

REPORT NUMBER: CAL-01-05

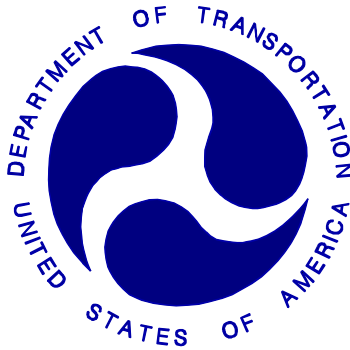
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**FORD MOTOR CORP.
2001 FORD RANGER
PICKUP**

NHTSA NUMBER: M10207

VERIDIAN TEST NUMBER: 8602-5

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



December 6, 2000

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
400 Seventh Street, SW, Room No. 5313
Washington, DC 20590



NCAP Frontal Barrier Impact Test Data Summary

Vehicle: 2001 Ford Ranger Pickup
 NHTSA No: M10207
 Test Date: December 6, 2000
 Test Speed: 57.1 kph

Vehicle Test Weight

Weight as Delivered: = 1551 kg
 Weight as Tested: = 1832 kg

Injury Criteria:

ATD Position	HIC	Clip (g's)	Chest Disp (mm)	Left Femur (N)	Right Femur (N)
Driver (245)	579.1	54.3	39.1	4373.5	6773
Passenger (150)	500.5	47.4	32.5	2193.5	3991.7

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

Vehicle Year/Make/Model/Body Style: 2001 Ford Ranger Pickup

NHTSA Test No.: M10207 Test Date: December 6, 2000

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head X	g	17.3	227.6	-55.4	78.8	8.1	262.4	-50.4	78.6
Head Y	g	5.0	86.1	-5.4	73.0	7.0	54.8	-6.5	96.5
Head Z	g	23.9	62.3	-10.1	115.2	40.8	80.2	-6.4	120.2
Head Resultant	g	59.2	77.3	0.1	27.2	64.6	80.7	0.1	-49.7
Redundant Head X	g	17.5	220.2	-55.8	76.6	8.3	262.3	-51.0	78.5
Redundant Head Y	g	5.0	85.5	-5.2	73.0	6.9	54.6	-6.2	96.9
Redundant Head Z	g	24.4	61.8	-10.4	115.4	41.2	80.2	-6.2	120.2
Redundant Head Resultant	g	60.0	76.6	0.1	16.7	64.7	80.3	0.1	-46.5
Upper Neck Fx	N	387.9	81.1	-444.3	148.4	283.7	88.0	-790.0	150.8
Upper Neck Fy	N	204.6	84.8	-72.7	135.4	175.9	73.8	-137.6	169.5
Upper Neck Fz	N	2022.8	70.9	-486.7	118.3	1772.0	77.7	-255.9	119.5
Upper Neck F Resultant	N	2031.6	70.9	2.8	18.7	1778.7	77.7	2.8	-47.3
Upper Neck Mx	N-m	7.8	230.2	-25.5	82.9	16.9	41.2	-9.5	87.0
Upper Neck My	N-m	38.9	162.2	-18.2	251.0	56.8	157.1	-25.9	280.4
Upper Neck Mz	N-m	5.5	233.5	-7.1	115.0	26.9	91.7	-9.2	148.0
Upper Neck M Resultant	N-m	39.0	162.2	0.5	-50.0	57.4	157.0	0.2	-49.5
Chest X	g	5.9	166.0	-51.6	82.0	2.6	173.7	-48.5	72.9
Chest Y	g	2.3	113.1	-6.2	44.3	8.1	94.6	-4.1	137.8
Chest Z	g	23.5	82.2	-12.6	119.7	24.3	79.6	-17.8	127.9
Chest Resultant	g	56.6	82.1	0.1	-47.6	49.3	73.0	0.0	-48.6
Redundant Chest X	g	6.0	165.9	-51.9	82.1	2.5	167.3	-48.6	72.9
Redundant Chest Y	g	2.4	123.1	-5.9	45.6	7.9	94.6	-4.1	138.0
Redundant Chest Z	g	23.3	82.1	-12.6	119.7	23.7	79.6	-17.9	127.8
Redundant Chest Resultant	g	56.9	82.1	0.1	-49.2	49.4	73.0	0.0	-49.4
Chest Displacement	mm	0.0	-15.1	-39.1	84.0	0.0	-32.3	-32.5	81.6

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

Vehicle Year/Make/Model/Body Style: 2001 Ford Ranger Pickup

NHTSA Test No.: M10207 Test Date: December 6, 2000

DESCRIPTION	Unit	MAXIMUM VALUE							
		Driver				Passenger			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Pelvic X	g	4.8	156.0	-68.9	45.0	6.2	135.8	-52.8	61.3
Pelvic Y	g	7.1	112.8	-13.6	44.7	12.4	69.8	-8.3	45.9
Pelvic Z	g	6.0	83.7	-16.6	118.2	2.6	89.2	-20.1	117.7
Pelvic Resultant	g	70.0	45.0	0.0	-42.3	53.3	61.3	0.0	-43.6
Left Femur	N	327.4	30.6	-4373.5	49.9	725.4	103.3	-2193.5	49.0
Right Femur	N	250.3	28.3	-6773.0	44.8	353.9	30.6	-3991.7	49.9
Left Upper Tibia Mx	N-m	40.4	74.1	-28.5	170.9	11.9	174.6	-49.5	64.1
Left Upper Tibia My	N-m	22.2	158.7	-136.8	42.9	10.9	113.6	-109.4	34.1
Left Lower Tibia Fz	N	228.5	69.5	-3351.4	41.8	547.1	52.9	-4447.7	101.6
Left Lower Tibia Mx	N-m	12.7	43.3	-8.3	79.0	27.3	103.6	-17.2	64.5
Left Lower Tibia My	N-m	31.8	93.1	-26.8	35.7	62.5	102.2	-53.1	34.5
Right Upper Tibia Mx	N-m	19.3	51.3	-24.8	86.6	14.2	208.2	-47.4	99.0
Right Upper Tibia My	N-m	89.3	71.9	-204.4	48.2	33.8	78.6	-121.1	39.4
Right Lower Tibia Fz	N	214.4	155.4	-5134.6	48.3	233.3	76.9	-3409.2	95.9
Right Lower Tibia Mx	N-m	10.0	38.0	-94.2	48.8	11.7	52.7	-16.5	96.3
Right Lower Tibia My	N-m	131.6	97.6	-37.6	34.7	49.7	95.7	-56.4	38.9
Left Foot Aft Ax	g	40.6	94.9	-84.8	41.3	58.8	102.8	-132.1	33.5
Left Foot Aft Az	g	16.6	48.5	-42.6	69.2	18.1	48.7	-82.5	101.1
Left Foot Fore Az	g	56.3	49.6	-94.5	53.3	94.6	49.0	-98.2	51.6
Right Foot Aft Ax	g	43.4	96.9	-152.1	47.0	53.3	96.5	-127.5	37.3
Right Foot Aft Az	g	6.8	49.0	-149.8	46.4	23.1	110.6	-51.5	95.2
Right Foot Fore Az	g	285.4	49.0	-270.7	45.9	55.0	48.4	-67.3	37.3
Lap Belt Load	N	4697.1	73.2	-6.2	11.7	5822.1	64.5	-35.3	248.9
Torso Belt	N	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

APPENDIX B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

NCAP 2001 Test 5 - 2001 Ford Ranger

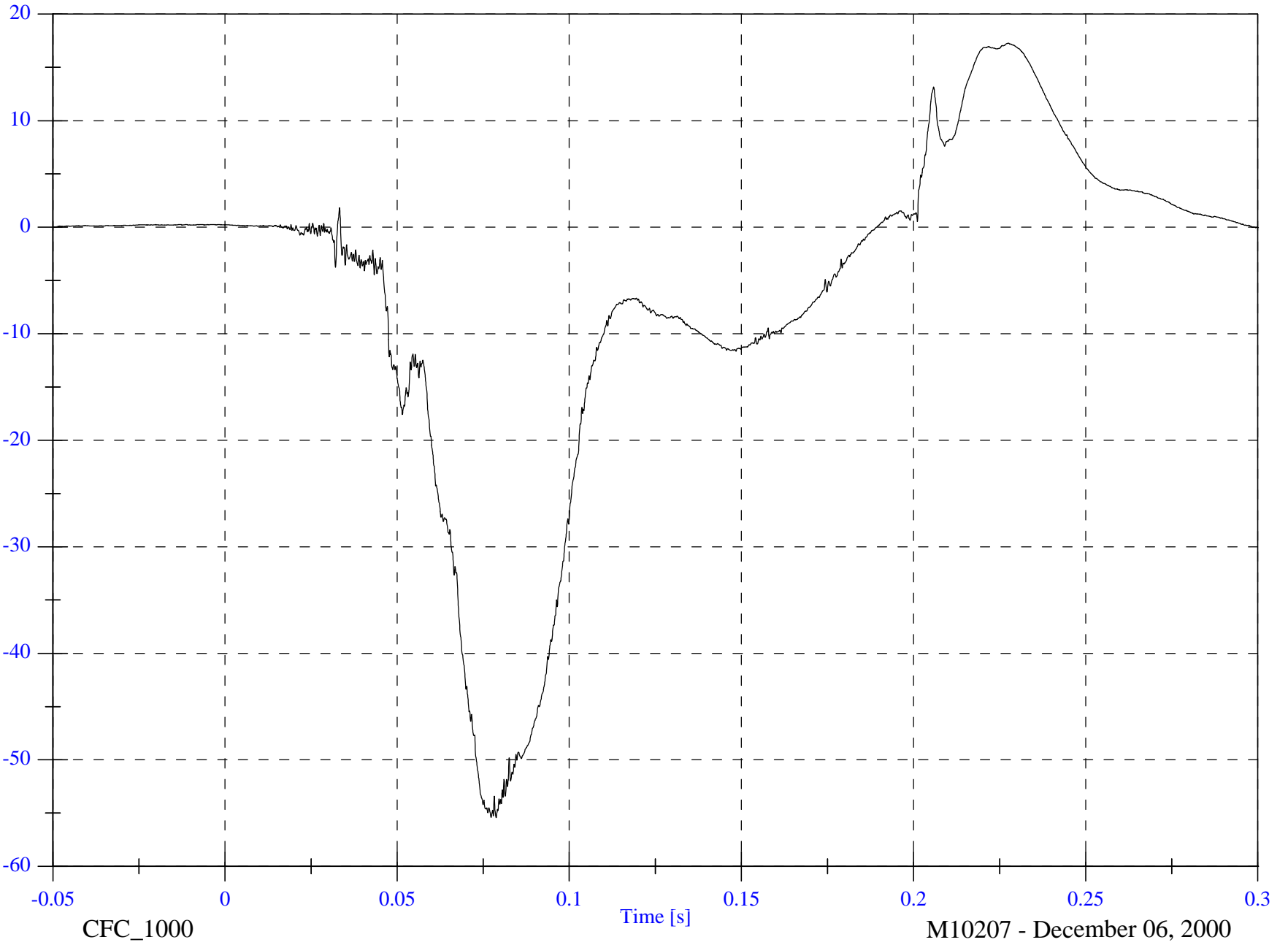
P1 Head x

Max: 17.3 [g] at 0.228 [s]

Min: -55.4 [g] at 0.079 [s]

B-4

g



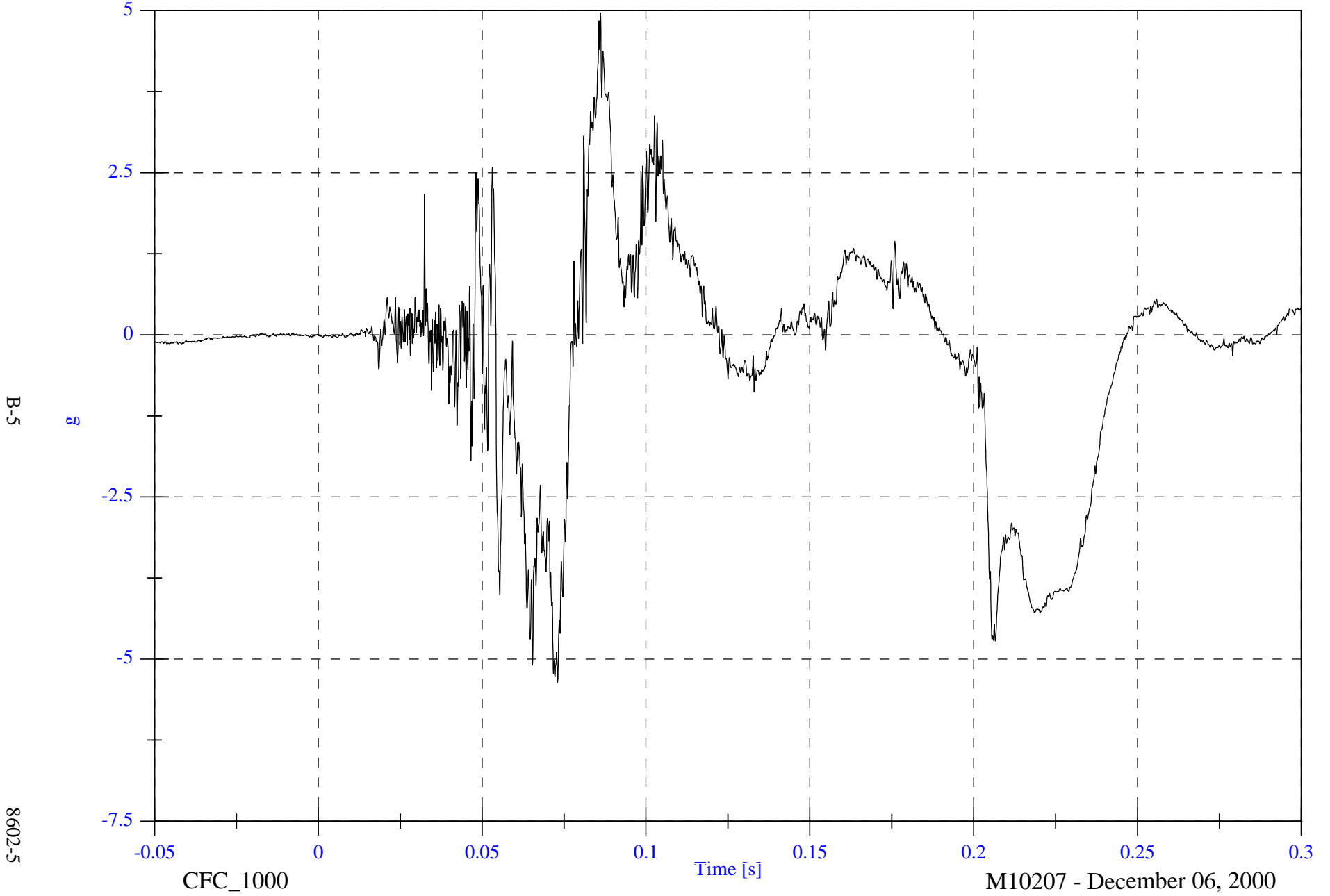
8602-5

NCAP 2001 Test 5 - 2001 Ford Ranger

Max: 5.0 [g] at 0.086 [s]

Min: -5.4 [g] at 0.073 [s]

P1 Head y



B-5

g

8602-5

CFC_1000

Time [s]

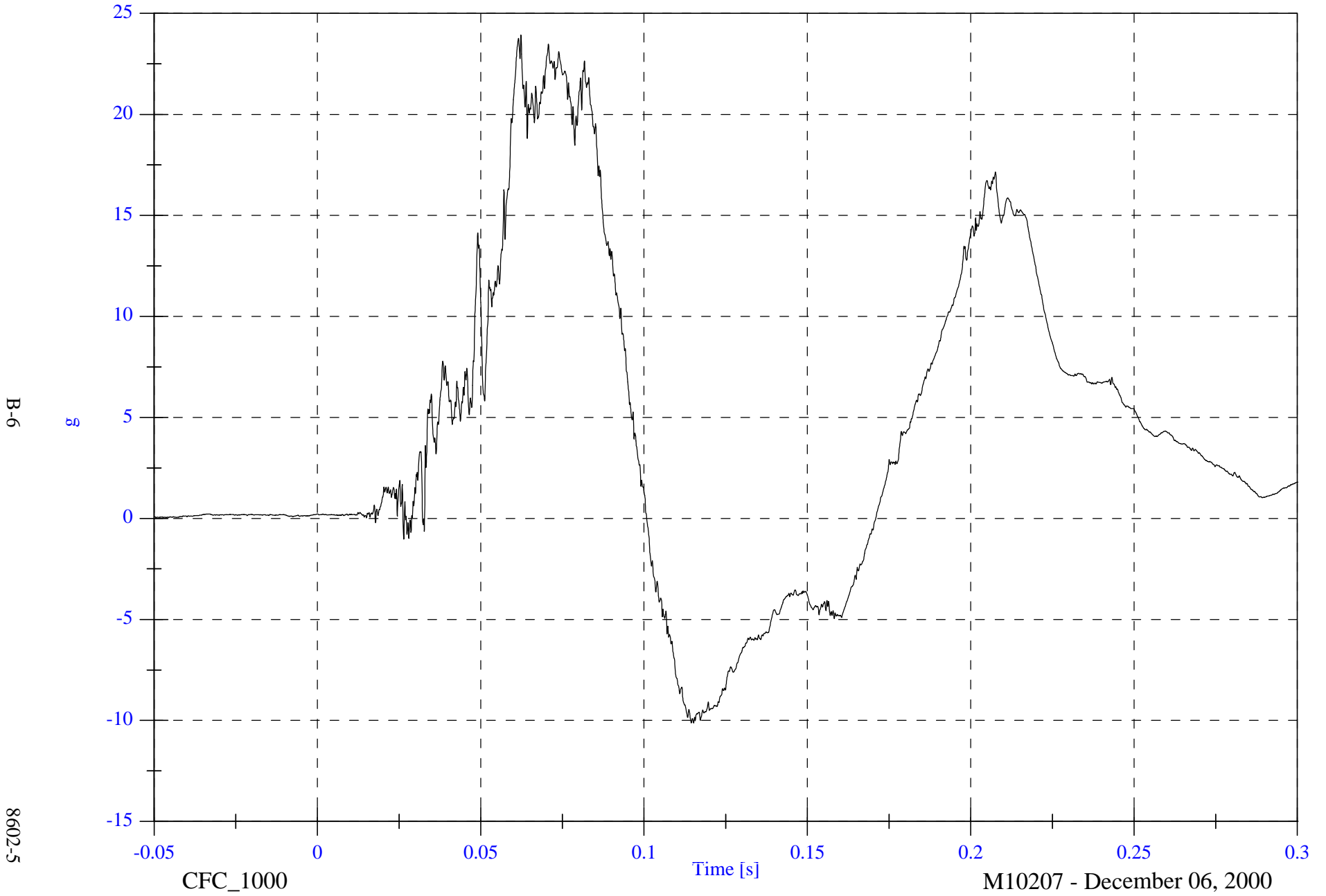
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Head z

Max: 23.9 [g] at 0.062 [s]

Min: -10.1 [g] at 0.115 [s]



B-6

g

8602-5

CFC_1000

Time [s]

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

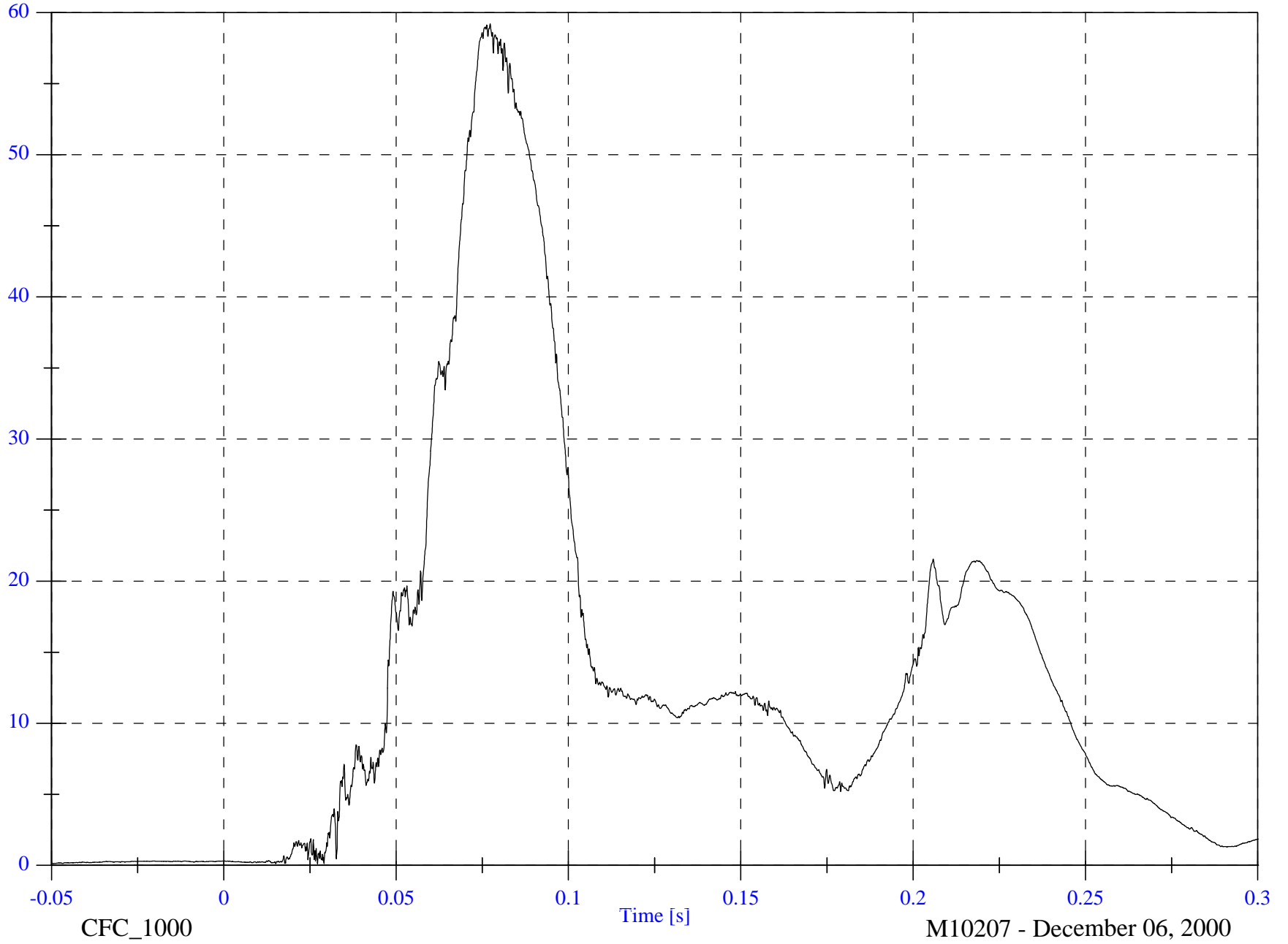
P1 Head Resultant

Max: 59.2 [g] at 0.077 [s]

Min: 0.1 [g] at 0.027 [s]

B-7

g



8602-5

CFC_1000

Time [s]

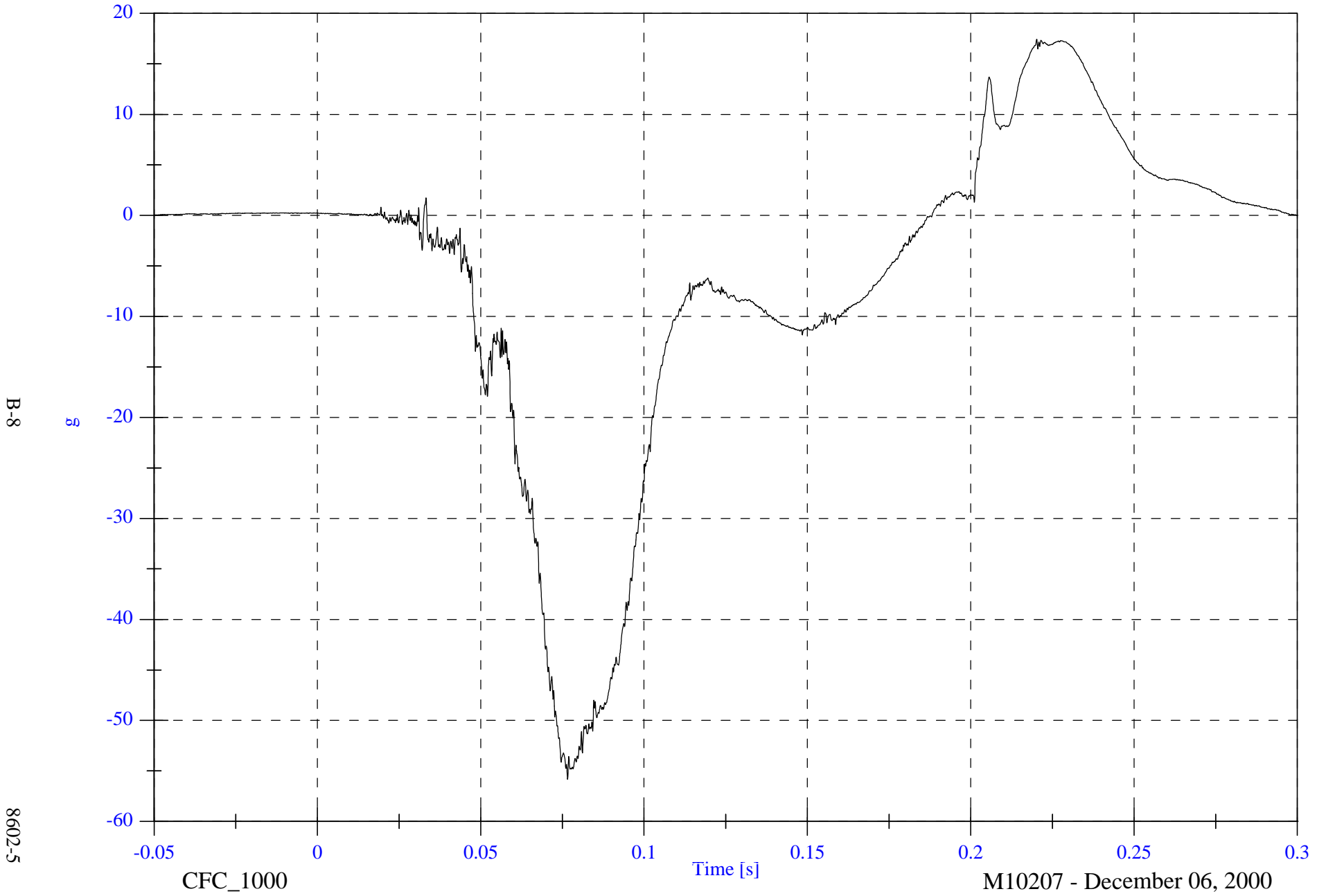
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Head Red x

Max: 17.5 [g] at 0.220 [s]

Min: -55.8 [g] at 0.077 [s]



B-8

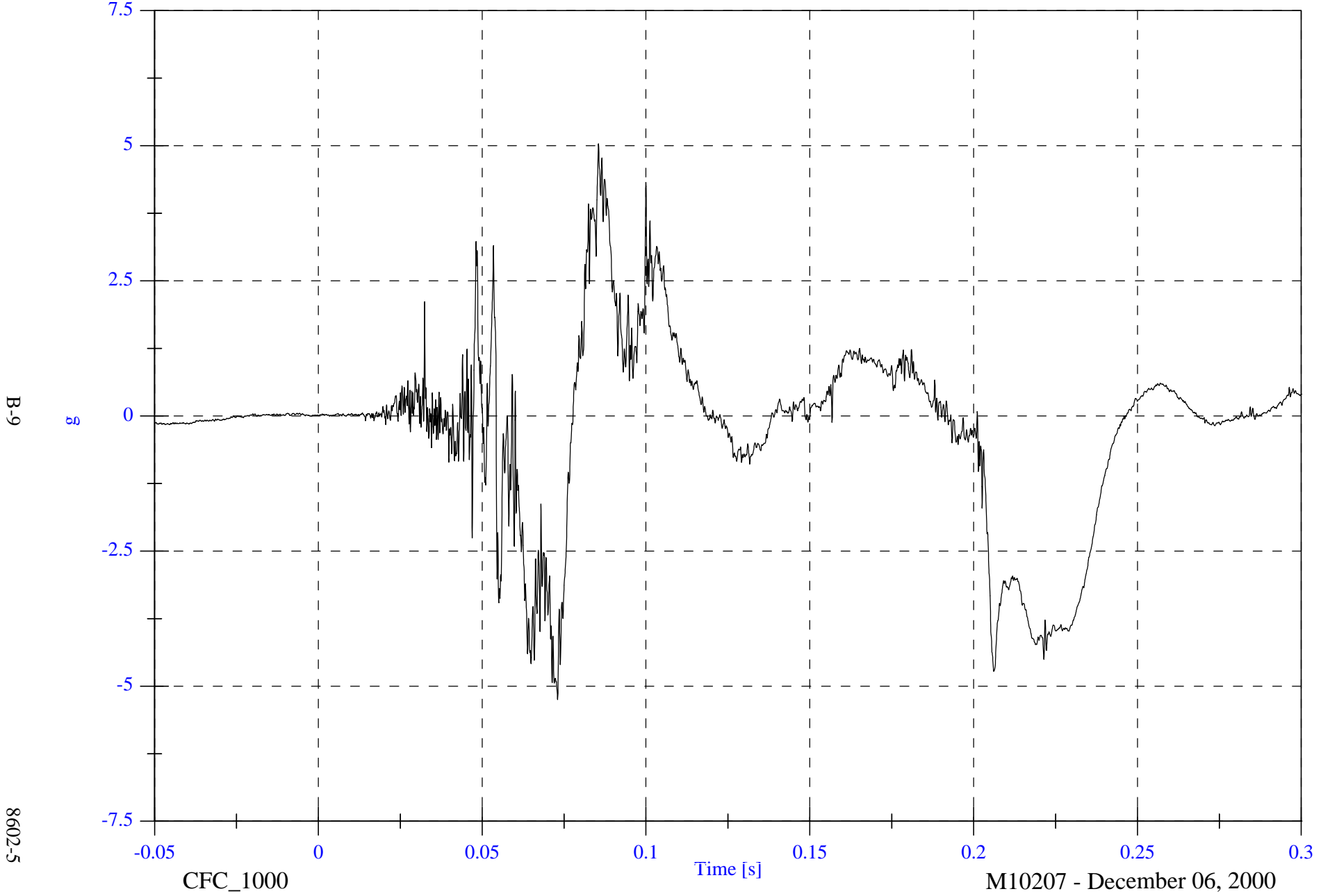
8602-5

NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Head Red y

Max: 5.0 [g] at 0.086 [s]

Min: -5.2 [g] at 0.073 [s]

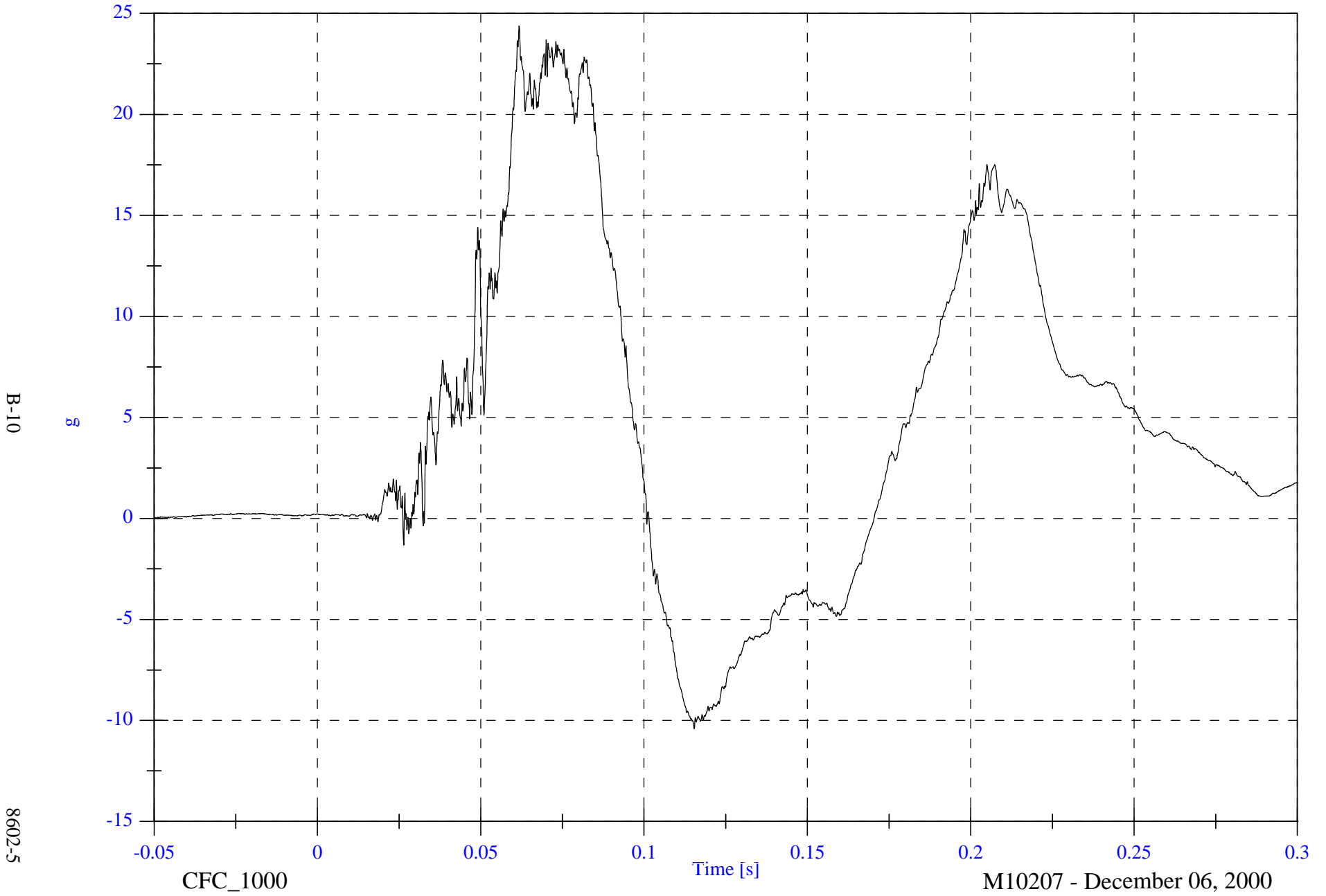


NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Head Red z

Max: 24.4 [g] at 0.062 [s]

Min: -10.4 [g] at 0.115 [s]



B-10

8602-5

CFC_1000

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

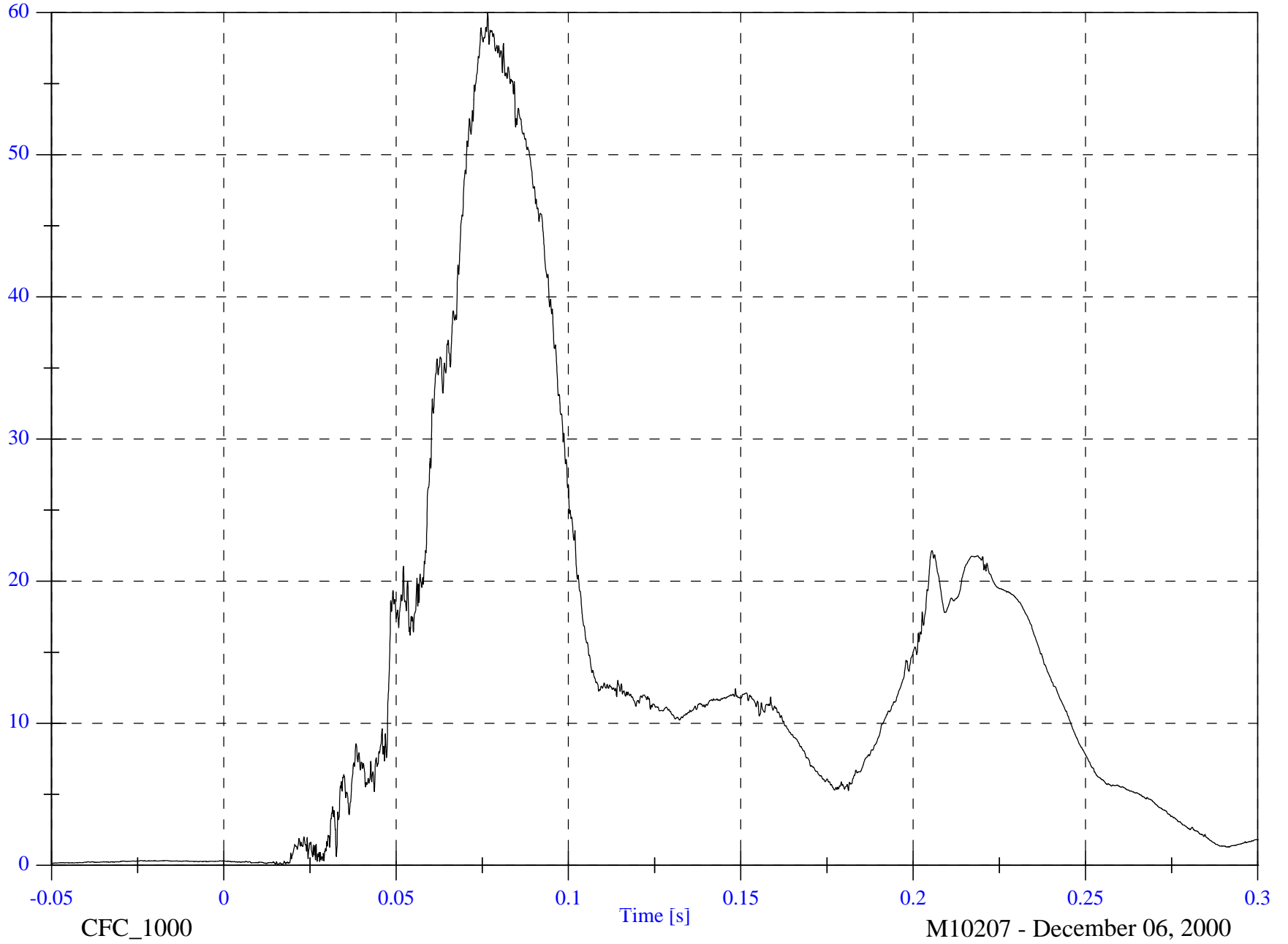
P1 Head Red Resultant

Max: 60.0 [g] at 0.077 [s]

Min: 0.1 [g] at 0.017 [s]

B-11

g



8602-5

CFC_1000

Time [s]

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Chest x

Max: 5.9 [g] at 0.166 [s]

Min: -51.6 [g] at 0.082 [s]



B-20

g

8602-5

CFC_180

Time [s]

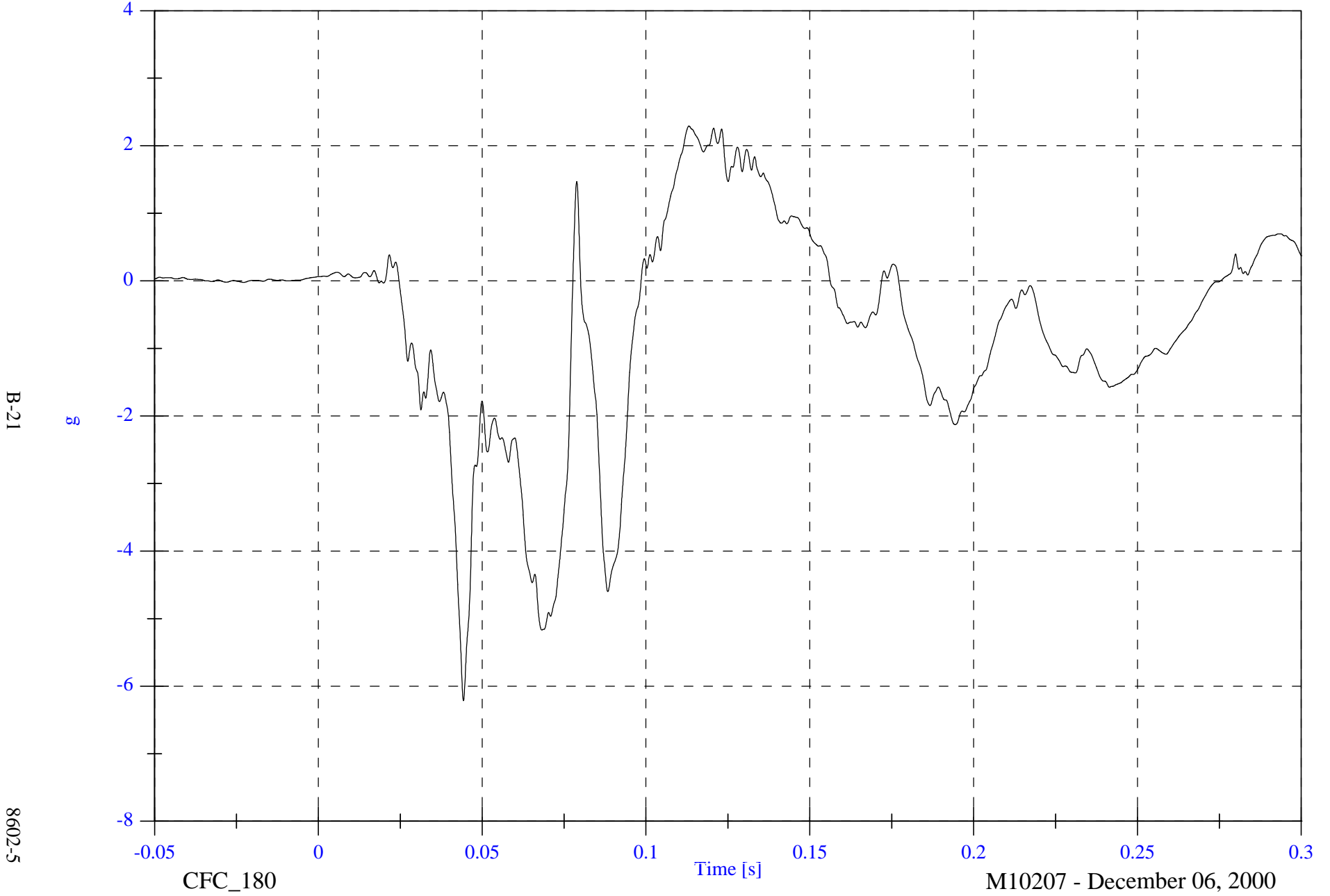
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

Max: 2.3 [g] at 0.113 [s]

Min: -6.2 [g] at 0.044 [s]

P1 Chest y



NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Chest z

Max: 23.5 [g] at 0.082 [s]

Min: -12.6 [g] at 0.120 [s]

B-22

g

8602-5



CFC_180

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Chest Resultant

Max: 56.6 [g] at 0.082 [s]

Min: 0.1 [g] at -0.048 [s]

B-23

8602-5



NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Chest Red x

Max: 6.0 [g] at 0.166 [s]

Min: -51.9 [g] at 0.082 [s]



B-24

g

8602-5

CFC_180

Time [s]

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

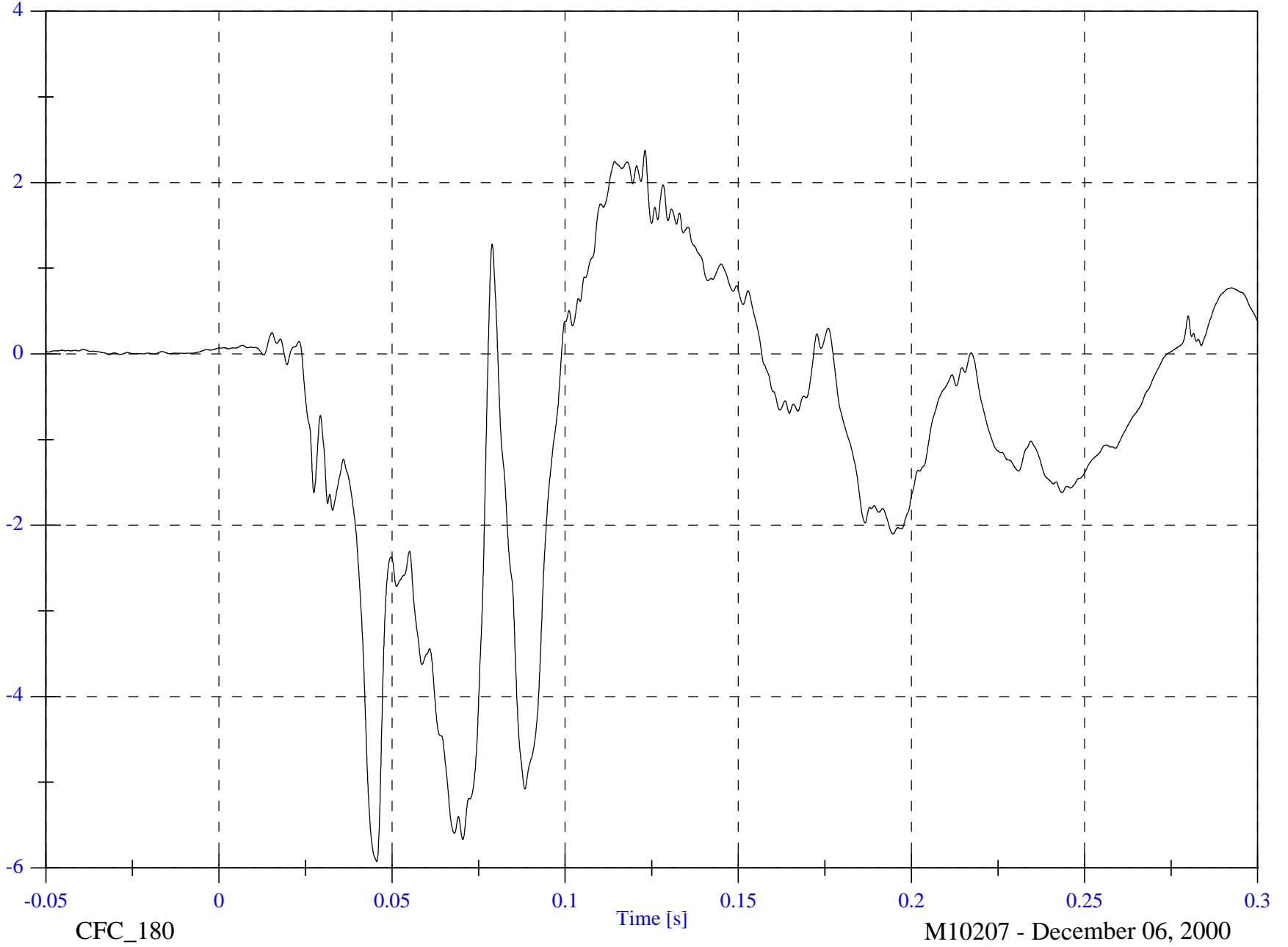
P1 Chest Red y

Max: 2.4 [g] at 0.123 [s]

Min: -5.9 [g] at 0.046 [s]

B-25

g



8602-5

CFC_180

Time [s]

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Chest Red z

Max: 23.3 [g] at 0.082 [s]

Min: -12.6 [g] at 0.120 [s]

B-26

g



8602-5

CFC_180

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Chest Red Resultant

Max: 56.9 [g] at 0.082 [s]

Min: 0.1 [g] at -0.049 [s]

B-27

8602-5



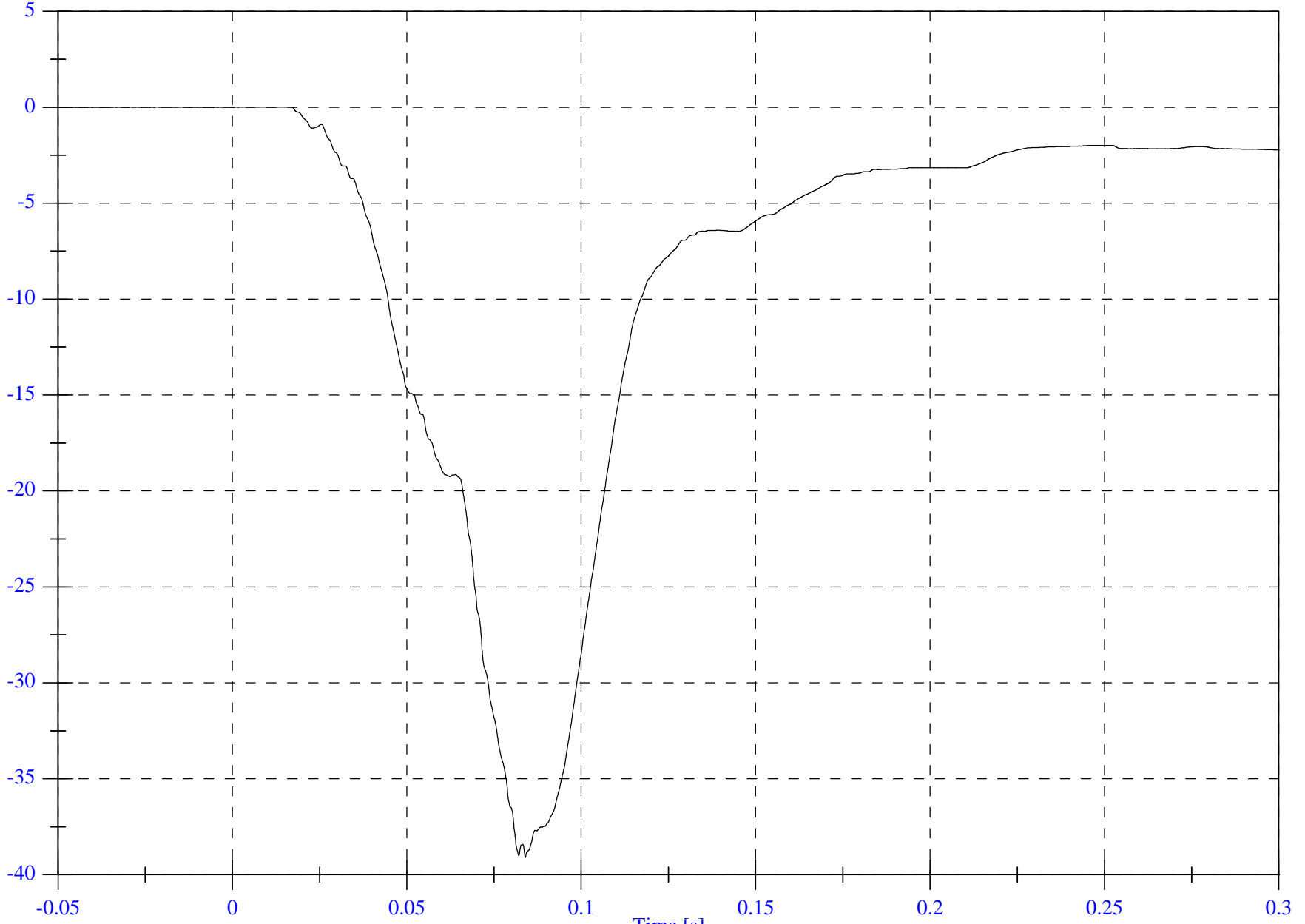
P1 Chest Compression

Max: 0.0 [mm] at -0.015 [s]

Min: -39.1 [mm] at 0.084 [s]

B-28

mm



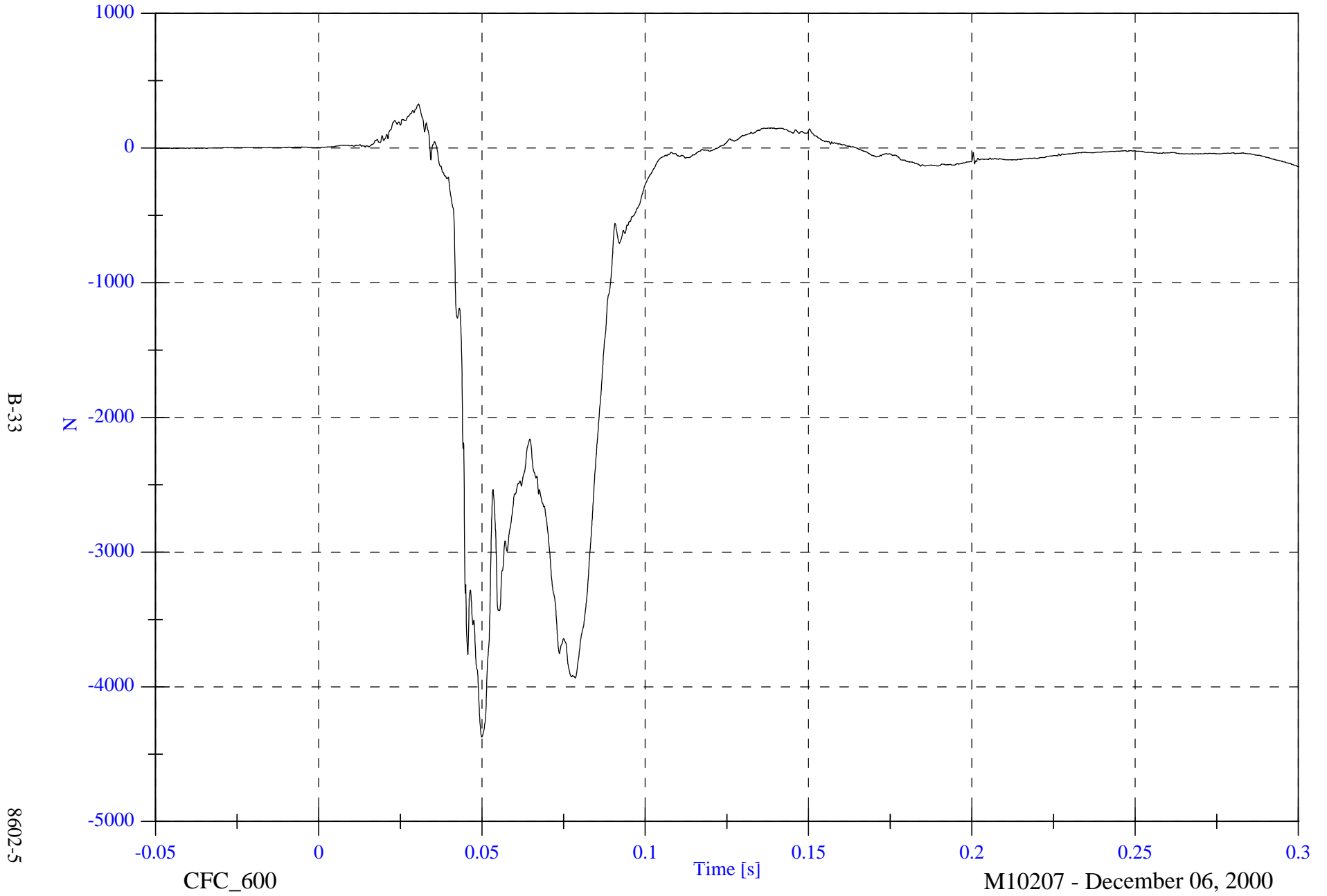
8602-5

NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Left Femur

Max: 327.4 [N] at 0.031 [s]

Min: -4373.5 [N] at 0.050 [s]



B-33

8602-5

CFC_600

Time [s]

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P1 Right Femur

Max: 250.3 [N] at 0.028 [s]

Min: -6773.0 [N] at 0.045 [s]



B-34

8602-5

CFC_600

Time [s]

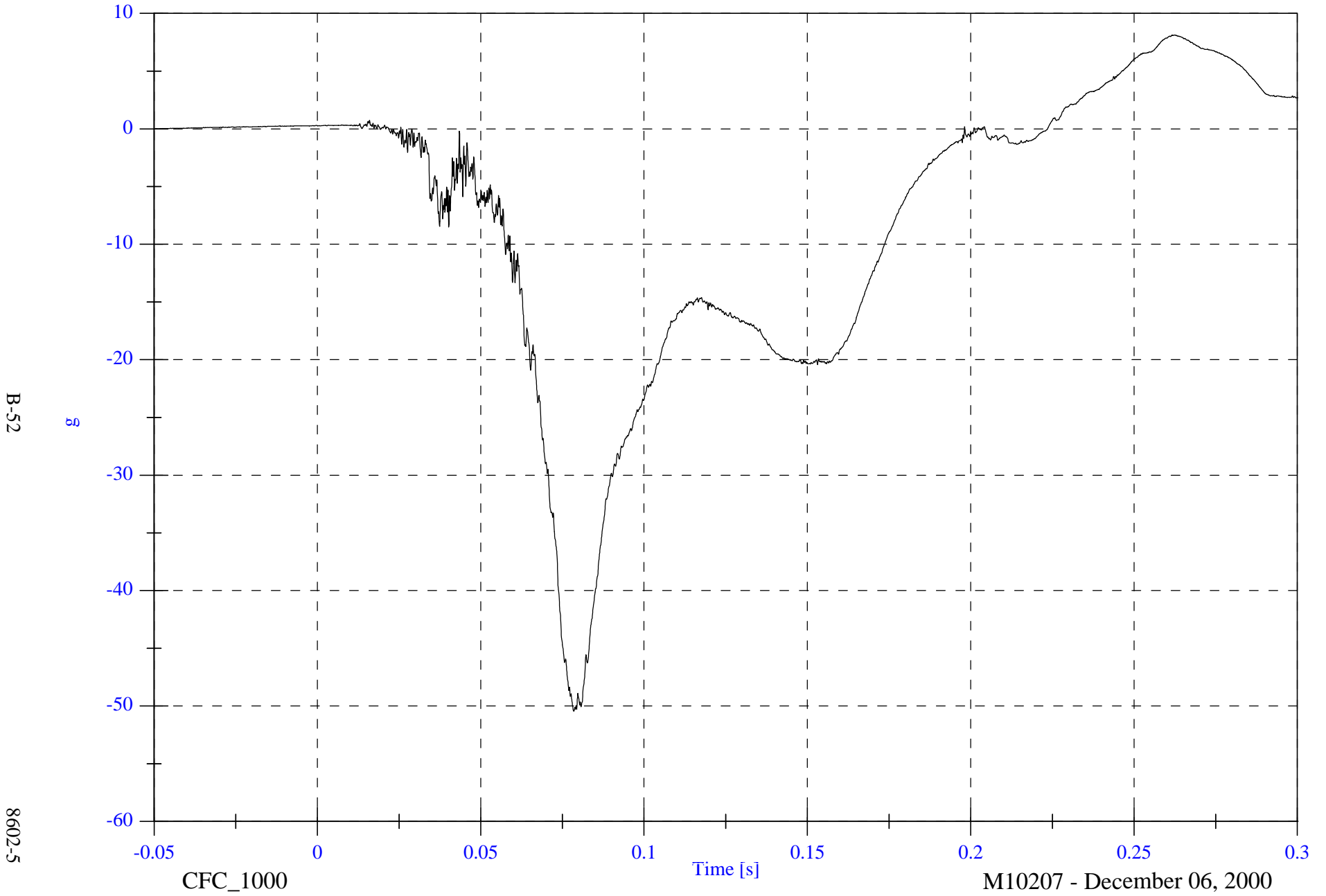
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Head x

Max: 8.1 [g] at 0.262 [s]

Min: -50.4 [g] at 0.079 [s]



B-52

g

8602-5

CFC_1000

Time [s]

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

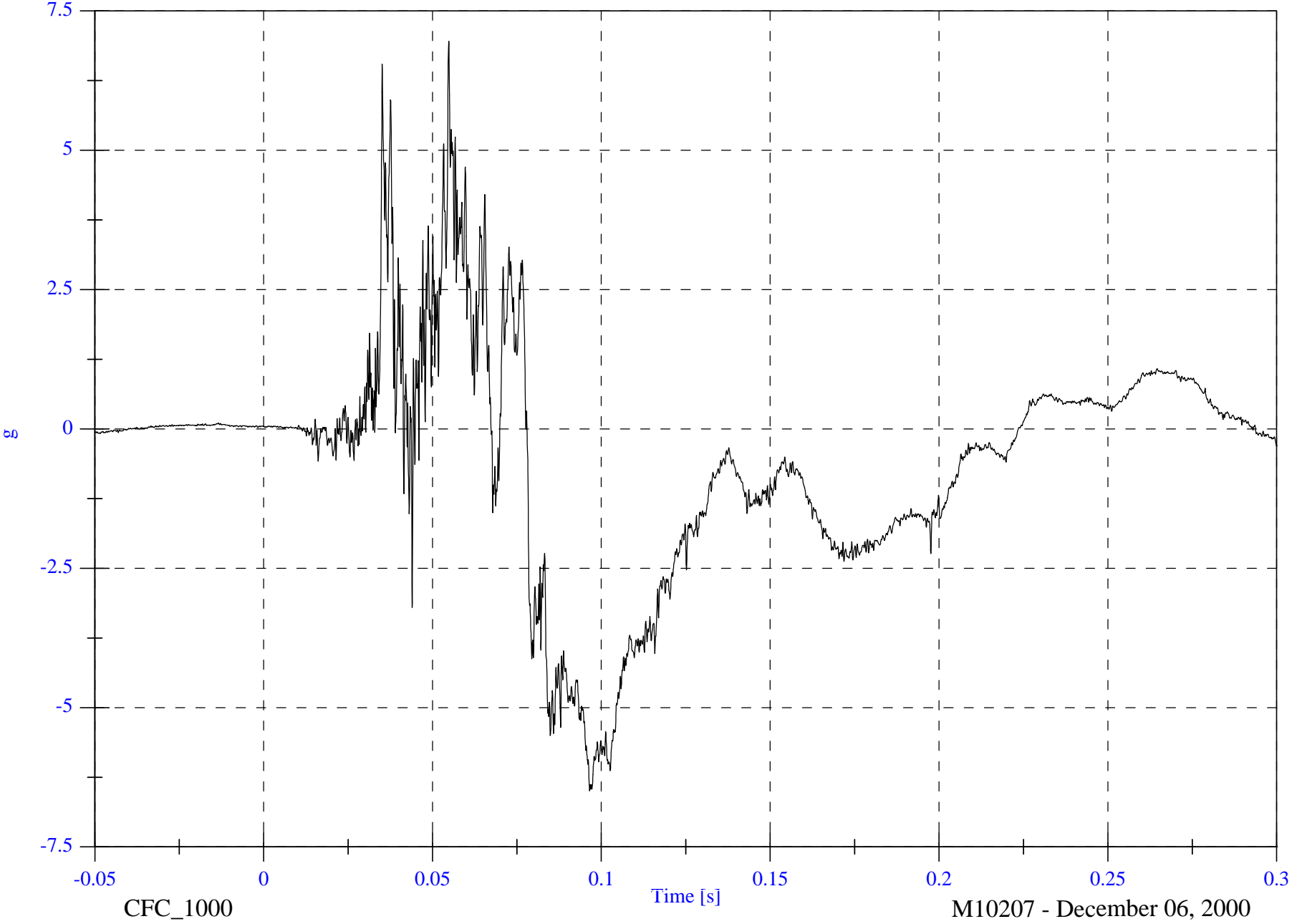
P2 Head y

Max: 7.0 [g] at 0.055 [s]

Min: -6.5 [g] at 0.097 [s]

B-53

8602-5



CFC_1000

Time [s]

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Head z

Max: 40.8 [g] at 0.080 [s]

Min: -6.4 [g] at 0.120 [s]

B-54

8602-5

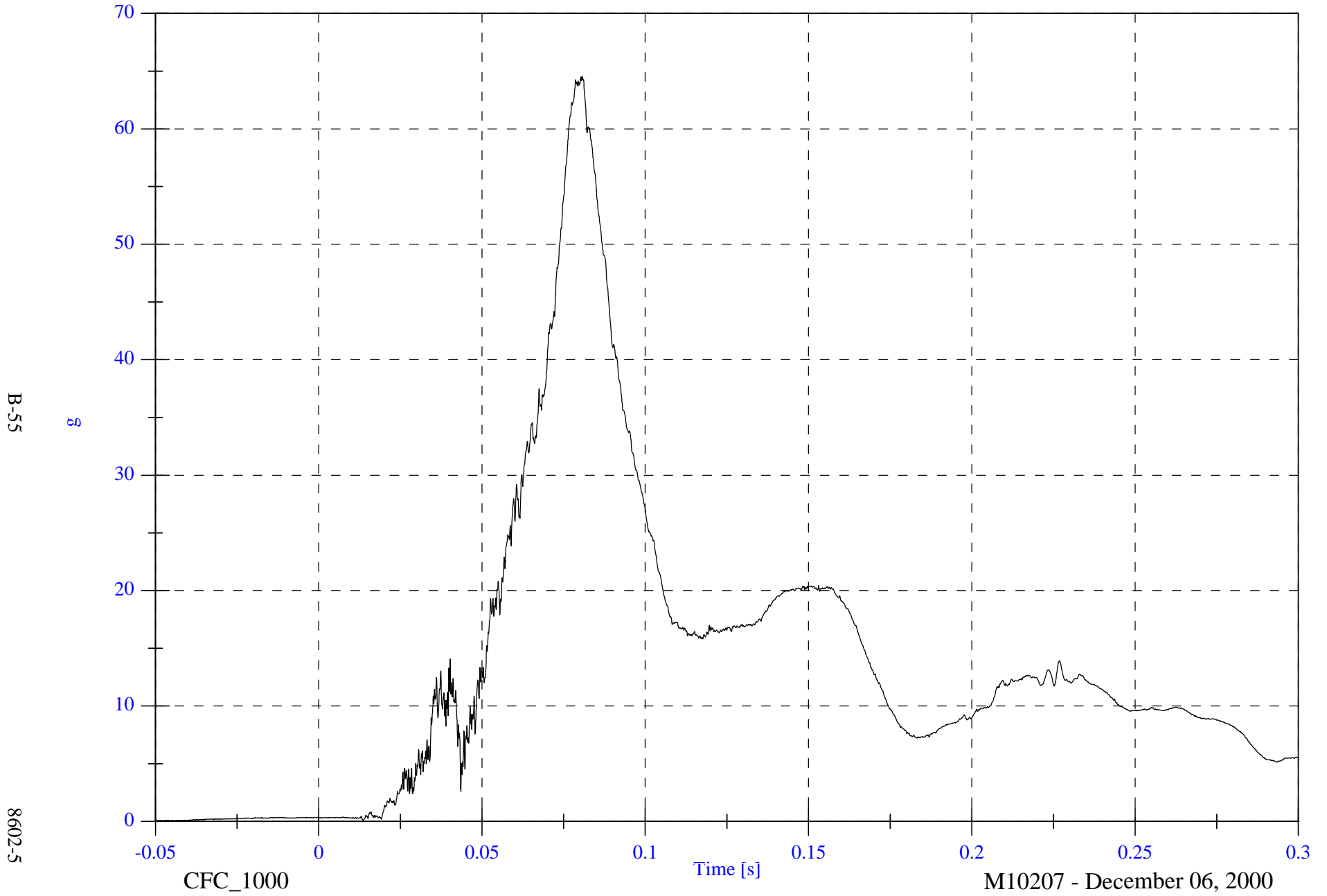


NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Head Resultant

Max: 64.6 [g] at 0.081 [s]

Min: 0.1 [g] at -0.050 [s]

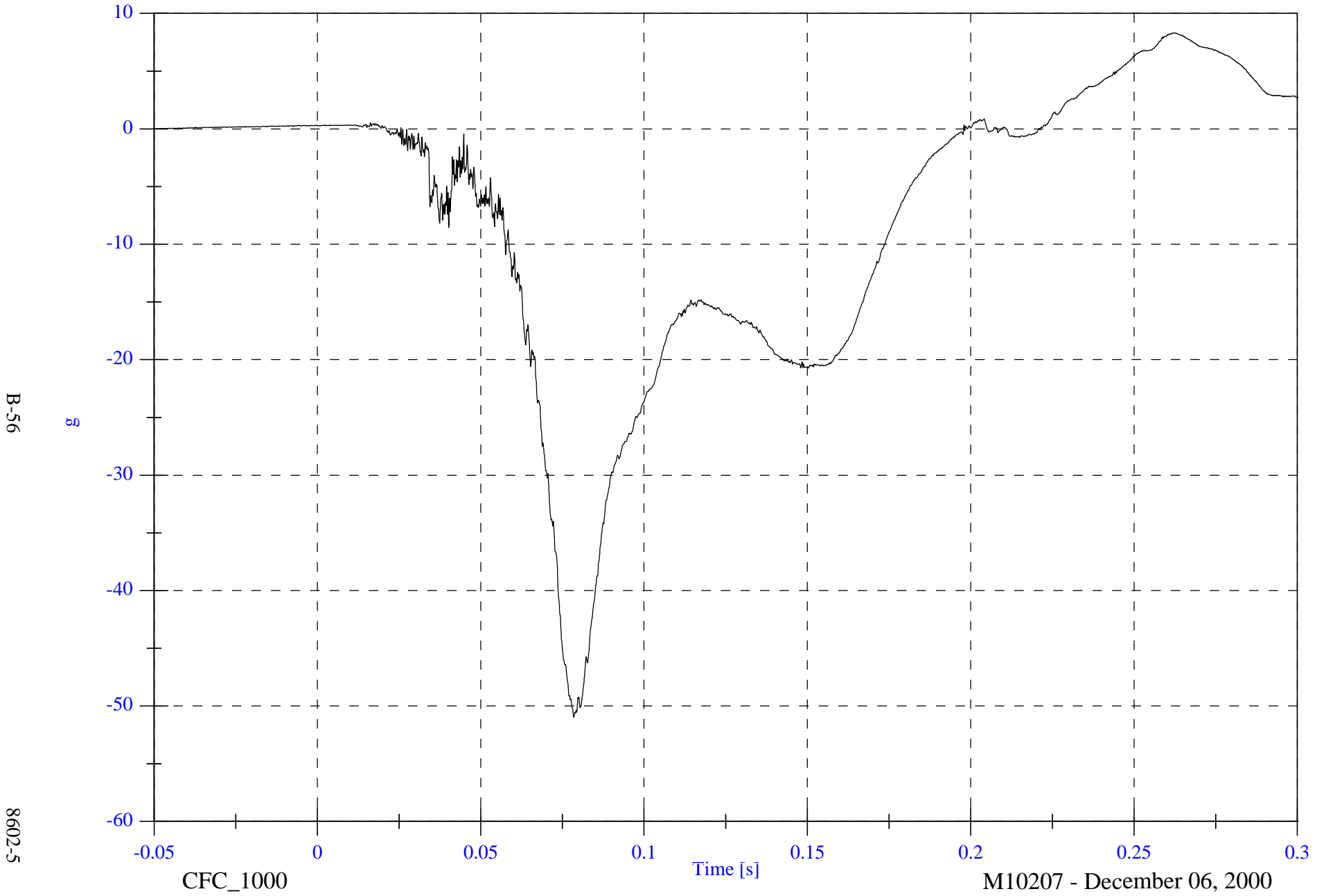


NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Head Red x

Max: 8.3 [g] at 0.262 [s]

Min: -51.0 [g] at 0.078 [s]



B-56

g

8602-5

CFC_1000

Time [s]

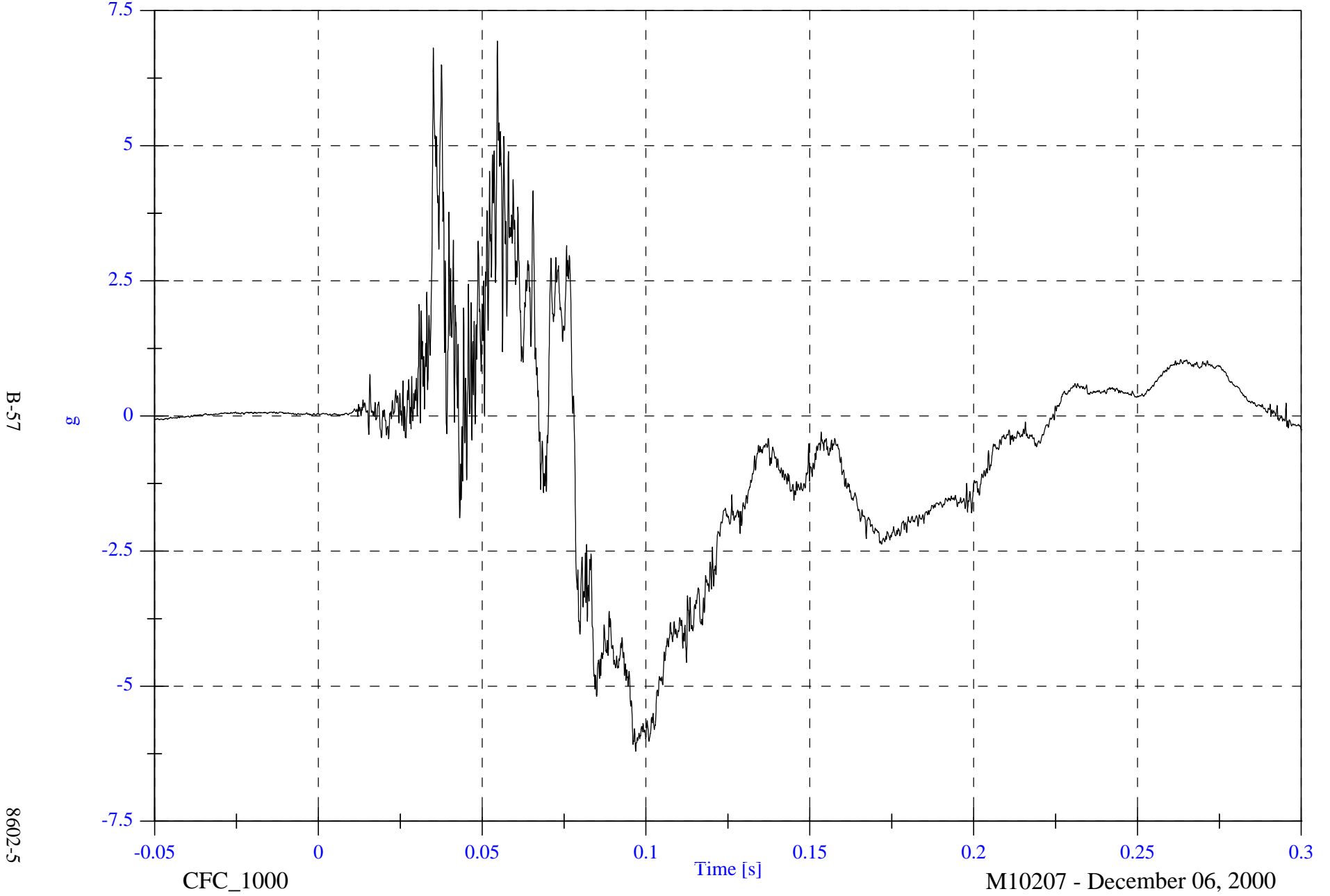
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Head Red y

Max: 6.9 [g] at 0.055 [s]

Min: -6.2 [g] at 0.097 [s]



B-57

8602-5

CFC_1000

Time [s]

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Head Red z

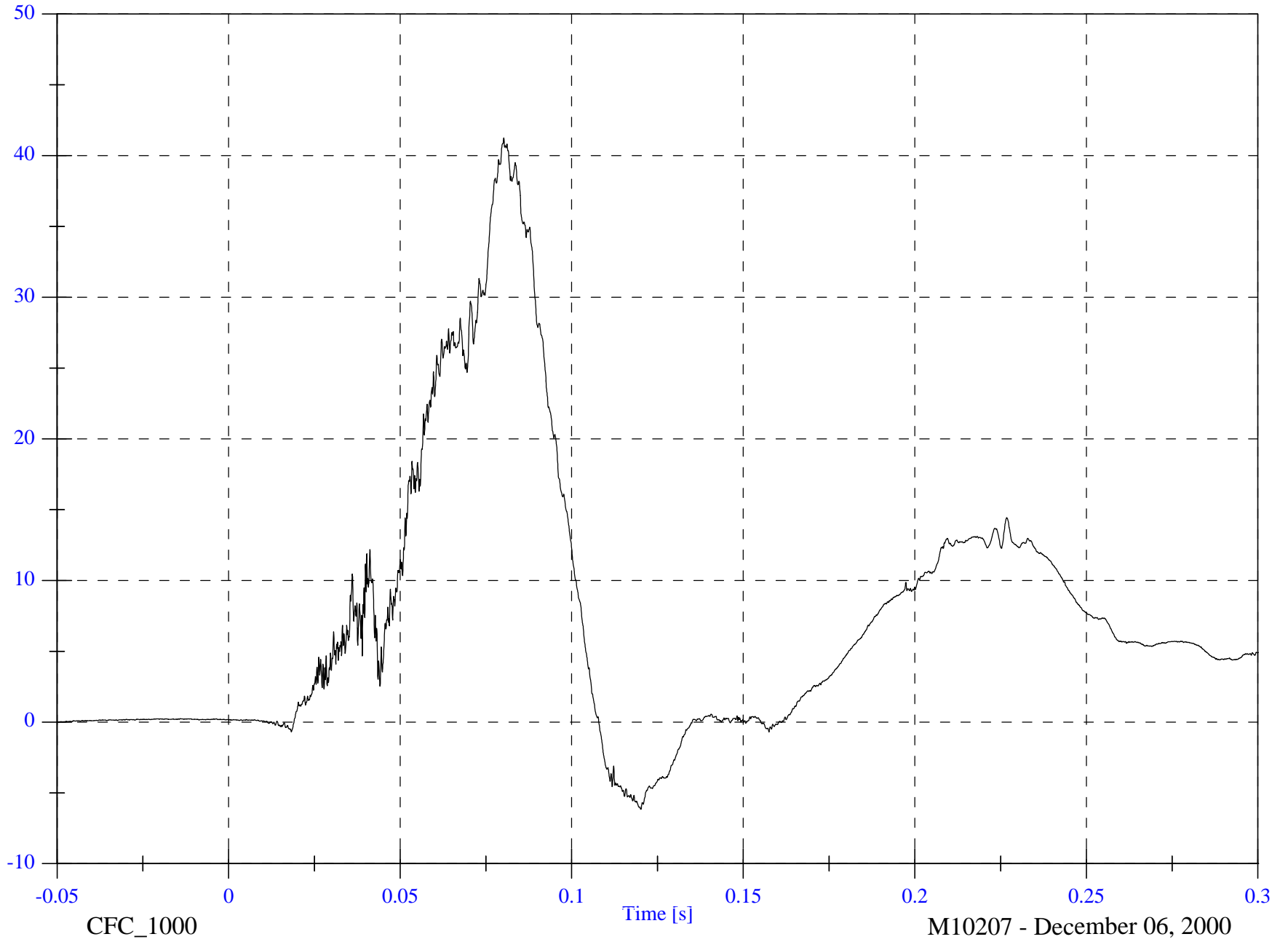
Max: 41.2 [g] at 0.080 [s]

Min: -6.2 [g] at 0.120 [s]

B-58

g

8602-5



CFC_1000

Time [s]

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

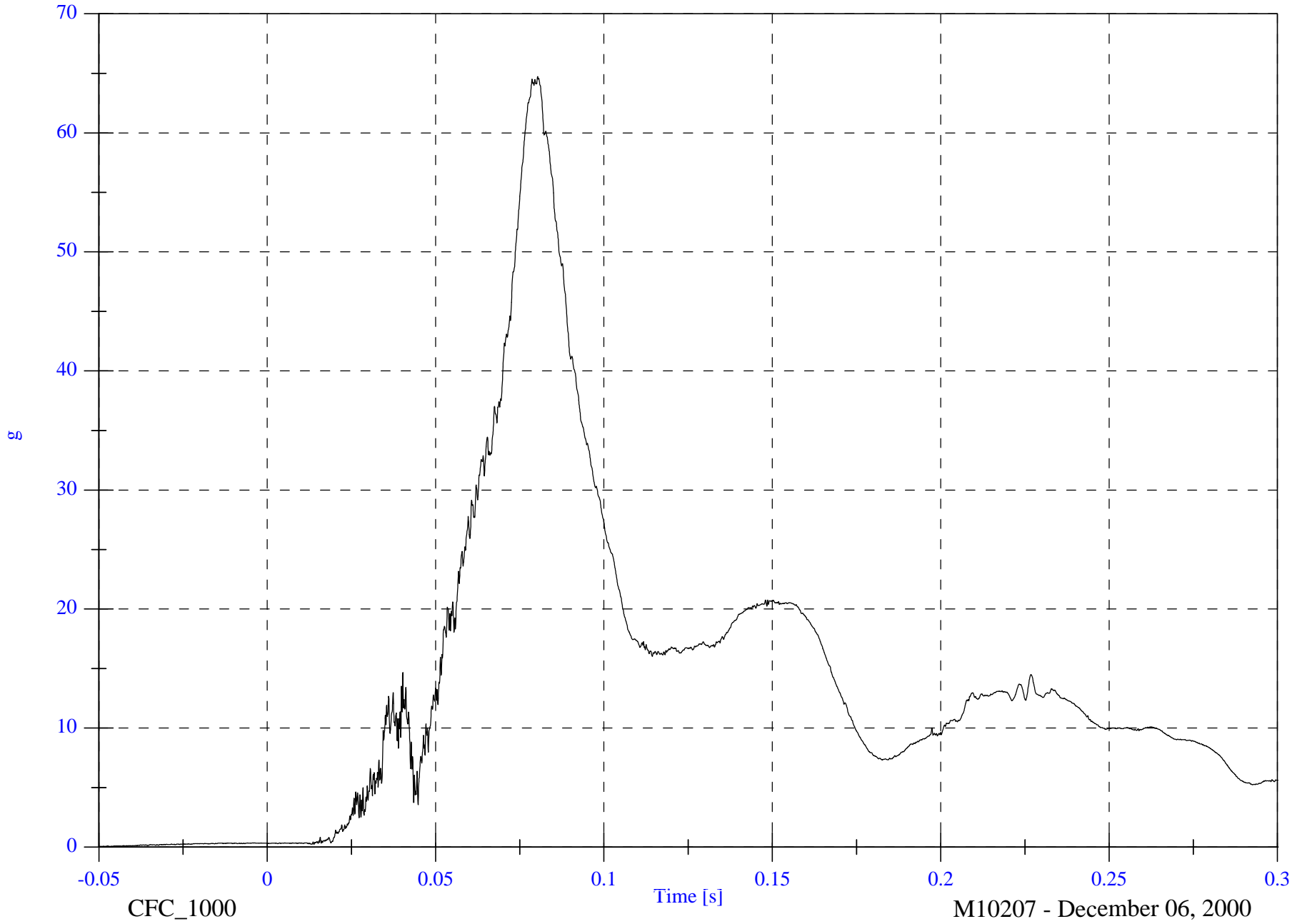
P2 Head Red Resultant

Max: 64.7 [g] at 0.080 [s]

Min: 0.1 [g] at -0.047 [s]

B-59

8602-5



CFC_1000

Time [s]

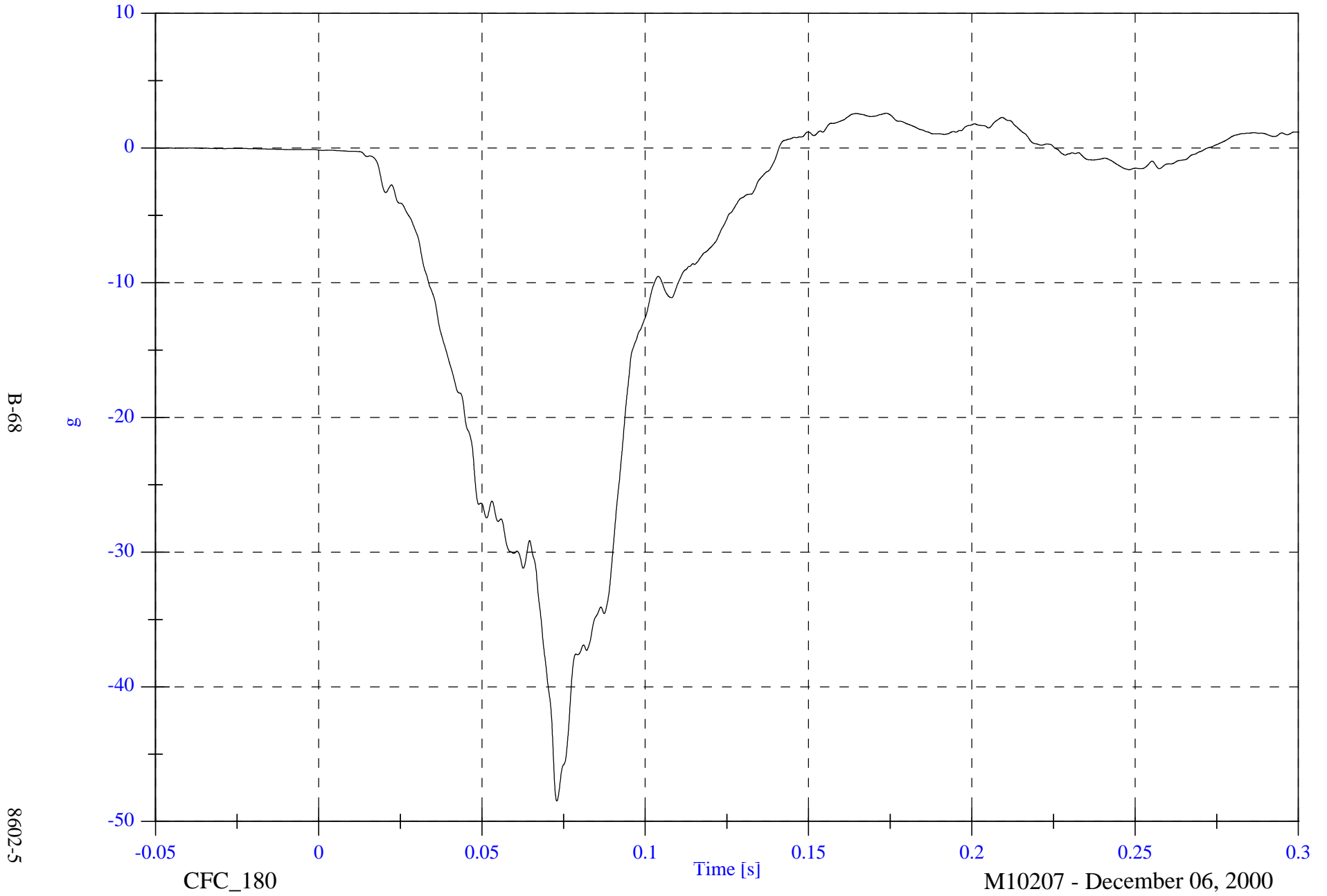
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Chest x

Max: 2.6 [g] at 0.174 [s]

Min: -48.5 [g] at 0.073 [s]



B-68

g

8602-5

CFC_180

Time [s]

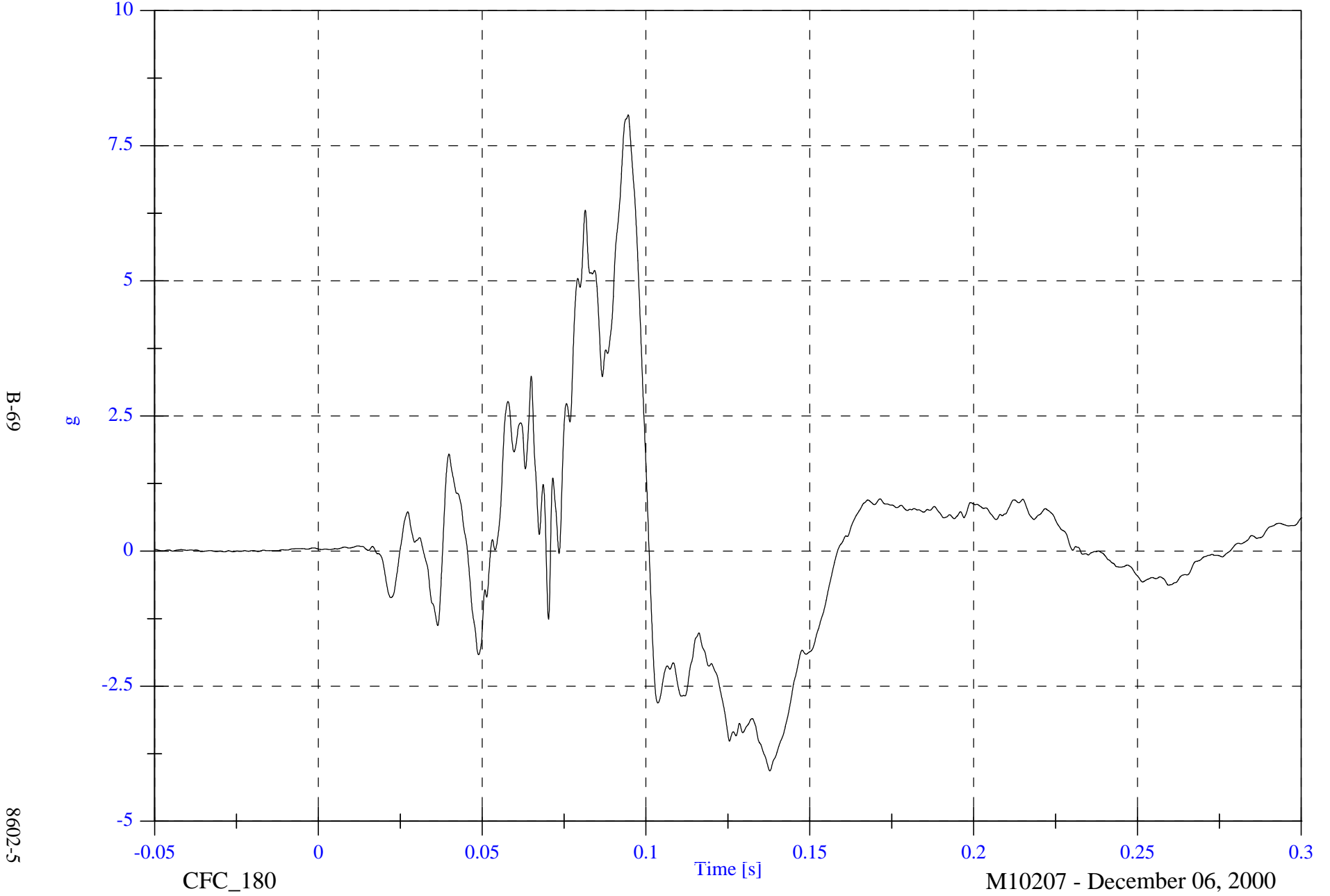
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

Max: 8.1 [g] at 0.095 [s]

Min: -4.1 [g] at 0.138 [s]

P2 Chest y

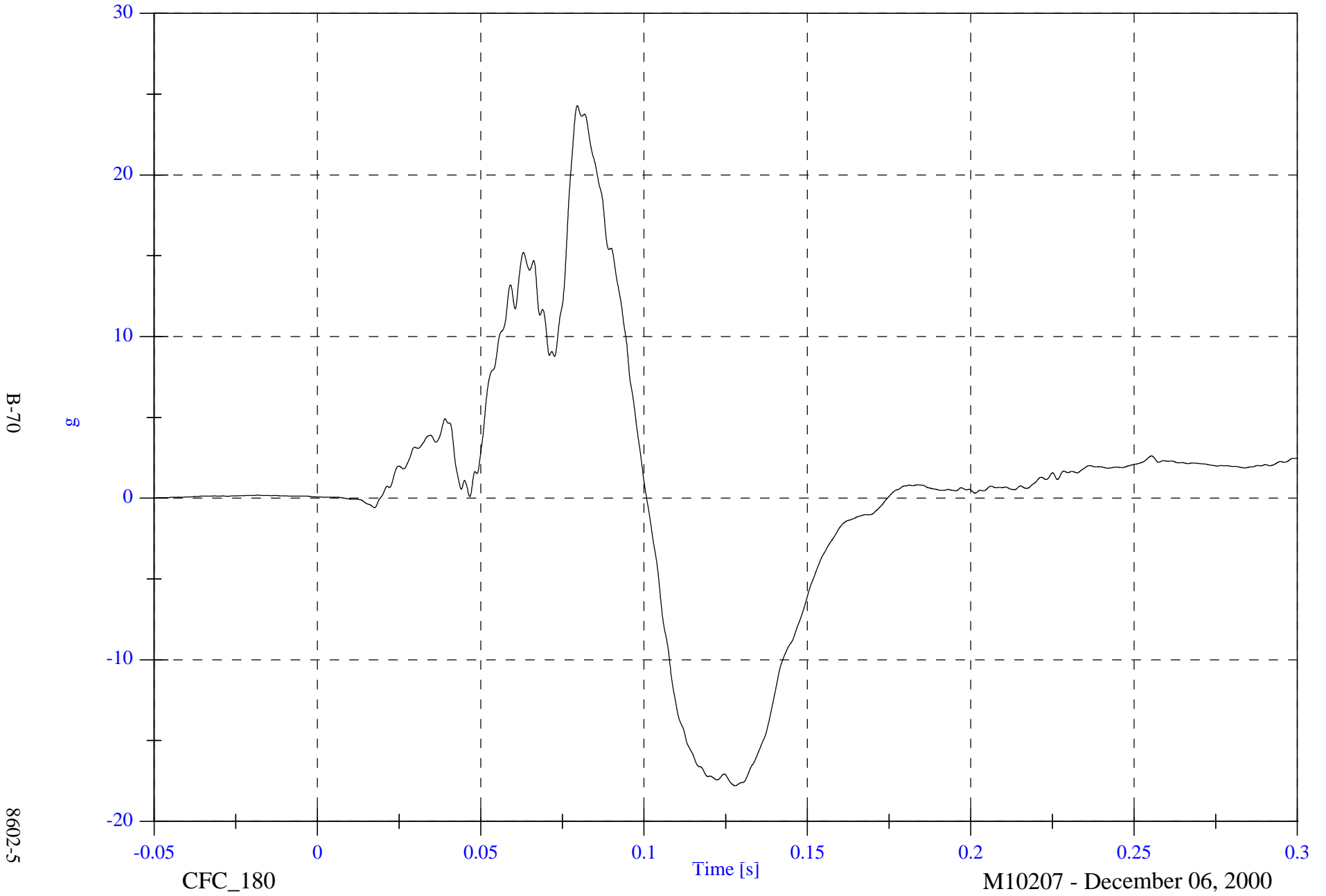


NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Chest z

Max: 24.3 [g] at 0.080 [s]

Min: -17.8 [g] at 0.128 [s]



B-70

8602-5

CFC_180

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

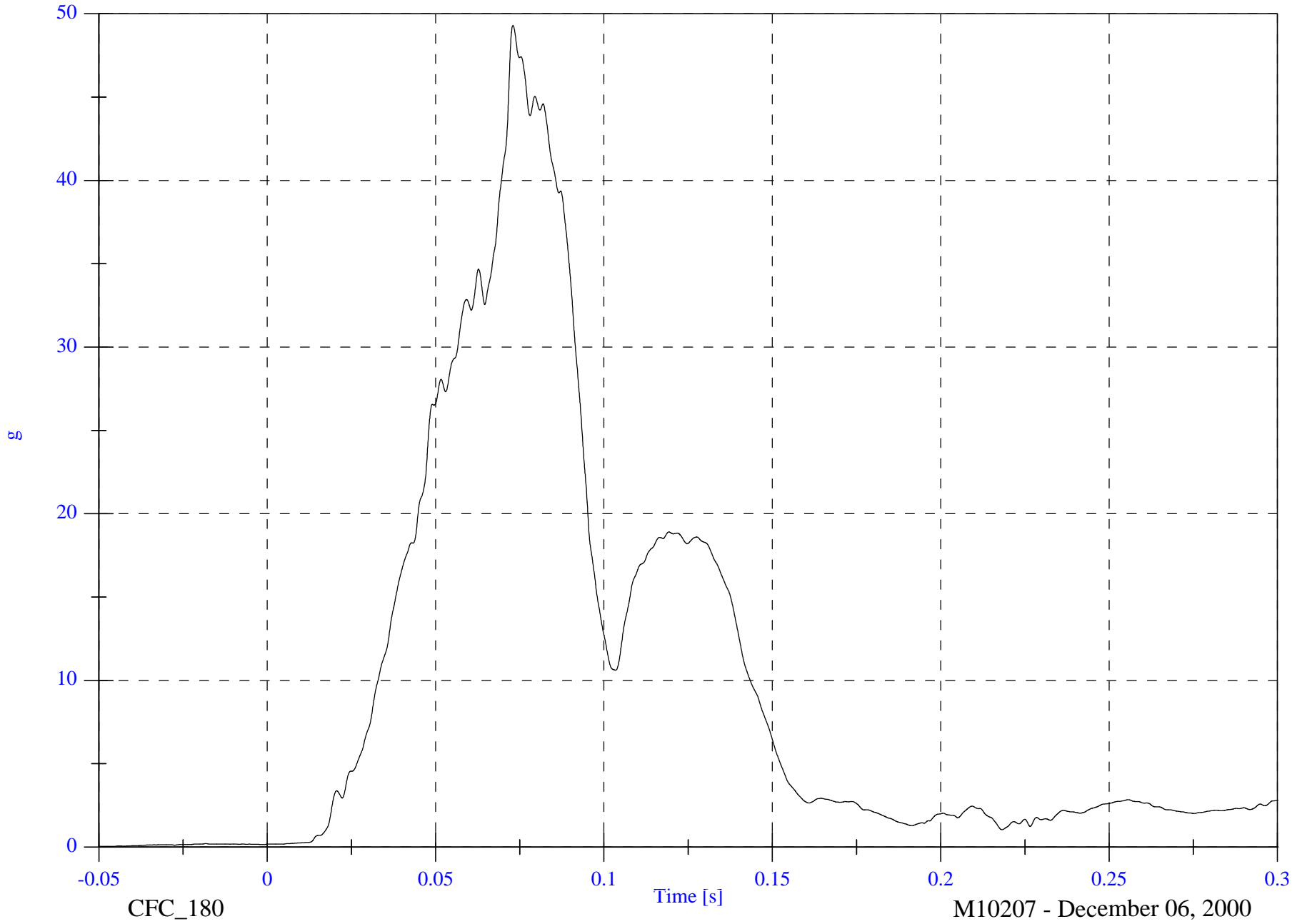
P2 Chest Resultant

Max: 49.3 [g] at 0.073 [s]

Min: 0.0 [g] at -0.049 [s]

B-71

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NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Chest Red x

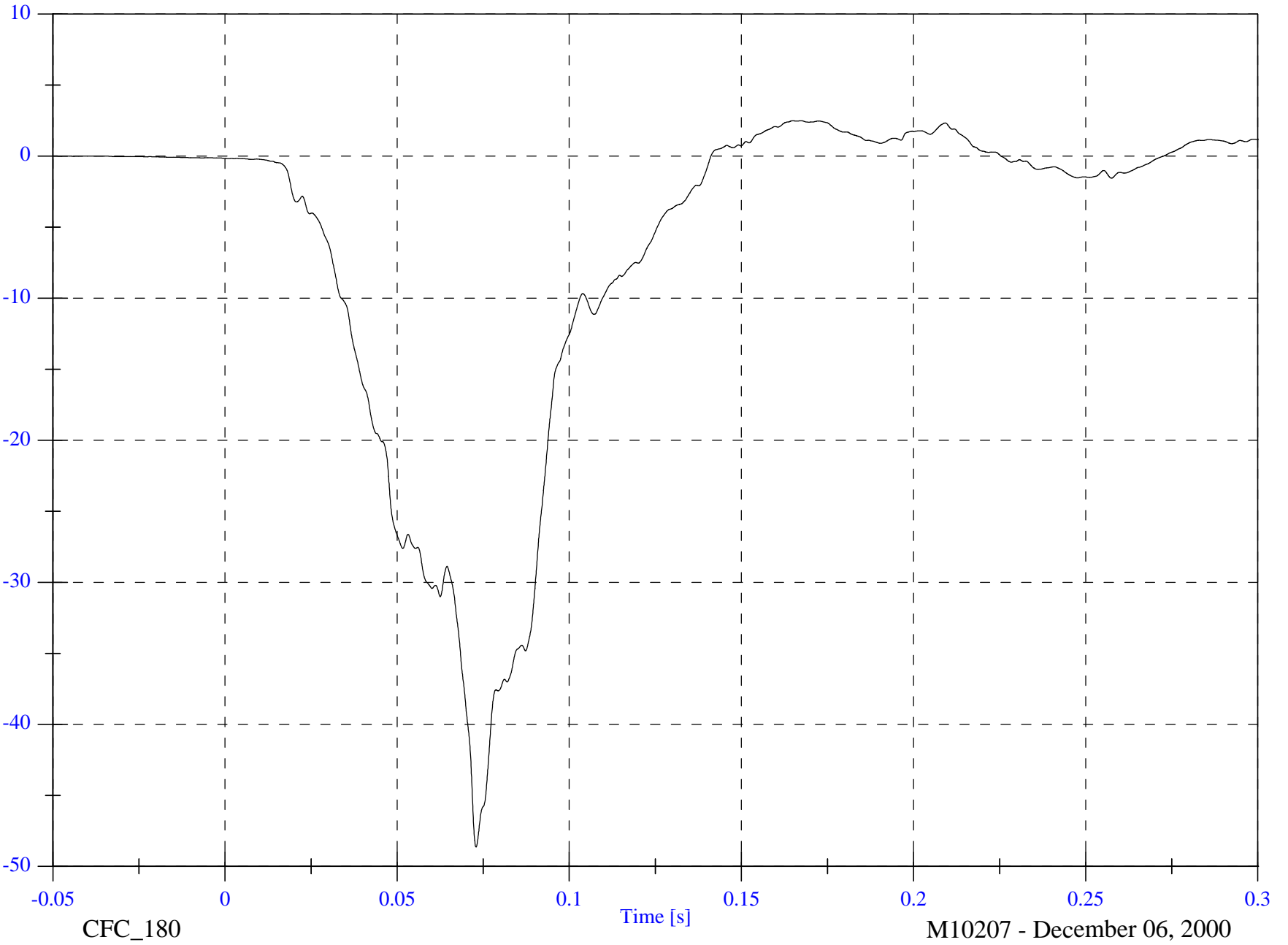
Max: 2.5 [g] at 0.167 [s]

Min: -48.6 [g] at 0.073 [s]

B-72

g

8602-5



CFC_180

Time [s]

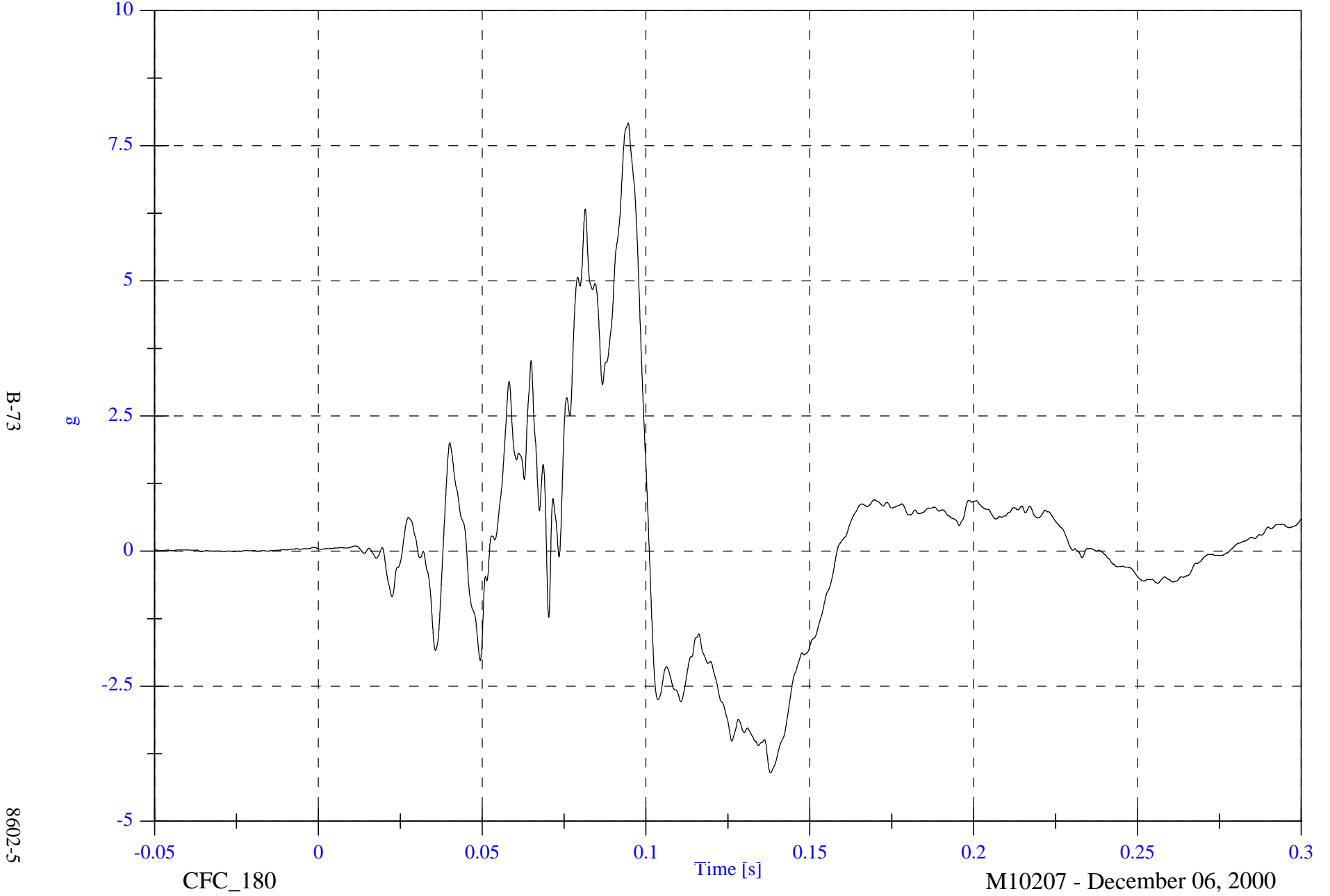
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Chest Red y

Max: 7.9 [g] at 0.095 [s]

Min: -4.1 [g] at 0.138 [s]



NCAP 2001 Test 5 - 2001 Ford Ranger

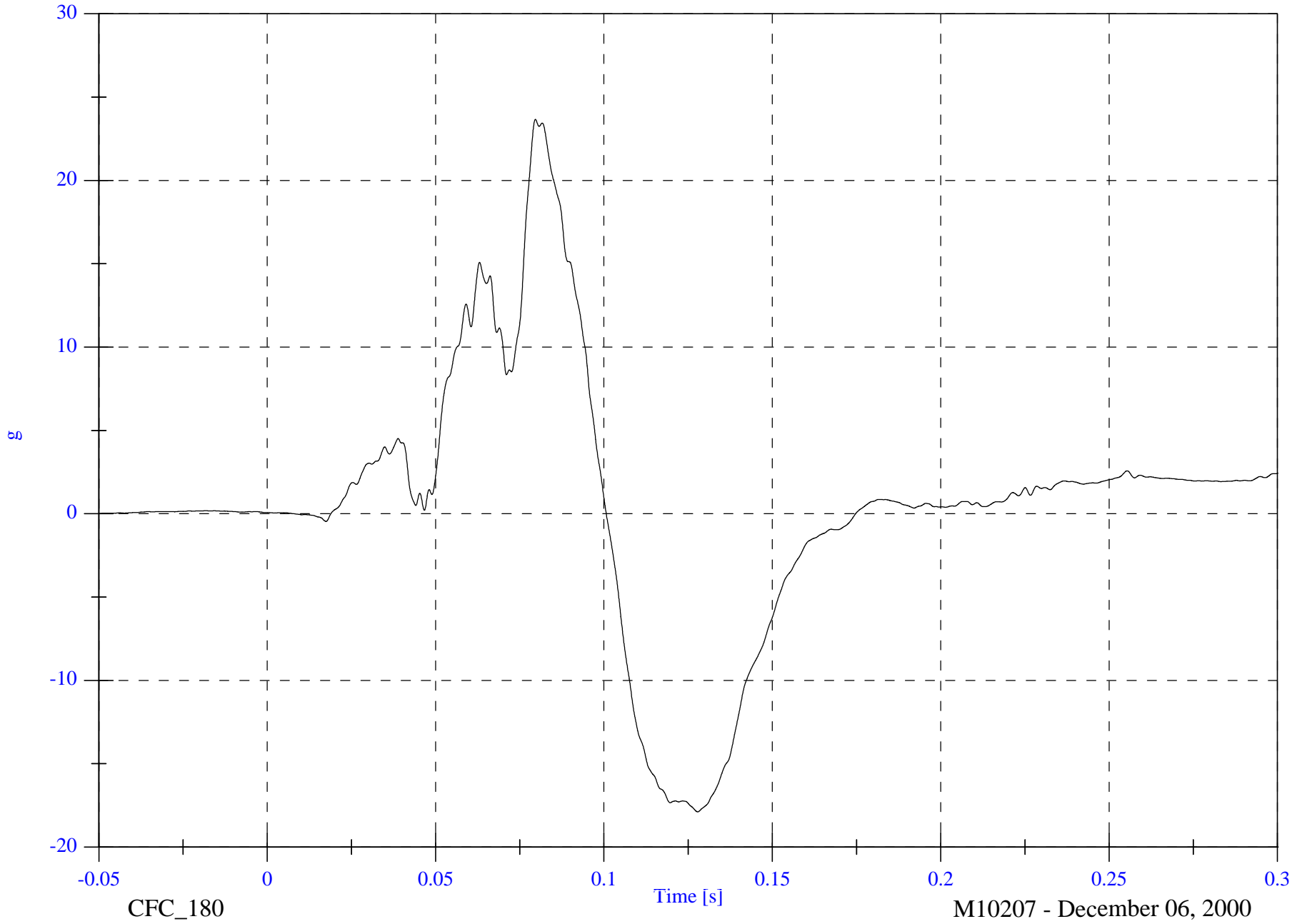
P2 Chest Red z

Max: 23.7 [g] at 0.080 [s]

Min: -17.9 [g] at 0.128 [s]

B-74

8602-5



CFC_180

M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Chest Red Resultant

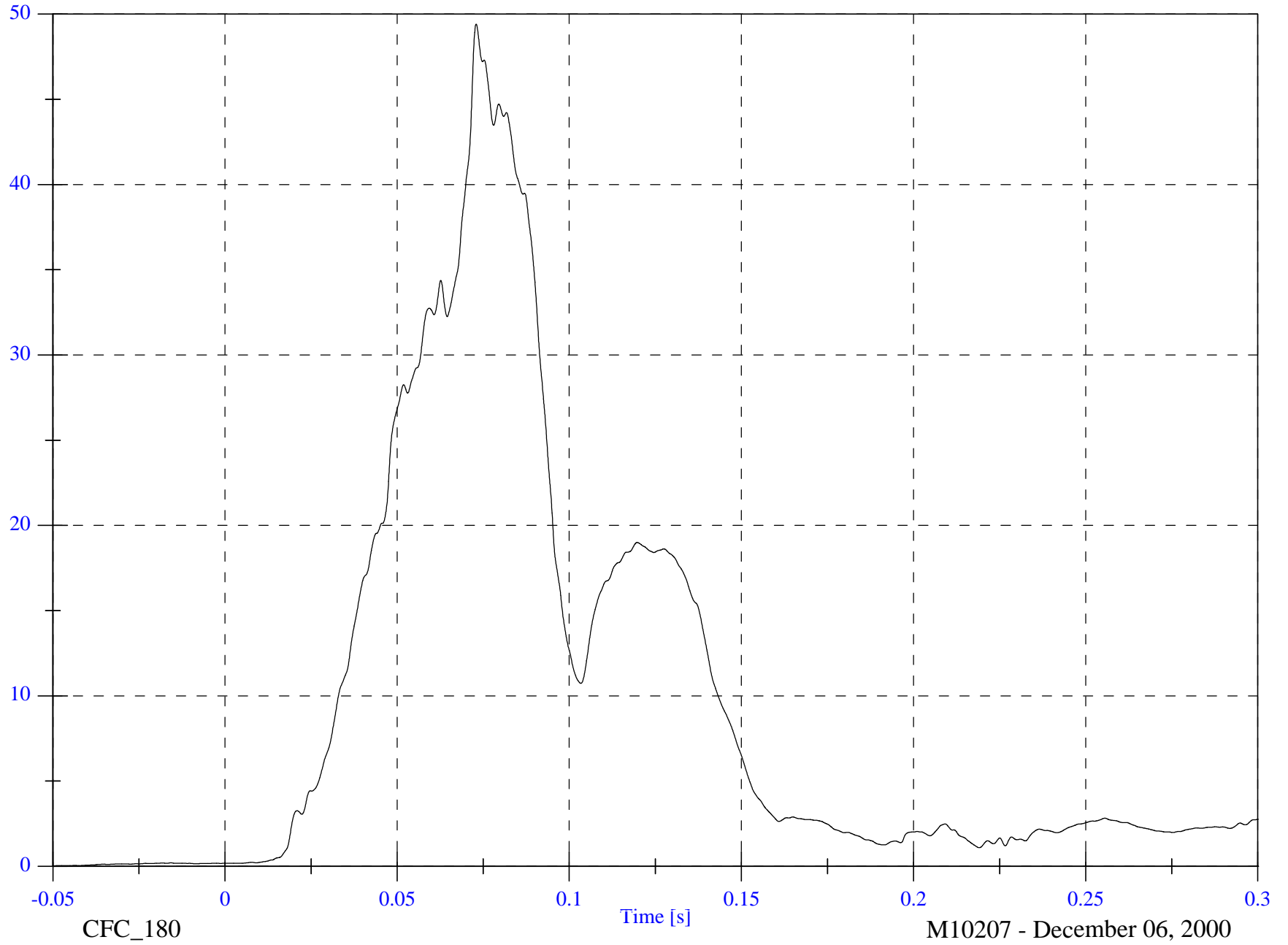
Max: 49.4 [g] at 0.073 [s]

Min: 0.0 [g] at -0.049 [s]

B-75

g

8602-5



CFC_180

Time [s]

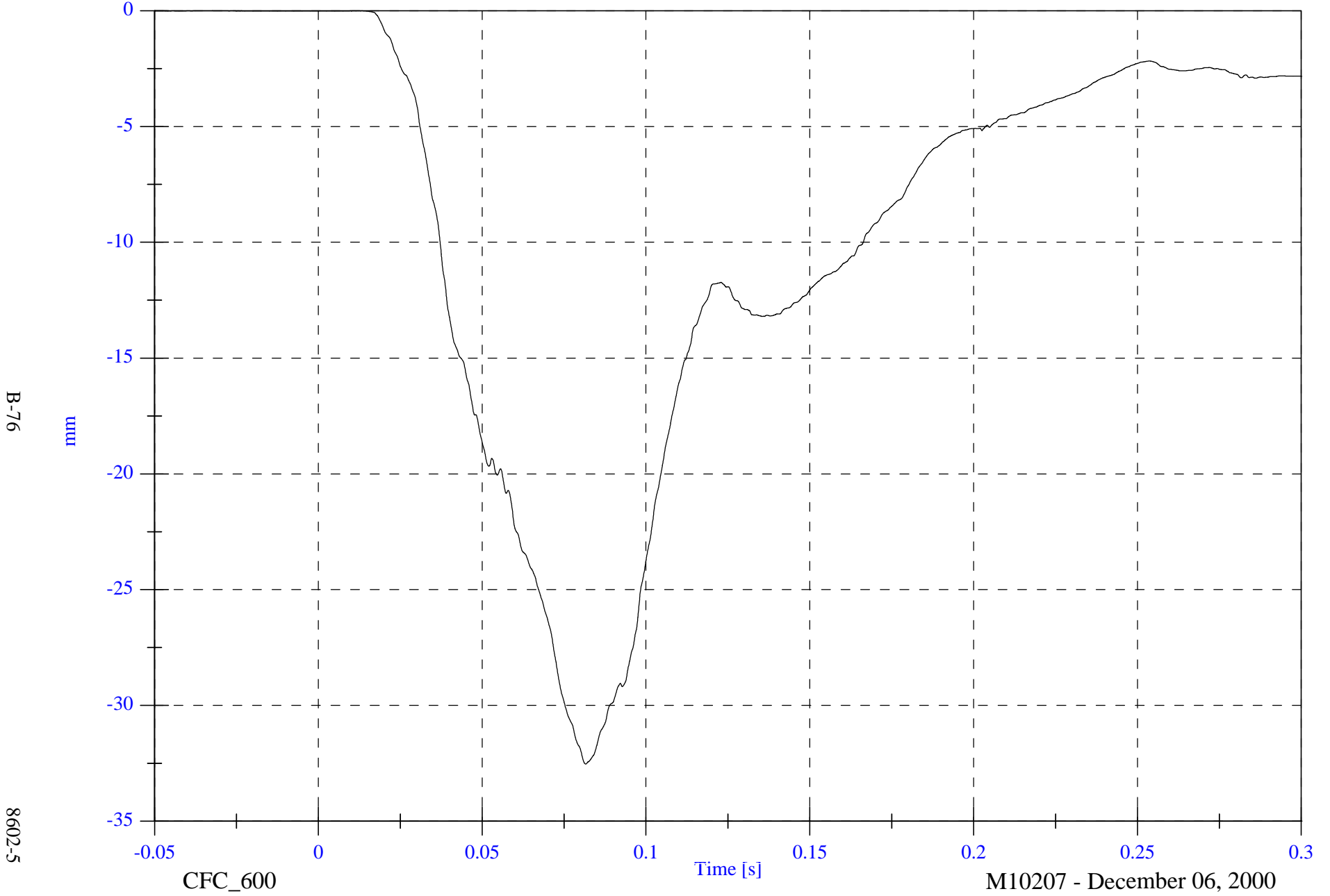
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Chest Compression

Max: 0.0 [mm] at -0.032 [s]

Min: -32.5 [mm] at 0.082 [s]



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8602-5

CFC_600

Time [s]

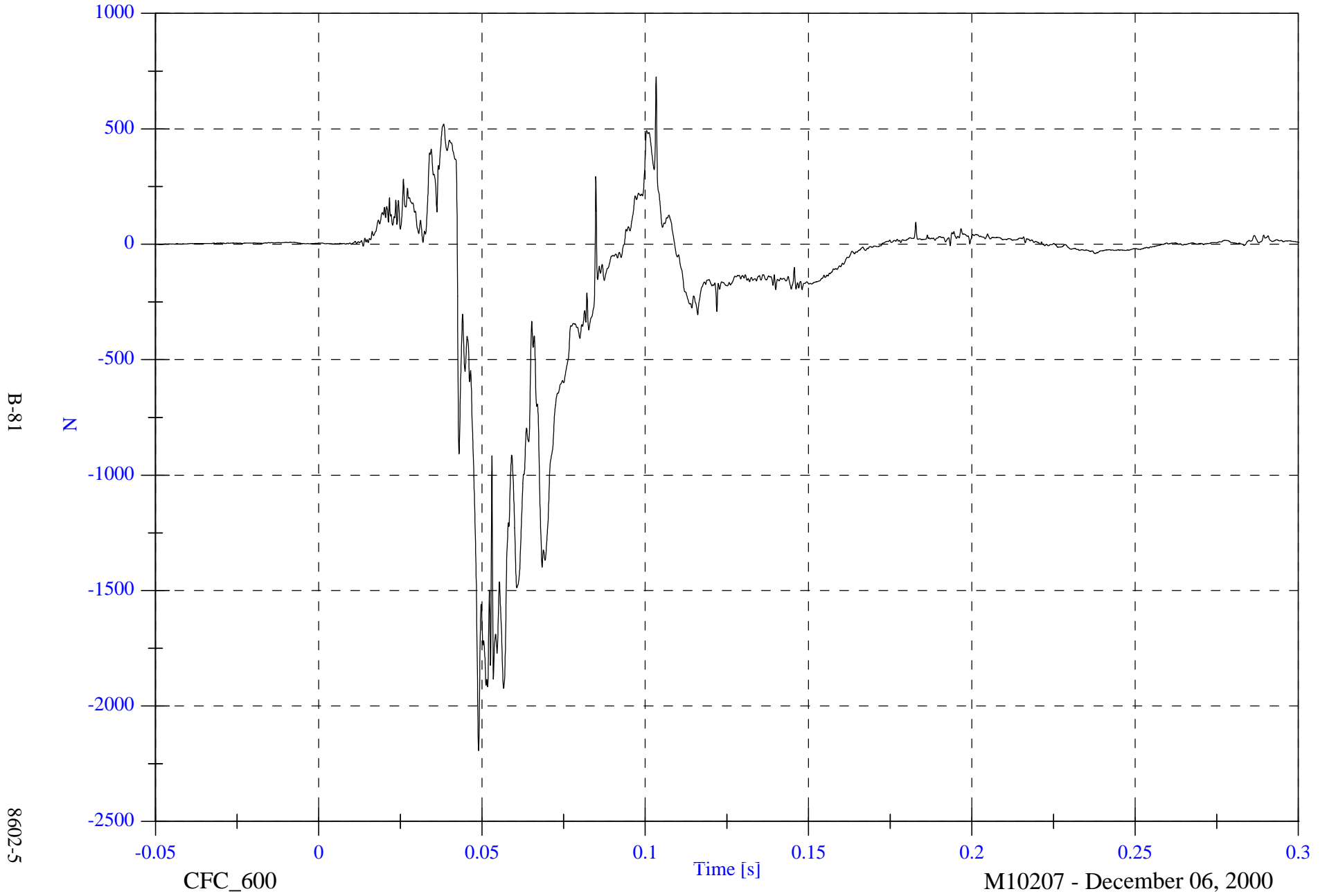
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Left Femur

Max: 725.4 [N] at 0.103 [s]

Min: -2193.5 [N] at 0.049 [s]



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CFC_600

Time [s]

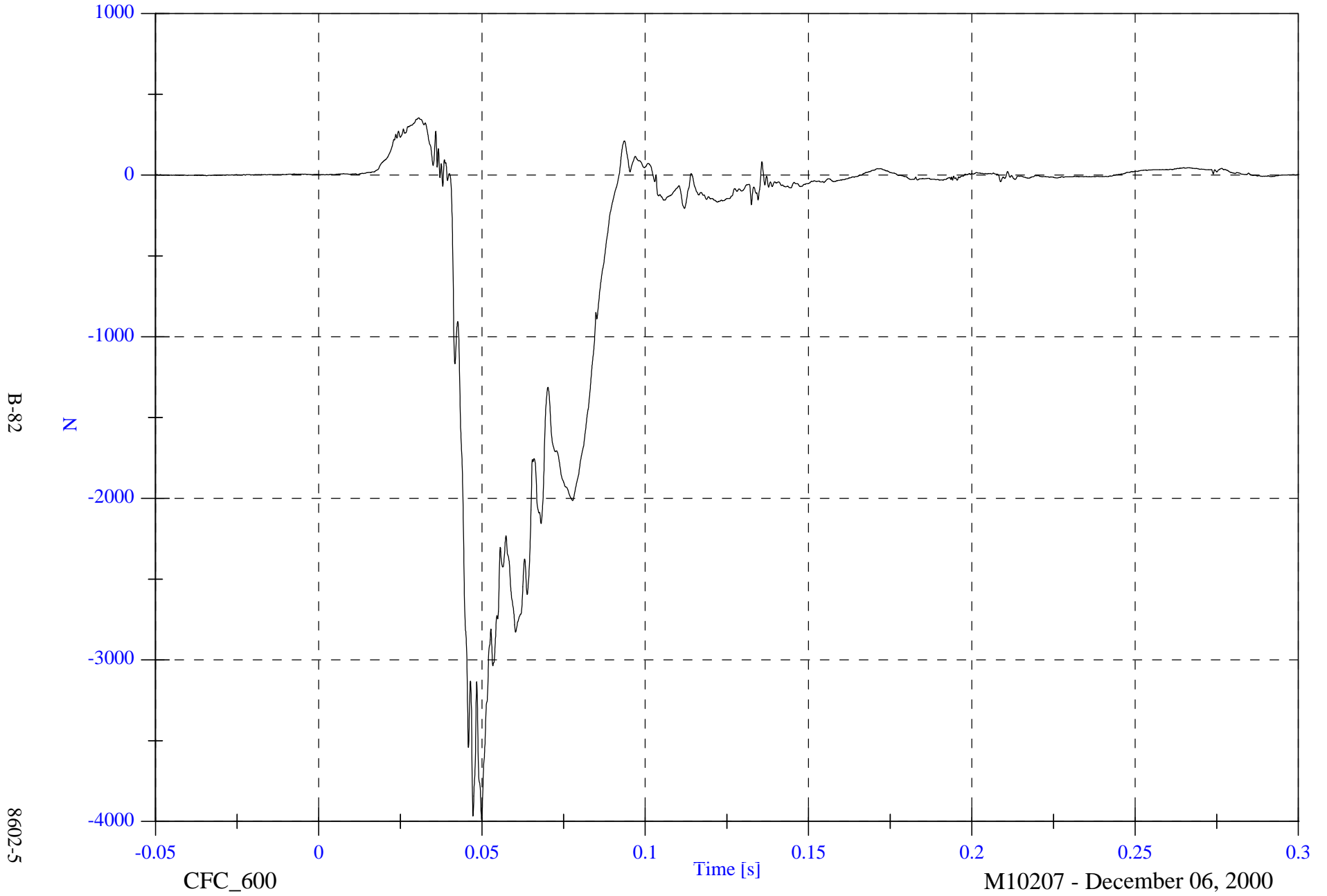
M10207 - December 06, 2000

NCAP 2001 Test 5 - 2001 Ford Ranger

P2 Right Femur

Max: 353.9 [N] at 0.031 [s]

Min: -3991.7 [N] at 0.050 [s]



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CFC_600

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