

Frontal Barrier Impact Test

Saturn Corporation

2002 Saturn Vue

NHTSA Number: R21306

TRC Inc. Test Number: 030623-1

Prepared By:

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Final Report

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16. Abstract <p>A 48.0 km/h flat frontal rigid barrier impact test was conducted on a 2002 Saturn Vue MPV, NHTSA No. R21306, at Transportation Research Center Inc. on June 23, 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 47.9 km/h. The vehicle's maximum static crush was 515 millimeters. The ambient temperature was 21° C.</p> <p>The driver's 15 millisecond Head Injury Criteria (HIC) was 279. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 59.1 g. The driver's maximum chest deflection was 57 millimeters. The driver's left and right femur maximum axial compressive forces were 13452 N (see Data Acquisition Explanations) and 7035 N, respectively.</p> <p>The passenger's 15 millisecond HIC was 321. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.3 g. The passenger's maximum chest deflection was 13 millimeters. The passenger's left and right femur maximum axial compressive forces were 7016 N and 6371 N, respectively.</p>			
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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 95th percentile driver dummy and a 50th 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 MPV, 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 primary and secondary airbag signal was 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) Hybrid III 95th percentile adult male Hybrid III anthropomorphic test device (dummy) in the driver's position and one (1) Part 572E 50th percentile adult male Hybrid III dummy in the passenger's position. The 95th percentile dummy was positioned in the front outboard designated seating position according to NHTSA Laboratory Test Procedure TP-208-11. The 50th 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 passenger 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 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 June 23, 2003.

The test vehicle, a 2002 Saturn Vue MPV, NHTSA Number R21306, 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 1828.1 kg. The vehicle's impact speed was 47.9 km/h. The vehicle sustained 515 mm of static crush during the impact.

The driver's 36 millisecond Head Injury Criteria (HIC) was 330. The driver's 15 millisecond HIC was 279. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 59.1 g. The driver's maximum chest deflection was 57 mm. The driver's left and right femur maximum axial compressive forces were 13452 N and 7035 N, respectively. The driver dummy's neck injury calculations were as follows: NTF, 0.27; NTE, 0.33; NCF, 0.15; NCE, 0.06. The driver's upper neck maximum tension force was 2044 N and maximum compression force was 334 N.

The right front passenger's 36 millisecond HIC was 493. The passenger's 15 millisecond HIC was 321. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.3 g. The passenger's maximum chest deflection was 13 mm. The passenger's left and right femur maximum axial compressive forces were 7016 N and 6371 N, respectively. The right front passenger's neck injury calculations were as follows: NTF, 0.38; NTE, 0.09; NCF, 0.10; NCE, 0.05. The right front passenger's upper neck maximum tension force was 1779 N and maximum compression force was 359 N.

Data Acquisition Explanations

The driver's left femur z-axis force channel, LFMZF1, exceed full scale between approximately 82.5 and 84.6 ms.

The passenger's z-axis chest acceleration channel, CSTZG2, recorded no useful data throughout the test. The resultant chest acceleration calculation was also affected. The passenger's maximum resultant acceleration with 3 ms minimum duration was calculated using the redundant chest acceleration channels and was not affected.

The passenger's airbag fire sensor channel, PABET1, recorded no useful data throughout the test.

The vehicle's top engine x-axis acceleration channel, ENGXG1, did not return to zero post-test.

The vehicle's left front brake caliper x-axis acceleration channel, BCLXG1, exceed full scale at approximately 56 ms.

Table 1 Crash Test Summary

Test mode:	Flat frontal load cell barrier		
Test date:	06/23/03		
Test time:	12:06		
Ambient temperature:	21° C		
Vehicle year/make/ model/body style:	2002/Saturn/Vue/MPV		
Vehicle test weight:	1828.1 kg		
Impact angle ¹ :	0°		
Impact velocity ² :	47.9 km/h		
Maximum static crush:	515 mm		
Average rebound:	820 mm		
Number of data channels:	175		
Number of cameras:	High-speed	14	Real-time 1
<u>Dummies:</u>	<u>Driver #83</u>		<u>Passenger #90</u>
Type:	Large Male (HIII-95)		Part 572E (HIII-50)
Location:	Right front		Left front
Restraint:	Single stage airbag		Single stage airbag
<u>Seat track position for test:</u>			
Driver:	Full rear		
Passenger:	Mid; 13 th of 25 positions		
<u>Seat back position for test:</u>			
Driver:	4.4°; measured at the head restraint support posts		
Passenger:	4.1°; measured at the head restraint support posts		
<u>Head restraint position for test:</u>			
Driver:	Full up		
Passenger:	Full up		
<u>Steering column position:</u>	25.5; highest position of adjustable range		
<u>Large male H-point position relative to position established by SAE J826 H-point machine:</u>			
Large male H-point:	146 mm rearward, 14 mm below 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: 5GZCZ63B32S801367

Model year: 2002

Body style: MPV

Color: Black Silver

Engine data:

 Cylinders: 6

 Displacement 3.0-liters

 Cylinder placement: V

 Engine placement: Transverse

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

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

Date vehicle received: 10/2/2002

Odometer reading: 422

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	None	Power door locks	Yes

Certification data from vehicle's label:

Vehicle manufactured by: Saturn Corporation

Date of manufacture: 11/01

VIN: 5GZCZ63B32S801367

GVWR: 4400 lbs. (1996 kg)

GAWR: Front: 2311 lbs. (1048 kg)

 Rear: 2089 lbs. (948 kg)

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

Tires on vehicle (mfr., line, size): Bridgestone, Dueler H/T, 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, Temporary, T155/90R16

Type of seats:

Front Bucket
Rear Split bench

Maximum width: 1824 mm

Wheelbase: 2700 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:¹ 378 kg

Rated cargo/luggage weight:¹ 38 kg

Test vehicle attitude:

Delivered attitude:	LF	827 mm;	RF	827 mm;	LR	847 mm;	RR	841 mm
Fully loaded attitude:	LF	803 mm;	RF	802 mm;	LR	821 mm;	RR	818 mm
Pre-test attitude:	LF	798 mm;	RF	800 mm;	LR	811 mm;	RR	805 mm
Post-test attitude:	LF	821 mm;	RF	819 mm;	LR	812 mm;	RR	793 mm

¹ By calculation, not on label.

Table 2 General Test and Vehicle Parameter Data Cont'd

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

Right front	452.5 kg	Right rear	351.5 kg
Left front	489.0 kg	Left rear	348.5 kg
Total front weight	941.5 kg	(57.4 % of total vehicle weight)	
Total rear weight	700.0 kg	(42.6 % of total vehicle weight)	
Total delivered weight	1641.5 kg		

Calculation of test vehicle's target test weight:

Total Delivered Weight (UDW) =	1628.0 kg
Rated Cargo/Luggage Weight (RCLW) ¹ =	38.0 kg
Weight of 1 Part 572E Dummy @ 76 kg	
And 1 Large Male Dummy @ 102 kg =	178.0 kg
Target test weight =	1844.0 kg

Weight of test vehicle with required dummies and 8.6 kg of cargo weight:

Right front	501.0 kg	Right rear	405.2 kg
Left front	511.4 kg	Left rear	410.5 kg
Total front weight	1012.4 kg	(55.4% of total vehicle weight)	
Total rear weight	815.7 kg	(44.6% of total vehicle weight)	
Total test weight	1828.1 kg	(0.9% below target test weight)	

Weight of ballast secured in vehicle: None

Components removed to meet target test weight: Rear fascia, rear wiper and motor, rear door panels and glass.

Location of Vehicle's CG: 1204 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: 030623-1
Test date: 06/23/03
Test time: 12:06
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

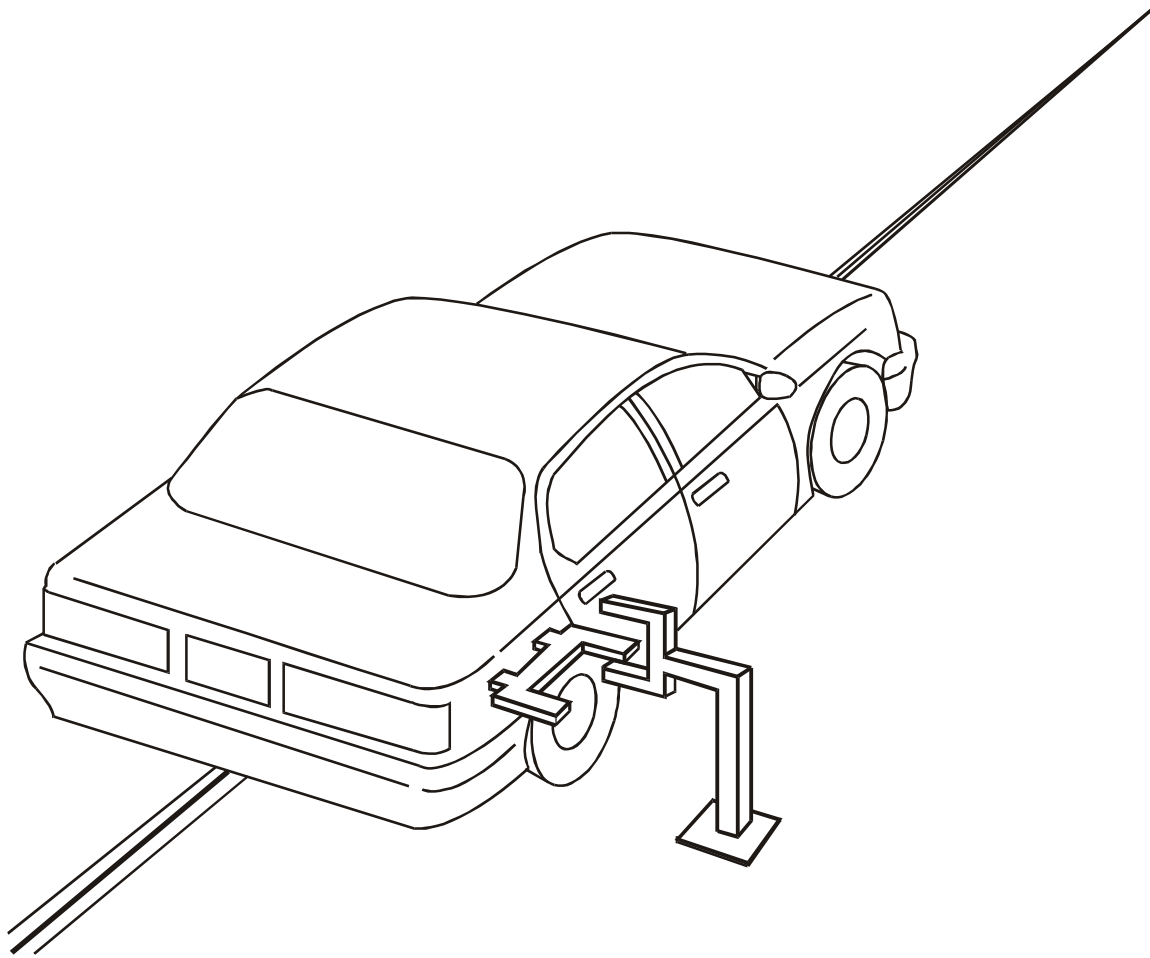
Barrier impact velocity:

Primary: N/A
Secondary: 47.9 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 890 mm; C 781 mm; R 790 mm
Average rebound: 820 mm

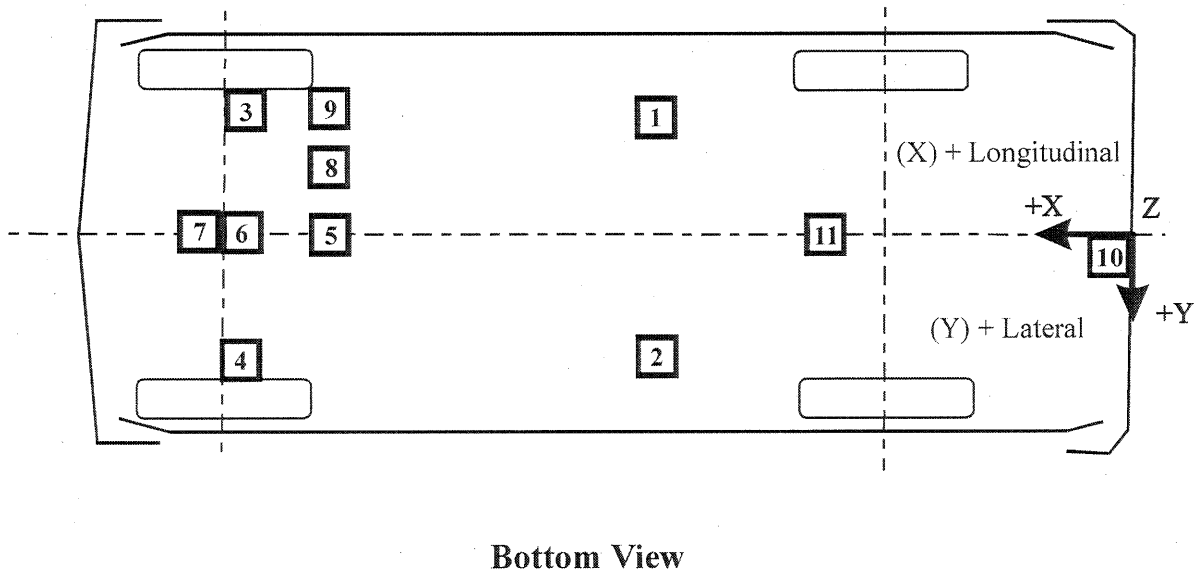
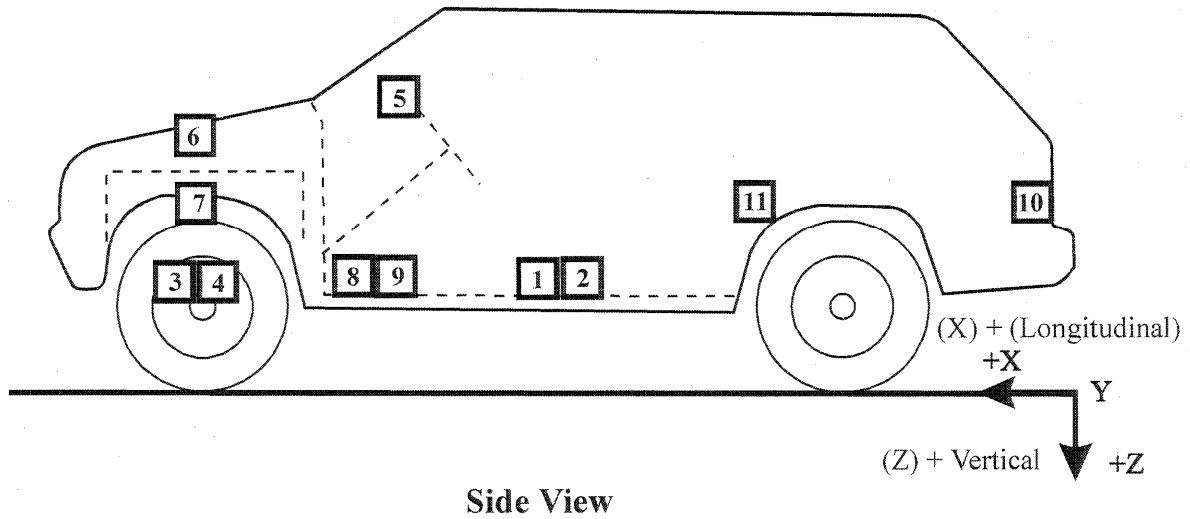
Figure 1 Impact Velocity Measurement System



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

The vanes have 305-millimeter spacing.

Figure 2 Vehicle Accelerometer Placement



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: 030623-1

No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	1635 mm	-500 mm	-441 mm	15.3 g @ 114.9 ms	303.3 g @ 109.1 ms
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	1635 mm	560 mm	-433 mm	2.7 g @ 109.1 ms	31.4 g @ 51.1 ms
3 FRONT BRAKE CALIPER LEFT LONGITUDINAL ¹	4405 mm	-710 mm	-325 mm	38.6 g @ 76.2 ms	378.6 g @ 57.1 ms
4 FRONT BRAKE CALIPER RIGHT LONGITUDINAL	4405 mm	710 mm	-325 mm	13.9 g @ 88.3 ms	53.2 g @ 49.9 ms
5 DASH PANEL CENTER LONGITUDINAL	3020 mm	0 mm	-1123 mm	40.3 g @ 102.9 ms	55.0 g @ 49.4 ms
6 ENGINE TOP LONGITUDINAL ¹	3915 mm	-23 mm	-891 mm	40.9 g @ 67.9 ms	112.7 g @ 40.4 ms
7 ENGINE BOTTOM LONGITUDINAL	4420 mm	90 mm	-198 mm	15.8 g @ 62.2 ms	82.5 g @ 39.2 ms

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

TEST NUMBER: 030623-1 No. LOCATION	X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
8 TOEPAN NEXT TO ACCELERATOR	3108 mm	-170 mm	-335 mm				
LONGITUDINAL				2.5 g	@ 112.1 ms	27.5 g	@ 49.5 ms
VERTICAL				30.6 g	@ 60.8 ms	10.1 g	@ 35.8 ms
9 TOEPAN NEXT TO FOOTREST	3108 mm	-480 mm	-370 mm				
LONGITUDINAL				4.0 g	@ 112.6 ms	35.6 g	@ 53.7 ms
VERTICAL				28.3 g	@ 61.0 ms	6.8 g	@ 46.9 ms
10 REAR DECK VERTICAL	923 mm	0 mm	-480 mm				
				9.4 g	@ 82.9 ms	14.6 g	@ 62.6 ms
11 REAR COMPARTMENT CENTER	1150 mm	0 mm	-524 mm				
LONGITUDINAL				3.0 g	@ 109.8 ms	30.3 g	@ 49.6 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	
	H3-95-Denton Limit	H3-95-Denton Test Value
HIC (15 ms)	700	279
NIJ (Compression Flexion)	1.0	0.15
NIJ (Compression Extension)	1.0	0.06
NIJ (Tension Flexion)	1.0	0.27
NIJ (Tension Extension)	1.0	0.33
Peak Upper Neck Tension (N)	5030	2044
Peak Upper Neck Compression (N)	4830	334
3 ms Chest Acceleration (g)	55	59.1
Chest Deflection (mm)	70	57
Left Femur Load (N)	12,700	13452 ¹
Right Femur Load (N)	12,700	7035
Left Tibia to Femur Displacement (mm)	17	3
Right Tibia to Femur Displacement (mm)	17	0
Left Upper Tibia Index	1.0	0.67
Right Upper Tibia Index	1.0	0.79
Left Lower Tibia Index	1.0	0.47
Right Lower Tibia Index	1.0	0.46
Left Upper Tibia Compression FZ (N)	9840	2964
Right Upper Tibia Compression FZ (N)	9840	4480
Left Lower Tibia Compression FZ (N)	9840	3880
Right Lower Tibia Compression FZ (N)	9840	4690
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 5 Dummy Injury Criteria Data, Cont'd.

VOLPE TO002		
Injury Criteria and Performance Limits		
Parameter	Passenger	
	H3-50-THOR Limit	H3-50-THOR Test Value
HIC (15 ms)	700	321
NIJ (Compression Flexion)	1.0	0.10
NIJ (Compression Extension)	1.0	0.05
NIJ (Tension Flexion)	1.0	0.38
NIJ (Tension Extension)	1.0	0.09
Peak Upper Neck Tension (N)	4170	1779
Peak Upper Neck Compression (N)	4000	359
3 ms Chest Acceleration (g)	60	51.3 ¹
Chest Deflection (mm)	63	13
Left Femur Load (N)	9040	7016
Right Femur Load (N)	6040	6371
Left Tibia to Femur Displacement (mm)	15	1
Right Tibia to Femur Displacement (mm)	15	2
Left Upper Tibia Index	0.91*	0.55
Right Upper Tibia Index	0.91*	0.90
Left Lower Tibia Index	0.91*	0.53
Right Lower Tibia Index	0.91*	0.59
Left Upper Tibia Compression FZ (N)	5600	2789
Right Upper Tibia Compression FZ (N)	5600	3602
Left Lower Tibia Compression FZ (N)	5200	3152
Right Lower Tibia Compression FZ (N)	5200	4253
Left Foot XL Rotation (degrees)	35	24
Right Foot XL Rotation (degrees)	35	13
Left Foot YL Rotation (degrees)	35	37
Right Foot YL Rotation (degrees)	35	40

* Revised Tibia Index

¹ See Data Acquisition Explanations

Table 6 Post-Impact Dummy/Vehicle Data

Visible Dummy Contact Points:

	<u>Driver</u>	<u>Passenger</u>
Head	Airbag, header, sun visor, windshield	Airbag, A-pillar
Chest	Airbag	Airbag
Abdomen	None	None
Left knee	Knee bolster	Glove box
Right knee	Knee bolster	Glove box, door panel

Door opening:

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

Seat movement:

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

Glazing damage: Cracked from driver dummy head contact.

Other notable impact effects: Doors were locked after 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 airbag. The dummy's head contacted the windshield. On rebound, the head and neck extended forward and the head contacted the sun visor and header. The dummy came to rest seated on the driver's seat leaning forward and rotated outboard.

Right Front Passenger Dummy

Upon impact, the passenger dummy translated forward impacting both knees into the dash panel. The dummy's head rotated forward and leftward as the dummy's head and chest were restrained by the airbag. On rebound, the head contacted the A-pillar and the right knee contacted the door panel. The dummy came to rest leaning forward on the seat cushion.

Figure 3 Dummy Measurement Locations for Front Seat Occupants

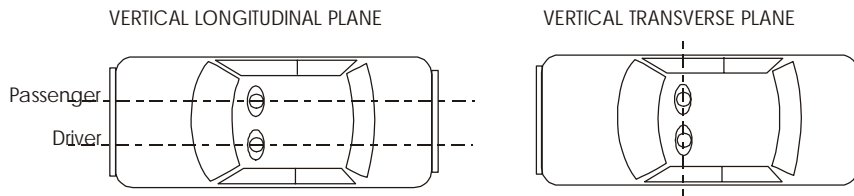
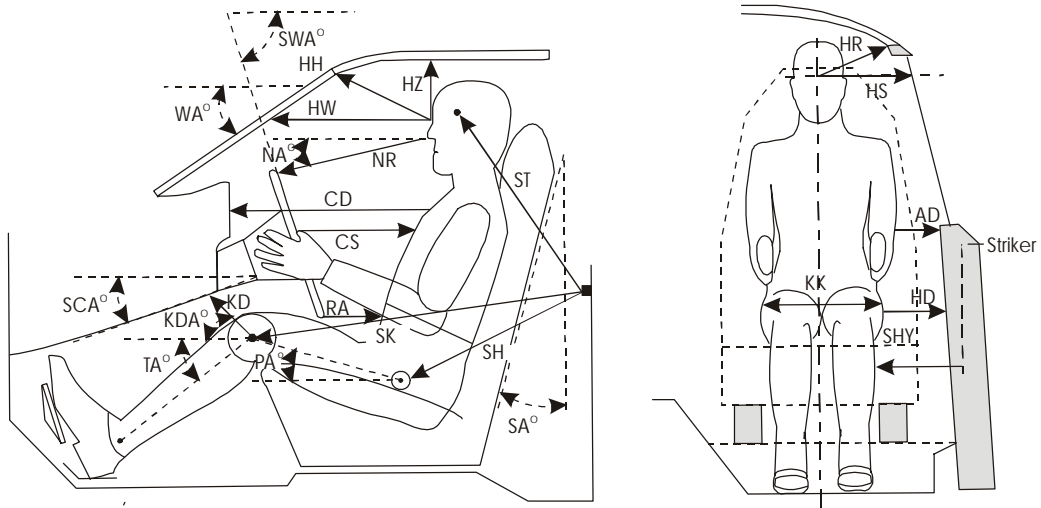


Table 7 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial # 83)	Passenger (Serial # 90)
WA	Windshield angle	36.1°	36.1°
SWA	Steering wheel angle	25.5°	NA
SCA	Steering column angle	64.5°	NA
SA	Seat back angle	4.4°	4.1°
HZ	Head to roof	196 mm	216 mm
HH	Head to header	450 mm	378 mm
HW	Head to windshield	754 mm	681 mm
HR	Head to side header	265 mm	220 mm
NR	Nose to rim	561 mm	NA
NA	Nose to rim angle	17.3°	NA
CD	Chest to dash	654 mm	542 mm
CS	Steering wheel to chest	435 mm	NA
RA	Rim to abdomen	307 mm	NA
KDL	Left knee to dash	250 mm	146 mm
KDR	Right knee to dash	248 mm	151 mm
KDA	Outboard knee to dash angle	22.3°	26.3°
PA	Pelvic angle	20.3°	24.2°
TA	Tibia angle	44.2°	54.1°
KK	Knee to knee	321 mm	270 mm
ST ¹	Striker to head	610 mm	580 mm
	Striker to head angle	-89.1°	-86.5°
SK ¹	Striker to knee	469 mm	562 mm
	Striker to knee angle	-2.2°	-5.7°
SH ¹	Striker to H-point	116 mm	208 mm
	Striker to H-point angle	25.6°	13.9°
SHY	Striker to H-point (Y dir.)	175 mm	226 mm
HS	Head to side window	340 mm	329 mm
HD	H-point to door	108 mm	145 mm
AD	Arm to door	88 mm	96 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

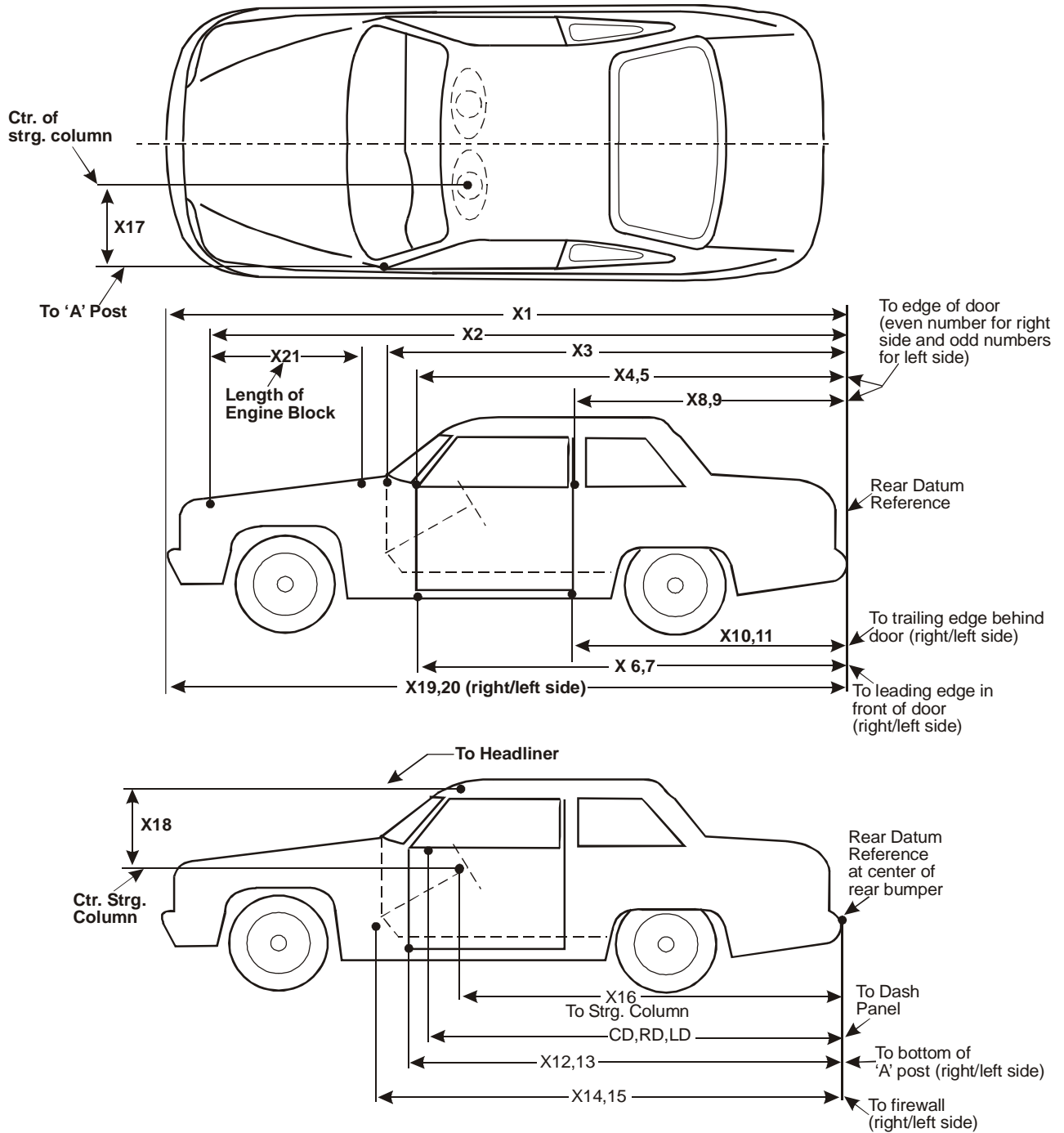


Table 8 Impacted Vehicle Measurements

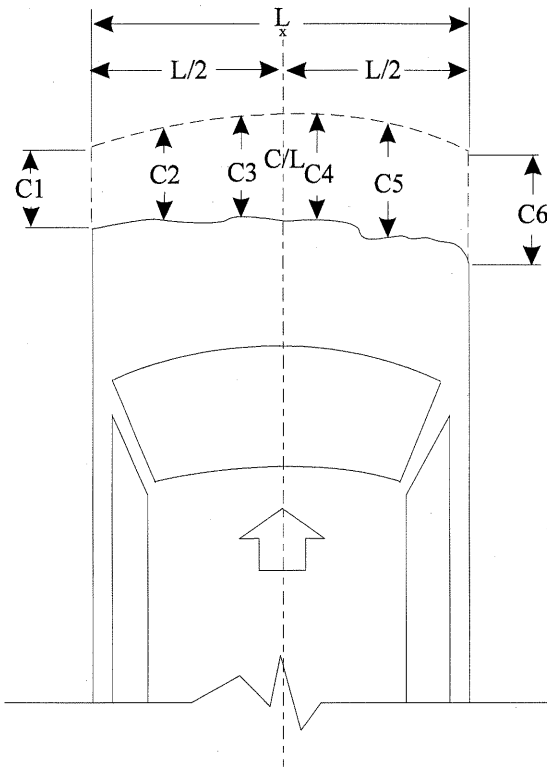
Test number: 030623-1

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	4249	356
X2	Rear Surface of Vehicle to Front of Engine Block	4070	3785	285
X3	Rear Surface of Vehicle to Firewall	3610	3500	110
X4	Rear Surface of Veh. to Upper Leading Edge of Right Door	3036	3040	-4
X5	Rear Surface of Veh. to Upper Leading Edge of Left Door	3041	3041	0
X6	Rear Surface of Veh. to Lower Leading Edge of Right Door	3036	3057	-21
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	2057	2060	-3
X9	Rear Surface of Veh. to Upper Trailing Edge of Left Door	2062	2065	-3
X10	Rear Surface of Veh. to Lower Trailing Edge of Right Door	2090	2110	-20
X11	Rear Surface of Veh. to Lower Trailing Edge of Left Door	2099	2105	-6
X12	Rear Surface of Veh. to Bottom of " A " Post on Right Side	3051	3045	6
X13	Rear Surface of Veh. to Bottom of " A " Post on Left Side	3048	3043	5
X14	Rear Surface of Vehicle to Firewall--Right Side	3515	3530	-15
X15	Rear Surface of Vehicle to Firewall --Left Side	3515	3521	-6
X16	Rear Surface of Vehicle to Steering Wheel Center	2641	2730	-89
X17	Center of Steering Column to " A " Post	297	383	-86
X18	Center of Steering Column to Headliner	468	385	83
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4395	4030	365
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4391	3876	515
X21	Length of Engine Block	420	420	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2912	2925	-13
CD	Rear Surface of Vehicle to Center of Dash Panel	2880	2886	-6
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2895	2897	-2

All distance measurements are in millimeters.

Figure 5 Vehicle Crush



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

Vehicle: 2002 Saturn Vue

Location	Pre-test	Post-test	Difference ¹
L	1525 mm		
C1	4391 mm	3876 mm	515 mm
C2	4520 mm	4038 mm	482 mm
C3	4575 mm	4173 mm	402 mm
C4	4583 mm	4261 mm	356 mm
C5	4529 mm	4209 mm	322 mm
C6	4395 mm	4030 mm	320 mm
CL	4605 mm	4249 mm	365 mm

¹ The difference for points C1-C6, measured with the bumper fascia, are included in the NHTSA database submission as Damage Profile Distance 1-6.

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	4417 mm	4549 mm	4603 mm	4604 mm	4551 mm	4392 mm
	Y	-752 mm	-446 mm	-148 mm	150 mm	455 mm	755 mm
	Z	-424 mm	-435 mm	-370 mm	-415 mm	-425 mm	-400 mm
Top of Front Bumper	X	4420 mm	4546 mm	4605 mm	4605 mm	4548 mm	4399 mm
	Y	-757 mm	-460 mm	-150 mm	148 mm	453 mm	770 mm
	Z	-524 mm	-526 mm	-464 mm	-518 mm	-525 mm	-545 mm
Center of Grille	X	4402 mm	4518 mm	4565 mm	4566 mm	4527 mm	4392 mm
	Y	-752 mm	-451 mm	-150 mm	156 mm	460 mm	770 mm
	Z	-625 mm	-610 mm	-616 mm	-613 mm	-615 mm	-630 mm
Front of Hood	X	4239 mm	4347 mm	4402 mm	4428 mm	4349 mm	4214 mm
	Y	-725 mm	-450 mm	-148 mm	150 mm	452 mm	730 mm
	Z	-914 mm	-916 mm	-924 mm	-915 mm	-920 mm	-922 mm

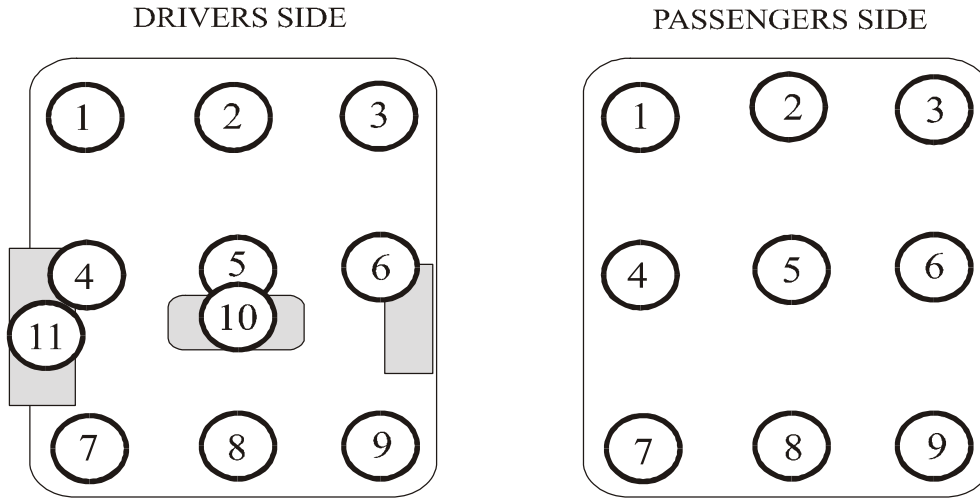
		Post-Test Profile					
		Vehicle Left			Vehicle Right		
		Point 1	Point 2	Point 3	Point 4	Point 5	Point 6
Bottom of Front Bumper	X	4130 mm	4140 mm	4215 mm	4285 mm	4287 mm	4240 mm
	Y	-652 mm	-440 mm	-151 mm	150 mm	452 mm	715 mm
	Z	-455 mm	-455 mm	-451 mm	-450 mm	-453 mm	-425 mm
Top of Front Bumper	X	4125 mm	4117 mm	4222 mm	4295 mm	4310 mm	4245 mm
	Y	-700 mm	-455 mm	-155 mm	145 mm	450 mm	465 mm
	Z	-560 mm	-553 mm	-552 mm	-545 mm	-555 mm	-570 mm
Center of Grille	X	4073 mm	4100 mm	4196 mm	4273 mm	4295 mm	4297 mm
	Y	-737 mm	-450 mm	-153 mm	154 mm	460 mm	765 mm
	Z	-650 mm	-635 mm	-635 mm	-634 mm	-649 mm	-675 mm
Front of Hood	X	4095 mm	4113 mm	4121 mm	4130 mm	4095 mm	4061 mm
	Y	-710 mm	-440 mm	-150 mm	145 mm	445 mm	730 mm
	Z	-1010 mm	-930 mm	-914 mm	-906 mm	-968 mm	-1080 mm

		Difference					
		Vehicle Left			Vehicle Right		
		Point 1	Point 2	Point 3	Point 4	Point 5	Point 6
Bottom of Front Bumper	X	287 mm	409 mm	388 mm	319 mm	264 mm	152 mm
	Y	100 mm	6 mm	-3 mm	0 mm	3 mm	40 mm
	Z	-31 mm	-20 mm	-81 mm	-35 mm	-28 mm	-25 mm
Top of Front Bumper ¹	X	295 mm	429 mm	383 mm	310 mm	238 mm	154 mm
	Y	57 mm	5 mm	-5 mm	3 mm	3 mm	305 mm
	Z	-36 mm	-27 mm	-88 mm	-27 mm	-30 mm	-25 mm
Center of Grille	X	329 mm	418 mm	369 mm	293 mm	232 mm	95 mm
	Y	15 mm	1 mm	-3 mm	2 mm	0 mm	5 mm
	Z	-25 mm	-25 mm	-19 mm	-21 mm	-34 mm	-45 mm
Front of Hood	X	144 mm	234 mm	281 mm	298 mm	254 mm	153 mm
	Y	15 mm	10 mm	-2 mm	5 mm	7 mm	0 mm
	Z	-96 mm	-14 mm	10 mm	9 mm	-48 mm	-158 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 2, measured at the top of the front bumper, is included in the NHTSA database submission as Damage Profile Distance 2.

Figure 6 Toeboard Measurements



Driver Toe Pan			
Pre-Test			
Index	Xmm	Ymm	Zmm
1	3030	-506	208
2	3033	-372	209
3	3033	-193	217
4	2953	-532	267
5	2947	-375	279
6	2958	-196	305
7	2839	-544	347
8	2816	-382	363
9	2877	-201	361
10	2867	-352	138
11	2884	-596	332

Driver Toe Pan			
Post-Test			
Xmm	Ymm	Zmm	
3022	-501	208	
3024	-367	212	
3022	-187	224	
2950	-530	271	
2944	-373	287	
2954	-194	316	
2836	-543	353	
2814	-382	372	
2875	-201	374	
2849	-358	128	
2883	-595	336	

Difference			
Xmm	Ymm	Zmm	
8	-5	0	
9	-5	-3	
11	-6	-7	
3	-2	-4	
3	-2	-8	
4	-2	-11	
3	-1	-6	
2	0	-9	
2	0	-13	
18	6	10	
1	-1	-4	

Passenger Toe Pan			
Pre-Test			
Index	Xmm	Ymm	Zmm
1	3040	220	204
2	3060	365	189
3	3051	511	170
4	2950	221	279
5	2954	372	274
6	2963	558	267
7	2859	214	344
8	2871	381	339
9	2886	583	332

Passenger Toe Pan			
Post-Test			
Xmm	Ymm	Zmm	
3034	221	220	
3050	362	200	
3043	508	180	
2946	223	298	
2952	373	293	
2961	559	280	
2857	216	365	
2870	384	357	
2885	586	345	

Difference			
Xmm	Ymm	Zmm	
6	-1	-16	
10	3	-11	
8	3	-10	
4	-2	-19	
2	-1	-19	
2	-1	-13	
2	-2	-21	
1	-3	-18	
1	-3	-13	

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	2615	-519	-89	2621	-513	-80	-6	-6	-9
Right	2619	-221	-80	2661	-244	-69	-42	23	-11

Driver Knees

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
Left	2592	-516	-124	2599	-506	-114	-7	-10	-10
Right	2581	-188	-137	2623	-232	-132	-42	44	-5

Passenger Knees

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
Left	2610	279	-110	2625	273	-62	-15	6	-48
Right	2606	549	-130	2603	541	-51	3	8	-79

Steering Wheel

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
1	2382	-370	-329	2450	-370	-390	-68	0	61

Driver Front Outboard Seat Attachment Bolt

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
1	2280	-582	284	2280	-581	288	0	-1	-4

Passenger Front Outboard Seat Attachment Bolt

Pre-Test				Post-Test			Difference		
Index	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm	Xmm	Ymm	Zmm
1	2282	576	284	2282	578	297	0	-2	-13

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

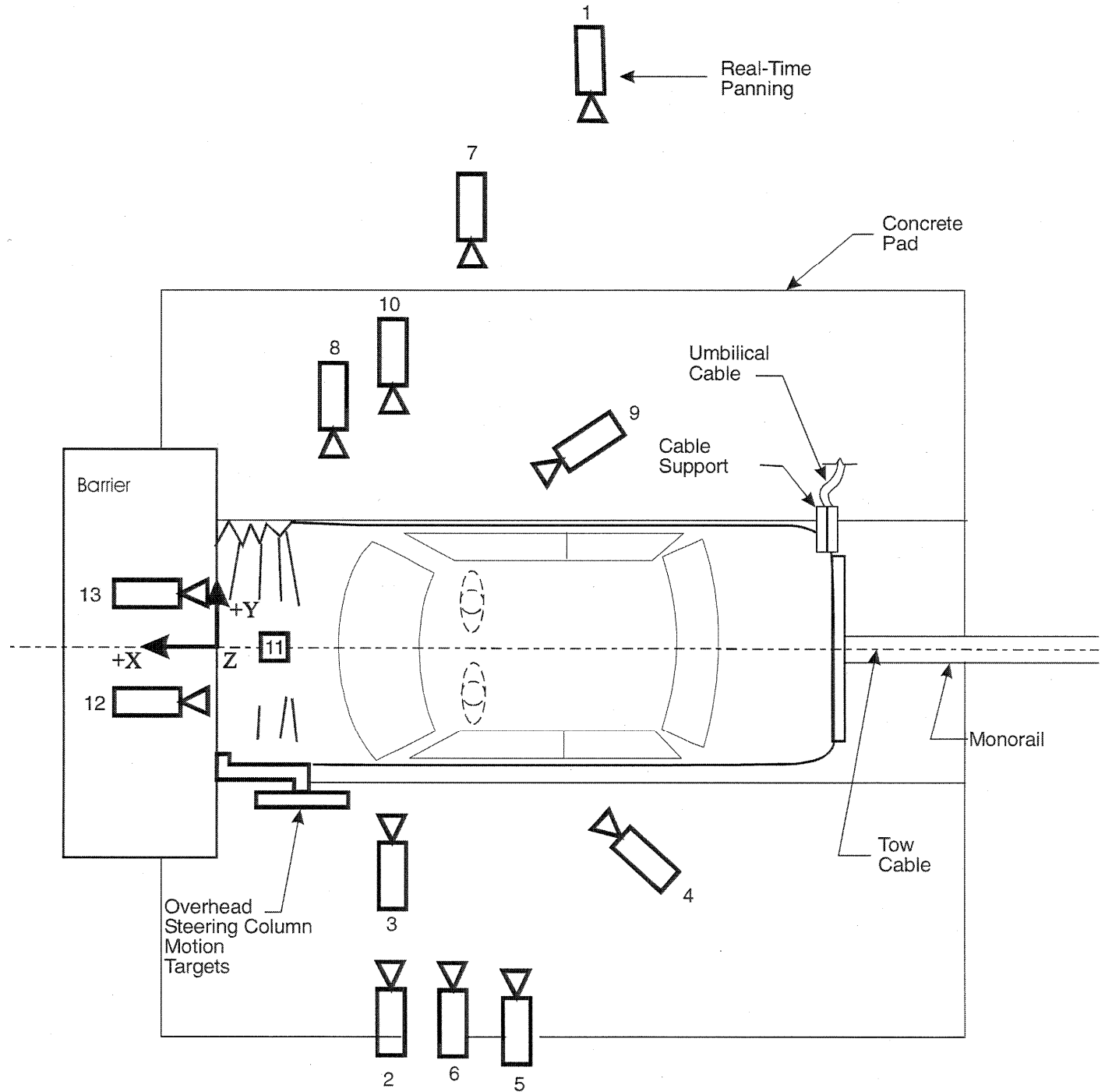
+Y: Rightward from centerline

+Z: Downward from vehicle reference point

Table 11 Fuel System Data

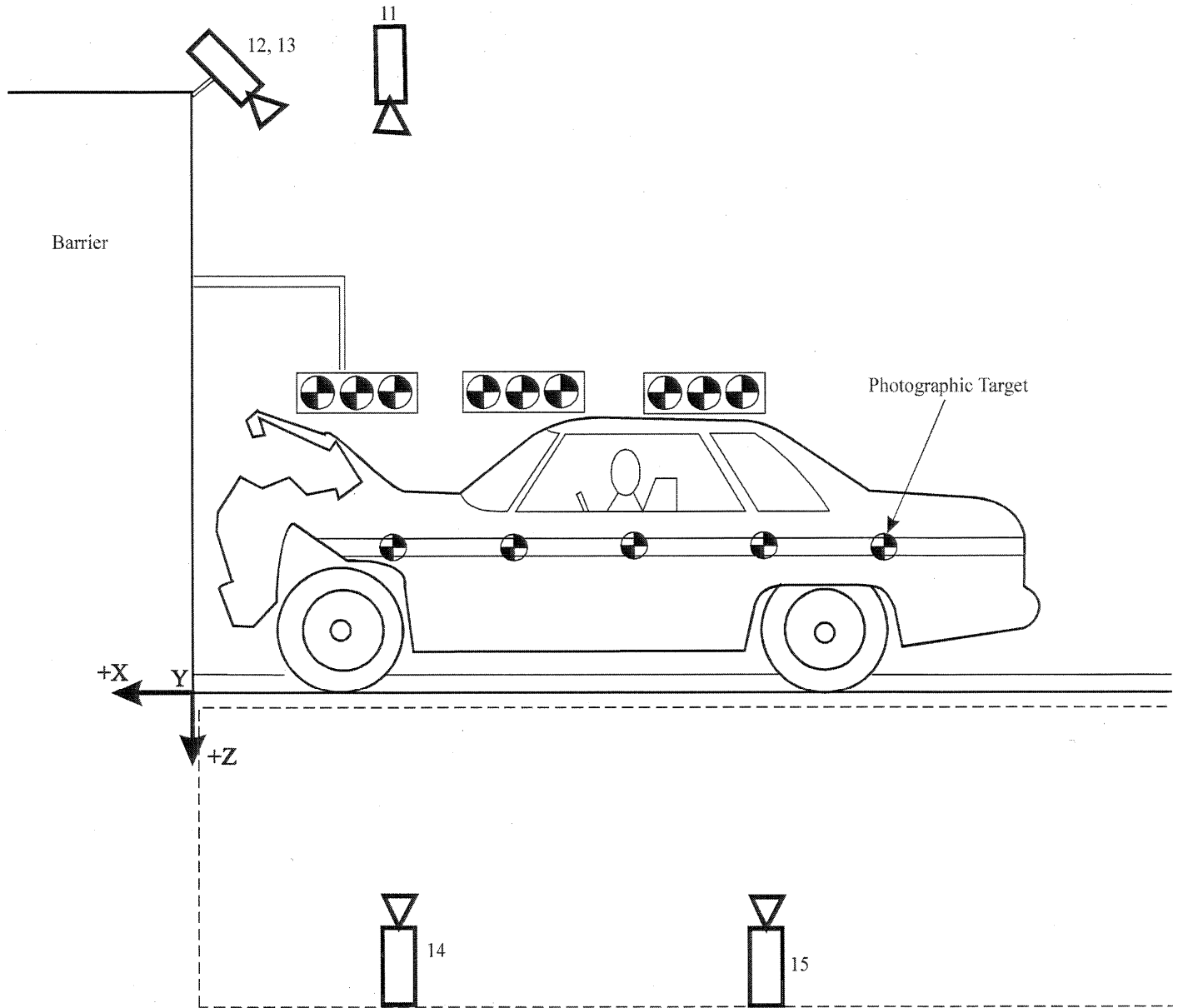
Usable fuel system capacity:	59.1 liters (from manufacturer's information)
Test volume range:	55.5 - 54.3 liters (92-94% of usable)
Actual test volume:	55.5 liters (94% of usable)
Test fluid type:	Stoddard
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistoke
Test fluid color:	Purple
Type of fuel 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



+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.



- +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	3660 frames/s	2570 mm	-8290 mm	1450 mm	-2.6	7960 mm
3	Left tight dummy	Photosonic	35 mm	1005 frames/s	3270 mm	-6710 mm	1280 mm	-1.5	6330 mm
4	Left angled on dummy	Photosonic	25 mm	1010 frames/s	4350 mm	-3600 mm	2020 mm	-9.5	3730 mm
5	Left steering column upper	Photosonic	25 mm	1000 frames/s	3630 mm	-5800 mm	2240 mm	-11.4	5300 mm
6	Left steering column lower	Photosonic	25 mm	1000 frames/s	3630 mm	-5750 mm	1430 mm	-4.6	5300 mm
7	Right side overall	Photosonic	13 mm	1007 frames/s	2330 mm	3020 mm	1090 mm	0.9	6800 mm
8	Right tight dummy	Photosonic	25 mm	1002 frames/s	1430 mm	6800 mm	1212 mm	-0.2	6550 mm
9	Right angled on dummy	Photosonic	25 mm	N/A ¹	4800 mm	3850 mm	2100 mm	-11	4180 mm
10	Right side passenger	Photosonic	25 mm	1027 frames/s	2130 mm	4670 mm	1480 mm	-3.9	7750 mm
11	Overhead	Photosonic	17 mm	1002 frames/s	750 mm	0 mm	5650 mm	-90	N/A
12	Barrier driver	Photosonic	17 mm	997 frames/s	0 mm	-350 mm	2530 mm	-50.7	2640 mm
13	Barrier passenger	Photosonic	17 mm	997 frames/s	0 mm	350 mm	2530 mm	-46.8	2640 mm
14	Pit front	Photosonic	17 mm	920 frames/s	450 mm	0 mm	880 mm	90	N/A
15	Pit rear	Photosonic	13 mm	2020 frames/s	2290 mm	0 mm	880 mm	90	N/A

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

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

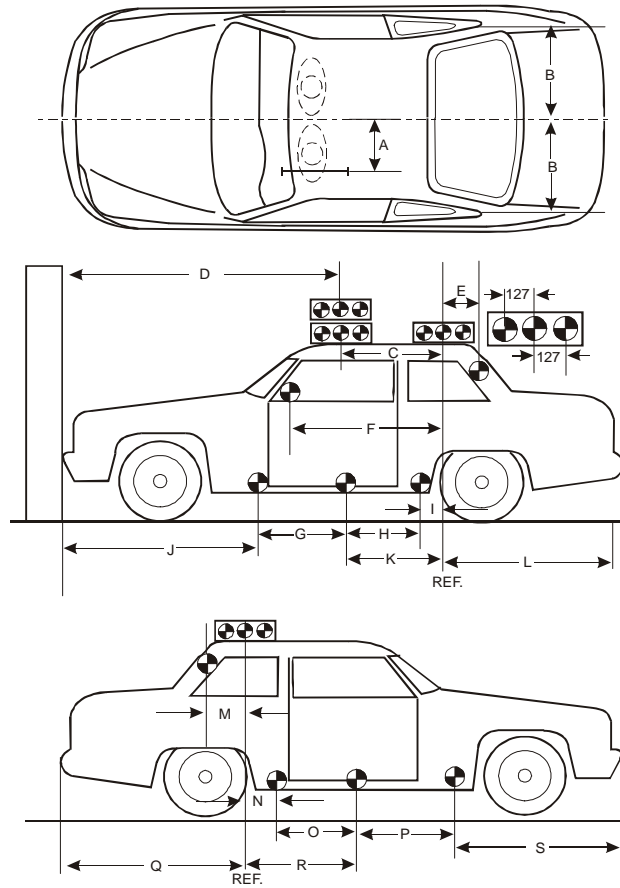
All TRC Inc. high-speed cameras are equipped with red LEDs which put timing marks on the right edge of the film. TRC Inc. uses a single timing generator to generate the timing for all cameras. This allows the timing marks to be common to all cameras. The timing marks can be used to measure camera speed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

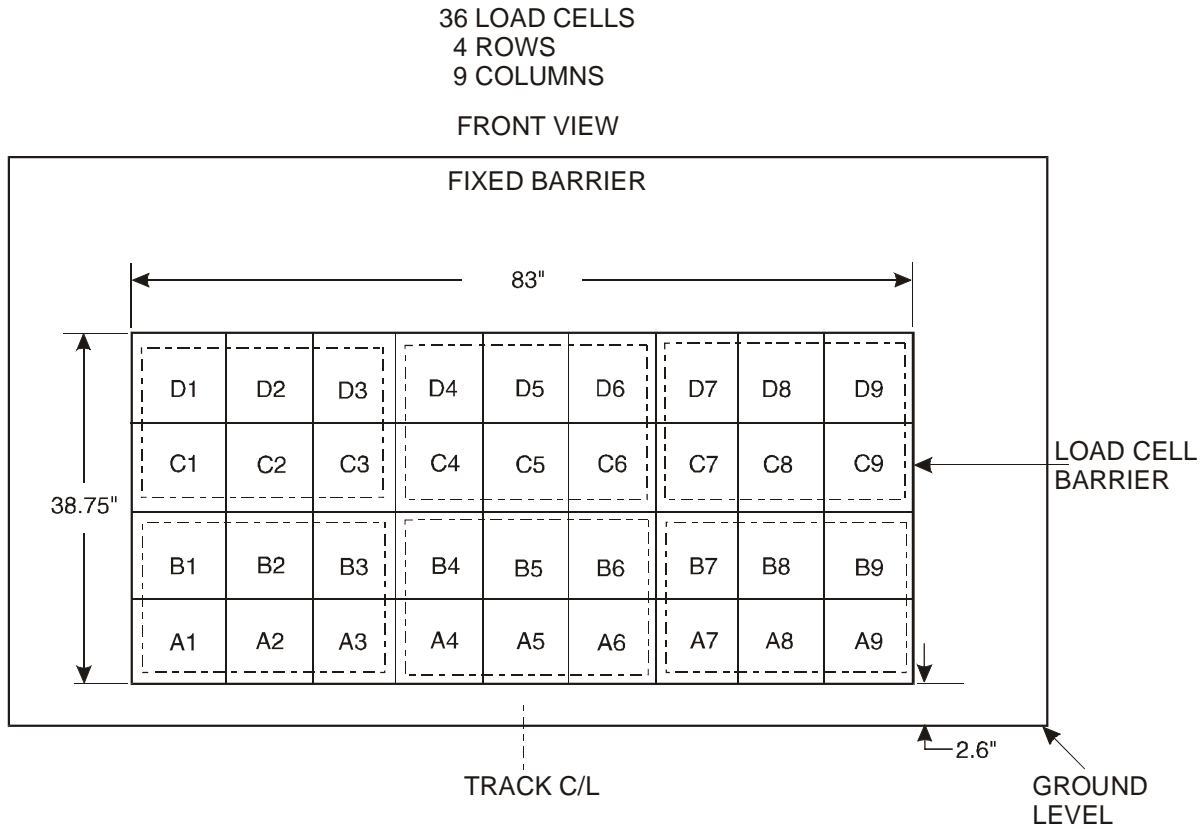
Figure 8 Vehicle Reference Photo Target Locations



Measurement	Pre-Test
A	402 mm
B	720 mm
C	610 mm
D	1973 mm
E	-286 mm
F	1995 mm
G	833 mm
H	866 mm
I	588 mm
J	1263 mm
K	1455 mm
L	840 mm
M	-318 mm
N	593 mm
O	863 mm
P	805 mm
Q	845 mm
R	1455 mm
S	1290 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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Figure A-1 Pre-Test Front View



Figure A-2 Post-Test Front View



Figure A-3 Pre-Test Left Front View



Figure A-4 Post-Test Left Front View



Figure A-5 Pre-Test Left Side View



Figure A-6 Post-Test Left Side View



Figure A-7 Pre-Test Left Rear View



Figure A-8 Post-Test Left Rear View



Figure A-9 Pre-Test Rear View

Intentionally Left Blank



Figure A-10 Pre-Test Right Rear View



Figure A-11 Post-Test Right Rear View



Figure A-12 Pre-Test Right Side View



Figure A-13 Post-Test Right Side View



Figure A-14 Pre-Test Right Front View



Figure A-15 Post-Test Right Front View



Figure A-16 Pre-Test Overhead Overall View



Figure A-17 Post-Test Overhead Overall View



Figure A-18 Pre-Test Overhead Close-up View



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



Figure A-20 Post-Test Impact Still View

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Figure A-21 Pre-Test Front Underbody View



Figure A-22 Post-Test Front Underbody View

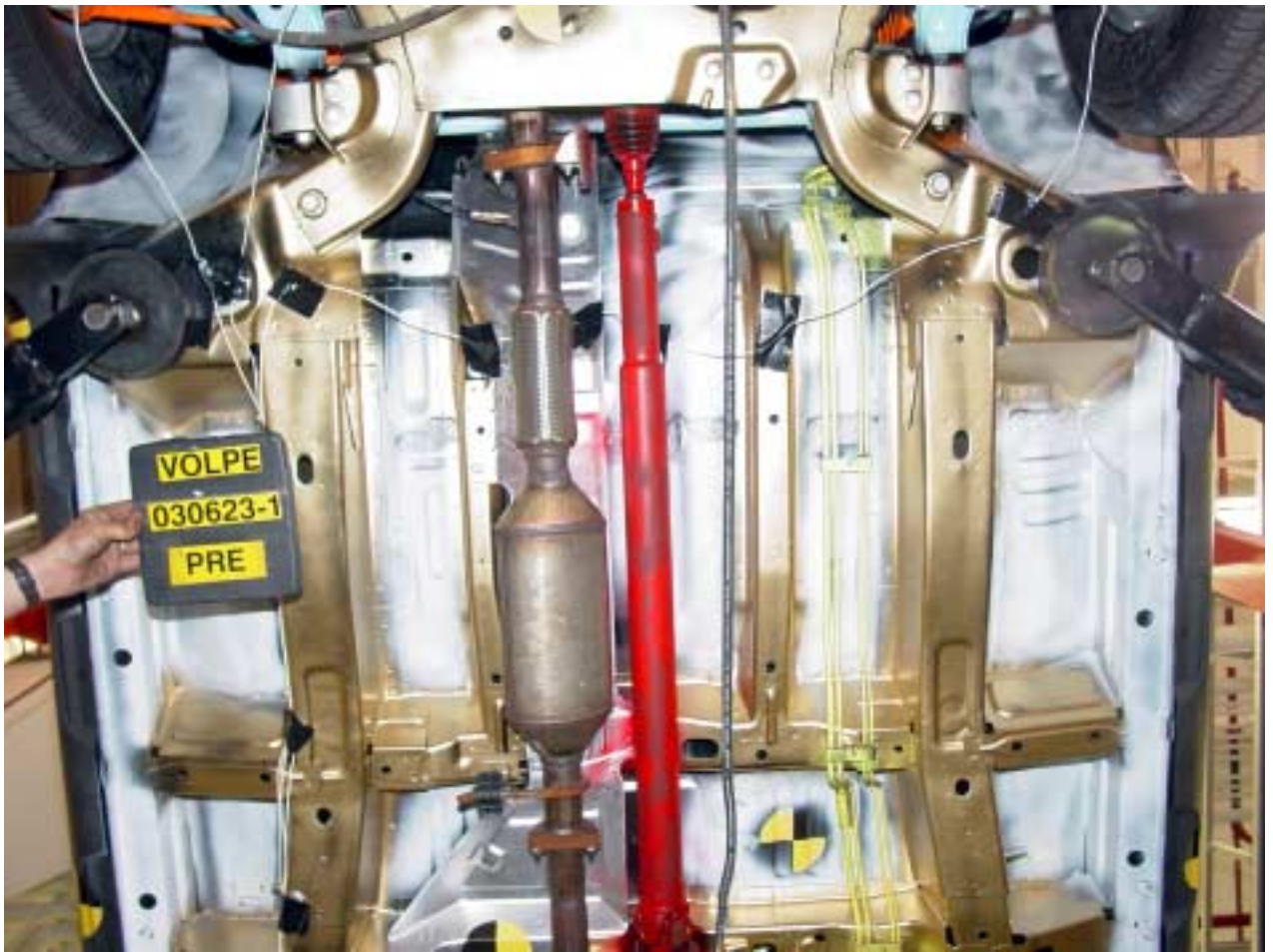


Figure A-23 Pre-Test Front Mid Underbody View



Figure A-24 Post-Test Front Mid Underbody View



Figure A-25 Pre-Test Mid Underbody View

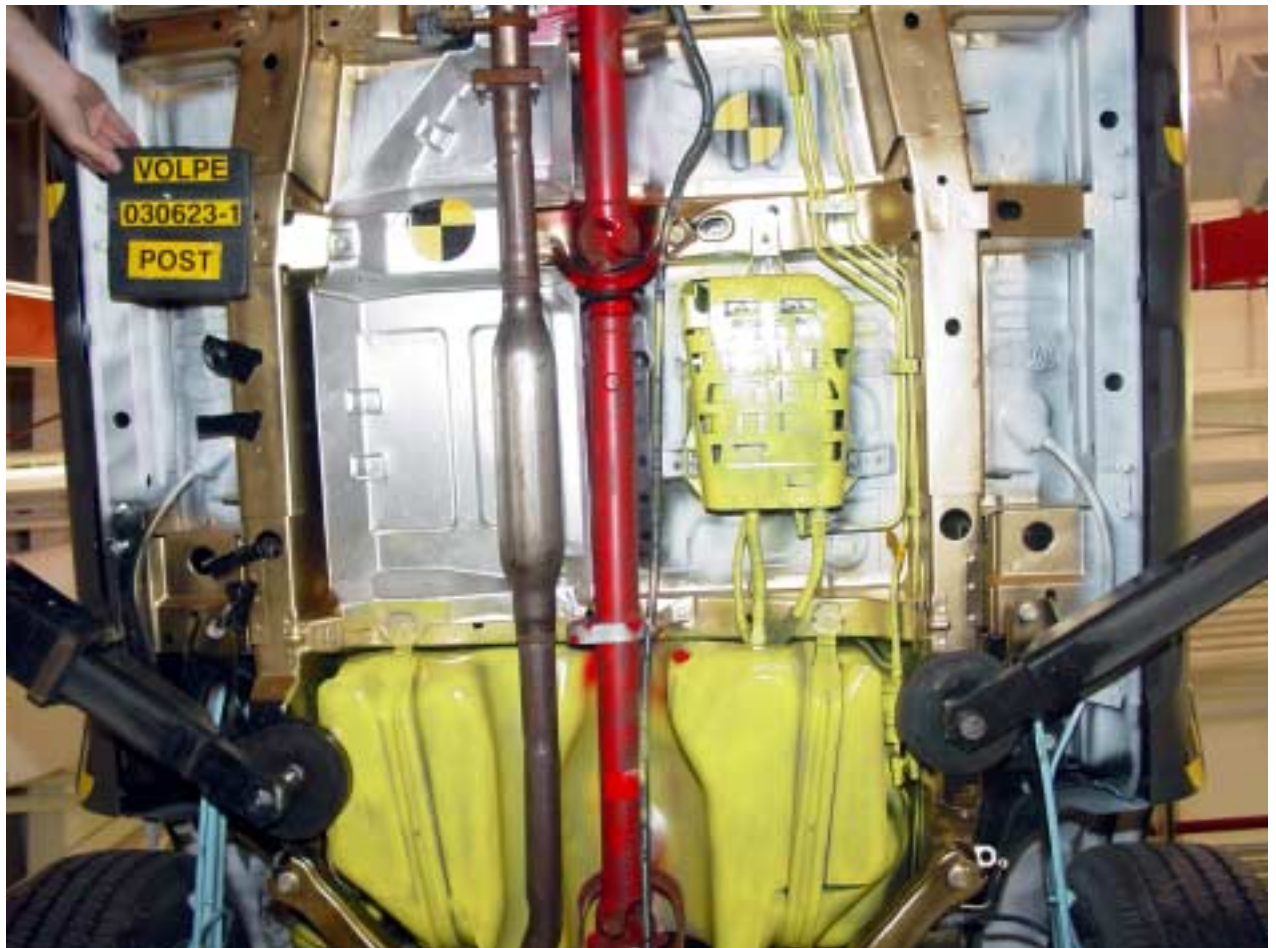


Figure A-26 Post-Test Mid Underbody View

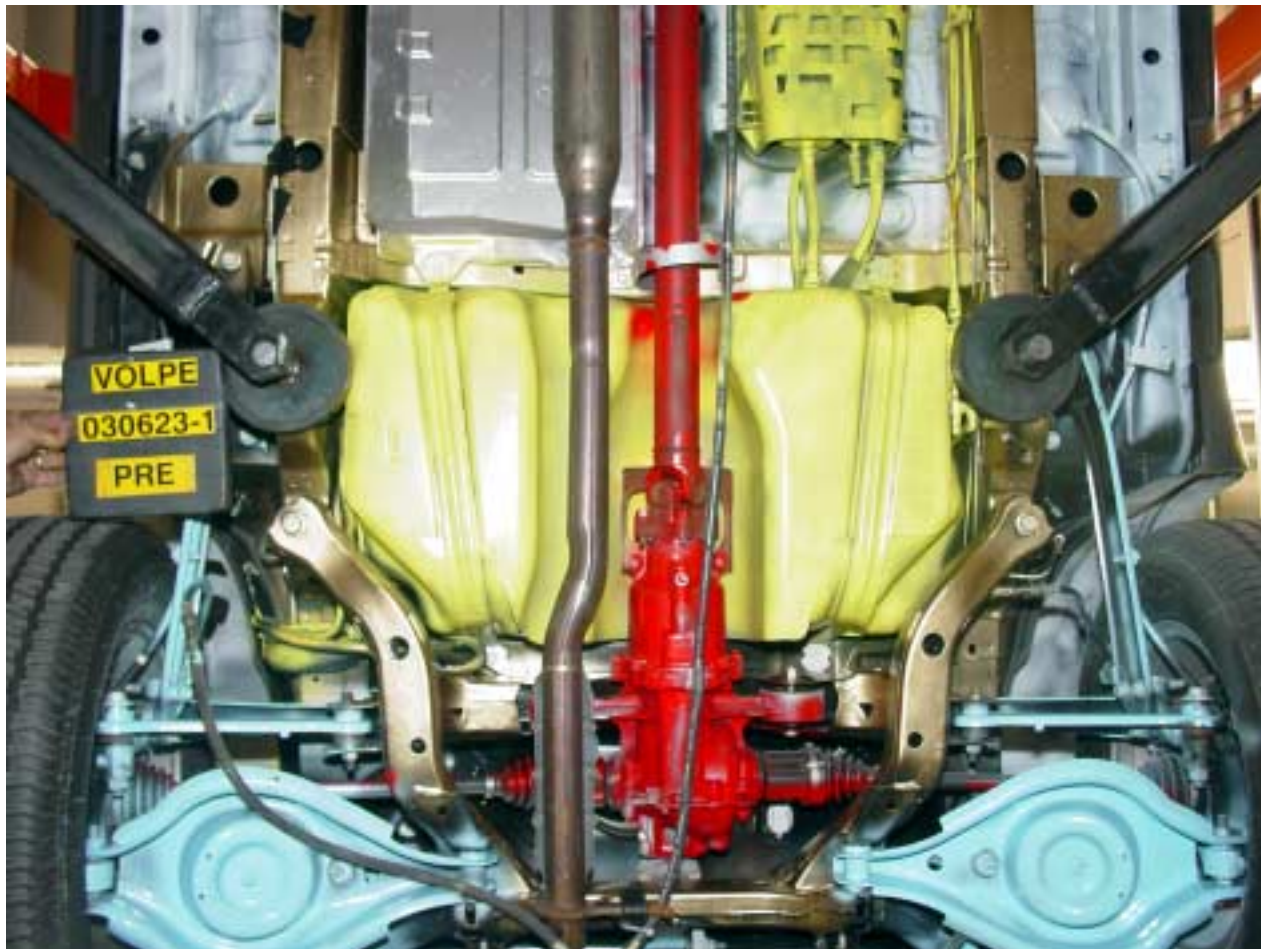


Figure A-27 Pre-Test Rear Mid Underbody View

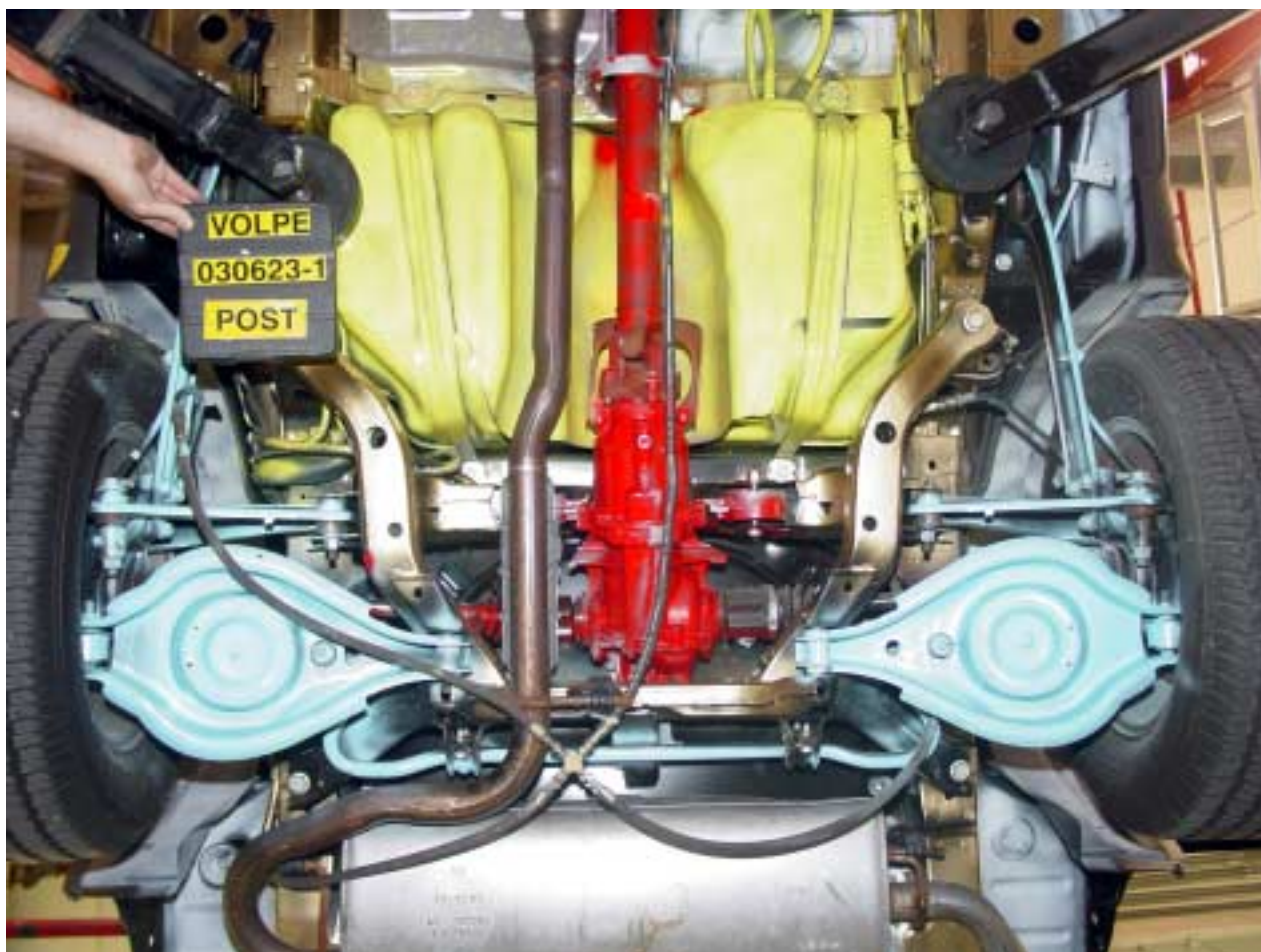


Figure A-28 Post-Test Rear Mid Underbody View



Figure A-29 Pre-Test Rear Underbody View



Figure A-30 Post-Test Rear Underbody View



Figure A-31 Pre-Test Engine Compartment View



Figure A-32 Post-Test Engine Compartment View



Figure A-33 Pre-Test Windshield View



Figure A-34 Post-Test Windshield View



Figure A-35 Pre-Test Driver and Passenger Dummies Front View



Figure A-36 Post-Test Driver and Passenger Dummies Front View



Figure A-37 Pre-Test Driver Dummy Position - View 1



Figure A-38 Post-Test Driver Dummy Position - View 1



Figure A-39 Pre-Test Driver Dummy Position - View 2



Figure A-40 Post-Test Driver Dummy Position - View 2

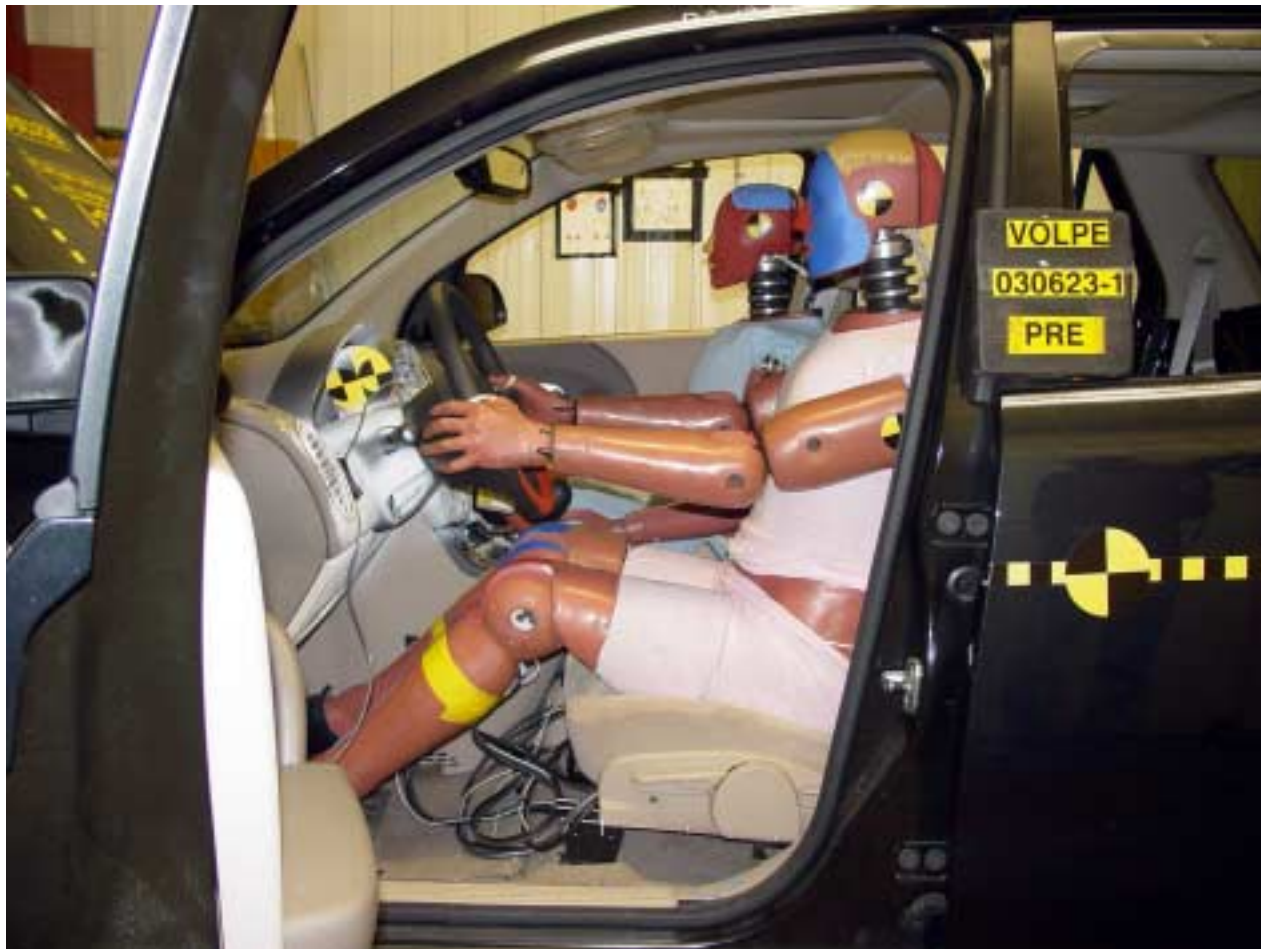


Figure A-41 Pre-Test Driver Dummy & Vehicle Interior - View 1



Figure A-42 Post-Test Driver Dummy & Vehicle Interior - View 1



Figure A-43 Pre-Test Driver Dummy & Vehicle Interior - View 2



Figure A-44 Post-Test Driver Dummy & Vehicle Interior - View 2



Figure A-45 Pre-Test Driver Dummy & Vehicle Interior - View 3



Figure A-46 Post-Test Driver Dummy & Vehicle Interior - View 3



Figure A-47 Pre-Test Passenger Dummy Position - View 1



Figure A-48 Post-Test Passenger Dummy Position - View 1



Figure A-49 Pre-Test Passenger Dummy Position - View 2



Figure A-50 Post-Test Passenger Dummy Position - View 2



Figure A-51 Pre-Test Passenger Dummy & Vehicle Interior - View 1



Figure A-52 Post-Test Passenger Dummy & Vehicle Interior - View 1



Figure A-53 Pre-Test Passenger Dummy & Vehicle Interior - View 2



Figure A-54 Post-Test Passenger Dummy & Vehicle Interior - View 2



Figure A-55 Pre-Test Passenger Dummy & Vehicle Interior - View 3



Figure A-56 Post-Test Passenger Dummy & Vehicle Interior - View 3



Figure A-57 Post-Test Driver Dummy Overall View



Figure A-58 Post-Test Driver Dummy Head Contact - View 1



Figure A-59 Post-Test Driver Dummy Head Contact - View 2



Figure A-60 Post-Test Driver Dummy Head Contact - View 3



Figure A-61 Post-Test Driver Dummy Head Contact - View 4

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Figure A-62 Post-Test Driver Dummy Knee Contact - View 1



Figure A-63 Post-Test Driver Dummy Knee Contact - View 2



Figure A-64 Post-Test Driver Dummy Knee Contact - View 3

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Figure A-65 Pre-Test Driver Seat Position View

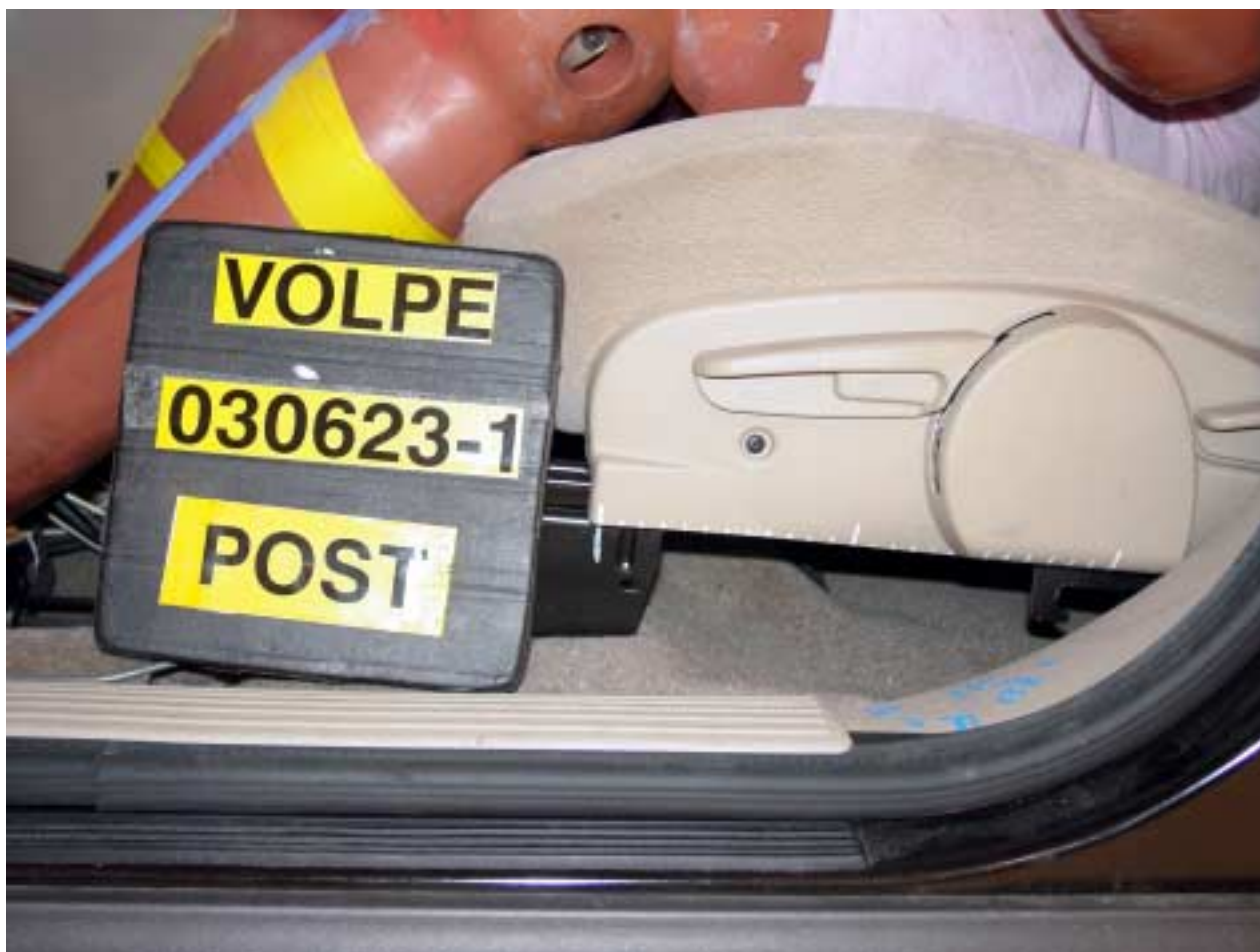


Figure A-66 Post-Test Driver Seat Position View



Figure A-67 Post-Test Passenger Dummy Overall View

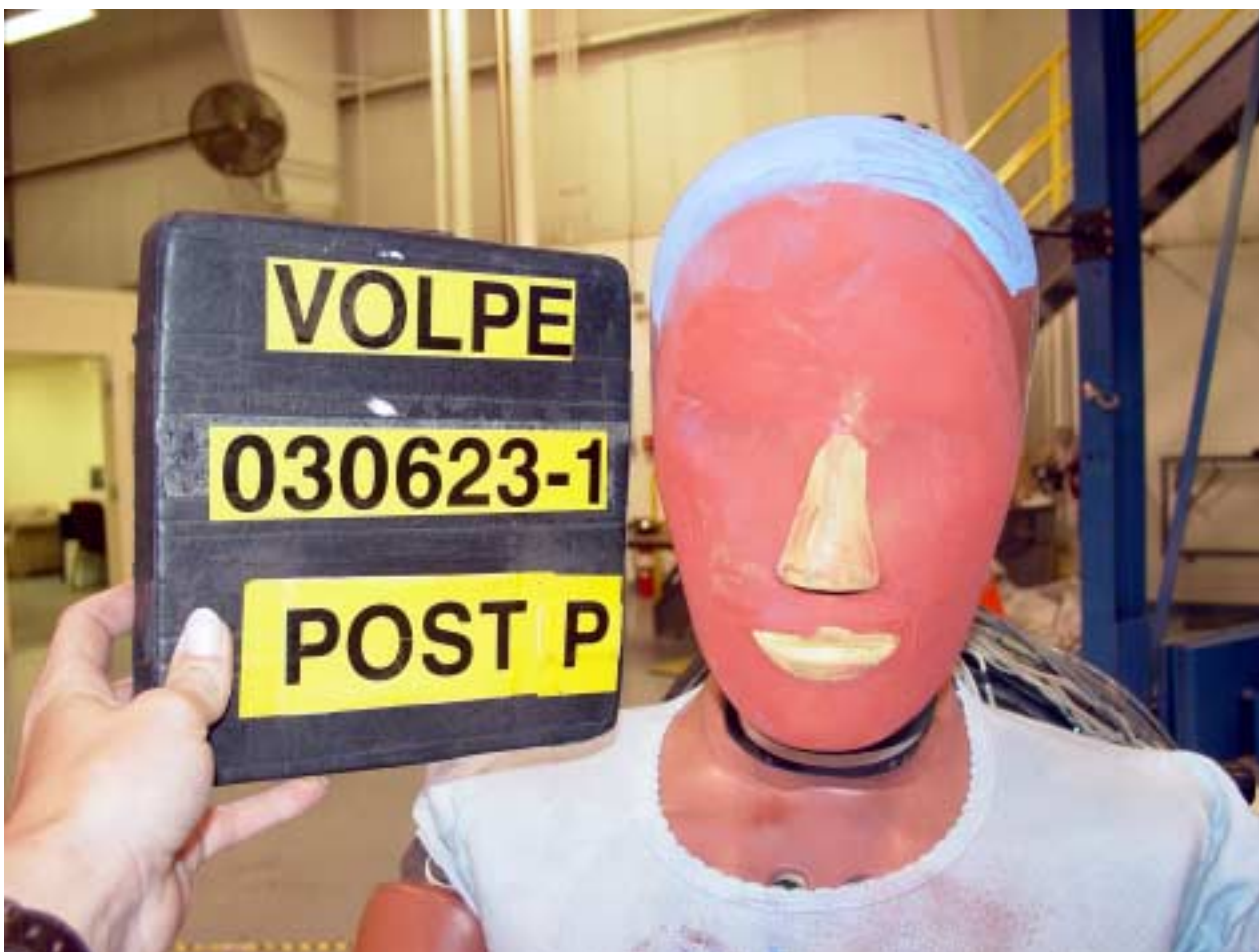


Figure A-68 Post-Test Passenger Dummy Head Contact - View 1



Figure A-69 Post-Test Passenger Dummy Head Contact - View 2



Figure A-70 Post-Test Passenger Dummy Head Contact - View 3



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



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



Figure A-73 Post-Test Passenger Dummy Knee Contact - View 3

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Figure A-74 Pre-Test Passenger Seat Position View



Figure A-75 Post-Test Passenger Seat Position View



Figure A-76 Pre-Test Vehicle Certification Label View

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Figure A-77 Pre-Test Load Cell Barrier View



Figure A-78 Post-Test Load Cell Barrier View



Figure A-79 Pre-Test Fuel Cap View



Figure A-80 Post-Test Fuel Cap View

Appendix B

Dummy, Vehicle, and Barrier Data Plots

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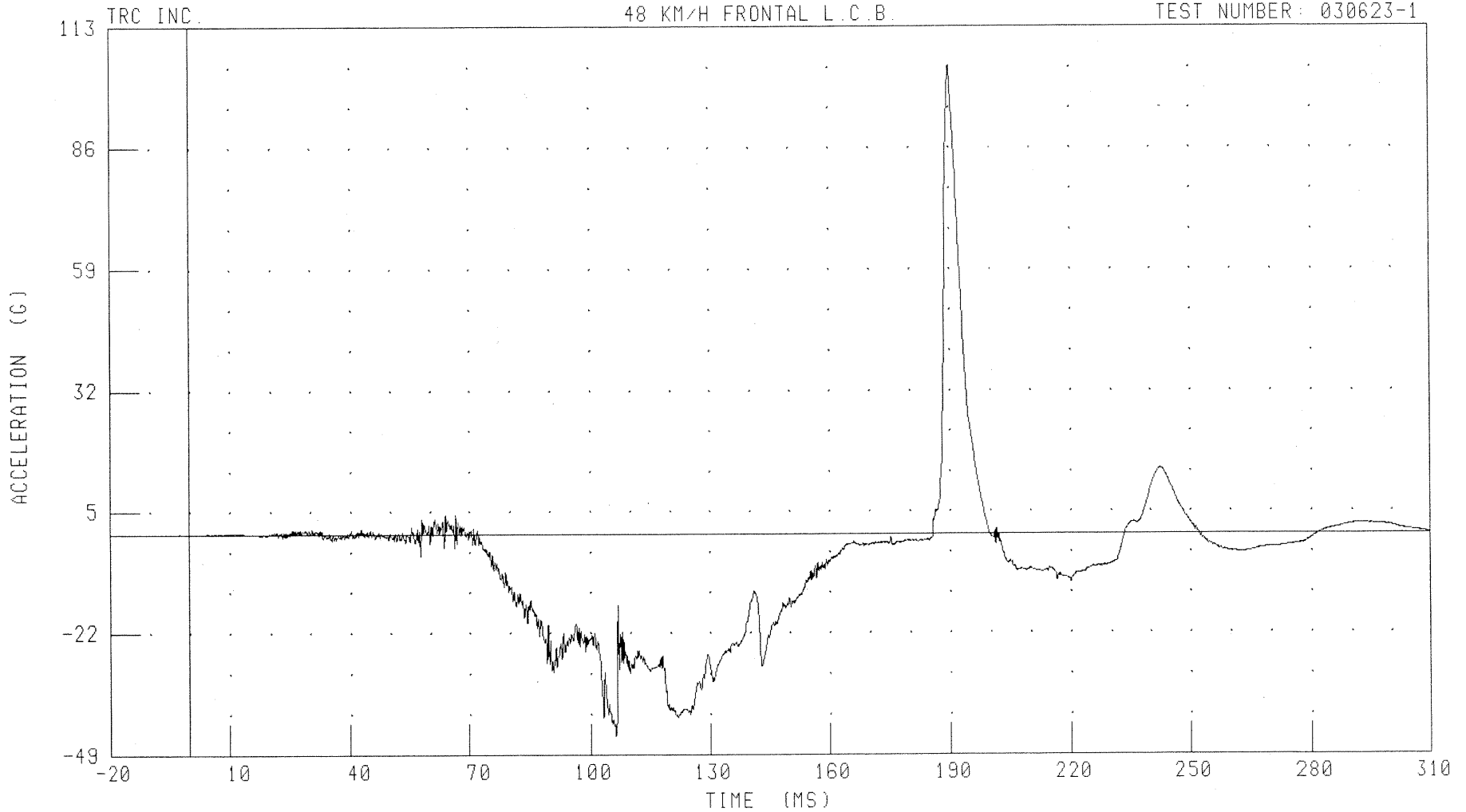
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¹ Curve is not included in NHTSA database.

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: 030623-1



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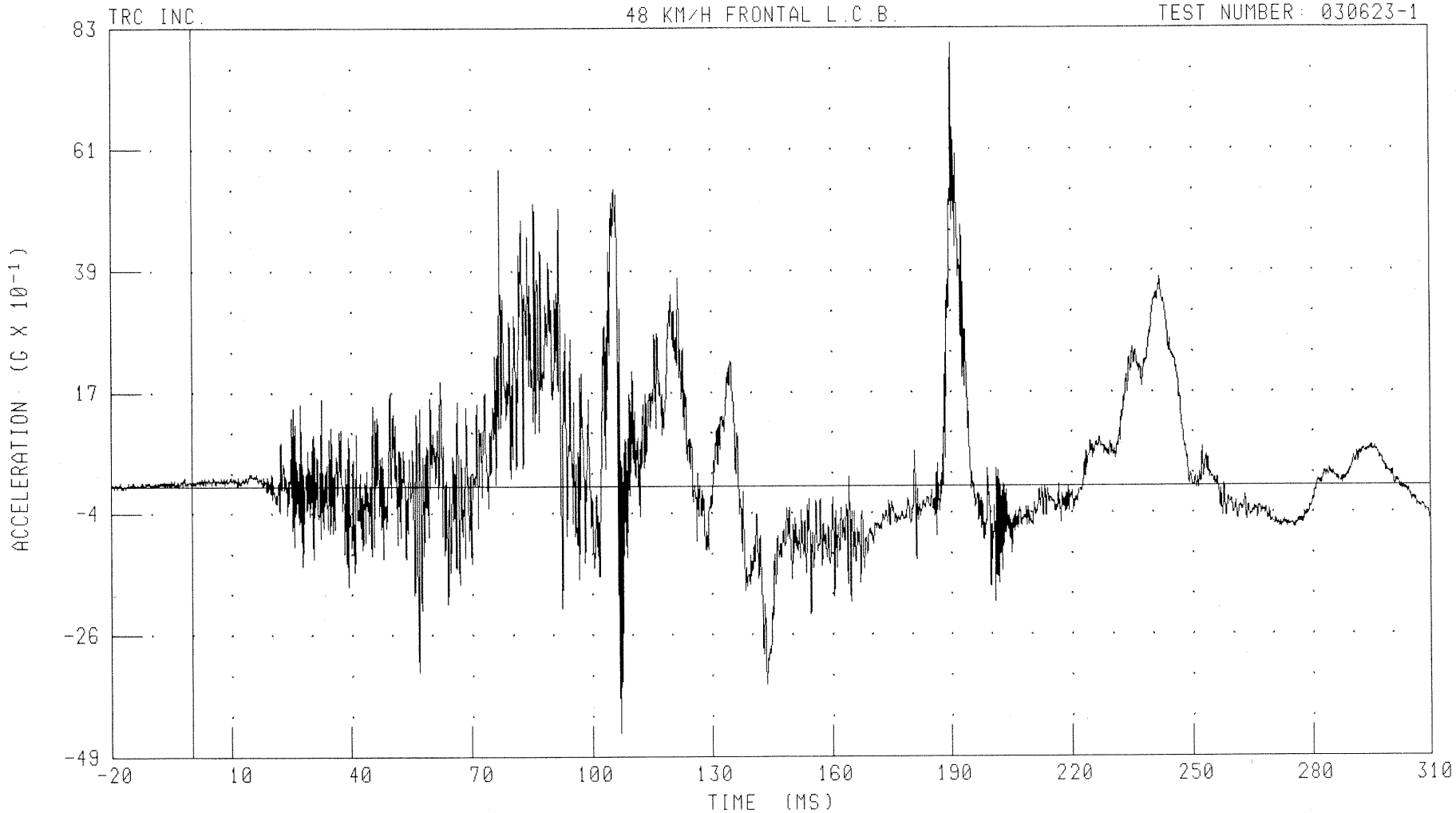
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030623-1

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: 030623-1



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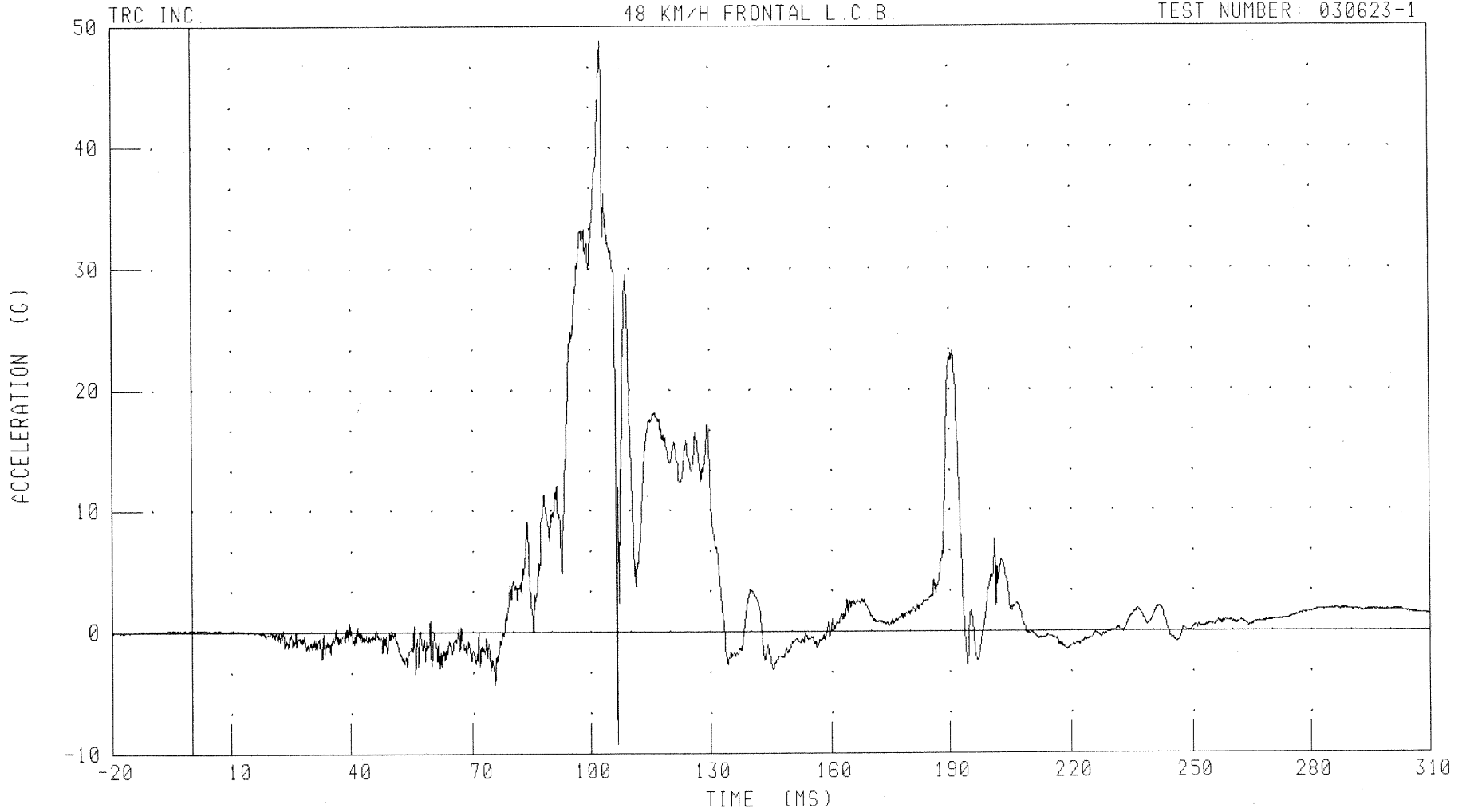
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030623-1

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: 030623-1



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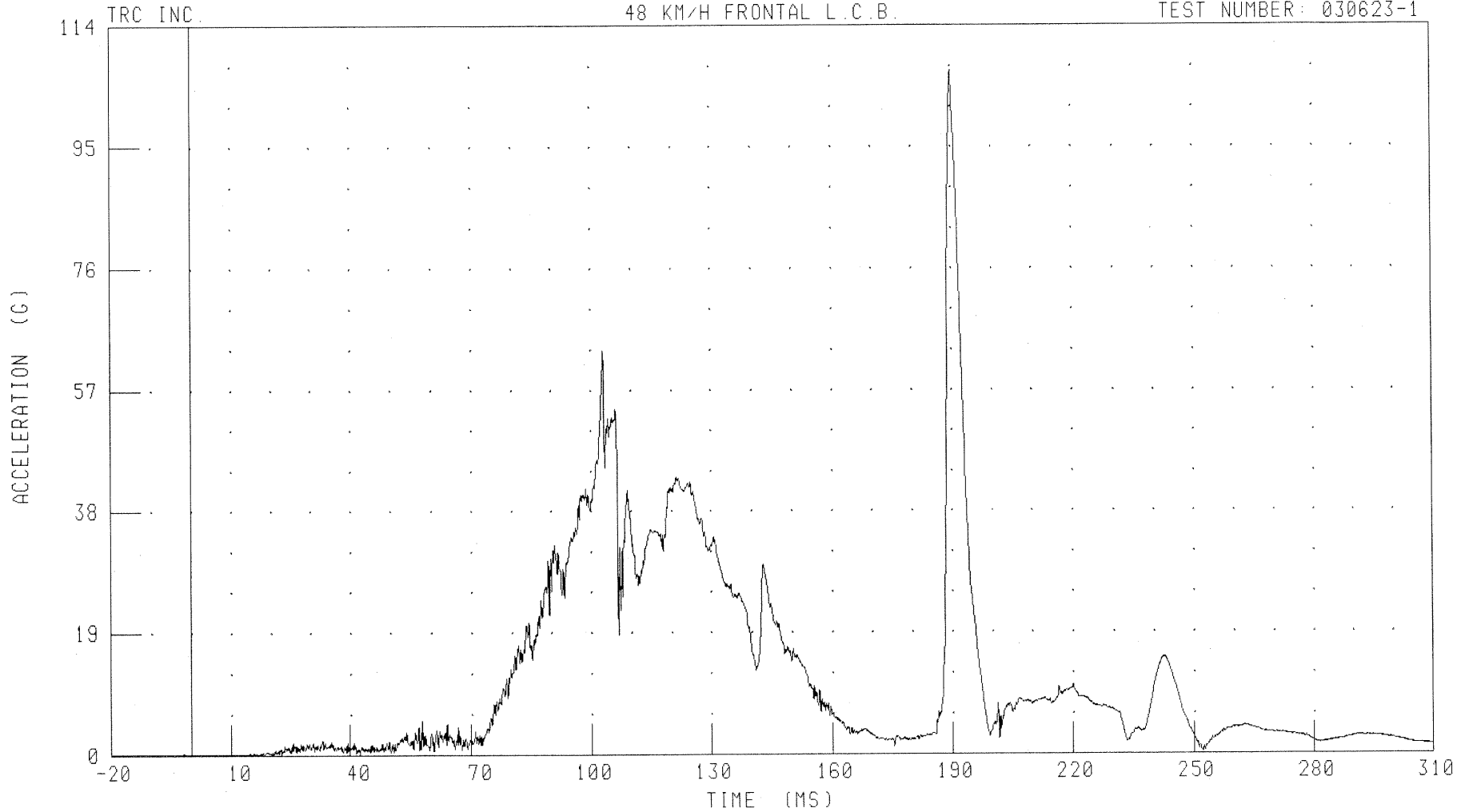
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030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



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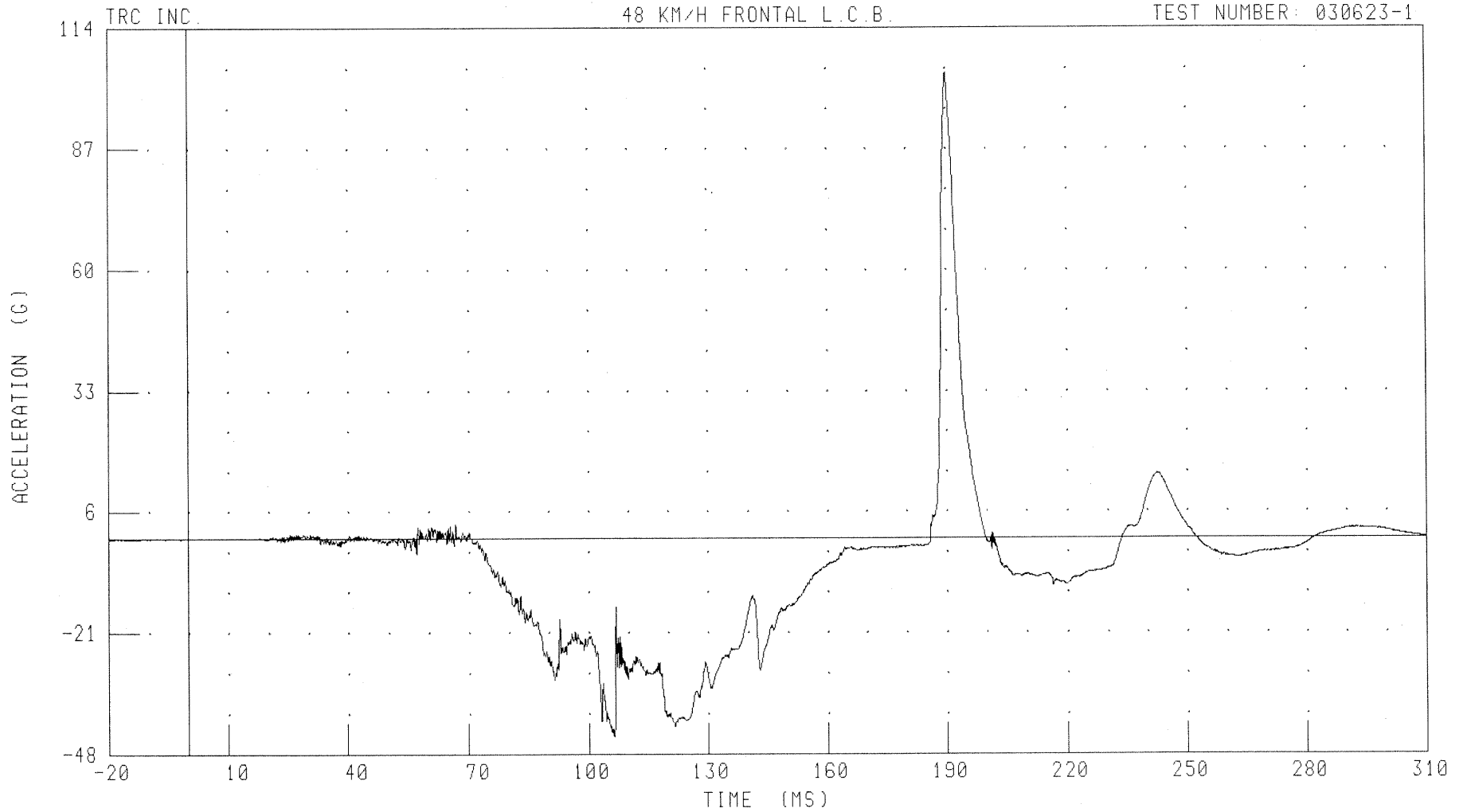
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030623-1

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: 030623-1



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B-13

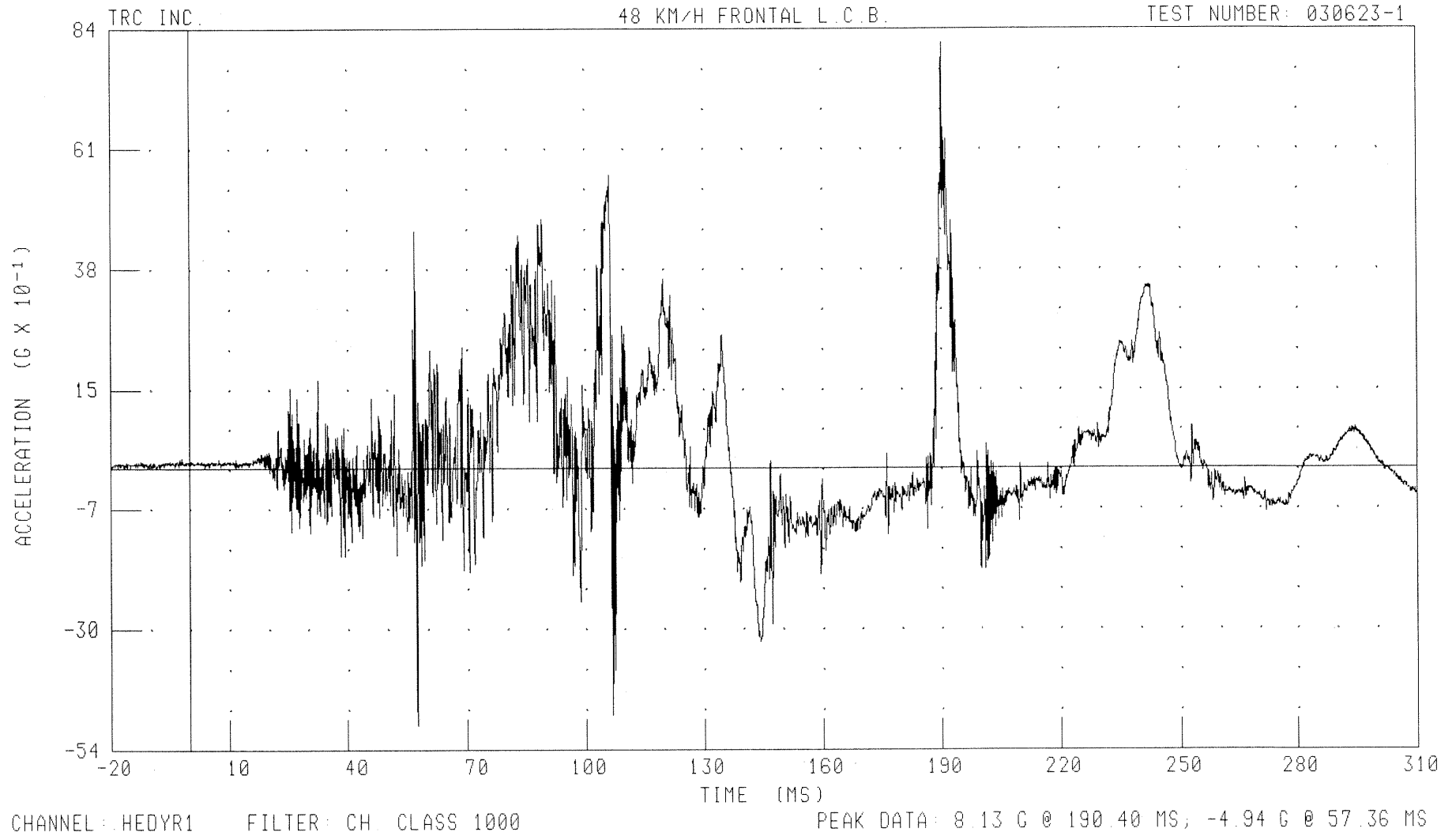
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2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

DRIVER HEAD Y-AXIS ACCELERATION REDUNDANT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



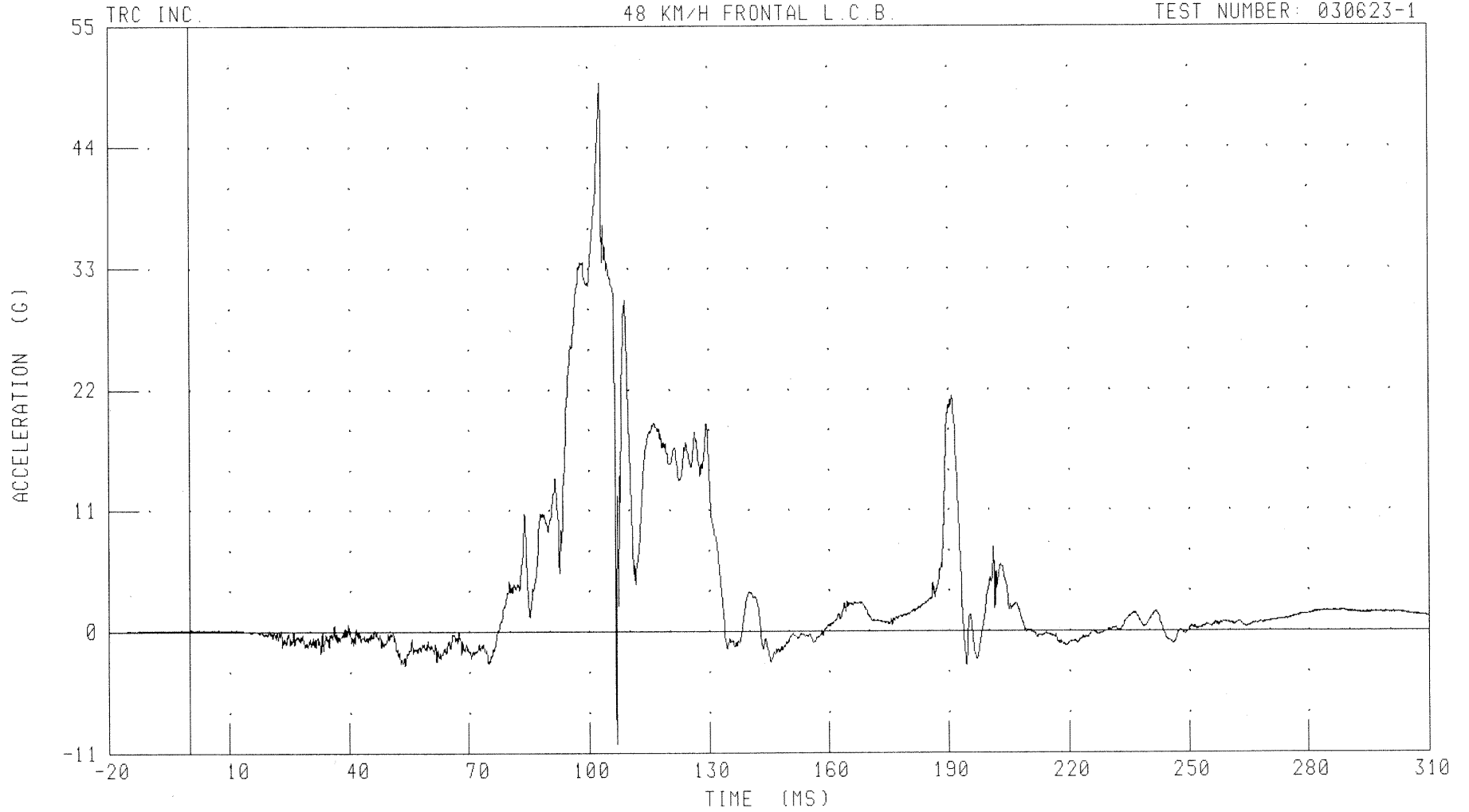
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030623-1

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: 030623-1



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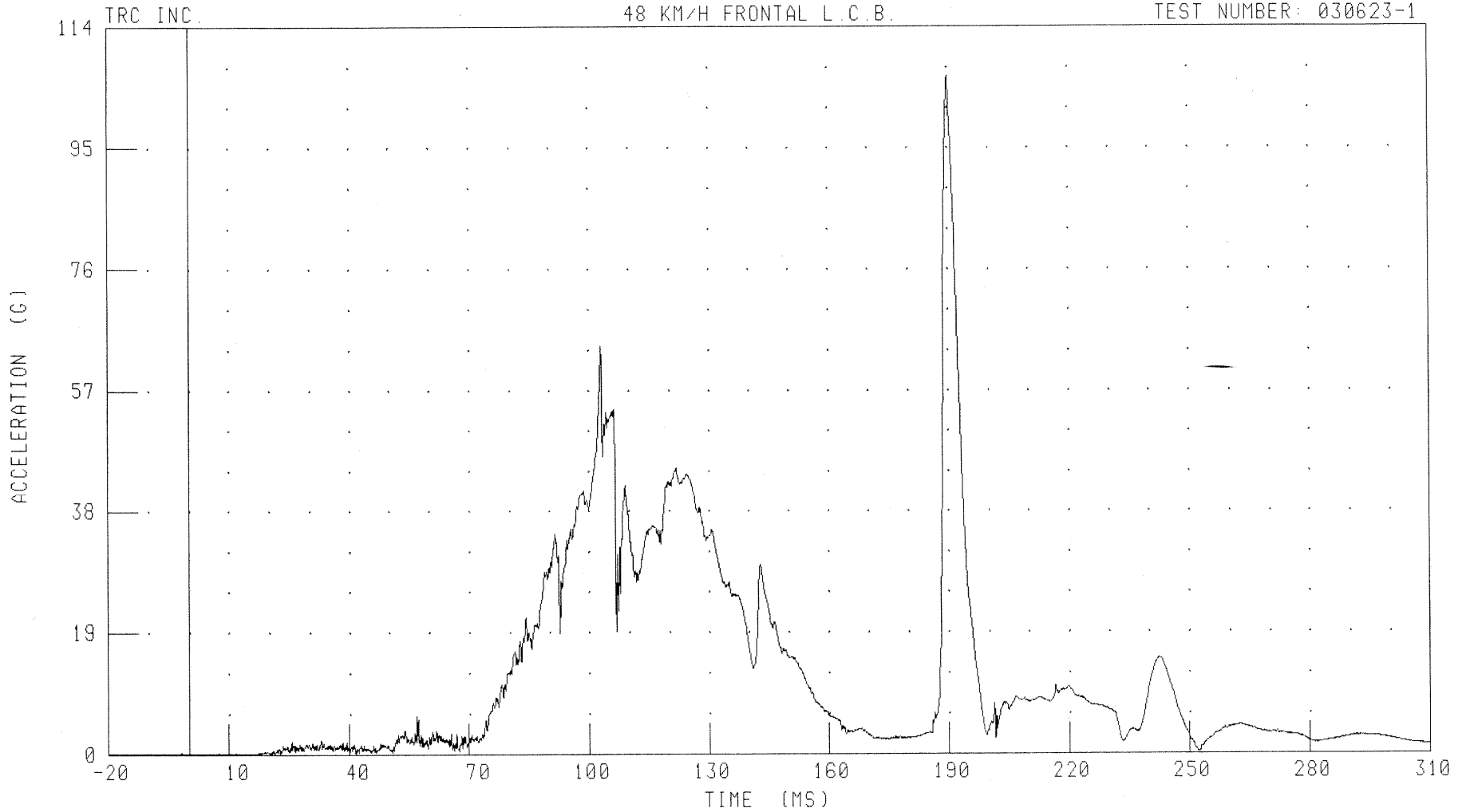
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030623-1

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: 030623-1



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B-16

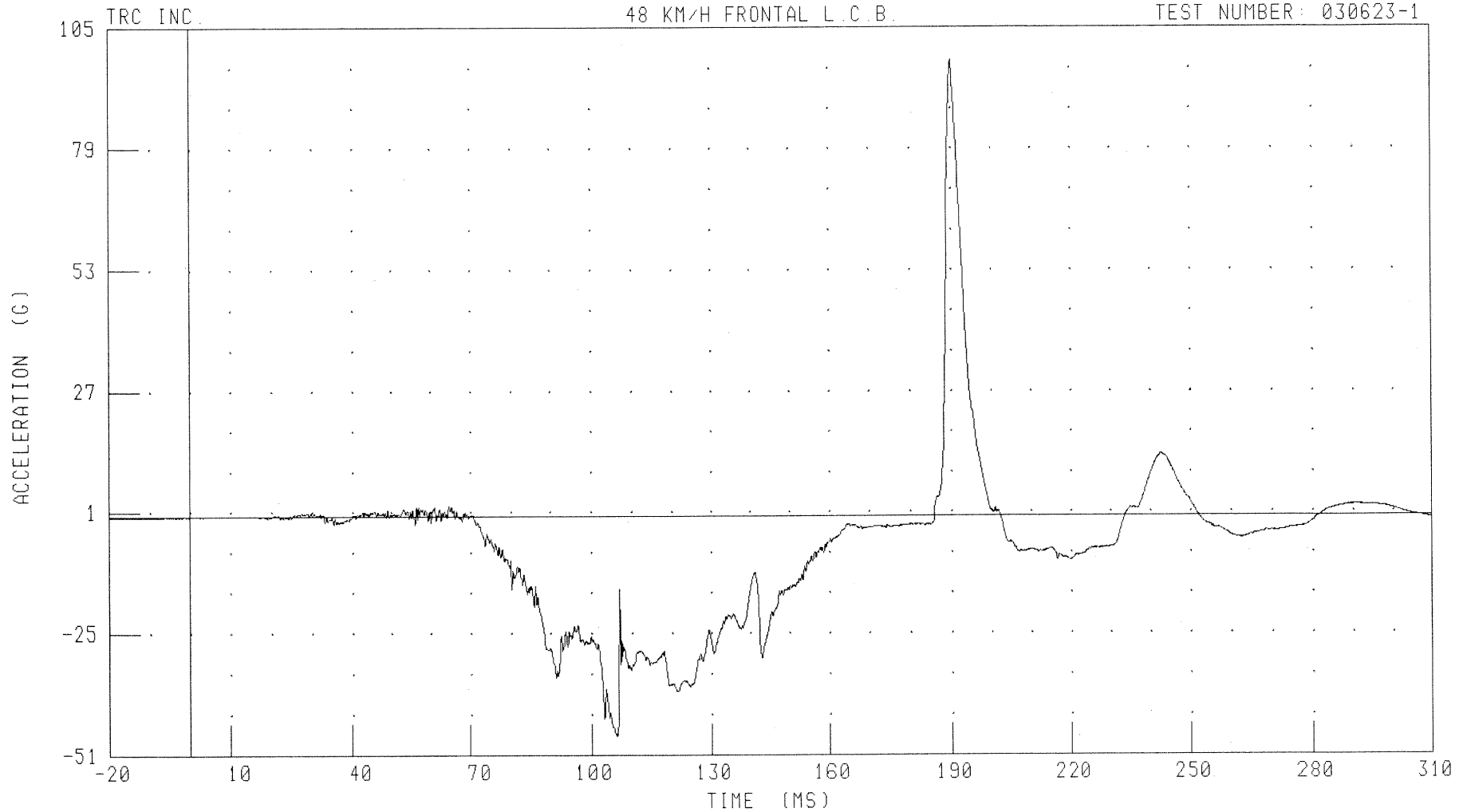
030623-1

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: 030623-1



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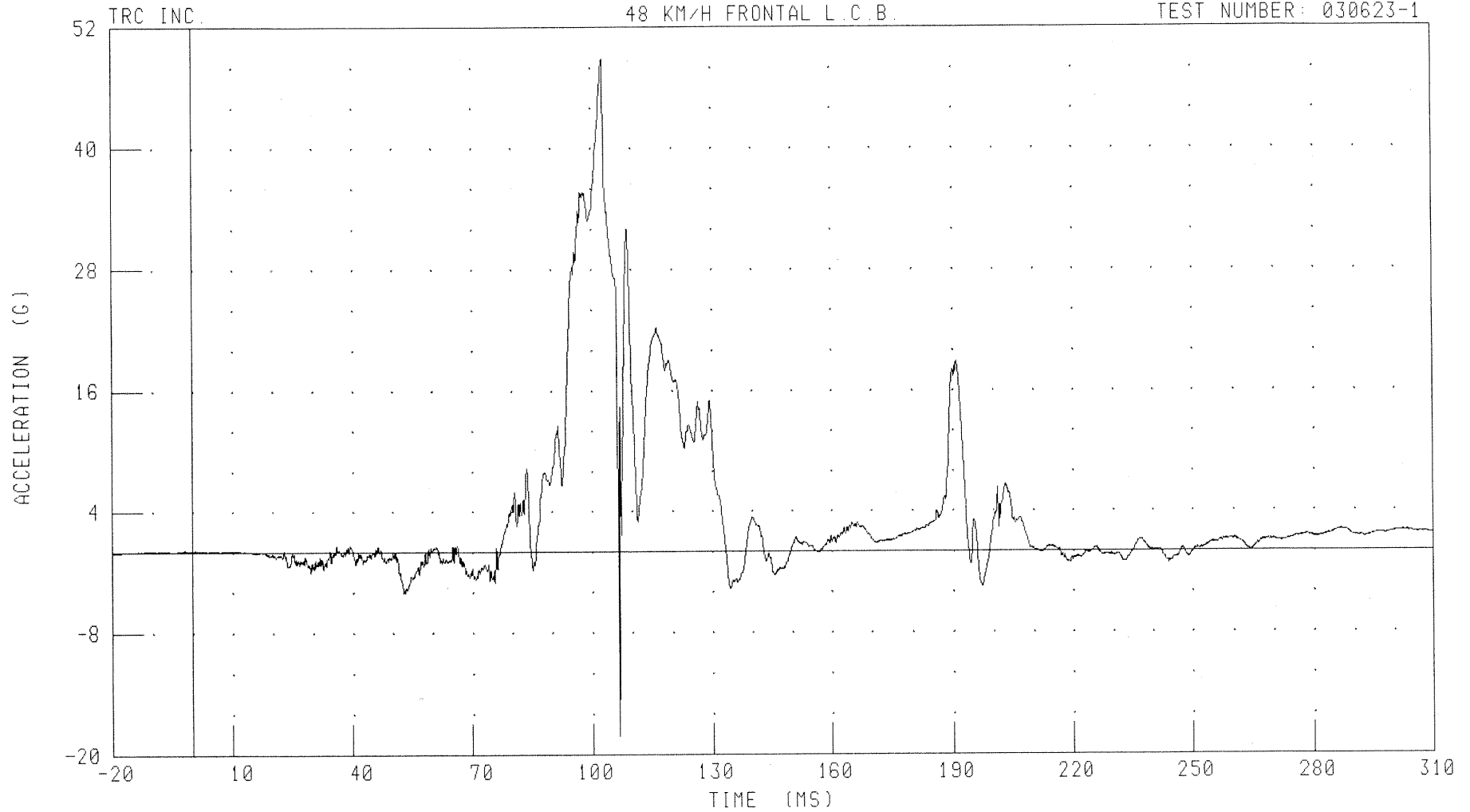
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030623-1

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: 030623-1



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B-18

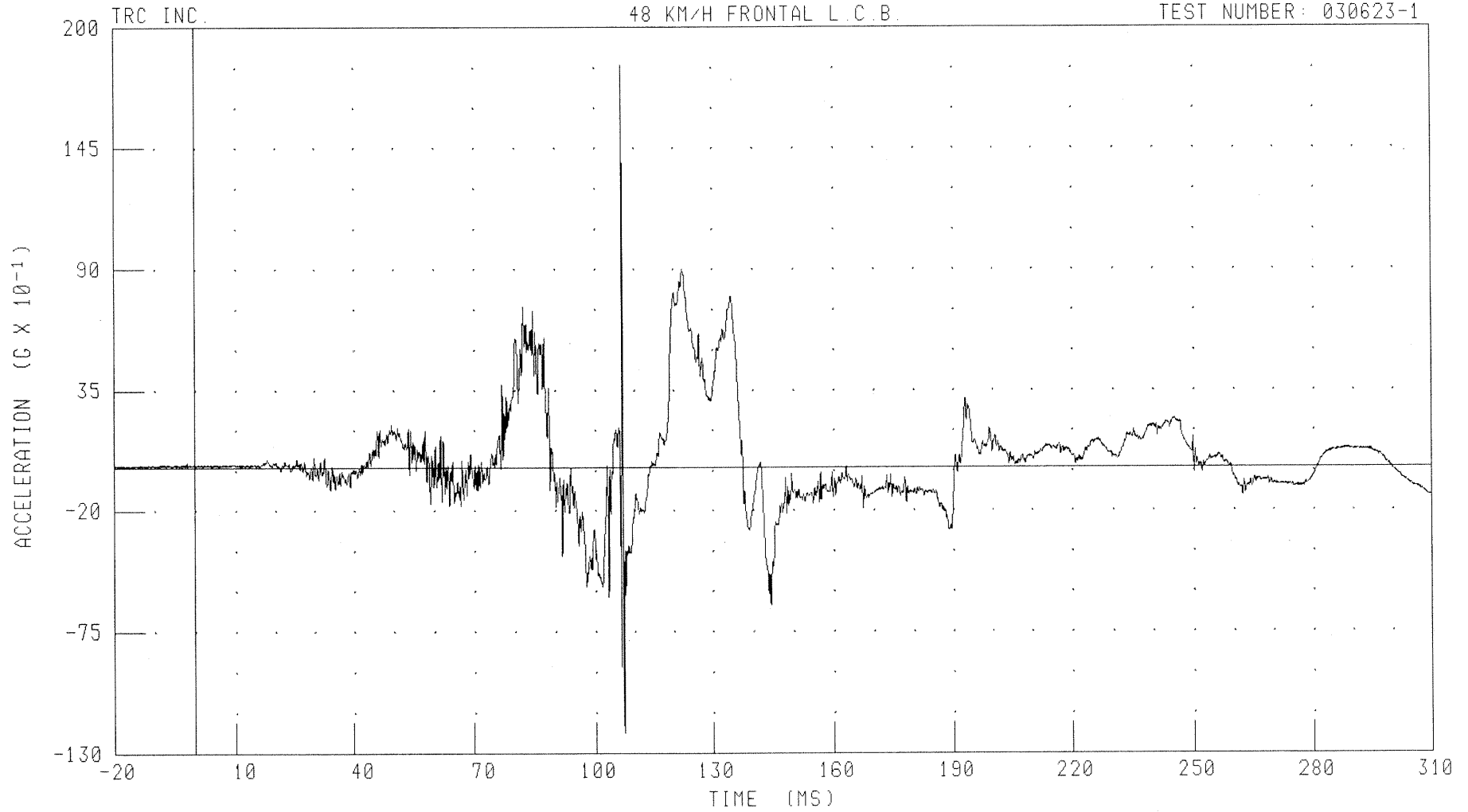
030623-1

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: 030623-1



CHANNEL: HD2YG1 FILTER: CH. CLASS 1000

PEAK DATA: 18.29 G @ 107.04 MS; -12.06 G @ 107.36 MS

B-19

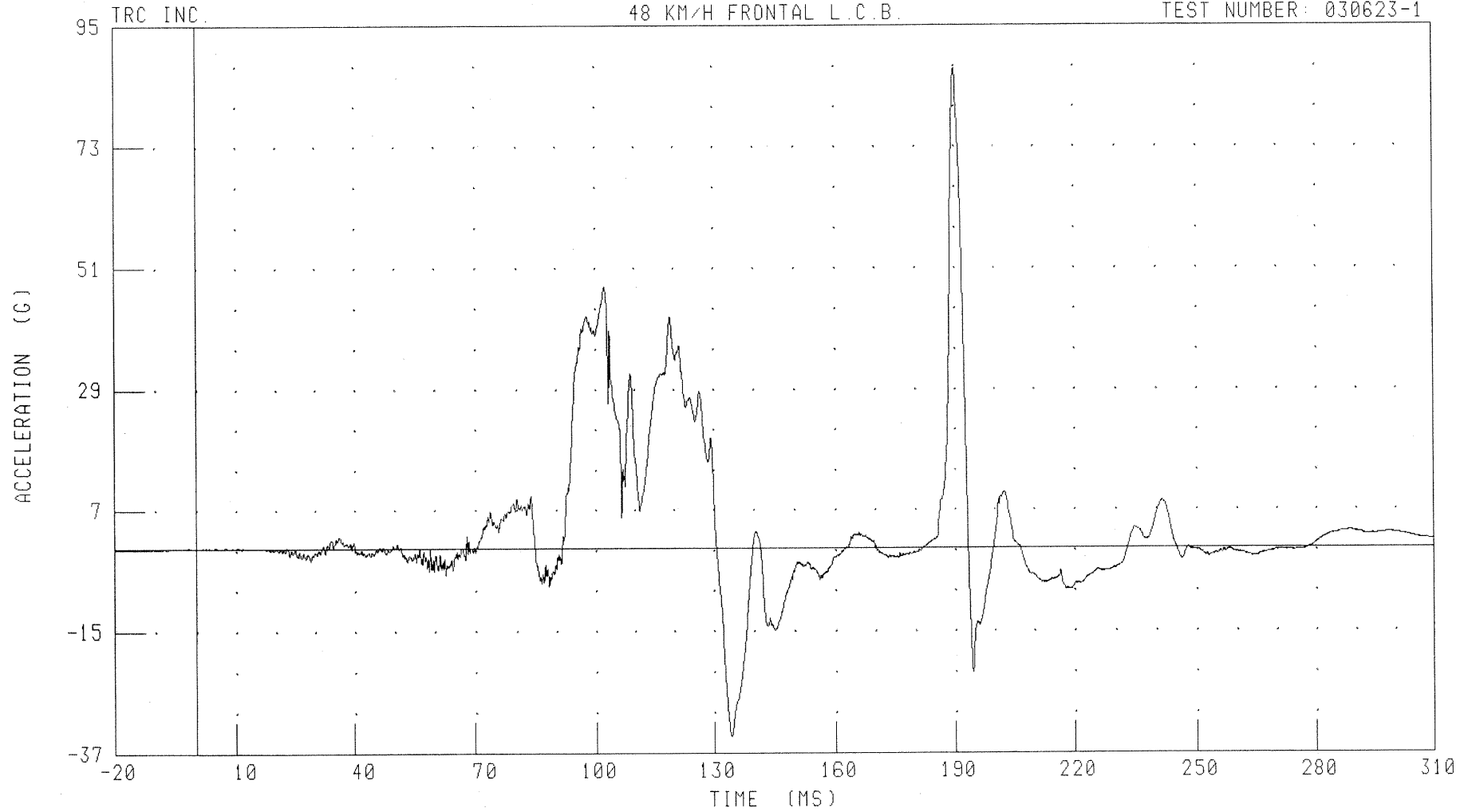
030623-1

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: 030623-1



CHANNEL: HD2ZG1 FILTER: CH. CLASS 1000

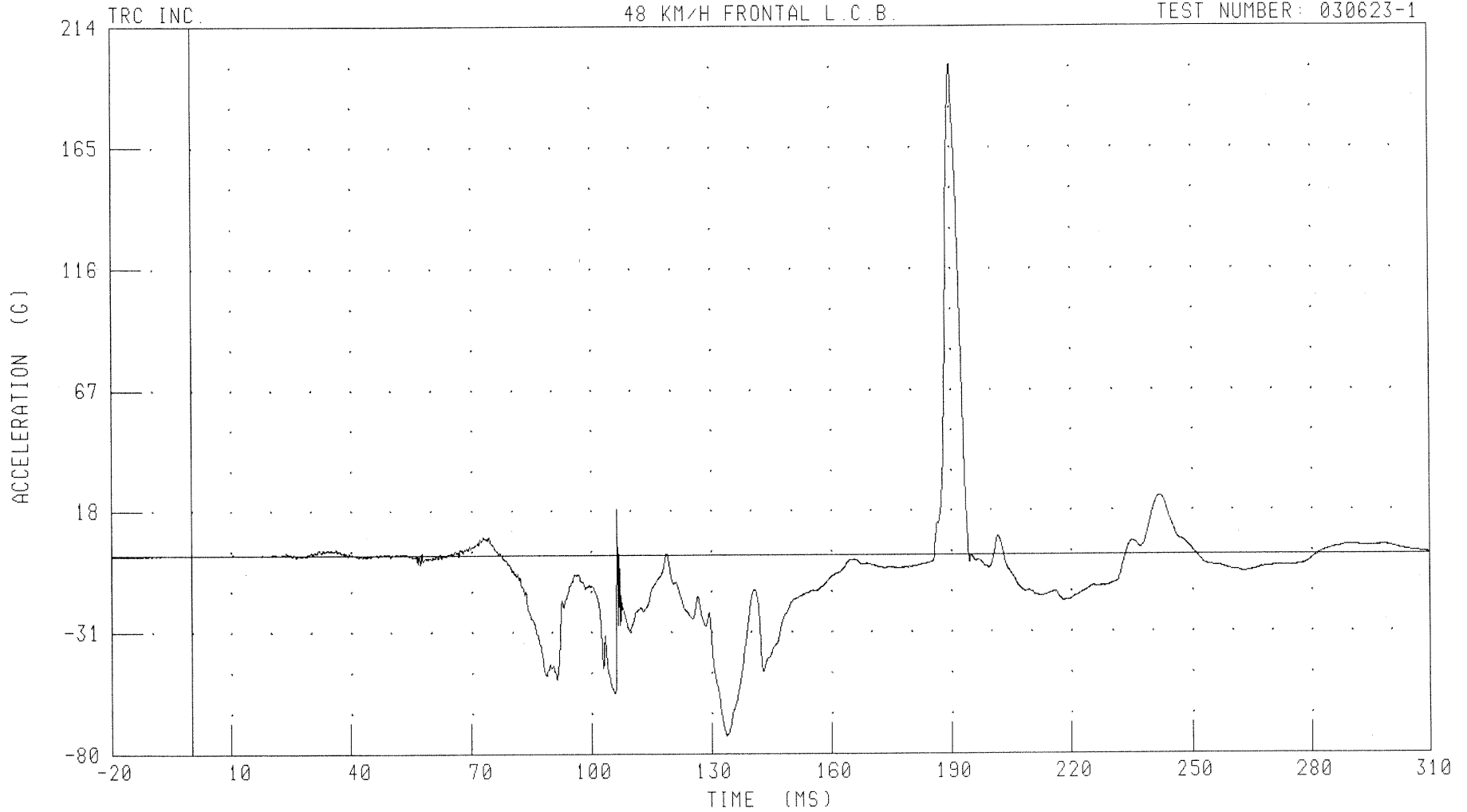
PEAK DATA: 87.25 G @ 190.24 MS; -34.00 G @ 134.32 MS

B-20

030623-1

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: 030623-1



CHANNEL: HD3XC1

FILTER: CH. CLASS 1000

PEAK DATA: 198.57 G @ 190.16 MS; -72.79 G @ 134.00 MS

B-21

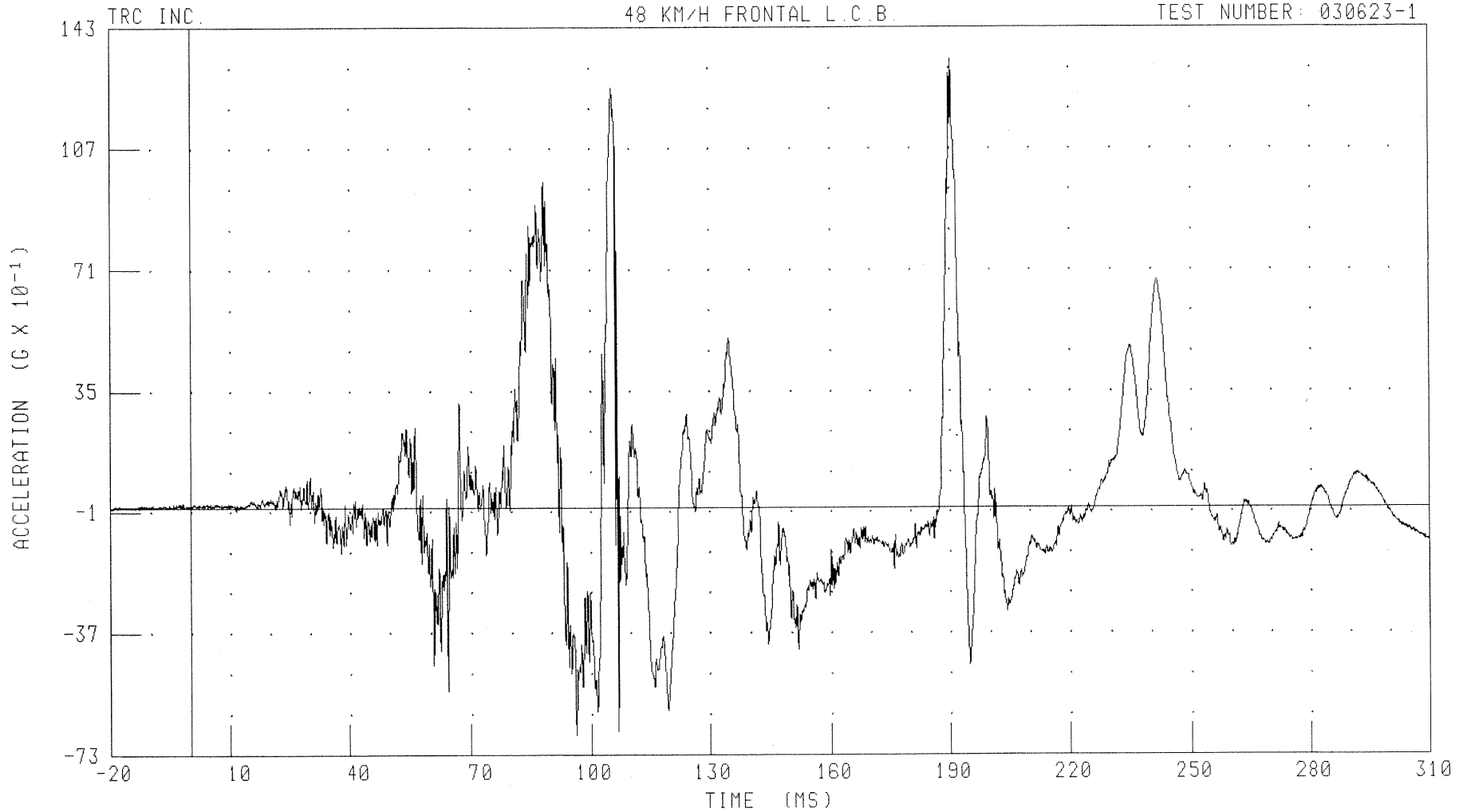
030623-1

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: 030623-1



CHANNEL: HD3YG1 FILTER: CH. CLASS 1000

PEAK DATA: 133.7 G @ 190.56 MS; -6.72 G @ 96.32 MS

B-22

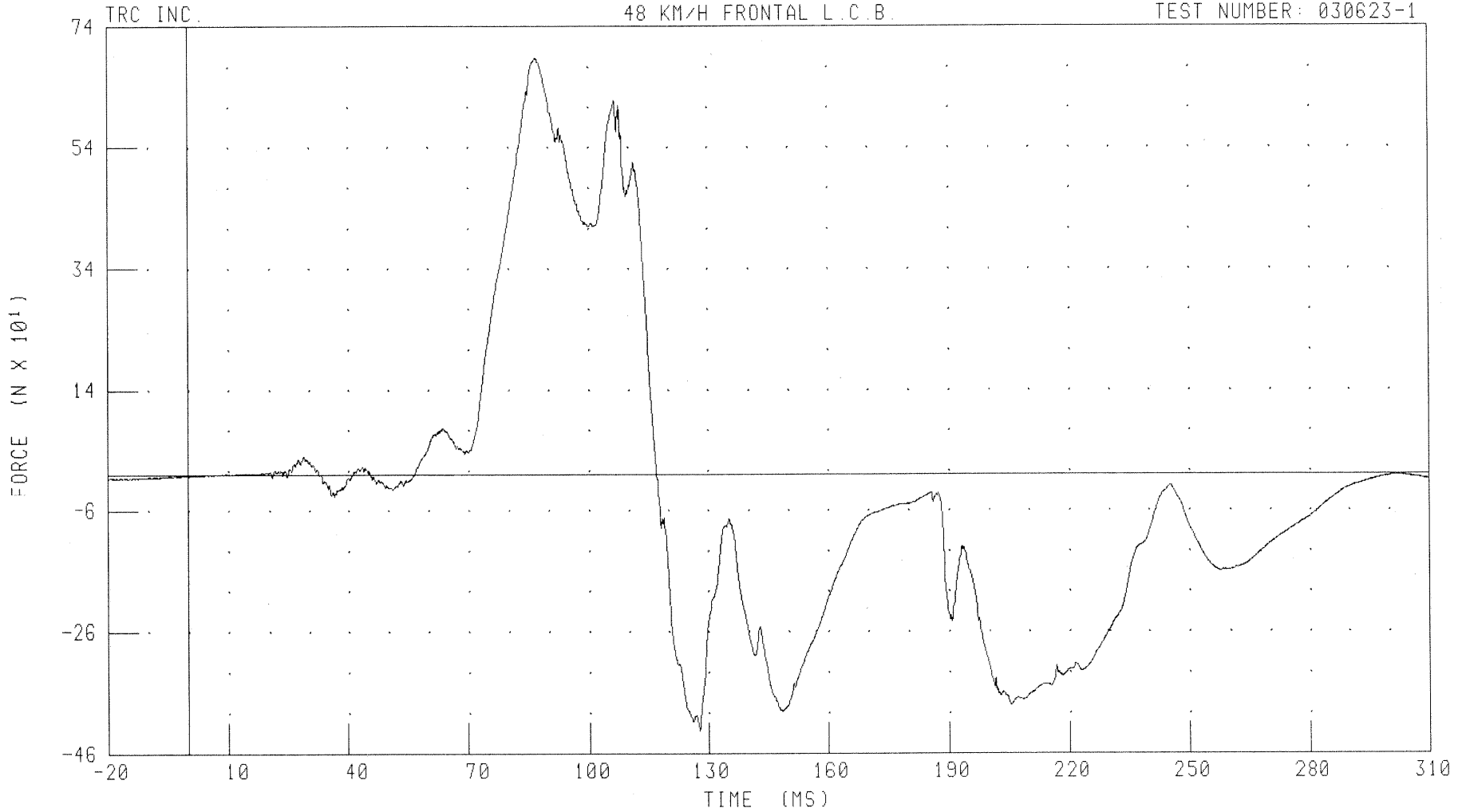
030623-1

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: 030623-1



CHANNEL: NEKXF1 FILTER: CH. CLASS 1000

PEAK DATA: 688.31 N @ 87.04 MS; -422.94 N @ 127.84 MS

B-23

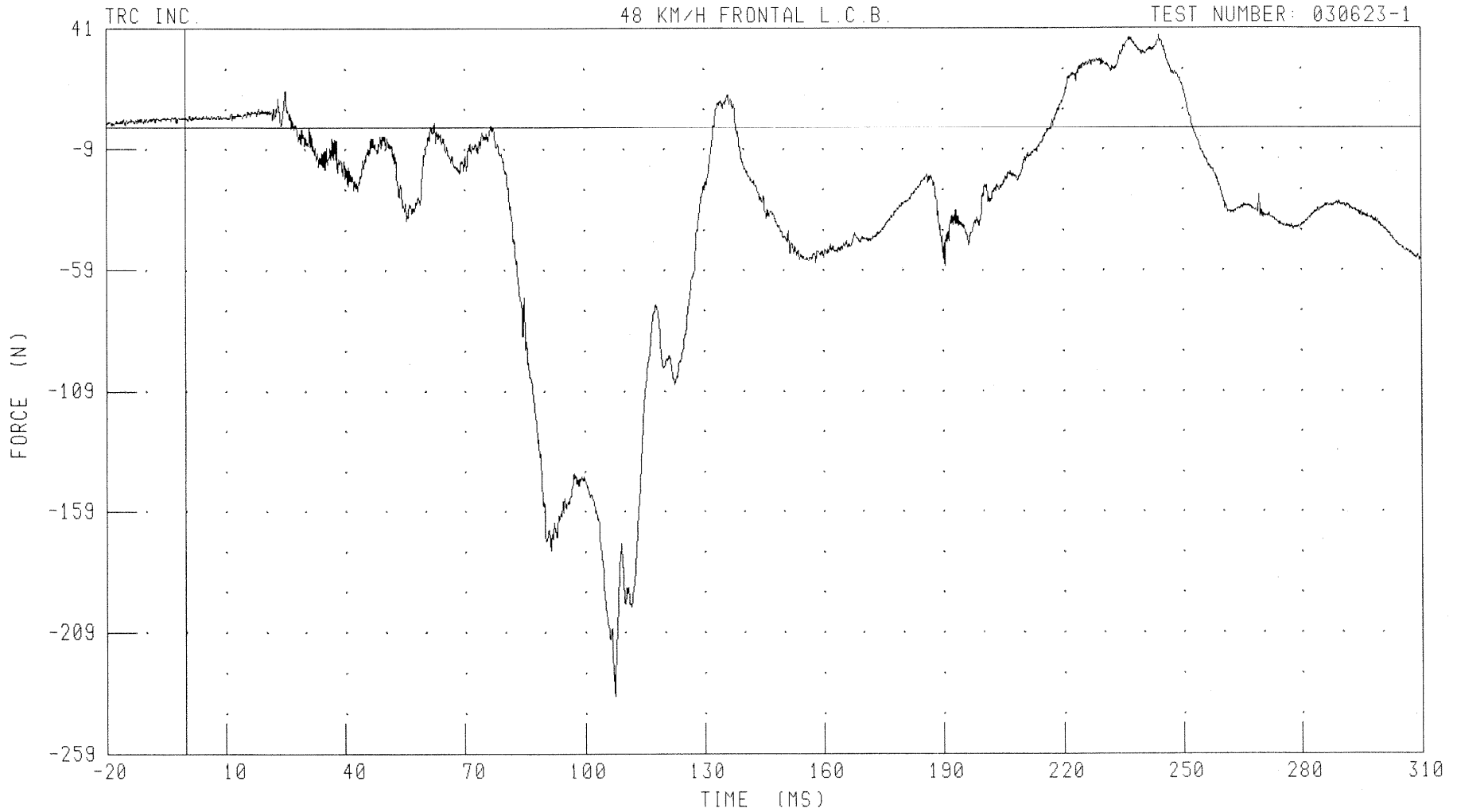
030623-1

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: 030623-1



CHANNEL: NEKYF1 FILTER: CH. CLASS 1000

PEAK DATA: 38.09 N @ 244.16 MS; -235.28 N @ 107.60 MS

B-24

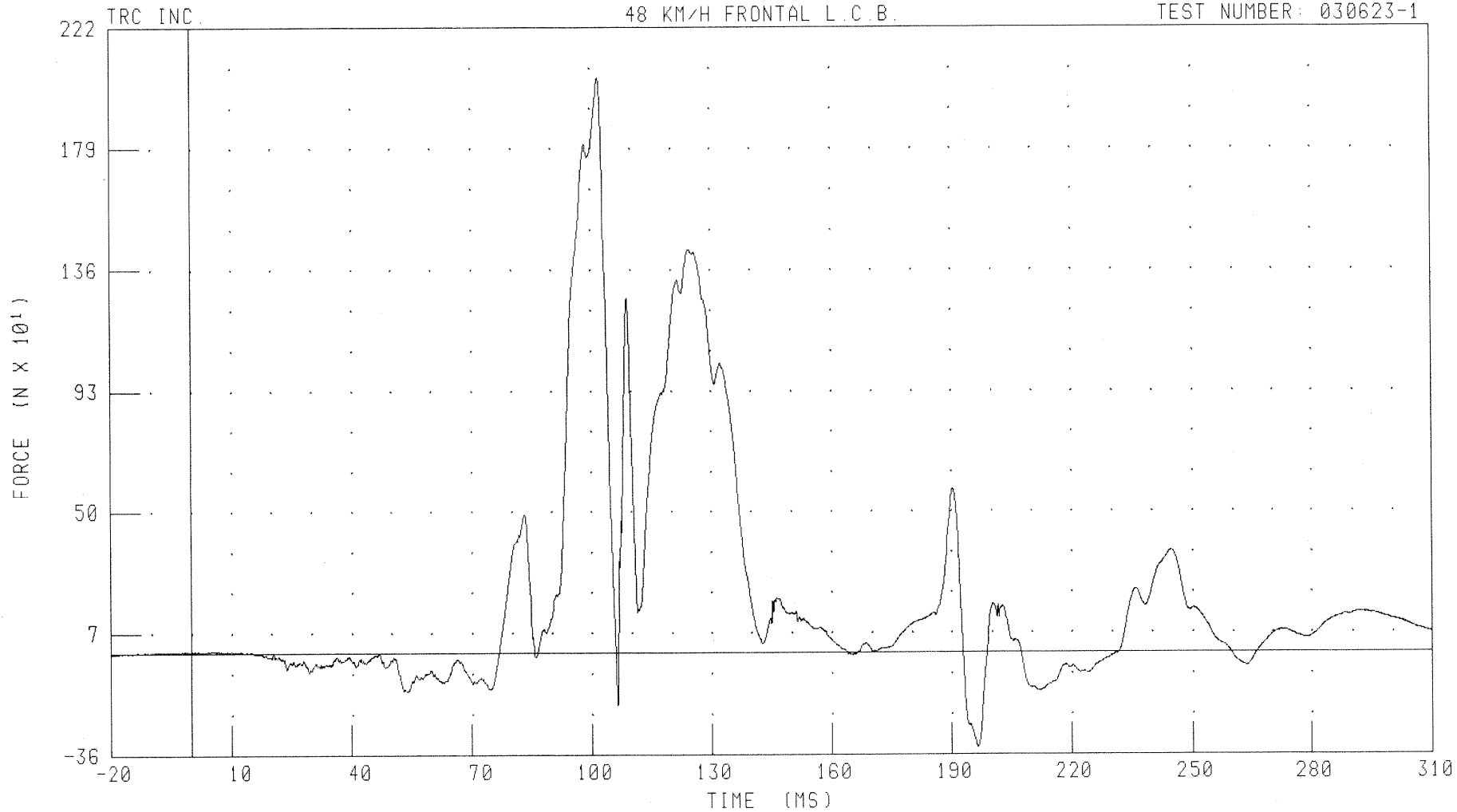
030623-1

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: 030623-1



CHANNEL: NEKZF1

FILTER: CH. CLASS 1000

PEAK DATA: 2043.97 N @ 102.16 MS; -333.94 N @ 196.56 MS

B-25

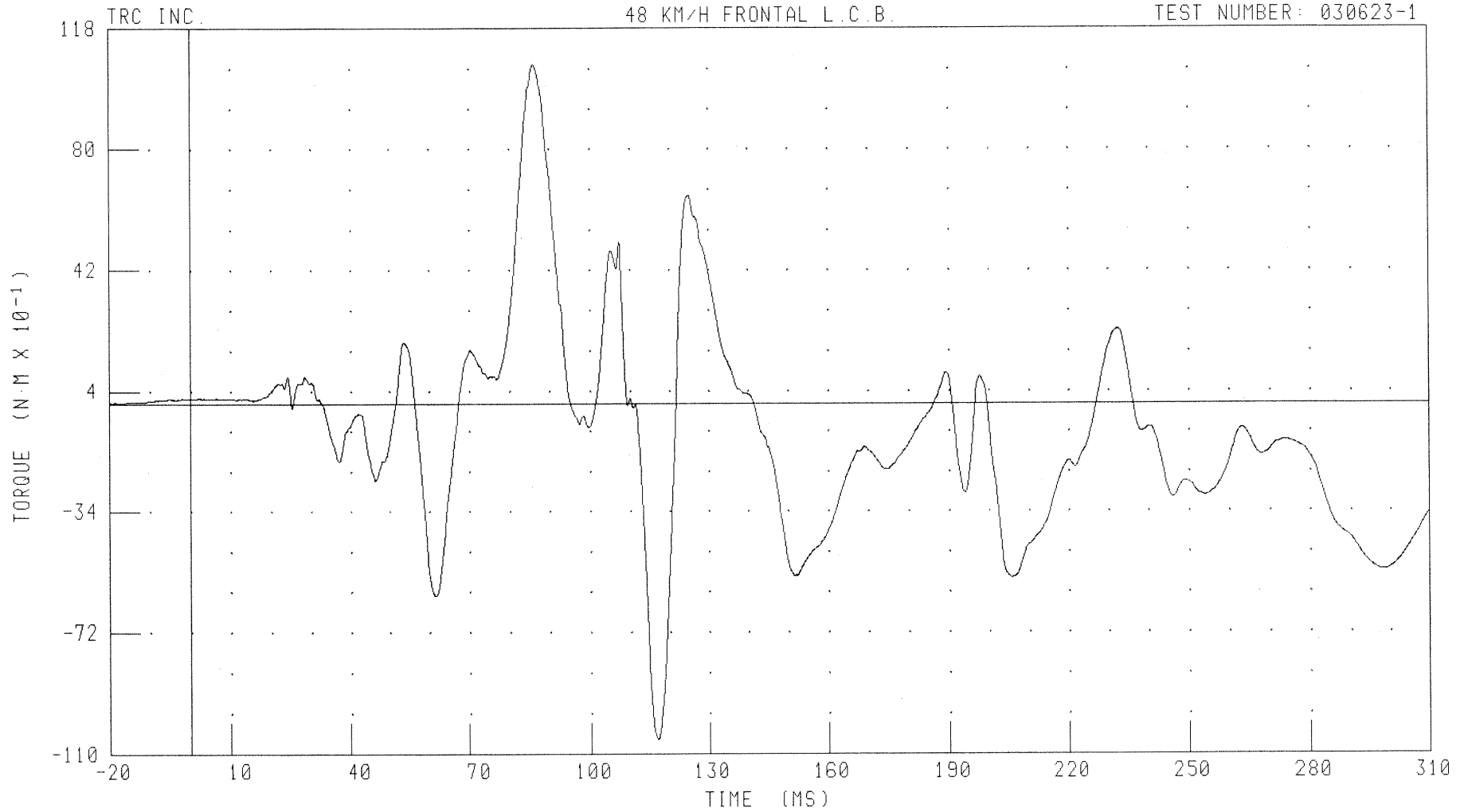
030623-1

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: 030623-1



CHANNEL: NEKX1

FILTER: CH. CLASS 600

PEAK DATA: 10.67 N·M @ 86.16 MS; -10.54 N·M @ 117.04 MS

B-26

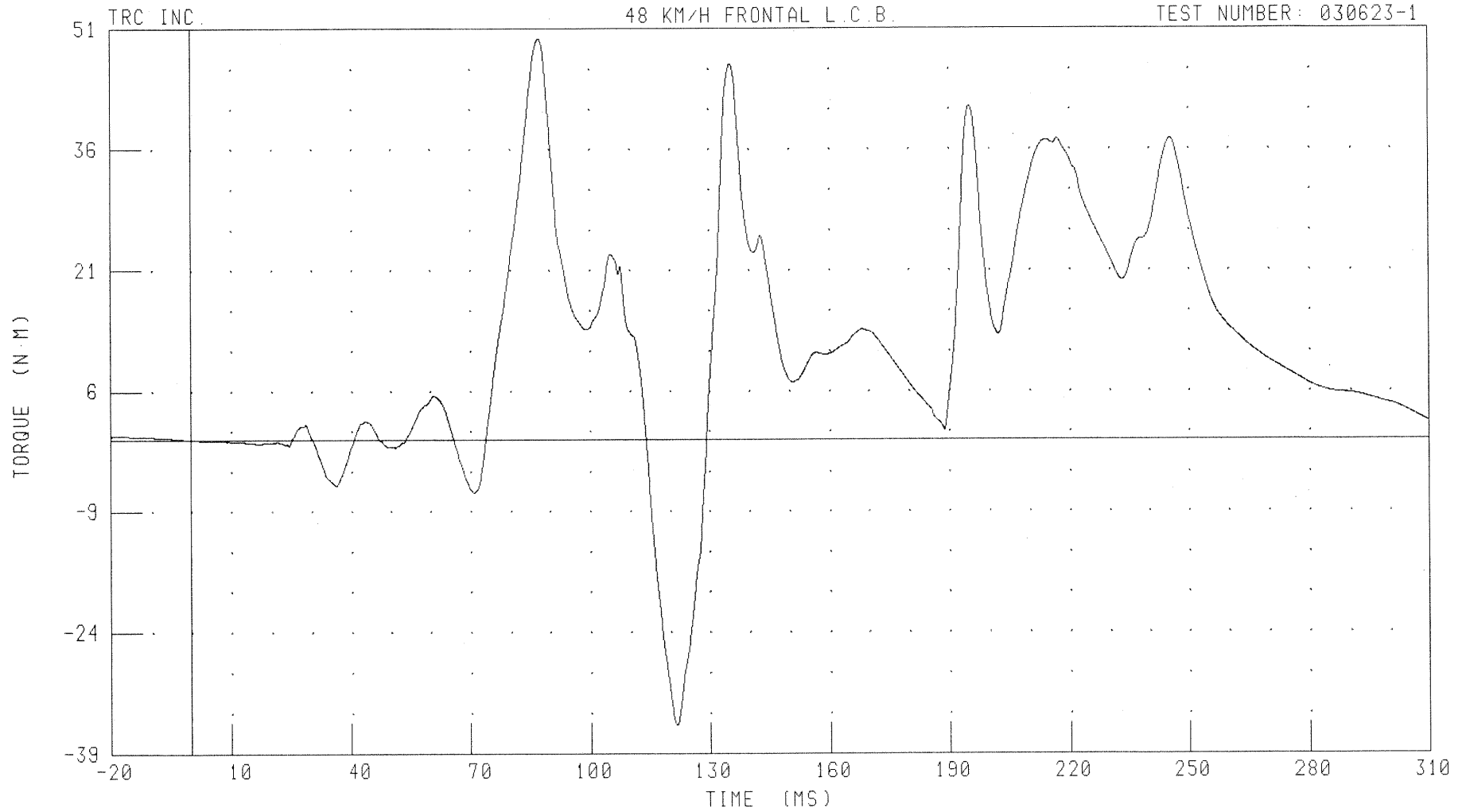
030623-1

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: 030623-1



CHANNEL: NEKYM1

FILTER: CH. CLASS 600

PEAK DATA: 49.80 N·M @ 87.60 MS, -35.46 N·M @ 121.68 MS

B-27

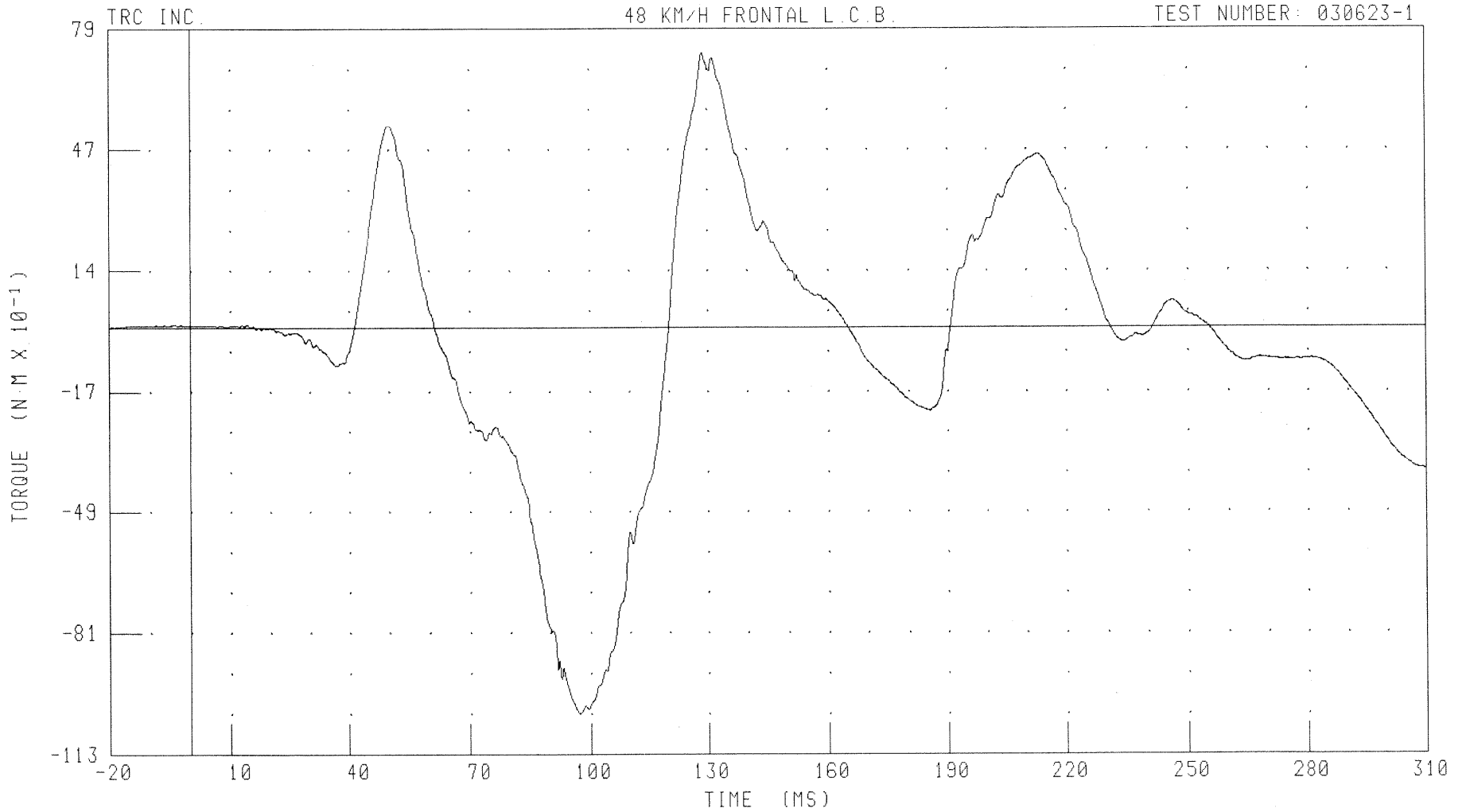
030623-1

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: 030623-1



CHANNEL: NEKZM1

FILTER: CH. CLASS 600

PEAK DATA: 7.25 N·M @ 128.88 MS, -10.24 N·M @ 97.36 MS

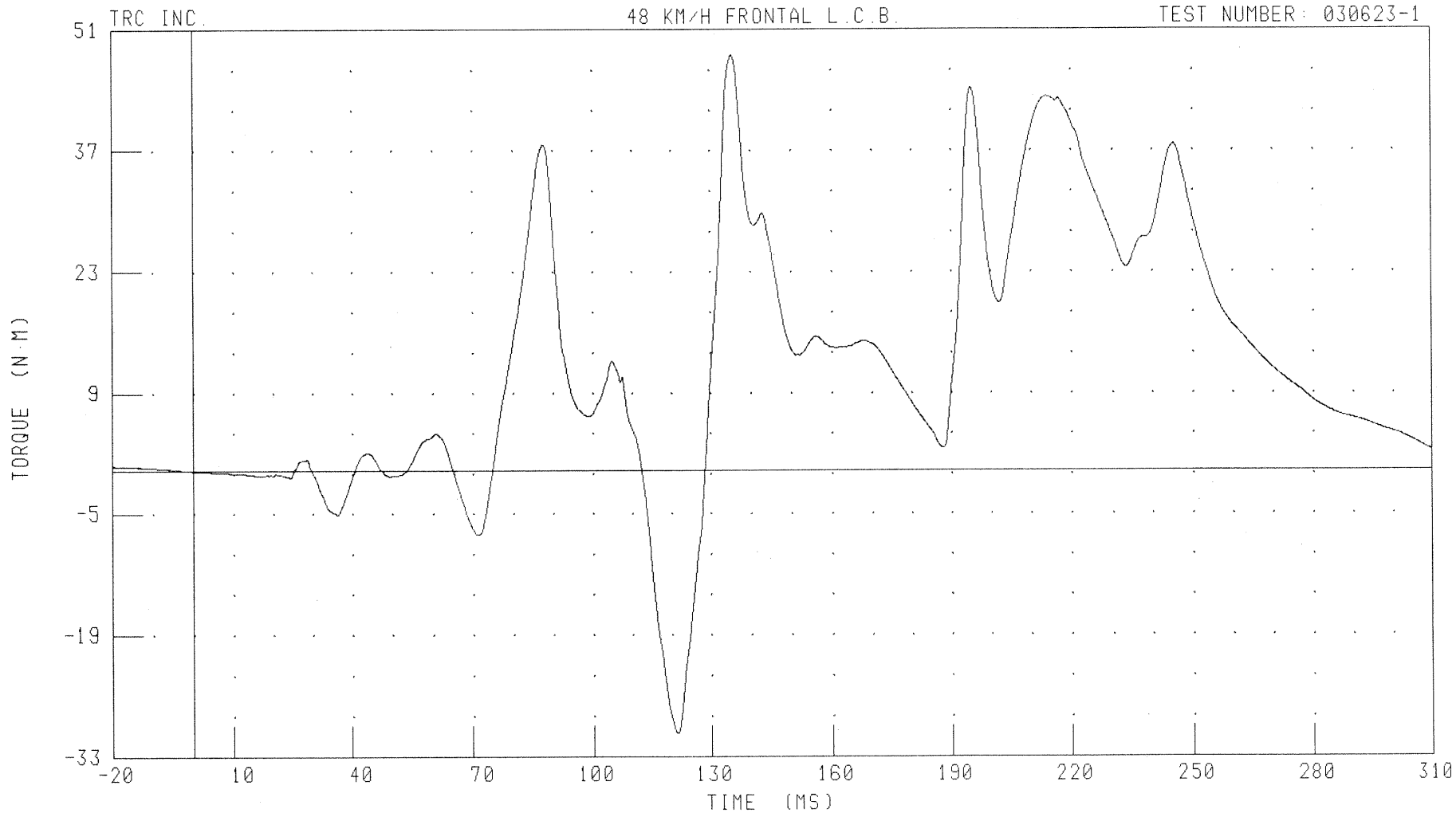
B-28

030623-1

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: 030623-1



CHANNEL: NEKOM1

FILTER: CH. CLASS 600

PEAK DATA: 48.05 N·M @ 135.52 MS; -30.31 N·M @ 121.44 MS

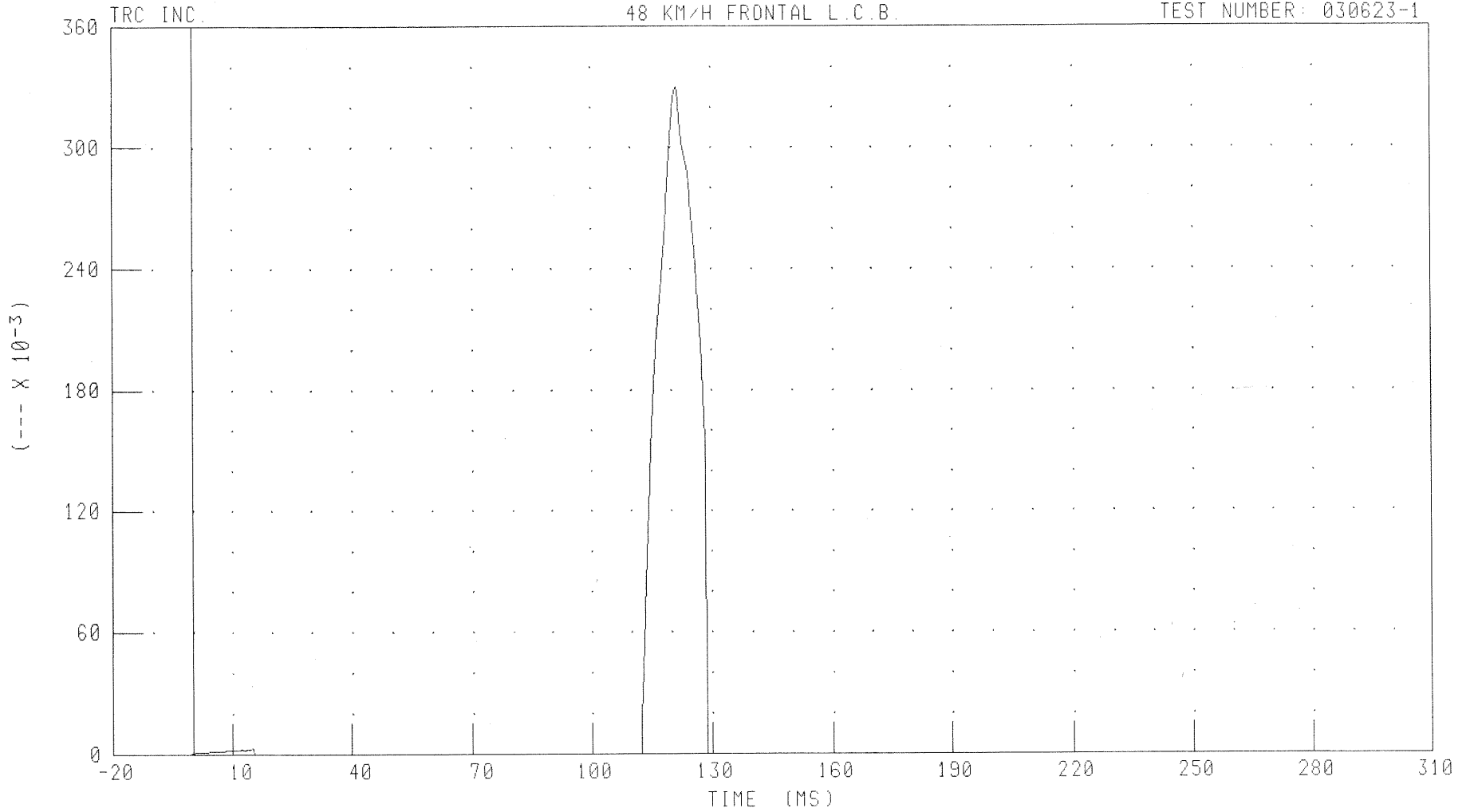
B-29

030623-1

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: 030623-1



CHANNEL: NTE1

FILTER: CH. CLASS 600

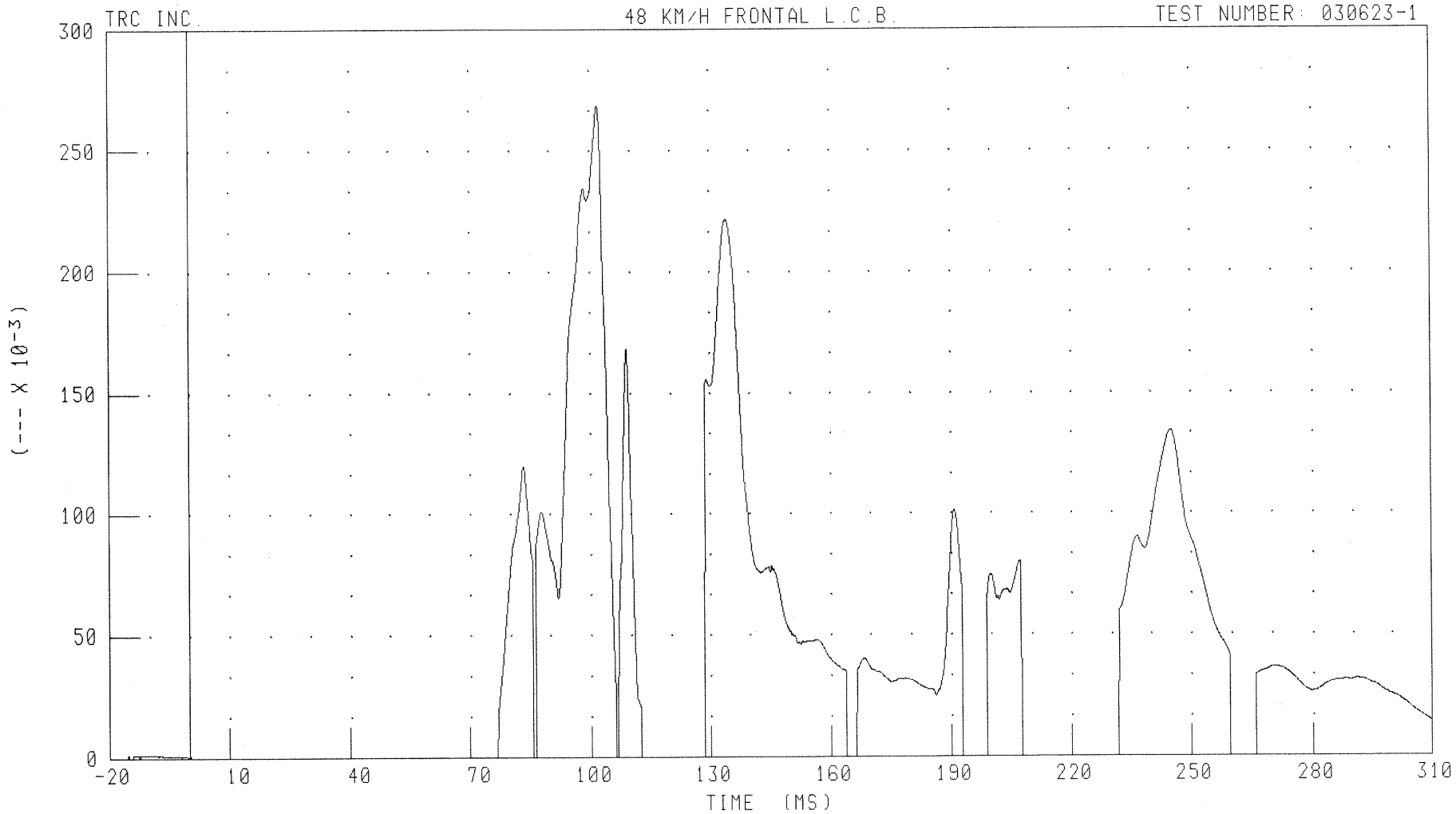
PEAK DATA: 0.33 --- @ 121.60 MS; 0.00 --- @ -20.00 MS

B-30

030623-1

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: 030623-1



CHANNEL: NTF1

FILTER: CH. CLASS 600

PEAK DATA: 0.27 --- @ 102.16 MS; 0.00 --- @ -20.00 MS

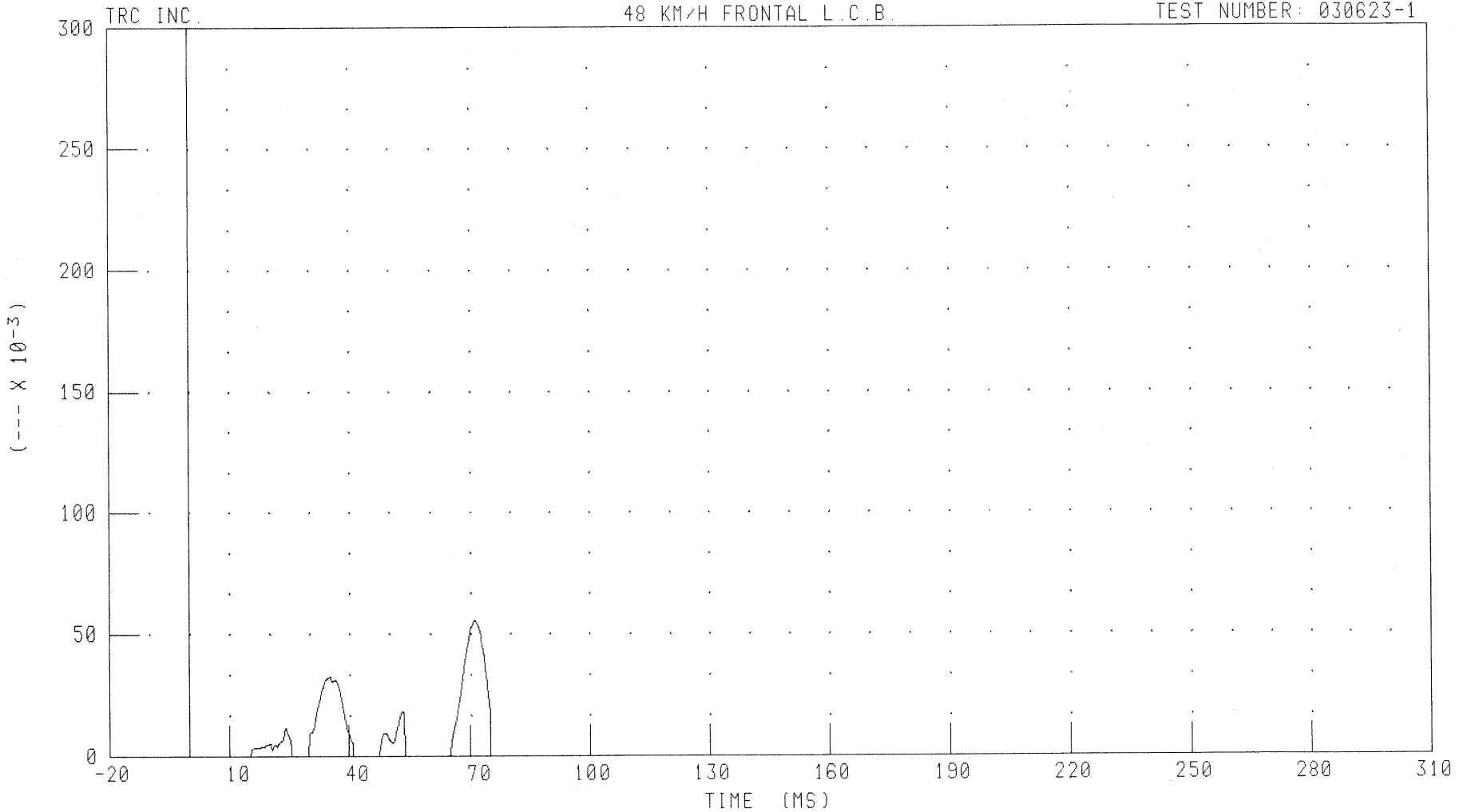
B-31

030623-1

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: 030623-1



CHANNEL: NCE1

FILTER: CH. CLASS 600

PEAK DATA: 0.06 --- @ 70.96 MS; 0.00 --- @ -20.00 MS

B-32

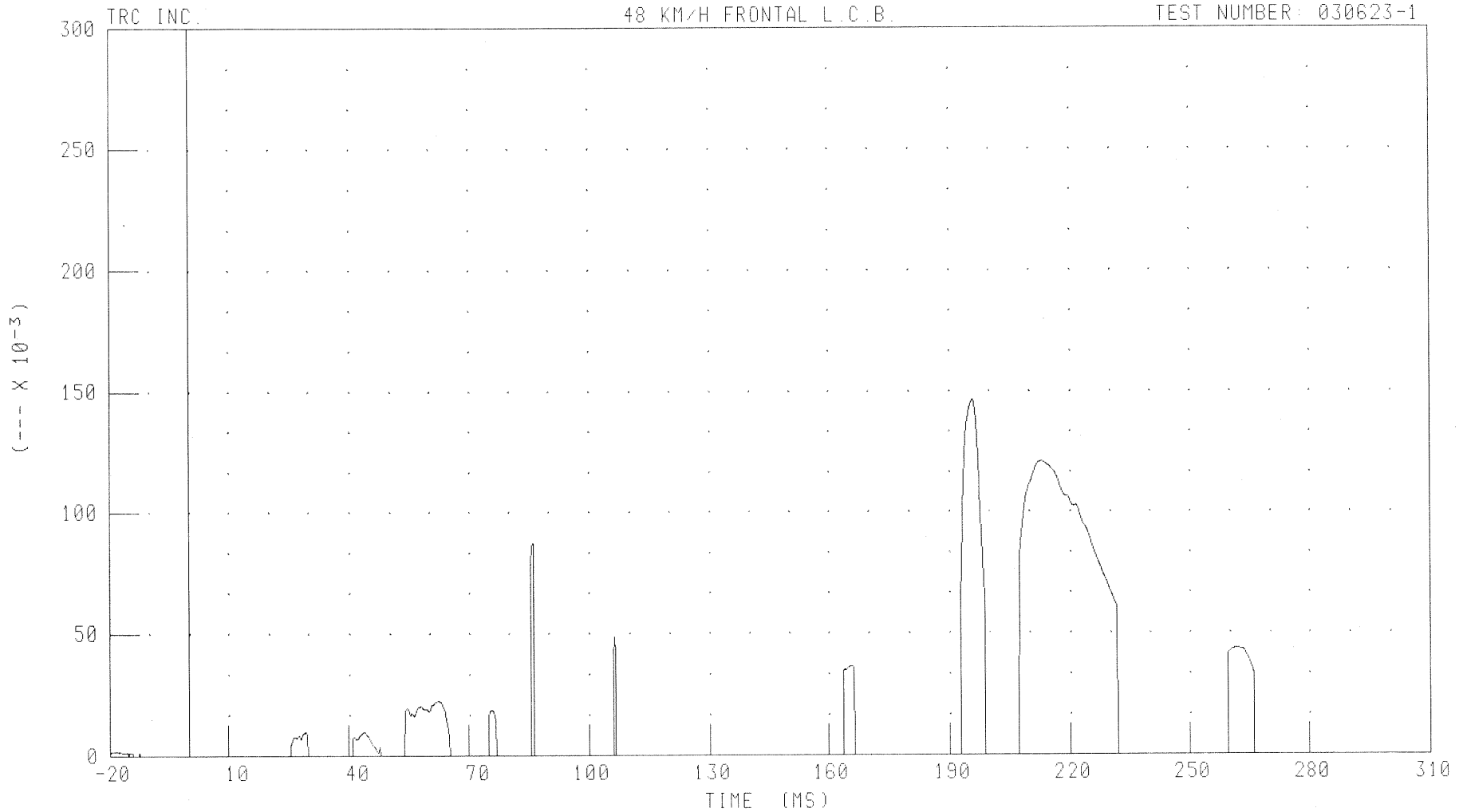
030623-1

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: 030623-1



CHANNEL: NCF1

FILTER: CH CLASS 600

PEAK DATA: 0 15 --- @ 196 00 MS; 0 00 --- @ -15 36 MS

B-33

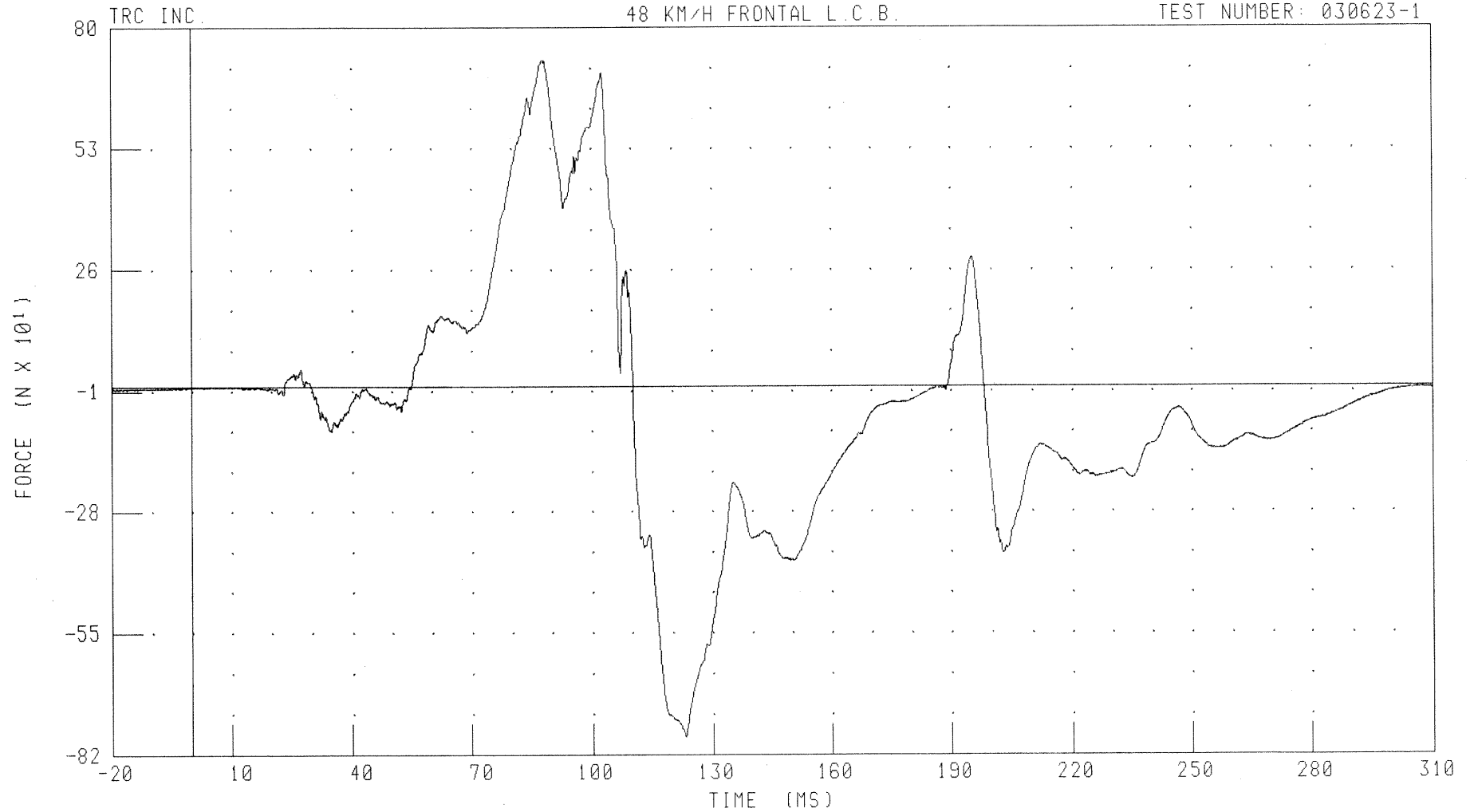
030623-1

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: 030623-1



CHANNEL: NKLXF1 FILTER: CH. CLASS 1000

PEAK DATA: 728.28 N @ 87.92 MS; -782.37 N @ 123.20 MS

B-34

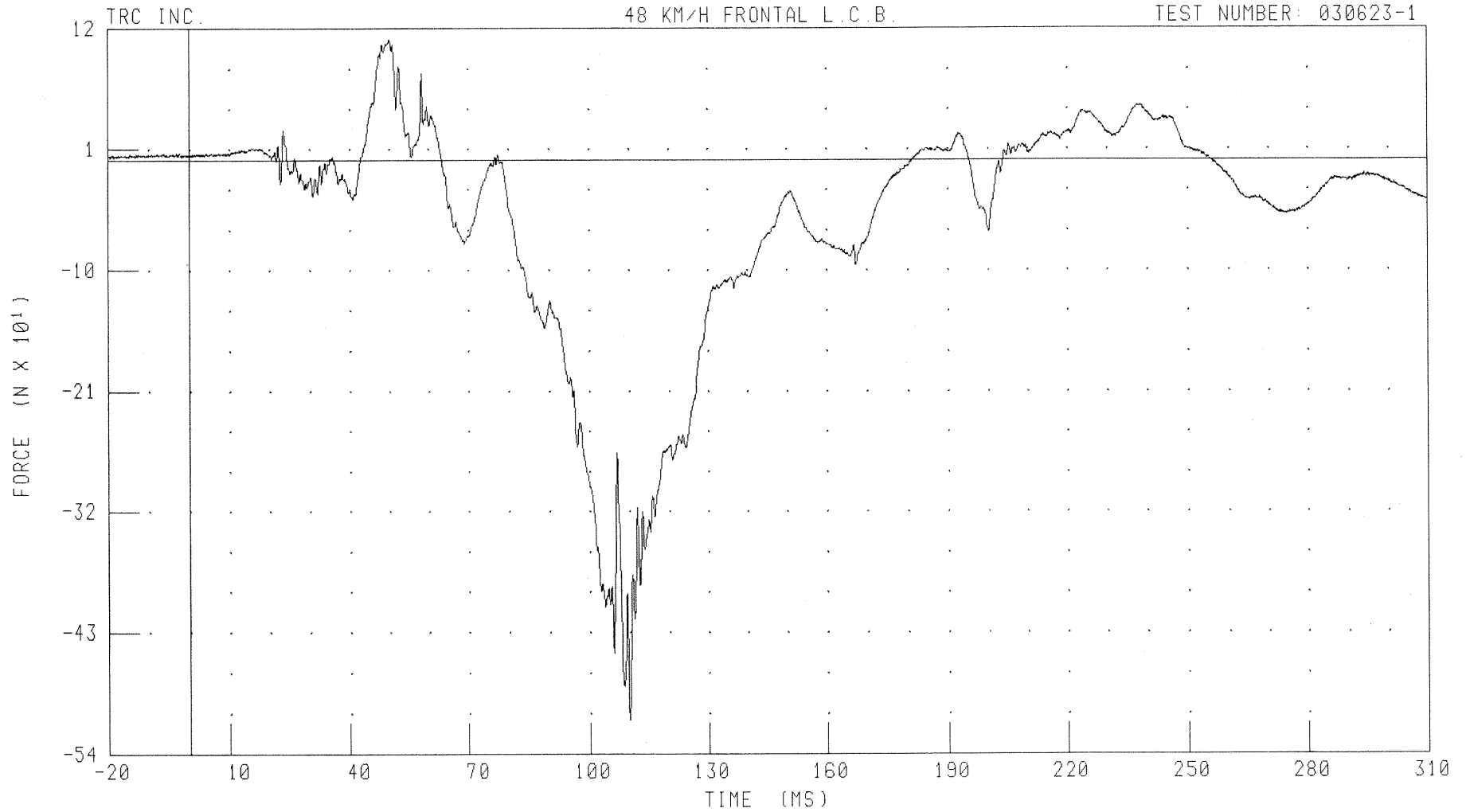
030623-1

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: 030623-1



CHANNEL: NKLYF1

FILTER: CH. CLASS 1000

PEAK DATA: 110.20 N @ 50.24 MS; -509.76 N @ 110.00 MS

B-35

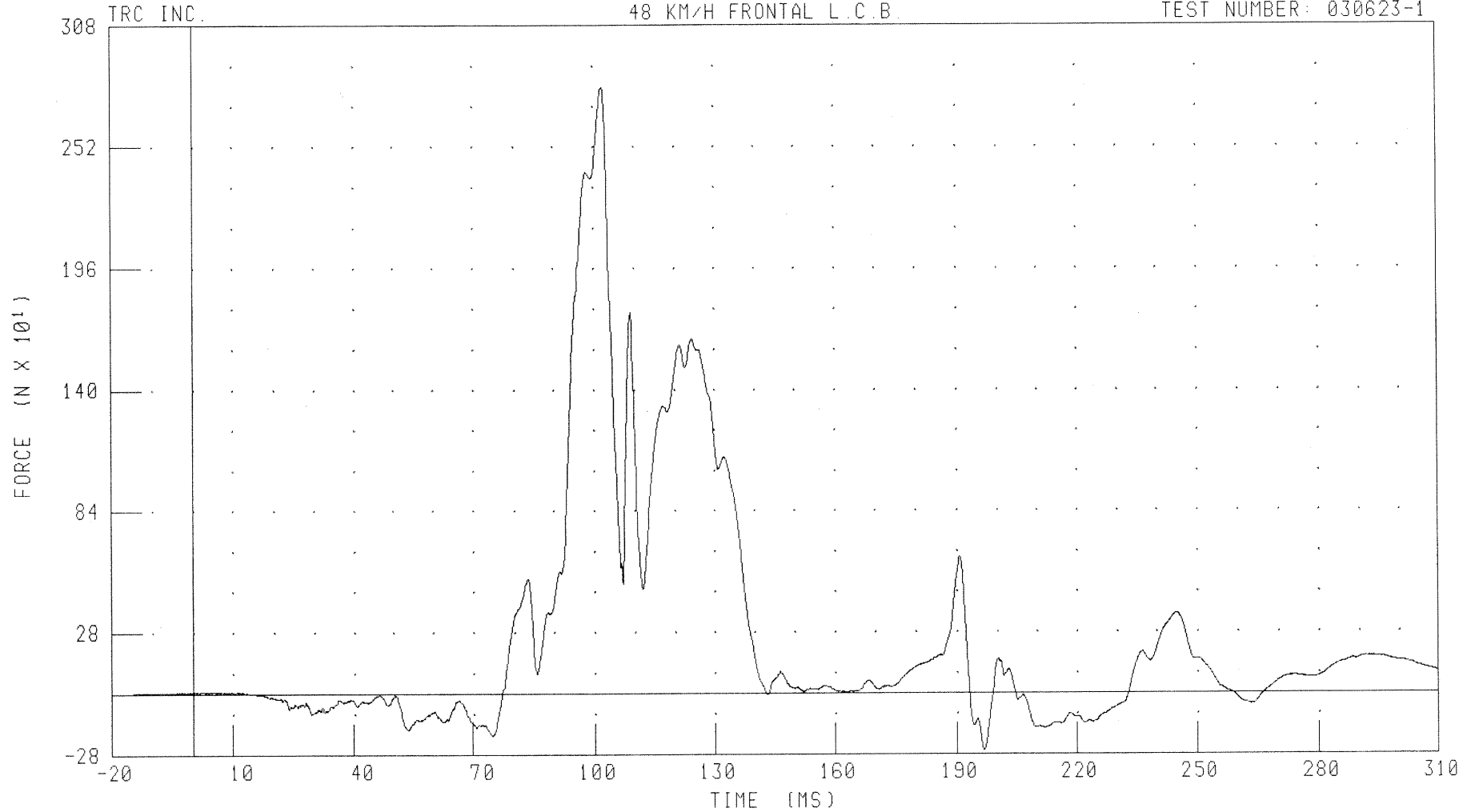
030623-1

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: 030623-1



CHANNEL: NKLZF1

FILTER: CH. CLASS 1000

PEAK DATA: 2798.16 N @ 102.40 MS, -260.54 N @ 196.80 MS

B-36

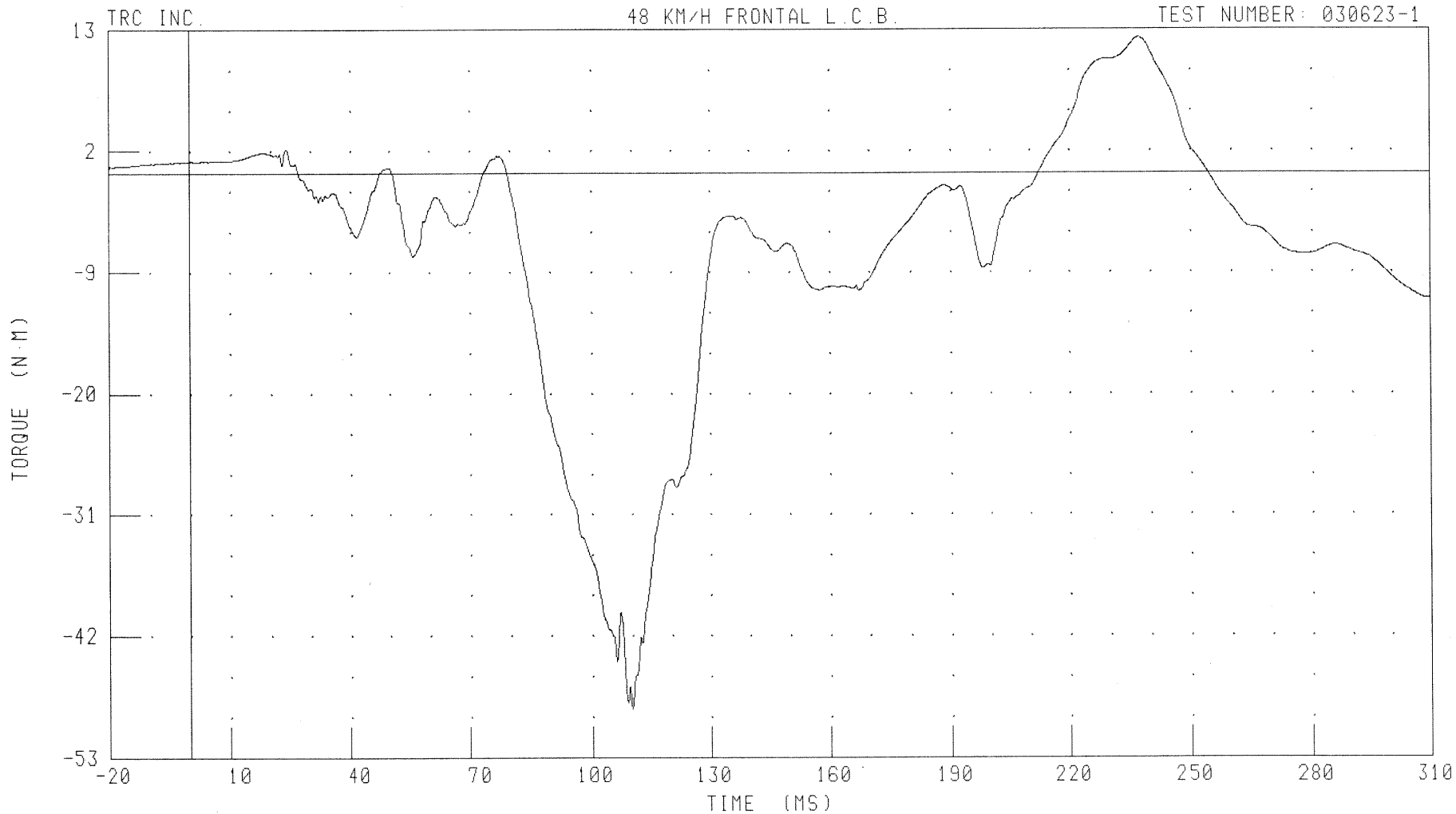
030623-1

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: 030623-1



CHANNEL: NKLXM1

FILTER: CH. CLASS 600

PEAK DATA: 12.25 N·M @ 237.44 MS; -48.60 N·M @ 110.00 MS

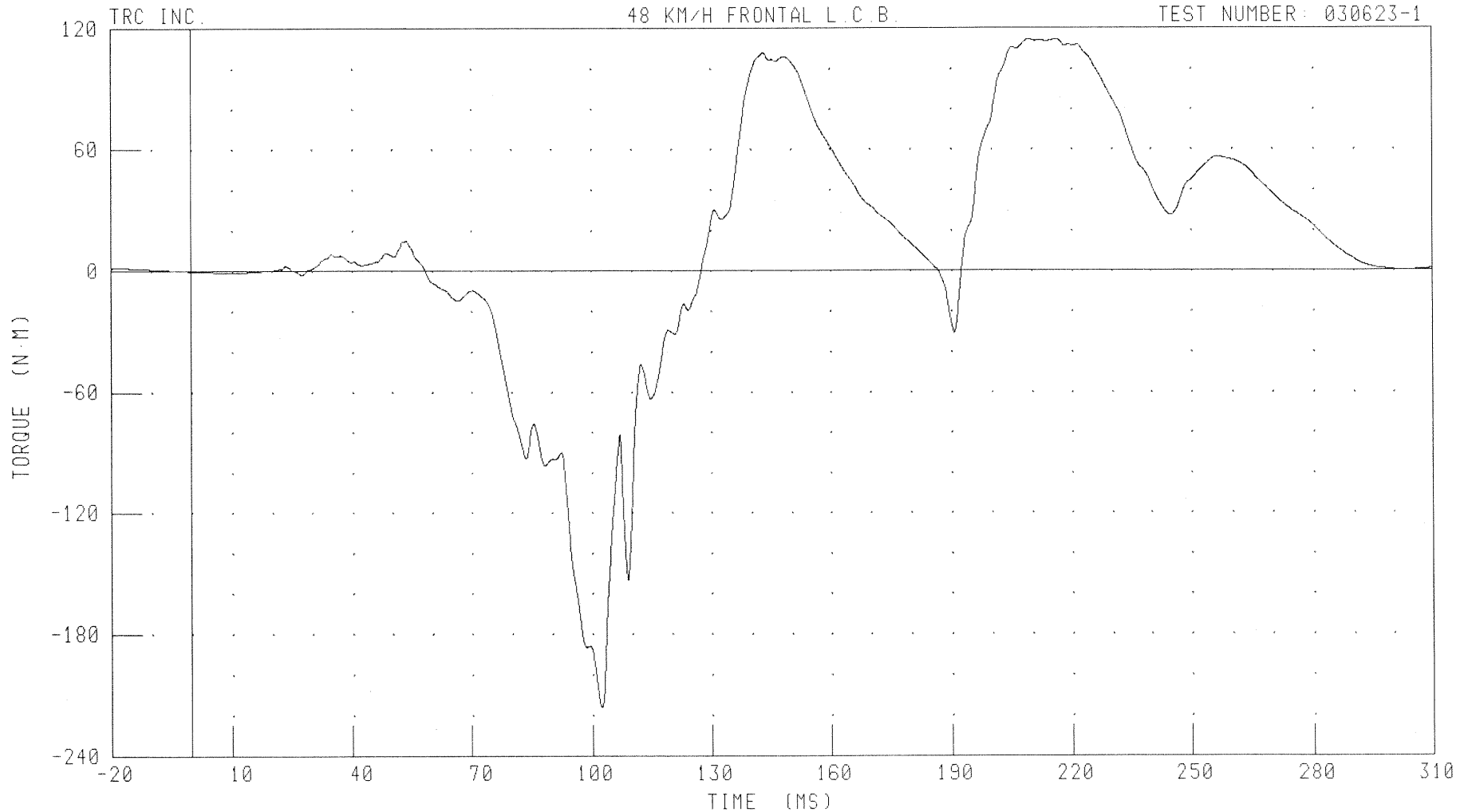
B-37

030623-1

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: 030623-1



CHANNEL: NKLYM1 FILTER: CH. CLASS 600

TIME (MS)

PEAK DATA: 114.76 N·M @ 209.36 MS; -215.96 N·M @ 102.40 MS

B-38

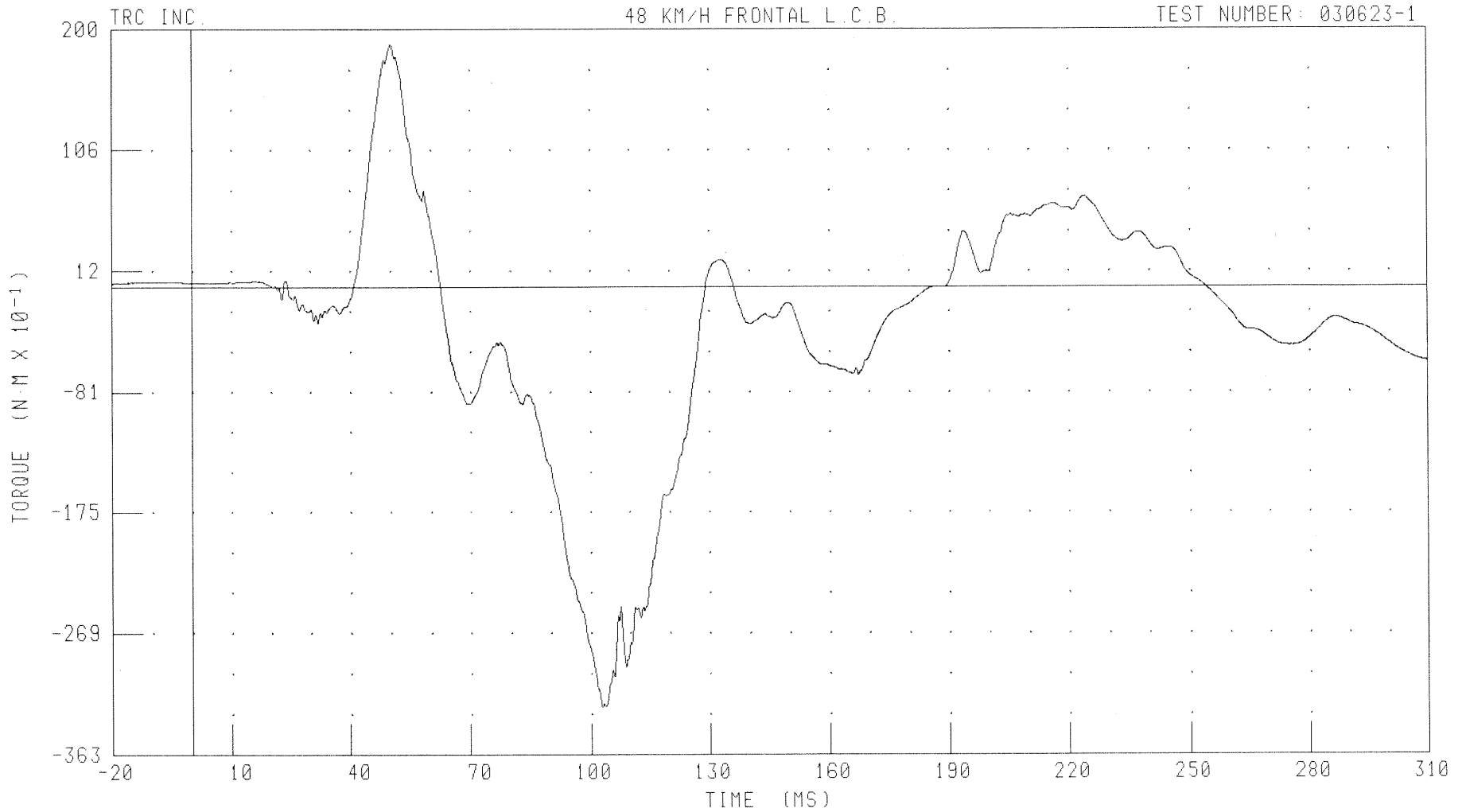
030623-1

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: 030623-1



CHANNEL: NKLZM1 FILTER: CH. CLASS 600

PEAK DATA: 18.85 N.M @ 50.32 MS; -32.76 N.M @ 102.88 MS

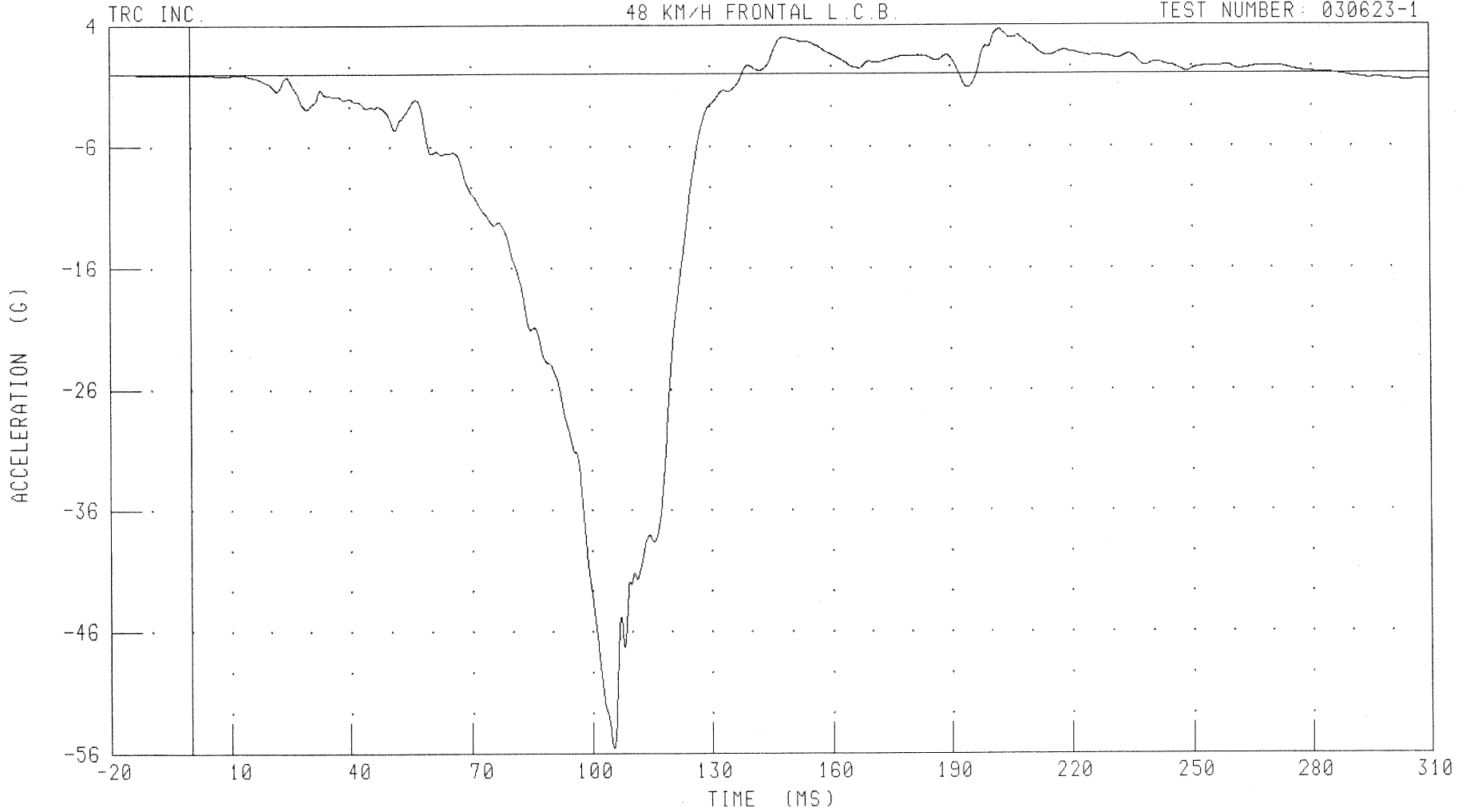
B-39

030623-1

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: 030623-1



CHANNEL: CSTXG1 FILTER: CH. CLASS 180

PEAK DATA: 3.68 G @ 202.72 MS; -55.55 G @ 105.44 MS

B-40

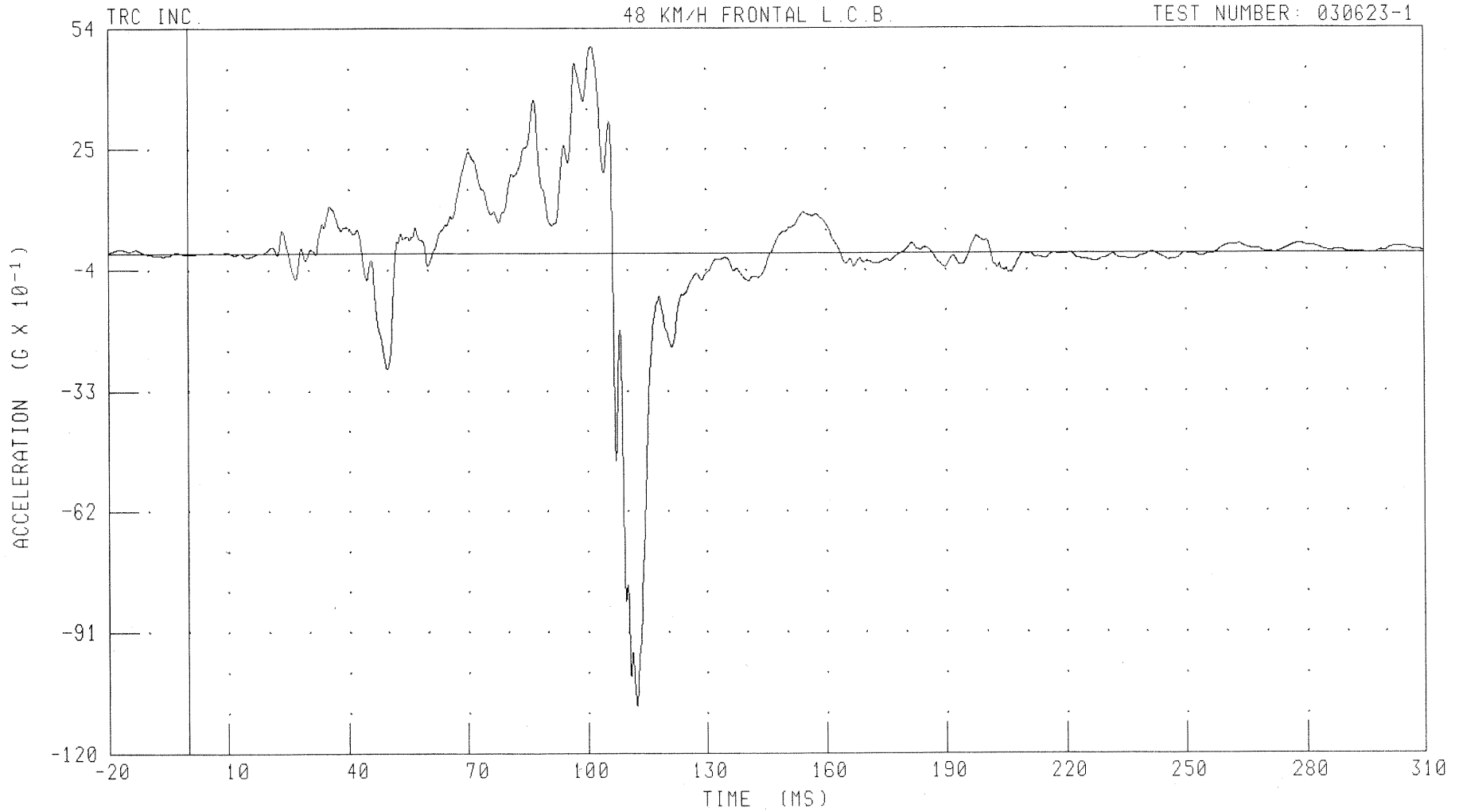
030623-1

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: 030623-1



CHANNEL: CSTYG1 FILTER: CH. CLASS 180

PEAK DATA: 4.97 G @ 101.28 MS; -10.86 G @ 112.24 MS

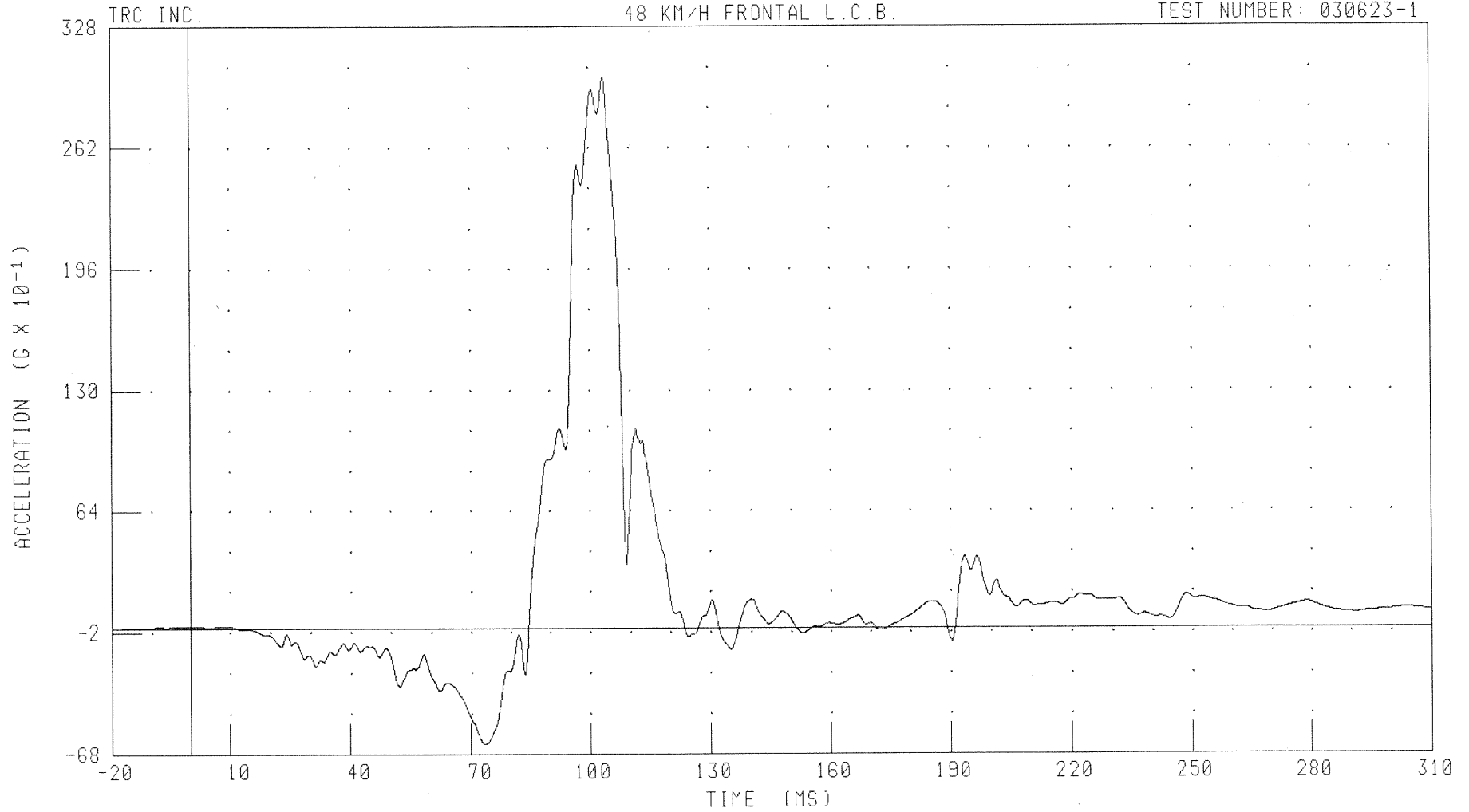
B-41

030623-1

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: 030623-1



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

PEAK DATA: 30.07 G @ 103.76 MS; -6.25 G @ 73.36 MS

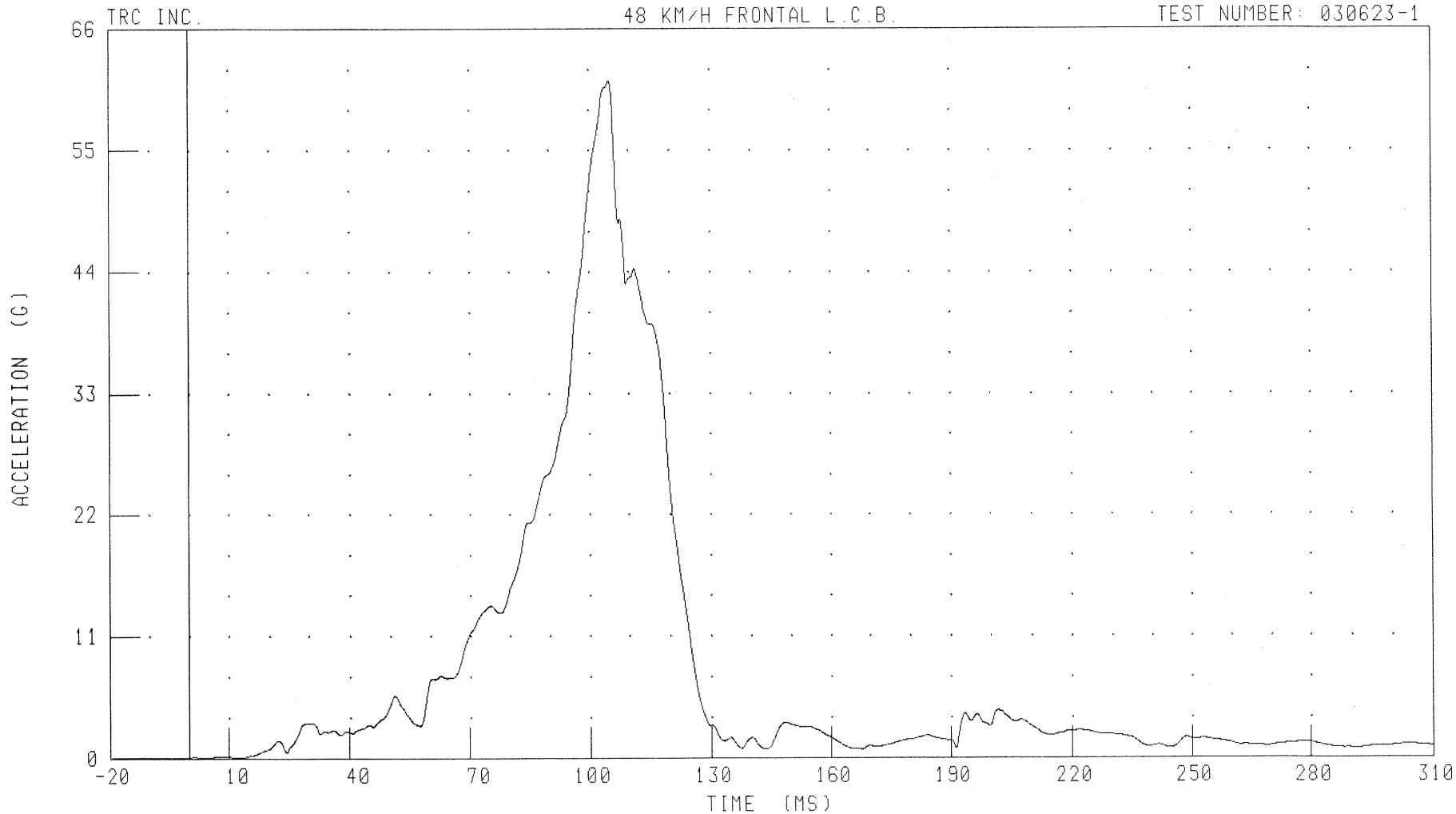
B-42

030623-1

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: 030623-1



CHANNEL: CSTRG1 FILTER: CH. CLASS 180

PEAK DATA: 61.32 G @ 105.28 MS; 0.00 G @ -20.00 MS

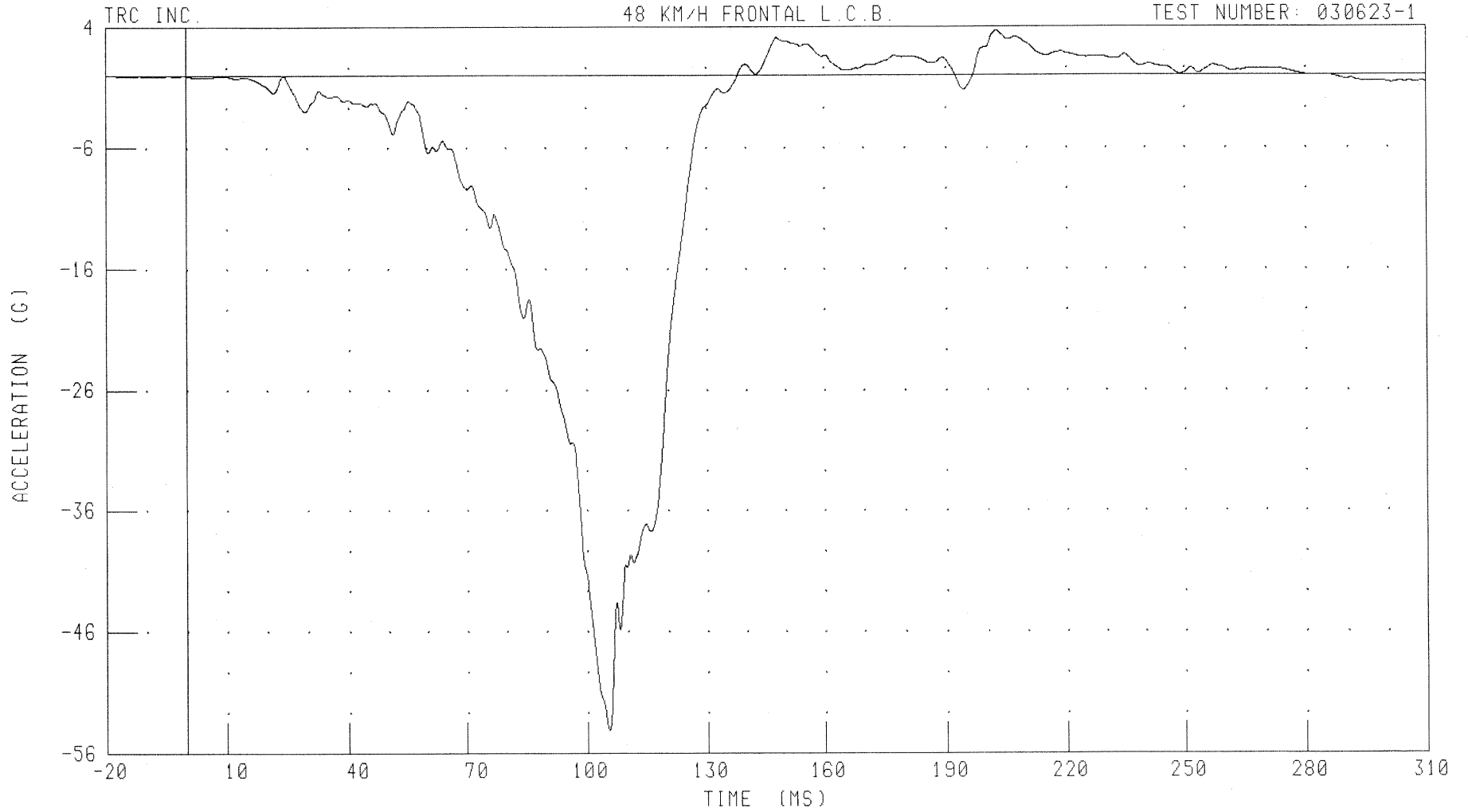
B-43

030623-1

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: 030623-1



CHANNEL: CSTXR1 FILTER: CH CLASS 180

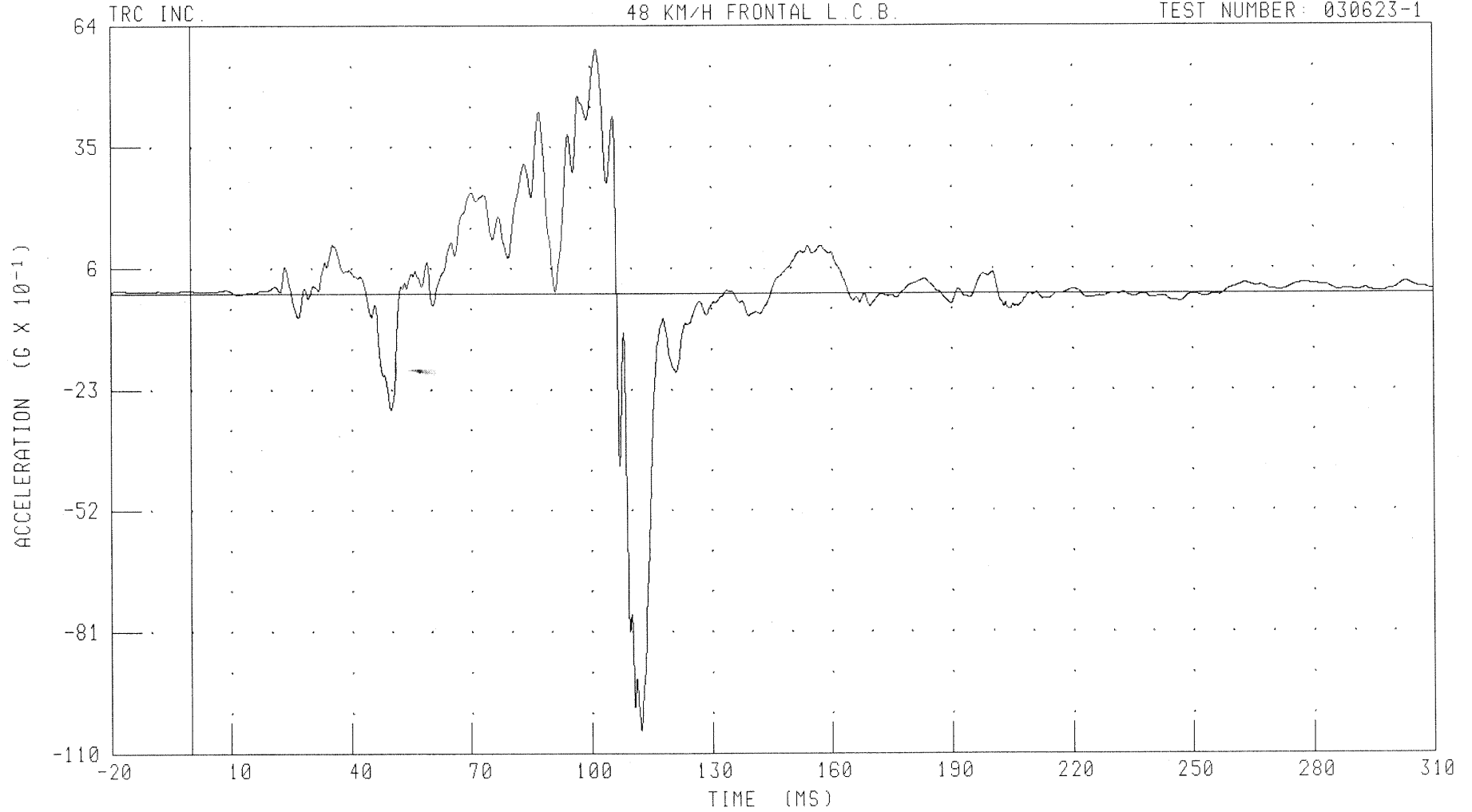
PEAK DATA: 3.71 G @ 202.72 MS; -54.11 G @ 105.52 MS

B-44

030623-1

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: 030623-1



CHANNEL: CSTYR1

FILTER: CH. CLASS 180

PEAK DATA: 5.84 G @ 101.68 MS; -10.45 G @ 112.24 MS

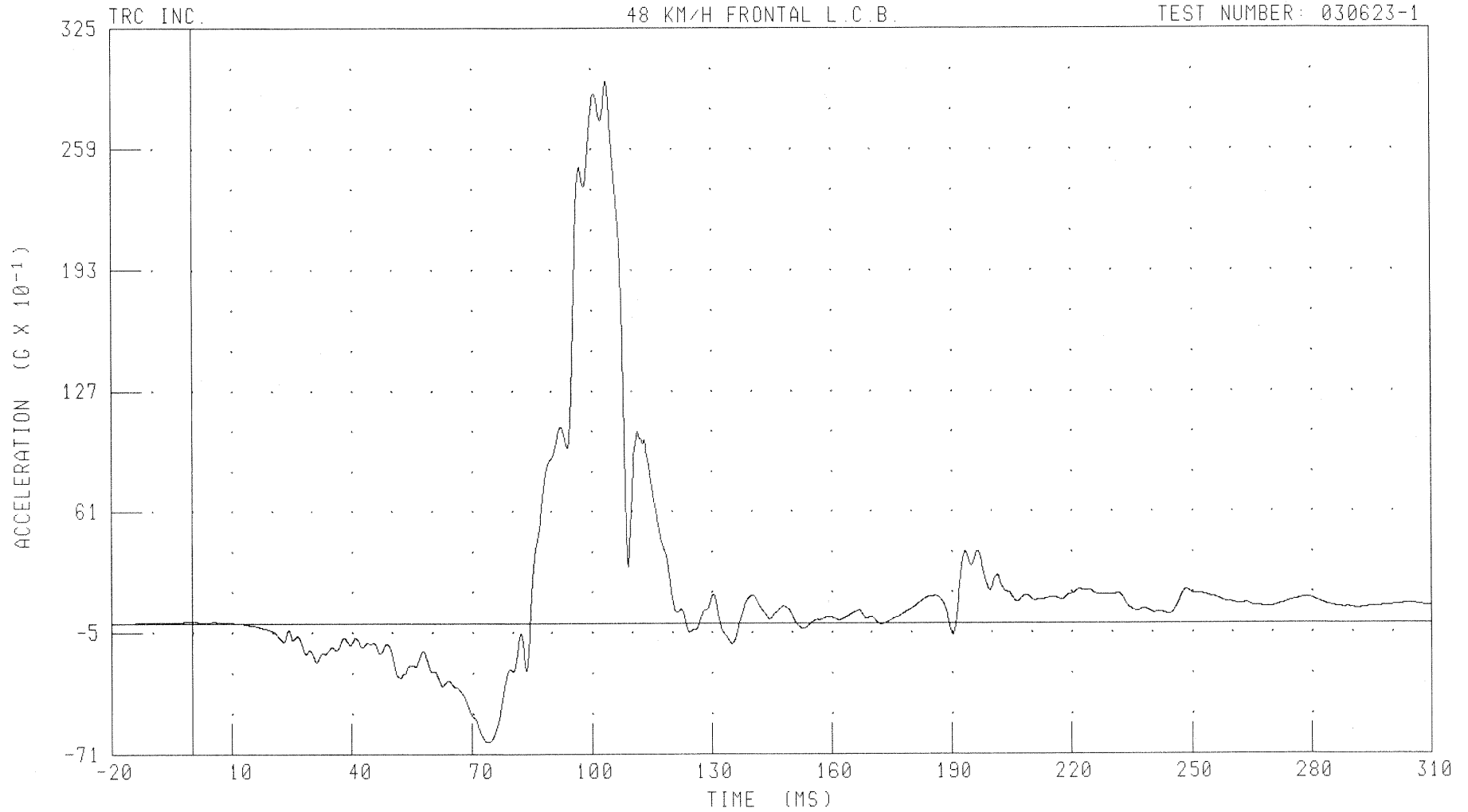
B-45

030623-1

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: 030623-1



CHANNEL: CSTZR1 FILTER: CH. CLASS 180

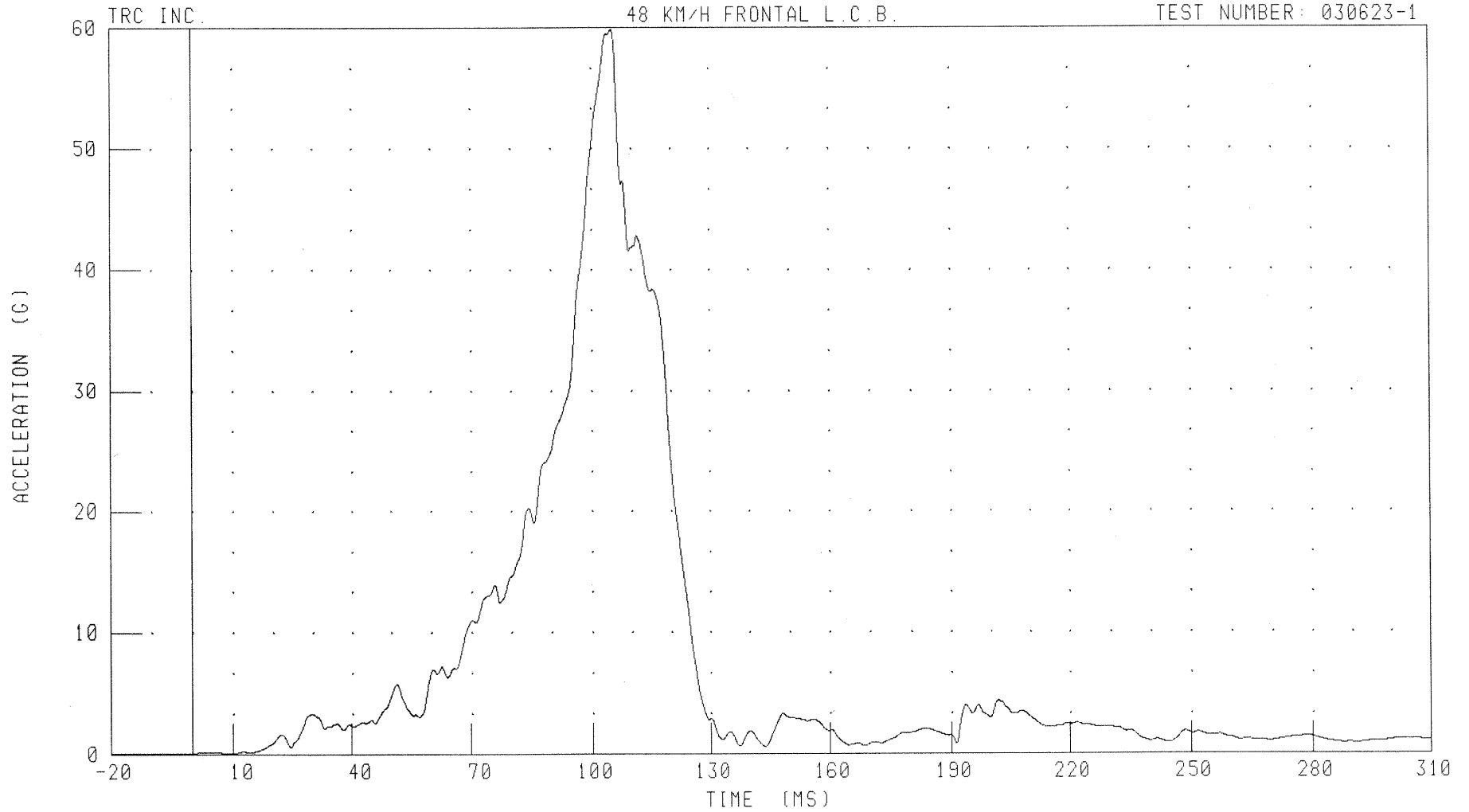
PEAK DATA: 29.63 G @ 103.84 MS; -6.46 G @ 73.92 MS

B-46

030623-1

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

TEST NUMBER: 030623-1



CHANNEL: CSTRR1 FILTER: CH. CLASS 180

PEAK DATA: 59.84 G @ 105.28 MS, 0.01 G @ -20.00 MS

B-47

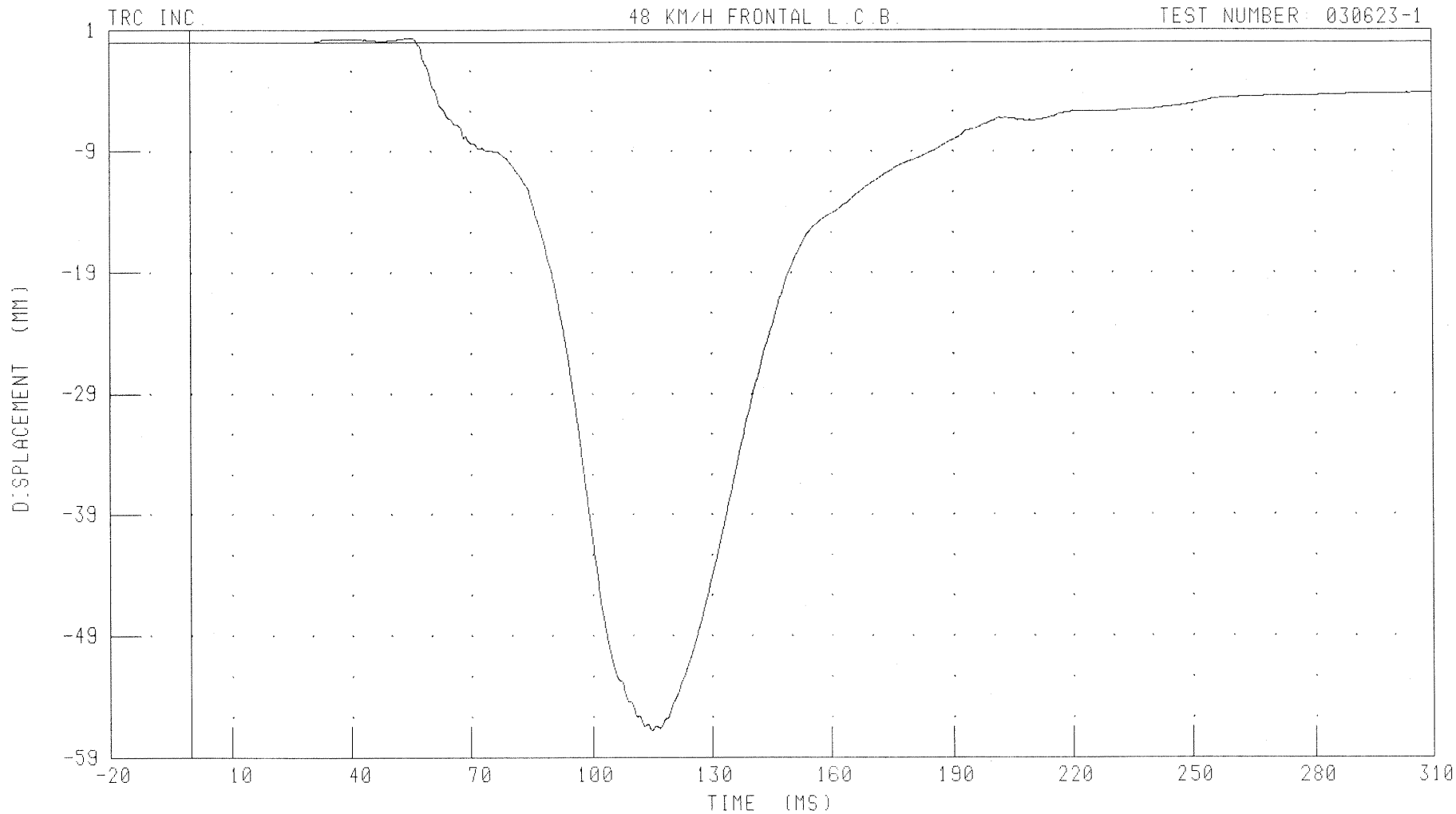
030623-1

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

DRIVER CHEST DEFLECTION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: CSTXD1

FILTER: CH CLASS 600

PEAK DATA: 0.33 MM @ 55.76 MS; -56.81 MM @ 114.88 MS

B-48

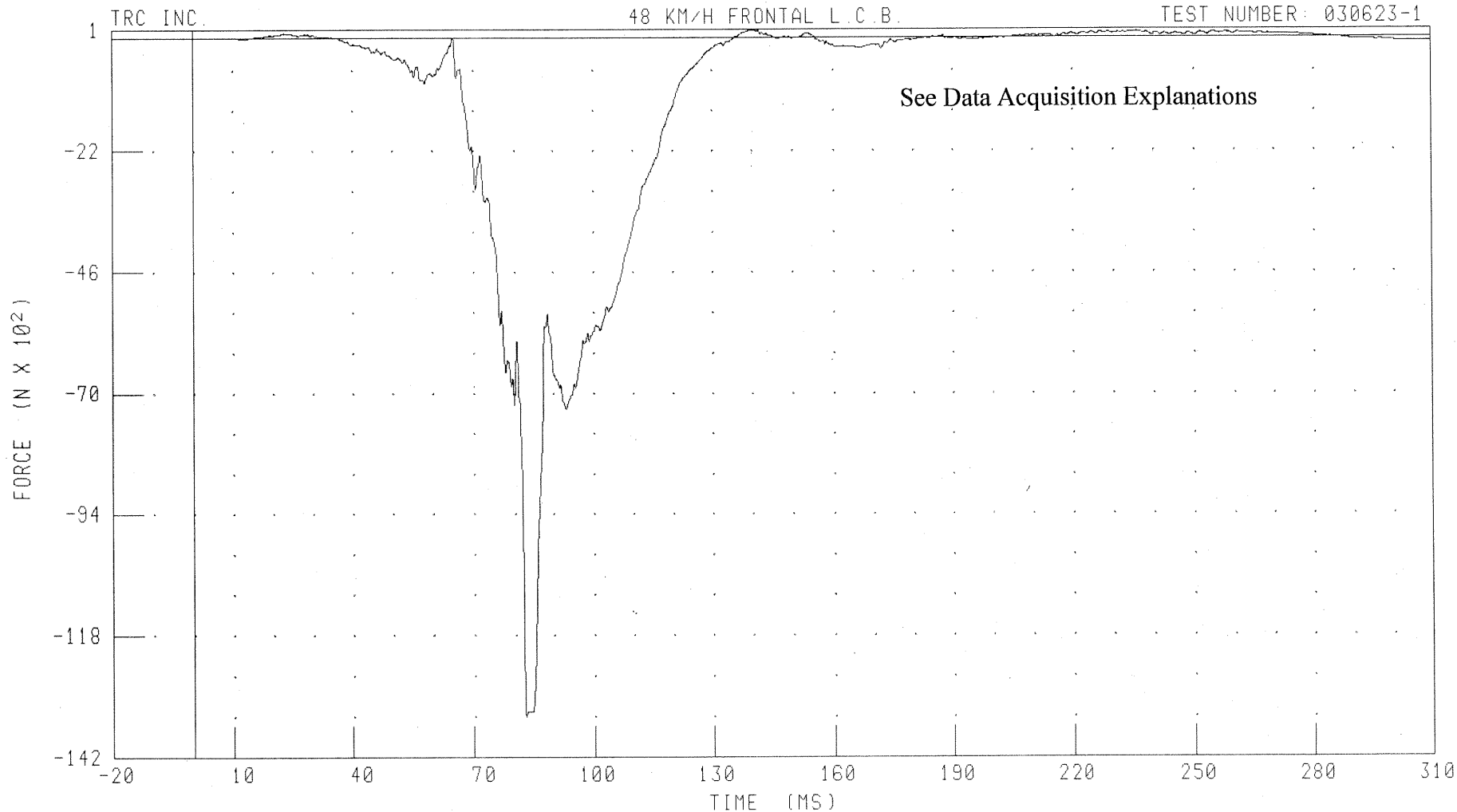
030623-1

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: 030623-1



See Data Acquisition Explanations

CHANNEL: LFMZF1 FILTER: CH. CLASS 600

PEAK DATA: 153.96 N @ 140.16 MS, -1345.73 N @ 82.72 MS

B-49

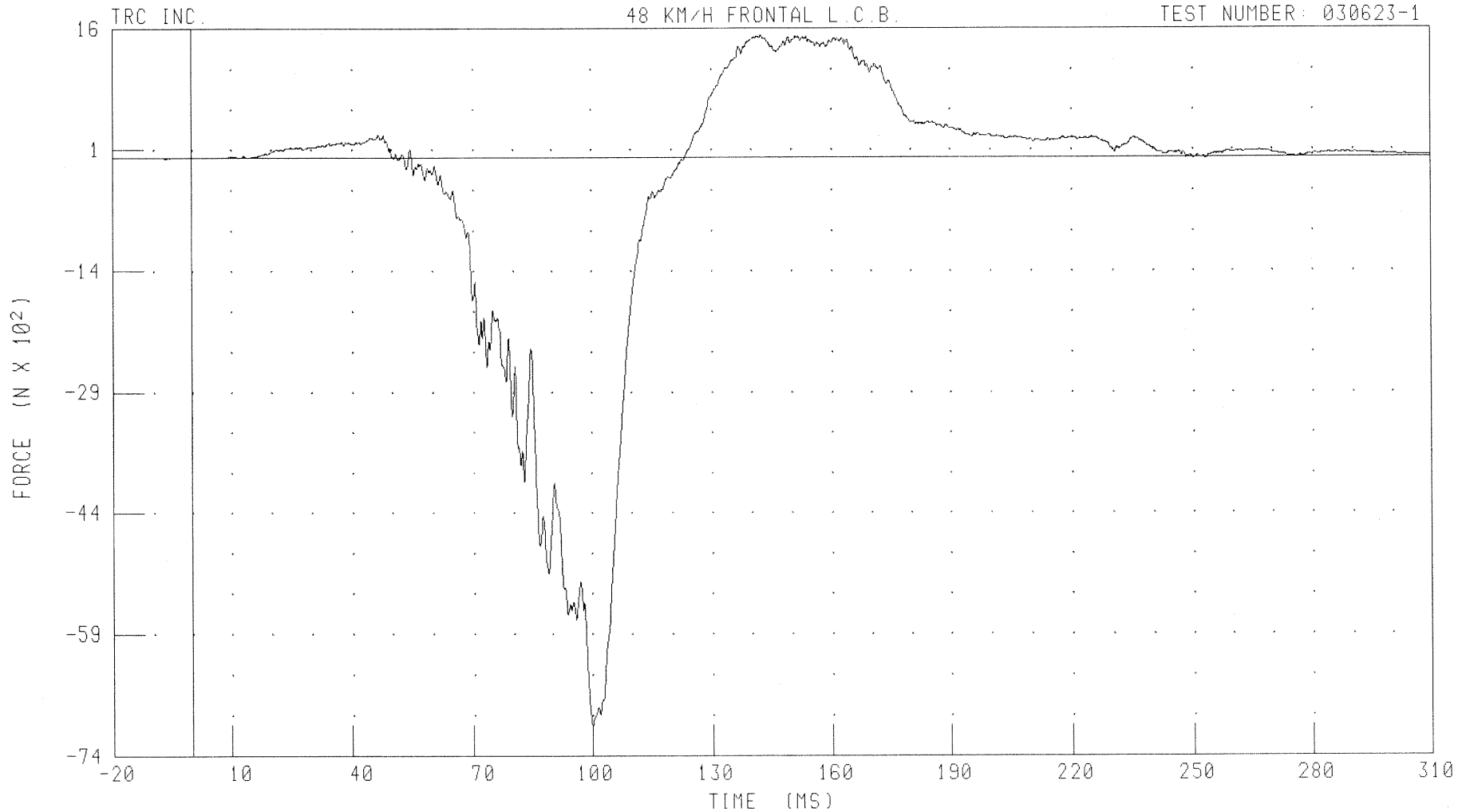
030623-1

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: 030623-1



CHANNEL: RFMZFI FILTER: CH. CLASS 600

PEAK DATA: 1513.42 N @ 142.72 MS; -7035.49 N @ 100.08 MS

B-50

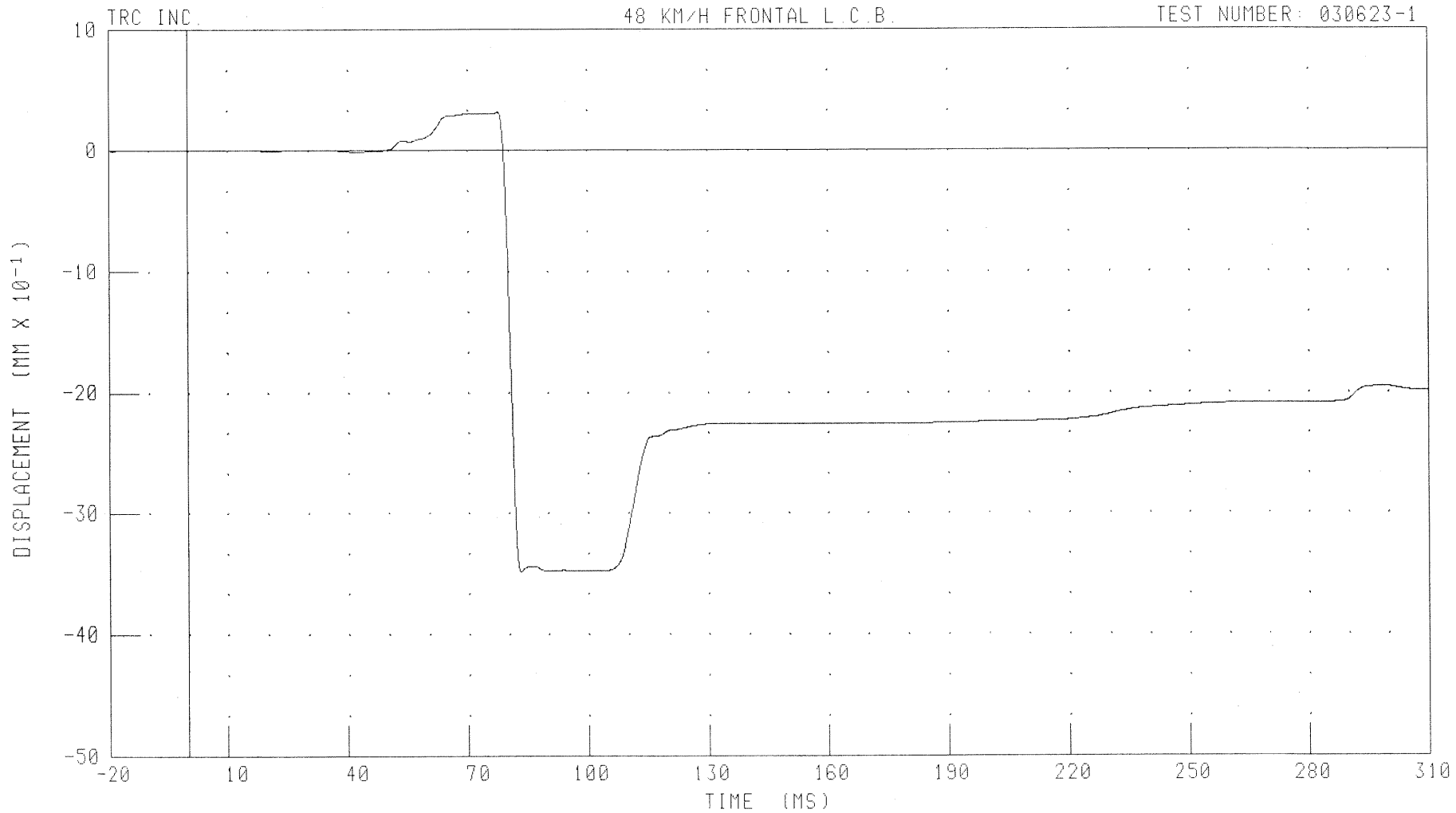
030623-1

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: 030623-1



CHANNEL: KNLXD1

FILTER: CH CLASS 180

PEAK DATA: 0.32 MM @ 77.60 MS, -3.49 MM @ 83.12 MS

B-51

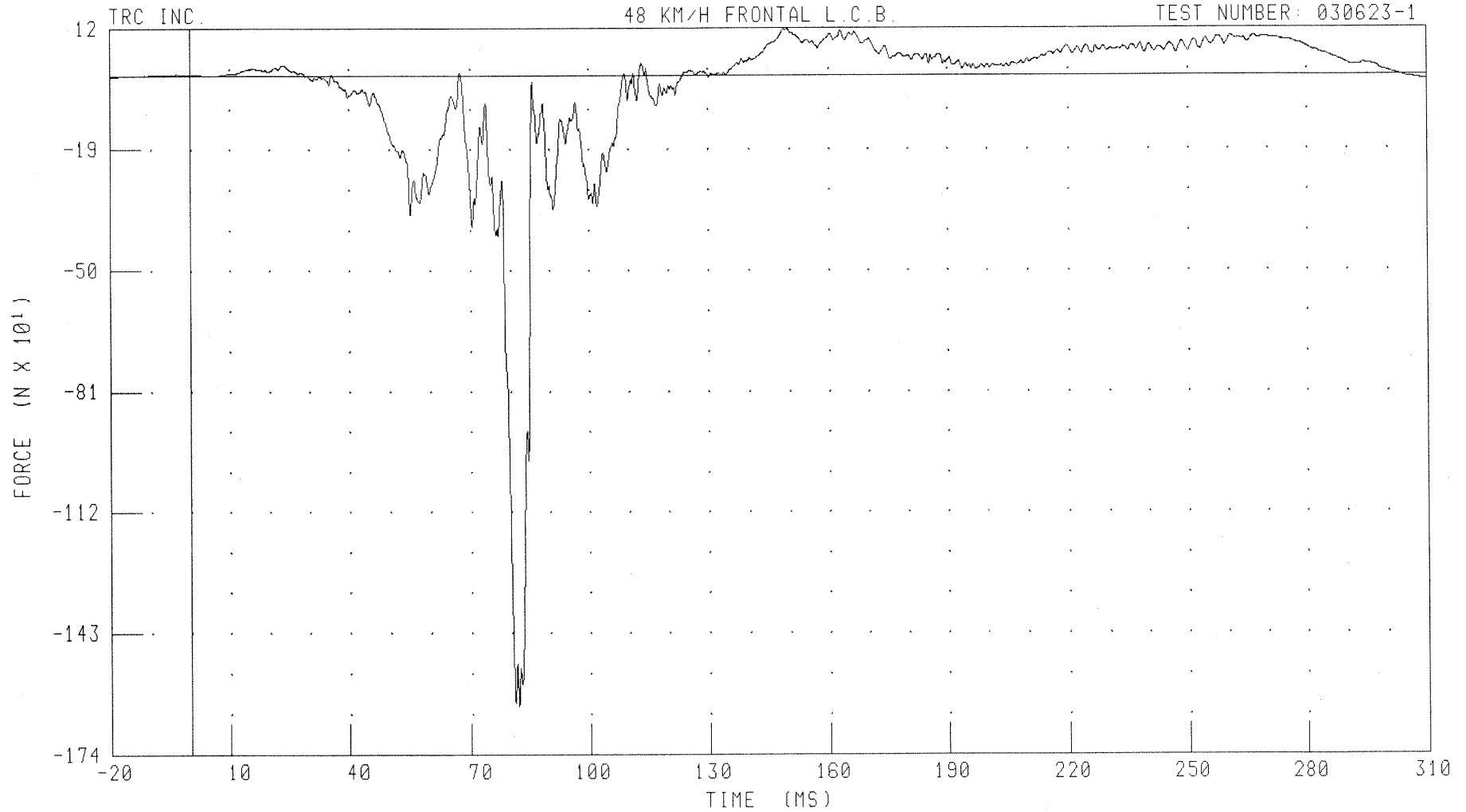
030623-1

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: 030623-1



CHANNEL: TBLXF1 FILTER: CH. CLASS 600

PEAK DATA: 117.60 N @ 149.76 MS, -1616.42 N @ 81.92 MS

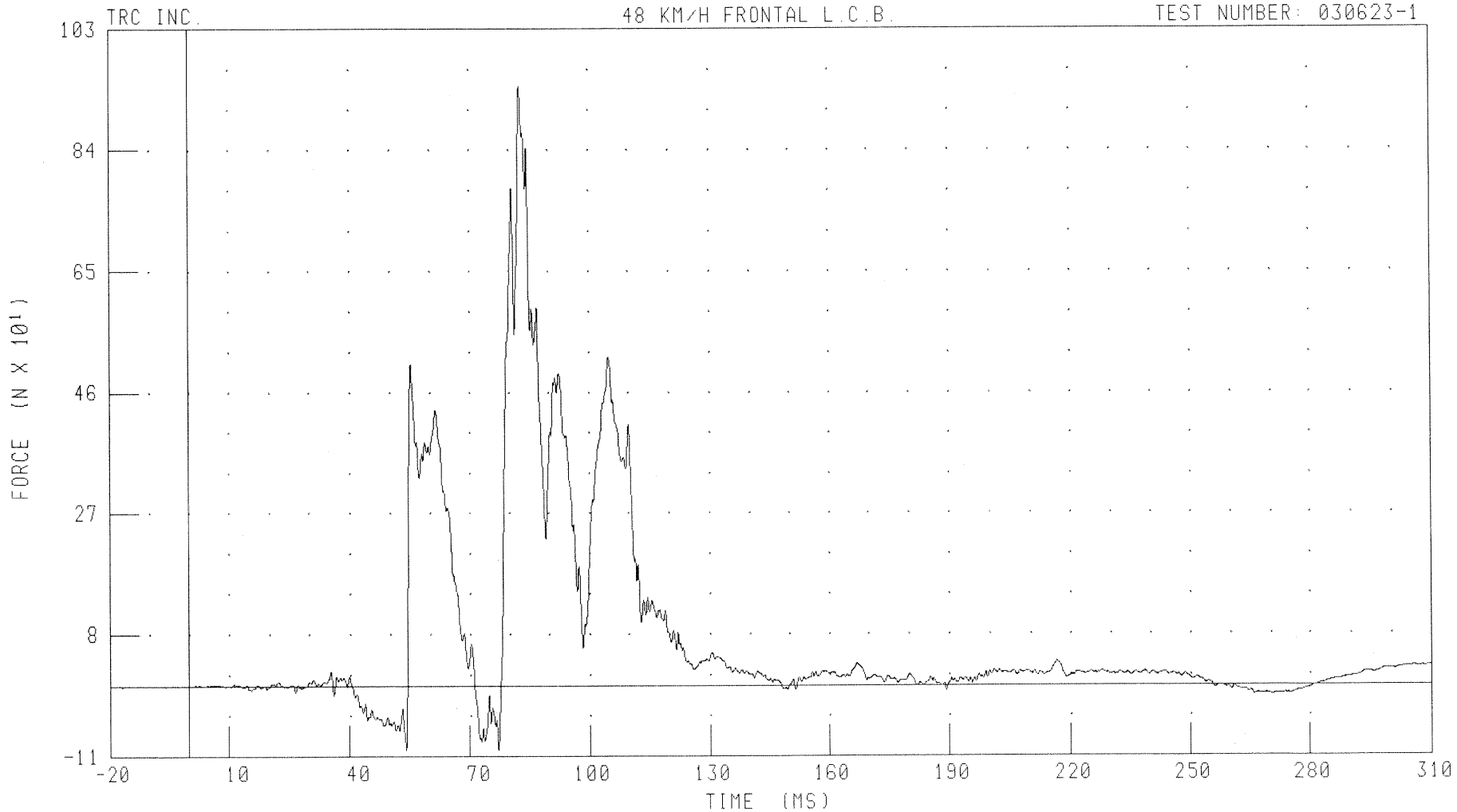
B-52

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: TBLYF1

FILTER: CH. CLASS 600

PEAK DATA: 940.58 N @ 82.96 MS; -100.70 N @ 53.92 MS

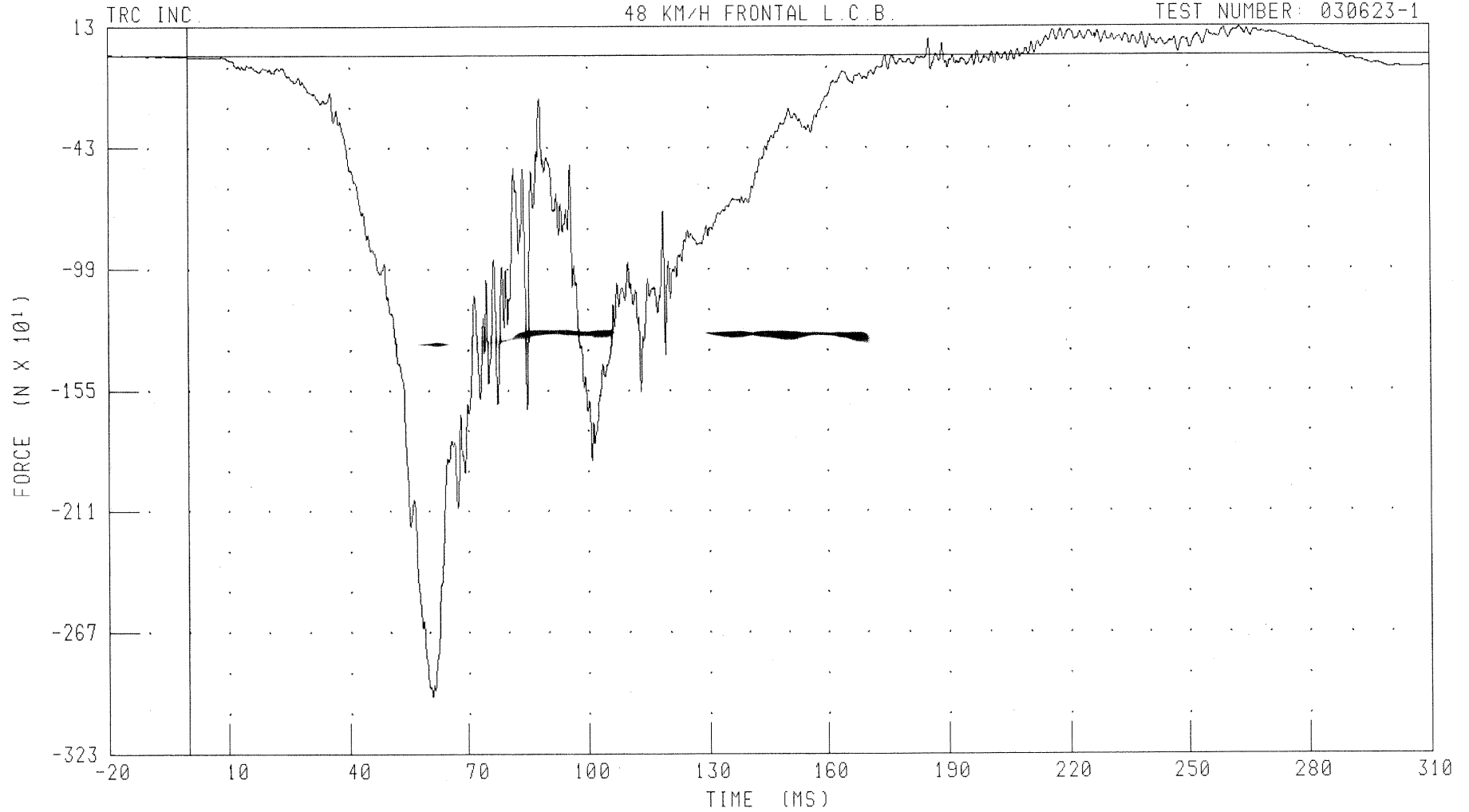
B-53

030623-1

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: 030623-1



CHANNEL: TBLZF1 FILTER: CH. CLASS 600

PEAK DATA: 124.09 N @ 263.04 MS; -2963.77 N @ 60.88 MS

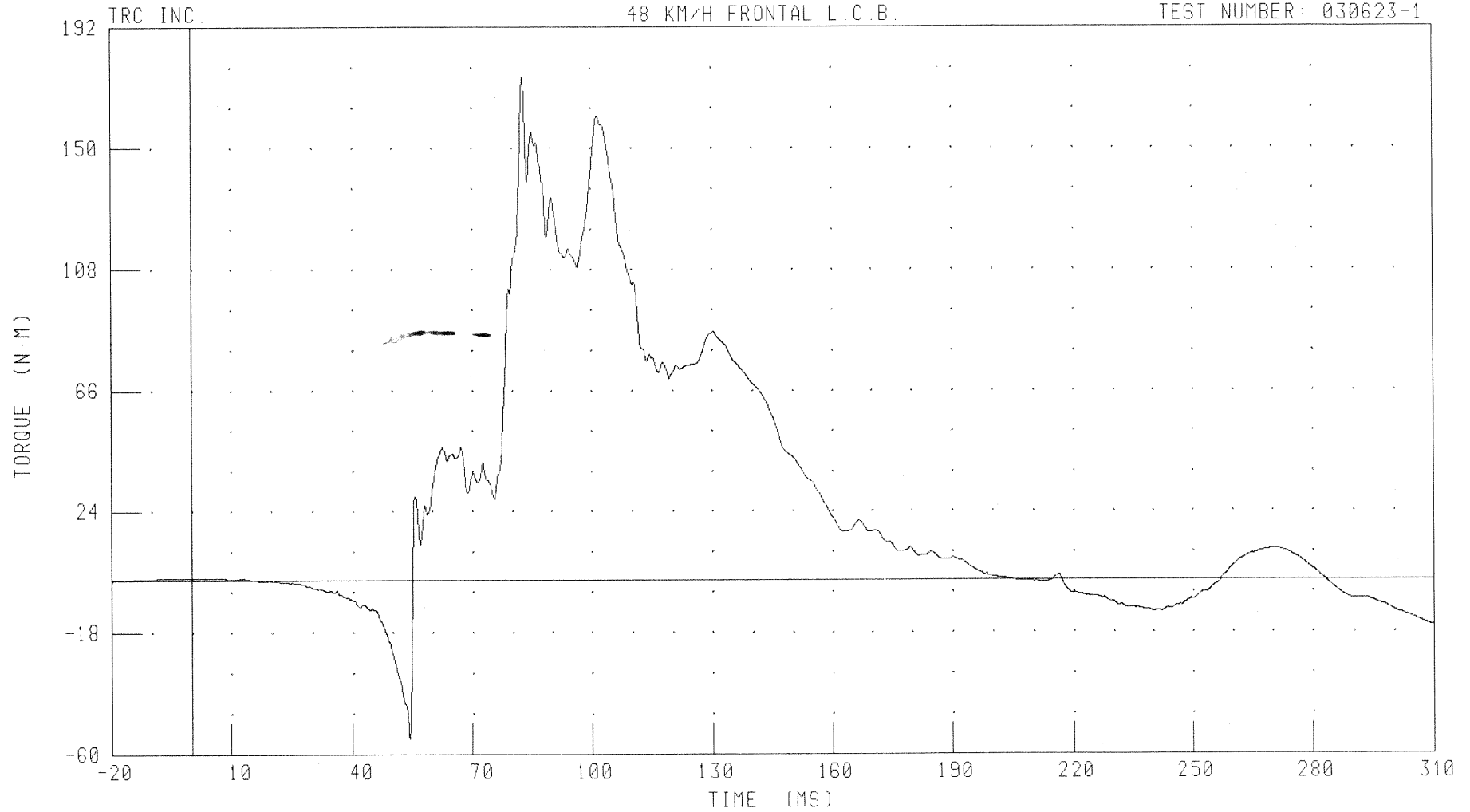
B-54

030623-1

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: 030623-1



CHANNEL: TBLXM1 FILTER: CH. CLASS 600

PEAK DATA: 174.74 N·M @ 82.96 MS; -54.80 N·M @ 54.40 MS

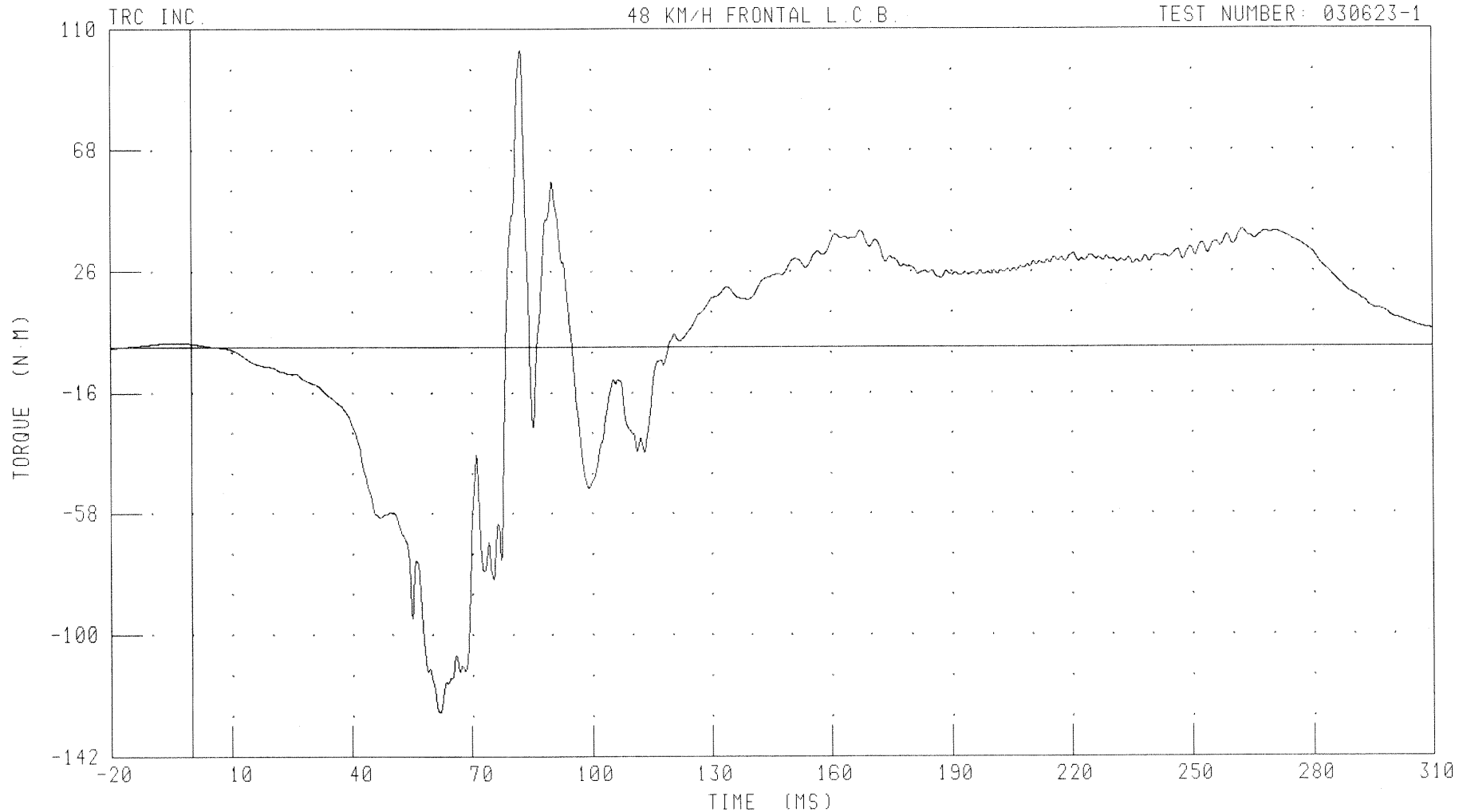
B-55

030623-1

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: 030623-1



CHANNEL: TBLYM1

FILTER: CH. CLASS 600

PEAK DATA: 102.74 N·M @ 82.56 MS; -126.75 N·M @ 61.92 MS

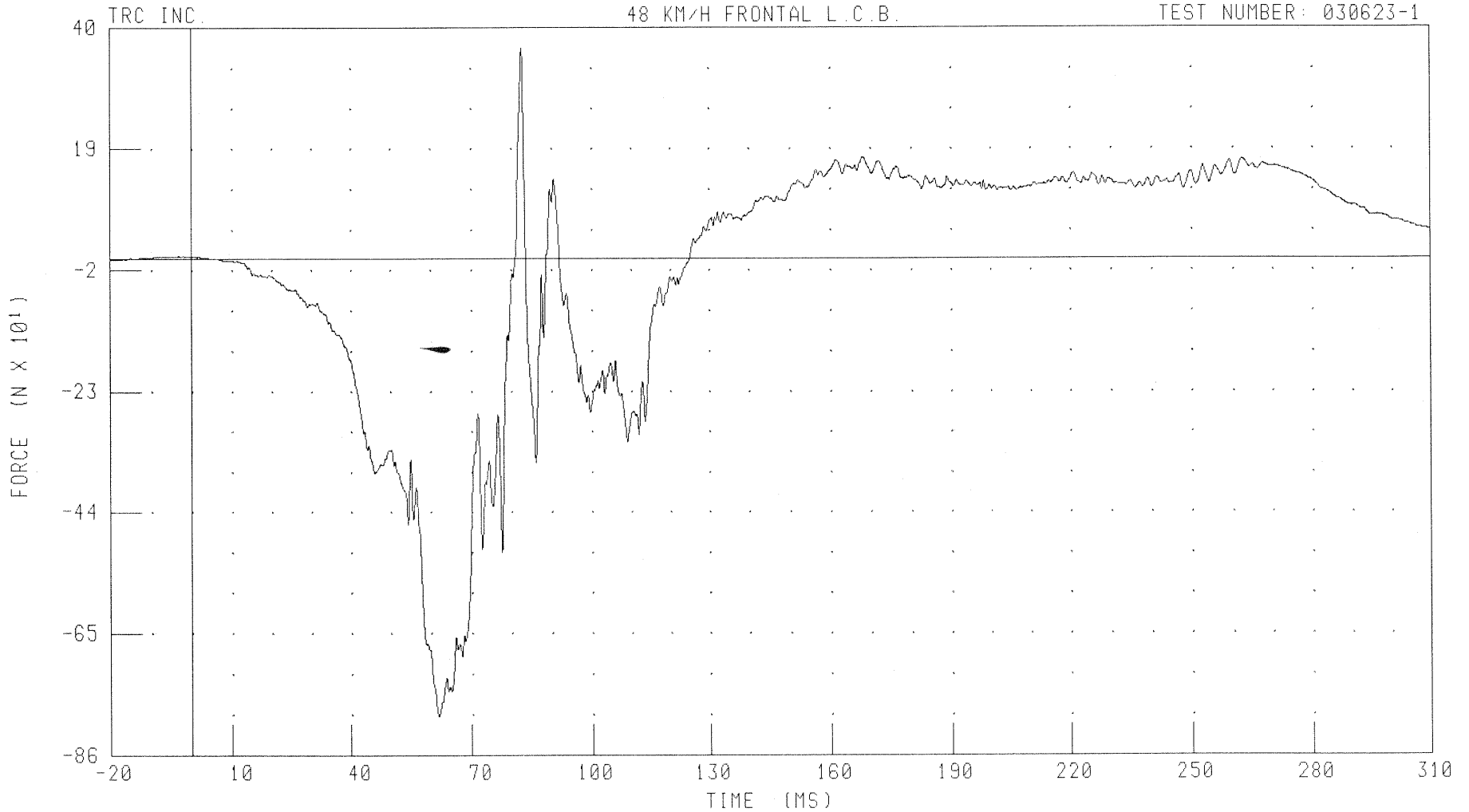
B-56

030623-1

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: 030623-1



CHANNEL: ANLXF1 FILTER: CH. CLASS 600

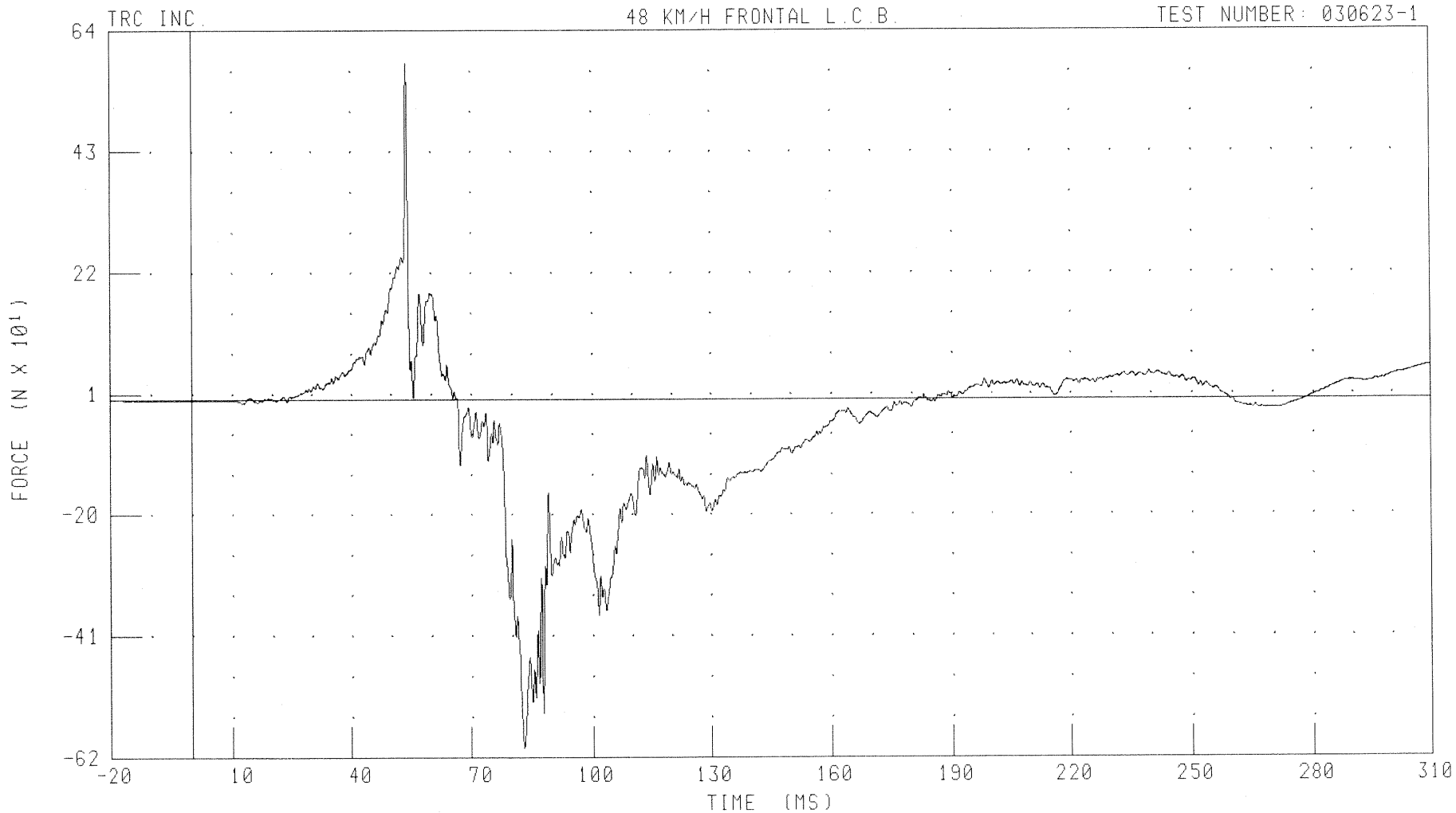
PEAK DATA: 364.70 N @ 82.80 MS; -792.48 N @ 61.84 MS

B-57

030623-1

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: 030623-1



CHANNEL: ANLYF1

FILTER: CH. CLASS 600

PEAK DATA: 584.34 N @ 54.16 MS; -603.91 N @ 82.88 MS

B-58

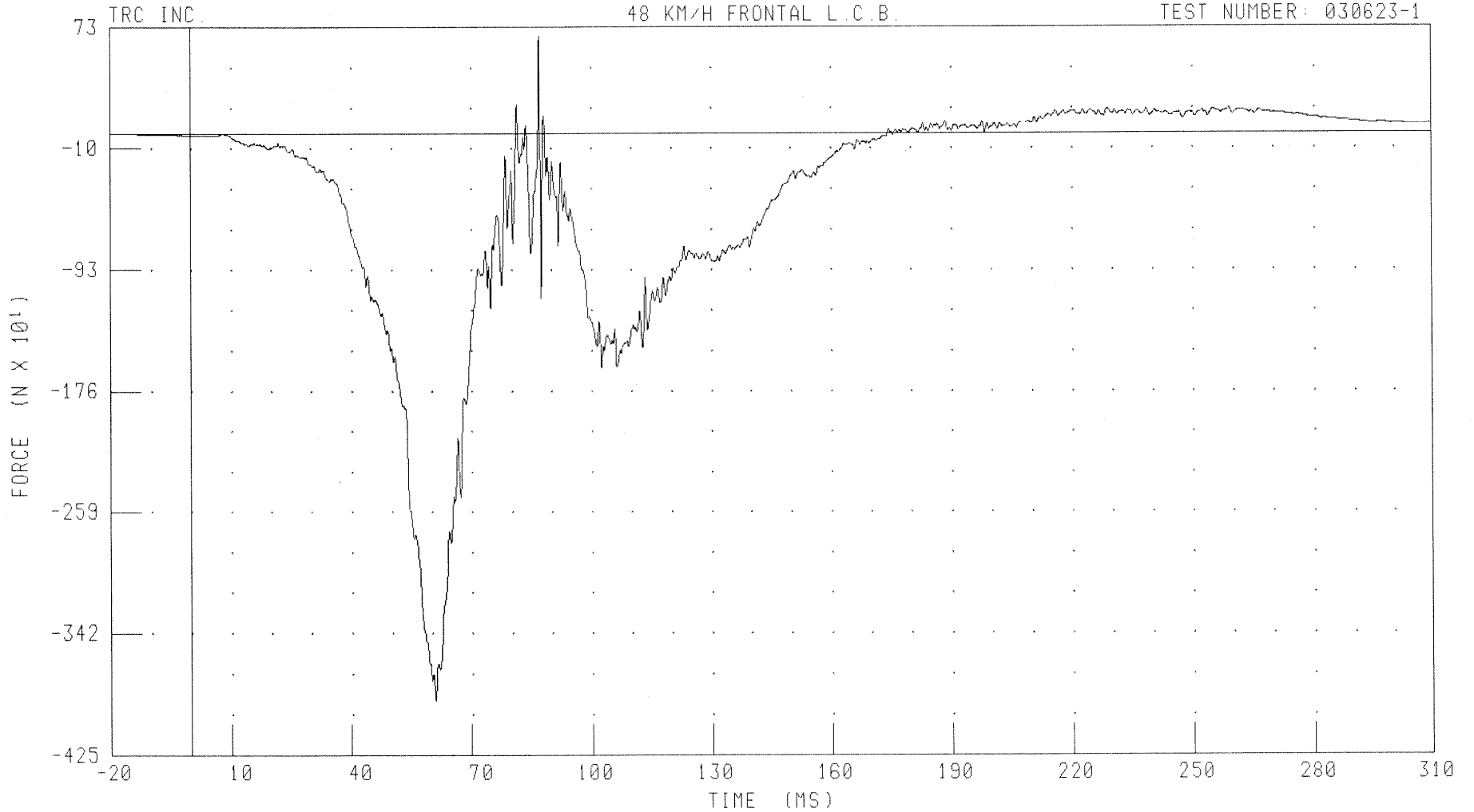
030623-1

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: 030623-1



CHANNEL: ANLZF1

FILTER: CH. CLASS 600

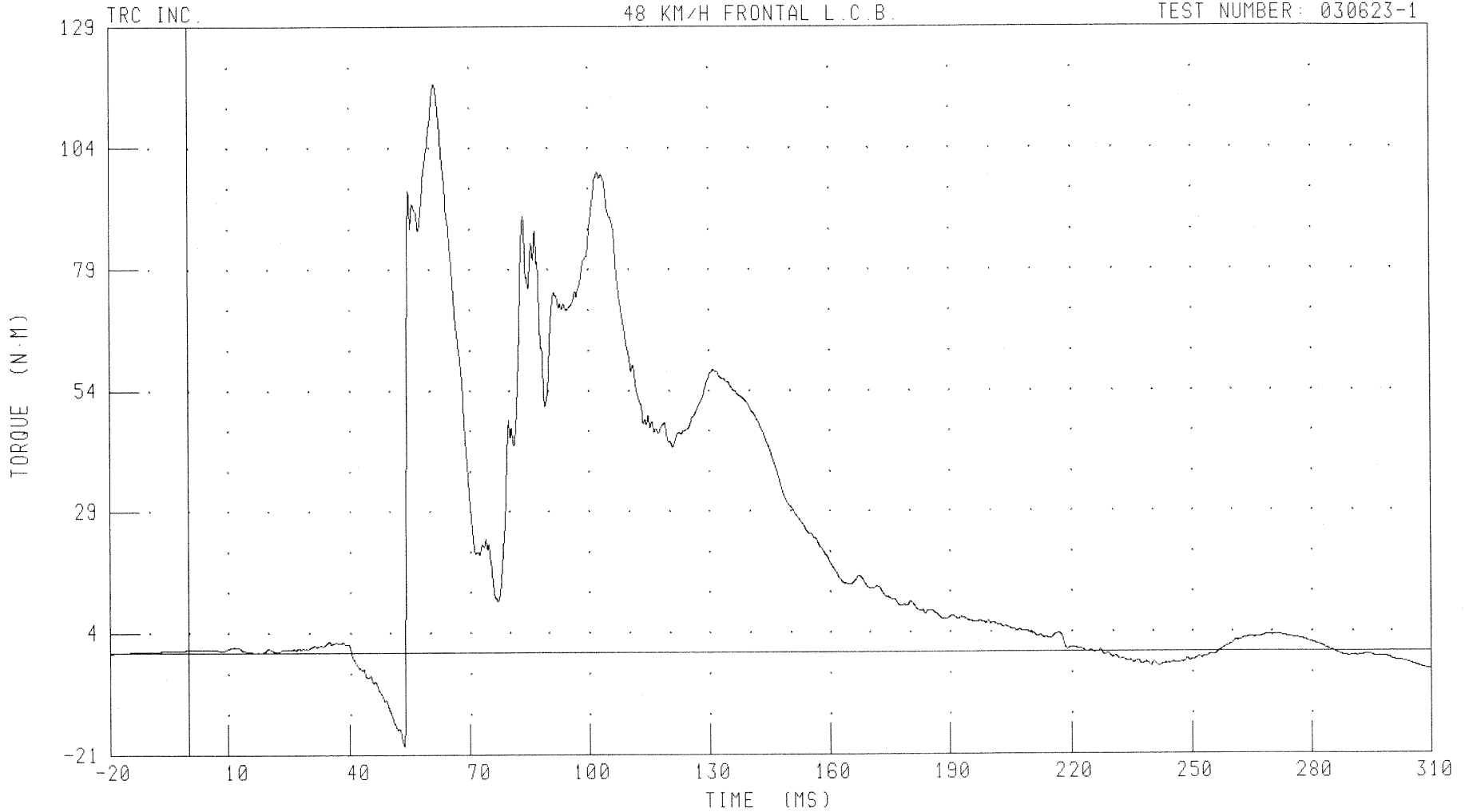
PEAK DATA: 669.32 N @ 87.04 MS, -3879.56 N @ 60.88 MS

B-59

030623-1

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: 030623-1



CHANNEL: ANLXM1 FILTER: CH. CLASS 600

PEAK DATA: 117.21 N.M @ 61.44 MS; -19.32 N.M @ 53.52 MS

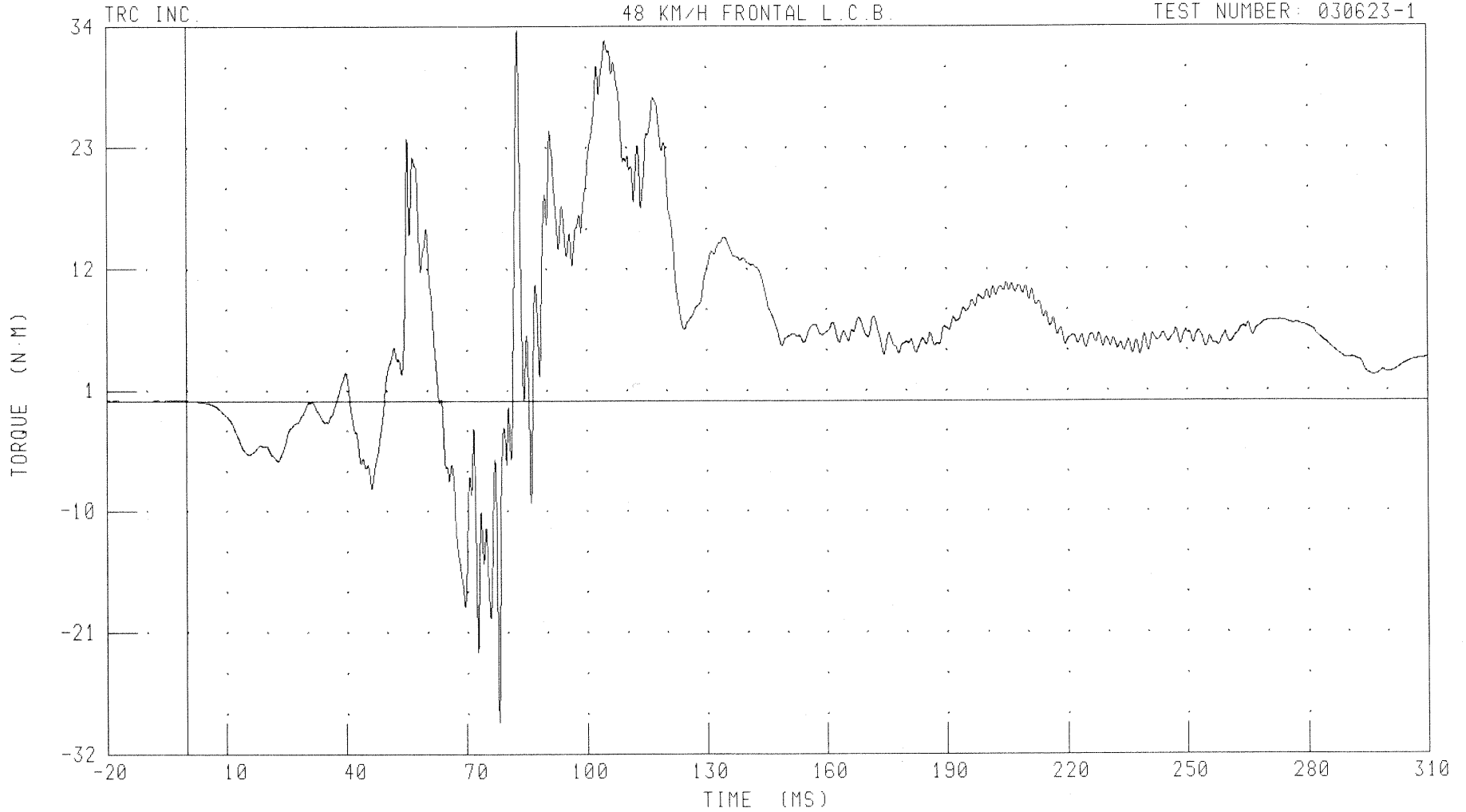
B-60

030623-1

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: 030623-1



CHANNEL: ANLYM1

FILTER: CH. CLASS 600

PEAK DATA: 33.64 N.M @ 82.96 MS; -29.10 N.M @ 78.00 MS

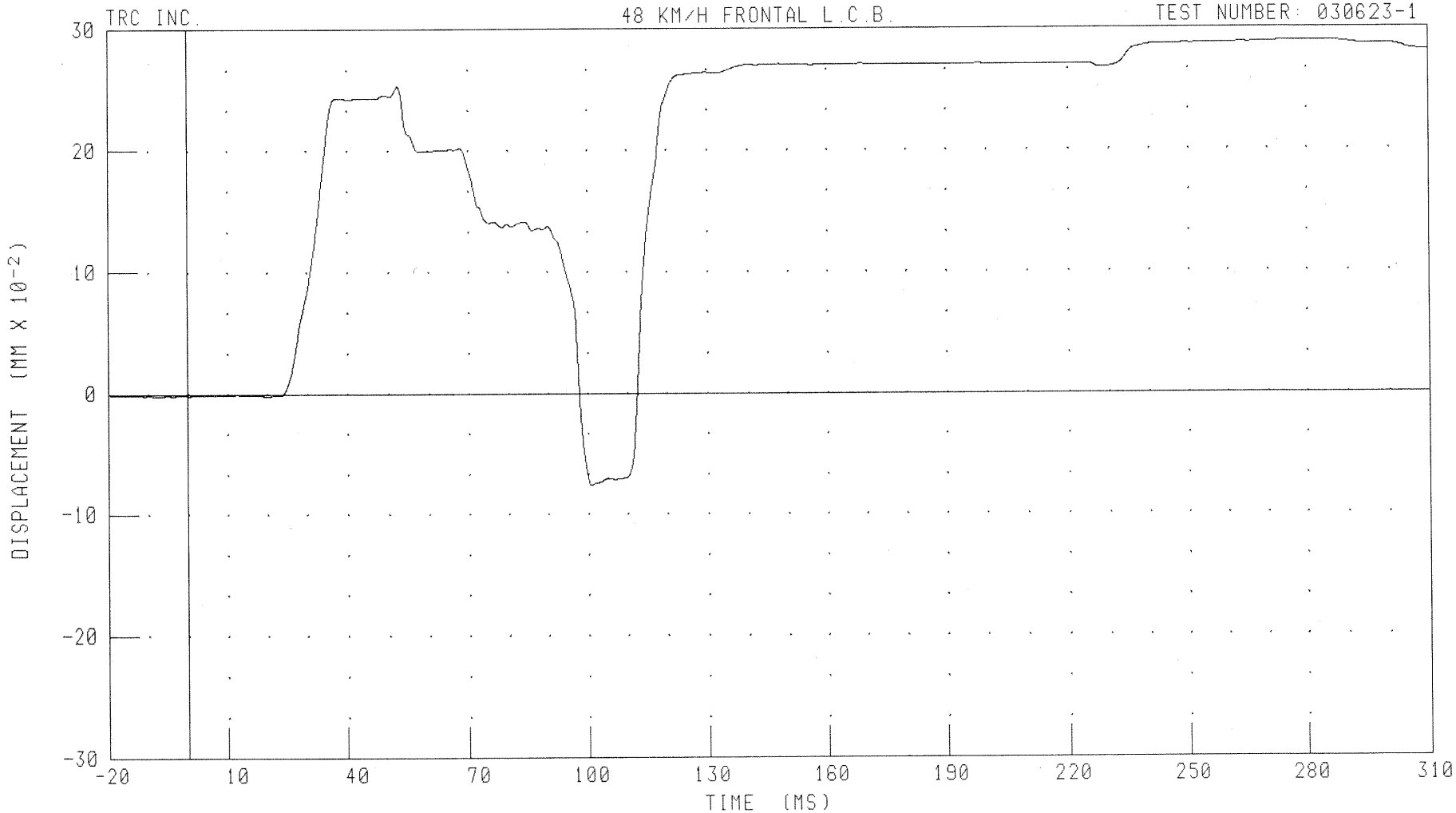
B-61

030623-1

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: 030623-1



CHANNEL: KNRXD1

FILTER: CH CLASS 180

PEAK DATA: 0.29 MM @ 286.88 MS; -0.08 MM @ 100.96 MS

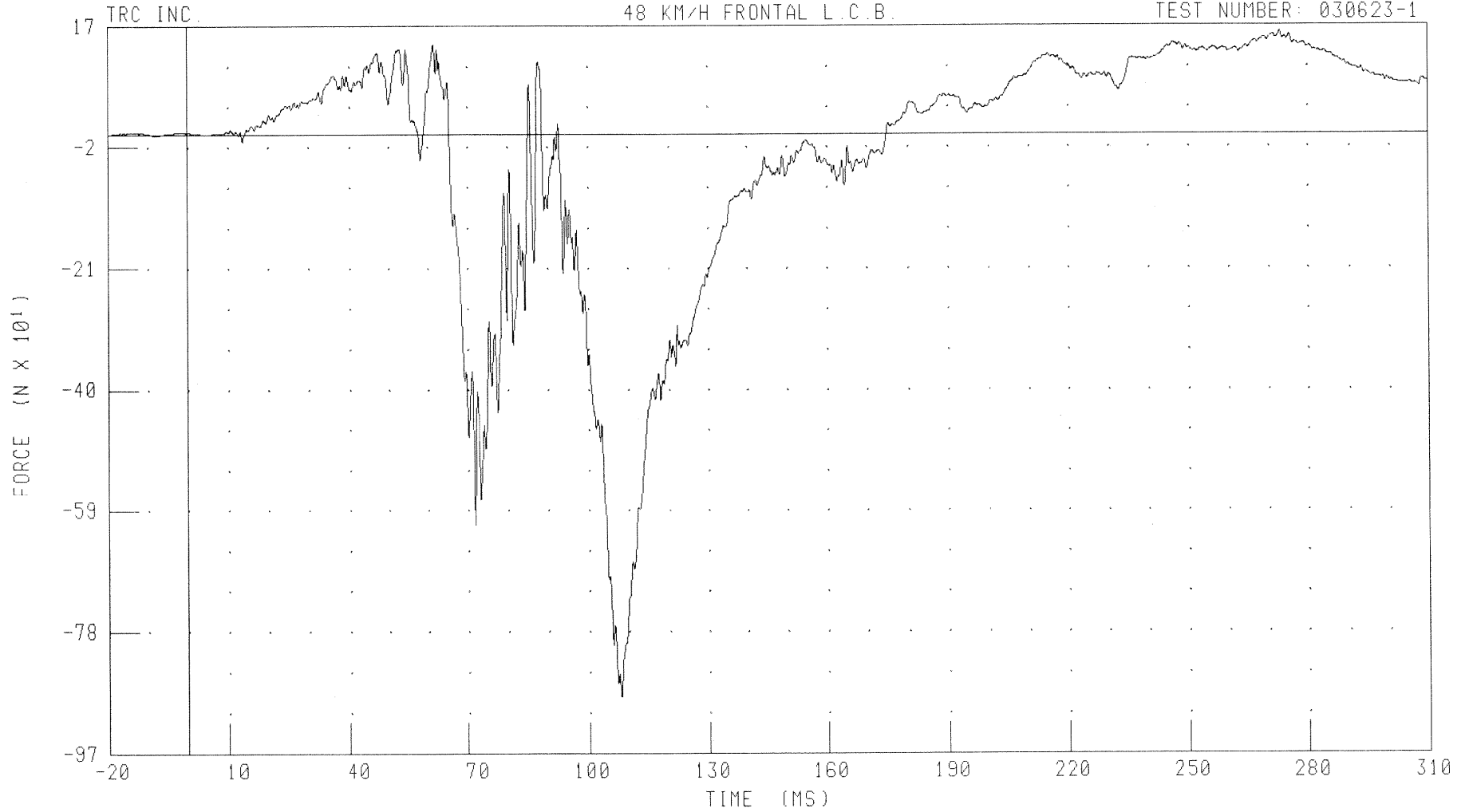
B-62

030623-1

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: 030623-1



CHANNEL: TBRXF1

FILTER: CH. CLASS 600

PEAK DATA: 161 00 N @ 273.04 MS; -881.71 N @ 108.16 MS

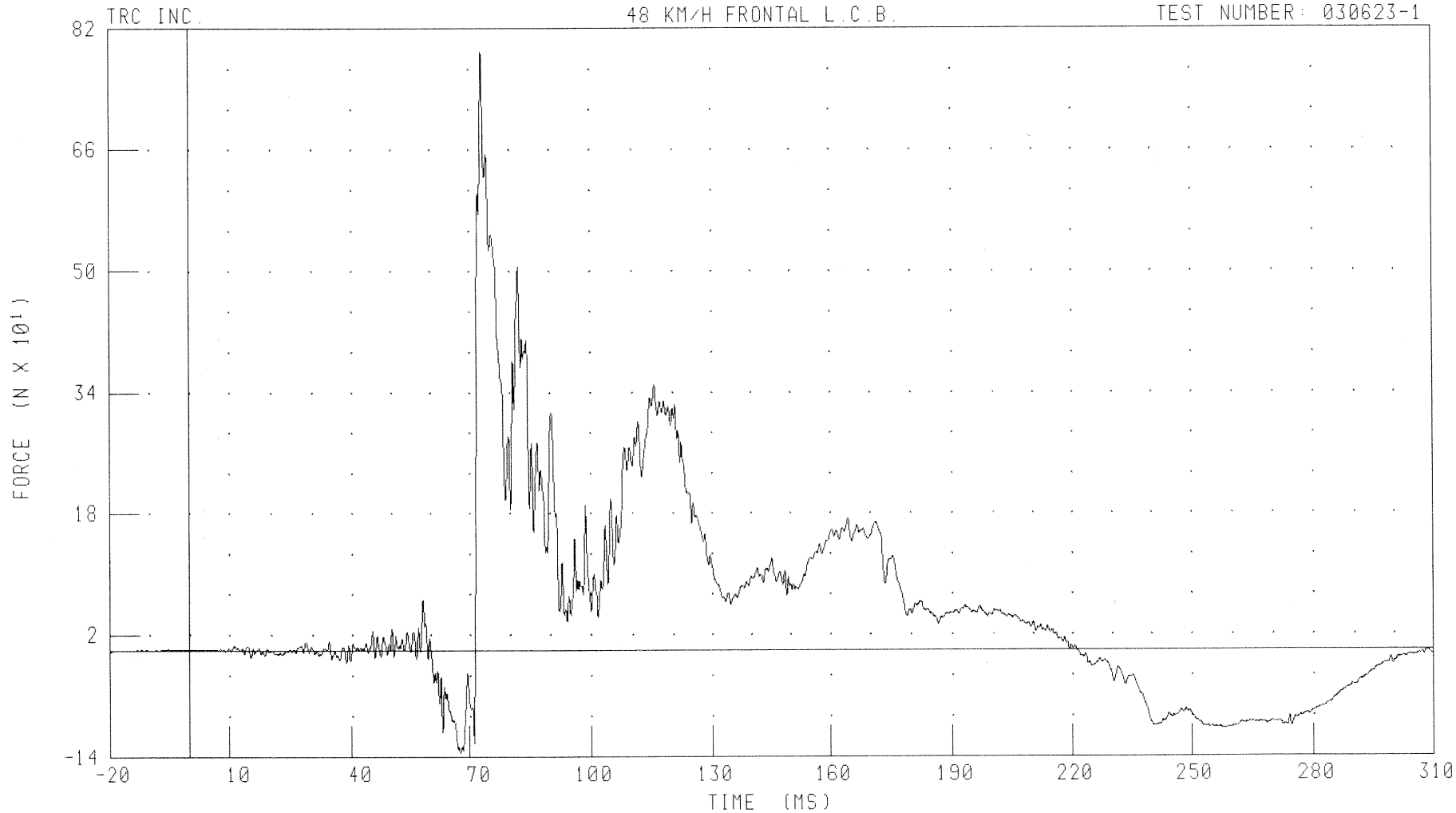
B-63

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: TBRYF1

FILTER: CH. CLASS 600

PEAK DATA: 788.60 N @ 73.28 MS; -134.15 N @ 67.60 MS

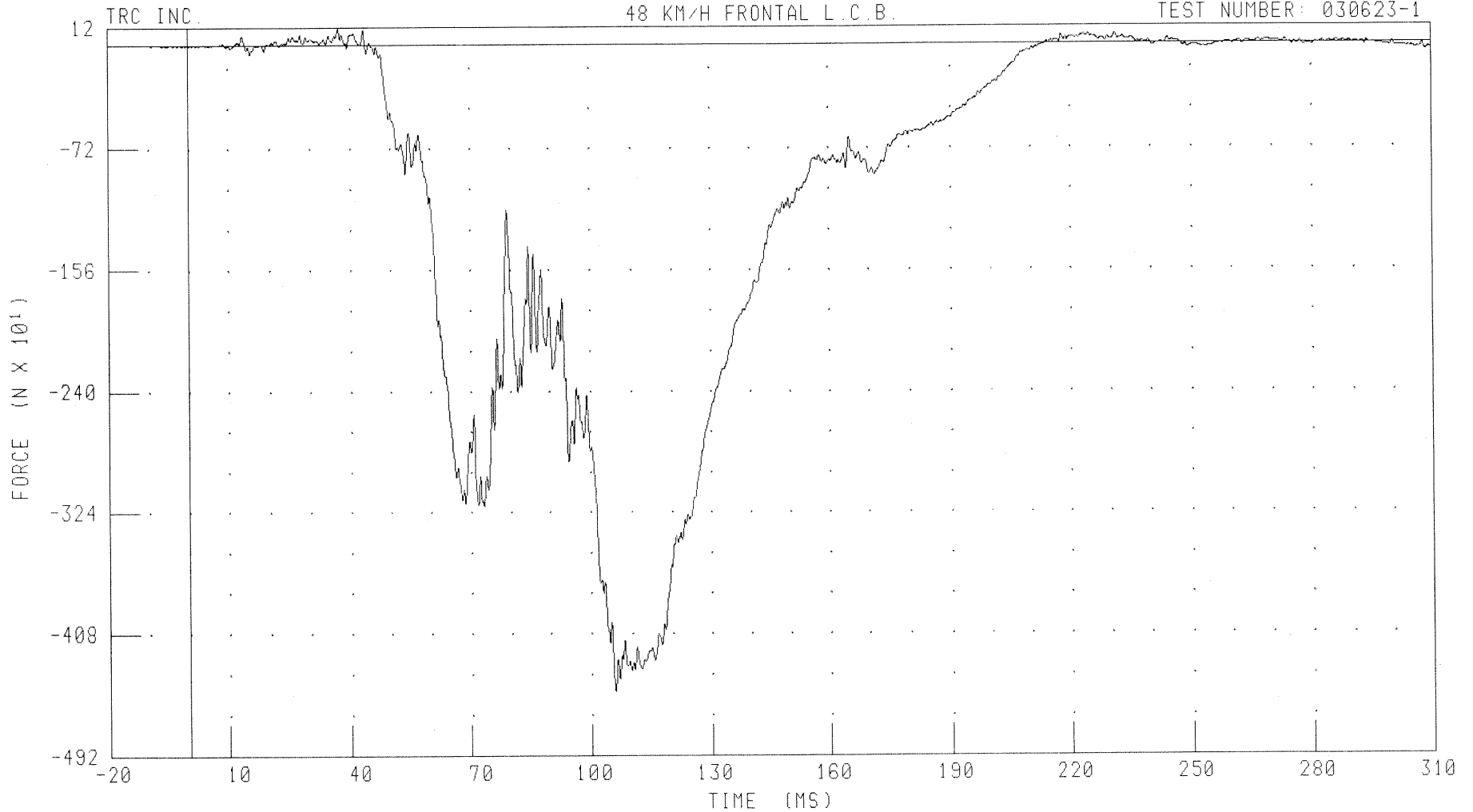
B-64

030623-1

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: 030623-1



CHANNEL: TBRZF1 FILTER: CH. CLASS 600

PEAK DATA: 114.72 N @ 37.28 MS, -4479.89 N @ 105.84 MS

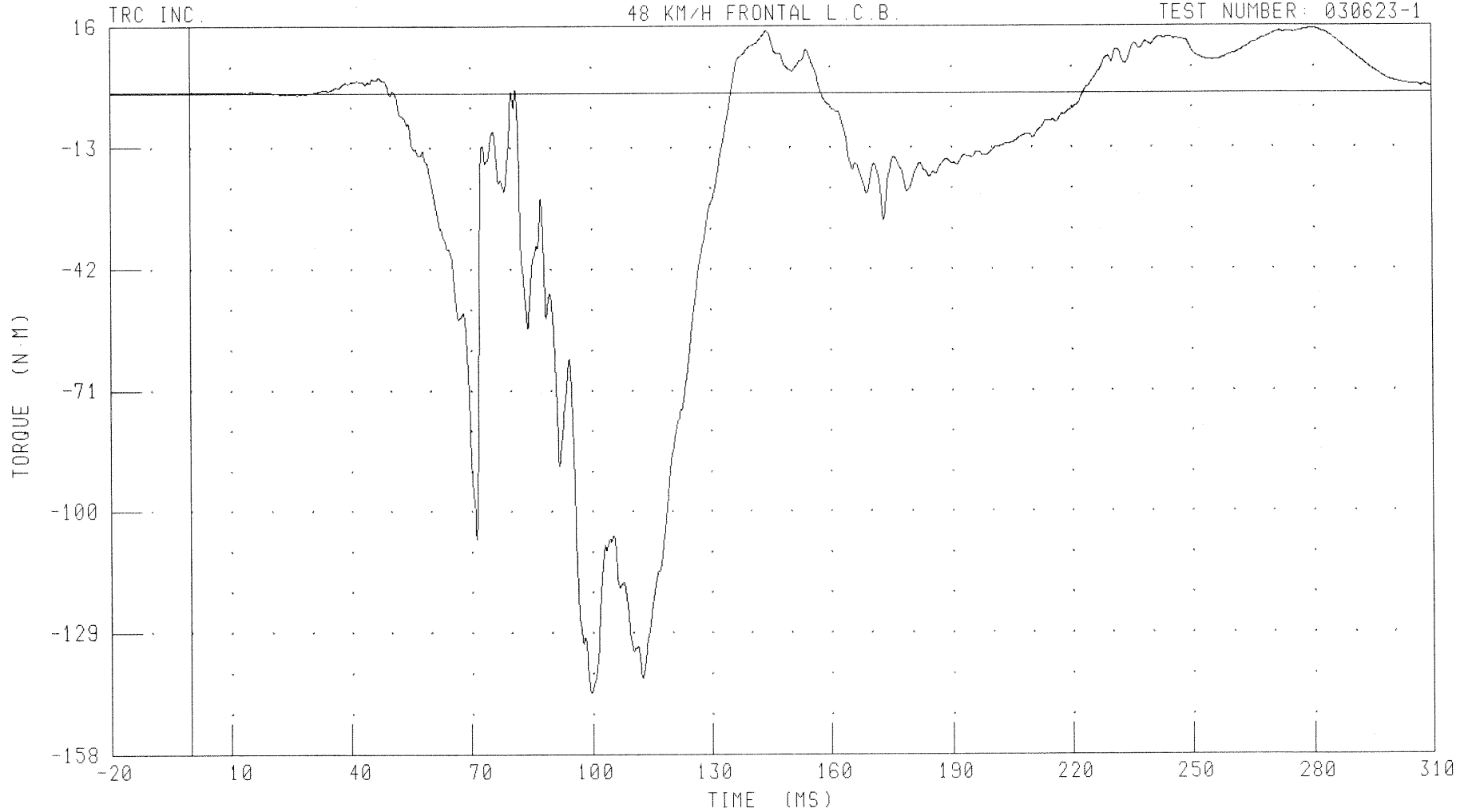
B-65

030623-1

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: 030623-1



CHANNEL: TBRXM1

FILTER: CH. CLASS 600

PEAK DATA: 15.29 N·M @ 279.12 MS; -143.27 N·M @ 99.68 MS

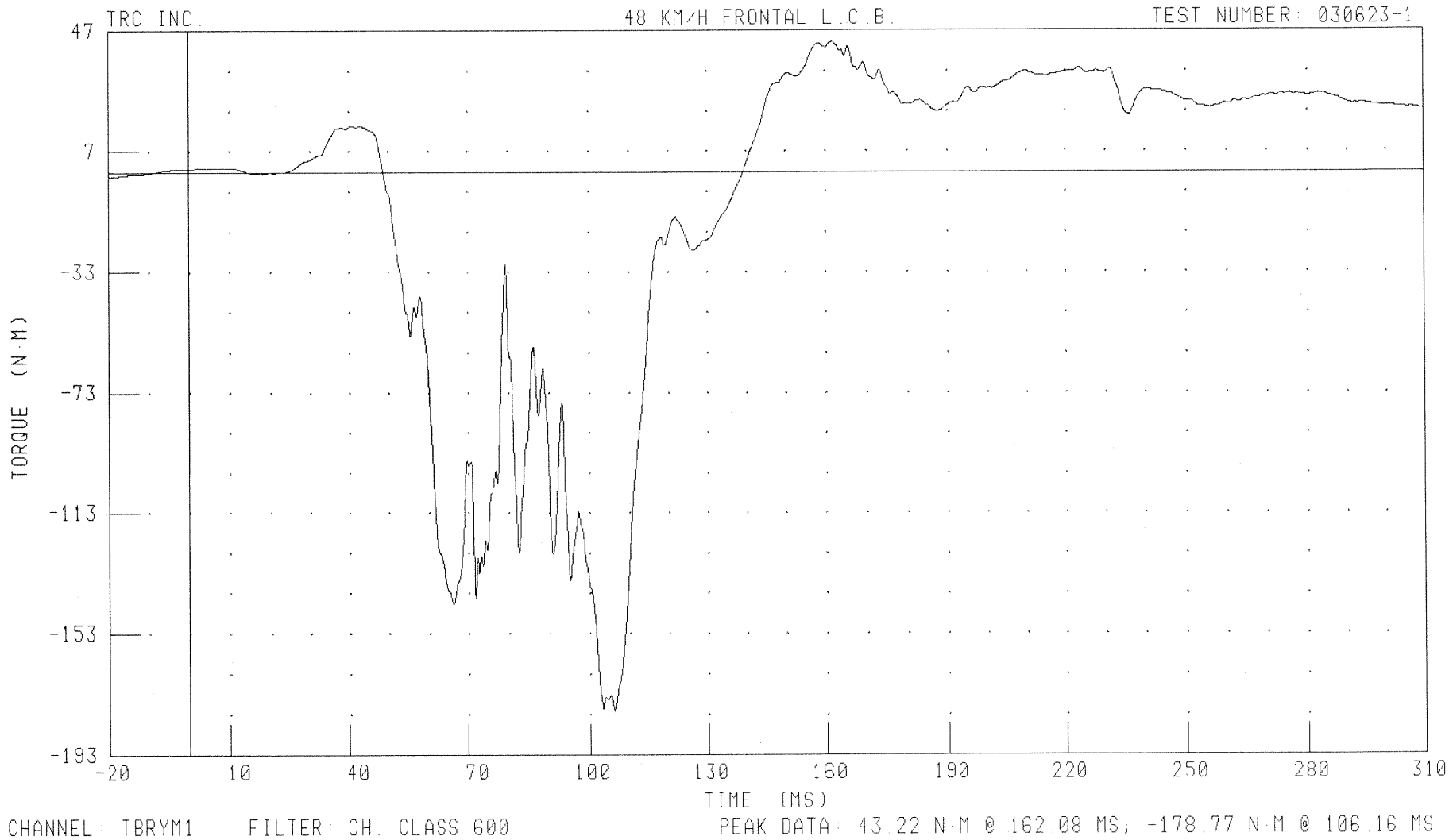
B-66

030623-1

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: 030623-1



CHANNEL: TBRYM1

FILTER: CH. CLASS 600

TIME (MS)

PEAK DATA: 43.22 N.M @ 162.08 MS; -178.77 N.M @ 106.16 MS

B-67

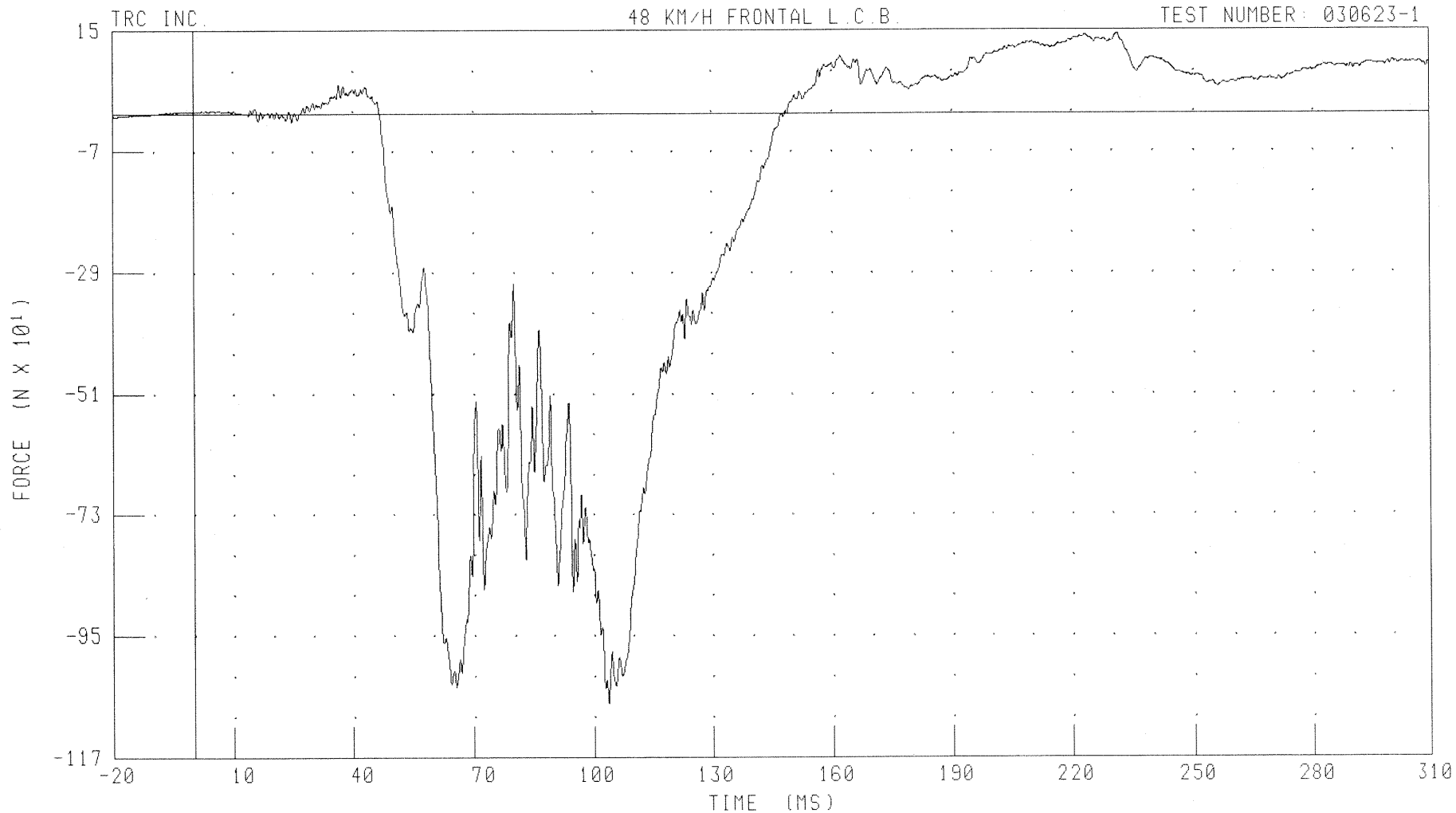
030623-1

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: 030623-1



CHANNEL: ANRXF1 FILTER: CH. CLASS 600

PEAK DATA: 143.48 N @ 231.68 MS; -107.71 N @ 103.84 MS

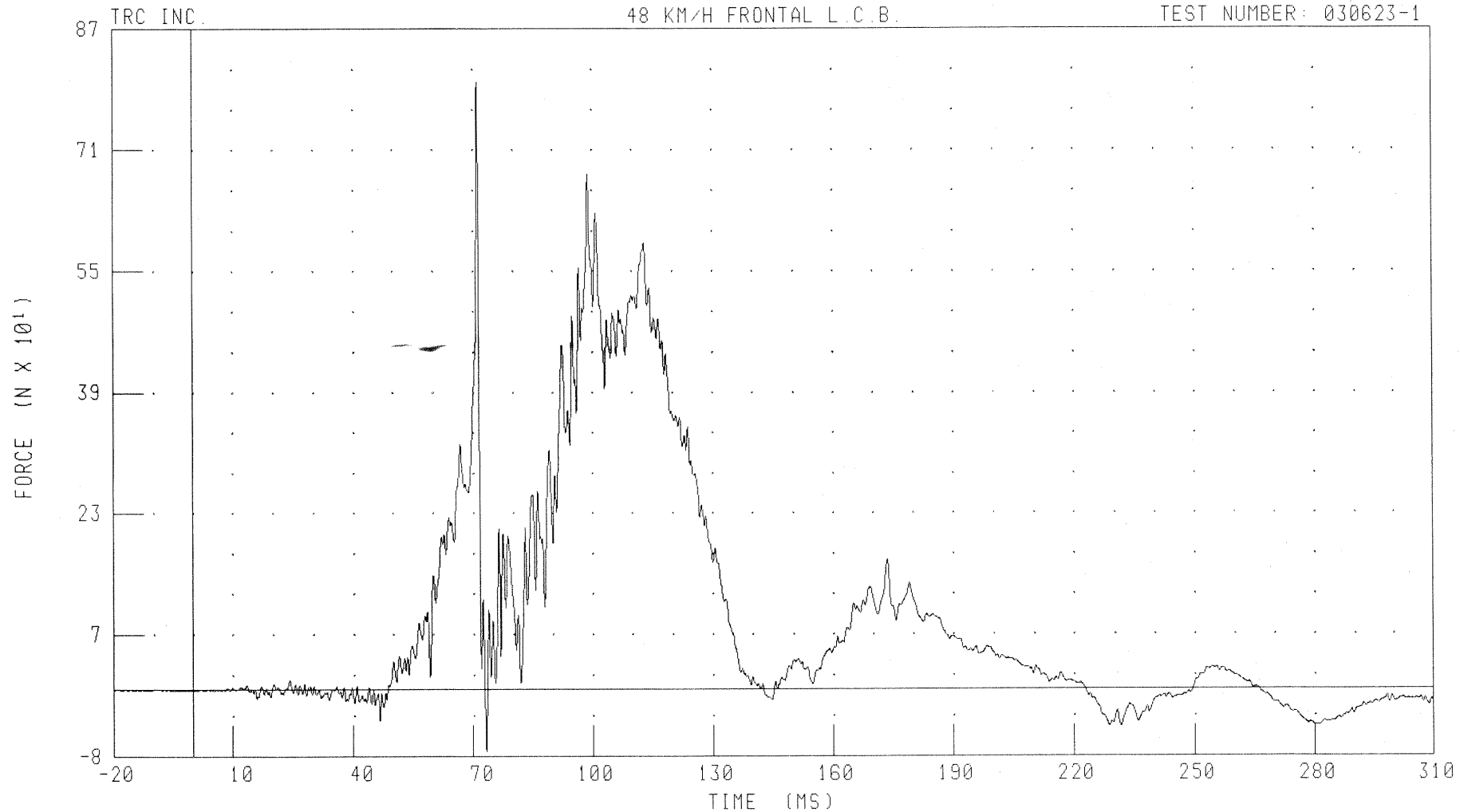
B-68

030623-1

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: 030623-1



CHANNEL: ANRYF1

FILTER: CH. CLASS 600

PEAK DATA: 802.27 N @ 71.36 MS, -80.81 N @ 73.36 MS

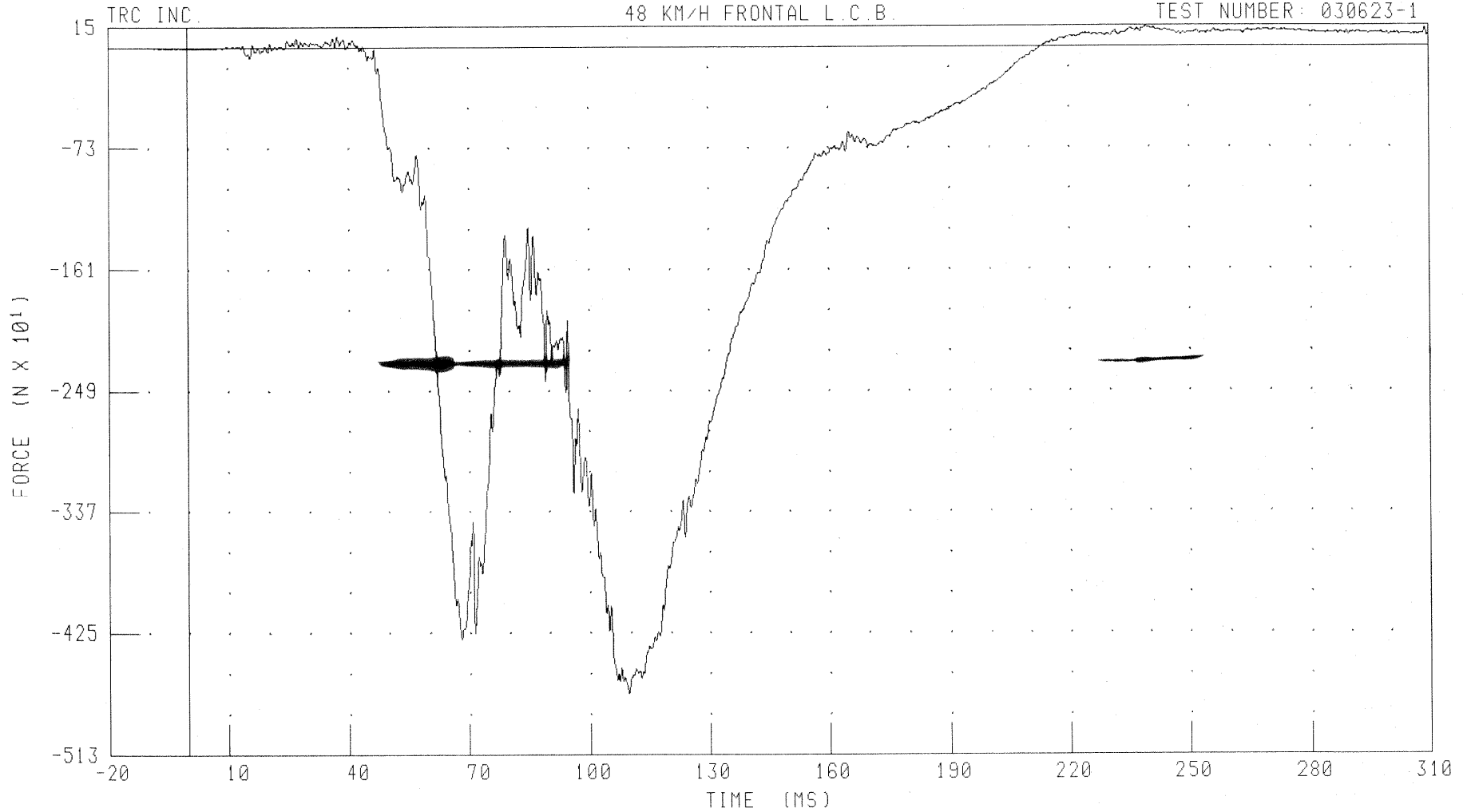
B-69

030623-1

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: 030623-1



CHANNEL: ANRZF1

FILTER: CH. CLASS 600

PEAK DATA: 141.97 N @ 239.52 MS; -4689.75 N @ 109.60 MS

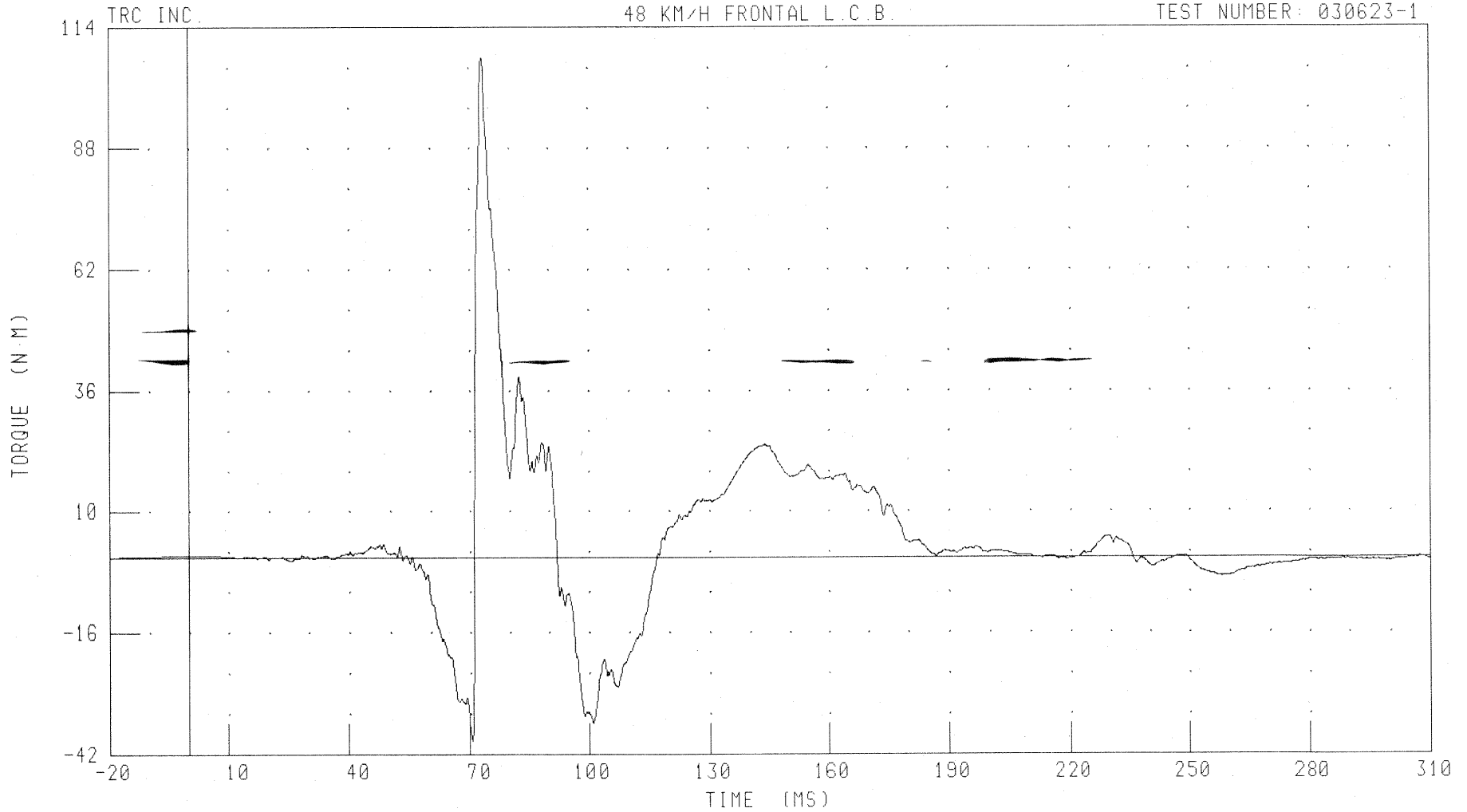
B-70

030623-1

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: 030623-1



CHANNEL: ANRXM1 FILTER: CH. CLASS 600

PEAK DATA: 107.38 N·M @ 73.36 MS; -39.06 N·M @ 70.64 MS

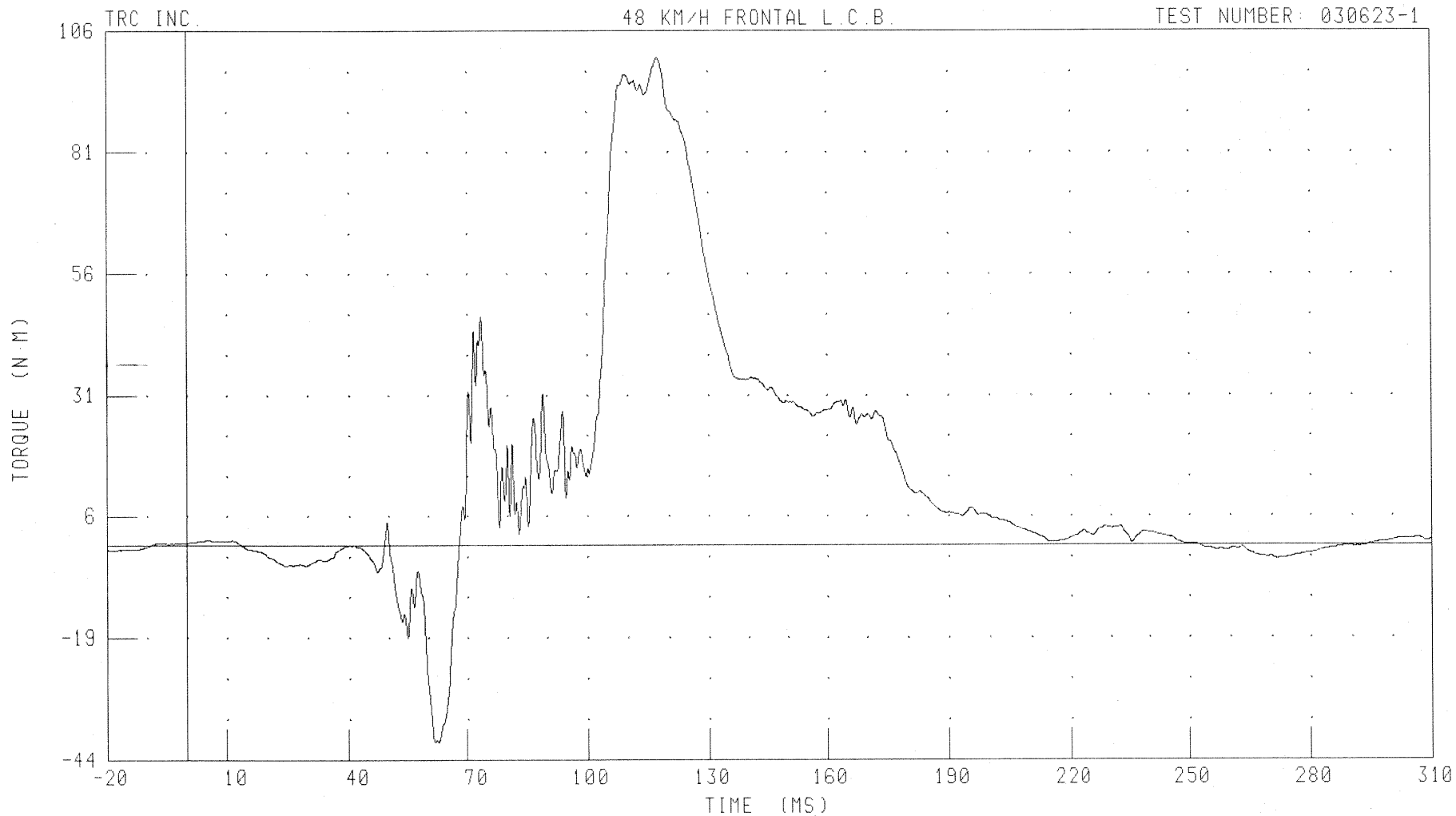
B-71

030623-1

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: 030623-1



CHANNEL: ANRYM1

FILTER: CH. CLASS 600

PEAK DATA: 100.51 N.M @ 117.60 MS, -40.41 N.M @ 62.64 MS

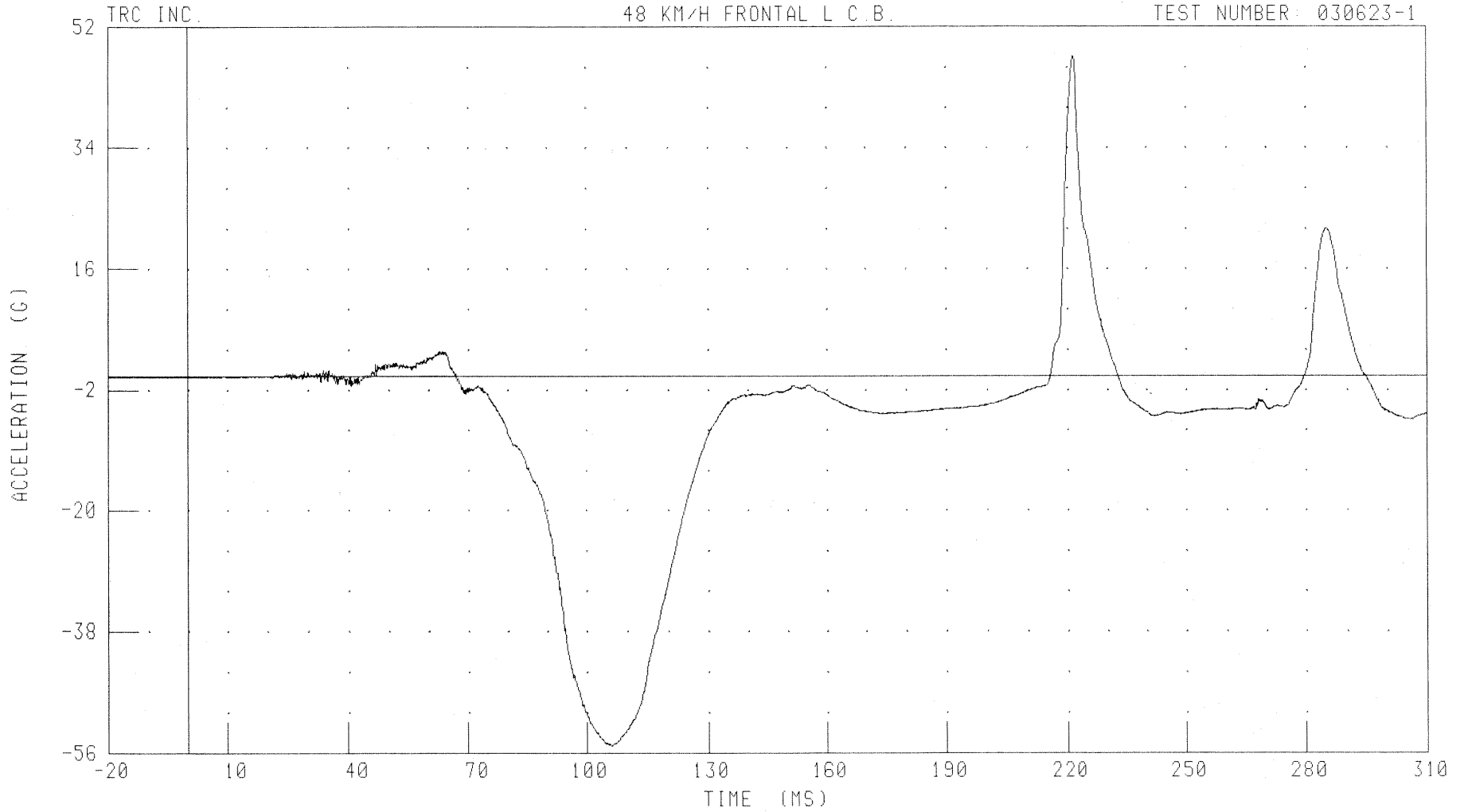
B-72

030623-1

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: 030623-1



CHANNEL: HEDXG2 FILTER: CH CLASS 1000

PEAK DATA: 47.66 G @ 221.68 MS; -54.95 G @ 106.16 MS

B-73

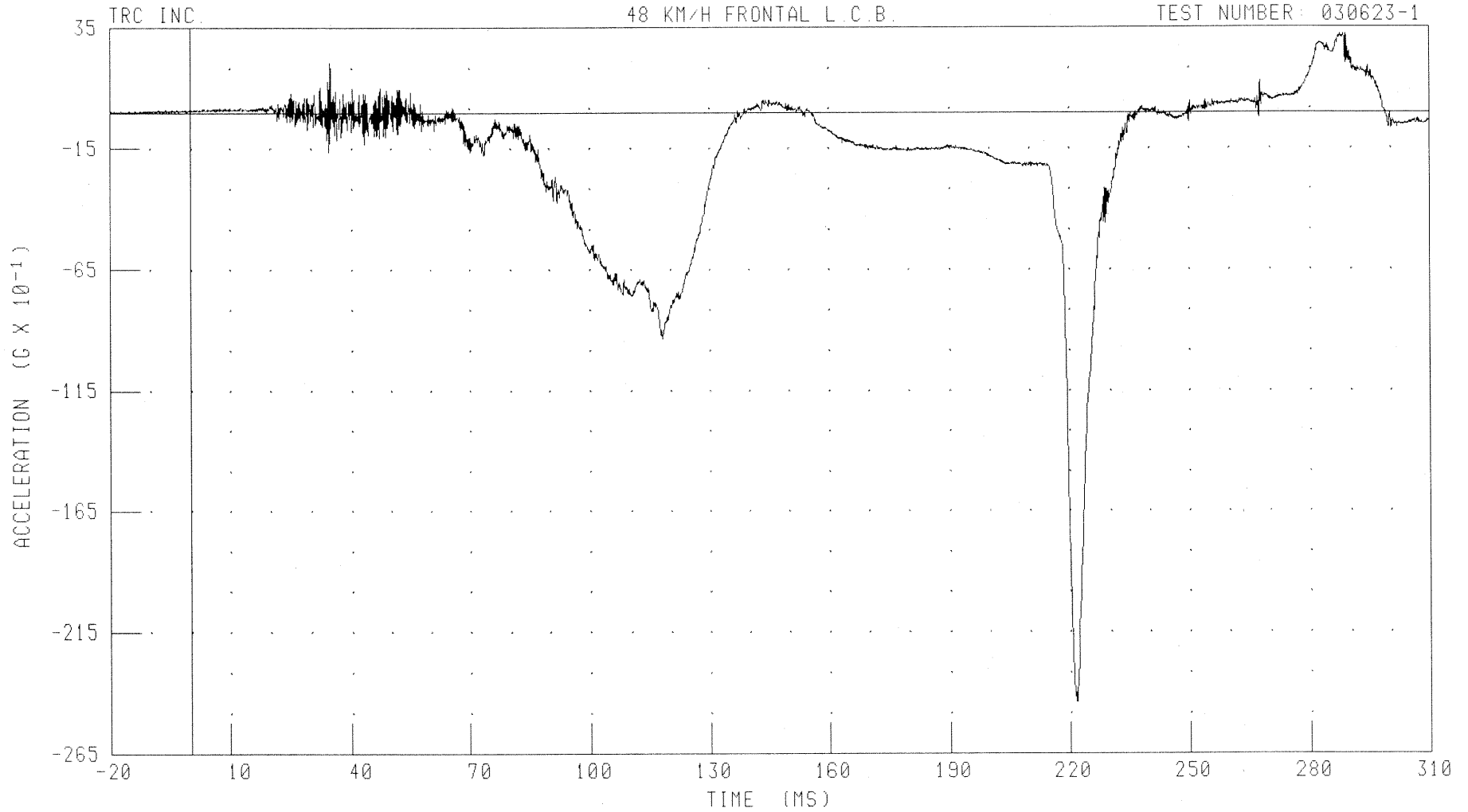
030623-1

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: 030623-1



CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

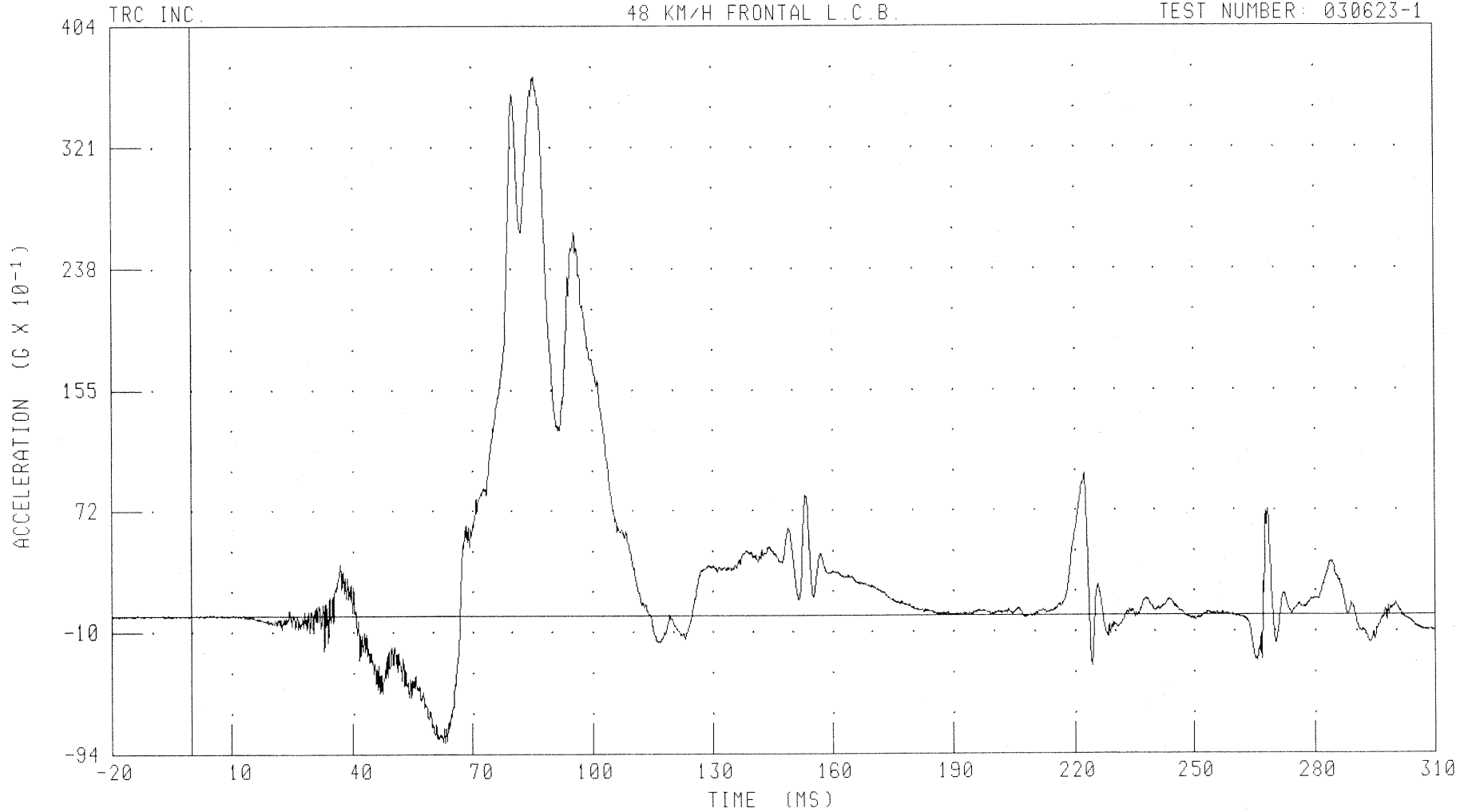
PEAK DATA: 3.23 G @ 287.60 MS, -24.40 G @ 221.68 MS

B-74

030623-1

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: 030623-1



CHANNEL: HEDZG2

FILTER: CH. CLASS 1000

PEAK DATA: 36.98 G @ 86.08 MS, -8.63 G @ 63.04 MS

B-75

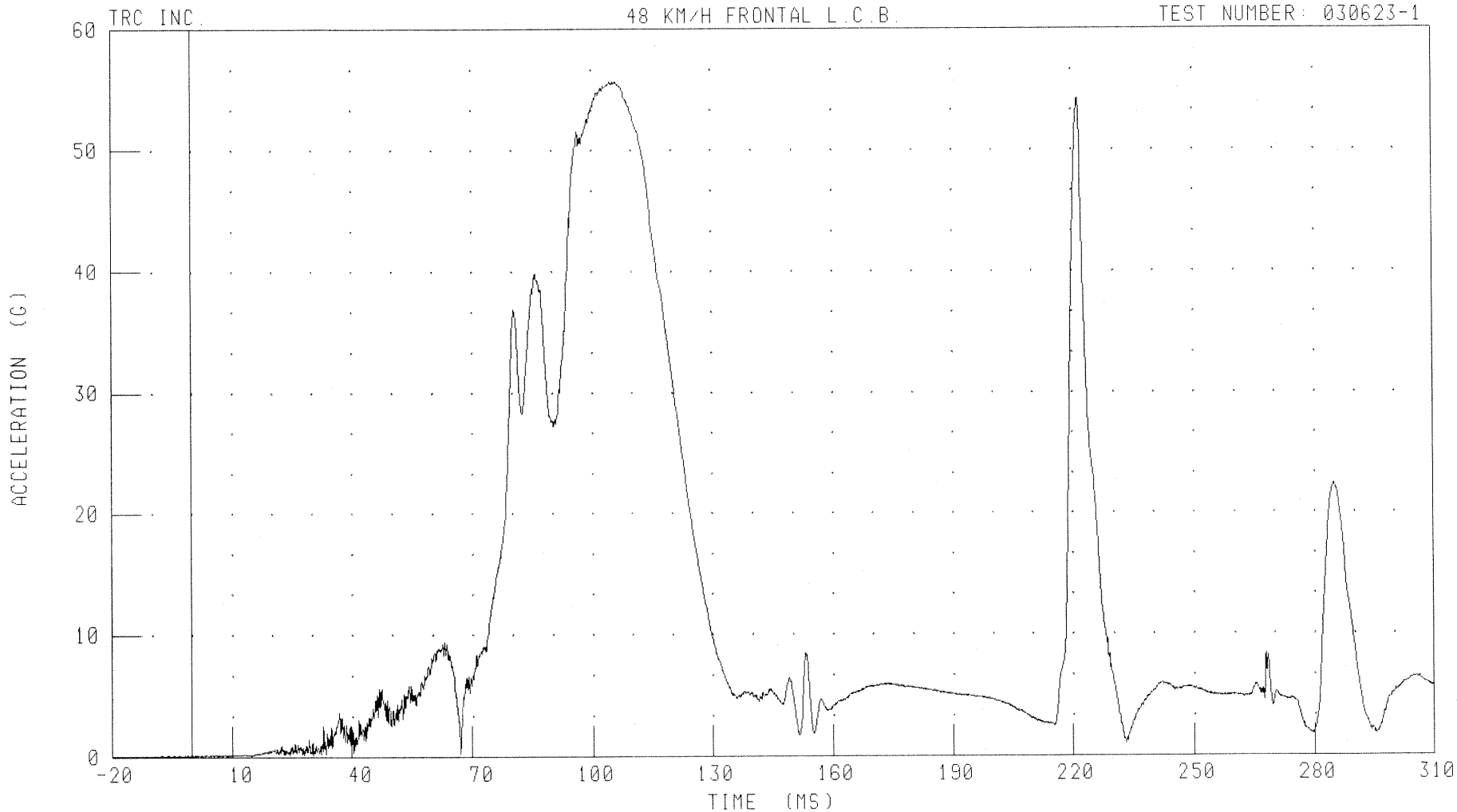
030623-1

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: 030623-1



CHANNEL: HEDRG2

FILTER: CH. CLASS 1000

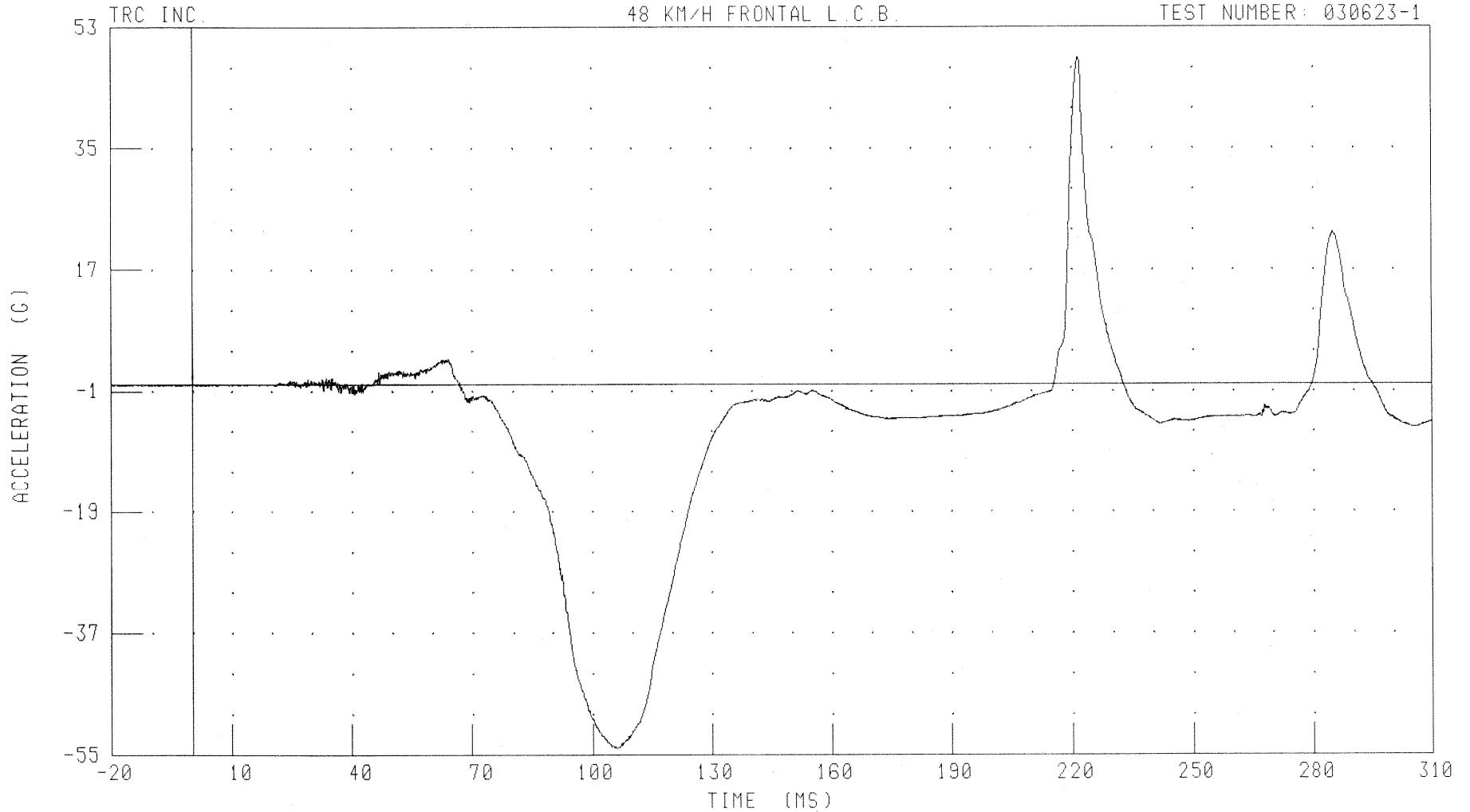
PEAK DATA: 55.73 G @ 105.52 MS, 22.48 G @ 280 MS

B-76

030623-1

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: 030623-1



CHANNEL: HEDXR2 FILTER: CH. CLASS 1000

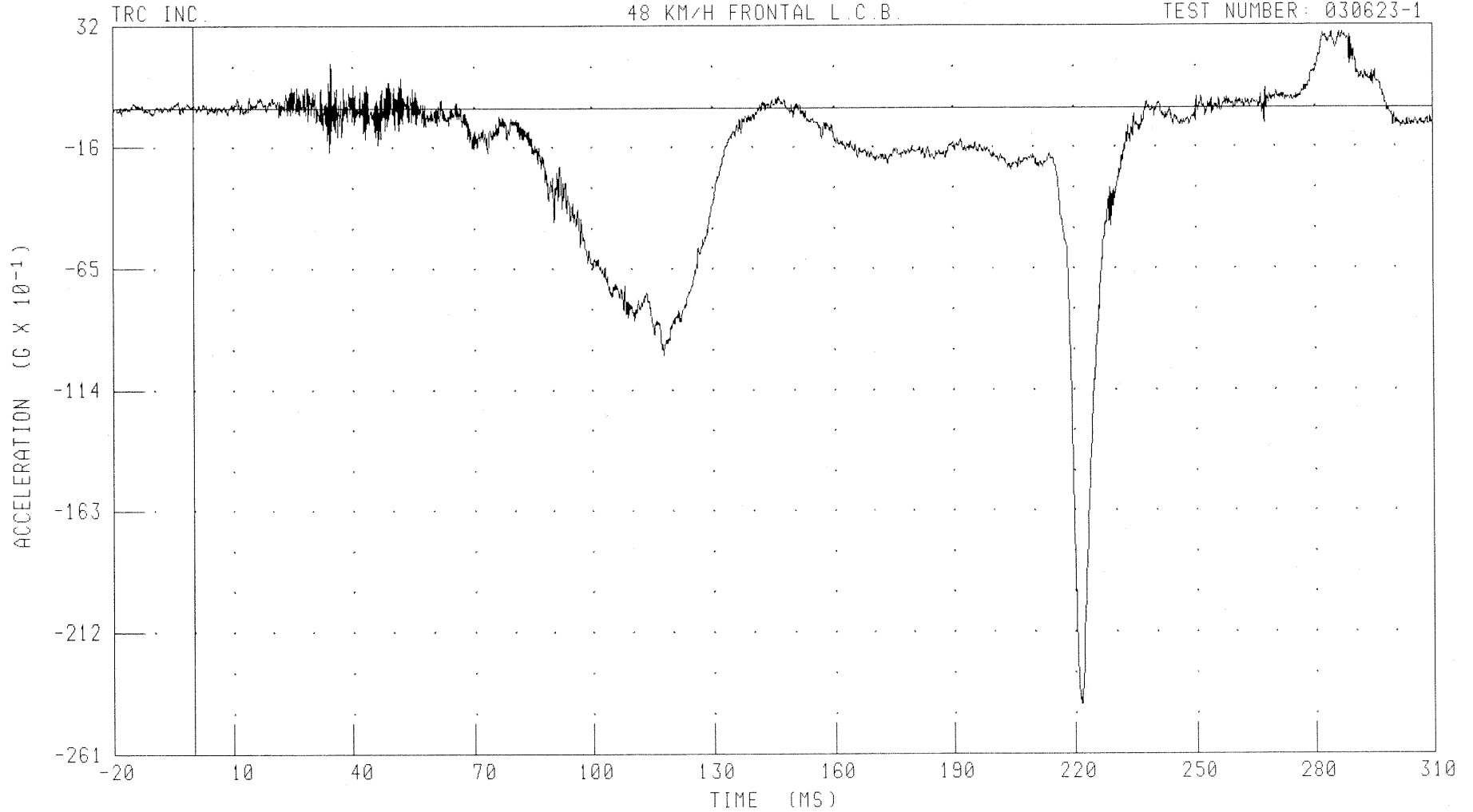
PEAK DATA: 48.50 G @ 221.68 MS, -54.07 G @ 106.16 MS

B-77

030623-1

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: 030623-1



CHANNEL: HEDYR2

FILTER: CH. CLASS 1000

PEAK DATA: 3.03 G @ 284.40 MS; -24.12 G @ 221.68 MS

B-78

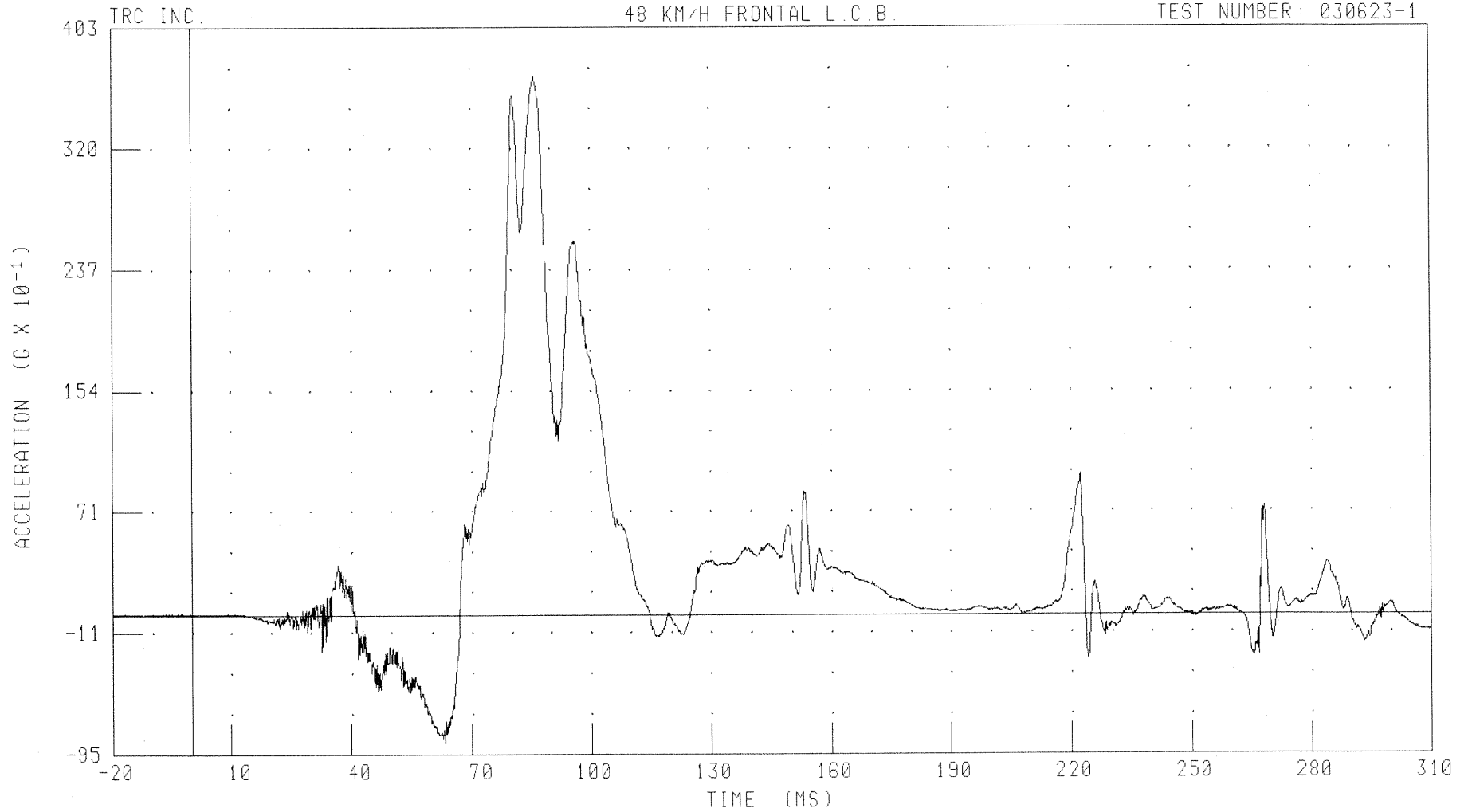
030623-1

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: 030623-1



CHANNEL: HEDZR2 FILTER: CH, CLASS 1000

PEAK DATA: 36.91 G @ 86.00 MS; -8.71 G @ 63.04 MS

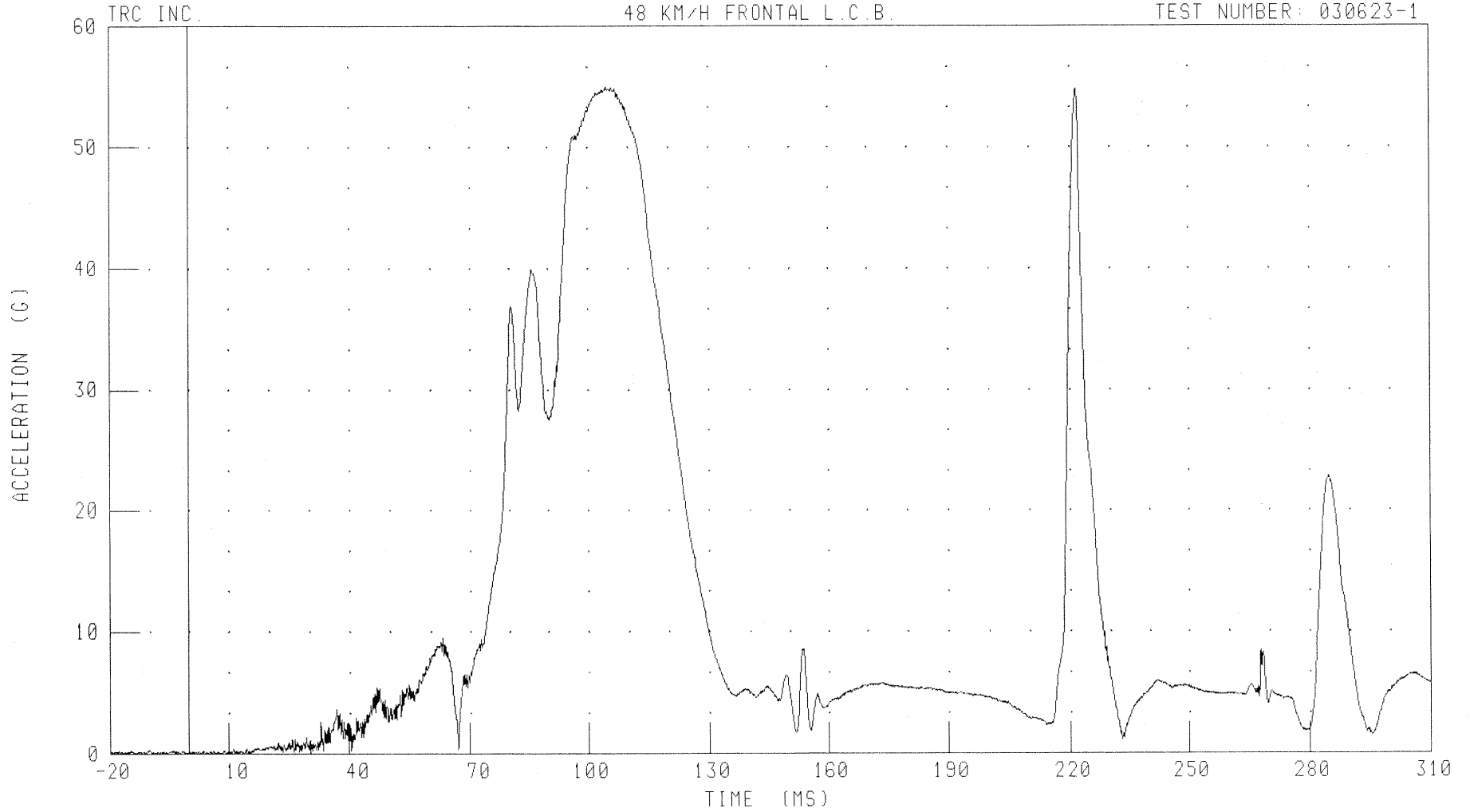
B-79

030623-1

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: 030623-1



CHANNEL: HEDRR2 FILTER: CH. CLASS 1000

PEAK DATA: 55.01 G @ 104.88 MS, 0.02 G @ 5.68 MS

B-80

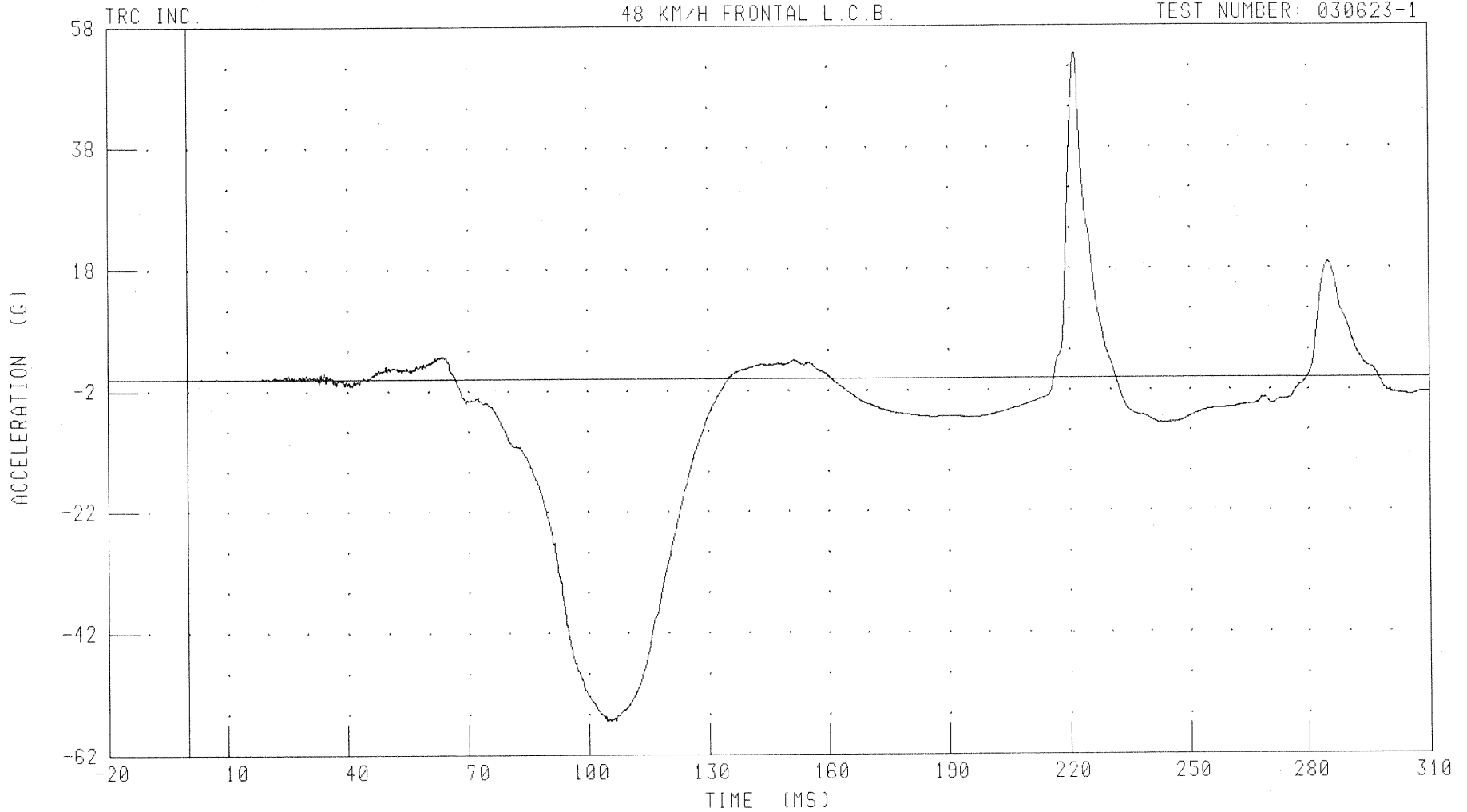
030623-1

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: 030623-1



CHANNEL: HD1XG2 FILTER: CH. CLASS 1000

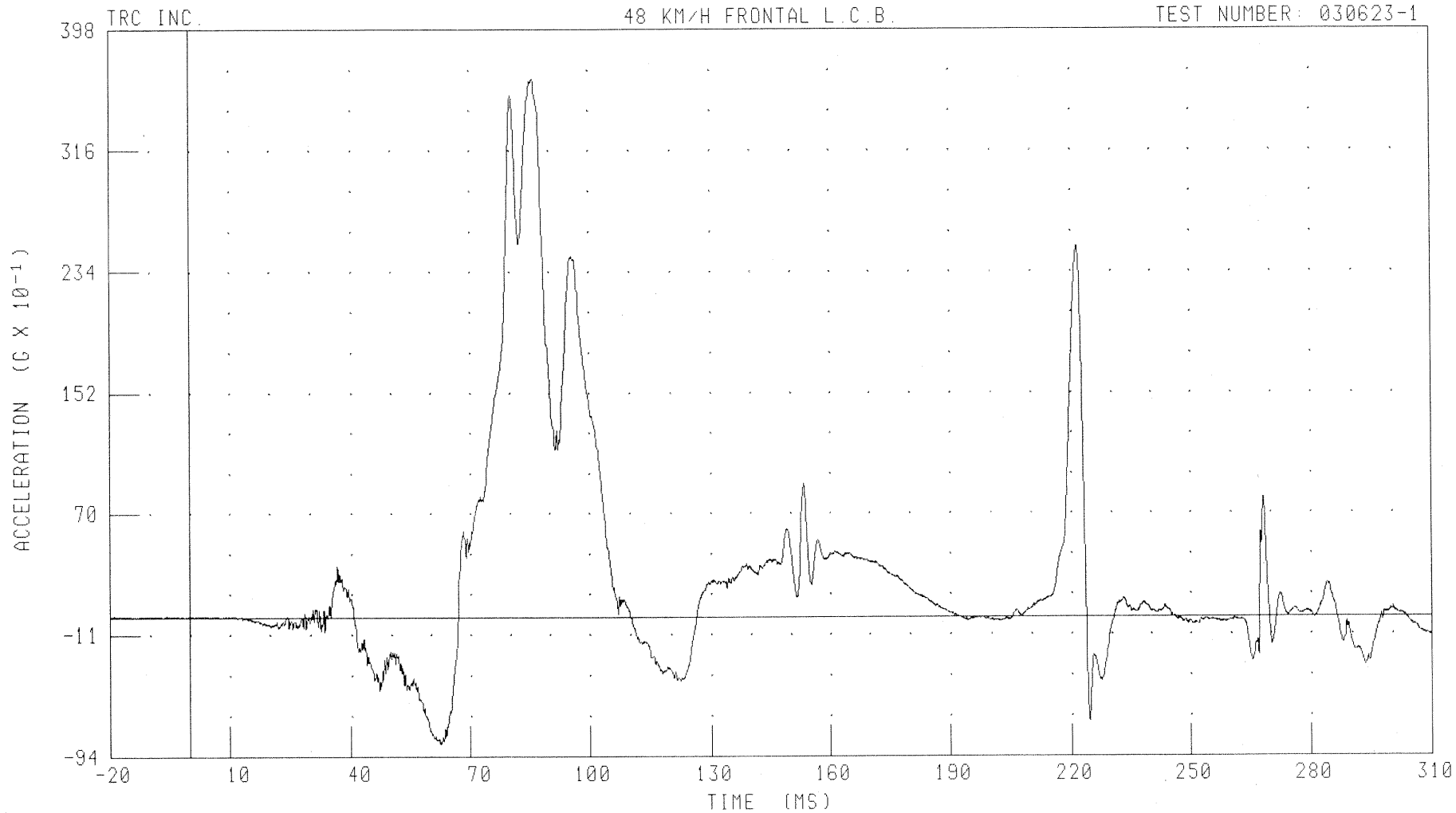
PEAK DATA: 53.52 G @ 221.60 MS; -56.50 G @ 104.56 MS

B-81

030623-1

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: 030623-1



CHANNEL: HD1ZG2

FILTER: CH. CLASS 1000

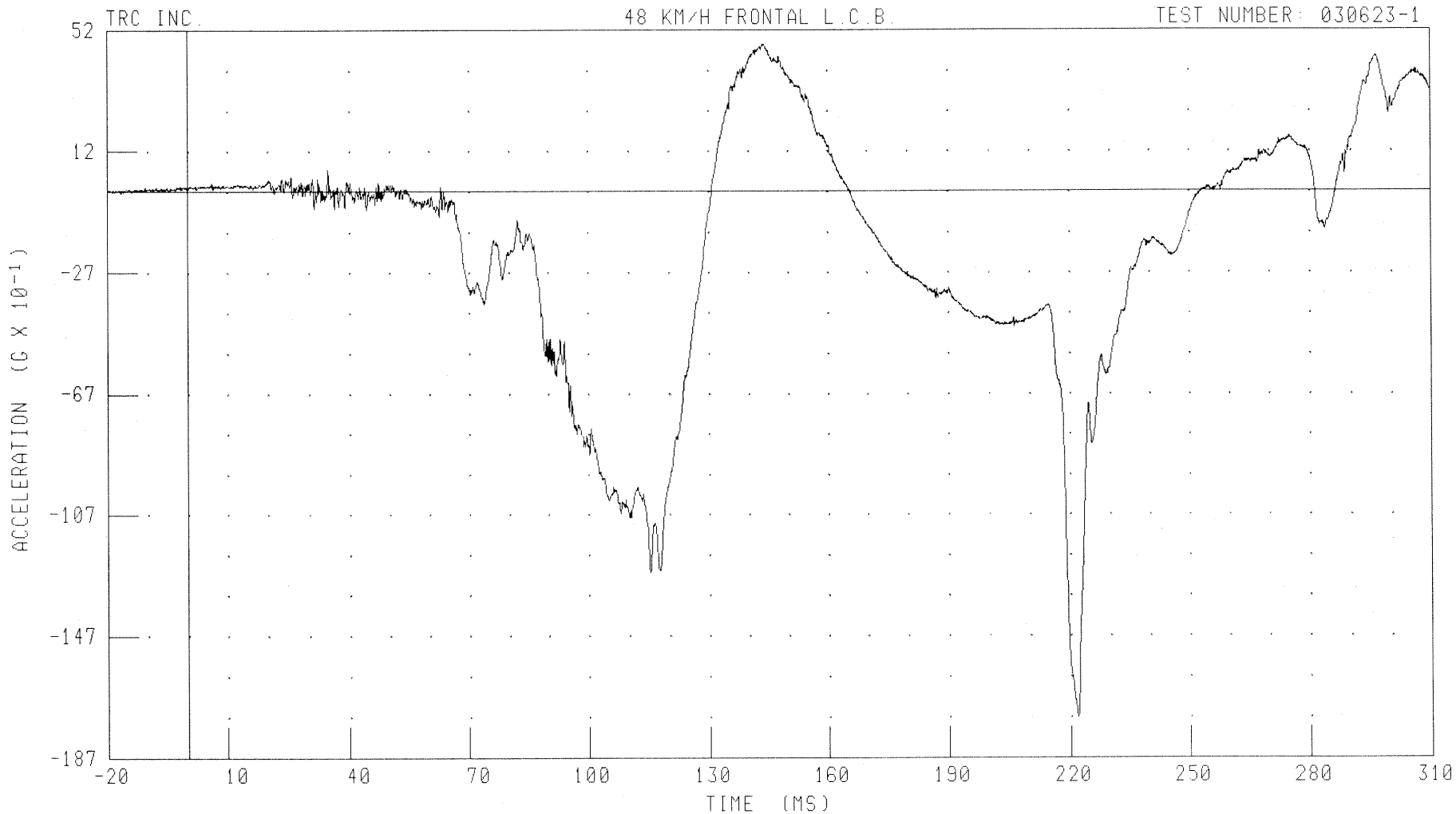
PEAK DATA: 36.49 G @ 86.16 MS, -8.57 G @ 62.40 MS

B-82

030623-1

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: 030623-1



CHANNEL: HD2YG2

FILTER: CH. CLASS 1000

PEAK DATA: 4.85 G @ 144.16 MS; -17.38 G @ 221.76 MS

B-83

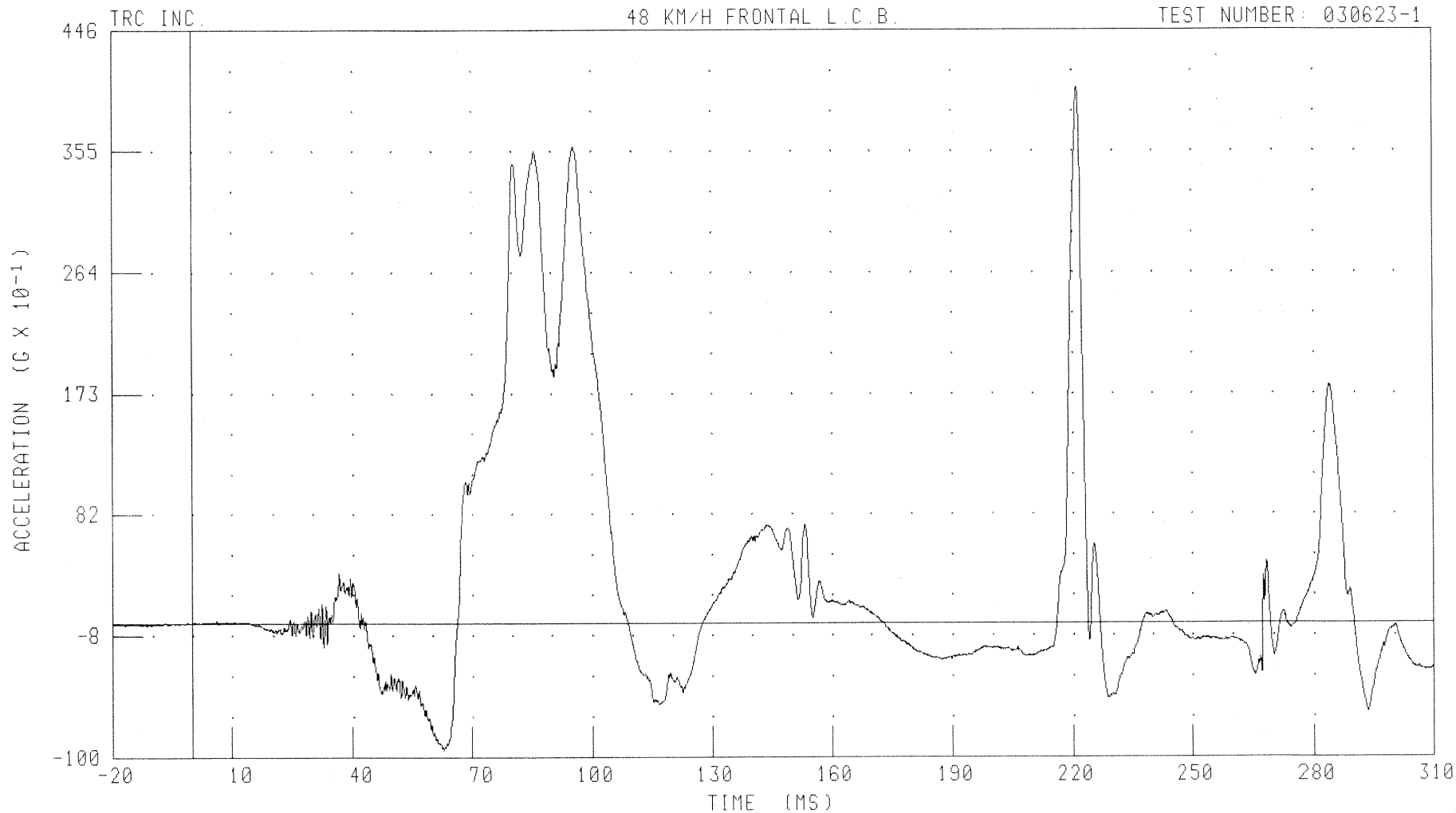
030623-1

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: 030623-1



CHANNEL: HD2ZG2

FILTER: CH. CLASS 1000

PEAK DATA: 40.34 G @ 221.52 MS, -9.44 G @ 62.80 MS

B-84

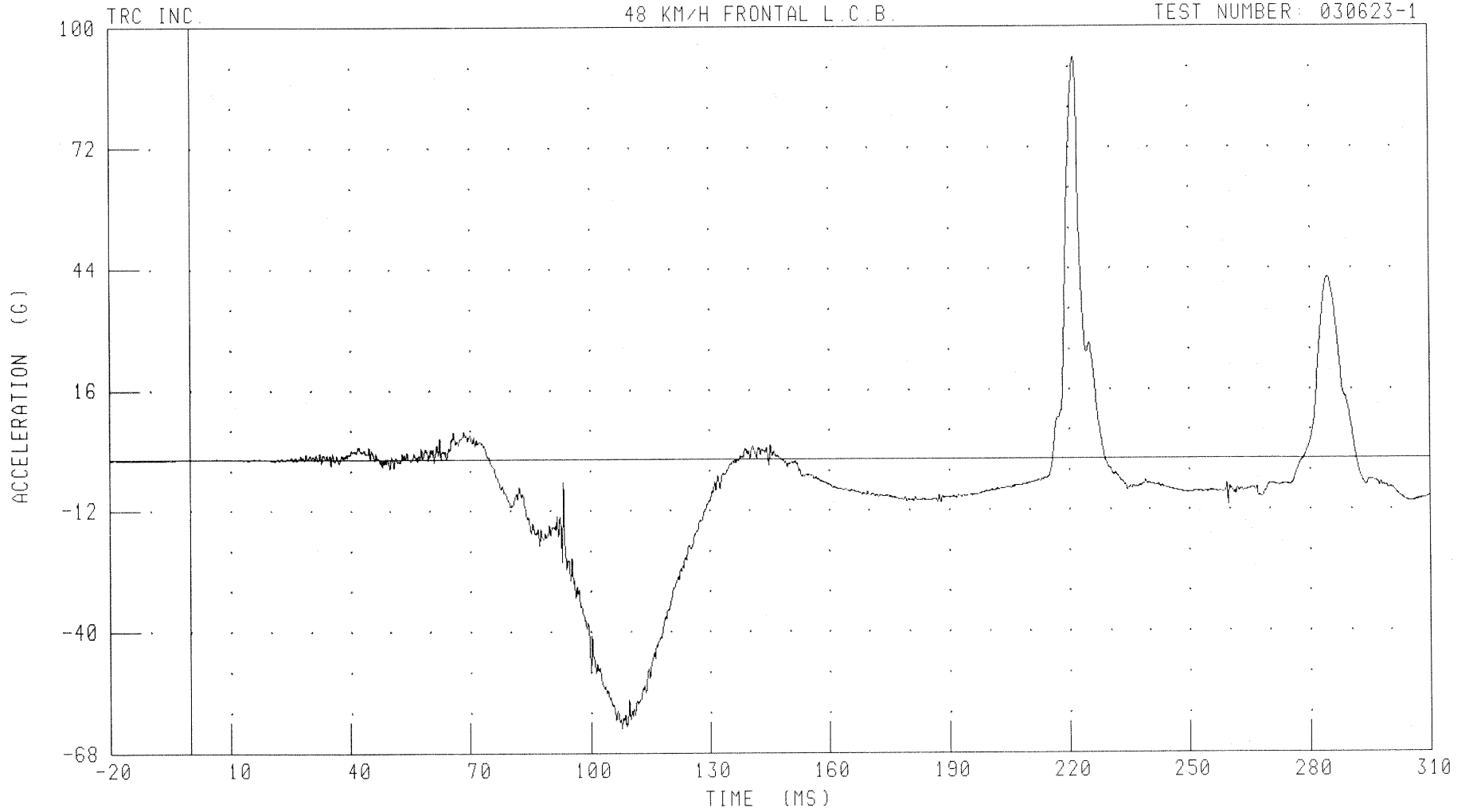
030623-1

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: 030623-1



CHANNEL: HD3XG2 FILTER: CH. CLASS 1000

PEAK DATA: 92.85 G @ 221.44 MS; -62.29 G @ 107.76 MS

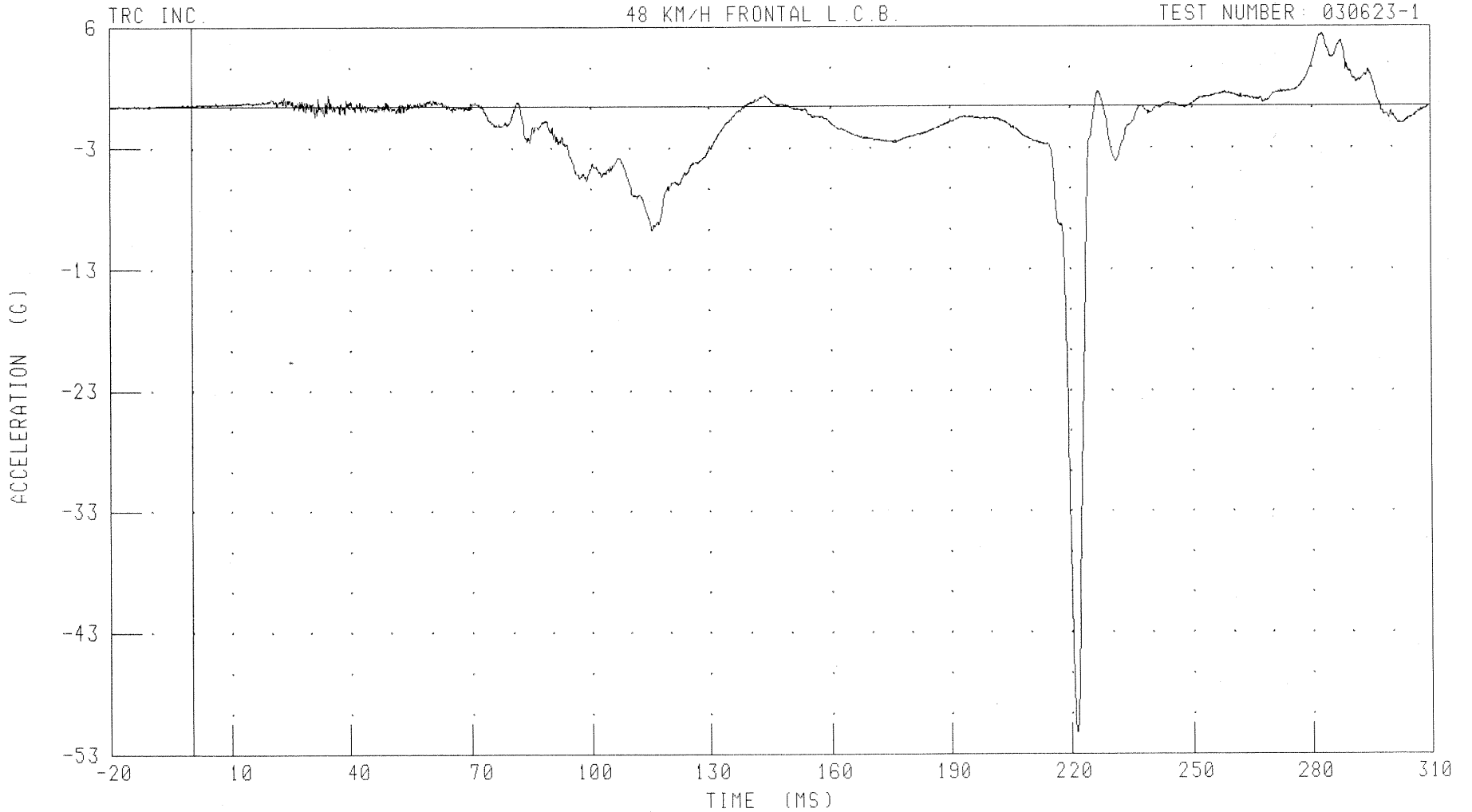
B-85

030623-1

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: 030623-1



CHANNEL: HD3YG2

FILTER: CH. CLASS 1000

PEAK DATA: 5.91 G @ 282.80 MS, -51.76 G @ 221.36 MS

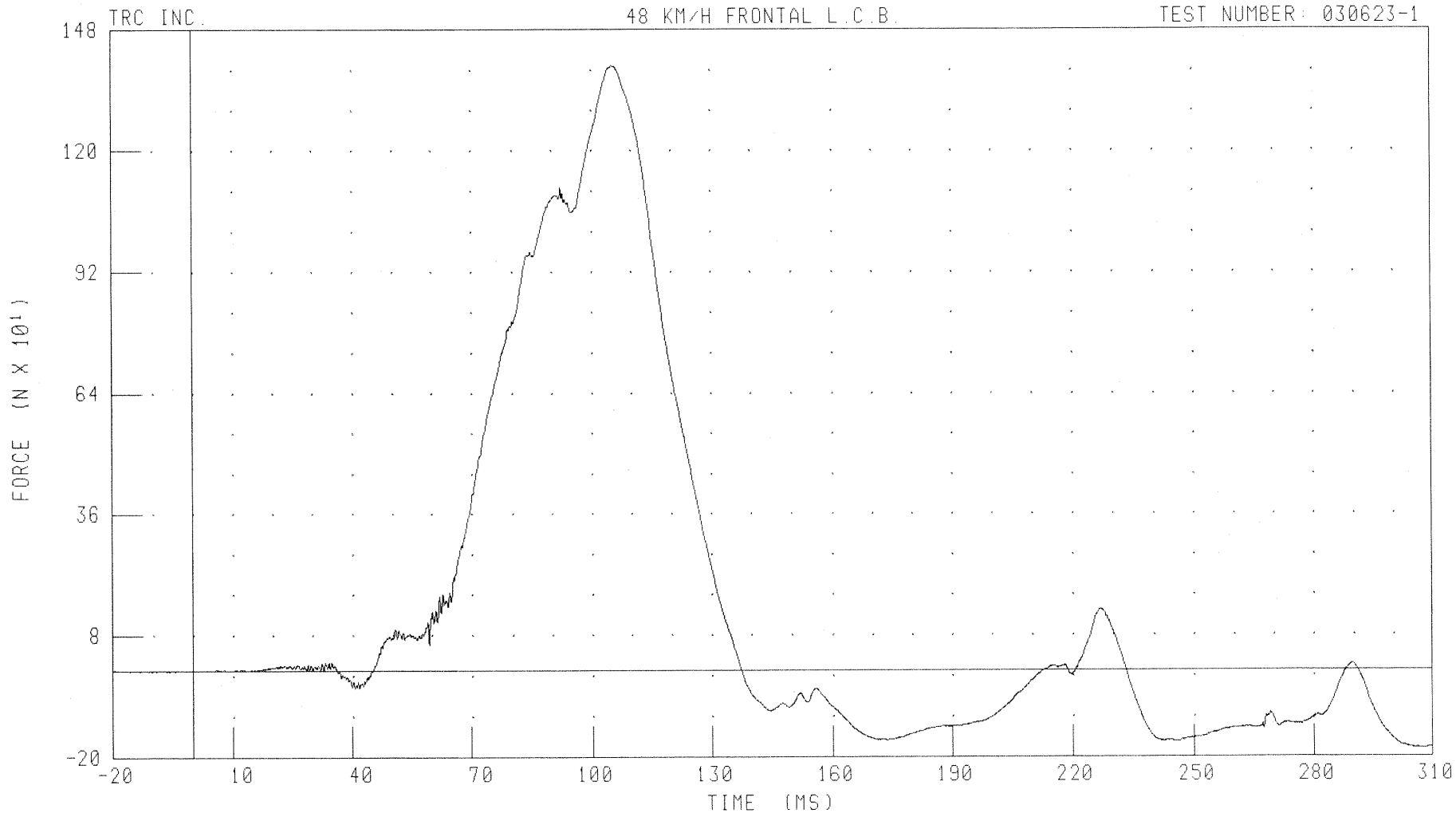
B-86

030623-1

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: 030623-1



CHANNEL: NEKXF2

FILTER: CH. CLASS 1000

PEAK DATA: 1397.18 N @ 105.44 MS; -182.01 N @ 306.88 MS

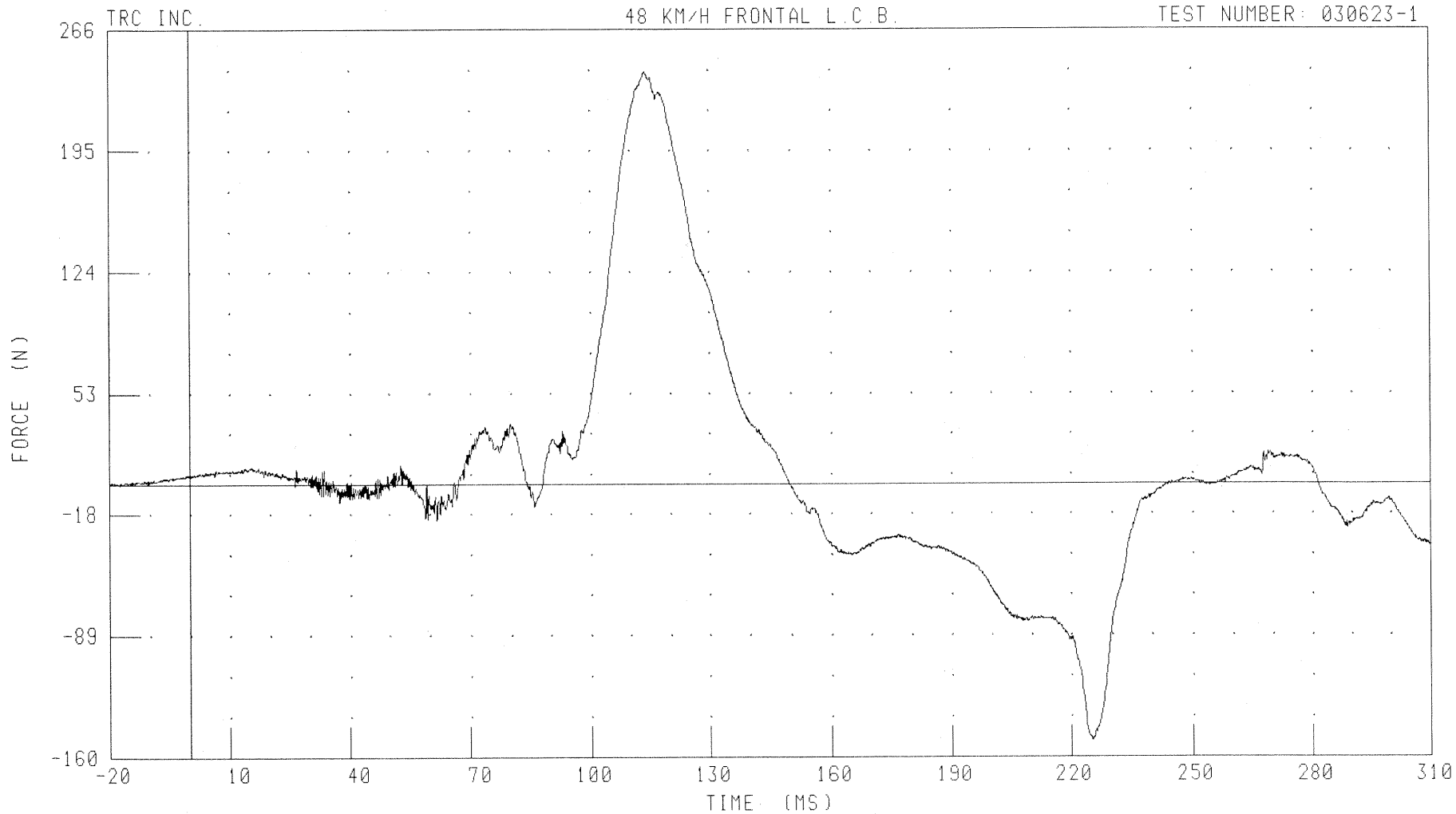
B-87

030623-1

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: 030623-1



CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

PEAK DATA: 241.24 N @ 114.00 MS; -150.36 N @ 225.12 MS

B-88

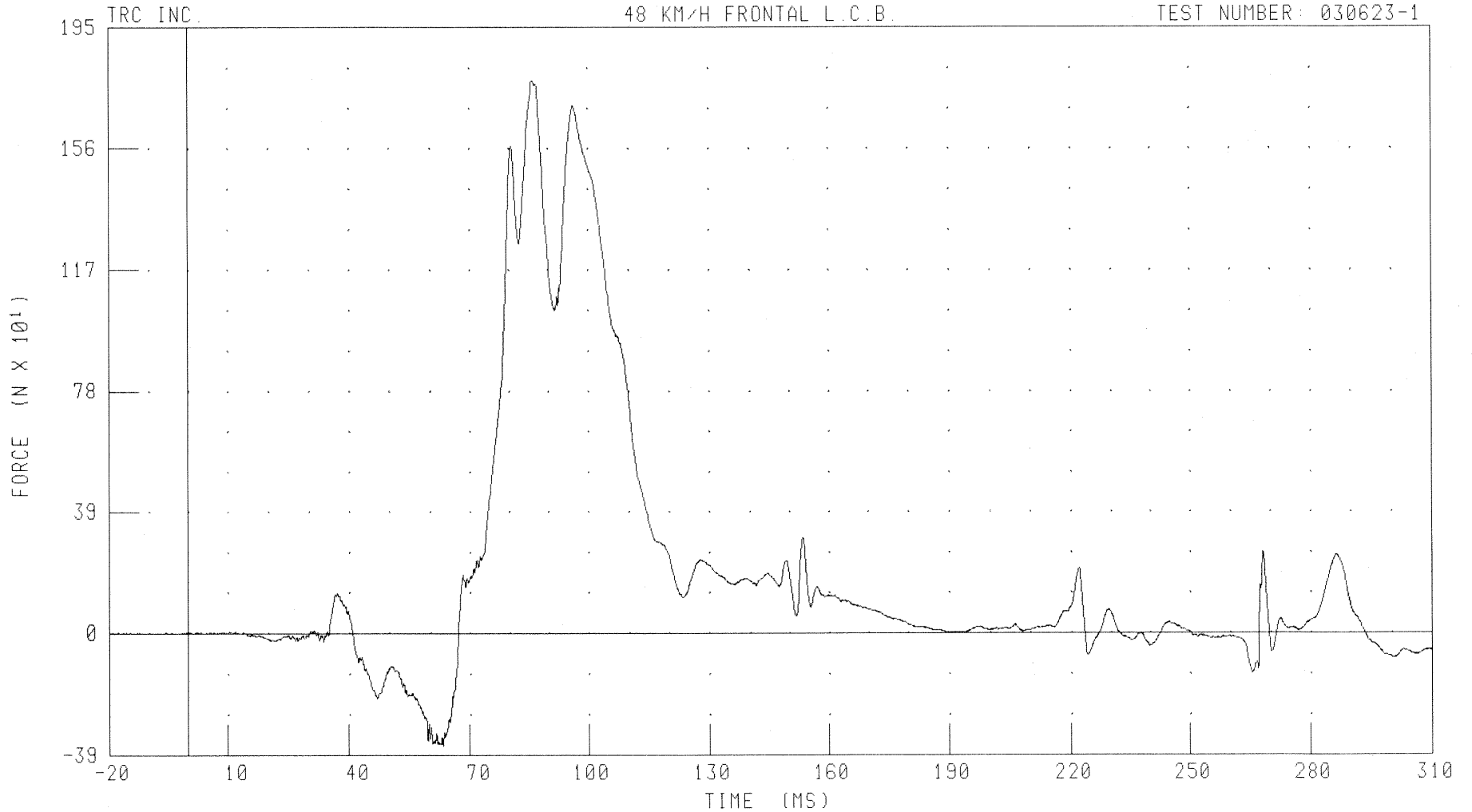
030623-1

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: 030623-1



CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

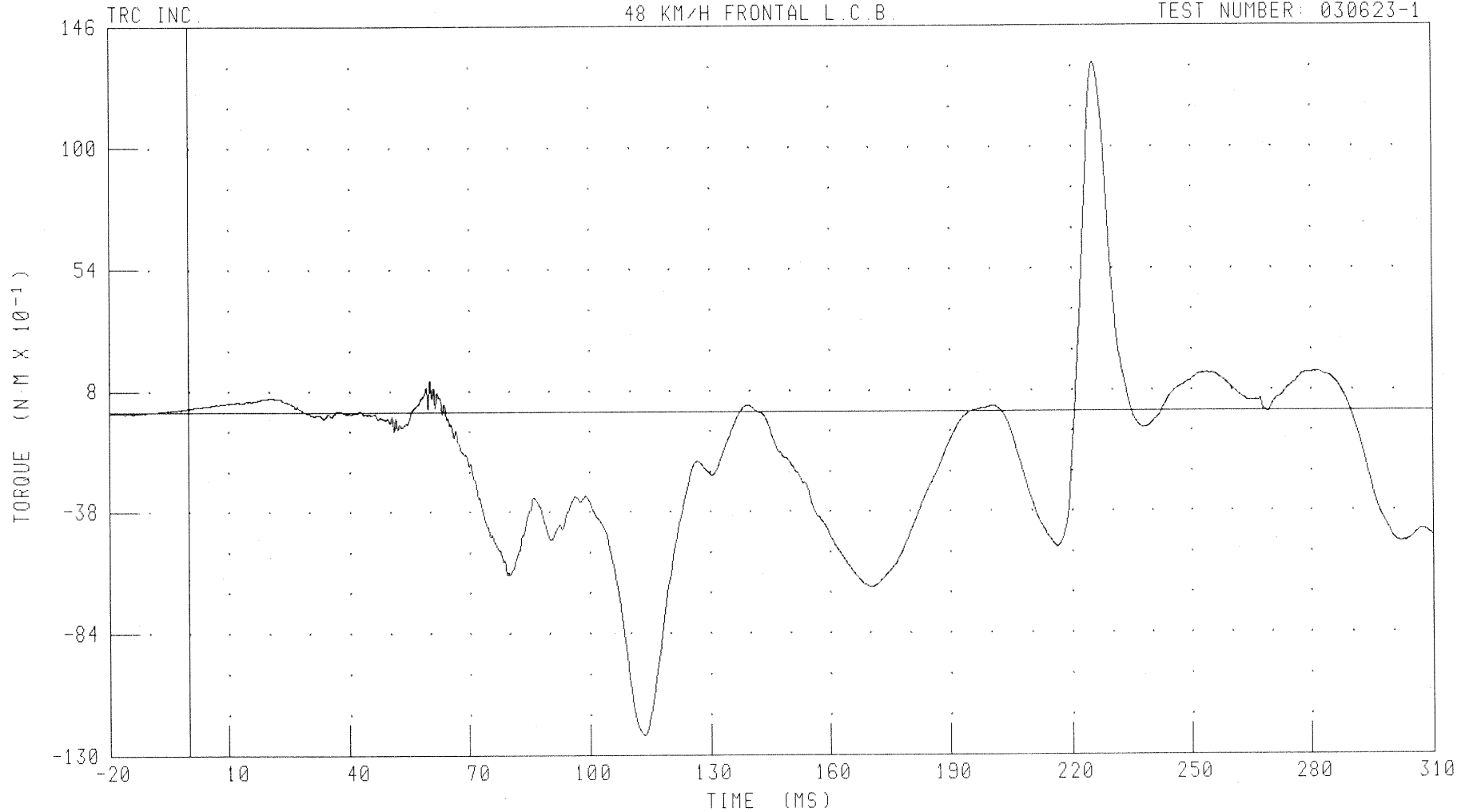
PEAK DATA: 178.96 N @ 86.16 MS; -359.47 N @ 63.20 MS

B-89

030623-1

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: 030623-1



CHANNEL: NEKXM2

FILTER: CH. CLASS 600

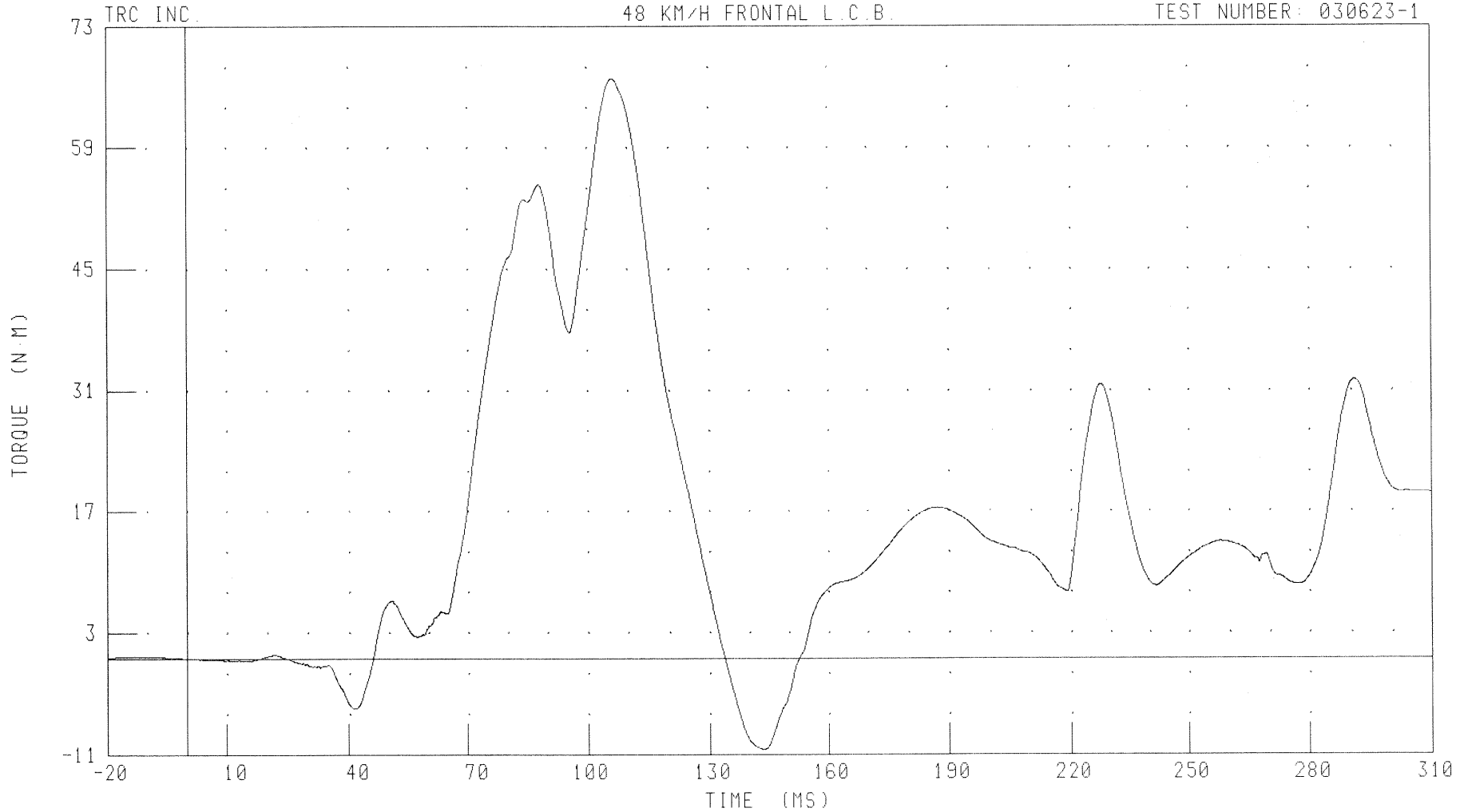
PEAK DATA: 13.22 N·M @ 225.44 MS, -122.7 N·M @ 113.76 MS

B-90

030623-1

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: 030623-1



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

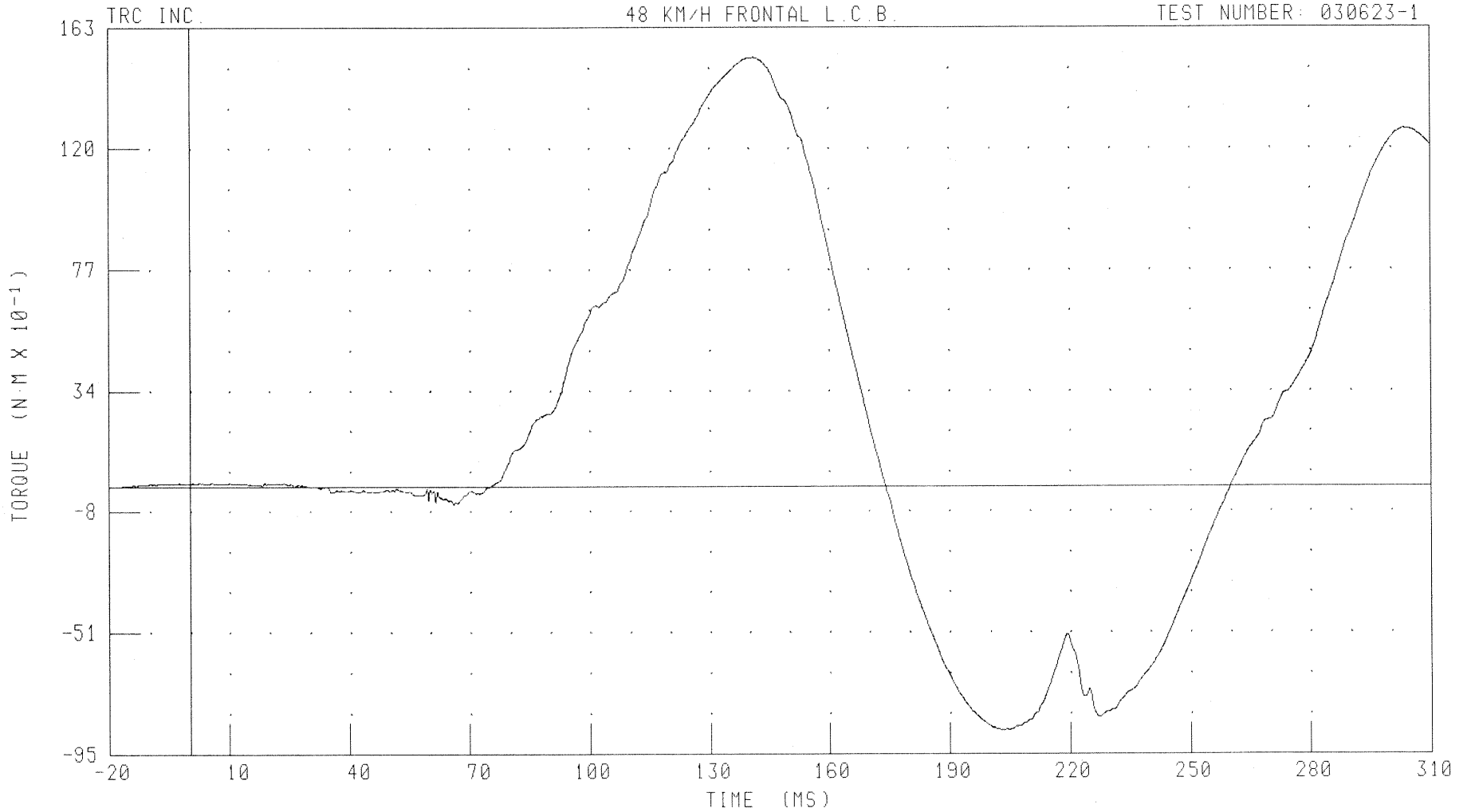
PEAK DATA: 66.99 N·M @ 106.56 MS; -10.44 N·M @ 143.60 MS

B-91

030623-1

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: 030623-1



CHANNEL: NEKZM2 FILTER: CH. CLASS 600

PEAK DATA: 15.25 N.M @ 141.36 MS, -8.67 N.M @ 202.72 MS

B-92

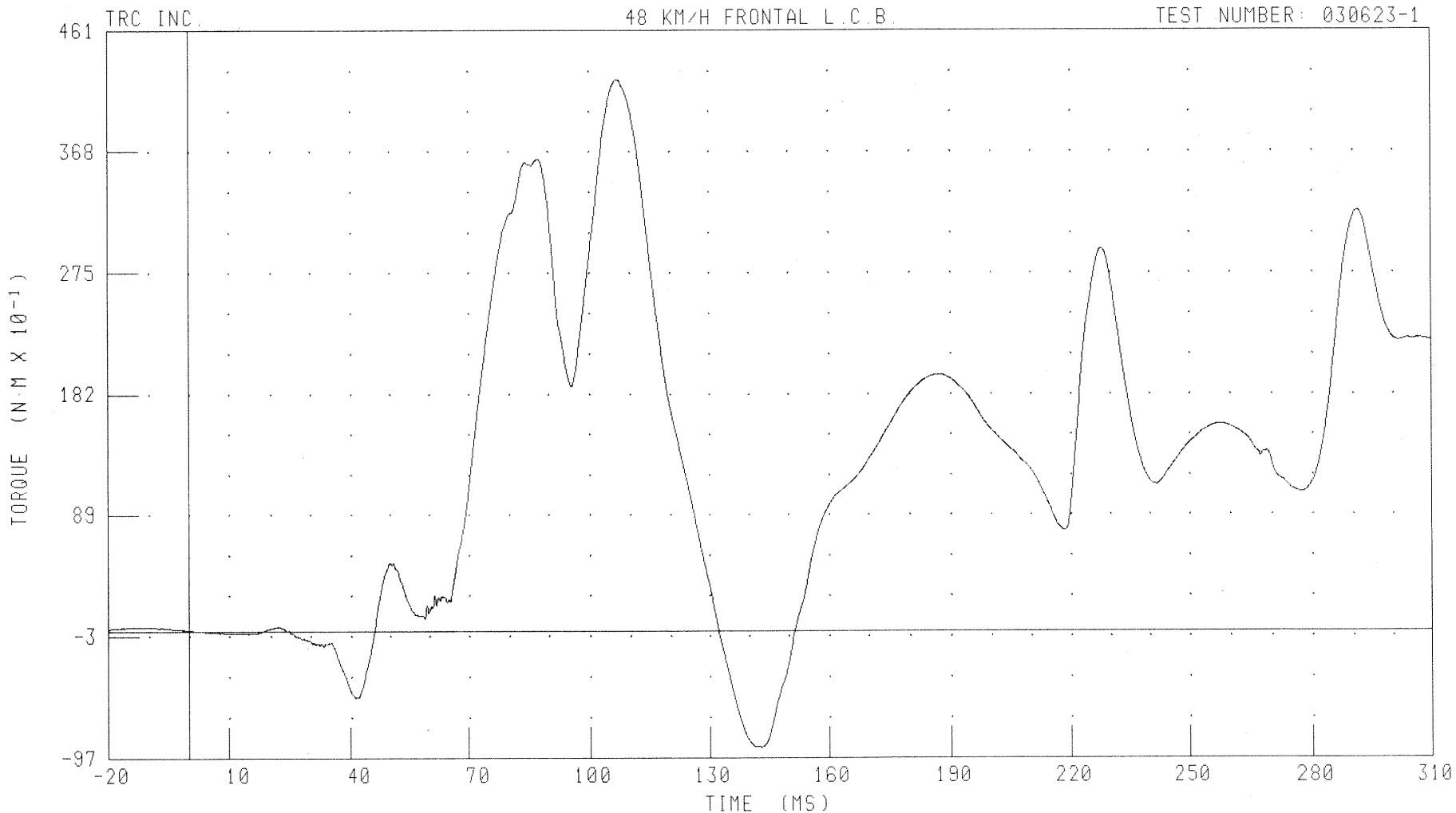
030623-1

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: 030623-1



CHANNEL: NEKOM2

FILTER: CH. CLASS 600

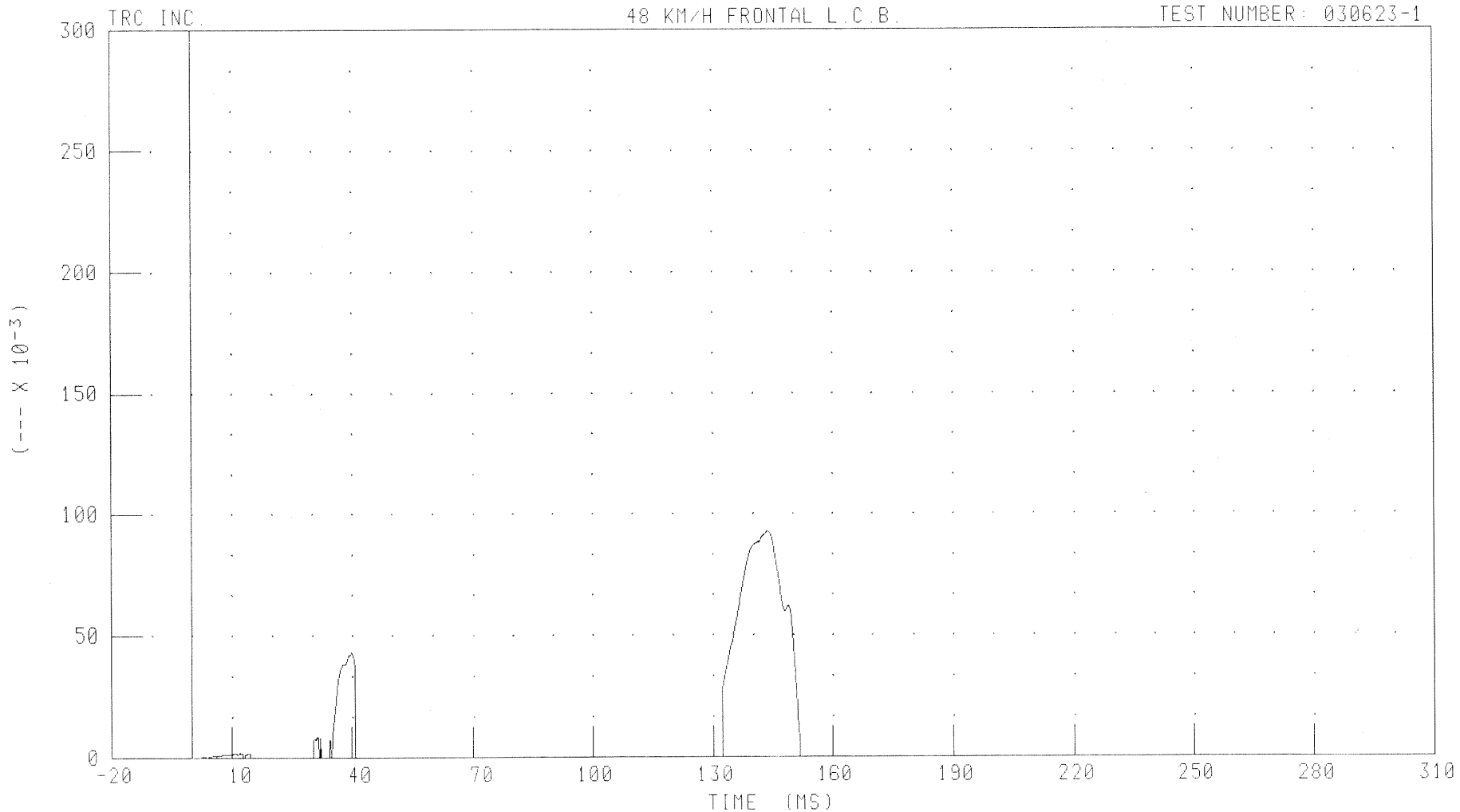
PEAK DATA: 42.33 N.M @ 106.88 MS; -8.89 N.M @ 143.28 MS

B-93

030623-1

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: 030623-1



CHANNEL NTE2

FILTER: CH. CLASS 600

PEAK DATA: 0.09 --- @ 143.76 MS; 0.00 --- @ -20.00 MS

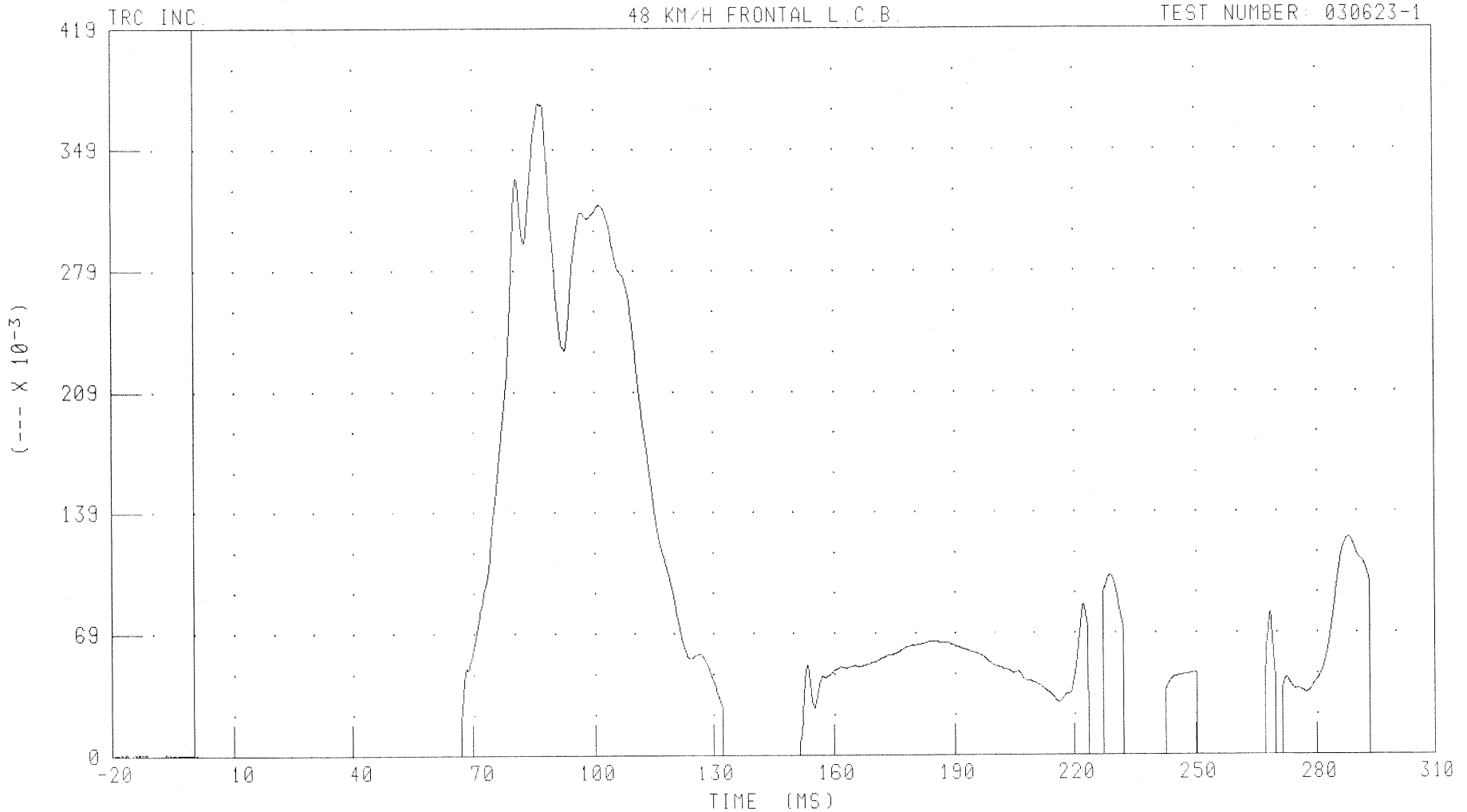
B-94

030623-1

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: 030623-1



CHANNEL NTF2

FILTER: CH CLASS 600

PEAK DATA: 0.38 --- 0 86.32 MS, 0 00 --- 0 -20.00 MS

B-95

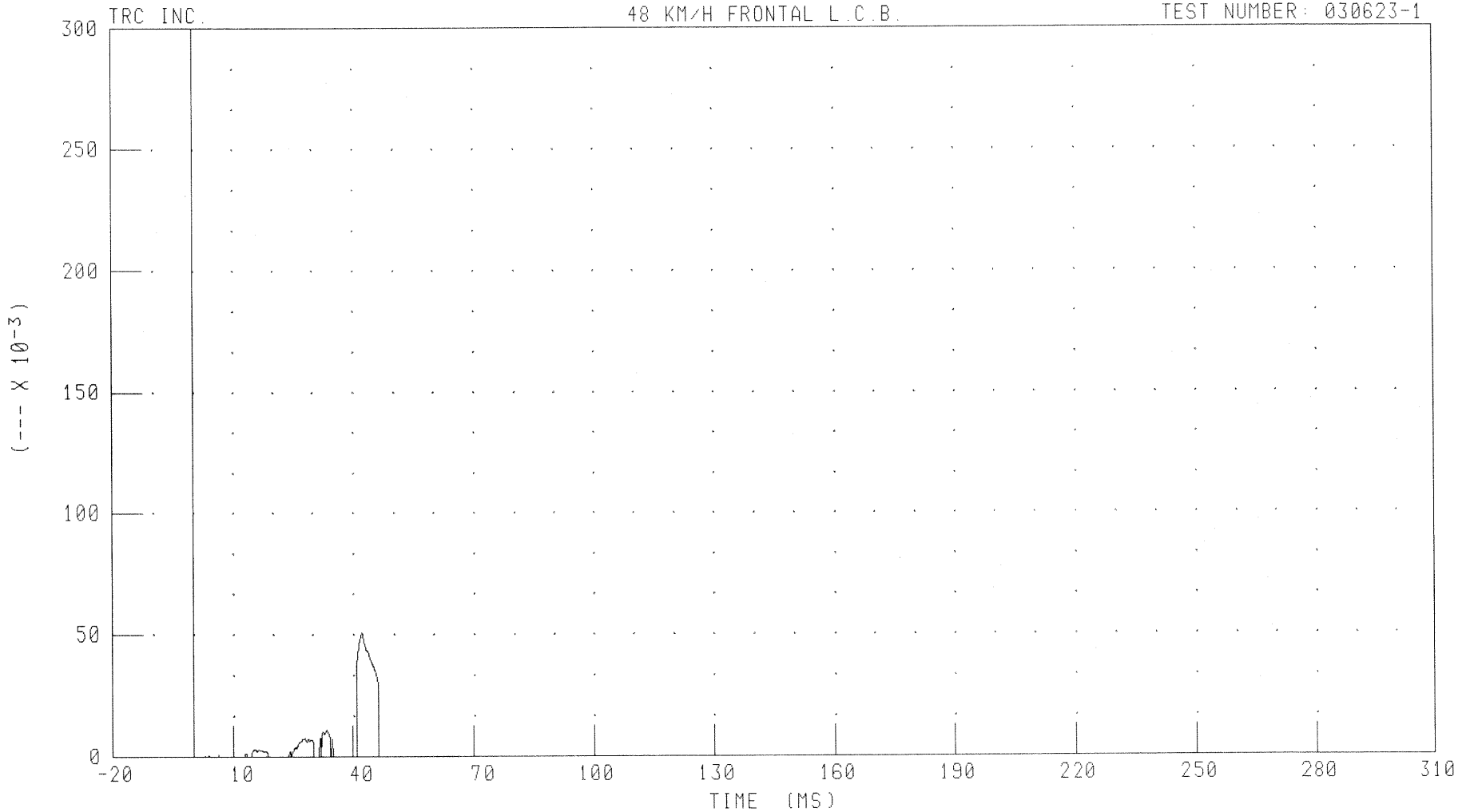
030623-1

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: 030623-1



CHANNEL: NCE2

FILTER: CH. CLASS 600

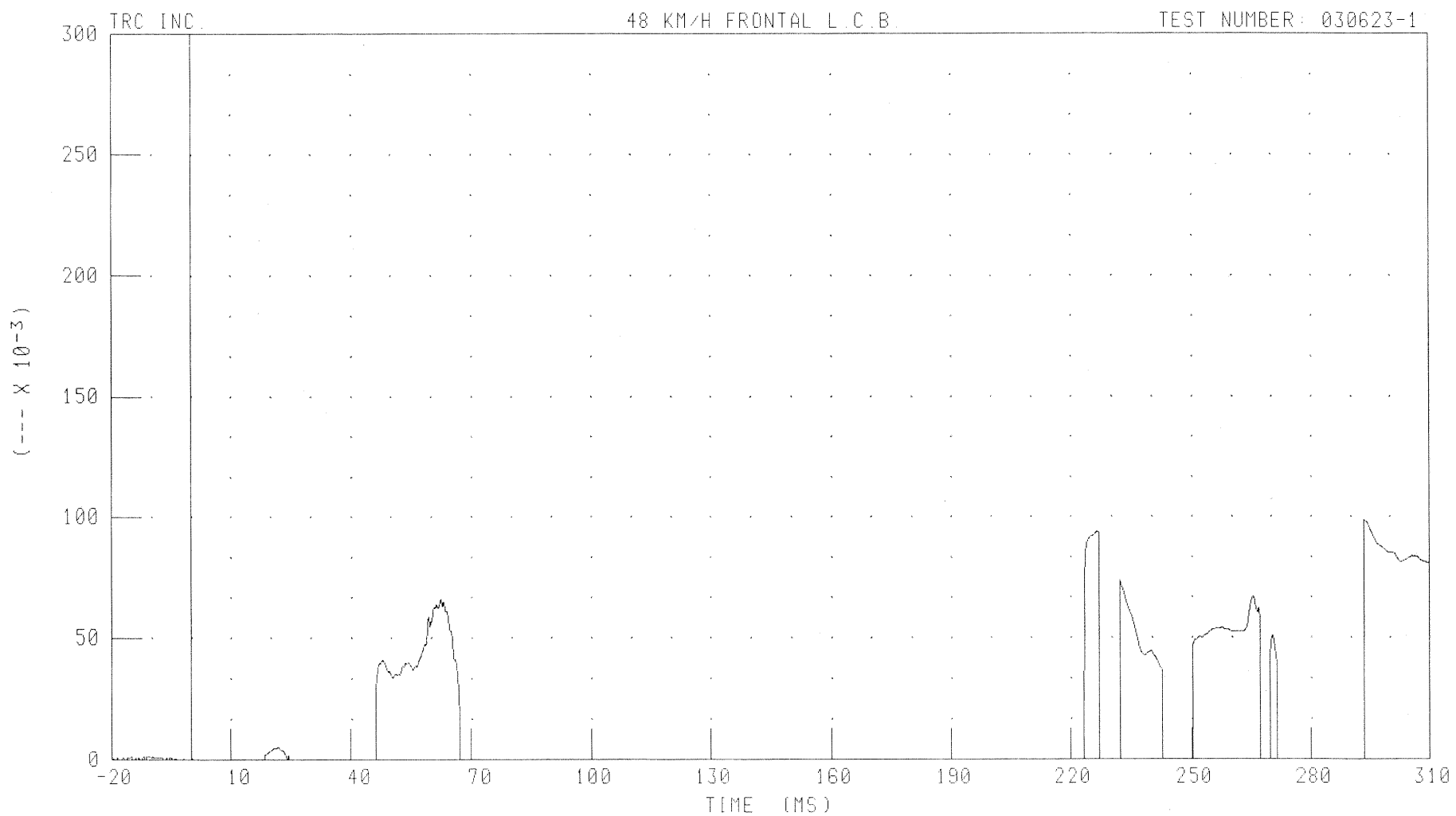
PEAK DATA: 0.05 --- @ 42.24 MS, 0.00 --- @ -20.00 MS

B-96

030623-1

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: 030623-1



CHANNEL: NCF2

FILTER: CH CLASS 600

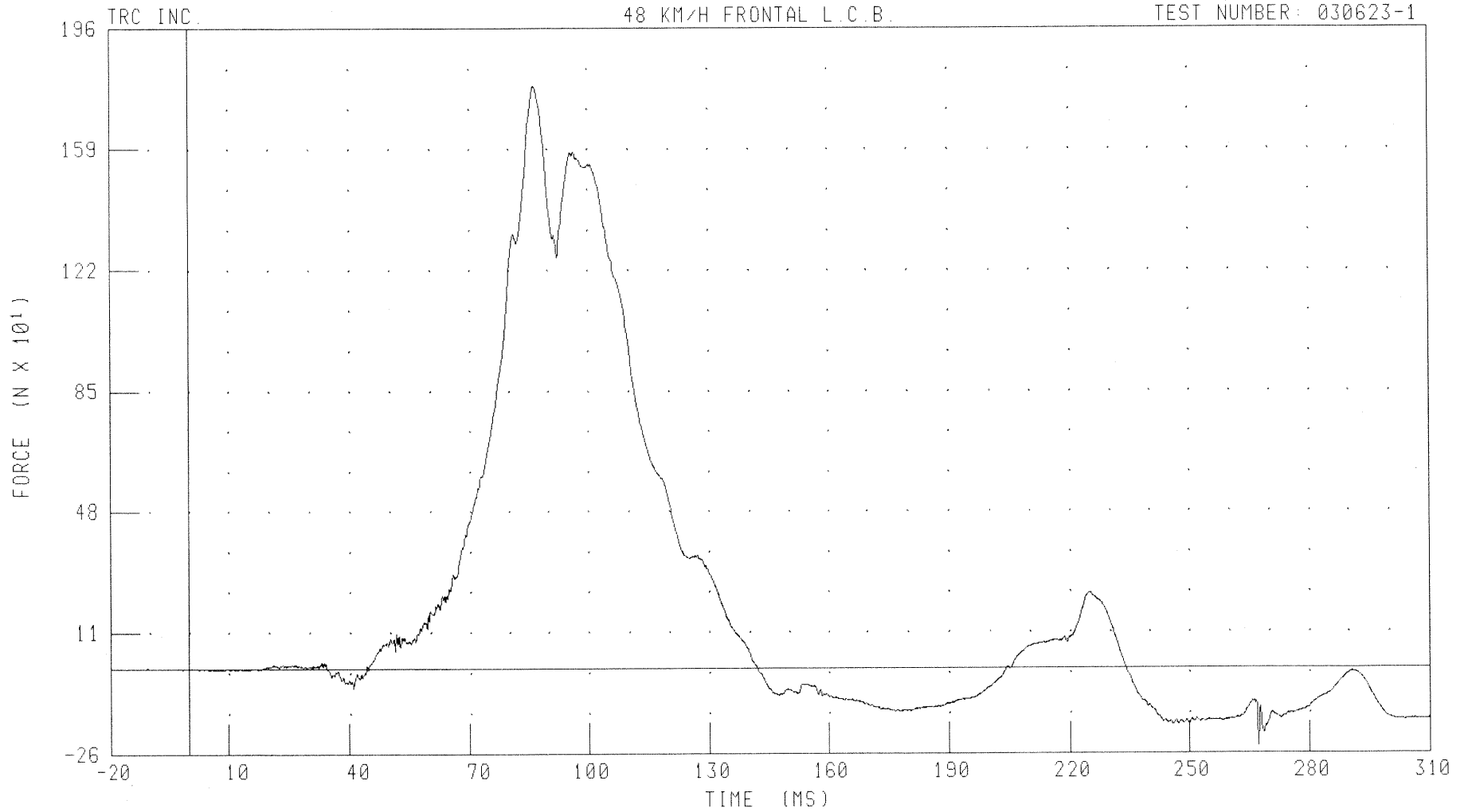
PEAK DATA: 0.10 --- @ 293.52 MS; 0.00 --- @ -19.44 MS

B-97

030623-1

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: 030623-1



CHANNEL: NKLXF2 FILTER: CH CLASS 1000

PEAK DATA: 1784.45 N @ 86.56 MS; -239.04 N @ 267.28 MS

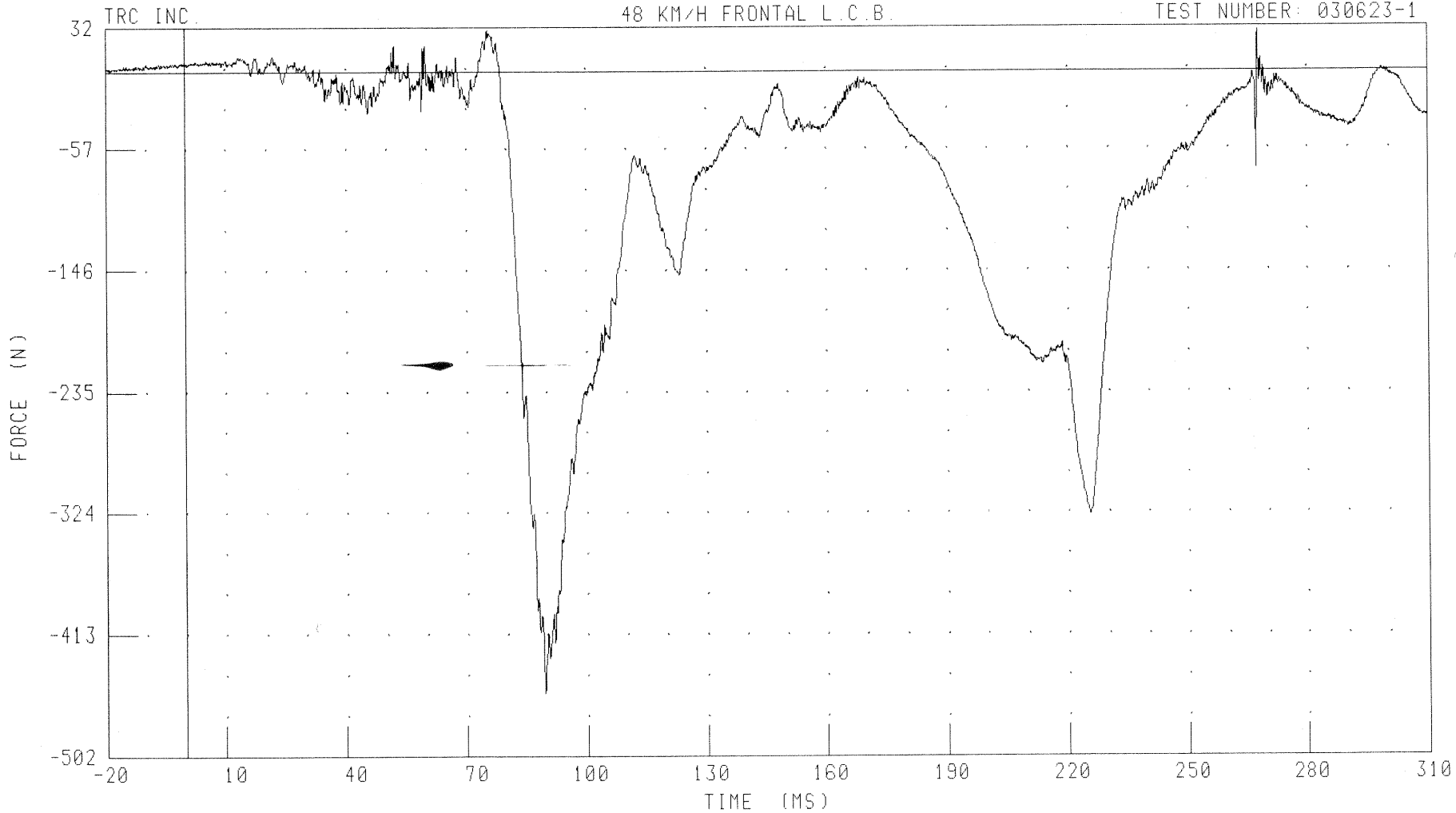
B-98

030623-1

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: 030623-1



CHANNEL: NKLYF2 FILTER: CH CLASS 1000

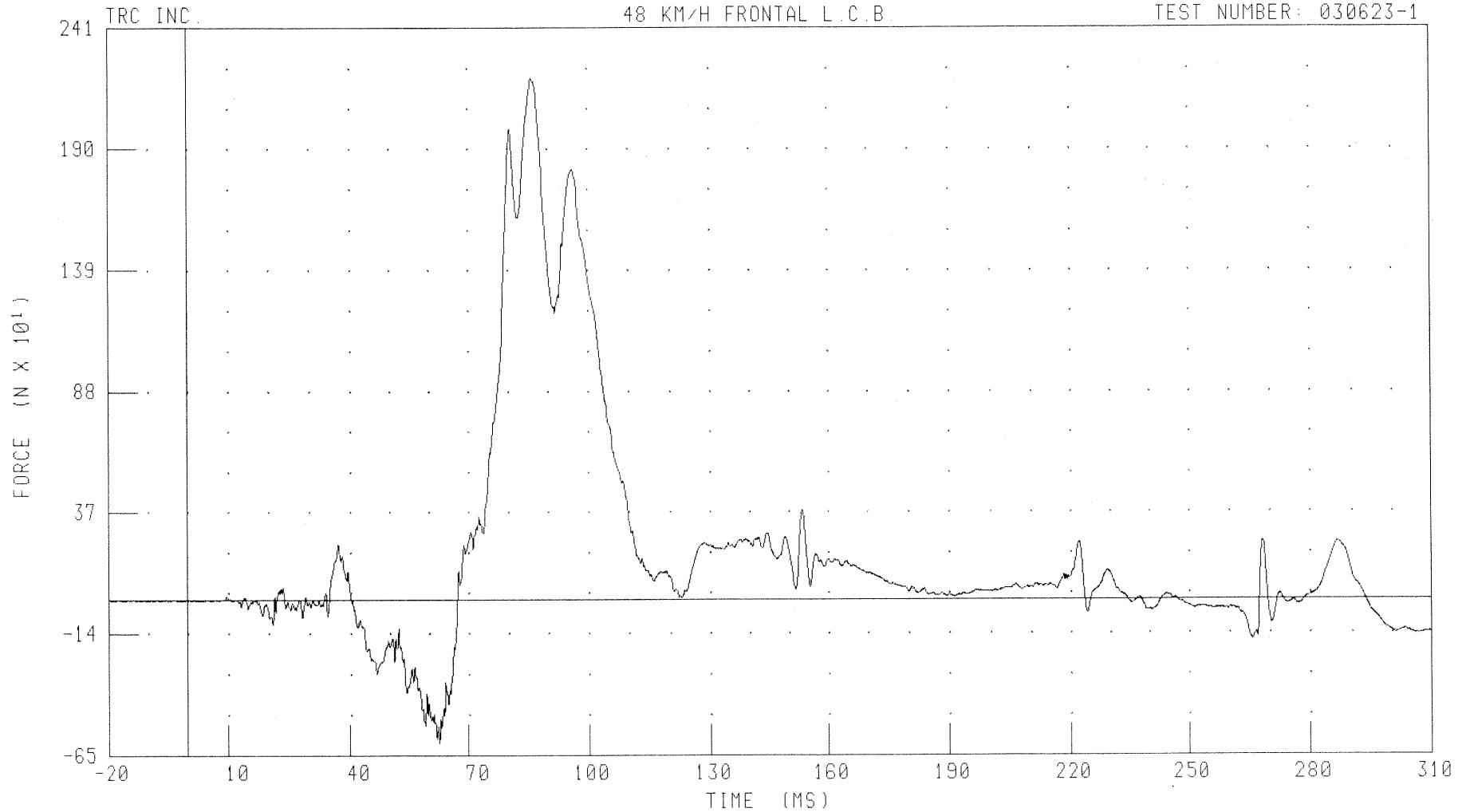
PEAK DATA: 29.63 N @ 75.60 MS; -455.91 N @ 89.52 MS

B-99

030623-1

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: 030623-1



CHANNEL: NKLZF2 FILTER: CH CLASS 1000

PEAK DATA: 2198.33 N @ 86.16 MS, -598.46 N @ 62.56 MS

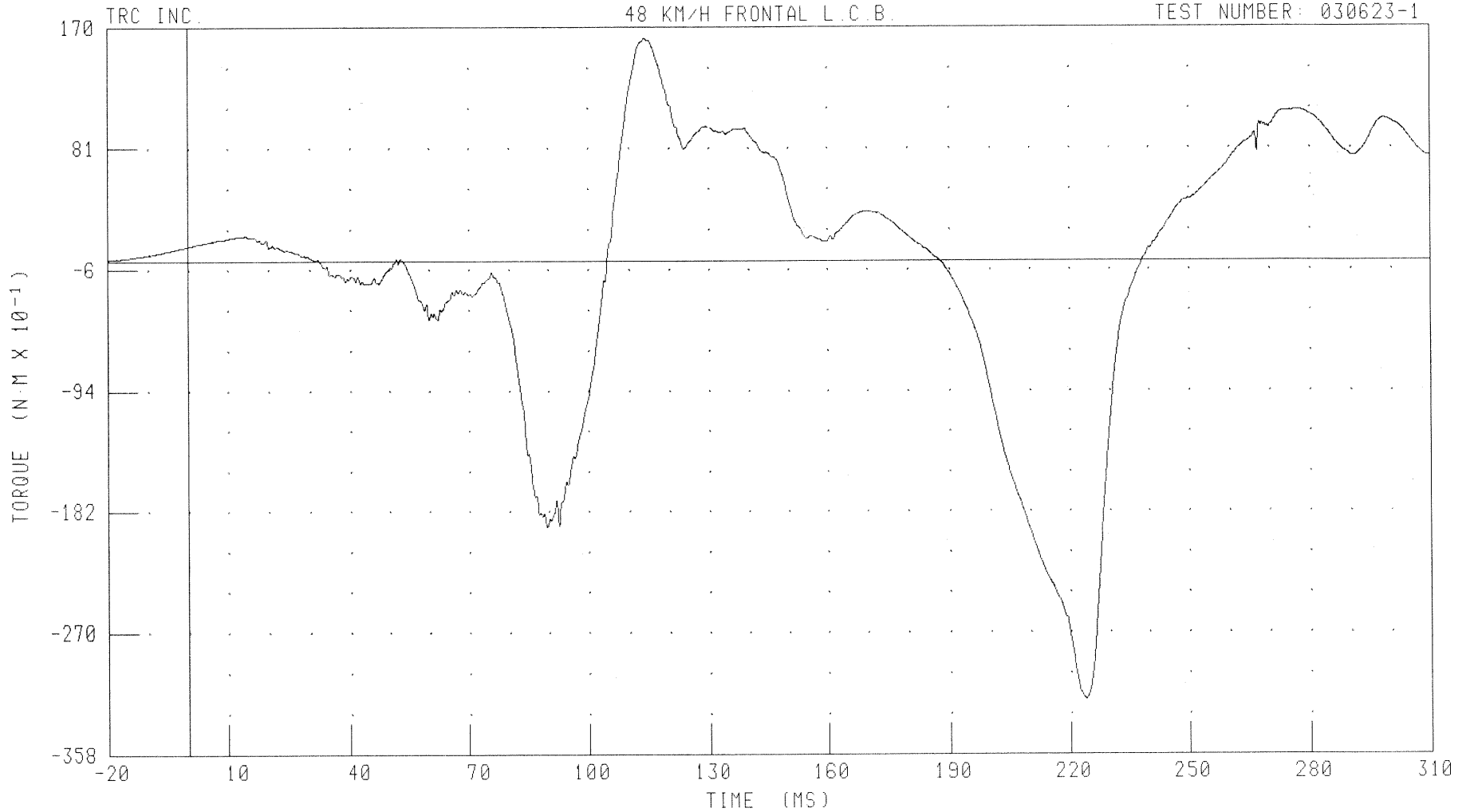
B-100

030623-1

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: 030623-1



CHANNEL: NKLX12

FILTER: CH. CLASS 600

PEAK DATA: 16.20 N·M @ 114.08 MS; -31.83 N·M @ 223.92 MS

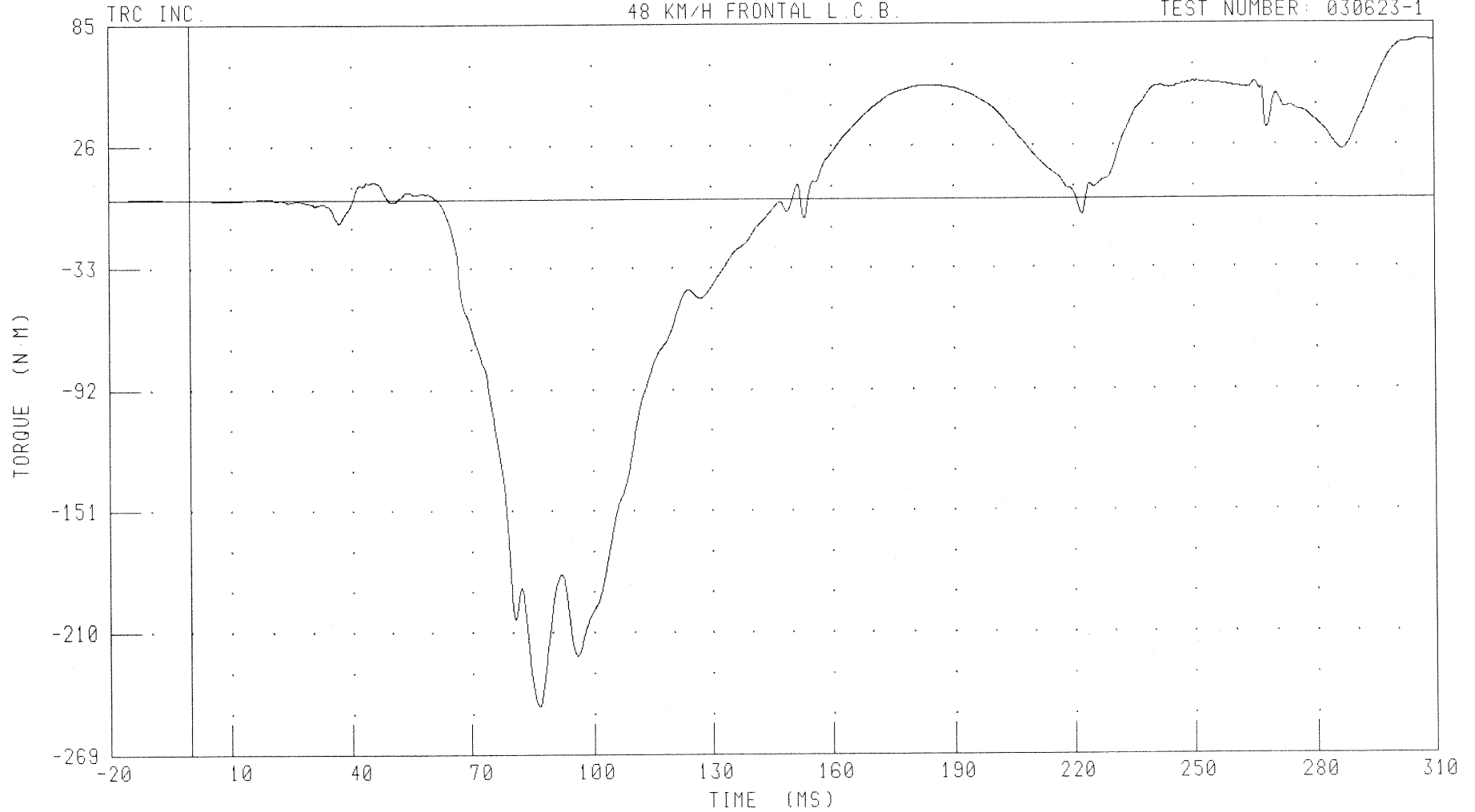
B-101

030623-1

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: 030623-1



CHANNEL: NKLYM2

FILTER: CH. CLASS 600

TIME (MS)

PEAK DATA: 77.36 N.M @ 306.64 MS, -245.63 N.M @ 86.88 MS

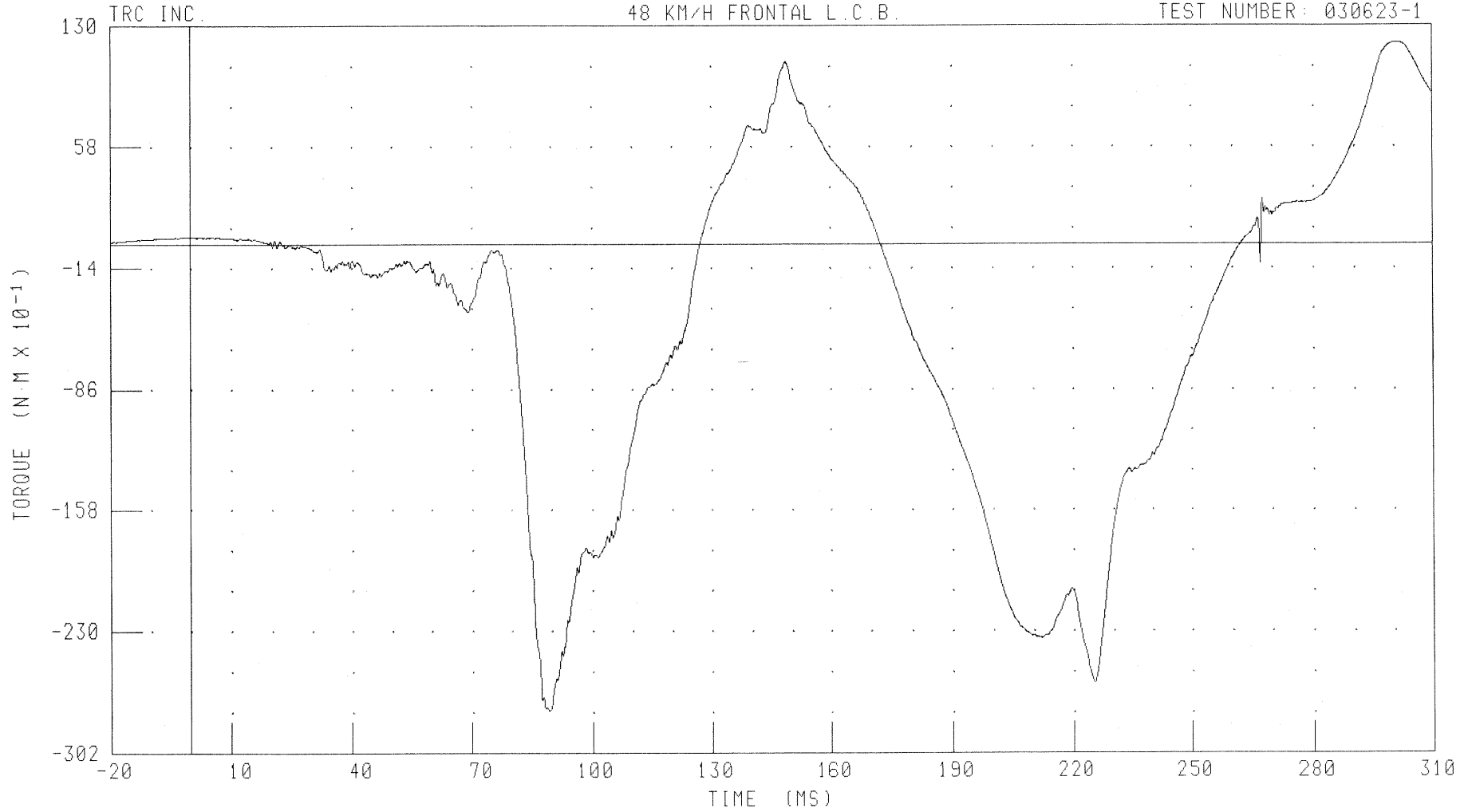
B-102

030623-1

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: 030623-1



CHANNEL: NKLZM2 FILTER: CH. CLASS 600

PEAK DATA: 11.99 N·M @ 301.20 MS, -27.71 N·M @ 89.44 MS

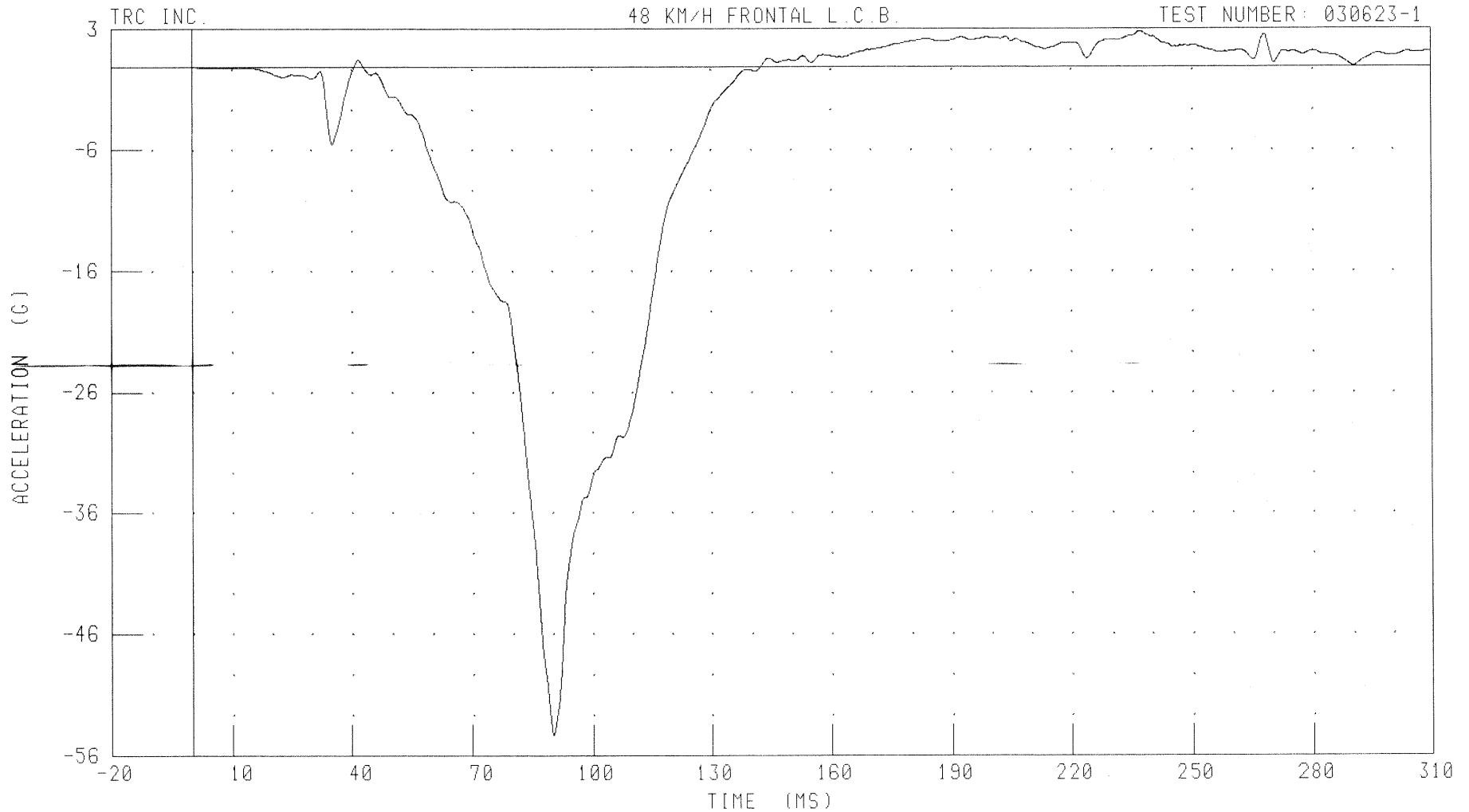
B-103

030623-1

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: 030623-1



CHANNEL: CSTXG2 FILTER: CH. CLASS 180

PEAK DATA: 2.87 G @ 237.12 MS, -55.23 G @ 90.08 MS

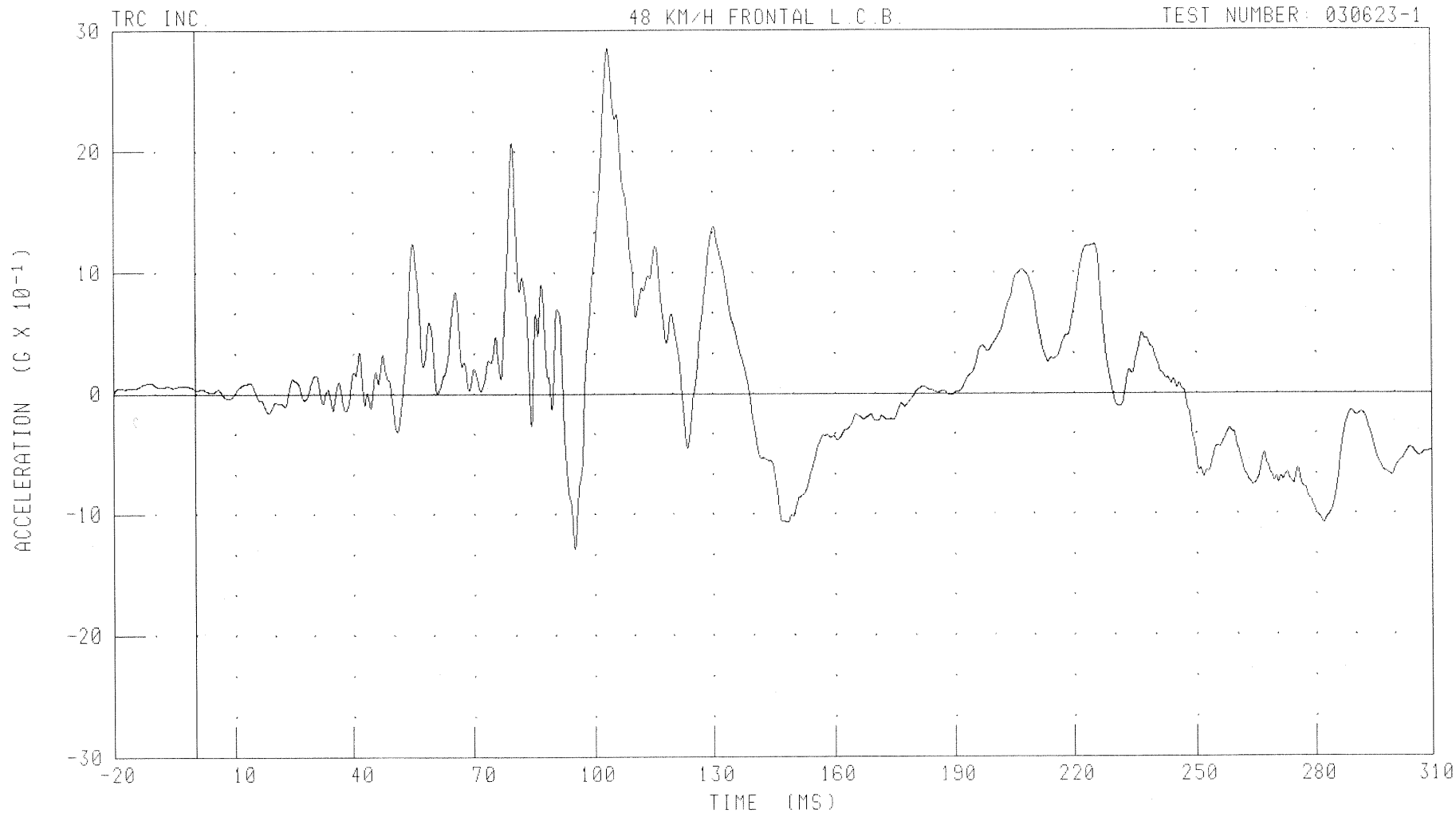
B-104

030623-1

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: 030623-1



CHANNEL: CSTYG2 FILTER: CH CLASS 100

PEAK DATA 2.86 G @ 103.76 MS, -1.29 G @ 95.04 MS

B-105

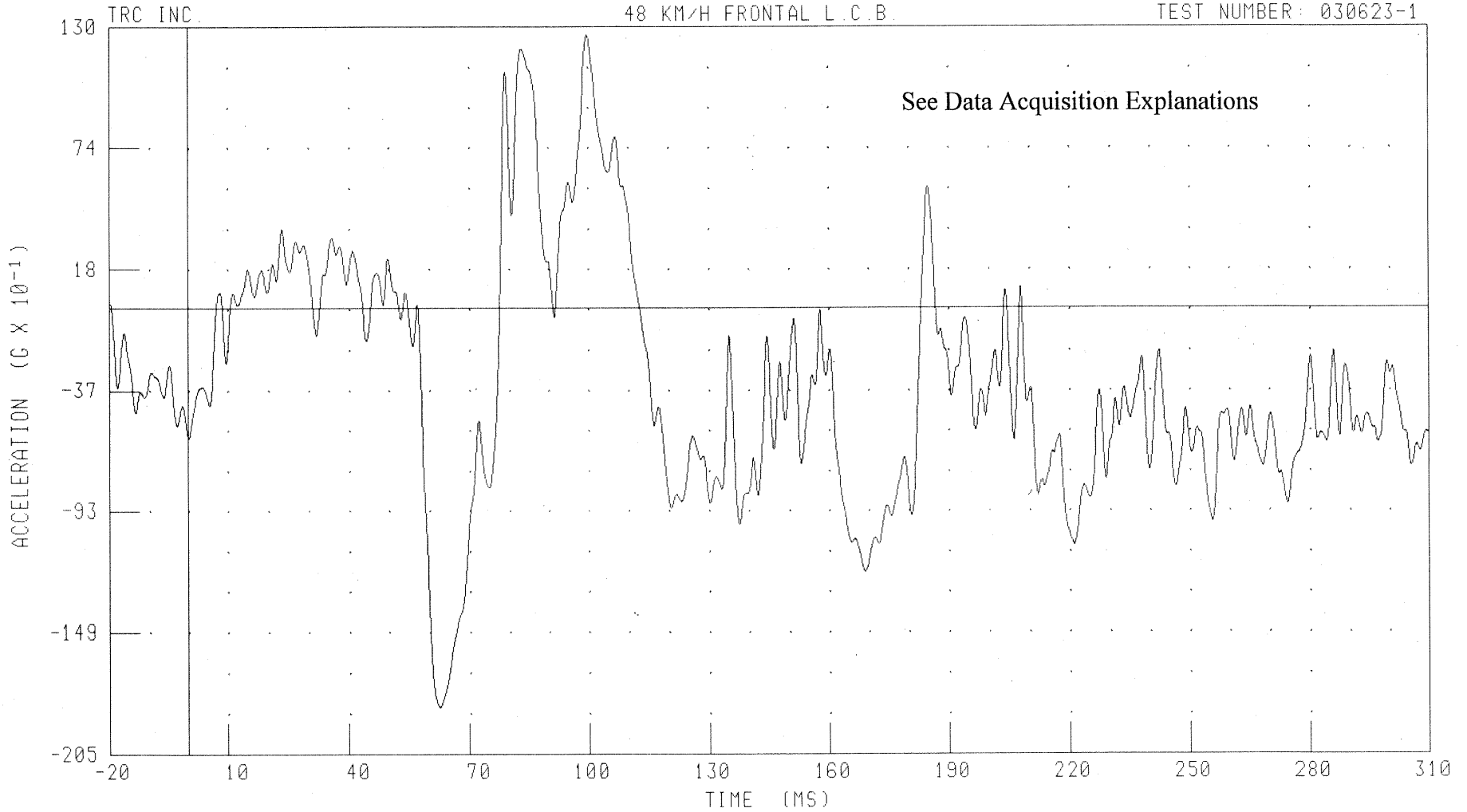
030623-1

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: 030623-1



CHANNEL: CSTZG2 FILTER: CH. CLASS 180

PEAK DATA: 12.61 G @ 99.92 MS, -18.45 G @ 62.56 MS

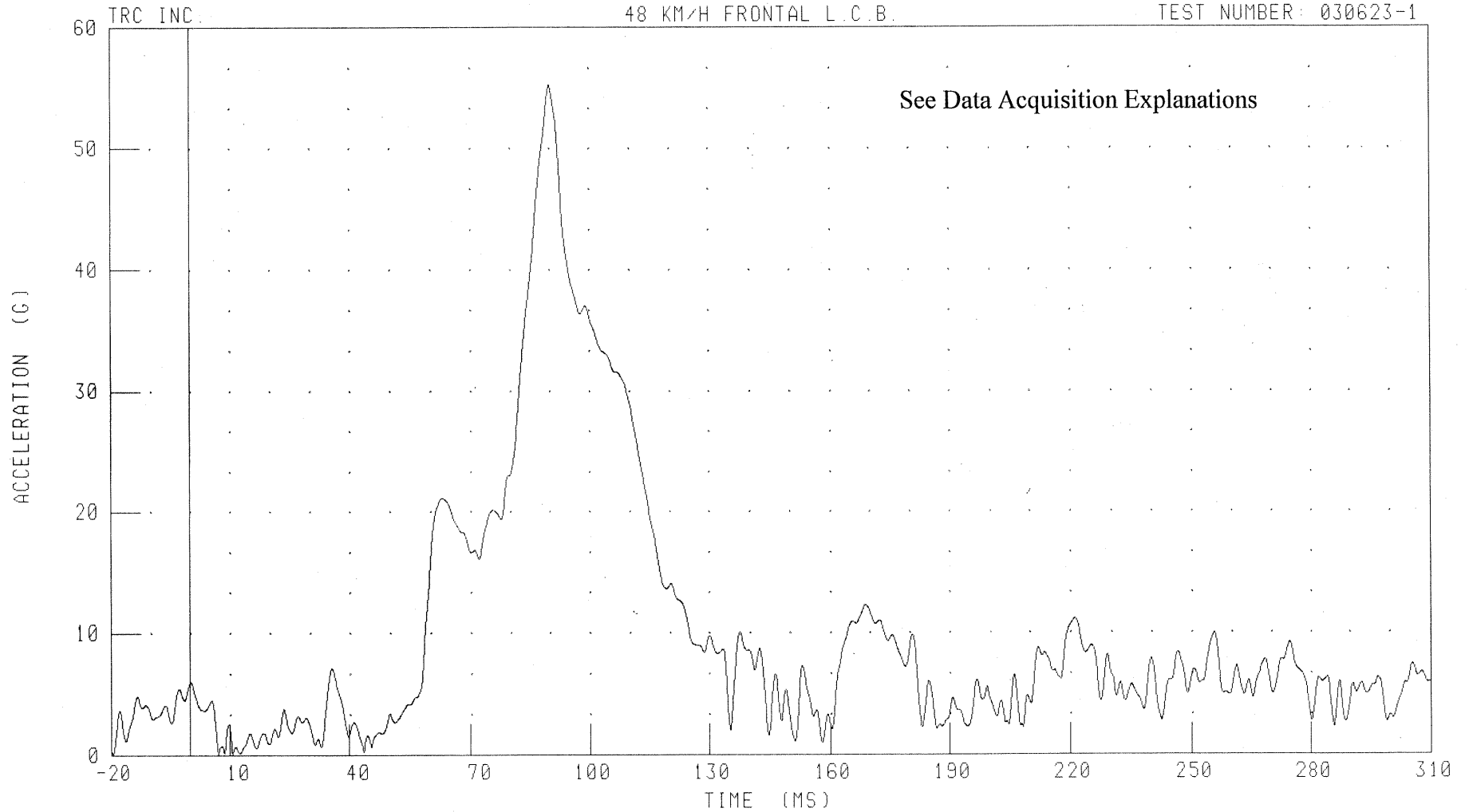
B-106

030623-1

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: 030623-1



CHANNEL: CSTRG2 FILTER: CH CLASS 180

PEAK DATA: 55.28 G @ 90.08 MS; 0.01 G @ -20.00 MS

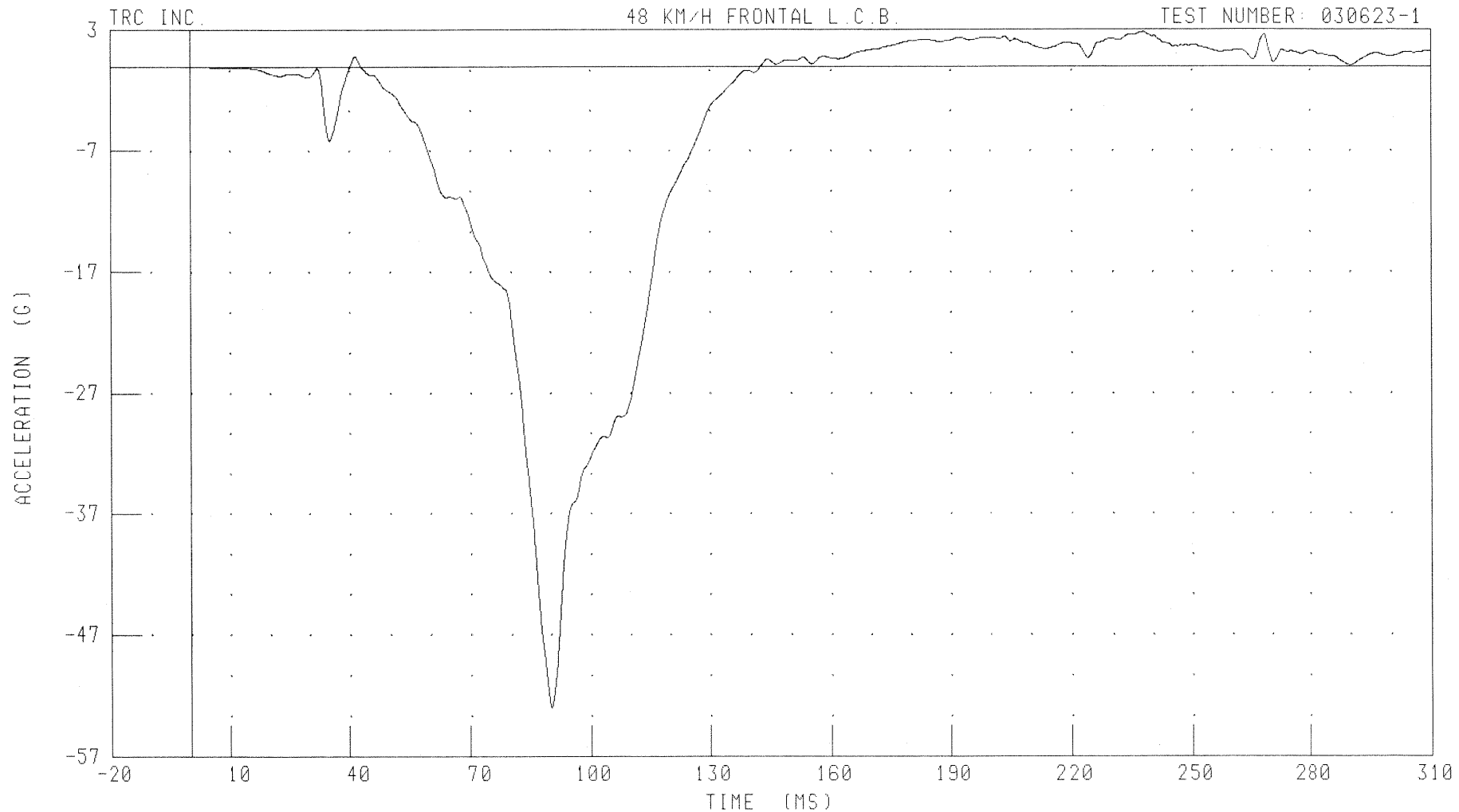
B-107

030623-1

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: 030623-1



CHANNEL: CSTXR2

FILTER: CH. CLASS 180

PEAK DATA: 2.81 G @ 237.92 MS, -53.02 G @ 90.16 MS

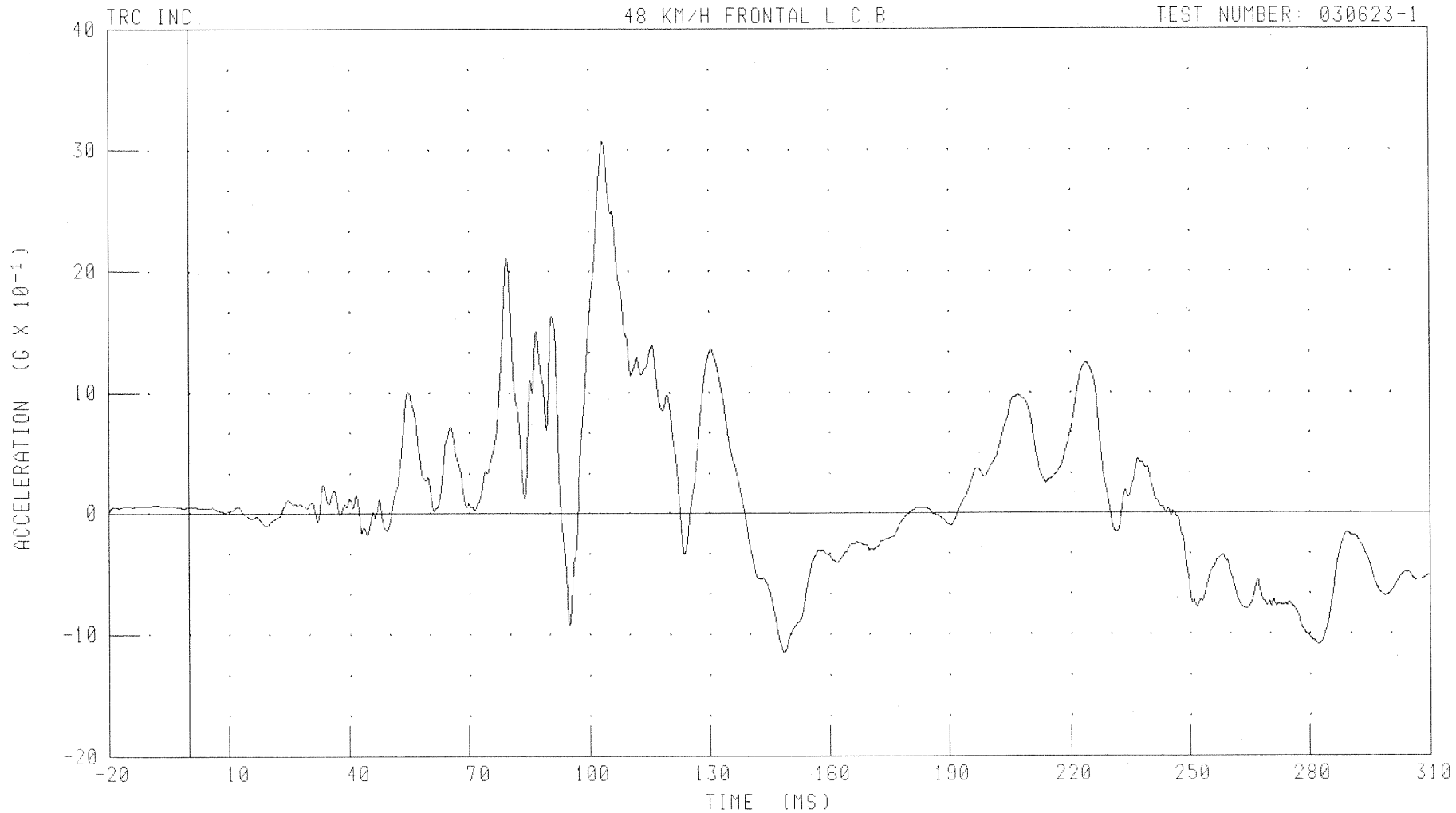
B-108

030623-1

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: 030623-1



CHANNEL: CSTYR2 FILTER: CH. CLASS 180

PEAK DATA 3.07 G @ 103.84 MS, -1.15 G @ 148.64 MS

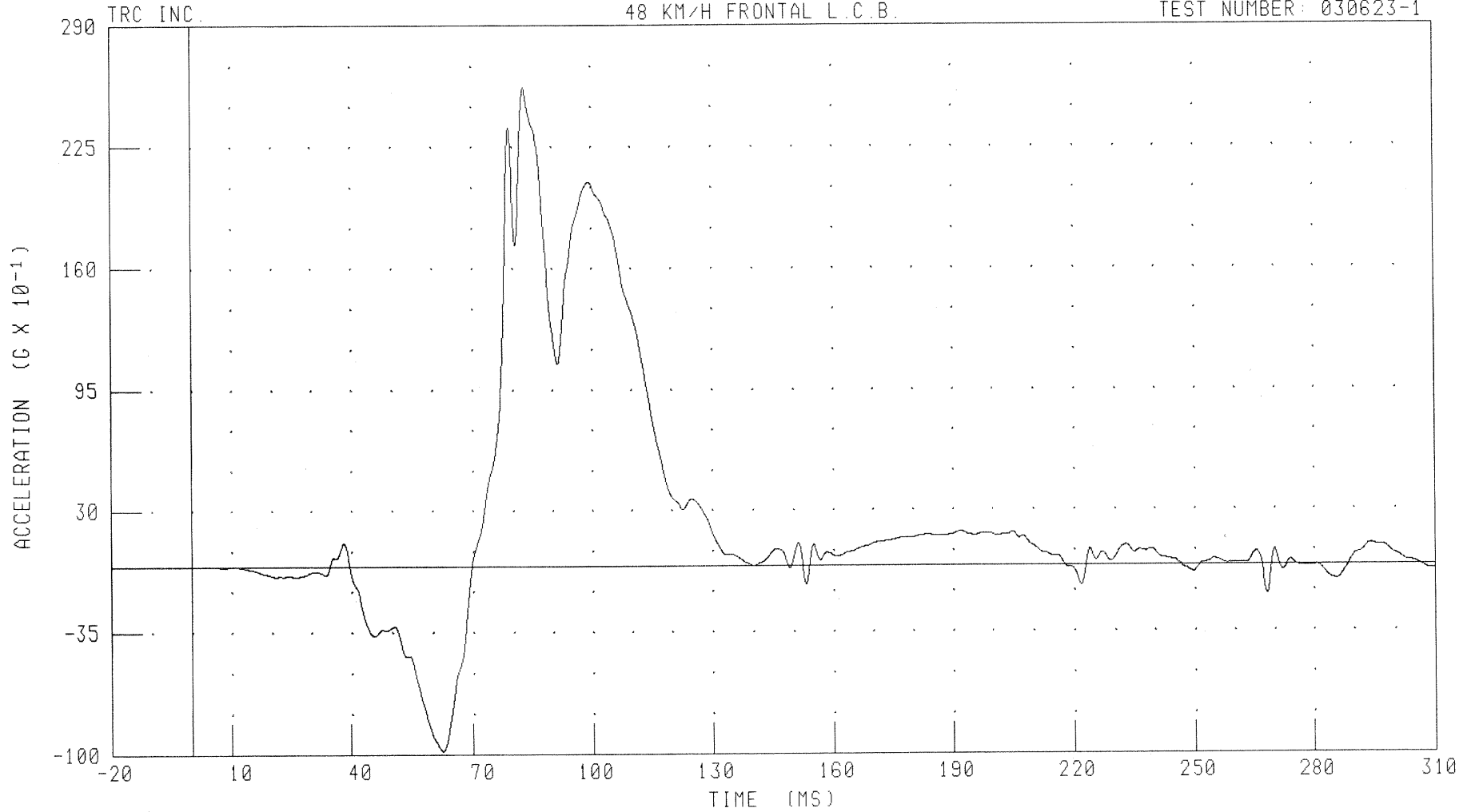
B-109

030623-1

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: 030623-1



CHANNEL: CSTZR2 FILTER: CH. CLASS 180

PEAK DATA: 25.70 G @ 83.04 MS, -9.82 G @ 62.48 MS

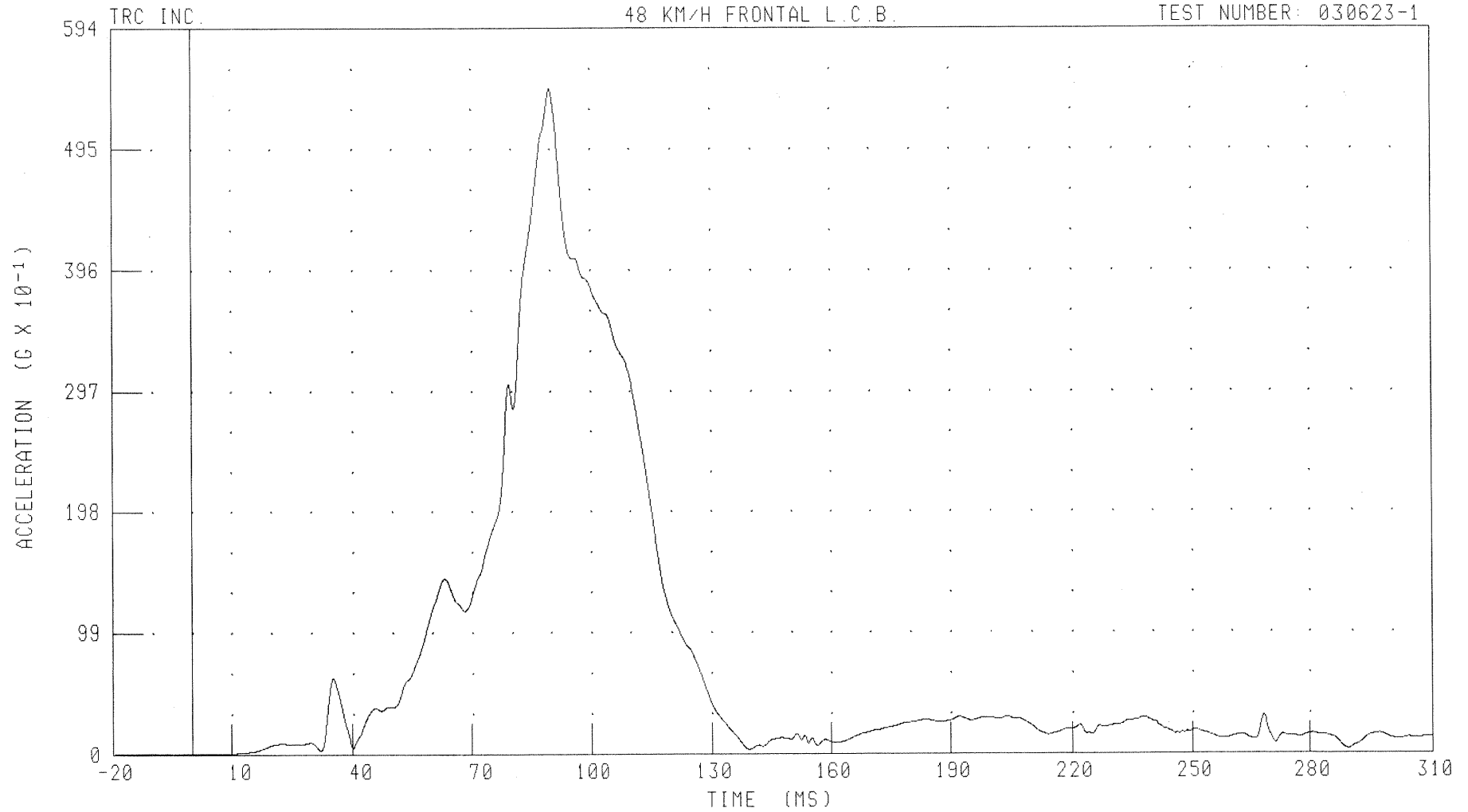
B-110

030623-1

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: 030623-1



CHANNEL: CSTR2 FILTER: CH. CLASS 180

PEAK DATA: 54.48 G @ 90.08 MS; 0.00 G @ -20.00 MS

B-111

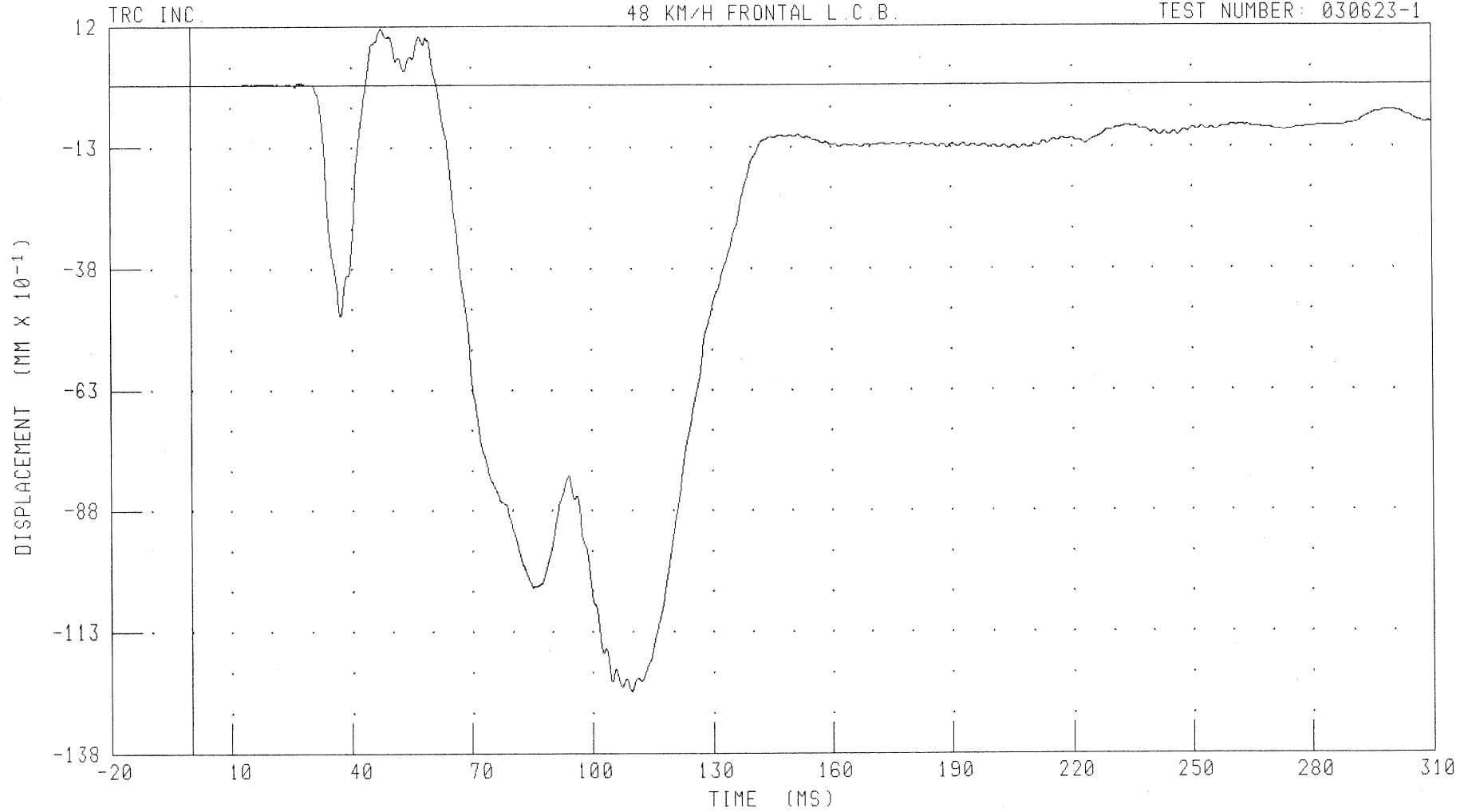
030623-1

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

PASSENGER CHEST DEFLECTION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: CSTXD2 FILTER: CH CLASS 600

PEAK DATA: 1 15 MM @ 47 60 MS, -12.53 MM @ 109 84 MS

B-112

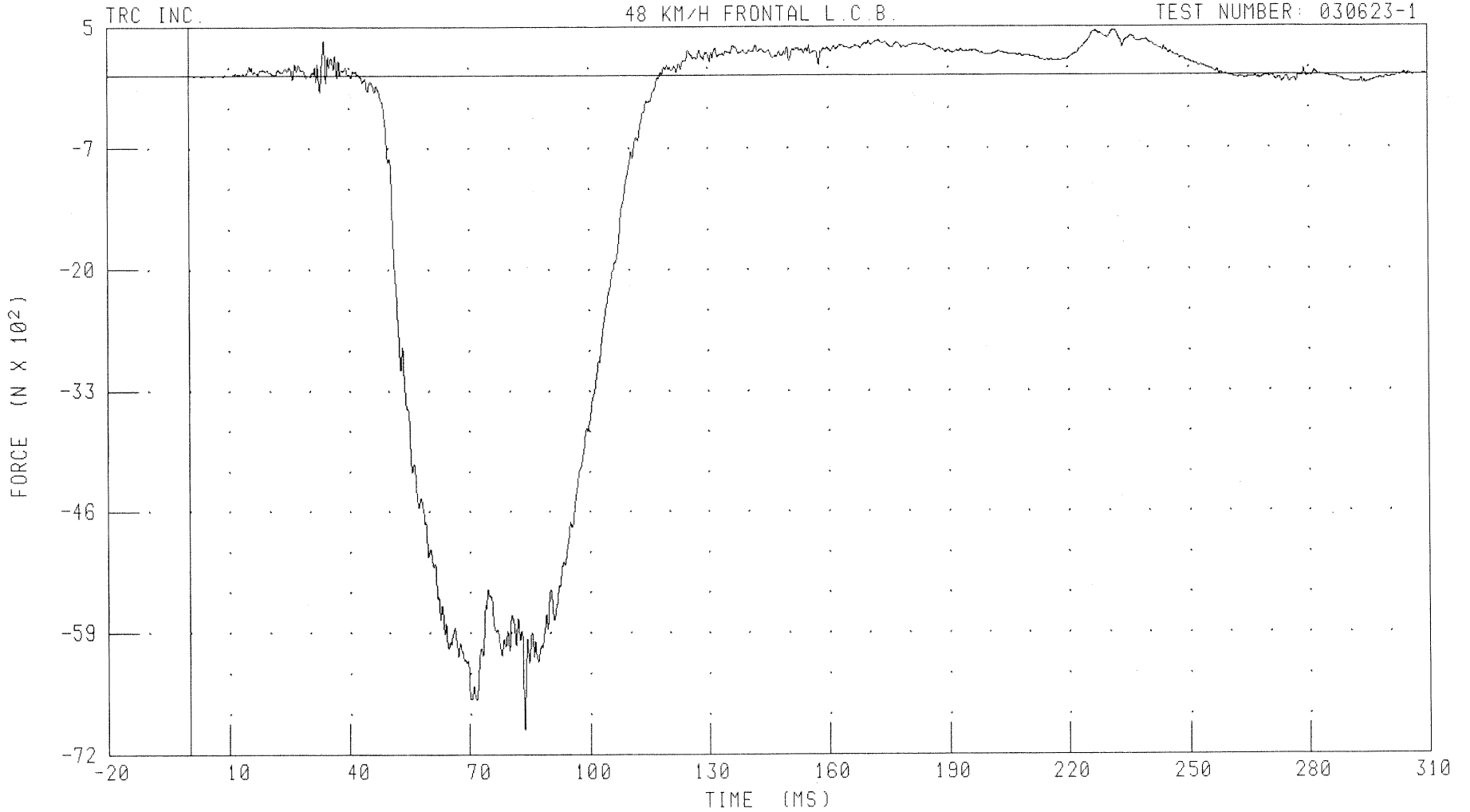
030623-1

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: 030623-1



CHANNEL: LFMZF2 FILTER: CH. CLASS 600

PEAK DATA: 481.60 N @ 231.68 MS; -7015.55 N @ 83.52 MS

B-113

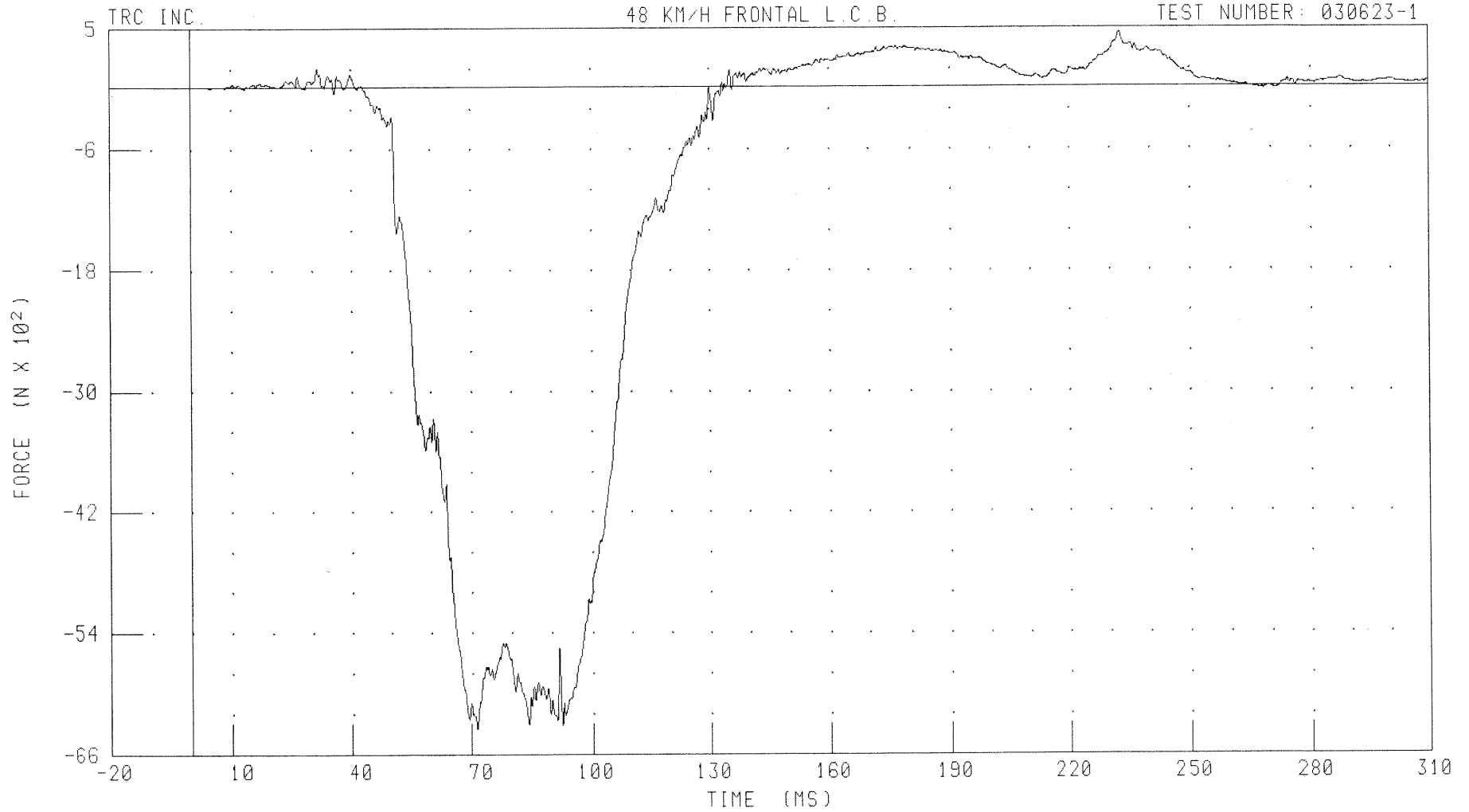
030623-1

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: 030623-1



CHANNEL: RFMZ F2 FILTER: CH CLASS 600

PEAK DATA: 534.21 N @ 232.80 MS, -6371.48 N @ 71.28 MS

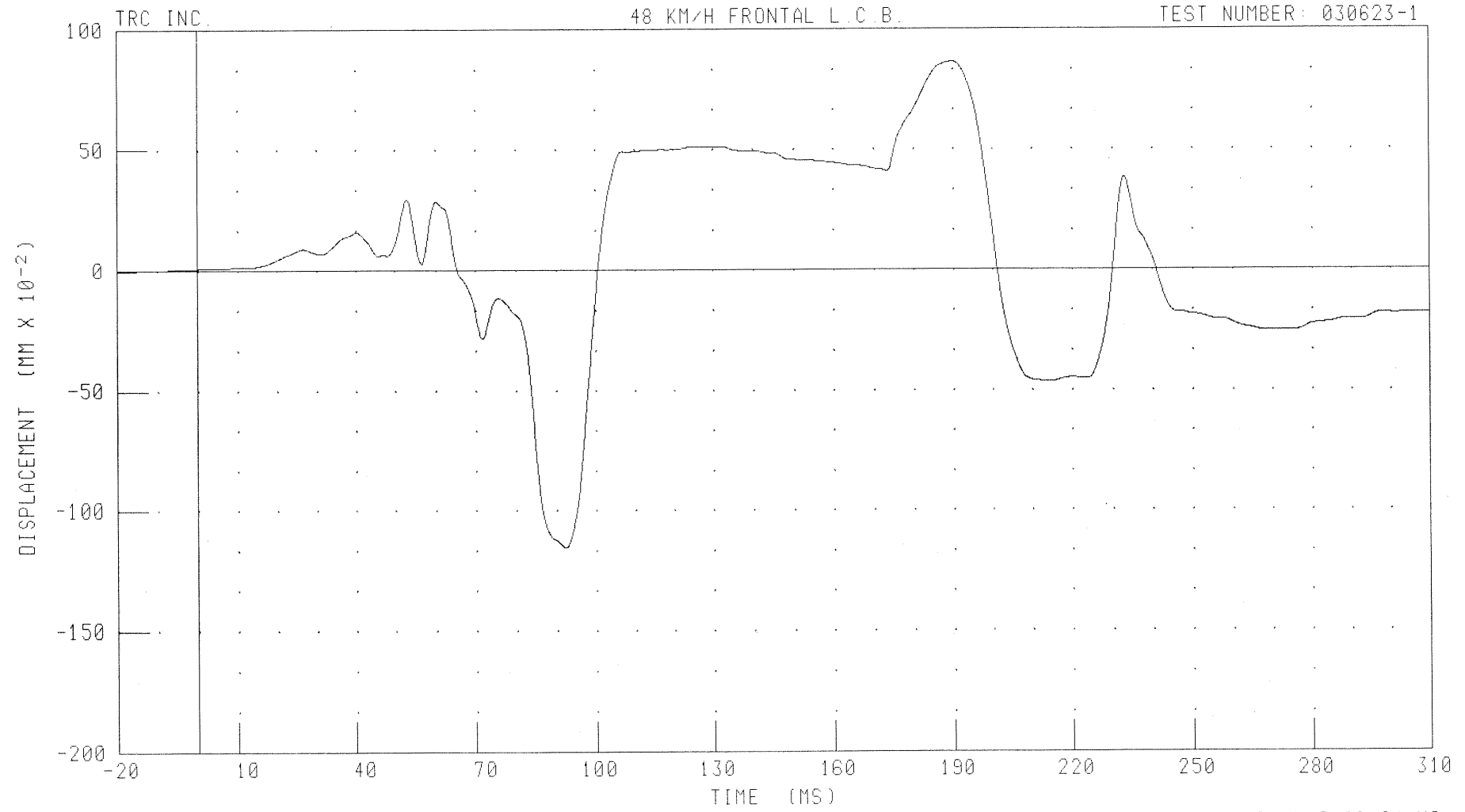
B-114

030623-1

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: 030623-1



CHANNEL: KNLXD2 FILTER: CH. CLASS 180

PEAK DATA: 0.86 MM @ 190.00 MS; -1.16 MM @ 92.24 MS

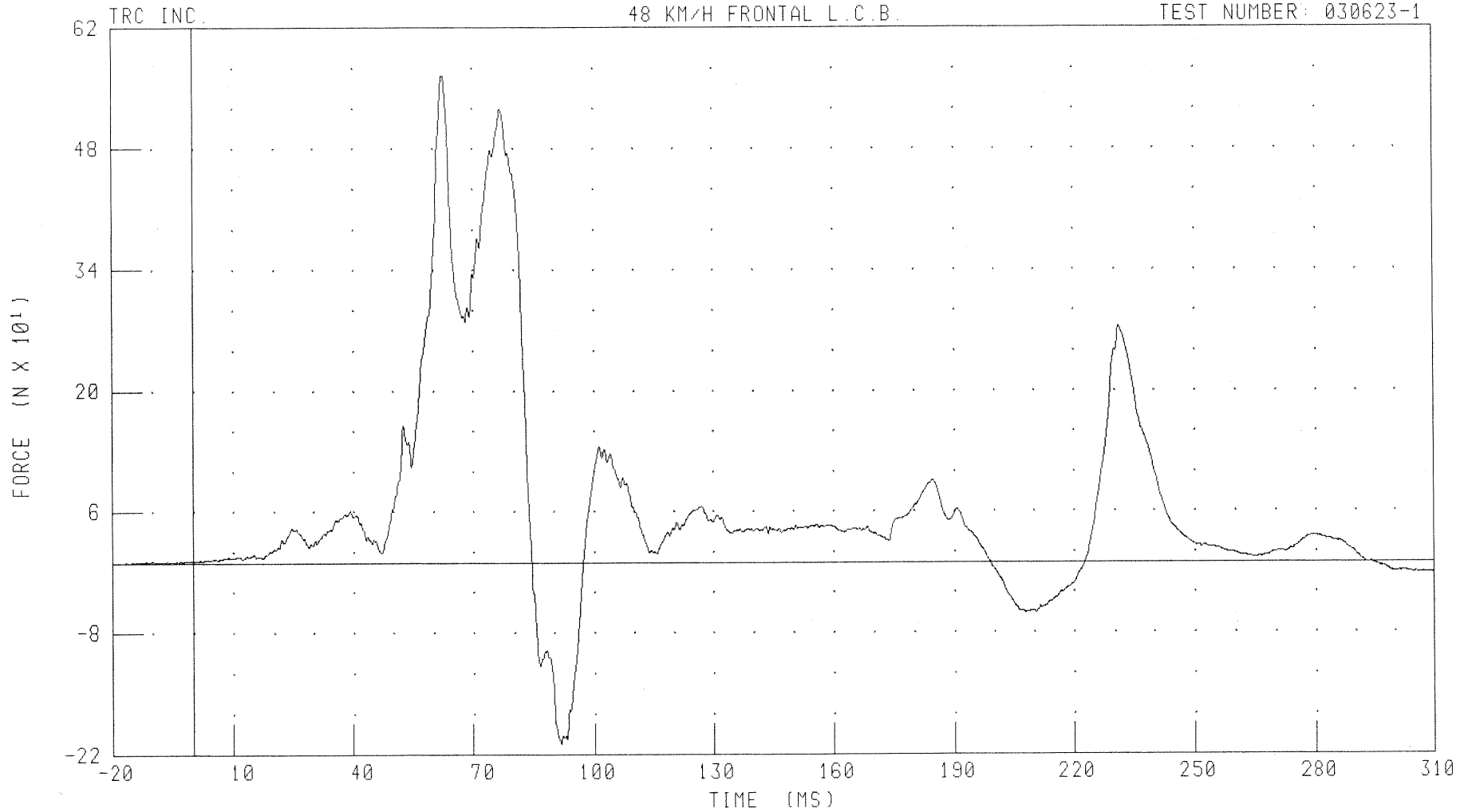
B-115

030623-1

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: 030623-1



CHANNEL: TBLXF2

FILTER: CH. CLASS 600

PEAK DATA: 56.53 N @ 62.48 MS, -208.55 N @ 91.60 MS

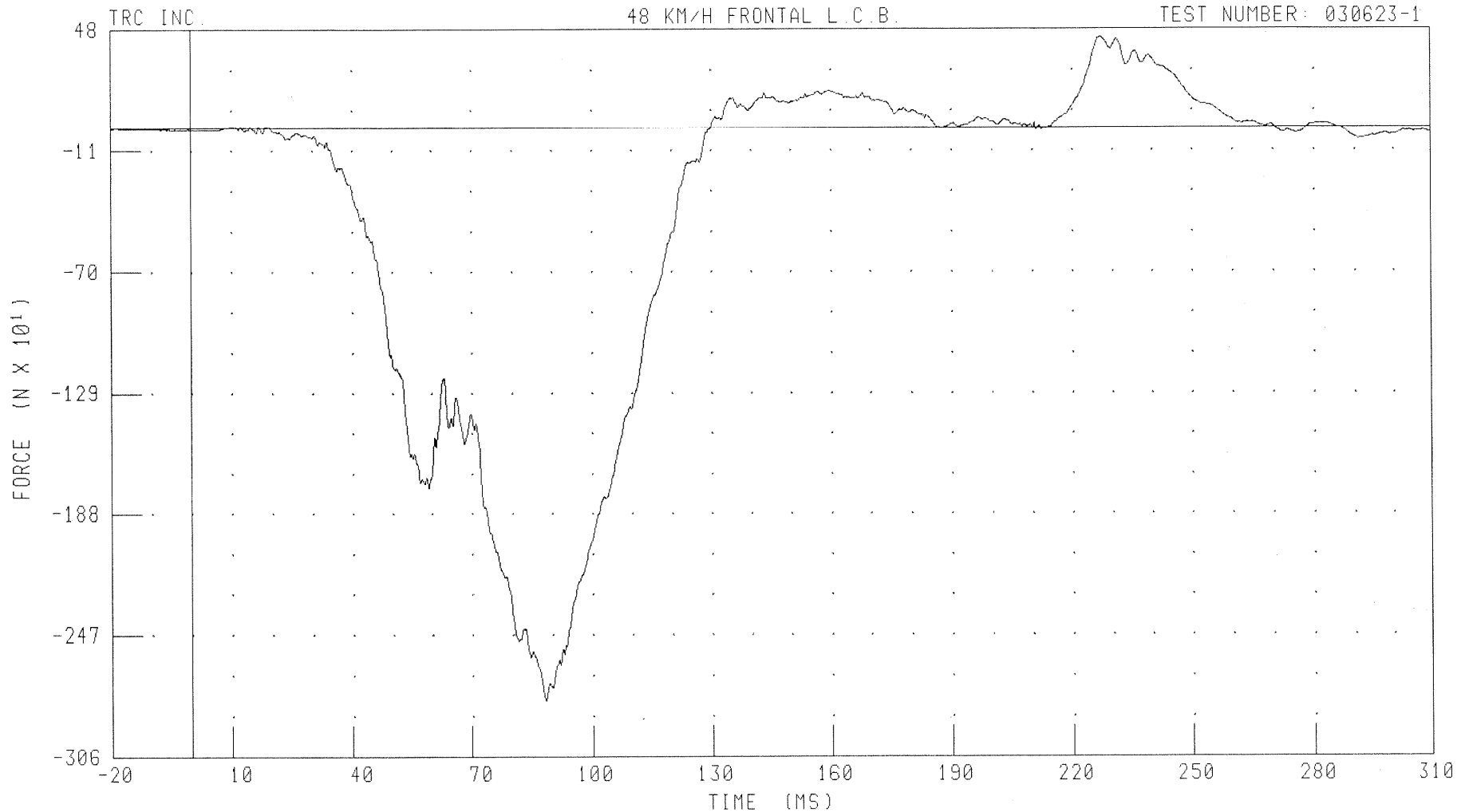
B-116

030623-1

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: 030623-1



CHANNEL: TBLZF2

FILTER: CH. CLASS 600

PEAK DATA: 440.04 N @ 227.36 MS; -2788.82 N @ 88.32 MS

B-117

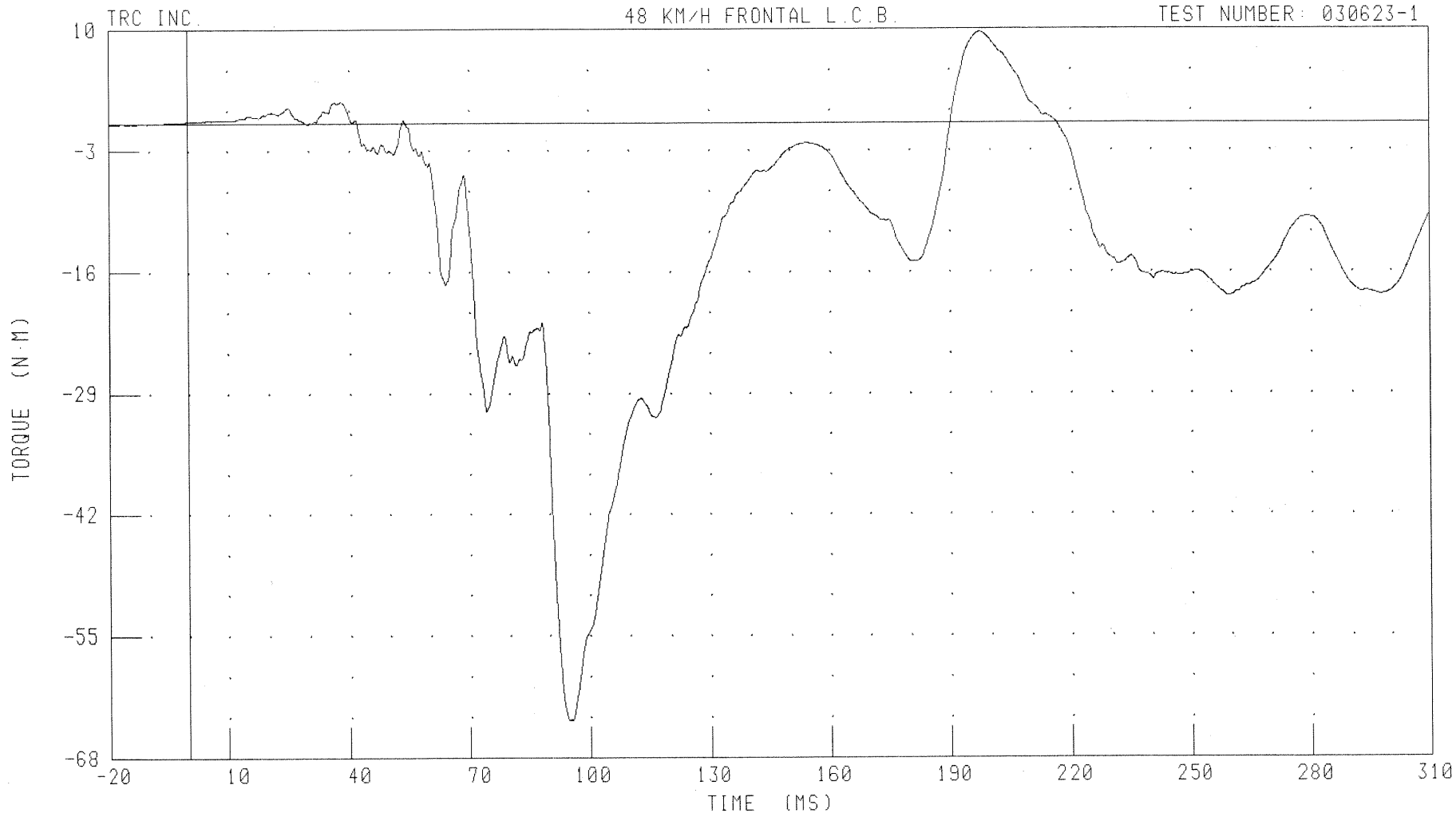
030623-1

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: 030623-1



CHANNEL: TBLXM2 FILTER: CH. CLASS 600

PEAK DATA: 9.68 N·M @ 197.76 MS; -64.03 N·M @ 95.04 MS

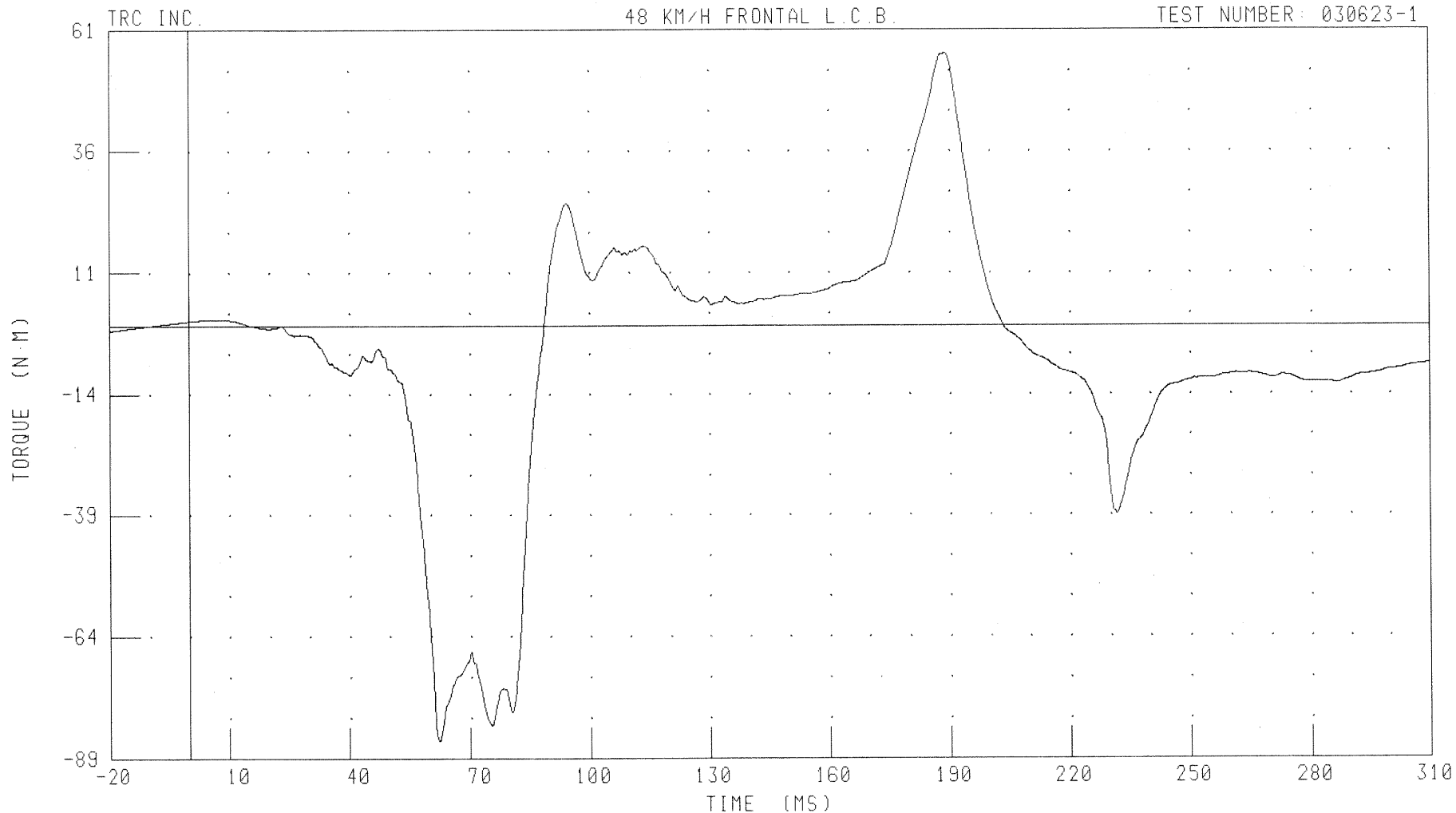
B-118

030623-1

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: 030623-1



CHANNEL: TBLYM2

FILTER: CH. CLASS 600

PEAK DATA: 56.27 N·M @ 189.04 MS; -85.40 N·M @ 62.16 MS

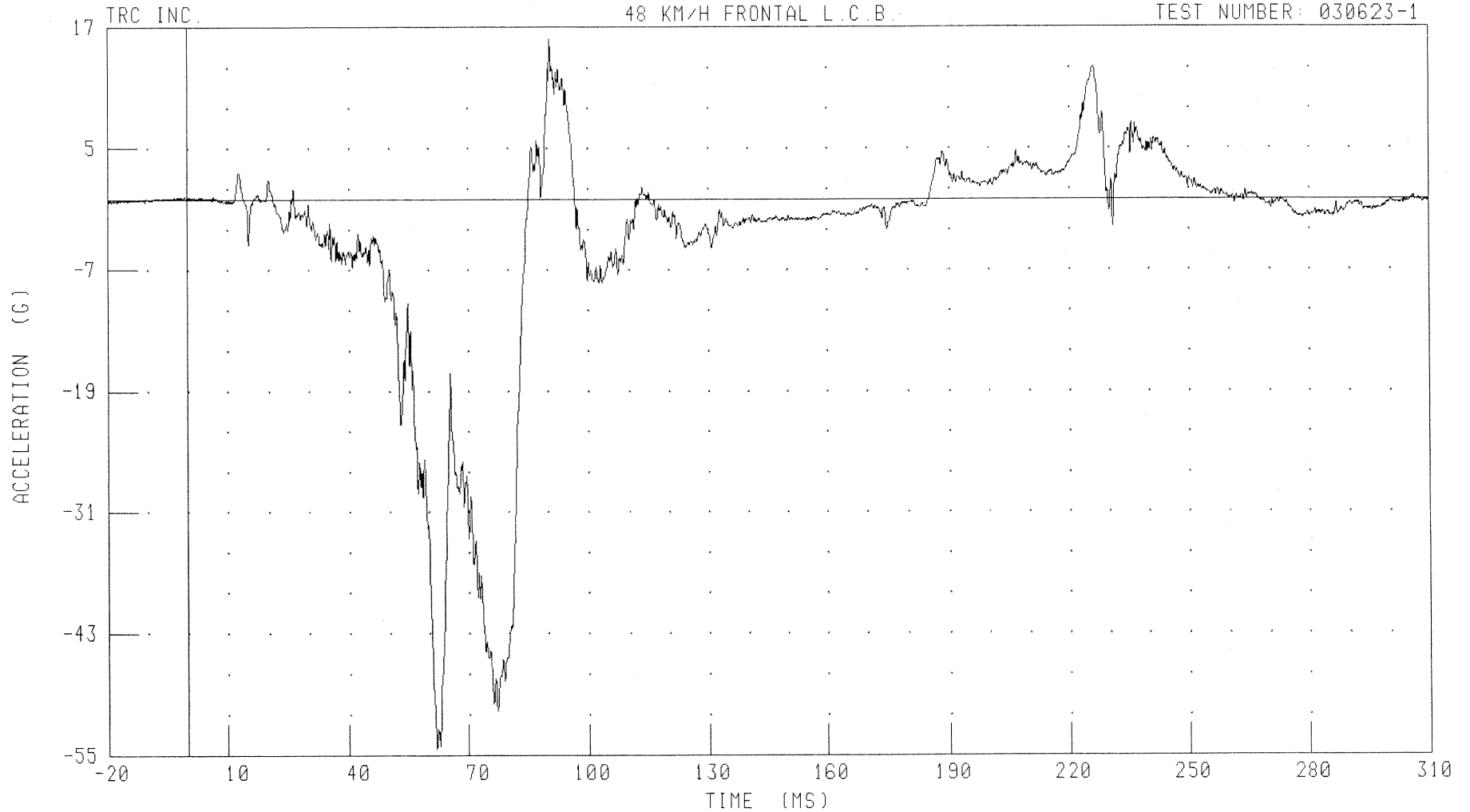
B-119

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: TBLXG2 FILTER CH. CLASS 1000

PEAK DATA: 15.78 G @ 90.72 MS; -54.45 G @ 61.84 MS

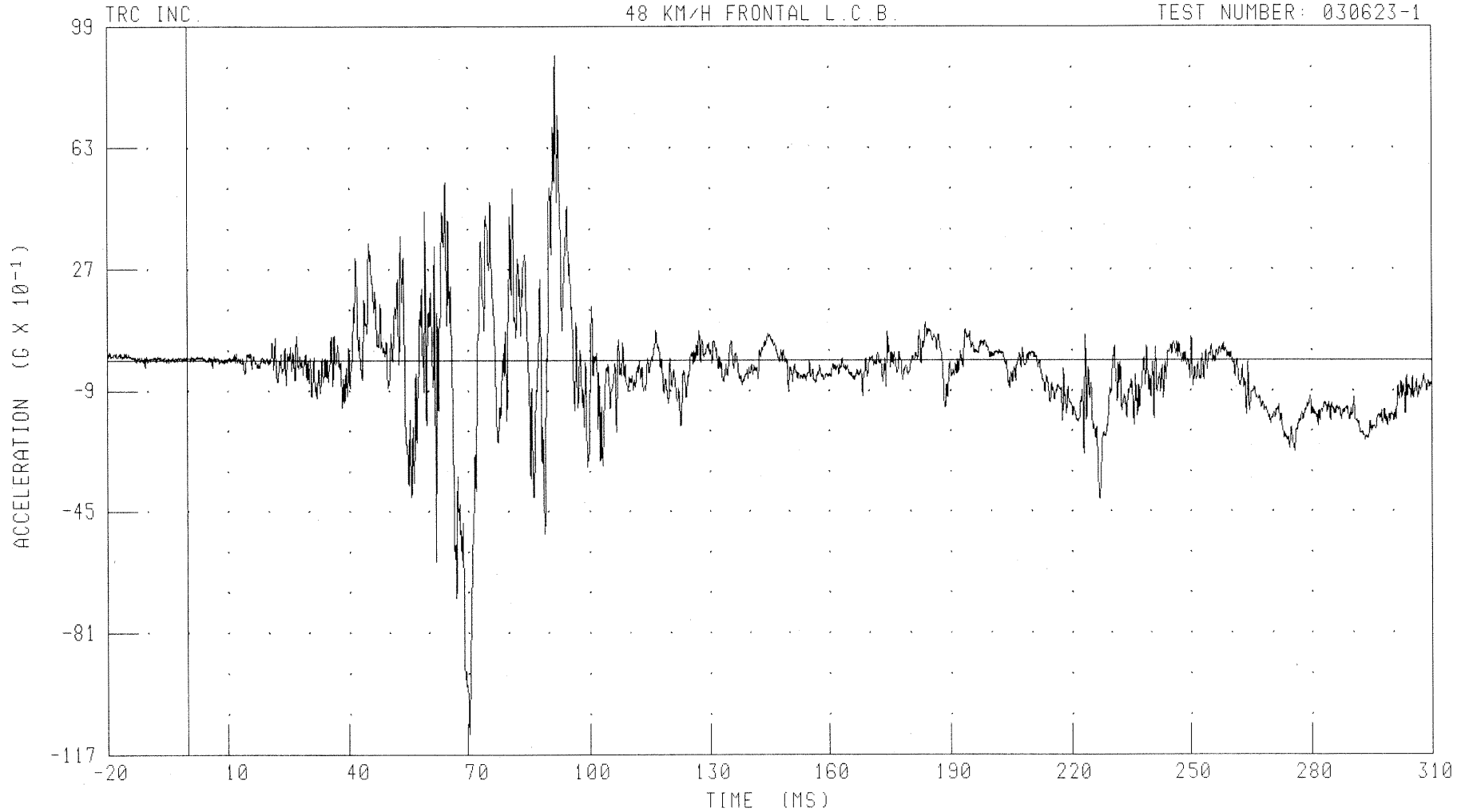
B-120

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL TBLYG2 FILTER: CH CLASS 1000

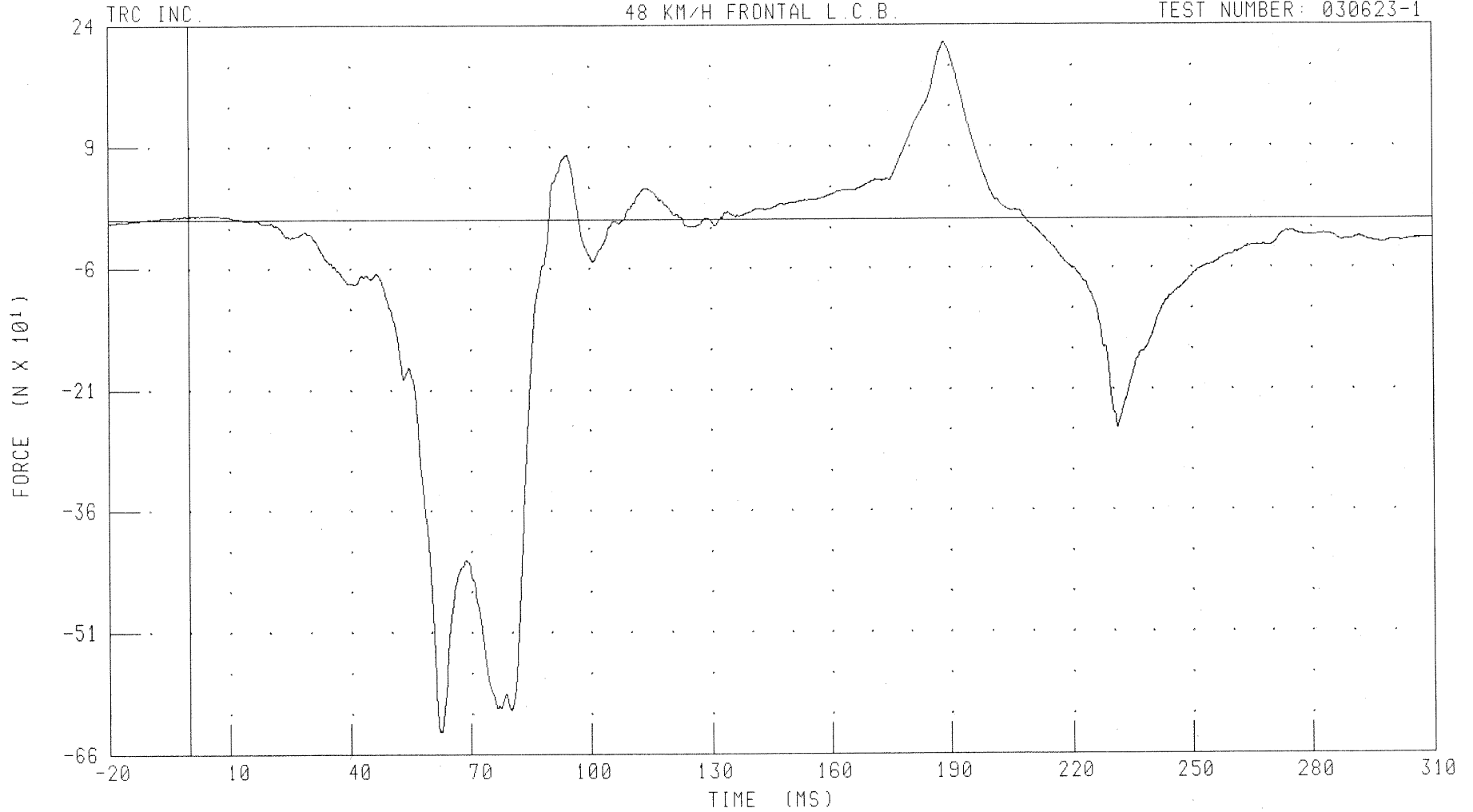
PEAK DATA 9.04 G @ 91.92 MS; -11.08 G @ 70.32 MS

B-121

030623-1

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: 030623-1



CHANNEL: ANLXF2

FILTER: CH. CLASS 600

PEAK DATA: 218.79 N @ 188.88 MS; -632.66 N @ 62.08 MS

B-122

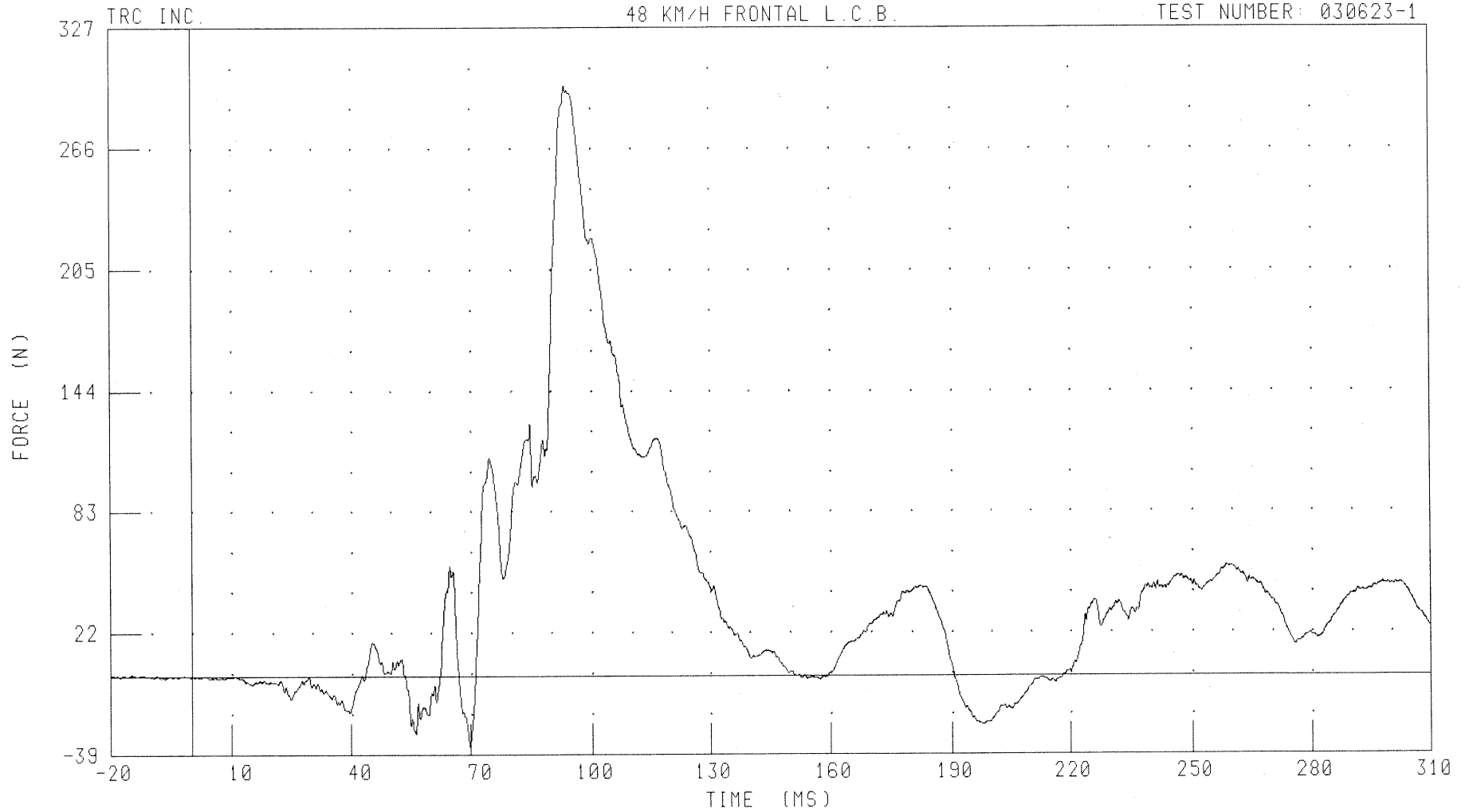
030623-1

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: 030623-1



CHANNEL: ANLYF2

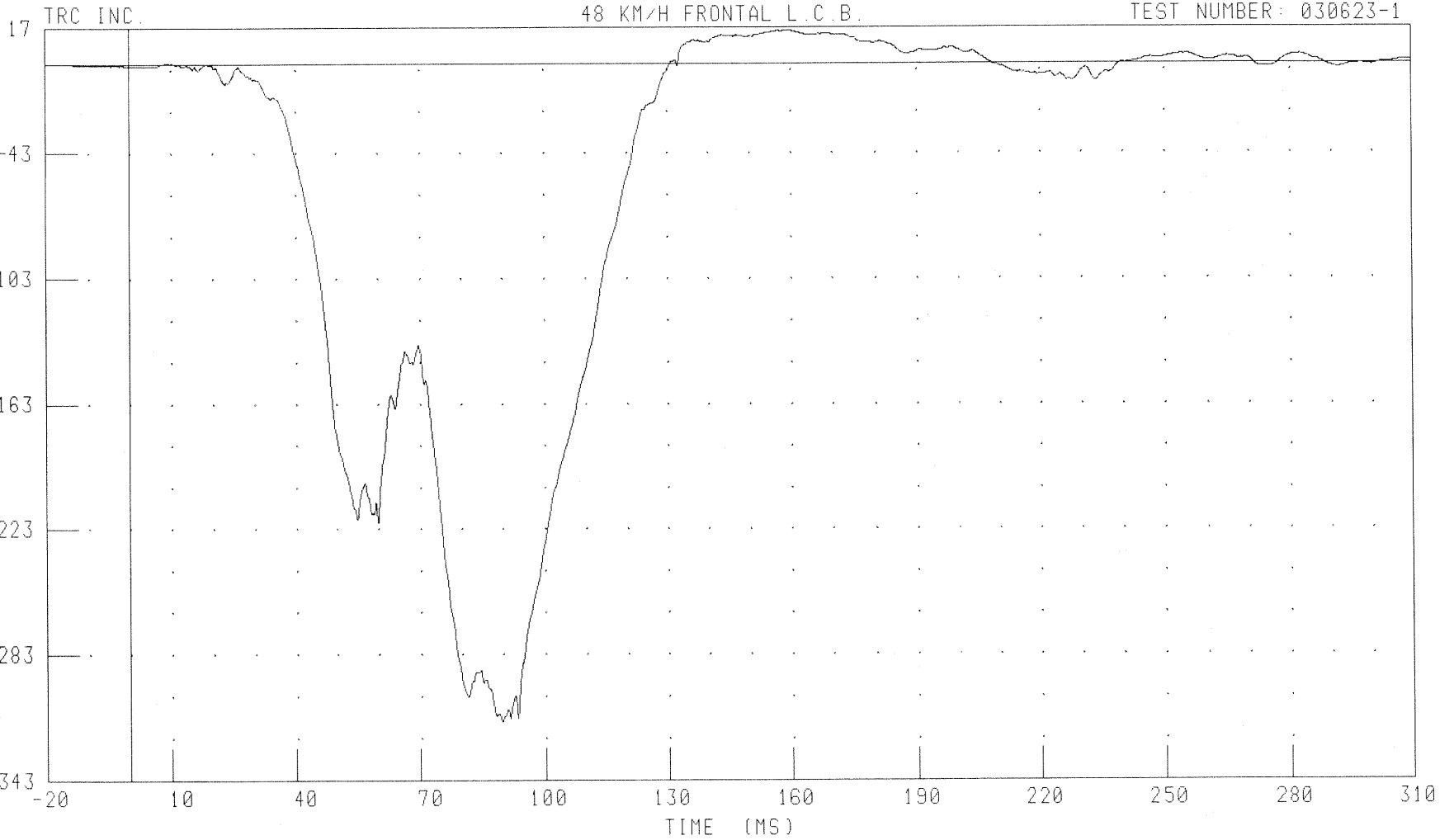
FILTER: CH. CLASS 600

PEAK DATA: 297.69 N @ 93.60 MS; -35.52 N @ 69.84 MS

B-123

030623-1

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



CHANNEL: ANLZF2 FILTER: CH CLASS 600

PEAK DATA: 157.91 N @ 158.64 MS; -315.64 N @ 89.76 MS

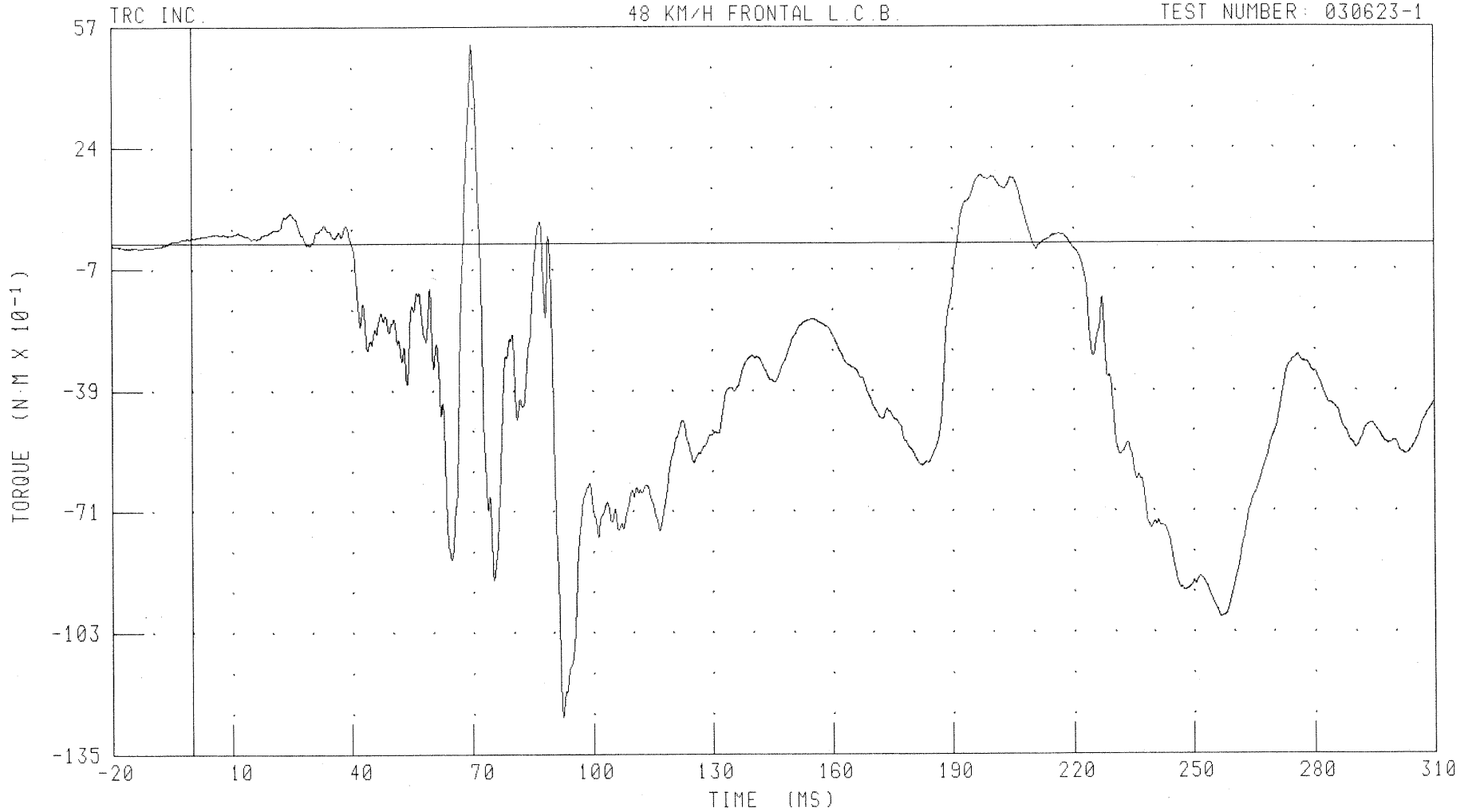
B-124

030623-1

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: 030623-1



CHANNEL: ANLXM2 FILTER: CH. CLASS 600

PEAK DATA: 5.25 N·M @ 69.92 MS; -12.51 N·M @ 92.32 MS

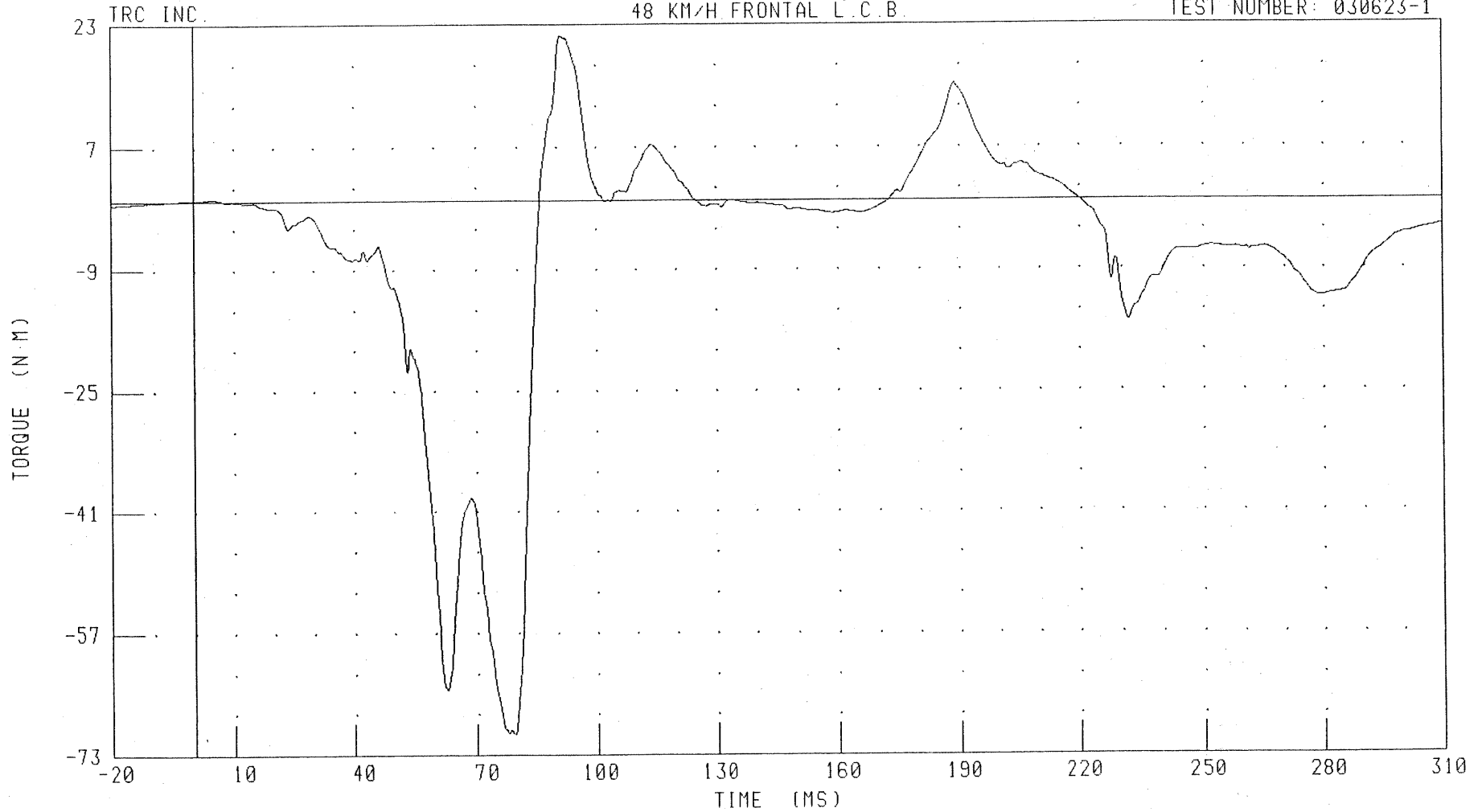
B-125

030623-1

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: 030623-1



CHANNEL: ANLYM2

FILTER: CH. CLASS 600

PEAK DATA: 21.51 N.M @ 91.20 MS; -70.35 N.M @ 79.12 MS

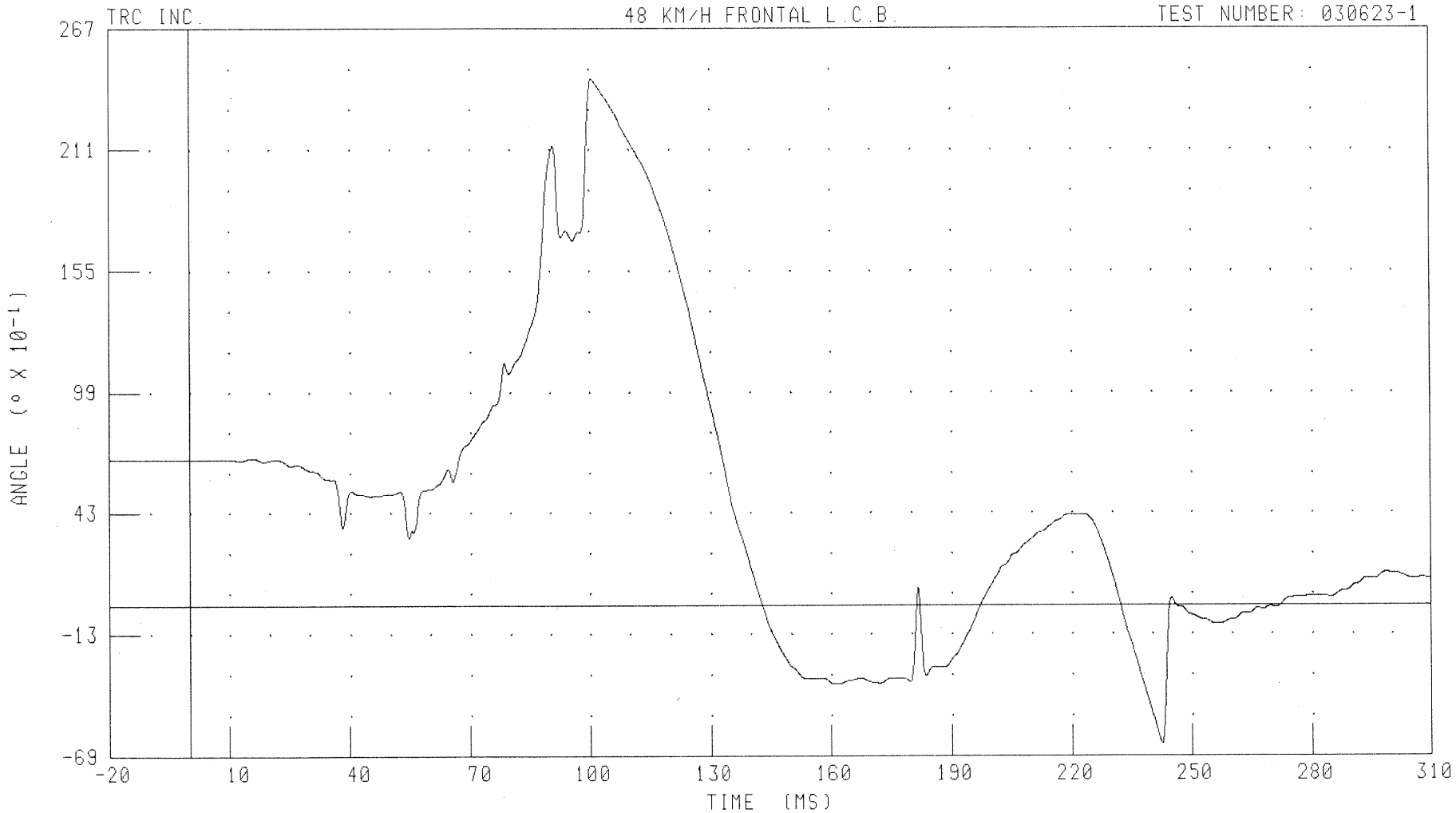
B-126

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTLXD2 FILTER: CH CLASS 180

PEAK DATA: 24.38 ° @ 100.80 MS; -6.34 ° @ 242.40 MS

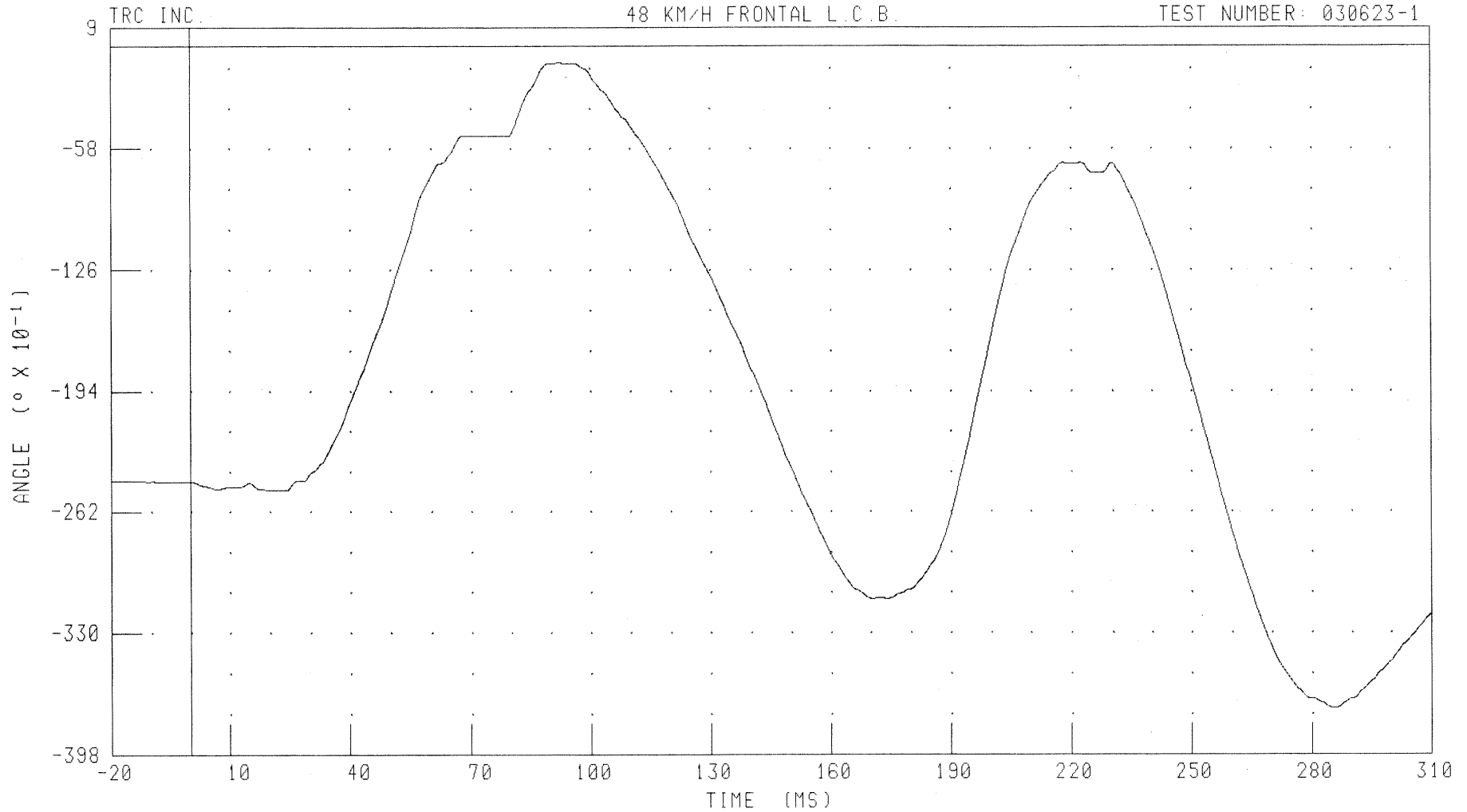
B-127

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTLYD2 FILTER: CH. CLASS 180

PEAK DATA: -0.96 ° @ 92.24 MS, -37.20 ° @ 285.84 MS

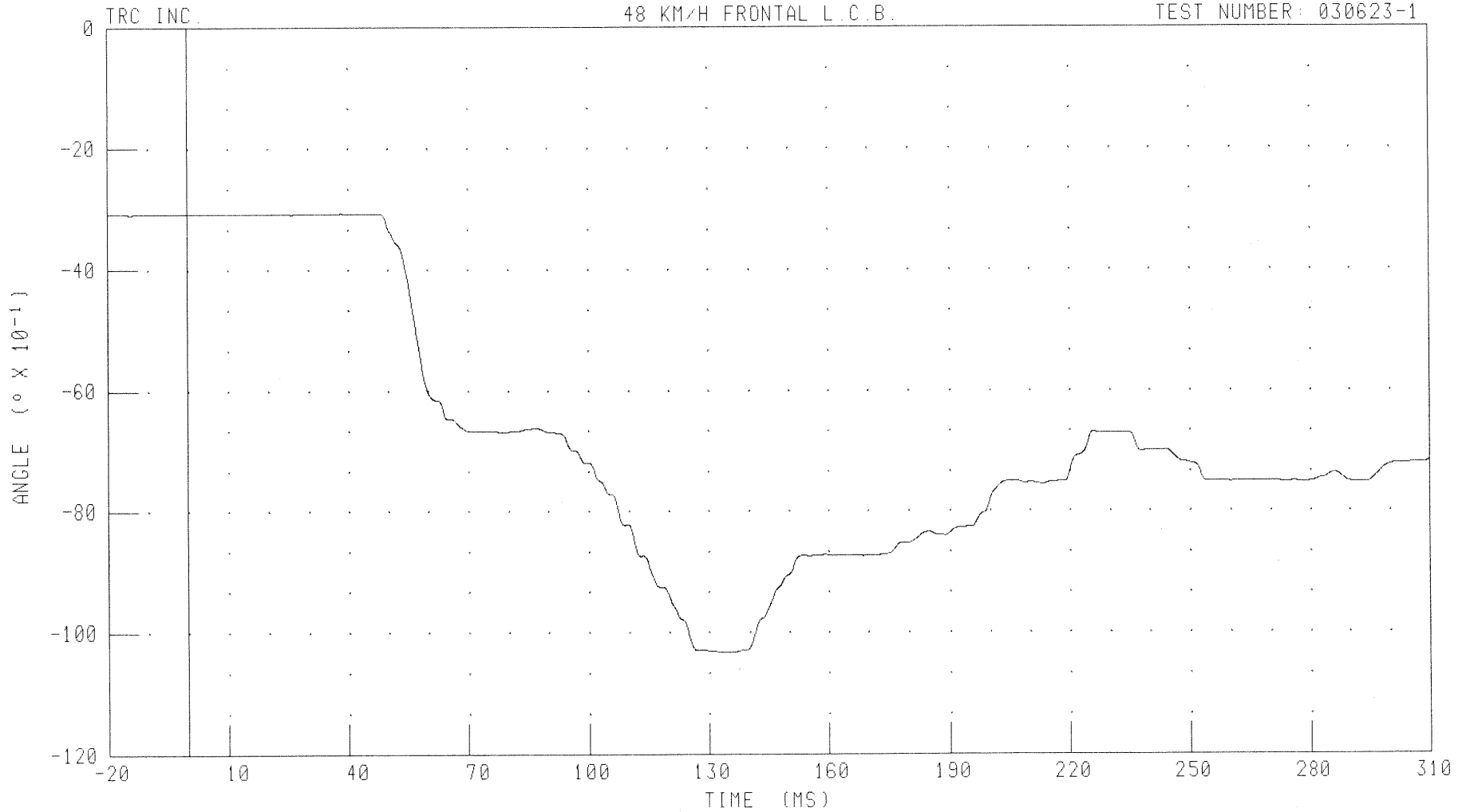
B-128

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTLZD2 FILTER: CH. CLASS 180

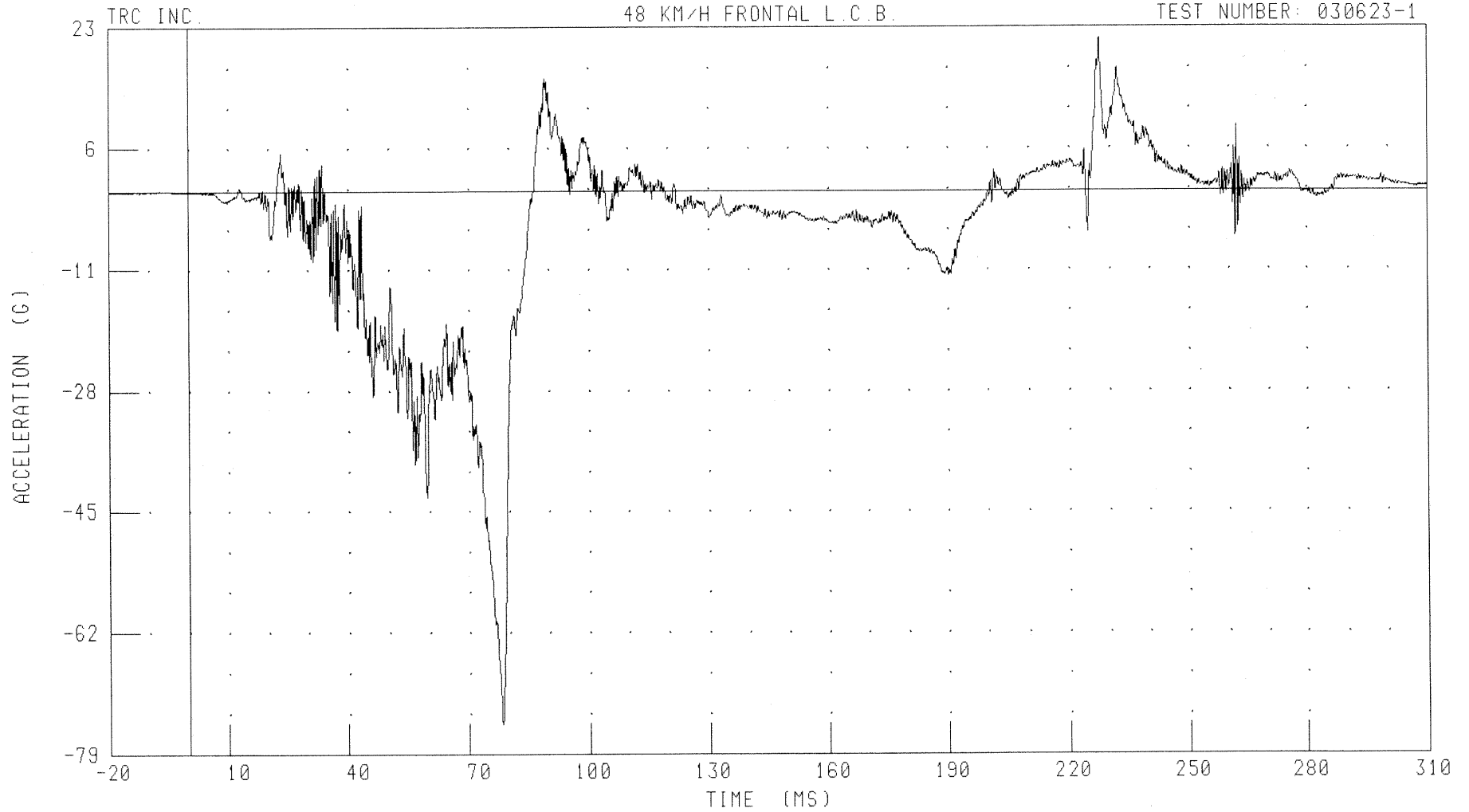
PEAK DATA: -3.07 ° @ 38.32 MS; -103.33 ° @ 135.84 MS

B-129

030623-1

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

TEST NUMBER: 030623-1



CHANNEL: FTLXC2 FILTER: CH: CLASS 1000

PEAK DATA: 21.50 G @ 227.76 MS; -74.91 G @ 78.24 MS

B-130

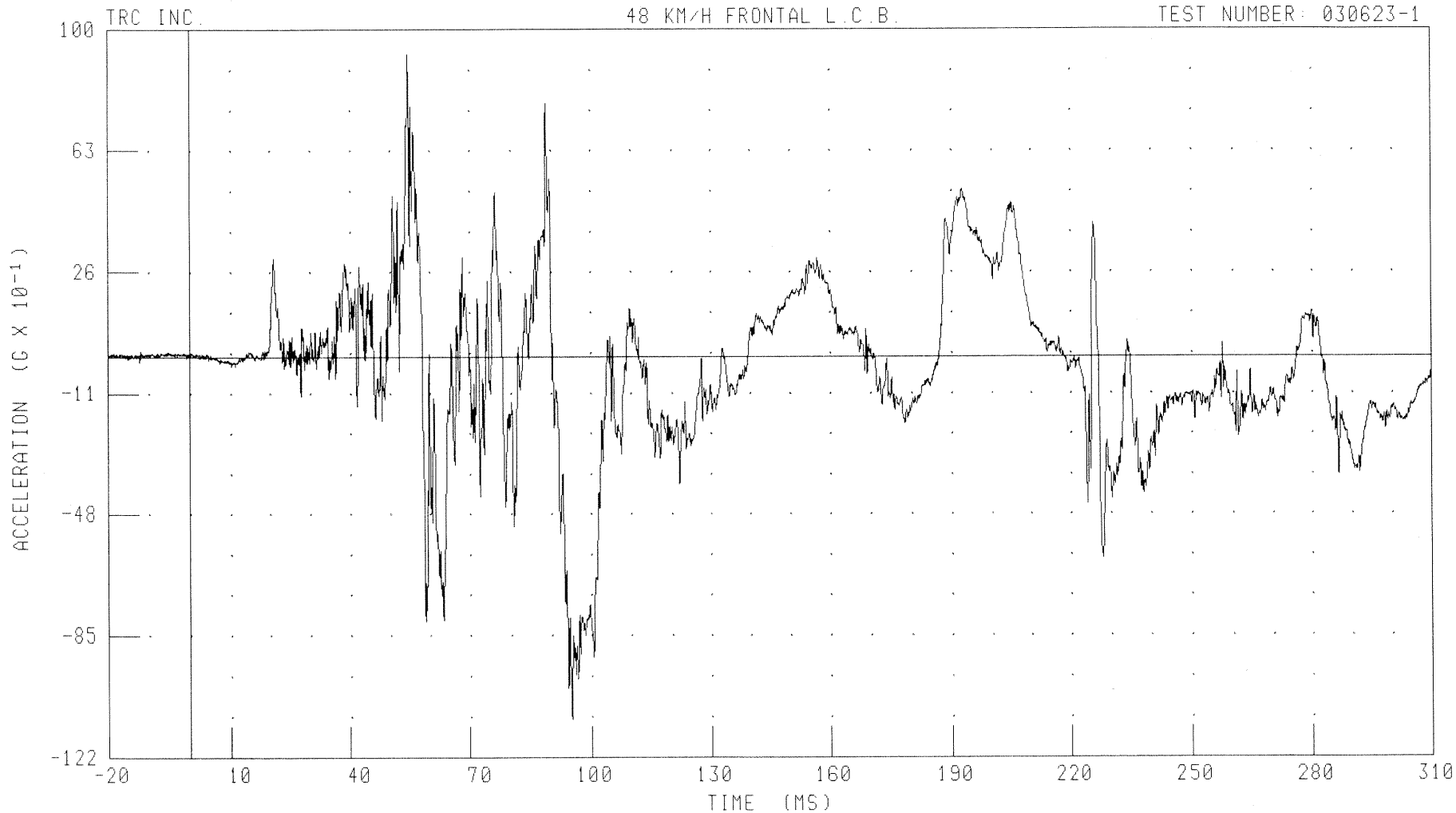
030623-1

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

PASSENGER LEFT FOOT Y-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTLYC2 FILTER: CH. CLASS 1000

PEAK DATA: 9.27 G @ 54.72 MS, -11.06 G @ 94.96 MS

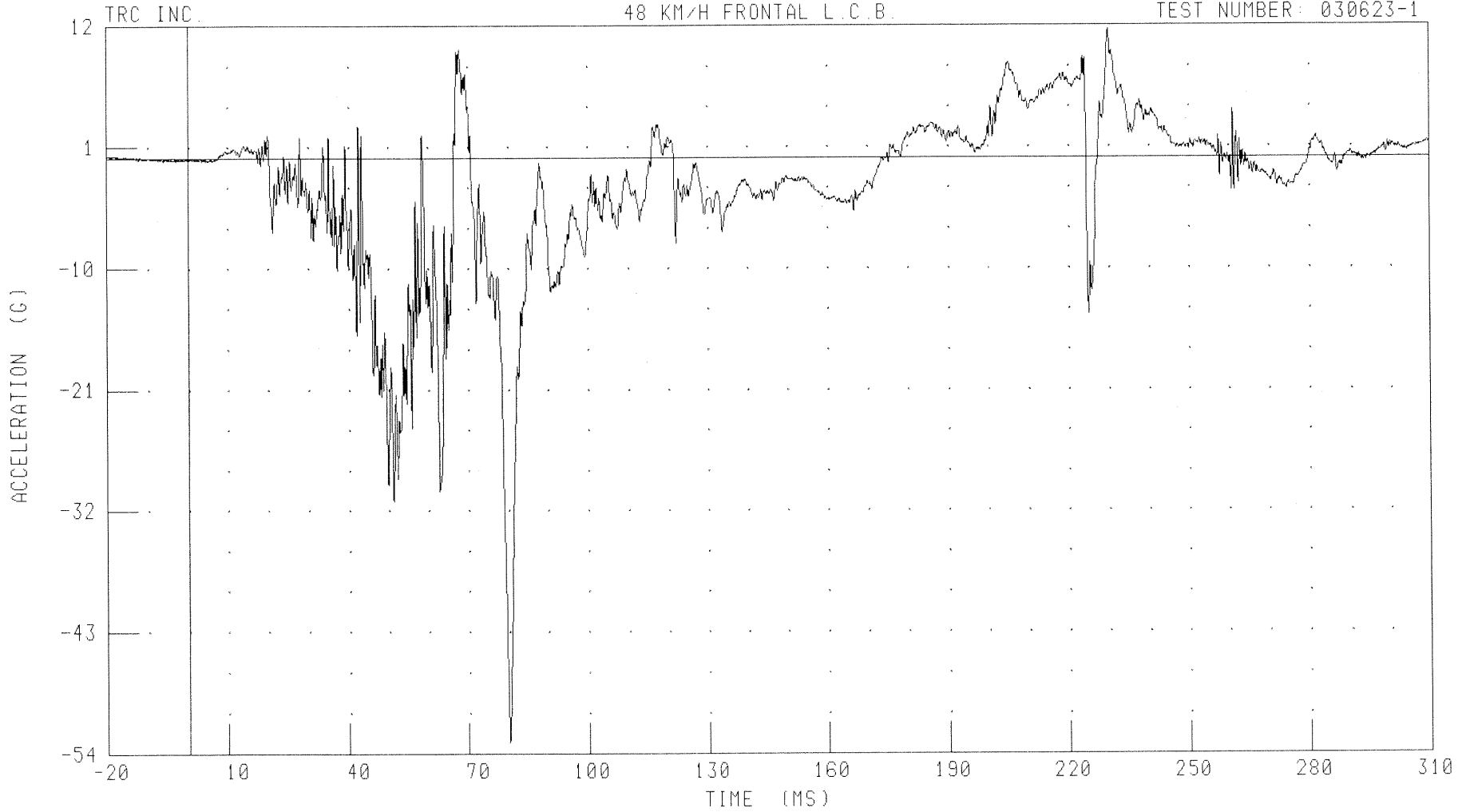
B-131

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTLZG2

FILTER: CH. CLASS 1000

PEAK DATA: 11.63 G @ 230.08 MS; -52.97 G @ 80.16 MS

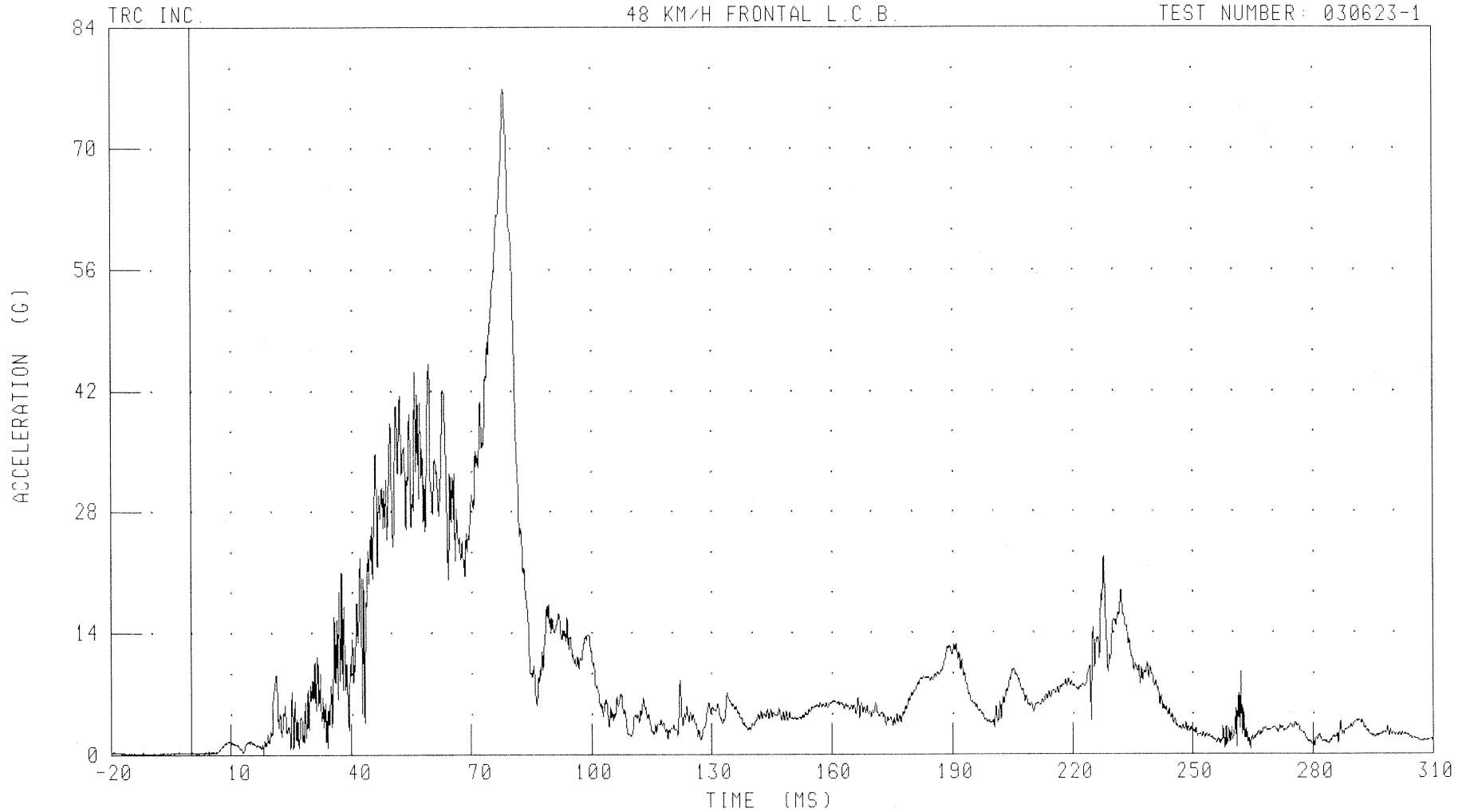
B-132

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTLCG2

FILTER: CH. CLASS 1000

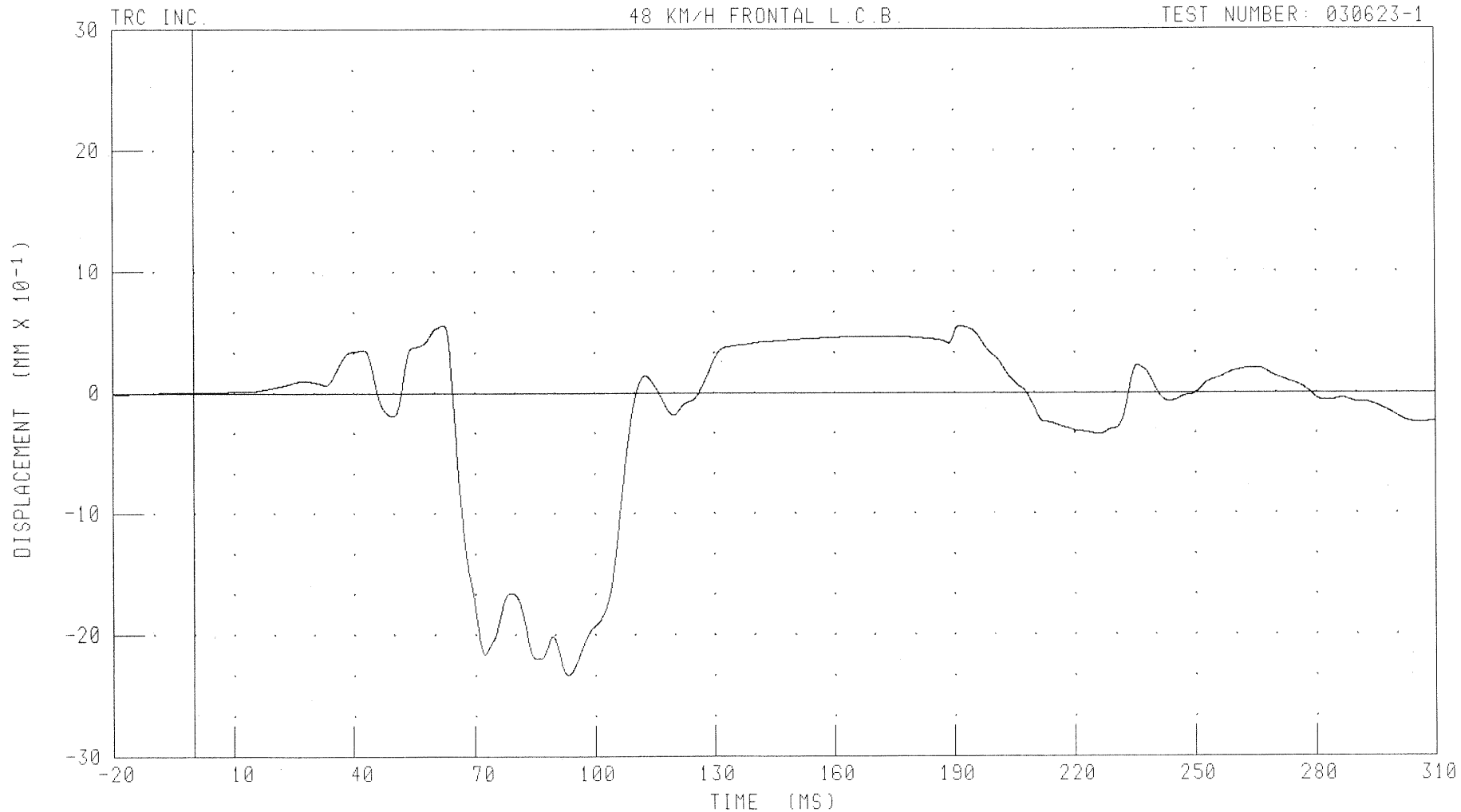
PEAK DATA: 76.95 G @ 78.24 MS; 0.04 G @ -12.96 MS

B-133

030623-1

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: 030623-1



CHANNEL: KNRXD2 FILTER: CH. CLASS 180

PEAK DATA: 0.56 MM @ 62.40 MS; -2.33 MM @ 93.36 MS

B-134

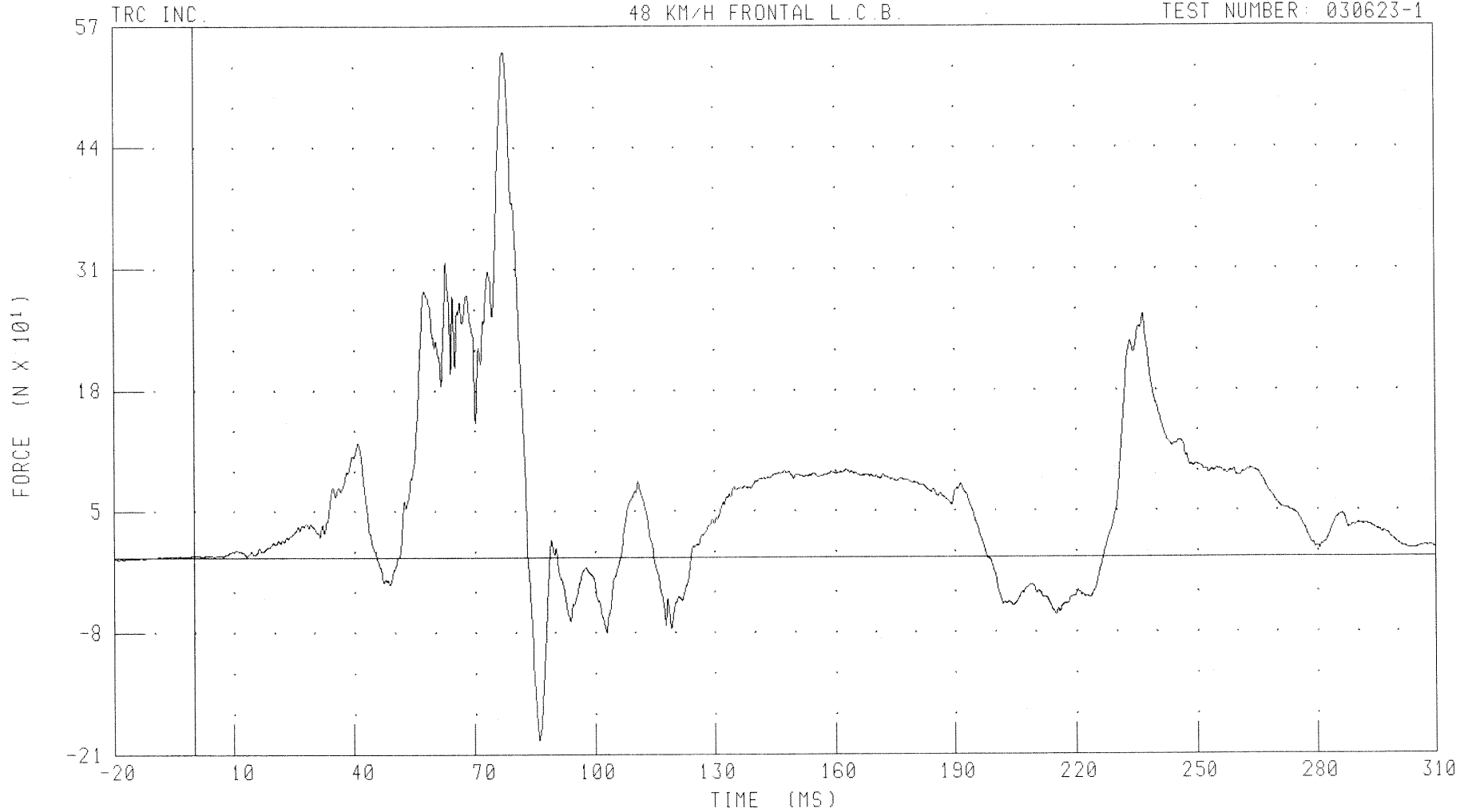
030623-1

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: 030623-1



CHANNEL: TBRXF2 FILTER: CH. CLASS 600

PEAK DATA: 542.34 N @ 77.52 MS; -194.90 N @ 86.08 MS

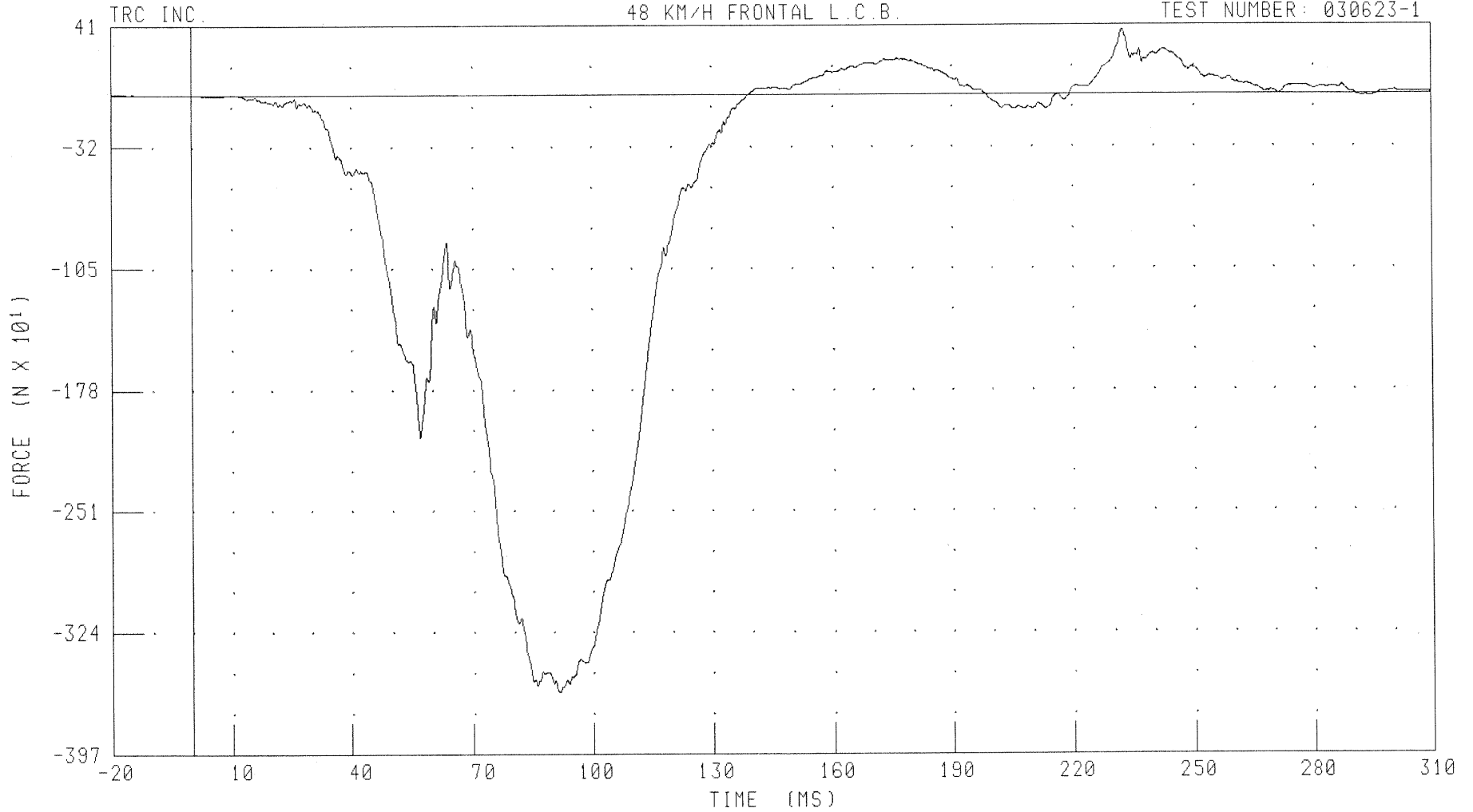
B-135

030623-1

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: 030623-1



CHANNEL: TBRZF2 FILTER: CH CLASS 600

PEAK DATA: 381.56 N @ 232.48 MS; -3601.84 N @ 91.36 MS

B-136

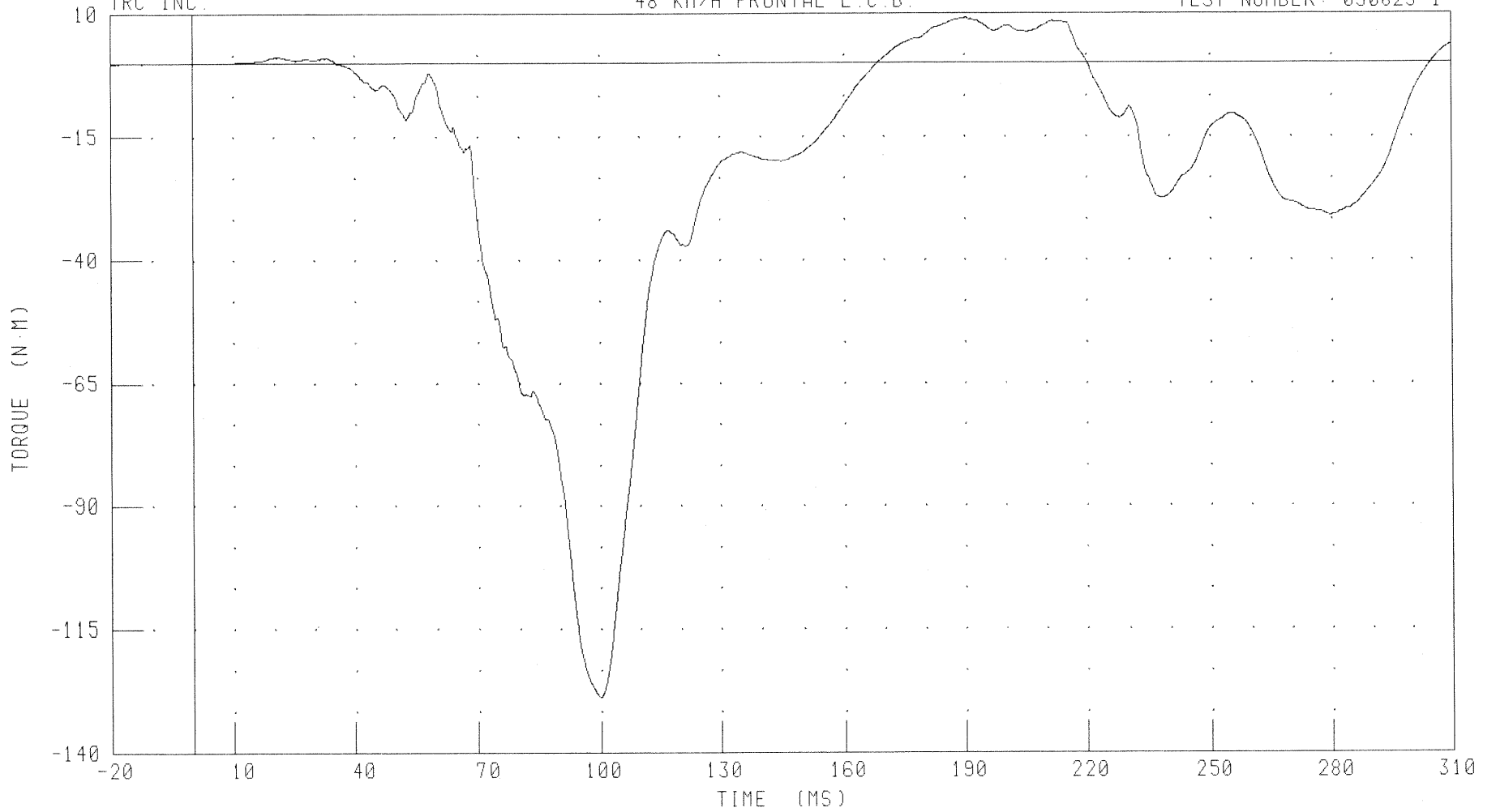
030623-1

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

TRC INC.

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: TBRXM2

FILTER: CH. CLASS 600

PEAK DATA: 9.16 N·M @ 190.48 MS; -128.82 N·M @ 100.00 MS

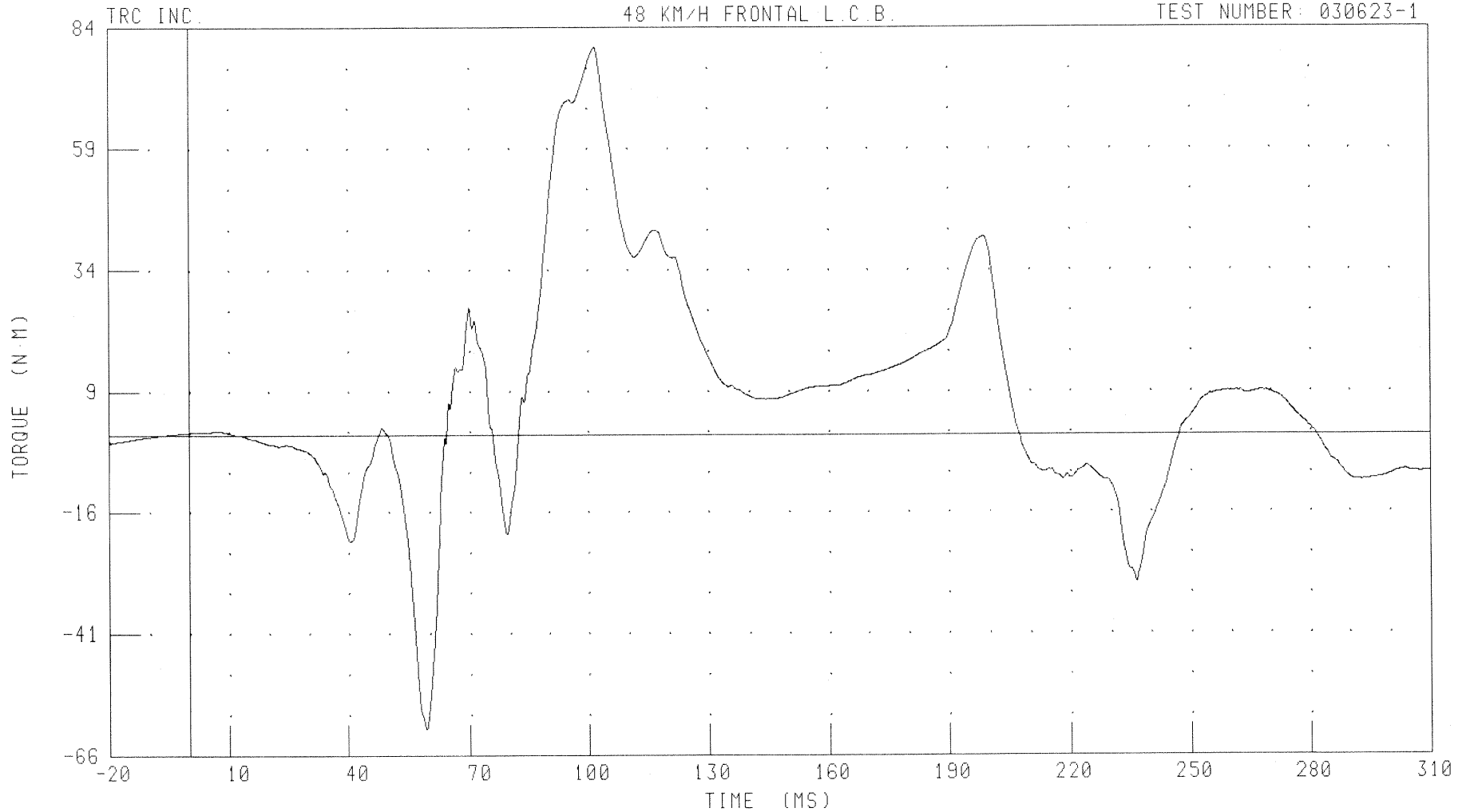
B-137

030623-1

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: 030623-1



CHANNEL: TBRYM2 FILTER: CH CLASS 600

PEAK DATA: 79.94 N·M @ 102.08 MS; -60.57 N·M @ 59.20 MS

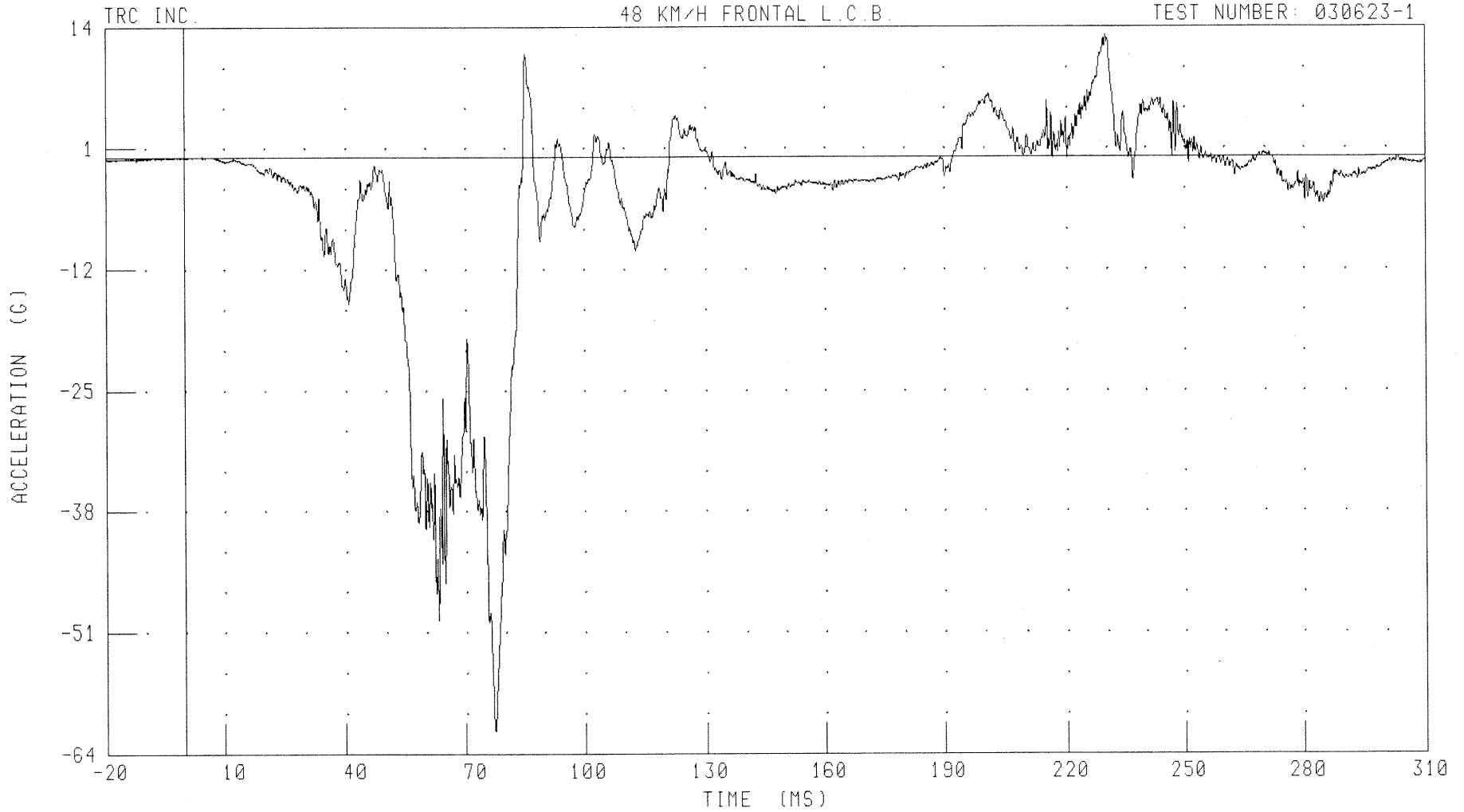
B-138

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: TBRXG2

FILTER: CH. CLASS 1000

PEAK DATA: 13.10 G @ 229.92 MS; -61.57 G @ 77.44 MS

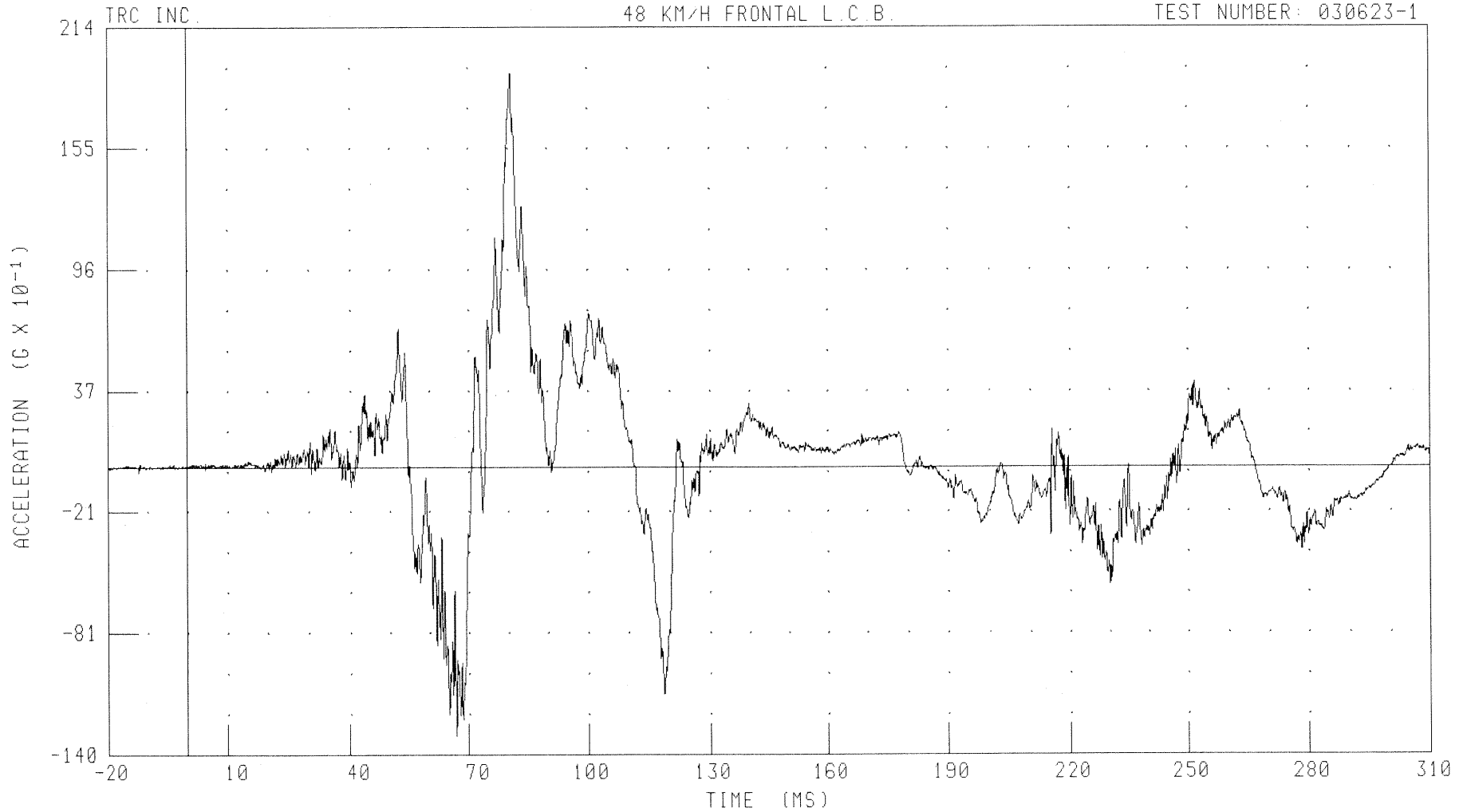
B-139

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: TBRYG2 FILTER: CH. CLASS 1000

PEAK DATA: 19.17 G @ 80.88 MS; -13.08 G @ 66.88 MS

B-140

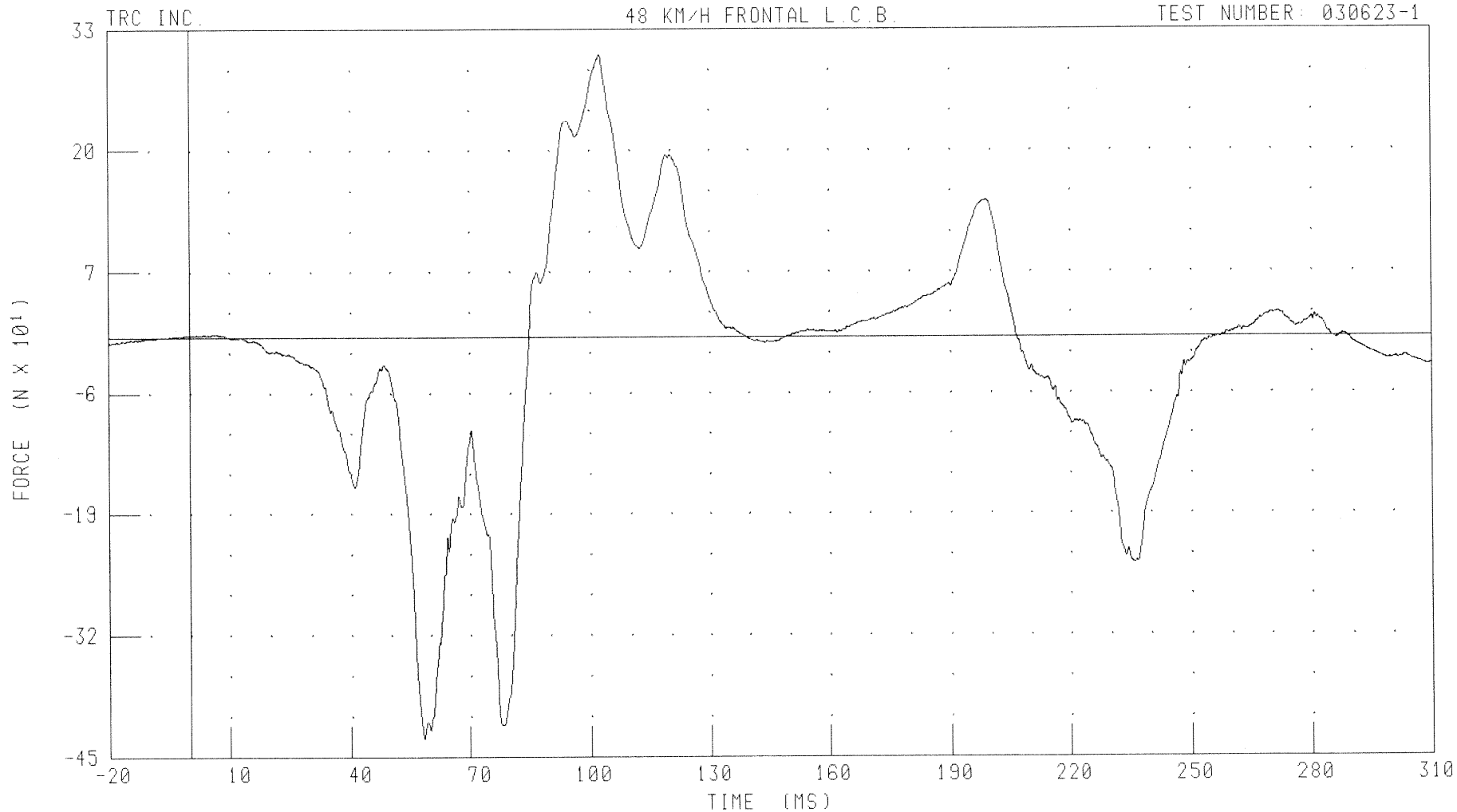
030623-1

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: 030623-1



CHANNEL: ANRXF2 FILTER: CH. CLASS 600

PEAK DATA: 302.75 N @ 102.72 MS; -430.71 N @ 58.32 MS

B-141

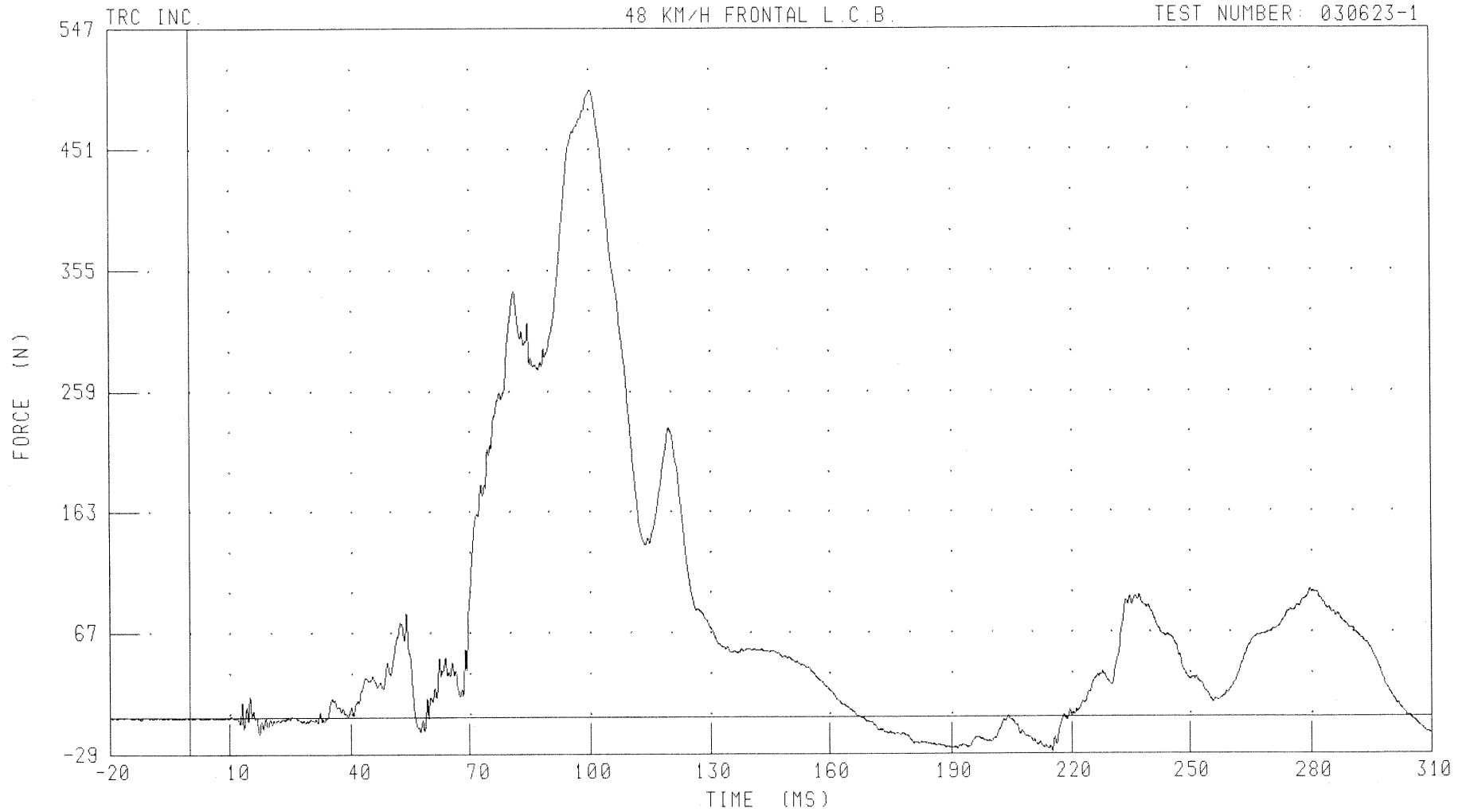
030623-1

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: 030623-1



CHANNEL: ANRYF2

FILTER: CH. CLASS 600

PEAK DATA: 498.80 N @ 100.48 MS; -27.25 N @ 215.12 MS

B-142

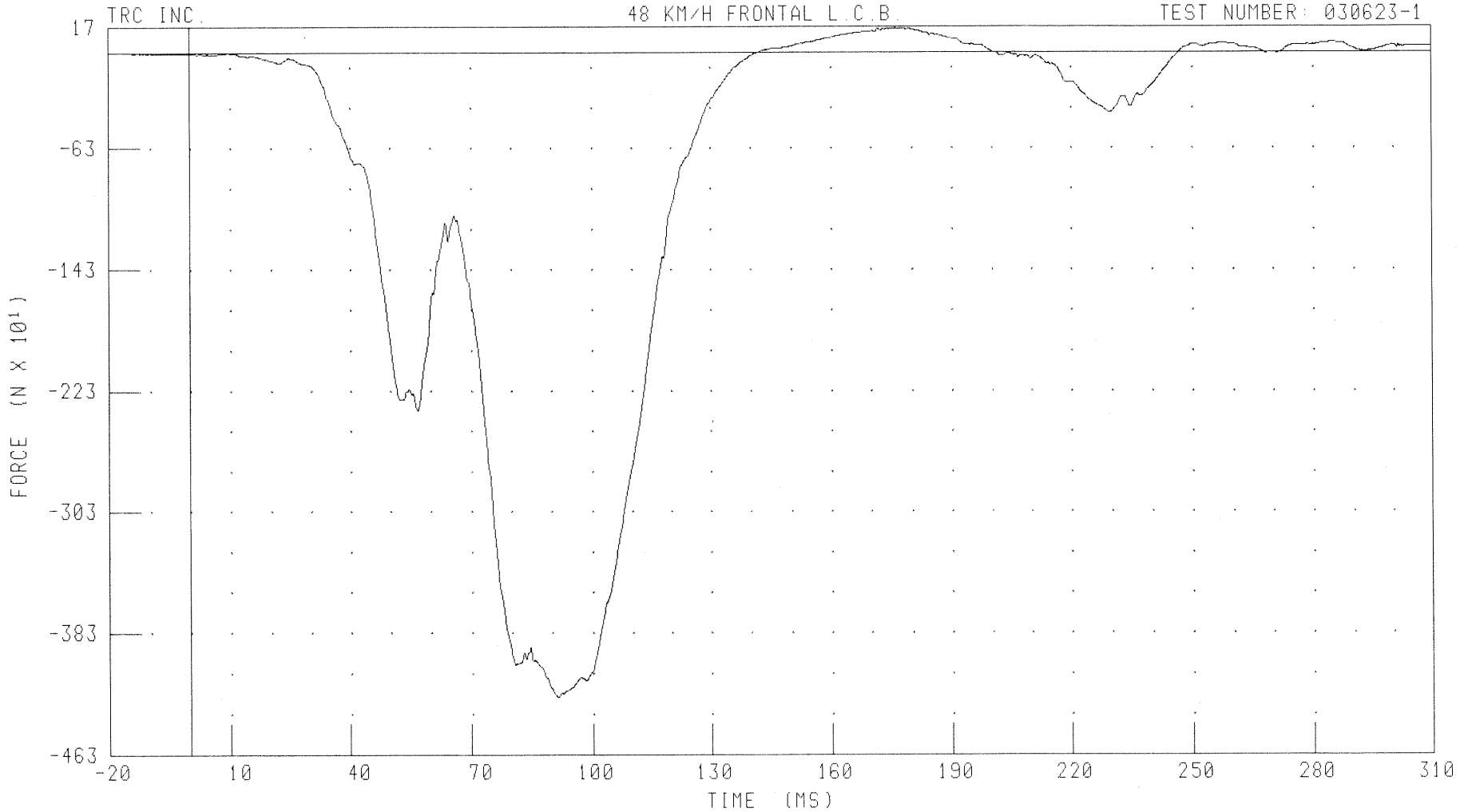
030623-1

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: 030623-1



CHANNEL: ANRZF2

FILTER: CH. CLASS 600

PEAK DATA: 161.49 N @ 176.16 MS; -425.95 N @ 91.44 MS

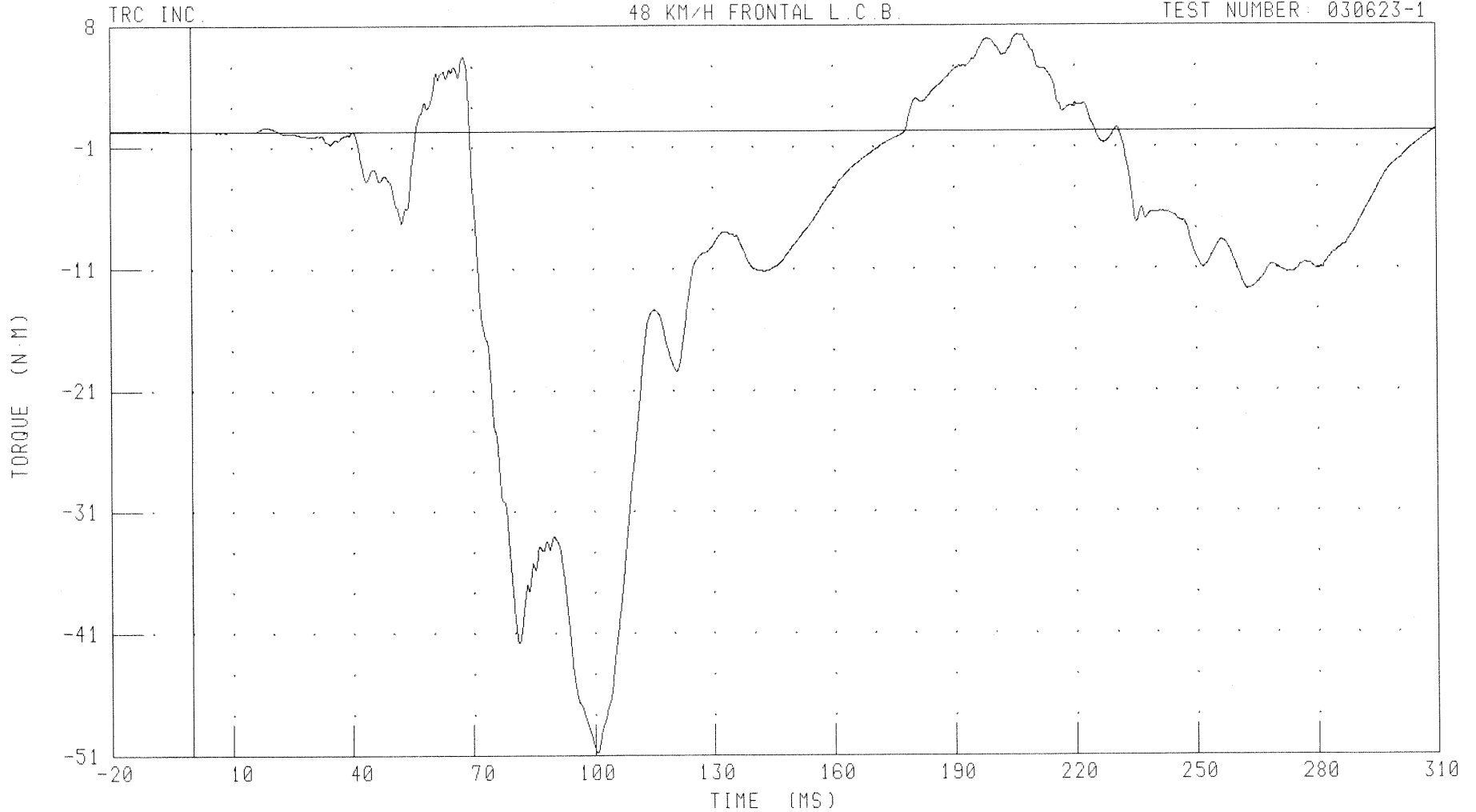
B-143

030623-1

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: 030623-1



CHANNEL: ANRXM2

FILTER: CH. CLASS 600

PEAK DATA: 7.95 N.M @ 206.24 MS; -51.09 N.M @ 100.56 MS

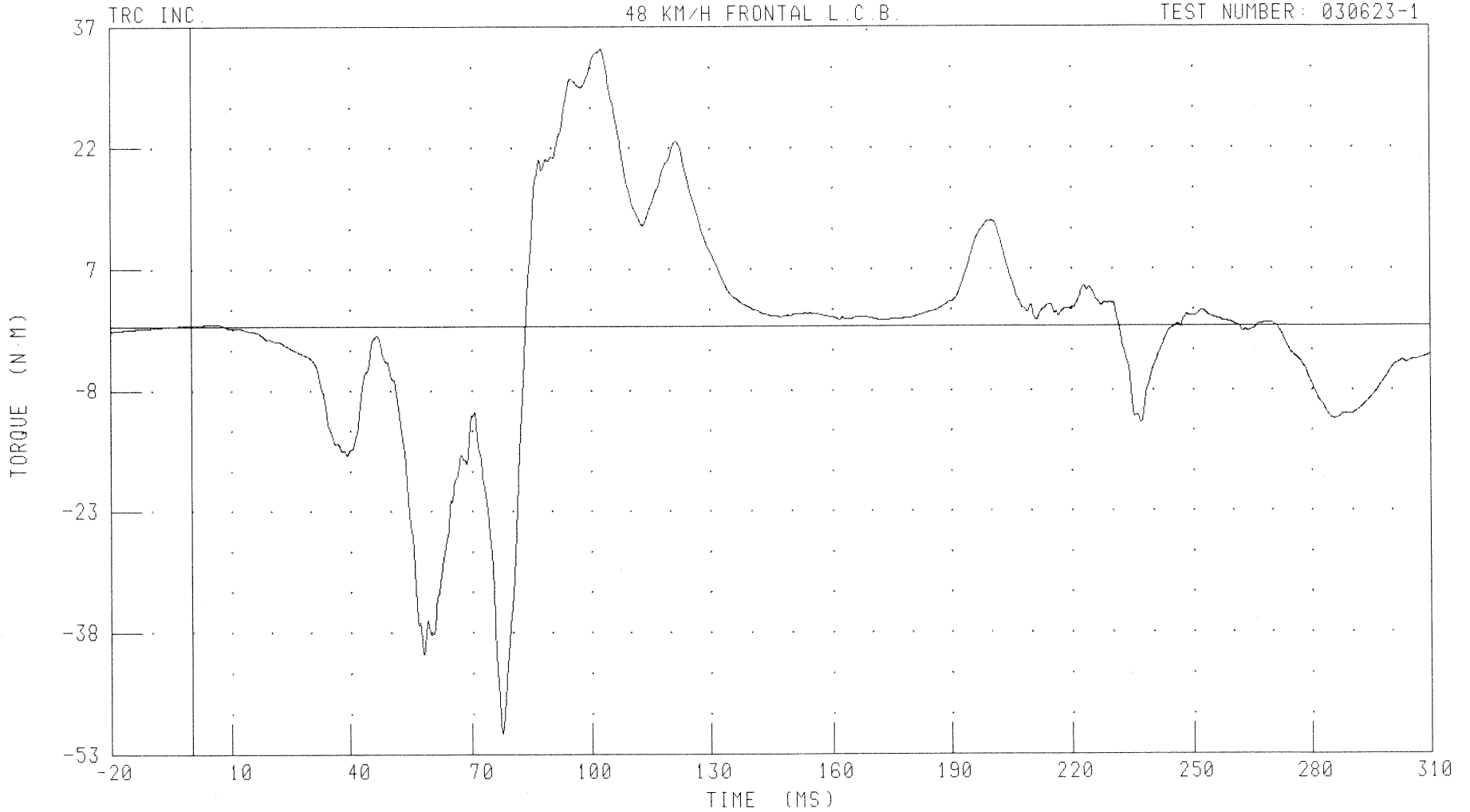
B-144

030623-1

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: 030623-1



CHANNEL: ANRYM2

FILTER: CH CLASS 600

PEAK DATA: 34.28 N.M @ 102.96 MS, -50.43 N.M @ 77.44 MS

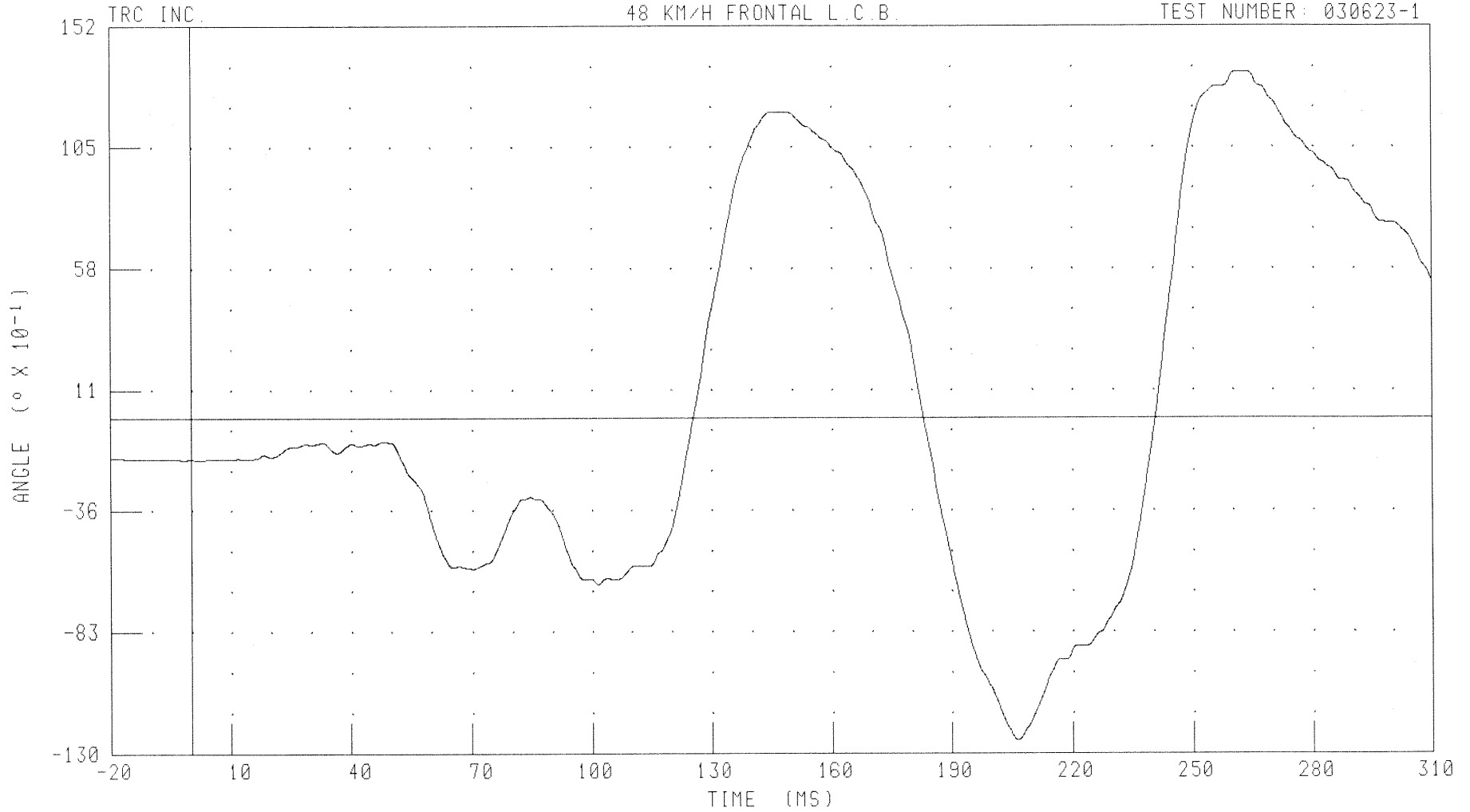
B-145

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTRXD2 FILTER: CH. CLASS 180

PEAK DATA: 113.42 ° @ 260.96 MS, -125.00 ° @ 206.24 MS

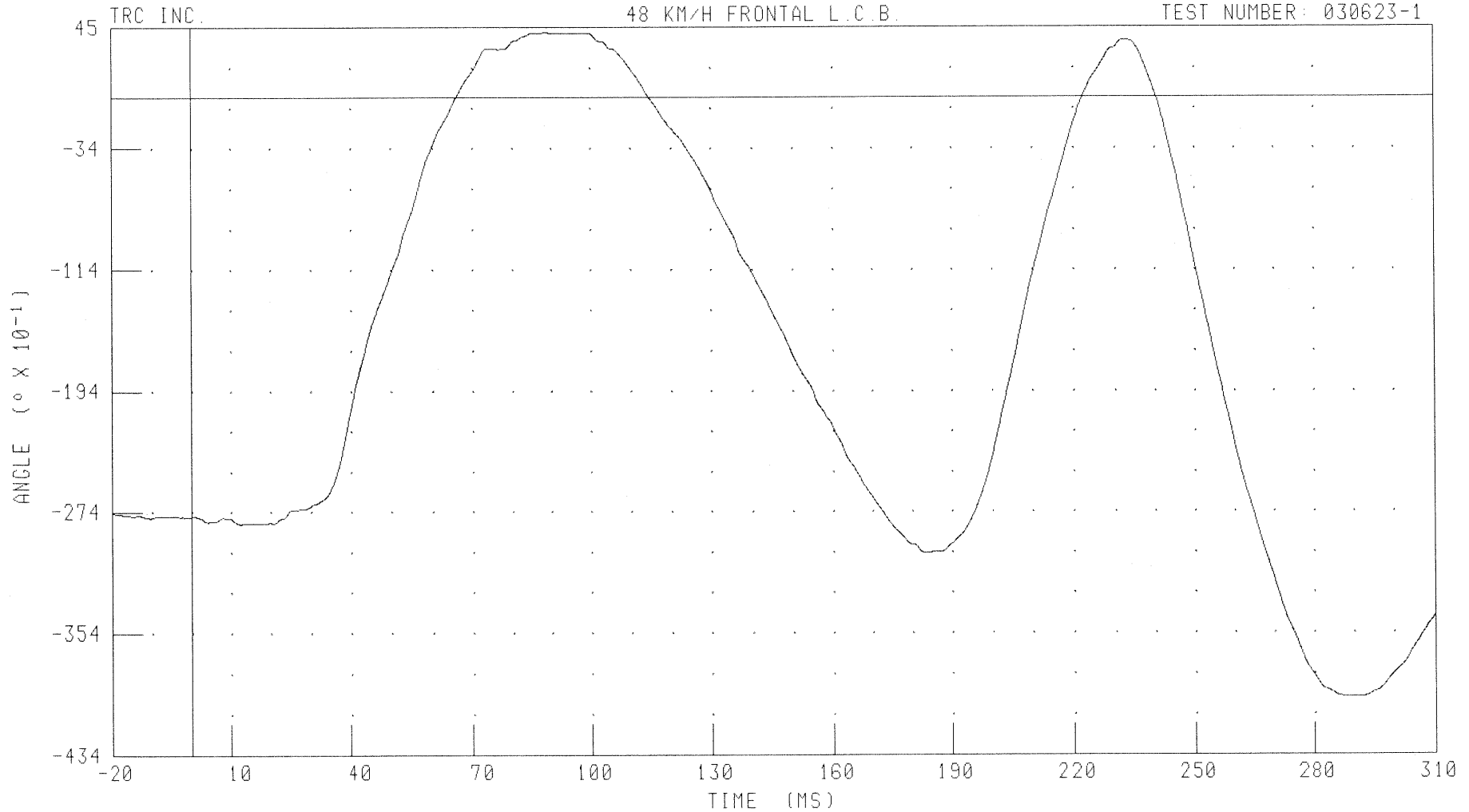
B-146

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTRYD2 FILTER: CH CLASS 180

PEAK DATA: 4.25 ° @ 88.72 MS, -39.59 ° @ 290.08 MS

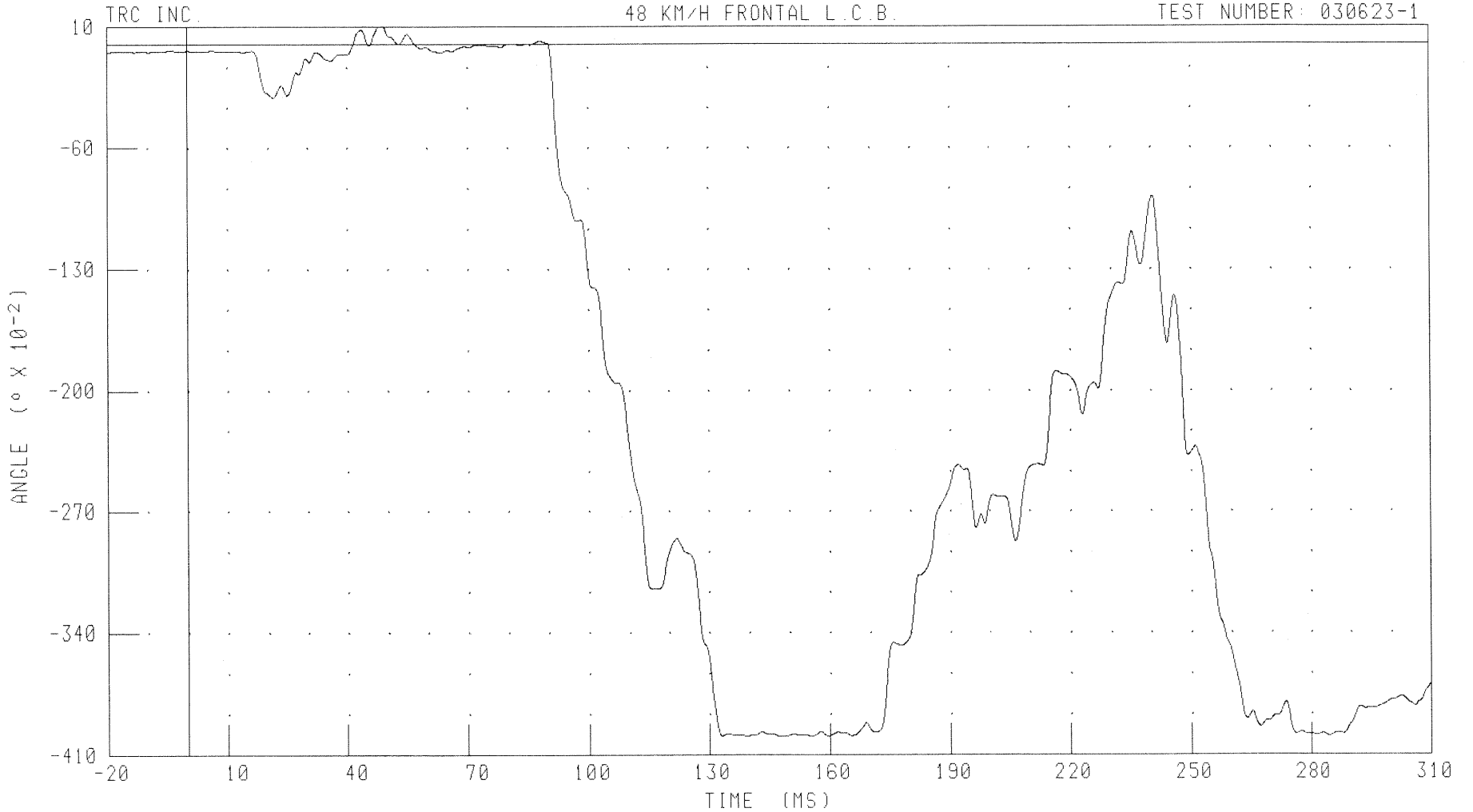
B-147

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTRZD2 FILTER: CH. CLASS 180

PEAK DATA: 0.12 ° @ 48.56 MS; -4.00 ° @ 147.60 MS

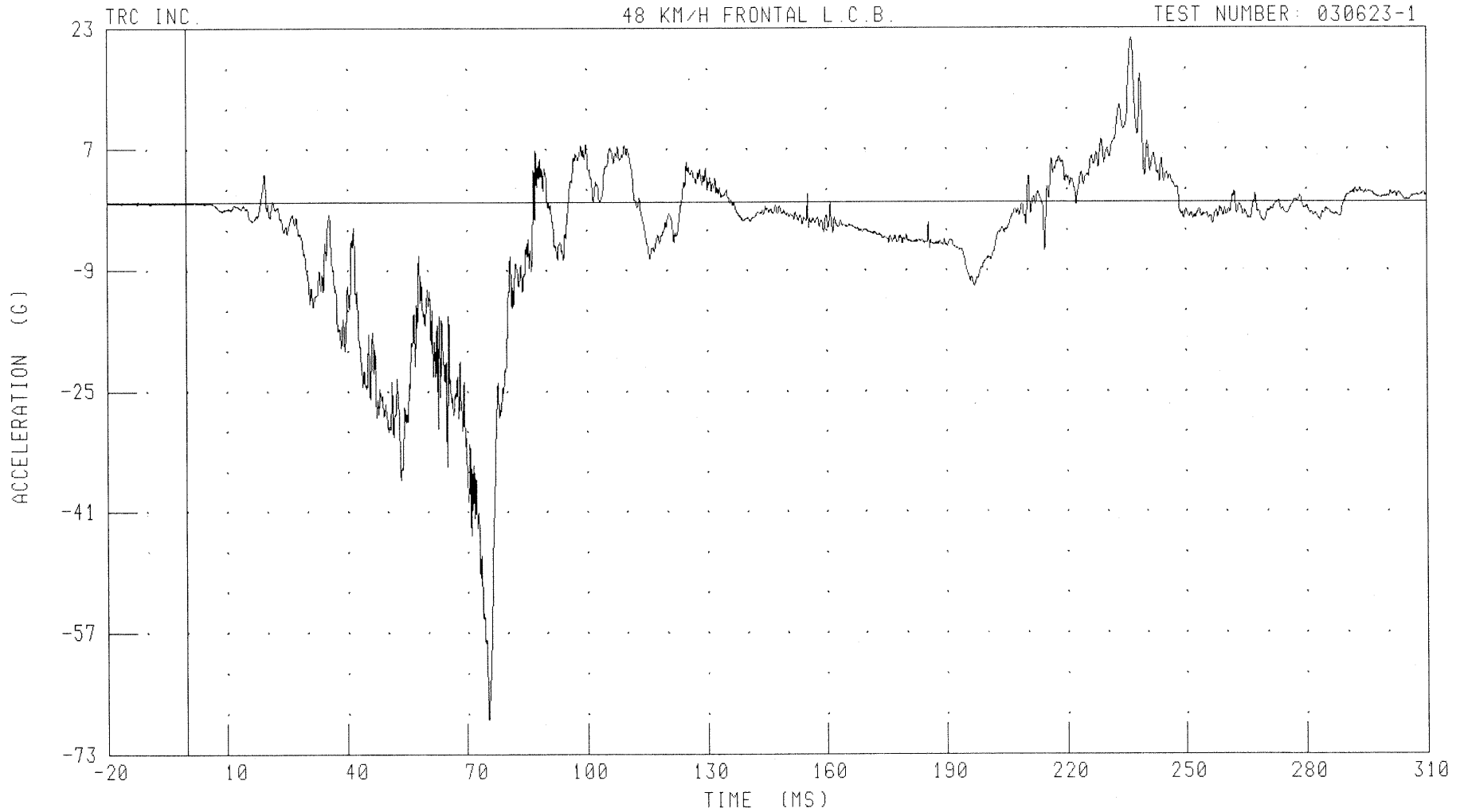
B-148

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTRXG2

FILTER: CH. CLASS 1000

PEAK DATA: 21.63 G @ 236.24 MS; -68.35 G @ 75.28 MS

B-149

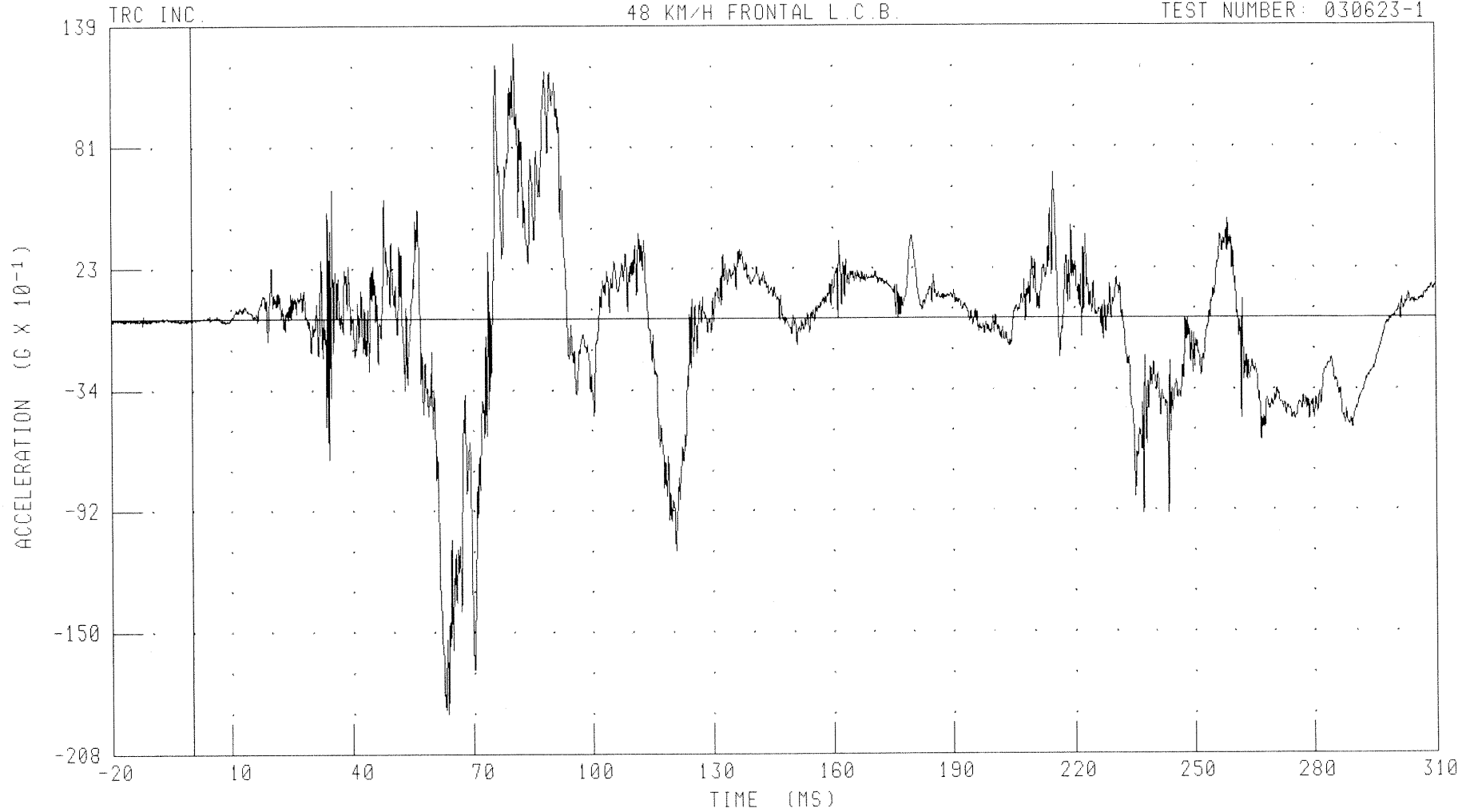
030623-1

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

PASSENGER RIGHT FOOT Y-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTRYG2

FILTER: CH. CLASS 1000

PEAK DATA: 13.16 G @ 80.56 MS, -18.90 G @ 63.60 MS

B-150

030623-1

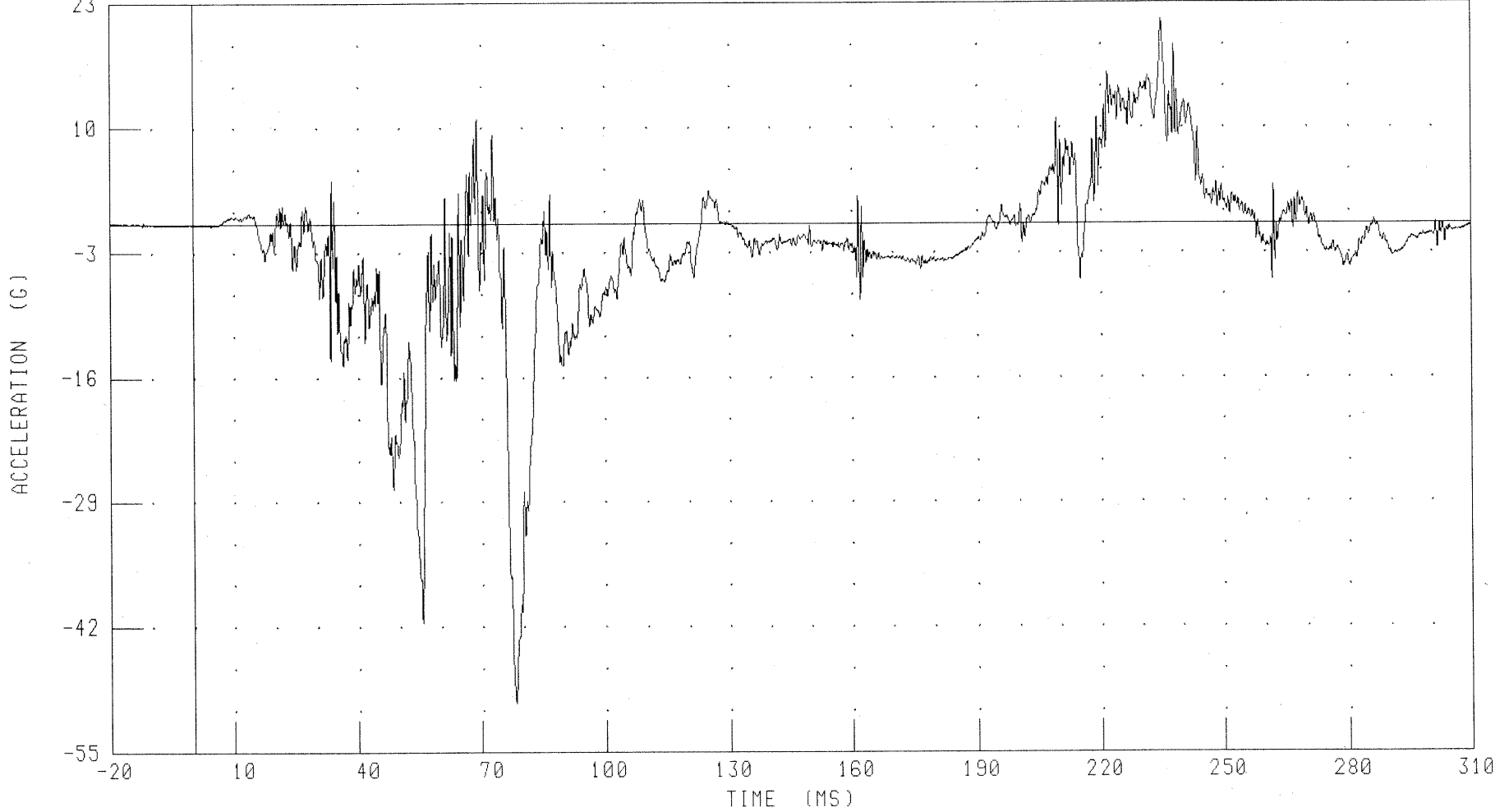
2002 SATURN VUE INTO FRONTAL LOAD CELL BARRIER AT 48 KM/H

PASSENGER RIGHT FOOT Z-AXIS ACCELERATION

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1

TRC INC.



CHANNEL: FTRZG2 FILTER: CH. CLASS 1000

PEAK DATA: 21.23 G @ 235.04 MS, -49.91 G @ 78.16 MS

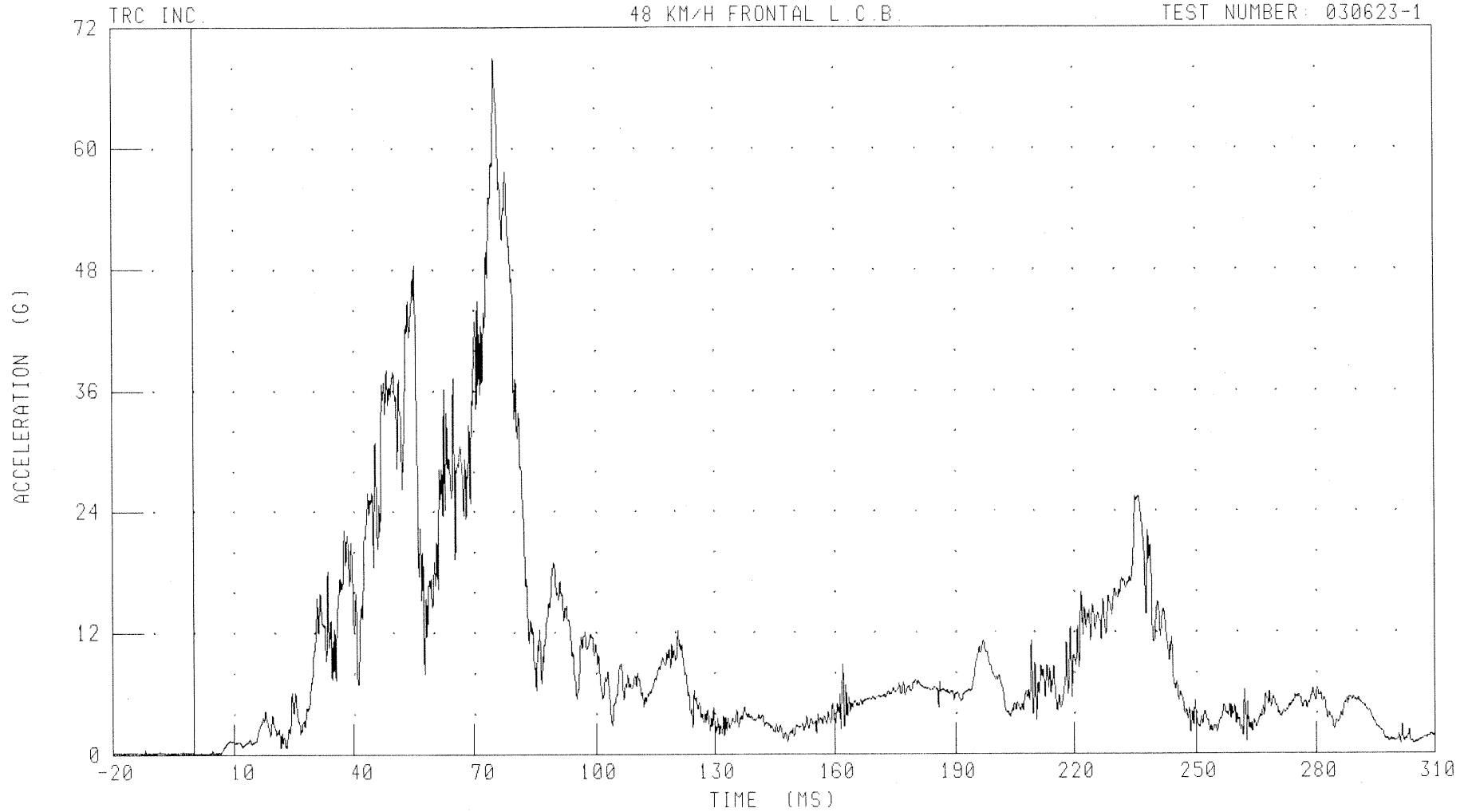
B-151

030623-1

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

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL: FTRRG2 FILTER: CH. CLASS 1000

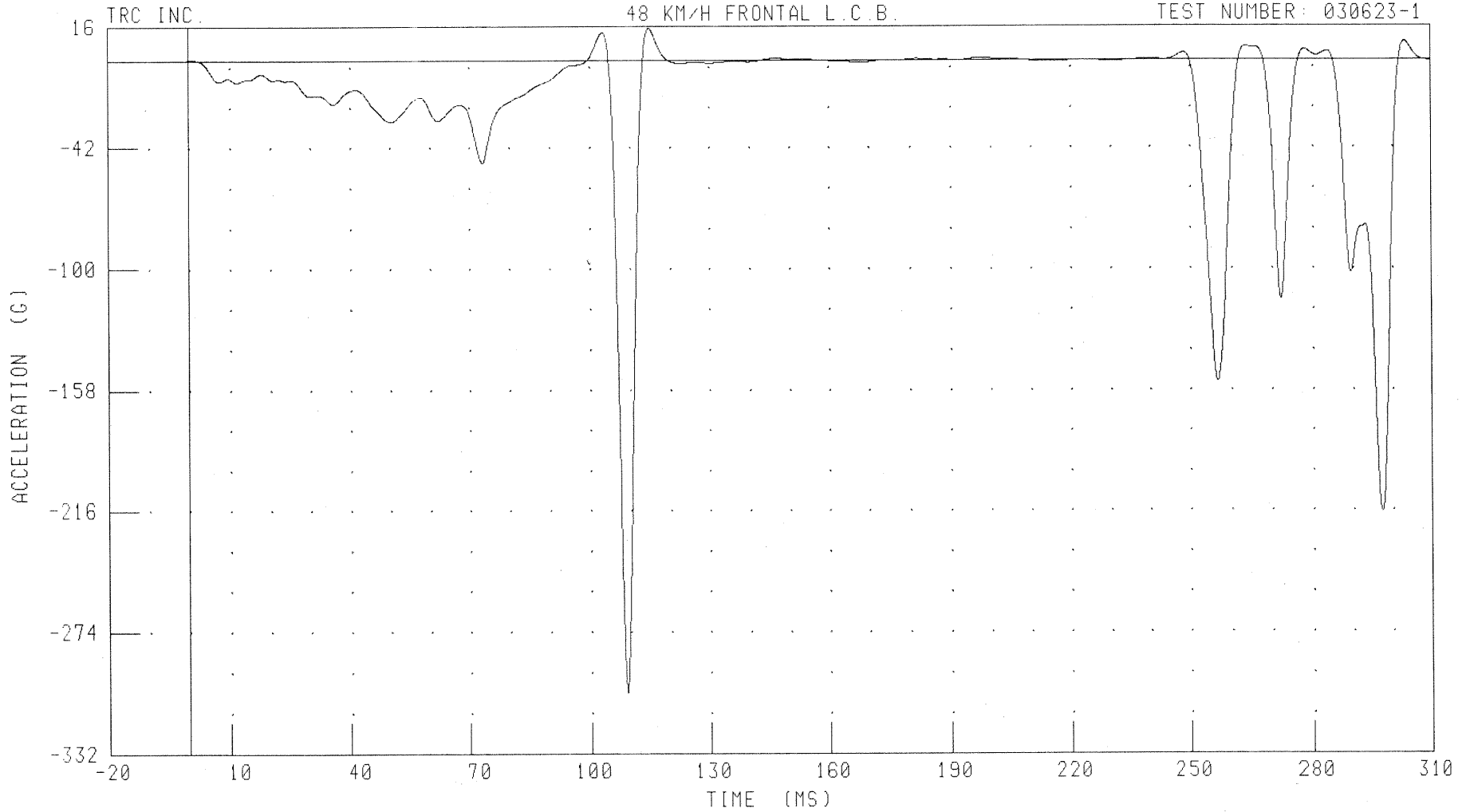
PEAK DATA: 68.92 G @ 75.28 MS; 0.05 G @ 1.44 MS

B-152

030623-1

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

TEST NUMBER: 030623-1



CHANNEL: LRSXG1

FILTER: CH. CLASS 60

PEAK DATA: 15.28 G @ 114.88 MS; -303.27 G @ 109.12 MS

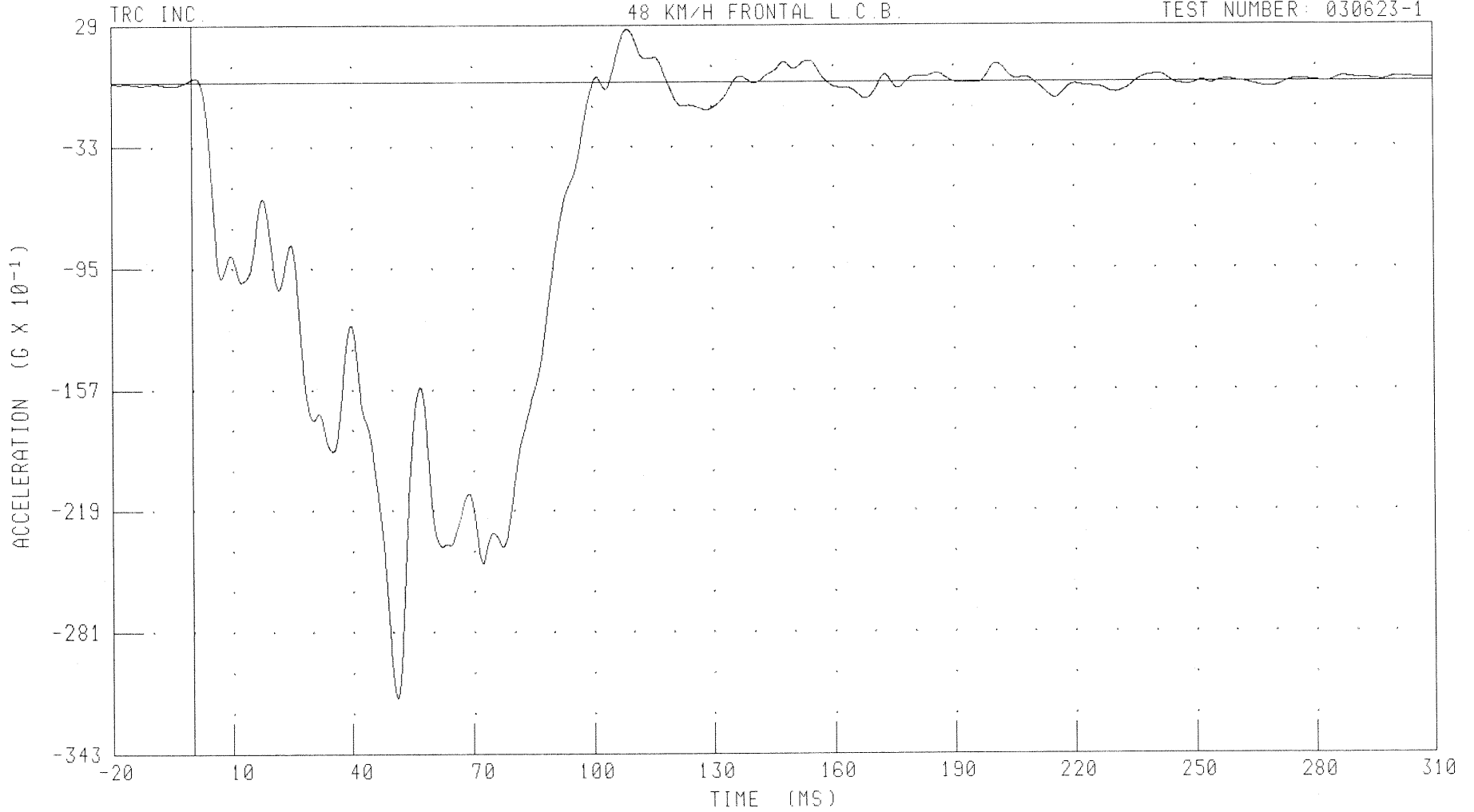
B-153

030623-1

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: 030623-1



CHANNEL: RRSXG1

FILTER: CH. CLASS 60

PEAK DATA: 2.70 G @ 109.12 MS, -31.45 G @ 51.12 MS

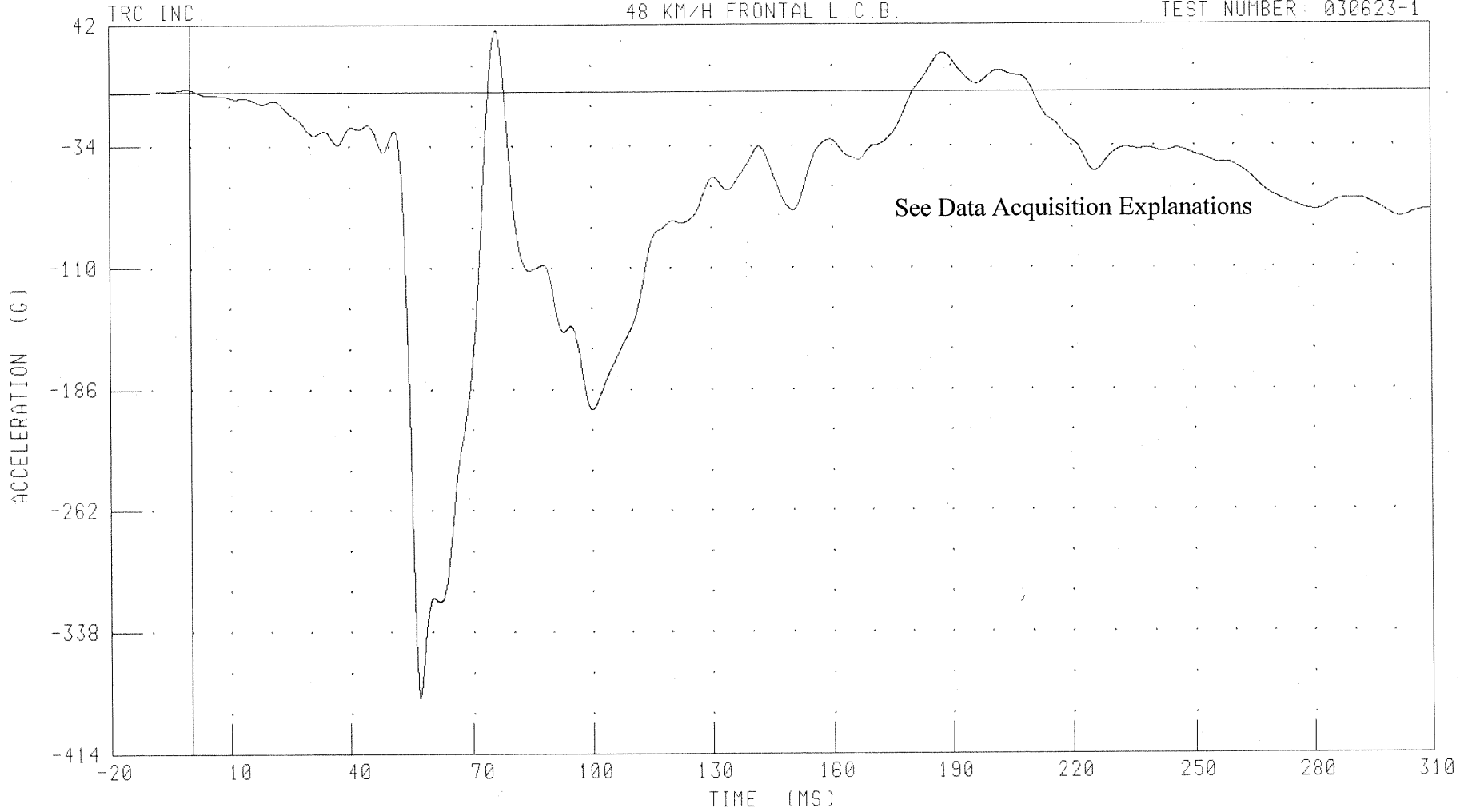
B-154

030623-1

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: 030623-1



CHANNEL: BCLXG1 FILTER: CH CLASS 60

PEAK DATA: 38.63 G @ 76.16 MS; -378.60 G @ 57.12 MS

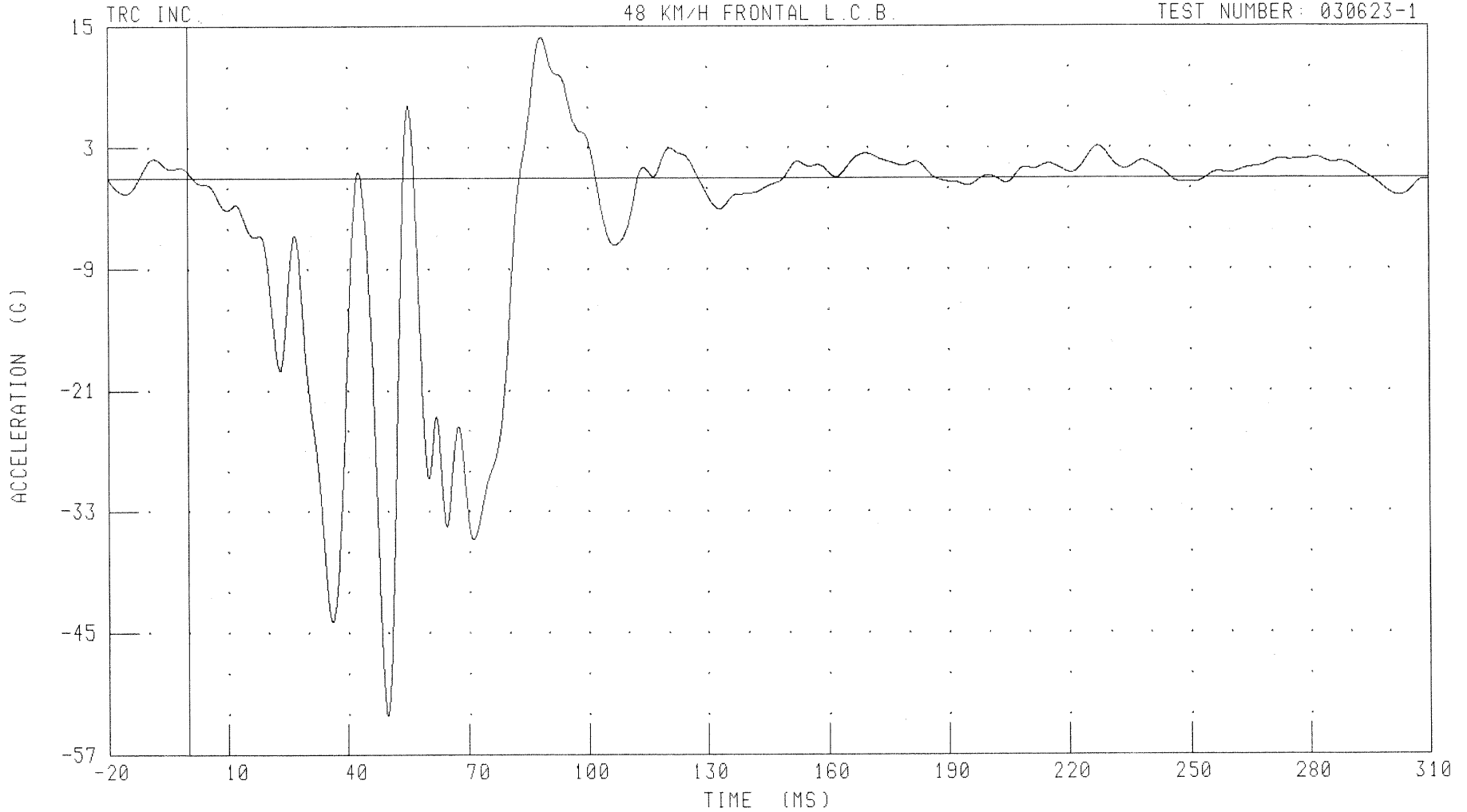
B-155

030623-1

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: 030623-1



CHANNEL: BCRXC1

FILTER: CH. CLASS 60

PEAK DATA: 13.91 G @ 88.32 MS; -53.16 G @ 49.92 MS

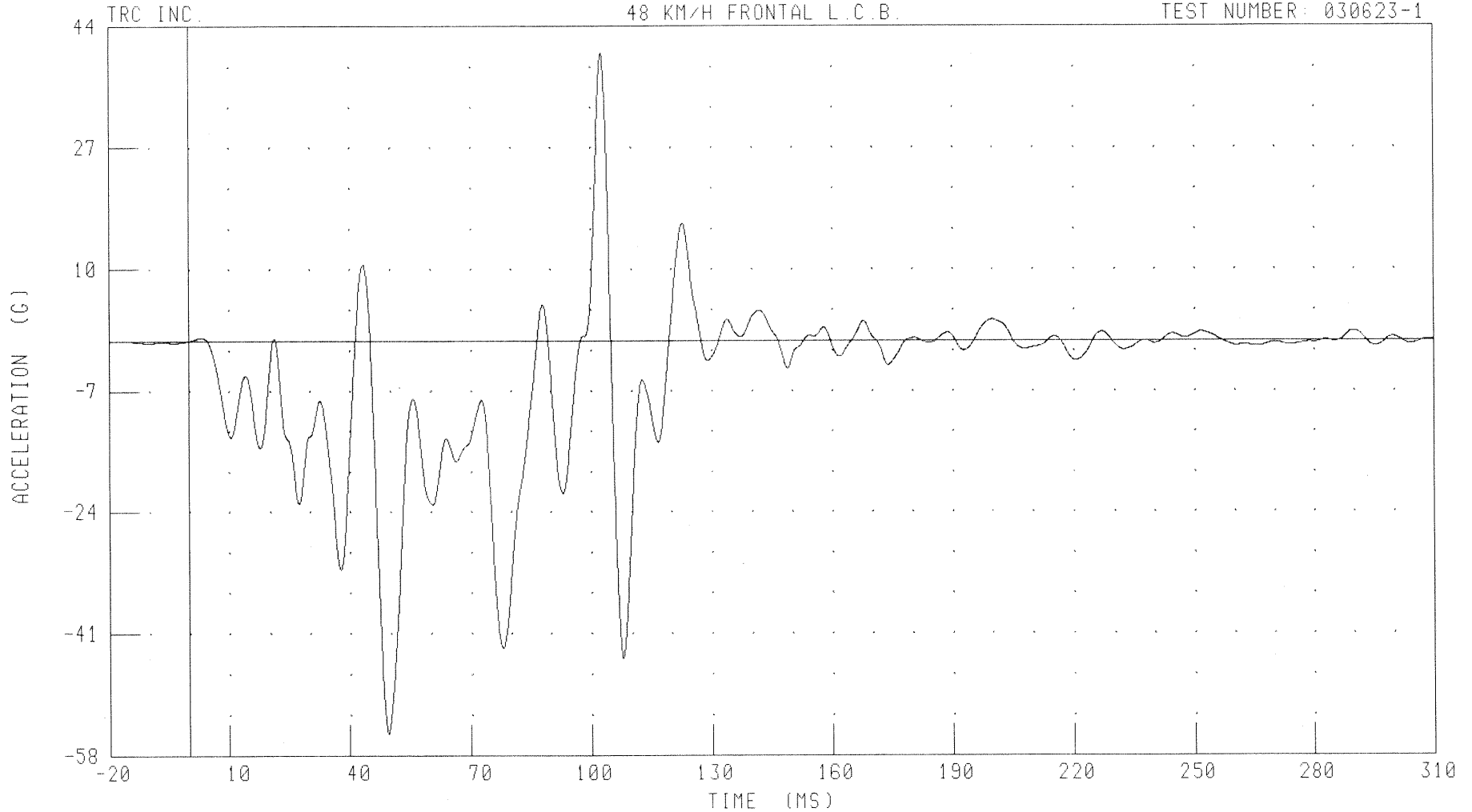
B-156

030623-1

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: 030623-1



CHANNEL: DPCXC1

FILTER CH. CLASS 60

PEAK DATA: 40.29 G @ 102.88 MS; -54.98 G @ 49.36 MS

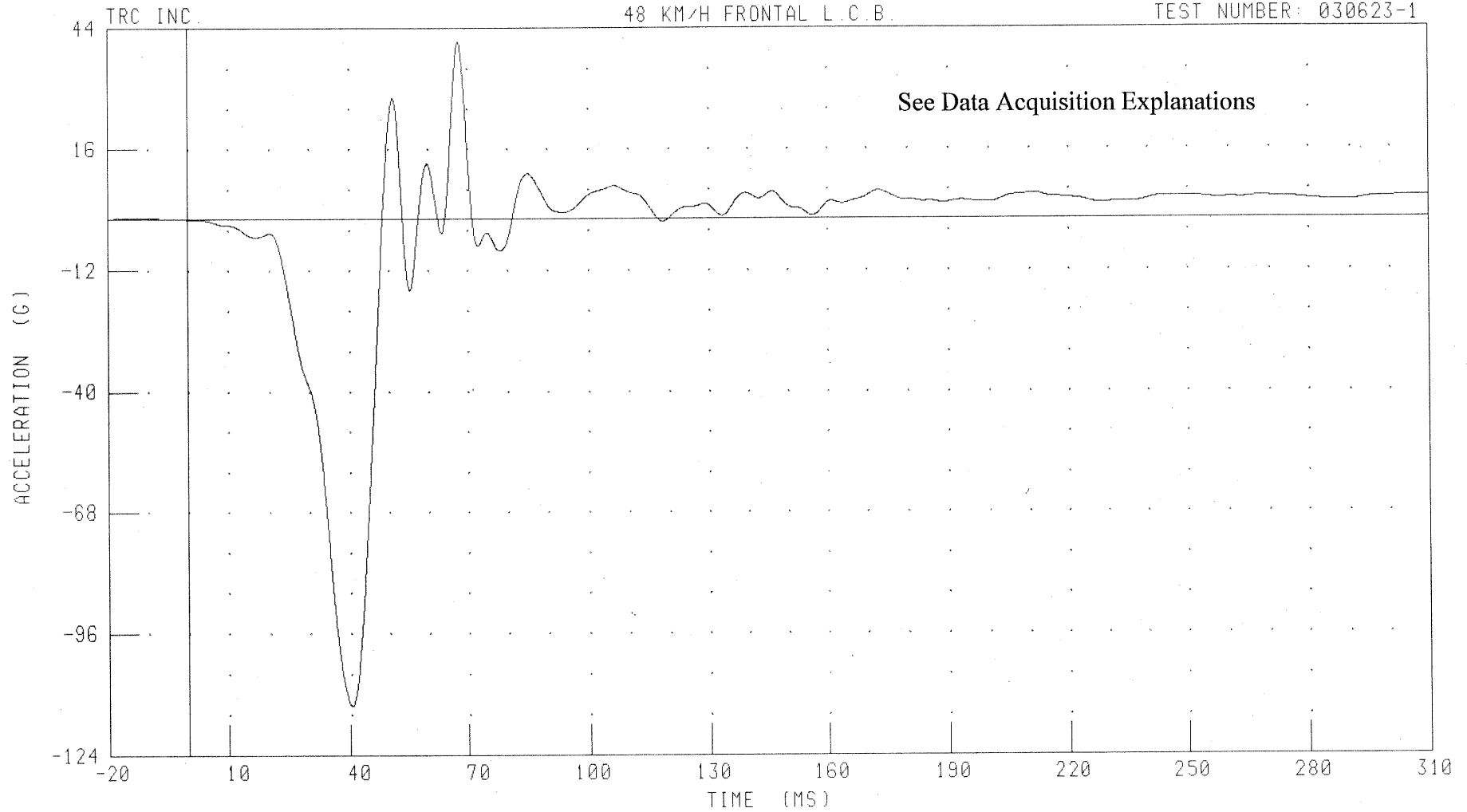
B-157

030623-1

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: 030623-1



CHANNEL: ENGXG1 FILTER: CH. CLASS 60

PEAK DATA: 40.88 G @ 67.92 MS, -112.68 G @ 40.40 MS

B-158

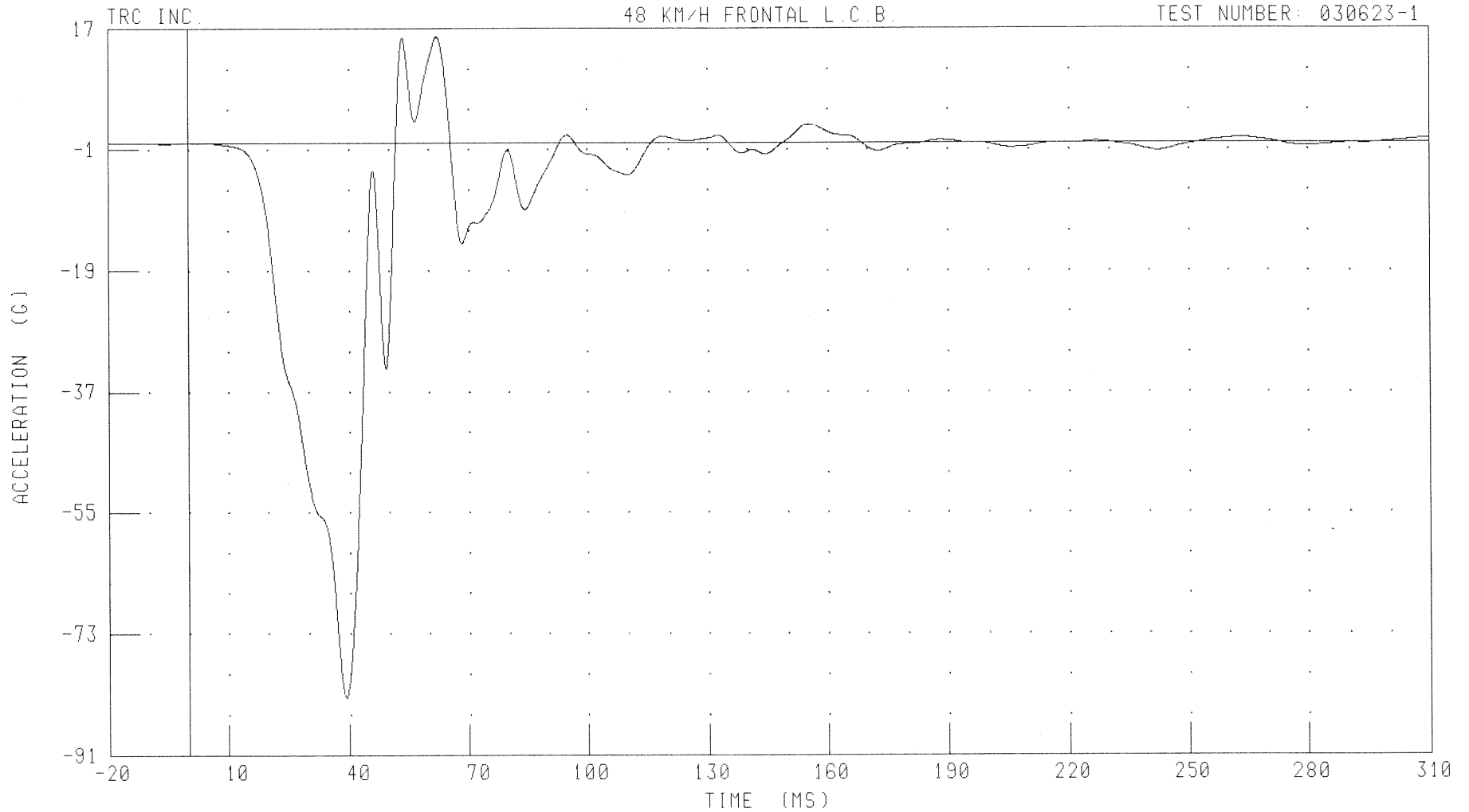
030623-1

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: 030623-1



CHANNEL: ENGXC2

FILTER: CH. CLASS 60

PEAK DATA: 15.76 G @ 62.16 MS; -82.49 G @ 39.20 MS

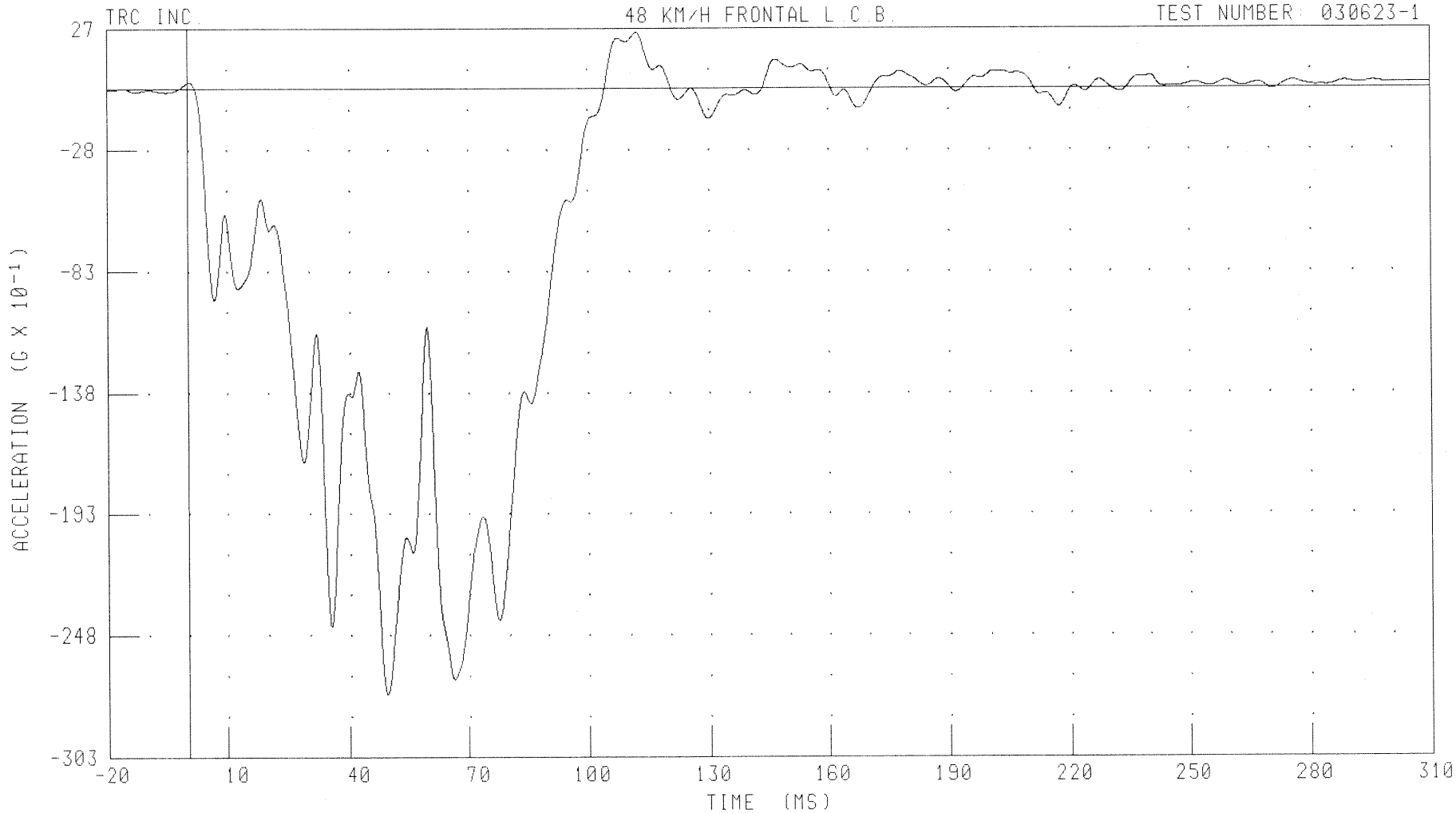
B-159

030623-1

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: 030623-1



CHANNEL: TPAXG1

FILTER: CH CLASS 60

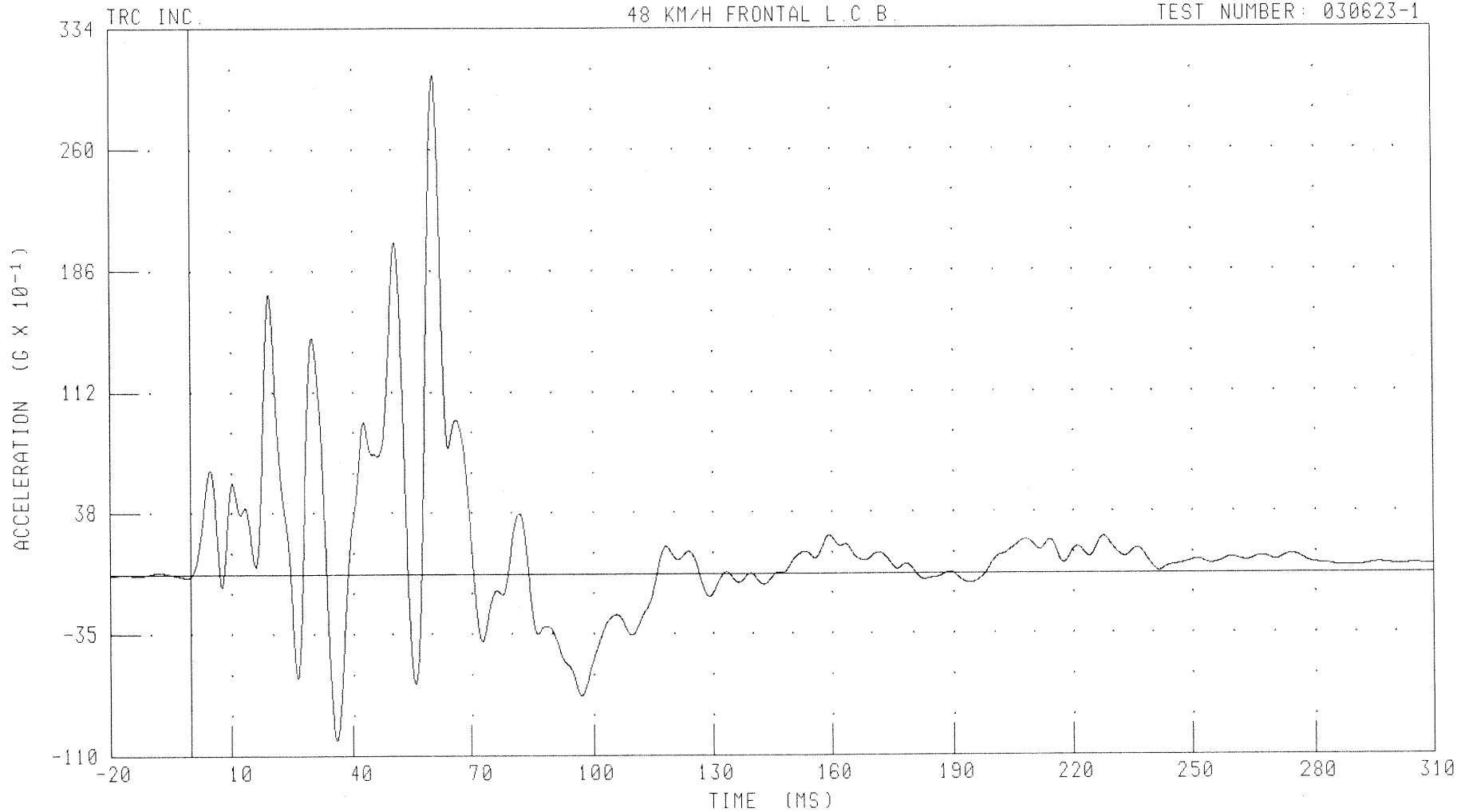
PEAK DATA: 2.53 G @ 112.08 MS; -27.48 G @ 49.52 MS

B-160

030623-1

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: 030623-1



CHANNEL: TPAZG1

FILTER: CH. CLASS 60

PEAK DATA: 30.55 G @ 60.80 MS; -10.05 G @ 35.84 MS

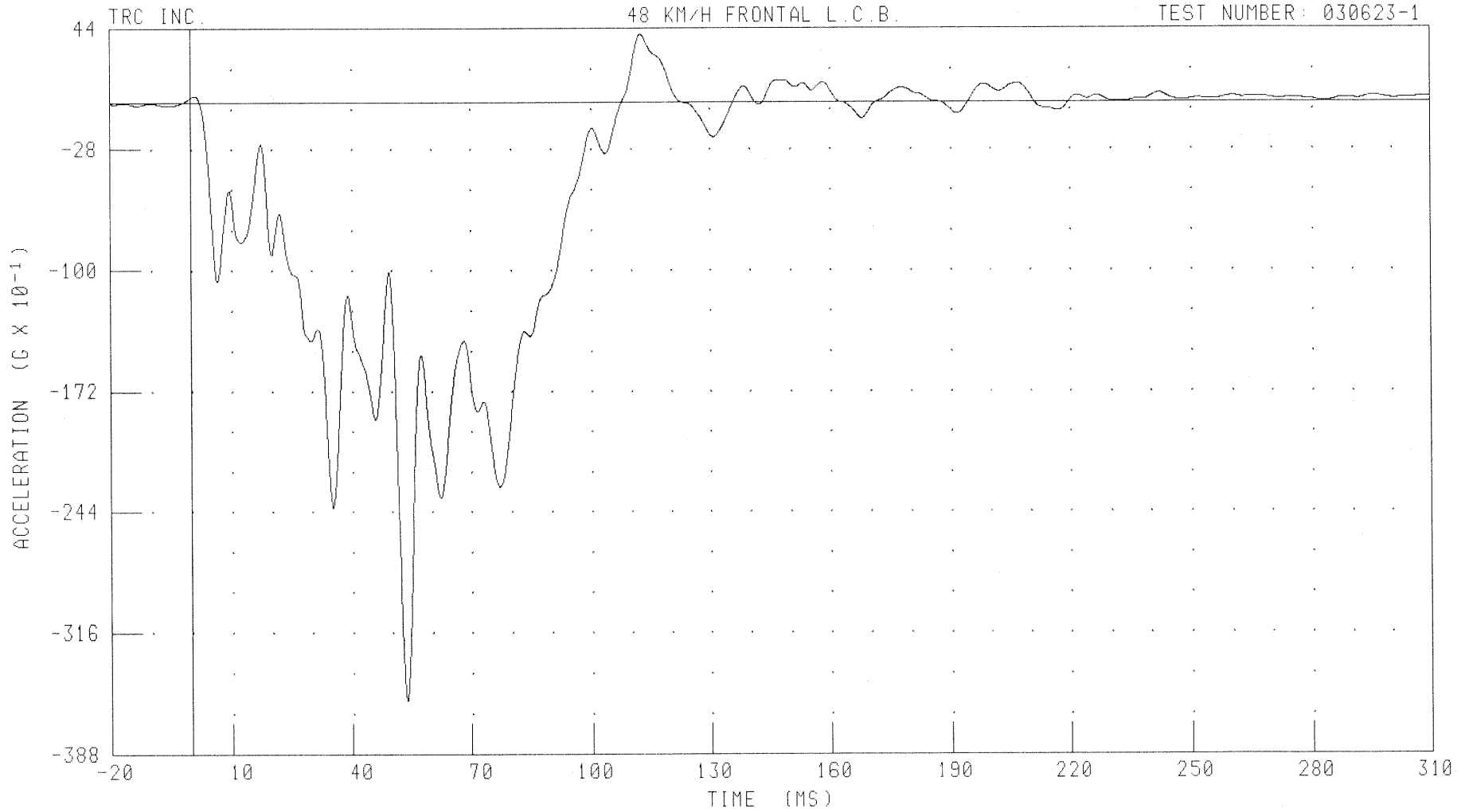
B-161

030623-1

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: 030623-1



CHANNEL: TPFXC1

FILTER: CH. CLASS 60

PEAK DATA: 4.04 G @ 112.56 MS, -35.64 G @ 53.68 MS

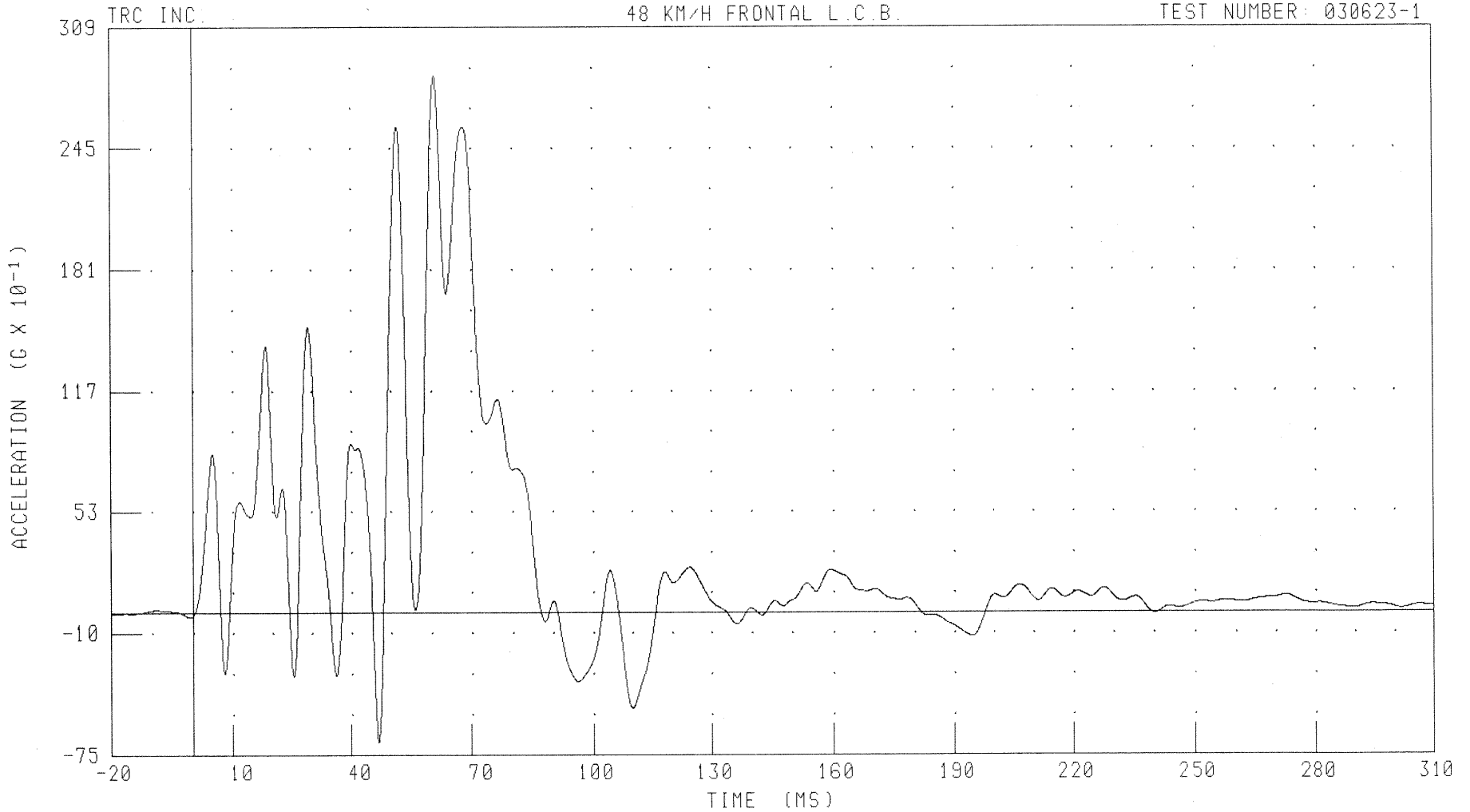
B-162

030623-1

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: 030623-1



CHANNEL: TPFZG1

FILTER: CH. CLASS 60

PEAK DATA: 28.34 G @ 60.96 MS; -6.84 G @ 46.88 MS

B-163

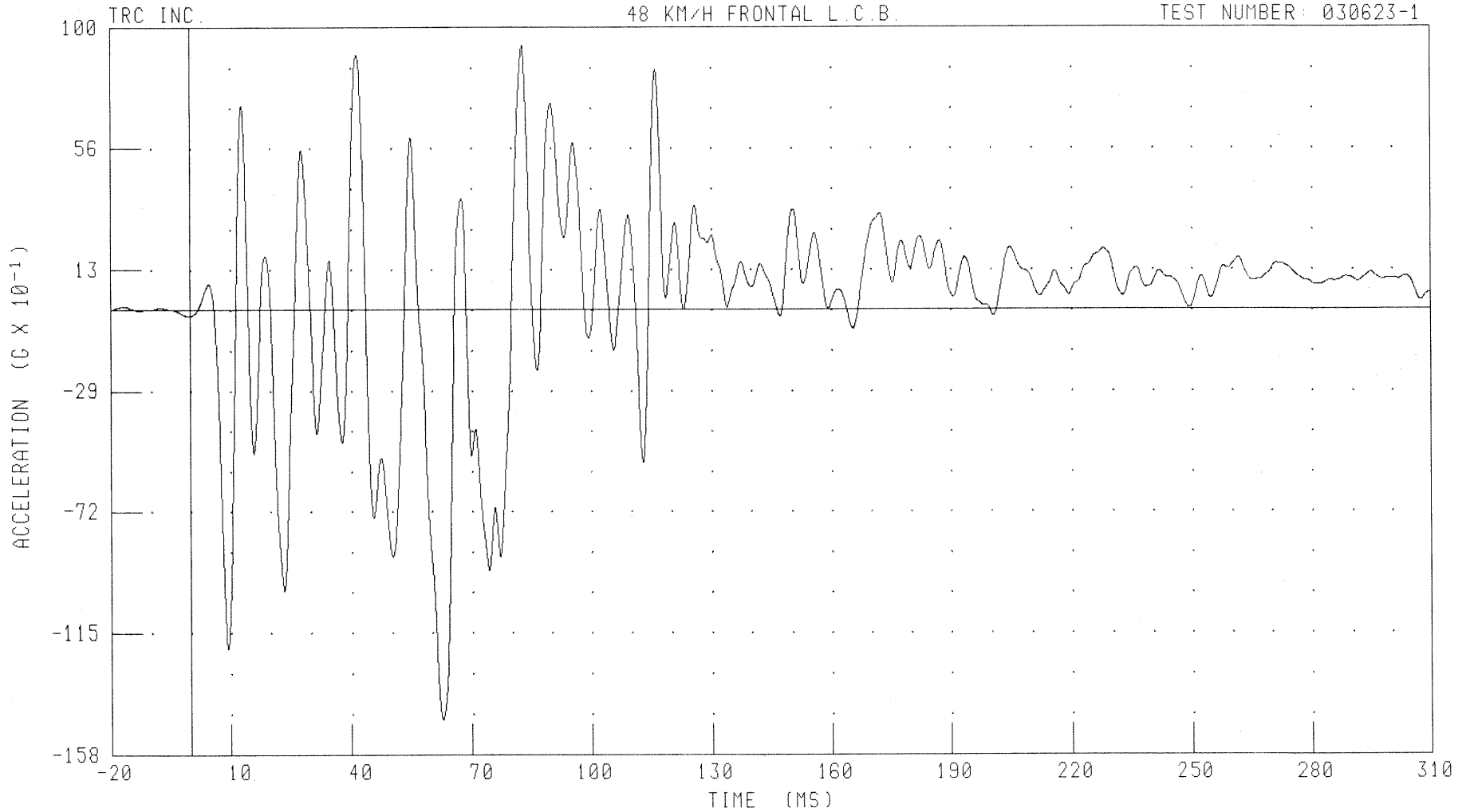
030623-1

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: 030623-1



CHANNEL: RDKZG1

FILTER: CH. CLASS 60

PEAK DATA: 9.36 G @ 82.88 MS; -14.58 G @ 62.56 MS

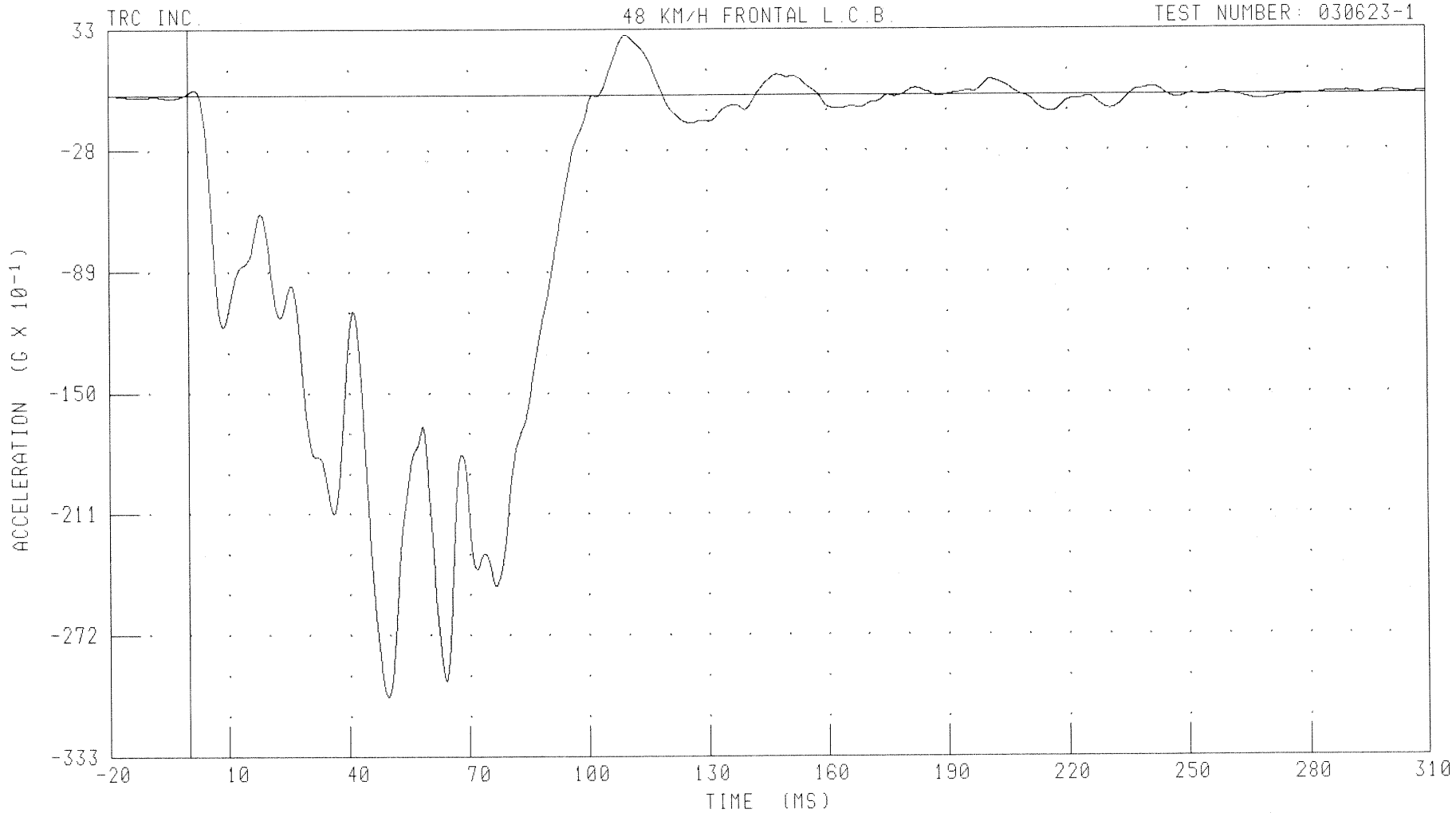
B-164

030623-1

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: 030623-1



CHANNEL: RDCXG1

FILTER: CH. CLASS 60

PEAK DATA: 3.02 G @ 109.84 MS; -30.31 G @ 49.60 MS

B-165

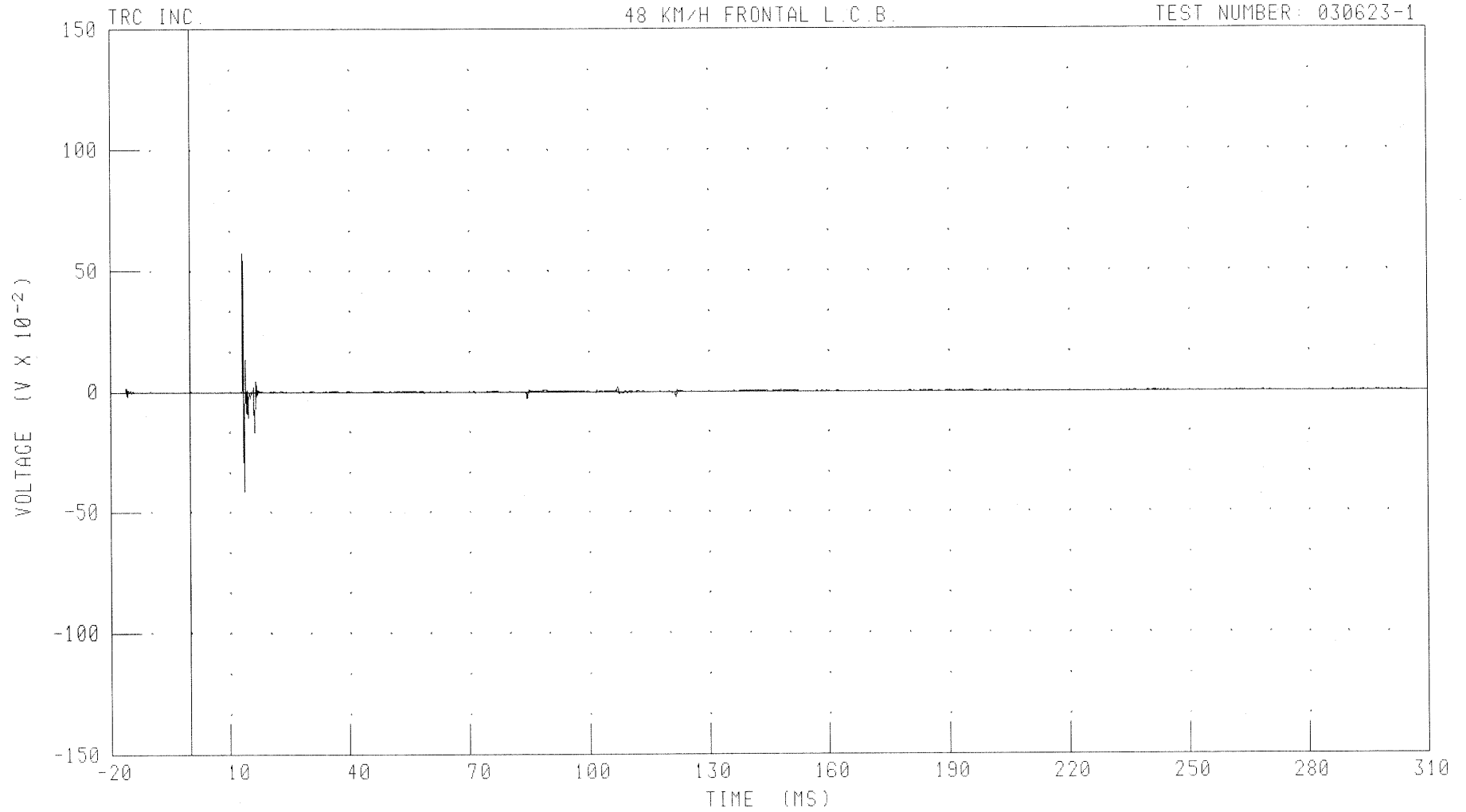
030623-1

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

DRIVER AIRBAG EVENT

48 KM/H FRONTAL L.C.B.

TEST NUMBER: 030623-1



CHANNEL DABET1 FILTER CH CLASS 1000

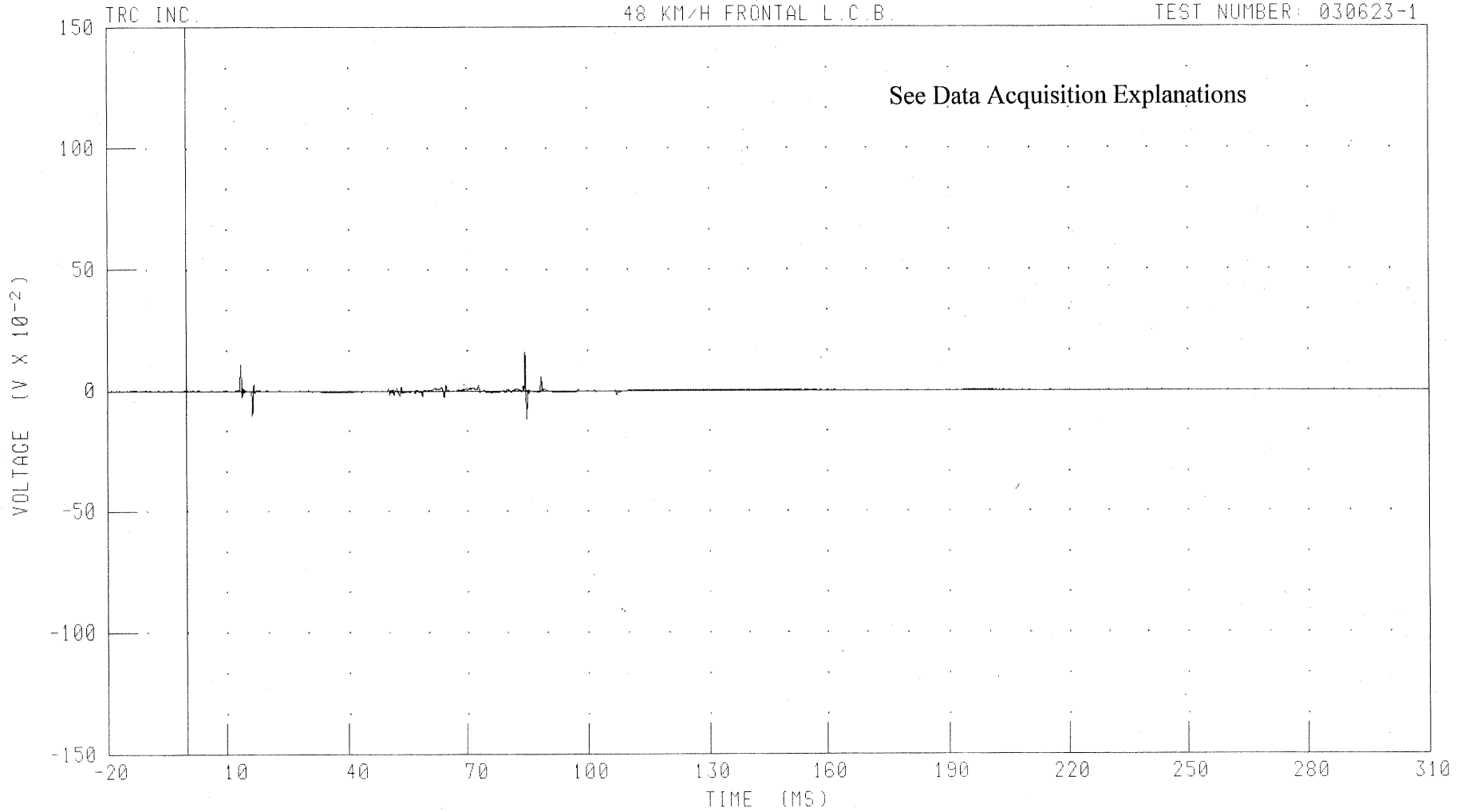
PEAK DATA: 0.58 V @ 13.36 MS, -0.41 V @ 13.68 MS

B-166

030623-1

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

TEST NUMBER: 030623-1



PEAK DATA 0.16 V @ 84.72 MS, -0.12 V @ 85.12 MS

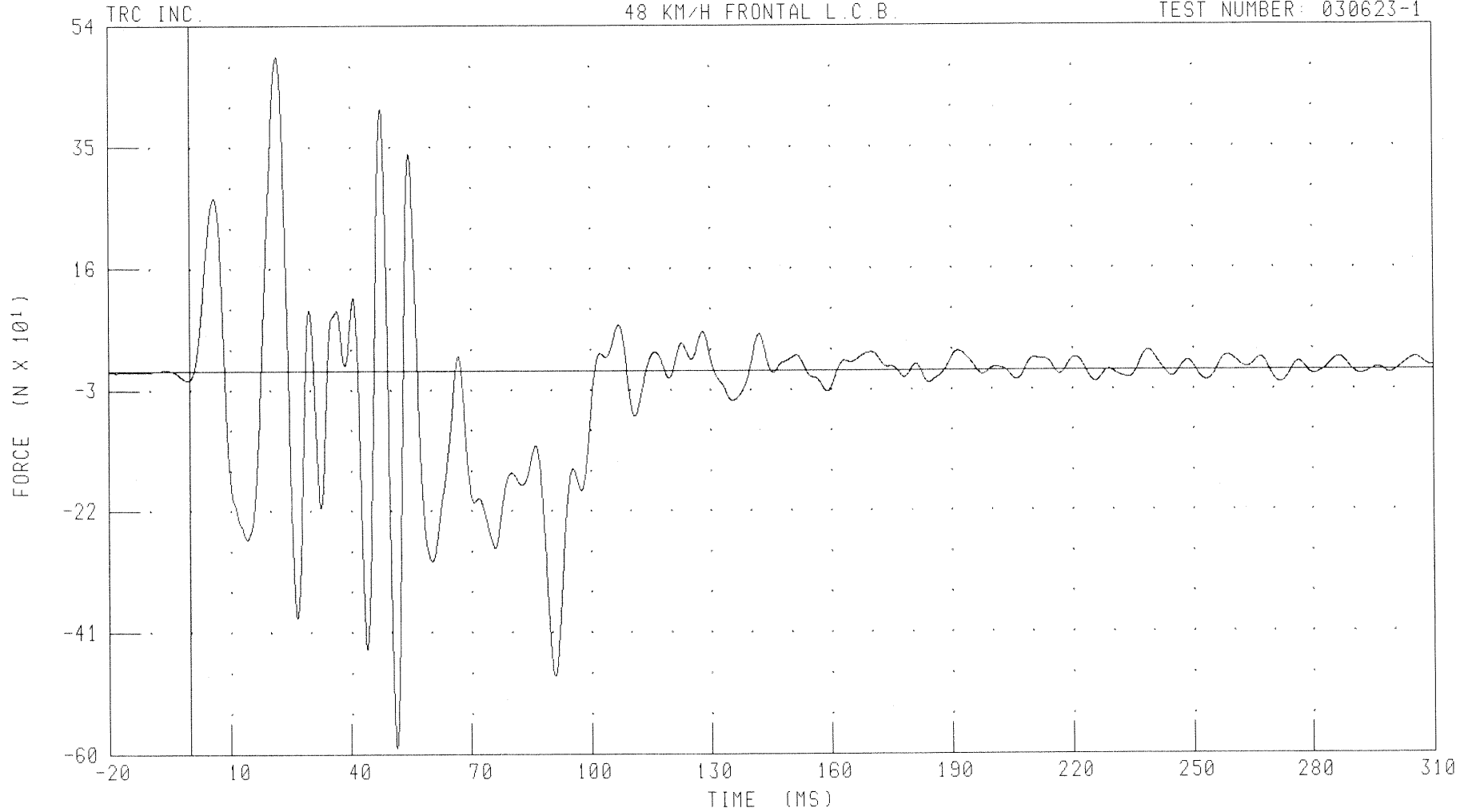
B-167

030623-1

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: 030623-1



CHANNEL: BA1F

FILTER: CH. CLASS 60

PEAK DATA: 491.83 N @ 21.92 MS; -590.22 N @ 51.36 MS

B-168

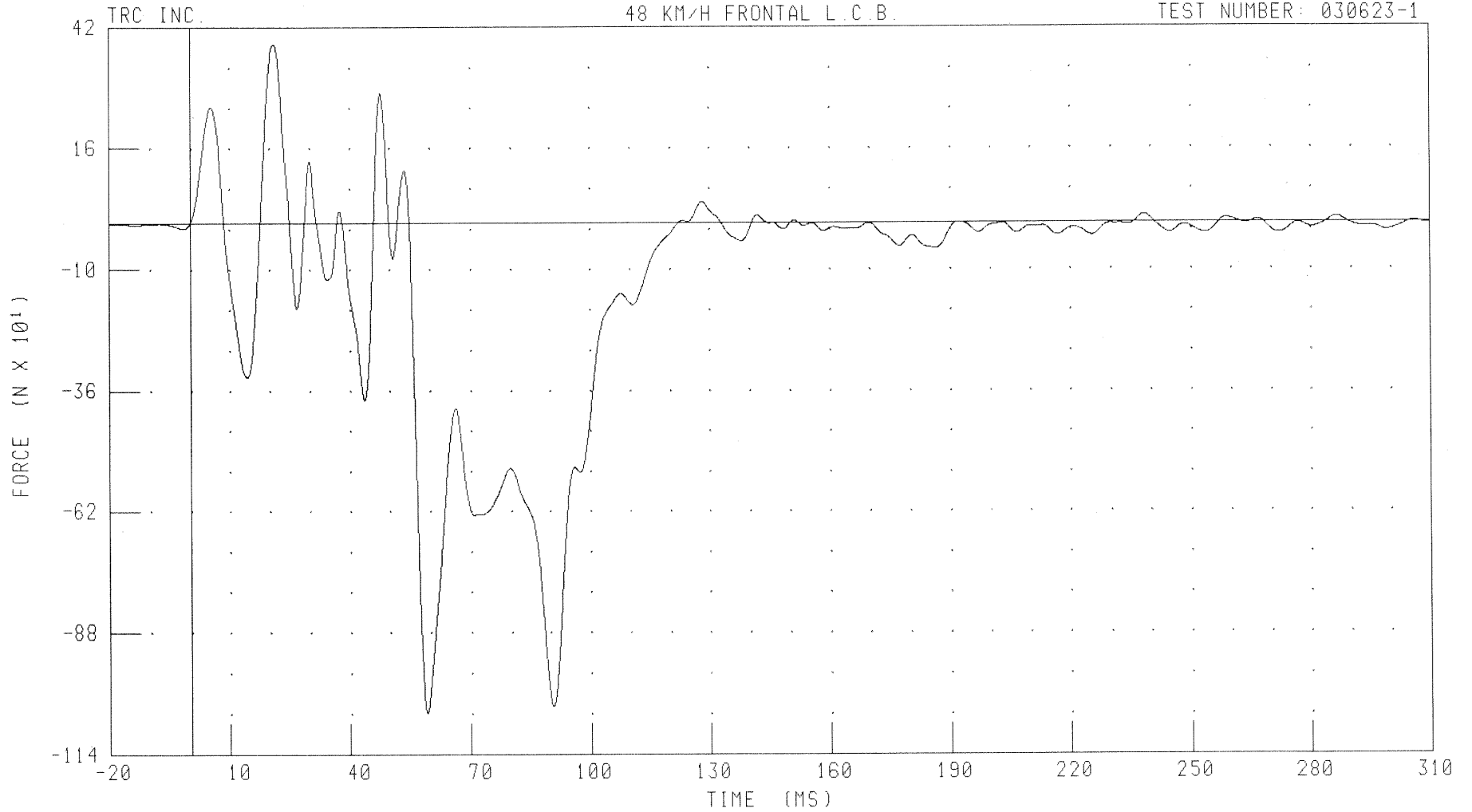
030623-1

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: 030623-1



CHANNEL: BA2F

FILTER: CH. CLASS 60

PEAK DATA: 384.02 N @ 21.28 MS; -1051.38 N @ 59.12 MS

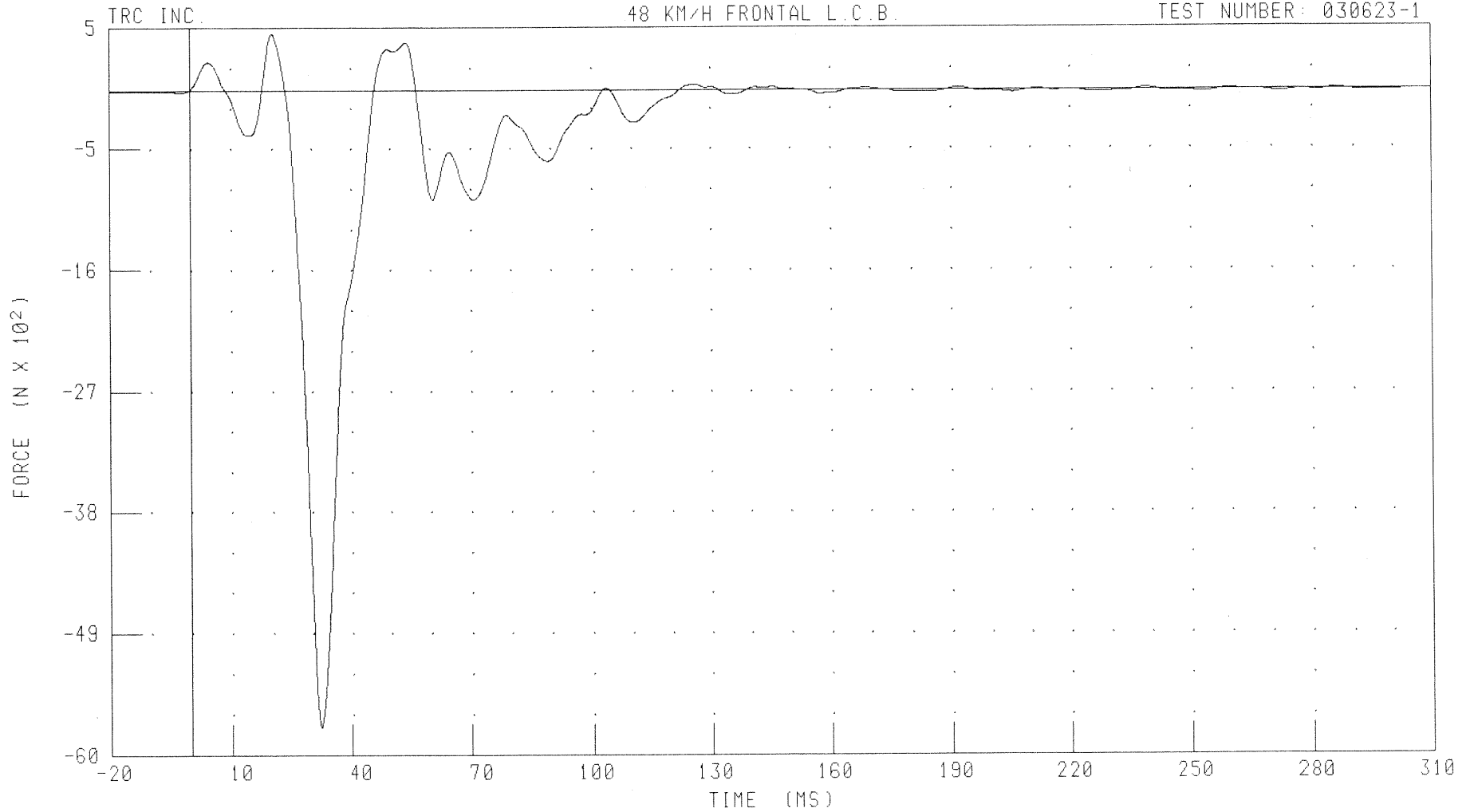
B-169

030623-1

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: 030623-1



CHANNEL: BA3F

FILTER: CH. CLASS 60

PEAK DATA: 519.46 N @ 20.16 MS; -5776.14 N @ 32.08 MS

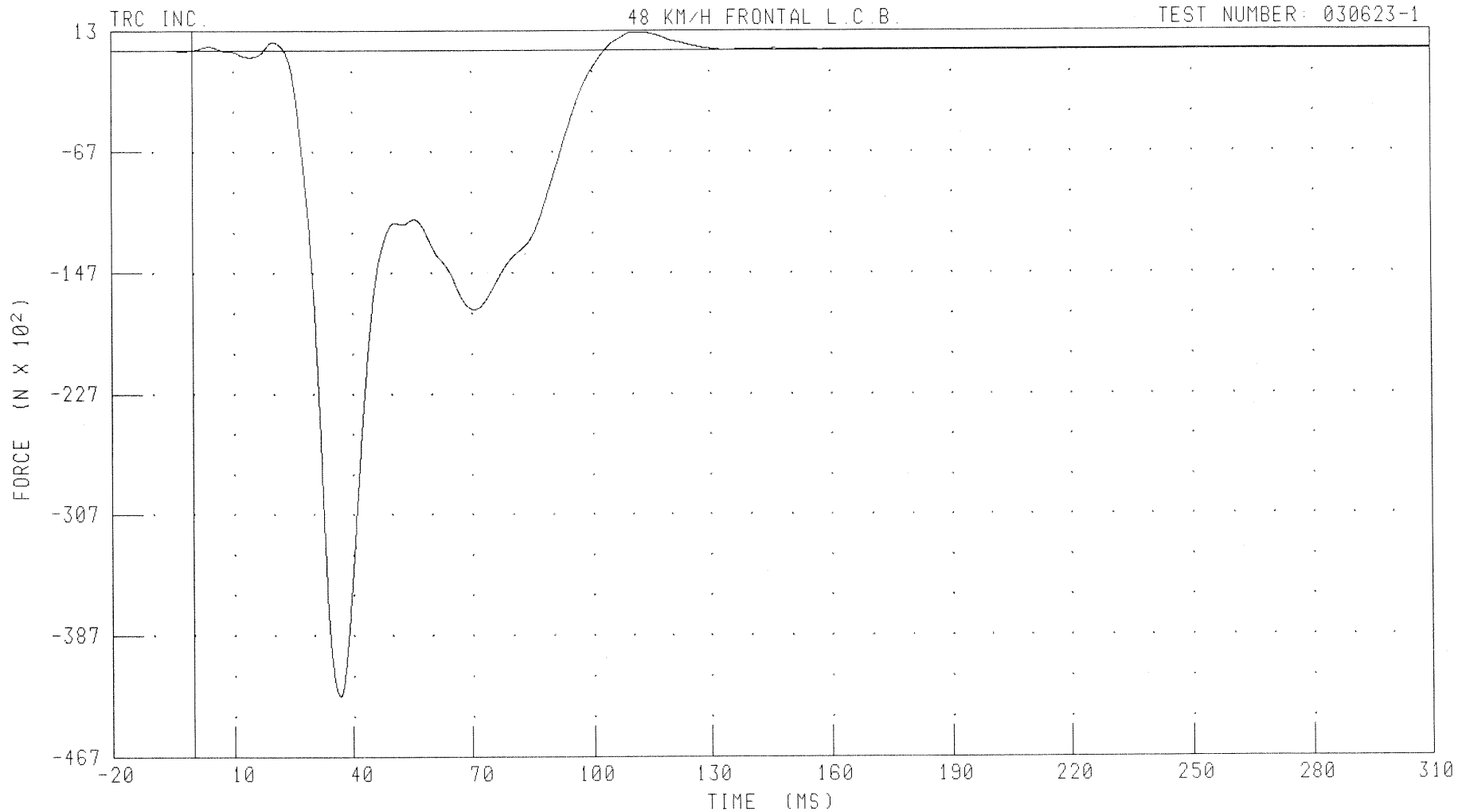
B-170

030623-1

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: 030623-1



CHANNEL: BA4F

FILTER: CH. CLASS 60

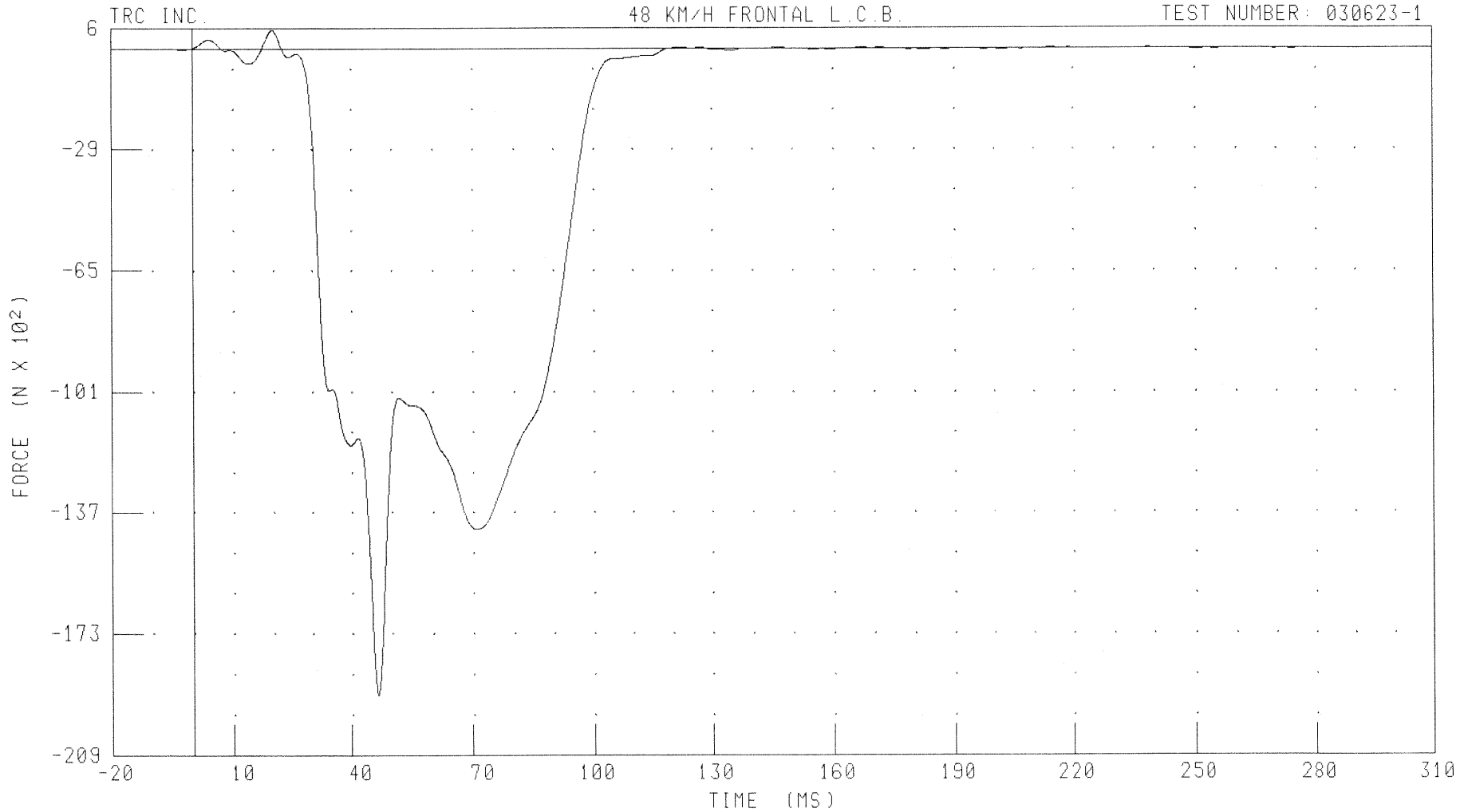
PEAK DATA: 1211.46 N @ 111.36 MS; -42729.49 N @ 36.72 MS

B-171

030623-1

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: 030623-1



CHANNEL: BA5F

FILTER: CH. CLASS 60

PEAK DATA: 560.48 N @ 19.92 MS; -19221.53 N @ 46.64 MS

B-172

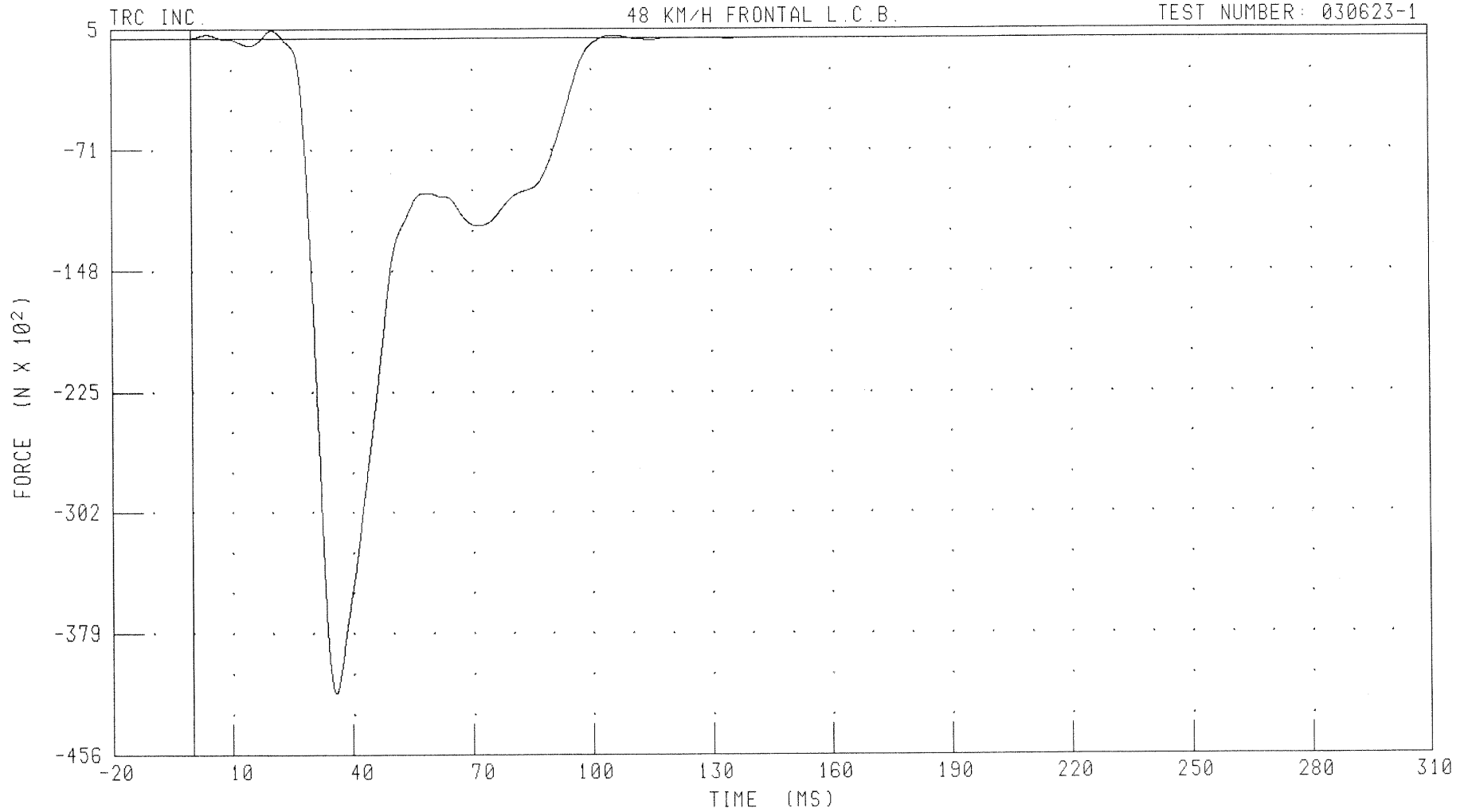
030623-1

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: 030623-1



CHANNEL: BA6F

FILTER: CH. CLASS 60

PEAK DATA: 538.40 N @ 20.32 MS; -41709.87 N @ 35.76 MS

B-173

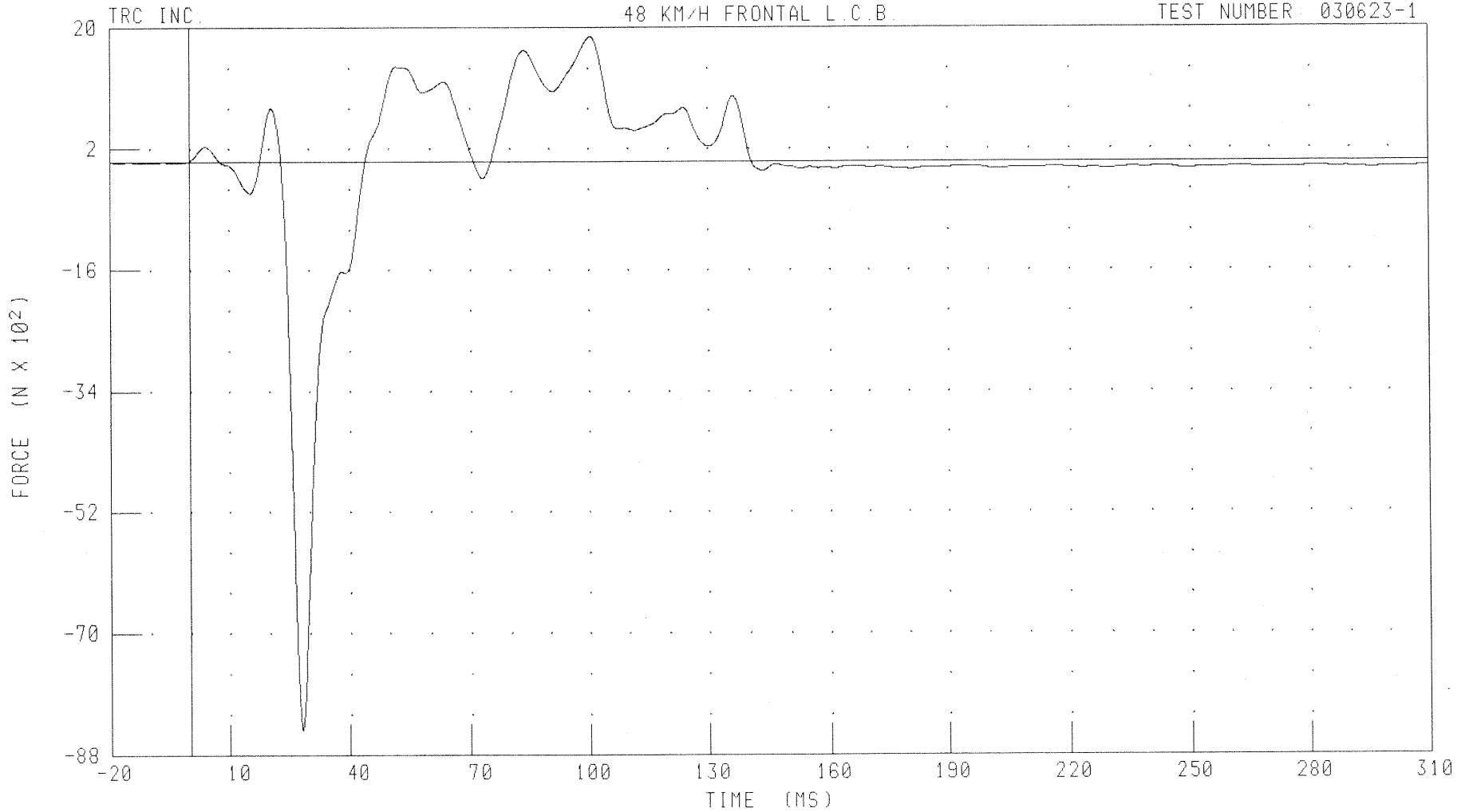
030623-1

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: 030623-1



CHANNEL: BA7F

FILTER: CH CLASS 60

PEAK DATA: 1869.33 N @ 100.72 MS; -8429.29 N @ 28.16 MS

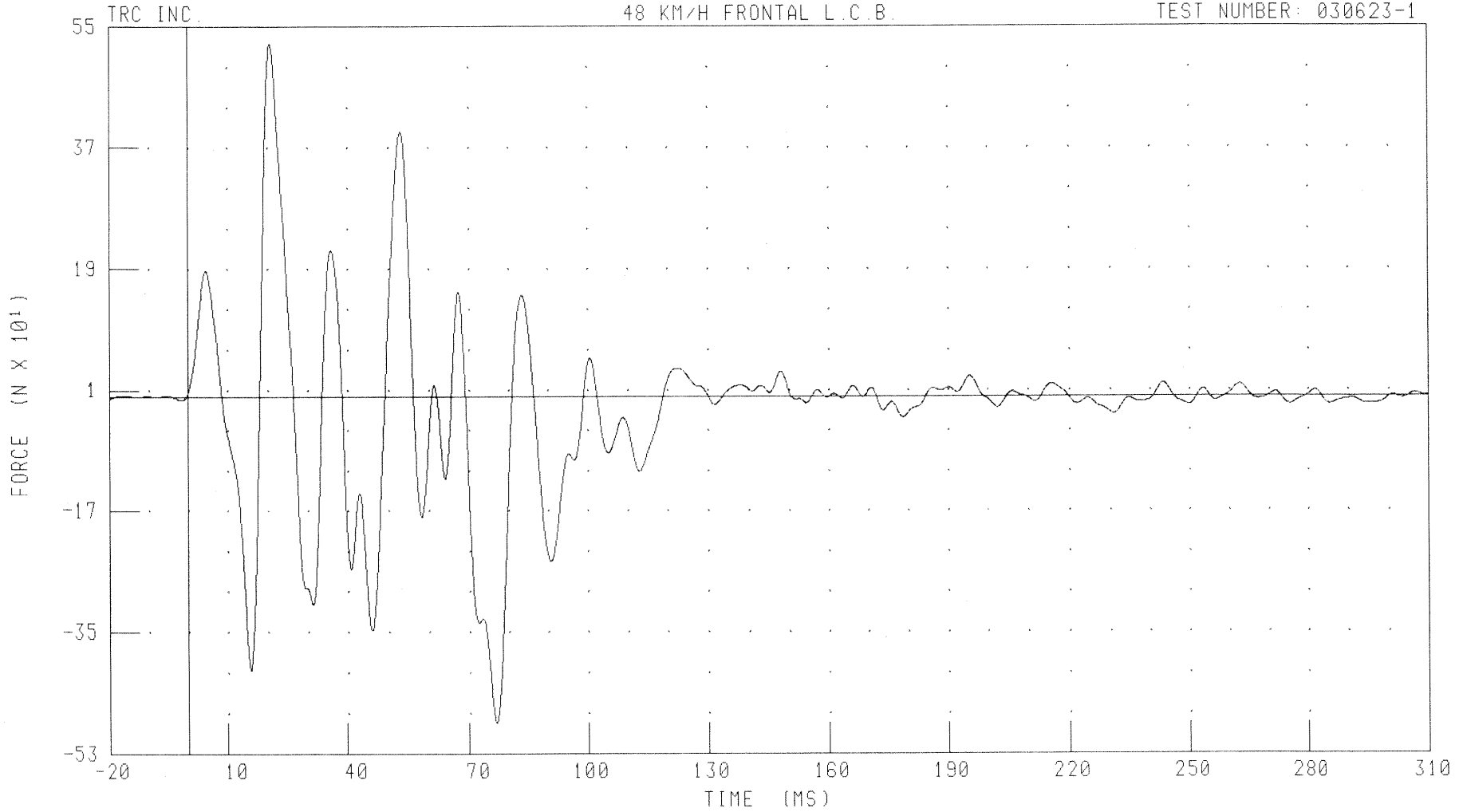
B-174

030623-1

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: 030623-1



CHANNEL: BA8F

FILTER: CH. CLASS 60

PEAK DATA: 524.67 N @ 20.72 MS; -485.23 N @ 76.88 MS

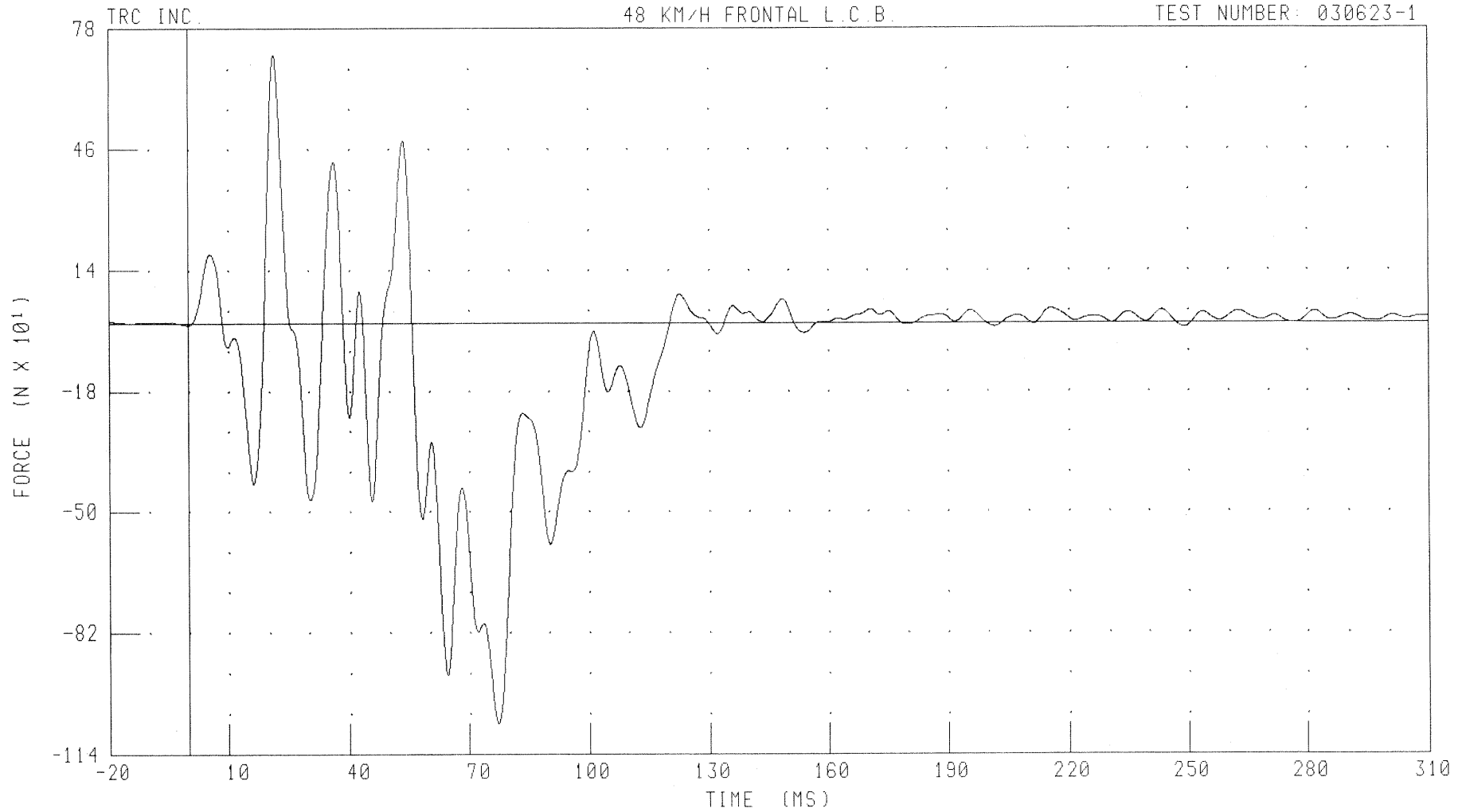
B-175

030623-1

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: 030623-1



CHANNEL: BA9F

FILTER: CH. CLASS 60

PEAK DATA: 711.11 N @ 21.52 MS; -1059.46 N @ 77.20 MS

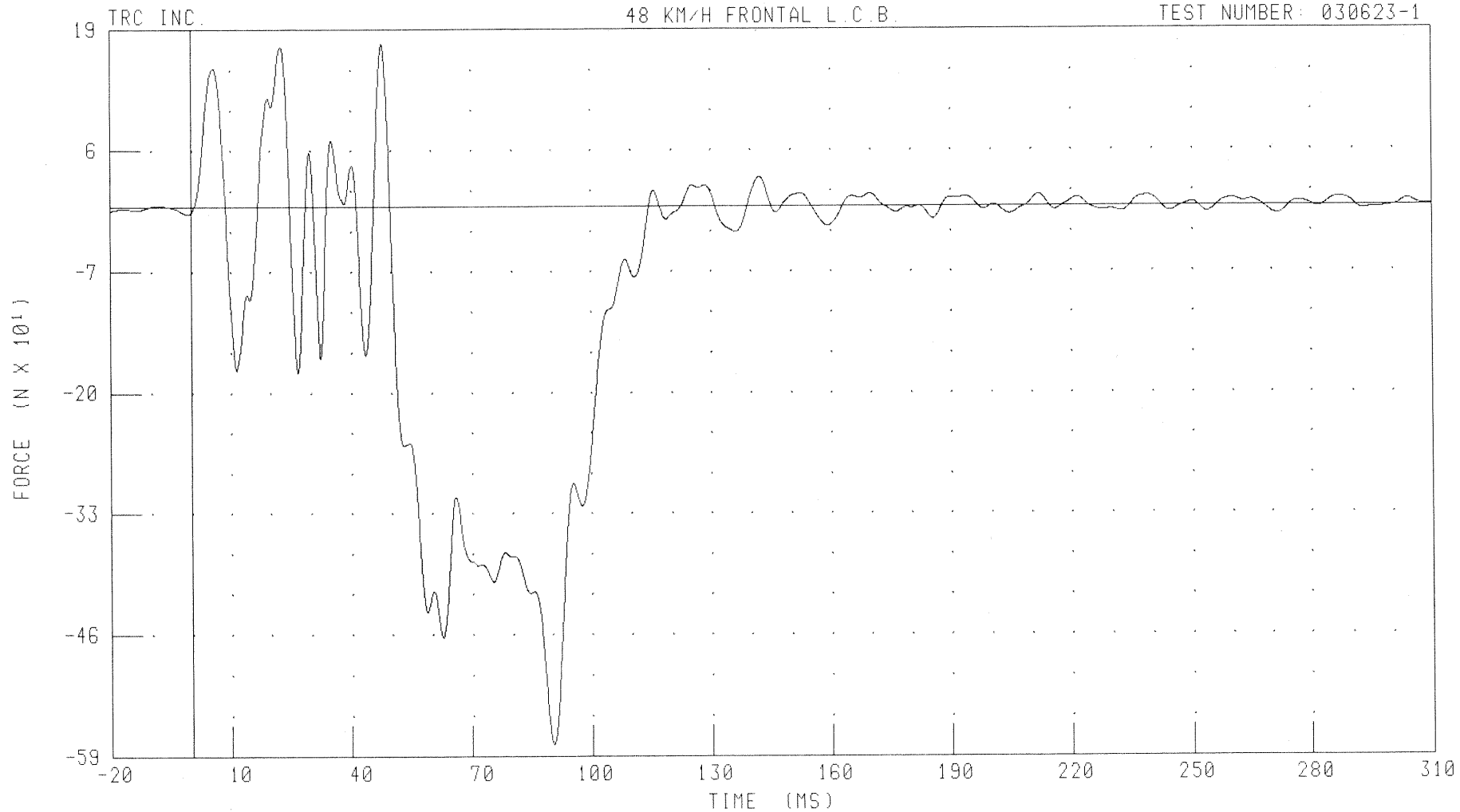
B-176

030623-1

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: 030623-1



CHANNEL: BB1F

FILTER: CH. CLASS 60

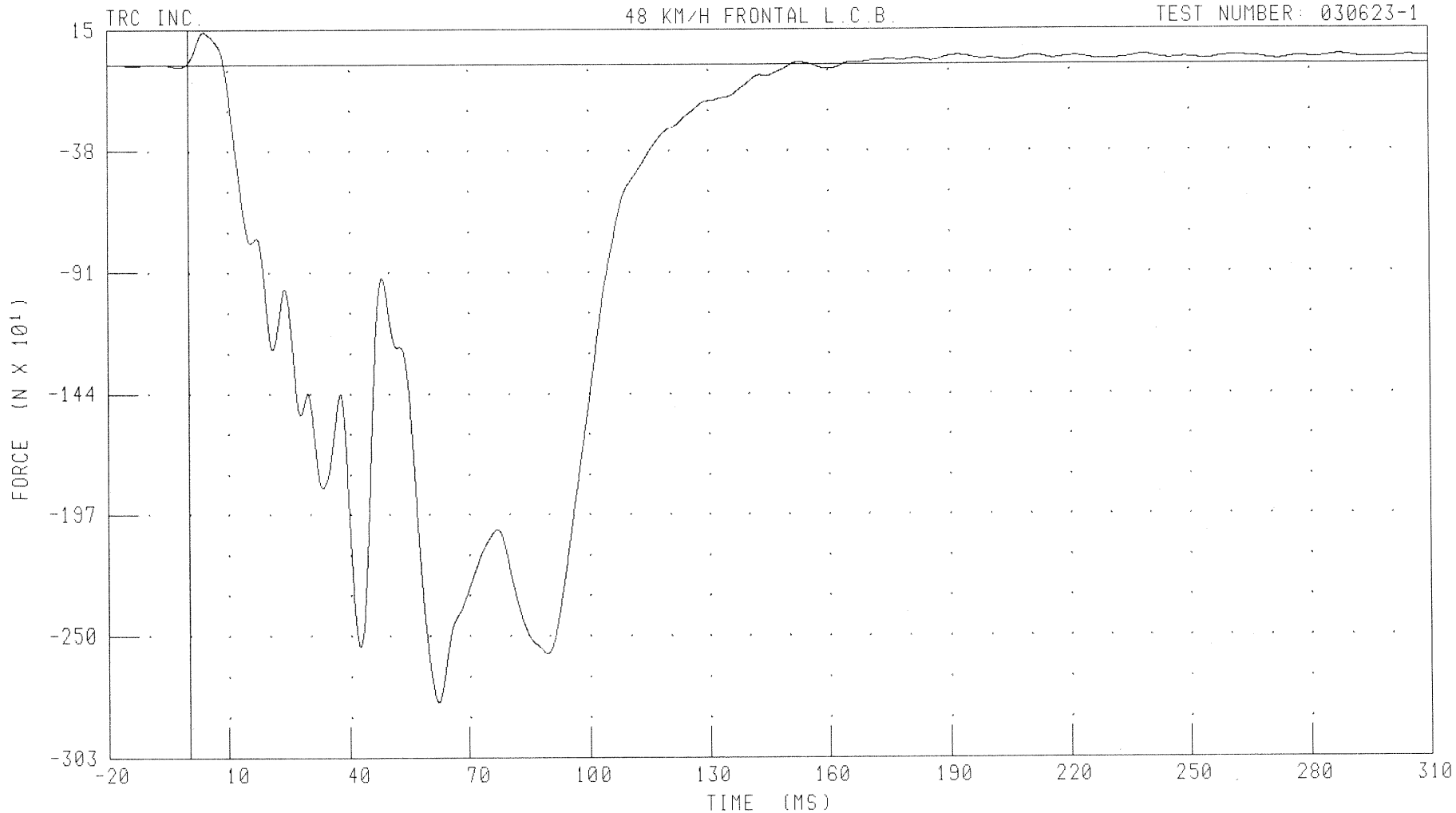
PEAK DATA: 174.45 N @ 47.84 MS, -577.92 N @ 90.24 MS

B-177

030623-1

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: 030623-1



CHANNEL: BB2F

FILTER: CH. CLASS 60

PEAK DATA: 140.33 N @ 4.16 MS; -278.94 N @ 62.24 MS

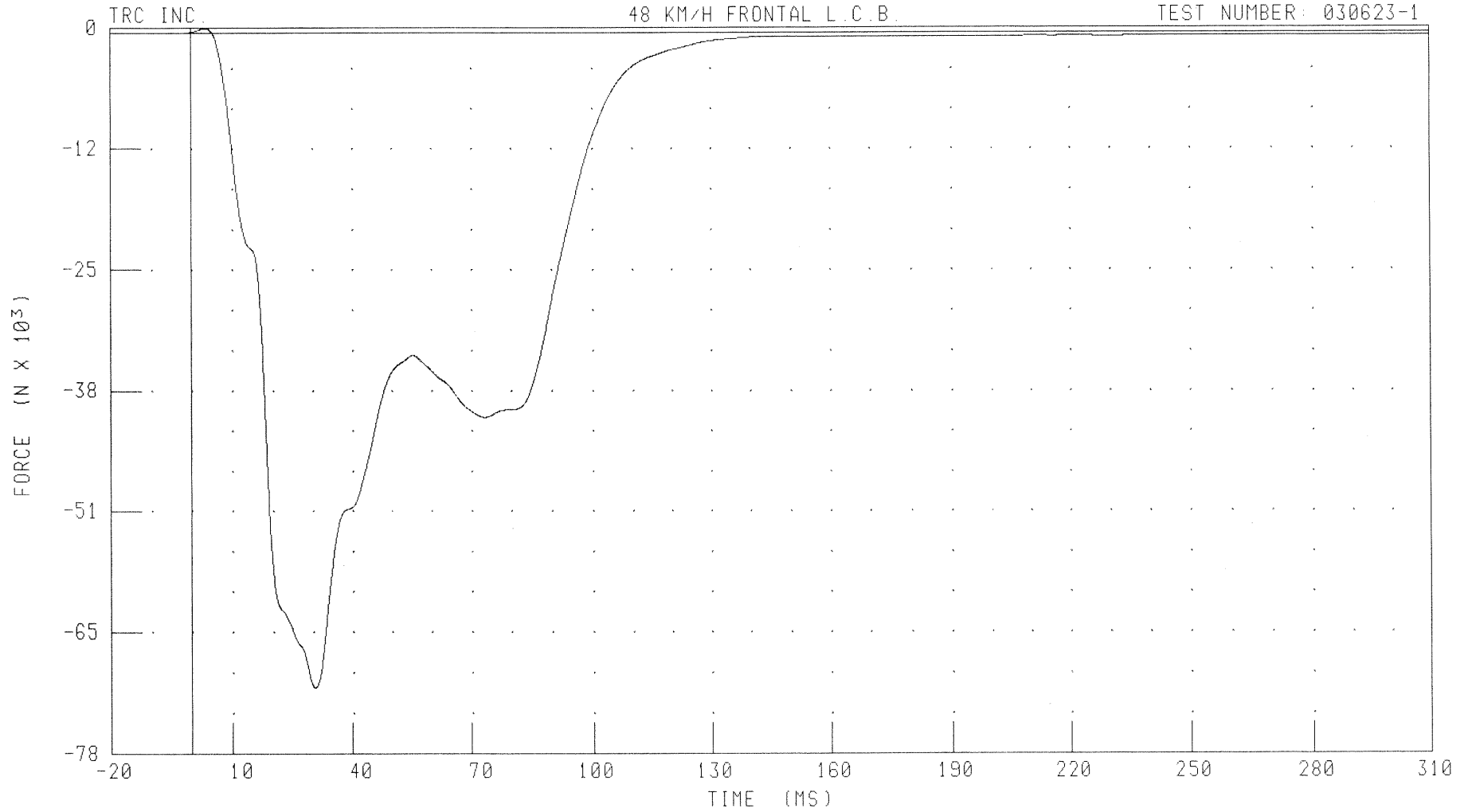
B-178

030623-1

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: 030623-1



CHANNEL: BB3F

FILTER: CH. CLASS 60

PEAK DATA: 463.25 N @ 3.52 MS, -71036.54 N @ 30.56 MS

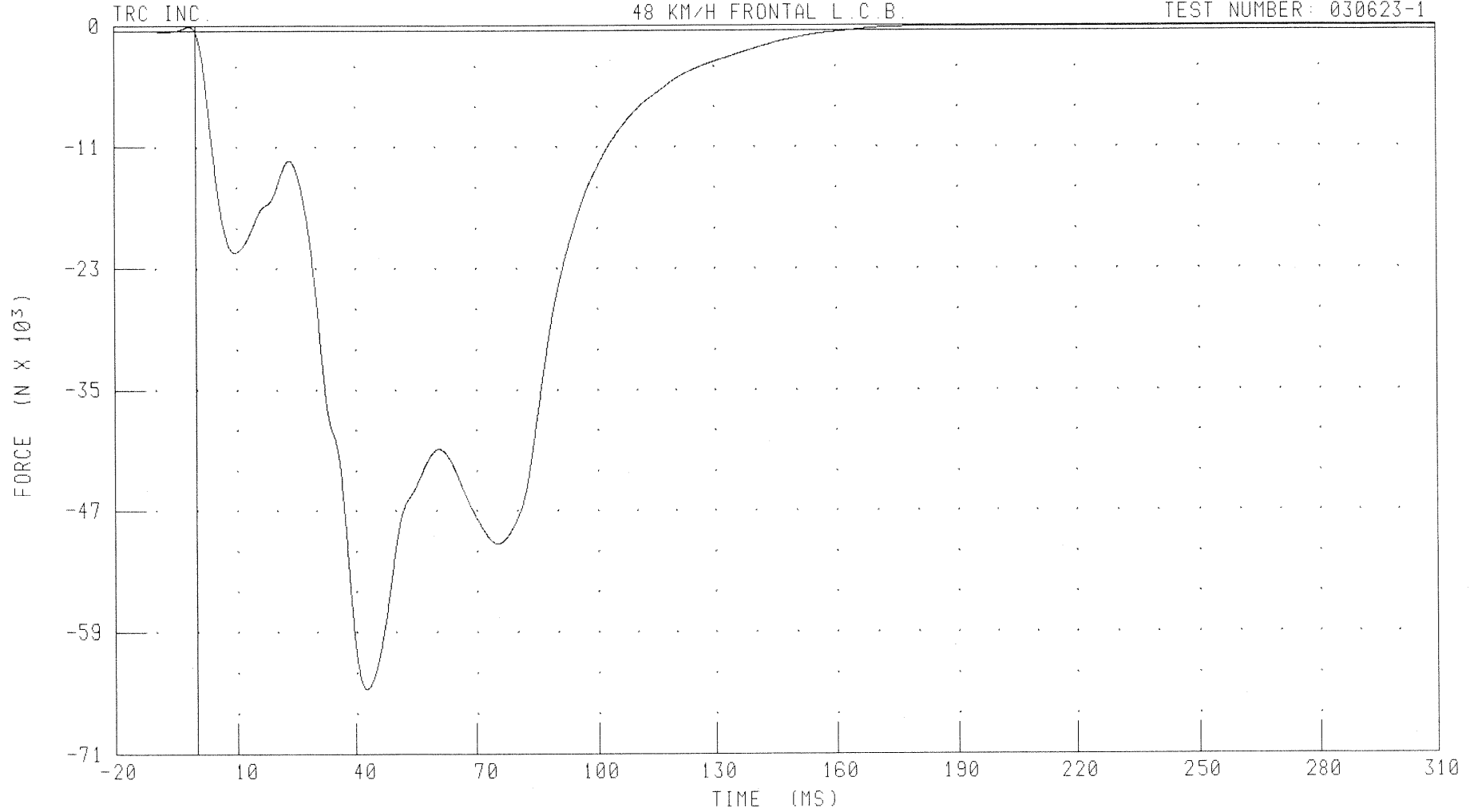
B-179

030623-1

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: 030623-1



CHANNEL: BB4F

FILTER: CH. CLASS 60

PEAK DATA: 476.51 N @ 191.04 MS; -65097.25 N @ 42.64 MS

B-180

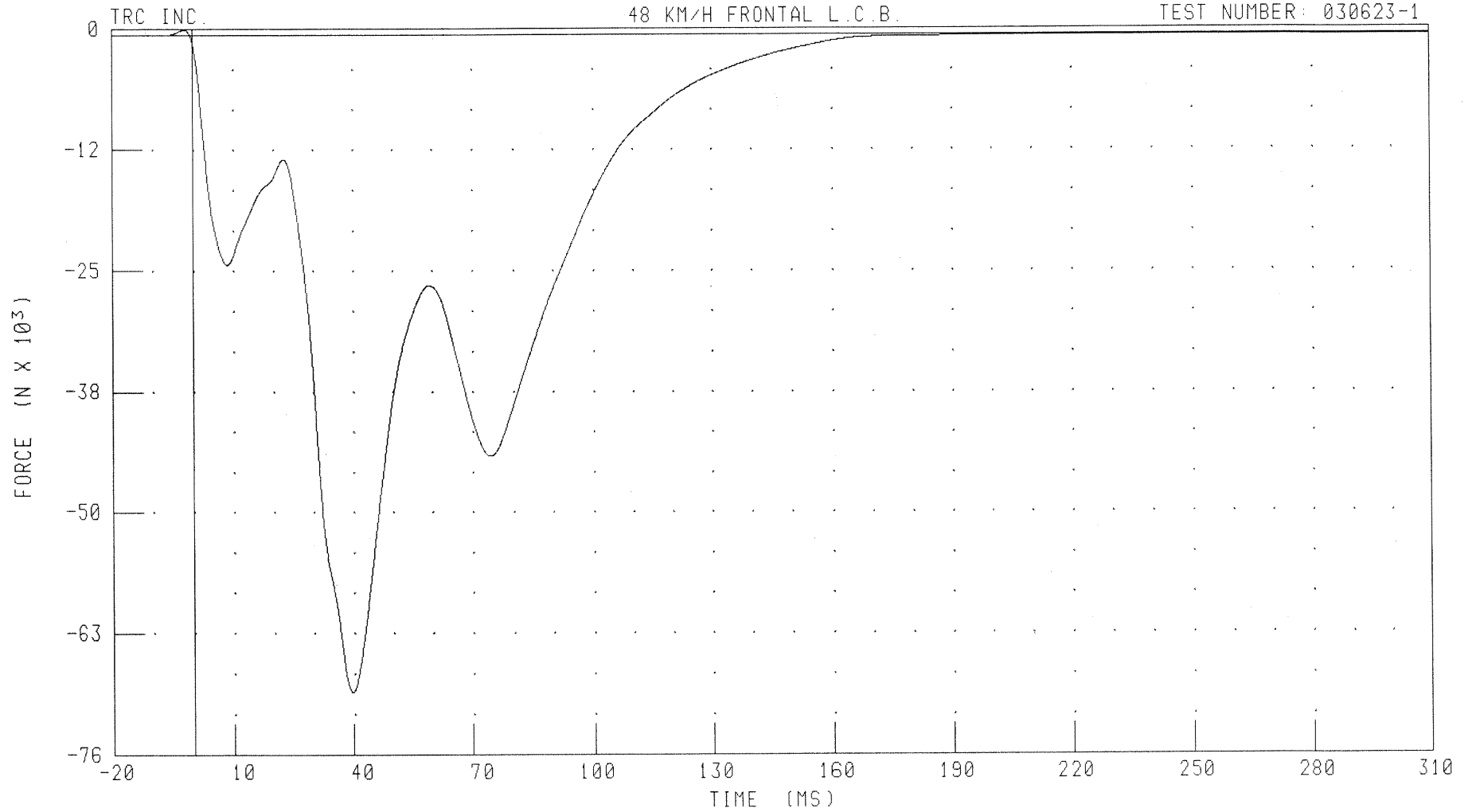
030623-1

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: 030623-1



CHANNEL: BB5F

FILTER: CH. CLASS 60

PEAK DATA: 573.76 N @ -2.08 MS, -70162.26 N @ 39.68 MS

B-181

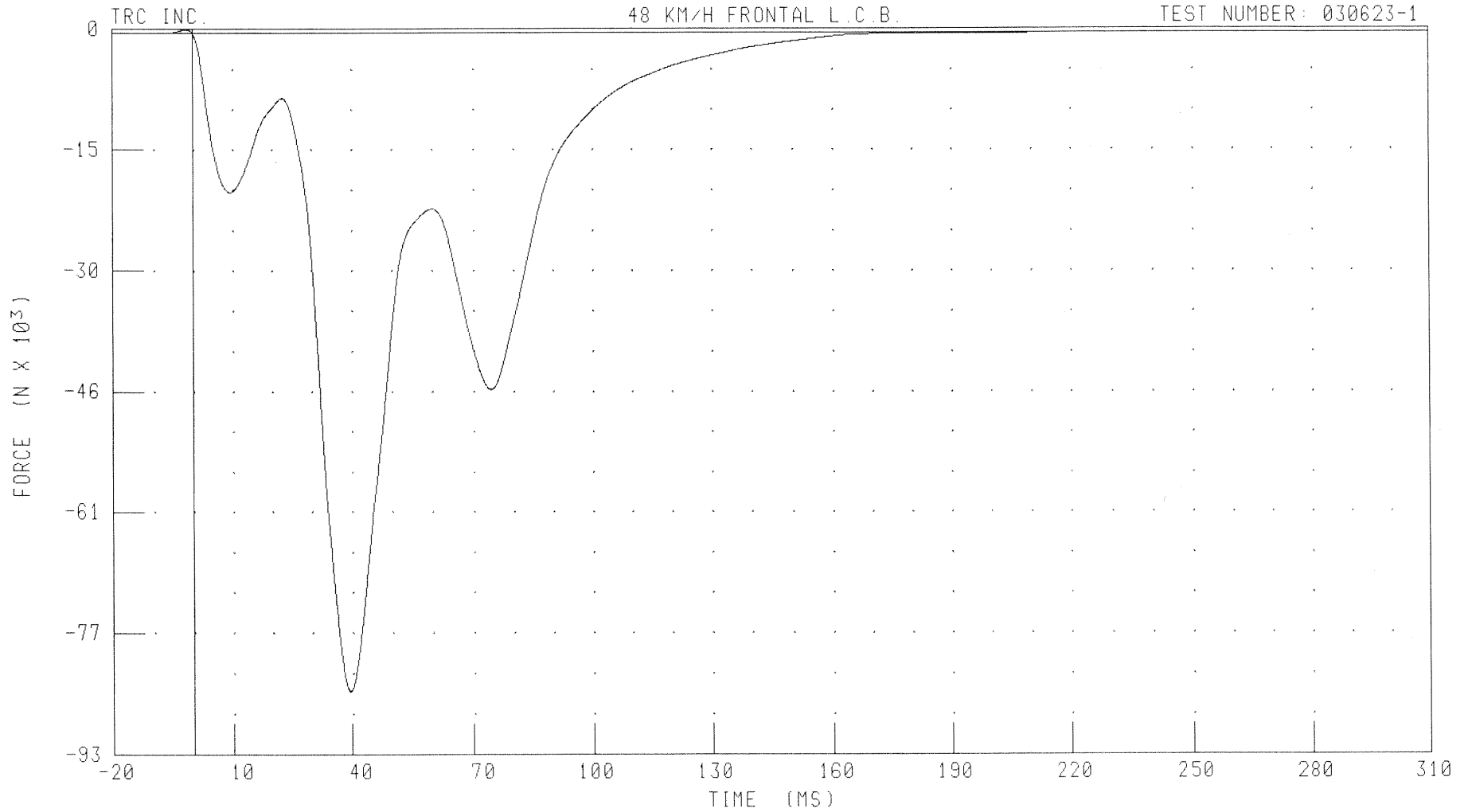
030623-1

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: 030623-1



CHANNEL: BB6F FILTER: CH. CLASS 60

PEAK DATA: 435.61 N @ -1.52 MS; -85034.95 N @ 39.52 MS

B-182

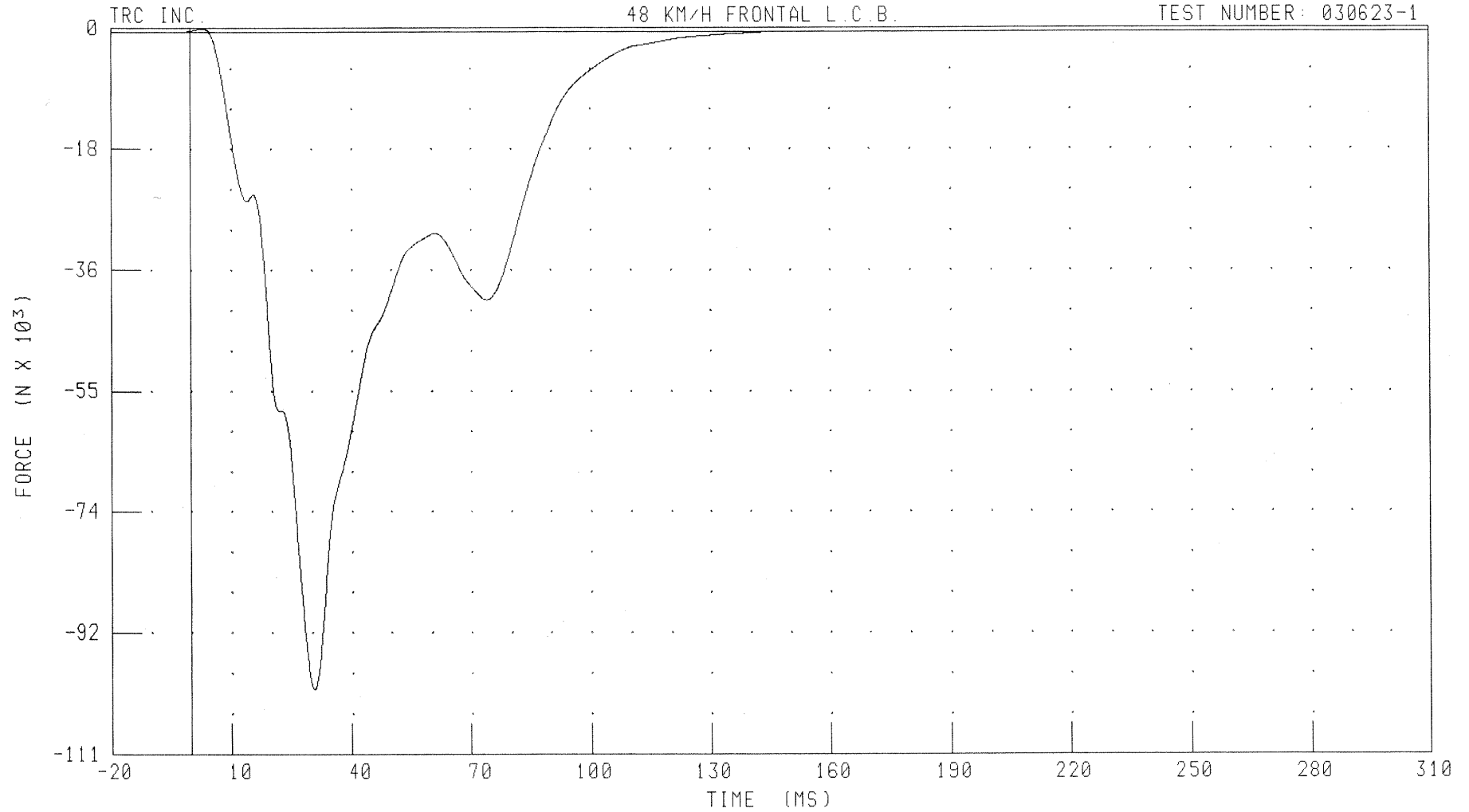
030623-1

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: 030623-1



CHANNEL: BB7F

FILTER: CH. CLASS 60

PEAK DATA: 496.68 N @ 2.96 MS; -101740.42 N @ 30.64 MS

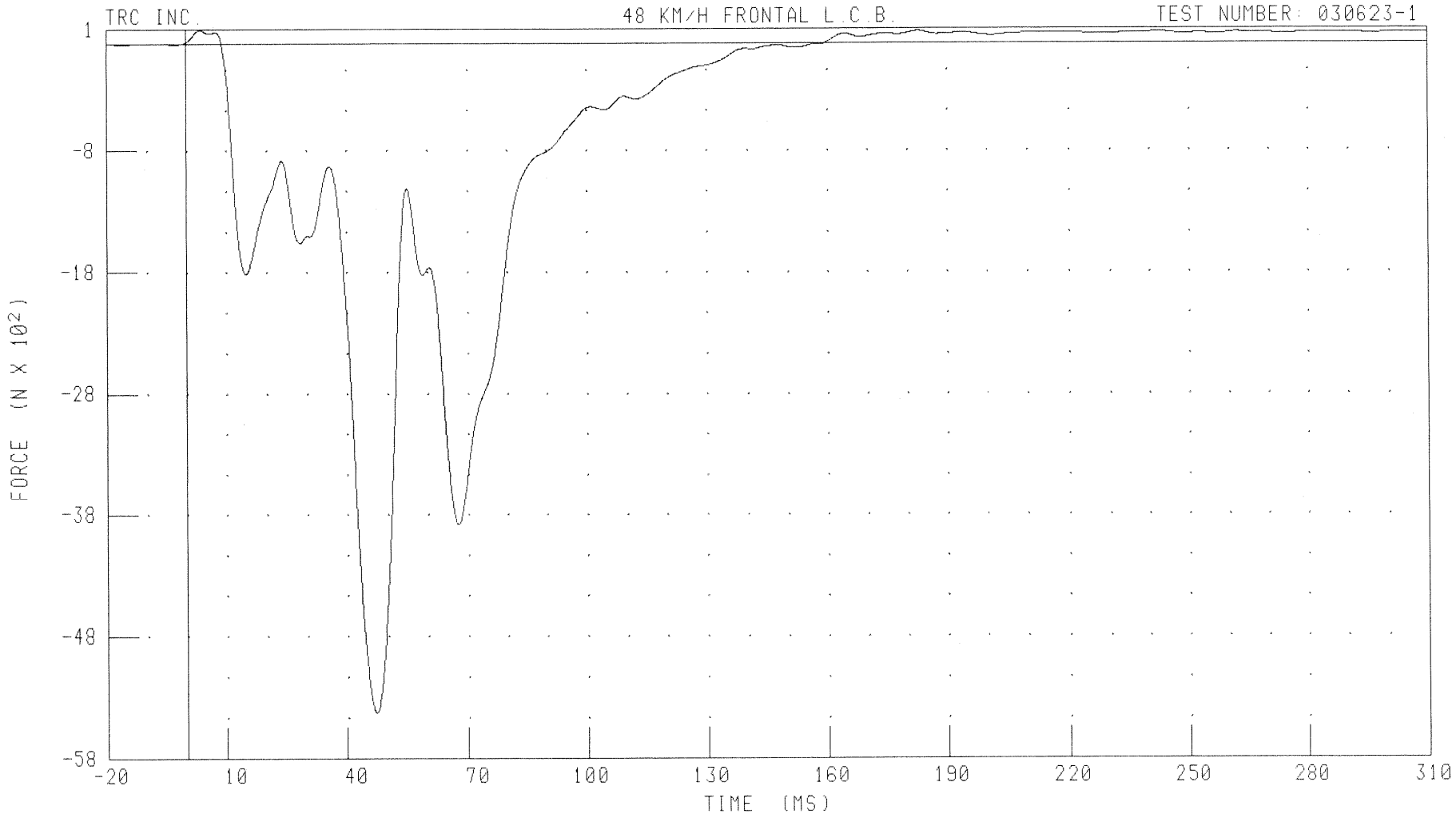
B-183

030623-1

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: 030623-1



CHANNEL: BB8F

FILTER: CH. CLASS 60

PEAK DATA: 115.84 N @ 3.52 MS; -5507.43 N @ 47.20 MS

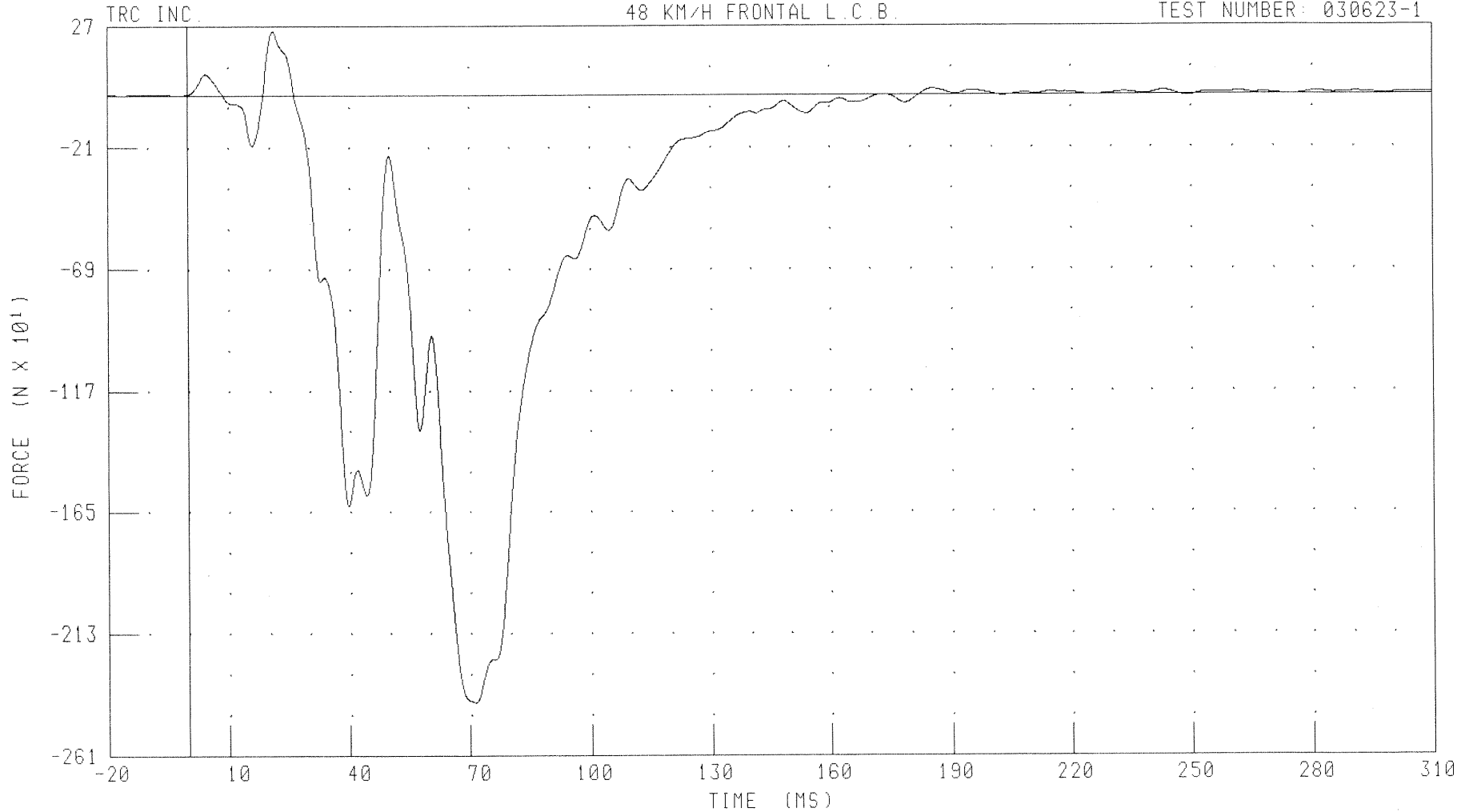
B-184

030623-1

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: 030623-1



CHANNEL: BB9F

FILTER: CH CLASS 60

PEAK DATA: 250.87 N @ 21.12 MS; -2401.84 N @ 71.28 MS

B-185

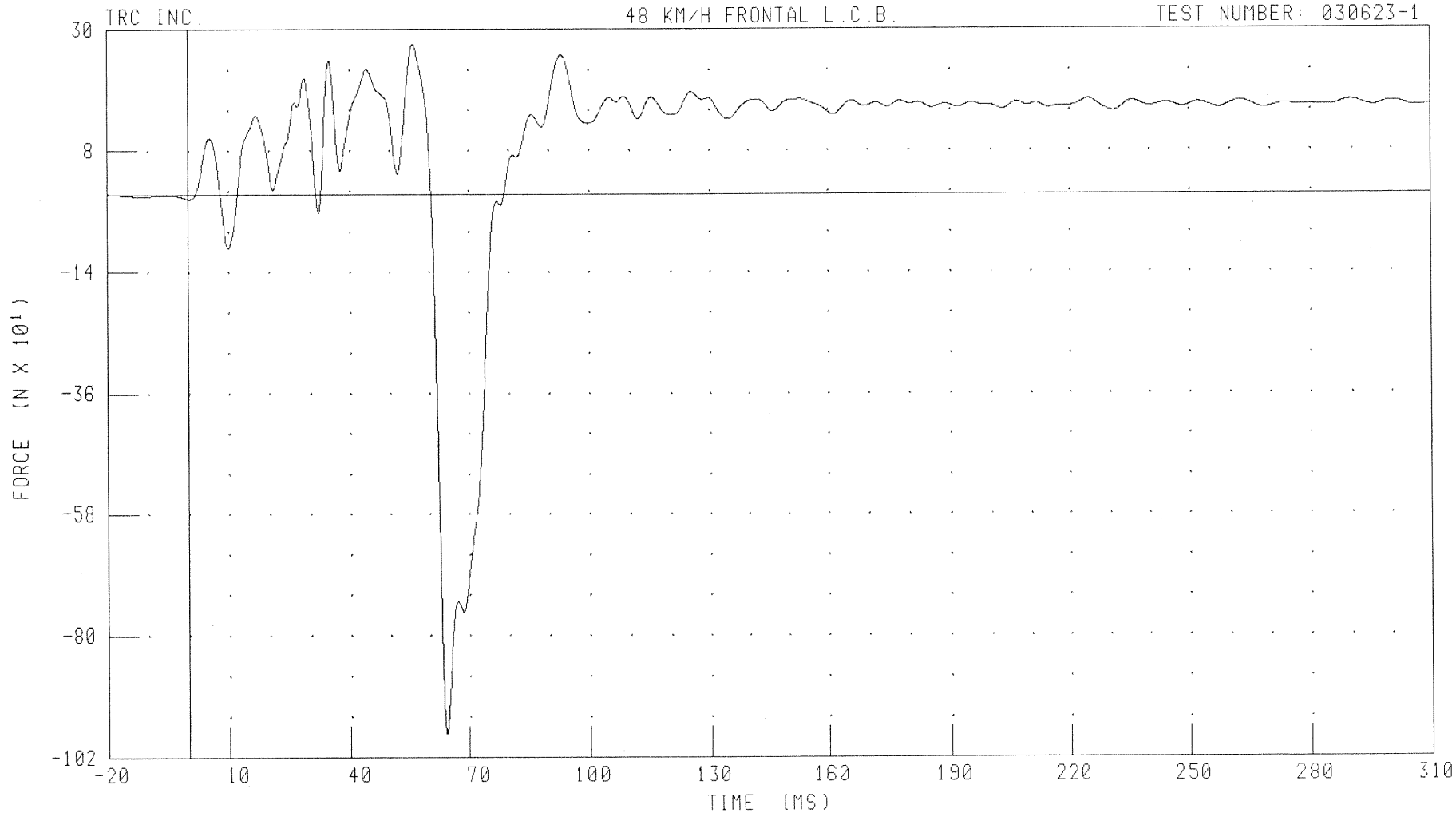
030623-1

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: 030623-1



CHANNEL: BC1F

FILTER: CH. CLASS 60

PEAK DATA: 273.13 N @ 56.08 MS, -978.05 N @ 64.16 MS

B-186

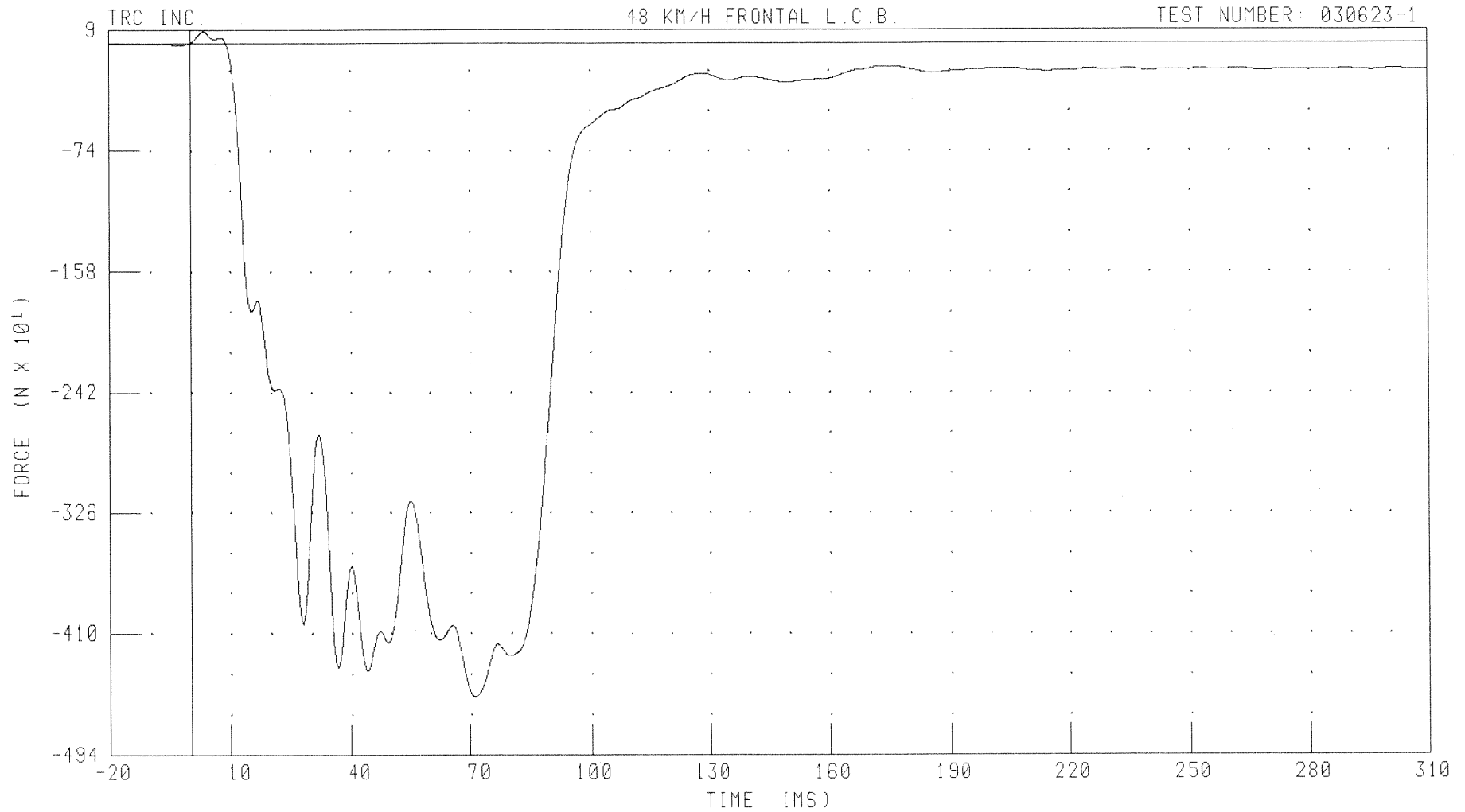
030623-1

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: 030623-1



CHANNEL: BC2F

FILTER: CH. CLASS 60

PEAK DATA: 85.67 N @ 3.44 MS; -454.85 N @ 71.20 MS

B-187

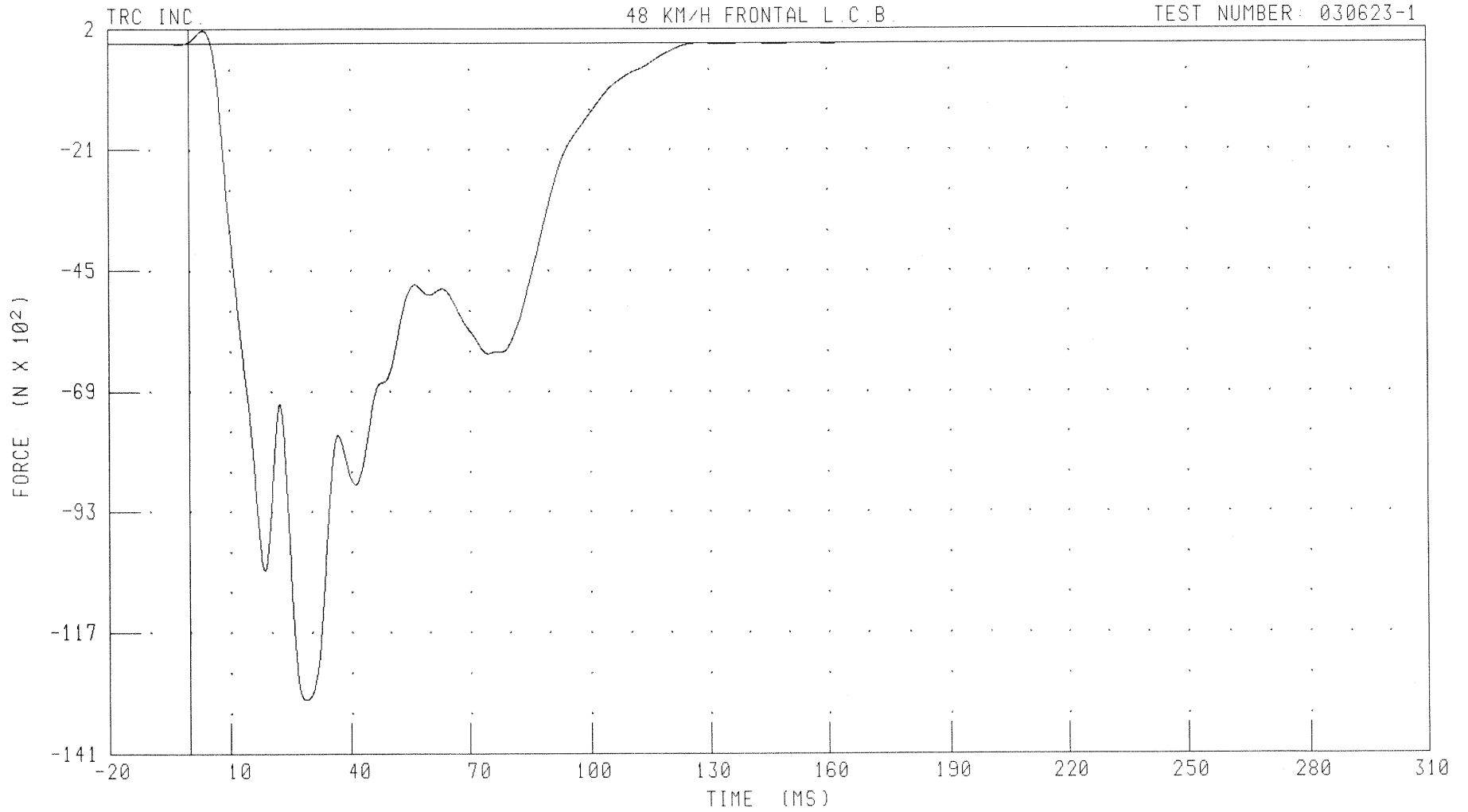
030623-1

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: 030623-1



CHANNEL: BC3F

FILTER: CH. CLASS 60

PEAK DATA: 246.51 N @ 3.44 MS, -13057.23 N @ 28.32 MS

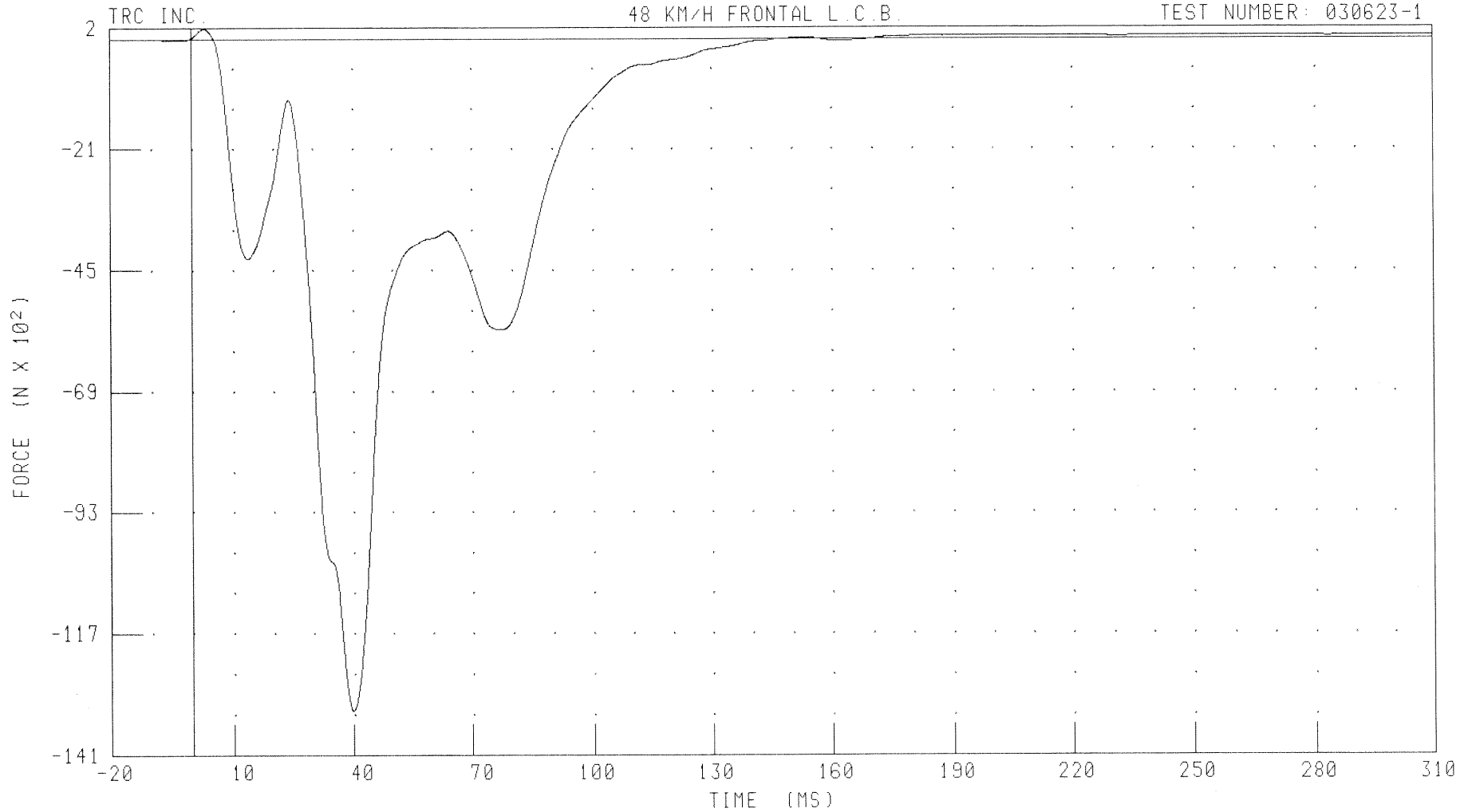
B-188

030623-1

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: 030623-1



CHANNEL: BC4F

FILTER: CH. CLASS 60

PEAK DATA: 207.79 N @ 3.04 MS, -13306.98 N @ 39.84 MS

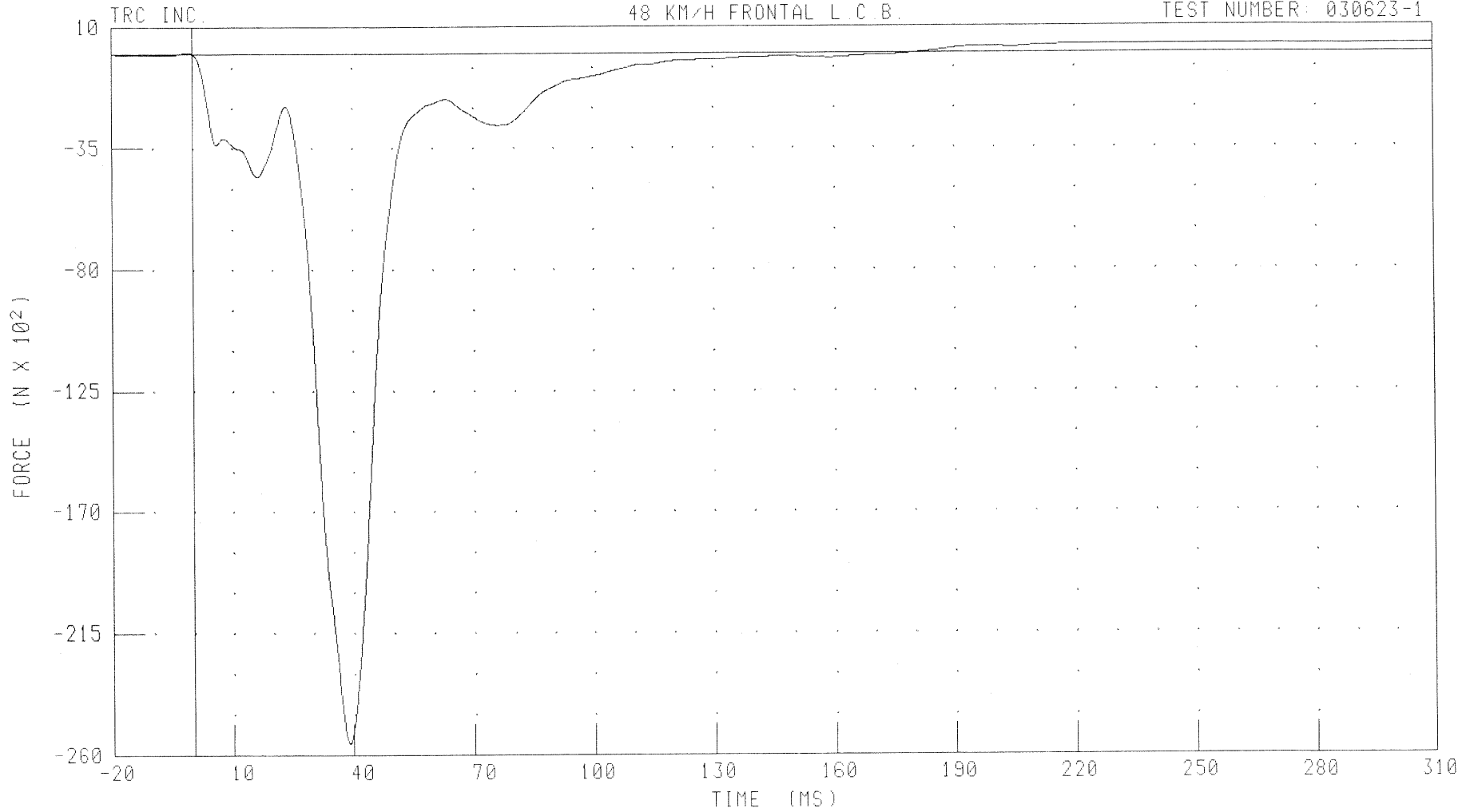
B-189

030623-1

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: 030623-1



CHANNEL: BC5F

FILTER: CH CLASS 60

PEAK DATA: 339.72 N @ 235.84 MS; -255.78 N @ 39.04 MS

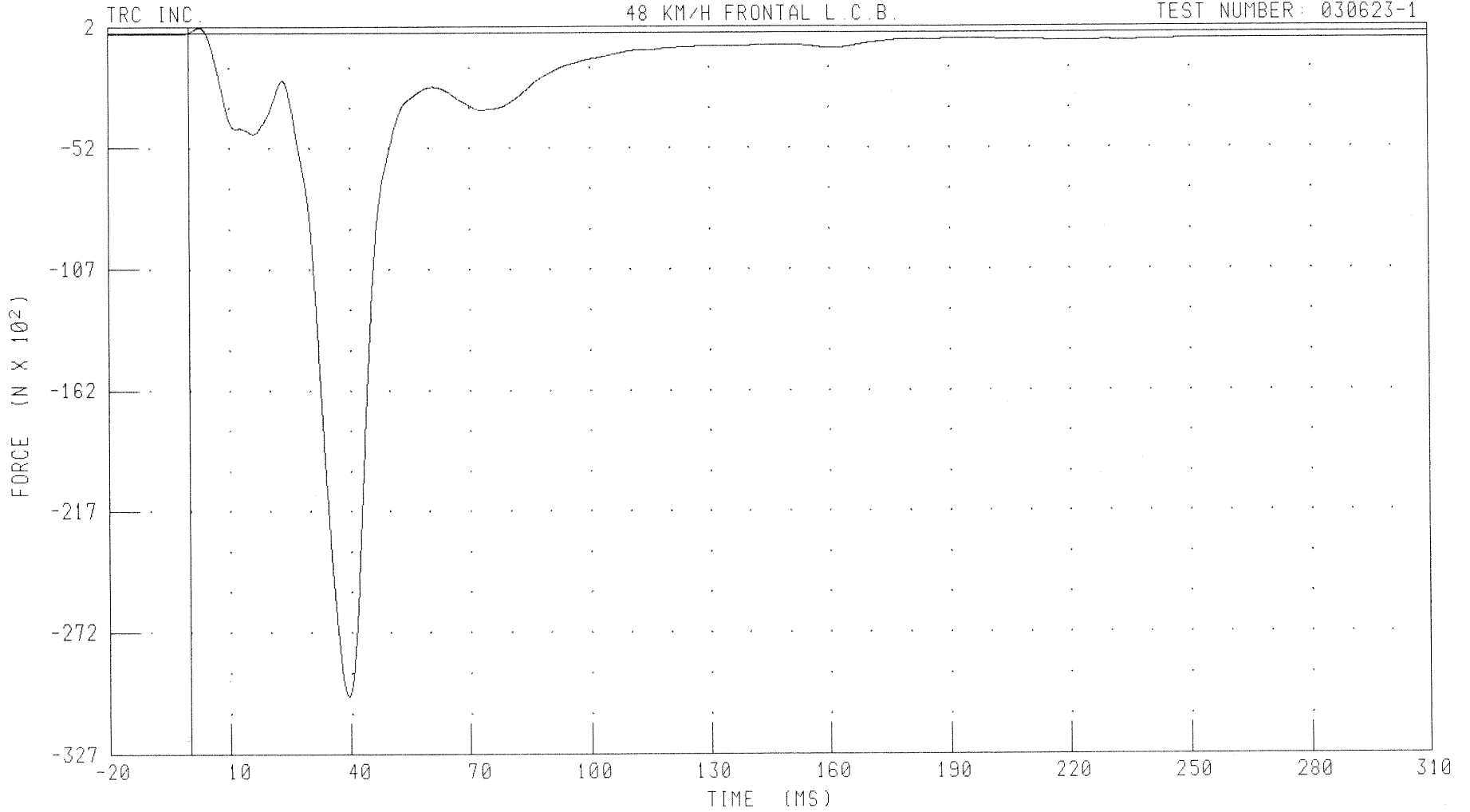
B-190

030623-1

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: 030623-1



CHANNEL: BC6F

FILTER: CH. CLASS 60

PEAK DATA: 268.24 N @ 2.80 MS, -301.14 N @ 39.44 MS

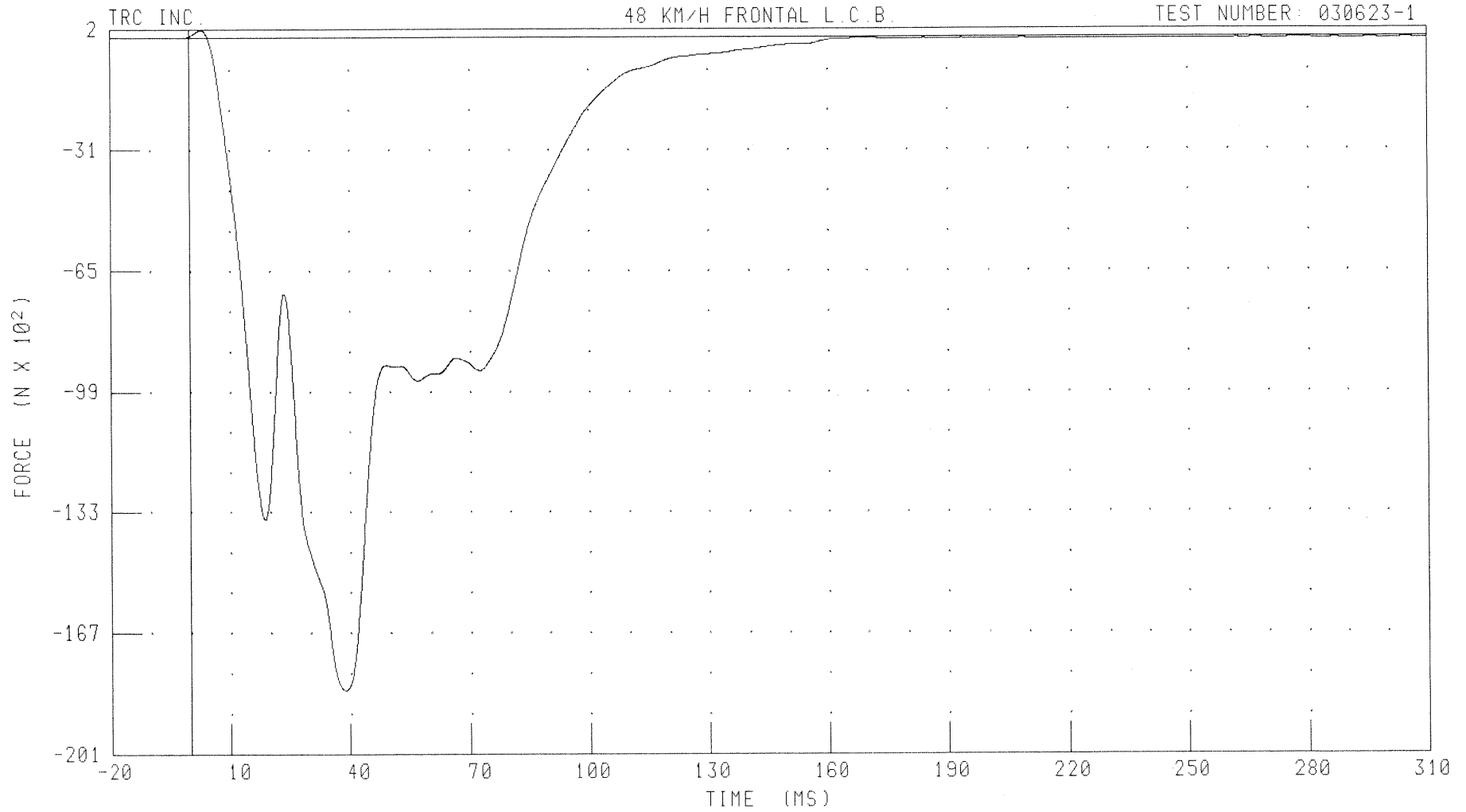
B-191

030623-1

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: 030623-1



CHANNEL: BC7F

FILTER: CH. CLASS 60

PEAK DATA: 207.64 N @ 2.96 MS; -18393.29 N @ 38.88 MS

B-192

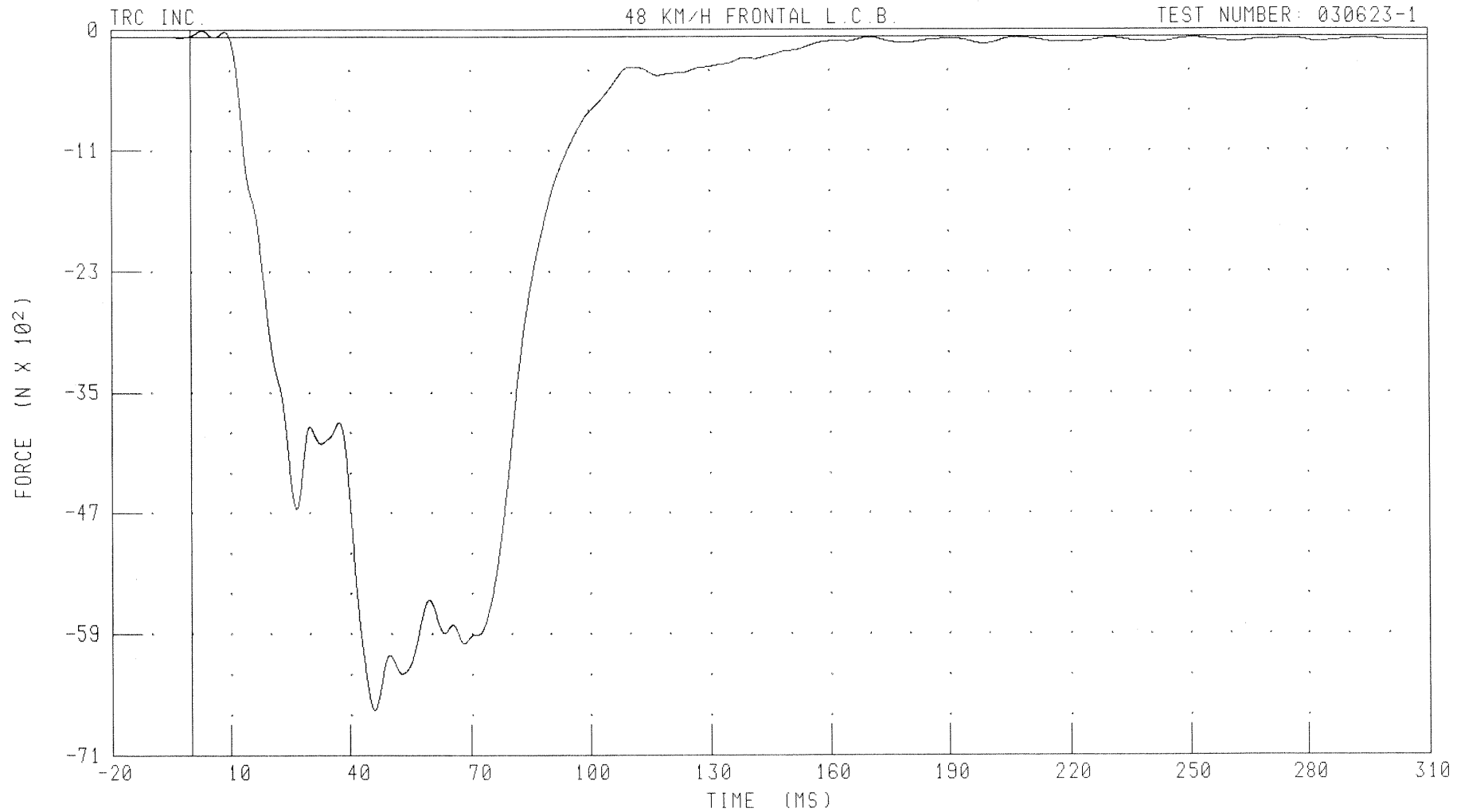
030623-1

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: 030623-1



CHANNEL: BC8F

FILTER: CH. CLASS 60

PEAK DATA: 63.08 N @ 3.04 MS; -66.85 66 N @ 45.92 MS

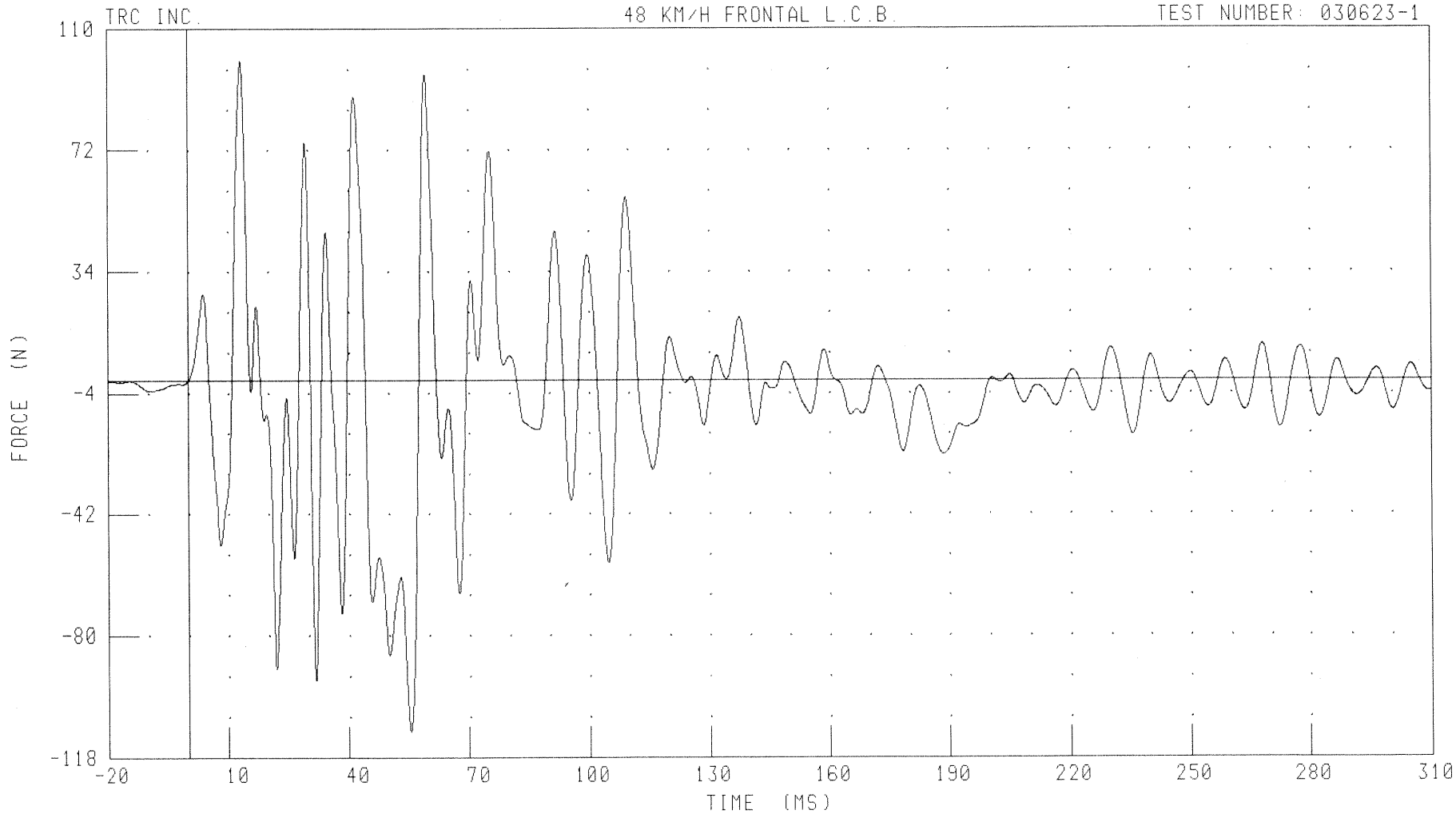
B-193

030623-1

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: 030623-1



CHANNEL: BC9F

FILTER: CH. CLASS 60

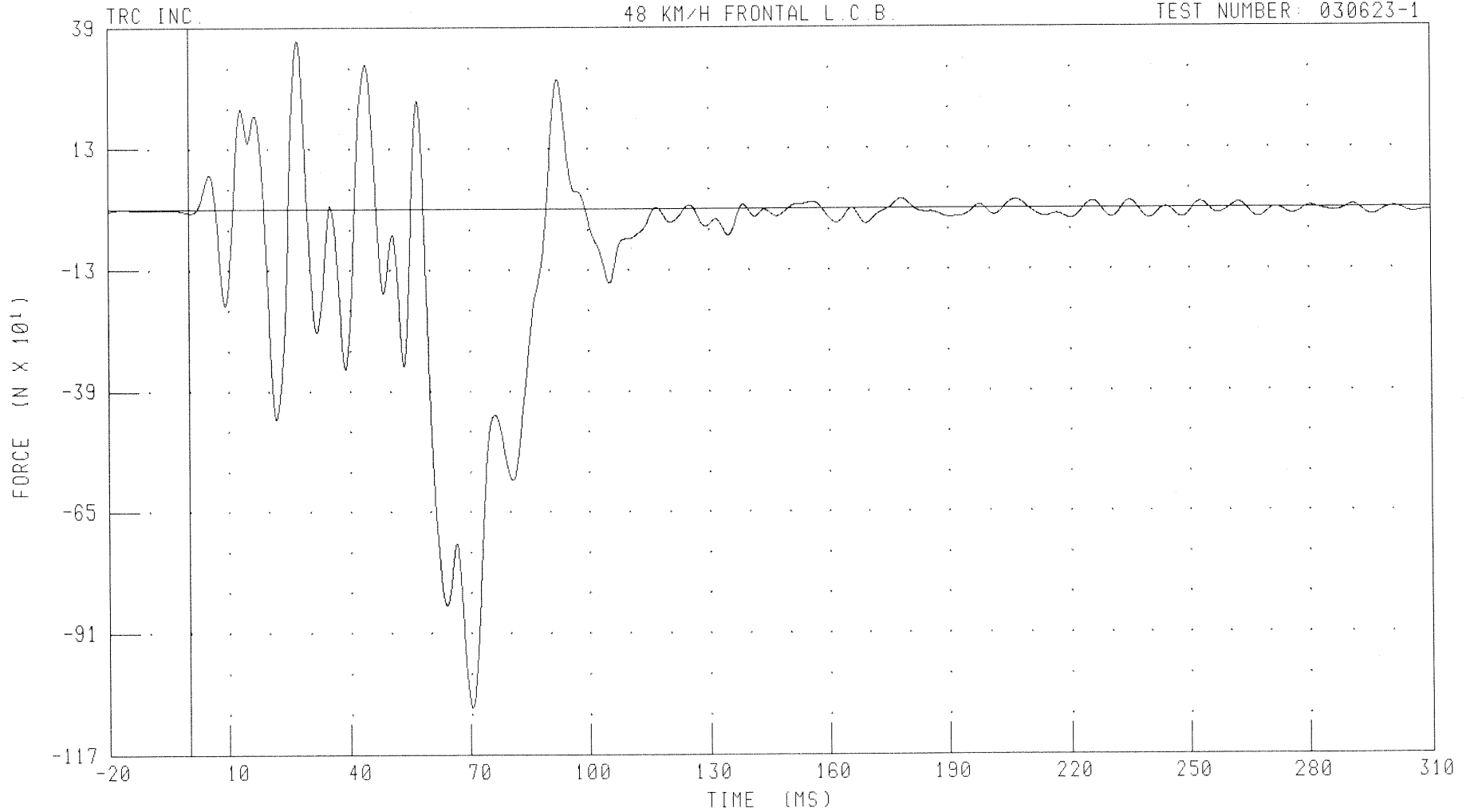
PEAK DATA: 100.10 N @ 13.36 MS, -110.03 N @ 55.44 MS

B-194

030623-1

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: 030623-1



CHANNEL: BD1F

FILTER: CH. CLASS 60

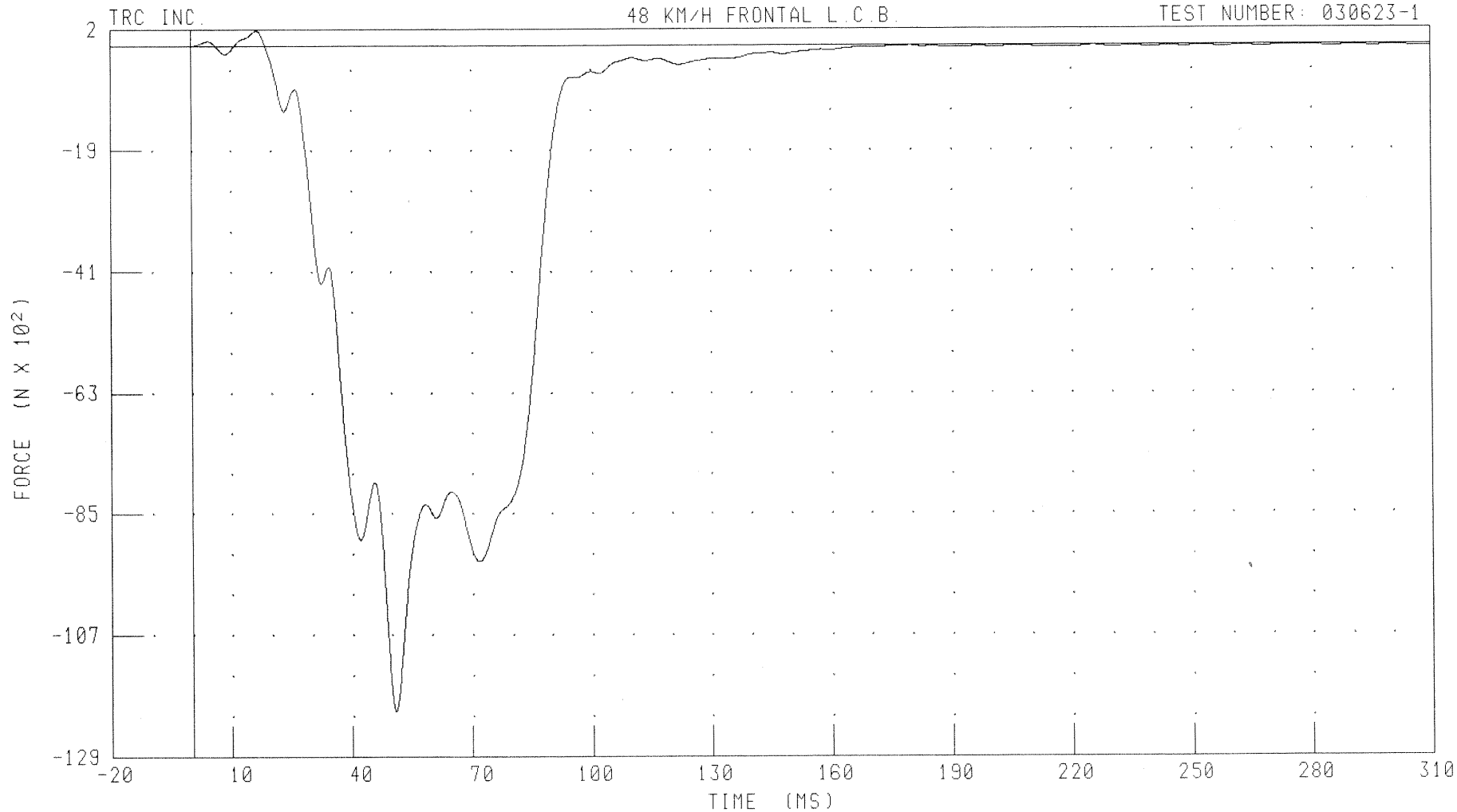
PEAK DATA: 361.21 N @ 27.28 MS, -1069.62 N @ 70.40 MS

B-195

030623-1

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: 030623-1



CHANNEL: BD2F

FILTER: CH. CLASS 60

PEAK DATA: 270.73 N @ 16.56 MS, -12098.09 N @ 51.04 MS

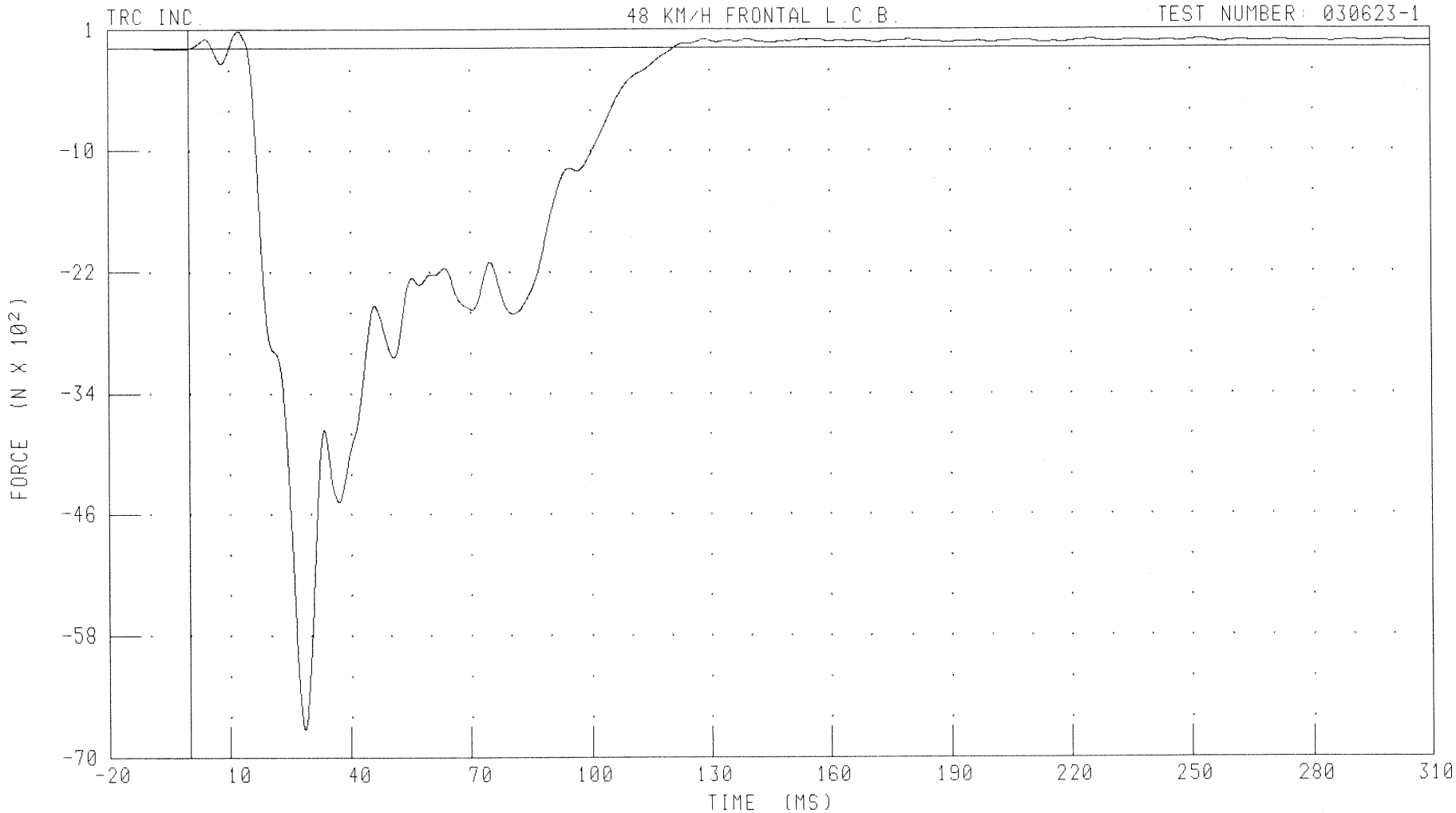
B-196

030623-1

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: 030623-1



CHANNEL: BD3F

FILTER: CH. CLASS 60

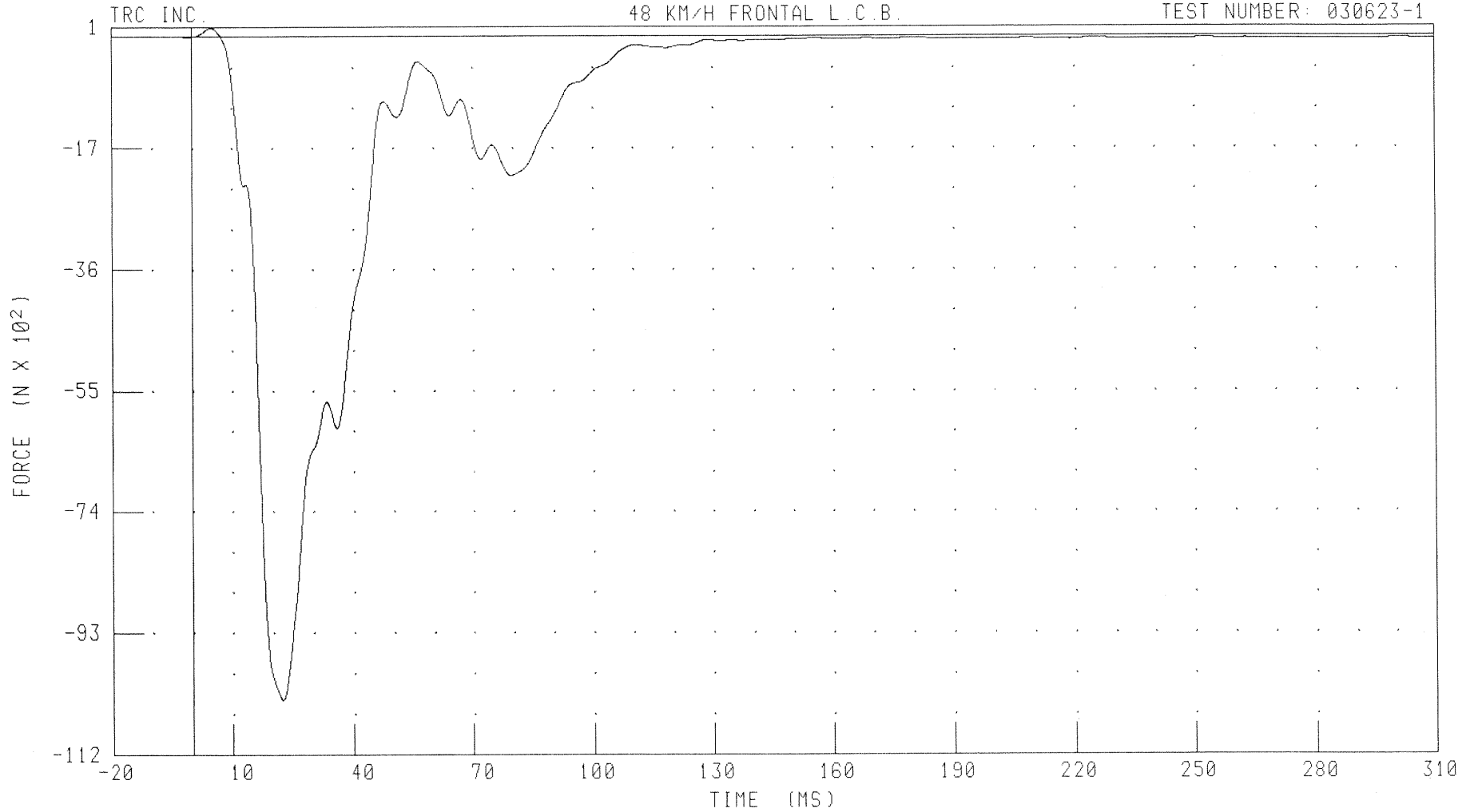
PEAK DATA: 165.73 N @ 12.32 MS, -6743.37 N @ 28.48 MS

B-197

030623-1

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: 030623-1



CHANNEL: BD4F

FILTER: CH. CLASS 60

PEAK DATA: 127.91 N @ 4.72 MS, -10407.61 N @ 22.32 MS

B-198

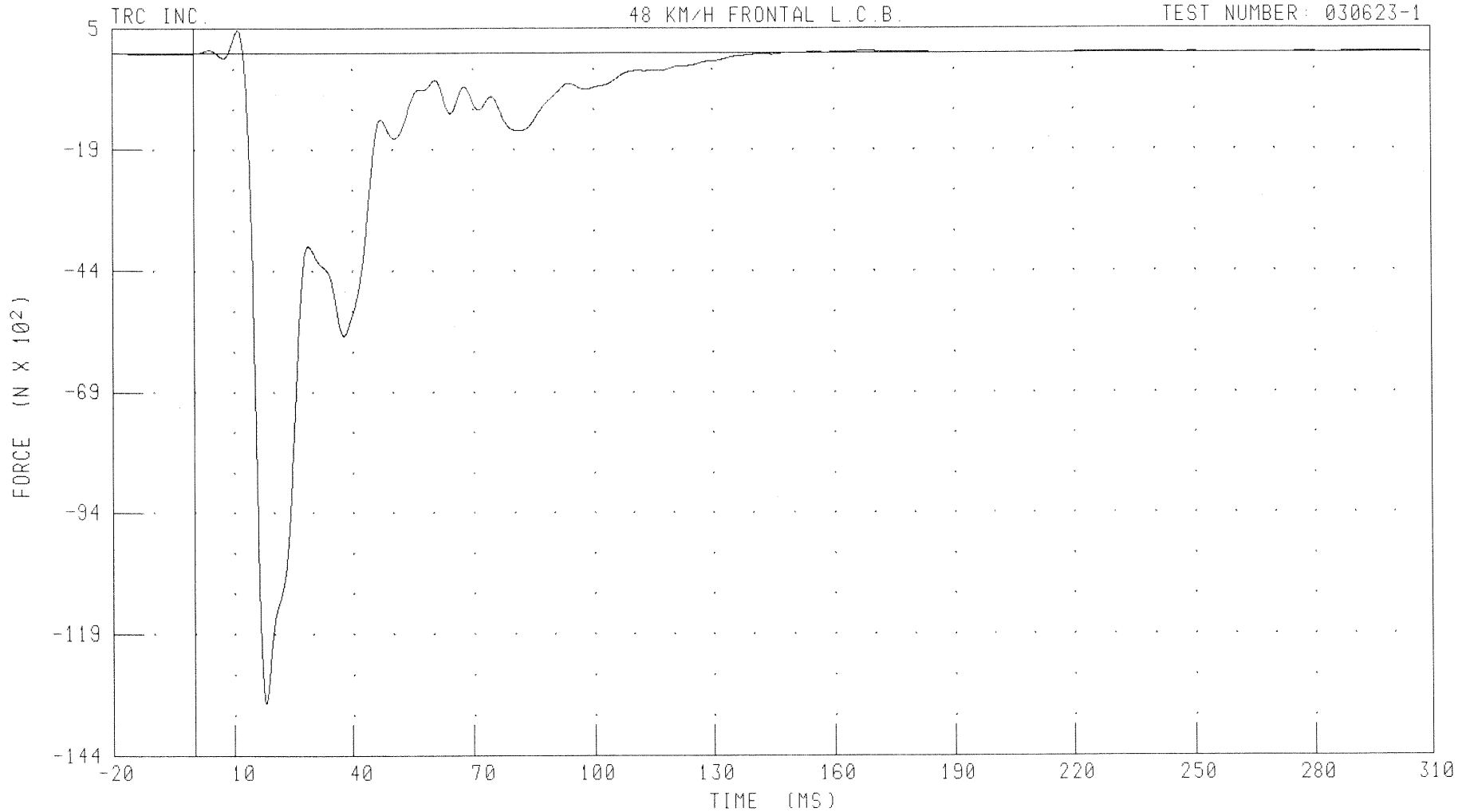
030623-1

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: 030623-1



CHANNEL: BD5F

FILTER: CH. CLASS 60

PEAK DATA: 465.76 N @ 11.20 MS; -13410.46 N @ 17.92 MS

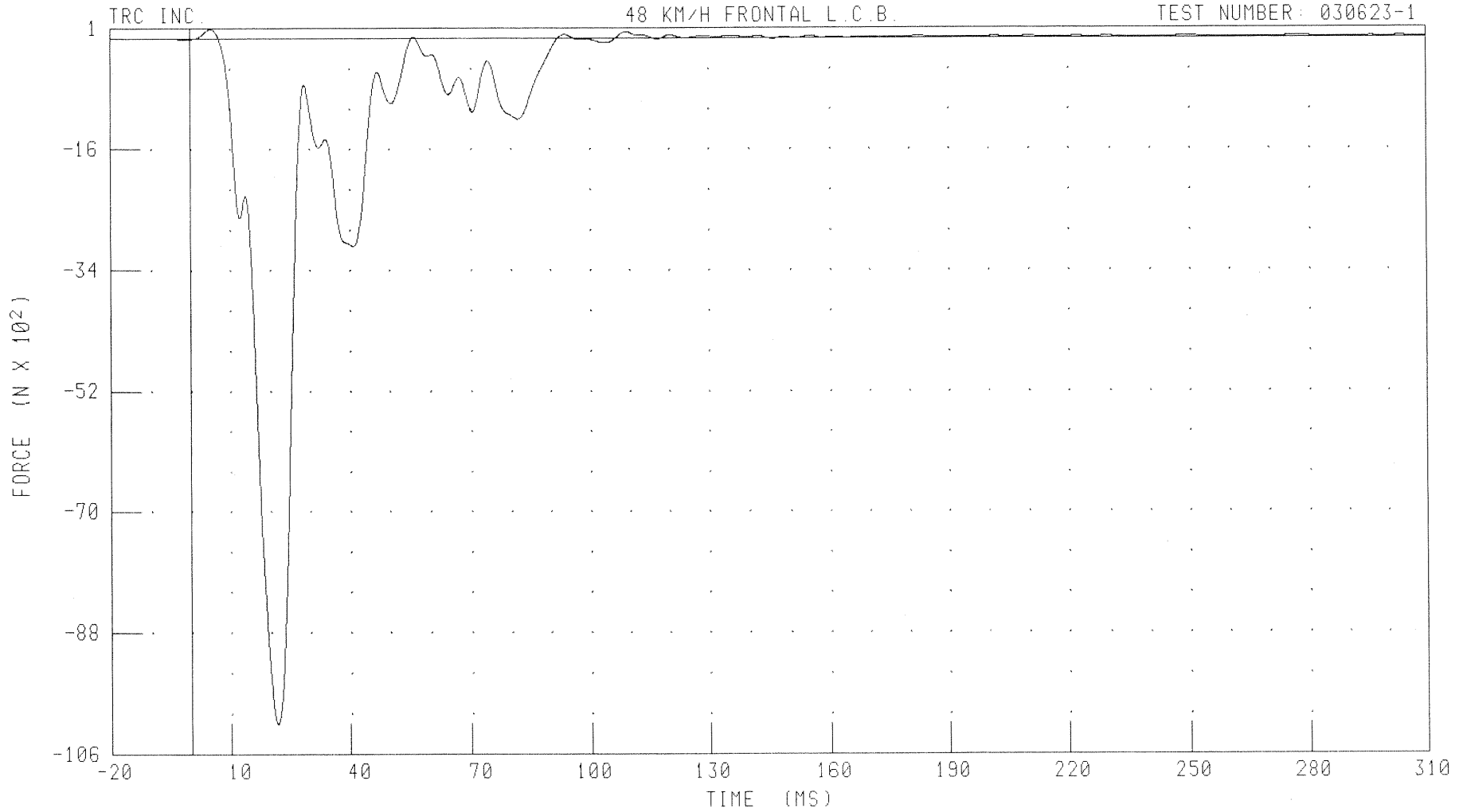
B-199

030623-1

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: 030623-1



CHANNEL: B06F

FILTER: CH. CLASS 60

PEAK DATA: 137.47 N @ 5.20 MS; -10205.98 N @ 21.68 MS

B-200

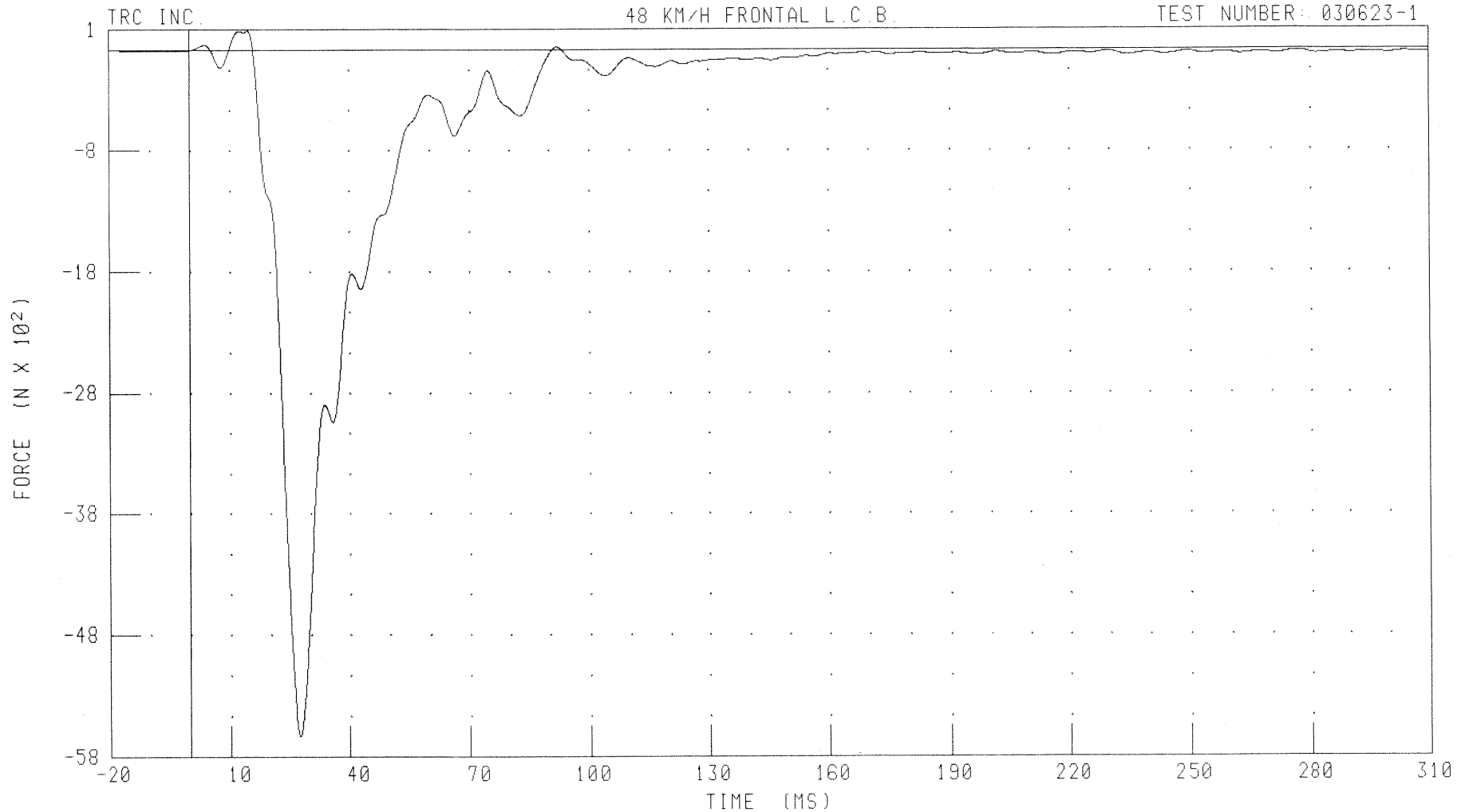
030623-1

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: 030623-1



CHANNEL: BD7F

FILTER: CH. CLASS 60

PEAK DATA: 161.08 N @ 14.64 MS; -5664.70 N @ 27.36 MS

B-201

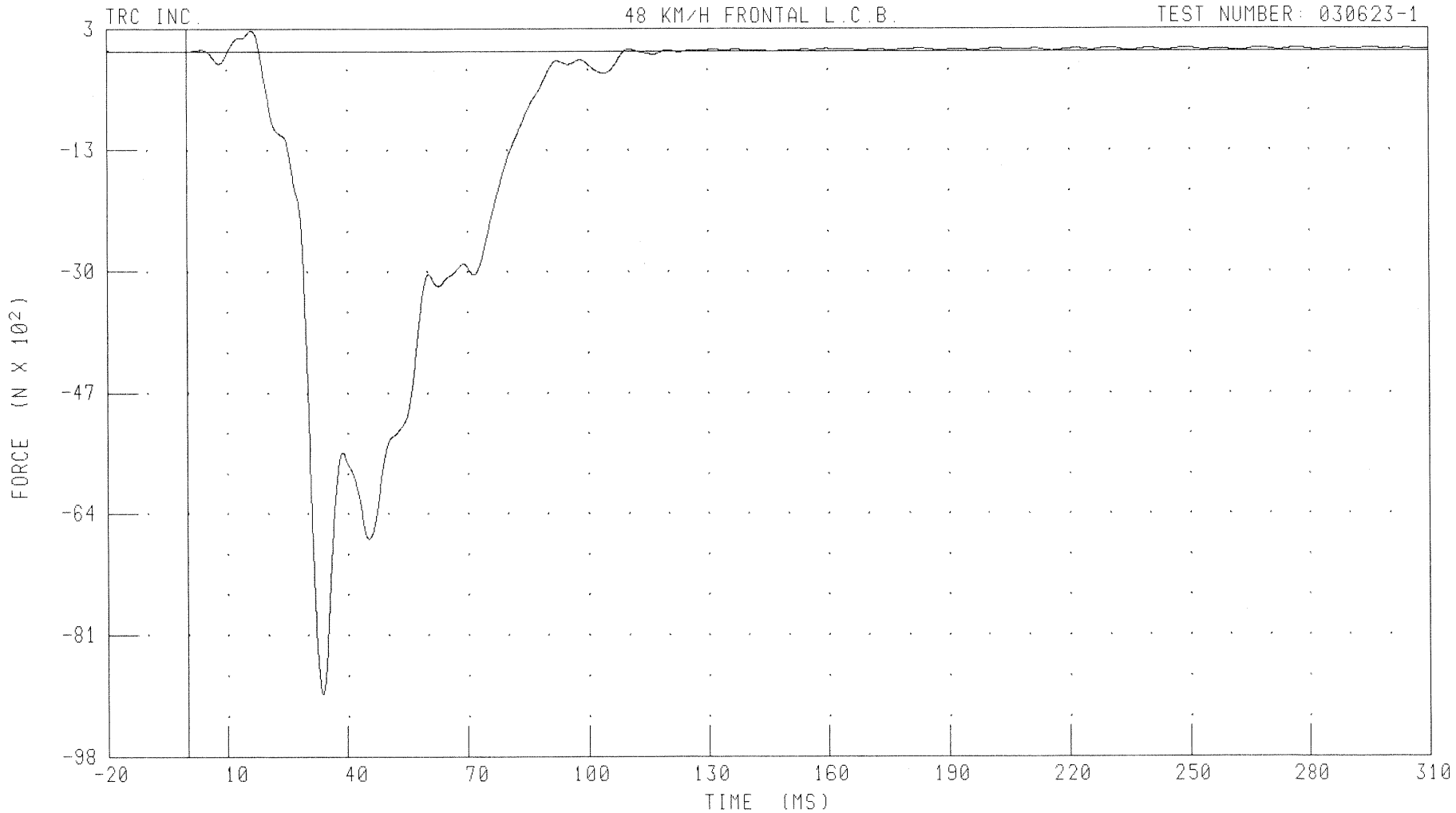
030623-1

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: 030623-1



CHANNEL: B08F

FILTER: CH. CLASS 60

PEAK DATA: 286.99 N @ 16.08 MS; -9018.83 N @ 33.84 MS

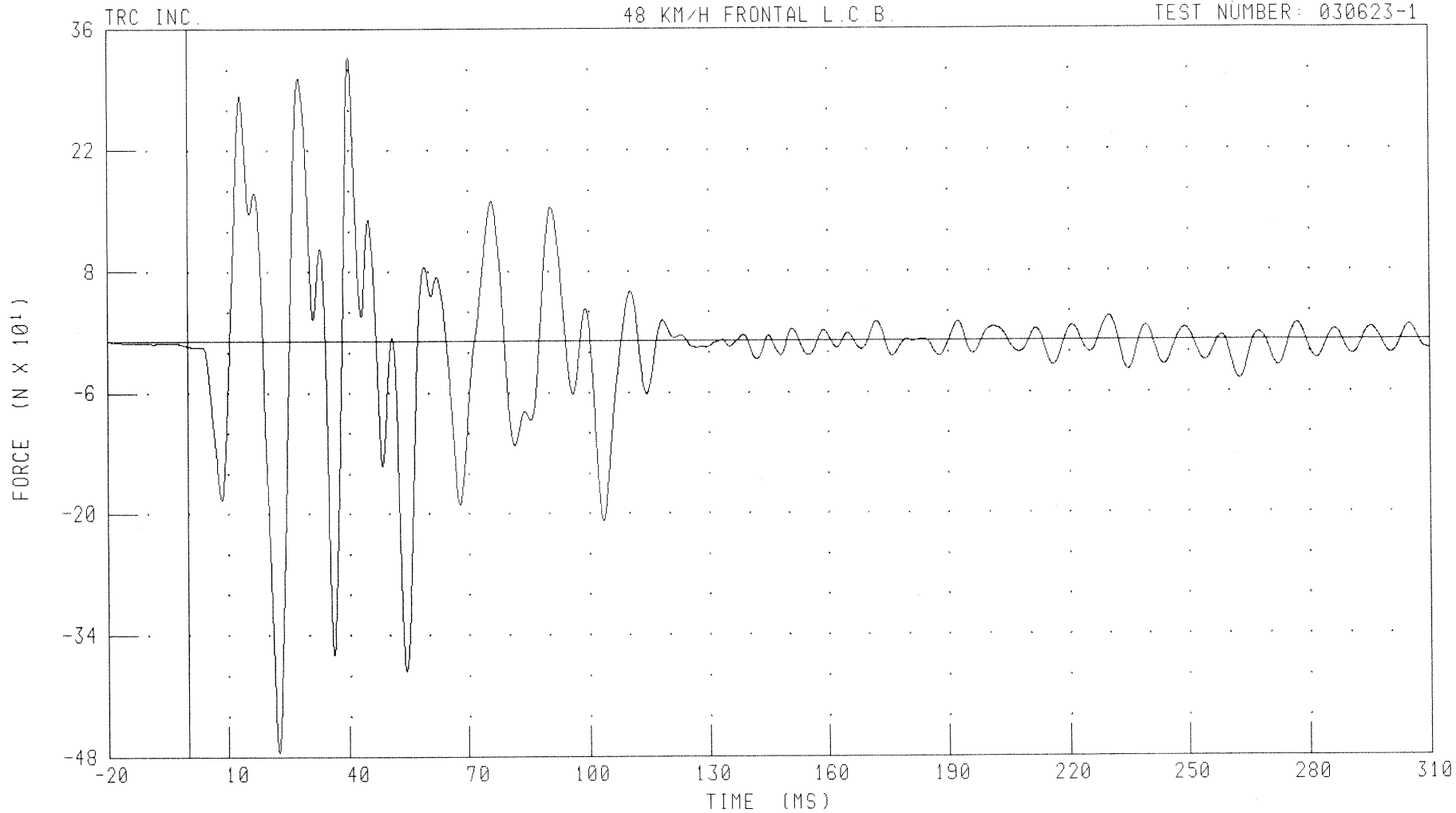
B-202

030623-1

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: 030623-1



CHANNEL: BD9F

FILTER: CH. CLASS 60

PEAK DATA: 327.60 N @ 40.16 MS, -475.08 N @ 22.64 MS

B-203

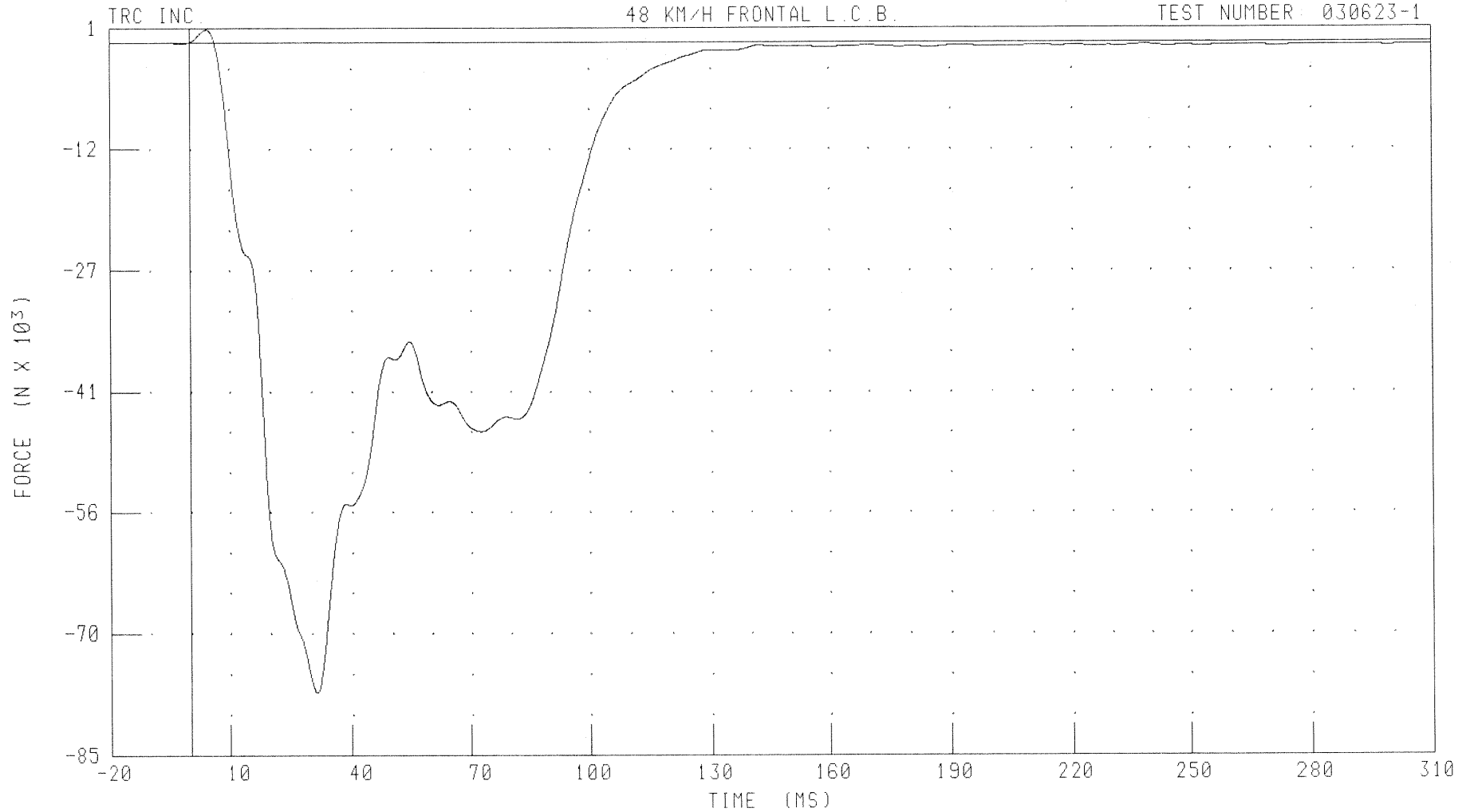
030623-1

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: 030623-1



CHANNEL: LCBG1F FILTER: CH. CLASS 60

PEAK DATA: 1550.07 N @ 4.24 MS, -77830.32 N @ 31.28 MS

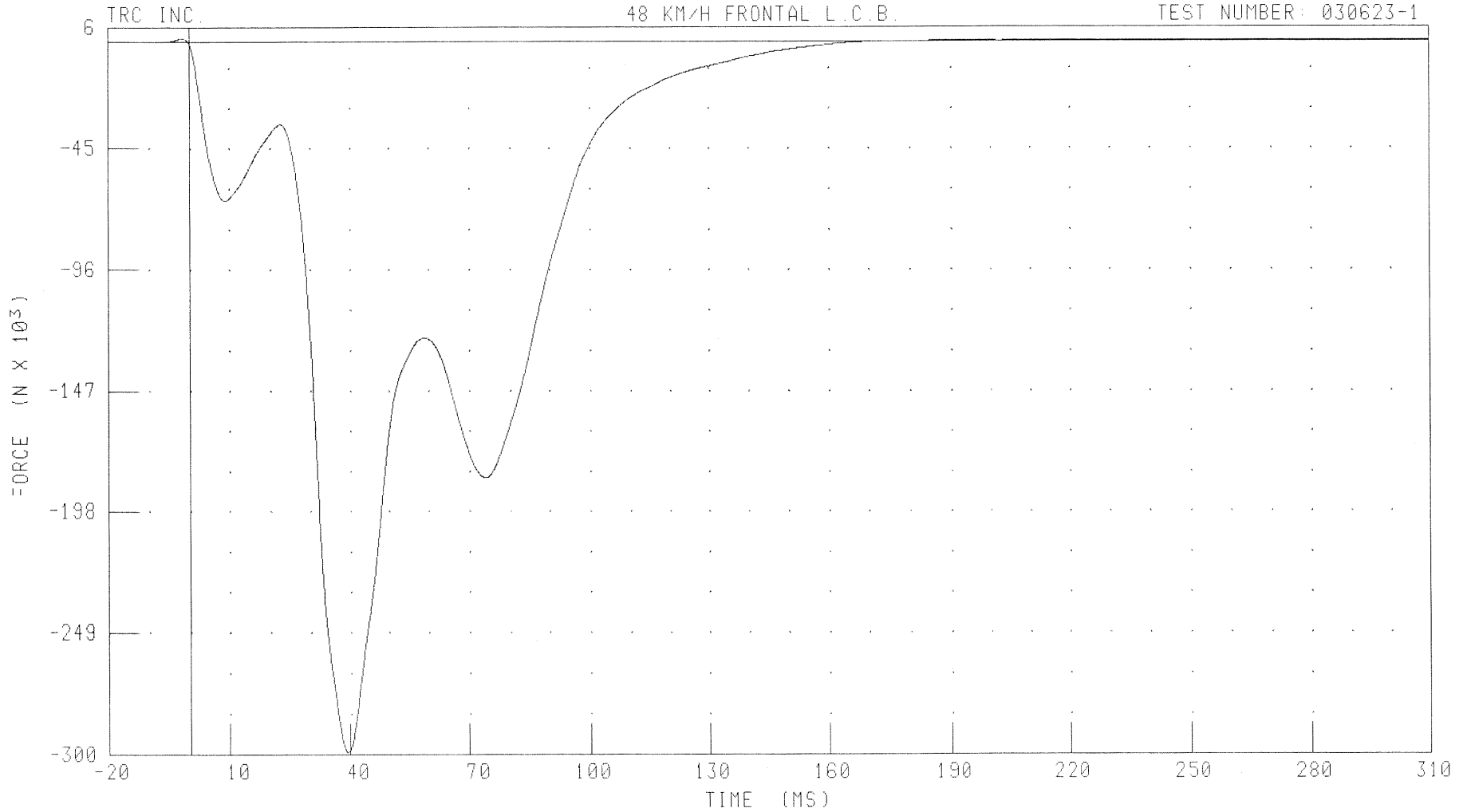
B-204

030623-1

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: 030623-1



CHANNEL LCBG2F FILTER CH CLASS 60

PEAK DATA: 1393 98 N @ -1 76 MS, -299092 00 N @ 39 36 MS

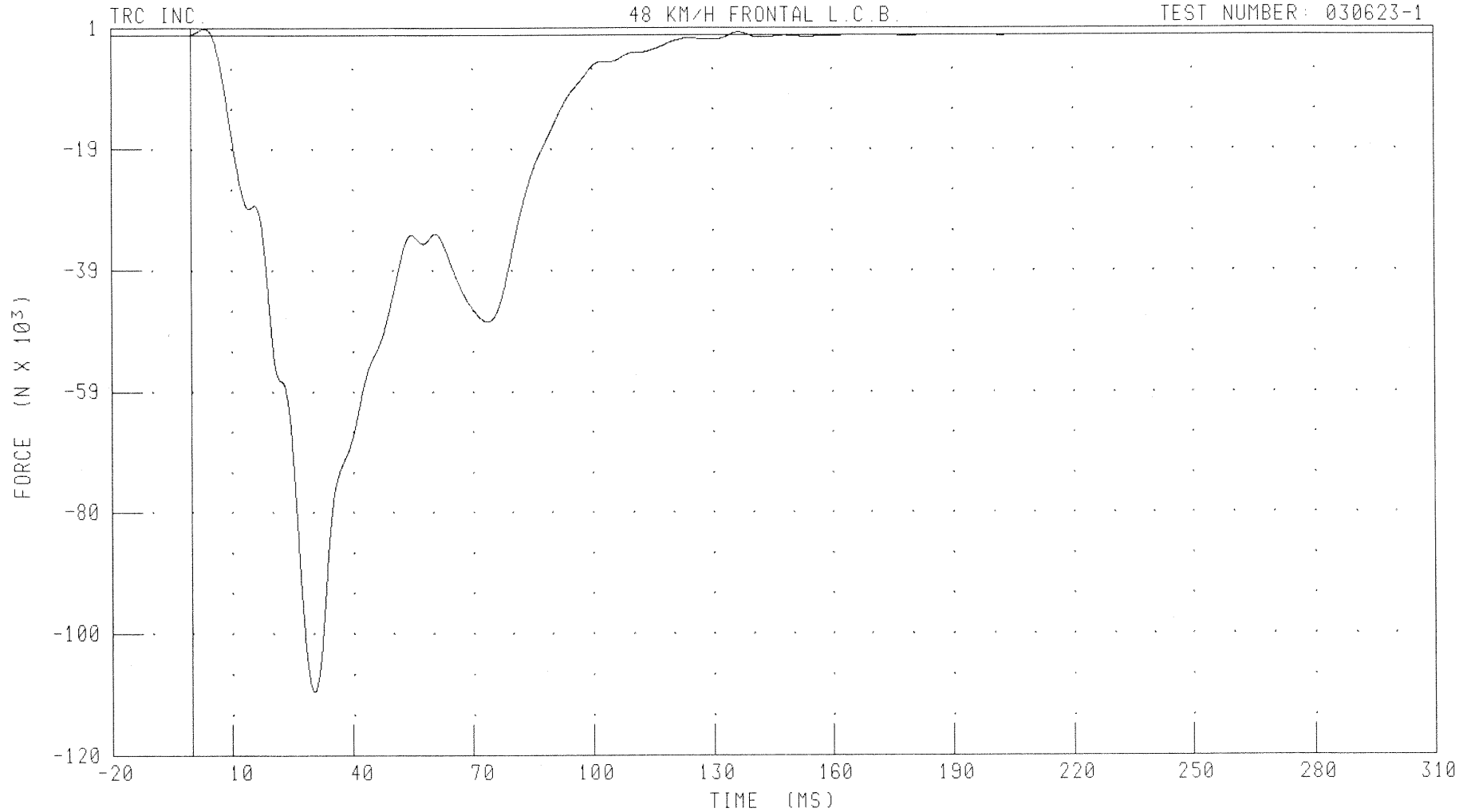
B-205

030623-1

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: 030623-1



CHANNEL: LCBG3F FILTER: CH CLASS 60

PEAK DATA: 1120.04 N @ 3.52 MS, -109997.88 N @ 30.32 MS

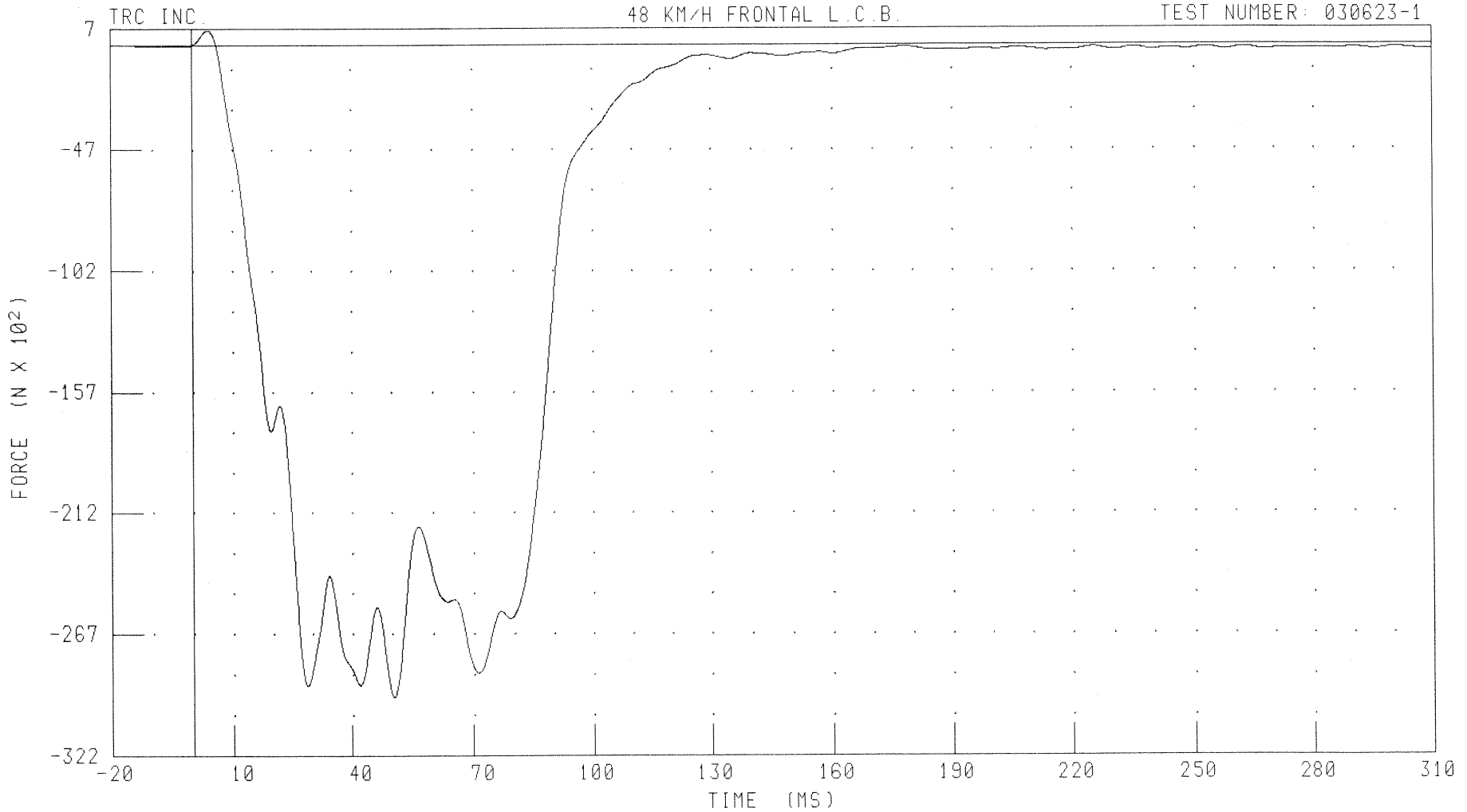
B-206

030623-1

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: 030623-1



CHANNEL: LCBG4F FILTER: CH. CLASS 60

PEAK DATA: 675.91 N @ 3.92 MS; -29615.23 N @ 50.56 MS

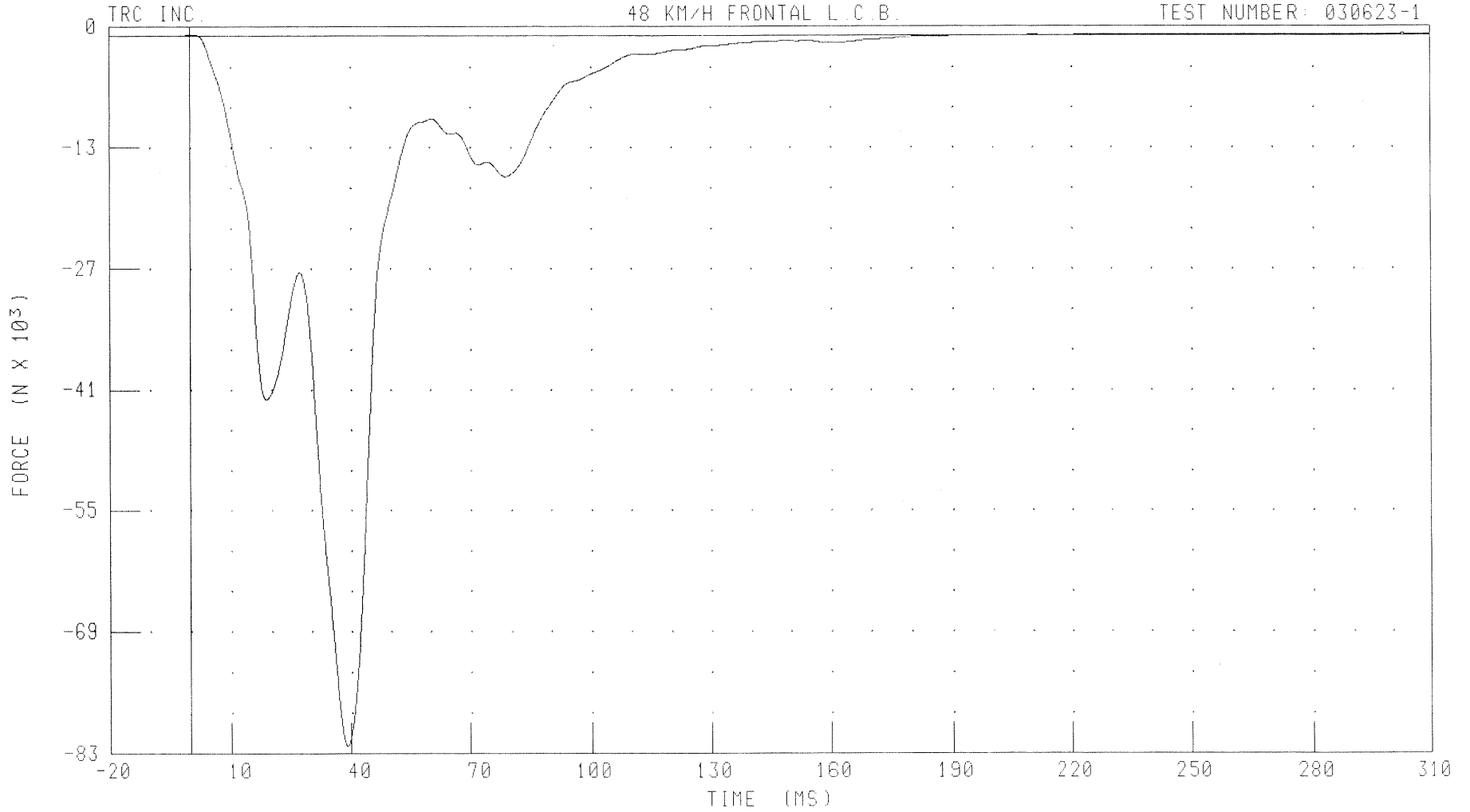
B-207

030623-1

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: 030623-1



CHANNEL: LCBG5F FILTER: CH. CLASS 60

PEAK DATA: 137.37 N @ 302.64 MS, -82181.07 N @ 39.04 MS

B-208

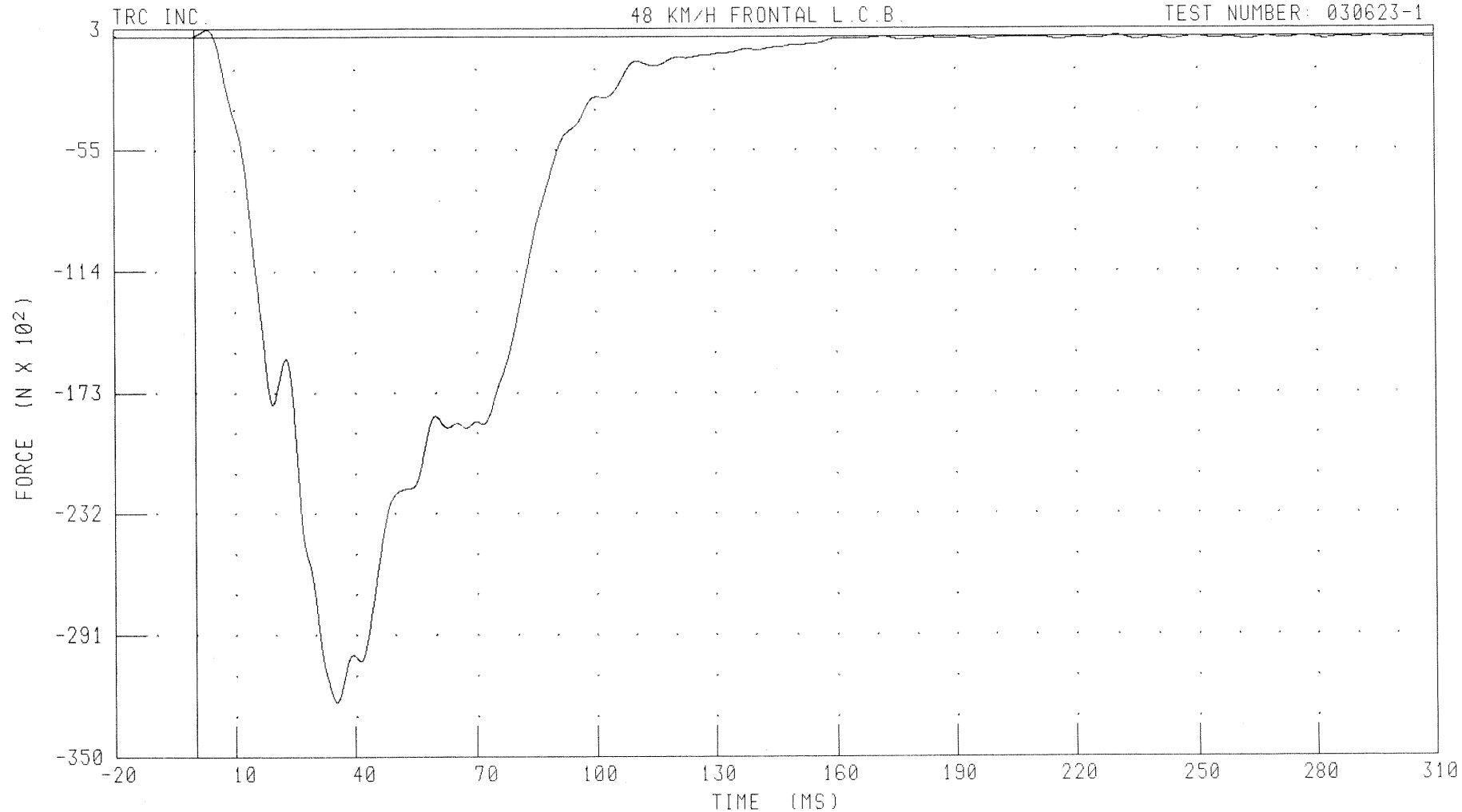
030623-1

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: 030623-1



CHANNEL: LCBG6F

FILTER: CH. CLASS 60

PEAK DATA: 339.93 N @ 3.12 MS; -32380.02 N @ 35.36 MS

B-209

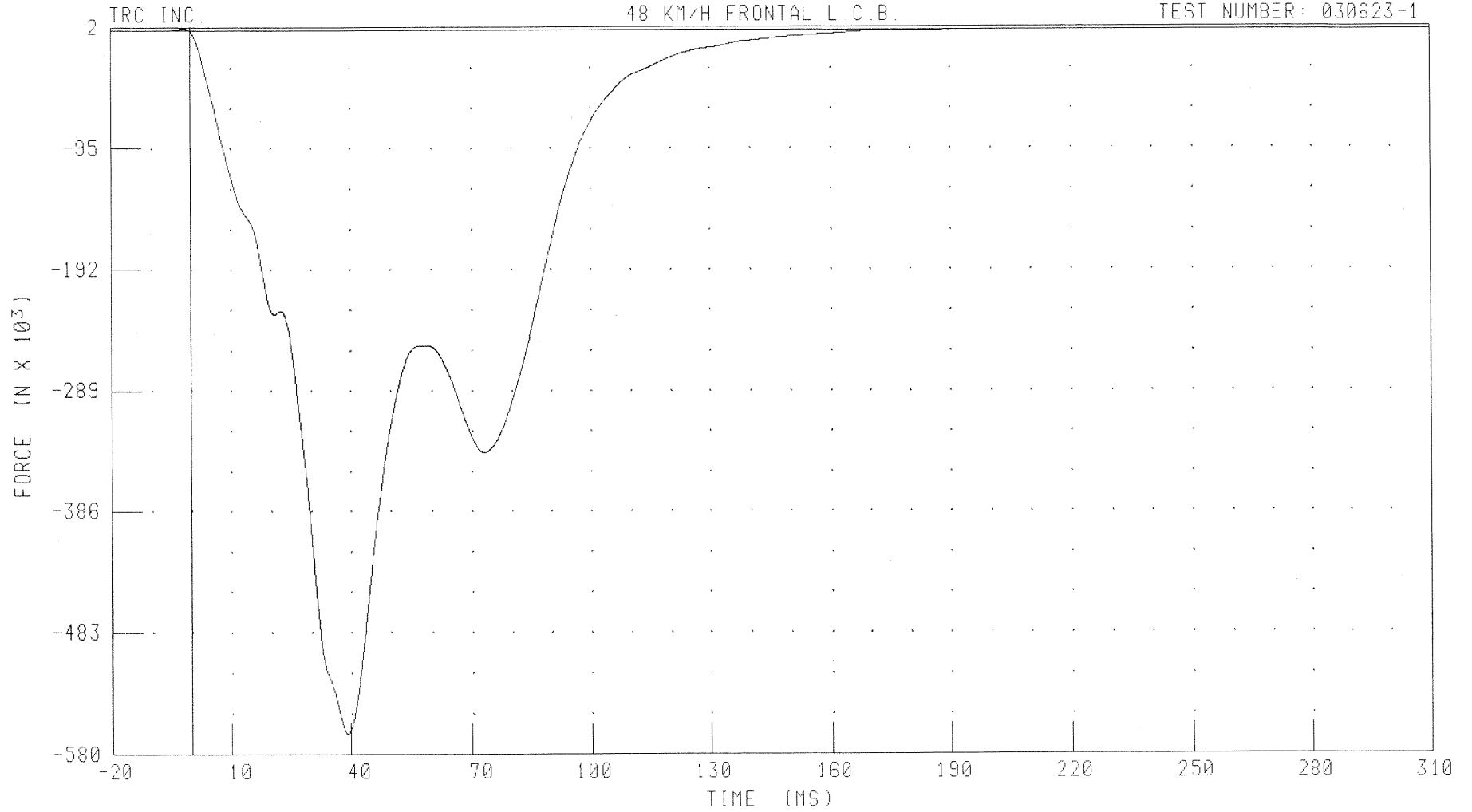
030623-1

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: 030623-1



CHANNEL: LCBGT FILTER CH. CLASS 60

PEAK DATA: 116147 N @ -1.60 MS; -564078.50 N @ 39.12 MS

B-210

030623-1

Appendix C

Dummy Configuration and Performance Verification Data

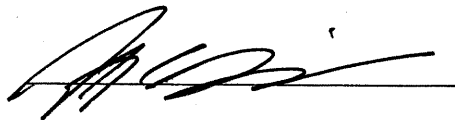
Pre-test Dummy Configuration and Performance Verification Data

Driver Dummy S/N: 083

Transportation Research Center Inc.
HIII 95th Dummy
External Dimensions
Serial No. 083 Calibration No. 14

Test Parameter	Dimension	Specification	Results	Pass
Total Sitting Height	A	927.1 - 942.3 mm	938 mm	Yes
Shoulder Pivot Height	B	541.0 - 556.2 mm	551 mm	Yes
H-Point Height	C	101.6 - 111.8 mm	107 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	115 mm	Yes
Thigh Clearance	F	160.0 - 175.2 mm	167 mm	Yes
Back Of Elbow To Wrist Pivot	G	307.4 - 317.4 mm	309 mm	Yes
Skull Cap To Backline	H	86.4 - 91.4 mm	87 mm	Yes
Shoulder-Elbow Length	I	348.0 - 363.2 mm	355 mm	Yes
Elbow Rest Height	J	208.3 - 223.5 mm	211 mm	Yes
Buttock Knee Length	K	624.8 - 650.2 mm	636 mm	Yes
Popliteal Height	L	457.2 - 482.6 mm	475 mm	Yes
Knee Pivot Height	M	520.7 - 546.1 mm	531 mm	Yes
Buttock Popliteal Length	N	490.2 - 515.6 mm	502 mm	Yes
Chest Depth	O	284.5 - 299.7 mm	299 mm	Yes
Foot Length	P	251.5 - 266.7 mm	258 mm	Yes
Buttock to Knee Pivot Length	R	556.3 - 581.7 mm	578 mm	Yes
Head Breadth	S	148.9 - 160.0 mm	156 mm	Yes
Head Depth	T	190.5 - 200.7 mm	194 mm	Yes
Hip Breadth	U	396.3 - 411.5 mm	406 mm	Yes
Shoulder Breadth	V	467.4 - 482.6 mm	476 mm	Yes
Foot Breadth	W	91.5 - 106.7 mm	93 mm	Yes
Head Circumference	X	566.4 - 576.6 mm	574 mm	Yes
Chest Circumference	Y	1120.2 - 1150.6 mm	1133 mm	Yes
Waist Circumference	Z	988.1 - 1018.5 mm	1000 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. 14 - 1

Test Date 06/09/2003

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Peak Resultant Acceleration	220 - 265 g	239.2 g	Yes
Peak Lateral Acceleration	15 g Max	7.0 g	Yes
Is Acceleration Curve Unimodal?	Yes	Yes	Yes

Comments:

Technician



Approved



06.09.2003 10:42:53 612

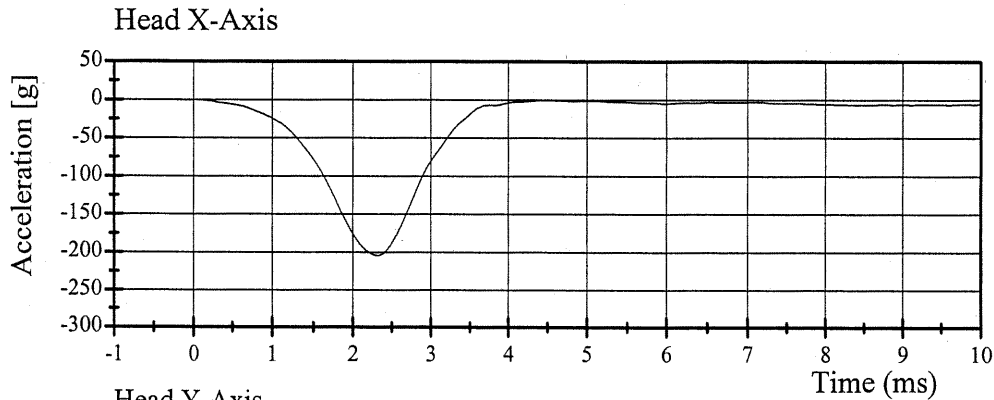


Transportation Research Center Inc.

Head Drop Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

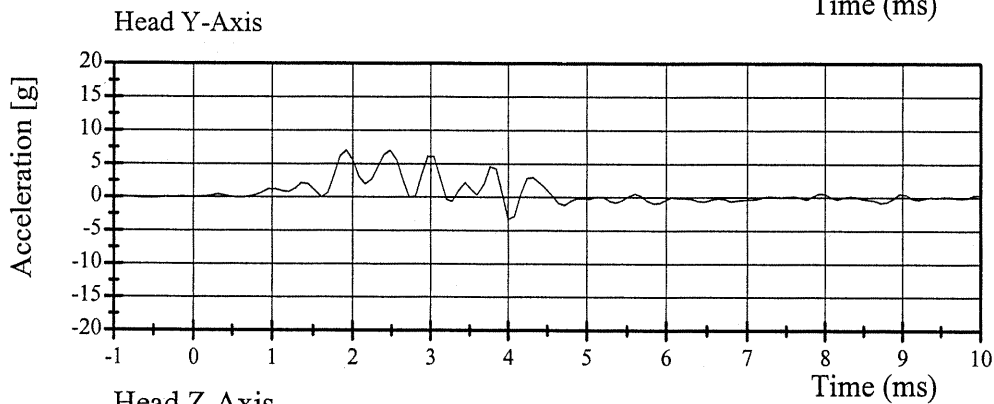
Test Date 06/09/2003



Filter Class: 1000

Max: -0.1 g at 0.0 ms

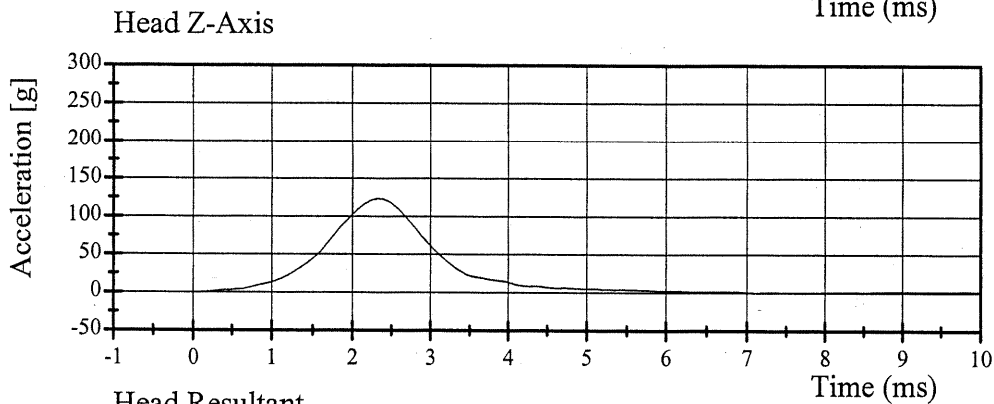
Min: -204.6 g at 2.3 ms



Filter Class: 1000

Max: 7.0 g at 1.9 ms

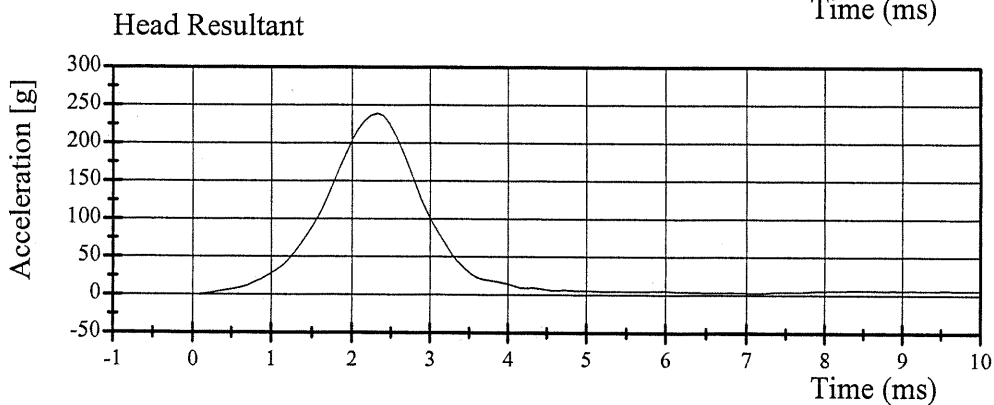
Min: -3.3 g at 4.0 ms



Filter Class: 1000

Max: 123.7 g at 2.3 ms

Min: 0.1 g at 0.0 ms



Filter Class: 1000

Max: 239.2 g at 2.3 ms

Min: 0.0 g at 0.4 ms

06.09.2003 10:42:54 612



Transportation Research Center Inc.

Neck Flexion Test - 6 Channel Transducer

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/09/2003

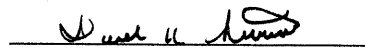
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impact Velocity	6.89 - 7.13 m/s	6.97 m/s	Yes
Integrated Pendulum Velocity			
10 ms	2.20 - 2.70 m/s	2.51 m/s	Yes
20 ms	4.00 - 5.00 m/s	4.61 m/s	Yes
30 ms	5.70 - 6.90 m/s	6.48 m/s	Yes
Peak D Plane Rotation	61 - 75 °	63.7 °	Yes
Peak Moment About Occipital Condyles (During time interval rotation is within specified corridors)	110.0 - 130.0 N·m	99.23 N·m	No
Positive Moment Decay Time To 10 N·m	77 - 97 ms	92.48 ms	Yes

Comments:

Technician



Approved



06.09.2003 11:13:07 502



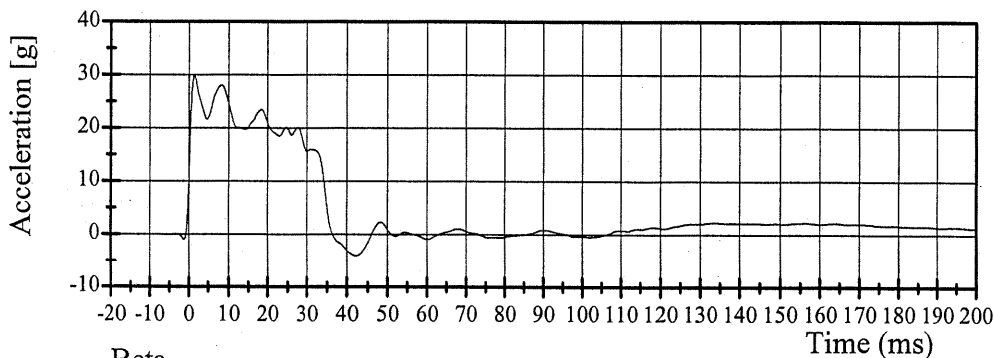
Transportation Research Center Inc.

Neck Flexion Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/09/2003

Pendulum Deceleration

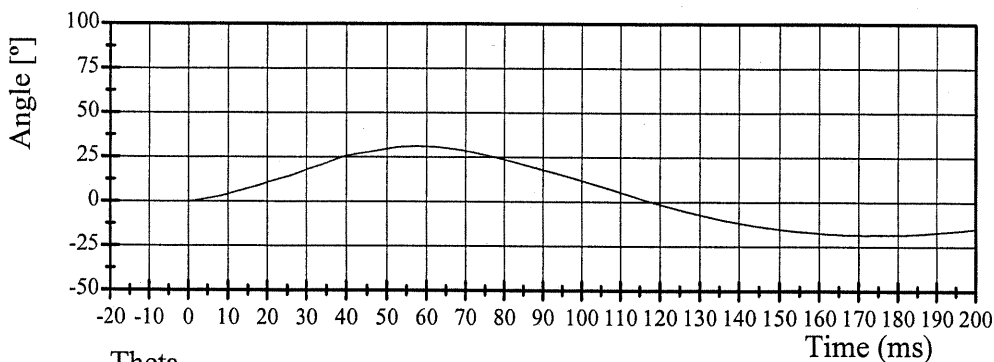


Filter Class: 180

Max: 29.9 g at 1.4 ms

Min: -4.0 g at 42.2 ms

Beta

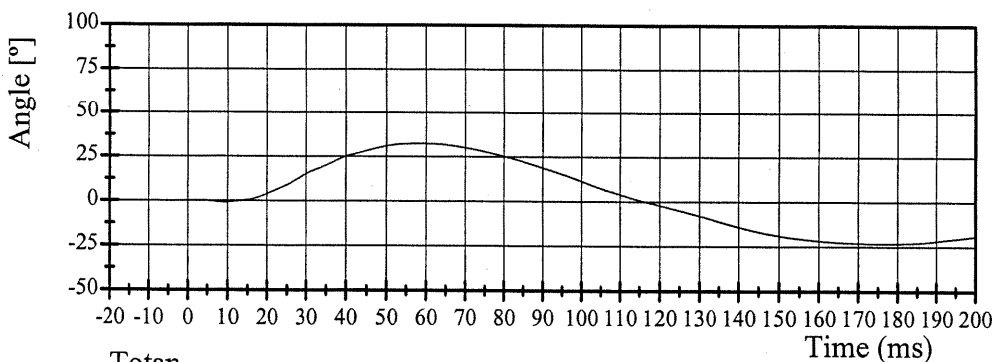


Filter Class: 60

Max: 31.1 ° at 57.2 ms

Min: -18.4 ° at 171.8 ms

Theta

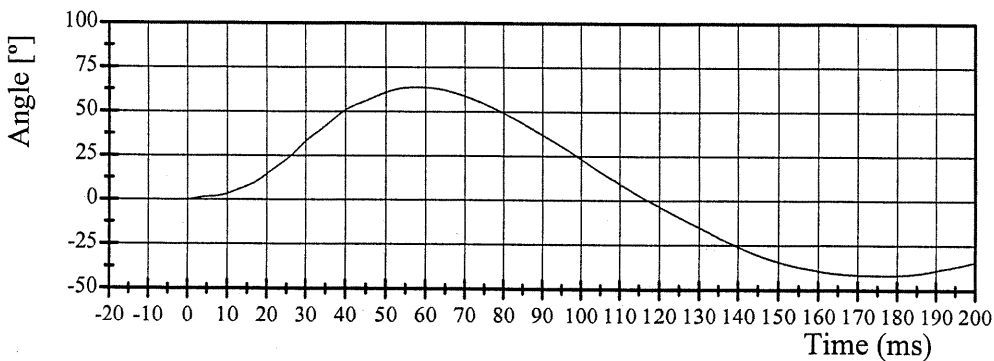


Filter Class: 60

Max: 32.6 ° at 57.8 ms

Min: -23.2 ° at 176.3 ms

Totan



Filter Class: 60

Max: 63.7 ° at 57.5 ms

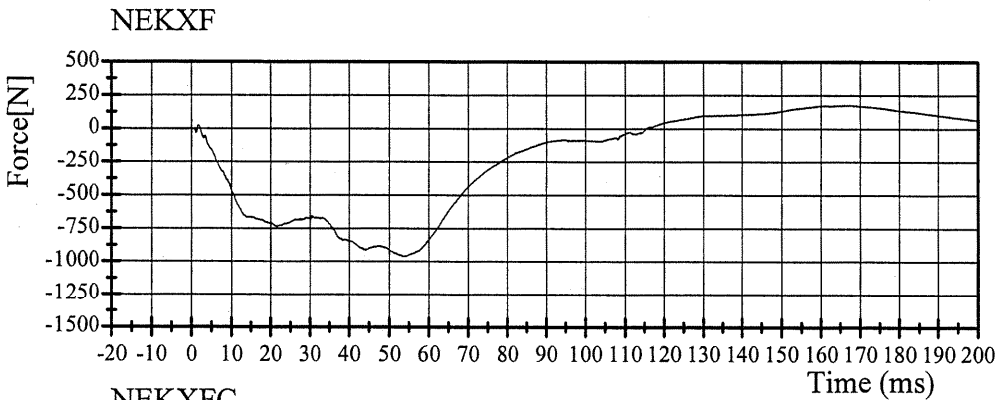
Min: -41.6 ° at 174.2 ms

Transportation Research Center Inc.

Neck Flexion Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

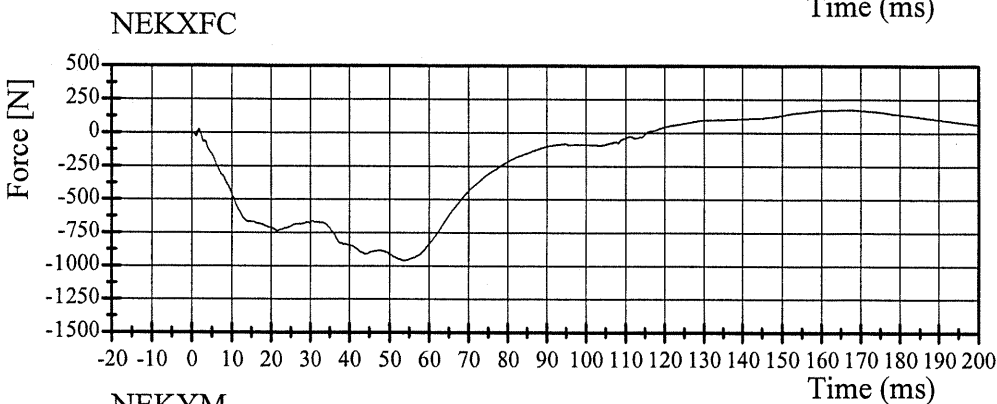
Test Date 06/09/2003



Filter Class: 1000

Max: 175.8 N at 166.6 ms

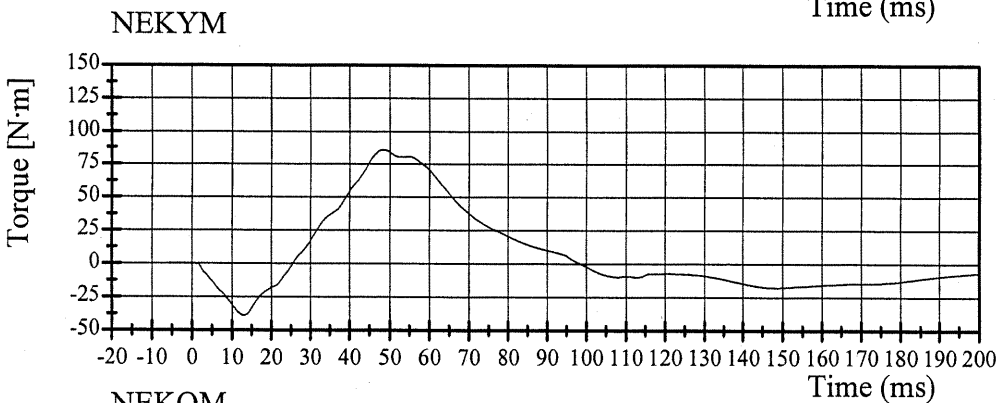
Min: -959.7 N at 53.4 ms



Filter Class: 600

Max: 175.5 N at 166.6 ms

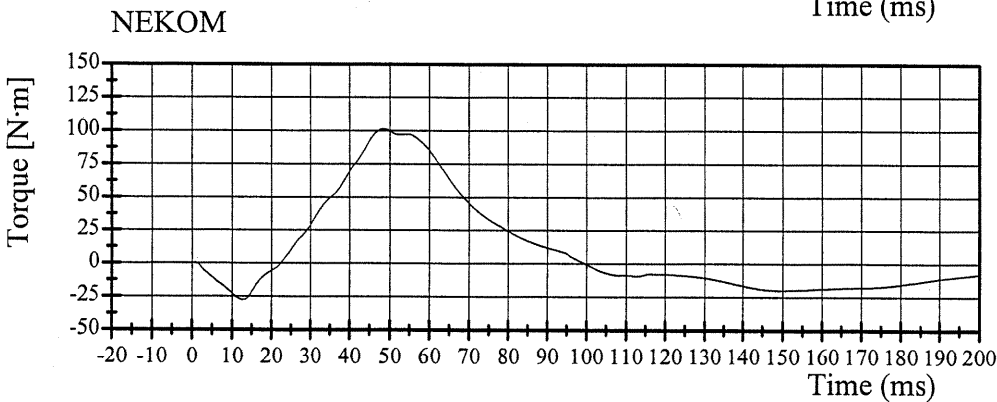
Min: -959.6 N at 53.5 ms



Filter Class: 600

Max: 85.7 N·m at 48.2 ms

Min: -39.0 N·m at 13.0 ms



Filter Class: 600

Max: 101.4 N·m at 48.3 ms

Min: -27.6 N·m at 12.8 ms

Transportation Research Center Inc.

Neck Extension Test - 6 Channel Transducer

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/09/2003

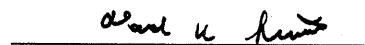
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Impact Velocity	5.95 - 6.19 m/s	6.02 m/s	Yes
Integrated Pendulum Velocity			
10 ms	1.80 - 2.20 m/s	1.97 m/s	Yes
20 ms	3.40 - 4.20 m/s	3.88 m/s	Yes
30 ms	4.80 - 5.80 m/s	5.60 m/s	Yes
Peak D Plane Rotation	81 - 98 °	91.9 °	Yes
Peak Moment About Occipital Condyles (During time interval rotation is within specified corridors)	-84.0 - (-66.0) N·m	-69.21 N·m	Yes
Positive Moment Decay Time To -10 N·m	100 - 120 ms	111.28 ms	Yes

Comments:

Technician



Approved



06.09.2003 12:17:10 572



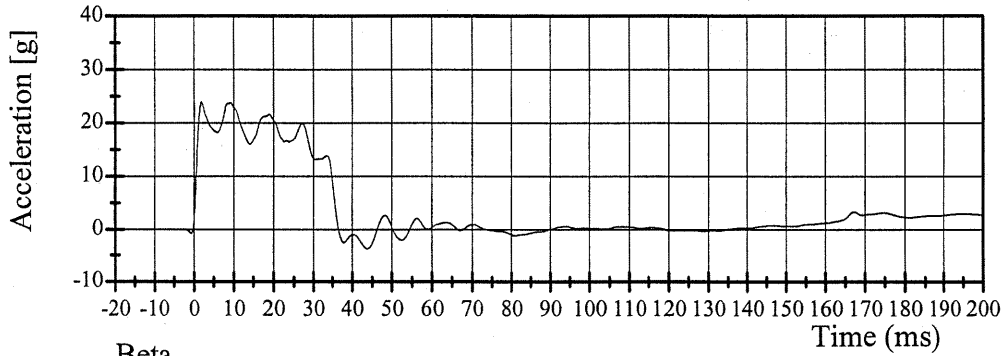
Transportation Research Center Inc.

Neck Extension Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/09/2003

Pendulum Deceleration

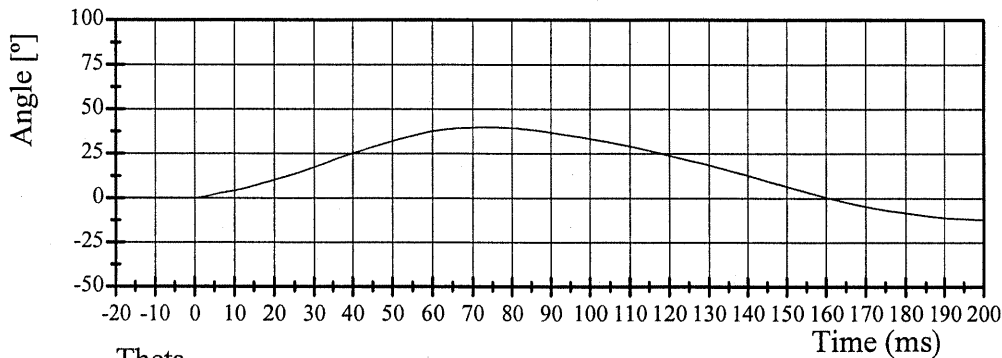


Filter Class: 180

Max: 23.9 g at 1.9 ms

Min: -3.6 g at 43.7 ms

Beta

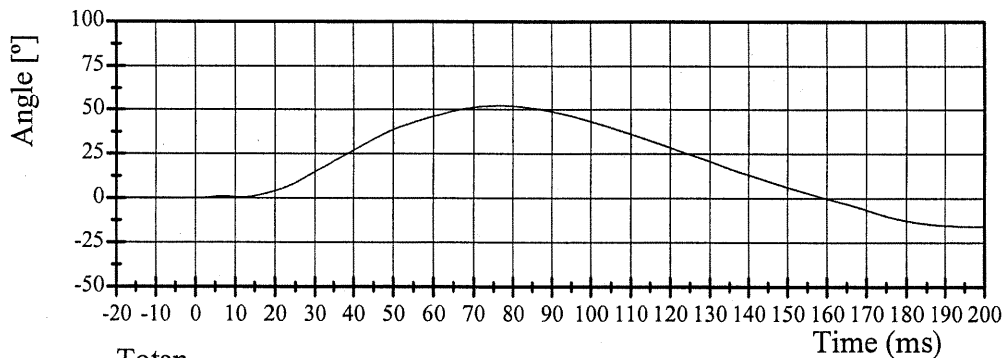


Filter Class: 60

Max: 39.9° at 73.4 ms

Min: -12.0° at 200.1 ms

Theta

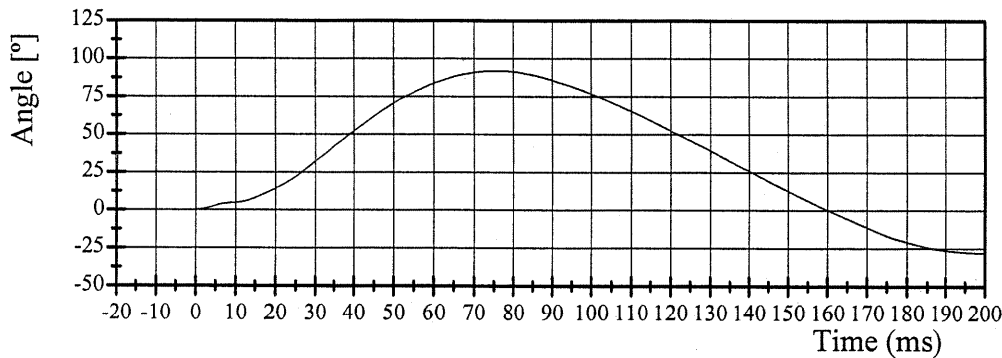


Filter Class: 60

Max: 52.1° at 76.9 ms

Min: -15.9° at 200.0 ms

Totan



Filter Class: 60

Max: 91.9° at 75.6 ms

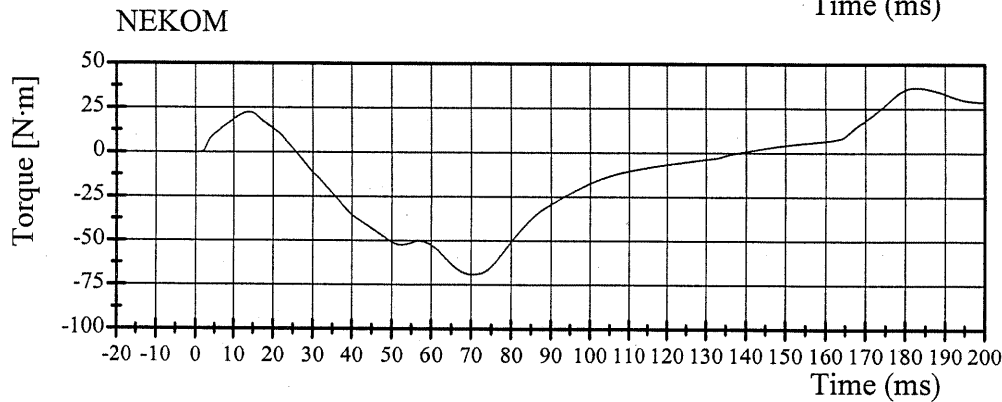
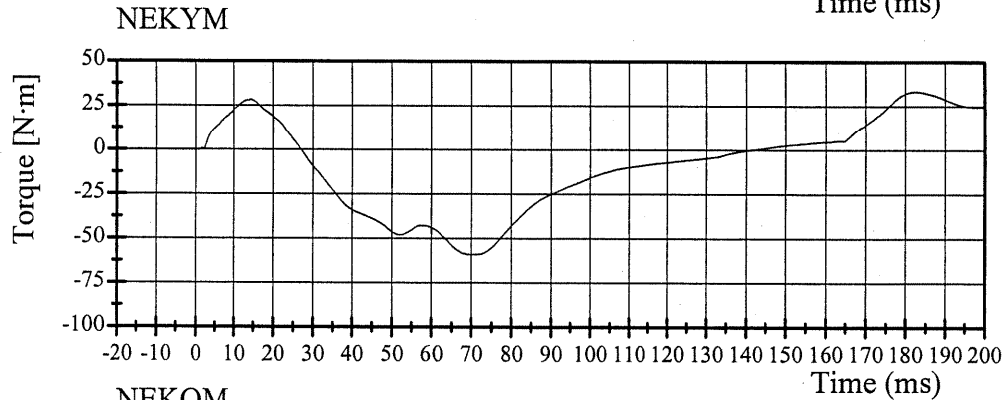
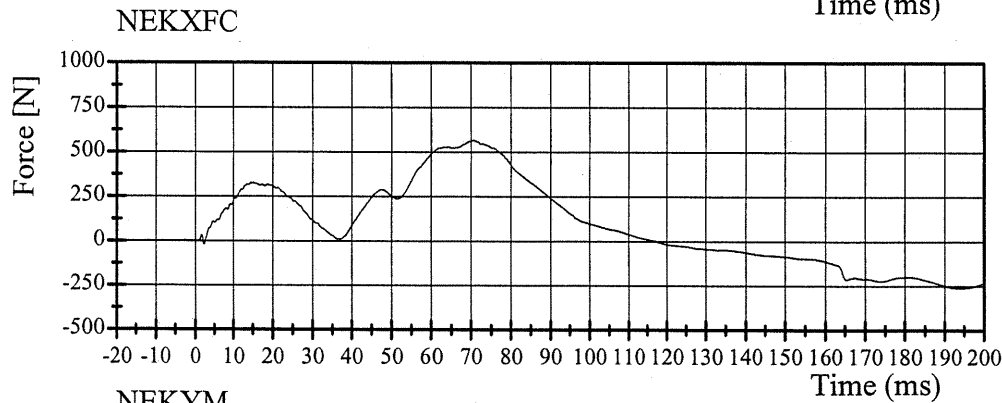
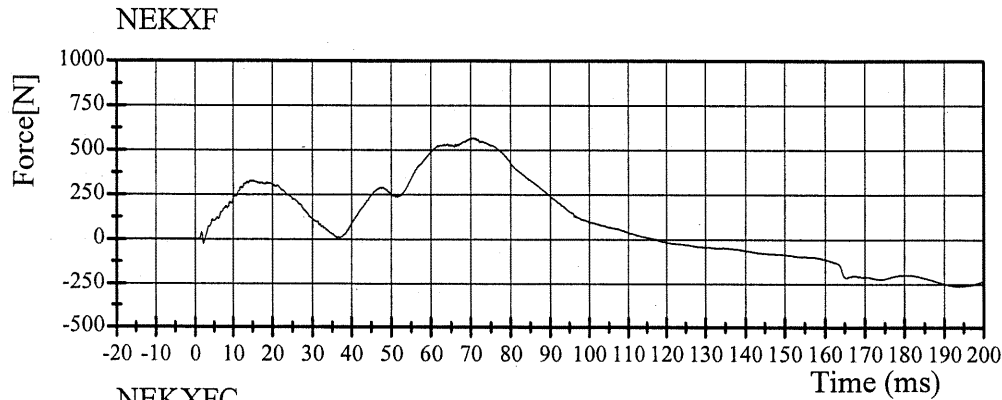
Min: -27.9° at 200.1 ms

Transportation Research Center Inc.

Neck Extension Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/09/2003



06.09.2003 12:17:13 572



Transportation Research Center Inc.

Thorax Test

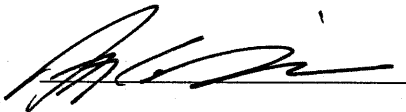
HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/09/2003

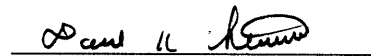
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Pendulum Velocity	6.59 - 6.83 m/s	6.66 m/s	Yes
Maximum Chest Deflection	-76.0 - (-66.0) mm	-71.1 mm	Yes
Maximum Resistive Force	4700 - 6000 N	5364 N	Yes
Internal Hysteresis	69 - 85 %	72 %	Yes

Comments:

Technician



Approved



06.09.2003 14:45:36 944

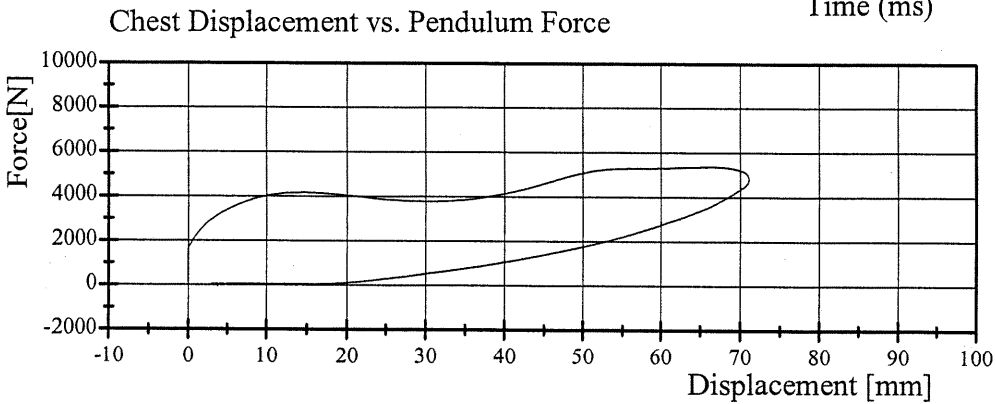
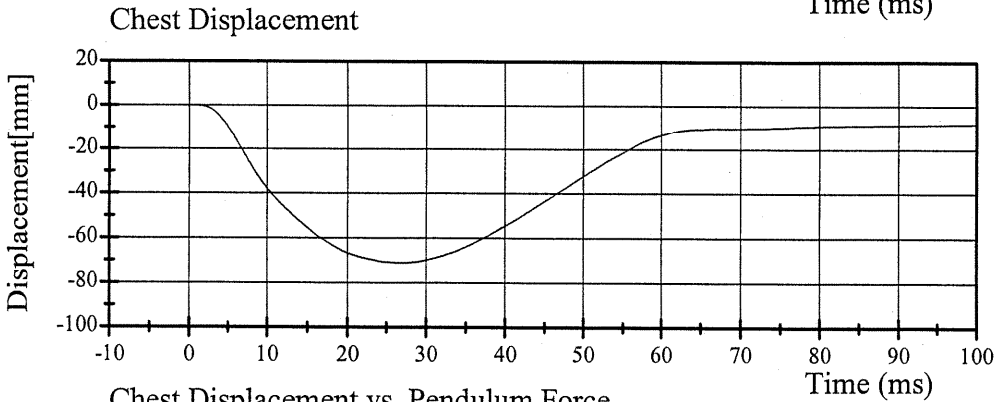
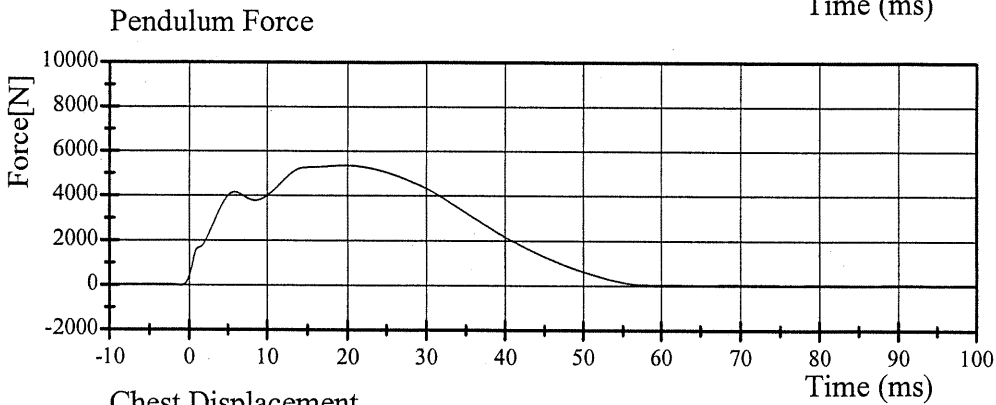
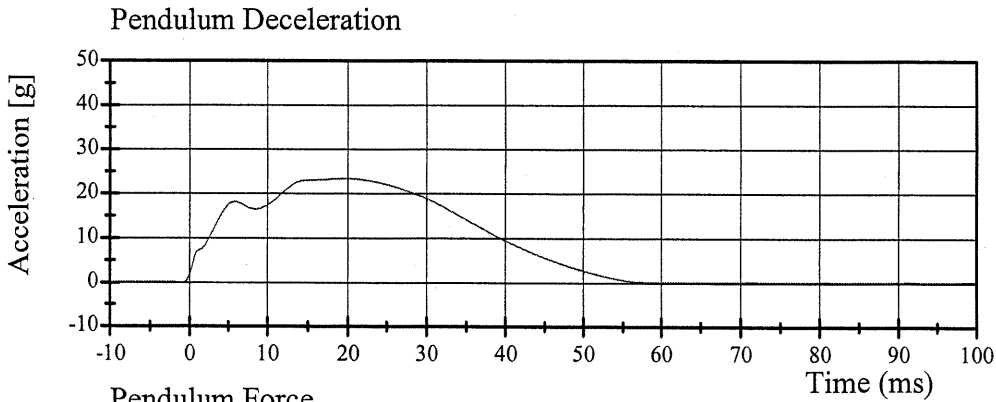


Transportation Research Center Inc.

Thorax Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/09/2003



06.09.2003 14:45:38 944



Transportation Research Center Inc.

Left Knee Slider Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/09/2003

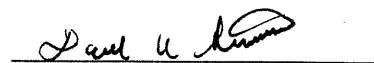
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.72 m/s	Yes
Knee Displacement	-18.3 - (-15.0) mm	-17.5 mm	Yes

Comments:

Technician



Approved



06.09.2003 15:05:54 1774

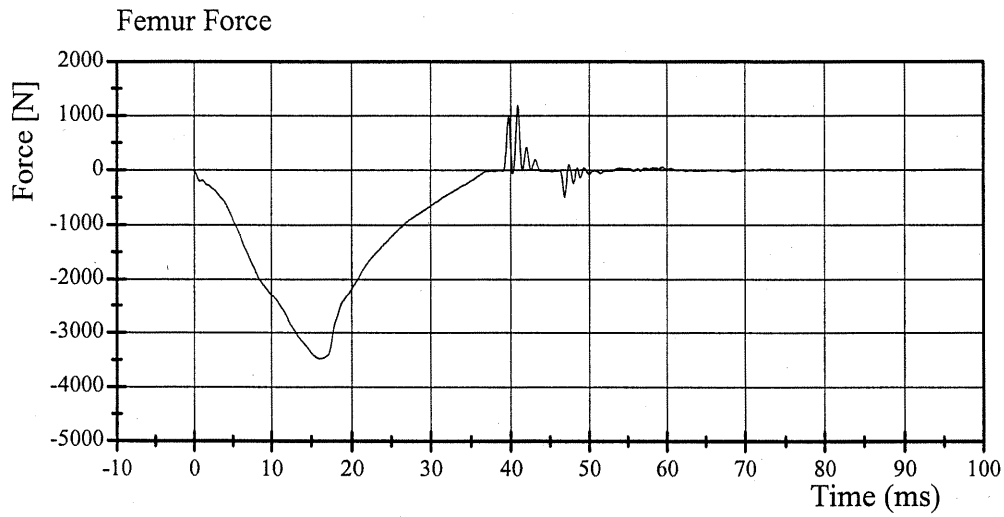


Transportation Research Center Inc.

Left Knee Slider Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

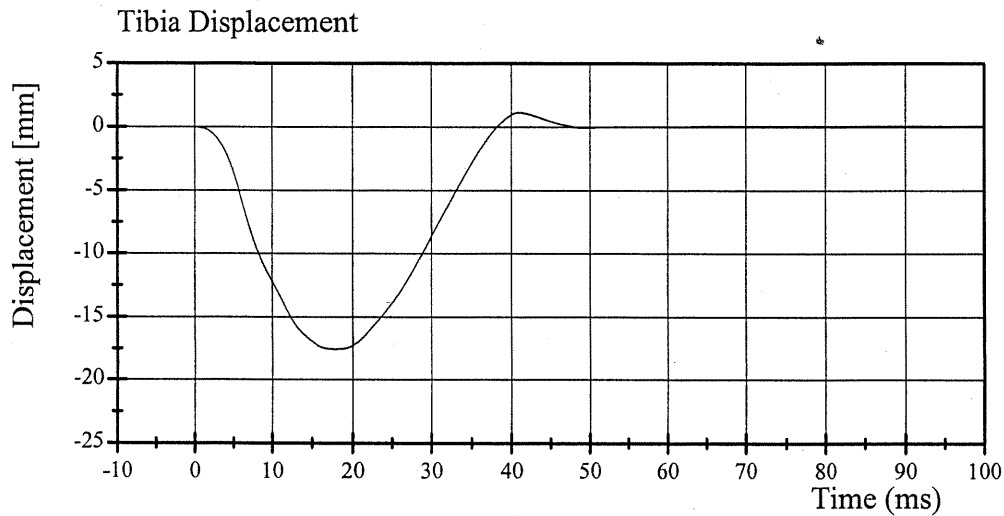
Test Date 06/09/2003



Filter Class: 600

Max: 1186.4 N at 40.9 ms

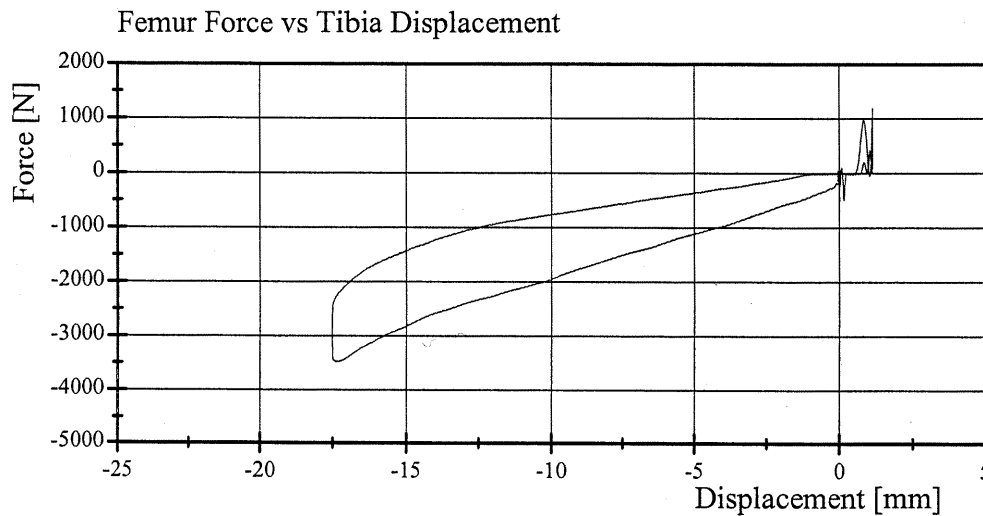
Min: -3477.9 N at 16.1 ms



Filter Class: 180

Max: 1.1 mm at 41.0 ms

Min: -17.5 mm at 18.0 ms



06.09.2003 15:05:55 1774



Transportation Research Center Inc.

Right Knee Slider Test

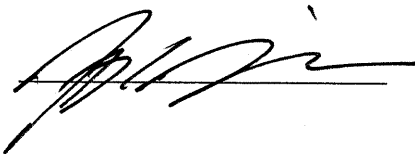
HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/09/2003

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	2.73 m/s	Yes
Knee Displacement	-18.3 - (-15.0) mm	-16.2 mm	Yes

Comments:

Technician



Approved



06.09.2003 09:14:45 1764

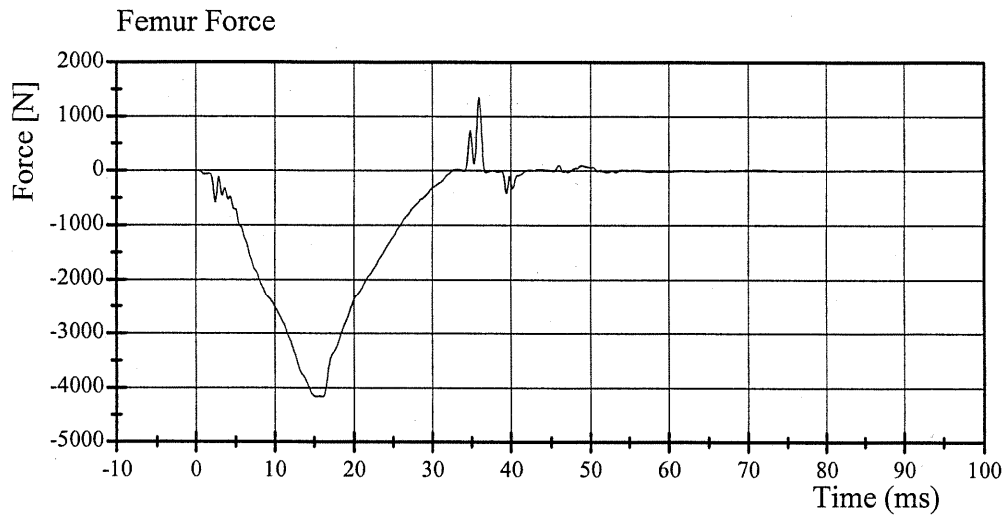


Transportation Research Center Inc.

Right Knee Slider Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

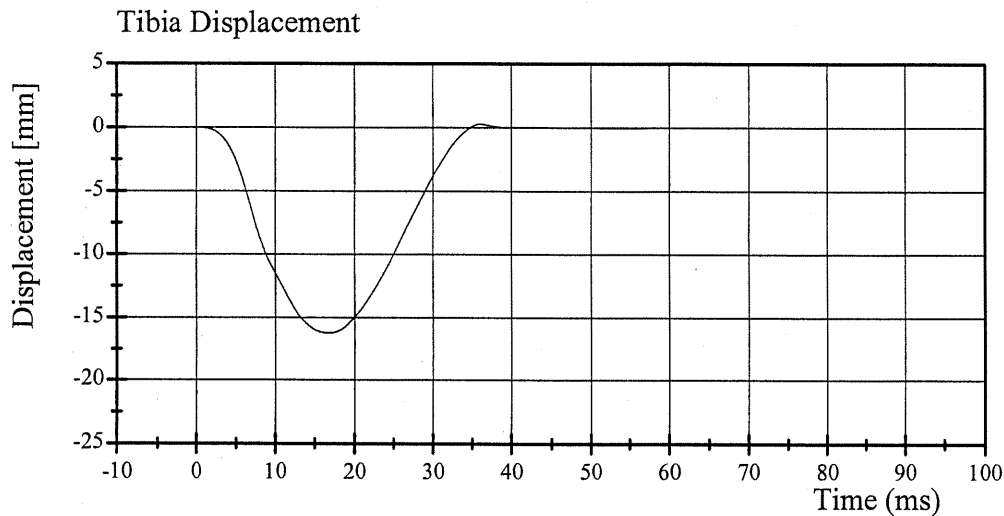
Test Date 06/09/2003



Filter Class: 600

Max: 1350.1 N at 35.9 ms

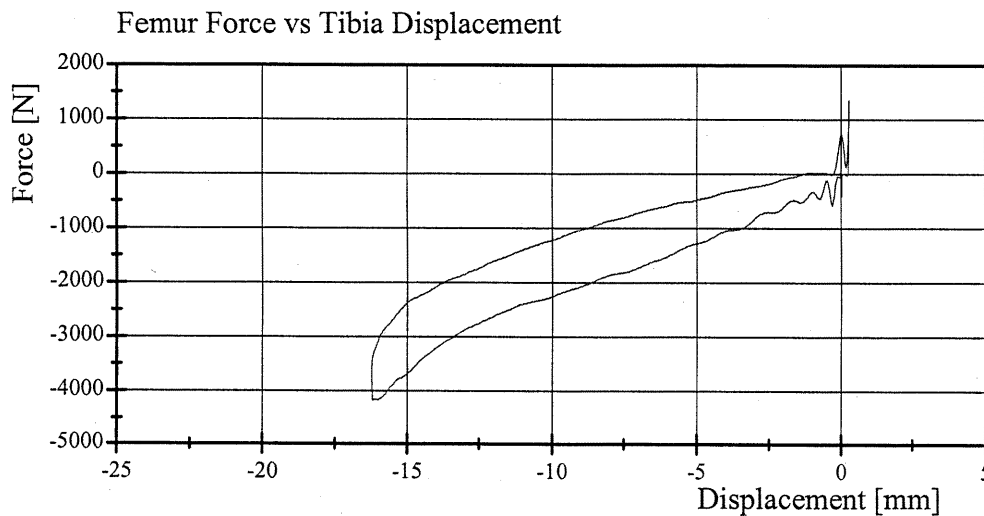
Min: -4169.8 N at 16.1 ms



Filter Class: 180

Max: 0.3 mm at 36.1 ms

Min: -16.2 mm at 16.7 ms



06.09.2003 09:14:46 1764



Transportation Research Center Inc.

Left Knee Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/04/2003

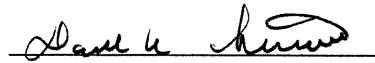
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.10 m/s	Yes
Maximum Pendulum Force	4900 - 6000 N	5628 N	Yes

Comments:

Technician



Approved



06.09.2003 12:26:52 2143

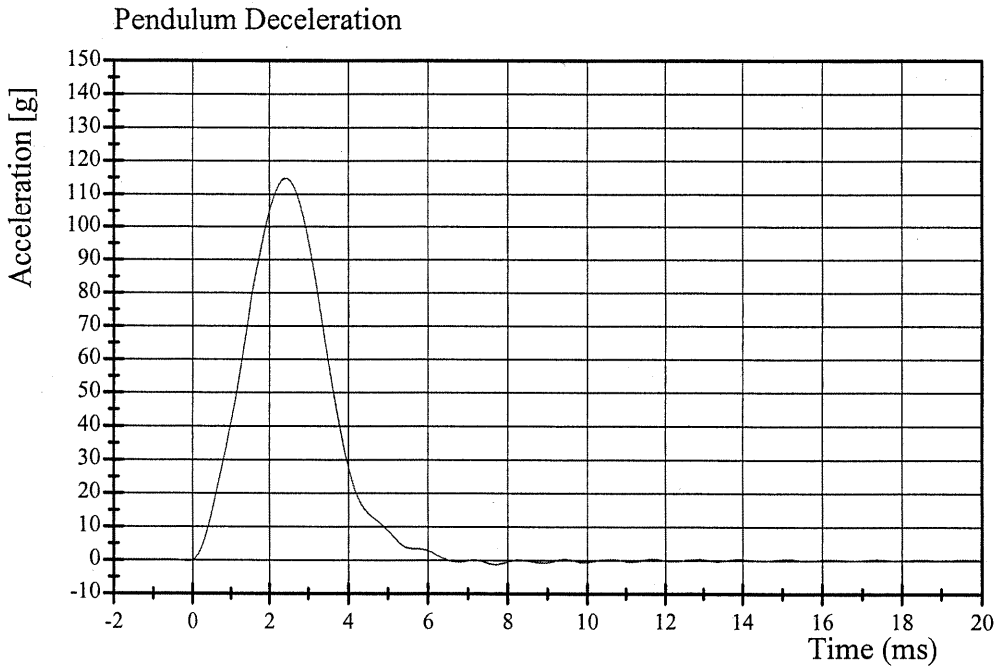


Transportation Research Center Inc.

Left Knee Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

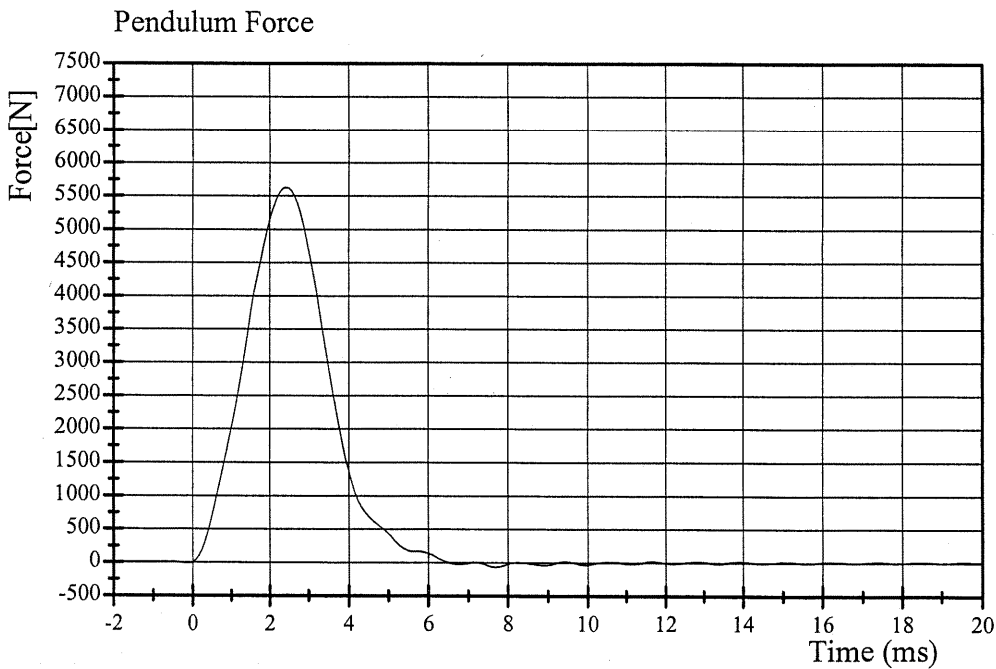
Test Date 06/04/2003



Filter Class: 600

Max: 114.8 g at 2.4 ms

Min: -1.3 g at 7.7 ms



Filter Class: 600

Max: 5628.2 N at 2.4 ms

Min: -63.0 N at 7.7 ms

Transportation Research Center Inc.

Right Knee Test

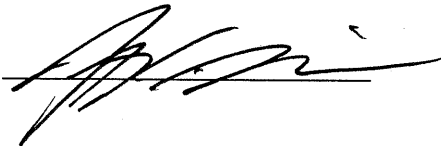
HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/04/2003

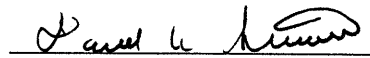
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.09 m/s	Yes
Maximum Pendulum Force	4900 - 6000 N	5387 N	Yes

Comments:

Technician



Approved



06.04.2003 14:01:32 2145



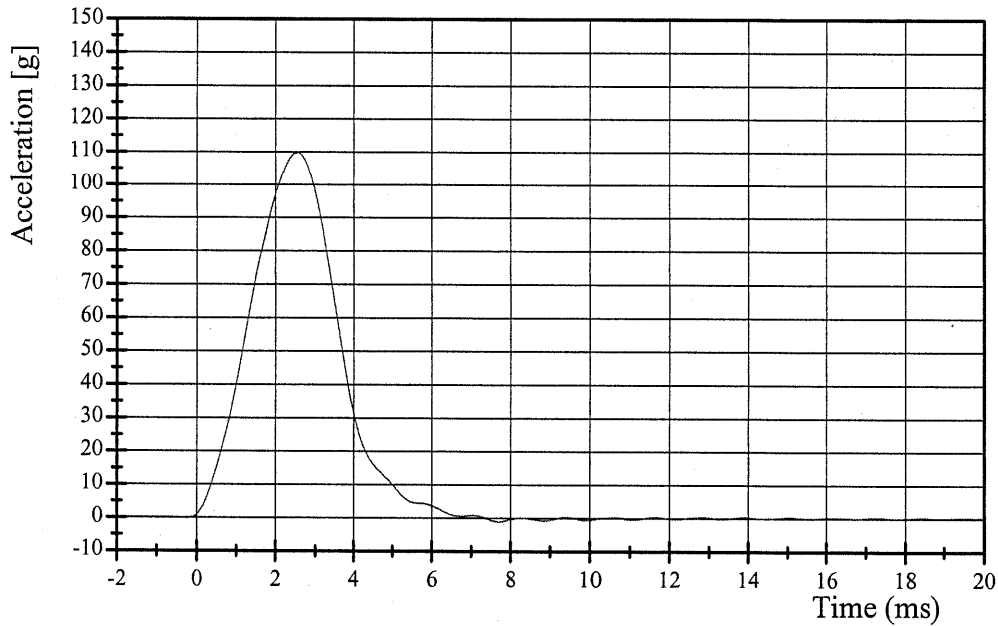
Transportation Research Center Inc.

Right Knee Test

HIII 95th Male Serial No. 083 Calibration No. 14 - 1

Test Date 06/04/2003

Pendulum Deceleration

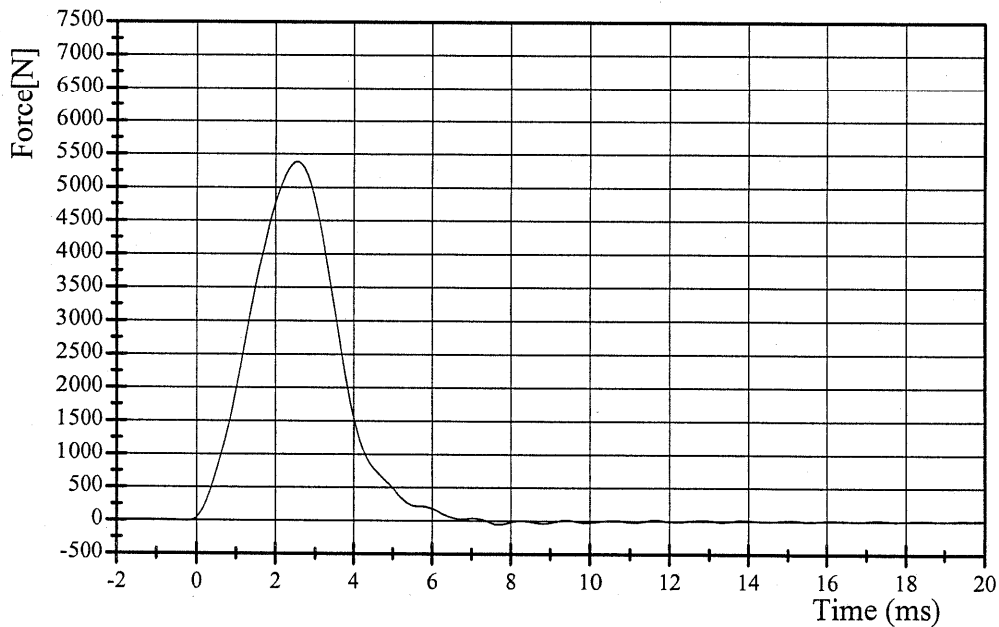


Filter Class: 600

Max: 109.9 g at 2.6 ms

Min: -1.1 g at 7.7 ms

Pendulum Force



Filter Class: 600

Max: 5387.4 N at 2.6 ms

Min: -54.2 N at 7.7 ms

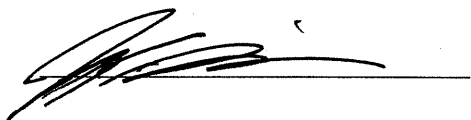
Post-test Dummy Configuration and Performance Verification Data

Driver 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

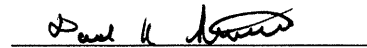
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Peak Resultant Acceleration	220 - 265 g	255.4 g	Yes
Peak Lateral Acceleration	15 g Max	3.6 g	Yes
Is Acceleration Curve Unimodal?	Yes	Yes	Yes

Comments:

Technician



Approved



06.25.2003 10:44:30 612

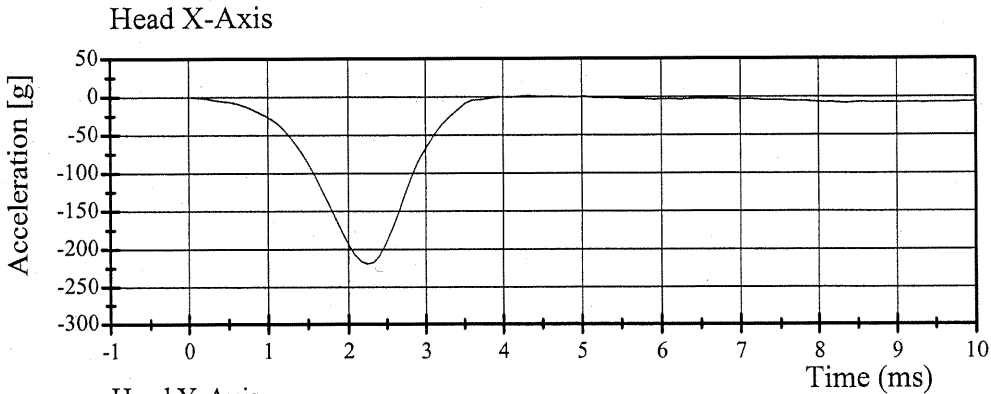


Transportation Research Center Inc.

Head Drop Test

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

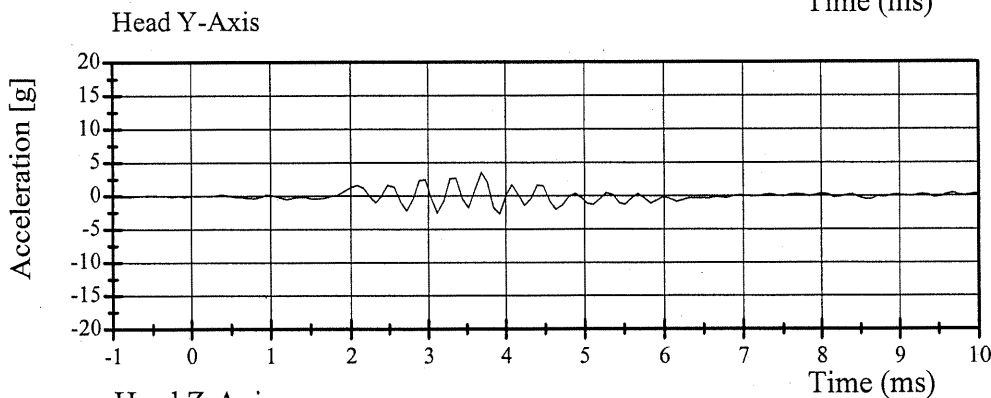
Test Date 06/25/2003



Filter Class: 1000

Max: 1.8 g at 4.3 ms

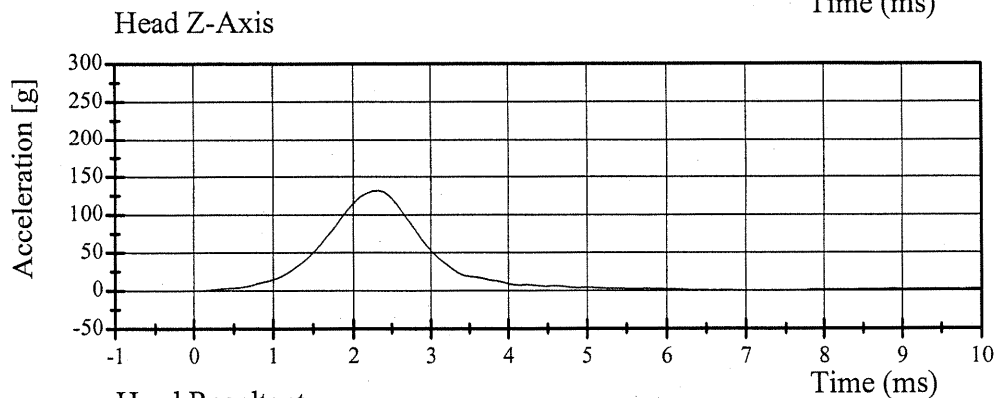
Min: -219.2 g at 2.2 ms



Filter Class: 1000

Max: 3.6 g at 3.7 ms

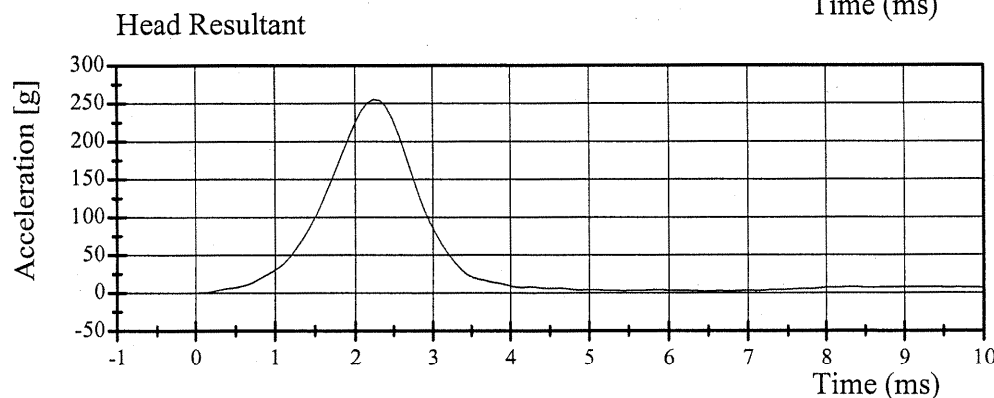
Min: -2.7 g at 3.9 ms



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.

Neck Flexion Test - 6 Channel Transducer

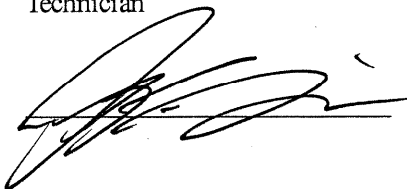
HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/26/2003

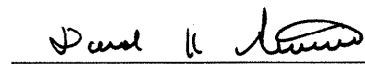
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impact Velocity	6.89 - 7.13 m/s	6.93 m/s	Yes
Integrated Pendulum Velocity			
10 ms	2.20 - 2.70 m/s	2.29 m/s	Yes
20 ms	4.00 - 5.00 m/s	4.35 m/s	Yes
30 ms	5.70 - 6.90 m/s	6.17 m/s	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



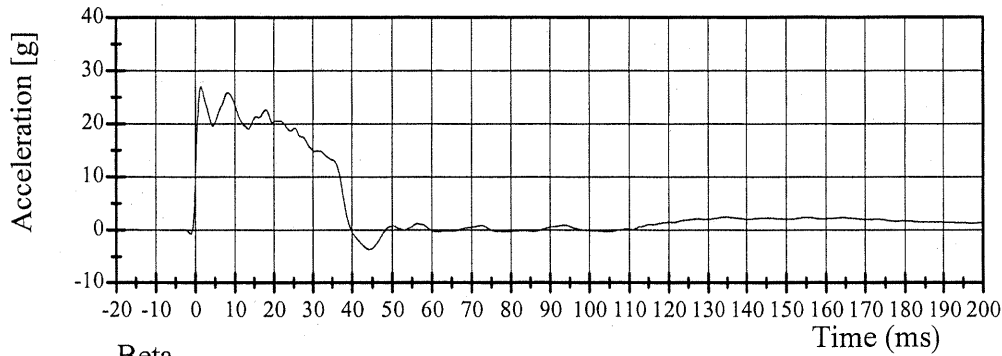
Transportation Research Center Inc.

Neck Flexion Test

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

Test Date 06/26/2003

Pendulum Deceleration

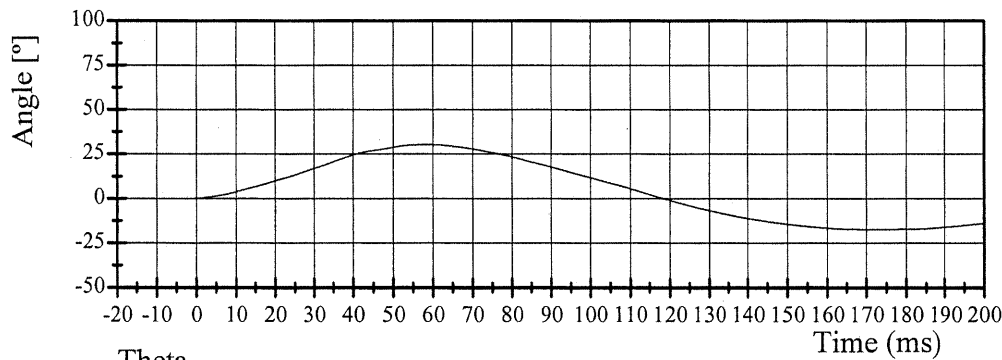


Filter Class: 180

Max: 27.0 g at 1.4 ms

Min: -3.6 g at 44.3 ms

Beta

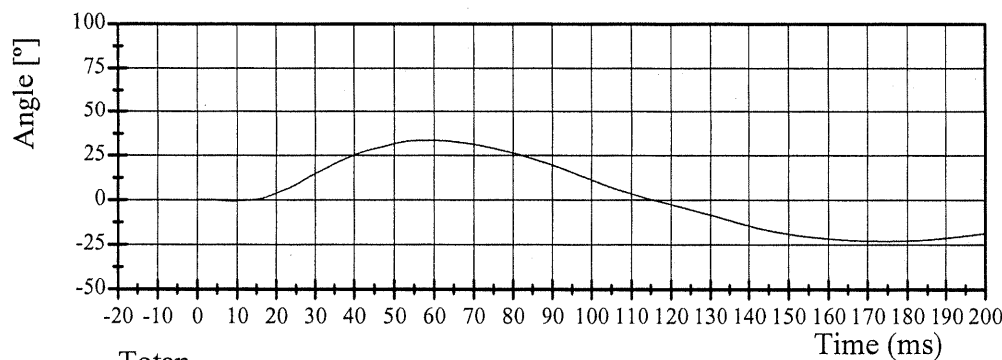


Filter Class: 60

Max: 30.3 ° at 58.2 ms

Min: -17.4 ° at 171.8 ms

Theta

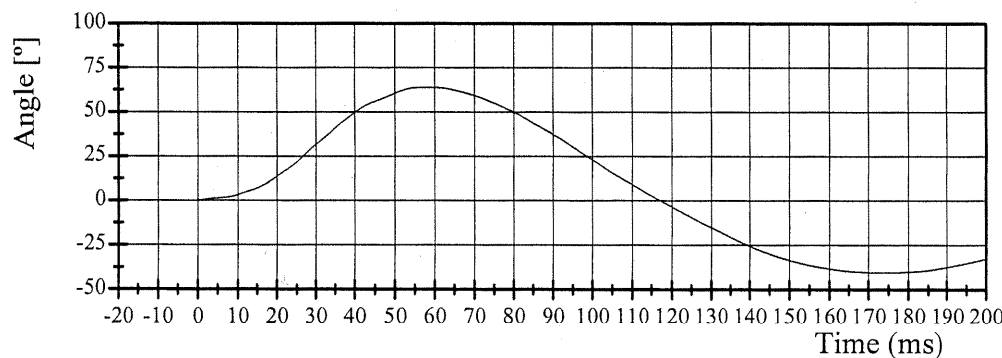


Filter Class: 60

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



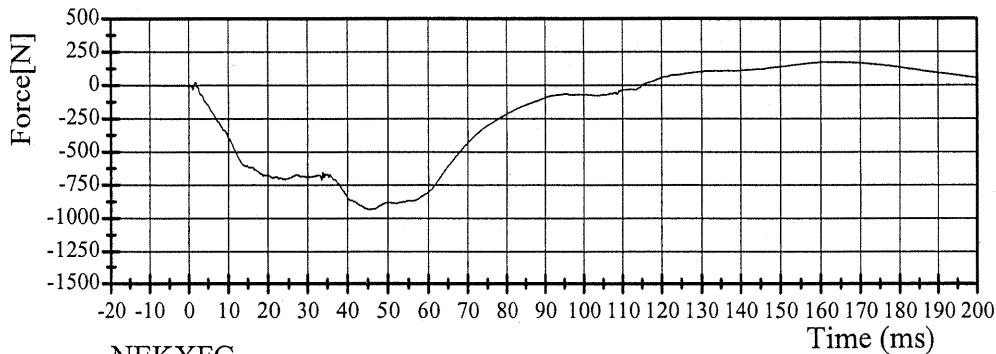
Transportation Research Center Inc.

Neck Flexion Test

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

Test Date 06/26/2003

NEKXF

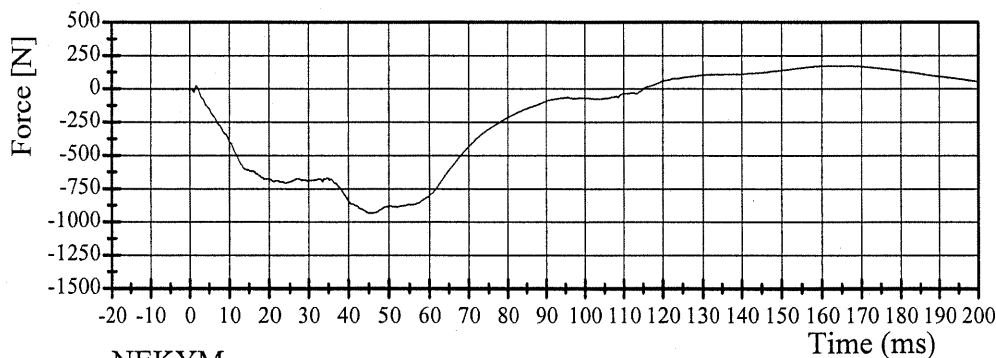


Filter Class: 1000

Max: 173.2 N at 161.6 ms

Min: -934.0 N at 45.7 ms

NEKXFC

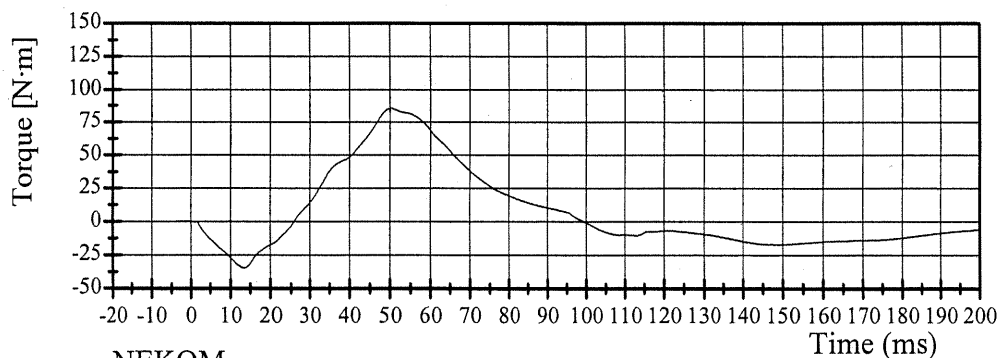


Filter Class: 600

Max: 172.6 N at 161.6 ms

Min: -933.6 N at 45.8 ms

NEKYM

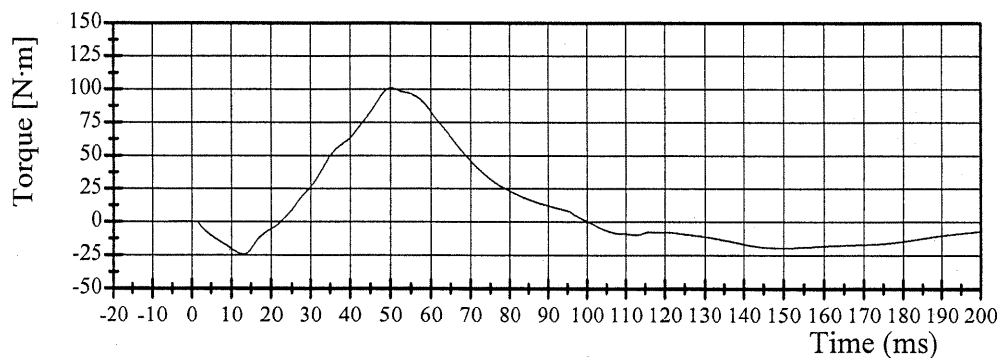


Filter Class: 600

Max: 85.5 N·m at 50.3 ms

Min: -34.6 N·m at 13.6 ms

NEKOM



Filter Class: 600

Max: 101.1 N·m at 50.3 ms

Min: -24.3 N·m at 13.0 ms

06.26.2003 10:50:17 508



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

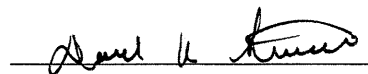
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Impact Velocity	5.95 - 6.19 m/s	6.02 m/s	Yes
Integrated Pendulum Velocity			
10 ms	1.80 - 2.20 m/s	1.88 m/s	Yes
20 ms	3.40 - 4.20 m/s	3.76 m/s	Yes
30 ms	4.80 - 5.80 m/s	5.44 m/s	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



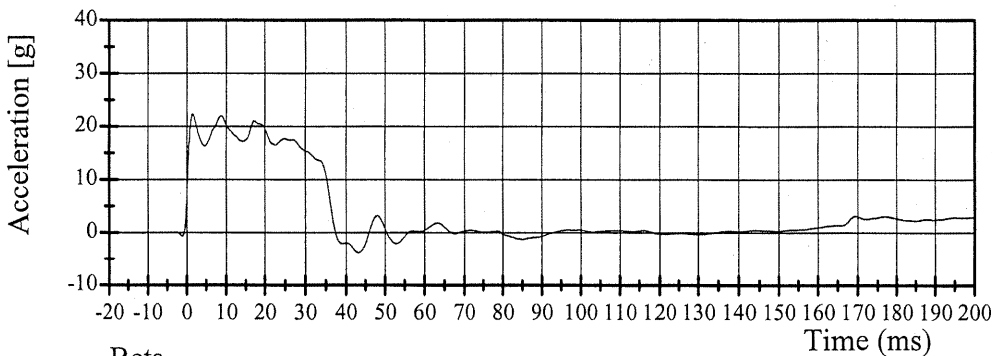
Transportation Research Center Inc.

Neck Extension Test

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

Test Date 06/26/2003

Pendulum Deceleration

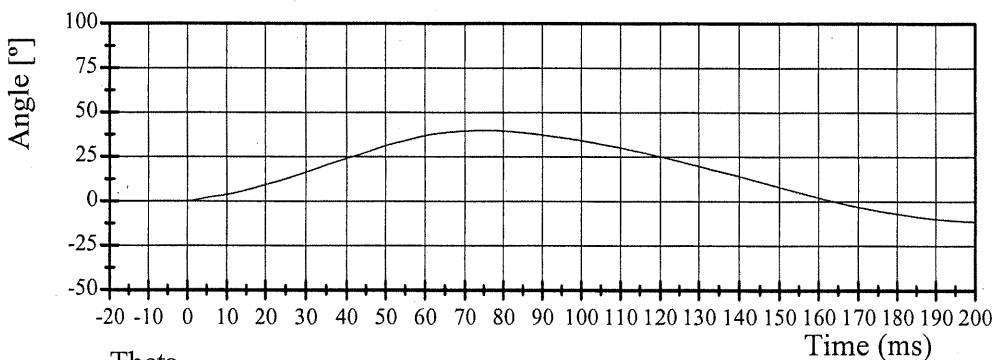


Filter Class: 180

Max: 22.3 g at 1.5 ms

Min: -3.7 g at 43.2 ms

Beta

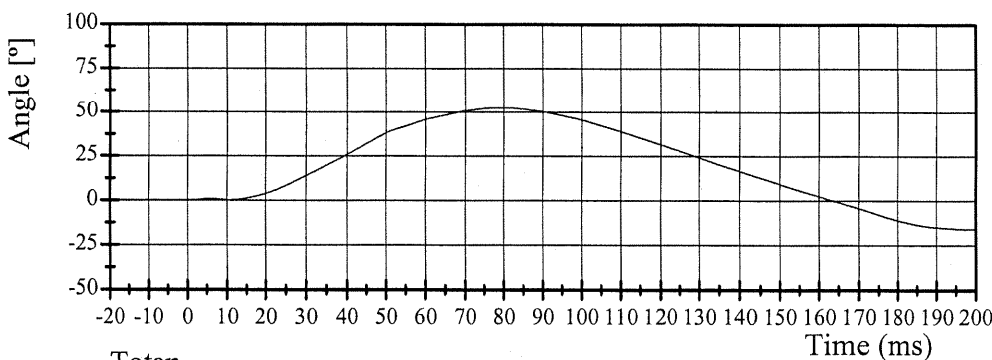


Filter Class: 60

Max: 39.9 ° at 75.7 ms

Min: -11.4 ° at 202.3 ms

Theta

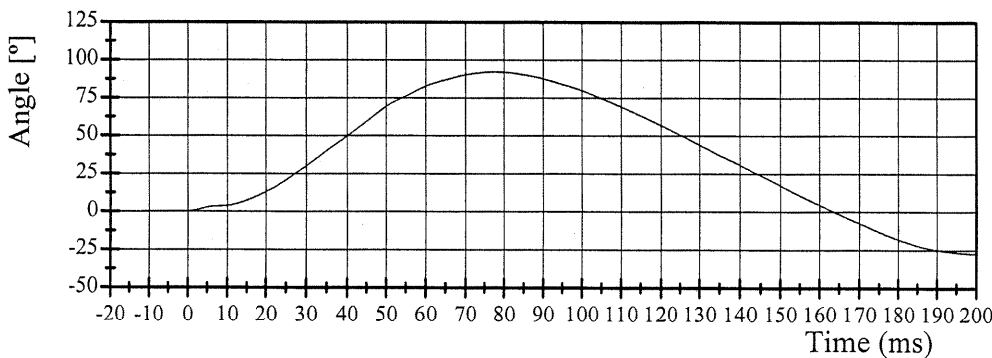


Filter Class: 60

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

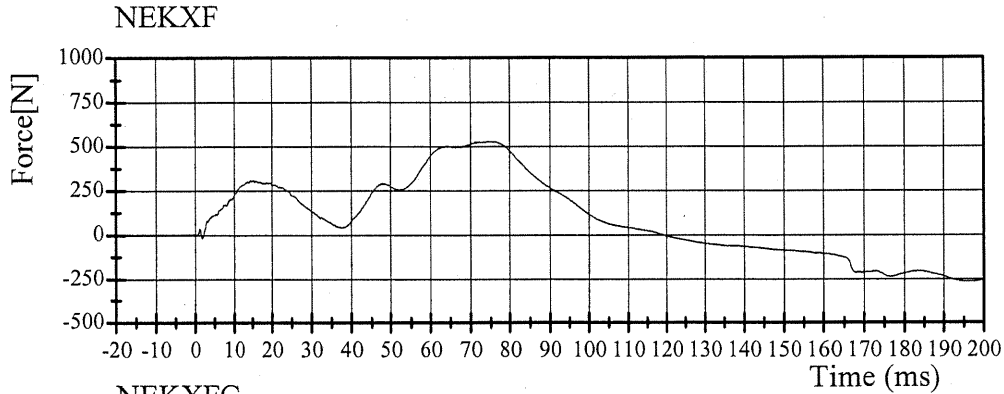


Transportation Research Center Inc.

Neck Extension Test

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

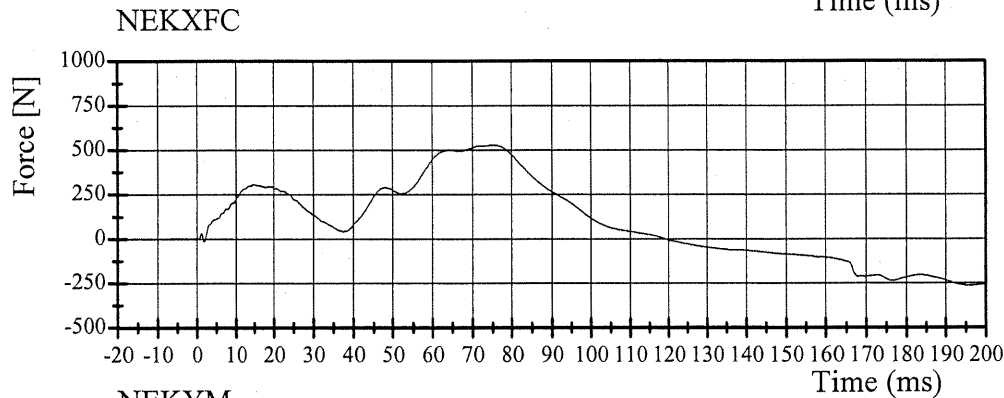
Test Date 06/26/2003



Filter Class: 1000

Max: 528.1 N at 75.2 ms

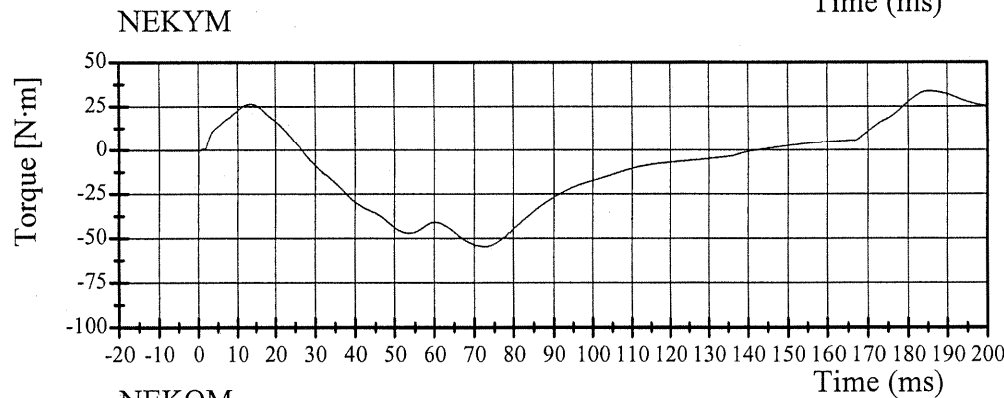
Min: -264.3 N at 195.4 ms



Filter Class: 600

Max: 527.9 N at 75.1 ms

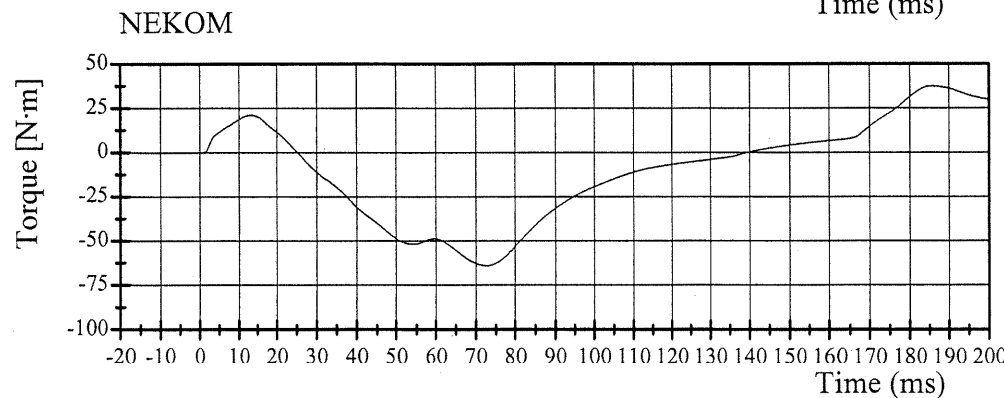
Min: -264.0 N at 195.3 ms



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

Transportation Research Center Inc.

Thorax Test

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

Test Date 06/24/2003

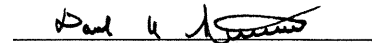
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	6.59 - 6.83 m/s	6.66 m/s	Yes
Maximum Chest Deflection	-76.0 - (-66.0) mm	-71.0 mm	Yes
Maximum Resistive Force	4700 - 6000 N	5404 N	Yes
Internal Hysteresis	69 -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

Comments:

Technician



Approved



06.24.2003 13:56:37 967



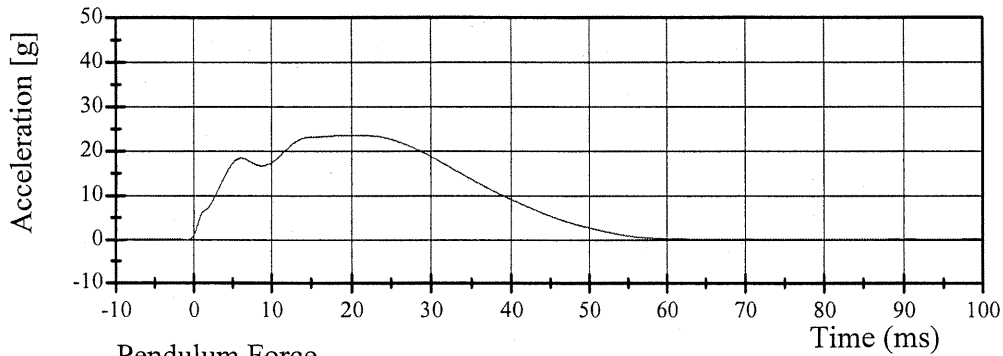
Transportation Research Center Inc.

Thorax Test

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

Test Date 06/24/2003

Pendulum Deceleration

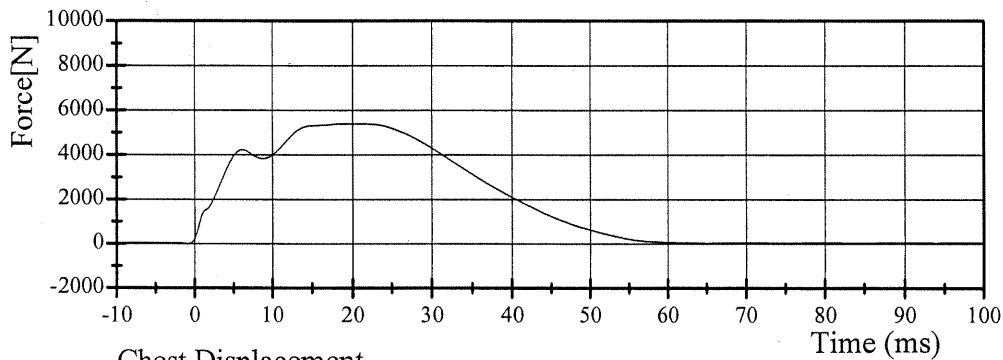


Filter Class: 180

Max: 23.6 g at 19.0 ms

Min: -0.0 g at -74.4 ms

Pendulum Force

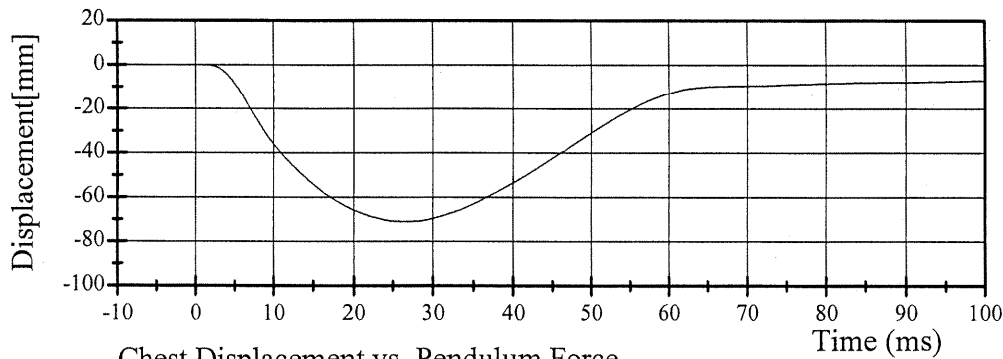


Filter Class: 180

Max: 5403.8 N at 19.0 ms

Min: -9.6 N at -74.4 ms

Chest Displacement

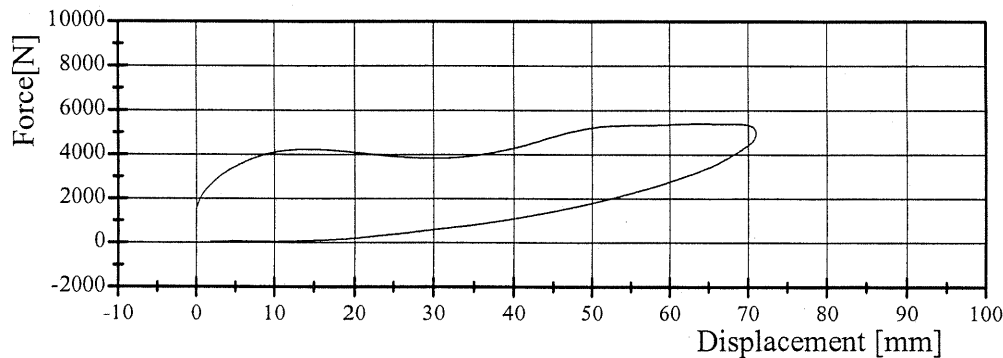


Filter Class: 180

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

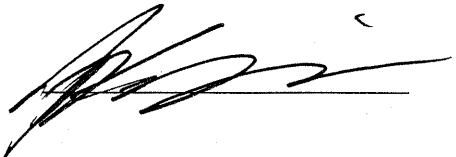
HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/25/2003

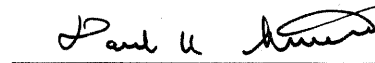
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.70 m/s	Yes
Knee Displacement	-18.3 - (-15.0) mm	-18.2 mm	Yes

Comments:

Technician



Approved



06.25.2003 13:34:03 1743

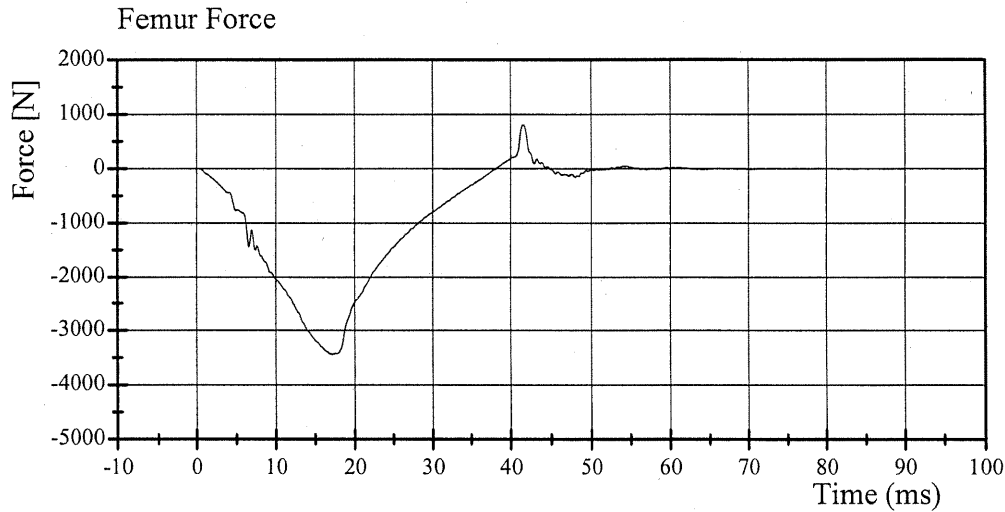


Transportation Research Center Inc.

Left Knee Slider Test

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

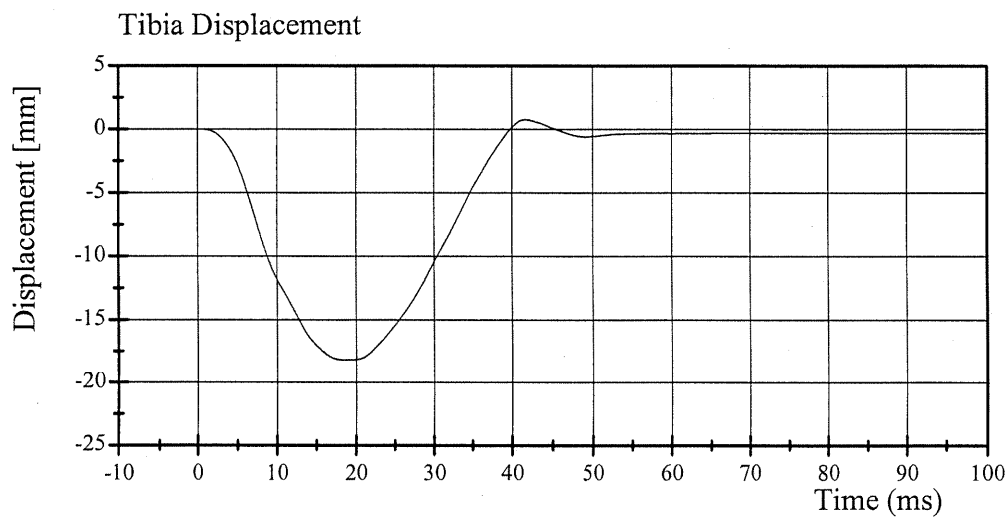
Test Date 06/25/2003



Filter Class: 600

Max: 805.5 N at 41.5 ms

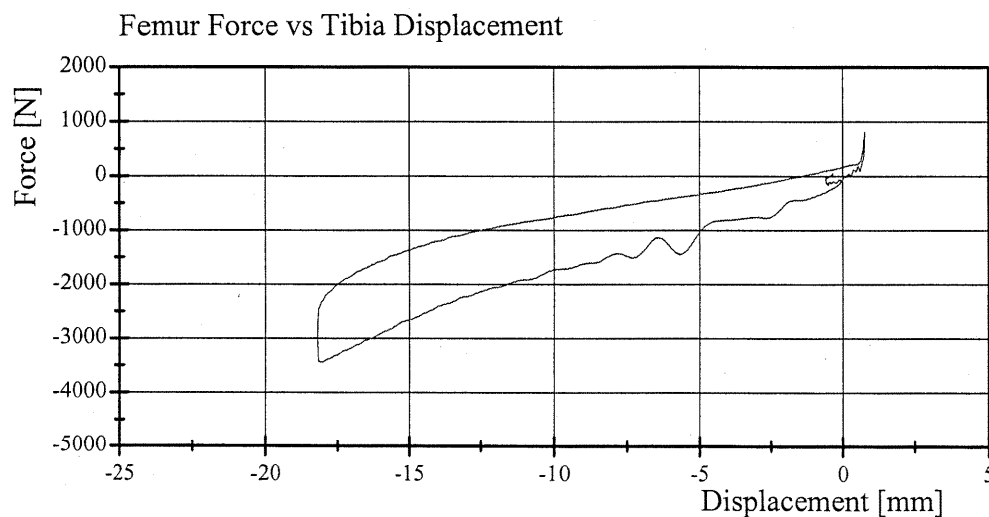
Min: -3439.8 N at 17.3 ms



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

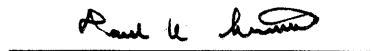
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.77 m/s	Yes
Knee Displacement	-18.3 - (-15.0) mm	-16.7 mm	Yes

Comments:

Technician



Approved



06.25.2003 11:29:09 1714

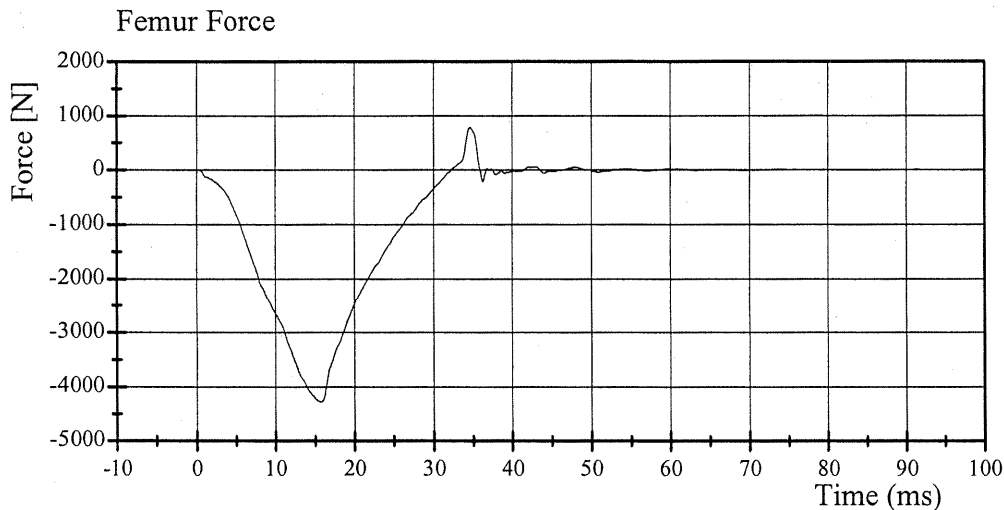


Transportation Research Center Inc.

Right Knee Slider Test

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

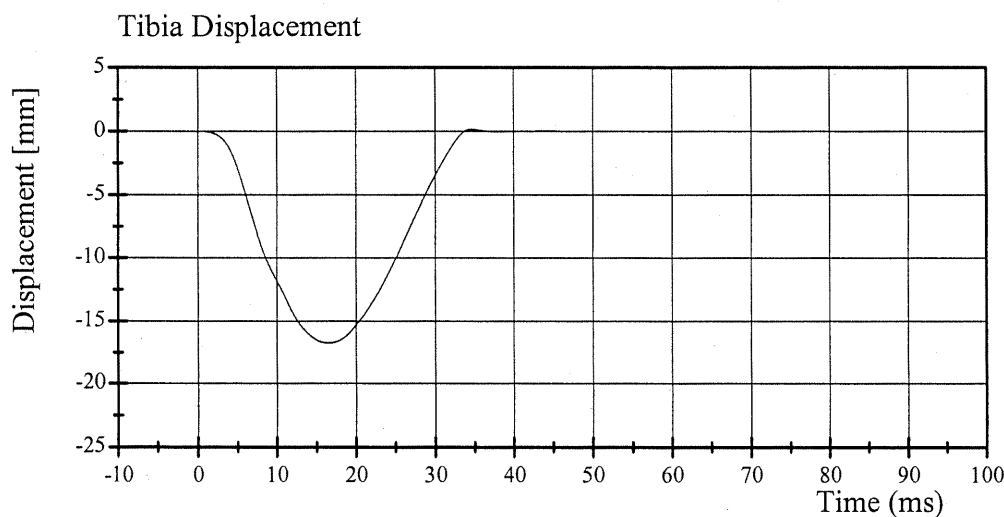
Test Date 06/25/2003



Filter Class: 600

Max: 783.7 N at 34.6 ms

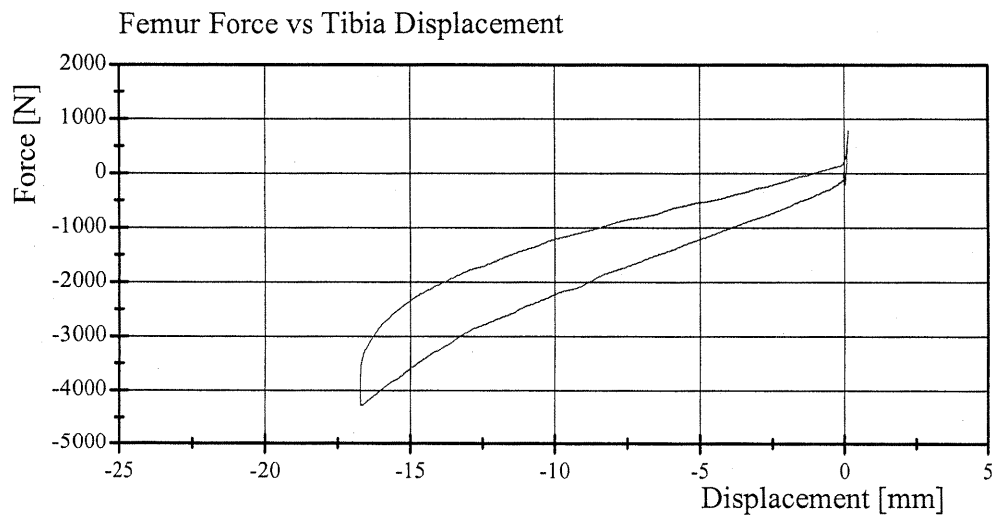
Min: -4280.6 N at 15.8 ms



Filter Class: 180

Max: 0.2 mm at 34.6 ms

Min: -16.7 mm at 16.5 ms



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

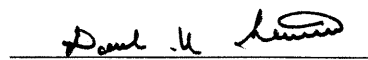
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.09 m/s	Yes
Maximum Pendulum Force	4900 - 6000 N	5593 N	Yes

Comments:

Technician



Approved



06.27.2003 07:39:50 2014



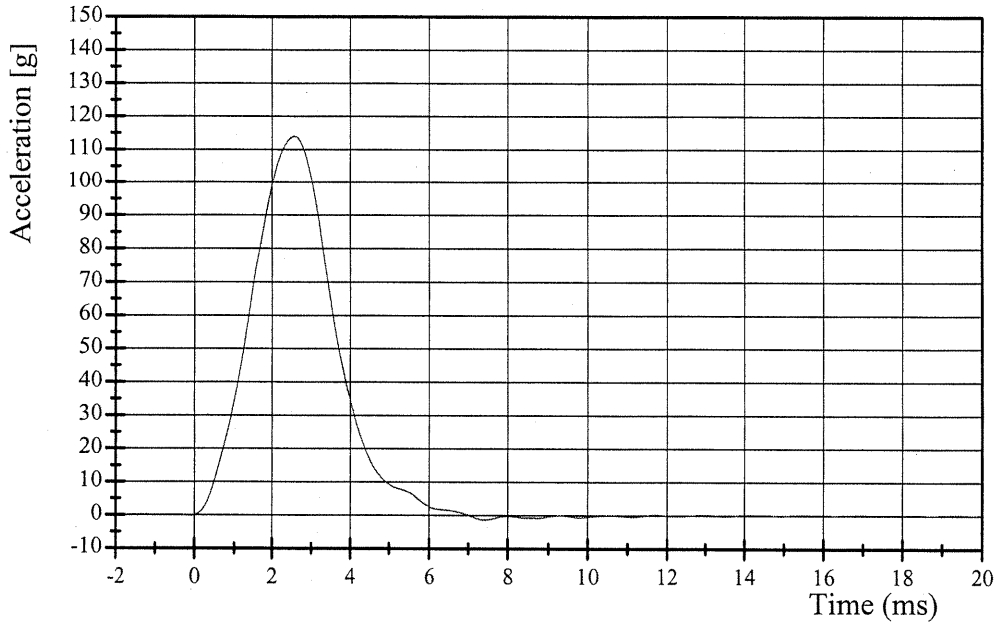
Transportation Research Center Inc.

Left Knee Test

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

Test Date 06/27/2003

Pendulum Deceleration

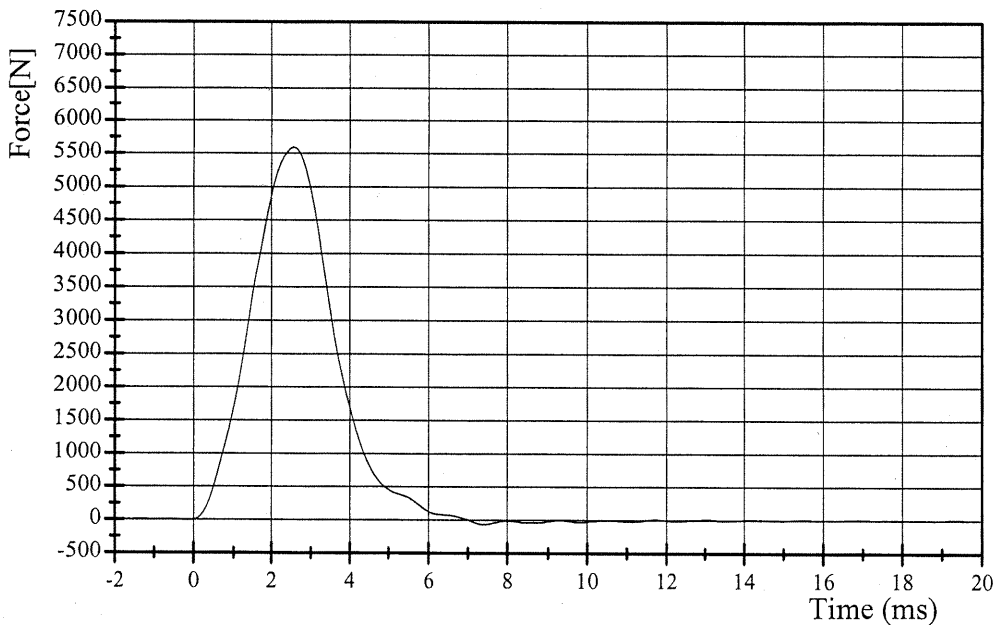


Filter Class: 600

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

Transportation Research Center Inc.

Right Knee Test

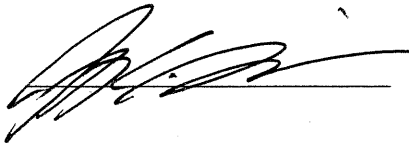
HIII 95th Male Serial No. 083 Calibration No. 15 - 1

Test Date 06/27/2003

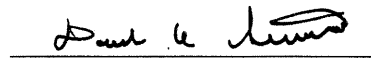
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.10 m/s	Yes
Maximum Pendulum Force	4900 - 6000 N	5291 N	Yes

Comments:

Technician



Approved



06.27.2003 07:37:34 2012



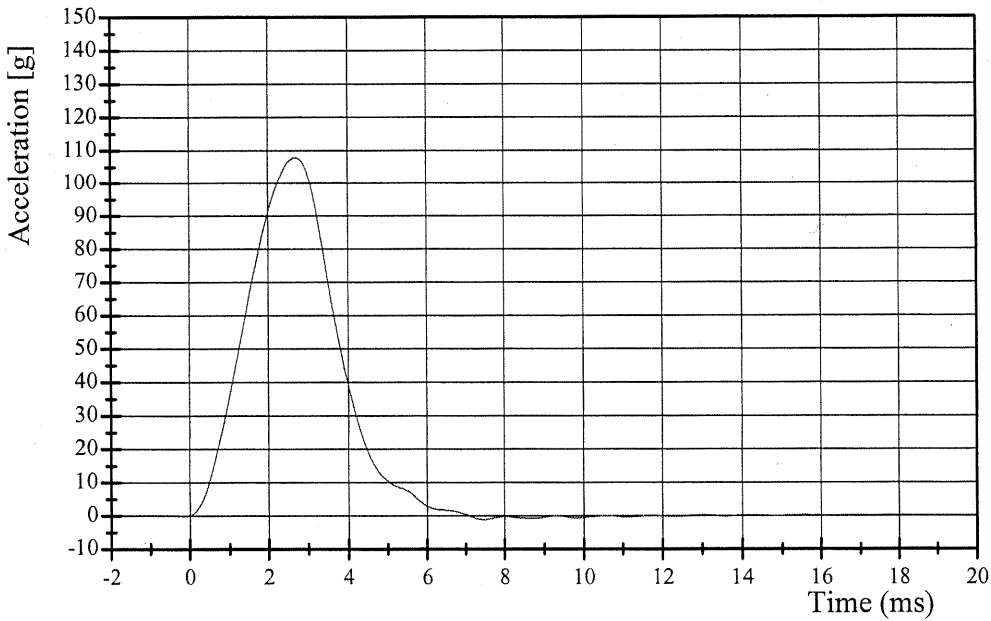
Transportation Research Center Inc.

Right Knee Test

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

Test Date 06/27/2003

Pendulum Deceleration

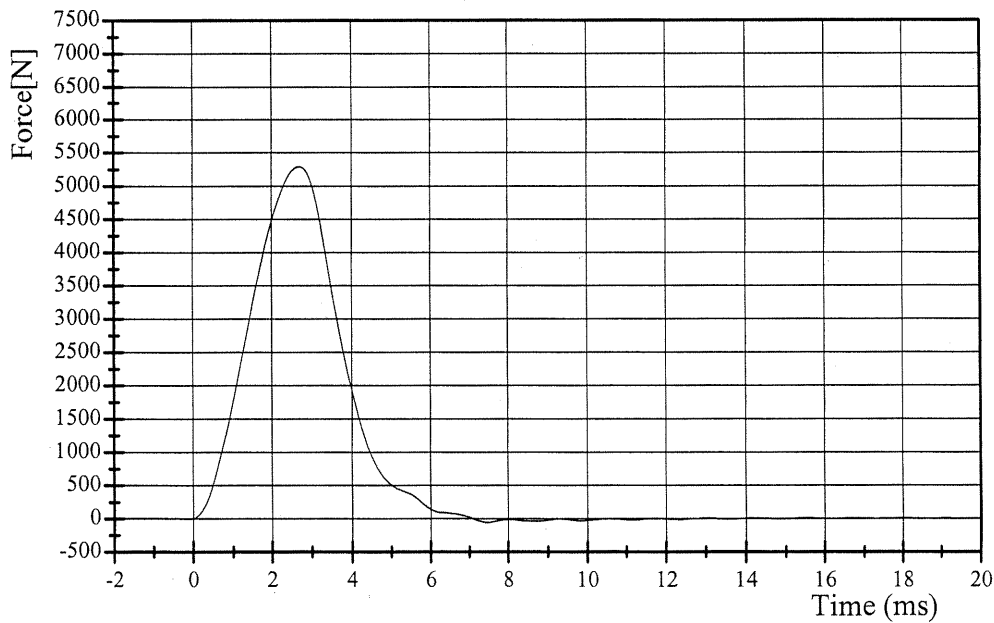


Filter Class: 600

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

06.27.2003 07:37:35 2012



THOR Leg Configuration Information

Passenger 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
Sept, 2003	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

C-43

030623-1

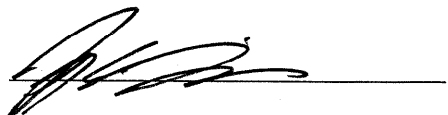
Pre-test Dummy Configuration and Performance Verification Data

Passenger Dummy S/N: 090

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 090 Calibration No. 42

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	885	Yes
B	Shoulder Pivot Height	505.5 - 520.7	514	Yes
C	H-Point Height	83.8 - 88.9	87	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	150	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	293	Yes
H	Skull Cap To Backline	40.6 - 45.7	43	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	338	Yes
J	Elbow Rest Height	190.5 - 210.8	201	Yes
K	Buttock Knee Length	579.1 - 604.5	587	Yes
L	Popliteal Height	429.3 - 454.7	430	Yes
M	Knee Pivot Height	485.1 - 500.4	493	Yes
N	Buttock Popliteal Length	452.1 - 477.5	461	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	102	Yes
Y	Chest Circumference	970.3 - 1000.8	990	Yes
Z	Waist Circumference	835.7 - 866.1	856	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. 42 - 1

Test Date 06/04/2003

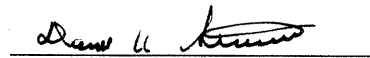
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Peak Resultant Acceleration	225 - 275 g	228.8 g	Yes
Peak Lateral Acceleration	15 g Max	9.9 g	Yes
Oscillations After Main Pulse	Less Than 10% of Peak Resultant Acceleration?	Yes	Yes

Comments:

Technician



Approved



06.04.2003 14:15:00 615



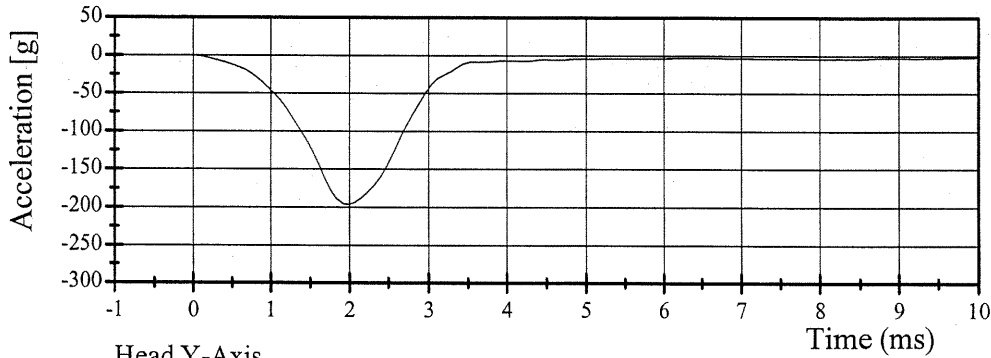
Transportation Research Center Inc.

572E Head Drop Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/04/2003

Head X-Axis

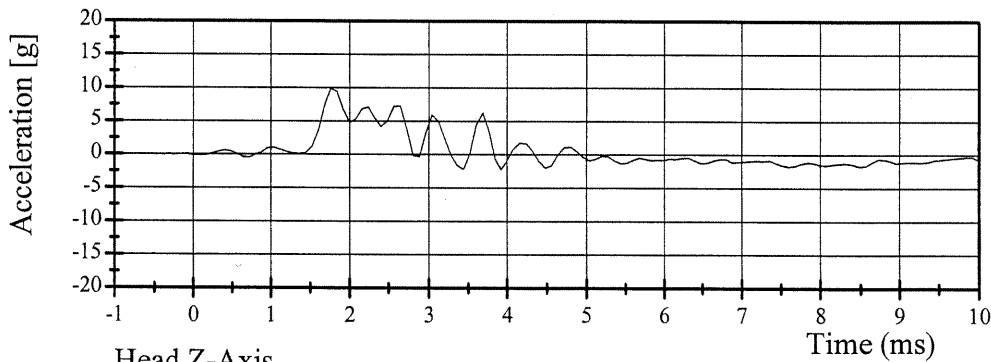


Filter Class: 1000

Max: 0.0 g at 0.0 ms

Min: -196.4 g at 2.0 ms

Head Y-Axis

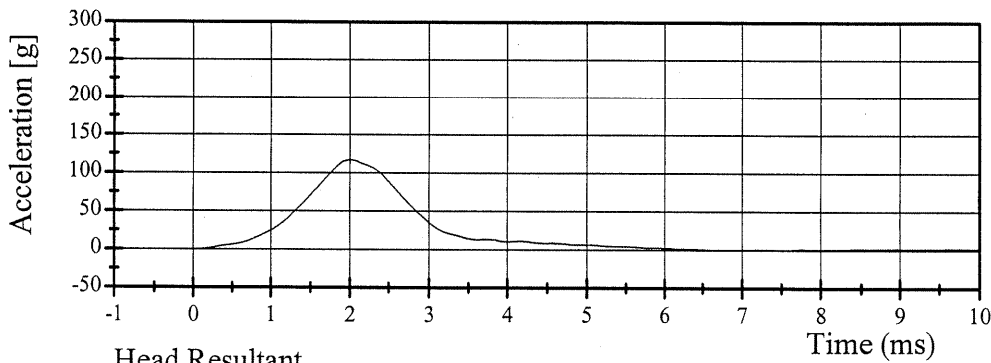


Filter Class: 1000

Max: 9.9 g at 1.8 ms

Min: -2.3 g at 3.9 ms

Head Z-Axis

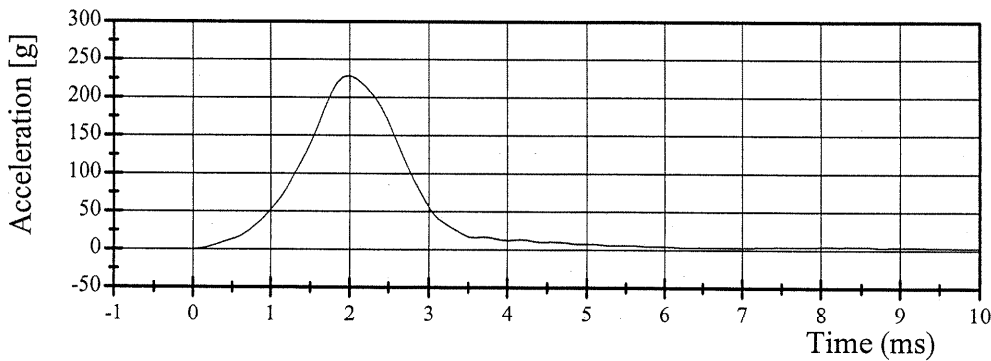


Filter Class: 1000

Max: 117.2 g at 2.0 ms

Min: 0.0 g at 0.0 ms

Head Resultant



Filter Class: 1000

Max: 228.8 g at 2.0 ms

Min: 0.0 g at 0.2 ms



Transportation Research Center Inc.

572E Neck Flexion Test - 6 Channel Transducer

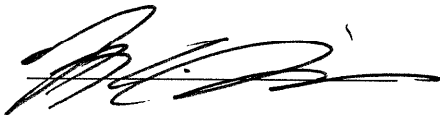
HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/06/2003

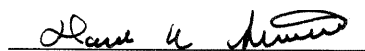
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Impact Velocity	6.89 - 7.13 m/s	6.97 m/s	Yes
Pendulum Deceleration			
10 ms	22.50 - 27.50 g	24.01 g	Yes
20 ms	17.60 - 22.60 g	21.88 g	Yes
30 ms	12.50 - 18.50 g	16.94 g	Yes
Max Pendulum Deceleration	29.00 g	24.80 g	Yes
Max Pendulum Deceleration After 30 ms	29.00 g	16.85 g	Yes
Deceleration-Time Curve			
Decay Time To 5g	34 - 42 ms	36.40 ms	Yes
D Plane Rotation			
Max	64 - 78 °	70.43 °	Yes
Time	57 - 64 ms	59.28 ms	Yes
Moment About Occipital Condyle			
Max	88.1 - 108.5 N·m	95.72 N·m	Yes
Time	47 - 58 ms	50.00 ms	Yes
Rotation Angle-Time Curve			
Decay Time To Zero	113 - 128 ms	118.40 ms	Yes
Positive Moment-Time Curve			
Decay Time To Zero	97 - 107 ms	98.16 ms	Yes

Comments:

Technician



Approved



06.06.2003 07:37:31 499



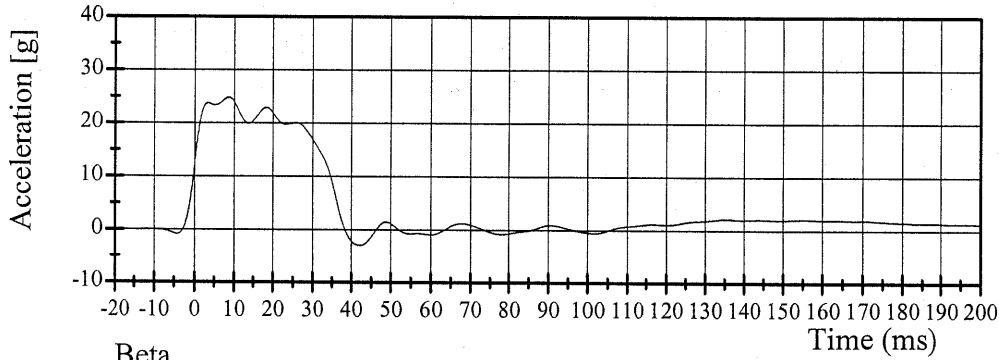
Transportation Research Center Inc.

572E Neck Flexion Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/06/2003

Pendulum Deceleration

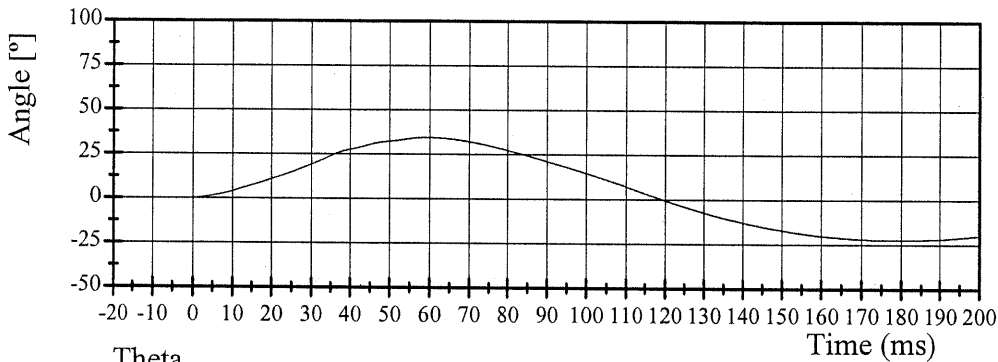


Filter Class: 60

Max: 24.8 g at 8.6 ms

Min: -2.9 g at 42.2 ms

Beta

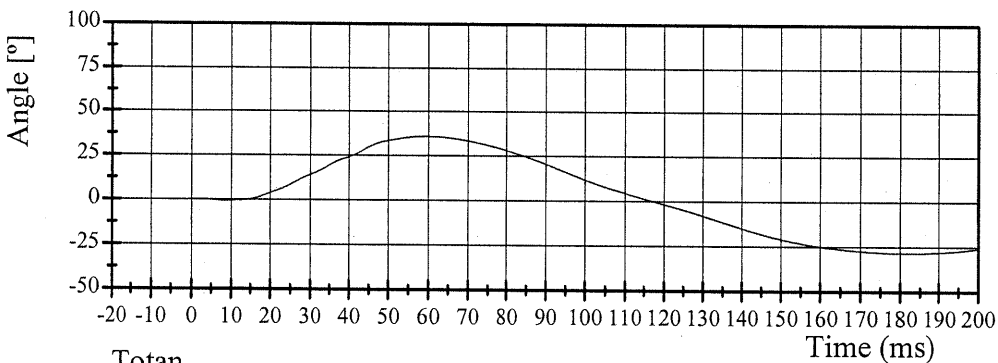


Filter Class: 60

Max: 34.5 ° at 59.3 ms

Min: -22.3 ° at 177.5 ms

Theta

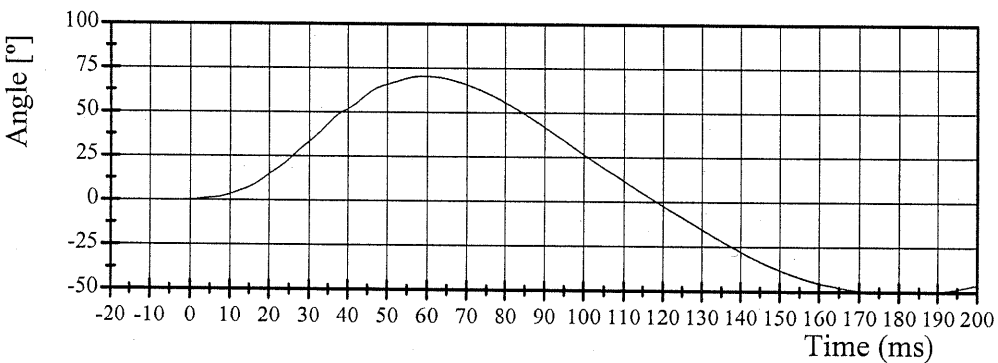


Filter Class: 60

Max: 35.9 ° at 59.2 ms

Min: -28.4 ° at 181.5 ms

Totan



Filter Class: 60

Max: 70.4 ° at 59.3 ms

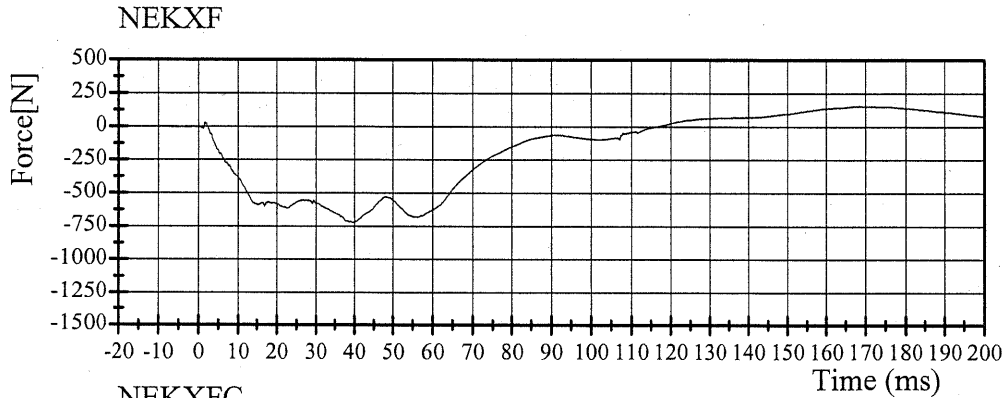
Min: -50.6 ° at 180.6 ms

Transportation Research Center Inc.

572E Neck Flexion Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

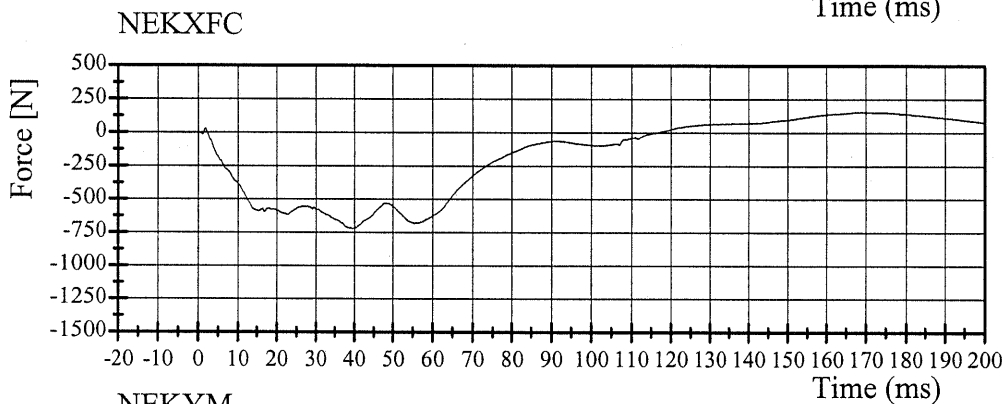
Test Date 06/06/2003



Filter Class: 1000

Max: 156.5 N at 169.0 ms

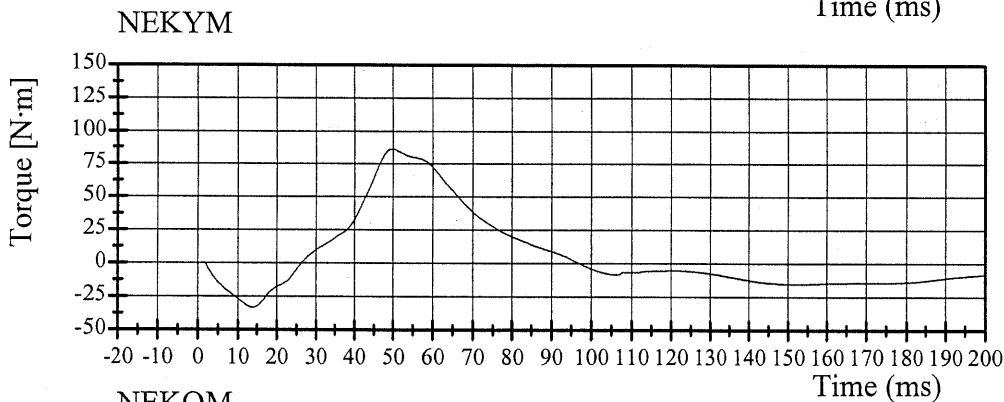
Min: -721.2 N at 39.6 ms



Filter Class: 600

Max: 155.9 N at 169.0 ms

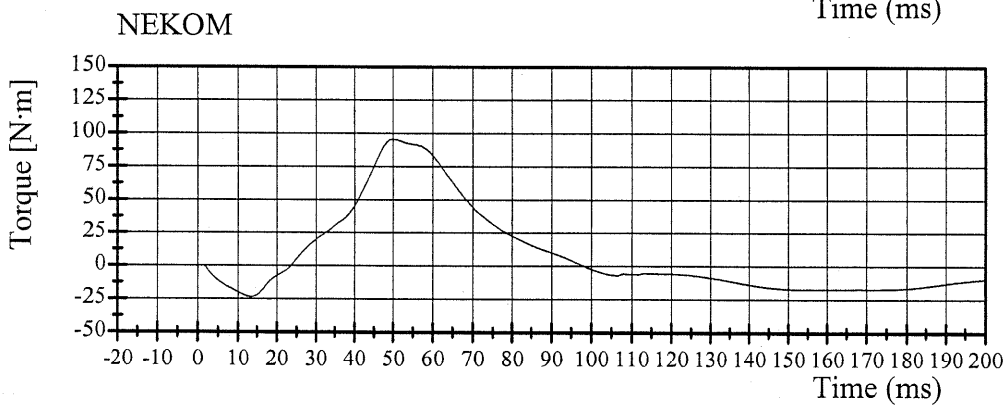
Min: -720.7 N at 39.6 ms



Filter Class: 600

Max: 86.0 N·m at 49.7 ms

Min: -33.5 N·m at 13.9 ms



Filter Class: 600

Max: 95.7 N·m at 50.0 ms

Min: -23.5 N·m at 13.4 ms



Transportation Research Center Inc.

572E Neck Extension Test - 6 Channel Transducer

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/06/2003

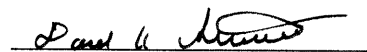
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Impact Velocity	5.95 - 6.19 m/s	6.02 m/s	Yes
Pendulum Deceleration			
10 ms	17.20 - 21.20 g	18.34 g	Yes
20 ms	14.00 - 19.00 g	17.31 g	Yes
30 ms	11.00 - 16.00 g	14.59 g	Yes
Max Pendulum Deceleration	22.00 g	18.89 g	Yes
Max Pendulum Deceleration After 30 ms	22.00 g	14.56 g	Yes
Deceleration-Time Curve			
Decay Time To 5g	38 - 46 ms	40.96 ms	Yes
D Plane Rotation			
Max	81 - 106 °	98.85 °	Yes
Time	72 - 82 ms	79.84 ms	Yes
Moment About Occipital Condyle			
Min	-80.0 - (-52.9) N·m	-65.57 N·m	Yes
Time	65 - 79 ms	74.56 ms	Yes
Rotation Angle-Time Curve			
Decay Time To Zero	147 - 174 ms	164.96 ms	Yes
Negative Moment-Time Curve			
Decay Time To Zero	120 - 148 ms	141.92 ms	Yes

Comments:

Technician



Approved



06.06.2003 08:08:39 577



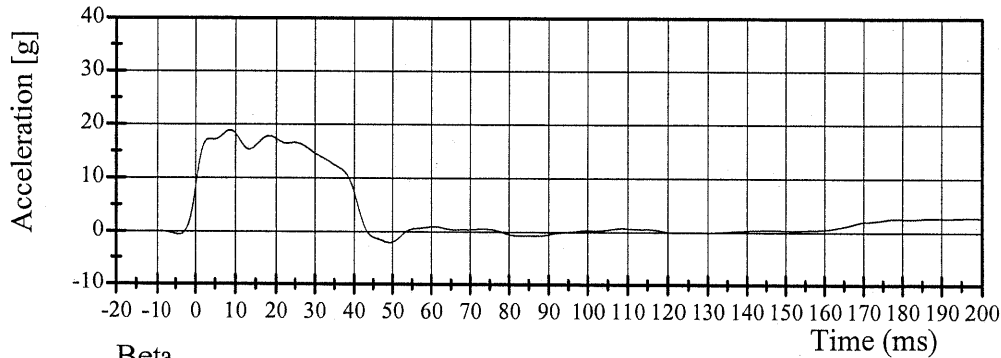
Transportation Research Center Inc.

572E Neck Extension Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/06/2003

Pendulum Deceleration

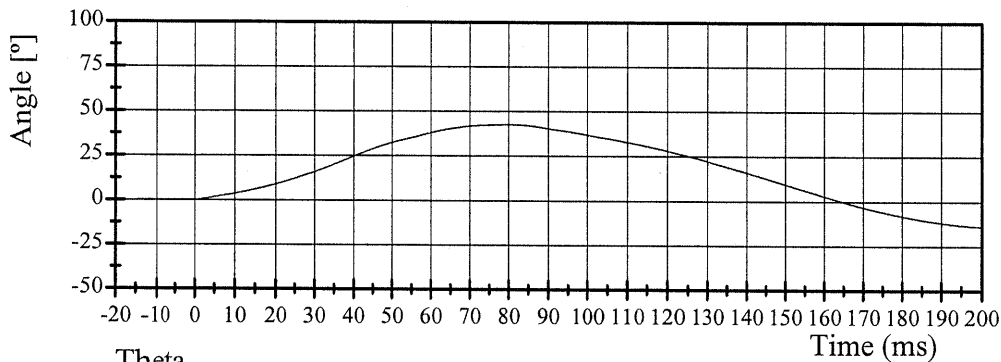


Filter Class: 60

Max: 18.9 g at 8.7 ms

Min: -2.0 g at 49.3 ms

Beta

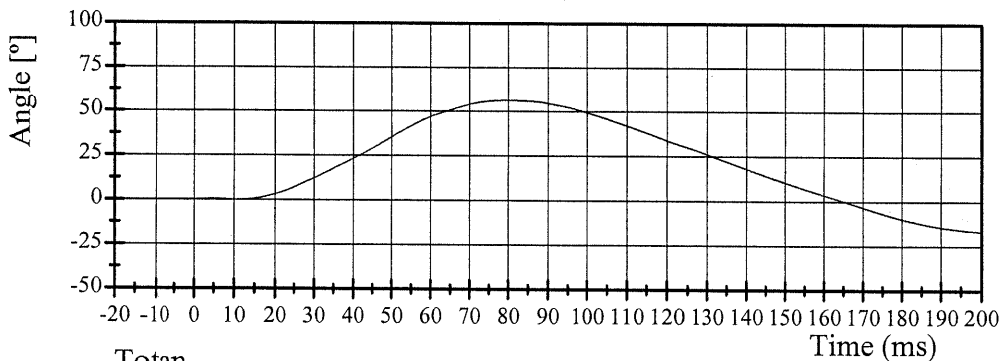


Filter Class: 60

Max: 42.6 ° at 79.7 ms

Min: -14.5 ° at 208.2 ms

Theta

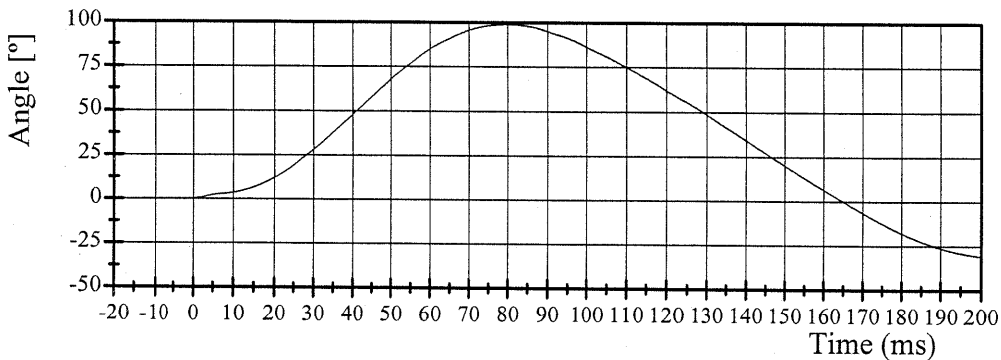


Filter Class: 60

Max: 56.2 ° at 79.9 ms

Min: -17.4 ° at 209.0 ms

Totan



Filter Class: 60

Max: 98.9 ° at 79.8 ms

Min: -31.9 ° at 208.6 ms

06.06.2003 08:08:40 577



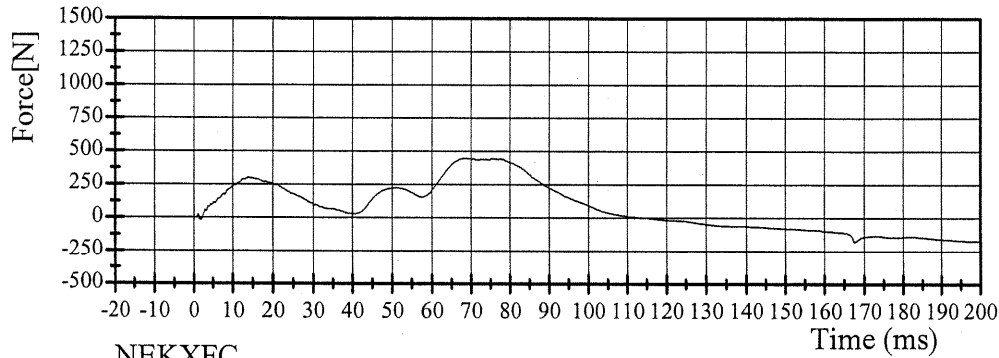
Transportation Research Center Inc.

572E Neck Extension Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/06/2003

NEKXF

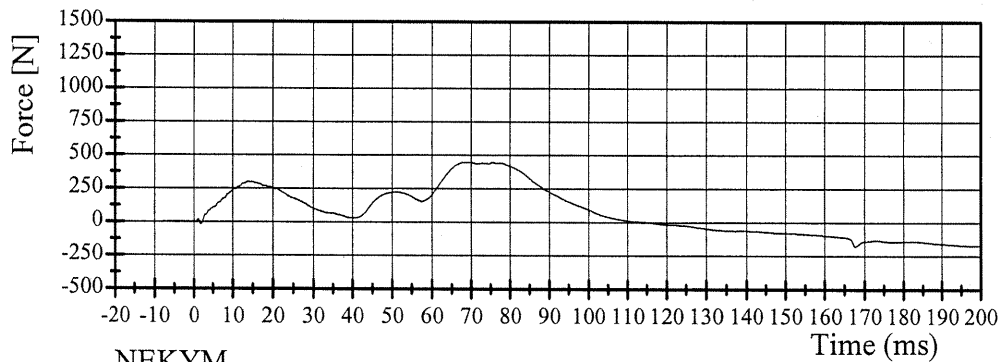


Filter Class: 1000

Max: 447.7 N at 75.4 ms

Min: -179.1 N at 167.6 ms

NEKXFC

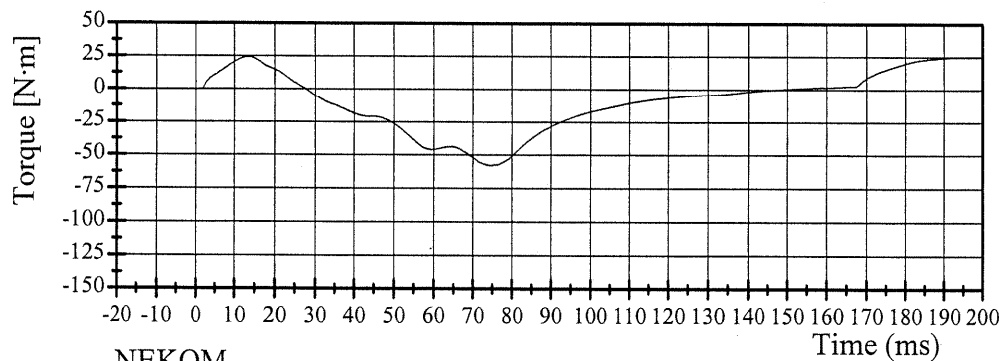


Filter Class: 600

Max: 447.1 N at 68.7 ms

Min: -178.1 N at 167.6 ms

NEKYM

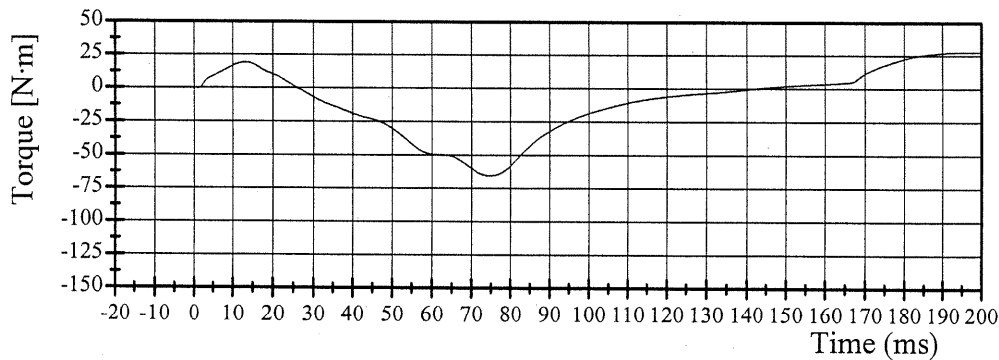


Filter Class: 600

Max: 24.9 N·m at 197.7 ms

Min: -57.9 N·m at 74.6 ms

NEKOM



Filter Class: 600

Max: 27.9 N·m at 197.6 ms

Min: -65.6 N·m at 74.6 ms

06.06.2003 08:08:41 577



Transportation Research Center Inc.

572E Thorax Test

HIH 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/03/2003

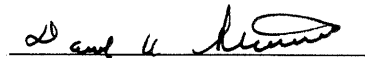
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Pendulum Velocity	6.59 - 6.83 m/s	6.63 m/s	Yes
Maximum Chest Deflection	-72.6 - (-63.5) mm	-68.7 mm	Yes
Maximum Resistive Force	5160 - 5894 N	5657 N	Yes
Internal Hysteresis	69 - 85 %	71 %	Yes

Comments:

Technician



Approved



06.03.2003 11:16:21 963



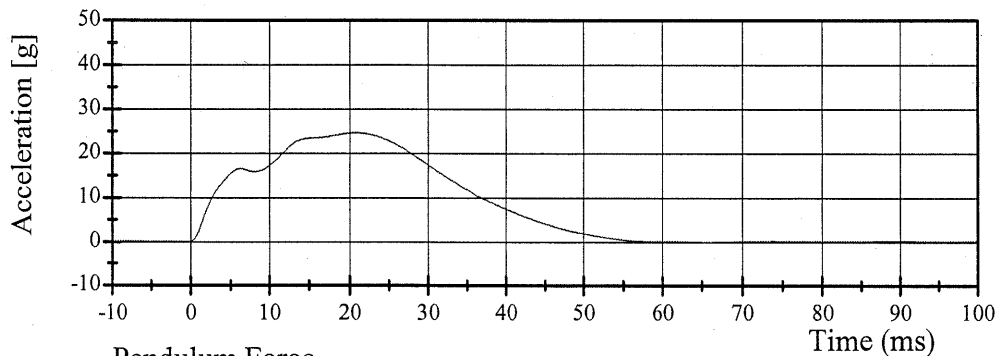
Transportation Research Center Inc.

572E Thorax Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/03/2003

Pendulum Deceleration

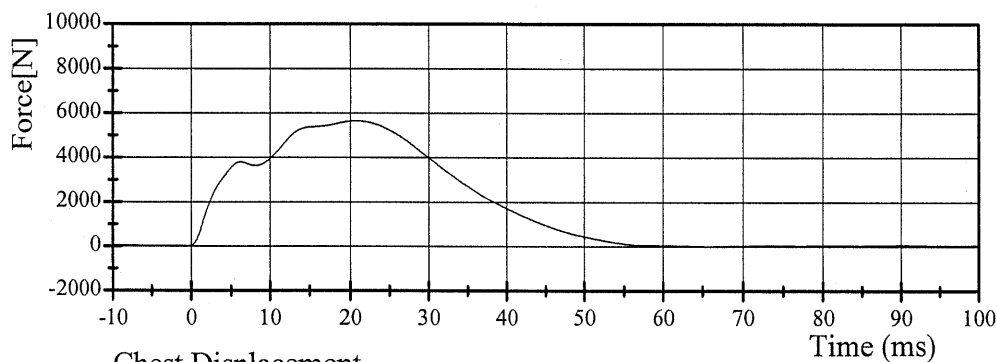


Filter Class: 180

Max: 24.7 g at 20.8 ms

Min: -0.2 g at 290.8 ms

Pendulum Force

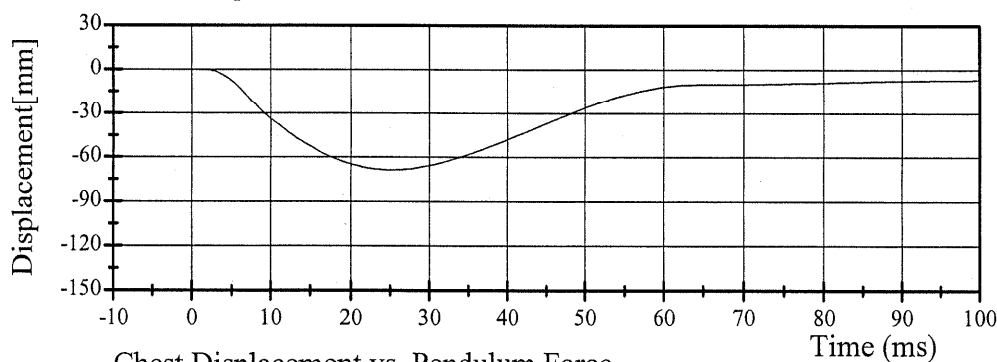


Filter Class: 180

Max: 5656.8 N at 20.8 ms

Min: -35.0 N at 290.8 ms

Chest Displacement

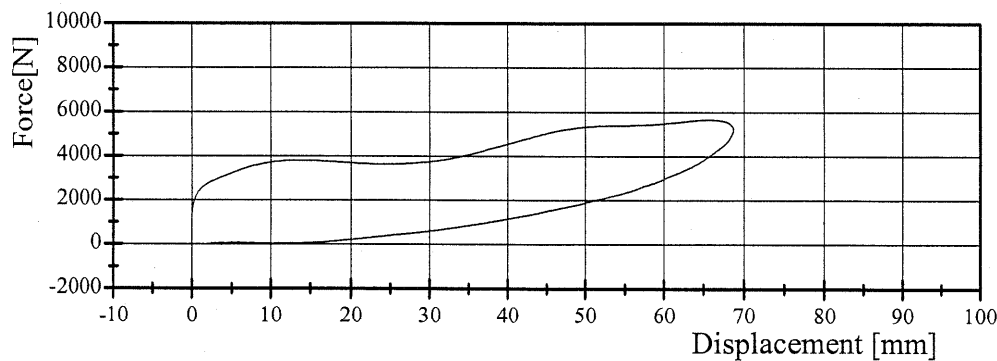


Filter Class: 180

Max: 0.0 mm at 1.0 ms

Min: -68.7 mm at 25.1 ms

Chest Displacement vs. Pendulum Force



06.03.2003 11:16:22 963



Transportation Research Center Inc

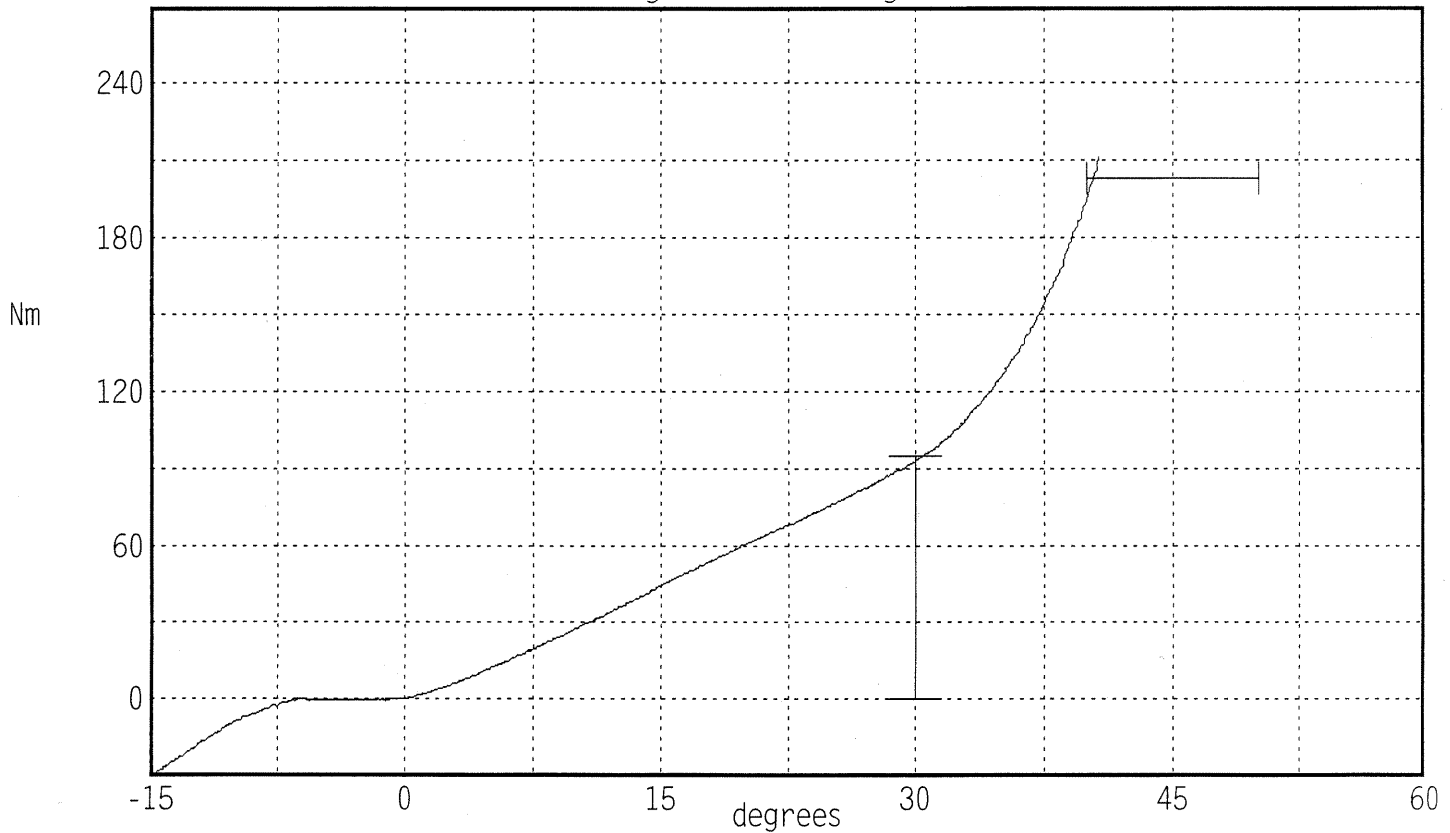
Hybrid III Hip Range of Motion

Serial Number: 090L
Test Number: 090C42
Comments:

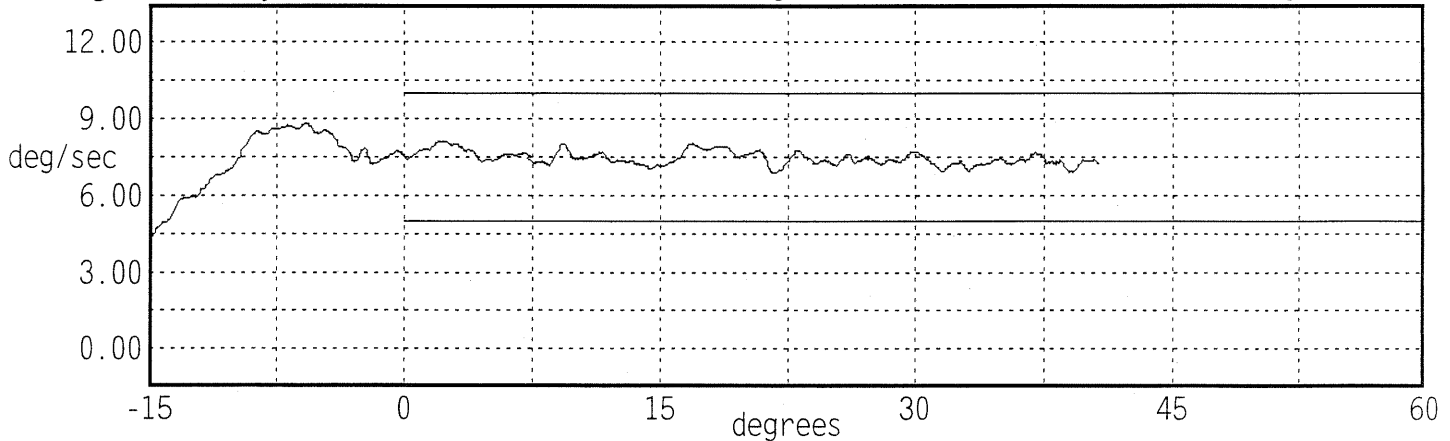
Date: 06/03/2003
Time: 13:39

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.7 °C	Pass
Humidity	10 - 70	51 %	Pass
Moment at 30 deg	<= 94.9	93.1 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	40.4 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point
Peak Moment: 211.0 Nm at 40.7 deg
Peak Angle: 40.7 deg at 211.0 Nm



Angular Velocity Max: 8.1 deg/sec Min: 6.9 deg/sec



Transportation Research Center Inc

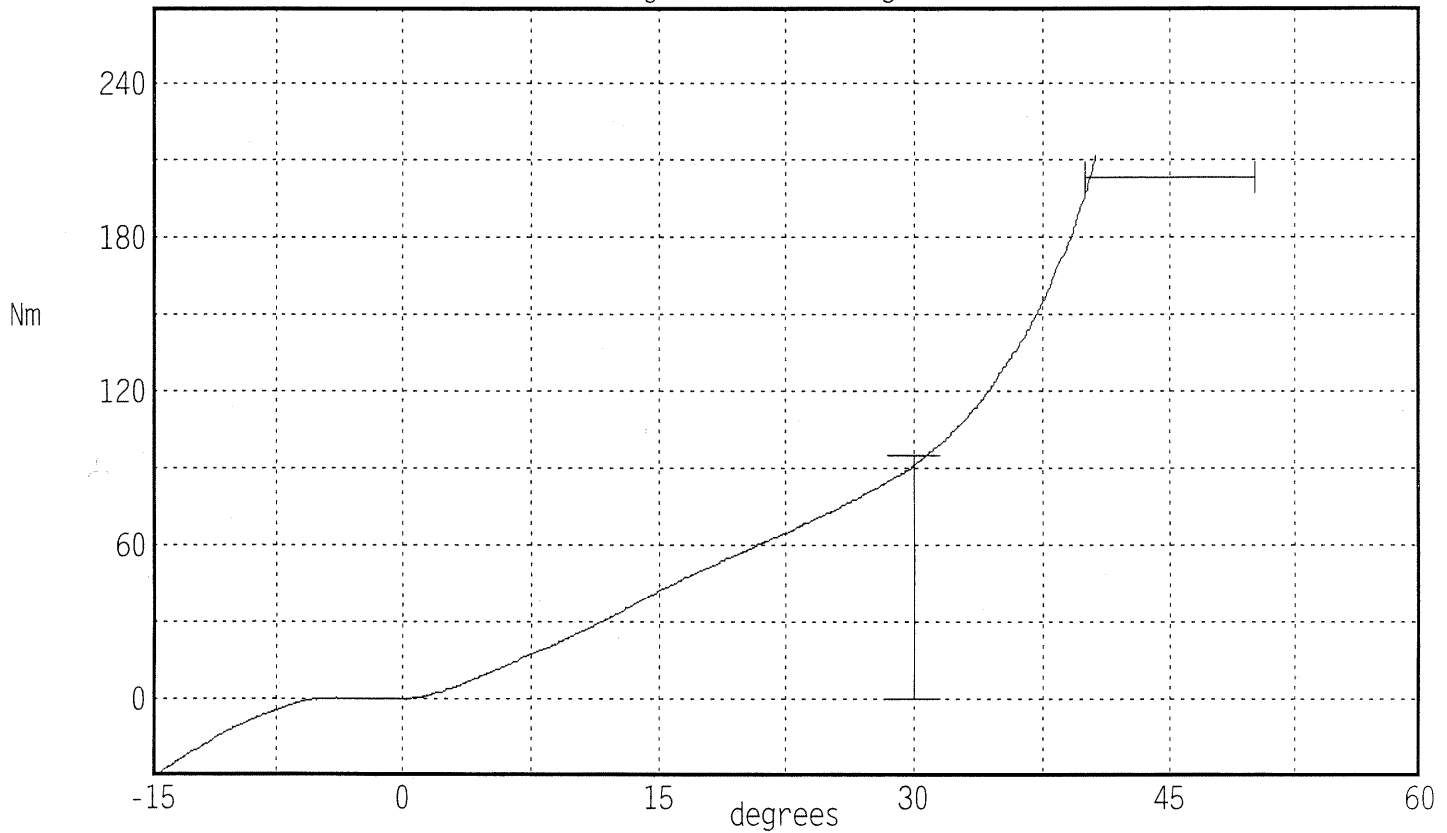
Hybrid III Hip Range of Motion

Serial Number: 090R
Test Number: 090C42
Comments:

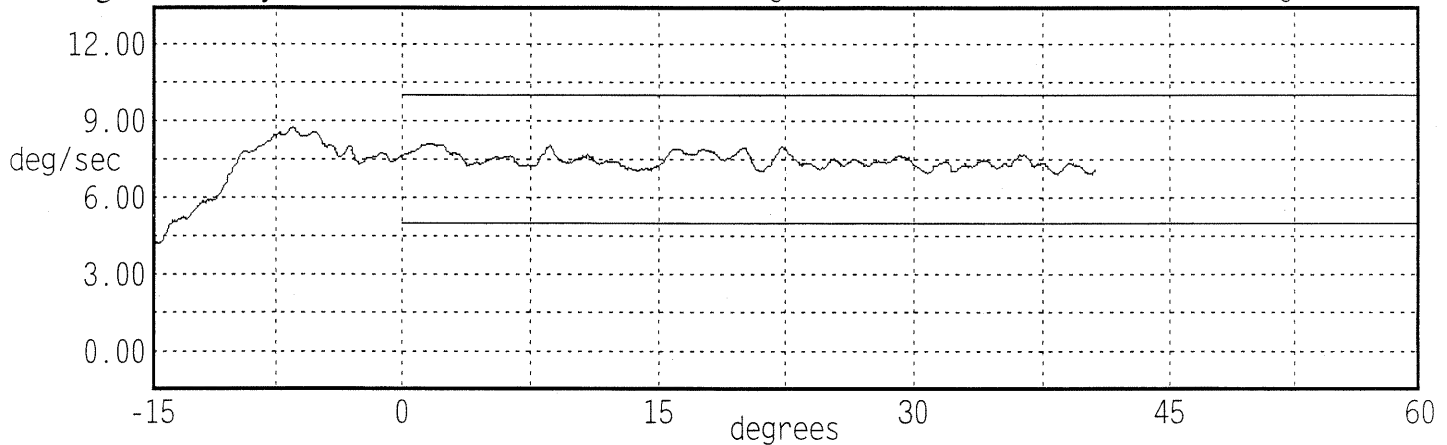
Date: 06/03/2003
Time: 13:46

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.7 °C Pass
Humidity	10 - 70	51 % Pass
Moment at 30 deg	<= 94.9	91.2 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

Moment About H-Point
Peak Moment: 211.3 Nm at 40.6 deg
Peak Angle: 40.6 deg at 209.4 Nm



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. 42 - 1

Test Date 06/02/2003

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.70 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1260 N	Yes
Force At 18 mm Displacement	-2268 - (-3096) N	-2321 N	Yes

Comments:

Technician



Approved



06.02.2003 12:54:30 1468

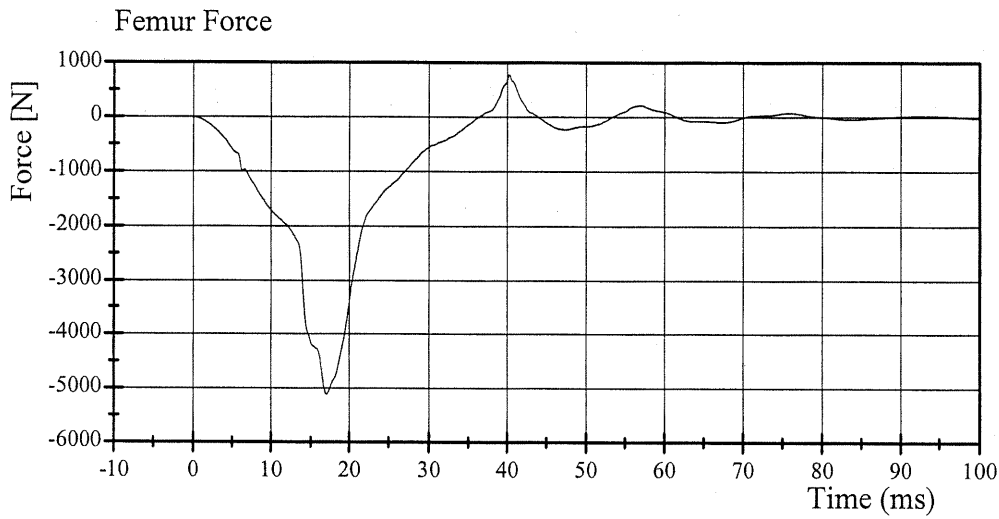


Transportation Research Center Inc.

572E Left Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

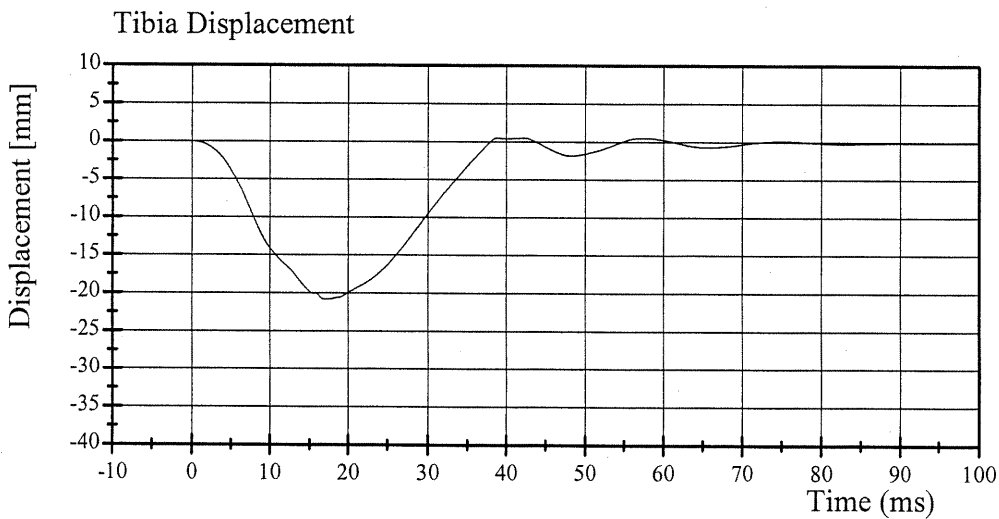
Test Date 06/02/2003



Filter Class: 600

Max: 780.3 N at 40.2 ms

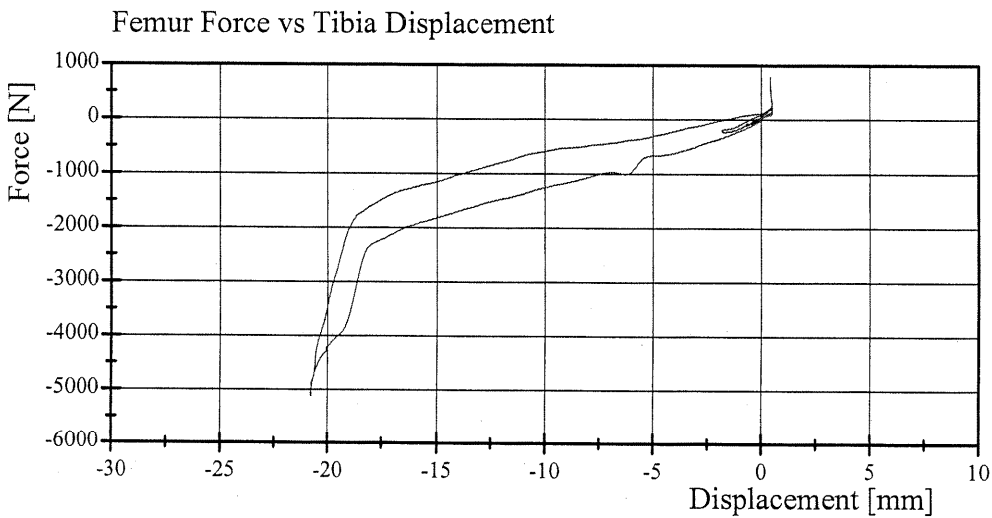
Min: -5121.4 N at 17.1 ms



Filter Class: 600

Max: 0.5 mm at 42.4 ms

Min: -20.8 mm at 17.0 ms



06.02.2003 12:54:31 1468



Transportation Research Center Inc.

572E Right Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/06/2003

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.76 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1479 N	Yes
Force At 18 mm Displacement	-2268 - (-3096) N	-2939 N	Yes

Comments:

Technician



Approved



06.06.2003 13:27:11 1754

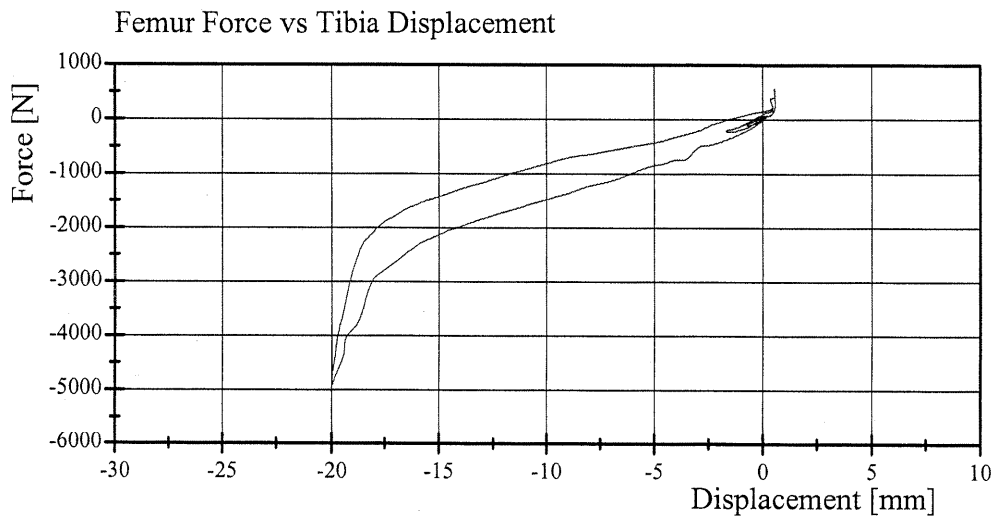
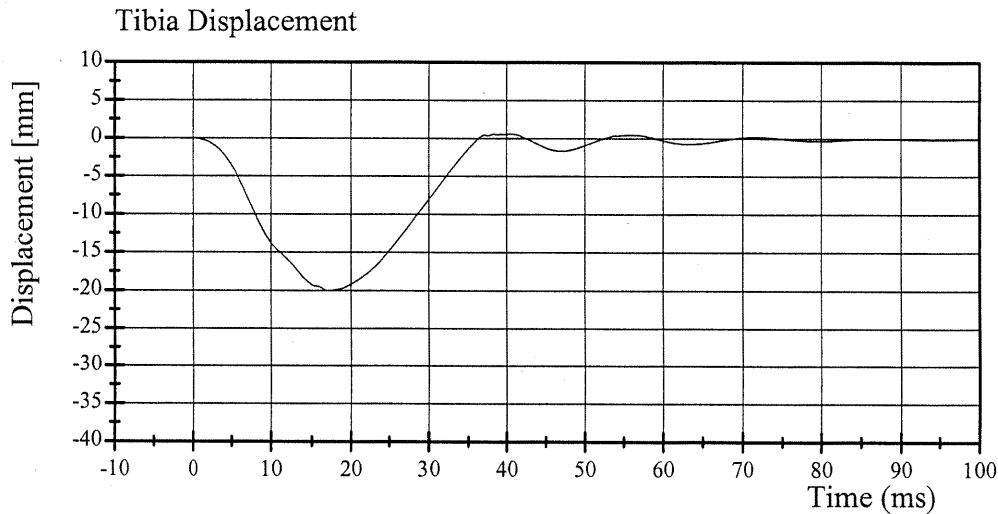
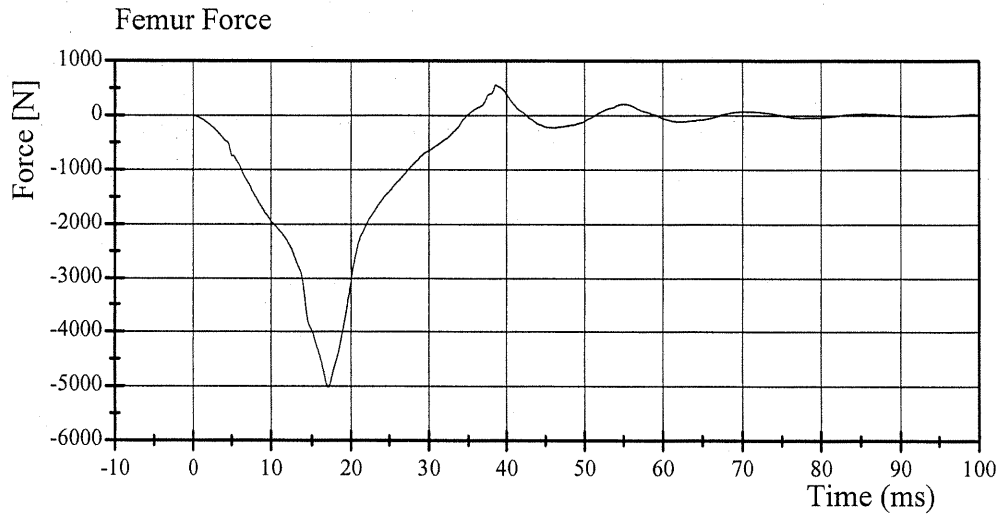


Transportation Research Center Inc.

572E Right Knee Slider Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/06/2003



06.06.2003 13:27:12 1754



Transportation Research Center Inc.

572E Left Knee Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/02/2003

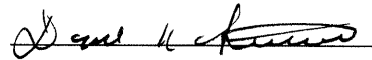
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	31 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.11 m/s	Yes
Maximum Pendulum Force	4715 - 5783 N	5455 N	Yes

Comments:

Technician



Approved



06.02.2003 12:30:49 2074



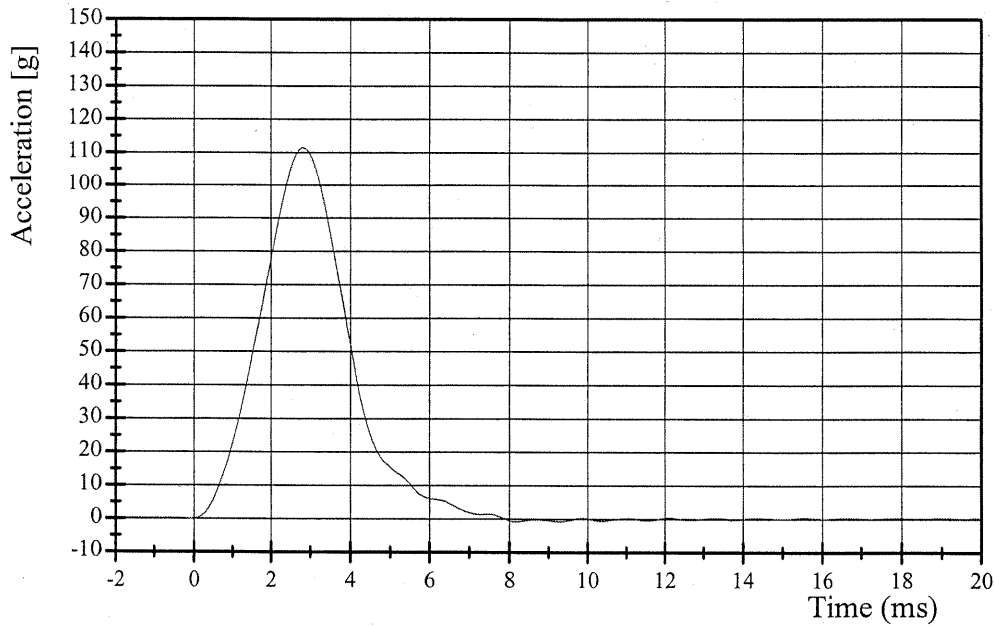
Transportation Research Center Inc.

572E Left Knee Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/02/2003

Pendulum Deceleration

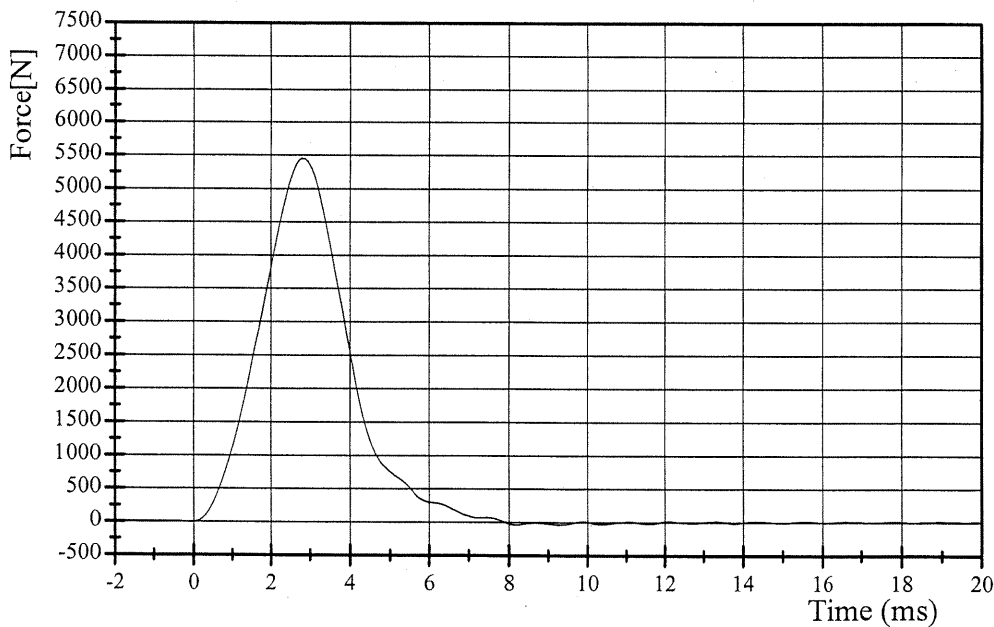


Filter Class: 600

Max: 111.5 g at 2.8 ms

Min: -0.8 g at 8.2 ms

Pendulum Force



Filter Class: 600

Max: 5455.2 N at 2.8 ms

Min: -38.4 N at 8.2 ms



Transportation Research Center Inc.

572E Right Knee Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/04/2003

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	2.10 m/s	Yes
Maximum Pendulum Force	4715 - 5783 N	5146 N	Yes

Comments:

Technician



Approved



06.04.2003 13:57:21 2206



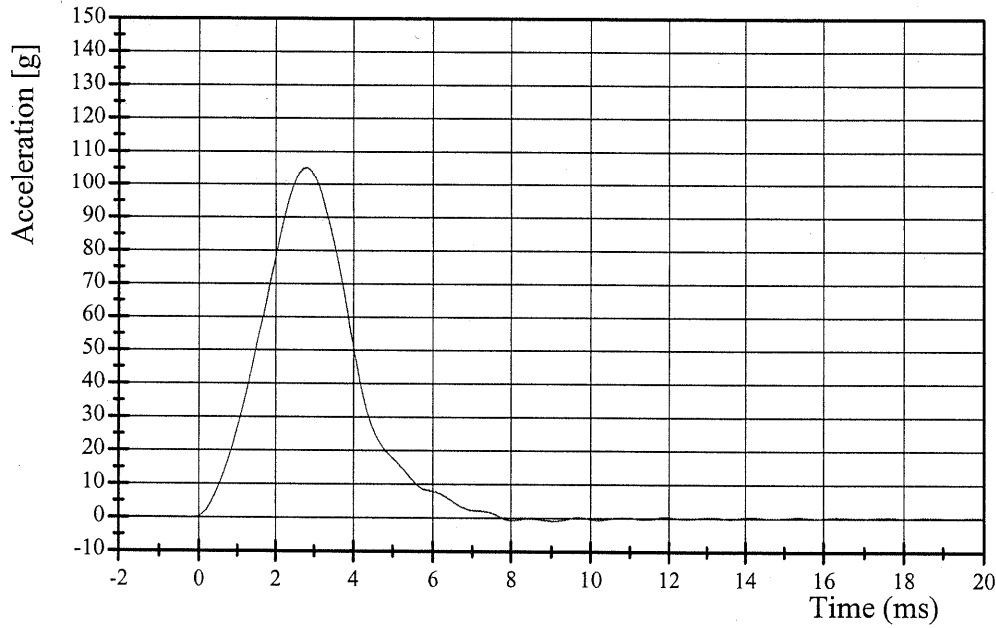
Transportation Research Center Inc.

572E Right Knee Test

HIII 50th Male Serial No. 090 Calibration No. 42 - 1

Test Date 06/04/2003

Pendulum Deceleration

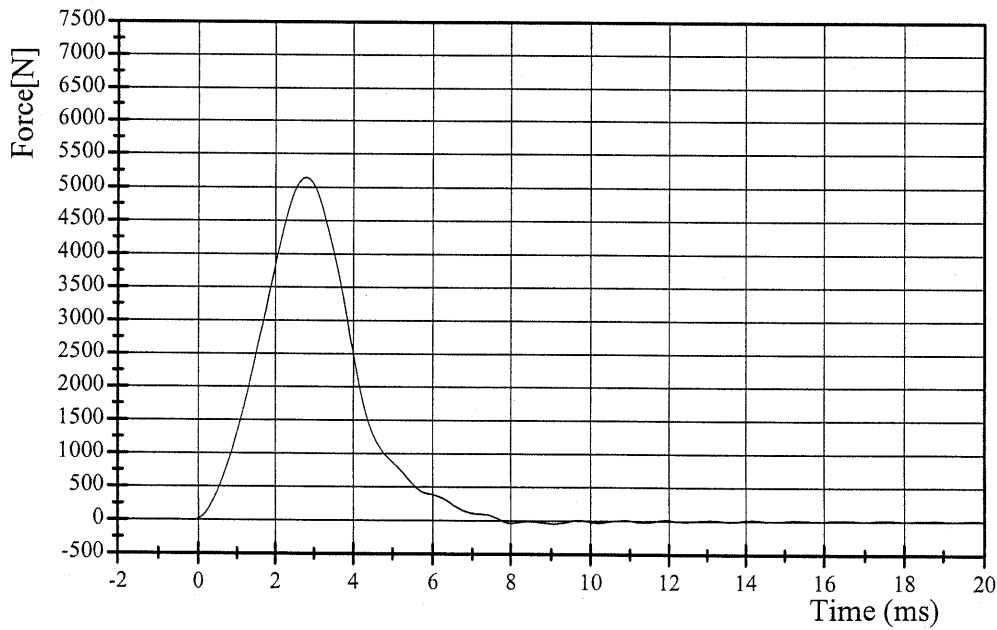


Filter Class: 600

Max: 105.2 g at 2.8 ms

Min: -0.8 g at 9.1 ms

Pendulum Force



Filter Class: 600

Max: 5146.3 N at 2.8 ms

Min: -40.5 N at 9.1 ms



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 Heel of Foot Impact Test

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

Testing Summary

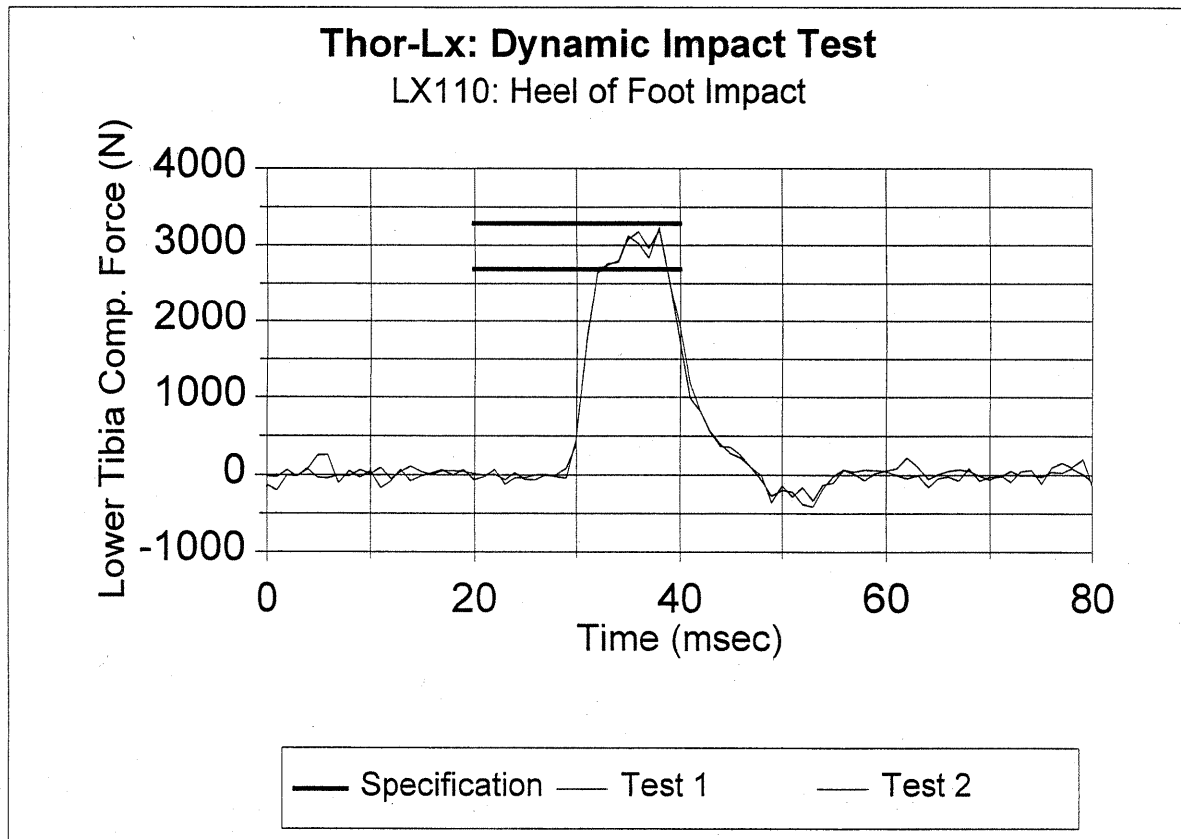
Impact Speed	4.0 m/s	Scan Rate	10000 scans/sec
Impact Effective Mass	5.0 kg	Filter	CFC 600
Impactor	NHTSA Dynamic Impactor (TLX-9000-013)		

Response

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

*Average Value

Test Plot



Tested by: Patrick Pope

Date: 6-11-03

Analyzed by: Y. Wang

Date: 6-11-03

GESAC, INC

DESIGN | MANUFACTURE | TEST | SOFTWARE DEVELOPMENT | ERGONOMICS

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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	Test Date	June 9, 2003
Customer	TRC	Temp (C)/Hum.(%)	21/62
Description	Left Lower Extremities	Serial No.	LX110

Testing Summary

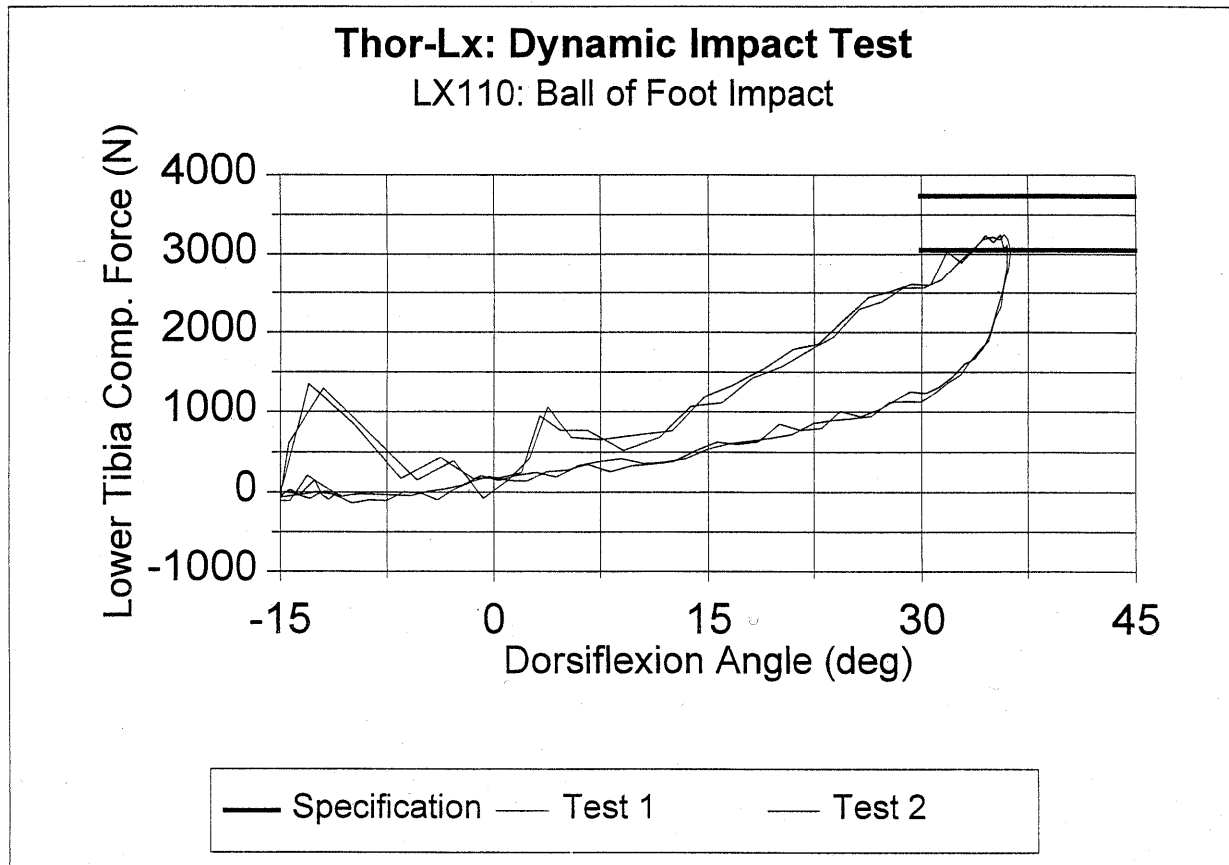
Impact Speed	5.0 m/s	Scan Rate	10000 scans/sec
Impact Effective Mass	5.0 kg	Filter	CFC 600
Impactor	NHTSA Dynamic Impactor (TLX-9000-013)		

Response

Peak 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

GESAC, INC

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Thor-LX Test Report

Dynamic Ball of Foot Impact Test (page 2)

Engineer	P. Pope Y. Wang	Test Date	June 9, 2003
Customer	TRC	Temp (C)/Hum.(%)	21/62
Description	Left Lower Extremities	Serial No.	LX110

Testing Summary

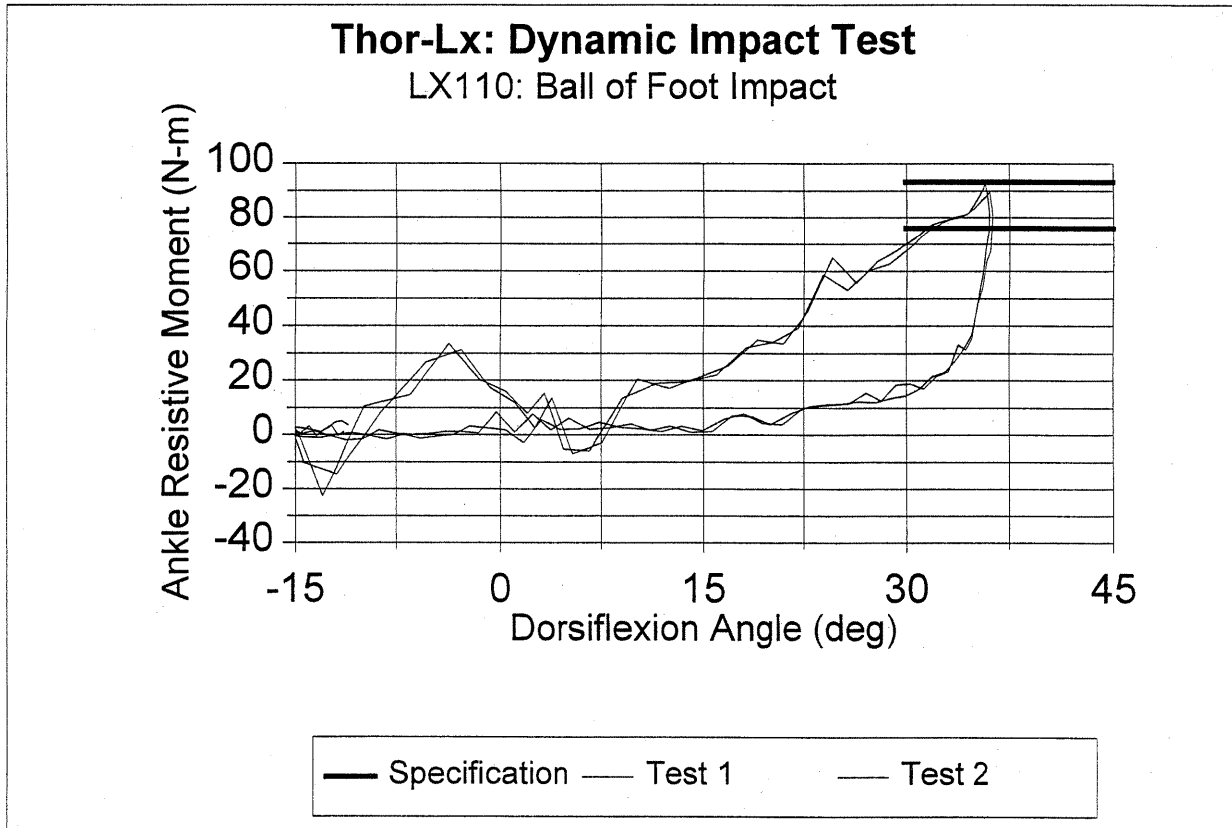
Impact Speed	5.0 m/s	Scan Rate	10000 scans/sec
Impact Effective Mass	5.0 kg	Filter	CFC 600
Impactor	NHTSA Dynamic Impactor (TLX-9000-013)		

Response

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

*Average Value

Test Plot



Tested by: *P. Pope*

Date: 6-11-03

Analyzed by: *Y. Wang*

Date: 6-11-03

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Thor-Lx Test Report

Everson Quasi-Static Test

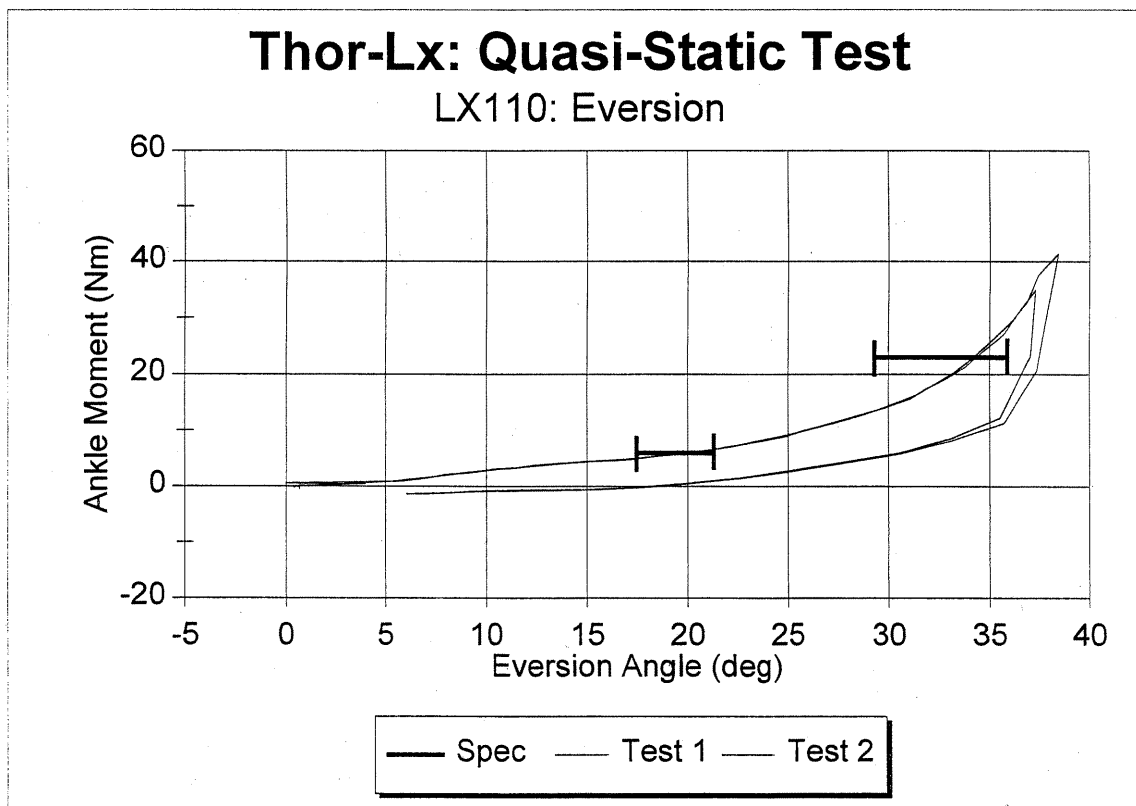
Engineer	P. Pope Y. Wang	Test Date	June 11, 2003
Customer	TRC	Temp. (C)/Hum.(%)	22/62
Description	Left Lower Extremity	Serial No.	LX110

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

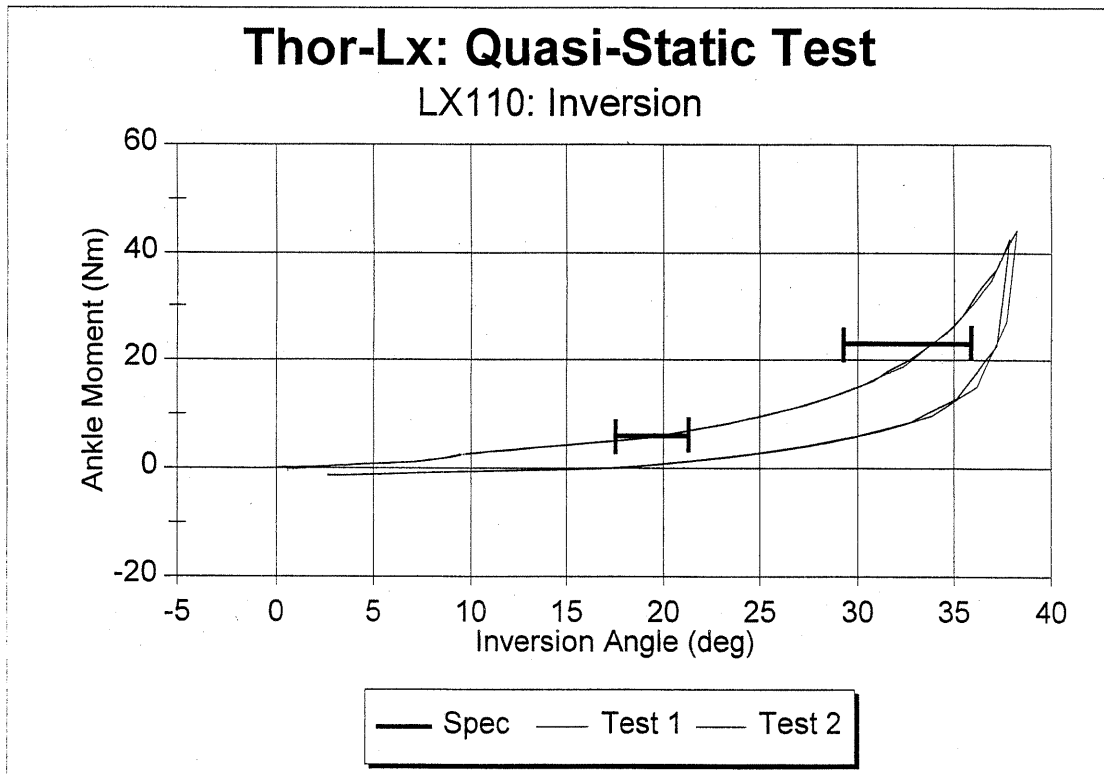
Engineer	P. Pope Y. Wang	Test Date	June 10, 2003
Customer	TRC	Temp. (C)/Hum.(%)	22/61
Description	Left Lower Extremity	Serial No.	LX110

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*

Analyzed by: *Y. Wang*

Date: 6-11-03

Date: 6-11-03

C-70

030623-1

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Thor-LX Test Report

Dynamic Heel of Foot Impact Test

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

Testing Summary

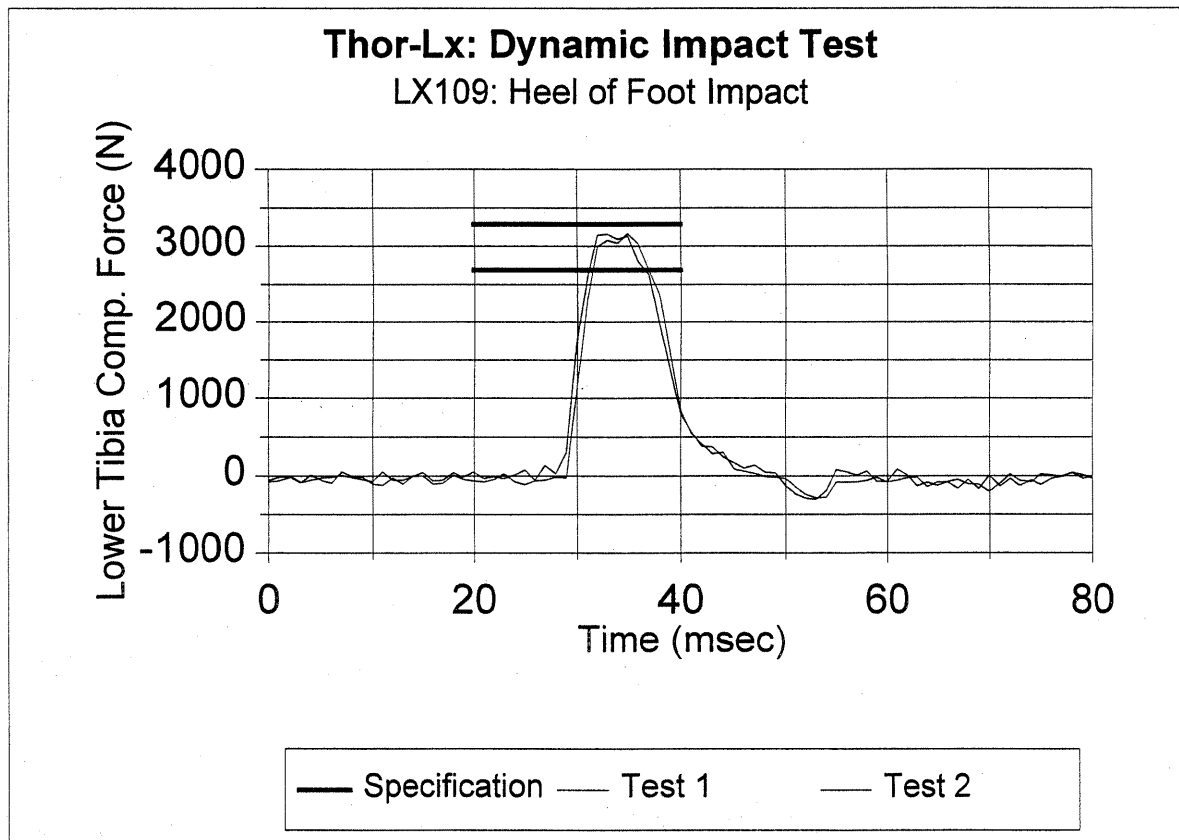
Impact Speed	4.0 m/s	Scan Rate	10000 scans/sec
Impact Effective Mass	5.0 kg	Filter	CFC 600
Impactor	NHTSA Dynamic Impactor (TLX-9000-013)		

Response

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

*Average Value

Test Plot



Tested by: Patrick Pope

Date: 4-16-03

Analyzed by: Wang

Date: 04-16-03

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Thor-LX Test Report

Dynamic Ball of Foot Impact Test (page 1)

Engineer	P. Pope Y. Wang	Test Date	April 16, 2003
Customer	TRC	Temp (C)/Hum.(%)	22/62
Description	Right Lower Extremities	Serial No.	LX109

Testing Summary

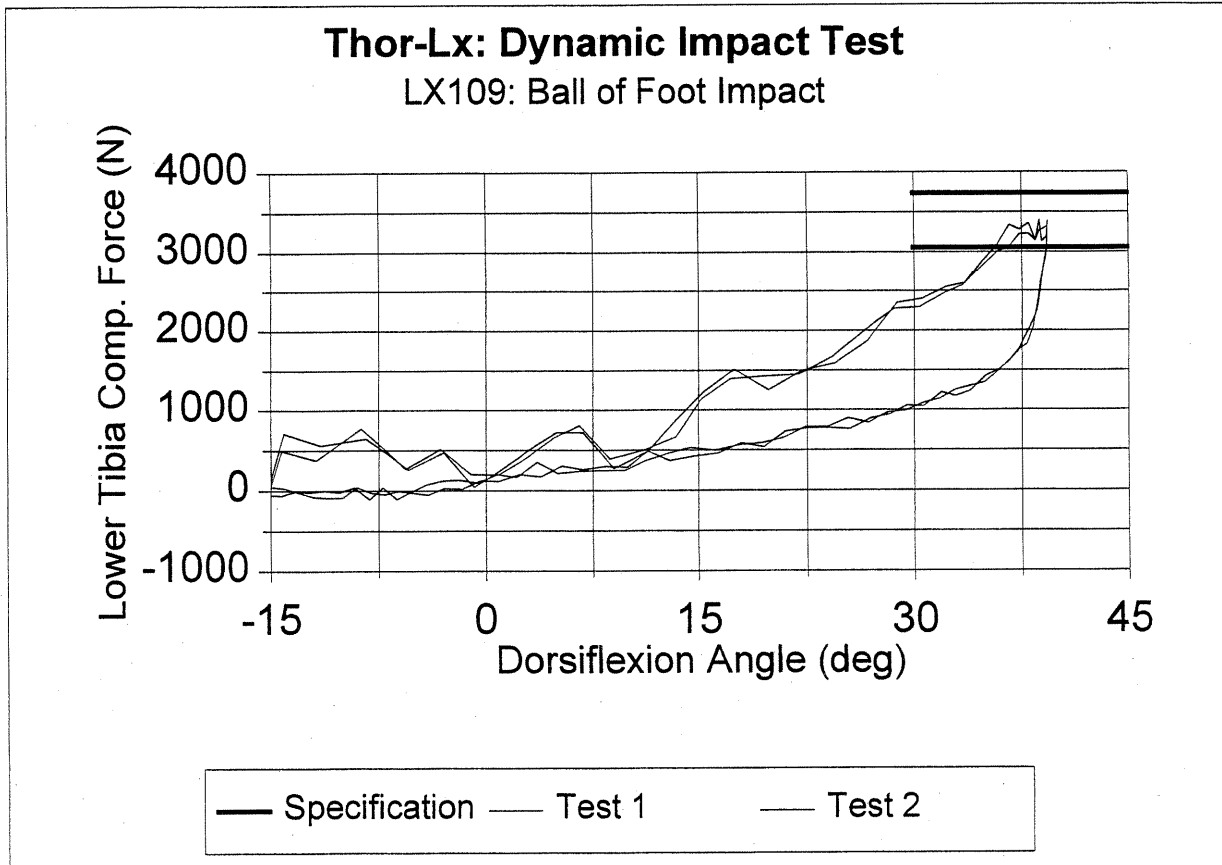
Impact Speed	5.0 m/s	Scan Rate	10000 scans/sec
Impact Effective Mass	5.0 kg	Filter	CFC 600
Impactor	NHTSA Dynamic Impactor (TLX-9000-013)		

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: *Michael J. ...*

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

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Fax (301) 432-6199

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

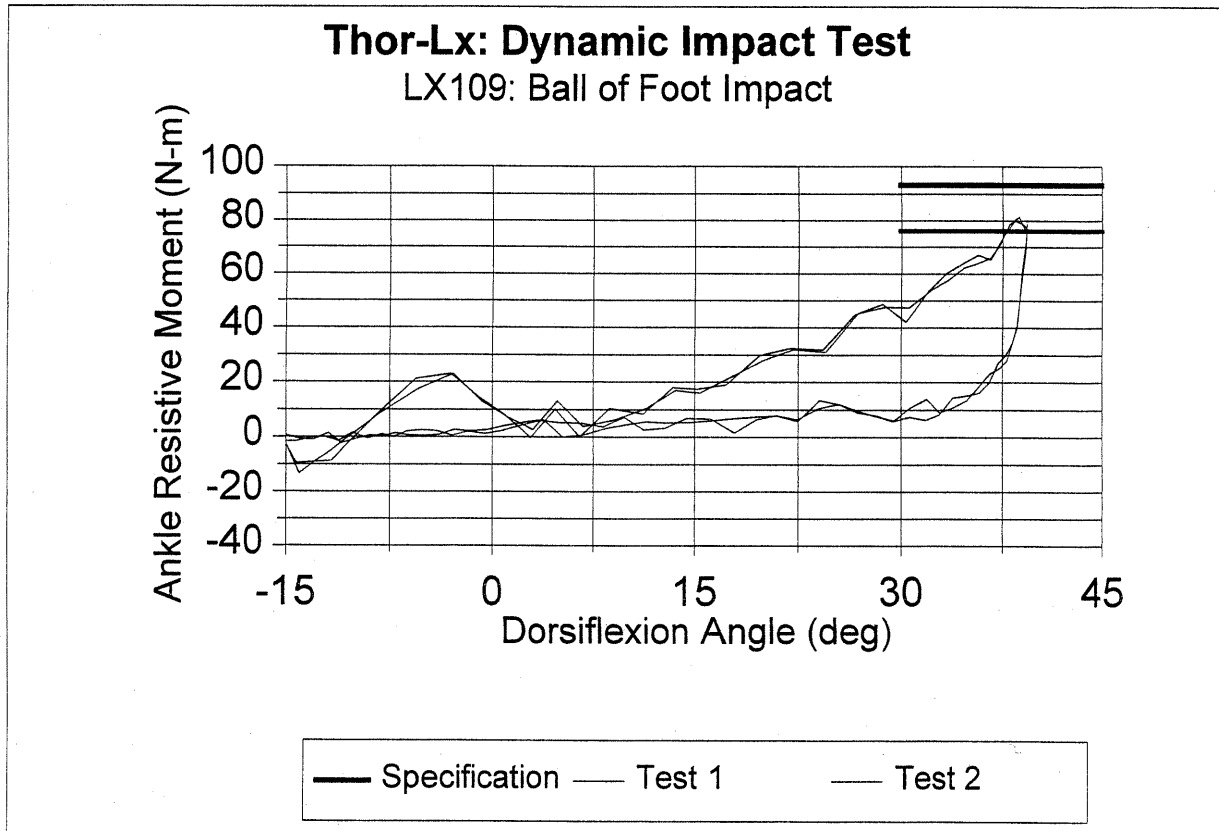
Impact Speed 5.0 m/s Scan Rate 10000 scans/sec
Impact Effective Mass 5.0 kg Filter CFC 600
Impactor NHTSA Dynamic Impactor (TLX-9000-013)

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: Patricia Pope

Date: 4-16-03

Analyzed by: Y. Wang

Date: 04-16-03

GESAC, INC

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Thor-Lx Test Report

Inversion Quasi-Static Test

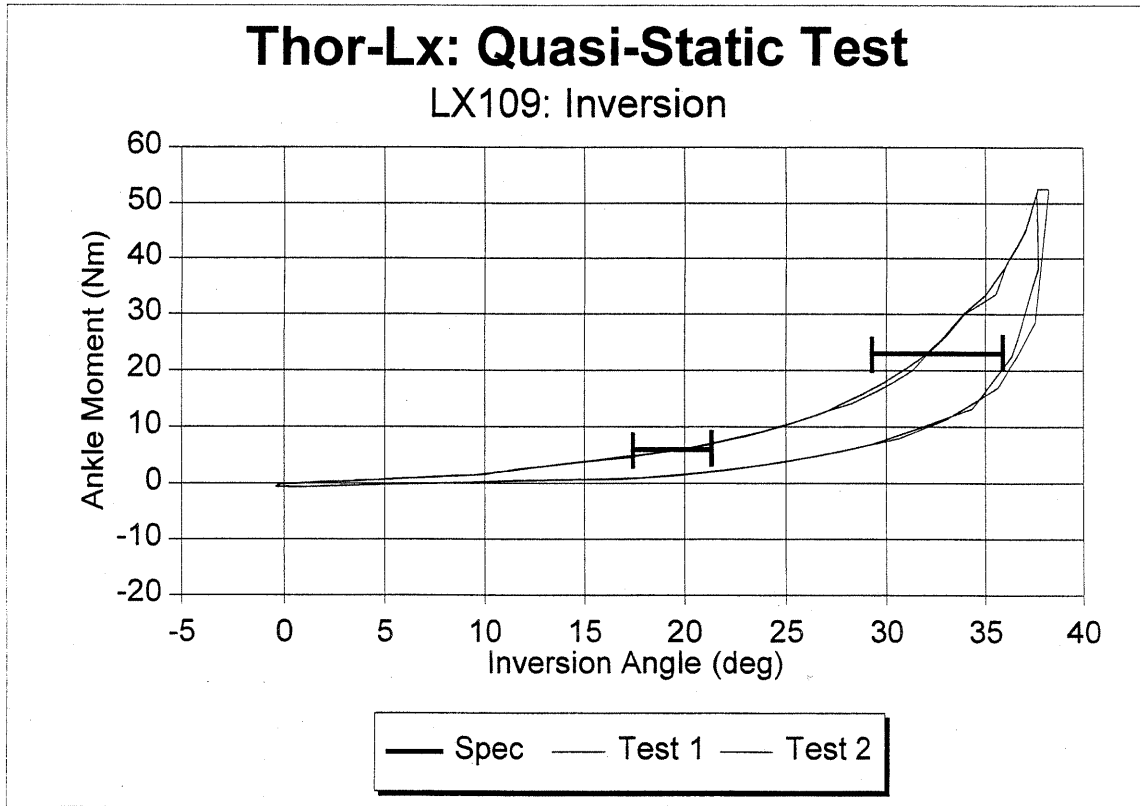
Engineer	P. Pope Y. Wang	Test Date	April 15, 2003
Customer	TRC	Temp. (C)/Hum.(%)	22/62
Description	Right Lower Extremity	Serial No.	LX109

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

Date: 4-16-03

Analyzed by: Wang

Date: 04-16-03

GESAC, INC

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Thor-Lx Test Report

Eversion Quasi-Static Test

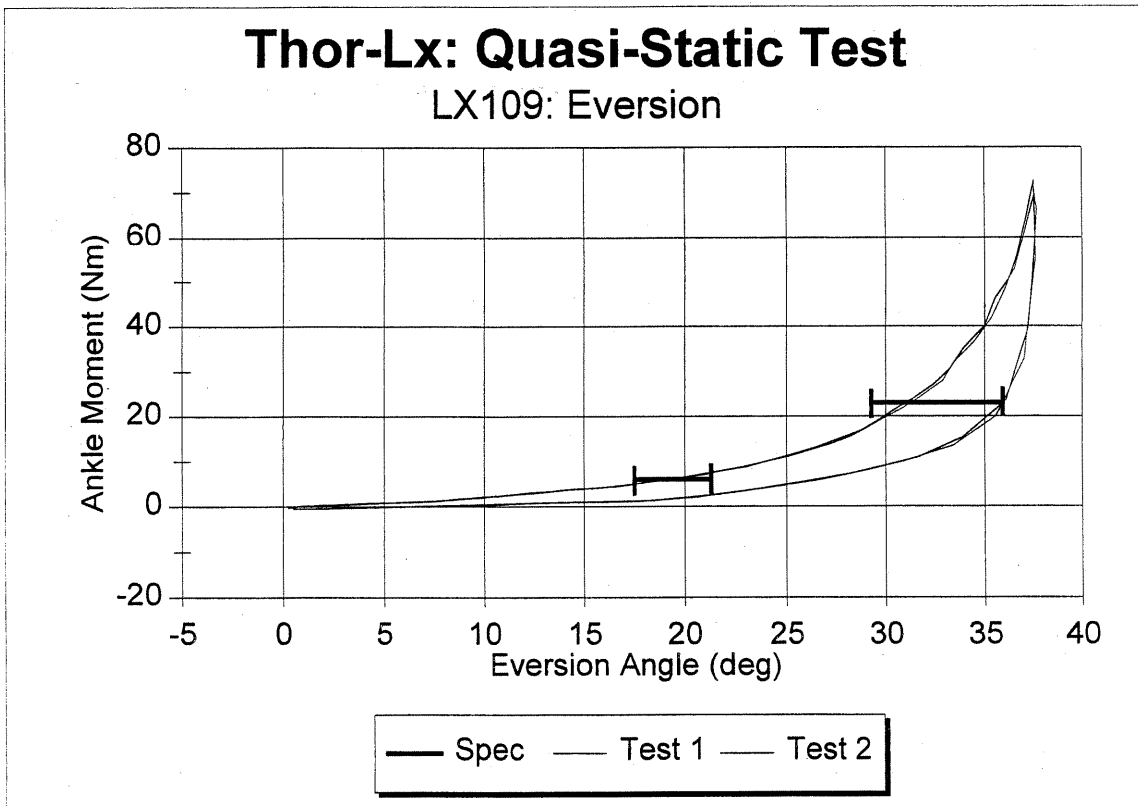
Engineer	P. Pope Y. Wang	Test Date	April 15, 2003
Customer	TRC	Temp. (C)/Hum.(%)	22/62
Description	Right Lower Extremity	Serial No.	LX109

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: [Signature]

Date: 04-16-03

Post-test Dummy Configuration and Performance Verification Data

Passenger 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

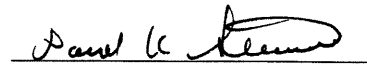
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Peak Resultant Acceleration	225 - 275 g	249.1 g	Yes
Peak Lateral Acceleration	15 g Max	-8.4 g	Yes
Oscillations After Main Pulse	Less Than 10% of Peak Resultant Acceleration?	Yes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

Comments:

Technician



Approved



06.25.2003 09:00:45 613

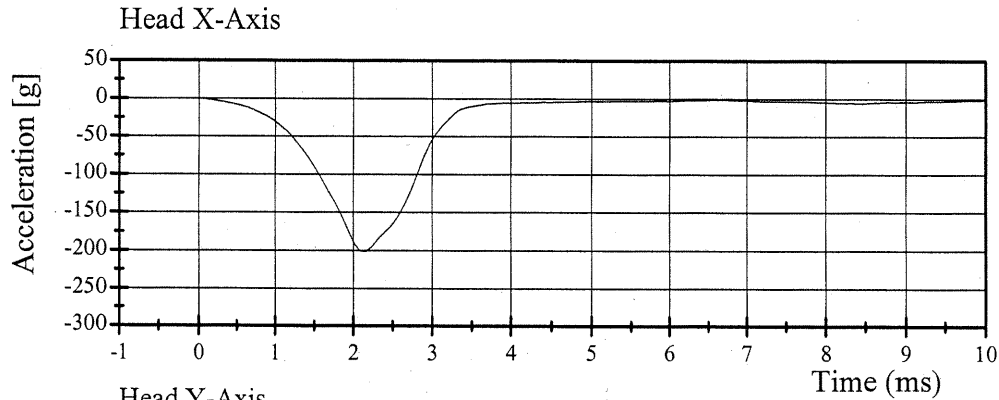


Transportation Research Center Inc.

572E Head Drop Test

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

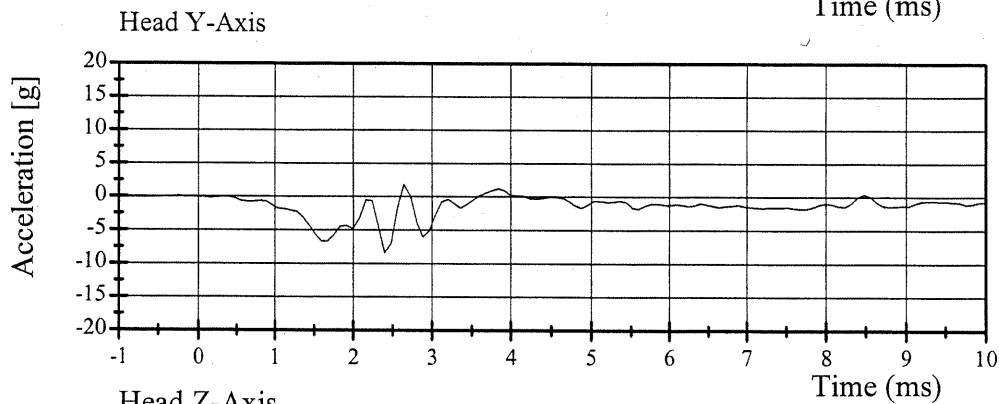
Test Date 06/25/2003



Filter Class: 1000

Max: -0.0 g at 0.0 ms

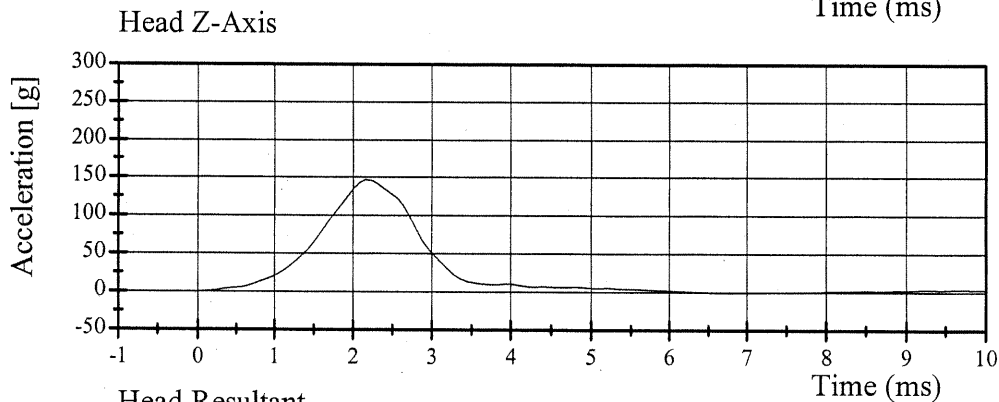
Min: -201.5 g at 2.2 ms



Filter Class: 1000

Max: 1.8 g at 2.6 ms

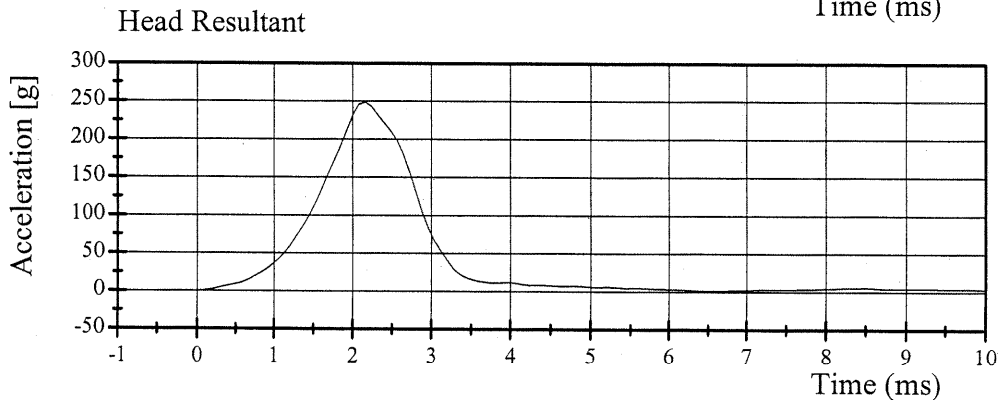
Min: -8.4 g at 2.4 ms



Filter Class: 1000

Max: 146.6 g at 2.2 ms

Min: -0.8 g at 6.8 ms



Filter Class: 1000

Max: 249.1 g at 2.2 ms

Min: 0.0 g at 0.6 ms

06.25.2003 09:00:46 613



Transportation Research Center Inc.

572E Neck Flexion Test - 6 Channel Transducer

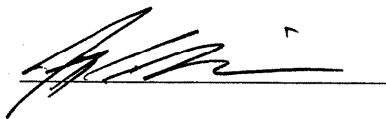
HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/27/2003

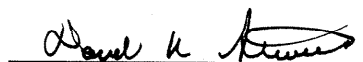
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impact Velocity	6.89 - 7.13 m/s	6.93 m/s	Yes
Pendulum Deceleration			
10 ms	22.50 - 27.50 g	24.81 g	Yes
20 ms	17.60 - 22.60 g	22.18 g	Yes
30 ms	12.50 - 18.50 g	17.23 g	Yes
Max Pendulum 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



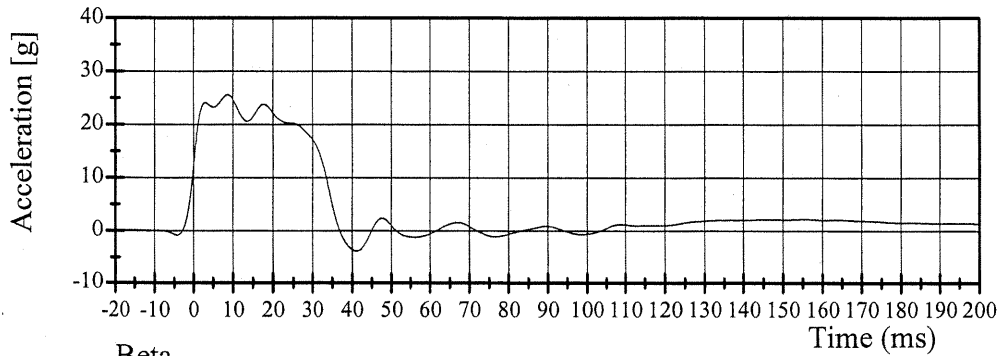
Transportation Research Center Inc.

572E Neck Flexion Test

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

Test Date 06/27/2003

Pendulum Deceleration

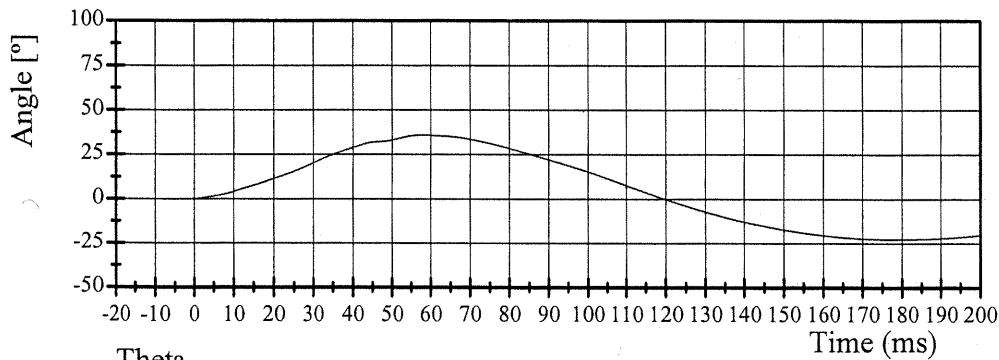


Filter Class: 60

Max: 25.6 g at 8.7 ms

Min: -3.8 g at 41.1 ms

Beta

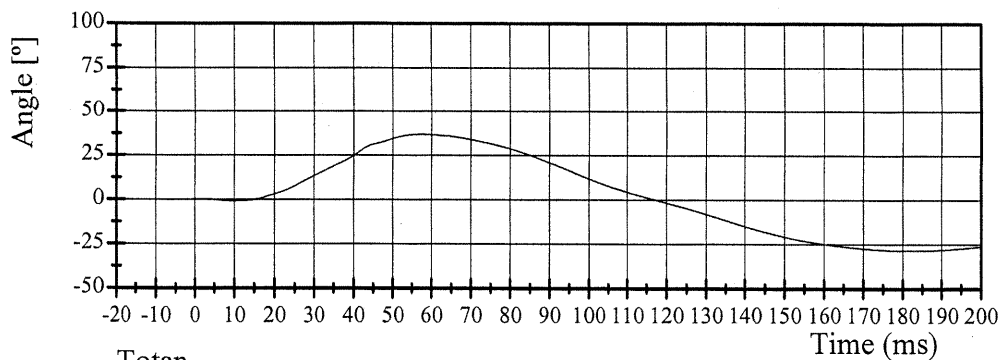


Filter Class: 60

Max: 36.0° at 57.8 ms

Min: -22.6° at 178.9 ms

Theta

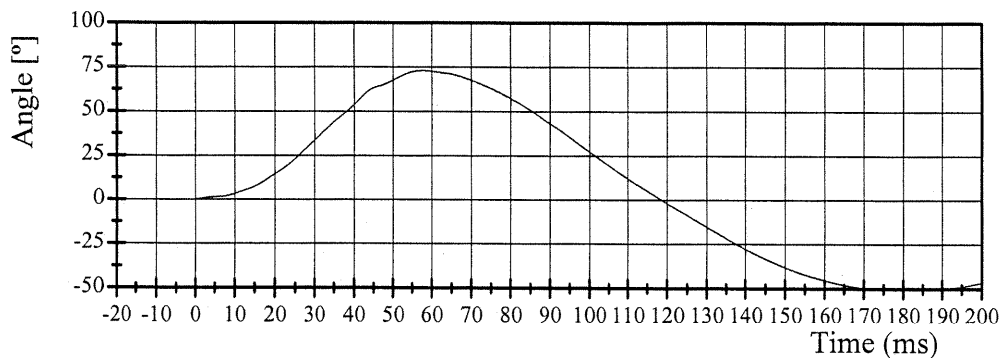


Filter Class: 60

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

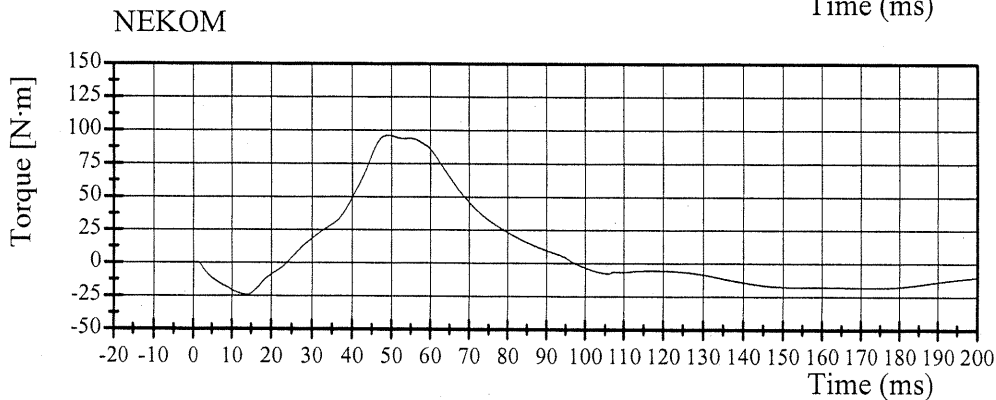
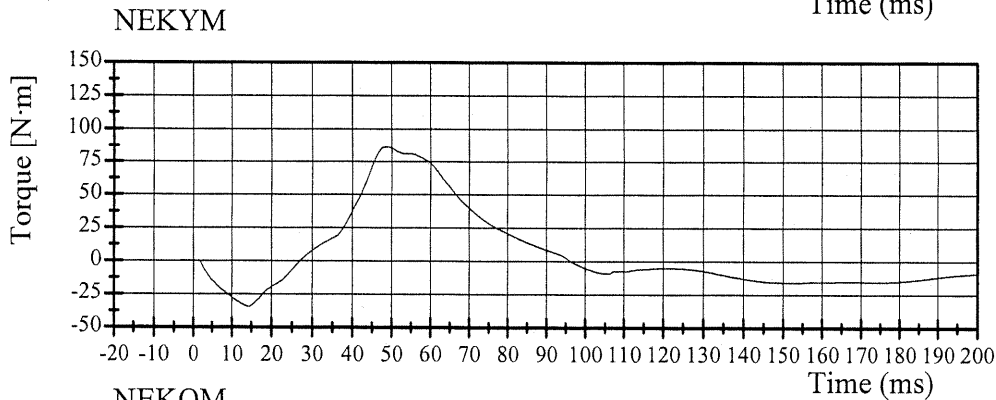
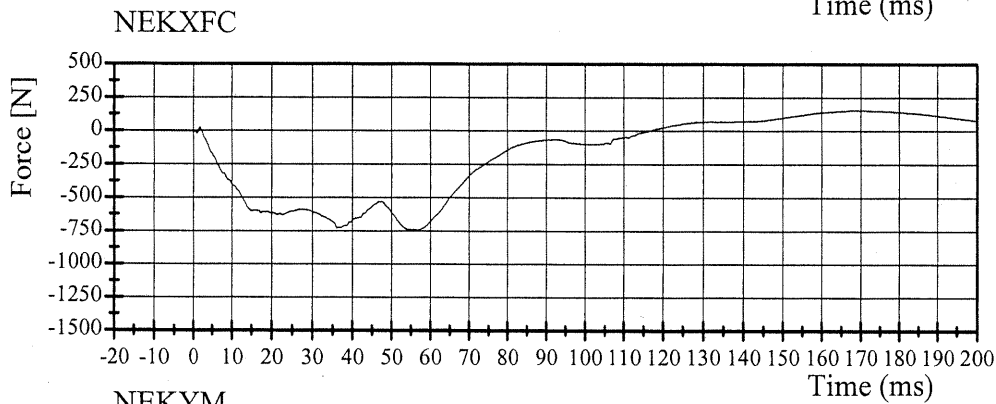
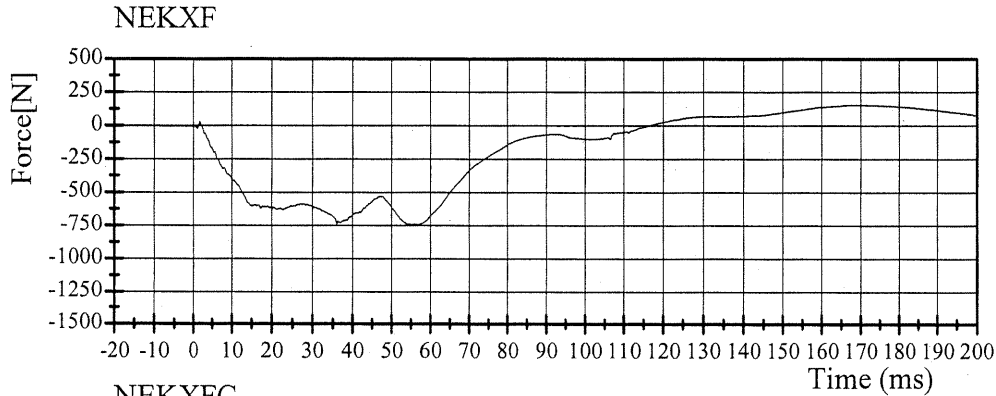


Transportation Research Center Inc.

572E Neck Flexion Test

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

Test Date 06/27/2003



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

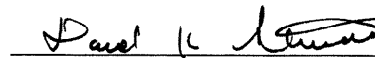
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Impact Velocity	5.95 - 6.19 m/s	5.98 m/s	Yes
Pendulum Deceleration			
10 ms	17.20 - 21.20 g	19.10 g	Yes
20 ms	14.00 - 19.00 g	16.64 g	Yes
30 ms	11.00 - 16.00 g	12.52 g	Yes
Max Pendulum 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



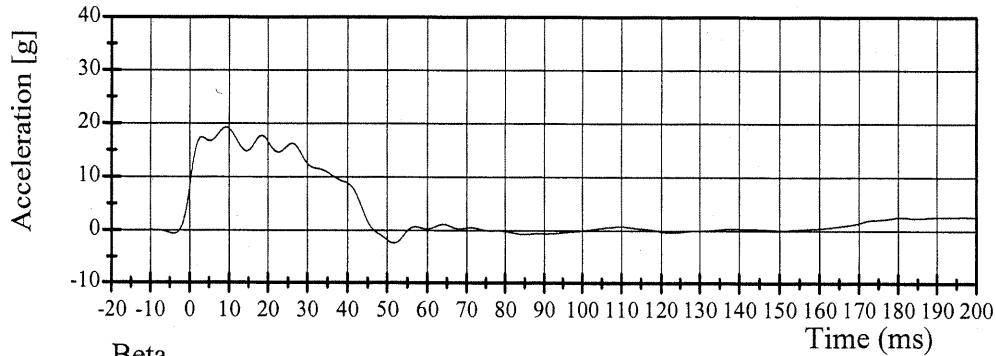
Transportation Research Center Inc.

572E Neck Extension Test

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

Test Date 06/27/2003

Pendulum Deceleration

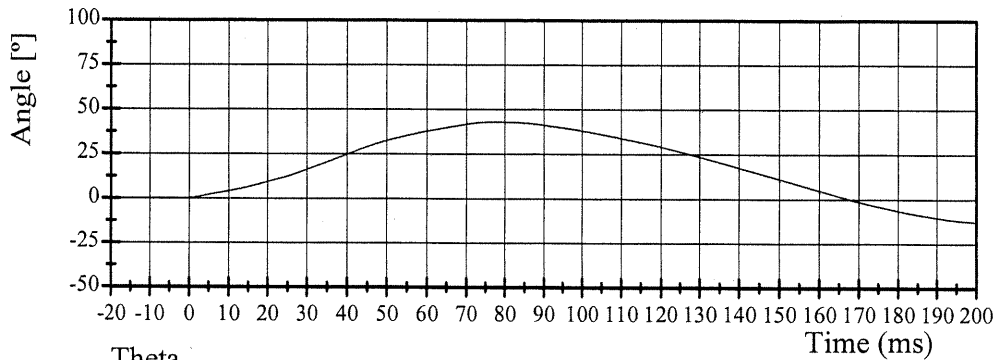


Filter Class: 60

Max: 19.3 g at 9.4 ms

Min: -2.4 g at 51.7 ms

Beta

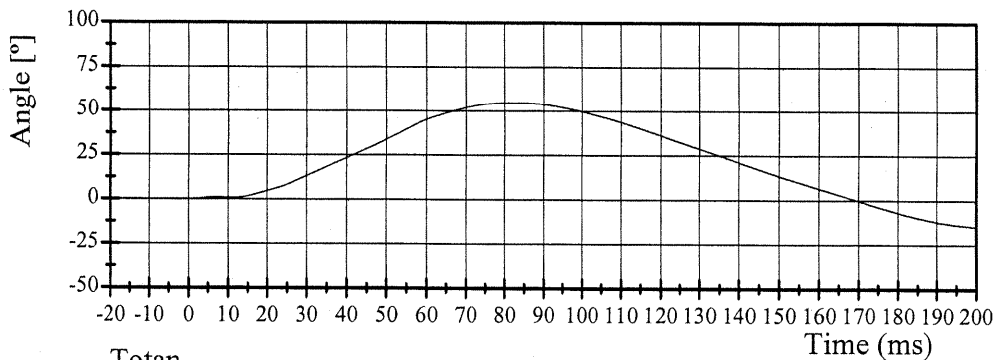


Filter Class: 60

Max: 42.9 ° at 77.0 ms

Min: -13.6 ° at 210.5 ms

Theta

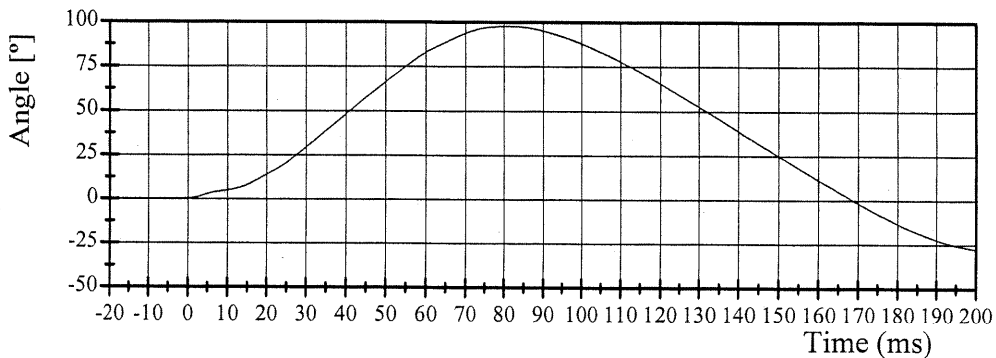


Filter Class: 60

Max: 54.9 ° at 83.0 ms

Min: -15.9 ° at 211.3 ms

Totan



Filter Class: 60

Max: 97.7 ° at 81.4 ms

Min: -29.4 ° at 211.0 ms

06.27.2003 12:47:53 578



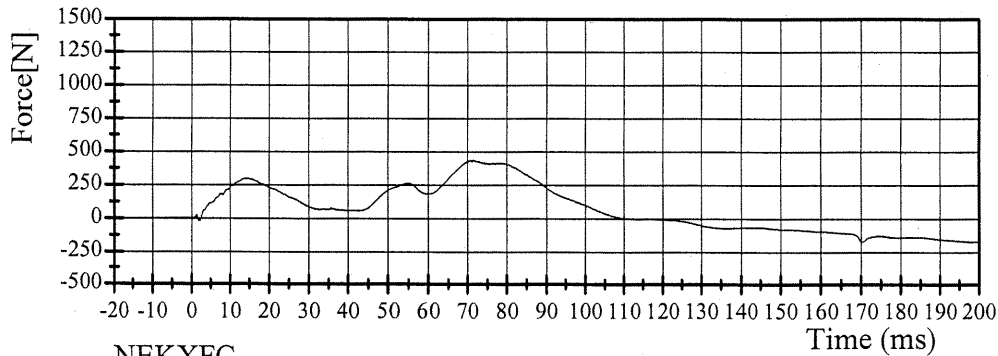
Transportation Research Center Inc.

572E Neck Extension Test

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

Test Date 06/27/2003

NEKXF

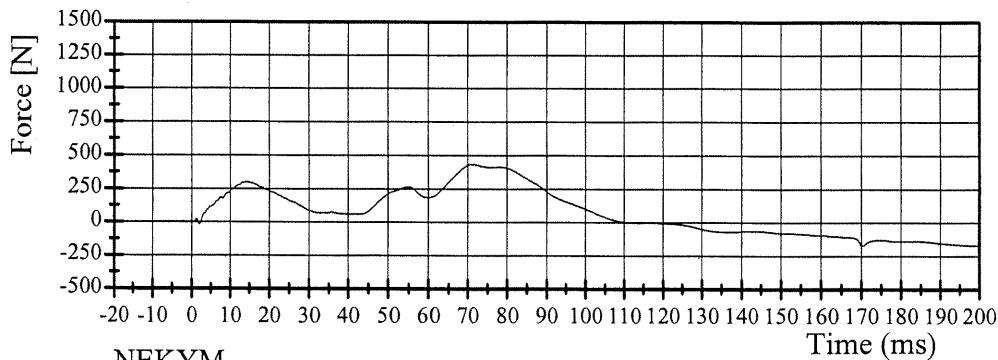


Filter Class: 1000

Max: 436.4 N at 71.4 ms

Min: -172.5 N at 170.2 ms

NEKXFC

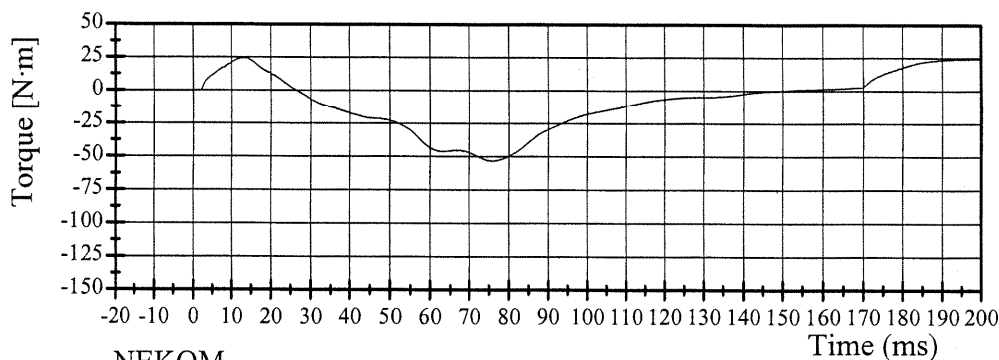


Filter Class: 600

Max: 432.9 N at 71.6 ms

Min: -172.3 N at 170.2 ms

NEKYM

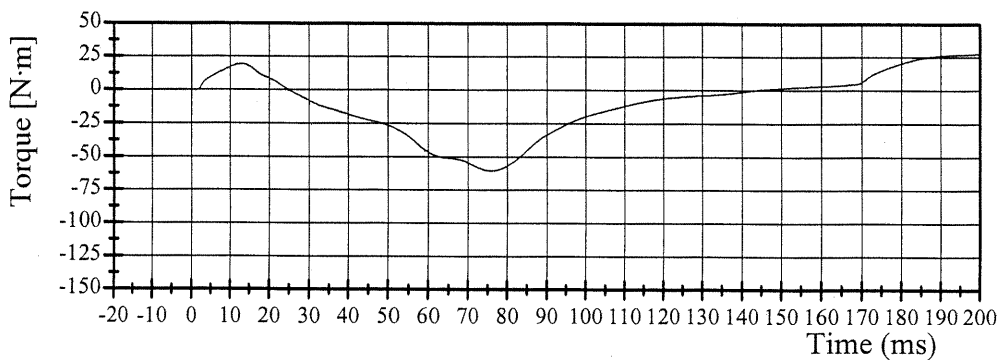


Filter Class: 600

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

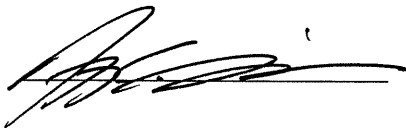
HIII 50th Male Serial No. 090 Calibration No. 43 - 1

Test Date 06/24/2003

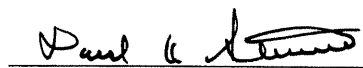
Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	6.59 - 6.83 m/s	6.66 m/s	Yes
Maximum Chest Deflection	-72.6 - (-63.5) mm	-71.7 mm	Yes
Maximum Resistive Force	5160 - 5894 N	5615 N	Yes
Internal Hysteresis	69 -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

Comments:

Technician



Approved



06.24.2003 13:02:20 952



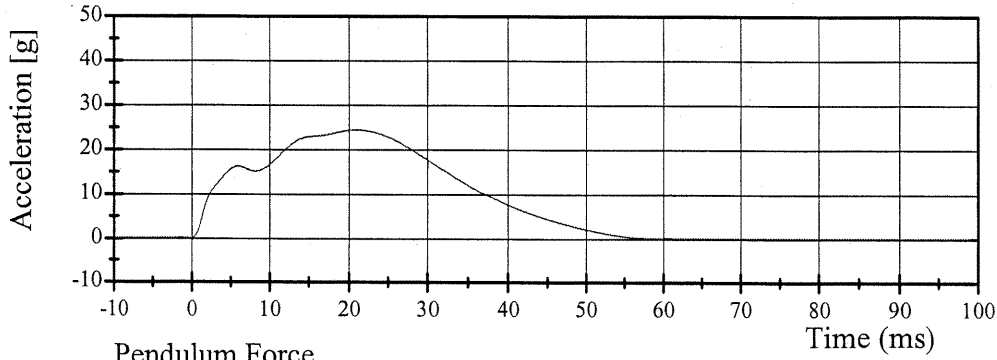
Transportation Research Center Inc.

572E Thorax Test

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

Test Date 06/24/2003

Pendulum Deceleration

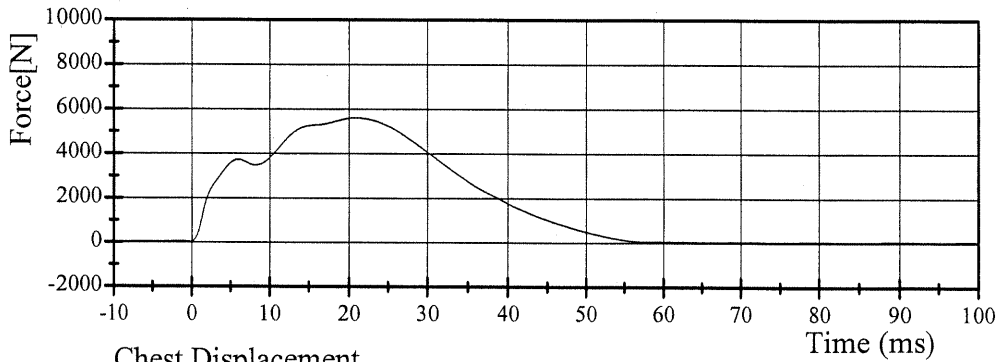


Filter Class: 180

Max: 24.5 g at 20.9 ms

Min: -0.4 g at 449.7 ms

Pendulum Force

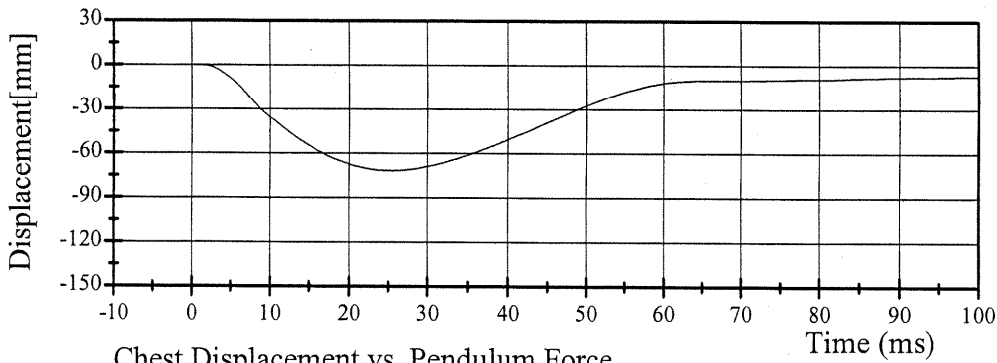


Filter Class: 180

Max: 5615.3 N at 20.9 ms

Min: -85.0 N at 449.7 ms

Chest Displacement

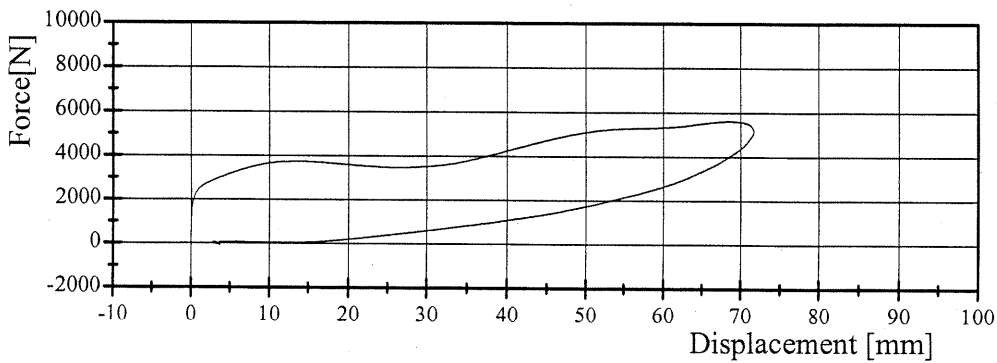


Filter Class: 180

Max: 0.0 mm at 0.6 ms

Min: -71.7 mm at 25.5 ms

Chest Displacement vs. Pendulum Force



06.24.2003 13:02:21 952



Transportation Research Center Inc

Hybrid III Hip Range of Motion

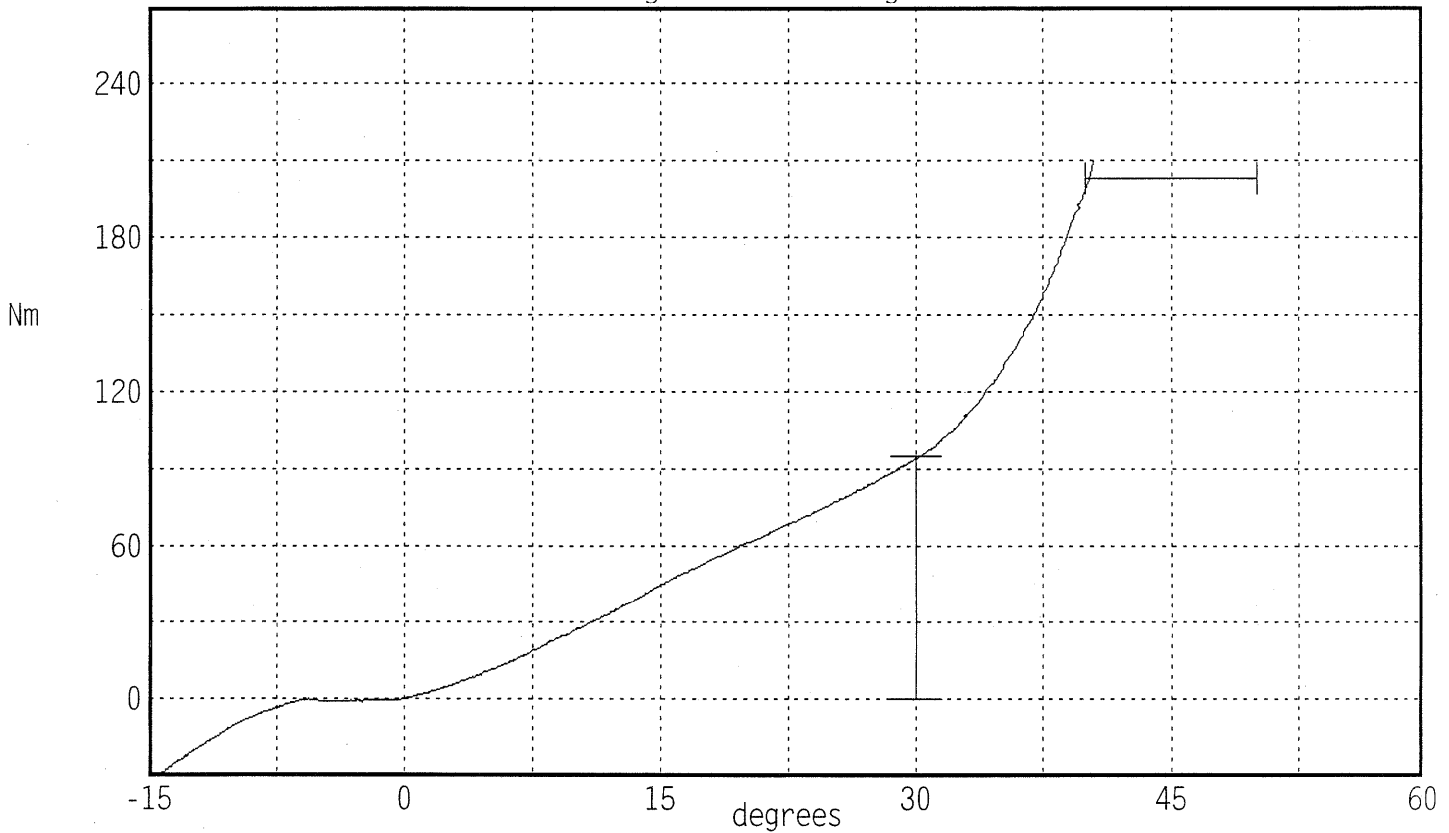
Serial Number: 090L
Test Number: 090C43

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

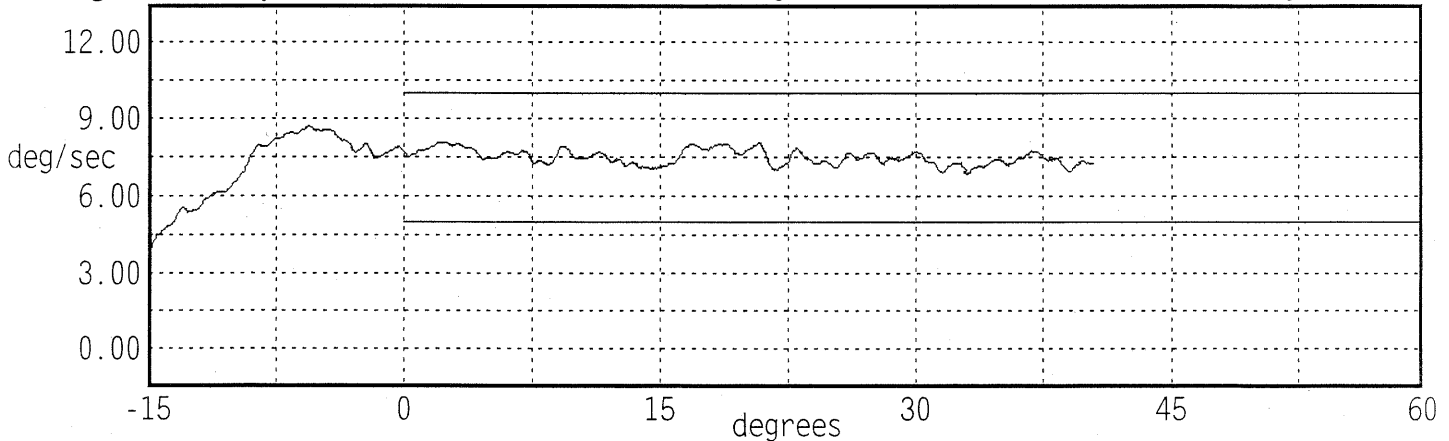
Comments:

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



Angular Velocity Max: 8.1 deg/sec Min: 6.9 deg/sec



Transportation Research Center Inc

Hybrid III Hip Range of Motion

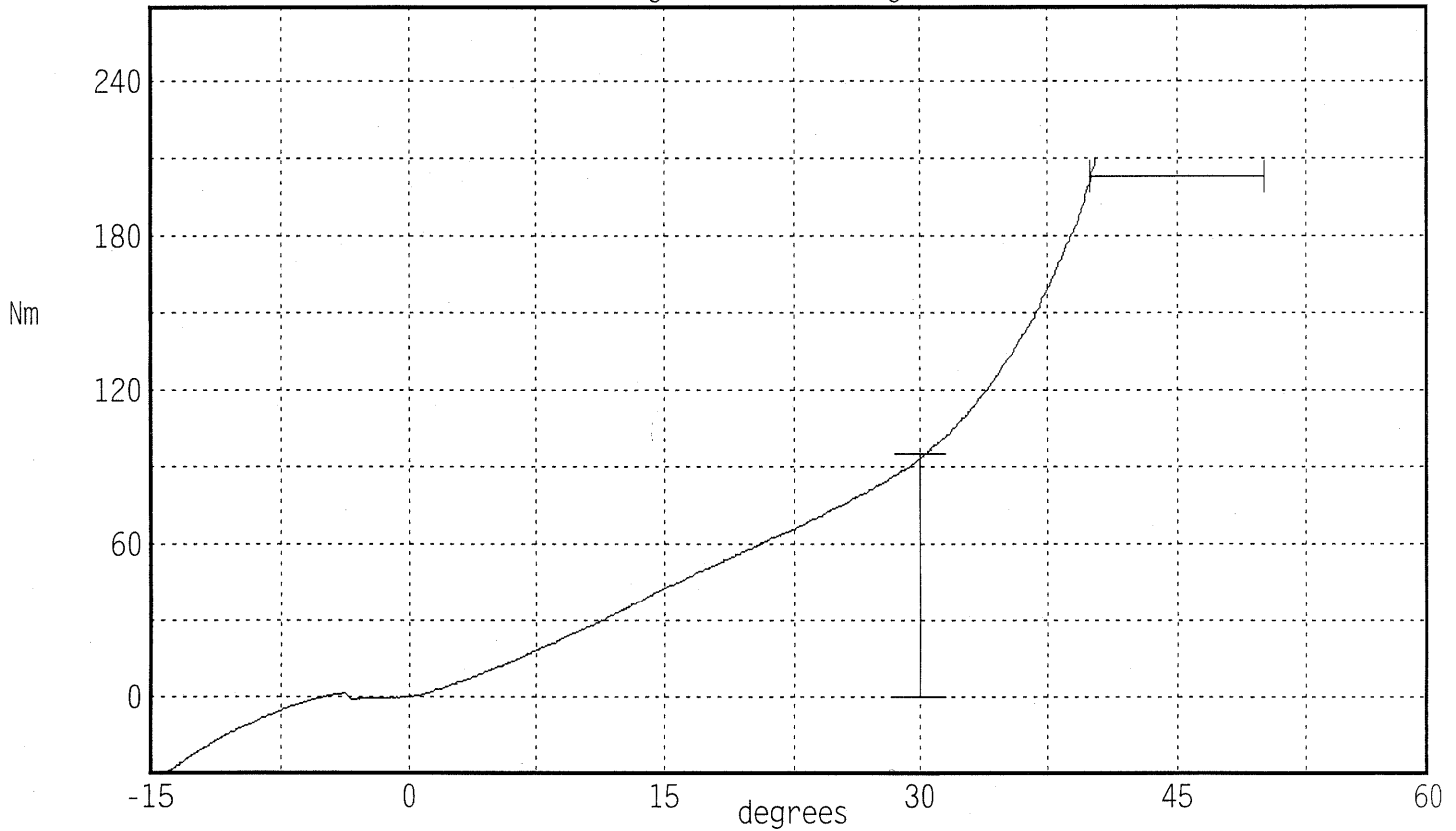
Serial Number: 090R
Test Number: 090C43

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

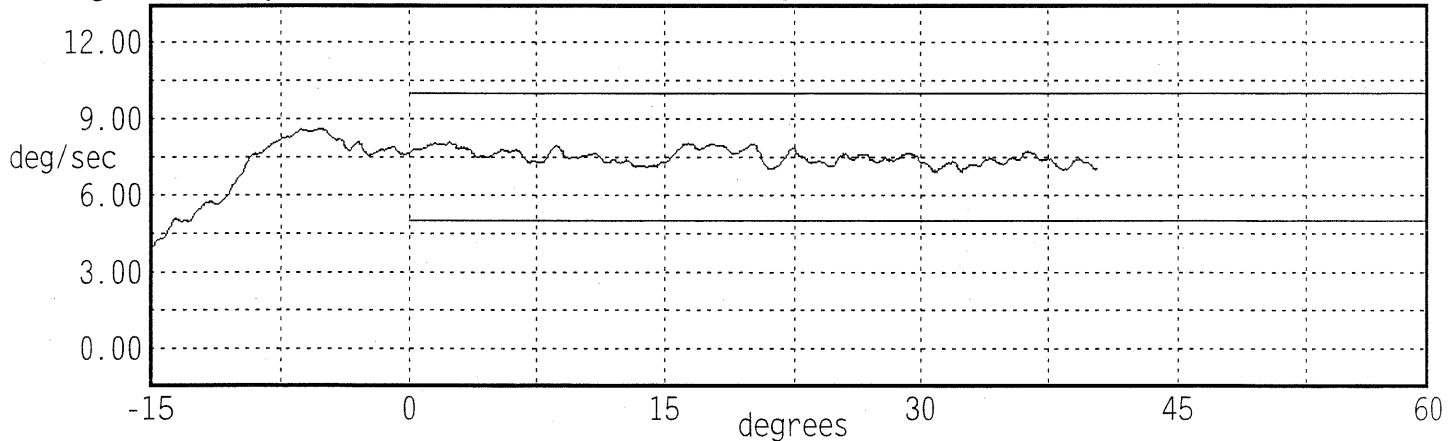
Comments:

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

Moment About H-Point
Peak Moment: 210.0 Nm at 40.3 deg
Peak Angle: 40.3 deg at 210.0 Nm



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

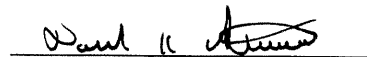
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.76 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1205 N	No
Force At 18 mm Displacement	-2268 - (-3096) N	-2181 N	No

Comments:

Technician



Approved



06.25.2003 09:24:49 1753

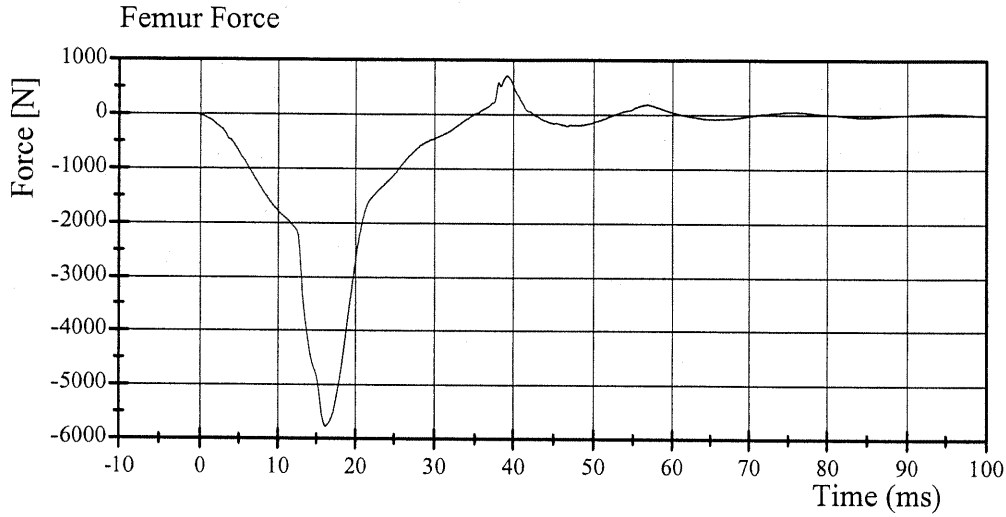


Transportation Research Center Inc.

572E Left Knee Slider Test

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

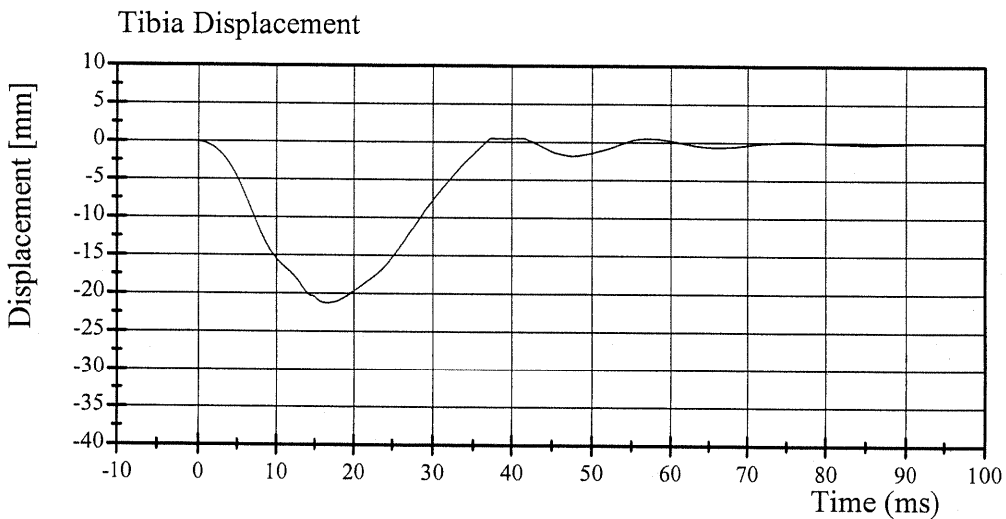
Test Date 06/25/2003



Filter Class: 600

Max: 711.4 N at 39.1 ms

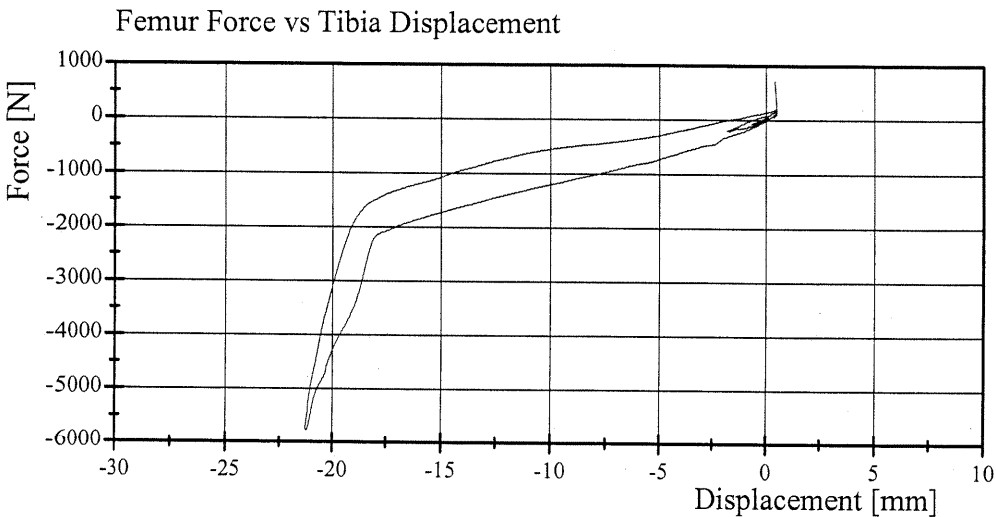
Min: -5769.3 N at 16.2 ms



Filter Class: 600

Max: 0.5 mm at 41.2 ms

Min: -21.3 mm at 16.6 ms



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

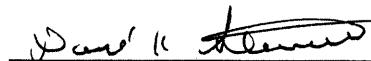
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.78 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1187 N	No
Force At 18 mm Displacement	-2268 - (-3096) N	-2122 N	No

Comments:

Technician



Approved



06.25.2003 10:23:39 1740



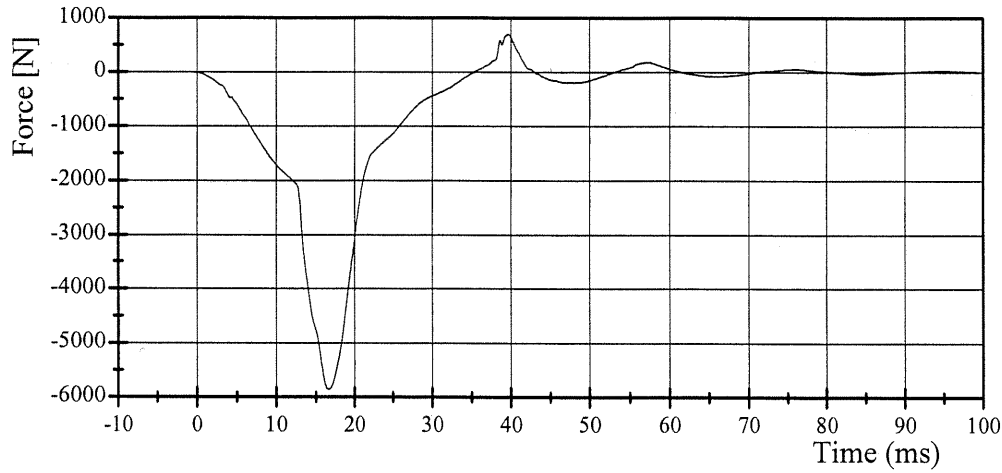
Transportation Research Center Inc.

572E Left Knee Slider Test

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

Test Date 06/25/2003

Femur Force

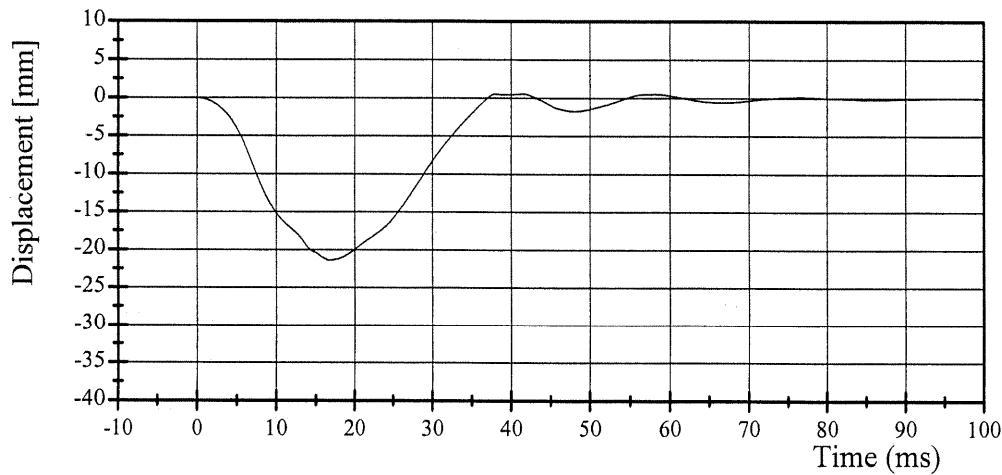


Filter Class: 600

Max: 701.2 N at 39.6 ms

Min: -5855.3 N at 16.6 ms

Tibia Displacement

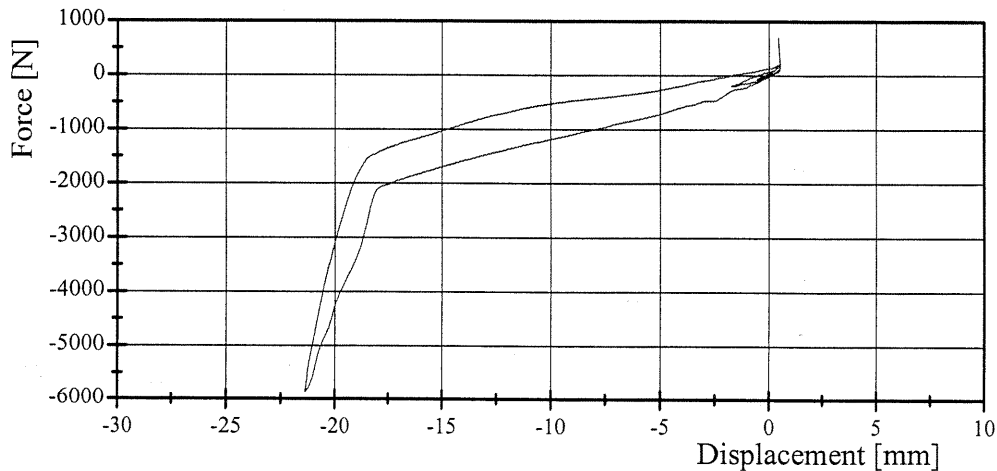


Filter Class: 600

Max: 0.5 mm at 41.7 ms

Min: -21.4 mm at 16.7 ms

Femur Force vs Tibia Displacement



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

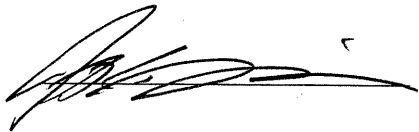
Test Date 06/25/2003

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

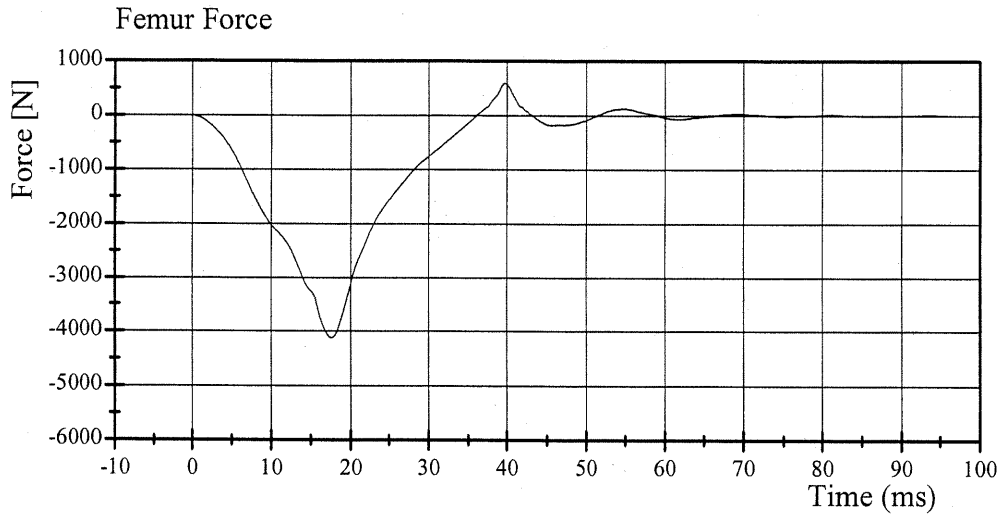


Transportation Research Center Inc.

572E Left Knee Slider Test

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

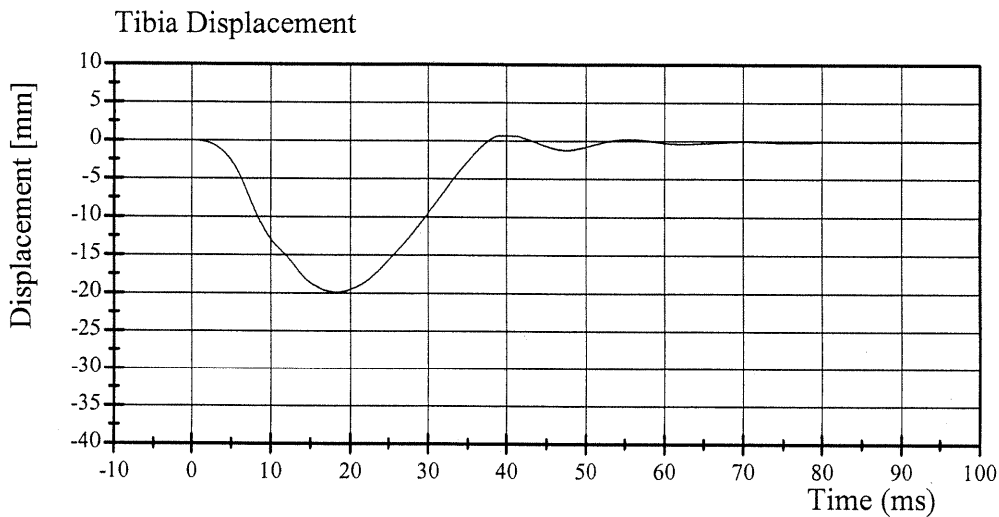
Test Date 06/25/2003



Filter Class: 600

Max: 596.3 N at 39.8 ms

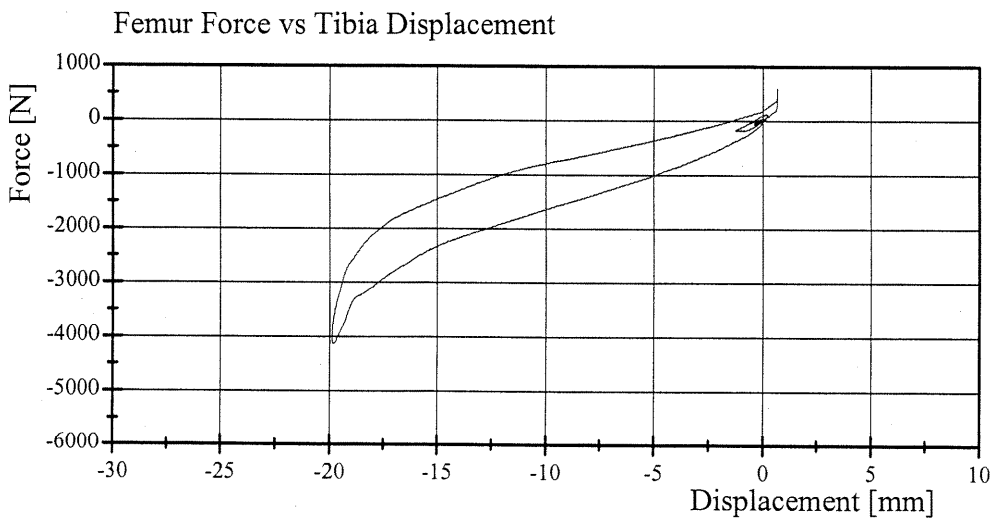
Min: -4126.4 N at 17.5 ms



Filter Class: 600

Max: 0.7 mm at 40.2 ms

Min: -19.9 mm at 18.2 ms



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

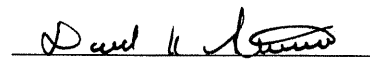
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	2.70 - 2.80 m/s	2.77 m/s	Yes
Force At 10 mm Displacement	-1259 - (-1721) N	-1484 N	Yes
Force At 18 mm Displacement	-2268 - (-3096) N	-2880 N	Yes

Comments:

Technician



Approved



06.25.2003 10:48:54 1742

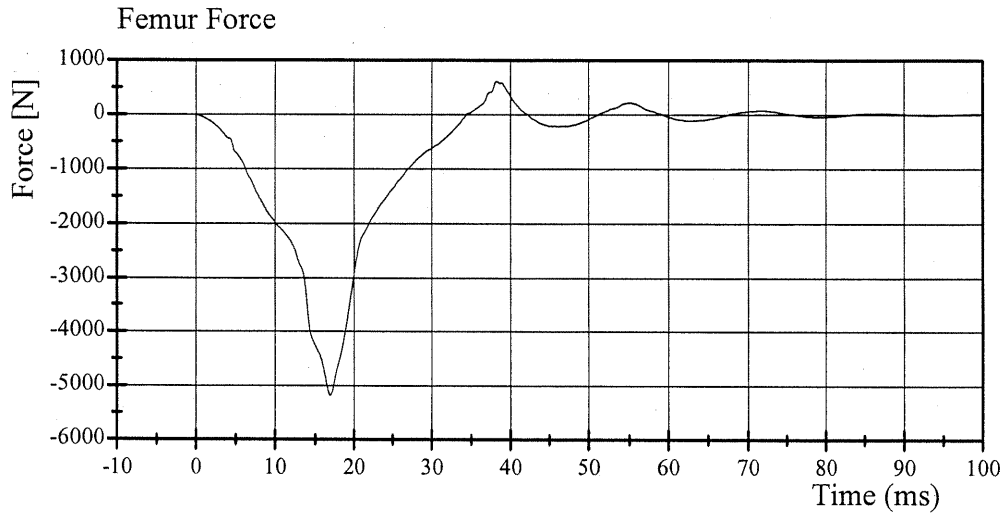


Transportation Research Center Inc.

572E Right Knee Slider Test

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

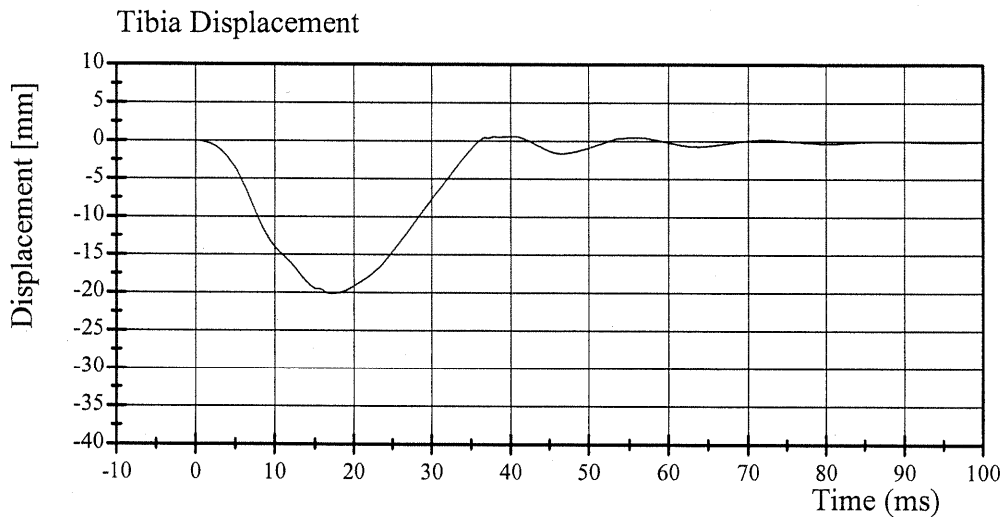
Test Date 06/25/2003



Filter Class: 600

Max: 612.7 N at 38.2 ms

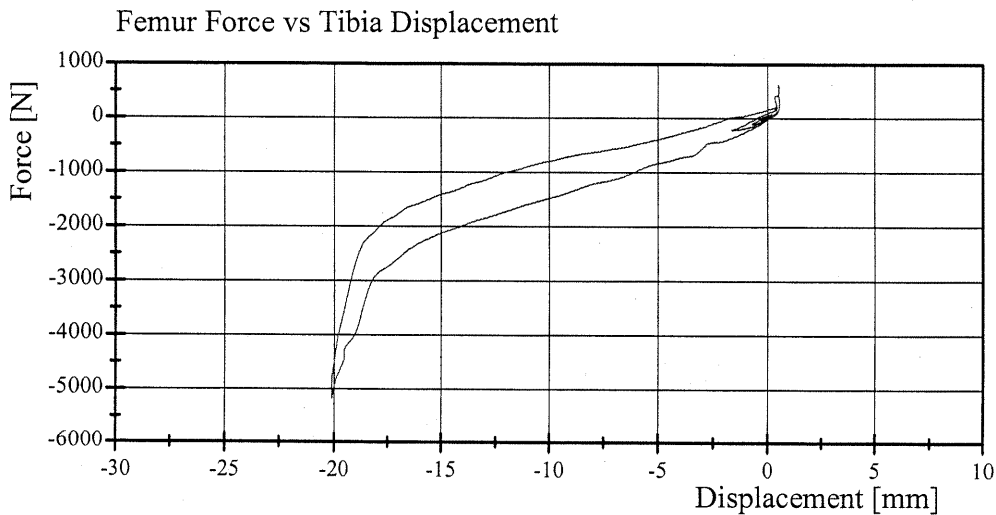
Min: -5182.1 N at 16.9 ms



Filter Class: 600

Max: 0.6 mm at 40.5 ms

Min: -20.1 mm at 17.4 ms



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

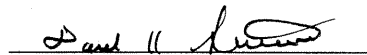
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.12 m/s	Yes
Maximum Pendulum Force	4715 - 5783 N	5300 N	Yes

Comments:

Technician



Approved



06.27.2003 07:32:28 2071

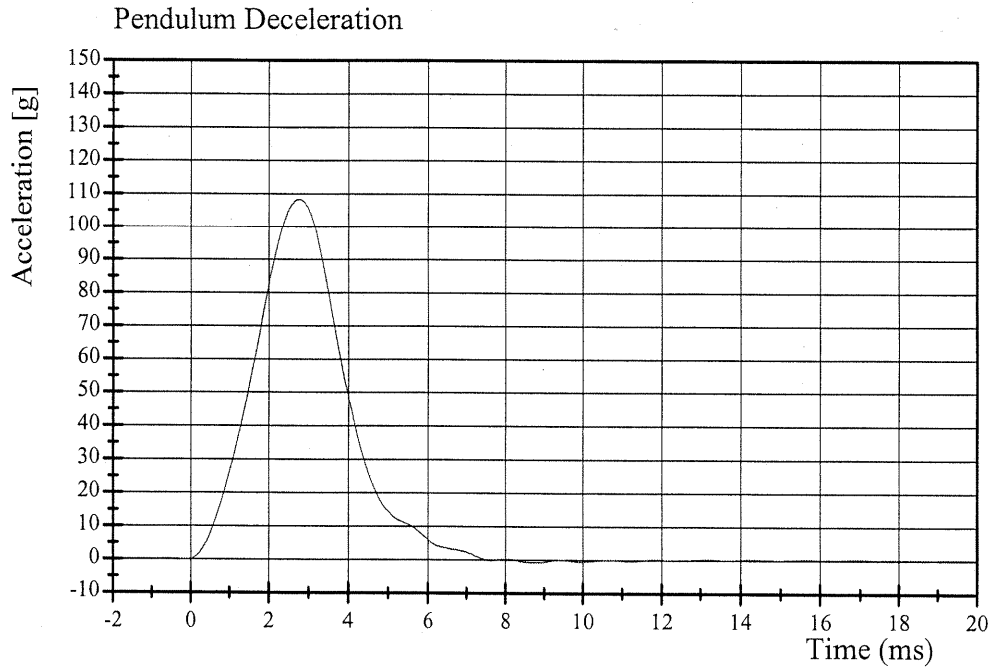


Transportation Research Center Inc.

572E Left Knee Test

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

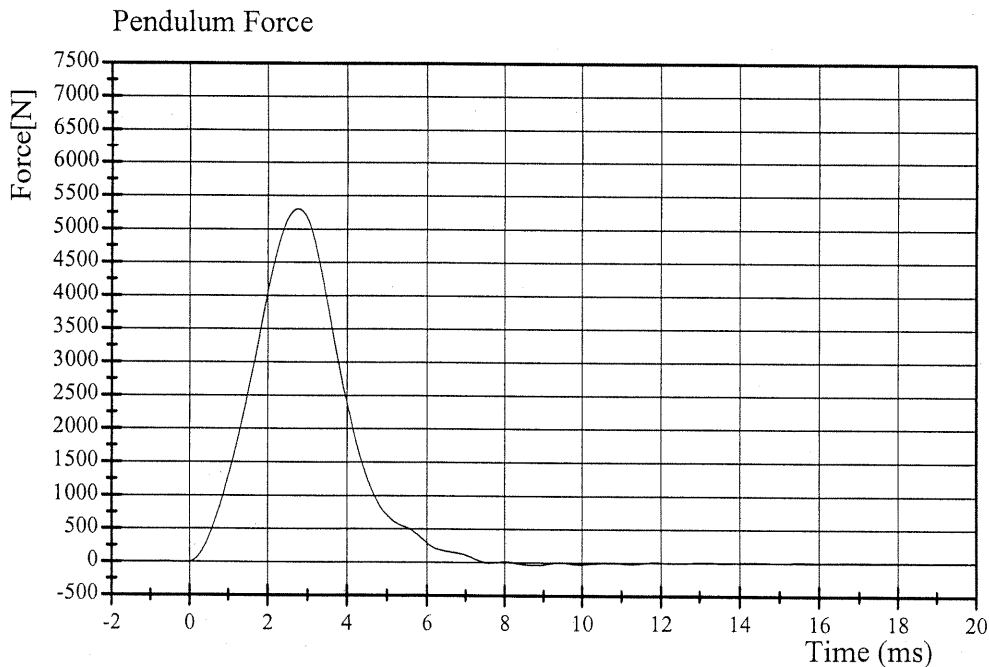
Test Date 06/27/2003



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

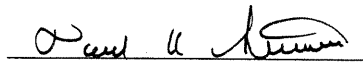
Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	2.07 - 2.13 m/s	2.10 m/s	Yes
Maximum Pendulum Force	4715 - 5783 N	5302 N	Yes

Comments:

Technician



Approved



06.27.2003 07:34:53 2077



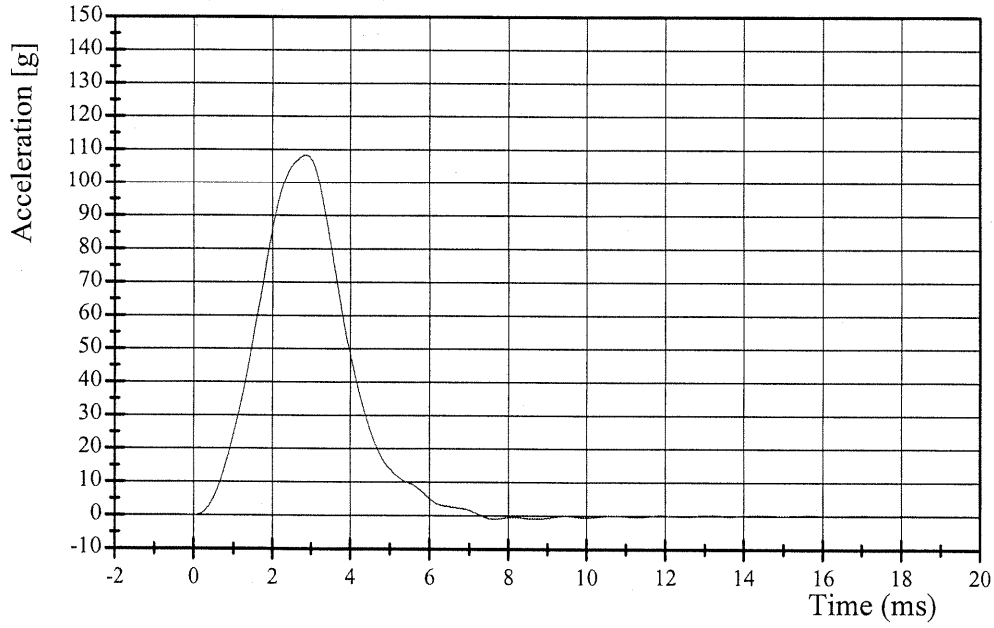
Transportation Research Center Inc.

572E Right Knee Test

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

Test Date 06/27/2003

Pendulum Deceleration

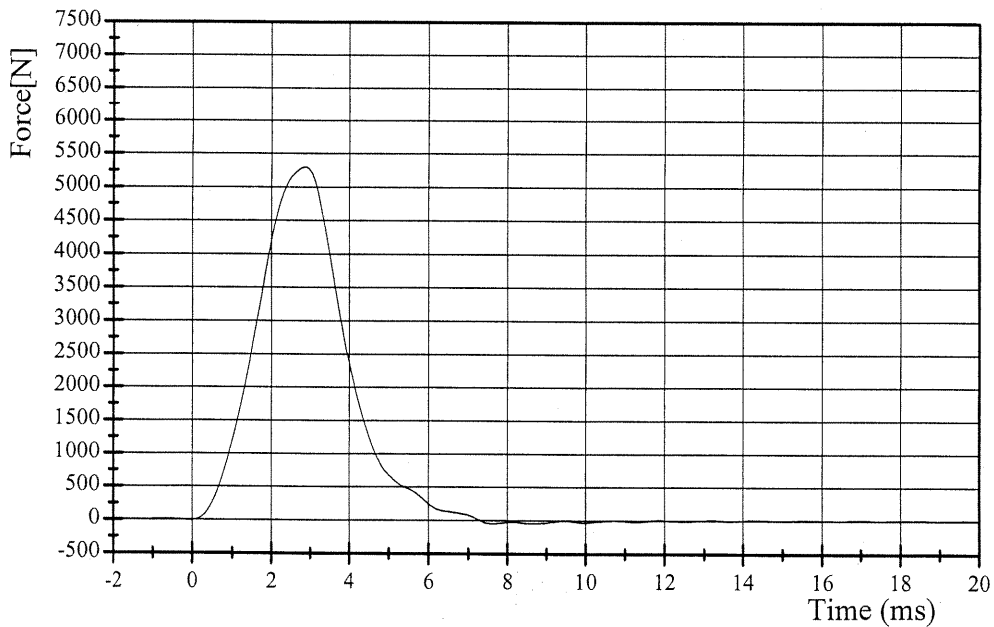


Filter Class: 600

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



Type: Hybrid III 95th S/N: 083 Mfg.: First Technologies Test Date: 6/23/03
 Proj./Seg. No.: 20020480-1002 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: John Clarridge

Date: 6/20/03

Type: Hybrid III 50th S/N: 090 Mfg.: Alderson Test Date: 6/23/03
 Proj./Seg. No.: 20020480-1002 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 Pink	X
Shoes	X
One G Joint Adjustments	X

* Items to be checked during calibration.

Inspection Completed By: John Clarridge

Date: 6/20/03

Transportation Research Center Inc.

Hybrid III Dummy Post-Use Inspection

Type: Hybrid III 95th S/N: 083 Mfg.: First Technologies Test Date: 6/23/03
 Proj./Seg. No.: 20020480-1002 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: John Clarridge Date: 6/23/03

Transportation Research Center Inc.

Hybrid III Dummy Post-Use Inspection

Type: Hybrid III 50th S/N: 090 Mfg.: Alderson Test Date: 6/23/03
 Proj./Seg. No.: 20020480-1002 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 other damage to report.

Inspection Completed By: John Clarridge Date: 6/23/03

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

6/23/2003 8:46:59 AM

Name of Test 030623-1

System MINIDAU

Name of DAU DAU6

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range		Pol.	Cal.	Group	Mfg.	Model
6001	AGN47	HEDXG1	Head Accel X	Fwd	801.60320	g	+	1/22/2003	OK 083v	Endevco	7264-2000LC
6002	J27457	HEDYG1	Head Accel Y	Lft	799.31309	g	-	1/2/2003	OK 083v	Endevco	7264-2KM5T
6003	AAKE2	HEDZG1	Head Accel Z	Up	805.66483	g	-	1/22/2003	OK 083v	Endevco	7264-2000LC
6004	J27523	HEDXR1	Head Accel Red X	Fwd	796.76314	g	+	1/22/2003	OK 083v	Endevco	7264-2KM5T
6005	J27466	HEDYR1	Head Accel Red Y	Lft	803.06167	g	-	1/22/2003	OK 083v	Endevco	7264-2KM5T
6006	ACCP9	HEDZR1	Head Accel Red Z	Up	801.80405	g	-	1/22/2003	OK 083v	Endevco	7264-2000LC
6007	J29006	HD1XG1	Head (LT) Accel X	Fwd	788.00751	g	+	1/22/2003	OK 083v	Endevco	7264-2KM5T
6008	AGAG0	HD1ZG1	Head (LT) Accel Z	Up	796.34180	g	-	1/22/2003	OK 083v	Endevco	7264-2000LC
6009	J29023	HD2YG1	Head (FT) Accel Y	Lft	812.59522	g	-	1/22/2003	OK 083v	Endevco	7264-2KM5T
6010	J27470	HD2ZG1	Head (FT) Accel Z	Up	808.02979	g	-	1/22/2003	OK 083v	Endevco	7264-2KM5T
6011	AAJY4	HD3XG1	Head (TP) Accel X	Fwd	796.91196	g	+	1/22/2003	OK 083v	Endevco	7264-2000LC
6012	AAKB3	HD3YG1	Head (TP) Accel Y	Lft	800.93859	g	-	1/22/2003	OK 083v	Endevco	7264-2000LC
6013	1716A-810-FX	NEKXF1	Neck Force X	Hd	8907.3118	N	-	5/15/2003	OK 083v	Denton	1716A
6014	1716A-810-FY	NEKYF1	Neck Force Y	Hd	8886.9255	N	+	5/15/2003	OK 083v	Denton	1716A
6015	1716A-810-FZ	NEKZF1	Neck Force Z	Hd	13330.913	N	+	5/15/2003	OK 083v	Denton	1716A
6016	1716A-810-MX	NEKXM1	Neck Moment X	Rt Ear	282.12640	N·m	-	5/15/2003	OK 083v	Denton	1716A
6017	1716A-810-MY	NEKYM1	Neck Moment Y	Chn	282.43295	N·m	+	5/15/2003	OK 083v	Denton	1716A
6018	1716A-810-MZ	NEKZM1	Neck Moment Z	Chn	282.98160	N·m	+	5/15/2003	OK 083v	Denton	1716A
6019	1794A-215-FX	NKLXF1	Neck Lower Force X	Hd	13328.265	N	-	10/24/2002	OK 083v	Denton	1794A
6020	1794A-215-FY	NKLYF1	Neck Lower Force Y	Hd	13356.430	N	+	10/24/2002	OK 083v	Denton	1794A
6021	1794A-215-FZ	NKLZF1	Neck Lower Force Z	Hd	13340.587	N	+	10/24/2002	OK 083v	Denton	1794A
6022	1794A-215-MX	NKLXM1	Neck Lower Moment X	Rt Ear	451.58203	N·m	-	10/24/2002	OK 083v	Denton	1794A
6024	1794A-215-MY	NKLYM1	Neck Lower Moment Y	Chn	451.75586	N·m	+	10/24/2002	OK 083v	Denton	1794A
6025	1794A-215-MZ	NKLZM1	Neck Lower Moment Z	Chn	451.68417	N·m	+	10/24/2002	OK 083v	Denton	1794A
6026	J19873	CSTXG1	Chest Accel X	Fwd	398.14613	g	+	1/22/2003	OK 083v	Endevco	7264-2KM5T
6027	AAKA2	CSTYG1	Chest Accel Y	Lft	400.20635	g	-	1/22/2003	OK 083v	Endevco	7264-2000LC
6028	AF973	CSTZG1	Chest Accel Z	Up	403.58178	g	-	1/22/2003	OK 083v	Endevco	7264-2000LC
6029	AGT82	CSTXR1	Chest Accel Red X	Rwd	401.40491	g	-	1/22/2003	OK 083v	Endevco	7264-2000LC
6030	J23772	CSTYR1	Chest Accel Red Y	Lft	396.70855	g	-	1/22/2003	OK 083v	Endevco	7264-2KM5T
6031	AF9Y5	CSTZR1	Chest Accel Red Z	Up	397.05620	g	-	1/22/2003	OK 083v	Endevco	7264-2000LC
6032	14CB1-2897-923	CSTXD1	Chest Deflection X	Stn Fr	99.590744	mm	+	1/29/2003	OK 083v	Servo	14CB1-2897

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System MINIDAU

Name of DAU DAU7

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
7001	2430-726	LFMZFI	Left Femur Force Z	Kne	13346.634	N	+ 9/25/2002	--- 083v	GSE	2430
7002	2430-729	RFMZFI	Right Femur Force Z	Kne	13354.104	N	+ 9/25/2002	OK 083v	GSE	2430
7003	08TC1-2702-083	KNLXD1	Left Knee Displacement	Tib	24.939982	mm	- 1/29/2003	OK 083v	Servo	08TC1-2702
7004	3643-92-FX	TBLXF1	Left Upper Tibia Force X	Tib	11121.890	N	- 9/25/2002	OK 083v	Denton	3643
7005	3643-92-FY	TBLXF1	Left Upper Tibia Force Y	Tib	11101.284	N	+ 9/25/2002	OK 083v	Denton	3643
7006	3643-92-FZ	TBLZF1	Left Upper Tibia Force Z	Tib	11129.250	N	+ 9/25/2002	OK 083v	Denton	3643
7007	3643-92-MX	TBLXM1	Left Upper Tibia Moment X	Ank	396.50605	N·m	- 9/25/2002	OK 083v	Denton	3643
7008	3643-92-MY	TBLYM1	Left Upper Tibia Moment Y	Ank	395.93437	N·m	+ 9/25/2002	OK 083v	Denton	3643
7009	3644-92-FX	ANLXF1	Left Lower Tibia Force X	Ank	11136.661	N	- 9/25/2002	OK 083v	Denton	3644
7010	3644-92-FY	ANLYF1	Left Lower Tibia Force Y	Ank	11115.479	N	+ 9/25/2002	OK 083v	Denton	3644
7011	3644-92-FZ	ANLZF1	Left Lower Tibia Force Z	Ank	11123.647	N	+ 9/25/2002	OK 083v	Denton	3644
7012	3644-92-MX	ANLXM1	Left Lower Tibia Moment X	Ank	394.94147	N·m	- 9/25/2002	OK 083v	Denton	3644
7013	3644-92-MY	ANLYM1	Left Lower Tibia Moment Y	Ank	395.43075	N·m	+ 9/25/2002	OK 083v	Denton	3644
7014	08TC1-2702-273r	KNRDX1	Right Knee Displacement	Tib	26.056927	mm	- 1/29/2003	OK 083v	Servo	08TC1-2702
7015	3643-94-FX	TBRXF1	Right Upper Tibia Force X	Tib	11132.545	N	- 9/25/2002	OK 083v	Denton	3643
7016	3643-94-FY	TBRXF1	Right Upper Tibia Force Y	Tib	11110.859	N	+ 9/25/2002	OK 083v	Denton	3643
7017	3643-94-FZ	TBRZF1	Right Upper Tibia Force Z	Tib	11111.739	N	+ 9/25/2002	OK 083v	Denton	3643
7018	3643-94-MX	TBRXM1	Right Upper Tibia Moment X	Ank	396.26878	N·m	- 9/25/2002	OK 083v	Denton	3643
7019	3643-94-MY	TBRYM1	Right Upper Tibia Moment Y	Ank	395.26953	N·m	+ 9/25/2002	OK 083v	Denton	3643
7020	3644-94-FX	ANRXF1	Right Lower Tibia Force X	Ank	11111.471	N	- 9/25/2002	OK 083v	Denton	3644
7021	3644-94-FY	ANRYF1	Right Lower Tibia Force Y	Ank	11137.699	N	+ 9/25/2002	OK 083v	Denton	3644
7022	3644-94-FZ	ANRZF1	Right Lower Tibia Force Z	Ank	11112.316	N	+ 9/25/2002	OK 083v	Denton	3644
7023	3644-94-MX	ANRXM1	Right Lower Tibia Moment X	Ank	396.29973	N·m	- 9/25/2002	OK 083v	Denton	3644
7024	3644-94-MY	ANRYM1	Right Lower Tibia Moment Y	Ank	395.05433	N·m	+ 9/25/2002	OK 083v	Denton	3644
7025	02I02I05-F14	HEDXG2	Head Accel X	Fwd	798.87657	g	+ 1/24/2003	OK 090v	Entran	EGE-73B6Q-200
7026	02I02I10-N20	HEDYG2	Head Accel Y	Lft	809.80624	g	- 1/24/2003	OK 090v	Entran	EGE-73B6Q-200
7027	02I02I10-N28	HEDZG2	Head Accel Z	Up	789.48991	g	- 1/24/2003	OK 090v	Entran	EGE-73B6Q-200
7028	02I02I10-N18	HEDXR2	Head Accel Red X	Rwd	810.53698	g	- 1/24/2003	OK 090v	Entran	EGE-73B6Q-200
7029	02I02I05-F02	HEDYR2	Head Accel Red Y	Rgt	809.61416	g	+ 1/24/2003	OK 090v	Entran	EGE-73B6Q-200
7030	02I02I16-A20	HEDZR2	Head Accel Red Z	Up	792.61873	g	- 1/24/2003	OK 090v	Entran	EGE-73B6Q-200
7031	02I02I05-F18	HD1XG2	Head (LT) Accel X	Fwd	791.95668	g	+ 1/24/2003	OK 090v	Entran	EGE-73B6Q-200
7032	02I02I05-F15	HD1ZG2	Head (LT) Accel Z	Up	795.03105	g	- 1/24/2003	OK 090v	Entran	EGE-73B6Q-200

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System MINIDAU

Name of DAU DAU8

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
8001	02I02I05-F13	HD2YG2	Head (FT) Accel Y	Lft	803.96959 g	-	1/24/2003	OK 090v	Entran	EGE-73B6Q-200
8002	02I02I05-F05	HD2ZG2	Head (FT) Accel Z	Up	792.90105 g	-	1/24/2003	OK 090v	Entran	EGE-73B6Q-200
8003	ALAB9	HD3XG2	Head (TP) Accel X	Fwd	803.43972 g	+	3/27/2003	OK 090v	Endevco	7264-2000T
8004	J19501	HD3YG2	Head (TP) Accel Y	Lft	806.61677 g	-	3/27/2003	OK 090v	Endevco	7264-2KM5T
8005	1716-0499-FX	NEKXF2	Neck Force X	Hd	8898.8491 N	-	10/3/2002	OK 090v	Denton	1716
8006	1716-0499-FY	NEKYF2	Neck Force Y	Hd	8892.4032 N	+	10/3/2002	OK 090v	Denton	1716
8007	1716-0499-FZ	NEKZF2	Neck Force Z	Hd	13357.219 N	+	10/3/2002	OK 090v	Denton	1716
8008	1716-0499-MX	NEKXM2	Neck Moment X	Rt Ear	282.63557 N·m	-	10/3/2002	OK 090v	Denton	1716
8009	1716-0499-MY	NEKYM2	Neck Moment Y	Chn	282.10935 N·m	+	10/3/2002	OK 090v	Denton	1716
8010	1716-0499-MZ	NEKZM2	Neck Moment Z	Chn	282.86129 N·m	+	10/3/2002	OK 090v	Denton	1716
8011	1794A-0121-FX	NKLXF2	Neck Lower Force X	Hd	13359.969 N	-	10/26/2002	OK 090v	Denton	1794A
8012	1794A-0121-FY	NKLYF2	Neck Lower Force Y	Hd	13347.598 N	+	10/26/2002	OK 090v	Denton	1794A
8013	1794A-0121-FZ	NKLZF2	Neck Lower Force Z	Hd	13345.705 N	+	10/26/2002	OK 090v	Denton	1794A
8014	1794A-0121-MX	NKLXM2	Neck Lower Moment X	Rt Ear	451.82593 N·m	-	10/26/2002	OK 090v	Denton	1794A
8015	1794A-0121-MY	NKLYM2	Neck Lower Moment Y	Chn	452.42008 N·m	+	10/26/2002	OK 090v	Denton	1794A
8016	1794A-0121-MZ	NKLZM2	Neck Lower Moment Z	Chn	452.53370 N·m	+	10/26/2002	OK 090v	Denton	1794A
8017	J14688	CSTXG2	Chest Accel X	Fwd	404.31160 g	+	1/21/2003	OK 090v	Endevco	7264-2KM5T
8018	AAKA1	CSTYG2	Chest Accel Y	Lft	401.26649 g	-	1/21/2003	OK 090v	Endevco	7264-2000LC
8019	ADAL2	CSTZG2	Chest Accel Z	Up	398.02851 g	-	1/21/2003	OK 090v	Endevco	7264-2000LC
8020	J36744	CSTXR2	Chest Accel Red X	Rwd	397.17016 g	-	1/21/2003	OK 090v	Endevco	7264-2000TZ
8021	J14660	CSTYR2	Chest Accel Red Y	Lft	405.06649 g	-	1/21/2003	OK 090v	Endevco	7264-2KM5T
8022	J14666	CSTZR2	Chest Accel Red Z	Up	399.76264 g	-	1/21/2003	OK 090v	Endevco	7264-2KM5T
8023	83672-14	CSTXD2	Chest Deflection X #1	Stn Fr	99.861130 mm	+	1/31/2003	OK 090v	Servo	14CB1-2897
8024	2430-631	LFMZF2	Left Femur Force Z #3	Kne	13351.754 N	+	10/7/2002	OK 090v	GSE	2430
8025	2430-741	RFMZF2	Right Femur Force Z #6	Kne	13346.905 N	+	10/7/2002	--- 090v	GSE	2430
8026	150-121VR-3892	KNLXD2	Left Knee Displacement	Tib	40.084115 mm	-	1/28/2003	OK 090v	Space Age	150-0121VR
8027	4509J-90-FX	TBLXF2	Left Upper Tibia Force X	Tib	11124.889 N	+	12/27/2002	OK 090v	Denton	4509J
8028	4509J-90-FZ	TBLZF2	Left Upper Tibia Force Z	Tib	11114.020 N	+	12/27/2002	OK 090v	Denton	4509J
8029	4509J-90-MX	TBLXM2	Left Upper Tibia Moment X	Tib	395.10063 N·m	+	12/27/2002	OK 090v	Denton	4509J
8030	4509J-90-MY	TBLYM2	Left Upper Tibia Moment Y	Tib	394.56003 N·m	+	12/27/2002	OK 090v	Denton	4509J
8031	EJ59J	TBLXG2	Left Tibia Accel X	Fwd	1214.3924 g	+	1/21/2003	OK 090v	Endevco	7264-2000T
8032	AJ507	TBLYG2	Left Tibia Accel Y	Rt	1221.2283 g	+	1/22/2003	OK 090v	Endevco	7264-2KM5T

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System MINIDAU

Name of DAU DAU9

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
9001	4929J-121-FX	ANLXF2	Left Lower Tibia Force X	Ank	11117.181	N	+ 12/30/2002	OK 090v	Denton	4929J
9002	4929J-121-FY	ANLYF2	Left Lower Tibia Force Y	Ank	11111.371	N	+ 12/30/2002	OK 090v	Denton	4929J
9003	4929J-121-FZ	ANLZF2	Left Lower Tibia Force Z	Ank	11119.378	N	+ 12/30/2002	OK 090v	Denton	4929J
9004	4929J-121-MX	ANLXM2	Left Lower Tibia Moment X	Ank	394.60500	N·m	+ 12/30/2002	OK 090v	Denton	4929J
9005	4929J-121-MY	ANLYM2	Left Lower Tibia Moment Y	Ank	396.30648	N·m	+ 12/30/2002	OK 090v	Denton	4929J
9006	PD210-4B-AK-02	FTLXD2	Left Foot Disp. X 103X	Eversi	327.20881	°	+ 9/19/2002	OK 090v	Contelec	PD210-4B
9007	PD210-4B-AK-02	FTLYD2	Left Foot Disp. Y 103Y	Dorsif	322.59080	°	+ 9/19/2002	OK 090v	Contelec	PD210-4B
9008	PD210-4B-AK-02	FTLZD2	Left Foot Disp. Z 103Z	Exter	326.27051	°	- 9/19/2002	OK 090v	Contelec	PD210-4B
9009	EY99J	FTLXG2	Left Foot Accel X	Fwd	1169.2701	g	+ 1/22/2003	OK 090v	Endevco	7264-2000T
9010	J17988	FTLYG2	Left Foot Accel Y	Rt	1164.1920	g	+ 1/22/2003	OK 090v	Endevco	7264-2KM5T
9011	FG97J	FTLZG2	Left Foot Accel Z	Dn	1170.1519	g	+ 1/21/2003	OK 090v	Endevco	7264-2KM5T
9012	150-121VL-3726	KNRXD2	Right Knee Displacement	Tib	39.158349	mm	- 1/28/2003	OK 090v	Space Age	150-0121VL
9013	4509J-89-FX	TBRXF2	Right Upper Tibia Force X	Tib	11125.882	N	+ 12/27/2002	OK 090v	Denton	4509J
9014	4509J-89-FZ	TBRZF2	Right Upper Tibia Force Z	Tib	11122.546	N	+ 12/27/2002	OK 090v	Denton	4509J
9015	4509J-89-MX	TBRXM2	Right Upper Tibia Moment X	Tib	396.41007	N·m	+ 12/27/2002	OK 090v	Denton	4509J
9016	4509J-89-MY	TBRYM2	Right Upper Tibia Moment Y	Tib	394.90815	N·m	+ 12/27/2002	OK 090v	Denton	4509J
9017	J35770	TBRXG2	Right Tibia Accel X	Fwd	1227.7883	g	+ 1/22/2003	OK 090v	Endevco	7264-2000TZ
9018	AAKC6	TBRYG2	Right Tibia Accel Y	Rt	1238.9594	g	+ 1/22/2003	OK 090v	Endevco	7264-2000LC
9019	4929J-120-FX	ANRXF2	Right Lower Tibia Force X	Ank	11123.189	N	+ 12/27/2002	OK 090v	Denton	4929J
9020	4929J-120-FY	ANRYF2	Right Lower Tibia Force Y	Ank	11133.371	N	+ 12/27/2002	OK 090v	Denton	4929J
9021	4929J-120-FZ	ANRZF2	Right Lower Tibia Force Z	Ank	11130.904	N	+ 12/27/2002	OK 090v	Denton	4929J
9022	4929J-120-MX	ANRXM2	Right Lower Tibia Moment X	Ank	394.51730	N·m	+ 12/27/2002	OK 090v	Denton	4929J
9023	4929J-120-MY	ANRYM2	Right Lower Tibia Moment Y	Ank	395.65904	N·m	+ 12/27/2002	OK 090v	Denton	4929J
9024	PD210-4B-AK-02	FTRXD2	Right Foot Disp. X 108X	Eversi	318.62592	°	- 9/19/2002	OK 090v	Contelec	PD210-4B
9025	PD210-4B-AK-02	FTRYD2	Right Foot Disp. Y 108Y	Dorsif	326.97895	°	+ 9/19/2002	OK 090v	Contelec	PD210-4B
9026	PD210-4B-AK-02	FTRZD2	Right Foot Disp. Z 108Z	Intern	322.83489	°	- 9/19/2002	OK 090v	Contelec	PD210-4B
9027	AGAC4	FTRXG2	Right Foot Accel X	Fwd	1180.7573	g	+ 1/21/2003	OK 090v	Endevco	7264-2KM5T
9028	AJ452	FTRYG2	Right Foot Accel Y	Rt	1204.7058	g	+ 1/22/2003	OK 090v	Endevco	7264-2KM5T
9029	CC24H	FTRZG2	Right Foot Accel Z	Dn	1239.2293	g	+ 1/21/2003	OK 090v	Endevco	7264-2KM5T
9030	J35808	LRSX	LT RR SEAT X-MEMBER	RR	978.76163	g	- 2/27/2003	OK -1	Endevco	7264-2000TZ
9031	P27476	RRSXG	RT RR SEAT X-MEMBER	FWD	1016.6395	g	+ 5/6/2003	OK -1	Endevco	7264C-2K-2-180
9032	P27204	BCLXG	FR BRAKE CALIPER X-AXIS	RR	1005.2619	g	- 5/7/2003	OK -1	Endevco	7264C-2K-2-180

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System MINIDAU

Name of DAU DAUA

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range		Pol.	Cal.	Group	Mfg.	Model
0001	P27195	BCRXG	FR BRAKE CALIPER X-AXIS	FWD	1003.5673	g	+	5/7/2003	OK	Endevco	7264C-2K-2-180
0002	P27468	DPCXG	DASH PNL CENTER X-AXIS	FWD	1012.3578	g	+	5/6/2003	OK -1	Endevco	7264C-2K-2-180
0003	P27185	ENGXG1	ENGINE TOP X-AXIS	FWD	999.68759	g	+	5/7/2003	OK -1	Endevco	7264C-2K-2-180
0004	P25265	ENGXG2	ENGINE BOTTOM X-AXIS	FWD	988.95155	g	+	11/21/2002	--- -1	Endevco	7264C-2K-2-180
0005	P27498	TPAXG	TOEPAN X-AXIS (ACCEL)	FWD	1004.9067	g	+	5/6/2003	OK -1	Endevco	7264C-2K-2-180
0006	J12272	TPAZG	TOEPAN Z-AXIS (ACCEL)	UP	993.51884	g	-	3/4/2003	OK -1	Endevco	7264-2000T
0007	03C03C14-F06	TPFXG	TOEPAN X-AXIS (FOOT)	FWD	992.24806	g	+	3/31/2003	OK -1	Entran	EGE-73B6Q-20C
0008	P27161	TPFZG	TOEPAN Z-AXIS (FOOT)	UP	980.39215	g	-	5/7/2003	OK -1	Endevco	7264C-2K-2-180
0009	J33398	RDKZG	RR DECK Z-AXIS	DN	986.55054	g	+	3/4/2003	OK -1	Endevco	7264-2000TZ
0010	J33401	RDCXG	RR COMPARTMENT CENT	FWD	1012.3178	g	+	3/4/2003	OK -1	Endevco	7264-2000TZ
0011	ABFire1	DABET1	DRIV. AB EVENT PRI	IP02	5.12	V	+	8/20/2002	OK VOLPE	FLUKE	Y8101A
0013	ABFire3	PABET1	PASS. AB EVENT PRI	6	5.12	V	+	8/20/2002	OK VOLPE	FLUKE	Y8101A

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Name of Test 030623-1

System MINIDAU

Name of DAU DAUE

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
0001	EVENT	EVENT	EVENT		5.12	V	+ 10/15/2002	OK -1	TRC	Event
0002	62467	BA1F	ROW A CELL 1		221904.96	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0003	122042A	BA2F	ROW A CELL 2		221805.75	N	+ 3/11/2003	OK TRC	Interface	1220BZY-50K
0004	68054	BA3F	ROW A CELL 3		221929.78	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0005	68061	BA4F	ROW A CELL 4		222029.10	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0006	68058	BA5F	ROW A CELL 5		221743.79	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0007	68042	BA6F	ROW A CELL 6		221706.63	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0008	68032	BA7F	ROW A CELL 7		221942.19	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0009	68026	BA8F	ROW A CELL 8		221793.36	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0010	68045	BA9F	ROW A CELL 9		222551.99	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0011	68027	BB1F	ROW B CELL 1		222203.12	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0012	68055	BB2F	ROW B CELL 2		221545.75	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0013	68046	BB3F	ROW B CELL 3		221904.96	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0014	68068	BB4F	ROW B CELL 4		221545.75	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0015	68024	BB5F	ROW B CELL 5		222066.37	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0016	68044	BB6F	ROW B CELL 6		221706.63	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0017	68069	BB7F	ROW B CELL 7		223214.28	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0018	68034	BB8F	ROW B CELL 8		221756.18	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0019	68047	BB9F	ROW B CELL 9		222016.68	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0020	62466	BC1F	ROW C CELL 1		221967.01	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0021	62510	BC2F	ROW C CELL 2		222066.37	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0022	68052	BC3F	ROW C CELL 3		221830.55	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0023	68028	BC4F	ROW C CELL 4		221842.95	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0024	68064	BC5F	ROW C CELL 5		221780.97	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0025	68012	BC6F	ROW C CELL 6		221880.15	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0026	68063	BC7F	ROW C CELL 7		222029.10	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0027	68015	BC8F	ROW C CELL 8		222178.24	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0028	62453	BC9F	ROW C CELL 9		221756.18	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0029	68050	BD1F	ROW D CELL 1		221880.15	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0030	68021	BD2F	ROW D CELL 2		222352.50	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0031	68039	BD3F	ROW D CELL 3		221991.84	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K
0032	68018	BD4F	ROW D CELL 4		222128.51	N	+ 3/11/2003	OK TRC	Interface	1220TX-50K

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0033	68067	BD5F	ROW D CELL 5	222140.94	N	+	3/11/2003	OK	TRC	Interface	1220TX-50K
0034	62456	BD6F	ROW D CELL 6	221855.35	N	+	3/11/2003	OK	TRC	Interface	1220TX-50K
0035	68014	BD7F	ROW D CELL 7	221880.15	N	+	3/11/2003	OK	TRC	Interface	1220TX-50K
0036	68051	BD8F	ROW D CELL 8	222265.34	N	+	3/11/2003	OK	TRC	Interface	1220TX-50K
0037	68033	BD9F	ROW D CELL 9	222053.94	N	+	3/11/2003	OK	TRC	Interface	1220TX-50K

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Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos Output	Flip
HEDXG	Head Accel X	7264-2000LC	AGN47	Endevco	0.01996 g	2000	1/22/2003	Fwd	0
HEDYG	Head Accel Y	7264-2KM5T	J27457	Endevco	0.02785 g	2000	1/2/2003	Lft	1
HEDZG	Head Accel Z	7264-2000LC	AAKE2	Endevco	0.02542 g	2000	1/22/2003	Up	1
HEDXR	Head Accel Red X	7264-2KM5T	J27523	Endevco	0.02142 g	2000	1/22/2003	Fwd	0
HEDYR	Head Accel Red Y	7264-2KM5T	J27466	Endevco	0.02277 g	2000	1/22/2003	Lft	1
HEDZR	Head Accel Red Z	7264-2000LC	ACCP9	Endevco	0.02456 g	2000	1/22/2003	Up	1
HD1XG	Head (LT) Accel X	7264-2KM5T	J29006	Endevco	0.02499 g	2000	1/22/2003	Fwd	0
HD1ZG	Head (LT) Accel Z	7264-2000LC	AGAGO	Endevco	0.02074 g	2000	1/22/2003	Up	1
HD2YG	Head (FT) Accel Y	7264-2KM5T	J29023	Endevco	0.02864 g	2000	1/22/2003	Lft	1
HD2ZG	Head (FT) Accel Z	7264-2KM5T	J27470	Endevco	0.02263 g	2000	1/22/2003	Up	1
HD3XG	Head (TP) Accel X	7264-2000LC	AAJY4	Endevco	0.02677 g	2000	1/22/2003	Fwd	0
HD3YG	Head (TP) Accel Y	7264-2000LC	AAKB3	Endevco	0.02557 g	2000	1/22/2003	Lft	1
NEKXF	Neck Force X	1716A	1716A-810-FX	Denton	0.000192243 N	8896.4	5/15/2003	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716A	1716A-810-FY	Denton	0.000185847 N	8896.4	5/15/2003	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716A	1716A-810-FZ	Denton	0.000096743 N	13344.6	5/15/2003	Hd Up,Cst Dn	0
NEKXM	Neck Moment X	1716A	1716A-810-MX	Denton	0.005854159 N	282.5	5/15/2003	Rt Ear to Rt Shld	1
NEKYM	Neck Moment Y	1716A	1716A-810-MY	Denton	0.005924247 N	282.5	5/15/2003	Chn to Strnm	0
NEKZM	Neck Moment Z	1716A	1716A-810-MZ	Denton	0.0081869 N	282.5	5/15/2003	Chn to Lt Shld	0
NKLXF	Neck Lower Force X	1794A	1794A-215-FX	Denton	0.000139689 N	13344.6	10/24/2002	Hd Fd,Cst Rr	1
NKLYF	Neck Lower Force Y	1794A	1794A-215-FY	Denton	0.000137396 N	13344.6	10/24/2002	Hd Lt,Cst Rt	0
NKLZF	Neck Lower Force Z	1794A	1794A-215-FZ	Denton	0.000069151 N	13344.6	10/24/2002	Hd Up,Cst Dn	0
NKLXM	Neck Lower Moment X	1794A	1794A-215-MX	Denton	0.003843362 N	452	10/24/2002	Rt Ear to Rt Shld	1
NKLYM	Neck Lower Moment Y	1794A	1794A-215-MY	Denton	0.003790486 N	452	10/24/2002	Chn to Strnm	0
NKLZM	Neck Lower Moment Z	1794A	1794A-215-MZ	Denton	0.006869911 N	452	10/24/2002	Chn to Lt Shld	0
CSTXG	Chest Accel X	7264-2KM5T	J19873	Endevco	0.02473 g	2000	1/22/2003	Fwd	0
CSTYG	Chest Accel Y	7264-2000LC	AAKA2	Endevco	0.02722 g	2000	1/22/2003	Lft	1

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Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos Output	Flip
CSTZG	Chest Accel Z	7264-2000LC	AF973	Endevco	0.02643 g	2000	1/22/2003	Up	1
CSTXR	Chest Accel Red X	7264-2000LC	AGT82	Endevco	0.01993 g	2000	1/22/2003	Rwd	1
CSTYR	Chest Accel Red Y	7264-2KM5T	J23772	Endevco	0.02746 g	2000	1/22/2003	Lft	1
CSTZR	Chest Accel Red Z	7264-2000LC	AF9Y5	Endevco	0.02433 g	2000	1/22/2003	Up	1
CSTXD	Chest Deflection X	14CB1-2897	14CB1-2897-9230	Servo	1.28526 m	100	1/29/2003	Stn Fr Spn	0
LFMZF	Left Femur Force Z	2430	2430-726	GSE	0.000069245 N	13344	9/25/2002	Kne Fd,Pel Rr	0
RFMZF	Right Femur Force Z	2430	2430-729	GSE	0.000069964 N	13344	9/25/2002	Kne Fd,Pel Rr	0
KNLXD	Left Knee Displacement	08TC1-2702	08TC1-2702-083L	Servo	41.05857 m	25.4	1/29/2003	Tib Rr,Hld Fem	1
KNLLF	Left Knee-Left Force	2372	2372-146-LEFT	Denton	0.000225383 N	8896.4	9/25/2002	Knee Up,Clev Dn	0
KNLMF	Left Knee-Right Force	2372	2372-146-RIGHT	Denton	0.000225473 N	8896.4	9/25/2002	Knee Up,Clev Dn	0
TBLXF	Left Upper Tibia Force X	3643	3643-92-FX	Denton	0.000177059 N	11120.6	9/25/2002	Tib Rr,Knee Fd	1
TBLYF	Left Upper Tibia Force Y	3643	3643-92-FY	Denton	0.000176708 N	11120.6	9/25/2002	Tib Rt,Knee Lt	0
TBLZF	Left Upper Tibia Force Z	3643	3643-92-FZ	Denton	0.000097468 N	11120.6	9/25/2002	Tib Dn,Knee Up	0
TBLXM	Left Upper Tibia Moment X	3643	3643-92-MX	Denton	0.00755134 N	395.4	9/25/2002	Ank Rt,Hld Knee	1
TBLYM	Left Upper Tibia Moment Y	3643	3643-92-MY	Denton	0.007606727 N	395.4	9/25/2002	Ank Fd,Bot Clev Rr	0
ANLXF	Left Lower Tibia Force X	3644	3644-92-FX	Denton	0.000174145 N	11120.6	9/25/2002	Ank Rr,Knee Fd	1
ANLYF	Left Lower Tibia Force Y	3644	3644-92-FY	Denton	0.000173165 N	11120.6	9/25/2002	Ank Rt,Knee Lft	0
ANLZF	Left Lower Tibia Force Z	3644	3644-92-FZ	Denton	0.000096092 N	11120.6	9/25/2002	Ank Dn,Tib Up	0
ANLXM	Left Lower Tibia Moment X	3644	3644-92-MX	Denton	0.007537178 N	395.4	9/25/2002	Ank Rt,Hld Knee	1
ANLYM	Left Lower Tibia Moment Y	3644	3644-92-MY	Denton	0.007441325 N	395.4	9/25/2002	Ank Fd,Hld Knee	0
KNRXD	Right Knee Displacement	08TC1-2702	08TC1-2702-273r	Servo	39.29857 m	25.4	1/29/2003	Tib Rr,Hld Fem	1
KNRMF	Right Knee-Left Force	2372	2372-148-LEFT	Denton	0.000226451 N	8896.4	9/25/2002	Knee Up,Clev Dn	0
KNRLF	Right Knee-Right Force	2372	2372-148-RIGHT	Denton	0.000226226 N	8896.4	9/25/2002	Knee Up,Clev Dn	0
TBRXF	Right Upper Tibia Force X	3643	3643-94-FX	Denton	0.000173552 N	11120.6	9/25/2002	Tib Rr,Knee Fd	1
TBRYF	Right Upper Tibia Force Y	3643	3643-94-FY	Denton	0.000173237 N	11120.6	9/25/2002	Tib Rt,Knee Lt	0
TBRZF	Right Upper Tibia Force Z	3643	3643-94-FZ	Denton	0.000095795 N	11120.6	9/25/2002	Tib Dn,Knee Up	0
TBRXM	Right Upper Tibia Moment X	3643	3643-94-MX	Denton	0.007383156 N	395.4	9/25/2002	Ank Rt,Hld Knee	1
TBRYM	Right Upper Tibia Moment Y	3643	3643-94-MY	Denton	0.007444436 N	395.4	9/25/2002	Ank Fd,Bot Clev Rr	0

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Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos Output	Flip
ANRXF	Right Lower Tibia Force X	3644	3644-94-FX	Denton	0.000176546 N	11120.6	9/25/2002	Ank Rr,Knee Fd	1
ANRYF	Right Lower Tibia Force Y	3644	3644-94-FY	Denton	0.000175458 N	11120.6	9/25/2002	Ank Rt,Knee Lft	0
ANRZF	Right Lower Tibia Force Z	3644	3644-94-FZ	Denton	0.000097 N	11120.6	9/25/2002	Ank Dn,Tib Up	0
ANRXM	Right Lower Tibia Moment X	3644	3644-94-MX	Denton	0.007690187 N	395.4	9/25/2002	Ank Rt,Hld Knee	1
ANRYM	Right Lower Tibia Moment Y	3644	3644-94-MY	Denton	0.007623672 N	395.4	9/25/2002	Ank Fd,Hld Knee	0

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Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos Output	Flip
HEDXG	Head Accel X	EGE-73B6Q-20	02102105-F14	Entran	0.0221 g	2000	1/24/2003	Fwd	0
HEDYG	Head Accel Y	EGE-73B6Q-20	02102110-N20	Entran	0.02529 g	2000	1/24/2003	Lft	1
HEDZG	Head Accel Z	EGE-73B6Q-20	02102110-N28	Entran	0.02092 g	2000	1/24/2003	Up	1
HEDXR	Head Accel Red X	EGE-73B6Q-20	02102110-N18	Entran	0.02256 g	2000	1/24/2003	Rwd	1
HEDYR	Head Accel Red Y	EGE-73B6Q-20	02102105-F02	Entran	0.0204 g	2000	1/24/2003	Rgt	0
HEDZR	Head Accel Red Z	EGE-73B6Q-20	02102116-A20	Entran	0.02307 g	2000	1/24/2003	Up	1
HD1XG	Head (LT) Accel X	EGE-73B6Q-20	02102105-F18	Entran	0.02155 g	2000	1/24/2003	Fwd	0
HD1ZG	Head (LT) Accel Z	EGE-73B6Q-20	02102105-F15	Entran	0.023 g	2000	1/24/2003	Up	1
HD2YG	Head (FT) Accel Y	EGE-73B6Q-20	02102105-F13	Entran	0.02196 g	2000	1/24/2003	Lft	1
HD2ZG	Head (FT) Accel Z	EGE-73B6Q-20	02102105-F05	Entran	0.02083 g	2000	1/24/2003	Up	1
HD3XG	Head (TP) Accel X	7264-2000T	ALAB9	Endevco	0.02451 g	2000	3/27/2003	Fwd	0
HD3YG	Head (TP) Accel Y	7264-2KM5T	J19501	Endevco	0.02539 g	2000	3/27/2003	Lft	1
NEKXF	Neck Force X	1716	1716-0499-FX	Denton	0.000190515 N	8896.4	10/3/2002	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716	1716-0499-FY	Denton	0.000187548 N	8896.4	10/3/2002	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716	1716-0499-FZ	Denton	0.000088118 N	13344.6	10/3/2002	Hd Up,Cst Dn	0
NEKXM	Neck Moment X	1716	1716-0499-MX	Denton	0.00592 N	282.5	10/3/2002	Rt Ear to Rt Shld	1
NEKYM	Neck Moment Y	1716	1716-0499-MY	Denton	0.005854513 N	282.5	10/3/2002	Chn to Strnm	0
NEKZM	Neck Moment Z	1716	1716-0499-MZ	Denton	0.008227611 N	282.5	10/3/2002	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	0.000139487 N	13344.6	10/26/2002	Hd Lt,Cst Rt	0
NKLZF	Neck Lower Force Z	1794A	1794A-0121-FZ	Denton	0.000062279 N	13344.6	10/26/2002	Hd Up,Cst Dn	0
NKLXM	Neck Lower Moment X	1794A	1794A-0121-MX	Denton	0.00382831 N	452	10/26/2002	Rt Ear to Rt Shld	1
NKLYM	Neck Lower Moment Y	1794A	1794A-0121-MY	Denton	0.003734955 N	452	10/26/2002	Chn to Strnm	0
NKLZM	Neck Lower Moment Z	1794A	1794A-0121-MZ	Denton	0.00694115 N	452	10/26/2002	Chn to Lt Shld	0
CSTXG	Chest Accel X	7264-2KM5T	J14688	Endevco	0.04085 g	2000	1/21/2003	Fwd	0
CSTYG	Chest Accel Y	7264-2000LC	AAKA1	Endevco	0.03038 g	2000	1/21/2003	Lft	1

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Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos Output	Flip
CSTZG	Chest Accel Z	7264-2000LC	ADAL2	Endevco	0.01949 g	2000	1/21/2003	Up	1
CSTXR	Chest Accel Red X	7264-2000TZ	J36744	Endevco	0.02302 g	2000	1/21/2003	Rwd	1
CSTYR	Chest Accel Red Y	7264-2KM5T	J14660	Endevco	0.03241 g	2000	1/21/2003	Lft	1
CSTZR	Chest Accel Red Z	7264-2KM5T	J14666	Endevco	0.03284 g	2000	1/21/2003	Up	1
CSTXD	Chest Deflection X #1	14CB1-2897	83672-14	Servo	1.13936 m	100	1/31/2003	Stn Fr Spn	0
LFMZF	Left Femur Force Z #3	2430	2430-631	GSE	0.000071013 N	13344	10/7/2002	Kne Fd,Pel Rr	0
RFMZF	Right Femur Force Z #6	2430	2430-741	GSE	0.000067656 N	13344	10/7/2002	Kne Fd,Pel Rr	0
KNLXD	Left Knee Displacement	150-0121VR	150-121VR-3892L	Space Age	23.22389 m	40	1/28/2003	Tib Rr,Hld Fem	1
TBLXF	Left Upper Tibia Force X	4509J	4509J-90-FX	Denton	0.000167356 N	11120	12/27/2002	Tib Fd,Knee Rr	0
TBLYF	Left Upper Tibia Force Y	4509J	4509J-90-FY	Denton	0.000167949 N	11120	12/27/2002	Tib Rt,Knee Lt	0
TBLZF	Left Upper Tibia Force Z	4509J	4509J-90-FZ	Denton	0.000093066 N	11120	12/27/2002	Tib Dn,Knee Up	0
TBLXM	Left Upper Tibia Moment X	4509J	4509J-90-MX	Denton	0.007199291 N	395.4	12/27/2002	Tib Lt,Hld Knee	0
TBLYM	Left Upper Tibia Moment Y	4509J	4509J-90-MY	Denton	0.007209155 N	395.4	12/27/2002	Tib Fd,Clevis Rr	0
TBLXG	Left Tibia Accel X	7264-2000T	EJ59J	Endevco	0.02219 g	2000	1/21/2003	Fwd	0
TBLYG	Left Tibia Accel Y	7264-2KM5T	AJ507	Endevco	0.02795 g	2000	1/22/2003	Rt	0
ANLXF	Left Lower Tibia Force X	4929J	4929J-121-FX	Denton	0.000173138 N	11120.5	12/30/2002	Ank Fd,Knee Rr	0
ANLYF	Left Lower Tibia Force Y	4929J	4929J-121-FY	Denton	0.000174541 N	11120.5	12/30/2002	Ank Rt,Knee Lt	0
ANLZF	Left Lower Tibia Force Z	4929J	4929J-121-FZ	Denton	0.000095530 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	395.4	12/30/2002	Ank Lt,Hld Knee	0
ANLYM	Left Lower Tibia Moment Y	4929J	4929J-121-MY	Denton	0.0074678 N	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	6/6/2003	Eversion	0
FTLYD	Left Foot Disp. Y 103Y	PD210-4B	PD210-4B-AK-0327	Contelec	3.1596 °	318	6/6/2003	Dorsiflexion	0
FTLZD	Left Foot Disp. Z 103Z	PD210-4B	PD210-4B-AK-0259	Contelec	3.1385 °	318	9/19/2002	External Rotation	1
FTLXG	Left Foot Accel X	7264-2000T	EY99J	Endevco	0.03649 g	2000	1/22/2003	Fwd	0
FTLYG	Left Foot Accel Y	7264-2KM5T	J17988	Endevco	0.03383 g	2000	1/22/2003	Rt	0
FTLZG	Left Foot Accel Z	7264-2KM5T	FG97J	Endevco	0.02917 g	2000	1/21/2003	Dn	0
KNRXD	Right Knee Displacement	150-0121VL	150-121VL-3726R	Space Age	23.77294 m	40	1/28/2003	Tib Rr,Hld Fem	1
TBRXF	Right Upper Tibia Force X	4509J	4509J-89-FX	Denton	0.000169811 N	11120	12/27/2002	Tib Fd,Knee Rr	0

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Chsnam	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos Output	Flip
TBRYF	Right Upper Tibia Force Y	4509J	4509J-89-FY	Denton	0.000169604 N	11120	12/27/2002	Tib Rt,Knee Lt	0
TBRZF	Right Upper Tibia Force Z	4509J	4509J-89-FZ	Denton	0.000093183 N	11120	12/27/2002	Tib Dn,Knee Up	0
TBRXM	Right Upper Tibia Moment X	4509J	4509J-89-MX	Denton	0.00717551 N	395.4	12/27/2002	Tib Lt,Hld Knee	0
TBRYM	Right Upper Tibia Moment Y	4509J	4509J-89-MY	Denton	0.0072028 N	395.4	12/27/2002	Tib Fd,Clevis Rr	0
TBRXG	Right Tibia Accel X	7264-2000TZ	J35770	Endevco	0.02453 g	2000	1/22/2003	Fwd	0
TBRYG	Right Tibia Accel Y	7264-2000LC	AAKC6	Endevco	0.02755 g	2000	1/22/2003	Rt	0
ANRXF	Right Lower Tibia Force X	4929J	4929J-120-FX	Denton	0.000171115 N	11120.5	12/27/2002	Ank Fd,Knee Rr	0
ANRYF	Right Lower Tibia Force Y	4929J	4929J-120-FY	Denton	0.000172239 N	11120.5	12/27/2002	Ank Rt,Knee Lt	0
ANRZF	Right Lower Tibia Force Z	4929J	4929J-120-FZ	Denton	0.000095431 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	395.4	12/27/2002	Ank Lt,Hld Knee	0
ANRYM	Right Lower Tibia Moment Y	4929J	4929J-120-MY	Denton	0.00748002 N	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	9/19/2002	Eversion	1
FTRYD	Right Foot Disp. Y 108Y	PD210-4B	PD210-4B-AK-0255	Contelec	3.1317 °	318	9/19/2002	Dorsiflexion	0
FTRZD	Right Foot Disp. Z 108Z	PD210-4B	PD210-4B-AK-0256	Contelec	3.1719 °	318	9/19/2002	Internal Rotation	1
FTRXG	Right Foot Accel X	7264-2KM5T	AGAC4	Endevco	0.02409 g	2000	1/21/2003	Fwd	0
FTRYG	Right Foot Accel Y	7264-2KM5T	AJ452	Endevco	0.025 g	2000	1/22/2003	Rt	0
FTRZG	Right Foot Accel Z	7264-2KM5T	CC24H	Endevco	0.03443 g	2000	1/21/2003	Dn	0

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