REPORT NUMBER: CAL-01-24

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

VOLVO GOTHENBURG SWEDEN
2001 VOLVO S60
4-DOOR SEDAN

NHTSA NUMBER: V15900

VERIDIAN TEST NUMBER: 8629-1

VERIDIAN ENGINEERING
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225

September 10, 2001

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Performance Standards
Office of Crashworthiness Standards
Mail Code: NPS-10
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Approval Date:

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NHTSA, Office of Crashworthiness Standards

Date of Report Acceptance

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16. Abstract

A frontal load cell barrier test of a 2001 Volvo S60 4-Door Sedan was performed at Veridian Engineering crash test facility in Buffalo, New York, on September 10, 2001.

The impact velocity was 56.49 kph and the temperature at the barrier face was 21.1°C. The maximum post-test vehicle crush was 536 mm. The test vehicle was equipped with 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions.

With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements.

ATD Position	**HIC**	**Clip (g's)**	**Chest Disp (mm)**	**Left Femur (N)**	**Right Femur (N)**
Driver (150)	502.4	52.1	-42.4	-3604.5	-3056.0
Passenger (245)	399.4	47.3	-38.7	-2241.3	-3128.9

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TABLE OF CONTENTS

SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.49 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored under Contract No. S0830. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 56.49 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

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 Indicant Test Procedure, dated December 1999. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. At the vehicle manufacturer’s request, seat belt load cells and displacement potentiometers were not installed to prevent potential interference with the vehicles pretensioning and load limiting seat belt systems. The driver (position 1) ATD (Serial No. 150) and the right-front passenger (position 2) ATD (Serial No.245) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. The 125 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Appendix C contains Load Cell Barrier information. Appendix D contains the instrumentation data channel assignments. Appendix E contains the dummy calibration data and Appendix F contains the owner’s manual instructions for the occupant seating and restraint systems.

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 36 load cells was impacted by a 2001 Volvo S60 4-Door Sedan at a velocity of 56.49 kph. The test was performed at Veridian Engineering on September 10, 2001. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The occupant data is summarized below.

ATD Position	HIC	Clip (g)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)	Belt Spool (mm)	Belt Stretch (mm/m)
Driver	502.4	52.1	-42.4	-3604.5	-3056.0	N/A	N/A
Passenger	399.4	47.3	-38.7	-2241.3	-3128.9	N/A	N/A

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 536 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: Face to the upper centerline of the airbag, back of head to the outboard half of head restraint, chest to the lower half of the airbag, left knee to the knee bolster left of the steering column, and right knee to the knee bolster right of the steering column.

The passenger's visible contact points were as follows: Face to the right half of the airbag, back of head to the outboard half of the head restraint, chest to the lower half of the airbag, left knee to the left quarter of the glove compartment door, and right knee to the right third of the glove compartment door.

The 2001 Volvo S60 4-Door Sedan did not exceed the requirements of FMVSS 208, FMVSS 212, FMVSS 219, and FMVSS 301. Data pertaining to these standards are presented in the data sheets.

SECTION 2

GENERAL TEST AND VEHICLE PARAMETER DATA

DATA SHEET NO. 1 CRASH TEST SUMMARY

Vehicle NHTSA No.: V15900 Test Mode: 56.3 kph Frontal Barrier

Test Date: September 10, 2001 Time: 15:32 Temperature: 21.1 °C

Vehicle Make/Model/Body Style: 2001 Volvo S60 4-Door Sedan

Vehicle Test Weight: 1732.0 kg

Vehicle/Barrier Impact Angle: 0 °

Impact Velocity: 56.49 kph

Maximum Static Crush: 536 mm

Vehicle Rebound: 482.67 mm

DUMMIES:	DRIVER	PASSENGER
Type:	572E	572E
Restraint System:	Seatbelt, Airbag, Knee Bolster	Seatbelt, Airbag, Knee Bolster

Number of Data Channels: 125

Number of Cameras: 1 Real Time

16 High Speed

DOOR OPENING DATA: Closed/Operable - Left Front

Closed/Operable - Right Front

Front Seat(s) Data:	DRIVER	PASSENGER
Seat Track Failure: (mm of shift)	0	0
Seat Back Failure:	None	None

VISIBLE DUMMY CONTACT POINTS:	DRIVER	PASSENGER
Head:	Face to upper centerline of airbag; Back of head to outboard half of head restraint	Face to right half of airbag; Back of head to outboard half of head restraint
Abdomen:	None	None
Chest:	Airbag	Airbag
Knees:	Left knee to bolster left of steering column; Right knee to bolster right of steering column	Left knee to left quarter of glove compartment door; Right knee to right third of glove compartment door

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2001 Volvo S60 4-Door Sedan

NHTSA No. : V15900 ; VIN: YV1RS61R312081271 ; Color: Blue

Engine Data: 5 cylinders; - CID; 2.4 Liters; - cc

Placement: - Longitudinal or In-Line; X Transverse or Lateral

Transmission Data: 5 speeds; - Manual; X Automatic; X Overdrive

Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive

Major Options: X A/C; X Pwr.Strg.; X Pwr. Brakes

X Pwr. Windows; X Pwr. Door Locks; X Tilt Wheel

Date Received: 8/31/01 ; Odometer Reading 27 km

Selling Dealer: Jim Culligan, Inc.

& Address: 8129 Main Street, Williamsville, NY 14231-9005

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Volvo Gothenburg Sweden

Date of Manufacture 06/01

GVWR: 1996 kg; GAWR: 1057 kg FRONT; 1007 kg REAR

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load: 44 kpa FRONT

44 kpa REAR

Recommended Tire Size: P195/65R15

* Recommended Cold Tire Pressure: 38 kpa FRONT; 38 kpa REAR

Size of Tires on Test Vehicle: P195/65R15 ; Manufacturer: Michelin

Vehicle Capacity Data:

Type of Front Seats: - Bench; X Bucket; - Split Bench

Number of Occupants: 2 Front; 3 Rear; 5 Total

Vehicle Capacity Weight (VCW) = 403.7 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 63.5 kg

*Tire pressure used for test

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

Right Front =	443.5 kg	Right Rear =	305.0 kg
Left Front =	442.0 kg	Left Rear =	332.0 kg
TOTAL FRONT =	885.5 kg	TOTAL REAR =	637 kg

TOTAL DELIVERED WEIGHT = 1522.5 kg

% of Total Front of Vehicle Weight = 58.2% % of Total Rear Weight = 41.8% %

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	1522.5 kg
Rated Cargo/Luggage Weight (RCLW) =	63.5 kg
Weight of 2 p.572 Dummies @ 76 each =	152 kg
TARGET TEST WEIGHT =	1738 kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 57.5 KG OF CARGO WEIGHT:

Right Front =	481.0 kg	Right Rear =	375.0 kg
Left Front =	487.0 kg	Left Rear =	389.0 kg
TOTAL FRONT =	968 kg	TOTAL REAR =	764 kg

TOTAL TEST WEIGHT = 1732 kg

% of Total Front Weight = 55.9% % % of Total Rear Weight = 44.1% %

Weight of Ballast Secured in Vehicle Trunk Area = 0 kg

Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF 683	LF 682	RR 702	LR 692
FULLY LOADED:	RF 672	LF 670	RR 674	LR 662
AS TESTED:	RF 673	LF 670	RR 676	LR 671

Vehicle's Wheel Base: 2716 mm

Location of Vehicle's C.G.: 1198 mm rearward of front wheel center.

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 18.5 liters

Usable Capacity Figure Furnished by COTR = 18.5 liters

Test Volume Range (92 to 94% of Usable Capacity) = 17.02 to 17.39 liters

ACTUAL TEST VOLUME= 17.1 liters (with entire fuel system filled)

Test Fluid Type: Stoddard Solution ; Spec. Grav. = 0.764

Kinematic Viscosity = 0.96 centistokes; Color = Orange

Type of Fuel Pump: Electric- X ; Mechanical- -

Does Electric Pump operate with ignition switch "ON" & engine "OFF" Yes- No-

Details of Fuel System: The fuel tank is located on the vehicle underbody forward of the rear wheels and beneath the rear seat. The fuel filler is located on the right rear quarter aft of the rear wheel and the fuel lines are routed along the vehicle underbody right of the tunnel.

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°

Test Date: September 10, 2001 Time: 15:32 Temperature: 21.1 °C

Vehicle NHTSA No.: V15900

Required Impact Velocity Range: 55.5 to 57.1 kph

BARRIER IMPACT VELOCITY: (Speed traps within 5 feet of impact plane.)

Trap No. 1 = 56.49 kph; Trap No. 2 = 56.49 kph

Distance from vehicle to barrier: (1) entering trap = 813 mm

(2) exiting trap = 305 mm

VEHICLE STATIC CRUSH: (mm) (For frontal and rear impacts only.)

Vehicle Length:

Pre-Test	Left =	4497	; C/L =	4581	; Right =	4497
Post-Test	Left =	4078	; C/L =	4049	; Right =	4046
Crush	Left =	419	; C/L =	532	; Right =	451

AVERAGE = 467 mm

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

	Left =	479	; C/L =	506	; Right =	463

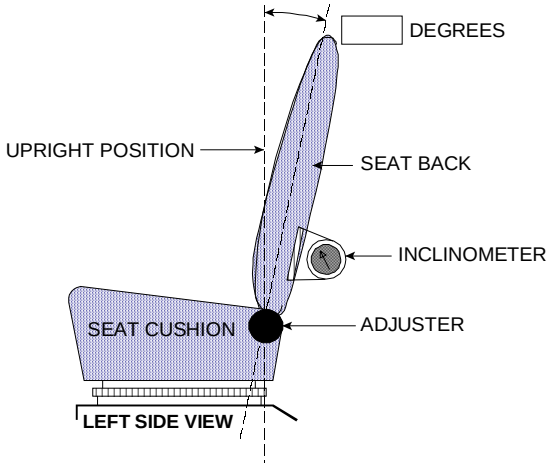
AVERAGE = 483 mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2001 Vehicle Model: Volvo S60 Body Style : 4-Door Sedan

1. Nominal Design Riding Position for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.



FRONT SEAT ASSEMBLY

Seat back angle for driver's seat: 19

Measurement instructions: With the vehicle attitude at 0 degrees, place a level along the rear of the seatback centerline so that it spans the bottom and top of the seat back frame. Place the seatback at 19 degrees from vertical.

Seat back angle for passenger's seat: 19

Measurement instructions: With the vehicle attitude at 0 degrees, place a level along the rear of the seatback centerline so that it spans the bottom and top of the seat back frame. Place the seatback at 19 degrees from vertical.

2. Seat Fore and Aft Positioning

Positioning of the driver's seat: Place power seat cushion in mid-position.

Positioning of the passenger's seat: Place seat in mid-position. Mid-position is located at detent 8, where the forward most detent is defined as 0.

3. Fuel Tank Capacity Data

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 18.5 liters

B. "Usable Capacity" of the optional equipment fuel tank is 21.1 liters

C. "Usable Capacity" of the vehicle(s) used for certification testing to requirements of FMVSS 301 = 18.5 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 17.1 liters

3.3 Is vehicle equipped with electric fuel pump? Yes- X ; No- -

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

When ignition is switched on without starting the engine, the fuel pump operates for a few seconds then stops.

The fuel pump operates continuously while the engine is running.

4. STEERING COLUMN ADJUSTMENTS:

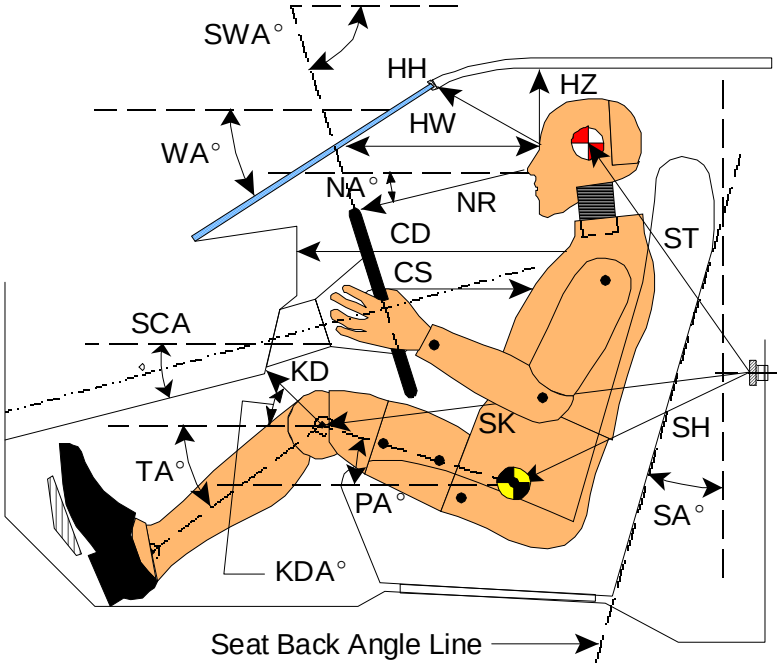
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: The steering column is placed in mid-tilt and mid-length (telescoping) position. When properly positioned, the steering wheel rim is at 25 degrees from vertical (with the vehicle attitude at 0 degrees) and its telescoping length is set to the middle of its 60 mm travel.

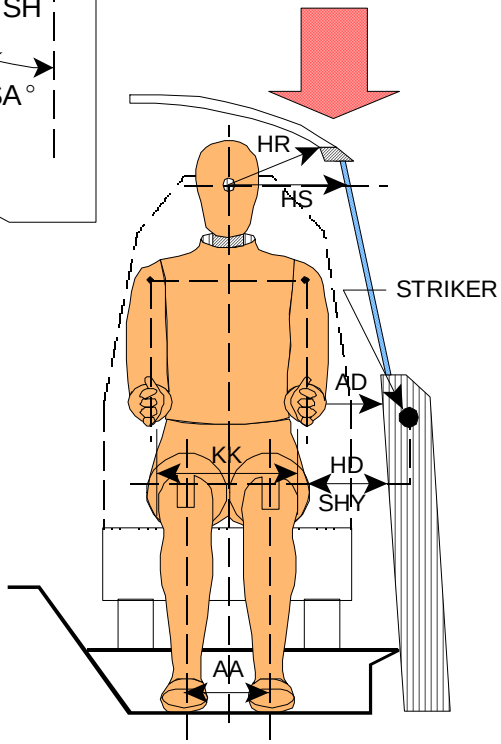
5. SEAT BELT UPPER ANCHORAGE

Nominal design riding position: Upper anchorages are not adjustable.

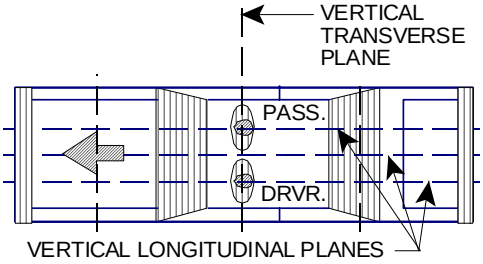
DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



AD - Arm to Door
HD - H-Point to Door
HR - Head to Side Header
HS - Head to Side Window
KK - Knee to Knee
AA - Ankle to Ankle
SHY- Striker to H-Point (Y Direction)



CD - Chest to Dash
CS - Steering Wheel to Chest
HH - Head to Header
HW - Head to Windshield
HZ - Head to Roof
KDA - Knee to Dash Angle
KDL- Left Knee to Dash
KDR - Right Knee to Dash
NA - Nose to Rim Angle
NR - Nose to Rim
PA - Pelvic Angle
RA - Rim to Abdomen
SA - Seat Back Angle
SCA - Steering Column Angle
SH - Striker to H-Point
SK - Striker to Knee
ST - Striker to Head
SWA- Steering Wheel Angle
TA - Tibial Angle
WA - Windshield Angle



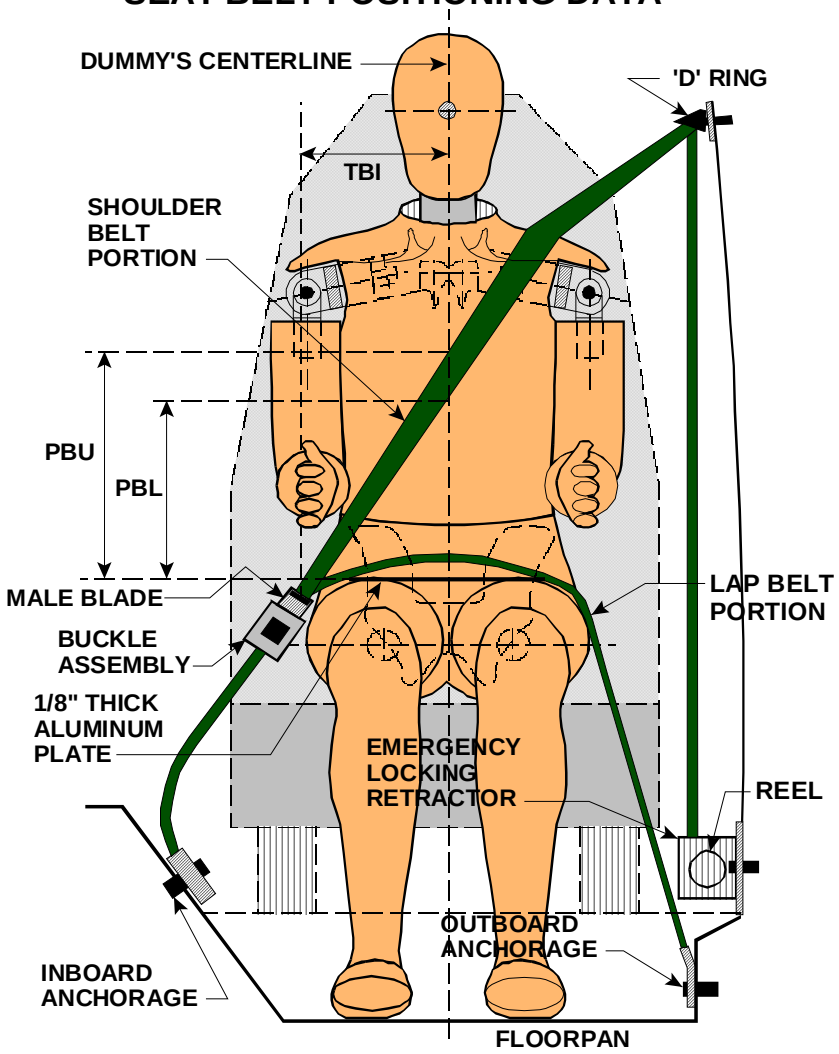
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #150)			PASS. (Serial #245)		
WA^O	27.5 deg.			N/A		
SWA^O	66.5 deg.			N/A		
SCA^O	23.5 deg.			N/A		
SA^O	19 deg.			19 deg.		
HZ	187			193		
HH	358			364		
HW	685			689		
HR	221			237		
NR	376	Angle	12 deg.	N/A		
CD	530			568		
CS	293			N/A		
RA	178			N/A		
KDL	168	Angle (KDA)	28 deg.	158		
KDR	168			182	Angle (KDA)	25 deg.
PA^O	23.5 deg.			24.0 deg.		
TA^O	43.1 deg.			43.4 deg.		
KK	353			285		
AA	354			243		
ST	430	Angle	11 deg.	409	Angle	11 deg.
SK	611	Angle	97 deg.	609	Angle	101 deg.
SH	298	Angle	134 deg.	305	Angle	135 deg.
SHY	212			214		
HS	342			356		
HD	140			140		
AD	107			116		

Dimensions in millimeters

DATA SHEET NO. 6 SEAT BELT POSITIONING DATA

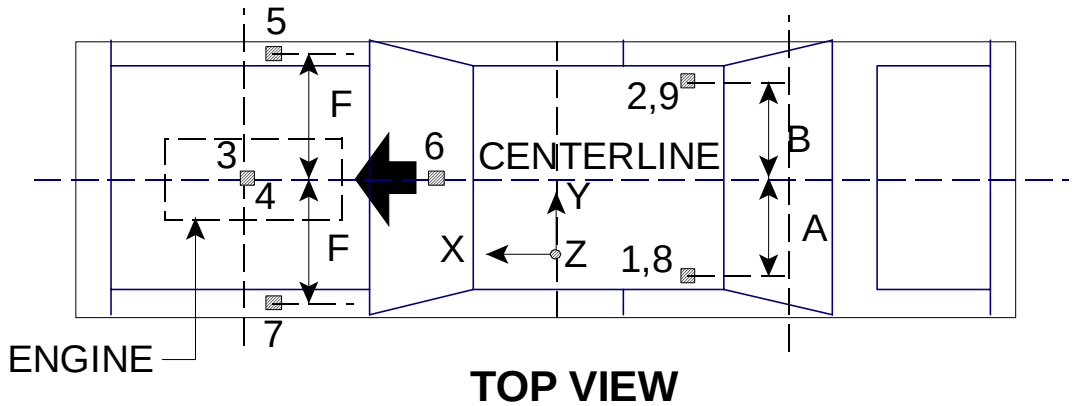
SEAT BELT POSITIONING DATA



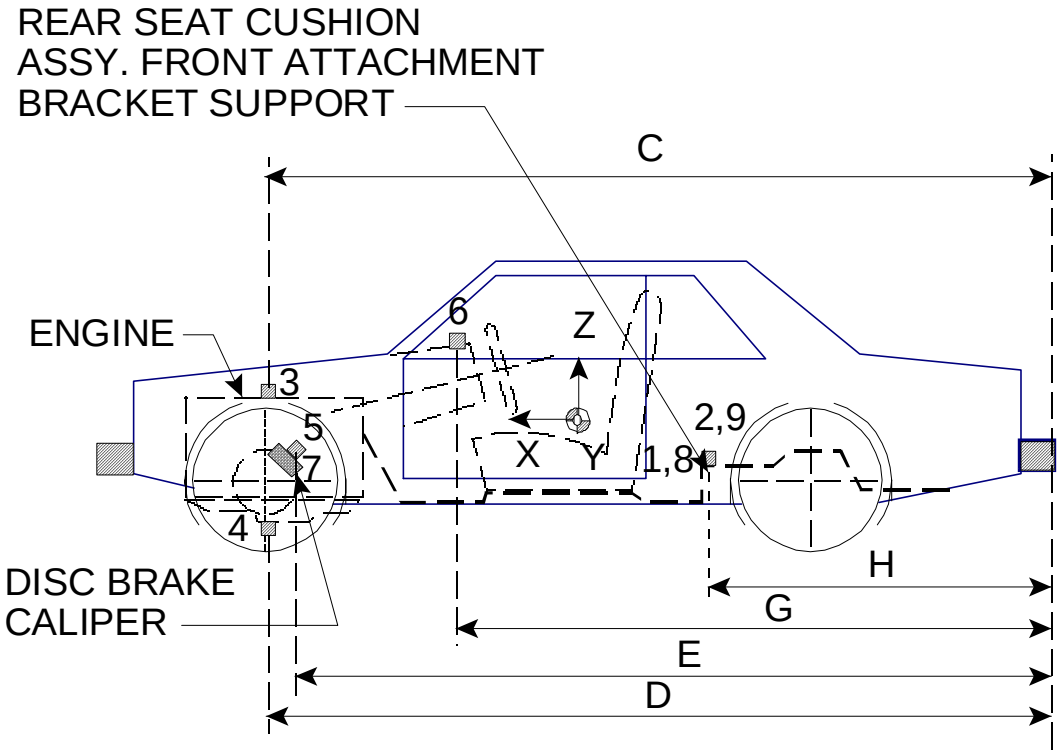
FRONT VIEW OF DUMMY

	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	345	342
PBL-- Top surface of alum. plate to belt lower edge	263	259
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



TOP VIEW



LEFT SIDE VIEW

Note: Vehicle accelerometer location and data summary shown in DATA SHEET NO. 7

DATA SHEET NO. 7 VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY (cont.)

DIMENSION	PRE-TEST LENGTH (mm)
A Left Rear Seat Crossmember Y	714
B Right Rear Seat Crossmember Y	714
C Top of Engine X	3731
D Bottom of Engine X	3586
E Disc Brake Calipers X	3686
F Disc Brake Calipers Y	630
G Instrument Panel X	2900
H Rear Seat Crossmembers X	1911

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Rear Seat X-Member @ Left Side	*	-	*	-
2	Rear Seat X-Member @ Right Side	2.4	131.5	-42.1	46.5
3	Top of Engine Block	58.5	39.3	-154.6	28.0
4	Bottom of Engine	0.1	-6.7	**	-
5	Disc Brake Caliper @ Right Side	25.7	35.9	-76.7	27.4
6	Instrument Panel	19.2	70.5	-91.4	61.9
7	Disc Brake Caliper @Left Side	17.2	66.2	-84.6	29.0
8	Rear Seat X-Member @ Left-Redundant	1.7	133.6	-42.7	34.2
9	Rear Seat X-Member @ Right-Redundant	2.6	131.5	-42.7	46.6

* Transducer failed.
** Transducer cable was cut at approximately 38 ms.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

Vehicle Year/Make/Model/Body Style: 2001 Volvo S60 4-Door Sedan

NHTSA Test No.: V15900 Test Date: September 10, 2001

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	**Unit**	**Pos**	**msec**	**Neg**	**msec**	**Pos**	**msec**	**Neg**	**msec**
Head X	**g**	22.3	170.5	-50.3	73.0	12.4	240.3	-52.3	72.4
Head Y	**g**	6.8	169.5	-7.6	71.9	11.8	50.3	-5.2	137.9
Head Z	**g**	25.7	50.3	-13.3	93.9	20.5	57.2	-13.7	90.4
Head Resultant	**g**	51.9	73.0	-	-	52.3	72.4	-	-
Redundant Head X	**g**	22.6	170.5	-50.7	74.0	12.4	240.1	-52.3	72.0
Redundant Head Y	**g**	6.5	169.6	-7.7	81.9	11.7	50.0	-5.1	138.0
Redundant Head Z	**g**	25.9	49.9	-13.2	93.1	20.6	56.7	-13.0	90.0
Redundant Head Resultant	**g**	52.1	73.1	-	-	52.3	72.0	-	-
Upper Neck Fx	**N**	857.3	61.0	-326.2	116.0	611.3	78.1	-367.4	142.1
Upper Neck Fy	**N**	120.9	64.2	-123.4	121.0	89.4	87.1	-215.8	137.4
Upper Neck Fz	**N**	1379.3	53.0	-476.9	94.9	1612.2	56.4	-383.9	282.4
Upper Neck F Resultant	**N**	1381.7	53.0	-	-	1617.5	56.4	-	-
Upper Neck Mx	**N-m**	8.0	234.7	-13.5	59.6	17.8	95.0	-16.1	130.4
Upper Neck My	**N-m**	89.8	60.6	-27.2	110.5	31.5	148.1	-17.9	242.5
Upper Neck Mz	**N-m**	8.9	89.0	-9.8	147.4	15.4	98.2	-6.9	160.2
Upper Neck M Resultant	**N-m**	91.0	60.6	-	-	33.7	147.9	-	-
Chest X	**g**	7.6	172.1	-53.4	60.6	3.0	287.6	-50.4	67.3
Chest Y	**g**	4.4	92.3	-5.7	54.1	3.4	47.2	-8.6	62.9
Chest Z	**g**	8.8	44.4	-10.9	98.7	11.9	56.1	-8.0	100.2
Chest Resultant	**g**	53.4	60.6	-	-	51.0	67.2	-	-
Redundant Chest X	**g**	7.5	172.2	-53.1	60.7	2.8	287.4	-51.0	67.4
Redundant Chest Y	**g**	4.5	92.1	-5.6	52.8	4.0	47.3	-8.8	62.9
Redundant Chest Z	**g**	9.0	43.7	-10.9	98.6	11.8	55.8	-8.2	100.3
Redundant Chest Resultant	**g**	53.1	60.7	-	-	51.6	67.3	-	-
Chest Displacement	**mm**	0.0	7.4	-42.4	64.6	0.0	12.2	-38.7	59.2

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)

Vehicle Year/Make/Model/Body Style: 2001 Volvo S60 4-Door Sedan

NHTSA Test No.: V15900 Test Date: September 10, 2001

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	**Unit**	**Pos**	**msec**	**Neg**	**msec**	**Pos**	**msec**	**Neg**	**msec**
Pelvic X	**g**	10.4	86.8	-68.6	57.3	8.2	88.1	-70.2	52.6
Pelvic Y	**g**	13.6	77.2	-11.9	43.2	3.9	45.7	-9.7	68.7
Pelvic Z	**g**	3.6	43.0	-33.3	66.6	2.5	278.3	-31.2	64.5
Pelvic Resultant	**g**	74.8	62.7	-	-	72.1	52.6	-	-
Left Femur	**N**	494.8	43.1	-3604.5	60.0	611.7	46.3	-2241.3	52.4
Right Femur	**N**	517.2	32.1	-3056.0	62.9	728.3	46.6	-3128.9	60.2
Left Upper Tibia Mx	**N-m**	8.2	299.9	-66.7	54.6	59.1	49.4	-15.6	139.9
Left Upper Tibia My	**N-m**	33.3	236.8	-130.7	64.4	20.3	105.2	-132.9	51.3
Left Lower Tibia Fz	**N**	221.8	159.1	-1881.2	72.2	215.8	116.4	-3395.1	50.6
Left Lower Tibia Mx	**N-m**	77.4	51.0	-4.9	34.3	73.5	57.4	-27.5	47.0
Left Lower Tibia My	**N-m**	164.3	70.1	-5.6	26.3	41.8	79.9	-24.1	38.7
Right Upper Tibia Mx	**N-m**	39.6	42.1	-42.8	41.0	25.1	35.6	-35.9	60.2
Right Upper Tibia My	**N-m**	35.5	95.5	-223.9	43.1	28.7	141.9	-138.5	56.1
Right Lower Tibia Fz	**N**	198.3	128.1	-4973.7	43.0	447.8	140.7	-2522.3	50.6
Right Lower Tibia Mx	**N-m**	106.5	47.0	-29.2	39.5	9.9	30.3	-58.6	54.0
Right Lower Tibia My	**N-m**	162.8	56.8	-71.8	41.9	50.9	77.9	-46.4	31.7
Left Foot Aft Ax	**g**	16.2	64.6	-32.4	26.7	16.2	71.4	-69.0	37.8
Left Foot Aft Az	**g**	13.8	64.3	-44.3	47.3	18.7	66.3	-72.4	46.2
Left Foot Fore Az	**g**	49.3	63.2	-55.4	25.1	21.5	64.5	-88.5	46.4
Right Foot Aft Ax	**g**	31.9	48.6	-265.9	41.4	17.2	41.1	-73.4	29.9
Right Foot Aft Az	**g**	23.3	61.4	-268.3	40.1	3.3	16.9	-65.0	49.7
Right Foot Fore Az	**g**	54.7	42.1	-646.7	40.0	42.1	41.0	-102.7	30.1

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)

Vehicle Year/Make/Model/Body Style: 2001 Volvo S60 4-Door Sedan

NHTSA Test No.: V15900 Test Date: September 10, 2001

	HEAD INJURY CRITERIA (HIC)			
	HIC**	t_1 (msec)	t_2 (msec)	Average Acceleration t_1 to t_2
Position #1 - Driver	502.4	48.7	84.7	45.5
Position #2 - Passenger	399.4	53.3	89.3	41.5

** HIC is as defined in FMVSS 208. The maximum time interval from t_1 to t_2 is 36 milliseconds.

	CLIP SUMMARY*			
	CLIP (g's)	t_1 (msec)	t_2 (msec)	CSI
Position #1 - Driver	52.1	59.5	62.5	554.0
Position #2 - Passenger	47.3	65.8	68.8	465.6

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)
REDUNDANT DATA

Vehicle Year/Make/Model/Body Style: 2001 Volvo S60 4-Door Sedan

NHTSA Test No.: V15900 Test Date: September 10, 2001

	HEAD INJURY CRITERIA (HIC) **REDUNDANT**			
	HIC**	t_1 (msec)	t_2 (msec)	Average Acceleration t_1 to t_2
Position #1 - Driver	509.7	48.7	84.7	45.8
Position #2 - Passenger	390.5	52.9	88.9	41.1

** HIC is as defined in FMVSS 208. The maximum time interval from t_1 to t_2 is 36 milliseconds.

	CLIP SUMMARY* **REDUNDANT**			
	CLIP (g's)	t_1 (msec)	t_2 (msec)	CSI
Position #1 - Driver	51.8	59.5	62.5	547.0
Position #2 - Passenger	48.1	65.9	68.9	484.1

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

DATA SHEET NO. 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	1508	1520
Shoulder belt length as measured on Part 572 Dummy.	874	885
Lap belt length as measured on Part 572 Dummy.	634	635
SHOULDER BELT SPOOL-OFF DATA:		
As determined by film analysis.	Spool-on: 102 mm Spool-off: 222 mm	Spool-on: 64 mm Spool-off: 229 mm
As determined mechanically.	*	*
As determined electronically.	*	*
BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	*	*m
Measured mechanically.	2 mm/m	0 mm/m

Dimensions in millimeters

* At the vehicle manufacturer's request, restraint instrumentation was not installed to prevent potential interference with the vehicles pretensioning and load limiting seat belt systems

DATA SHEET NO.10 SUMMARY OF FMVSS 212 DATA

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with a 20 mm molding.

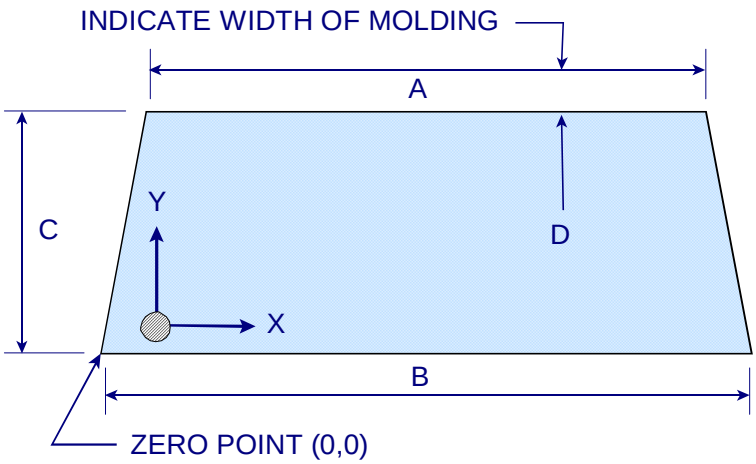
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants,

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		
	PRE-TEST (mm)	POST-TEST (mm)	% OF RETENTION
RIGHT SIDE	2209	2209	100.0%
LEFT SIDE	2209	2209	100.0%
TOTAL	4418	4418	100.0%

AREA OF RETENTION FAILURE:



FRONT VIEW OF WINDSHIELD

DIMENSIONS (mm)	
A	1228
B	1570
C	810
D	20

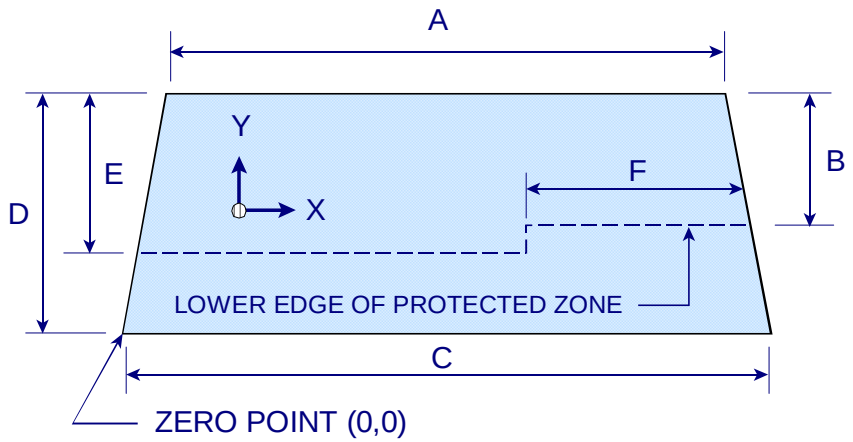
FAILURE DETAILS: None

DATA SHEET NO. 11 FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 165 mm diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. The locus of points is drawn on the inner surface of the windshield contacted by the sphere across the width of the instrument panel. From the outermost contactable points extend the locus line horizontally to the edges of the windshield, then draw a line on the inner surface of the windshield below and 13 mm distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection of this line onto the outer surface of the windshield.

FMVSS 219 TEST DATA:



DIMENSIONS (mm)	
A	1228
B	498
C	1570
D	810
E	552
F	560

FRONT VIEW OF WINDSHIELD

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

(Show location of penetration on the above sketch)

	COORDINATES	
	X	Y
1.	-	-
2.	-	-
3.	-	-
4.	-	-

DATA SHEET NO. 12 FMVSS NO. 301-75 "FUEL SYSTEM INTEGRITY" POST IMPACT TEST DATA

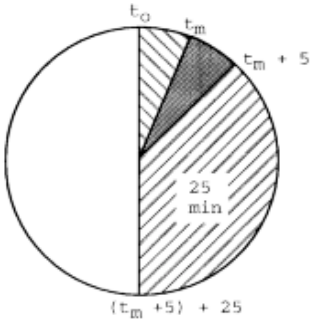
NHTSA TEST No.:	V15900	TEST DATE:	September 10, 2001
VEHICLE MAKE/MODEL:	2001 Volvo S60 4-Door Sedan		

The test vehicle was filled from 92% to 94% of the manufacture's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

= =

TEST VEHICLE IMPACT TYPE:	X	Frontal (56 kph)
		Oblique (48 kph) with _____ deg. barrier face first contacting _____
	-	(driver/passenger) side
	-	Rear Moving Barrier (48 kph)
	-	Lateral Moving Barrier (32 kph)

FUEL SPILLAGE MEASUREMENT:

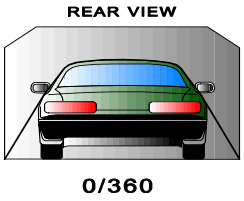


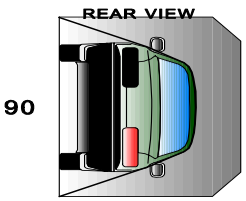
	ACTUAL	MAX ALLOWED
1. From impact until vehicle motion ceases	0	28 g
2. For 5 minute period after vehicle motion ceases	0	141 g
3. For next 25 minutes	0	28 g/min.

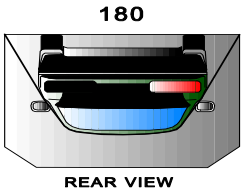
SOLVENT SPILLAGE DETAILS: None

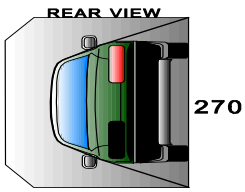
DATA SHEET NO. 13 - ROLLOVER DATA

Vehicle: 2001 Volvo S60 4-Door Sedan NHTSA No.: V15900









I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Stage	Rotation Time (spec. 1 -3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
0º - 90º	1	minutes	17	seconds	5	minutes	6	minutes	17	seconds	7	minutes
90º - 180º	1	minutes	7	seconds	5	minutes	6	minutes	7	seconds	7	minutes
180º-270º	1	minutes	2	seconds	5	minutes	6	minutes	2	seconds	7	minutes
270º-360º	1	minutes	12	seconds	5	minutes	6	minutes	12	seconds	7	minutes

II. FMVSS 301 REQUIREMENTS: (Maximum allowable solvent spillage):

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)
142 g	28 g	28 g	28 g

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

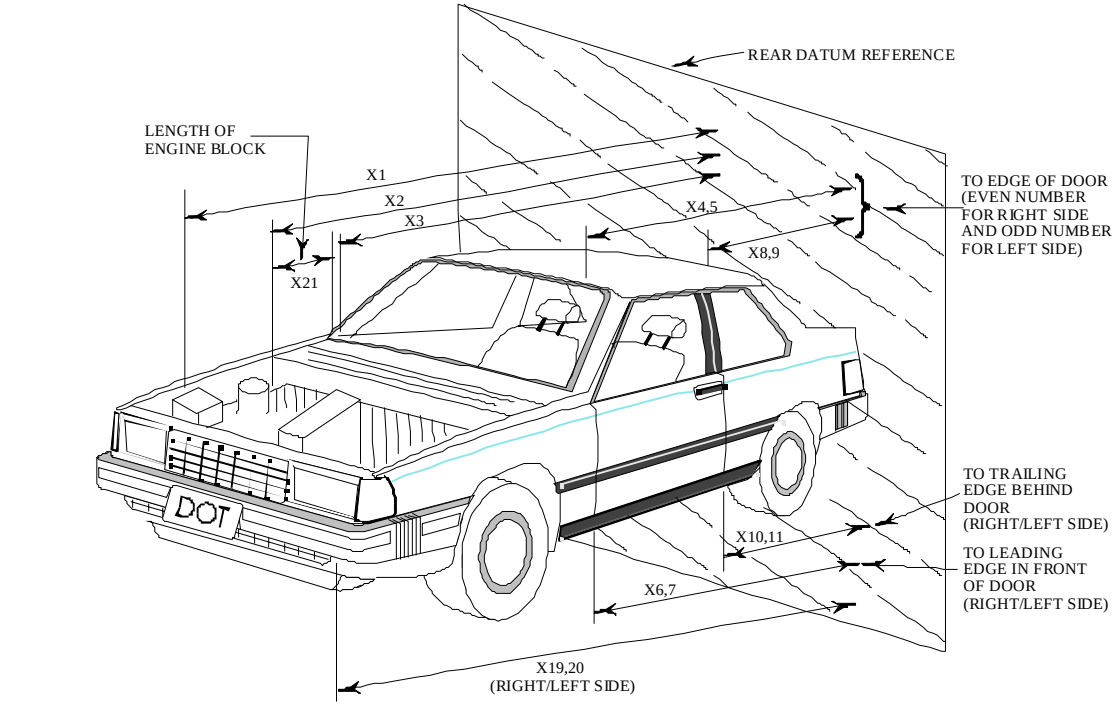
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0º - 90º	0	0	0	N/A
90º - 180º	0	0	0	N/A
180º-270º	0	0	0	N/A
270º-360º	0	0	0	N/A

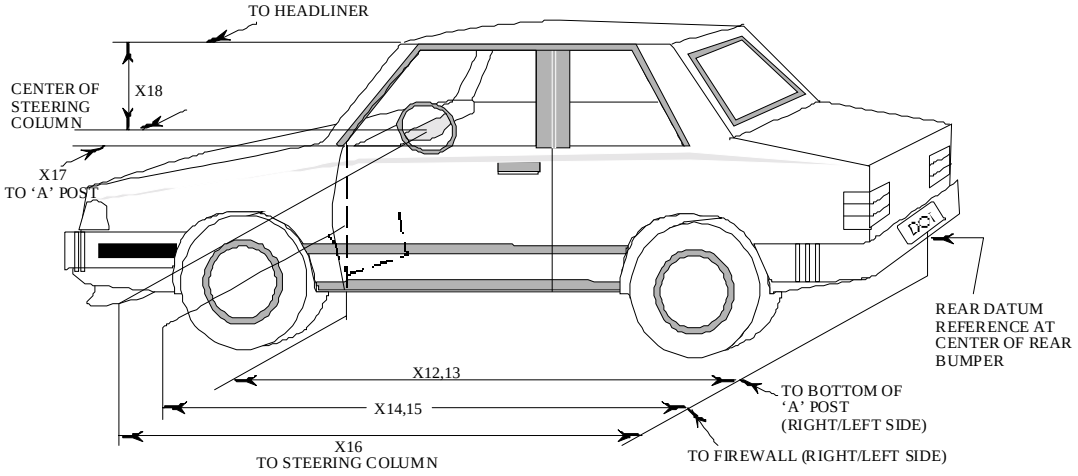
Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

Rollover Stage	Spillage Location
0º - 90º	None
90º - 180º	None
180º-270º	None
270º-360º	None

DATA SHEET NO. 14 TEST VEHICLE MEASUREMENTS





DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

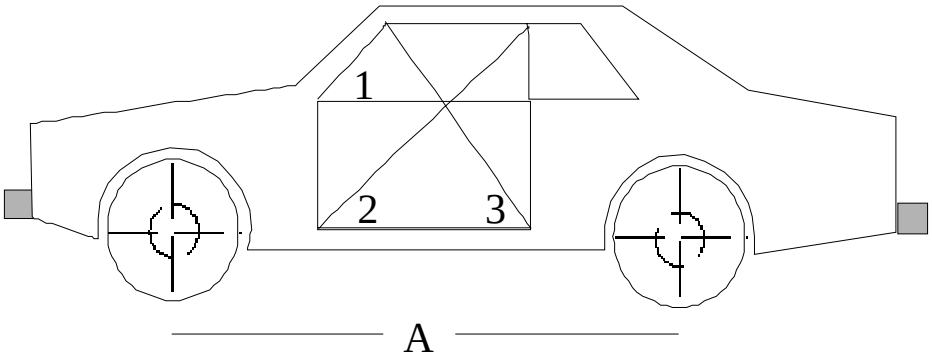
No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4581	4049	532
X2	Rear Surface of Vehicle to Front of Engine	4146	3906	240
X3	Rear Surface of Vehicle to Firewall	3499	3400	99
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3117	3109	8
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3121	3116	5
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3150	3136	14
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3153	3145	8
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2056	2044	12
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2057	2055	2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2099	2078	21
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2100	2092	8
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3301	3287	14
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3306	3296	10
X14	Rear Surface of Vehicle to Firewall, Right Side	3549	3451	98
X15	Rear Surface of Vehicle to Firewall, Left Side	3544	3453	91
X16	Rear Surface of Vehicle to Steering Column	2676	2677	-1
X17	Center of Steering Column to "A" Post	297	285	12
X18	Center of Steering Column to Headliner	431	458	-27
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4497	4046	451
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4497	4078	419
X21	Length of Engine Block	464	464	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2863	2841	22
CD	Rear Surface of Vehicle to Center of Dash Panel	2911	2897	14
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2862	2850	12

All Dimensions in mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

VEHICLE INTRUSION MEASUREMENTS

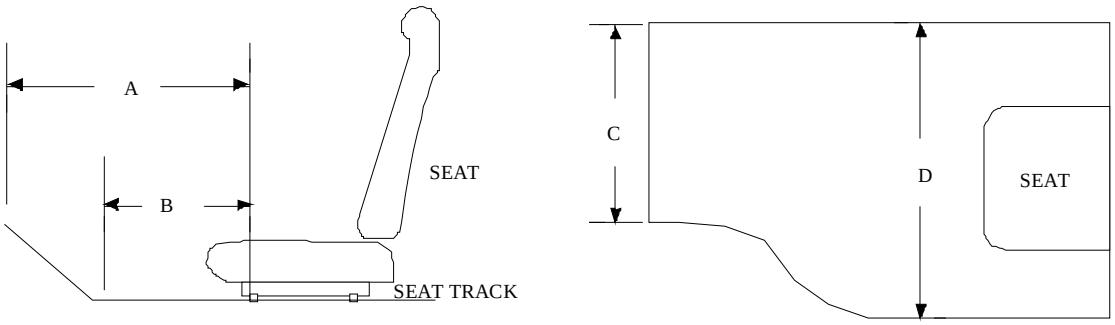
DOOR OPENING WIDTH



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	987	1480	939	989	1485	940
AFTER TEST	985	1482	939	977	1480	952
DIFFERENCE	2	-2	0	12	5	-12

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2714	2719
AFTER TEST	2643	2626
DIFFERENCE	71	93

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
VEHICLE INTRUSION MEASUREMENTS
STATIC FOOTWELL DEFORMATION



DRIVER

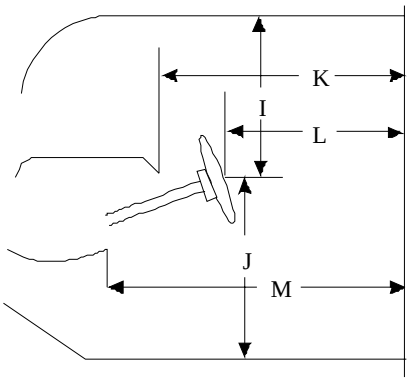
Measurement	Pre-Test	Post-Test	Difference
A	768	652	116
B	542	528	14
C	425	452	-27
D	429	437	-8

PASSENGER

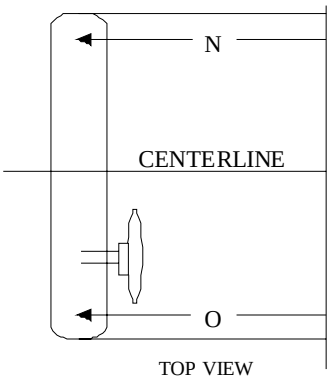
Measurement	Pre-Test	Post-Test	Difference
A	740	651	89
B	546	541	5
C	398	397	1
D	484	480	4

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
VEHICLE INTRUSION MEASUREMENTS
STATIC PASSENGER COMPARTMENT INTRUSION

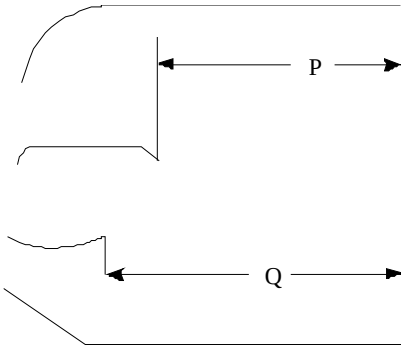


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



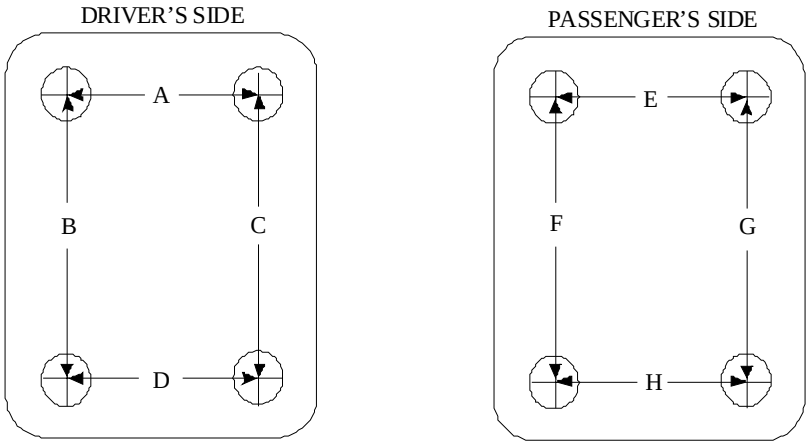
PASSENGER'S SIDE

Measurement	Pre-Test	Post-Test	Difference
I	431	458	-27
J	633	628	5
K	1926	1911	15
L	1704	1706	-2
M	1998	1974	24
N	1891	1875	16
O	1889	1879	10
P = K (PASS.)	2002	1955	47
Q = M (PASS.)	1958	1941	17

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

FLOORBOARD DEFORMATION



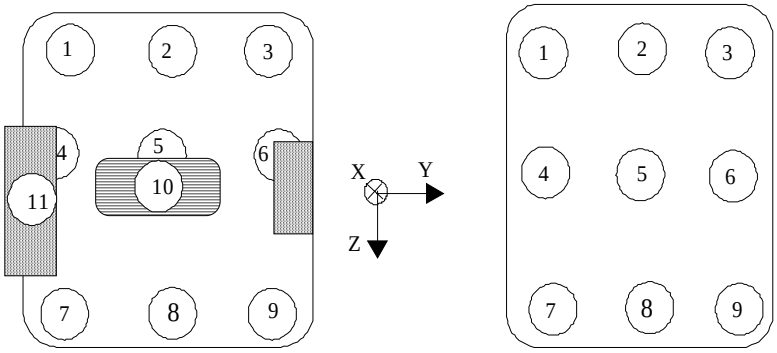
TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	400	398	2
B	400	400	0
C	400	400	0
D	400	398	2
E	400	400	0
F	400	400	0
G	400	400	0
H	400	400	0

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)
TOE-PAN INTRUSION

DRIVER'S SIDE PASSENGER'S SIDE



Driver Side Toe-pan Measurements

Toe-pan Location	X Deformation (mm)			Z Deformation (mm)		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3336	3268	68	-477	-497	20
2	3419	3297	122	-452	-483	31
3	3400	3258	142	-476	-489	13
4	3297	3248	49	-347	-355	8
5	3329	3251	78	-331	-348	17
6	3333	3247	86	-325	-339	14
7	3191	3177	14	-234	-226	-8
8	3193	3173	20	-233	-224	-9
9	3193	3154	39	-233	-213	-20
10	3213	3111	102	-411	-430	19
11	3227	3182	45	-360	-351	-9

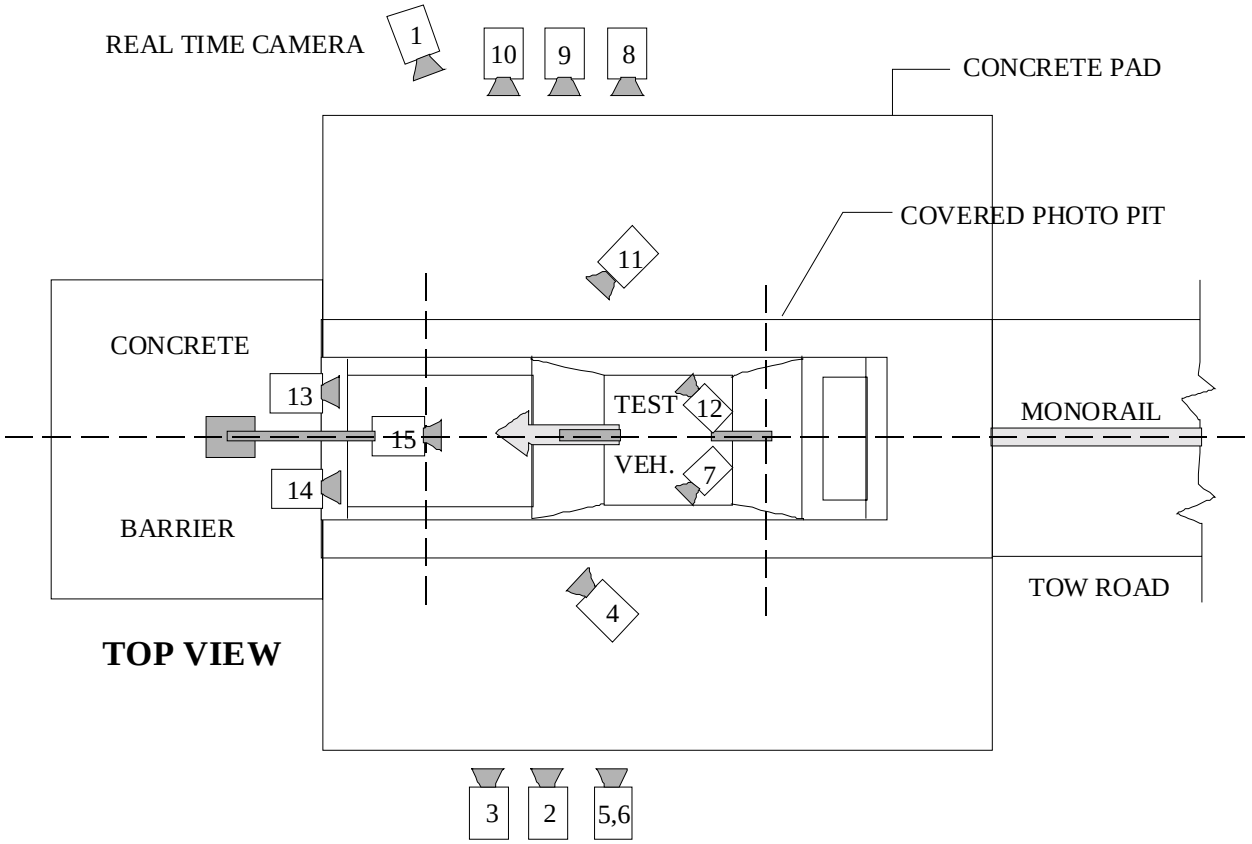
Passenger Side Toe-pan Measurements

Toe-pan Location	X Deformation (mm)			Z Deformation (mm)		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3383	3352	31	-460	-469	9
2	3389	3305	84	-464	-465	1
3	3312	3275	37	-477	-476	-1
4	3285	3272	13	-361	-358	-3
5	3293	3259	34	-356	-367	11
6	3278	3244	34	-365	-371	6
7	3196	3172	24	-244	-223	-21
8	3195	3196	-1	-241	-230	-11
9	3186	3192	-6	-240	-213	-27

Reference: SAE: X = Rear Bumper (Positive: forward); Z = Ground (Positive: down)

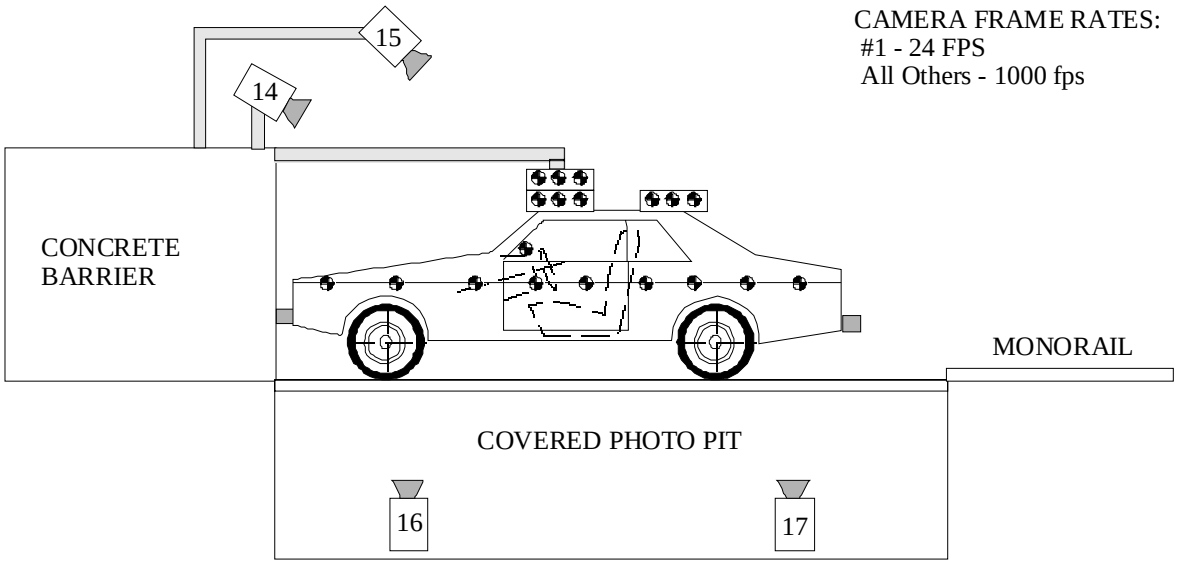
DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS

NOTE: Camera information shown in DATA SHEET NO. 15.



TOP VIEW

CAMERA FRAME RATES:
#1 - 24 FPS
All Others - 1000 fps



LEFT SIDE VIEW

DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS (cont.)

NHTSA Test No.: V15900 Vehicle: 2001 Volvo S60 4-Door Sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)* X	Y	Z	ANGLE (deg)**	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	6526	1508	1055	-3.0	6208	12.5	1000
3	Left Side View	8080	905	1085	-3.5	7762	25	1000
4	Driver and Interior View	7235	2993	1955	-10.1	-	25	1050
5	Steering Column (Bottom)	7395	1744	1158	-3.5	7077	25	1000
6	Steering Column (Top)	7395	1744	1785	-9.0	7077	25	1005
7	Left Belt	-	-	-	-	-	13	955
8	Overall Right Side	6536	1884	1052	-3.0	6823	12.5	1005
9	Right Side View	7965	1360	1072	-3.5	8252	25	1000
10	Right Passenger View	8085	1815	1358	-2.5	8372	35	1000
11	Passenger and Interior View	7450	2748	1970	-10.0	-	25	1000
12	Right Belt	-	-	-	-	-	13	1000
13	Passenger Front View	620	-92	1987	-38.0	-	13	1005
14	Driver Front View	620	-92	1987	-39.1	-	13	1000
15	Windshield View	0	-530	3374	-55.0	-	13	1000
16	Pit View of Engine	0	615	-3048	90.0	-	13	1000
17	Pit View of Fuel Tank	0	2820	-3048	90.0	-	13	1030

*X = film plane to monorail centerline ** = referenced to horizontal plane

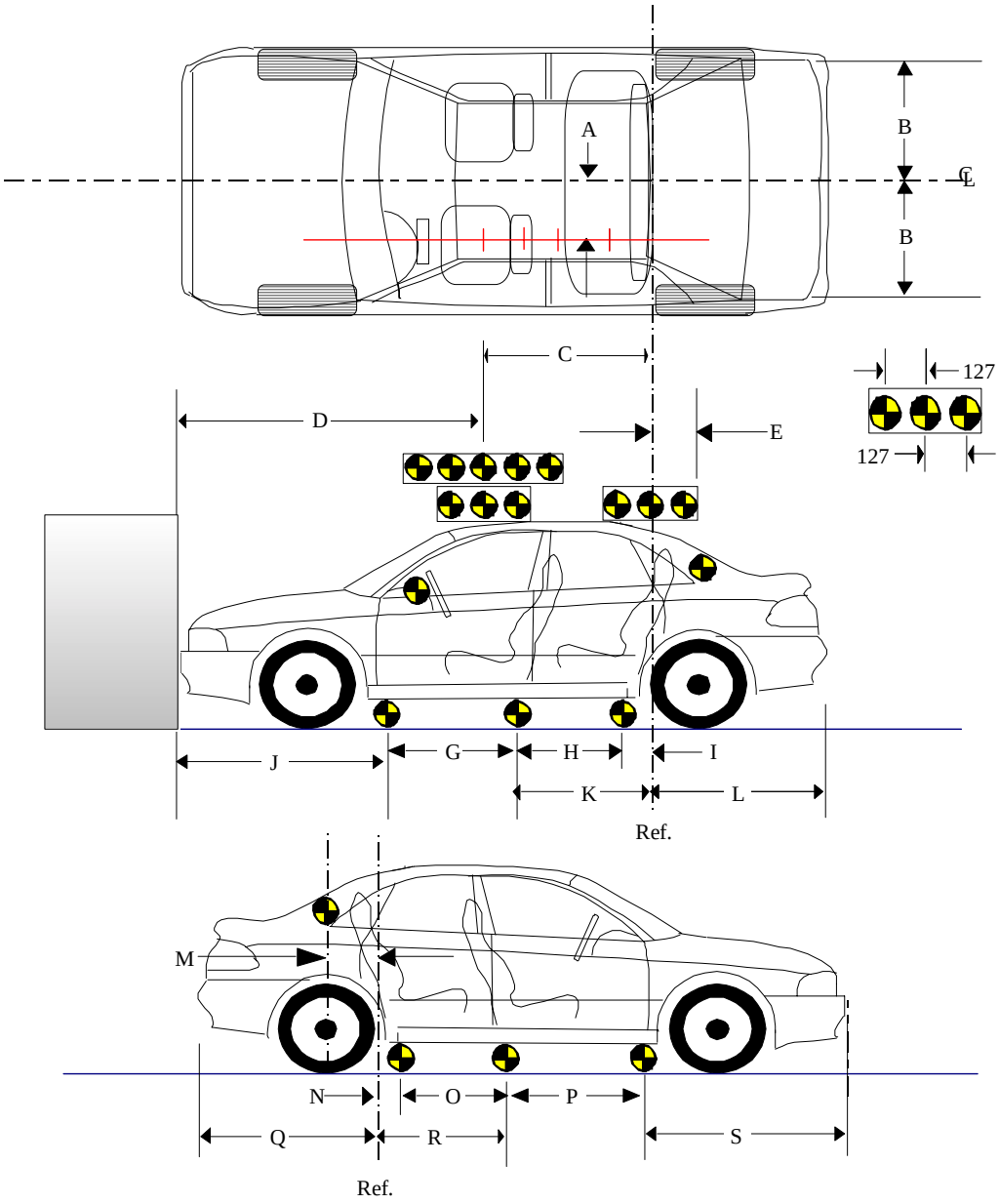
Y = film plane to impact location N.T. indicates No Timing

Z = film plane to ground

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

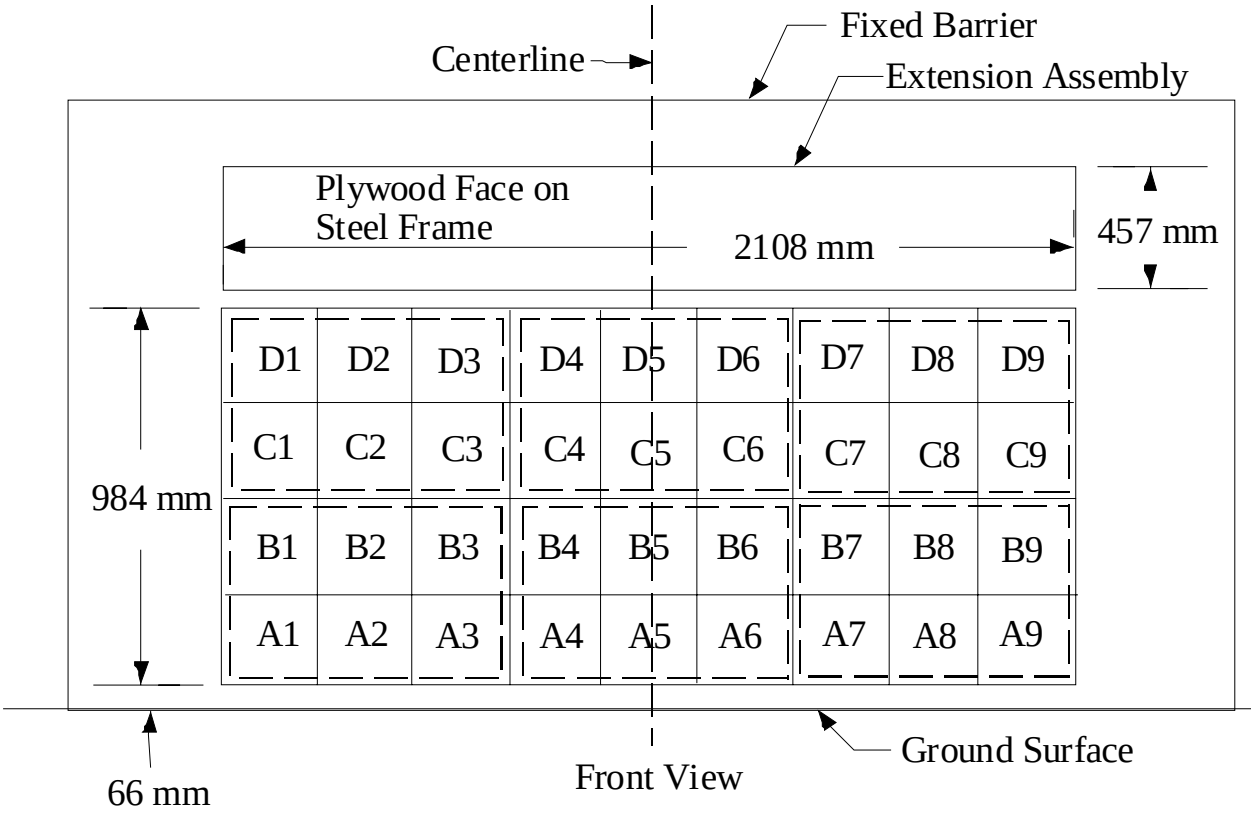
(Dimensions in millimeters)

A	363
B	605
C	1221
D	2087
E	300
F	1603
G	905
H	896
I	153
J	1336
K	1049
L	1291
M	303
N	156
O	895
P	963
Q	1285
R	1051
S	1282



DATA SHEET NO. 17 LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells
4 Rows
9 Columns
6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

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

The following data is presented in Appendix B:

(1)Data from 36 individual load cells
(2)Total or Sum of 36 individual load cells
(3)Data from 6 Groupings shown above (6 cells/group)

DATA SHEET NO. 18 POST TEST AIR BAG DATA

NHTSA No.: V15900; Test Date: September 10, 2001; Technician: Lawrence Q. Valvo

Vehicle Model Year/Make/Model: 2001 Volvo S60 4-Door Sedan

A. No. of vent holes: 2 -Driver 2 -Passenger

B. Size of vent holes: (mm^2) 962 -Driver 2827 -Passenger

C. Total vent area: (mm^2) 1924 -Driver 5654 -Passenger

D. Deflated air bag length and width dimensions or, if round, diameter. (mm)

Driver: 660 -Height; 660 -Width; 340 -Depth

Passenger: 660 -Height; 430 -Width; 500 -Depth

E. Is the air bag tethered?

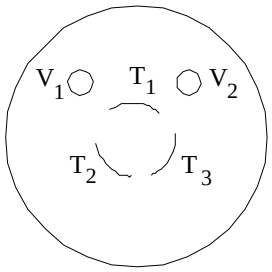
Driver: X -Yes; - -No; If yes, record length of tether- 310

Passenger: - -Yes; X -No; If yes, record length of tether- -

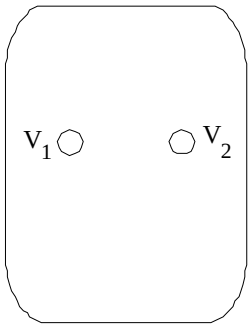
Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.

(Note: Not to scale; V_n = Vent hole$_n$, T_n = Tether$_n$).

Driver



Passenger



F. Record part numbers and manufacturer name of the air bag and gas generator.

Driver: Air bag: ALVA NO. 1200

Generator: Not available

Passenger: Air bag: Not available

Generator: Not available

DATA SHEET NO. 19 ACCIDENT INVESTIGATION DIVISION DATA

FOR 56.3 KPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Volvo S60 4-Door Sedan

NHTSA Test No.: V15900 VIN: YV1RS61R312081271

Model Year: 2001 Build Date: 06/01 Test Date: September 10, 2001

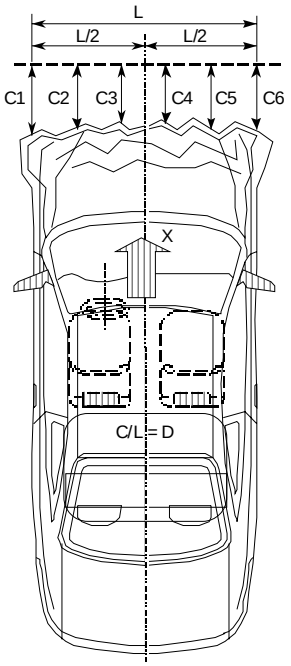
Vehicle Size Category: Test Weight: 1732.0 kg

Vehicle Wheelbase: 2716 mm; Front Overhang: 893 mm; Overall Width: 1800 mm

Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE	POST	DIFF	
C1 =	4429	4074	355	mm
C2 =	4543	4043	500	mm
C3 =	4578	4058	520	mm
C4 =	4578	4042	536	mm
C5 =	4538	4037	501	mm
C6 =	4427	4033	394	mm



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region: L1= 1474 mm

L2= 737 mm

L5= 295 mm

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Figure A-1: LOAD CELL LOCATIONS.

Figure A-2: PRE-TEST FRONT VIEW

Figure A-3: POST-TEST FRONT VIEW.

Figure A-4: PRE-TEST LEFT SIDE VIEW

Figure A-5: POST-TEST LEFT SIDE VIEW

Figure A-6: PRE-TEST RIGHT SIDE VIEW

Figure A-7: POST-TEST RIGHT SIDE VIEW

Figure A-8: PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

Figure A-9: POST-TEST RIGHT FRONT THREE-QUARTER VIEW

Figure A-10: PRE-TEST LEFT REAR THREE-QUARTER VIEW

Figure A-11: POST-TEST LEFT REAR THREE-QUARTER VIEW

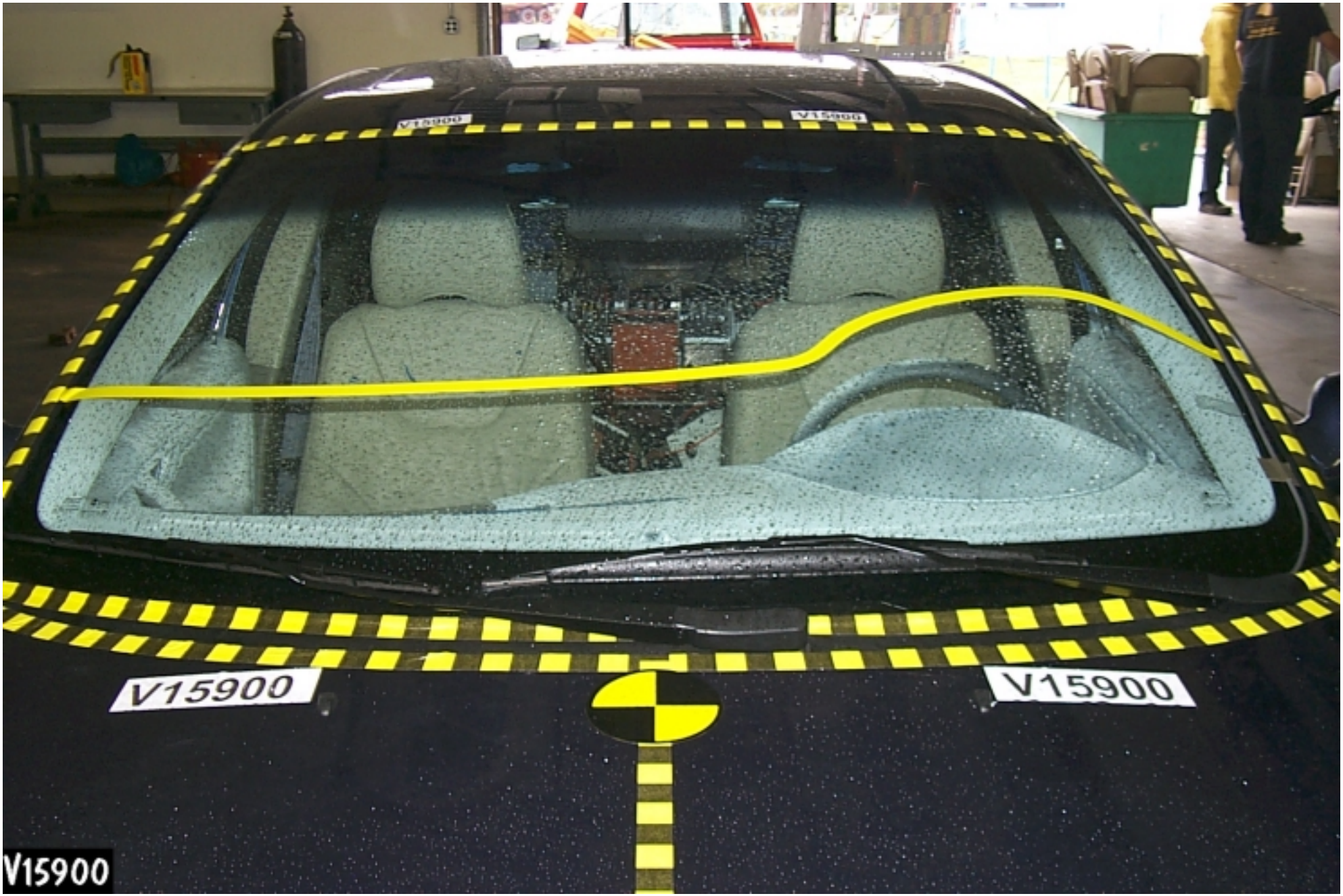


Figure A-12: PRE-TEST WINDSHIELD VIEW

Figure A-13: POST-TEST WINDSHIELD VIEW

Figure A-14: PRE-TEST ENGINE COMPARTMENT VIEW

Figure A-15: FUEL CAP VIEW

Figure A-16: PRE-TEST FRONT UNDERBODY VIEW

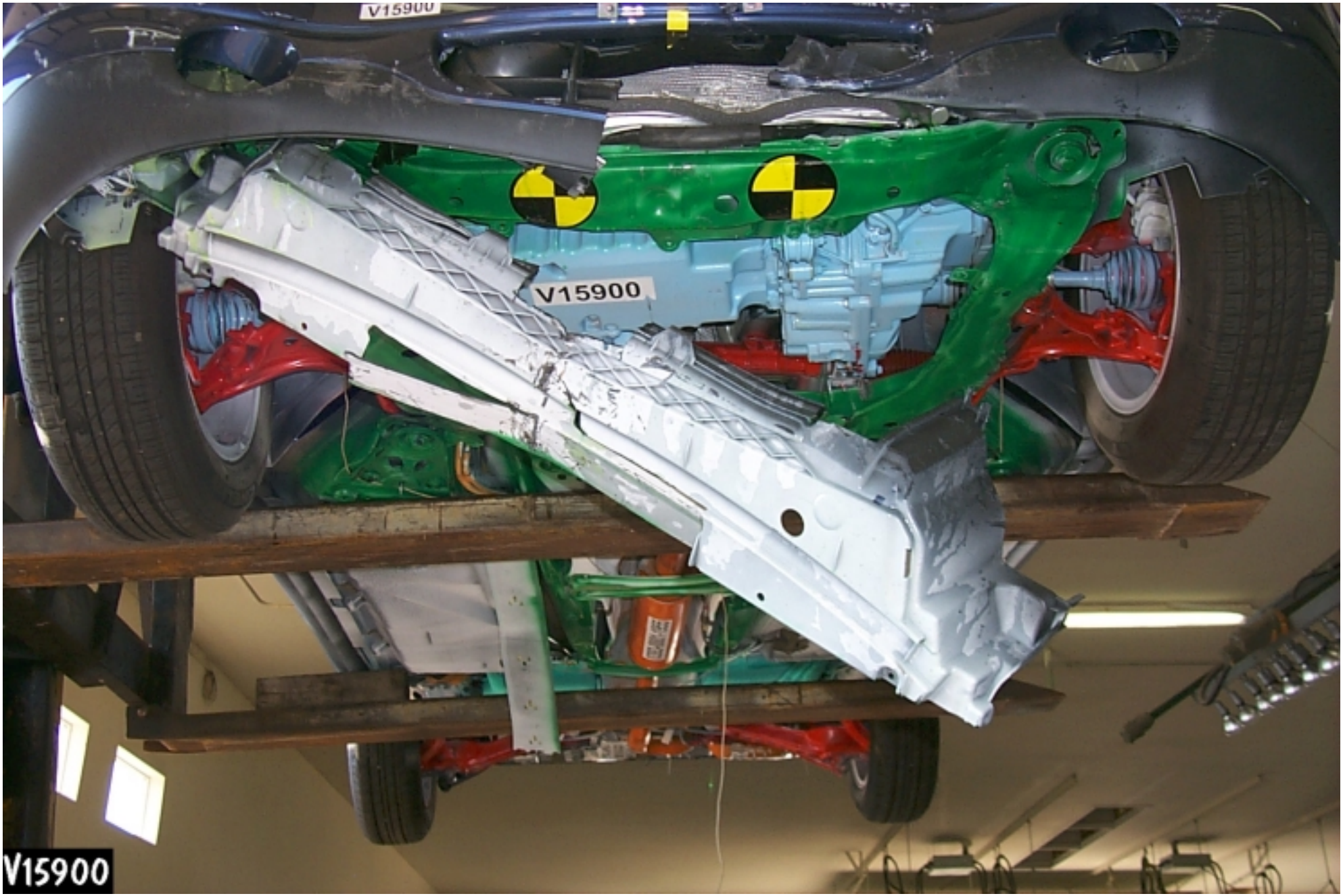


Figure A-17: POST-TEST FRONT UNDERBODY VIEW

Figure A-18: PRE-TEST FRONT SIDE UNDERBODY VIEW

Figure A-19: POST-TEST FRONT SIDE UNDERBODY VIEW

Figure A-20: PRE-TEST REAR UNDERBODY VIEW

Figure A-21: POST-TEST REAR UNDERBODY VIEW

Figure A-22: PRE-TEST DRIVER POSITION VIEW

Figure A-23: POST-TEST DRIVER POSITION VIEW

Figure A-24: PRE-TEST PASSENGER POSITION VIEW

Figure A-25: POST-TEST PASSENGER POSITION VIEW

Figure A-26: PRE-TEST DRIVER AND INTERIOR VIEW

Figure A-27: POST-TEST DRIVER AND INTERIOR VIEW

Figure A-28: PRE-TEST PASSENGER AND INTERIOR VIEW

Figure A-29: POST-TEST PASSENGER AND INTERIOR VIEW

Figure A-30: PRE-TEST DRIVER HEAD LOCATION

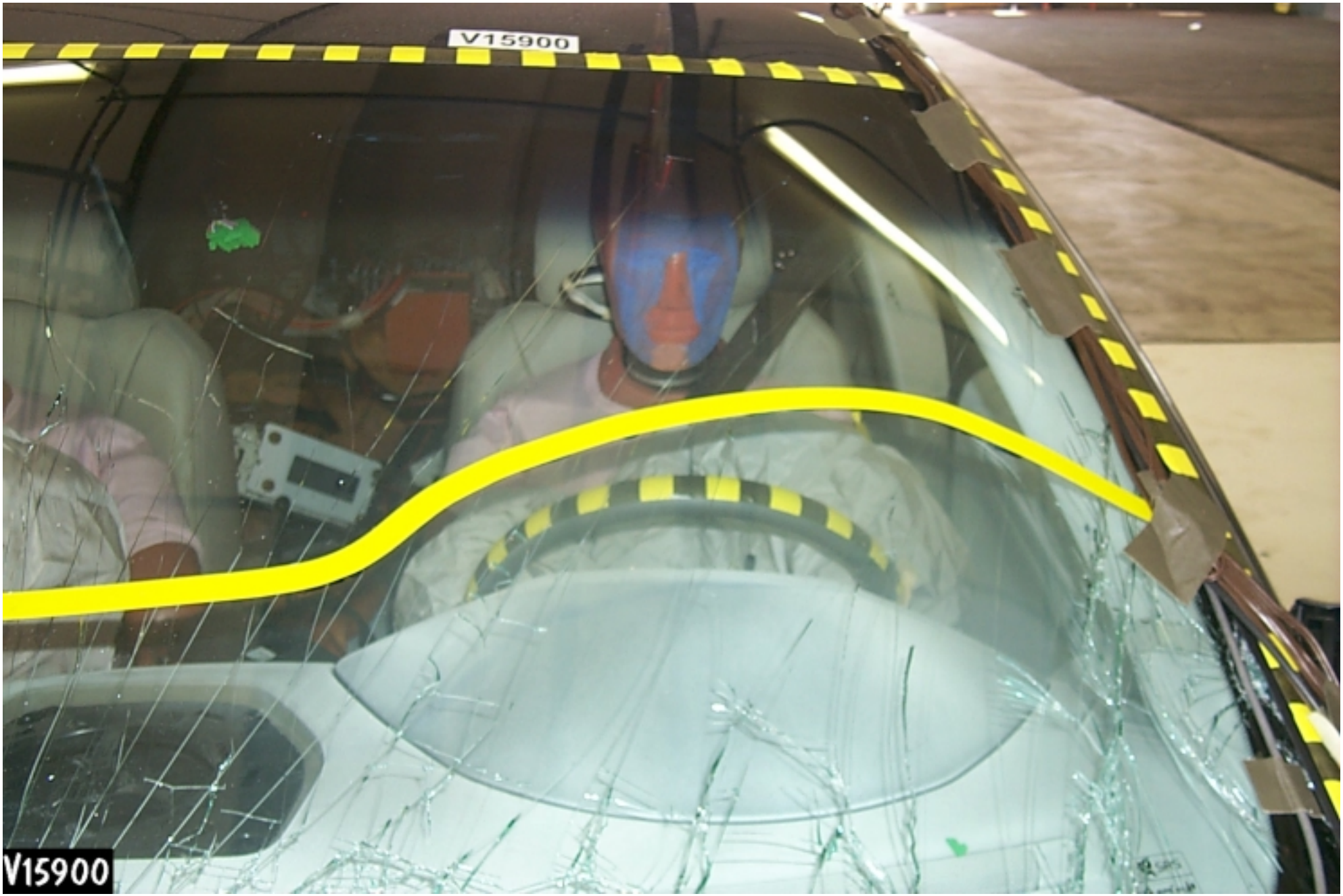


Figure A-31: POST-TEST DRIVER HEAD LOCATION

Figure A-32: PRE-TEST PASSENGER HEAD LOCATION

Figure A-33: POST-TEST PASSENGER HEAD LOCATION

Figure A-34: PRE-TEST DRIVER FLOOR PAN VIEW

Figure A-35: POST-TEST DRIVER FLOOR PAN VIEW

Figure A-36: PRE-TEST PASSENGER FLOOR PAN VIEW

Figure A-37: POST-TEST PASSENGER FLOOR PAN VIEW

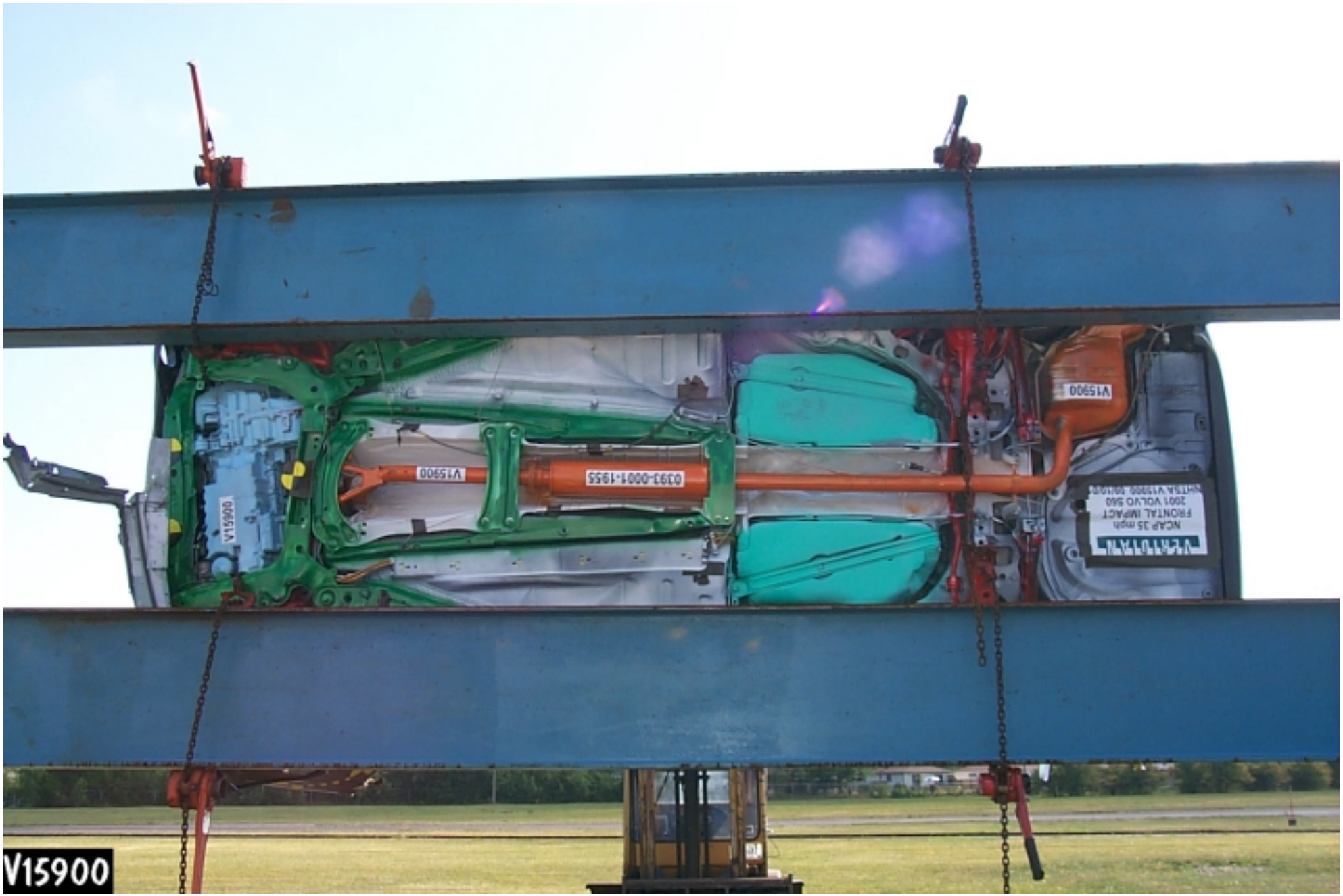


Figure A-38: ROLLOVER VIEW

Figure A-39: IMPACT VIEW

APPENDIX B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

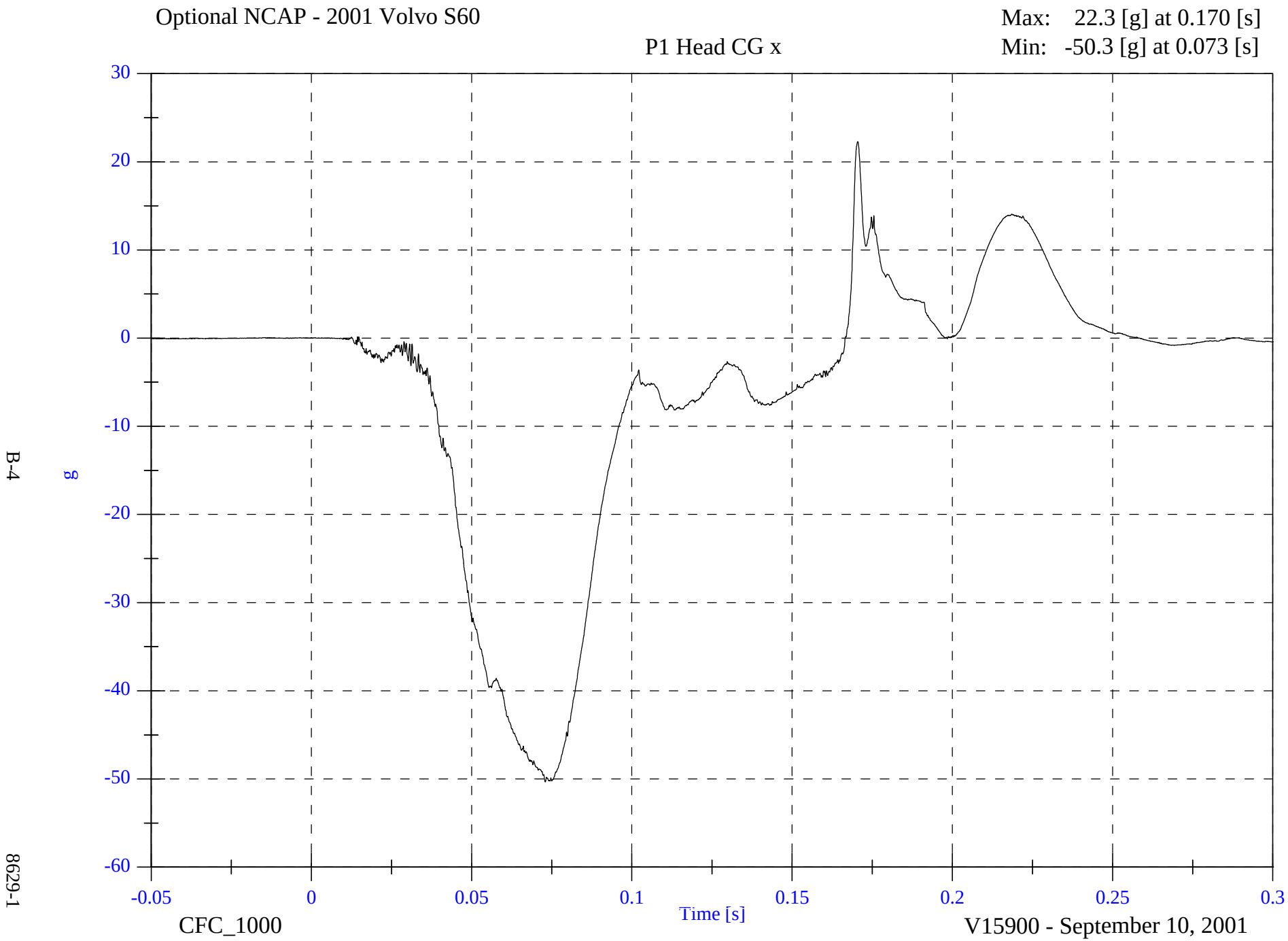
Hybrid III Dummy Sign Conventions
Load Cells and Special Transducers

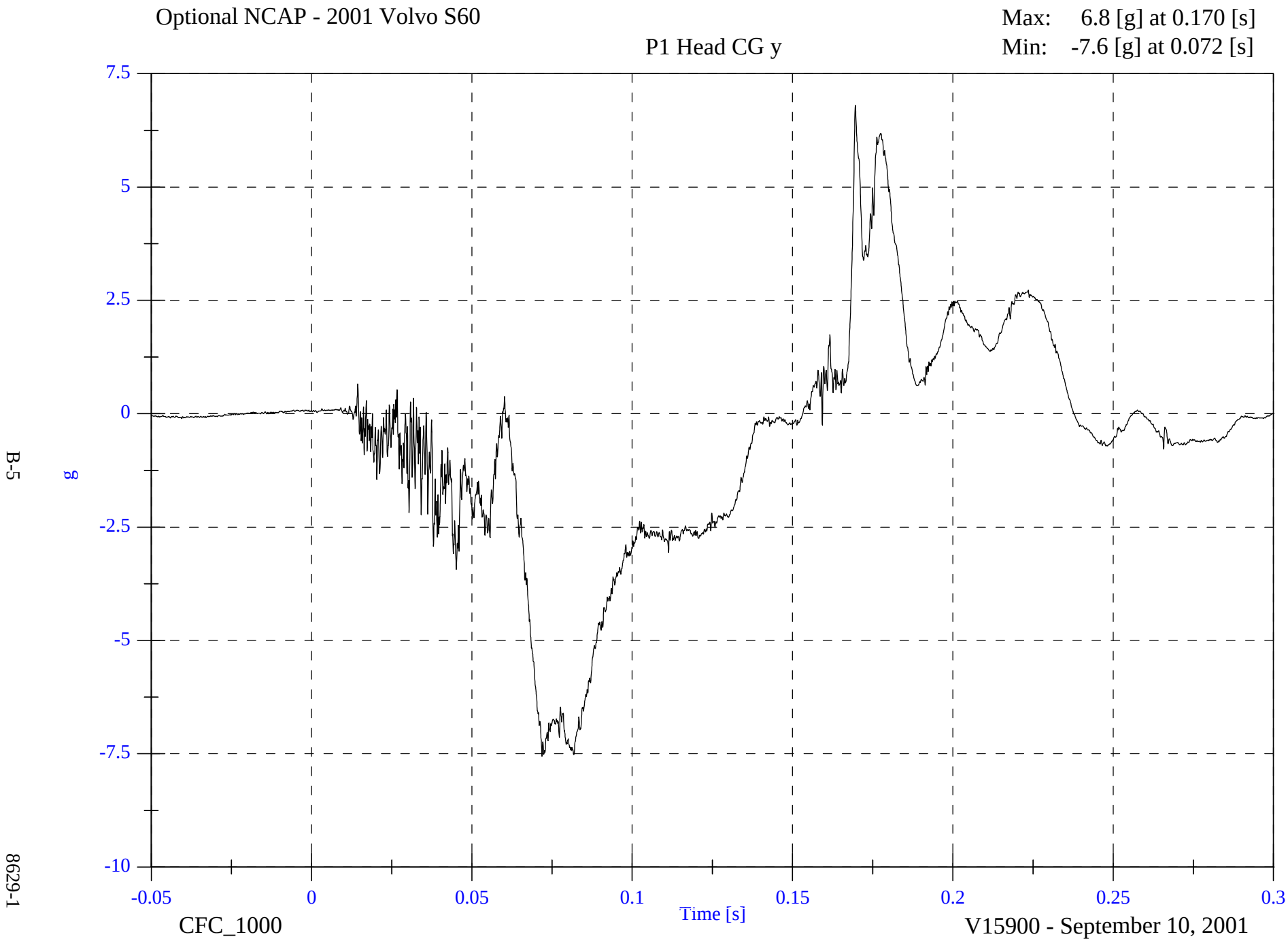
Transducer	**SAE Sign Convention (positive unless noted)**
Upper Neck Load Cell	Fx Head rearward Fy Head left Fz Neck in tension Mx Left ear to left shoulder My Chin to chest (flexion) Mz Chin to left shoulder (look left)
Chest Displacement Potentiometer	Compression is negative
Pelvic Load Cell (Lower Lumbar)	Fx Chest rearward Fy Chest left Fz Spine in tension
Femur Load Cell	Compression is negative
Upper Tibia Load Cell (right and left leg)	Mx Support tibia at ends, load left side center My Support tibia at ends, load front (shin) center
Lower Tibia Load Cell (right and left leg)	Fz Tibia in tension Mx Support tibia at ends, load left side center My Support tibia at ends, load front (shin) center

DATA CHANNEL FILTER CLASS SUMMARY

NHTSA TEST NO.

DATA TYPE	**SAE FILTER CLASS (Hz)**
Dummy Head Accelerations	1000
Dummy Chest Accelerations	180
Dummy Chest Displacements	60
Dummy Femur Forces	600
Dummy Belt Loads	60
Dummy Belt Displacements	180
Dummy Neck Forces	1000
Dummy Neck Moments	600
Vehicle Accelerations	60
Vehicle Velocity Integrations	180
Vehicle Displacement Integrations	180
Load Cell Barrier Forces	60


Optional NCAP - 2001 Volvo S60
P1 Head CG x
Max: 22.3 [g] at 0.170 [s]
Min: -50.3 [g] at 0.073 [s]
30
20
10
0
-10
-20
-30
-40
-50
-60
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001
B-4
8629-1


Optional NCAP - 2001 Volvo S60
P1 Head CG y
Max: 6.8 [g] at 0.170 [s]
Min: -7.6 [g] at 0.072 [s]
7.5
5
2.5
0
-2.5
-5
-7.5
-10
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-5
8629-1
CFC_1000
V15900 - September 10, 2001

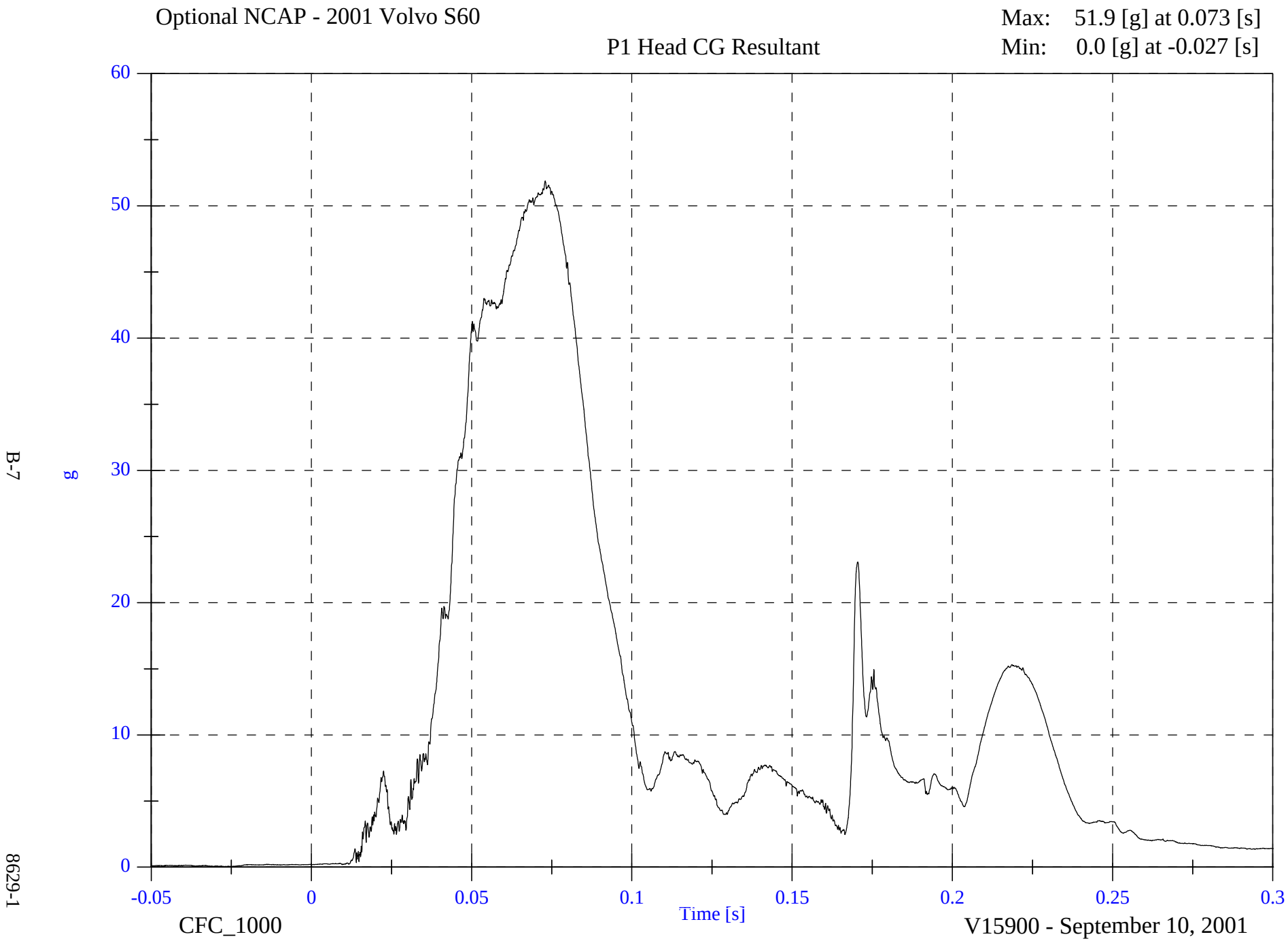
Optional NCAP - 2001 Volvo S60

P1 Head CG z

Max: 25.7 [g] at 0.050 [s]
Min: -13.3 [g] at 0.094 [s]

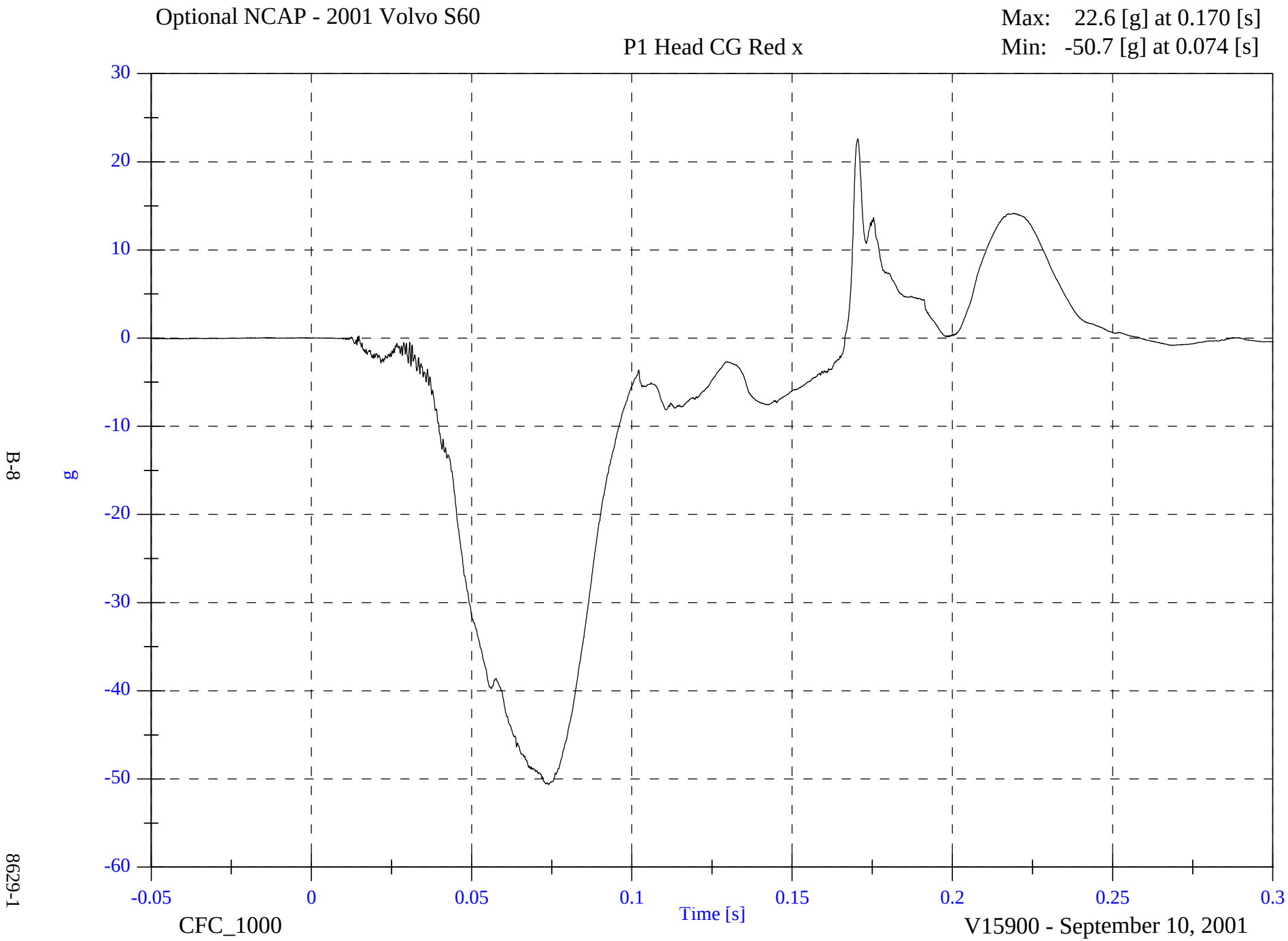
CFC_1000

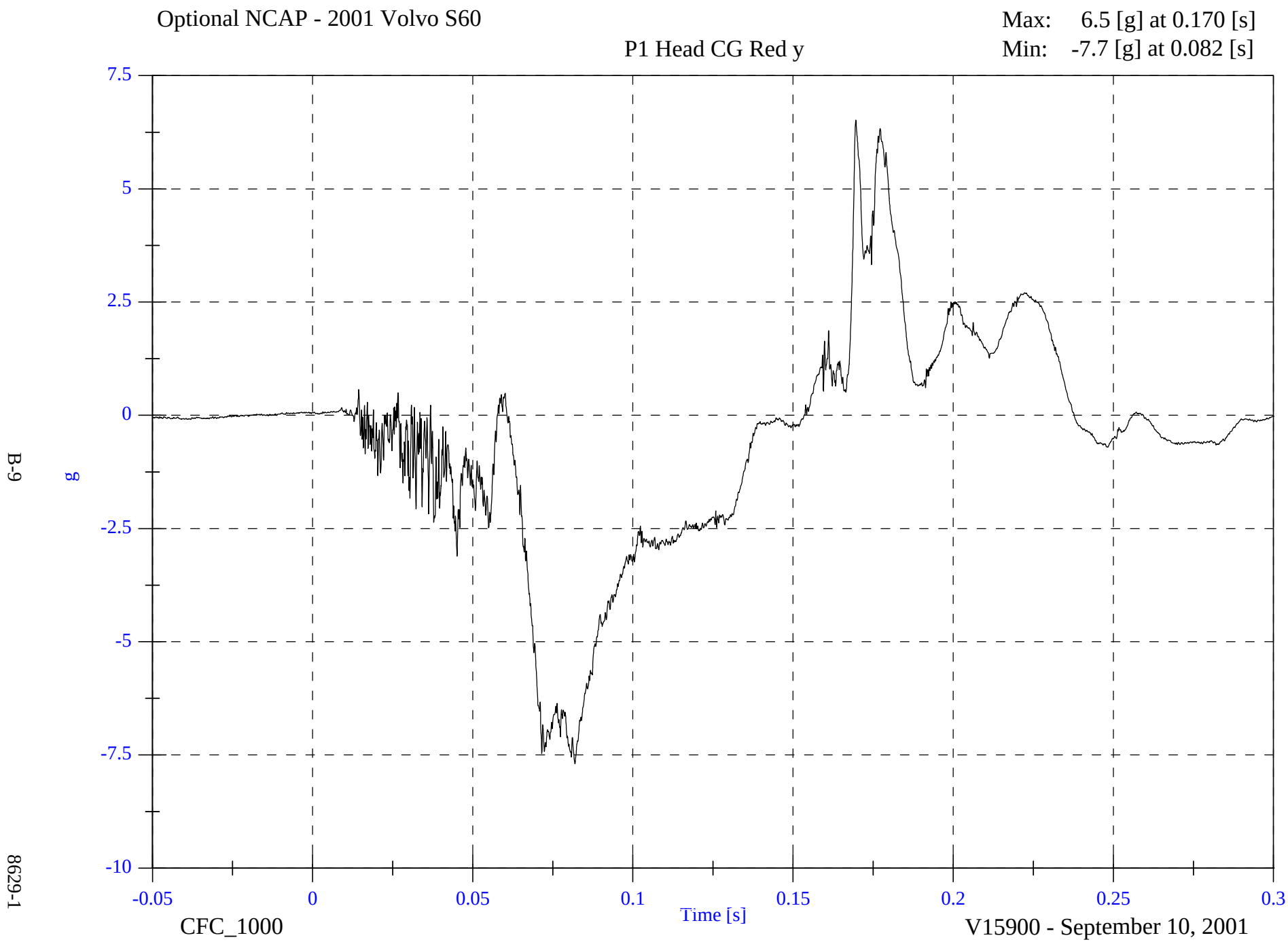
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Head CG Resultant
Max: 51.9 [g] at 0.073 [s]
Min: 0.0 [g] at -0.027 [s]
60
50
40
30
20
10
0
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

B-7

8629-1

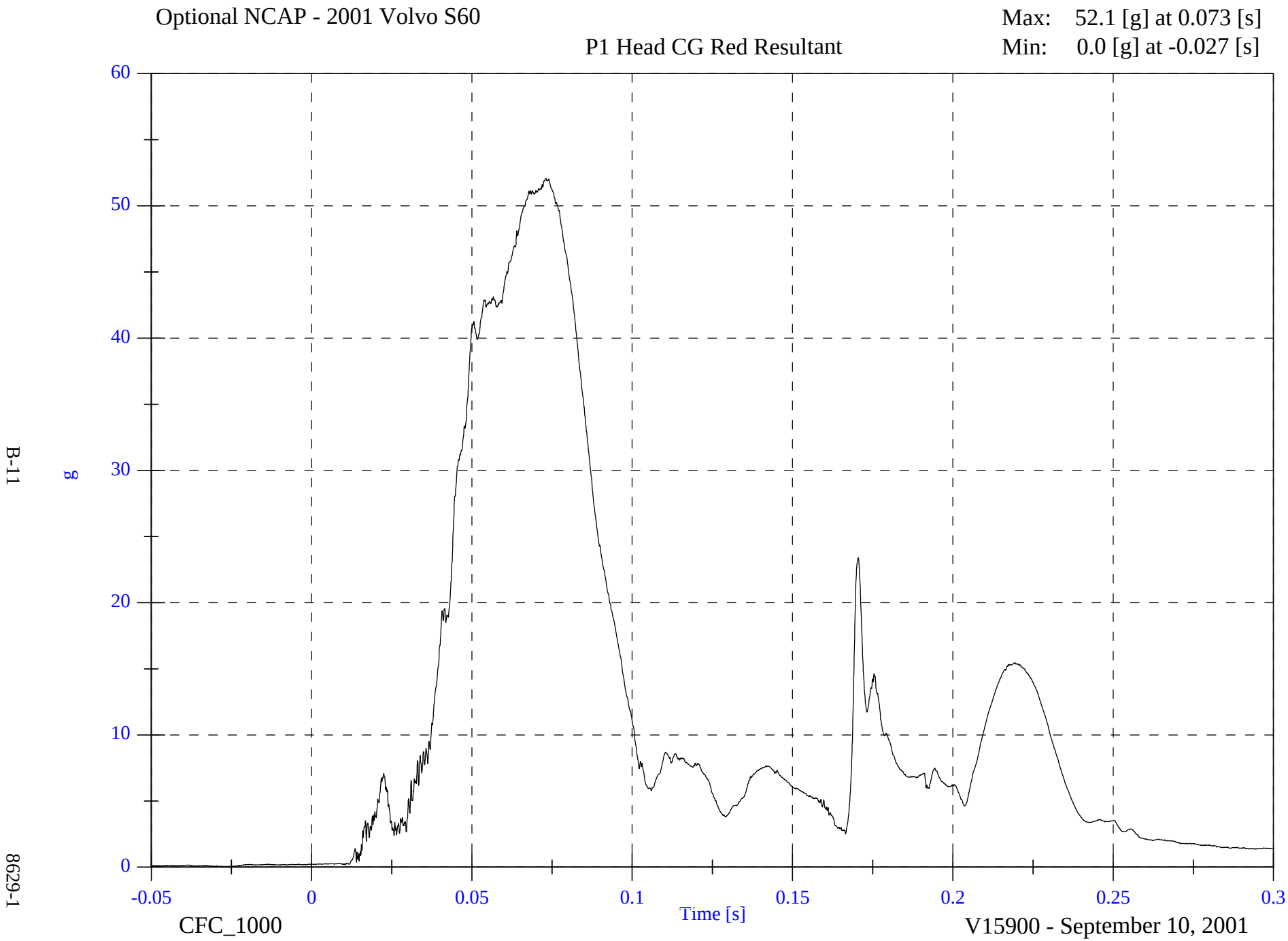

Optional NCAP - 2001 Volvo S60
P1 Head CG Red x
Max: 22.6 [g] at 0.170 [s]
Min: -50.7 [g] at 0.074 [s]
30
20
10
0
-10
-20
-30
-40
-50
-60
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

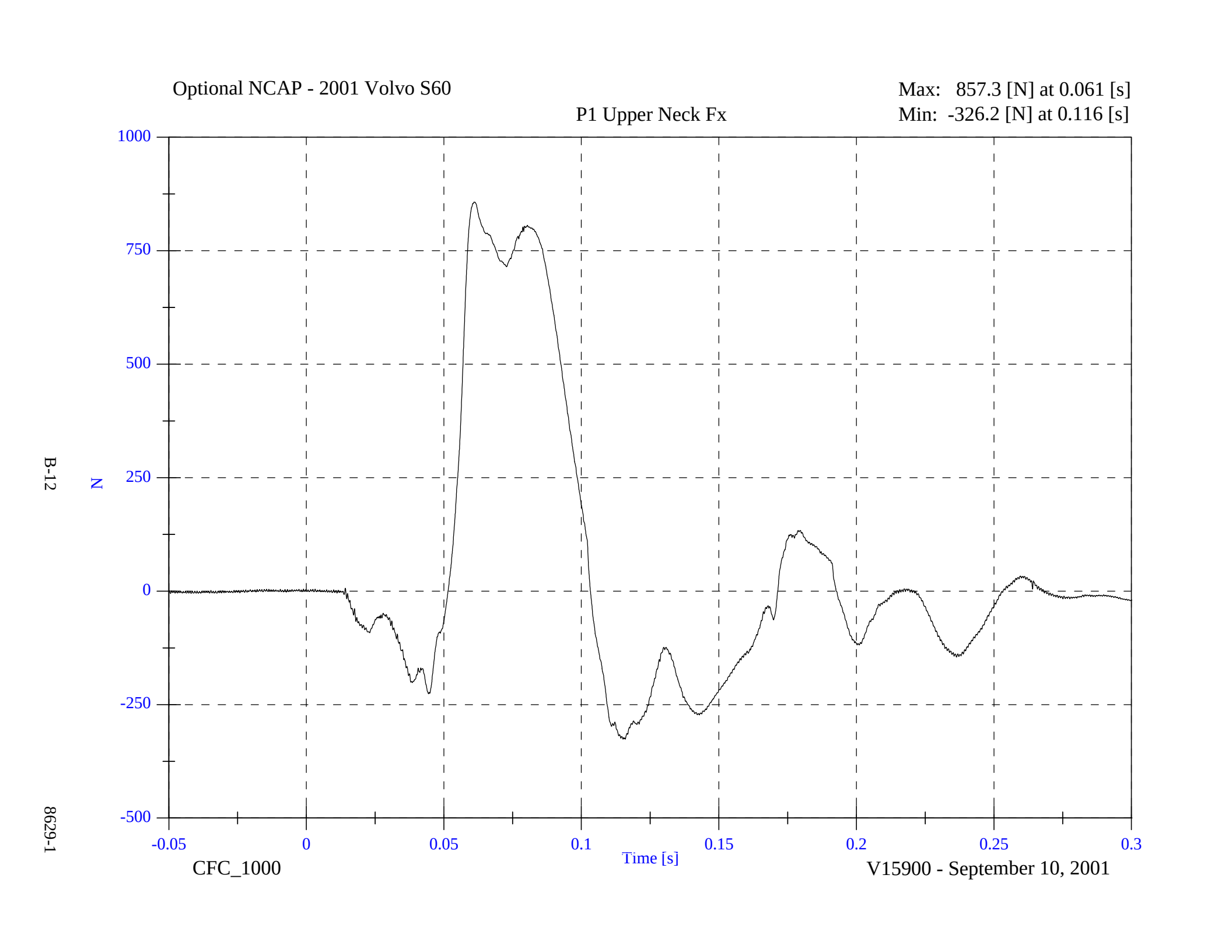

Optional NCAP - 2001 Volvo S60
P1 Head CG Red y
Max: 6.5 [g] at 0.170 [s]
Min: -7.7 [g] at 0.082 [s]
7.5
5
2.5
0
-2.5
-5
-7.5
-10
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001
B-9
86291

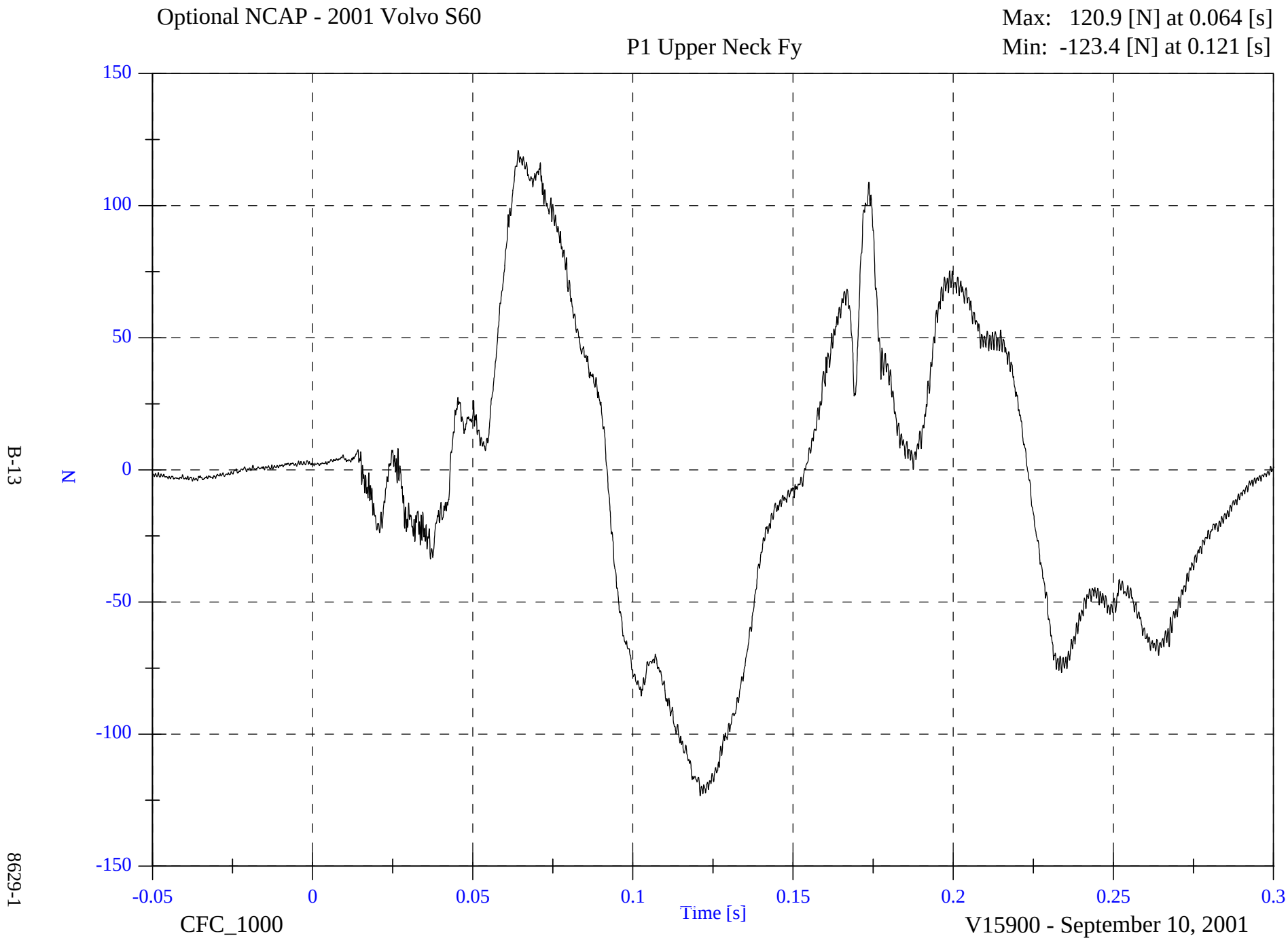

Optional NCAP - 2001 Volvo S60
P1 Head CG Red z
Max: 25.9 [g] at 0.050 [s]
Min: -13.2 [g] at 0.093 [s]
30
25
20
15
10
5
0
-5
-10
-15
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

B-10

8629-1


Optional NCAP - 2001 Volvo S60
P1 Head CG Red Resultant
Max: 52.1 [g] at 0.073 [s]
Min: 0.0 [g] at -0.027 [s]
60
50
40
30
20
10
0
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001
B-11
8629-1

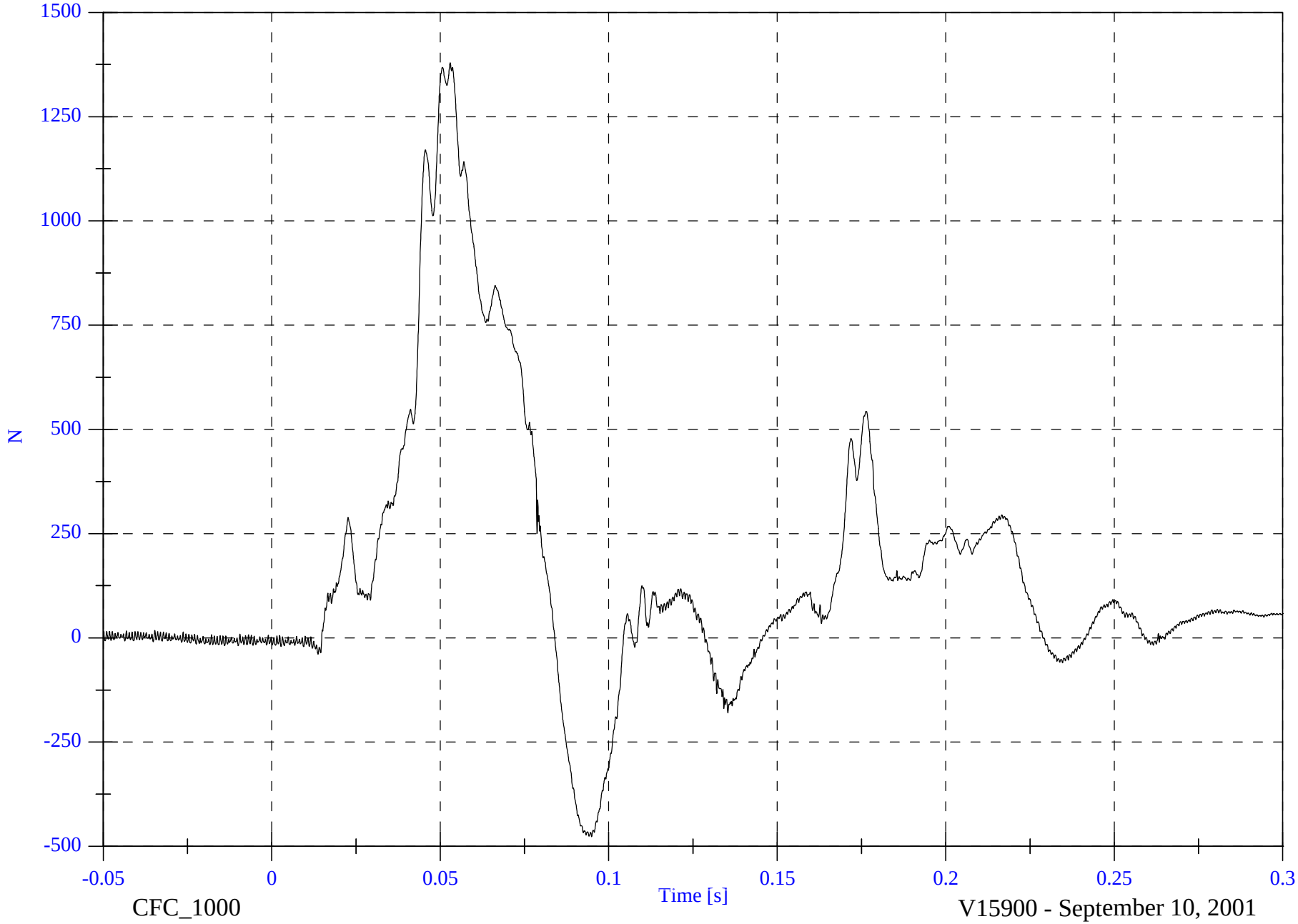

Optional NCAP - 2001 Volvo S60
P1 Upper Neck Fx
Max: 857.3 [N] at 0.061 [s]
Min: -326.2 [N] at 0.116 [s]
1000
750
500
250
0
-250
-500
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001
B-12
8629-1


Optional NCAP - 2001 Volvo S60
P1 Upper Neck Fy
Max: 120.9 [N] at 0.064 [s]
Min: -123.4 [N] at 0.121 [s]
150
100
50
0
-50
-100
-150
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001
B-13
8629-1

Optional NCAP - 2001 Volvo S60

P1 Upper Neck Fz

Max: 1379.3 [N] at 0.053 [s]
Min: -476.9 [N] at 0.095 [s]



B-14

8629-1

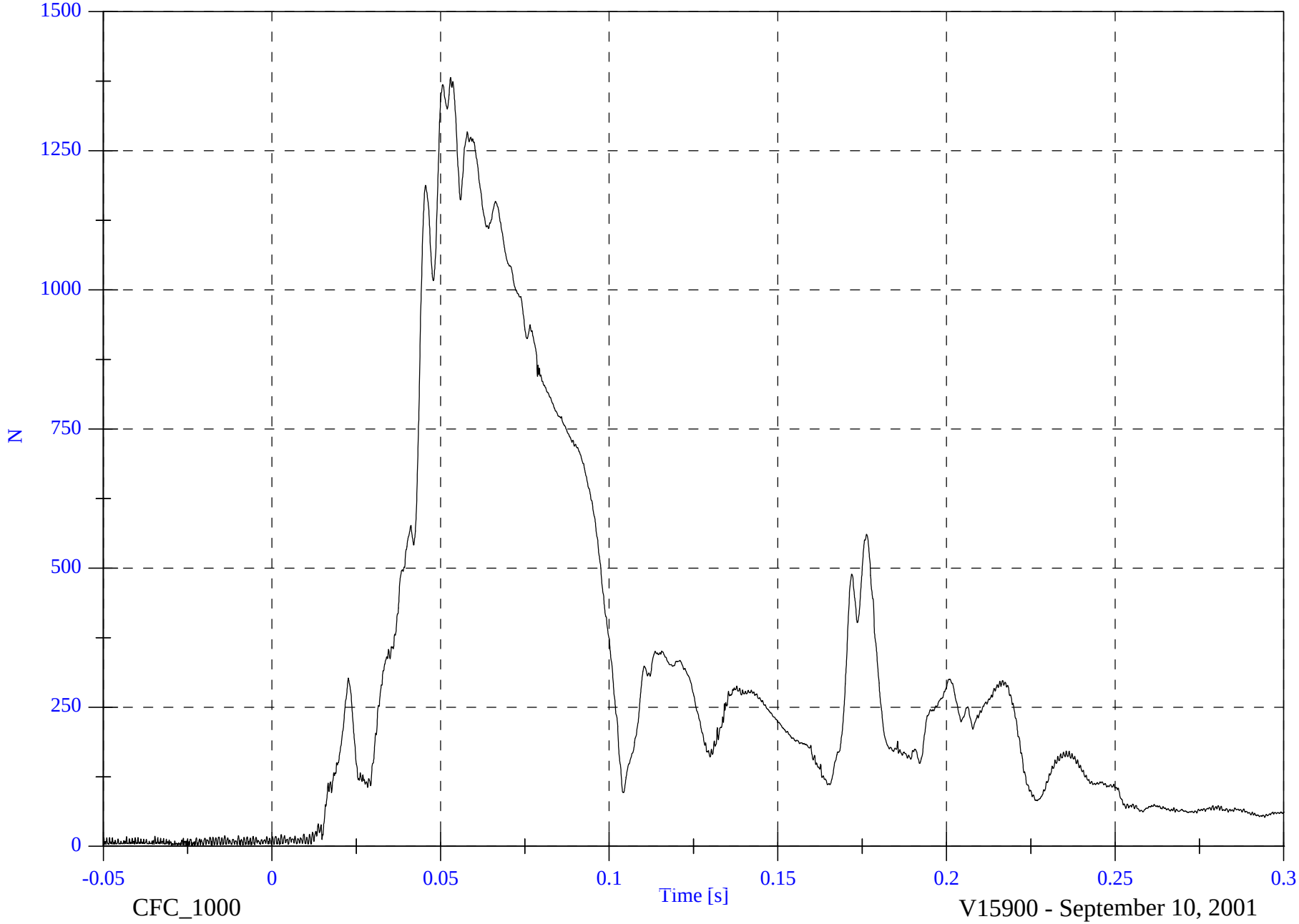
CFC_1000

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P1 Upper Neck F Resultant

Max: 1381.7 [N] at 0.053 [s]
Min: 0.4 [N] at -0.024 [s]



B-15

8629-1

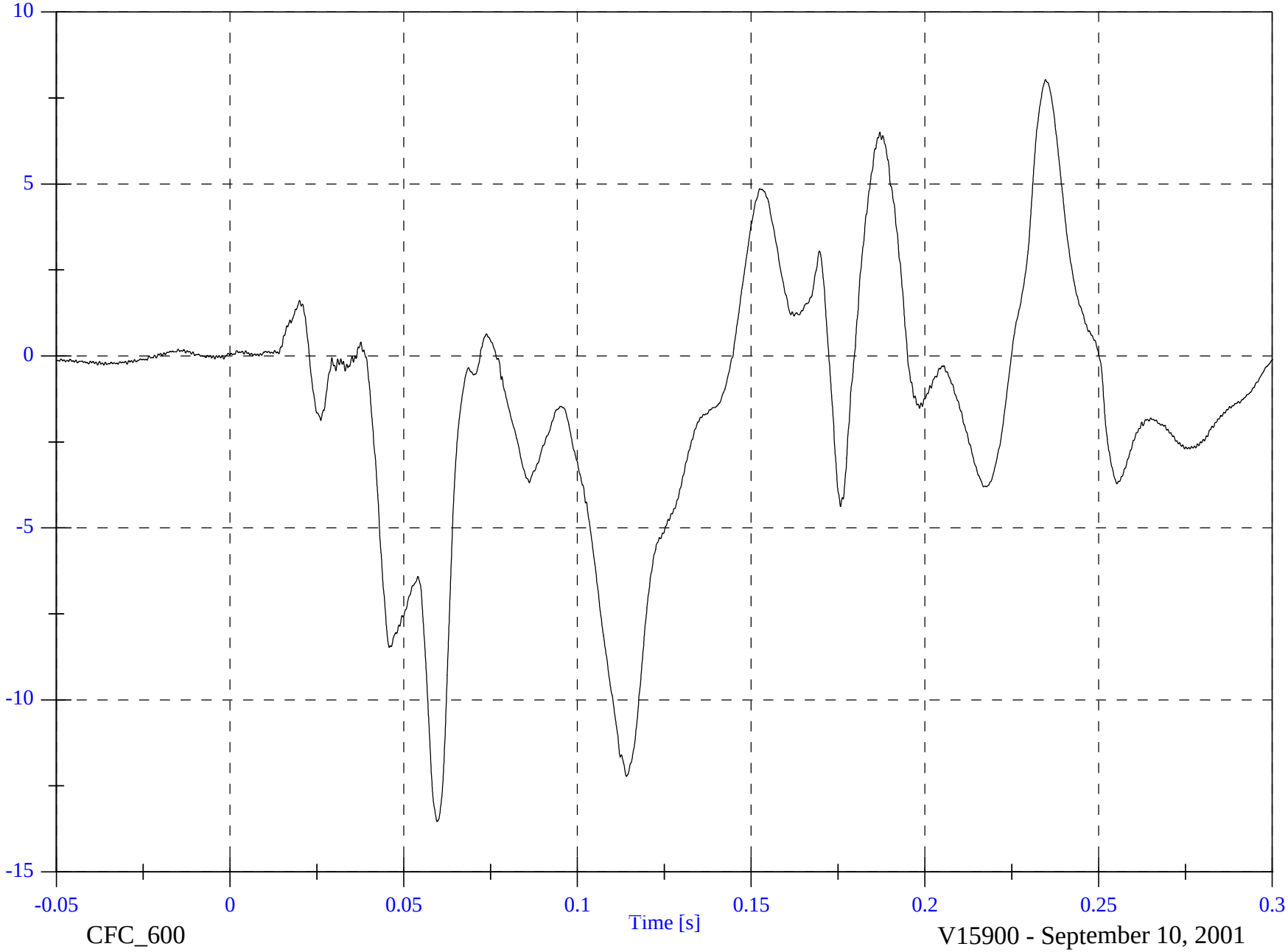
CFC_1000

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

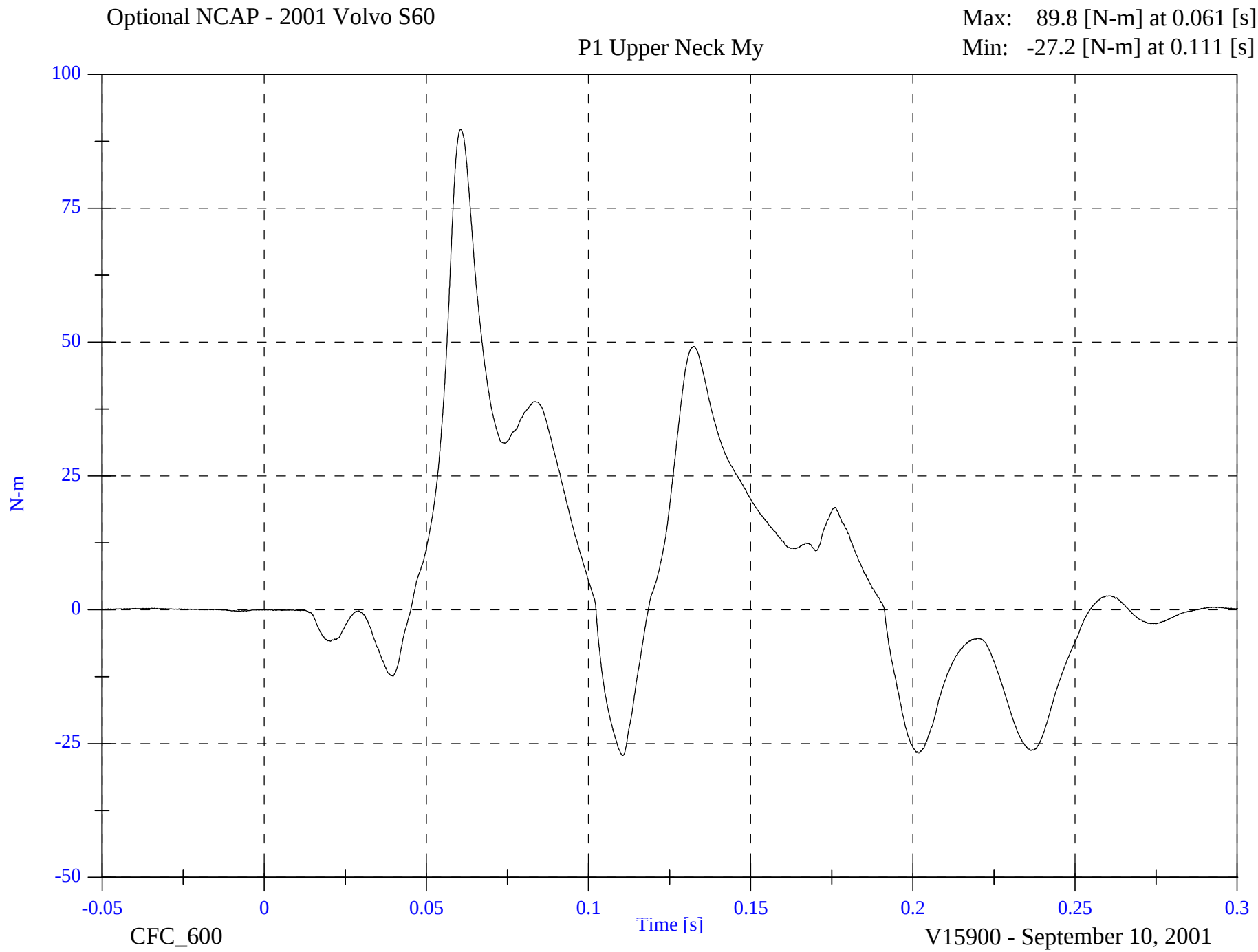
P1 Upper Neck Mx

Max: 8.0 [N-m] at 0.235 [s]
Min: -13.5 [N-m] at 0.060 [s]



CFC_600

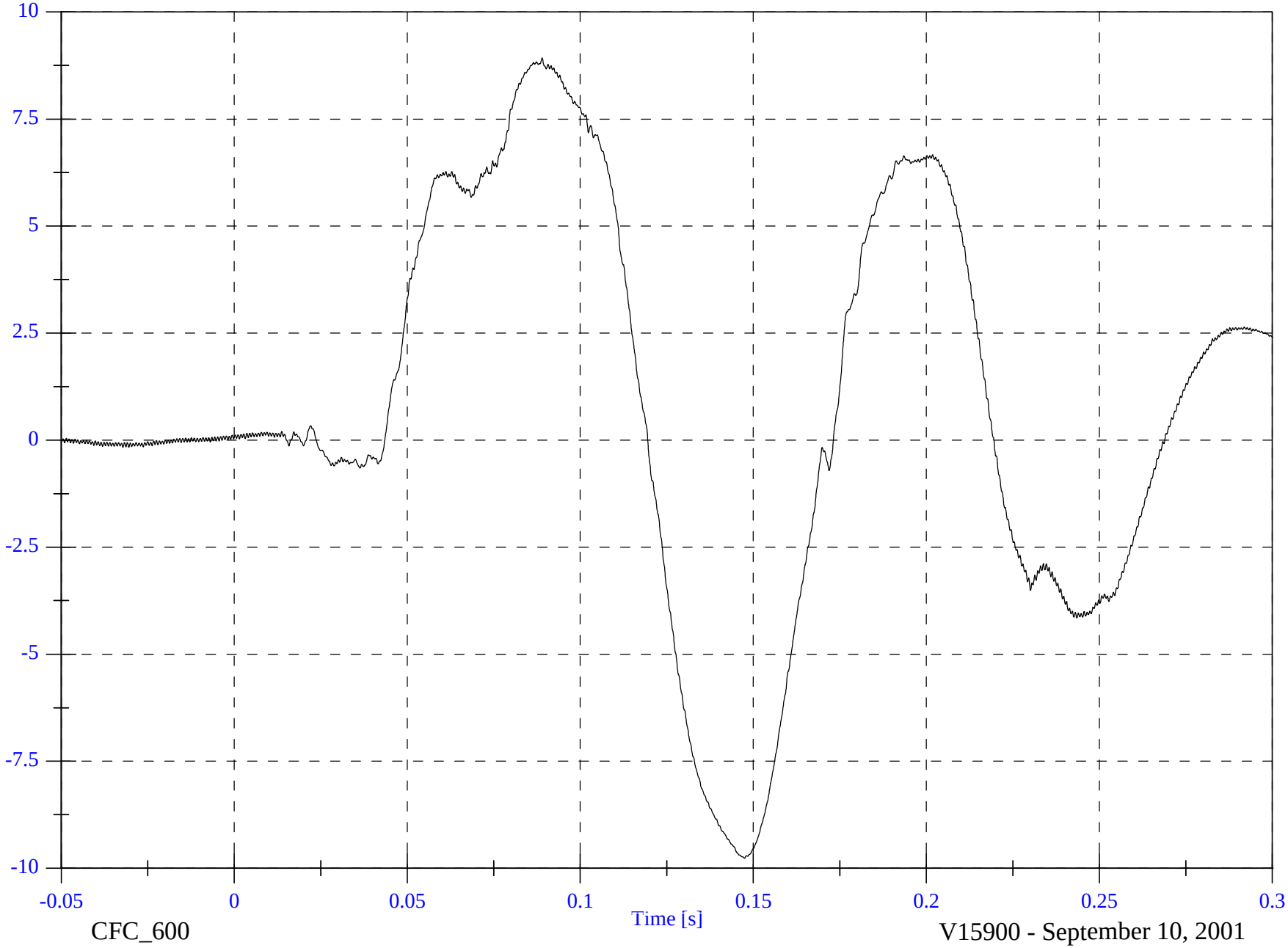
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Upper Neck My
Max: 89.8 [N-m] at 0.061 [s]
Min: -27.2 [N-m] at 0.111 [s]
100
75
50
25
0
-25
-50
N-m
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P1 Upper Neck Mz

Max: 8.9 [N-m] at 0.089 [s]
Min: -9.8 [N-m] at 0.147 [s]

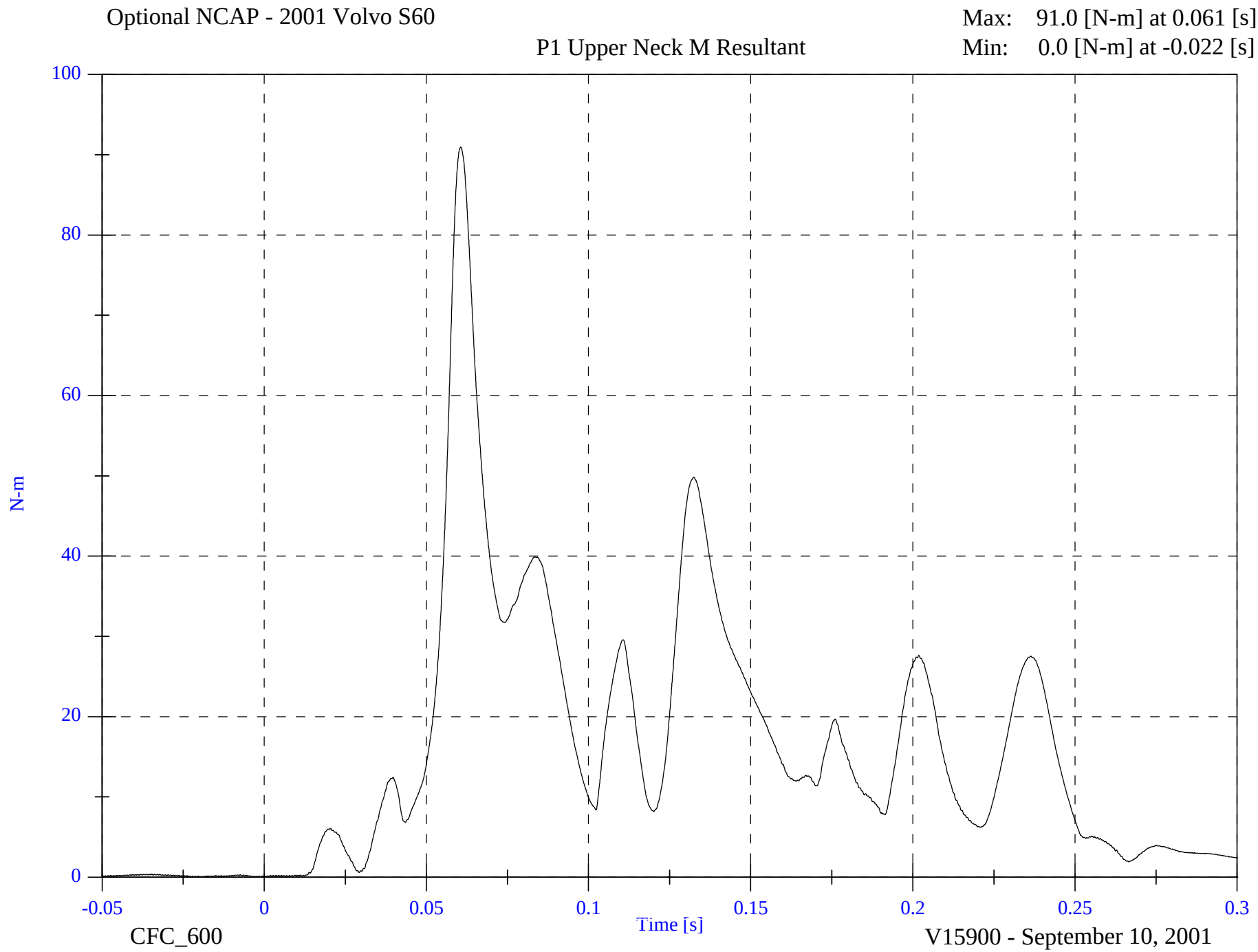


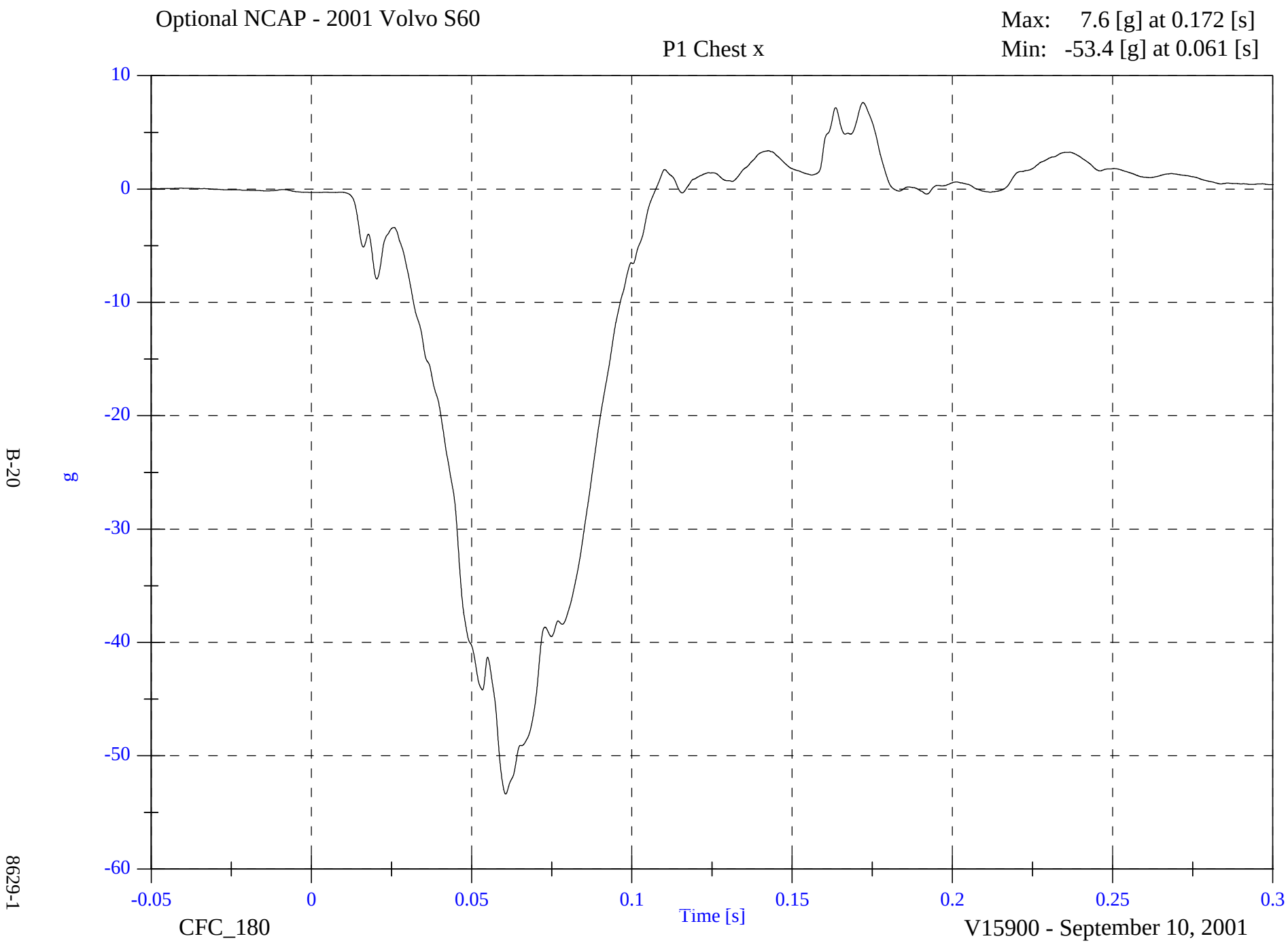
CFC_600

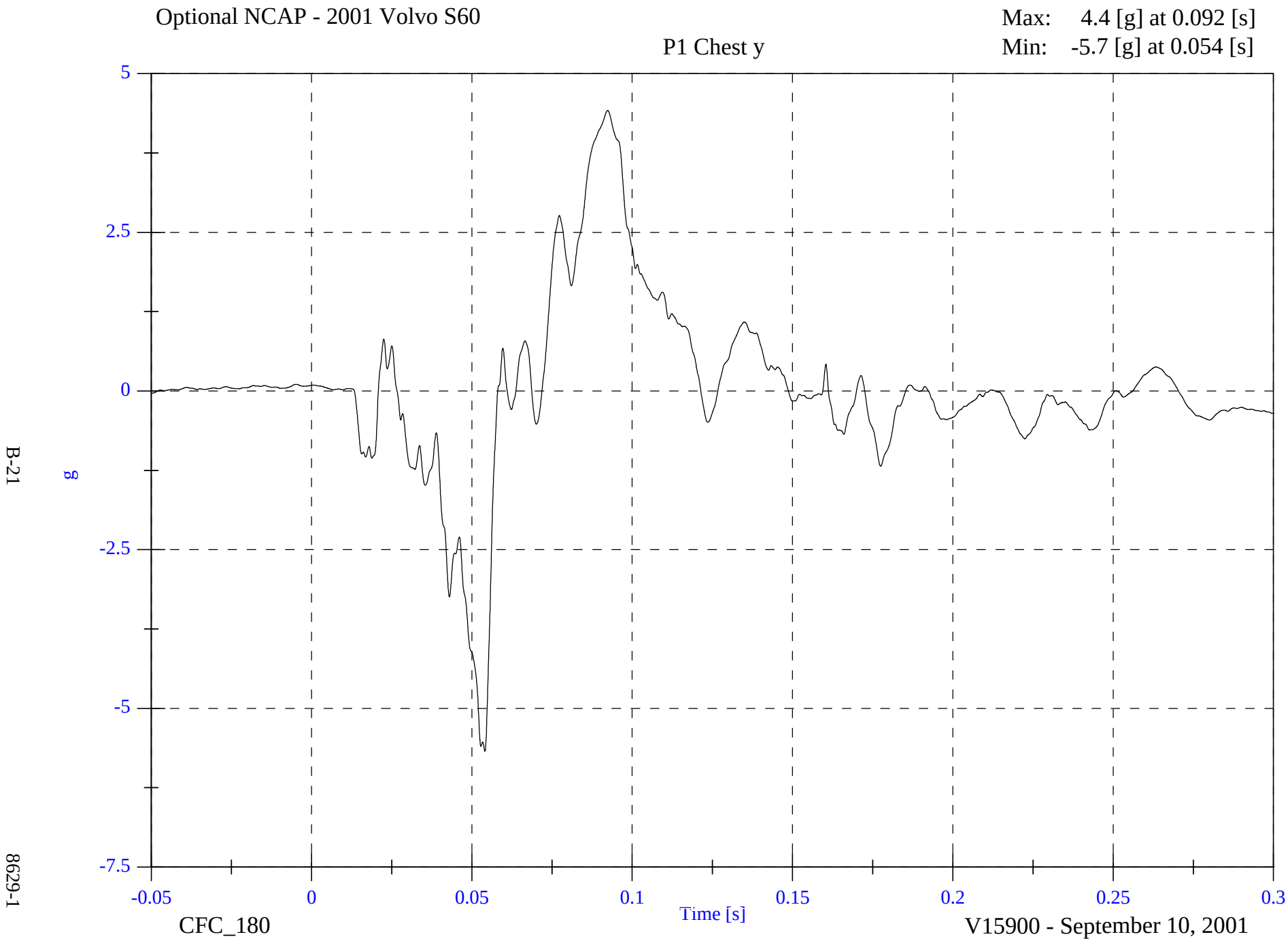
V15900 - September 10, 2001

B-18

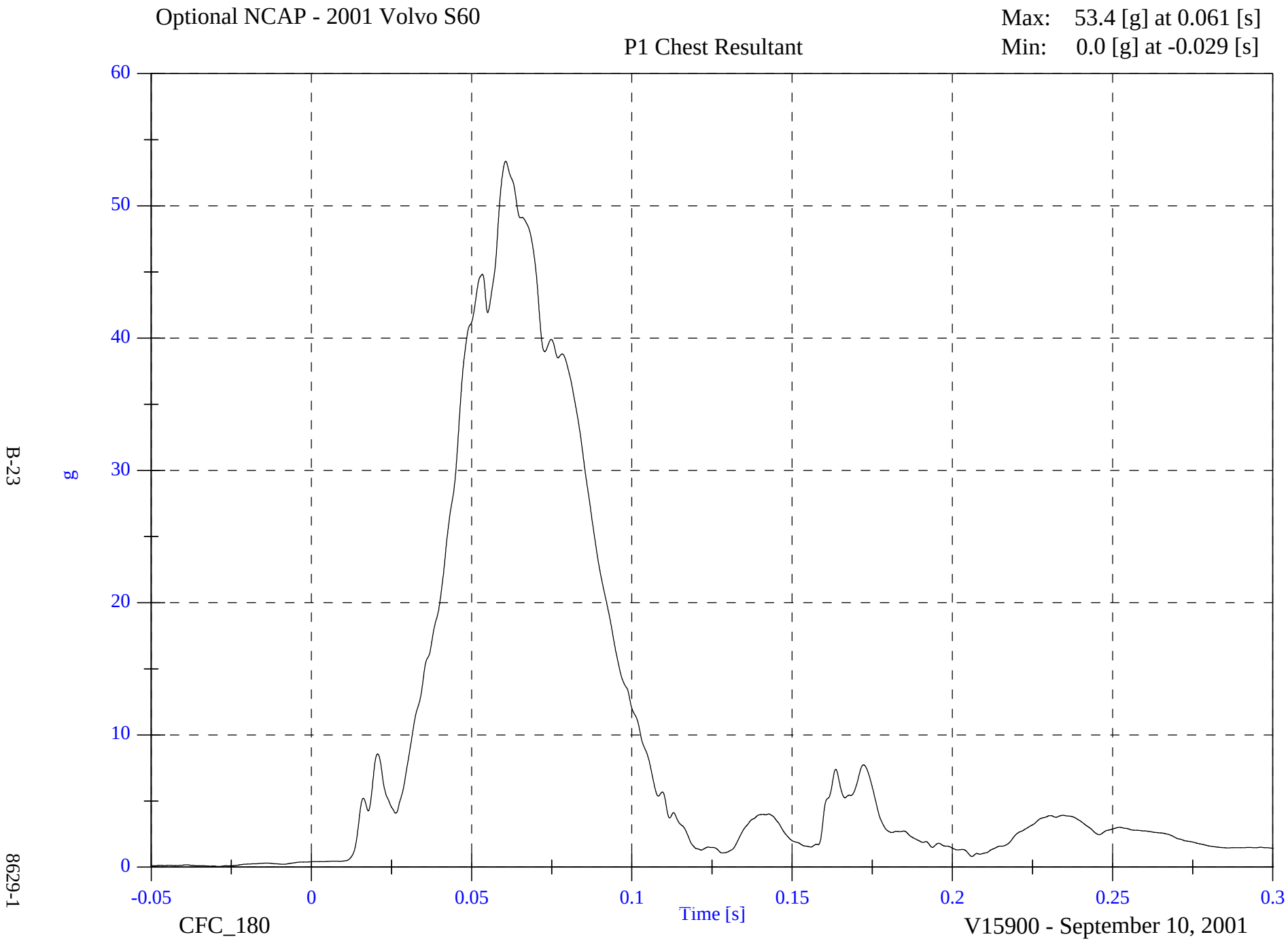
8629-1

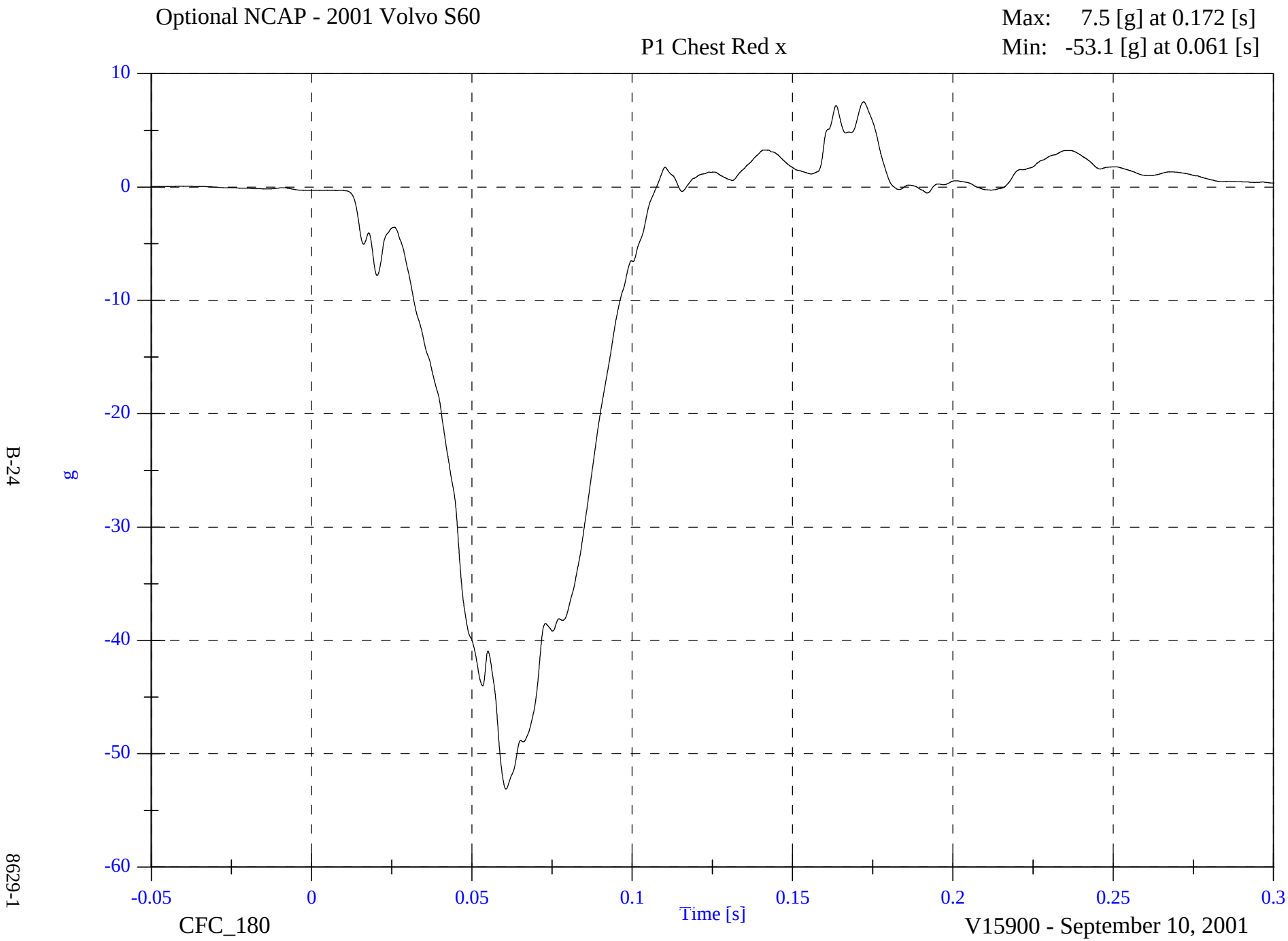

Optional NCAP - 2001 Volvo S60
P1 Upper Neck M Resultant
Max: 91.0 [N-m] at 0.061 [s]
Min: 0.0 [N-m] at -0.022 [s]
100
80
60
40
20
0
N-m
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001

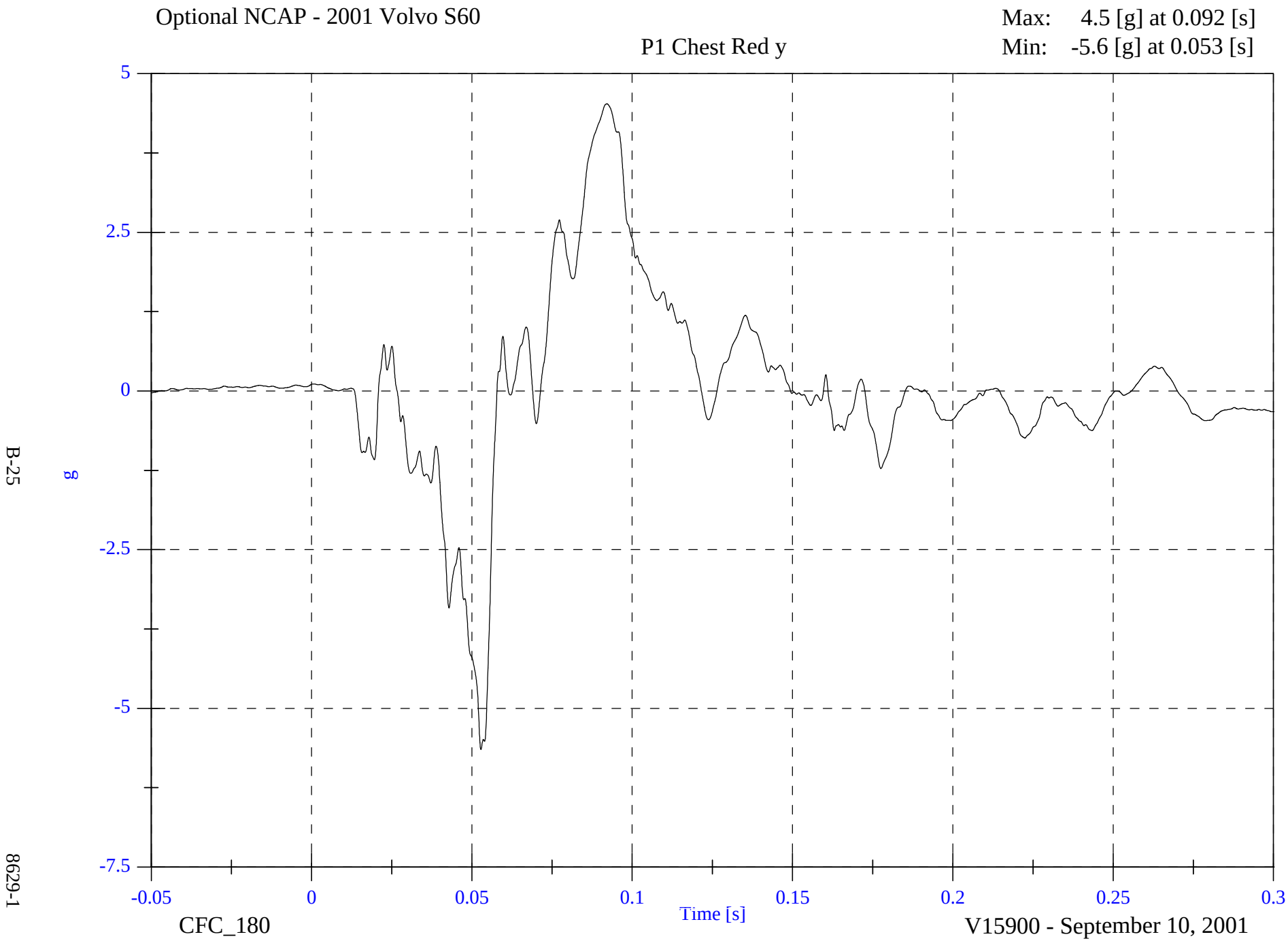

Optional NCAP - 2001 Volvo S60
P1 Chest x
Max: 7.6 [g] at 0.172 [s]
Min: -53.4 [g] at 0.061 [s]
10
0
-10
-20
-30
-40
-50
-60
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-20
8629-1
CFC_180
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Chest y
Max: 4.4 [g] at 0.092 [s]
Min: -5.7 [g] at 0.054 [s]
5
2.5
0
-2.5
-5
-7.5
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-21
8629-1
CFC_180
V15900 - September 10, 2001

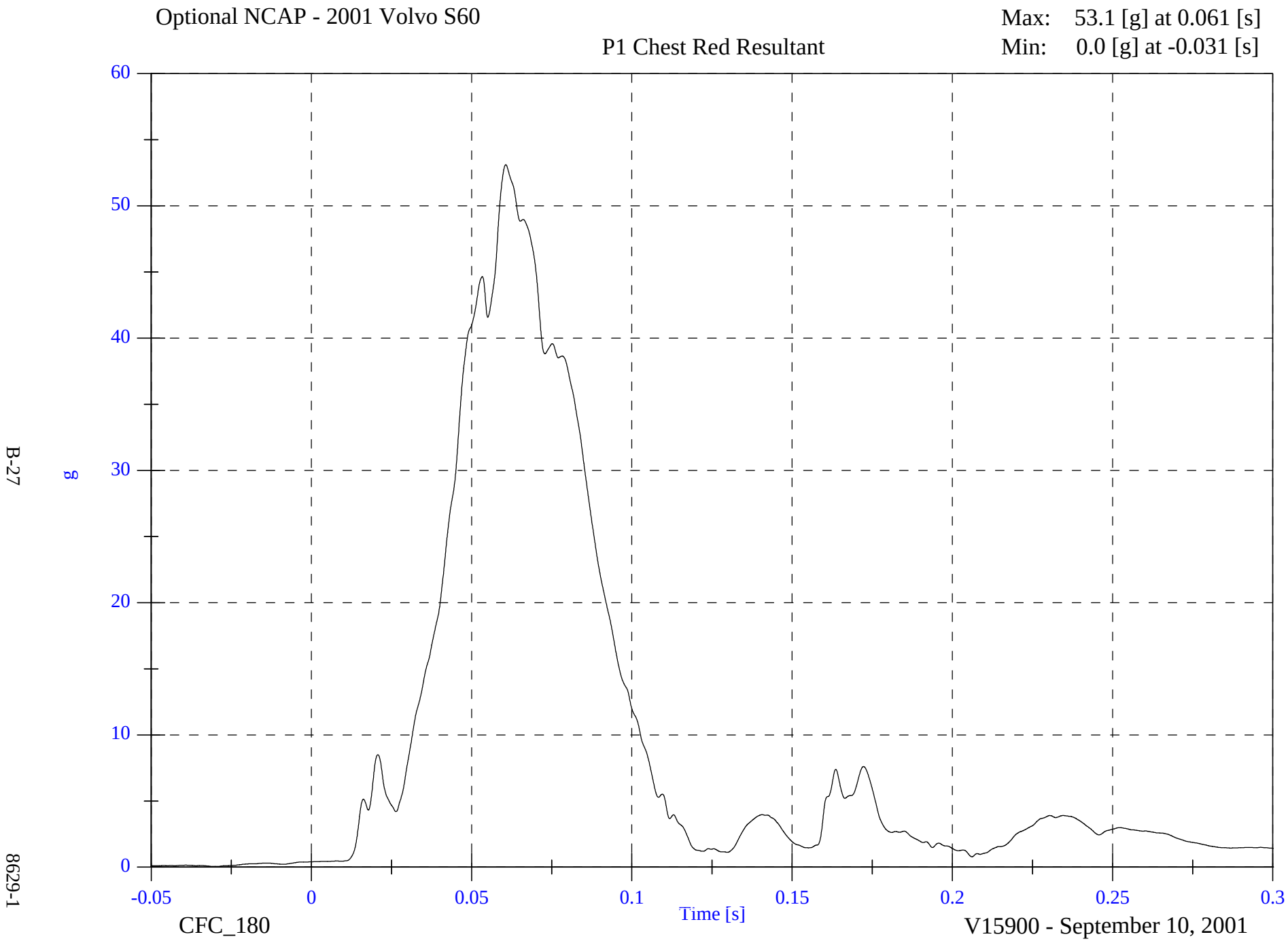

Optional NCAP - 2001 Volvo S60
P1 Chest z
Max: 8.8 [g] at 0.044 [s]
Min: -10.9 [g] at 0.099 [s]
10
7.5
5
2.5
0
-2.5
-5
-7.5
-10
-12.5
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_180
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Chest Resultant
Max: 53.4 [g] at 0.061 [s]
Min: 0.0 [g] at -0.029 [s]
60
50
40
30
20
10
0
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_180
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Chest Red x
Max: 7.5 [g] at 0.172 [s]
Min: -53.1 [g] at 0.061 [s]
10
0
-10
-20
-30
-40
-50
-60
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_180
V15900 - September 10, 2001
B-24
8629-1


Optional NCAP - 2001 Volvo S60
P1 Chest Red y
Max: 4.5 [g] at 0.092 [s]
Min: -5.6 [g] at 0.053 [s]
5
2.5
0
-2.5
-5
-7.5
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-25
8629-1
CFC_180
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Chest Red z
Max: 9.0 [g] at 0.044 [s]
Min: -10.9 [g] at 0.099 [s]
10
7.5
5
2.5
0
-2.5
-5
-7.5
-10
-12.5
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_180
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Chest Red Resultant
Max: 53.1 [g] at 0.061 [s]
Min: 0.0 [g] at -0.031 [s]
60
50
40
30
20
10
0
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_180
V15900 - September 10, 2001

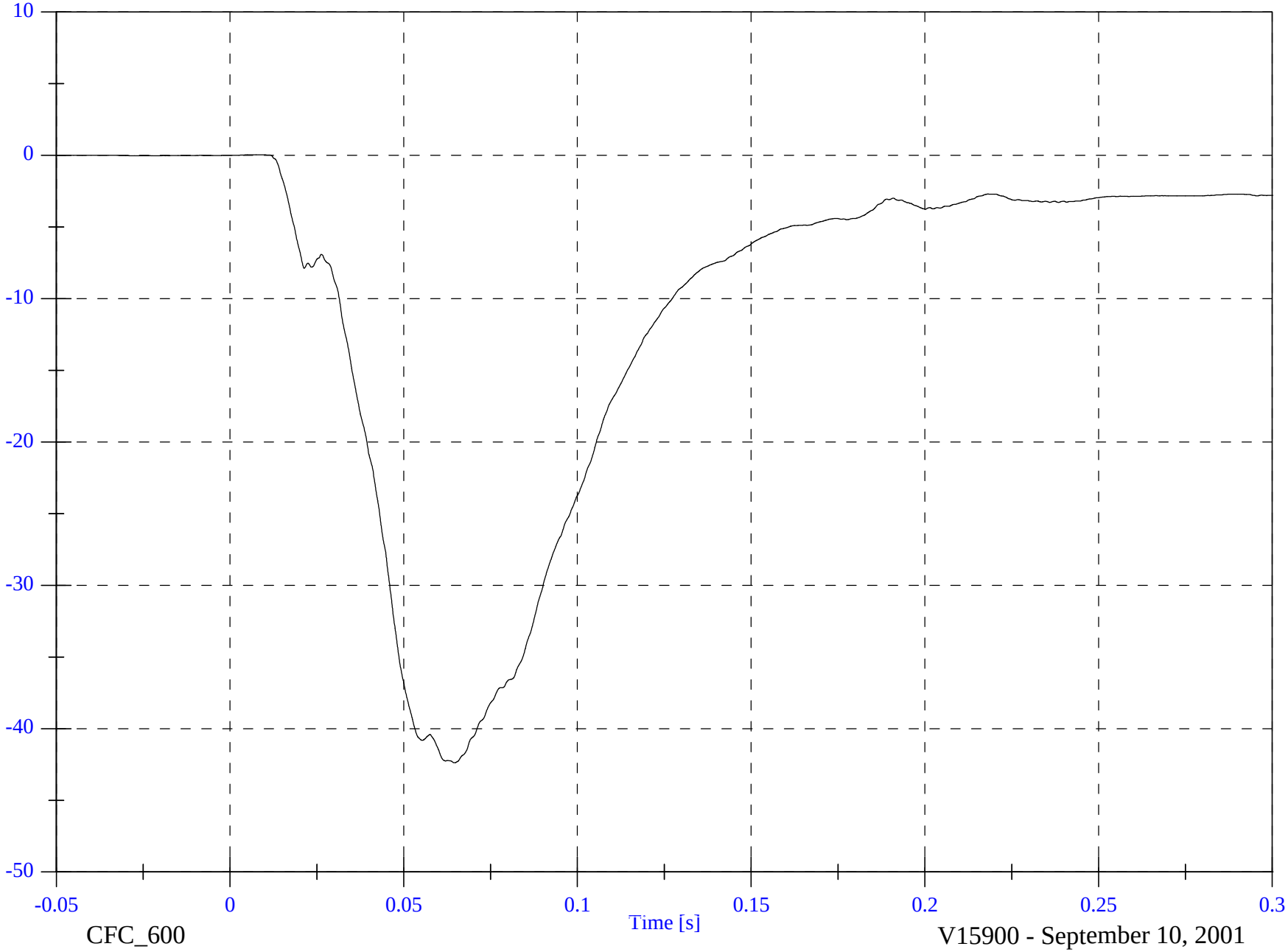
B-27

8629-1

Optional NCAP - 2001 Volvo S60

P1 Chest Compression

Max: 0.0 [mm] at 0.007 [s]
Min: -42.4 [mm] at 0.065 [s]

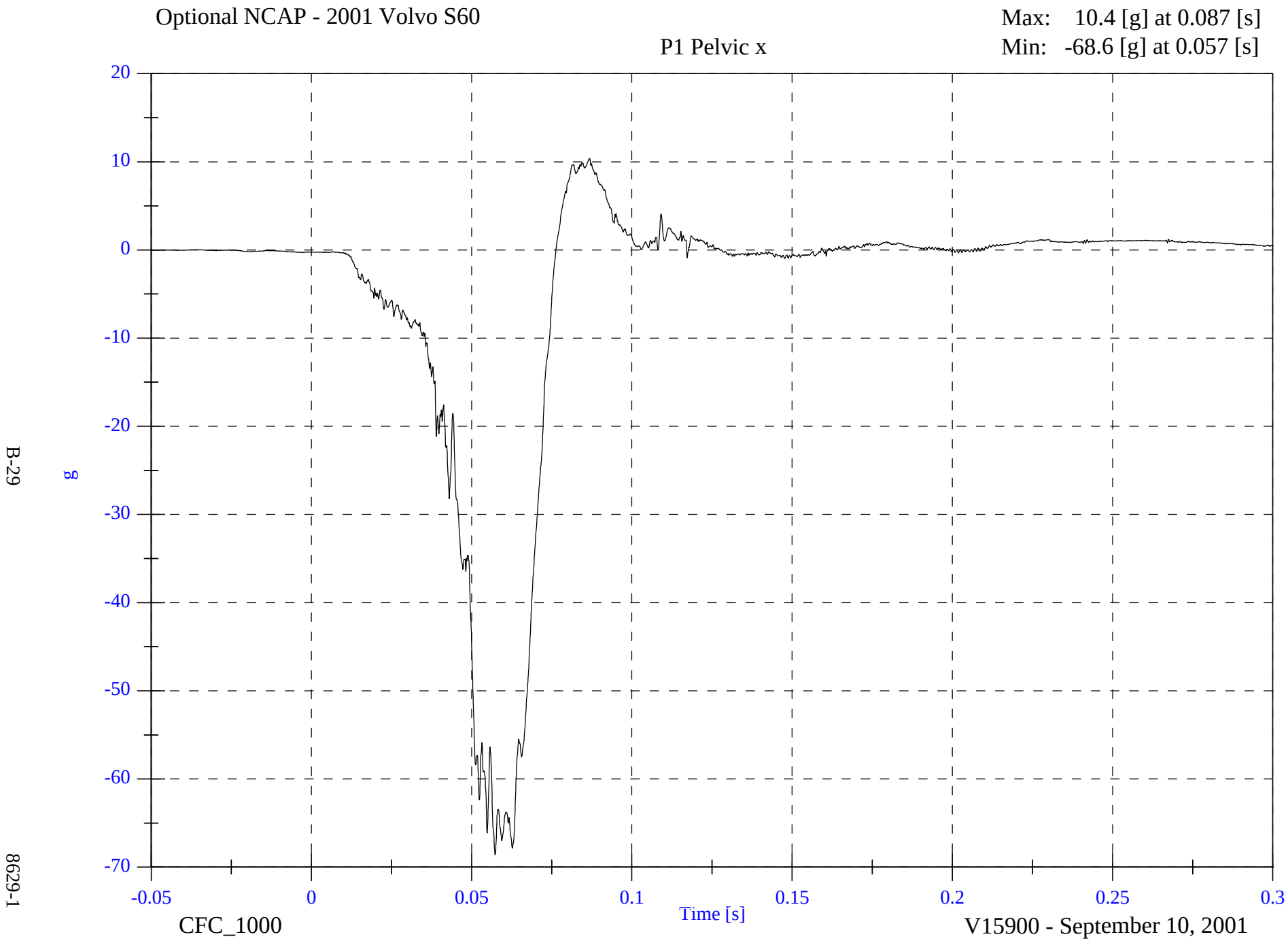


B-28

8629-1

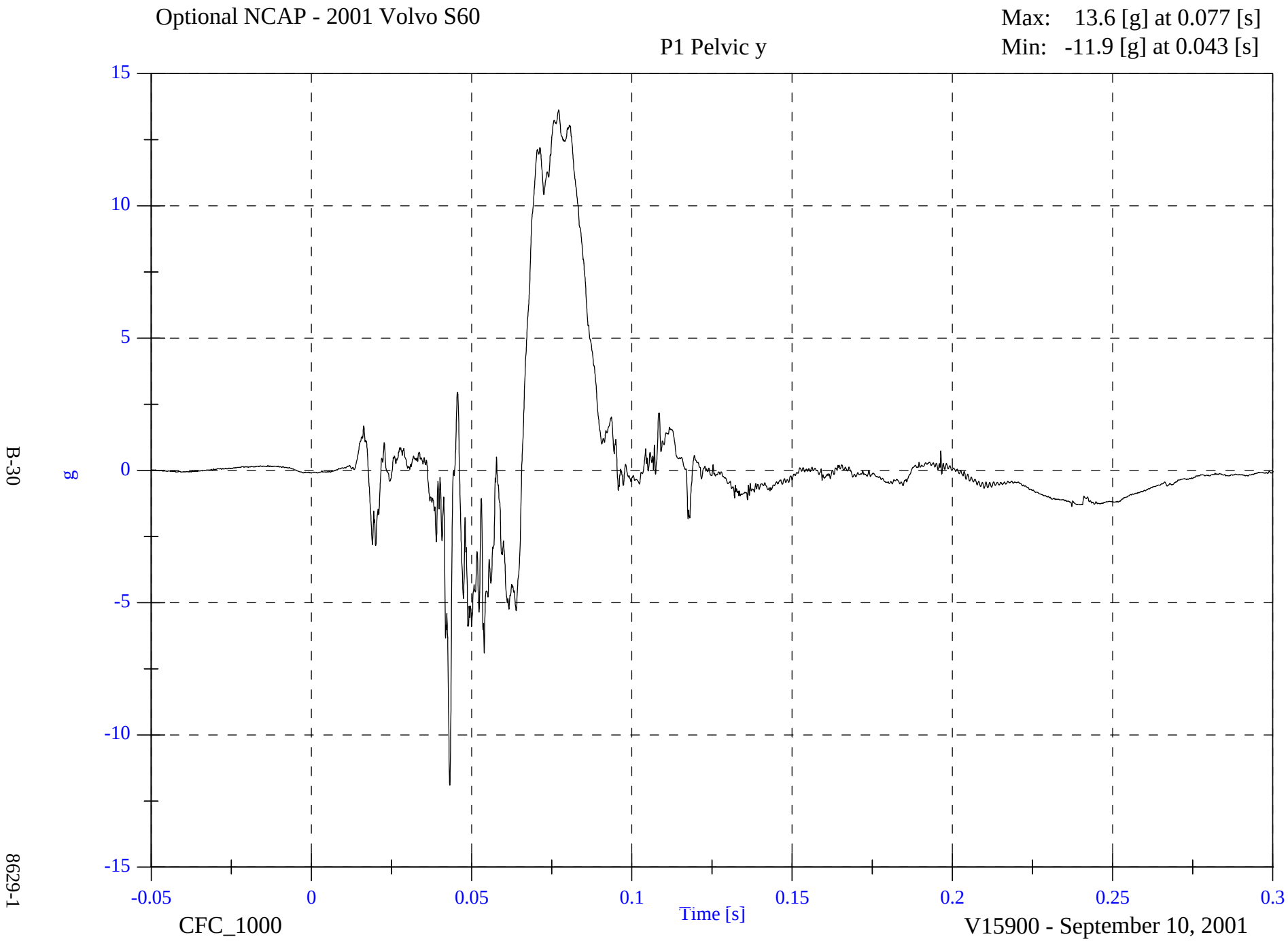
CFC_600

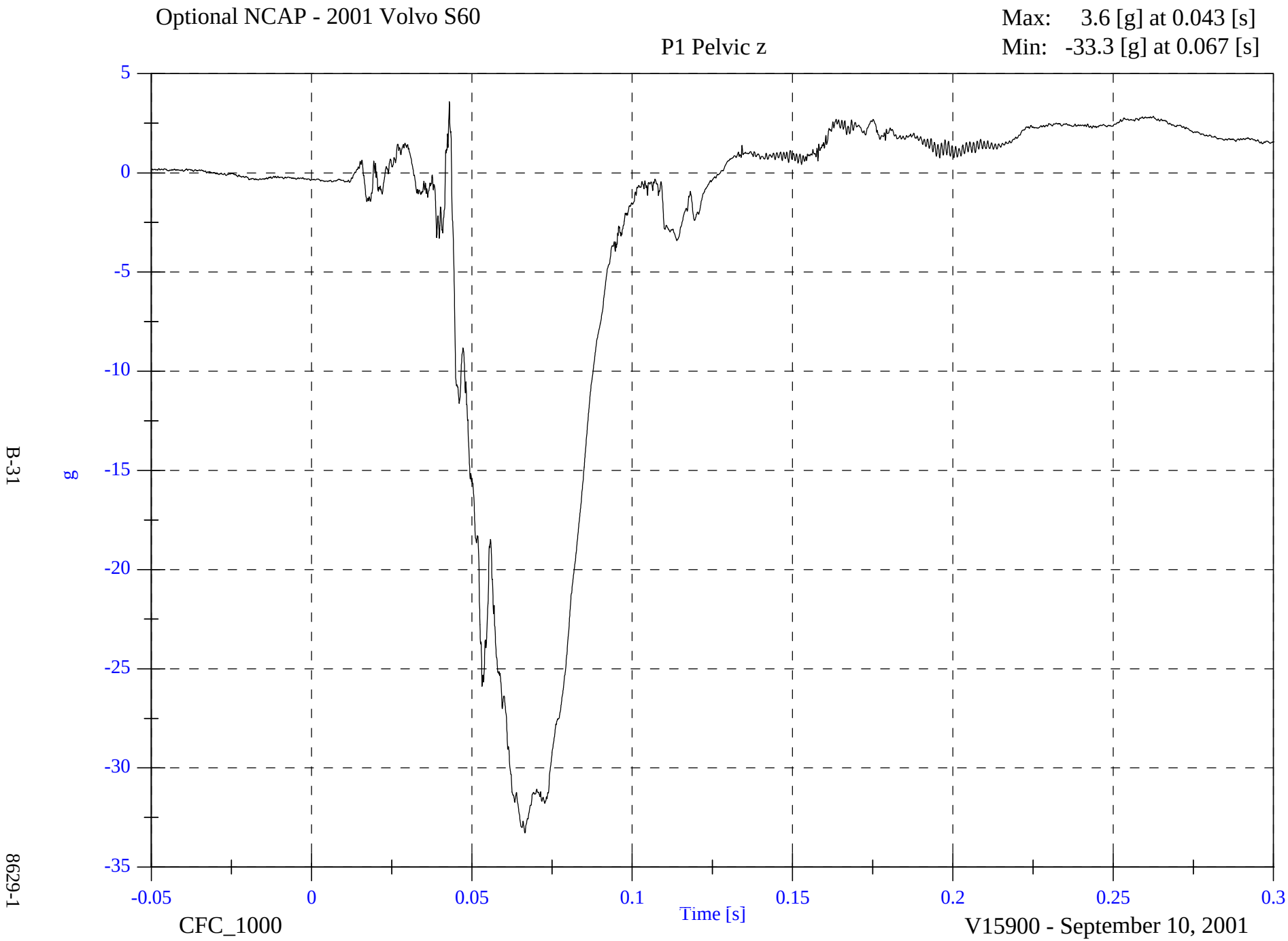
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Pelvic x
Max: 10.4 [g] at 0.087 [s]
Min: -68.6 [g] at 0.057 [s]
20
10
0
-10
-20
-30
-40
-50
-60
-70
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

B-29

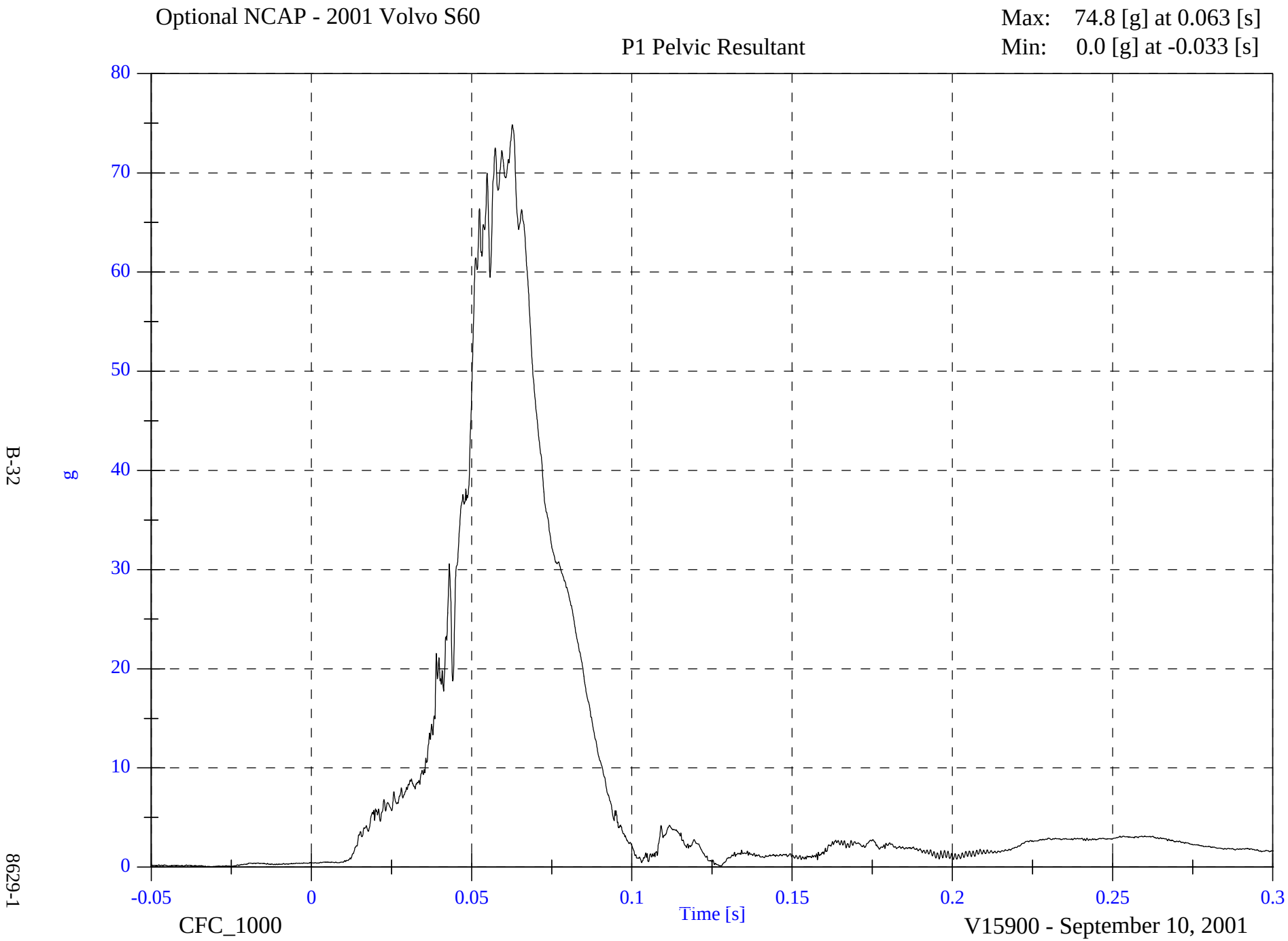
8629-1

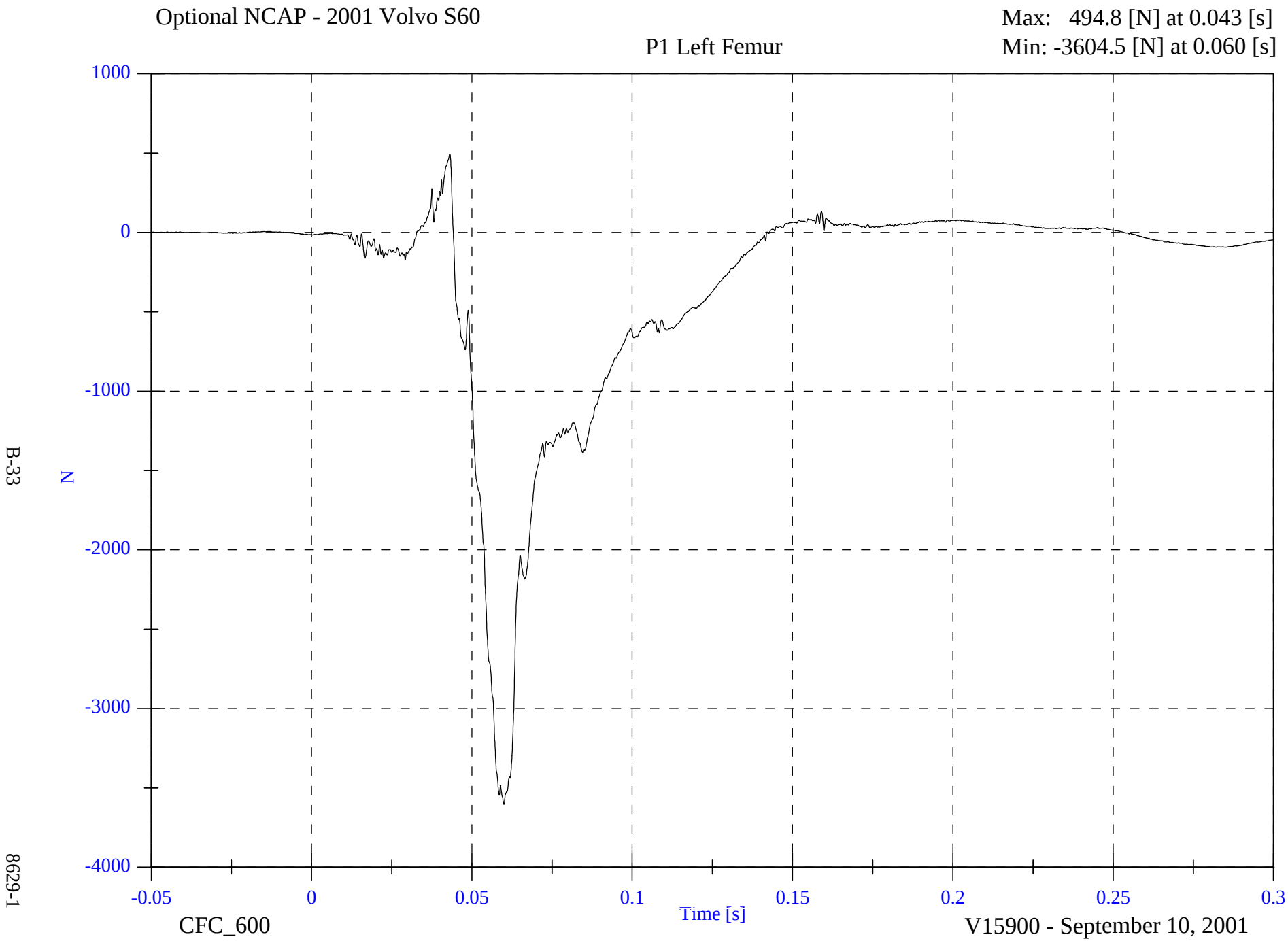

Optional NCAP - 2001 Volvo S60
P1 Pelvic y
Max: 13.6 [g] at 0.077 [s]
Min: -11.9 [g] at 0.043 [s]
15
10
5
0
-5
-10
-15
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001
B-30
8629-1

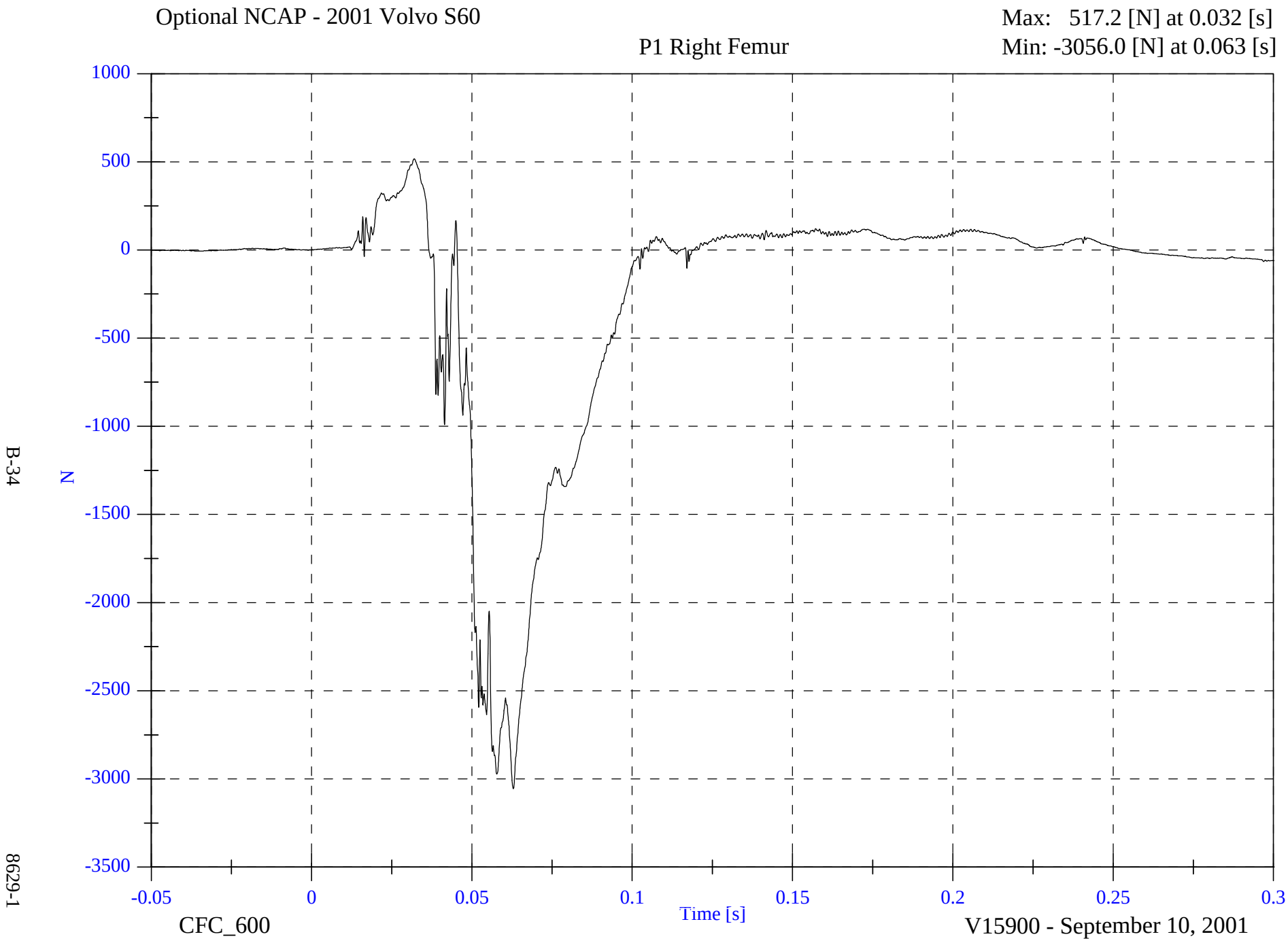

Optional NCAP - 2001 Volvo S60
P1 Pelvic z
Max: 3.6 [g] at 0.043 [s]
Min: -33.3 [g] at 0.067 [s]
5
0
-5
-10
-15
-20
-25
-30
-35
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

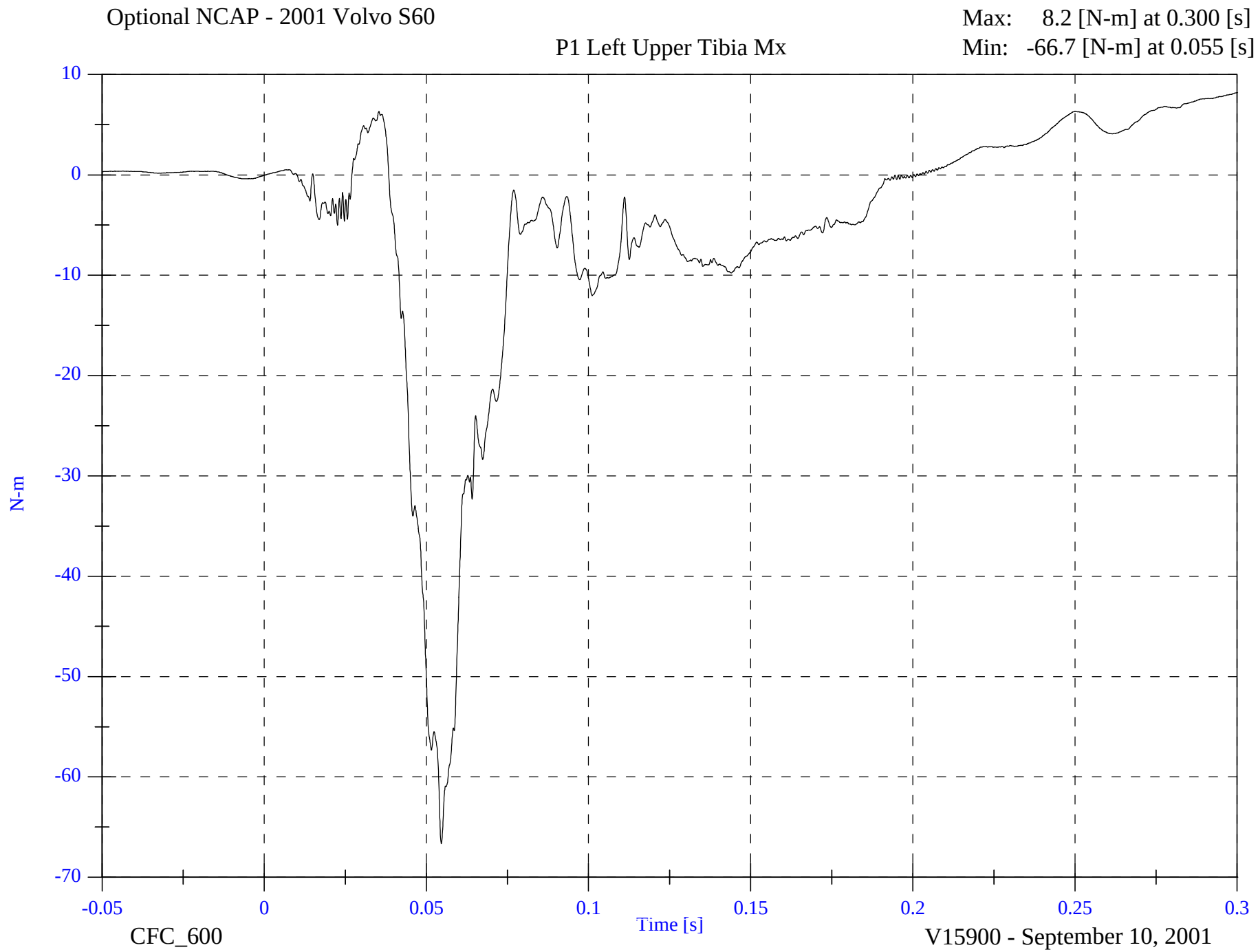
B-31

8629-1


Optional NCAP - 2001 Volvo S60
P1 Pelvic Resultant
Max: 74.8 [g] at 0.063 [s]
Min: 0.0 [g] at -0.033 [s]
80
70
60
50
40
30
20
10
0
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001
B-32
8629-1


Optional NCAP - 2001 Volvo S60
P1 Left Femur
Max: 494.8 [N] at 0.043 [s]
Min: -3604.5 [N] at 0.060 [s]
1000
0
-1000
-2000
-3000
-4000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001
B-33
8629-1

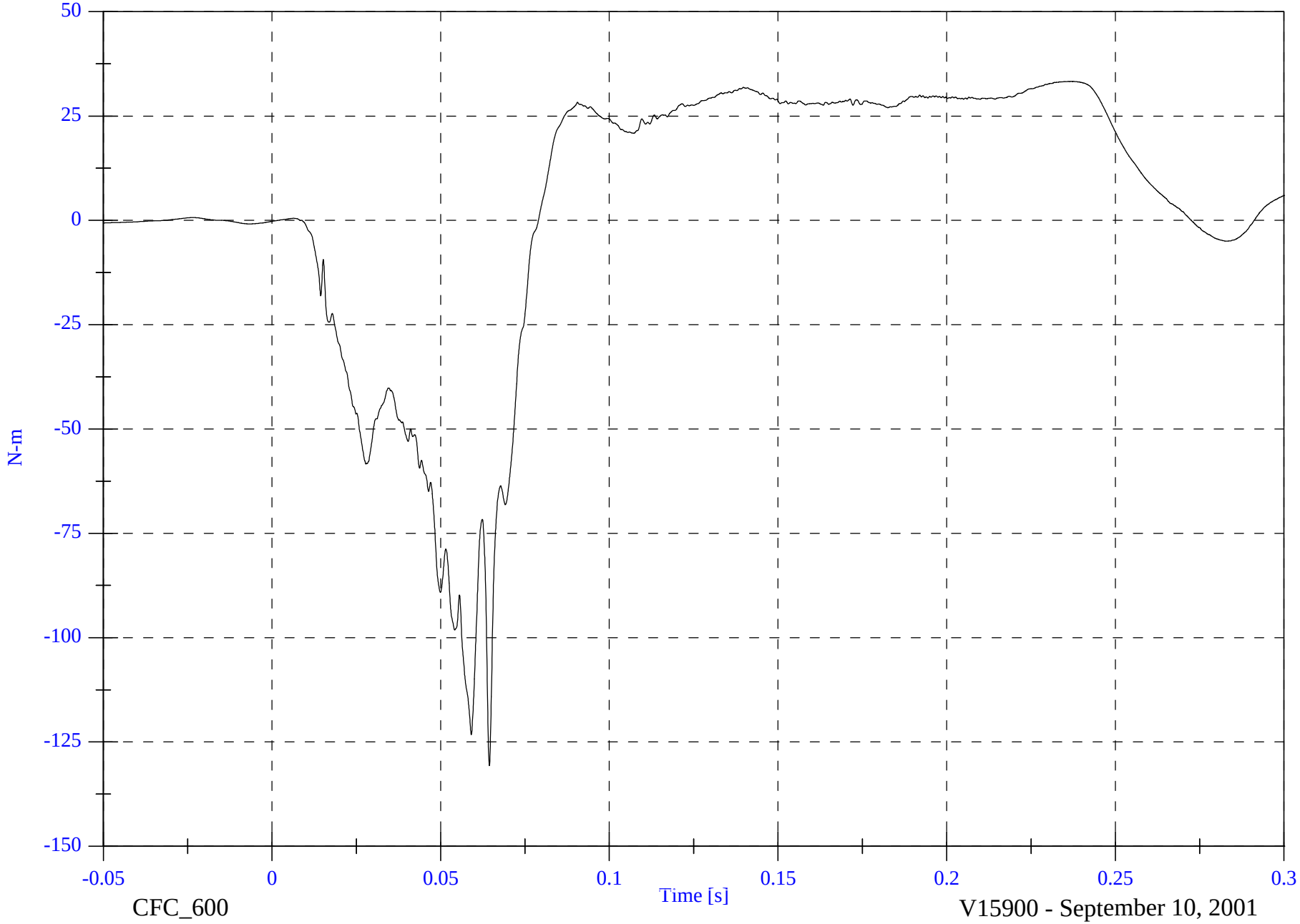

Optional NCAP - 2001 Volvo S60
P1 Right Femur
Max: 517.2 [N] at 0.032 [s]
Min: -3056.0 [N] at 0.063 [s]
1000
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Left Upper Tibia Mx
Max: 8.2 [N-m] at 0.300 [s]
Min: -66.7 [N-m] at 0.055 [s]
10
0
-10
-20
-30
-40
-50
-60
-70
N-m
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P1 Left Upper Tibia My

Max: 33.3 [N-m] at 0.237 [s]
Min: -130.7 [N-m] at 0.064 [s]



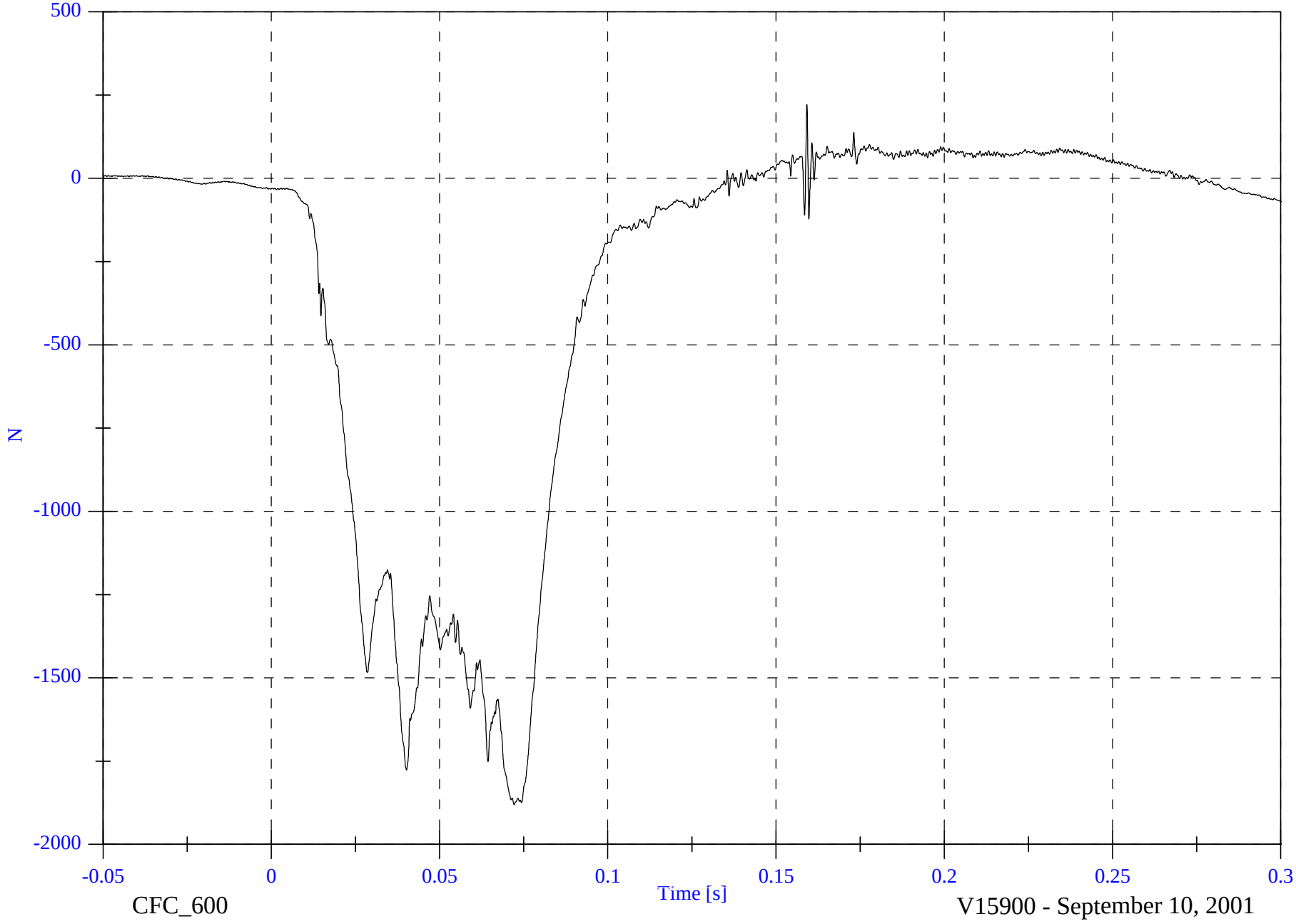
CFC_600

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P1 Left Lower Tibia Fz

Max: 221.8 [N] at 0.159 [s]
Min: -1881.2 [N] at 0.072 [s]

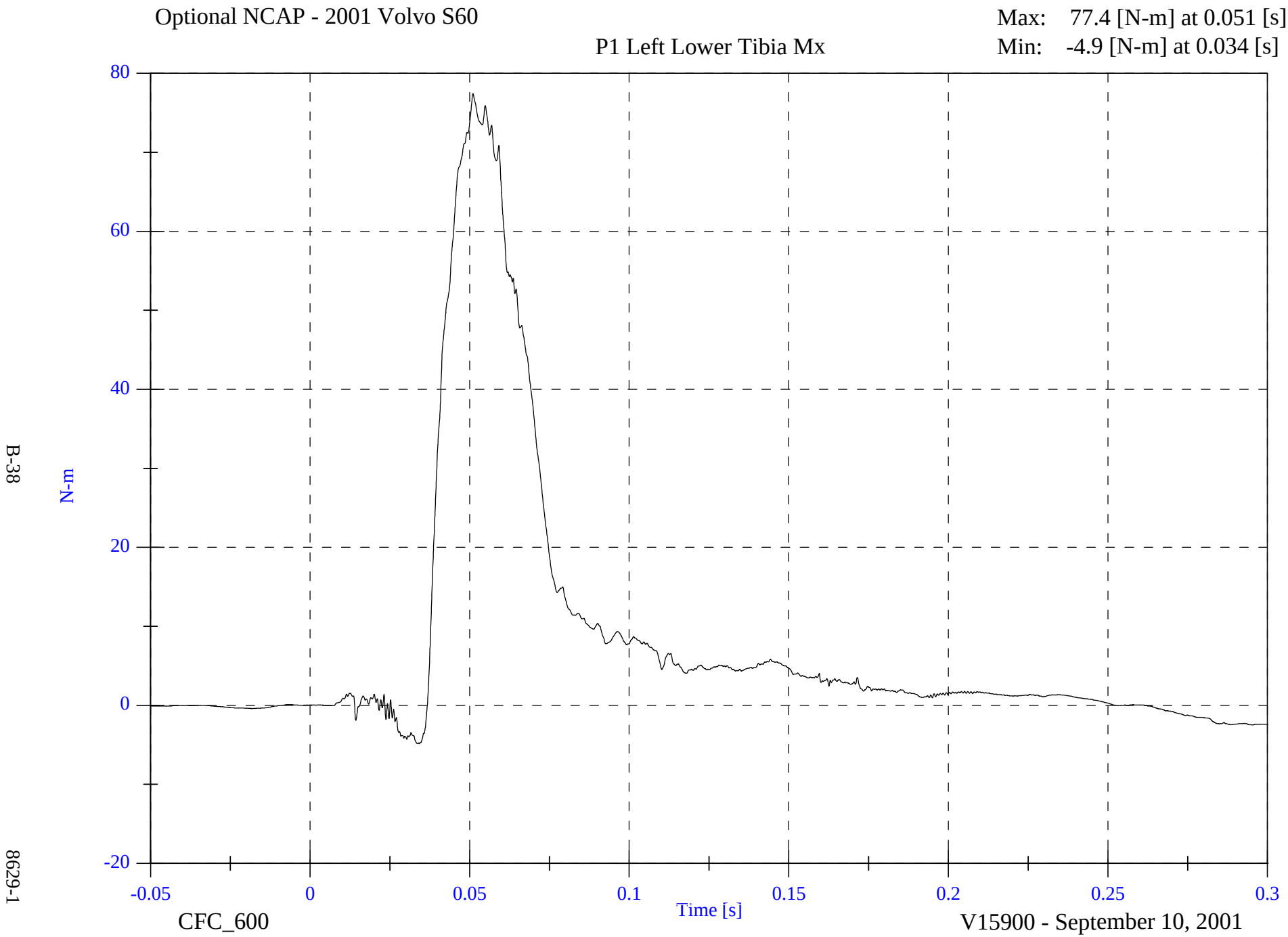


B-37

8629-1

CFC_600

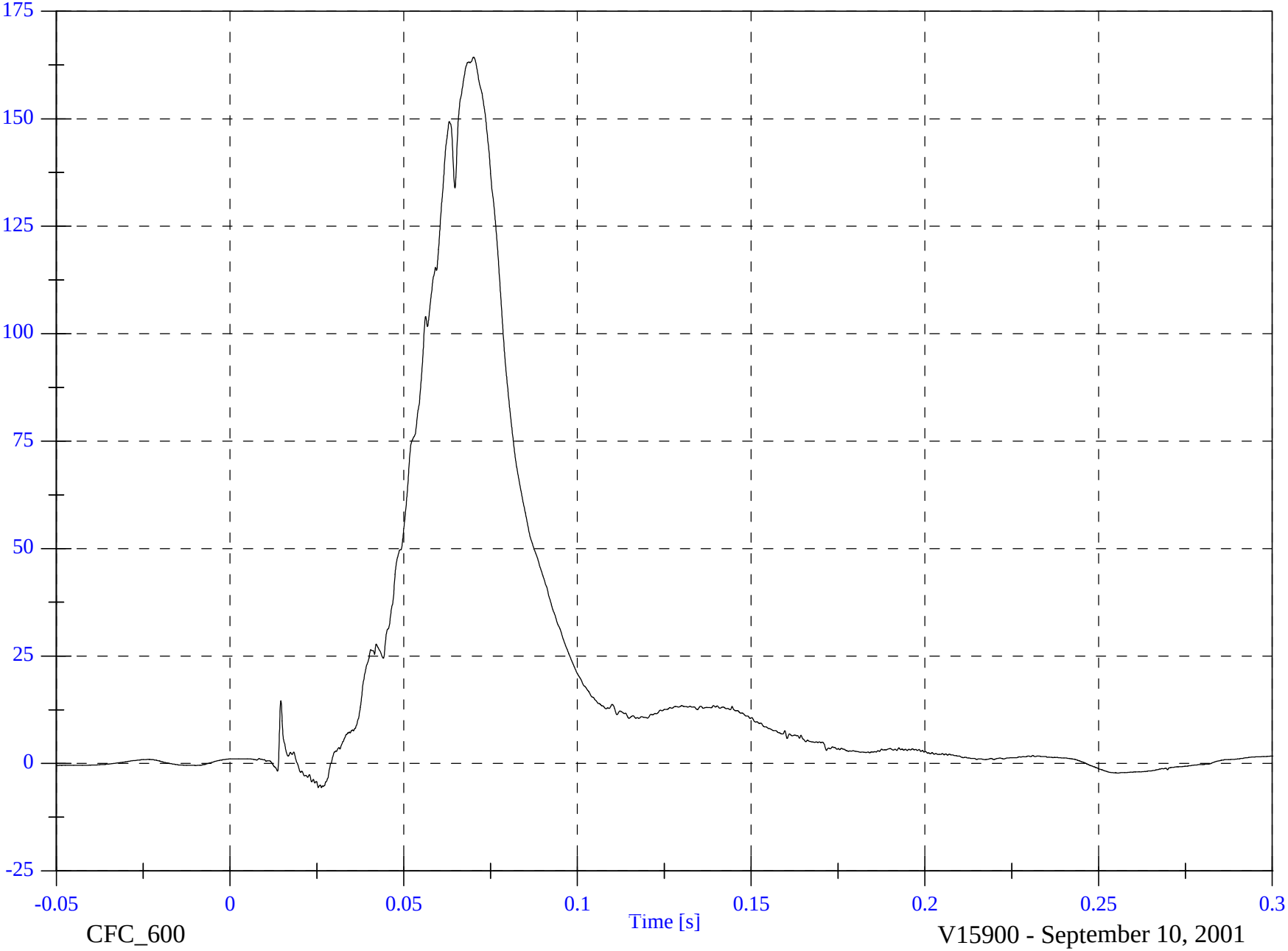
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Left Lower Tibia Mx
Max: 77.4 [N-m] at 0.051 [s]
Min: -4.9 [N-m] at 0.034 [s]
80
60
40
20
0
-20
N-m
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P1 Left Lower Tibia My

Max: 164.3 [N-m] at 0.070 [s]
Min: -5.6 [N-m] at 0.026 [s]



CFC_600

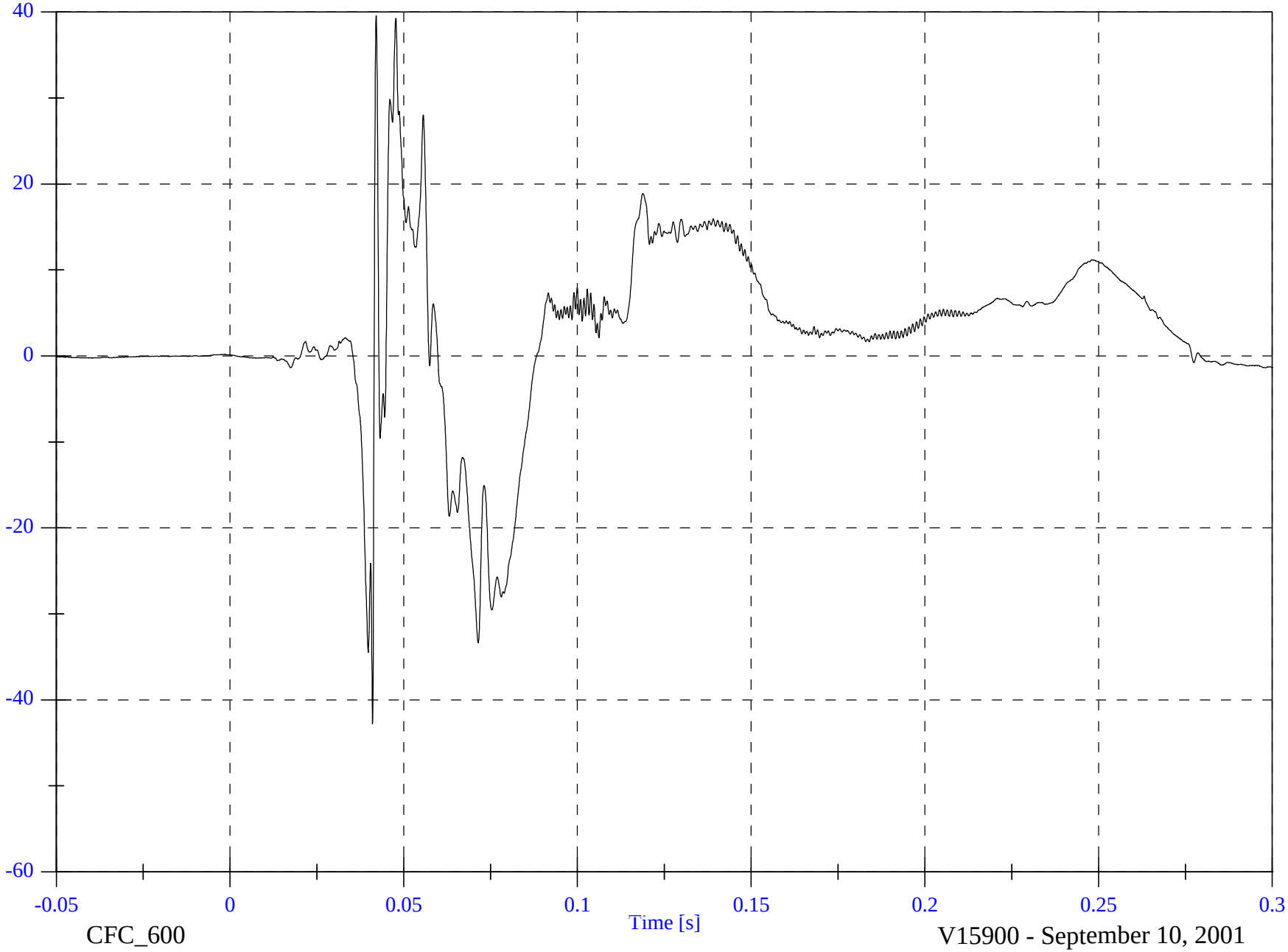
V15900 - September 10, 2001

8629-1

Optional NCAP - 2001 Volvo S60

P1 Right Upper Tibia Mx

Max: 39.6 [N-m] at 0.042 [s]
Min: -42.8 [N-m] at 0.041 [s]



CFC_600

V15900 - September 10, 2001

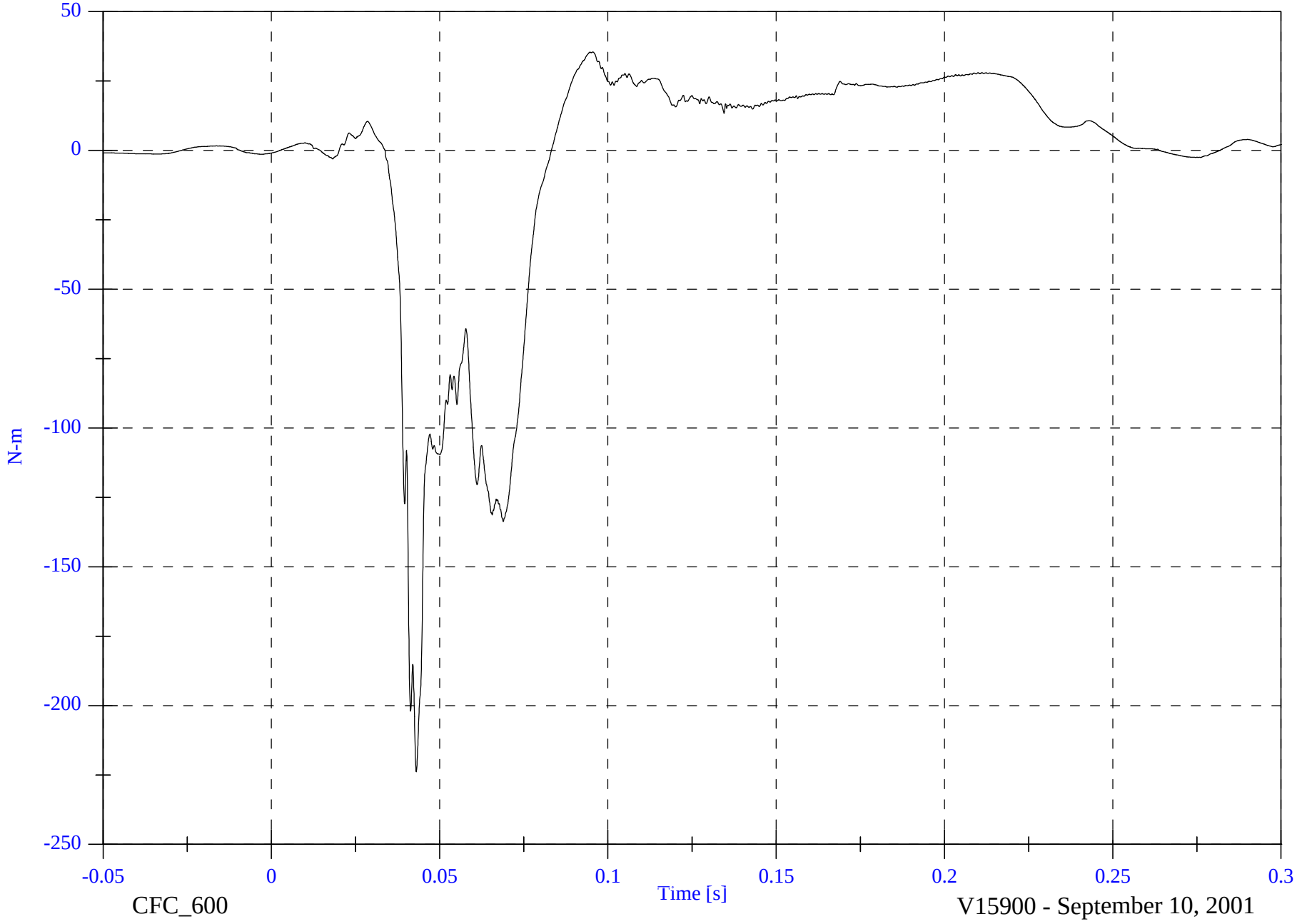
B-40

8629-1

Optional NCAP - 2001 Volvo S60

P1 Right Upper Tibia My

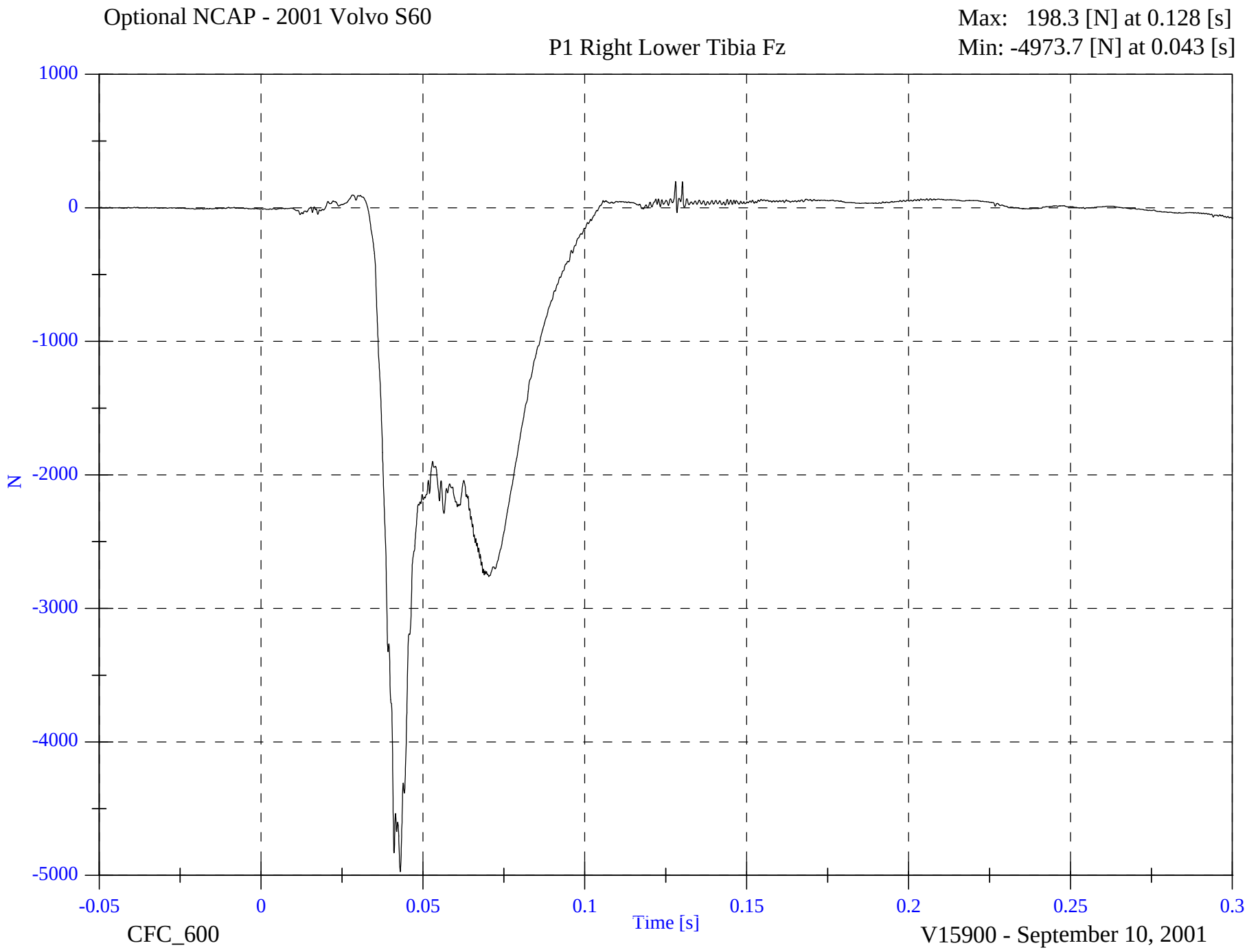
Max: 35.5 [N-m] at 0.096 [s]
Min: -223.9 [N-m] at 0.043 [s]



CFC_600

V15900 - September 10, 2001

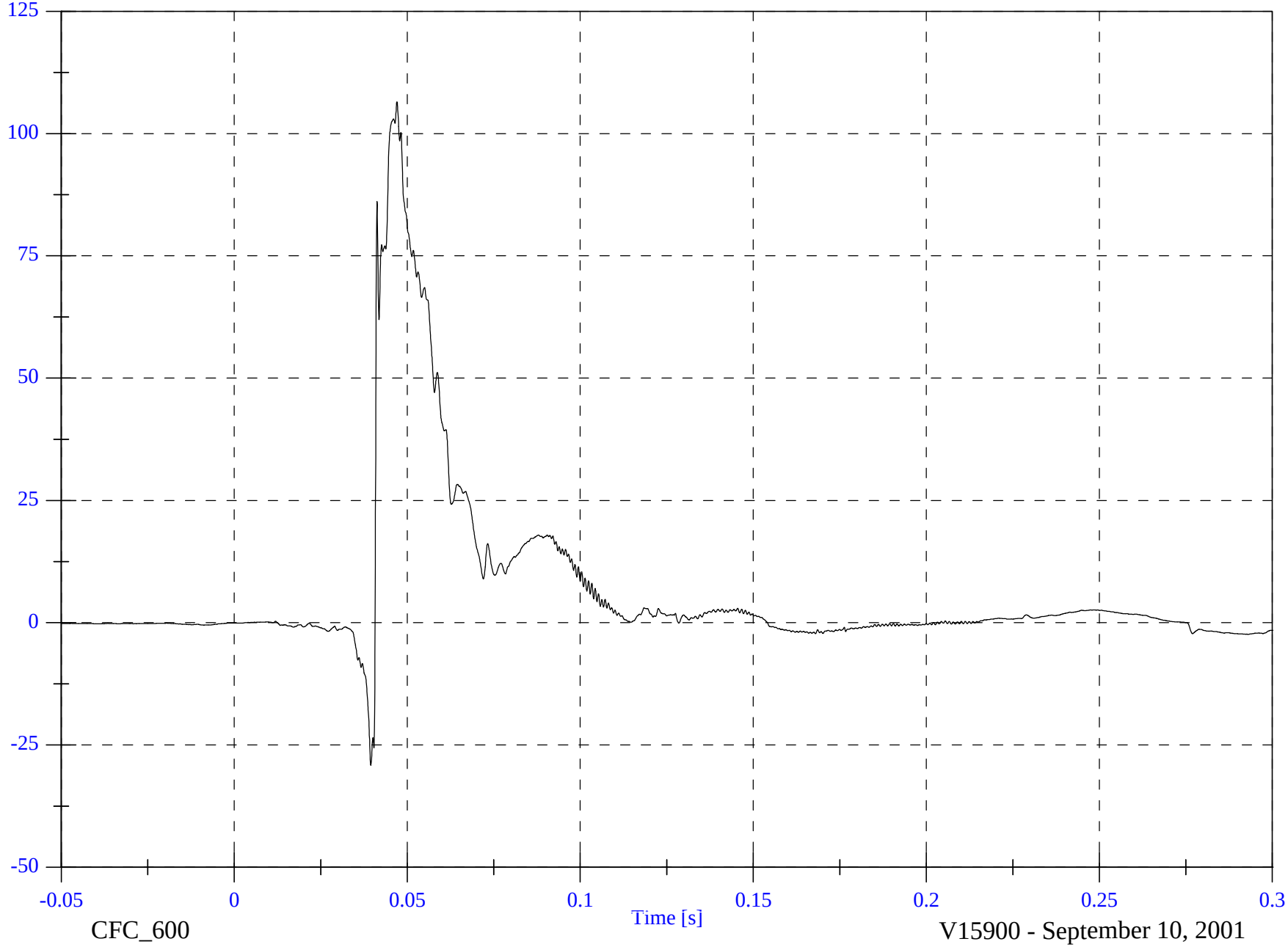
8629-1


Optional NCAP - 2001 Volvo S60
P1 Right Lower Tibia Fz
Max: 198.3 [N] at 0.128 [s]
Min: -4973.7 [N] at 0.043 [s]
1000
0
-1000
-2000
-3000
-4000
-5000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P1 Right Lower Tibia Mx

Max: 106.5 [N-m] at 0.047 [s]
Min: -29.2 [N-m] at 0.039 [s]

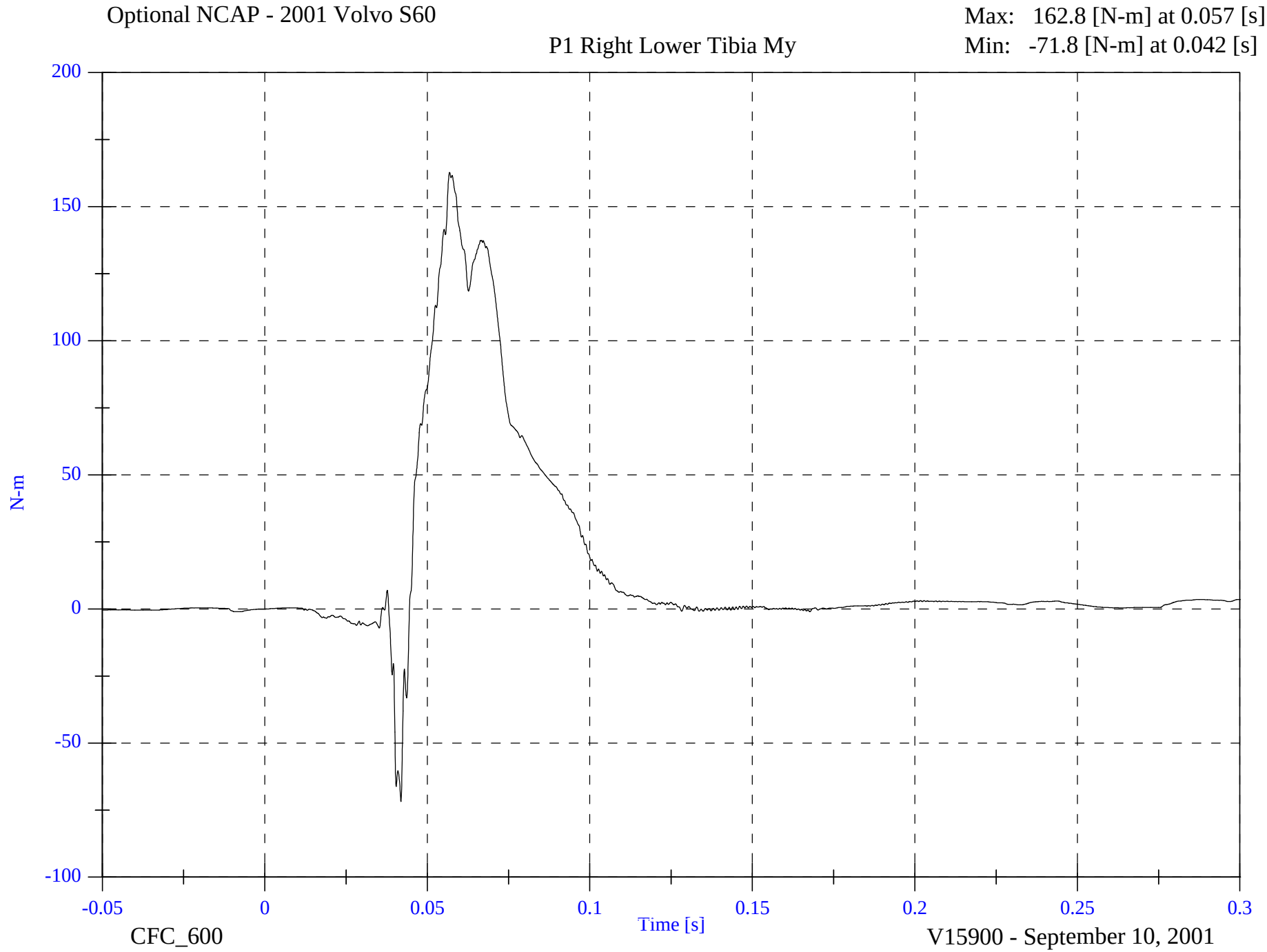


B-43

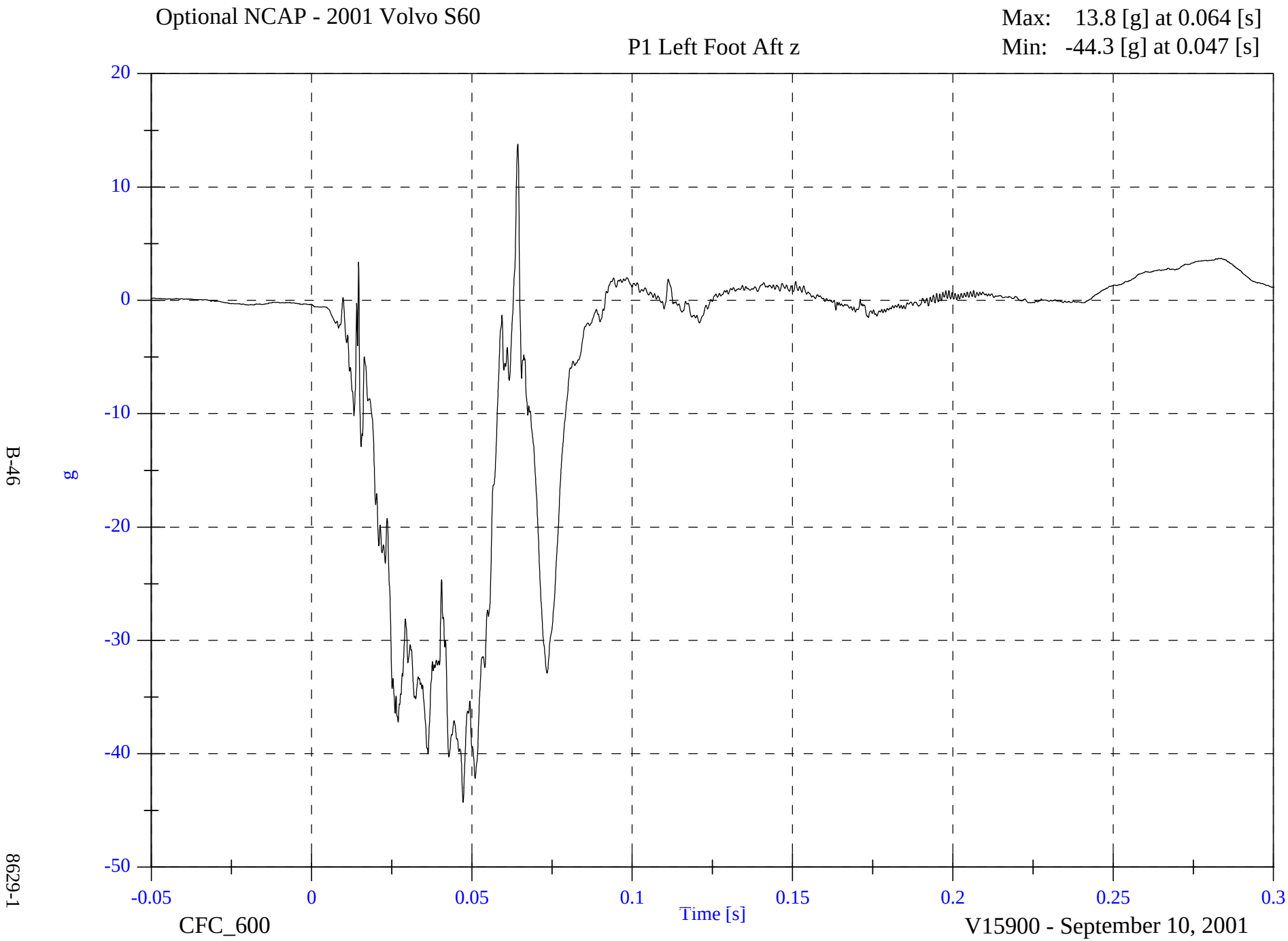
8629-1

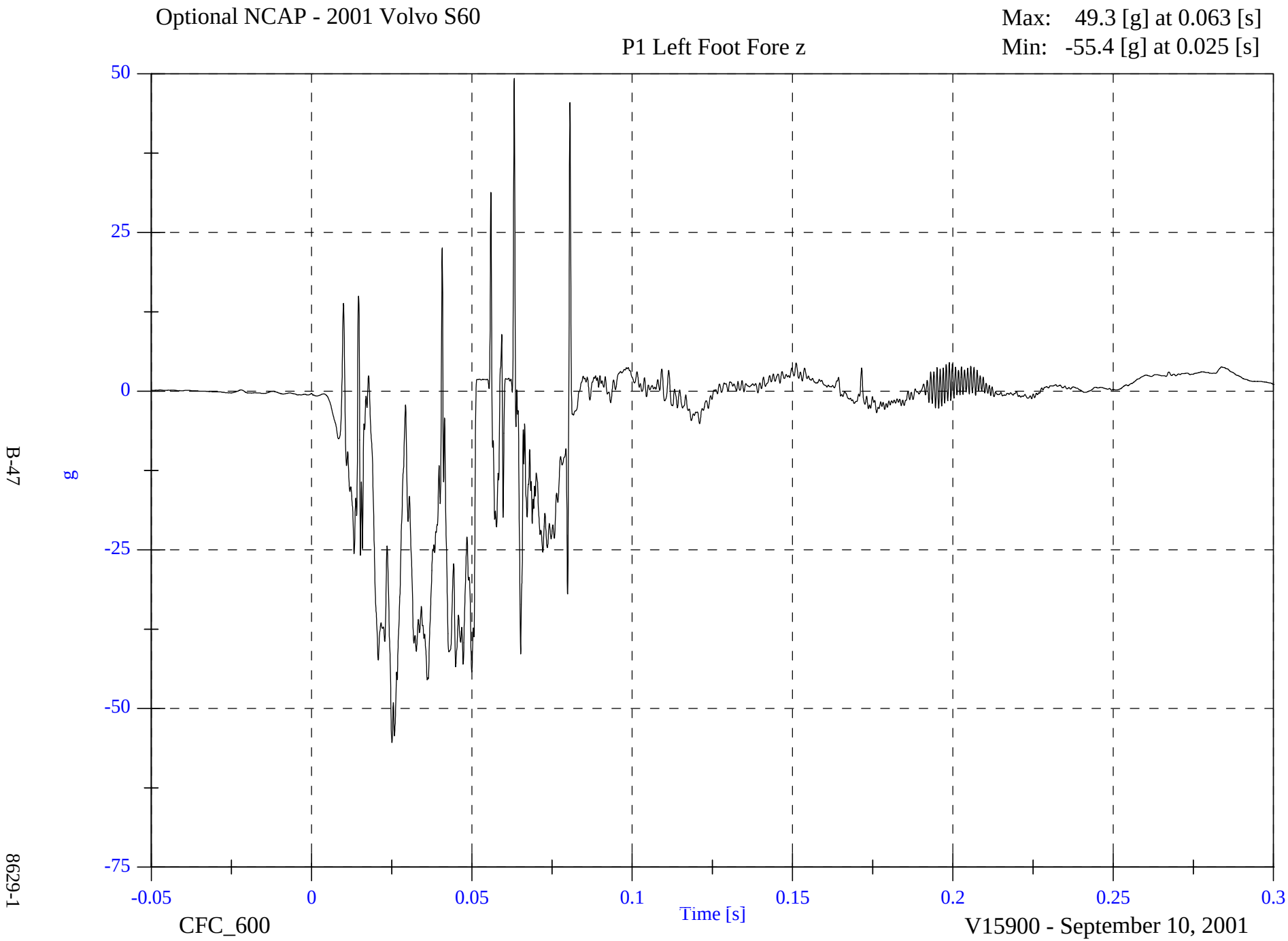
CFC_600

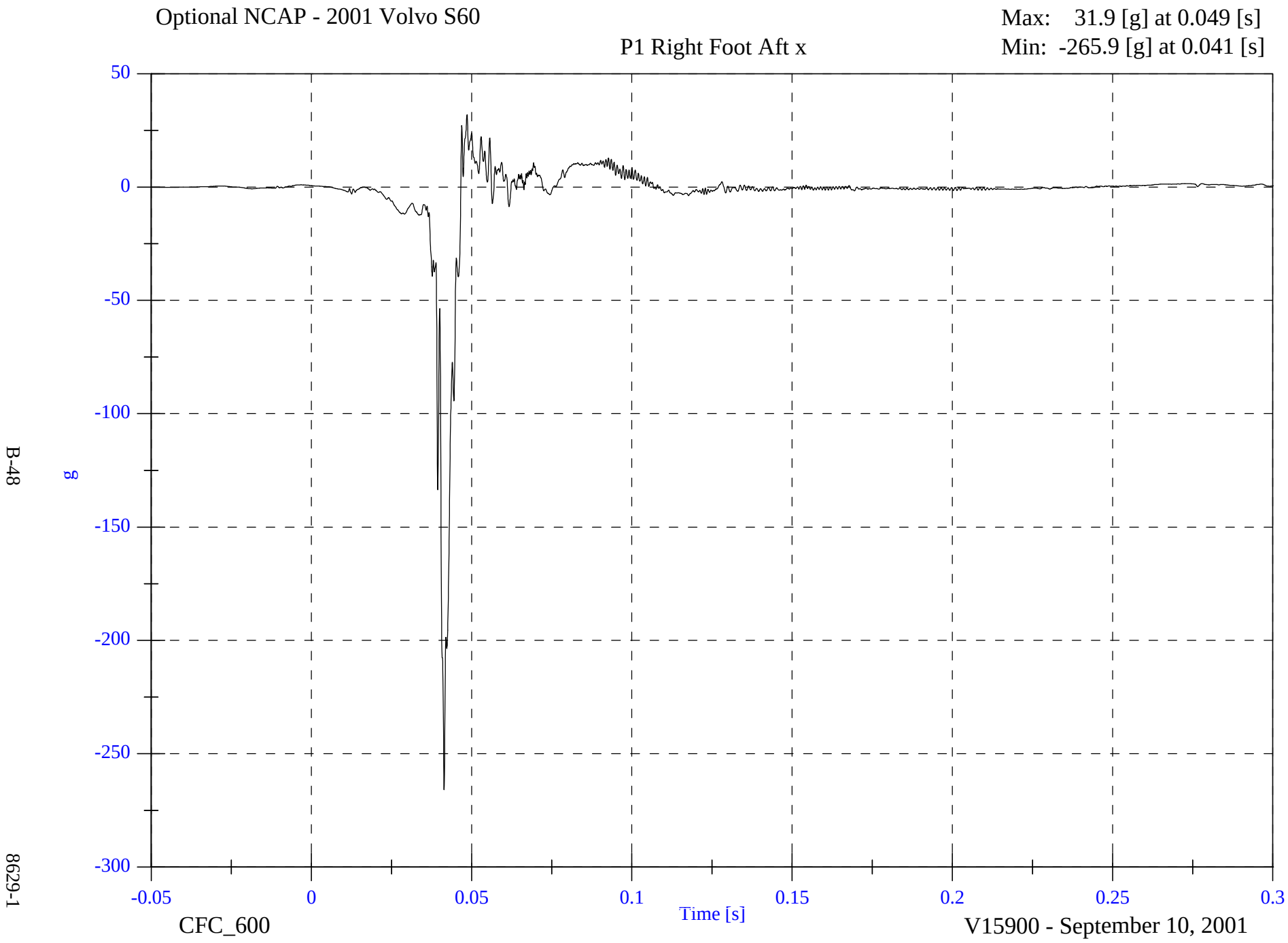
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Right Lower Tibia My
Max: 162.8 [N-m] at 0.057 [s]
Min: -71.8 [N-m] at 0.042 [s]
200
150
100
50
0
-50
-100
N-m
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Left Foot Aft x
Max: 16.2 [g] at 0.065 [s]
Min: -32.4 [g] at 0.027 [s]
20
10
0
-10
-20
-30
-40
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Left Foot Aft z
Max: 13.8 [g] at 0.064 [s]
Min: -44.3 [g] at 0.047 [s]
20
10
0
-10
-20
-30
-40
-50
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001

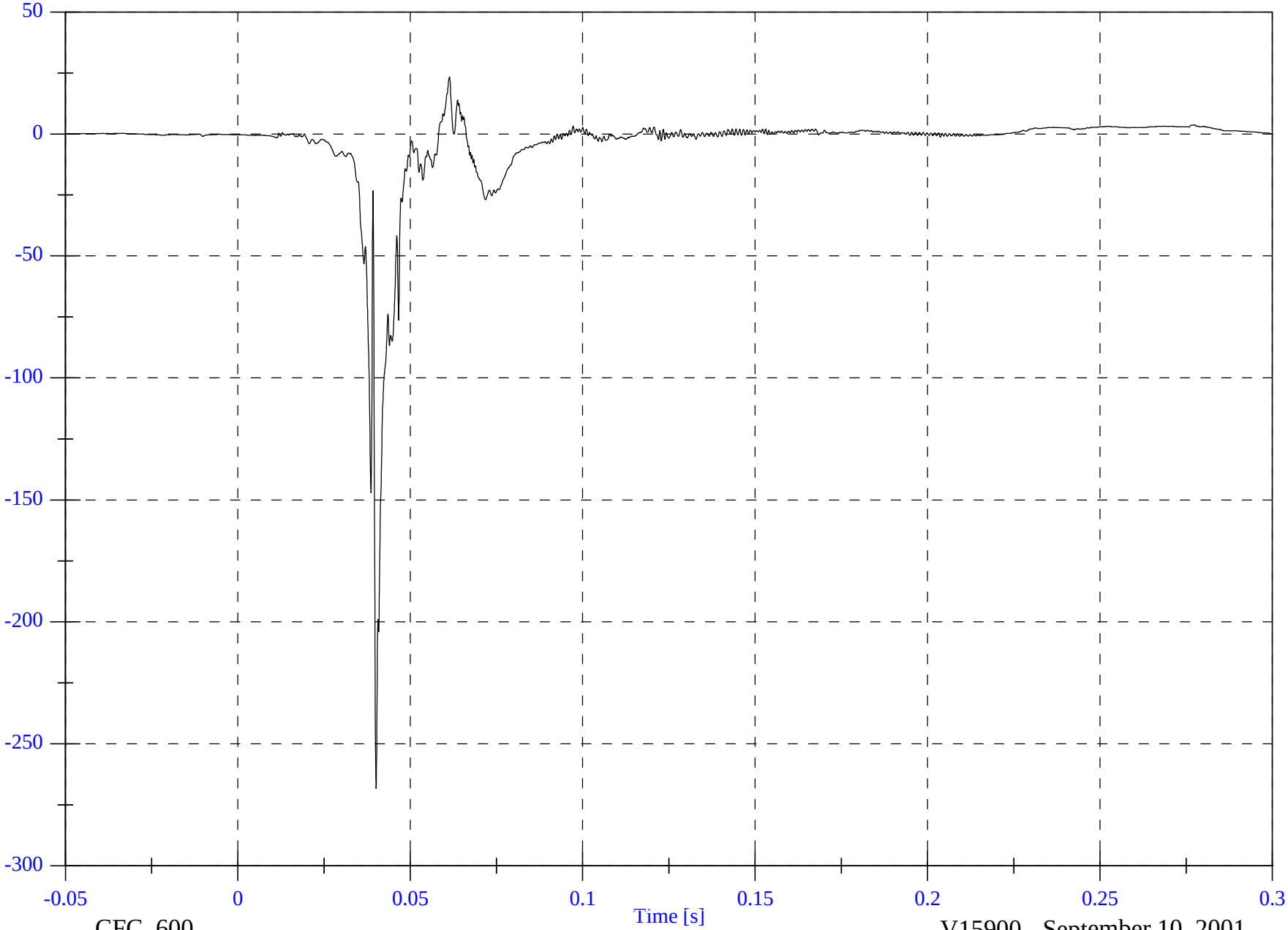

Optional NCAP - 2001 Volvo S60
P1 Left Foot Fore z
Max: 49.3 [g] at 0.063 [s]
Min: -55.4 [g] at 0.025 [s]
50
25
0
-25
-50
-75
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001
B-47
8629-1


Optional NCAP - 2001 Volvo S60
P1 Right Foot Aft x
Max: 31.9 [g] at 0.049 [s]
Min: -265.9 [g] at 0.041 [s]
50
0
-50
-100
-150
-200
-250
-300
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001
B-48
8629-1

Optional NCAP - 2001 Volvo S60

P1 Right Foot Aft z

Max: 23.3 [g] at 0.061 [s]
Min: -268.3 [g] at 0.040 [s]

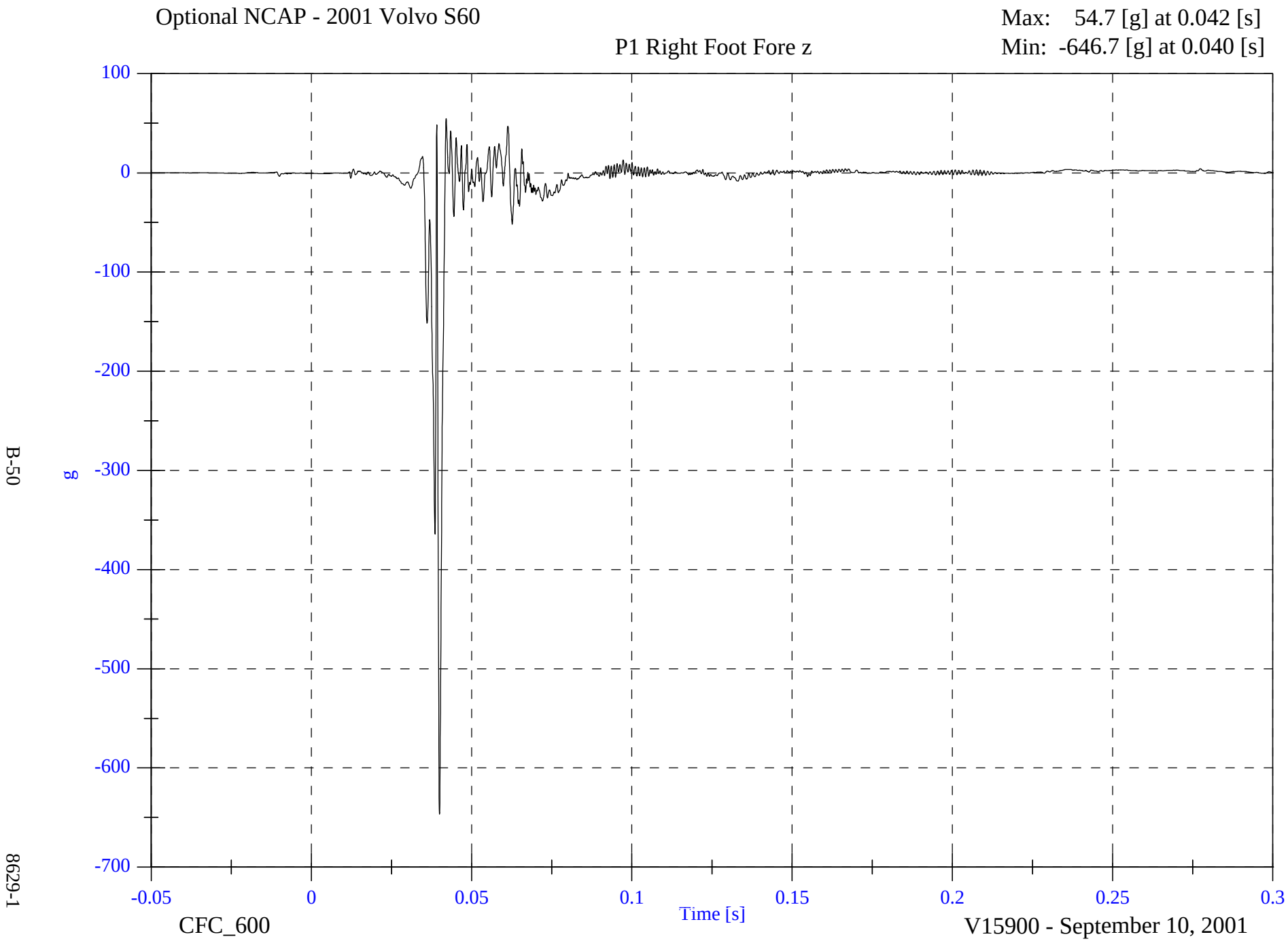


B-49

8629-1

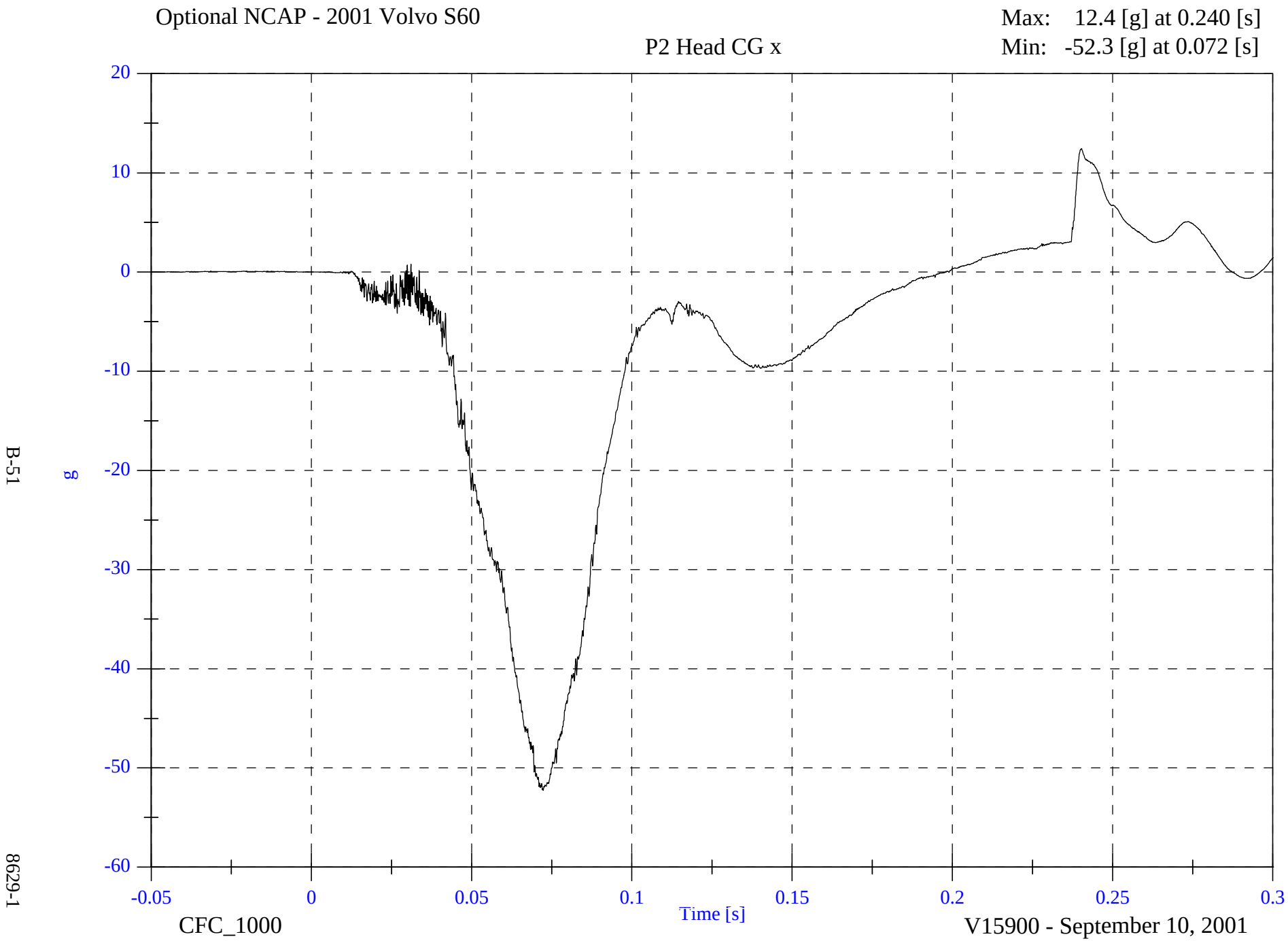
CFC_600

V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P1 Right Foot Fore z
Max: 54.7 [g] at 0.042 [s]
Min: -646.7 [g] at 0.040 [s]
100
0
-100
-200
-300
-400
-500
-600
-700
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001

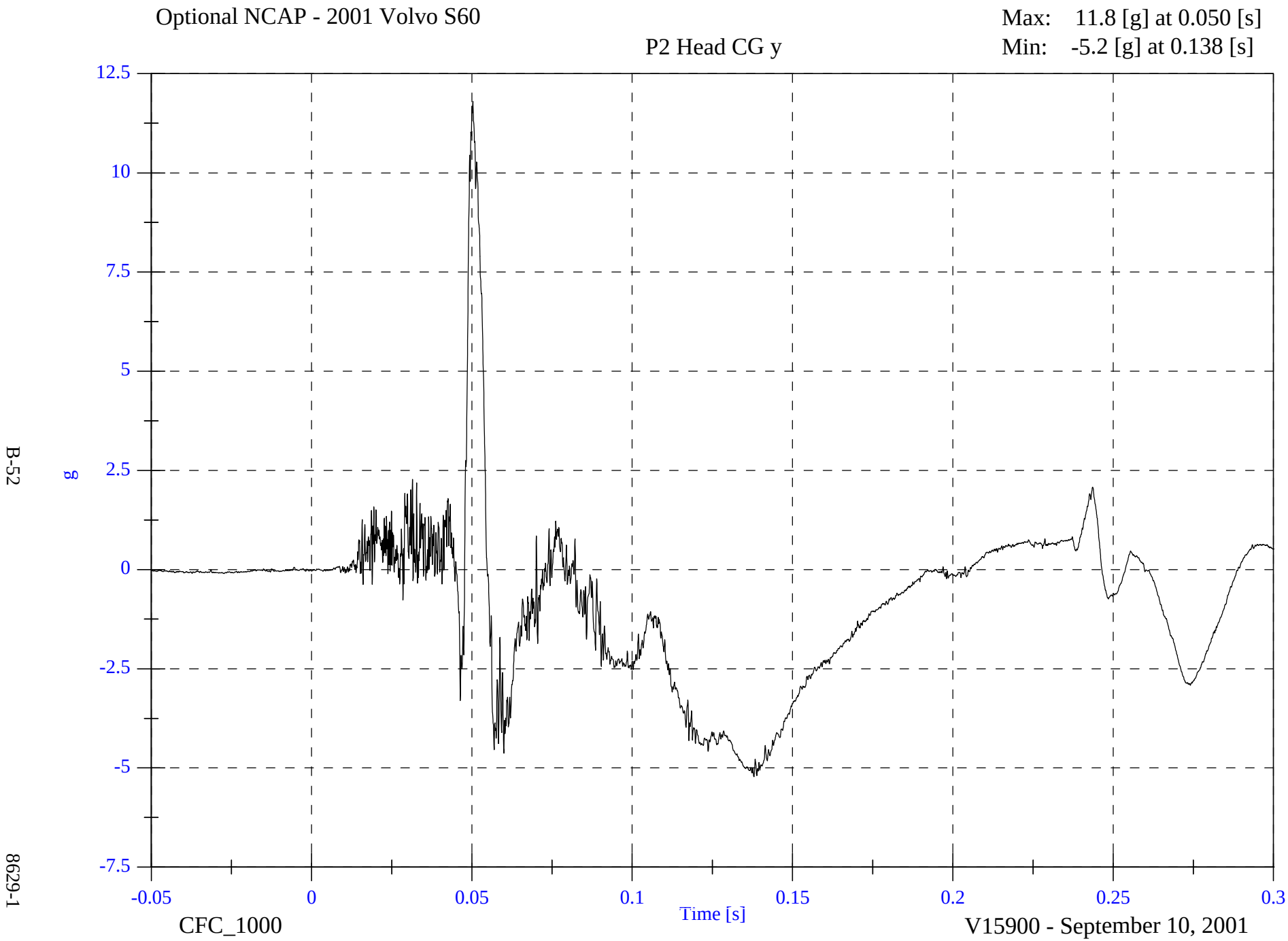
B-50

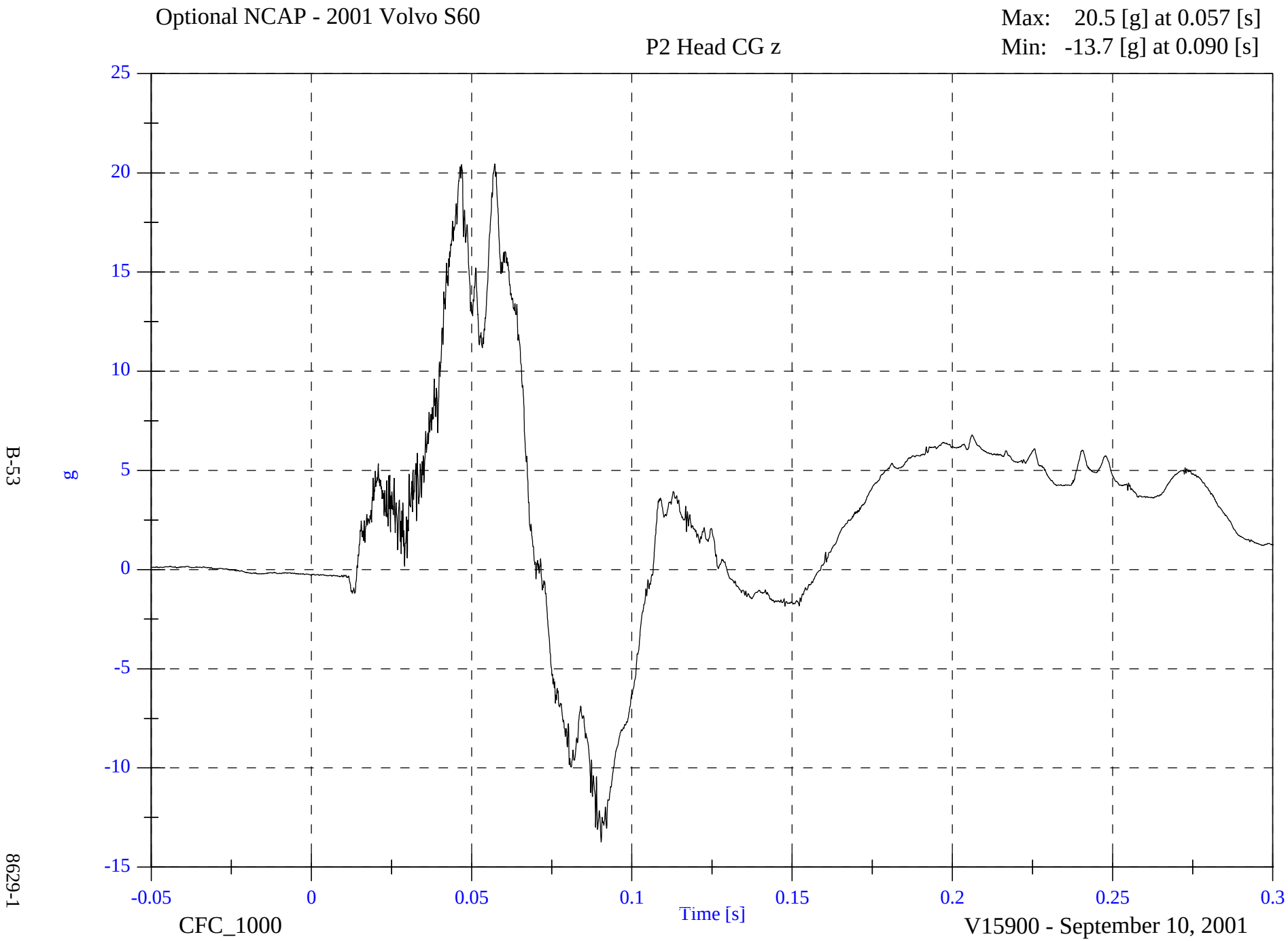
8629-1


Optional NCAP - 2001 Volvo S60
P2 Head CG x
Max: 12.4 [g] at 0.240 [s]
Min: -52.3 [g] at 0.072 [s]
20
10
0
-10
-20
-30
-40
-50
-60
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

B-51

8629-1

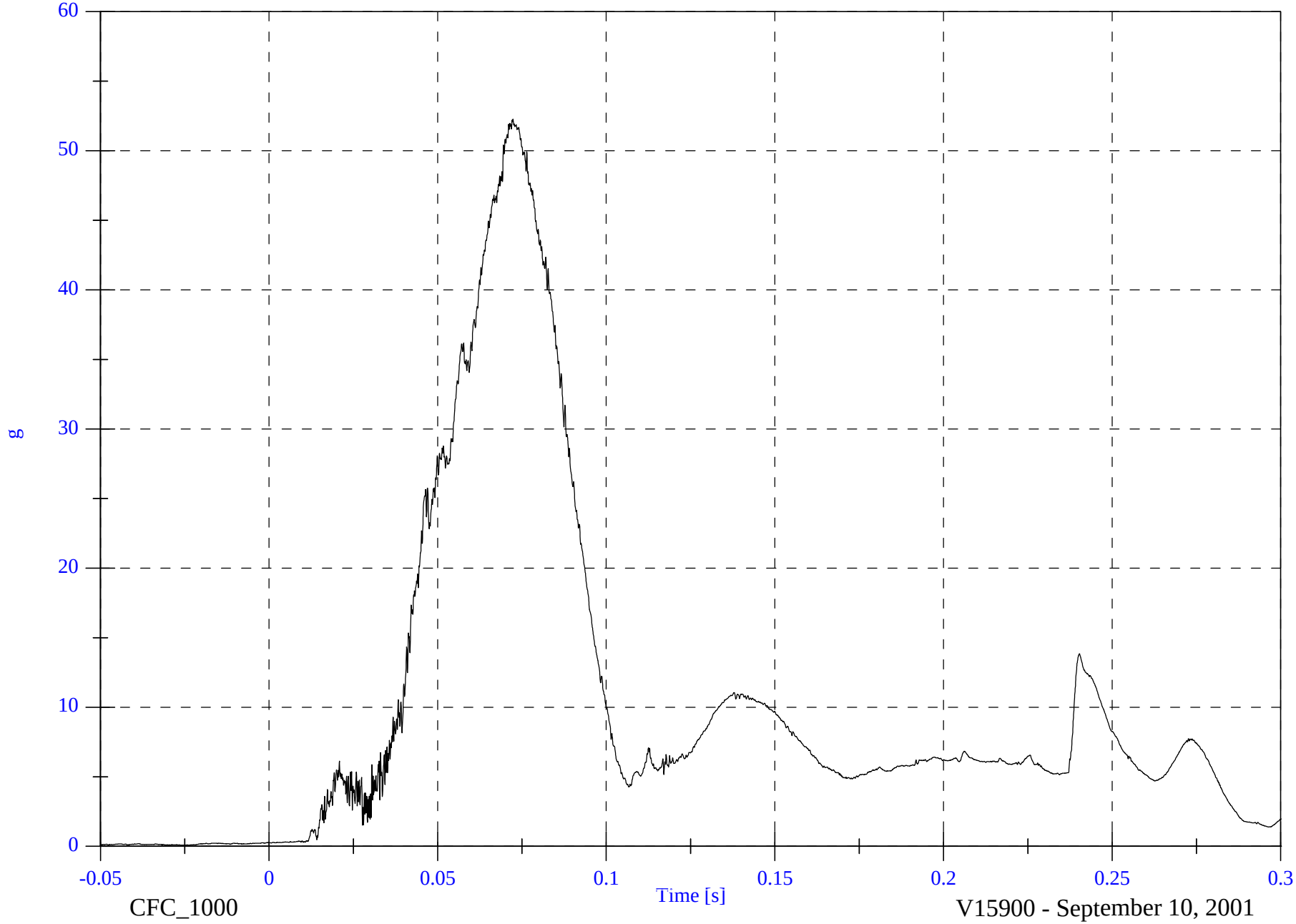

Optional NCAP - 2001 Volvo S60
P2 Head CG y
Max: 11.8 [g] at 0.050 [s]
Min: -5.2 [g] at 0.138 [s]
12.5
10
7.5
5
2.5
0
-2.5
-5
-7.5
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001
B-52
8629-1


Optional NCAP - 2001 Volvo S60
P2 Head CG z
Max: 20.5 [g] at 0.057 [s]
Min: -13.7 [g] at 0.090 [s]
25
20
15
10
5
0
-5
-10
-15
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001
B-53
8629-1

Optional NCAP - 2001 Volvo S60

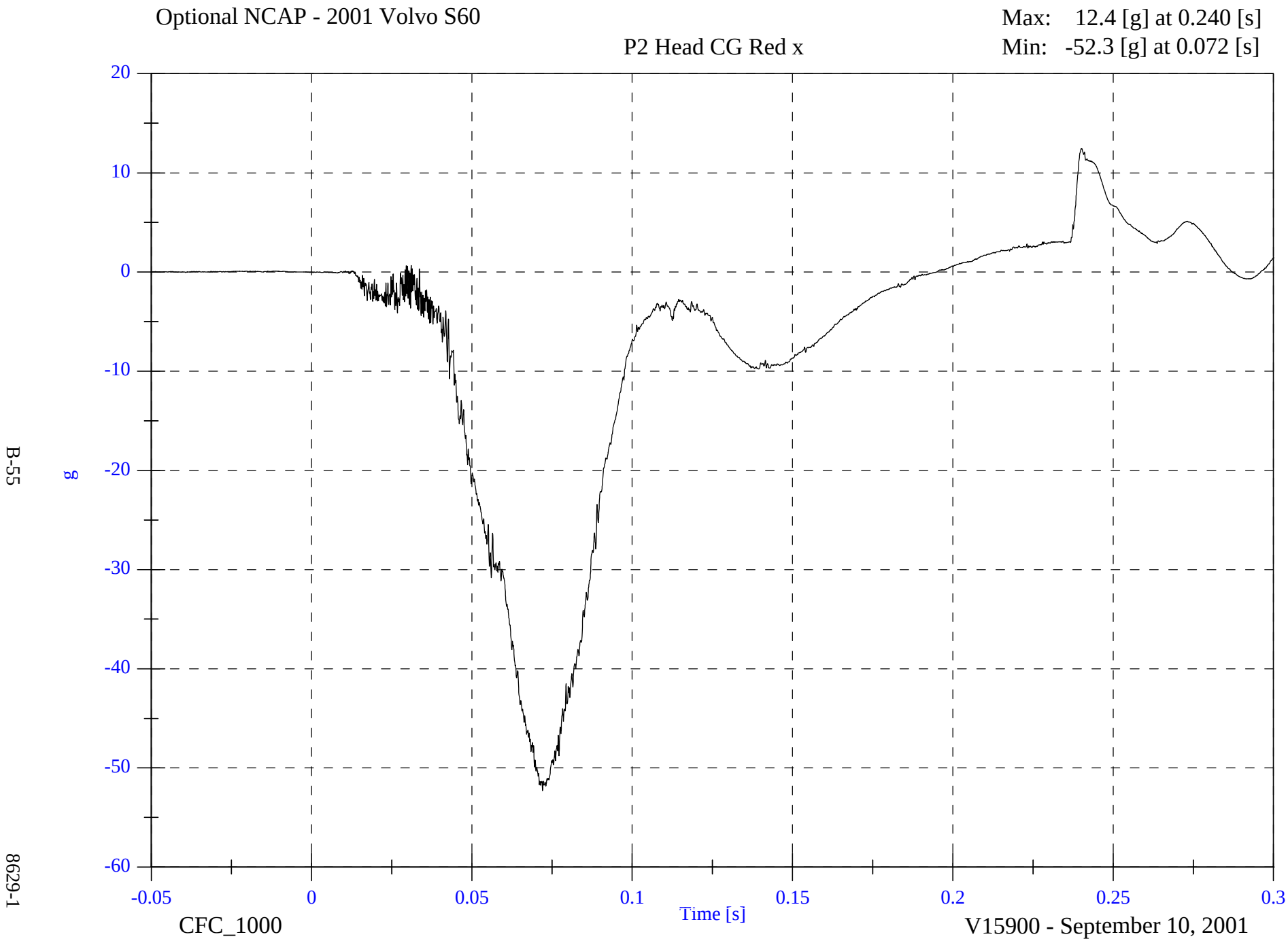
P2 Head CG Resultant

Max: 52.3 [g] at 0.072 [s]
Min: 0.1 [g] at -0.026 [s]



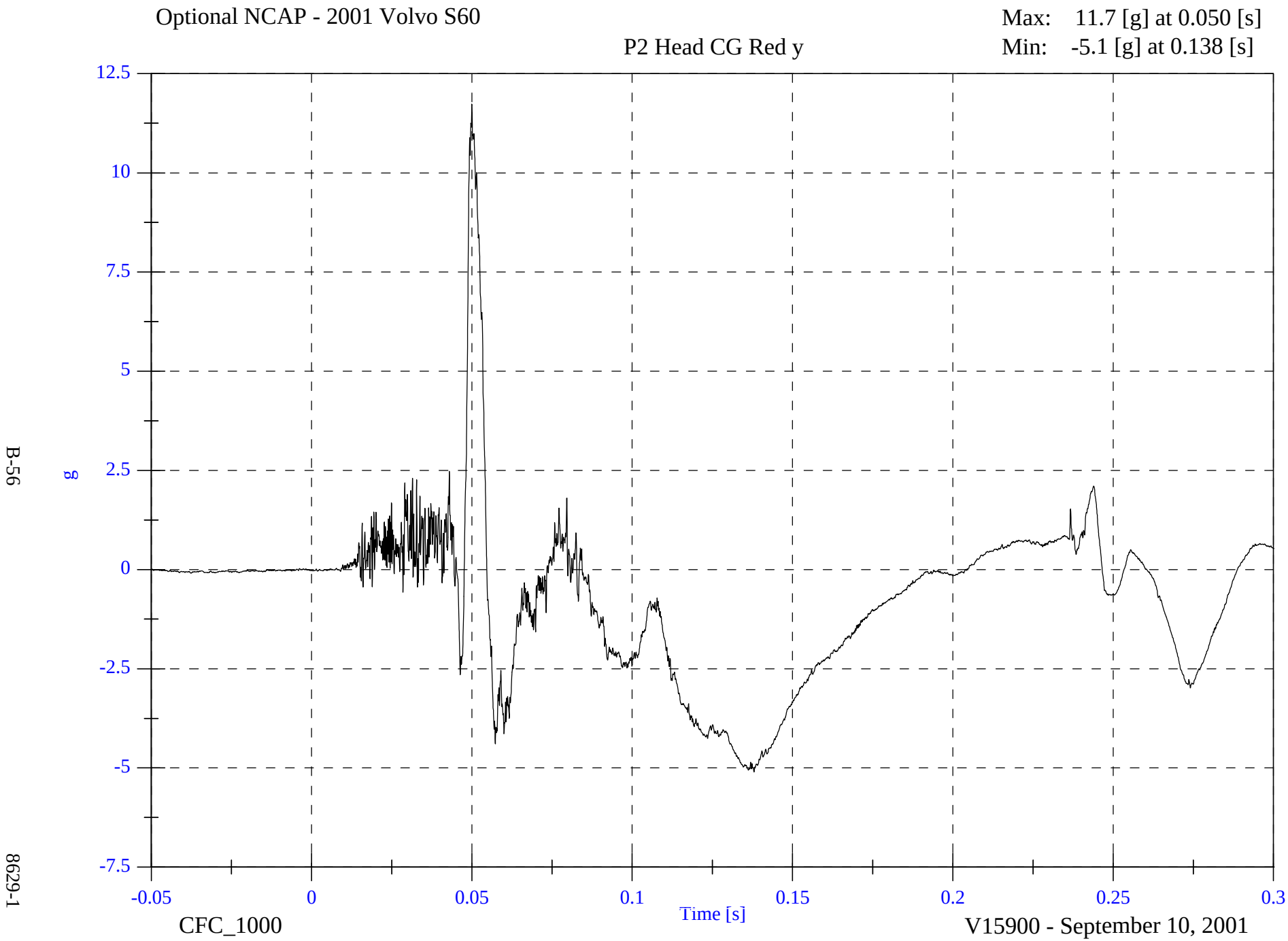
CFC_1000

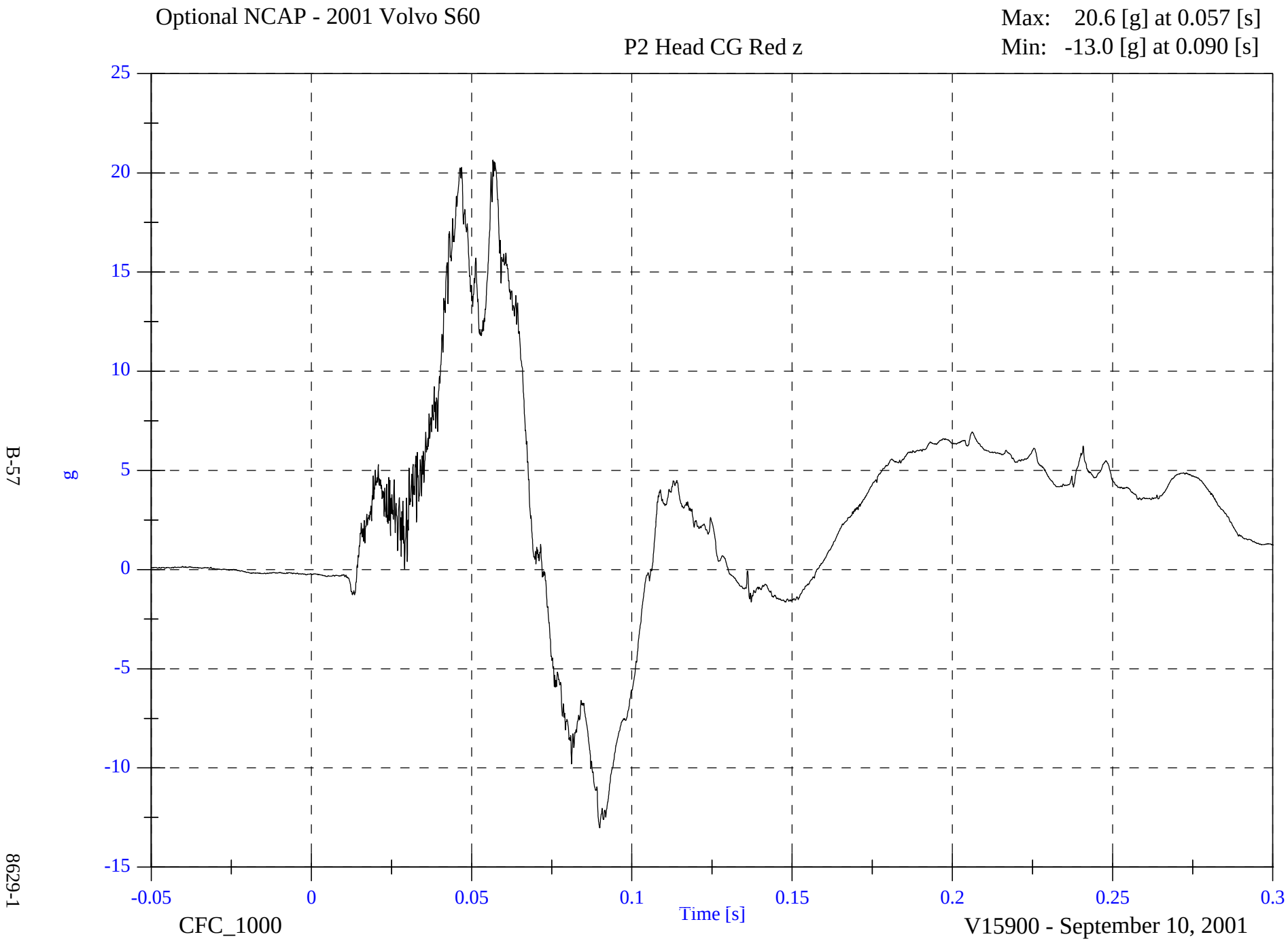
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Head CG Red x
Max: 12.4 [g] at 0.240 [s]
Min: -52.3 [g] at 0.072 [s]
20
10
0
-10
-20
-30
-40
-50
-60
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

B-55

8629-1


Optional NCAP - 2001 Volvo S60
P2 Head CG Red y
Max: 11.7 [g] at 0.050 [s]
Min: -5.1 [g] at 0.138 [s]
12.5
10
7.5
5
2.5
0
-2.5
-5
-7.5
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-56
8629-1
CFC_1000
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Head CG Red z
Max: 20.6 [g] at 0.057 [s]
Min: -13.0 [g] at 0.090 [s]
25
20
15
10
5
0
-5
-10
-15
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

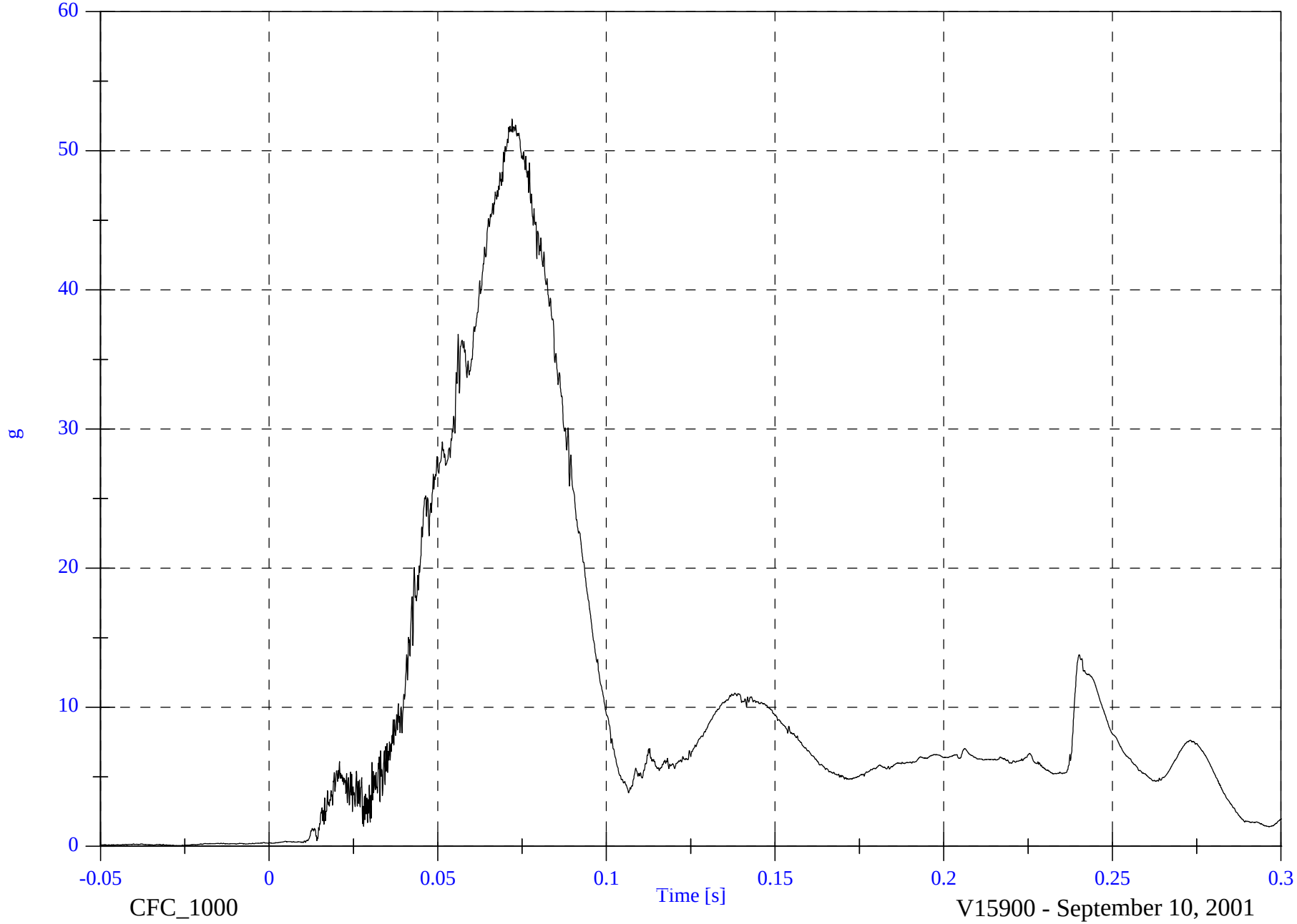
B-57

8629-1

Optional NCAP - 2001 Volvo S60

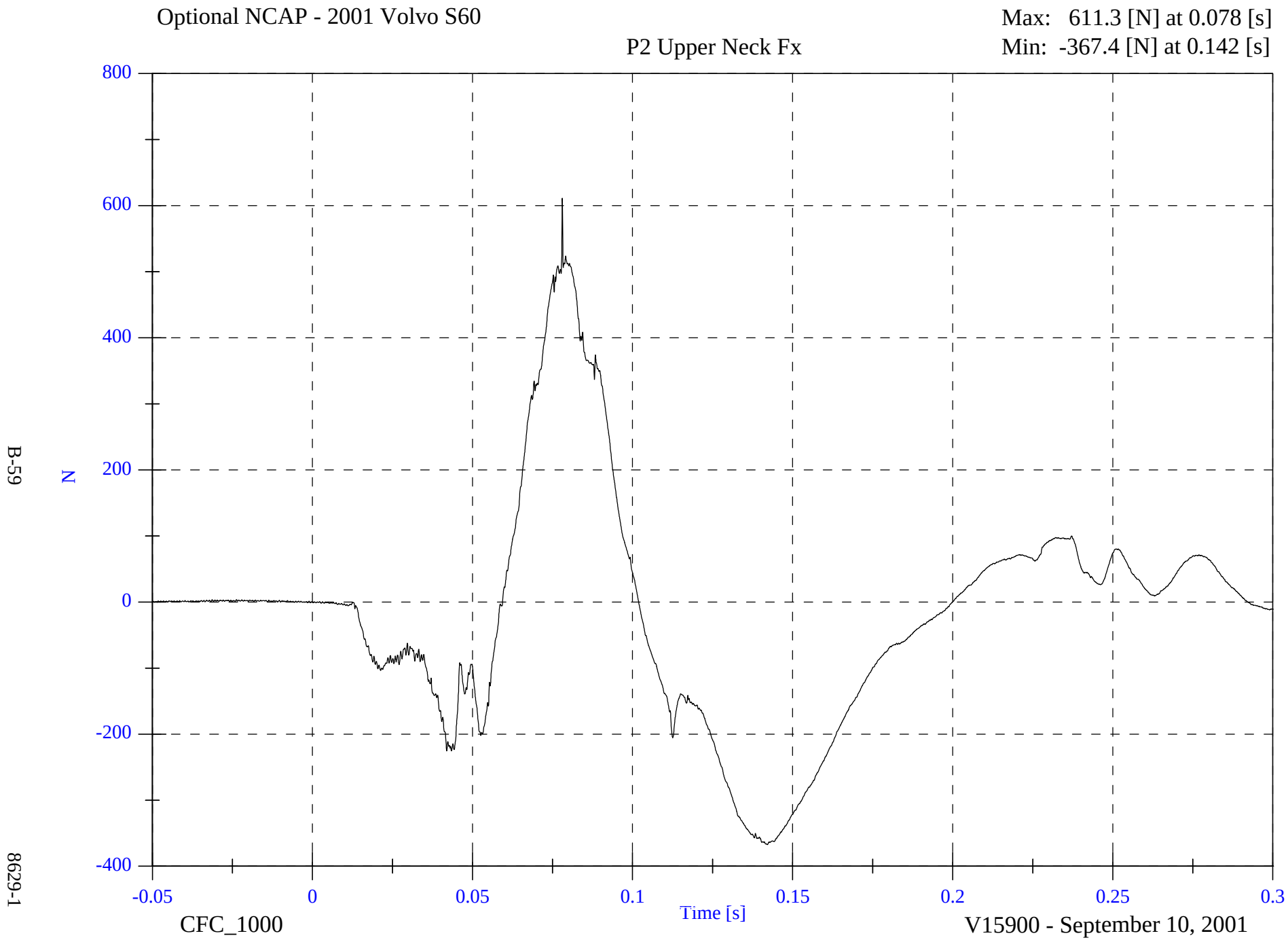
P2 Head CG Red Resultant

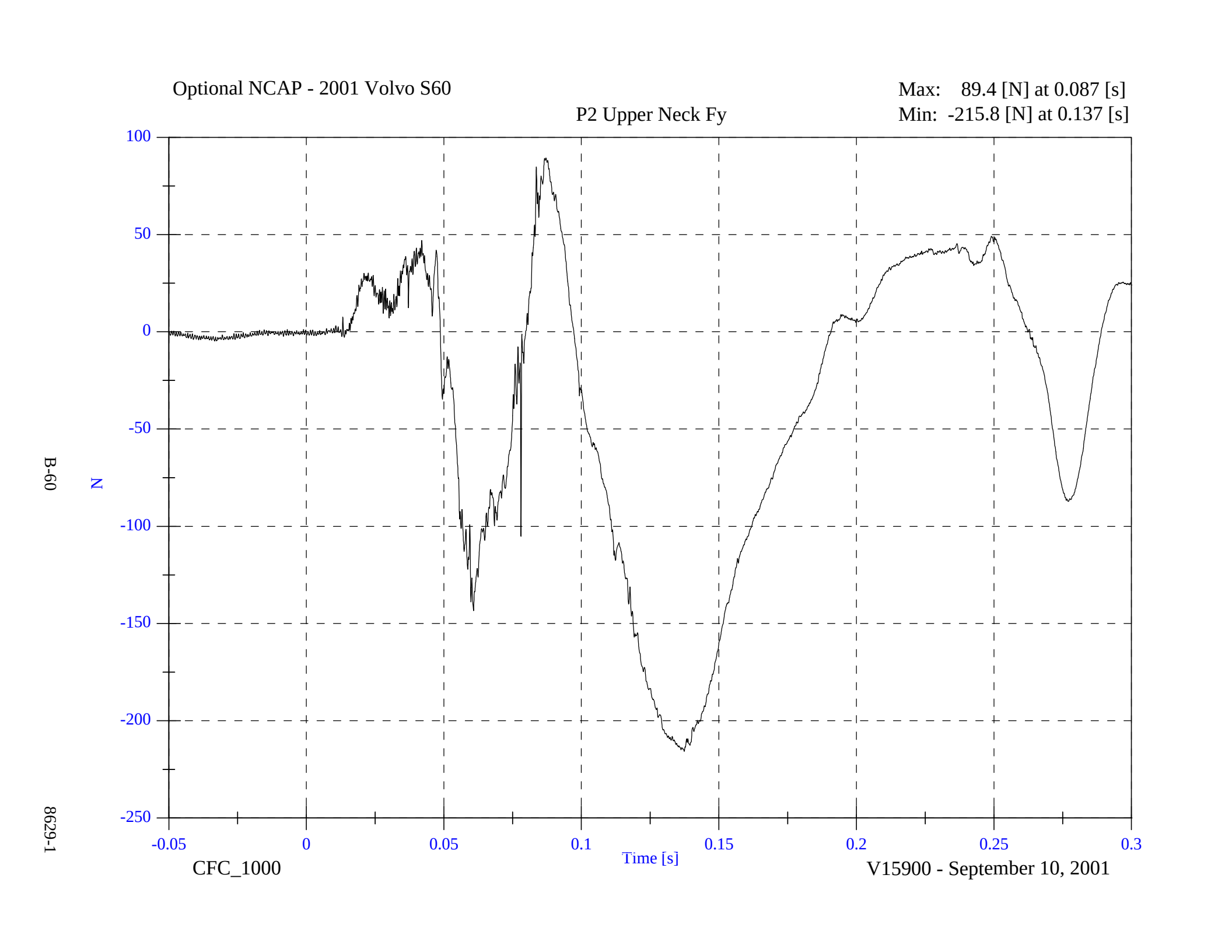
Max: 52.3 [g] at 0.072 [s]
Min: 0.0 [g] at -0.028 [s]



CFC_1000

V15900 - September 10, 2001

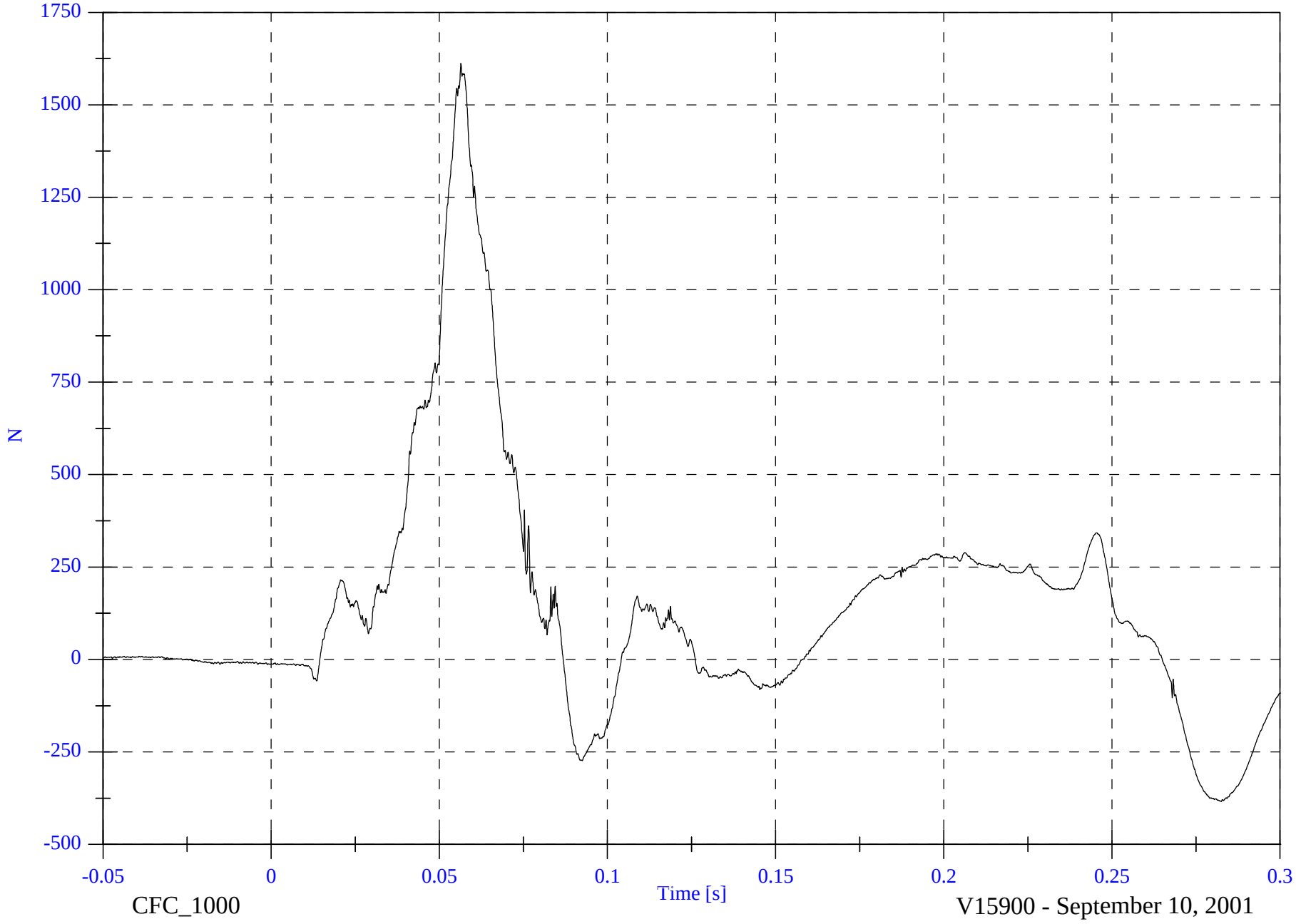

Optional NCAP - 2001 Volvo S60
P2 Upper Neck Fx
Max: 611.3 [N] at 0.078 [s]
Min: -367.4 [N] at 0.142 [s]
800
600
400
200
0
-200
-400
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001
B-59
8629-1


Optional NCAP - 2001 Volvo S60
P2 Upper Neck Fy
Max: 89.4 [N] at 0.087 [s]
Min: -215.8 [N] at 0.137 [s]
100
50
0
-50
-100
-150
-200
-250
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-60
8629-1
CFC_1000
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P2 Upper Neck Fz

Max: 1612.2 [N] at 0.056 [s]
Min: -383.9 [N] at 0.282 [s]

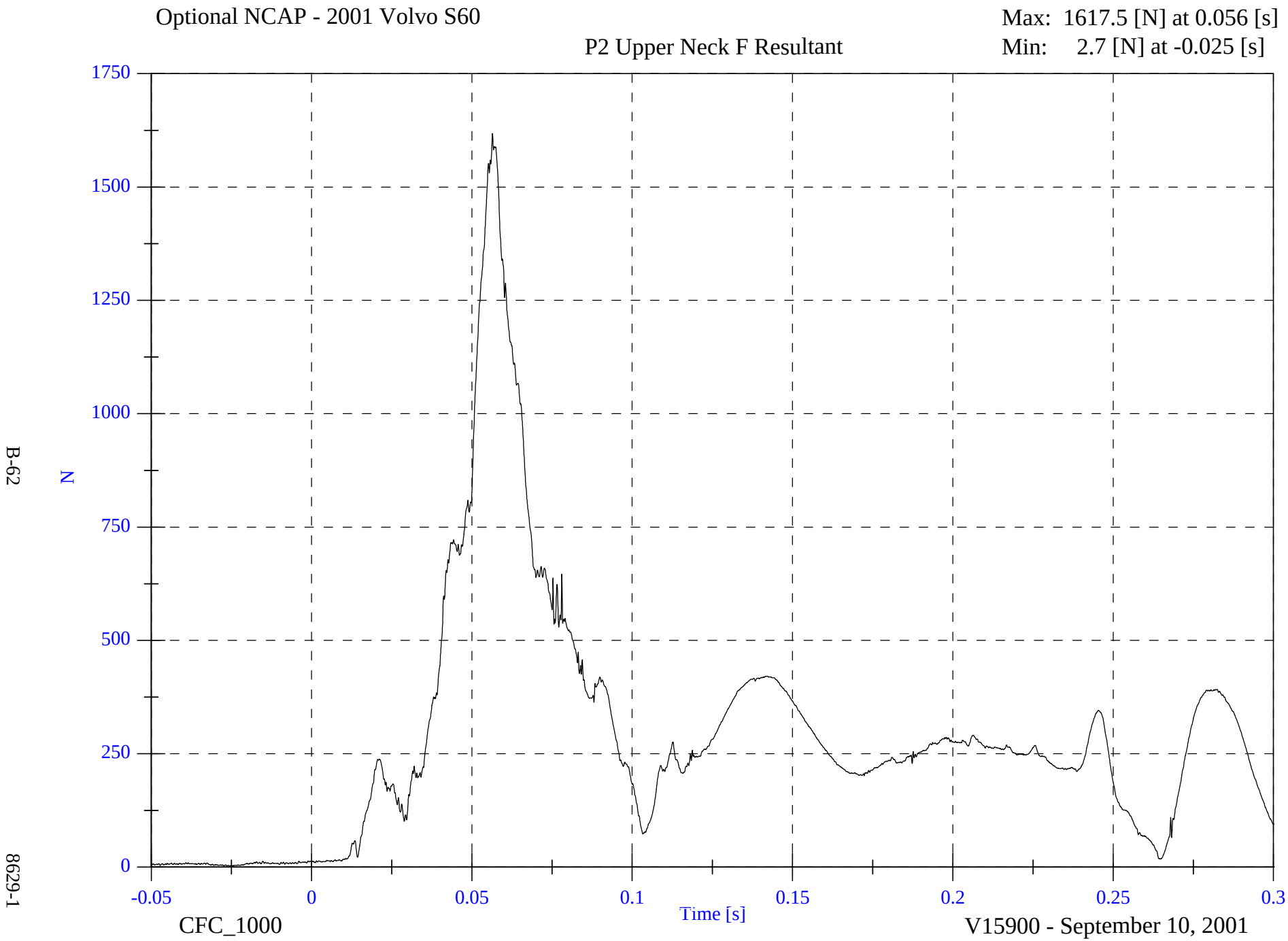


B-61

8629-1

CFC_1000

V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Upper Neck F Resultant
Max: 1617.5 [N] at 0.056 [s]
Min: 2.7 [N] at -0.025 [s]
1750
1500
1250
1000
750
500
250
0
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

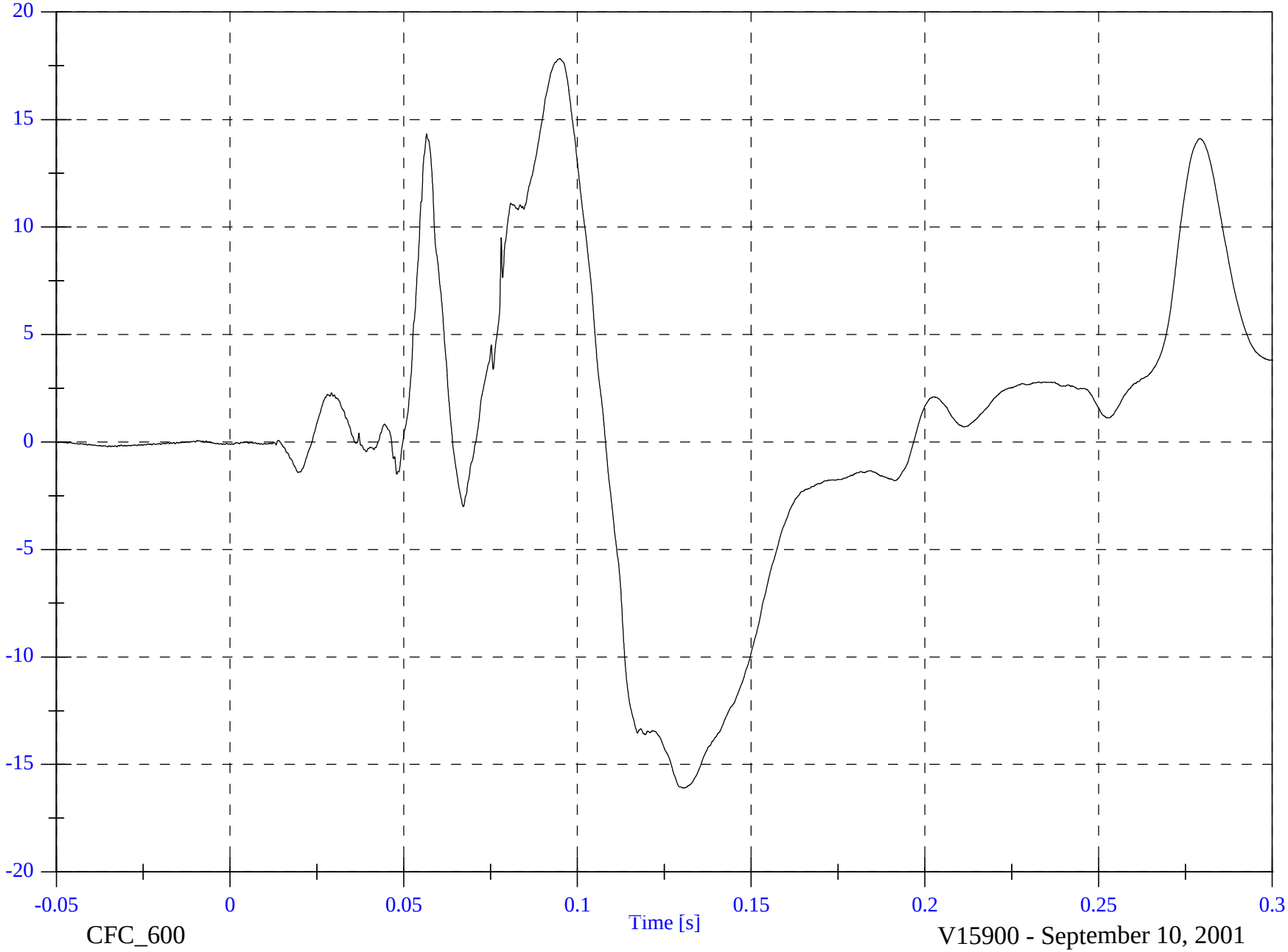
B-62

8629-1

Optional NCAP - 2001 Volvo S60

P2 Upper Neck Mx

Max: 17.8 [N-m] at 0.095 [s]
Min: -16.1 [N-m] at 0.130 [s]



CFC_600

V15900 - September 10, 2001

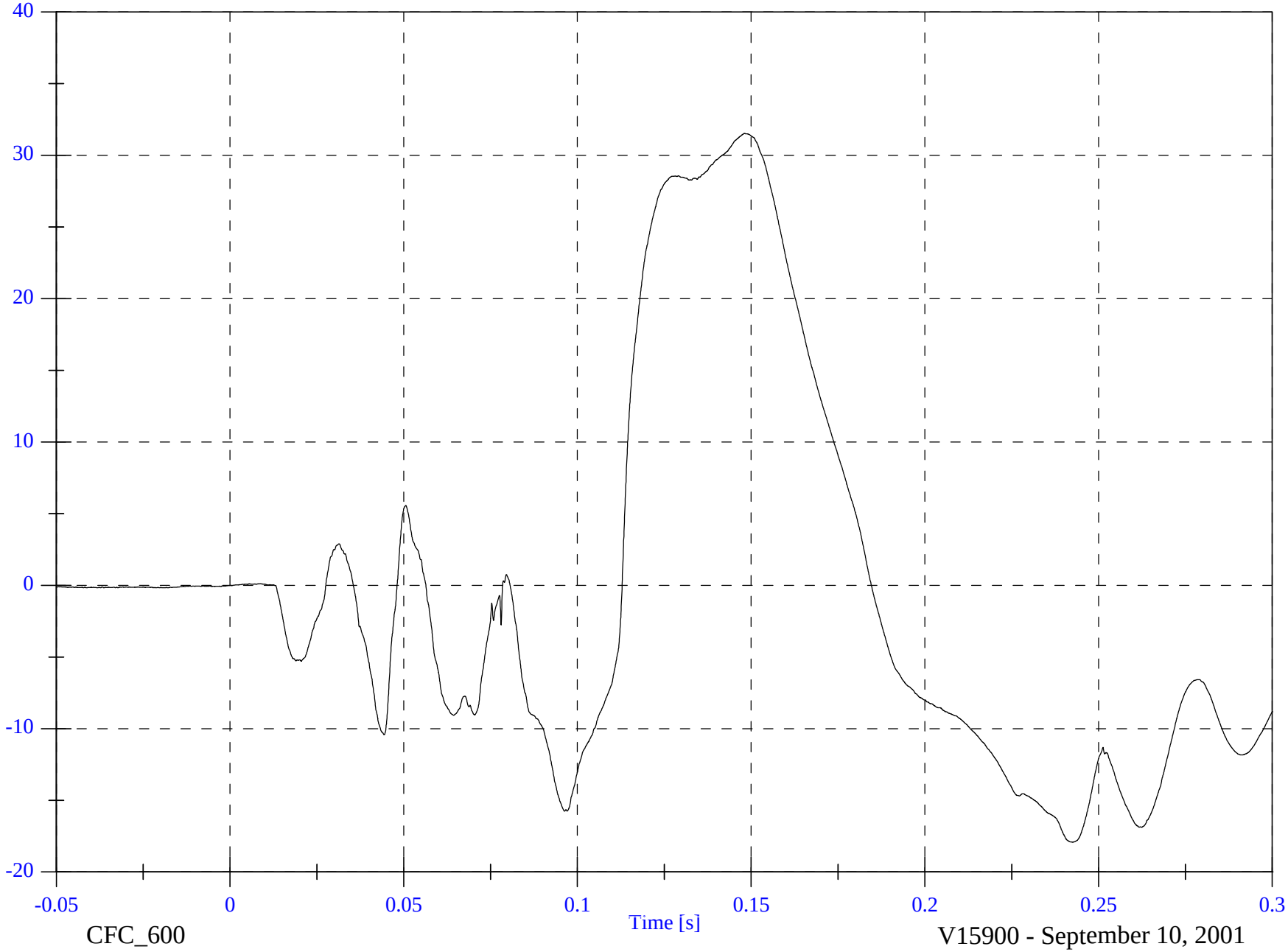
B-63

8629-1

Optional NCAP - 2001 Volvo S60

P2 Upper Neck My

Max: 31.5 [N-m] at 0.148 [s]
Min: -17.9 [N-m] at 0.242 [s]



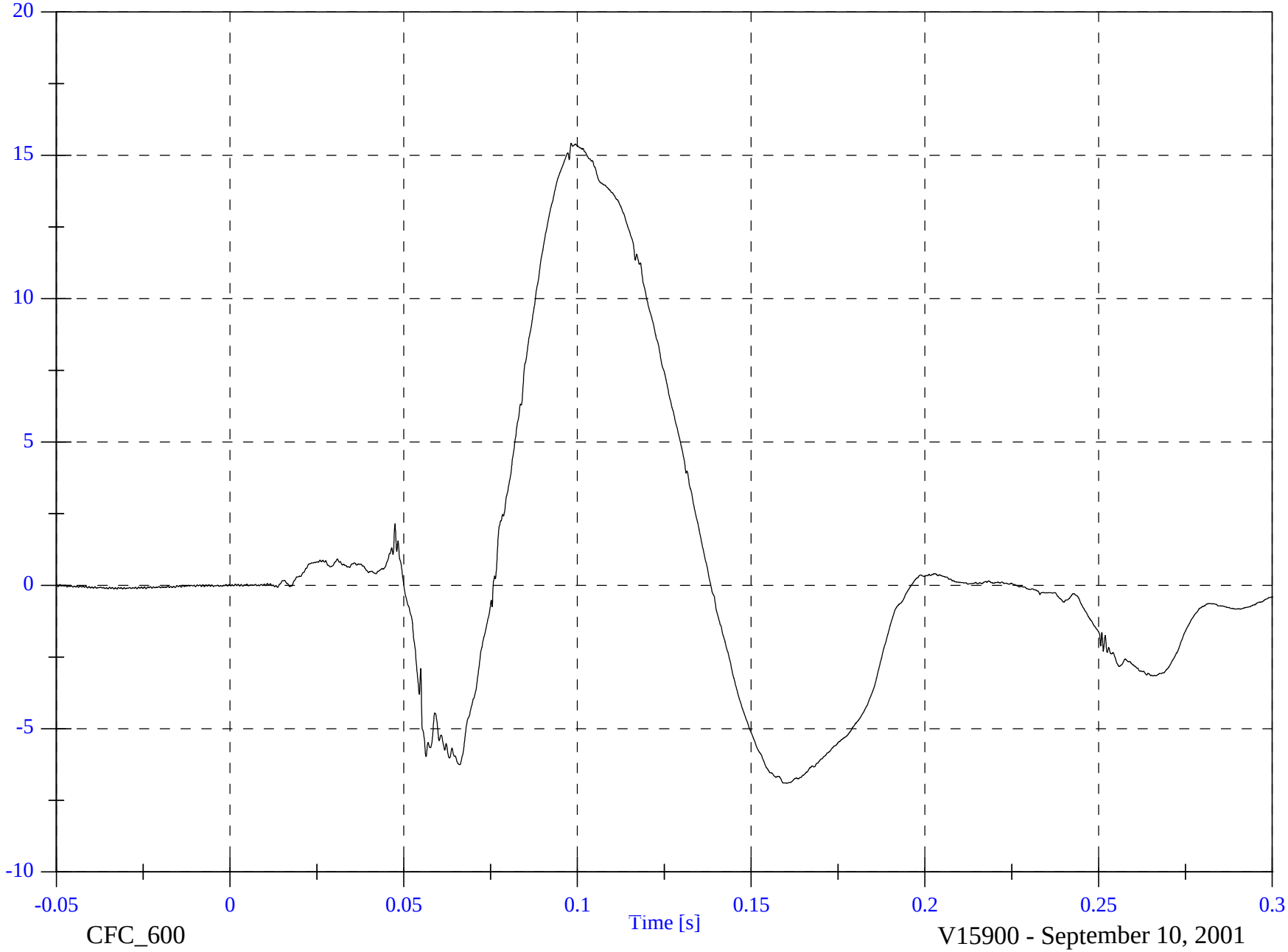
CFC_600

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P2 Upper Neck Mz

Max: 15.4 [N-m] at 0.098 [s]
Min: -6.9 [N-m] at 0.160 [s]



B-65

8629-1

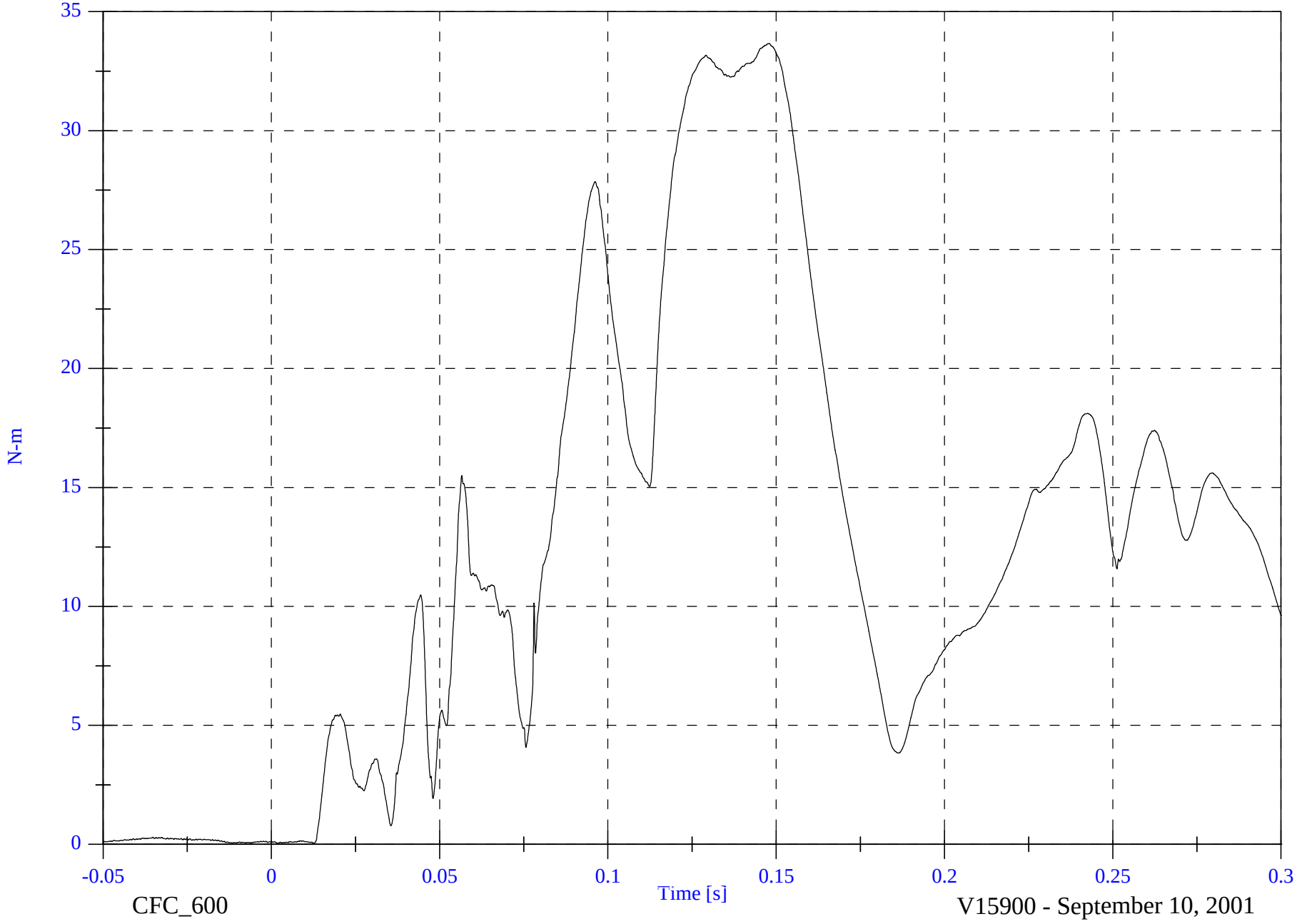
CFC_600

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P2 Upper Neck M Resultant

Max: 33.7 [N-m] at 0.148 [s]
Min: 0.0 [N-m] at 0.012 [s]

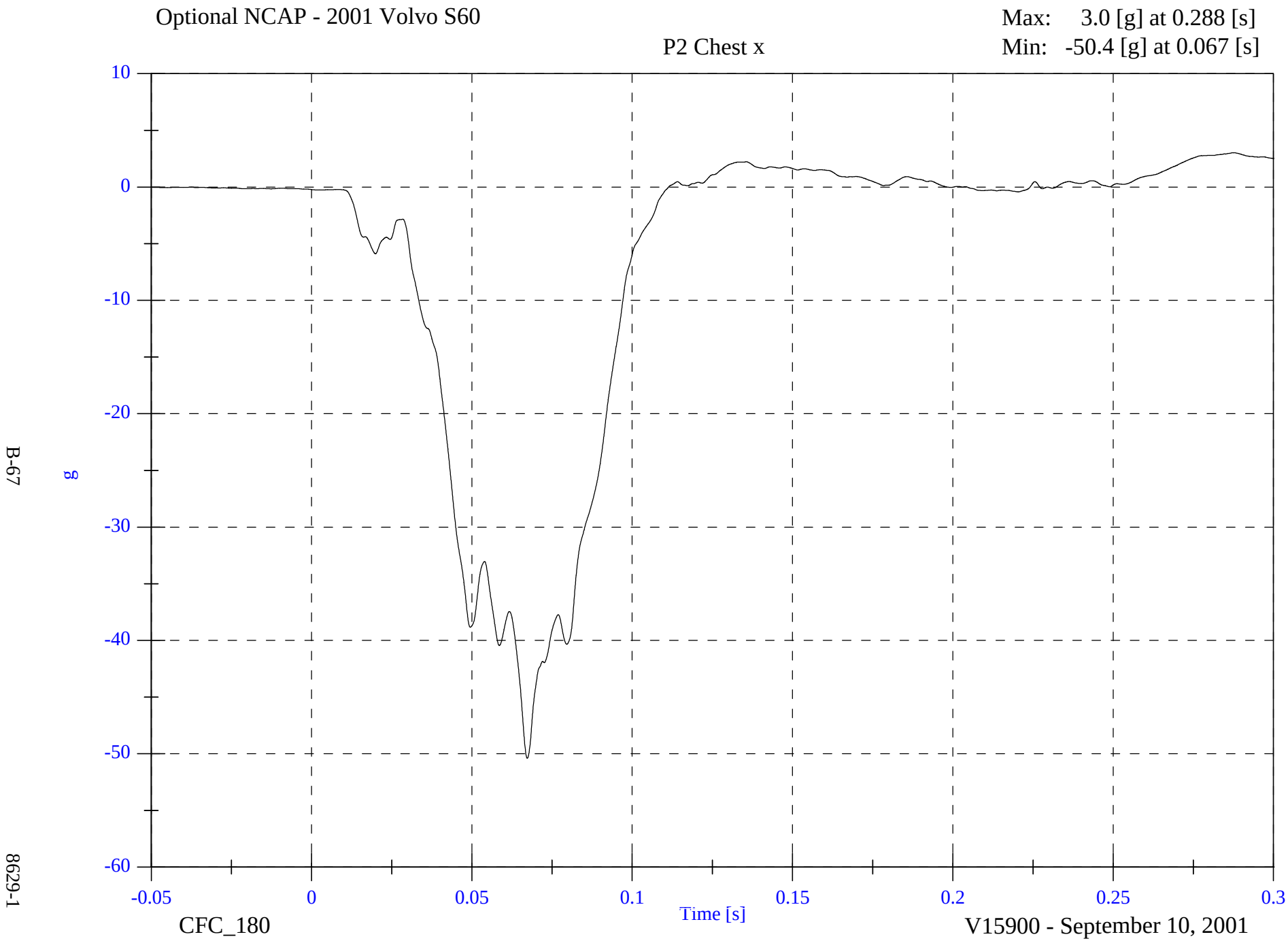


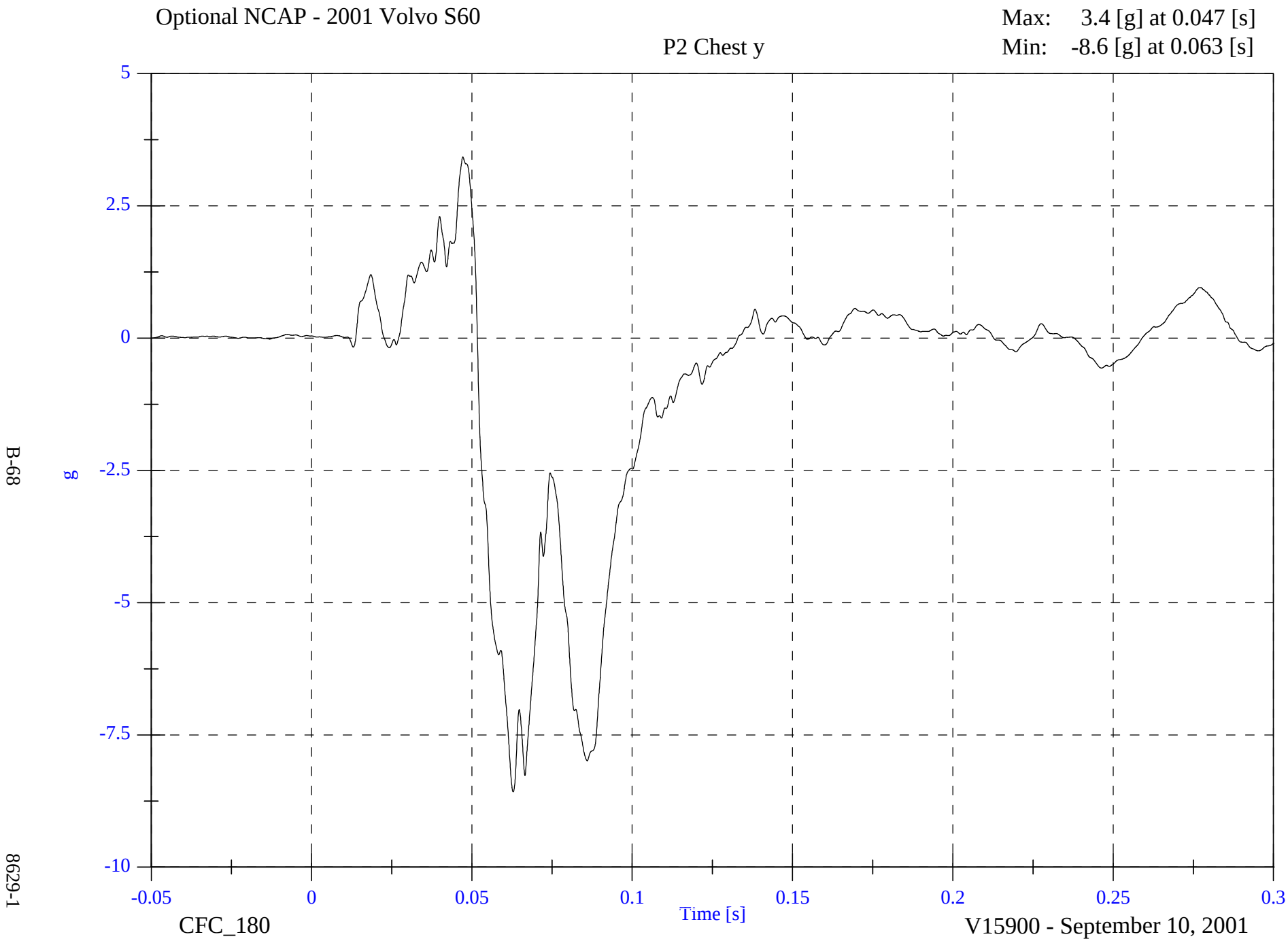
B-66

8629-1

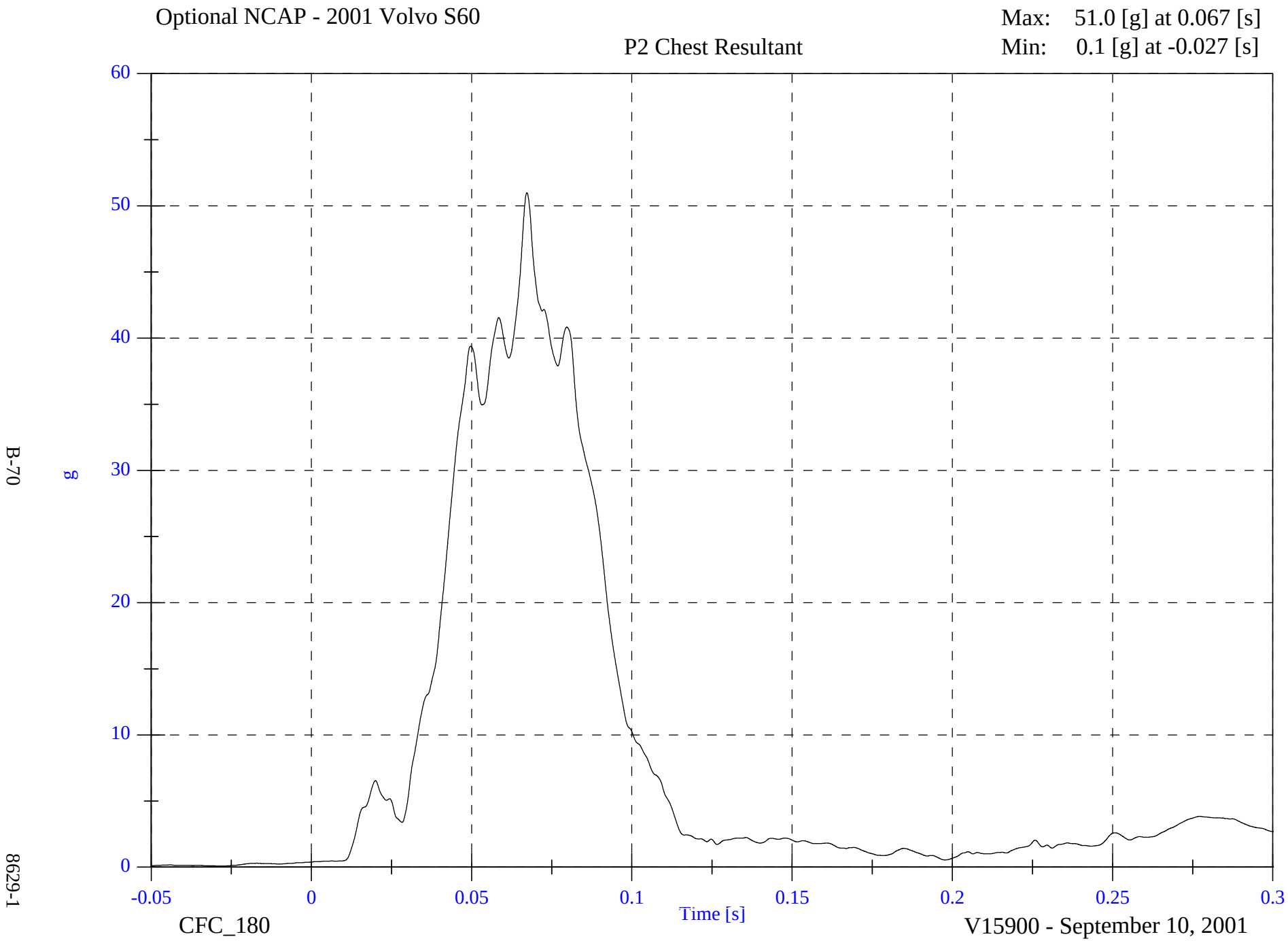
CFC_600

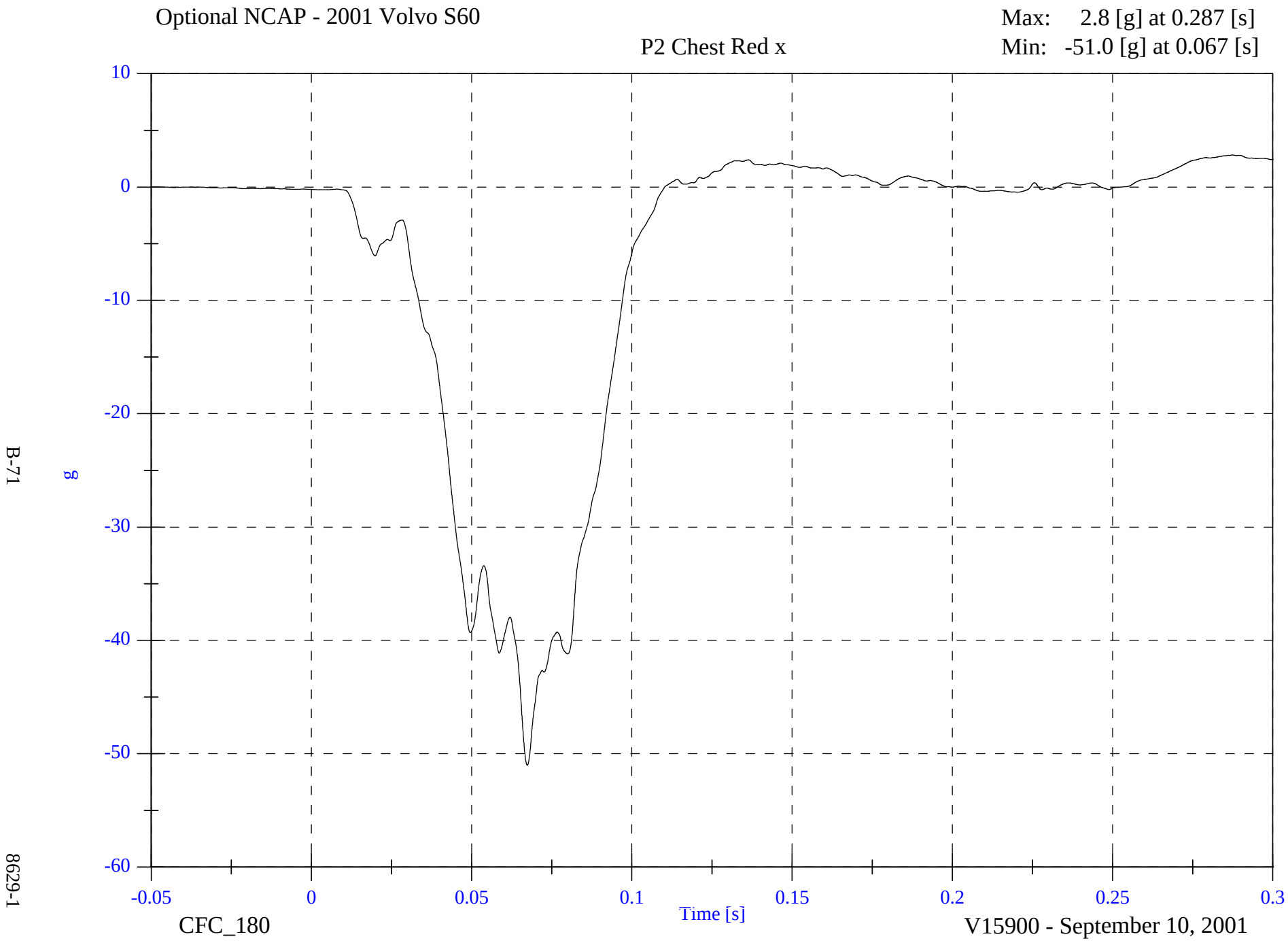
V15900 - September 10, 2001

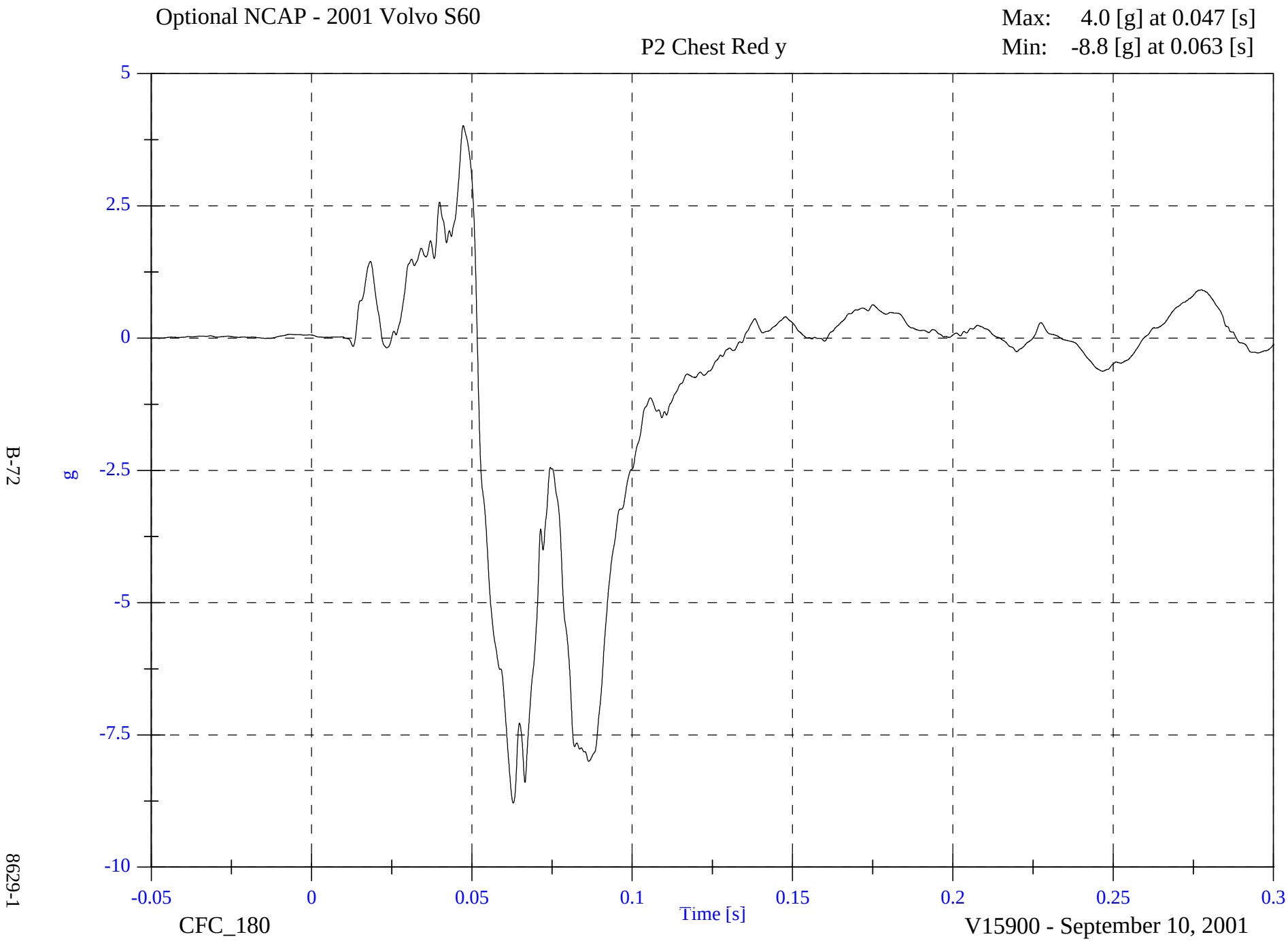

Optional NCAP - 2001 Volvo S60
P2 Chest x
Max: 3.0 [g] at 0.288 [s]
Min: -50.4 [g] at 0.067 [s]
10
0
-10
-20
-30
-40
-50
-60
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-67
8629-1
CFC_180
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Chest y
Max: 3.4 [g] at 0.047 [s]
Min: -8.6 [g] at 0.063 [s]
5
2.5
0
-2.5
-5
-7.5
-10
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-68
8629-1
CFC_180
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Chest z
Max: 11.9 [g] at 0.056 [s]
Min: -8.0 [g] at 0.100 [s]
12.5
10
7.5
5
2.5
0
-2.5
-5
-7.5
-10
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-69
8629-1
CFC_180
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Chest Resultant
Max: 51.0 [g] at 0.067 [s]
Min: 0.1 [g] at -0.027 [s]
60
50
40
30
20
10
0
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_180
V15900 - September 10, 2001
B-70
8629-1

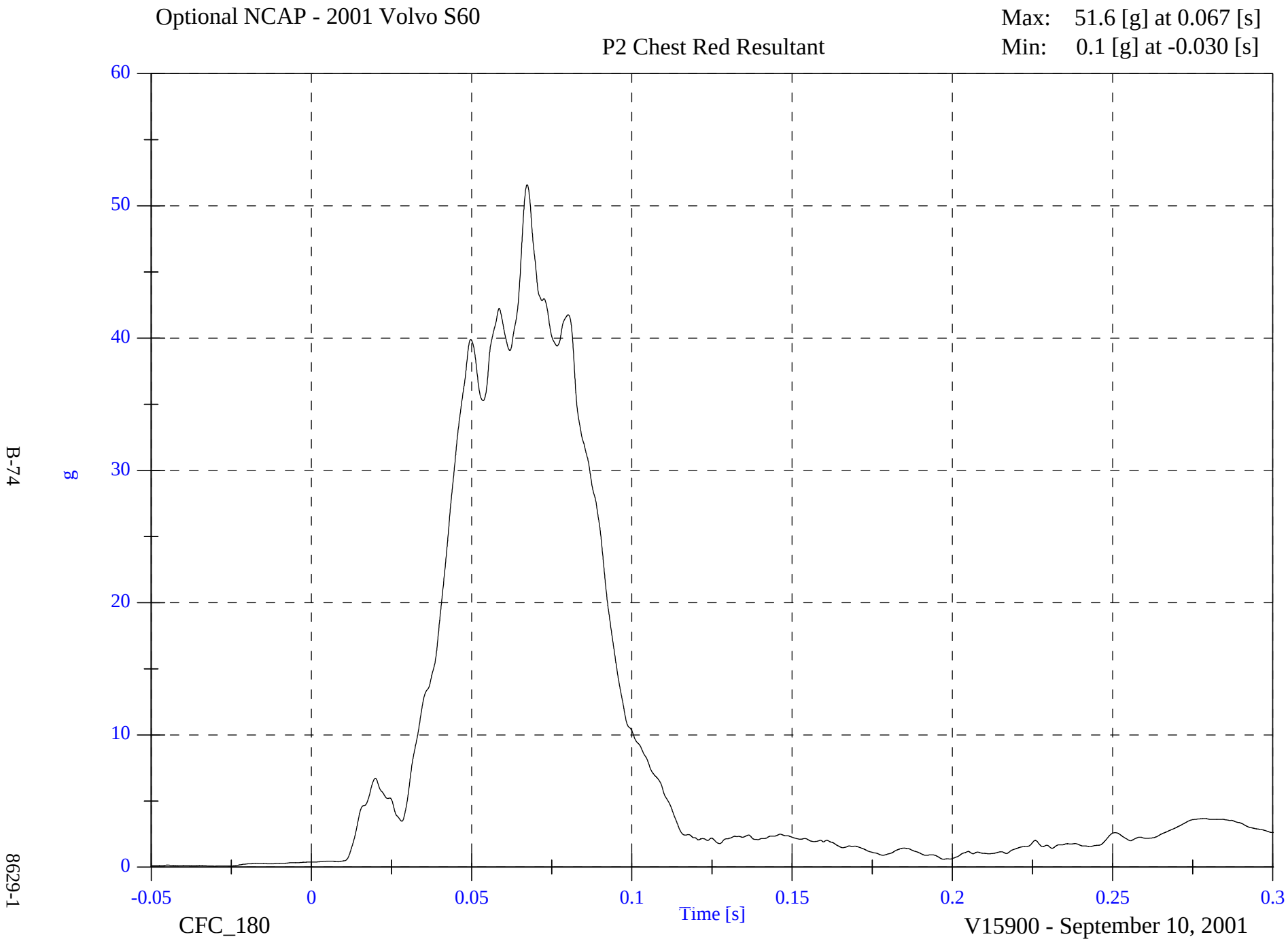

Optional NCAP - 2001 Volvo S60
P2 Chest Red x
Max: 2.8 [g] at 0.287 [s]
Min: -51.0 [g] at 0.067 [s]
10
0
-10
-20
-30
-40
-50
-60
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-71
8629-1
CFC_180
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Chest Red y
Max: 4.0 [g] at 0.047 [s]
Min: -8.8 [g] at 0.063 [s]
5
2.5
0
-2.5
-5
-7.5
-10
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_180
V15900 - September 10, 2001

B-72

8629-1

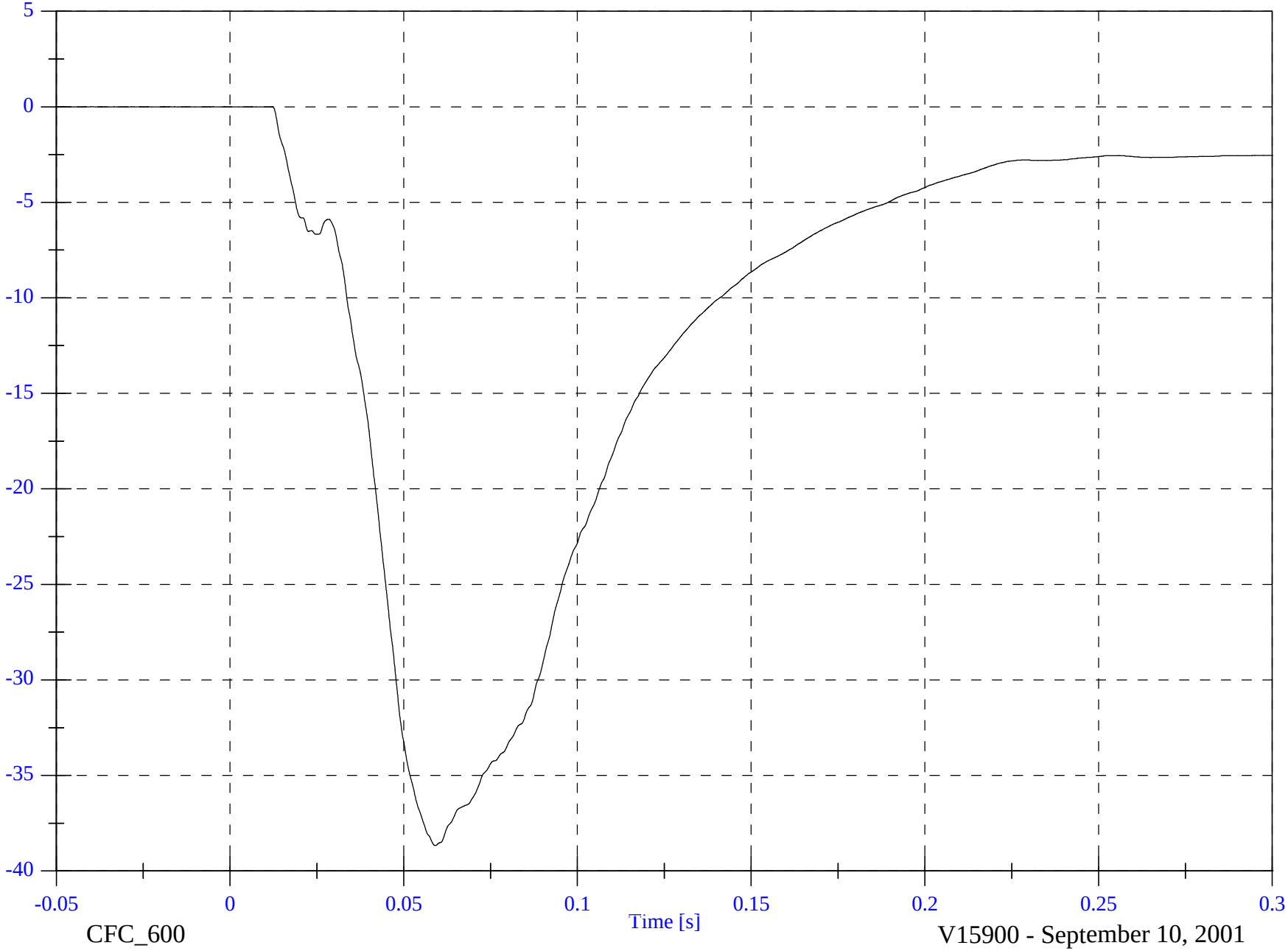

Optional NCAP - 2001 Volvo S60
P2 Chest Red z
Max: 11.8 [g] at 0.056 [s]
Min: -8.2 [g] at 0.100 [s]
12.5
10
7.5
5
2.5
0
-2.5
-5
-7.5
-10
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_180
V15900 - September 10, 2001
B-73
8629-1


Optional NCAP - 2001 Volvo S60
P2 Chest Red Resultant
Max: 51.6 [g] at 0.067 [s]
Min: 0.1 [g] at -0.030 [s]
60
50
40
30
20
10
0
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_180
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P2 Chest Compression

Max: 0.0 [mm] at 0.012 [s]
Min: -38.7 [mm] at 0.059 [s]

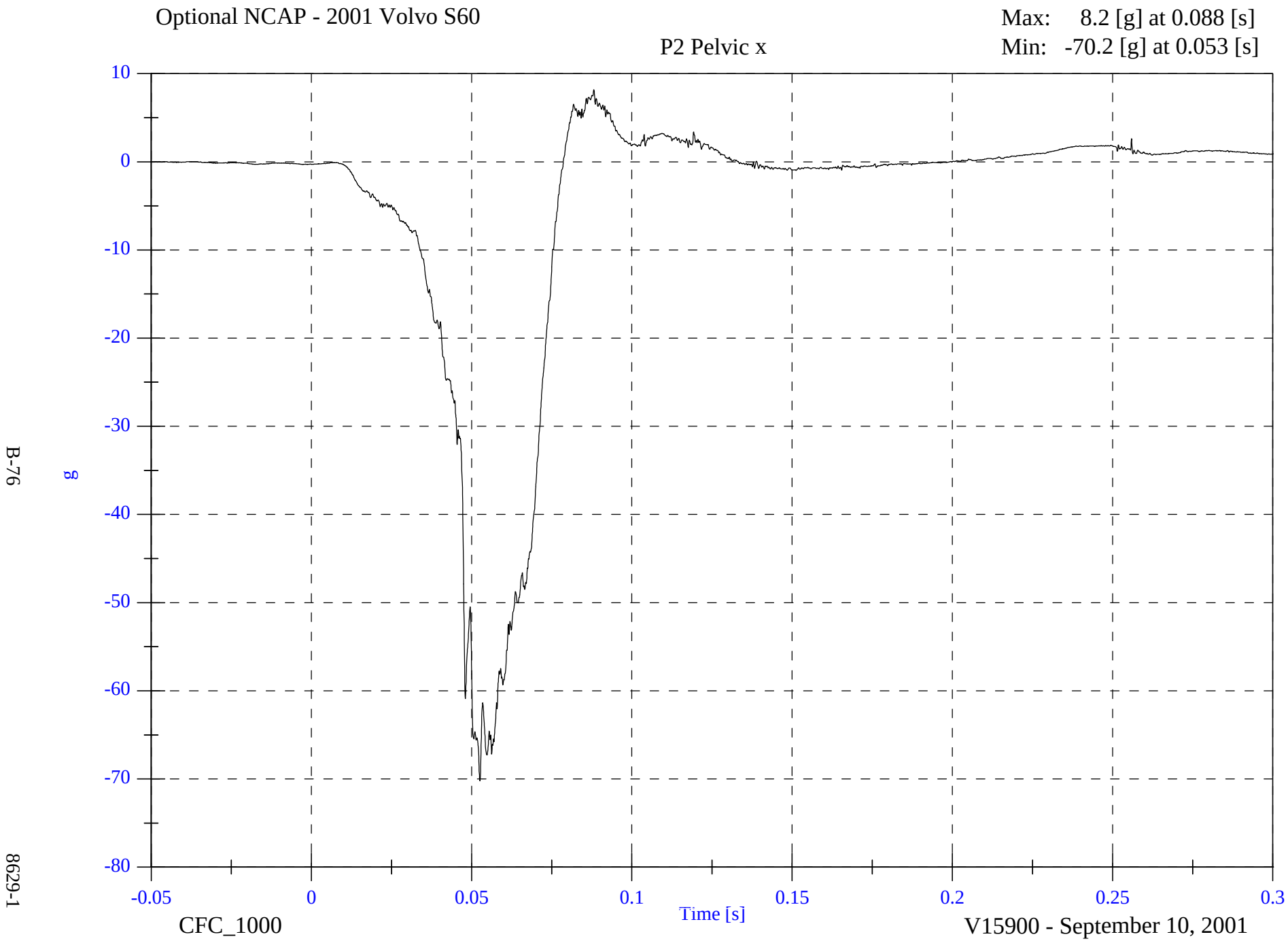


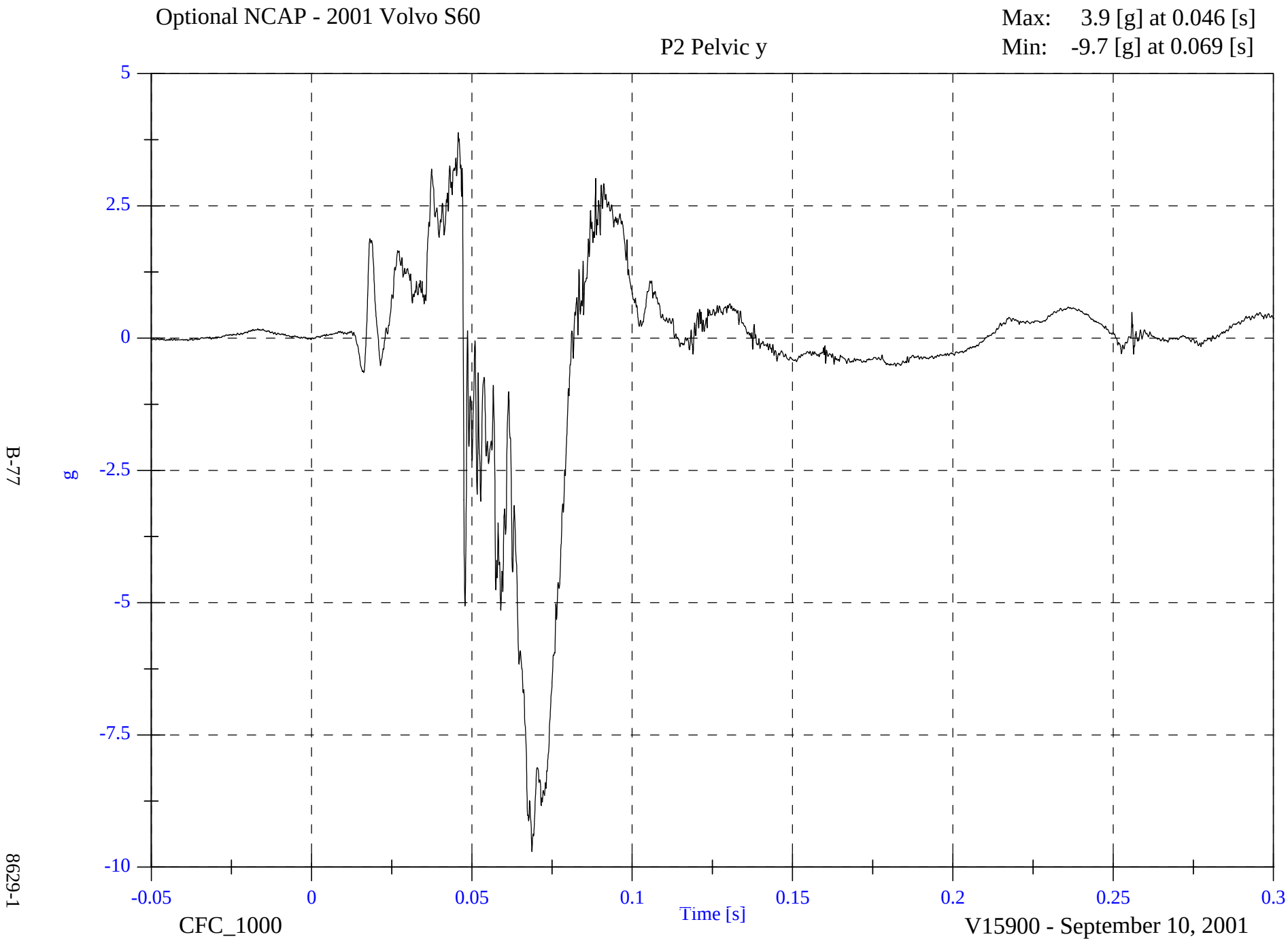
B-75

8629-1

CFC_600

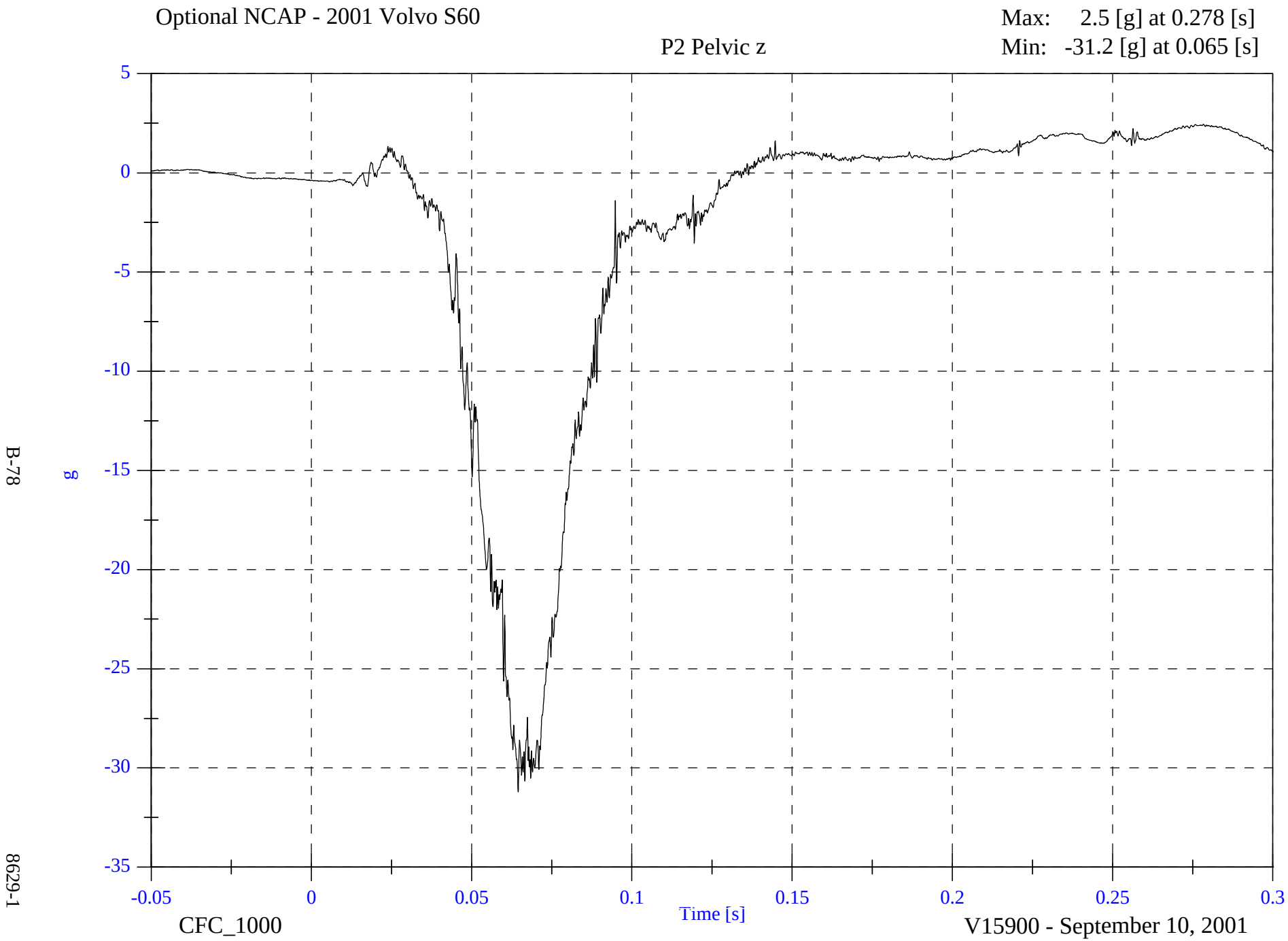
V15900 - September 10, 2001

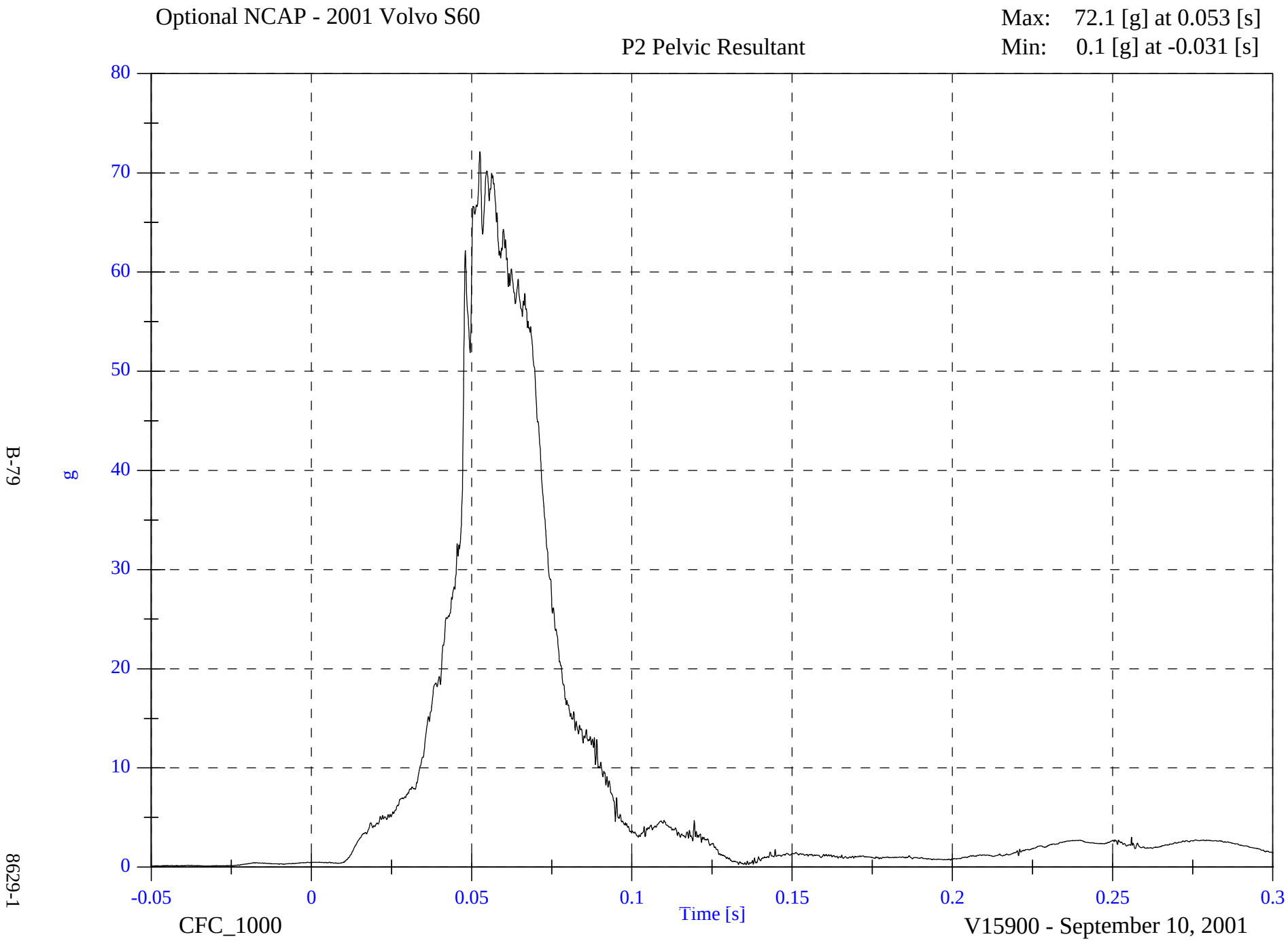

Optional NCAP - 2001 Volvo S60
P2 Pelvic x
Max: 8.2 [g] at 0.088 [s]
Min: -70.2 [g] at 0.053 [s]
10
0
-10
-20
-30
-40
-50
-60
-70
-80
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

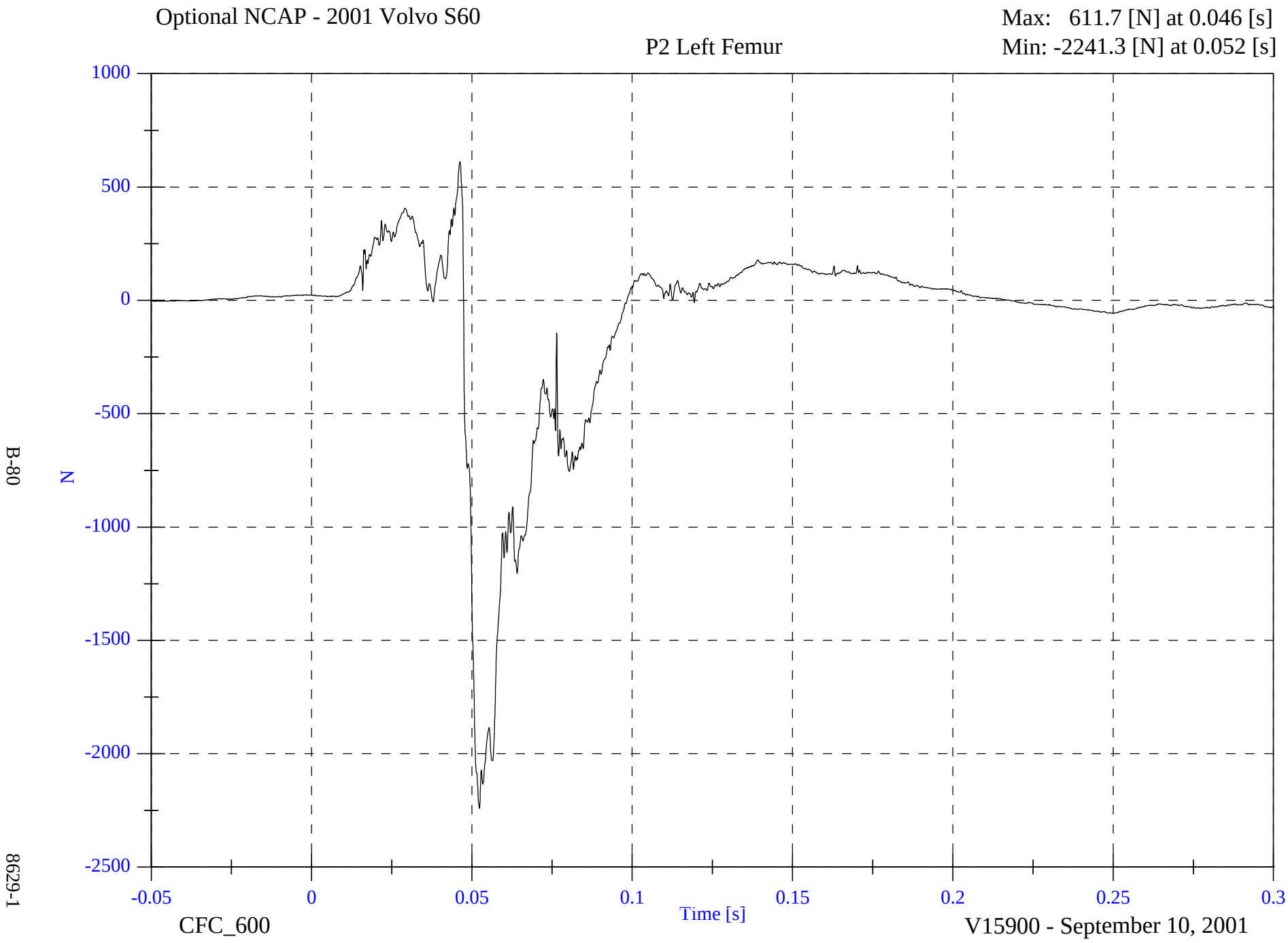

Optional NCAP - 2001 Volvo S60
P2 Pelvic y
Max: 3.9 [g] at 0.046 [s]
Min: -9.7 [g] at 0.069 [s]
5
2.5
0
-2.5
-5
-7.5
-10
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

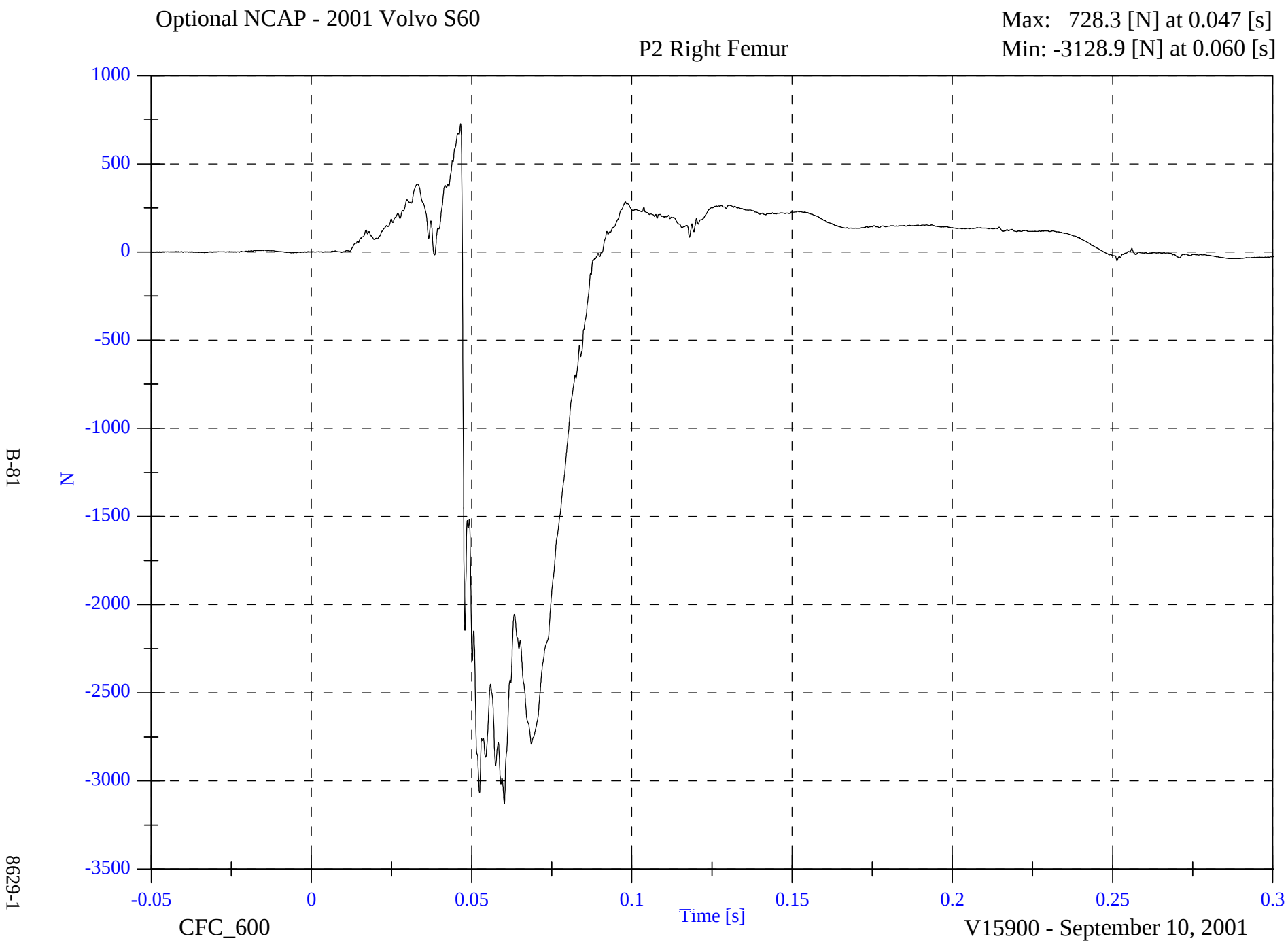
B-77

8629-1


Optional NCAP - 2001 Volvo S60
P2 Pelvic z
Max: 2.5 [g] at 0.278 [s]
Min: -31.2 [g] at 0.065 [s]
5
0
-5
-10
-15
-20
-25
-30
-35
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Pelvic Resultant
Max: 72.1 [g] at 0.053 [s]
Min: 0.1 [g] at -0.031 [s]
80
70
60
50
40
30
20
10
0
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_1000
V15900 - September 10, 2001

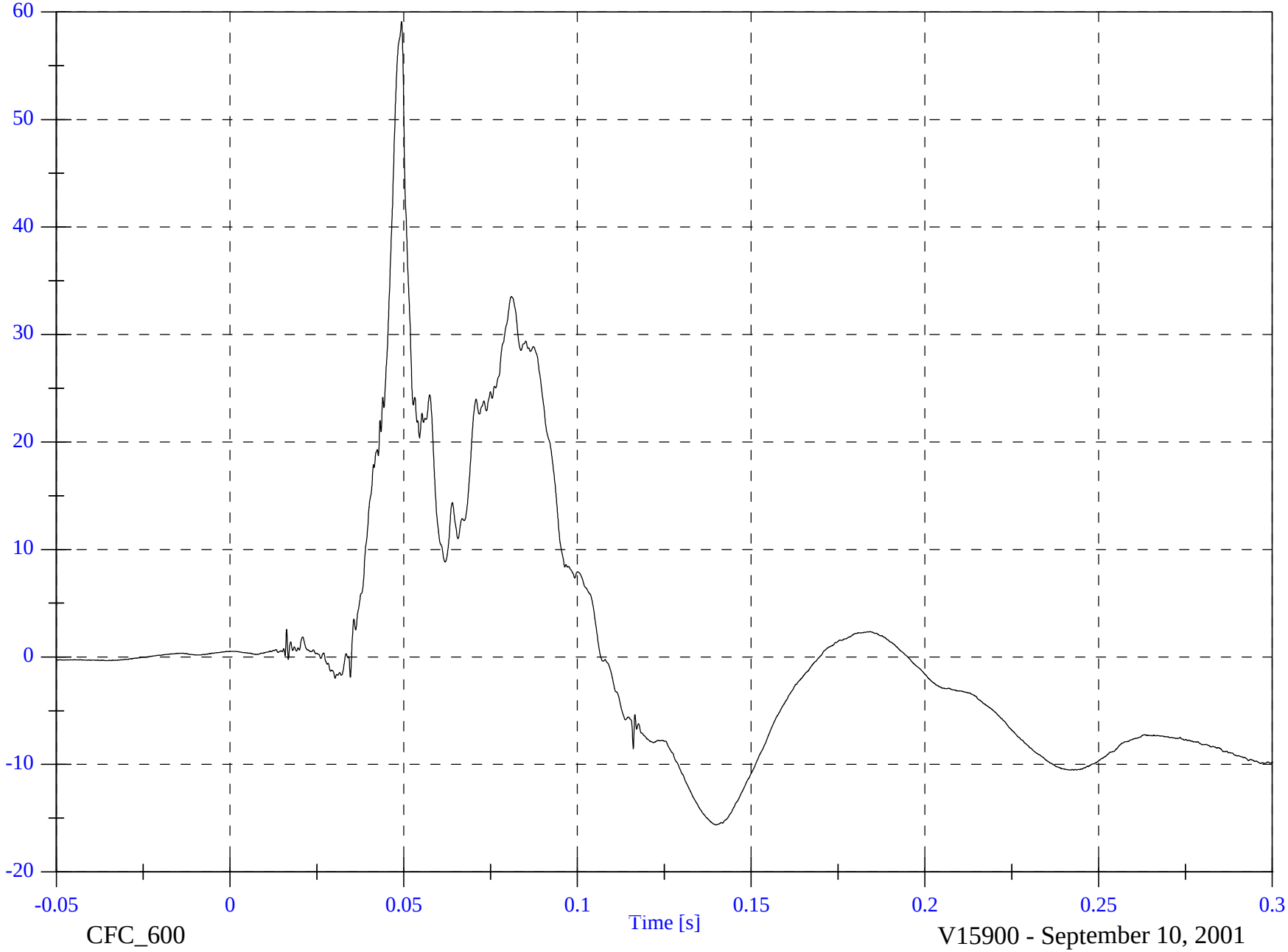

Optional NCAP - 2001 Volvo S60
P2 Left Femur
Max: 611.7 [N] at 0.046 [s]
Min: -2241.3 [N] at 0.052 [s]
1000
500
0
-500
-1000
-1500
-2000
-2500
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-80
8629-1
CFC_600
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Right Femur
Max: 728.3 [N] at 0.047 [s]
Min: -3128.9 [N] at 0.060 [s]
1000
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-81
8629-1
CFC_600
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P2 Left Upper Tibia Mx

Max: 59.1 [N-m] at 0.049 [s]
Min: -15.6 [N-m] at 0.140 [s]



CFC_600

V15900 - September 10, 2001

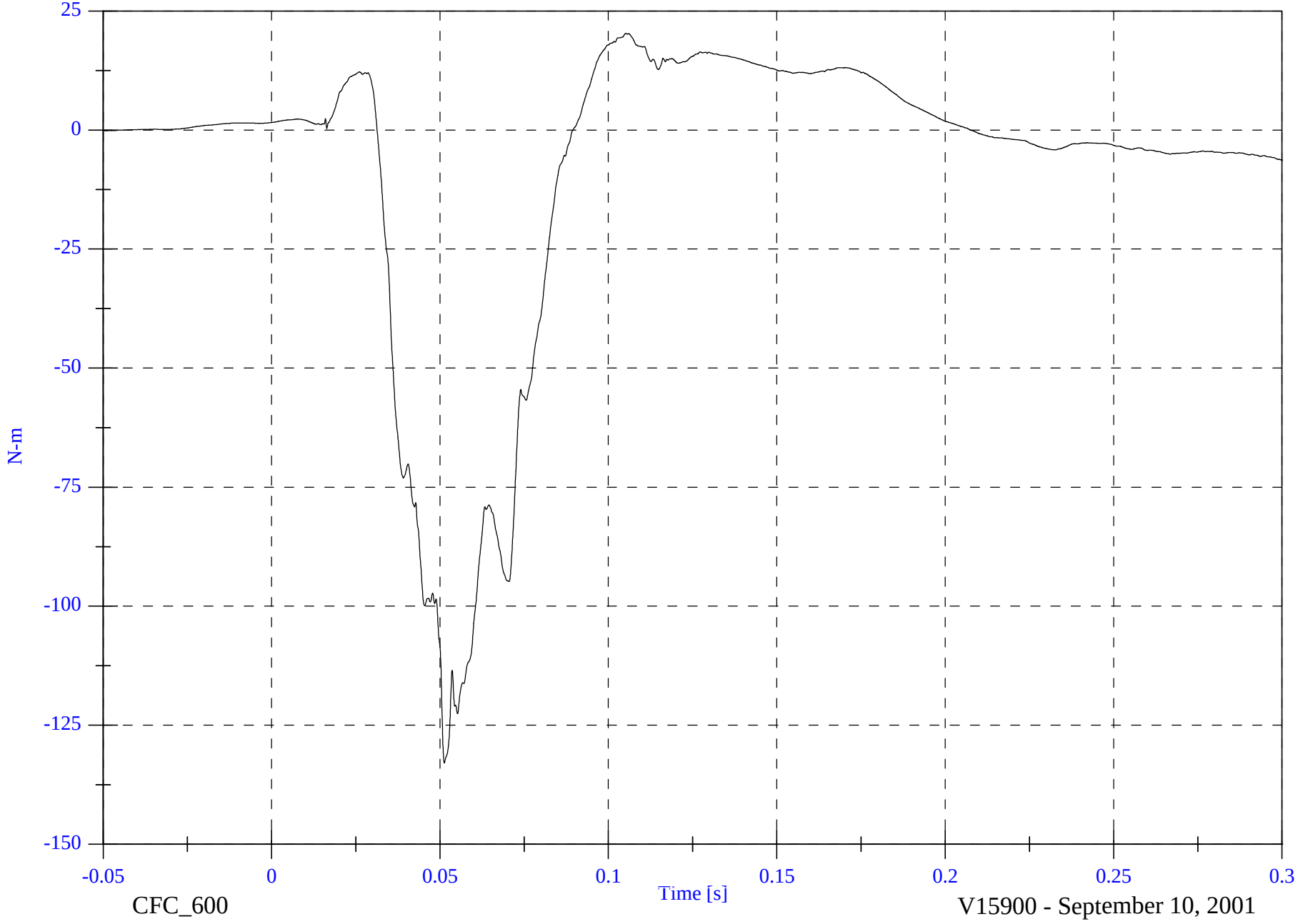
B-82

8629-1

Optional NCAP - 2001 Volvo S60

P2 Left Upper Tibia My

Max: 20.3 [N-m] at 0.105 [s]
Min: -132.9 [N-m] at 0.051 [s]

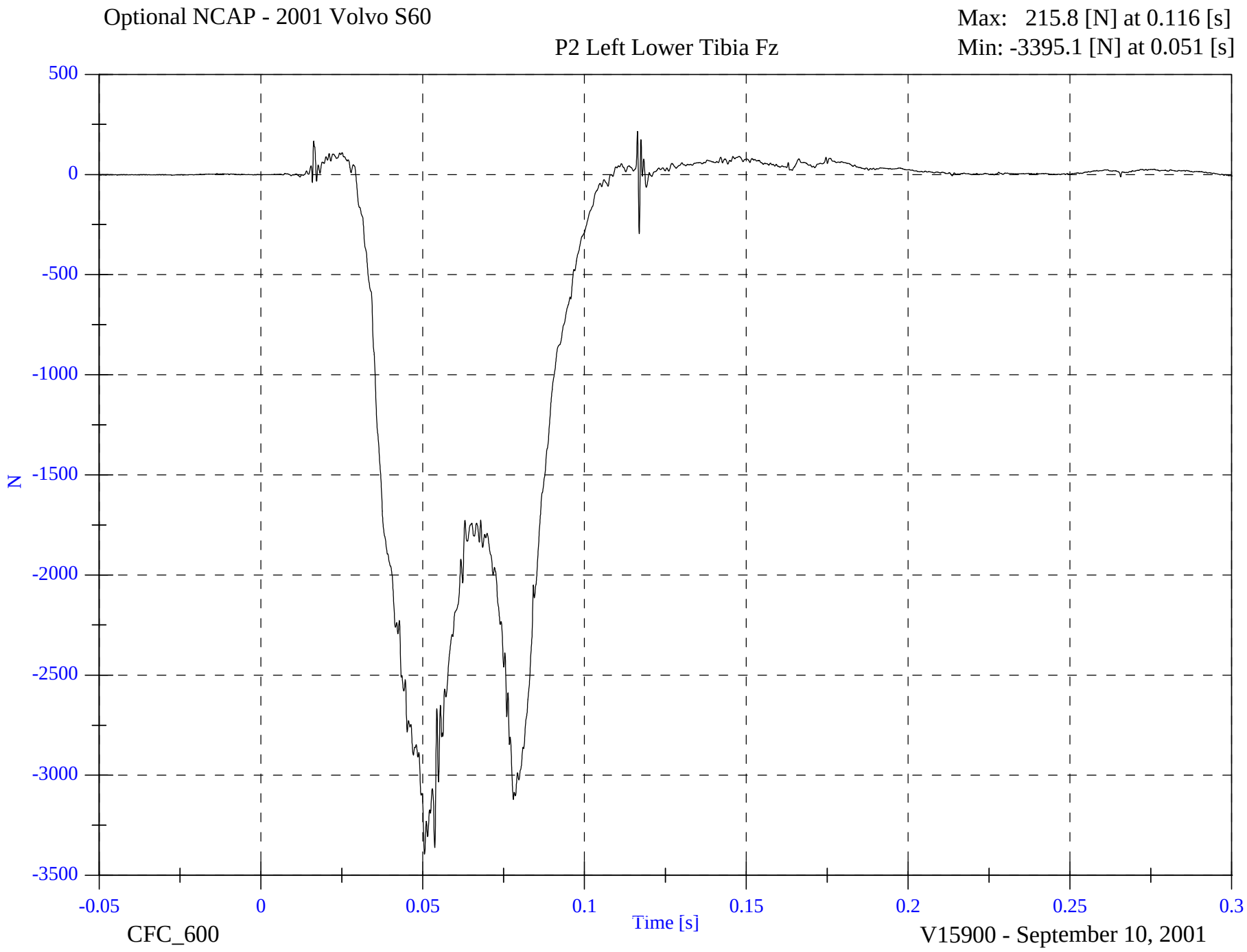


B-83

8629-1

CFC_600

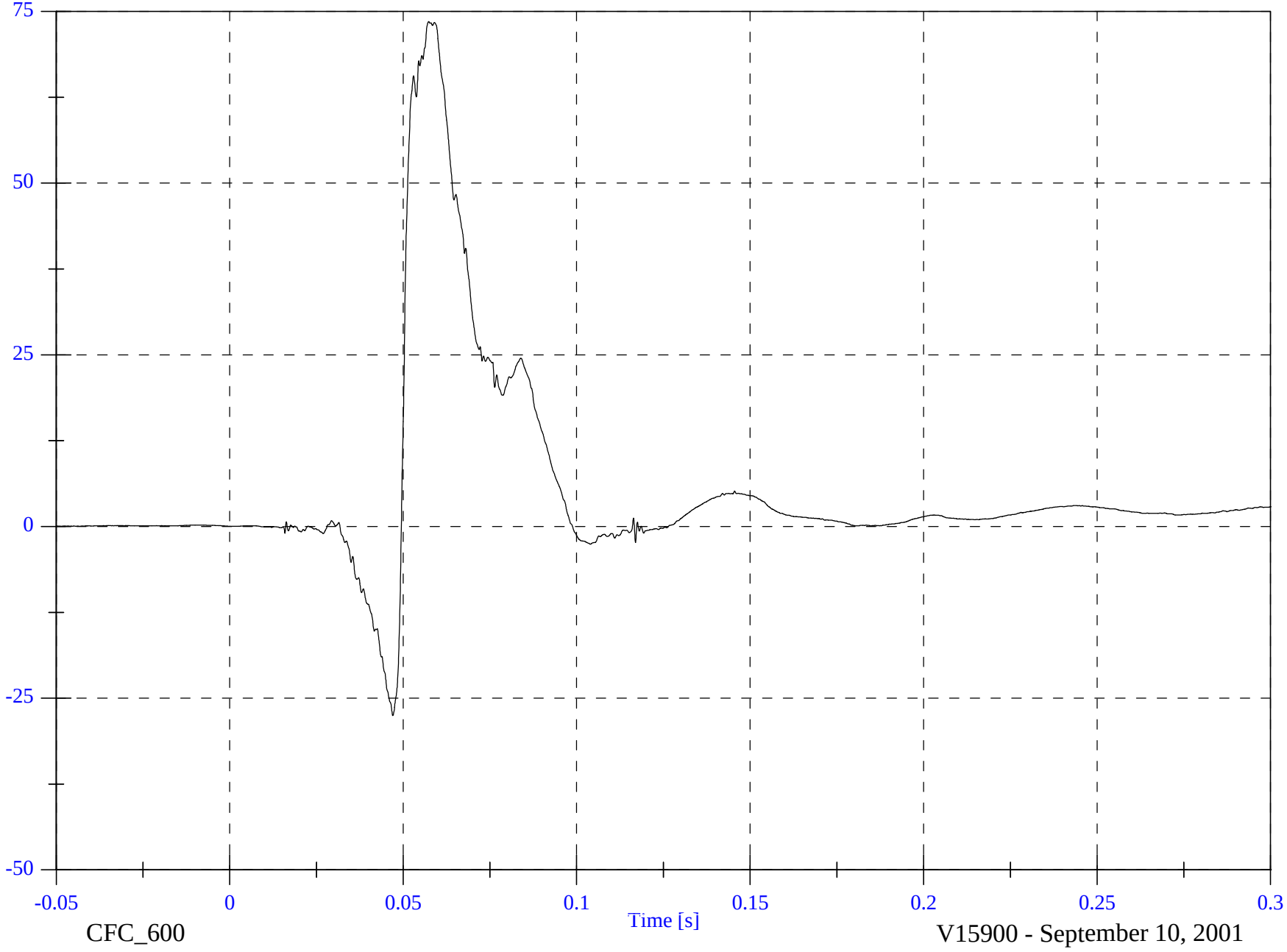
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Left Lower Tibia Fz
Max: 215.8 [N] at 0.116 [s]
Min: -3395.1 [N] at 0.051 [s]
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P2 Left Lower Tibia Mx

Max: 73.5 [N-m] at 0.057 [s]
Min: -27.5 [N-m] at 0.047 [s]



B-85

8629-1

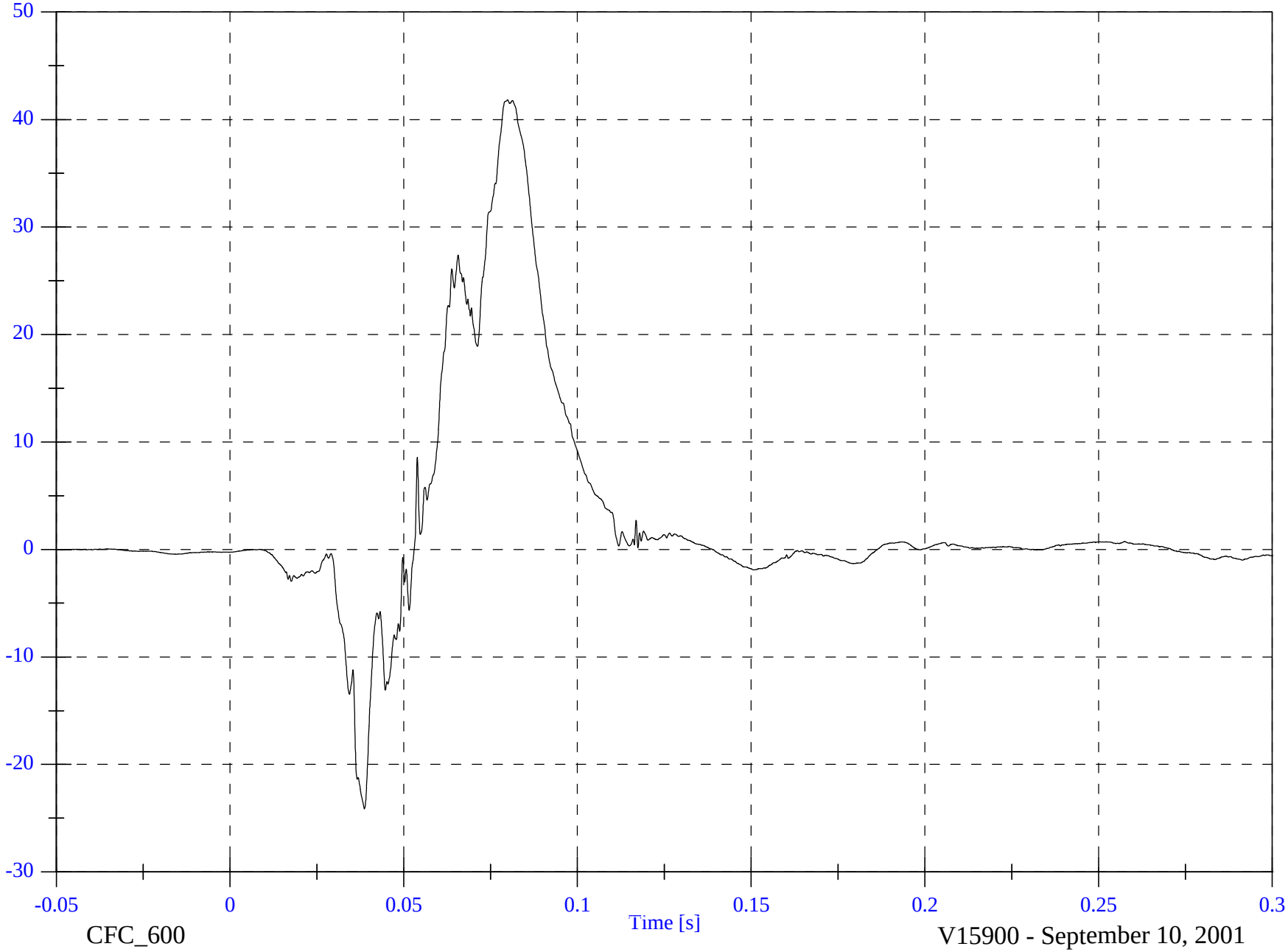
CFC_600

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P2 Left Lower Tibia My

Max: 41.8 [N-m] at 0.080 [s]
Min: -24.1 [N-m] at 0.039 [s]



B-86

8629-1

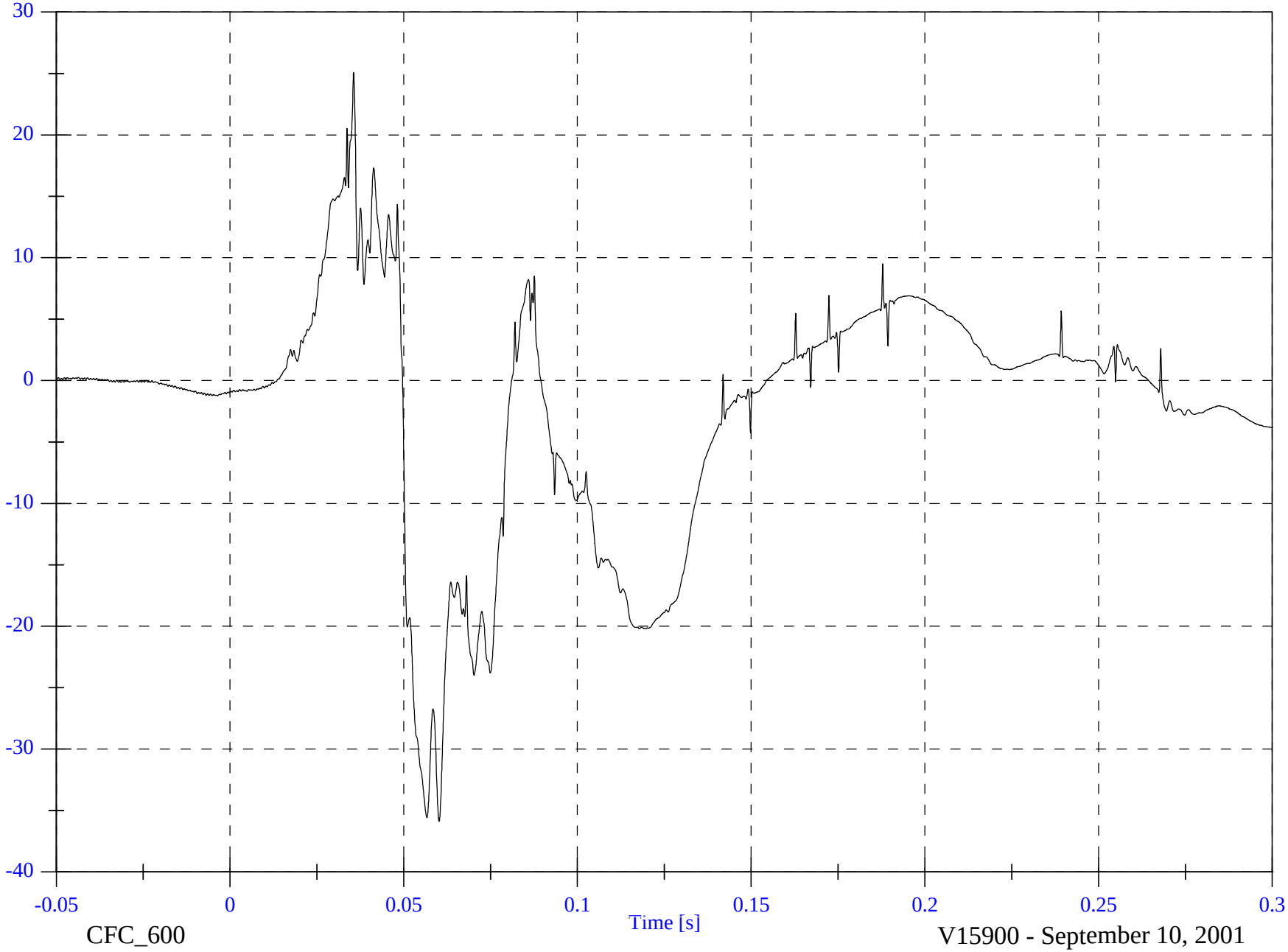
CFC_600

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P2 Right Upper Tibia Mx

Max: 25.1 [N-m] at 0.036 [s]
Min: -35.9 [N-m] at 0.060 [s]



CFC_600

V15900 - September 10, 2001

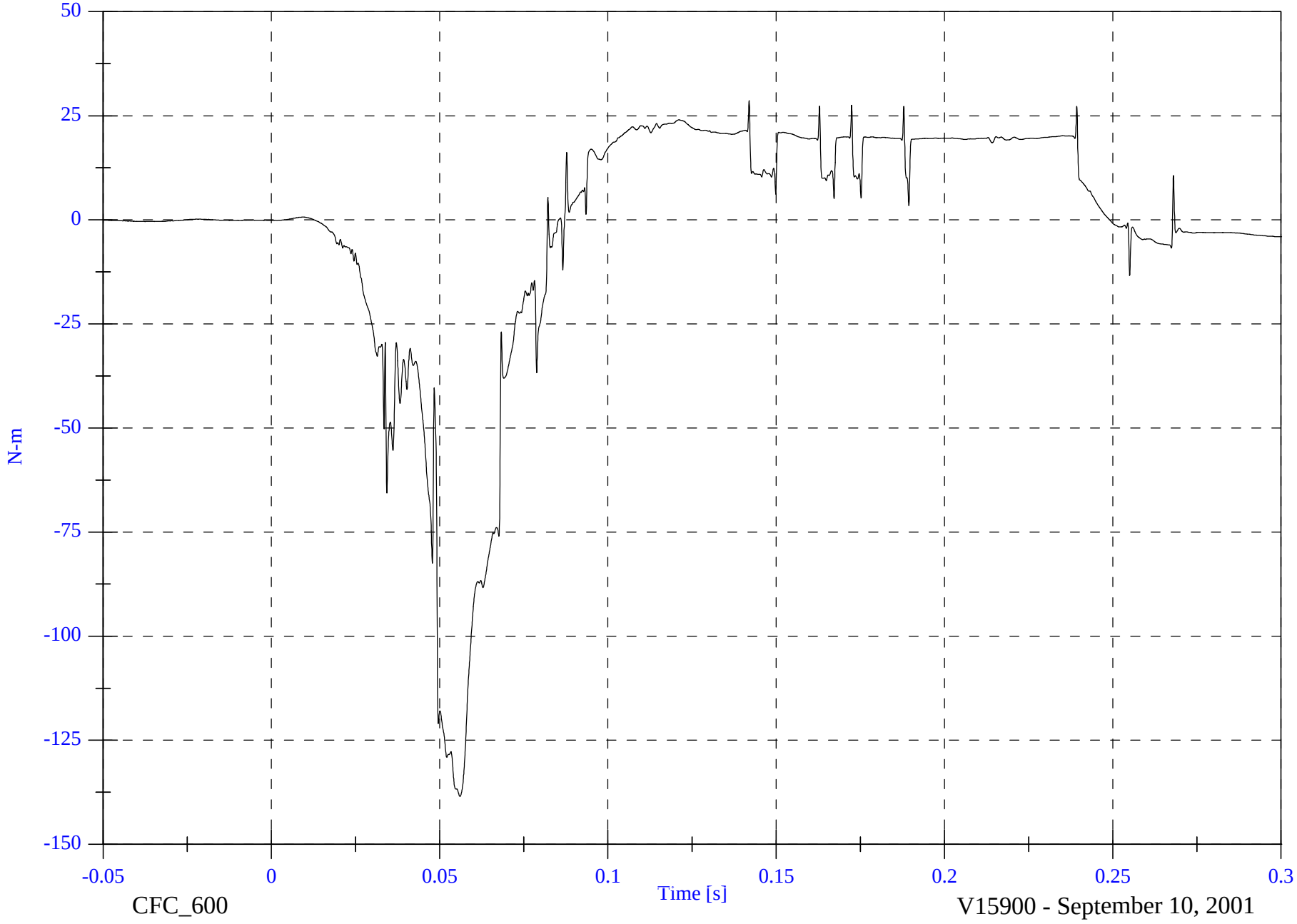
B-87

8629-1

Optional NCAP - 2001 Volvo S60

P2 Right Upper Tibia My

Max: 28.7 [N-m] at 0.142 [s]
Min: -138.5 [N-m] at 0.056 [s]

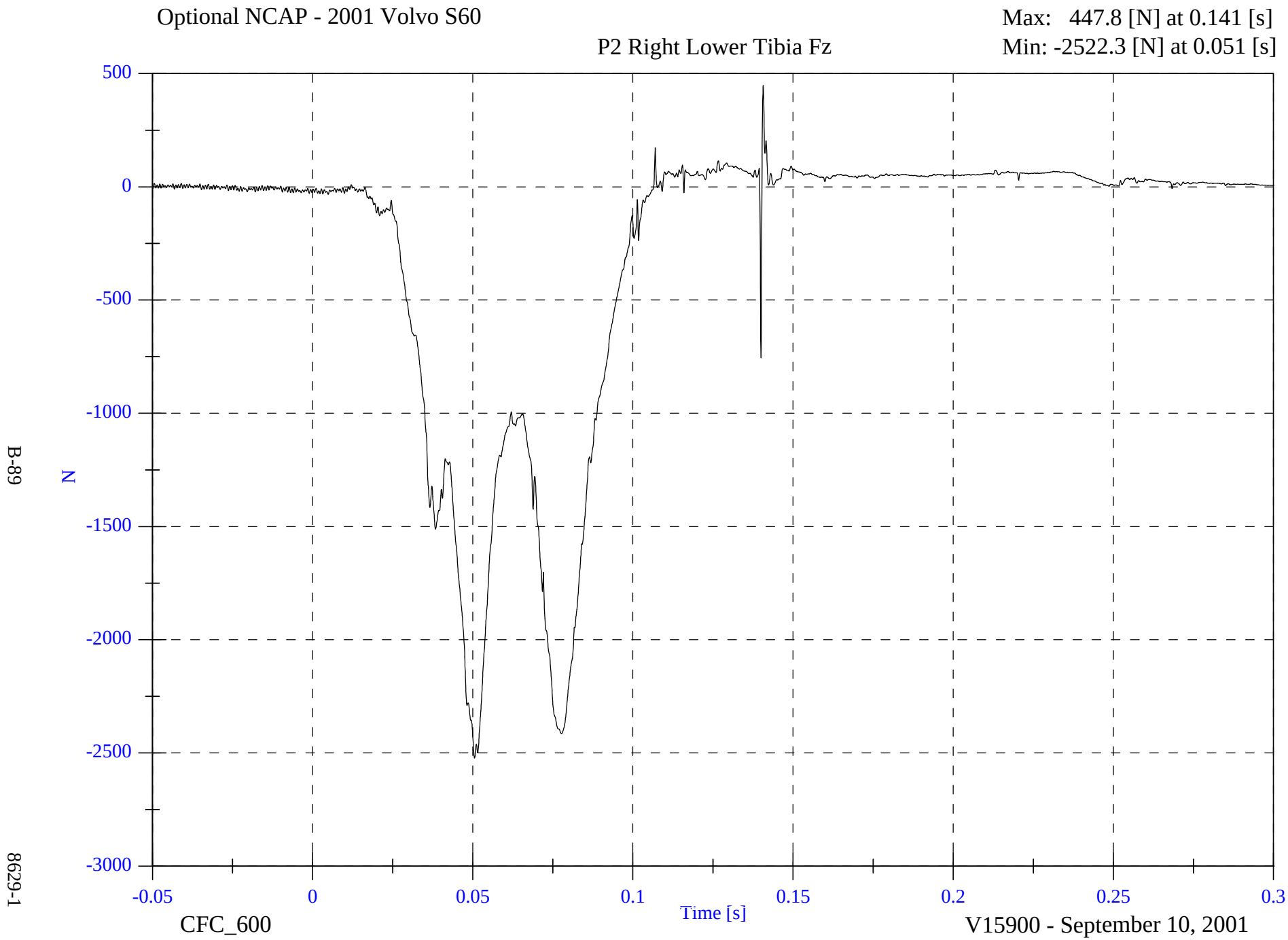


B-88

8629-1

CFC_600

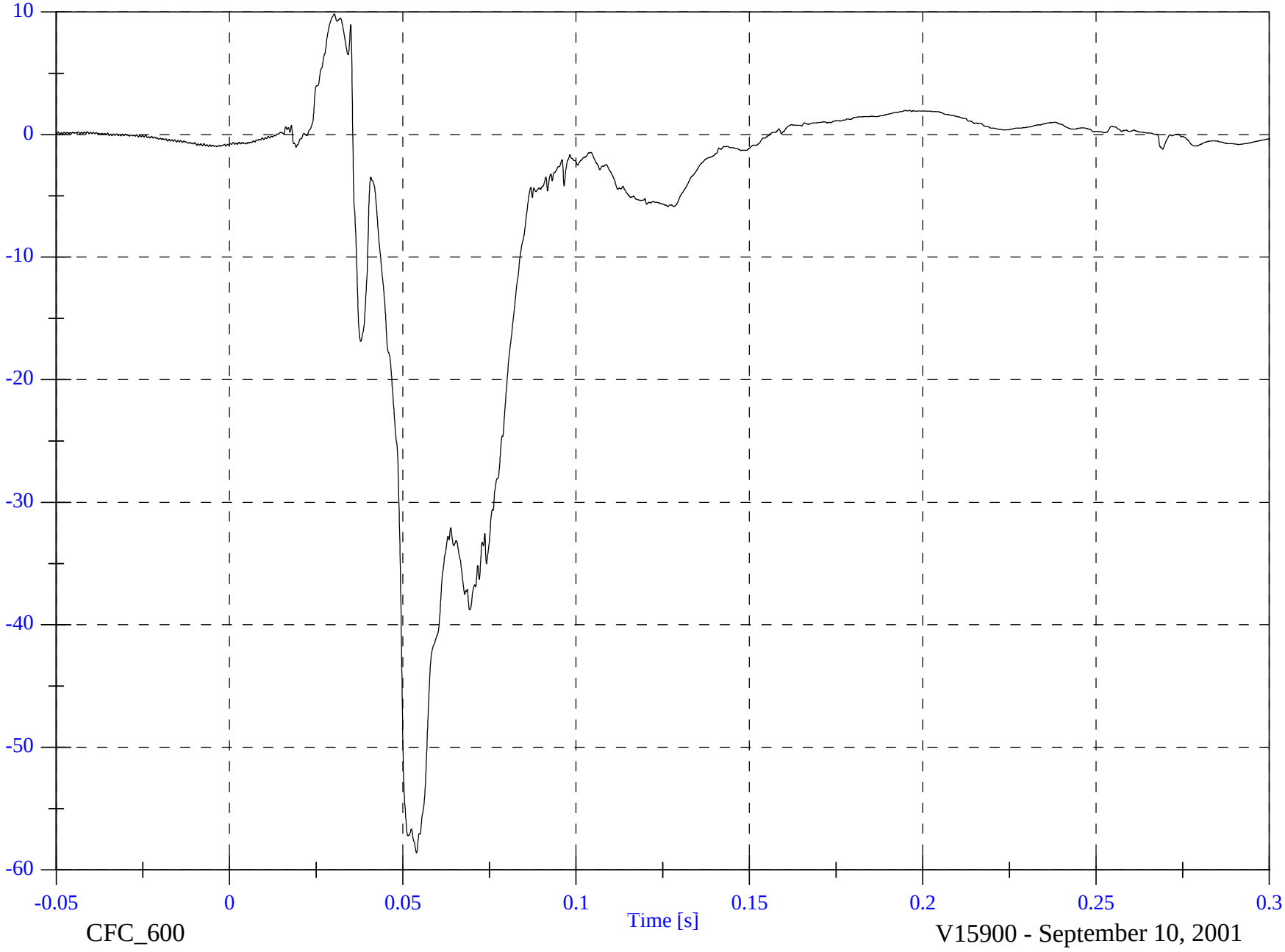
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Right Lower Tibia Fz
Max: 447.8 [N] at 0.141 [s]
Min: -2522.3 [N] at 0.051 [s]
500
0
-500
-1000
-1500
-2000
-2500
-3000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P2 Right Lower Tibia Mx

Max: 9.9 [N-m] at 0.030 [s]
Min: -58.6 [N-m] at 0.054 [s]



B-90

8629-1

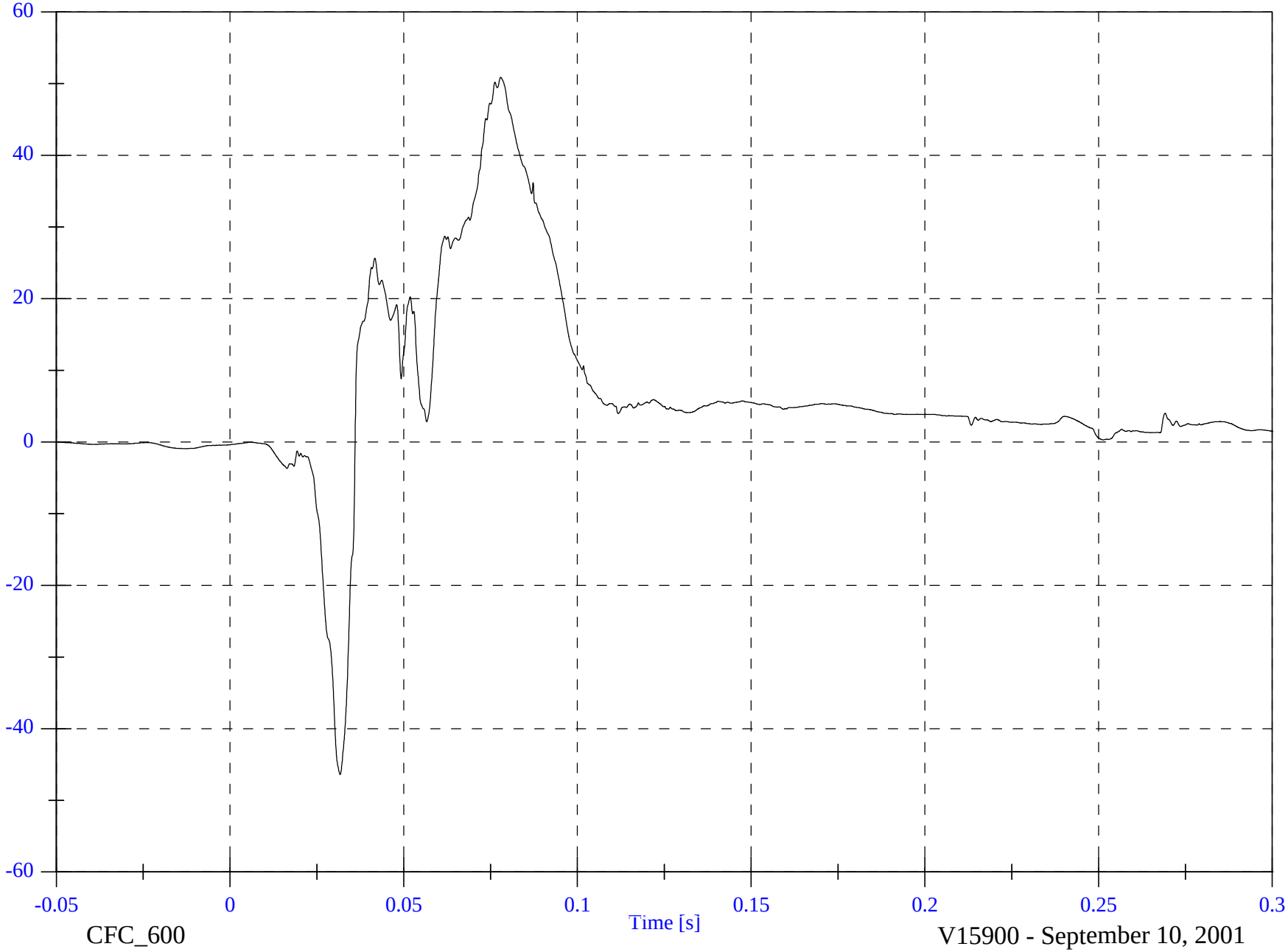
CFC_600

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

P2 Right Lower Tibia My

Max: 50.9 [N-m] at 0.078 [s]
Min: -46.4 [N-m] at 0.032 [s]

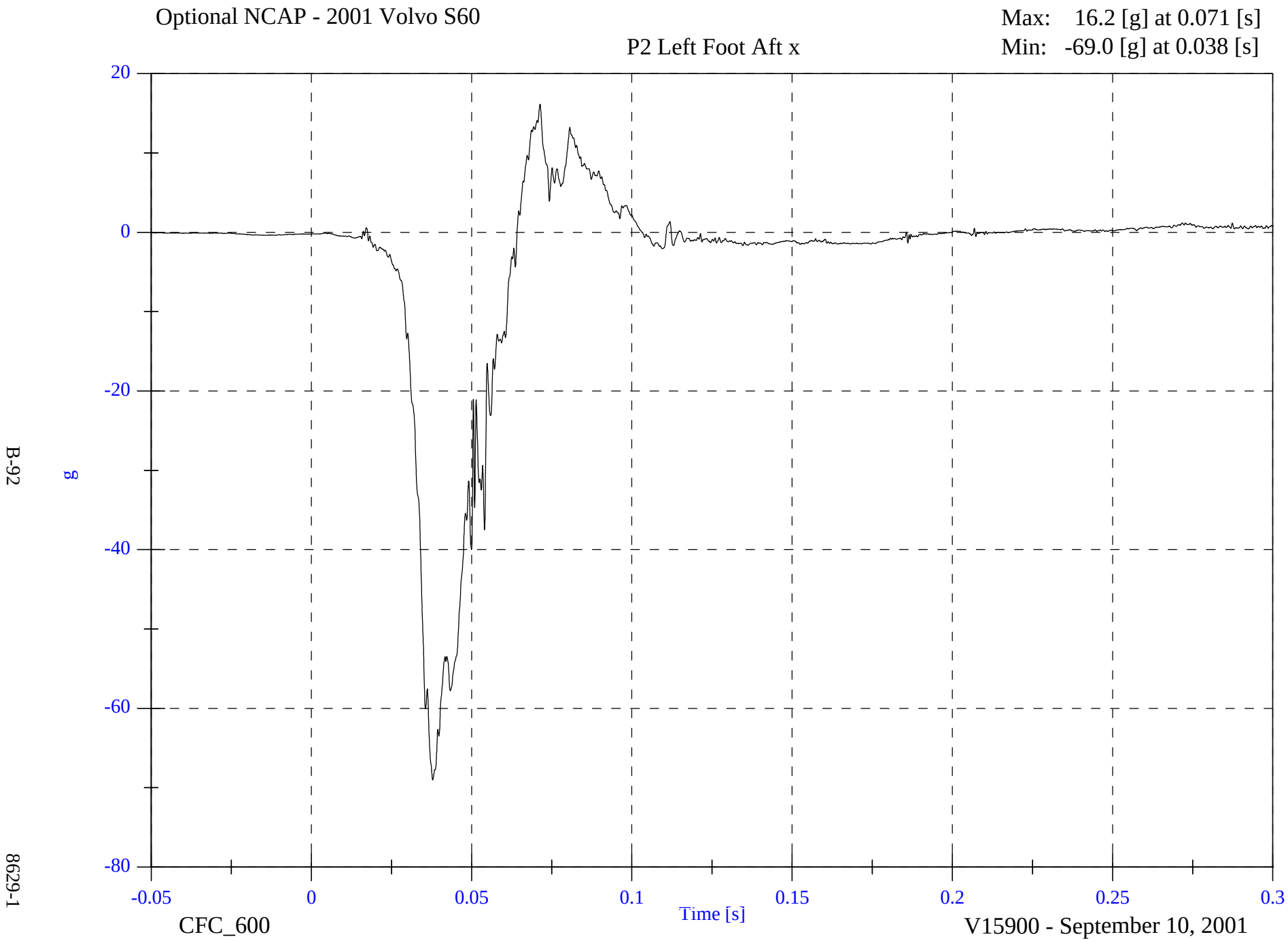


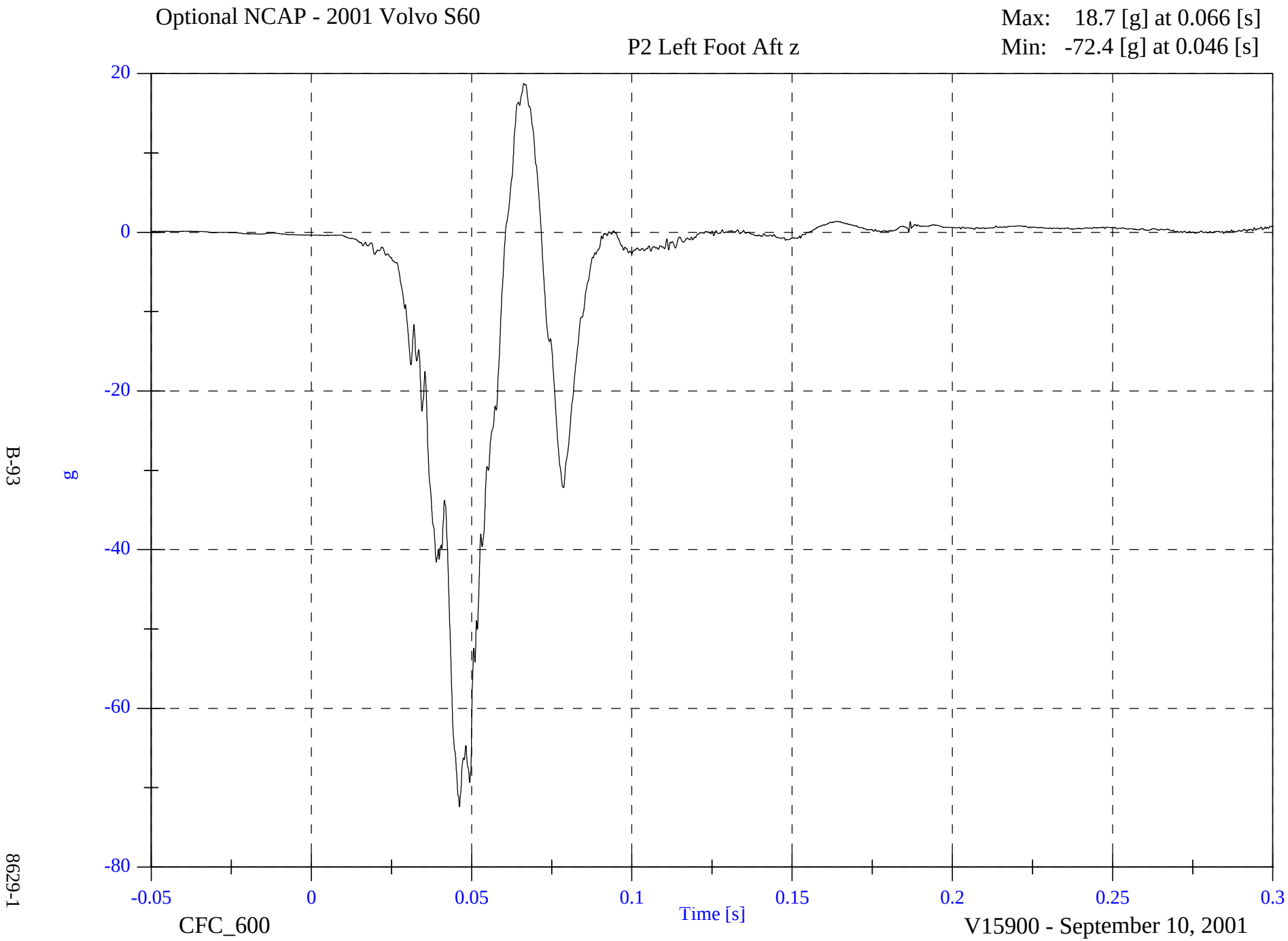
B-91

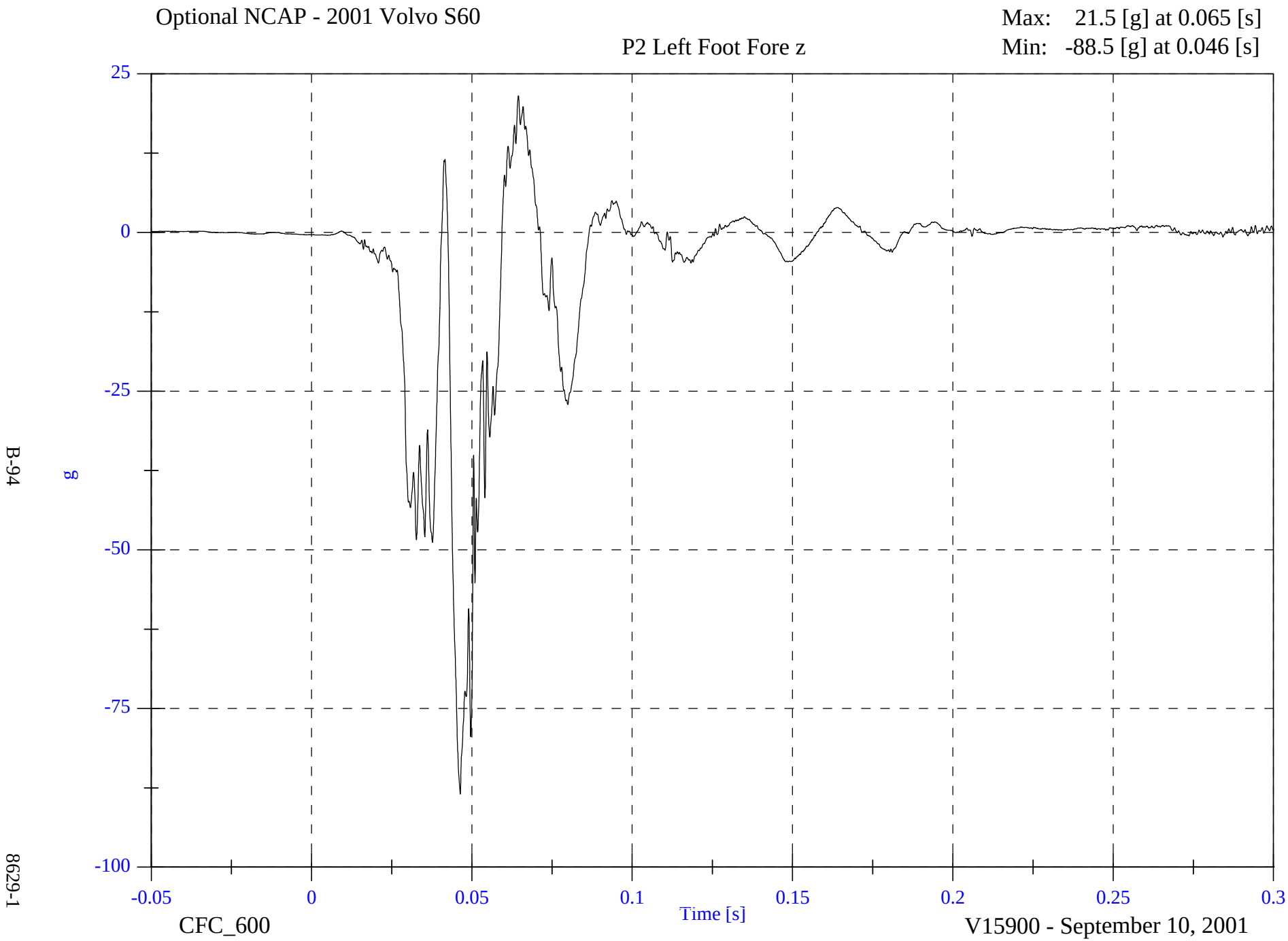
8629-1

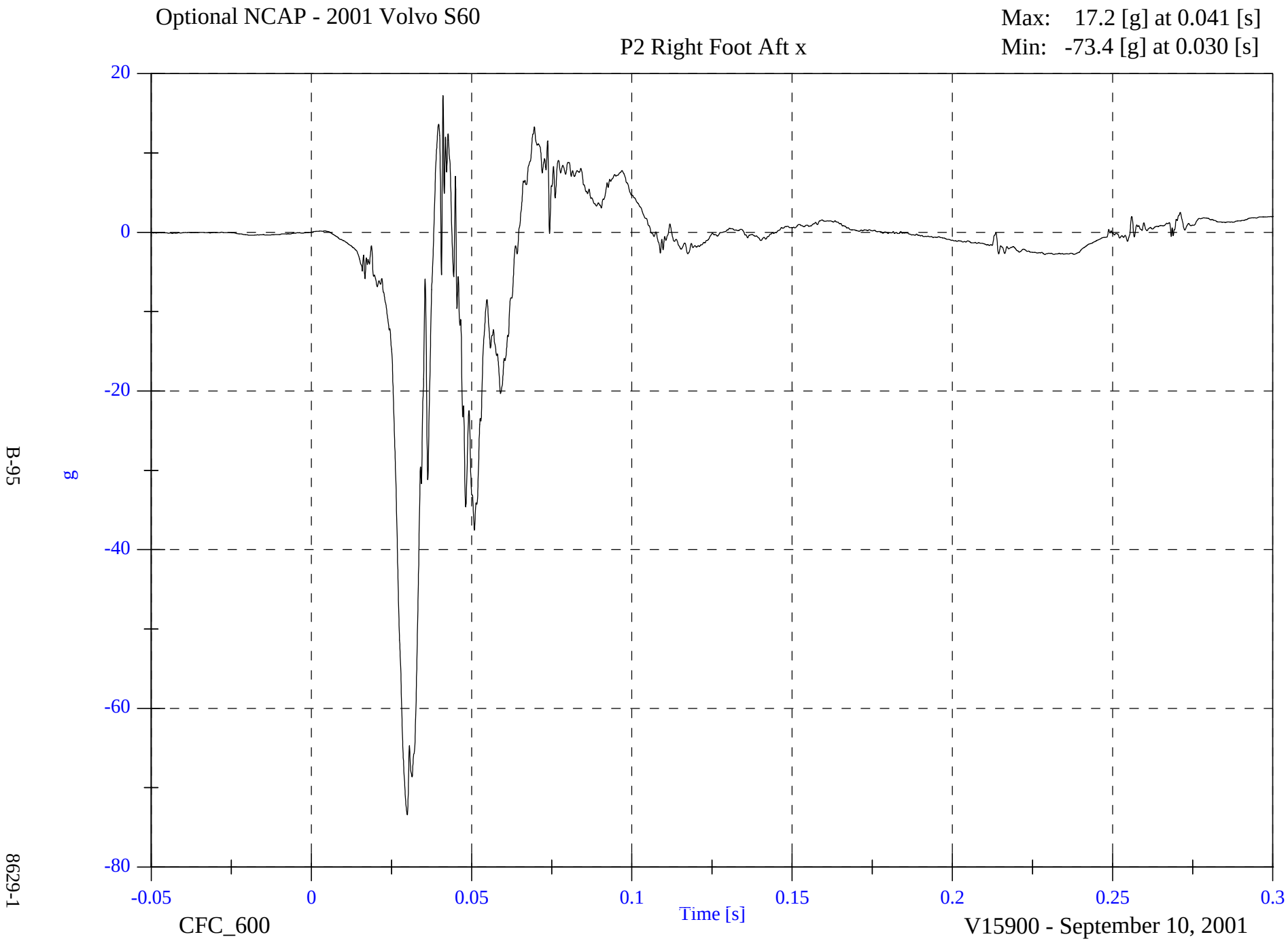
CFC_600

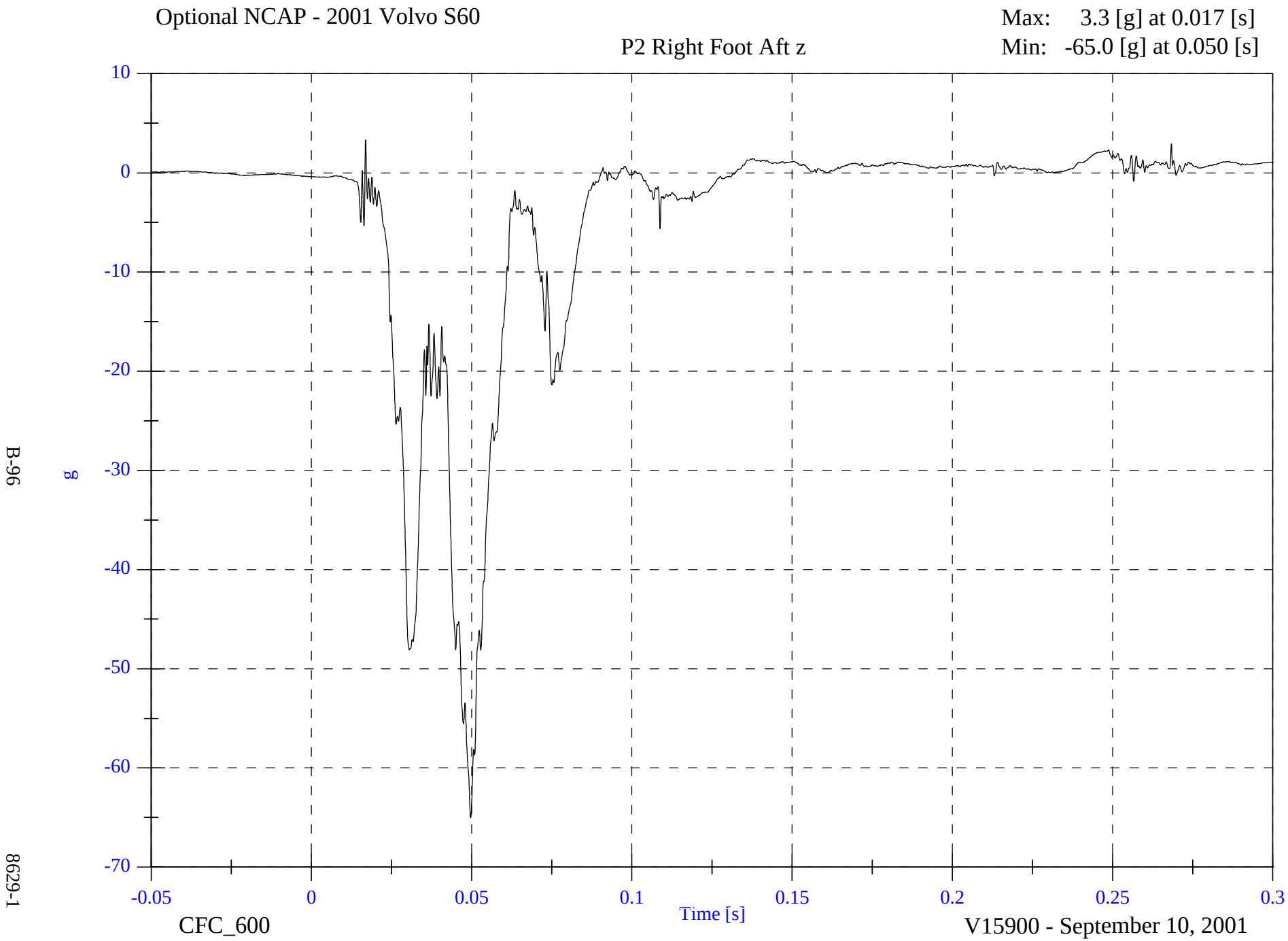
V15900 - September 10, 2001

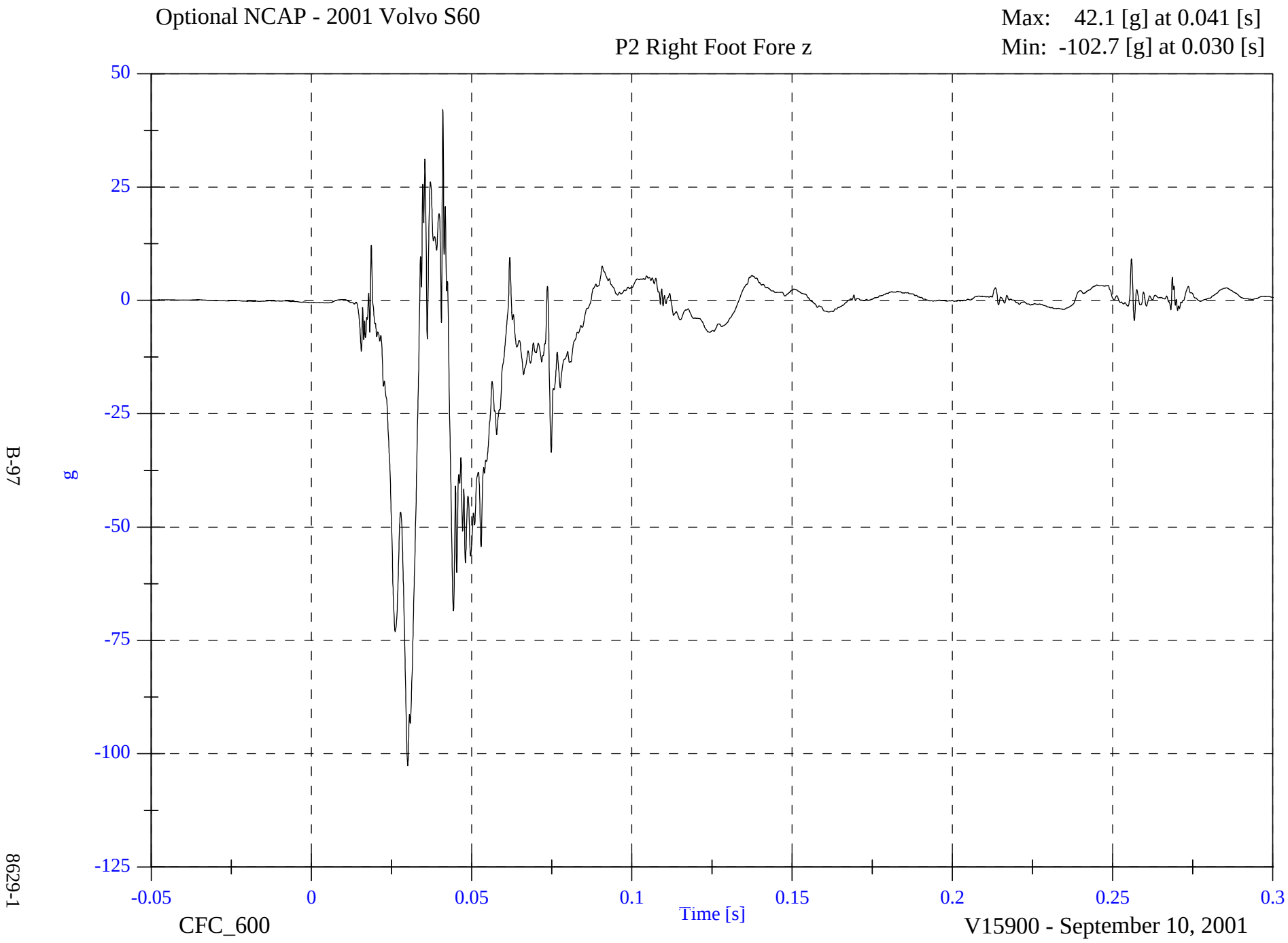

Optional NCAP - 2001 Volvo S60
P2 Left Foot Aft x
Max: 16.2 [g] at 0.071 [s]
Min: -69.0 [g] at 0.038 [s]
20
0
-20
-40
-60
-80
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-92
8629-1
CFC_600
V15900 - September 10, 2001

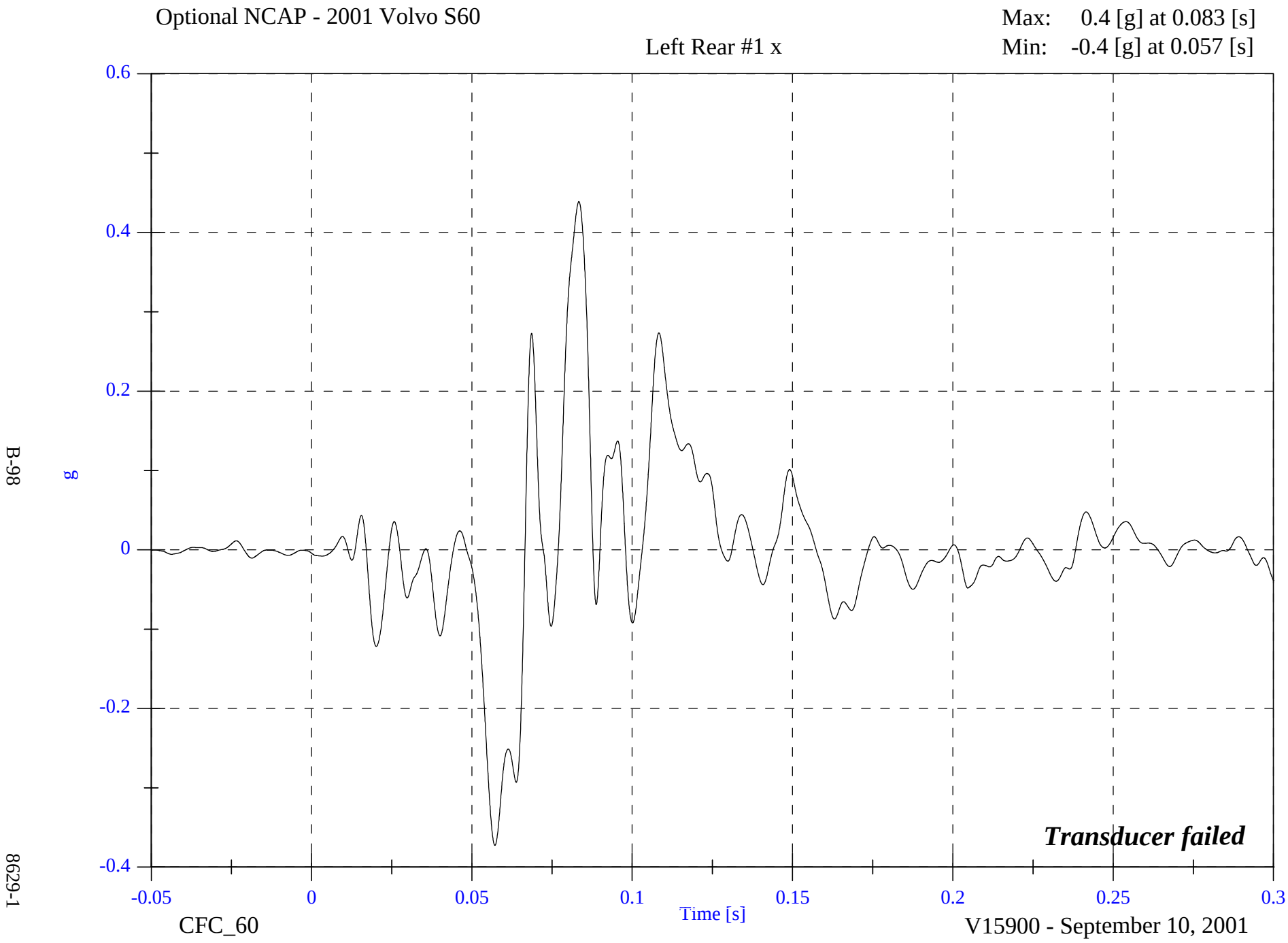

Optional NCAP - 2001 Volvo S60
P2 Left Foot Aft z
Max: 18.7 [g] at 0.066 [s]
Min: -72.4 [g] at 0.046 [s]
20
0
-20
-40
-60
-80
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-93
8629-1
CFC_600
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Left Foot Fore z
Max: 21.5 [g] at 0.065 [s]
Min: -88.5 [g] at 0.046 [s]
25
0
-25
-50
-75
-100
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001
B-94
8629-1


Optional NCAP - 2001 Volvo S60
P2 Right Foot Aft x
Max: 17.2 [g] at 0.041 [s]
Min: -73.4 [g] at 0.030 [s]
20
0
-20
-40
-60
-80
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-95
8629-1
CFC_600
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
P2 Right Foot Aft z
Max: 3.3 [g] at 0.017 [s]
Min: -65.0 [g] at 0.050 [s]
10
0
-10
-20
-30
-40
-50
-60
-70
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-96
8629-1
CFC_600
V15900 - September 10, 2001

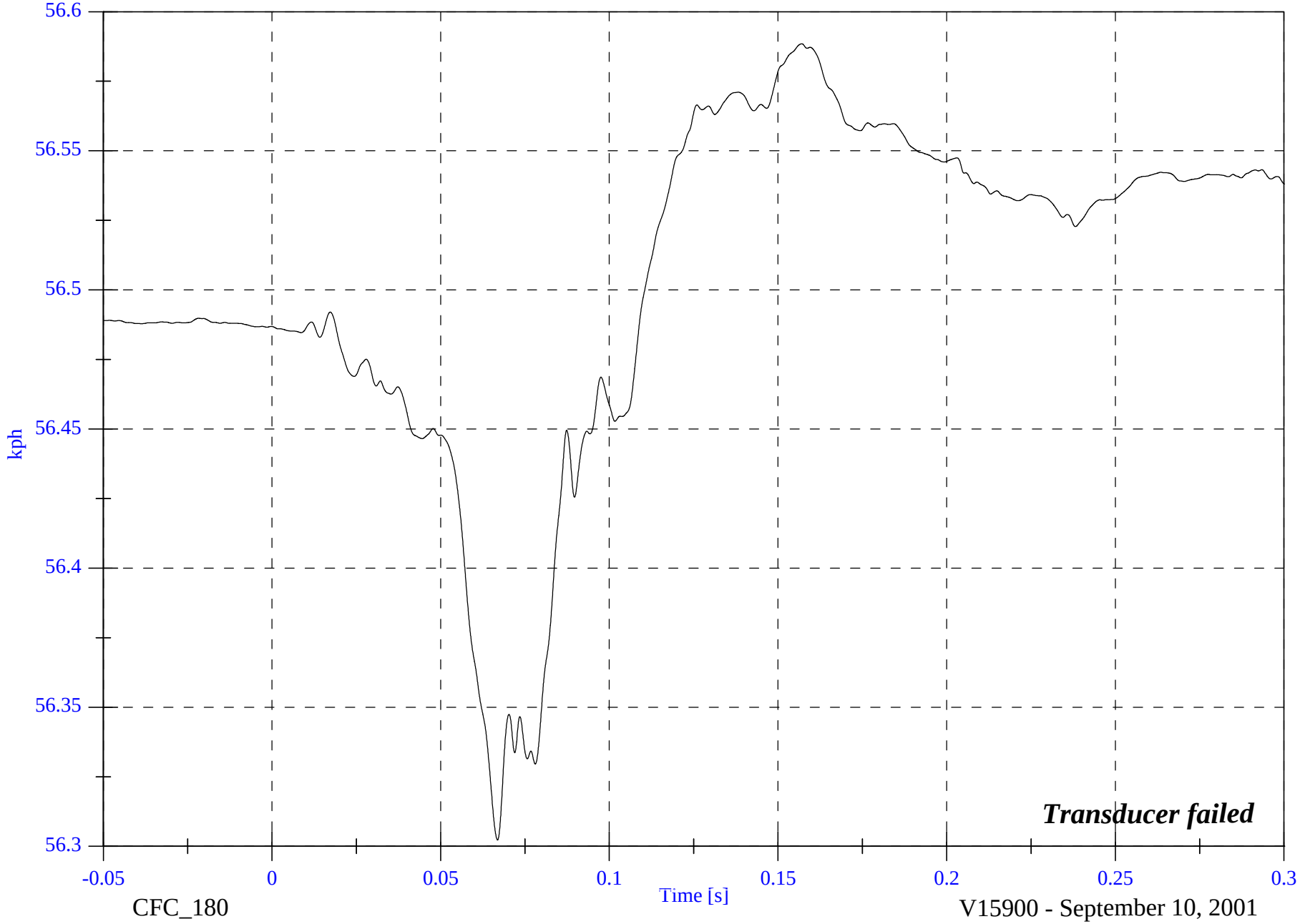

Optional NCAP - 2001 Volvo S60
P2 Right Foot Fore z
Max: 42.1 [g] at 0.041 [s]
Min: -102.7 [g] at 0.030 [s]
50
25
0
-25
-50
-75
-100
-125
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_600
V15900 - September 10, 2001
B-97
8629-1


Optional NCAP - 2001 Volvo S60
Left Rear #1 x
Max: 0.4 [g] at 0.083 [s]
Min: -0.4 [g] at 0.057 [s]
0.6
0.4
0.2
0
-0.2
-0.4
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
Transducer failed
B-98
8629-1
CFC_60
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Left Rear #1 x Velocity

Max: 56.6 [kph] at 0.157 [s]
Min: 56.3 [kph] at 0.067 [s]



B-99

8629-1

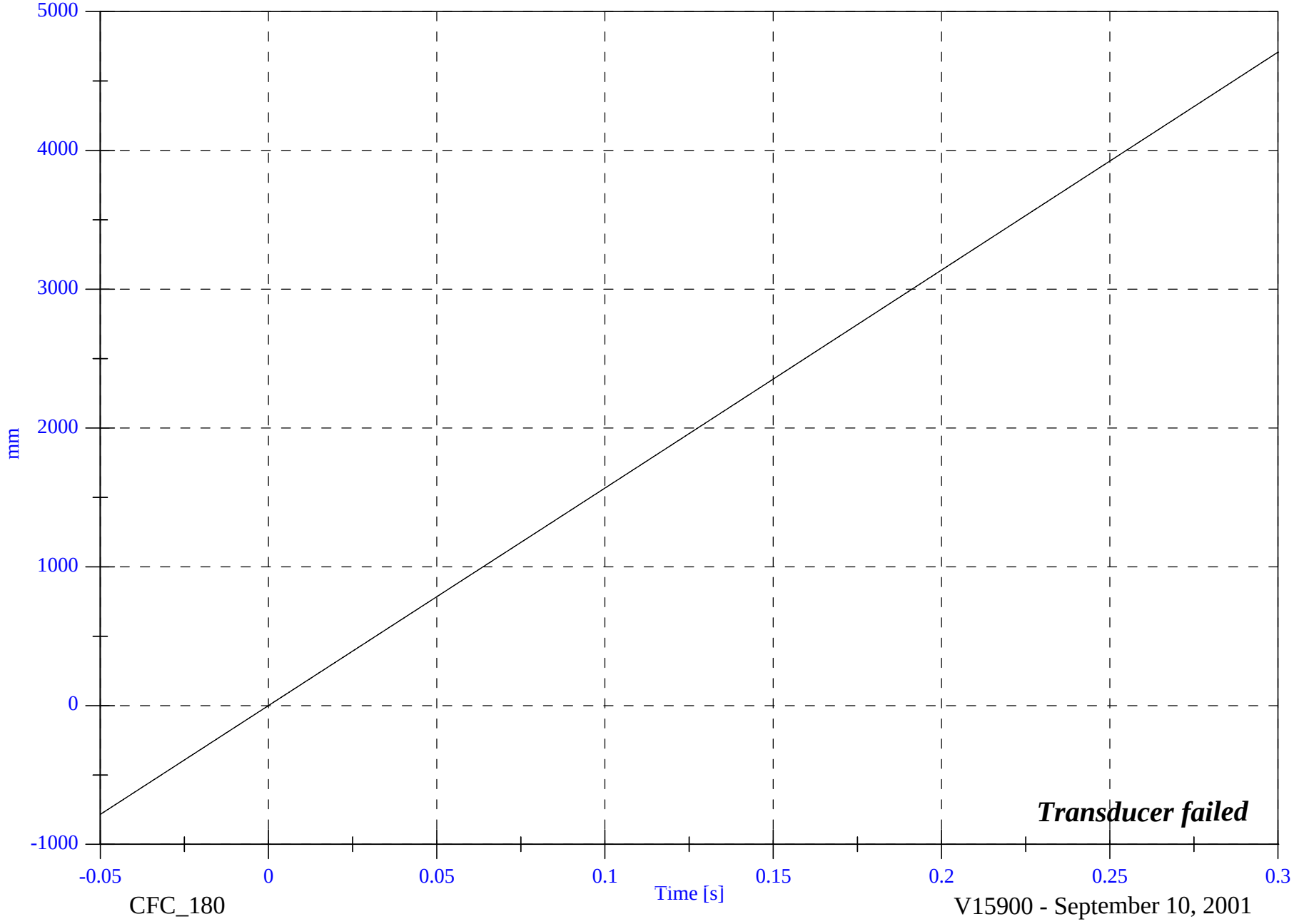
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Left Rear #1 x Displacement

Max: 4708.1 [mm] at 0.300 [s]
Min: -784.6 [mm] at -0.050 [s]



B-100

8629-1

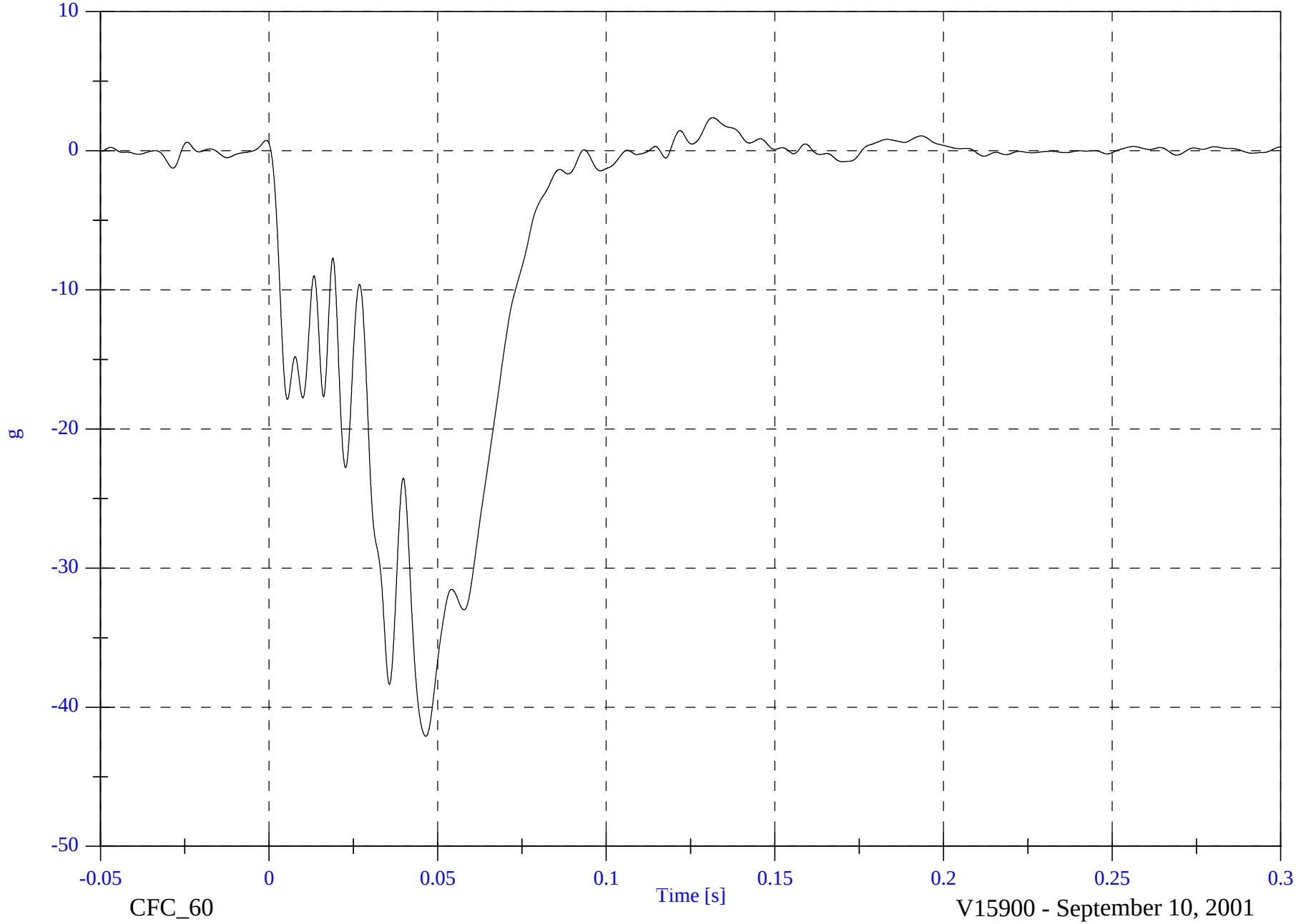
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Right Rear #2 x

Max: 2.4 [g] at 0.131 [s]
Min: -42.1 [g] at 0.046 [s]



B-101

8629-1

CFC_60

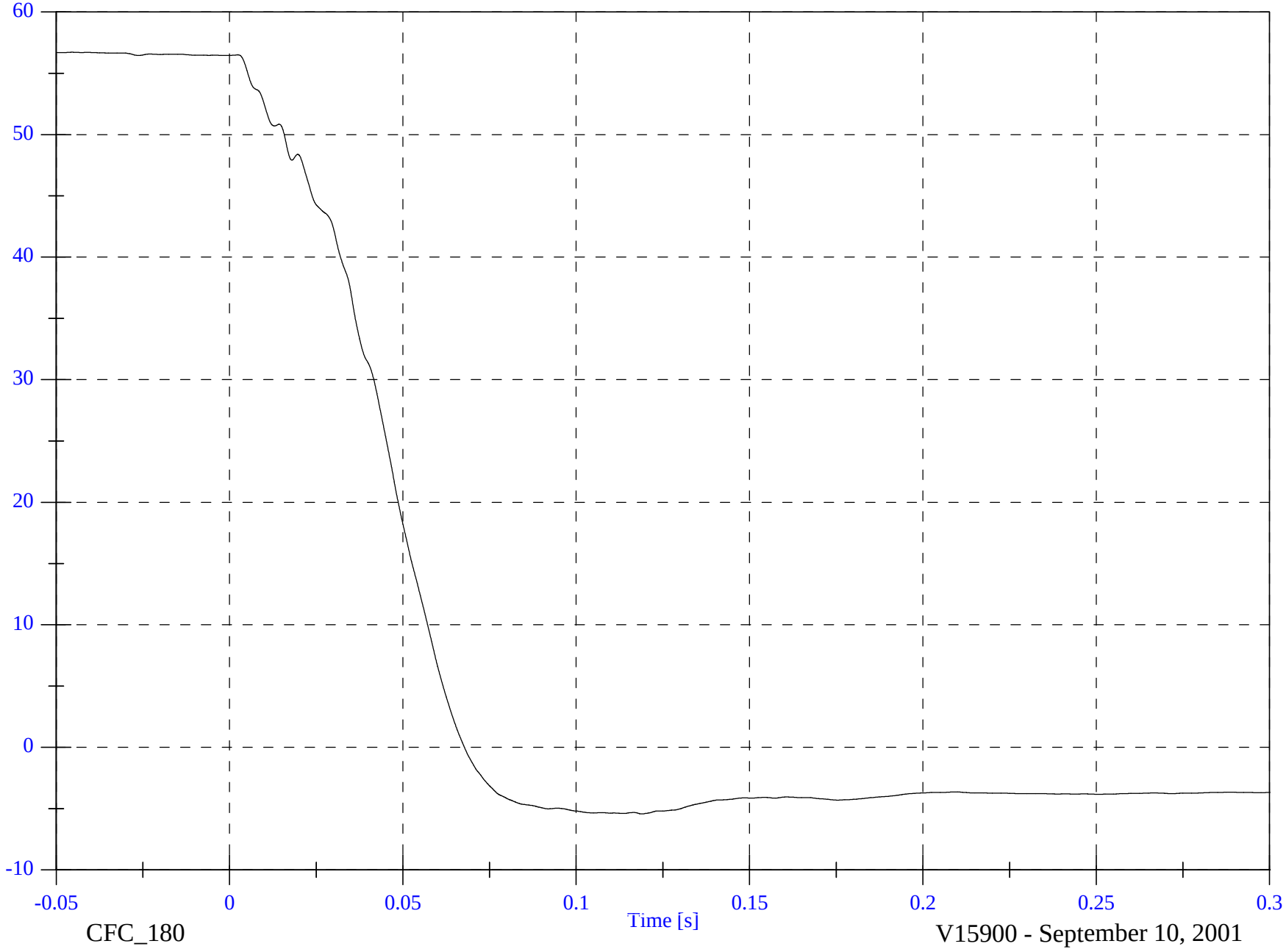
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Max: 56.7 [kph] at -0.045 [s]

Right Rear #2 x Velocity

Min: -5.4 [kph] at 0.119 [s]



B-102

8629-1

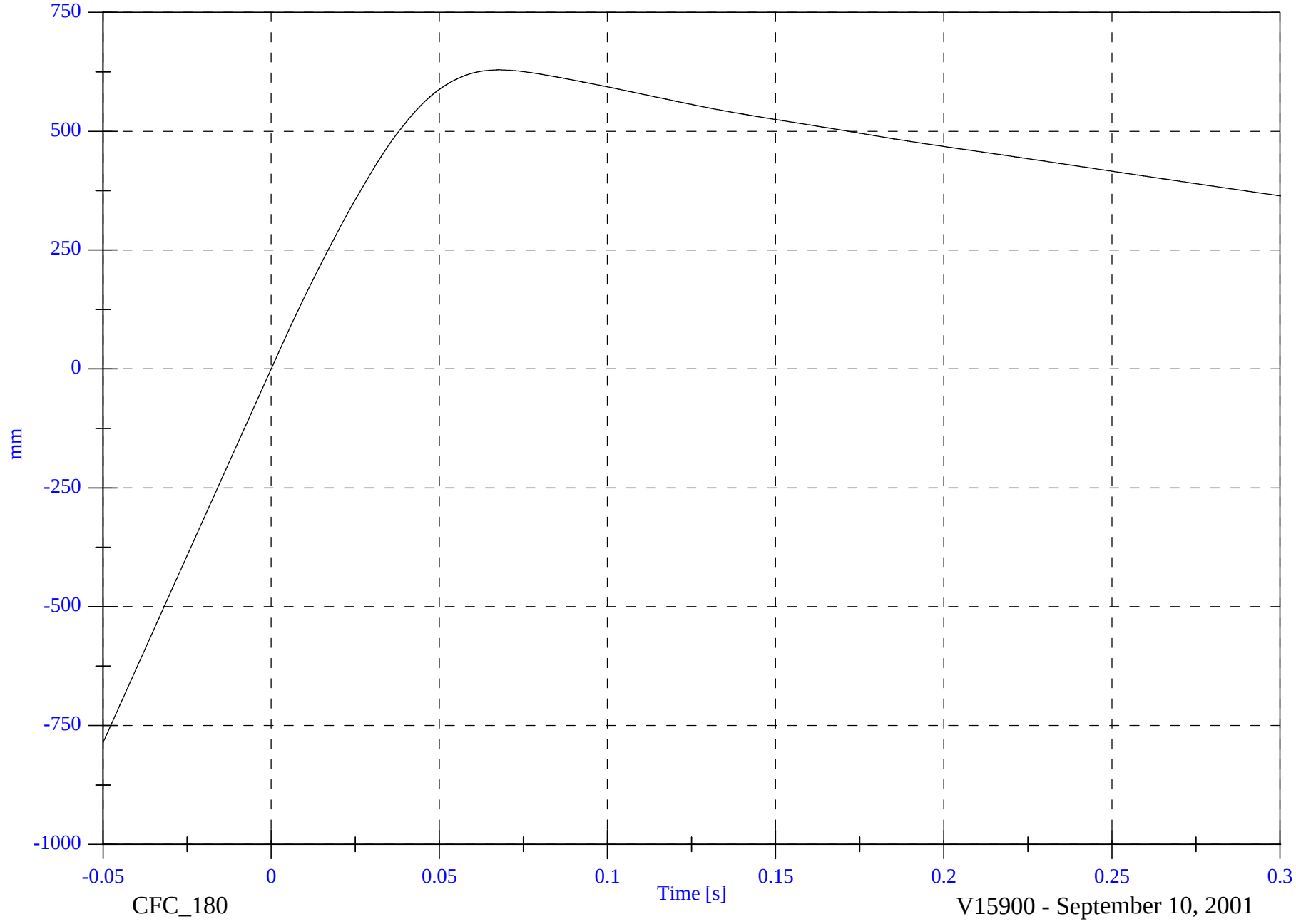
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Right Rear #2 x Displacement

Max: 629.0 [mm] at 0.068 [s]
Min: -785.9 [mm] at -0.050 [s]

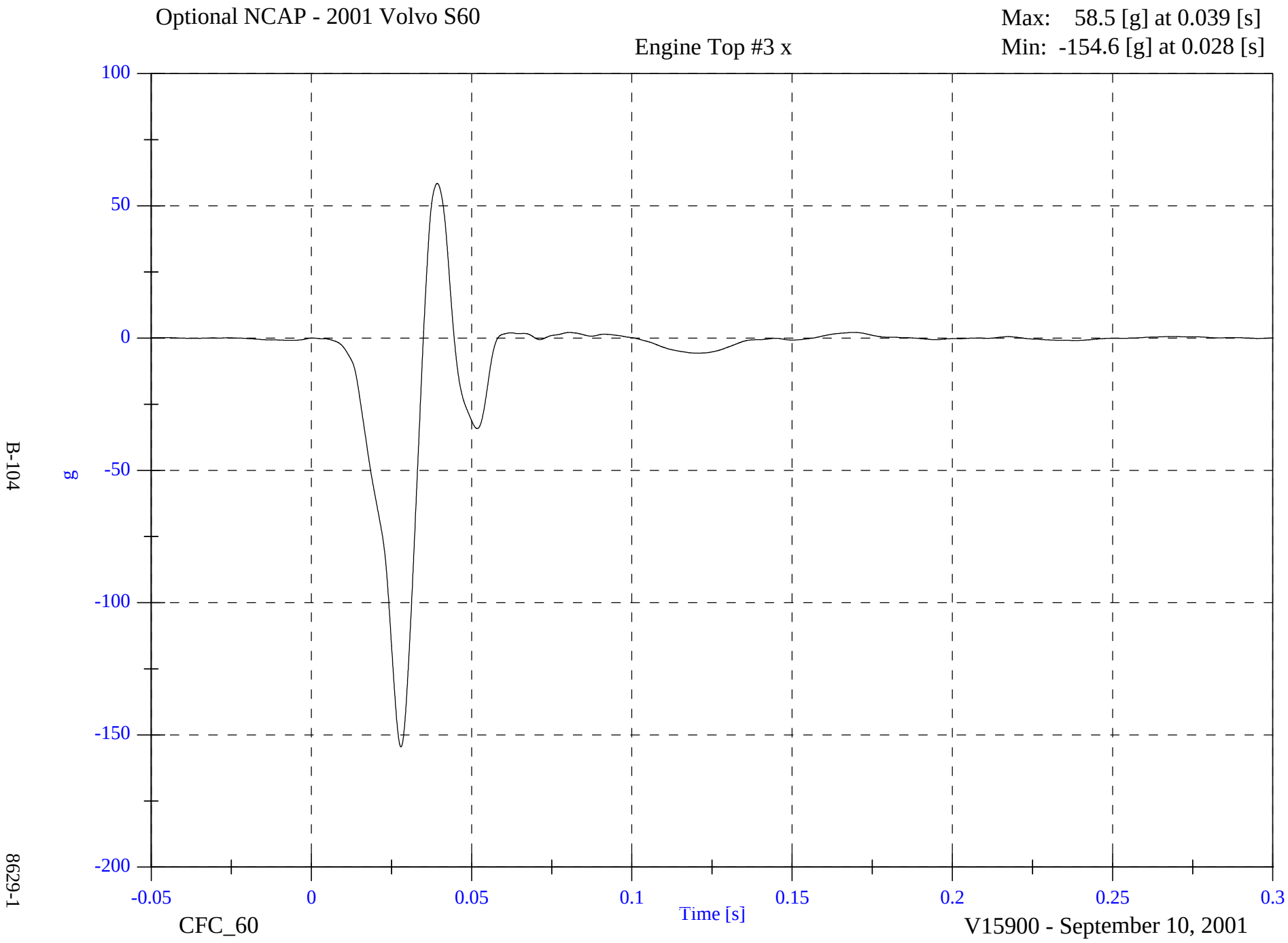


B-103

8629-1

CFC_180

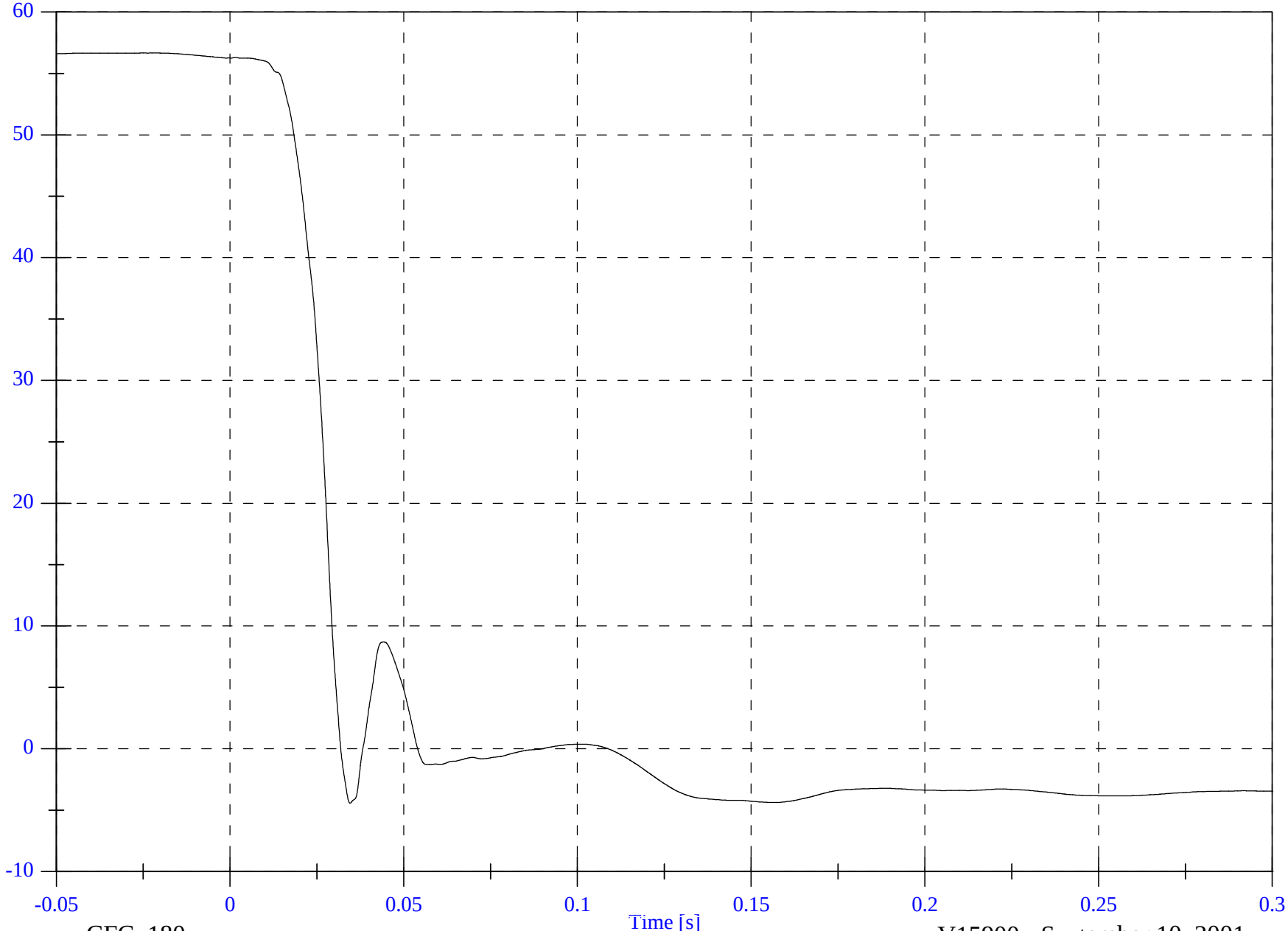
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Engine Top #3 x
Max: 58.5 [g] at 0.039 [s]
Min: -154.6 [g] at 0.028 [s]
100
50
0
-50
-100
-150
-200
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-104
8629-1
CFC_60
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Engine Top #3 x Velocity

Max: 56.7 [kph] at -0.022 [s]
Min: -4.4 [kph] at 0.035 [s]



B-105

8629-1

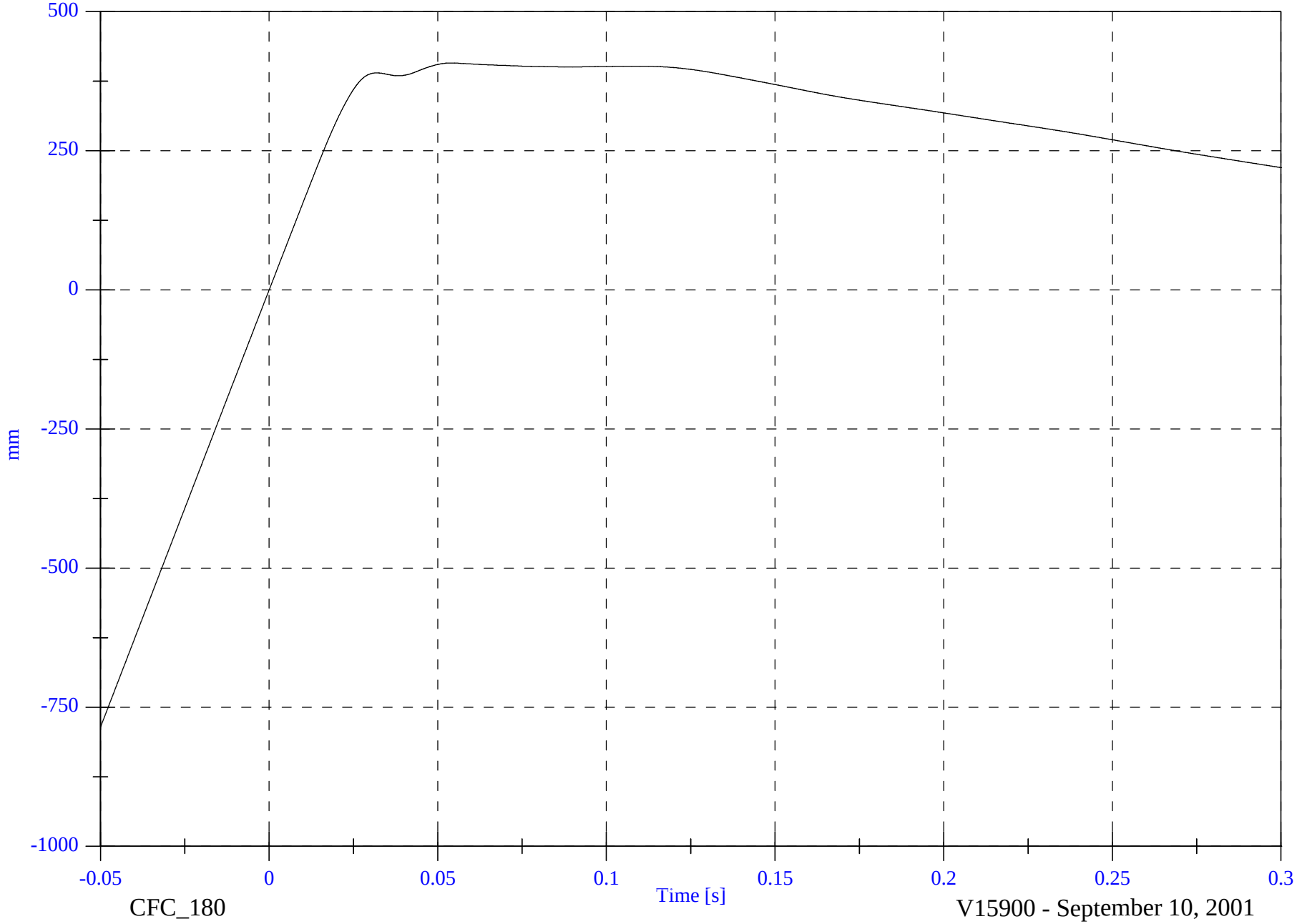
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Engine Top #3 x Displacement

Max: 407.9 [mm] at 0.054 [s]
Min: -785.8 [mm] at -0.050 [s]

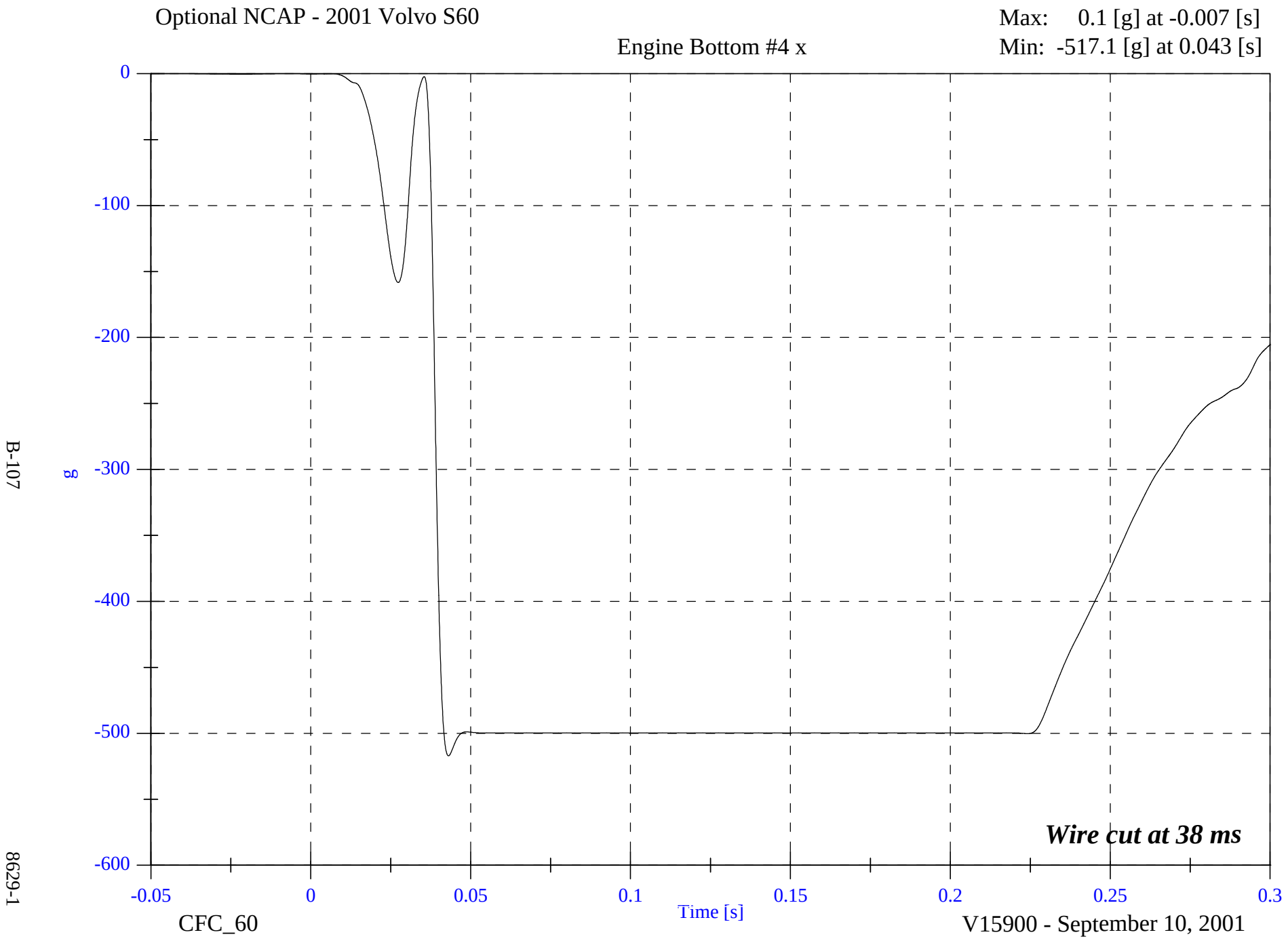


B-106

8629-1

CFC_180

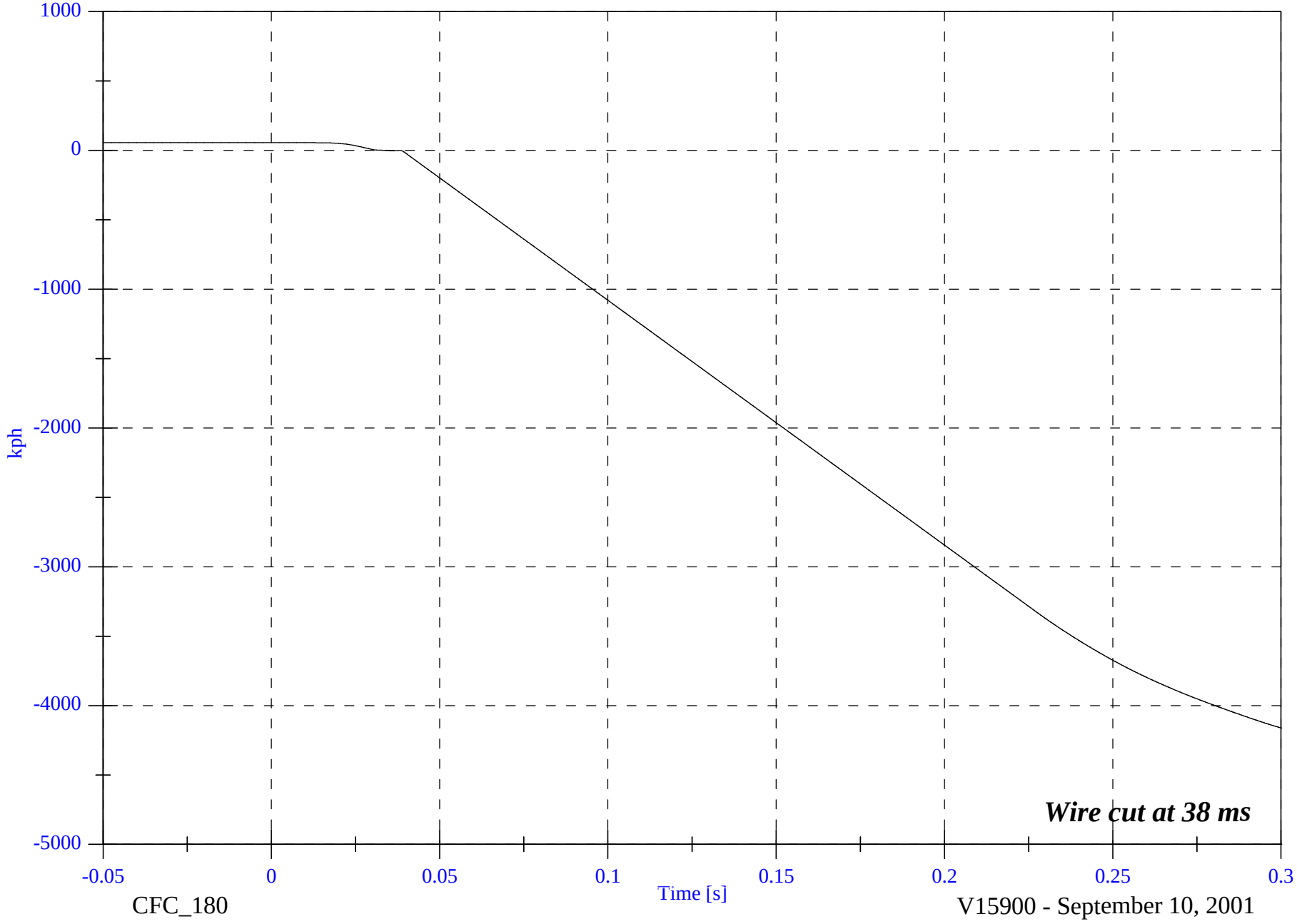
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Engine Bottom #4 x
Max: 0.1 [g] at -0.007 [s]
Min: -517.1 [g] at 0.043 [s]
0
-100
-200
-300
-400
-500
-600
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
Wire cut at 38 ms
B-107
8629-1
CFC_60
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Engine Bottom #4 x Velocity

Max: 56.7 [kph] at -0.035 [s]
Min: -4161.5 [kph] at 0.300 [s]



B-108

8629-1

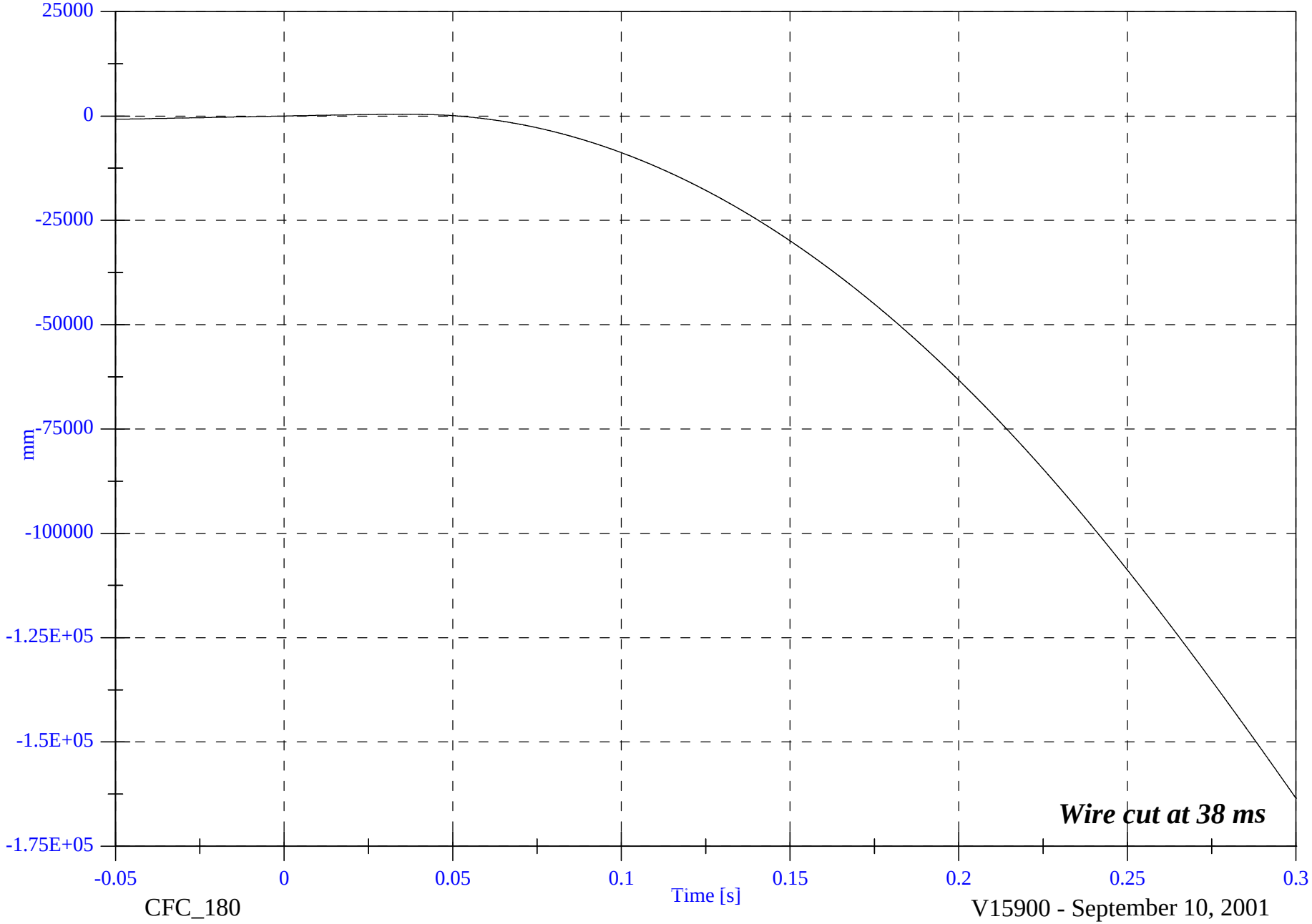
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Engine Bottom #4 x Displacement

Max: 402.0 [mm] at 0.035 [s]
Min: -163474.2 [mm] at 0.300 [s]



B-109

8629-1

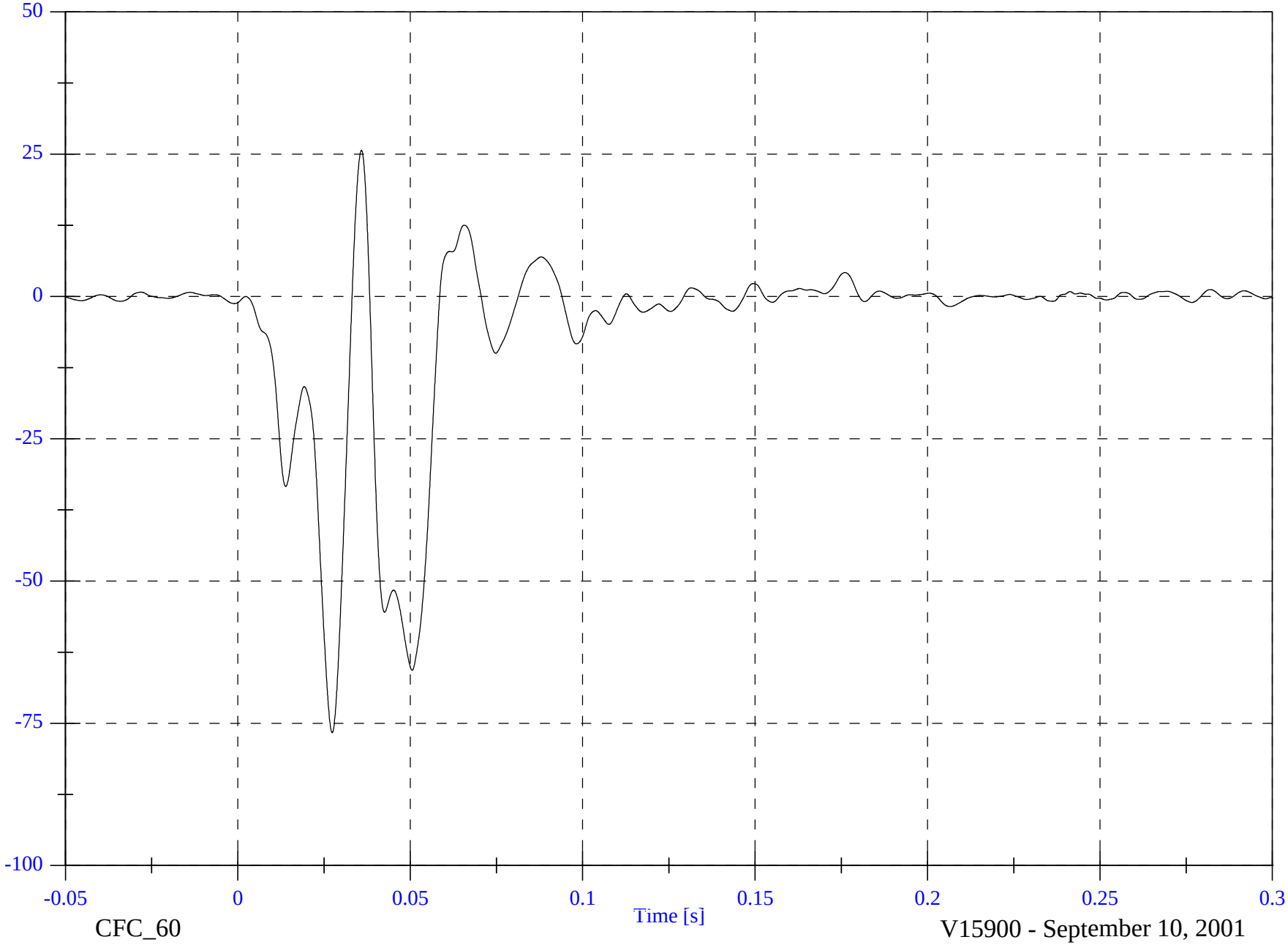
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Right Caliper #5 x

Max: 25.7 [g] at 0.036 [s]
Min: -76.7 [g] at 0.027 [s]



B-110

8629-1

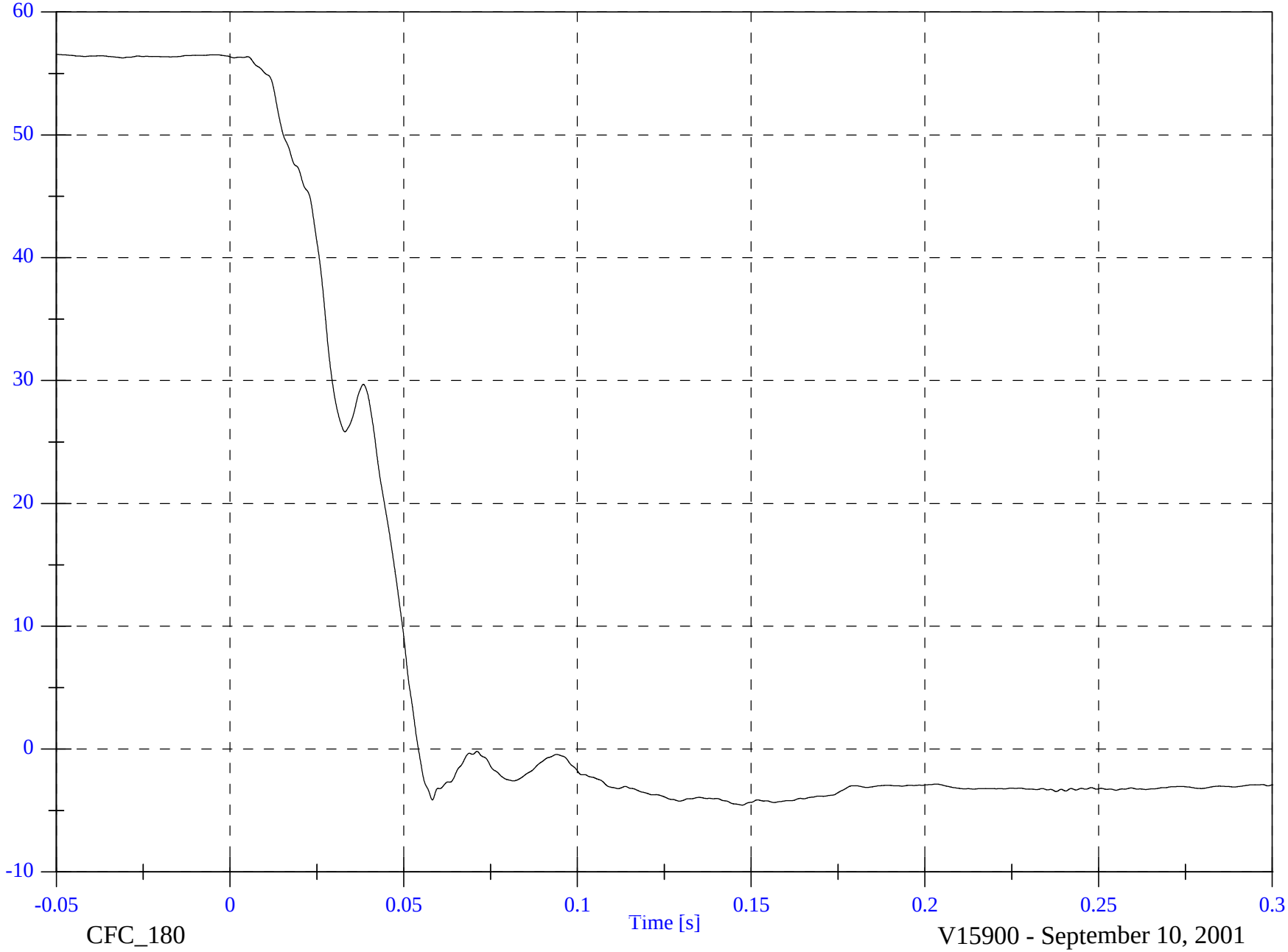
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Right Caliper #5 x Velocity

Max: 56.5 [kph] at -0.050 [s]
Min: -4.6 [kph] at 0.147 [s]



B-111

8629-1

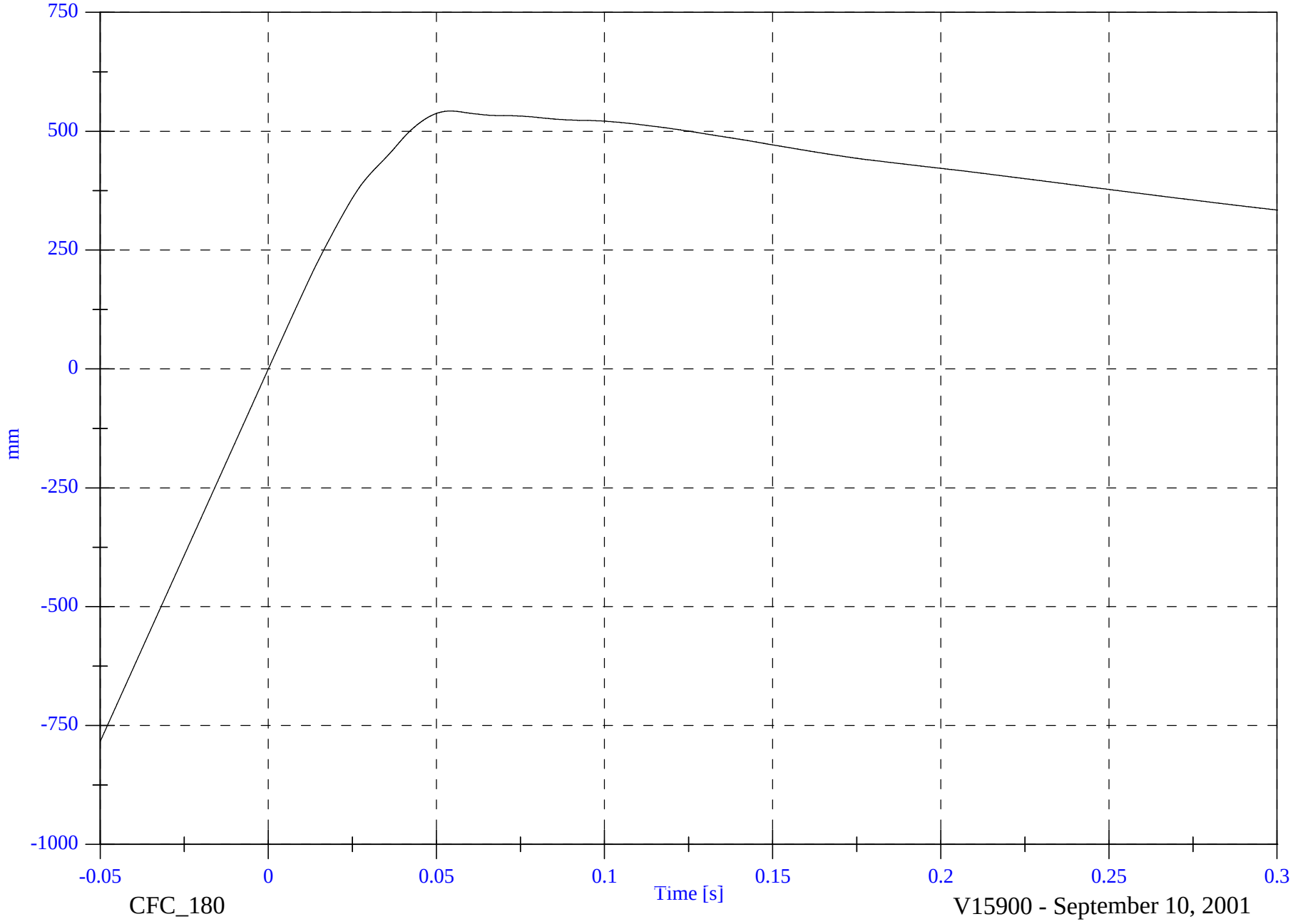
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Right Caliper #5 x Displacement

Max: 542.5 [mm] at 0.054 [s]
Min: -783.6 [mm] at -0.050 [s]



B-112

8629-1

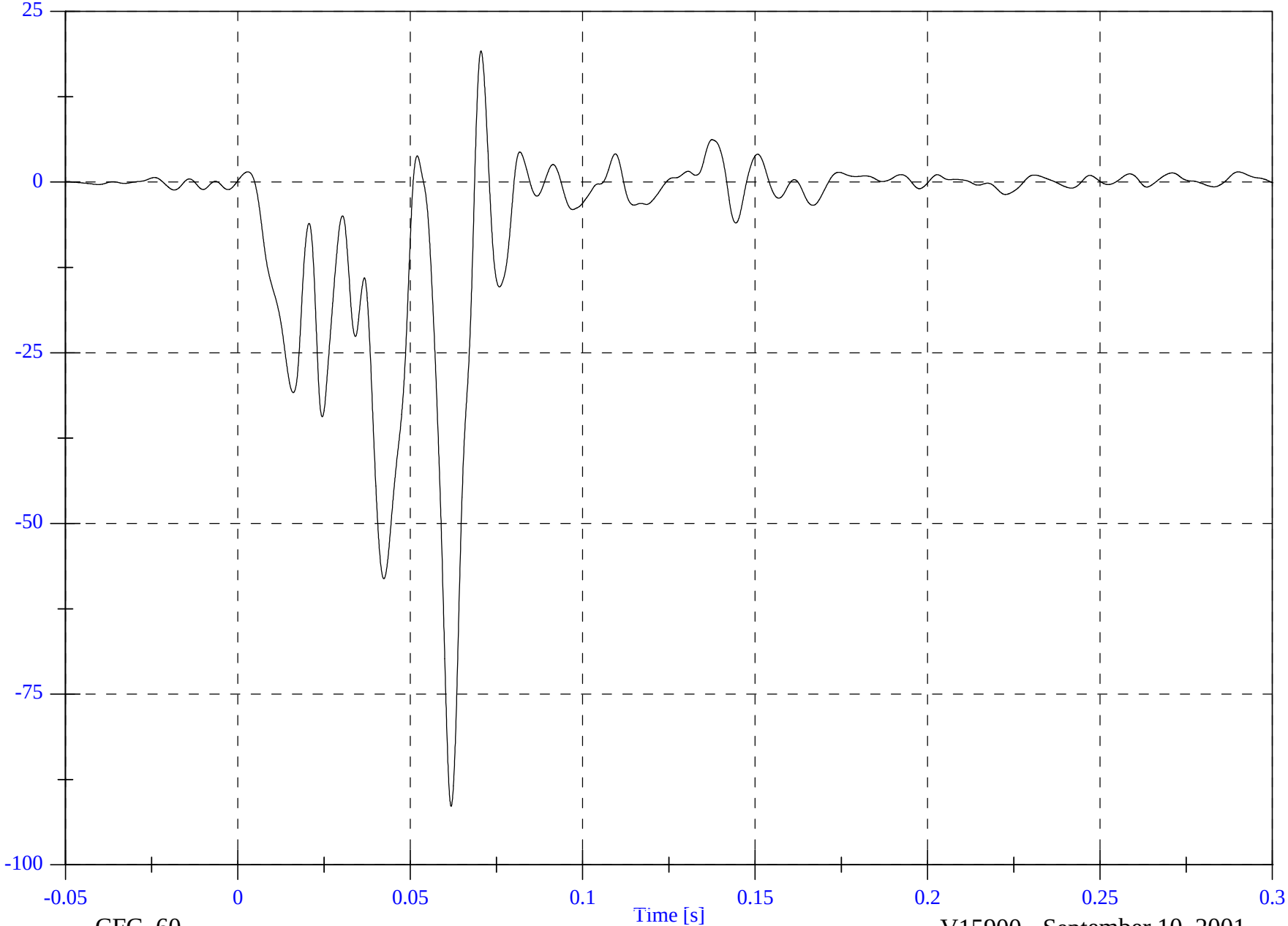
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Instrument Panel #6 x

Max: 19.2 [g] at 0.071 [s]
Min: -91.4 [g] at 0.062 [s]



B-113

8629-1

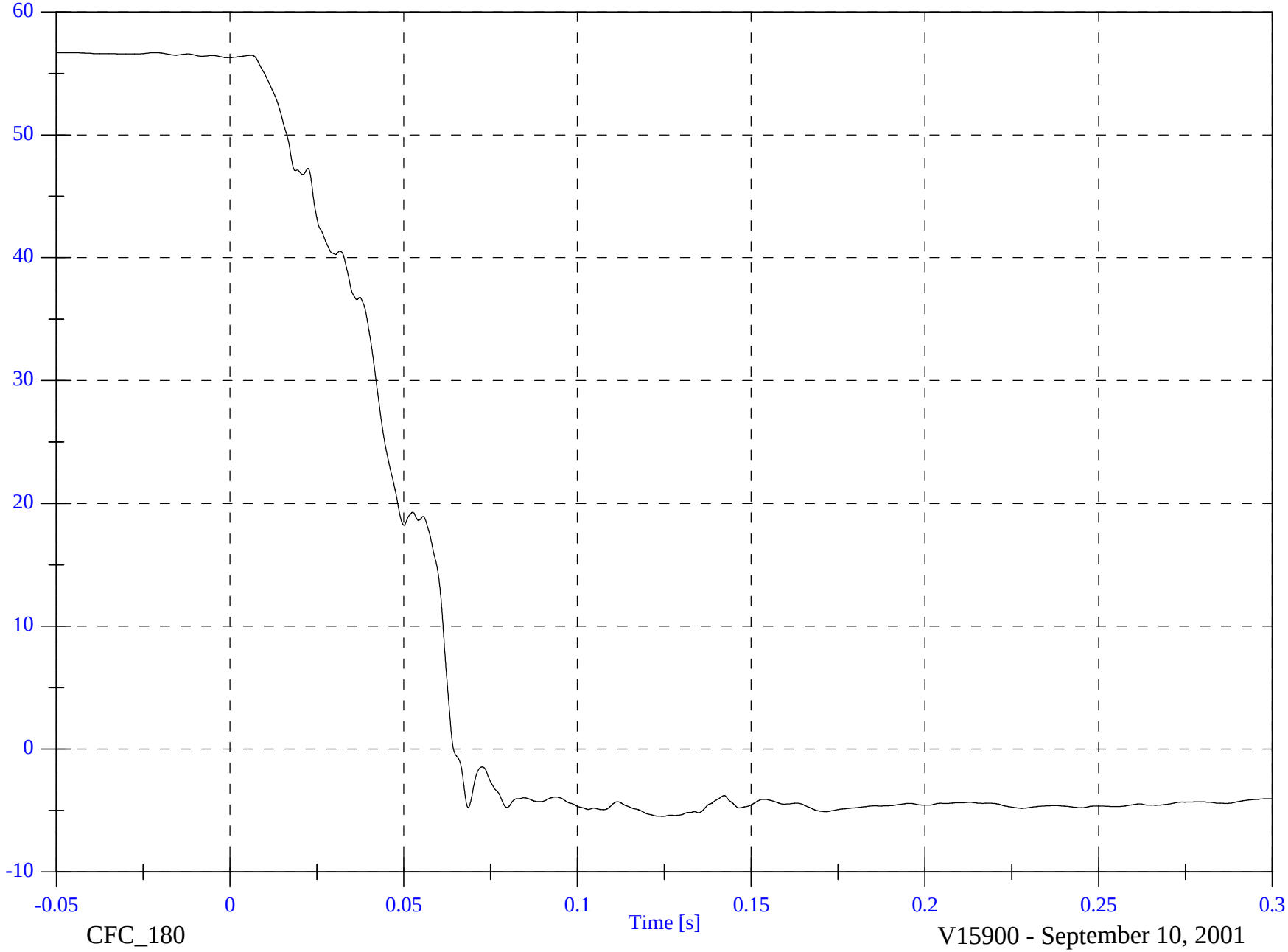
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Instrument Panel #6 x Velocity

Max: 56.7 [kph] at -0.022 [s]
Min: -5.5 [kph] at 0.124 [s]



B-114

8629-1

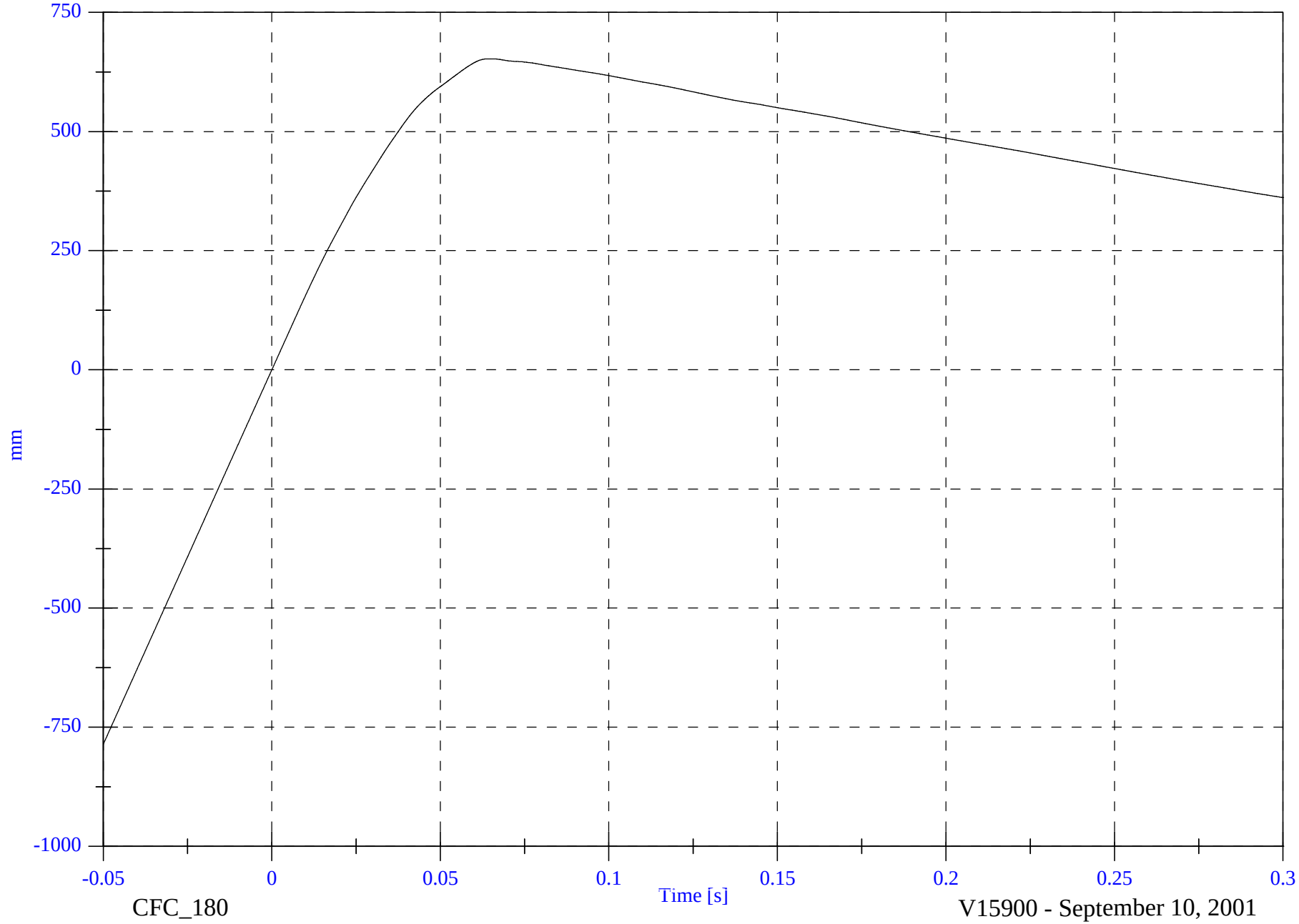
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Instrument Panel #6 x Displacement

Max: 652.5 [mm] at 0.064 [s]
Min: -785.8 [mm] at -0.050 [s]

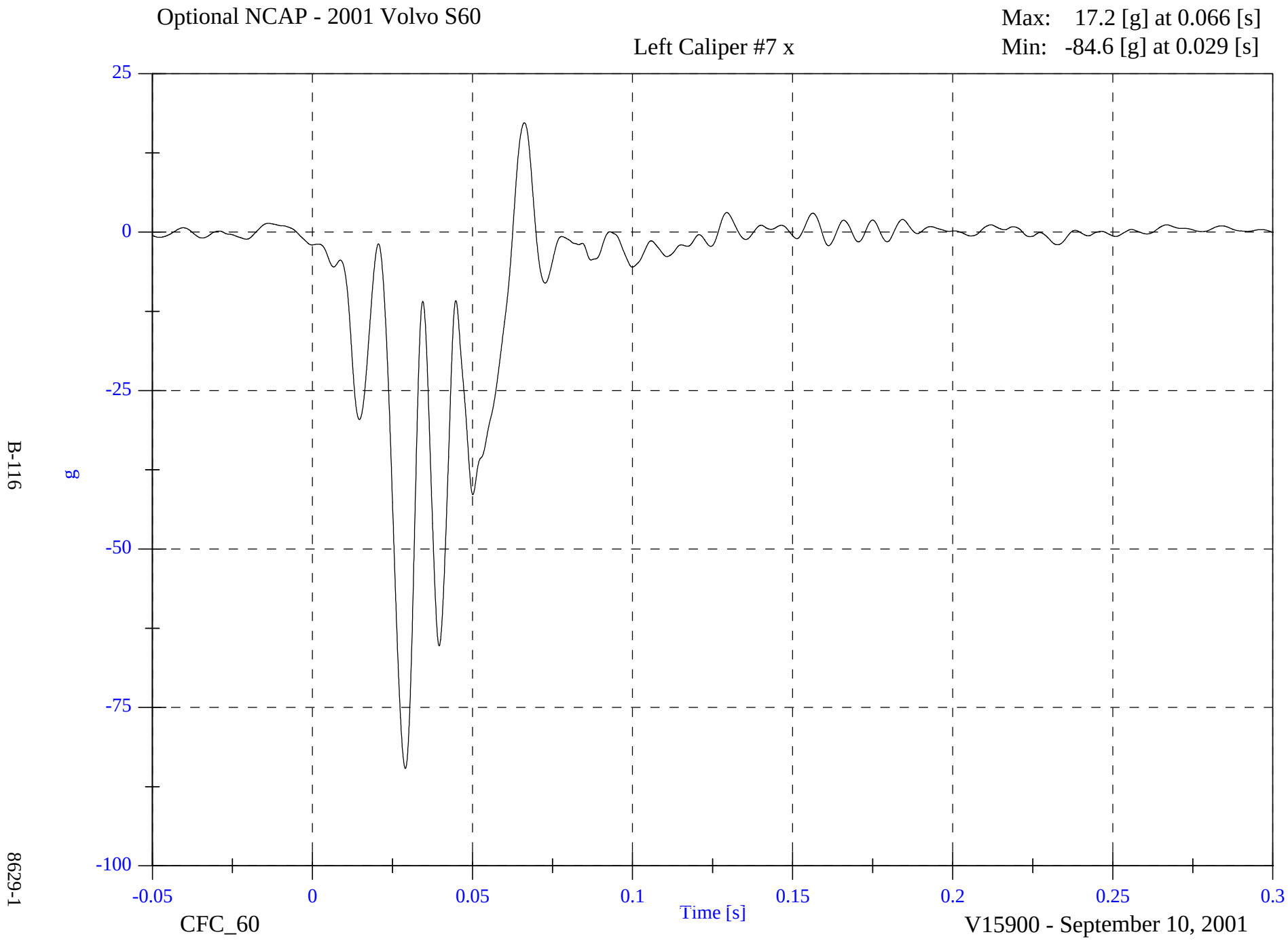


B-115

8629-1

CFC_180

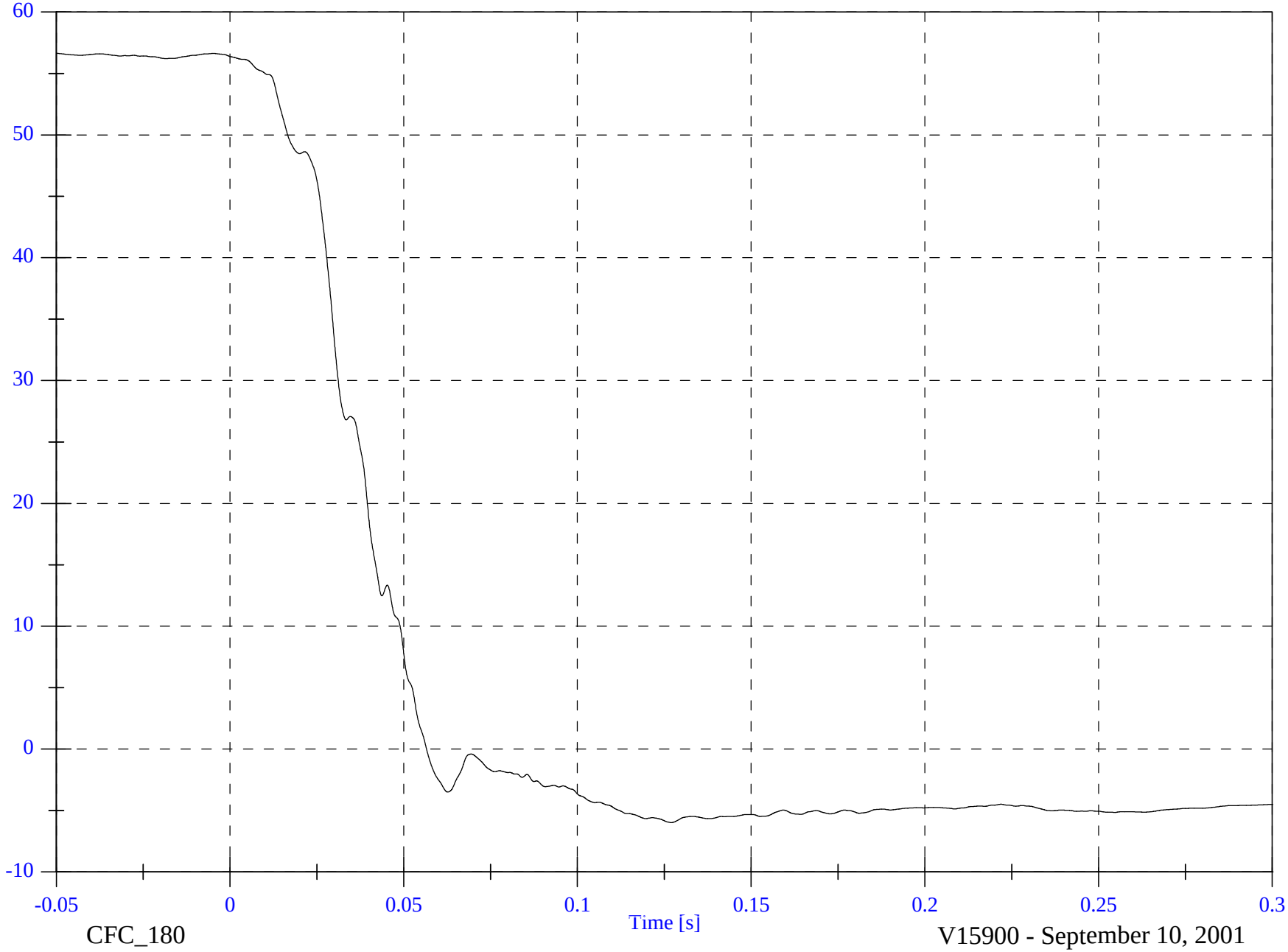
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Left Caliper #7 x
Max: 17.2 [g] at 0.066 [s]
Min: -84.6 [g] at 0.029 [s]
25
0
-25
-50
-75
-100
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_60
V15900 - September 10, 2001
B-116
8629-1

Optional NCAP - 2001 Volvo S60

Left Caliper #7 x Velocity

Max: 56.6 [kph] at -0.050 [s]
Min: -6.0 [kph] at 0.127 [s]



B-117

8629-1

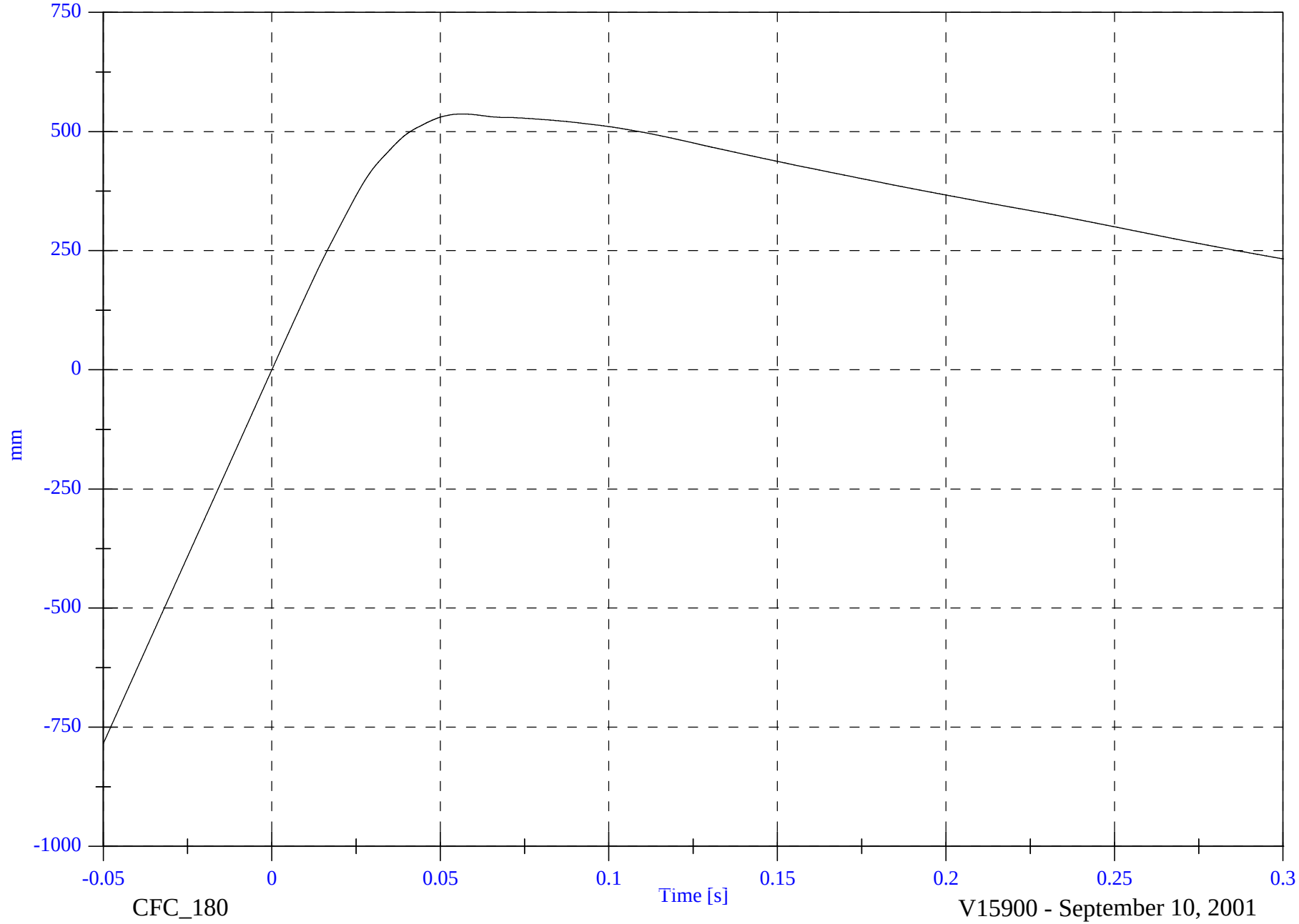
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Left Caliper #7 x Displacement

Max: 536.9 [mm] at 0.057 [s]
Min: -784.3 [mm] at -0.050 [s]

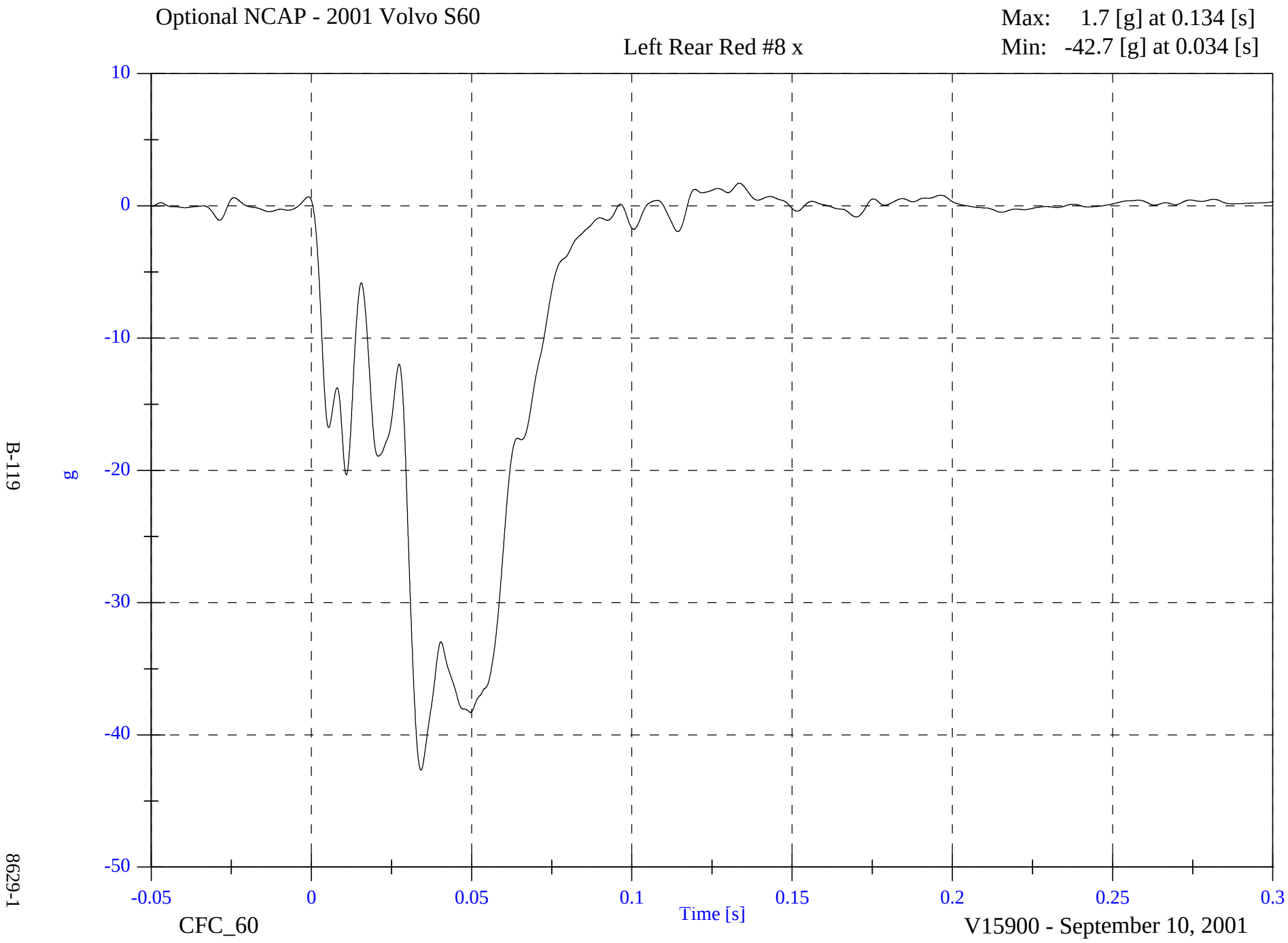


B-118

8629-1

CFC_180

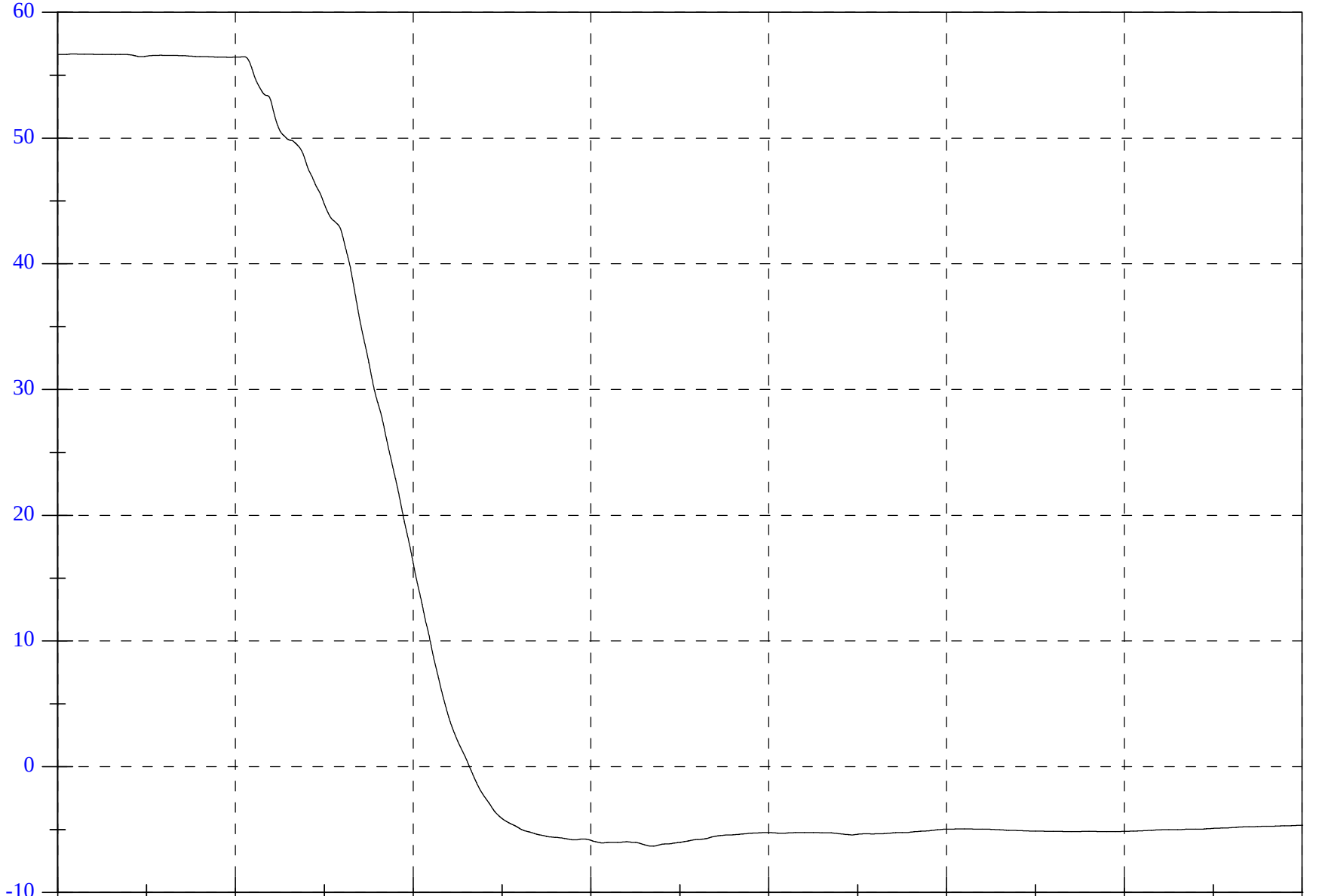
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Left Rear Red #8 x
Max: 1.7 [g] at 0.134 [s]
Min: -42.7 [g] at 0.034 [s]
10
0
-10
-20
-30
-40
-50
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
B-119
8629-1
CFC_60
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Left Rear Red #8 x Velocity

Max: 56.7 [kph] at -0.046 [s]
Min: -6.3 [kph] at 0.117 [s]



B-120

8629-1

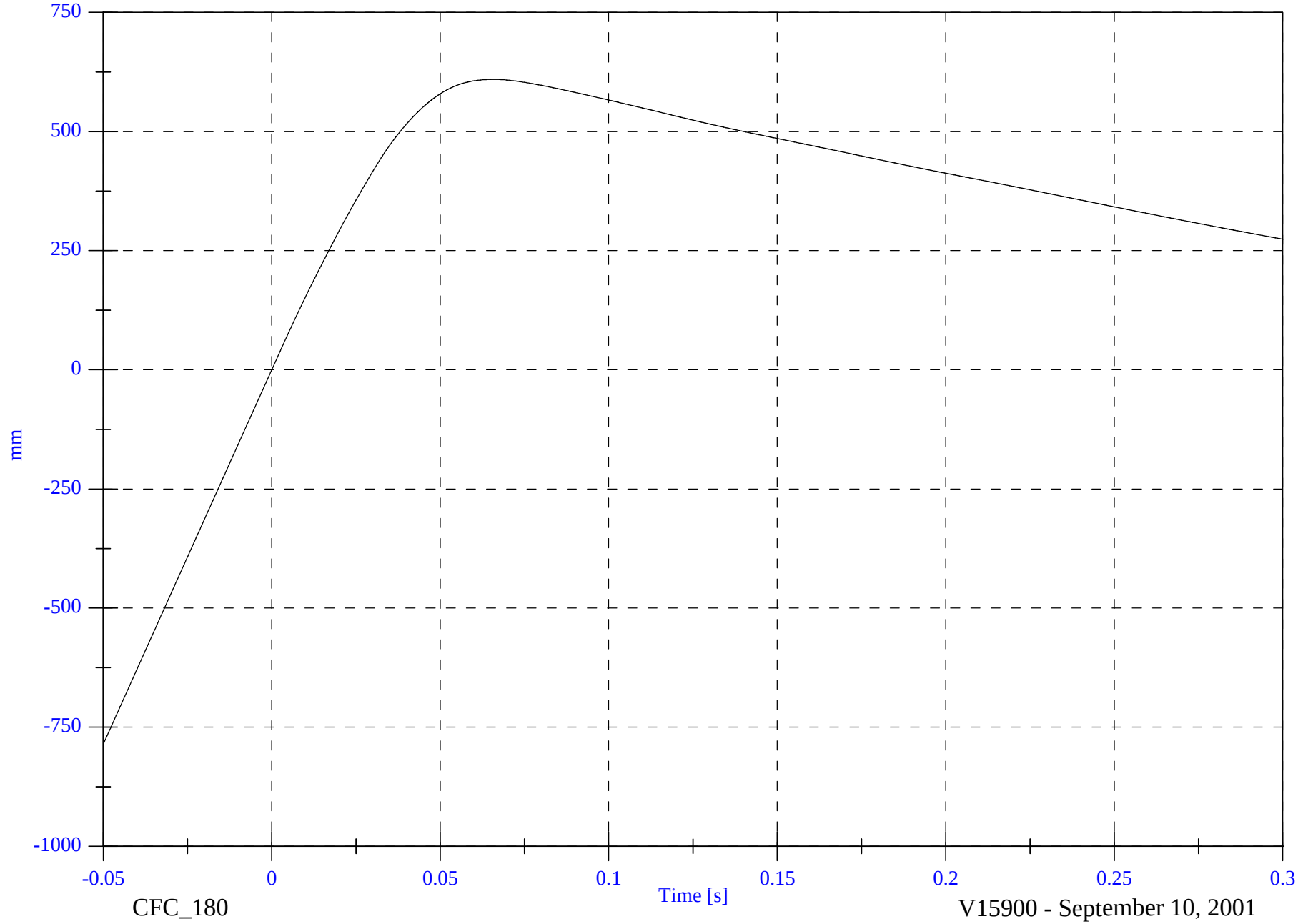
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Left Rear Red #8 x Displacement

Max: 609.4 [mm] at 0.066 [s]
Min: -785.7 [mm] at -0.050 [s]

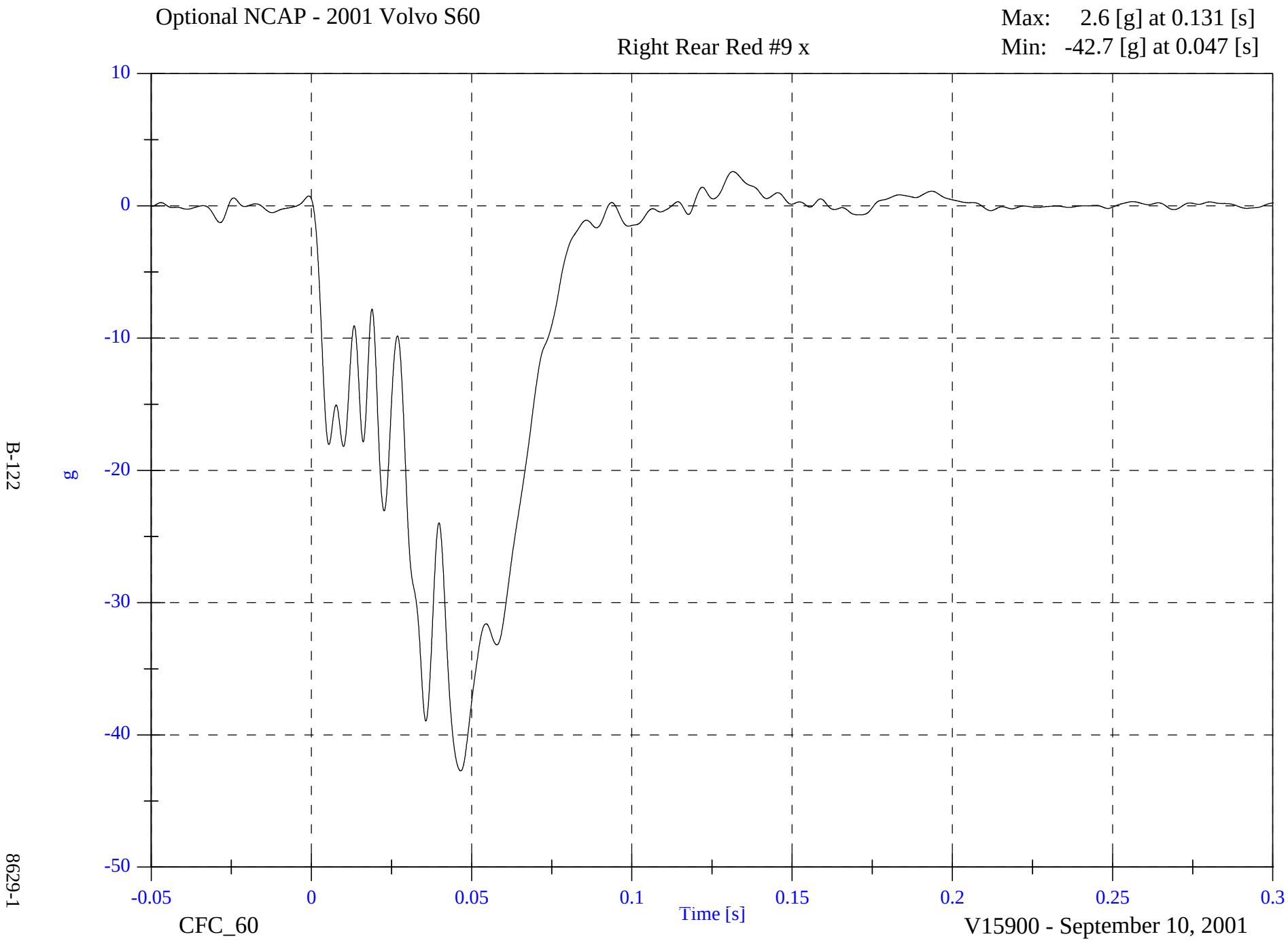


B-121

8629-1

CFC_180

V15900 - September 10, 2001

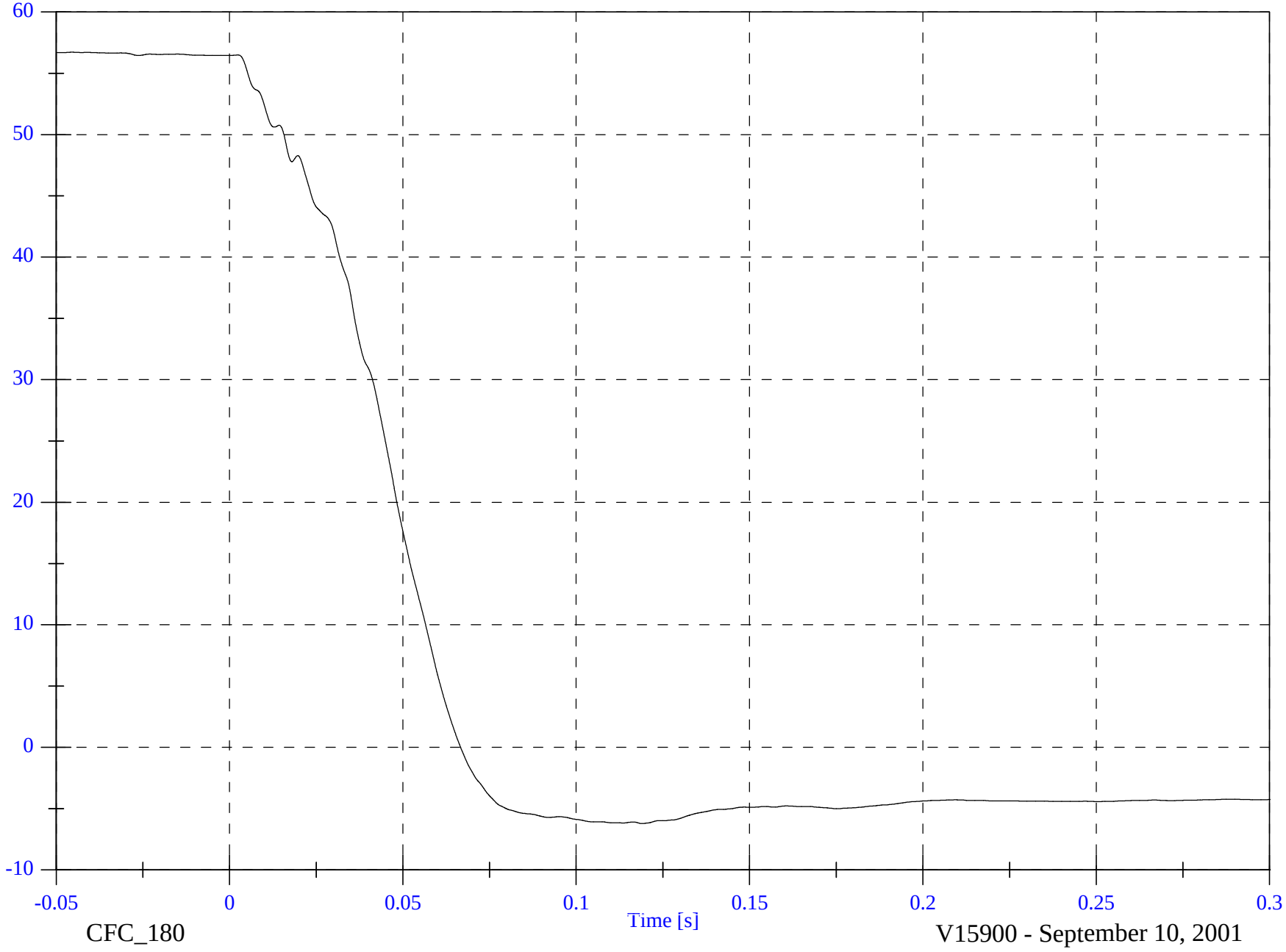

Optional NCAP - 2001 Volvo S60
Right Rear Red #9 x
Max: 2.6 [g] at 0.131 [s]
Min: -42.7 [g] at 0.047 [s]
10
0
-10
-20
-30
-40
-50
g
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [s]
CFC_60
V15900 - September 10, 2001
B-122
8629-1

Optional NCAP - 2001 Volvo S60

Max: 56.7 [kph] at -0.045 [s]

Right Rear Red #9 x Velocity

Min: -6.2 [kph] at 0.119 [s]



B-123

8629-1

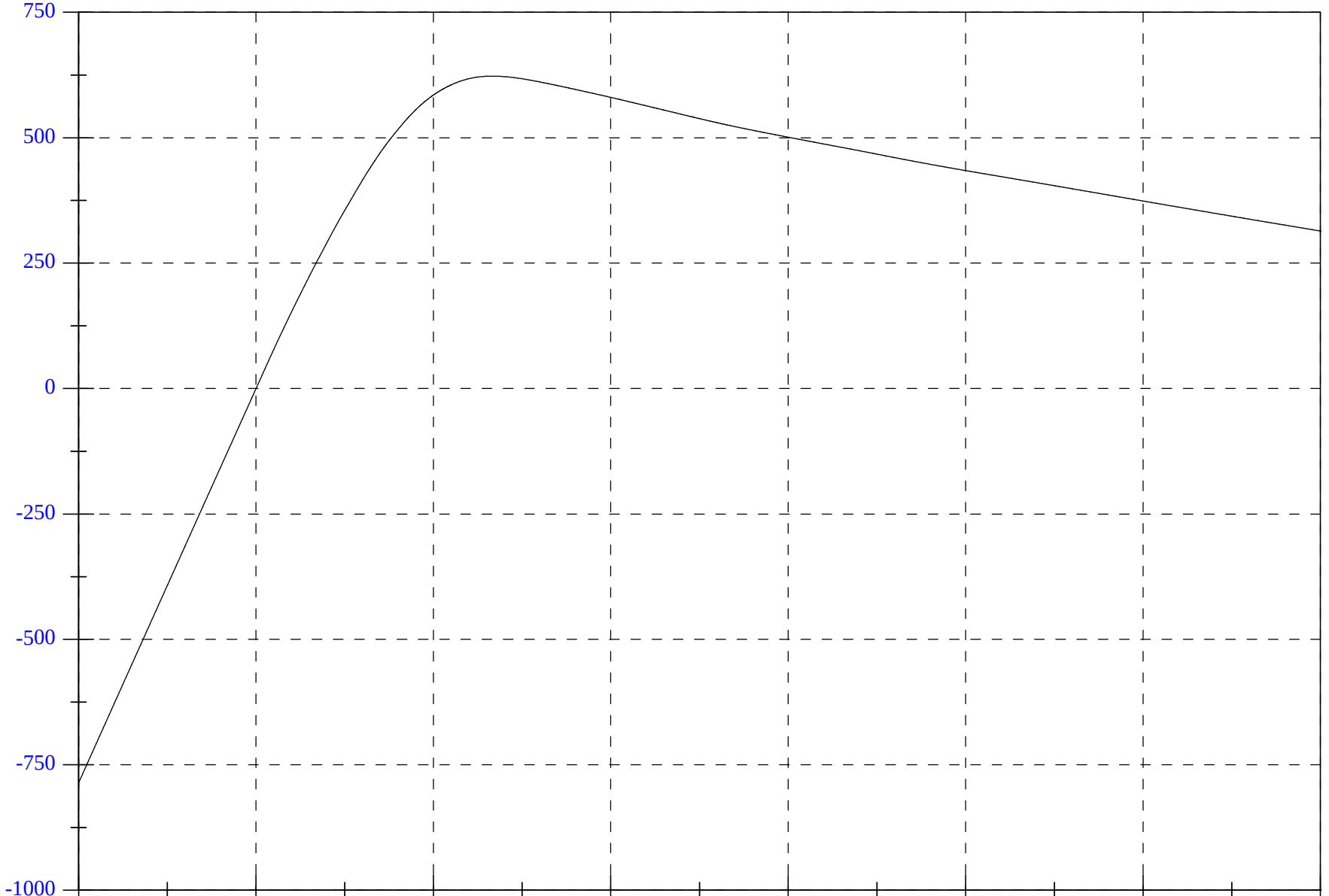
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Right Rear Red #9 x Displacement

Max: 622.8 [mm] at 0.067 [s]
Min: -785.9 [mm] at -0.050 [s]



B-124

8629-1

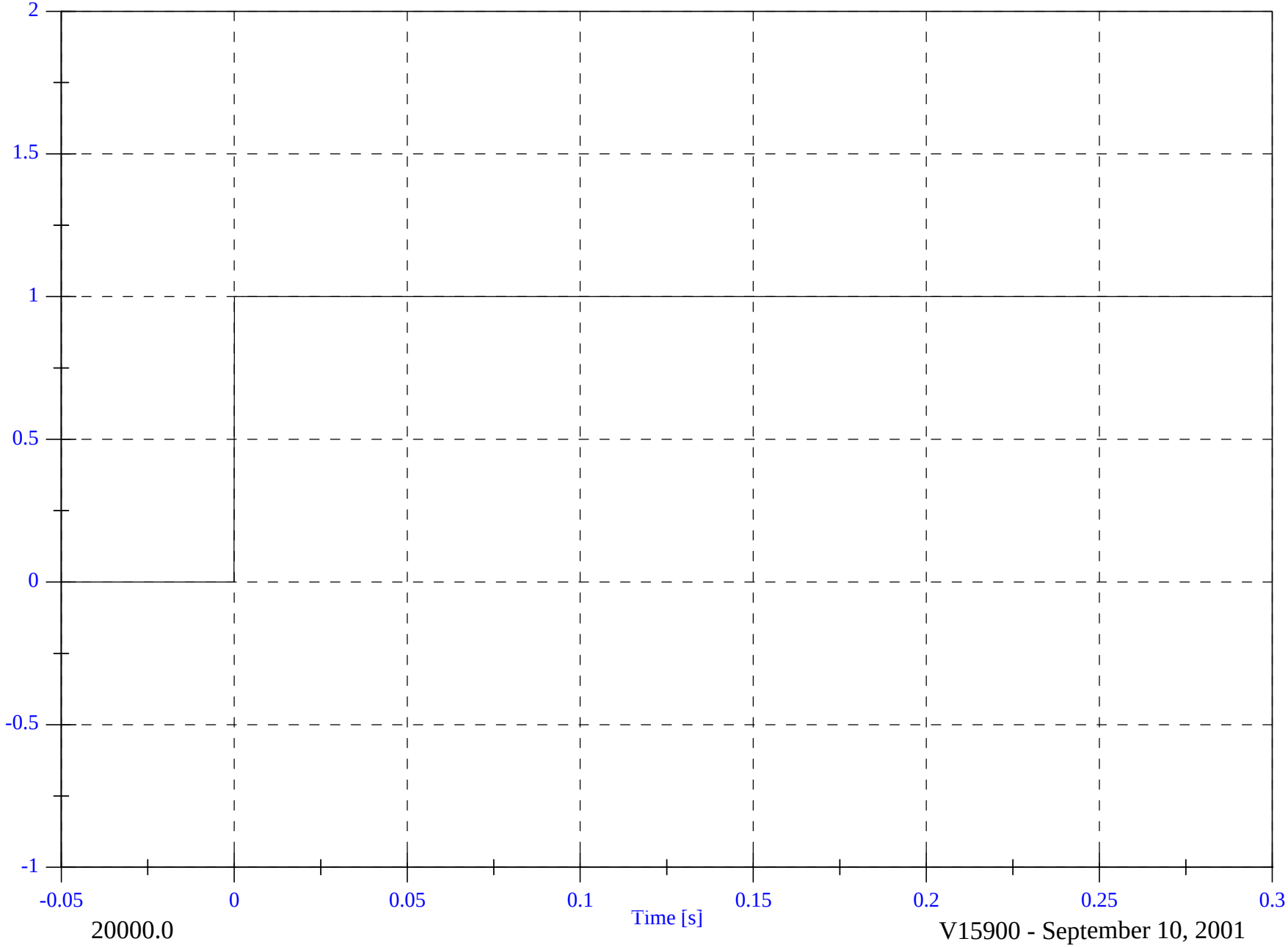
CFC_180

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Contact Time

Max: 1.0 [] at 0.000 [s]
Min: 0.0 [] at -0.050 [s]



B-125

8629-1

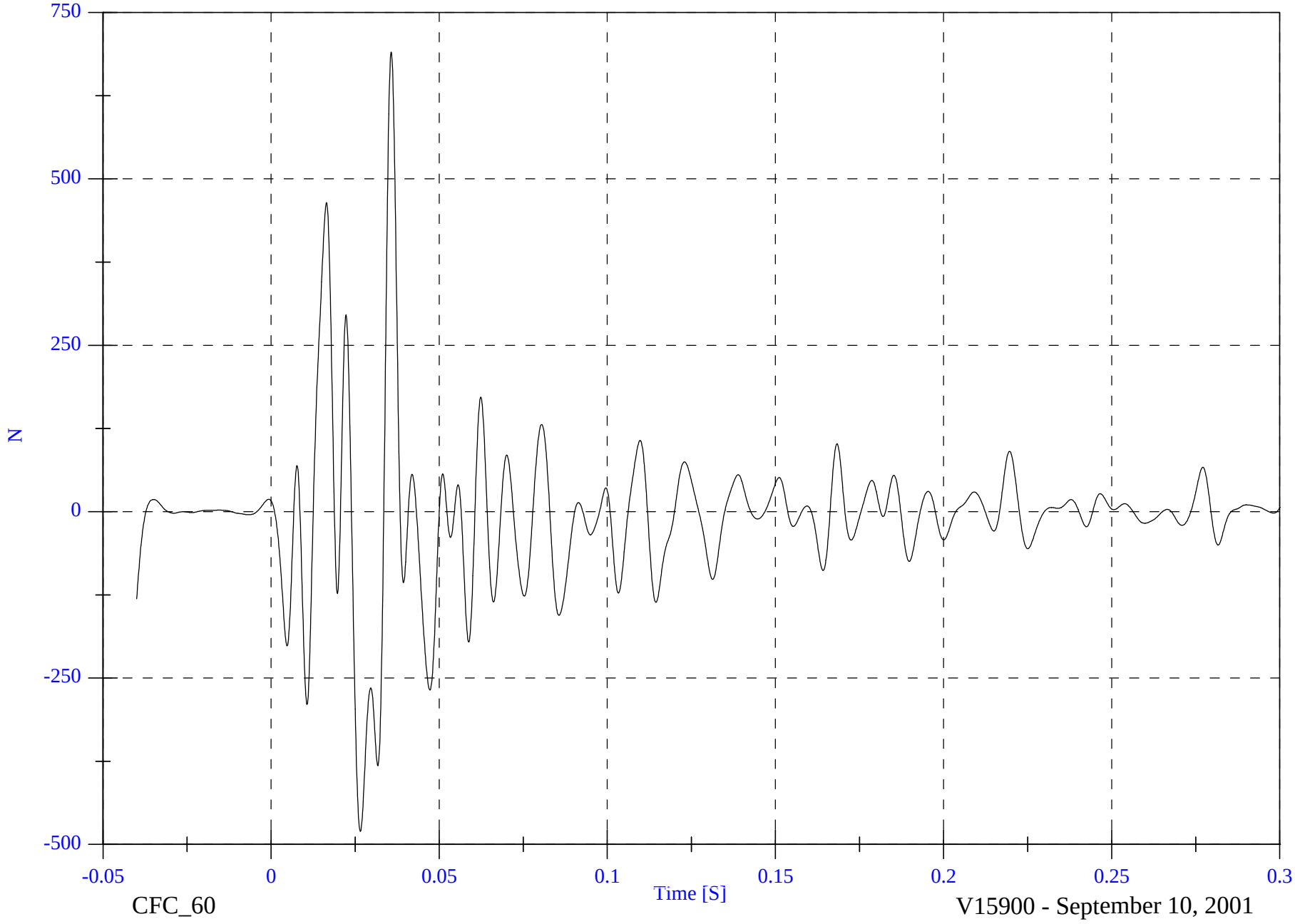
20000.0

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell A1 Fx

Max: 690.4 [N] at 0.036 [S]
Min: -480.6 [N] at 0.026 [S]



B-126

8629-1

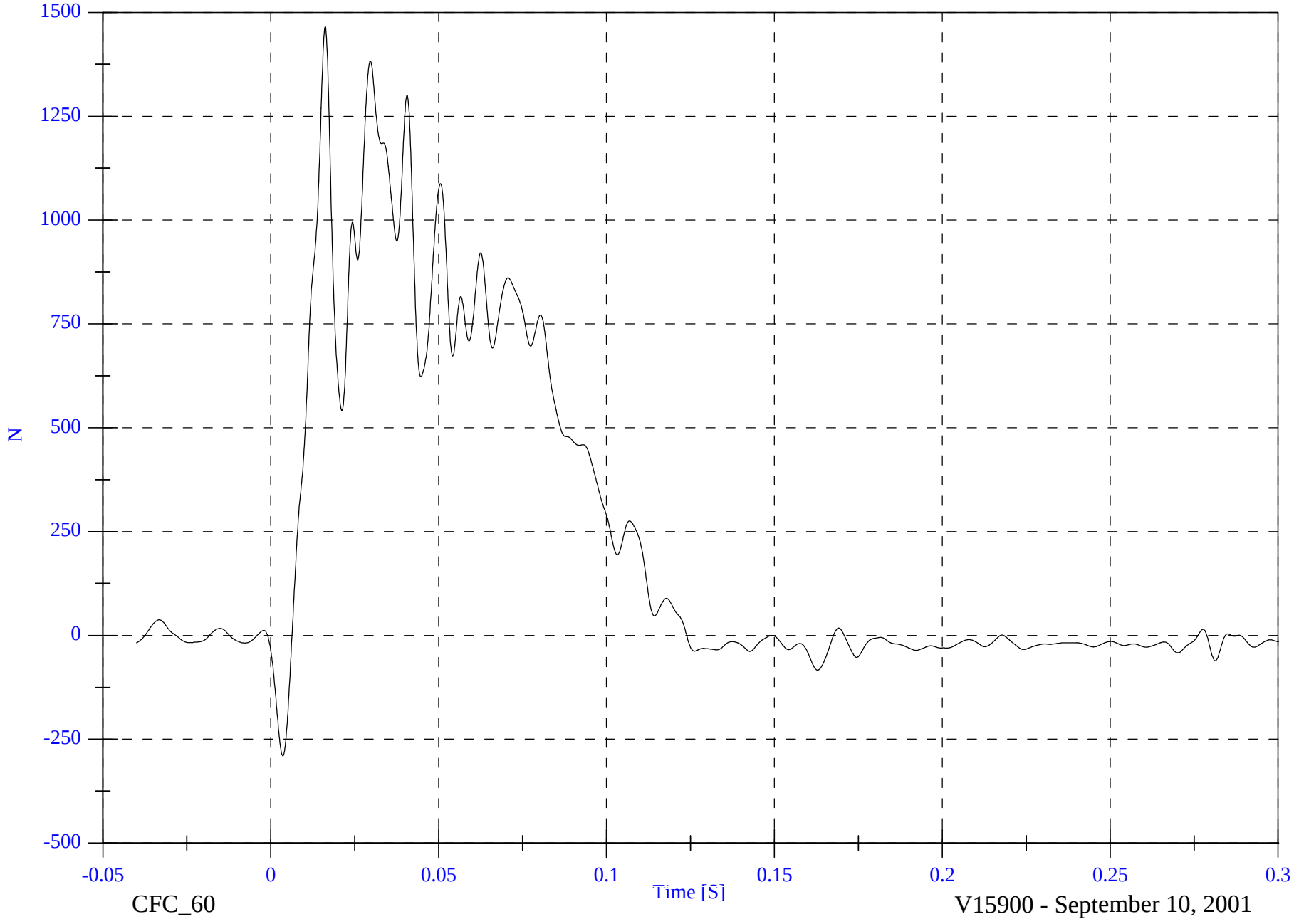
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell A2 Fx

Max: 1466.0 [N] at 0.016 [S]
Min: -290.1 [N] at 0.004 [S]

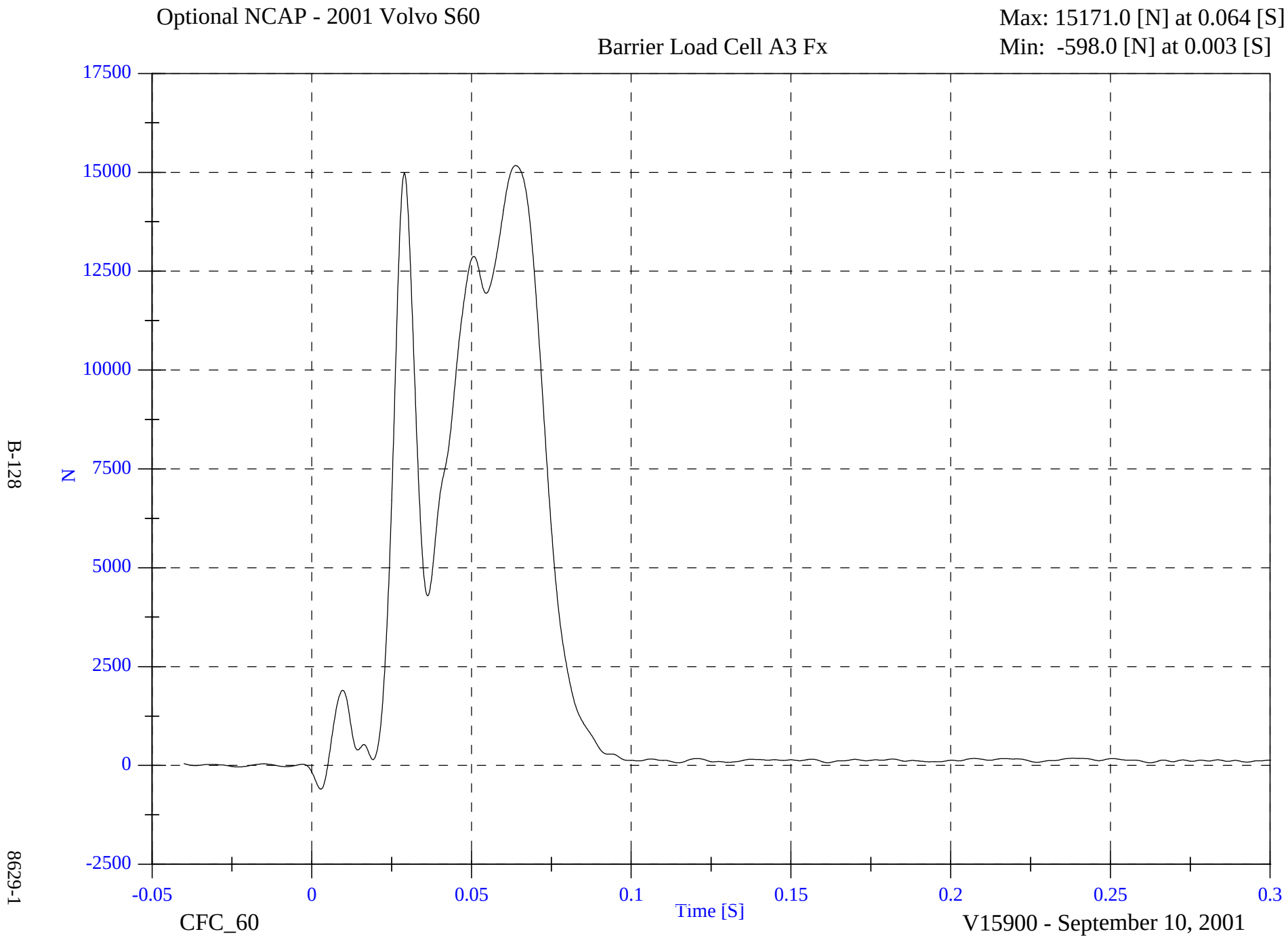


B-127

8629-1

CFC_60

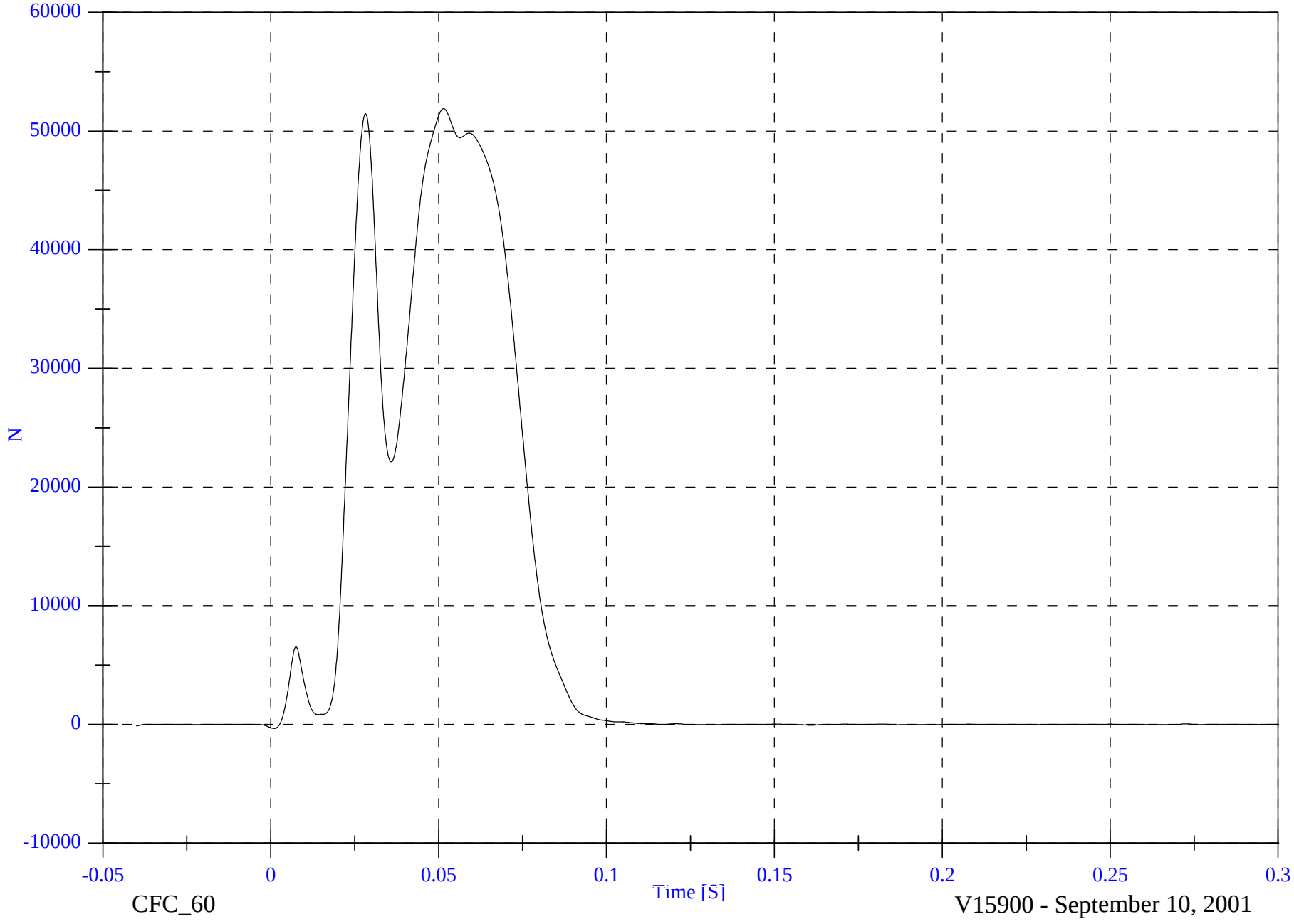
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Barrier Load Cell A3 Fx
Max: 15171.0 [N] at 0.064 [S]
Min: -598.0 [N] at 0.003 [S]
17500
15000
12500
10000
7500
5000
2500
0
-2500
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
B-128
8629-1
CFC_60
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell A4 Fx

Max: 51886.8 [N] at 0.051 [S]
Min: -342.9 [N] at 0.001 [S]

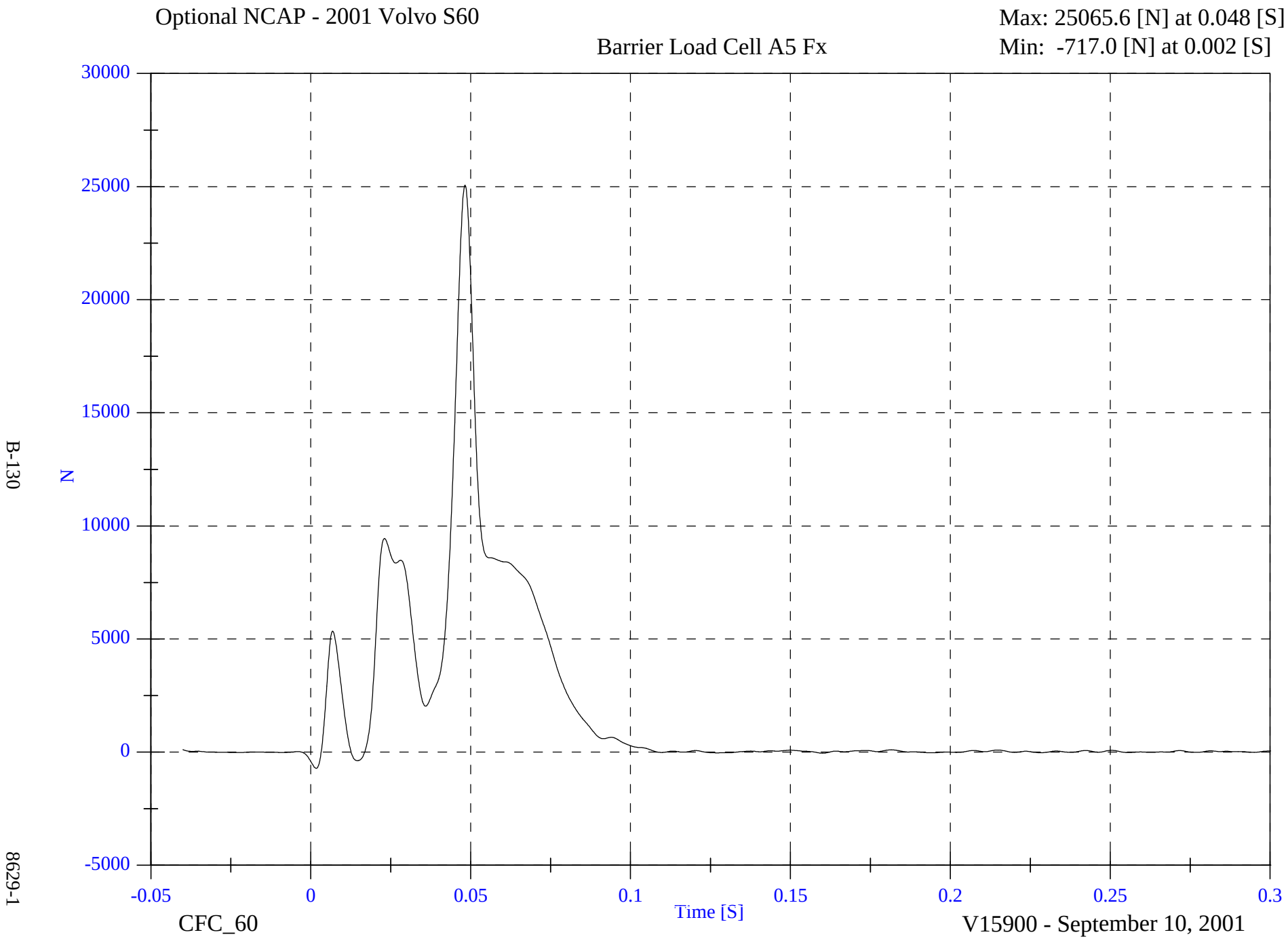


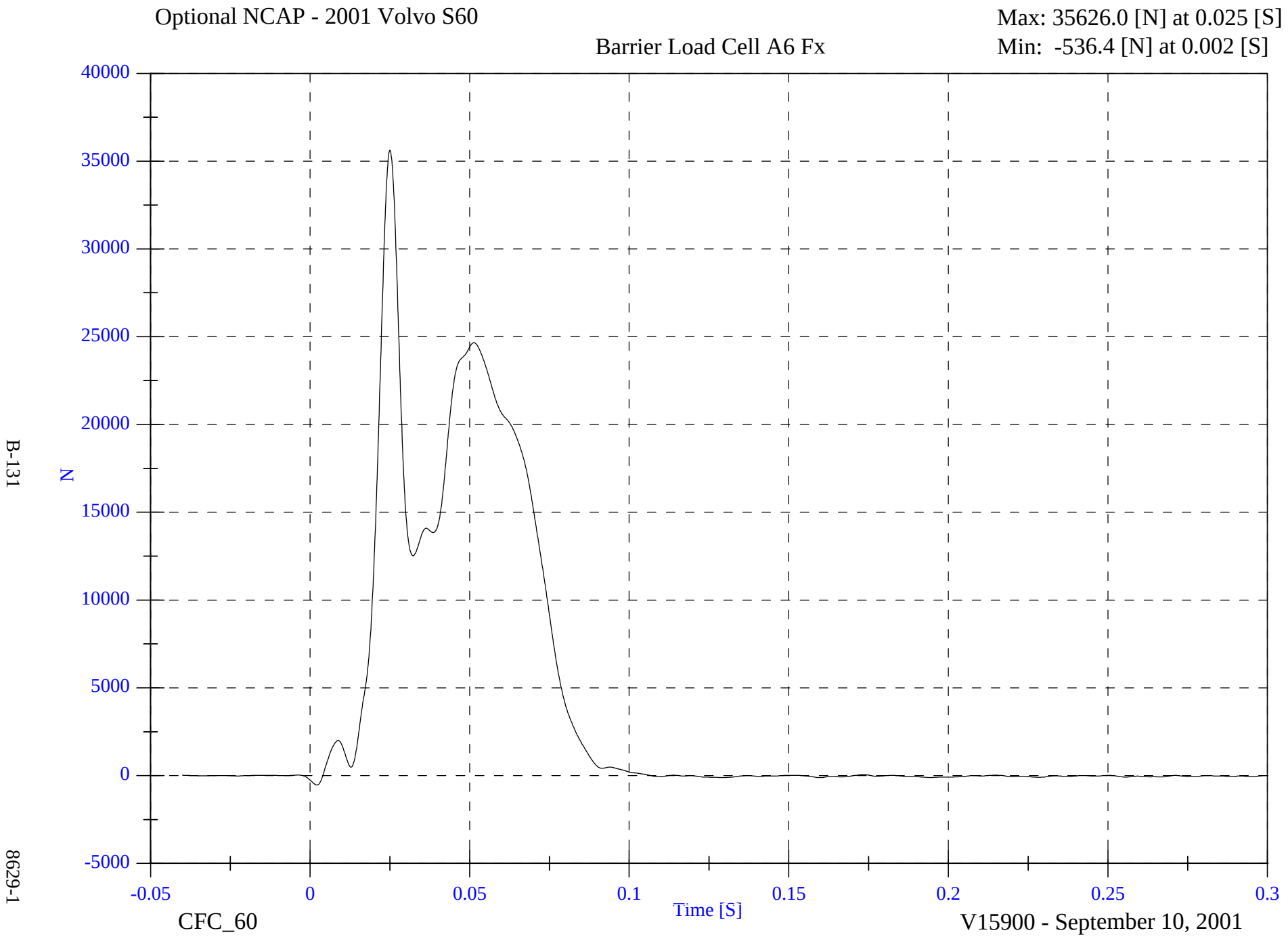
B-129

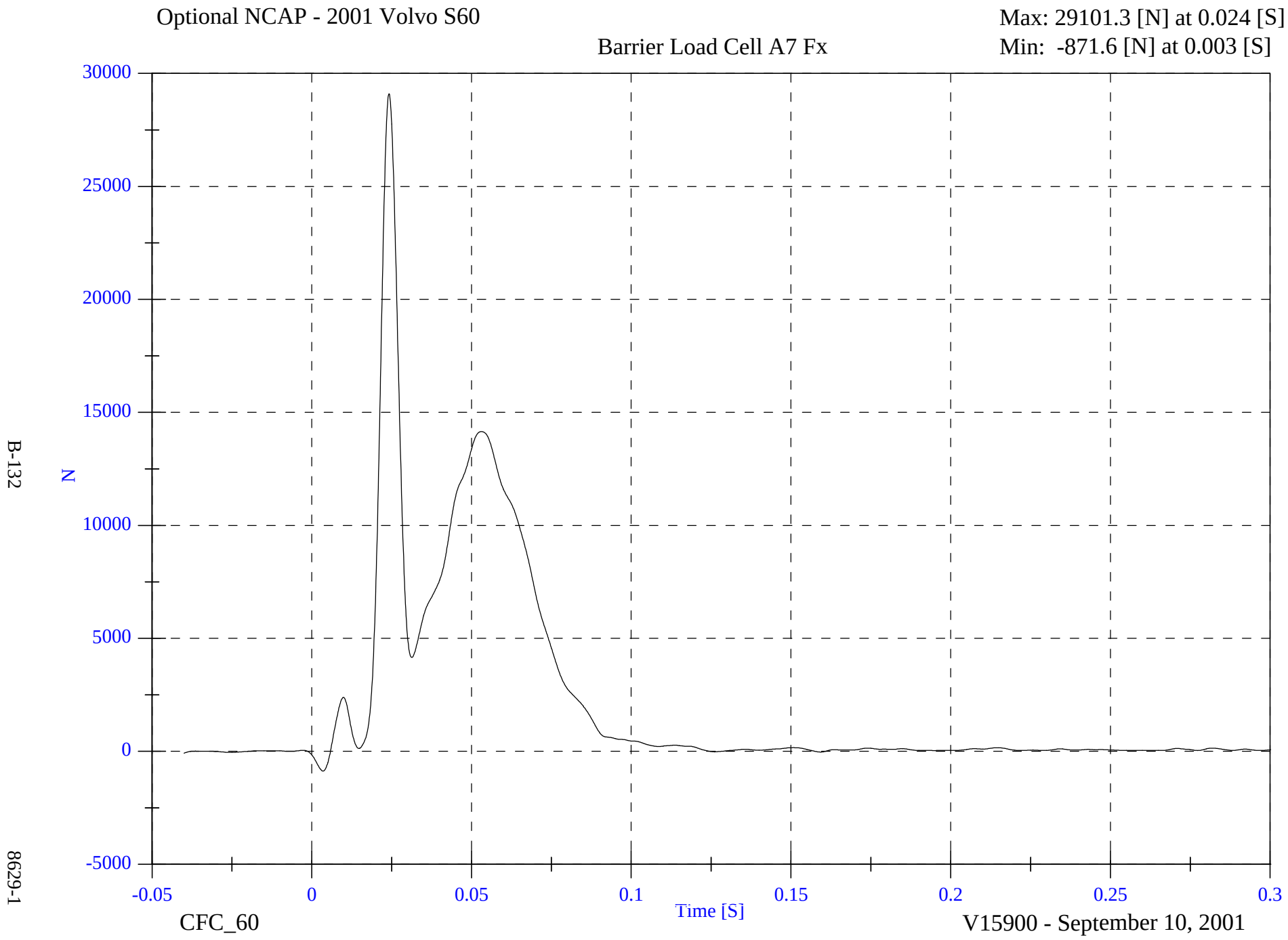
8629-1

CFC_60

V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Barrier Load Cell A5 Fx
Max: 25065.6 [N] at 0.048 [S]
Min: -717.0 [N] at 0.002 [S]
30000
25000
20000
15000
10000
5000
0
-5000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
B-130
8629-1
CFC_60
V15900 - September 10, 2001

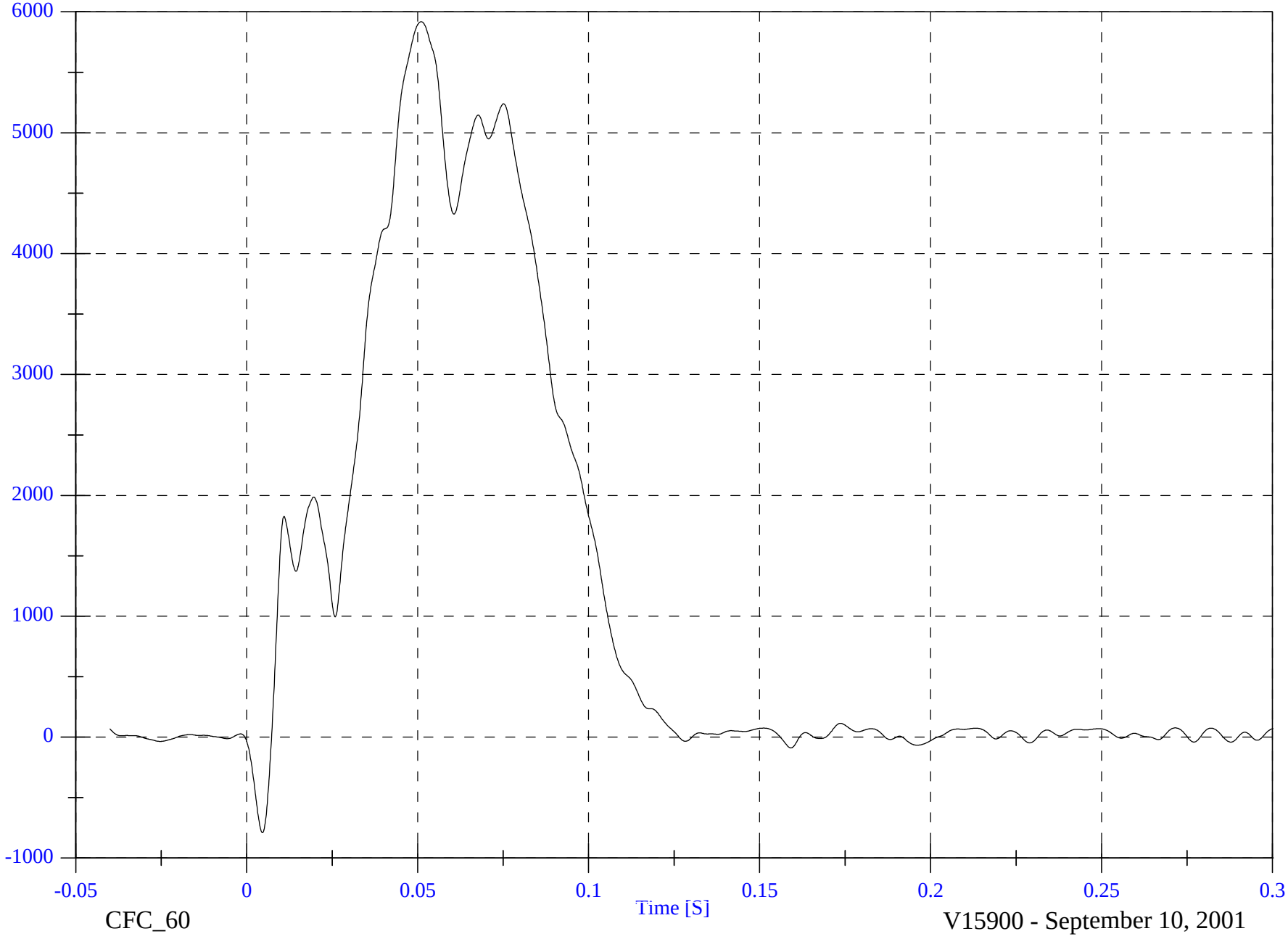

Optional NCAP - 2001 Volvo S60
Barrier Load Cell A6 Fx
Max: 35626.0 [N] at 0.025 [S]
Min: -536.4 [N] at 0.002 [S]
40000
35000
30000
25000
20000
15000
10000
5000
0
-5000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
CFC_60
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Barrier Load Cell A7 Fx
Max: 29101.3 [N] at 0.024 [S]
Min: -871.6 [N] at 0.003 [S]
30000
25000
20000
15000
10000
5000
0
-5000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
B-132
8629-1
CFC_60
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell A8 Fx

Max: 5919.2 [N] at 0.051 [S]
Min: -791.0 [N] at 0.005 [S]



B-133

8629-1

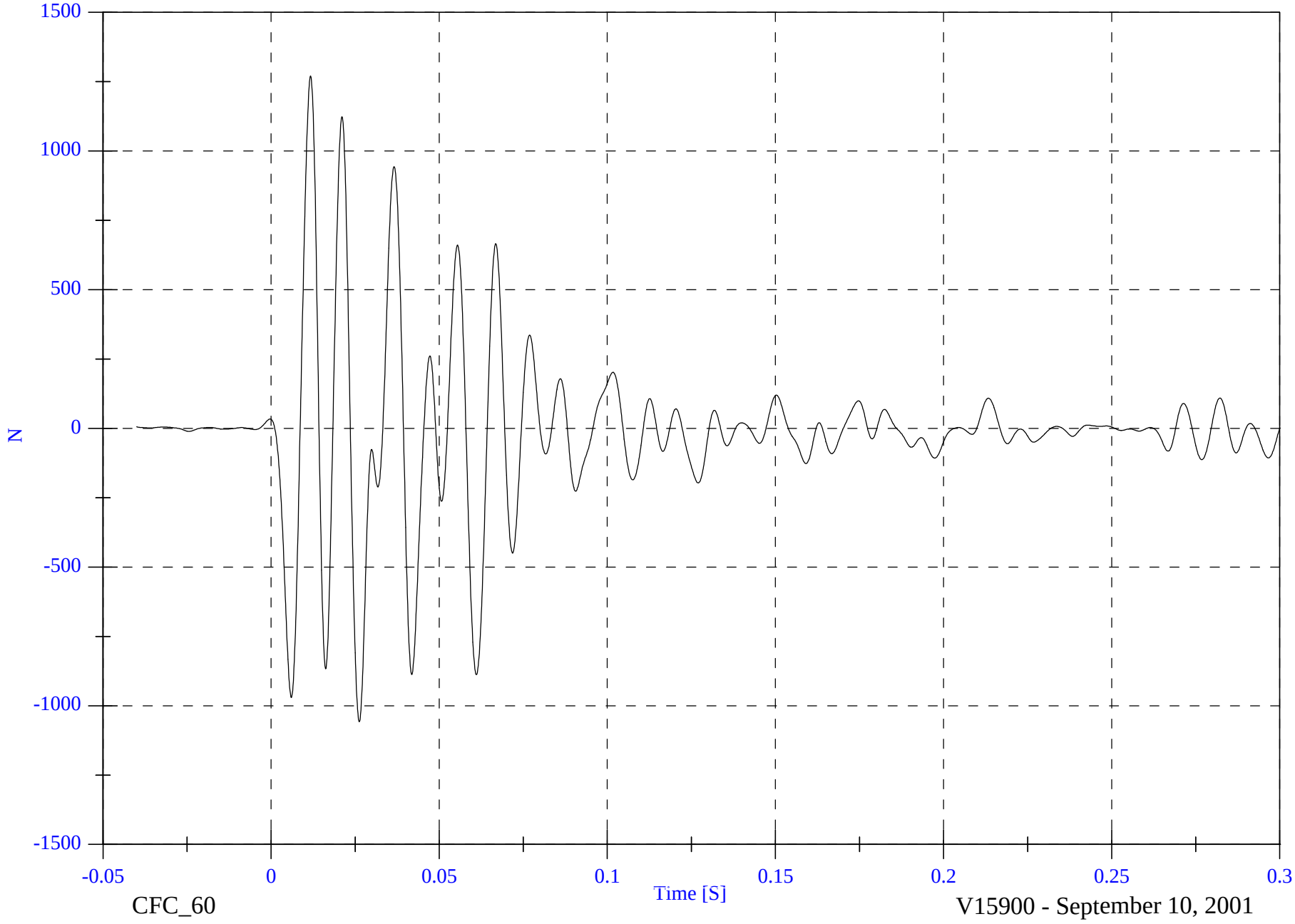
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell A9 Fx

Max: 1270.9 [N] at 0.012 [S]
Min: -1057.7 [N] at 0.026 [S]



B-134

8629-1

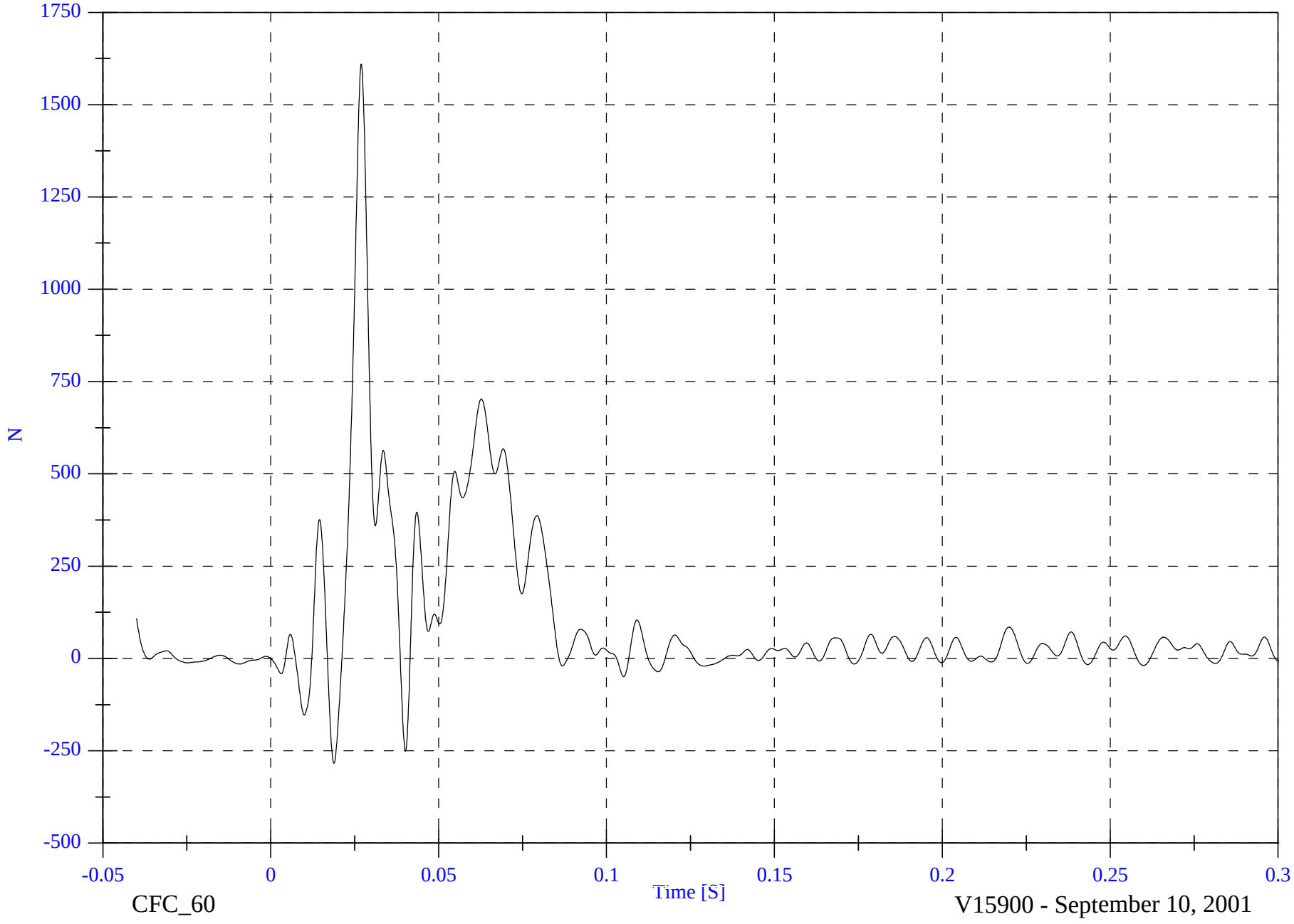
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell B1 Fx

Max: 1609.5 [N] at 0.027 [S]
Min: -284.1 [N] at 0.019 [S]

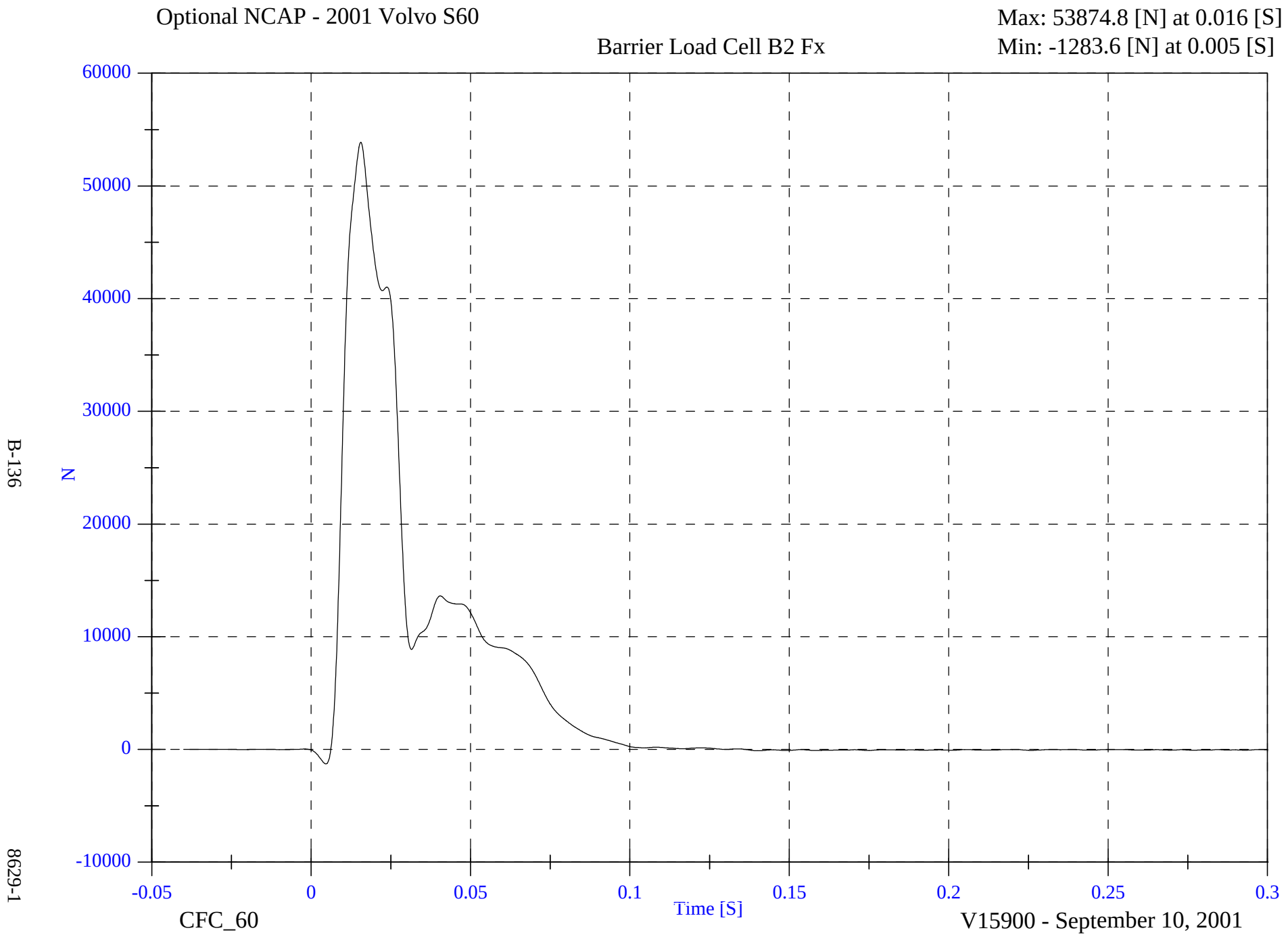


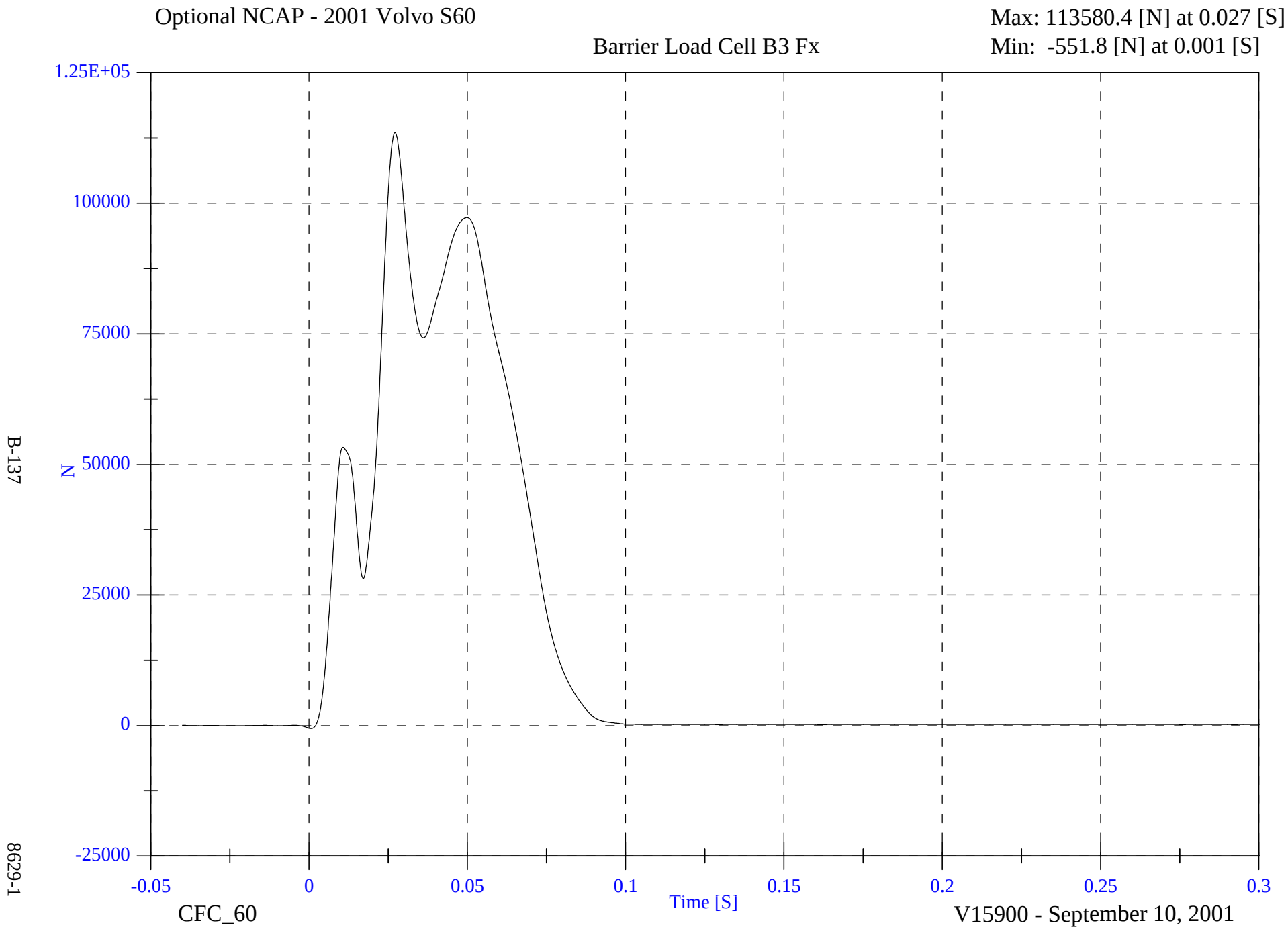
B-135

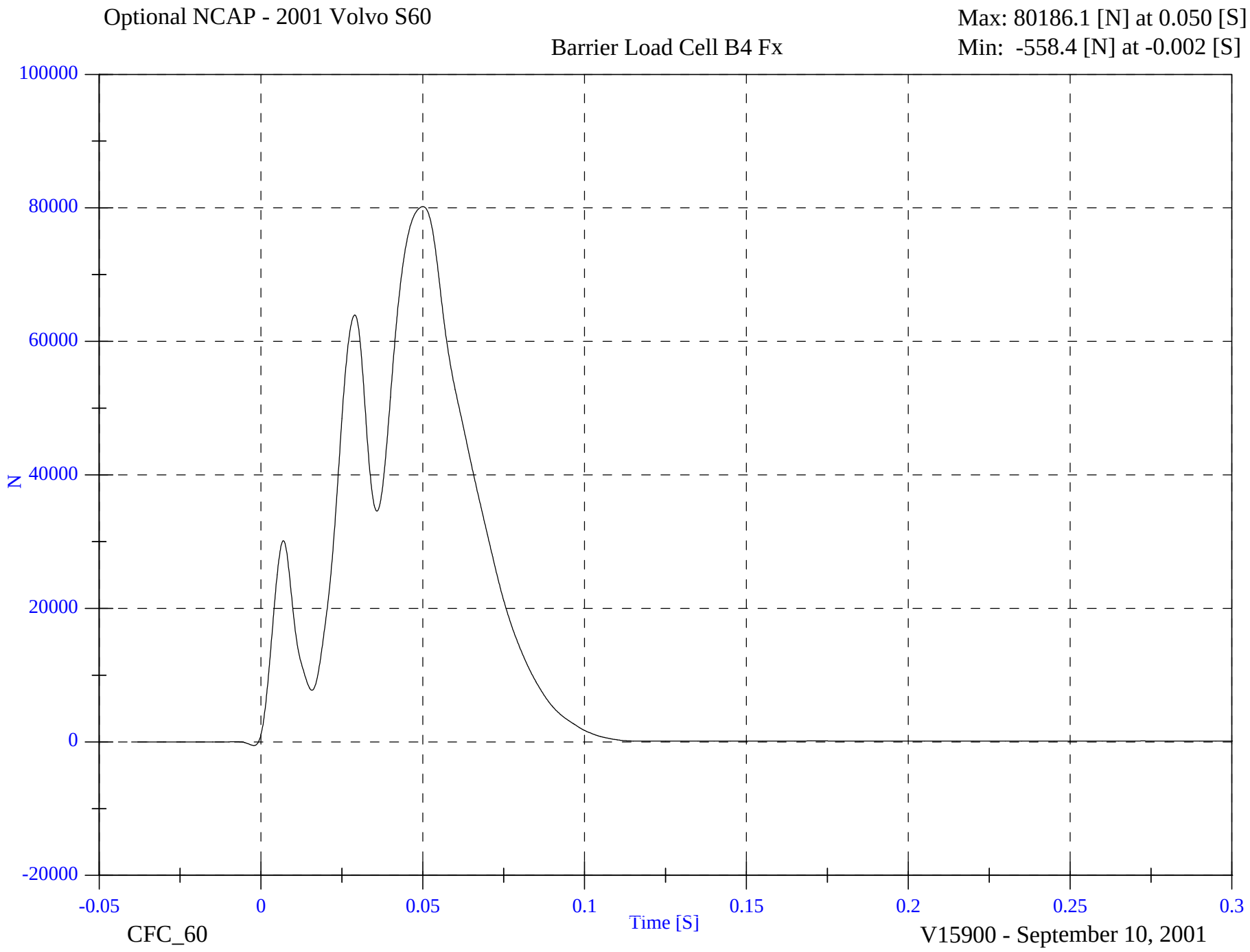
8629-1

CFC_60

V15900 - September 10, 2001

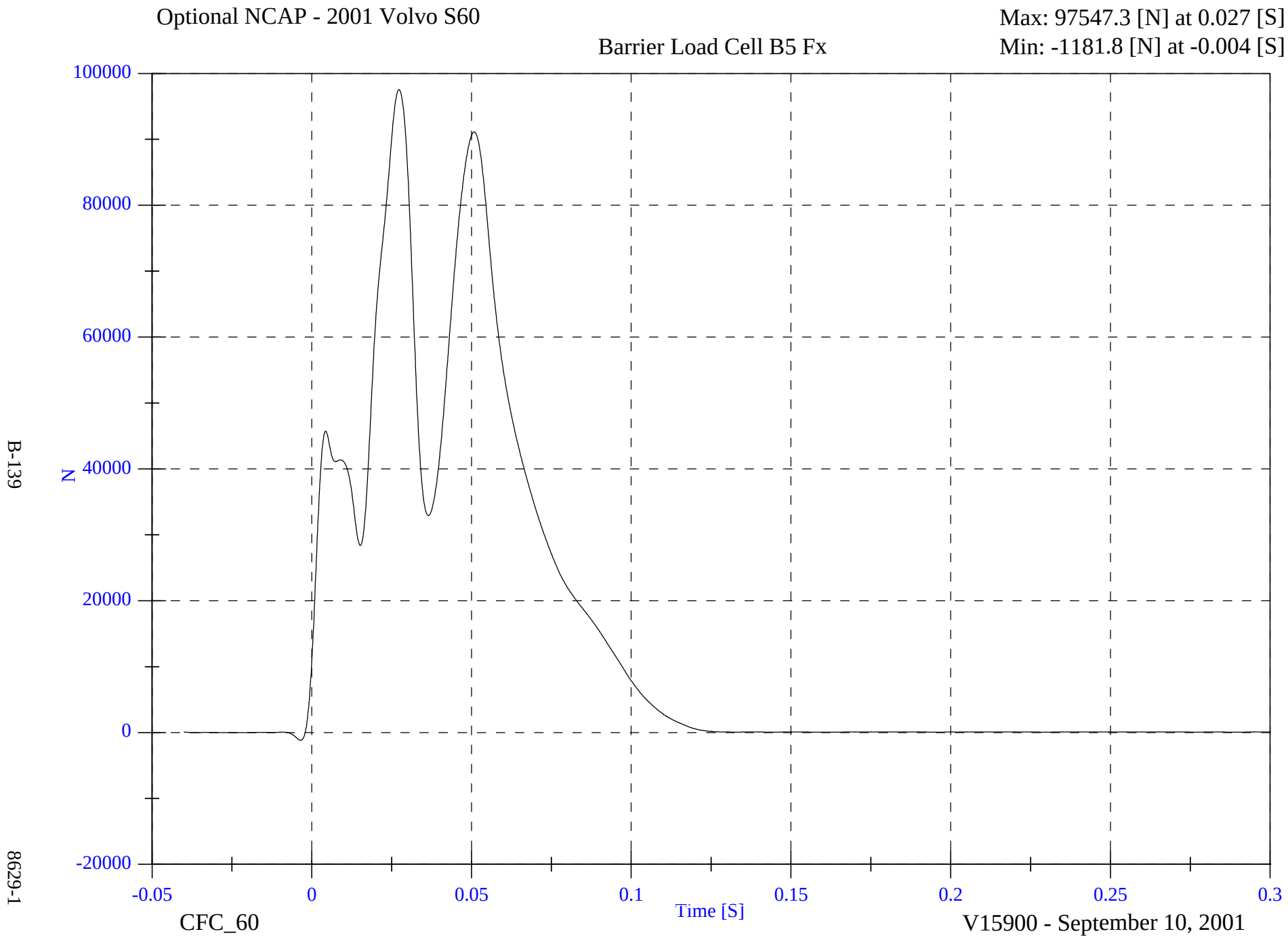

Optional NCAP - 2001 Volvo S60
Barrier Load Cell B2 Fx
Max: 53874.8 [N] at 0.016 [S]
Min: -1283.6 [N] at 0.005 [S]
60000
50000
40000
30000
20000
10000
0
-10000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
CFC_60
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Barrier Load Cell B3 Fx
Max: 113580.4 [N] at 0.027 [S]
Min: -551.8 [N] at 0.001 [S]
1.25E+05
100000
75000
50000
25000
0
-25000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
B-137
8629-1
CFC_60
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Barrier Load Cell B4 Fx
Max: 80186.1 [N] at 0.050 [S]
Min: -558.4 [N] at -0.002 [S]
100000
80000
60000
40000
20000
0
-20000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
CFC_60
V15900 - September 10, 2001

B-138

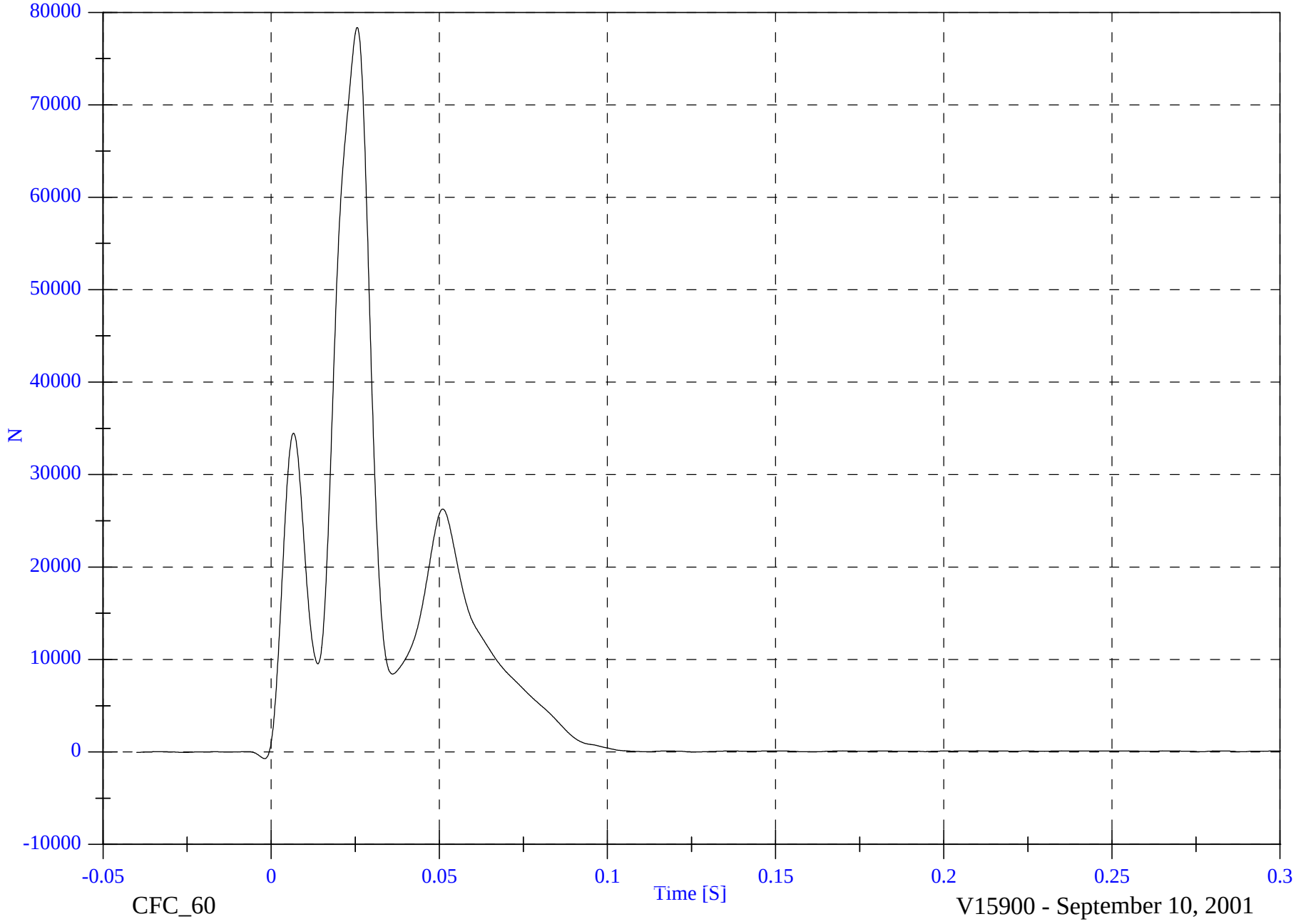
8629-1


Optional NCAP - 2001 Volvo S60
Barrier Load Cell B5 Fx
Max: 97547.3 [N] at 0.027 [S]
Min: -1181.8 [N] at -0.004 [S]
100000
80000
60000
40000
20000
0
-20000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
B-139
8629-1
CFC_60
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell B6 Fx

Max: 78369.9 [N] at 0.026 [S]
Min: -724.2 [N] at -0.002 [S]



B-140

8629-1

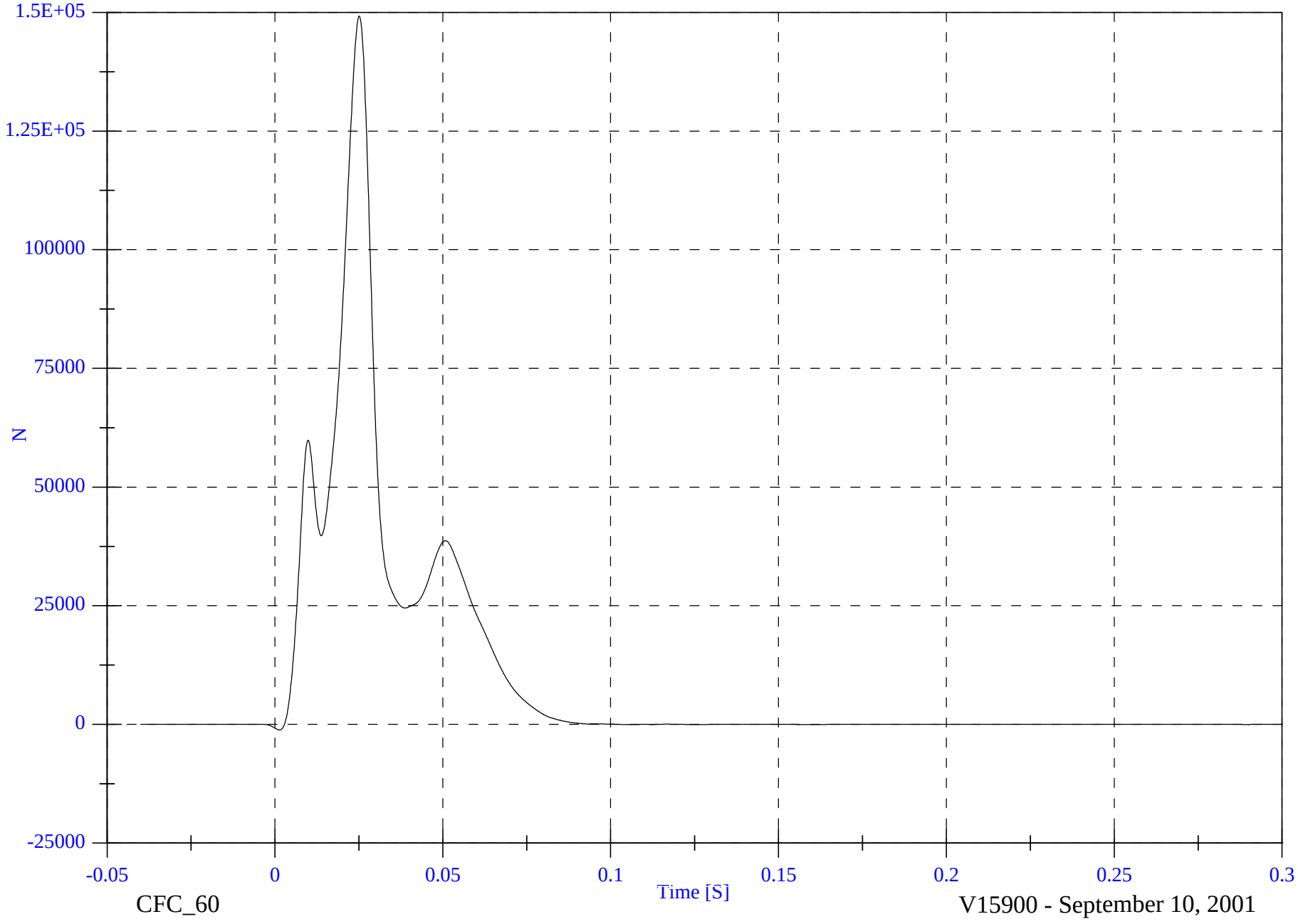
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell B7 Fx

Max: 149240.2 [N] at 0.025 [S]
Min: -1163.0 [N] at 0.001 [S]

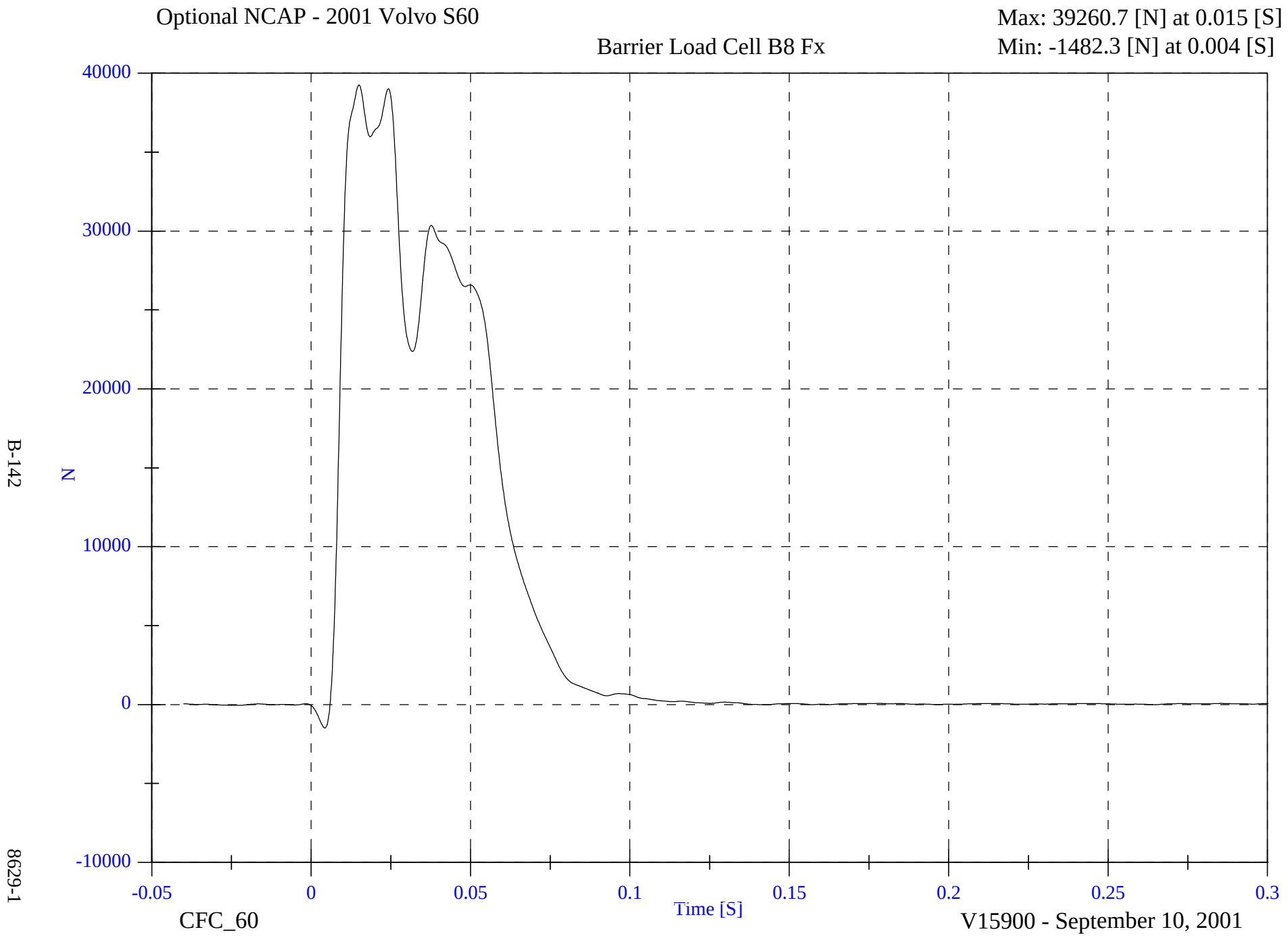


B-141

8629-1

CFC_60

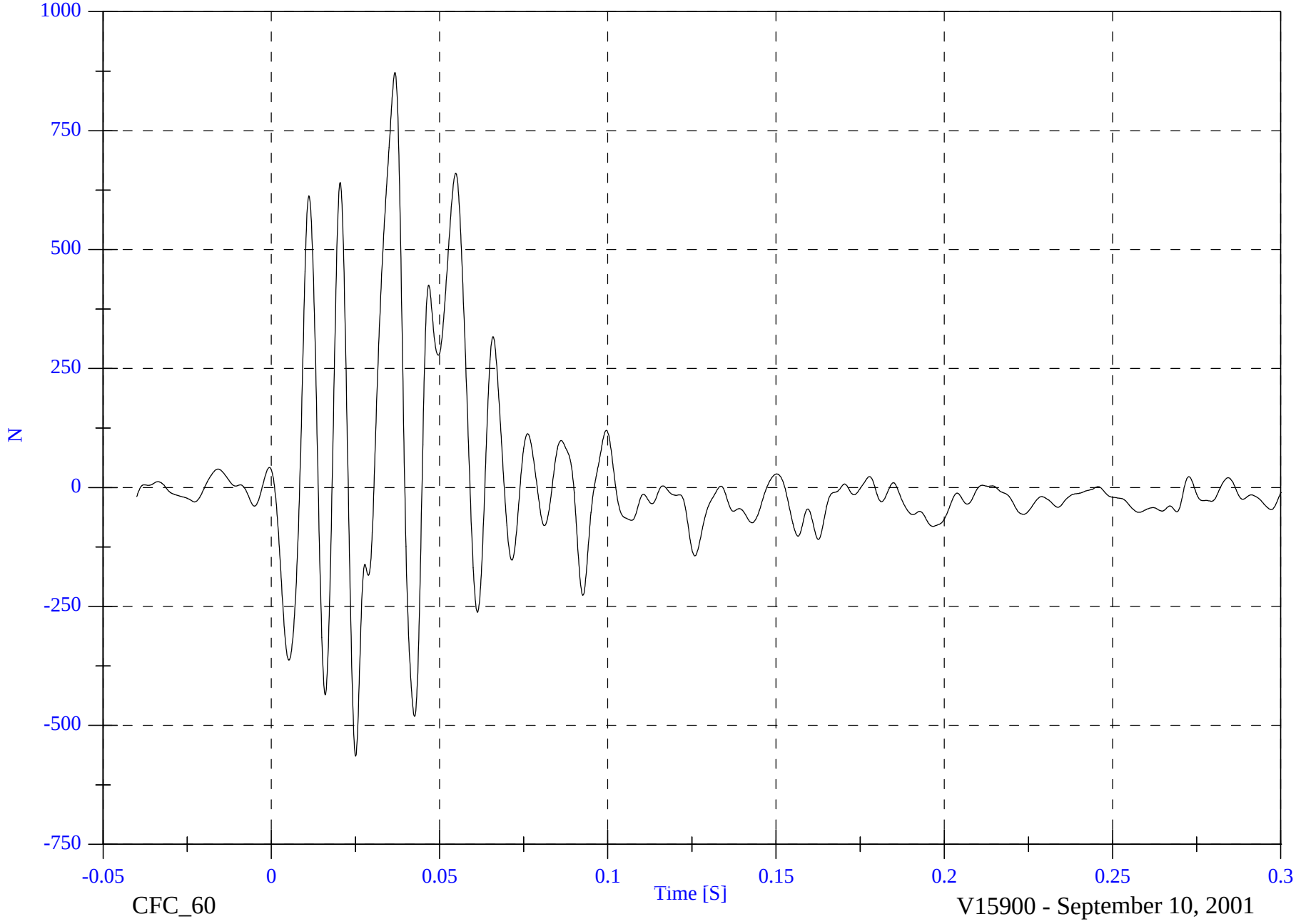
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Barrier Load Cell B8 Fx
Max: 39260.7 [N] at 0.015 [S]
Min: -1482.3 [N] at 0.004 [S]
40000
30000
20000
10000
0
-10000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
B-142
8629-1
CFC_60
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell B9 Fx

Max: 872.0 [N] at 0.037 [S]
Min: -564.4 [N] at 0.025 [S]

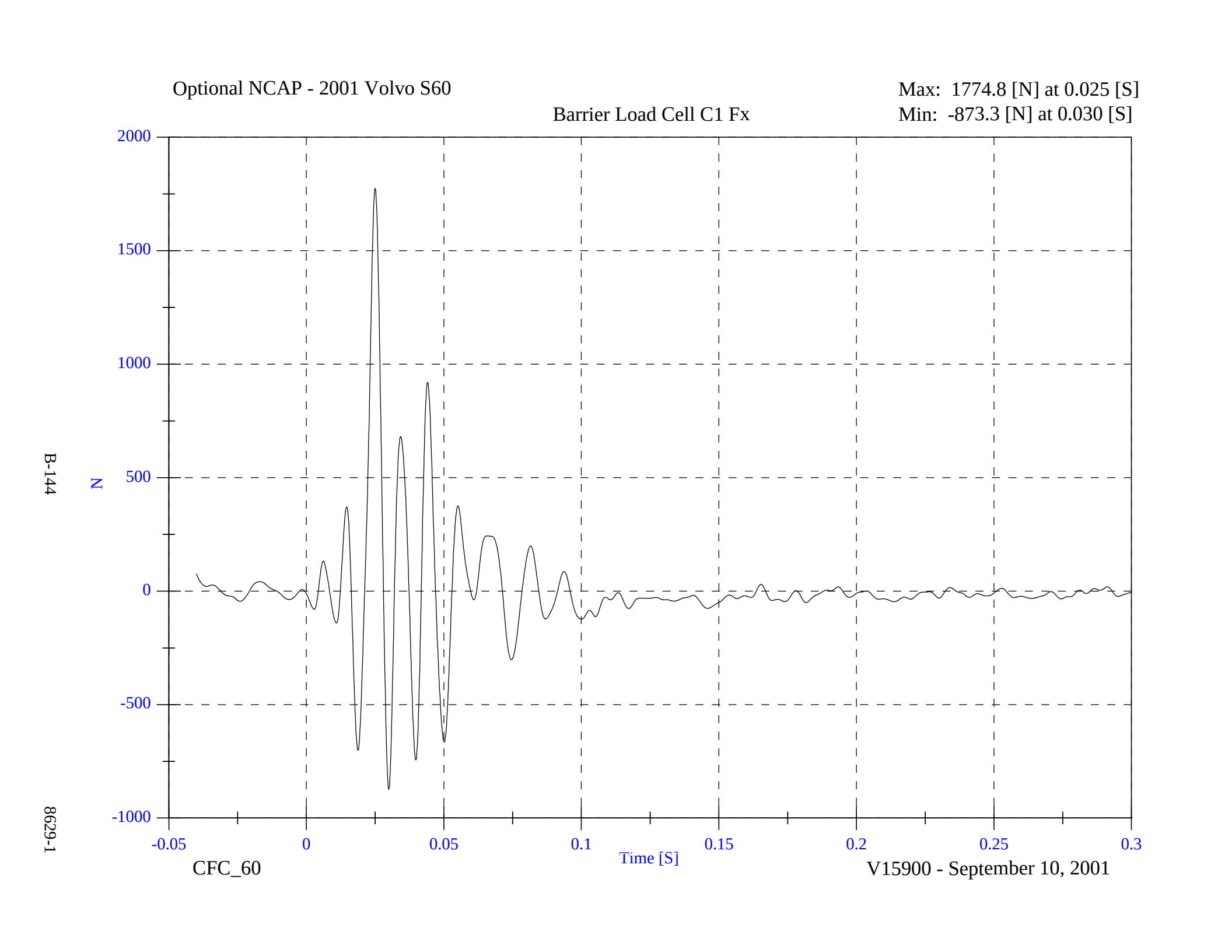


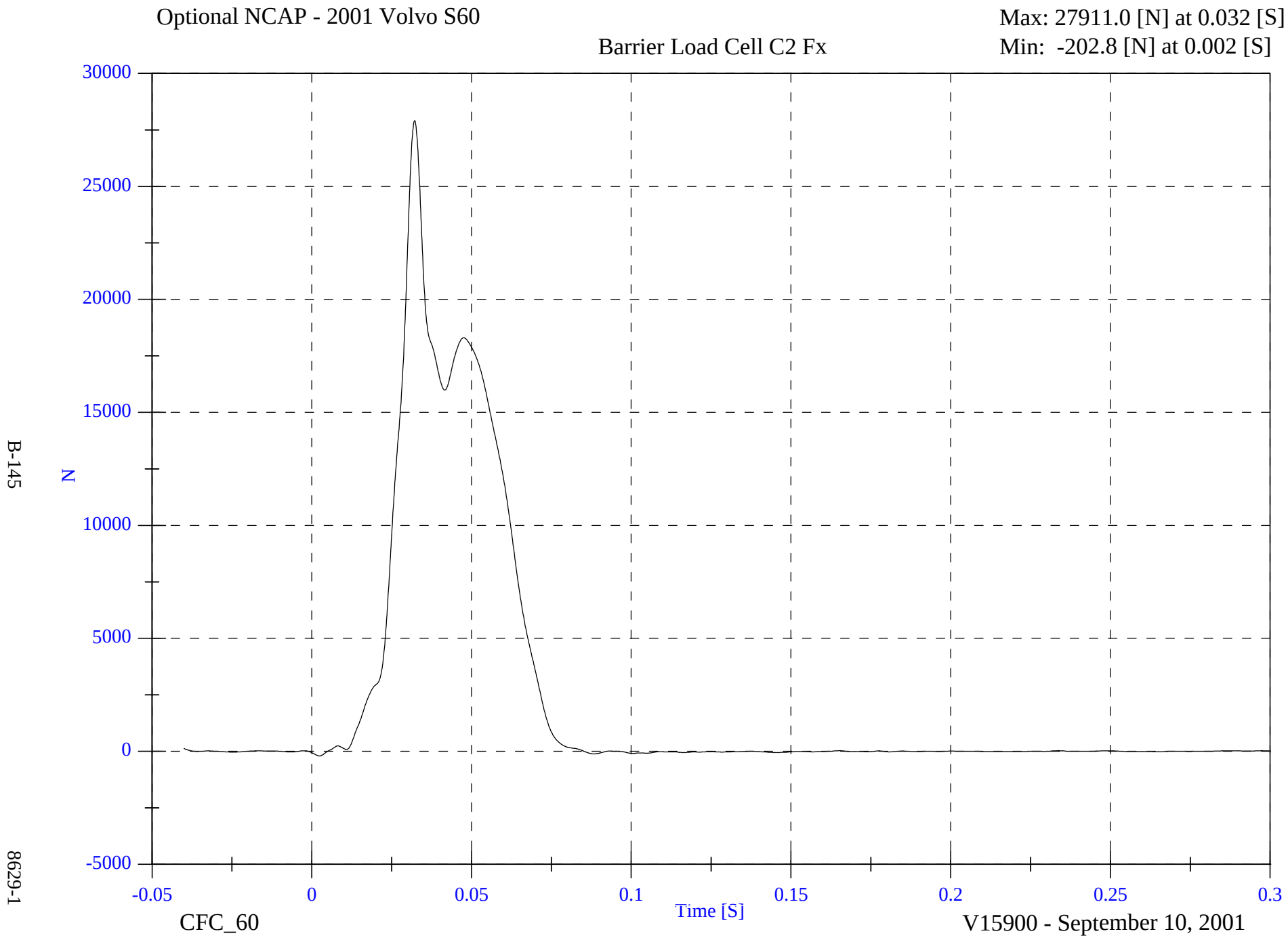
B-143

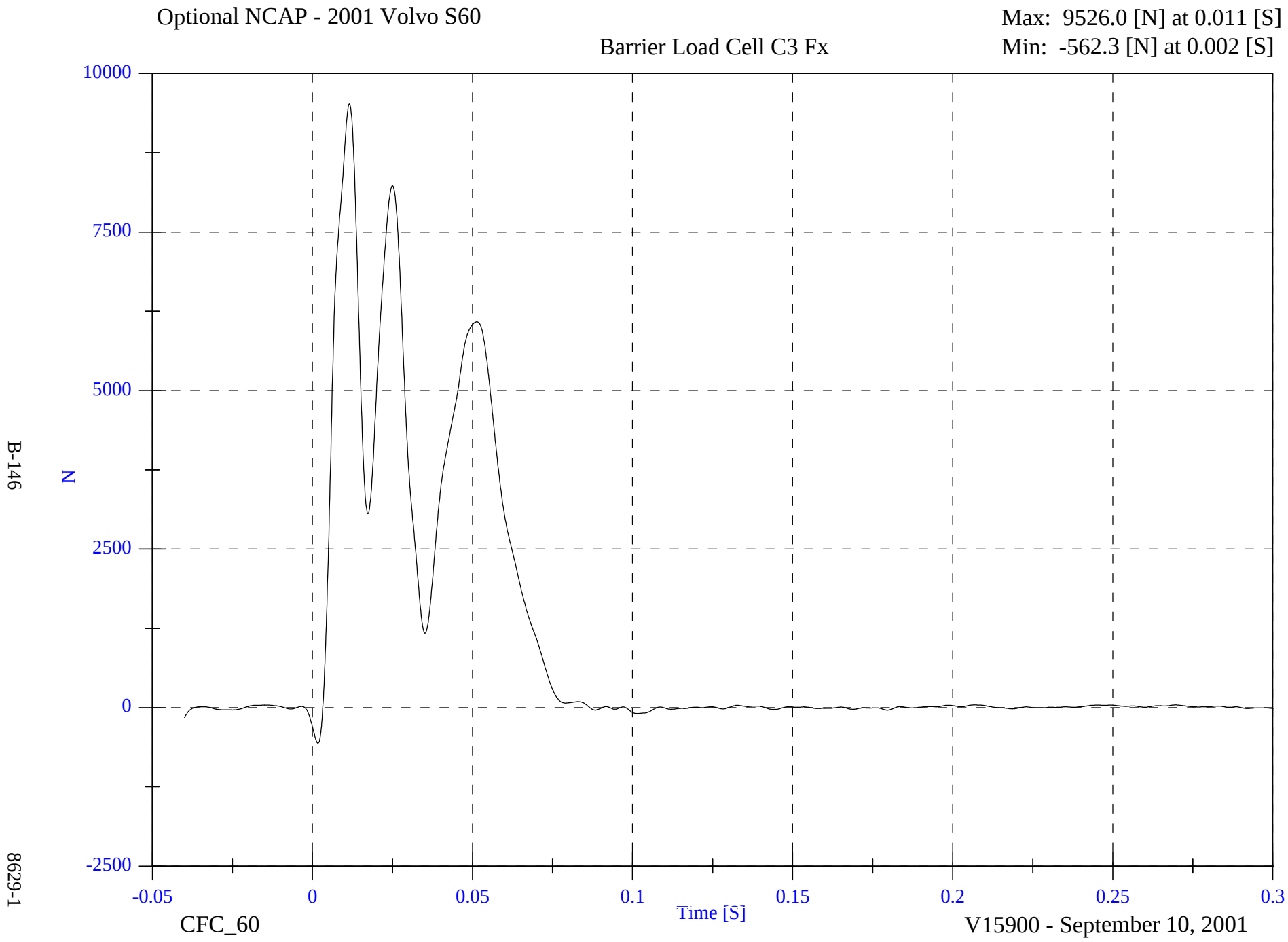
8629-1

CFC_60

V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Barrier Load Cell C1 Fx
Max: 1774.8 [N] at 0.025 [S]
Min: -873.3 [N] at 0.030 [S]
2000
1500
1000
500
0
-500
-1000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
B-144
8629-1
CFC_60
V15900 - September 10, 2001

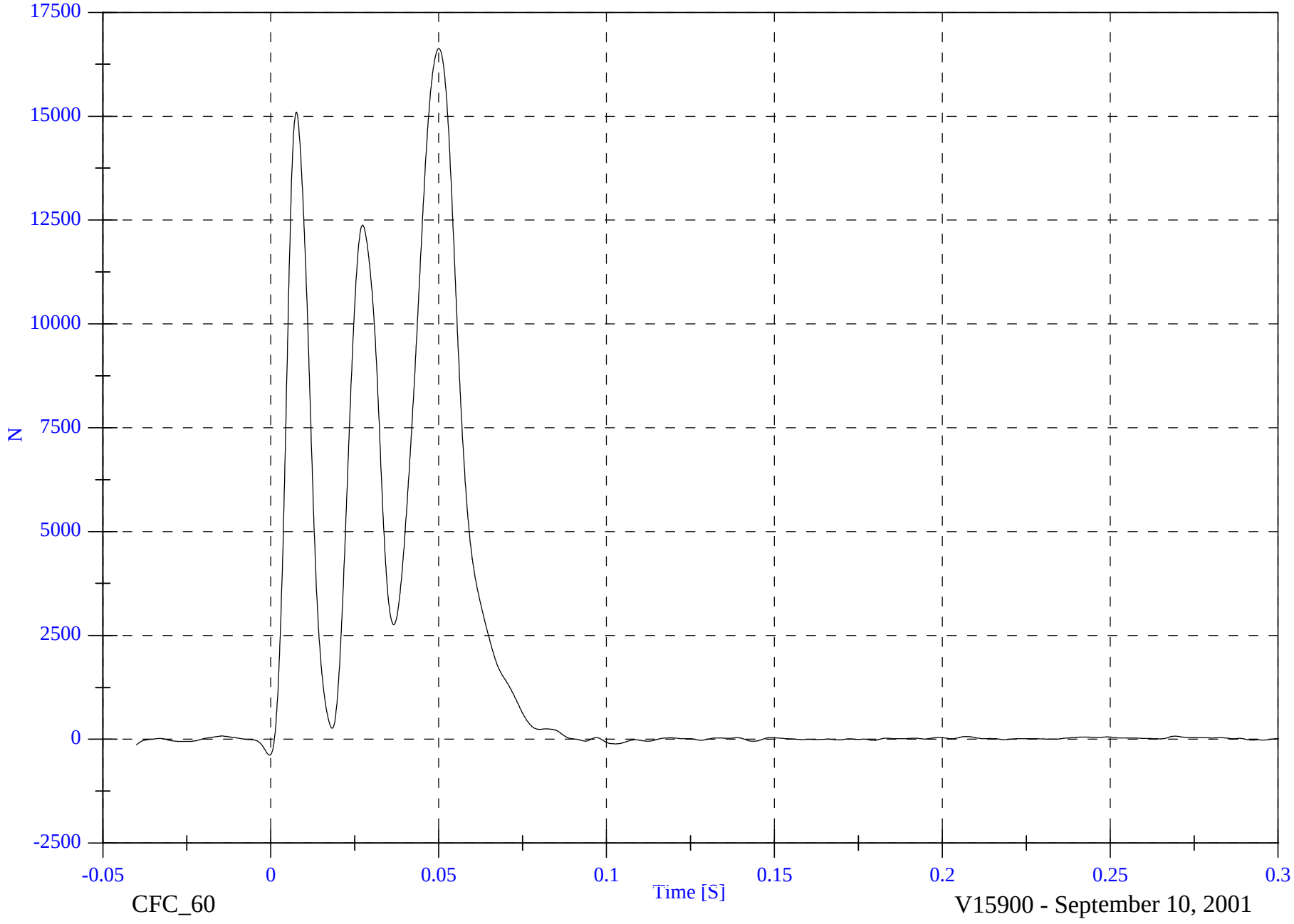

Optional NCAP - 2001 Volvo S60
Barrier Load Cell C2 Fx
Max: 27911.0 [N] at 0.032 [S]
Min: -202.8 [N] at 0.002 [S]
30000
25000
20000
15000
10000
5000
0
-5000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
CFC_60
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Barrier Load Cell C3 Fx
Max: 9526.0 [N] at 0.011 [S]
Min: -562.3 [N] at 0.002 [S]
10000
7500
5000
2500
0
-2500
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
CFC_60
V15900 - September 10, 2001
B-146
8629-1

Optional NCAP - 2001 Volvo S60

Barrier Load Cell C4 Fx

Max: 16627.7 [N] at 0.050 [S]
Min: -384.8 [N] at -0.000 [S]



B-147

8629-1

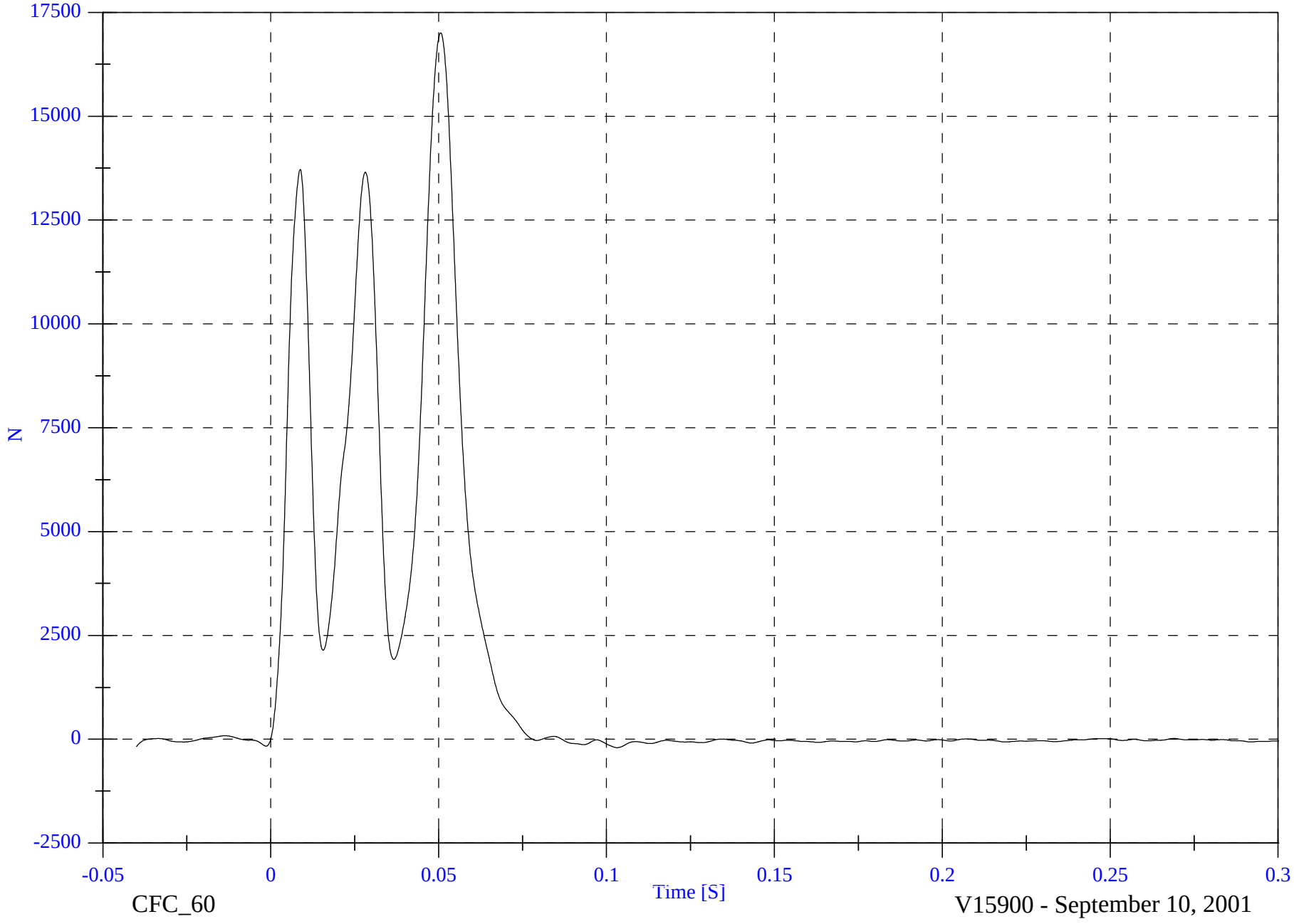
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell C5 Fx

Max: 17006.3 [N] at 0.051 [S]
Min: -202.3 [N] at 0.103 [S]



B-148

8629-1

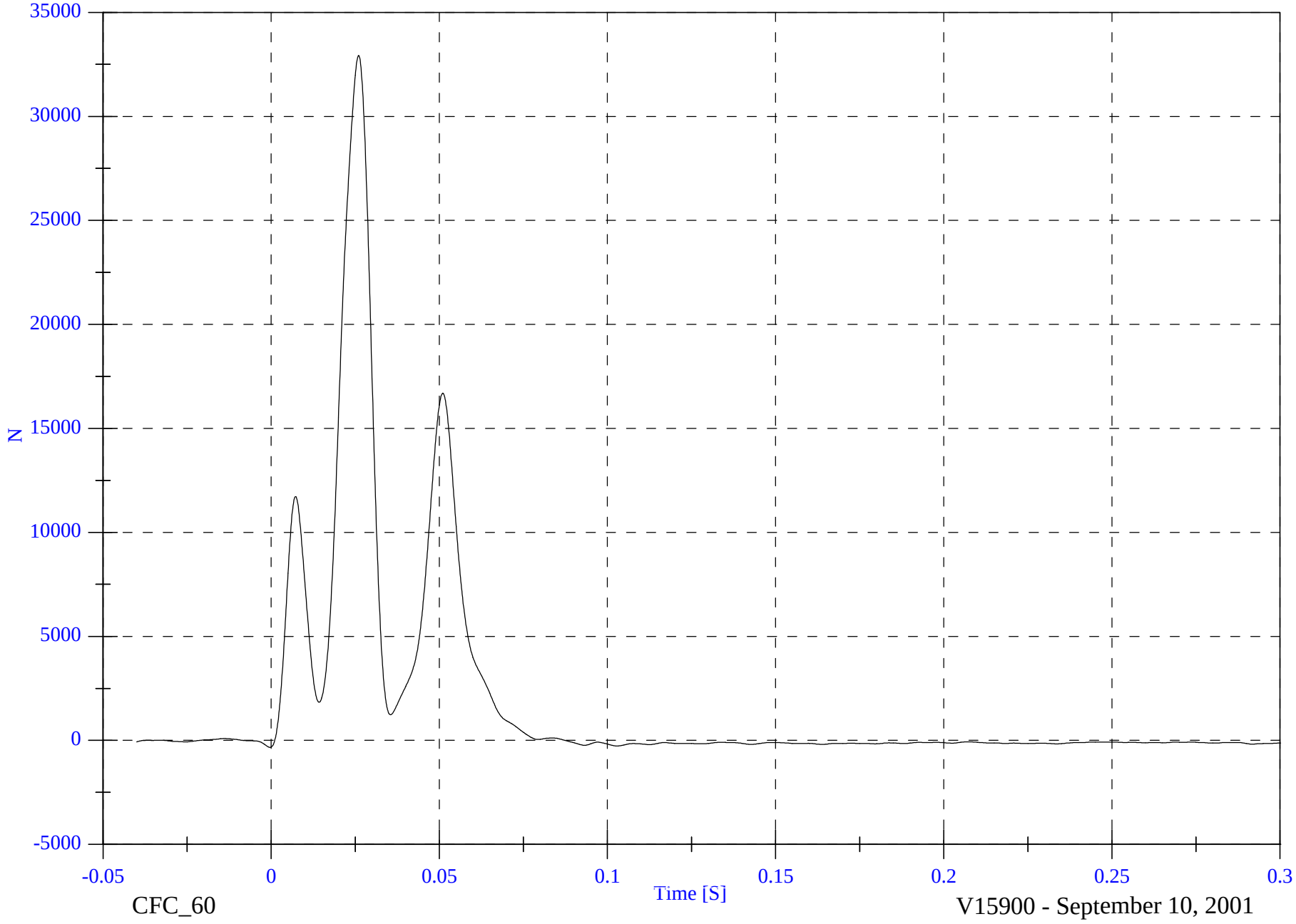
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell C6 Fx

Max: 32928.9 [N] at 0.026 [S]
Min: -336.2 [N] at -0.000 [S]



B-149

8629-1

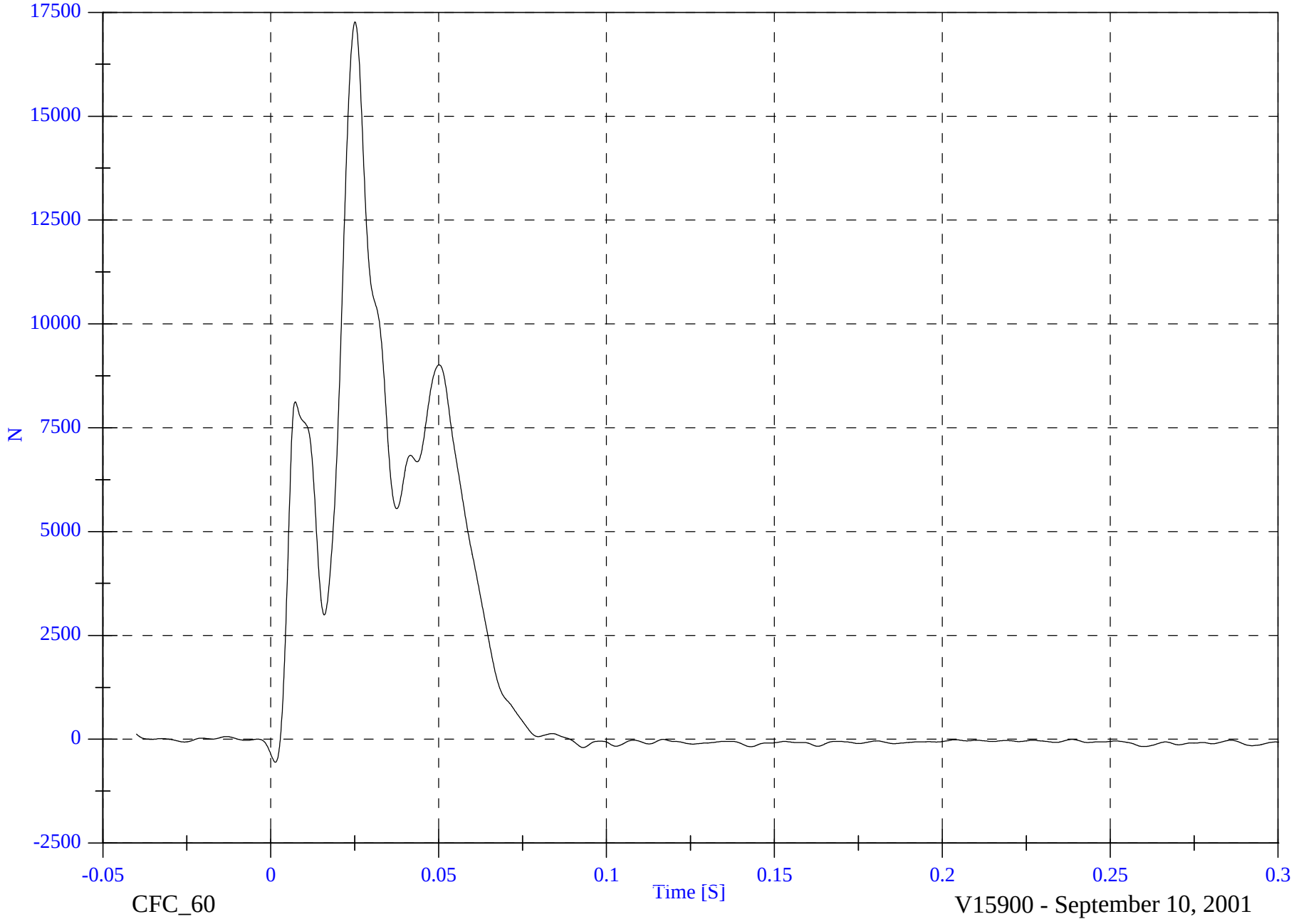
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell C7 Fx

Max: 17270.0 [N] at 0.025 [S]
Min: -553.2 [N] at 0.001 [S]



B-150

8629-1

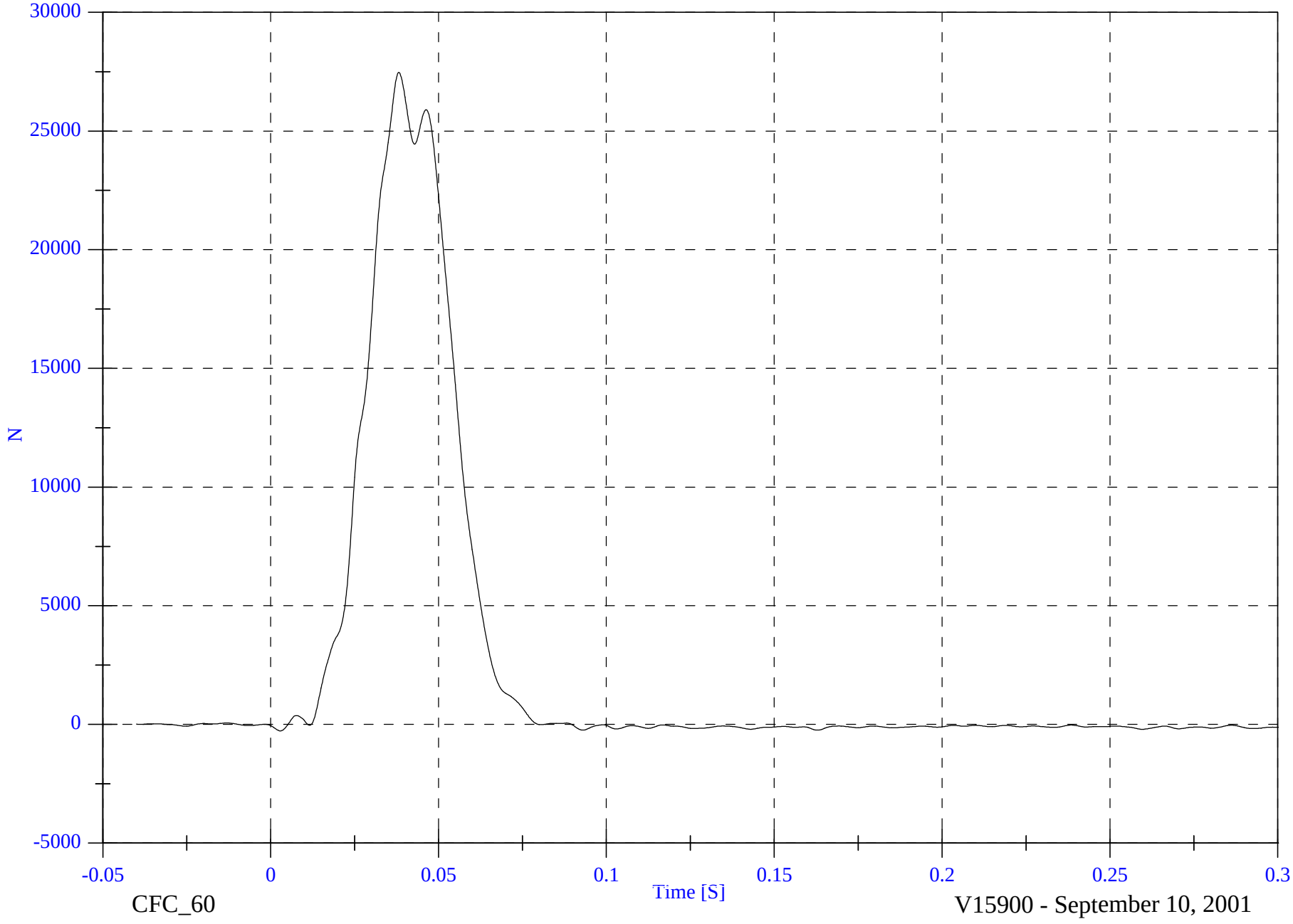
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell C8 Fx

Max: 27467.8 [N] at 0.038 [S]
Min: -273.6 [N] at 0.003 [S]



B-151

8629-1

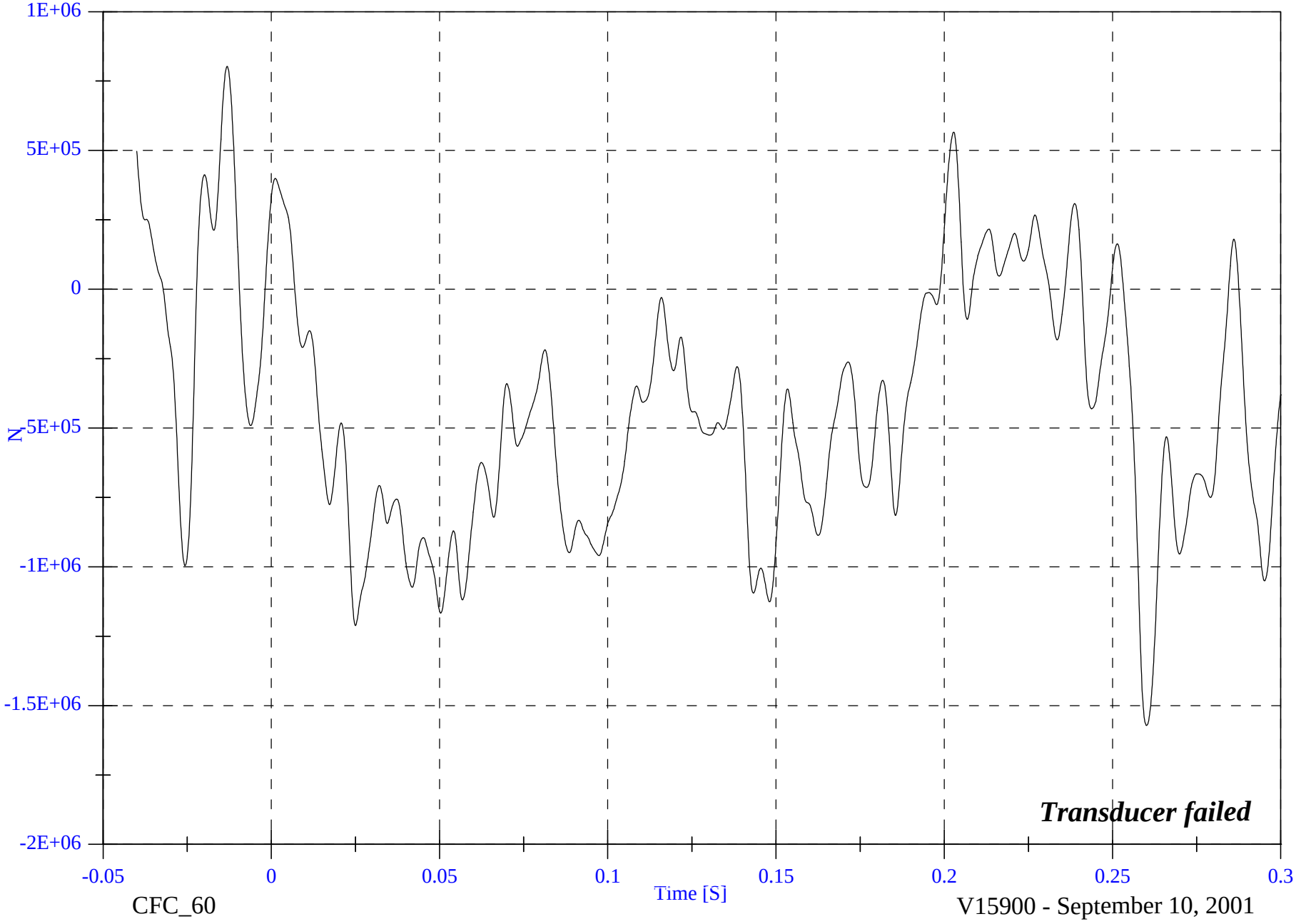
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell C9 Fx

Max: 802814.5 [N] at -0.013 [S]
Min: -1571643.4 [N] at 0.260 [S]



B-152

8629-1

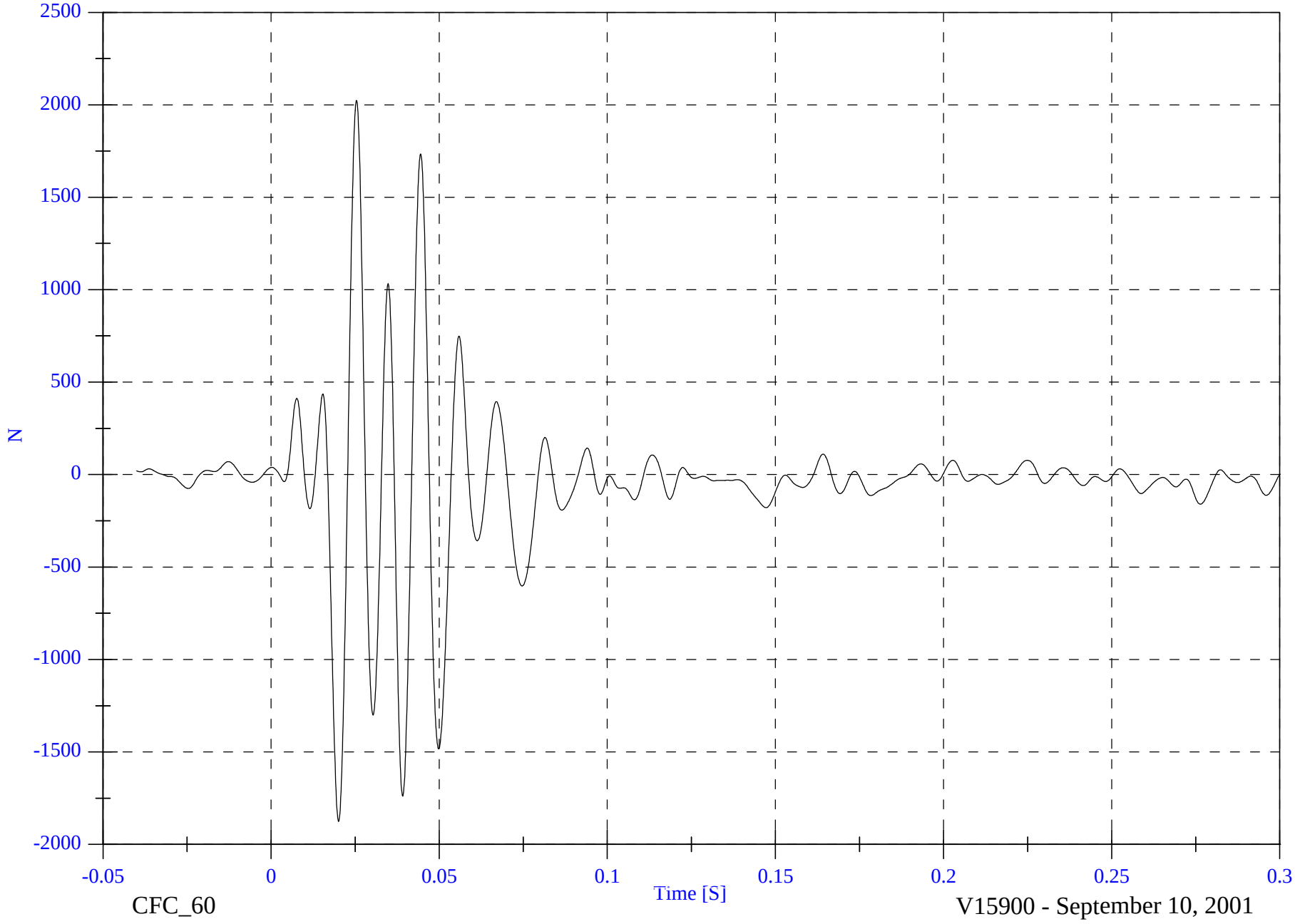
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell D1 Fx

Max: 2024.5 [N] at 0.025 [S]
Min: -1876.1 [N] at 0.020 [S]



B-153

8629-1

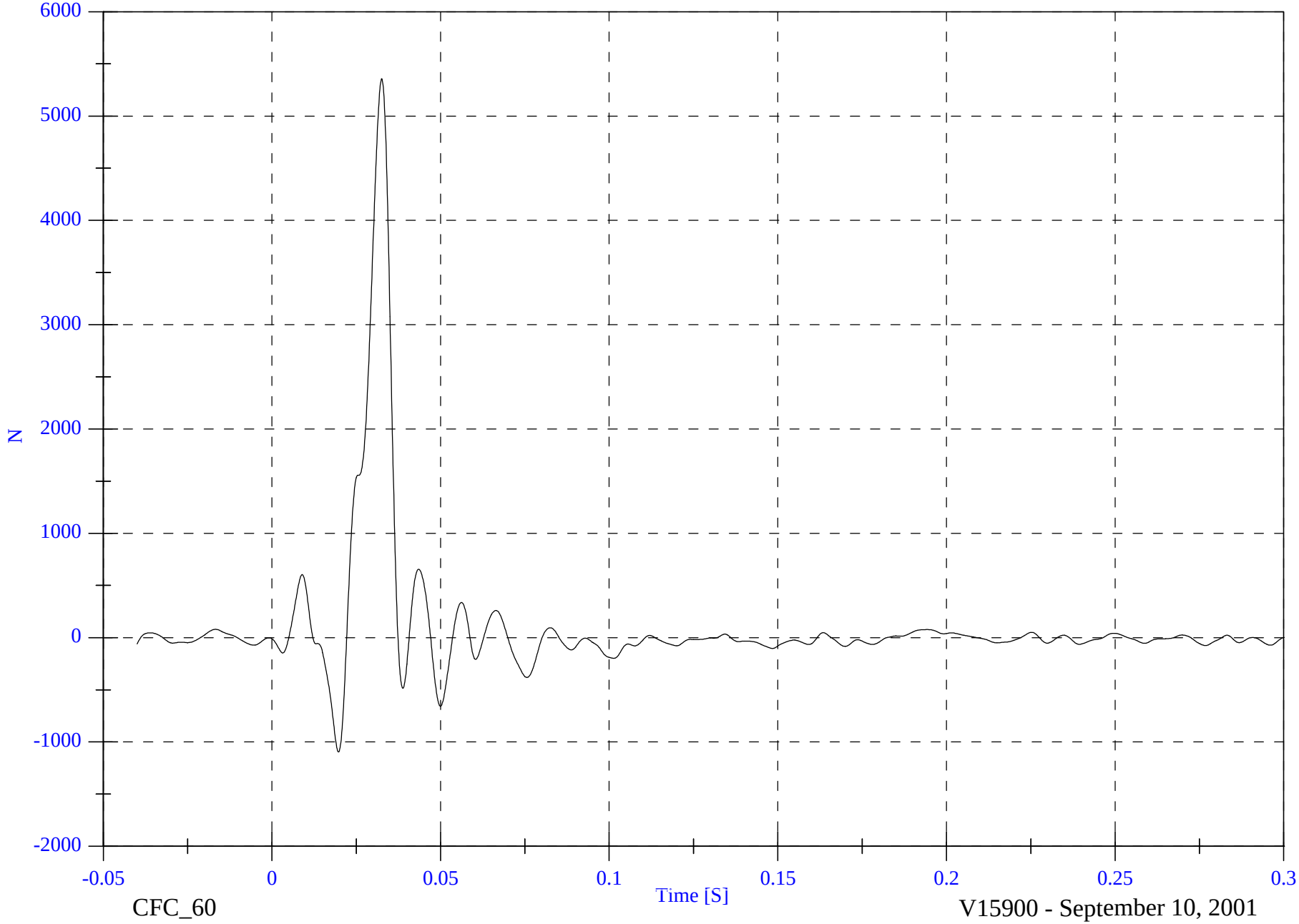
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell D2 Fx

Max: 5358.3 [N] at 0.032 [S]
Min: -1095.9 [N] at 0.020 [S]

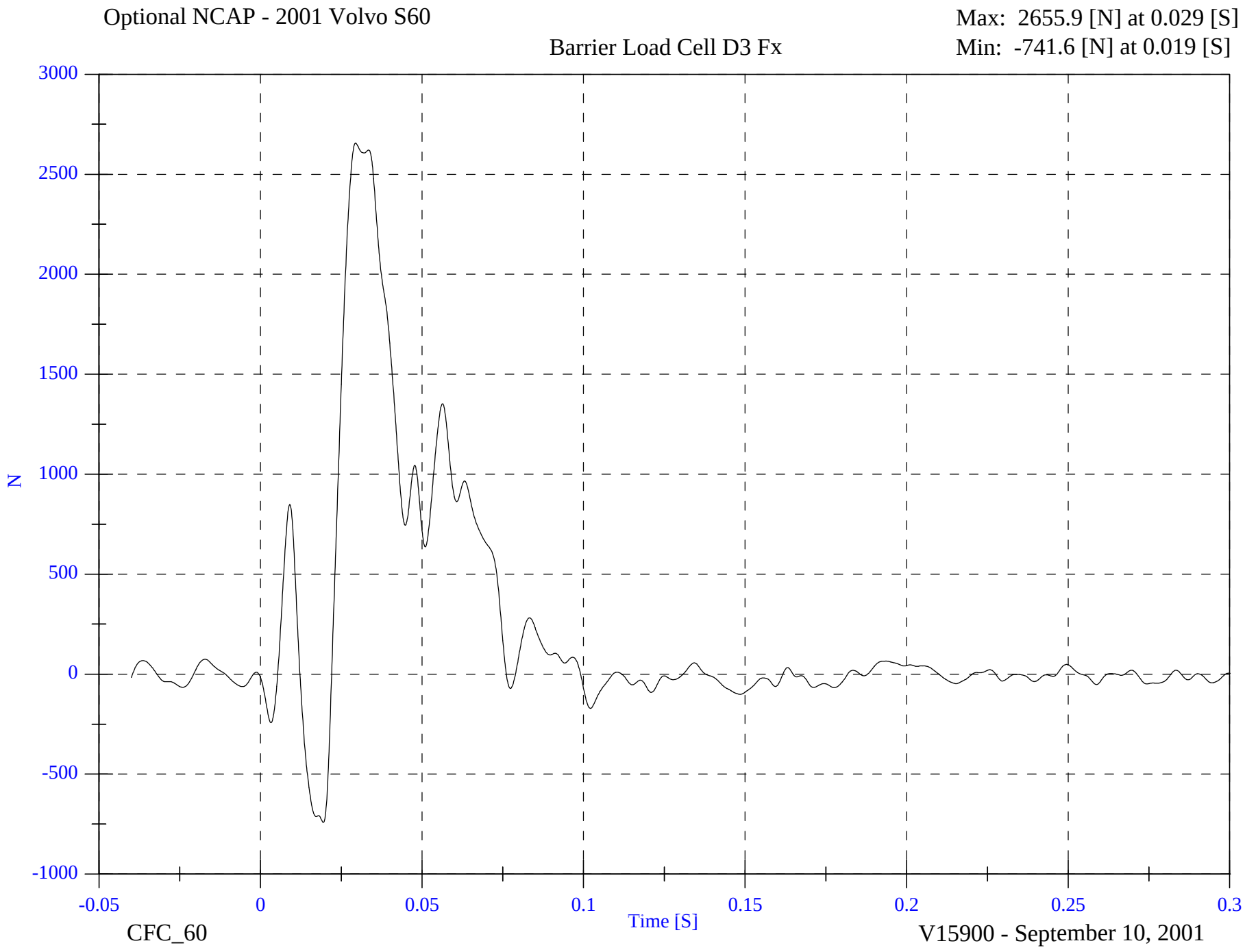


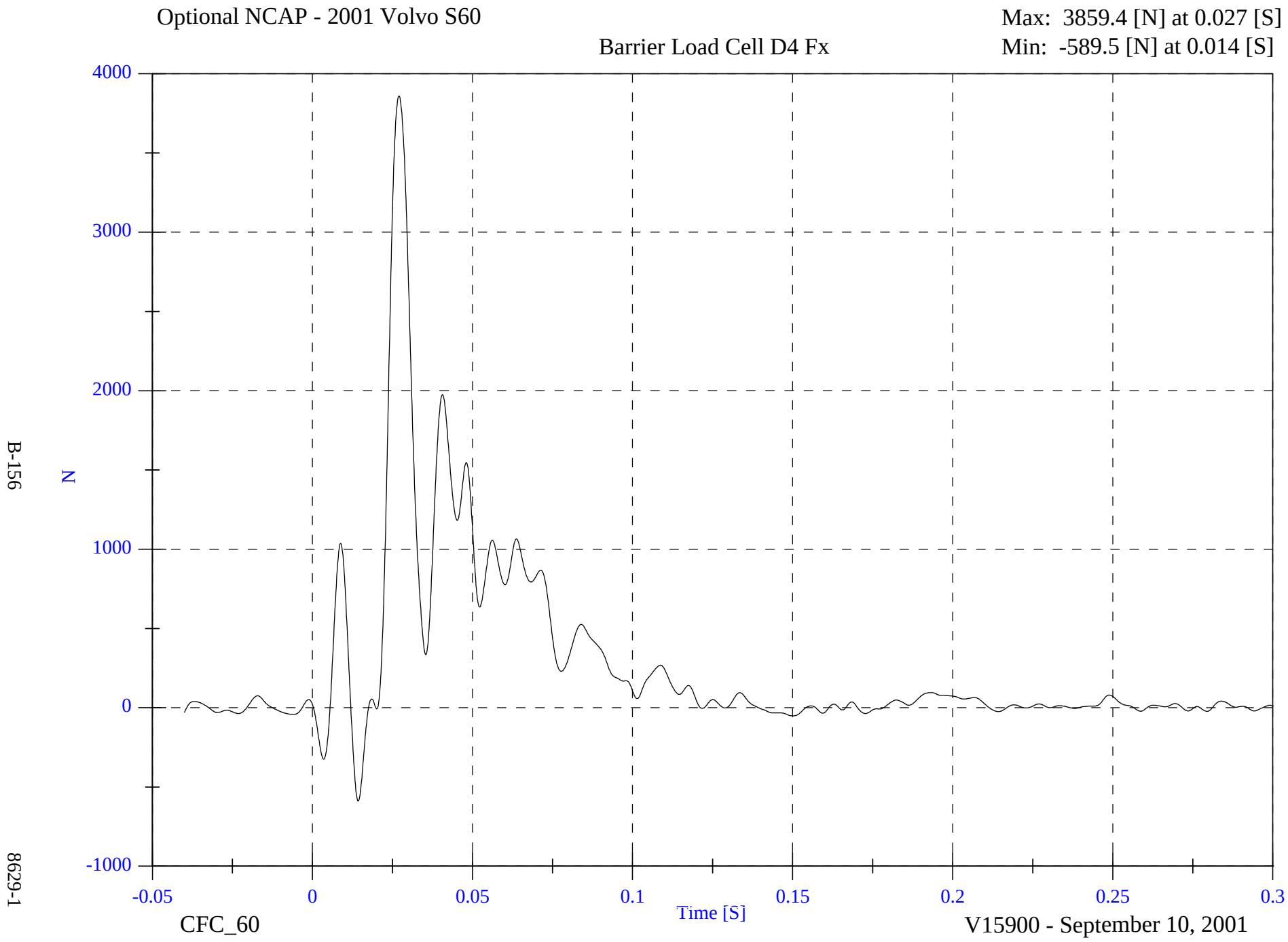
B-154

8629-1

CFC_60

V15900 - September 10, 2001

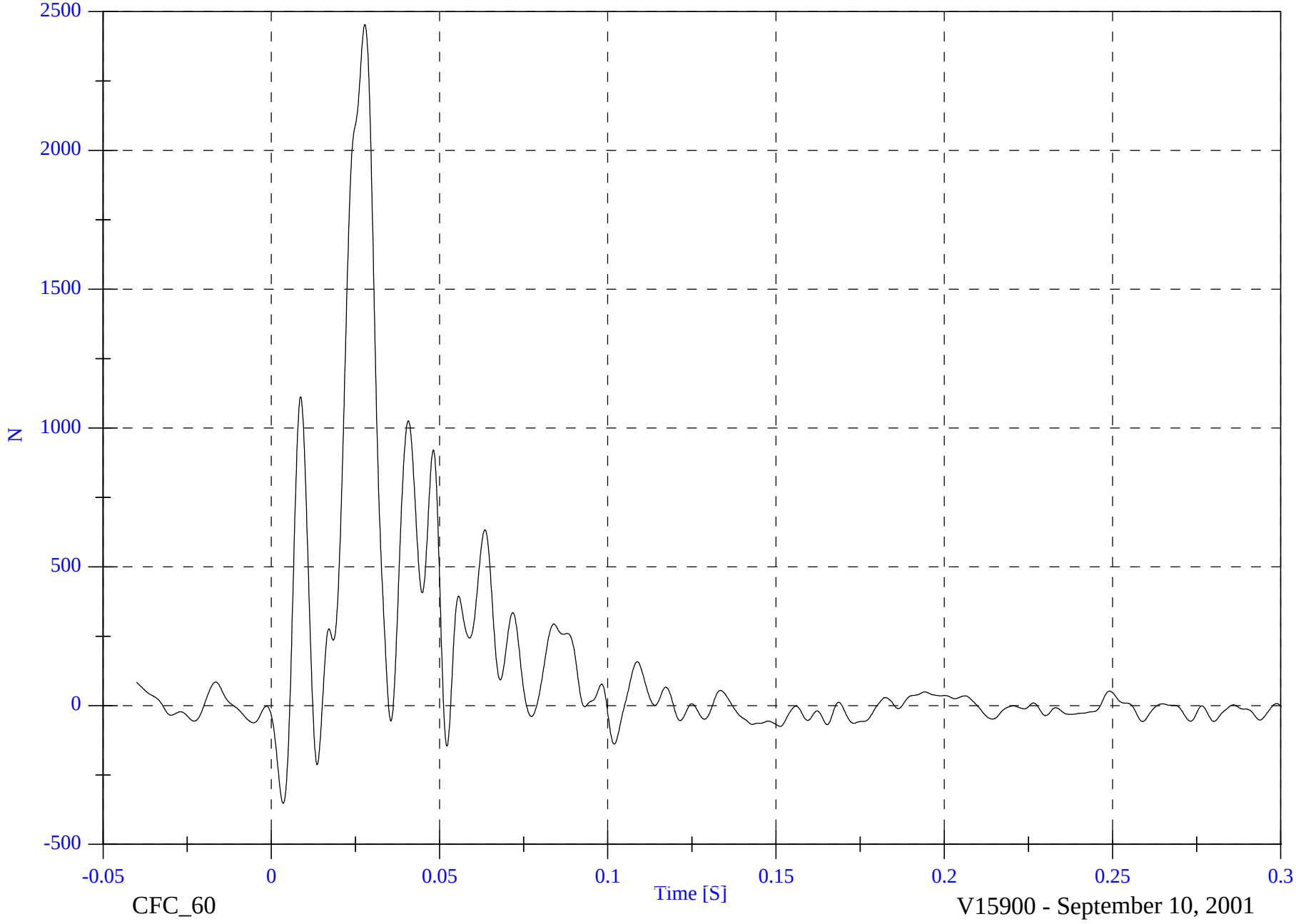

Optional NCAP - 2001 Volvo S60
Barrier Load Cell D3 Fx
Max: 2655.9 [N] at 0.029 [S]
Min: -741.6 [N] at 0.019 [S]
3000
2500
2000
1500
1000
500
0
-500
-1000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
B-155
8629-1
CFC_60
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Barrier Load Cell D4 Fx
Max: 3859.4 [N] at 0.027 [S]
Min: -589.5 [N] at 0.014 [S]
4000
3000
2000
1000
0
-1000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
CFC_60
V15900 - September 10, 2001
B-156
8629-1

Optional NCAP - 2001 Volvo S60

Barrier Load Cell D5 Fx

Max: 2453.8 [N] at 0.028 [S]
Min: -352.4 [N] at 0.003 [S]

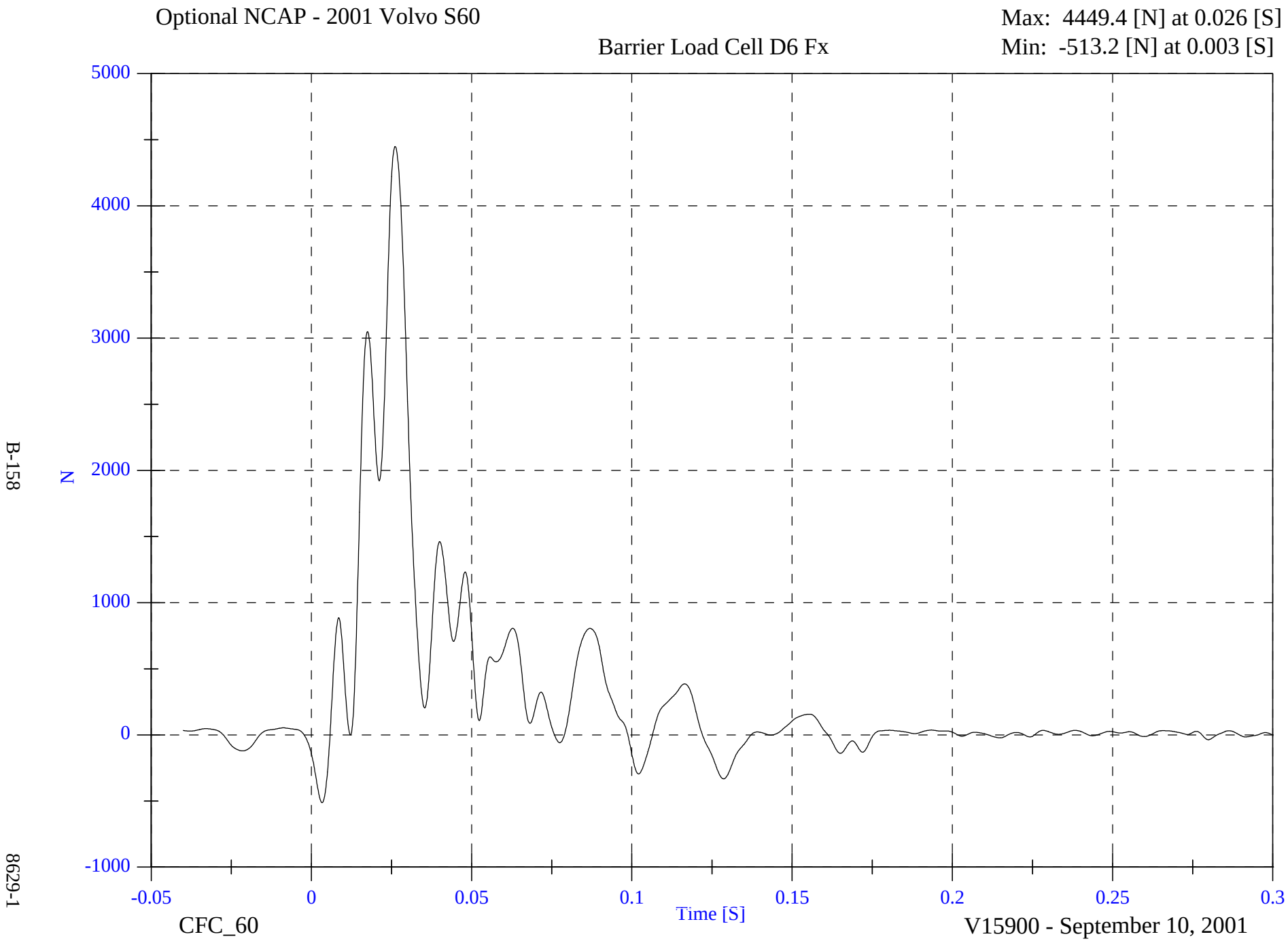


B-157

8629-1

CFC_60

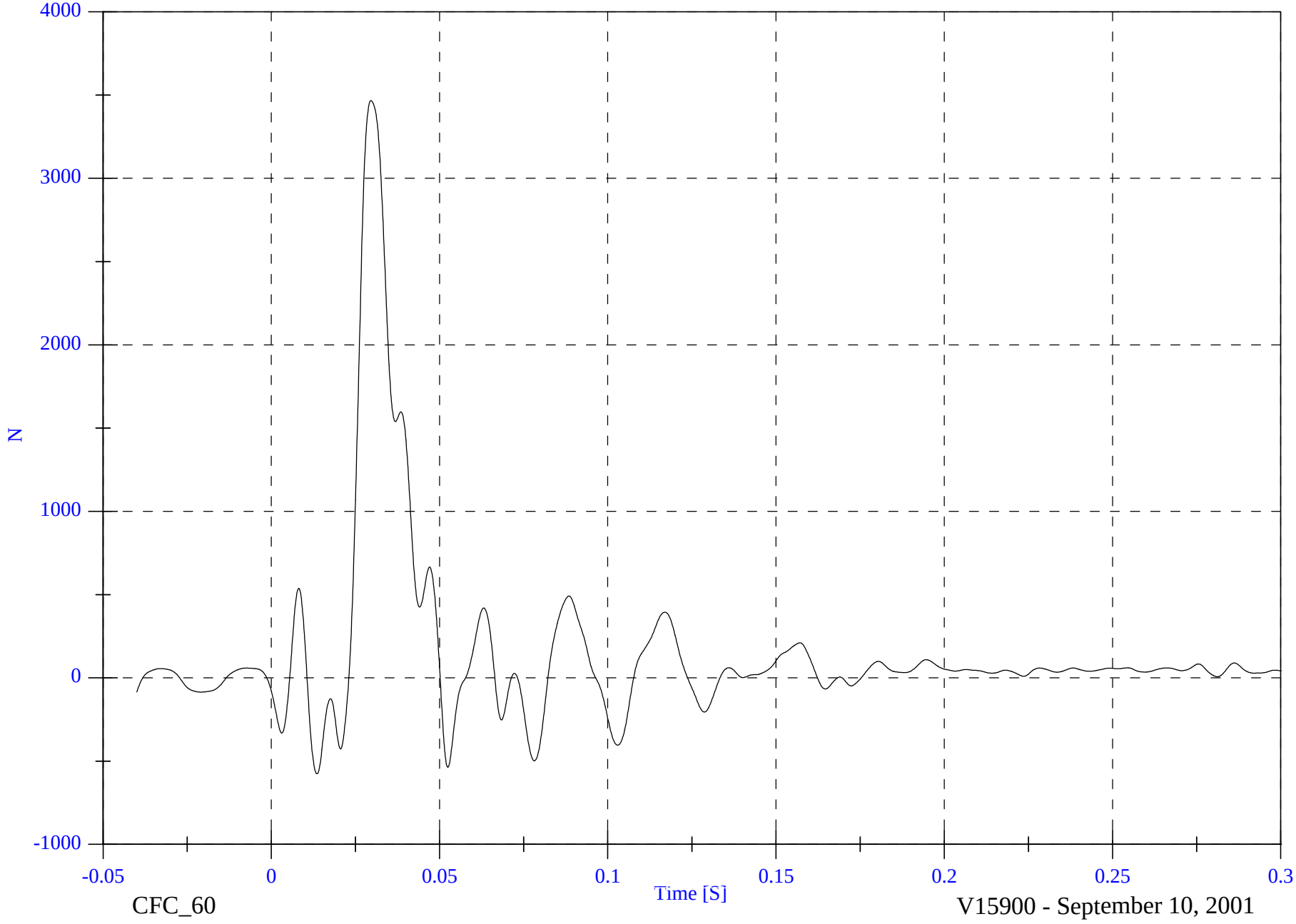
V15900 - September 10, 2001


Optional NCAP - 2001 Volvo S60
Barrier Load Cell D6 Fx
Max: 4449.4 [N] at 0.026 [S]
Min: -513.2 [N] at 0.003 [S]
5000
4000
3000
2000
1000
0
-1000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
CFC_60
V15900 - September 10, 2001
B-158
8629-1

Optional NCAP - 2001 Volvo S60

Barrier Load Cell D7 Fx

Max: 3466.9 [N] at 0.030 [S]
Min: -577.1 [N] at 0.013 [S]



B-159

8629-1

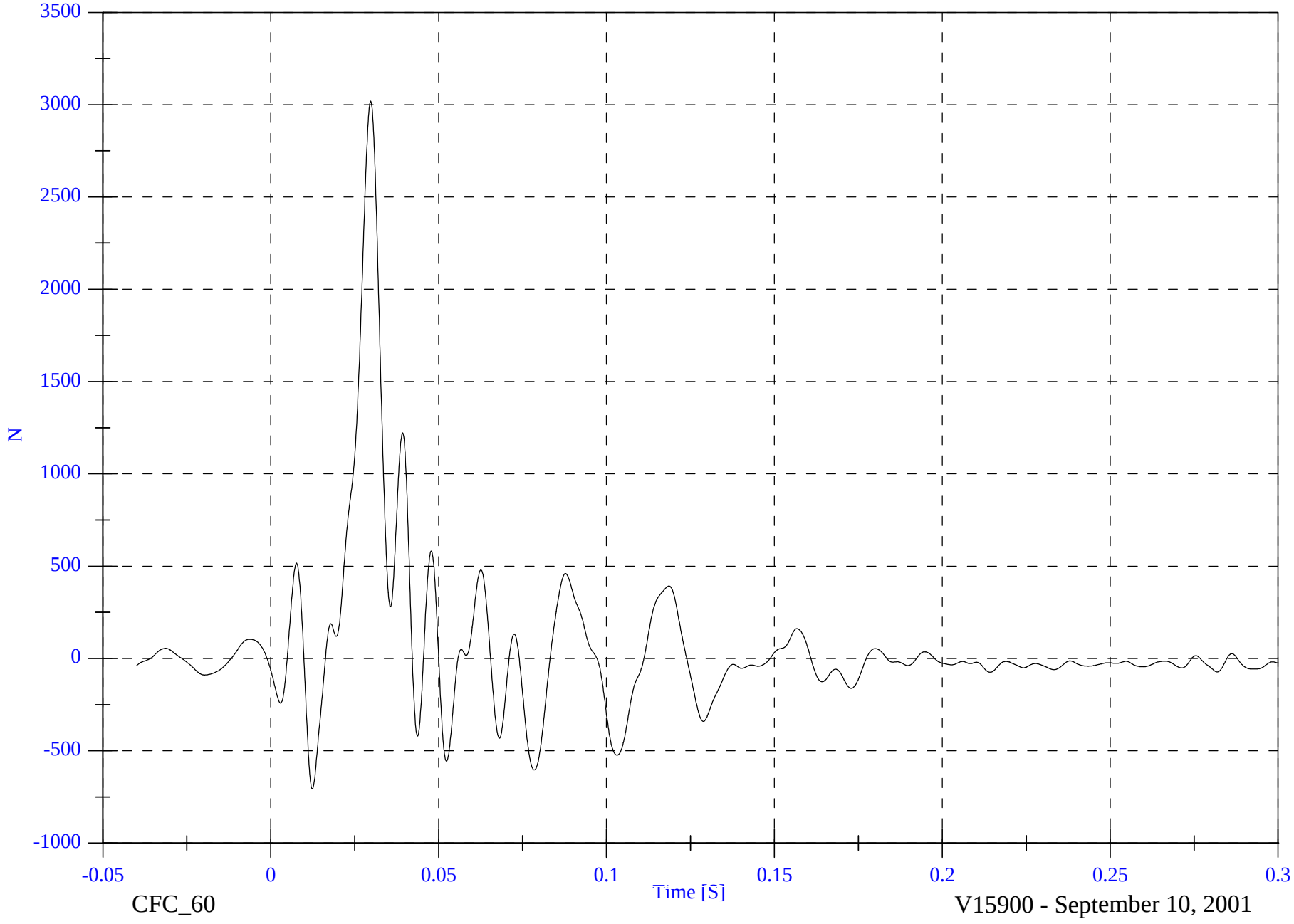
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell D8 Fx

Max: 3019.9 [N] at 0.030 [S]
Min: -707.1 [N] at 0.012 [S]



B-160

8629-1

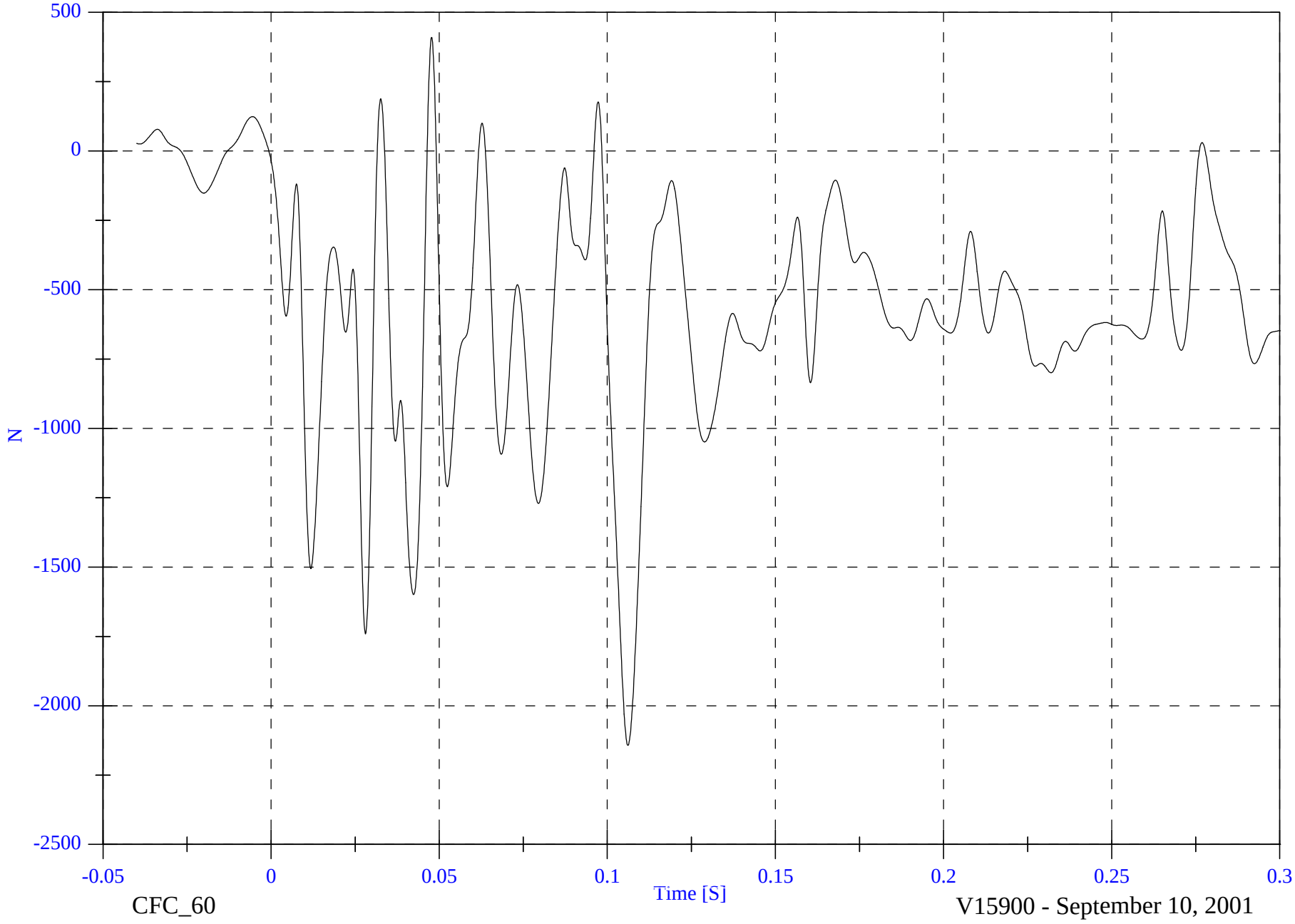
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Barrier Load Cell D9 Fx

Max: 409.8 [N] at 0.048 [S]
Min: -2143.1 [N] at 0.106 [S]



B-161

8629-1

CFC_60

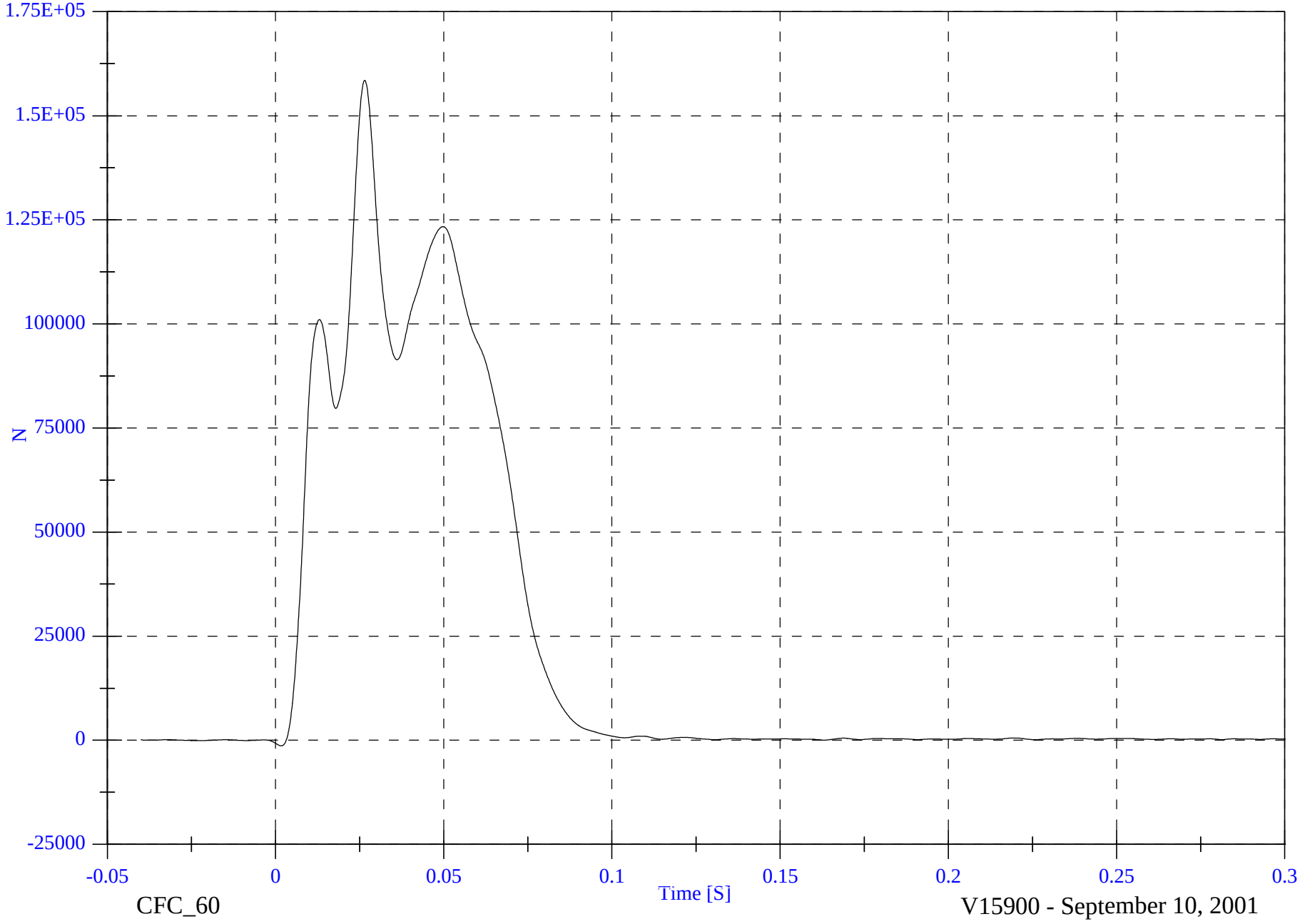
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Group 1 Load Cell Sum (A1,A2,A3,B1,B2,B3)

Max: 158506.2 [N] at 0.026 [S]

Min: -1343.6 [N] at 0.002 [S]



B-162

8629-1

CFC_60

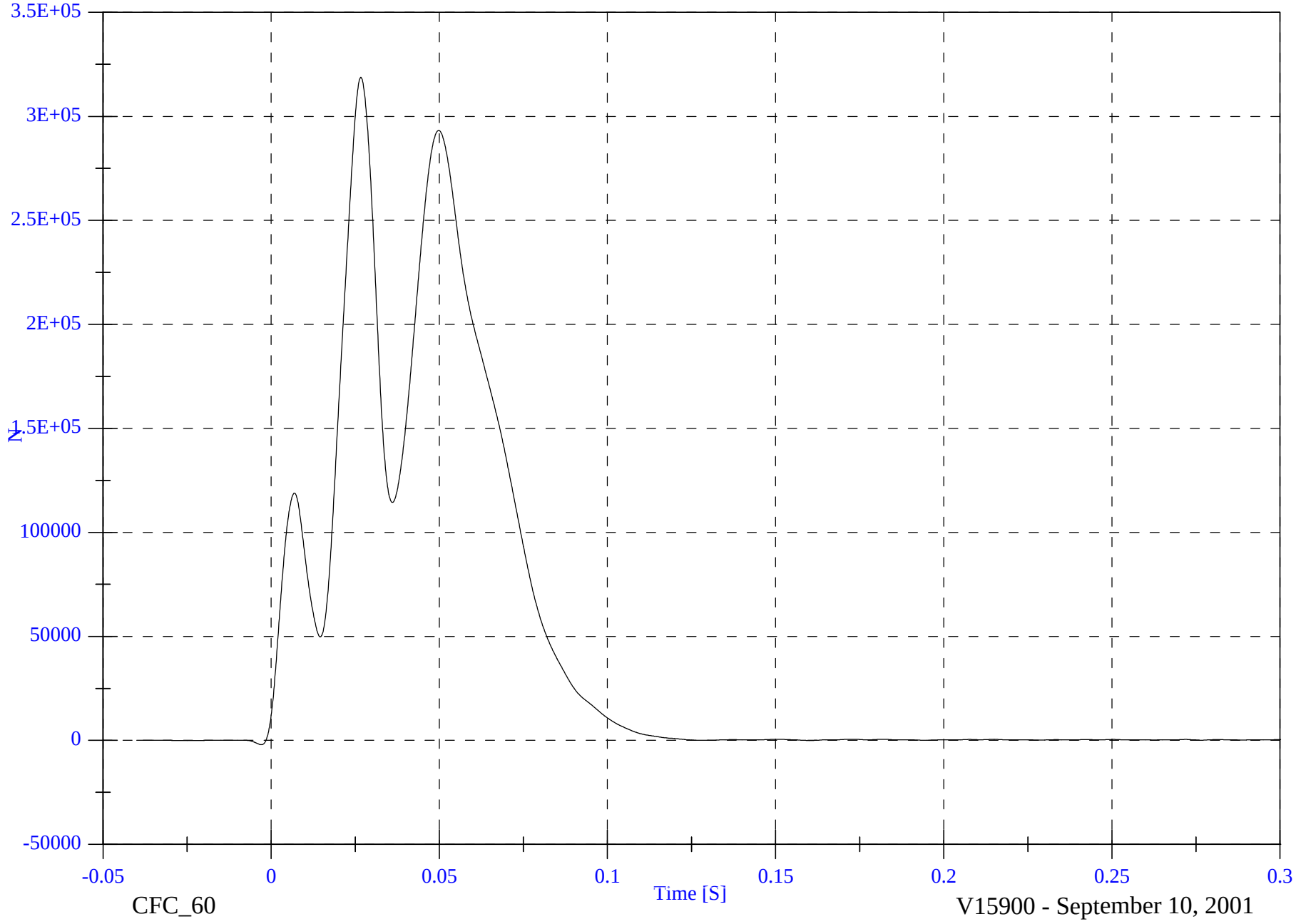
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Group 2 Load Cell Sum (A4,A5,A6,B4,B5,B6)

Max: 318796.0 [N] at 0.027 [S]

Min: -2082.7 [N] at -0.003 [S]

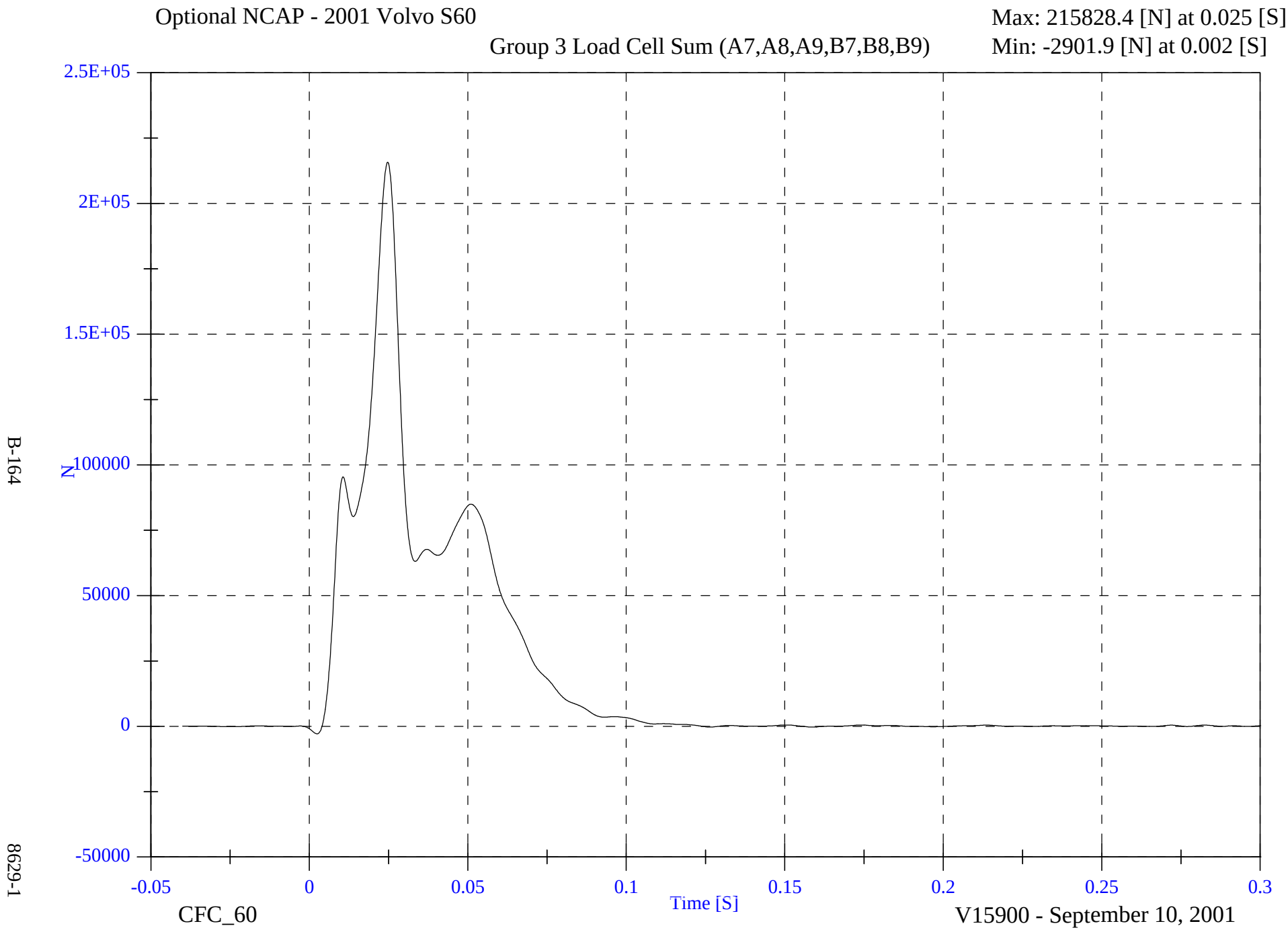


B-163

8629-1

CFC_60

V15900 - September 10, 2001

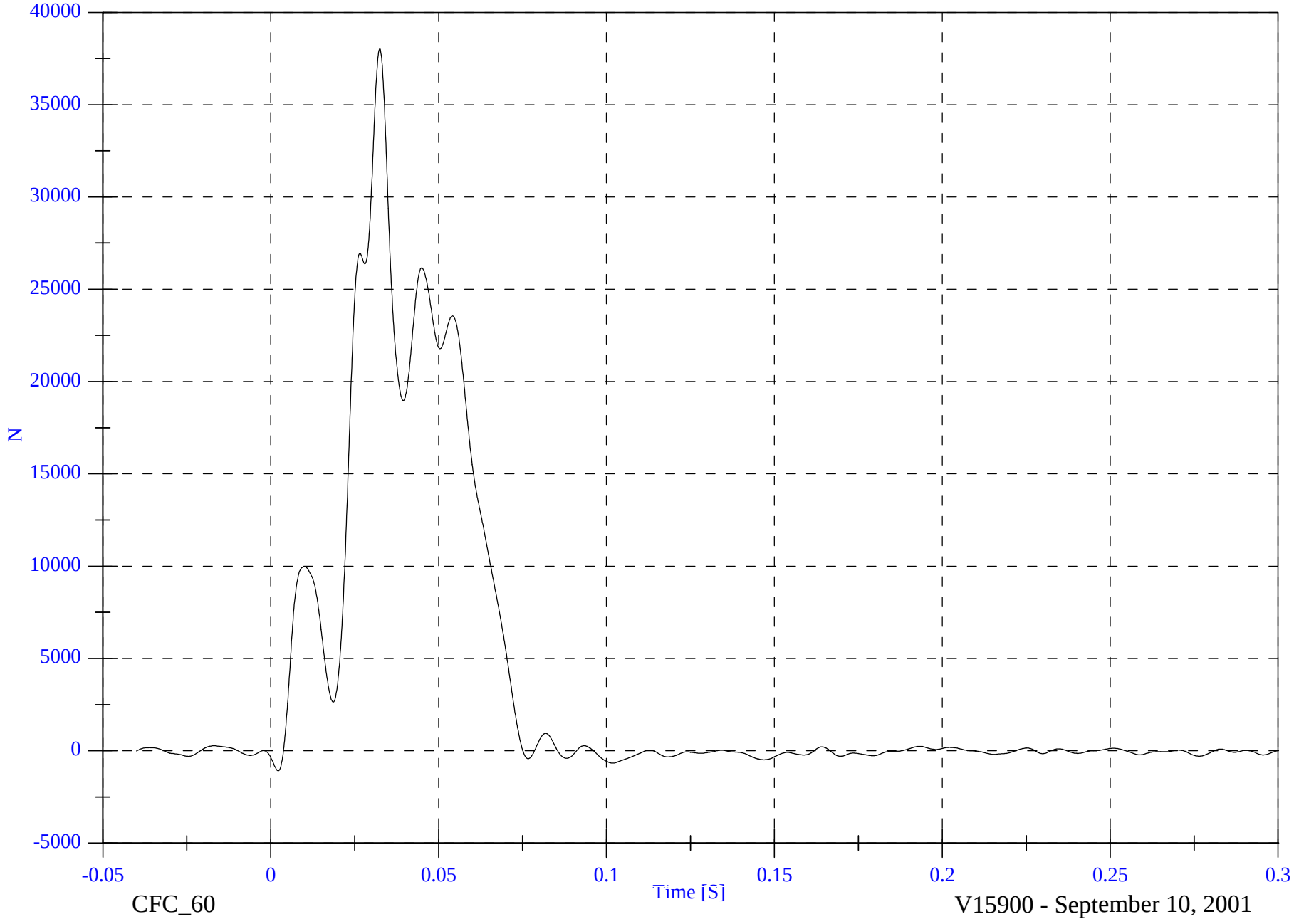

Optional NCAP - 2001 Volvo S60
Group 3 Load Cell Sum (A7,A8,A9,B7,B8,B9)
Max: 215828.4 [N] at 0.025 [S]
Min: -2901.9 [N] at 0.002 [S]
2.5E+05
2E+05
1.5E+05
100000
50000
0
-50000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
CFC_60
V15900 - September 10, 2001
B-164
8629-1

Optional NCAP - 2001 Volvo S60

Group 4 Load Cell Sum (C1,C2,C3,D1,D2,D3)

Max: 38039.0 [N] at 0.032 [S]

Min: -1086.2 [N] at 0.002 [S]

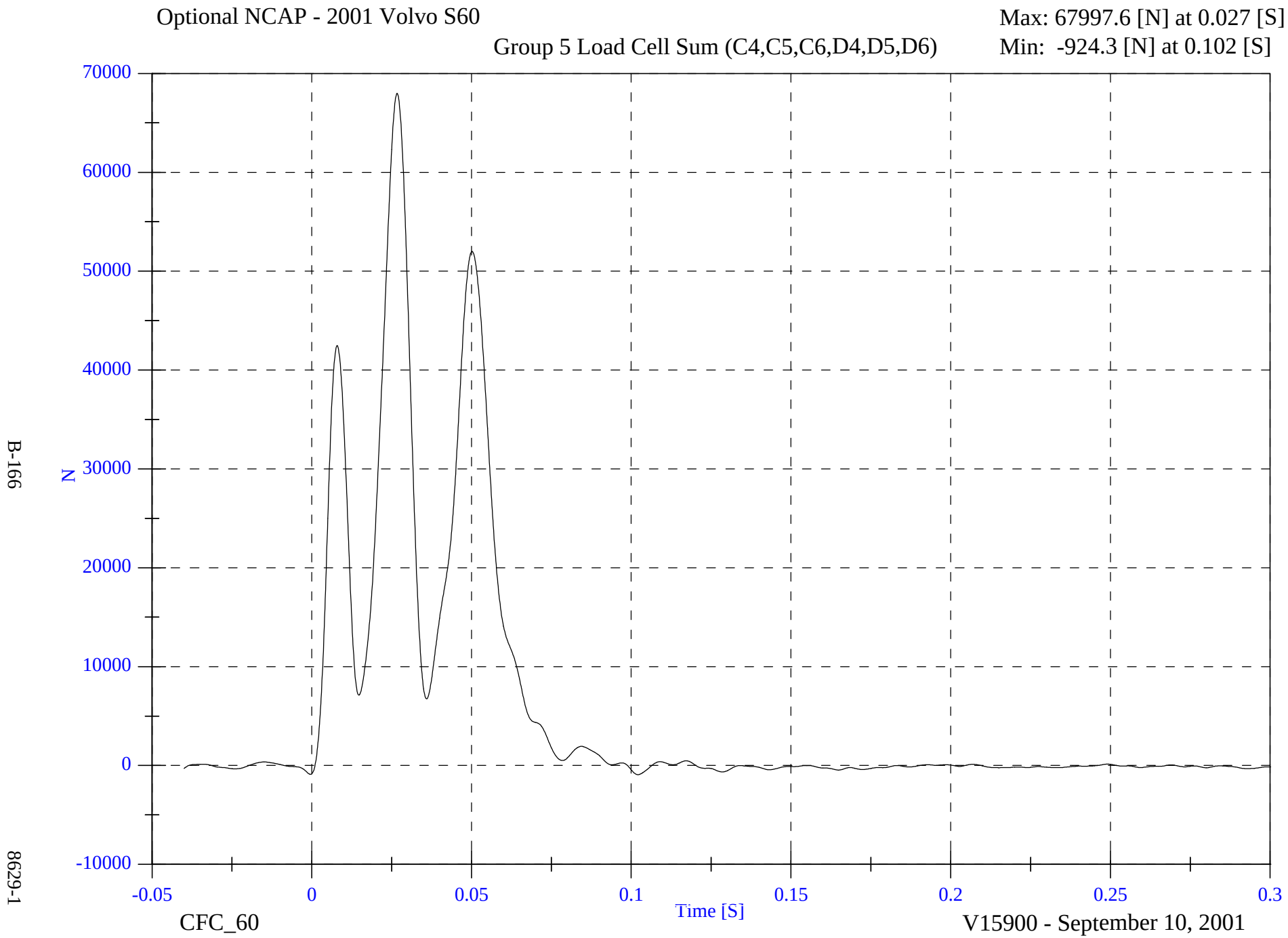


B-165

8629-1

CFC_60

V15900 - September 10, 2001

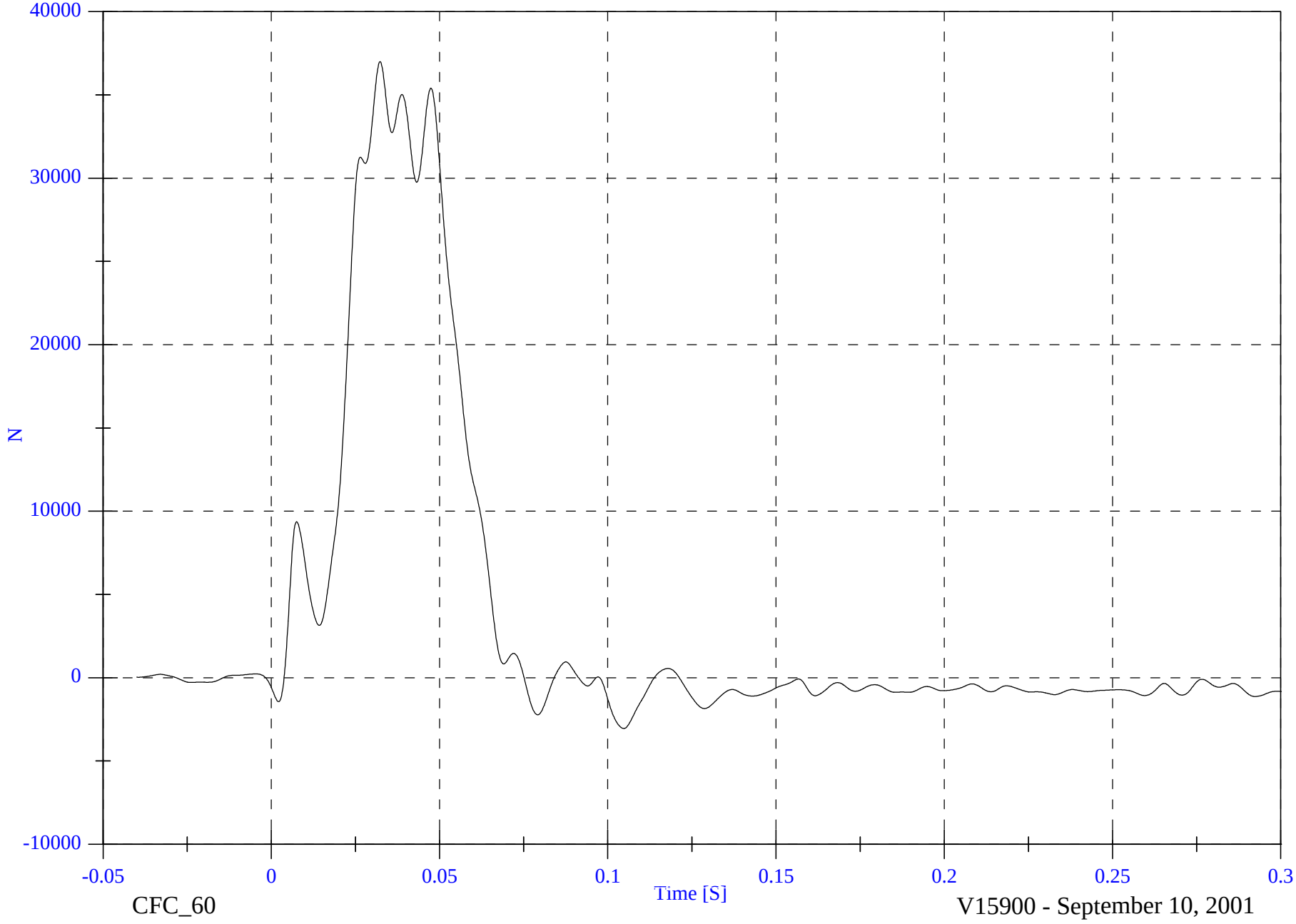

Optional NCAP - 2001 Volvo S60
Group 5 Load Cell Sum (C4,C5,C6,D4,D5,D6)
Max: 67997.6 [N] at 0.027 [S]
Min: -924.3 [N] at 0.102 [S]
70000
60000
50000
40000
30000
20000
10000
0
-10000
N
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
Time [S]
B-166
8629-1
CFC_60
V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Group 6 Load Cell Sum (C7,C8,D7,D8,D9)

Max: 37004.4 [N] at 0.032 [S]

Min: -3046.0 [N] at 0.105 [S]



B-167

8629-1

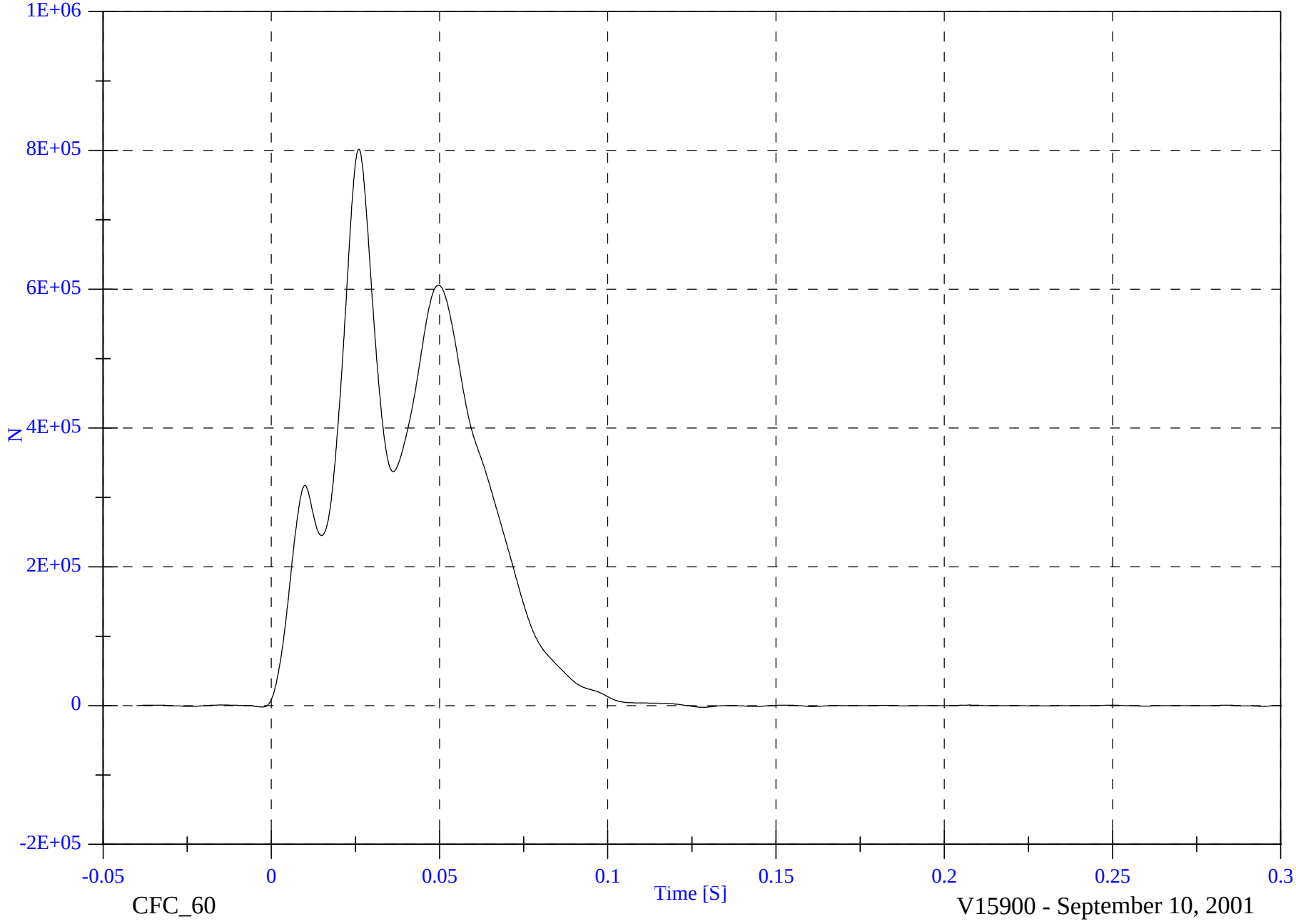
CFC_60

V15900 - September 10, 2001

Optional NCAP - 2001 Volvo S60

Total Load Cell Sum (All 6 Groups)

Max: 801888.0 [N] at 0.026 [S]
Min: -2457.7 [N] at 0.128 [S]



B-168

8629-1

CFC_60

V15900 - September 10, 2001

APPENDIX C

PART 572B/E DUMMY CONFIGURATION
AND PERFORMANCE VERIFICATION DATA SHEETS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Veridian Engineering. A summary of the test results, and Part 572 specifications are included in this Appendix.

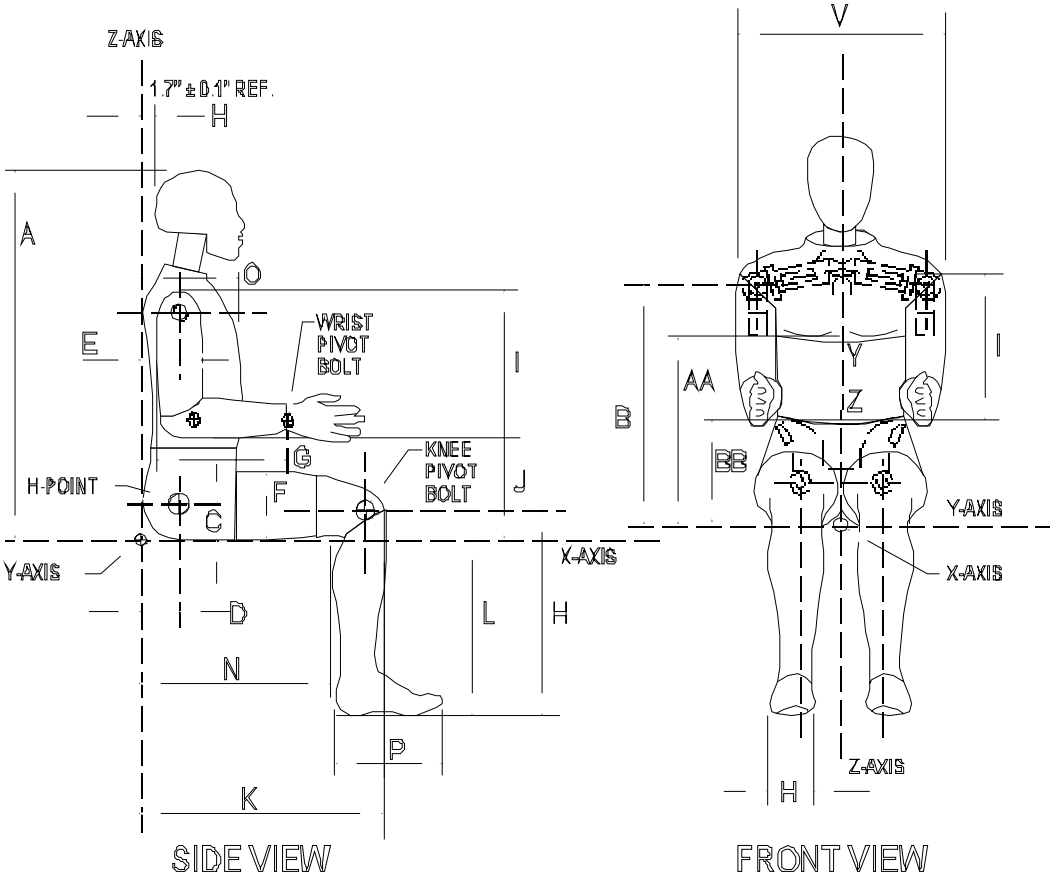
Dummy serial numbers and certification dates are:

Position No./Location	Serial No.	Completion Date
#1/Driver	150	9/5/01
#2/Right Front Passenger	245	9/5/01

Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Indicant Testing Final Report No. 6525-V-1.

EXTERNAL DIMENSIONS SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumber does not allow the Hybrid III to be positioned in a perfect erect attitude. (REF. S572.31(A)(6))

PART 572E
HEAD DROP TEST

Dummy Serial Number	150
Sequential Test Number	3
Date	8/30/01
Workfile	150301.hdp

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	71.0
Relative Humidity	10% - 70%	30.0
Peak Resultant Acceleration	225-275 G's	264.0
Peak Lateral Acceleration	15 G's Max	12.34
Is Acceleration Curve Unimodal?	YES	Yes

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	150
Sequential Test Number	3
Date	9/4/01
Workfile	150301.nfl

6 Axis Neck Transducer

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	71.0
Relative Humidity		10% - 70%	31.0
Impact Velocity		22.60 - 23.40 Ft/s	23.24
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	24.45
	20 ms	17.60 - 22.60 G's	21.15
	30 ms	12.50 - 18.50 G's	15.05
Max Pendulum G's Above 30 ms		29 G's Max	15.05
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	40.25
D Plane Rotation	Max	64 - 78 Deg	77.38
	Time	57 - 64 ms	59.25
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	78.92
	Time	47 - 58 ms	52.12
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	117.75
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	99.50

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	150	
Sequential Test Number	3	
Date	9/1/01	6 Axis Neck Transducer
Workfile	150301.nex	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	71.0
Relative Humidity		10% - 70%	30.0
Impact Velocity		19.50 - 20.30 Ft/s	19.75
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.25
	20 ms	14.00 - 19.00 G's	16.48
	30 ms	11.00 - 16.00 G's	13.04
Max Pendulum G's Above 30 ms		22 G's Max	13.04
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	44.75
D Plane Rotation	Max	81 - 106 Deg	101.40
	Time	72 - 82 ms	78.00
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-52.13
	Time	65 - 79 ms	74.12
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	159.38
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	137.12

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number	150
Sequential Test Number	3
Date	9/5/01
Workfile	150301.th3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70.0
Relative Humidity	10% - 70%	32.0
Pendulum Velocity	21.6 - 22.4 Ft/s	21.9
Maximum Deflection	2.50 - 2.86 in	2.52
Maximum Resistive Force	1160 - 1325 Lbs	1191.24
Internal Hysteresis	69 - 85 %	71.95

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number	150
Sequential Test Number	3
Date	9/5/01
Workfile	150301.lf / 150301.rf

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 – 78 Deg F	71.0
Relative Humidity	10% - 70%	32.0
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1091.95
RIGHT KNEE		
Temperature	66 - 78 Deg F	71.0
Relative Humidity	10% - 70%	32.0
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1065.72

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 150
Sequential Test Number 3
Date 9/4/01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			71
Relative Humidity			31
Location for Chest Circumference	AA	16.9 -17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.1
Waist Circumference	Z	32.9 - 34.1 in	33.8
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	6.0
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.8
Knee Pivot Height	M	19.1 - 19.7 in	19.6
Foot Length	P	9.9 - 10.5 in	10.1
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.6
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.2
Elbow Rest Height	J	7.5 - 8.3 in	8.1
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.5

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number	245
Sequential Test Number	3
Date	8/30/01
Workfile	245301.nex

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	71.0
Relative Humidity	10% - 70%	30.0
Peak Resultant Acceleration	225-275 G's	230.24
Peak Lateral Acceleration	15 G's Max	5.17
Is Acceleration Curve Unimodal?	YES	Yes

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	245
Sequential Test Number	3
Date	8/31/01
Workfile	245301.nfl

6 Axis Neck Transducer

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	71.0
Relative Humidity		10% - 70%	30.0
Impact Velocity		22.60 - 23.40 Ft/s	23.23
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	23.72
	20 ms	17.60 - 22.60 G's	20.14
	30 ms	12.50 - 18.50 G's	15.64
Max Pendulum G's Above 30 ms		29 G's Max	15.99
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	40.25
D Plane Rotation	Max	64 - 78 Deg	73.17
	Time	57 - 64 ms	62.50
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs	75.27
	Time	47 - 58 ms	53.50
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	116.75
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	101.50

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	245	
Sequential Test Number	3	
Date	9/1/01	6 Axis Neck Transducer
Workfile	245301.nex	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	71.0
Relative Humidity		10% - 70%	30.0
Impact Velocity		19.50 - 20.30 Ft/s	19.52
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.13
	20 ms	14.00 - 19.00 G's	16.28
	30 ms	11.00 - 16.00 G's	12.69
Max Pendulum G's Above 30 ms		22 G's Max	12.69
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	44.88
D Plane Rotation	Max	81 - 106 Deg	96.21
	Time	72 - 82 ms	77.75
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-49.68
	Time	65 - 79 ms	74.38
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	157.50
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	144.75

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number	245
Sequential Test Number	3
Date	9/4/01
Workfile	245301.th3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	71.0
Relative Humidity	10% - 70%	31.0
Pendulum Velocity	21.6 - 22.4 Ft/s	22.0
Maximum Deflection	2.50 - 2.86 in	2.70
Maximum Resistive Force	1160 - 1325 Lbs	1202.54
Internal Hysteresis	69 - 85 %	69.36

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number	245
Sequential Test Number	3
Date	5/5/01
Workfile	245301.lf / 245305.rf

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	66 - 78 Deg F	71.0
Relative Humidity	10% - 70%	32.0
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1065.62
RIGHT KNEE		
Temperature	66 - 78 Deg F	71.0
Relative Humidity	10% - 70%	32.0
Probe Velocity	6.8 - 7.0 Ft/s	7.0
Peak Knee Impact Force	1060 - 1300 Lbs	1069.31

Remarks:

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 245
Sequential Test Number 3
Date 9/4/01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			71
Relative Humidity			31
Location for Chest Circumference	AA	16.9 -17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.0
Waist Circumference	Z	32.9 - 34.1 in	33.6
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	6.0
Buttock Knee Length	K	22.8 - 23.8 in	23.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.5
Knee Pivot Height	M	19.1 - 19.7 in	19.2
Foot Length	P	9.9 - 10.5 in	10.2
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.6
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.2
Elbow Rest Height	J	7.5 - 8.3 in	8.0
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.2
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6

Remarks:

Laboratory Technician: B. Swiecicki

APPENDIX D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 150)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	AC-P16832	08/23/01	02/21/02
	Y	ENDEVCO	AC-P16591	08/23/01	02/21/02
	Z	ENDEVCO	AC-P16286	09/04/01	03/05/02
Head	X (R)	ENDEVCO	AC-P17141	08/23/01	02/21/02
	Y (R)	ENDEVCO	AC-P17242	08/23/01	02/21/02
	Z (R)	ENDEVCO	AC-P17265	08/23/01	02/21/02
Neck Load Cell	X	DENTON	LC-269FX	07/12/01	01/10/02
	Y	DENTON	LC-269FY	07/12/01	01/10/02
	Z	DENTON	LC-269FZ	07/12/01	01/10/02
Neck Moment	X	DENTON	LC-269MX	07/12/01	01/10/02
	Y	DENTON	LC-269MY	07/12/01	01/10/02
	Z	DENTON	LC-269MZ	07/12/01	01/10/02
Chest	X	ENDEVCO	AC-P17285	08/23/01	02/21/02
	Y	ENDEVCO	AC-P14393	08/23/01	02/21/02
	Z	ENDEVCO	AC-P17235	08/23/01	02/21/02
Chest	X (R)	ENDEVCO	AC-P16863	08/23/01	02/21/02
	Y (R)	ENDEVCO	AC-P17248	08/23/01	02/21/02
	Z (R)	ENDEVCO	AC-P17283	08/23/01	02/21/02
Chest Deflection Gauge		SERVO	DS-150	08/23/01	02/21/02
Pelvic	X	ENDEVCO	AC-J30041	08/23/01	02/21/02
	Y	ENDEVCO	AC-P13355	08/23/01	02/21/02
	Z	ENDEVCO	AC-P13329	08/23/01	02/21/02

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 150)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell		GSE	LC-418	07/24/01	01/22/02
Right Femur Load Cell		GSE	LC-419	07/24/01	01/22/02
Left Upper Tibia	Mx	DENTON	LC-045MX	09/05/01	03/06/02
	My	DENTON	LC-045MY	09/05/01	03/06/02
Left Lower Tibia	Fz	DENTON	LC-125FZ	09/05/01	03/06/02
	Mx	DENTON	LC-125MX	09/05/01	03/06/02
	My	DENTON	LC-125MY	09/05/01	03/06/02
Right Upper Tibia	Mx	DENTON	LC-038MX	09/05/01	03/06/02
	My	DENTON	LC-038MY	09/05/01	03/06/02
Right Lower Tibia	Fz	DENTON	LC-124FZ	09/05/01	03/06/02
	Mx	DENTON	LC-124MX	09/05/01	03/06/02
	My	DENTON	LC-124MY	09/05/01	03/06/02
Left Foot Rear	X	ENDEVCO	AC-P19343	08/27/01	02/25/02
	Z	ENDEVCO	AC-P16583	08/27/01	02/25/02
Left Foot Front	Z	ENDEVCO	AC-P18728	08/27/01	02/25/02
Right Foot Rear	X	ENDEVCO	AC-P18628	08/27/01	02/25/02
	Z	ENDEVCO	AC-P18741	08/27/01	02/25/02
Right Foot Front	Z	ENDEVCO	AC-P16587	08/27/01	02/25/02
Lap Belt Load Cells		-	-	-	-
Shoulder Belt Load Cells		-	-	-	-
Spool-Out Potentiometer		-	-	-	-
Belt Stretch Transducer		-	-	-	-

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 245)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	AC-J32184	08/22/01	02/20/02
	Y	ENDEVCO	AC-J32185	08/22/01	02/20/02
	Z	ENDEVCO	AC-J31011	08/22/01	02/20/02
Head	X (R)	ENDEVCO	AC-J31020	08/24/01	02/22/02
	Y (R)	ENDEVCO	AC-J31101	08/22/01	02/20/02
	Z (R)	ENDEVCO	AC-J31059	08/22/01	02/20/02
Neck Load Cell	X	DENTON	LC-076FX	07/12/01	01/10/02
	Y	DENTON	LC-076FY	07/12/01	01/10/02
	Z	DENTON	LC-076FZ	07/12/01	01/10/02
Neck Moment	X	DENTON	LC-076MX	07/12/01	01/10/02
	Y	DENTON	LC-076MY	07/12/01	01/10/02
	Z	DENTON	LC-076MZ	07/12/01	01/10/02
Chest	X	ENDEVCO	AC-J34019	08/22/01	02/20/02
	Y	ENDEVCO	AC-J33018	08/22/01	02/20/02
	Z	ENDEVCO	AC-J32783	08/22/01	02/20/02
Chest	X (R)	ENDEVCO	AC-J31066	08/22/01	02/20/02
	Y (R)	ENDEVCO	AC-P16979	08/22/01	02/20/02
	Z (R)	ENDEVCO	AC-J31022	08/22/01	02/20/02
Chest Deflection Gauge		SERVO	DS-245	08/22/01	02/20/02
Pelvic	X	ENDEVCO	AC-J31034	08/22/01	02/20/02
	Y	ENDEVCO	AC-P17258	08/22/01	02/20/02
	Z	ENDEVCO	AC-J31010	08/22/01	02/20/02

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 245)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell		GSE	LC-551	07/24/01	01/22/02
Right Femur Load Cell		GSE	LC-951	07/24/01	01/22/02
Left Upper Tibia	Mx	DENTON	LC-016MX	09/05/01	03/06/02
	My	DENTON	LC-016MY	09/05/01	03/06/02
Left Lower Tibia	Fz	DENTON	LC-123FZ	09/05/01	03/06/02
	Mx	DENTON	LC-123MX	09/05/01	03/06/02
	My	DENTON	LC-123MY	09/05/01	03/06/02
Right Upper Tibia	Mx	DENTON	LC-023MX	09/05/01	03/06/02
	My	DENTON	LC-023MY	09/05/01	03/06/02
Right Lower Tibia	Fz	DENTON	LC-111FZ	09/05/01	03/06/02
	Mx	DENTON	LC-111MX	09/05/01	03/06/02
	My	DENTON	LC-111MY	09/05/01	03/06/02
Left Foot Rear	X	ENDEVCO	AC-J30491	08/28/01	02/26/02
	Z	ENDEVCO	AC-J31026	08/28/01	02/26/02
Left Foot Front	Z	ENDEVCO	AC-J32831	08/28/01	02/26/02
Right Foot Rear	X	ENDEVCO	AC-J33376	08/28/01	02/26/02
	Z	ENDEVCO	AC-J32832	08/28/01	02/26/02
Right Foot Front	Z	ENDEVCO	AC-J31095	08/28/01	02/26/02
Lap Belt Load Cells		-	-	-	-
Shoulder Belt Load Cells		-	-	-	-
Spool-Out Potentiometer		-	-	-	-
Belt Stretch Transducer		-	-	-	-

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember	ICS	AC-D40	04/18/01	10/17/01
Right Rear Seat Crossmember	ICS	AC-D32	08/15/01	02/13/02
Top of Engine	ENDEVCO	AC-A13883	08/29/01	02/27/02
Bottom of Engine	ENDEVCO	AC-J18400	08/27/01	02/25/02
Right Disc Brake Caliper	ENDEVCO	AC-J32965	08/16/01	02/14/02
Instrument Panel	ENDEVCO	AC-AP1A2	08/29/01	02/27/02
Left Disc Brake Caliper	ENDEVCO	AC-J31058	08/29/01	02/27/02
Left Seat Rear Crossmember (R)	ICS	AC-D88	04/18/01	10/17/01
Right Seat Rear Crossmember (R)	ICS	AC-D41	04/18/01	10/17/01