

REPORT NUMBER: NCAP-MGA-2001-010

**NEW CAR ASSESSMENT PROGRAM
CHILD RESTRAINT SYSTEM IN
FRONTAL BARRIER IMPACT TEST**

**Volvo Cars of North America, Inc
2001 Volvo S60 4 door
NHTSA NUMBER: M15900**

**PREPARED BY:
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February 2, 2001

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-01-D-12005.

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TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Purpose and Test Procedure	1
2	Post-Test Observations	2
3	Hybrid III 3 Year Old ATD Injury Criteria and Sensor Data	3
4	Dummy Dimensions	5
5	Child Seat Photographs	6
6	Child and Vehicle Data Plots	22
7	Child Dummy Calibration Data Traces and Tables	102
8	Test Equipment and Instrumentation Calibration	131
9	Child Seat Owner's Manual Restraint Instructions	134

SECTION 1

PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This 35 mph (56.3 km/h) frontal barrier impact test is part of the FY' 01 New Car Assessment Program (NCAP) frontal barrier crashworthiness evaluation program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract Number DTNH22-01-D-12005. The purpose of this test is to obtain child seat research data for a frontal barrier impact. The impact velocity used in this test is in excess of the current 30 mph (48.3 km/h) FMVSS 208/212/219/301 requirements.

1.2 TEST PROCEDURE

This 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Test Procedure, dated December 1999 and the corresponding MGA Research Corporation Test Procedure NHTSA3, dated January 5, 2001.

The test was conducted at MGA Research Corporation on February 2, 2001 at a speed of 56.3 km/h. The specified impact velocity range was 55.5 to 57.1 km/h. The frontal barrier impact event was documented by one (1) real-time panning motion picture camera and sixteen (16) high-speed motion picture cameras.

The test vehicle contained four (4) anthropomorphic test devices (ATDs). Two (2) part 572O 5th percentile adult female ATDs and two (2) part 572P 3 year old ATDs. Both adult ATDs were instrumented with head, chest and pelvic tri-axial accelerometers, left and right femur load cells, upper and lower tibia sensors, and foot accelerometers. In addition, chest displacement and upper neck six-axis force and moment sensors were utilized. The adult ATDs were positioned in the front outboard seating positions according to the dummy placement procedures specified in the Laboratory Indicant Test Procedure. Both child ATDs were instrumented with head, chest, and pelvic tri-axial accelerometers, and upper and lower neck load cells. The child ATDs were positioned according to the child seat manufacturer's instructions. One hundred forty-three (143) channels of data were recorded with an EME on-board data acquisition system. The data was digitally sampled at 10,000 samples per second and processed per section IP11 of the Laboratory Test Procedure.

The adult ATD data will not be presented in this report. This report will contain only the child dummy information.

SECTION 2
POST-TEST OBSERVATIONS

Test Vehicle: 2001/Volvo/S60/4 Door

NHTSA No.: M15900

Test Program: NCAP

Test Date: February 2, 2001

	Left Rear Passenger	Right Rear Passenger
Child Seat	Century STE	Evenflo Horizon V
Child Seat Mass (kg)	4.5	4.5
Belt Fraying	None	None
Stress Marks	None	None
Cracks	None	None
Buckle Stress	None	None
Latch Hooks	Not used	Not used
Contact	Feet to seatback	Feet to seatback

SECTION 3

HYBRID III 3 YEAR OLD ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2001/Volvo/S60/4 Door

NHTSA No.: M15900

Test Program: NCAP

Test Date: February 2, 2001

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Left Rear Passenger				Right Rear Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	32.1	211	54.1	91	47.5	199	57.7	90
Head CG	Y	G's	6.6	54	27.3	91	41.0	90	9.0	103
Head CG	Z	G's	79.5	78	9.7	47	82.3	80	9.2	40
Head CG	N/A	G's	82.4	78			85.0	80		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Left Rear Passenger				Right Rear Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	8.4	224	43.5	63	8.1	172	42.5	67
Chest CG	Y	G's	2.6	43	4.5	61	4.8	108	4.8	60
Chest CG	Z	G's	17.8	85	40.5	63	20.5	84	34.1	64
Chest CG Resultant	N/A	G's	59.4	63			54.1	66		

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Left Rear Passenger				Right Rear Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Tether	N/A	Newtons								

HEAD INJURY CRITERIA (HIC)

Location	Left Rear Passenger				Right Rear Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Primary (36 msec)	1057	25.9	64.1	95.9	1091	27.4	64.3	92.1
Head CG Primary (15 msec)	744	30.1	72.0	87.0	817	31.2	71.7	86.7

CHEST CLIP (3 MSEC)

Location	Left Rear Passenger			Right Rear Passenger		
	Clip	T ¹	T ²	Clip	T ¹	T ²
Chest CG Primary	57.5	61.2	64.3	53.2	64.0	67.1

HYBRID III 3 YEAR OLD ATD INJURY CRITERIA AND SENSOR DATA...(continued)

Test Vehicle: 2001/Volvo/S60/4 Door

NHTSA No.: M15900

Test Program: NCAP

Test Date: February 2, 2001

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Left Rear Passenger				Right Rear Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	22.1	131	63.7	60	24.1	108	59.9	67
Pelvis	Y	G's	6.0	54	8.9	70	4.3	125	7.6	54
Pelvis	Z	G's	11.7	212	48.2	65	17.0	202	42.6	65

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Left Rear Passenger				Right Rear Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	40.0	45	767.6	93	87.2	178	675.9	95
Neck Force	Y	Newtons	123.7	55	68.4	78	86.4	207	90.4	44
Neck Force	Z	Newtons	2073.8	81	271.5	33	2148.7	80	298.7	45
Neck Moment	X	N"m	8.0	62	4.2	88	5.3	90	7.7	105
Neck Moment	Y	N"m	14.3	93	18.4	62	13.1	91	19.0	209
Neck Moment	Z	N"m	2.9	45	5.6	96	4.3	94	2.0	50

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Left Rear Passenger				Right Rear Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	317.3	206	1528.	82	258.3	196	1619.9	83
Neck Force	Y	Newtons	82.4	120	100.7	101	68.7	195	124.4	92
Neck Force	Z	Newtons	1447.6	77	474.0	47	1481.9	78	336.7	43
Neck Moment	X	N"m	18.3	56	11.6	90	12.8	90	13.3	46
Neck Moment	Y	N"m	136.0	90	17.9	206	115.3	84	16.8	196
Neck Moment	Z	N"m	10.6	90	3.1	147	5.6	114	5.9	89

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Left Rear Passenger				Right Rear Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	mm			12.4	98			19.7	89

SECTION 4
DUMMY DIMENSIONS

Test Vehicle: 2001/Volvo/S60/4 Door

NHTSA No.: M15900

Test Program: NCAP

Test Date: February 2, 2001

Code	Measurement Description	Left Rear Passenger	Right Rear Passenger
		Length (mm)	Length (mm)
HZ	Head to Roof (Z)	348	333
HS	Head to Side Window (Y)	441	425
	Head to Seatback	571	578
	Chin to Clip	55	60
KK	Knee to Knee	113	114
KDL	Left Knee to Seatback	264	308
KDR	Right Knee to Seatback	242	302

SECTION 5
CHILD SEAT PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

<u>Photographs</u>	<u>Page No.</u>
Photo 1 - Pre-Test LRS 3 Year Old Left Side View	8
Photo 2 - Post-Test LRS 3 Year Old Left Side View	9
Photo 3 - Pre-Test LRS 3 Year Old Left Side View (Door Open)	10
Photo 4 - Post-Test LRS 3 Year Old Left Side View (Door Open)	11
Photo 5 - Pre-Test LRS 3 Year Old Right Side View	12
Photo 6 - Pre-Test LRS 3 Year Old Right Side View (Door Open)	13
Photo 7 - Post-Test LRS 3 Year Old Right Side View (Door Open)	14
Photo 8 - Post-Test LRS Car Seat View	15
Photo 9 - Post-Test LRS Car Seat View	16
Photo 10 - Post-Test LRS Car Seat View	17
Photo 11 - Post-Test RRS Car Seat View	18
Photo 12 - Post-Test RRS Car Seat View	19
Photo 13 - Pre-Test RRS Top Tether View	20
Photo 14 - Pre-Test LRS Top Tether View	21



Photo 1 - Pre-Test LRS 3 Year Old Left Side View



Photo 2 - Post-Test LRS 3 Year Old Left Side View



Photo 3 - Pre-Test LRS 3 Year Old Left Side View (Door Open)



Photo 4 - Post-Test LRS 3 Year Old Left Side View (Door Open)



Photo 5 - Pre-Test RRS 3 Year Old Right Side View



Photo 6 - Pre-Test RRS 3 Year Old Right Side View (Door Open)



Photo 7 - Post-Test RRS 3 Year Old Right Side View (Door Open)



Photo 8 - Post-Test LRS Car Seat View



Photo 9 - Post-Test LRS Car Seat View

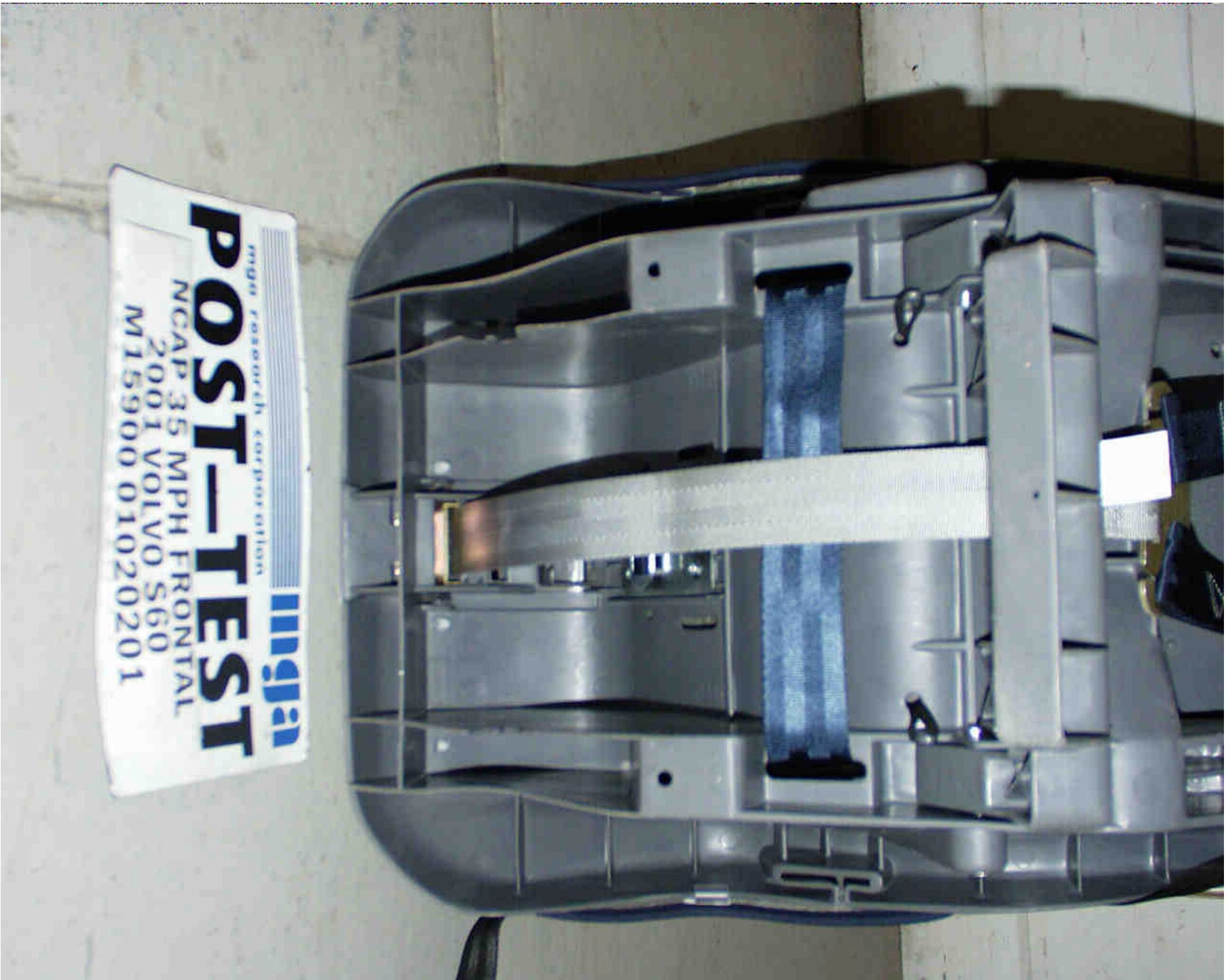


Photo 10 - Post-Test LRS Car Seat View



Photo 11 - Post-Test RRS Car Seat View

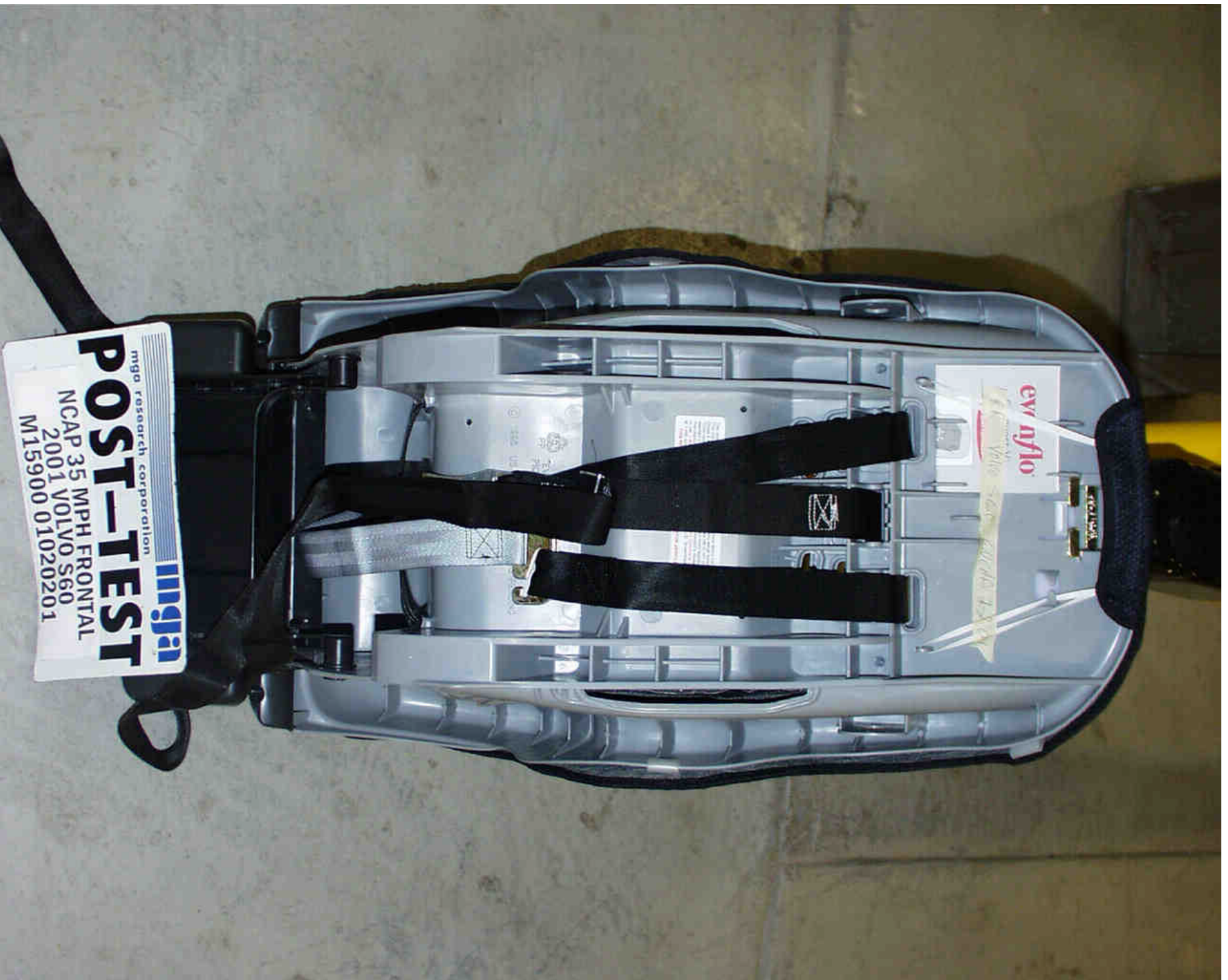


Photo 12 - Post-Test RRS Car Seat View



Photo 13 - Pre-Test RRS Top Tether View



Photo 14 - Pre-Test LRS Top Tether View

SECTION 6
CHILD AND VEHICLE DATA PLOTS

TABLE OF DATA PLOTS

<u>Data Plots</u>	<u>Page No.</u>
Figure 1 - LRS 3 Year Old Head X Acceleration vs. Time	26
Figure 2 - LRS 3 Year Old Head Y Acceleration vs. Time	27
Figure 3 - LRS 3 Year Old Head Z Acceleration vs. Time	28
Figure 4 - LRS 3 Year Old Head Resultant Acceleration vs. Time	29
Figure 5 - LRS 3 Year Old Head X Velocity vs. Time	30
Figure 6 - LRS 3 Year Old Upper Neck Force X vs. Time	31
Figure 7 - LRS 3 Year Old Upper Neck Force Y vs. Time	32
Figure 8 - LRS 3 Year Old Upper Neck Force Z vs. Time	33
Figure 9 - LRS 3 Year Old Upper Neck Force Resultant vs. Time	34
Figure 10 - LRS 3 Year Old Upper Neck Force Moment X vs. Time	35
Figure 11 - LRS 3 Year Old Upper Neck Force Moment Y vs. Time	36
Figure 12 - LRS 3 Year Old Upper Neck Force Moment Z vs. Time	37
Figure 13 - LRS 3 Year Old Upper Neck Force Moment Resultant vs. Time	38
Figure 14 - LRS 3 Year Old Lower Neck Force X vs. Time	39
Figure 15 - LRS 3 Year Old Lower Neck Force Y vs. Time	40
Figure 16 - LRS 3 Year Old Lower Neck Force Z vs. Time	41
Figure 17 - LRS 3 Year Old Lower Neck Force Resultant vs. Time	42
Figure 18 - LRS 3 Year Old Lower Neck Moment X vs. Time	43
Figure 19 - LRS 3 Year Old Lower Neck Moment Y vs. Time	44
Figure 20 - LRS 3 Year Old Lower Neck Moment Z vs. Time	45
Figure 21 - LRS 3 Year Old Lower Neck Moment Resultant vs. Time	46
Figure 22 - LRS 3 Year Old Chest X Acceleration vs. Time	47
Figure 23 - LRS 3 Year Old Chest Y Acceleration vs. Time	48
Figure 24 - LRS 3 Year Old Chest Z Acceleration vs. Time	49
Figure 25 - LRS 3 Year Old Chest Resultant Acceleration vs. Time	50
Figure 26 - LRS 3 Year Old Chest X Velocity vs. Time	51
Figure 27 - LRS 3 Year Old Chest Compression vs. Time	52
Figure 28 - LRS 3 Year Old Pelvis X Acceleration vs. Time	53
Figure 29 - LRS 3 Year Old Pelvis Y Acceleration vs. Time	54
Figure 30 - LRS 3 Year Old Pelvis Z Acceleration vs. Time	55
Figure 31 - LRS 3 Year Old Pelvis Resultant Acceleration vs. Time	56
Figure 32 - LRS 3 Year Old Pelvis X Velocity vs. Time	57

TABLE OF DATA PLOTS

<u>Data Plots</u>	<u>Page No.</u>
Figure 33 - RRS 3 Year Old Head X Acceleration vs. Time	58
Figure 34 - RRS 3 Year Old Head Y Acceleration vs. Time	59
Figure 35 - RRS 3 Year Old Head Z Acceleration vs. Time	60
Figure 36 - RRS 3 Year Old Head Resultant Acceleration vs. Time	61
Figure 37 - RRS 3 Year Old Head X Velocity vs. Time	62
Figure 38 - RRS 3 Year Old Upper Neck Force X vs. Time	63
Figure 39 - RRS 3 Year Old Upper Neck Force Y vs. Time	64
Figure 40 - RRS 3 Year Old Upper Neck Force Z vs. Time	65
Figure 41 - RRS 3 Year Old Upper Neck Force Resultant vs. Time	66
Figure 42 - RRS 3 Year Old Upper Neck Force Moment X vs. Time	67
Figure 43 - RRS 3 Year Old Upper Neck Force Moment Y vs. Time	68
Figure 44 - RRS 3 Year Old Upper Neck Force Moment Z vs. Time	69
Figure 45 - RRS 3 Year Old Upper Neck Force Moment Resultant vs. Time	70
Figure 46 - RRS 3 Year Old Lower Neck Force X vs. Time	71
Figure 47 - RRS 3 Year Old Lower Neck Force Y vs. Time	72
Figure 48 - RRS 3 Year Old Lower Neck Force Z vs. Time	73
Figure 49 - RRS 3 Year Old Lower Neck Force Resultant vs. Time	74
Figure 50 - RRS 3 Year Old Lower Neck Moment X vs. Time	75
Figure 51 - RRS 3 Year Old Lower Neck Moment Y vs. Time	76
Figure 52 - RRS 3 Year Old Lower Neck Moment Z vs. Time	77
Figure 53 - RRS 3 Year Old Lower Neck Moment Resultant vs. Time	78
Figure 54 - RRS 3 Year Old Chest X Acceleration vs. Time	79
Figure 55 - RRS 3 Year Old Chest Y Acceleration vs. Time	80
Figure 56 - RRS 3 Year Old Chest Z Acceleration vs. Time	81
Figure 57 - RRS 3 Year Old Chest Resultant Acceleration vs. Time	82
Figure 58 - RRS 3 Year Old Chest X Velocity vs. Time	83
Figure 59 - RRS 3 Year Old Chest Compression vs. Time	84
Figure 60 - RRS 3 Year Old Pelvis X Acceleration vs. Time	85
Figure 61 - RRS 3 Year Old Pelvis Y Acceleration vs. Time	86
Figure 62 - RRS 3 Year Old Pelvis Z Acceleration vs. Time	87
Figure 63 - RRS 3 Year Old Pelvis Resultant Acceleration vs. Time	88
Figure 64 - RRS 3 Year Old Pelvis X Velocity vs. Time	89

TABLE OF DATA PLOTS

<u>Data Plots</u>	<u>Page No.</u>
Figure 65 - Left Rear Seat Crossmember X Acceleration vs. Time	90
Figure 66 - Left Rear Seat Crossmember X Velocity vs. Time	91
Figure 67 - Left Rear Seat Crossmember X Displacement vs. Time	92
Figure 68 - Right Rear Seat Crossmember X Acceleration vs. Time	93
Figure 69 - Right Rear Seat Crossmember X Velocity vs. Time	94
Figure 70 - Right Rear Seat Crossmember X Displacement vs. Time	95
Figure 71 - Left Rear Seat Crossmember Redundant X Acceleration vs. Time	96
Figure 72 - Left Rear Seat Crossmember Redundant X Velocity vs. Time	97
Figure 73 - Left Rear Seat Crossmember Redundant X Displacement vs. Time	98
Figure 74 - Right Rear Seat Crossmember Redundant X Acceleration vs. Time	99
Figure 75 - Right Rear Seat Crossmember Redundant X Velocity vs. Time	100
Figure 76 - Right Rear Seat Crossmember Redundant X Displacement vs. Time	101



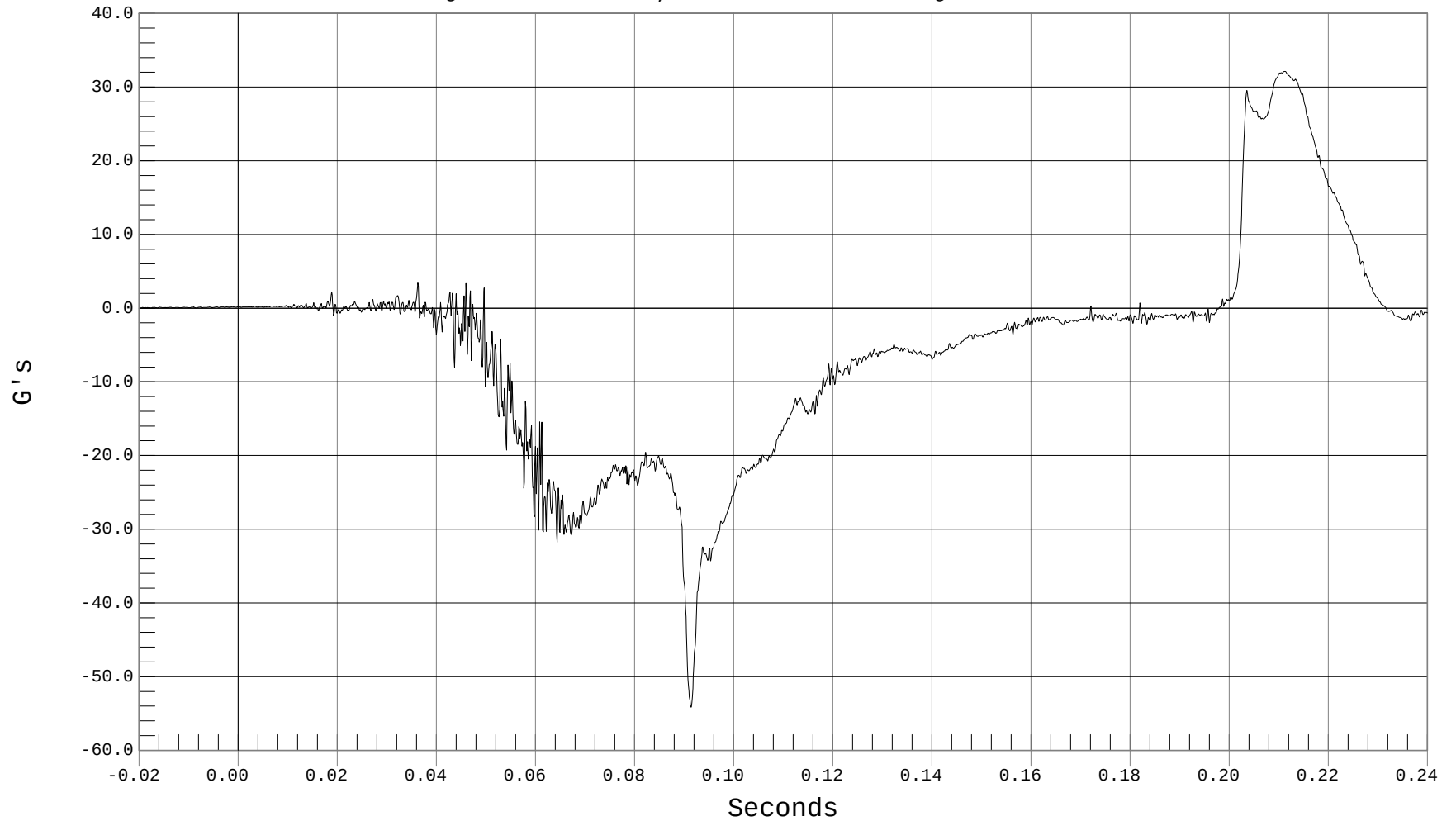
LRS 3 YR OLD HEAD X ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD HEAD X, B01011AT.A13

Ymin = -54.13 G's @ 0.0914 Seconds, Ymax = 32.13 G's @ 0.2112 Seconds





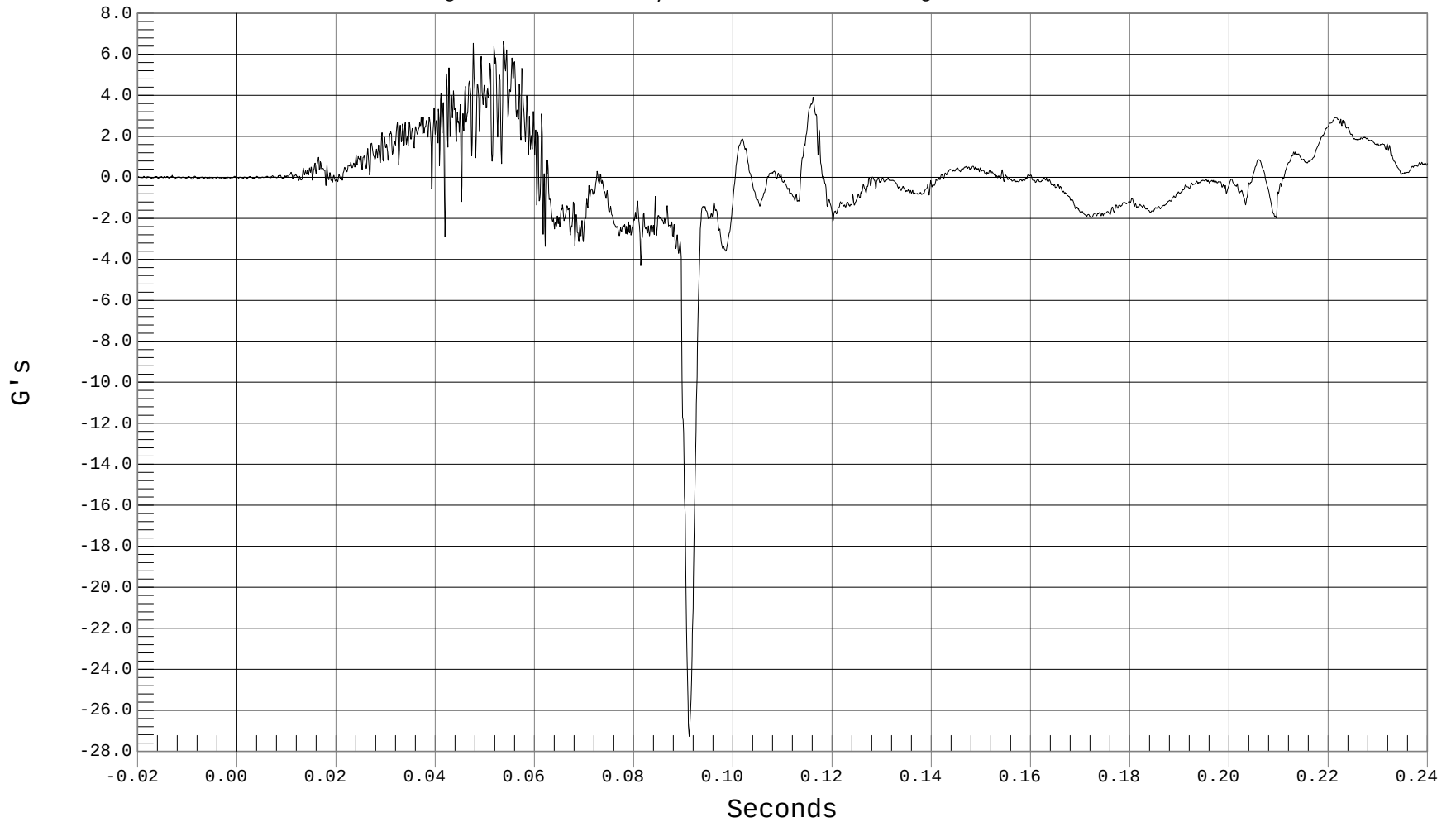
LRS 3 YR OLD HEAD Y ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD HEAD Y, B01011AT.A14

Ymin = -27.27 G's @ 0.0912 Seconds, Ymax = 6.64 G's @ 0.0538 Seconds





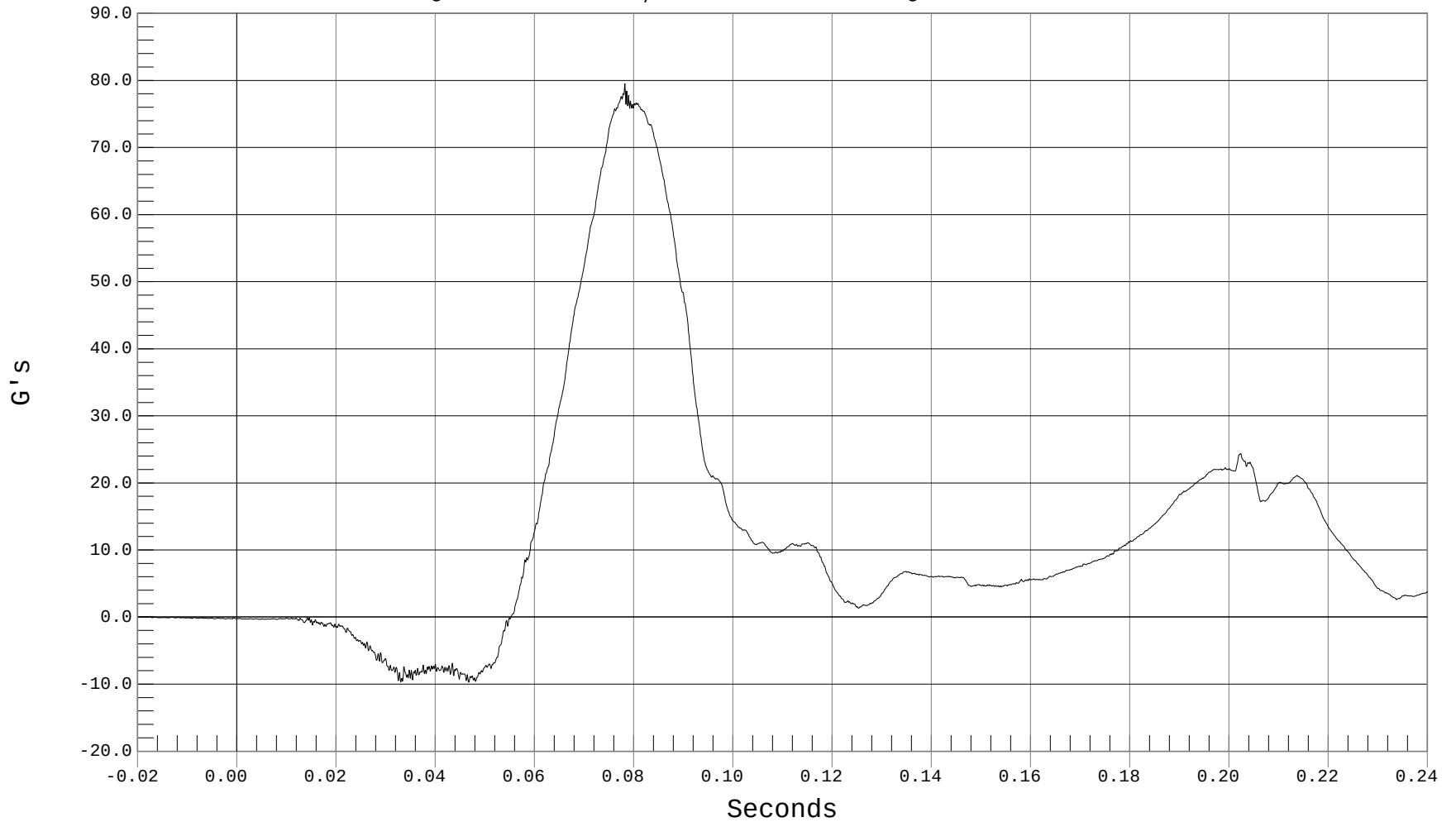
LRS 3 YR OLD HEAD Z ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD HEAD Z, B01011AT.A15

Ymin = -9.73 G's @ 0.0468 Seconds, Ymax = 79.5 G's @ 0.0783 Seconds





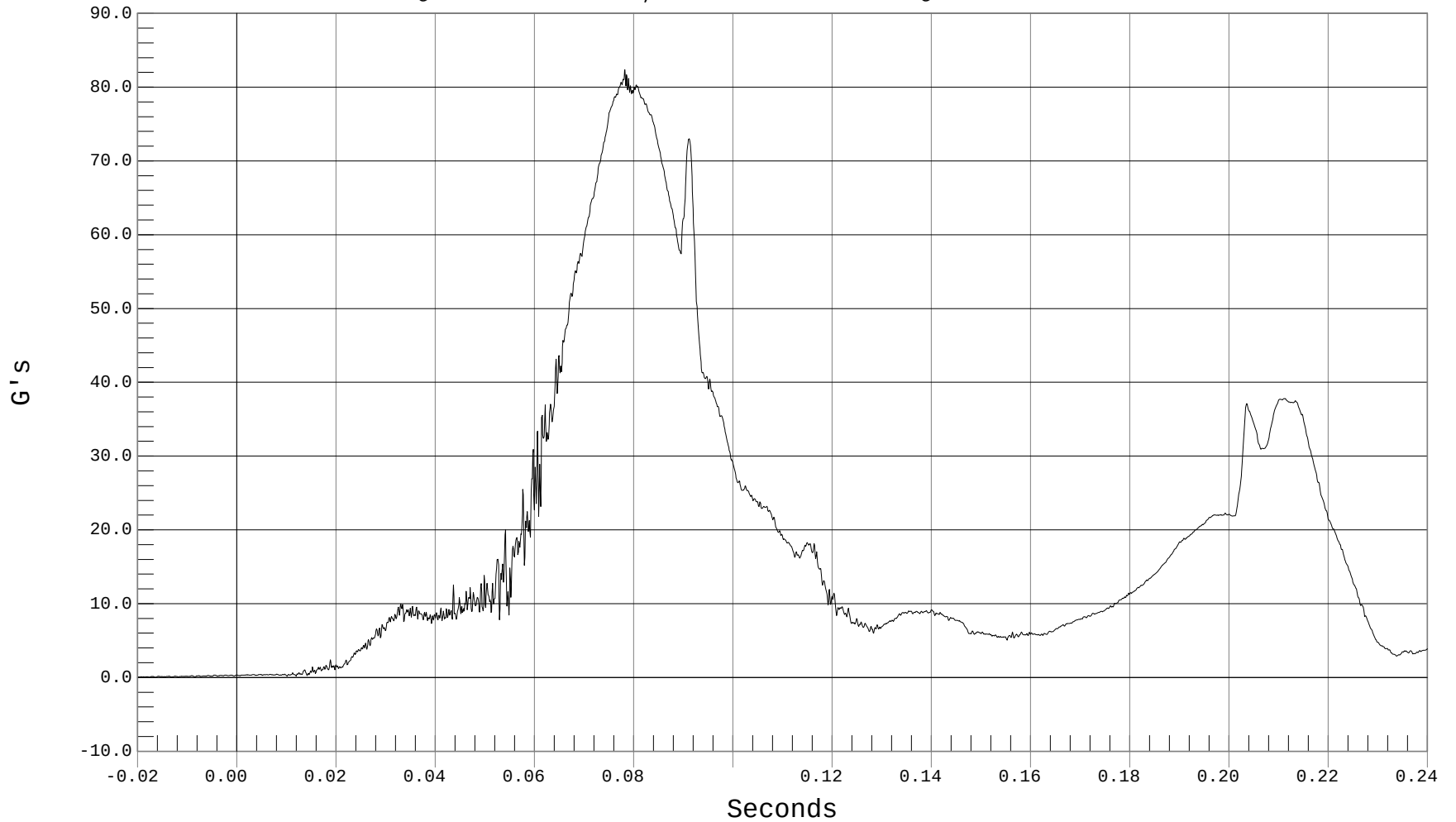
LRS 3 YR OLD HEAD RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS 3 YR OLD HEAD RESULTANT ACCELERATION, B01011AV.A13

Ymin = .03 G's @ -0.0185 Seconds, Ymax = 82.36 G's @ 0.0783 Seconds





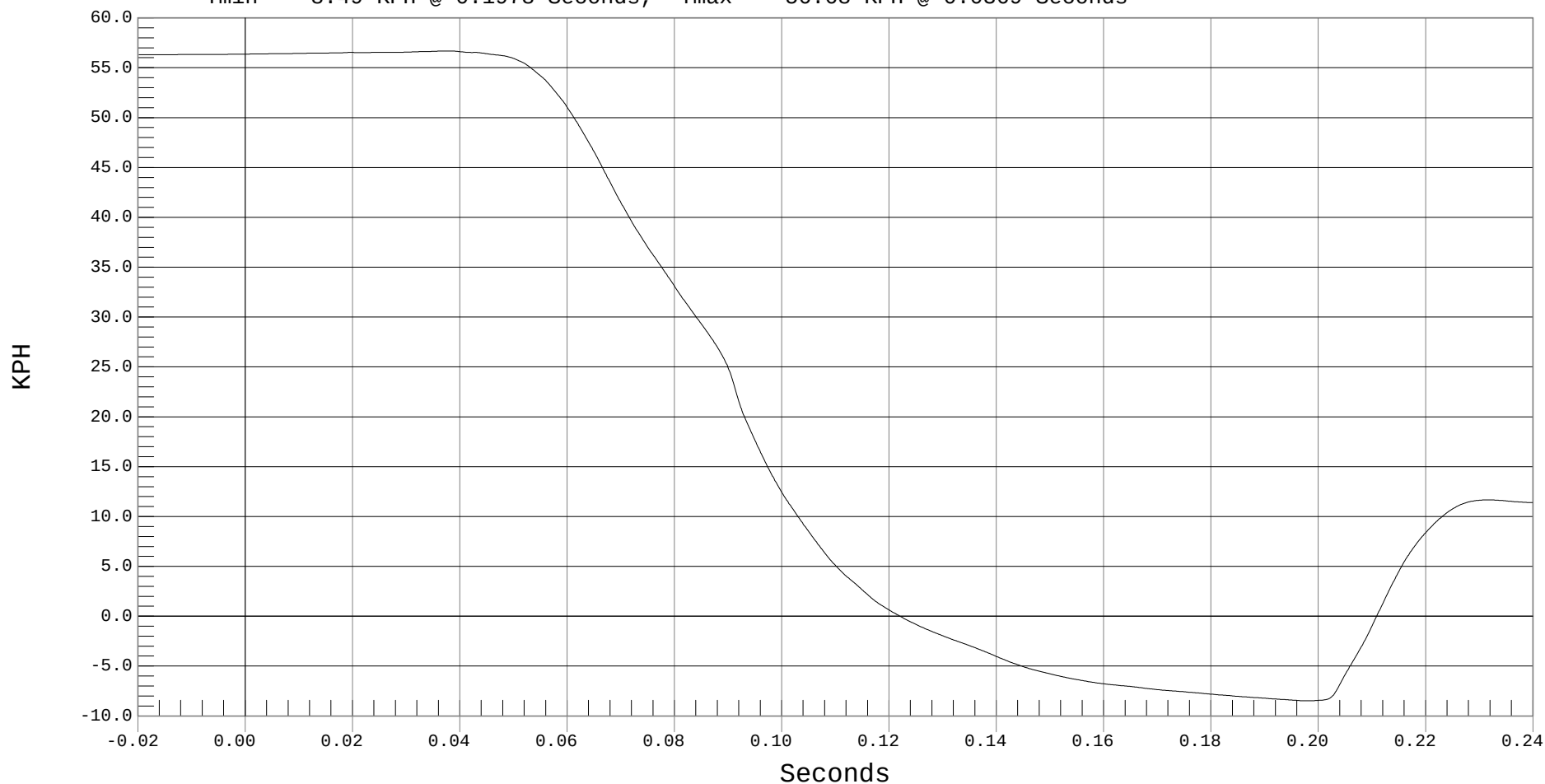
LRS 3 YR OLD HEAD X VELOCITY

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

1 LRS 3 YR OLD HEAD X VELOCITY, B01011AI.V13

Ymin = -8.49 KPH @ 0.1978 Seconds, Ymax = 56.68 KPH @ 0.0369 Seconds





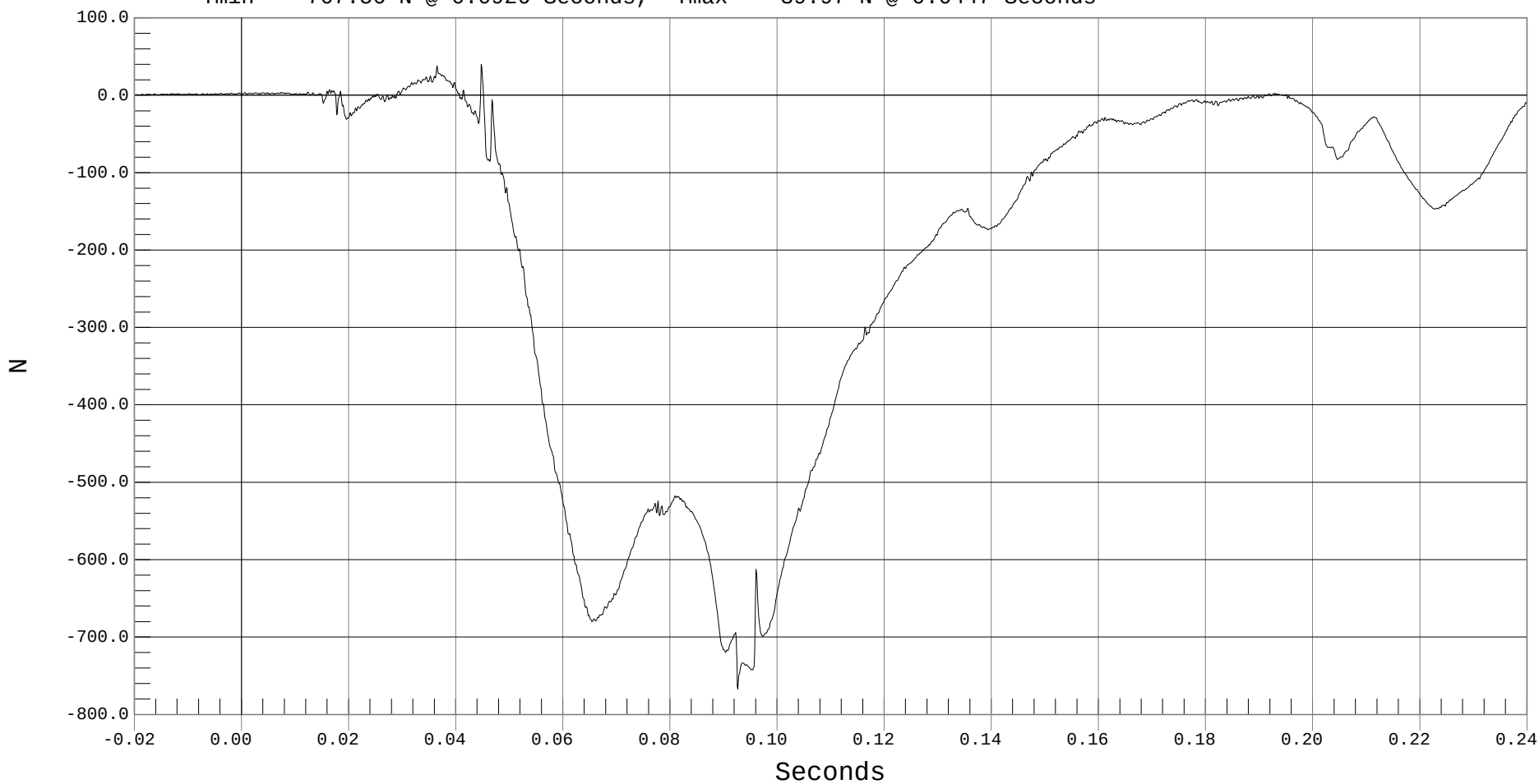
LRS 3 YR OLD UPPER NECK FORCE X

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD UPPER NECK FORCE X, B01011FM.F16

Ymin = -767.56 N @ 0.0926 Seconds, Ymax = 39.97 N @ 0.0447 Seconds





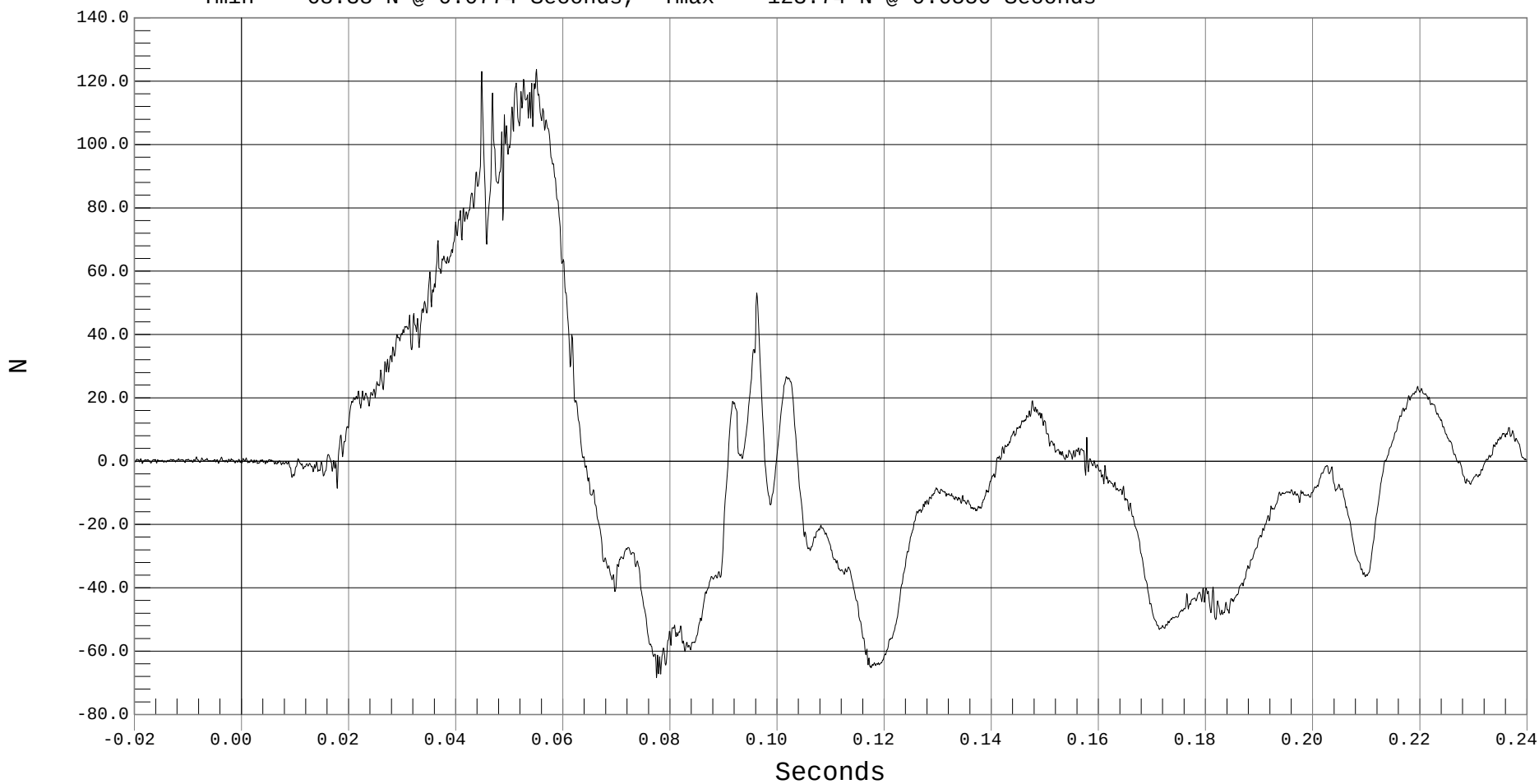
LRS 3 YR OLD UPPER NECK FORCE Y

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD UPPER NECK FORCE Y, B01011FM.F17

Ymin = -68.38 N @ 0.0774 Seconds, Ymax = 123.74 N @ 0.0550 Seconds





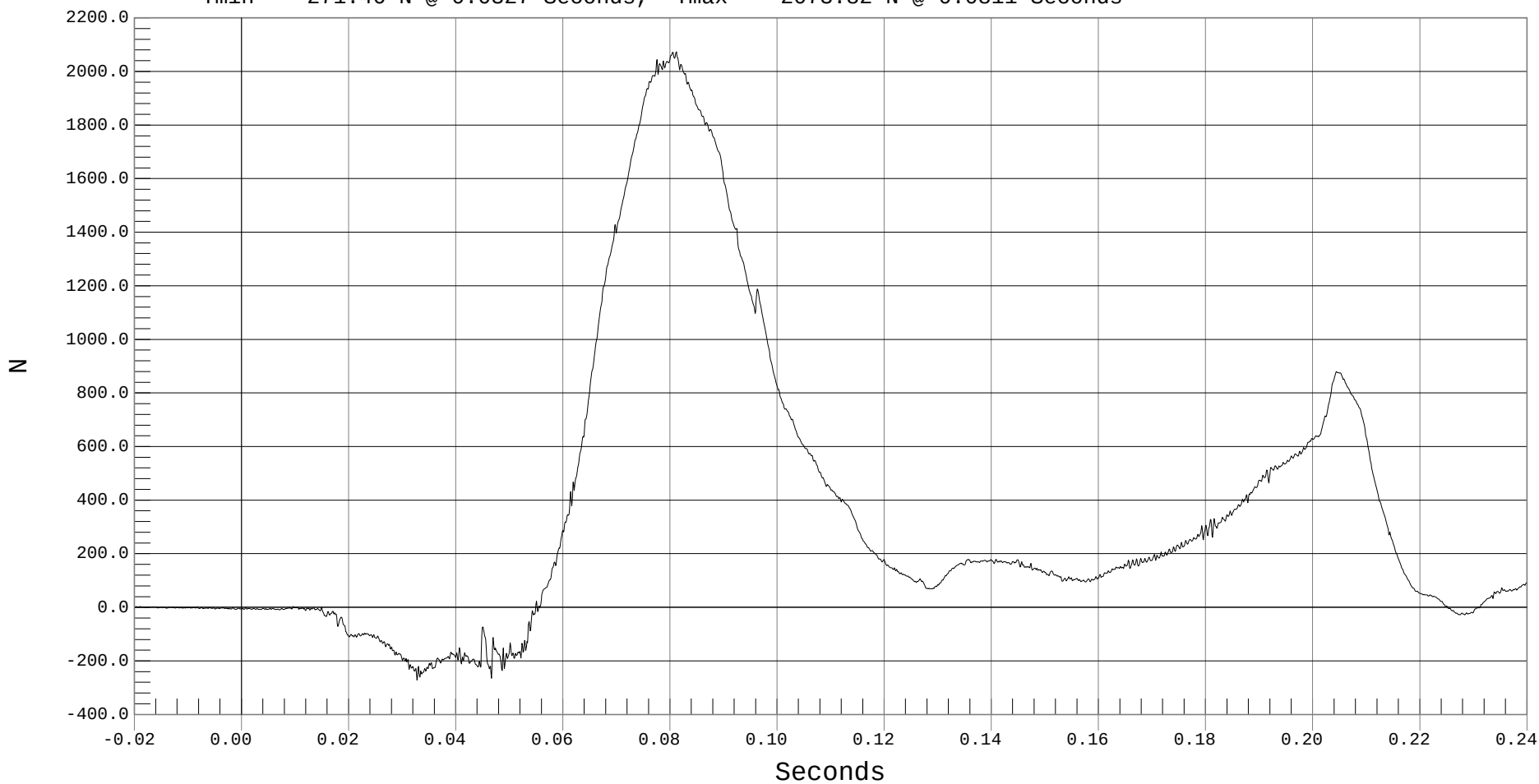
LRS 3 YR OLD UPPER NECK FORCE Z

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD UPPER NECK FORCE Z, B01011FM.F18

Ymin = -271.46 N @ 0.0327 Seconds, Ymax = 2073.82 N @ 0.0811 Seconds





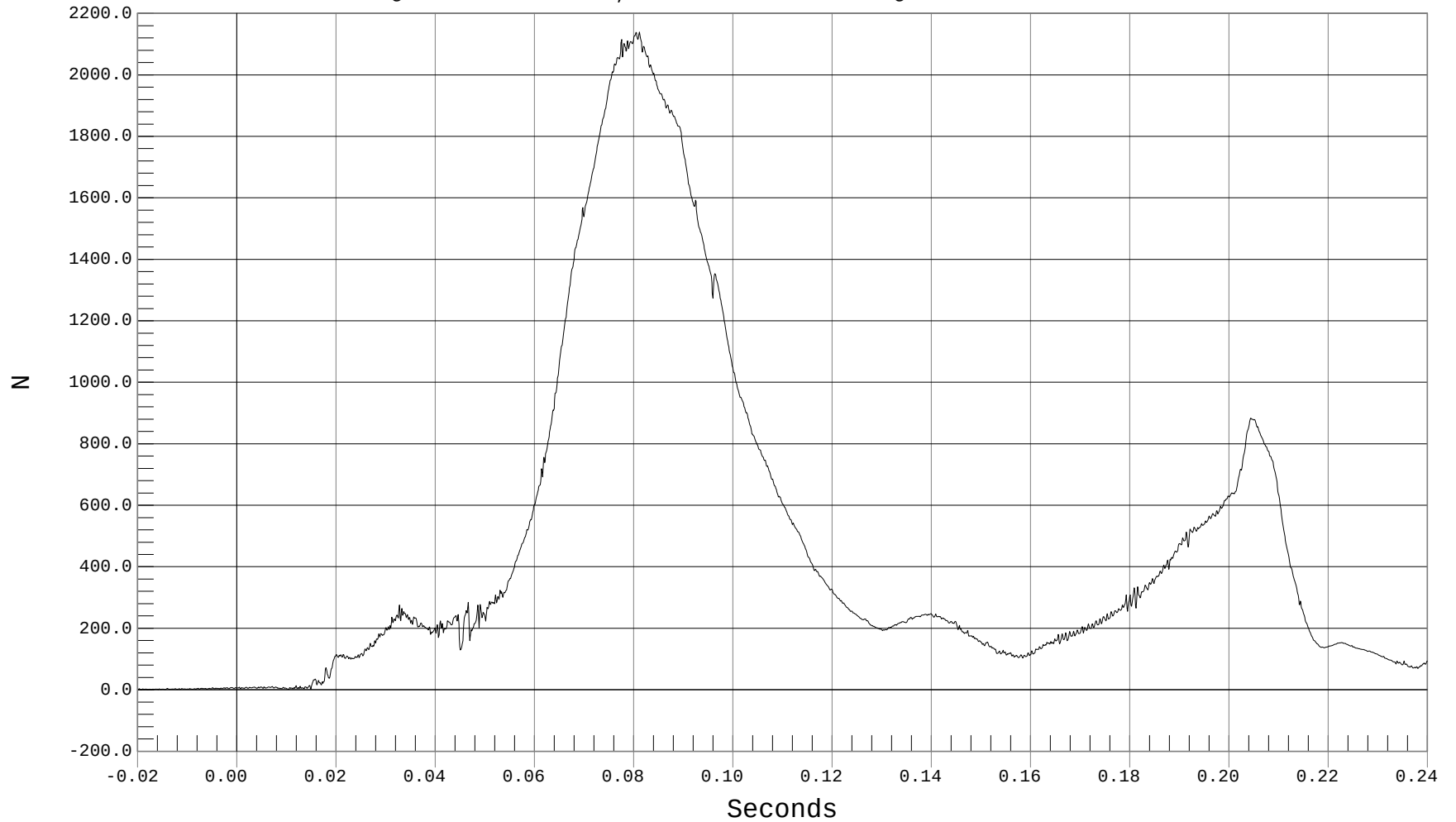
LRS 3 YR OLD UPPER NECK FORCE RESULTANT

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS 3 YR OLD UPPER NECK FORCE RESULTANT, B01011FV.F16

Ymin = .45 N @ -0.0180 Seconds, Ymax = 2138.66 N @ 0.0812 Seconds





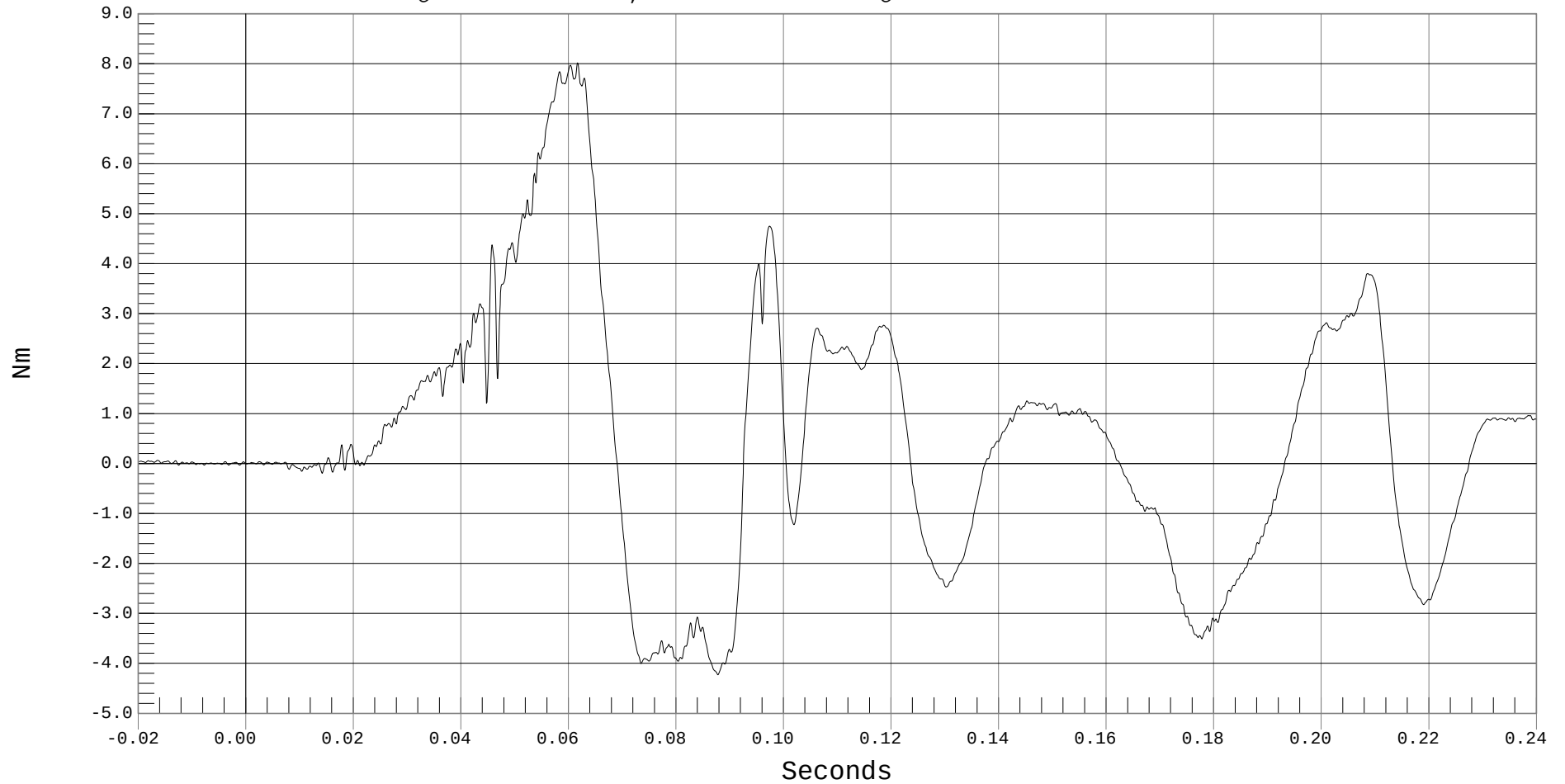
LRS 3 YR OLD UPPER NECK MOMENT X

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 LRS CHILD UPPER NECK MOMENT X, B01011MF.M19

Ymin = -4.23 Nm @ 0.0877 Seconds, Ymax = 8.02 Nm @ 0.0616 Seconds





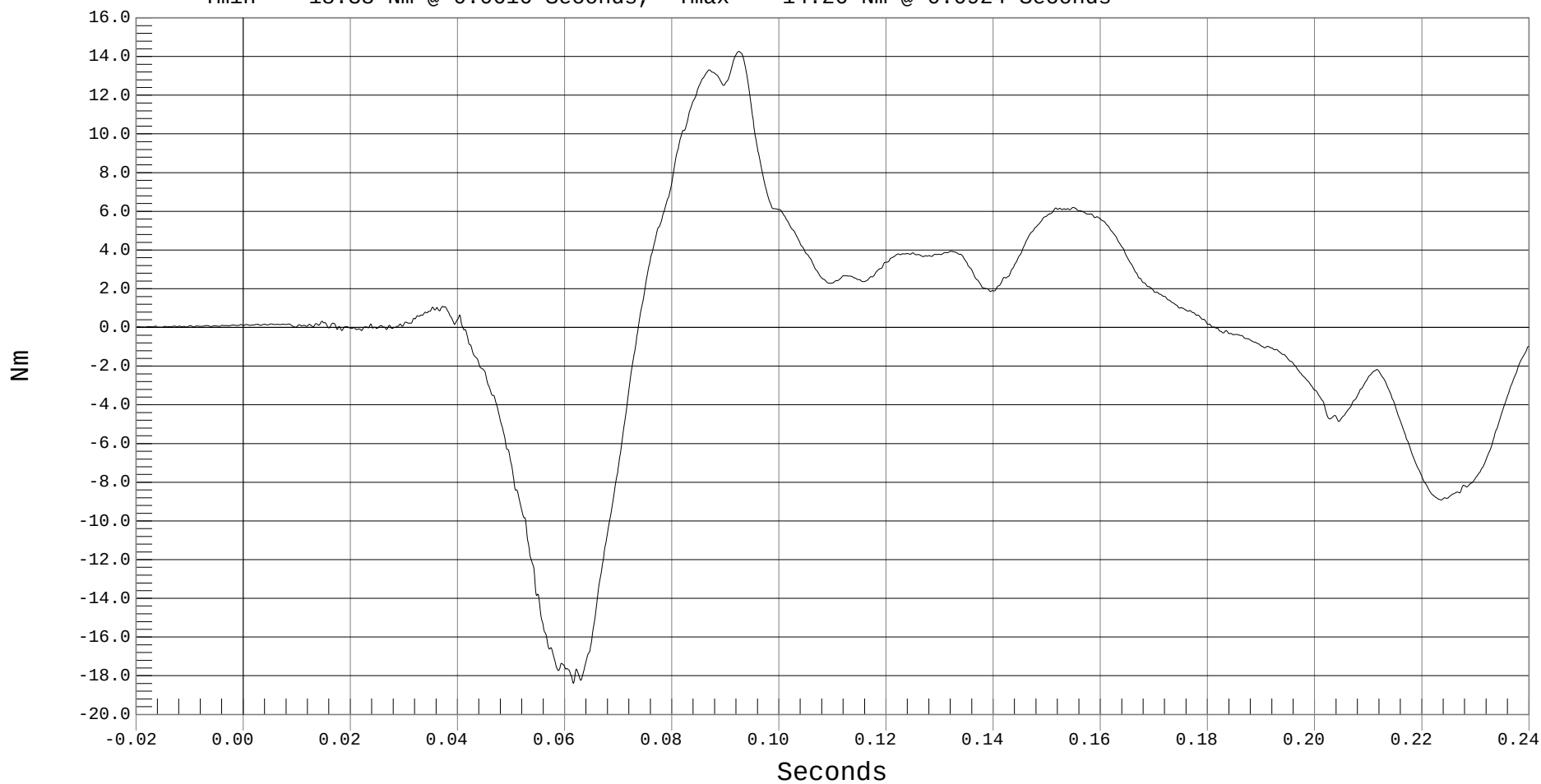
LRS 3 YR OLD UPPER NECK MOMENT Y

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 LRS CHILD UPPER NECK MOMENT Y, B01011MF.M20

Ymin = -18.38 Nm @ 0.0616 Seconds, Ymax = 14.26 Nm @ 0.0924 Seconds





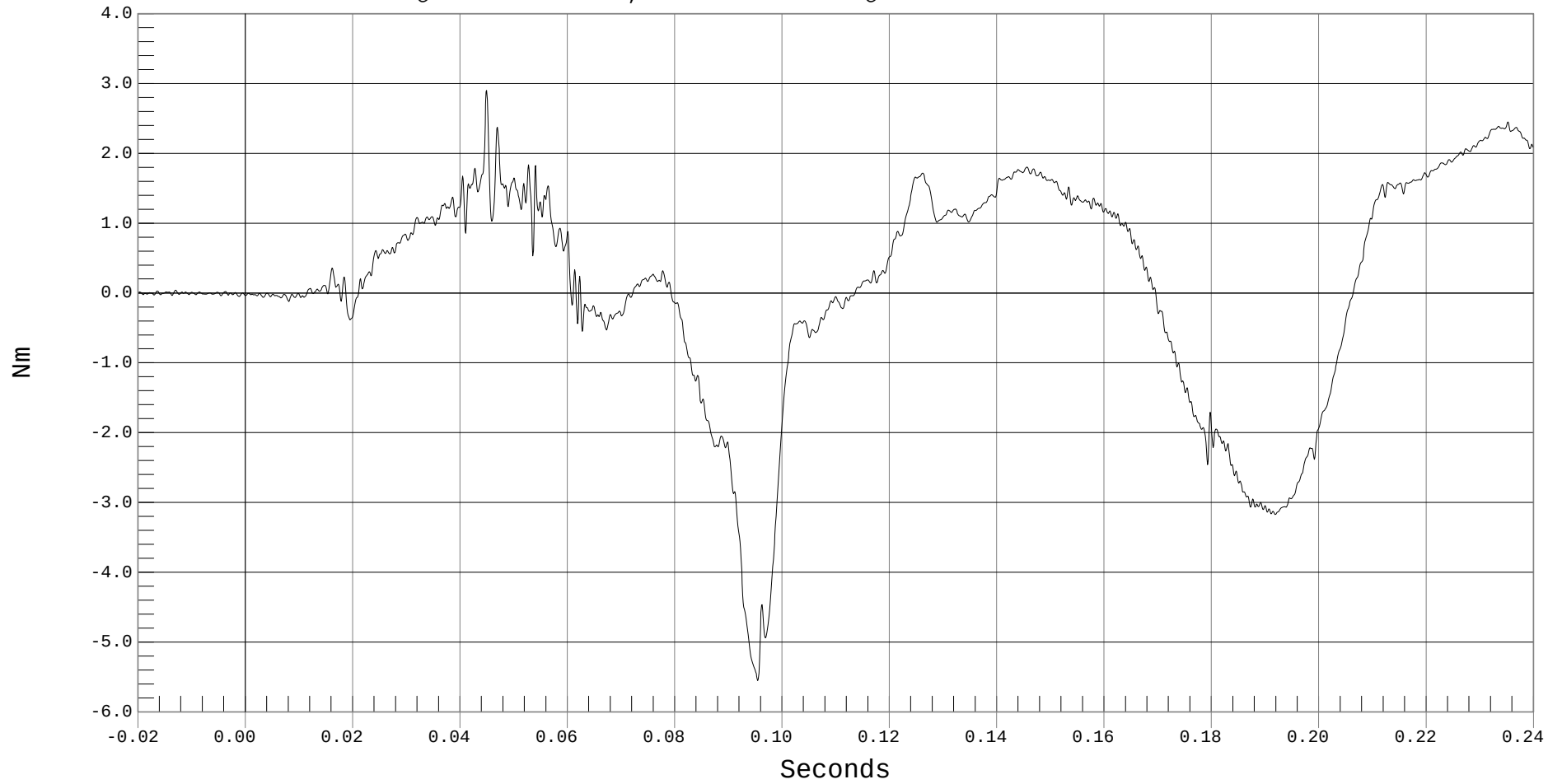
LRS 3 YR OLD UPPER NECK MOMENT Z

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 LRS CHILD UPPER NECK MOMENT Z, B01011MF.M21

Ymin = -5.55 Nm @ 0.0954 Seconds, Ymax = 2.9 Nm @ 0.0449 Seconds





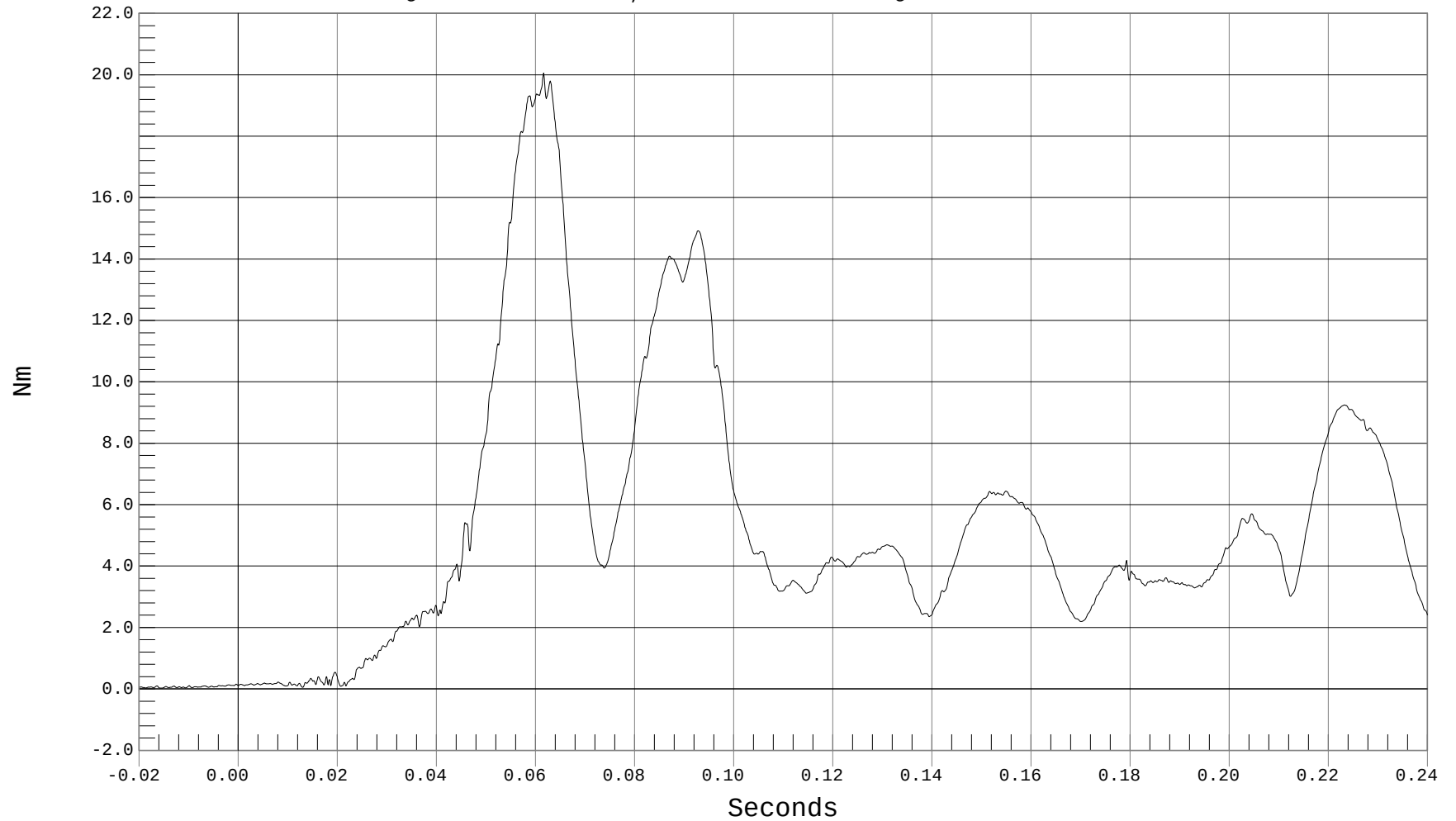
LRS 3 YR OLD UPPER NECK MOMENT RESULTANT

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 LRS 3 YR OLD UPPER NECK MOMENT RESULTANT, B01011MV.M19

Ymin = .03 Nm @ -0.0157 Seconds, Ymax = 20.06 Nm @ 0.0617 Seconds





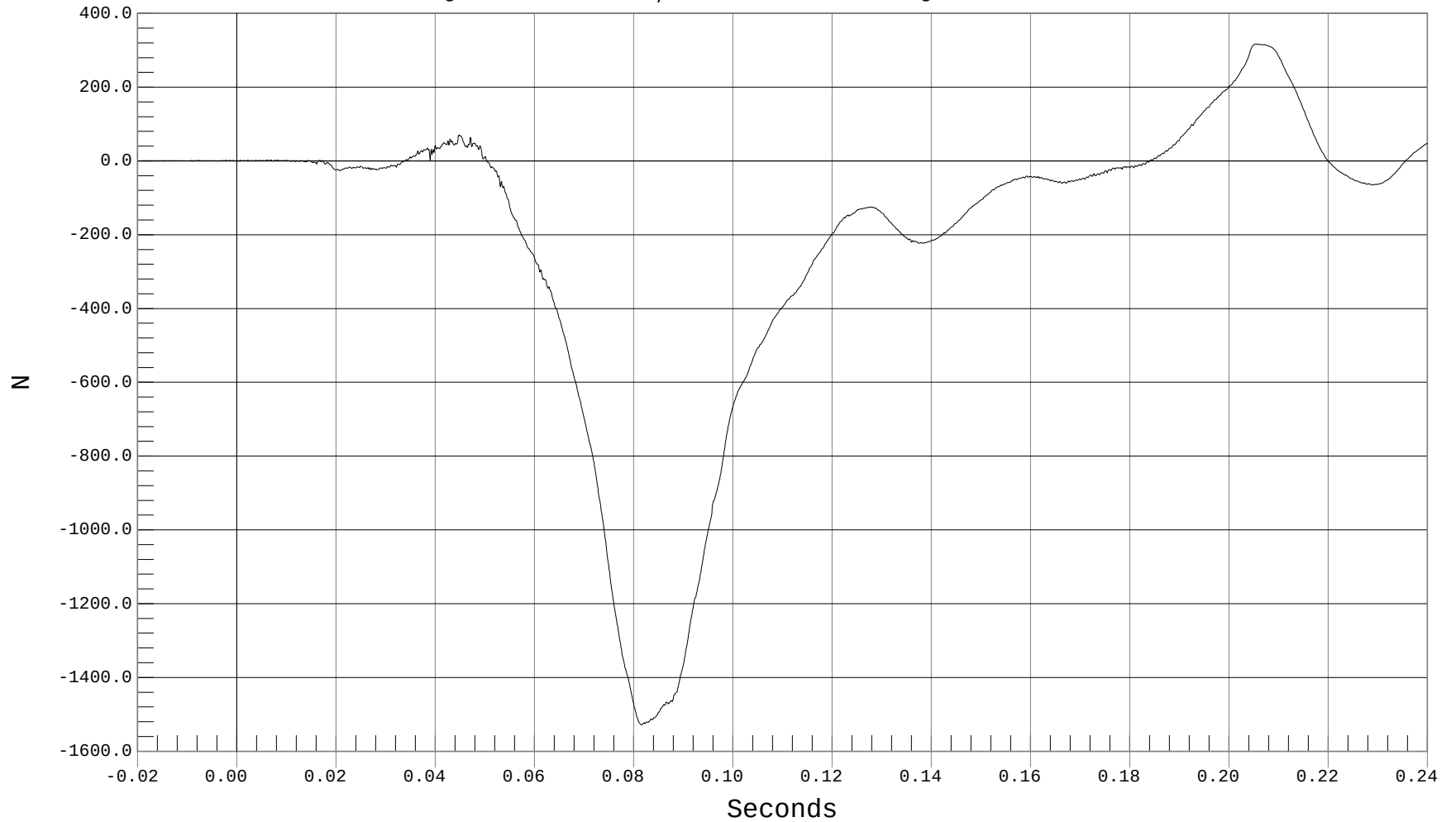
LRS 3 YR OLD LOWER NECK FORCE X

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD LOWER NECK FORCE X, B01011FT.F22

Ymin = -1528.66 N @ 0.0816 Seconds, Ymax = 317.27 N @ 0.2055 Seconds





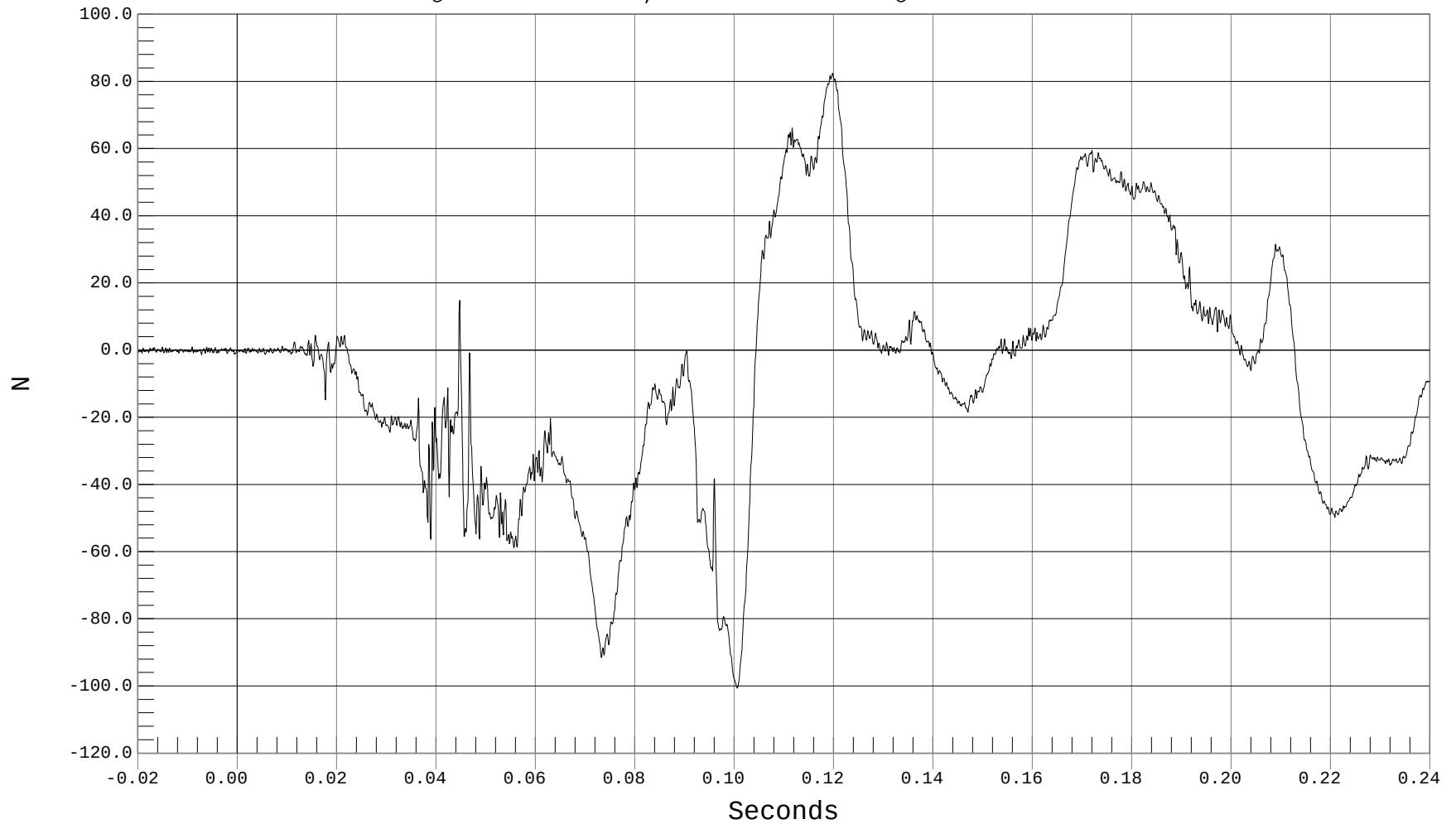
LRS 3 YR OLD LOWER NECK FORCE Y

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD LOWER NECK FORCE Y, B01011FT.F23

Ymin = -100.69 N @ 0.1007 Seconds, Ymax = 82.43 N @ 0.1198 Seconds





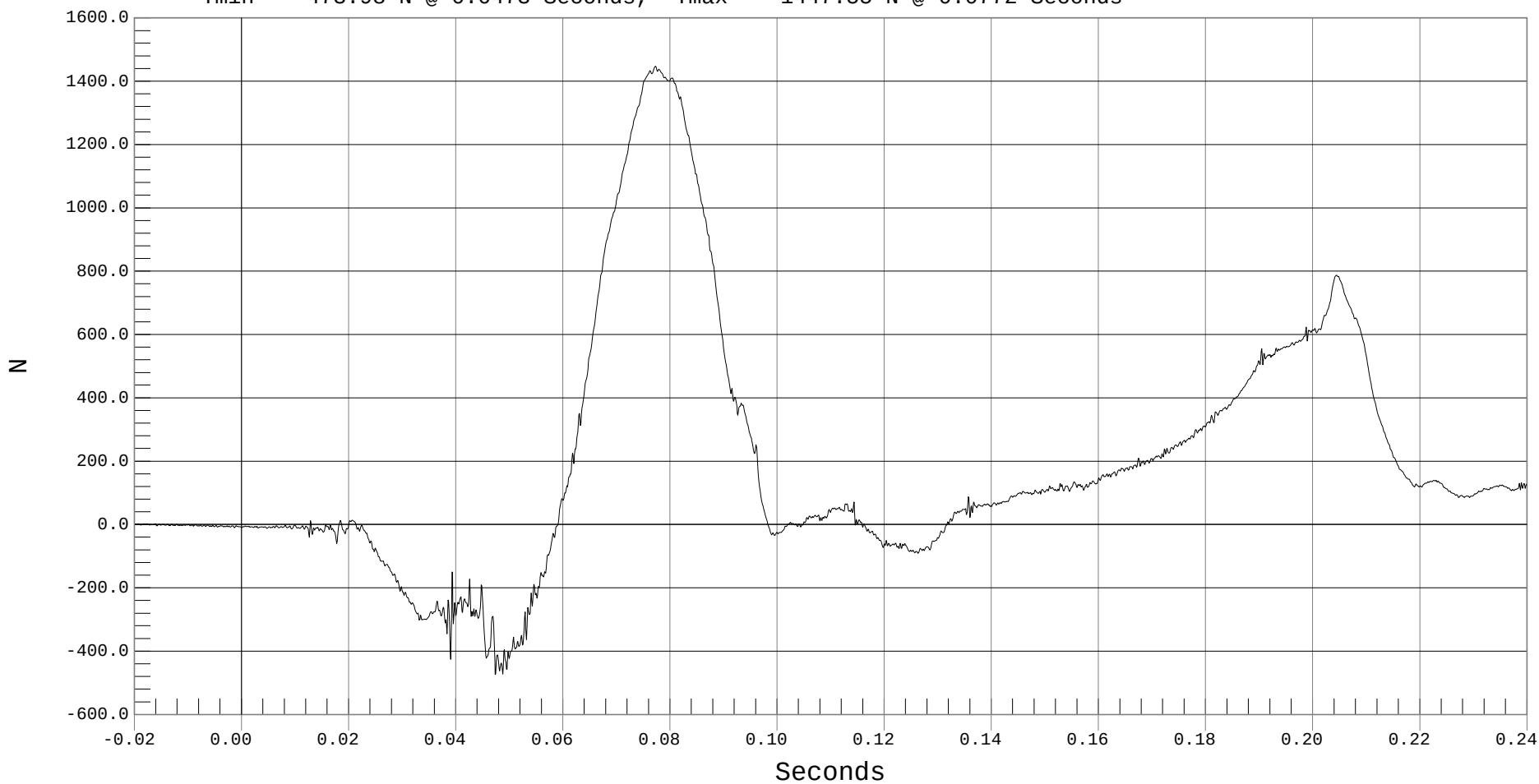
LRS 3 YR OLD LOWER NECK FORCE Z

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD LOWER NECK FORCE Z, B01011FM.F24

Ymin = -473.98 N @ 0.0473 Seconds, Ymax = 1447.55 N @ 0.0772 Seconds





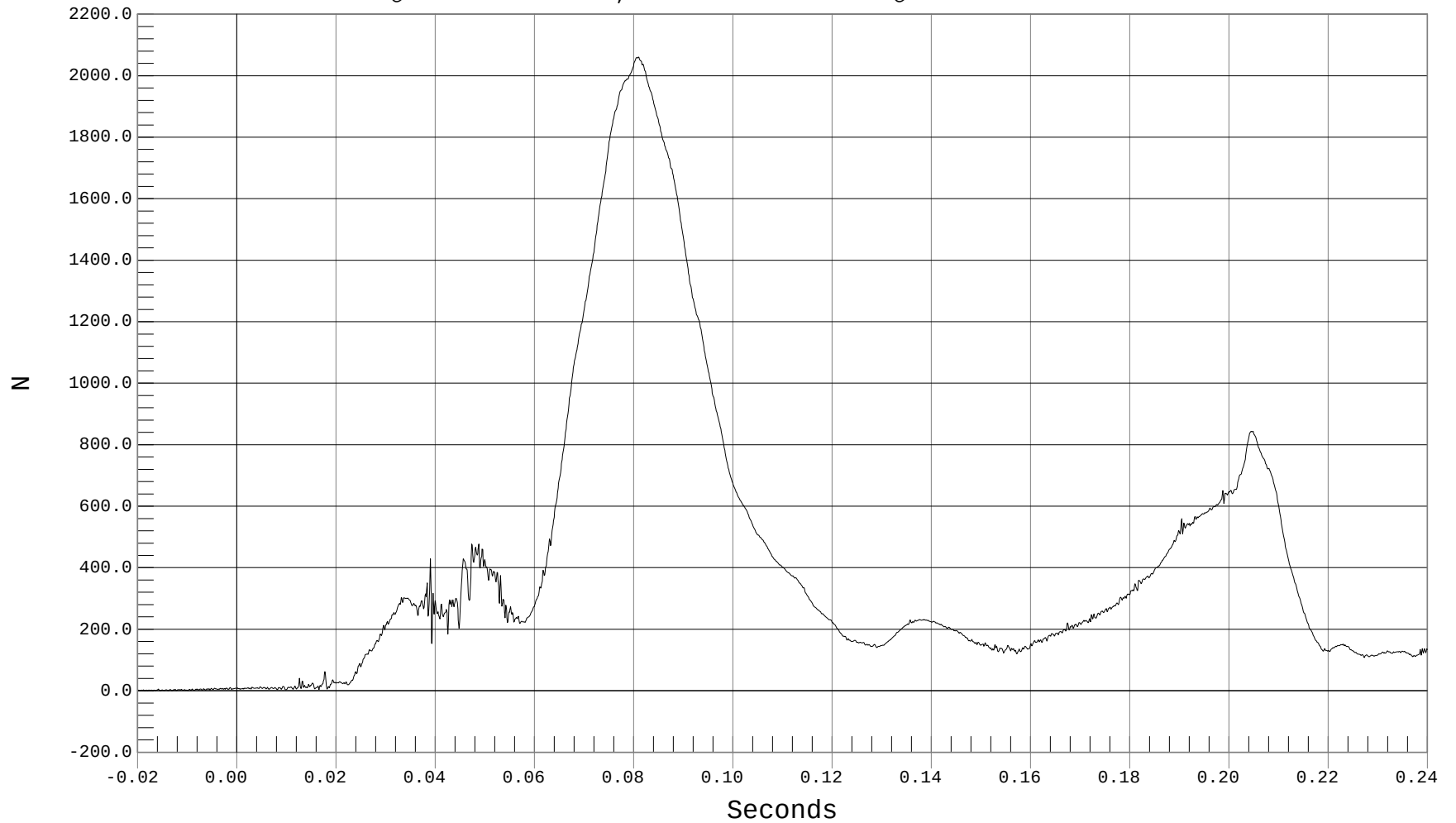
LRS 3 YR OLD LOWER NECK FORCE RESULTANT

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS 3 YR OLD LOWER NECK FORCE RESULTANT, B01011FV.F22

Ymin = .23 N @ -0.0185 Seconds, Ymax = 2061.06 N @ 0.0810 Seconds





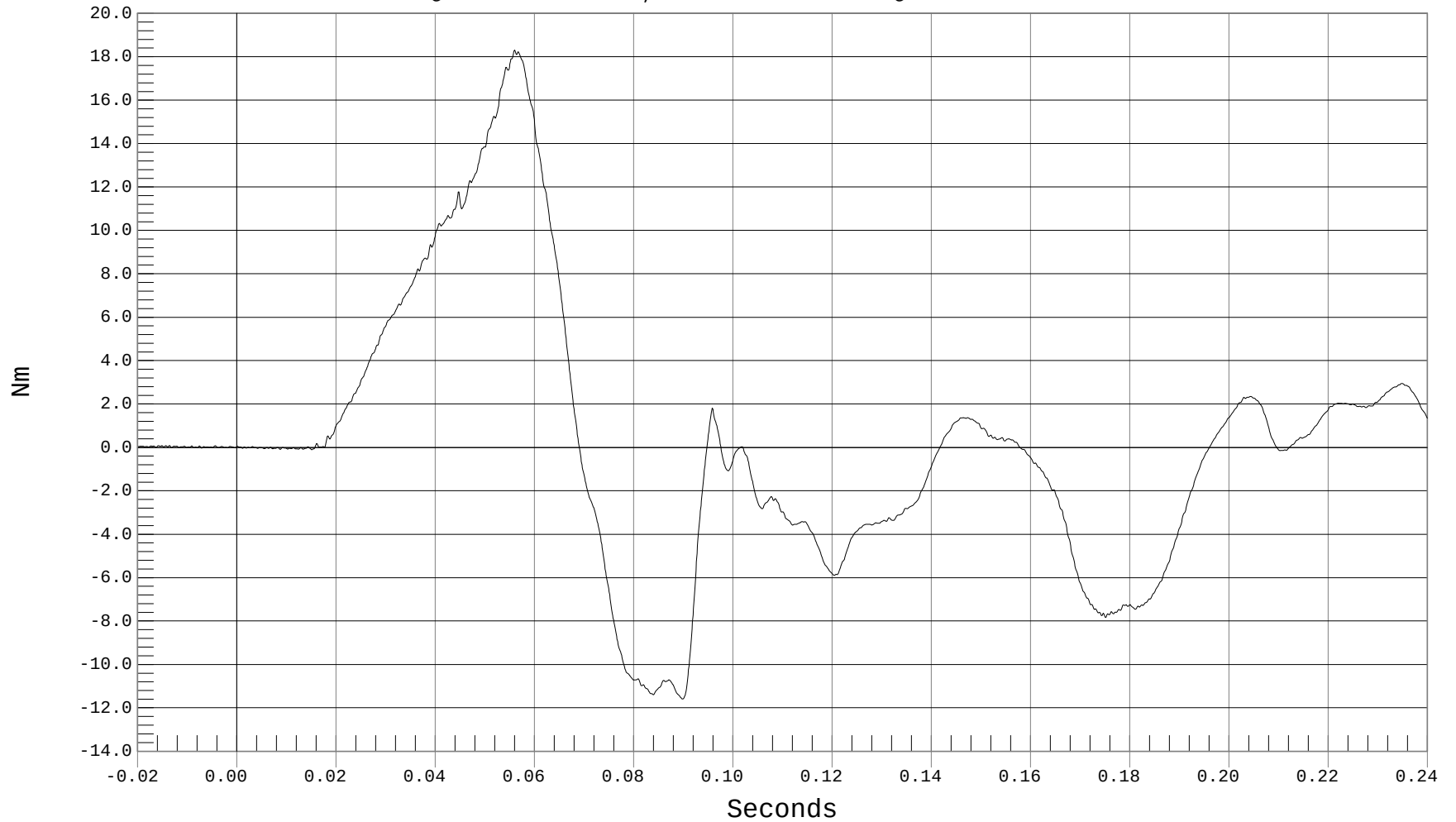
LRS 3 YR OLD LOWER NECK MOMENT X

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 LRS CHILD LOWER NECK MOMENT X, B01011MF.M25

Ymin = -11.59 Nm @ 0.0899 Seconds, Ymax = 18.3 Nm @ 0.0560 Seconds





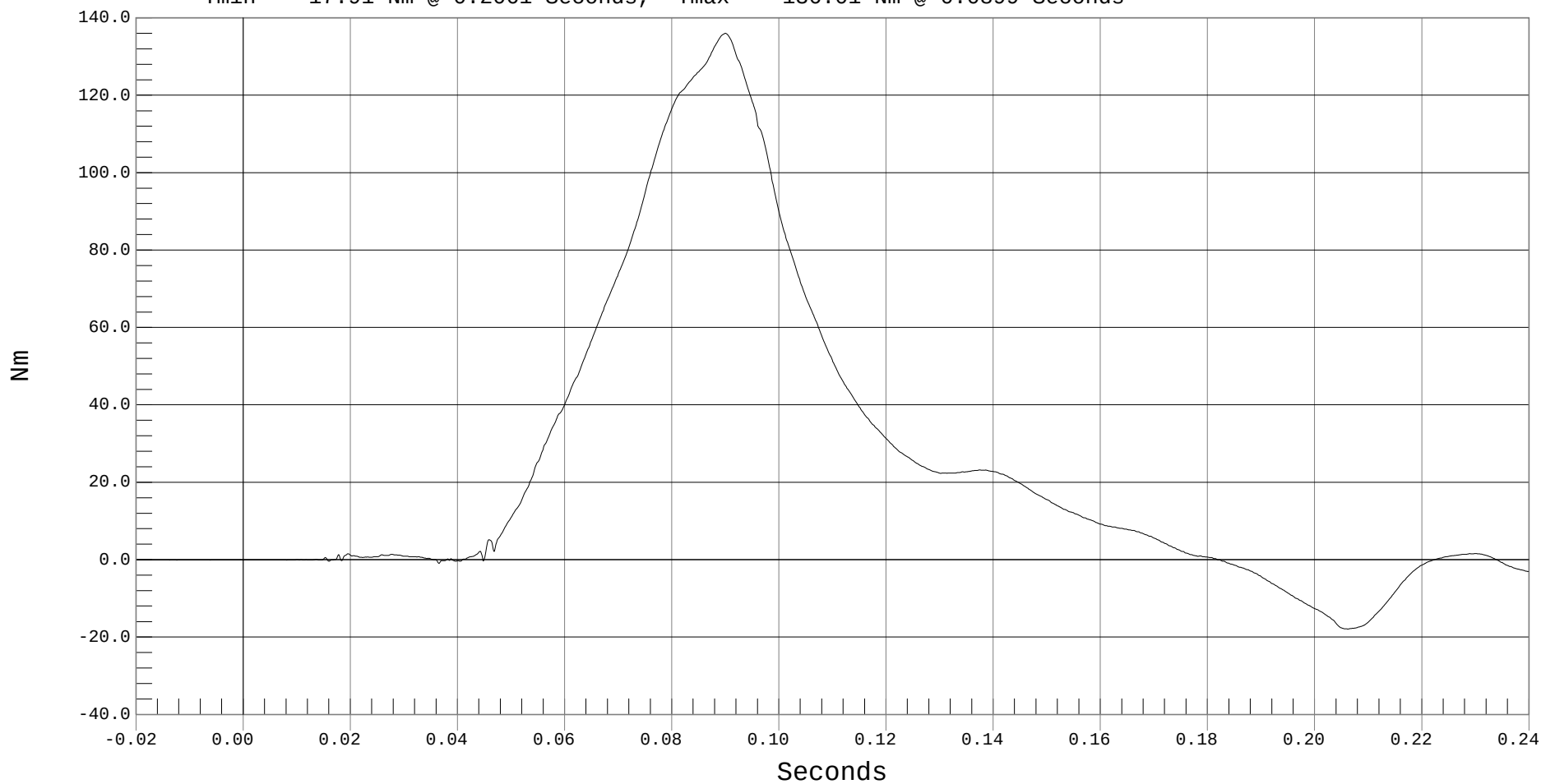
LRS 3 YR OLD LOWER NECK MOMENT Y

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 LRS CHILD LOWER NECK MOMENT Y, B01011MF.M26

Ymin = -17.91 Nm @ 0.2061 Seconds, Ymax = 136.01 Nm @ 0.0899 Seconds





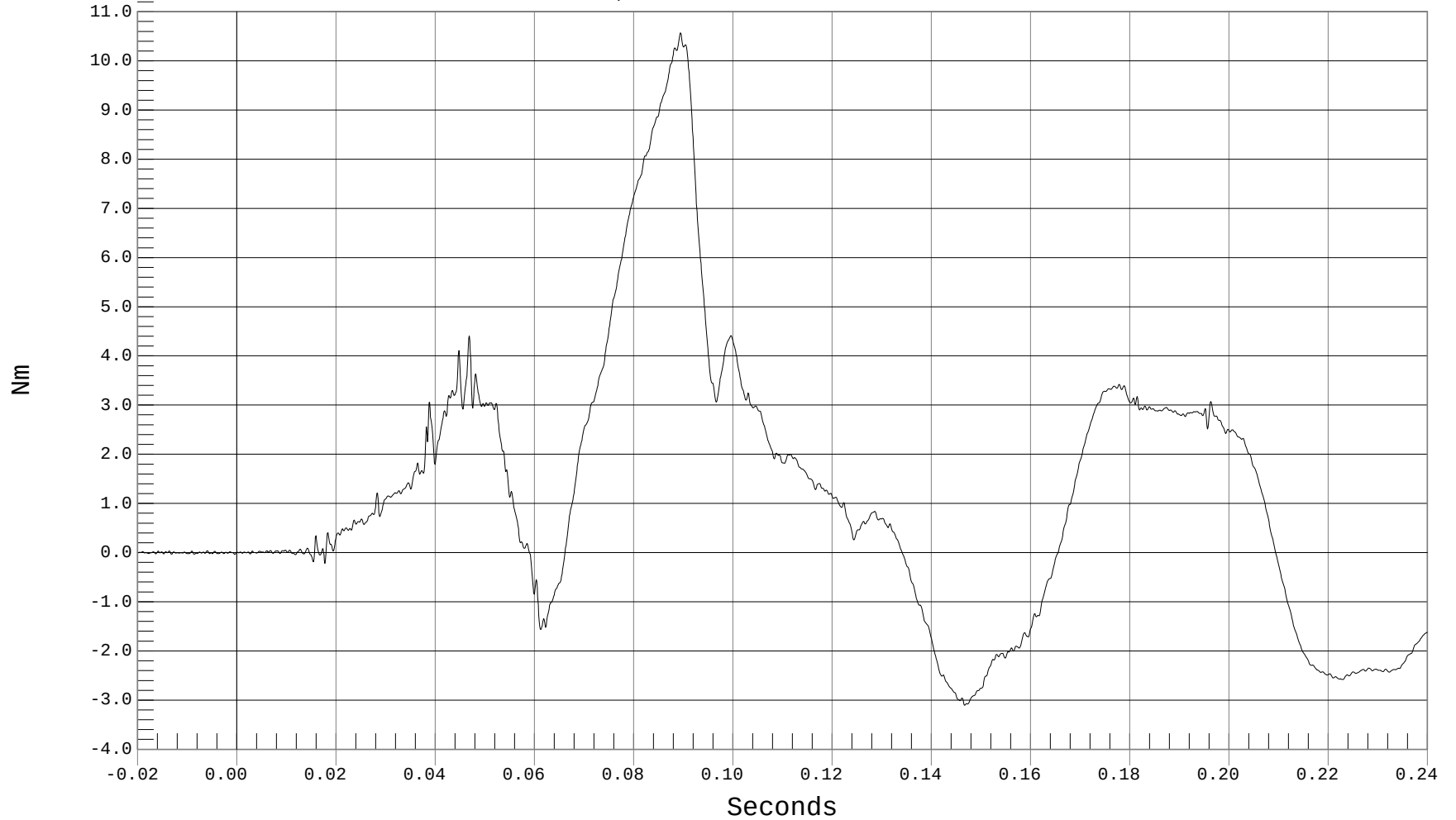
LRS 3 YR OLD LOWER NECK MOMENT Z

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 LRS CHILD LOWER NECK MOMENT Z, B01011MF.M27

Ymin = -3.1 Nm @ 0.1468 Seconds, Ymax = 10.57 Nm @ 0.0895 Seconds





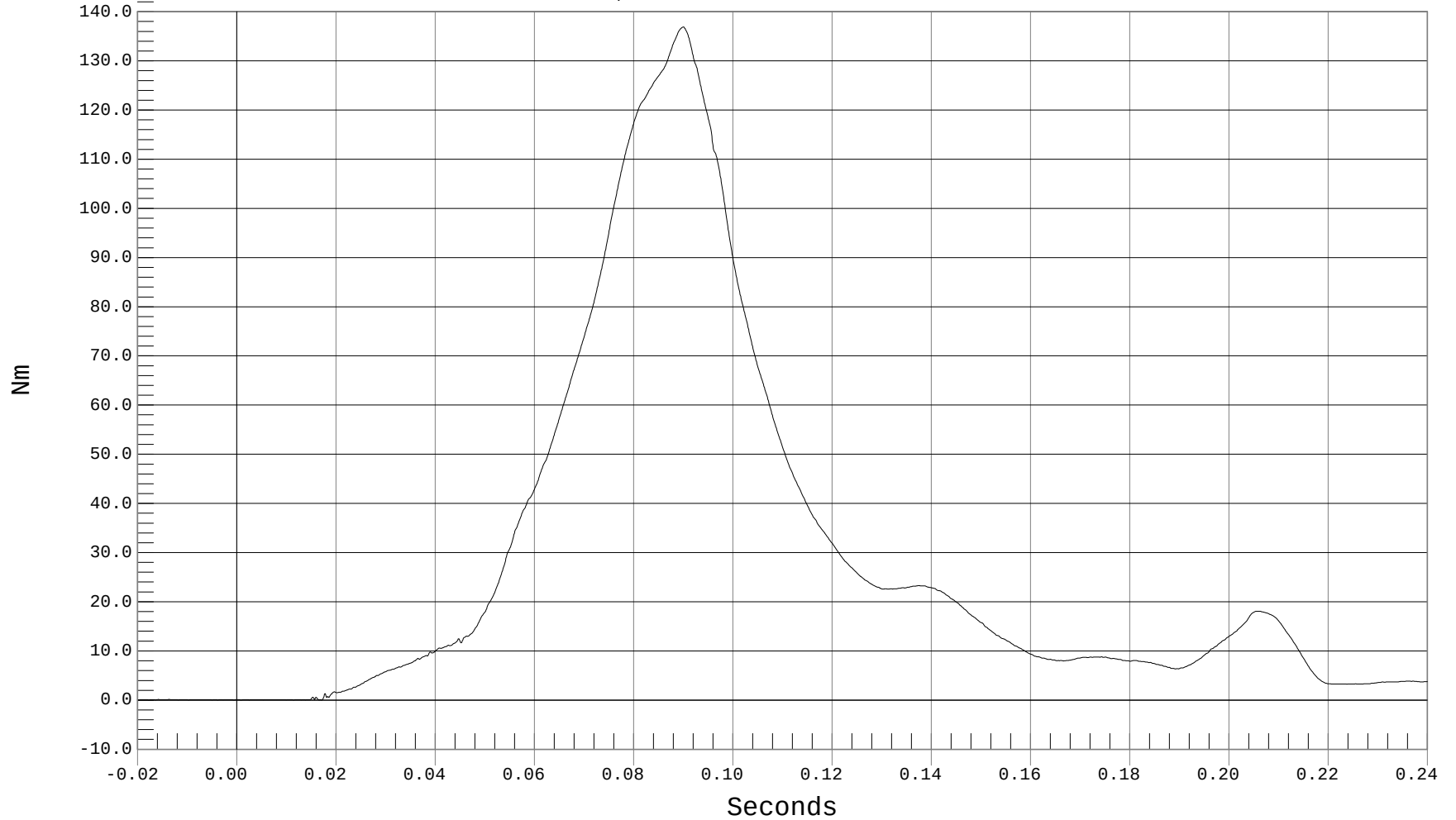
LRS 3 YR OLD LOWER NECK MOMENT RESULTANT

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 LRS 3 YR OLD LOWER NECK MOMENT RESULTANT, B01011MV.M25

Ymin = .01 Nm @ 0.0171 Seconds, Ymax = 136.89 Nm @ 0.0900 Seconds





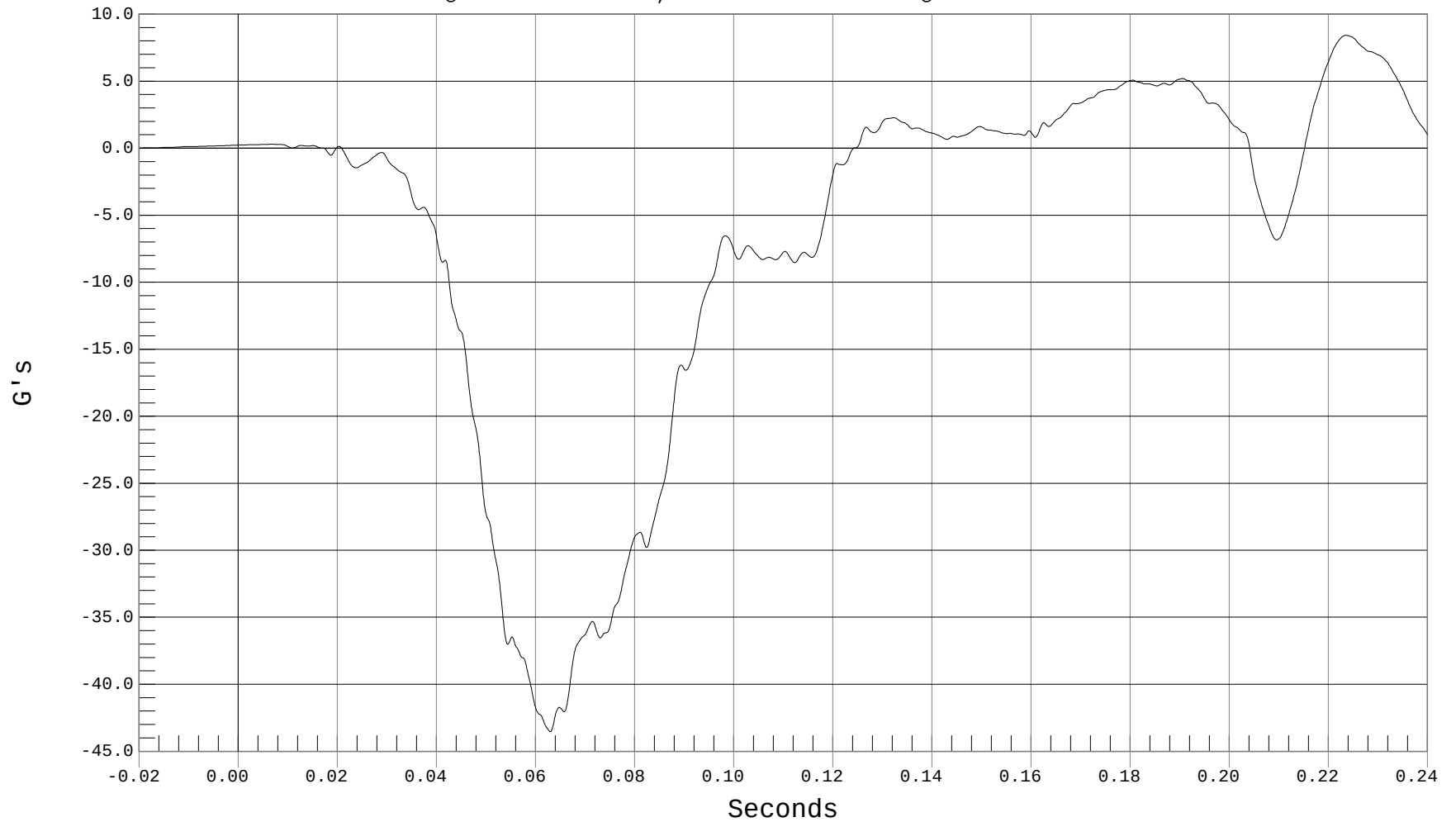
LRS 3 YR OLD CHEST X ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LRS CHILD CHEST X, B01011AF.A28

Ymin = -43.54 G's @ 0.0630 Seconds, Ymax = 8.42 G's @ 0.2236 Seconds





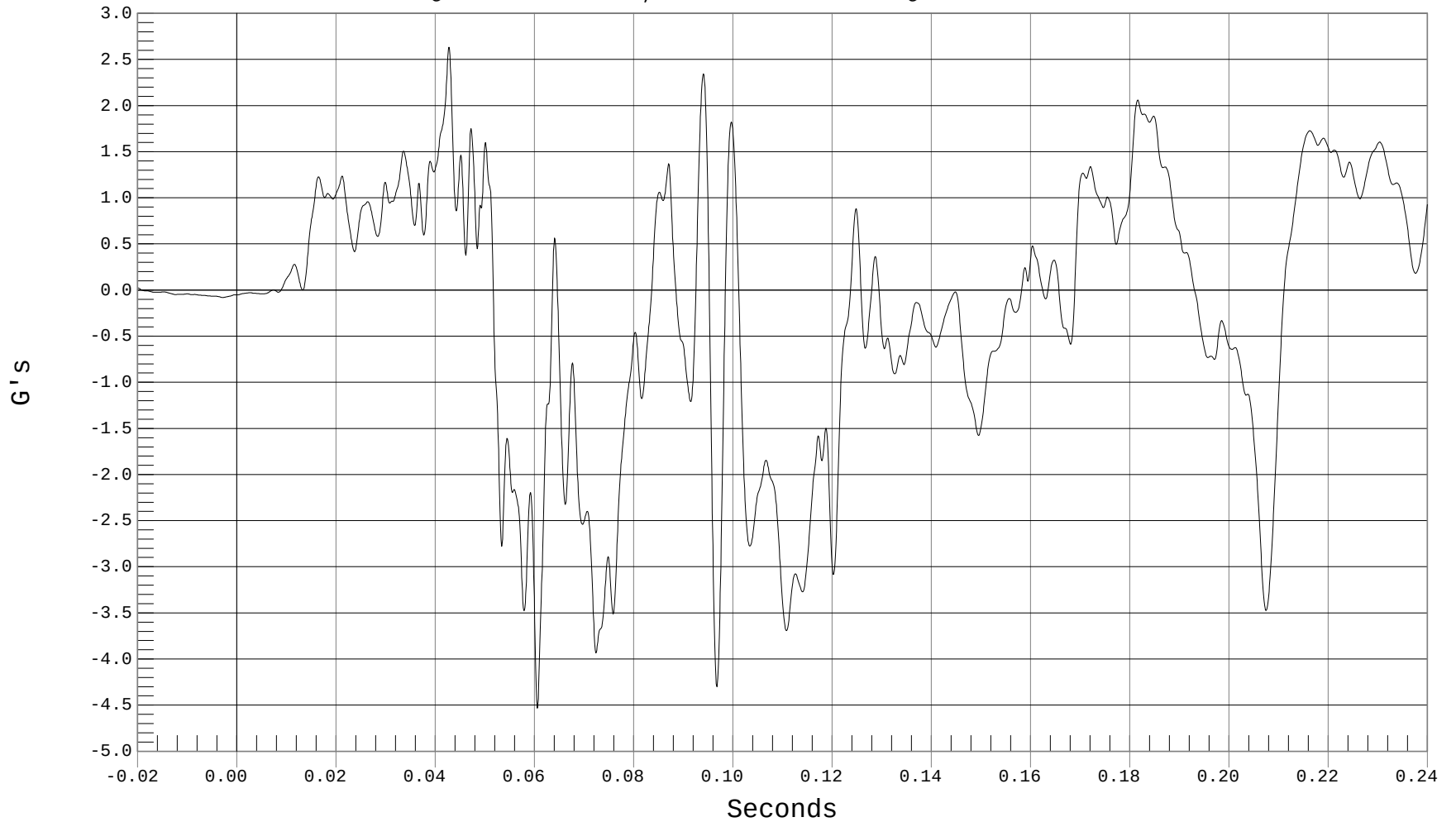
LRS 3 YR OLD CHEST Y ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LRS CHILD CHEST Y, B01011AF.A29

Ymin = -4.53 G's @ 0.0606 Seconds, Ymax = 2.63 G's @ 0.0428 Seconds





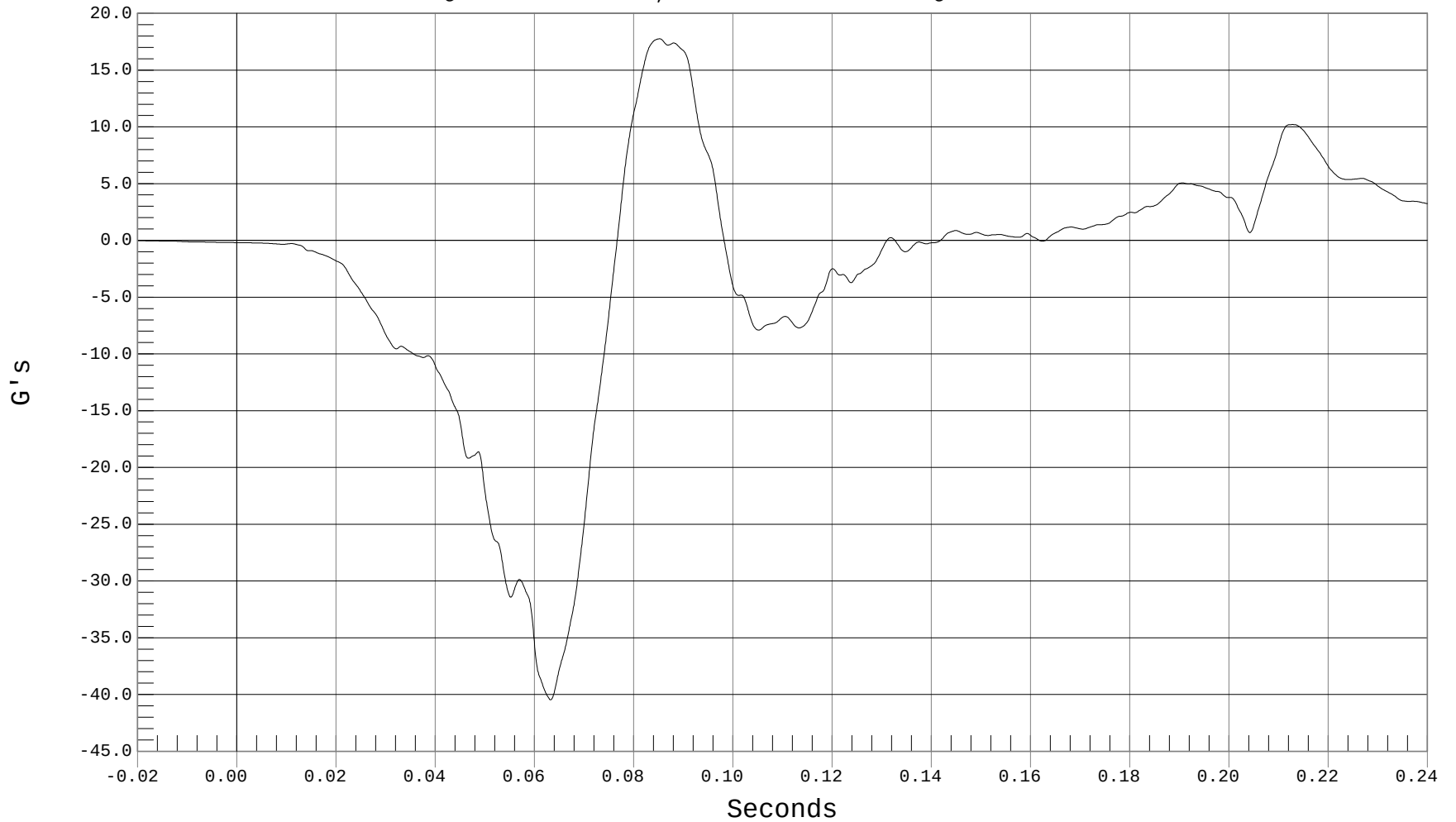
LRS 3 YR OLD CHEST Z ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LRS CHILD CHEST Z, B01011AF.A30

Ymin = -40.48 G's @ 0.0633 Seconds, Ymax = 17.75 G's @ 0.0852 Seconds





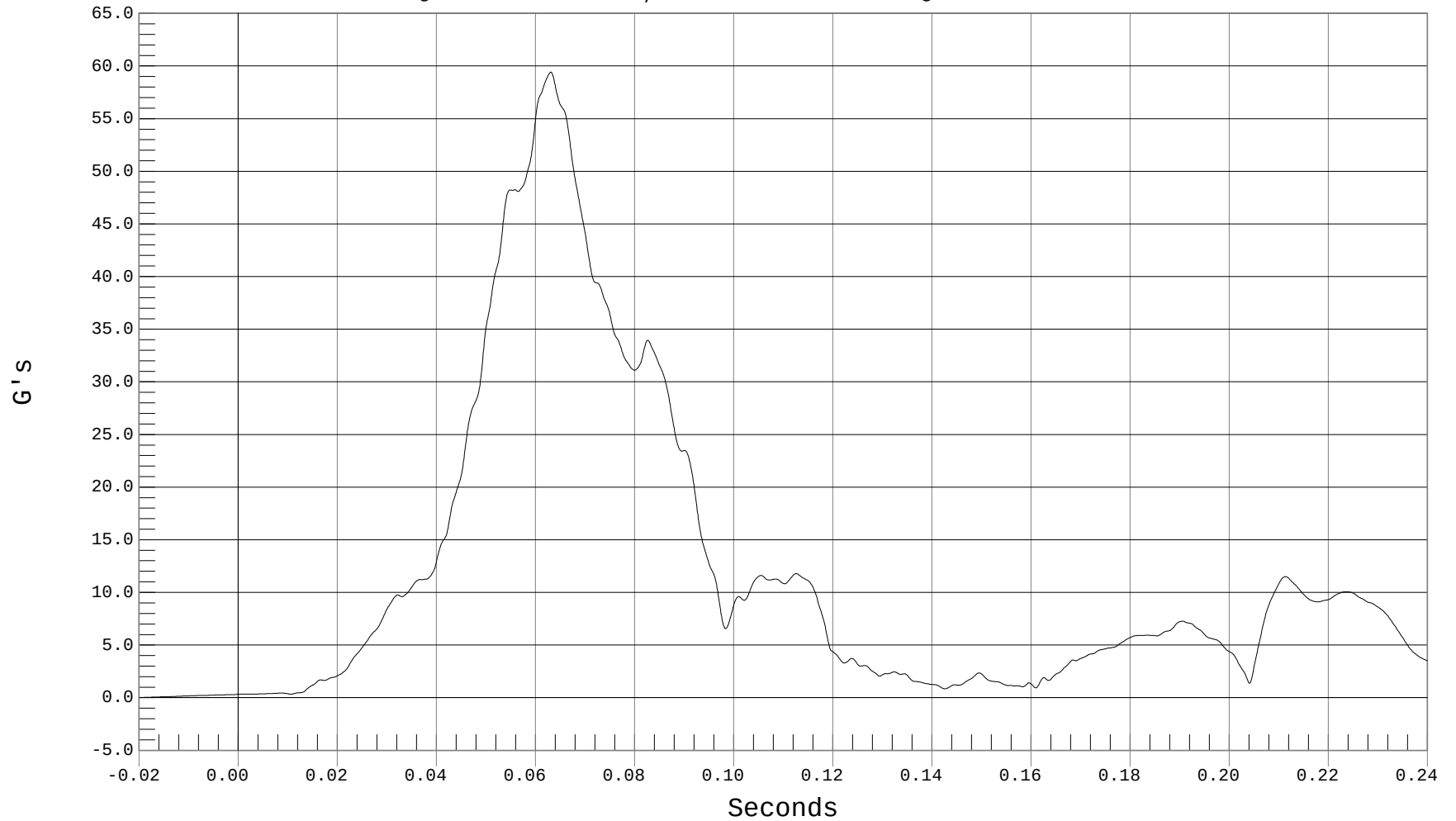
LRS 3 YR OLD CHEST RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LRS 3 YR OLD CHEST RESULTANT ACCELERATION, B01011AV.A28

Ymin = .02 G's @ -0.0194 Seconds, Ymax = 59.42 G's @ 0.0631 Seconds





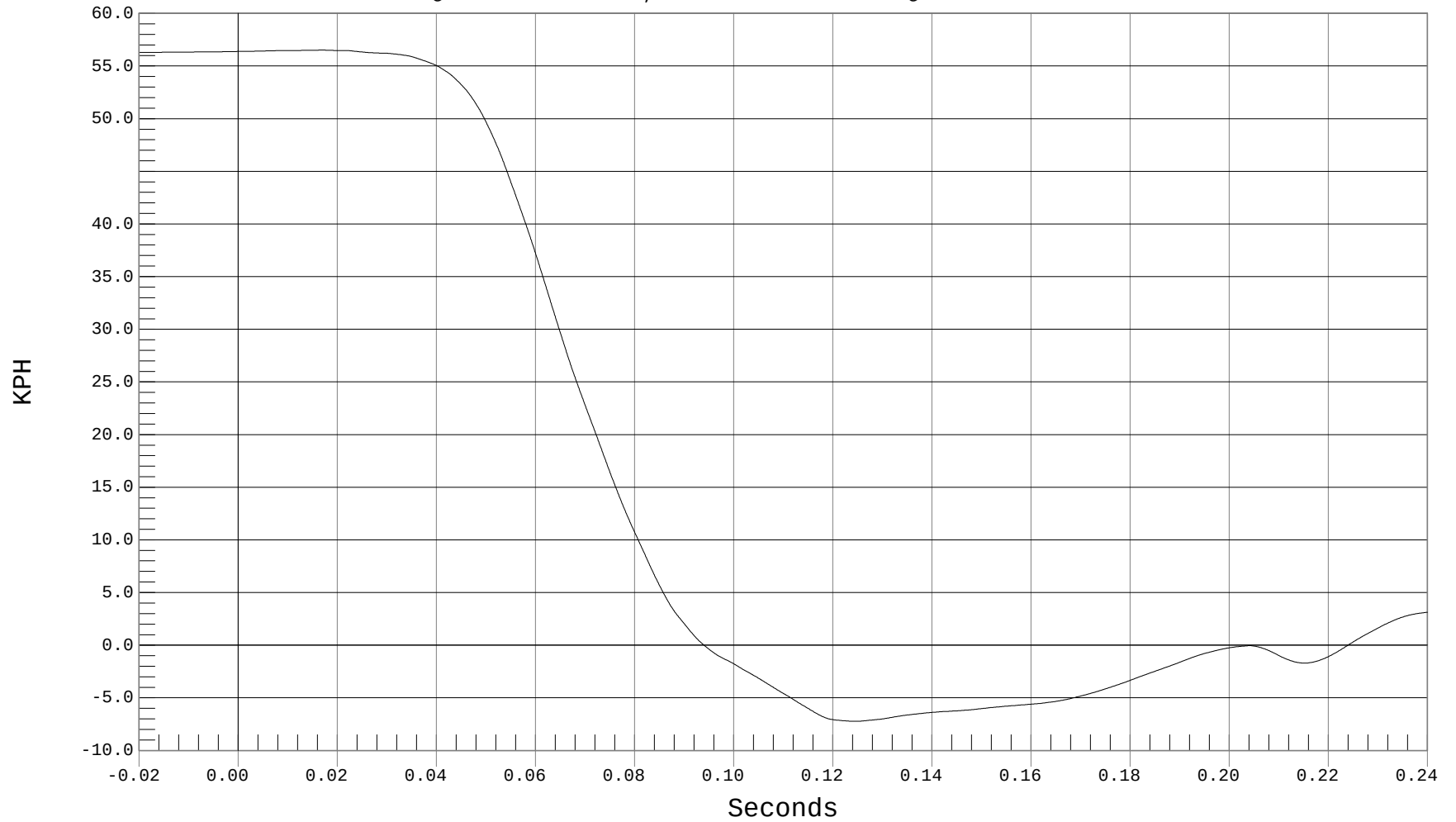
LRS 3 YR OLD CHEST X VELOCITY

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LRS 3 YR OLD CHEST X VELOCITY, B01011AI.V28

Ymin = -7.22 KPH @ 0.1242 Seconds, Ymax = 56.5 KPH @ 0.0172 Seconds





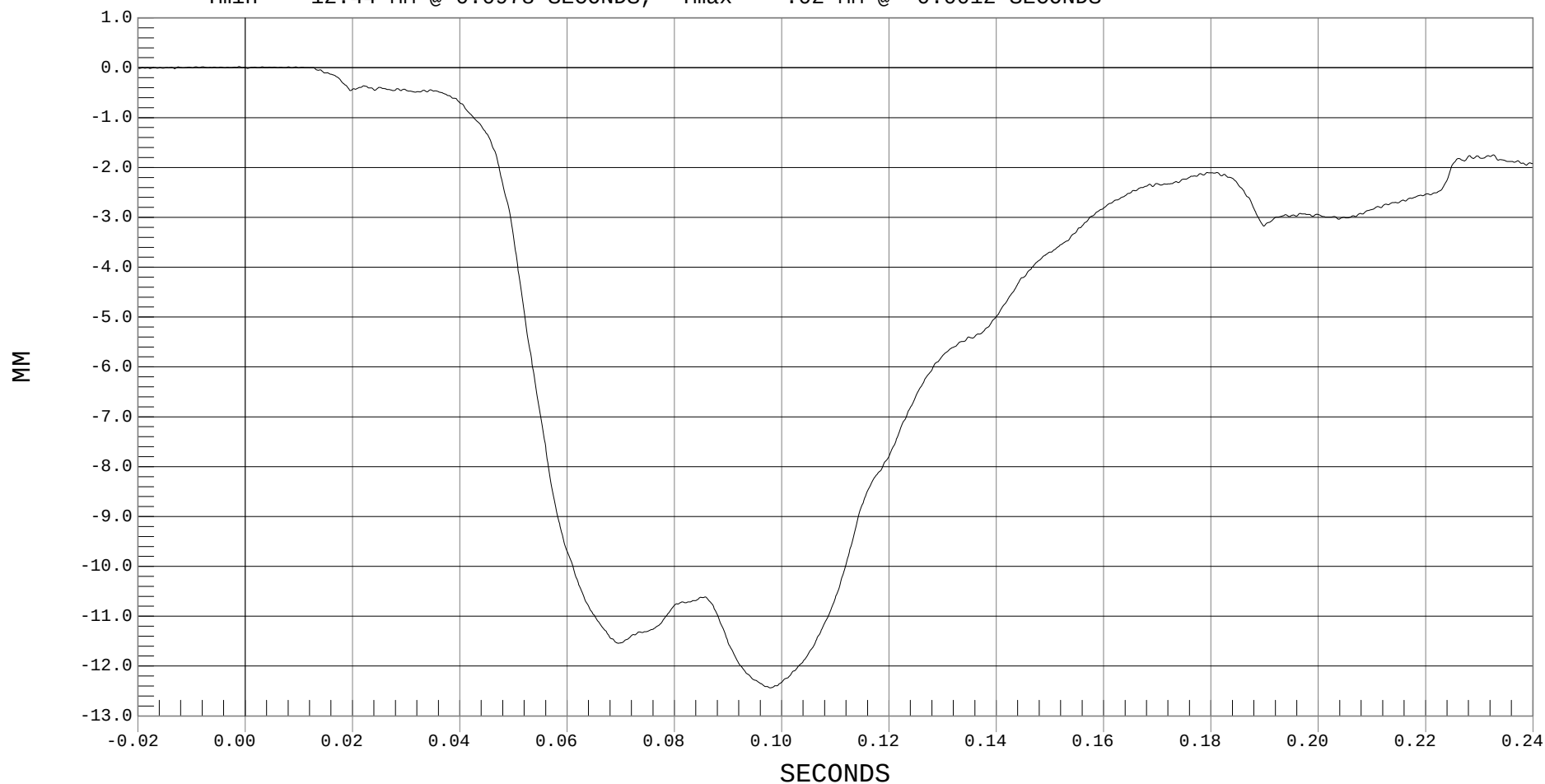
LRS 3 YR OLD CHEST COMPRESSION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DISPLACEMENT, B01011DF.D31

Ymin = -12.44 MM @ 0.0978 SECONDS, Ymax = .02 MM @ -0.0012 SECONDS





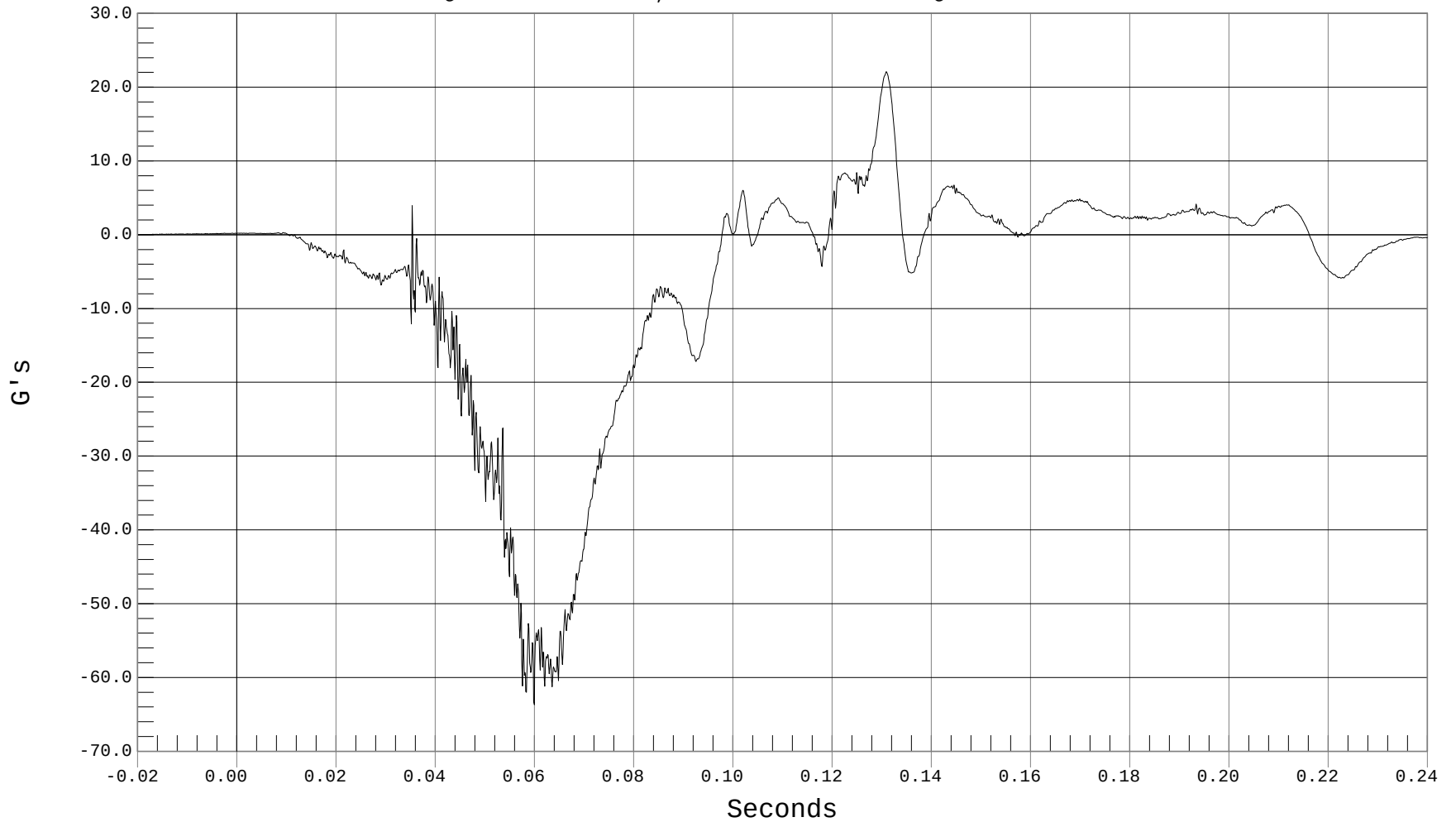
LRS 3 YR OLD PELVIS X ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD PELVIS X, B01011AT.A34

Ymin = -63.71 G's @ 0.0600 Seconds, Ymax = 22.07 G's @ 0.1310 Seconds





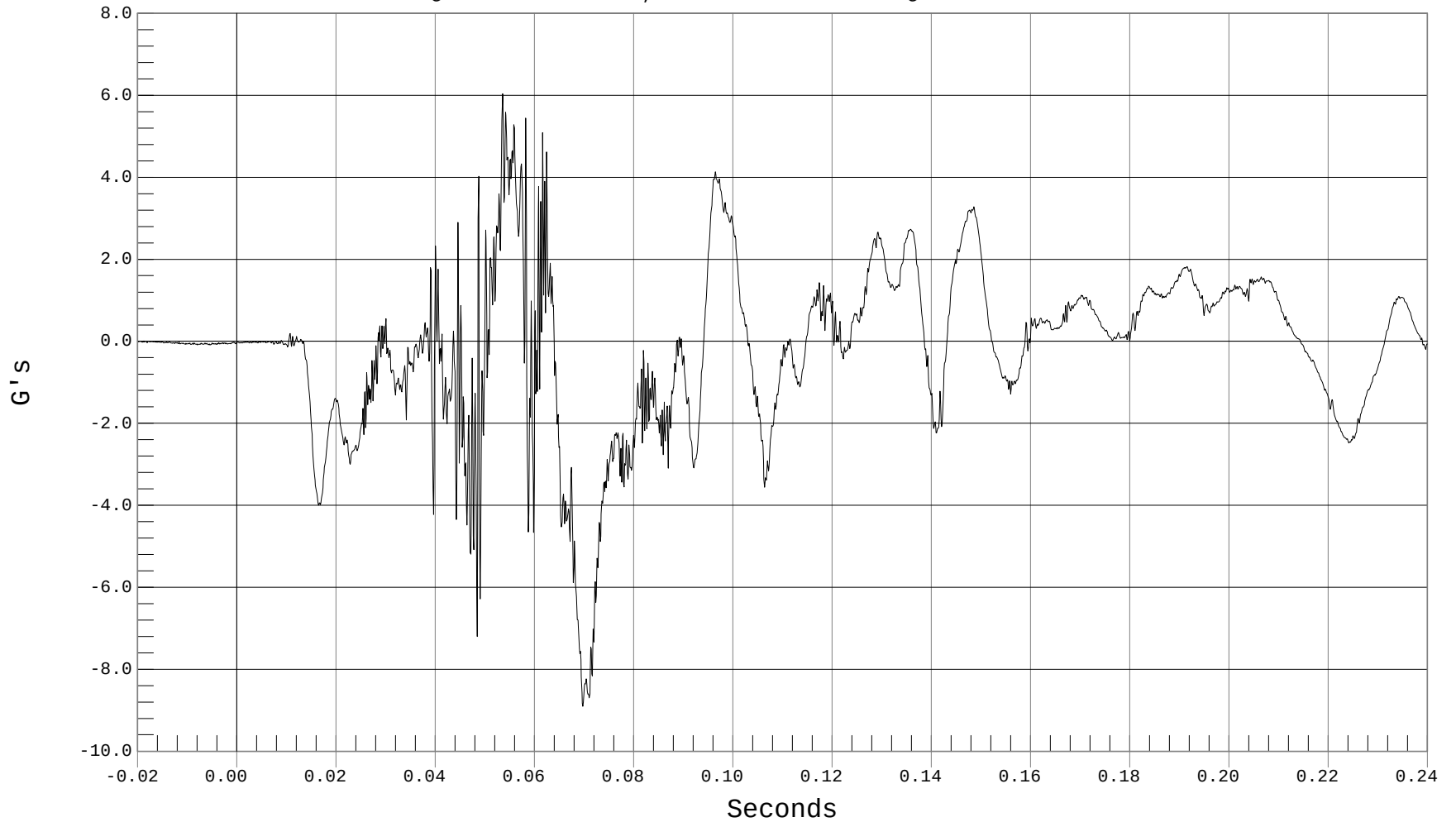
LRS 3 YR OLD PELVIS Y ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD PELVIS Y, B01011AT.A35

Ymin = -8.91 G's @ 0.0698 Seconds, Ymax = 6.04 G's @ 0.0536 Seconds





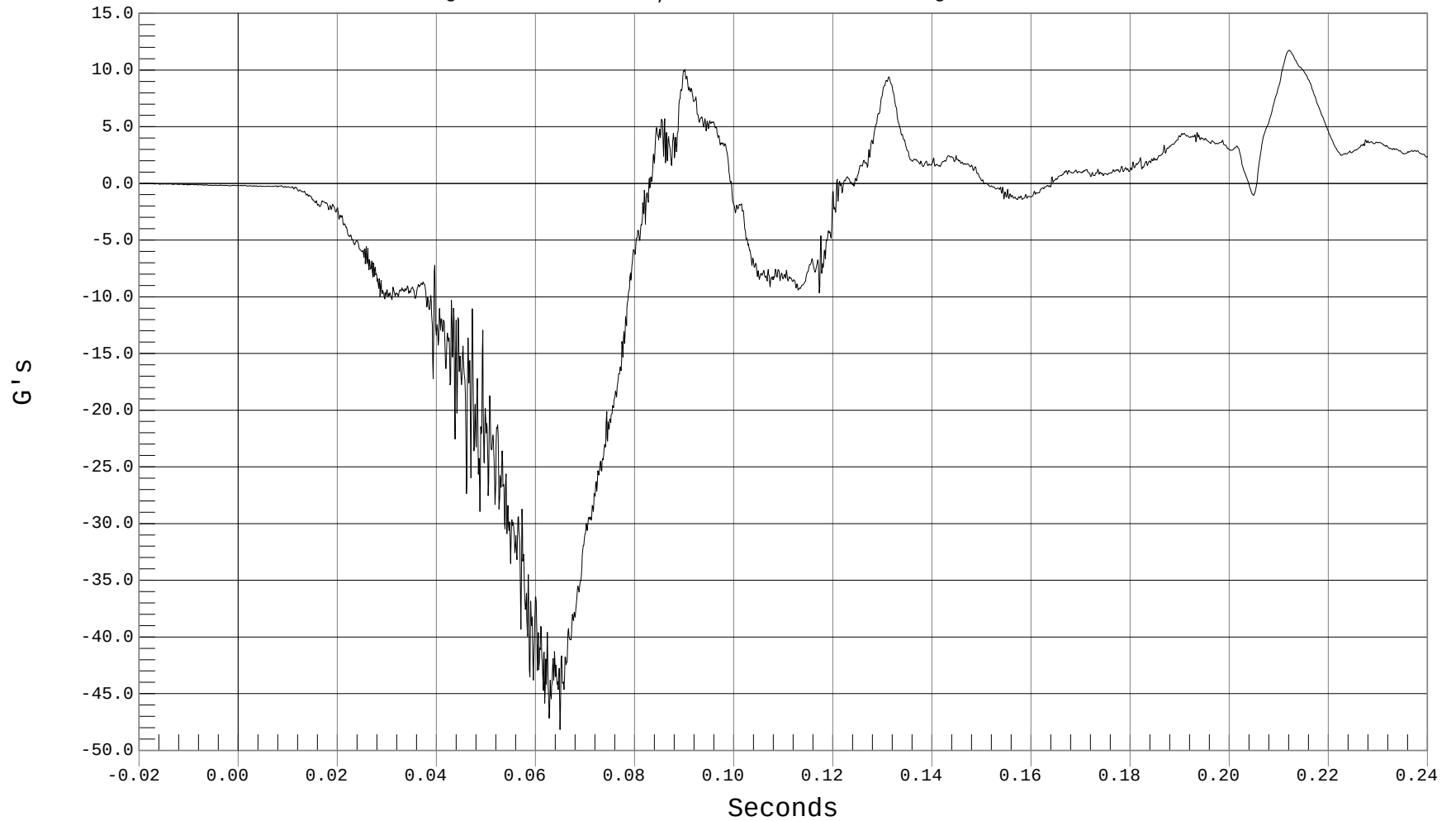
LRS 3 YR OLD PELVIS Z ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS CHILD PELVIS Z, B01011AT.A36

Ymin = -48.17 G's @ 0.0650 Seconds, Ymax = 11.74 G's @ 0.2121 Seconds





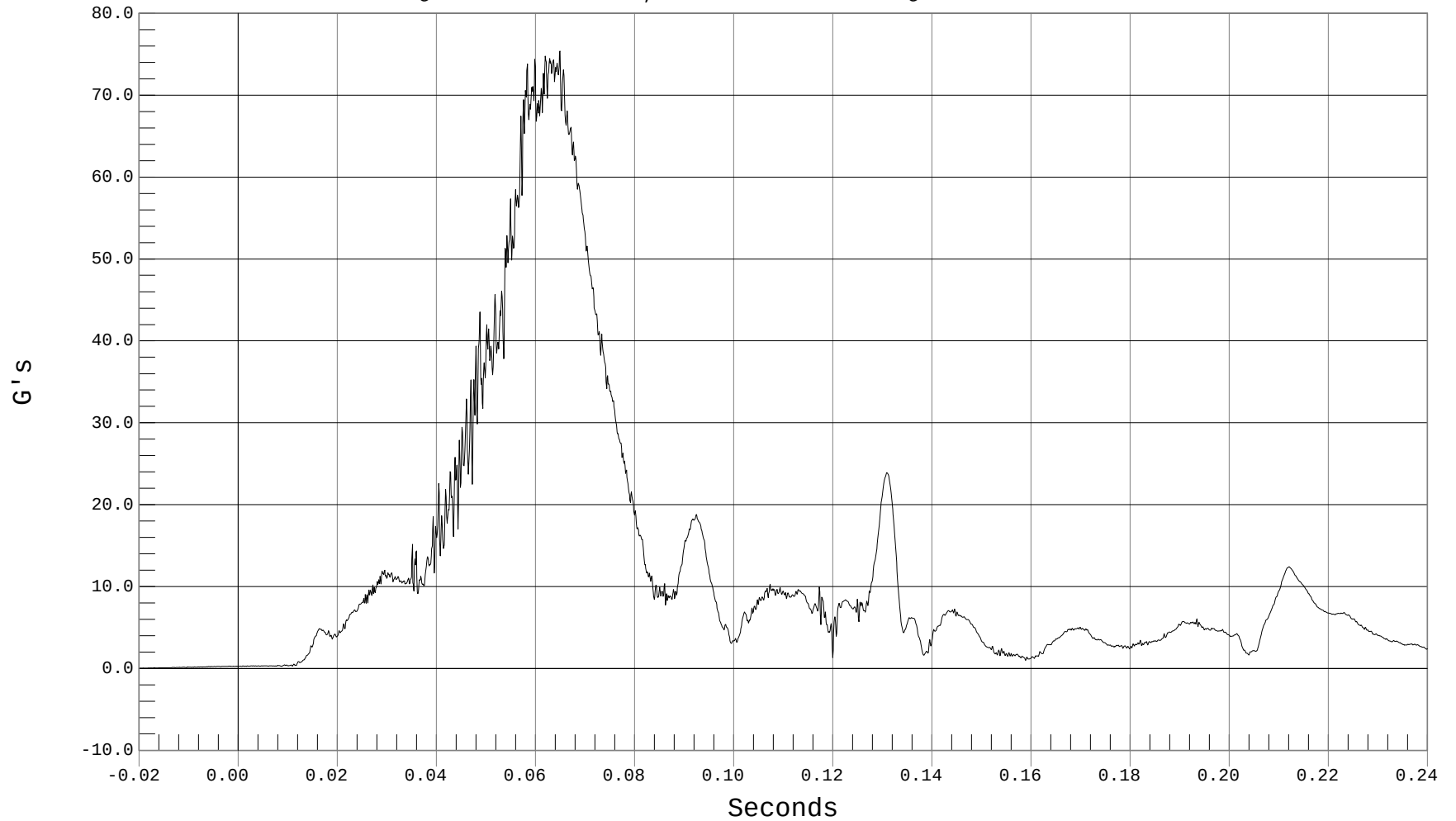
LRS 3 YR OLD PELVIS RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 LRS 3 YR OLD PELVIS RESULTANT ACCELERATION, B01011AV.A34

Ymin = .02 G's @ -0.0196 Seconds, Ymax = 75.4 G's @ 0.0650 Seconds





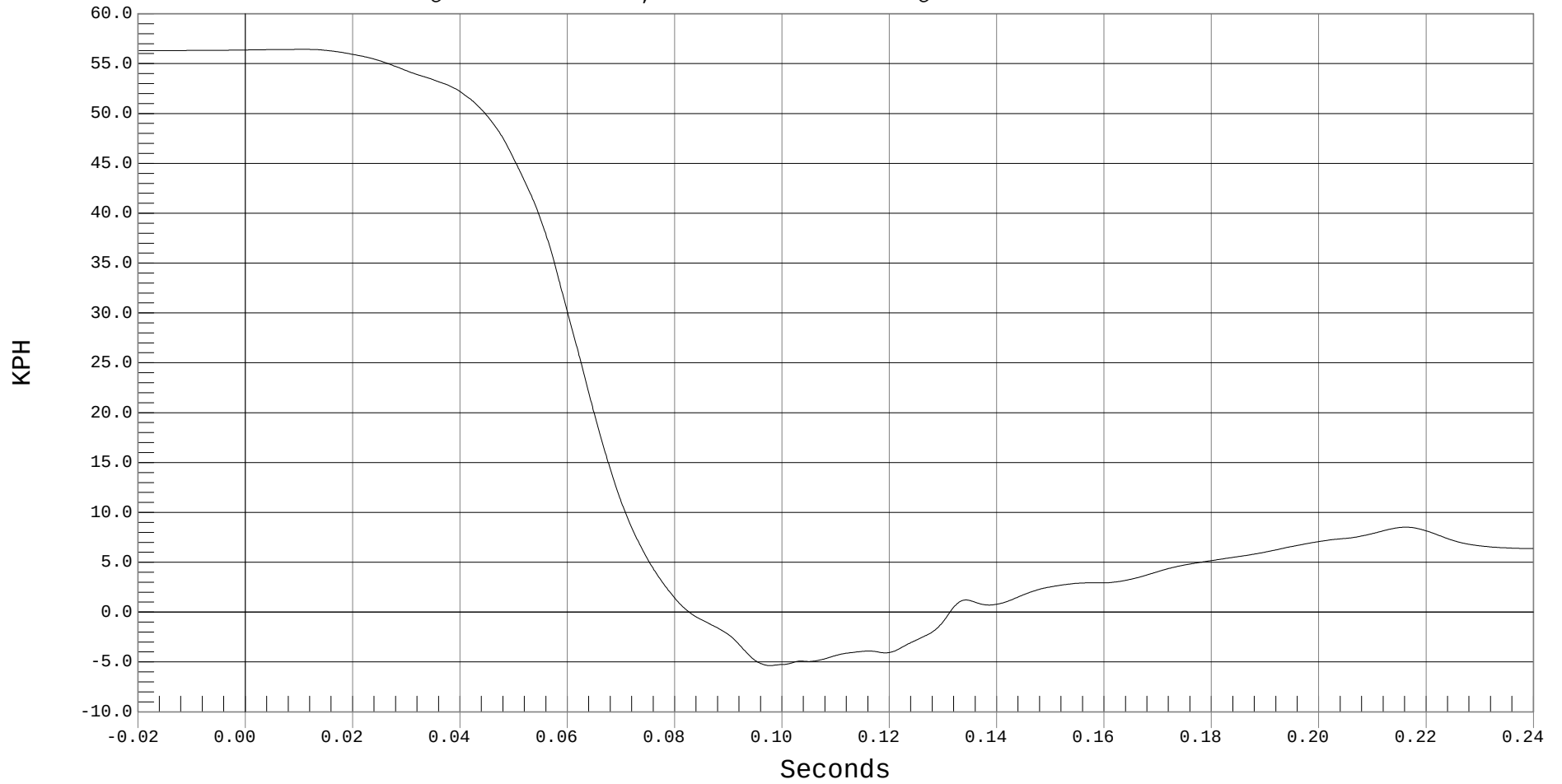
LRS 3 YR OLD PELVIS X VELOCITY

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 3 YR OLD PELVIS X VELOCITY, B01011AI.V34

Ymin = -5.36 KPH @ 0.0977 Seconds, Ymax = 56.43 KPH @ 0.0106 Seconds





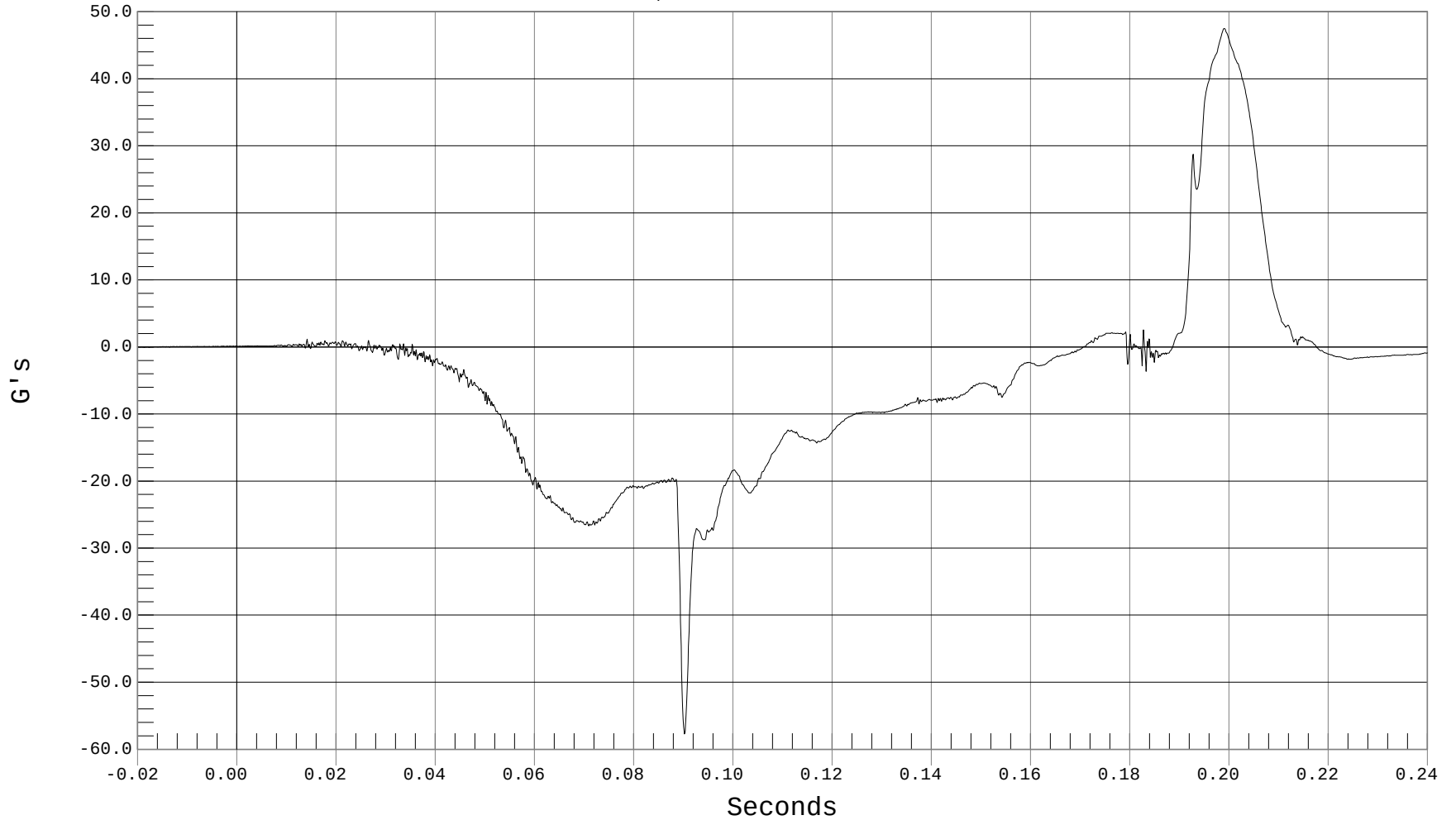
RRS 3 YR OLD HEAD X ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD HEAD X, B01011AT.A37

Ymin = -57.72 G's @ 0.0903 Seconds, Ymax = 47.51 G's @ 0.1991 Seconds





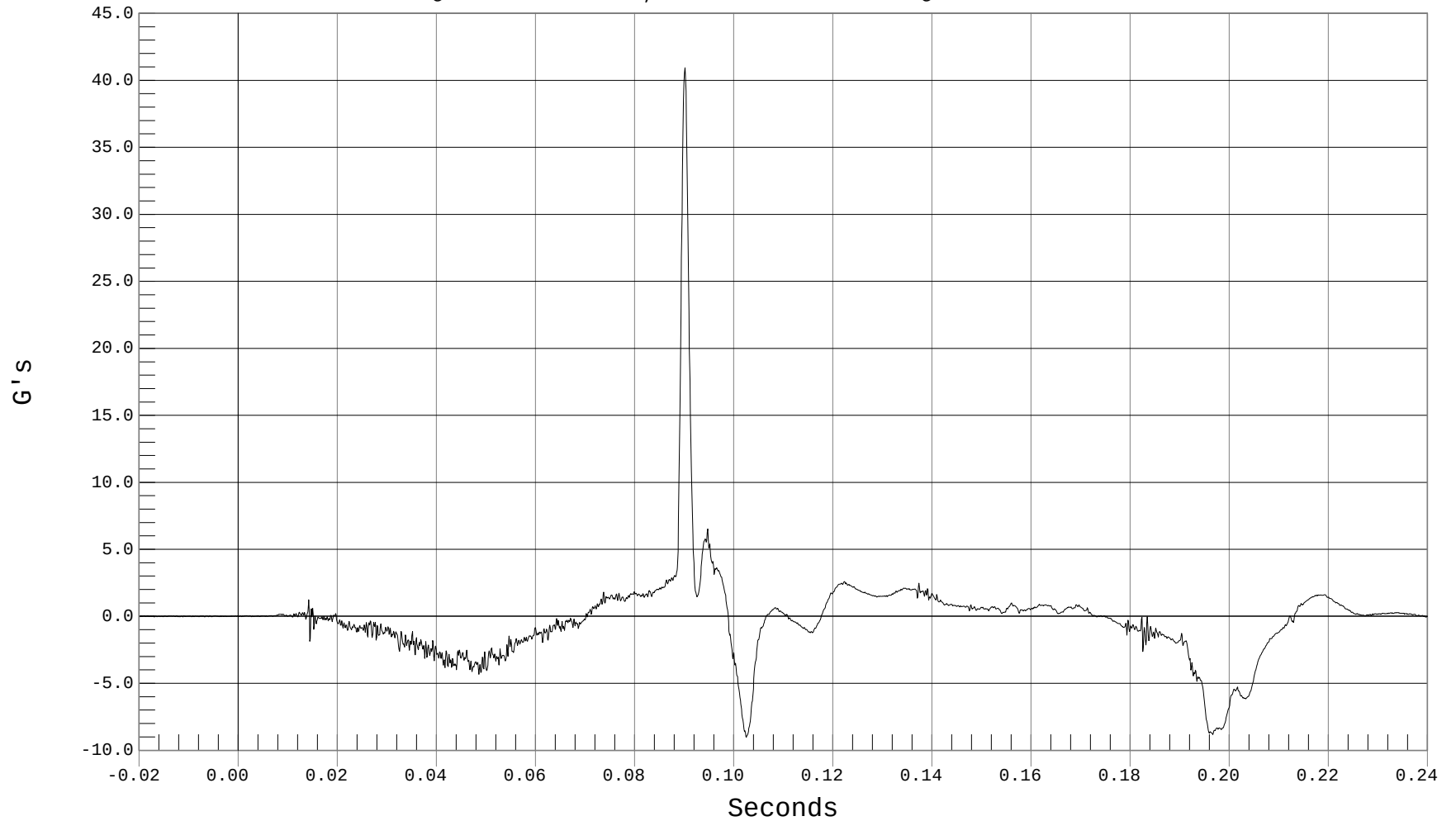
RRS 3 YR OLD HEAD Y ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD HEAD Y, B01011AT.A38

Ymin = -9.03 G's @ 0.1026 Seconds, Ymax = 40.95 G's @ 0.0902 Seconds





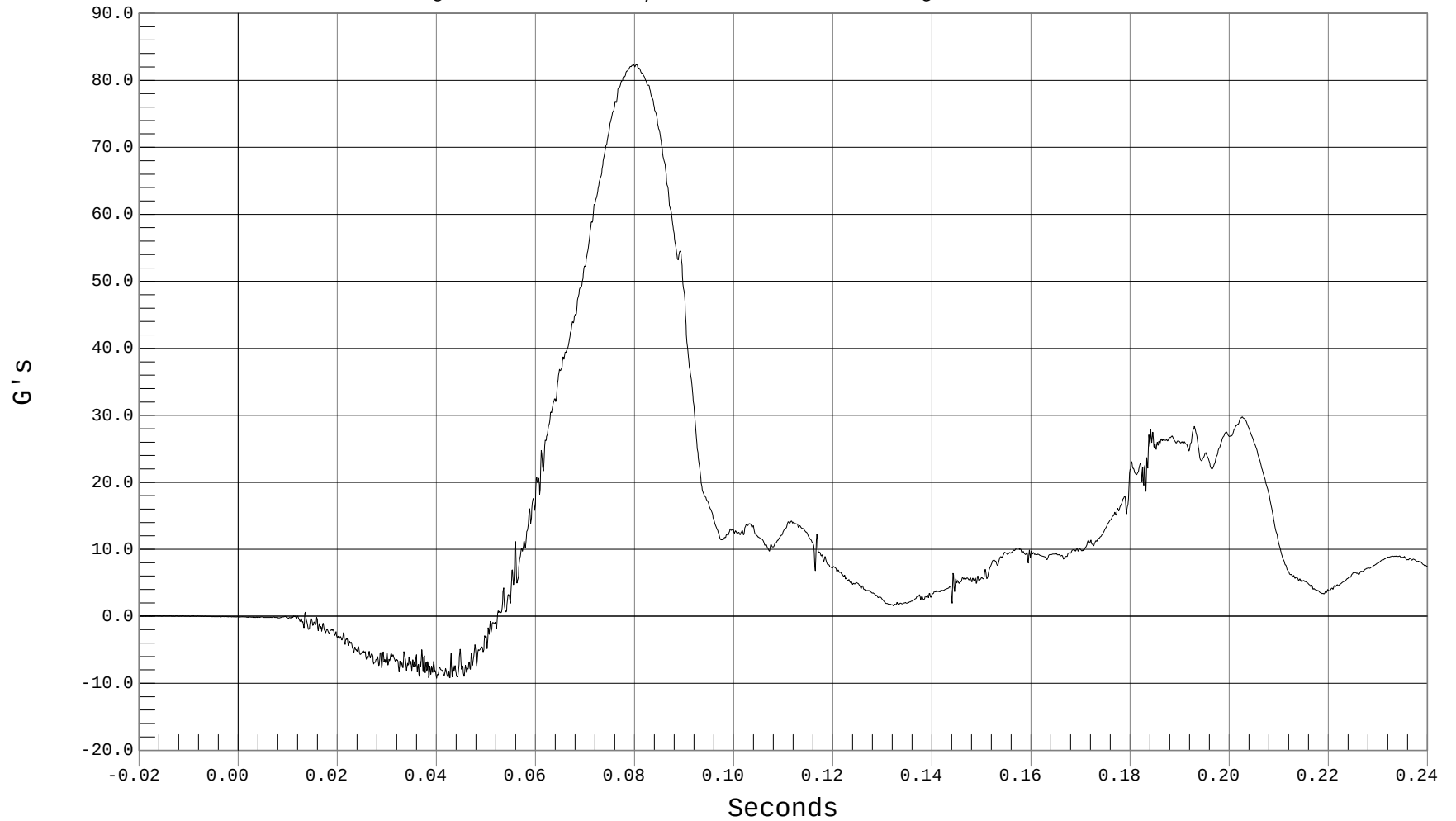
RRS 3 YR OLD HEAD Z ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD HEAD Z, B01011AT.A39

Ymin = -9.23 G's @ 0.0401 Seconds, Ymax = 82.33 G's @ 0.0799 Seconds





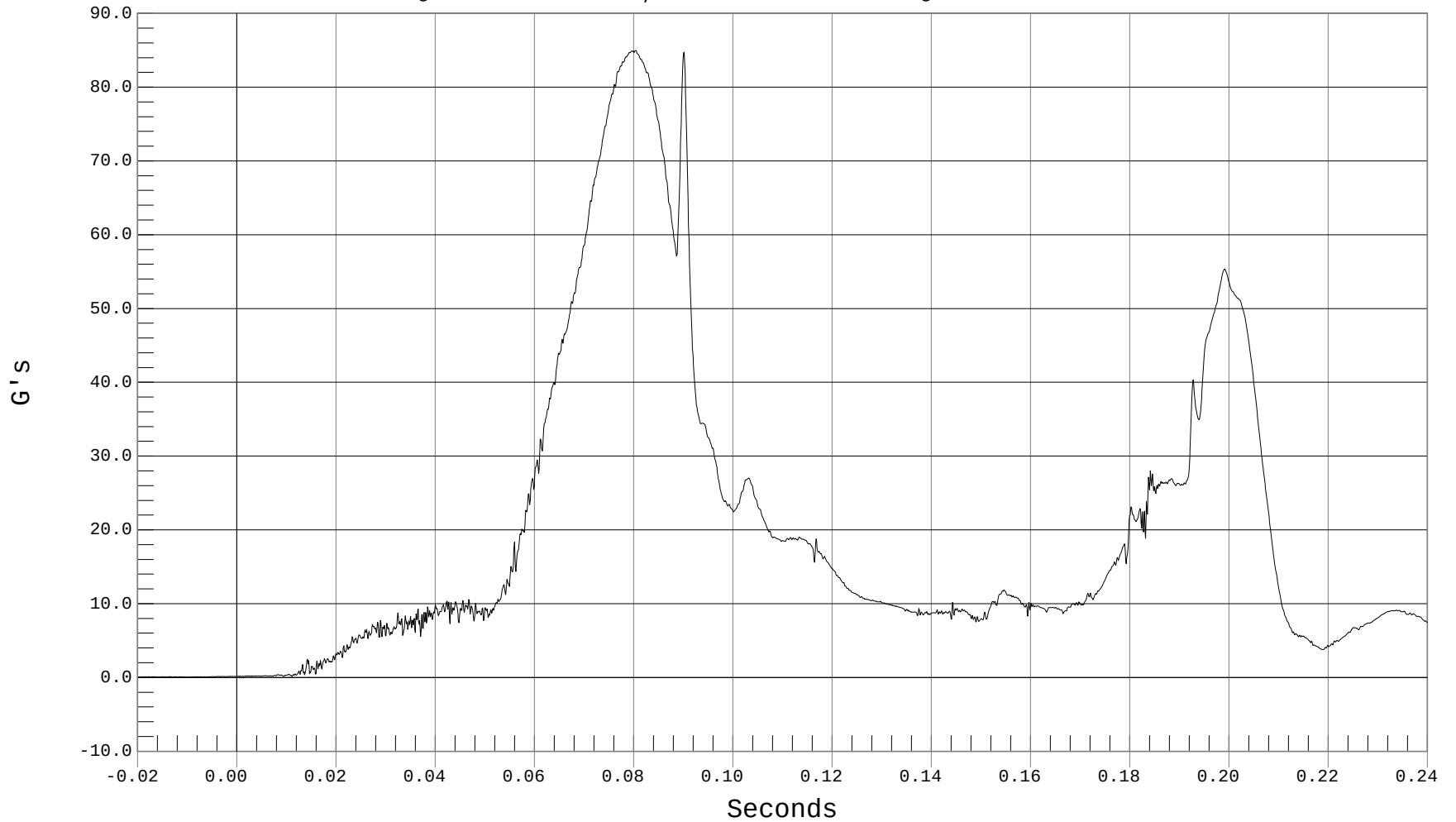
RRS 3 YR OLD HEAD RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS 3 YR OLD HEAD RESULTANT ACCELERATION, B01011AV.A37

Ymin = .03 G's @ -0.0192 Seconds, Ymax = 84.95 G's @ 0.0804 Seconds





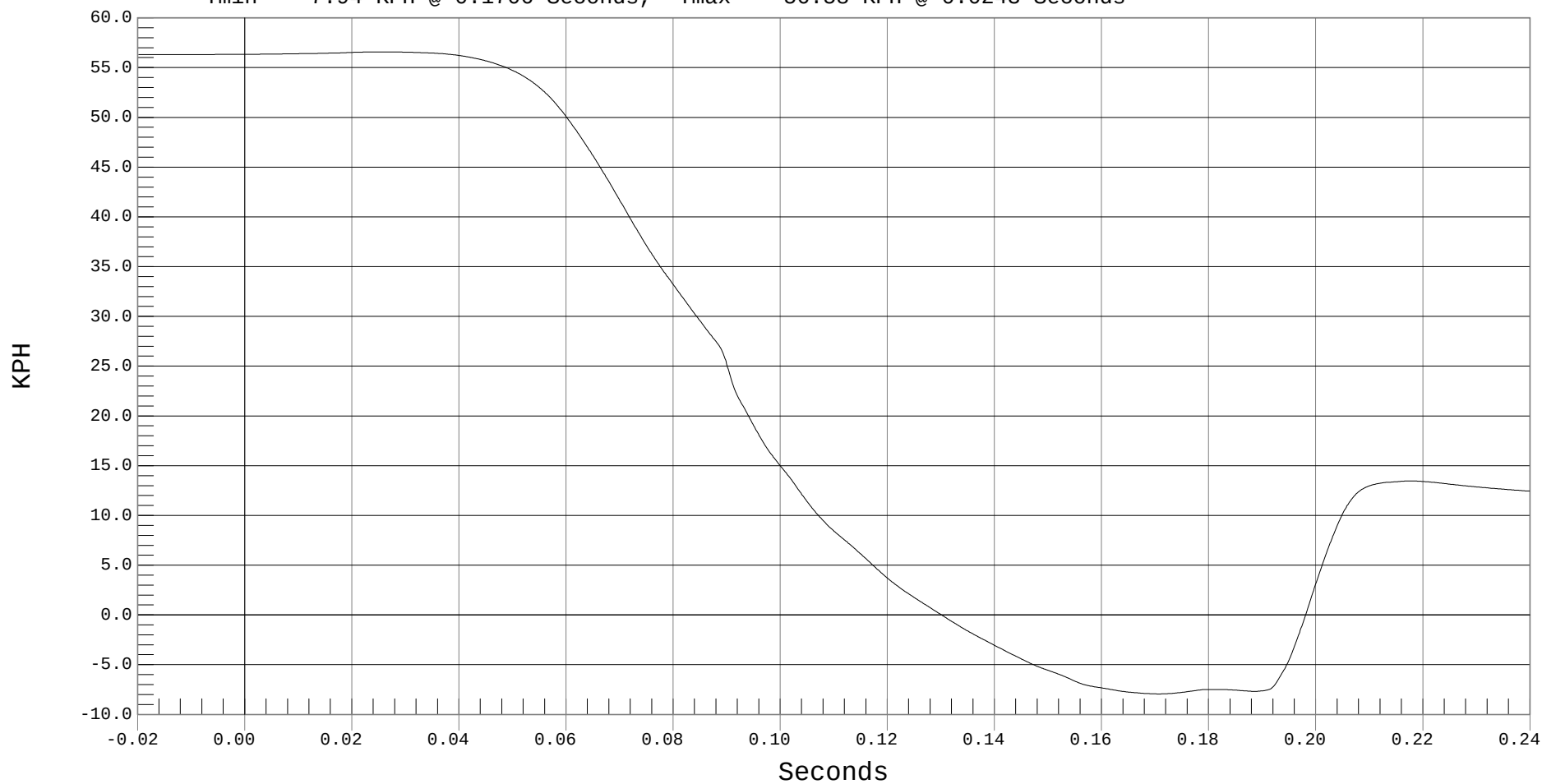
RRS 3 YR OLD HEAD X VELOCITY

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS 3 YR OLD HEAD X VELOCITY, B01011AI.V37

Ymin = -7.94 KPH @ 0.1706 Seconds, Ymax = 56.58 KPH @ 0.0243 Seconds





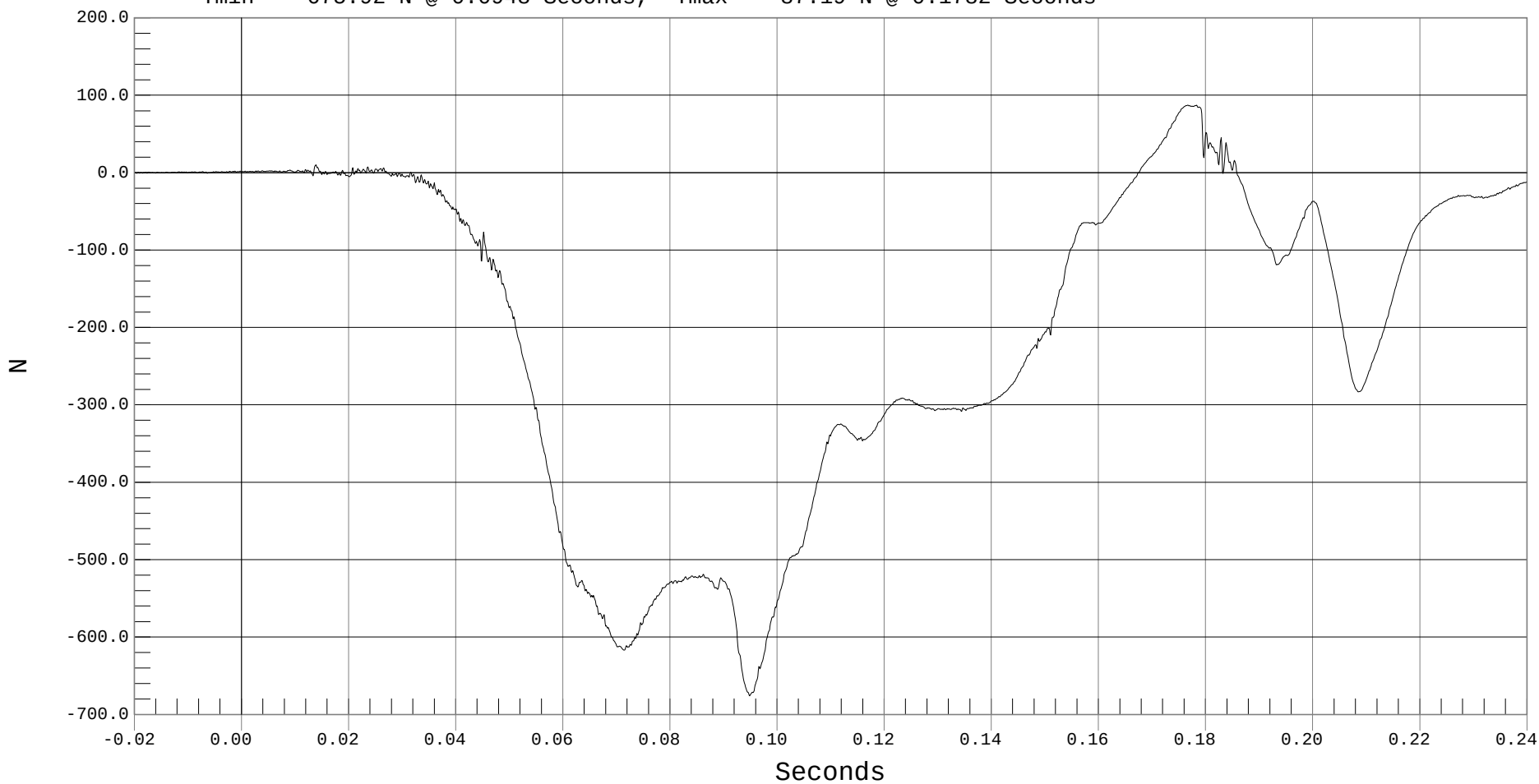
RRS 3 YR OLD UPPER NECK FORCE X

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD UPPER NECK FORCE X, B01011FM.F40

Ymin = -675.92 N @ 0.0948 Seconds, Ymax = 87.19 N @ 0.1782 Seconds





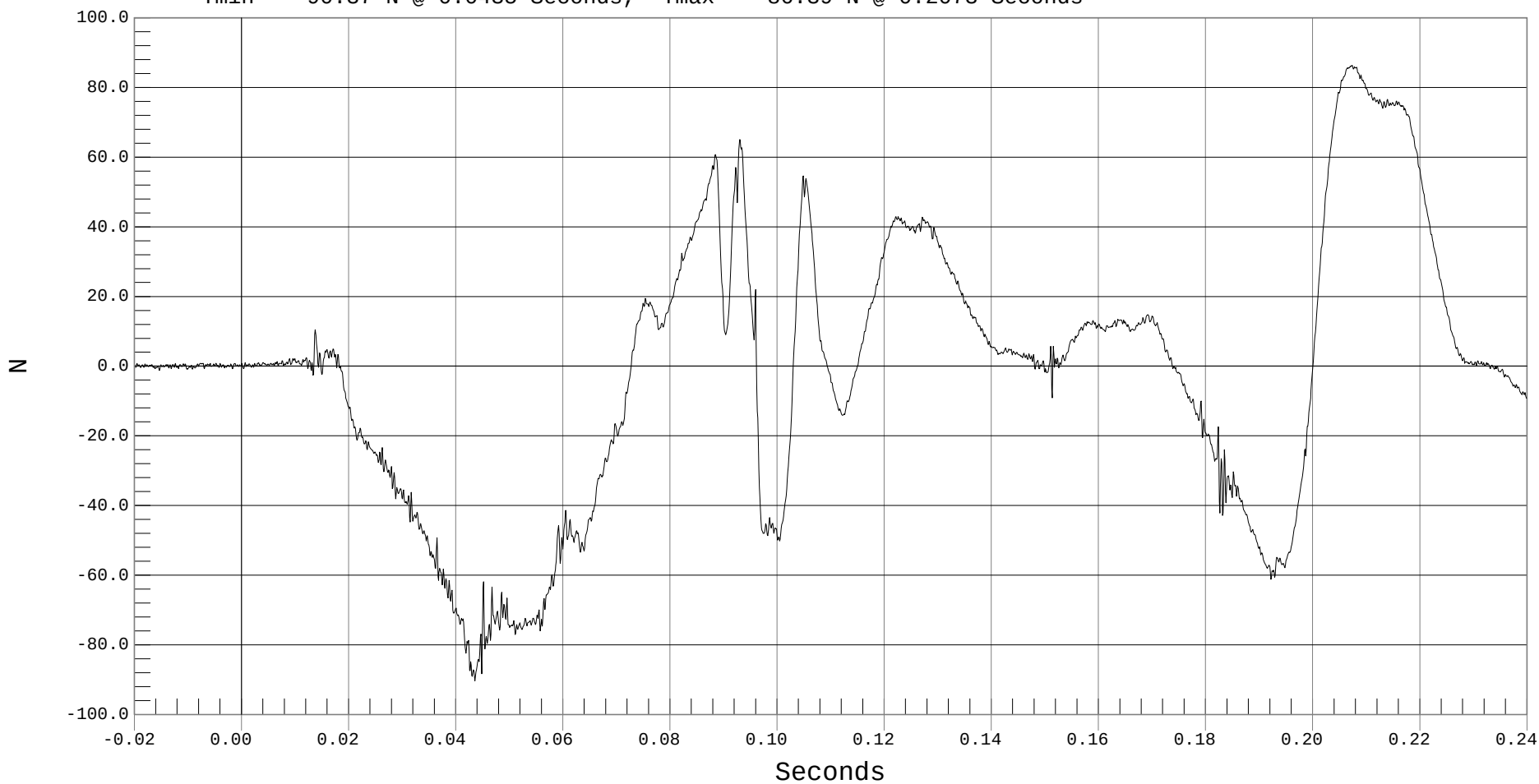
RRS 3 YR OLD UPPER NECK FORCE Y

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD UPPER NECK FORCE Y, B01011FM.F41

Ymin = -90.37 N @ 0.0435 Seconds, Ymax = 86.39 N @ 0.2073 Seconds





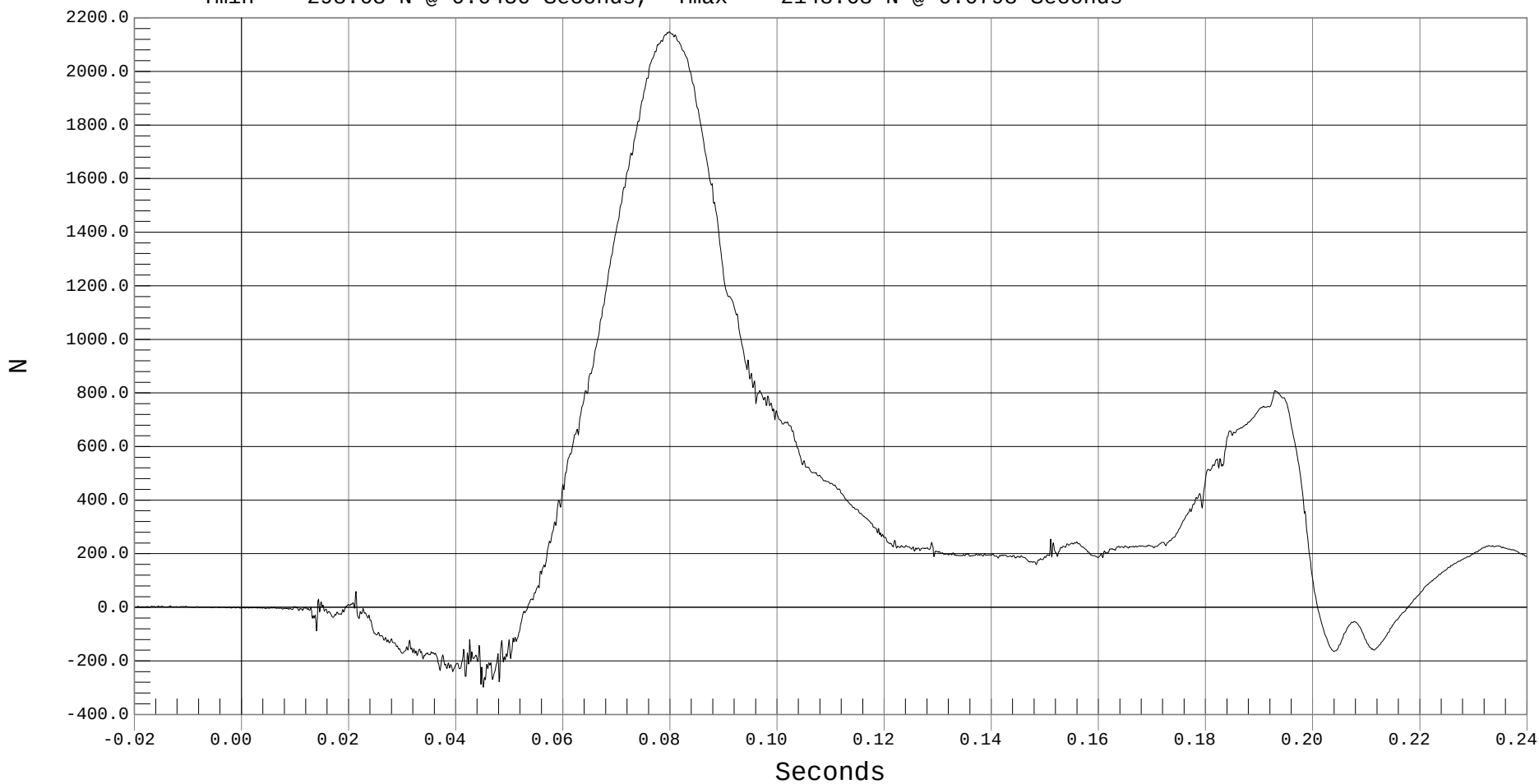
RRS 3 YR OLD UPPER NECK FORCE Z

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD UPPER NECK FORCE Z, B01011FM.F42

Ymin = -298.68 N @ 0.0450 Seconds, Ymax = 2148.68 N @ 0.0798 Seconds





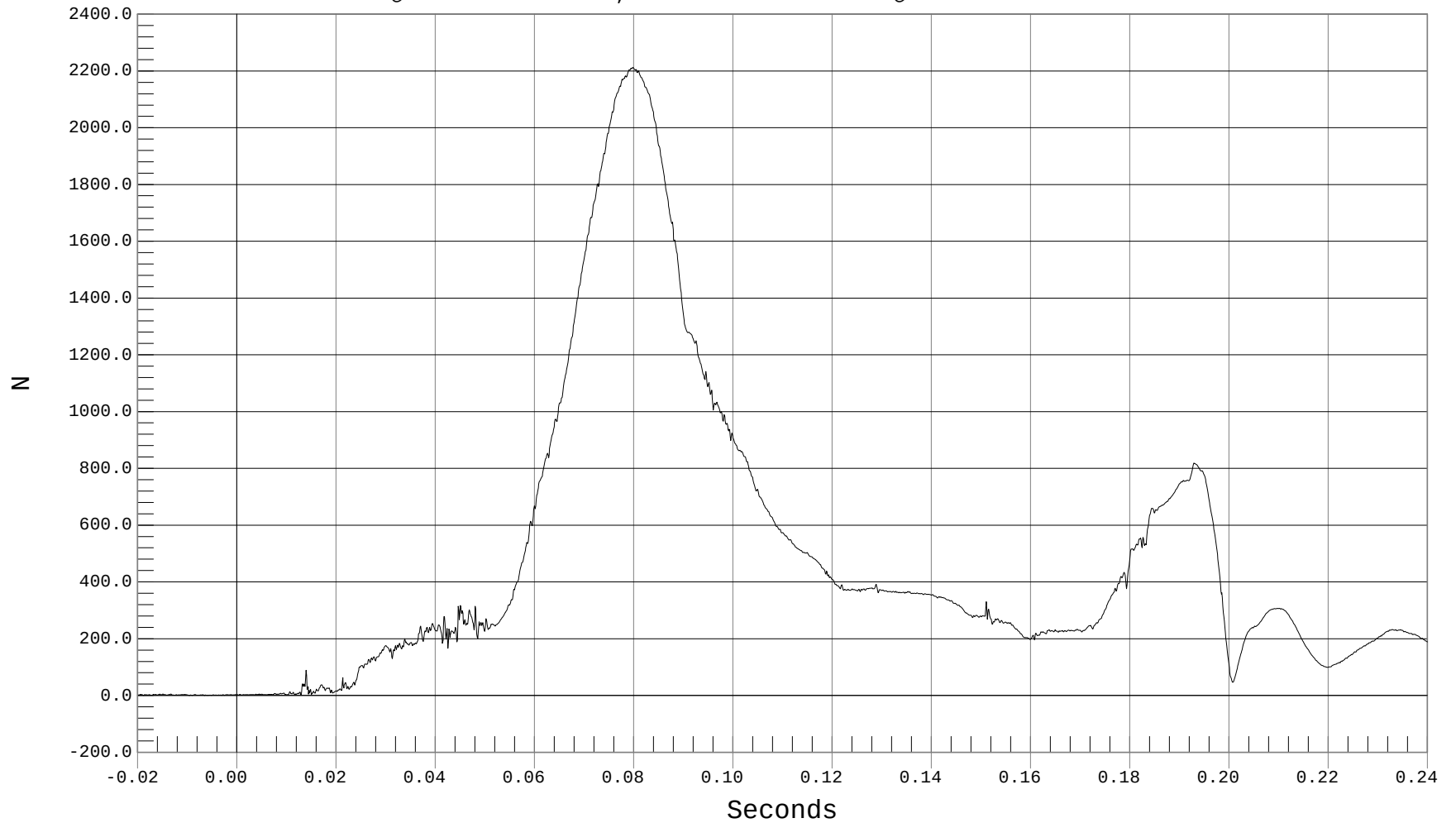
RRS 3 YR OLD UPPER NECK FORCE RESULTANT

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS 3 YR OLD UPPER NECK FORCE RESULTANT, B01011FV.F40

Ymin = .22 N @ -0.0030 Seconds, Ymax = 2213.19 N @ 0.0799 Seconds





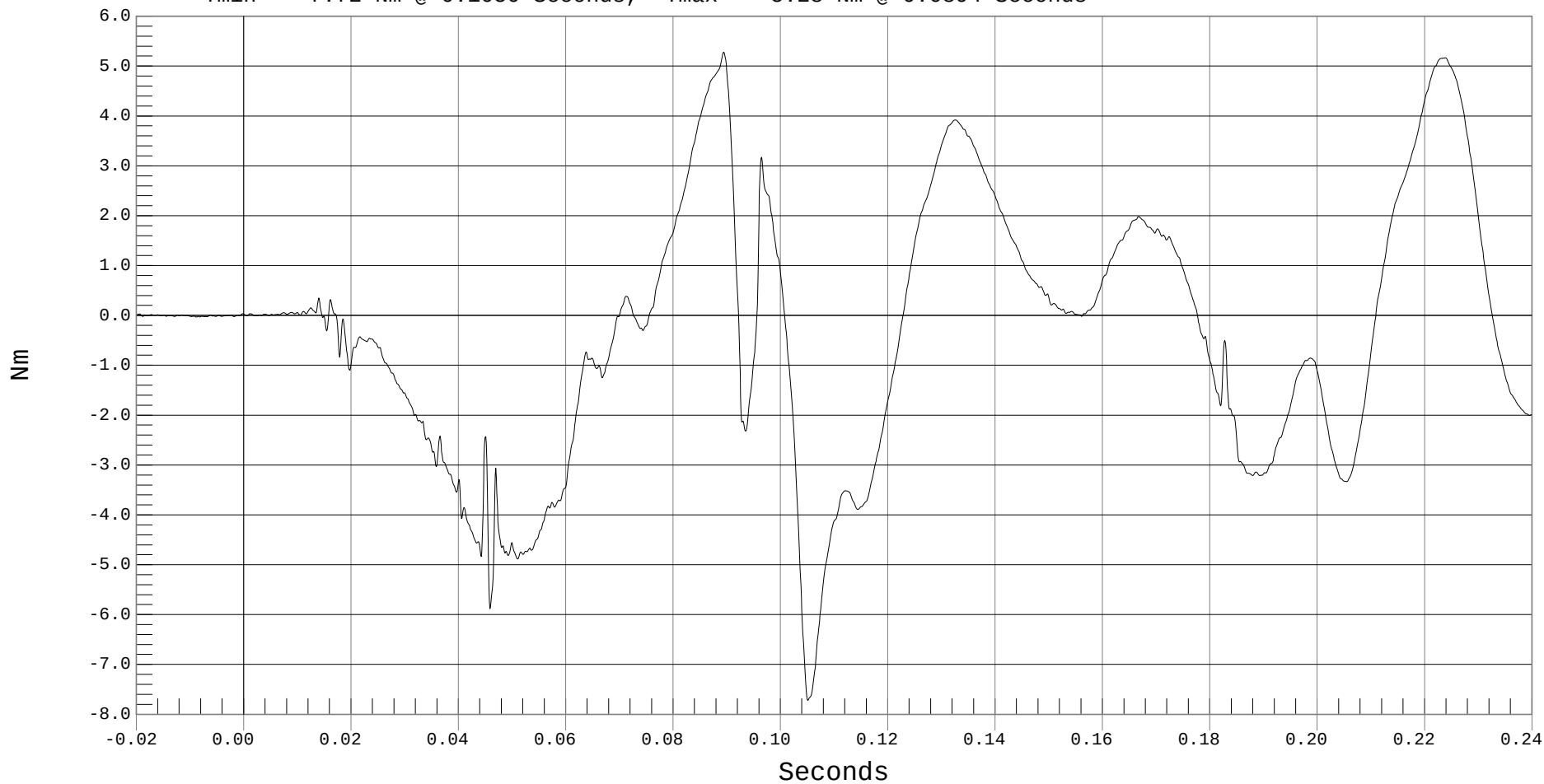
RRS 3 YR OLD UPPER NECK MOMENT X

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD UPPER NECK MOMENT X, B01011MF.M43

Ymin = -7.72 Nm @ 0.1050 Seconds, Ymax = 5.28 Nm @ 0.0894 Seconds





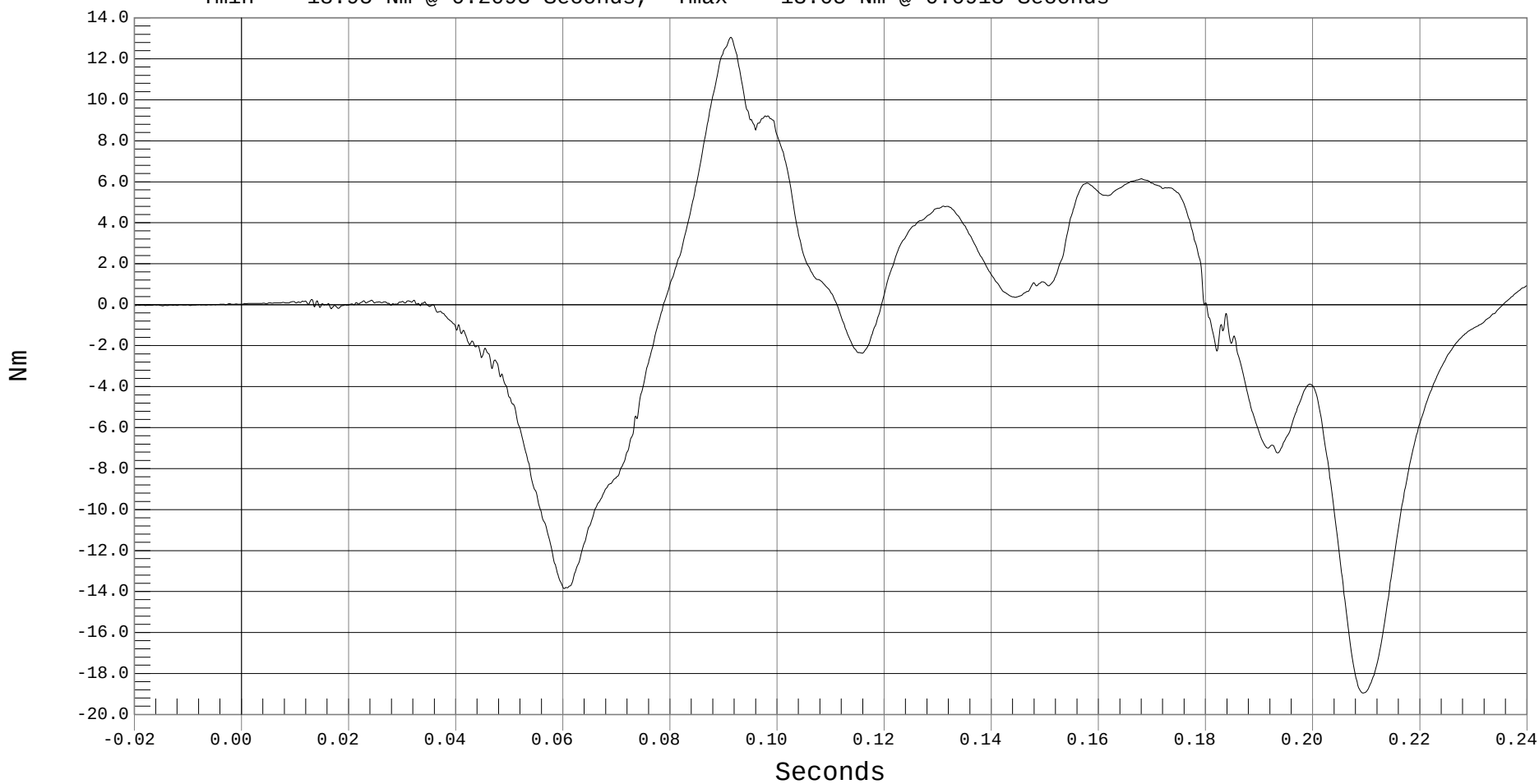
RRS 3 YR OLD UPPER NECK MOMENT Y

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD UPPER NECK MOMENT Y, B01011MF.M44

Ymin = -18.95 Nm @ 0.2093 Seconds, Ymax = 13.05 Nm @ 0.0913 Seconds





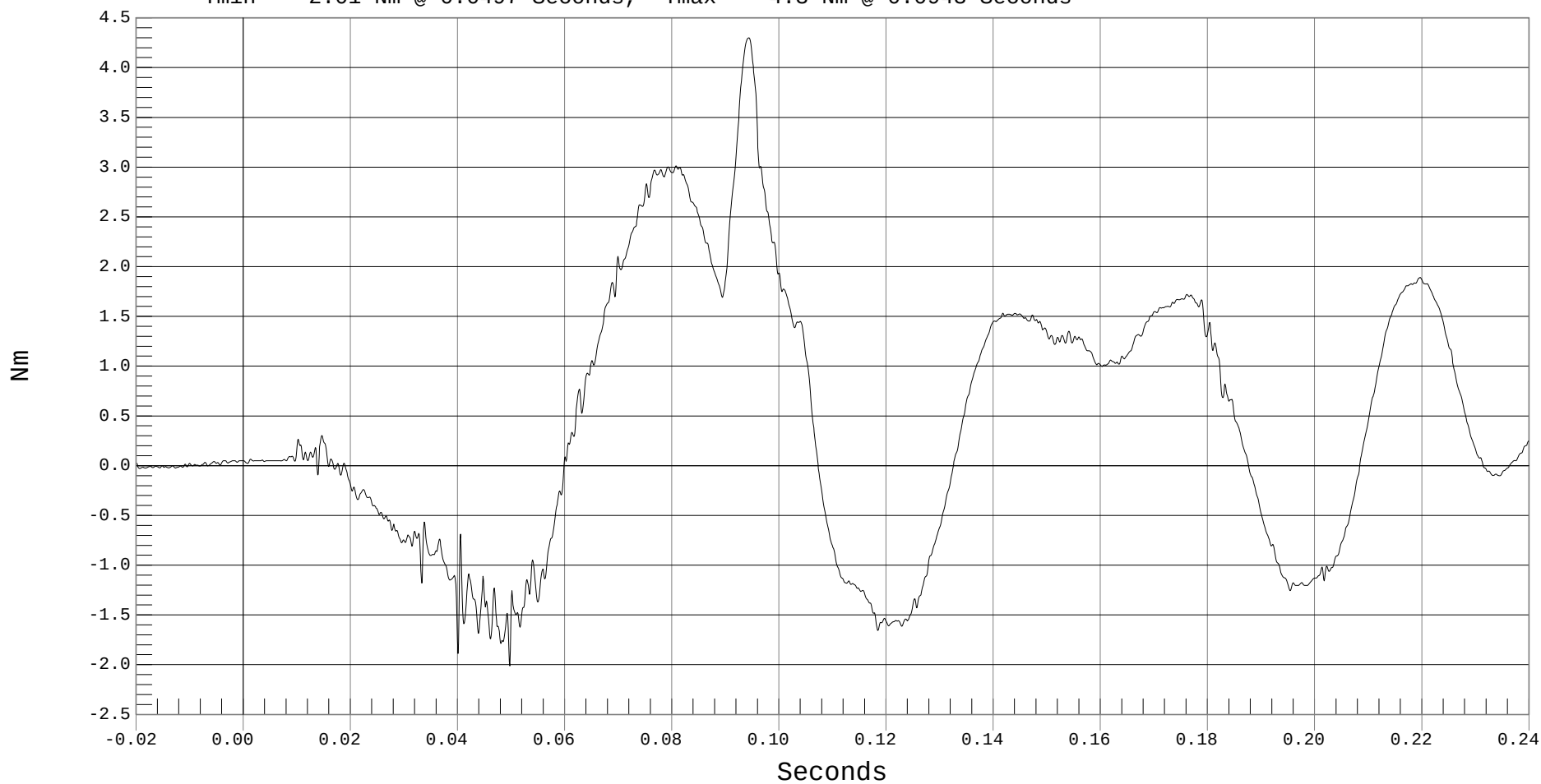
RRS 3 YR OLD UPPER NECK MOMENT Z

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD UPPER NECK MOMENT Z, B01011MF.M45

Ymin = -2.01 Nm @ 0.0497 Seconds, Ymax = 4.3 Nm @ 0.0943 Seconds





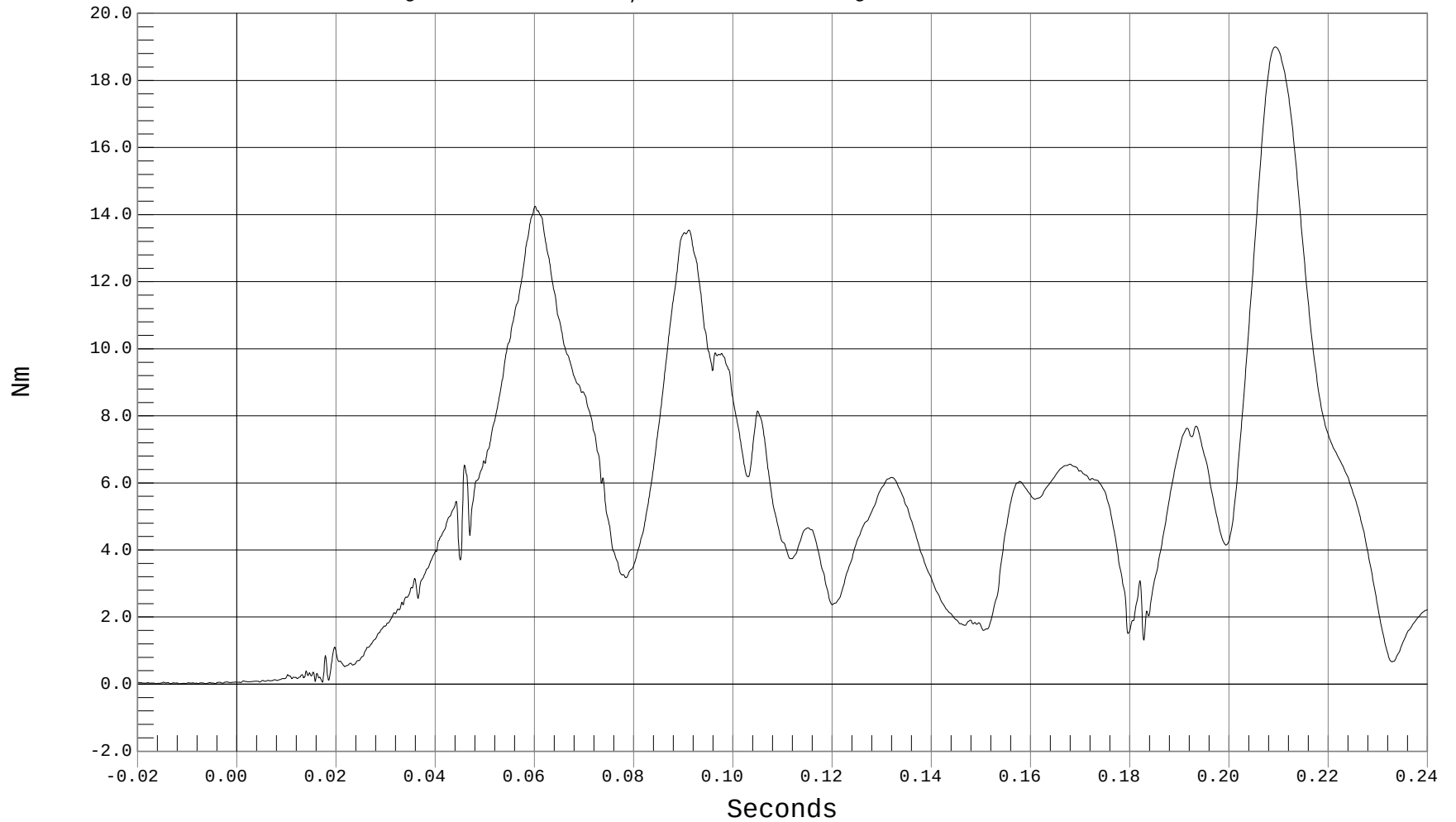
RRS 3 YR OLD UPPER NECK MOMENT RESULTANT

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS 3 YR OLD UPPER NECK MOMENT RESULTANT, B01011MV.M43

Ymin = .01 Nm @ -0.0063 Seconds, Ymax = 19 Nm @ 0.2094 Seconds





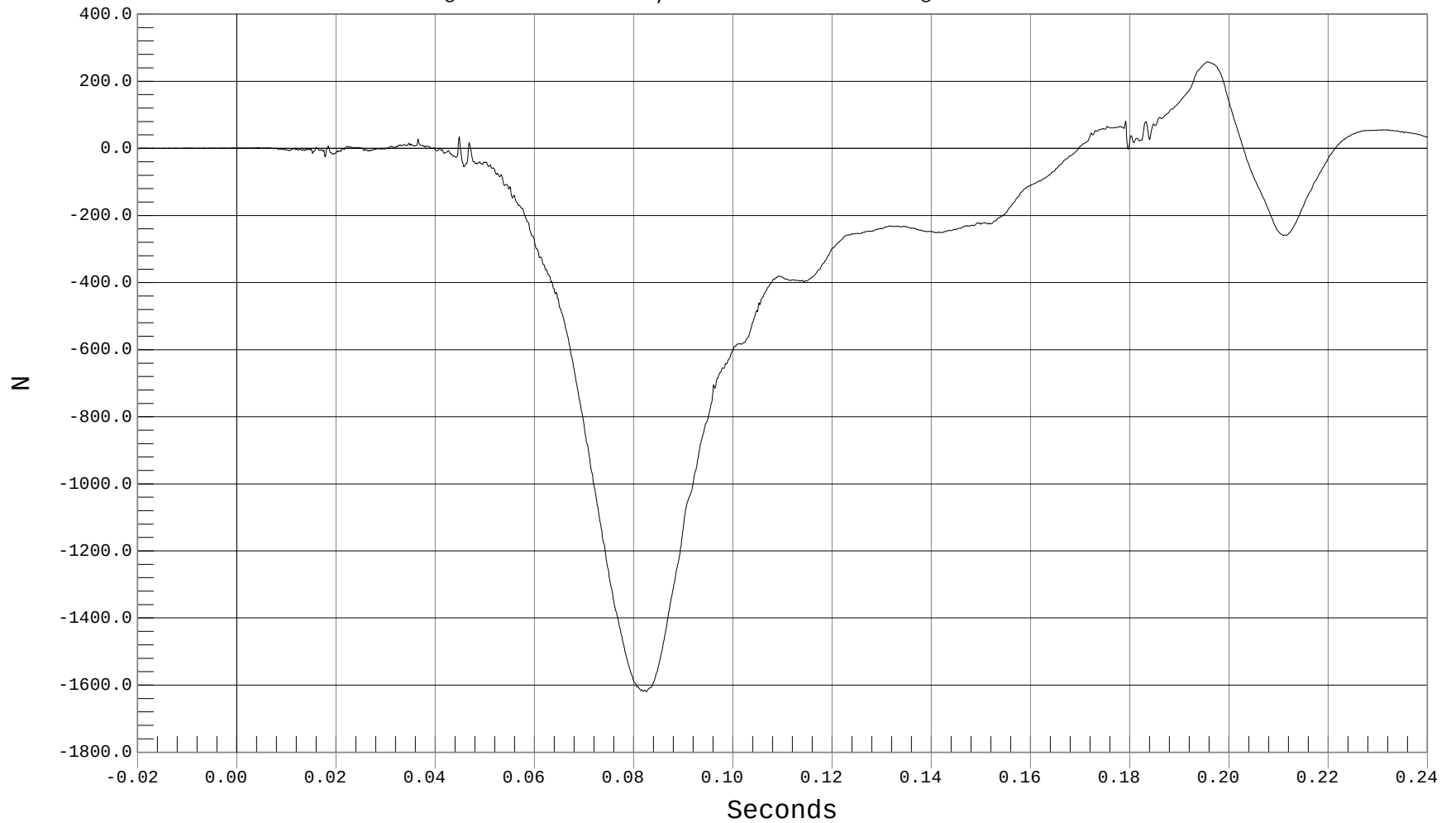
RRS 3 YR OLD LOWER NECK FORCE X

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD LOWER NECK FORCE X, B01011FT.F46

Ymin = -1619.85 N @ 0.0826 Seconds, Ymax = 258.34 N @ 0.1958 Seconds





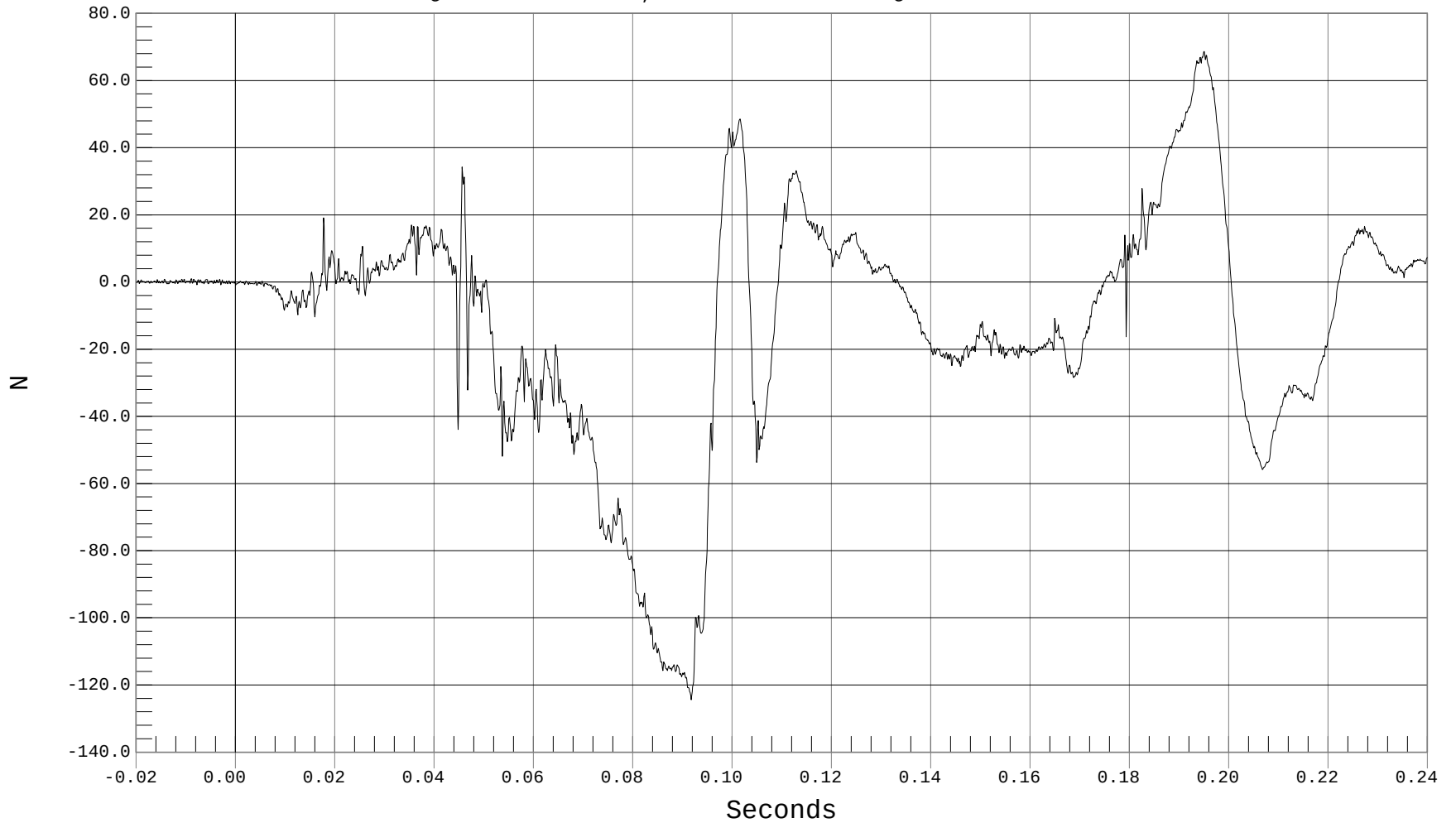
RRS 3 YR OLD LOWER NECK FORCE Y

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD LOWER NECK FORCE Y, B01011FT.F47

Ymin = -124.44 N @ 0.0918 Seconds, Ymax = 68.66 N @ 0.1951 Seconds





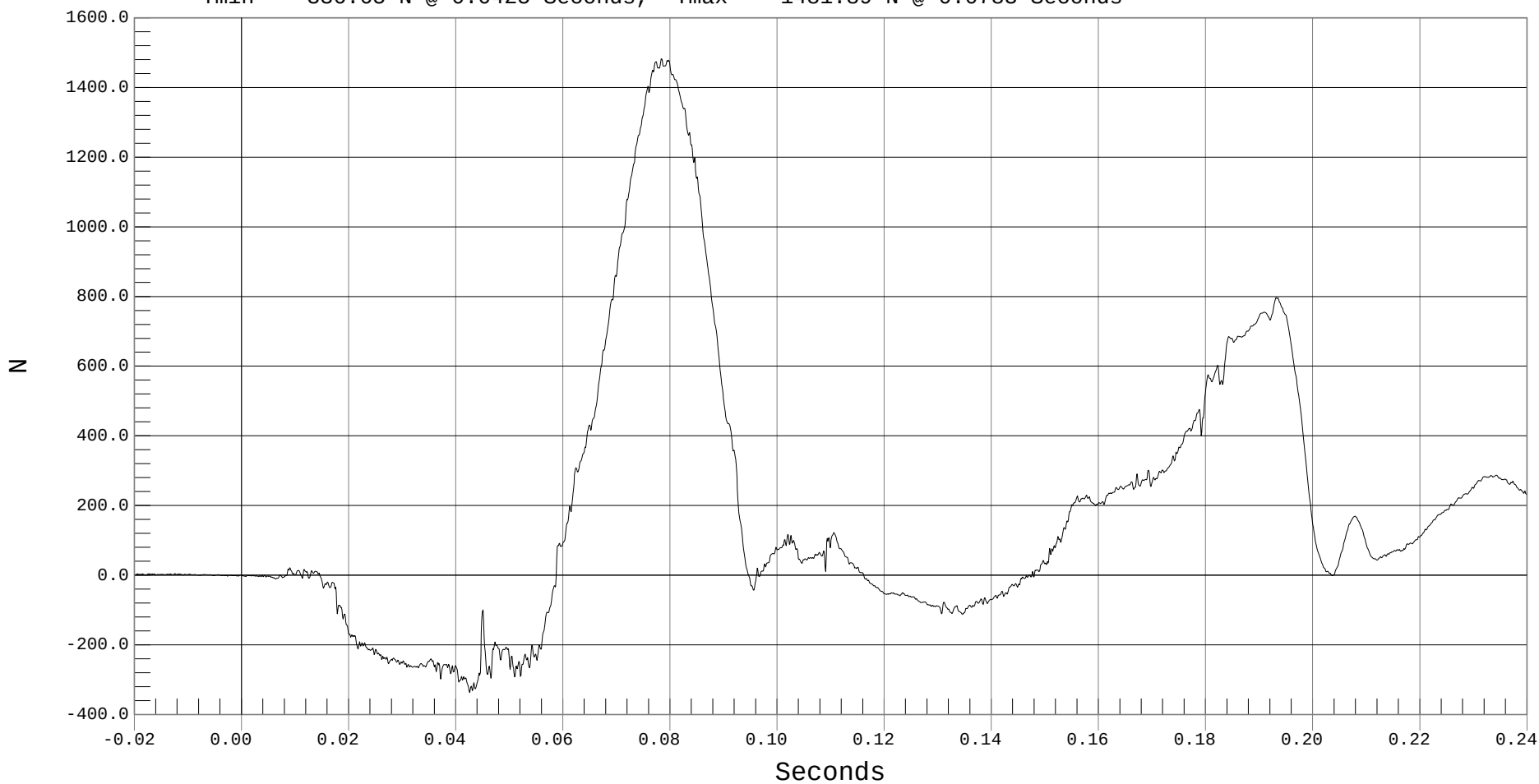
RRS 3 YR OLD LOWER NECK FORCE Z

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD LOWER NECK FORCE Z, B01011FM.F48

Ymin = -336.65 N @ 0.0425 Seconds, Ymax = 1481.89 N @ 0.0783 Seconds





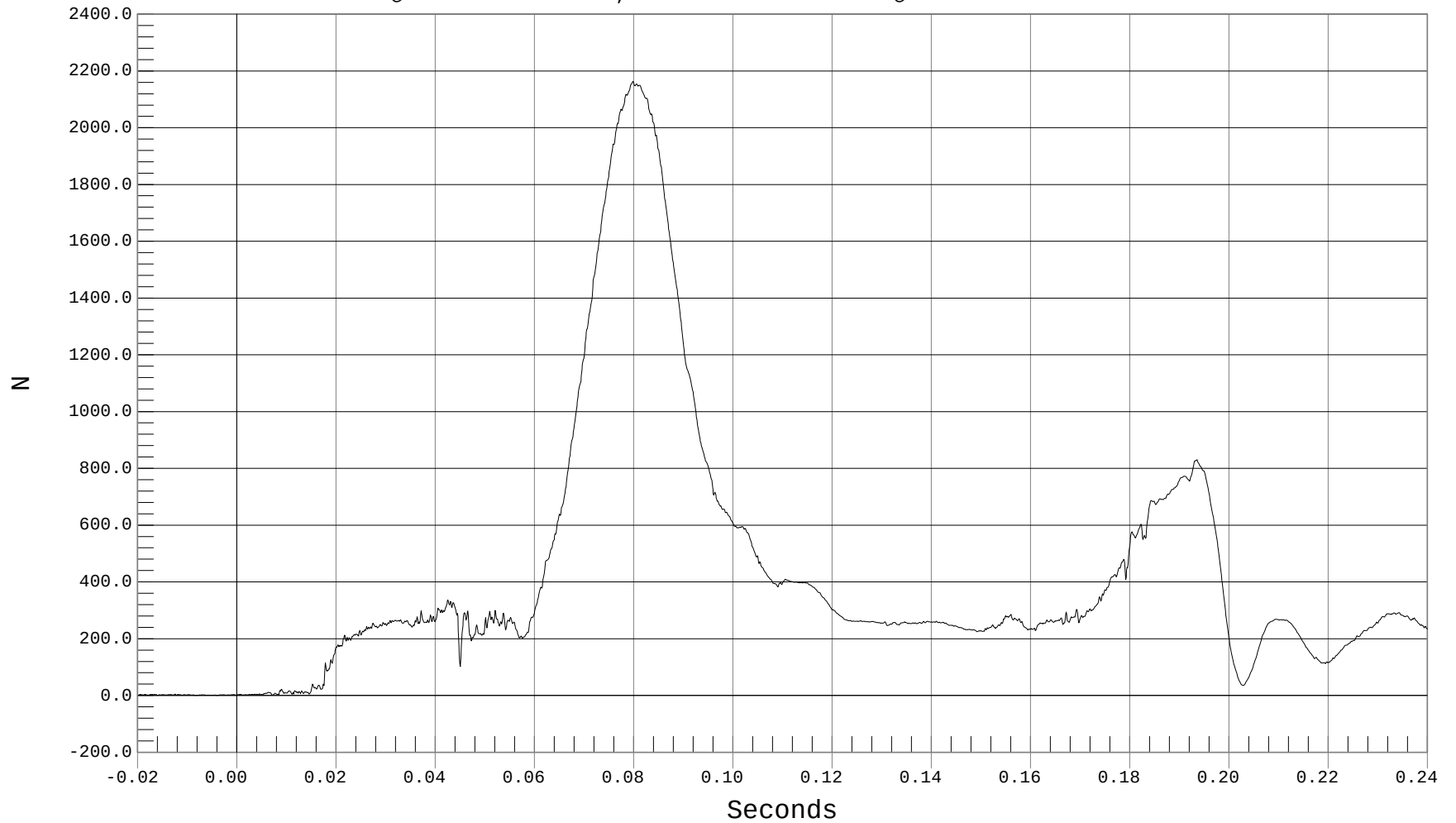
RRS 3 YR OLD LOWER NECK FORCE RESULTANT

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS 3 YR OLD LOWER NECK FORCE RESULTANT, B01011FV.F46

Ymin = .34 N @ -0.0160 Seconds, Ymax = 2163.46 N @ 0.0799 Seconds





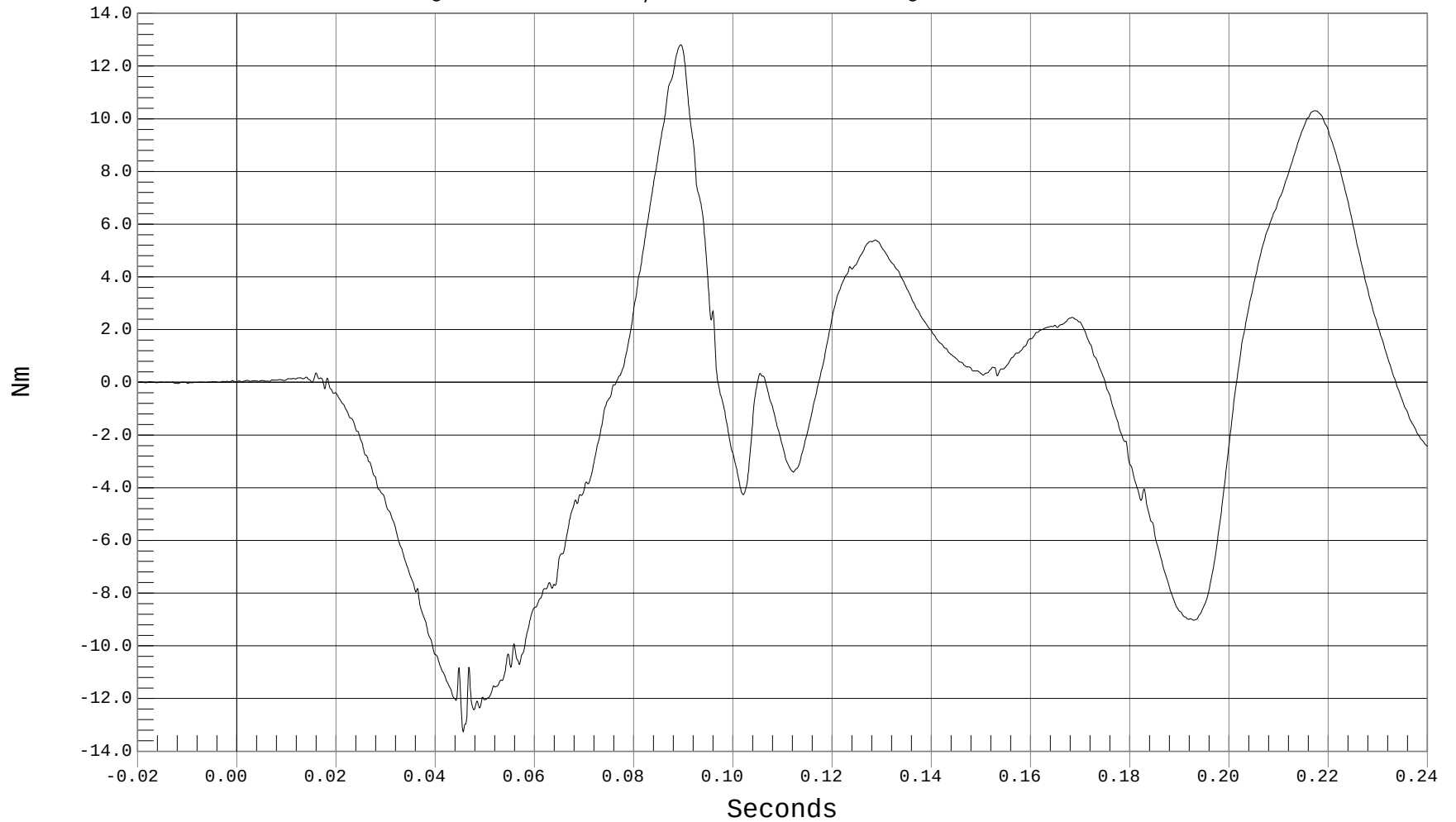
RRS 3 YR OLD LOWER NECK MOMENT X

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD LOWER NECK MOMENT X, B01011MF.M49

Ymin = -13.27 Nm @ 0.0457 Seconds, Ymax = 12.81 Nm @ 0.0896 Seconds





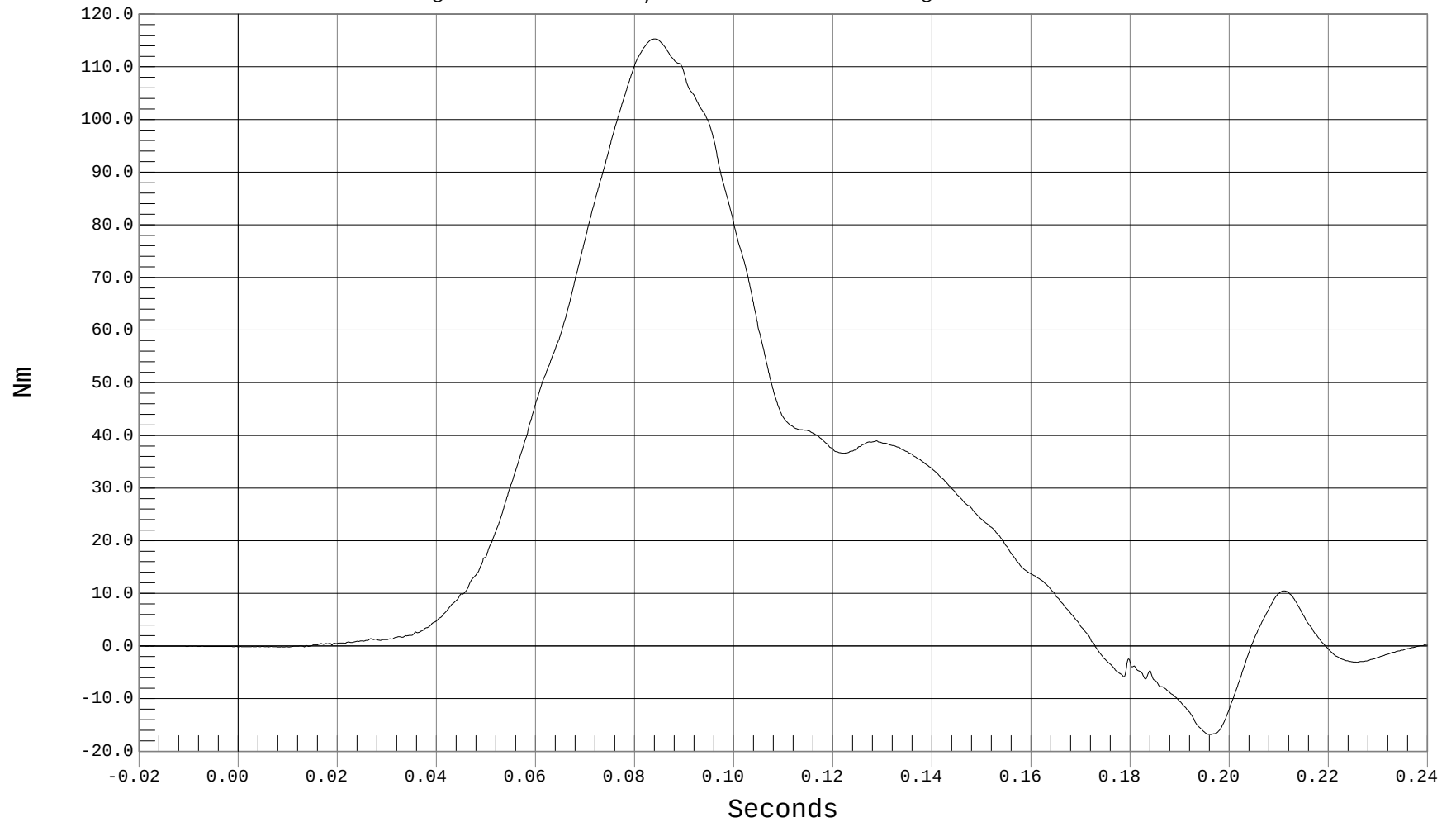
RRS 3 YR OLD LOWER NECK MOMENT Y

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD LOWER NECK MOMENT Y, B01011MF.M50

Ymin = -16.81 Nm @ 0.1962 Seconds, Ymax = 115.29 Nm @ 0.0841 Seconds





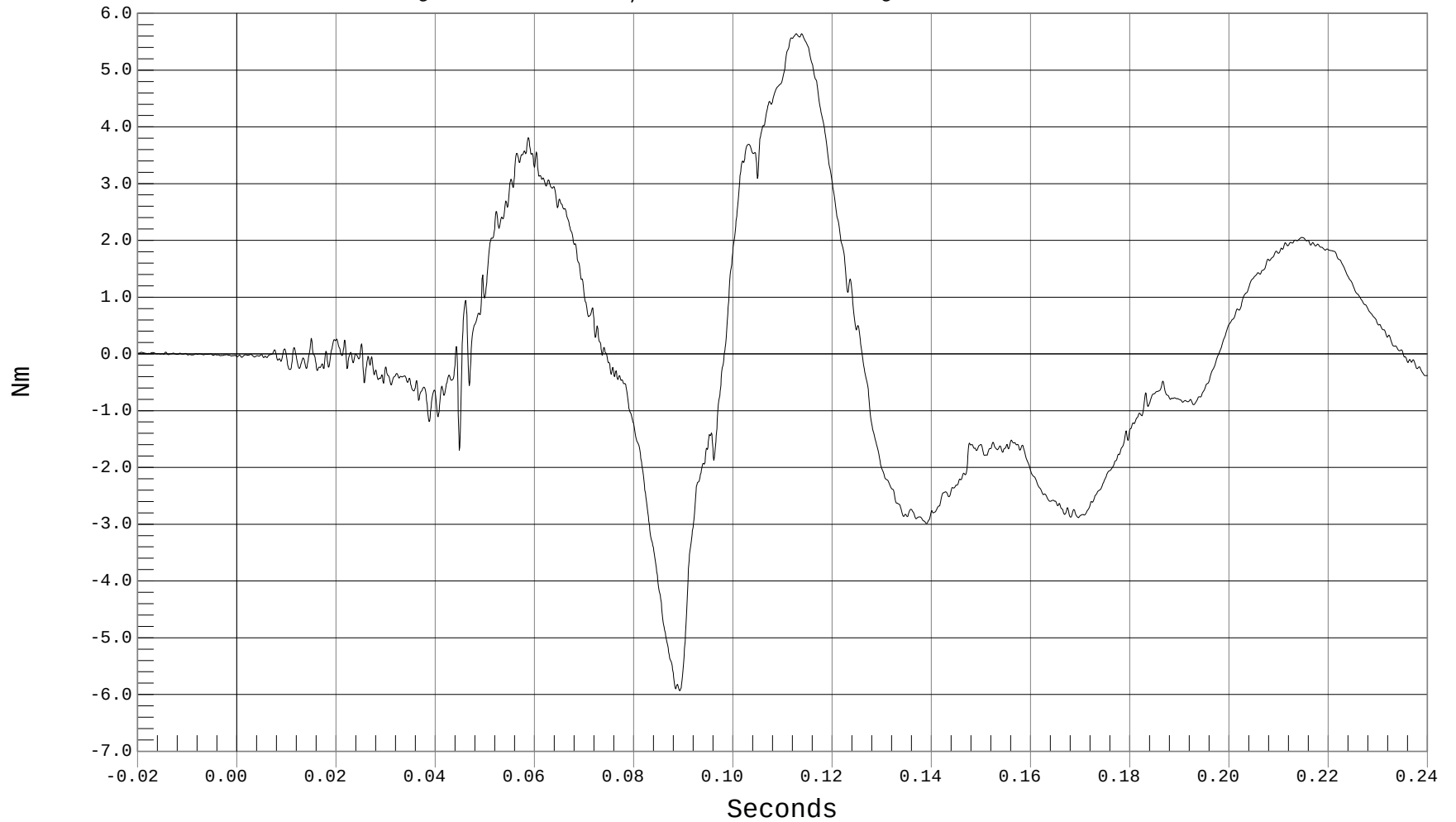
RRS 3 YR OLD LOWER NECK MOMENT Z

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD LOWER NECK MOMENT Z, B01011MF.M51

Ymin = -5.93 Nm @ 0.0893 Seconds, Ymax = 5.64 Nm @ 0.1139 Seconds





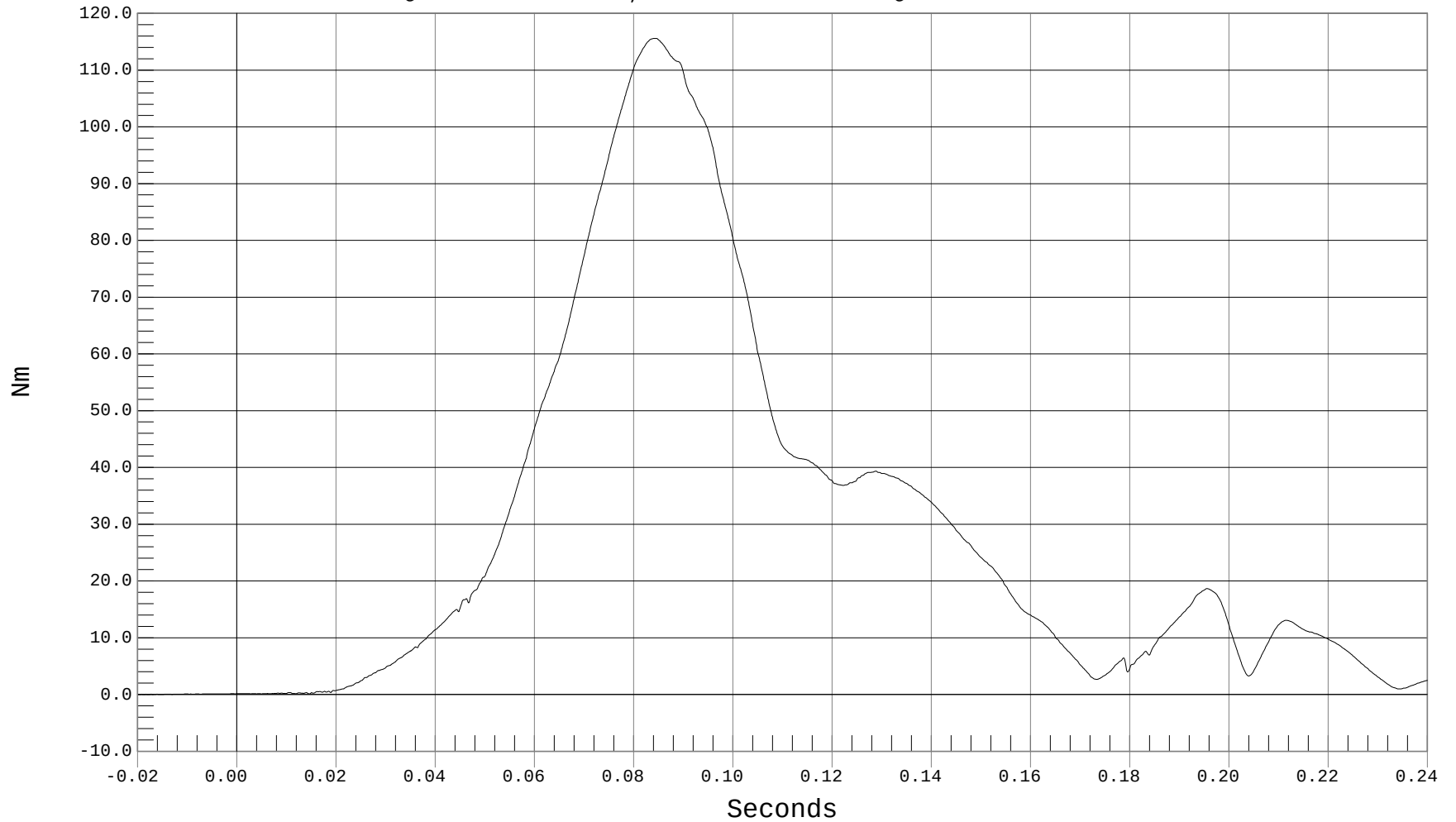
RRS 3 YR OLD LOWER NECK MOMENT RESULTANT

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS 3 YR OLD LOWER NECK MOMENT RESULTANT, B01011MV.M49

Ymin = .01 Nm @ -0.0179 Seconds, Ymax = 115.6 Nm @ 0.0842 Seconds





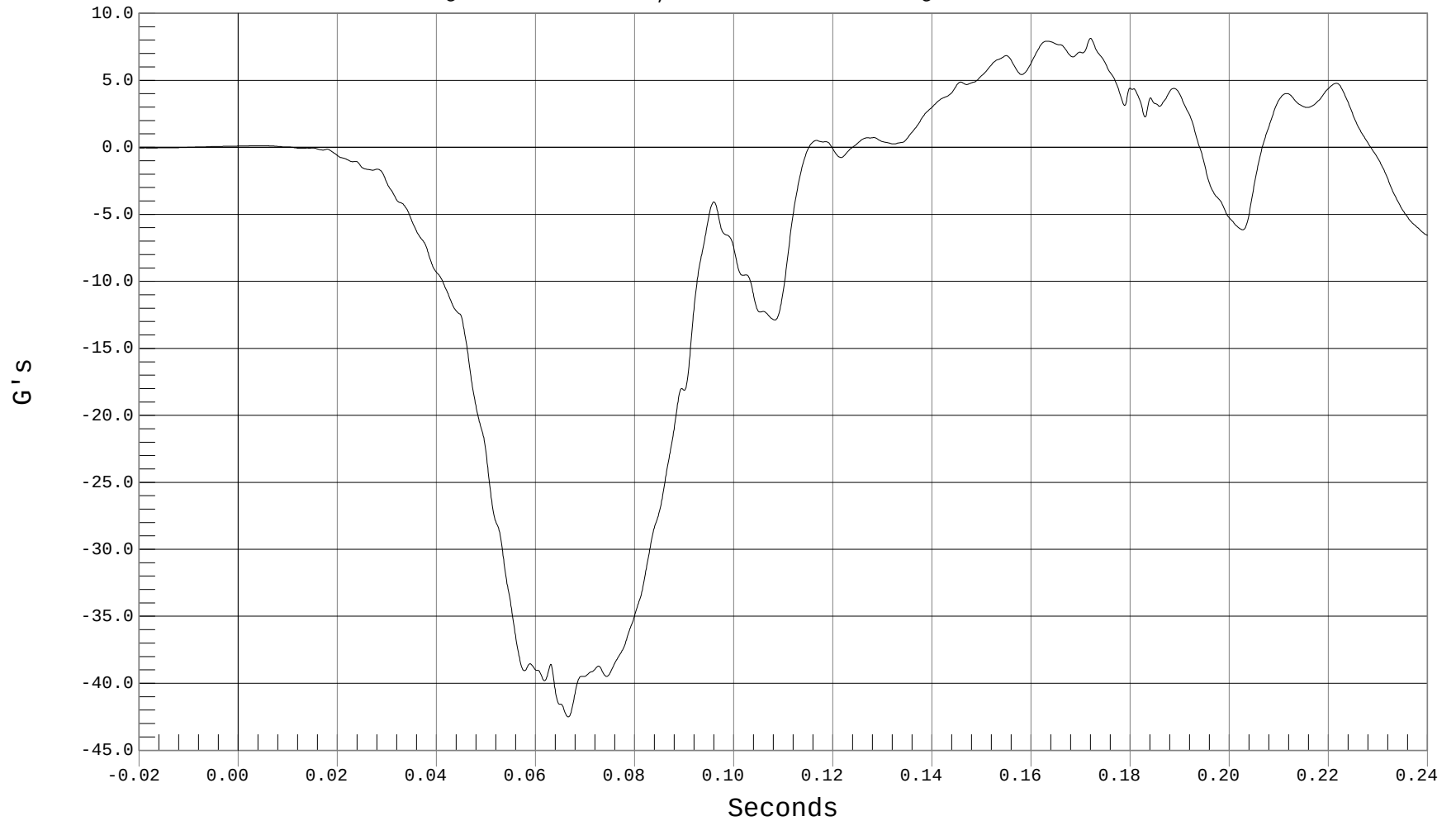
RRS 3 YR OLD CHEST X ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS CHILD CHEST X, B01011AF.A52

Ymin = -42.51 G's @ 0.0666 Seconds, Ymax = 8.14 G's @ 0.1720 Seconds





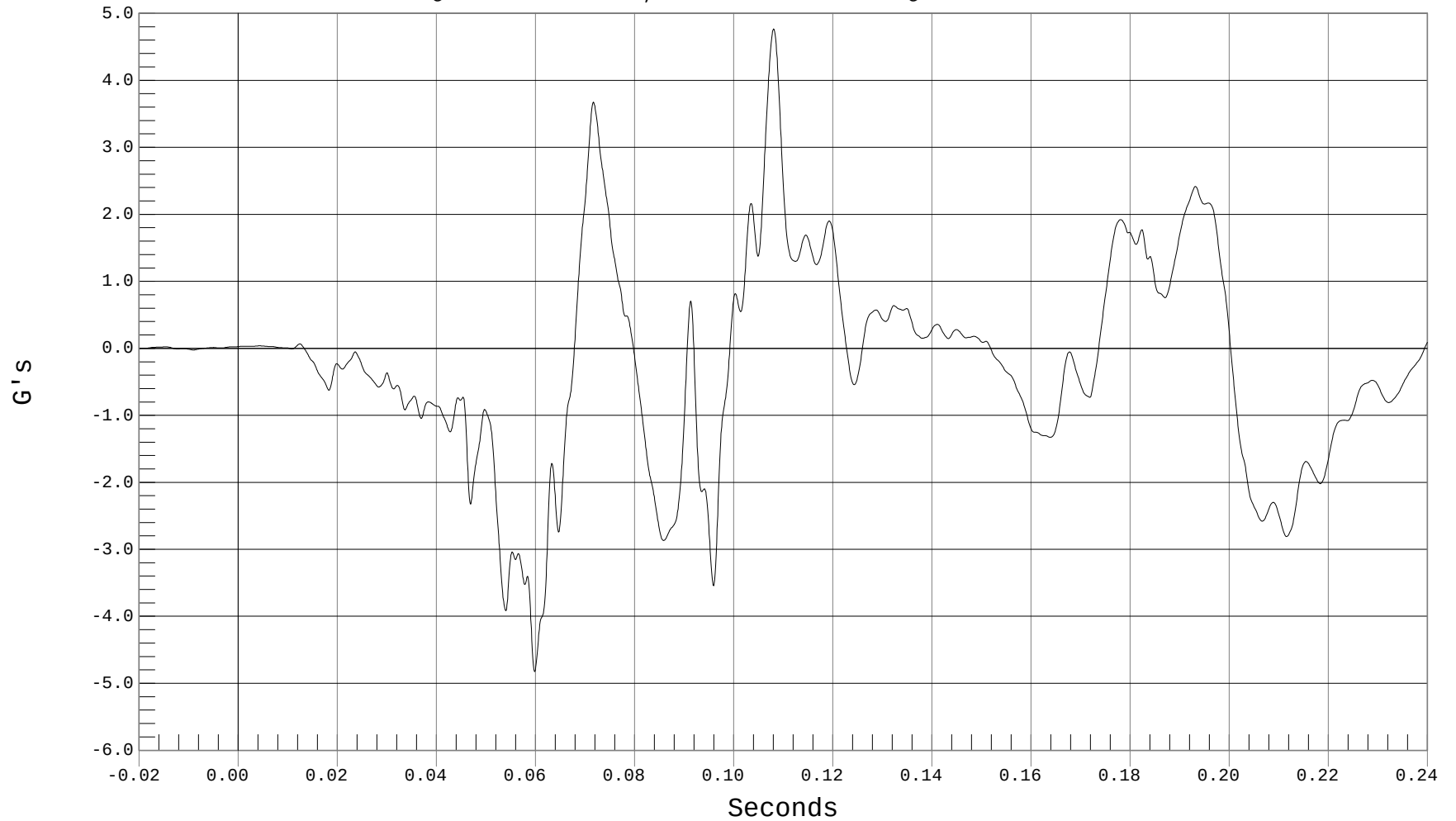
RRS 3 YR OLD CHEST Y ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS CHILD CHEST Y, B01011AF.A53

Ymin = -4.83 G's @ 0.0599 Seconds, Ymax = 4.77 G's @ 0.1081 Seconds





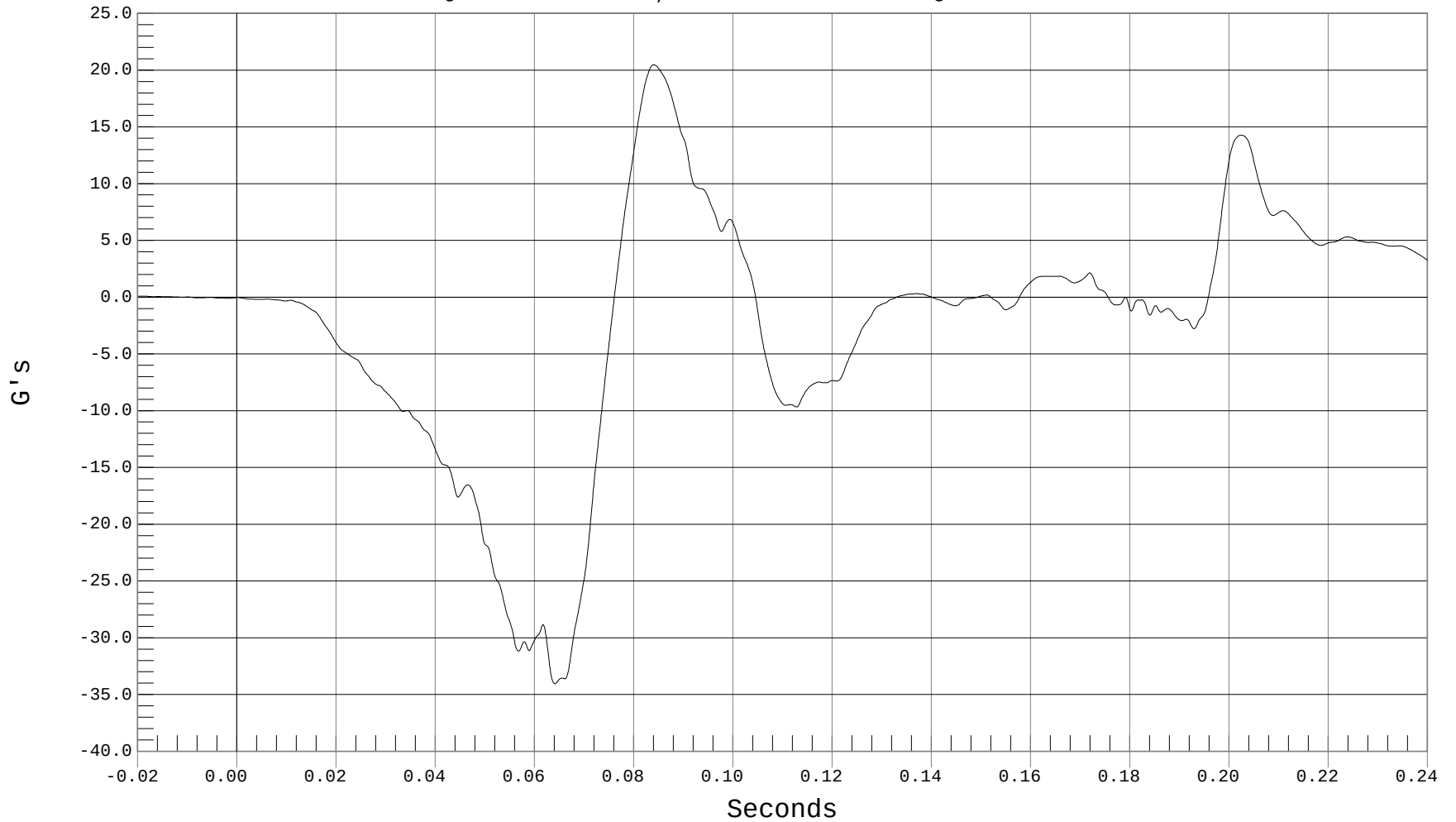
RRS 3 YR OLD CHEST Z ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS CHILD CHEST Z, B01011AF.A54

Ymin = -34.06 G's @ 0.0642 Seconds, Ymax = 20.47 G's @ 0.0841 Seconds





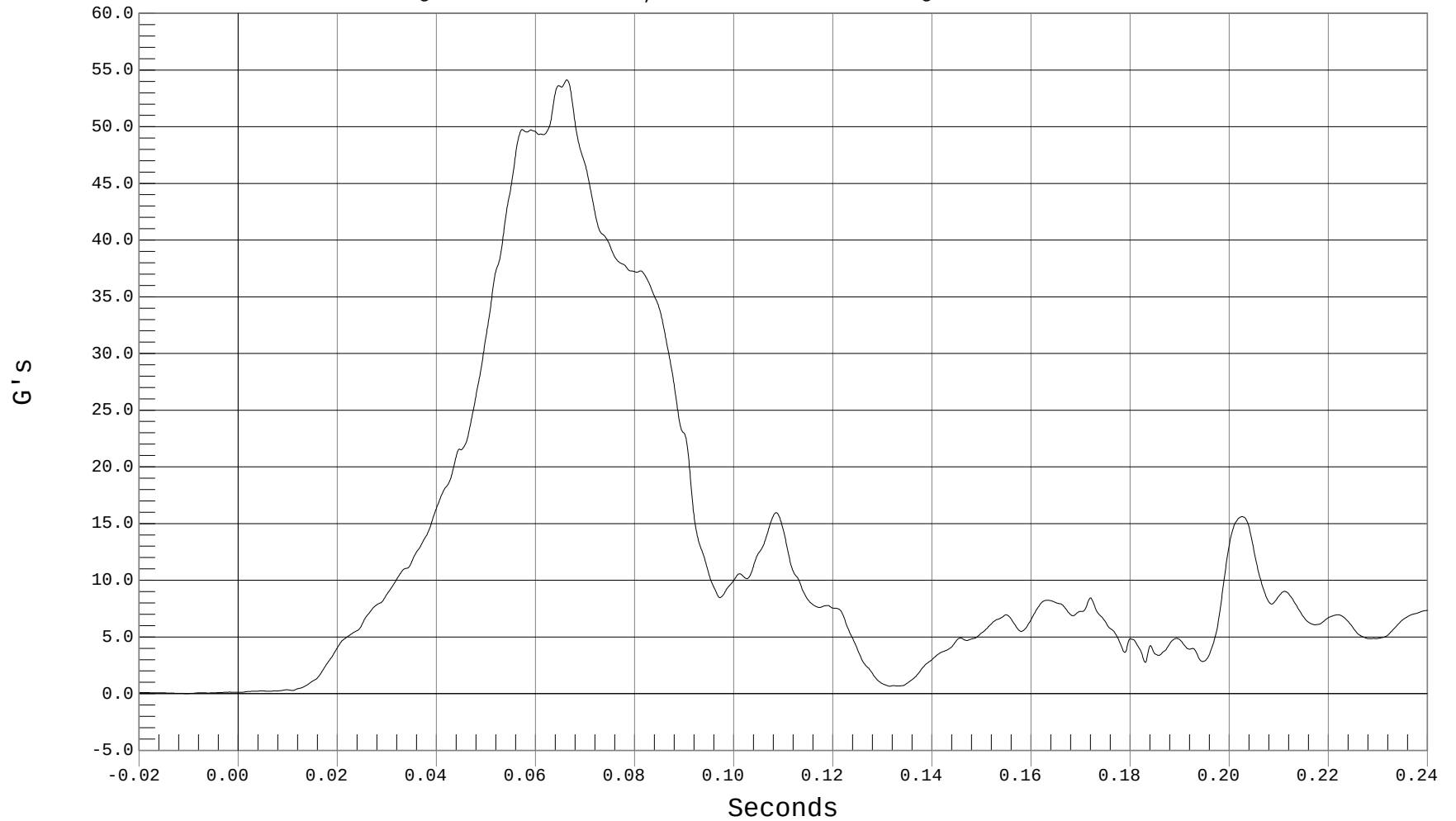
RRS 3 YR OLD CHEST RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS 3 YR OLD CHEST RESULTANT ACCELERATION, B01011AV.A52

Ymin = .01 G's @ -0.0104 Seconds, Ymax = 54.13 G's @ 0.0664 Seconds





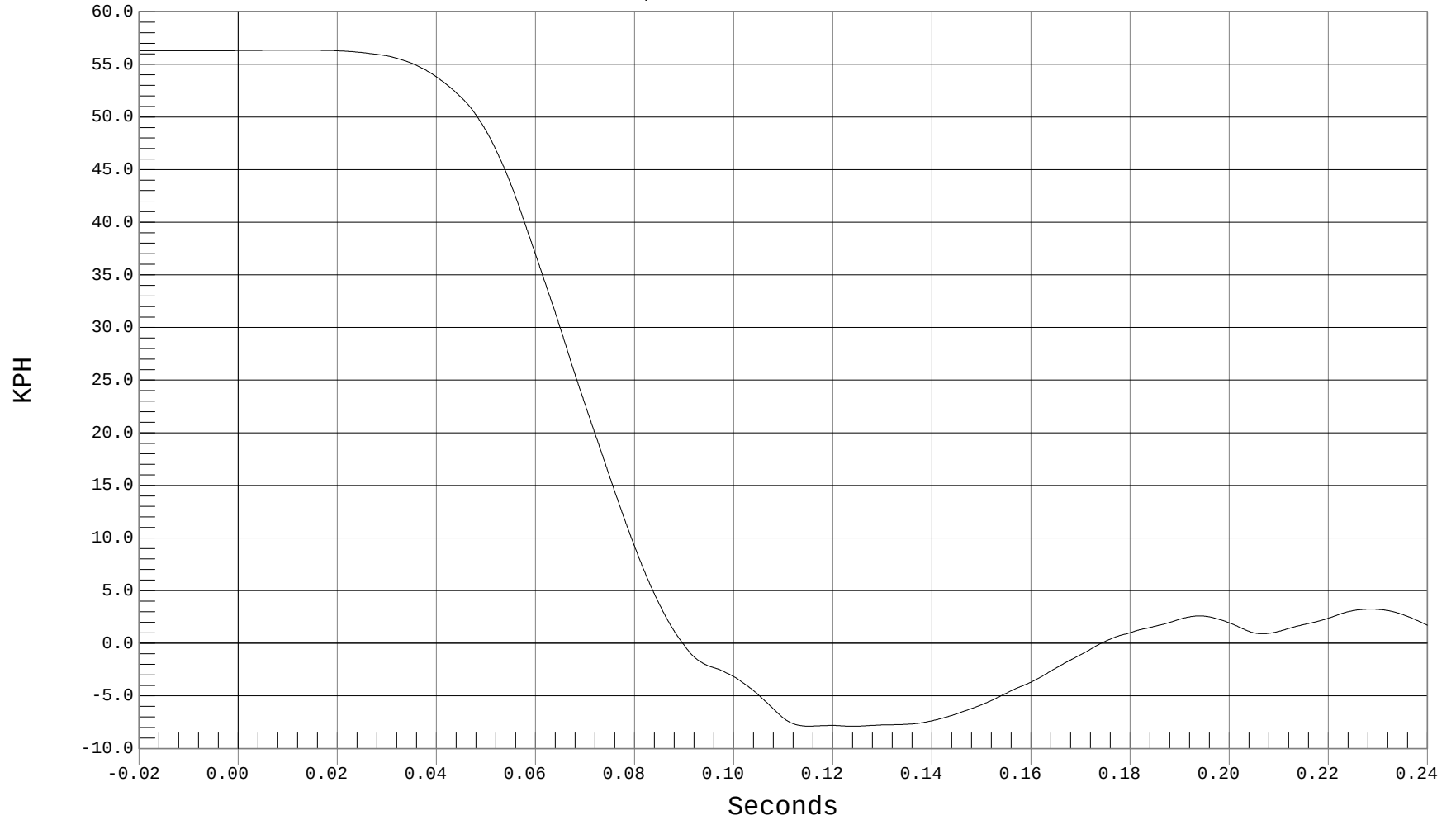
RRS 3 YR OLD CHEST X VELOCITY

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS 3 YR OLD CHEST X VELOCITY, B01011AI.V52

Ymin = -7.87 KPH @ 0.1240 Seconds, Ymax = 56.34 KPH @ 0.0109 Seconds





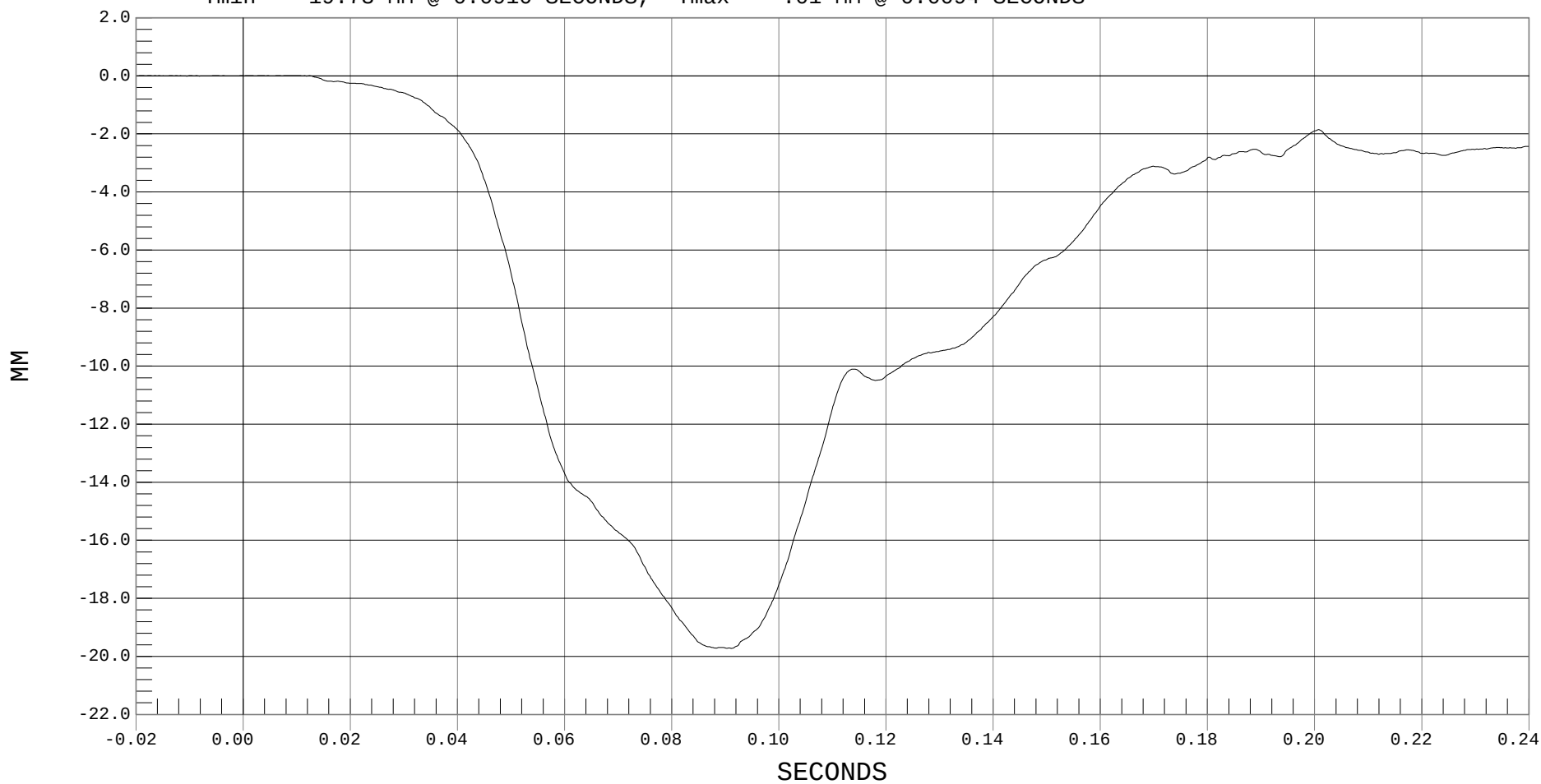
RRS 3 YR OLD CHEST COMPRESSION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 D00R (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DISPLACEMENT, B01011DF.D55

Ymin = -19.73 MM @ 0.0910 SECONDS, Ymax = .01 MM @ 0.0094 SECONDS





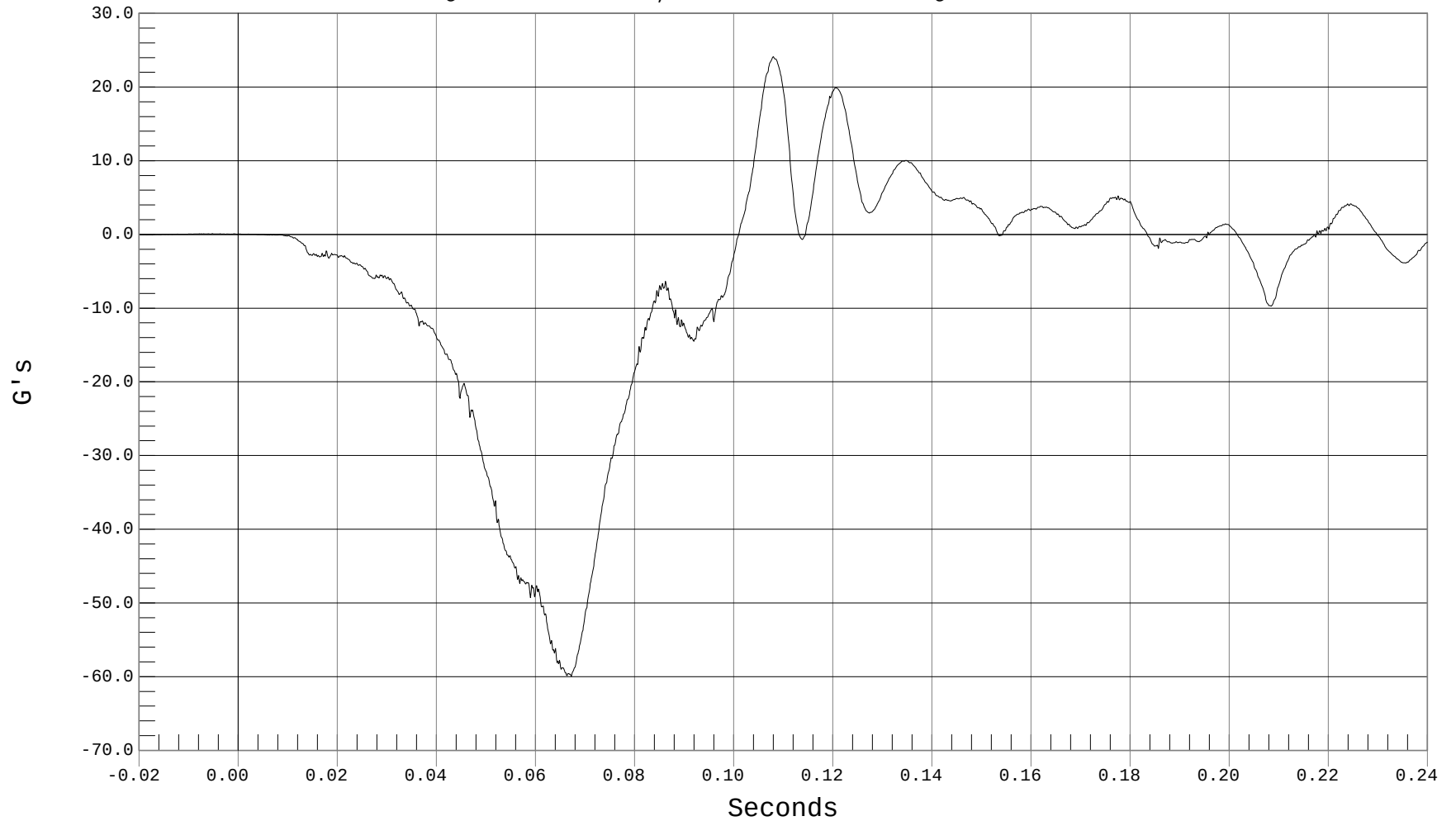
RRS 3 YR OLD PELVIS X ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD PELVIS X, B01011AT.A56

Ymin = -59.94 G's @ 0.0673 Seconds, Ymax = 24.12 G's @ 0.1080 Seconds





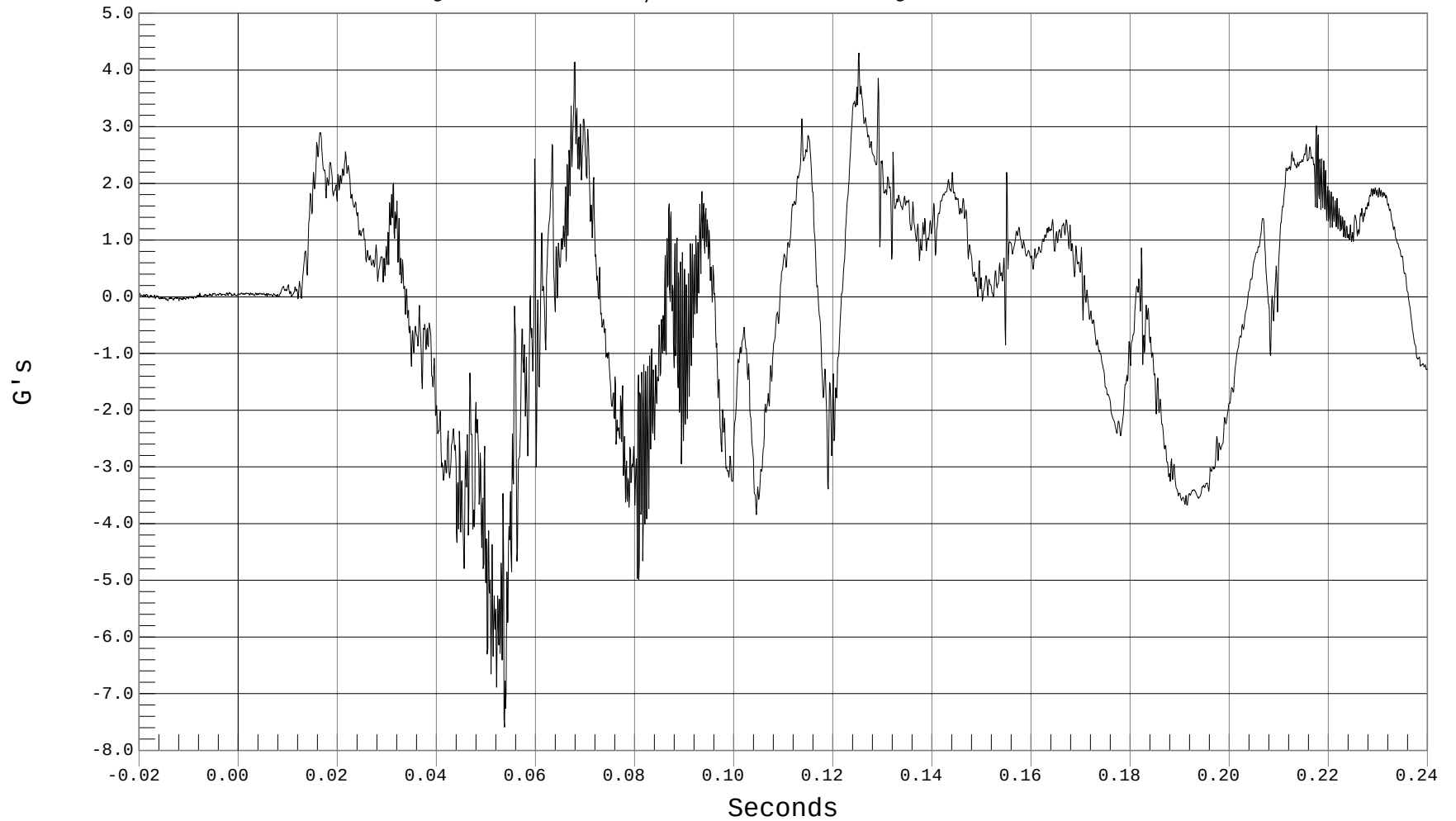
RRS 3 YR OLD PELVIS Y ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD PELVIS Y, B01011AT.A57

Ymin = -7.59 G's @ 0.0538 Seconds, Ymax = 4.3 G's @ 0.1253 Seconds





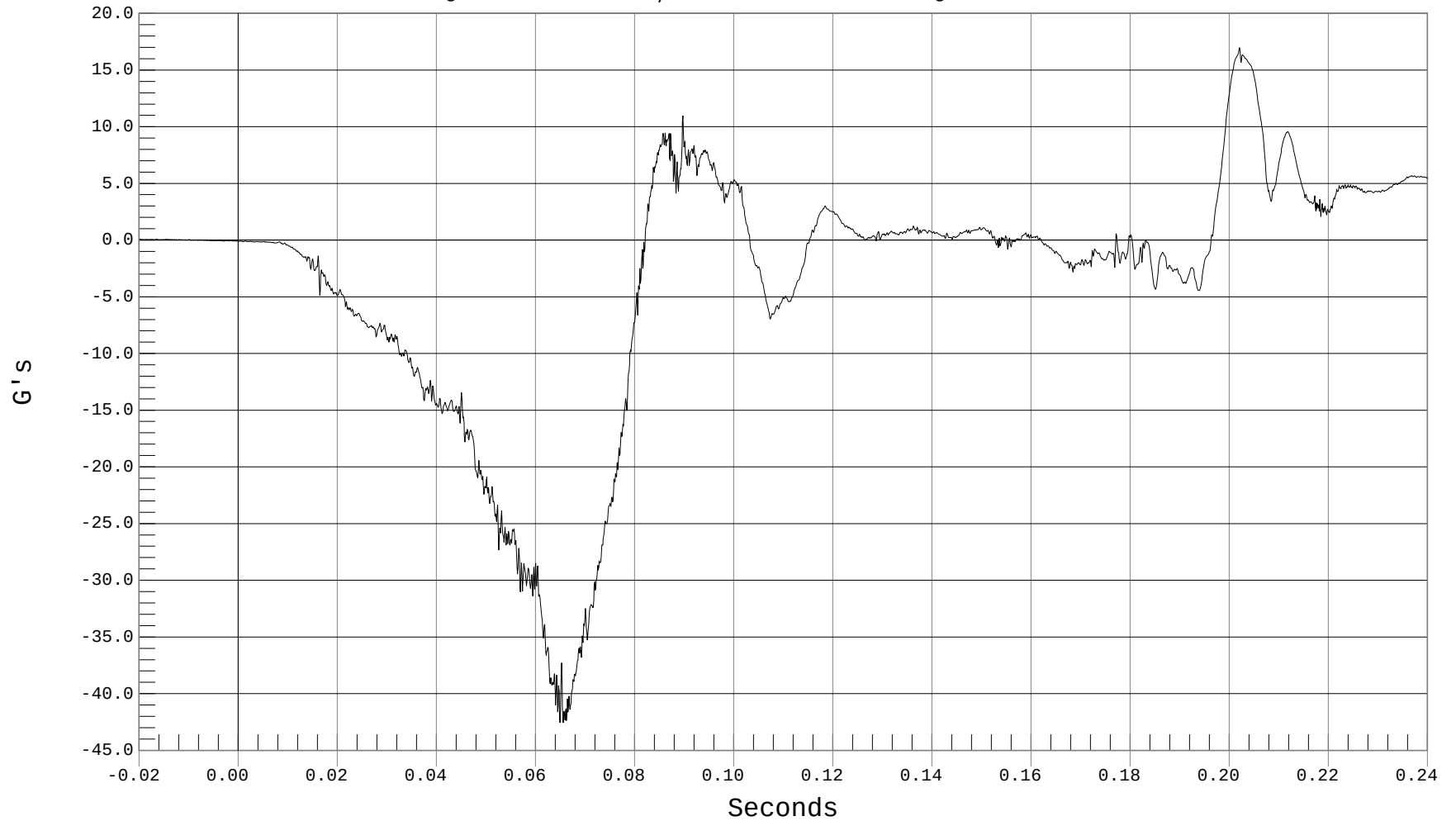
RRS 3 YR OLD PELVIS Z ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD PELVIS Z, B01011AT.A58

Ymin = -42.56 G's @ 0.0650 Seconds, Ymax = 16.98 G's @ 0.2021 Seconds





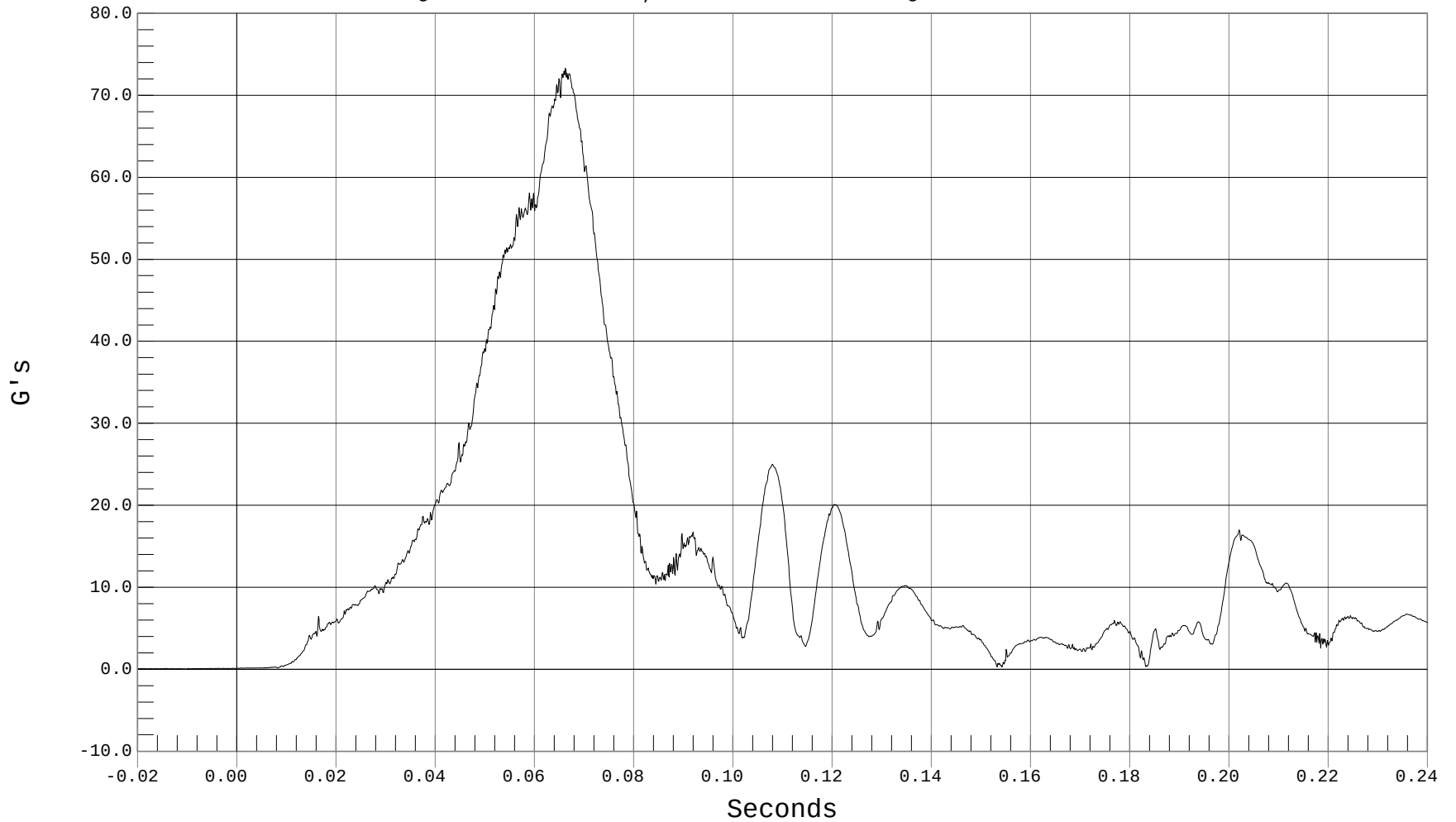
RRS 3 YR OLD PELVIS RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS 3 YR OLD PELVIS RESULTANT ACCELERATION, B01011AV.A56

Ymin = .03 G's @ -0.0102 Seconds, Ymax = 73.3 G's @ 0.0663 Seconds





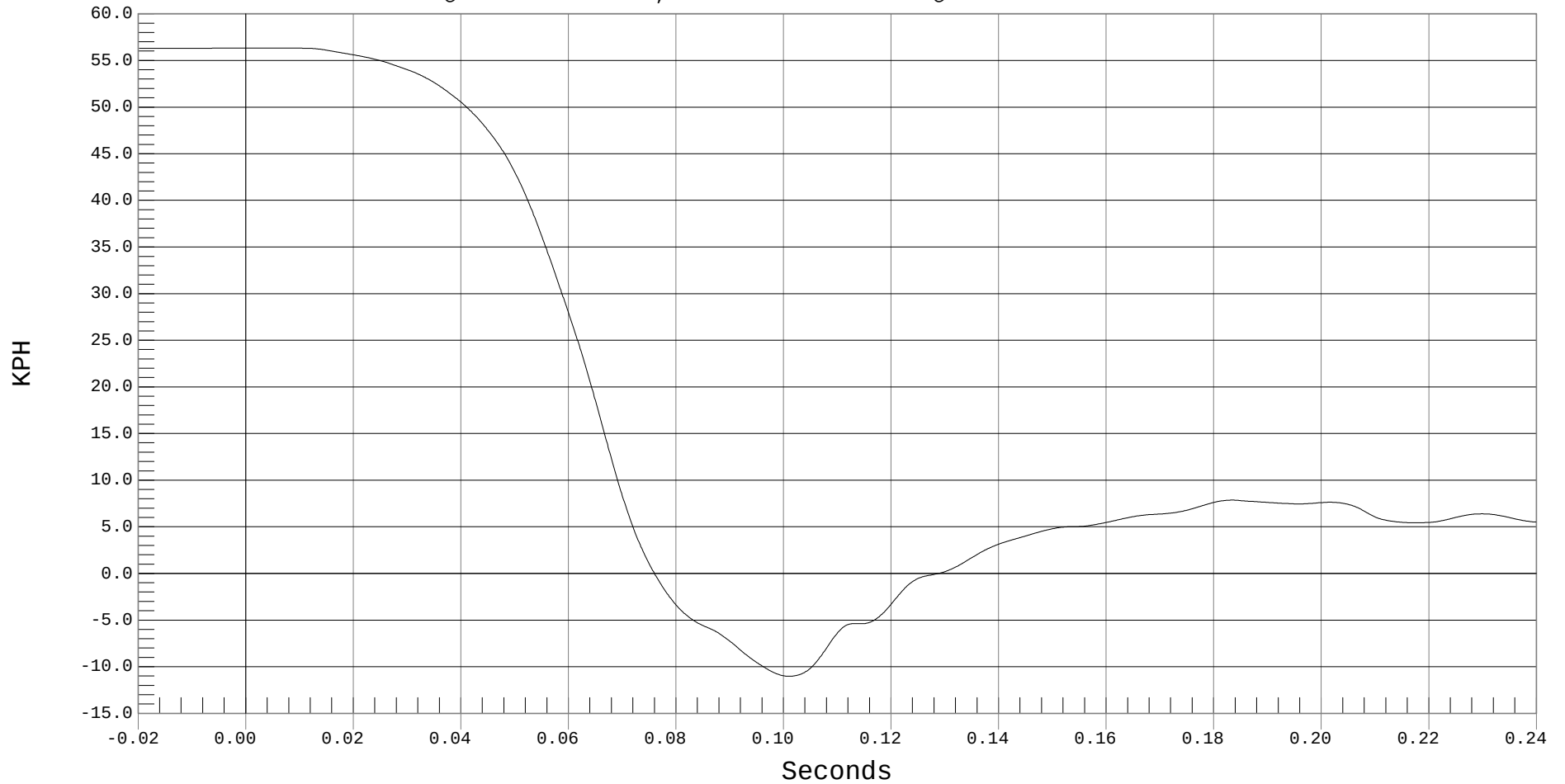
RRS 3 YR OLD PELVIS X VELOCITY

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS 3 YR OLD PELVIS X VELOCITY, B01011AI.V56

Ymin = -11.03 KPH @ 0.1009 Seconds, Ymax = 56.33 KPH @ 0.0042 Seconds





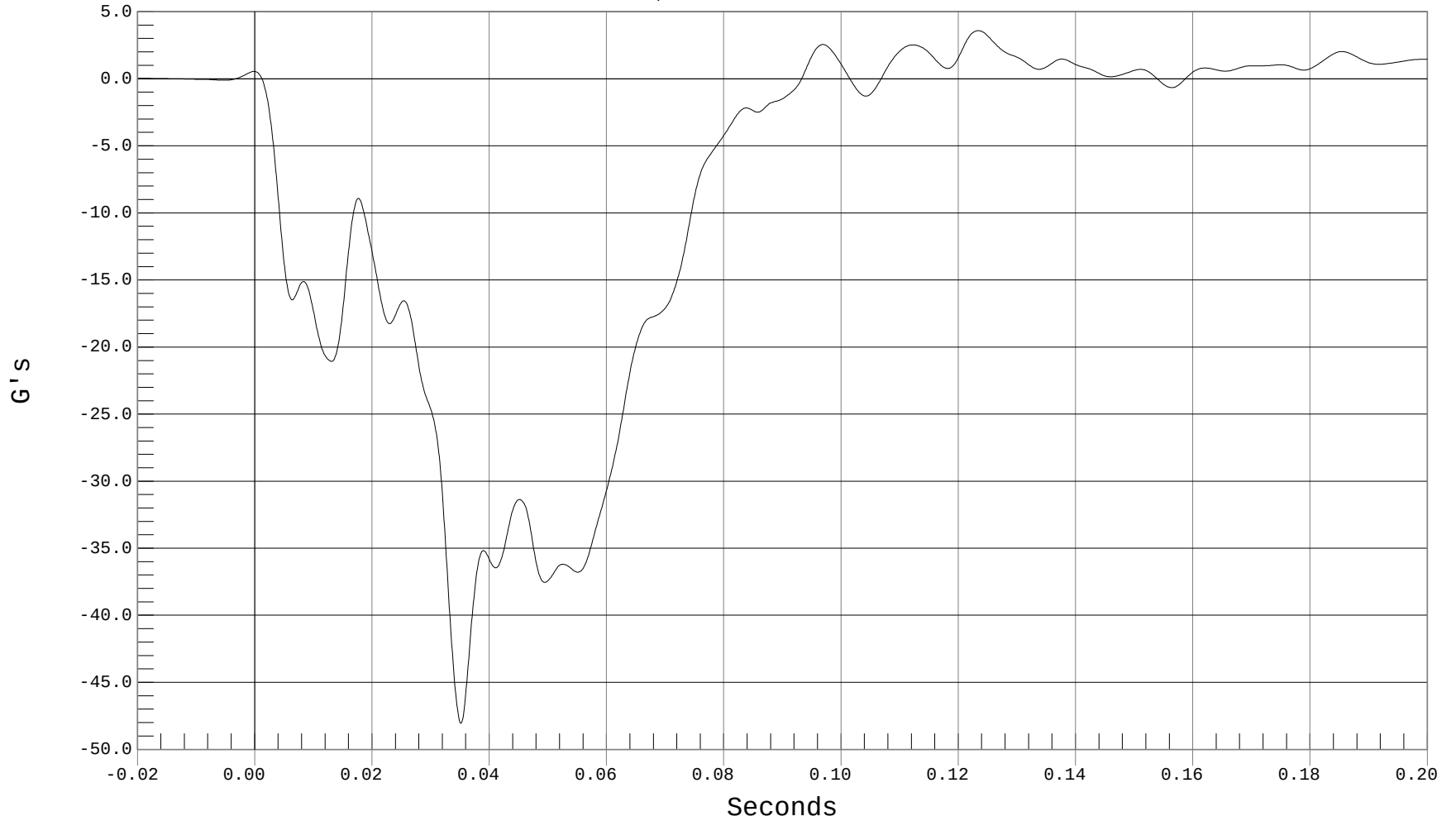
LEFT REAR SEAT CROSSMEMBER X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 LEFT REAR SEAT CROSSMEMBER X, B01011AF.A59

Ymin = -48.04 G's @ 0.0352 Seconds, Ymax = 3.59 G's @ 0.1234 Seconds





LEFT REAR SEAT CROSSMEMBER X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT

Component: 2001 VOLVO S60 4 DOOR (M15900)

Other Info:

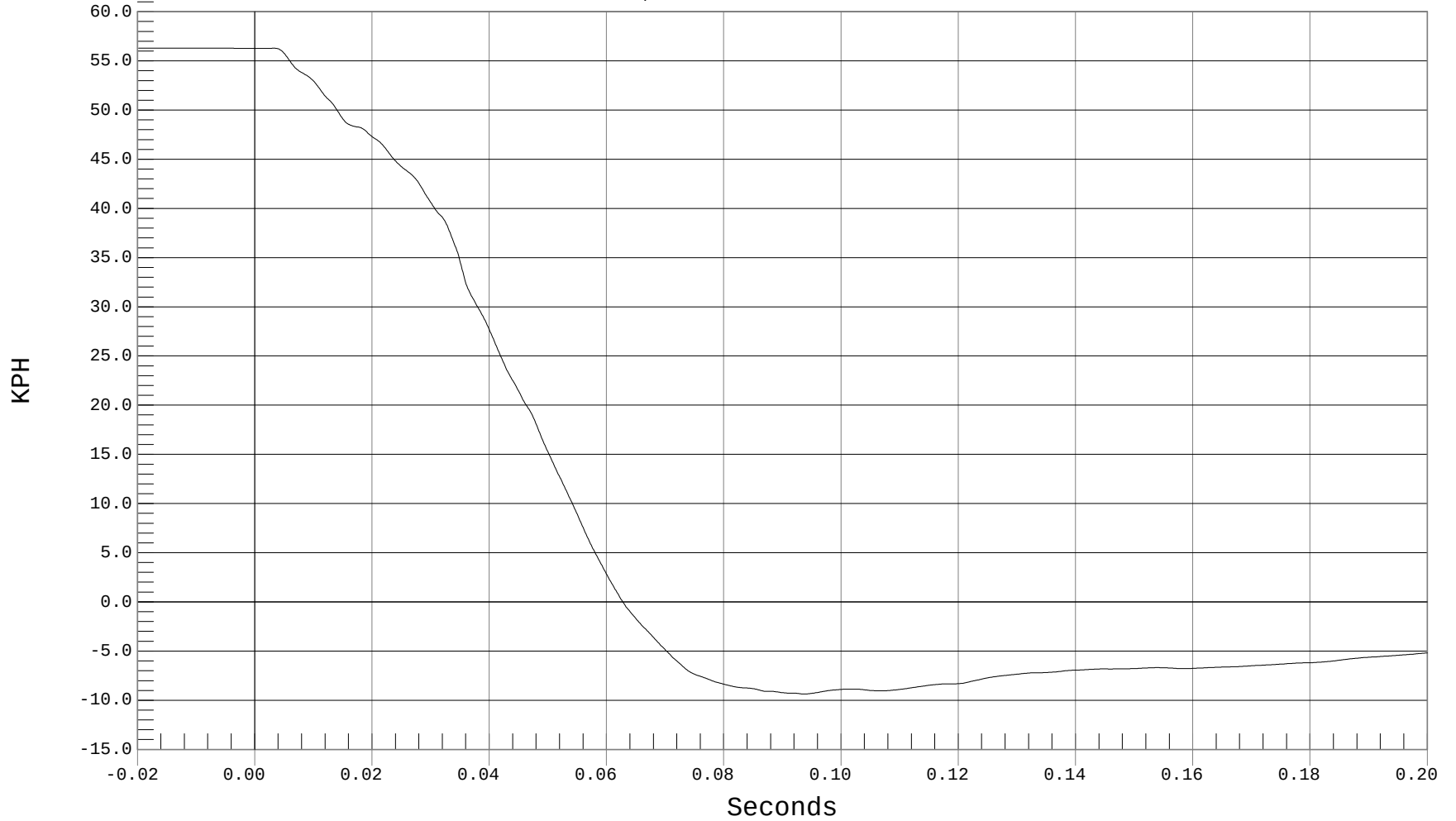
Test Date: 02-02-01

Speed: 35.0 MPH, 56.3 KPH

Filter Class: 180

— 1 LEFT REAR SEAT CROSSMEMBER X VELOCITY, B01011AI.V59

Ymin = -9.36 KPH @ 0.0938 Seconds, Ymax = 56.3 KPH @ -0.0137 Seconds





LEFT REAR SEAT CROSSMEMBER X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT

Component: 2001 VOLVO S60 4 DOOR (M15900)

Other Info:

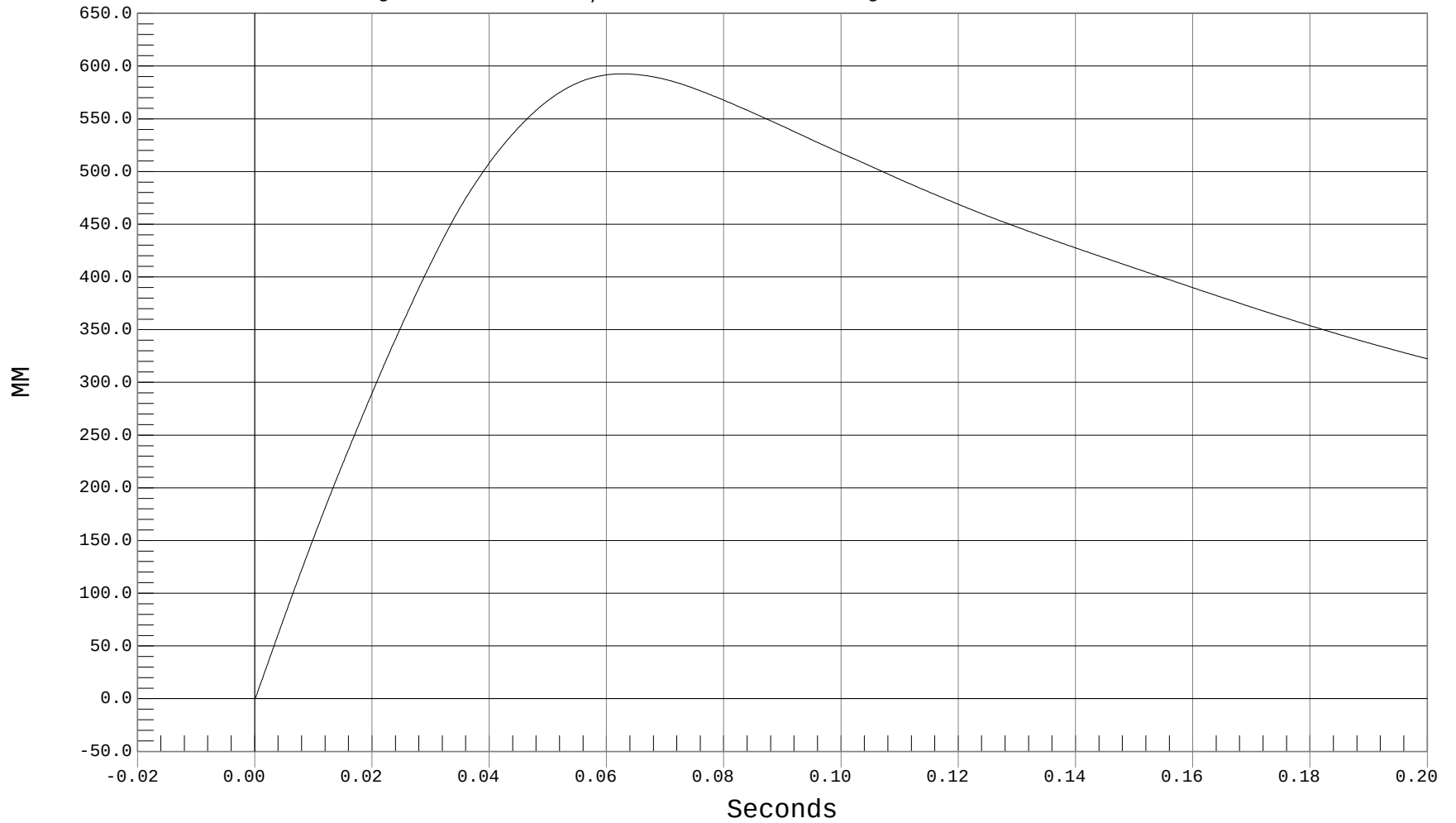
Test Date: 02-02-01

Speed: 35.0 MPH, 56.3 KPH

Filter Class: 180

— 1 LEFT REAR SEAT CROSSMEMBER X DISPLACEMENT, B01011AI.D59

Ymin = 0 MM @ 0.0001 Seconds, Ymax = 592.65 MM @ 0.0627 Seconds





RIGHT REAR SEAT CROSSMEMBER X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT

Component: 2001 VOLVO S60 4 DOOR (M15900)

Other Info:

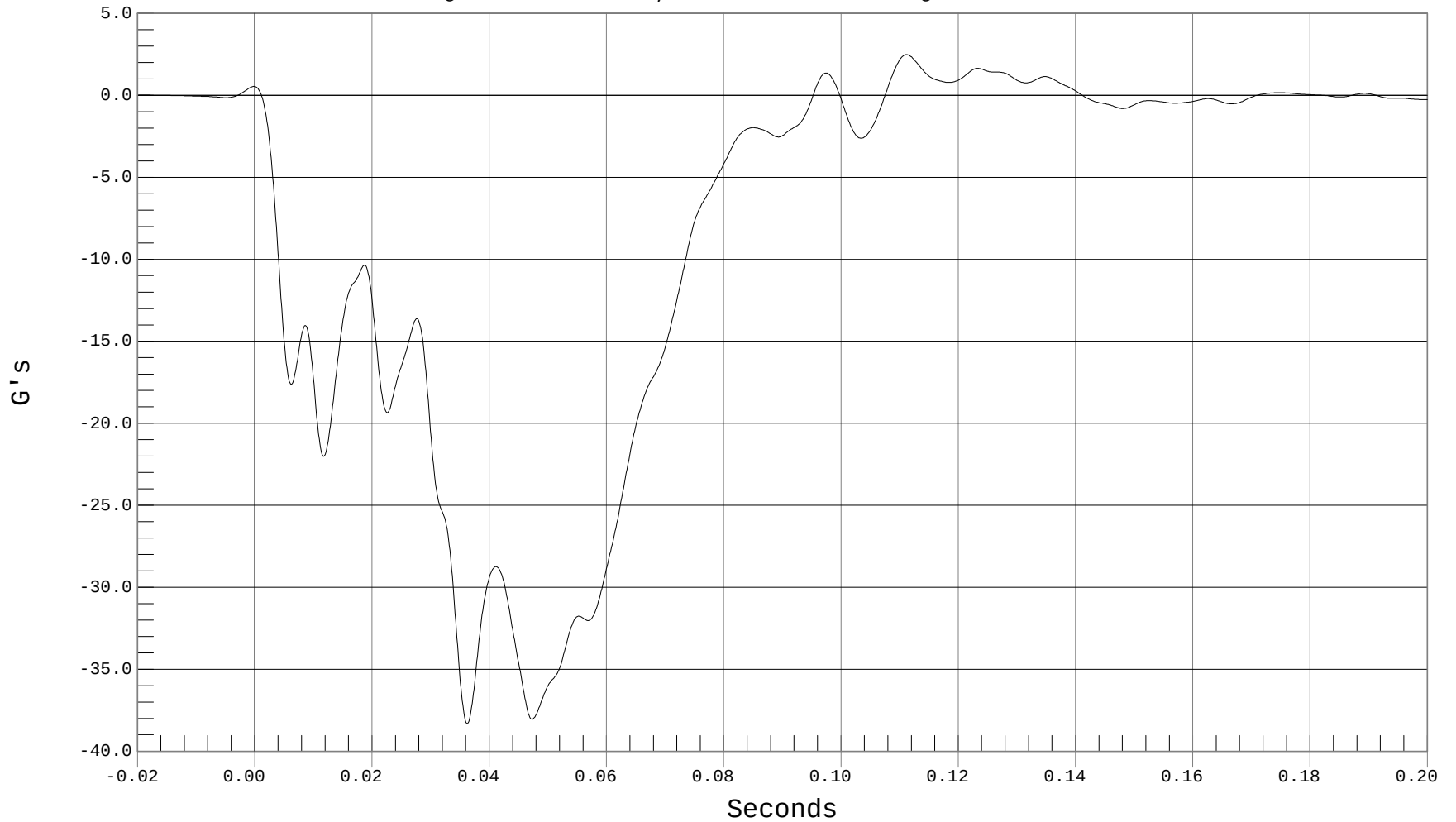
Test Date: 02-02-01

Speed: 35.0 MPH, 56.3 KPH

Filter Class: 60

1 RIGHT REAR SEAT CROSSMEMBER X, B01011AF.A58

Ymin = -38.31 G's @ 0.0363 Seconds, Ymax = 2.49 G's @ 0.1112 Seconds





RIGHT REAR SEAT CROSSMEMBER X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT

Component: 2001 VOLVO S60 4 DOOR (M15900)

Other Info:

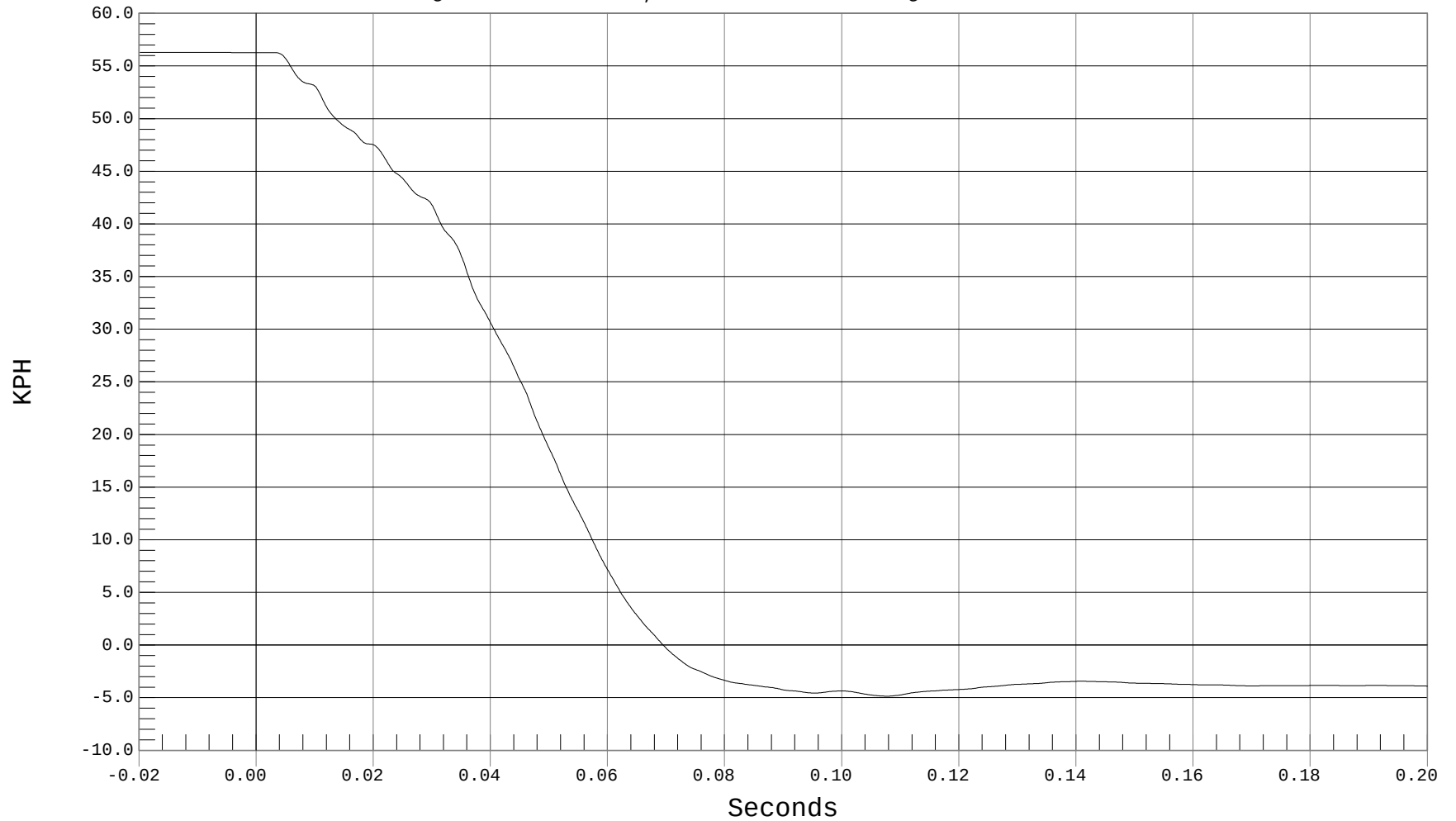
Test Date: 02-02-01

Speed: 35.0 MPH, 56.3 KPH

Filter Class: 180

— 1 RIGHT REAR SEAT CROSSMEMBER X VELOCITY, B01011AI.V58

Ymin = -4.85 KPH @ 0.1078 Seconds, Ymax = 56.3 KPH @ -0.0181 Seconds





RIGHT REAR SEAT CROSSMEMBER X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT

Component: 2001 VOLVO S60 4 D00R (M15900)

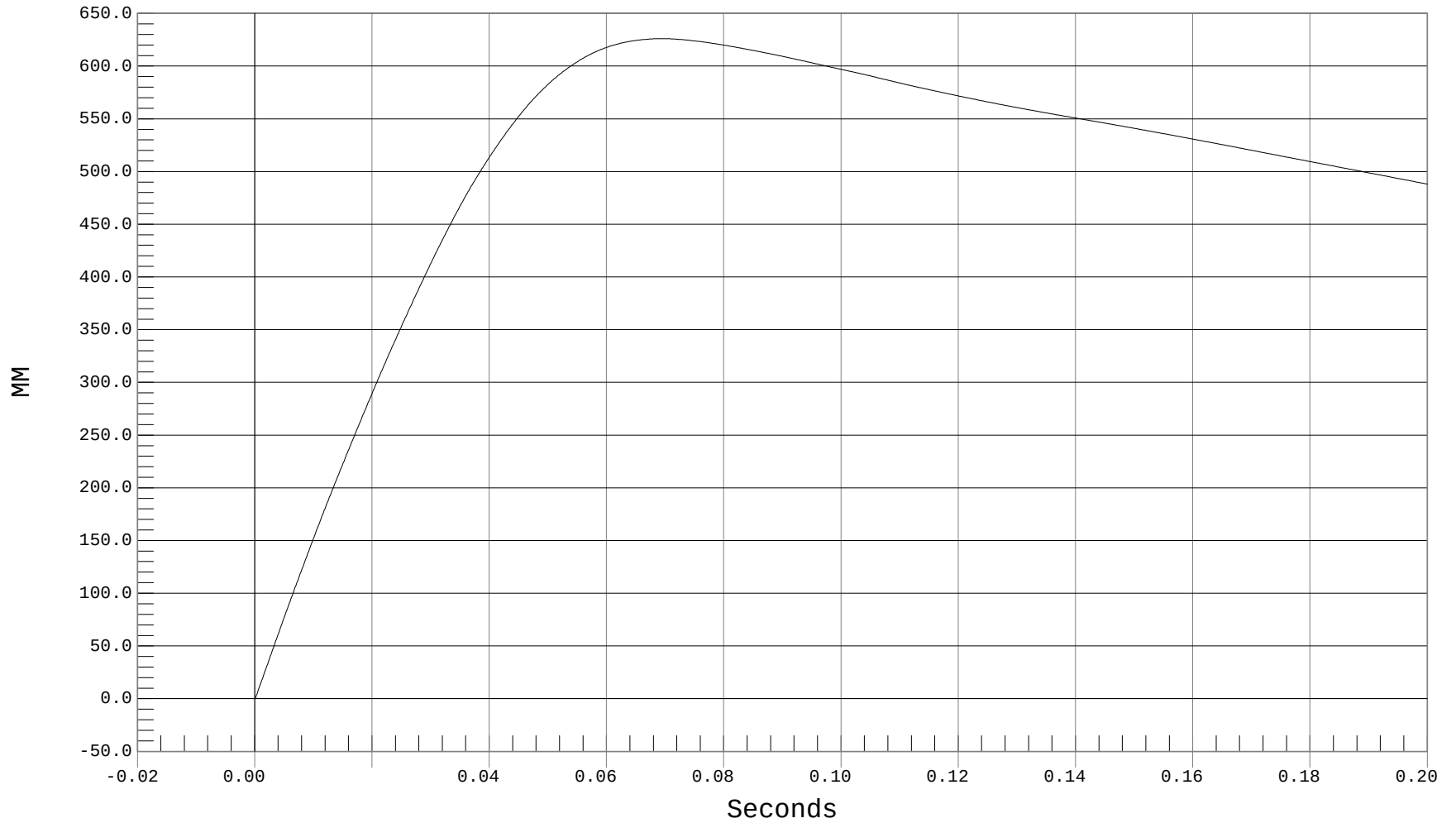
Other Info:

Test Date: 02-02-01

Speed: 35.0 MPH, 56.3 KPH

Filter Class: 180

— 1 RIGHT REAR SEAT CROSSMEMBER X DISPLACEMENT, B01011AI.D58





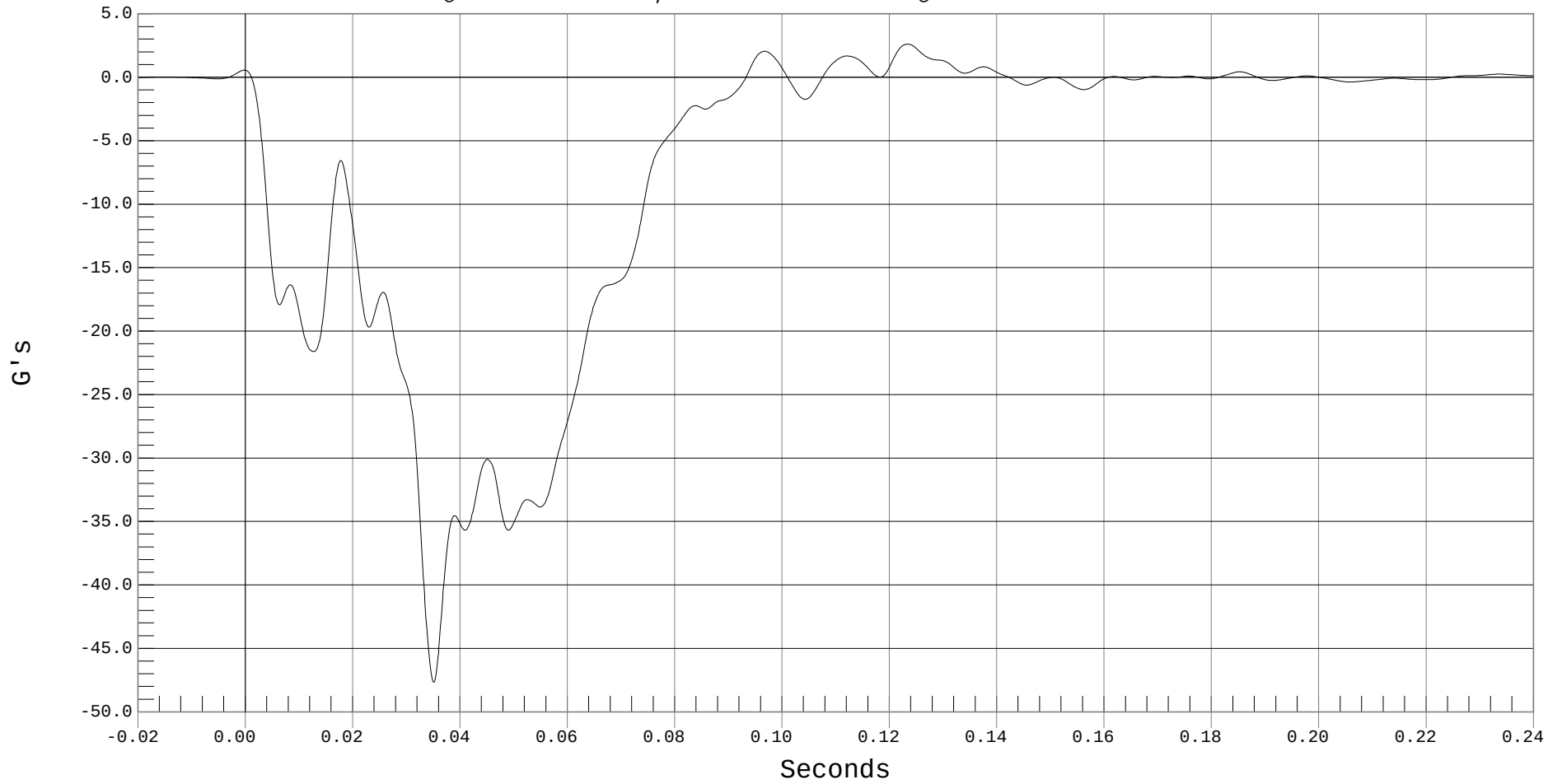
LEFT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

1 LEFT REAR SEAT X-MEMBER Xr, B01011AF.A03

Ymin = -47.67 G's @ 0.0350 Seconds, Ymax = 2.61 G's @ 0.1233 Seconds





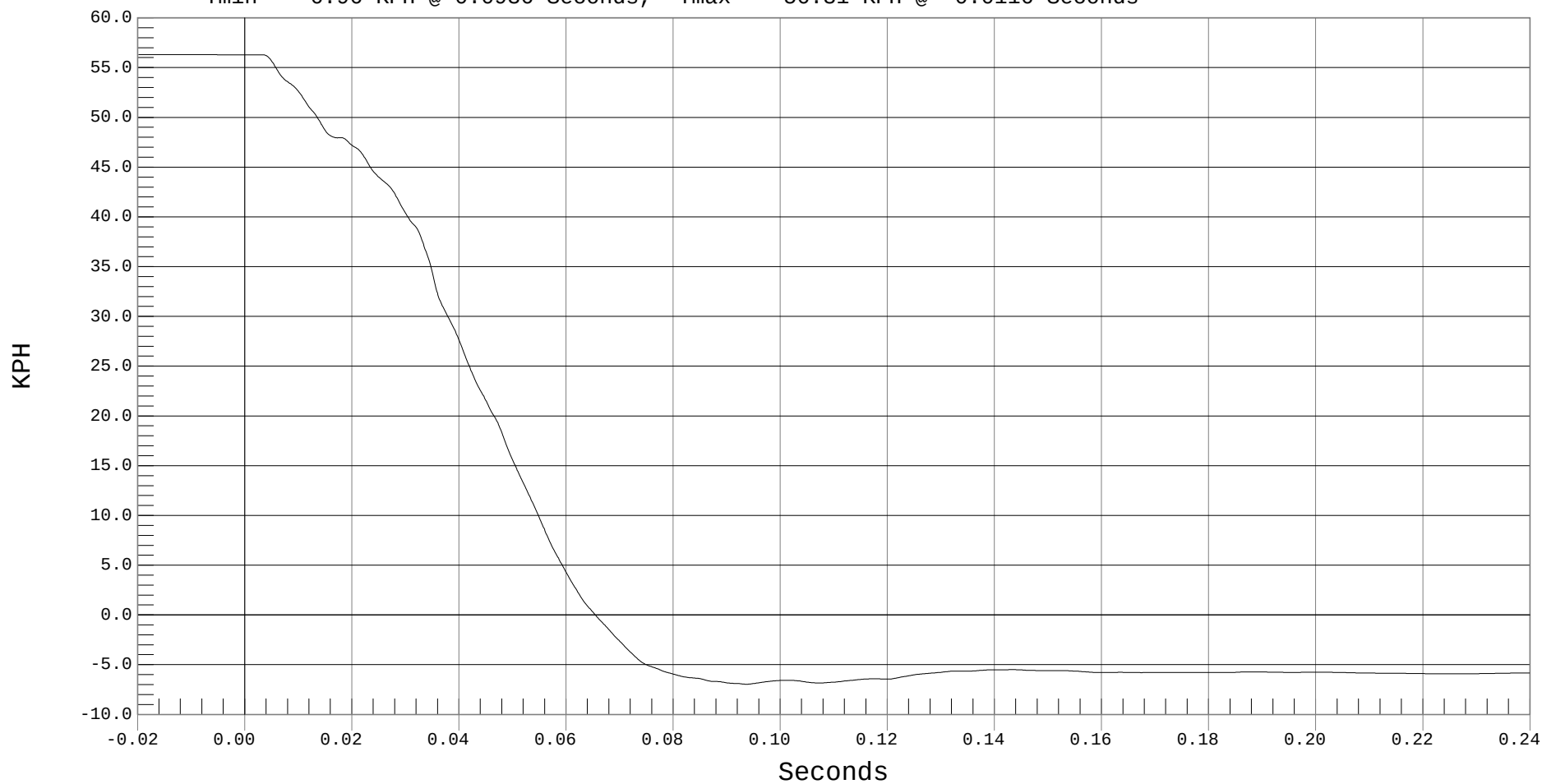
LEFT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LEFT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY, B01011AI.V03

Ymin = -6.96 KPH @ 0.0936 Seconds, Ymax = 56.31 KPH @ -0.0116 Seconds





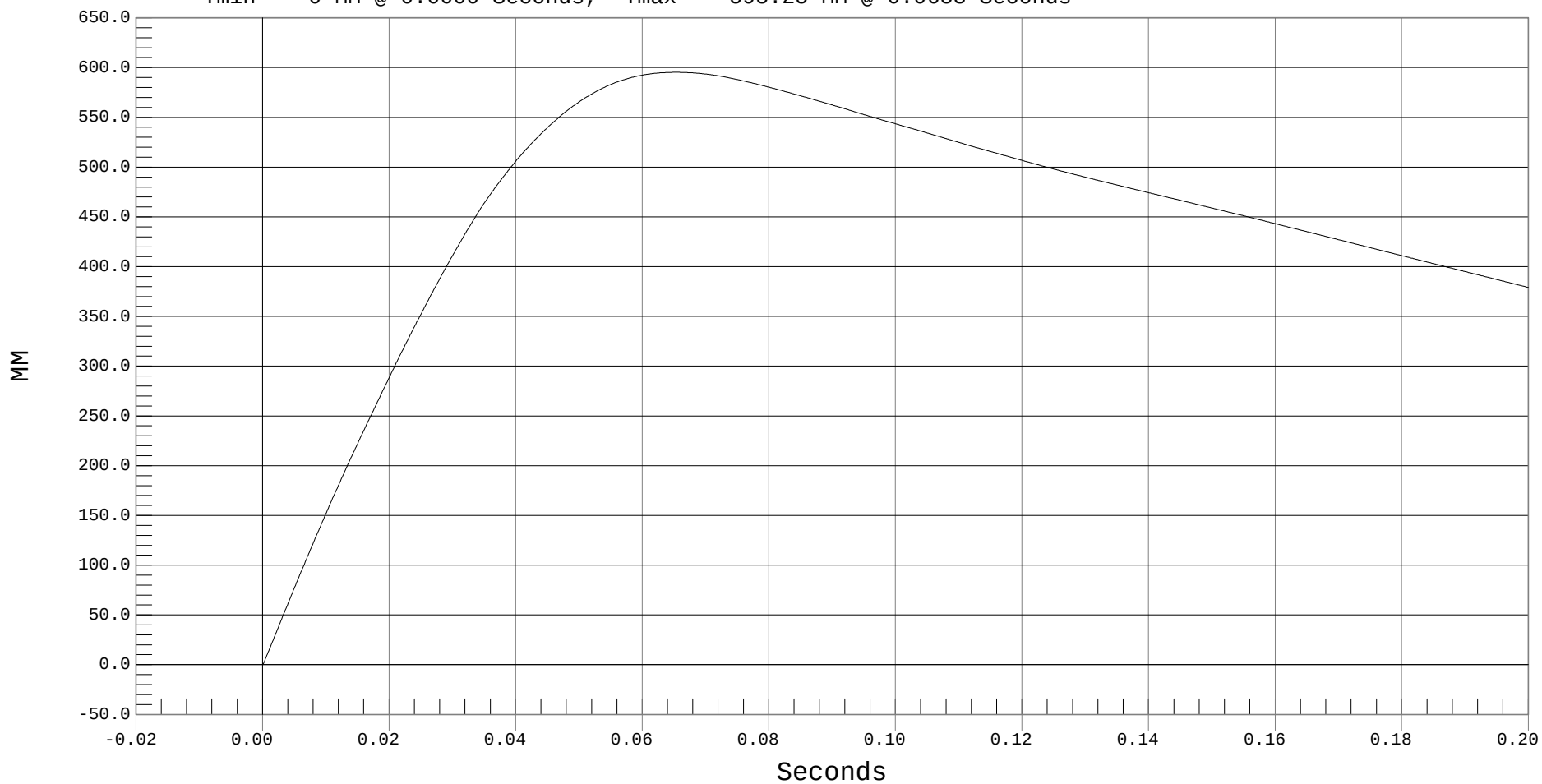
LEFT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LEFT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT, B01011AI.D03

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 595.25 MM @ 0.0653 Seconds





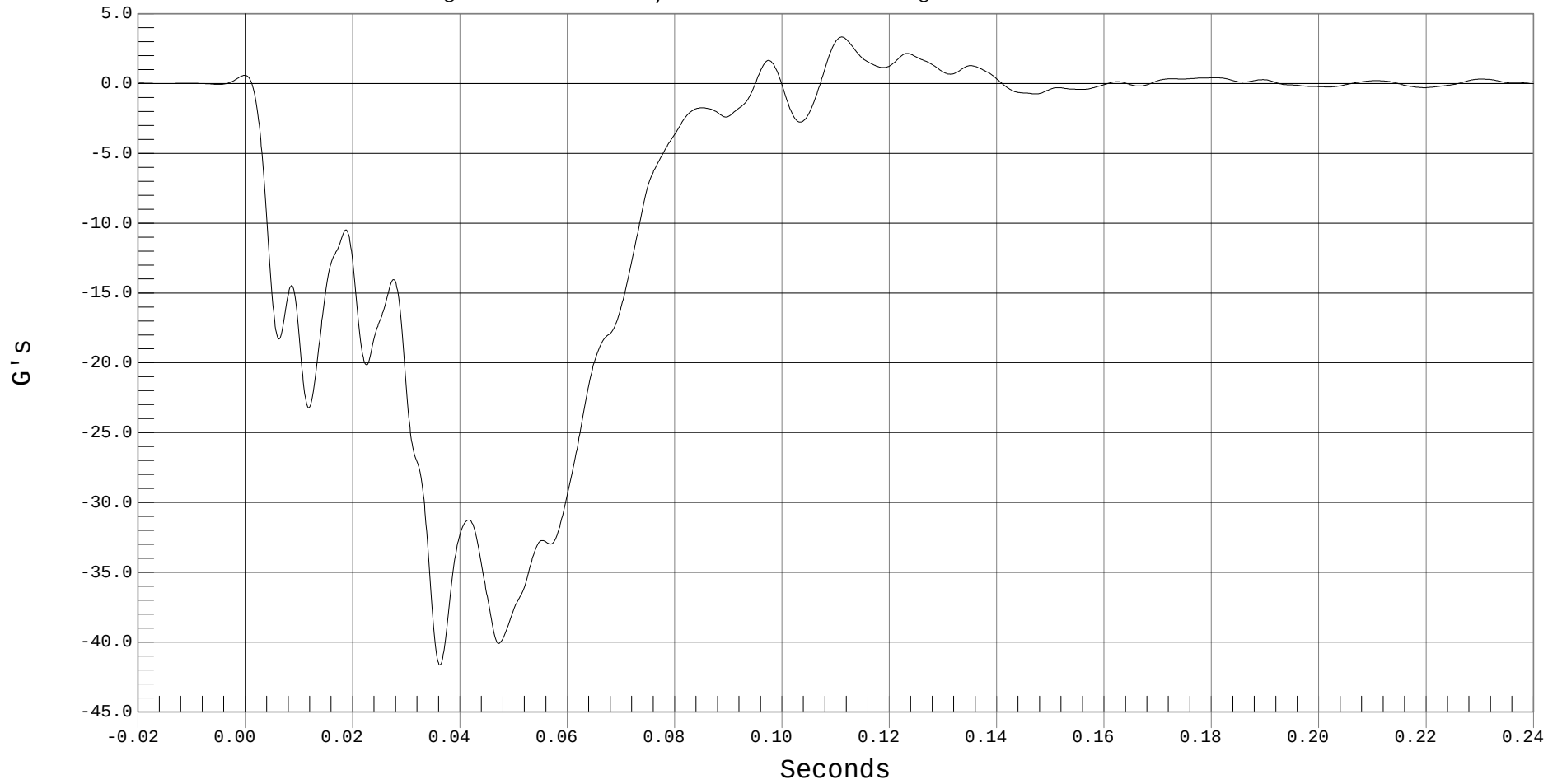
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 RIGHT REAR SEAT X-MEMBER Xr, B01011AF.A02

Ymin = -41.65 G's @ 0.0362 Seconds, Ymax = 3.34 G's @ 0.1110 Seconds





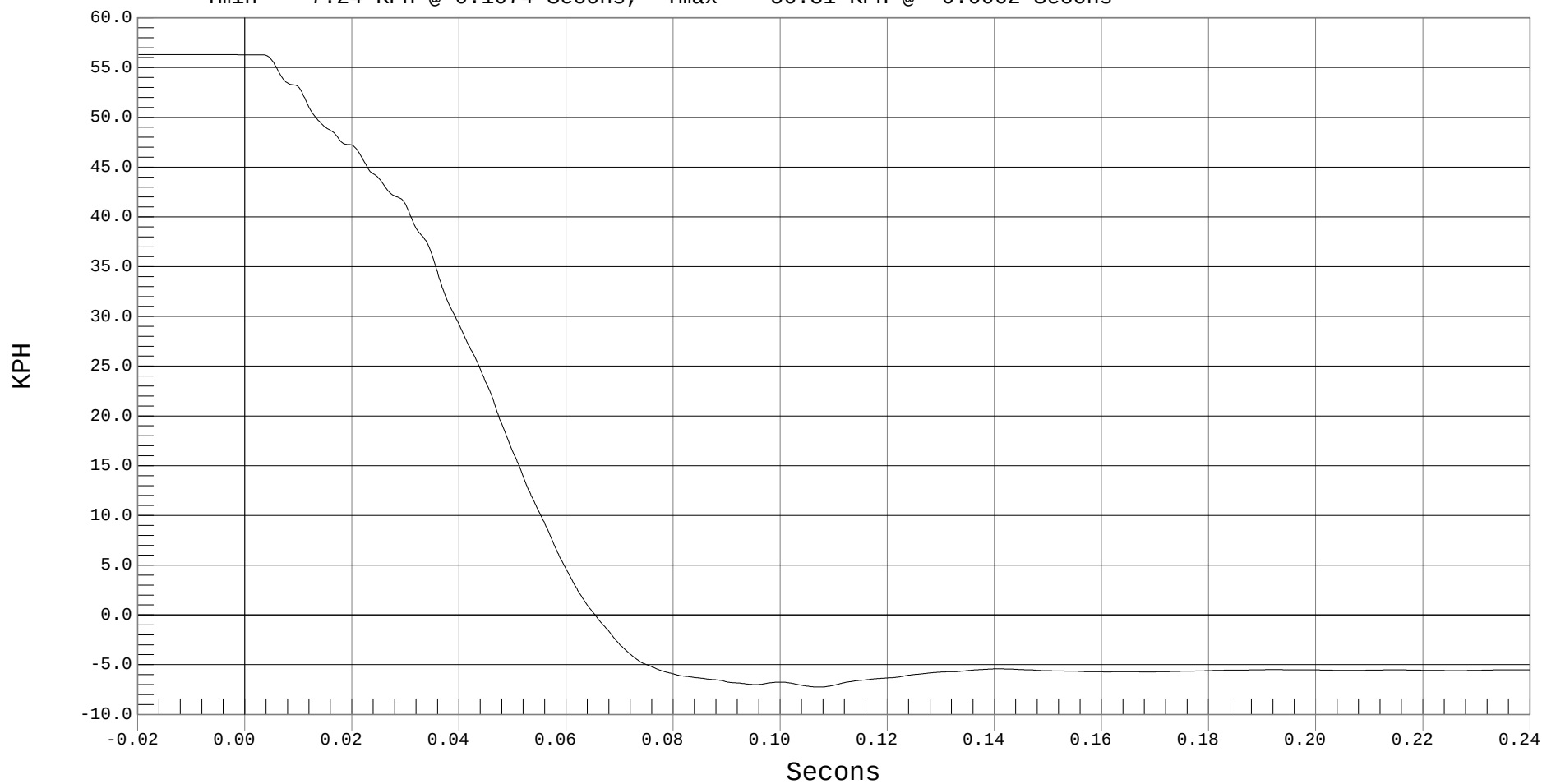
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

1 RIGHT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY, B01011AI.V02

Ymin = -7.24 KPH @ 0.1074 Secons, Ymax = 56.31 KPH @ -0.0062 Secons





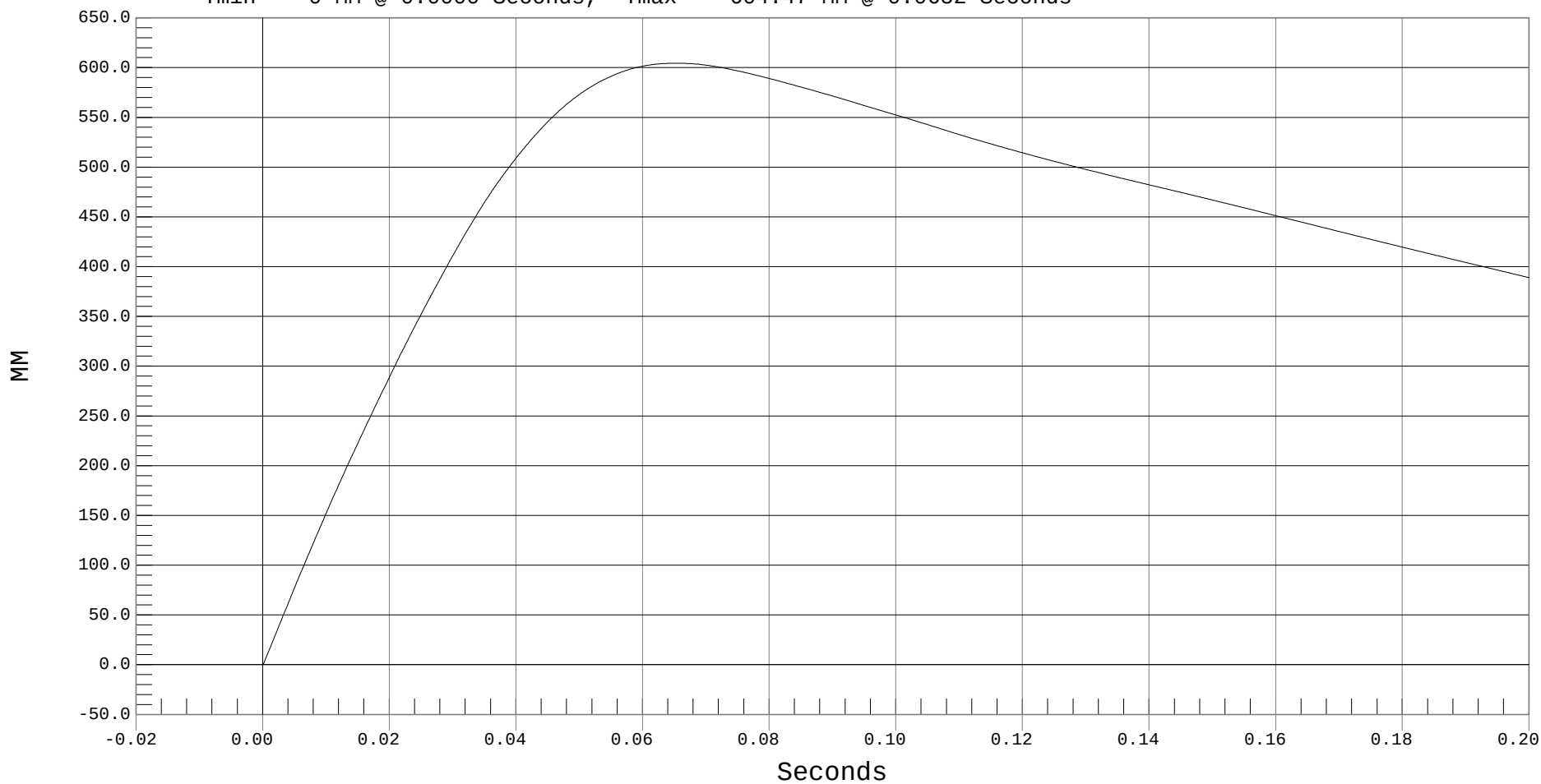
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT

Test Desc.: NCAP FRONTAL BARRIER IMPACT
Component: 2001 VOLVO S60 4 DOOR (M15900)
Other Info:

Test Date: 02-02-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

1 RIGHT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT, B01011AI.D02

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 604.47 MM @ 0.0652 Seconds



SECTION 7
CHILD DUMMY CALIBRATION DATA TRACES AND TABLES

Hybrid III Calibration Data Sheet
3 Year Old
Head Drop Calibration

ATD Serial No.: 139

Test I.D.: D01061

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.7	PASS
Laboratory Relative Humidity	%	10 to 70	23	PASS
Peak Resultant Acceleration	G's	250.0 to 280.0	261.7	PASS
Peak Lateral Acceleration	G's	$\leq \pm 15.0$	1.7	PASS
Is Acceleration Unimodal?	Yes/No	< 10% Peak	Yes	PASS
Overall Test Results				PASS

Laboratory Technician

1/11/00

Test Date

Approved By



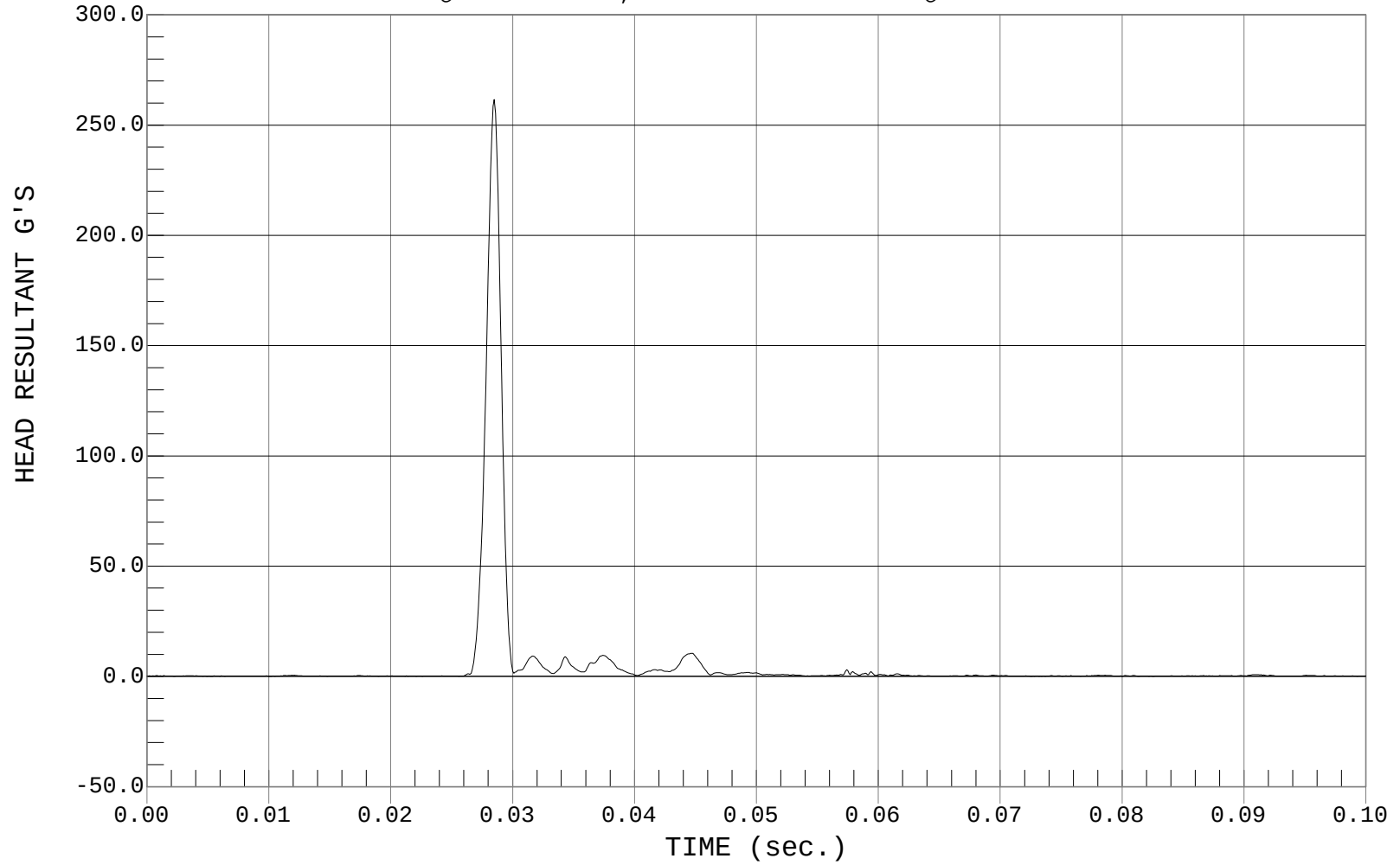
PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #139

Test Date: 01-11-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD RESULTANT, D01061AV.A01

Ymin = .07 G'S @ 0.0022 sec., Ymax = 261.67 G'S @ 0.0285 sec.





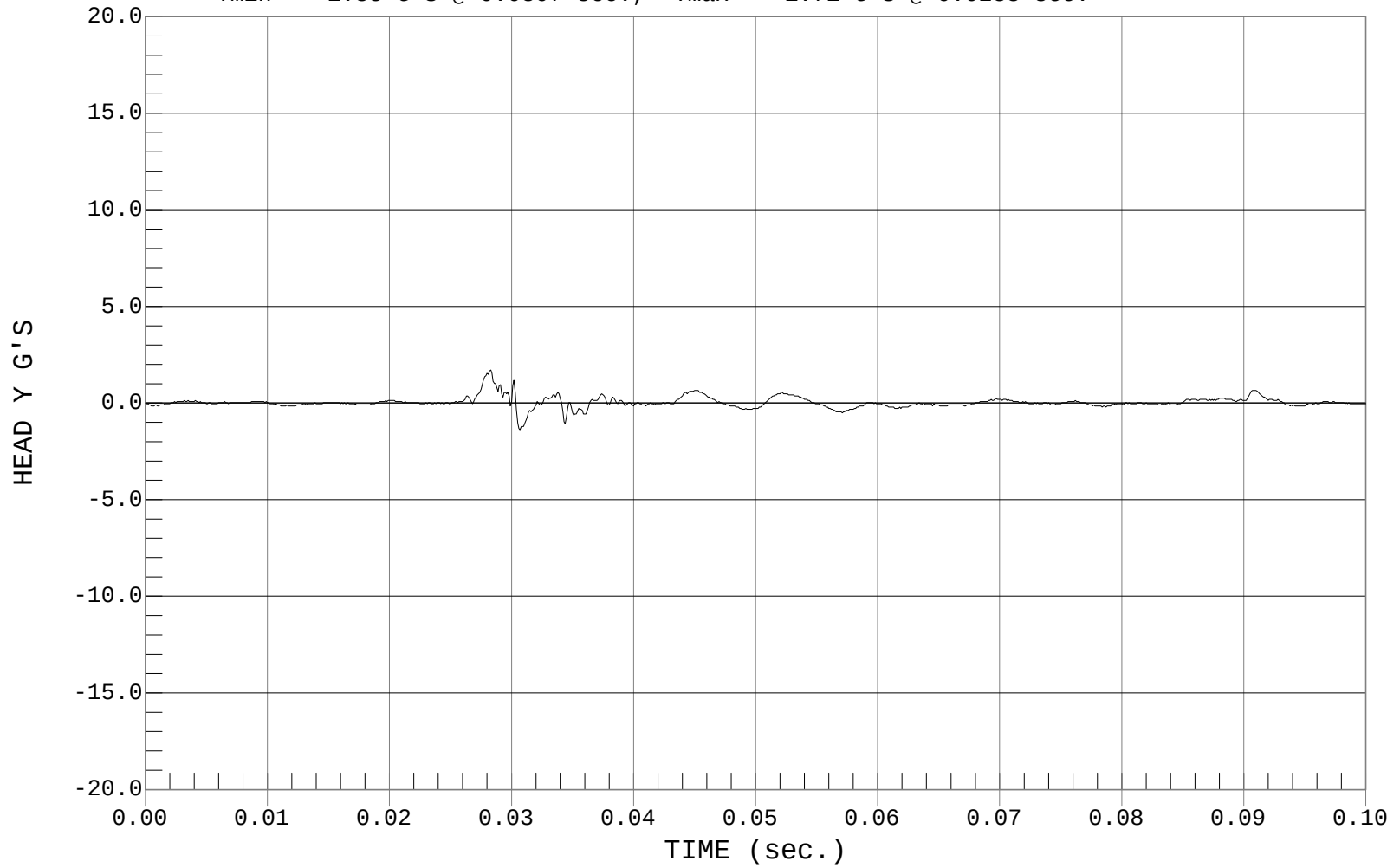
PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #139

Test Date: 01-11-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01061AR.A02

Ymin = -1.38 G'S @ 0.0307 sec., Ymax = 1.71 G'S @ 0.0283 sec.



Hybrid III Calibration Data Sheet
3 Year Old
Thorax Impact Test

ATD Serial No.: 139

Test I.D.: D01064

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.7	PASS
Laboratory Relative Humidity	%	10 to 70	29	PASS
Probe Velocity	m/s	5.9 to 6.1	6.0	PASS
Peak Deflection	mm	32 to 38	33	PASS
Peak Resistive Force Within Deflection Corridor	kN	.68 to .81	.78	PASS
Internal Hysteresis	%	65 to 85	71	PASS
Max Force 12.5 mm – 32 mm Deflection	kN	Max .86	.83	PASS
Overall Test Results				PASS

Laboratory Technician

1/14/01
Test Date

Approved By



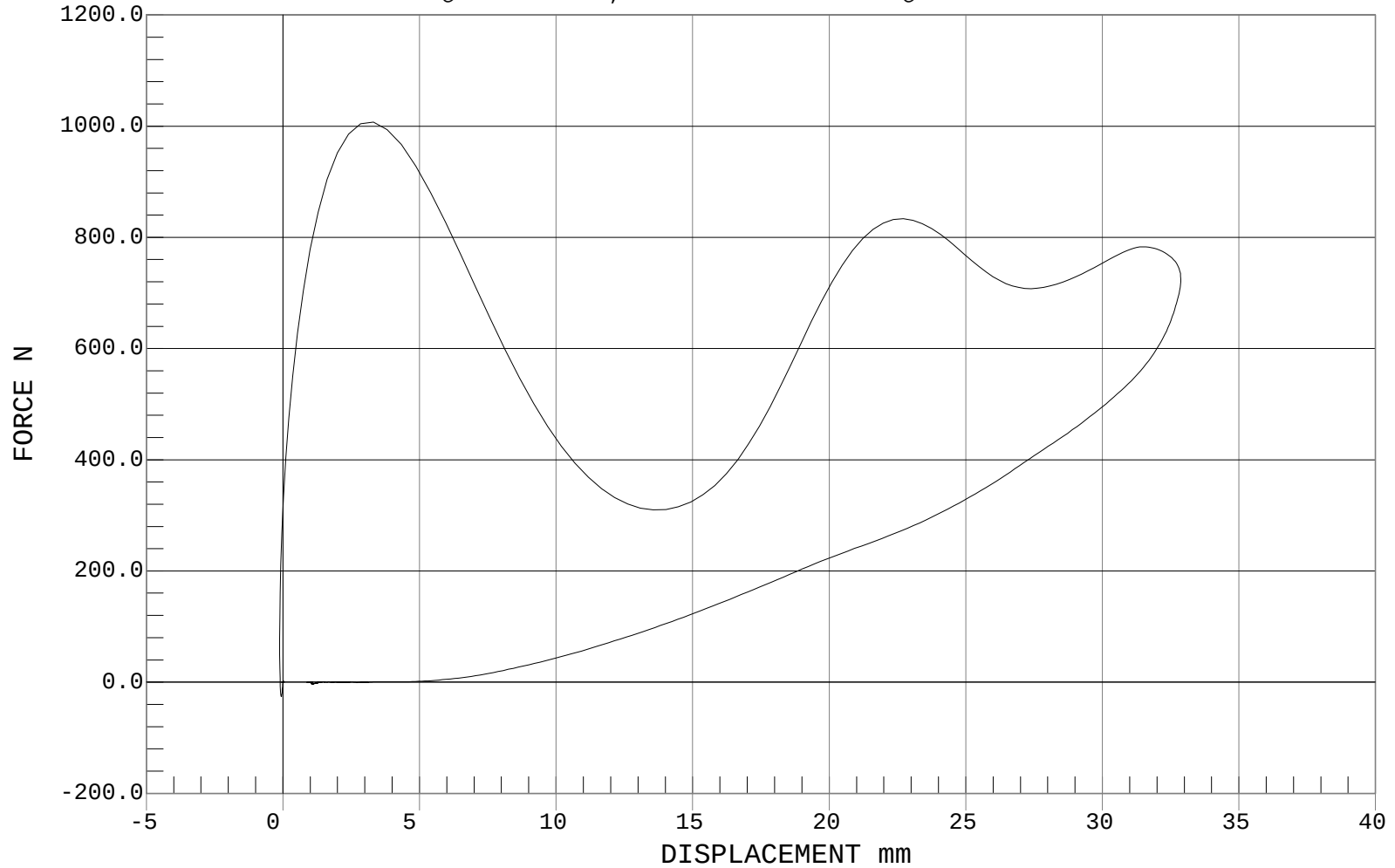
THORAX IMPACT

Test Desc.: Dummy Calibration - Chest Impact
Component: Dummy #139

Test Date: 01-14-01
Speed: 19.62 FT/SEC, 5.98 M/SEC

— 1 FORCE, D01064CH.FVD

Ymin = -25.96 N @ -0.0615 mm, Ymax = 1007.07 N @ 3.3156 mm



Hybrid III Calibration Data Sheet
3 Year Old
Neck Flexion Test

ATD Serial No.: 139

Test I.D.: D01062

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.7	PASS
Laboratory Relative Humidity		%	10 to 70	23	PASS
Pendulum Velocity		m/s	5.4 to 5.6	5.5	PASS
Pendulum Deceleration	10 Msec.	m/s	2.0 to 2.7	2.4	PASS
	15 Msec.	m/s	3.0 to 4.0	3.5	PASS
	20 Msec.	m/s	4.0 to 5.1	4.7	PASS
"D" Plane Rotation	Maximum	Deg.	70.0 to 82.0	73.1	PASS
Moment About Occipital Condyle	Maximum	Nm	42.0 to 53.0	43.4	PASS
Positive Moment Decay Time To 10 Nm		Msec.	60.0 to 80.0	71.3	PASS
Overall Test Results					PASS

Laboratory Technician

1/12/01

Test Date

Approved By



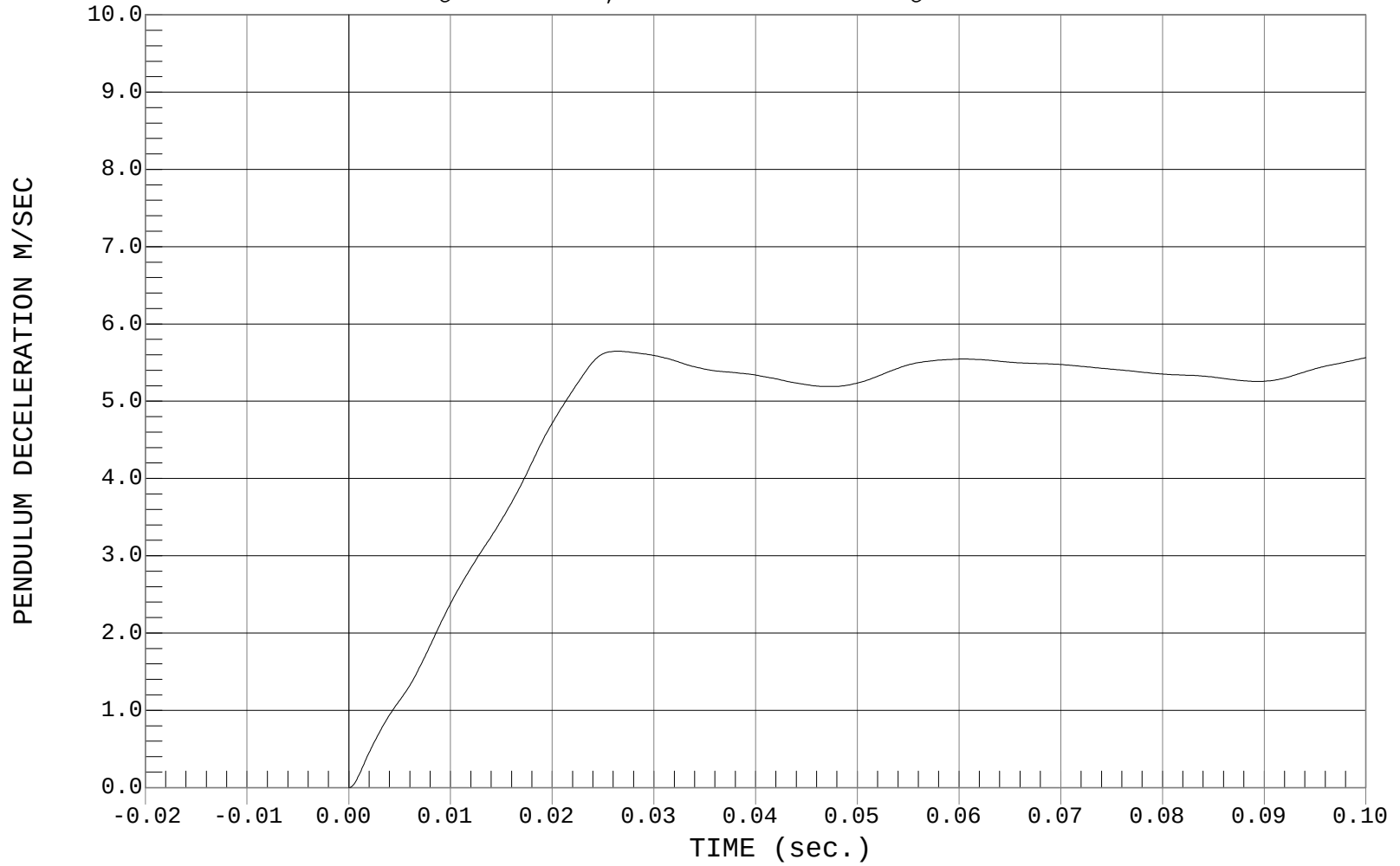
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #139

Test Date: 01-11-01
Speed: 18.00 FT/SEC, 5.49 M/SEC

— 1 PENDULUM DECELERATION, D01062AI.A04

Ymin = 0 M/SEC @ 0.0001 sec, Ymax = 6.06 M/SEC @ 0.1886 sec





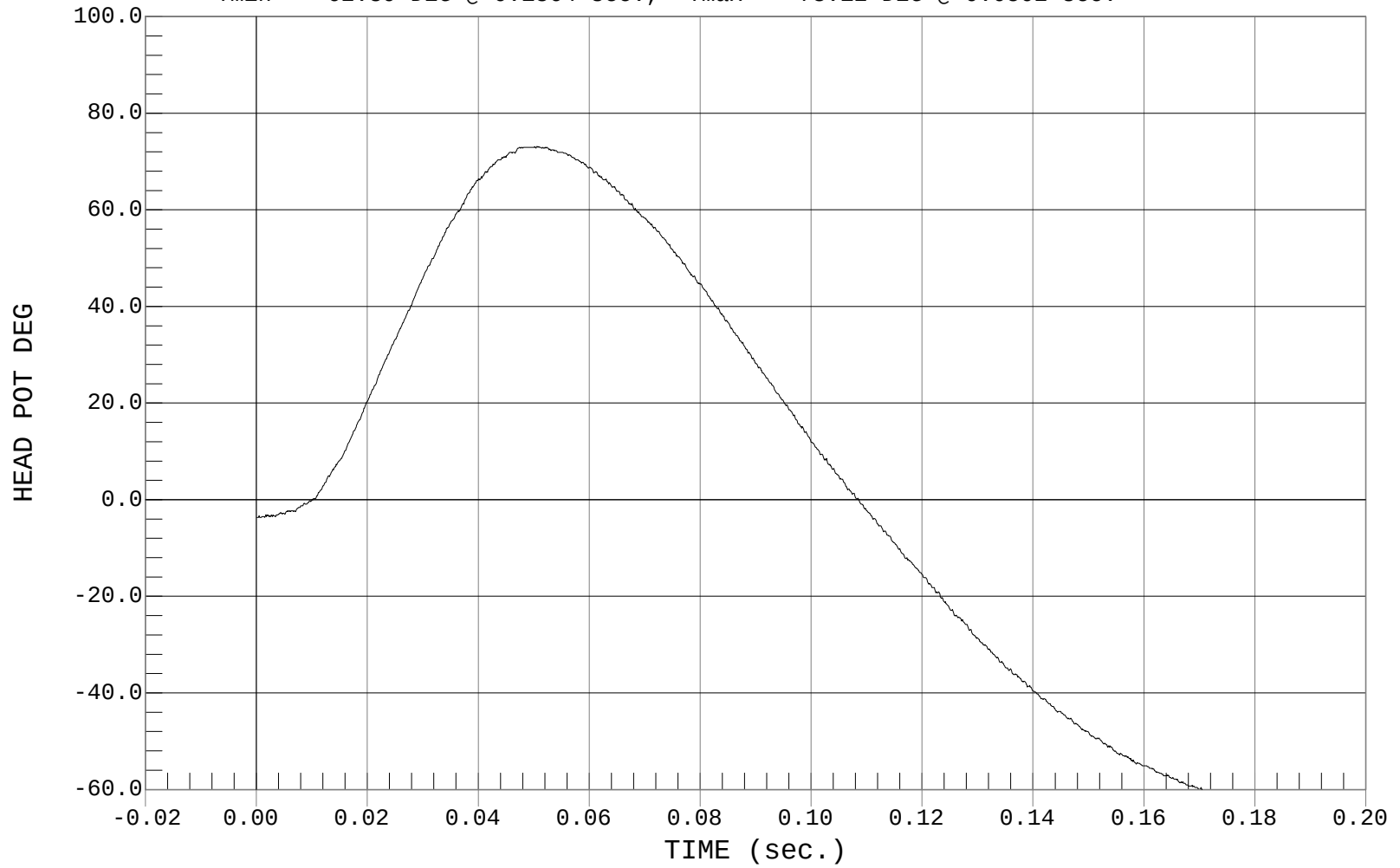
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #139

Test Date: 01-11-01
Speed: 18.00 FT/SEC, 5.49 M/SEC

— 1 HEAD POT, D01062DU.D05

Ymin = -62.89 DEG @ 0.1864 sec., Ymax = 73.12 DEG @ 0.0502 sec.





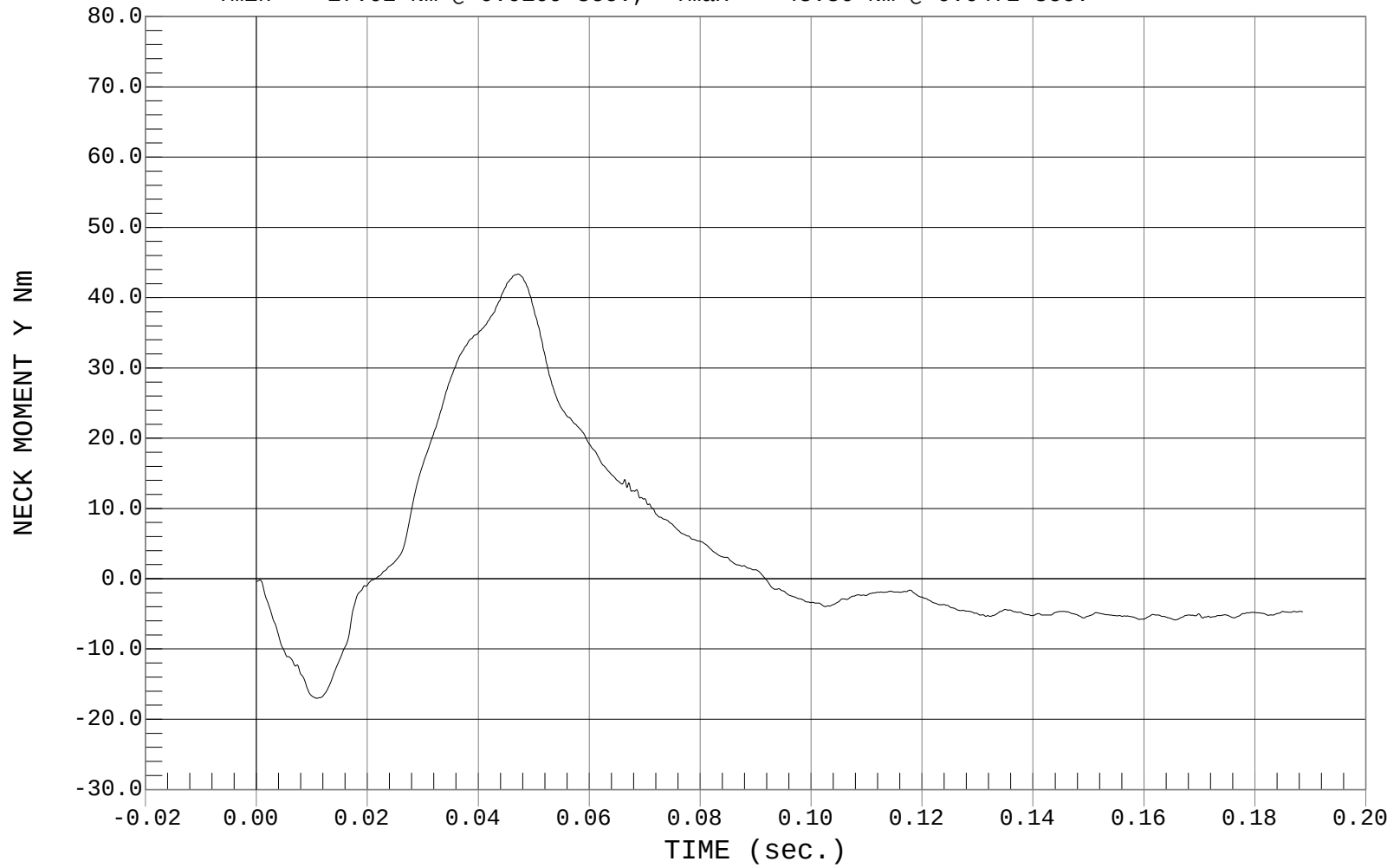
OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #139

Test Date: 01-11-01
Speed: 18.00 FT/SEC, 5.49 M/SEC

— 1 NECK MOMENT Y, D01062MF.M01

Ymin = -17.02 Nm @ 0.0109 sec., Ymax = 43.36 Nm @ 0.0472 sec.



Hybrid III Calibration Data Sheet
3 Year Old
Neck Extension Test

ATD Serial No.: 139

Test I.D.: D01063

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.5	PASS
Laboratory Relative Humidity		%	10 to 70	24	PASS
Pendulum Velocity		m/s	3.55 to 3.75	3.66	PASS
Pendulum Deceleration	6 Msec.	m/s	1.0 to 1.4	1.2	PASS
	10 Msec.	m/s	1.9 to 2.5	2.1	PASS
	14 Msec.	m/s	2.8 to 3.5	2.9	PASS
"D" Plane Rotation	Maximum	Deg.	83.0 to 93.0	88.5	PASS
Moment About Occipital Condyle	Minimum	Nm	-53.3 to -43.7	-46.4	PASS
Negative Moment Decay Time To -10Nm		Msec.	60.0 to 80.0	68.9	PASS
Overall Test Results					PASS

Laboratory Technician

1/11/01

Test Date

Approved By



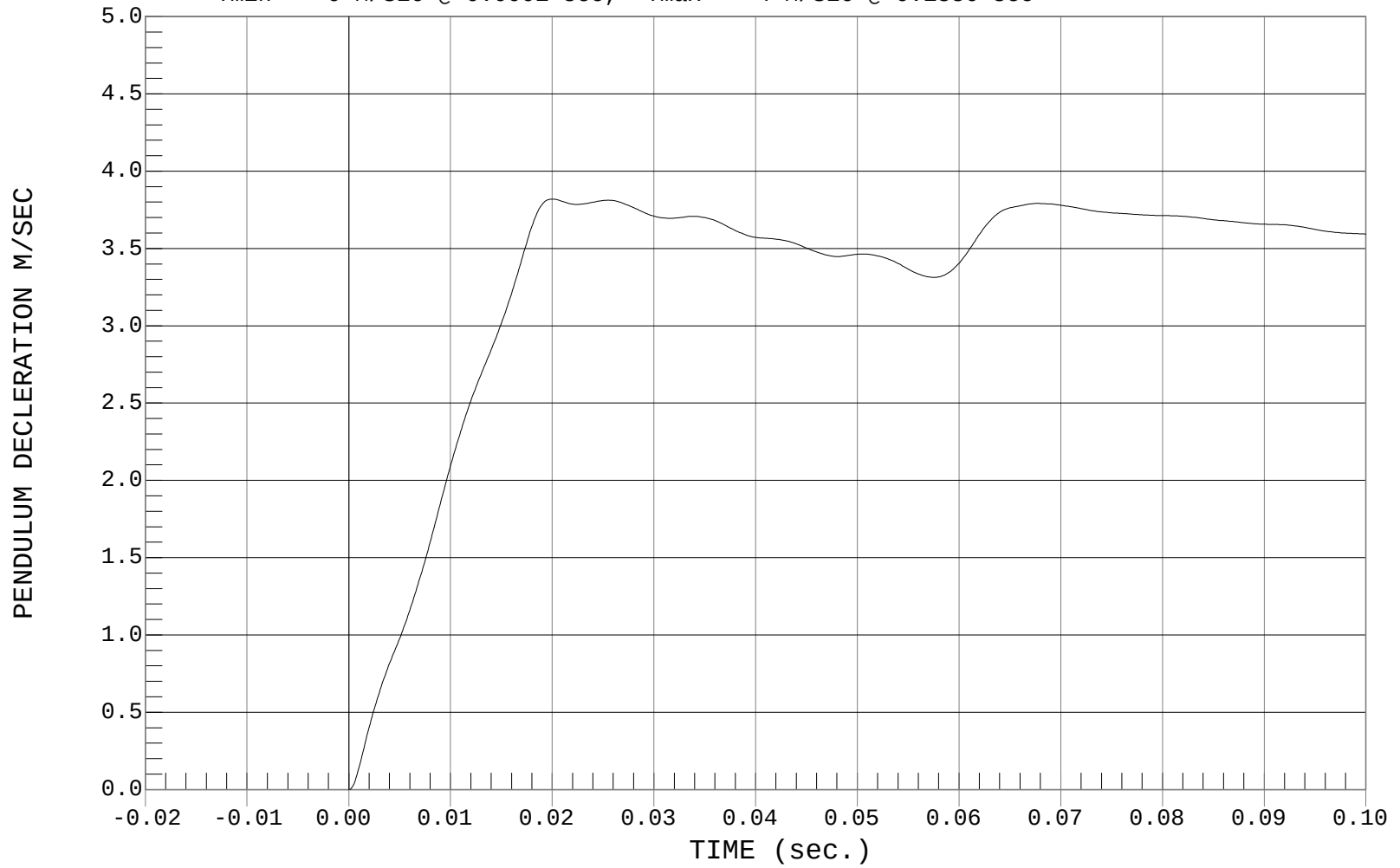
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #139

Test Date: 01-11-01
Speed: 12.00 FT/SEC, 3.66 M/SEC

— 1 PENDULUM DECLERATION, D01063AI.A04

Ymin = 0 M/SEC @ 0.0001 sec, Ymax = 4 M/SEC @ 0.1886 sec





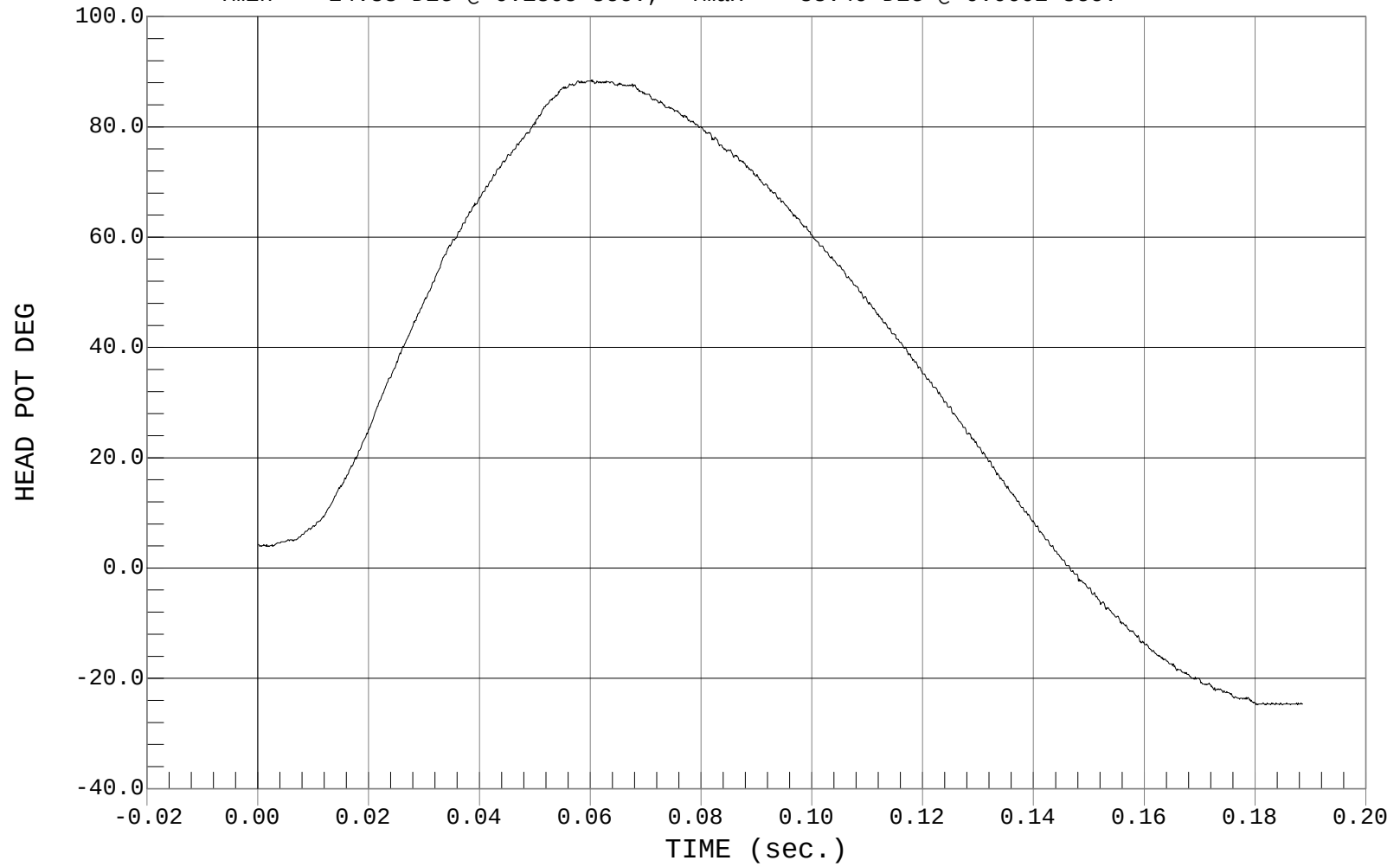
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #139

Test Date: 01-11-01
Speed: 12.00 FT/SEC, 3.66 M/SEC

— 1 HEAD POT, D01063DU.D05

Ymin = -24.83 DEG @ 0.1805 sec., Ymax = 88.49 DEG @ 0.0602 sec.





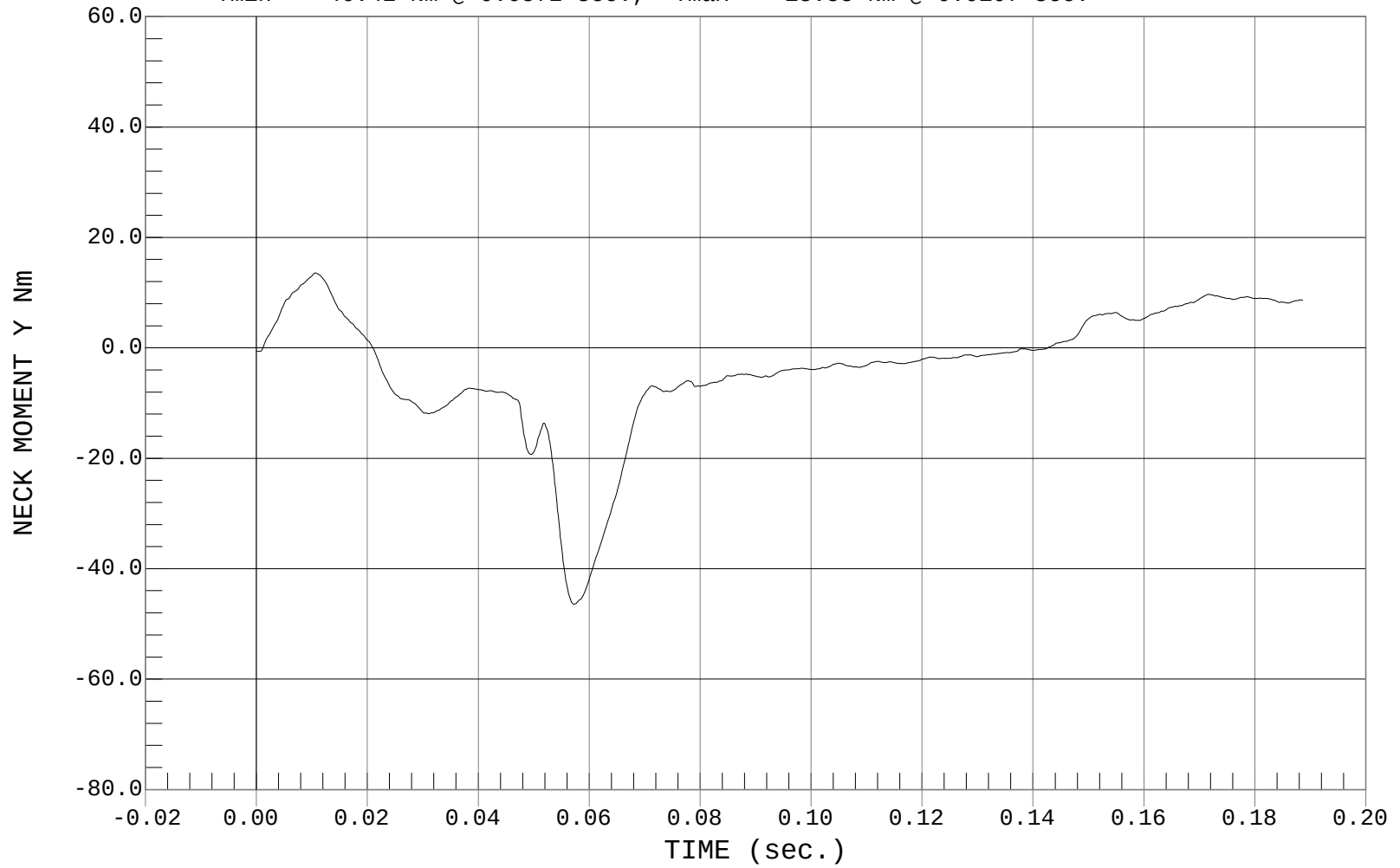
OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #139

Test Date: 01-11-01
Speed: 12.00 FT/SEC, 3.66 M/SEC

— 1 NECK MOMENT Y, D01063MF.M01

Ymin = -46.42 Nm @ 0.0572 sec., Ymax = 13.55 Nm @ 0.0107 sec.



Hybrid III Calibration Data Sheet
3 Year Old
Torso Flexion Test

ATD Serial No.: 139

Test I.D.: D01065

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	°C	18.9 to 25.6	21.4	PASS
Relative Humidity	%	10 to 70	24	PASS
Force @ 45°	N	130 to 180	161	PASS
Initial Angle	Deg	0-15	10	PASS
Return Angle	Deg	0-10	2	PASS
Overall Test Results				PASS

Laboratory Technician

1/12/01
Test Date

Approved By

Hybrid III Calibration Data Sheet
3 Year Old
Head Drop Calibration

ATD Serial No.: 142C

Test I.D.: D01071

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	22.1	PASS
Laboratory Relative Humidity	%	10 to 70	23	PASS
Peak Resultant Acceleration	G's	250.0 to 280.0	267.9	PASS
Peak Lateral Acceleration	G's	$\leq \pm 15.0$	-4.0	PASS
Is Acceleration Unimodal?	Yes/No	<10% Peak	Yes	PASS
Overall Test Results				PASS

Laboratory Technician

1/11/01
Test Date

Approved By



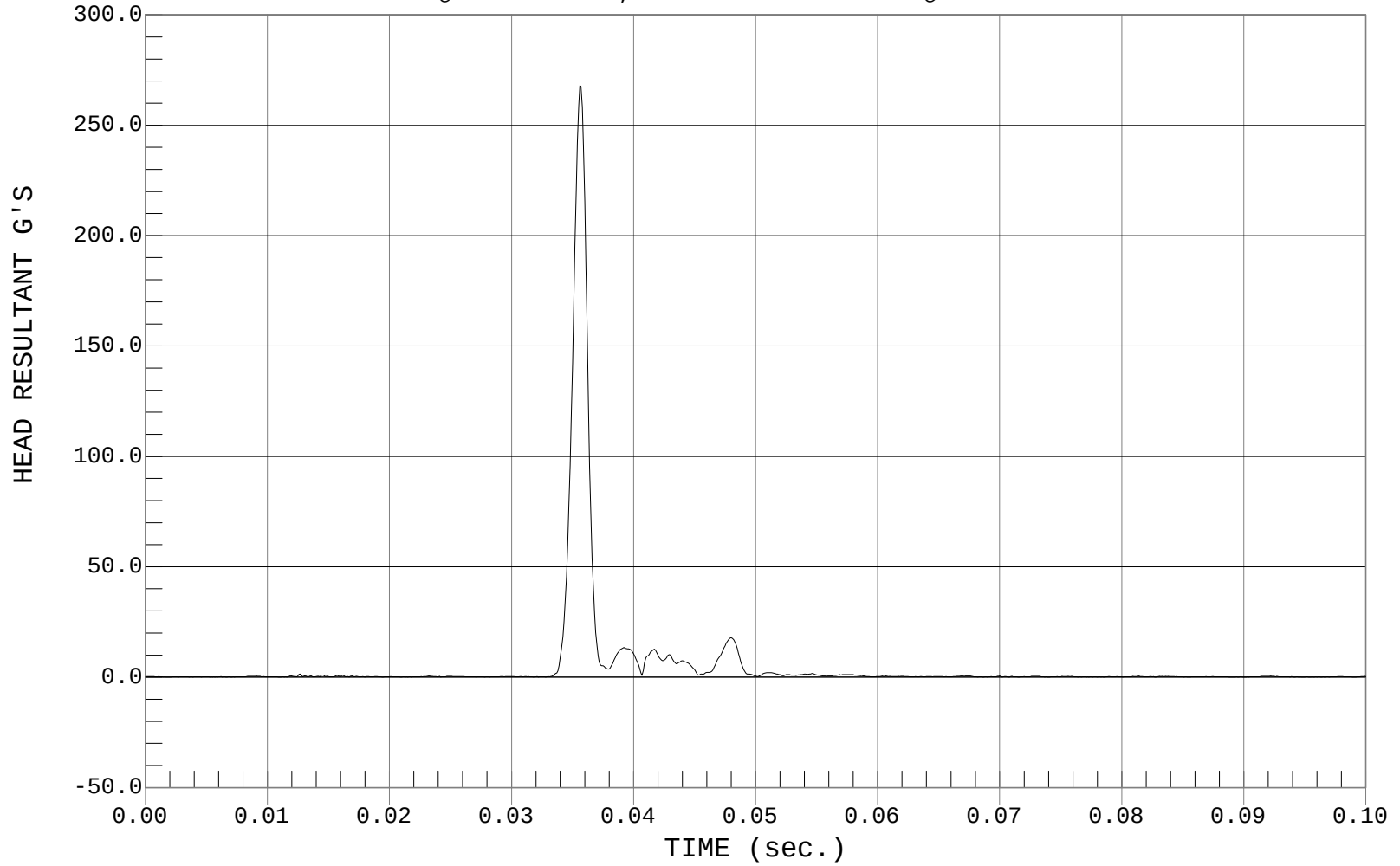
PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #142C

Test Date: 01-11-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD RESULTANT, D01071AV.A01

Ymin = .07 G'S @ 0.0015 sec., Ymax = 267.89 G'S @ 0.0356 sec.





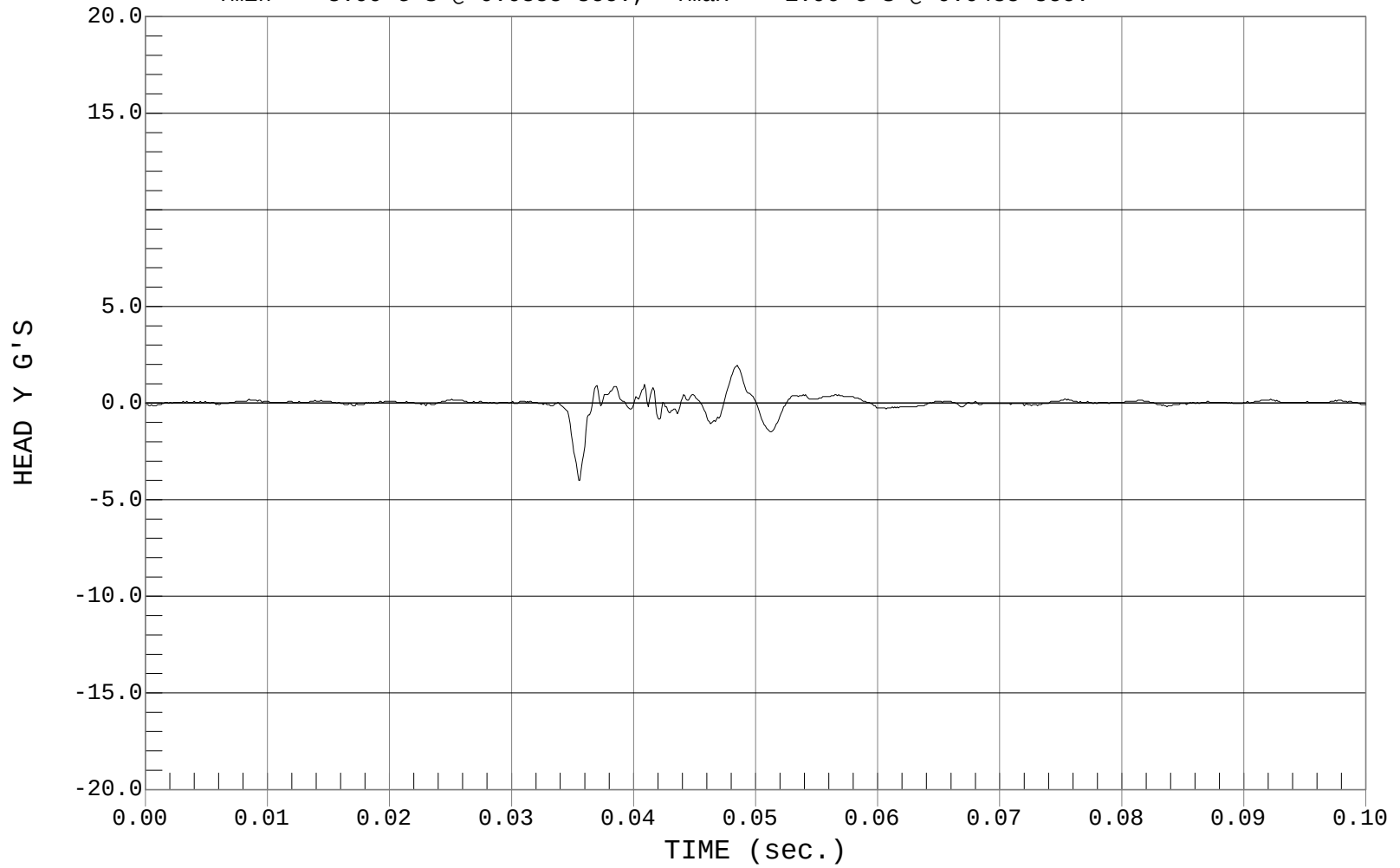
PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #142C

Test Date: 01-11-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01071AR.A02

Ymin = -3.99 G'S @ 0.0355 sec., Ymax = 1.96 G'S @ 0.0485 sec.



Hybrid III Calibration Data Sheet
3 Year Old
Thorax Impact Test

ATD Serial No.: 142C

Test I.D.: D01074

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.7	PASS
Laboratory Relative Humidity	%	10 to 70	29	PASS
Probe Velocity	M/s	6.58 to 6.82	6.0	PASS
Peak Resistive Force Within Deflection Corridor	kN	.68 to .81	.80	PASS
Internal Hysteresis	%	65 to 85%	73	PASS
Max Force 12.5 mm to 32 mm Deflection	kN	Max .86	.88	FAIL
Overall Test Results				FAIL

* TEST DOES NOT MEET SPECIFICATION

Laboratory Technician

1/14/01
Test Date

Approved By



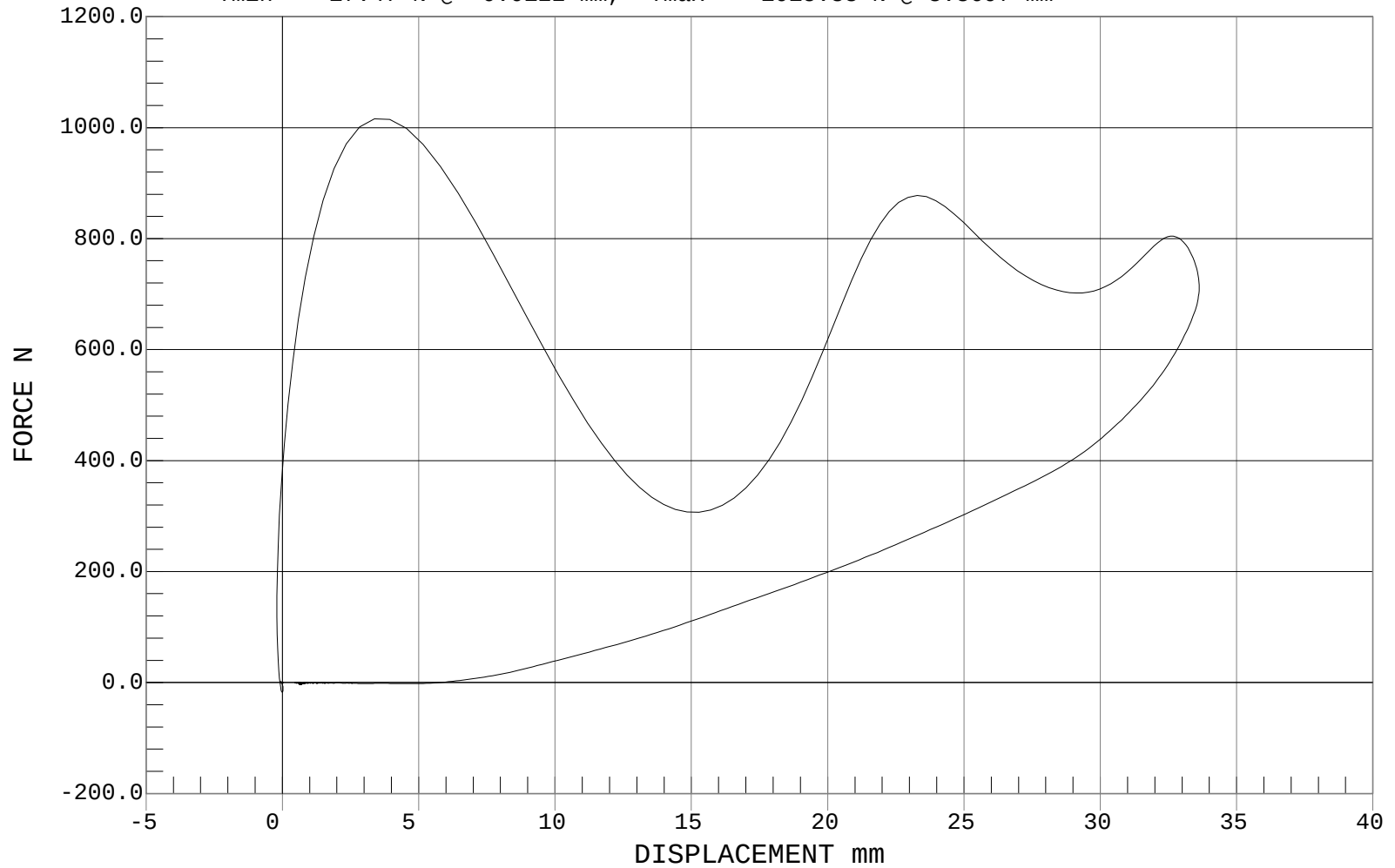
THORAX IMPACT

Test Desc.: Dummy Calibration - Chest Impact
Component: Dummy #142C

Test Date: 01-14-01
Speed: 19.72 FT/SEC, 6.01 M/SEC

— 1 FORCE, D01074CH.FVD

Ymin = -17.47 N @ -0.0122 mm, Ymax = 1015.88 N @ 3.3697 mm



Hybrid III Calibration Data Sheet
3 Year Old
Neck Flexion Test

ATD Serial No.: 142C

Test I.D.: D01072

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	PASS
Laboratory Relative Humidity		%	10 to 70	22	PASS
Pendulum Velocity		m/s	5.4 to 5.6	5.5	PASS
Pendulum Deceleration	10 Msec.	m/s	2.0 to 2.7	2.4	PASS
	15 Msec.	m/s	3.0 to 4.0	3.4	PASS
	20 Msec.	m/s	4.0 to 5.1	4.6	PASS
"D" Plane Rotation	Maximum	Deg.	70.0 to 82.0	73.8	PASS
Moment About Occipital Condyle	Maximum	Nm	42.0 to 53.0	44.4	PASS
Positive Moment Decay Time to 10Nm		Msec.	60.0 to 80.0	73.4	PASS
Overall Test Results					PASS

Laboratory Technician

1/12/01
Test Date

Approved By



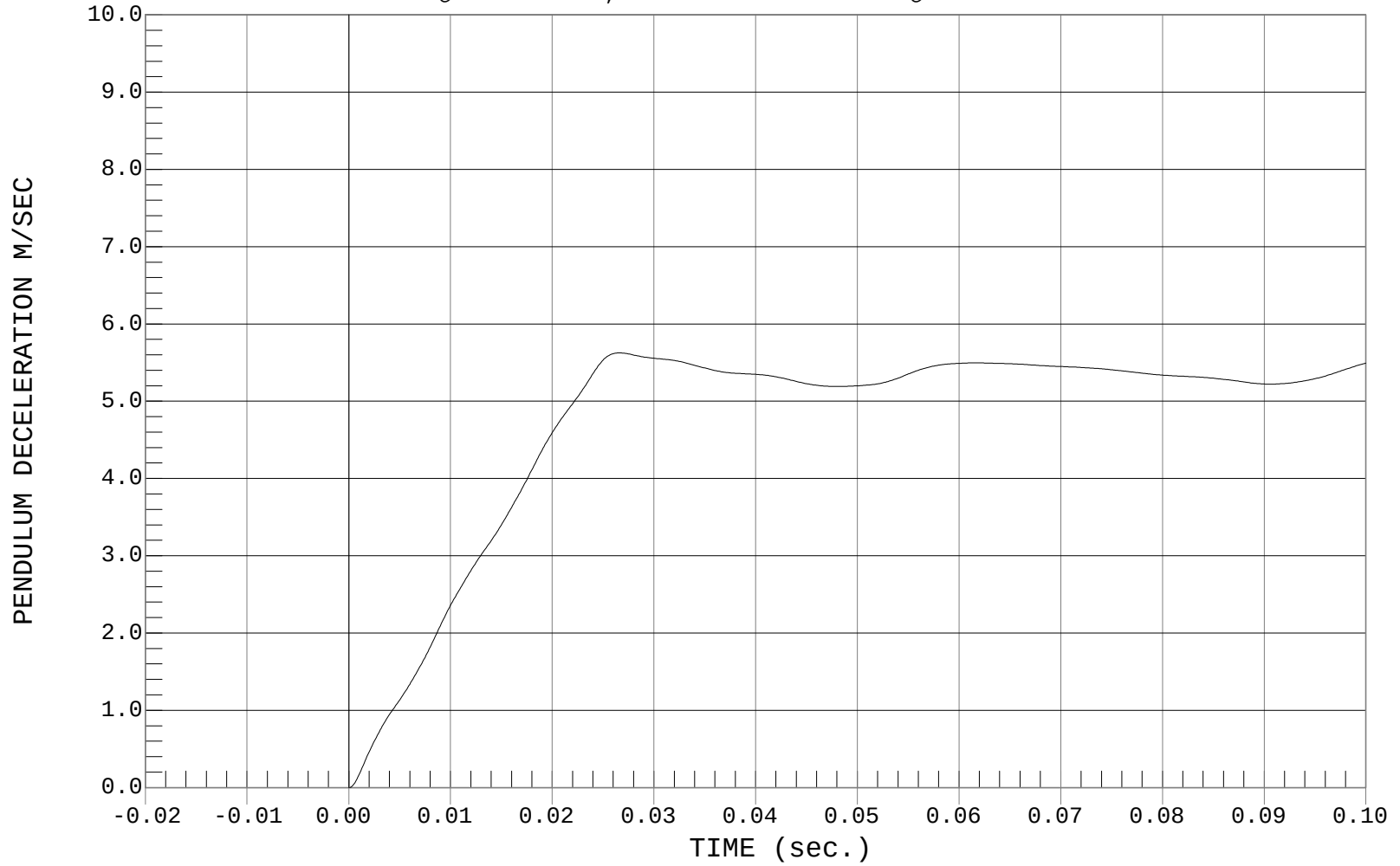
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #142C

Test Date: 01-12-01
Speed: 18.00 FT/SEC, 5.49 M/SEC

— 1 PENDULUM DECELERATION, D01072AI.A04

Ymin = 0 M/SEC @ 0.0001 sec, Ymax = 5.97 M/SEC @ 0.1885 sec





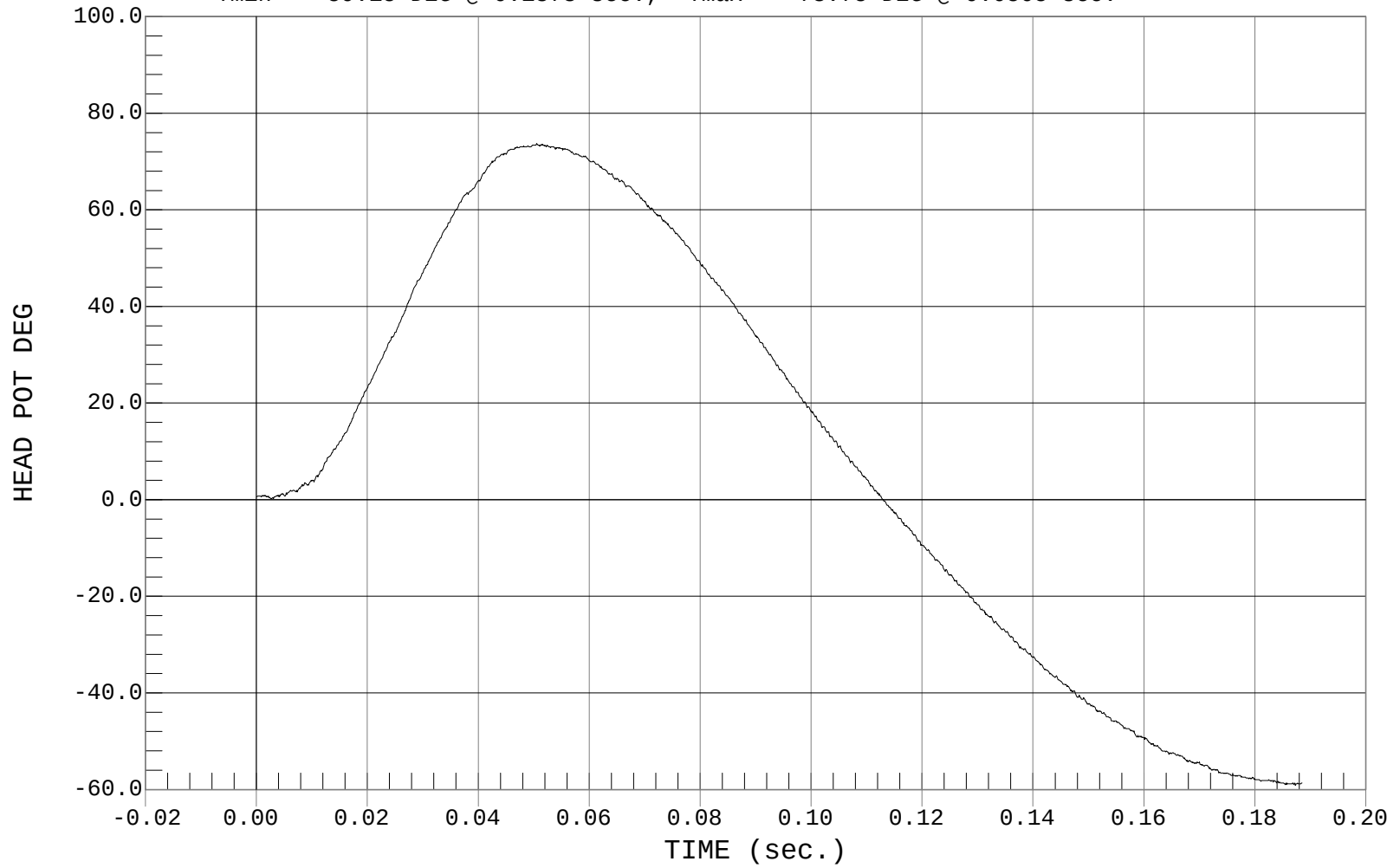
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #142C

Test Date: 01-12-01
Speed: 18.00 FT/SEC, 5.49 M/SEC

— 1 HEAD POT, D01072DU.D05

Ymin = -59.15 DEG @ 0.1873 sec., Ymax = 73.75 DEG @ 0.0505 sec.





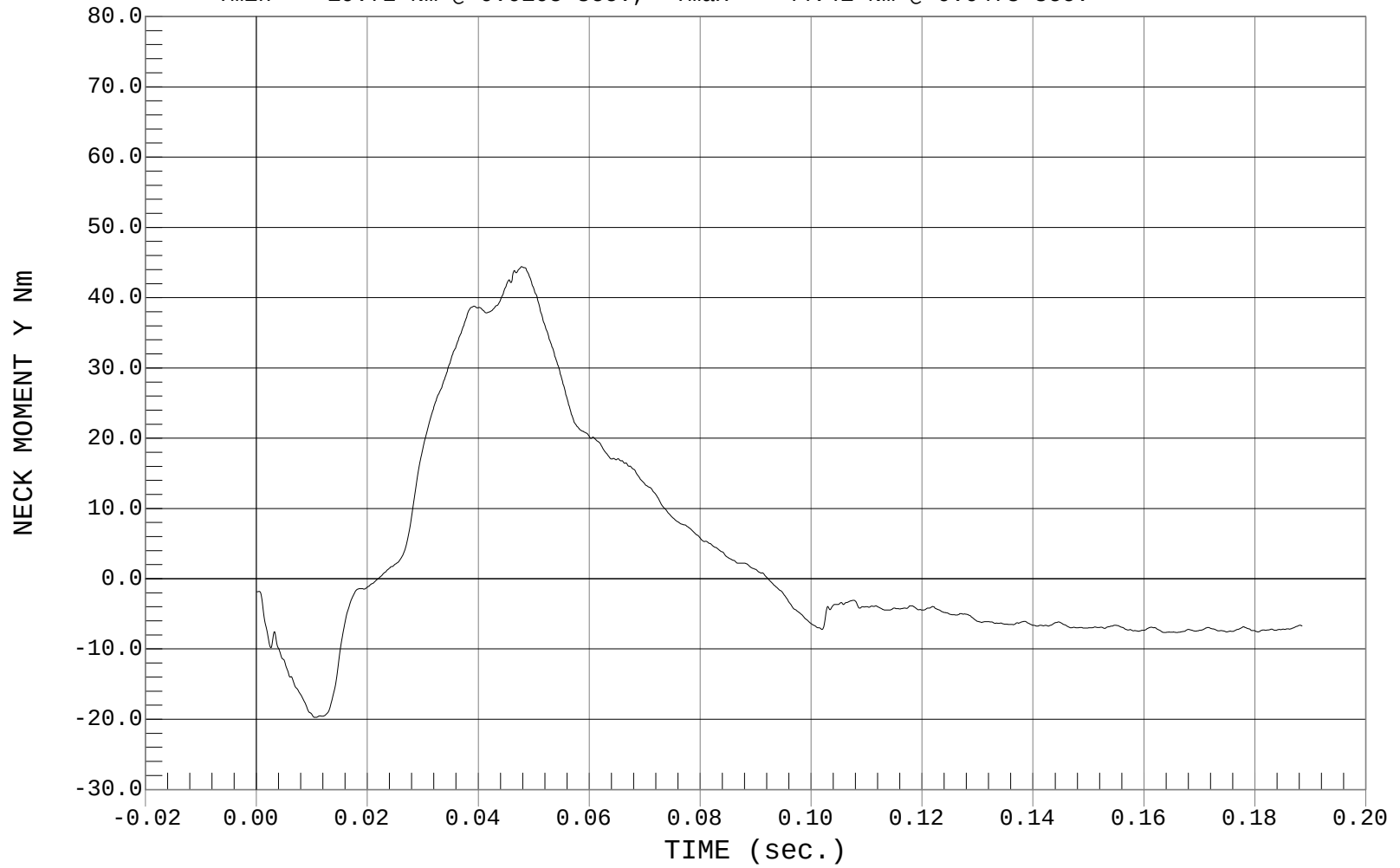
OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #142C

Test Date: 01-12-01
Speed: 18.00 FT/SEC, 5.49 M/SEC

— 1 NECK MOMENT Y, D01072MF.M01

Ymin = -19.72 Nm @ 0.0105 sec., Ymax = 44.41 Nm @ 0.0478 sec.



Hybrid III Calibration Data Sheet
3 Year Old
Neck Extension Test

ATD Serial No.: 142C

Test I.D.: D01073

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	PASS
Laboratory Relative Humidity		%	10 to 70	22	PASS
Pendulum Velocity		m/s	3.55 to 3.75	3.66	PASS
Pendulum Deceleration	6 Msec.	m/s	1.0 to 1.4	1.2	PASS
	10 Msec.	m/s	1.9 to 2.5	2.1	PASS
	14 Msec.	m/s	2.8 to 3.5	2.9	PASS
"D" Plane Rotation	Maximum	Deg.	83.0 to 93.0	88.8	PASS
Moment About Occipital Condyle	Minimum	Nm	-53.3 to -43.7	-46.3	PASS
Negative Moment Decay Time to -10 Nm		Msec.	60.0 to 80.0	68.8	PASS
Overall Test Results					PASS

Laboratory Technician

1/12/01
Test Date

Approved By



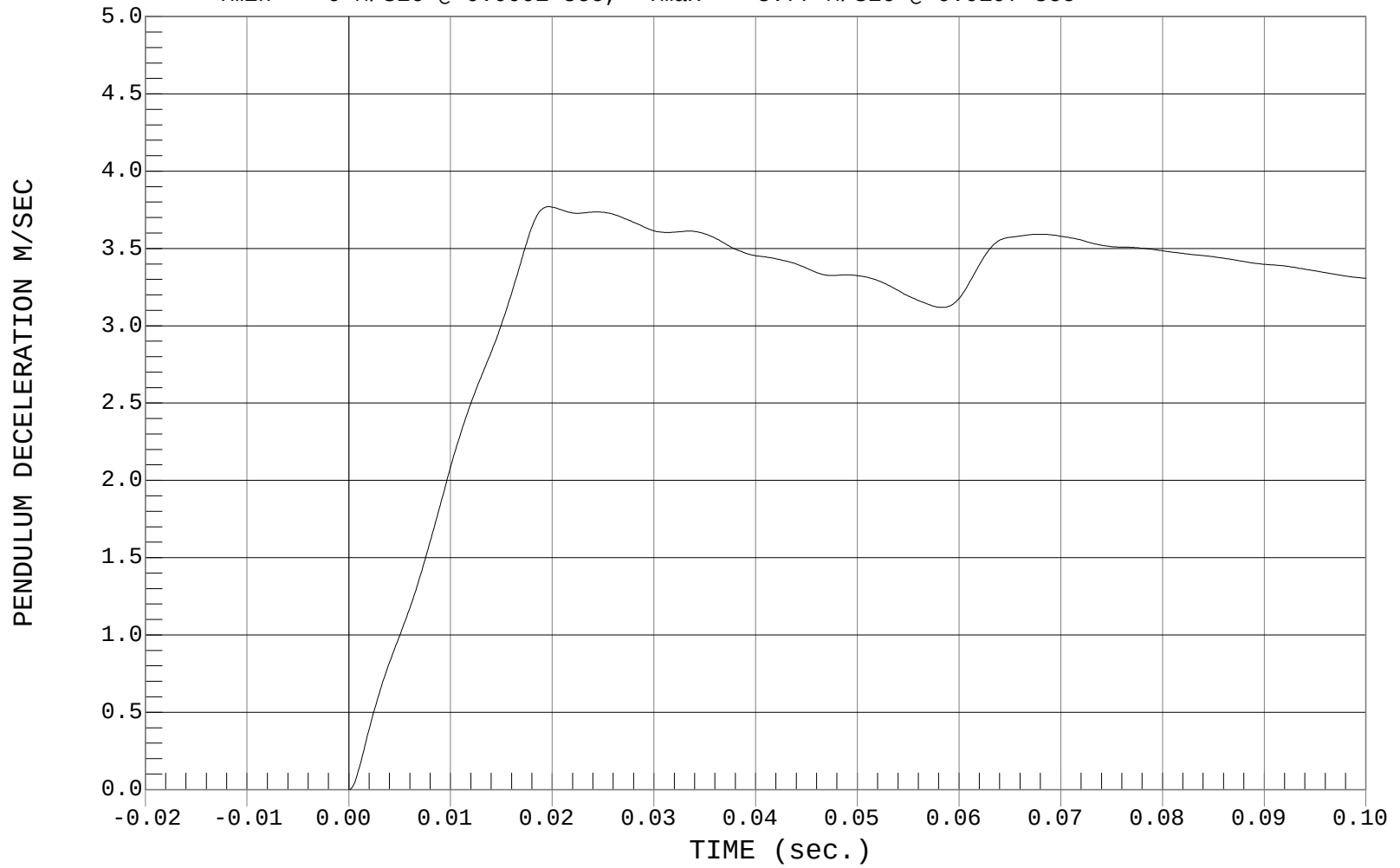
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #142C

Test Date: 01-12-01
Speed: 12.00 FT/SEC, 3.66 M/SEC

— 1 PENDULUM DECELERATION, D01073AI.A04

Ymin = 0 M/SEC @ 0.0001 sec, Ymax = 3.77 M/SEC @ 0.0197 sec





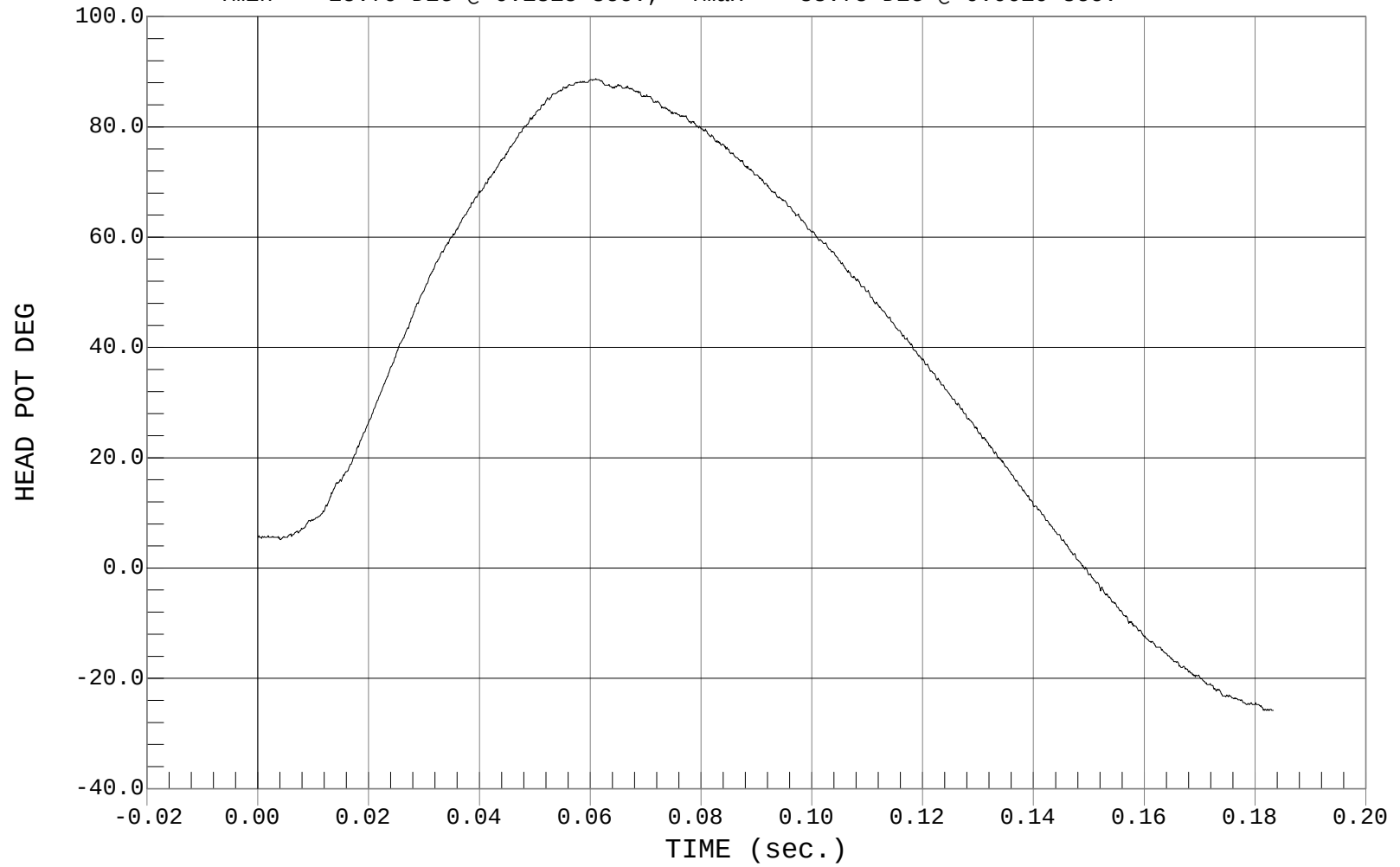
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #142C

Test Date: 01-12-01
Speed: 12.00 FT/SEC, 3.66 M/SEC

— 1 HEAD POT, D01073DU.D05

Ymin = -25.79 DEG @ 0.1815 sec., Ymax = 88.75 DEG @ 0.0610 sec.





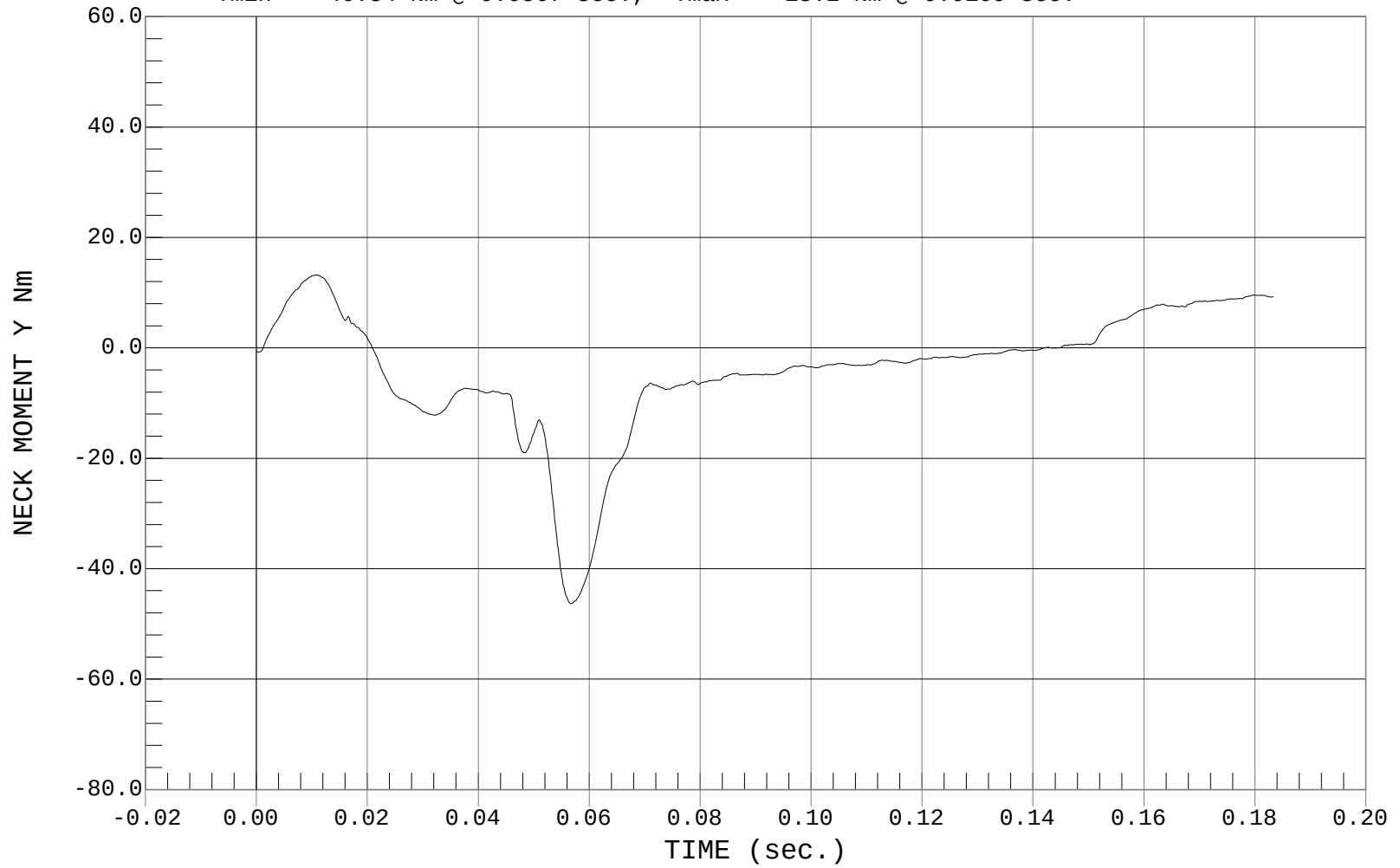
OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #142C

Test Date: 01-12-01
Speed: 12.00 FT/SEC, 3.66 M/SEC

— 1 NECK MOMENT Y, D01073MF.M01

Ymin = -46.34 Nm @ 0.0567 sec., Ymax = 13.2 Nm @ 0.0109 sec.



Hybrid III Calibration Data Sheet
3 Year Old
Torso Flexion Test

ATD Serial No.: 142C

Test I.D.: D01075

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	°C	18.9 to 25.6	21.4	PASS
Relative Humidity	%	10 to 70	25	PASS
Force @ 45°	N	130 to 180	158	PASS
Initial Angle	Deg	0 to 15	6	PASS
Return Angle	Deg	0 to 10	2	PASS
Overall Test Results				PASS

Laboratory Technician

1/12/01

Test Date

Approved By

SECTION 8
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

DUMMY AND LABORATORY INSTRUMENT CALIBRATION
INSTRUMENTS FOR CHILD DUMMY NO. 139

	INSTRUMENTS FOR DUMMY NO. <u>139</u>		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AJ7F6	Endevco	1/4/01
Head Y	J19843	Endevco	1/4/01
Head Z	J19244	Endevco	1/4/01
Chest X	AJ7F7	Endevco	1/4/01
Chest Y	AJ454	Endevco	1/4/01
Chest Z	J23757	Endevco	1/4/01
Pelvis X	AJ8C0	Endevco	1/4/01
Pelvis Y	J14189	Endevco	1/4/01
Pelvis Z	J23943	Endevco	1/4/01
Upper Neck Force X	114	FTSS	11/7/00
Upper Neck Force Y	114	FTSS	11/7/00
Upper Neck Force Z	114	FTSS	11/7/00
Upper Neck Moment X	114	FTSS	11/7/00
Upper Neck Moment Y	114	FTSS	11/7/00
Upper Neck Moment Z	114	FTSS	11/7/00
Lower Neck Force X	119	FTSS	11/8/00
Lower Neck Force Y	119	FTSS	11/8/00
Lower Neck Force Z	119	FTSS	11/8/00
Lower Neck Moment X	119	FTSS	11/8/00
Lower Neck Moment Y	119	FTSS	11/8/00
Lower Neck Moment Z	119	FTSS	11/8/00
Chest Deflection Gauge	139	Servo	1/8/01

DUMMY AND LABORATORY INSTRUMENT CALIBRATION
INSTRUMENTS FOR CHILD DUMMY NO. 142C

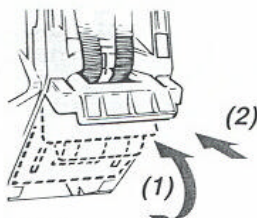
	INSTRUMENTS FOR DUMMY NO. <u>142C</u>		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	J19927	Endevco	1/4/01
Head Y	J18736	Endevco	1/4/01
Head Z	J14674	Endevco	1/4/01
Chest X	J14235	Endevco	1/4/01
Chest Y	J18724	Endevco	1/4/01
Chest Z	AJ5R0	Endevco	1/4/01
Pelvis X	J19440	Endevco	1/4/01
Pelvis Y	AJ4W2	Endevco	1/4/01
Pelvis Z	J20093	Endevco	1/4/01
Upper Neck Force X	120	FTSS	11/6/00
Upper Neck Force Y	120	FTSS	11/6/00
Upper Neck Force Z	120	FTSS	11/6/00
Upper Neck Moment X	120	FTSS	11/6/00
Upper Neck Moment Y	120	FTSS	11/6/00
Upper Neck Moment Z	120	FTSS	11/6/00
Lower Neck Force X	121	FTSS	11/8/00
Lower Neck Force Y	121	FTSS	11/8/00
Lower Neck Force Z	121	FTSS	11/8/00
Lower Neck Moment X	121	FTSS	11/8/00
Lower Neck Moment Y	121	FTSS	11/8/00
Lower Neck Moment Z	121	FTSS	11/8/00
Chest Deflection Gauge	142C	Servo	1/12/01

SECTION 9
CHILD SEAT OWNER'S MANUAL RESTRAINT INSTRUCTIONS

FORWARD-FACING TODDLER - MORE THAN 20 LBS. (9 KG)

* Car Seat MUST Be In Upright Position

- Rotate recline stand to upright position (1).
- Push recline stand in (2).



Be sure stand locks into position.

! WARNING

When locking recline stand into upright position, make certain straps do not get pinched between recline stand and bottom of car seat, as this will prevent adjustment of harness system.

* Car Seat Installation

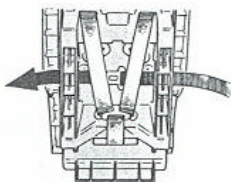
Never put car seat in a front vehicle seat unless recommended in vehicle owner's manual.

- 1 Place car seat forward-facing on vehicle seat firmly against vehicle seat back.

Belt here
forward-facing



- 2 Thread vehicle seat belt through openings and behind harness straps as shown; then buckle vehicle seat belt.



- 3 Press down firmly in center of car seat to compress vehicle's cushion as you tighten vehicle lap belt.

HINT: Use your knee to press down in center of car seat.



13

FORWARD-FACING TODDLER - MORE THAN 20 LBS. (9 KG) continued

- 4 Test for secure installation:

- Pull front to back.
- Pull left to right.

If vehicle seat belt does not hold car seat securely, see "Vehicle Seat Belts" section or move car seat to another seating location and repeat steps 1 through 4.



* Placing Child In Car Seat

! WARNING

Harness straps **MUST** be in the top slots for forward-facing use to prevent serious injury or death.

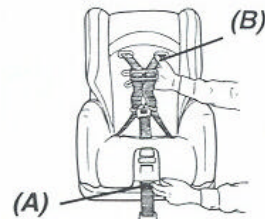
Do not use strap covers (shown), blankets, thick cushions, or padding under harness straps or child. They interfere with proper fit of harness straps and child could be ejected on impact.



- 1 Harness straps must be in the top slots. If straps must be moved, see "Changing Harness Strap Slots" section.

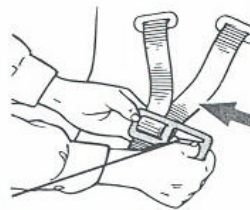
- 2 Loosen harness straps:

- Lift adjuster lever (A) to release harness straps.
- Pull harness straps (B).



- 3 Unhook harness tie from harness strap on child's left.

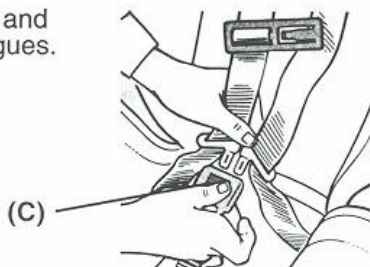
Harness Tie



14

FORWARD-FACING TODDLER - MORE THAN 20 LBS. (9 KG) continued

- 4 Press red button (C) and remove harness tongues.



- 5 Place child in car seat. Child's bottom and back must be firmly against the car seat.



- 6 Place child's arms through harness straps and insert both tongues into buckle.

Make sure harness straps are not twisted.



- 7 Pull up on tongues to be sure buckle is locked.

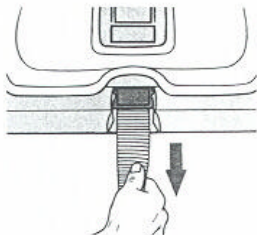


- 8 From back of harness tie, slide harness strap over harness tie tab.

Harness Tie Tab



- 9 Pull lower belt in front of car seat to tighten harness straps.



FORWARD-FACING TODDLER - MORE THAN 20 LBS. (9 KG) continued

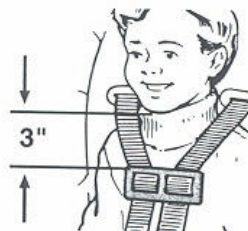


WARNING

Do not use harness straps that are loose or unbuckled. Harness straps must be snug and positioned over shoulders or child could be seriously injured.

- 10 Position harness tie at mid chest or 3 inches (8 cm) below child's chin.

IMPORTANT: The harness tie keeps the harness straps close and snug on child's shoulders to help prevent ejection.



- 11 Harness straps must be snug against child with just enough room for you to insert one finger between each harness strap and child's chest.

NOTE: Forward-facing - Must use top slots only.



- 12 Be sure crotch strap is in the opening **closest** to but not under child. For children over 30 lbs. (13.6 kg) move the crotch strap to the forward opening. This will give a larger child more room and comfort. See "Changing Crotch Strap Slots" section.

VEHICLE SEAT BELTS

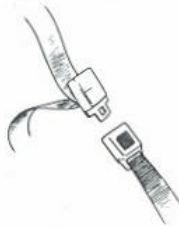
Identify your vehicle seat belt. Car seat must be used with a vehicle seat belt that will stay tight while driving. If vehicle does not have a lap belt that will stay tight, see dealer.

NOTE: #1 The locking latch plate on some seat belts may slip and loosen after being buckled through car seat. If this happens, flip latch plate over as shown and re-buckle. Test installation again to see if vehicle belt stays tight. If not, move car seat to another seating position.



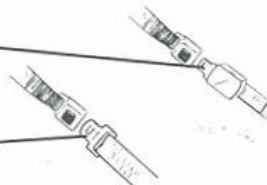
* Combination Lap/Shoulder Belt with Locking Latch Plate

- Install car seat per instructions. See **NOTE #1** above.



* Lap-Only Belts

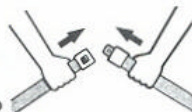
- Manually Adjustable Lap-Only Belts. See **NOTE #1** above.



- Retractor Lap-Only Belts.

To determine if a lap-only belt can be used, follow the steps below:

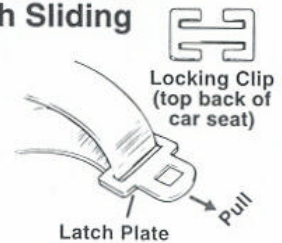
- 1) Pull on both halves of vehicle seat belts.
 - If one belt gets longer, see step 2.
 - If neither belt gets longer, install car seat according to instructions.
- 2) Pull end that gets longer all the way out, allow belt to retract 4 - 6 inches (10 - 15 cm) and pull again.
 - If belt gets longer, do not install car seat. Check vehicle owner's manual or contact auto dealer for options.
 - If belt does not get longer, install car seat per instructions on page 9 or page 13 substituting the instruction below for those in steps 3.
 - Pull lap belt that moves all the way out and thread through belt slots. Buckle lap belt. Release lap belt and remove slack in lap belt by pushing lap belt that moves into the retractor while pushing down on car seat to compress vehicle cushion.



VEHICLE SEAT BELTS continued

* Continuous Loop Combination Lap/Shoulder Belt with Sliding Latch Plate

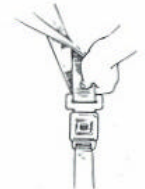
Pull on latch plate. If belt slides freely through latch plate, a locking clip **must** be used (stored on top back of car seat).



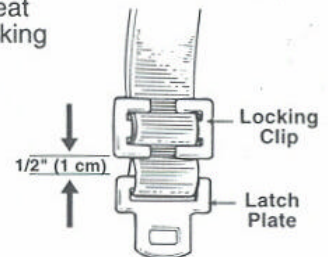
! WARNING

Failure to use locking clip where required will result in car seat not being securely held in place and child being seriously injured or killed in a sudden stop or accident.

- 1 Place car seat in seating position to be used.
- 2 Thread vehicle seat belt through openings in car seat and tighten lap belt.
- 3 With vehicle lap belt properly tightened, hold the combination lap/shoulder belts together just behind the sliding latch plate, and unbuckle belt.



- 4 Continue holding vehicle seat belts together and slide locking clip on vehicle seat belt approximately 1/2 inch (1 cm) away from latch plate.



- 5 Rebuckle vehicle seat belt. **HINT:** It may be necessary to press car seat into vehicle cushion in order to rebuckle.

Test installation again to see if car seat is secure. If it is not, remove locking clip, adjust vehicle seat belt and re-attach locking clip.

! WARNING

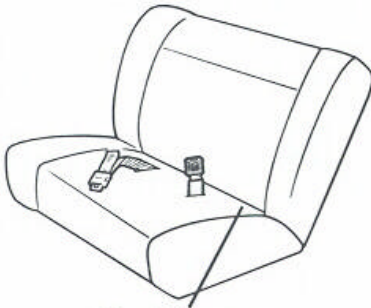
Remove locking clip from vehicle seat belt when not being used with a car seat. The vehicle seat belt will not properly restrain an adult or child and serious injury could occur. Do not use locking clip as a vehicle seat belt shortener.

VEHICLE SEAT BELTS continued

* Belts Anchored Forward of Seat Crease

Belts anchored forward of seat crease (as shown below) may not securely hold car seat. Check vehicle owner's manual or auto dealer.

- Do not use unless approved by vehicle manufacturer.
- After installation, check that car seat stays securely fastened.



Seat Crease



Seat Crease

* Do Not Use These Vehicle Seat Belts

The following vehicle seat belts **MUST NOT** be used. They will not restrain a car seat and child will be seriously injured or killed.

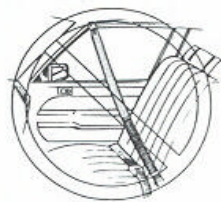
Lap/Shoulder Belt with Sewn Latch Plate

Do not use. This type of vehicle seat belt stays loose while driving. In a sudden stop or accident it will lock, but car seat may move forward and cause serious injury. See your vehicle dealer for options.



Automatic (Passive) Seat Belts

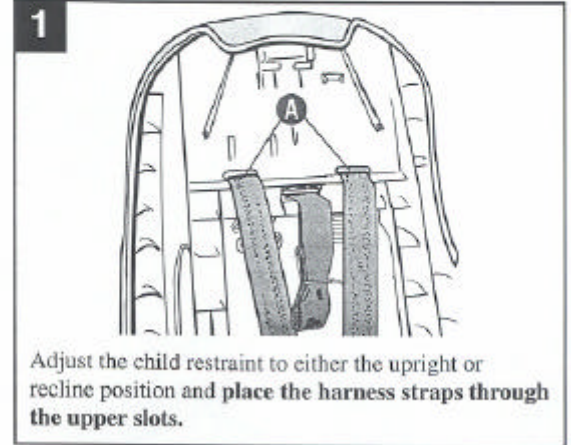
Do not use this type of vehicle seat belt to anchor your car seat.



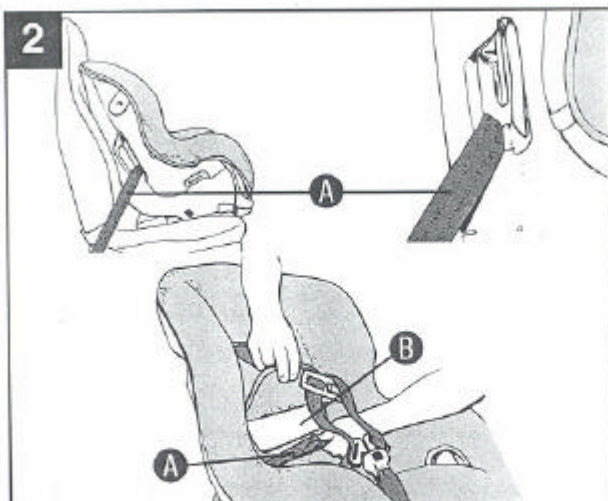
FORWARD FACING TODDLER USE

Weight: 20 to 40 pounds. (9 to 18 kg)

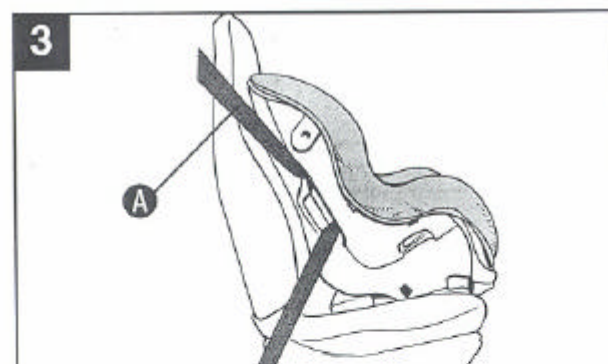
Maximum Height: 40 inches (101 cm) or if child's ears are at top of seat back.



Adjust the child restraint to either the upright or recline position and place the harness straps through the upper slots.



Put the child restraint in your vehicle forward facing and buckle the vehicle seat belt **A** as shown. Use the "Belt Trac™" **B** for easy access and seat belt routing.



If your vehicle seat belt has a shoulder belt **A** it must be located as shown.

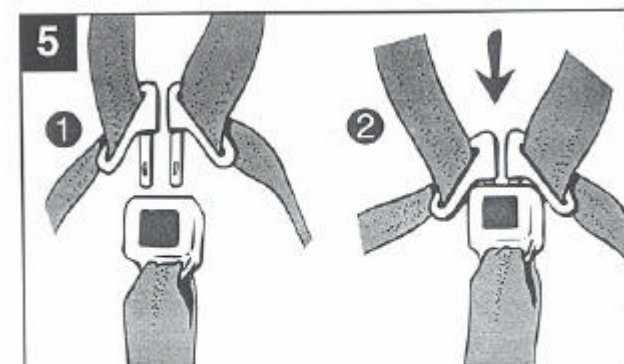
Note: See instructions under "Using a Metal Locking Clip", when using a lap/shoulder belt **A** combination.



It is very important to put the vehicle seat belt in the right place. If the belt is put anywhere else, the child restraint will not protect your child in a crash. The seat belt must be as tight as possible. Using your knee, put your full weight on the seat as you tighten the belt.

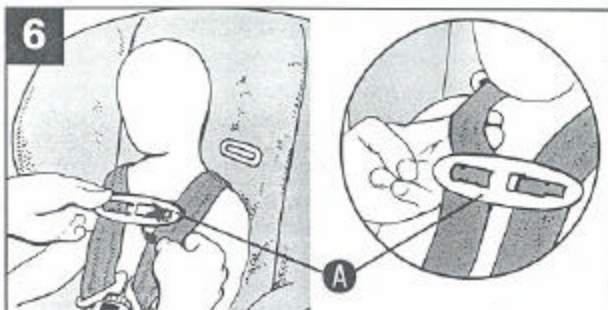
If you can pull the top of the child restraint more than one inch (25 mm) forward or 1 to 2 inches (25 mm - 50 mm) to the side, the belt is not tight enough.

Tighten again, try a different seating position or see section titled "Tether Strap".



Place child in seat, place straps over shoulders and snap each of two tongues into crotch strap buckle as shown.

Check that the buckle has engaged by pulling up on the harness straps. Tighten the harness by pulling the strap at the front of the seat.



Position the harness tie on baby's chest at armpit level. The vehicle seat belt must be tight and the child restraint must be firmly secured to the vehicle seat. The child restraint harness must be fastened and tight with no more than two fingers-width of slack between the strap and child. The harness tie **A** must be on and properly positioned at armpit level.

TETHER STRAP (Factory installed)

IMPORTANT INFORMATION ABOUT TETHER STRAP. PLEASE READ CAREFULLY.

Failure to properly follow these instructions could result in serious injury to your child or to other occupants in the vehicle.

- Your child restraint has been manufactured with a top tether strap to comply with new Federal regulations.

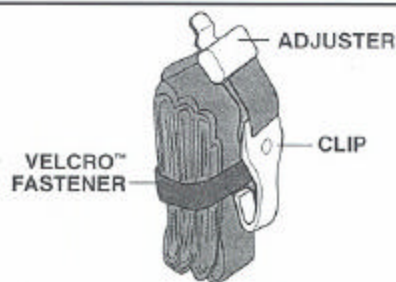


Use the tether strap only when using the child restraint in the forward-facing position.

A properly used top tether strap may help limit movement of the child's head in a crash, thereby reducing the risk of injury. A top tether strap must always be used with a vehicle whose lap belts only lock during a sudden stop or crash or seat belts with buckles located forward of the seat bight **A**.

- The tether strap is to be used in addition to the vehicle seat belt system.
- The length of the tether strap has been developed using federal regulations. As a result, depending on your model of the vehicle, you may experience several inches or more of excess strap after connecting the tether strap to the anchor. Because you may wish to install the child restraint in more than one particular model of vehicle, **DO NOT CUT** off the excess length from the tether strap. If you do, you may not have enough length to attach the tether strap in a different model vehicle.

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Excess tether strap can be a hazard to the child or others if not properly stored. Tightly fold or roll the excess tether strap and secure with Velcro™ fastener. When the tether strap is not in use, keep strap tightly rolled or folded with Velcro™ fastener. Keep tether clip and strap as close to the tether attachment point as possible.

- Strap should be wound as tight as possible to limit its size and limit its ability to swing around the child restraint in the event of a crash. This will help prevent the clip from becoming a projectile in the event of a crash or becoming a strangulation hazard.

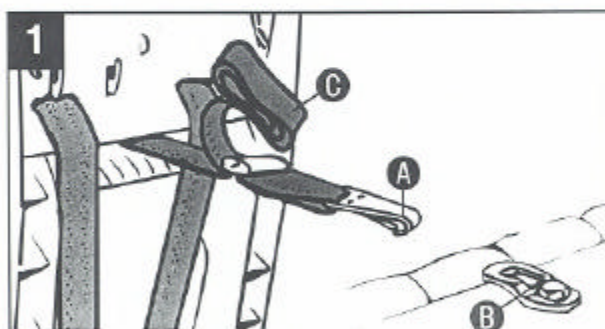
Failure to properly store an unused tether could result in serious injury to the child or other occupants in the vehicle.

Please check the vehicle owner's manual to determine if an attachment point for a top tether has already been installed by the vehicle manufacturer. If your vehicle does not have an anchor bracket for attachment of the top tether strap to the vehicle, you must contact an authorized dealer of the vehicle manufacturer.

TOP TETHER STRAP INSTALLATION

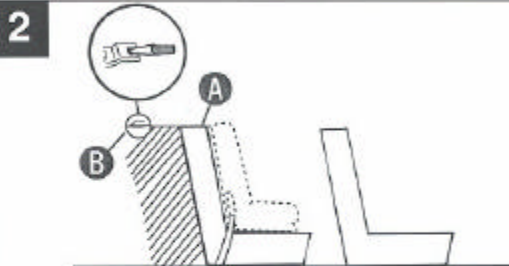
- Install the child restraint per the instructions **FORWARD-FACING USE** in this booklet.
- See your vehicle owner's manual for location of the anchor bracket for attachment of the top tether strap to the vehicle. If there is no anchor bracket, please contact an authorized dealer of the vehicle manufacturer to have an anchor bracket installed.

WARNING: An improperly installed anchor can cause serious injury.



Attach tether clip **A** to anchor bracket **B** and tighten tether strap securely. Pull loose end of strap to tighten. Remove slack **C** so that the tether strap does not move more than 1 inch (25 mm) forward or 1 to 2 inches (25 mm to 50 mm) to the side.

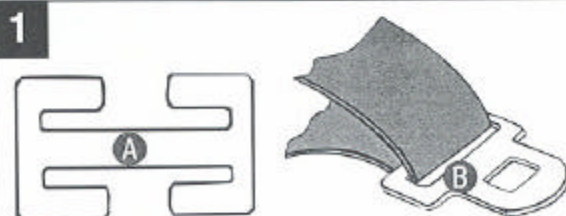
IMPORTANT: Fold into small loops or tightly roll the excess tether strap and secure it with attached Velcro™ fasteners. Then tuck the rolled excess strap between the child restraint and the vehicle seat to prevent access by the child or other vehicle occupants.



For typical installation of tether **A** and anchor bracket **B** system.

If there are any questions regarding the location of the anchor brackets which are not answered by the vehicle owner's manual, please contact an authorized dealer of vehicle manufacturer. If you still have questions, please call evenflo® at 1-800-233-5921.

USING A METAL LOCKING CLIP



You must use a metal locking clip **A** with seat belt whose buckle tongue **B** slides freely along the belt. A metal locking clip **A** is attached to the back of the child restraint.