

**NHTSA  
VEHICLE DATABASE  
REPORT  
TEST# 2644**

U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
CRASH AUTOMOBILE RESEARCH SYSTEM  
DYNAMIC CRASH FILE CATALOG

SELECTION CRITERION  
VEHDB

VERSION 4 DATA

TABLE OF CONTENTS

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<i>REFERENCE NUMBER</i>	<i>CONTRACT NUMBER</i>	<i>TEST PERFORMER</i>	<i>TEST TITLE</i>
2644		INSURANCE INSTITUTE	IIHS OFFSET CRASHWORTHINESS EVALUATI

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**TEST INFORMATION  
FOR TEST 2644**

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**Test Title:** IIHS OFFSET CRASHWORTHINESS EVALUATION

**Test Date:** 17-OCT-95                      **Entry Date:** 18-AUG-97

**Test Number:** 2644                      **Contract Number:**

**Test Performer:** INSURANCE INSTITUTE FO **Test Reference Number:** CF95030

**Test Configuration:** VEHICLE INTO BARRIER

**Test Type:** OTHER

**Test Objectives:** IIHS 40% OVERLAP - 1996 FORD EXPLORER

**Closing Speed:** 64.4                      **Impact Angle:** 0

**Test Track Surface:** CONCRETE                      **Test Track Conditions:** DRY

**Impact Point:** 0                      **Offset Distance:** -678

**Recorder Type:** UNKNOWN                      **Data Link To Recorder:** UNKNOWN

**System of Measurement:**

**Ambient Temperature:** 0

**Total Curves:** 31

**Test Comments:** NO COMMENTS

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**VEHICLE INFORMATION  
FOR TEST 2644**

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<b>Vehicle Identification Number:</b>	1	
<b>Make:</b>	FORD	
<b>Model:</b>	EXPLORER	
<b>Year:</b>	1996	
<b>Test Weight:</b>	1930	
<b>Engine Type:</b>	V6 TRANSVERSE FRONT	
<b>Engine Displacement:</b>	4	
<b>Transmission Type:</b>	AUTOMATIC - FRONT WHEEL DRIVE	
<b>Body Type:</b>	UTILITY VEHICLE	
<b>Vehicle Length:</b>	4790	
<b>Vehicle Width:</b>	1780	
<b>Wheelbase:</b>	2830	
<b>Vehicle C.G. Distance:</b>	0	
<b>Steering Column Collapse Mechanism:</b>	UNKNOWN	
<b>Steering Column Attachment To Dash:</b>	UNKNOWN	
<b>Vehicle Modification Indicator:</b>	PRODUCTION VEHICLE	
<b>Description of Vehicle Modification:</b>		
<b>PDOF Angle:</b>	0	
<b>Travel Angle:</b>	0	
<b>Vehicle Speed:</b>	64.4	
<b>Vehicle Damage Index:</b>		
<b>Bumper Engagement:</b>	UNKNOWN	
<b>Sill Engagement:</b>	UNKNOWN	
<b>A-Pillar Engagement:</b>	NO DIRECT ENGAGEMENT	
<b>Total Length of Indentation:</b>	0	
<b>Maximum Crush Distance:</b>	720	
<b>Distance Between Center of Damage Area and Center of Gravity Axis:</b>	0	
<b>Damage Profile Distances:</b>		
<b>Point Number 1:</b>	<b>Point Number 3:</b>	<b>Point Number 5:</b>
<b>Point Number 2:</b>	<b>Point Number 4:</b>	<b>Point Number 6:</b>
<b>Angle of Moving Test Cart:</b>	0	
<b>Vehicle Orientation on Moving Cart:</b>	0	

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BARRIER INFORMATION  
FOR TEST 2644

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*Test Number:* 2644  
*Barrier Shape:* FLAT BARRIER  
*Type of Barrier:* DEFORMABLE  
*Barrier Angle:* 0  
*Barrier Diameter:* 0  
*Barrier Comments:* EEVC DEFORMABLE OFFSET BARRIER

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**OCCUPANT INFORMATION  
FOR TEST 2644**

<b>Vehicle Containing Occupant:</b>	1		
<b>Seating Position:</b>	LEFT FRONT SEAT		
<b>Seat Position:</b>	UNKNOWN		
<b>Occupant Type:</b>	HYBRID III DUMMY		
<b>Age:</b>	0		
<b>Sex:</b>	M		
<b>Height:</b>	0		
<b>Weight:</b>	0		
<b>Dummy Size Percentile:</b>	50 PERCENTILE		
<b>Manufacturer of Dummy and Serial Number:</b>	UNKNOWN		
<b>Clearance Distances:</b>			
<b>Head to Windshield Header:</b>		<b>Head to Windshield:</b>	
<b>Head to Side Header:</b>		<b>Head to Side Window:</b>	
<b>Chest to Dash:</b>		<b>Chest to Steering Wheel:</b>	
<b>Arm to Door:</b>		<b>Hip to Door:</b>	
<b>Knee to Dash:</b>			
<b>Head Contact Region:</b>	UNKNOWN		
<b>Chest or Abdomen Contact Region:</b>	UNKNOWN		
<b>Leg Contact Region:</b>	UNKNOWN		
<b>Head Injury:</b>	475		
<b>HIC Time Interval:</b>			
<b>Lower Boundary:</b>	0	<b>Upper Boundary:</b>	0
<b>Thorax Peak Acceleration (CLIP3M):</b>	31		
<b>Chest Severity Index:</b>	0		
<b>Peak Load:</b>			
<b>Left Femur:</b>	4600	<b>Right Femur:</b>	1700
<b>Lap Belt:</b>	0	<b>Shoulder Belt:</b>	0
<b>Occupant Comments:</b>	NO COMMENTS		

RESTRAINT INFORMATION  
FOR TEST 2644

<p><i>Vehicle Containing Restraint:</i> 1</p> <p><i>Occupant Seating Postion:</i> 01</p> <p><i>Restraint Number:</i> 1</p> <p><i>Restraint Type:</i> AIR BAG</p> <p><i>Restraint Mount Position:</i> STEERING WHEEL</p> <p><i>Restraint Deployment:</i> DEPLOYED PROPERLY</p> <p><i>Restraint Comments:</i> NO COMMENTS</p>	<p><i>Vehicle Containing Restraint:</i> 1</p> <p><i>Occupant Seating Postion:</i> 01</p> <p><i>Restraint Number:</i> 2</p> <p><i>Restraint Type:</i> 3 POINT BELT</p> <p><i>Restraint Mount Position:</i> BELT - CONVENTIONAL</p> <p><i>Restraint Deployment:</i> NOT APPLICABLE</p> <p><i>Restraint Comments:</i> NO COMMENTS</p>
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**INSTRUMENTATION INFORMATION  
FOR TEST 2644**

<i>Curve Nbr.</i>	<i>Veh. Nbr.</i>	<i>Sensor Type</i>	<i>Sensor Location</i>	<i>Sensor Attachment</i>	<i>Axis</i>	<i>Instrumentation Comments</i>
1	1	ACCELEROMETER	OTHER	HEAD CG	XL	
2	1	ACCELEROMETER	OTHER	HEAD CG	YL	
3	1	ACCELEROMETER	OTHER	HEAD CG	ZL	
4	1	DISPLACEMENT TR	OTHER	KNEE - RIGHT	XL	
5	1	LOAD CELL	OTHER	FEMUR - RIGHT	ZL	
6	1	LOAD CELL	OTHER	TIBIA - RIGHT UPPER	XL	
7	1	LOAD CELL	OTHER	TIBIA - RIGHT UPPER	YL	
8	1	LOAD CELL	OTHER	TIBIA - RIGHT LOWER	XL	
9	1	LOAD CELL	OTHER	TIBIA - RIGHT LOWER	YL	
10	1	LOAD CELL	OTHER	TIBIA - RIGHT LOWER	ZL	
11	1	ACCELEROMETER	OTHER	FOOT - RIGHT	XL	
12	1	ACCELEROMETER	OTHER	FOOT - RIGHT	ZL	
13	1	LOAD CELL	OTHER	NECK - UPPER	XL	
14	1	LOAD CELL	OTHER	NECK - UPPER	YL	
15	1	LOAD CELL	OTHER	NECK - UPPER	ZL	
16	1	ACCELEROMETER	OTHER	FOOT - LEFT	XL	
17	1	ACCELEROMETER	OTHER	FOOT - LEFT	ZL	
18	1	ACCELEROMETER	OTHER	CHEST	XL	
19	1	ACCELEROMETER	OTHER	CHEST	YL	
20	1	ACCELEROMETER	OTHER	CHEST	ZL	

**INSTRUMENTATION INFORMATION  
FOR TEST 2644**

<i>Curve Nbr.</i>	<i>Veh. Nbr.</i>	<i>Sensor Type</i>	<i>Sensor Location</i>	<i>Sensor Attachment</i>	<i>Axis</i>	<i>Instrumentation Comments</i>
21	1	DISPLACEMENT TR	OTHER	CHEST	XL	
22	1	LOAD CELL	OTHER	TIBIA - LEFT LOWER	XL	
23	1	LOAD CELL	OTHER	TIBIA - LEFT LOWER	YL	
24	1	LOAD CELL	OTHER	TIBIA - LEFT LOWER	ZL	
25	1	ACCELEROMETER	OTHER	VEHICLE CG	XG	
26	1	ACCELEROMETER	OTHER	VEHICLE CG	YG	
27	1	ACCELEROMETER	OTHER	VEHICLE CG	ZG	
28	1	DISPLACEMENT TR	OTHER	KNEE - LEFT	XL	
29	1	LOAD CELL	OTHER	FEMUR - LEFT	ZL	
30	1	LOAD CELL	OTHER	TIBIA - LEFT UPPER	XL	
31	1	LOAD CELL	OTHER	TIBIA - LEFT UPPER	YL	

**END  
of  
NHTSA  
VEHICLE DATABASE  
REPORT  
( \*\*\* )**

File : v2644aa0.001

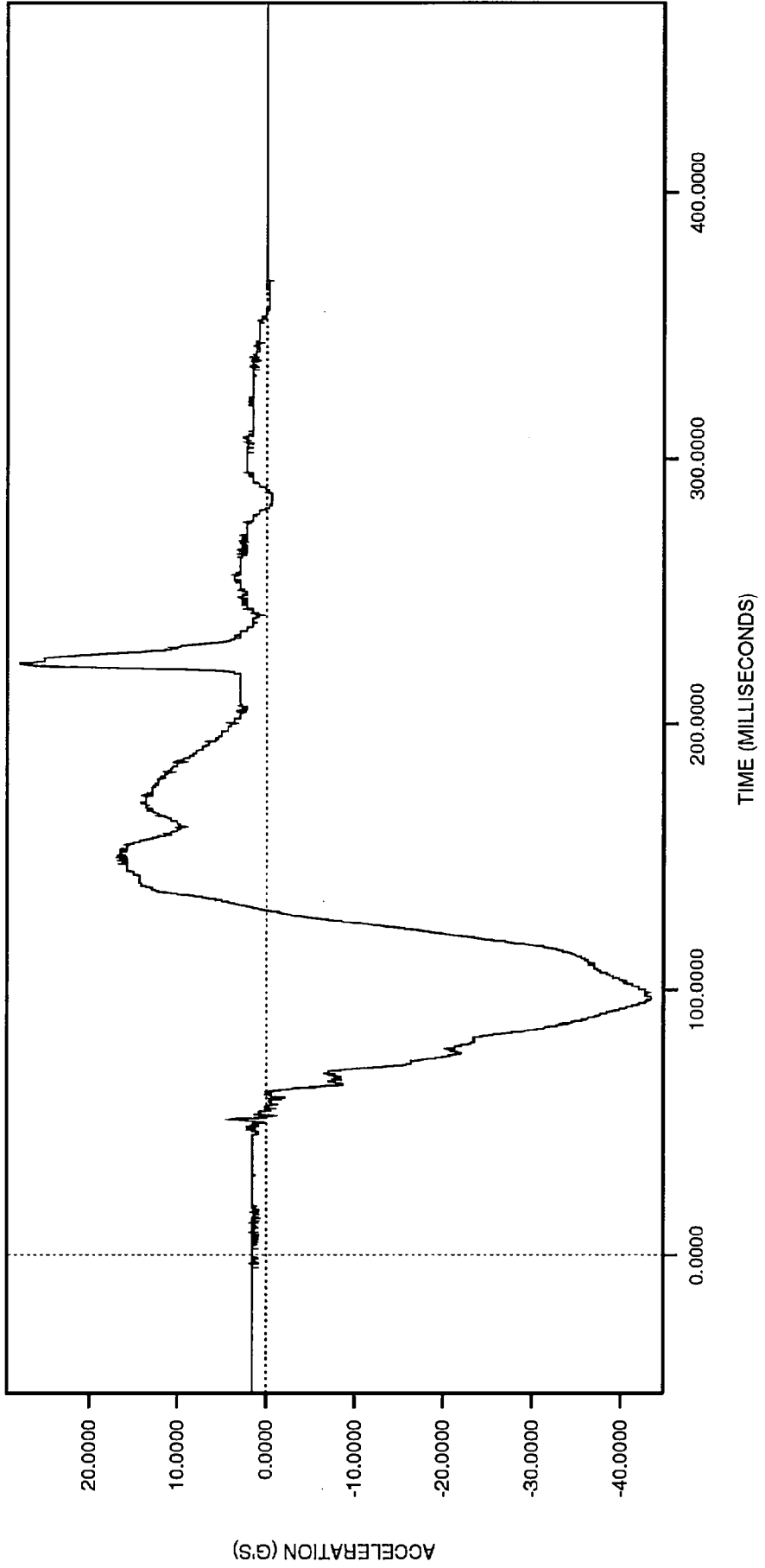
Test Performer : INSURANCE INSTITUTE FOR H  
Year : 1996 Make : FORD  
Occupant Location : OTHER  
Restraint [1] : AIR BAG  
Sensor Attachment : HEAD CG  
Status : AS MEASURED  
Filter CutOff : 2500 HZ  
Comments :

Reference : CF95030  
Model : EXPLORER  
Occupant Type : H3  
Restraint [2] : 3 POINT BELT  
YMIN = -43.3875  
YMAX = 27.8844

Speed : 64.40 KMPH  
Body : UTILITY VEHICLE  
HIC = 475.00

Config : VTB  
Vehicle # : 1  
CSI = 0.00  
Axis : XL

Sensor Type : ACCELERATION  
AT 96.4000 MILLISECONDS  
AT 222.9000 MILLISECONDS



File : v2644aa0.002

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : HEAD CG

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -32.0199

YMAX = 56.6140

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : ACCELERATION

AT 115.2000 MILLISECONDS

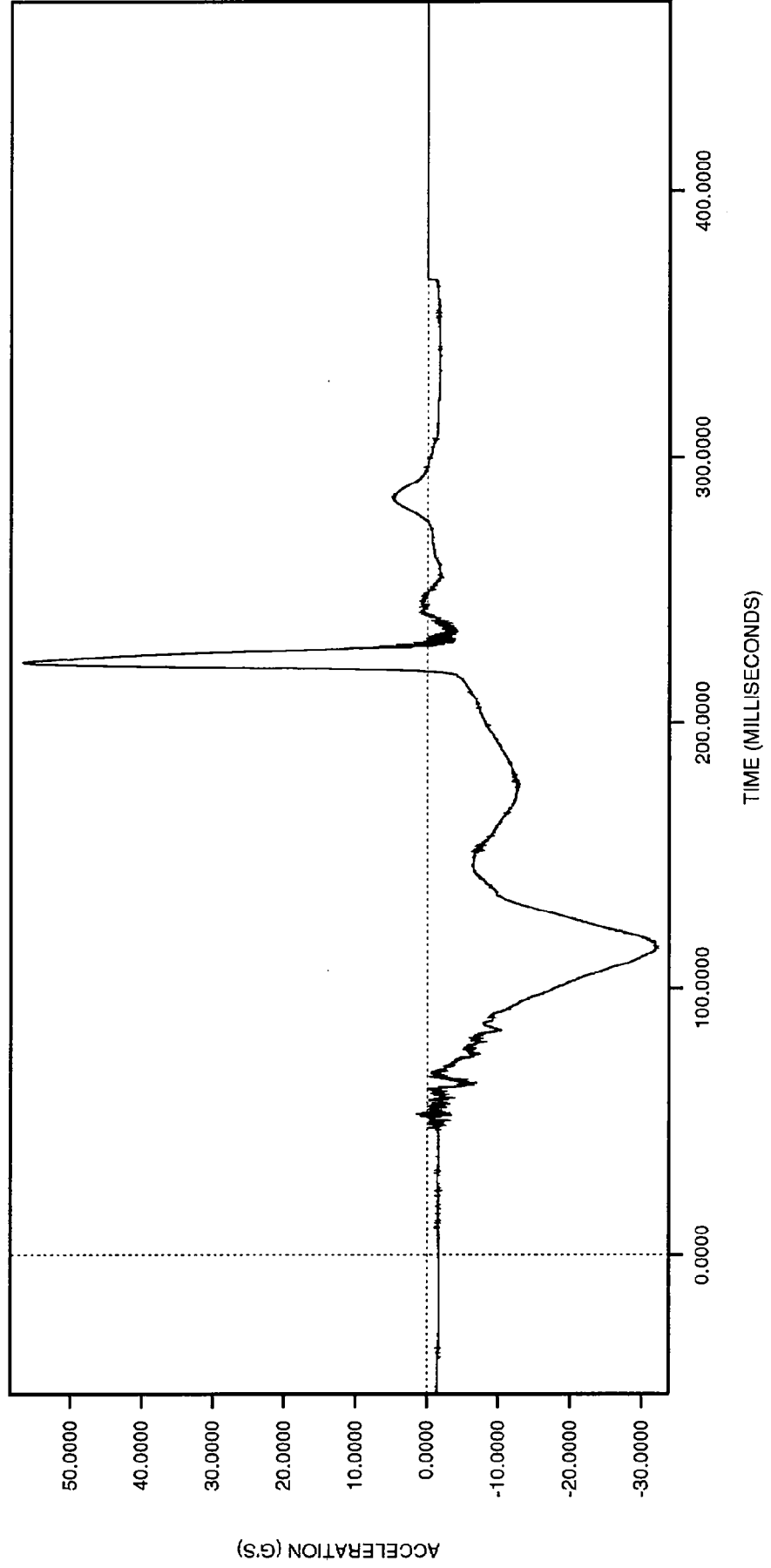
AT 222.7000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : YL



File : v2644aa0.003

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : HEAD CG

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -23.0538

YMAX = 4.9352

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : ACCELERATION

AT 225.4000 MILLISECONDS

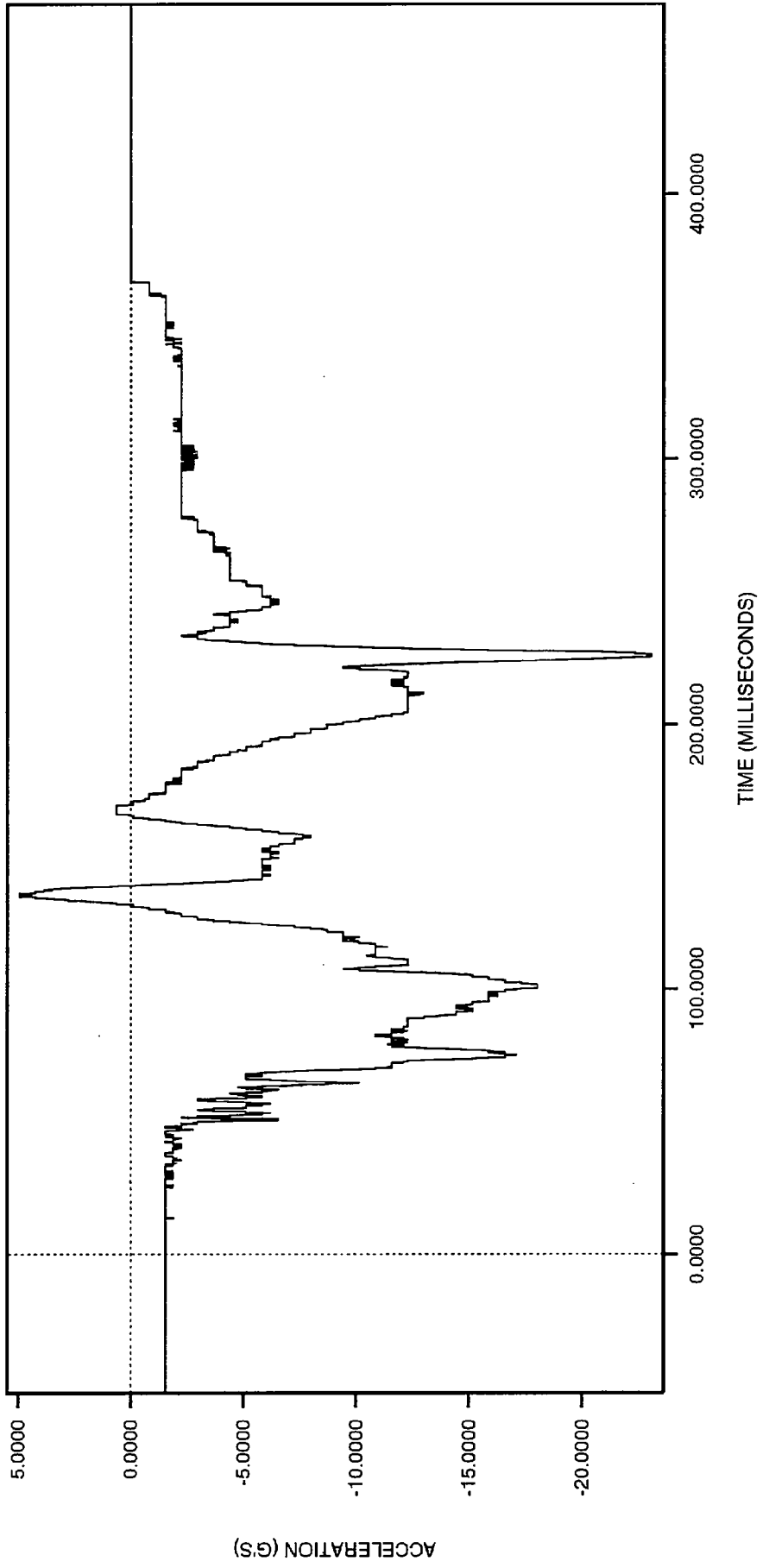
AT 135.1000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : ZL



File : v2644da0.004

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : KNEE - RIGHT

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -0.0756

YMAX = 0.1696

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : DISPLACEMENT

AT 145.3000 MILLISECONDS

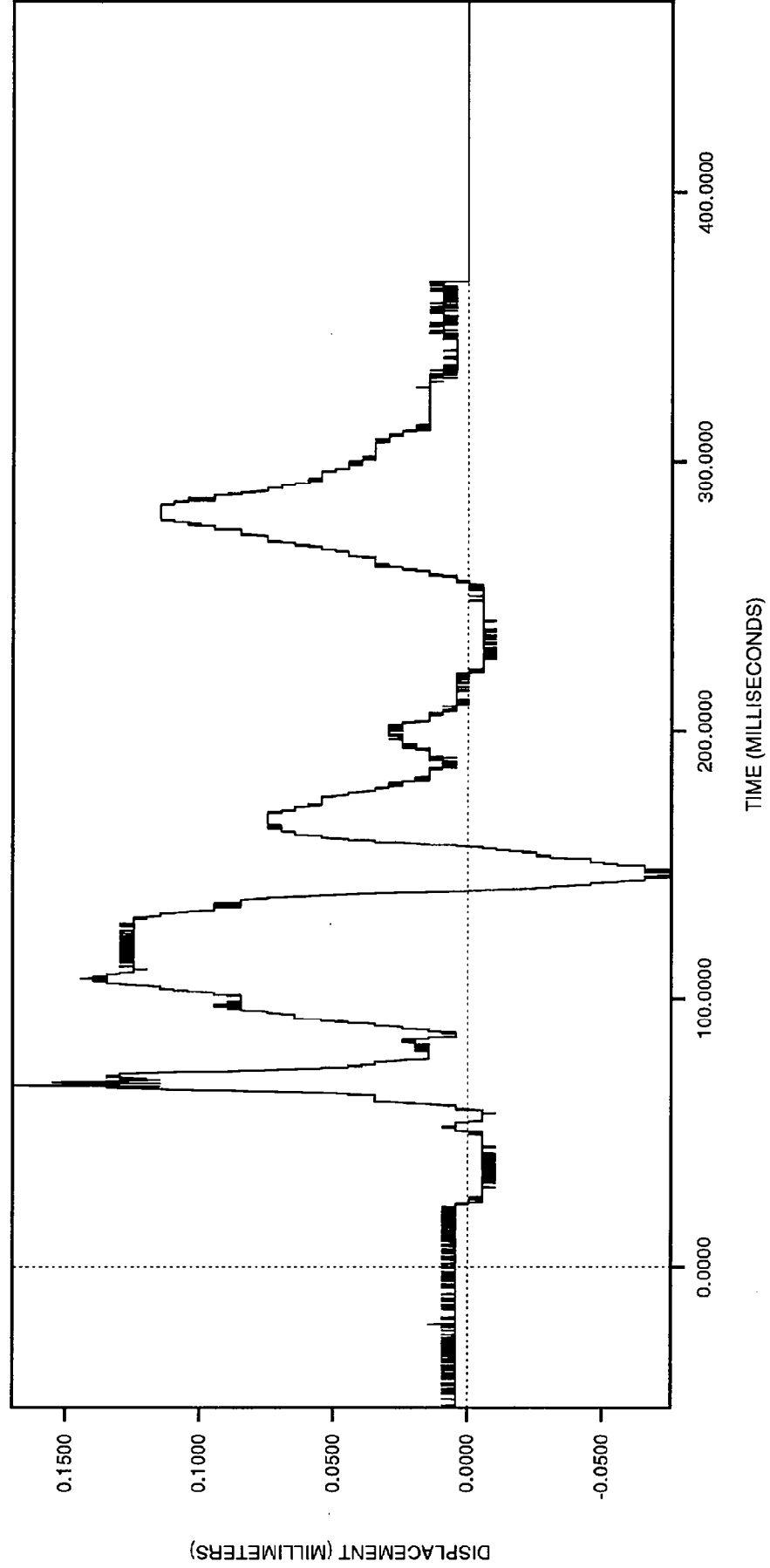
AT 67.6000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : XL



File : v2644fa0.005

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : FEMUR - RIGHT

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -677.6540

YMAX = 5273.3301

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : FORCE

AT 133.0000 MILLISECONDS

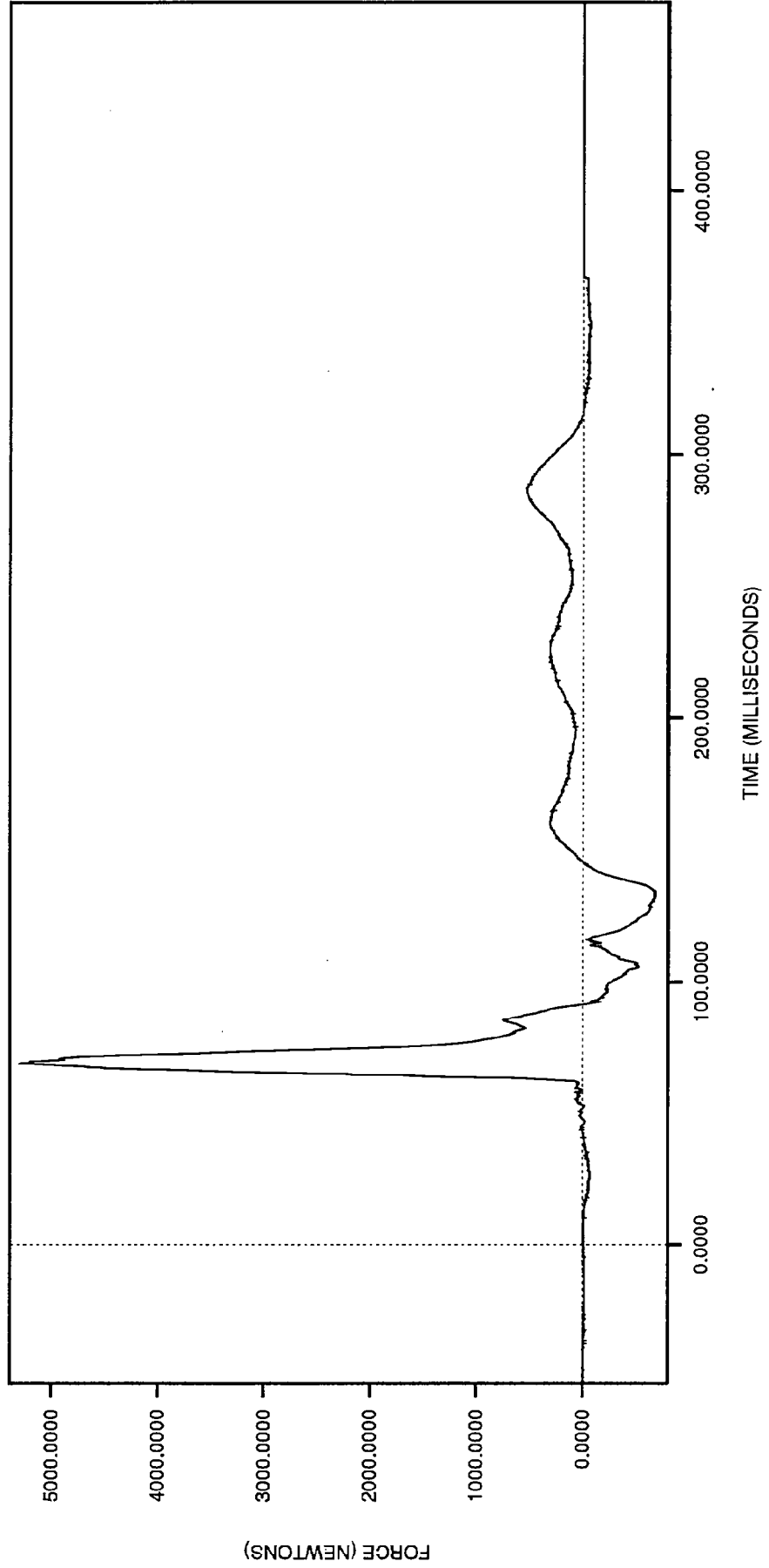
AT 69.0000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : ZL



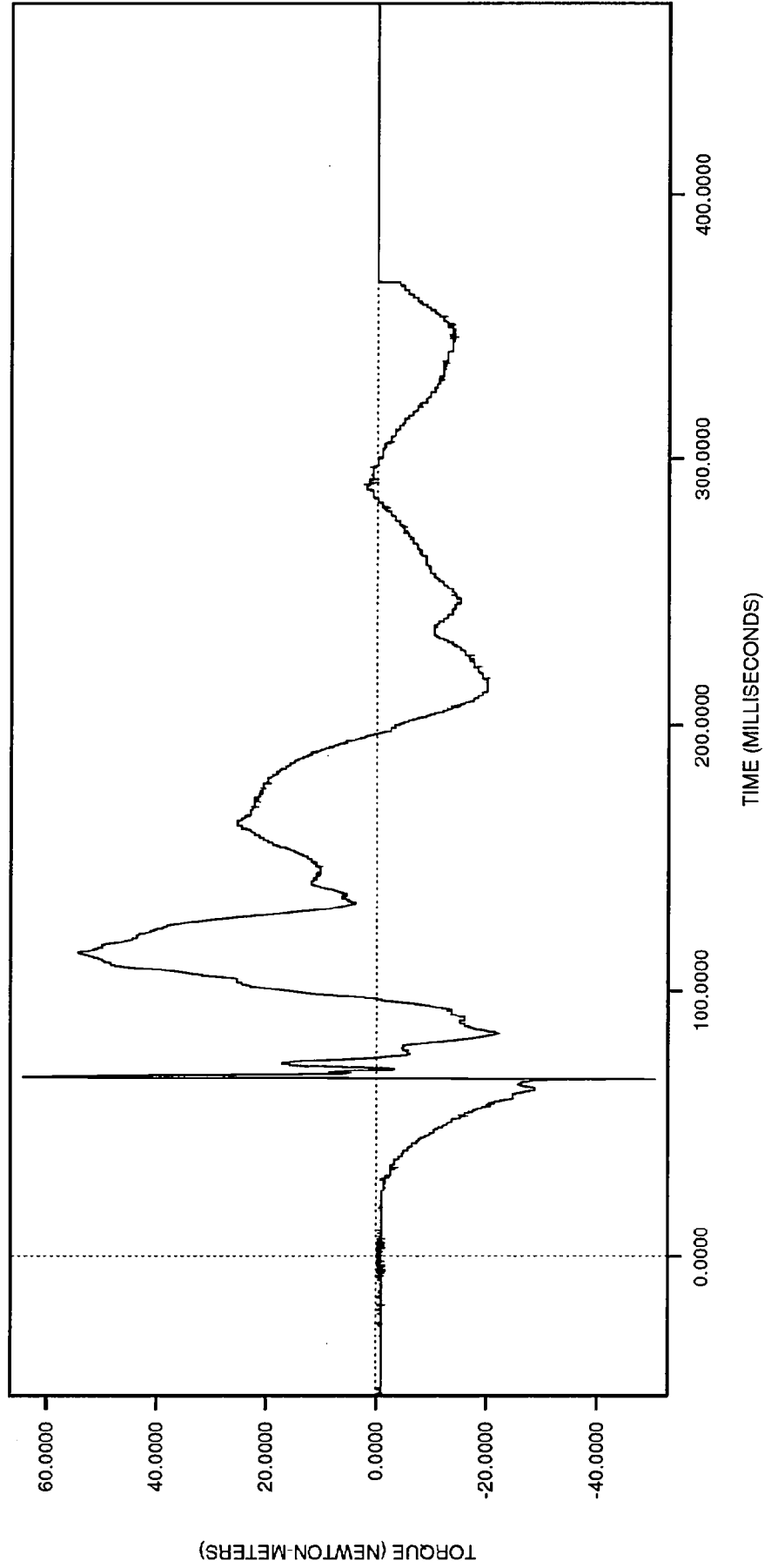
File : v2644ta0.006

Test Performer : INSURANCE INSTITUTE FOR H  
Year : 1996 Make : FORD  
Occupant Location : OTHER  
Restraint [1] : AIR BAG  
Sensor Attachment : TIBIA - RIGHT UPPER  
Status : AS MEASURED  
Filter CutOff : 2500 HZ  
Comments :

Reference : CF95030  
Model : EXPLORER  
Occupant Type : H3  
Restraint [2] : 3 POINT BELT  
YMIN = -50.5693  
YMAX = 64.2806

Speed : 64.40 KMPH  
Body : UTILITY VEHICLE  
HIC = 475.00  
Sensor Type : TORQUE  
AT 66.8000 MILLISECONDS  
AT 67.6000 MILLISECONDS

Config : VTB  
Vehicle # : 1  
CSI = 0.00  
Axis : XL



File : v2644ta0.007

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD  
Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : TIBIA - RIGHT UPPER

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -17.5215

YMAX = 141.8810

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : TORQUE

AT 287.9000 MILLISECONDS

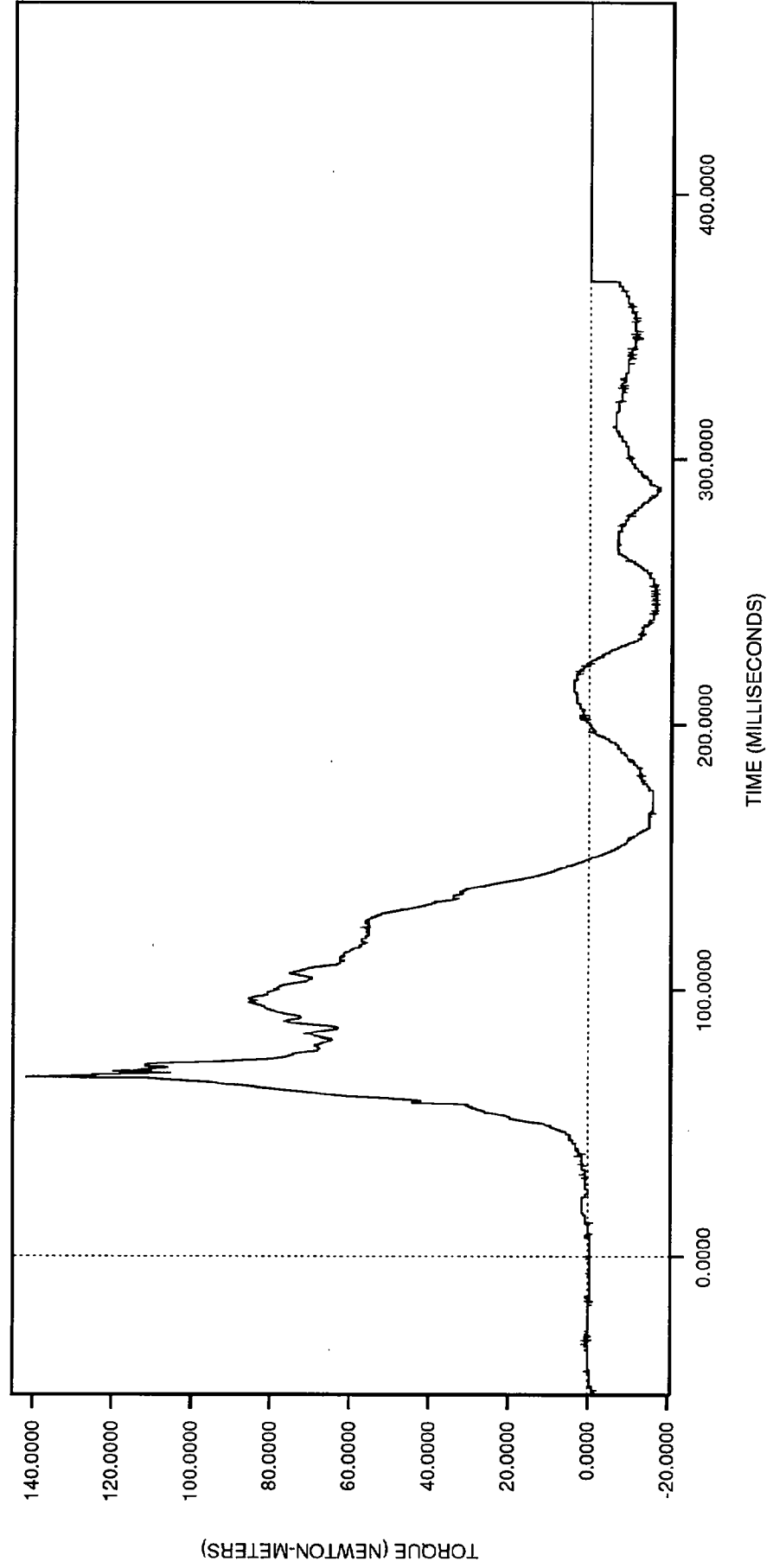
AT 67.0000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : YL



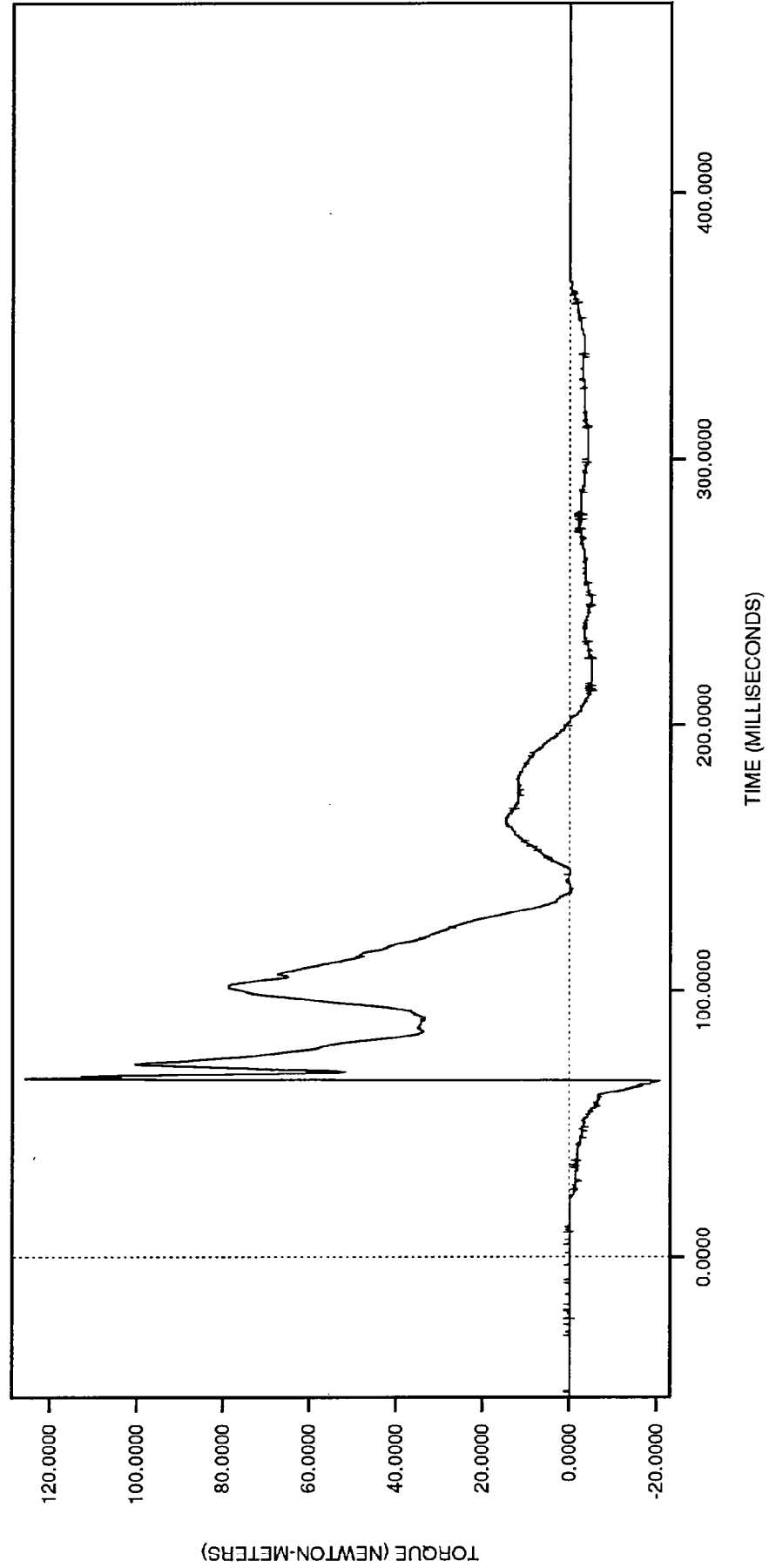
File : v2644ta0.008

Test Performer : INSURANCE INSTITUTE FOR H  
Year : 1996 Make : FORD  
Occupant Location : OTHER  
Restraint [1] : AIR BAG  
Sensor Attachment : TIBIA - RIGHT LOWER  
Status : AS MEASURED  
Filter CutOff : 2500 HZ  
Comments :

Reference : CF95030  
Model : EXPLORER  
Occupant Type : H3  
Restraint [2] : 3 POINT BELT  
YMIN = -20.3374  
YMAX = 125.8160

Speed : 64.40 KMPH  
Body : UTILITY VEHICLE  
HIC = 475.00  
Sensor Type : TORQUE  
AT 66.2000 MILLISECONDS  
AT 67.2000 MILLISECONDS

Config : VTB  
Vehicle # : 1  
CSI = 0.00  
Axis : XL



File : v2644ta0.009

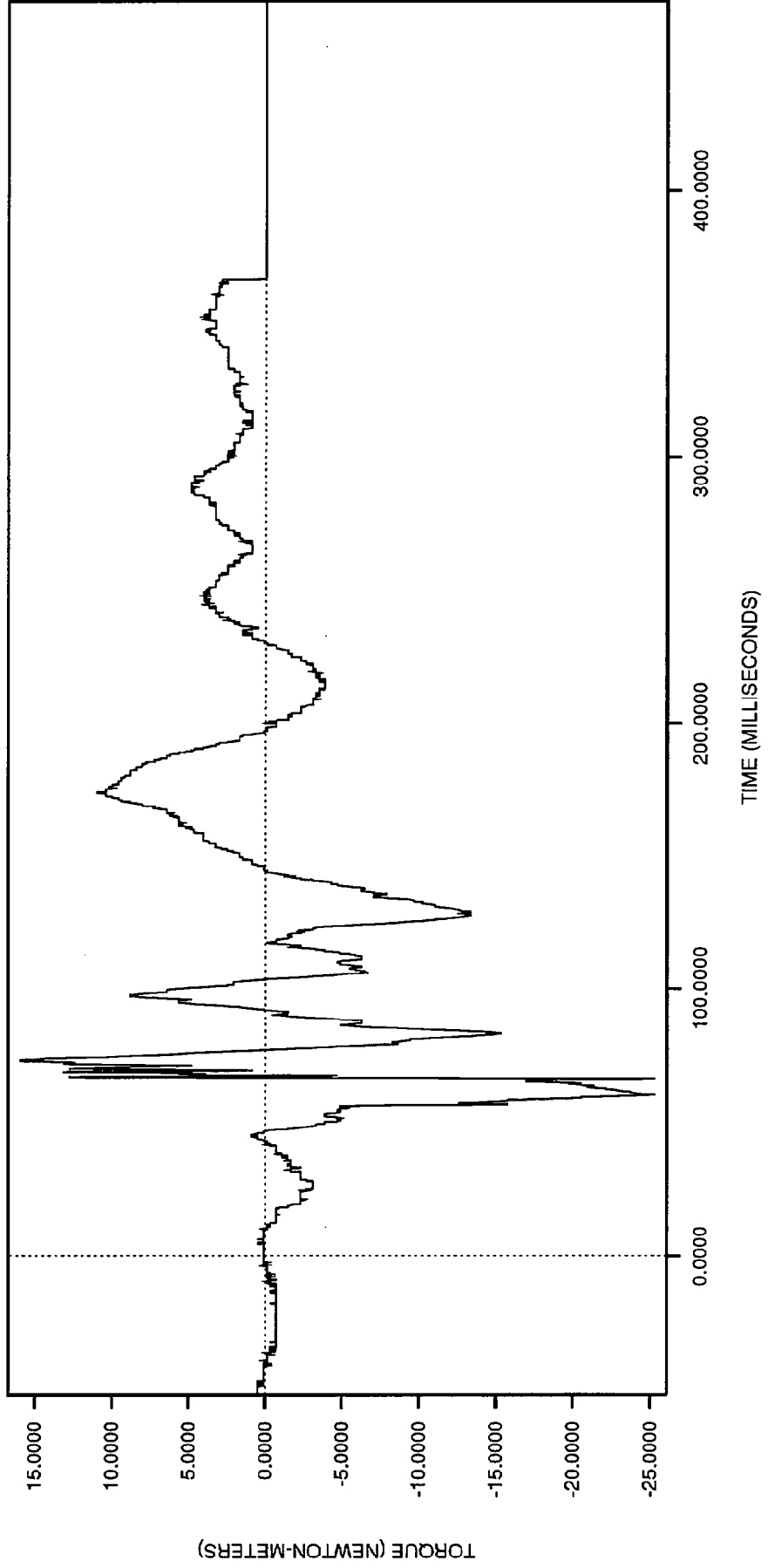
Test Performer : INSURANCE INSTITUTE FOR H  
Year : 1996 Make : FORD  
Occupant Location : OTHER  
Restraint [1] : AIR BAG  
Sensor Attachment : TIBIA - RIGHT LOWER  
Status : AS MEASURED  
Filter CutOff : 2500 HZ

Reference : CF95030  
Model : EXPLORER  
Occupant Type : H3  
Restraint [2] : 3 POINT BELT  
YMIN = -25.2768  
YMAX = 15.9385

Speed : 64.40 KMPH  
Body : UTILITY VEHICLE  
HIC = 475.00

Config : VTB  
Vehicle # : 1  
CSI = 0.00

Sensor Type : TORQUE  
Axis : YL  
AT 60.6000 MILLISECONDS  
AT 73.3000 MILLISECONDS



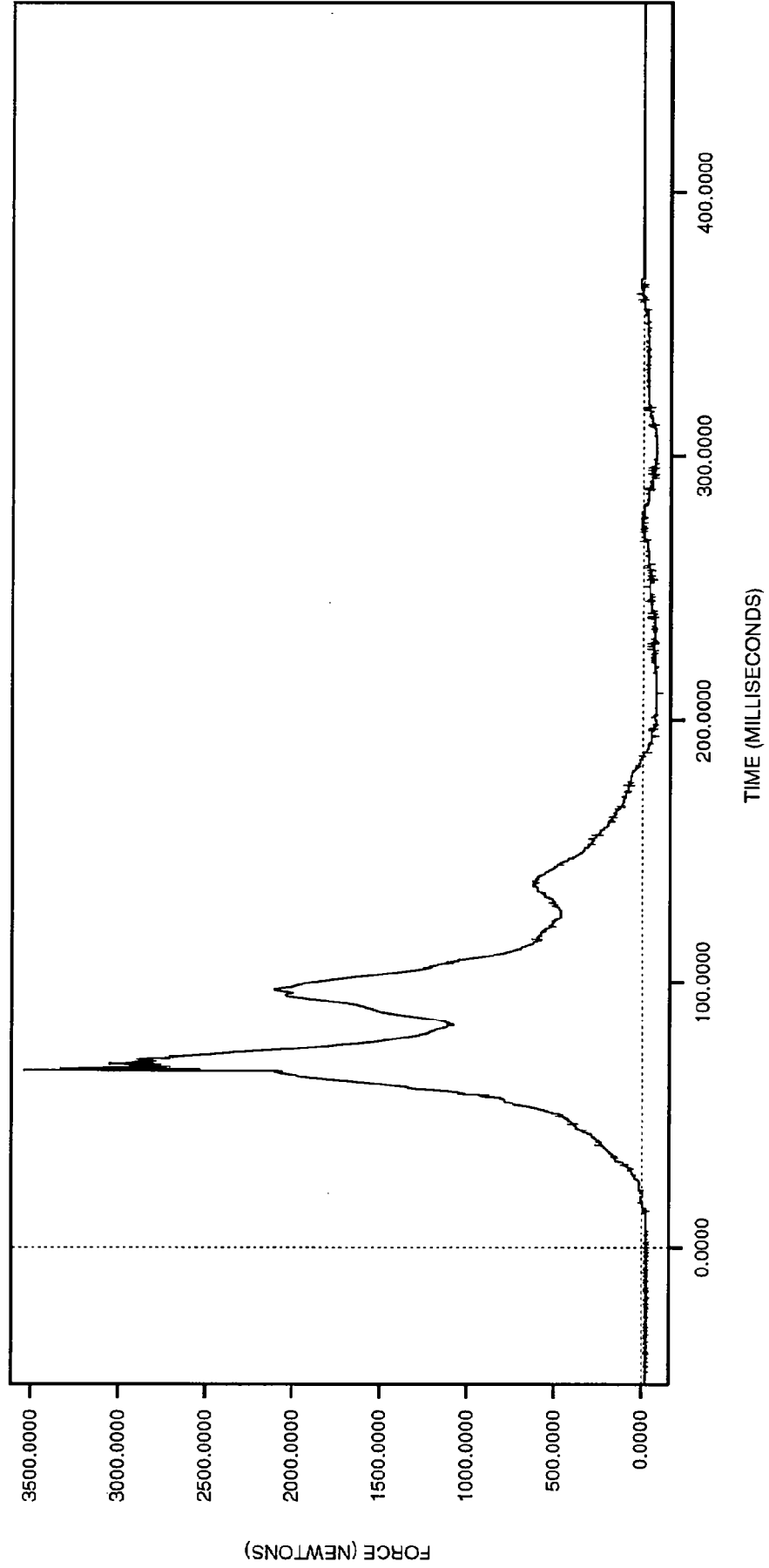
File : v2644ta0.010

Test Performer : INSURANCE INSTITUTE FOR H  
Year : 1996 Make : FORD  
Occupant Location : OTHER  
Restraint [1] : AIR BAG  
Sensor Attachment : TIBIA - RIGHT LOWER  
Status : AS MEASURED  
Filter CutOff : 2500 HZ  
Comments :

Reference : CF95030  
Model : EXPLORER  
Occupant Type : H3  
Restraint [2] : 3 POINT BELT  
YMIN = -83.3023  
YMAX = 3541.4399

Speed : 64.40 KMPH  
Body : UTILITY VEHICLE  
HIC = 475.00  
Sensor Type : FORCE  
AT 210.3000 MILLISECONDS  
AT 66.7000 MILLISECONDS

Config : VTB  
Vehicle # : 1  
CSI = 0.00  
Axis : ZL



File : v2644aa0.011

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : FOOT - RIGHT

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -86.2321

YMAX = 3.7071

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : ACCELERATION

AT 66.8000 MILLISECONDS

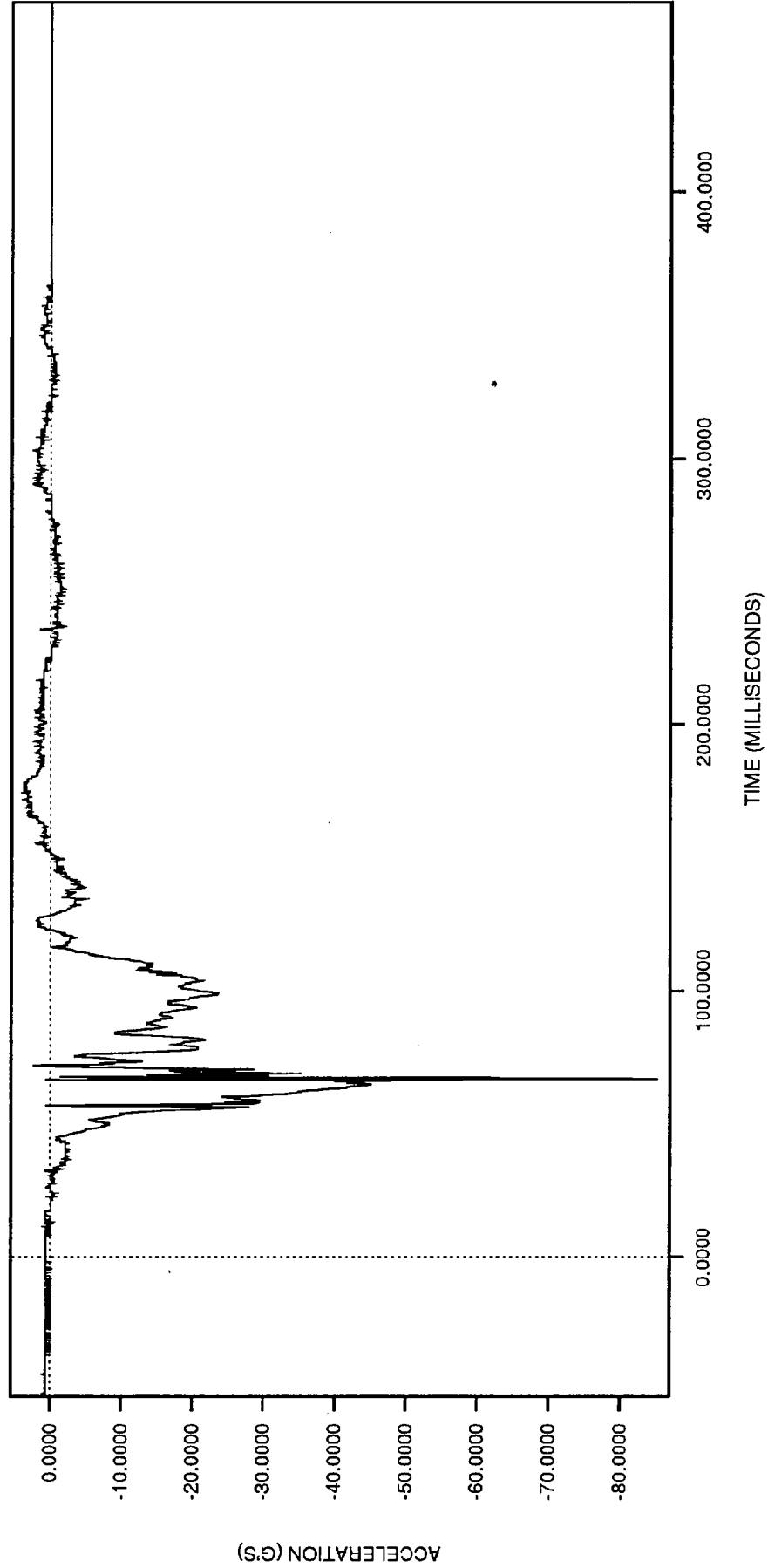
AT 174.7000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : XL



File : v2644aa0.012

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD  
Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : FOOT - RIGHT

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -203.5280

YMAX = 85.4869

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : ACCELERATION

AT 66.6000 MILLISECONDS

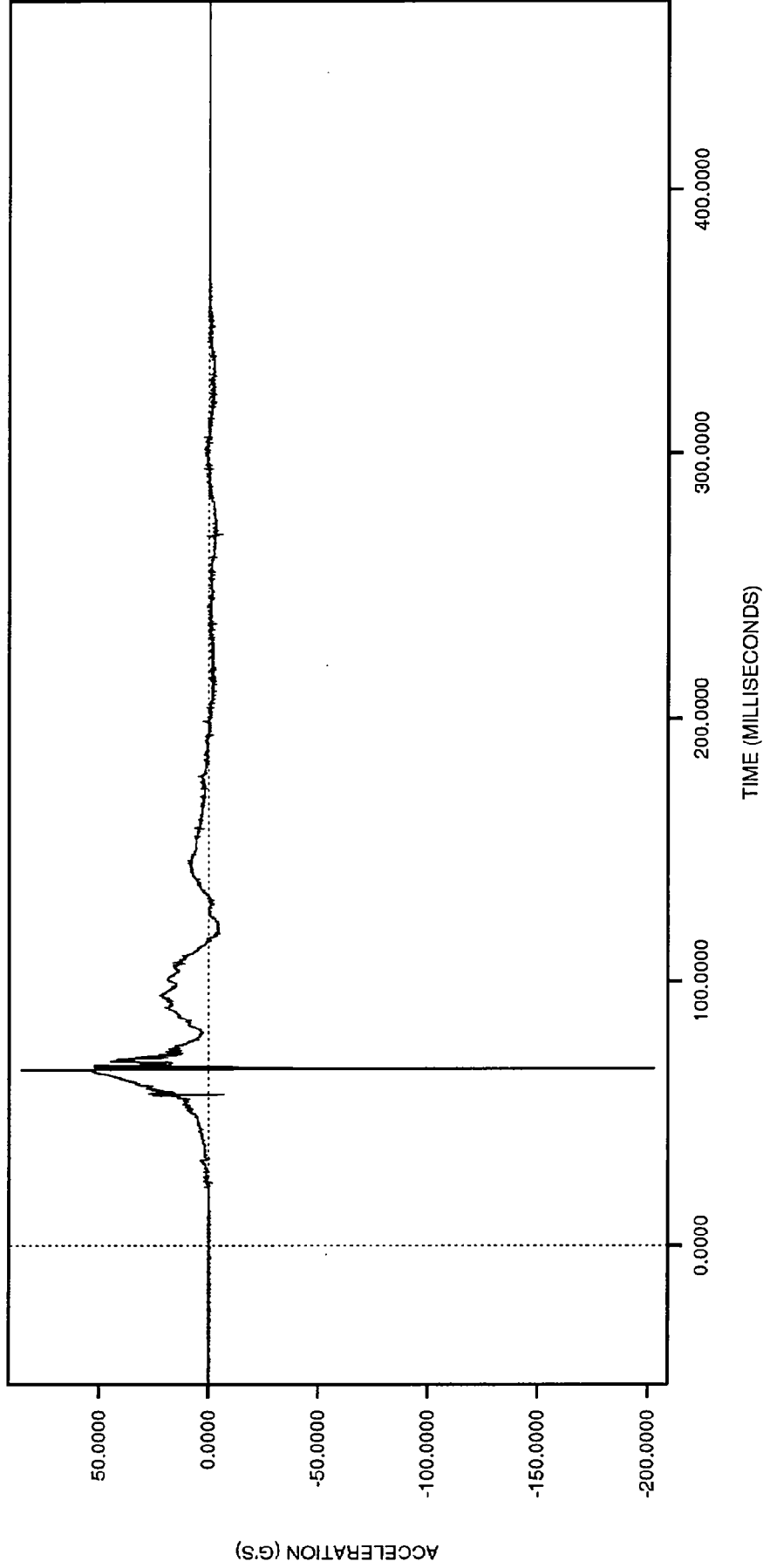
AT 66.2000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : ZL



File : v2644fa0.013

Test Performer : INSURANCE INSTITUTE FOR H  
Year : 1996 Make : FORD  
Occupant Location : OTHER  
Restraint [1] : AIR BAG  
Sensor Attachment : NECK - UPPER  
Status : AS MEASURED  
Filter CutOff : 2500 HZ

Reference : CF95030  
Model : EXPLORER  
Occupant Type : H3  
Restraint [2] : 3 POINT BELT  
YMIN = -494.7450  
YMAX = 459.2890

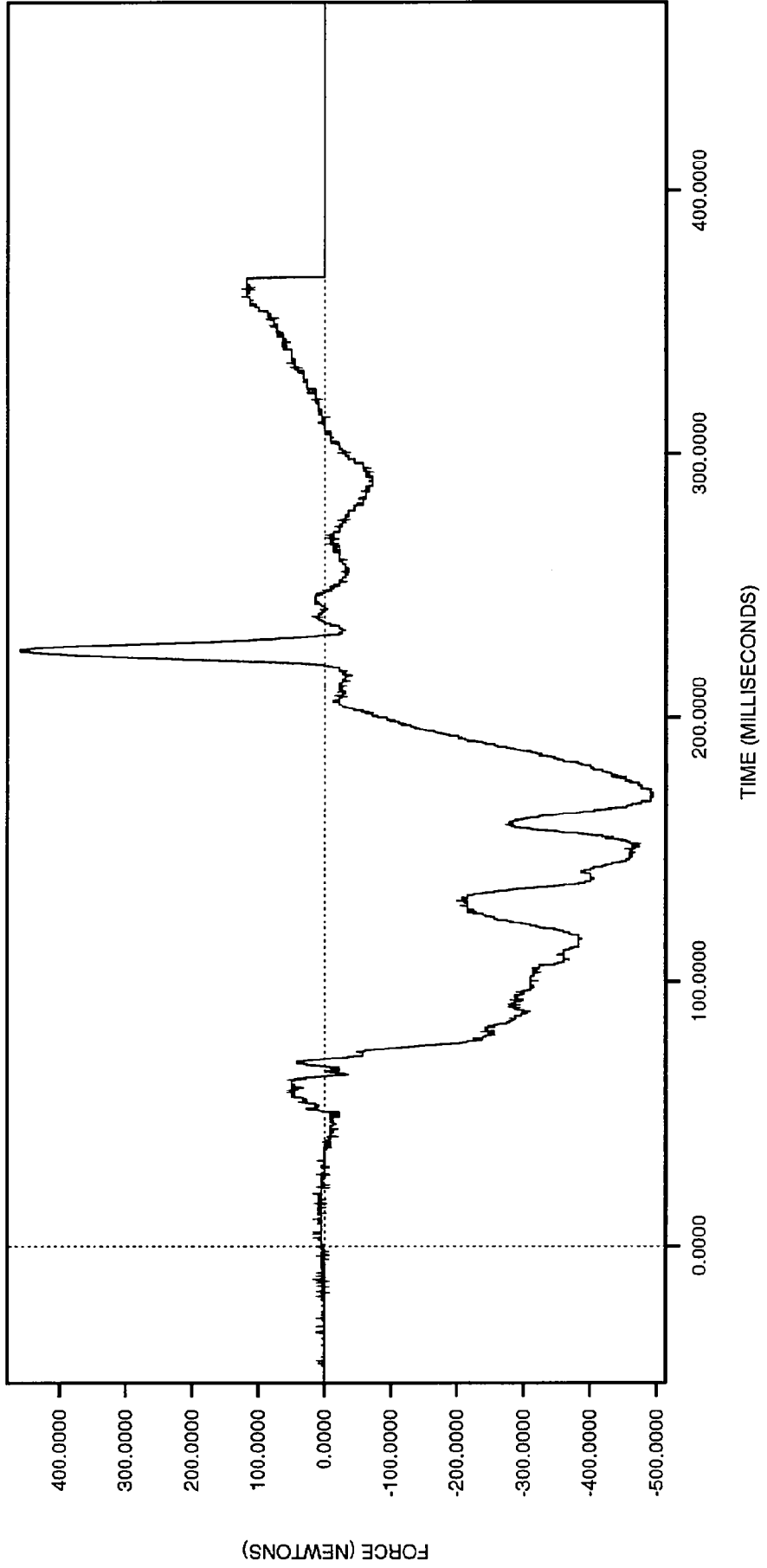
Speed : 64.40 KMPH  
Body : UTILITY VEHICLE  
HIC = 475.00

Config : VTB  
Vehicle # : 1  
CSI = 0.00

Sensor Type : FORCE  
AT 170.2000 MILLISECONDS  
AT 225.2000 MILLISECONDS

Axis : XL

Comments :



File : v2644ta0.014

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : NECK - UPPER

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -48.8132

YMAX = 20.7673

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : TORQUE

AT 162.4000 MILLISECONDS

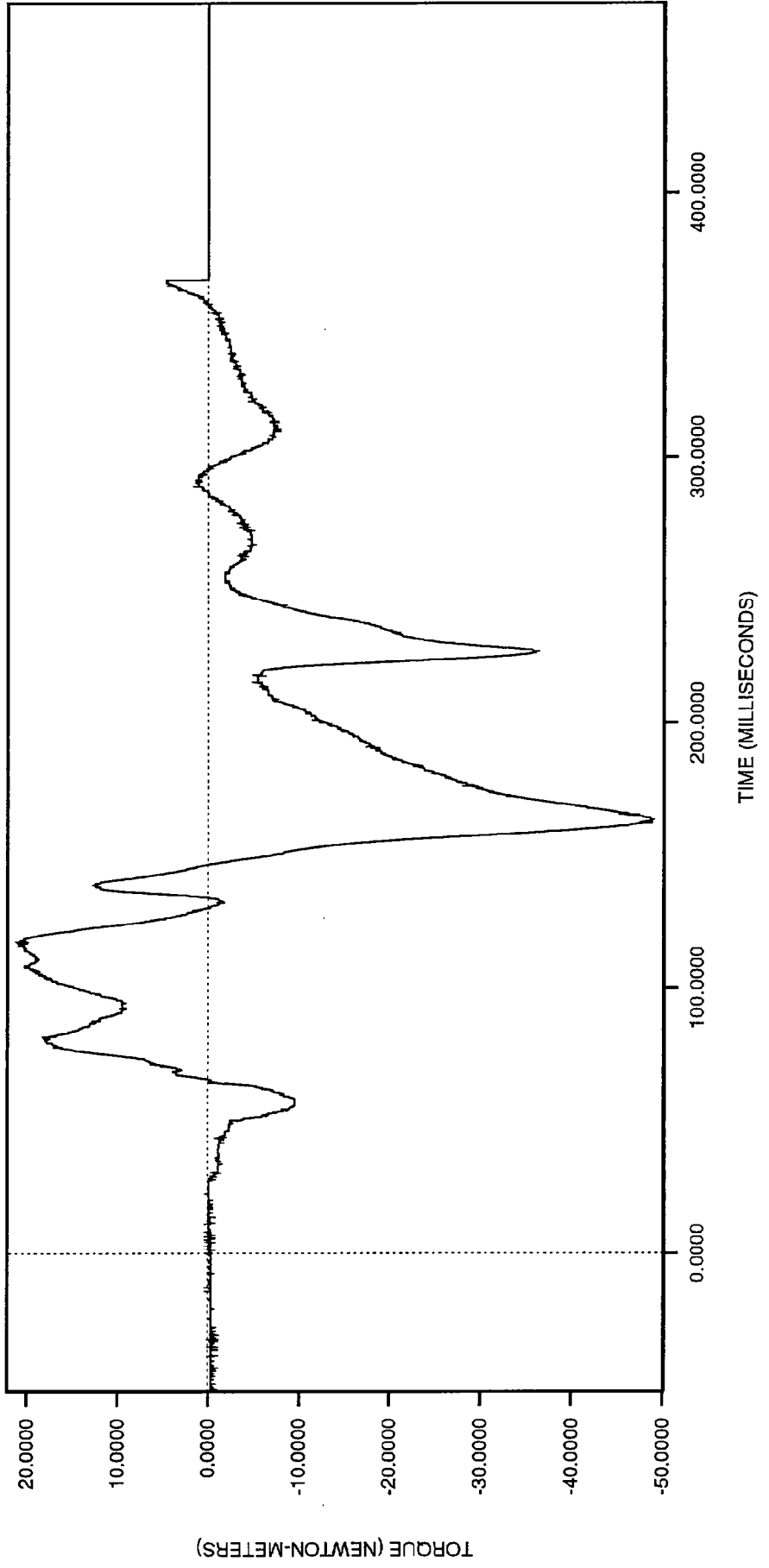
AT 116.1000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : YL



File : v2644fa0.015

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD  
Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : NECK - UPPER

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -1491.2900

YMAX = 179.4800

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : FORCE

AT 100.6000 MILLISECONDS

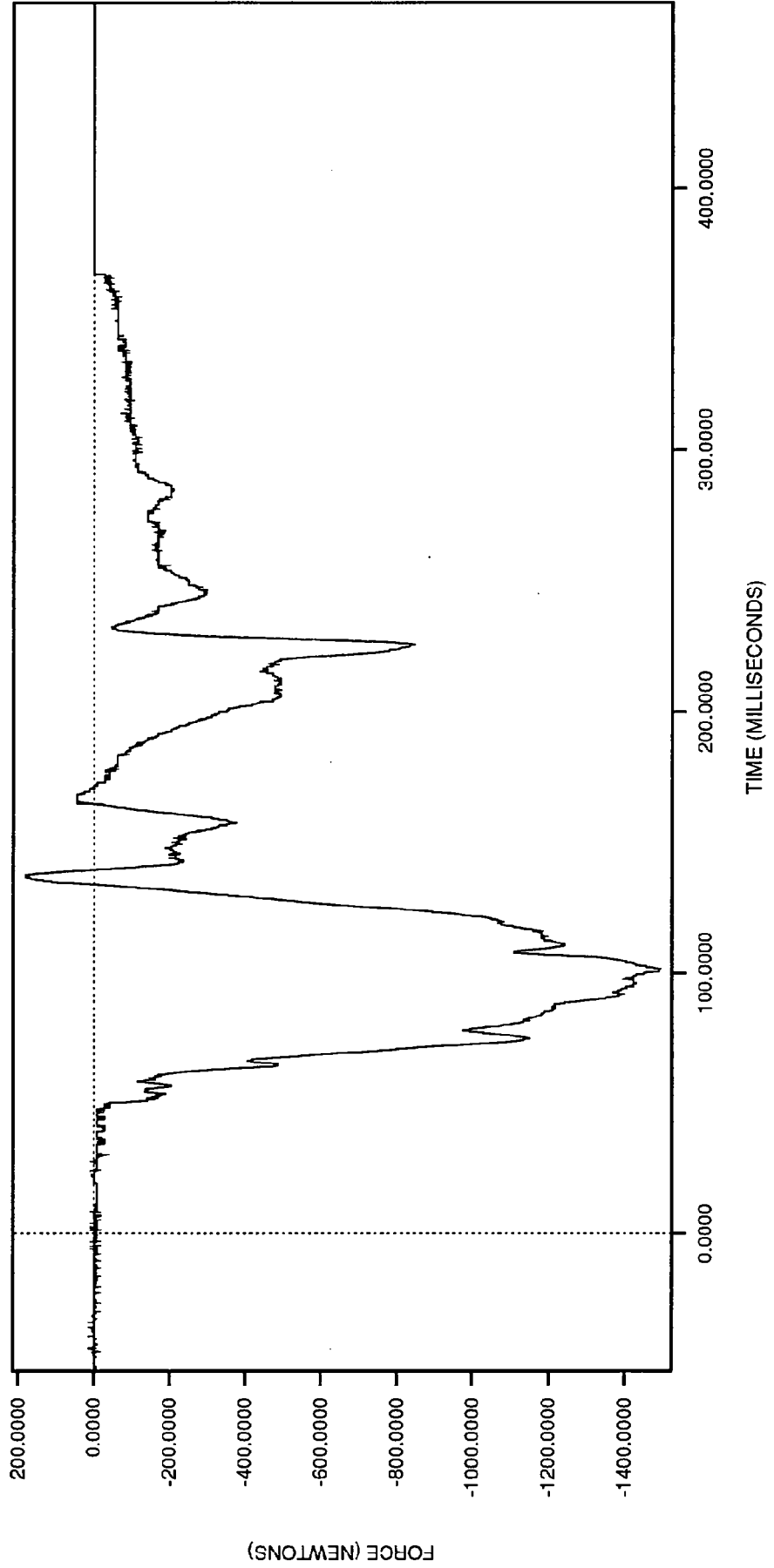
AT 136.9000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : ZL



File : v2644aa0.016

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD  
Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : FOOT - LEFT

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -71.2024

YMAX = 19.8565

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : ACCELERATION

AT 79.2000 MILLISECONDS

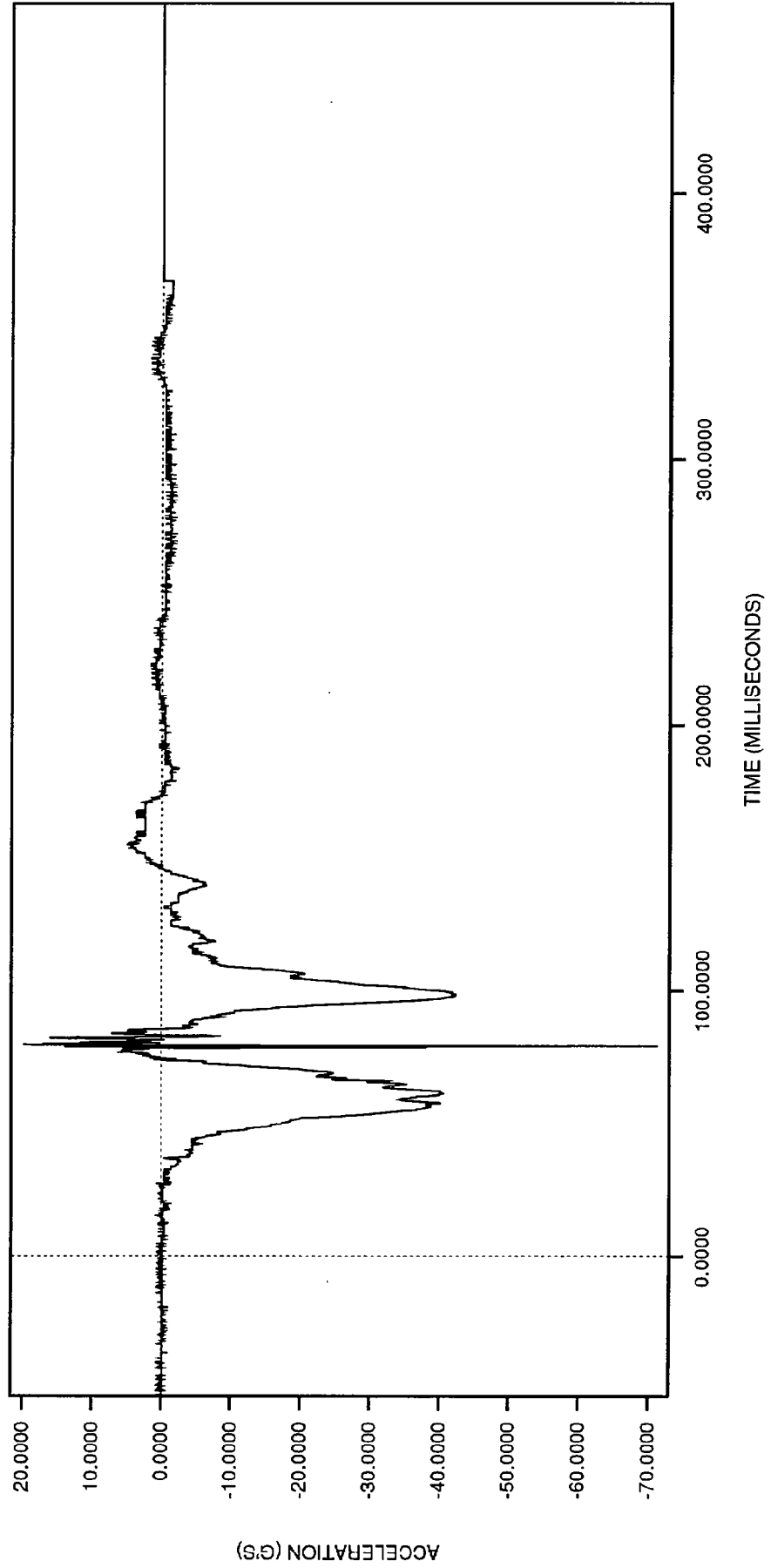
AT 79.8000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : XL



File : v2644aa0.017

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD  
Occupant Location : OTHER

Restraint [1] : AIR BAG  
Sensor Attachment : FOOT - LEFT

Status : AS MEASURED  
Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER  
Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -287.4230  
YMAX = 55.0053

Speed : 64.40 KMPH

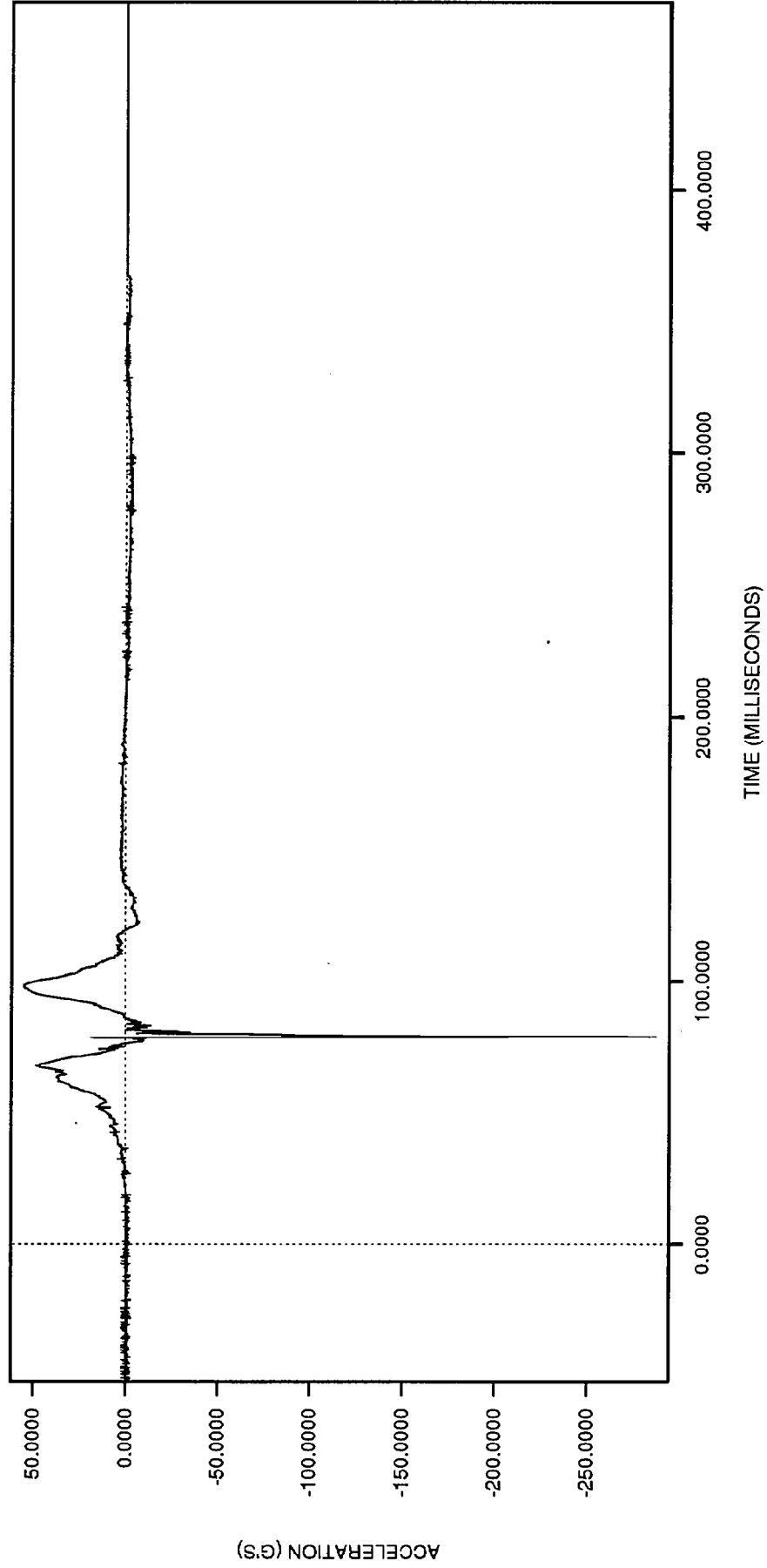
Body : UTILITY VEHICLE  
HIC = 475.00

Sensor Type : ACCELERATION  
AT 78.9000 MILLISECONDS  
AT 98.4000 MILLISECONDS

Config : VTB

Vehicle # : 1  
CSI = 0.00

Axis : ZL



File : v2644aa0.018

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : CHEST

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -33.8909

YMAX = 6.1575

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : ACCELERATION

AT 91.2000 MILLISECONDS

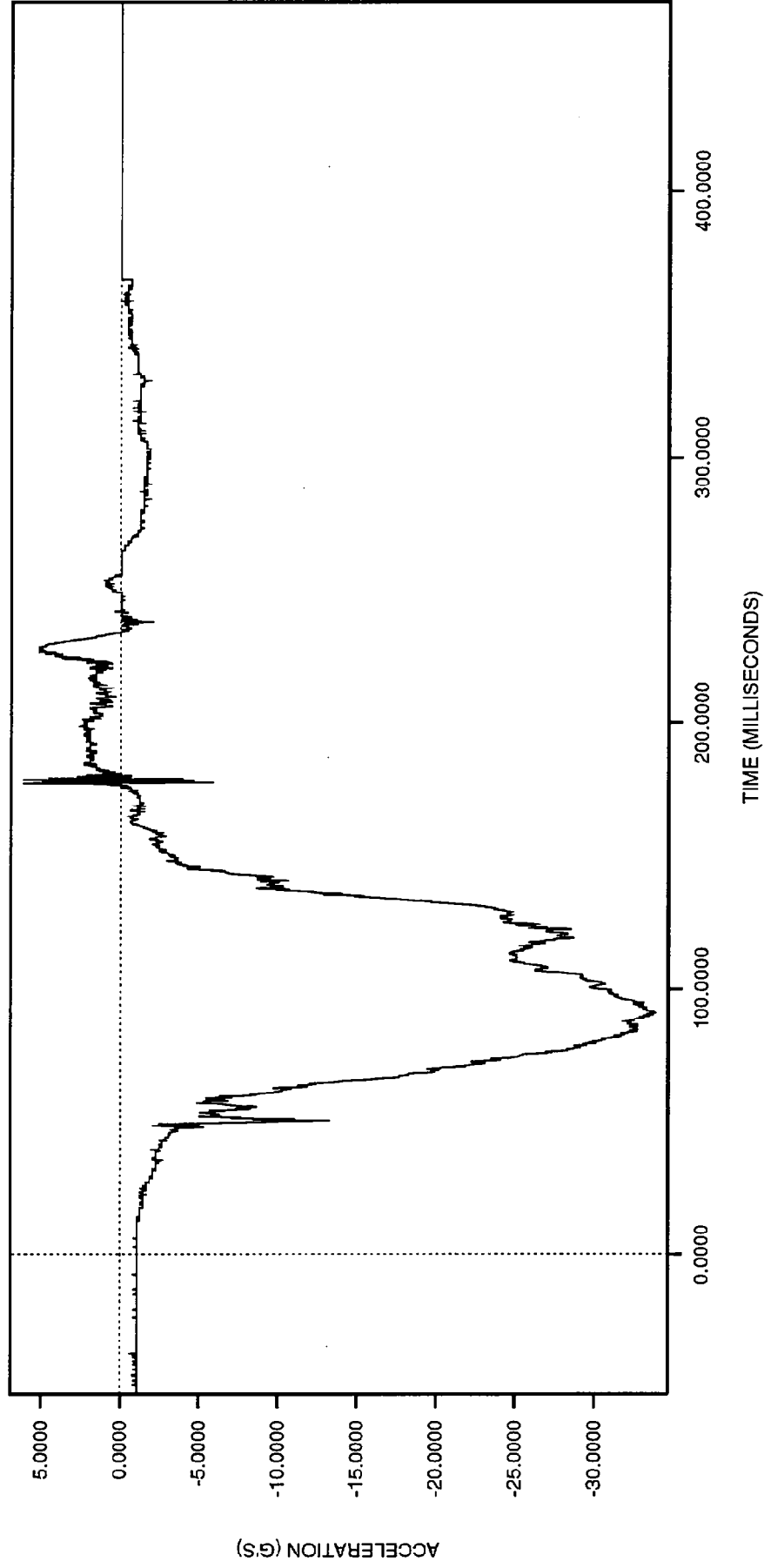
AT 177.5000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : XL



File : v2644aa0.019

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : CHEST

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -22.4566

YMAX = 8.4331

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : ACCELERATION

AT 134.9000 MILLISECONDS

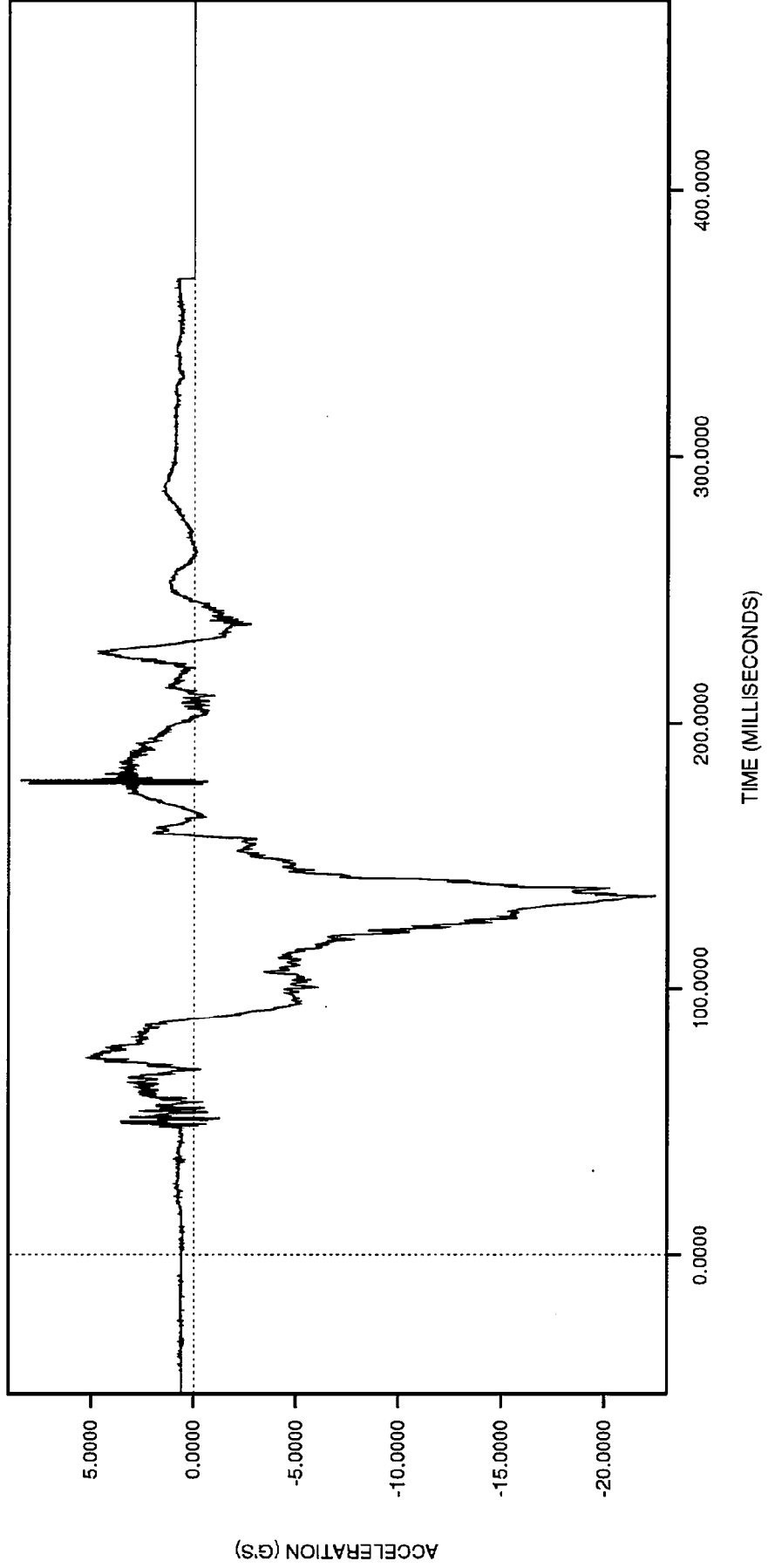
AT 178.5000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : YL



File : v2644aa0.020

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : CHEST

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -12.8052

YMAX = 22.4764

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : ACCELERATION

AT 100.3000 MILLISECONDS

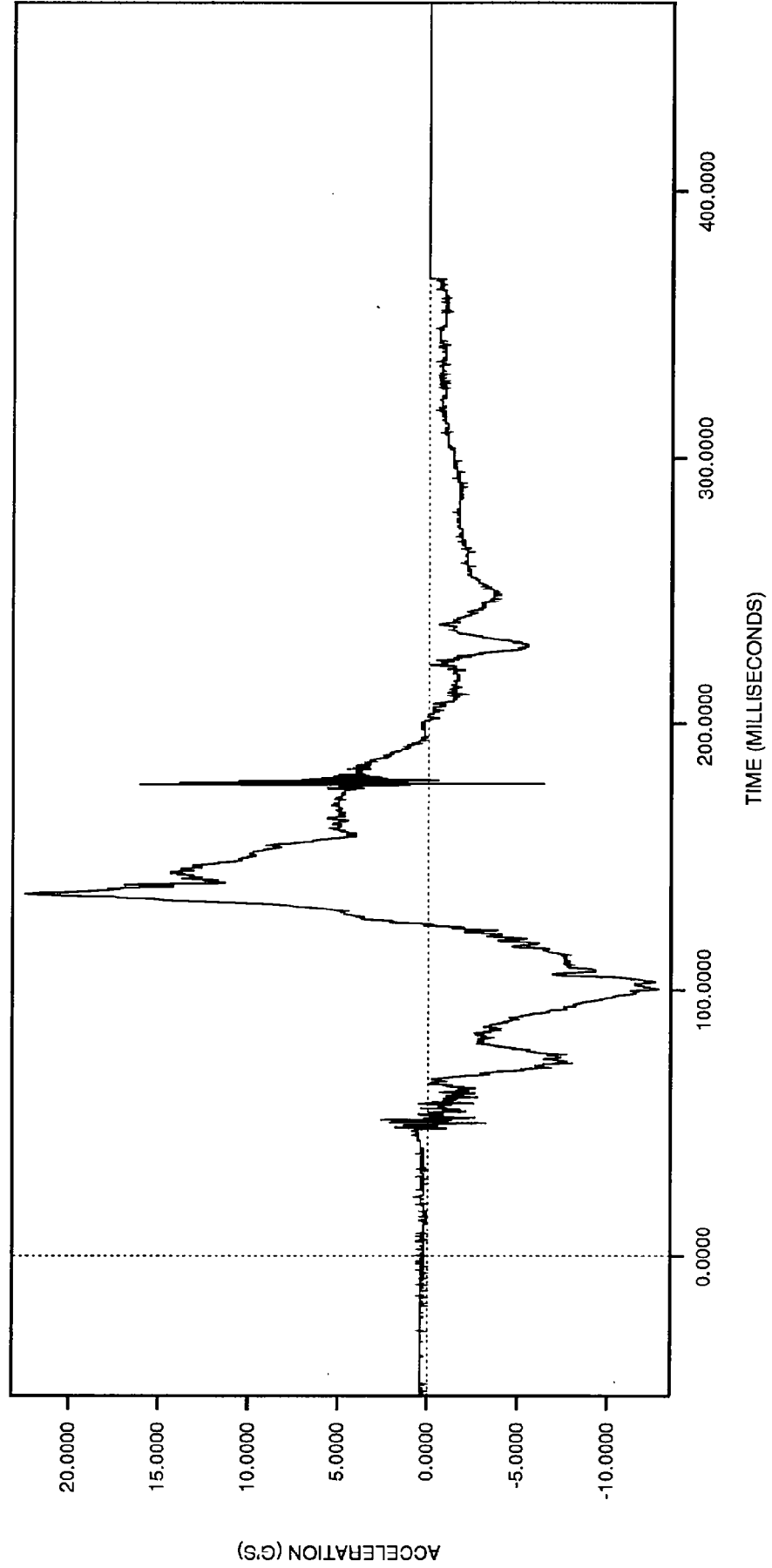
AT 136.3000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : ZL



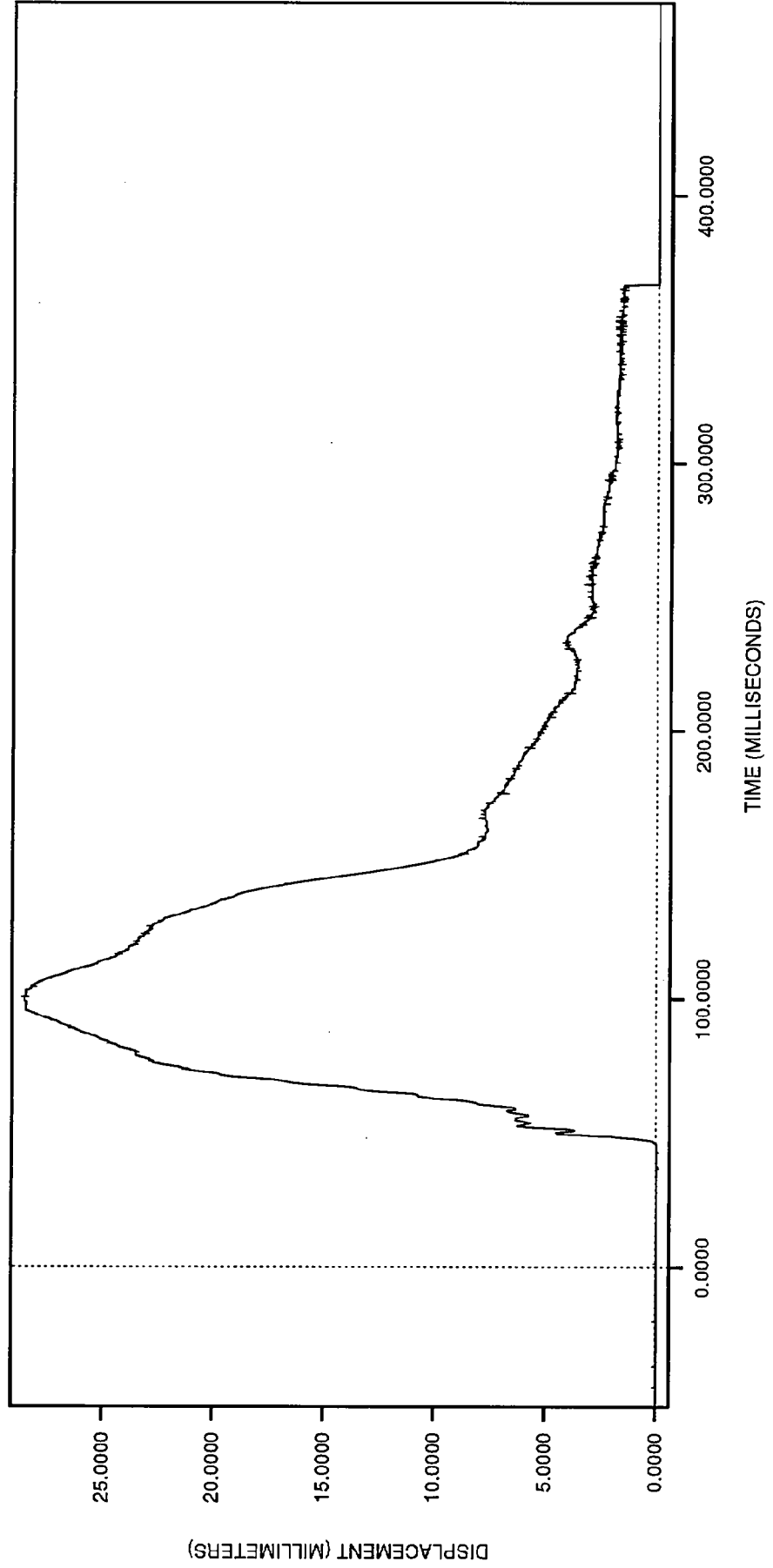
File : v2644da0.021

Test Performer : INSURANCE INSTITUTE FOR H  
Year : 1996 Make : FORD  
Occupant Location : OTHER  
Restraint [1] : AIR BAG  
Sensor Attachment : CHEST  
Status : AS MEASURED  
Filter CutOff : 2500 HZ  
Comments :

Reference : CF95030  
Model : EXPLORER  
Occupant Type : H3  
Restraint [2] : 3 POINT BELT  
YMIN = -0.0474  
YMAX = 28.5367

Speed : 64.40 KMPH  
Body : UTILITY VEHICLE  
HIC = 475.00  
Sensor Type : DISPLACEMENT  
AT 36.9000 MILLISECONDS  
AT 99.0000 MILLISECONDS

Config : VTB  
Vehicle # : 1  
CSI = 0.00  
Axis : XL



File : v2644ta0.022

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : TIBIA - LEFT LOWER

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -102.0960

YMAX = 22.6911

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : TORQUE

AT 79.3000 MILLISECONDS

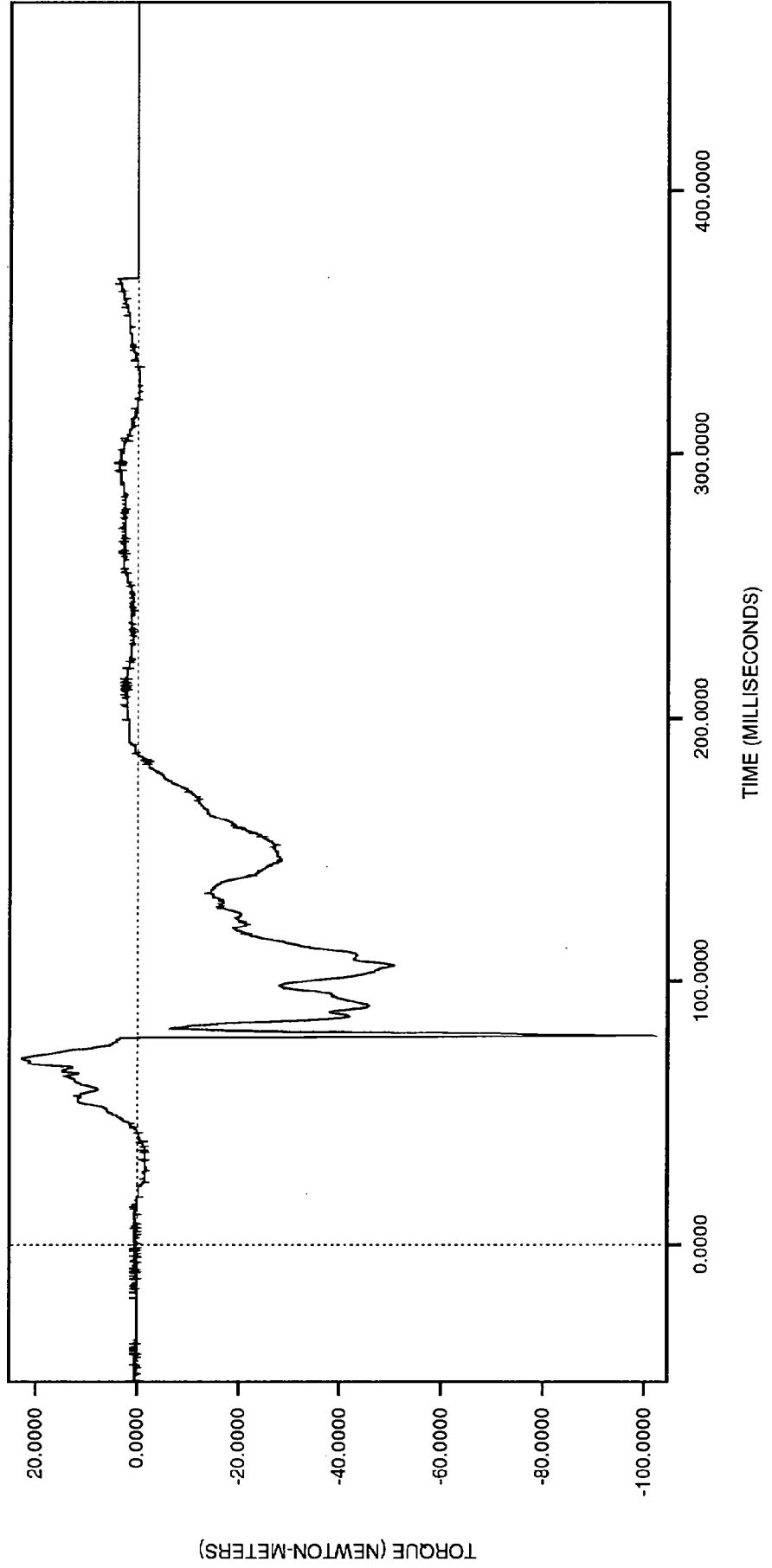
AT 70.4000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : XL



File : v2644ta0.023

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : TIBIA - LEFT LOWER

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -36.0442

YMAX = 17.1482

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : TORQUE

AT 99.0000 MILLISECONDS

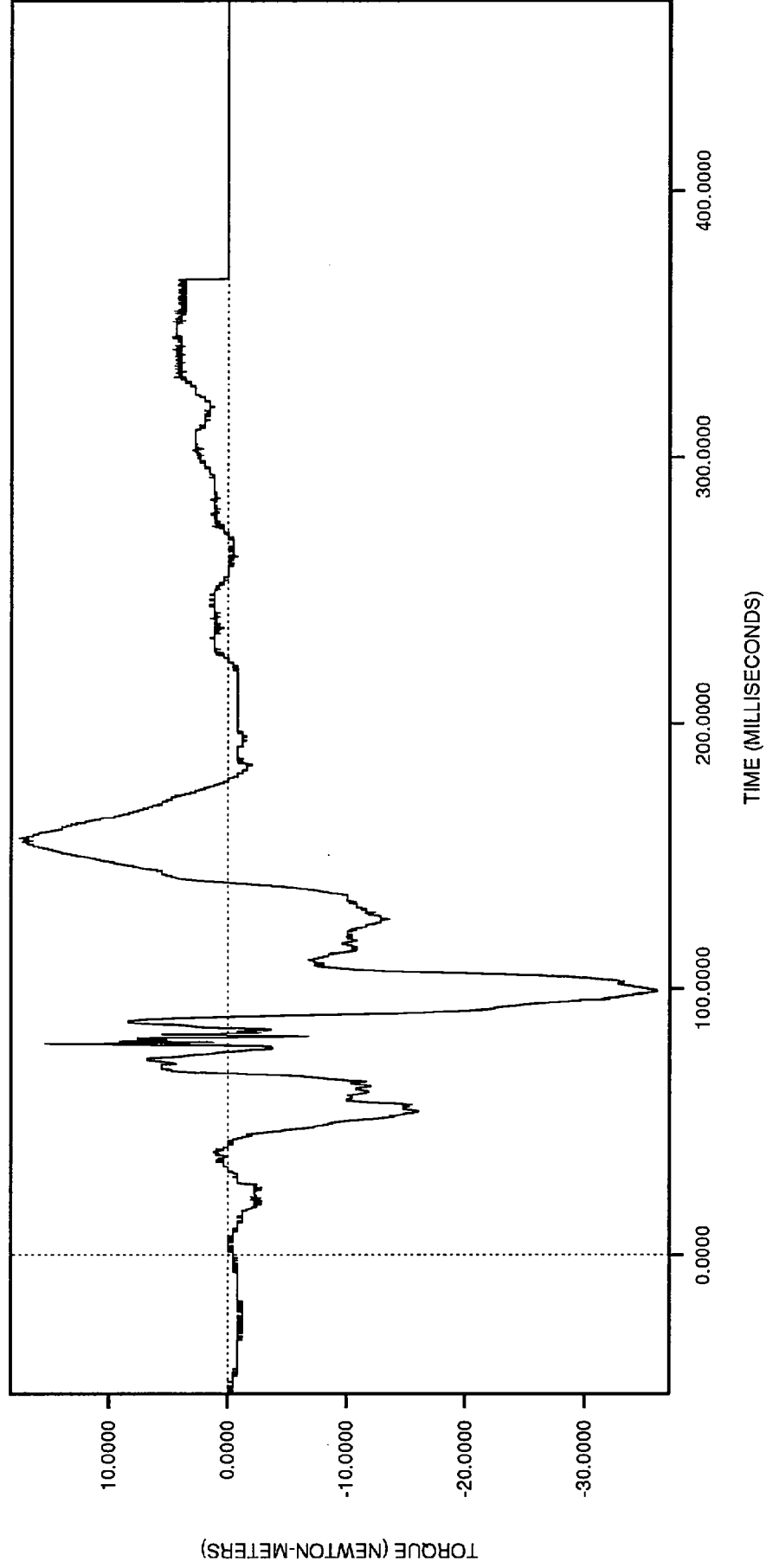
AT 155.4000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : YL



File : v2644fa0.024

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : TIBIA - LEFT LOWER

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -86.7415

YMAX = 3002.0400

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : FORCE

AT 204.6000 MILLISECONDS

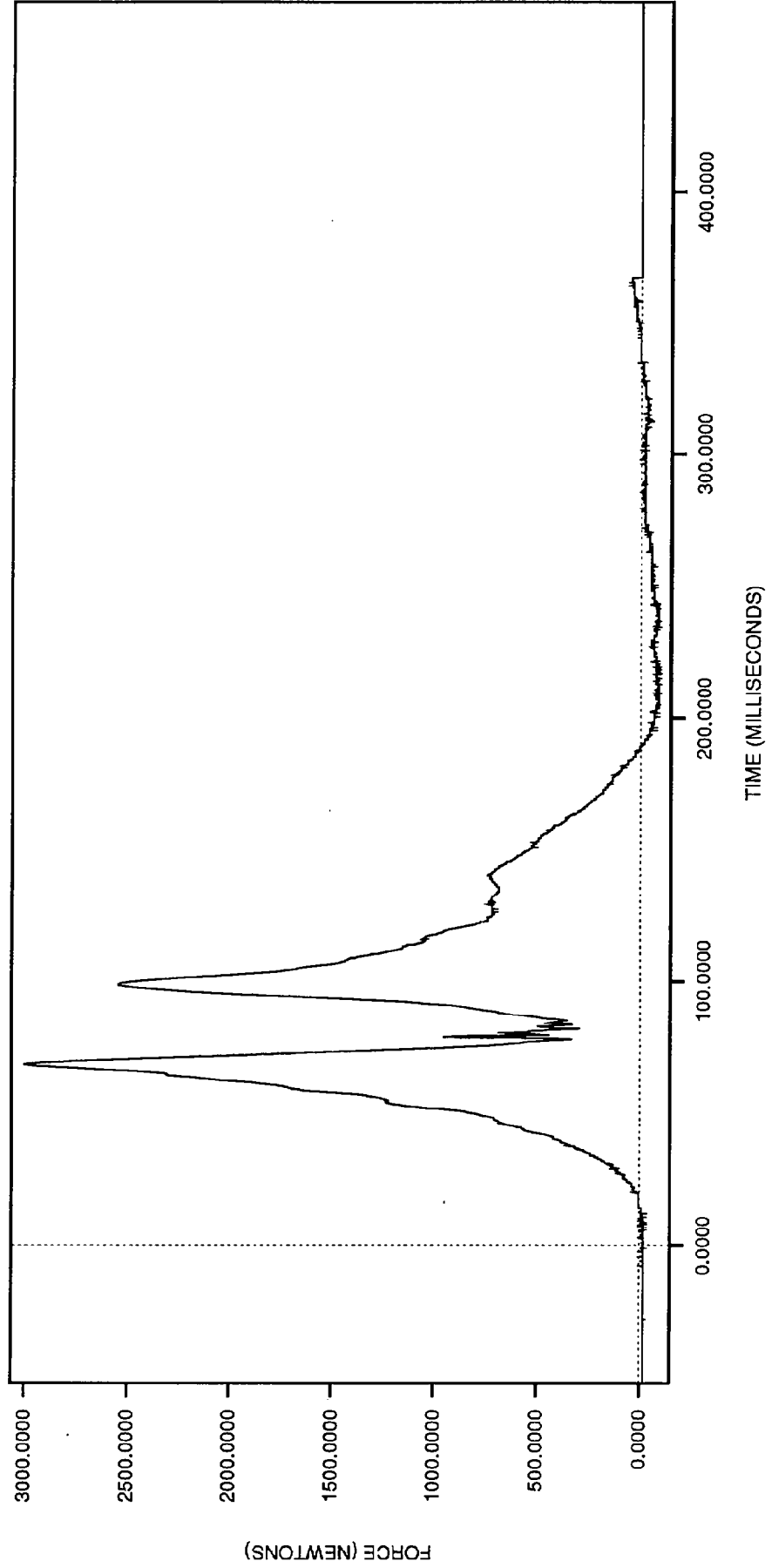
AT 68.7000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : ZL



File : V2644aa0.025

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : VEHICLE CG

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -102.8720

YMAX = 80.4076

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : ACCELERATION

AT 64.5000 MILLISECONDS

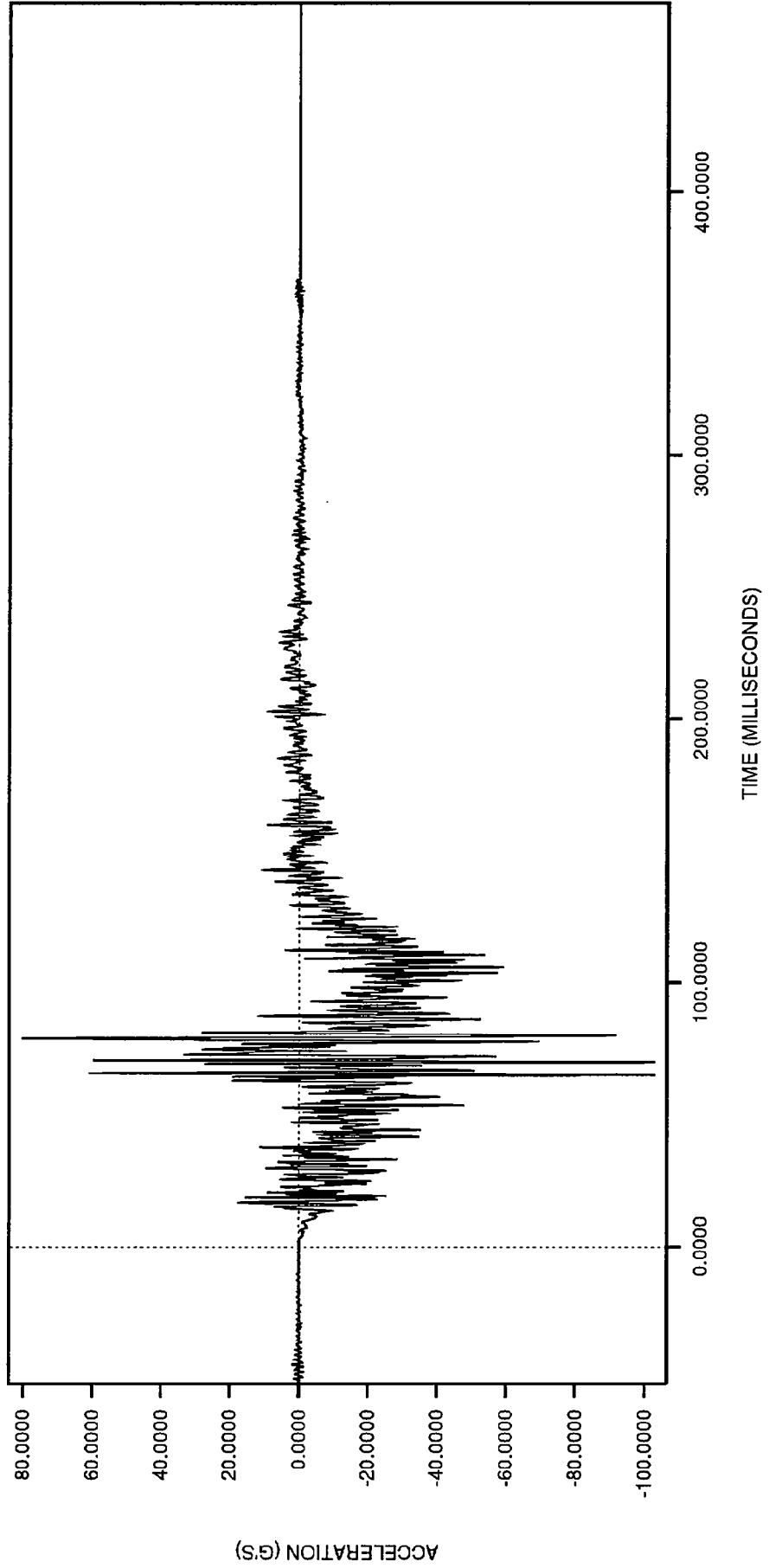
AT 78.6000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : XG



File : v2644aa0.026

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : VEHICLE CG

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -53.9771

YMAX = 51.7244

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : ACCELERATION

AT 63.9000 MILLISECONDS

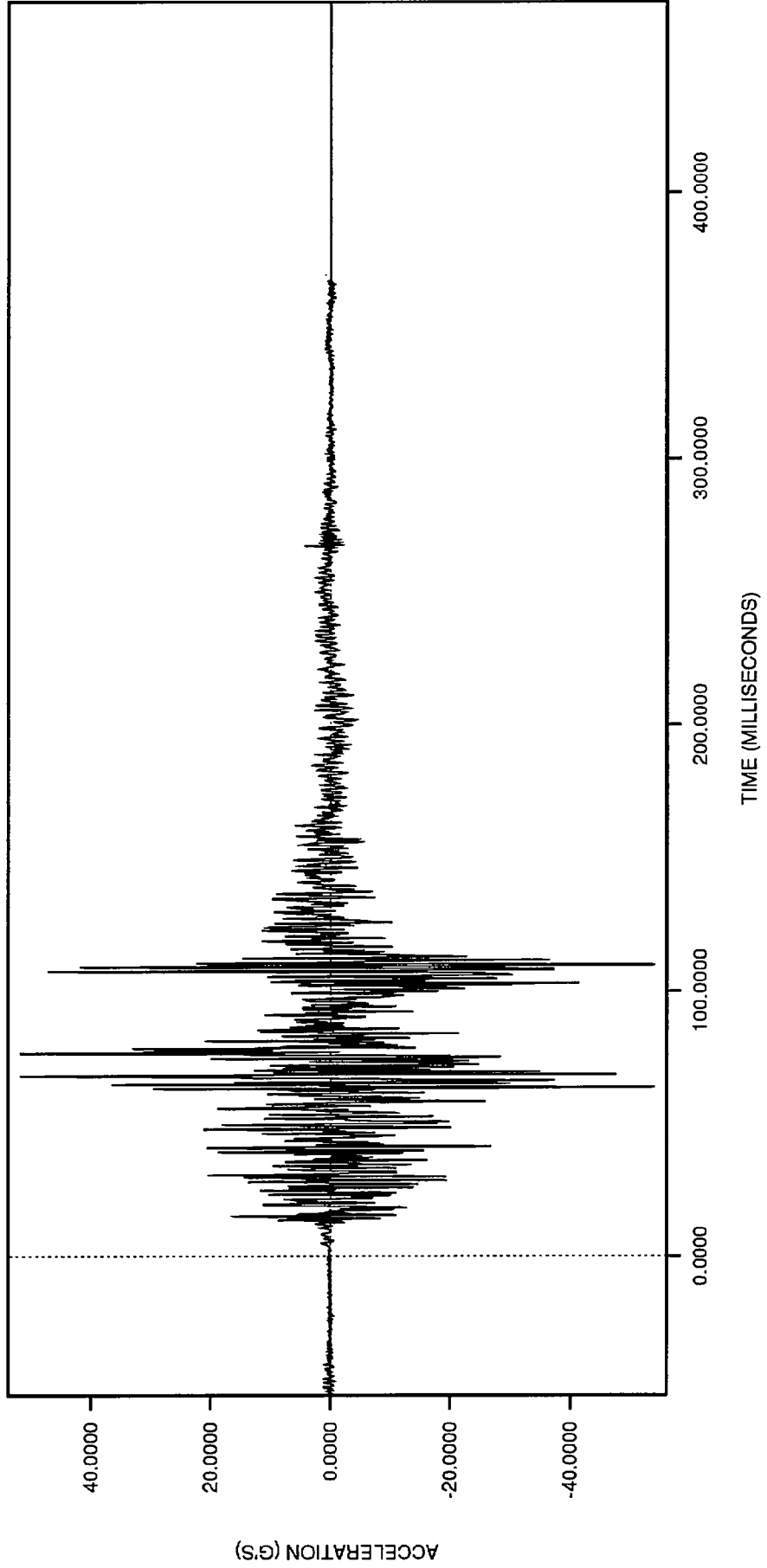
AT 68.3000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : YG



File : v2644aa0.027

Test Performer : INSURANCE INSTITUTE FOR H  
Year : 1996 Make : FORD  
Occupant Location : OTHER  
Restraint [1] : AIR BAG  
Sensor Attachment : VEHICLE CG  
Status : AS MEASURED  
Filter CutOff : 2500 HZ  
Comments :

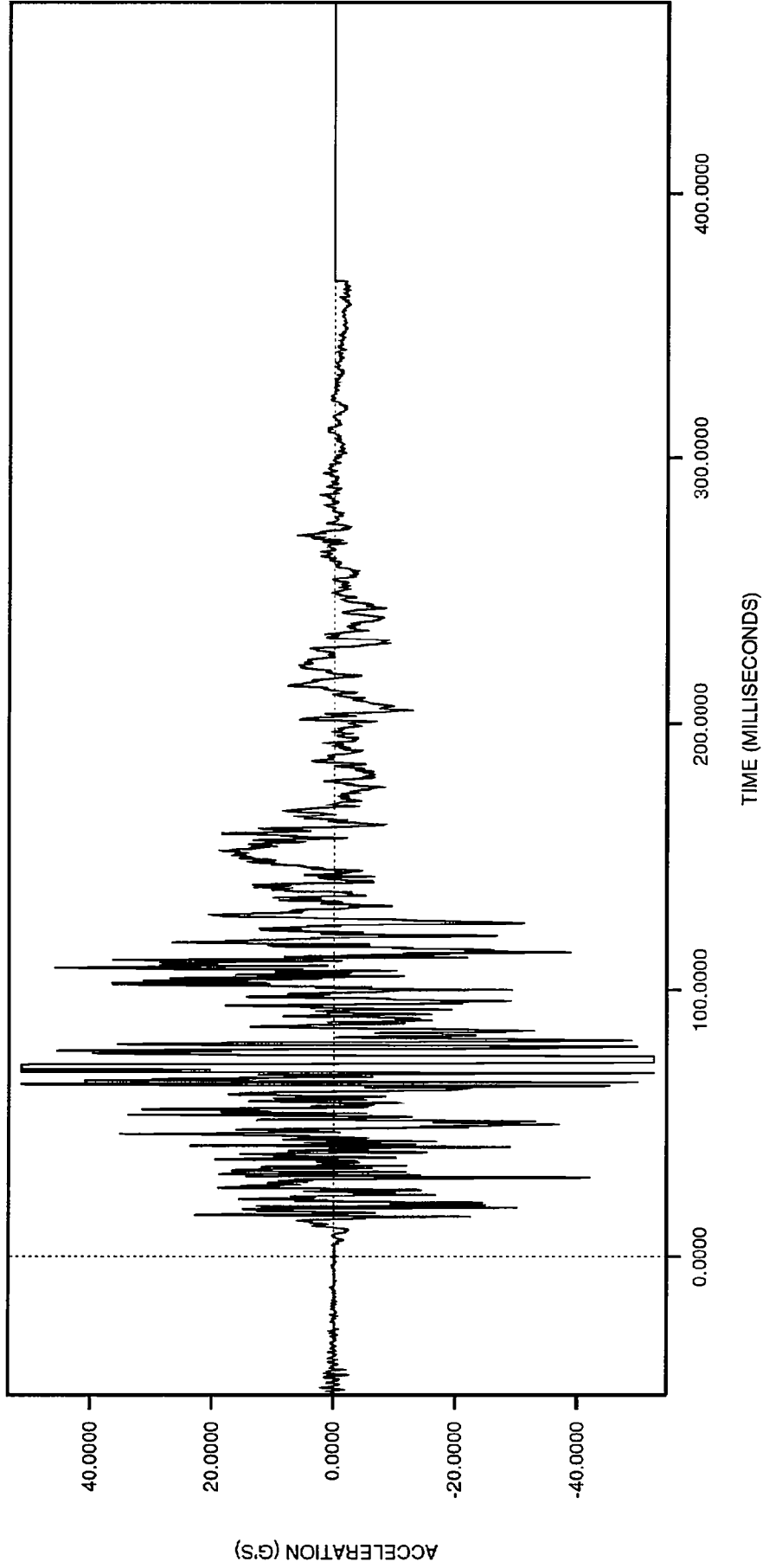
Reference : CF95030  
Model : EXPLORER  
Occupant Type : H3  
Restraint [2] : 3 POINT BELT  
YMIN = -52.5673  
YMAX = 51.3113

Speed : 64.40 KMPH  
Body : UTILITY VEHICLE  
HIC = 475.00

Config : VTB  
Vehicle # : 1  
CSI = 0.00

Sensor Type : ACCELERATION  
AT 68.7000 MILLISECONDS  
AT 64.5000 MILLISECONDS

Axis : ZG



File : v2644da0.028

Test Performer : INSURANCE INSTITUTE FOR H  
Year : 1996 Make : FORD  
Occupant Location : OTHER  
Restraint [1] : AIR BAG  
Sensor Attachment : KNEE - LEFT  
Status : AS MEASURED  
Filter CutOff : 2500 HZ

Reference : CF95030  
Model : EXPLORER  
Occupant Type : H3  
Restraint [2] : 3 POINT BELT  
YMIN = -0.0335  
YMAX = 0.2116

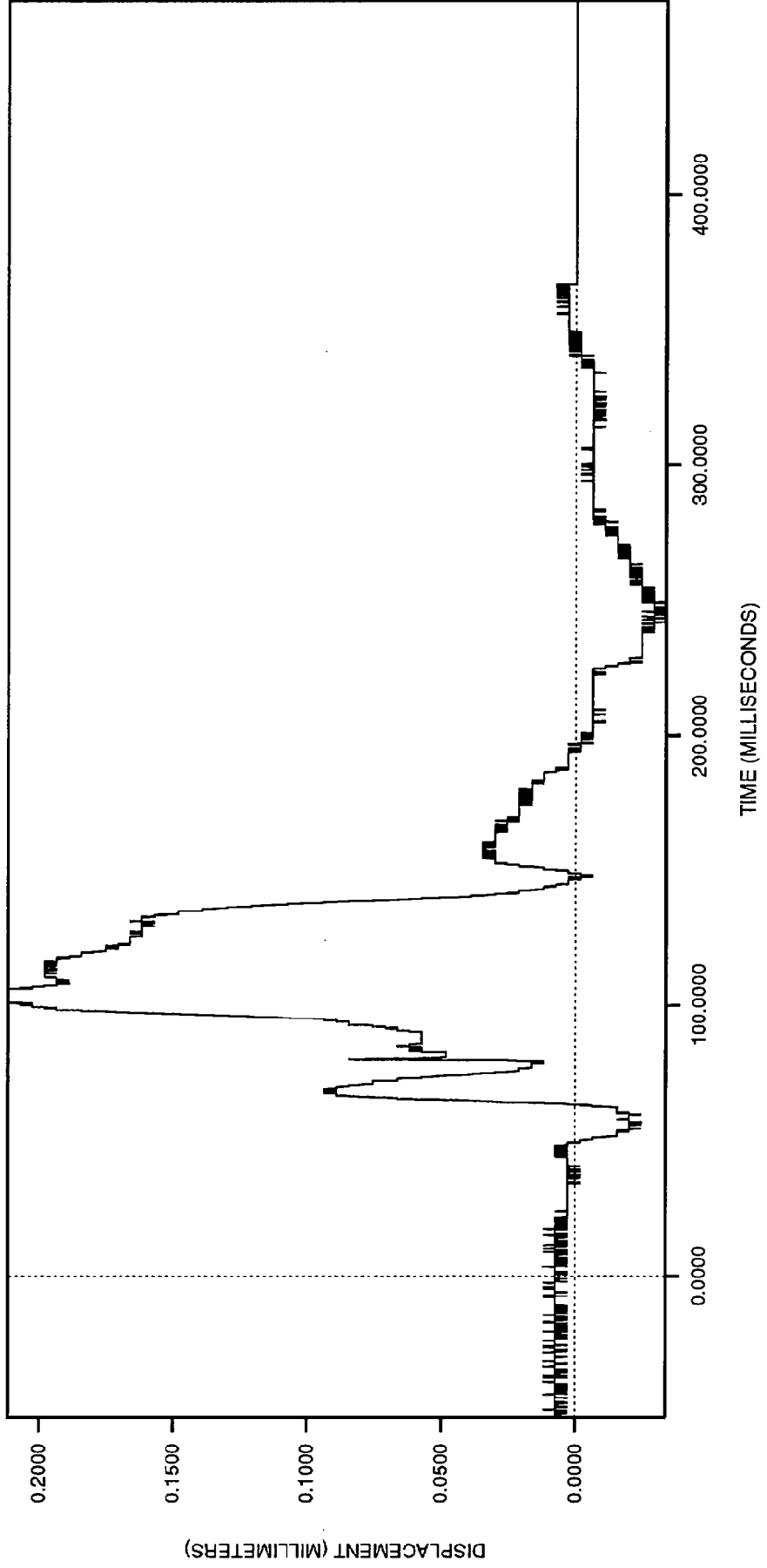
Speed : 64.40 KMPH  
Body : UTILITY VEHICLE  
HIC = 475.00

Config : VTB  
Vehicle # : 1  
CSI = 0.00

Sensor Type : DISPLACEMENT  
AT 241.8000 MILLISECONDS  
AT 100.8000 MILLISECONDS

Axis : XL

Comments :



File : v2644fa0.029

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : FEMUR - LEFT

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -1023.9200

YMAX = 3687.8701

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : FORCE

AT 124.7000 MILLISECONDS

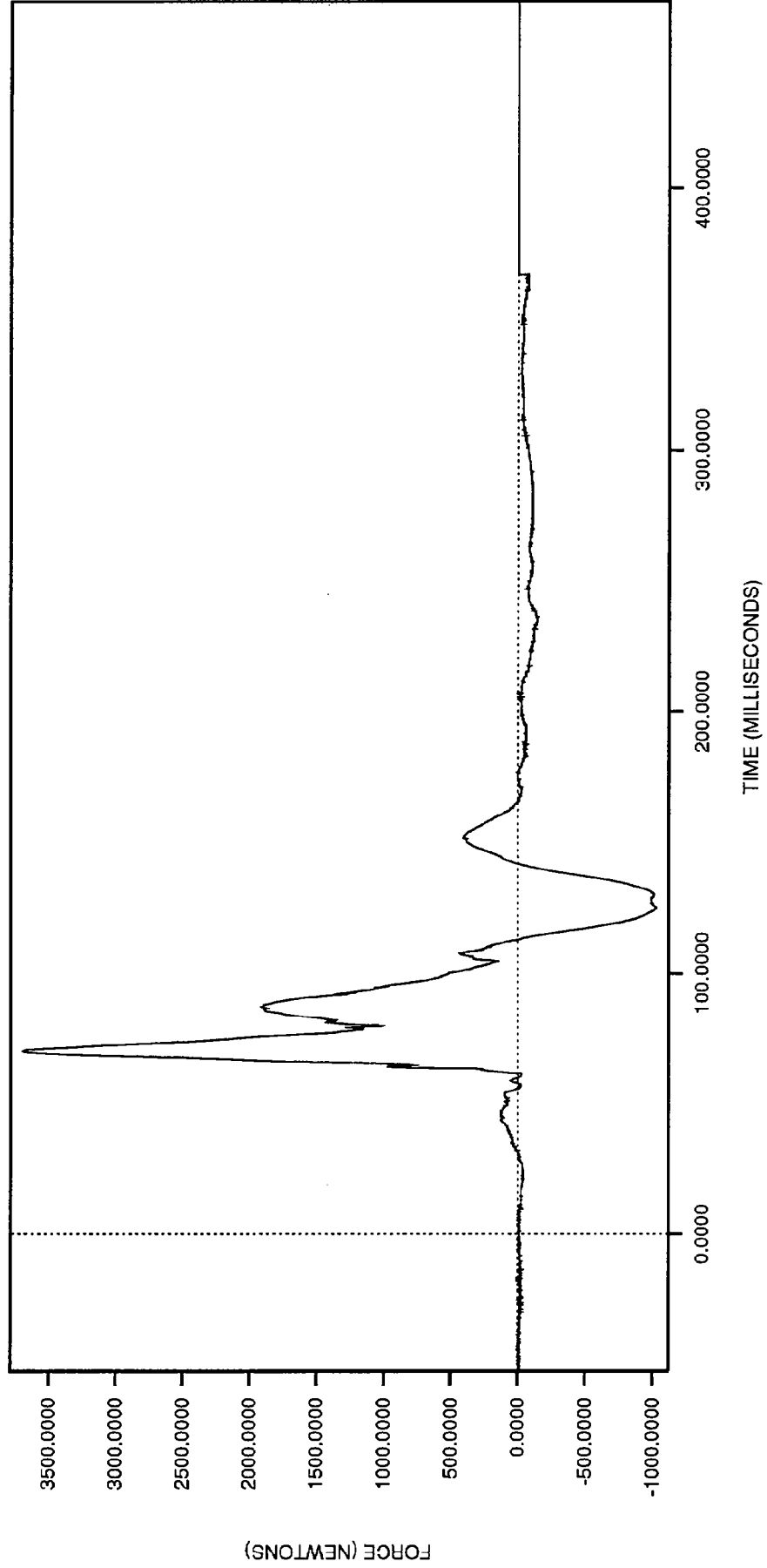
AT 70.2000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : ZL



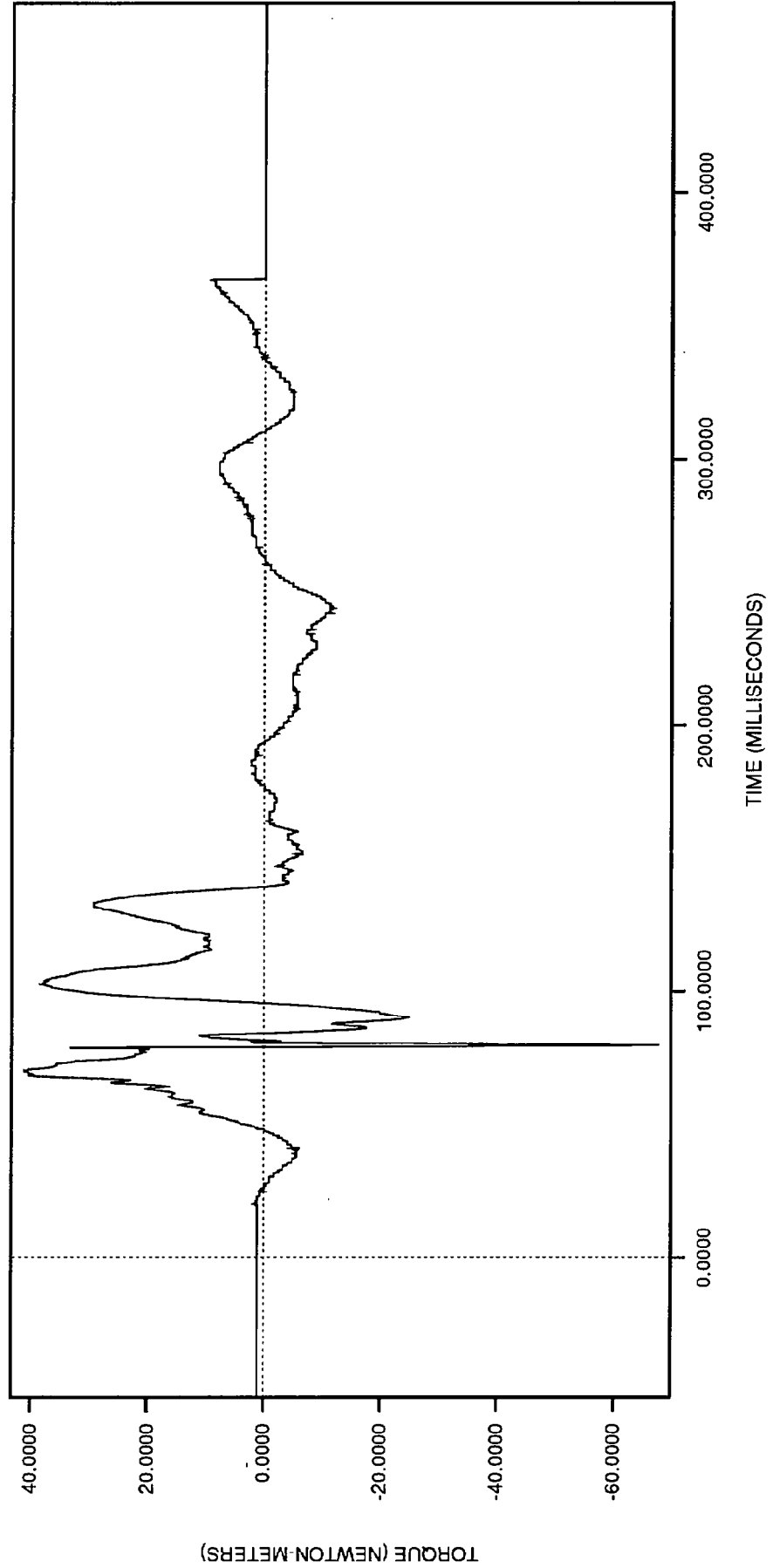
File : v2644ta0.030

Test Performer : INSURANCE INSTITUTE FOR H  
Year : 1996 Make : FORD  
Occupant Location : OTHER  
Restraint [1] : AIR BAG  
Sensor Attachment : TIBIA - LEFT UPPER  
Status : AS MEASURED  
Filter CutOff : 2500 HZ  
Comments :

Reference : CF95030  
Model : EXPLORER  
Occupant Type : H3  
Restraint [2] : 3 POINT BELT  
YMIN = -67.5819  
YMAX = 41.1847

Speed : 64.40 KMPH  
Body : UTILITY VEHICLE  
HIC = 475.00  
Sensor Type : TORQUE  
AT 79.9000 MILLISECONDS  
AT 70.1000 MILLISECONDS

Config : VTB  
Vehicle # : 1  
CSI = 0.00  
Axis : XL



File : v2644ta0.031

Test Performer : INSURANCE INSTITUTE FOR H

Year : 1996 Make : FORD

Occupant Location : OTHER

Restraint [1] : AIR BAG

Sensor Attachment : TIBIA - LEFT UPPER

Status : AS MEASURED

Filter CutOff : 2500 HZ

Comments :

Reference : CF95030

Model : EXPLORER

Occupant Type : H3

Restraint [2] : 3 POINT BELT

YMIN = -7.2644

YMAX = 108.1690

Speed : 64.40 KMPH

Body : UTILITY VEHICLE

HIC = 475.00

Sensor Type : TORQUE

AT 318.1000 MILLISECONDS

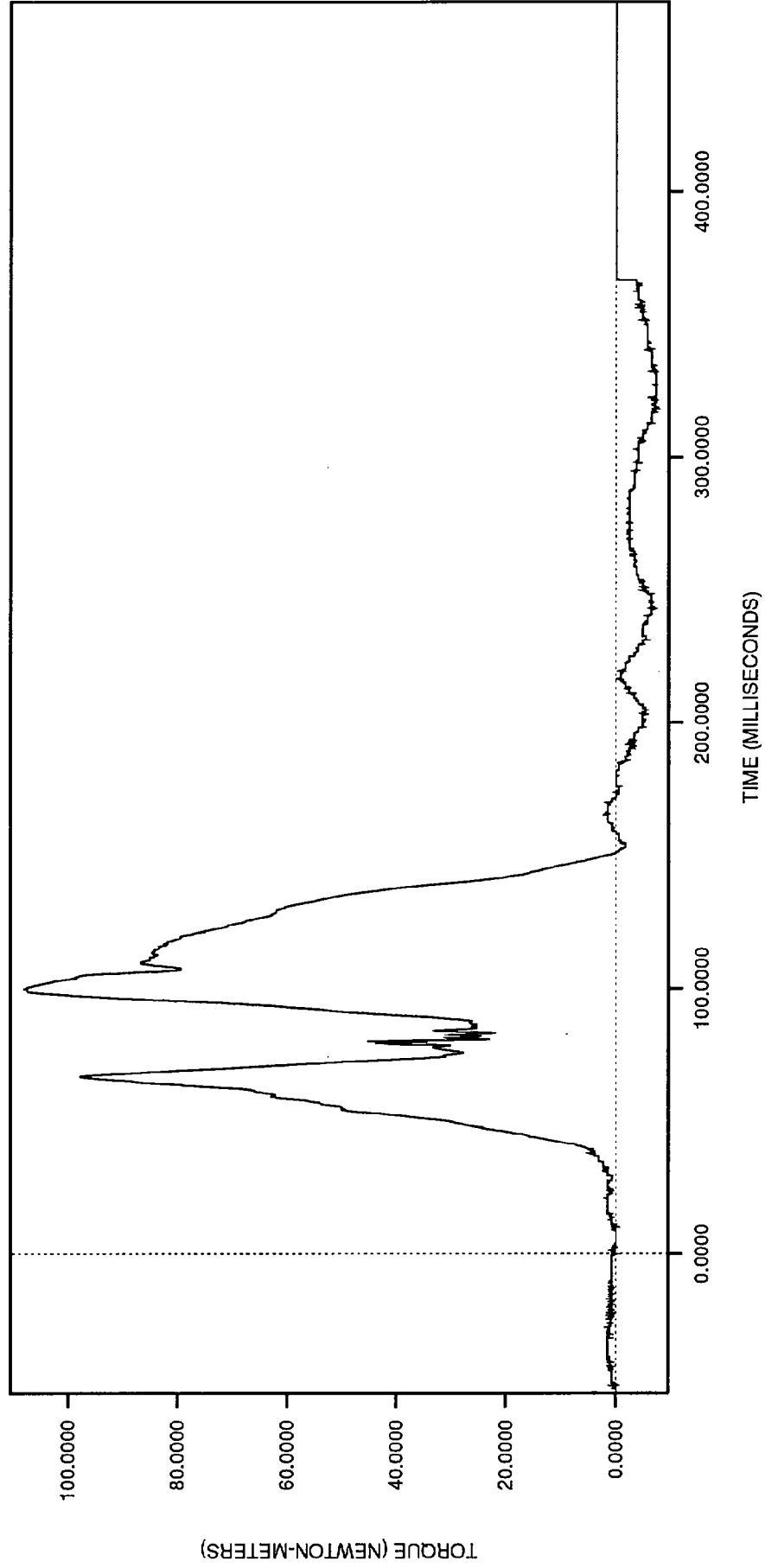
AT 99.9000 MILLISECONDS

Config : VTB

Vehicle # : 1

CSI = 0.00

Axis : YL



✓2644

# DRAFT

April 5, 1996

## Insurance Institute for Highway Safety Crashworthiness Evaluation

### Crash Test Report 1996 Ford Explorer (CF95030)

Vehicle identification number	1FMDU34X6TUA06621
Body style	Four-door utility vehicle
Engine/transmission	4.0-liter V6, 4-speed automatic transmission, four-wheel drive

#### Standard crashworthiness features

- Driver and right front passenger air bags
- Dual-locking shoulder belts (front seating positions only)
- Shoulder belt upper anchorage height adjusters (front seats only)
- Shoulder belt webbing grabbers (front seats only)
- Right front and rear outboard shoulder belt retractors are convertible from emergency to automatic locking for ease of child restraint use
- Rear seat left and right head restraints

#### Other standard safety features

- Four-wheel antilock brakes

#### Optional safety features

- None

#### Vehicle specifications (provided by manufacturer)

Wheelbase:	283	cm
Overall length:	479	cm
Overall width:	178	cm
Curb weight:	1900	kg

#### Vehicle specifications (measured)

Front bumper to firewall:	110	cm
Curb weight:	1930	kg
Test weight:	2048	kg
Overall Width	179	cm

#### Nominal test parameters:

- 40.0 mi/h (64.4 km/h), 40 percent overlap, deformable barrier face with slotted bumper

#### Crash test date:

- October 17, 1995

**1996 Ford Explorer**



**1996 Ford Explorer – Postcrash**



## Summary

A 1996 Ford Explorer was crash tested on October 17, 1995 into a fixed, deformable barrier at 39.1 mi/h (62.9 km/h) and 40 percent overlap on the driver side. A Hybrid III 50th percentile male dummy was positioned in the driver seat with the lap/shoulder belt fastened.

Measures of intrusion taken after the crash showed that the lower instrument panel in front of the driver moved rearward an average of 10 cm. The greatest resultant intrusion was measured in the toepan region and ranged from 18 to 22 cm, with the most intrusion occurring at the outboard edge of the toepan. The driver door aperture shortened 8 cm as measured at the lower edge of the side window. The driver door latch failed during the test, allowing the door to open 110-122 ms into the crash; all other doors remained closed and could be opened after the test without the use of tools.

Dummy kinematics were well-controlled during the early part of the crash, but then the driver door opened and the dummy slid off the air bag to the left as the vehicle slid to the right during rebound from the barrier. The dummy's head passed well outside the occupant compartment, extending the neck rearward, then struck the outside of the B-pillar on the way back into the vehicle.

The maximum neck extension bending moment recorded while the head and neck were extended rearward outside the occupant compartment was 55 Nm.

## Test Conditions

This vehicle had previously been tested in the Institute's Low Speed Crash Test Program and subjected to an impact on the front corner of the passenger side at 5 mi/h (8 km/h) into a 30 degree angle barrier and a rear impact at 5 mi/h (8 km/h) into a flat barrier. All structural damage on the front was repaired prior to this test (see Appendix, Low Speed Crash Test Damage).

The test was conducted according to the procedures specified in the IIHS Offset Barrier Crash Test Protocol (Version II). The Hybrid III dummy seated in the driver seat was equipped with instrumented lower legs that included feet modified to include two accelerometers and to have a 45 degree dorsiflexion range. All dummy seating parameters were set according to the procedures specified for Federal Motor Vehicle Safety Standard 208 compliance testing (49 CFR Part 571.208 § 11). The dummy's left foot was placed on the footrest. The manual lap/shoulder belt was fastened.

The manually adjustable driver seat back was adjusted to an angle of 18 degrees from vertical as measured at the outboard edge of the seat back frame at a point 33 cm above the seat back pivot. The seat was adjusted to midway between the two extremes of seat fore and aft travel. After the final positioning of the dummy, measurements from various parts of the dummy to a number of vehicle interior points were made. These measurements are identified in the Appendix, Dummy Clearance Measurements.

The vehicle acceleration measurements were made by a triaxial arrangement of accelerometers mounted on the vehicle's longitudinal centerline and 46 cm behind its center of gravity (184 cm behind the front axle). The vehicle speed recorded just prior to impact was 39.1 mi/h (62.9 km/h) and the actual overlap was 40 percent.

## Structural Performance

The driver door opened between 100 and 120 ms into the crash. The postcrash examination of the latch, which is a dual fork bolt design, showed evidence suggesting that the latch system failed through the combination of two mechanisms: a deformation-induced activation of the handle-to-latch push rod, which released the upper fork bolt to the first catch position, coupled with a forced bypass of the lower fork bolt by the latch. The upper fork bolt was found in the unlatched position after the crash suggesting the latch had been activated during the crash. The postcrash condition of the push rod connecting the interior door handle and the latch mechanism was consistent with this possibility. When the push rod was disconnected from the detent lever, the detent lever sprung into the neutral position indicating that the push rod was under compression, probably due to the damage sustained by the door end panel. The door end panel was crushed 3 cm toward the front of the door, but only 1 cm of push rod movement is needed to activate the latch. The damage sustained by the lower fork bolt and the latch itself suggests that the push rod activation released only the upper fork bolt. The top of the lower fork bolt is bent toward the rear of the vehicle so that its tooth no longer aligns with the tooth of the detent lever. Adjacent edges of the fork bolt and detent lever teeth were rounded, indicating that the two

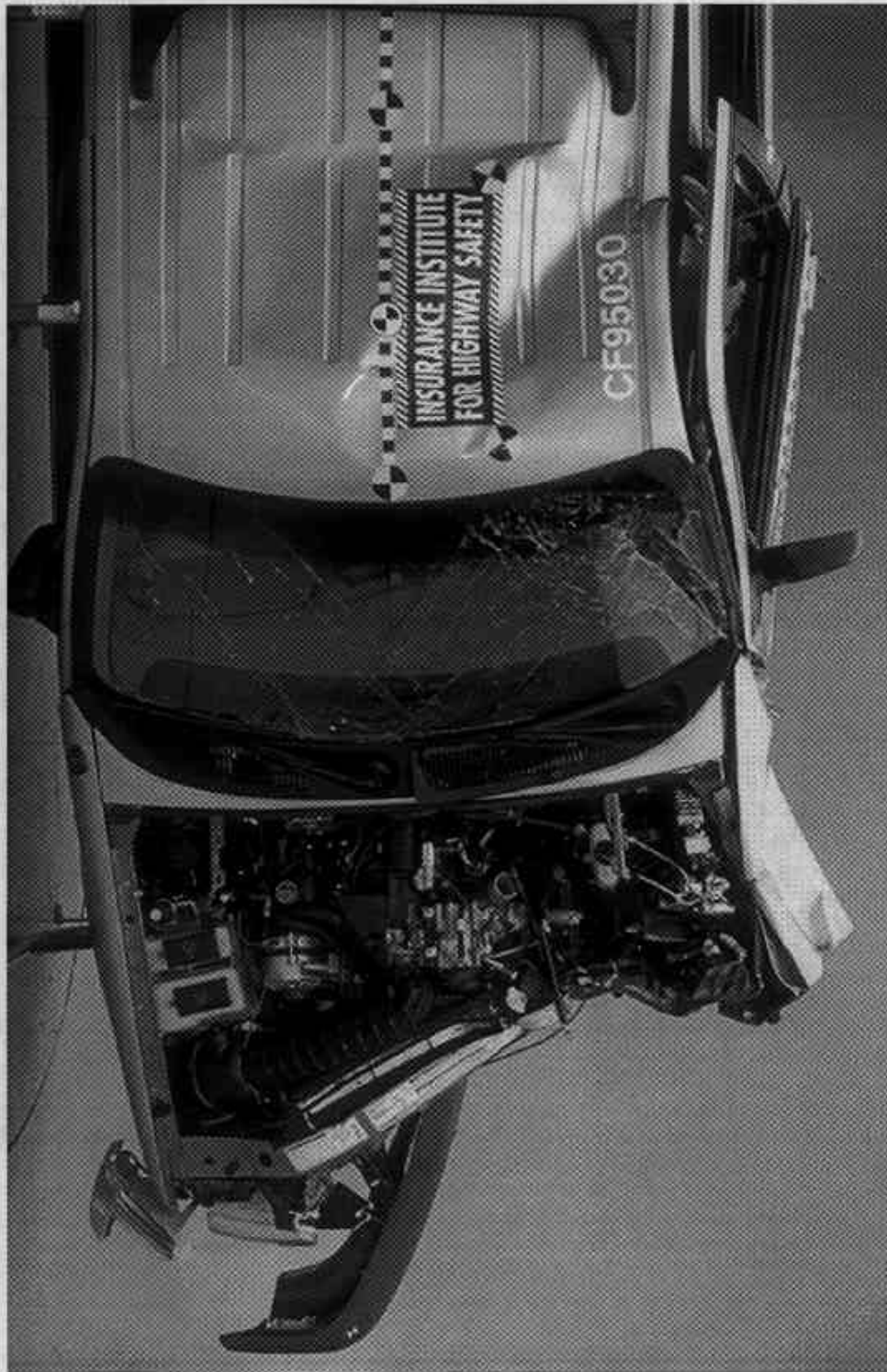
pieces were forced past each other. This bypass activation likely occurred as the door continued to be pushed rearward against the B-pillar, after the push rod had released the upper fork bolt to the first catch position. All other doors remained closed and could be opened with ease after the crash.

No leakage of the fuel system was observed after the crash. In addition, no leakage was observed when the vehicle was rotated on its right side to allow postcrash photography.

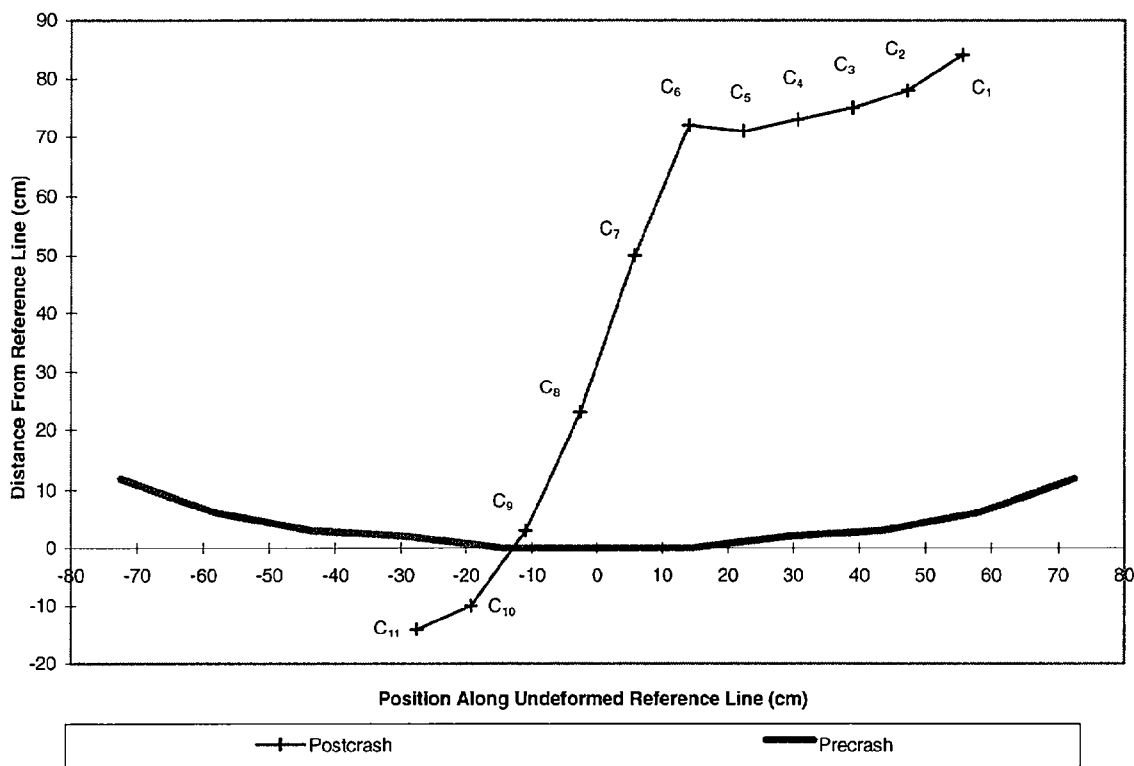
Figure 1 shows the overhead view of the crash deformation. Figure 2 illustrates the precrash and postcrash contour measures of the front bumper profile and the resulting permanent crush. Figure 3 shows the precrash and postcrash view from below, and Figure 4 illustrates the deformation of the frame rails, which are visible in Figure 3.

Table 1 contains a summary of various measures of intrusion made after the crash. They reflect residual deformation, which is typically less than the maximum deformation that occurs during the crash.

**Figure 1**  
**Overhead View of Crash Deformation — 1996 Ford Explorer**



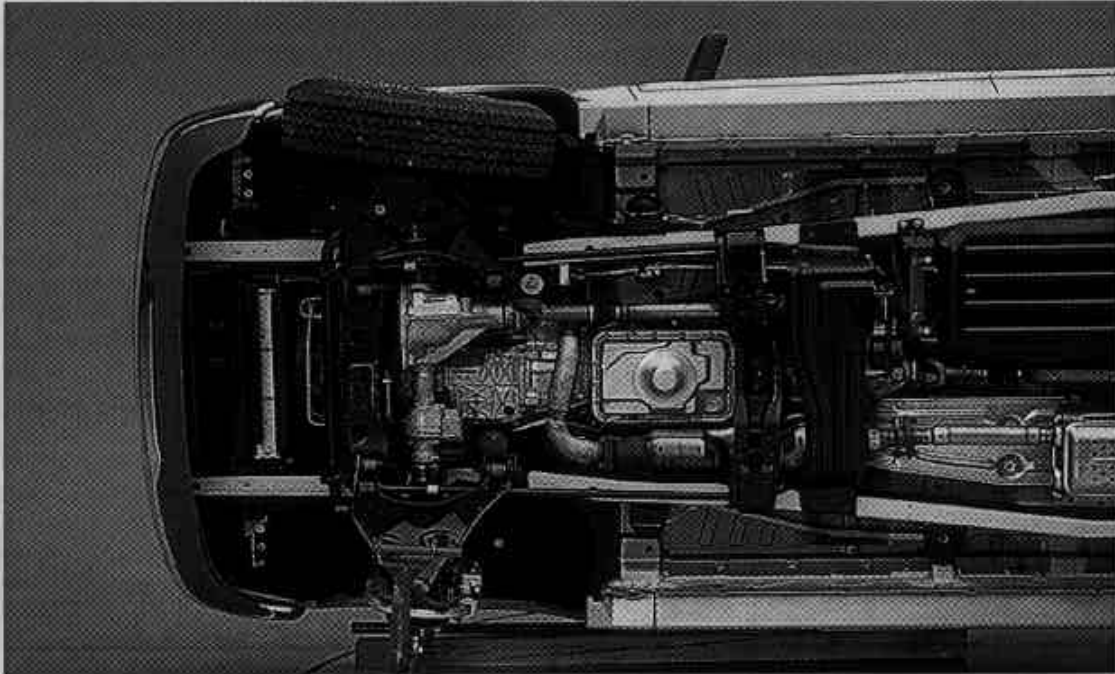
**Figure 2**  
**Exterior Crush Contour at Bumper Height – 1996 Ford Explorer**



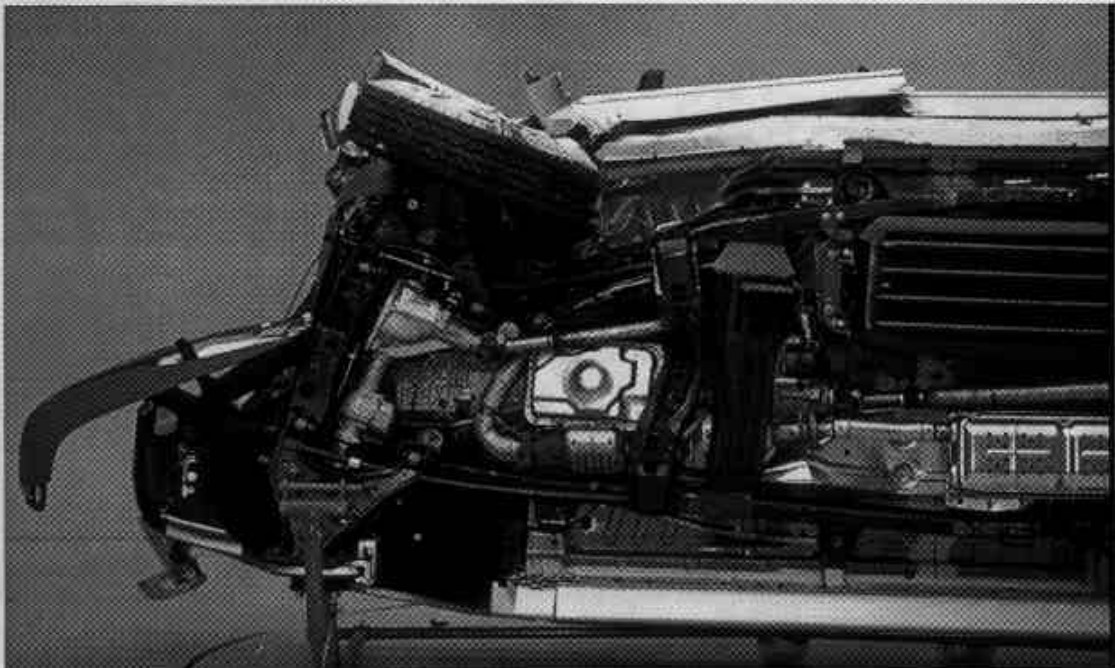
	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	C <sub>8</sub>	C <sub>9</sub>	C <sub>10</sub>	C <sub>11</sub>
<b>Postcrash Contour (cm)</b>	84	78	75	73	71	72	50	23	3	-10	-14
<b>Precrash Contour (cm)</b>	12	6	3	2	0	0	0	2	3	6	12
<b>Resulting Crush (cm)</b>	72	72	72	71	71	72	50	21	0	-16	-26

All contour measurements are given in centimeters. The length of the reference line was 145 cm precrash and 83 cm postcrash.

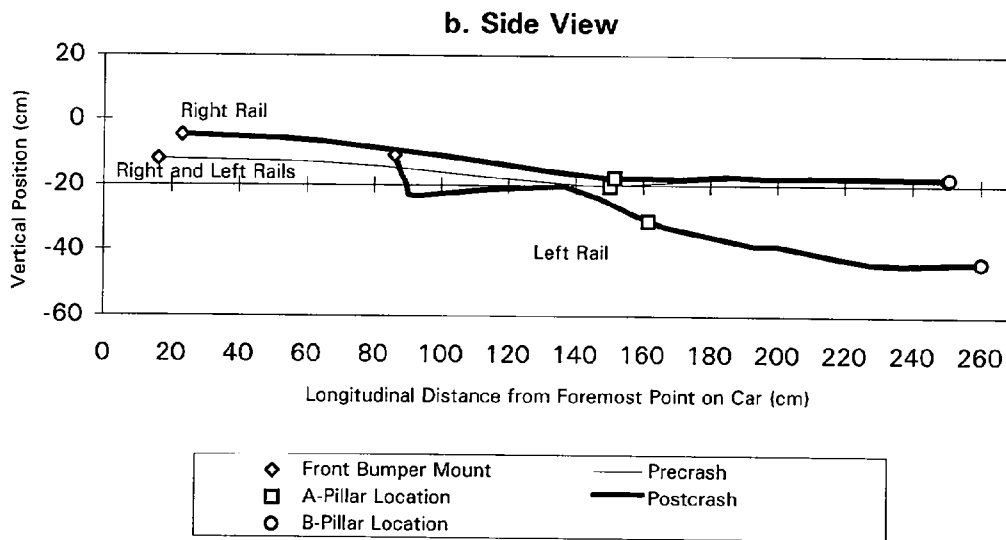
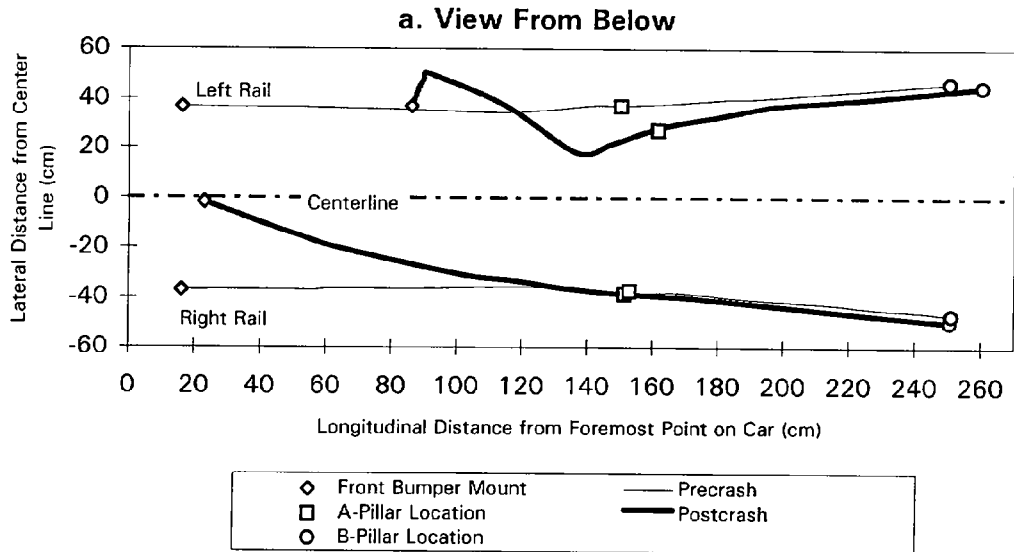
**Figure 3 — View from Below  
1996 Ford Explorer**



**1996 Ford Explorer — Postcrash**



**Figure 4. Rail Deformation — 1996 Ford Explorer**



<b>Selected Locations</b>	<b>Longitudinal</b>	<b>Lateral</b>	<b>Vertical</b>	<b>Resultant</b>
Door opening width at window bottom (cm)	-8	—	—	—
Left lower instrument panel (cm)	-10	0	2	10
Right lower instrument panel (cm)	-9	0	4	9
Steering column (cm)	-6	1	5	8
Brake pedal (cm)	-8	-1	1	8
Left toepan (cm)	-19	7	-8	22
Center toepan (cm)	-16	9	-7	20
Right toepan (cm)	-15	9	-5	18
Footrest (cm)	-15	4	3	16

\* All measurements taken on the driver side. From the driver's position, positive is forward, left and up.

## **Restraint System Performance**

### **Air Bags**

The uninflated driver air bag is 65 cm in diameter; the excursion of the center of the inflated air bag is limited by four 30 cm long tethers. It has two vent holes at positions corresponding to 11 and 1 o'clock on the frontward-facing surface.

The air bag contacted the dummy's chin as it was deploying, at 50 ms into the crash, but it appeared to be fully inflated about the same time as the dummy loaded it. Analysis of the high speed film taken at camera position G indicates that the air bag appeared to be fully inflated 62 ms into the crash, by which time the dummy's head had moved forward 8 cm relative to the occupant compartment (the initial nose to steering wheel clearance measurement was 38 cm). Markings left by the dummy's face paint indicate that the head contacted the air bag 2 cm to the right of its horizontal center. The dummy's nose was 5 cm above the vertical center of the air bag at the time of contact.

The passenger side air bag is untethered and deploys rearward nearly horizontally through an opening in the vertical surface of the instrument panel facing the seat. The plastic deployment door contacted but did not damage the windshield.

### **Seat Belts**

This vehicle is equipped with three-point lap/shoulder belts with sliding latch plates in all four outboard seating positions. The center rear position is equipped with a lap belt. The front belts are dual locking with adjustable upper anchorages, and the rear outboard belts are vehicle-

sensitive only. All lap/shoulder belts except in the driver position convert to automatically locking retractors for easier installation of child restraints. The inboard lower anchorages for the front positions are attached to and move with the seats; all other lower anchorages are attached to the floor. During the crash, 4 cm of webbing was pulled from the retractor through the D-ring as measured by a pull-string mounted between the retractor housing and the webbing just beyond the retractor. The distance between the postcrash position of the latchplate and its precrash position indicates that 2 cm of webbing passed through the latch plate from the lap portion into the shoulder portion of the belt.

## **Seat**

Postcrash examination of the driver side seat rails found no discernible movement of the seat in its tracks during the crash. No unusual seat dynamics were noted in the high speed film record of the crash.

## **Steering Column**

The upper end of the steering column moved rearward 6 cm and upward 5 cm relative to the occupant compartment. The column's telescoping mechanism collapsed 7 cm, and both shear modules were separated 3 cm.

## **Dummy Kinematics**

### **Head, Neck, and Torso**

Analysis of the high speed film record from camera position G showed that the driver dummy's head and chest began loading the air bag approximately 62 ms into the crash. The torso and head then began to slide to the left across the air bag with the head turning to the right. The driver door opened and the dummy continued moving to the left. The dummy's head left the occupant compartment at approximately 150 ms. As the head was leaving the occupant compartment, the neck was restrained by the shoulder belt, causing the neck to hyperextend. The right side of the head struck the outside of the B-pillar at 220 ms into the crash as it was re-entering the occupant compartment. The timing and duration of these events, as obtained from the high speed film analysis are provided in Table 2.

<b>Event</b>	<b>Time</b>
Deployment of air bag (ms)	42 - 62
Face in contact with air bag (ms)	50
Head contacts air bag (ms)	62
Head begins sliding off air bag and rebounding (ms)	100
Left front door opens (ms)	110 - 122
Head leaves occupant compartment through left front door opening (ms)	150
Initial head contact with B-pillar during rebound (ms)	220

### **Legs and Feet**

Paint deposits indicate that the dummy's left knee struck the lower instrument panel to the right and above the left instrument panel intrusion reference point. The distance between the center of the transferred paint mark and the reference point was 11 cm. The left foot was found slightly everted and dorsiflexed against the stop.

The right knee struck the lower instrument panel to the left and above the right instrument panel intrusion reference point. The distance between the center of the paint mark and the reference point was 10 cm. The right foot was also found slightly everted and dorsiflexed against the stop. The feet were found close together with both contacting the brake pedal.

### **Dummy Injury Measures**

#### **Head**

Table 3 provides a summary of the head injury measurements recorded during the crash. The peak resultant head acceleration of 65 g and the maximum head acceleration, sustained for at least 3 ms (55 g) were both recorded near 220 ms, which coincides with the B-pillar impact. The Head Injury Criterion (HIC), however, was calculated over a period in which the head was loading the air bag (83 to 119 ms).

<b>Table 3. Head Injury Measurements — 1996 Ford Explorer</b>		
<b>Measure</b>	<b>Published Tolerance Threshold</b>	<b>Result</b>
Peak vector resultant acceleration (g)	80	65
Peak vector resultant acceleration — 3 ms clip (g)	80	55
Head Injury Criterion (HIC)	1000	490
Head Injury Criterion (HIC— 15 ms)*	700	242

\* A proposal from the Motor Vehicle Manufacturers Association, under consideration by the Canadian Government, suggests calculating HIC over a 15 ms interval rather than the 36 ms interval specified by the U.S. standard. The proposal includes an injury threshold of 700 for front seat occupants protected by air bags.

## Neck

Table 4 summarizes the neck injury measurements. The maximum extension moment was recorded at 162 ms, when the high speed film from camera position G shows that the dummy's head and neck is extended rearward. This occurred as the shoulder belt caught the dummy's neck when the dummy moved through the open driver's door.

<b>Table 4. Neck Injury Measurements — 1996 Ford Explorer</b>		
<b>Measure</b>	<b>Published Tolerance Threshold</b>	<b>Result</b>
Maximum A-P shear force (kN)	±3.1 *	-0.5
Maximum axial compression force (kN)	4.0 *	0.2
Maximum axial tension force (kN)	3.3 *	1.5
Maximum flexion bending moment (Nm)	190 **	14
Maximum extension bending moment (Nm)	57 **	55

\* These values are for instantaneous loading. Neck loads are compared to magnitude-duration injury criteria in Figures A-12 to A-15.

\*\* These published thresholds are recommended injury assessment reference values from Bakaitis and Mertz (1994), but significant neck injury may occur at lower bending moments. Mertz and Patrick (1971) report that bending moments of 47 Nm in extension and 88 Nm in flexion would be non-injurious for occupants represented by the Hybrid III 50th percentile adult male dummy.

## Chest

Table 5 summarizes the chest injury measurements.

<b>Table 5. Chest Injury Measurements — 1996 Ford Explorer</b>		
<b>Measure</b>	<b>Published Tolerance Threshold</b>	<b>Result</b>
Vector resultant of spine acceleration — 3 ms clip (g)	60	33
Rib compression (mm)	50	29
Viscous criterion (m/s)	1.0	0.2

## Legs and Feet

Table 6 summarizes the leg and foot injury measurements.

*Left Leg and Foot.* The recorded foot accelerations showed a period of relatively high frequency vibrations (75-83 ms) that were observed in other data channels on the same leg. These vibrations, which are characteristic of metal to metal contact, probably occurred as the ankle shaft reached its rotation limit and may not be indicative of the forces that would have been experienced by a human occupant. Consequently, measurements made during this period of vibration in the foot accelerometers were excluded from the left leg injury results reported in Table 6. The upper and lower tibia L-M moments and the lower tibia vector moment and tibia index were affected by this adjustment.

*Right Leg and Foot.* As with the left foot, the right foot acceleration measurements included large magnitude oscillations of relatively high frequency. The vibrations occurred between 54 and 56 ms and between 63 and 68 ms. Again, because the very high acceleration recorded during these periods may not be indicative of forces that a human occupant would experience. The right leg measurements made during these periods are not included in Table 6. The femur force, upper tibia moments, lower tibia L-M and vector moments, and axial tibia force were affected by this adjustment.

<b>Table 6. Leg and Foot Measurements — 1996 Ford Explorer</b>			
<b>Measure</b>	<b>Published Tolerance Threshold</b>	<b>Left</b>	<b>Right</b>
Axial femur force (kN)	9.1 *	3.7	4.9
Tibia-femur displacement (mm)	15	0	0
<b>Upper Tibia</b>			
L-M moment (Nm)	±225	40	55
A-P moment (Nm)	±225	107	112
Vector resultant moment (Nm)	225	111	112
Index	1.00	0.56	0.57
<b>Lower Tibia</b>			
L-M moment (Nm)	±225 **	-51	101
A-P moment (Nm)	±225 **	-35	-25
Vector resultant (Nm)	225 **	56	101
Axial force (kN)	8.0 **	3.0	2.9
Index	1.00	0.30	0.50
<b>Foot</b>			
A-P foot acceleration (g)	±150	-42	-46
I-S foot acceleration (g)	±150	56	55
Vector resultant acceleration (g)	150	69	71

\* This critical value is for instantaneous loading. Femur loads are compared to magnitude-duration injury criteria in Figures A-23 and A-34.

\*\* These published thresholds are for fractures of the tibia. Ankle and foot injuries could be produced by bending moments as low as 50-100 Nm, and heel fractures have been associated with axial forces as low as 6.0 kN.

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## **Appendix**

Low speed crash damage repair estimate

Dummy Clearance Measurements

Index to graphs of time plots of dummy and vehicle data

Manufacturer's window sticker

**1996 Ford Explorer four-door utility vehicle: 5 mi/h Front into Angle Barrier**

VIN: 1FMDU34X6TUA06621

Mileage: 19

Features: Driver and passenger air bags, four-wheel antilock brakes, four-wheel drive, air conditioning, automatic transmission, electric remote control mirrors, power door locks, power windows, luggage rack, heated back glass, privacy glass, rear wiper, tilt steering wheel, cruise control, running board mounted side deflectors, two-stage paint.

Description	Part		Labor	
	Mfg. No	Price	Operation	Hours
Bumper, front	F5TZ17757C	\$370.07	Replace*	1.7
Strip, front impact	F5TZ17K833A	41.00	Replace	
Valance panel, front			Repair/align	1.0
Valance panel, front			Refinish	1.0
Bumper brace, left front	F5TZ17752D	9.35	Replace*	
Bumper brace, right front	F5TZ17752C	9.35	Replace**	
Bumper mount bracket, rt. frt	F5TZ17859B	73.13	Replace**	
Grille assembly			Remove/reinstall	0.3
Panel, front end	F5TZ8190A	103.55	Replace*	1.2
Panel, front end			Refinish	3.5
Bracket, front end panel, rt.	F5TZ88455B	5.60	Replace	1.3
Headlamp assembly, right	F5TZ13008A	138.68	Replace	
Headlamps			Aim	0.5
Headlamp adjuster, right	F5TZ13032C	6.45	Replace	
Lamp assembly, park/turn, rt.	F5TZ13200A	39.15	Replace	
Hood panel			Repair/align*	1.5
Hood panel			Refinish	2.4
Radiator support			Repair/align*	3.0
Radiator support			Refinish	0.5
Baffle, radiator support	F57Z8C291A	24.90	Replace	
Fender, left front			Repair/align*	1.0
Fender, left front			Refinish	2.3
Fender, right front	F5TZ16005A	110.02	Replace*	1.9
Fender, right front			Refinish	2.8
Stripe, fender, upper left	F5TZ7820001CA	37.75	Replace	0.4
Stripe, fender, upper right	F5TZ7820000CA	37.75	Replace	0.3
Skirt, right inner fender			Repair/align	1.0
Antenna mast, right fender			Remove/reinstall	0.3
Undercoating	Sublet	5.00		
Frame end bracket, left front			Repair/align*	0.5
Frame end bracket, rt. front			Repair/align*	1.0
Closeout panel, right front	F5TZ8A269A	9.03	Replace	
Frame rail end, right front			Repair/align*	0.5
Bulb, turn signal, right front	F4CZ13466A	3.18	Replace	
Headlamp bezel, right	F5TZ13064C	40.37	Replace	0.2
Bumper plate, outer left front	F5TZ17B985A	9.50	Replace**	
Bumper plate, outer rt. front	F5TZ17B984A	9.50	Replace*	
Bumper plate, inner left front	F5TZ17752A	10.52	Replace*	
Bumper plate, inner rt. front	F5TZ17752A	10.52	Replace*	
Paint and materials		187.50		
Total Parts		\$ 1,291.87		
Total Labor		903.00		30.1
Grand Total		\$2,194.87		

\* This item was repaired or replaced as indicated before the 40 mi/h frontal barrier offset test.

\*\* This item was repaired rather than replaced due to unavailability of the replacement part.

## Dummy Clearance Measurements

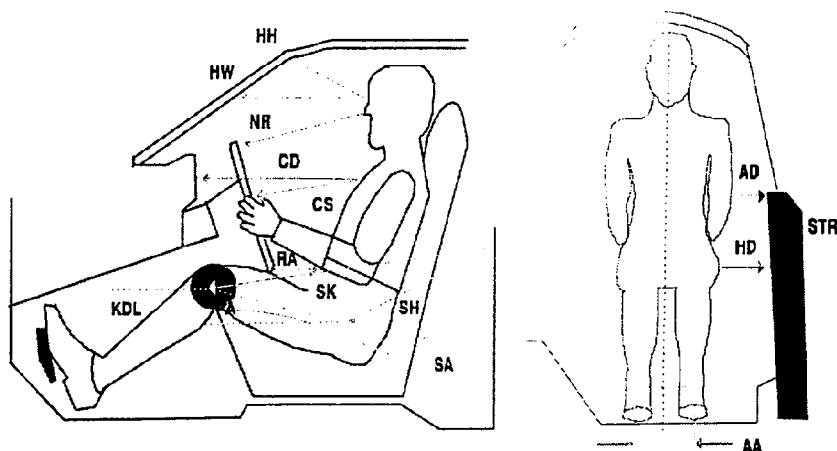
**Test Number:** CF95030  
**Vehicle Make:** Ford Explorer  
**Vehicle Model Year:** 1996  
**Seat Type:** Manual  
**Seat Back Information:** 18 degrees from vertical as measured on the back of the seat back frame 33 cm up from the pivot point.

Location	Code	Measurement	Location	Code	Measurement
Head to header	HH	390	Striker to H-point *	SH	230
Head to windshield	HW	585	Striker to H-point angle	SHA	26.7°
Nose to rim	NR	375	Striker to knee *	SK	585
Chest to dash	CD	560	Striker to knee angle	SKA	4.2°
Chest to steering wheel	CS	355	Striker to H-point horizontal	SHH	210
Rim to abdomen	RA	180	Striker to H-point vertical	SHV	100
Pelvic angle	PA	23.0°	Arm to door	AD	90
Knee to dash left	KDL	210	H-point to door	HD	135
Knee to dash right	KDR	215	Seat back angle	SA	18.0°
Torso angle	TA	15.2°	Ankle to ankle	AA	235

All distance measurements are in mm.

\* These measurements are made parallel to the vehicle's longitudinal axis.

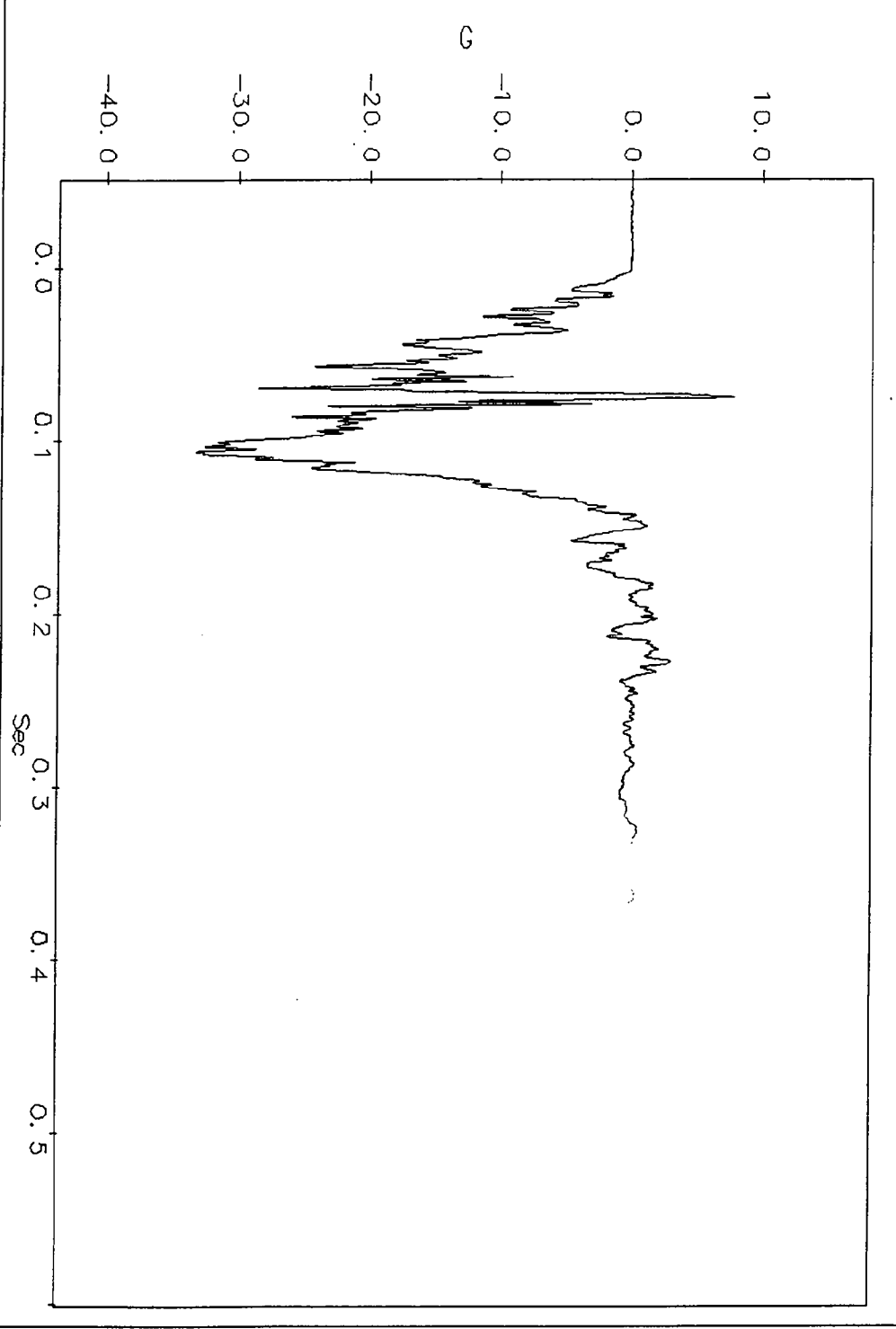
The seat is adjusted in the position midway between its extreme forward and rearward positions.



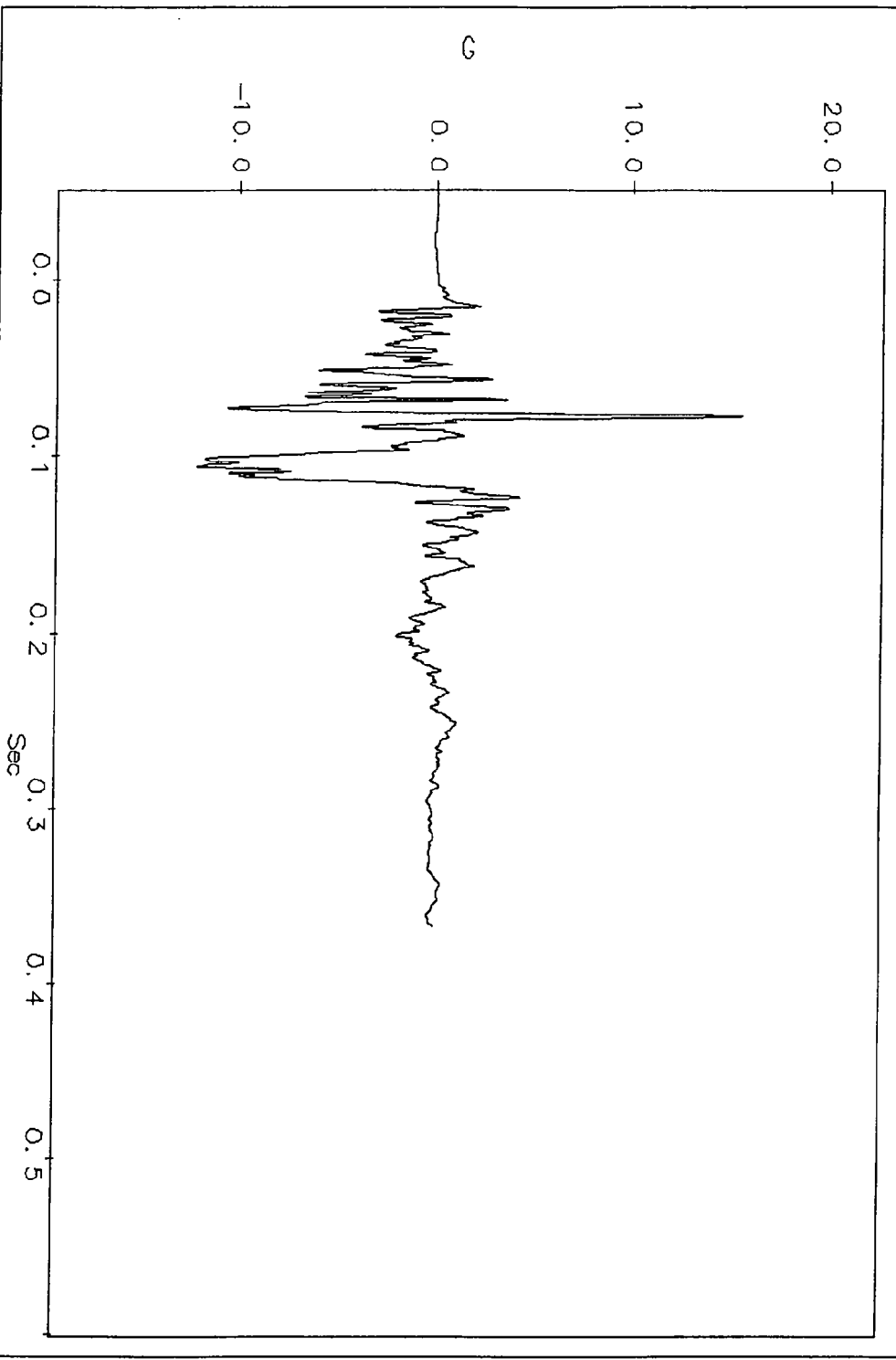
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A-6	Head lateral acceleration (Y)
A-7	Head I-S acceleration (Z)
A-8	Head vector resultant acceleration
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A-41	Right lower vector resultant moment
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A-43	Right foot vector acceleration
A-43a	Right foot A-P acceleration
A-43b	Right foot I-S acceleration

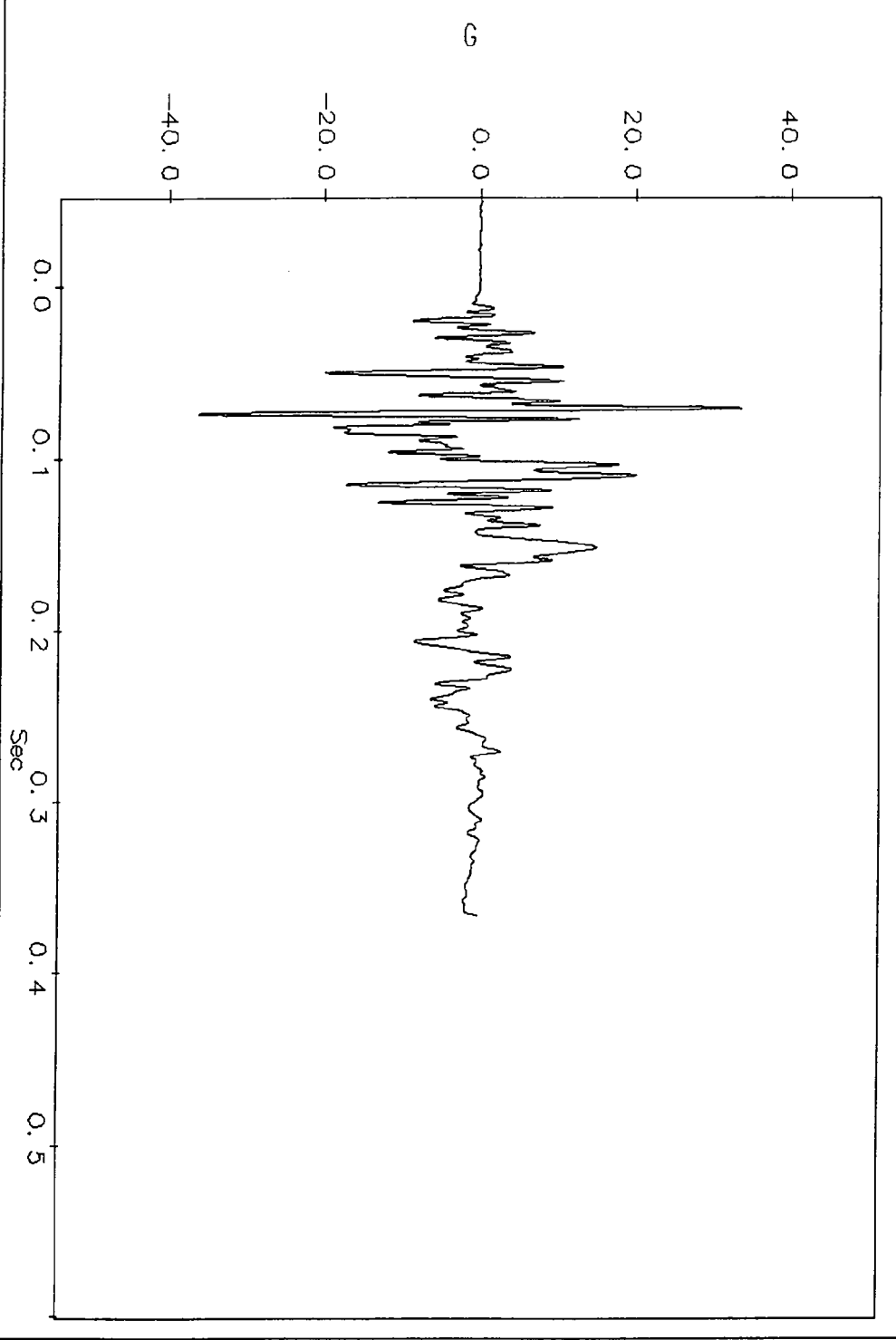
R-1 950330 Ford Explorer XLT 1996 Vehicle Longitudinal Accel



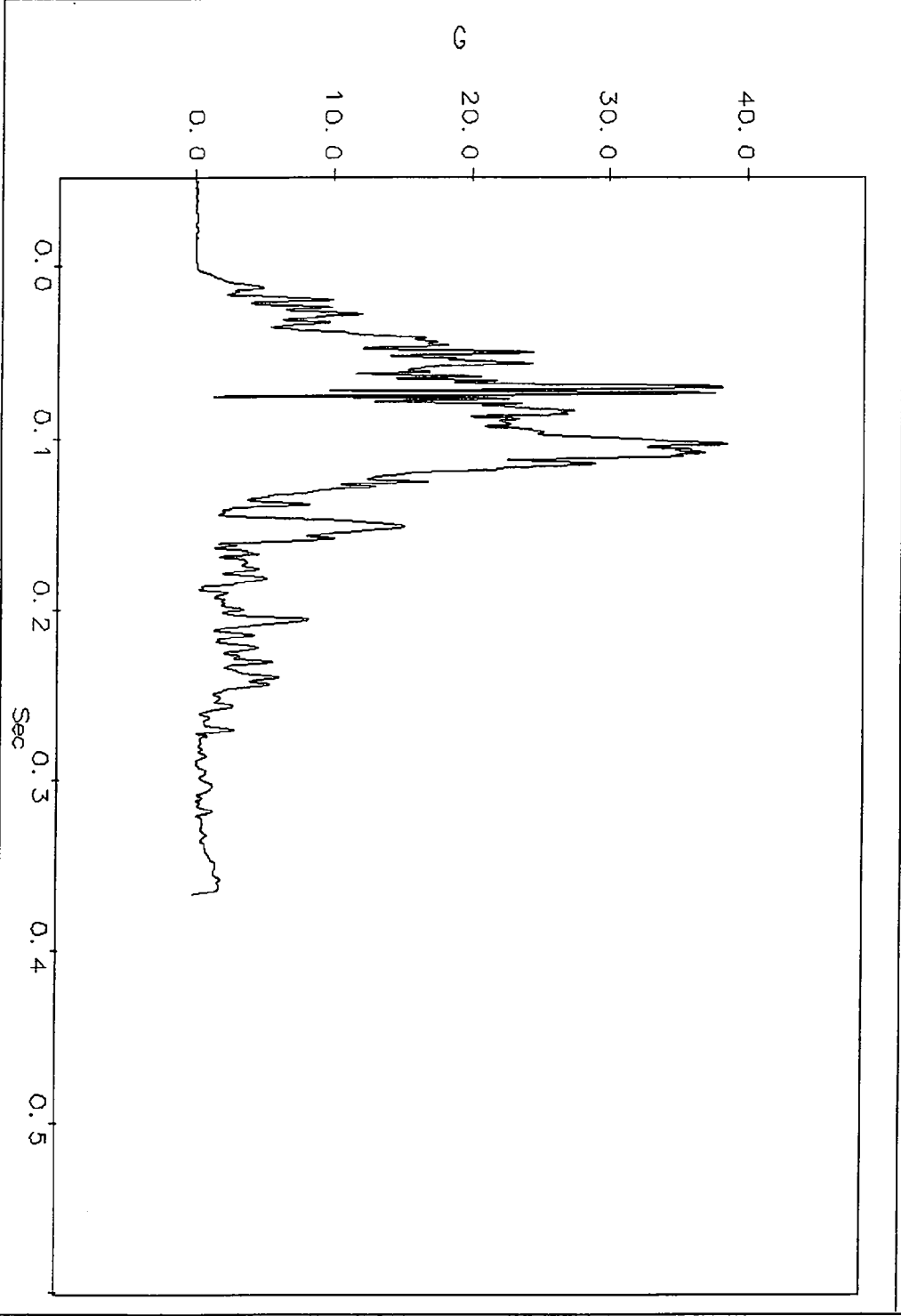
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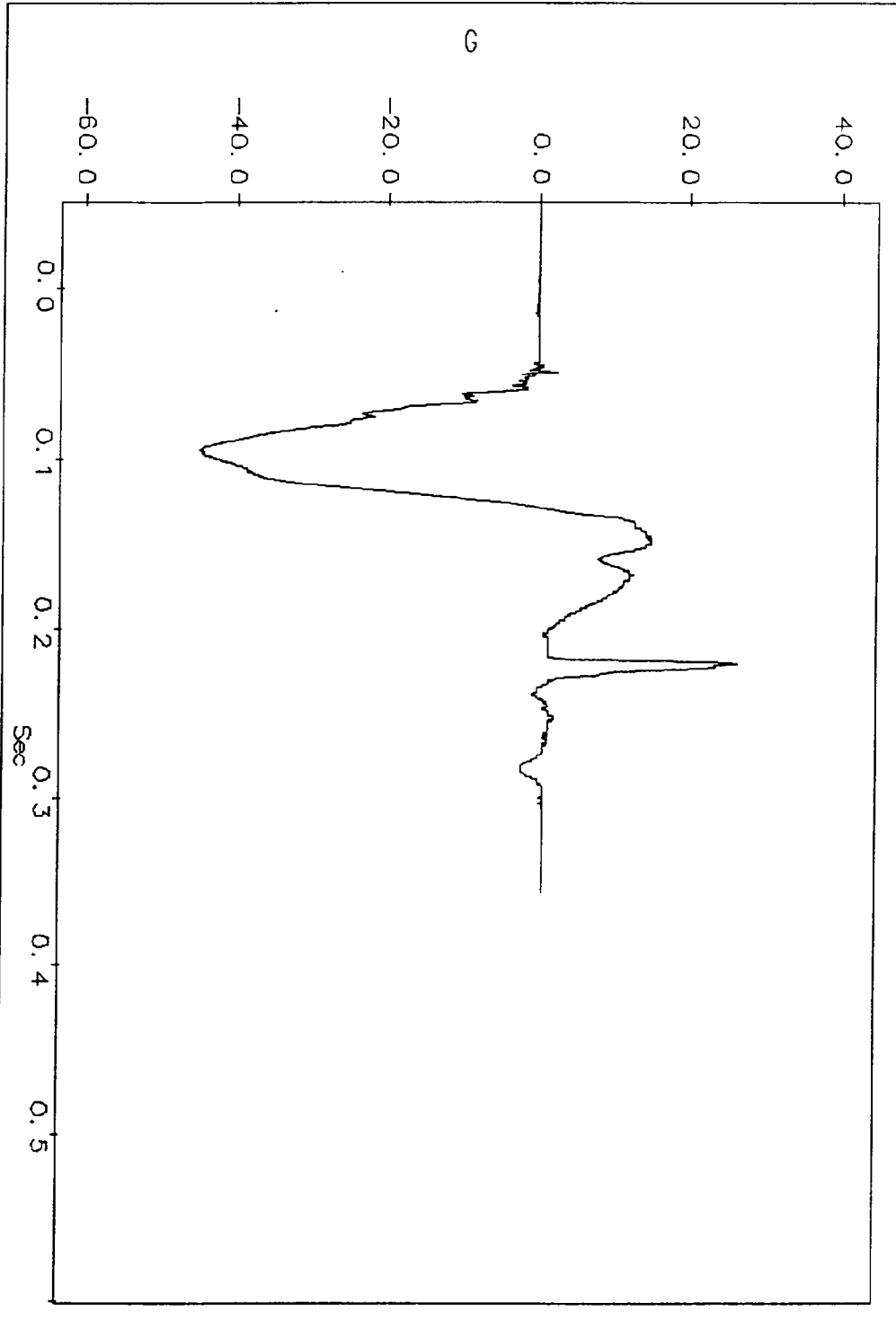
A-3 95030 Ford Explorer XLT 1996 Vehicle Vertical Accel.



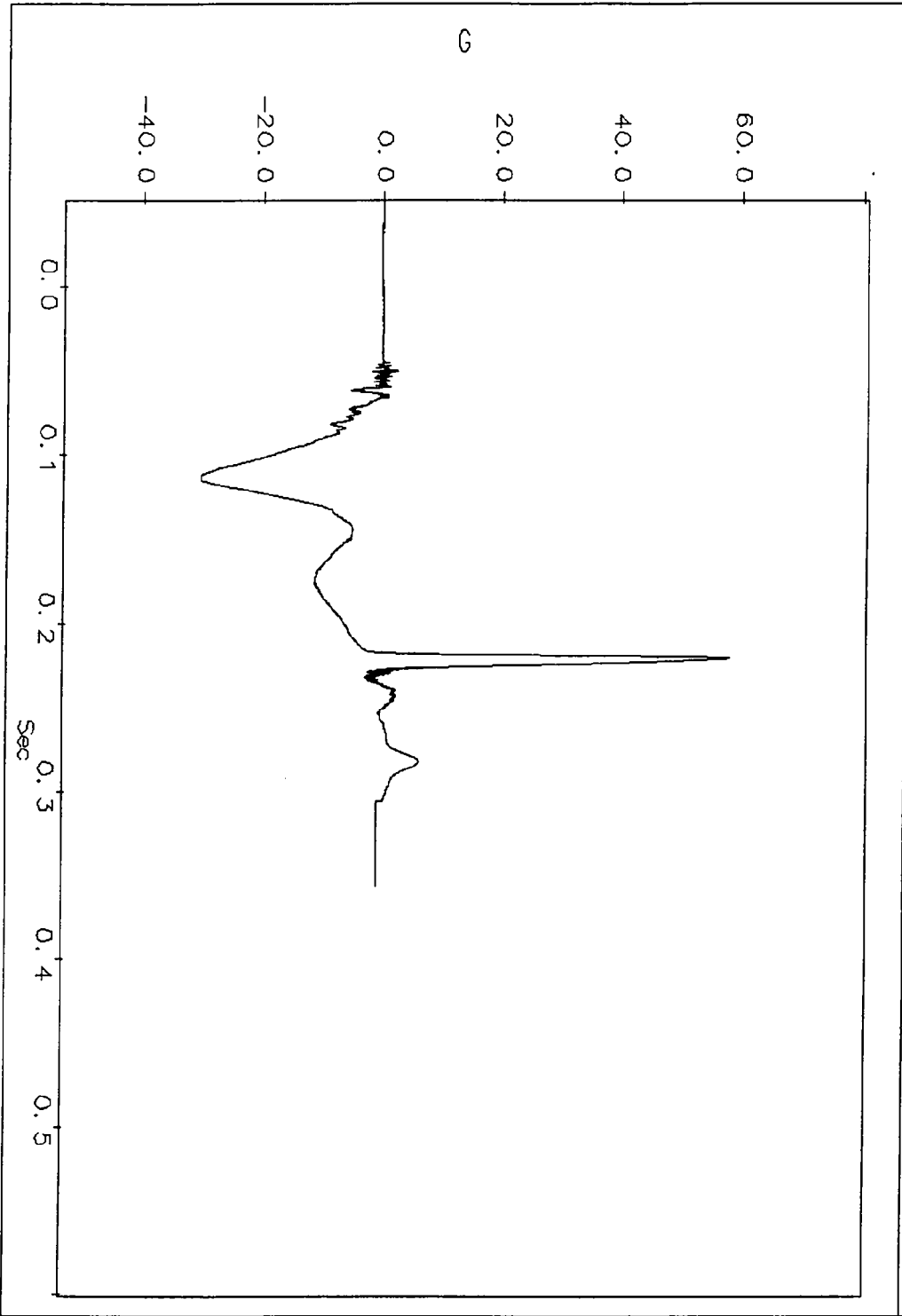
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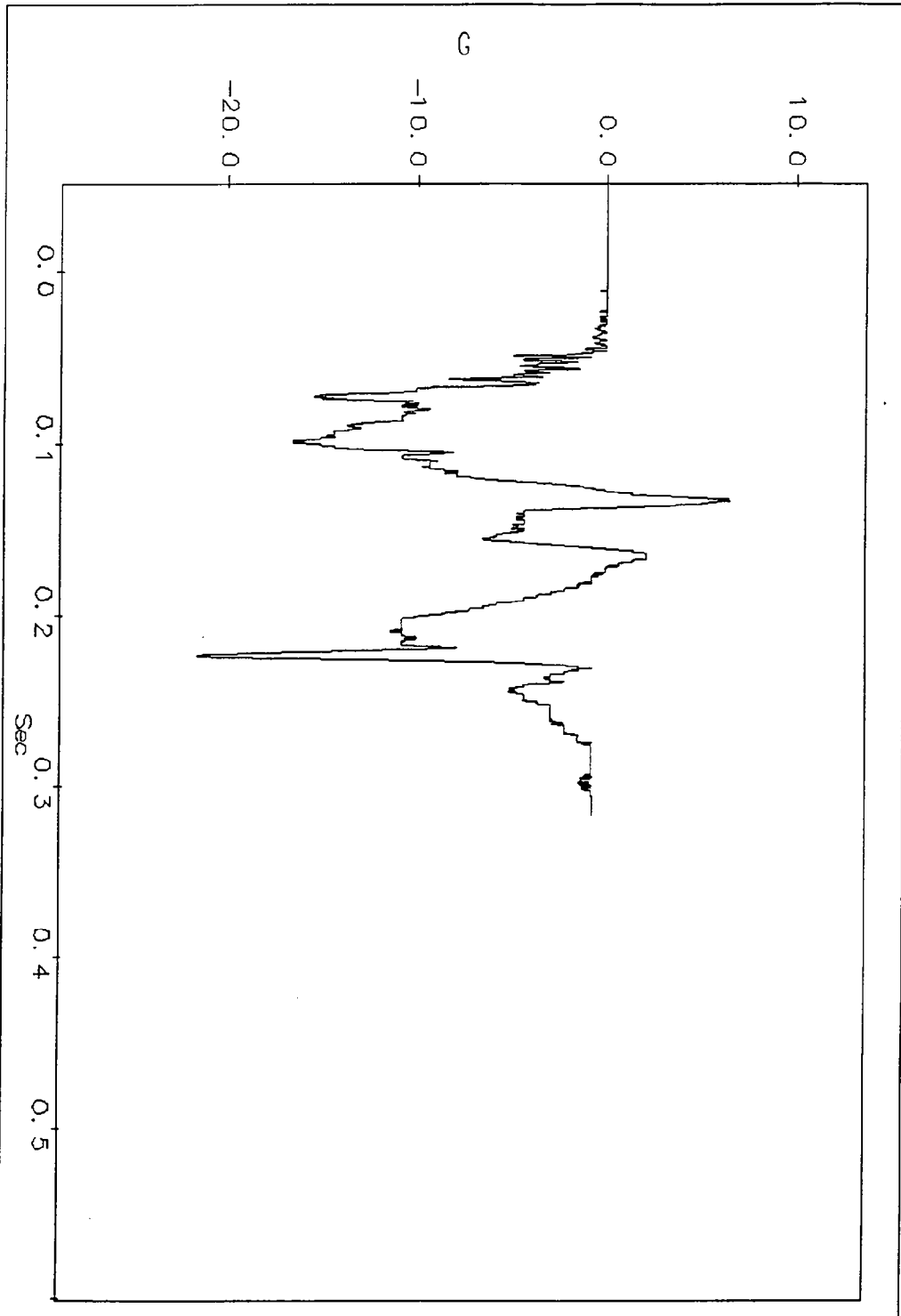
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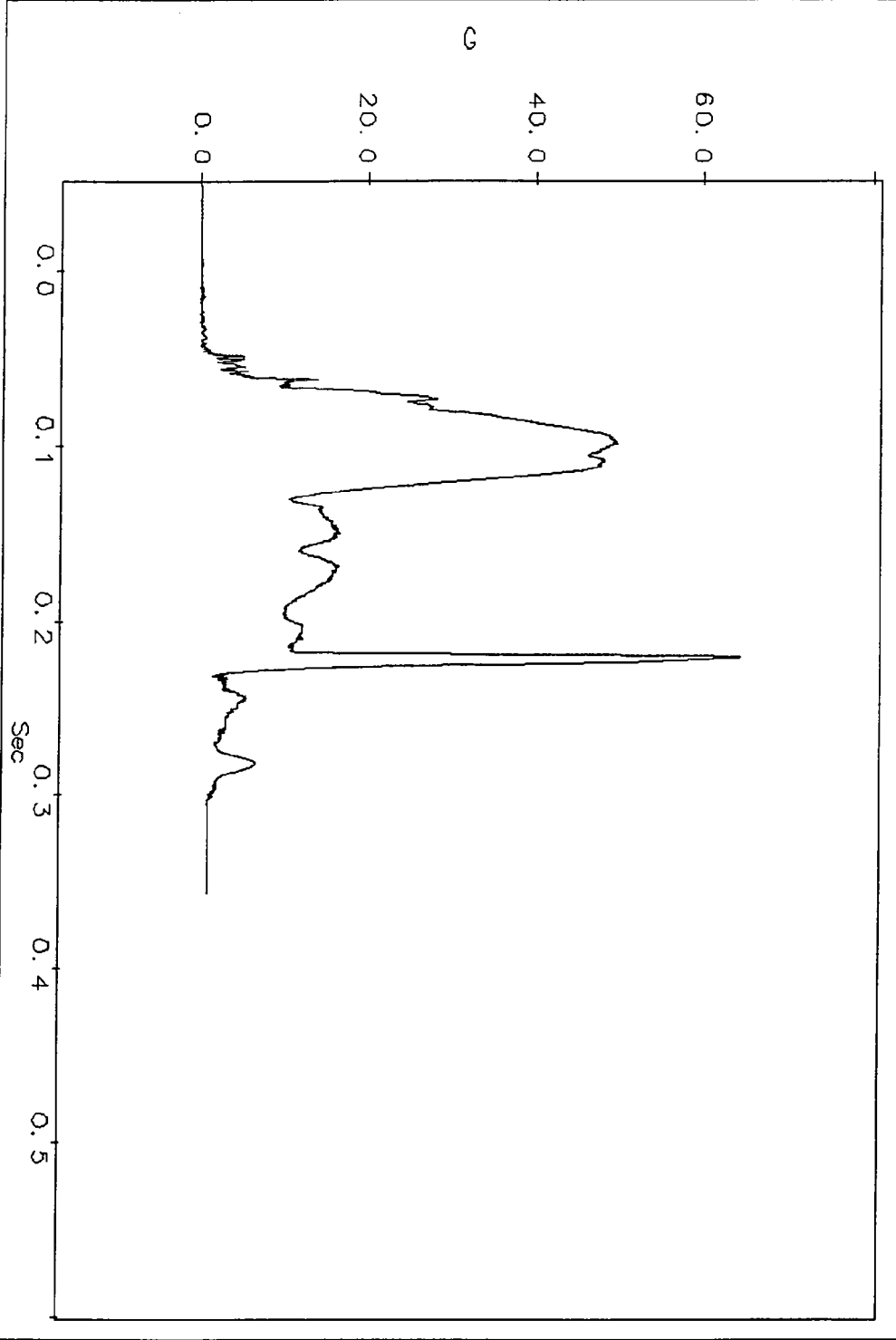
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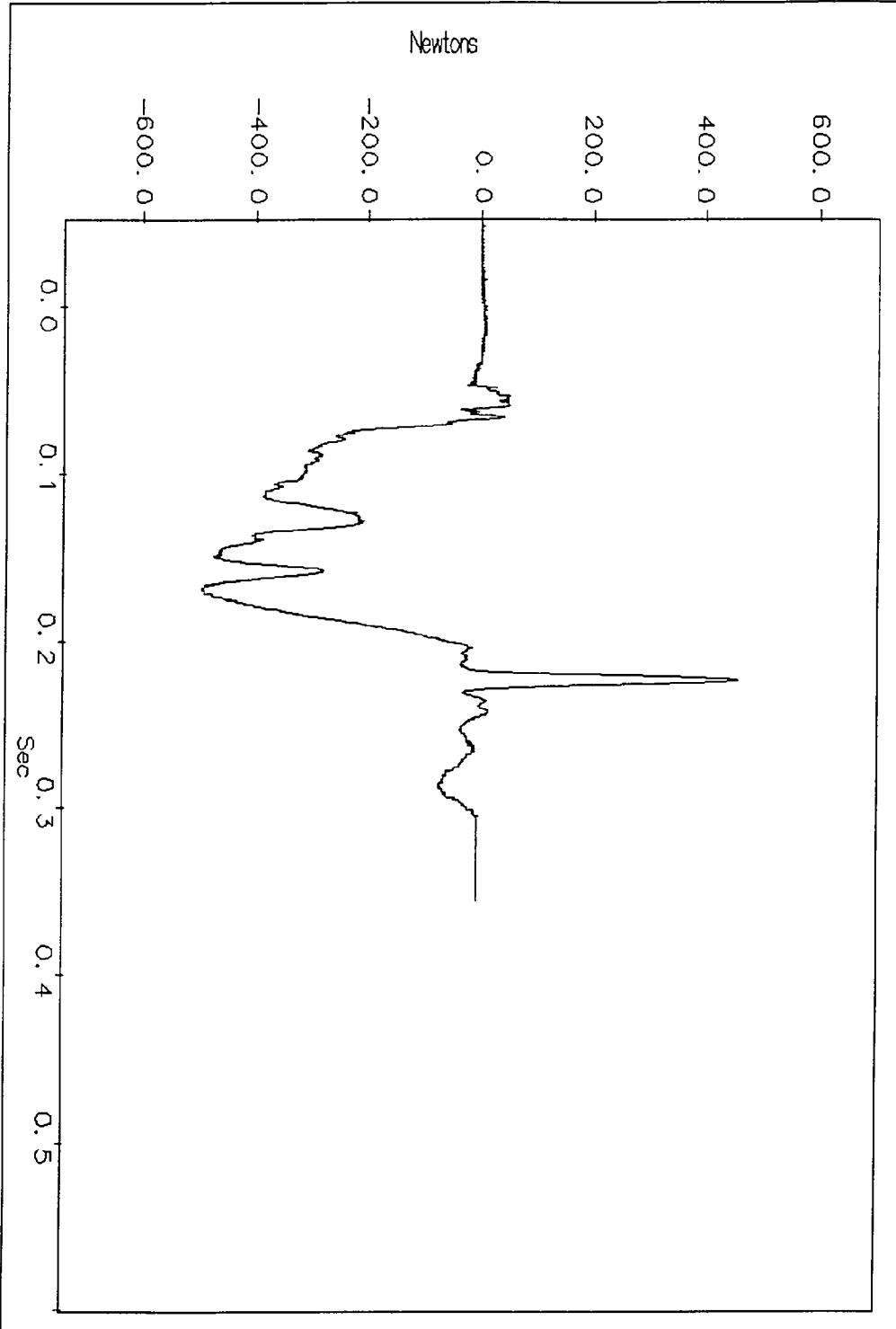
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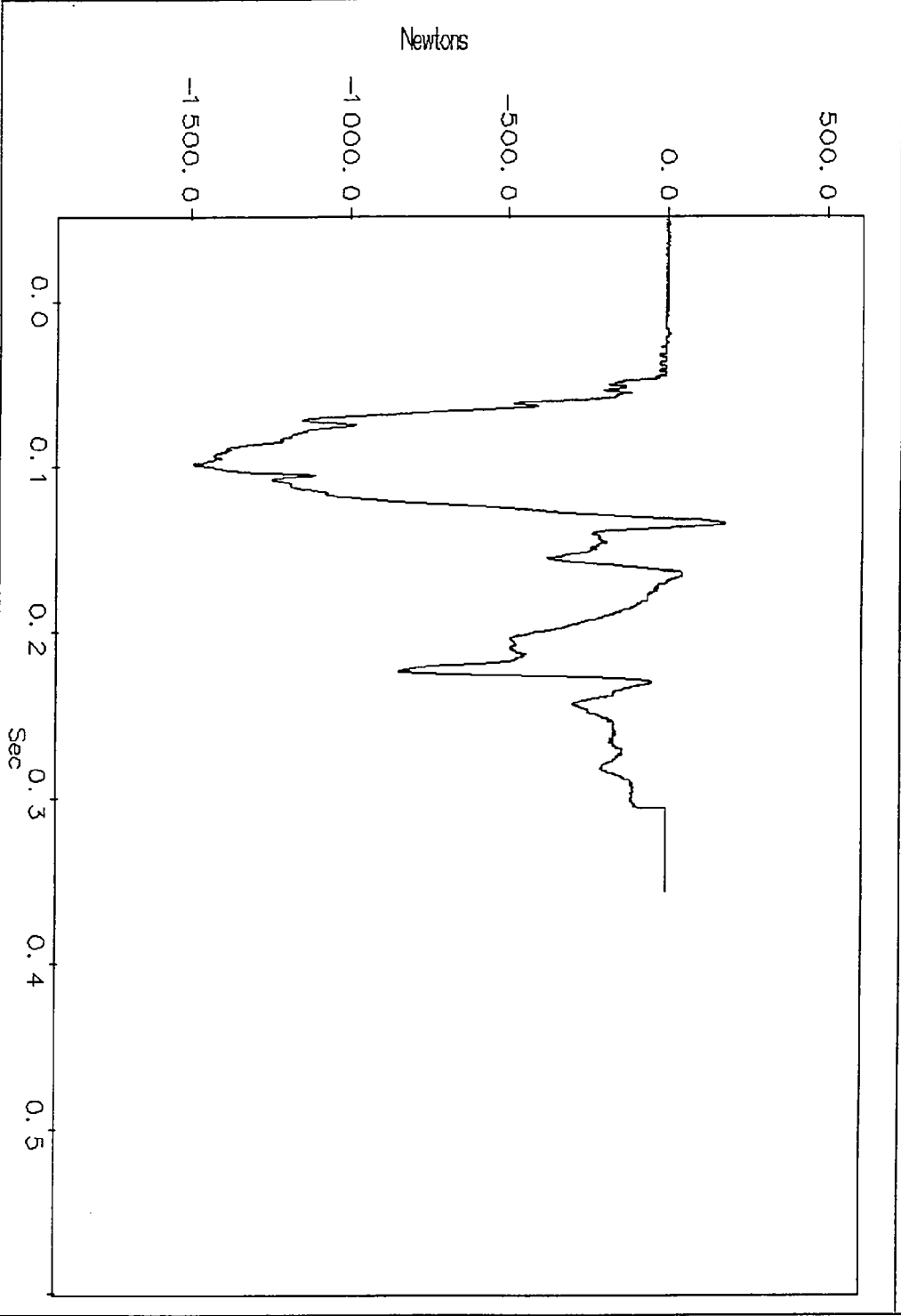
A-B 95030 Ford Explorer XLT 1996 Head Vector Accel.



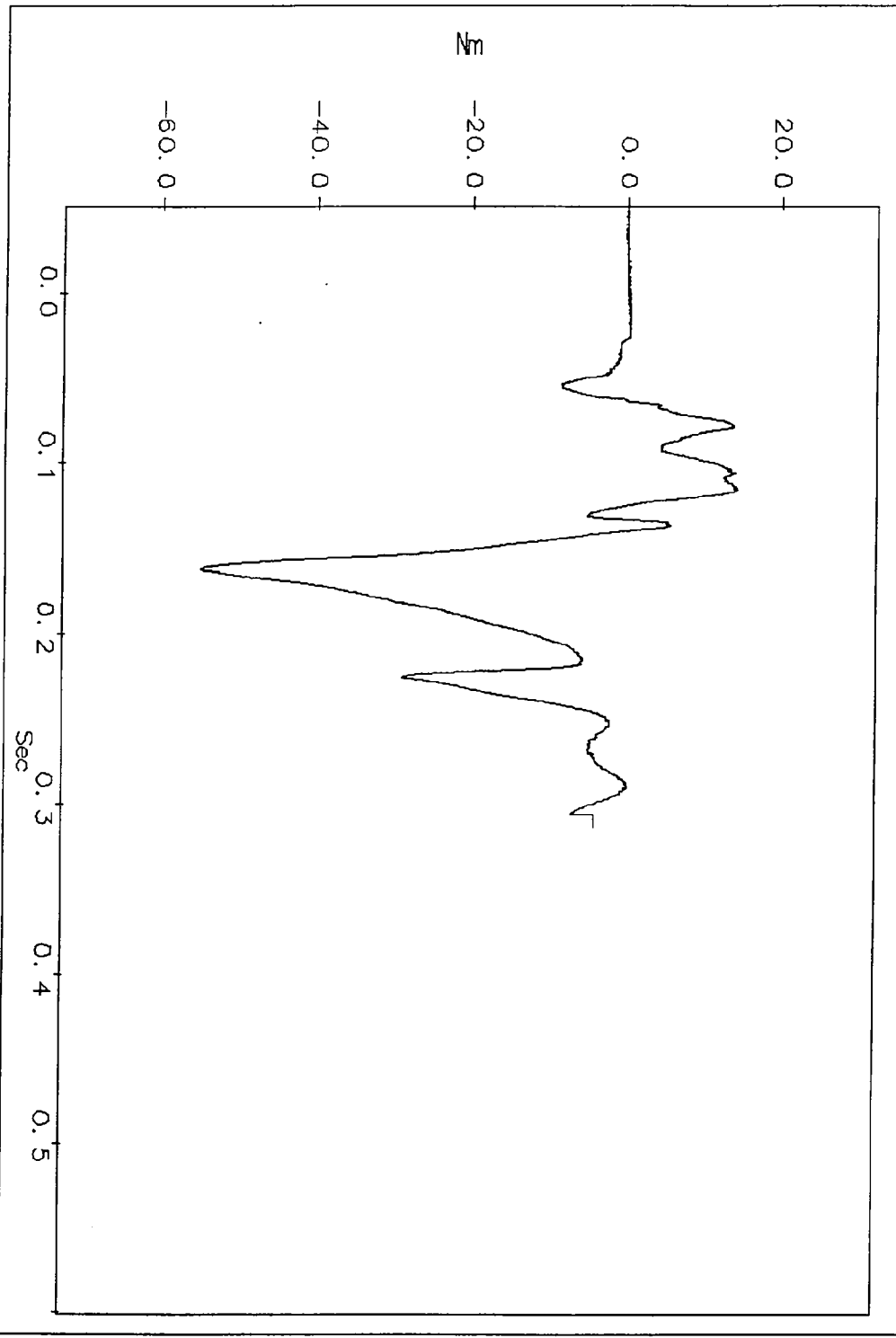
A-9 95030 Ford Explorer XLT 1996 Neck A-P Force



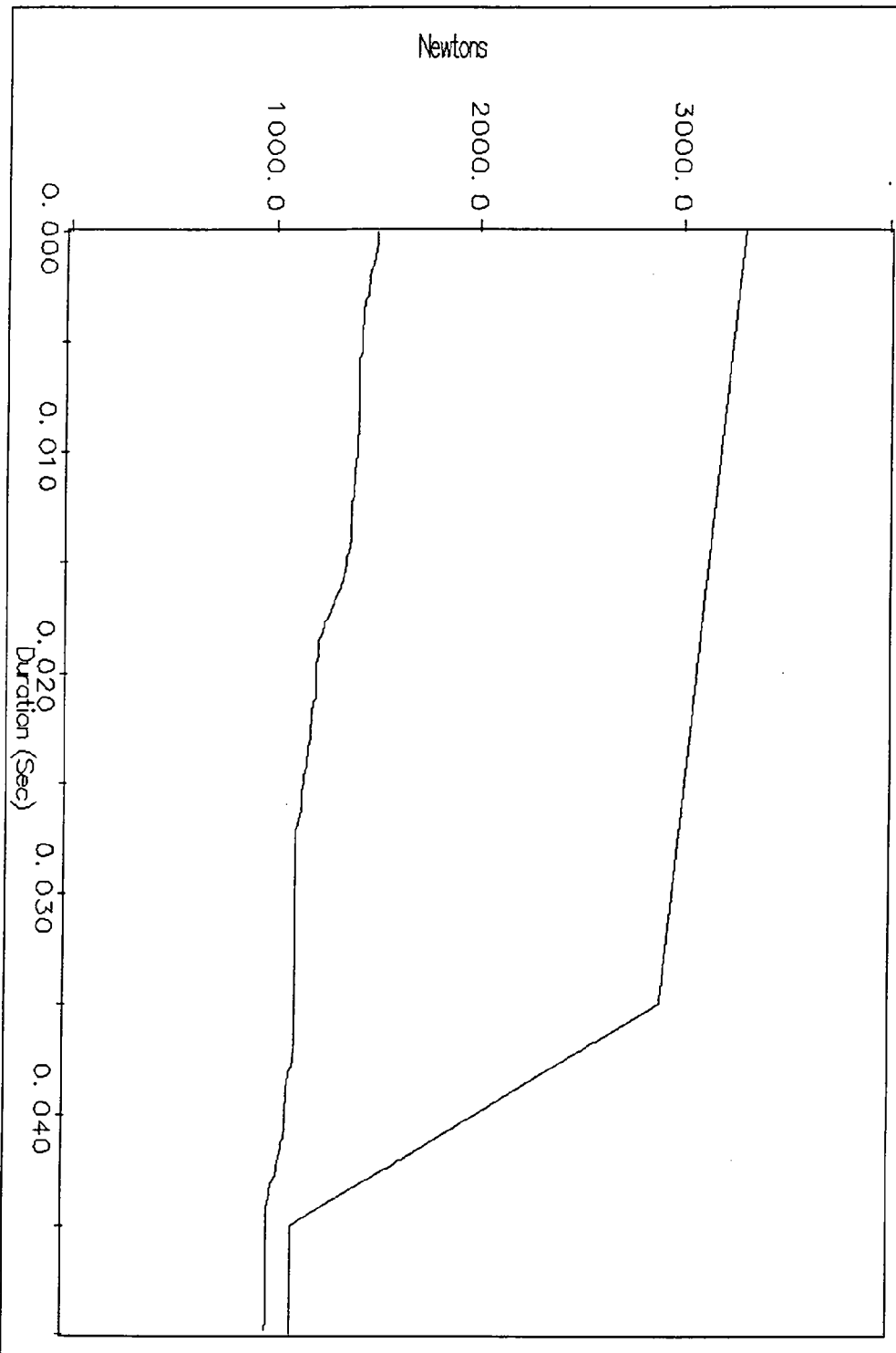
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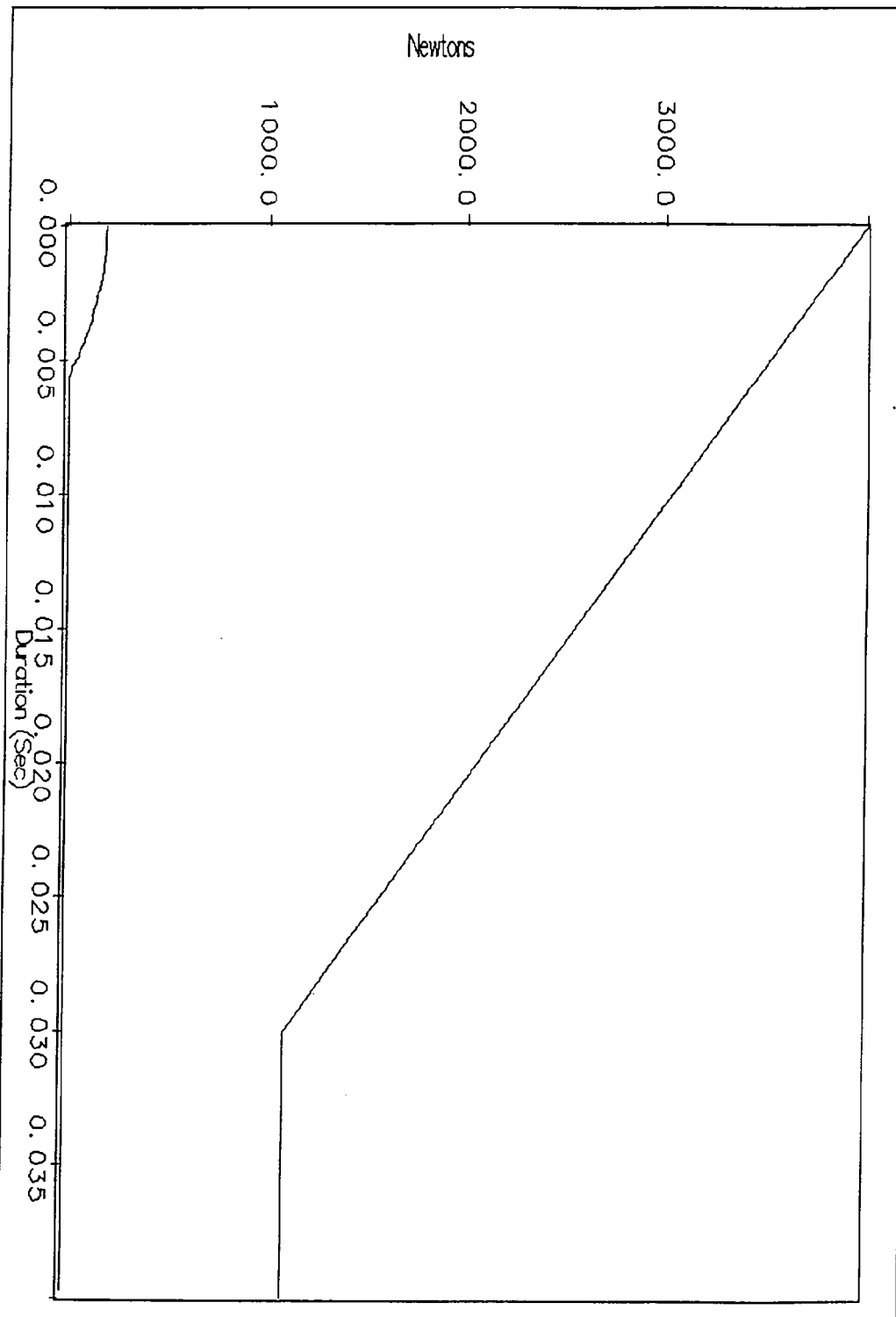
R-11 95030 Ford Explorer XLT 1996 Neck Occipital A-P Moment



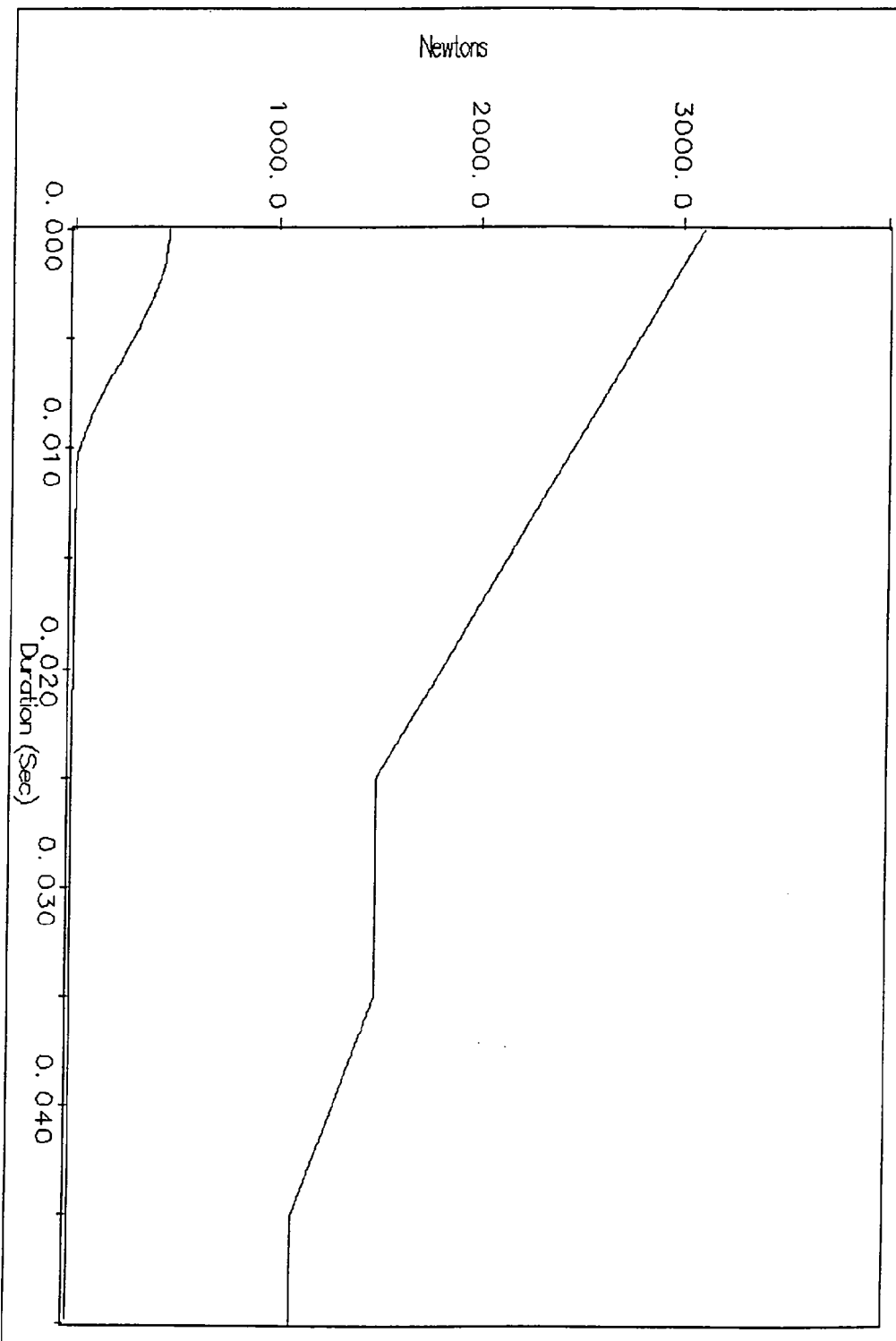
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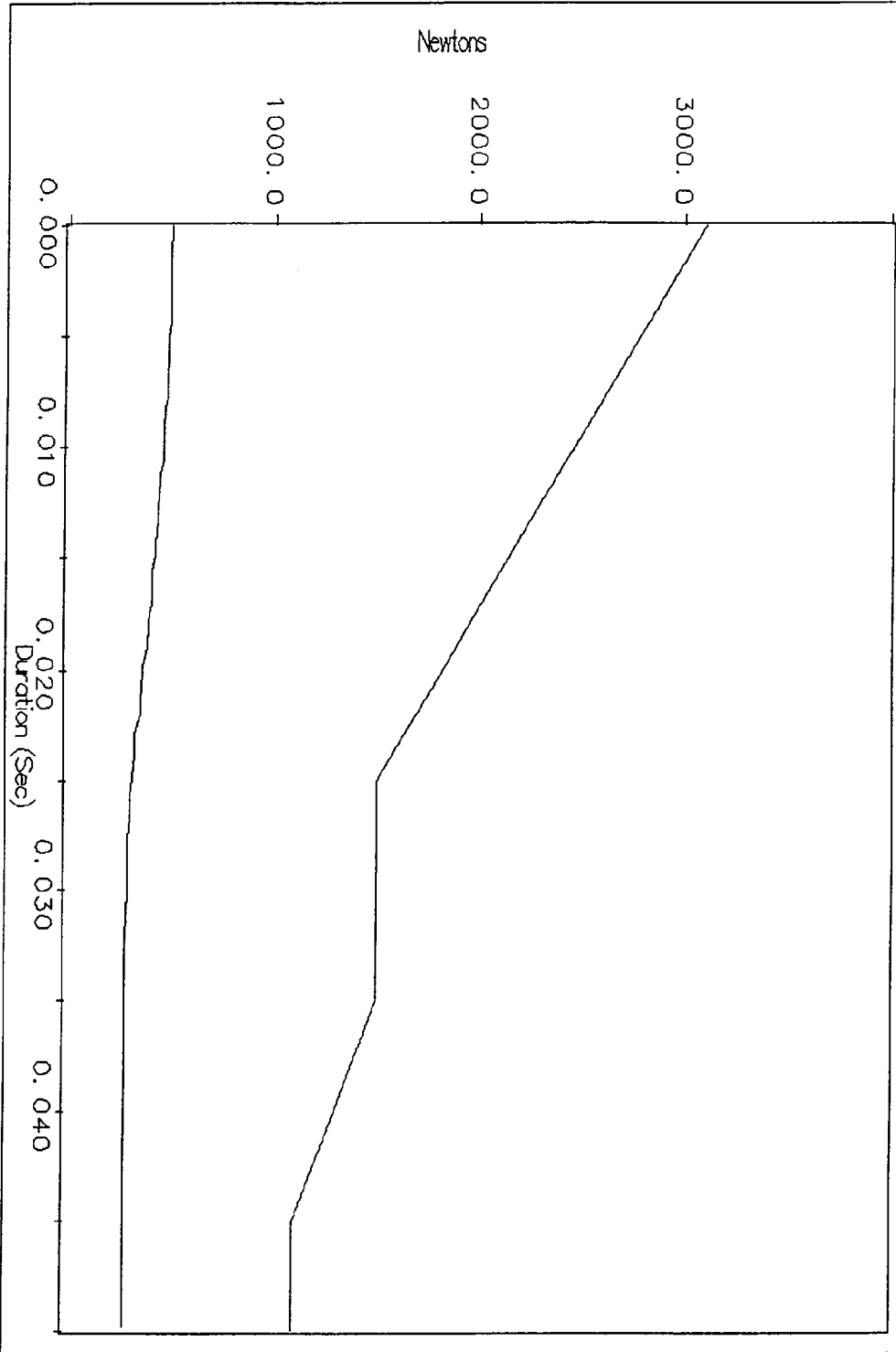
A-13 95030 Ford Explorer XLT 1996 Neck Compression Analysis



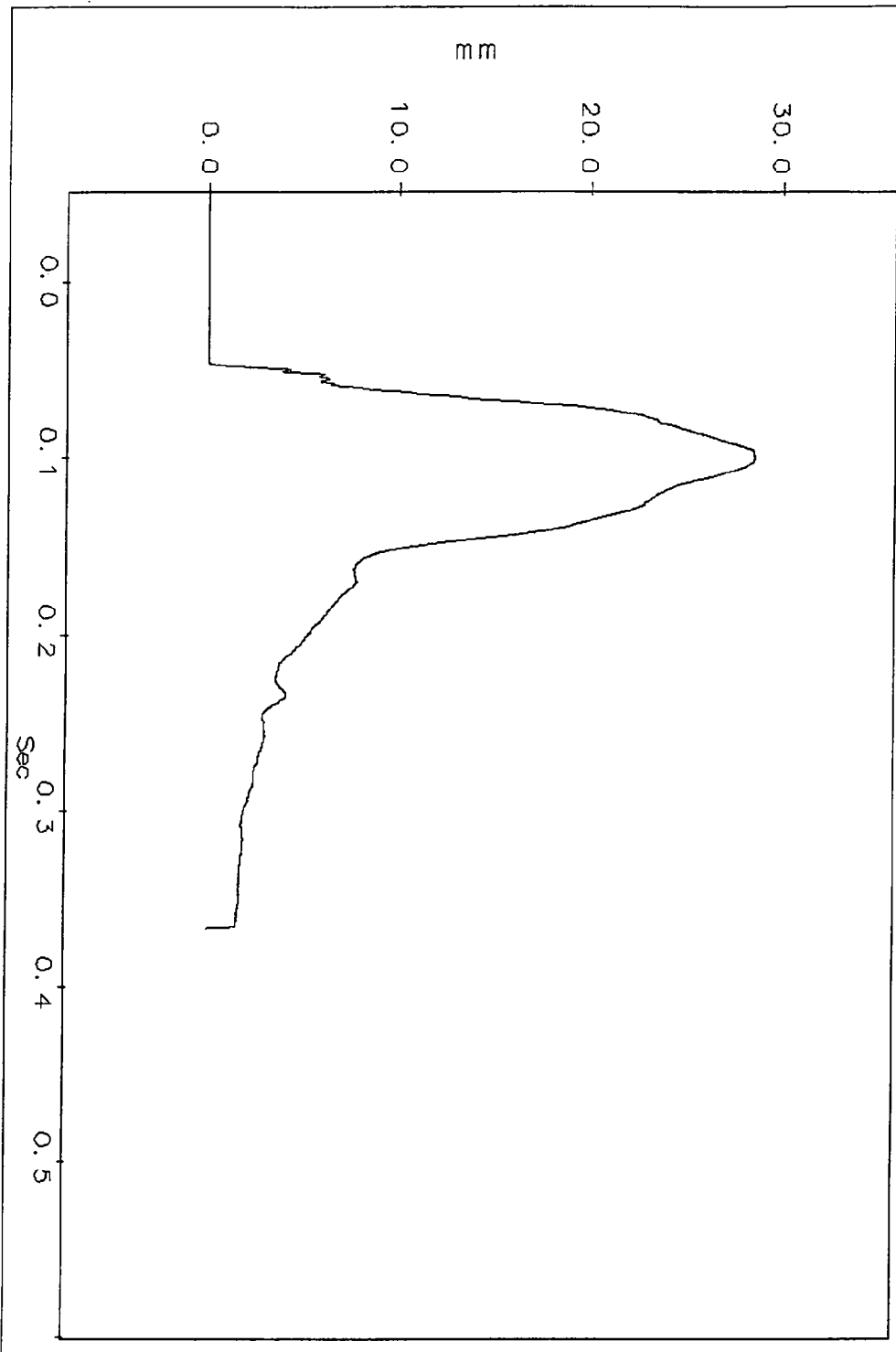
A-14 95030 Ford Explorer XLT 1996 Neck Shear (Pos.) Analysis



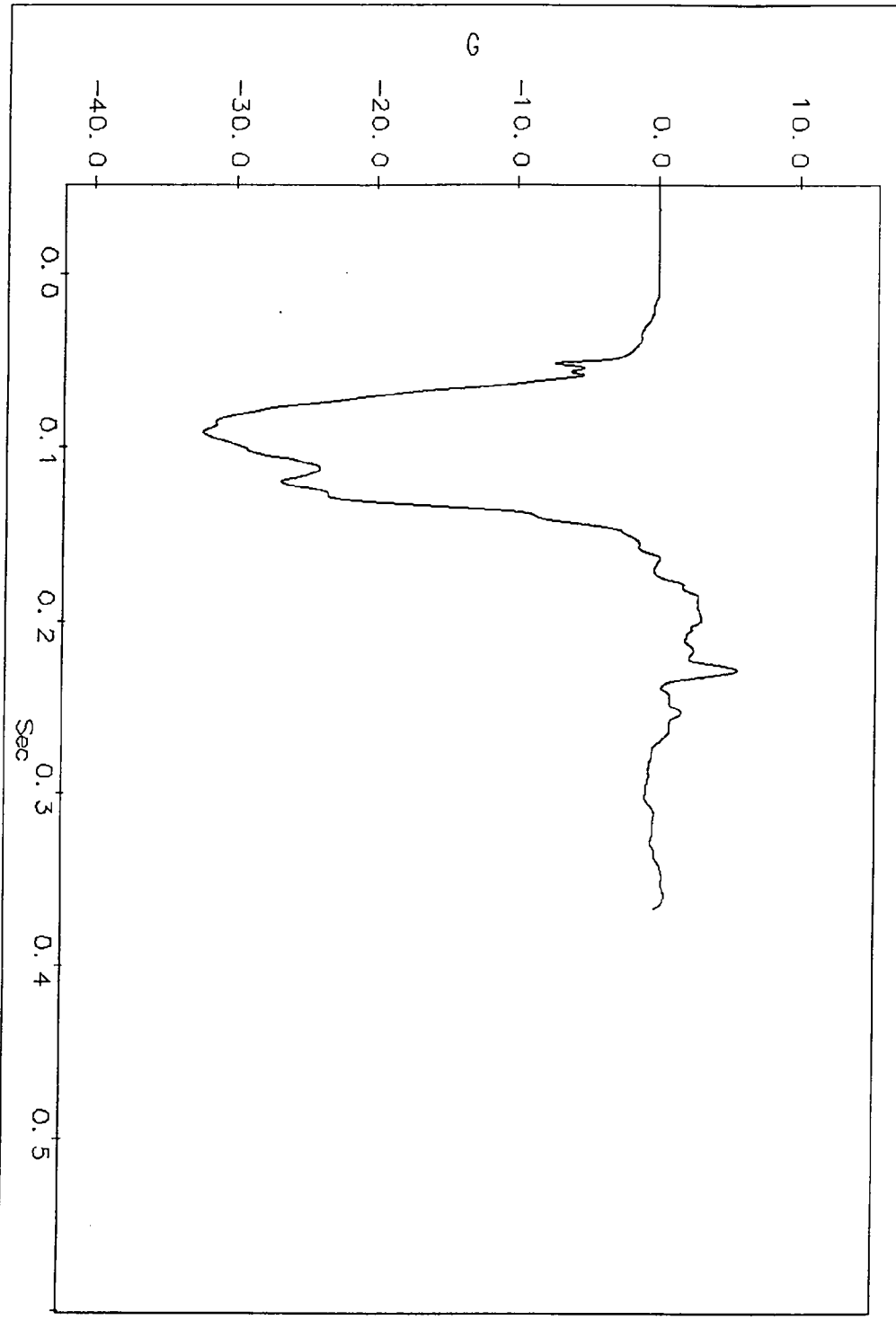
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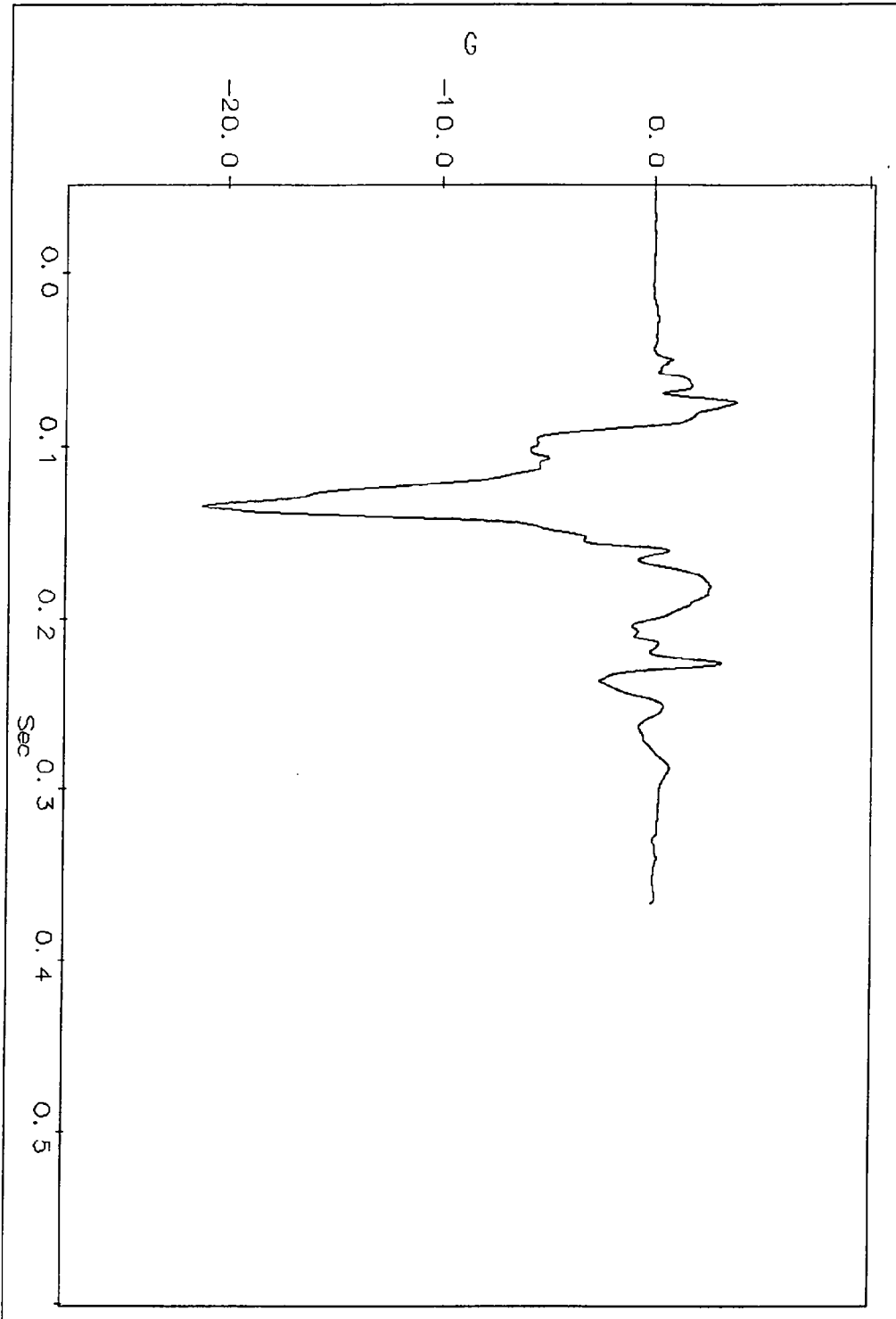
A-16 95030 Ford Explorer XLT 1996 Chest Compression



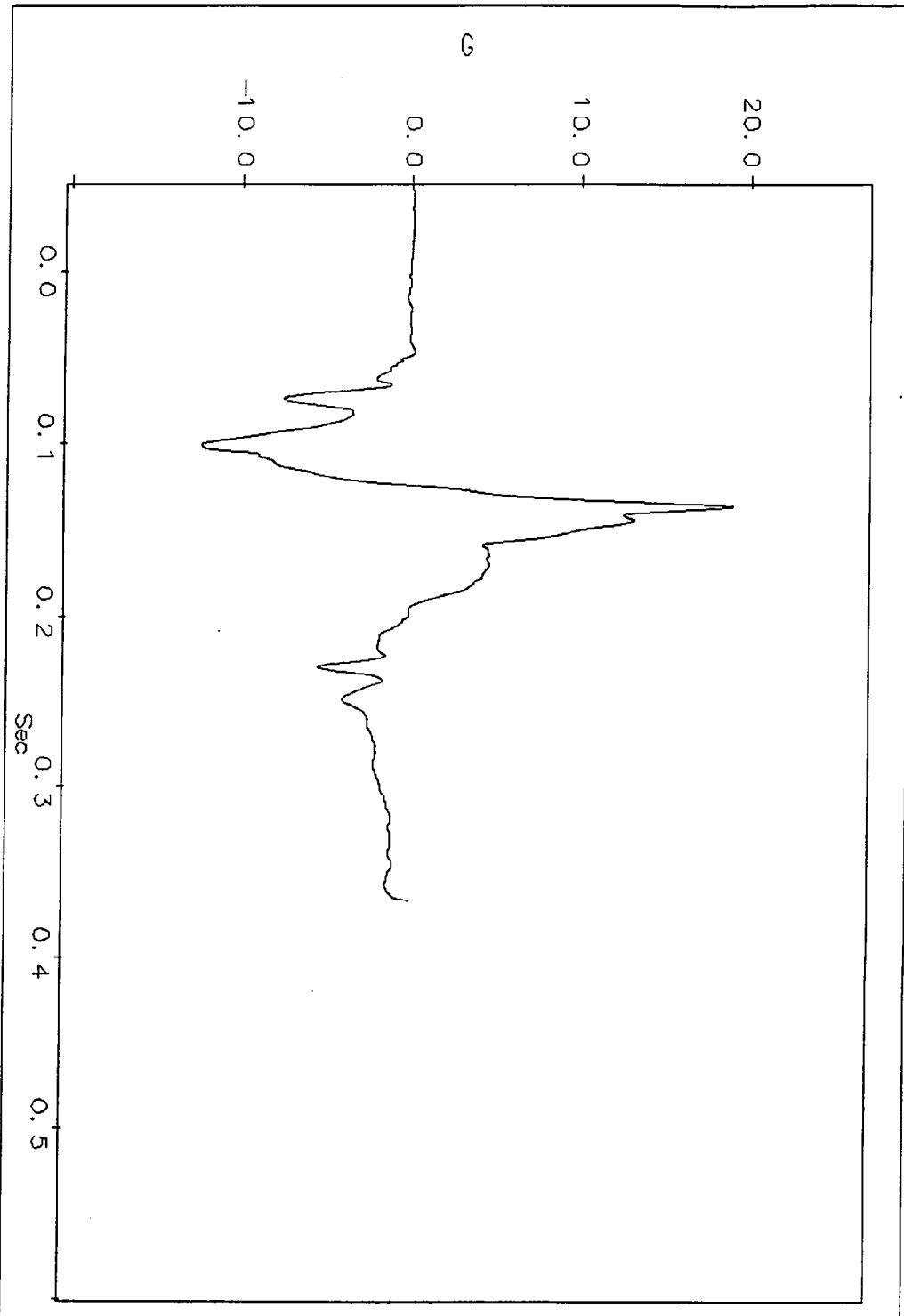
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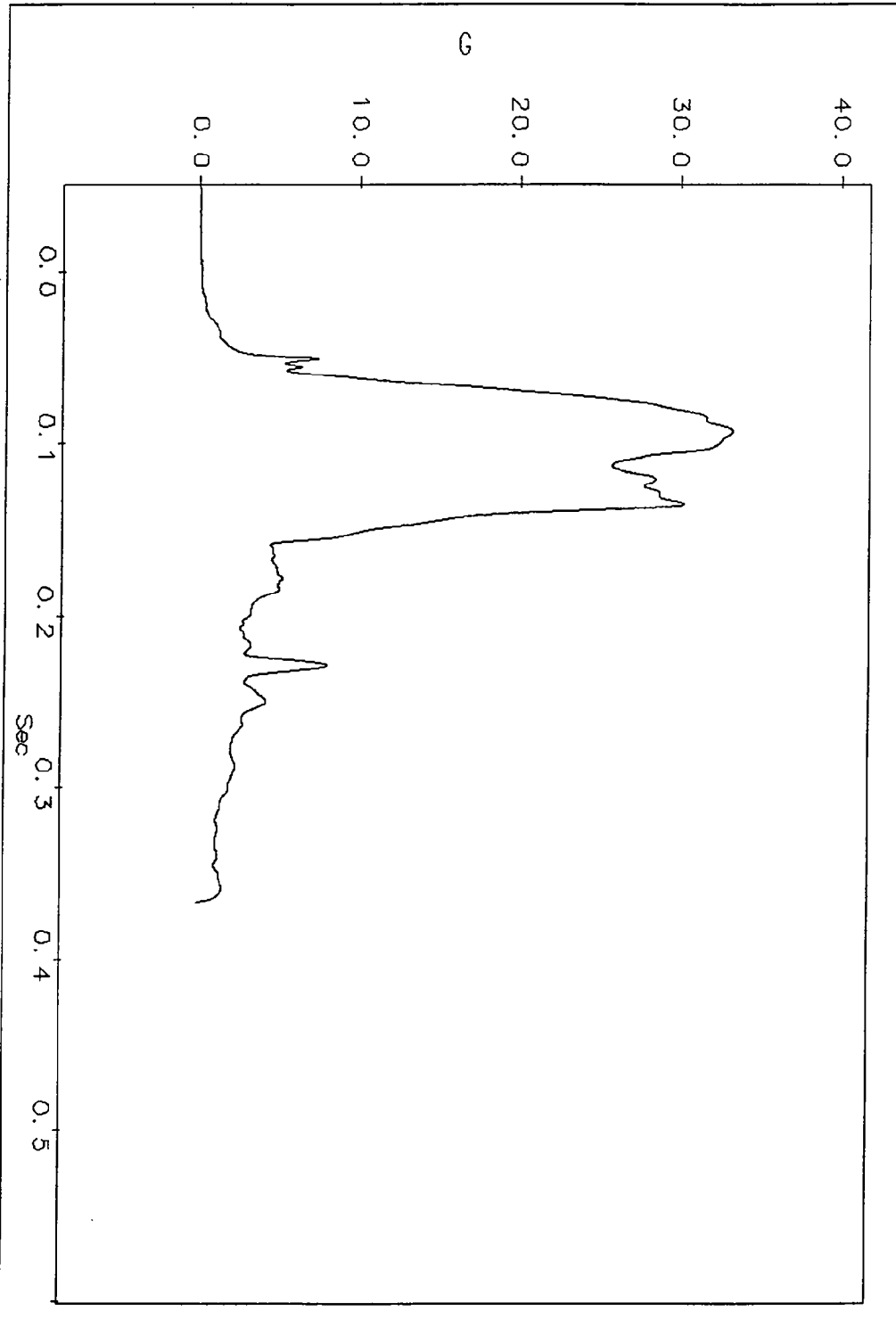
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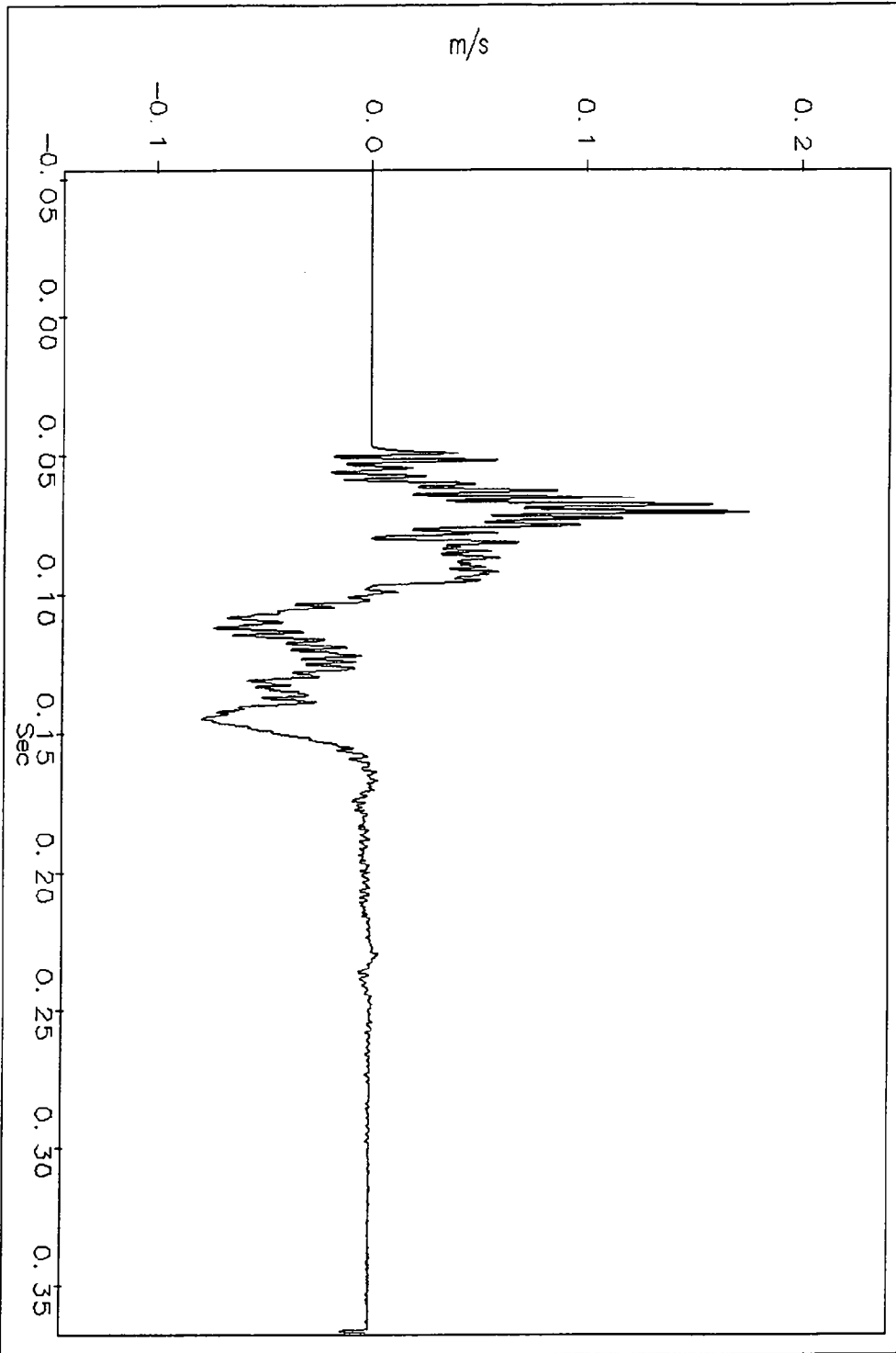
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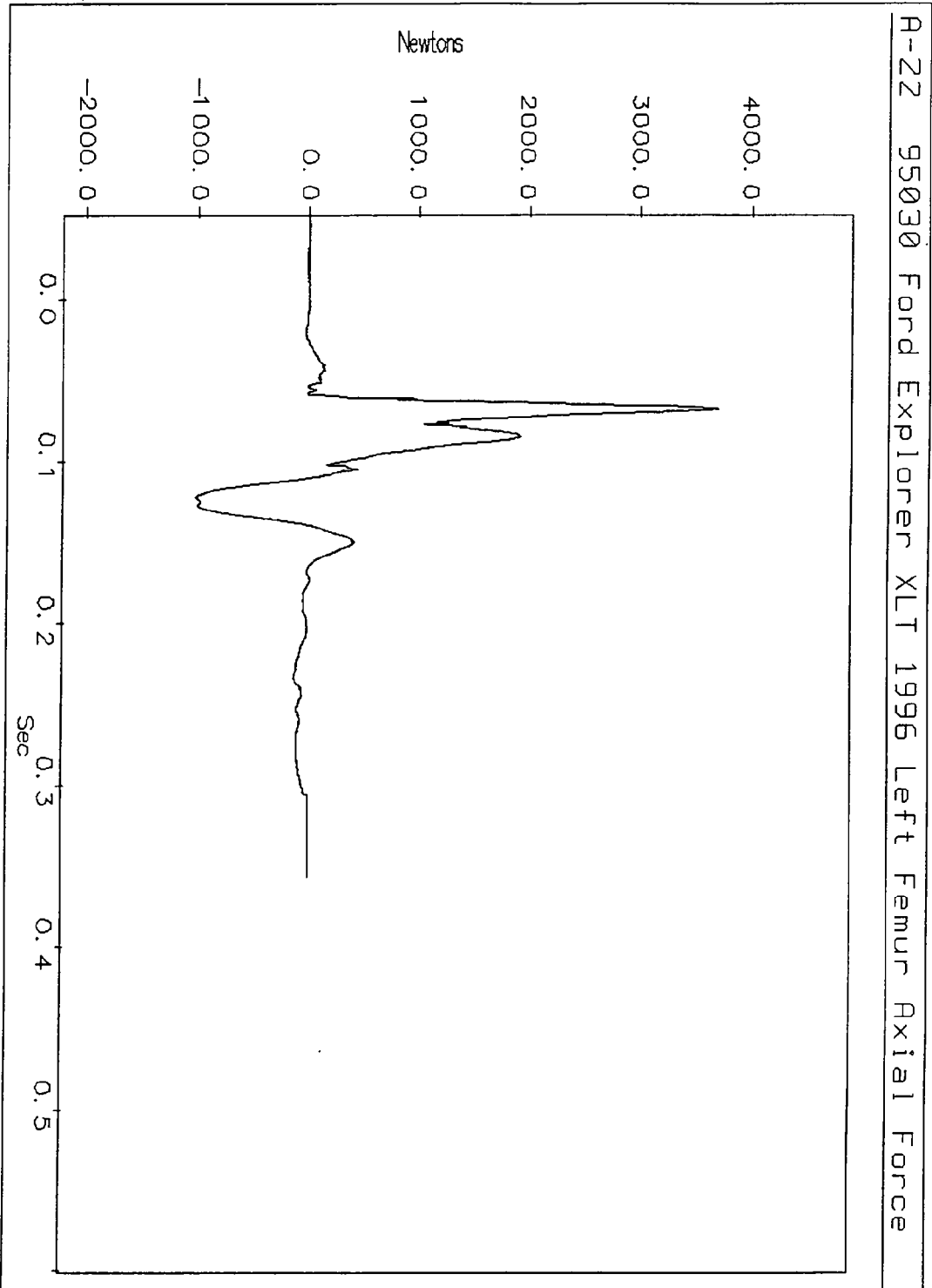
A-20 950330 Ford Explorer XLT 1996 Chest Vector Accel.



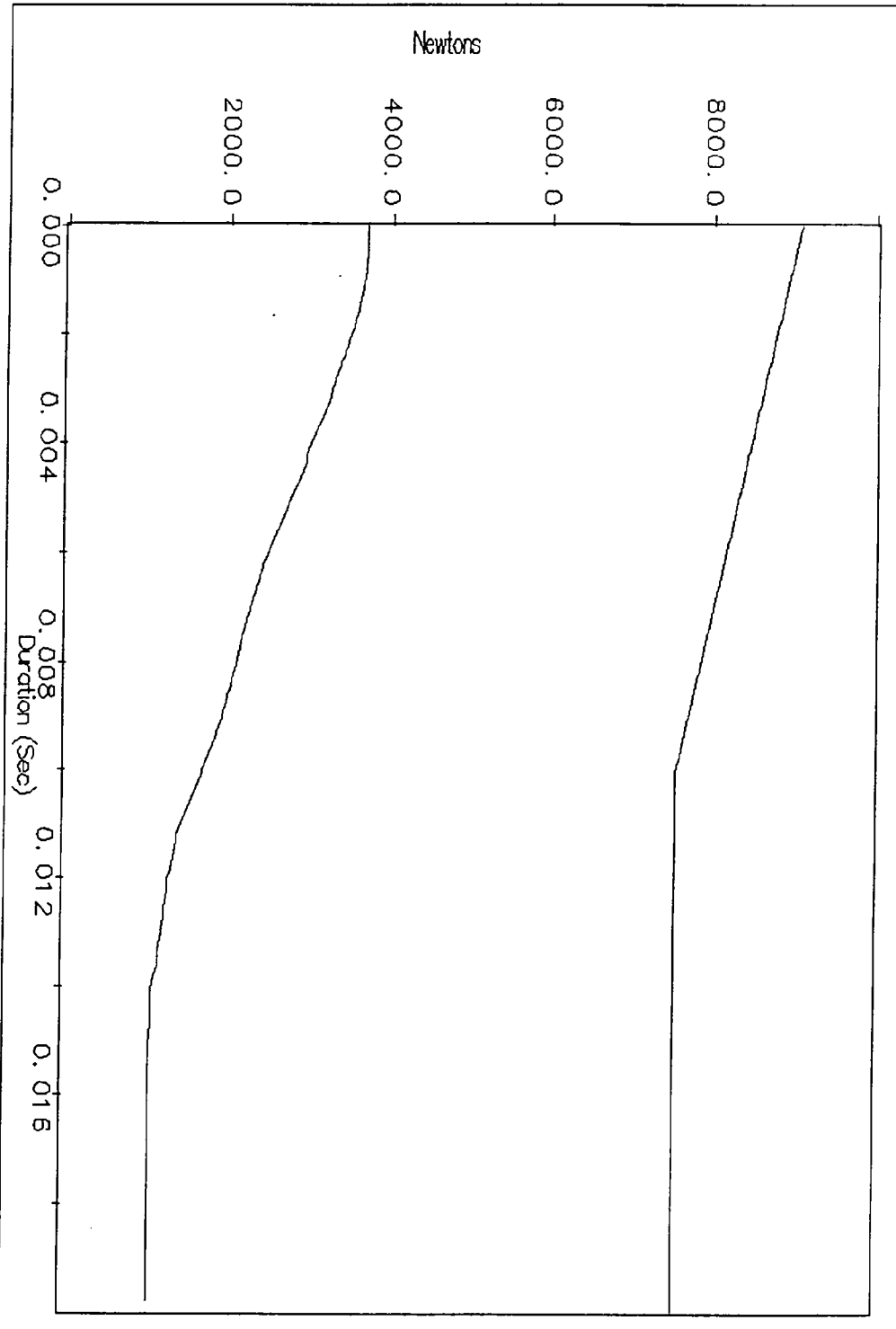
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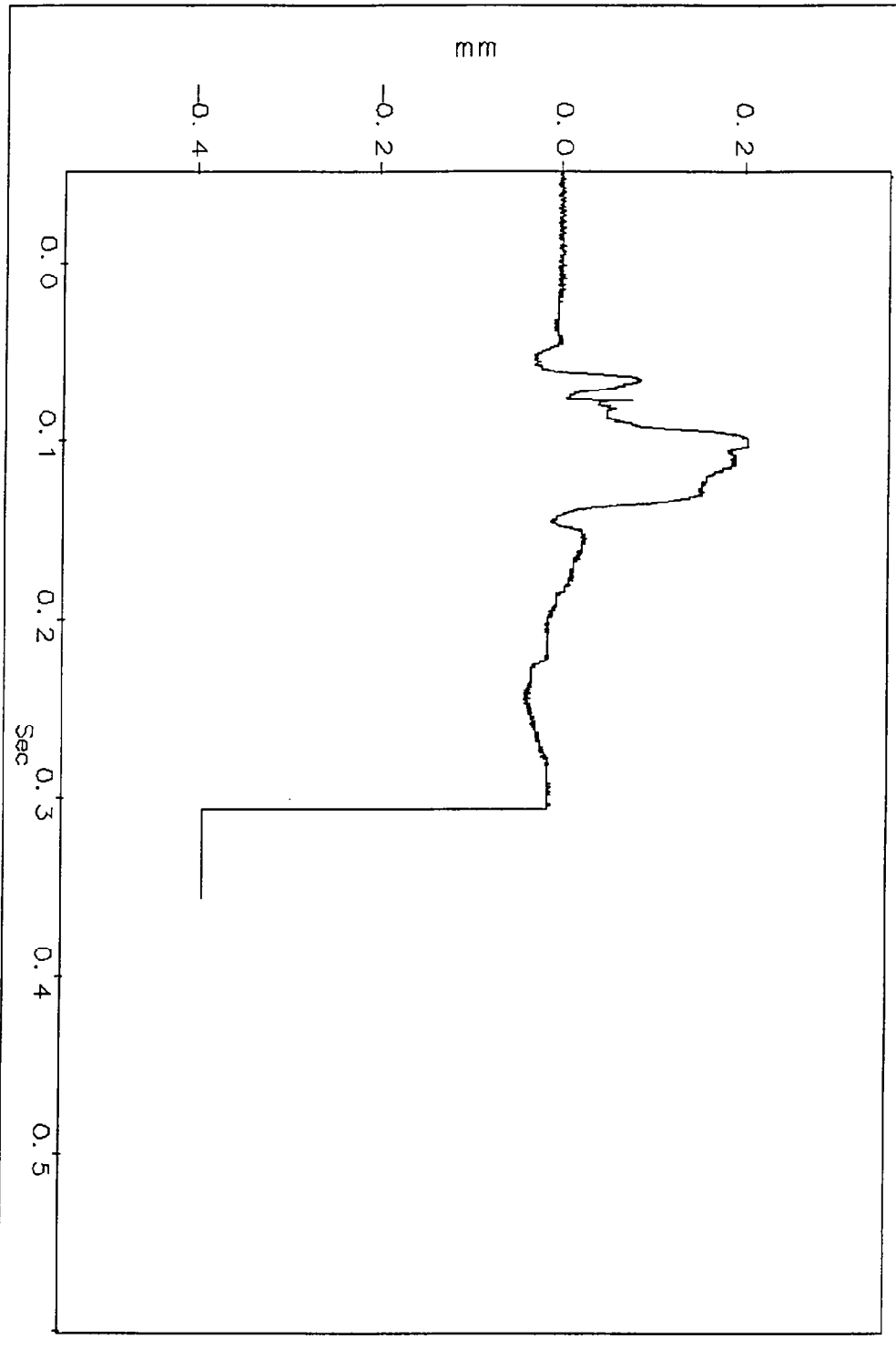
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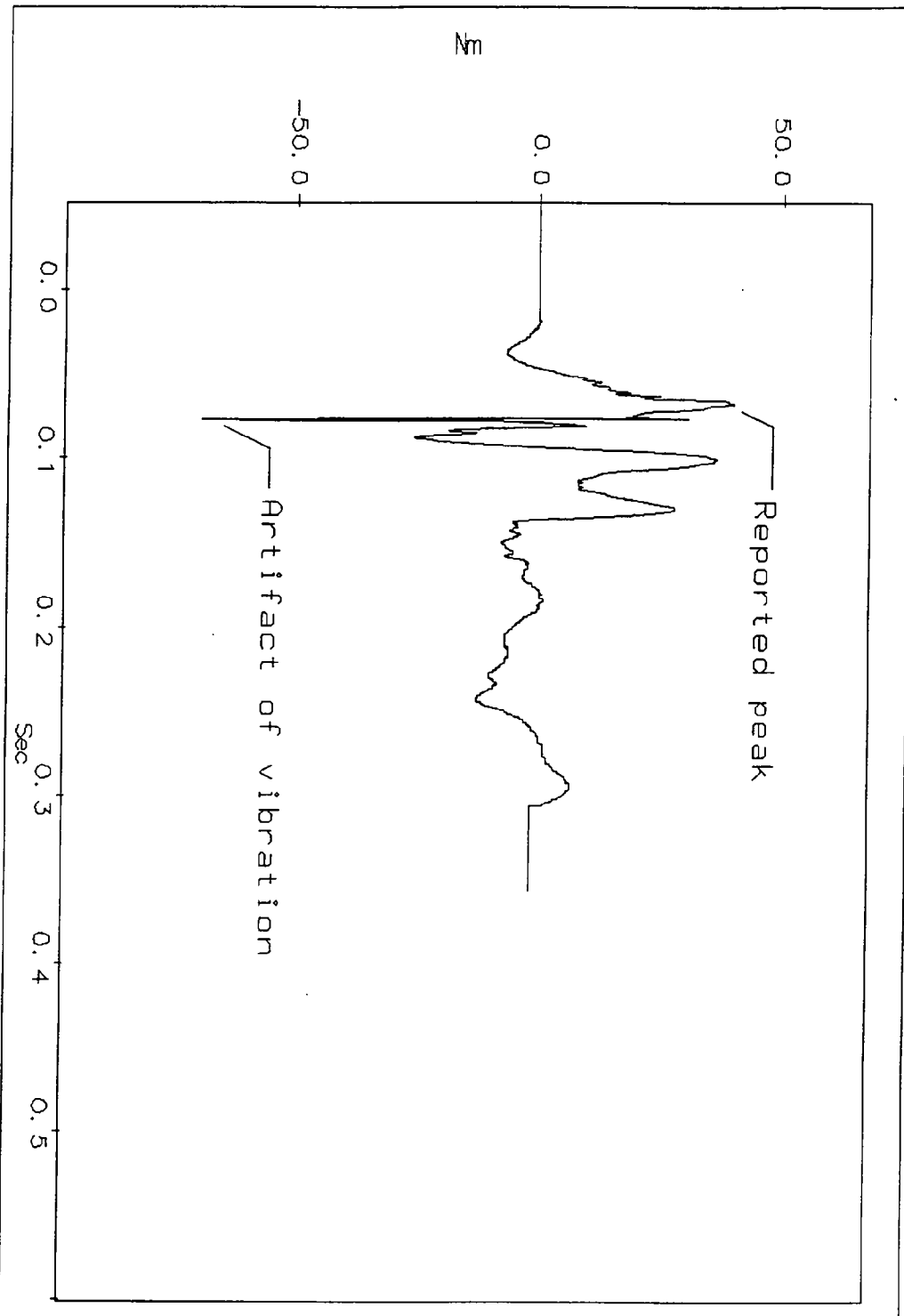
H-23 95030 Ford Explorer XLT 1996 Left Femur Analysis



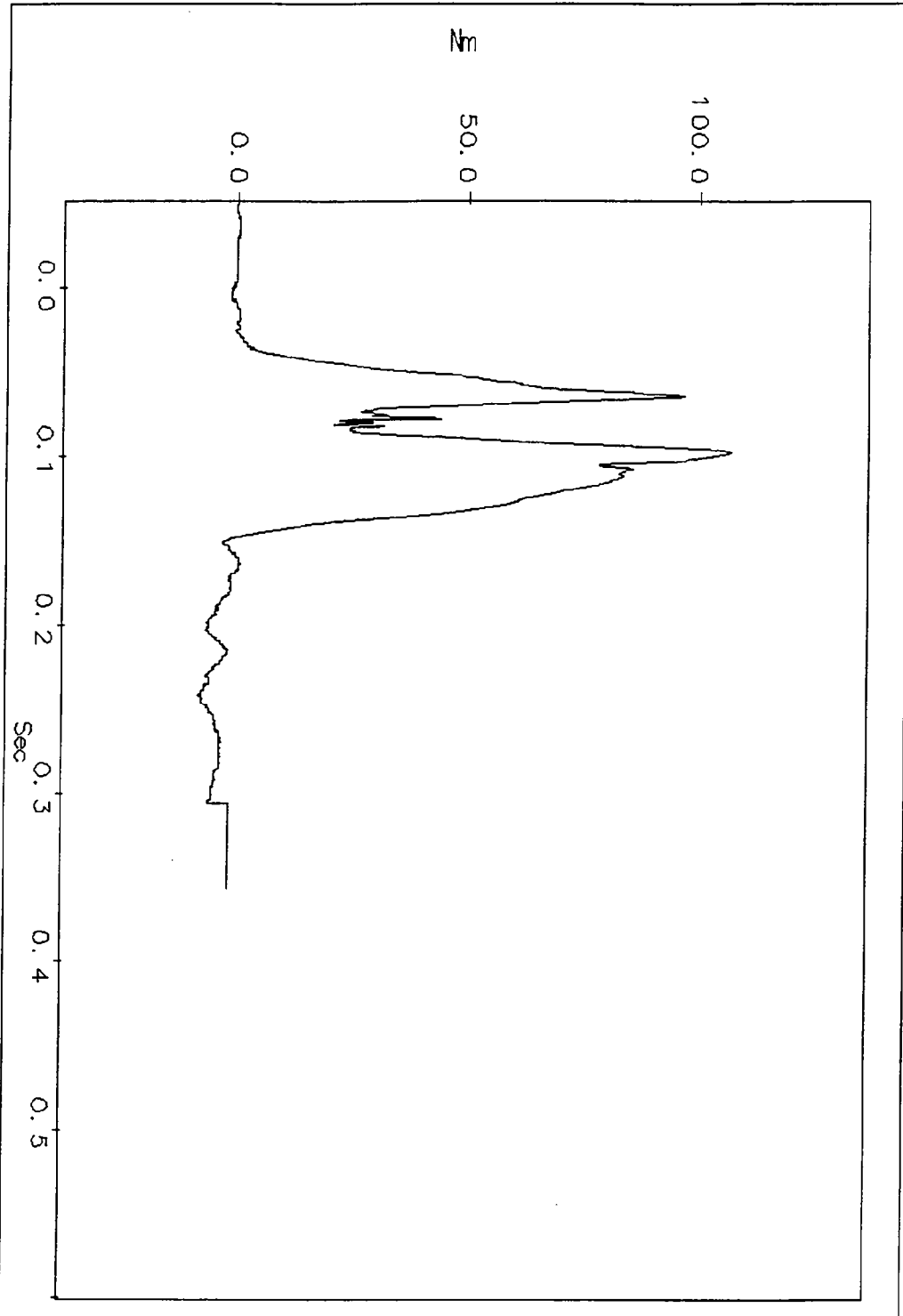
A-24 95030 Ford Explorer XLT 1996 Left Tibia-Femur Disp.



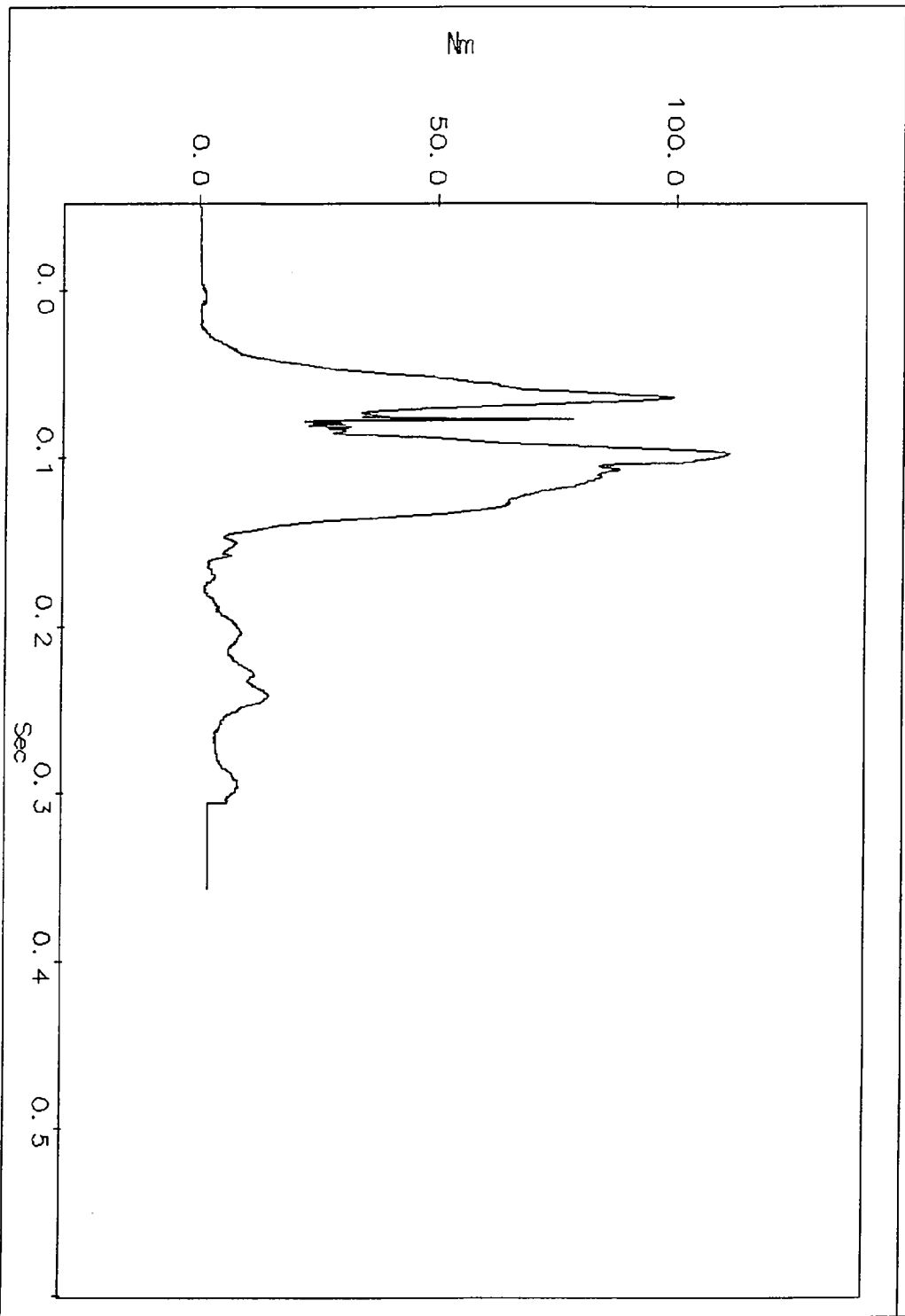
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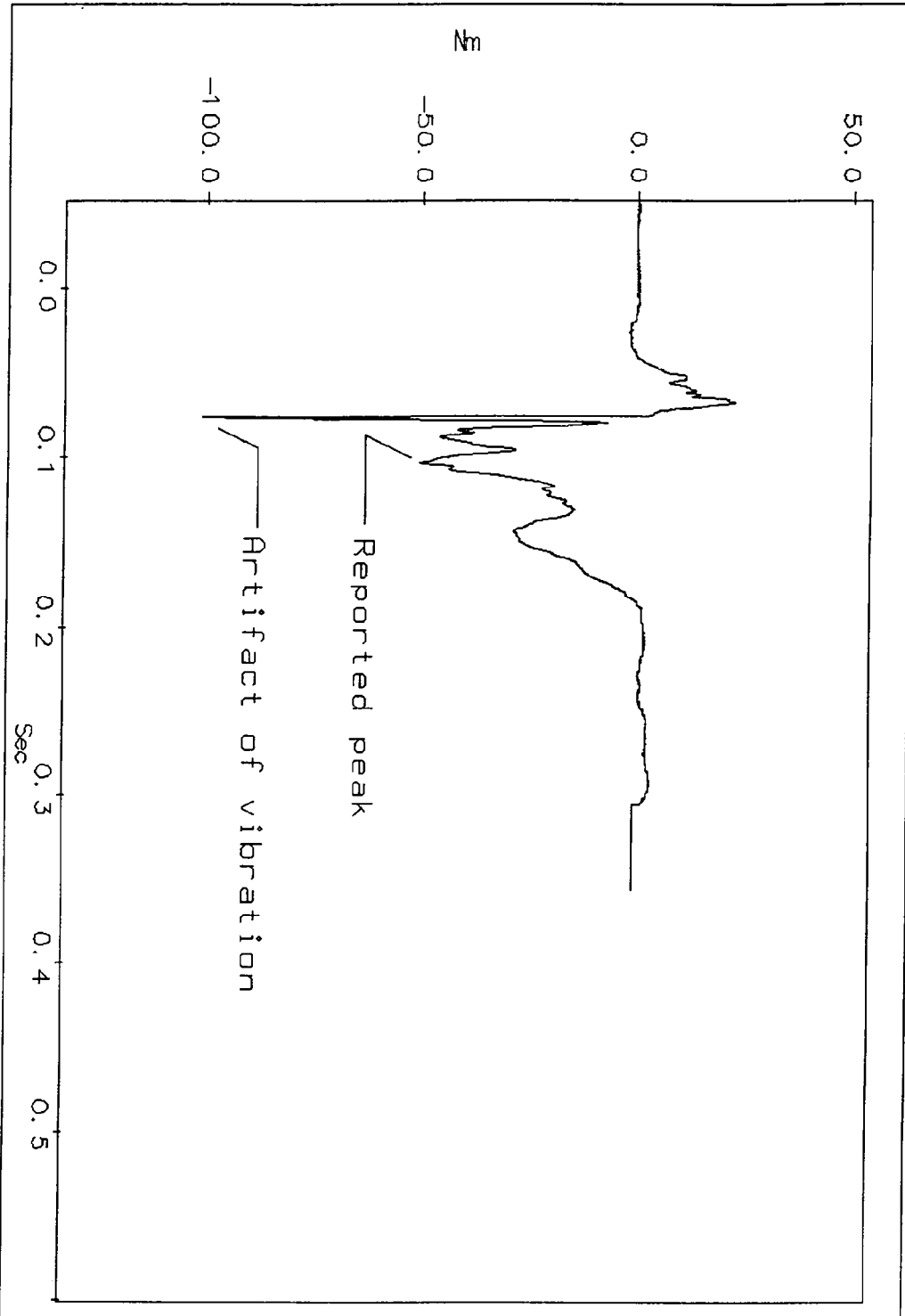
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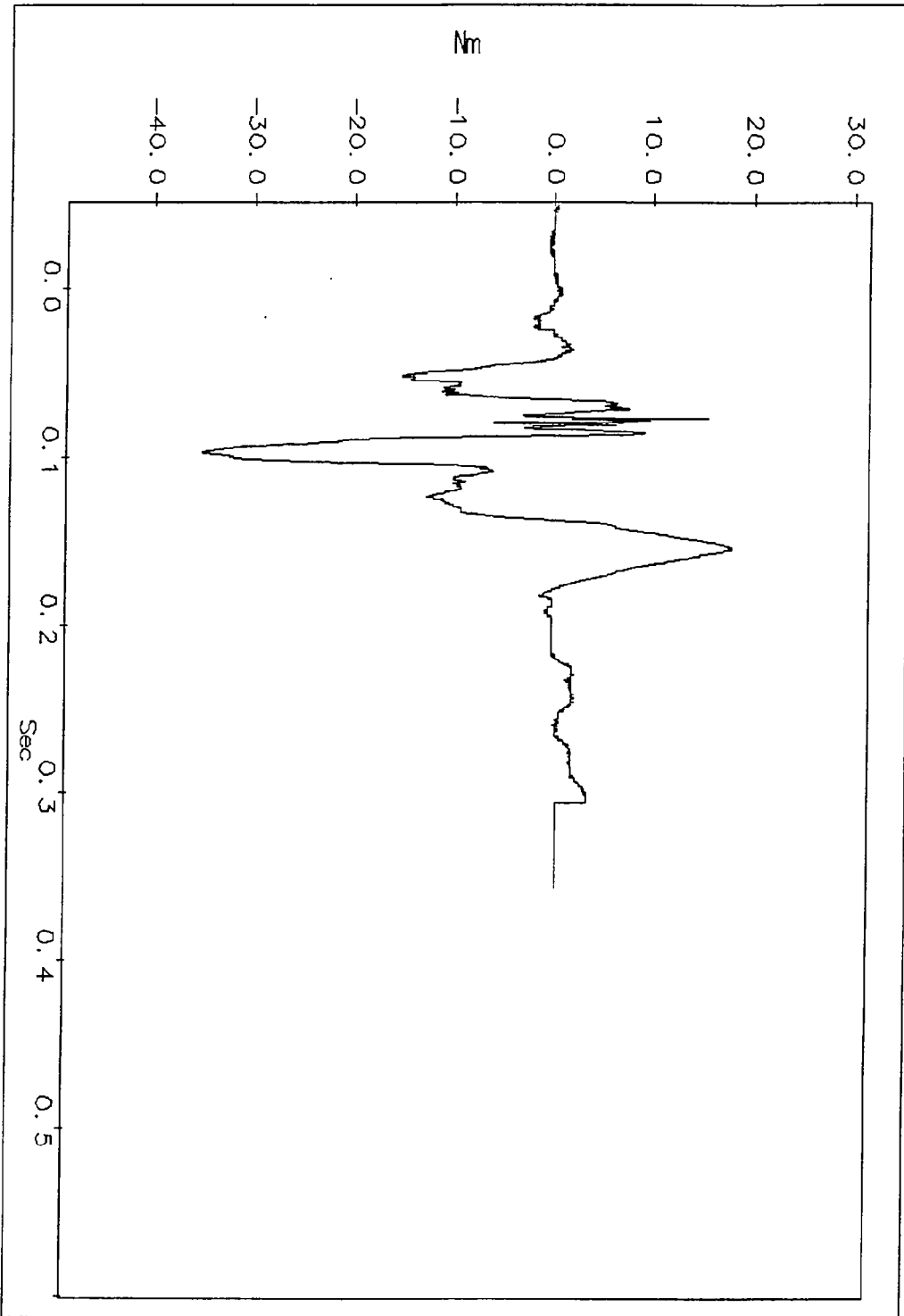
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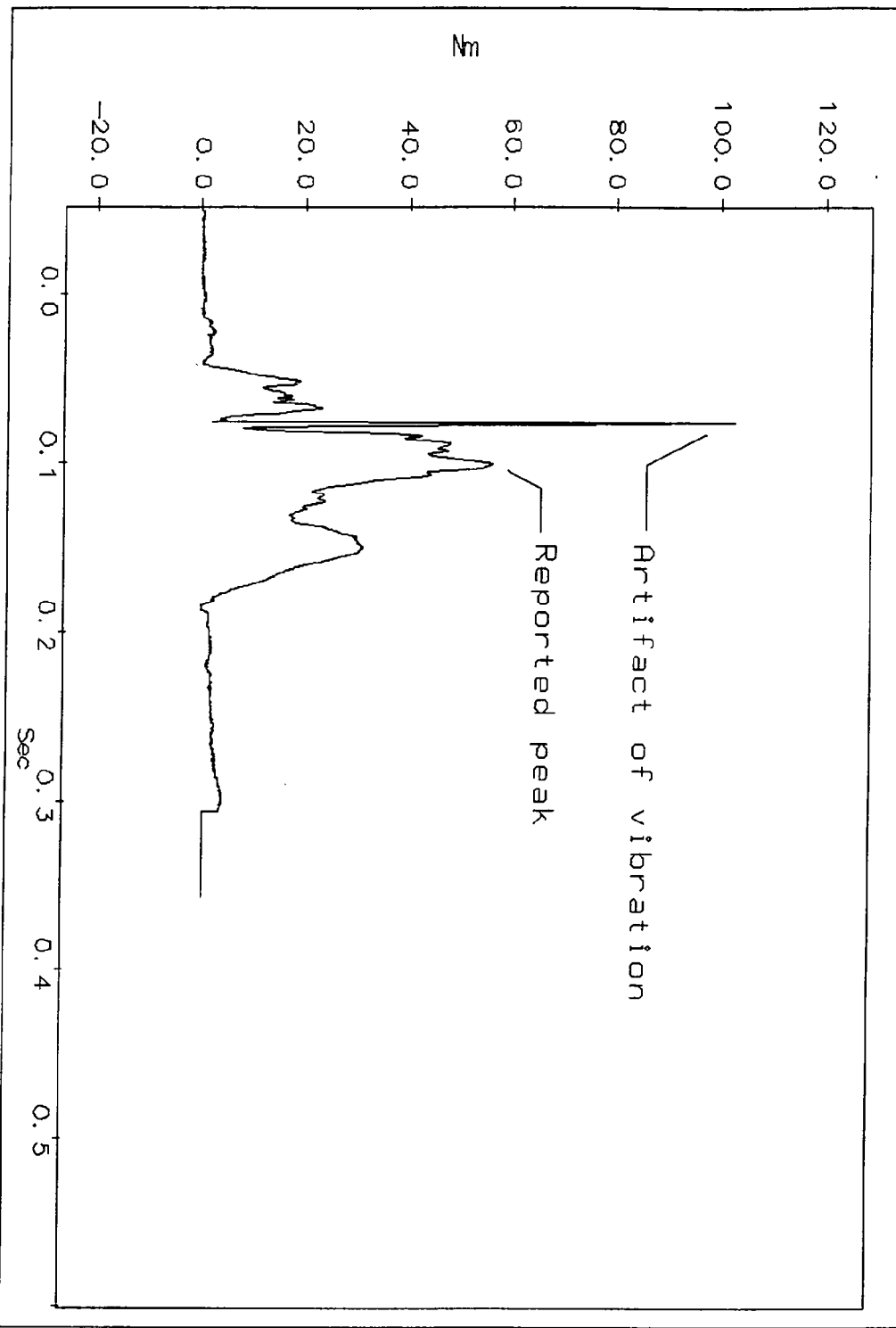
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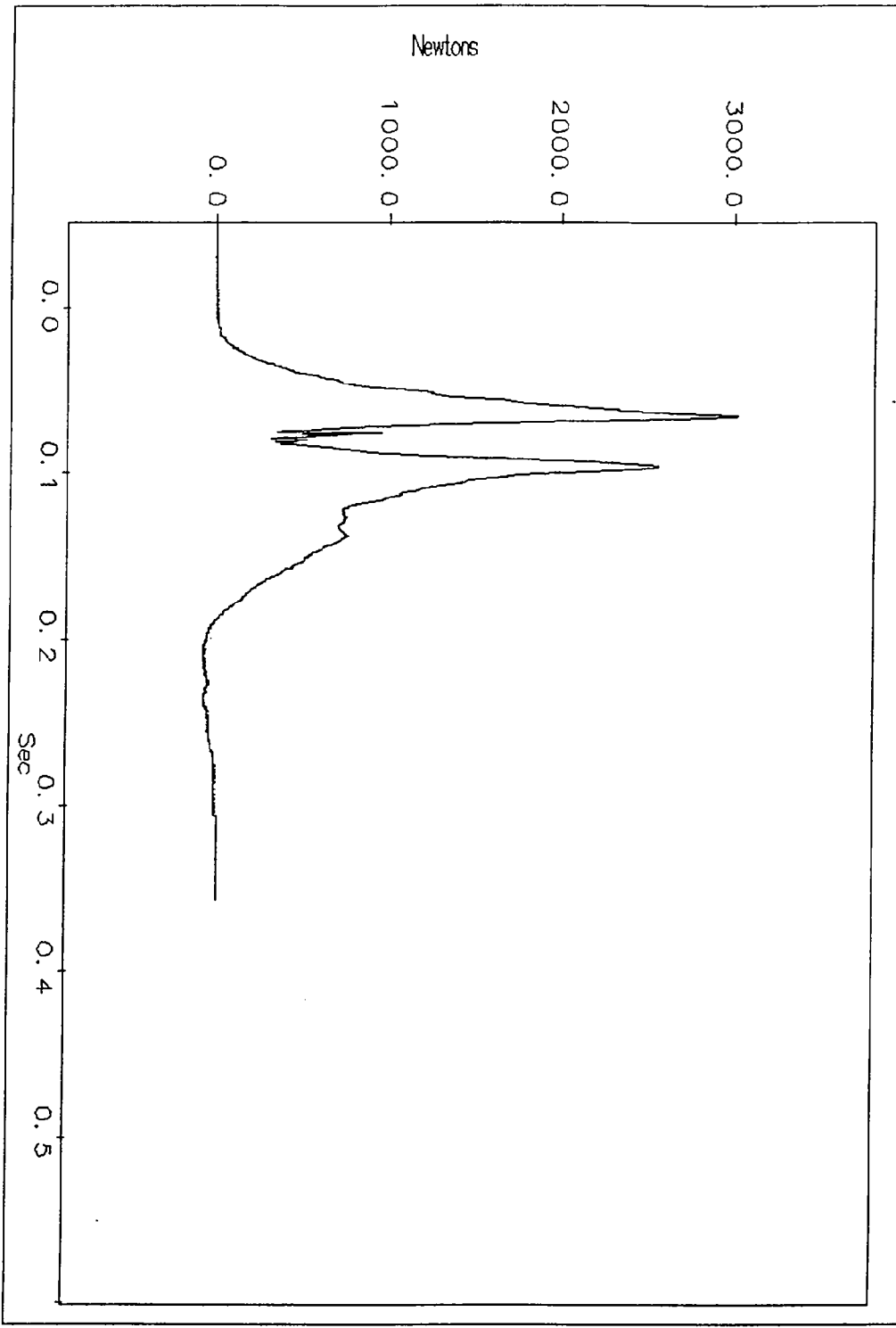
R-29 95030 Ford Explorer XLT 1996 L Lower Tibia A-P Moment



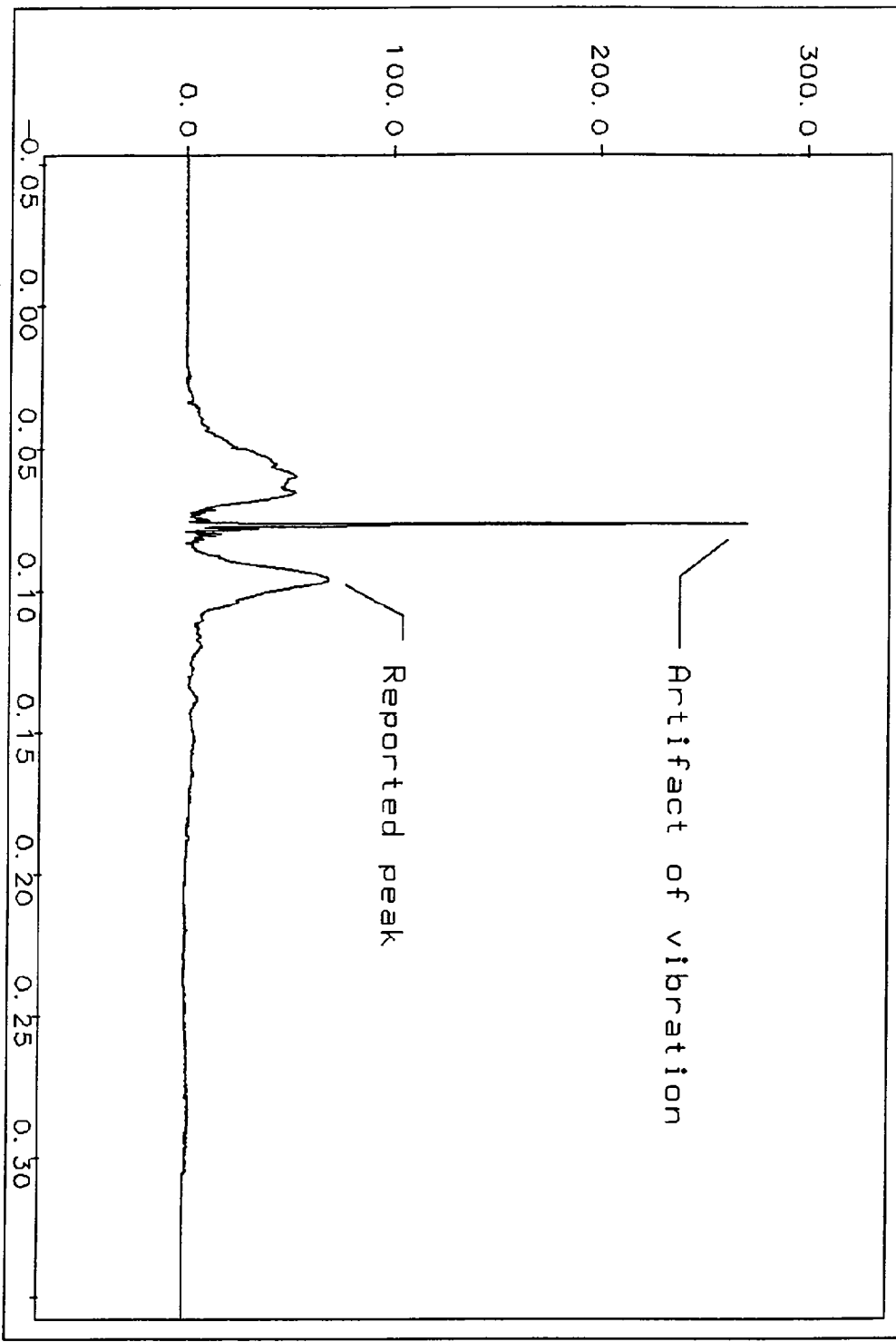
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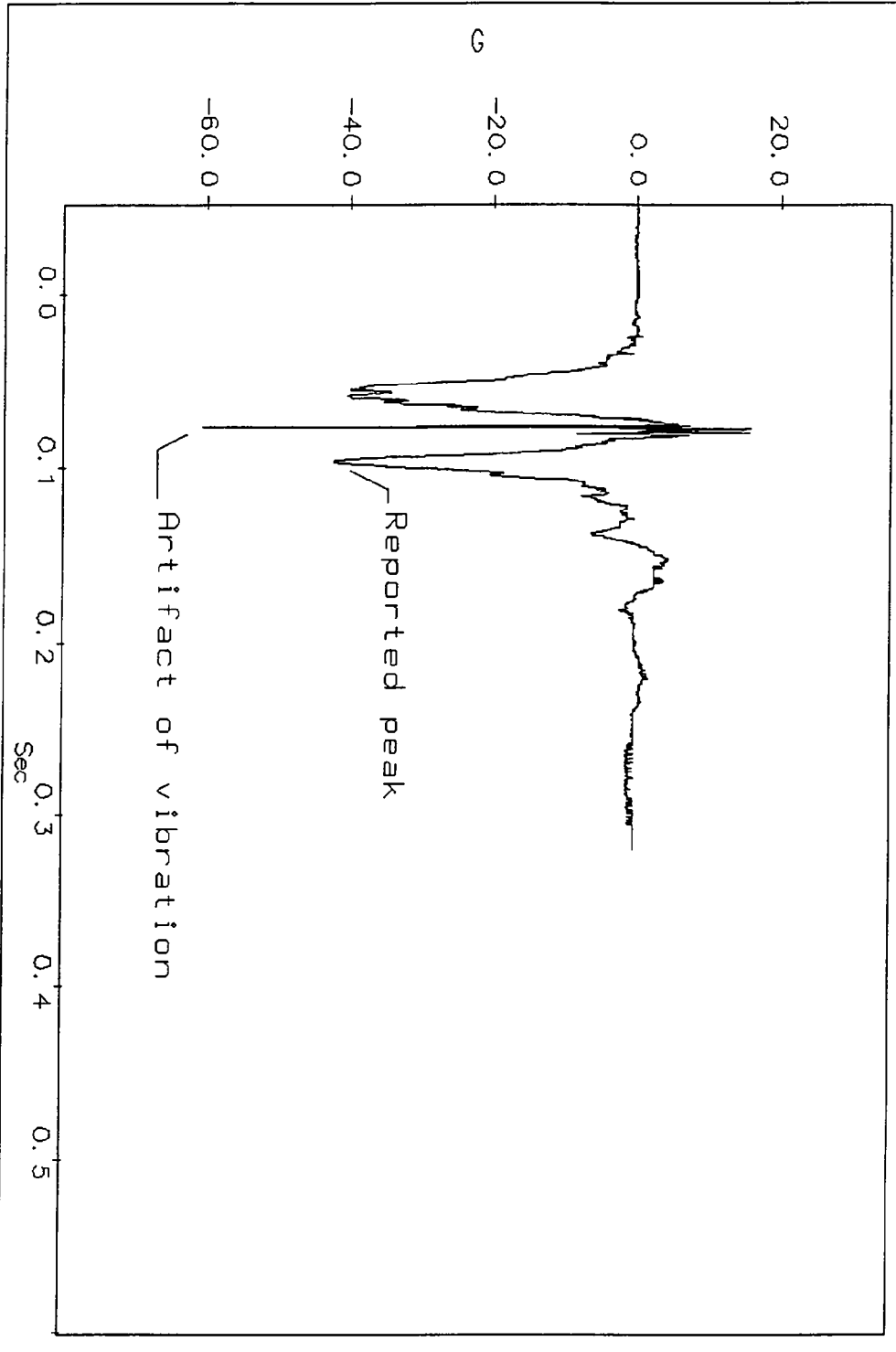
A-31 95030 Ford Explorer XLT 1996 L Lower Tibia Axial Force



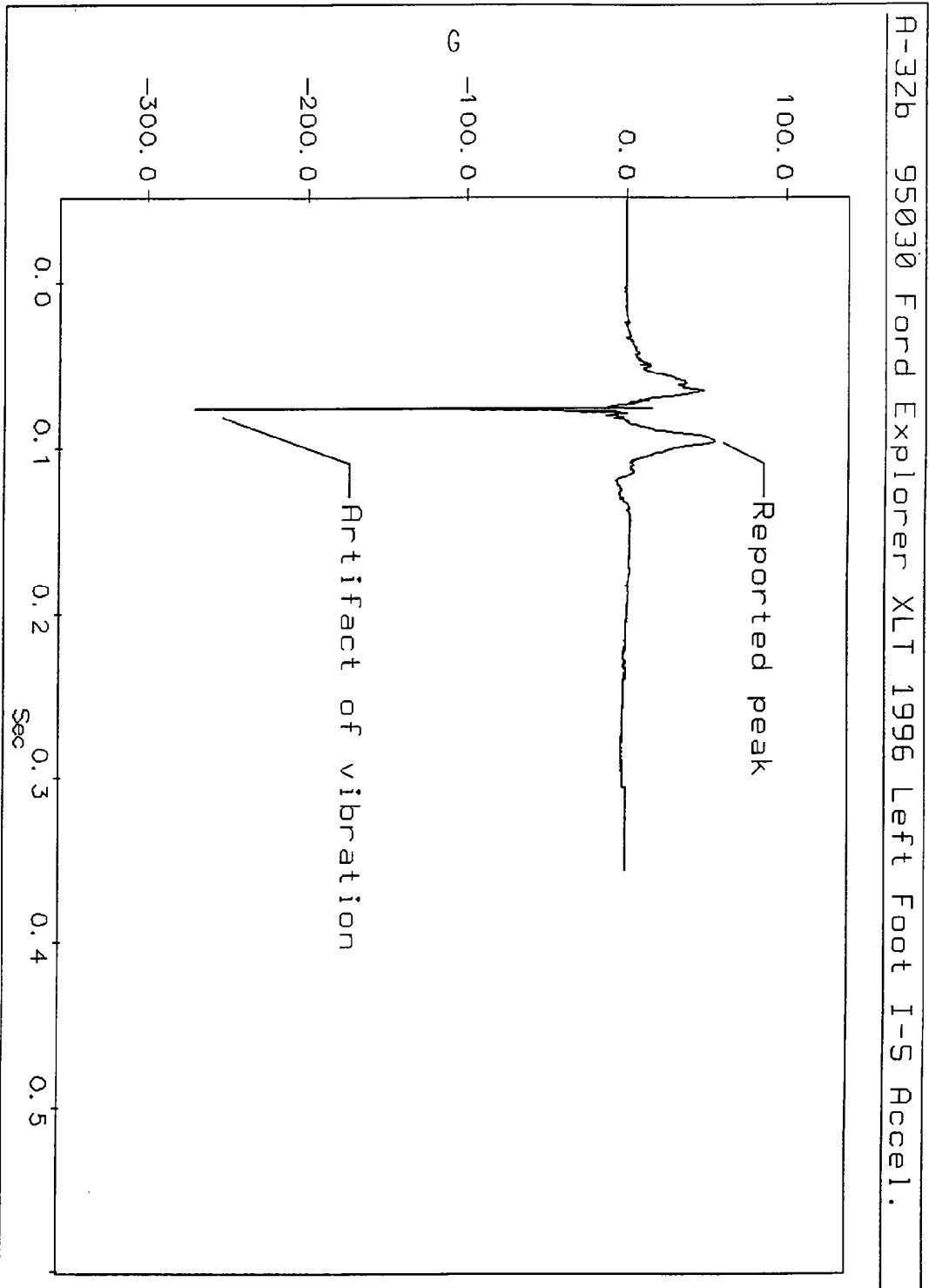
A-32 Ford Explorer XLT 1996 Left Foot Vector Accel.



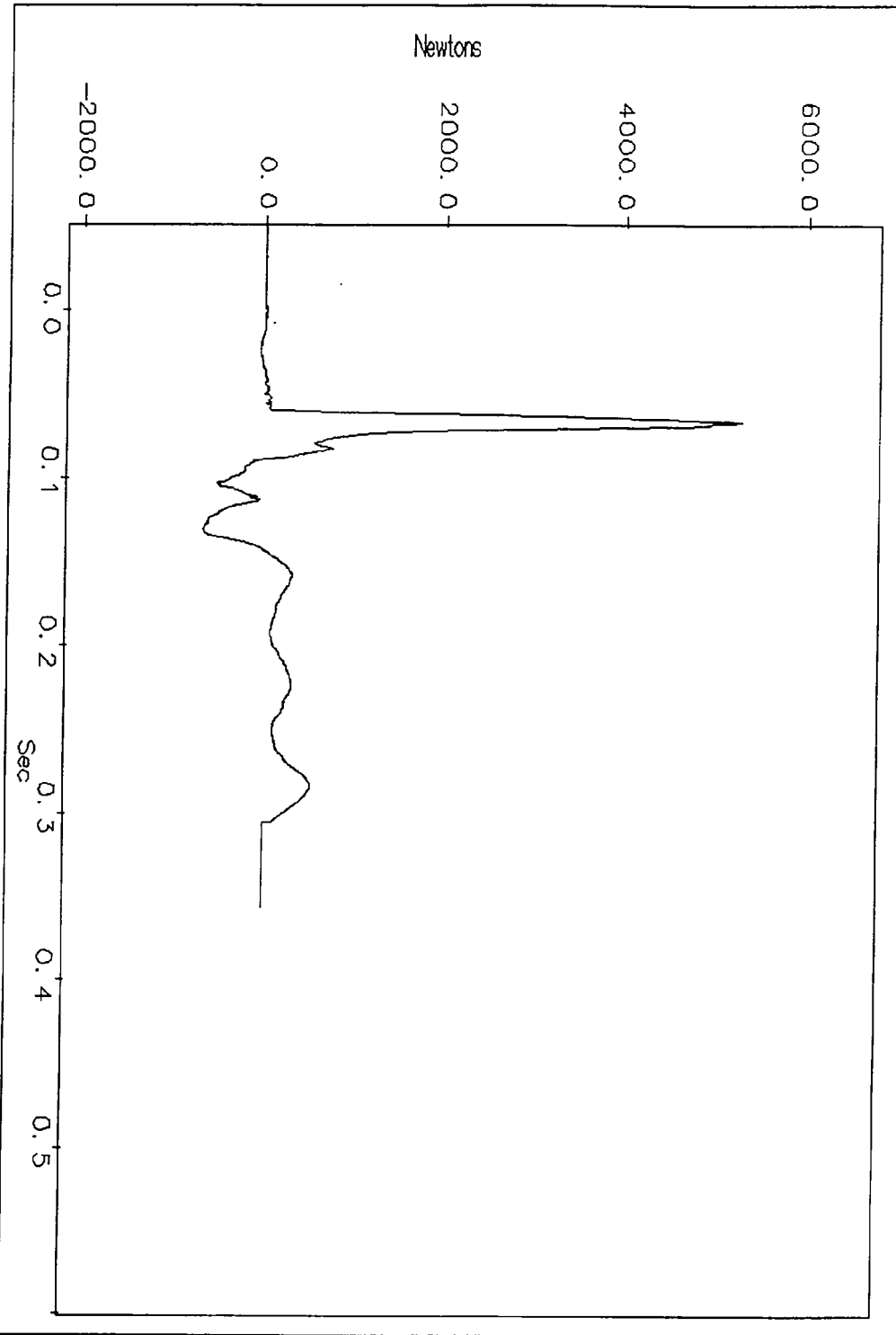
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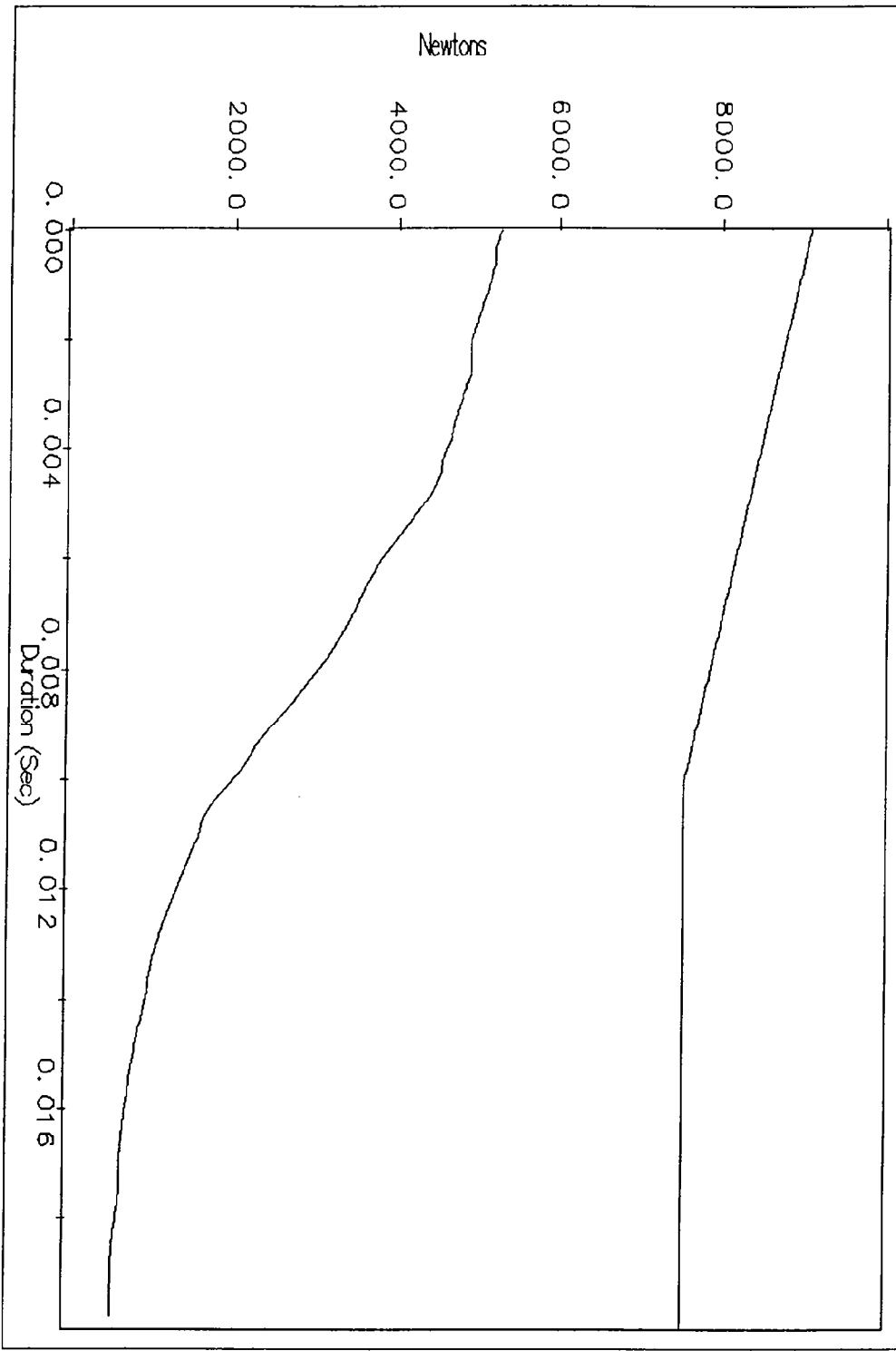
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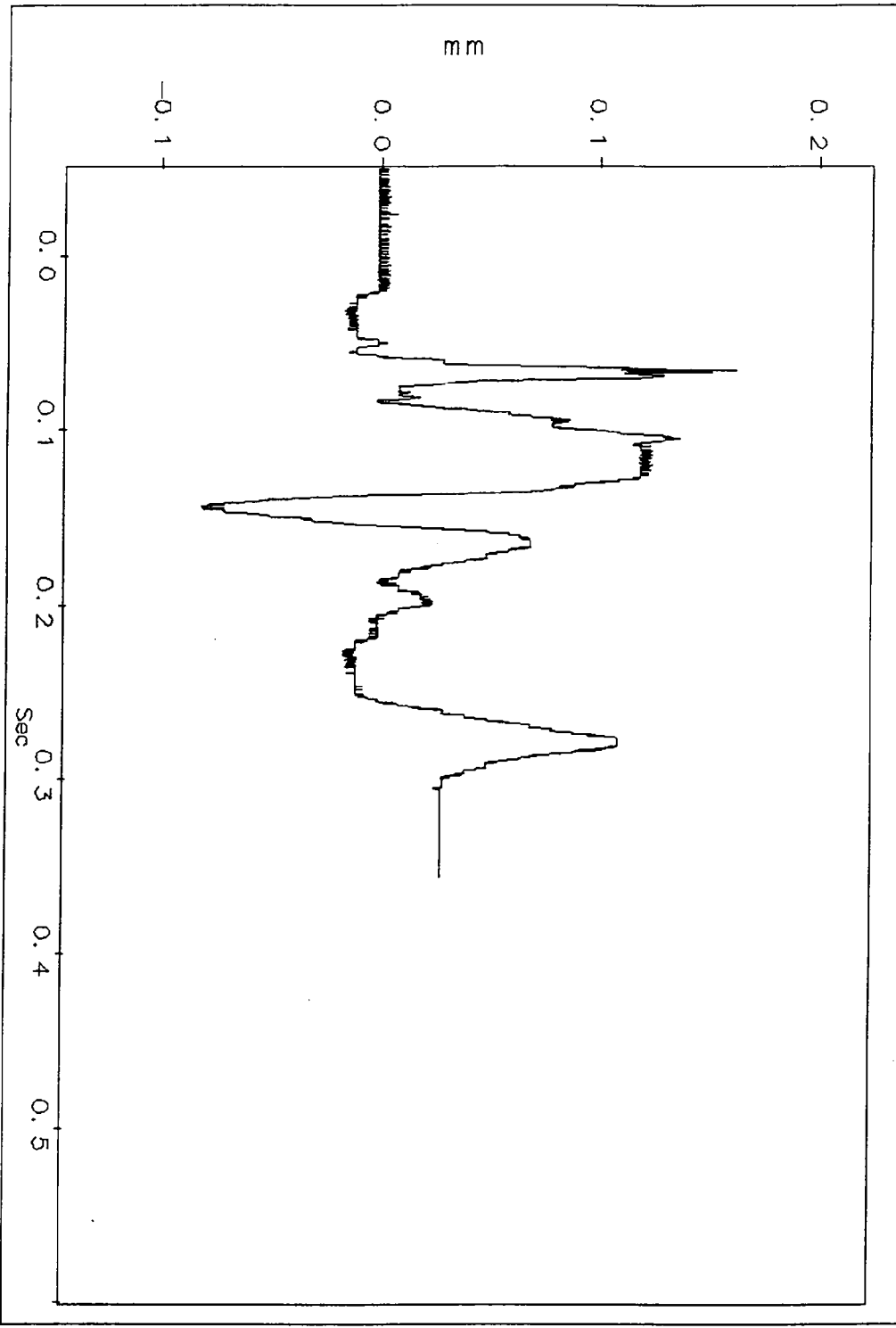
A-33 95030 Ford Explorer XLT 1996 Right Femur Axial Force



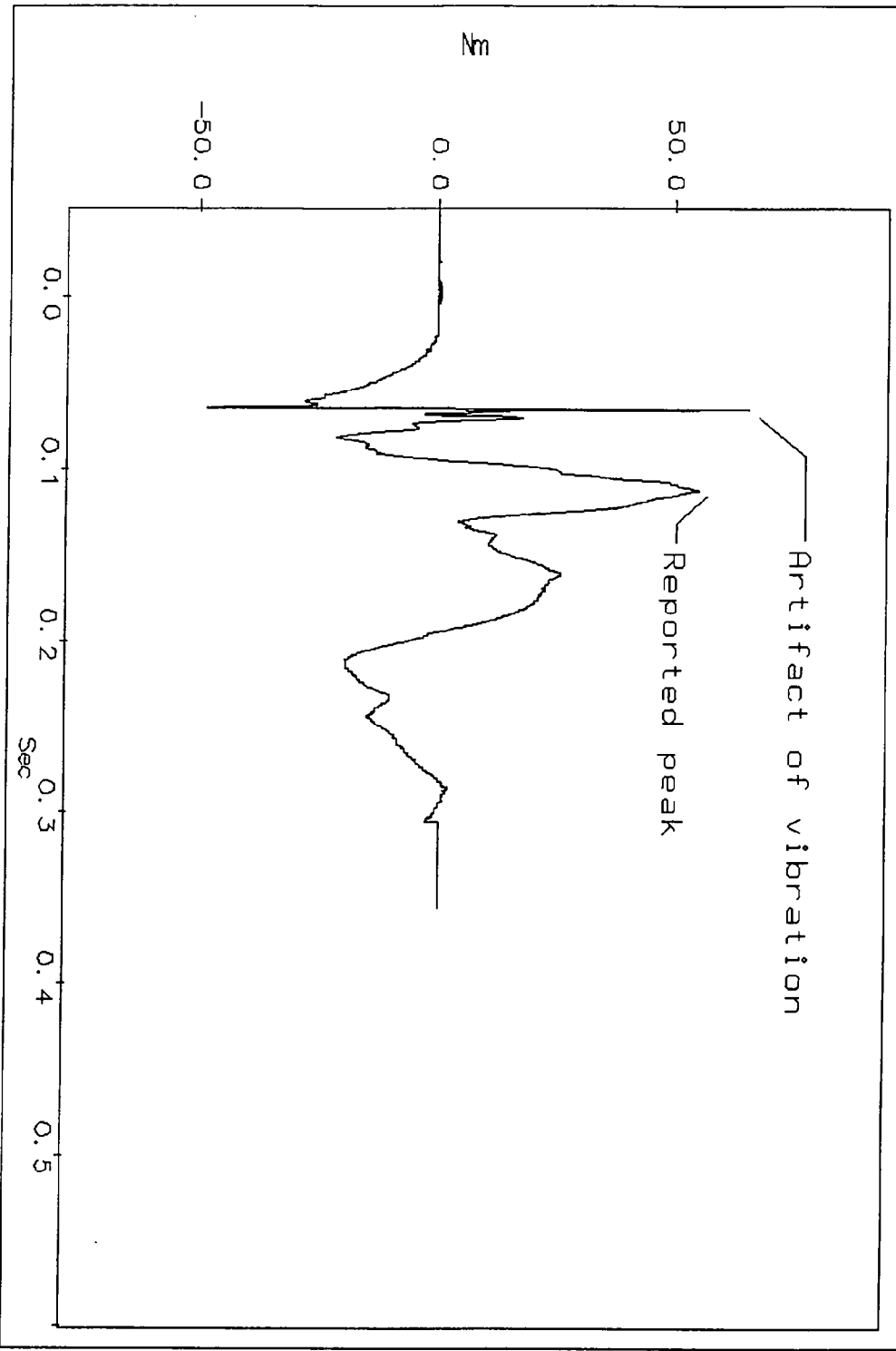
A-34 95030 Ford Explorer XLT 1996 Right Femur Analysis



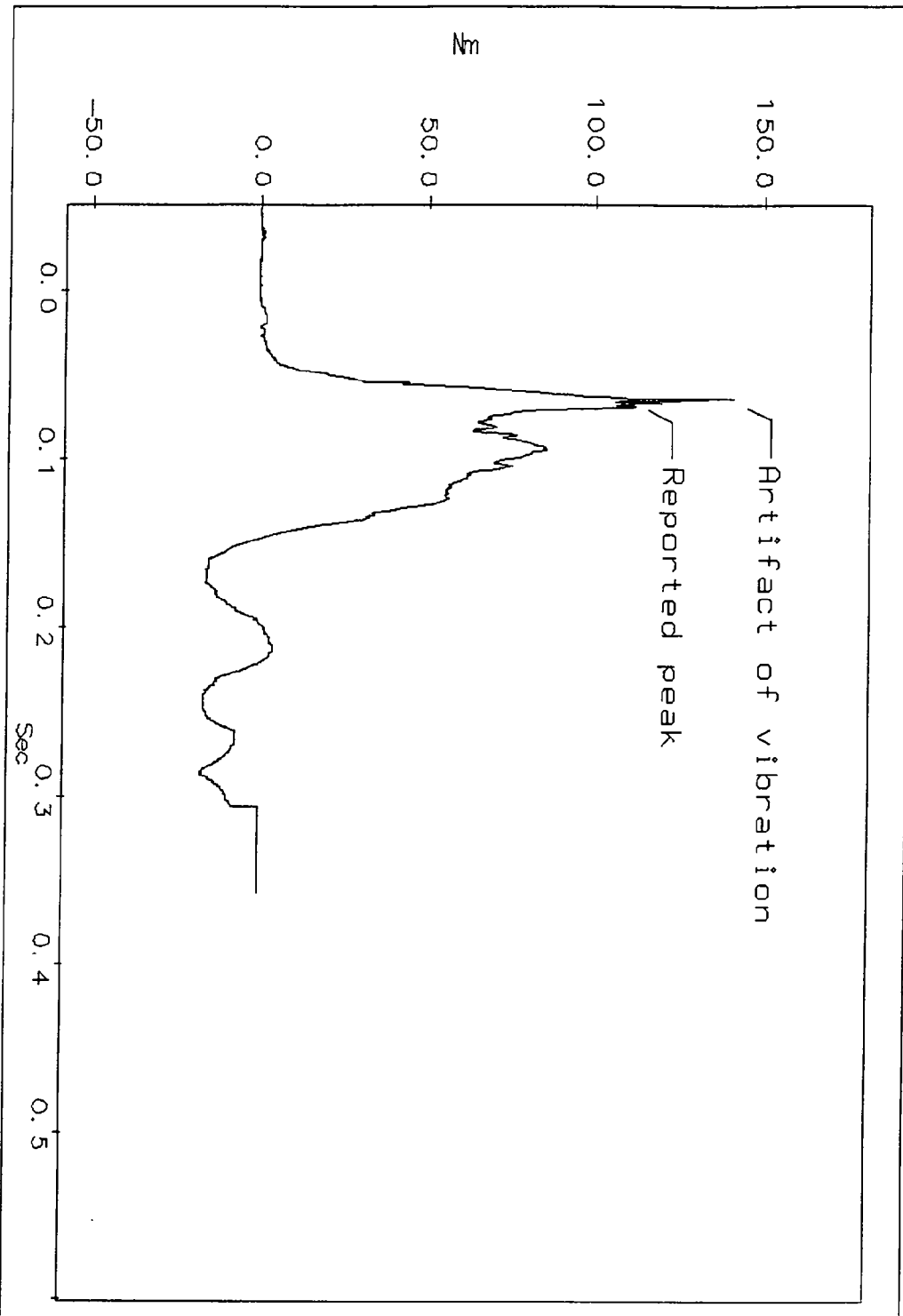
A-35 95030 Ford Explorer XLT 1996 Right Tibia-Femur Disp.



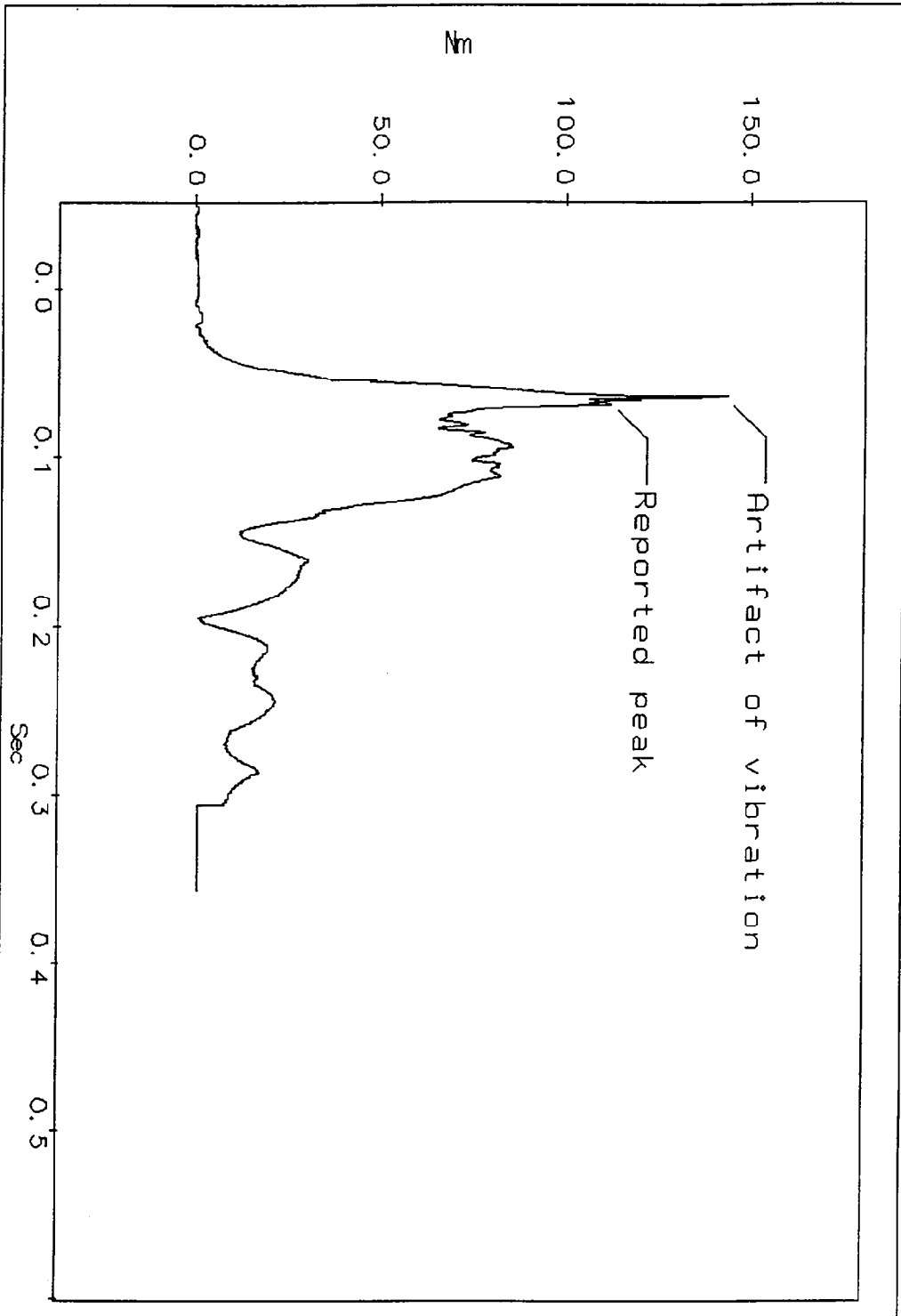
A-36 95030 Ford Explorer XLT 1996 R Upper Tibia L-M Moment



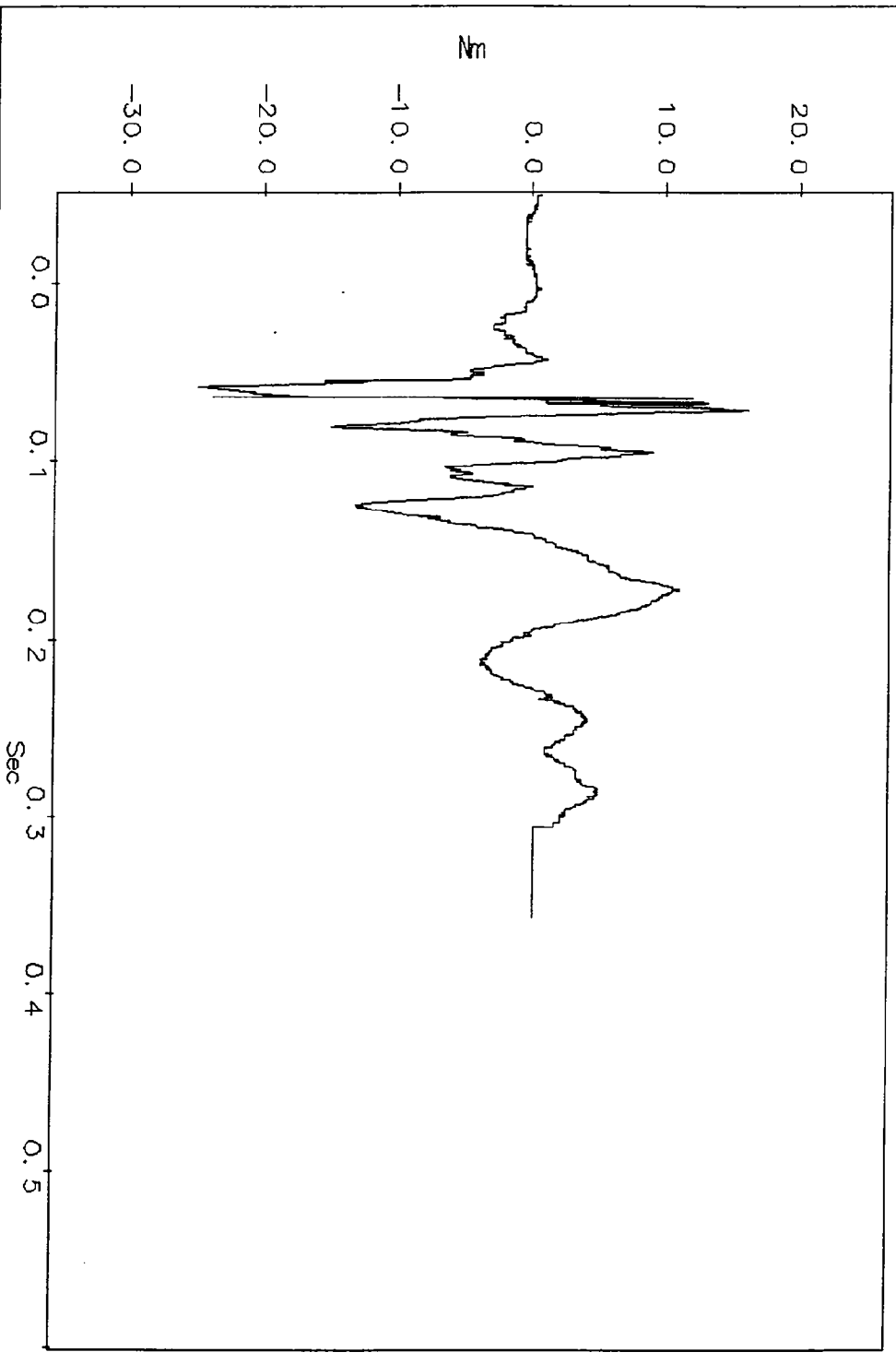
A-37 95030 Ford Explorer XLT 1996 R Upper Tibia A-P Moment



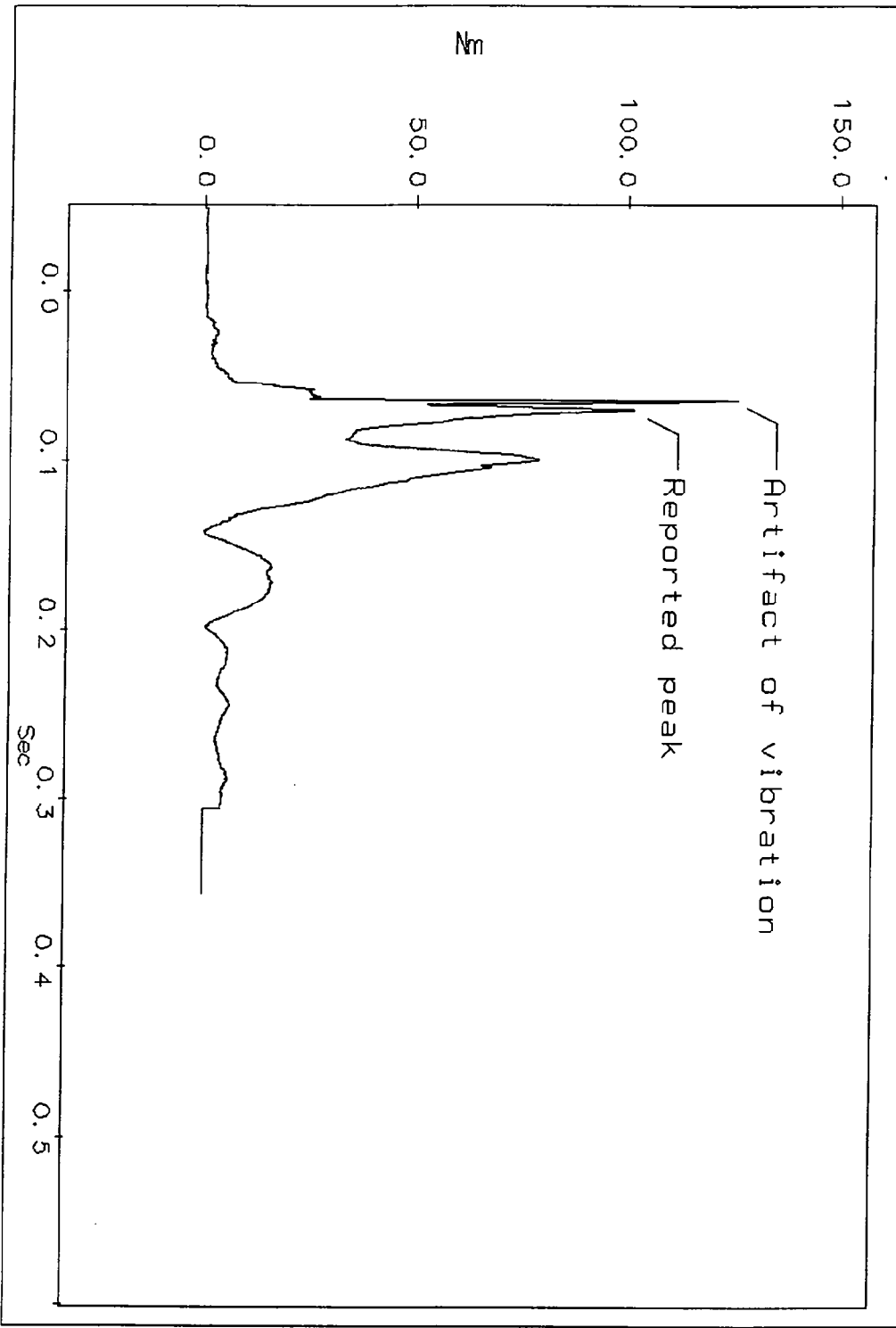
A-38 95030 Ford Explorer XLT 1996 R Upper Vector Moment



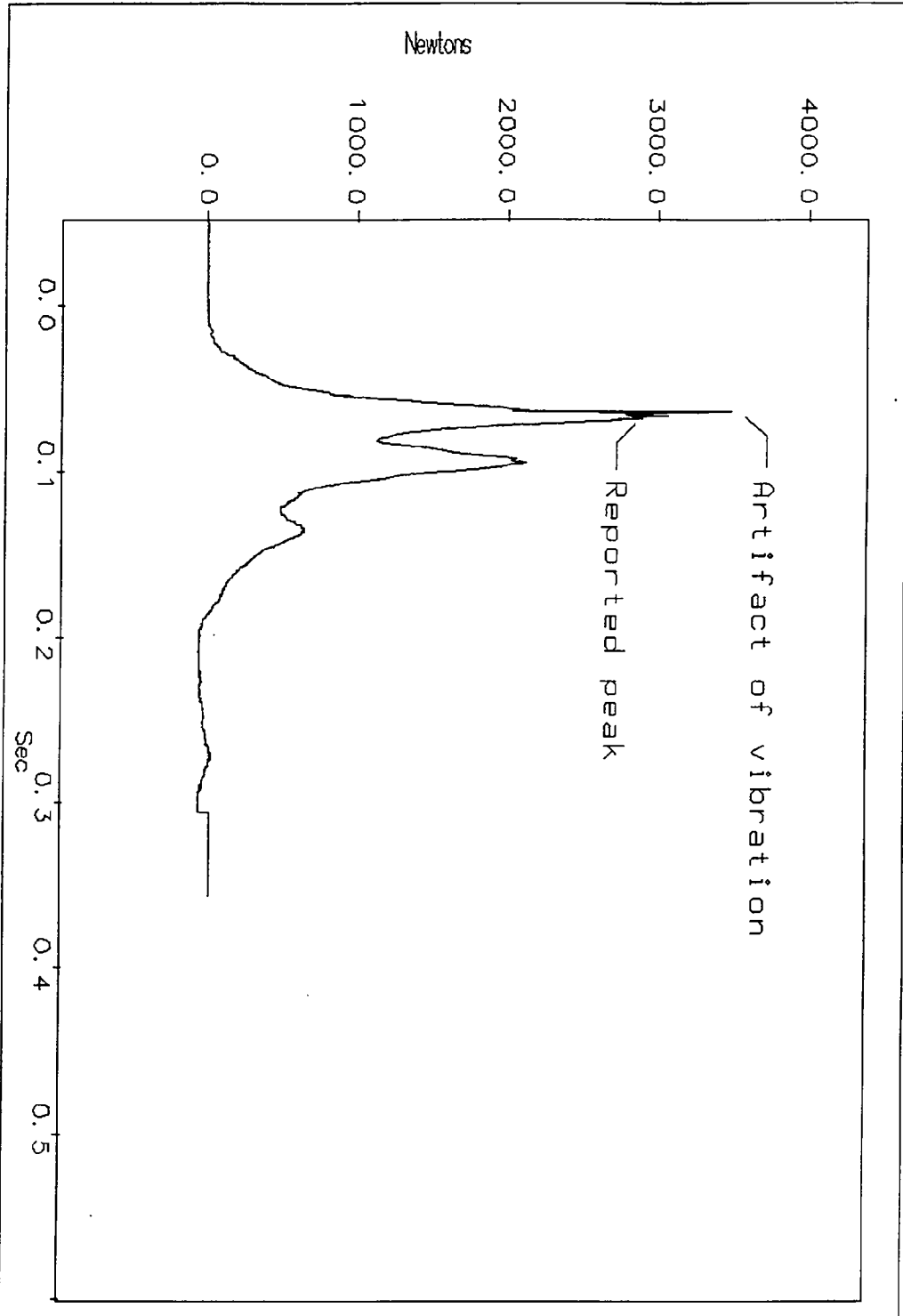
A-40 95030 Ford Explorer XLT 1996 R Lower Tibia A-P Moment



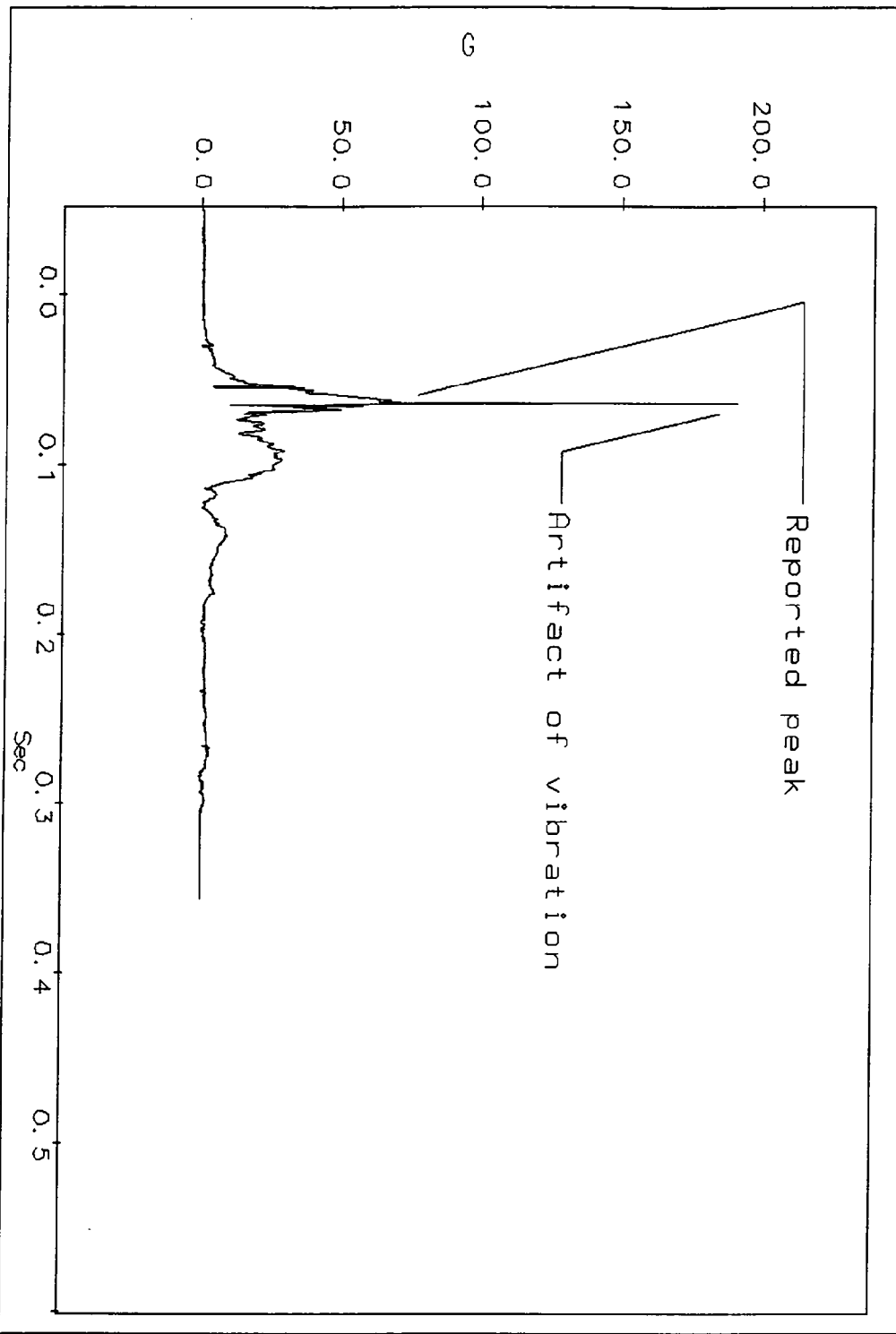
R-41 95030 Ford Explorer XLT 1996 R Lower Vector Moment



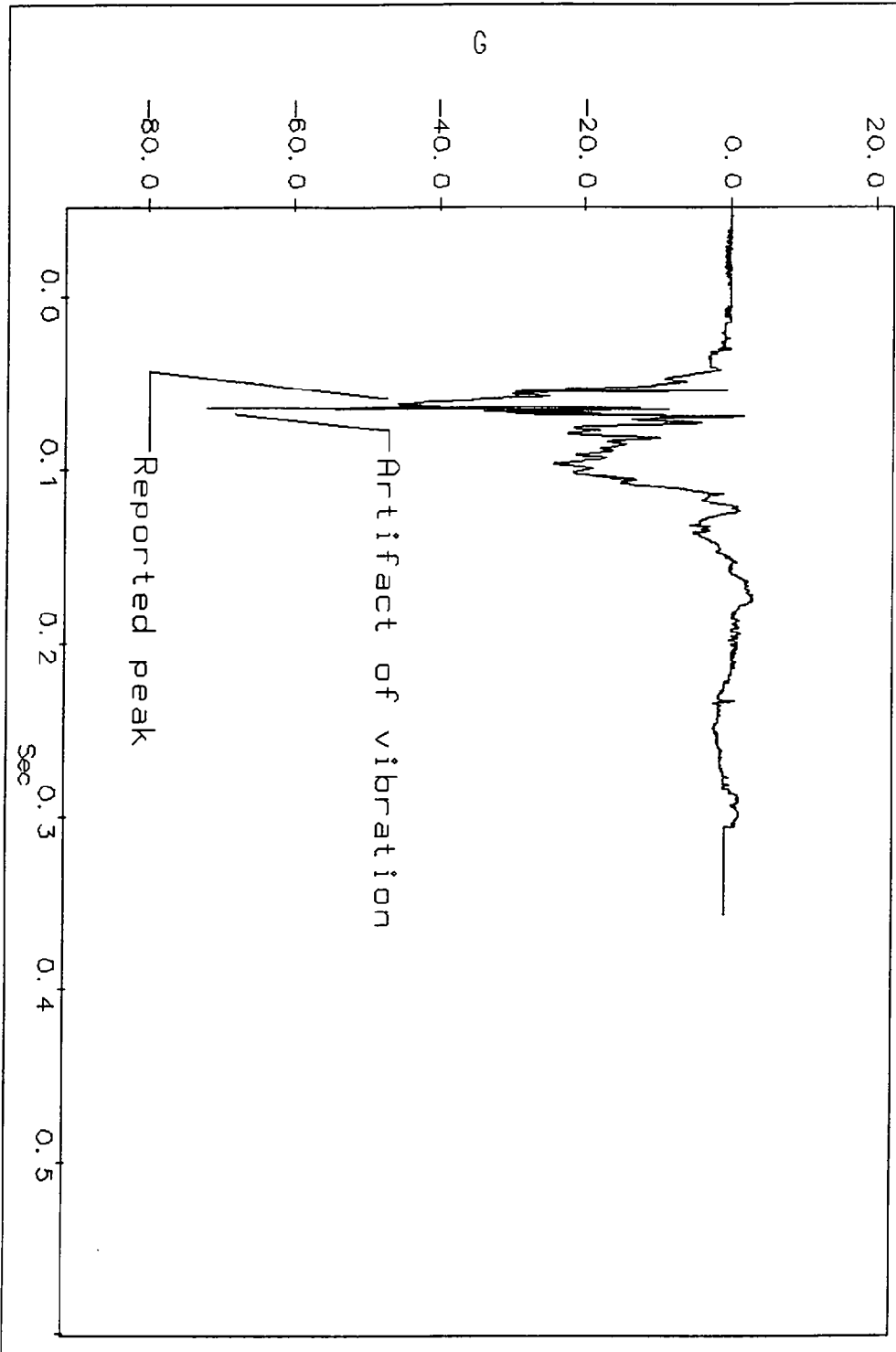
A-42 95030 Ford Explorer XLT 1996 R Lower Tibia Axial Force



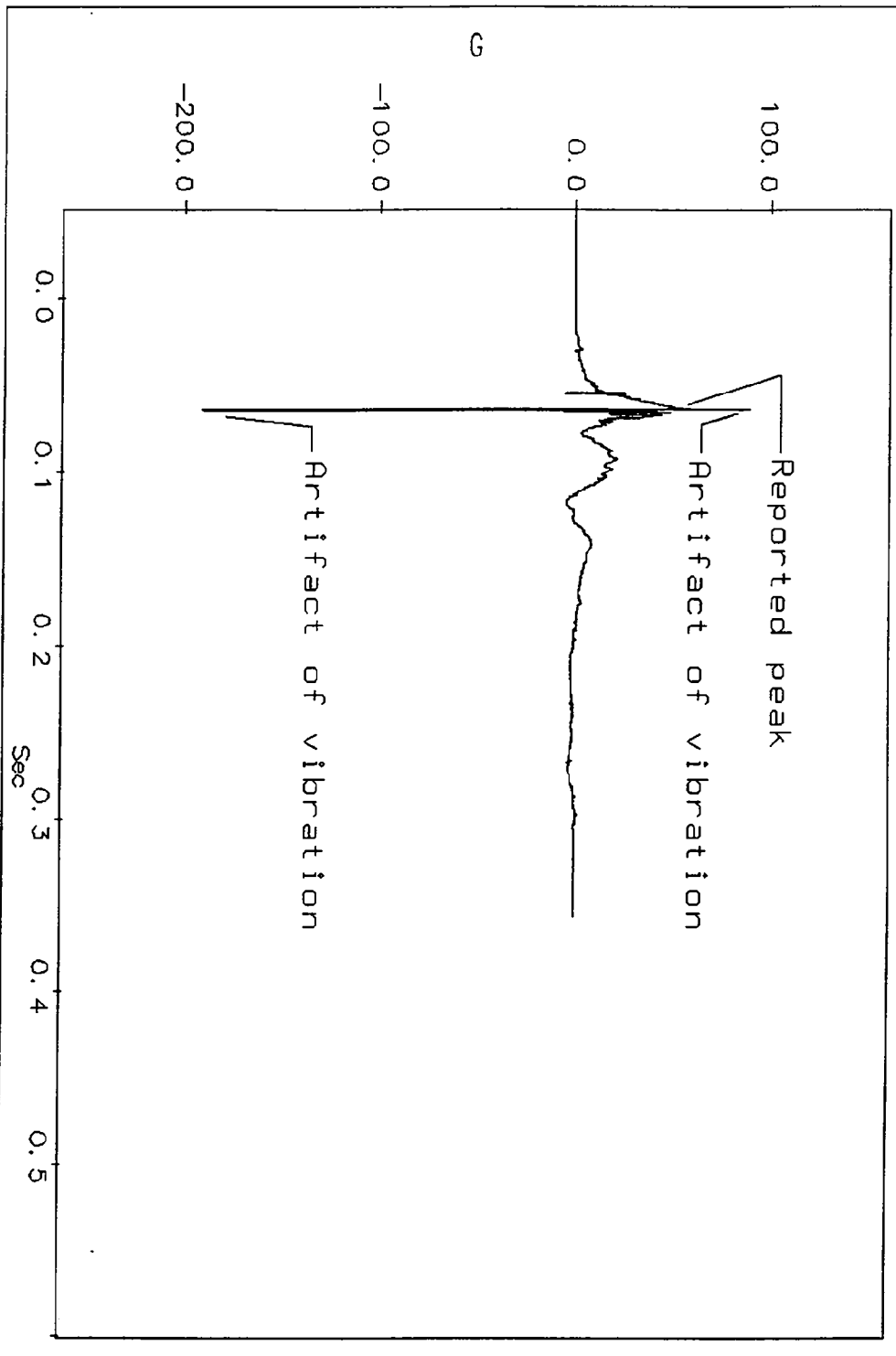
A-43 95030 Ford Explorer XLT 1996 Right Foot Vector Accel.



A-43a 95030 Ford Explorer XLT 1996 Right Foot A-P Accel.



A-43b 95030 Ford Explorer XLT 1996 Right Foot I-5 Accel.



QUALITY IS JOB!

# EXPLORER

1996 EXPLORER 4X4 4WD 4DR  
 XLT 112 WB  
 4.0L EFI V6 ENGINE  
 AUTOMATIC OVERDRIVE TRANS

VIN 1FMDU34X6TU A0662

EXTERIOR MOCHA FROST CLEARCOAT ME  
 INTERIOR SADDLE CLOTH CAPTAIN CHA

### STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

#### SAFETY/SECURITY

- DRIVER & PASS SRS AIR BAGS
- 4-WHEEL ANTI-LOCK BRAKES
- SIDE DOOR GUARD BEAMS
- REAR CTR HI-MNT STOP LAMP
- ADJ SEAT HEAD RESTRAINTS
- ILLUMINATED ENTRY DR LOCKS
- CHILD-PROOF REAR DR LOCKS
- TWO-STEP UNLOCKING

#### FUNCTIONAL

- CONTROL-TRAC 4-WHEEL DRIVE
- ELEC SHIFT TRANSFER CASE
- PHR RACK & PINION STEERING
- 4-WHEEL INDEPENDENT FRONT SUSP
- 2-WHEEL POWER DISC BRAKES
- SUPER ENGINE COOLING
- SOLAR LINTES WINDSHIELD
- HVI DUTY GAS SACK ABSORB
- 100K MILE TUNE-UP INTERVAL

#### EXTERIOR

- P225/70R15 BSH A/S TIRES
- LUXURY CAST ALUM WHEELS
- SPEED SENSITIVE FRT WIPERS
- REAR INTER WIPER/DEFROST

#### INTERIOR

- CFC FREE ATR CONDITIONING
- ELEC AN/EM STEREO W/CLOCK
- CLOTH CAPTAIN'S CHAIRS
- PHR MIRRORS/LOCKS/MIRRORS
- ILLUMINATED CONTROLS
- SPEED CONTROL/TILT WHEEL
- PHR LIFTGATE LOCK/UNLOCK
- EXTRA 12V POWERPOINT
- LOAD FLOOR TIE-DOWNS
- FOUR-GAGE CLUSTER W/TACH
- ACCESSORY DELAY
- HARBORLY
- 100K MILE BUMPER TO BUMPER
- ROADSIDE ASSISTANCE

### PRICE INFORMATION

Manufacturer's Suggested Retail Price

STANDARD VEHICLE PRICE **\$25,585.00**

#### OPTIONAL EQUIPMENT

1996 MODEL YEAR	
PREFERRED EQUIPMENT PKG 941A	350.00
RADIO ELEC PREM W/CASS/CLOCK	230.00
LUGGAGE RACK	NO CHARGE
AUTOMATIC OVERDRIVE TRANS	945.00
P235 OWL ALL-TERRAIN TIRES	230.00
3.55 RATIO REGULAR AXLE	NO CHARGE
FLOOR MATS/CARGO COVER GROUP	125.00
FLOOR MATS/COLOR-KEY CARPET	
CARGO AREA COVER	
TWO-STEP UNLOCK CREDIT	50.00
FRONT LICENSE PLATE BRACKET	NO CHARGE
<b>TOTAL VEHICLE &amp; OPTIONS</b>	<b>27,185.00</b>
<b>DESTINATION &amp; DELIVERY</b>	<b>500.00</b>
<b>TOTAL BEFORE DISCOUNTS</b>	<b>27,685.00</b>

OPTION PACKAGE SAVINGS COMPARED WITH BUYING THESE OPTIONS SEPARATELY **- 350.00**

Compare this vehicle to others in the class. Mileage guide available at the dealer.

CITY MPG

15



HIGHWAY MPG

20

Actual Mileage will vary with options, driving conditions, driving habits and vehicle's condition. Results reported to EPA indicate that the majority of vehicles with these estimates will achieve between

12 and 18 mpg in the city and between 17 and 23 mpg on the highway.

1996 EXPLORER 4WD, 4.0 LITER ENGINE, (FEEDBACK FUEL SYSTEM) & CYLINDERS, FUEL INJECTION, CATALYST, 4-SPEED AUTOMATIC.

Estimated Annual Fuel Cost: \$ 1058

A RANGE OF FUEL ECONOMY VALUES FOR OTHER VEHICLES CLASSIFIED AS SPECIAL PURPOSE IS NOT AVAILABLE AT THIS TIME.

For Comparison Shopping all vehicles classified as SEE NOTE BELOW have been issued mileage ratings ranging from to mpg city and to mpg highway.

This vehicle is equipped with an engine that has a 100,000 mile tune-up interval.

**TOTAL \$27,335.00**

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EDDINS FORD, INC.  
 P.O. BOX 557  
 MADISON

VA 22727

SHIP TO: ...

SHIP THROUGH

ITEM#: 27H61

1FMDU34X6TUA06621

27J 451 LOUISVILLE

DATE: 03/22