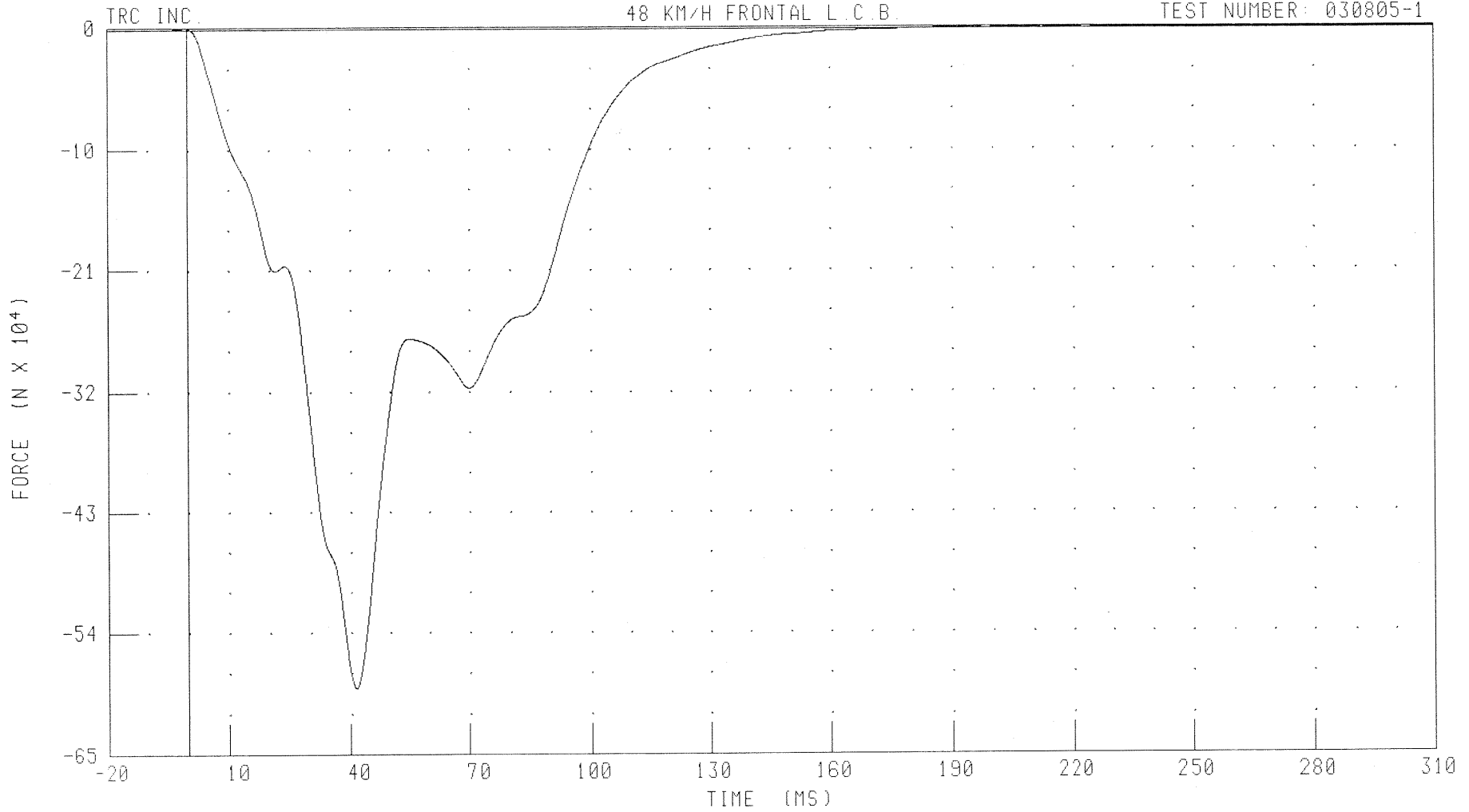
B-209

030805-1

2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H
TOTAL LOAD CELL BARRIER FORCE

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030805-1



TRC INC.

FORCE ($N \times 10^4$)

TIME (MS)

CHANNEL LCBGT FILTER: CH. CLASS 60

PEAK DATA: 1231.88 N @ -0.56 MS, -596281.69 N @ 41.44 MS

B-210

030805-1

Appendix C

Dummy Configuration and Performance Verification Data

THOR Leg Configuration Information

Driver Dummy S/N 090

Program Summary of THOR-Lx Leg Uses with Dummy S/N: 090

Date	Activity	THOR Leg Uses		Notes	Injury Criteria Exceeded
		Left LX-110	Right LX-109		
9/9/02	Calibration	yes	yes	Initial calibration	
2/14/03	Test	1	1	2002 Saturn Vue - Driver	Right lower tibia index, right lower compression, right foot YL rotation
2/20/03	Test	2	2	2002 Ford Windstar - Driver	Right foot XL rotation
2/28/03	Test	3	3	2002 Ford Windstar - Passenger	None
3/10/03	Calibration	yes	yes	Note #1	
3/18/03	Test	1	1	2003 Toyota Carolla - Driver	Right foot XL rotation
4/4/03	Test	2	2	2003 Toyota Carolla - Passenger	Right upper tibia index
4/15/03	Calibration	no	yes	Note #2	
5/5/03	Test	3	1	2002 Honda Civic - Driver	None
5/20/03	Calibration	yes	no	Note #3	
5/29/03	Test	1	2	2002 Honda Civic - Passenger	Left upper tibia index
6/6/03	Calibration	yes	no	Note #4	
6/23/03	Test	1	3	2002 Saturn Vue - Passenger	Left and right foot YL rotation
8/5/03	Test	2	4	2002 Saturn Vue - Driver; Note #5	Left foot YL rotation
10/15/03	Calibration	yes	yes	Note #6	

- #1 Scheduled calibration after three uses - Right and left legs
(2) Rubber eversion bumpers were replaced based on visual inspection prior to performing a calibration. Right leg failed the Dynamic Heel Foot Impact Test during calibration. The Tibia Compliant bushing was replaced and the leg passed the second test. Data from both the failing and passing test are included in the dummy calibration documentation.
- #2 Injury calibration - Right leg only
Replaced (2) Inversion/Eversion bumpers, Dorsi Plantar stop, Tibia Compliant bushing, and foot skin. These components were replaced prior to the final calibration data presented in the report.
- #3 Scheduled calibration after three uses - Left leg only
Replaced (2) Inversion/Eversion bumpers, Dorsi Plantar stop, Tibia Compliant bushing, and foot flesh. These components were replaced prior to the final calibration data presented in the report.
- #4 Injury calibration - Left leg only
Replaced (2) Inversion/Eversion bumpers, Ankle Rubber Torque Cylinder, Dorsi Plantar soft stop, (2) Ankle Z-rotation stops, Ankle bolt sleeve, and (2) Rotary X,Y potentiometers. These components were replaced prior to the final calibration data presented in the report.
- #5 Fourth use of right leg without calibration approved prior to test by COTR.
- #6 Final post-program calibration - Right and left legs
Calibration performed "as-is" without replacing any components. The right leg failed the Dynamic Heel test and Gesac recommended replacing the Tibia compliant bushing prior to retesting. The left leg failed the Dynamic Heel and Ball tests, Gesac recommended replacing the Tibia compliant bushing and Dorsi flexion stop prior to retesting. The z-axis lower tibia load cell in the left leg was also found to have a bad wire during calibration, Gesac recommended replacing the wire prior to further testing.

Pre-test Dummy Configuration and Performance Verification Data

Driver Dummy S/N: 090

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 090 Calibration No. 43

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	883	Yes
B	Shoulder Pivot Height	505.5 - 520.7	515	Yes
C	H-Point Height	83.8 - 88.9	87	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	86	Yes
F	Thigh Clearance	139.7 - 154.9	147	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	291	Yes
H	Skull Cap To Backline	40.6 - 45.7	43	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	337	Yes
J	Elbow Rest Height	190.5 - 210.8	201	Yes
K	Buttock Knee Length	579.1 - 604.5	588	Yes
L	Popliteal Height	429.3 - 454.7	432	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	460	Yes
O	Chest Depth	213.4 - 228.6	221	Yes
P	Foot Length	251.5 - 266.7	252	Yes
V	Shoulder Breadth	421.6 - 436.9	433	Yes
W	Foot Breadth	91.4 - 106.7	102	Yes
Y	Chest Circumference	970.3 - 1000.8	991	Yes
Z	Waist Circumference	835.7 - 866.1	857	Yes
AA	Location For Chest Circumference	429.3 - 434.3	432	Yes
BB	Location For Waist Circumference	226.1 - 231.1	229	Yes

Technician

Approved




Transportation Research Center Inc.

572E Head Drop Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/25/2003

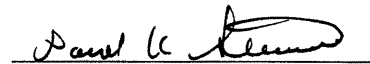
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Peak Resultant Acceleration	225 - 275 g	249.1 g	Yes
Peak Lateral Acceleration	15 g Max	-8.4 g	Yes
Oscillations After Main Pulse	Less Than 10% of Peak Resultant Acceleration?	Yes	Yes

Comments:

Technician



Approved



06.25.2003 09:00:45 613

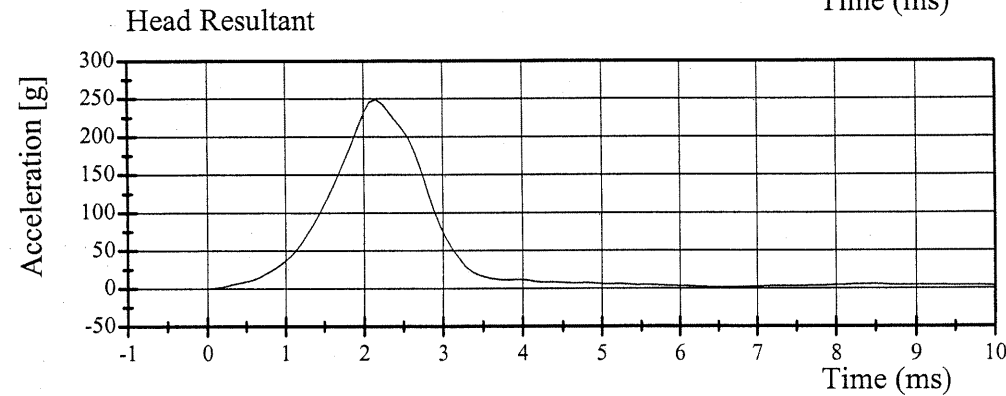
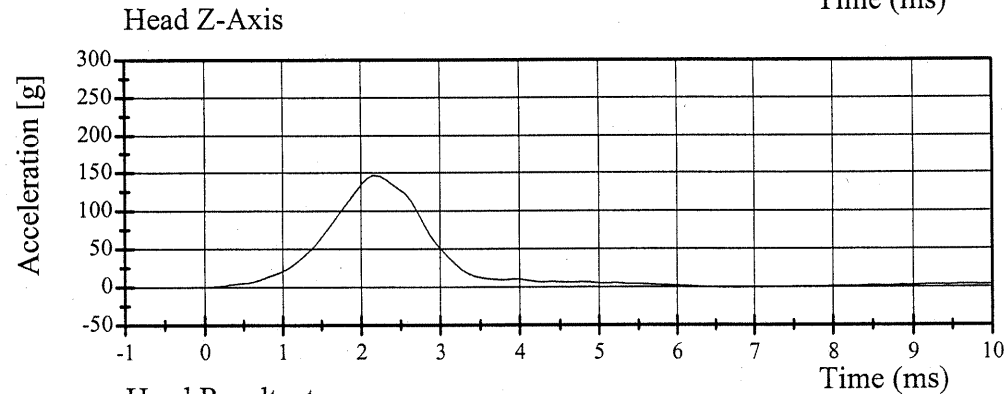
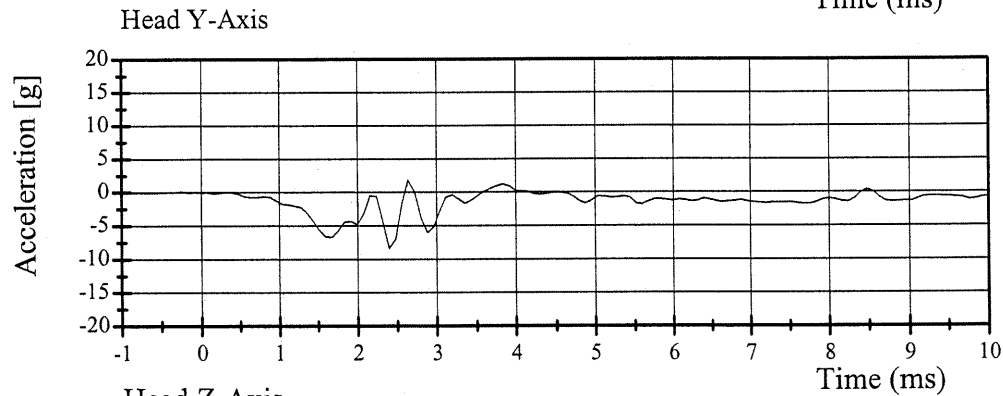
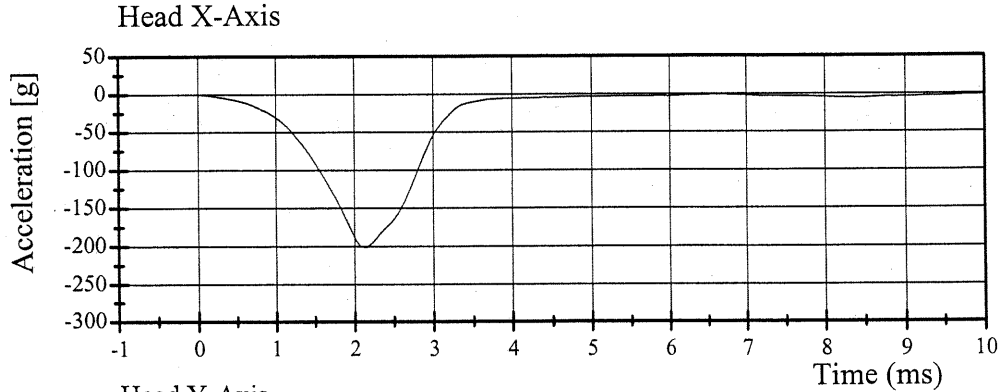


Transportation Research Center Inc.

572E Head Drop Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/25/2003



06.25.2003 09:00:46 613



Transportation Research Center Inc.

572E Neck Flexion Test - 6 Channel Transducer

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/27/2003

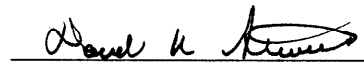
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impact Velocity	6.89 - 7.13 m/s	6.93 m/s	Yes
Pendulum Deceleration			
10 ms	22.50 - 27.50 g	24.81 g	Yes
20 ms	17.60 - 22.60 g	22.18 g	Yes
30 ms	12.50 - 18.50 g	17.23 g	Yes
Max Pendulum Deceleration	29.00 g	25.62 g	Yes
Max Pendulum Deceleration After 30 ms	29.00 g	17.16 g	Yes
Deceleration-Time Curve			
Decay Time To 5g	34 - 42 ms	35.04 ms	Yes
D Plane Rotation			
Max	64 - 78 °	73.03 °	Yes
Time	57 - 64 ms	57.68 ms	Yes
Moment About Occipital Condyle			
Max	88.1 - 108.5 N·m	96.25 N·m	Yes
Time	47 - 58 ms	49.36 ms	Yes
Rotation Angle-Time Curve			
Decay Time To Zero	113 - 128 ms	118.64 ms	Yes
Positive Moment-Time Curve			
Decay Time To Zero	97 - 107 ms	97.44 ms	Yes

Comments:

Technician



Approved



06.27.2003 12:11:56 501



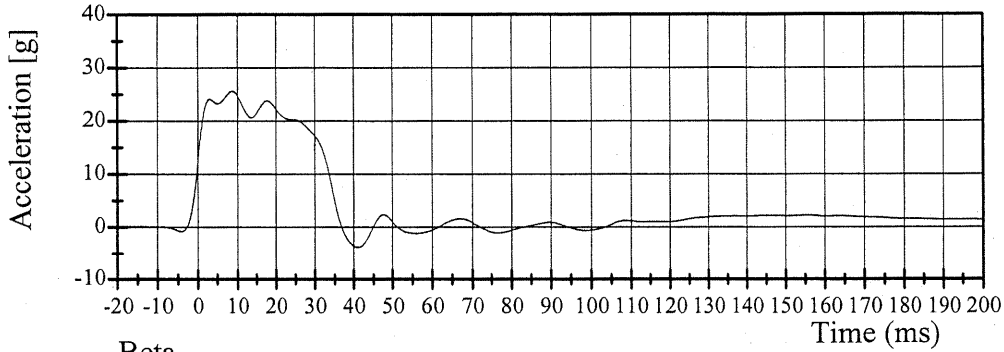
Transportation Research Center Inc.

572E Neck Flexion Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/27/2003

Pendulum Deceleration

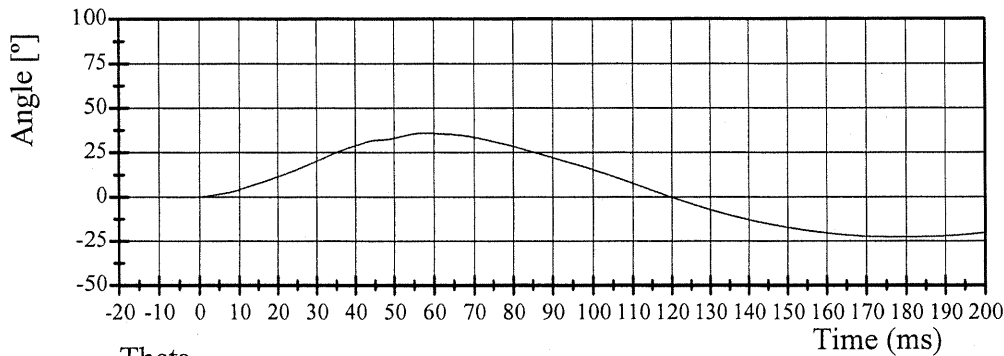


Filter Class: 60

Max: 25.6 g at 8.7 ms

Min: -3.8 g at 41.1 ms

Beta

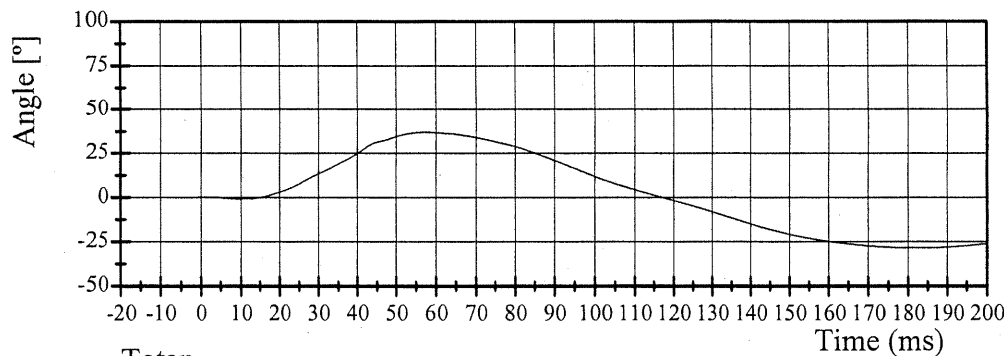


Filter Class: 60

Max: 36.0° at 57.8 ms

Min: -22.6° at 178.9 ms

Theta

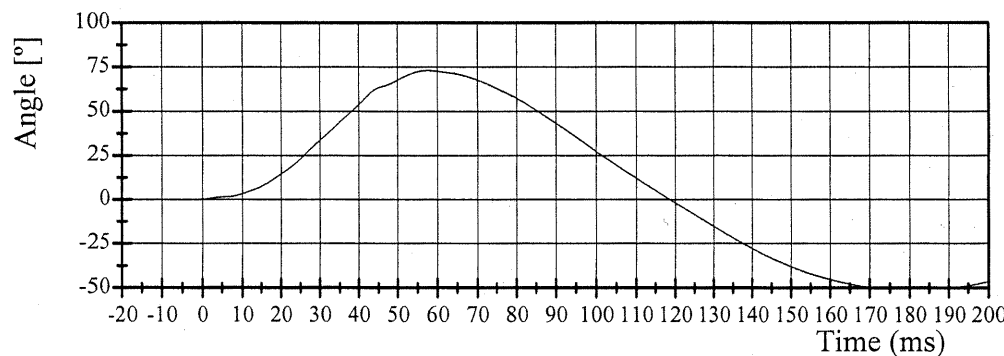


Filter Class: 60

Max: 37.0° at 57.4 ms

Min: -28.4° at 182.3 ms

Totan



Filter Class: 60

Max: 73.0° at 57.7 ms

Min: -51.1° at 181.4 ms

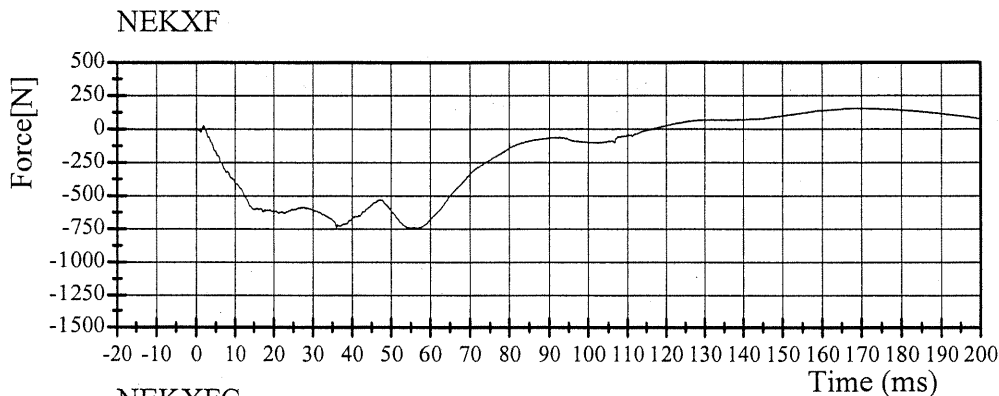


Transportation Research Center Inc.

572E Neck Flexion Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

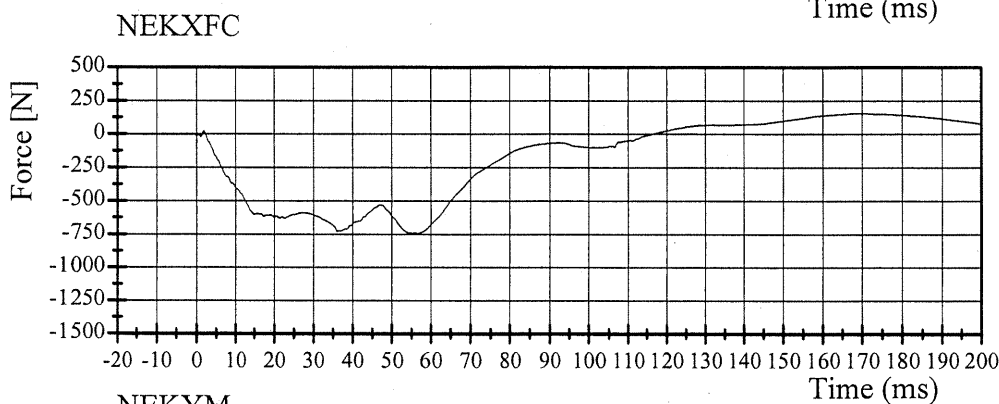
Test Date 06/27/2003



Filter Class: 1000

Max: 155.3 N at 168.8 ms

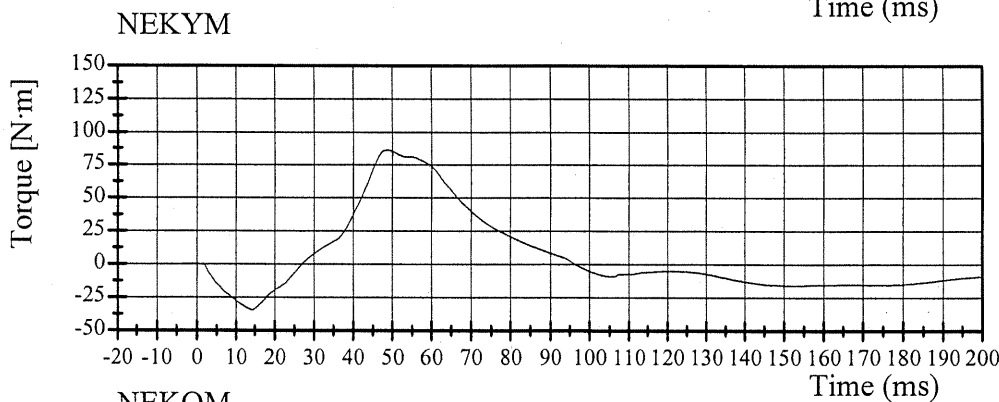
Min: -744.1 N at 56.9 ms



Filter Class: 600

Max: 154.9 N at 169.5 ms

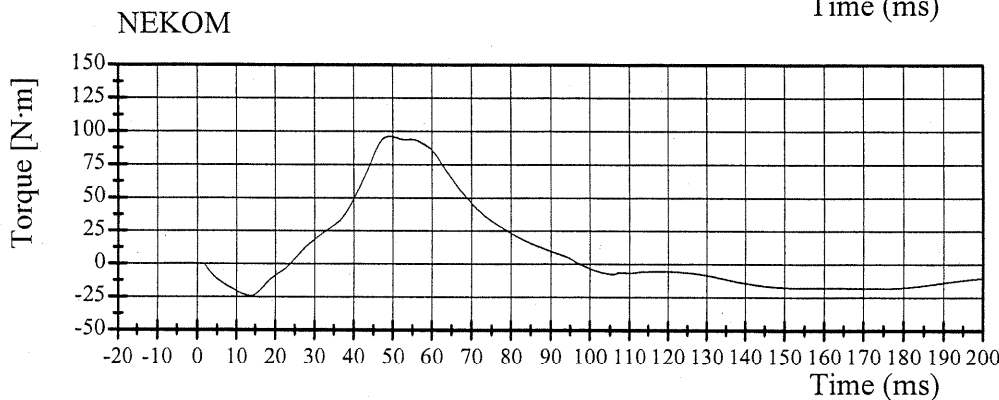
Min: -743.8 N at 56.8 ms



Filter Class: 600

Max: 86.1 N·m at 48.8 ms

Min: -34.4 N·m at 14.2 ms



Filter Class: 600

Max: 96.3 N·m at 49.4 ms

Min: -24.2 N·m at 13.8 ms

06.27.2003 12:11:59 501



Transportation Research Center Inc.

572E Neck Extension Test - 6 Channel Transducer

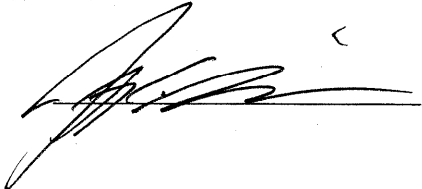
HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/27/2003

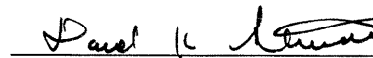
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Impact Velocity	5.95 - 6.19 m/s	5.98 m/s	Yes
Pendulum Deceleration			
10 ms	17.20 - 21.20 g	19.10 g	Yes
20 ms	14.00 - 19.00 g	16.64 g	Yes
30 ms	11.00 - 16.00 g	12.52 g	Yes
Max Pendulum Deceleration	22.00 g	19.27 g	Yes
Max Pendulum Deceleration After 30 ms	22.00 g	12.46 g	Yes
Deceleration-Time Curve			
Decay Time To 5g	38 - 46 ms	43.28 ms	Yes
D Plane Rotation			
Max	81 - 106 °	97.70 °	Yes
Time	72 - 82 ms	81.44 ms	Yes
Moment About Occipital Condyle			
Min	-80.0 - (-52.9) N·m	-60.48 N·m	Yes
Time	65 - 79 ms	76.00 ms	Yes
Rotation Angle-Time Curve			
Decay Time To Zero	147 - 174 ms	168.72 ms	Yes
Negative Moment-Time Curve			
Decay Time To Zero	120 - 148 ms	143.20 ms	Yes

Comments:

Technician



Approved



06.27.2003 12:47:52 578



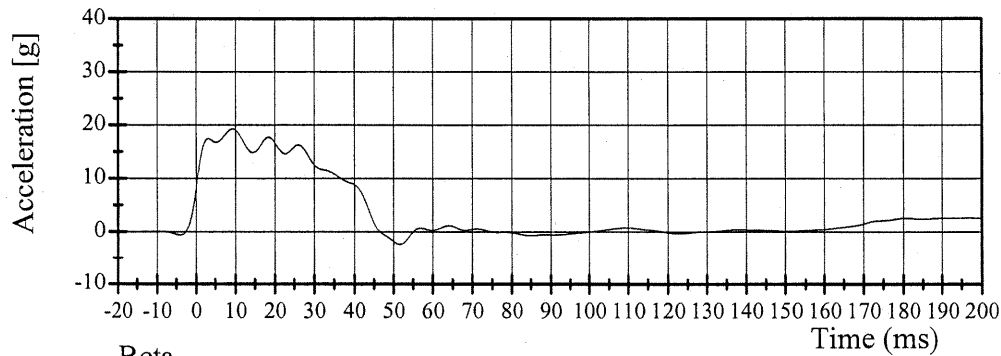
Transportation Research Center Inc.

572E Neck Extension Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/27/2003

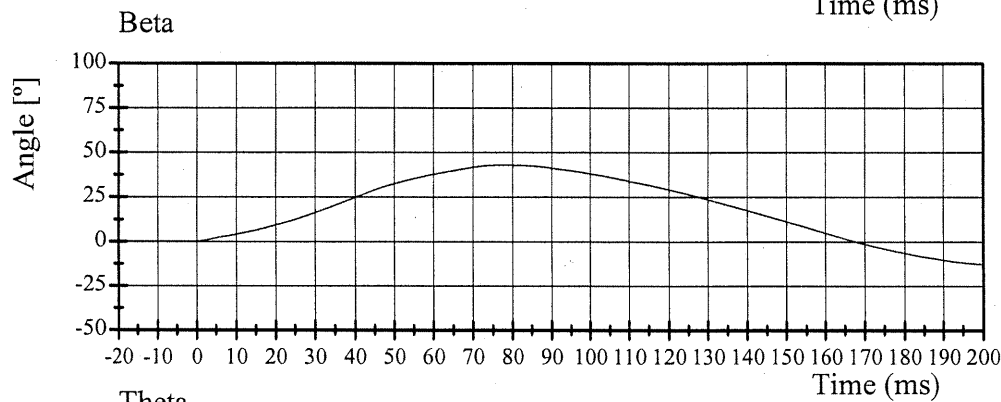
Pendulum Deceleration



Filter Class: 60

Max: 19.3 g at 9.4 ms

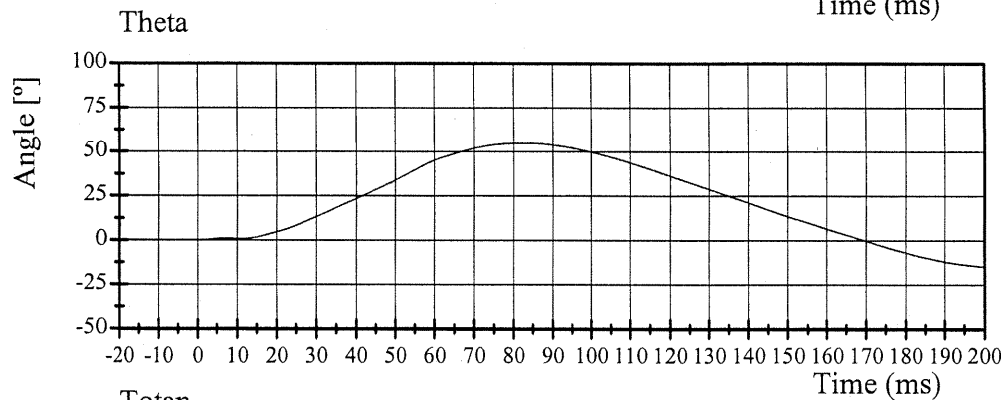
Min: -2.4 g at 51.7 ms



Filter Class: 60

Max: 42.9 ° at 77.0 ms

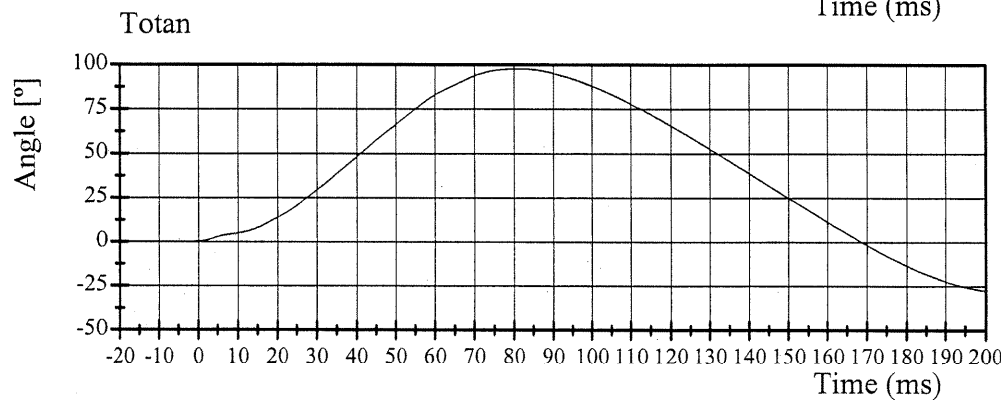
Min: -13.6 ° at 210.5 ms



Filter Class: 60

Max: 54.9 ° at 83.0 ms

Min: -15.9 ° at 211.3 ms



Filter Class: 60

Max: 97.7 ° at 81.4 ms

Min: -29.4 ° at 211.0 ms

06.27.2003 12:47:53 578



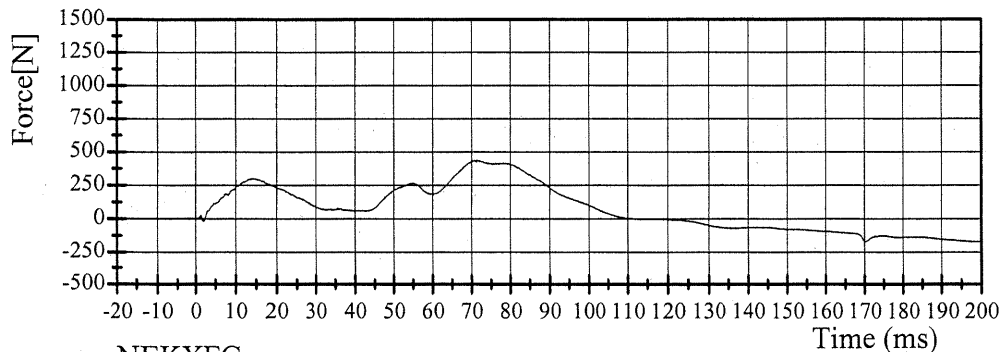
Transportation Research Center Inc.

572E Neck Extension Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/27/2003

NEKXF

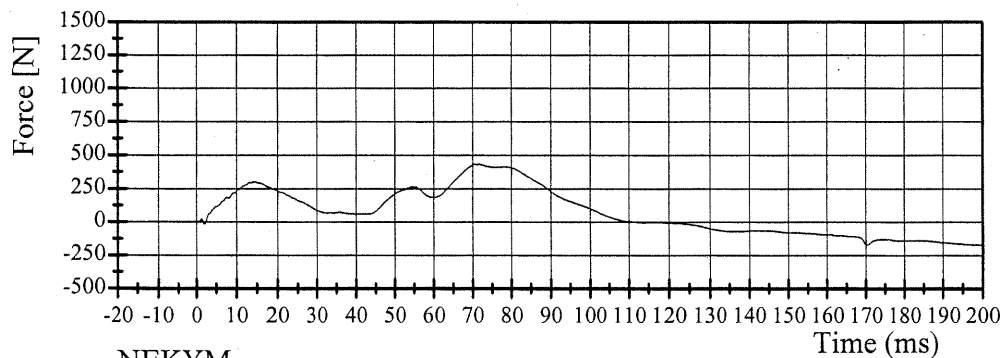


Filter Class: 1000

Max: 436.4 N at 71.4 ms

Min: -172.5 N at 170.2 ms

NEKXFC

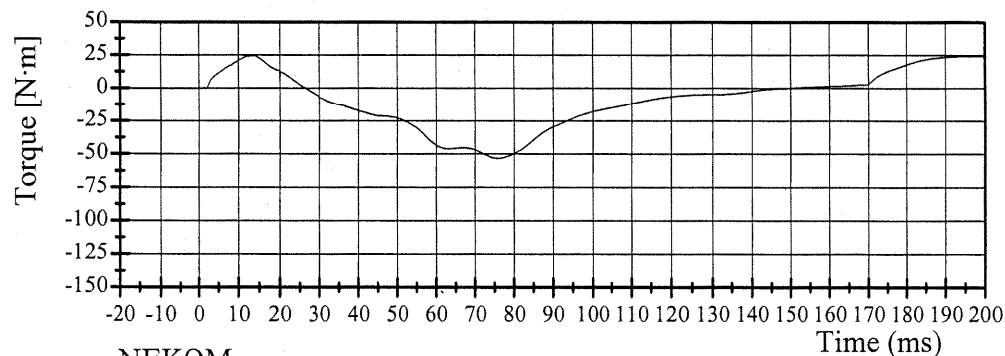


Filter Class: 600

Max: 432.9 N at 71.6 ms

Min: -172.3 N at 170.2 ms

NEKYM

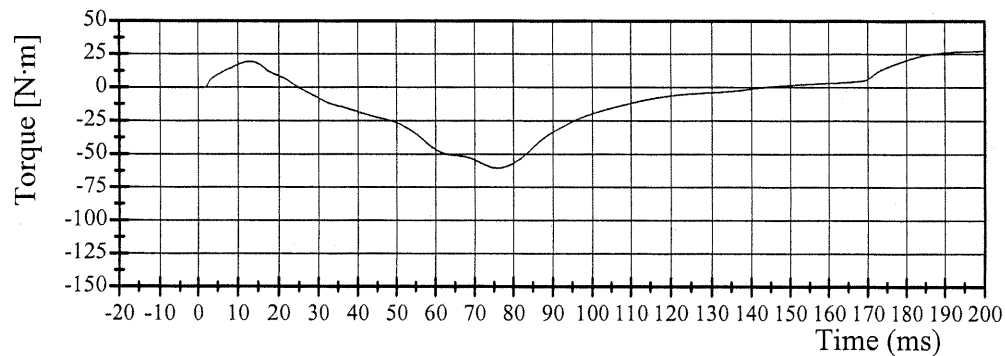


Filter Class: 600

Max: 24.6 N·m at 13.2 ms

Min: -53.3 N·m at 75.9 ms

NEKOM



Filter Class: 600

Max: 27.6 N·m at 203.0 ms

Min: -60.5 N·m at 76.0 ms



Transportation Research Center Inc.

572E Thorax Test

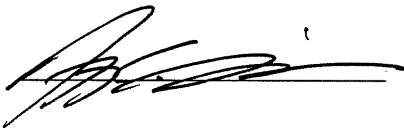
HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/24/2003

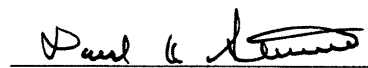
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	6.59 - 6.83 m/s	6.66 m/s	Yes
Maximum Chest Deflection	-72.6 - (-63.5) mm	-71.7 mm	Yes
Maximum Resistive Force	5160 - 5894 N	5615 N	Yes
Internal Hysteresis	69 - 85 %	70 %	Yes

Comments:

Technician



Approved



06.24.2003 13:02:20 952



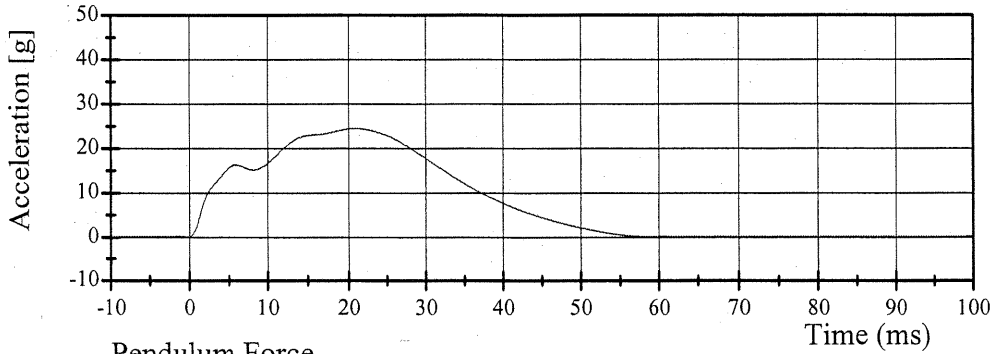
Transportation Research Center Inc.

572E Thorax Test

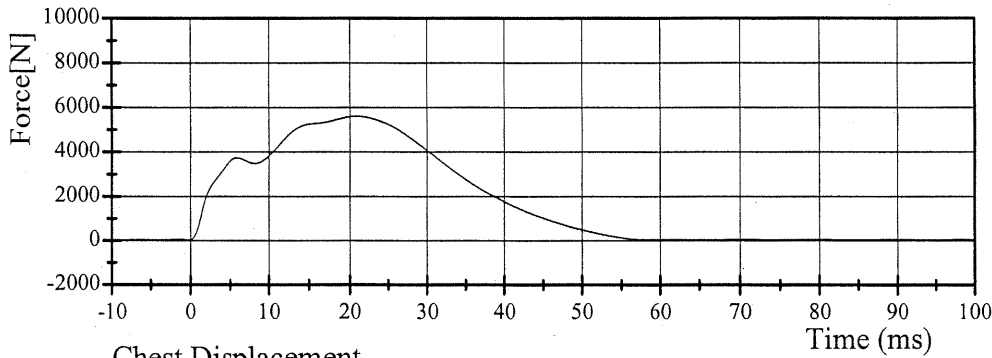
HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/24/2003

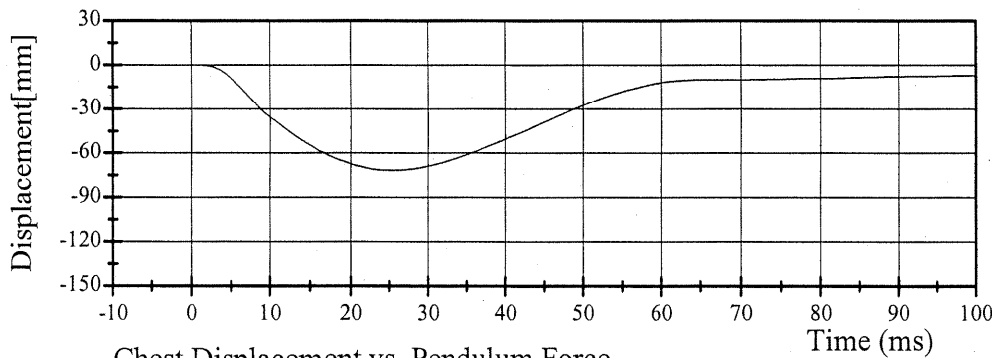
Pendulum Deceleration



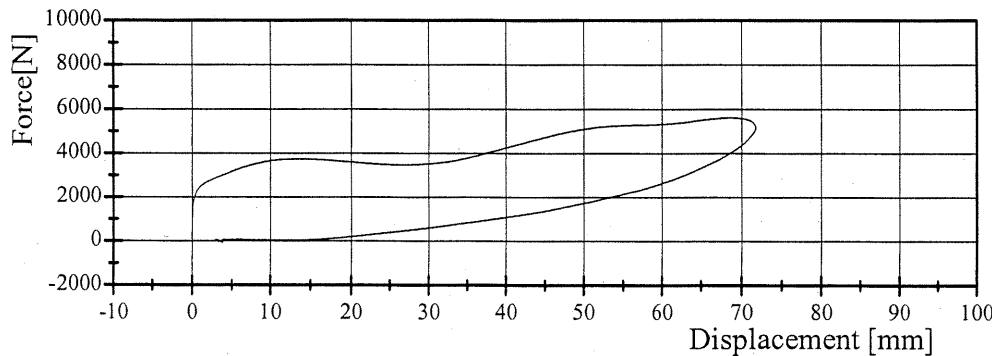
Pendulum Force



Chest Displacement



Chest Displacement vs. Pendulum Force



Transportation Research Center Inc

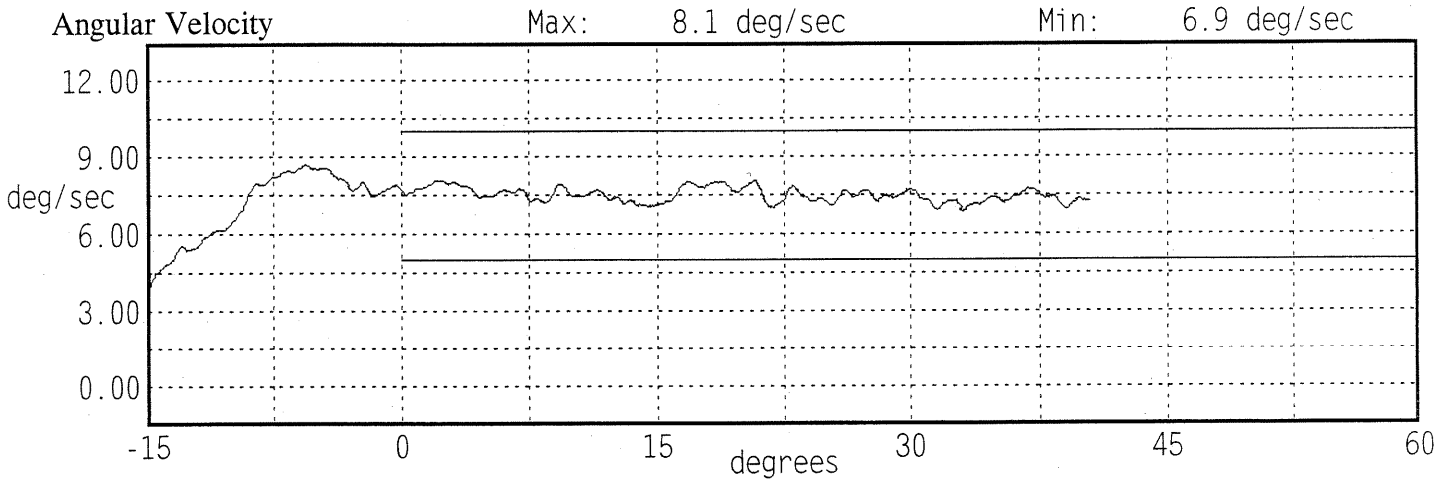
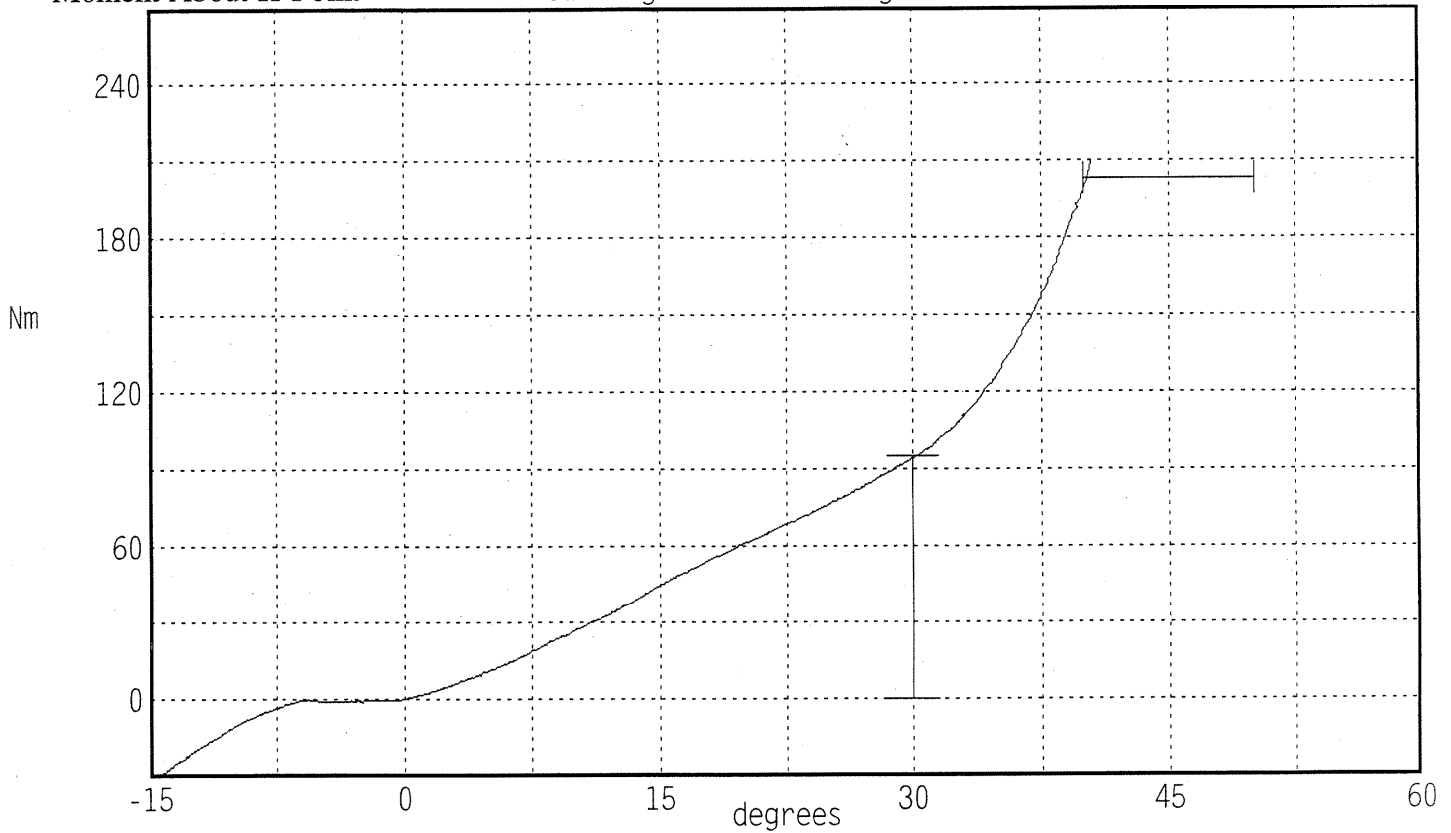
Hybrid III Hip Range of Motion

Serial Number: 090L
Test Number: 090C43
Comments:

Date: 06/27/2003
Time: 10:58

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.1 °C	Pass
Humidity	10 - 70	53 %	Pass
Moment at 30 deg	<= 94.9	94.2 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	40.2 deg	Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec	Pass

Moment About H-Point
Peak Moment: 210.0 Nm at 40.5 deg
Peak Angle: 40.5 deg at 210.0 Nm



Transportation Research Center Inc

Hybrid III Hip Range of Motion

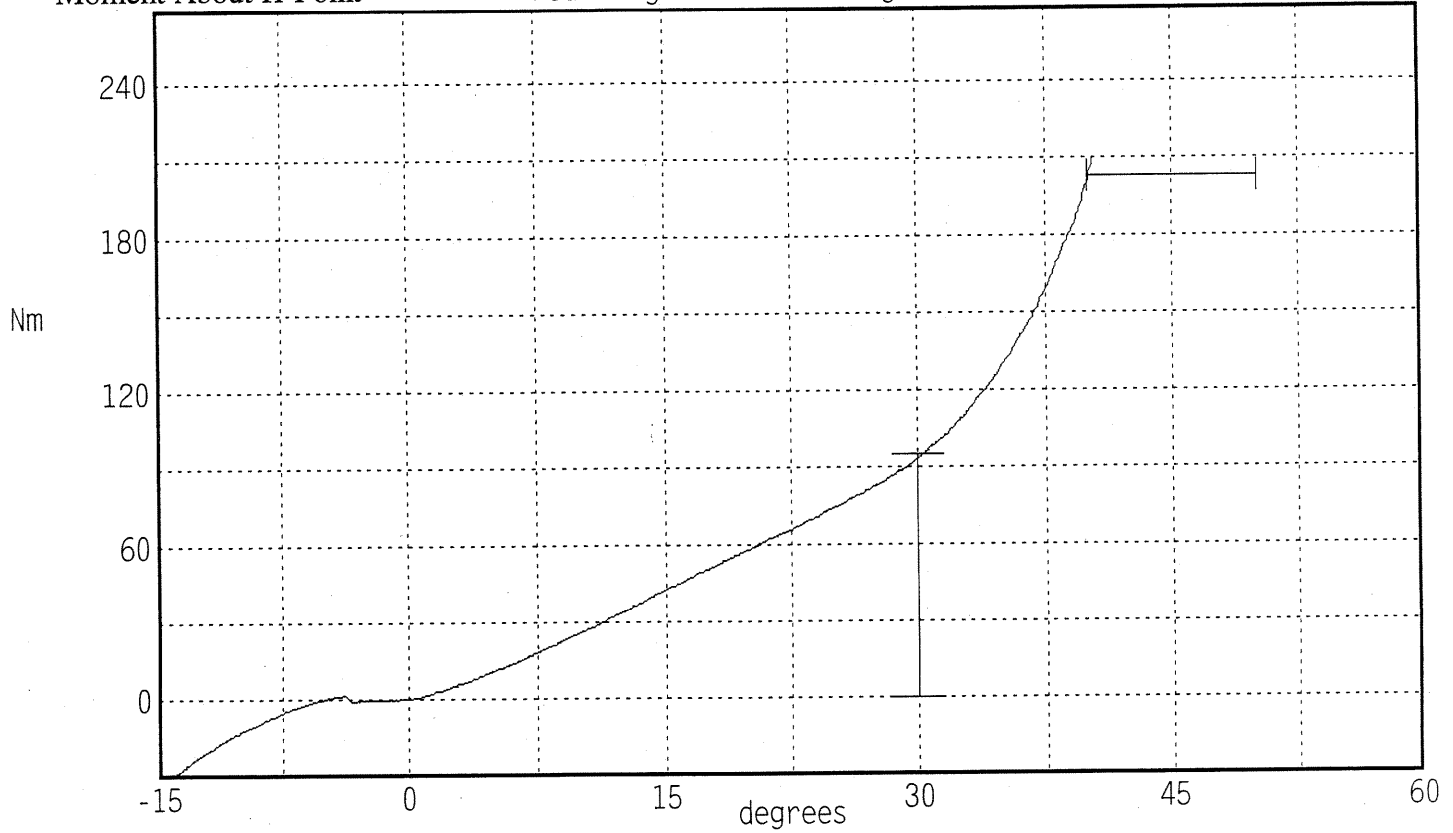
Serial Number: 090R
Test Number: 090C43
Comments:

Date: 06/27/2003
Time: 12:06

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.1 °C	Pass
Humidity	10 - 70	53 %	Pass
Moment at 30 deg	<= 94.9	93.2 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

Peak Moment: 210.0 Nm at 40.3 deg
Peak Angle: 40.3 deg at 210.0 Nm

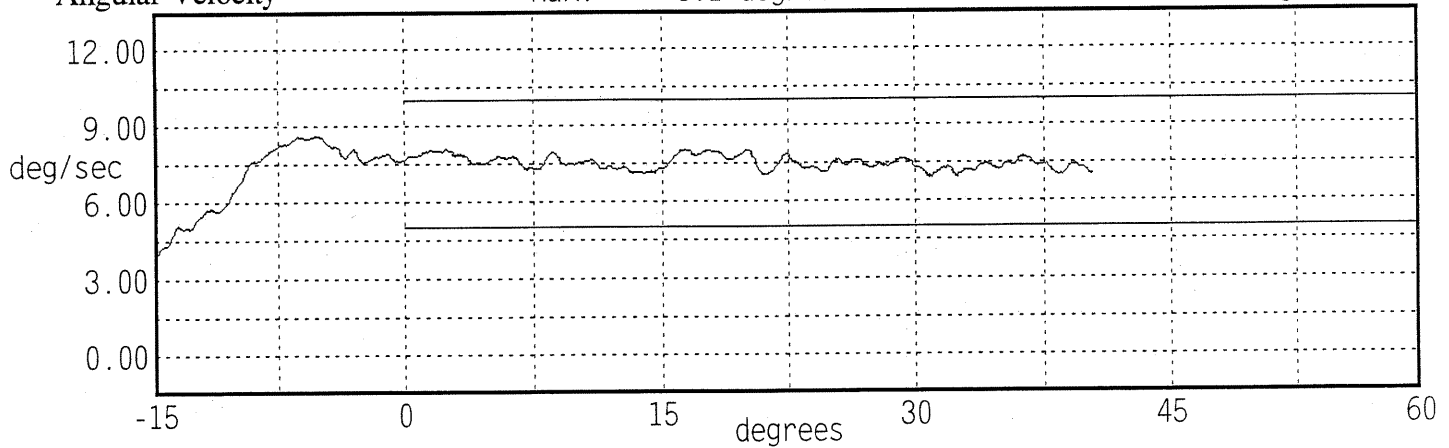
Moment About H-Point



Angular Velocity

Max: 8.1 deg/sec

Min: 6.9 deg/sec



Transportation Research Center Inc.

572E Left Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/25/2003

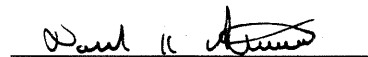
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.76 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1205 N	No
Force At 18 mm Displacement	-2268 - (-3096) N	-2181 N	No

Comments:

Technician



Approved



06.25.2003 09:24:49 1753

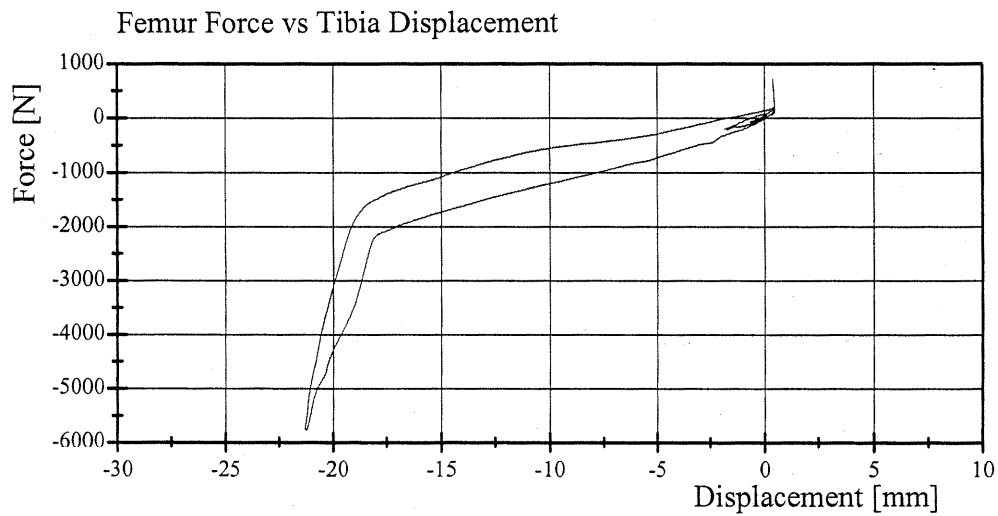
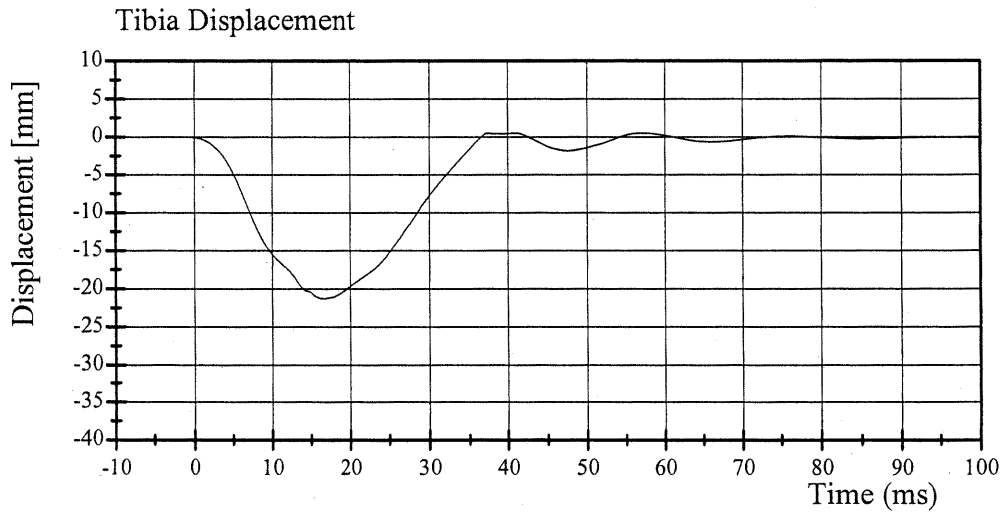
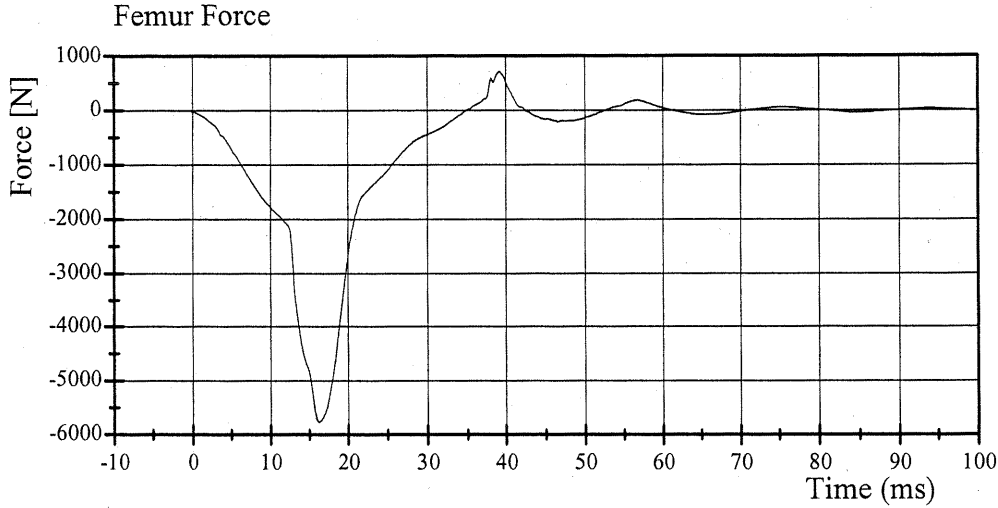


Transportation Research Center Inc.

572E Left Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/25/2003



06.25.2003 09:24:51 1753



Transportation Research Center Inc.

572E Left Knee Slider Test

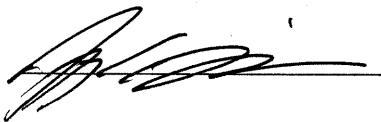
HIII 50th Male Serial No. 090 Calibration No. 43 - 2

Test Date 06/25/2003

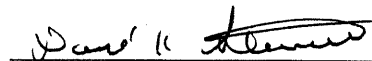
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.78 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1187 N	No
Force At 18 mm Displacement	-2268 - (-3096) N	-2122 N	No

Comments:

Technician



Approved



06.25.2003 10:23:39 1740

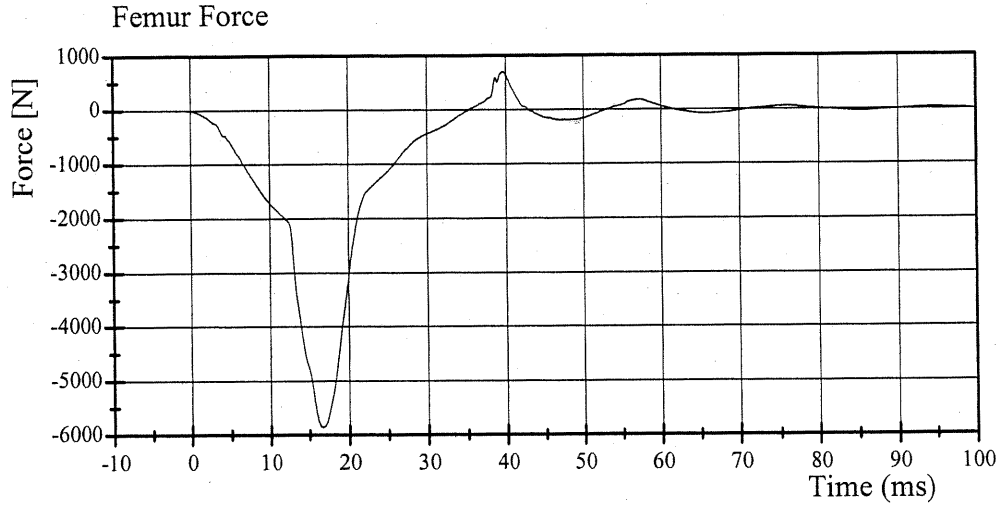


Transportation Research Center Inc.

572E Left Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 2

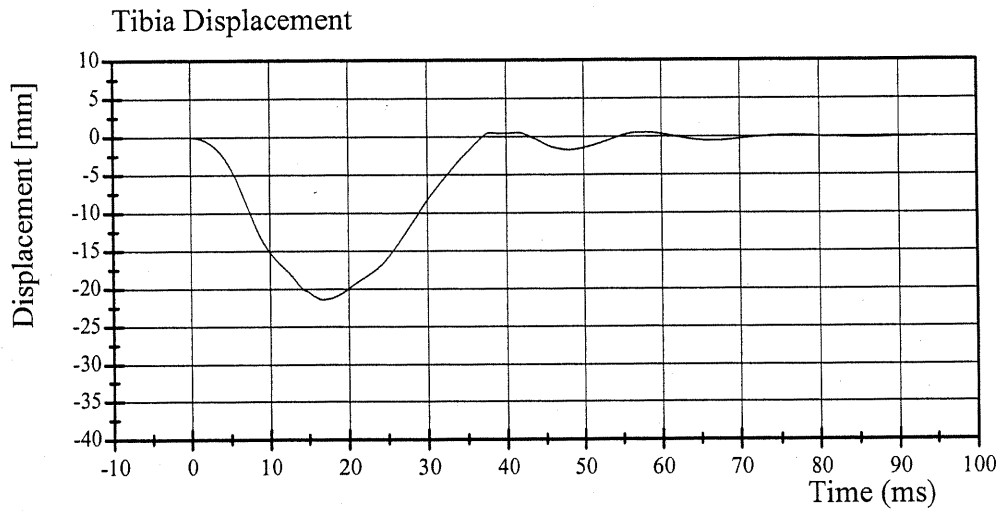
Test Date 06/25/2003



Filter Class: 600

Max: 701.2 N at 39.6 ms

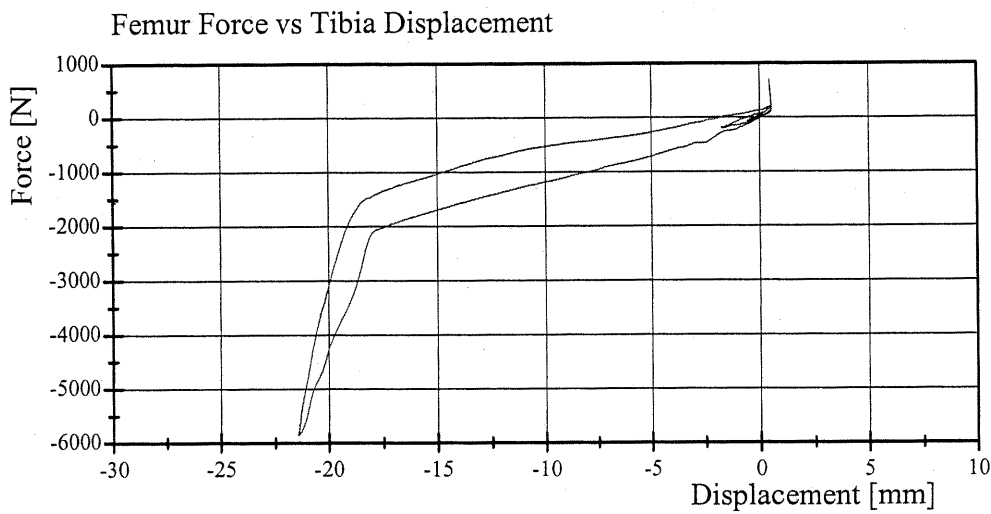
Min: -5855.3 N at 16.6 ms



Filter Class: 600

Max: 0.5 mm at 41.7 ms

Min: -21.4 mm at 16.7 ms



06.25.2003 10:23:40 1740



Transportation Research Center Inc.

572E Left Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 3

Test Date 06/25/2003

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.76 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1643 N	Yes
Force At 18 mm Displacement	-2268 - (-3096) N	-3088 N	Yes

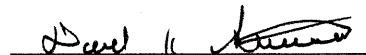
Comments:

New Knee Slider Installed.

Technician



Approved



06.27.2003 12:51:44 1740

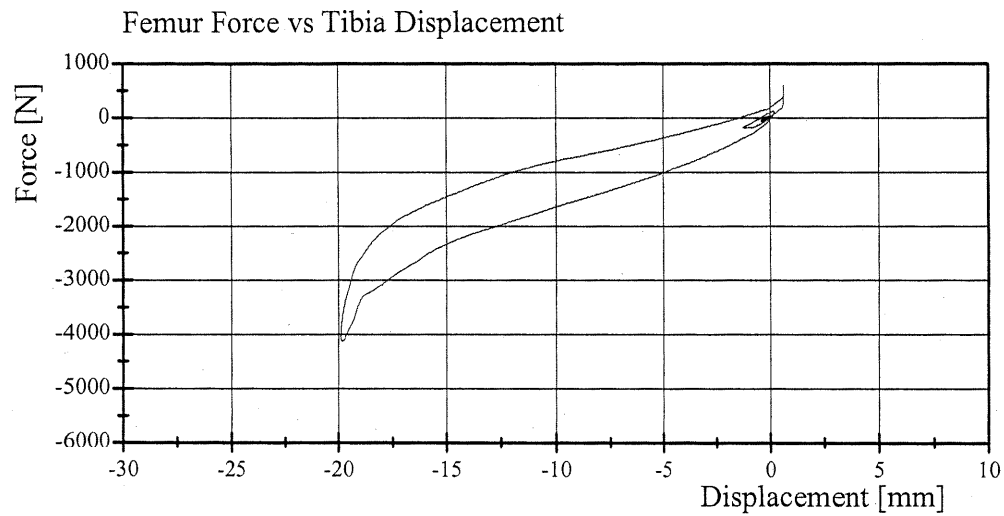
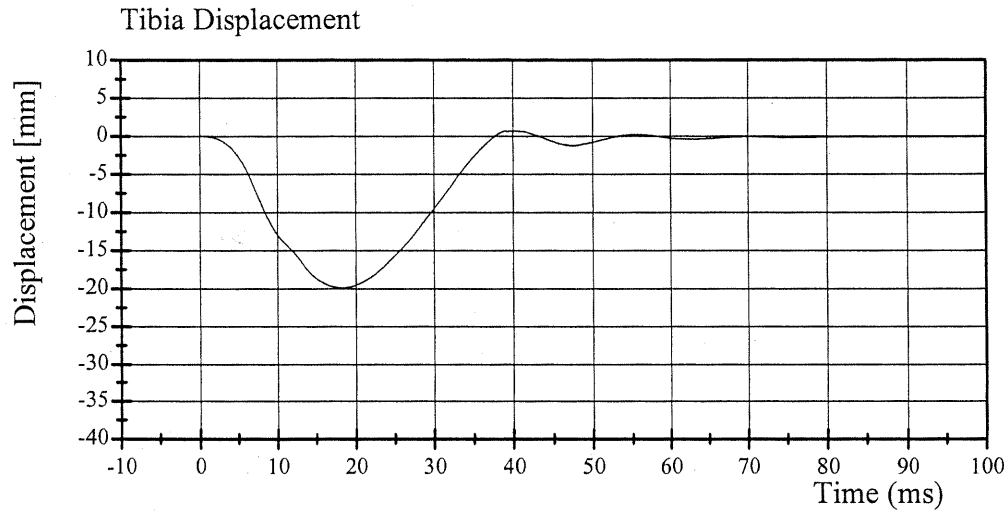
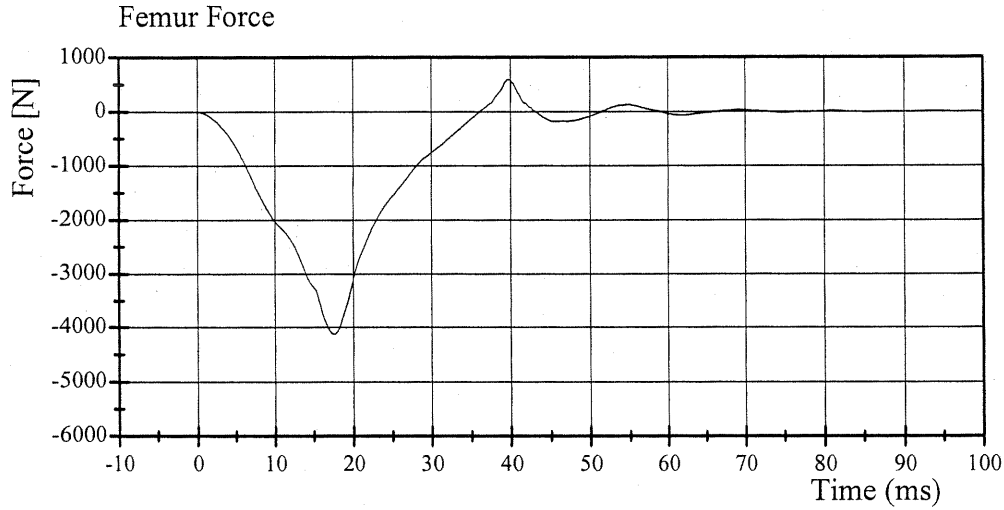


Transportation Research Center Inc.

572E Left Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 3

Test Date 06/25/2003



06.25.2003 14:45:37 1740



Transportation Research Center Inc.

572E Right Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/25/2003

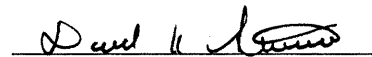
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.77 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1484 N	Yes
Force At 18 mm Displacement	-2268 - (-3096) N	-2880 N	Yes

Comments:

Technician



Approved



06.25.2003 10:48:54 1742



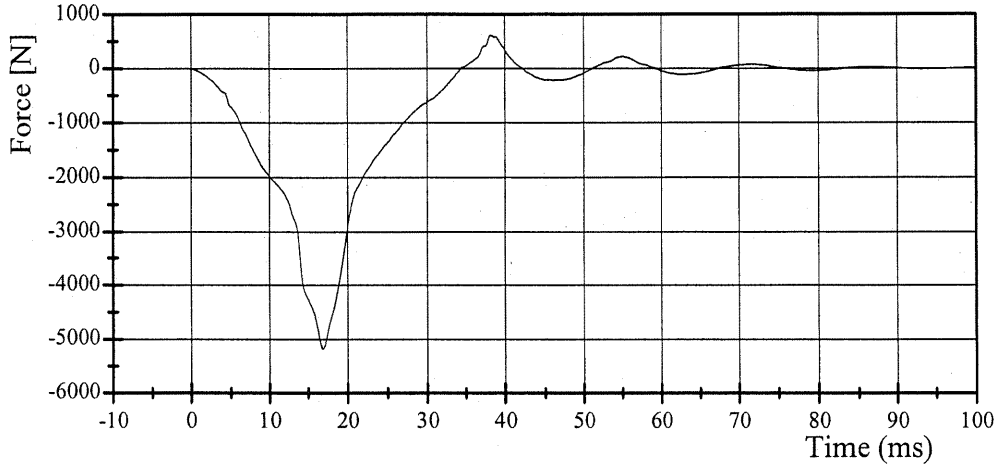
Transportation Research Center Inc.

572E Right Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/25/2003

Femur Force

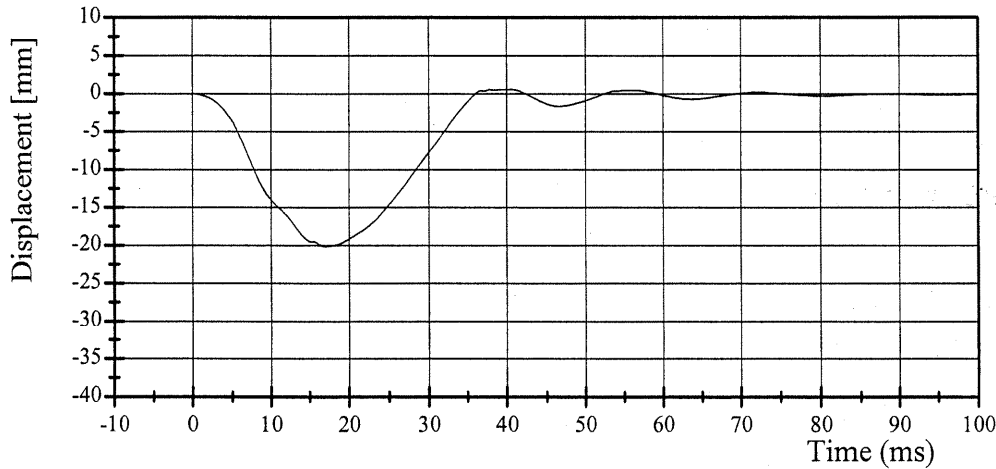


Filter Class: 600

Max: 612.7 N at 38.2 ms

Min: -5182.1 N at 16.9 ms

Tibia Displacement

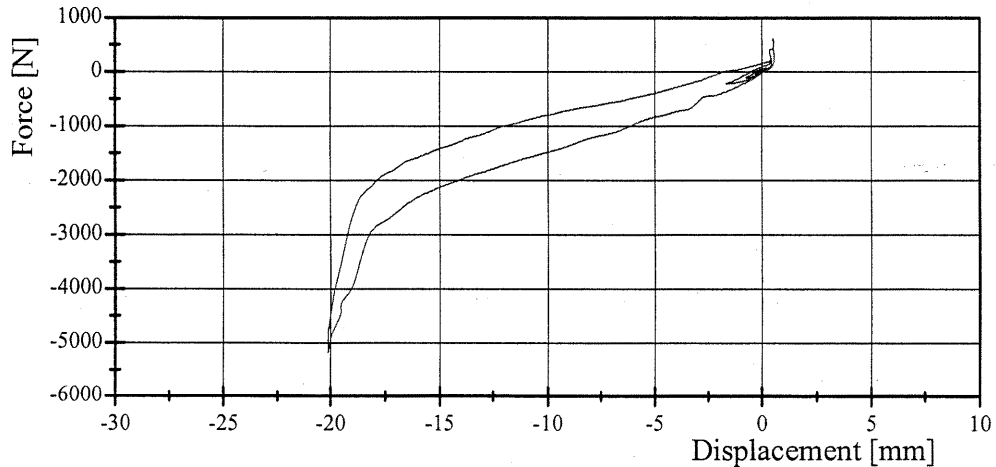


Filter Class: 600

Max: 0.6 mm at 40.5 ms

Min: -20.1 mm at 17.4 ms

Femur Force vs Tibia Displacement



06.25.2003 10:48:55 1742



Transportation Research Center Inc.

572E Left Knee Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/27/2003

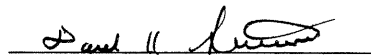
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.12 m/s	Yes
Maximum Pendulum Force	4715 - 5783 N	5300 N	Yes

Comments:

Technician



Approved



06.27.2003 07:32:28 2071

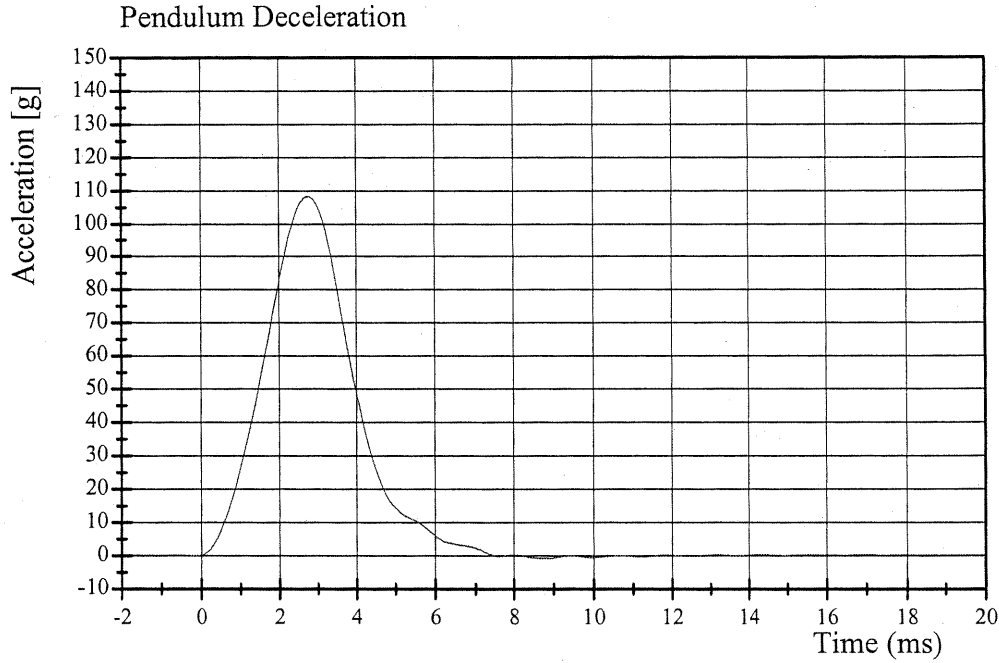


Transportation Research Center Inc.

572E Left Knee Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

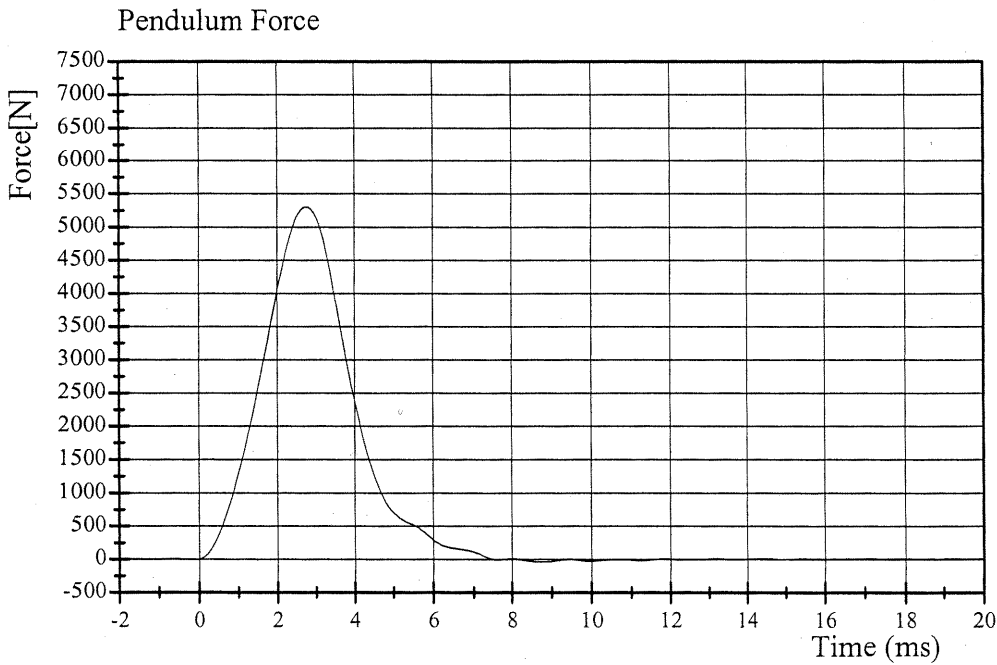
Test Date 06/27/2003



Filter Class: 600

Max: 108.3 g at 2.8 ms

Min: -0.8 g at 8.8 ms



Filter Class: 600

Max: 5299.8 N at 2.8 ms

Min: -38.5 N at 8.8 ms

06.27.2003 07:32:29 2071



Transportation Research Center Inc.

572E Right Knee Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/27/2003

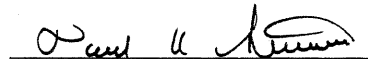
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.10 m/s	Yes
Maximum Pendulum Force	4715 - 5783 N	5302 N	Yes

Comments:

Technician



Approved



06.27.2003 07:34:53 2077



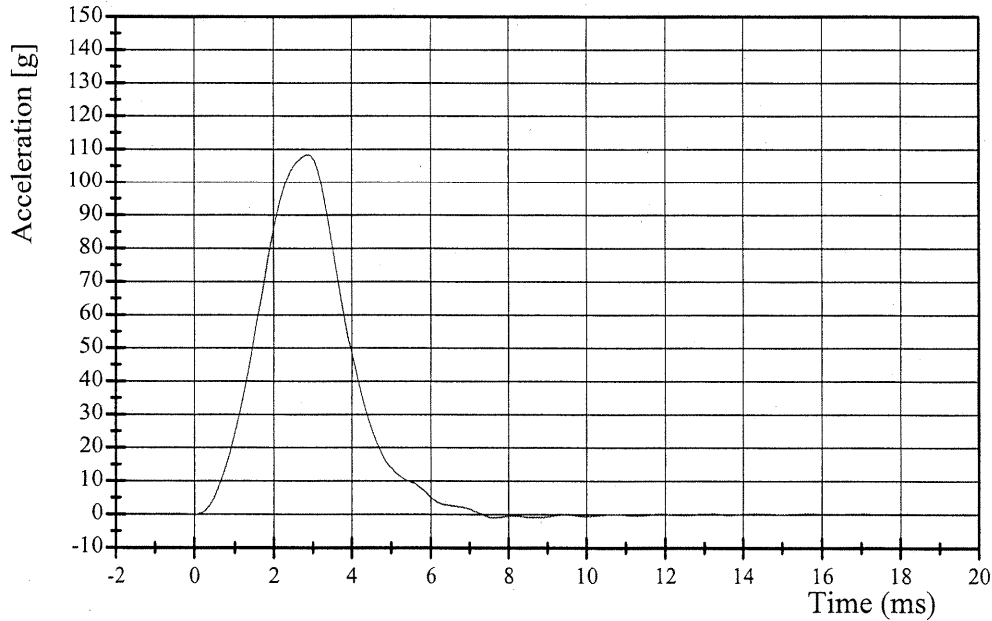
Transportation Research Center Inc.

572E Right Knee Test

HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/27/2003

Pendulum Deceleration

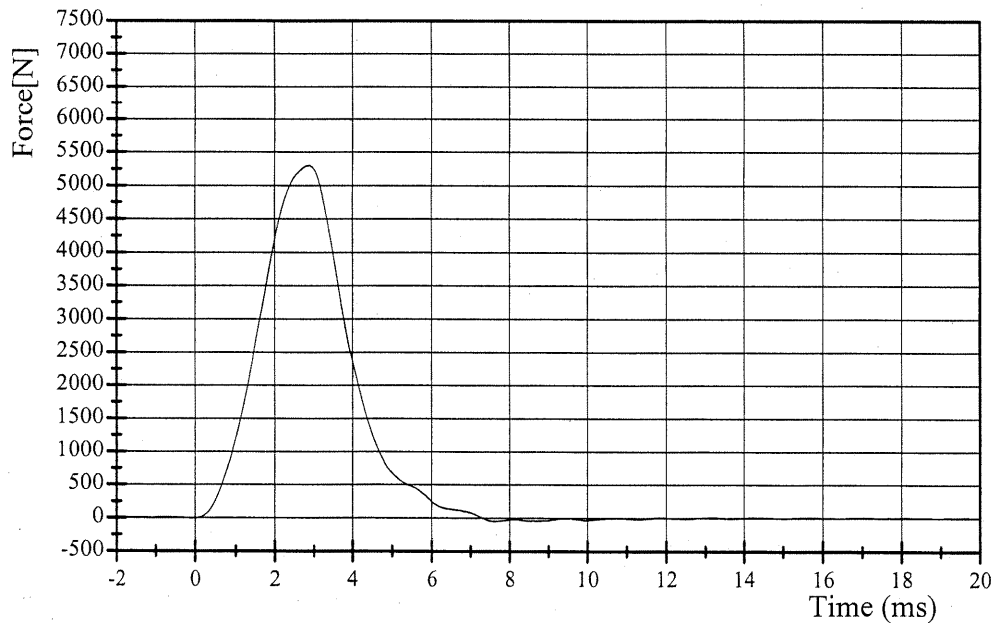


Filter Class: 600

Max: 108.4 g at 2.9 ms

Min: -1.0 g at 7.6 ms

Pendulum Force



Filter Class: 600

Max: 5302.5 N at 2.9 ms

Min: -48.1 N at 7.6 ms

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Thor-LX Test Report

Dynamic Heel of Foot Impact Test

Engineer	P. Pope Y. Wang	Test Date	June 6, 2003
Customer	TRC	Temp (C)/Hum.(%)	22/61
Description	Left Lower Extremities	Serial No.	LX110

Testing Summary

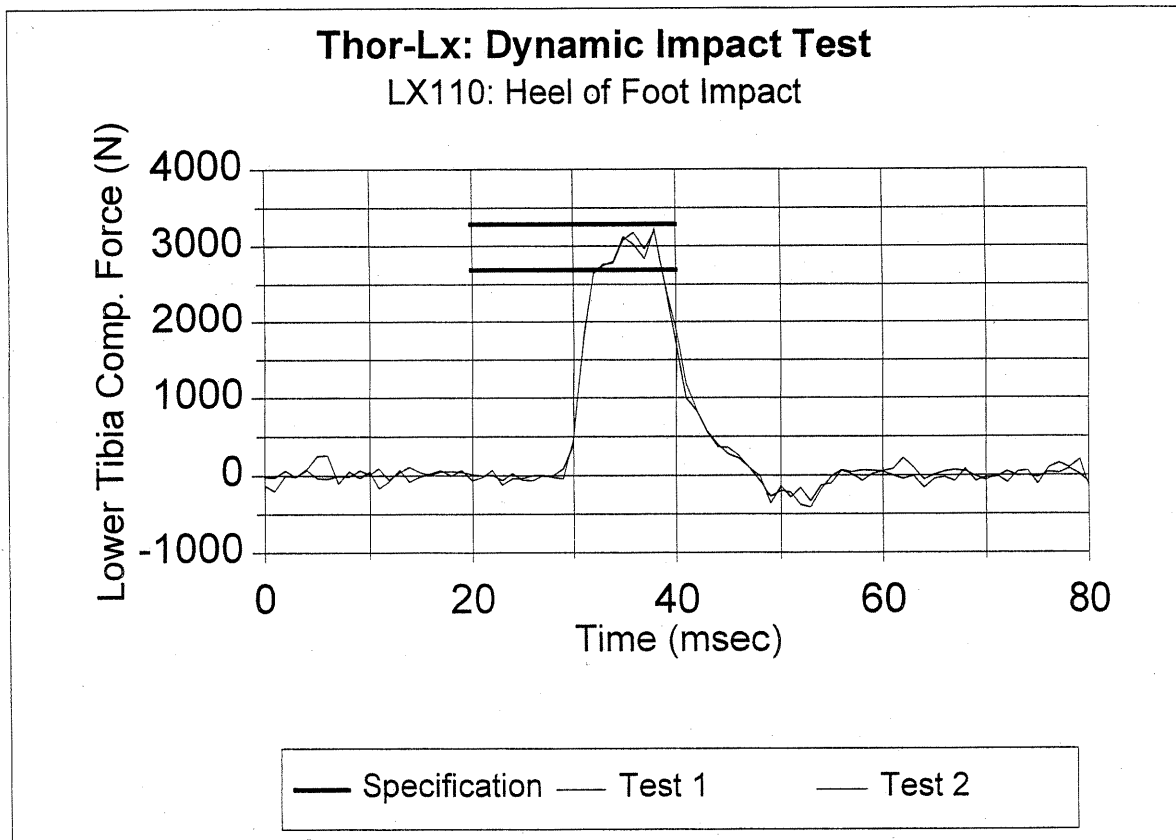
Impact Speed	4.0 m/s	Scan Rate	10000 scans/sec
Impact Effective Mass	5.0 kg	Filter	CFC 600
Impactor	NHTSA Dynamic Impactor (TLX-9000-013)		

Response

Peak Lower Tibia Compressive Force* (N)	Specification (N)	Within Reference
3222	2694 - 3292	Yes

*Average Value

Test Plot



Tested by: <u>Patrick Pope</u>	Date: <u>6-11-03</u>
Analyzed by: <u>Y. Wang</u>	Date: <u>6-11-03</u>

Thor-LX Test Report

Dynamic Ball of Foot Impact Test (page 1)

Engineer P. Pope
 Y. Wang
 Customer TRC
 Description Left Lower Extremities

Test Date June 9, 2003
 Temp (C)/Hum.(%) 21/62
 Serial No. LX110

Testing Summary

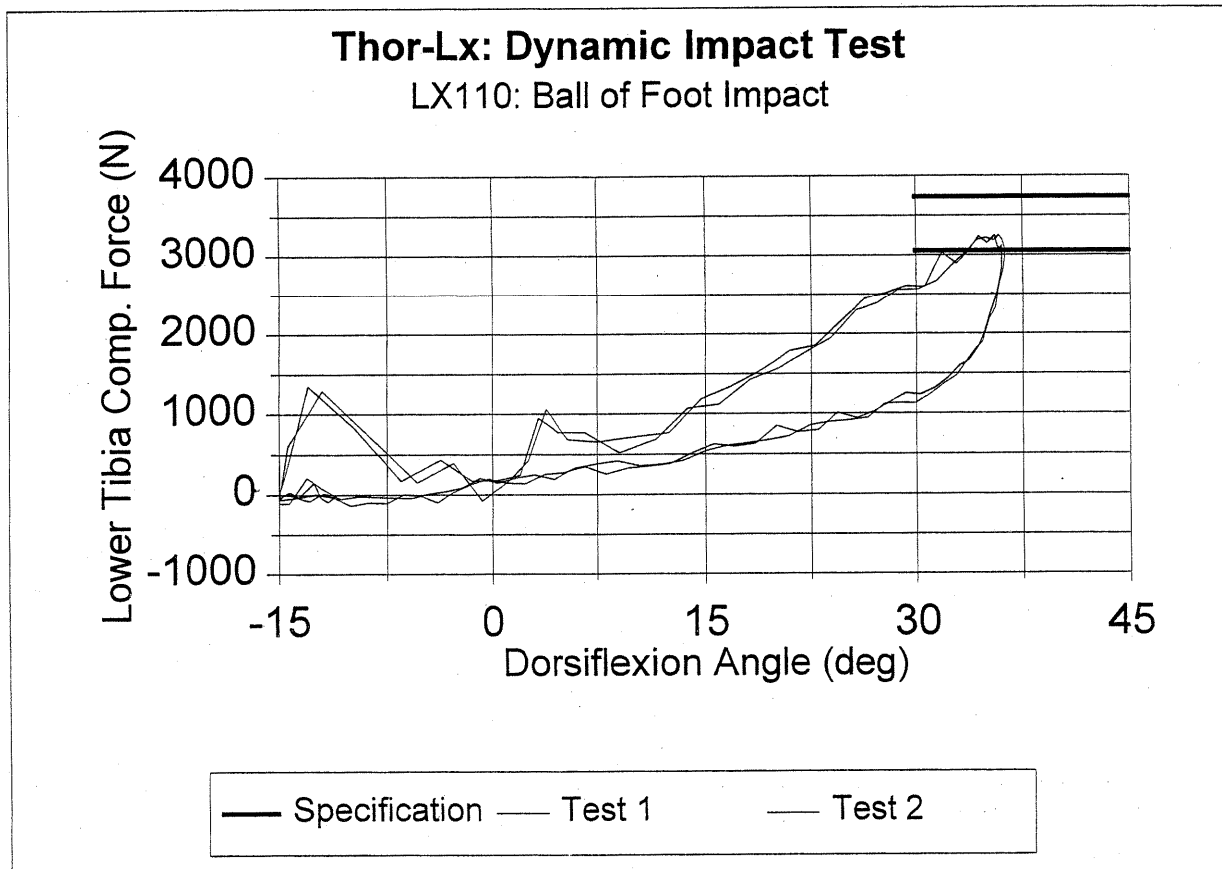
Impact Speed 5.0 m/s Scan Rate 10000 scans/sec
 Impact Effective Mass 5.0 kg Filter CFC 600
 Impactor NHTSA Dynamic Impactor (TLX-9000-013)

Response

Peak Lower Tibia Compressive Force* (N)	Specification (N)	Within Reference
3251	3058 - 3738	Yes

*Average Value

Test Plot



Tested by: Patrick Pope

Date: 6-11-03

Analyzed by: [Signature]

Date: 6-11-03

Thor-LX Test Report

Dynamic Ball of Foot Impact Test (page 2)

Engineer P. Pope
 Y. Wang
 Customer TRC
 Description Left Lower Extremities

Test Date
 Temp (C)/Hum.(%)
 Serial No.

June 9, 2003
 21/62
 LX110

Testing Summary

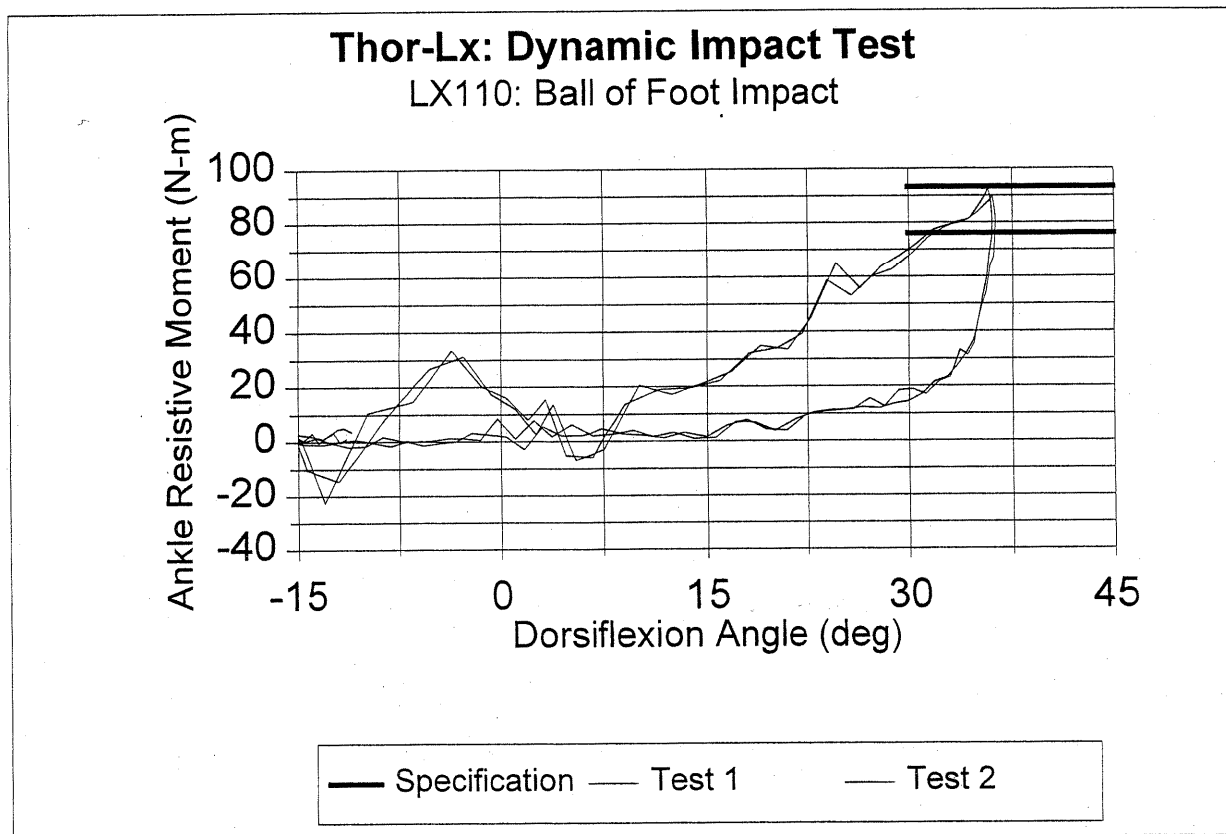
Impact Speed 5.0 m/s Scan Rate 10000 scans/sec
 Impact Effective Mass 5.0 kg Filter CFC 600
 Impactor NHTSA Dynamic Impactor (TLX-9000-013)

Response

Peak Ankle Resistive Moment* (N-m)	Specification (N-m)	Within Reference
91.3	76.2 - 93.2	Yes

*Average Value

Test Plot



Tested by: Paul Pope
 Analyzed by: Y. Wang

Date: 6-11-03
 Date: 6-11-03

Thor-Lx Test Report

Everson Quasi-Static Test

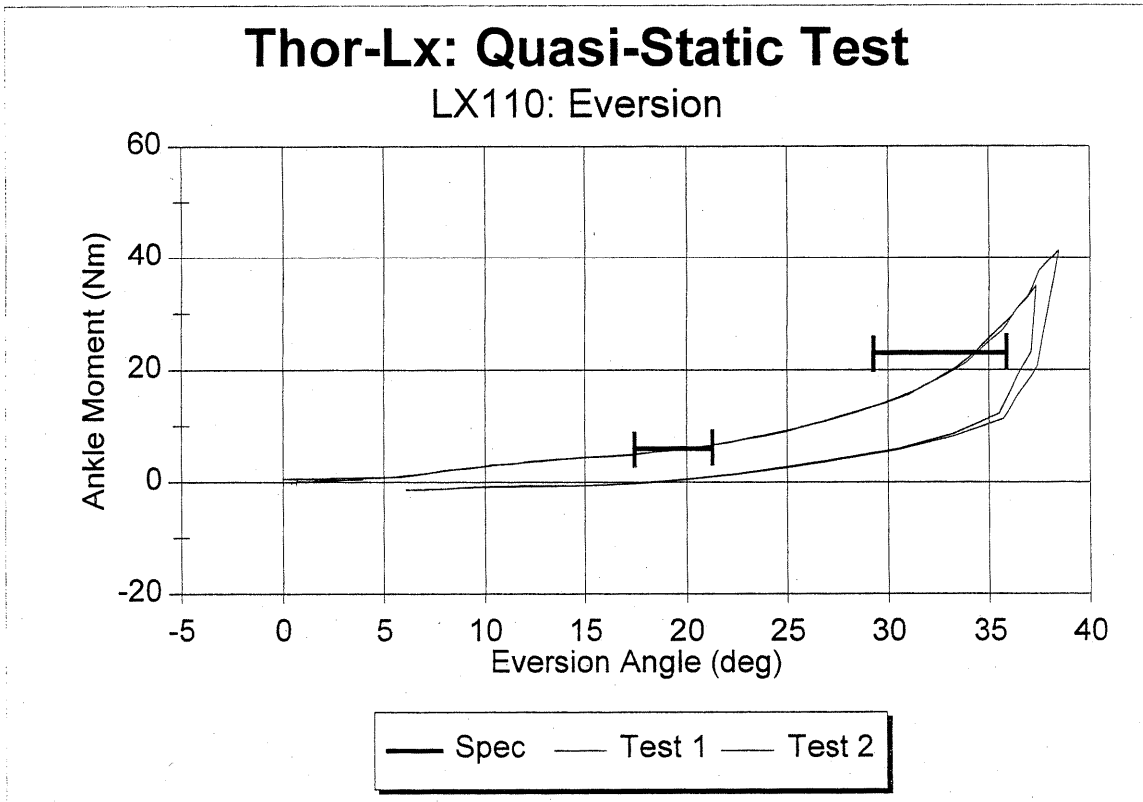
Engineer	P. Pope Y. Wang	Test Date	June 11, 2003
Customer	TRC	Temp. (C)/Hum.(%)	22/62
Description	Left Lower Extremity	Serial No.	LX110

Testing Summary (Design Reference)

Ankle Moment (Nm)	Everson Angle (Degree)	Reference Specification (Degree)	Within Reference?
6	20.1	17.5 - 21.3	Yes
23	34.3	29.3 - 35.9	Yes

*Average Value

Result Plot



Tested by: Patrick Pope

Date: 6-11-03

Analyzed by: [Signature]

Date: 6-11-03

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Thor-Lx Test Report

Inversion Quasi-Static Test

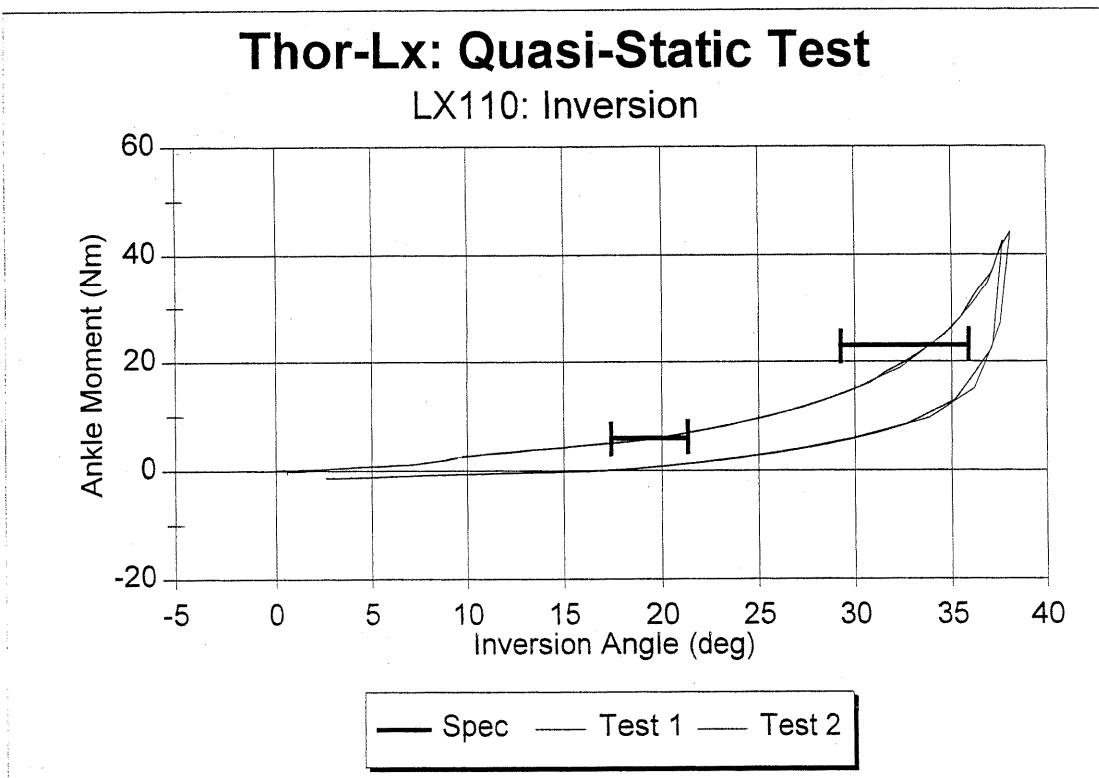
Engineer	P. Pope Y. Wang	Test Date	June 10, 2003
Customer	TRC	Temp. (C)/Hum.(%)	22/61
Description	Left Lower Extremity	Serial No.	LX110

Testing Summary (Design Reference)

Ankle Moment (Nm)	Inversion Angle (Degree)	Reference Specification (Degree)	Within Reference?
6	19.7	17.5 - 21.3	Yes
23	33.9	29.3 - 35.9	Yes

*Average Value

Result Plot



Tested by: Patrick Pope

Date: 6-11-03

Analyzed by: [Signature]

Date: 6-11-03

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Thor-LX Test Report

Dynamic Heel of Foot Impact Test

Engineer P. Pope
Y. Wang
Customer TRC
Description Right Lower Extremities

Test Date April 16, 2003
Temp (C)/Hum.(%) 22/61
Serial No. LX109

Testing Summary

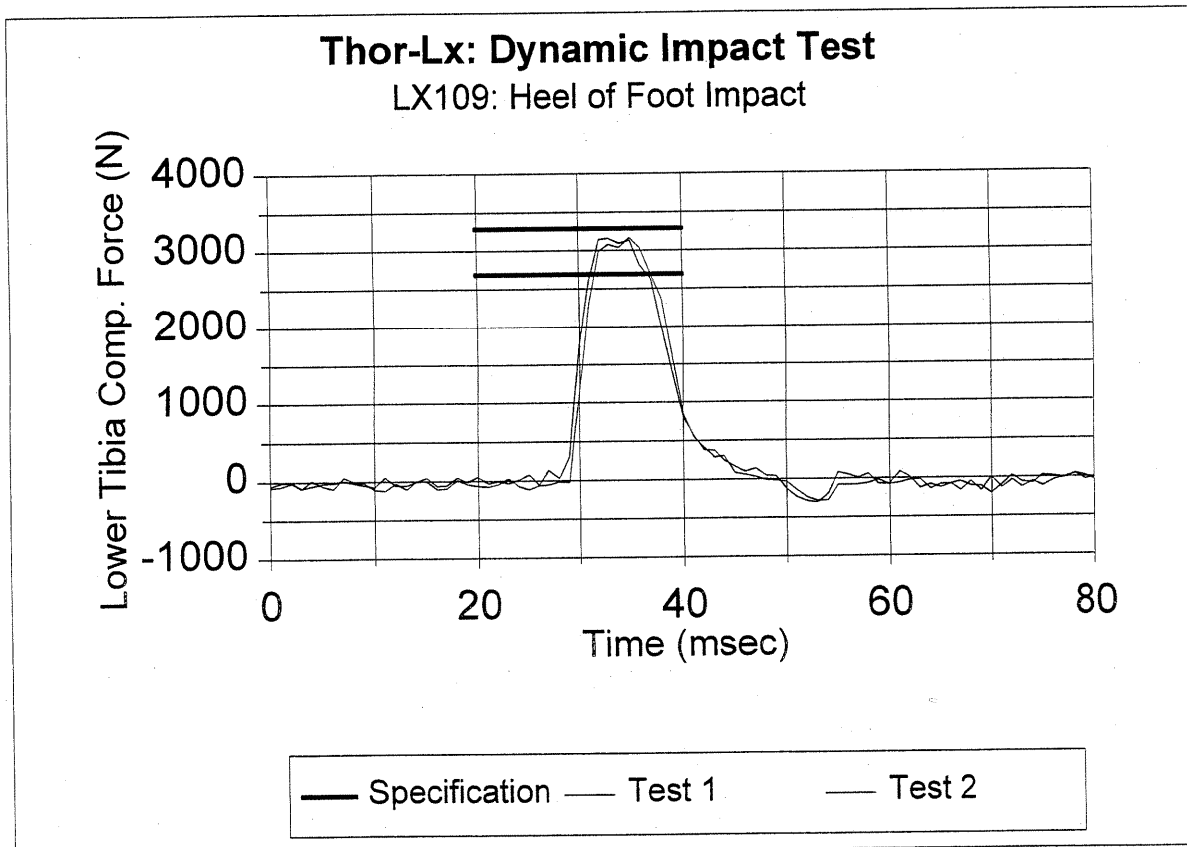
Impact Speed 4.0 m/s Scan Rate 10000 scans/sec
Impact Effective Mass 5.0 kg Filter CFC 600
Impactor NHTSA Dynamic Impactor (TLX-9000-013)

Response

Peak Lower Tibia Compressive Force* (N)	Specification (N)	Within Reference
3166	2694 - 3292	Yes

*Average Value

Test Plot



Tested by: Patrick Pope

Date: 4-16-03

Analyzed by: W. Wright

Date: 04-16-03

Thor-LX Test Report

Dynamic Ball of Foot Impact Test (page 1)

Engineer P. Pope
 Y. Wang
 Customer TRC
 Description Right Lower Extremities

Test Date April 16, 2003
 Temp (C)/Hum.(%) 22/62
 Serial No. LX109

Testing Summary

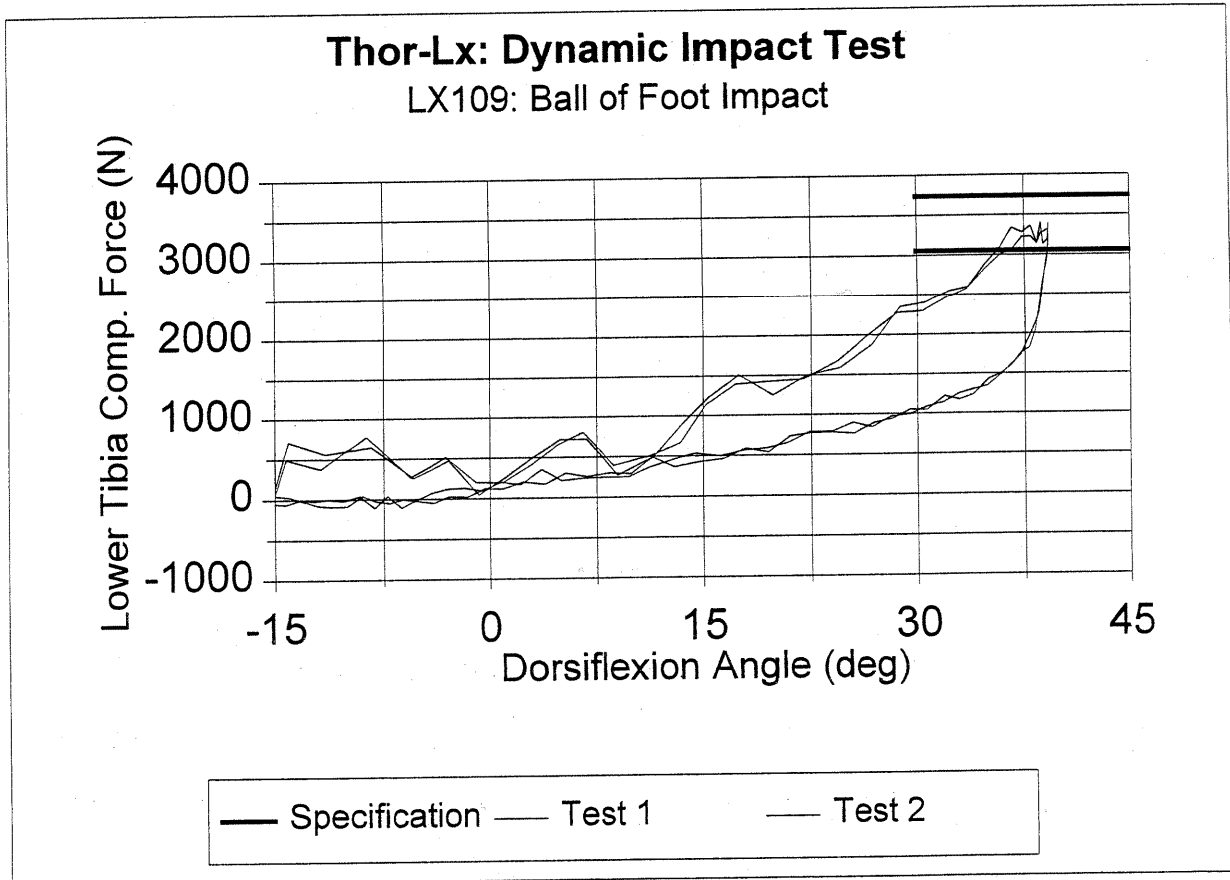
Impact Speed 5.0 m/s Scan Rate 10000 scans/sec
 Impact Effective Mass 5.0 kg Filter CFC 600
 Impactor NHTSA Dynamic Impactor (TLX-9000-013)

Response

Peak Lower Tibia Compressive Force* (N)	Specification (N)	Within Reference
3383	3058 - 3738	Yes

*Average Value

Test Plot



Tested by: Patrick Pope
 Analyzed by: Y. Wang

Date: 4-16-03
 Date: 04-16-03

Thor-LX Test Report

Dynamic Ball of Foot Impact Test (page 2)

Engineer P. Pope
 Y. Wang
 Customer TRC
 Description Right Lower Extremities

Test Date April 16, 2003
 Temp (C)/Hum.(%) 22/62
 Serial No. LX109

Testing Summary

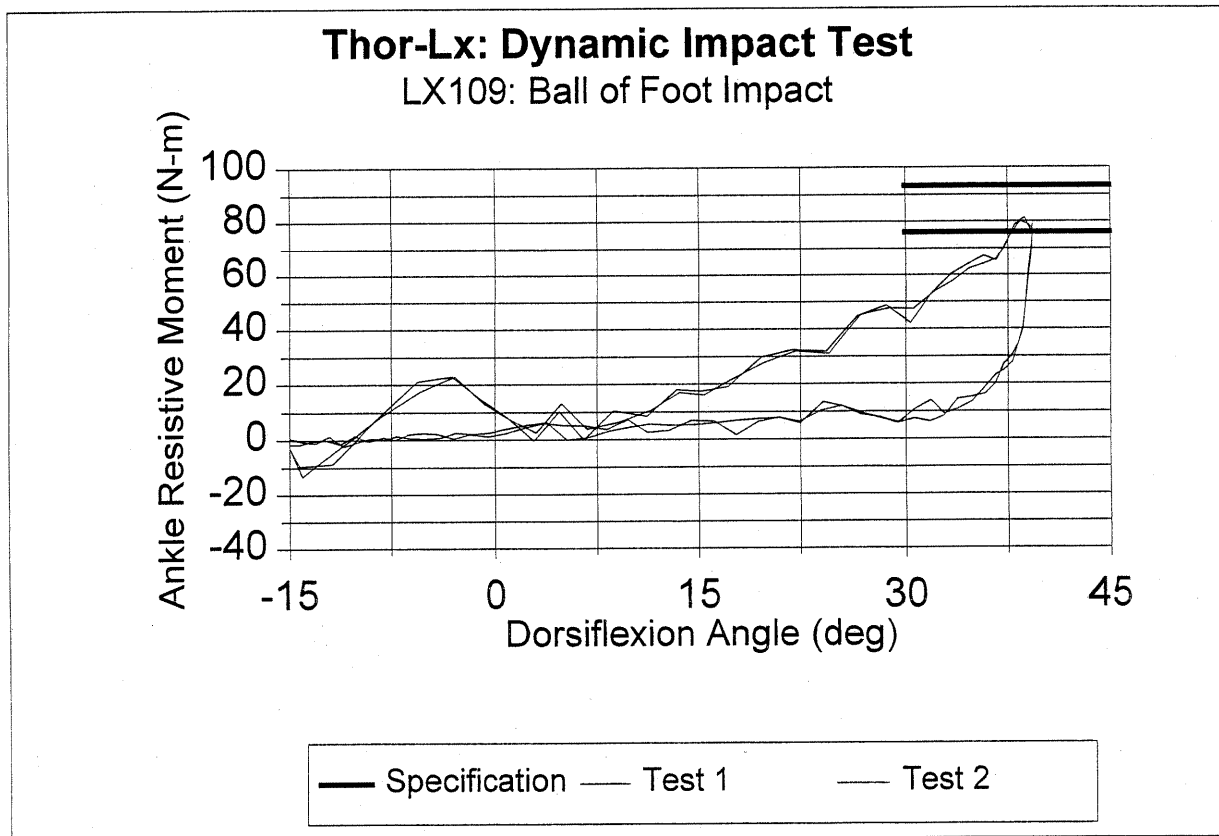
Impact Speed 5.0 m/s Scan Rate 10000 scans/sec
 Impact Effective Mass 5.0 kg Filter CFC 600
 Impactor NHTSA Dynamic Impactor (TLX-9000-013)

Response

Peak Ankle Resistive Moment* (N-m)	Specification (N-m)	Within Reference
80.7	76.2 - 93.2	Yes

*Average Value

Test Plot



Tested by: Patrick Pope
 Analyzed by: Y. Wang

Date: 4-16-03
 Date: 04-16-03

GESAC, INC

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Thor-Lx Test Report

Inversion Quasi-Static Test

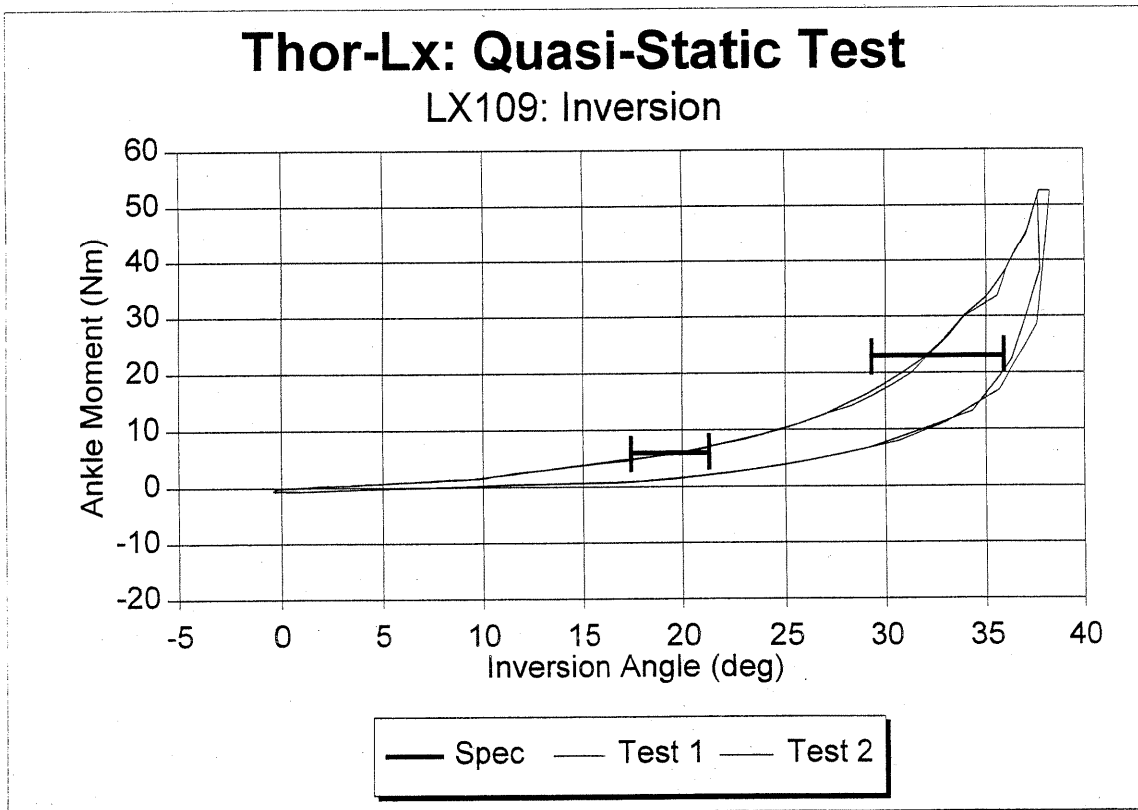
Engineer	P. Pope Y. Wang	Test Date	April 15, 2003
Customer Description	TRC Right Lower Extremity	Temp. (C)/Hum.(%)	22/62
		Serial No.	LX109

Testing Summary (Design Reference)

Ankle Moment (Nm)	Inversion Angle (Degree)	Reference Specification (Degree)	Within Reference?
6	19.9	17.5 - 21.3	Yes
23	32.1	29.3 - 35.9	Yes

*Average Value

Result Plot



Tested by: Patrick Pope

Date: 4-16-03

Analyzed by: Wang

Date: 04-16-03

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Tel (301) 432-5885 Fax (301) 432-6199

Thor-Lx Test Report

Eversion Quasi-Static Test

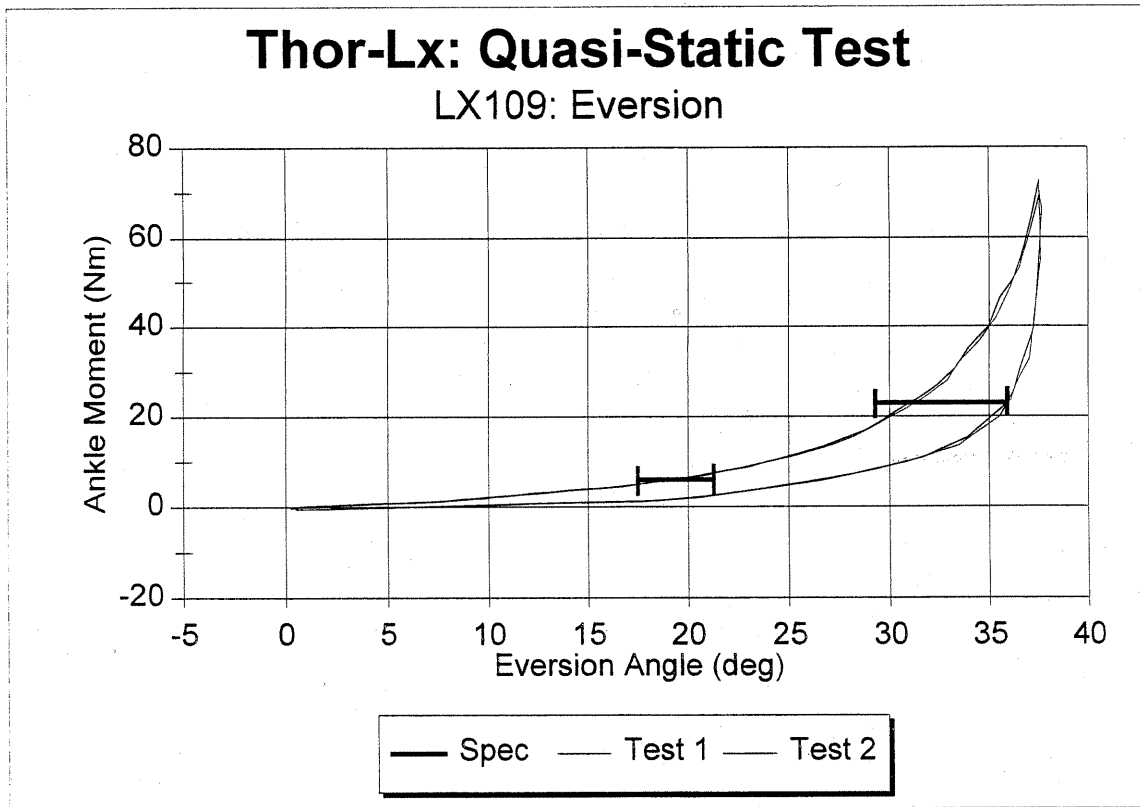
Engineer	P. Pope Y. Wang	Test Date	April 15, 2003
Customer	TRC	Temp. (C)/Hum.(%)	22/62
Description	Right Lower Extremity	Serial No.	LX109

Testing Summary (Design Reference)

Ankle Moment (Nm)	Eversion Angle (Degree)	Reference Specification (Degree)	Within Reference?
6	19.2	17.5 - 21.3	Yes
23	31.2	29.3 - 35.9	Yes

*Average Value

Result Plot



Tested by: Patrick Pope

Date: 4-16-03

Analyzed by: Y. Wang

Date: 04-16-03

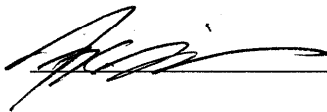
Post-test Dummy Configuration and Performance Verification Data

Driver Dummy S/N: 090

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 090 Calibration No. 44

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	882	Yes
B	Shoulder Pivot Height	505.5 - 520.7	514	Yes
C	H-Point Height	83.8 - 88.9	88	Yes
D	H-Point From Seatback	134.6 - 139.7	137	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	88	Yes
F	Thigh Clearance	139.7 - 154.9	147	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	292	Yes
H	Skull Cap To Backline	40.6 - 45.7	43	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	337	Yes
J	Elbow Rest Height	190.5 - 210.8	200	Yes
K	Buttock Knee Length	579.1 - 604.5	590	Yes
L	Popliteal Height	429.3 - 454.7	430	Yes
M	Knee Pivot Height	485.1 - 500.4	497	Yes
N	Buttock Popliteal Length	452.1 - 477.5	459	Yes
O	Chest Depth	213.4 - 228.6	220	Yes
P	Foot Length	251.5 - 266.7	253	Yes
V	Shoulder Breadth	421.6 - 436.9	432	Yes
W	Foot Breadth	91.4 - 106.7	103	Yes
Y	Chest Circumference	970.3 - 1000.8	990	Yes
Z	Waist Circumference	835.7 - 866.1	855	Yes
AA	Location For Chest Circumference	429.3 - 434.3	432	Yes
BB	Location For Waist Circumference	226.1 - 231.1	229	Yes

Technician



Approved



Transportation Research Center Inc.

572E Head Drop Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/12/2003

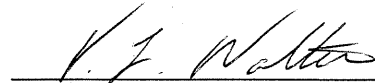
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	61 %	Yes
Peak Resultant Acceleration	225 - 275 g	236.5 g	Yes
Peak Lateral Acceleration	15 g Max	-5.9 g	Yes
Oscillations After Main Pulse	Less Than 10% of Peak Resultant Acceleration?	Yes	Yes

Comments:

Technician



Approved



08.12.2003 08:01:26 613

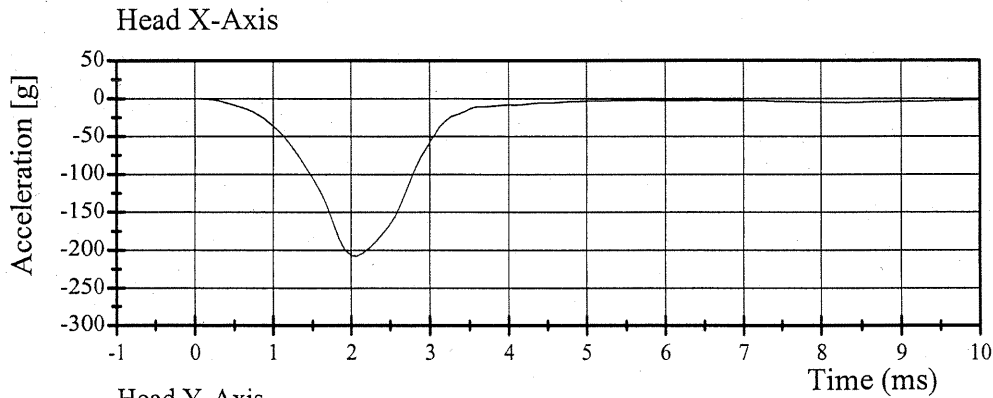


Transportation Research Center Inc.

572E Head Drop Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

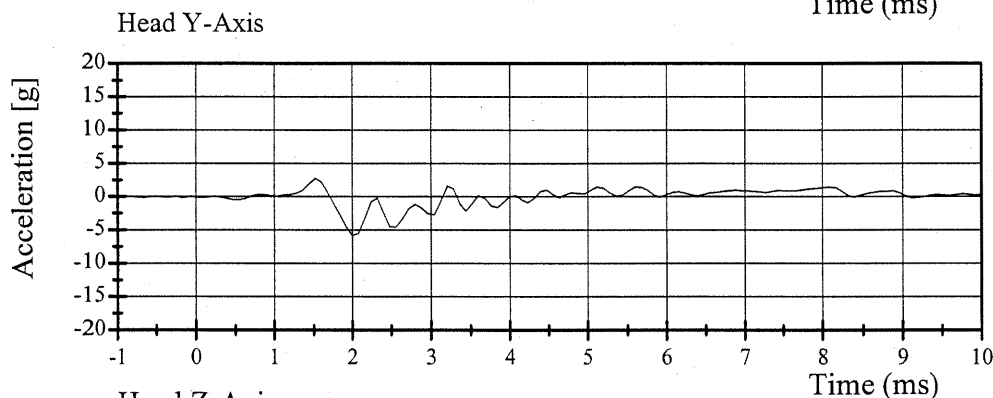
Test Date 08/12/2003



Filter Class: 1000

Max: -0.1 g at 0.0 ms

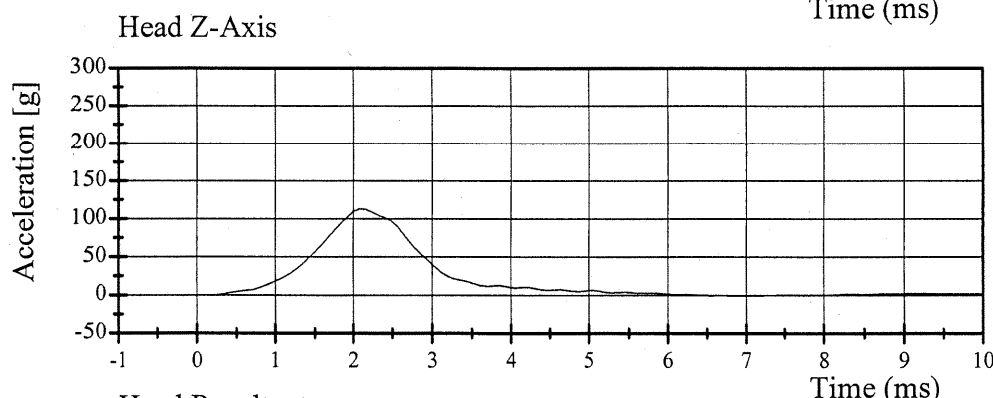
Min: -207.5 g at 2.1 ms



Filter Class: 1000

Max: 2.7 g at 1.5 ms

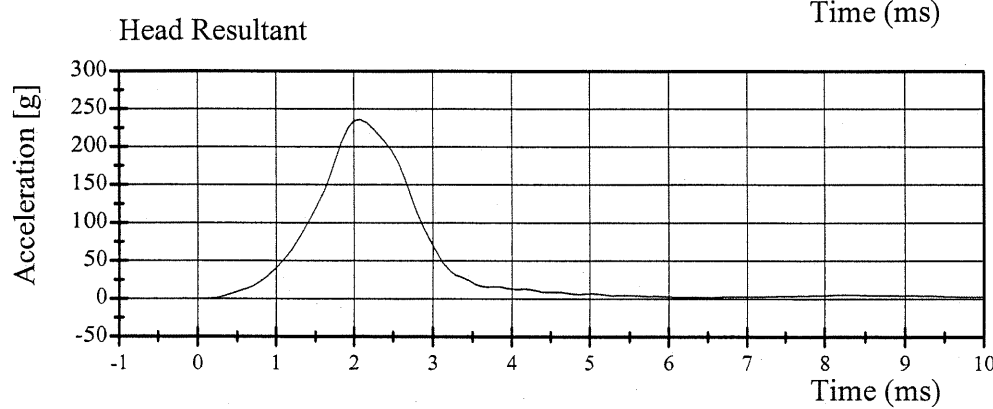
Min: -5.9 g at 2.0 ms



Filter Class: 1000

Max: 113.2 g at 2.1 ms

Min: -0.6 g at 6.9 ms



Filter Class: 1000

Max: 236.5 g at 2.1 ms

Min: 0.0 g at 1.6 ms

08.12.2003 08:01:27 613



Transportation Research Center Inc.

572E Neck Flexion Test - 6 Channel Transducer

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/12/2003

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Impact Velocity	6.89 - 7.13 m/s	7.01 m/s	Yes
Pendulum Deceleration			
10 ms	22.50 - 27.50 g	24.42 g	Yes
20 ms	17.60 - 22.60 g	21.94 g	Yes
30 ms	12.50 - 18.50 g	16.06 g	Yes
Max Pendulum Deceleration	29.00 g	25.19 g	Yes
Max Pendulum Deceleration After 30 ms	29.00 g	15.96 g	Yes
Deceleration-Time Curve			
Decay Time To 5g	34 - 42 ms	36.00 ms	Yes
D Plane Rotation			
Max	64 - 78 °	71.00 °	Yes
Time	57 - 64 ms	60.24 ms	Yes
Moment About Occipital Condyle			
Max	88.1 - 108.5 N·m	93.14 N·m	Yes
Time	47 - 58 ms	50.08 ms	Yes
Rotation Angle-Time Curve			
Decay Time To Zero	113 - 128 ms	119.92 ms	Yes
Positive Moment-Time Curve			
Decay Time To Zero	97 - 107 ms	98.08 ms	Yes

Comments:

Technician



Approved



08.12.2003 08:32:43 507



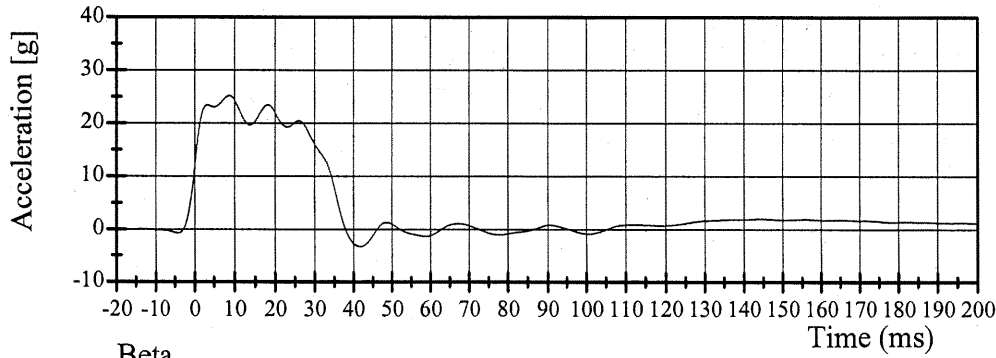
Transportation Research Center Inc.

572E Neck Flexion Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/12/2003

Pendulum Deceleration

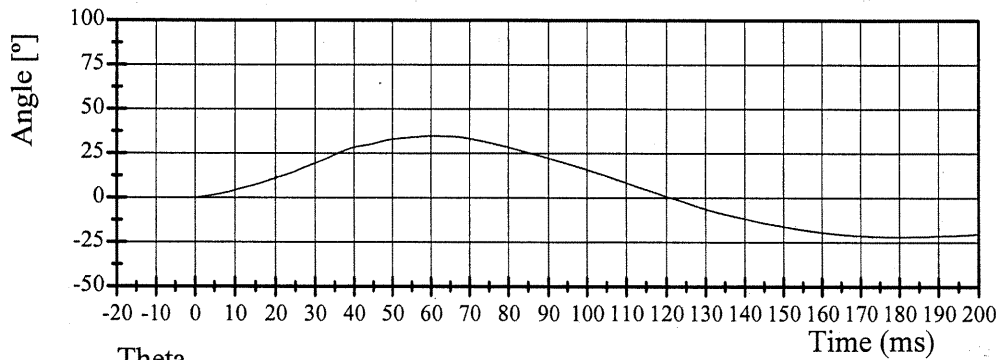


Filter Class: 60

Max: 25.2 g at 8.7 ms

Min: -3.2 g at 41.8 ms

Beta

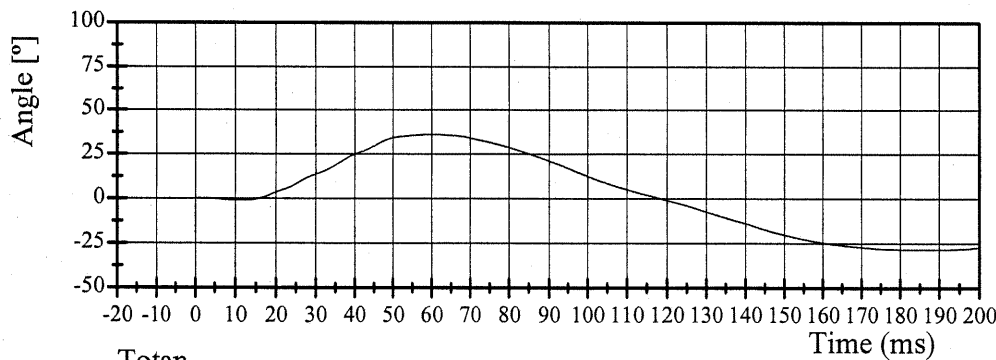


Filter Class: 60

Max: 34.8 ° at 60.5 ms

Min: -21.9 ° at 179.2 ms

Theta

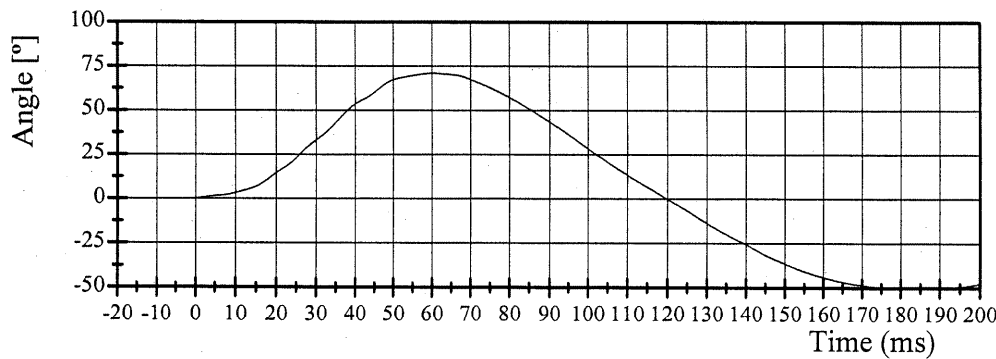


Filter Class: 60

Max: 36.2 ° at 60.0 ms

Min: -28.3 ° at 184.4 ms

Totan



Filter Class: 60

Max: 71.0 ° at 60.2 ms

Min: -50.2 ° at 181.7 ms

08.12.2003 08:32:44 507

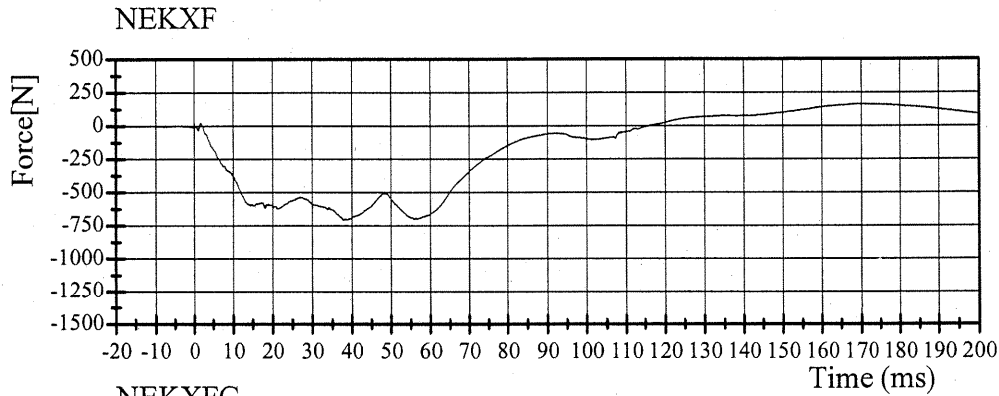


Transportation Research Center Inc.

572E Neck Flexion Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

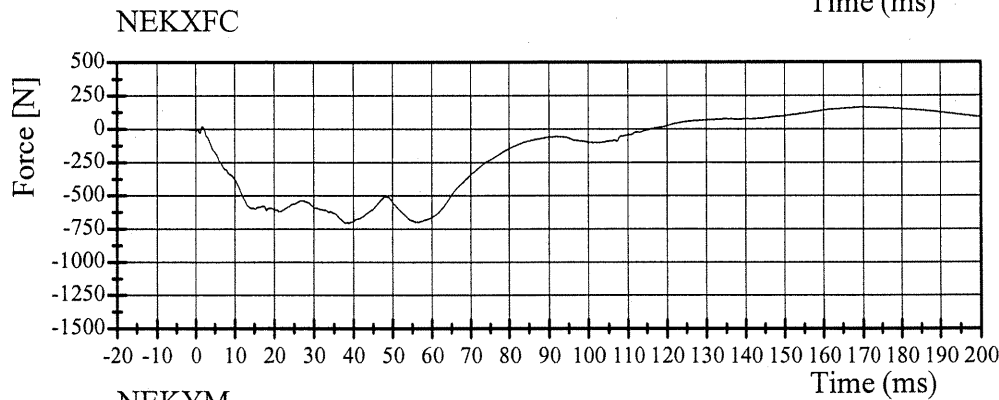
Test Date 08/12/2003



Filter Class: 1000

Max: 163.7 N at 169.5 ms

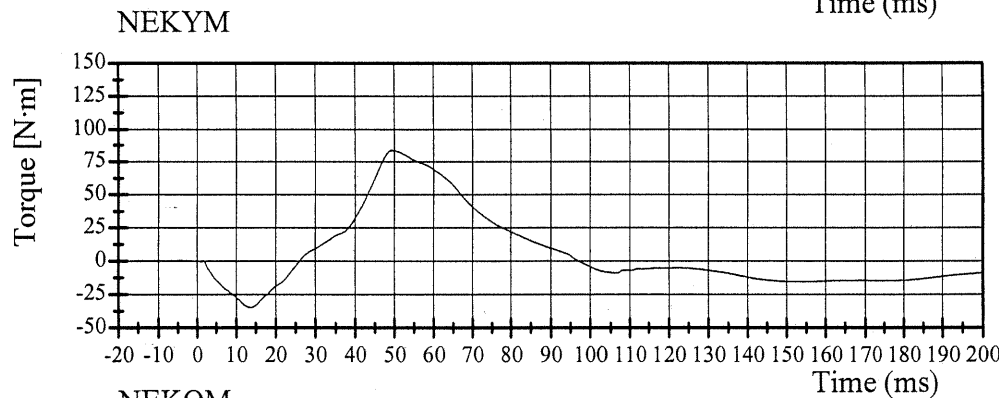
Min: -706.4 N at 38.9 ms



Filter Class: 600

Max: 163.5 N at 169.6 ms

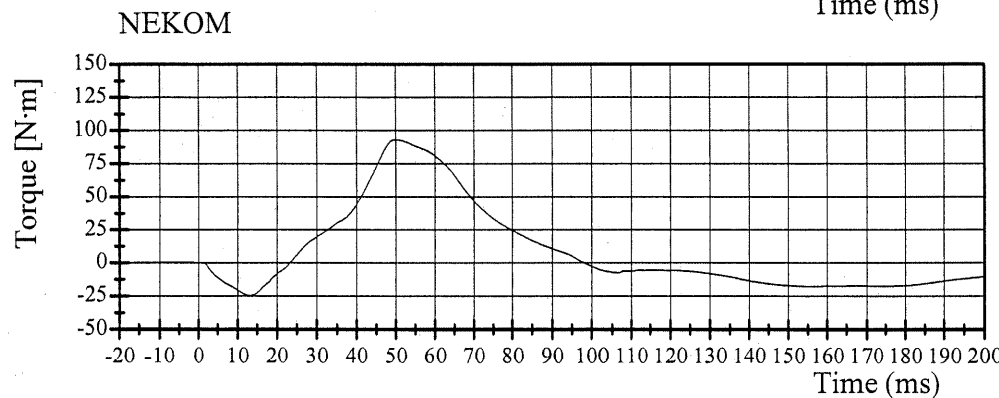
Min: -705.2 N at 37.9 ms



Filter Class: 600

Max: 83.6 N·m at 49.4 ms

Min: -34.8 N·m at 13.5 ms



Filter Class: 600

Max: 93.1 N·m at 50.1 ms

Min: -24.7 N·m at 13.2 ms

08.12.2003 08:32:46 507



Transportation Research Center Inc.

572E Neck Extension Test - 6 Channel Transducer

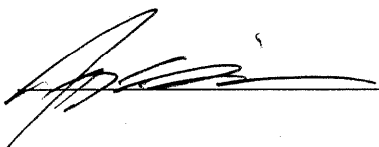
HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/12/2003

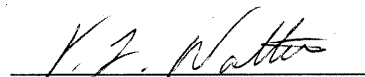
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impact Velocity	5.95 - 6.19 m/s	5.95 m/s	Yes
Pendulum Deceleration			
10 ms	17.20 - 21.20 g	17.72 g	Yes
20 ms	14.00 - 19.00 g	17.30 g	Yes
30 ms	11.00 - 16.00 g	13.46 g	Yes
Max Pendulum Deceleration	22.00 g	18.20 g	Yes
Max Pendulum Deceleration After 30 ms	22.00 g	13.39 g	Yes
Deceleration-Time Curve			
Decay Time To 5g	38 - 46 ms	42.32 ms	Yes
D Plane Rotation			
Max	81 - 106 °	98.24 °	Yes
Time	72 - 82 ms	80.88 ms	Yes
Moment About Occipital Condyle			
Min	-80.0 - (-52.9) N·m	-62.68 N·m	Yes
Time	65 - 79 ms	75.76 ms	Yes
Rotation Angle-Time Curve			
Decay Time To Zero	147 - 174 ms	167.84 ms	Yes
Negative Moment-Time Curve			
Decay Time To Zero	120 - 148 ms	141.92 ms	Yes

Comments:

Technician



Approved



08.12.2003 09:04:45 587



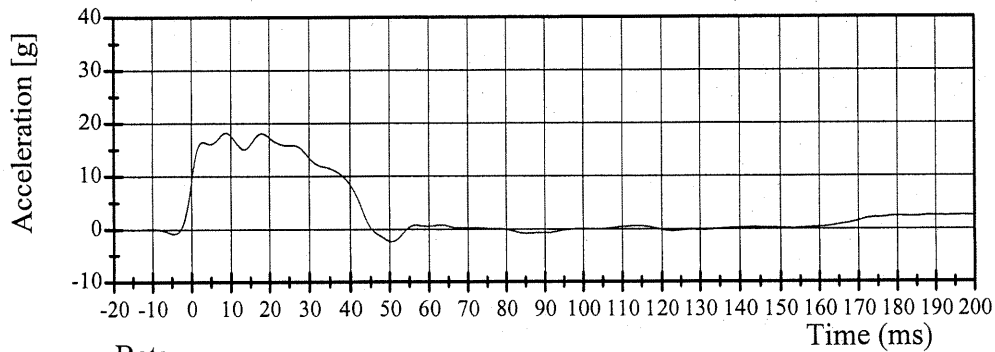
Transportation Research Center Inc.

572E Neck Extension Test

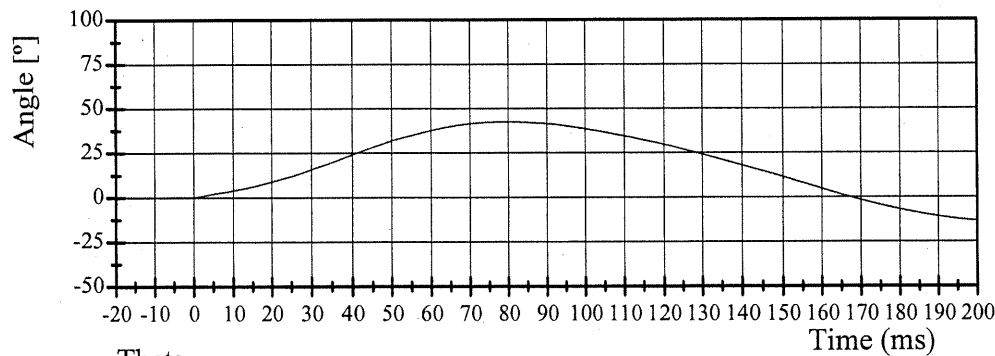
HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/12/2003

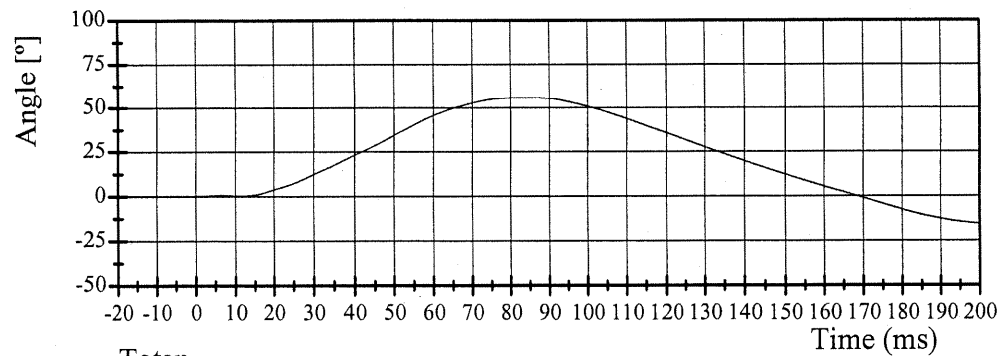
Pendulum Deceleration



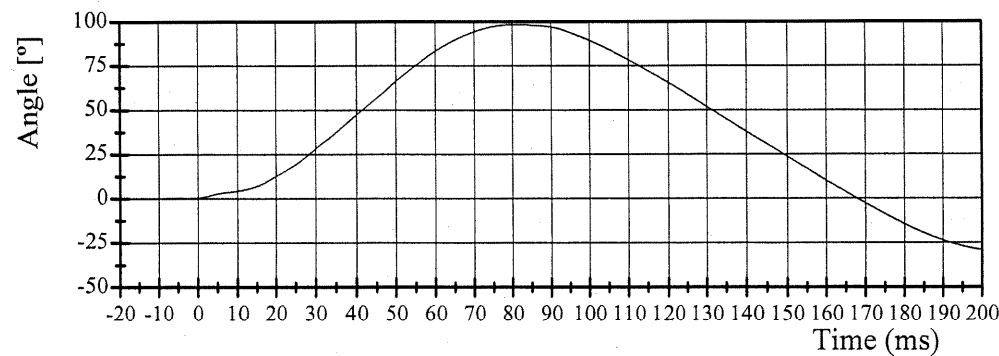
Beta



Theta



Totan

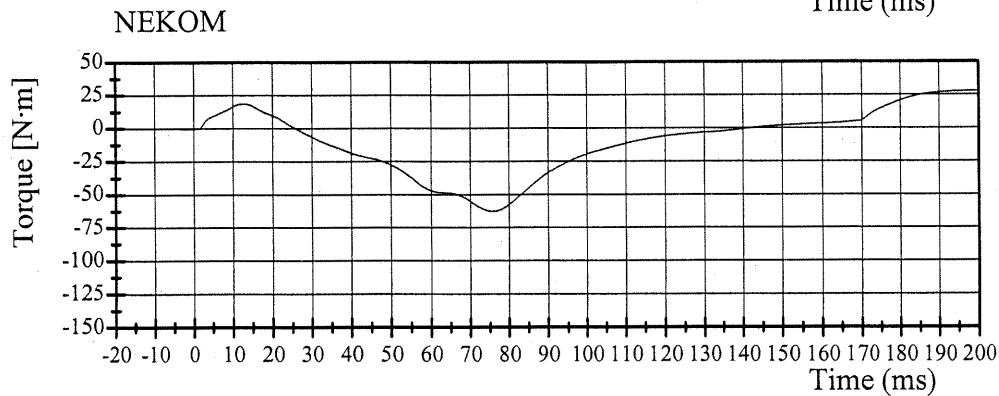
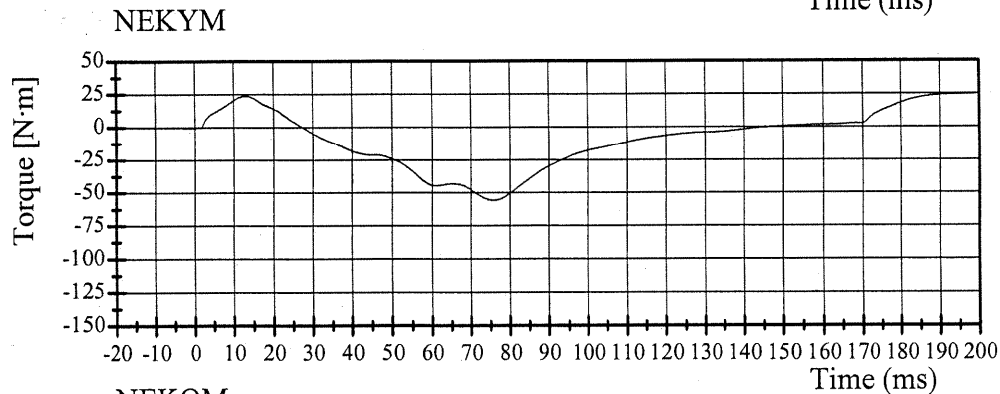
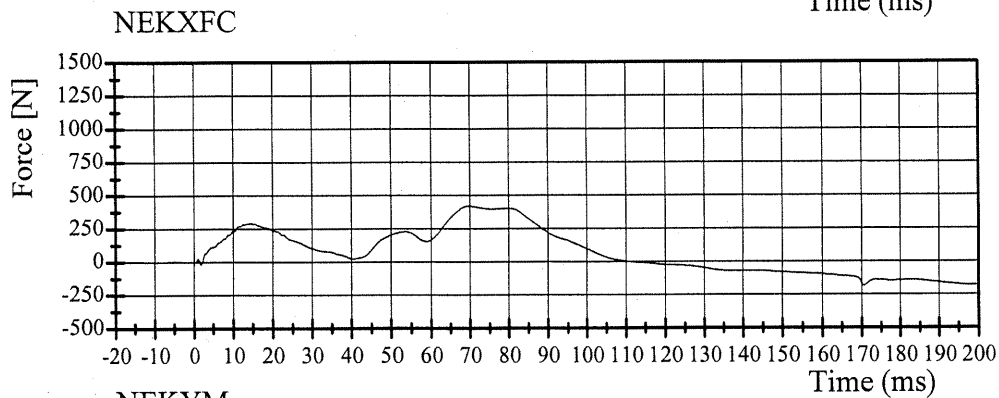
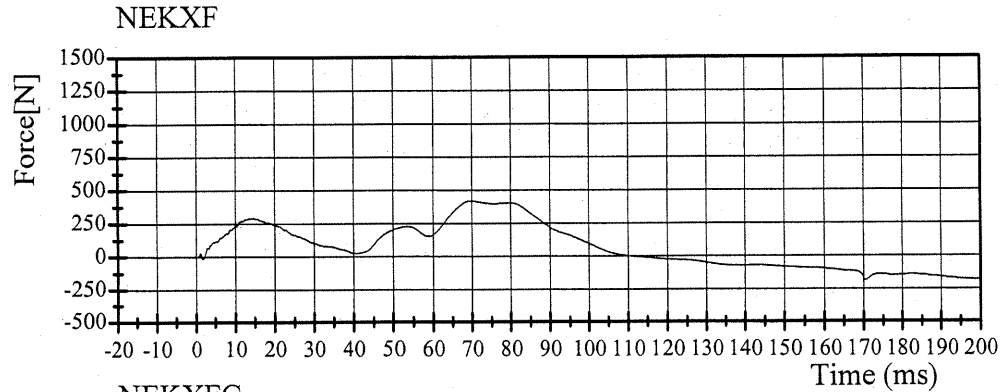


Transportation Research Center Inc.

572E Neck Extension Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/12/2003



08.12.2003 09:04:47 587



Transportation Research Center Inc.

572E Thorax Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/11/2003

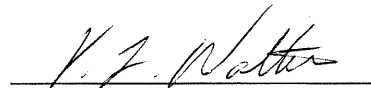
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Pendulum Velocity	6.59 - 6.83 m/s	6.66 m/s	Yes
Maximum Chest Deflection	-72.6 - (-63.5) mm	-71.7 mm	Yes
Maximum Resistive Force	5160 - 5894 N	5689 N	Yes
Internal Hysteresis	69 - 85 %	70 %	Yes

Comments:

Technician



Approved



08.11.2003 09:10:56 966



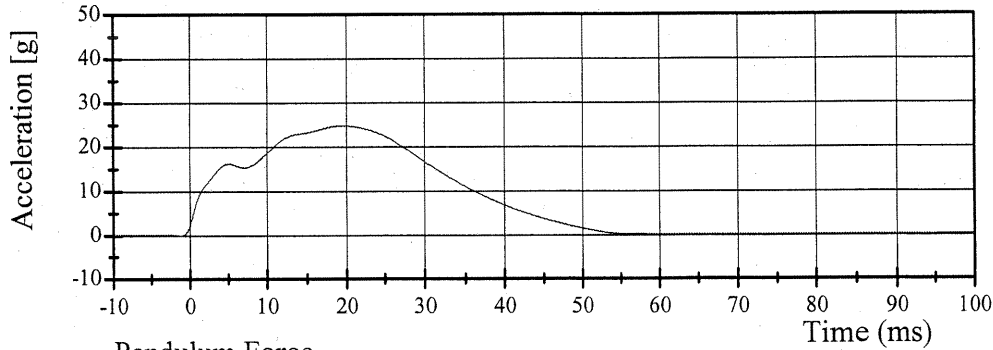
Transportation Research Center Inc.

572E Thorax Test

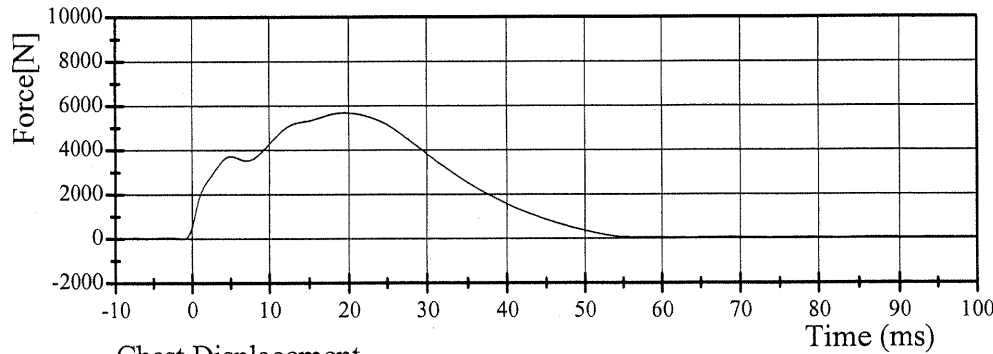
HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/11/2003

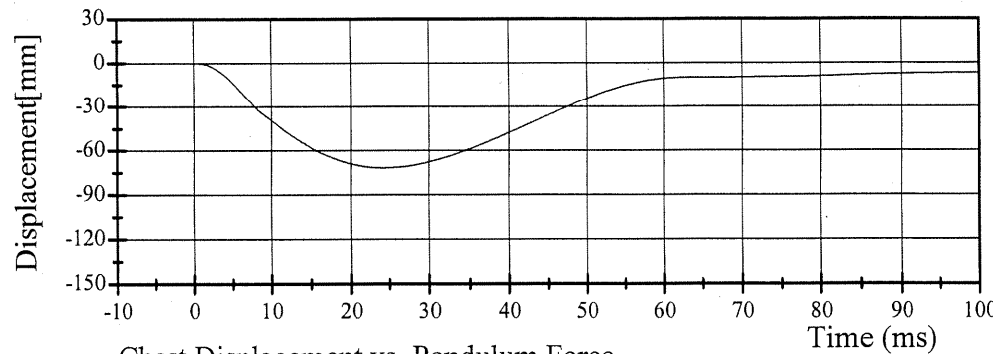
Pendulum Deceleration



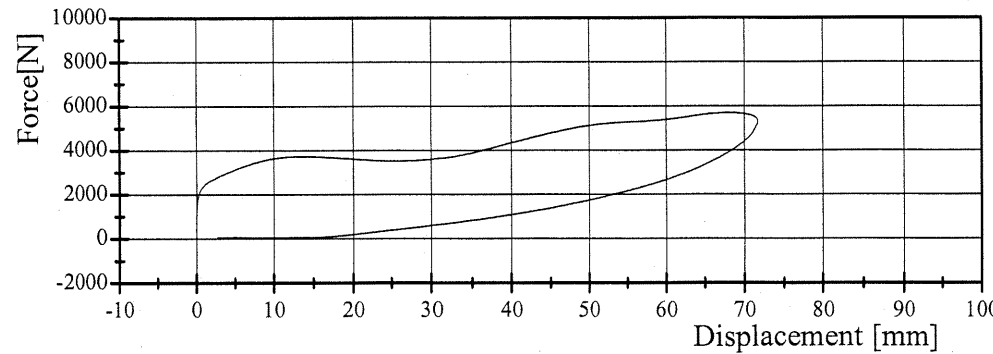
Pendulum Force



Chest Displacement



Chest Displacement vs. Pendulum Force



Transportation Research Center Inc

Hybrid III Hip Range of Motion

Serial Number: 090L
Test Number: 090C44

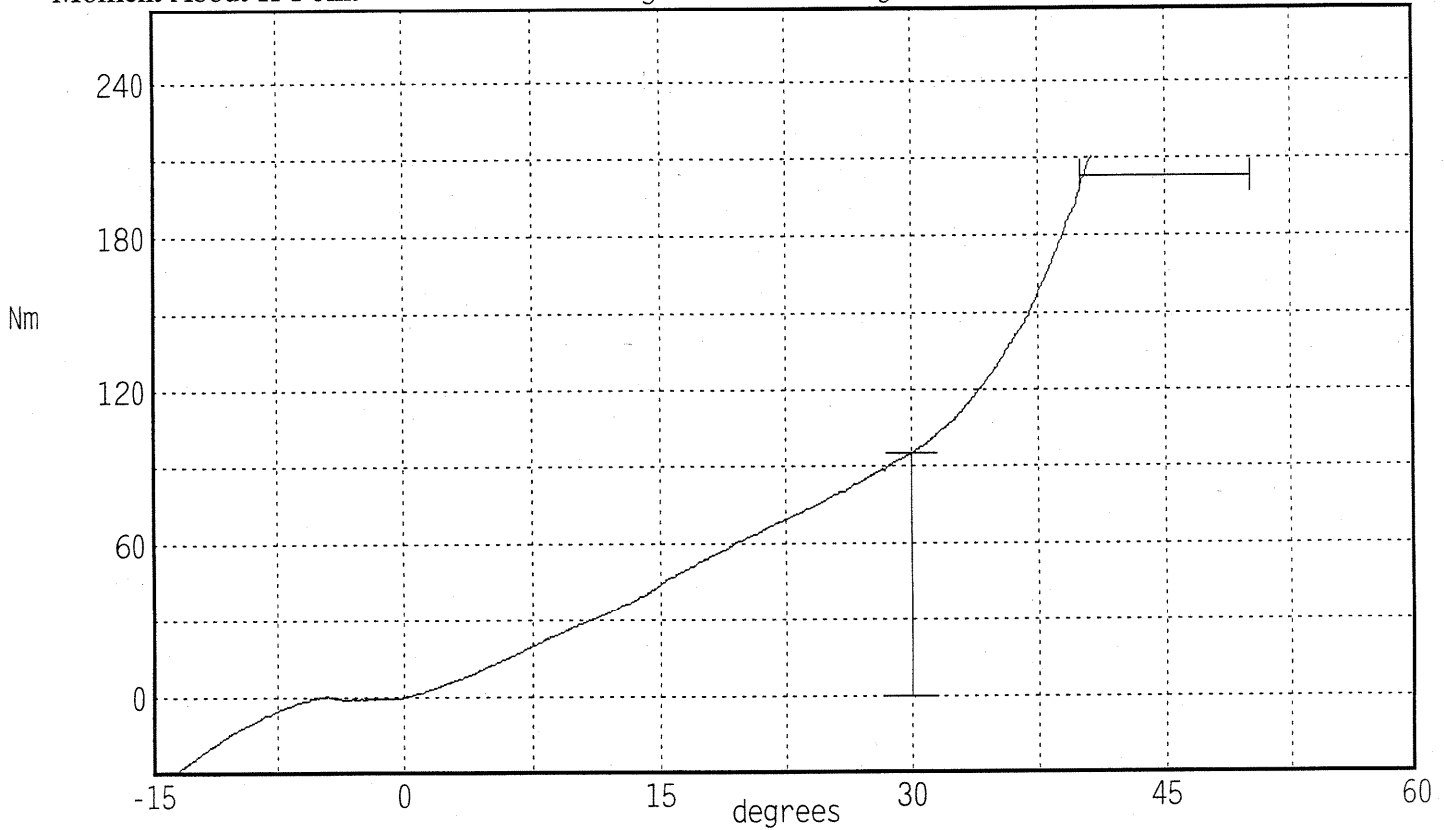
Date: 08/12/2003
Time: 08:58

Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.1 °C	Pass
Humidity	10 - 70	56 %	Pass
Moment at 30 deg	<= 94.9	94.8 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	40.2 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Peak Moment: 210.4 Nm at 40.6 deg
Peak Angle: 40.6 deg at 210.4 Nm

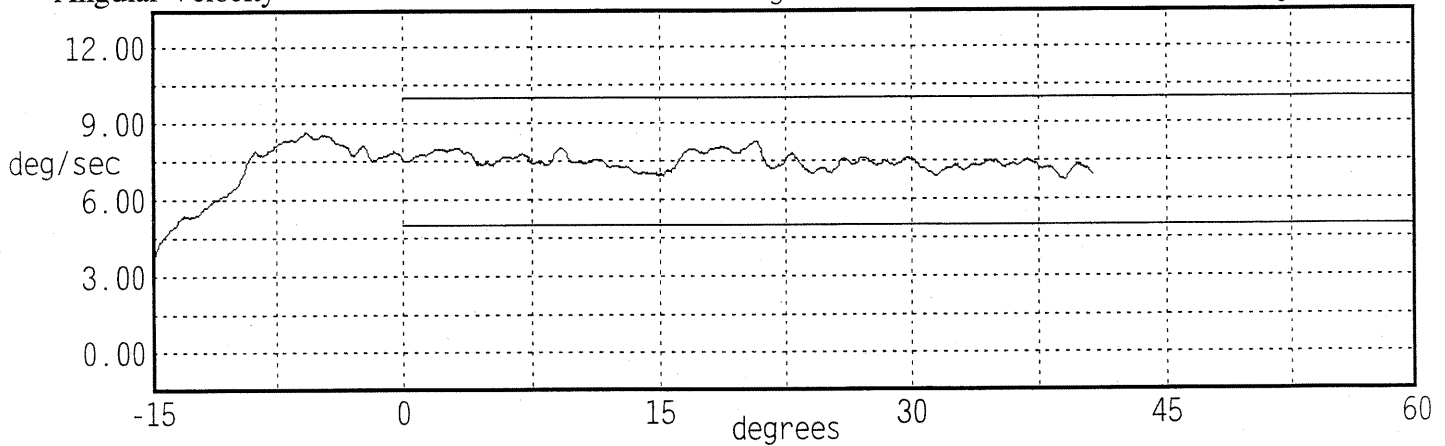
Moment About H-Point



Angular Velocity

Max: 8.3 deg/sec

Min: 6.7 deg/sec



Transportation Research Center Inc

Hybrid III Hip Range of Motion

Serial Number: 090R
Test Number: 090C44

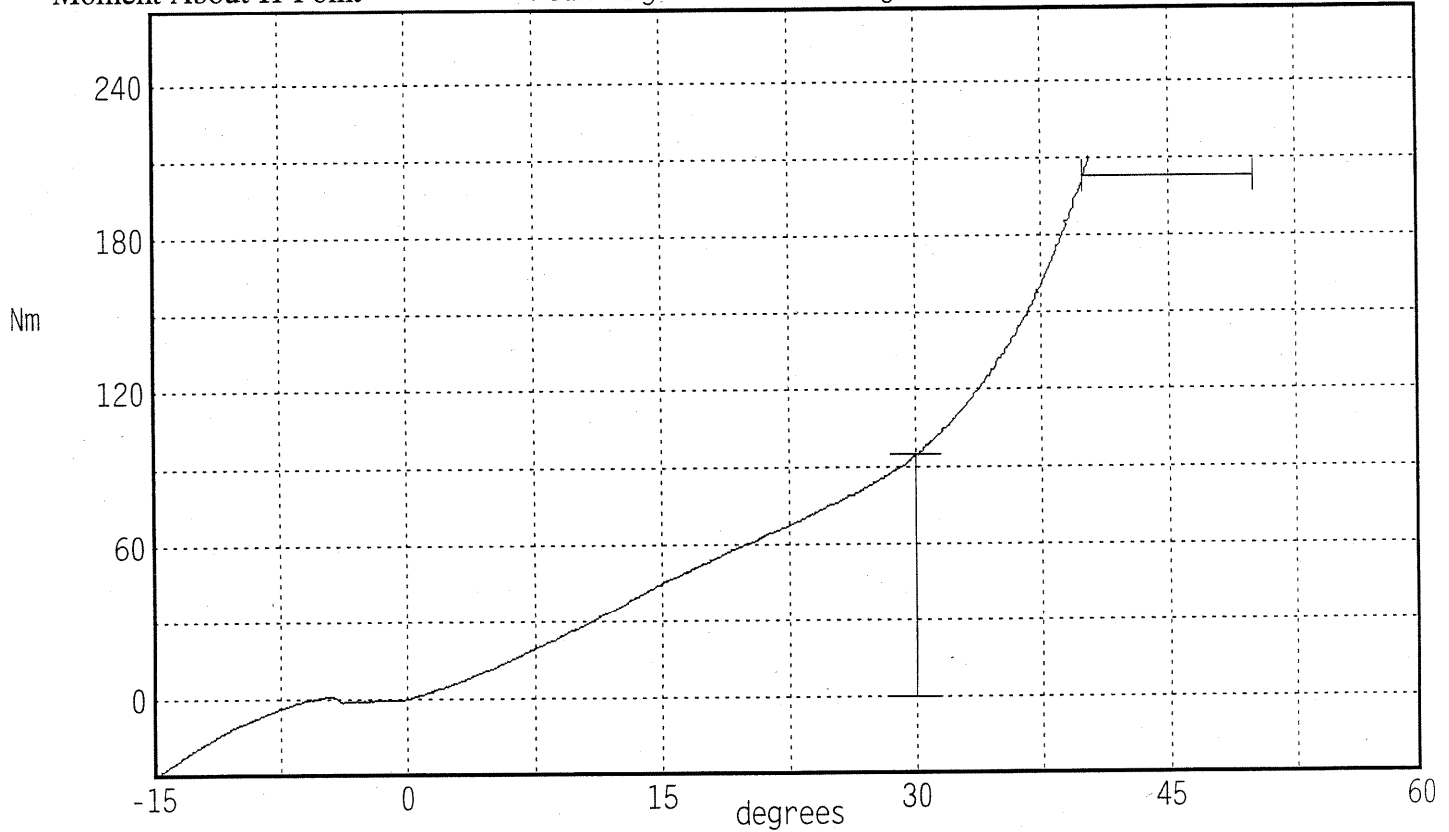
Date: 08/12/2003
Time: 08:52

Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.1 °C	Pass
Humidity	10 - 70	56 %	Pass
Moment at 30 deg	<= 94.9	94.8 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

Peak Moment: 210.3 Nm at 40.3 deg
Peak Angle: 40.3 deg at 209.0 Nm

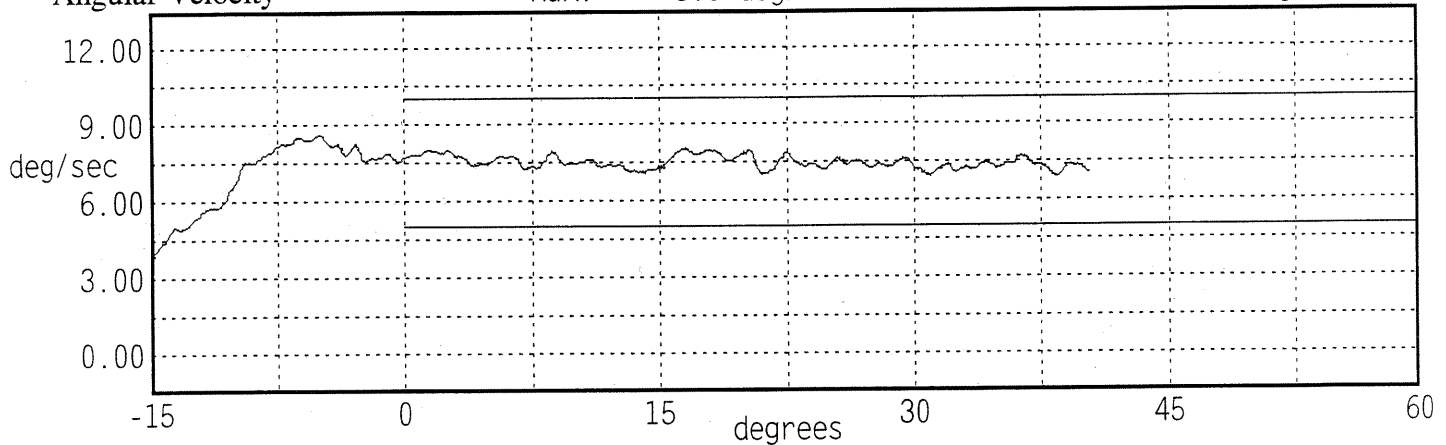
Moment About H-Point



Angular Velocity

Max: 8.0 deg/sec

Min: 6.9 deg/sec



Transportation Research Center Inc.

572E Left Knee Slider Test

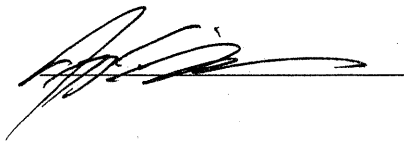
HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/11/2003

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.74 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1656 N	Yes
Force At 18 mm Displacement	-2268 - (-3096) N	-3072 N	Yes

Comments:

Technician



Approved



08.11.2003 14:44:13 1754

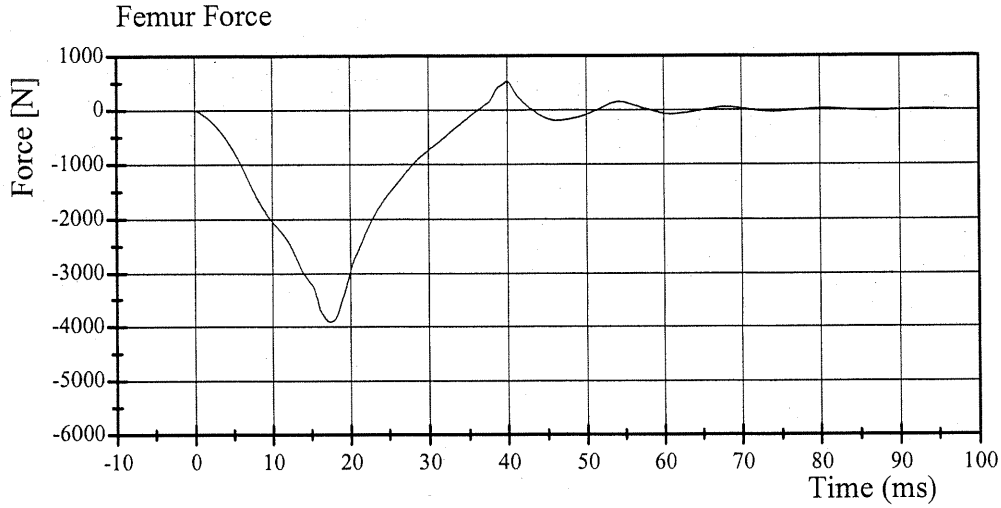


Transportation Research Center Inc.

572E Left Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

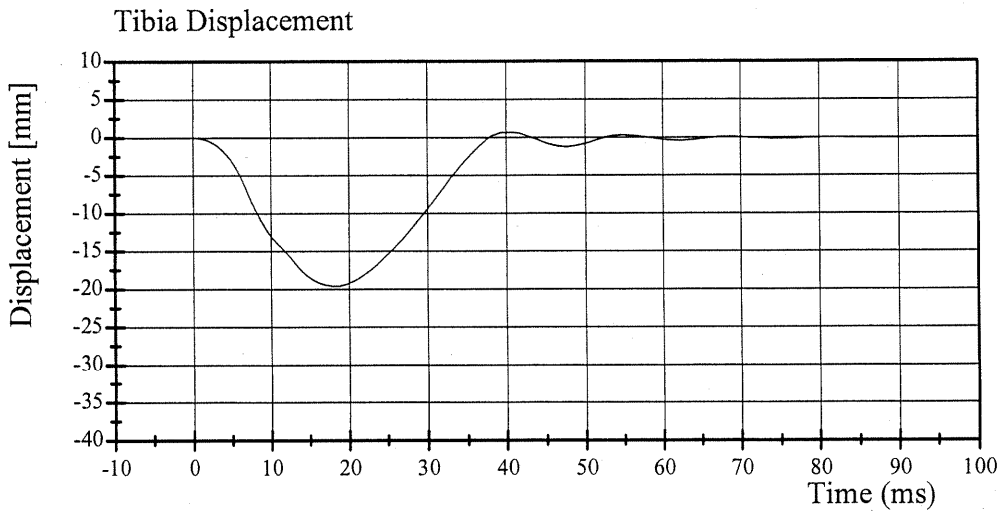
Test Date 08/11/2003



Filter Class: 600

Max: 532.7 N at 40.0 ms

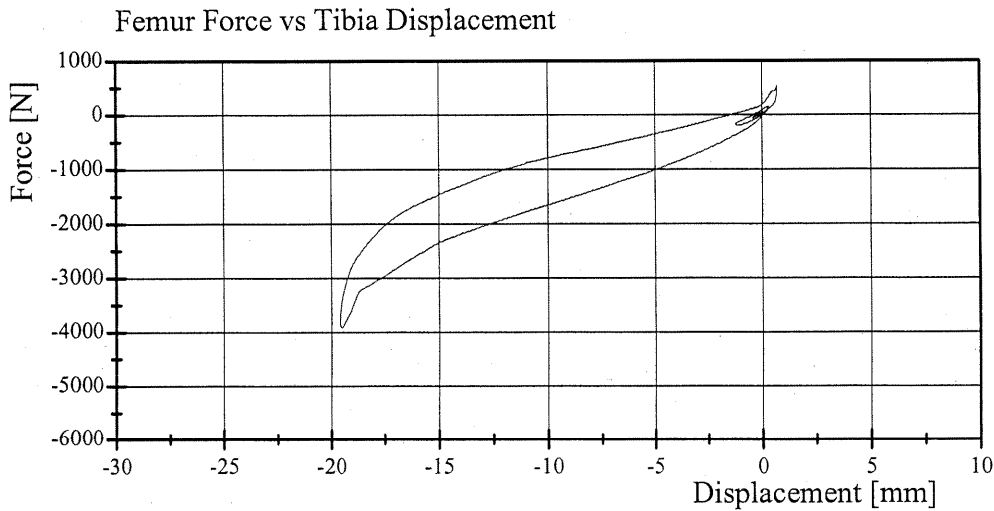
Min: -3912.0 N at 17.4 ms



Filter Class: 600

Max: 0.7 mm at 40.2 ms

Min: -19.6 mm at 18.2 ms



08.11.2003 14:44:14 1754



Transportation Research Center Inc.

572E Right Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/11/2003

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.74 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1550 N	Yes
Force At 18 mm Displacement	-2268 - (-3096) N	-3036 N	Yes

Comments:

Technician



Approved



08.11.2003 14:28:23 1754

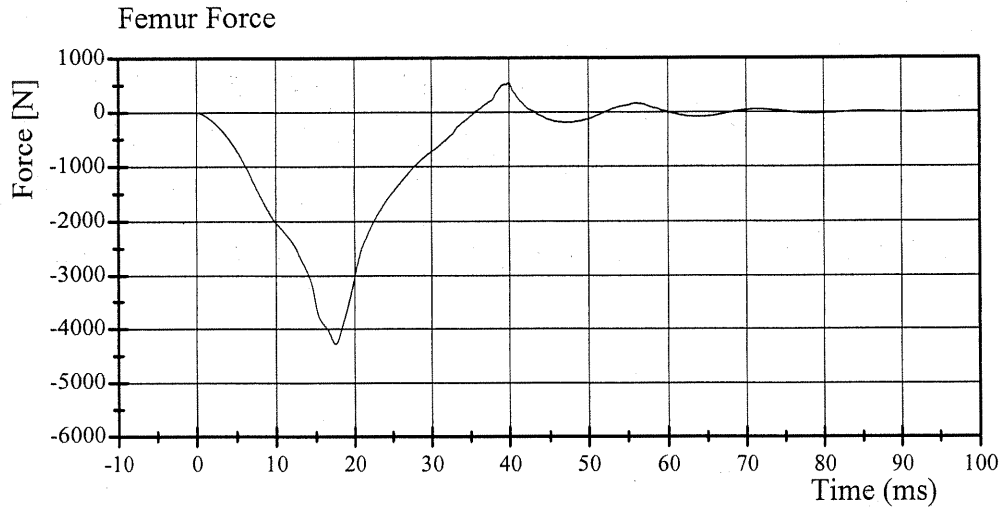


Transportation Research Center Inc.

572E Right Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

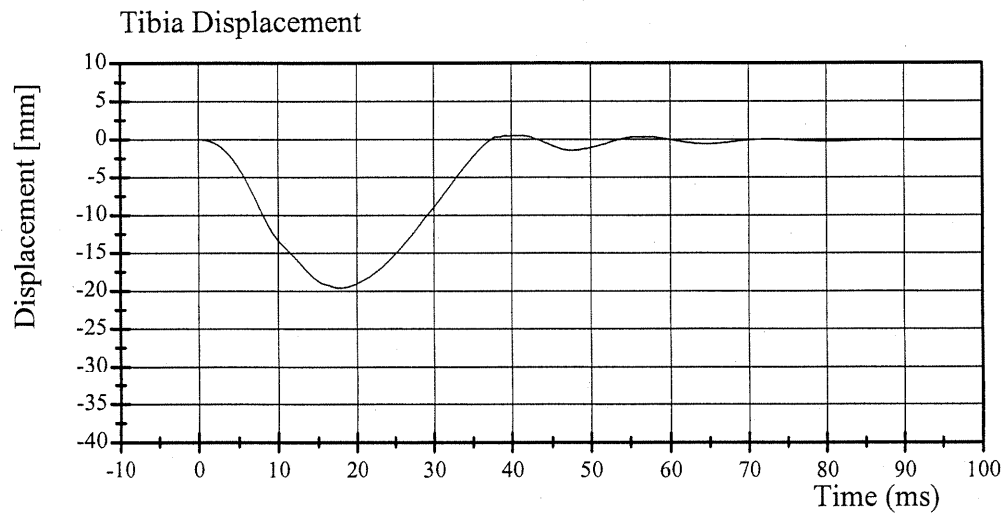
Test Date 08/11/2003



Filter Class: 600

Max: 540.7 N at 40.0 ms

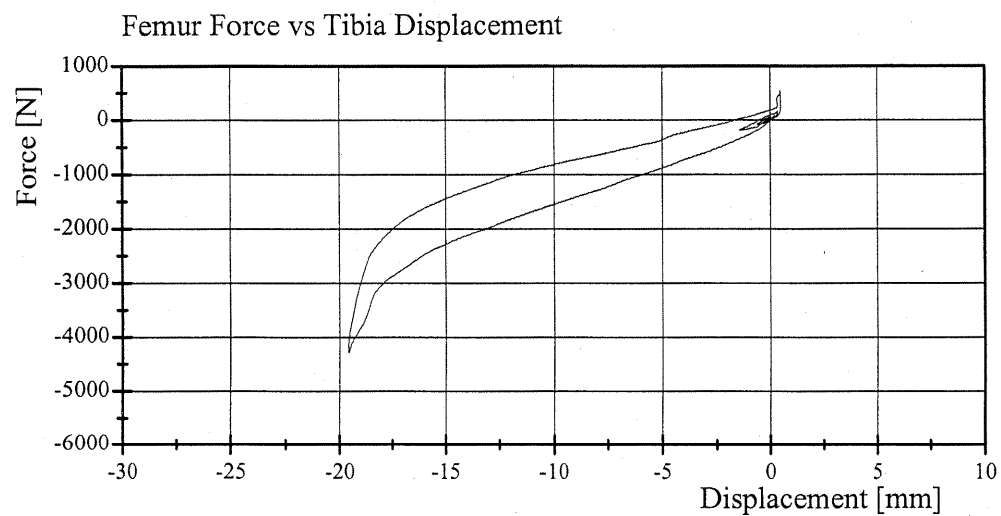
Min: -4281.2 N at 17.6 ms



Filter Class: 600

Max: 0.5 mm at 41.2 ms

Min: -19.6 mm at 17.9 ms



08.11.2003 14:28:24 1754



Transportation Research Center Inc.

572E Left Knee Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/11/2003

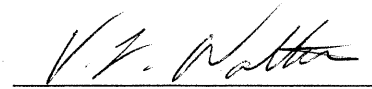
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.11 m/s	Yes
Maximum Pendulum Force	4715 - 5783 N	5405 N	Yes

Comments:

Technician



Approved



08.11.2003 13:41:27 2146



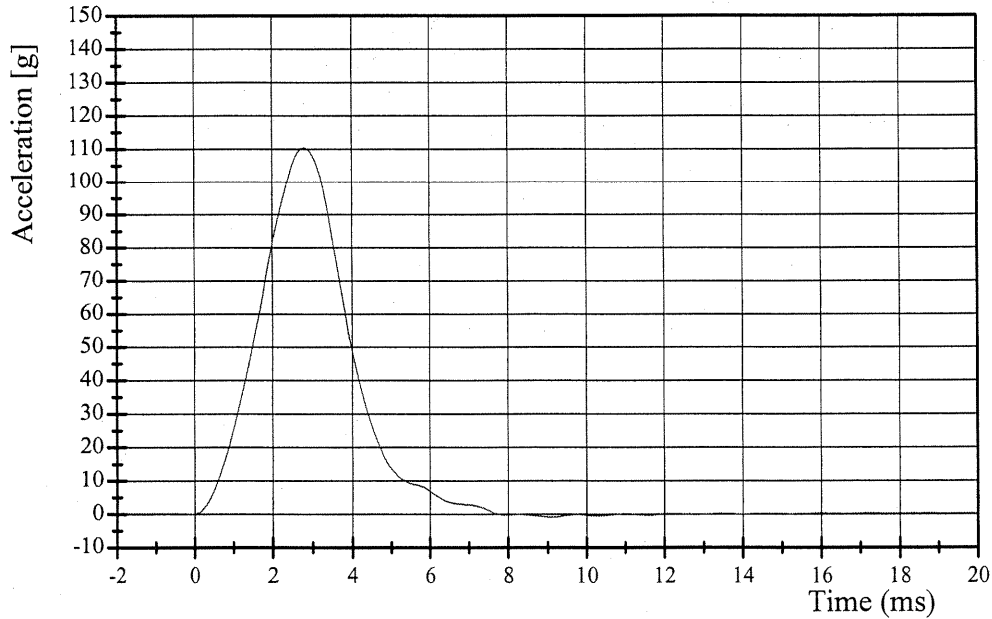
Transportation Research Center Inc.

572E Left Knee Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/11/2003

Pendulum Deceleration

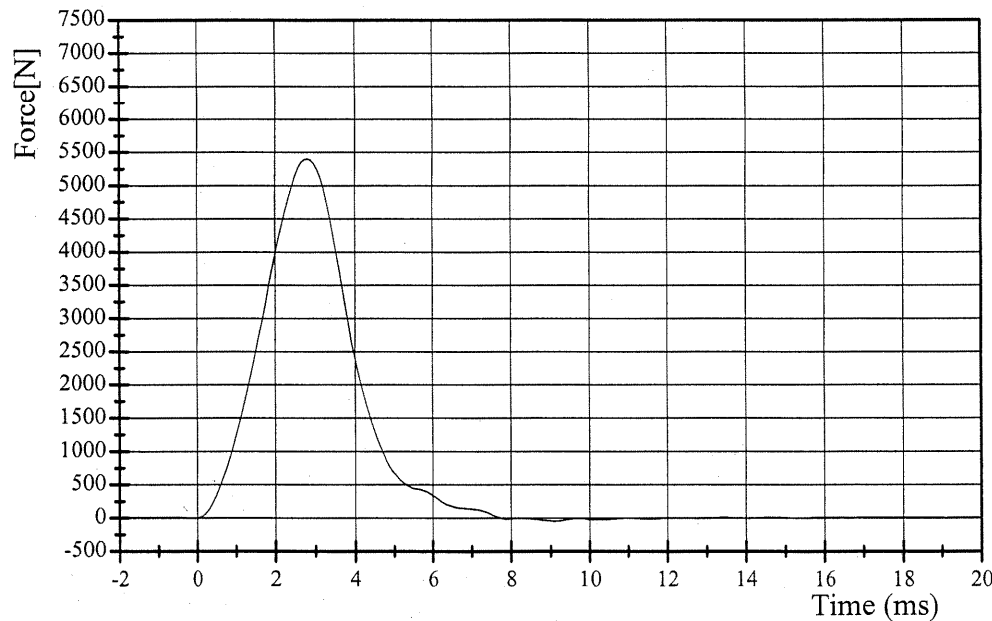


Filter Class: 600

Max: 110.5 g at 2.8 ms

Min: -0.9 g at 9.1 ms

Pendulum Force



Filter Class: 600

Max: 5404.6 N at 2.8 ms

Min: -43.1 N at 9.1 ms

08.11.2003 13:41:28 2146



Transportation Research Center Inc.

572E Right Knee Test


HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/11/2003

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.11 m/s	Yes
Maximum Pendulum Force	4715 - 5783 N	5720 N	Yes

Comments:

Technician



Approved



08.11.2003 13:44:16 2142



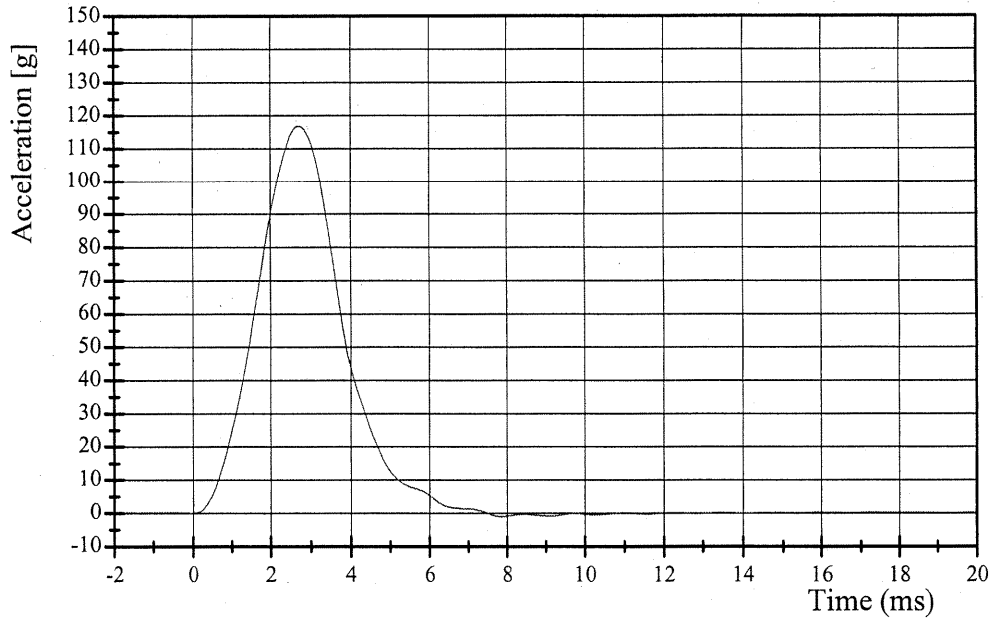
Transportation Research Center Inc.

572E Right Knee Test

HIII 50th Male Serial No. 090 Calibration No. 44 - 1

Test Date 08/11/2003

Pendulum Deceleration

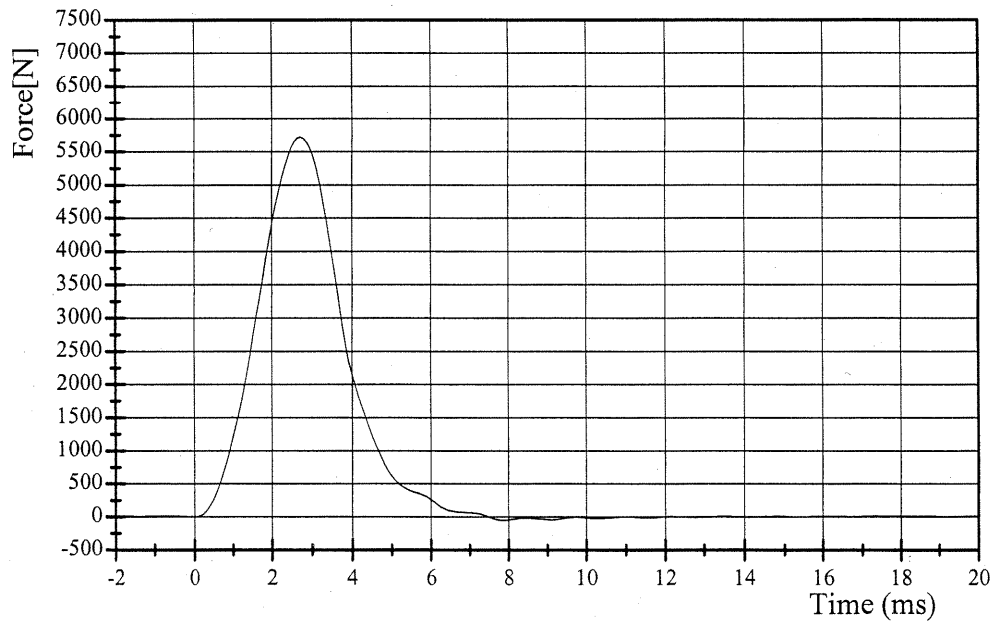


Filter Class: 600

Max: 116.9 g at 2.7 ms

Min: -1.0 g at 7.8 ms

Pendulum Force



Filter Class: 600

Max: 5720.2 N at 2.7 ms

Min: -51.4 N at 7.8 ms

08.11.2003 13:44:17 2142



GESAC, INC

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125 Orchard Drive, Boonsboro, MD 21713

Tel (301) 432-5885

Fax (301) 432-6199

Thor-LX Test Report

Dynamic Heel of Foot Impact Test

Engineer	P. Pope Y. Wang	Test Date	October 15, 2003
Customer	TRC	Temp (C)/Hum.(%)	22/61
Description	Right Lower Extremities	Serial No.	LX109

Testing Summary

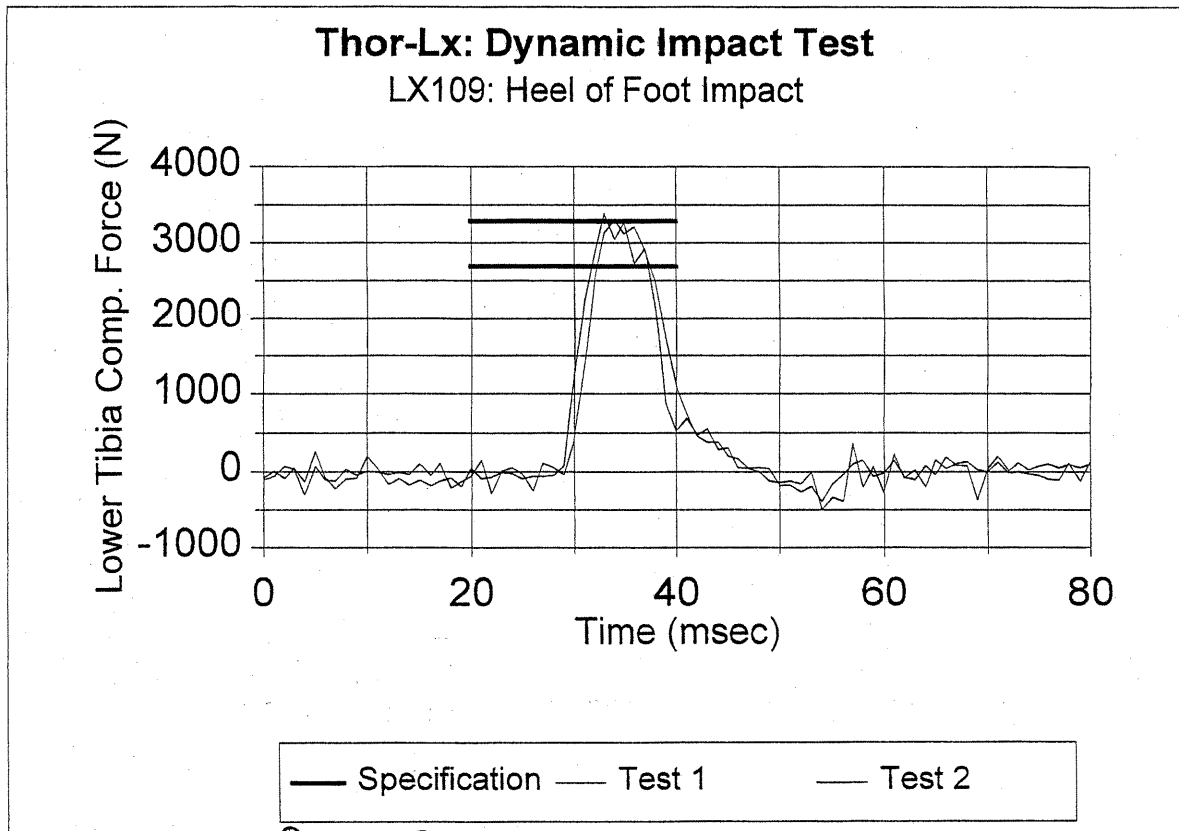
Impact Speed	4.0 m/s	Scan Rate	10000 scans/sec
Impact Effective Mass	5.0 kg	Filter	CFC 600
Impactor	NHTSA Dynamic Impactor (TLX-9000-013)		

Response

Peak Lower Tibia Compressive Force* (N)	Specification (N)	Within Reference
3342	2694 - 3292	No

*Average Value

Test Plot



Tested by: Patrick Pope

Date: 10-16-03

Analyzed by: [Signature]

Date: 10-16-03

Thor-LX Test Report

Dynamic Ball of Foot Impact Test (page 1)

Engineer P. Pope
 Y. Wang
 Customer TRC
 Description Right Lower Extremities

Test Date October 15, 2003
 Temp (C)/Hum.(%) 21/62
 Serial No. LX109

Testing Summary

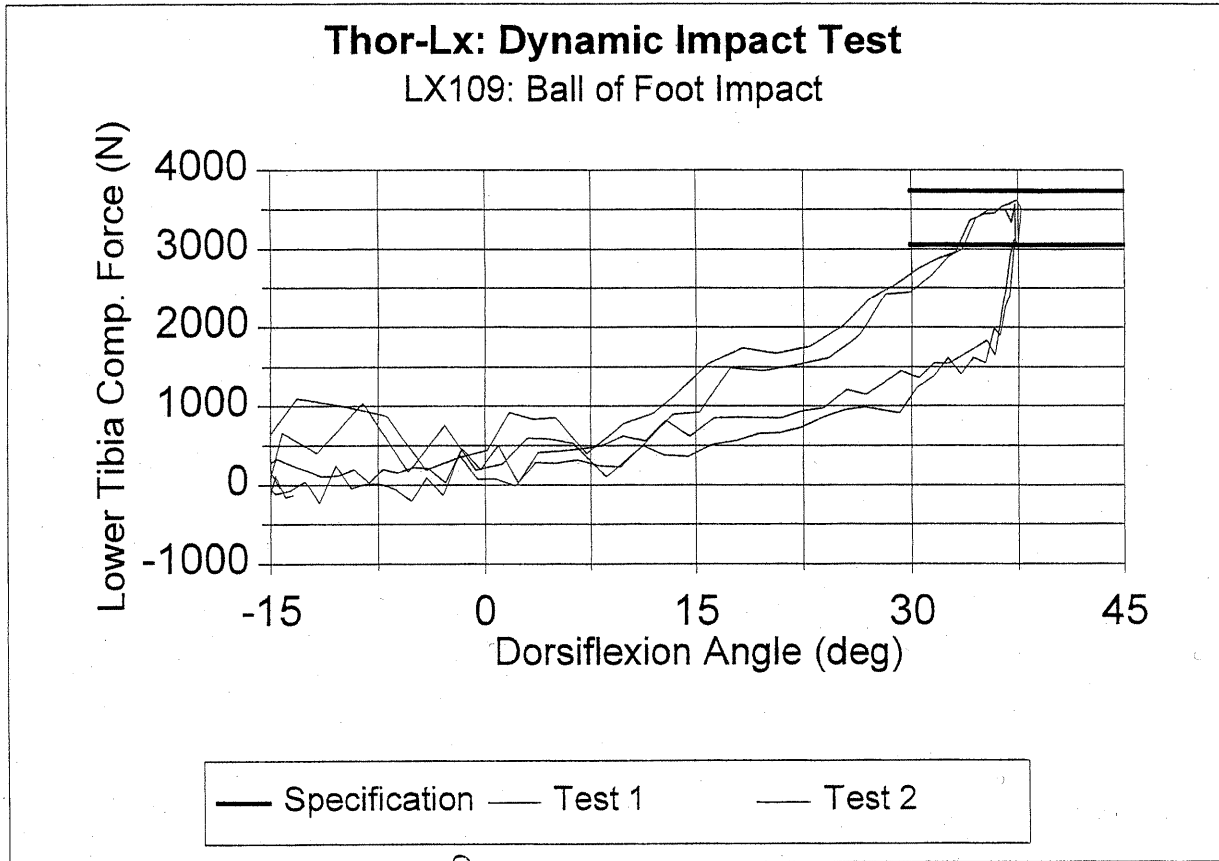
Impact Speed 5.0 m/s Scan Rate 10000 scans/sec
 Impact Effective Mass 5.0 kg Filter CFC 600
 Impactor NHTSA Dynamic Impactor (TLX-9000-013)

Response

Peak Lower Tibia Compressive Force* (N)	Specification (N)	Within Reference
3597	3058 - 3738	Yes

*Average Value

Test Plot



Tested by: Patrick Pope
 Analyzed by: [Signature]

Date: 10-16-03
 Date: 10-16-03

Thor-LX Test Report

Dynamic Ball of Foot Impact Test (page 2)

Engineer P. Pope
 Y. Wang
 Customer TRC
 Description Right Lower Extremities

Test Date October 15, 2003
 Temp (C)/Hum.(%) 21/62
 Serial No. LX109

Testing Summary

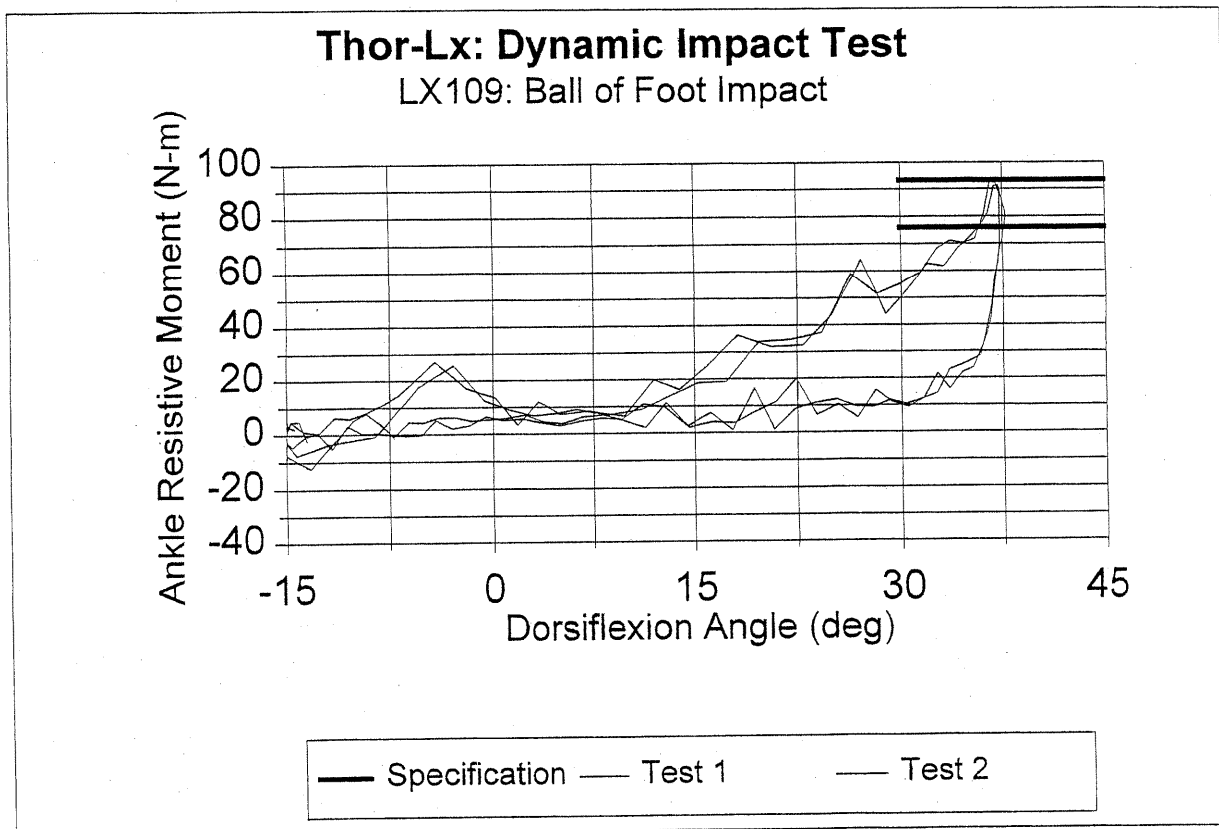
Impact Speed 5.0 m/s Scan Rate 10000 scans/sec
 Impact Effective Mass 5.0 kg Filter CFC 600
 Impactor NHTSA Dynamic Impactor (TLX-9000-013)

Response

Peak Ankle Resistive Moment* (N-m)	Specification (N-m)	Within Reference
92.4	76.2 - 93.2	Yes

*Average Value

Test Plot



Tested by: Patrick Pope
 Analyzed by: [Signature]

Date: 10-16-03
 Date: 10-16-03

GESAC, INC

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125 Orchard Drive, Boonsboro, MD 21713

Tel (301) 432-5885 Fax (301) 432-6199

Thor-Lx Test Report

Inversion Quasi-Static Test

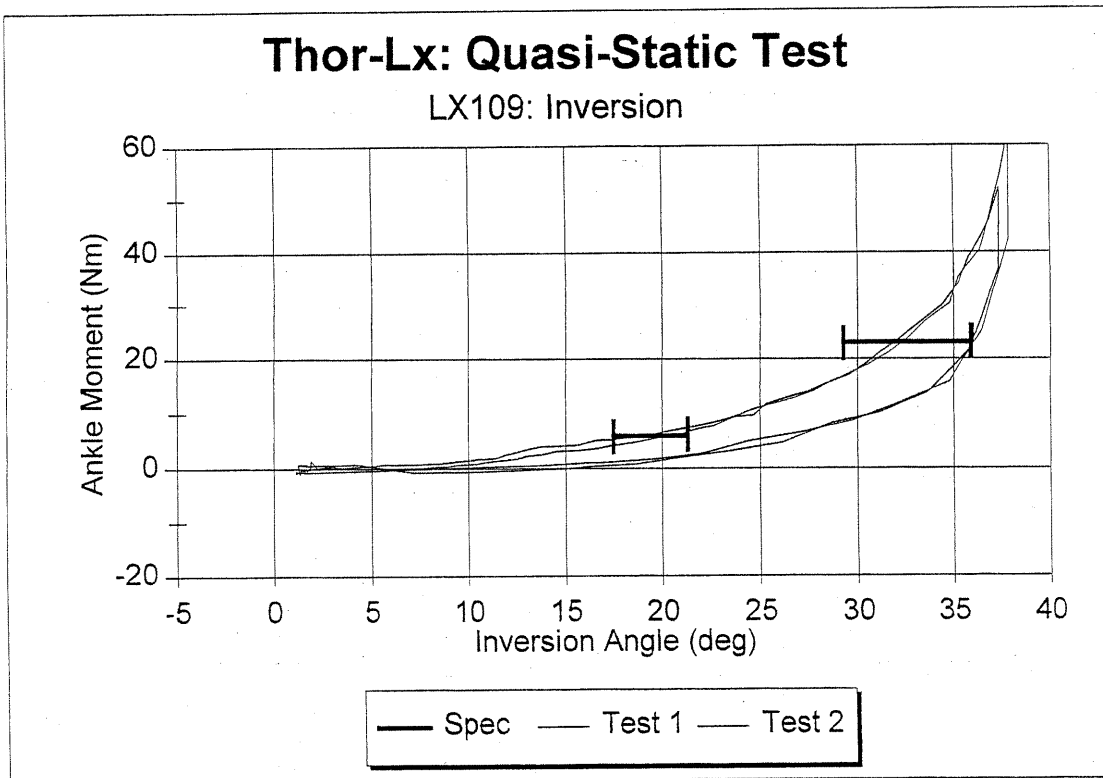
Engineer	P. Pope Y. Wang	Test Date	October 16, 2003
Customer	TRC	Temp. (C)/Hum.(%)	22/61
Description	Right Lower Extremity	Serial No.	LX109

Testing Summary (Design Reference)

Ankle Moment (Nm)	Inversion Angle (Degree)	Reference Specification (Degree)	Within Reference?
6	19.9	17.5 - 21.3	Yes
23	32.1	29.3 - 35.9	Yes

*Average Value

Result Plot



Tested by: Patrick Pope

Analyzed by: [Signature]

Date: 10-16-03

Date: 10-16-03

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Tel (301) 432-5885 Fax (301) 432-6199

Thor-Lx Test Report

Eversion Quasi-Static Test

Engineer P. Pope
Y. Wang
Customer TRC
Description Right Lower Extremity

Test Date
Temp. (C)/Hum.(%)
Serial No.

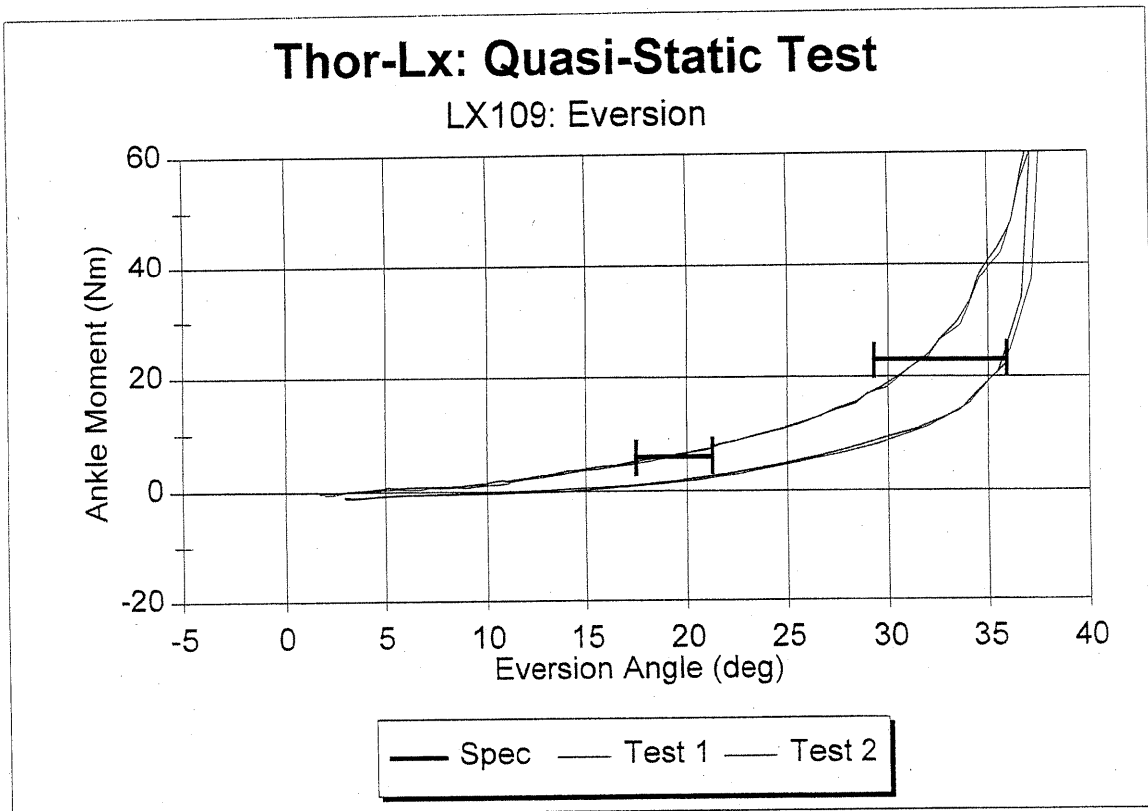
October 16, 2003
22/62
LX109

Testing Summary (Design Reference)

Ankle Moment (Nm)	Eversion Angle (Degree)	Reference Specification (Degree)	Within Reference?
6	19.0	17.5 - 21.3	Yes
23	31.6	29.3 - 35.9	Yes

*Average Value

Result Plot



Tested by: Patrick Pope

Date: 10-16-03

Analyzed by: [Signature]

Date: 10-16-03

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Tel (301) 432-5885 Fax (301) 432-6199

Thor-LX Test Report

Dynamic Heel of Foot Impact Test

Engineer P. Pope
Y. Wang
Customer TRC
Description Left Lower Extremities

Test Date October 16, 2003
Temp (C)/Hum.(%) 22/61
Serial No. LX110

Testing Summary

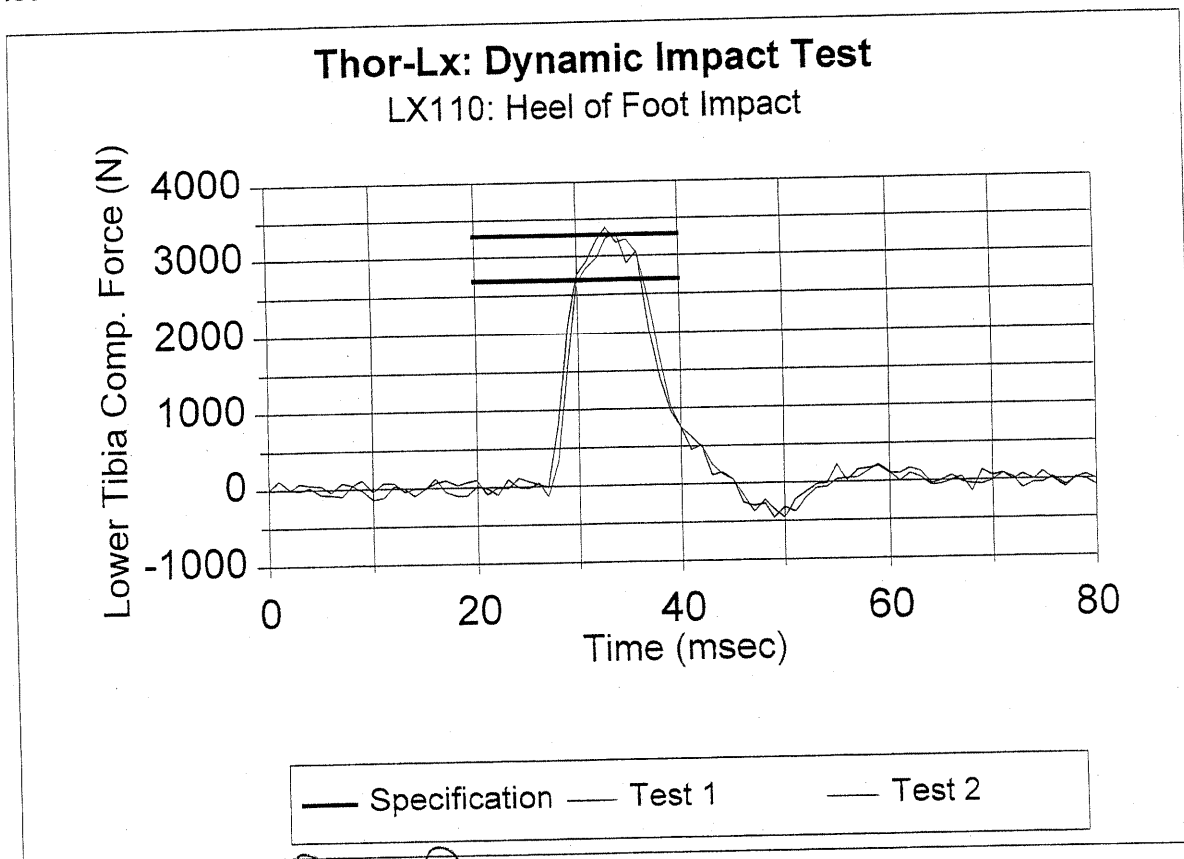
Impact Speed	4.0 m/s	Scan Rate	10000 scans/sec
Impact Effective Mass	5.0 kg	Filter	CFC 600
Impactor	NHTSA Dynamic Impactor (TLX-9000-013)		

Response

Peak Lower Tibia Compressive Force* (N)	Specification (N)	Within Reference
3351	2694 - 3292	No

*Average Value

Test Plot



Tested by: Patrick Pope

Date: 10-16-03

Analyzed by: (Signature)

Date: 10-16-03

GESAC, INC

DESIGN | MANUFACTURE | TEST | SOFTWARE DEVELOPMENT | ERGONOMICS

125 Orchard Drive, Boonsboro, MD 21713

Tel (301) 432-5885

Fax (301) 432-6199

Thor-LX Test Report

Dynamic Ball of Foot Impact Test (page 2)

Engineer	P. Pope Y. Wang	Test Date	October 16, 2003
Customer	NHTSA	Temp (C)/Hum.(%)	21/62
Description	Left Lower Extremities	Serial No.	LX110

Testing Summary

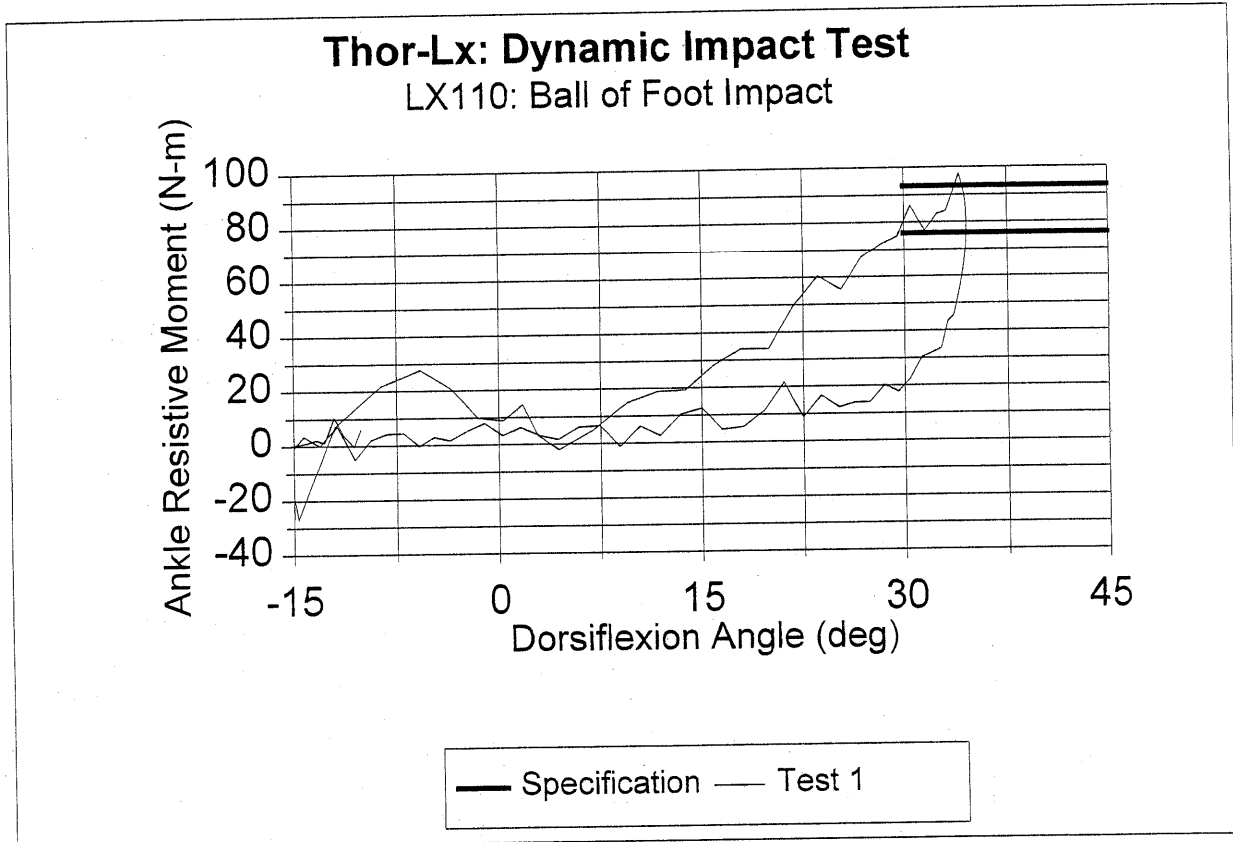
Impact Speed	5.0 m/s	Scan Rate	10000 scans/sec
Impact Effective Mass	5.0 kg	Filter	CFC 600
Impactor	NHTSA Dynamic Impactor (TLX-9000-013)		

Response

Peak Ankle Resistive Moment* (N-m)	Specification (N-m)	Within Reference
97.7	76.2 - 93.2	No

*Average Value

Test Plot



Tested by: Patrick Pope

Analyzed by: [Signature]

Date: 10-16-03

Date: 10-16-03

GESAC, INC

DESIGN | MANUFACTURE | TEST | SOFTWARE DEVELOPMENT | ERGONOMICS
 125 Orchard Drive, Boonsboro, MD 21713
 Tel (301) 432-5885 Fax (301) 432-6199

Thor-LX Test Report

Dynamic Ball of Foot Impact Test (page 1)

Engineer P. Pope
 Y. Wang
 Customer NHTSA
 Description Left Lower Extremities

Test Date October 16, 2003
 Temp (C)/Hum.(%) 21/62
 Serial No. LX110

Testing Summary

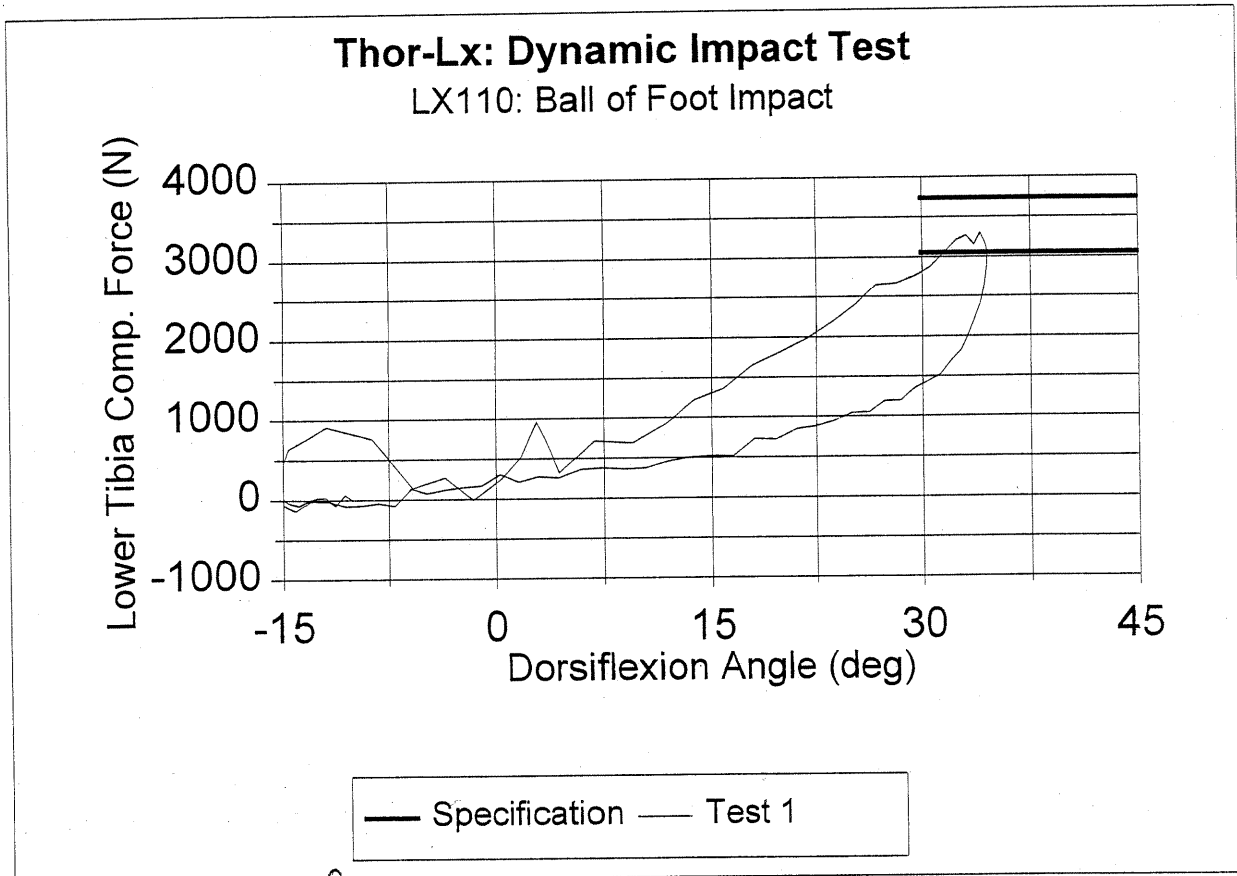
Impact Speed 5.0 m/s Scan Rate 10000 scans/sec
 Impact Effective Mass 5.0 kg Filter CFC 600
 Impactor NHTSA Dynamic Impactor (TLX-9000-013)

Response

Peak Lower Tibia Compressive Force* (N)	Specification (N)	Within Reference
3306	3058 - 3738	Yes

*Average Value

Test Plot



Tested by: Patrick Pope

Date: 10-16-03

Analyzed by: [Signature]

Date: 10-16-03

GESAC, INC

DESIGN | MANUFACTURE | TEST | SOFTWARE DEVELOPMENT | ERGONOMICS

125 Orchard Drive, Boonsboro, MD 21713

Tel (301) 432-5885 Fax (301) 432-6199

Thor-Lx Test Report

Inversion Quasi-Static Test

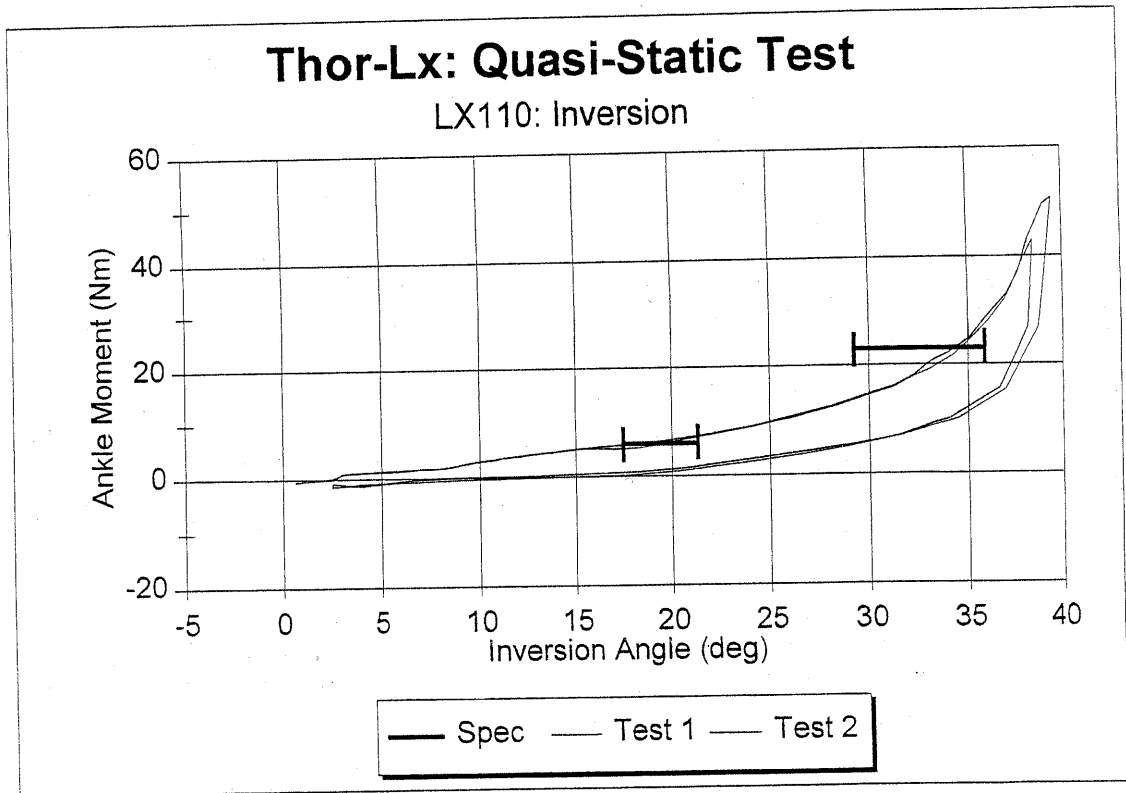
Engineer	P. Pope Y. Wang	Test Date	October 16, 2003
Customer Description	TRC Left Lower Extremity	Temp. (C)/Hum.(%)	22/61
		Serial No.	LX110

Testing Summary (Design Reference)

Ankle Moment (Nm)	Inversion Angle (Degree)	Reference Specification (Degree)	Within Reference?
6	18.8	17.5 - 21.3	Yes
23	34.5	29.3 - 35.9	Yes

*Average Value

Result Plot



Tested by: Patrick Pope

Date: 10-16-03

Analyzed by: [Signature]

Date: 10-16-03

Thor-Lx Test Report

Everson Quasi-Static Test

Engineer
Customer
Description

P. Pope
Y. Wang
TRC
Left Lower Extremity

Test Date
Temp. (C)/Hum.(%)
Serial No.

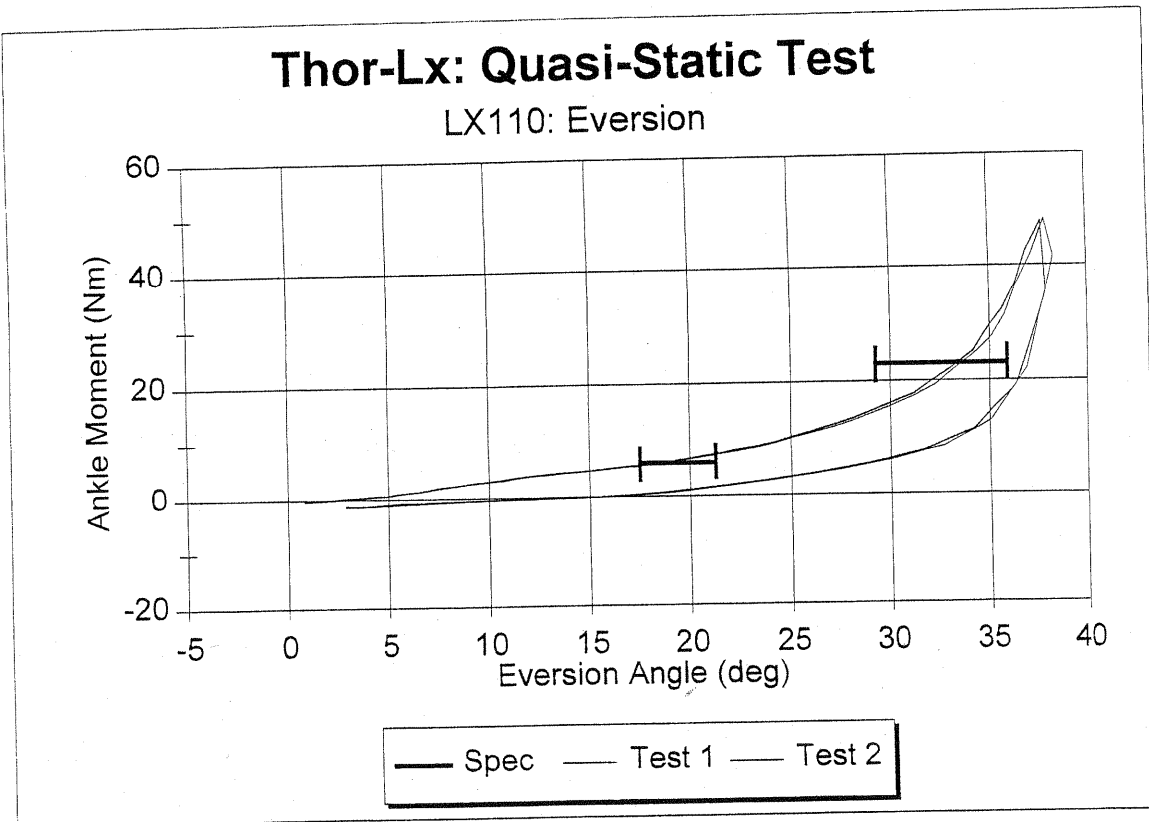
October 16, 2003
22/62
LX110

Testing Summary (Design Reference)

Ankle Moment (Nm)	Everson Angle (Degree)	Reference Specification (Degree)	Within Reference?
6	18.5	17.5 - 21.3	Yes
23	33.5	29.3 - 35.9	Yes

*Average Value

Result Plot



Tested by:

Patric Pope

Date:

10-16-03

Analyzed by:

(Signature)

Date:

10-16-03

Pre-test Dummy Configuration and Performance Verification Data

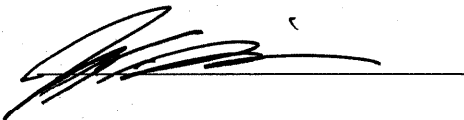
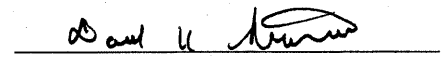
Passenger Dummy S/N: 083

Transportation Research Center Inc.
HIII 95th Dummy
External Dimensions
Serial No. 083 Calibration No. 15

Test Parameter	Dimension	Specification	Results	Pass
Total Sitting Height	A	927.1 - 942.3 mm	937 mm	Yes
Shoulder Pivot Height	B	541.0 - 556.2 mm	550 mm	Yes
H-Point Height	C	101.6 - 111.8 mm	106 mm	Yes
H-Point From Seatback	D	137.1 - 147.3 mm	141 mm	Yes
Shoulder Pivot From Backline	E	109.3 - 119.3 mm	113 mm	Yes
Thigh Clearance	F	160.0 - 175.2 mm	168 mm	Yes
Back Of Elbow To Wrist Pivot	G	307.4 - 317.4 mm	311 mm	Yes
Skull Cap To Backline	H	86.4 - 91.4 mm	88 mm	Yes
Shoulder-Elbow Length	I	348.0 - 363.2 mm	357 mm	Yes
Elbow Rest Height	J	208.3 - 223.5 mm	209 mm	Yes
Buttock Knee Length	K	624.8 - 650.2 mm	638 mm	Yes
Popliteal Height	L	457.2 - 482.6 mm	477 mm	Yes
Knee Pivot Height	M	520.7 - 546.1 mm	533 mm	Yes
Buttock Popliteal Length	N	490.2 - 515.6 mm	500 mm	Yes
Chest Depth	O	284.5 - 299.7 mm	297 mm	Yes
Foot Length	P	251.5 - 266.7 mm	254 mm	Yes
Buttock to Knee Pivot Length	R	556.3 - 581.7 mm	577 mm	Yes
Head Breadth	S	148.9 - 160.0 mm	154 mm	Yes
Head Depth	T	190.5 - 200.7 mm	195 mm	Yes
Hip Breadth	U	396.3 - 411.5 mm	405 mm	Yes
Shoulder Breadth	V	467.4 - 482.6 mm	477 mm	Yes
Foot Breadth	W	91.5 - 106.7 mm	93 mm	Yes
Head Circumference	X	566.4 - 576.6 mm	575 mm	Yes
Chest Circumference	Y	1120.2 - 1150.6 mm	1130 mm	Yes
Waist Circumference	Z	988.1 - 1018.5 mm	998 mm	Yes
Location For Chest Circumference	AA	502.9 - 513.1 mm	508 mm	Yes
Location For Waist Circumference	BB	274.3 - 284.5 mm	279 mm	Yes

Technician

Approved


Transportation Research Center Inc.

Head Drop Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/25/2003

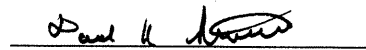
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Peak Resultant Acceleration	220 - 265 g	255.4 g	Yes
Peak Lateral Acceleration	15 g Max	3.6 g	Yes
Is Acceleration Curve Unimodal?	Yes	Yes	Yes

Comments:

Technician



Approved



06.25.2003 10:44:30 612

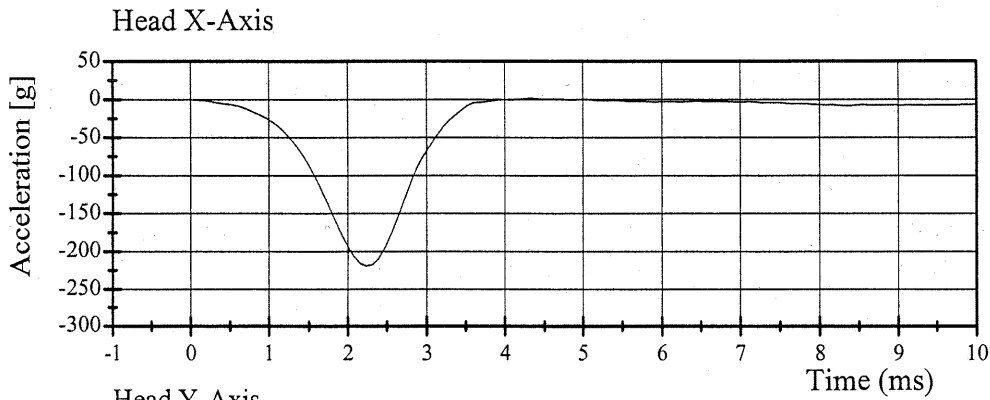


Transportation Research Center Inc.

Head Drop Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

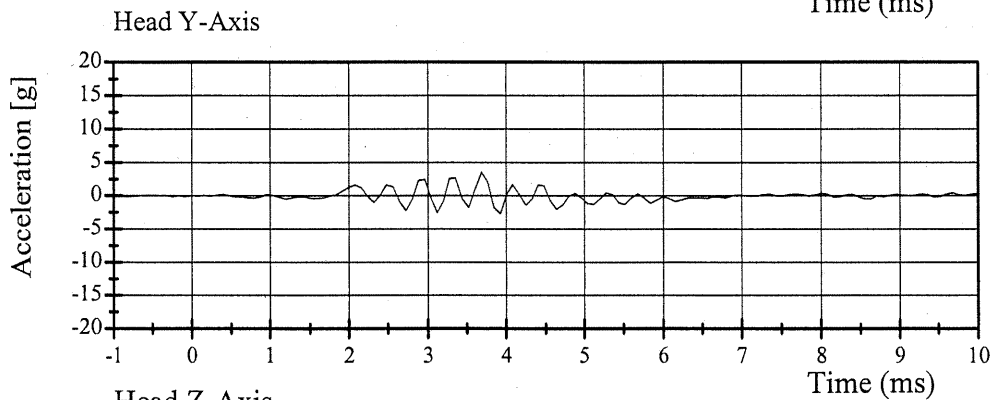
Test Date 06/25/2003



Filter Class: 1000

Max: 1.8 g at 4.3 ms

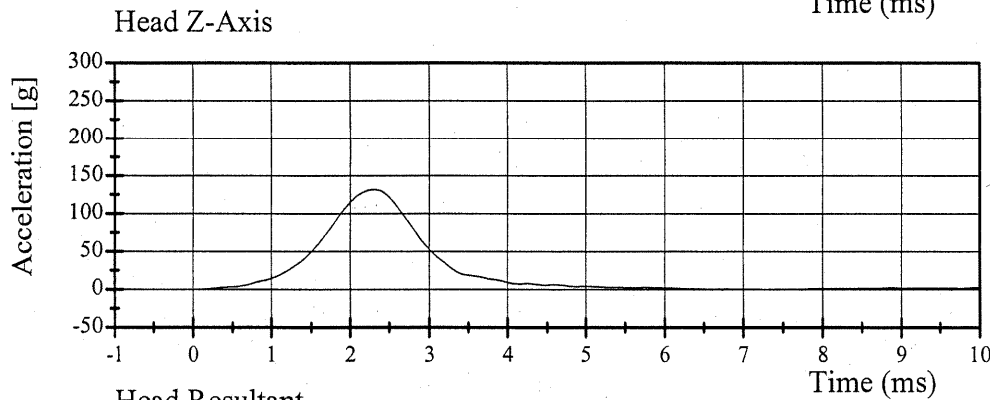
Min: -219.2 g at 2.2 ms



Filter Class: 1000

Max: 3.6 g at 3.7 ms

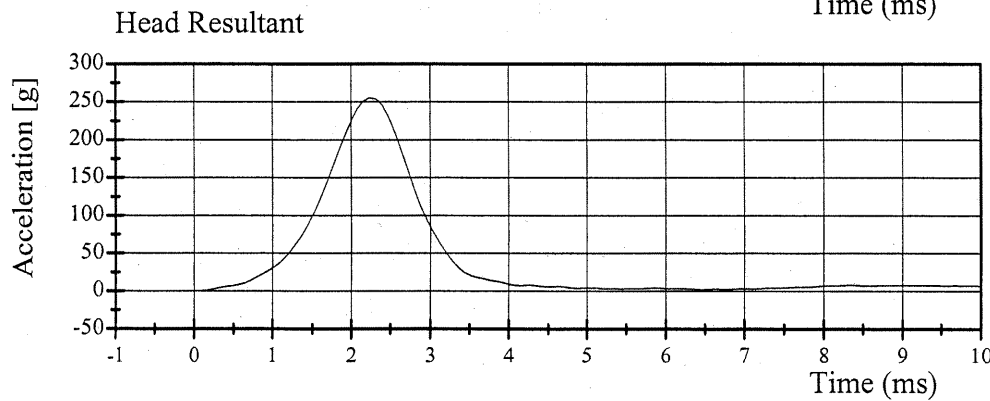
Min: -2.7 g at 3.9 ms



Filter Class: 1000

Max: 132.1 g at 2.3 ms

Min: 0.0 g at 7.3 ms



Filter Class: 1000

Max: 255.4 g at 2.2 ms

Min: 0.0 g at 0.1 ms

06.25.2003 10:44:31 612



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III LARGE MALE

26-JUN-03

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 083C15NF1 LG. MALE SN083 NECK FLEX CAL15

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
IMPACT VELOCITY	6.89 - 7.13 M/S	6.93 M/S
INTEGRATED PENDULUM VELOCITY	10 MS 2.2 - 2.7 M/S	2.27 M/S
	20 MS 4.0 - 5.0 M/S	4.33 M/S
	30 MS 5.7 - 6.9 M/S	6.15 M/S
PEAK D-PLANE ROTATION	61 - 75 DEG.	63.86 DEG.
ROTATION ANGLE DECAY TIME FROM PEAK TO ZERO	50 - 60 MS	58.08 MS
PEAK MOMENT ABOUT OCCIPITAL CONDYLE	110 - 130 NM	101.03 NM *
POSITIVE MOMENT DECAY TIME FROM PEAK TO ZERO	40 - 50 MS	49.92 MS
TIME OF PEAK ROTATION AFTER PEAK MOMENT	1 - 11 MS	8.80 MS

** Neck Performance Compared To SAE's User's Manual For The Hybrid III Large Male Test Dummy, September 1998, Draft. **

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN 

RUN NUMBER: 062603.1105;1

Transportation Research Center Inc.

Neck Flexion Test - 6 Channel Transducer

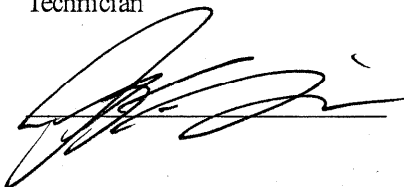
HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/26/2003

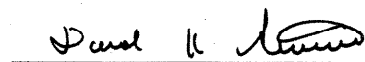
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impact Velocity	6.89 - 7.13 m/s	6.93 m/s	Yes
Integrated Pendulum Velocity			
10 ms	2.20 - 2.70 m/s	2.29 m/s	Yes
20 ms	4.00 - 5.00 m/s	4.35 m/s	Yes
30 ms	5.70 - 6.90 m/s	6.17 m/s	Yes
Peak D Plane Rotation	61 - 75 °	63.9 °	Yes
Peak Moment About Occipital Condyles (During time interval rotation is within specified corridors)	110.0 - 130.0 N·m	100.96 N·m	No
Positive Moment Decay Time To 10 N·m	77 - 97 ms	92.80 ms	Yes

Comments:

Technician



Approved



06.26.2003 10:50:15 508



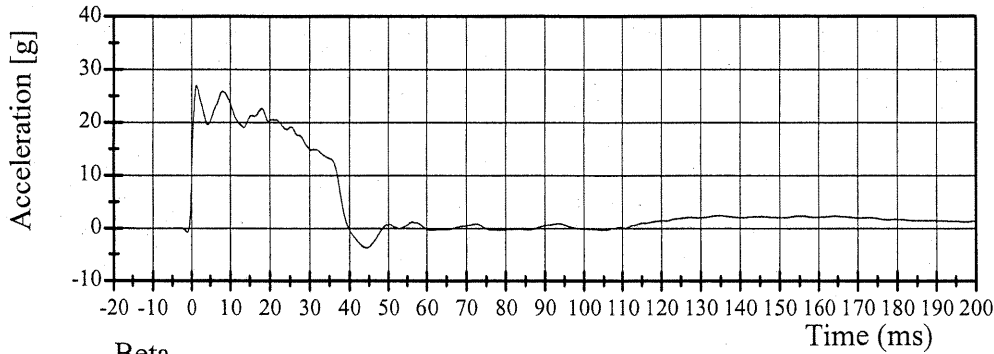
Transportation Research Center Inc.

Neck Flexion Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/26/2003

Pendulum Deceleration

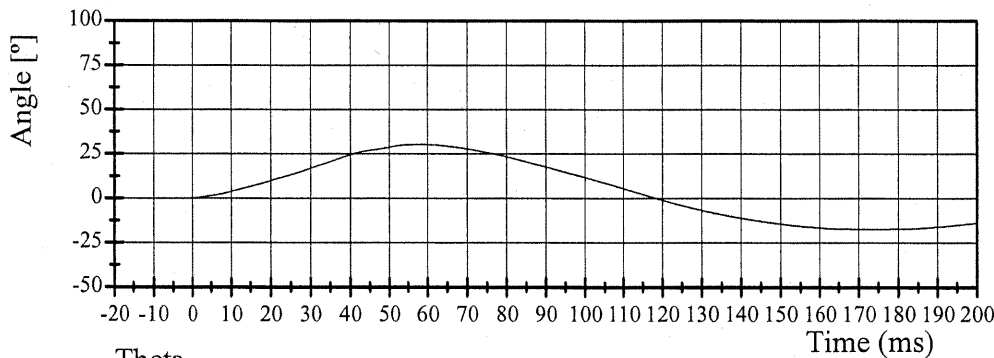


Filter Class: 180

Max: 27.0 g at 1.4 ms

Min: -3.6 g at 44.3 ms

Beta

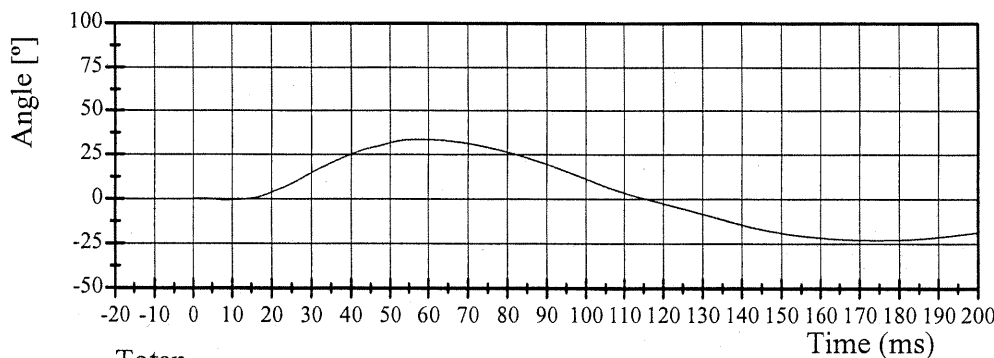


Filter Class: 60

Max: 30.3 ° at 58.2 ms

Min: -17.4 ° at 171.8 ms

Theta

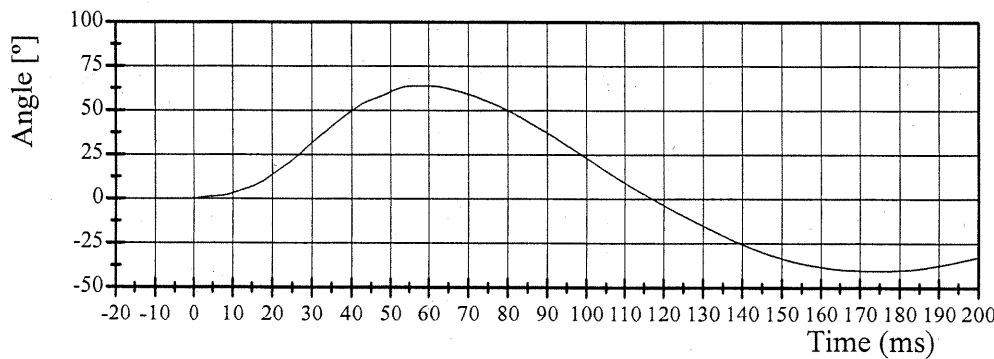


Filter Class: 60

Max: 33.6 ° at 59.9 ms

Min: -22.9 ° at 174.4 ms

Totan



Filter Class: 60

Max: 63.9 ° at 59.1 ms

Min: -40.3 ° at 173.5 ms

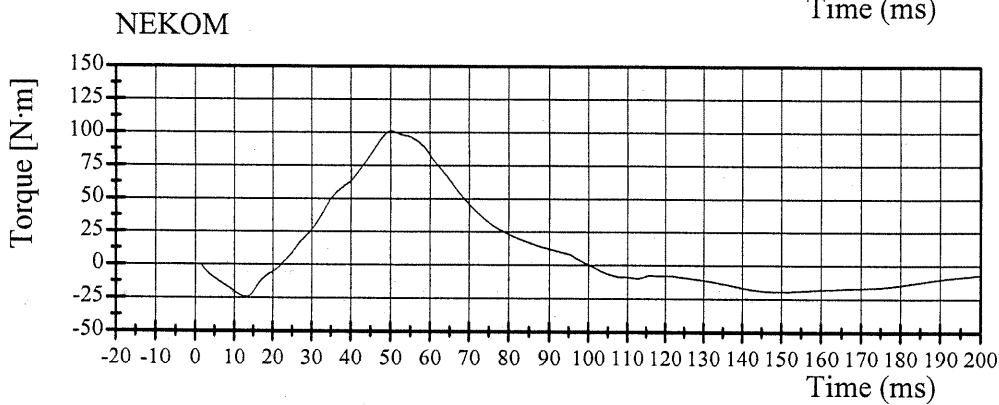
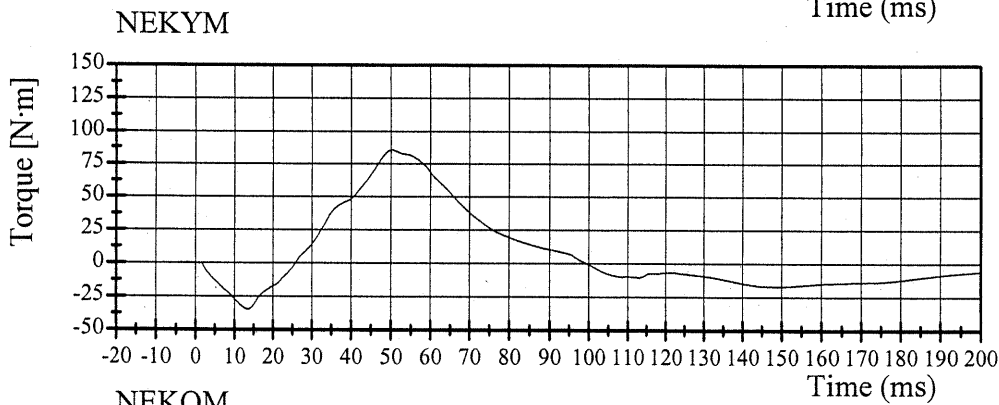
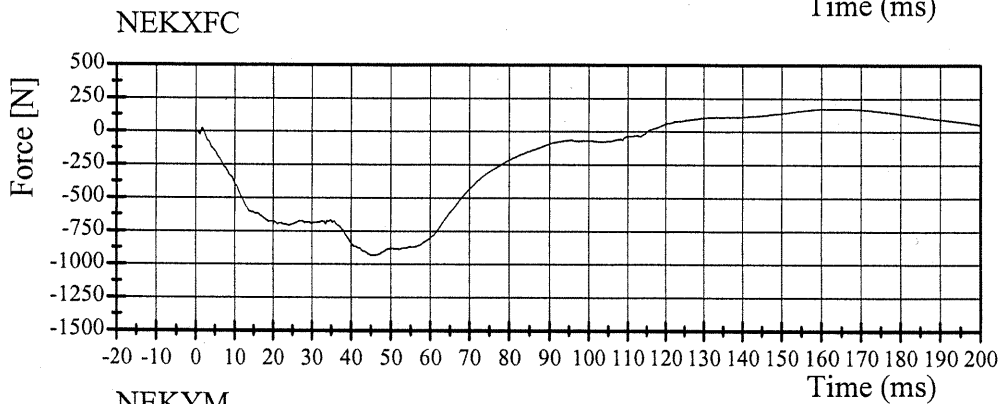
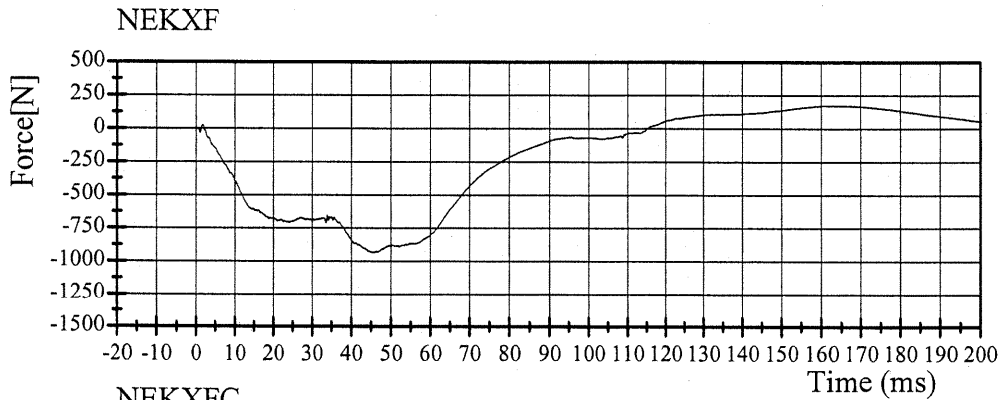


Transportation Research Center Inc.

Neck Flexion Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/26/2003



06.26.2003 10:50:17 508



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III LARGE MALE

26-JUN-03

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 083C15NE1 L.MALE SN083 NECK EXT CAL15

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	51.0 %
IMPACT VELOCITY	5.95 - 6.19 M/S	6.00 M/S
INTEGRATED PENDULUM VELOCITY	10 MS 1.8 - 2.2 M/S	1.88 M/S
	20 MS 3.4 - 4.2 M/S	3.75 M/S
	30 MS 4.8 - 5.8 M/S	5.43 M/S
PEAK D-PLANE ROTATION	81 - 98 DEG.	92.15 DEG.
ROTATION ANGLE DECAY TIME FROM PEAK TO ZERO	75 - 90 MS	86.08 MS
PEAK MOMENT ABOUT OCCIPITAL CONDYLE	-87 / -69 NM	-63.98 NM *
NEGATIVE MOMENT DECAY TIME FROM PEAK TO ZERO	53 - 66 MS	66.72 MS *
TIME OF PEAK ROTATION AFTER PEAK MOMENT	0 - 10 MS	4.80 MS

** Neck Performance Compared To SAE's User's Manual For The Hybrid III Large Male Test Dummy, September 1998, Draft. **

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN 

RUN NUMBER: 062603.1317;1

Transportation Research Center Inc.

Neck Extension Test - 6 Channel Transducer


HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/26/2003

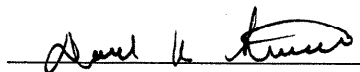
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Impact Velocity	5.95 - 6.19 m/s	6.02 m/s	Yes
Integrated Pendulum Velocity			
10 ms	1.80 - 2.20 m/s	1.88 m/s	Yes
20 ms	3.40 - 4.20 m/s	3.76 m/s	Yes
30 ms	4.80 - 5.80 m/s	5.44 m/s	Yes
Peak D Plane Rotation	81 - 98 °	92.3 °	Yes
Peak Moment About Occipital Condyles (During time interval rotation is within specified corridors)	-84.0 - (-66.0) N·m	-64.07 N·m	No
Positive Moment Decay Time To -10 N·m	100 - 120 ms	112.08 ms	Yes

Comments:

Technician



Approved



06.26.2003 11:25:01 587



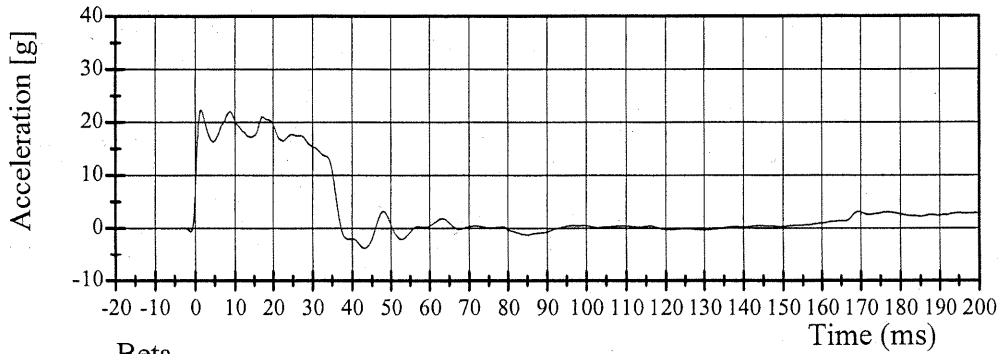
Transportation Research Center Inc.

Neck Extension Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/26/2003

Pendulum Deceleration

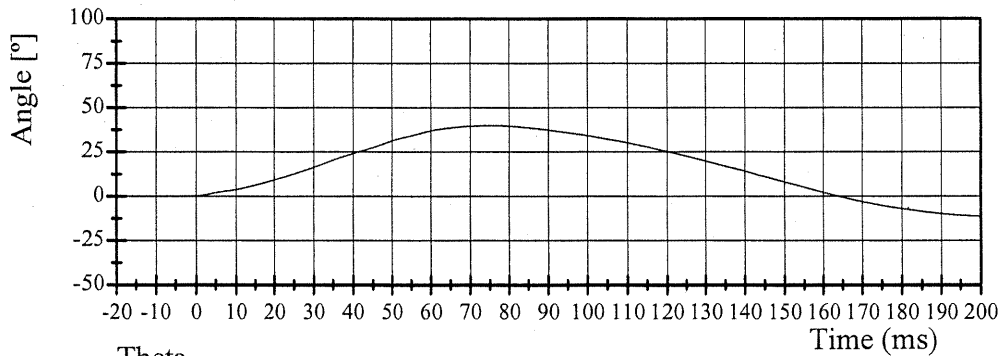


Filter Class: 180

Max: 22.3 g at 1.5 ms

Min: -3.7 g at 43.2 ms

Beta

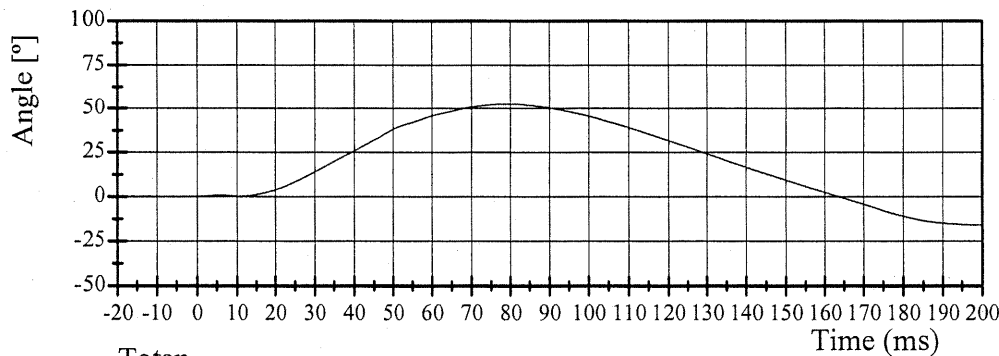


Filter Class: 60

Max: 39.9 ° at 75.7 ms

Min: -11.4 ° at 202.3 ms

Theta

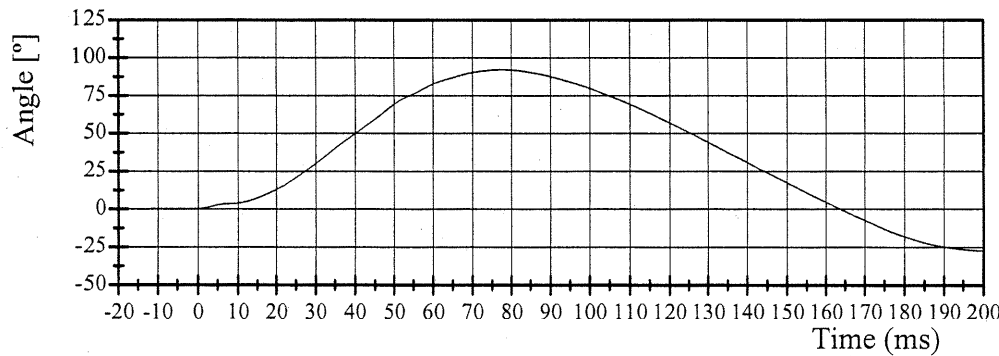


Filter Class: 60

Max: 52.5 ° at 79.6 ms

Min: -16.0 ° at 201.9 ms

Totan



Filter Class: 60

Max: 92.3 ° at 77.6 ms

Min: -27.4 ° at 202.3 ms

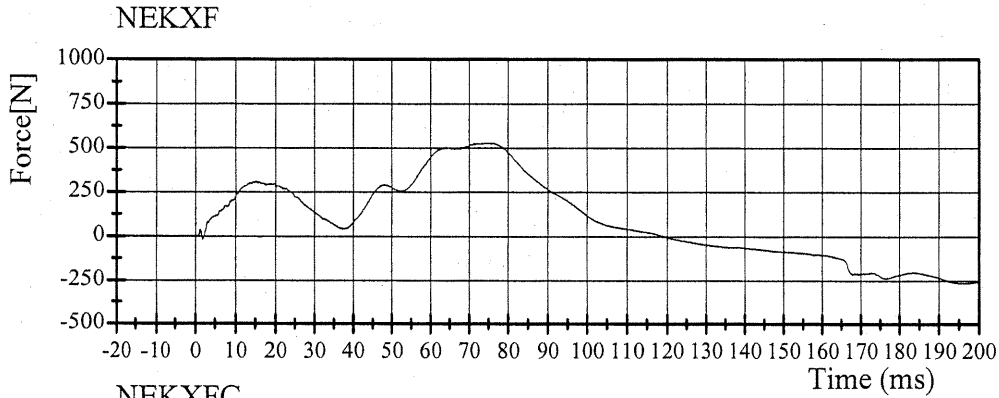


Transportation Research Center Inc.

Neck Extension Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

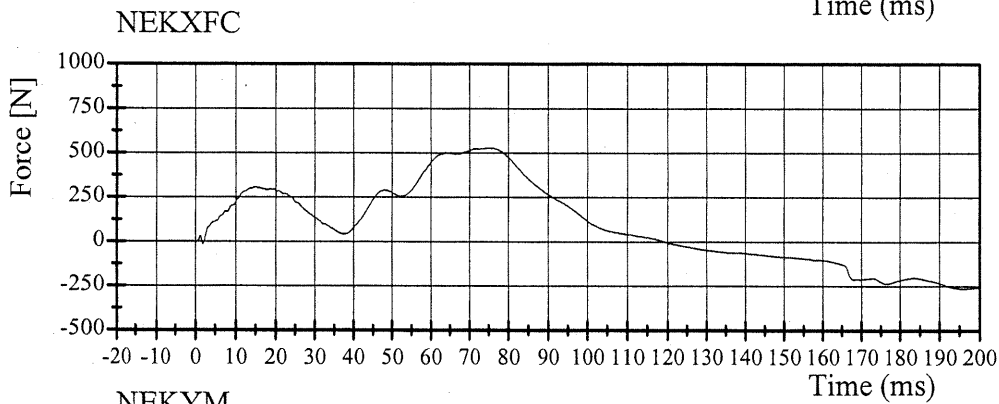
Test Date 06/26/2003



Filter Class: 1000

Max: 528.1 N at 75.2 ms

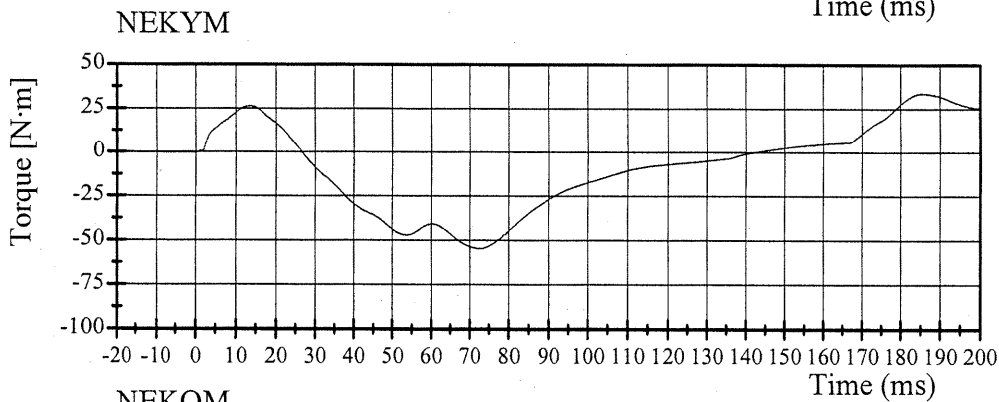
Min: -264.3 N at 195.4 ms



Filter Class: 600

Max: 527.9 N at 75.1 ms

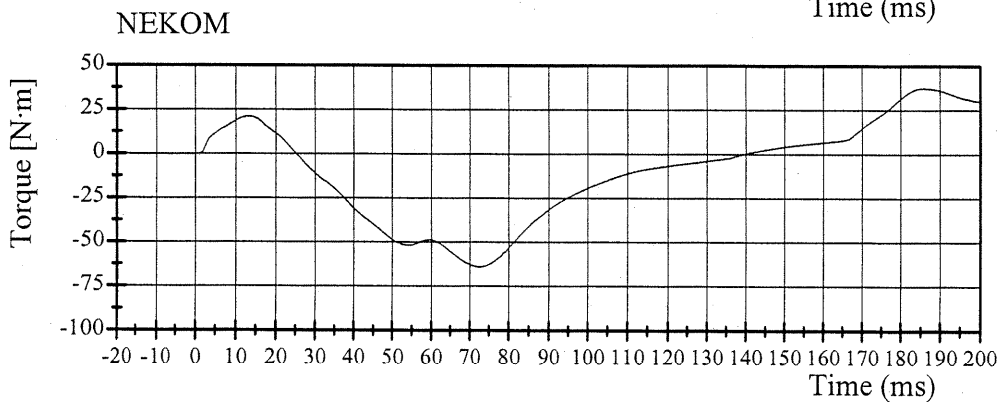
Min: -264.0 N at 195.3 ms



Filter Class: 600

Max: 33.7 N·m at 185.8 ms

Min: -54.8 N·m at 72.6 ms



Filter Class: 600

Max: 37.5 N·m at 185.9 ms

Min: -64.1 N·m at 72.8 ms

06.26.2003 11:25:03 587



Transportation Research Center Inc.

Thorax Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/24/2003

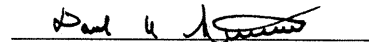
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	6.59 - 6.83 m/s	6.66 m/s	Yes
Maximum Chest Deflection	-76.0 - (-66.0) mm	-71.0 mm	Yes
Maximum Resistive Force	4700 - 6000 N	5404 N	Yes
Internal Hysteresis	69 - 85 %	71 %	Yes

Comments:

Technician



Approved



06.24.2003 13:56:37 967



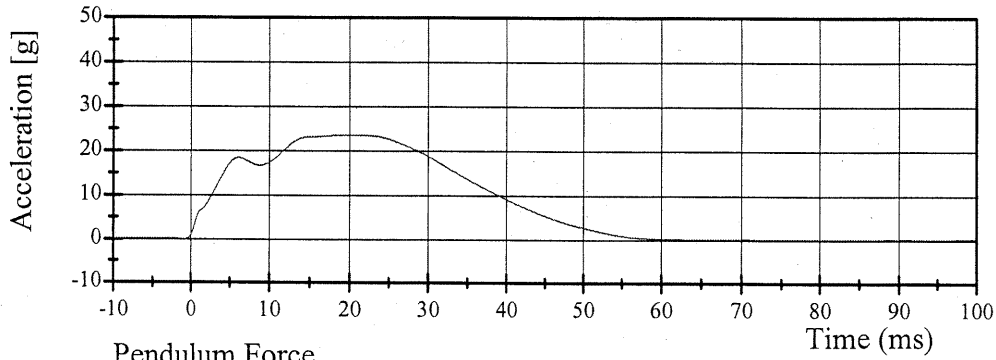
Transportation Research Center Inc.

Thorax Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/24/2003

Pendulum Deceleration

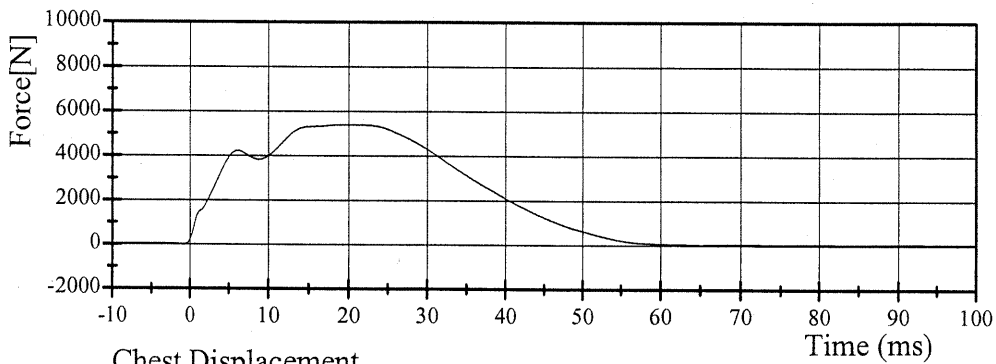


Filter Class: 180

Max: 23.6 g at 19.0 ms

Min: -0.0 g at -74.4 ms

Pendulum Force

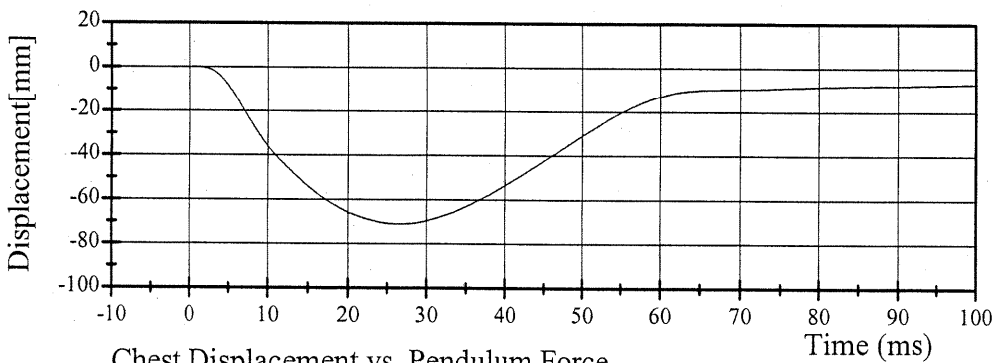


Filter Class: 180

Max: 5403.8 N at 19.0 ms

Min: -9.6 N at -74.4 ms

Chest Displacement

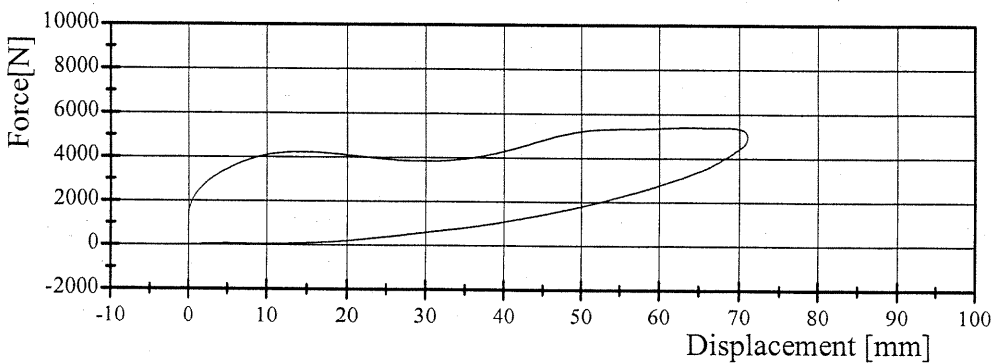


Filter Class: 180

Max: 0.0 mm at 1.0 ms

Min: -71.0 mm at 26.6 ms

Chest Displacement vs. Pendulum Force



06.24.2003 13:56:38 967



Transportation Research Center Inc.

Left Knee Slider Test

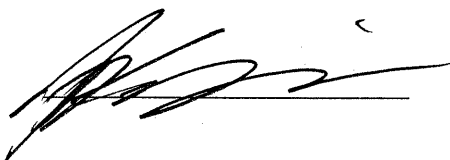
HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/25/2003

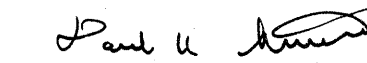
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.70 m/s	Yes
Knee Displacement	-18.3 - (-15.0) mm	-18.2 mm	Yes

Comments:

Technician



Approved



06.25.2003 13:34:03 1743

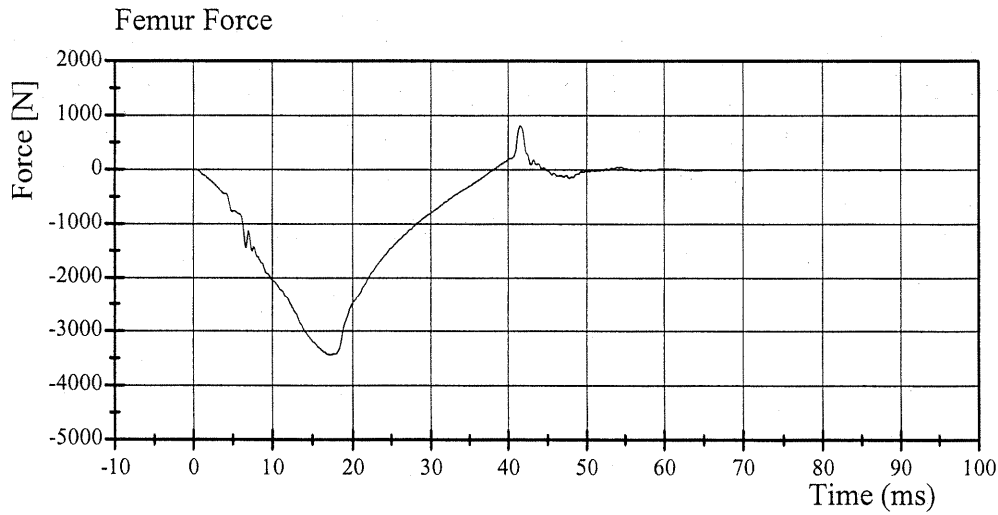


Transportation Research Center Inc.

Left Knee Slider Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

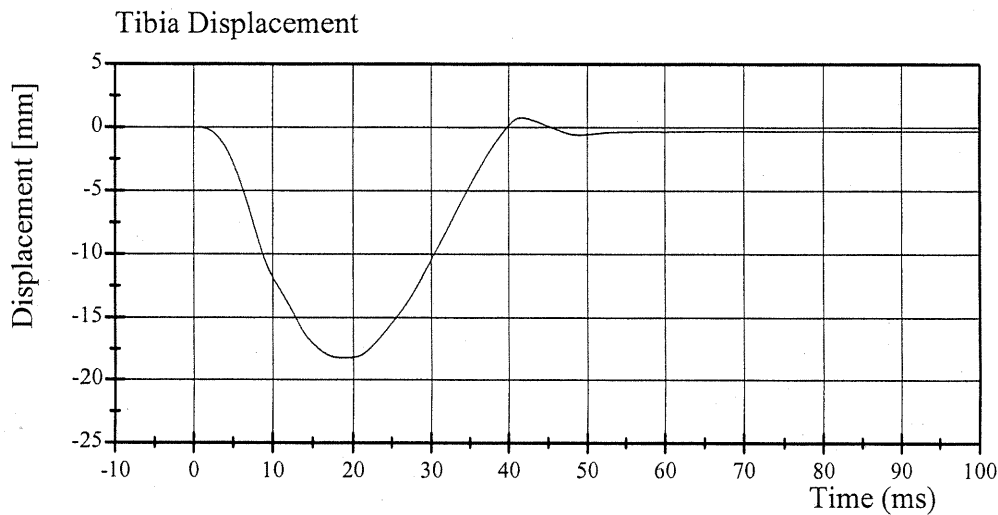
Test Date 06/25/2003



Filter Class: 600

Max: 805.5 N at 41.5 ms

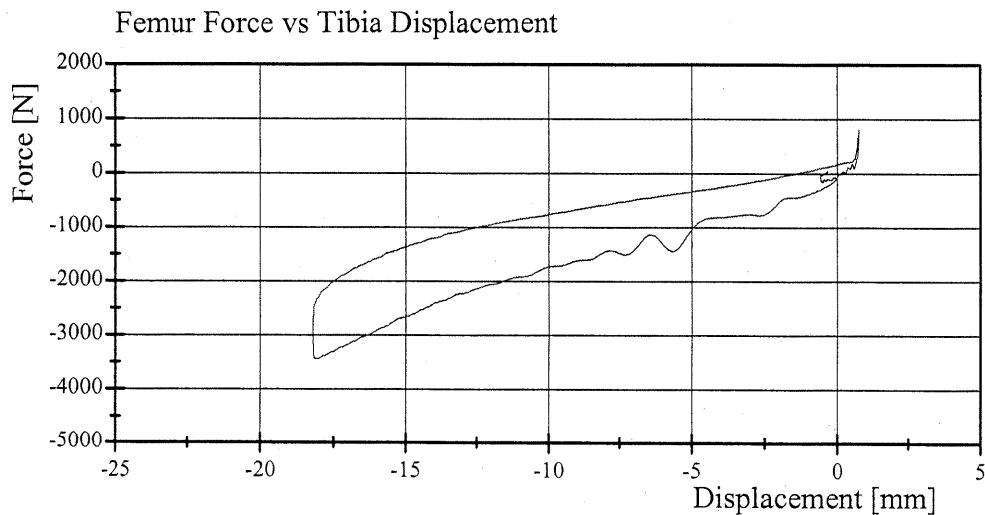
Min: -3439.8 N at 17.3 ms



Filter Class: 180

Max: 0.8 mm at 41.7 ms

Min: -18.2 mm at 19.0 ms



06.25.2003 13:34:04 1743



Transportation Research Center Inc.

Right Knee Slider Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/25/2003

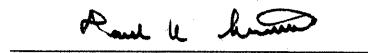
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.77 m/s	Yes
Knee Displacement	-18.3 - (-15.0) mm	-16.7 mm	Yes

Comments:

Technician



Approved



06.25.2003 11:29:09 1714

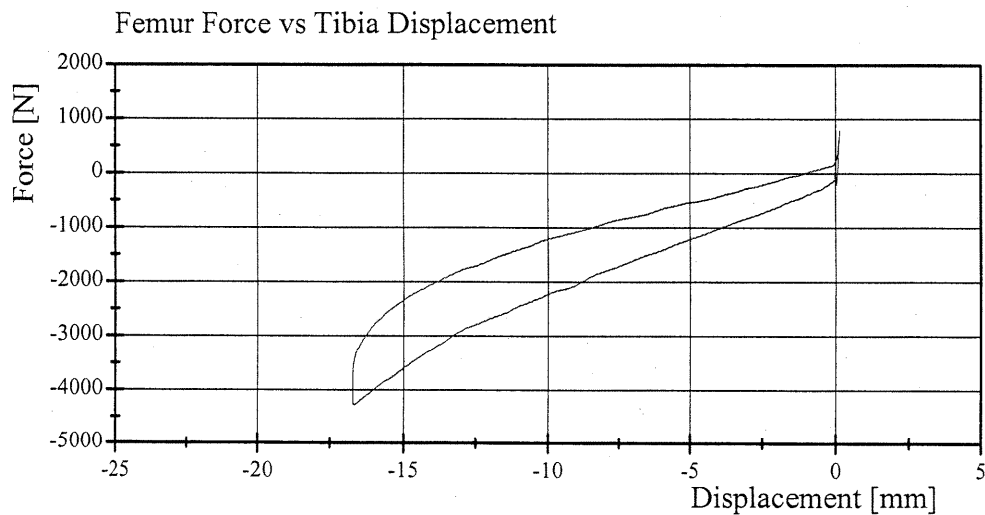
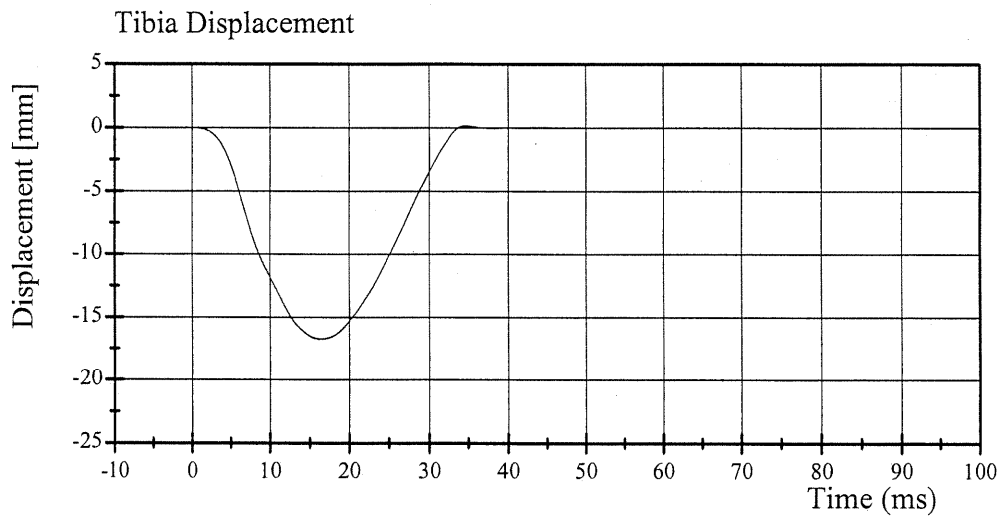
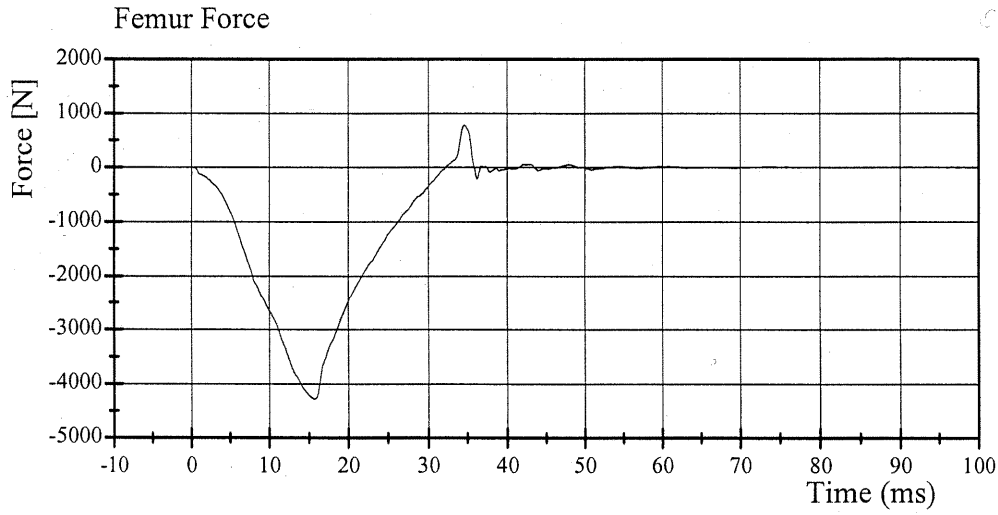


Transportation Research Center Inc.

Right Knee Slider Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/25/2003



06.25.2003 11:29:10 1714



Transportation Research Center Inc.

Left Knee Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/27/2003

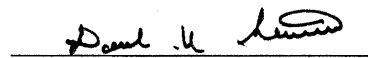
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.09 m/s	Yes
Maximum Pendulum Force	4900 - 6000 N	5593 N	Yes

Comments:

Technician



Approved



06.27.2003 07:39:50 2014



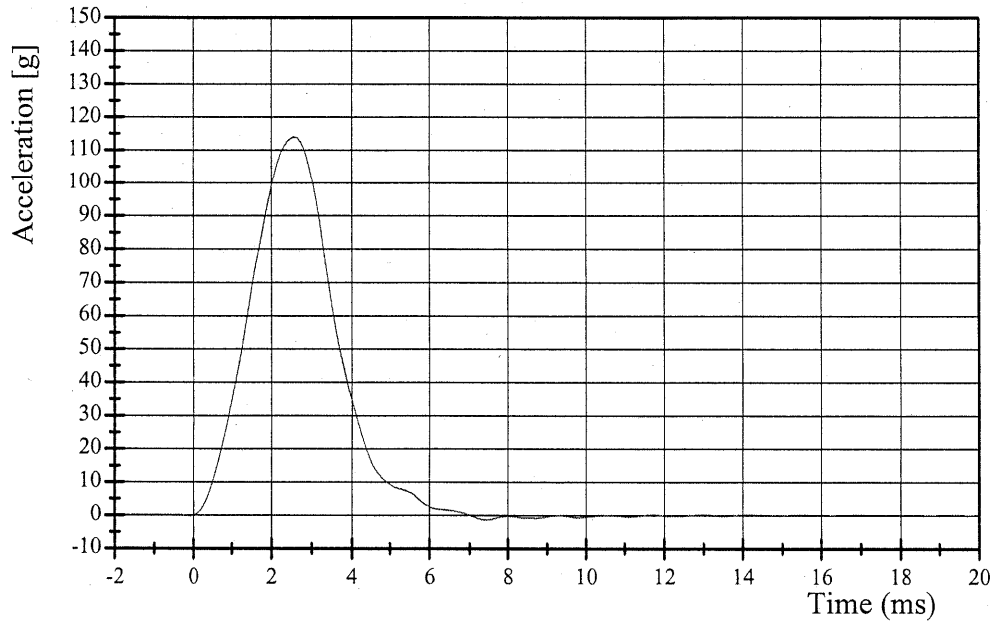
Transportation Research Center Inc.

Left Knee Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/27/2003

Pendulum Deceleration

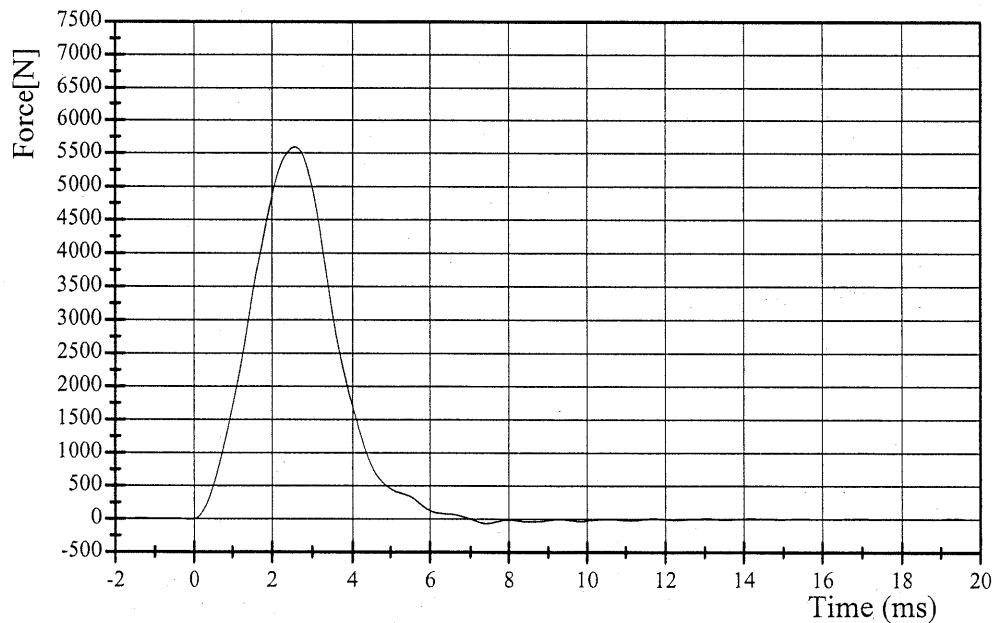


Filter Class: 600

Max: 114.1 g at 2.6 ms

Min: -1.4 g at 7.4 ms

Pendulum Force



Filter Class: 600

Max: 5592.9 N at 2.6 ms

Min: -66.9 N at 7.4 ms

06.27.2003 07:39:51 2014



Transportation Research Center Inc.

Right Knee Test

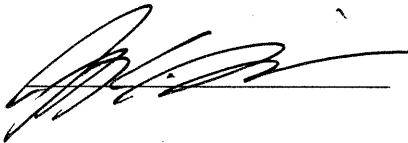
HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/27/2003

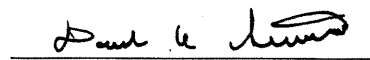
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.10 m/s	Yes
Maximum Pendulum Force	4900 - 6000 N	5291 N	Yes

Comments:

Technician



Approved



06.27.2003 07:37:34 2012



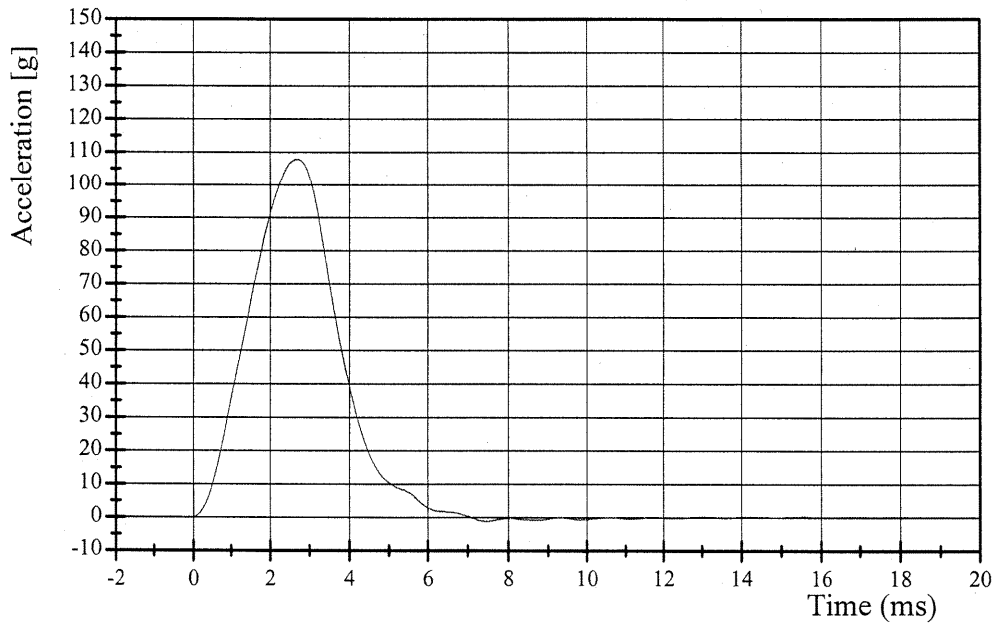
Transportation Research Center Inc.

Right Knee Test

HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/27/2003

Pendulum Deceleration

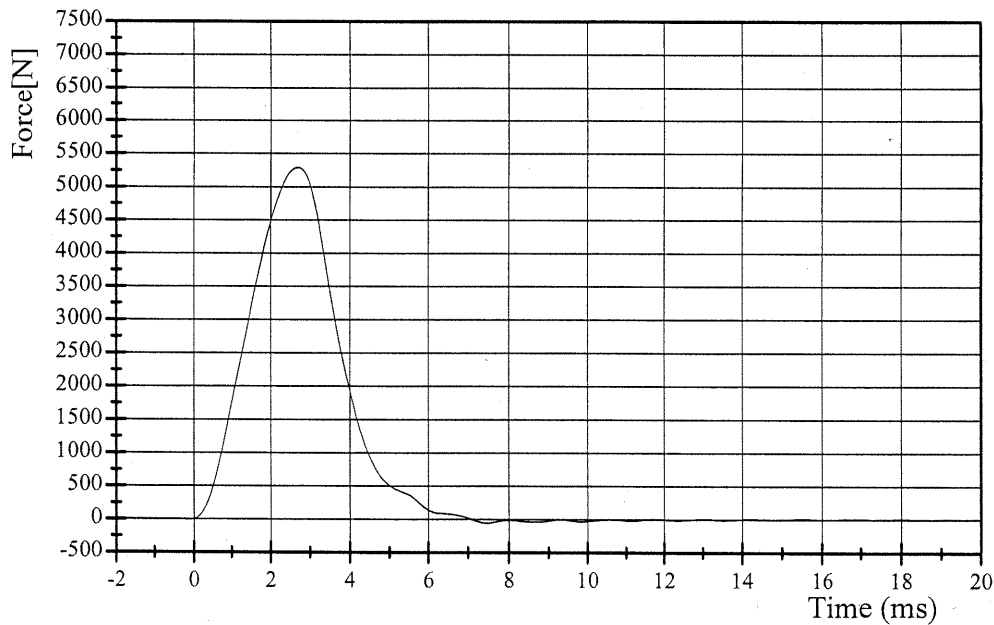


Filter Class: 600

Max: 107.9 g at 2.7 ms

Min: -1.2 g at 7.4 ms

Pendulum Force



Filter Class: 600

Max: 5290.7 N at 2.7 ms

Min: -57.1 N at 7.4 ms



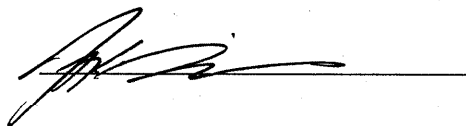
Post-test Dummy Configuration and Performance Verification Data

Passenger Dummy S/N: 083

Transportation Research Center Inc.
HIII 95th Dummy
External Dimensions
Serial No. 083 Calibration No. 16

Test Parameter	Dimension	Specification	Results	Pass
Total Sitting Height	A	927.1 - 942.3 mm	935 mm	Yes
Shoulder Pivot Height	B	541.0 - 556.2 mm	549 mm	Yes
H-Point Height	C	101.6 - 111.8 mm	105 mm	Yes
H-Point From Seatback	D	137.1 - 147.3 mm	140 mm	Yes
Shoulder Pivot From Backline	E	109.3 - 119.3 mm	114 mm	Yes
Thigh Clearance	F	160.0 - 175.2 mm	170 mm	Yes
Back Of Elbow To Wrist Pivot	G	307.4 - 317.4 mm	308 mm	Yes
Skull Cap To Backline	H	86.4 - 91.4 mm	87 mm	Yes
Shoulder-Elbow Length	I	348.0 - 363.2 mm	357 mm	Yes
Elbow Rest Height	J	208.3 - 223.5 mm	212 mm	Yes
Buttock Knee Length	K	624.8 - 650.2 mm	639 mm	Yes
Popliteal Height	L	457.2 - 482.6 mm	476 mm	Yes
Knee Pivot Height	M	520.7 - 546.1 mm	530 mm	Yes
Buttock Popliteal Length	N	490.2 - 515.6 mm	499 mm	Yes
Chest Depth	O	284.5 - 299.7 mm	298 mm	Yes
Foot Length	P	251.5 - 266.7 mm	253 mm	Yes
Buttock to Knee Pivot Length	R	556.3 - 581.7 mm	576 mm	Yes
Head Breadth	S	148.9 - 160.0 mm	152 mm	Yes
Head Depth	T	190.5 - 200.7 mm	197 mm	Yes
Hip Breadth	U	396.3 - 411.5 mm	403 mm	Yes
Shoulder Breadth	V	467.4 - 482.6 mm	475 mm	Yes
Foot Breadth	W	91.5 - 106.7 mm	95 mm	Yes
Head Circumference	X	566.4 - 576.6 mm	574 mm	Yes
Chest Circumference	Y	1120.2 - 1150.6 mm	1134 mm	Yes
Waist Circumference	Z	988.1 - 1018.5 mm	999 mm	Yes
Location For Chest Circumference	AA	502.9 - 513.1 mm	508 mm	Yes
Location For Waist Circumference	BB	274.3 - 284.5 mm	279 mm	Yes

Technician



Approved




Transportation Research Center Inc.

Head Drop Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/12/2003

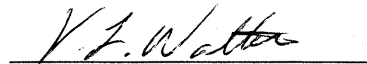
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Peak Resultant Acceleration	220 - 265 g	233.3 g	Yes
Peak Lateral Acceleration	15 g Max	-1.8 g	Yes
Is Acceleration Curve Unimodal?	Yes	Yes	Yes

Comments:

Technician



Approved



08.12.2003 12:19:41 613



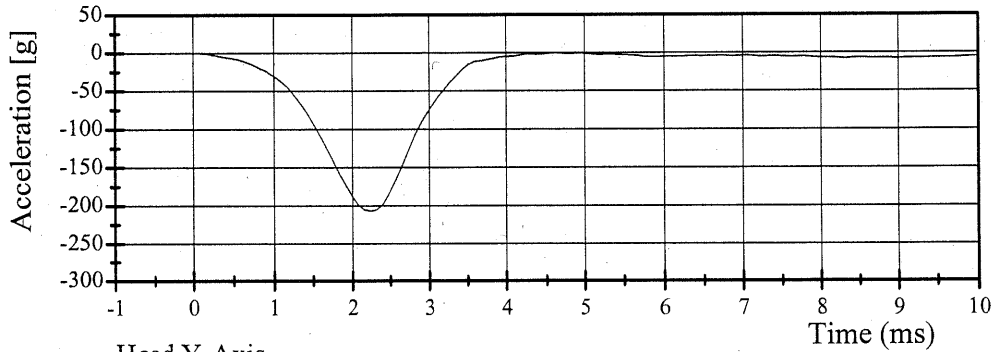
Transportation Research Center Inc.

Head Drop Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/12/2003

Head X-Axis

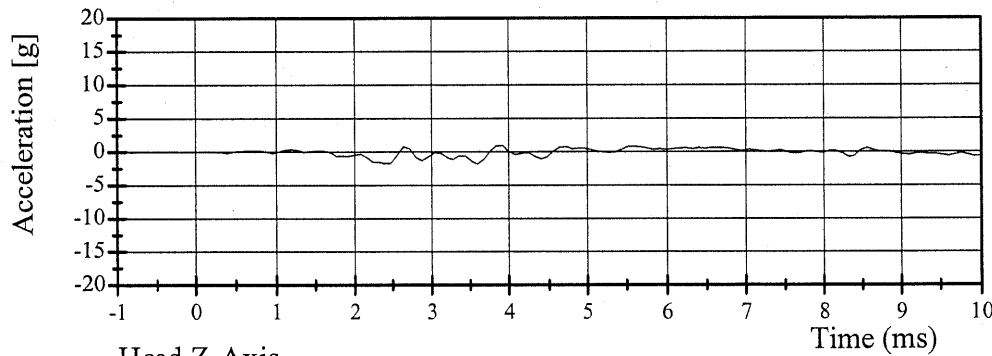


Filter Class: 1000

Max: 0.1 g at 0.0 ms

Min: -206.8 g at 2.2 ms

Head Y-Axis

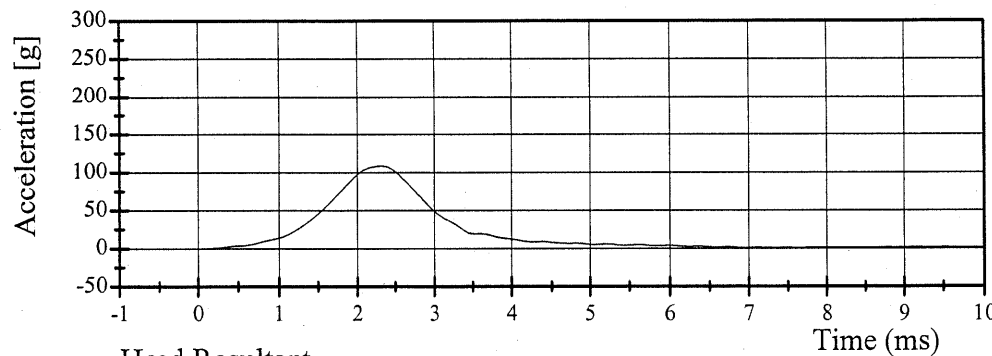


Filter Class: 1000

Max: 0.9 g at 3.9 ms

Min: -1.8 g at 3.6 ms

Head Z-Axis

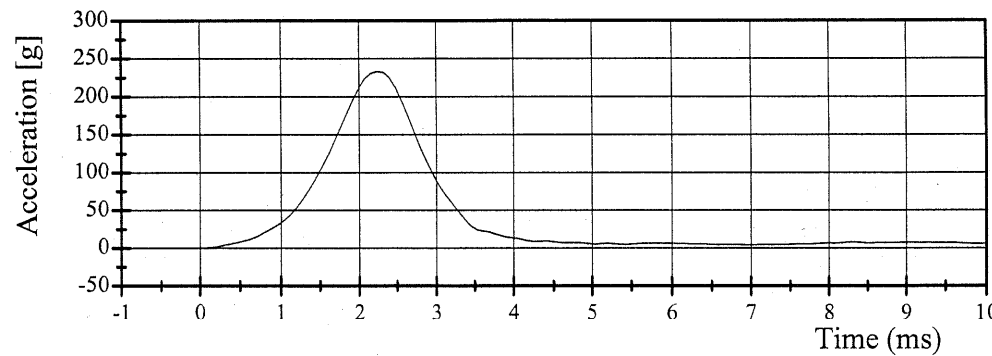


Filter Class: 1000

Max: 108.8 g at 2.3 ms

Min: 0.0 g at 0.0 ms

Head Resultant



Filter Class: 1000

Max: 233.3 g at 2.2 ms

Min: 0.0 g at 3.0 ms

08.12.2003 12:19:43 613



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III LARGE MALE

12-AUG-03

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 083C16NF1 LG. MALE SN083 NECK FLEX CAL16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	57.0 %
IMPACT VELOCITY	6.89 - 7.13 M/S	6.99 M/S
INTEGRATED PENDULUM VELOCITY	10 MS 2.2 - 2.7 M/S	2.34 M/S
	20 MS 4.0 - 5.0 M/S	4.42 M/S
	30 MS 5.7 - 6.9 M/S	6.24 M/S
PEAK D-PLANE ROTATION	61 - 75 DEG.	64.25 DEG.
ROTATION ANGLE DECAY TIME FROM PEAK TO ZERO	45 - 55 MS	59.12 MS *
PEAK MOMENT ABOUT OCCIPITAL CONDYLE	103 - 1125 NM	104.91 NM
POSITIVE MOMENT DECAY TIME FROM PEAK TO ZERO	42 - 52 MS	49.04 MS
TIME OF PEAK ROTATION AFTER PEAK MOMENT	1 - 11 MS	6.32 MS

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN 

RUN NUMBER: 110503.1317;1

Transportation Research Center Inc.

Neck Flexion Test - 6 Channel Transducer

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/12/2003

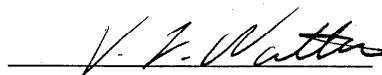
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Impact Velocity	6.89 - 7.13 m/s	6.97 m/s	Yes
Integrated Pendulum Velocity			
10 ms	2.20 - 2.70 m/s	2.34 m/s	Yes
20 ms	4.00 - 5.00 m/s	4.42 m/s	Yes
30 ms	5.70 - 6.90 m/s	6.24 m/s	Yes
Peak D Plane Rotation	61 - 75 °	64.3 °	Yes
Peak Moment About Occipital Condyles (During time interval rotation is within specified corridors)	110.0 - 130.0 N·m	104.93 N·m	No
Positive Moment Decay Time To 10 N·m	77 - 97 ms	91.92 ms	Yes

Comments:

Technician



Approved



08.12.2003 10:42:13 499



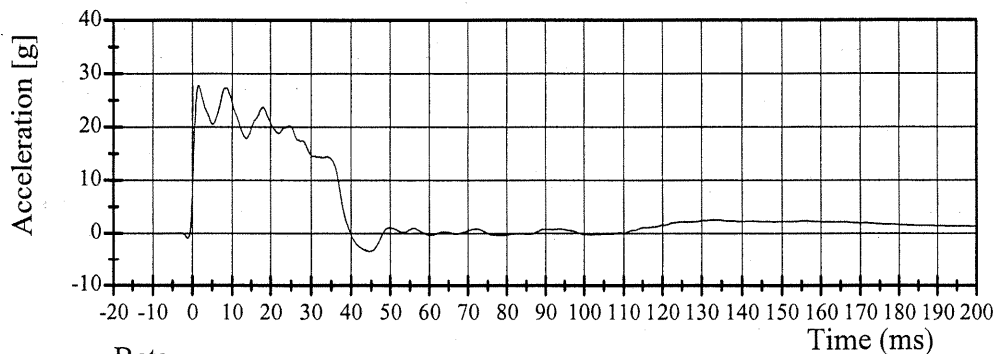
Transportation Research Center Inc.

Neck Flexion Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/12/2003

Pendulum Deceleration

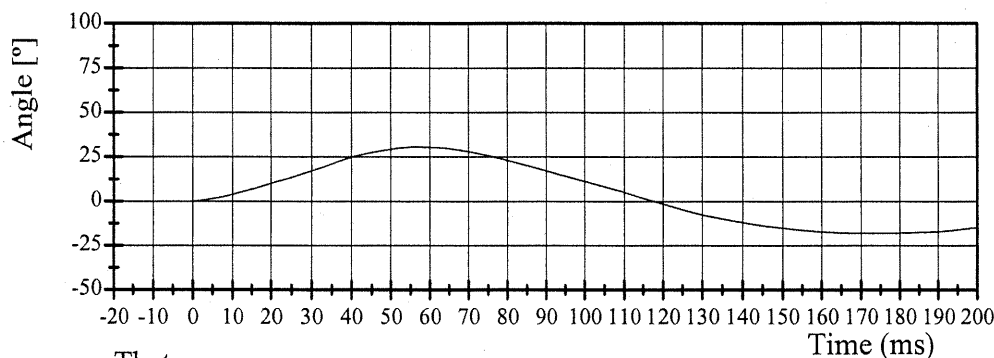


Filter Class: 180

Max: 27.8 g at 1.5 ms

Min: -3.4 g at 44.6 ms

Beta

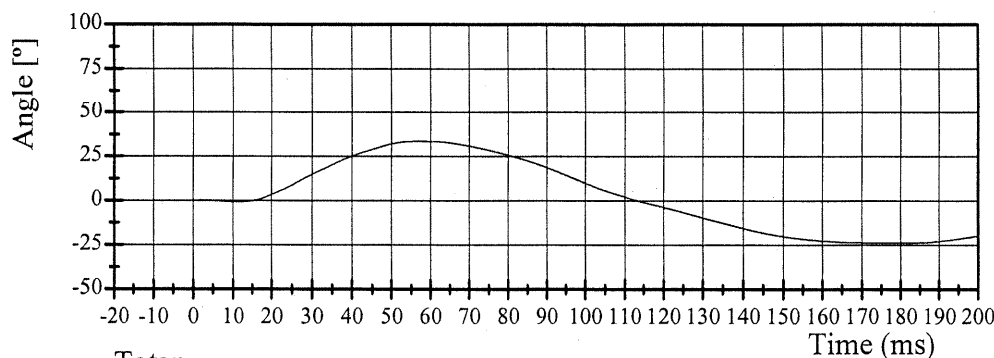


Filter Class: 60

Max: 30.6 ° at 56.6 ms

Min: -18.0 ° at 172.0 ms

Theta

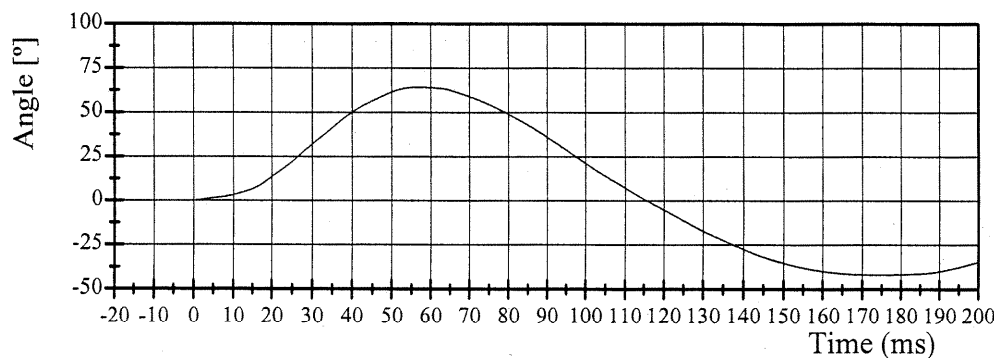


Filter Class: 60

Max: 33.6 ° at 56.8 ms

Min: -23.7 ° at 175.7 ms

Totan



Filter Class: 60

Max: 64.3 ° at 56.6 ms

Min: -41.7 ° at 173.6 ms

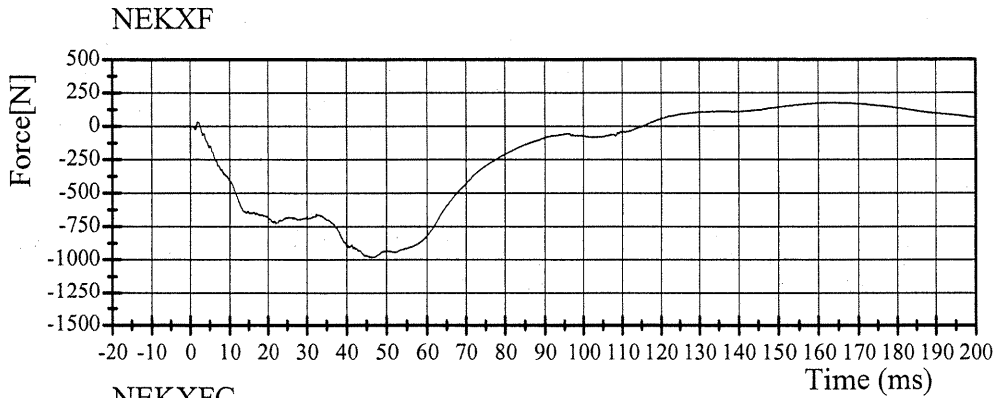


Transportation Research Center Inc.

Neck Flexion Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

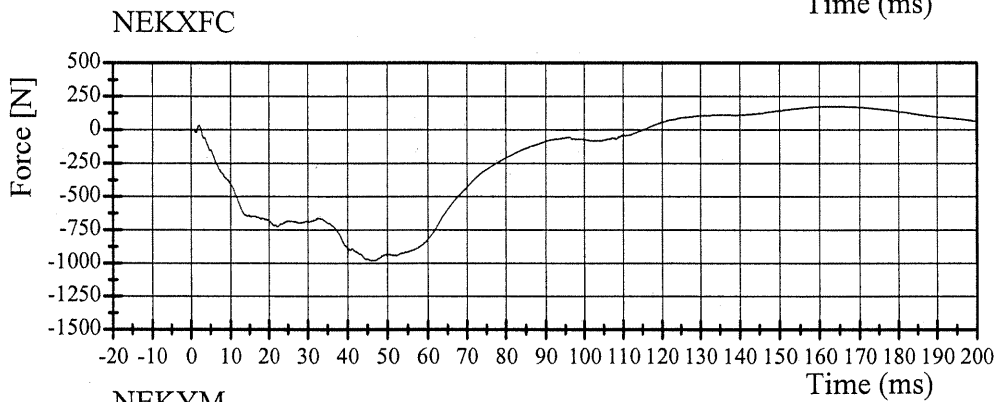
Test Date 08/12/2003



Filter Class: 1000

Max: 175.4 N at 162.0 ms

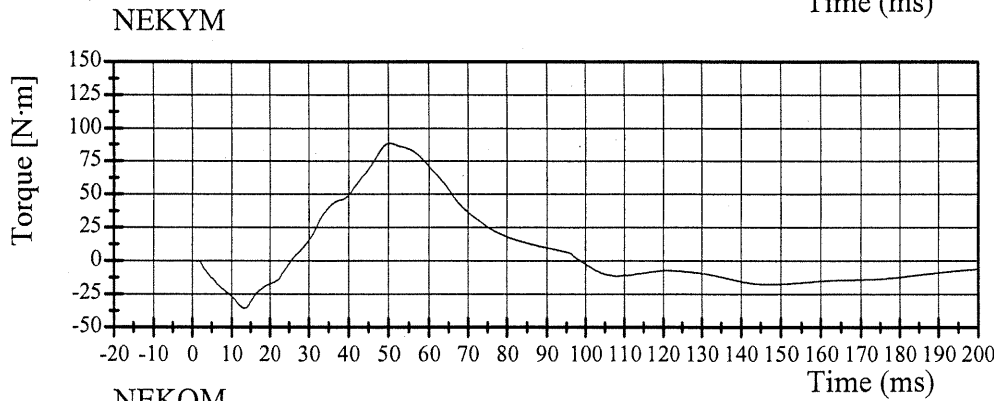
Min: -980.7 N at 46.2 ms



Filter Class: 600

Max: 175.2 N at 163.1 ms

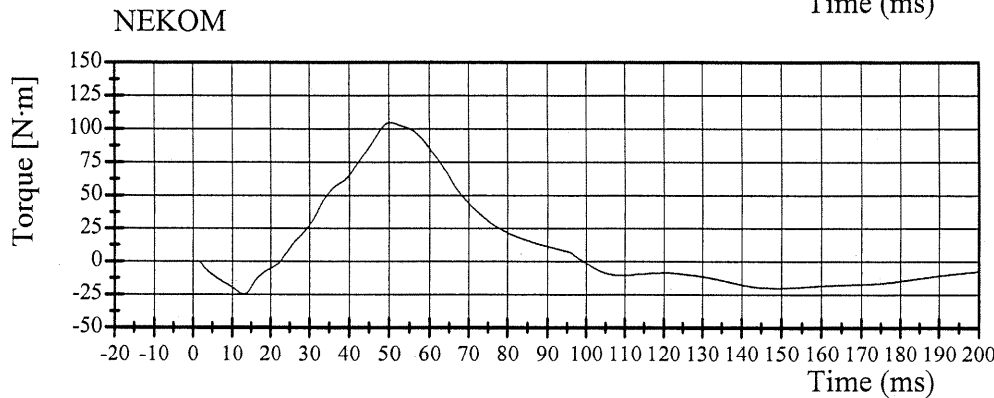
Min: -980.0 N at 46.3 ms



Filter Class: 600

Max: 88.4 N·m at 50.3 ms

Min: -35.7 N·m at 13.4 ms



Filter Class: 600

Max: 104.9 N·m at 50.3 ms

Min: -24.7 N·m at 13.0 ms

08.12.2003 10:42:16 499



TRANSPORTATION RESEARCH CENTER INC.

HYBRID III LARGE MALE

12-AUG-03

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

TRC INC. TEST NO: 083C16NE1 L.MALE SN083 NECK EXT CAL16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6 - 22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10 - 70 %	55.0 %
IMPACT VELOCITY	5.95 - 6.19 M/S	6.00 M/S
INTEGRATED PENDULUM VELOCITY	10 MS 1.8 - 2.2 M/S	1.96 M/S
	20 MS 3.4 - 4.2 M/S	3.71 M/S
	30 MS 4.8 - 5.8 M/S	5.34 M/S
PEAK D-PLANE ROTATION	81 - 98 DEG.	93.11 DEG.
ROTATION ANGLE DECAY TIME FROM PEAK TO ZERO	75 - 90 MS	86.16 MS
PEAK MOMENT ABOUT OCCIPITAL CONDYLE	-87 / -69 NM	-67.73 NM *
NEGATIVE MOMENT DECAY TIME FROM PEAK TO ZERO	53 - 66 MS	69.04 MS *
TIME OF PEAK ROTATION AFTER PEAK MOMENT	0 - 10 MS	5.60 MS

* TEST DOES NOT MEET SPECIFICATIONS

TECHNICIAN 

RUN NUMBER: 081203.1131;1

Transportation Research Center Inc.

Neck Extension Test - 6 Channel Transducer

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/12/2003

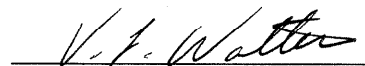
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impact Velocity	5.95 - 6.19 m/s	6.02 m/s	Yes
Integrated Pendulum Velocity			
10 ms	1.80 - 2.20 m/s	1.97 m/s	Yes
20 ms	3.40 - 4.20 m/s	3.72 m/s	Yes
30 ms	4.80 - 5.80 m/s	5.36 m/s	Yes
Peak D Plane Rotation	81 - 98 °	93.1 °	Yes
Peak Moment About Occipital Condyles (During time interval rotation is within specified corridors)	-84.0 - (-66.0) N·m	-67.78 N·m	Yes
Positive Moment Decay Time To -10 N·m	100 - 120 ms	112.88 ms	Yes

Comments:

Technician



Approved



08.12.2003 11:19:28 579



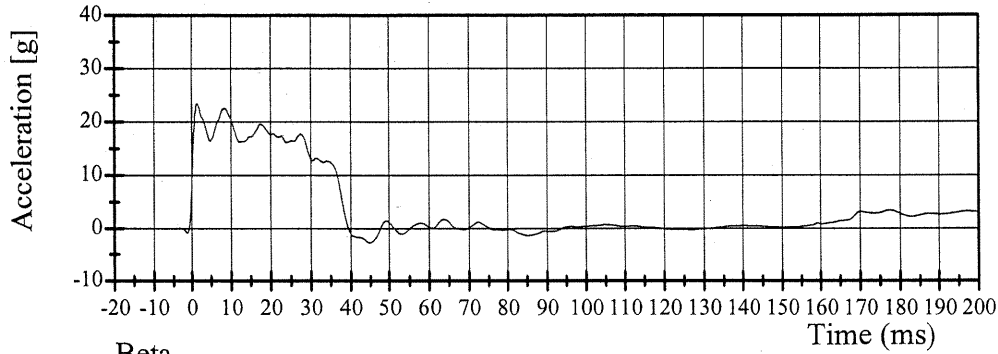
Transportation Research Center Inc.

Neck Extension Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/12/2003

Pendulum Deceleration

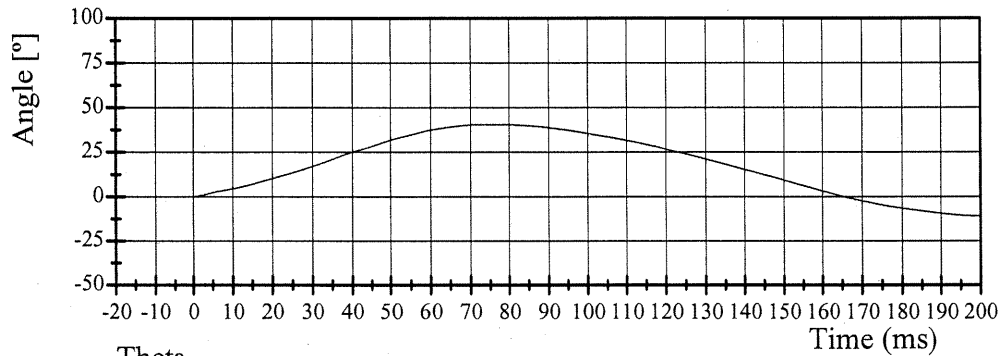


Filter Class: 180

Max: 23.4 g at 1.4 ms

Min: -2.7 g at 44.8 ms

Beta

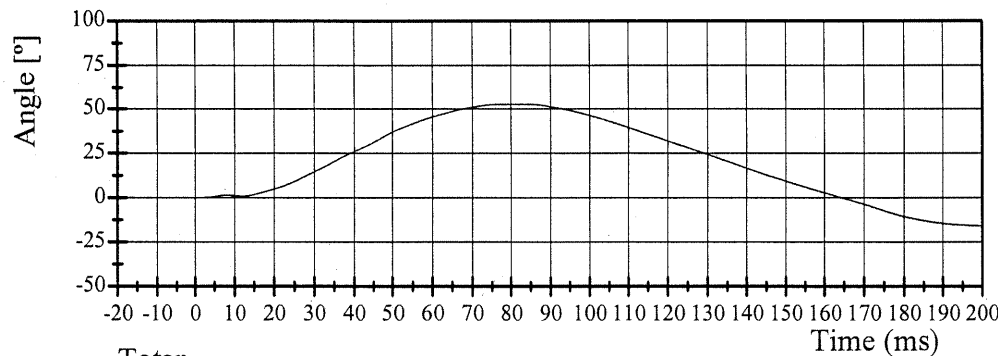


Filter Class: 60

Max: 40.4 ° at 77.1 ms

Min: -11.2 ° at 204.1 ms

Theta

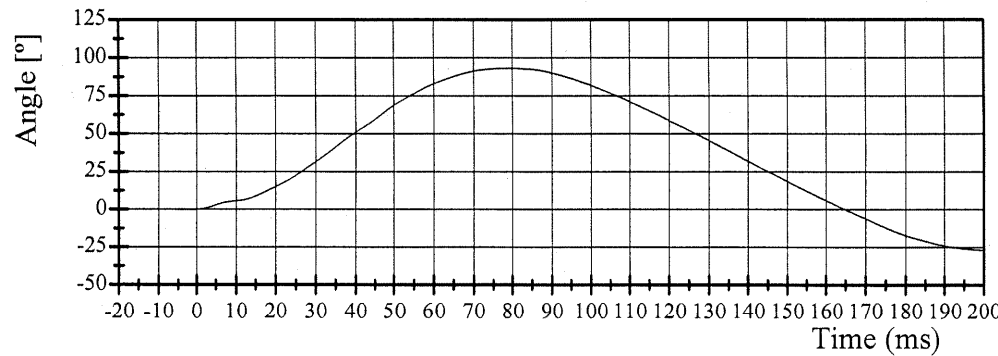


Filter Class: 60

Max: 52.7 ° at 82.0 ms

Min: -17.1 ° at 212.7 ms

Totan



Filter Class: 60

Max: 93.1 ° at 78.7 ms

Min: -27.9 ° at 211.6 ms

08.12.2003 11:19:29 579

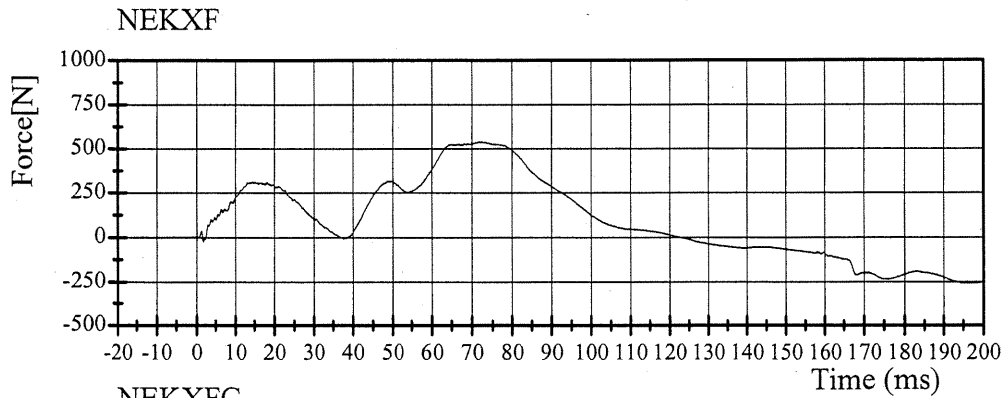


Transportation Research Center Inc.

Neck Extension Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

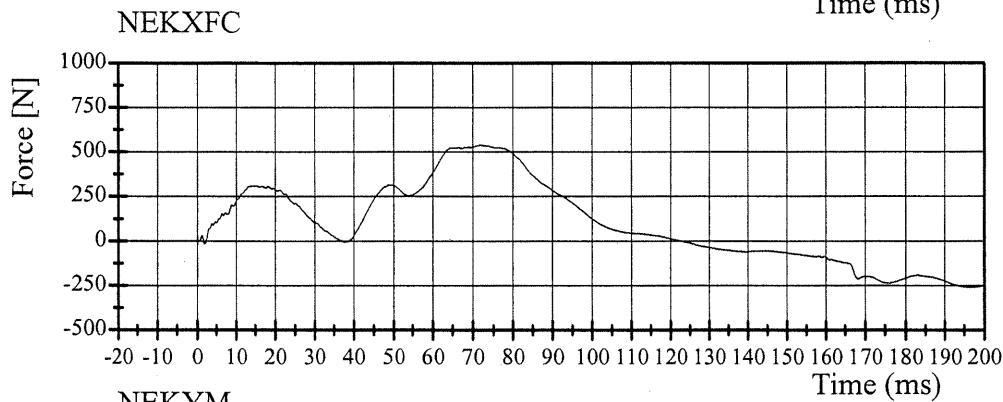
Test Date 08/12/2003



Filter Class: 1000

Max: 540.0 N at 71.8 ms

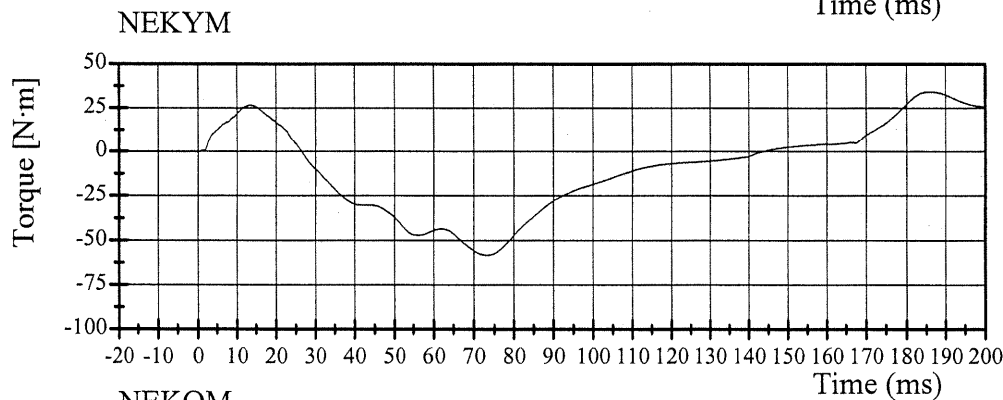
Min: -259.0 N at 196.4 ms



Filter Class: 600

Max: 538.2 N at 71.8 ms

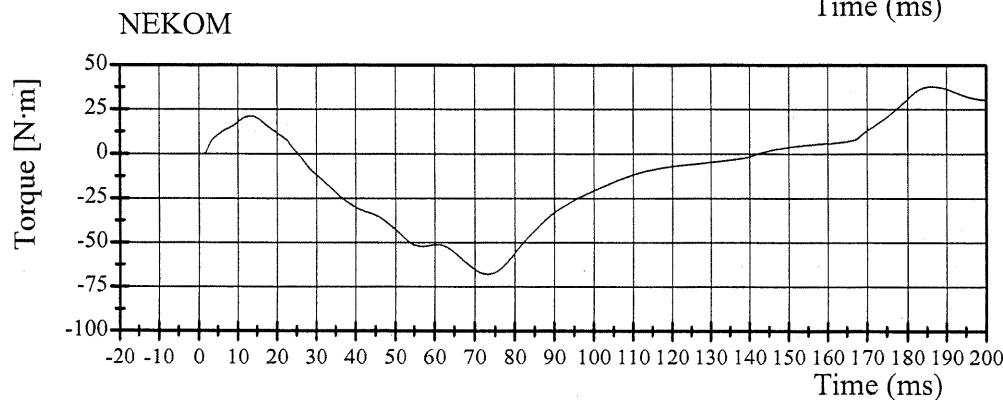
Min: -258.7 N at 196.2 ms



Filter Class: 600

Max: 34.3 N·m at 186.2 ms

Min: -58.3 N·m at 73.2 ms



Filter Class: 600

Max: 37.9 N·m at 186.2 ms

Min: -67.8 N·m at 73.1 ms

08.12.2003 11:19:30 579



Transportation Research Center Inc.

Thorax Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/11/2003

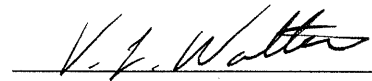
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	62 %	Yes
Pendulum Velocity	6.59 - 6.83 m/s	6.63 m/s	Yes
Maximum Chest Deflection	-76.0 - (-66.0) mm	-69.5 mm	Yes
Maximum Resistive Force	4700 - 6000 N	5406 N	Yes
Internal Hysteresis	69 - 85 %	72 %	Yes

Comments:

Technician



Approved



08.11.2003 08:15:34 942



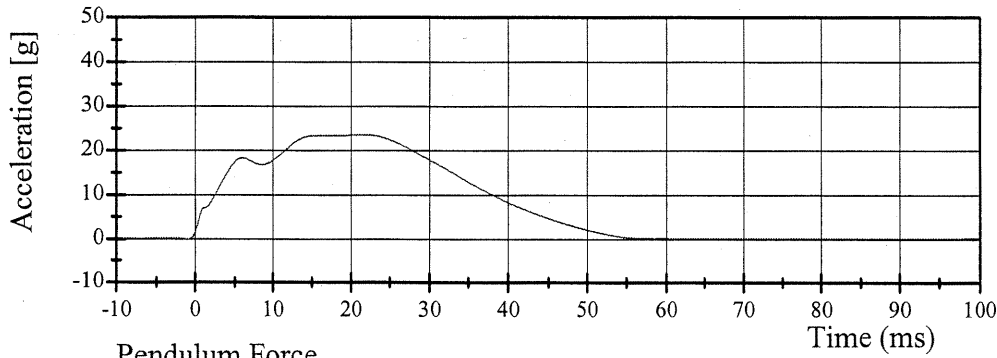
Transportation Research Center Inc.

Thorax Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/11/2003

Pendulum Deceleration

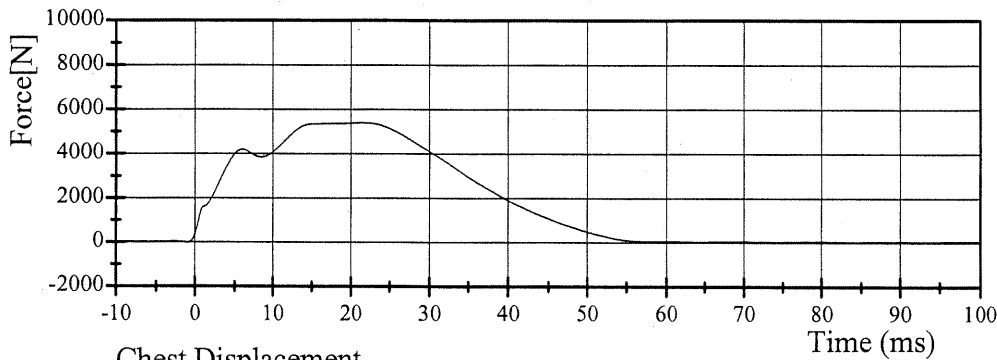


Filter Class: 180

Max: 23.6 g at 21.4 ms

Min: -0.1 g at 436.2 ms

Pendulum Force

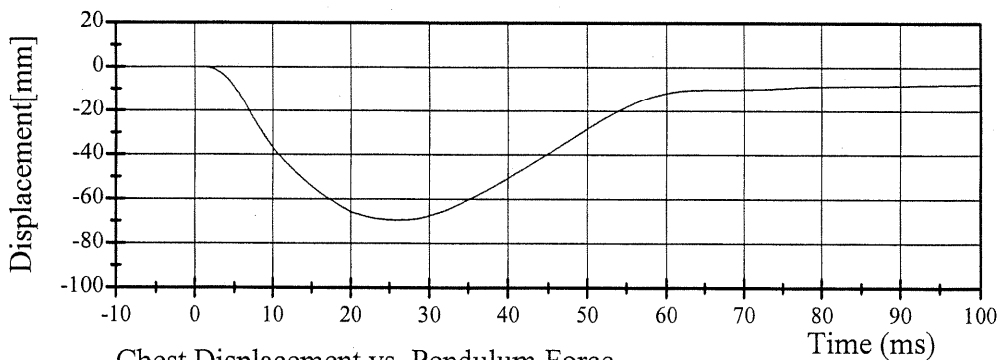


Filter Class: 180

Max: 5406.2 N at 21.4 ms

Min: -16.5 N at 436.2 ms

Chest Displacement

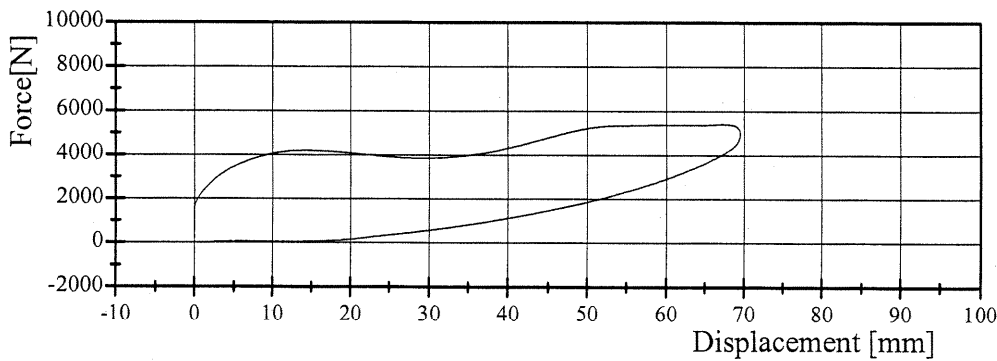


Filter Class: 180

Max: 0.0 mm at 0.9 ms

Min: -69.5 mm at 25.9 ms

Chest Displacement vs. Pendulum Force



08.11.2003 08:15:35 942



Transportation Research Center Inc.

Left Knee Slider Test

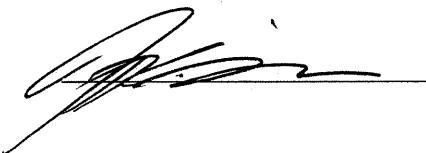
HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/11/2003

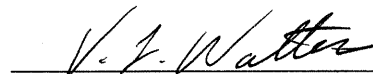
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.74 m/s	Yes
Knee Displacement	-18.3 - (-15.0) mm	-18.1 mm	Yes

Comments:

Technician



Approved



08.11.2003 14:57:12 1733



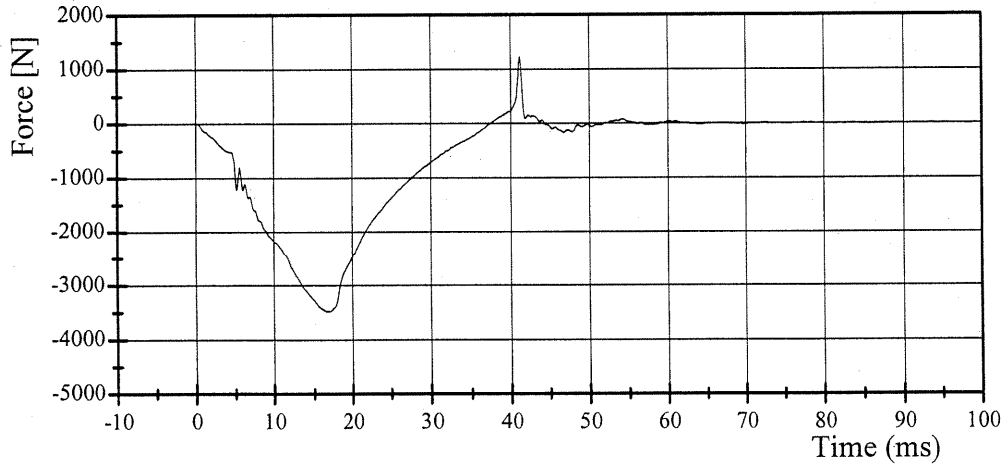
Transportation Research Center Inc.

Left Knee Slider Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/11/2003

Femur Force

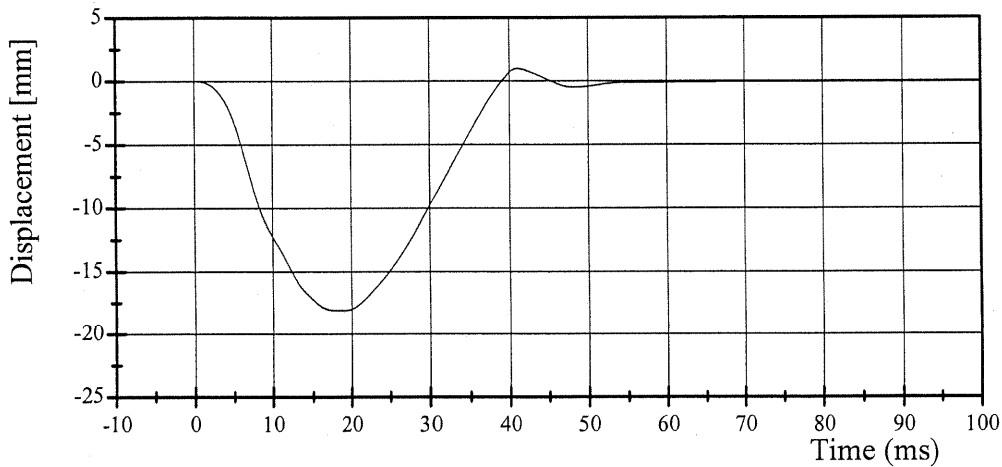


Filter Class: 600

Max: 1226.0 N at 41.2 ms

Min: -3480.9 N at 17.1 ms

Tibia Displacement

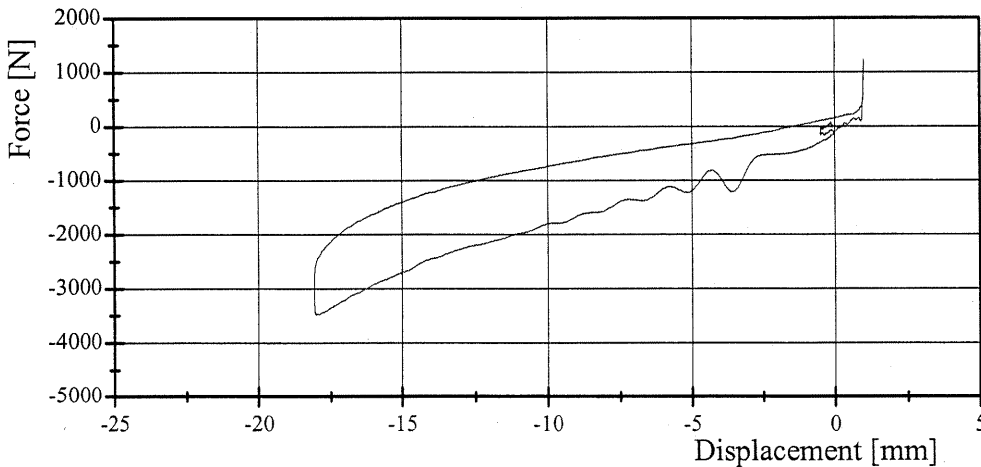


Filter Class: 180

Max: 1.0 mm at 41.1 ms

Min: -18.1 mm at 18.6 ms

Femur Force vs Tibia Displacement



08.11.2003 14:57:13 1733



Transportation Research Center Inc.

Right Knee Slider Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/11/2003

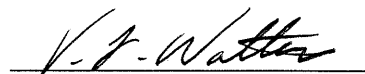
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.74 m/s	Yes
Knee Displacement	-18.3 - (-15.0) mm	-16.3 mm	Yes

Comments:

Technician



Approved



08.11.2003 15:12:28 1731

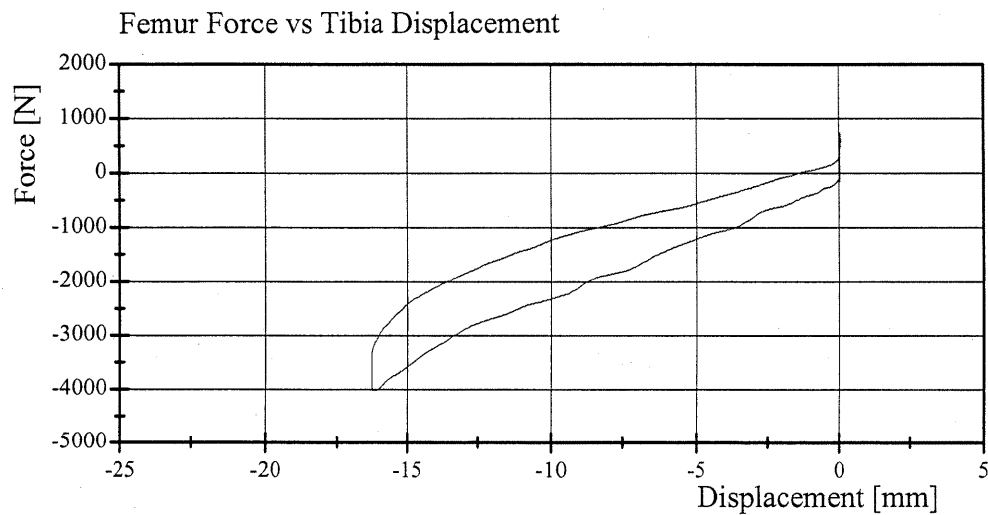
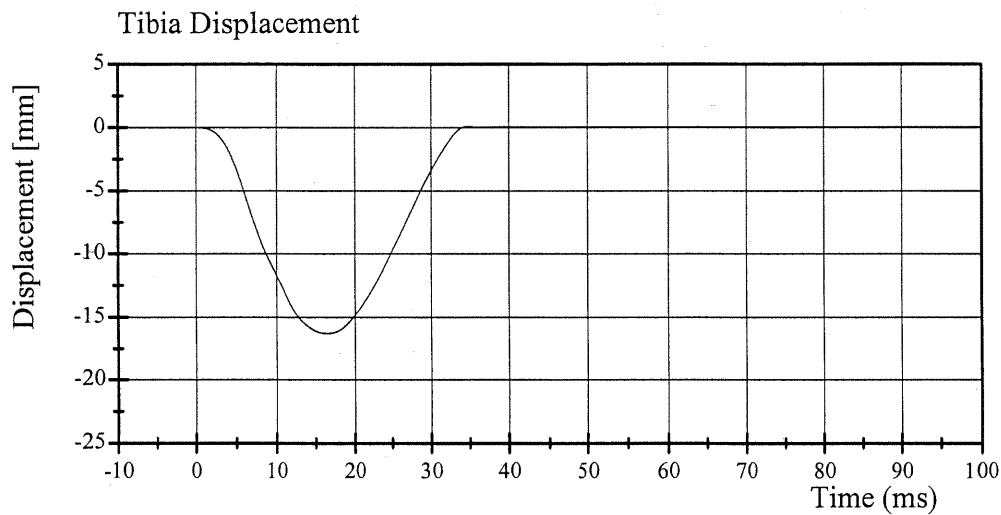
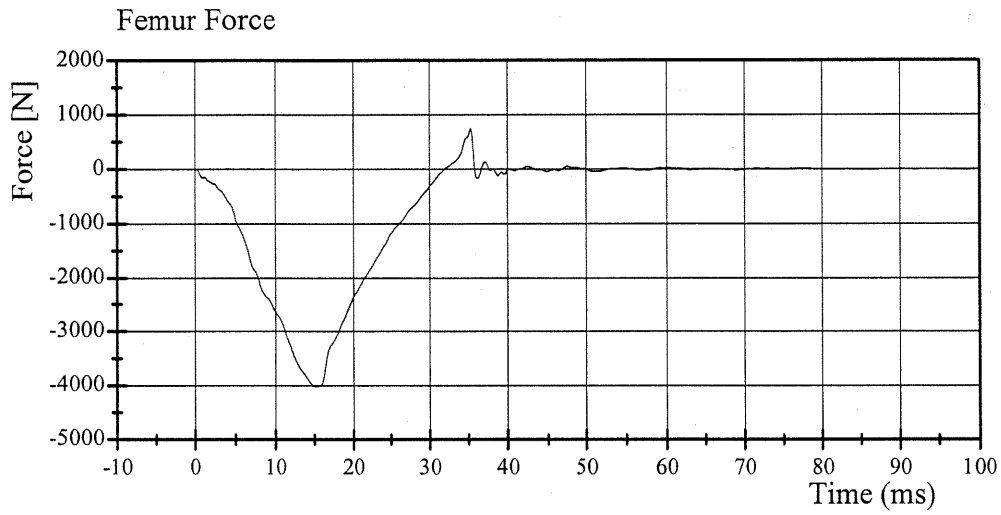


Transportation Research Center Inc.

Right Knee Slider Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/11/2003



08.11.2003 15:12:29 1731



Transportation Research Center Inc.

Left Knee Test

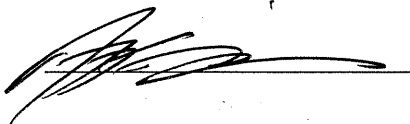
HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/11/2003


Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.11 m/s	Yes
Maximum Pendulum Force	4900 - 6000 N	5499 N	Yes

Comments:

Technician



Approved



08.11.2003 13:34:47 2010



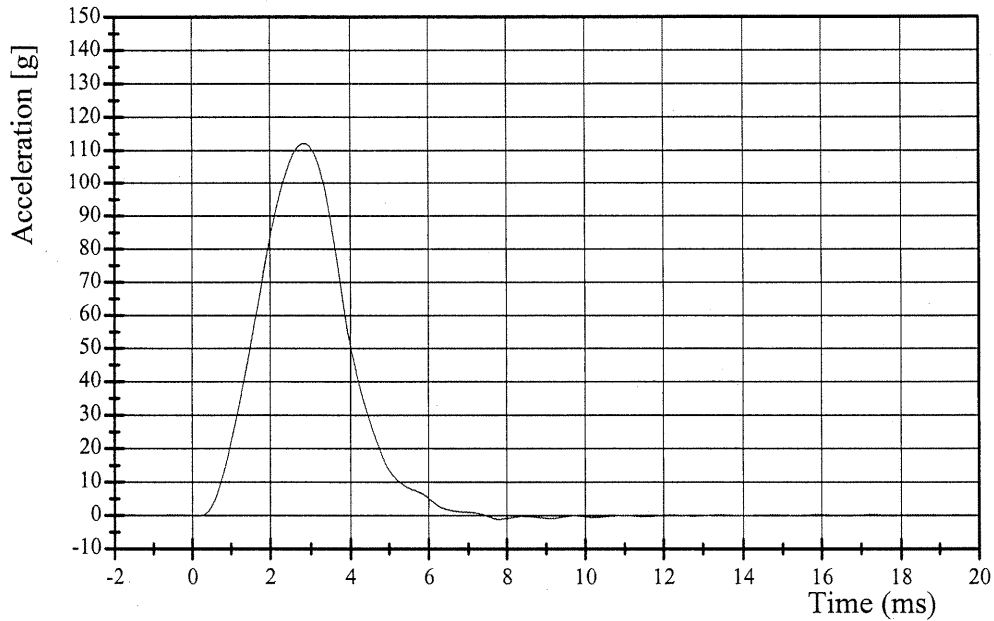
Transportation Research Center Inc.

Left Knee Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/11/2003

Pendulum Deceleration

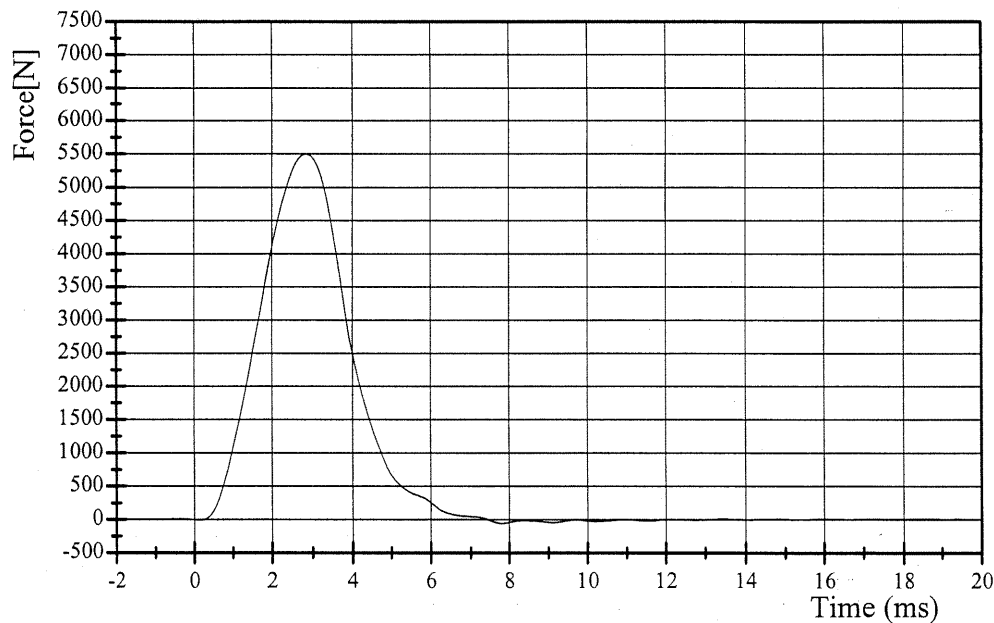


Filter Class: 600

Max: 112.2 g at 2.9 ms

Min: -1.1 g at 7.8 ms

Pendulum Force



Filter Class: 600

Max: 5499.2 N at 2.9 ms

Min: -55.3 N at 7.8 ms



Transportation Research Center Inc.

Right Knee Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/11/2003

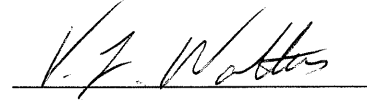
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.10 m/s	Yes
Maximum Pendulum Force	4900 - 6000 N	5767 N	Yes

Comments:

Technician



Approved



08.11.2003 13:37:57 2128



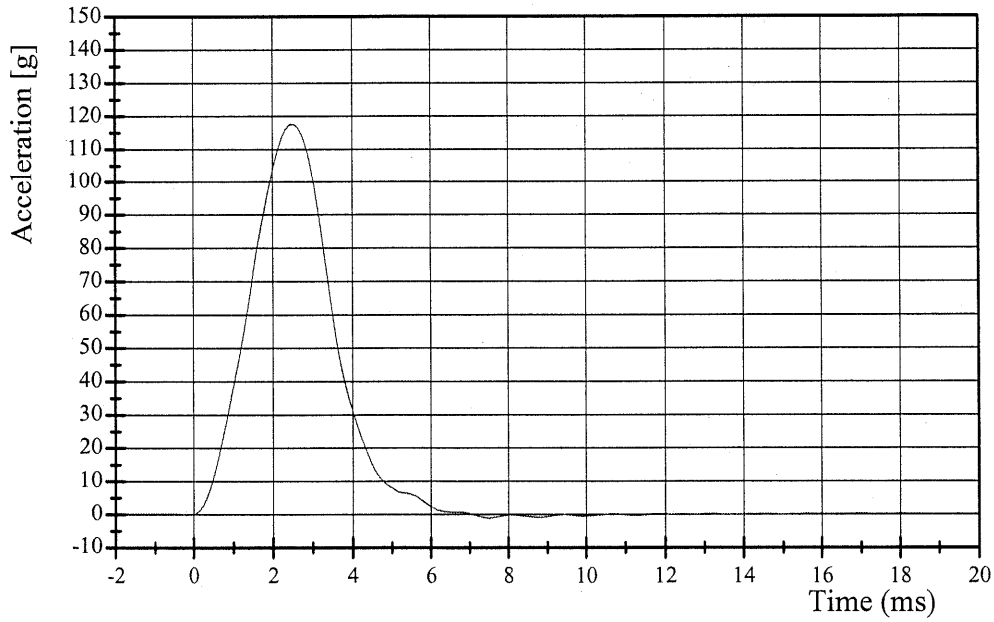
Transportation Research Center Inc.

Right Knee Test

HIII 95th Male Serial No. 083 Calibration No. 16 - 1

Test Date 08/11/2003

Pendulum Deceleration

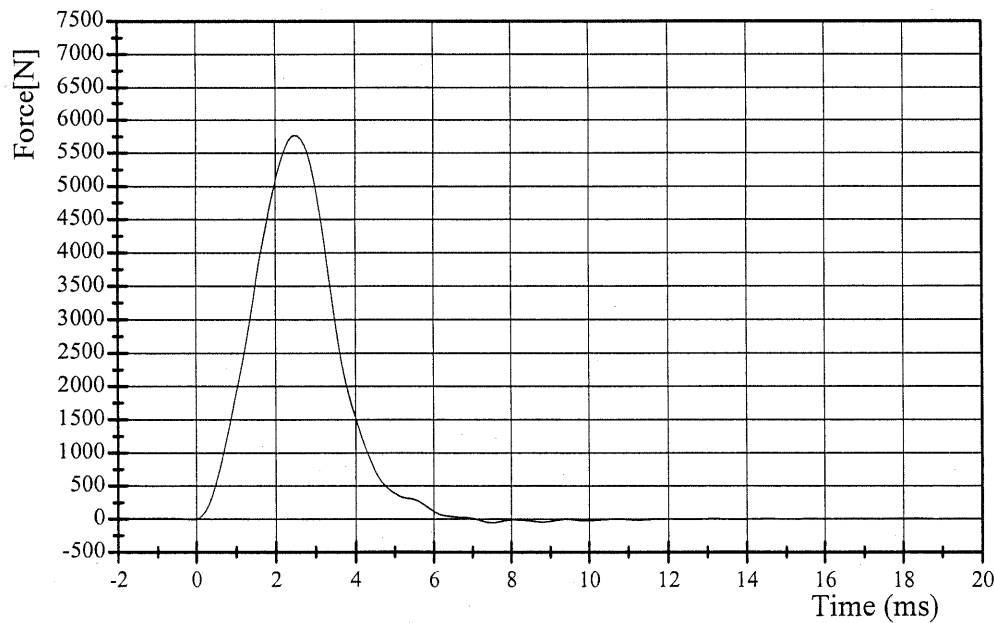


Filter Class: 600

Max: 117.6 g at 2.5 ms

Min: -1.1 g at 7.5 ms

Pendulum Force



Filter Class: 600

Max: 5767.3 N at 2.5 ms

Min: -53.9 N at 7.5 ms



Type: HIII-50% S/N: 090 Mfg.: Alderson Test Date: 08/05/03
 Proj./Seg. No.: 20020480-2001 Test Eng. Walt Dudek

ITEM	PRE-USE
HEAD:	
Head Ballast Condition	X
Accel. Mount Bolts and Cables	X
Skull Cap Bolts	X
Accel. Cable Exit (left or right)	X
NECK:	
* Bracket at specified setting, Serration Alignment, Bolt	N/A
* Condyle Pin, Set Screws	X
* Rubber Condition	X
* Neck Cable Torque (50 th 9.6 – 14.4 in-lb / 5 th 12 in-lb / 6YO 1.8 – 2.2 in-lb)	X
* Nodding Blocks Condition and Position	X
ARMS AND HANDS:	
Clavicle and Shoulder Bumpers Condition	X
Range of Motion Stops: Elbow, Top and Rear Shoulder	X
THORAX:	
Front and Rear Rib Bolts, Rib Ends Position, Rib Spacing	X
Chest Pot Arm, Ball Movement, Set Screws	X
Sternum Bolts and Sternum Bumpers Condition	X
Jacket Condition	X
Abdominal Insert Condition	X
Rib Damping Material and Stiffeners Condition	X
Rib Minimum Depth (Use Chest Depth Gage)	X
Accel. Mount Bolts	X
Lumbar Spine Rubber Condition, Spine Angle, (4) Attachment Bolts	X
PELVIS:	
Iliac Crest Bone	X
Flesh Condition	X
Accel. Mount Bolt	X
Lumbar Block Bolts	X
LEGS AND FEET:	
* Femur Load Cell Bolts (30 ft/lbs)	X
Knee Joint Function and Range of Motion	X
Knee Skins, Inserts and Castings Condition	X
Knee Slider Zero Position	X
Ankle Range of Motion, Bumper Condition	X
Foot Condition	X
OTHER:	
Cleanliness / Skin Condition & Position	X
Target Position	X
Clothes Blue	X
Shoes	X
One G Joint Adjustments	X

* Items to be checked during calibration.

Inspection Completed By: J. Clarridge

Date: 08/02/03

Type: HIII-95% S/N: 083 Mfg.: First Technologies Test Date: 08/05/03
 Proj./Seg. No.: 20020480-2001 Test Eng. Walt Dudek

ITEM	PRE-USE
HEAD:	
Head Ballast Condition	X
Accel. Mount Bolts and Cables	X
Skull Cap Bolts	X
Accel. Cable Exit (left or right)	X
NECK:	
* Bracket at specified setting, Serration Alignment, Bolt	X
* Condyle Pin, Set Screws	X
* Rubber Condition	X
* Neck Cable Torque (50 th 9.6 – 14.4 in-lb / 5 th 12 in-lb / 6YO 1.8 – 2.2 in-lb)	X
* Nodding Blocks Condition and Position	X
ARMS AND HANDS:	
Clavicle and Shoulder Bumpers Condition	X
Range of Motion Stops: Elbow, Top and Rear Shoulder	X
THORAX:	
Front and Rear Rib Bolts, Rib Ends Position, Rib Spacing	X
Chest Pot Arm, Ball Movement, Set Screws	X
Sternum Bolts and Sternum Bumpers Condition	X
Jacket Condition	X
Abdominal Insert Condition	X
Rib Damping Material and Stiffeners Condition	X
Rib Minimum Depth (Use Chest Depth Gage)	X
Accel. Mount Bolts	X
Lumbar Spine Rubber Condition, Spine Angle, (4) Attachment Bolts	X
PELVIS:	
Iliac Crest Bone	X
Flesh Condition	X
Accel. Mount Bolt	X
Lumbar Block Bolts	X
LEGS AND FEET:	
* Femur Load Cell Bolts (30 ft/lbs)	X
Knee Joint Function and Range of Motion	X
Knee Skins, Inserts and Castings Condition	X
Knee Slider Zero Position	X
Ankle Range of Motion, Bumper Condition	X
Foot Condition	X
OTHER:	
Cleanliness / Skin Condition & Position	X
Target Position	X
Clothes Pink	X
Shoes	X
One G Joint Adjustments	X

* Items to be checked during calibration.

Inspection Completed By: J. Clarridge

Date: 08/02/03

Transportation Research Center Inc.

Hybrid III Dummy Post-Use Inspection

Type: HIII-50% S/N: 090 Mfg.: Alderson Test Date: 08/05/03
 Proj./Seg. No.: 20020480-2001 Test Eng. Walt Dudek

ITEM	POST-USE
HEAD:	
Head Skin Condition	X
NECK:	
Rubber Condition	X
ARMS AND HANDS:	
Skin Condition	X
THORAX:	
Jacket Condition	X
Rib Damping Material and Stiffeners Condition	*
Chest Pot Arm and Ball Movement	X
Spine Condition	X
Sternum Assembly Condition	X
PELVIS:	
Flesh Condition	X
Iliac Crest Bone	X
Range of Motion Bumpers and Leg Cavity	X
LEGS AND FEET:	
Knee Skins, Inserts, and Castings Condition	X
Leg Skin Condition and Position	X
Foot Condition	X

NOTES: *Left side of ribs close to failing distance gauge (From previous testing). We will monitor this condition. No other damage to report.

Inspection Completed By: J. Clarridge

Date: 08/08/03

Transportation Research Center Inc.

Hybrid III Dummy Post-Use Inspection

Type: HIII-95% S/N: 083 Mfg.: First Technologies Test Date: 08/05/03
 Proj./Seg. No.: 20020480-2001 Test Eng. Walt Dudek

ITEM	POST-USE
HEAD:	
Head Skin Condition	X
NECK:	
Rubber Condition	X
ARMS AND HANDS:	
Skin Condition	X
THORAX:	
Jacket Condition	X
Rib Damping Material and Stiffeners Condition	X
Chest Pot Arm and Ball Movement	X
Spine Condition	X
Sternum Assembly Condition	X
PELVIS:	
Flesh Condition	X
Iliac Crest Bone	X
Range of Motion Bumpers and Leg Cavity	X
LEGS AND FEET:	
Knee Skins, Inserts, and Castings Condition	X
Leg Skin Condition and Position	X
Foot Condition	X

NOTES: No damage to report.

Inspection Completed By: J. Clarridge Date: 08/08/03

Appendix D

Test Equipment and Instrumentation Calibration Information

Large Male (HIII-95) Dummy Positioning

The seat track was placed in full rearward position.

The seat back angle was set as specified for the vehicle, the same angle used for the 50th percentile dummy.

If the vehicle was equipped with an adjustable steering column, it was set at its highest position when the large male was seated in the driver's position.

If the vehicle was equipped with adjustable seat belt D-rings, the large male's seating position's D-ring was placed in its highest position.

If the seat was equipped with an adjustable lumbar support, it was placed in its lowest position.

If the seat was vertically adjustable, it was placed in its lowest position.

The dummy was placed in the seat similar to a 50th percentile dummy with its legs parallel, its pelvis angle between 20 and 25 degrees and its head level.

The H-point location of the 95th percentile dummy (with the seat in the full rearward position) was recorded relative to the 50th percentile target H-point established by the SAE J826 H-point machine (with the seat in the mid position).

Sign Convention
SAE J211 MAR95

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

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

Rotation potentiometers:
+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

Load cells:
+Femur force: Tension
+Seat belt force: Tension
+Barrier force: Tension

Neck load cells:
+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

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

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	600
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. The polarity column indicates whether a polarity change occurred during data acquisition to conform to J211 MAR95. See Report Sign Convention sheet for description of data output as presented in the report: occasionally channels have been adjusted in post-acquisition processing to conform to J211 MAR95.

Channel Report

8/5/2003 7:35:42 AM

Name of Test 030805-1

System MINIDAU

Name of DAU DAU9

D-6

030805-1

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range		Pol.	Cal.	Group	Mfg.	Model	
9001	02102105-F14	HEDXG1	Head Accel X	Fwd	798.87657	g	+	1/24/2003	OK	090v	Entran	EGE-73B6Q-200
9002	02102110-N20	HEDYG1	Head Accel Y	Lft	809.80624	g	-	1/24/2003	OK	090v	Entran	EGE-73B6Q-200
9003	02102110-N28	HEDZG1	Head Accel Z	Up	789.48991	g	-	1/24/2003	OK	090v	Entran	EGE-73B6Q-200
9004	02102110-N18	HEDXR1	Head Accel Red X	Rwd	810.53698	g	-	1/24/2003	OK	090v	Entran	EGE-73B6Q-200
9005	02102105-F02	HEDYR1	Head Accel Red Y	Rgt	809.61416	g	+	1/24/2003	OK	090v	Entran	EGE-73B6Q-200
9006	02102116-A20	HEDZR1	Head Accel Red Z	Up	792.61873	g	-	1/24/2003	OK	090v	Entran	EGE-73B6Q-200
9007	02102105-F18	HD1XG1	Head (LT) Accel X	Fwd	791.95668	g	+	1/24/2003	OK	090v	Entran	EGE-73B6Q-200
9008	02102105-F15	HD1ZG1	Head (LT) Accel Z	Up	795.03105	g	-	1/24/2003	OK	090v	Entran	EGE-73B6Q-200
9009	02102105-F13	HD2YG1	Head (FT) Accel Y	Lft	803.96959	g	-	1/24/2003	OK	090v	Entran	EGE-73B6Q-200
9010	02102105-F05	HD2ZG1	Head (FT) Accel Z	Up	792.90105	g	-	1/24/2003	OK	090v	Entran	EGE-73B6Q-200
9011	ALAB9	HD3XG1	Head (TP) Accel X	Fwd	803.43972	g	+	3/27/2003	OK	090v	Endevco	7264-2000T
9012	J19501	HD3YG1	Head (TP) Accel Y	Lft	806.61677	g	-	3/27/2003	OK	090v	Endevco	7264-2KM5T
9013	1716-0499-FX	NEKXF1	Neck Force X	Hd	8898.8491	N	-	10/3/2002	OK	090v	Denton	1716
9014	1716-0499-FY	NEKYF1	Neck Force Y	Hd	8892.4032	N	+	10/3/2002	OK	090v	Denton	1716
9015	1716-0499-FZ	NEKZF1	Neck Force Z	Hd	13357.219	N	+	10/3/2002	OK	090v	Denton	1716
9016	1716-0499-MX	NEKXM1	Neck Moment X	Rt Ear	282.63557	N·m	-	10/3/2002	OK	090v	Denton	1716
9017	1716-0499-MY	NEKYM1	Neck Moment Y	Chn	282.10935	N·m	+	10/3/2002	OK	090v	Denton	1716
9018	1716-0499-MZ	NEKZM1	Neck Moment Z	Chn	282.86129	N·m	+	10/3/2002	OK	090v	Denton	1716
9019	1794A-0121-FX	NKLXF1	Neck Lower Force X	Hd	13359.969	N	-	10/26/2002	OK	090v	Denton	1794A
9020	1794A-0121-FY	NKLYF1	Neck Lower Force Y	Hd	13347.598	N	+	10/26/2002	OK	090v	Denton	1794A
9021	1794A-0121-FZ	NKLZF1	Neck Lower Force Z	Hd	13345.705	N	+	10/26/2002	OK	090v	Denton	1794A
9022	1794A-0121-MX	NKLXM1	Neck Lower Moment X	Rt Ear	451.82593	N·m	-	10/26/2002	OK	090v	Denton	1794A
9023	1794A-0121-MY	NKLYM1	Neck Lower Moment Y	Chn	452.42008	N·m	+	10/26/2002	OK	090v	Denton	1794A
9024	1794A-0121-MZ	NKLZM1	Neck Lower Moment Z	Chn	452.53370	N·m	+	10/26/2002	OK	090v	Denton	1794A
9025	J14688	CSTXG1	Chest Accel X	Fwd	404.31160	g	+	1/21/2003	OK	090v	Endevco	7264-2KM5T
9026	AAKA1	CSTYG1	Chest Accel Y	Lft	401.26649	g	-	1/21/2003	---	090v	Endevco	7264-2000LC
9027	ADAL2	CSTZG1	Chest Accel Z	Up	398.02851	g	-	1/21/2003	---	090v	Endevco	7264-2000LC
9028	J36744	CSTXR1	Chest Accel Red X	Rwd	397.17016	g	-	1/21/2003	---	090v	Endevco	7264-2000TZ
9029	J14660	CSTYR1	Chest Accel Red Y	Lft	405.06649	g	-	1/21/2003	---	090v	Endevco	7264-2KM5T
9030	J14666	CSTZR1	Chest Accel Red Z	Up	399.76264	g	-	1/21/2003	---	090v	Endevco	7264-2KM5T
9031	83672-14	CSTXD1	Chest Deflection X #1	Stn Fr	99.861130	mm	+	1/31/2003	OK	090v	Servo	14CB1-2897
9032	2430-631	LFMZFI	Left Femur Force Z #7	Kne	13351.754	N	+	10/7/2002	OK	090v	GSE	2430

Channel Report

8/5/2003 7:35:42 AM

Name of Test 030805-1 System MINIDAU Name of DAU DAUA

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
0001	150-121VR-3892	KNLXD1	Left Knee Displacement	Tib	40.084115 mm	-	1/28/2003	OK 090v	Space Age	150-0121VR
0002	4509J-90-FX	TBLXF1	Left Upper Tibia Force X	Tib	11124.889 N	+	12/27/2002	OK 090v	Denton	4509J
0003	4509J-90-FZ	TBLZF1	Left Upper Tibia Force Z	Tib	11114.020 N	+	12/27/2002	OK 090v	Denton	4509J
0004	4509J-90-MX	TBLXM1	Left Upper Tibia Moment X	Tib	395.10063 N·m	+	12/27/2002	OK 090v	Denton	4509J
0005	4509J-90-MY	TBLYM1	Left Upper Tibia Moment Y	Tib	394.56003 N·m	+	12/27/2002	OK 090v	Denton	4509J
0006	EJ59J	TBLXG1	Left Tibia Accel X	Fwd	1214.3924 g	+	1/21/2003	--- 090v	Endevco	7264-2000T
0007	AJ507	TBLYG1	Left Tibia Accel Y	Rt	1221.2283 g	+	1/22/2003	--- 090v	Endevco	7264-2KM5T
0008	4929J-121-FX	ANLXF1	Left Lower Tibia Force X	Ank	11117.181 N	+	12/30/2002	OK 090v	Denton	4929J
0009	4929J-121-FY	ANLYF1	Left Lower Tibia Force Y	Ank	11111.371 N	+	12/30/2002	OK 090v	Denton	4929J
0010	4929J-121-FZ	ANLZF1	Left Lower Tibia Force Z	Ank	11119.378 N	+	12/30/2002	OK 090v	Denton	4929J
0011	4929J-121-MX	ANLXM1	Left Lower Tibia Moment X	Ank	394.60500 N·m	+	12/30/2002	OK 090v	Denton	4929J
0012	4929J-121-MY	ANLYM1	Left Lower Tibia Moment Y	Ank	396.30648 N·m	+	12/30/2002	OK 090v	Denton	4929J
0013	PD210-4B-AK-03	FTLXD1	Left Foot Disp. X 103X	Eversi	322.69246 °	+	6/6/2003	OK 090v	Contelec	PD210-4B
0014	PD210-4B-AK-03	FTLYD1	Left Foot Disp. Y 103Y	Dorsif	324.09165 °	+	6/6/2003	OK 090v	Contelec	PD210-4B
0015	PD210-4B-AK-02	FTLZD1	Left Foot Disp. Z 103Z	Exter	326.27051 °	-	9/19/2002	OK 090v	Contelec	PD210-4B
0016	EY99J	FTLXG1	Left Foot Accel X	Fwd	1169.2701 g	+	1/22/2003	--- 090v	Endevco	7264-2000T
0017	J17988	FTLYG1	Left Foot Accel Y	Rt	1164.1920 g	+	1/22/2003	--- 090v	Endevco	7264-2KM5T
0018	FG97J	FTLZG1	Left Foot Accel Z	Dn	1170.1519 g	+	1/21/2003	OK 090v	Endevco	7264-2KM5T
0019	2430-741	RFMZF1	Right Femur Force Z #6	Kne	13346.905 N	+	10/7/2002	--- 090v	GSE	2430
0020	150-121VL-3726	KNRXD1	Right Knee Displacement	Tib	39.158349 mm	-	1/28/2003	OK 090v	Space Age	150-0121VL
0021	4509J-89-FX	TBRXF1	Right Upper Tibia Force X	Tib	11125.882 N	+	12/27/2002	OK 090v	Denton	4509J
0022	4509J-89-FZ	TBRZF1	Right Upper Tibia Force Z	Tib	11122.546 N	+	12/27/2002	OK 090v	Denton	4509J
0023	4509J-89-MX	TBRXM1	Right Upper Tibia Moment X	Tib	396.41007 N·m	+	12/27/2002	OK 090v	Denton	4509J
0024	4509J-89-MY	TBRYM1	Right Upper Tibia Moment Y	Tib	394.90815 N·m	+	12/27/2002	OK 090v	Denton	4509J
0025	J35770	TBRXG1	Right Tibia Accel X	Fwd	1227.7883 g	+	1/22/2003	--- 090v	Endevco	7264-2000TZ
0026	AAKC6	TBRYG1	Right Tibia Accel Y	Rt	1238.9594 g	+	1/22/2003	OK 090v	Endevco	7264-2000LC
0027	4929J-120-FX	ANRXF1	Right Lower Tibia Force X	Ank	11123.189 N	+	12/27/2002	OK 090v	Denton	4929J
0028	4929J-120-FY	ANRYF1	Right Lower Tibia Force Y	Ank	11133.371 N	+	12/27/2002	OK 090v	Denton	4929J
0029	4929J-120-FZ	ANRZF1	Right Lower Tibia Force Z	Ank	11130.904 N	+	12/27/2002	OK 090v	Denton	4929J
0030	4929J-120-MX	ANRXM1	Right Lower Tibia Moment X	Ank	394.51730 N·m	+	12/27/2002	OK 090v	Denton	4929J
0031	4929J-120-MY	ANRYM1	Right Lower Tibia Moment Y	Ank	395.65904 N·m	+	12/27/2002	OK 090v	Denton	4929J
0032	PD210-4B-AK-02	FTRXD1	Right Foot Disp. X 108X	Eversi	318.62592 °	-	9/19/2002	OK 090v	Contelec	PD210-4B

D-7

030805-1

Channel Report

8/5/2003 7:35:43 A^A

Name of Test 030805-1

System MINIDAU

Name of DAU DAUB

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
0001	PD210-4B-AK-02	FTRYD1	Right Foot Disp. Y 108Y	Dorsif	326.97895 °	+	9/19/2002	OK 090v	Contelec	PD210-4B
0003	PD210-4B-AK-02	FTRZD1	Right Foot Disp. Z 108Z	Intern	322.83489 °	-	9/19/2002	OK 090v	Contelec	PD210-4B
0004	AGAC4	FTRXG1	Right Foot Accel X	Fwd	1180.7573 g	+	1/21/2003	--- 090v	Endevco	7264-2KM5T
0005	AJ452	FTRYG1	Right Foot Accel Y	Rt	1204.7058 g	+	1/22/2003	OK 090v	Endevco	7264-2KM5T
0006	CC24H	FTRZG1	Right Foot Accel Z	Dn	1239.2293 g	+	1/21/2003	--- 090v	Endevco	7264-2KM5T
0007	AGN47	HEDXG2	Head Accel X	Fwd	801.60320 g	+	1/22/2003	--- 083v	Endevco	7264-2000LC
0008	J27457	HEDYG2	Head Accel Y	Lft	799.31309 g	-	1/22/2003	--- 083v	Endevco	7264-2KM5T
0009	AAKE2	HEDZG2	Head Accel Z	Up	805.66483 g	-	1/22/2003	--- 083v	Endevco	7264-2000LC
0010	J27523	HEDXR2	Head Accel Red X	Fwd	796.76314 g	+	1/22/2003	--- 083v	Endevco	7264-2KM5T
0011	J27466	HEDYR2	Head Accel Red Y	Lft	803.06167 g	-	1/22/2003	--- 083v	Endevco	7264-2KM5T
0012	ACCP9	HEDZR2	Head Accel Red Z	Up	801.80405 g	-	1/22/2003	--- 083v	Endevco	7264-2000LC
0013	J29006	HD1XG2	Head (LT) Accel X	Fwd	788.00751 g	+	1/22/2003	--- 083v	Endevco	7264-2KM5T
0014	AGAGO	HD1ZG2	Head (LT) Accel Z	Up	796.34180 g	-	1/22/2003	--- 083v	Endevco	7264-2000LC
0015	J29023	HD2YG2	Head (FT) Accel Y	Lft	812.59522 g	-	1/22/2003	--- 083v	Endevco	7264-2KM5T
0016	J27470	HD2ZG2	Head (FT) Accel Z	Up	808.02979 g	-	1/22/2003	--- 083v	Endevco	7264-2KM5T
0017	AAJY4	HD3XG2	Head (TP) Accel X	Fwd	796.91196 g	+	1/22/2003	--- 083v	Endevco	7264-2000LC
0018	AAKB3	HD3YG2	Head (TP) Accel Y	Lft	800.93859 g	-	1/22/2003	--- 083v	Endevco	7264-2000LC
0020	1716A-810-FX	NEKXF2	Neck Force X	Hd	8907.3118 N	-	5/15/2003	OK 083v	Denton	1716A
0021	1716A-810-FY	NEKYF2	Neck Force Y	Hd	8886.9255 N	+	5/15/2003	OK 083v	Denton	1716A
0022	1716A-810-FZ	NEKZF2	Neck Force Z	Hd	13330.913 N	+	5/15/2003	OK 083v	Denton	1716A
0023	1716A-810-MX	NEKXM2	Neck Moment X	Rt Ear	282.12640 N·m	-	5/15/2003	OK 083v	Denton	1716A
0024	1716A-810-MY	NEKYM2	Neck Moment Y	Chn	282.43295 N·m	+	5/15/2003	OK 083v	Denton	1716A
0025	1716A-810-MZ	NEKZM2	Neck Moment Z	Chn	282.98160 N·m	+	5/15/2003	OK 083v	Denton	1716A
0026	1794A-215-FX	NKLXF2	Neck Lower Force X	Hd	13328.265 N	-	10/24/2002	OK 083v	Denton	1794A
0027	1794A-215-FY	NKLYF2	Neck Lower Force Y	Hd	13356.430 N	+	10/24/2002	OK 083v	Denton	1794A
0028	1794A-215-FZ	NKLZF2	Neck Lower Force Z	Hd	13340.587 N	+	10/24/2002	OK 083v	Denton	1794A
0029	1794A-215-MX	NKLXM2	Neck Lower Moment X	Rt Ear	451.58203 N·m	-	10/24/2002	OK 083v	Denton	1794A
0030	1794A-215-MY	NKLYM2	Neck Lower Moment Y	Chn	451.75586 N·m	+	10/24/2002	OK 083v	Denton	1794A
0031	1794A-215-MZ	NKLZM2	Neck Lower Moment Z	Chn	451.68417 N·m	+	10/24/2002	OK 083v	Denton	1794A
0032	J19873	CSTXG2	Chest Accel X	Fwd	398.14613 g	+	1/22/2003	--- 083v	Endevco	7264-2KM5T

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Channel Report

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Name of Test 030805-1

System MINIDAU

Name of DAU DAUC

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
0001	AAKA2	CSTYG2	Chest Accel Y	Lft	400.20635	g	- 1/22/2003	--- 083v	Endevco	7264-2000LC
0002	AF973	CSTZG2	Chest Accel Z	Up	403.58178	g	- 1/22/2003	--- 083v	Endevco	7264-2000LC
0003	AGT82	CSTXR2	Chest Accel Red X	Rwd	401.40491	g	- 1/22/2003	--- 083v	Endevco	7264-2000LC
0004	J23772	CSTYR2	Chest Accel Red Y	Lft	396.70855	g	- 1/22/2003	--- 083v	Endevco	7264-2KM5T
0005	AF9Y5	CSTZR2	Chest Accel Red Z	Up	397.05620	g	- 1/22/2003	--- 083v	Endevco	7264-2000LC
0006	14CB1-2897-923	CSTXD2	Chest Deflection X	Stn Fr	99.590744	mm	+ 1/29/2003	OK 083v	Servo	14CB1-2897
0007	2430-726	LFMZFD	Left Femur Force Z	Kne	13346.634	N	+ 9/25/2002	--- 083v	GSE	2430
0008	08TC1-2702-083	KNLXD2	Left Knee Displacement	Tib	24.939982	mm	- 1/29/2003	OK 083v	Servo	08TC1-2702
0009	3643-92-FX	TBLXF2	Left Upper Tibia Force X	Tib	11121.890	N	- 9/25/2002	OK 083v	Denton	3643
0010	3643-92-FY	TBLYF2	Left Upper Tibia Force Y	Tib	11101.284	N	+ 9/25/2002	OK 083v	Denton	3643
0011	3643-92-FZ	TBLZF2	Left Upper Tibia Force Z	Tib	11129.250	N	+ 9/25/2002	OK 083v	Denton	3643
0012	3643-92-MX	TBLXM2	Left Upper Tibia Moment X	Ank	396.50605	N·m	- 9/25/2002	OK 083v	Denton	3643
0013	3643-92-MY	TBLYM2	Left Upper Tibia Moment Y	Ank	395.93437	N·m	+ 9/25/2002	OK 083v	Denton	3643
0014	3644-92-FX	ANLXF2	Left Lower Tibia Force X	Ank	11136.661	N	- 9/25/2002	OK 083v	Denton	3644
0015	3644-92-FY	ANLYF2	Left Lower Tibia Force Y	Ank	11115.479	N	+ 9/25/2002	OK 083v	Denton	3644
0016	3644-92-FZ	ANLZF2	Left Lower Tibia Force Z	Ank	11123.647	N	+ 9/25/2002	OK 083v	Denton	3644
0017	3644-92-MX	ANLXM2	Left Lower Tibia Moment X	Ank	394.94147	N·m	- 9/25/2002	OK 083v	Denton	3644
0018	3644-92-MY	ANLYM2	Left Lower Tibia Moment Y	Ank	395.43075	N·m	+ 9/25/2002	OK 083v	Denton	3644
0019	2430-729	RFMZFD	Right Femur Force Z	Kne	13354.104	N	+ 9/25/2002	OK 083v	GSE	2430
0020	08TC1-2702-273r	KNRXD2	Right Knee Displacement	Tib	26.056927	mm	- 1/29/2003	OK 083v	Servo	08TC1-2702
0021	3643-94-FX	TBRXF2	Right Upper Tibia Force X	Tib	11132.545	N	- 9/25/2002	OK 083v	Denton	3643
0022	3643-94-FY	TBRYP2	Right Upper Tibia Force Y	Tib	11110.859	N	+ 9/25/2002	OK 083v	Denton	3643
0023	3643-94-FZ	TBRZF2	Right Upper Tibia Force Z	Tib	11111.739	N	+ 9/25/2002	OK 083v	Denton	3643
0024	3643-94-MX	TBRXM2	Right Upper Tibia Moment X	Ank	396.26878	N·m	- 9/25/2002	OK 083v	Denton	3643
0025	3643-94-MY	TBRYM2	Right Upper Tibia Moment Y	Ank	395.26953	N·m	+ 9/25/2002	OK 083v	Denton	3643
0026	3644-94-FX	ANRXP2	Right Lower Tibia Force X	Ank	11111.471	N	- 9/25/2002	OK 083v	Denton	3644
0027	3644-94-FY	ANRYF2	Right Lower Tibia Force Y	Ank	11137.699	N	+ 9/25/2002	OK 083v	Denton	3644
0028	3644-94-FZ	ANRZF2	Right Lower Tibia Force Z	Ank	11112.316	N	+ 9/25/2002	OK 083v	Denton	3644
0029	3644-94-MX	ANRXM2	Right Lower Tibia Moment X	Ank	396.29973	N·m	- 9/25/2002	OK 083v	Denton	3644
0030	3644-94-MY	ANRYM2	Right Lower Tibia Moment Y	Ank	395.05433	N·m	+ 9/25/2002	OK 083v	Denton	3644
0031	P22074	LRSXG	LT RR SEAT X-MEMBER	FWD	1005.2421	g	+ 7/29/2003	OK -1	Endevco	7264C-2K-2-180
0032	P27191	RRSXG	RT RR SEAT X-MEMBER	FWD	978.59327	g	+ 5/7/2003	OK -1	Endevco	7264C-2K-2-180

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Channel Report

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Name of Test 030805-1

System MINIDAU

Name of DAU DAUD

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range		Pol.	Cal.	Group	Mfg.	Model	
0001	P21745	BCLXG	FR BRAKE CALIPER X-AXIS	FWD	1020.6726	g	+	1/20/2003	---	-1	Endevco	7264C-2K-2-180
0002	P28111	BCRXG	FR BRAKE CALIPER X-AXIS	RR	1015.8327	g	-	7/18/2003	OK	-1	Endevco	7264C-2K-2-180
0003	P24522	DPCXG	DASH PNL CENTER X-AXIS	FWD	989.94586	g	+	6/18/2003	OK	-1	Endevco	7264C-2K-2-180
0004	P27990	ENGXG1	ENGINE TOP X-AXIS	FWD	997.58397	g	+	5/1/2003	OK	-1	Endevco	7264C-2K-2-180
0005	P27487	ENGXG2	ENGINE BOTTOM X-AXIS	FWD	1016.3771	g	+	5/6/2003	OK	-1	Endevco	7264C-2K-2-180
0006	P28582	TPAXG	TOEPAN X-AXIS (ACCEL)	FWD	1003.4493	g	+	6/20/2003	OK	-1	Endevco	7264C-2K-2-180
0007	P28628	TPAZG	TOEPAN Z-AXIS (ACCEL)	UP	998.59572	g	-	6/20/2003	OK	-1	Endevco	7264C-2K-2-180
0008	P24559	TPFXG	TOEPAN X-AXIS (FOOT)	FWD	1008.8669	g	+	7/11/2003	OK	-1	Endevco	7264C-2K-2-180
0009	P28268	TPFZG	TOEPAN Z-AXIS (FOOT)	UP	1002.9186	g	-	6/18/2003	OK	-1	Endevco	7264C-2K-2-180
0010	P28113	RDKZG	RR DECK Z-AXIS	UP	989.25728	g	-	7/18/2003	OK	-1	Endevco	7264C-2K-2-180
0011	P28130	RDCXG	RR COMPARTMENT CENT	RR	1004.7490	g	-	7/18/2003	OK	-1	Endevco	7264C-2K-2-180
0012	ABFire1	DABETA	DRIV. AB EVENT PRI	IP02	5.12	V	+	8/20/2002	OK	VOLPE	FLUKE	Y8101A
0013	ABFire2	DABETB	DRIV. AB EVENT SEC	IP07	5.12	V	+	8/20/2002	OK	VOLPE	FLUKE	Y8101A
0014	ABFire3	PABETA	PASS. AB EVENT PRI	IP01	5.12	V	+	8/20/2002	OK	VOLPE	FLUKE	Y8101A
0015	ABFire4	PABETB	PASS. AB EVENT SEC	IP087	5.12	V	+	8/20/2002	OK	VOLPE	FLUKE	Y8101A

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Channel Report

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Name of Test 030805-1

System MINIDAU

Name of DAU DAUE

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
0001	62467	BA1F	ROW A CELL 1		221904.96	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0002	122042A	BA2F	ROW A CELL 2		221805.75	N	+ 3/11/2003	OK TRC	Interface	1220BZY-50K
0003	68054	BA3F	ROW A CELL 3		221929.78	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0004	68061	BA4F	ROW A CELL 4		222029.10	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0005	68058	BA5F	ROW A CELL 5		221743.79	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0006	68042	BA6F	ROW A CELL 6		221706.63	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0007	68032	BA7F	ROW A CELL 7		221942.19	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0008	68026	BA8F	ROW A CELL 8		221793.36	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0009	68045	BA9F	ROW A CELL 9		222551.99	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0010	68027	BB1F	ROW B CELL 1		222203.12	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0011	68055	BB2F	ROW B CELL 2		221545.75	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0012	68046	BB3F	ROW B CELL 3		221904.96	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0013	68068	BB4F	ROW B CELL 4		221545.75	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0014	68024	BB5F	ROW B CELL 5		222066.37	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0015	68044	BB6F	ROW B CELL 6		221706.63	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0016	68069	BB7F	ROW B CELL 7		223214.28	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0017	68034	BB8F	ROW B CELL 8		221756.18	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0018	68047	BB9F	ROW B CELL 9		222016.68	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0019	62466	BC1F	ROW C CELL 1		221967.01	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0020	62510	BC2F	ROW C CELL 2		222066.37	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0021	68052	BC3F	ROW C CELL 3		221830.55	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0022	68028	BC4F	ROW C CELL 4		221842.95	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0023	68064	BC5F	ROW C CELL 5		221780.97	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0024	68012	BC6F	ROW C CELL 6		221880.15	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0025	68063	BC7F	ROW C CELL 7		222029.10	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0026	68015	BC8F	ROW C CELL 8		222178.24	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0027	62453	BC9F	ROW C CELL 9		221756.18	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0028	68050	BD1F	ROW D CELL 1		221880.15	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0029	68021	BD2F	ROW D CELL 2		222352.50	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0030	68039	BD3F	ROW D CELL 3		221991.84	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0031	68018	BD4F	ROW D CELL 4		222128.51	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0032	68067	BD5F	ROW D CELL 5		222140.94	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K

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0033	62456	BD6F	ROW D CELL 6	221855.35	N	+	3/11/2003	OK	TRC	Interface	1220TX-50K
0034	68014	BD7F	ROW D CELL 7	221880.15	N	+	3/11/2003	OK	TRC	Interface	1220TX-50K
0035	68051	BD8F	ROW D CELL 8	222265.34	N	+	3/11/2003	OK	TRC	Interface	1220TX-50K
0036	68033	BD9F	ROW D CELL 9	222053.94	N	+	3/11/2003	OK	TRC	Interface	1220TX-50K
0037	EVENT	EVENT	EVENT	5.12	V	+	10/15/2002	OK	-1	TRC	Event

Dummy 090v Type HYBRID III 50TH Descriptio VOLPE - 090v HYBRID III 50TH w/THOR LEGS ICAL'd 9-19-02 (DKS 6-16-03)J211

Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos	Flip
HEDXG	Head Accel X	EGE-73B6Q-20002I02I05-F14		Entran	0.0221 g	2000	01/24/2003	Fwd	0
HEDYG	Head Accel Y	EGE-73B6Q-20002I02I10-N20		Entran	0.02529 g	2000	01/24/2003	Lft	1
HEDZG	Head Accel Z	EGE-73B6Q-20002I02I10-N28		Entran	0.02092 g	2000	01/24/2003	Up	1
HEDXR	Head Accel Red X	EGE-73B6Q-20002I02I10-N18		Entran	0.02256 g	2000	01/24/2003	Rwd	1
HEDYR	Head Accel Red Y	EGE-73B6Q-20002I02I05-F02		Entran	0.0204 g	2000	01/24/2003	Rgt	0
HEDZR	Head Accel Red Z	EGE-73B6Q-20002I02I16-A20		Entran	0.02307 g	2000	01/24/2003	Up	1
HD1XG	Head (LT) Accel X	EGE-73B6Q-20002I02I05-F18		Entran	0.02155 g	2000	01/24/2003	Fwd	0
HD1ZG	Head (LT) Accel Z	EGE-73B6Q-20002I02I05-F15		Entran	0.023 g	2000	01/24/2003	Up	1
HD2YG	Head (FT) Accel Y	EGE-73B6Q-20002I02I05-F13		Entran	0.02196 g	2000	01/24/2003	Lft	1
HD2ZG	Head (FT) Accel Z	EGE-73B6Q-20002I02I05-F05		Entran	0.02083 g	2000	01/24/2003	Up	1
HD3XG	Head (TP) Accel X	7264-2000T ALAB9		Endevco	0.02451 g	2000	03/27/2003	Fwd	0
HD3YG	Head (TP) Accel Y	7264-2KM5T J19501		Endevco	0.02539 g	2000	03/27/2003	Lft	1
NEKXF	Neck Force X	1716	1716-0499-FX	Denton	0.000190515 N	8896.4	10/03/2002	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716	1716-0499-FY	Denton	0.000187548 N	8896.4	10/03/2002	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716	1716-0499-FZ	Denton	0.000088118 N	13344.6	10/03/2002	Hd Up,Cst Dn	0
NEKXM	Neck Moment X	1716	1716-0499-MX	Denton	0.00592 N·m	282.5	10/03/2002	Rt Ear to Rt Shld	1
NEKYM	Neck Moment Y	1716	1716-0499-MY	Denton	0.005854513 N·m	282.5	10/03/2002	Chn to Strnm	0
NEKZM	Neck Moment Z	1716	1716-0499-MZ	Denton	0.008227611 N·m	282.5	10/03/2002	Chn to Lt Shld	0
NKLXF	Neck Lower Force X	1794A	1794A-0121-FX	Denton	0.000140895 N	13344.6	10/26/2002	Hd Fd,Cst Rr	1
NKLYF	Neck Lower Force Y	1794A	1794A-0121-FY	Denton	0.0001394871 N	13344.6	10/26/2002	Hd Lt,Cst Rt	0
NKLZF	Neck Lower Force Z	1794A	1794A-0121-FZ	Denton	0.0000622798 N	13344.6	10/26/2002	Hd Up,Cst Dn	0
NKLXM	Neck Lower Moment X	1794A	1794A-0121-MX	Denton	0.00382831 N·m	452	10/26/2002	Rt Ear to Rt Shld	1
NKLYM	Neck Lower Moment Y	1794A	1794A-0121-MY	Denton	0.0037349557 N·m	452	10/26/2002	Chn to Strnm	0
NKLZM	Neck Lower Moment Z	1794A	1794A-0121-MZ	Denton	0.00694115 N·m	452	10/26/2002	Chn to Lt Shld	0
CSTXG	Chest Accel X	7264-2KM5T J14688		Endevco	0.04085 g	2000	01/21/2003	Fwd	0
CSTYG	Chest Accel Y	7264-2000LC AAKA1		Endevco	0.03038 g	2000	01/21/2003	Lft	1

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Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos	Flip
CSTZG	Chest Accel Z	7264-2000LC	ADAL2	Endevco	0.01949 g	2000	01/21/2003	Up	1
CSTXR	Chest Accel Red X	7264-2000TZ	J36744	Endevco	0.02302 g	2000	01/21/2003	Rwd	1
CSTYR	Chest Accel Red Y	7264-2KM5T	J14660	Endevco	0.03241 g	2000	01/21/2003	Lft	1
CSTZR	Chest Accel Red Z	7264-2KM5T	J14666	Endevco	0.03284 g	2000	01/21/2003	Up	1
CSTXD	Chest Deflection X #1	14CB1-2897	83672-14	Servo	1.13936 mm	100	01/31/2003	Stn Fr Spn	0
LFMZF	Left Femur Force Z #7	2430	2430-631	GSE	0.000071013 N	13344	10/07/2002	Kne Fd,Pel Rr	0
RFMZF	Right Femur Force Z #6	2430	2430-741	GSE	0.000067656 N	13344	10/07/2002	Kne Fd,Pel Rr	0
KNLXD	Left Knee Displacement	150-0121VR	150-121VR-3892L	Space Age	23.22389 mm	40	01/28/2003	Tib Rr,Hld Fem	1
TBLXF	Left Upper Tibia Force X	4509J	4509J-90-FX	Denton	0.0001673561 N	11120	12/27/2002	Tib Fd,Knee Rr	0
TBLYF	Left Upper Tibia Force Y	4509J	4509J-90-FY	Denton	0.0001679496 N	11120	12/27/2002	Tib Rt,Knee Lt	0
TBLZF	Left Upper Tibia Force Z	4509J	4509J-90-FZ	Denton	0.0000930665 N	11120	12/27/2002	Tib Dn,Knee Up	0
TBLXM	Left Upper Tibia Moment X	4509J	4509J-90-MX	Denton	0.007199291 N-m	395.4	12/27/2002	Tib Lt,Hld Knee	0
TBLYM	Left Upper Tibia Moment Y	4509J	4509J-90-MY	Denton	0.007209155 N-m	395.4	12/27/2002	Tib Fd,Clevis Rr	0
TBLXG	Left Tibia Accel X	7264-2000T	EJ59J	Endevco	0.02219 g	2000	01/21/2003	Fwd	0
TBLYG	Left Tibia Accel Y	7264-2KM5T	AJ507	Endevco	0.02795 g	2000	01/22/2003	Rt	0
ANLXF	Left Lower Tibia Force X	4929J	4929J-121-FX	Denton	0.0001731384 N	11120.5	12/30/2002	Ank Fd,Knee Rr	0
ANLYF	Left Lower Tibia Force Y	4929J	4929J-121-FY	Denton	0.0001745413 N	11120.5	12/30/2002	Ank Rt,Knee Lt	0
ANLZF	Left Lower Tibia Force Z	4929J	4929J-121-FZ	Denton	0.0000955305 N	11120.5	12/30/2002	Ank Dn,Knee Up	0
ANLXM	Left Lower Tibia Moment X	4929J	4929J-121-MX	Denton	0.0075 N-m	395.4	12/30/2002	Ank Lt,Hld Knee	0
ANLYM	Left Lower Tibia Moment Y	4929J	4929J-121-MY	Denton	0.0074678 N-m	395.4	12/30/2002	Ank Fd,Hld Knee	0
FTLXD	Left Foot Disp. X 103X	PD210-4B	PD210-4B-AK-0326	Contelec	3.1733 °	318	06/06/2003	Eversion	0
FTLYD	Left Foot Disp. Y 103Y	PD210-4B	PD210-4B-AK-0327	Contelec	3.1596 °	318	06/06/2003	Dorsiflexion	0
FTLZD	Left Foot Disp. Z 103Z	PD210-4B	PD210-4B-AK-0259	Contelec	3.1385 °	318	09/19/2002	External Rotation	1
FTLXG	Left Foot Accel X	7264-2000T	EY99J	Endevco	0.03649 g	2000	01/22/2003	Fwd	0
FTLYG	Left Foot Accel Y	7264-2KM5T	J17988	Endevco	0.03383 g	2000	01/22/2003	Rt	0
FTLZG	Left Foot Accel Z	7264-2KM5T	FG97J	Endevco	0.02917 g	2000	01/21/2003	Dn	0
KNRXD	Right Knee Displacement	150-0121VL	150-121VL-3726R	Space Age	23.77294 mm	40	01/28/2003	Tib Rr,Hld Fem	1
TBRXF	Right Upper Tibia Force X	4509J	4509J-89-FX	Denton	0.0001698111 N	11120	12/27/2002	Tib Fd,Knee Rr	0

Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos	Flip
TBRYP	Right Upper Tibia Force Y	4509J	4509J-89-FY	Denton	0.0001696043 N	11120	12/27/2002	Tib Rt,Knee Lt	0
TBRZF	Right Upper Tibia Force Z	4509J	4509J-89-FZ	Denton	0.0000931834 N	11120	12/27/2002	Tib Dn,Knee Up	0
TBRXM	Right Upper Tibia Moment X	4509J	4509J-89-MX	Denton	0.00717551 N·m	395.4	12/27/2002	Tib Lt,Hld Knee	0
TBRYM	Right Upper Tibia Moment Y	4509J	4509J-89-MY	Denton	0.0072028 N·m	395.4	12/27/2002	Tib Fd,Clevis Rr	0
TBRXG	Right Tibia Accel X	7264-2000TZ	J35770	Endevco	0.02453 g	2000	01/22/2003	Fwd	0
TBRYG	Right Tibia Accel Y	7264-2000LC	AAKC6	Endevco	0.02755 g	2000	01/22/2003	Rt	0
ANRFX	Right Lower Tibia Force X	4929J	4929J-120-FX	Denton	0.0001711151 N	11120.5	12/27/2002	Ank Fd,Knee Rr	0
ANRYF	Right Lower Tibia Force Y	4929J	4929J-120-FY	Denton	0.0001722392 N	11120.5	12/27/2002	Ank Rt,Knee Lt	0
ANRZF	Right Lower Tibia Force Z	4929J	4929J-120-FZ	Denton	0.0000954316 N	11120.5	12/27/2002	Ank Dn,Knee Up	0
ANRXM	Right Lower Tibia Moment X	4929J	4929J-120-MX	Denton	0.007373798 N·m	395.4	12/27/2002	Ank Lt,Hld Knee	0
ANRYM	Right Lower Tibia Moment Y	4929J	4929J-120-MY	Denton	0.00748002 N·m	395.4	12/27/2002	Ank Fd,Hld Knee	0
FTRXD	Right Foot Disp. X 108X	PD210-4B	PD210-4B-AK-0254	Contelec	3.2138 °	318	09/19/2002	Eversion	1
FTRYD	Right Foot Disp. Y 108Y	PD210-4B	PD210-4B-AK-0255	Contelec	3.1317 °	318	09/19/2002	Dorsiflexion	0
FTRZD	Right Foot Disp. Z 108Z	PD210-4B	PD210-4B-AK-0256	Contelec	3.1719 °	318	09/19/2002	Internal Rotation	1
FTRXG	Right Foot Accel X	7264-2KM5T	AGAC4	Endevco	0.02409 g	2000	01/21/2003	Fwd	0
FTRYG	Right Foot Accel Y	7264-2KM5T	AJ452	Endevco	0.025 g	2000	01/22/2003	Rt	0
FTRZG	Right Foot Accel Z	7264-2KM5T	CC24H	Endevco	0.03443 g	2000	01/21/2003	Dn	0

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Dummy 083v Type HYBRID III 95TH Descriptio VOLPE - 083v HYBRID III 95TH ICAL'd 9-25-02 (DKS 5-28-03)J211

Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos	Flip
HEDXG	Head Accel X	7264-2000LC	AGN47	Endevco	0.01996 g	2000	01/22/2003	Fwd	0
HEDYG	Head Accel Y	7264-2KM5T	J27457	Endevco	0.02785 g	2000	01/02/2003	Lft	1
HEDZG	Head Accel Z	7264-2000LC	AAKE2	Endevco	0.02542 g	2000	01/22/2003	Up	1
HEDXR	Head Accel Red X	7264-2KM5T	J27523	Endevco	0.02142 g	2000	01/22/2003	Fwd	0
HEDYR	Head Accel Red Y	7264-2KM5T	J27466	Endevco	0.02277 g	2000	01/22/2003	Lft	1
HEDZR	Head Accel Red Z	7264-2000LC	ACCP9	Endevco	0.02456 g	2000	01/22/2003	Up	1
HD1XG	Head (LT) Accel X	7264-2KM5T	J29006	Endevco	0.02499 g	2000	01/22/2003	Fwd	0
HD1ZG	Head (LT) Accel Z	7264-2000LC	AGAG0	Endevco	0.02074 g	2000	01/22/2003	Up	1
HD2YG	Head (FT) Accel Y	7264-2KM5T	J29023	Endevco	0.02864 g	2000	01/22/2003	Lft	1
HD2ZG	Head (FT) Accel Z	7264-2KM5T	J27470	Endevco	0.02263 g	2000	01/22/2003	Up	1
HD3XG	Head (TP) Accel X	7264-2000LC	AAJY4	Endevco	0.02677 g	2000	01/22/2003	Fwd	0
HD3YG	Head (TP) Accel Y	7264-2000LC	AAKB3	Endevco	0.02557 g	2000	01/22/2003	Lft	1
NEKXF	Neck Force X	1716A	1716A-810-FX	Denton	0.0001922437 N	8896.4	05/15/2003	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716A	1716A-810-FY	Denton	0.0001858475 N	8896.4	05/15/2003	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716A	1716A-810-FZ	Denton	0.000096743 N	13344.6	05/15/2003	Hd Up,Cst Dn	0
NEKXM	Neck Moment X	1716A	1716A-810-MX	Denton	0.0058541592 N·m	282.5	05/15/2003	Rt Ear to Rt Shld	1
NEKYM	Neck Moment Y	1716A	1716A-810-MY	Denton	0.005924247 N·m	282.5	05/15/2003	Chn to Strnm	0
NEKZM	Neck Moment Z	1716A	1716A-810-MZ	Denton	0.0081869 N·m	282.5	05/15/2003	Chn to Lt Shld	0
NKLXF	Neck Lower Force X	1794A	1794A-215-FX	Denton	0.0001396894 N	13344.6	10/24/2002	Hd Fd,Cst Rr	1
NKLYF	Neck Lower Force Y	1794A	1794A-215-FY	Denton	0.0001373964 N	13344.6	10/24/2002	Hd Lt,Cst Rt	0
NKLZF	Neck Lower Force Z	1794A	1794A-215-FZ	Denton	0.0000691515 N	13344.6	10/24/2002	Hd Up,Cst Dn	0
NKLXM	Neck Lower Moment X	1794A	1794A-215-MX	Denton	0.003843362 N·m	452	10/24/2002	Rt Ear to Rt Shld	1
NKLYM	Neck Lower Moment Y	1794A	1794A-215-MY	Denton	0.0037904867 N·m	452	10/24/2002	Chn to Strnm	0
NKLZM	Neck Lower Moment Z	1794A	1794A-215-MZ	Denton	0.0068699115 N·m	452	10/24/2002	Chn to Lt Shld	0
CSTXG	Chest Accel X	7264-2KM5T	J19873	Endevco	0.02473 g	2000	01/22/2003	Fwd	0
CSTYG	Chest Accel Y	7264-2000LC	AAKA2	Endevco	0.02722 g	2000	01/22/2003	Lft	1

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Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos	Flip
CSTZG	Chest Accel Z	7264-2000LC	AF973	Endevco	0.02643 g	2000	01/22/2003	Up	1
CSTXR	Chest Accel Red X	7264-2000LC	AGT82	Endevco	0.01993 g	2000	01/22/2003	Rwd	1
CSTYR	Chest Accel Red Y	7264-2KM5T	J23772	Endevco	0.02746 g	2000	01/22/2003	Lft	1
CSTZR	Chest Accel Red Z	7264-2000LC	AF9Y5	Endevco	0.02433 g	2000	01/22/2003	Up	1
CSTXD	Chest Deflection X	14CB1-2897	14CB1-2897-9230	Servo	1.28526 mm	100	01/29/2003	Stn Fr Spn	0
LFMZf	Left Femur Force Z	2430	2430-726	GSE	0.000069245 N	13344	09/25/2002	Kne Fd,Pel Rr	0
RFMZf	Right Femur Force Z	2430	2430-729	GSE	0.000069964 N	13344	09/25/2002	Kne Fd,Pel Rr	0
KNLXD	Left Knee Displacement	08TC1-2702	08TC1-2702-083L	Servo	41.05857 mm	25.4	01/29/2003	Tib Rr,Hld Fem	1
KNLLF	Left Knee-Left Force	2372	2372-146-LEFT	Denton	0.000225383 N	8896.4	09/25/2002	Knee Up,Clev Dn	0
KNLMF	Left Knee-Right Force	2372	2372-146-RIGHT	Denton	0.000225473 N	8896.4	09/25/2002	Knee Up,Clev Dn	0
TBLXF	Left Upper Tibia Force X	3643	3643-92-FX	Denton	0.000177059 N	11120.6	09/25/2002	Tib Rr,Knee Fd	1
TBLYF	Left Upper Tibia Force Y	3643	3643-92-FY	Denton	0.000176708 N	11120.6	09/25/2002	Tib Rt,Knee Lt	0
TBLZF	Left Upper Tibia Force Z	3643	3643-92-FZ	Denton	0.000097468 N	11120.6	09/25/2002	Tib Dn,Knee Up	0
TBLXM	Left Upper Tibia Moment X	3643	3643-92-MX	Denton	0.00755134 N·m	395.4	09/25/2002	Ank Rt,Hld Knee	1
TBLYM	Left Upper Tibia Moment Y	3643	3643-92-MY	Denton	0.007606727 N·m	395.4	09/25/2002	Ank Fd,Bot Clev Rr	0
ANLXF	Left Lower Tibia Force X	3644	3644-92-FX	Denton	0.000174145 N	11120.6	09/25/2002	Ank Rr,Knee Fd	1
ANLYF	Left Lower Tibia Force Y	3644	3644-92-FY	Denton	0.000173165 N	11120.6	09/25/2002	Ank Rt,Knee Lft	0
ANLZF	Left Lower Tibia Force Z	3644	3644-92-FZ	Denton	0.000096092 N	11120.6	09/25/2002	Ank Dn,Tib Up	0
ANLXM	Left Lower Tibia Moment X	3644	3644-92-MX	Denton	0.007537178 N·m	395.4	09/25/2002	Ank Rt,Hld Knee	1
ANLYM	Left Lower Tibia Moment Y	3644	3644-92-MY	Denton	0.007441325 N·m	395.4	09/25/2002	Ank Fd,Hld Knee	0
KNRXD	Right Knee Displacement	08TC1-2702	08TC1-2702-273r	Servo	39.29857 mm	25.4	01/29/2003	Tib Rr,Hld Fem	1
KNRMF	Right Knee-Left Force	2372	2372-148-LEFT	Denton	0.000226451 N	8896.4	09/25/2002	Knee Up,Clev Dn	0
KNRLF	Right Knee-Right Force	2372	2372-148-RIGHT	Denton	0.000226226 N	8896.4	09/25/2002	Knee Up,Clev Dn	0
TBRXF	Right Upper Tibia Force X	3643	3643-94-FX	Denton	0.000173552 N	11120.6	09/25/2002	Tib Rr,Knee Fd	1
TBRYF	Right Upper Tibia Force Y	3643	3643-94-FY	Denton	0.000173237 N	11120.6	09/25/2002	Tib Rt,Knee Lt	0
TBRZF	Right Upper Tibia Force Z	3643	3643-94-FZ	Denton	0.000095795 N	11120.6	09/25/2002	Tib Dn,Knee Up	0
TBRXM	Right Upper Tibia Moment X	3643	3643-94-MX	Denton	0.007383156 N·m	395.4	09/25/2002	Ank Rt,Hld Knee	1
TBRYM	Right Upper Tibia Moment Y	3643	3643-94-MY	Denton	0.00744436 N·m	395.4	09/25/2002	Ank Fd,Bot Clev Rr	0

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Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos	Flip
ANRXF	Right Lower Tibia Force X	3644	3644-94-FX	Denton	0.000176546 N	11120.6	09/25/2002	Ank Rr,Knee Fd	1
ANRYF	Right Lower Tibia Force Y	3644	3644-94-FY	Denton	0.000175458 N	11120.6	09/25/2002	Ank Rt,Knee Lft	0
ANRZF	Right Lower Tibia Force Z	3644	3644-94-FZ	Denton	0.000097 N	11120.6	09/25/2002	Ank Dn,Tib Up	0
ANRXM	Right Lower Tibia Moment X	3644	3644-94-MX	Denton	0.007690187 N·m	395.4	09/25/2002	Ank Rt,Hld Knee	1
ANRYM	Right Lower Tibia Moment Y	3644	3644-94-MY	Denton	0.007623672 N·m	395.4	09/25/2002	Ank Fd,Hld Knee	0

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