DOT# 816

FRONTAL CRASH RESPONSES

A FULL FRONTAL CRASH TEST OF A 1982 AMERICAN MOTORS CONCORD INTO A 1983 DODGE OMNI WITH A CLOSING VELOCITY OF 55.1 MPH

PREPARED BY:
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TEST REPORT
JUNE 1985

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
400 SEVENTH STREET, S.W.
WASHINGTON, D.C. 20590

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This test conducted as a part of VRTC Project No. SRL-98 Frontal Crash Responses

16. Abstract

This test report documents one of a series of crash tests conducted to evaluate Part 572 and Hybrid III dummy responses in both the restrained and unrestrained environment, and to catalog vehicle structural responses from a variety of crash configurations. Testing was conducted with a 1982 American Motors Concord 4-door Sedan and a 1983 Dodge Omni 4-door Hatchback at the TRCO Crash Test Facility, East Liberty, Ohio. The American Motors Concord was towed into the Dodge Omni at 0° with a closing velocity of 55.1 mph. One Hybrid III dummy was located in the driver's designated seating position and one Hybrid III dummy was located in the right front seating position in the subject vehicle. One Hybrid III dummy was located in the driver's designated seating position and one Hybrid III dummy was located in the right front seating position in the partner vehicle. The test date was April 10, 1985 and the ambient temperature was 45°F.

17. Key Words	18. Distribution Statement
Occupant Response Crashworthiness Hybrid III Dummy	Available to the U.S. public through the National Technical Information Service, Springfield, Viriginia 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	269	

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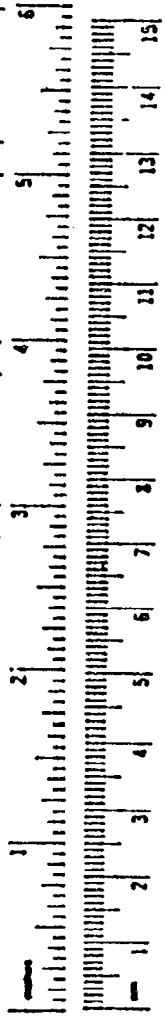
METRIC CONVERSION FACTORS

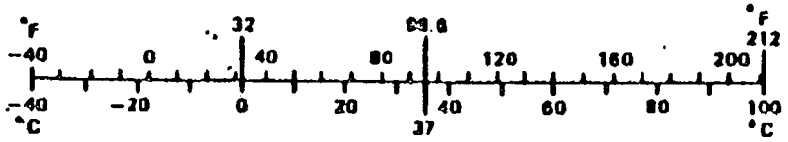
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	metric ton	t
	VOLUME			
tsp	teaspoons	5	milliliters	mL
Tbsp	tablespoons	15	milliliters	mL
in^3	cubic inches	16	milliliters	mL
fl oz	fluid ounces	30	milliliters	mL
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10 000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton (1000 kg)	1.1	short tons	
	VOLUME			
mL	milliliters	0.03	fluid ounces	fl oz
mL	milliliters	0.06	cubic inches	in^3
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F



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SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

This test was conducted as part of an overall test matrix with the purpose of evaluating Part 572 and Hybrid III dummies in both the restrained and unrestrained crash environments. Vehicle structural responses from a variety of crash configurations are also being cataloged.

INTRODUCTION

A 1982 American Motors Concord 4-door sedan and a 1983 Dodge Omni 4-door hatchback were used in a full frontal impact with a closing velocity of 55.1 mph on April 10, 1985. The Dodge Omni was stationary. The intended impact speed of the American Motors Concord was 54.9 mph. The actual test speed of the American Motors Concord was 55.1 mph. The vehicle centerlines were mismatched at impact by two inches.

Section 2 contains General Test and Vehicle Parameter Data. Section 3 contains vehicle crush and dummy response data. Appendix A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains data plots. Appendix C contains dummy certification. Appendix D contains miscellaneous test information.

SECTION 2.0

GENERAL TEST AND VEHICLE PARAMETER DATA

The following data sheets describe the General Test and Vehicle Parameter Data.

SUBJECT VEHICLE INFORMATION

VEHICLE MANUFACTURER: Chrysler Corporation

MAKE/MODEL: Dodge Omni VIN: 1B3BZ18C8DD270483

BODY STYLE: 4-door Hatchback MODEL YEAR: 1983

NHTSA NO.: R & D COLOR: Silver

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT 135 cu. in.

TRANSMISSION DATA: 5-Speed Manual

DATE VEHICLE RECEIVED: 3/29/85 ODOMETER READING: 20

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	No
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	No
OTHER			

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

DATA FROM CERTIFICATION LABEL ON LEFT DOOR FACE OR "B" POST:

VEHICLE MANUFACTURED BY: Chrysler Corporation

DATE OF MANUFACTURE: 6/83

GVWR: 3305 LBS.,

GAWR: FRONT 1770 LBS., REAR 1585 LBS.

SUBJECT VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 35 psi; REAR 35 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Goodyear Viva II P175/75 R 13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 3

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? No

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS):

RIGHT FRONT	697	LBS.	RIGHT REAR	394	LBS.
LEFT FRONT	728	LBS.	LEFT REAR	426	LBS.
TOTAL FRONT WEIGHT	1425	LBS. (63.5 % OF TOTAL VEHICLE WEIGHT)			
TOTAL REAR WEIGHT	820	LBS. (36.5 % OF TOTAL VEHICLE WEIGHT)			
TOTAL DELIVERED WEIGHT	2245	LBS.			

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 23 1/2	;LF 23 1/2	;RR 24 1/2	;LR 24 1/4
PRE-TEST ATTITUDE:	RF 23 5/8	;LF 23 5/8	;RR 23 1/4	;LR 23 1/4
POST-TEST ATTITUDE:	RF 22 9/16	;LF 28 3/8	;RR 22 9/16	;LR 25 1/4

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 363 LBS. CARGO:

RIGHT FRONT	841	LBS.	RIGHT REAR	645	LBS.
LEFT FRONT	814	LBS.	LEFT REAR	642	LBS.
TOTAL FRONT WEIGHT	1655	LBS. (56.3 % OF TOTAL VEHICLE WEIGHT)			
TOTAL REAR WEIGHT	1287	LBS. (43.7 % OF TOTAL VEHICLE WEIGHT)			
TOTAL TEST WEIGHT	2942	LBS.			

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA: 88 LBS.

SUBJECT VEHICLE TEST WEIGHT CALCULATION

Calculated Test Weight = Unloaded Delivered Weight +
(Number of Hybrid III Dummies X 167 lbs.) +
Cargo Weight
= 2245 + (2 X 167) + 115 lbs.
= 2694 lbs.*

Actual Test Weight = 2942 lbs.

Target Test Weight = 2930 lbs.

To achieve test weight, 13.1 gallons of stoddard solvent were added in the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Force Plate manufactured by K.J. Law Engineers, Inc., Detroit, Michigan.

*This weight is a calculated test weight based on the unloaded delivered weight (curb weight) plus two dummies, plus the calculated cargo weight from the label on each vehicle. This weight would normally be used as the target test weight, with instrumentation, camera, etc. in place. The vehicle would have to be adjusted to match the calculated weight to a 5% tolerance. The target weight was determined from one car in each class. The small car target weight was determined for the Dodge Omnis, Honda Accords, and Renault Fuegos by getting the heaviest small car, Fuego, to its lowest possible test ready weight. The same was done for the large cars, Chevrolet Celebrity and AMC Concord, and the Concord was used to determine target weight. Both target weights were given a range of $\pm$ 5% for the other car to achieve as final weight.

SUBJECT VEHICLE TEST FLUID DATA

TEST FLUID TYPE: RED STODDARD SOLVENT #2; SPEC. GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: NA GALLONS (FURNISHED BY CTM)

TEST VOLUME: 13.1 GALLONS (92-94% OF USEABLE)

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): NA GALLONS

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: No FUEL INJECTION: No

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? DNA

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVEBOX, ETC.

VEHICLE LOAD (UP TO CAPACITY): FRONT 35 psi; REAR 35 psi

RECOMMENDED TIRE SIZE: P 175/75 R 13 LOAD RANGE X B, C, A

VEHICLE CAPACITY: TYPES OF SEATS: Front - Bucket
Rear - Bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 2 FRONT
3 REAR
5 TOTAL

CARGO LOAD 115 LBS.

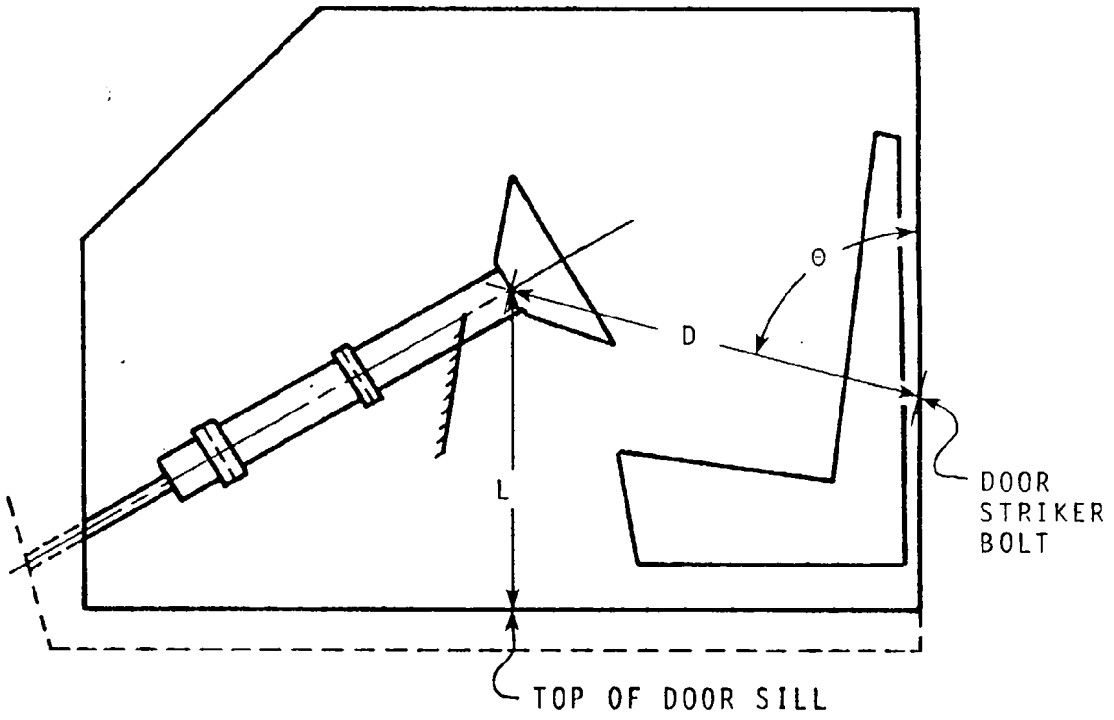
TOTAL 865 LBS.

*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL THROUGH CARBURETOR BOWL.

SUBJECT VEHICLE

STEERING COLUMN MEASUREMENTS

	PRE	POST
D	25 3/4"	21 7/8"
L	18 5/8"	21"
Θ	77°	72°



SUBJECT VEHICLE TEST CONDITIONS

TEST NUMBER: 850410

DATE OF TEST: April 10, 1985 TIME OF TEST: 15:29

WIND VELOCITY: 8-16 mph 201° HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 47°F

TEMPERATURE IN OCCUPANT COMPARTMENT: 70°F

DRIVER DUMMY TEMPERATURE 75°F

PASSENGER DUMMY TEMPERATURE 72°F

SUBJECT VEHICLE DATA

	ACTUAL	INTENDED
TEST WEIGHT (LBS.)	2942	2930*
VEHICLE ORIENTATION (DEGREES)	0	0
VEHICLE VELOCITY (MPH)	0	0
MAXIMUM CRUSH (INCHES)	25 9/16	DNA

DUMMIES

	DRIVER	MIDDLE PASSENGER	RT. FRONT PASSENGER	LEFT REAR PASSENGER	RT. REAR PASSENGER
TYPE:	HIII		HIII		
SERIAL NO.:	43		48		
INSTRUMENTATION:					
HEAD ACCEL.:	3		9		
CHEST ACCEL.:	3		3		
FEMUR L.C.'S:	2		2		
OTHER:	3 Neck Channels 1 Chest Disp.		6 Neck Channels 1 Chest Disp. 14 Lower Leg Channels 2 Knee Shear		

RESTRAINT SYSTEM: Driver dummy was restrained, Passenger dummy was unrestrained.

REMARKS: Chamois on dummy heads per chamois procedure in Appendix D.

*INTENDED TEST WEIGHT IS BASED ON THE WEIGHT OF A RENAULT FUEGO.

PARTNER VEHICLE INFORMATION

VEHICLE MANUFACTURER: American Motors Corporation

MAKE/MODEL: AMC Concord VIN: 1AMCA0552CK170328

BODY STYLE: 4-Door Sedan MODEL YEAR: 1982

NHTSA NO.: R & D COLOR: Brown

ENGINE DATA: TYPE: Inline CYLINDERS: 6 DISPLACEMENT 258 CID

TRANSMISSION DATA: Automatic

DATE VEHICLE RECEIVED: 3/29/85 ODOMETER READING: 14238

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	Yes
POWER SEATS	No	TILTING STEERING WHEEL	Yes
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	Yes
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	No
OTHER			

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

DATA FROM CERTIFICATION LABEL ON LEFT DOOR FACE OR "B" POST:

VEHICLE MANUFACTURED BY: American Motors Corporation

DATE OF MANUFACTURE: 6/82

GVWR: 4436 LBS.,

GAWR: FRONT 2180 LBS., REAR 2284 LBS.

PARTNER VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 35 psi; REAR 35 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Goodyear P195 75/R14

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 4

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? No

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS):

RIGHT FRONT	894	LBS.	RIGHT REAR	667	LBS.
LEFT FRONT	912	LBS.	LEFT REAR	697	LBS.
TOTAL FRONT WEIGHT	1806	LBS. (57.0 % OF TOTAL VEHICLE WEIGHT)			
TOTAL REAR WEIGHT	1364	LBS. (43.0 % OF TOTAL VEHICLE WEIGHT)			
TOTAL DELIVERED WEIGHT	3170	LBS.			

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 28 3/8	;LF 29	;RR 27 1/4	;LR 27 13/16
PRE-TEST ATTITUDE:	RF 26 1/4	;LF 27 7/16	;RR 25 1/2	;LR 26 7/8
POST-TEST ATTITUDE:	RF 25 13/16	;LF 28 9/16	;RR 25 3/8	;LR 27 1/4

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 45 LBS. CARGO:

RIGHT FRONT	769	LBS.	RIGHT REAR	997	LBS.
LEFT FRONT	765	LBS.	LEFT REAR	1018	LBS.
TOTAL FRONT WEIGHT	1534	LBS. (43.2 % OF TOTAL VEHICLE WEIGHT)			
TOTAL REAR WEIGHT	2015	LBS. (56.8 % OF TOTAL VEHICLE WEIGHT)			
TOTAL TEST WEIGHT	3549	LBS.			

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA: 0 LBS.

PARTNER VEHICLE TEST WEIGHT CALCULATION

Calculated Test Weight = Unloaded Delivered Weight +
(Number of Hybrid III Dummies X 167 lbs.) +
Cargo Weight
= 3170 + (2 X 167) + 175 lbs.
= 3679 lbs.*

Actual Test Weight = 3549 lbs.

Target Test Weight = 3577 lbs.

To achieve test weight, the truck lid, bumper, and rear window were removed. The weight of the test vehicle was measured by placing each wheel on a Force Plate manufactured by K.J. Law Engineers, Inc., Detroit, Michigan.

*This weight is a calculated test weight based on the unloaded delivered weight (curb weight) plus two dummies, plus the calculated cargo weight from the label on each vehicle. This weight would normally be used as the target test weight, with instrumentation, camera, etc. in place. The vehicle would have to be adjusted to match the calculated weight to a 5% tolerance. The target weight was determined from one car in each class. The small car target weight was determined for the Dodge Omnis, Honda Accords, and Renault Fuegos by getting the heaviest small car, Fuego, to its lowest possible test ready weight. The same was done for the large cars, Chevrolet Celebrity and AMC Concord, and the Concord was used to determine target weight. Both target weights were given a range of $\pm$ 5% for the other car to achieve as final weight.

PARTNER VEHICLE TEST FLUID DATA

TEST FLUID TYPE: RED STODDARD SOLVENT #2; SPEC. GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: NA GALLONS (FURNISHED BY CTM)

TEST VOLUME: 0 GALLONS (92-94% OF USEABLE)

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): NA GALLONS

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: No FUEL INJECTION: No

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? DNA

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVEBOX, ETC.

VEHICLE LOAD (UP TO CAPACITY): FRONT 35 psi; REAR 35 psi

RECOMMENDED TIRE SIZE: P205/70R14 LOAD RANGE X B, C, A

VEHICLE CAPACITY: TYPES OF SEATS: Bucket

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 3 FRONT
3 REAR
6 TOTAL

CARGO LOAD 175 LBS.

TOTAL 1075 LBS.

*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL THROUGH CARBURETOR BOWL.

PARTNER VEHICLE TEST CONDITIONS

TEST NUMBER: 850410

DATE OF TEST: April 10, 1985 TIME OF TEST: 15:29

WIND VELOCITY: 8-16 mph 201° HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 47°F

TEMPERATURE IN OCCUPANT COMPARTMENT: 74°F

DRIVER DUMMY TEMPERATURE 72°F

PASSENGER DUMMY TEMPERATURE 74°F

PARTNER VEHICLE DATA

	ACTUAL	INTENDED
TEST WEIGHT (LBS.)	3549	3577*
VEHICLE ORIENTATION (DEGREES)	0	0
VEHICLE VELOCITY (MPH)	55.1	54.9
MAXIMUM CRUSH (INCHES)	11 3/8	DNA
STEERING COLUMN COLLAPSE (INCHES)	PRE: 7	POST: 1 1/2

DUMMIES

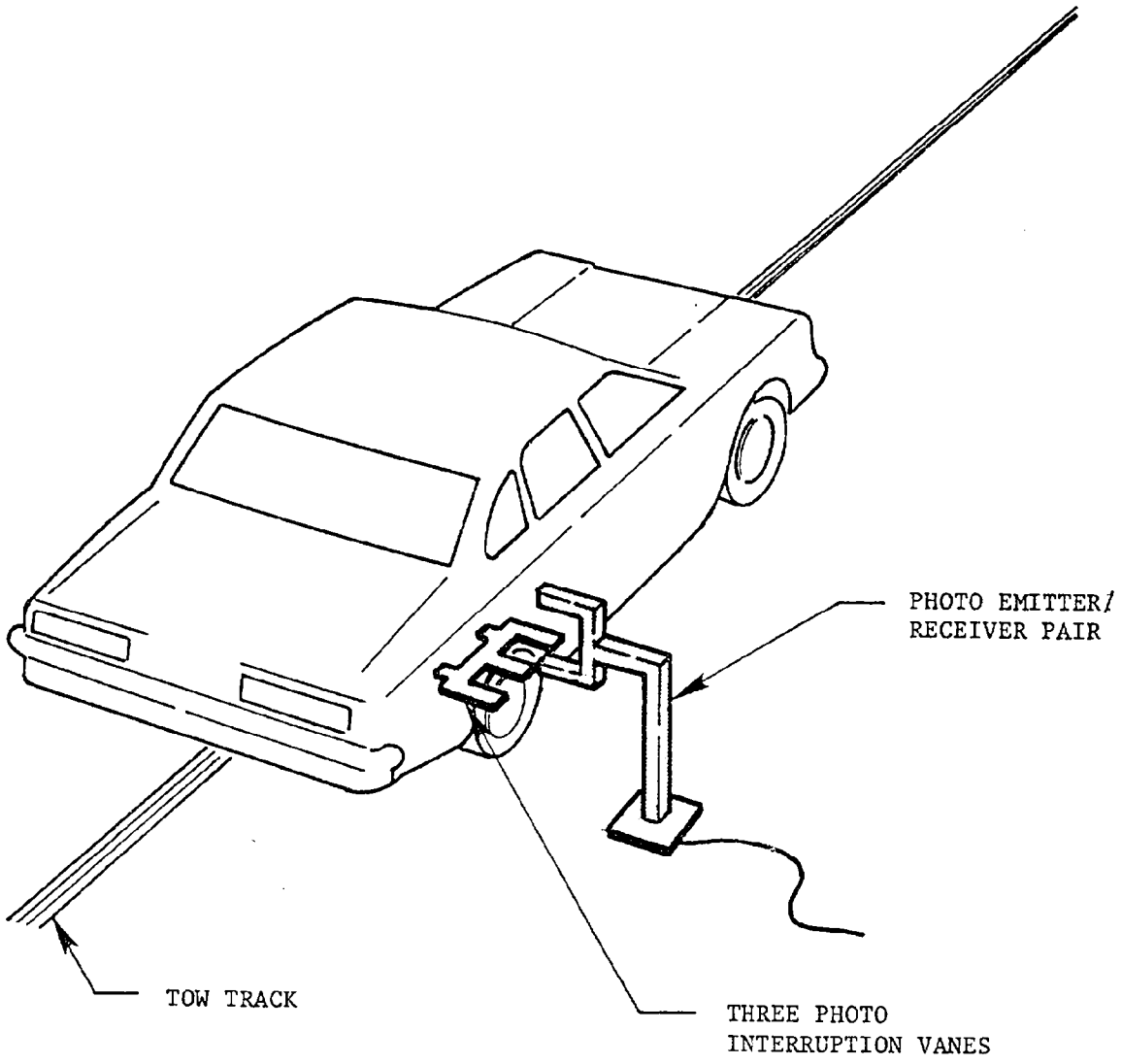
	DRIVER	MIDDLE PASSENGER	RT. FRONT PASSENGER	LEFT REAR PASSENGER	RT. REAR PASSENGER
TYPE:	HIII		HIII		
SERIAL NO.:	45		61		
INSTRUMENTATION:					
HEAD ACCEL.:	4		3		
CHEST ACCEL.:	3		3		
FEMUR L.C.'S:	2		2		
OTHER:	1 Chest Disp. 3 Neck 14 Lower Leg		1 Chest Disp. 3 Neck		

RESTRAINT SYSTEM: Driver dummy was unrestrained, passenger dummy was restrained.

REMARKS: Chamois on dummy heads per chamois procedure in Appendix D.

*INTENDED TEST WEIGHT IS BASED ON THE WEIGHT OF AN AMC CONCORD.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver 24 inches before impact.

The vanes have one foot spacing.

SECTION 3.0
DATA REQUIRED BY R & D

The following pages are included in this section:

1. Dummy temperature control and position data
2. Dummy kinematic summary
3. Vehicle crush data
4. Dummy and vehicle accelerometer location and data summary
5. High speed camera information

SUBJECT VEHICLE DUMMY DATA SUMMARY

	DRIVER DUMMY SN: 43				PASSENGER DUMMY SN: 48			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
HEAD ACCELERATION (g)								
LONGITUDINAL	19.77	205.25	80.37	79.50	---	--- γ	---	---γ
LATERAL	15.75	70.13	18.13	80.88	11.48	234.13	15.60	109.00
VERTICAL	---	---×	29.22	64.75	104.40	99.25	63.64	80.75
RESULTANT		81.73 @ 79.63				--- @ ---γ		
HIC	569.90	from 68.12 to 92.25			---	from --- to ---γ		
HEAD ANGULAR ACCELERATION								
POSITION 1								
LONGITUDINAL	---	--- α	---	--- α	109.21	99.75	62.69	80.75
VERTICAL	---	--- α	---	--- α	47.47	234.00	117.02	90.88
POSITION 2								
LATERAL	---	--- α	---	--- α	17.50	90.88	17.08	111.63
VERTICAL	---	--- α	---	--- α	76.33	99.13	52.83	80.38
POSITION 3								
LONGITUDINAL	---	--- α	---	--- α	---	---γ	---	--- γ
LATERAL	---	--- α	---	--- α	15.26	233.88	20.15	118.63
NECK LOADS (lb)								
SHEAR (X)	147.41	70.50	33.19	220.13	218.42	120.00	279.18	106.75
SHEAR (Y)	---	--- α	---	--- α	72.39	119.50	16.01	189.63
AXIAL (Z)	319.06	87.63	19.12	285.00	501.01	83.50	751.47	106.25
NECK MOMENTS (lb-ft)								
ABOUT LONGITUDINAL	---	--- α	---	--- α	16.03	113.38	7.86	144.50
ABOUT LATERAL	22.21	93.50	25.73	69.13	29.49	160.63	159.68	101.88
ABOUT VERTICAL	---	--- α	---	--- α	5.60	340.00	15.45	110.63
CHEST ACCELERATION (g)								
LONGITUDINAL	3.48	191.13	41.13	60.88	7.89	239.25	77.30	93.38
LATERAL	9.99	71.88	3.30	87.88	10.00	95.38	16.47	97.50
VERTICAL	10.75	87.63	8.32	46.38	11.10	85.00	35.18	79.88
RESULTANT		41.24 @ 60.88				78.83 @ 93.38		
3 MSEC CLIP		39.72				69.17		
CHEST DISPLACEMENT (in)		0.61	76.25			0.78	100.13	
FEMUR LOADS (lb)								
LEFT	---	--- γ	720.39	56.50	64.48	191.00	1370.67	71.00
RIGHT	186.67	50.13	728.36	61.75	174.03	109.00	1576.23	65.75

SUBJECT VEHICLE DUMMY DATA SUMMARY CONTD

	PASSENGER DUMMY SN: 48			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX	TIME	MAX	TIME
KNEE LOADS (lb)				
LEFT LEG				
LEFT SENSOR	799.04	89.88	264.66	39.38
RIGHT SENSOR	396.18	81.75	250.08	38.38
RIGHT LEG				
LEFT SENSOR	795.86	89.00	280.52	36.75
RIGHT SENSOR	269.33	89.00	210.49	36.75
KNEE DISPLACEMENT (in)				
LEFT KNEE	0.28	67.88	---	--- ε
RIGHT KNEE	0.07	63.63	---	--- ε
TIBIA MOMENTS (lb-ft)				
LEFT LEG				
ABOUT LONGITUDINAL	35.48	66.13	72.90	87.75
ABOUT LATERAL	186.05	87.88	109.25	58.63
RIGHT LEG				
ABOUT LONGITUDINAL	54.87	68.88	83.24	86.75
ABOUT LATERAL	133.55	91.63	81.79	70.13
ANKLE LOADS (lb)				
LEFT LEG				
LATERAL	76.80	88.00	77.69	54.88
VERTICAL	710.03	38.13	140.97	48.25
RIGHT LEG				
LATERAL	169.98	66.25	41.77	43.50
VERTICAL	710.30	36.38	140.38	49.00
ANKLE MOMENTS (lb-ft)				
LEFT LEG				
ABOUT LONGITUDINAL	20.30	50.50	14.89	87.50
RIGHT LEG				
ABOUT LONGITUDINAL	129.62	69.13	2.46	202.13

* LONGITUDINAL: FORWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

**LONGITUDINAL: REARWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

ϒ See TEST ANOMALIES

× There were no positive values in the time interval of interest.

α There was no instrumentation at this location.

ε There were no negative values in the time interval of interest.

PARTNER VEHICLE DUMMY DATA SUMMARY

	DRIVER DUMMY SN: 45				PASSENGER DUMMY SN: 61			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
HEAD ACCELERATION (g)								
LONGITUDINAL	5.19	336.25	55.95	83.00	12.41	206.25	45.30	111.88
LATERAL	8.05	95.63	7.78	83.00	5.88	141.88	13.48	109.38
VERTICAL	21.24	118.50	43.15	82.88	3.50	16.88	53.14	89.50
RESULTANT		70.07 @ 83.00				59.97 @ 89.50		
HIC	314.57	from 82.50 to 107.38			577.82	from 69.88 to 121.00		
POSITION 2	38.58	83.25	44.92	82.75	---	--- α	---	--- α
NECK LOADS (lb)								
SHEAR	108.72	90.38	220.82	125.00	373.12	114.38	25.41	332.13
AXIAL	48.05	84.38	303.25	125.75	504.71	92.75	2.40	20.38
NECK MOMENTS (lb-ft)								
ABOUT LATERAL	14.30	218.88	42.16	108.25	88.25	110.38	36.97	74.75
CHEST ACCELERATION (g)								
LONGITUDINAL	3.67	170.50	41.74	78.25	2.01	314.88	36.65	63.00
LATERAL	2.59	70.88	4.15	82.75	2.52	217.88	4.93	59.50
VERTICAL	15.39	82.50	17.66	112.25	9.52	82.63	10.61	49.63
RESULTANT		44.02 @ 78.38				36.98 @ 63.13		
3 MSEC CLIP		40.26				36.06		
CHEST DISPLACEMENT (in)		0.60	82.13			0.73	88.88	
FEMUR LOADS (lb)								
LEFT	85.43	183.50	1146.82	71.00	323.87	70.38	333.51	41.25
RIGHT	71.07	135.63	1622.97	66.50	---	--- γ	---	--- γ

PARTNER VEHICLE DUMMY DATA SUMMARY CONTD

	DRIVER DUMMY SN: 45			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX	TIME	MAX	TIME
KNEE LOADS (lb)				
LEFT LEG				
LEFT SENSOR	81.68	121.86	473.58	52.25
RIGHT SENSOR	65.91	90.00	352.73	49.50
RIGHT LEG				
LEFT SENSOR	97.99	75.75	504.99	47.50
RIGHT SENSOR	174.72	98.00	250.04	48.88
TIBIA MOMENTS (lb-ft)				
LEFT LEG				
ABOUT LONGITUDINAL	17.05	120.88	41.35	50.38
ABOUT LATERAL	90.84	51.88	48.18	99.75
RIGHT LEG				
ABOUT LONGITUDINAL	38.90	75.38	39.75	46.38
ABOUT LATERAL	98.84	46.63	105.60	59.75
ANKLE LOADS (lb)				
LEFT LEG				
LATERAL	89.88	49.25	67.61	50.75
VERTICAL	1014.64	51.38	28.88	70.00
RIGHT LEG				
LATERAL	87.48	122.25	39.26	45.63
VERTICAL	1072.91	48.13	51.53	122.13
ANKLE MOMENTS (lb-ft)				
LEFT LEG				
ABOUT LONGITUDINAL	73.48	50.63	7.44	46.50
RIGHT LEG				
ABOUT LONGITUDINAL	10.99	122.13	62.92	46.63

* LONGITUDINAL: FORWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

**LONGITUDINAL: REARWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

$^{\alpha}$ There was no instrumentation at this location

$^{\gamma}$ See TEST ANOMALIES

SUBJECT VEHICLE

VISIBLE DUMMY CONTACT POINTS:

	DRIVER 43	PASSENGER 48
Head	Steering Wheel Rim	Windshield
Chest	Steering Wheel Hub	Upper Instrument Panel, Right Knee
Abdomen	Steering Wheel	None
Left Knee	Lower Instrument Panel	Glove Box
Right Knee	Lower Instrument Panel	Glove Box

DOOR OPENING:

	LEFT	RIGHT
Front	Tools Required	Difficult
Rear	DNA	DNA

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	None	Forward
Rear	DNA	DNA

GLAZING DAMAGE: Windshield shattered and seperated from molding along bottom edge.

OTHER NOTABLE IMPACT EFFECTS:

Steering wheel bent over, floorboard bent down to touch ground.

PARTNER VEHICLE

VISIBLE DUMMY CONTACT POINTS:

	DRIVER 45	PASSENGER 61
Head	Windshield	None
Chest	Steering Wheel Hub	None
Abdomen	Steering Wheel	None
Left Knee	Lower Instrument Panel	None
Right Knee	Lower Instrument Panel	None

DOOR OPENING:

	LEFT	RIGHT
Front	Easy	Easy
Rear	DNA	DNA

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	No	No
Rear	DNA	DNA

GLAZING DAMAGE: Windshield was broken

OTHER NOTABLE IMPACT EFFECTS:

SUBJECT VEHICLE DUMMY KINEMATIC SUMMARY

DRIVER

Upon impact the driver moved forward as his knees went into the lower instrument panel and his chest hit the steering wheel. The torso's forward motion was finally stopped by the seat belt but the dummy's head continued forward and struck the upper steering wheel rim. The dummy then rebounded and came to rest sitting upright in the driver's seat.

PASSENGER

During impact, the passenger moved forward as his knees went into the glove box and his head hit the windshield. The dummy's head rotated backward until the back of his head contacted his back while his chest appeared to contact the upper instrument panel and his right knee. The dummy came to rest sitting upright in the passenger's seat.

PARTNER VEHICLE DUMMY KINEMATIC SUMMARY

DRIVER

Upon impact, the driver moved forward as his knees went into the lower instrument panel and the chest hit the steering wheel. The dummy's head continued forward until it struck the windshield. The driver dummy came to rest leaning forward in the driver's seat.

PASSENGER

During impact, the passenger moved forward until the seat belt stopped the torso's forward motion. The dummy's head rotated forward about the neck as his chin appeared to contact his chest. The dummy rebounded and came to rest sitting upright in the passenger's seat.

DUMMY TEMPERATURE CONTROL AND POSITIONING

Both vehicles were taken outside to the impact area between 13:00 and 13:30 AM the day of the test. At this point heaters were placed inside the vehicles to maintain the temperature. The vehicles remained in this position until approximately 14:05. The partner vehicle was then moved back into the barrier building to be hooked to the tow track. The subject vehicle was left at the impact point until the test at 15:29.

The Hybrid III dummies were seated per the General Motors Procedure but no coordinates for the H-point were used to seat the dummy because the H-point coordinates are unique to General Motors testing. The GM seating procedure is in Appendix D of this report.

SUBJECT VEHICLE
DUMMY IN-VEHICLE POSITION

RECORDING SHEET

VEHICLE NHTSA NO. R & D MFR./MAKE/MODEL: Dodge Omni

SEAT TYPE: ___Bench
X Bucket
___Split Bench

ADJUSTER TYPE: X Manual
___Power

BUCKET SEAT BACK TYPE: X Fixed
___Adjustable Reclining

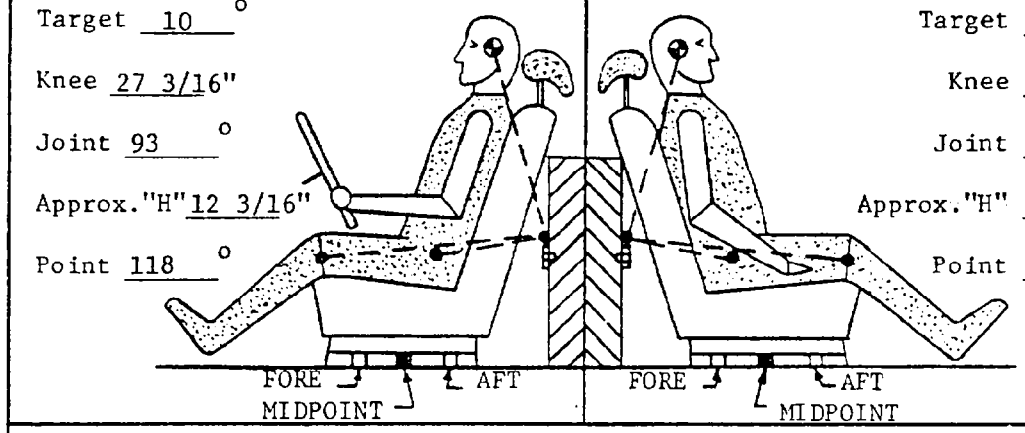
POSITIONING DATE: 4/10/85

AMBIENT TEMP.: 73° F. TIME: 6:45

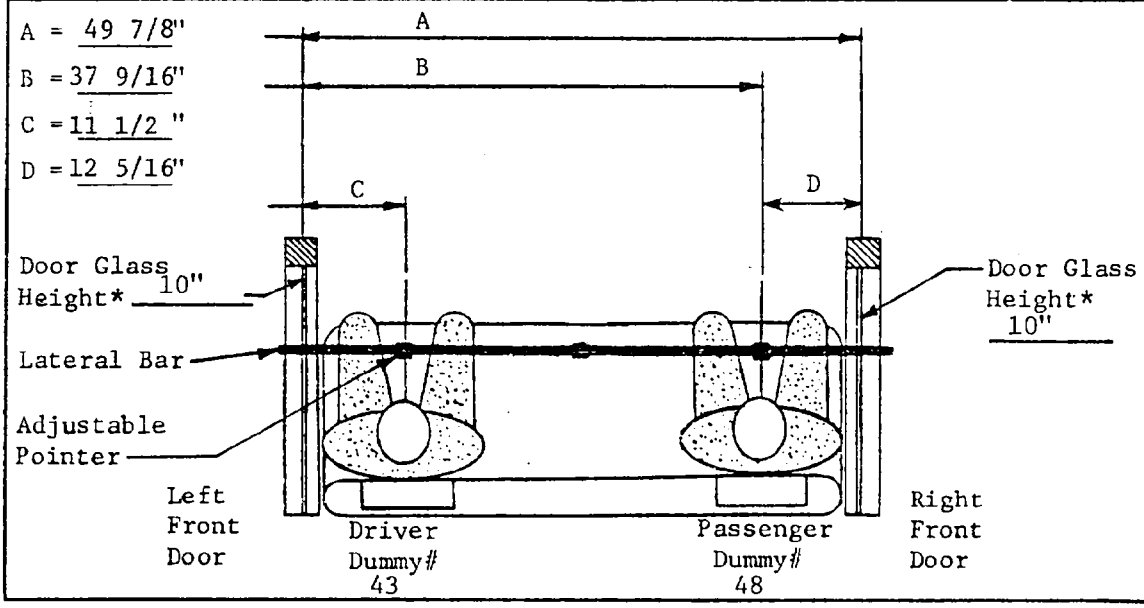
TECHNICIANS:
1. B. Miller
2. D. LeVally
3. R. Benavides
4.

DRIVER DUMMY # 43 TYPE HIII
Pelvis Angle 23°
Head 21 1/8"
Target 10°
Knee 27 3/16"
Joint 93°
Approx."H" 12 3/16"
Point 118°

PASSENGER DUMMY # 48 TYPE HIII
Pelvis Angle 24°
Head 20 7/16"
Target 11°
Knee 27 1/8"
Joint 94°
Approx."H" 12 1/8"
Point 119°



A = 49 7/8"
B = 37 9/16"
C = 11 1/2"
D = 12 5/16"



* Door glass height is equal on the right and left side of vehicle.

PARTNER VEHICLE
DUMMY IN-VEHICLE POSITION

RECORDING SHEET

VEHICLE NHTSA NO. R & D MFR./MAKE/MODEL: AMC Concord

SEAT TYPE: ___ Bench
X Bucket
___ Split Bench

ADJUSTER TYPE: X Manual
___ Power

BUCKET SEAT BACK TYPE: ___ Fixed
X Adjustable Reclining

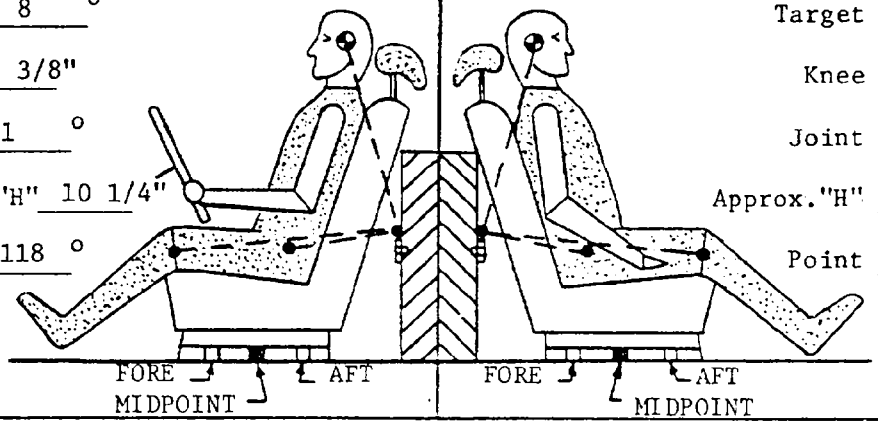
POSITIONING DATE: April 10, 1985

AMBIENT TEMP.: 73° F. TIME: 7:00

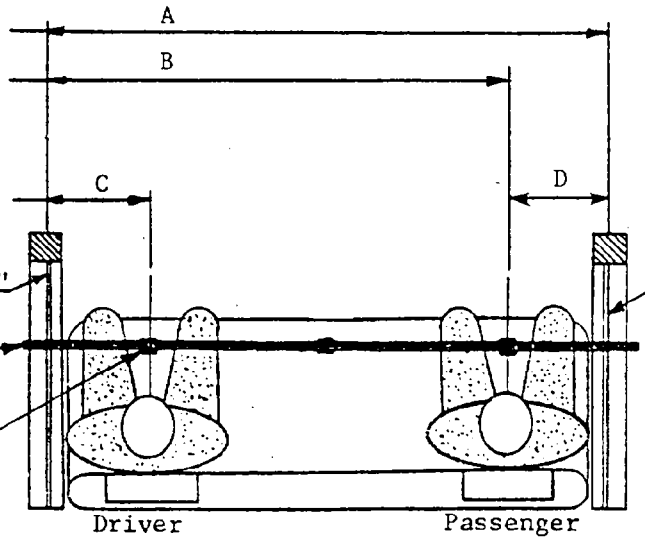
TECHNICIANS:
1. B. Miller
2. D. LeVally
3. R. Benavides
4. ____

DRIVER DUMMY # 45 TYPE HIII
Pelvis Angle 23°
Head 20 3/8"
Target 8°
Knee 24 3/8"
Joint 91°
Approx."H" 10 1/4"
Point 118°

PASSENGER DUMMY # 61 TYPE HIII
Pelvis Angle 23°
Head 21 3/16
Target 7°
Knee 25 1/4"
Joint 92°
Approx."H" 10 9/16"
Point 117°



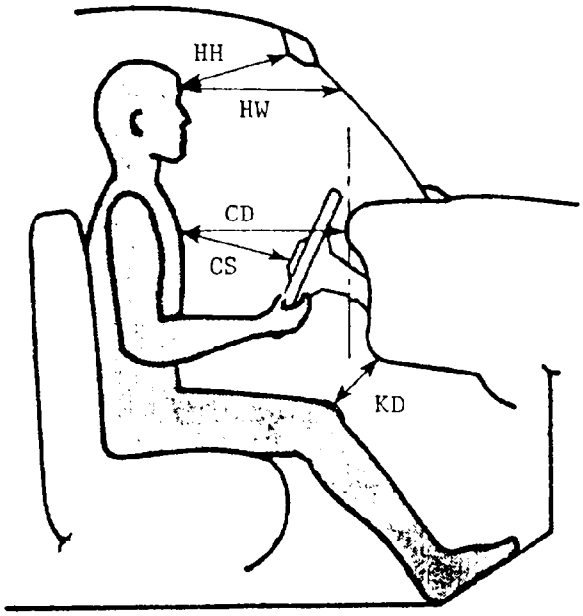
A = 54 1/16
B = 40 3/16
C = 14 1/2"
D = 13 7/8"



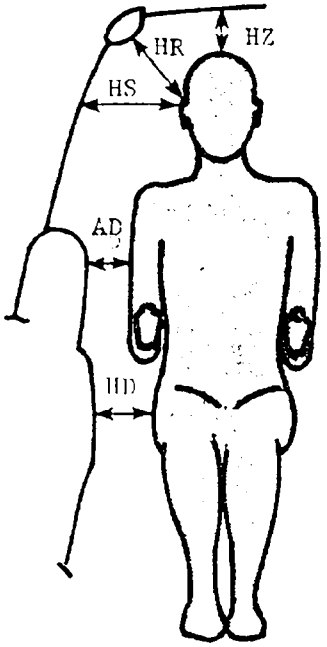
* Door glass height is equal on the right and left side of vehicle.

SUBJECT VEHICLE
DUMMY IN-VEHICLE POSITION RECORDING SHEET

	DRIVER 43	PASSENGER 48
HH	11 1/4	11 1/4
HW	17	17
CD	17 3/8	21 11/16
CS	15 1/4	NA
KDL	5 1/4	6 1/4
KDR	6	6



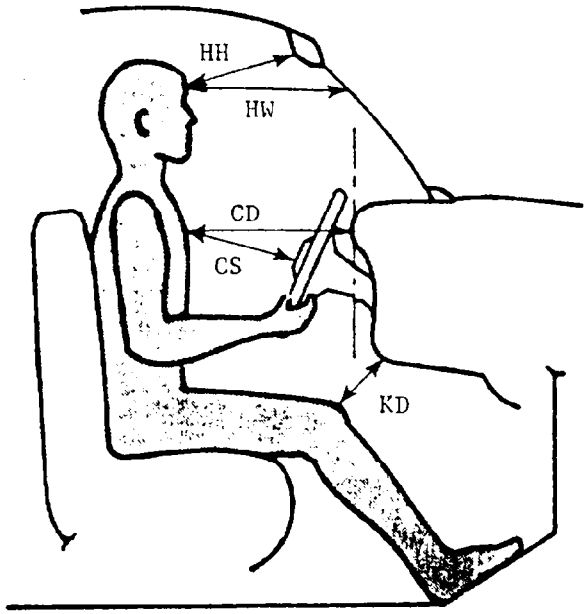
	DRIVER 45	PASSENGER 48
HR	7	7
HS	8 1/2	8 3/4
AD	2 1/4	3 5/8
HD	6 1/8	6 5/8
HZ	3 3/4	3



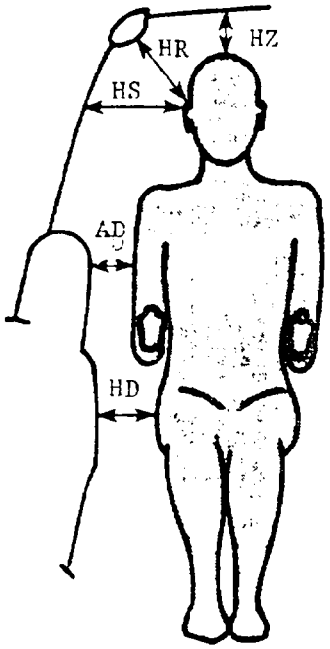
ALL MEASUREMENTS IN INCHES

PARTNER VEHICLE
DUMMY IN-VEHICLE POSITION RECORDING SHEET

	DRIVER 45	PASSENGER 61
HH	11 1/2	11 13/16
HW	20 1/4	20
CD	21 3/4	21 1/4
CS	13 11/16	NA
KDL	8 15/16	8 1/2
KDR	8 3/8	8 1/4

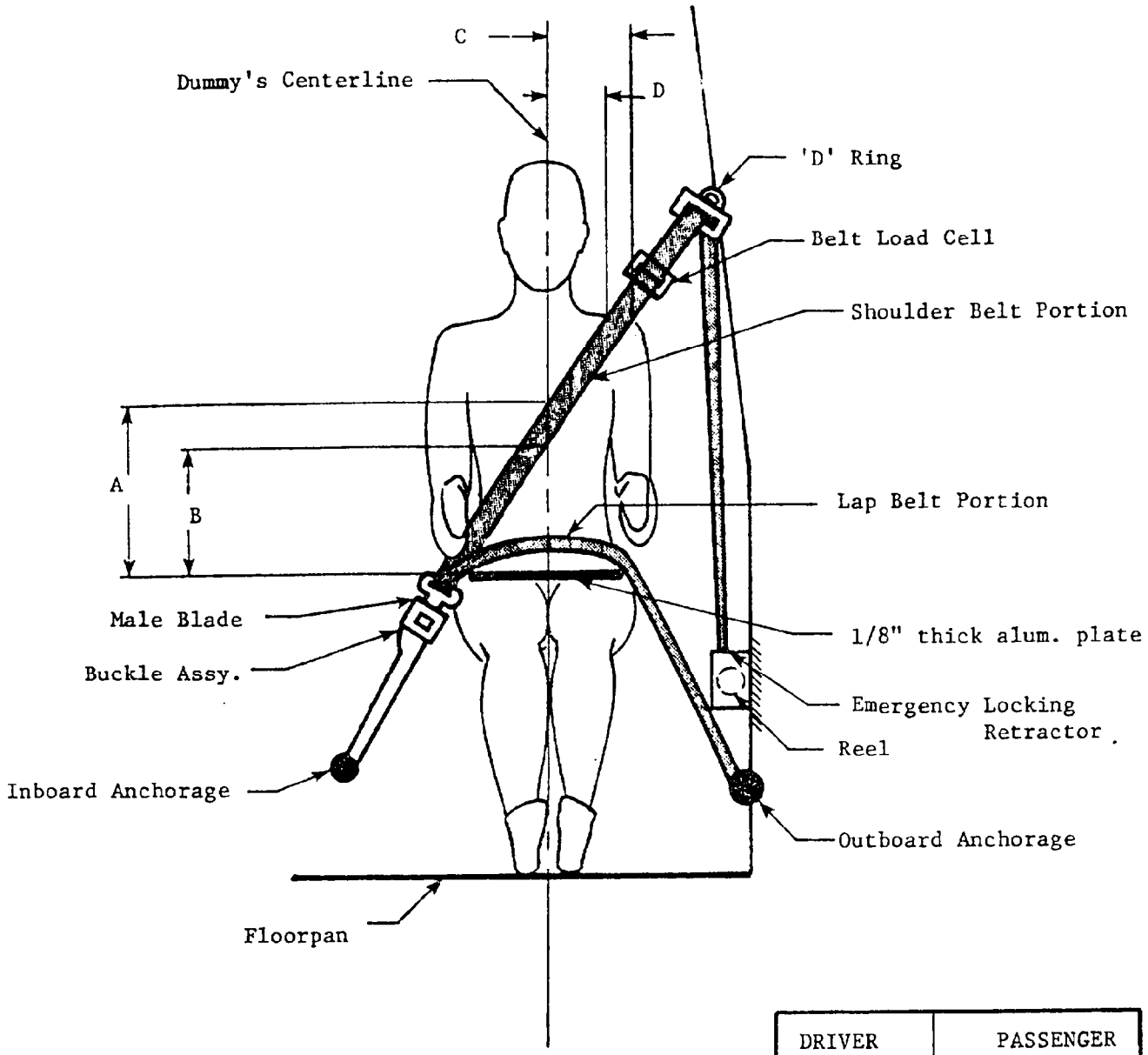


	DRIVER 45	PASSENGER 61
HR	7 1/2	6 5/8
HS	11 9/16	10 5/8
AD	4 13/16	4 1/4
HD	7 3/8	6 1/4
HZ	3 3/4	3



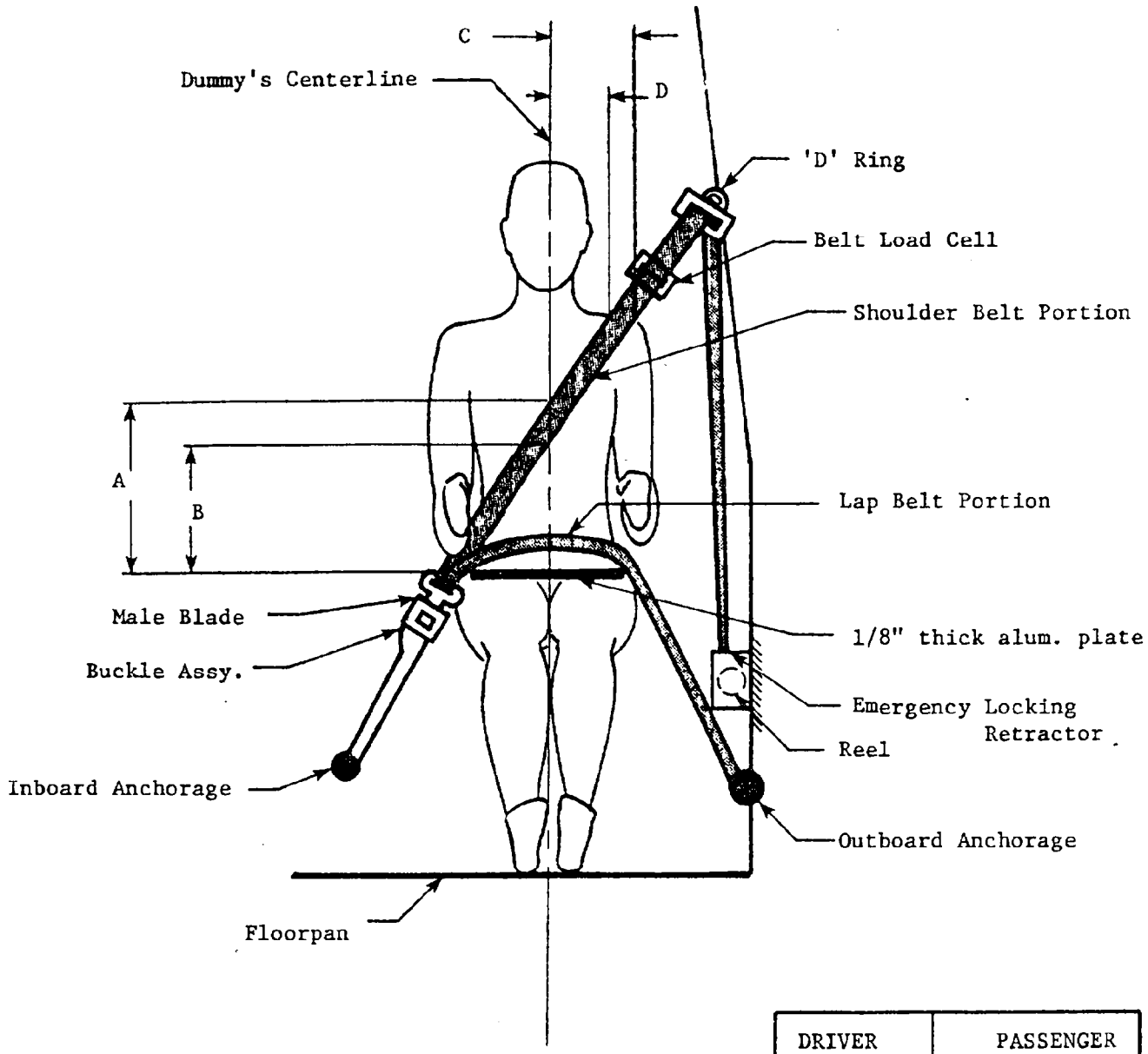
ALL MEASUREMENTS IN INCHES

SUBJECT VEHICLE
SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - Top surface of alum. plate to belt upper edge (in)	11 3/4"	DNA
B - Top surface of alum. plate to belt lower edge (in)	8 3/4"	DNA
C - Dummy centerline to outer edge of belt at chest flesh top (in)	6 1/4"	DNA
D - Dummy centerline to inner edge of belt at chest flesh top (in)	3 3/4"	DNA
LAP BELT TENSION (lbs)	3	DNA
SHOULDER BELT TENSION (lbs)	1	DNA

PARTNER VEHICLE
SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - Top surface of alum. plate to belt upper edge (in)	DNA	12 1/4"
B - Top surface of alum. plate to belt lower edge (in)	DNA	9 1/4"
C - Dummy centerline to outer edge of belt at chest flesh top (in)	DNA	6"
D - Dummy centerline to inner edge of belt at chest flesh top (in)	DNA	3"
LAP BELT TENSION (lbs)	DNA	3
SHOULDER BELT TENSION (lbs)	DNA	1

SUBJECT VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION*** MAX (g)	POSITIVE DIRECTION*** TIME (msec)	NEGATIVE DIRECTION*** MAX (g)	NEGATIVE DIRECTION*** TIME (msec)
1	FORWARD FRAME RAIL (LONGITUDINAL)	151.8	-19.5	18.4	102.52	18.38	216.70	24.38
2	FRONT FRAME CROSSMEMBER (LONGITUDINAL)	128.5	0.0	4.7	---	---γ	---	---γ
3	BRAKE CALIPER; FRONT RIGHT (LONGITUDINAL)	133.5	-24.5	10.8	---	---γ	---	---γ
4	ENGINE BOTTOM (LONGITUDINAL)	140.5	0.0	5.8	---	---γ	---	---γ
5	ENGINE BLOCK TOP (LONGITUDINAL)	138.5	-0.5	30.5	34.38	69.88	81.24	41.75
6	STEERING COLUMN; LOWER (A-P AXIS)	107.6	13.5	22.1	11.37	90.13	63.58	48.38
7	STEERING WHEEL HUB	97.6	13.5	31.5				
	(A-P AXIS)				19.23	75.63	51.30	42.00
	(I-S AXIS)				14.84	73.63	35.89	65.13
8	STEERING COLUMN DISPLACEMENT (A-P AXIS)				---	---α	---	---α
9	DASH PANEL	107.5	0.0	36.9				
	(LONGITUDINAL)				69.39	87.00	125.51	75.13
	(VERTICAL)				41.85	71.88	61.87	78.13
10	PITCH RATE GYRO	90.0	0.0	16.1	59.29	67.25	100.61	53.88
11	B-PILLAR SILL - LEFT	73.1	23.5	10.3				
	(LONGITUDINAL)	Δ V = 33.2 mph @ 119.75 msec			6.73	136.50	31.76	40.50
	(VERTICAL)				20.48	18.75	15.70	14.50
12	B-PILLAR SILL - RIGHT	73.0	-23.5	10.5				
	(LONGITUDINAL)	Δ V = 33.5 mph @ 125.50 msec			4.09	179.50	33.70	38.25
13	REAR SEAT LEFT CROSSMEMBER	60.9	16.0	16.5				
	(LONGITUDINAL)P**	Δ V = 34.3 mph @ 122.75 msec			2.41	171.50	29.91	41.38
	(VERTICAL)				21.55	62.38	14.33	55.63
14	REAR SEAT LEFT CROSSMEMBER	49.9	14.5	13.0				
(LONGITUDINAL)R**					2.57	182.13	31.33	40.25

SUBJECT VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY CONTD

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION*** MAX (g)	POSITIVE DIRECTION*** TIME (msec)	NEGATIVE DIRECTION*** MAX (g)	NEGATIVE DIRECTION*** TIME (msec)
15	REAR SEAT RIGHT CROSSMEMBER (LONGITUDINAL)P**	60.3	-15.5	14.8 ΔV = 34.6 mph @ 125.25 msec	2.79	179.13	31.10	44.38
16	REAR SEAT RIGHT CROSSMEMBER (LONGITUDINAL)R**	49.3	-15.0	12.0	3.47	189.75	28.02	38.75
17	REAR AXLE CENTERLINE (LONGITUDINAL)	42.6	0.0	6.3	6.29	120.75	30.99	43.88

* REFERENCE: X - REAR BUMPER (+ FORWARD), Y - VEHICLE CENTERLINE (+ TO LEFT), Z - GROUND LEVEL (+ UP)

** (P) = PRIMARY SENSOR, (R) = REDUNDANT SENSOR

*** POSITIVE DIRECTION LONGITUDINAL: FORWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD
NEGATIVE DIRECTION LONGITUDINAL: REARWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS IN INCHES.

γ See TEST ANOMALIES

α There was no instrumentation at this location.

PARTNER VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION*** MAX (g)	POSITIVE DIRECTION*** TIME (msec)	NEGATIVE DIRECTION*** MAX (g)	NEGATIVE DIRECTION*** TIME (msec)
1	FORWARD FRAME RAIL (LONGITUDINAL)	155.0	-14.0	17.3	2.16	175.13	33.51	18.25
2	FRONT FRAME CROSSMEMBER (LONGITUDINAL)	147.0	0.0	6.9	---	---γ	---	---γ
3	BRAKE CALIPER; FRONT RIGHT (LONGITUDINAL)	150.5	-21.5	13.5	8.59	164.38	54.02	46.88
4	ENGINE BOTTOM (LONGITUDINAL)	139.5	0.0	6.9	---	---γ	---	---γ
5	ENGINE BLOCK TOP (LONGITUDINAL)	154.4	3.5	28.5	7.98	57.38	64.08	42.75
6	STEERING COLUMN; LOWER (A-P AXIS)	149.5	11.5	19.1	3.49	176.63	57.58	24.00
7	STEERING WHEEL HUB	105.5	13.0	36.5				
	(A-P AXIS)				33.43	72.00	59.14	106.13
	(I-S AXIS)				45.30	71.00	21.12	39.00
8	STEERING COLUMN DISPLACEMENT (A-P AXIS)				---	---α	---	---α
9	DASH PANEL	114.9	0.0	40.3				
	(LONGITUDINAL)				40.96	106.50	40.95	40.38
	(VERTICAL)				63.24	106.38	73.87	89.25
10	PITCH RATE GYRO	118.1	0.0	23.9	44.37	52.38	59.52	65.00
11	B-PILLAR SILL - LEFT	86.0	25.5	11.0				
	(LONGITUDINAL)	Δ V = 27.9 mph @ 340.00 msec			1.32	173.13	37.32	23.13
	(VERTICAL)				---	---α	---	---α
12	B-PILLAR SILL - RIGHT	85.5	-25.5	10.3				
	(LONGITUDINAL)	Δ V = 28.6 mph @ 330.63 msec			---	---×	29.03	42.88
13	REAR SEAT LEFT CROSSMEMBER	67.0	17.5	13.5				
	(LONGITUDINAL)P**	Δ V = 28.2 mph @ 145.25 msec			1.76	173.63	28.05	23.25
	(VERTICAL)				9.73	30.75	8.28	8.13
14	REAR SEAT LEFT CROSSMEMBER	58.0	17.4	13.8				
	(LONGITUDINAL)R**				2.81	186.38	29.20	23.25

PARTNER VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY CONTD

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION*** MAX (g)	POSITIVE DIRECTION*** TIME (msec)	NEGATIVE DIRECTION*** MAX (g)	NEGATIVE DIRECTION*** TIME (msec)
15	REAR SEAT RIGHT CROSSMEMBER (LONGITUDINAL)P**	66.8	-16.8	11.8 ΔV = 29.2 mph @ 339.13 msec	1.84	173.38	25.47	43.63
16	REAR SEAT RIGHT CROSSMEMBER (LONGITUDINAL)R**				---	---$^{\alpha}$	---	---$^{\alpha}$
17	REAR AXLE CENTERLINE (LONGITUDINAL)				---	---$^{\alpha}$	---	---$^{\alpha}$

* REFERENCE: X - REAR BUMPER (+ FORWARD), Y - VEHICLE CENTERLINE (+ TO LEFT), Z - GROUND LEVEL (+ UP)

** (P) = PRIMARY SENSOR, (R) = REDUNDANT SENSOR

*** POSITIVE DIRECTION LONGITUDINAL: FORWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD
NEGATIVE DIRECTION LONGITUDINAL: REARWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

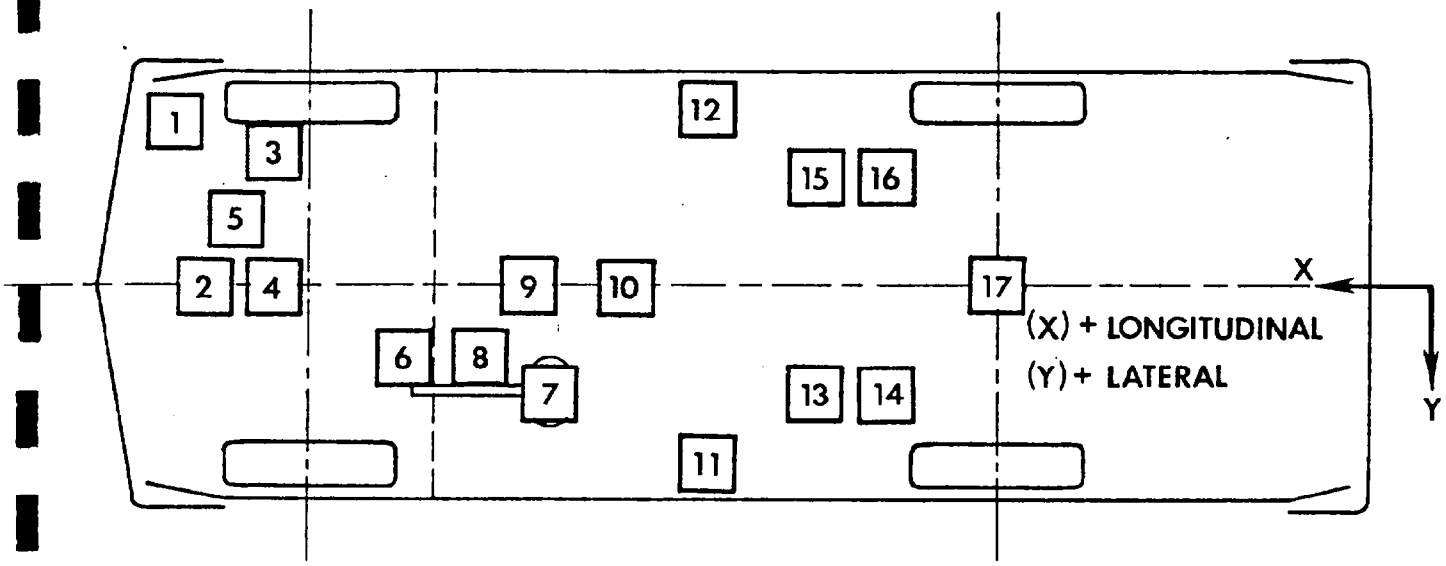
ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS IN INCHES.

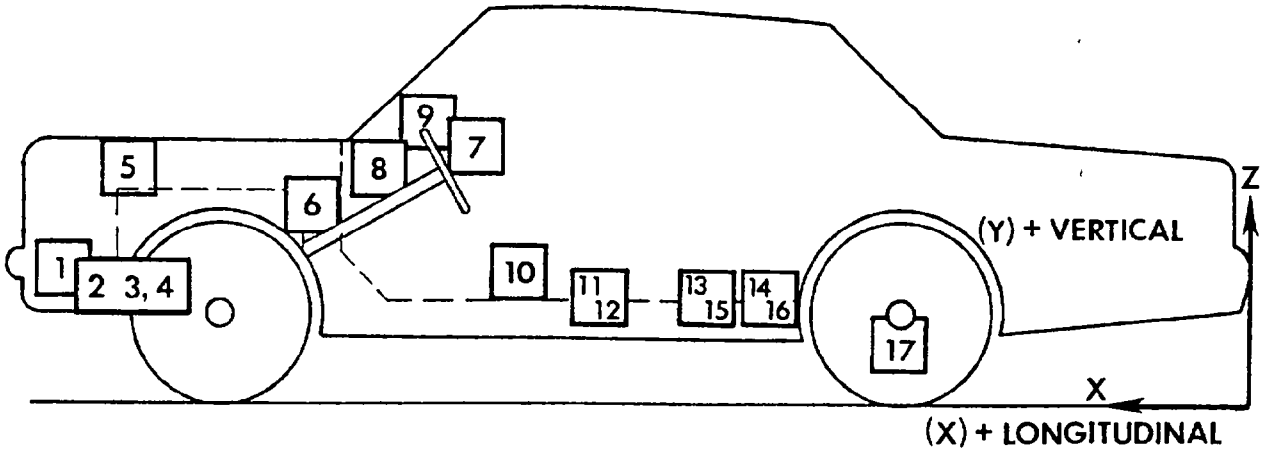
$^{\gamma}$ See TEST ANOMALIES

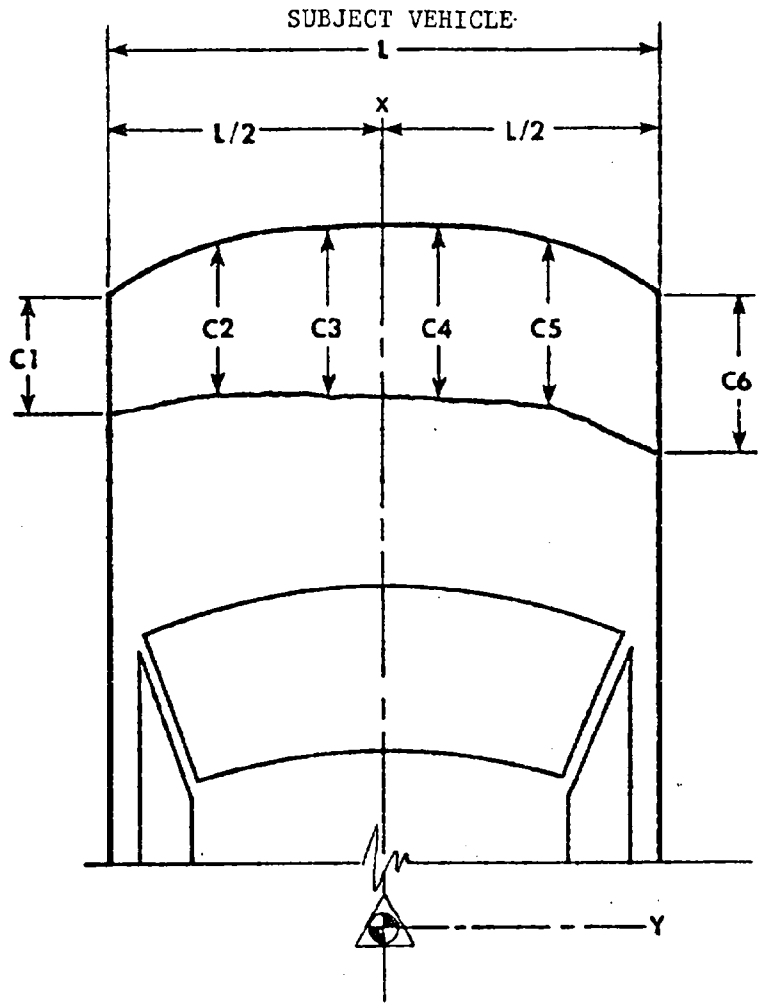
$^{\alpha}$ There was no instrumentation at this location.

$^{\times}$ There were no positive values in the time interval of interest.

VEHICLE ACCELEROMETER LOCATIONS







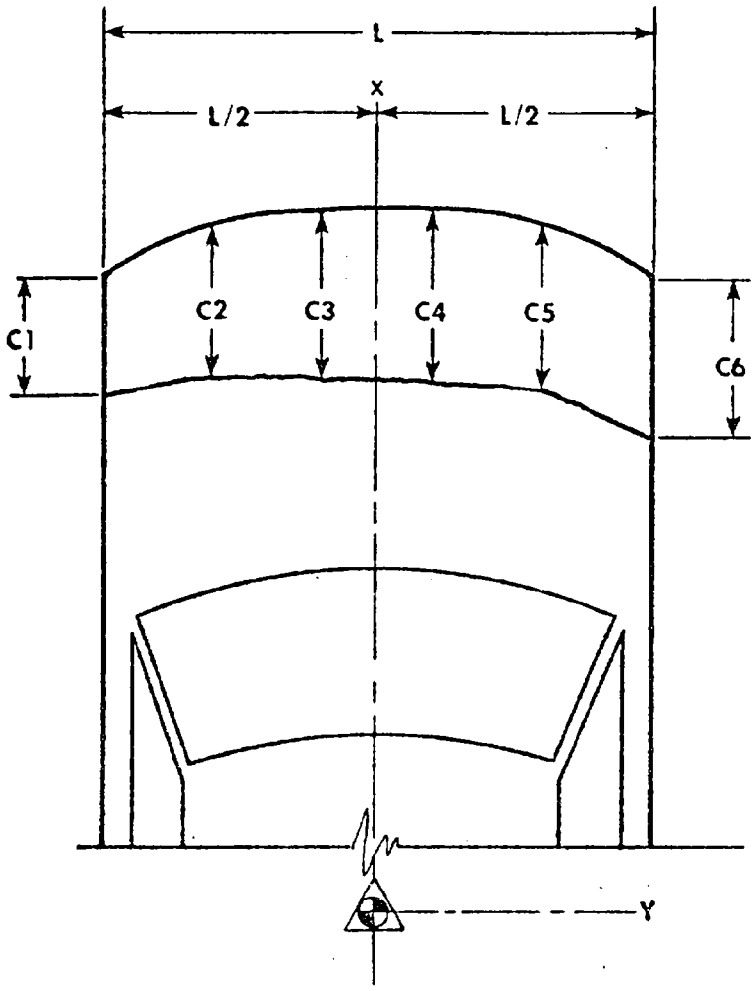
NOTE: C1 through C6 are spaced equally apart
All measurements in inches

VEHICLE Dodge Omni

	PRE-TEST	POST-TEST	CRUSH
L	54 3/4	53 3/4	1
C1	162 1/4	139 1/2	22 3/4
C2	163 1/4	137 11/16	25 9/16
C3	163 1/2	138 1/4	25 1/4
C4	163 1/2	138 5/8	24 7/8
C5	162 7/8	138 3/4	24 1/8
C6	162	138 3/8	23 5/8
D	0	0	0

Reference point is from the rear bumper forward.

PARTNER VEHICLE



NOTE: C1 through C6 are spaced equally apart
All measurements in inches

VEHICLE AMC Concord

	PRE-TEST	POST-TEST	CRUSH
L	60	60 3/8	-3/8
C1	180 1/4	169 1/4	11
C2	182 5/8	171 1/2	11 1/8
C3	181 5/8	170 5/8	11
C4	181 5/8	170 1/2	11 1/8
C5	182 1/2	171 1/4	11 1/4
C6	179 3/4	168 3/8	11 3/8
D	0	0	0

Reference point is from the rear bumper forward.

SUBJECT VEHICLE

IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL Dodge Omni TEST NUMBER 850410

DIMENSIONS IN INCHES

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST
X 1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	163 3/4	138 3/8
X 2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	142 1/2	128 5/8
X 3	REAR SURFACE OF VEHICLE TO FIREWALL	125	114 1/4
X 4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	107 7/8	107 1/2
X 5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	108 1/4	107 11/16
X 6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	110 1/8	109 7/16
X 7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	110 5/8	110
X 8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	71 9/16	71 1/8
X 9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	71 7/8	71 1/2
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	71 3/8	70 13/16
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	71 3/4	71 1/8
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF RIGHT SIDE	110 1/2	110
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF LEFT SIDE	110 3/16	110 7/16
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	125 1/4	118
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	125 1/4	120
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	97 9/16	95 5/8
Y17	STEERING COLUMN TO "A" POST	15 1/8	13 3/8

IMPACTED VEHICLE MEASUREMENTS CONTD

VEHICLE MAKE/MODEL Dodge Omni TEST NUMBER 850410

DIMENSIONS IN INCHES

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST
Z18	REAR OF WINDSHIELD HEADER TO STEERING WHEEL CENTER	20 1/4	18 13/16
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	162	138 3/8
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	162 1/4	139 1/2
X21	WIDTH OF ENGINE BLOCK	6	6
Z22	RIGHT FRONT SILL TO GROUND PLANE	8 3/4	7 1/4
Z23	LEFT FRONT SILL TO GROUND PLANE	8 3/4	8 3/16
Z24	RIGHT REAR SILL TO GROUND PLANE	8 7/8	8 1/8
Z25	LEFT REAR SILL TO GROUND PLANE	8 3/4	8 3/4
X26	FIREWALL TO ENGINE OR TRANSAXLE	11	2
Z27	VERTICAL DIMENSION FROM DOOR SILL TO CENTERLINE OF STEERING COLUMN	18 9/16	20 7/8
X28	WHEELBASE OF VEHICLE	98 15/16	94 1/2
Y29	WIDTH OF VEHICLE AT MAXIMUM WIDTH POINT	66 1/16	66 1/16
X30	REAR SURFACE OF VEHICLE TO ENGINE TARGET	NR*	NR*
X31	REAR SURFACE OF VEHICLE TO COMPARTMENT TARGET	NR*	NR*
X32	REAR SURFACE OF VEHICLE TO BUMPER TARGET	NR*	NR*
X33	REAR SURFACE OF VEHICLE TO FRAME CROSSMEMBER	NR*	NR*

*The Subject Vehicle did not have targets at this location.

PARTNER VEHICLE

IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL AMC Concord TEST NUMBER 850410

DIMENSIONS IN INCHES

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST
X 1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	182	170 3/4
X 2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	161	159
X 3	REAR SURFACE OF VEHICLE TO FIREWALL	132	130 7/8
X 4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	119 11/16	119 3/4
X 5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	119 7/8	119 11/16
X 6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	124 3/8	124
X 7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	124	123 13/16
X 8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	81 5/16	81 3/16
X 9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	81 1/4	81 1/8
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	81 3/8	81 1/16
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	81 1/4	81
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF RIGHT SIDE	122 3/4	122 1/2
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF LEFT SIDE	122 3/4	122 9/16
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	133 1/2	132
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	133	132
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	105 1/2	111 1/4
Y17	STEERING COLUMN TO "A" POST	14	15 1/4

PARTNER VEHICLE

IMPACTED VEHICLE MEASUREMENTS CONTD

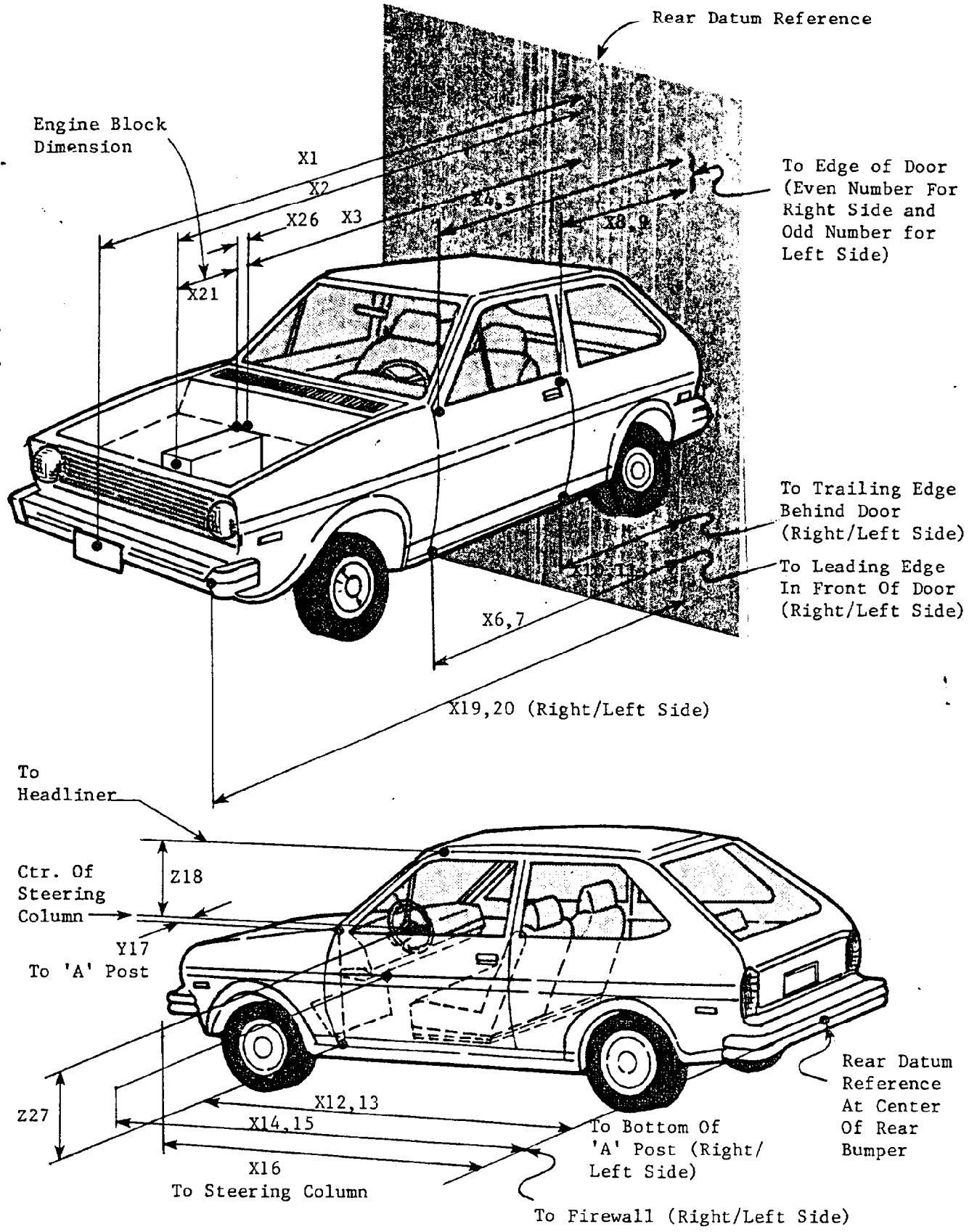
VEHICLE MAKE/MODEL AMC Concord TEST NUMBER 850410

DIMENSIONS IN INCHES

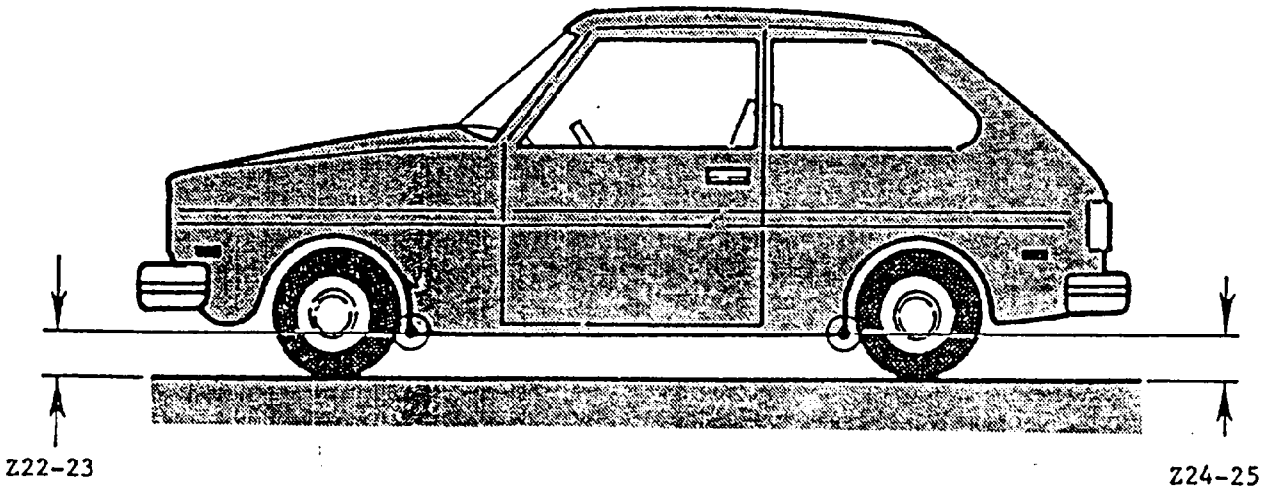
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST
Z18	REAR OF WINDSHIELD HEADER TO STEERING WHEEL CENTER	16 3/4	21 1/16
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	179 3/4	168 3/8
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	180 1/4	169 1/4
X21	LENGTH OF ENGINE BLOCK	26	26
Z22	RIGHT FRONT SILL TO GROUND PLANE	9 3/8	9 1/8
Z23	LEFT FRONT SILL TO GROUND PLANE	10 1/4	9 7/16
Z24	RIGHT REAR SILL TO GROUND PLANE	8 9/16	8 1/2
Z25	LEFT REAR SILL TO GROUND PLANE	9 5/8	9 13/16
X26	FIREWALL TO ENGINE OR TRANSAXLE	1	1/2
Z27	VERTICAL DIMENSION FROM DOOR SILL TO CENTERLINE OF STEERING COLUMN	20 3/16	17 1/2
X28	WHEELBASE OF VEHICLE	109	108 5/8
Y29	WIDTH OF VEHICLE AT MAXIMUM WIDTH POINT	71 5/8	71 5/8
X30	REAR SURFACE OF VEHICLE TO ENGINE TARGET	NR*	NR*
X31	REAR SURFACE OF VEHICLE TO COMPARTMENT TARGET	NR*	NR*
X32	REAR SURFACE OF VEHICLE TO BUMPER TARGET	NR*	NR*
X33	REAR SURFACE OF VEHICLE TO FRAME CROSSMEMBER	NR*	NR*

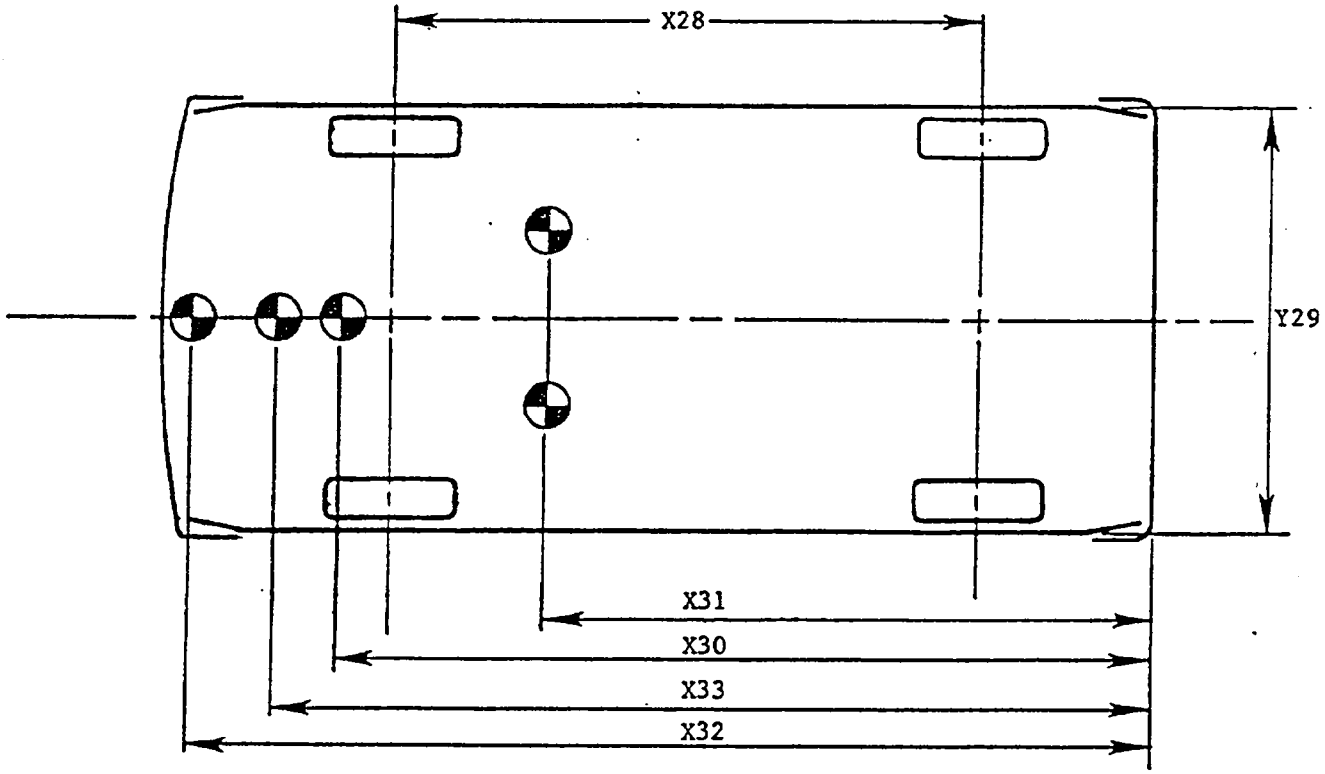
*The Partner Vehicle did not have targets at this location.

PRE-TEST AND POST-TEST MEASUREMENT POINTS



PRE-TEST AND POST-TEST MEASUREMENT POINTS CONTD.





CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Left Closeup	Photosonic 1B	25	1003	Bumper Engagement
2	Left	Photosonic 1B	13	980	Vehicle Crush
3	Left Closeup Partner	Photosonic 1B	25	1013	Dummy Kinematics
4	Onboard Partner Vehicle	Photosonic 1B	8	1000	Dummy Kinematics
5	Right	Photosonic 1B	17	933	Bumper Engagement
6	Onboard Subject Pass.	Photosonic 1B	5	1005	Dummy Kinematics
7	Right Overall	Hycam	16	478	Vehicle Dynamics
8	Right Closeup Partner	Photosonic 1B	50	983	Dummy Kinematics
9	Onboard Partner Pass	Photosonic 1B	8	1000	Dummy Kinematics
10	Right Closeup Subject	Hycam	50	498	Dummy Kinematics
11	Onboard Subject Driver	Photosonic 1B	8	998	Dummy Kinematics
12	Left Closeup Subject	Photosonic 1B	50	875	Dummy Kinematics
13	Overhead	Photosonic 1B	13	1013	Vehicle Crush
14	Right	Bolex	16	24	Real Time

Camera orientation is referenced to dummy positions in the partner vehicle.

NOTE: See page D-15 for camera LED information.

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	X*	Y*	Z*
1	8"	-21'11"	36"
2	13'	-24'4"	34"
3	-11'8"	-23'5"	78"
5	-4'6"	38'4"	36"
7	2'	47'	47"
8	-18'7"	41'6"	74"
10	13'5"	16'6"	74"
12	13'	-17'3"	73"
13	3'	0	30'
14	-1'6"	54'	56"

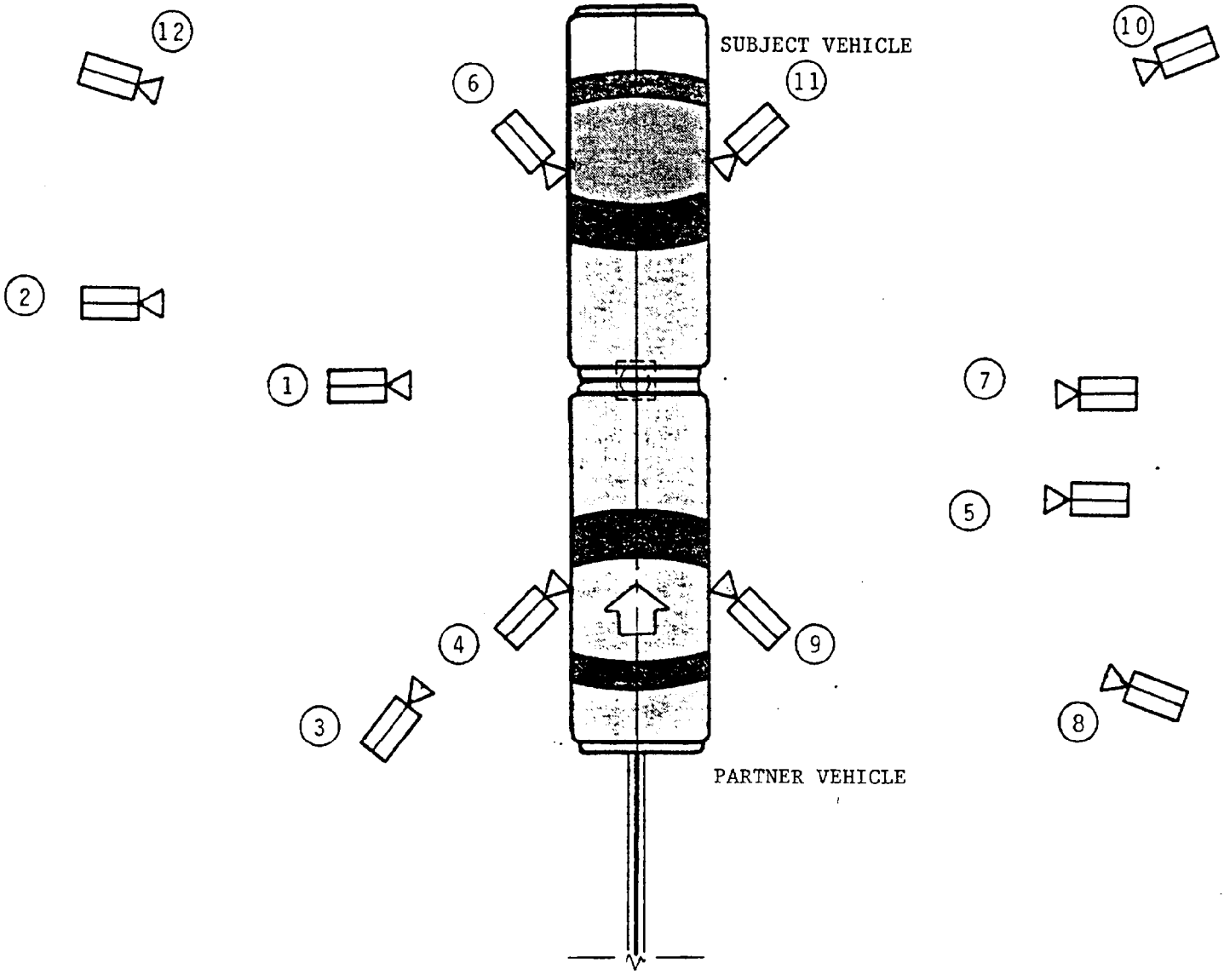
*Reference

+X = Forward with respect to the partner vehicle impact point.

+Y = Rightward from intended vehicle centerlines.

+Z = Upward from ground level

CAMERA POSITION DIAGRAM



TEST ANOMALIES

SUBJECT VEHICLE

The driver's left femur force transducer, LFMF1, did not record accurate data after 70 msec due to a faulty connector.

The passenger's head CG X-axis accelerometer, HEDXG2, recorded no data due to a faulty electronics card.

The passenger's position 3 X-axis accelerometer, HD3XG2, failed to record data after 75 msec due to a faulty electronics card.

The lower engine X-axis accelerometer, ENGXG2, failed to record data after 55 msec due to a cut cable.

The front frame crossmember X-axis accelerometer, FFCXG, failed to record data after 60 msec due to a cut cable.

The brake caliper X-axis accelerometer, BCRXG, failed to record data after 55 msec due to a cut cable.

PARTNER VEHICLE

The passenger's right femur force transducer, RFMF2, failed to record data after 55 msec due to a faulty connector.

The lower engine X-axis accelerometer, ENGXG2, failed to record data between 80 and 115 msec due to a crushed cable.

The front frame crossmember X-axis accelerometer, FFCXG, did not record data throughout the test due to a cut cable.

The following channels contain anomalous spikes at approximately 214 msec:

HEDXG1, Driver's X-axis head accelerometer
HEDZG1, Driver's Z-axis head accelerometer
HD2ZG1, Driver's Z-axis position 2 head accelerometer
CSTXG1, Driver's X-axis chest accelerometer
CSTYG1, Driver's Y-axis chest accelerometer
CSTZG1, Driver's Z-axis chest accelerometer
HEDXG2, Passenger's X-axis head accelerometer
HEDYG2, Passenger's Y-axis head accelerometer
HEDZG2, Passenger's Z-axis head accelerometer
CSTXG2, Passenger's X-axis chest accelerometer
CSTYG2, Passenger's Y-axis chest accelerometer
CSTZG2, Passenger's Z-axis chest accelerometer
LFMF2, Passenger's left femur force

APPENDIX A

PHOTOGRAPHS

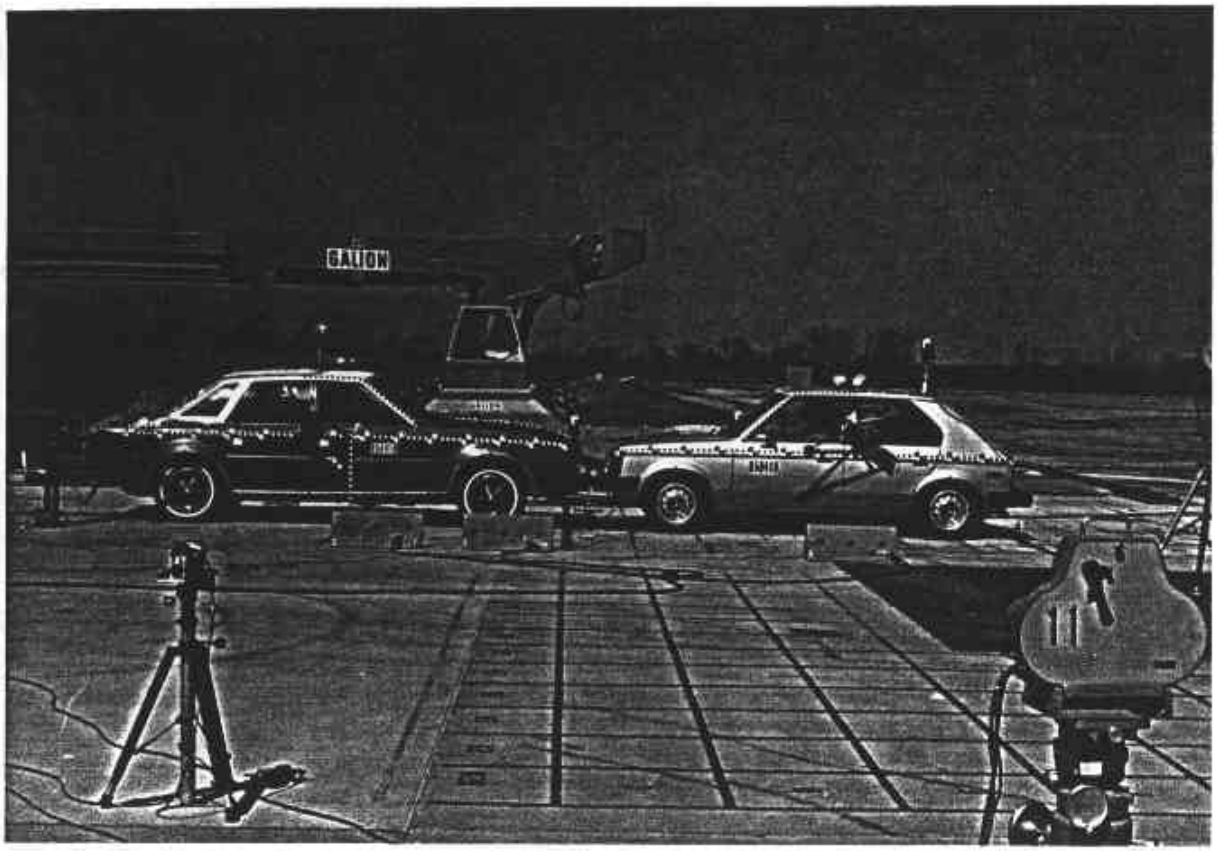


Figure A-1. PRE-TEST GENERAL OVERALL

Figure A-2. POST-TEST GENERAL OVERALL

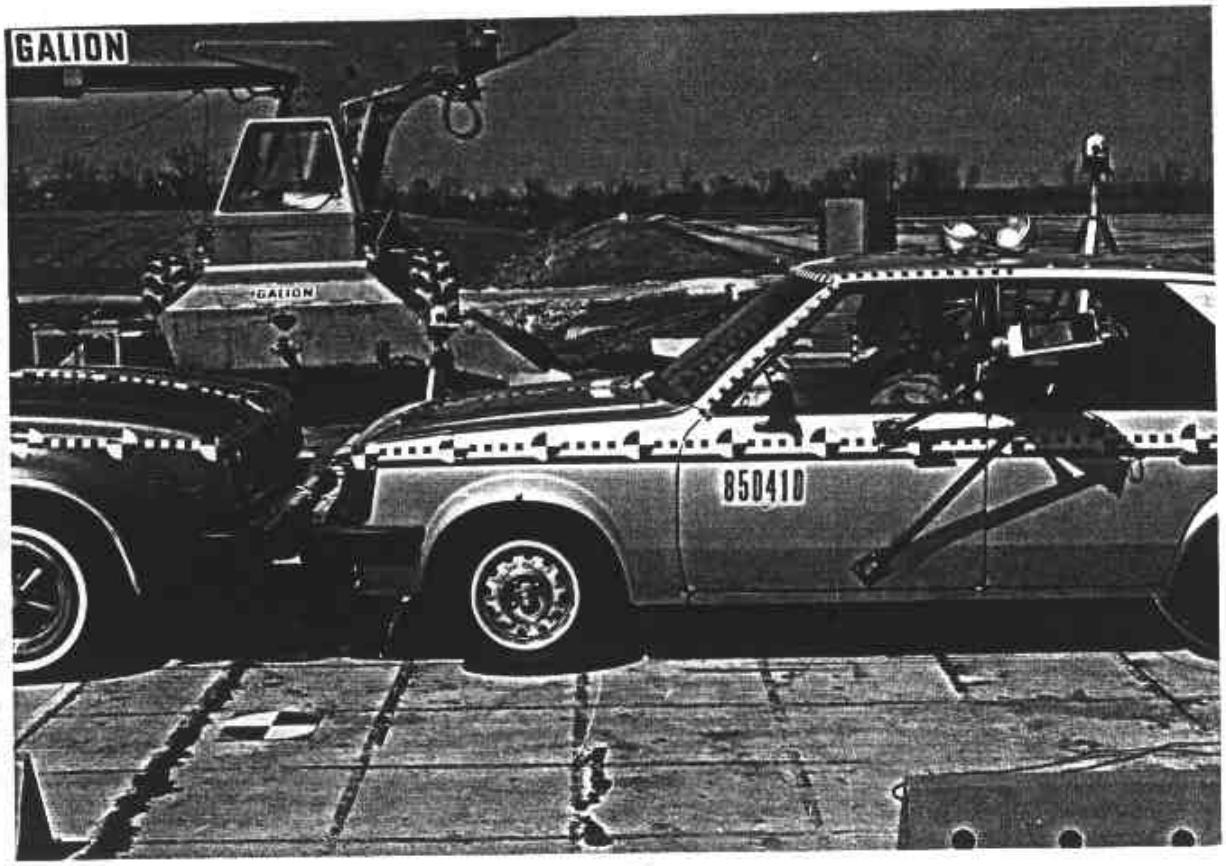


Figure A-3. PRE-TEST SUBJECT VEHICLE LEFT SIDE

Figure A-4. POST-TEST SUBJECT VEHICLE LEFT SIDE

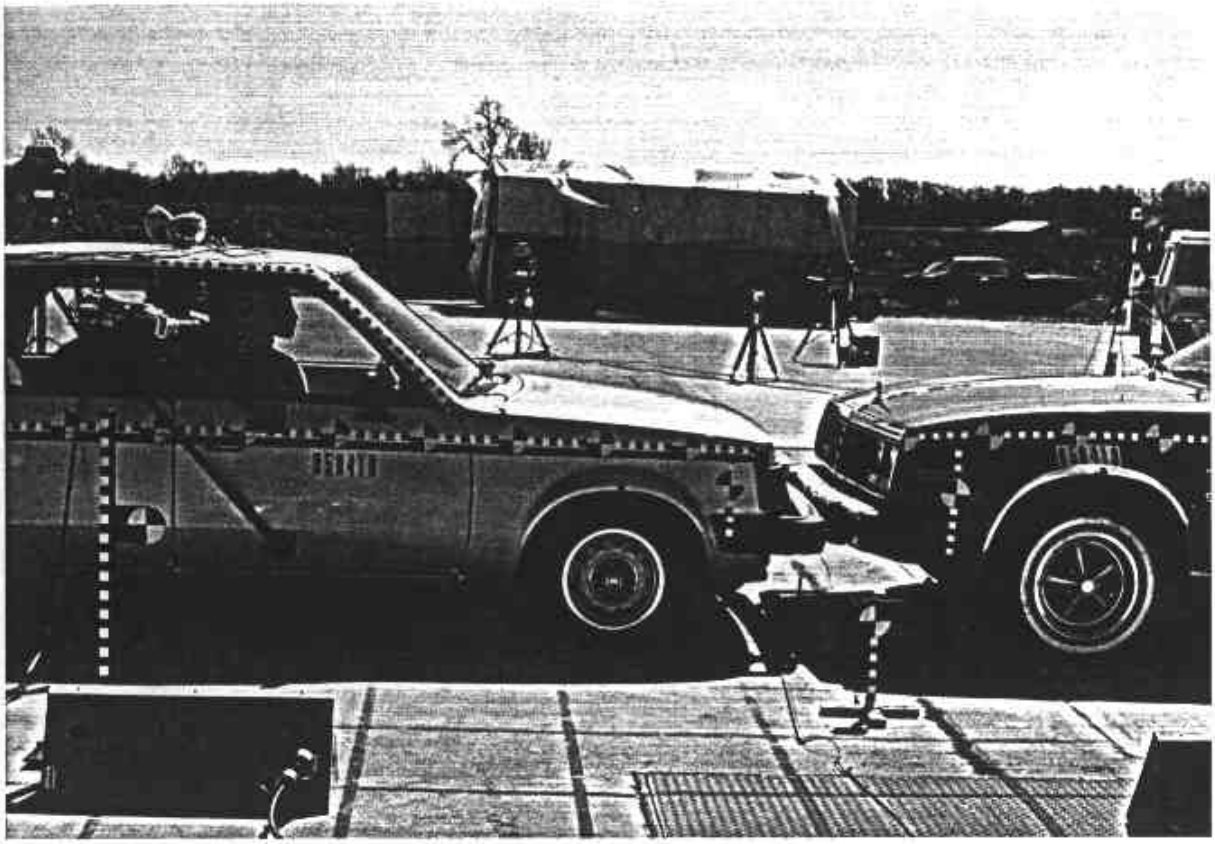


Figure A-5. PRE-TEST SUBJECT VEHICLE RIGHT SIDE

Figure A-6. POST-TEST SUBJECT VEHICLE RIGHT SIDE

Figure A-7. PRE-TEST SUBJECT VEHICLE FRONT VIEW

Figure A-8. POST-TEST SUBJECT VEHICLE FRONT VIEW

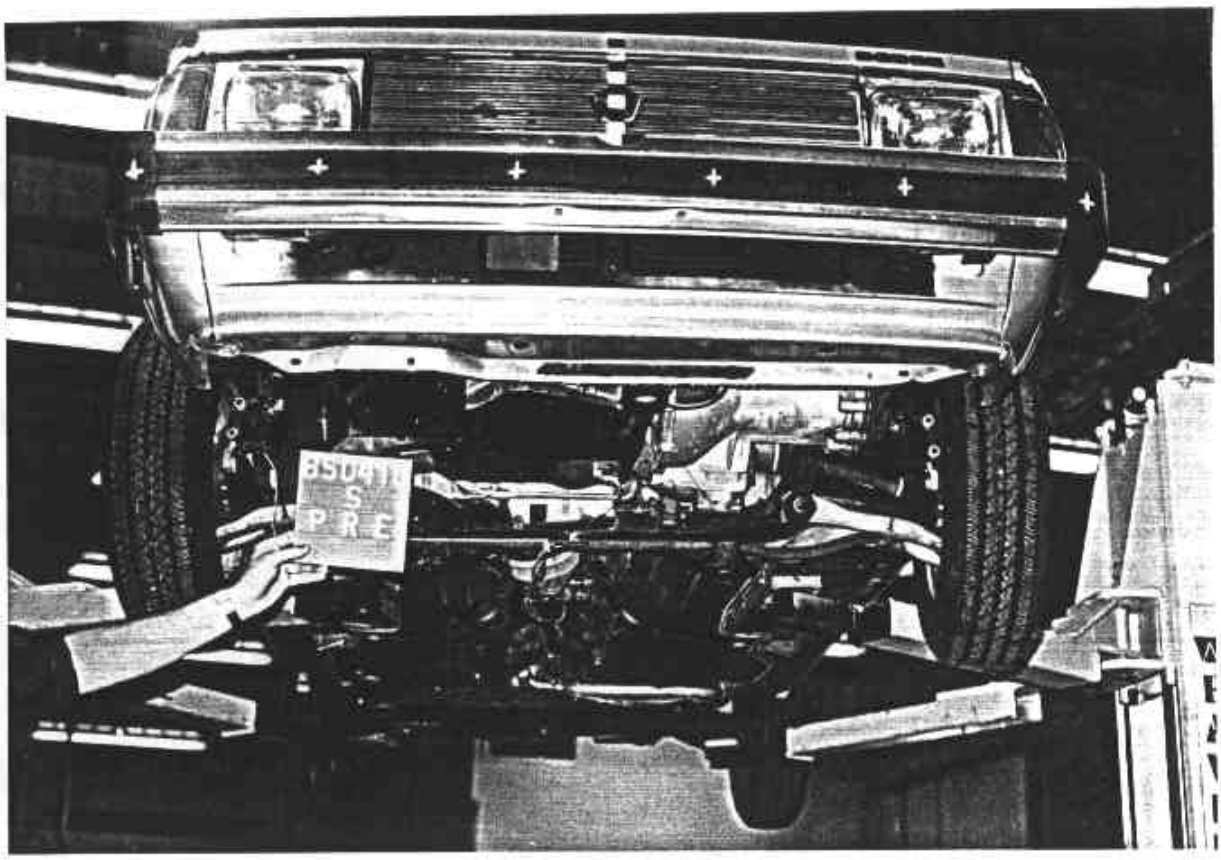


Figure A-9. PRE-TEST SUBJECT VEHICLE UNDERBODY VIEW

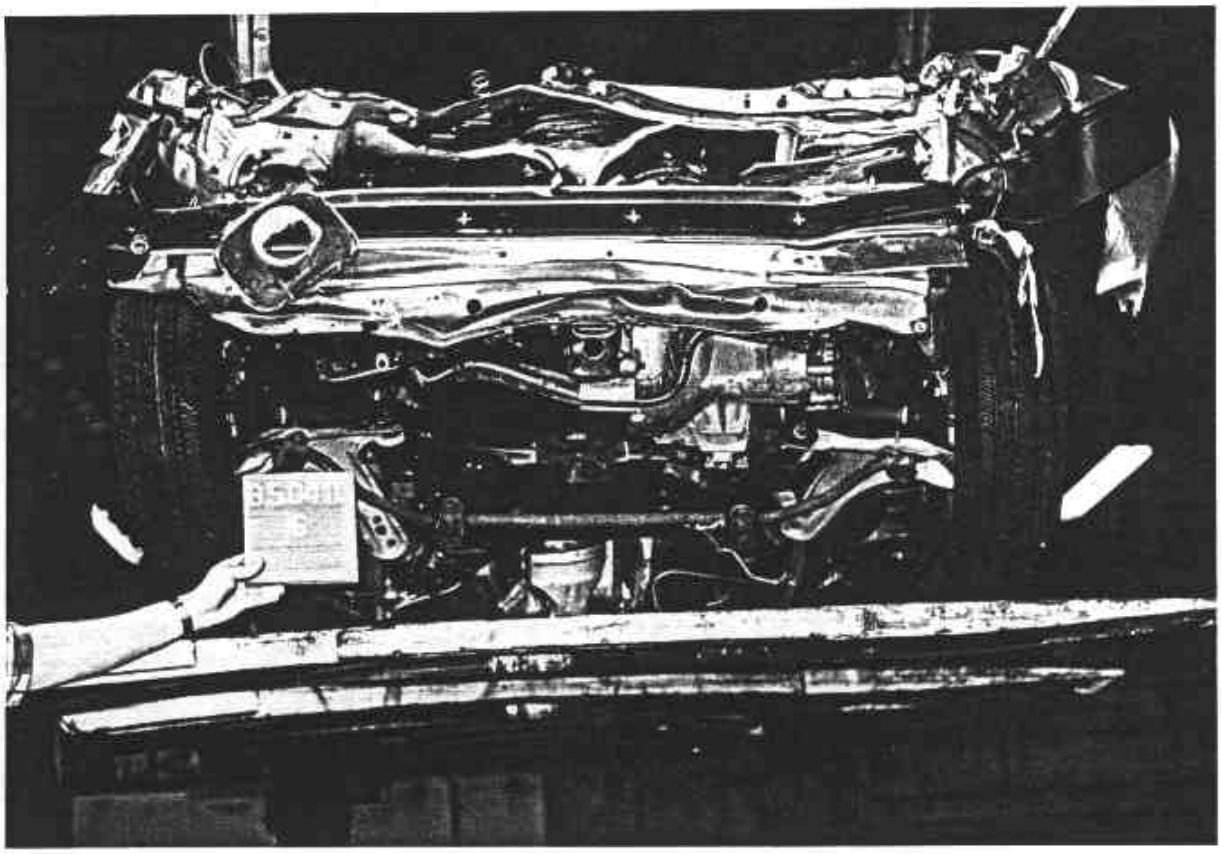


Figure A-10. POST-TEST SUBJECT VEHICLE UNDERBODY VIEW

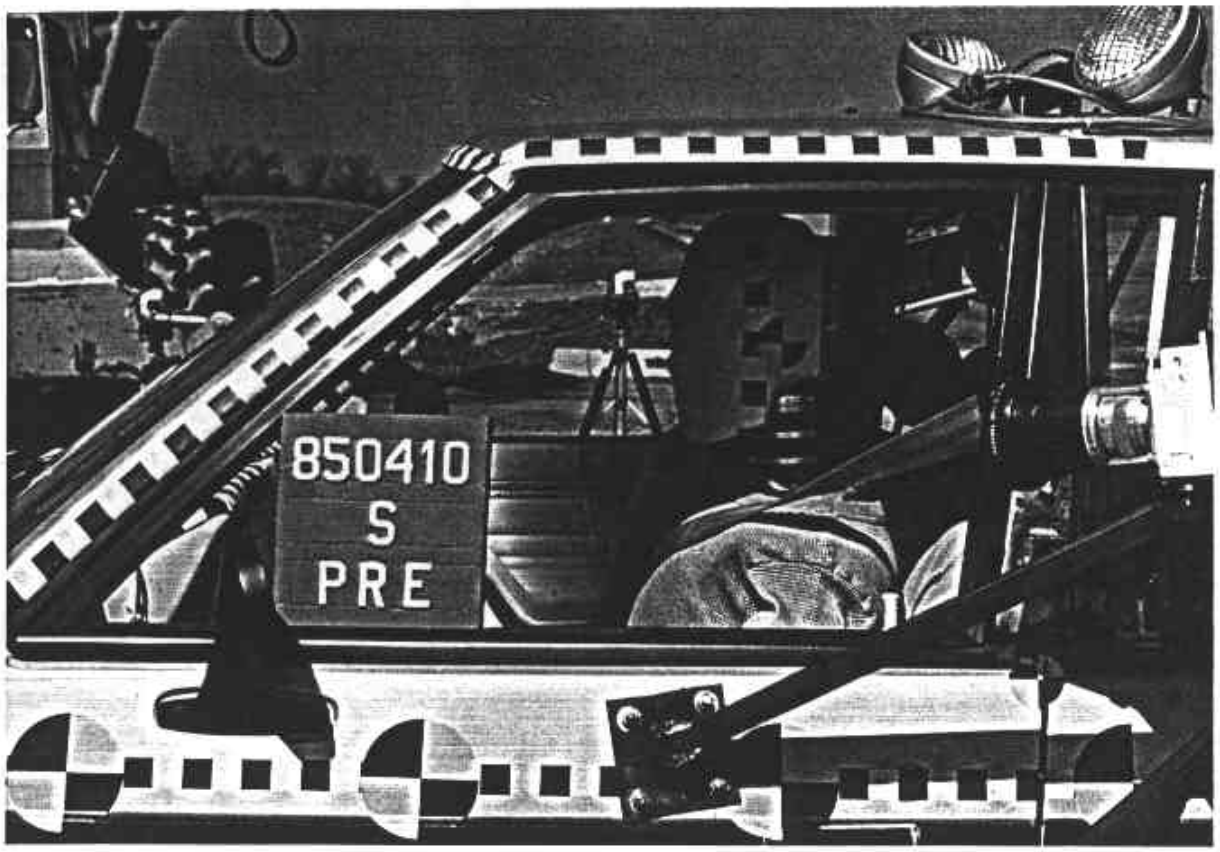


Figure A-11. PRE-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 1

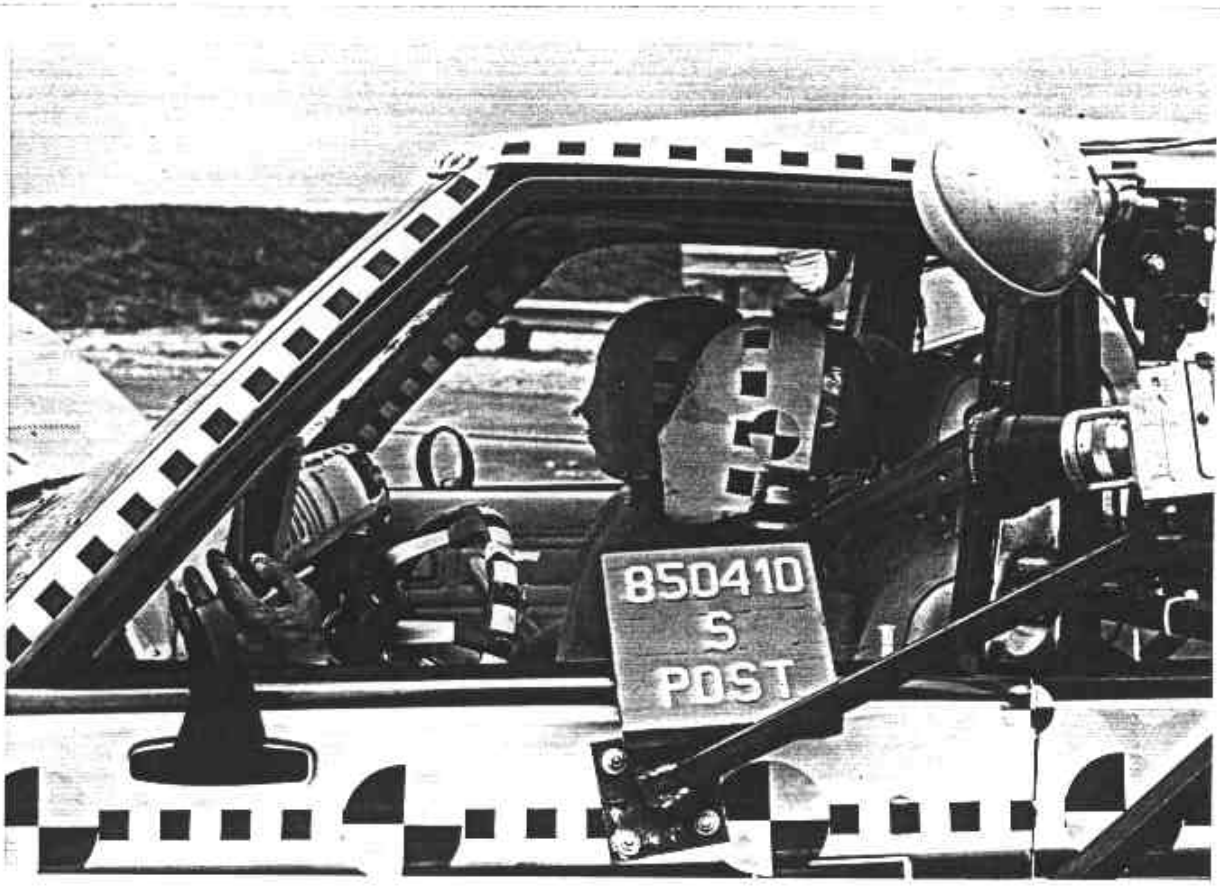


Figure A-12. POST-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 1

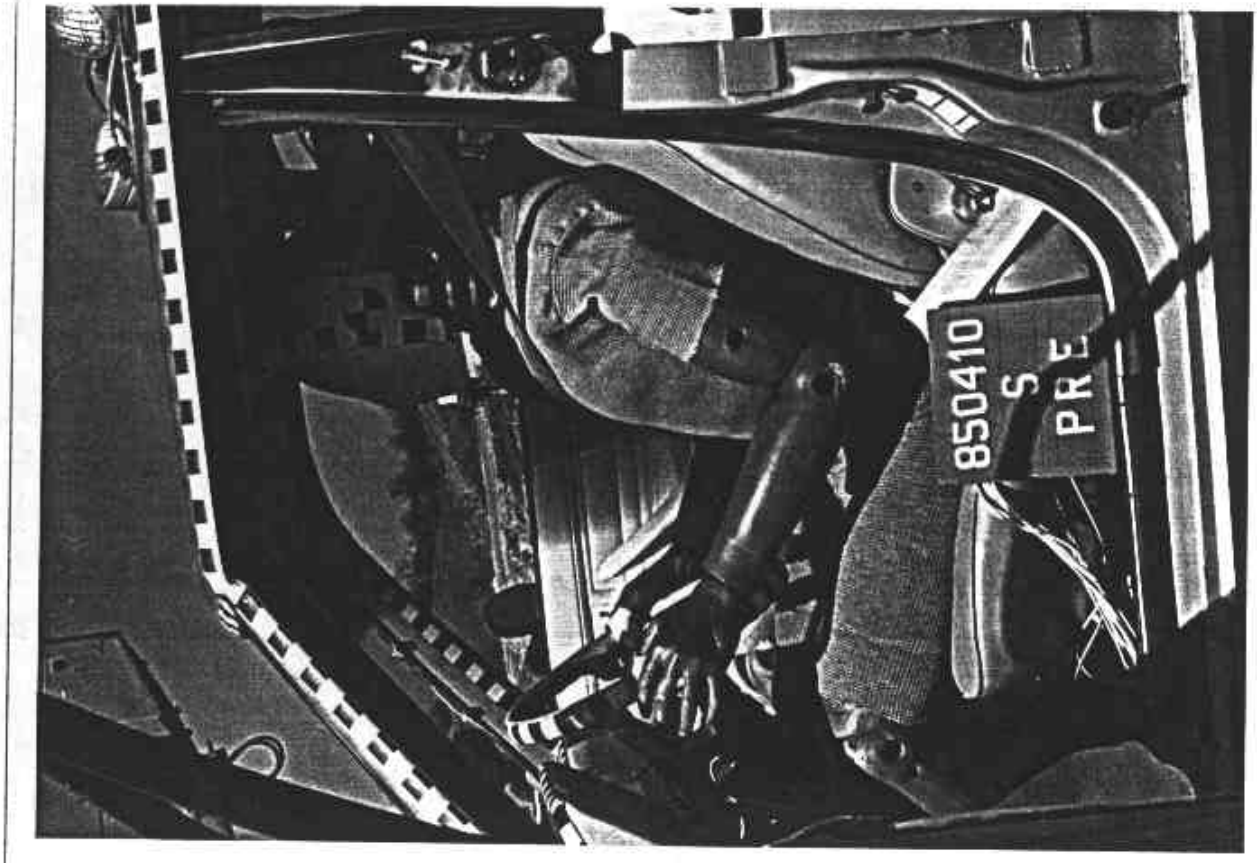


Figure A-13. PRE-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 2

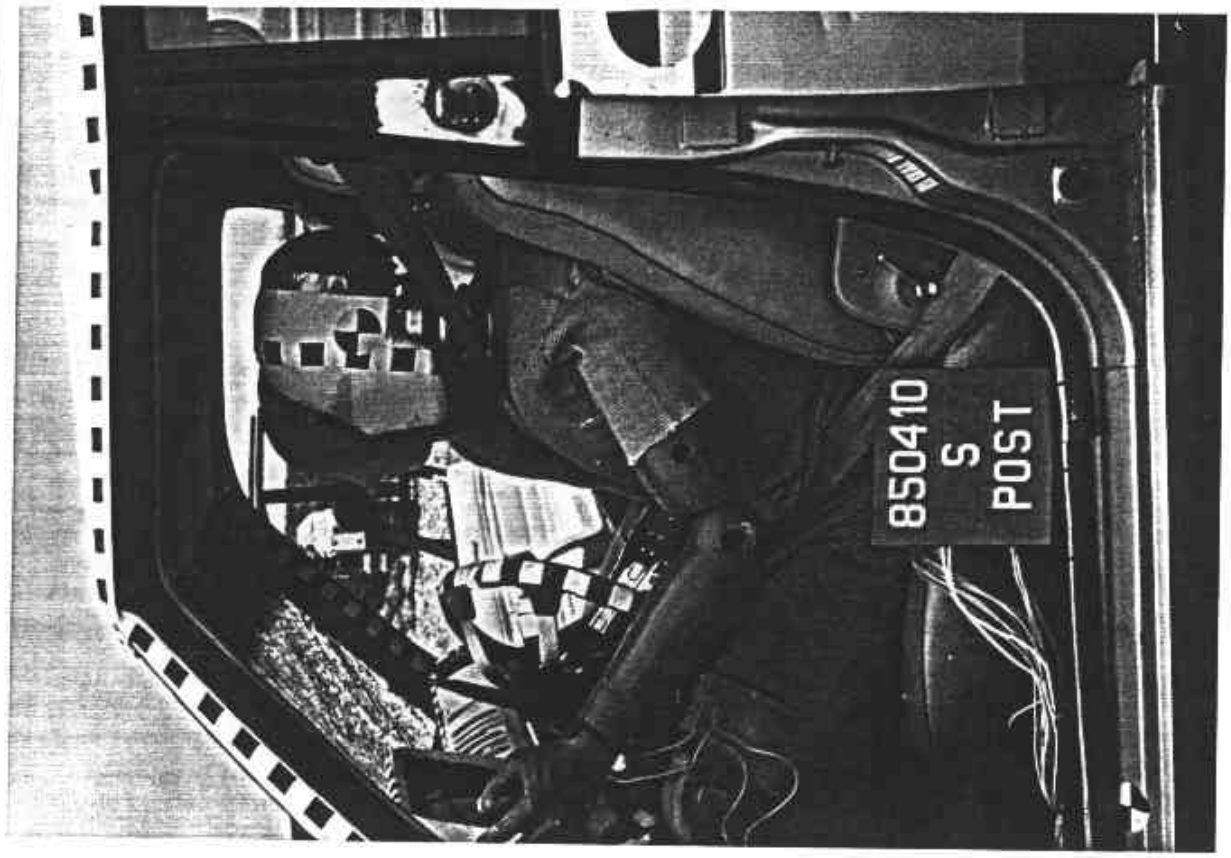


Figure A-14. POST-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 2

Figure A-15. PRE-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 3

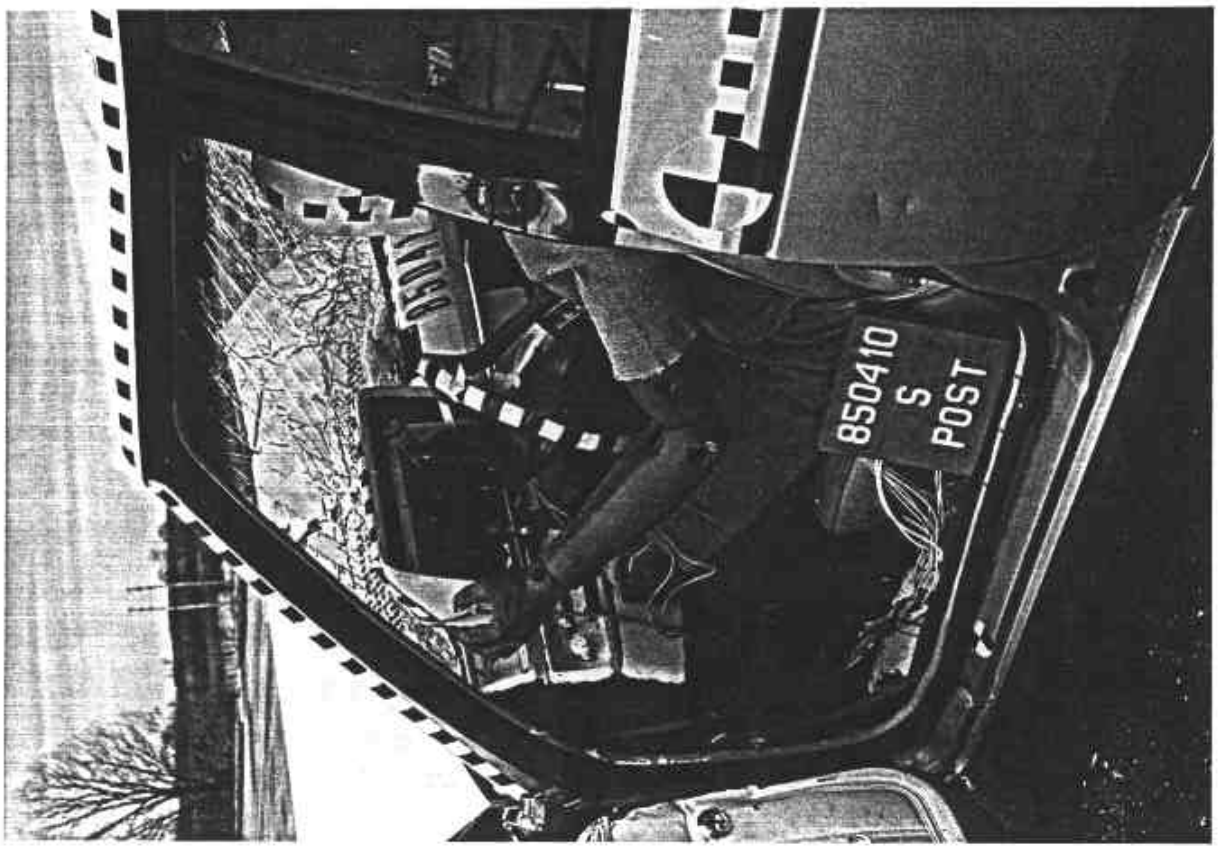


Figure A-16. POST-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 3

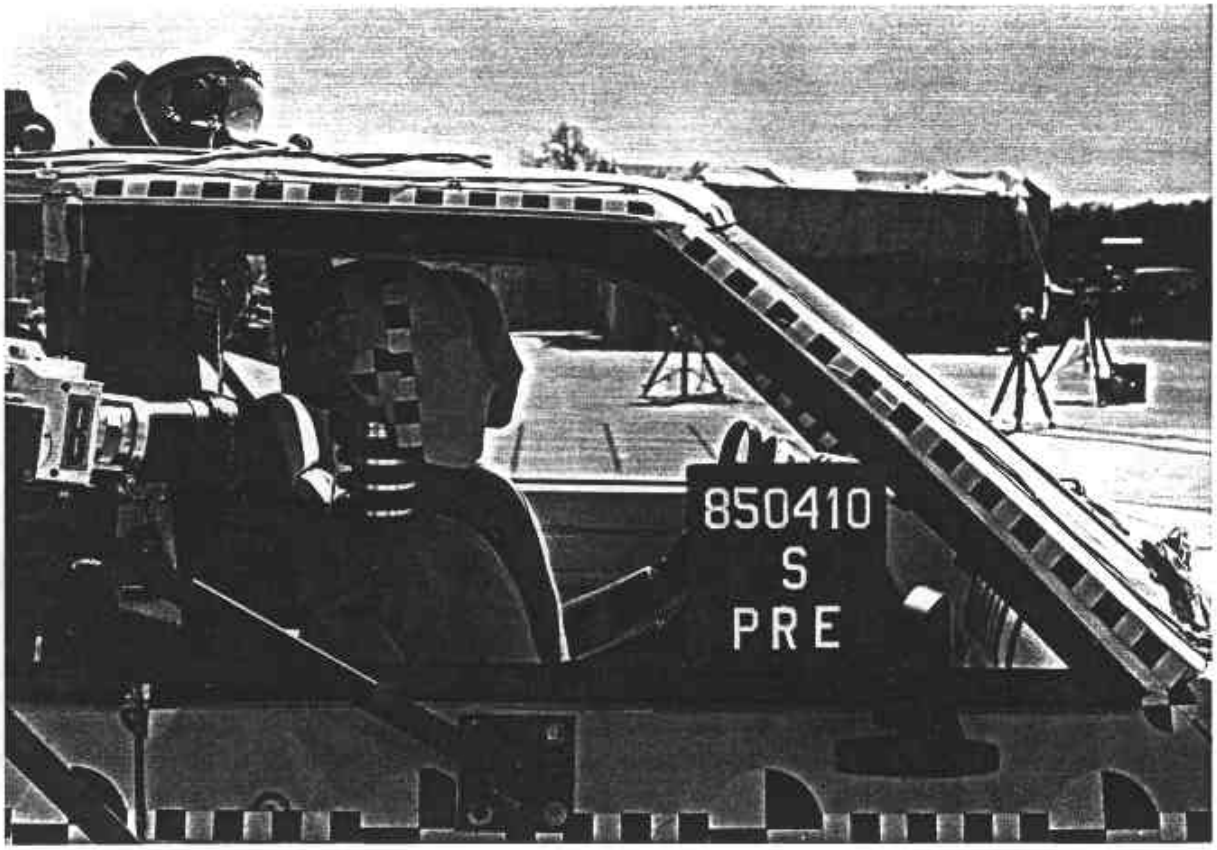


Figure A-17. PRE-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 1

Figure A-18. POST-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 1

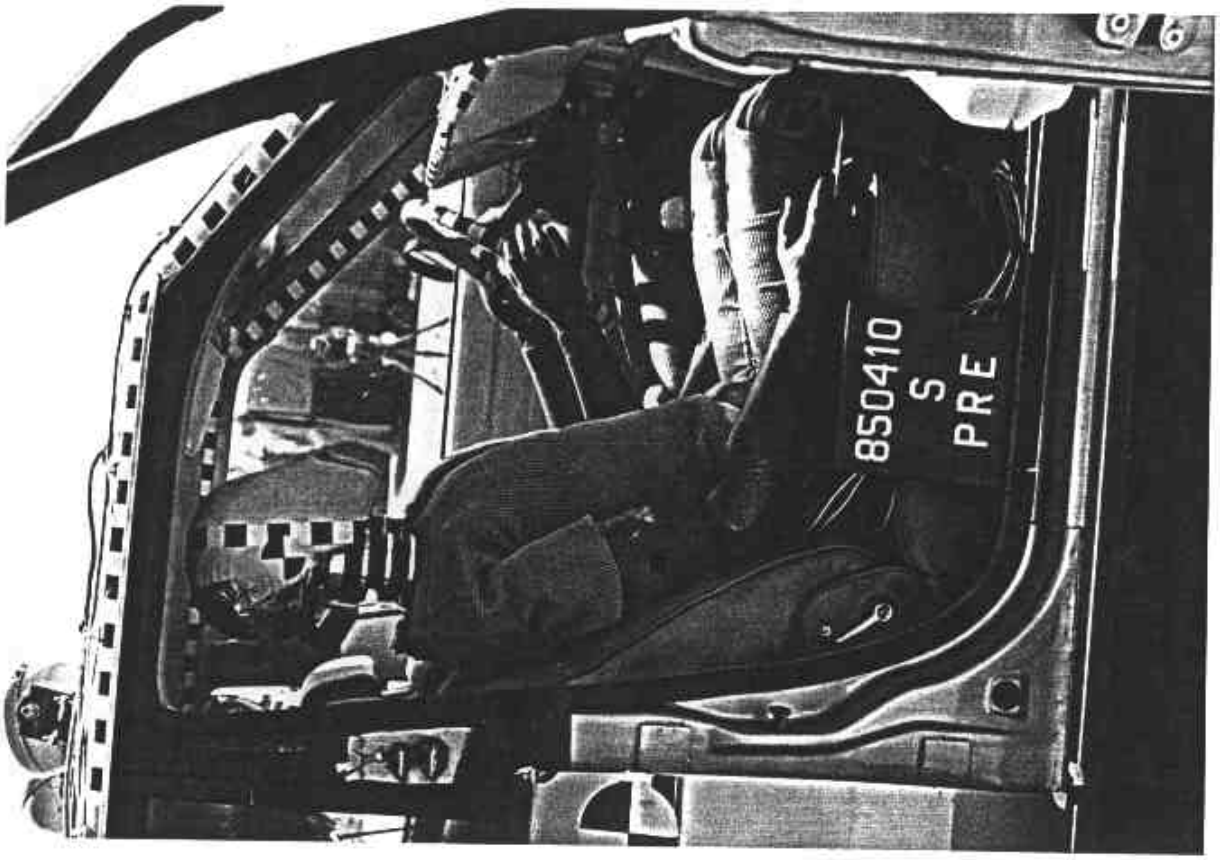


Figure A-19. PRE-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 2

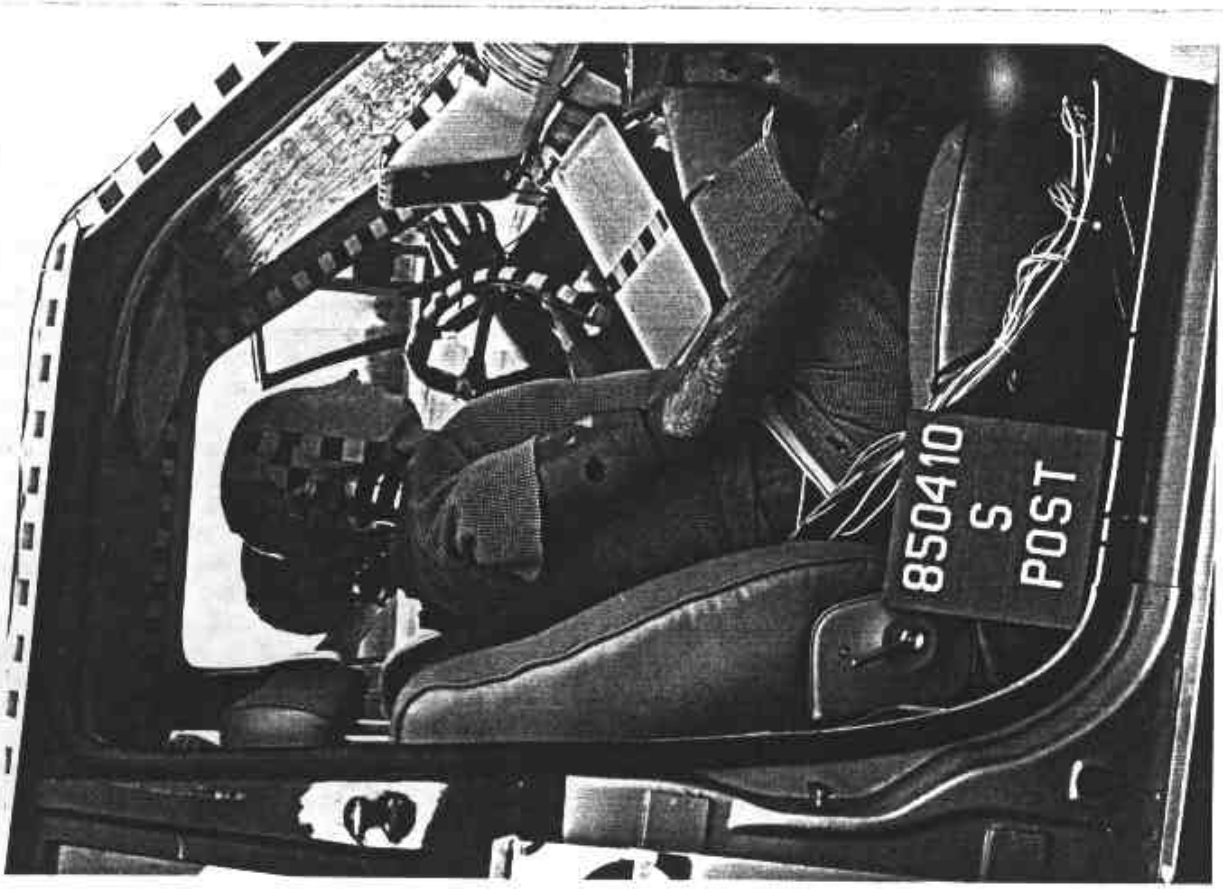


Figure A-20. POST-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 2

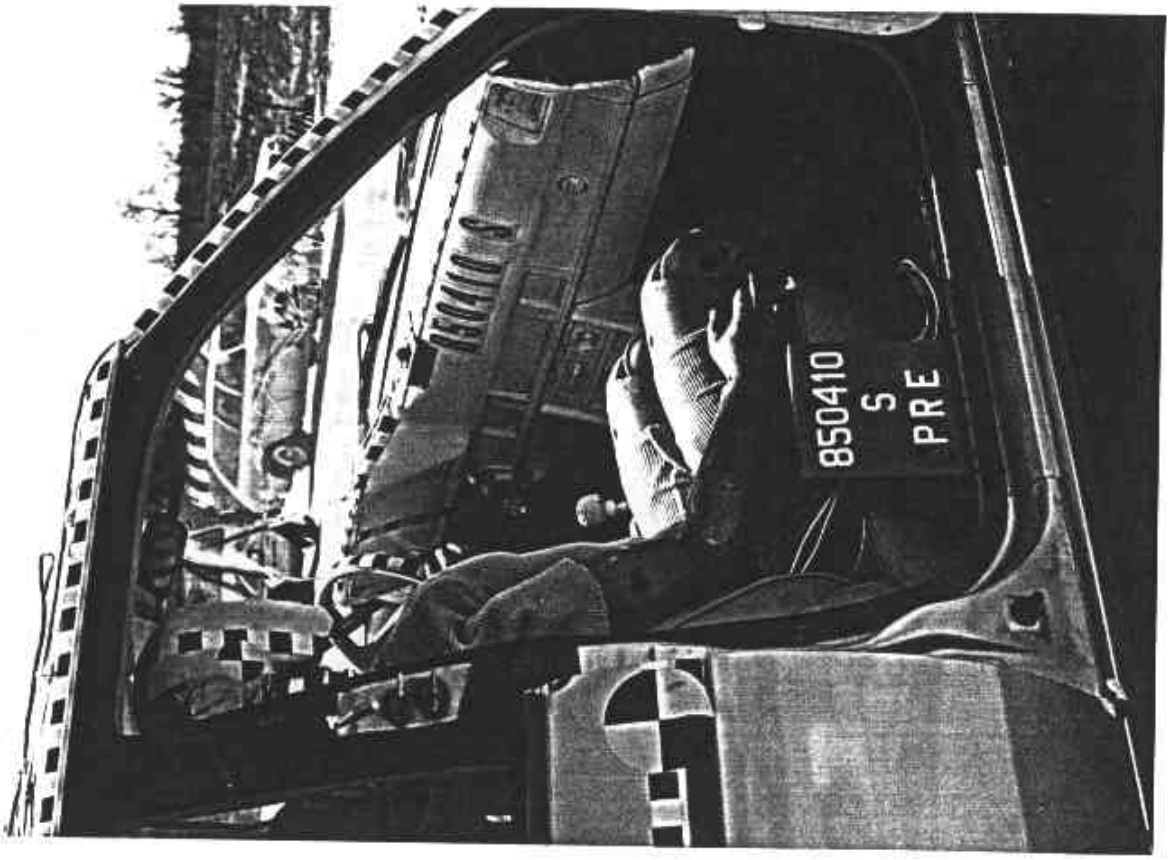


Figure A-21. PRE-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 3

Figure A-22. POST-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 3

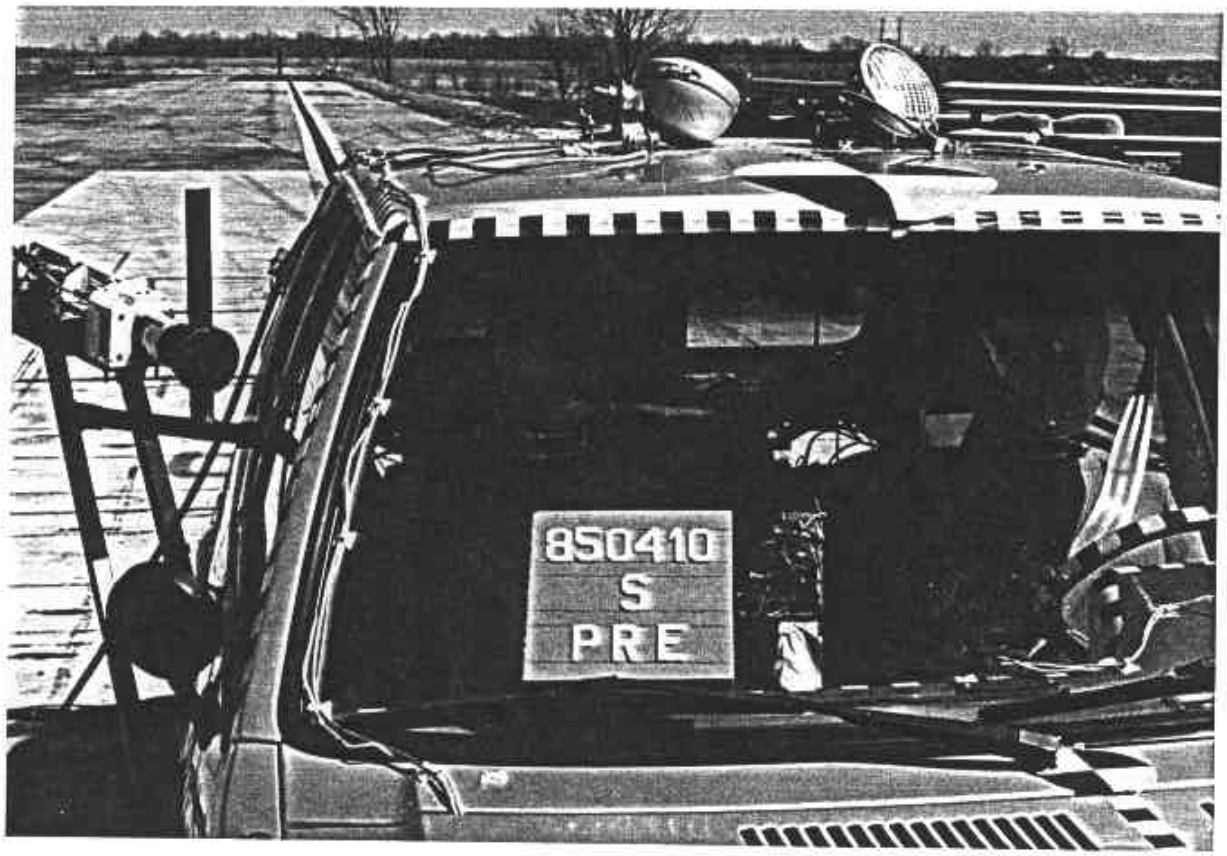


Figure A-23. PRE-TEST SUBJECT VEHICLE GLAZING

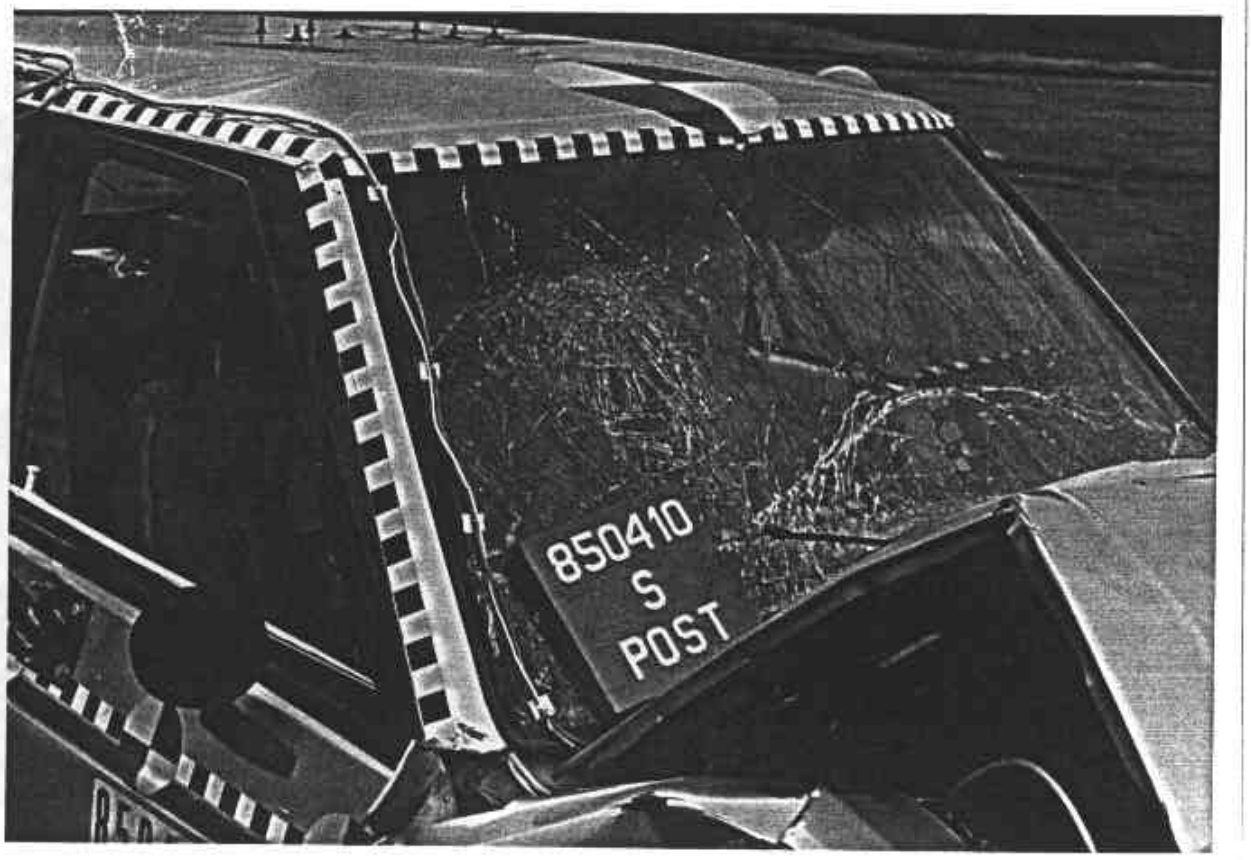


Figure A-24. POST-TEST SUBJECT VEHICLE GLAZING

Figure A-25. POST-TEST SUBJECT VEHICLE INTERIOR DAMAGE - VIEW 1

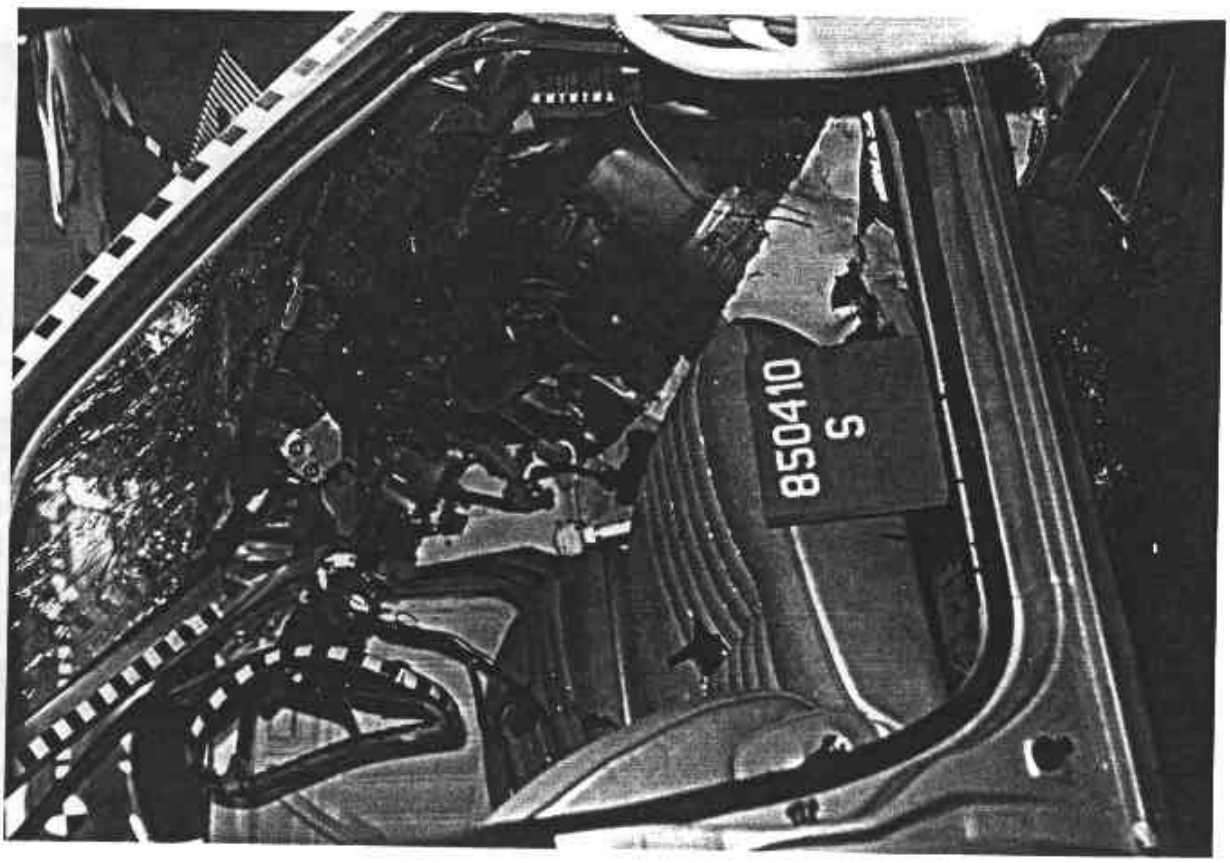


Figure A-26. POST-TEST SUBJECT VEHICLE INTERIOR DAMAGE - VIEW 2

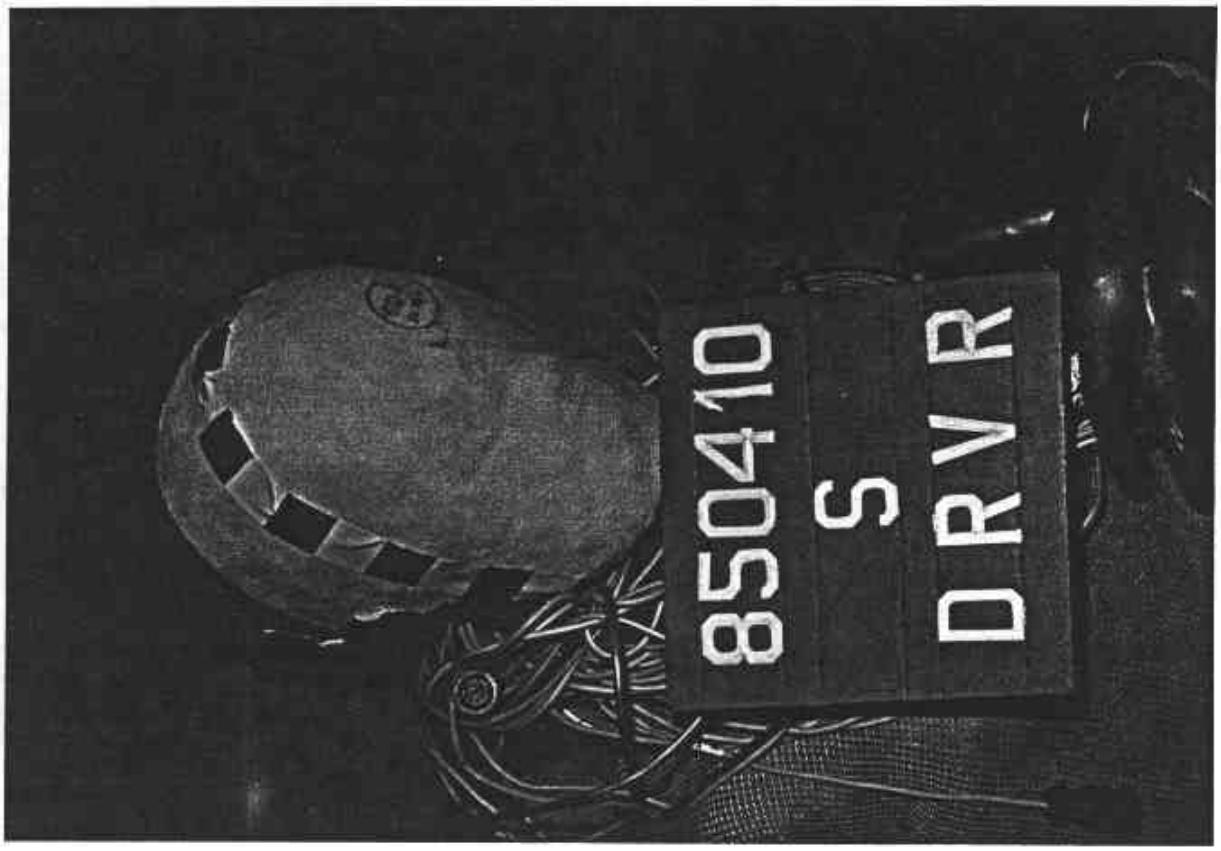


Figure A-27. POST-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 4

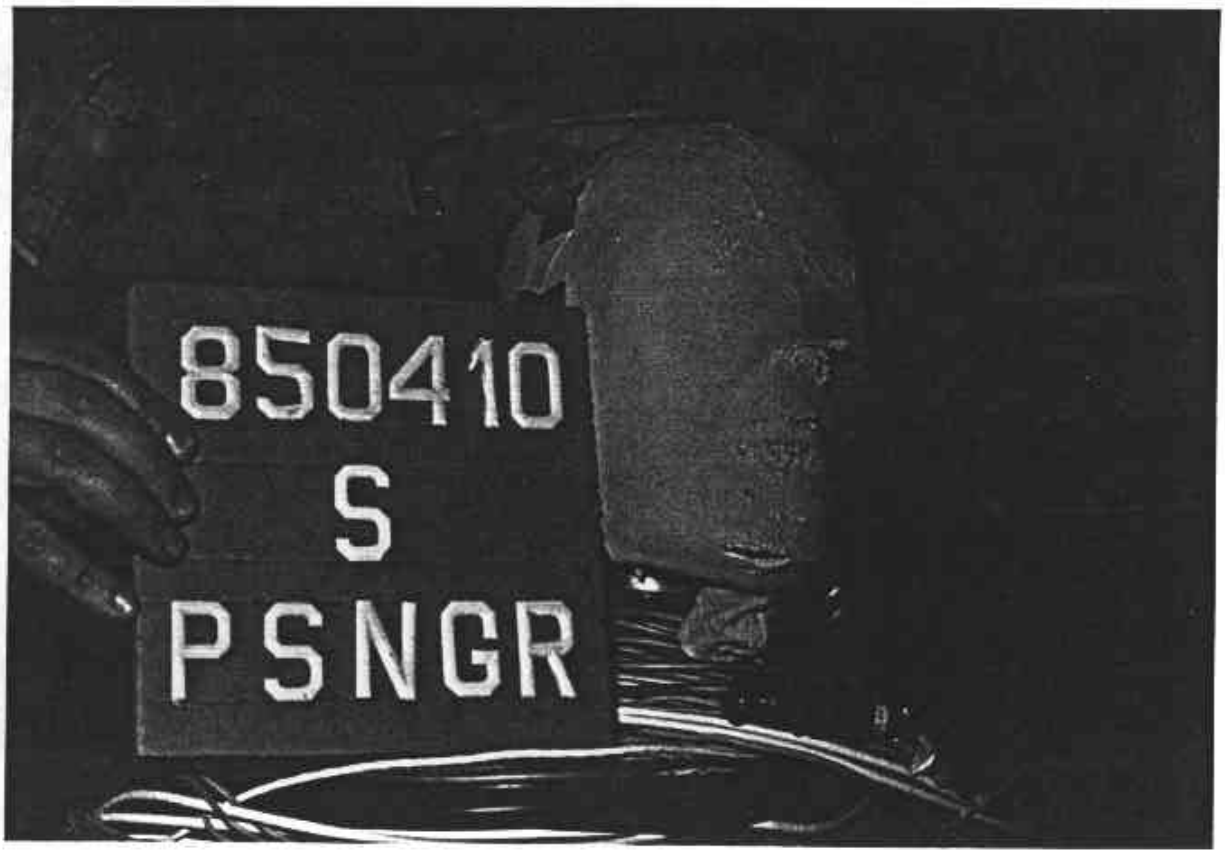


Figure A-28. POST-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 4

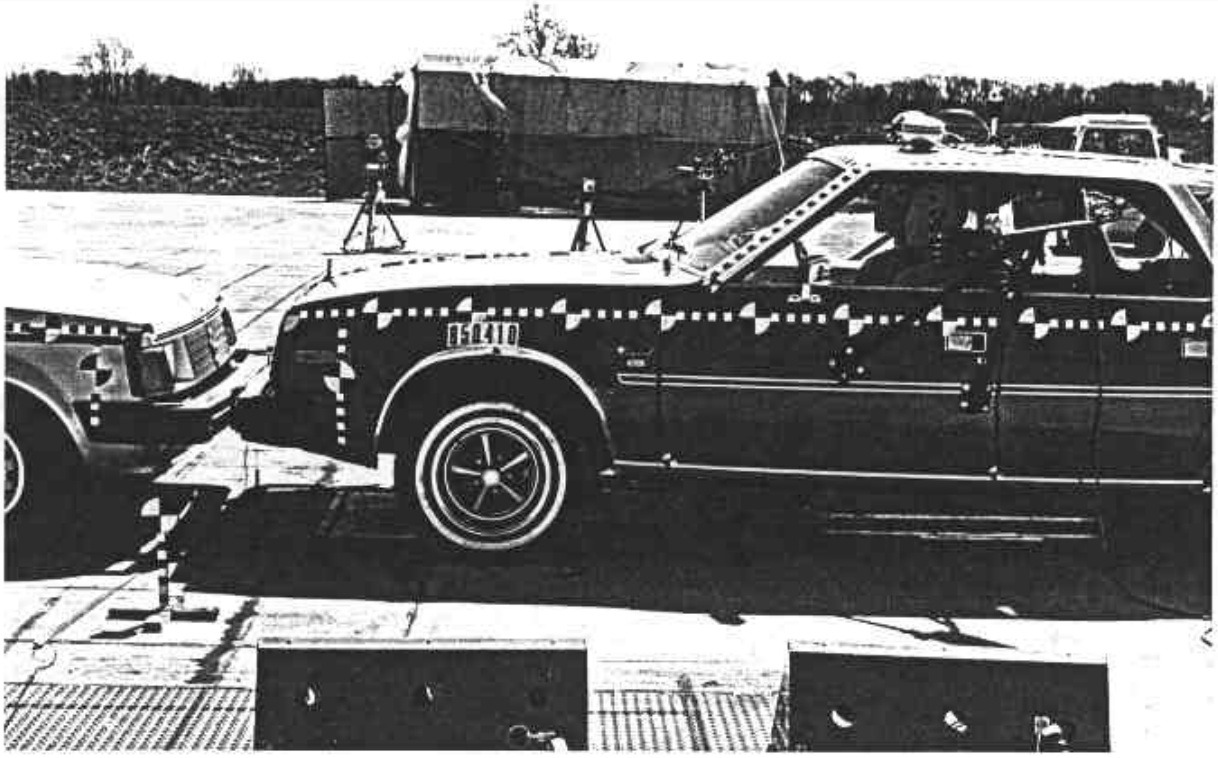


Figure A-29. PRE-TEST PARTNER VEHICLE LEFT SIDE

Figure A-30. POST-TEST PARTNER VEHICLE LEFT SIDE

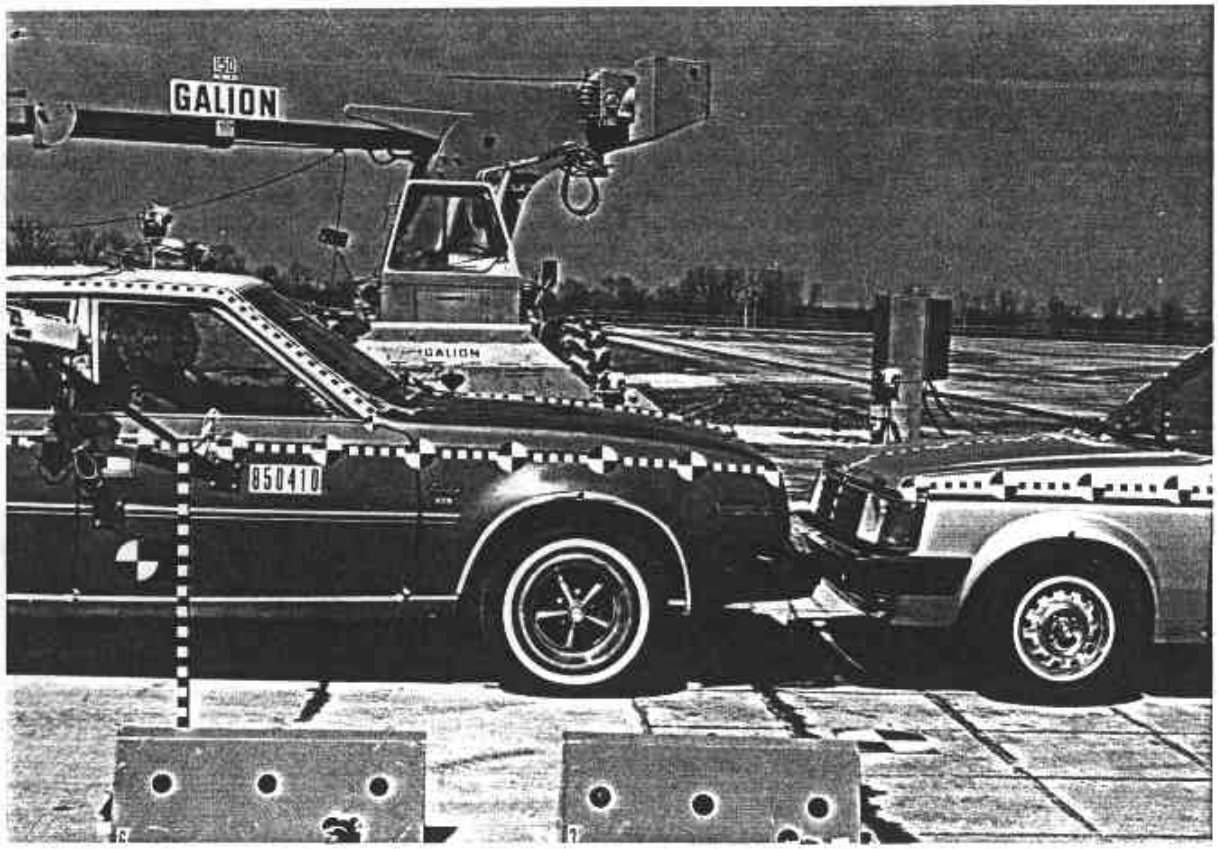


Figure A-31. PRE-TEST PARTNER VEHICLE RIGHT SIDE

Figure A-32. POST-TEST PARTNER VEHICLE RIGHT SIDE

Figure A-33. PRE-TEST PARTNER VEHICLE FRONT VIEW

Figure A-34. POST-TEST PARTNER VEHICLE FRONT VIEW

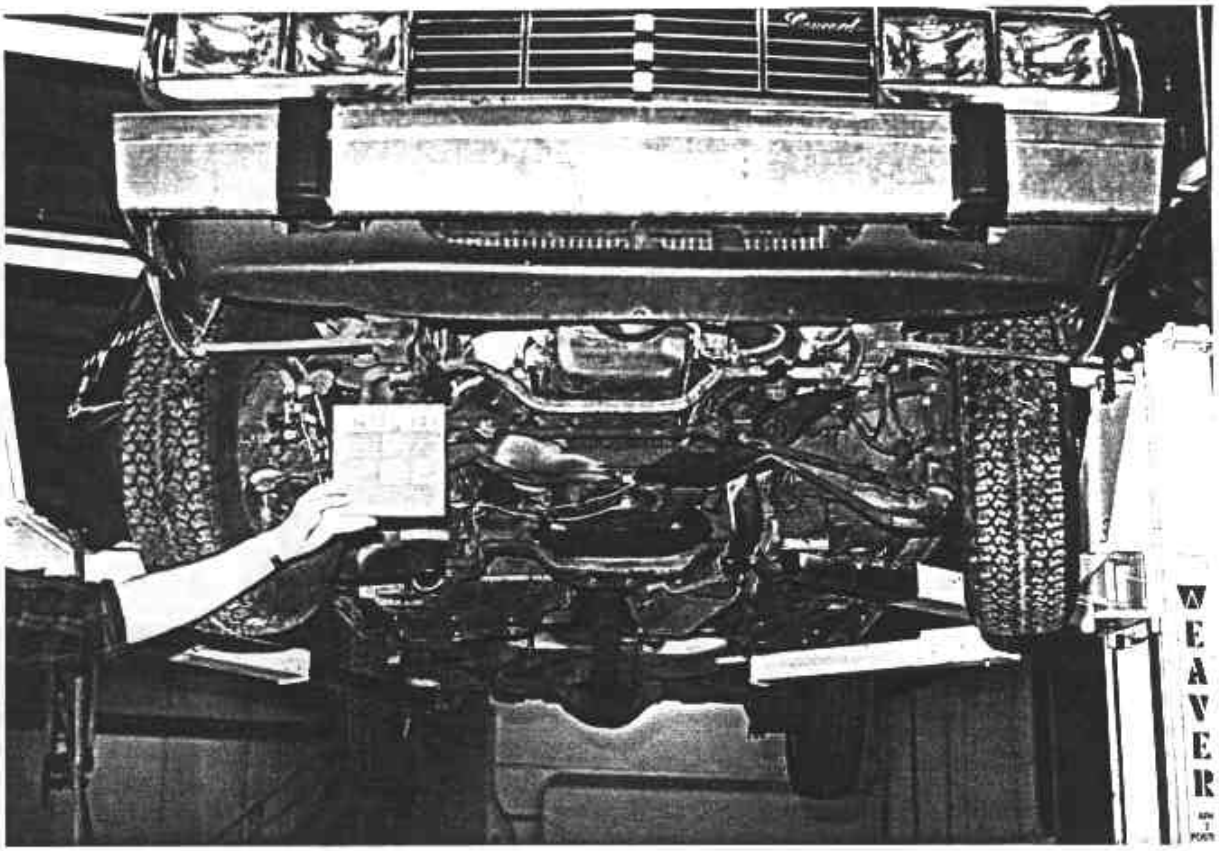


Figure A-35. PRE-TEST PARTNER VEHICLE UNDERBODY VIEW

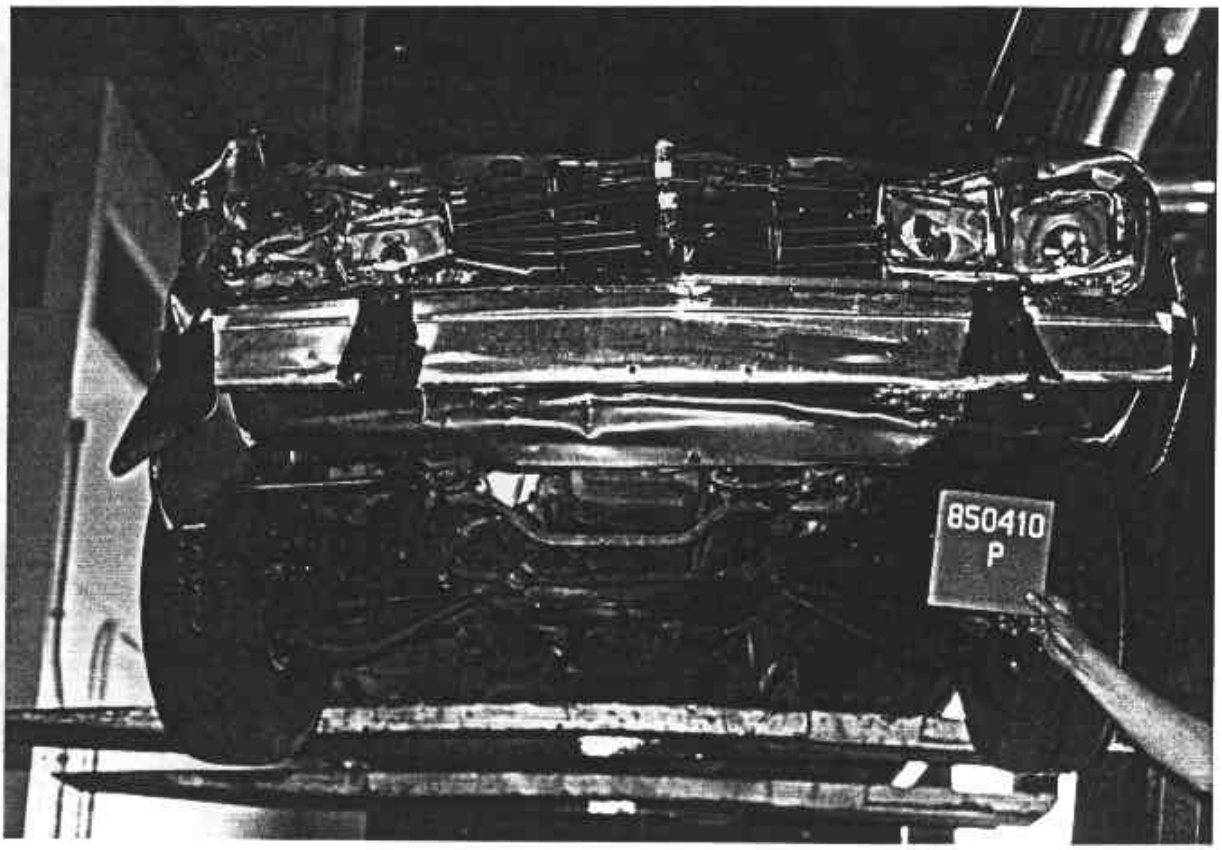


Figure A-36. POST-TEST PARTNER VEHICLE UNDERBODY VIEW

Figure A-37. PRE-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 1

Figure A-38. POST-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 1

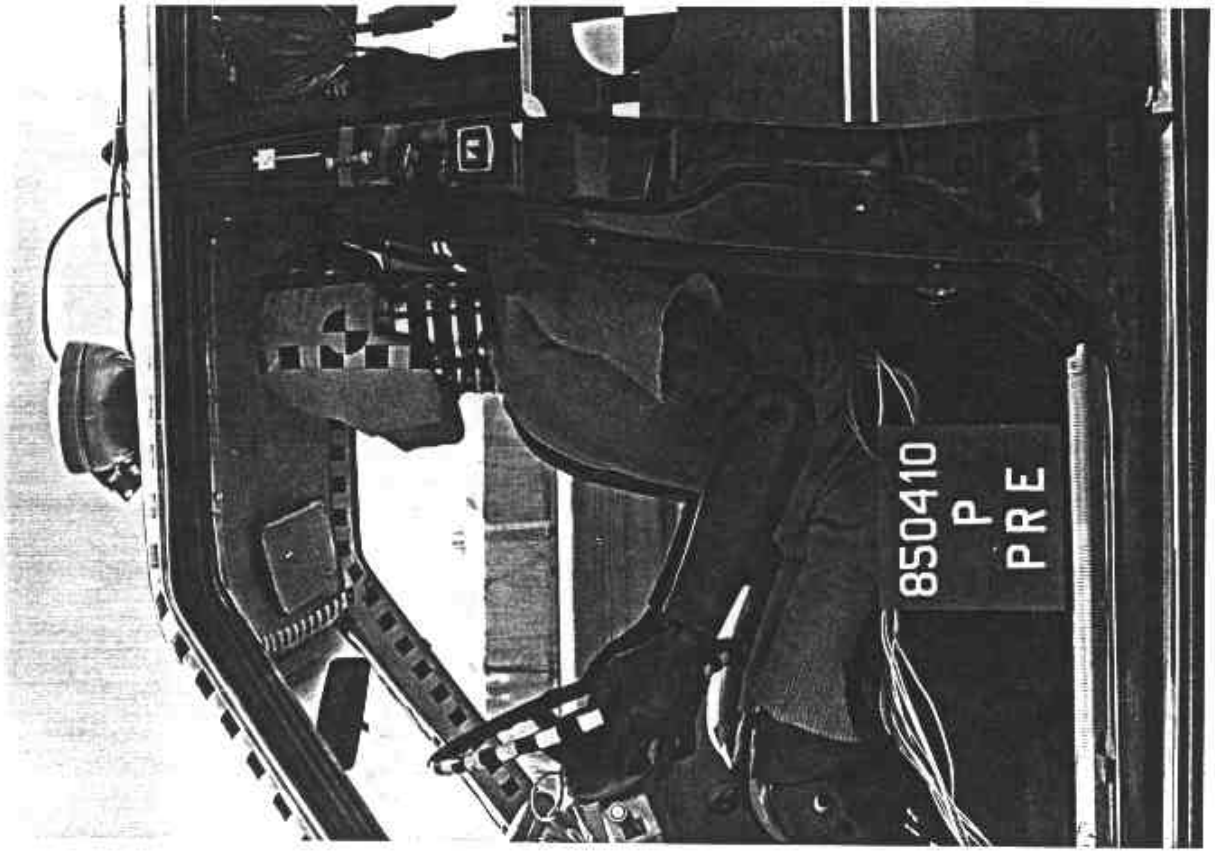


Figure A-39. PRE-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 2

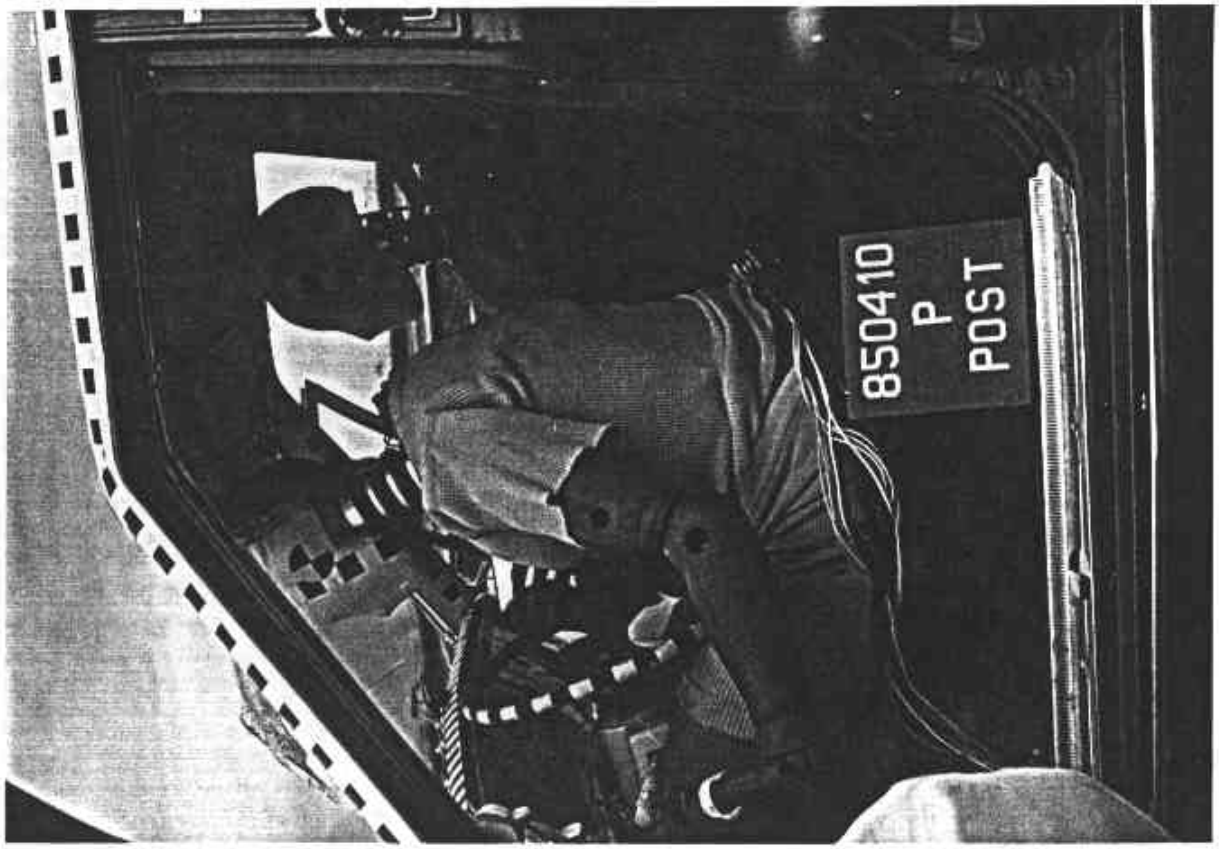


Figure A-40. POST-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 2

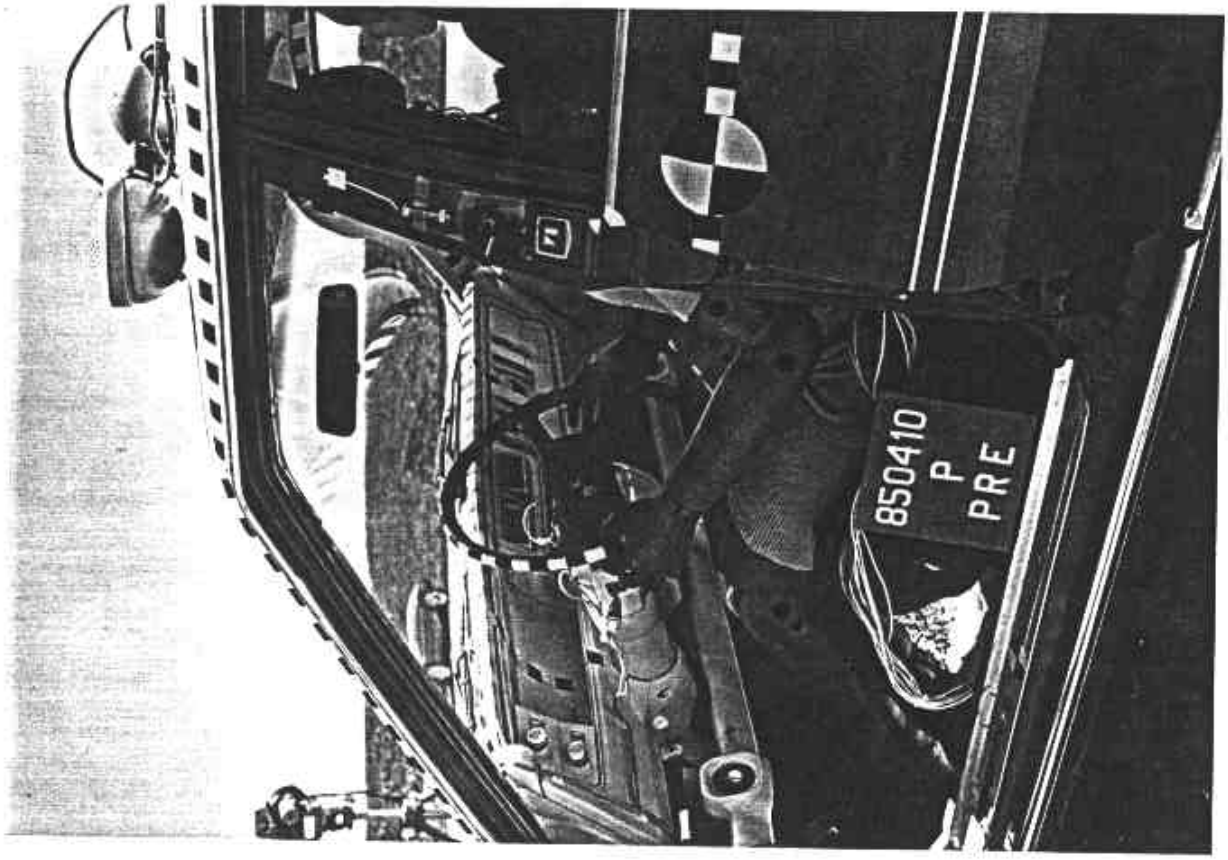


Figure A-41. PRE-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 3

Figure A-42. POST-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 3

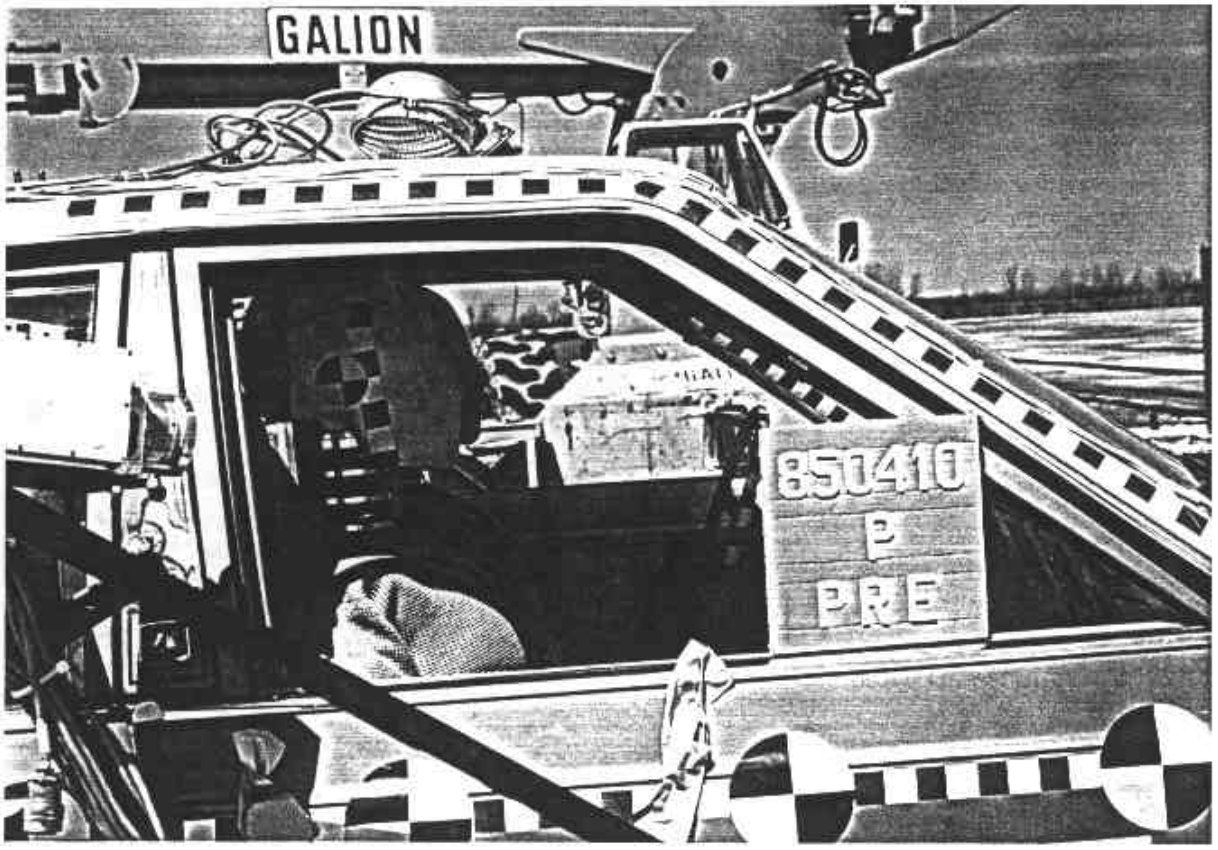


Figure A-43. PRE-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 1

Figure A-44. POST-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 1

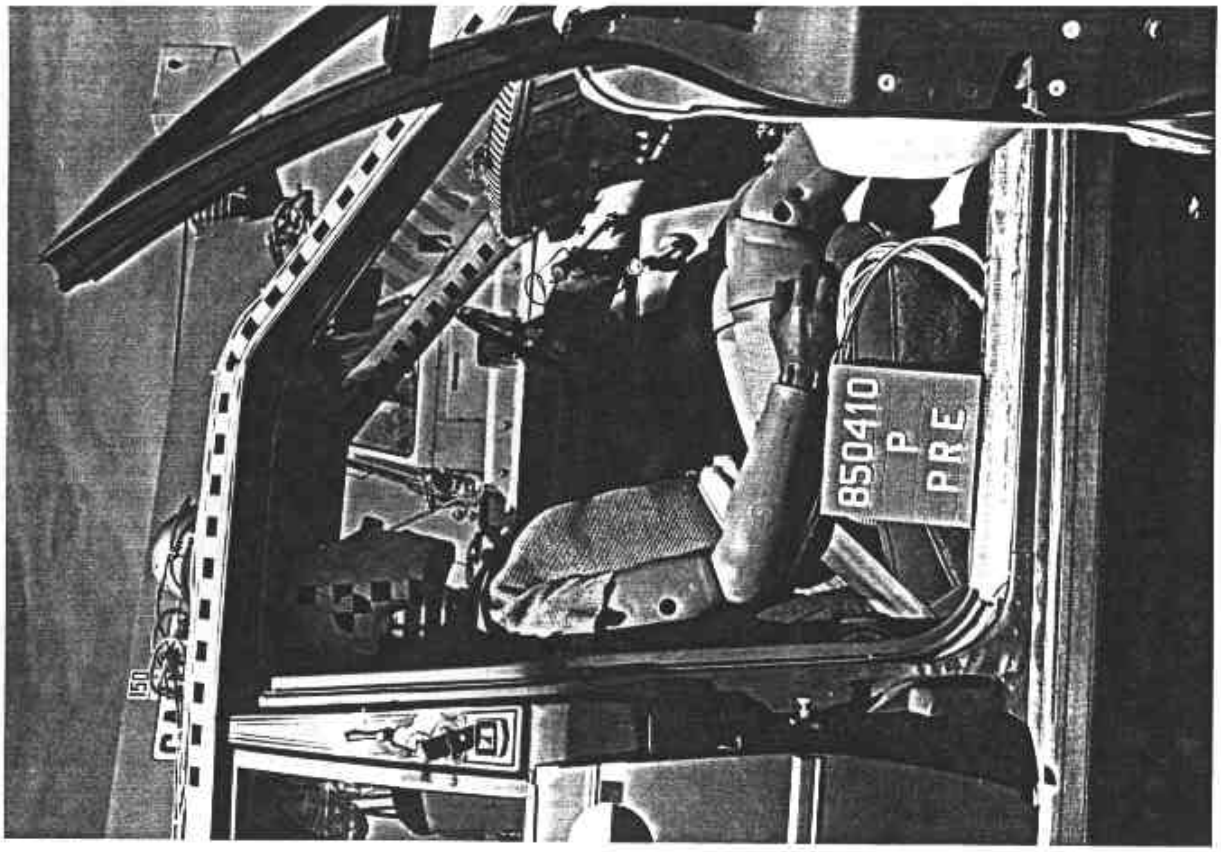


Figure A-45. PRE-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 2

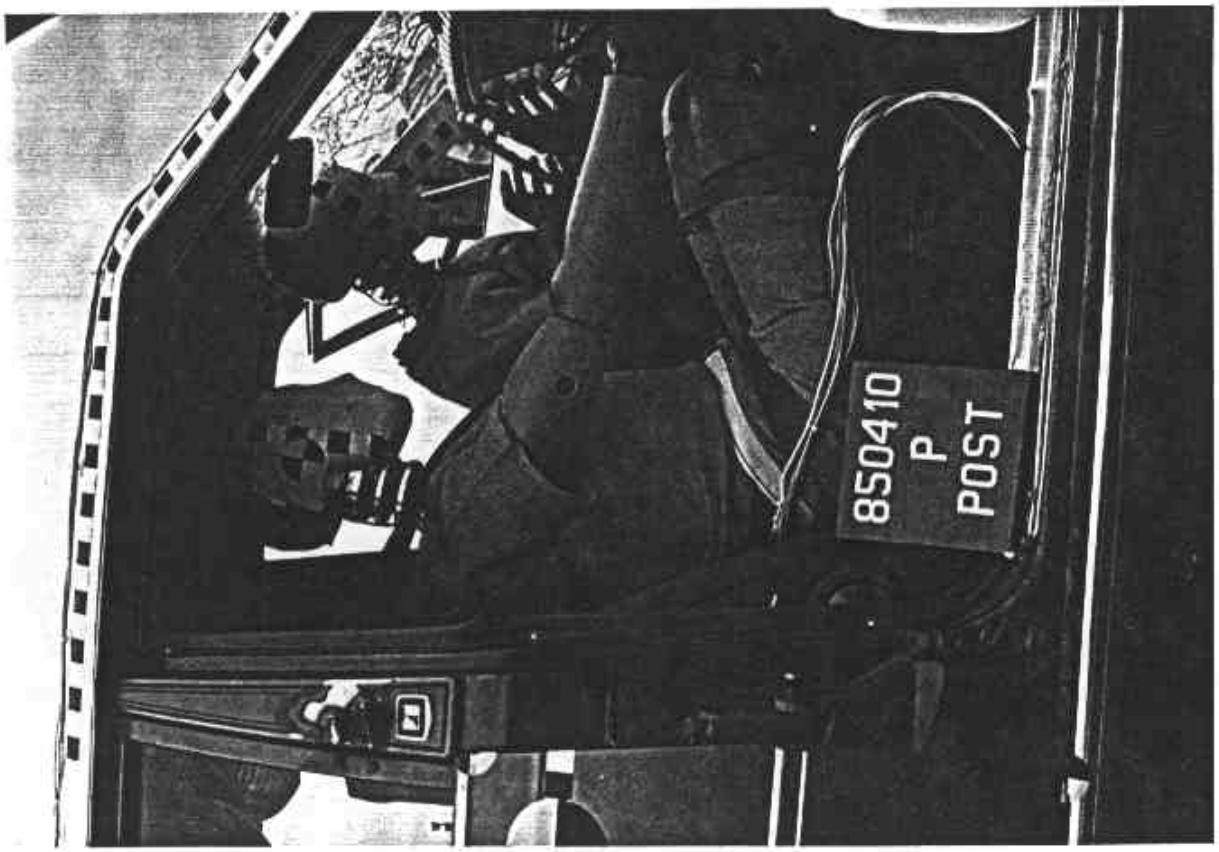


Figure A-46. POST-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 2

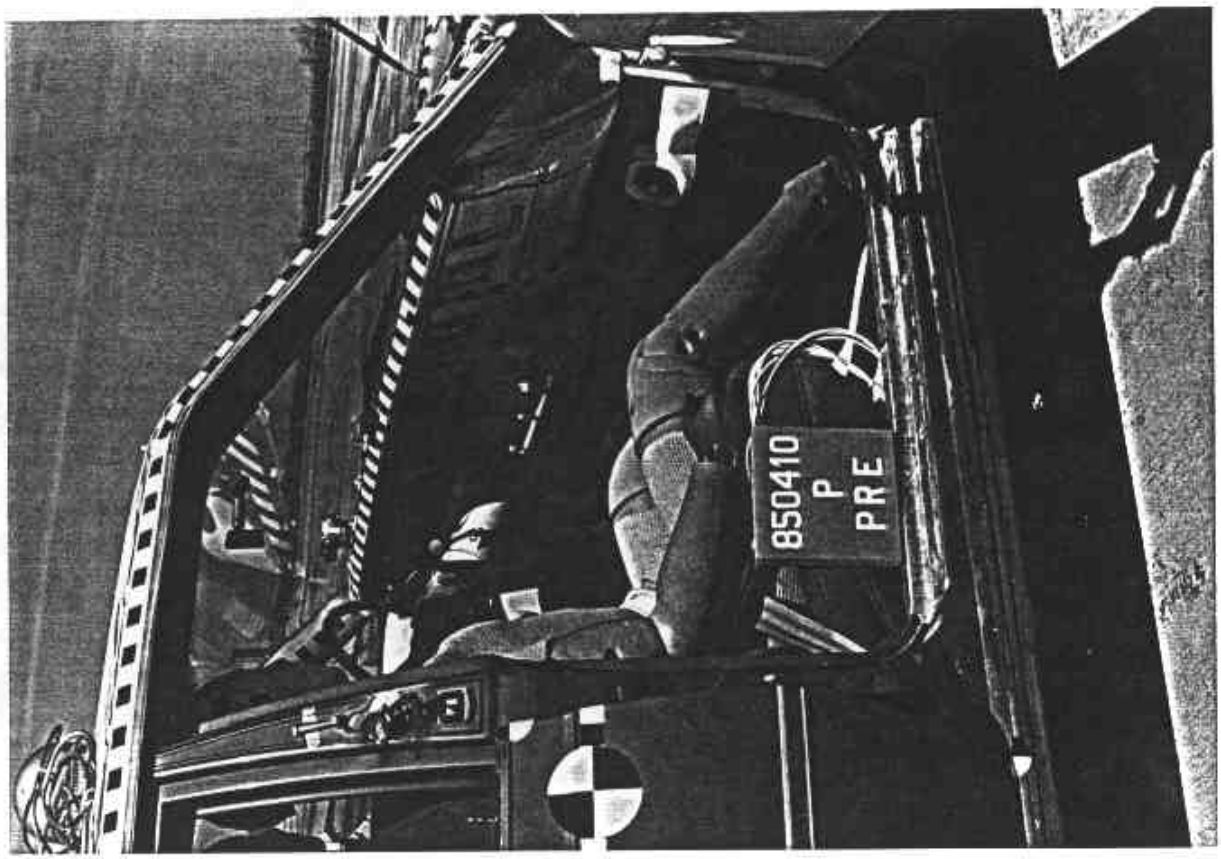


Figure A-47. PRE-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 3

Figure A-48. POST-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 3

Figure A-49. PRE-TEST PARTNER VEHICLE GLAZING DAMAGE

Figure A-50. POST-TEST PARTNER VEHICLE GLAZING

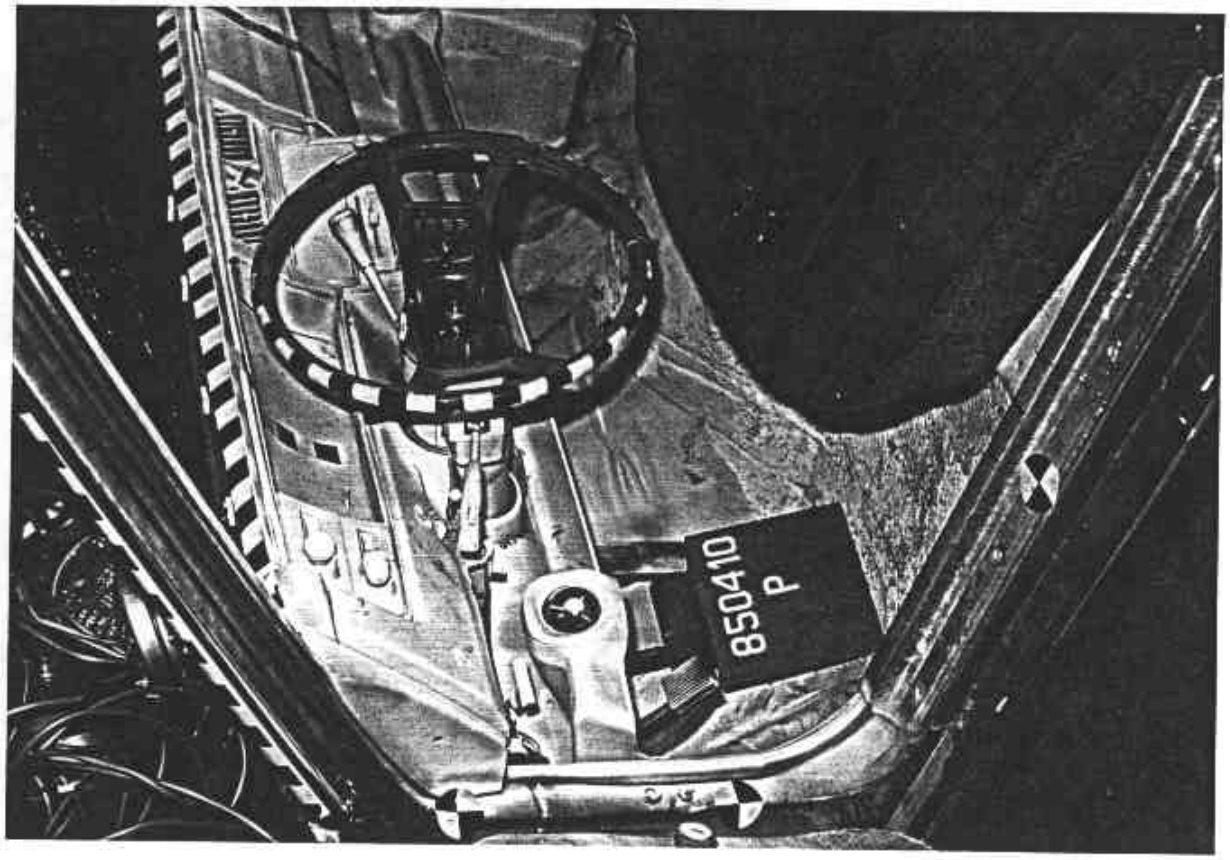


Figure A-51. POST-TEST PARTNER VEHICLE INTERIOR DAMAGE - VIEW 1

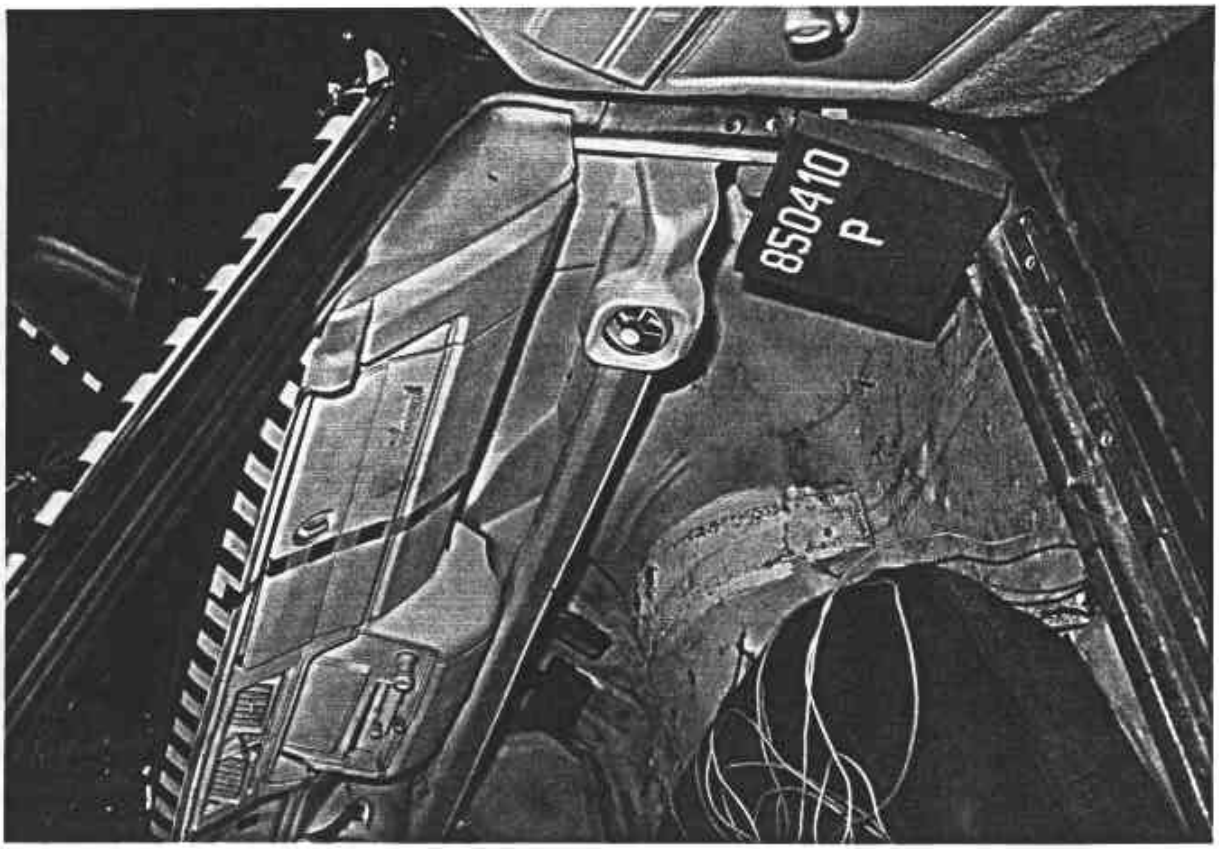


Figure A-52. POST-TEST PARTNER VEHICLE INTERIOR DAMAGE - VIEW 2

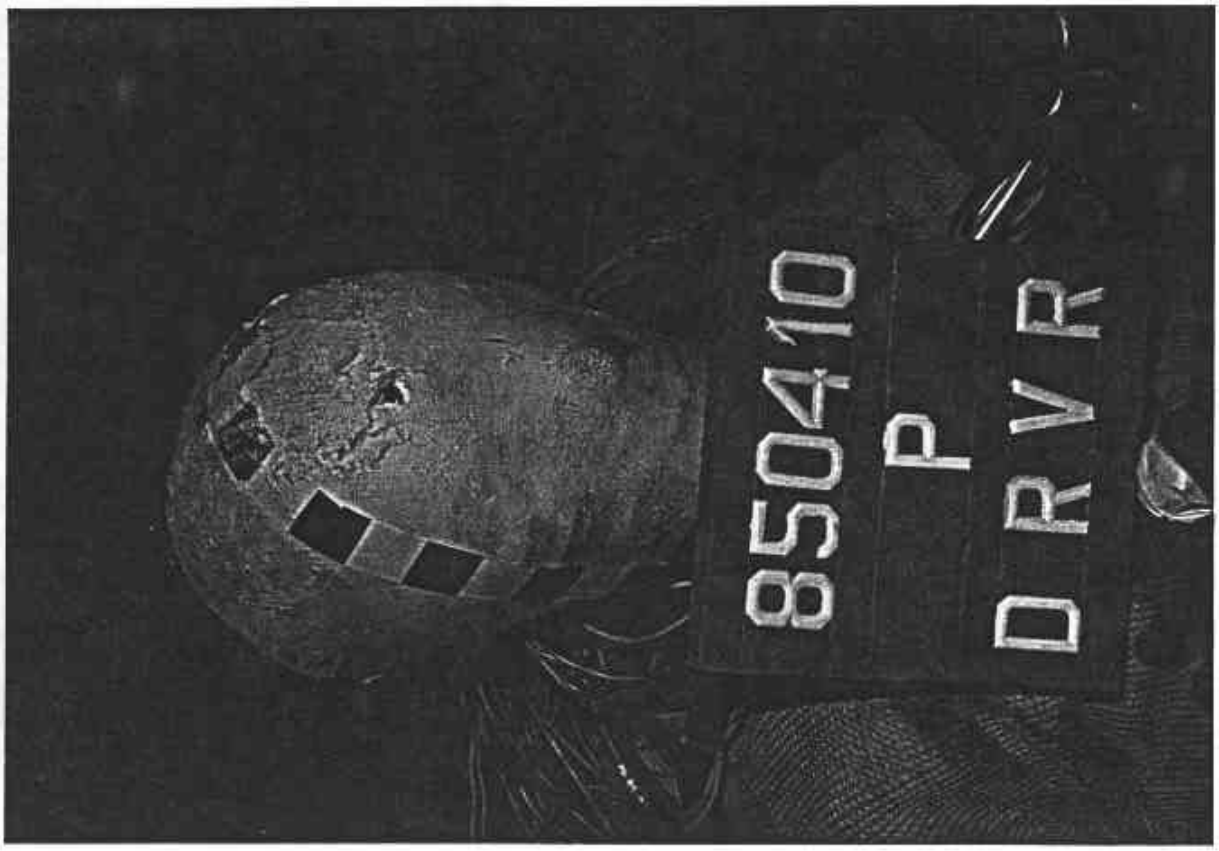


Figure A-53. POST-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 4

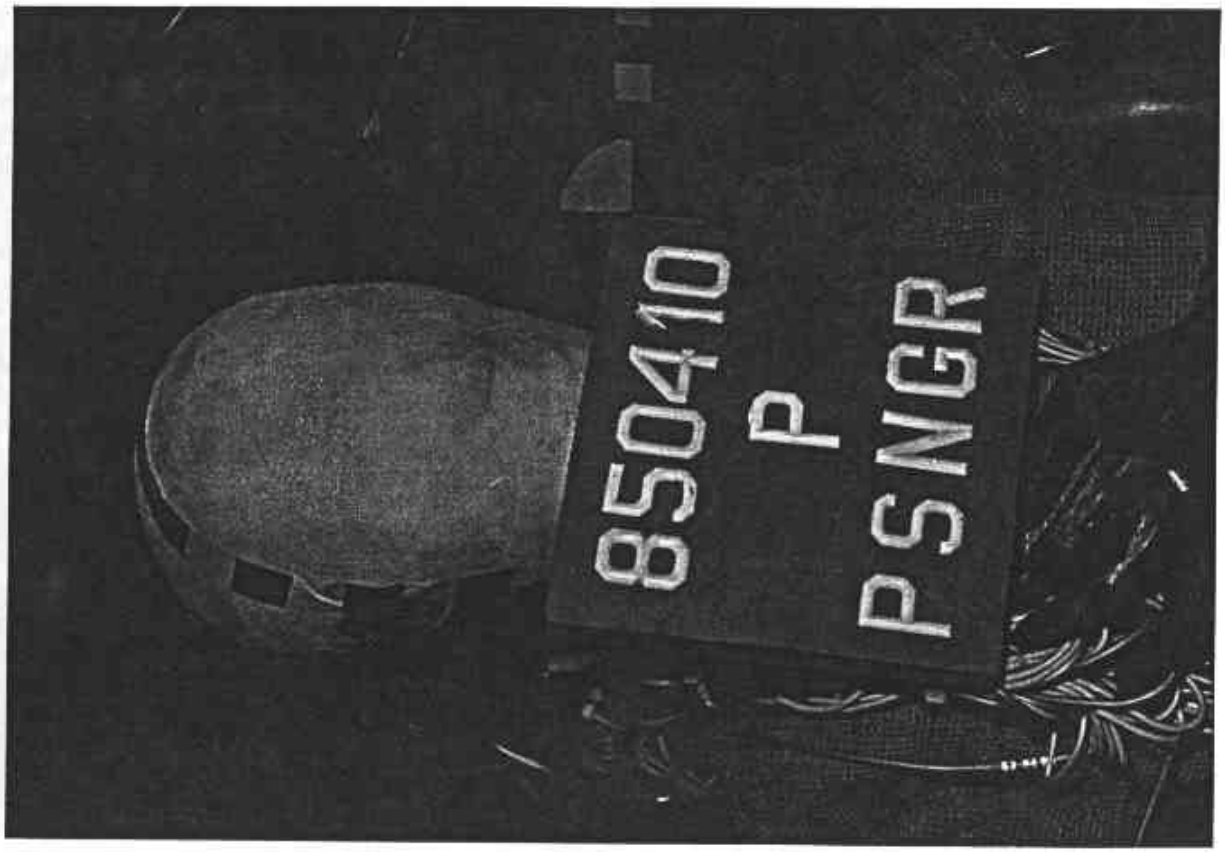


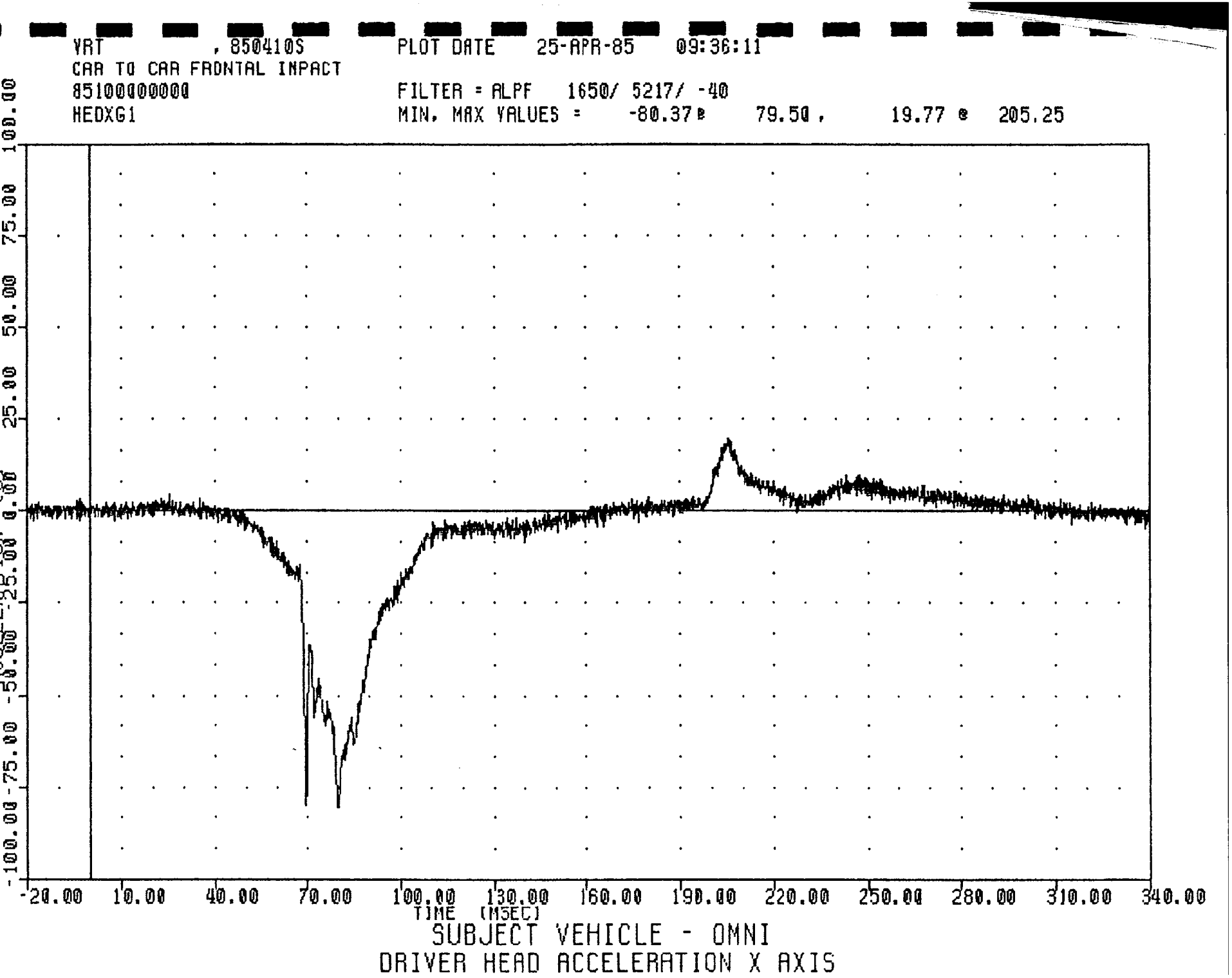
Figure A-54. POST-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 4

APPENDIX B

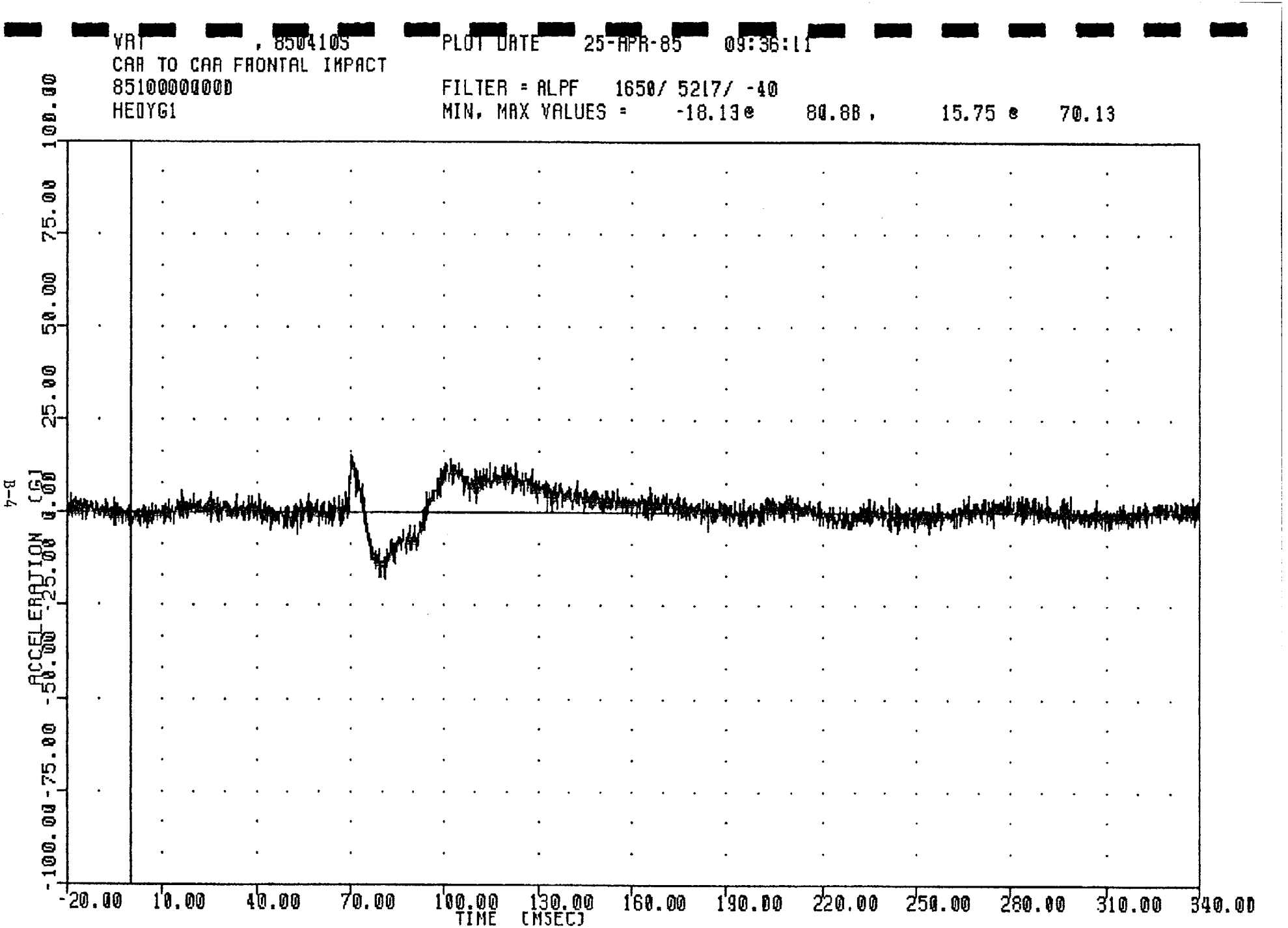
DATA PLOT PRESENTATION

Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. The data was filtered according to SAE J211.

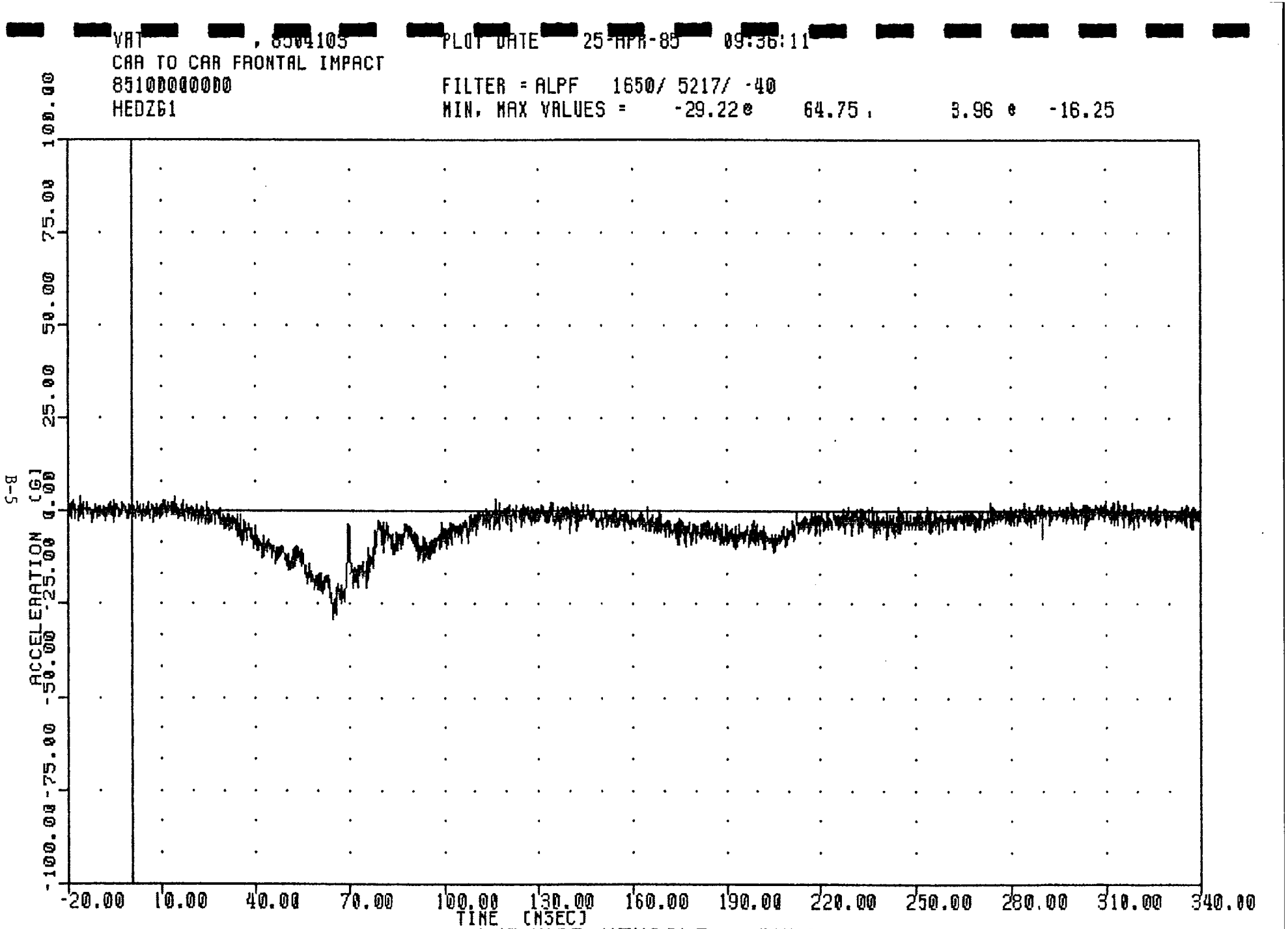
SUBJECT VEHICLE DATA PLOTS



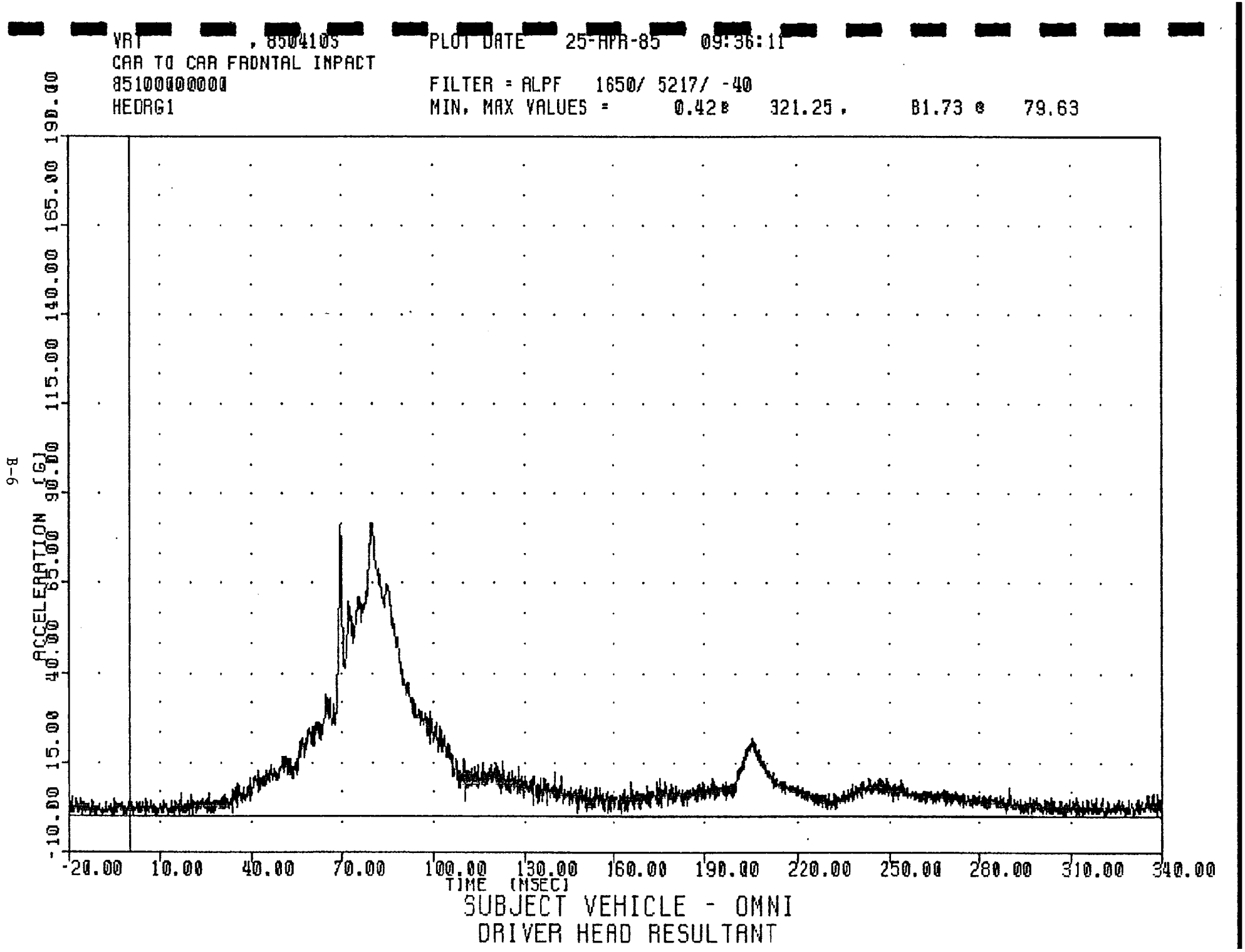
SUBJECT VEHICLE - OMNI
DRIVER HEAD ACCELERATION X AXIS

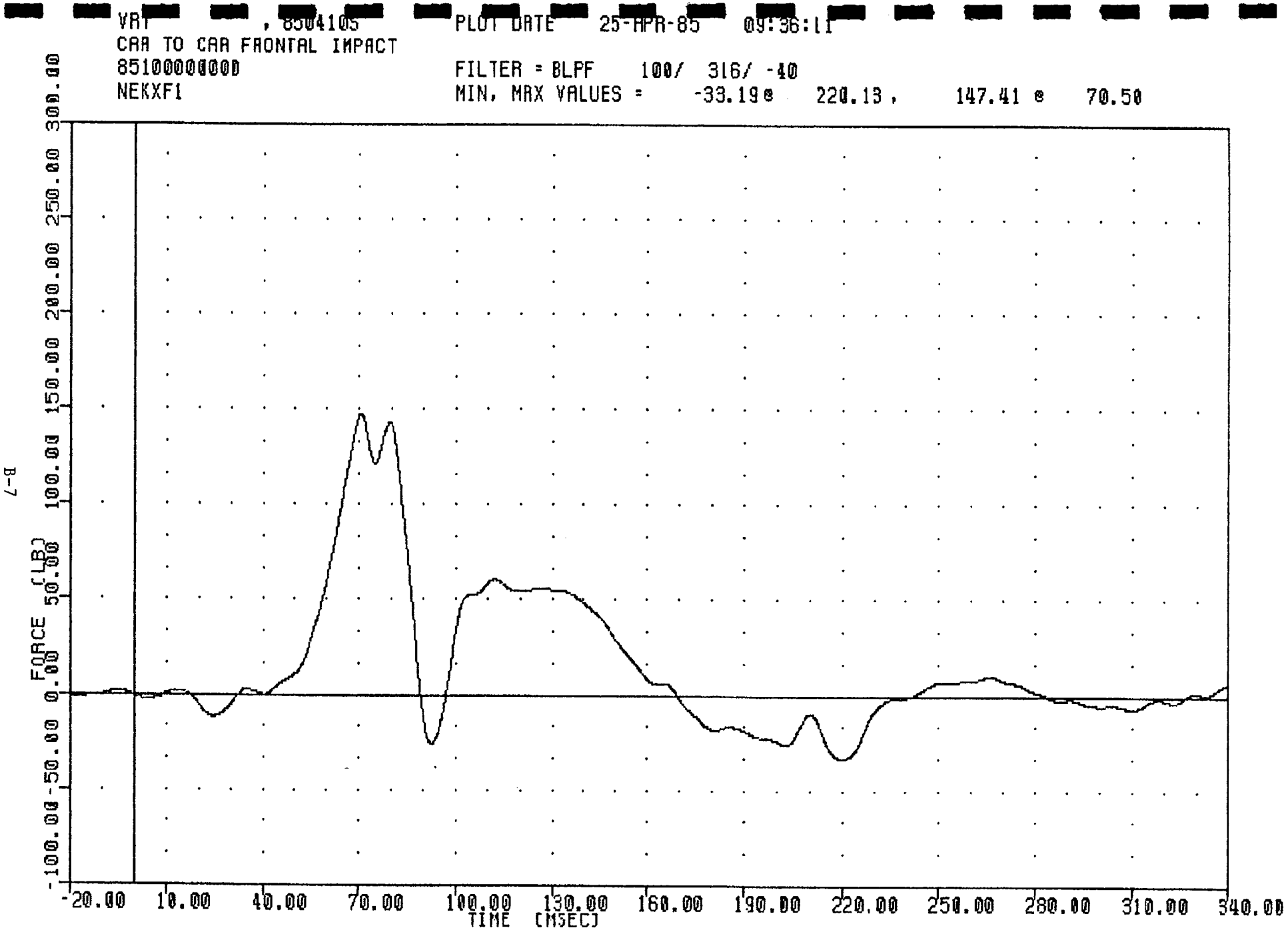


SUBJECT VEHICLE - OMNI
DRIVER HEAD ACCELERATION Y AXIS



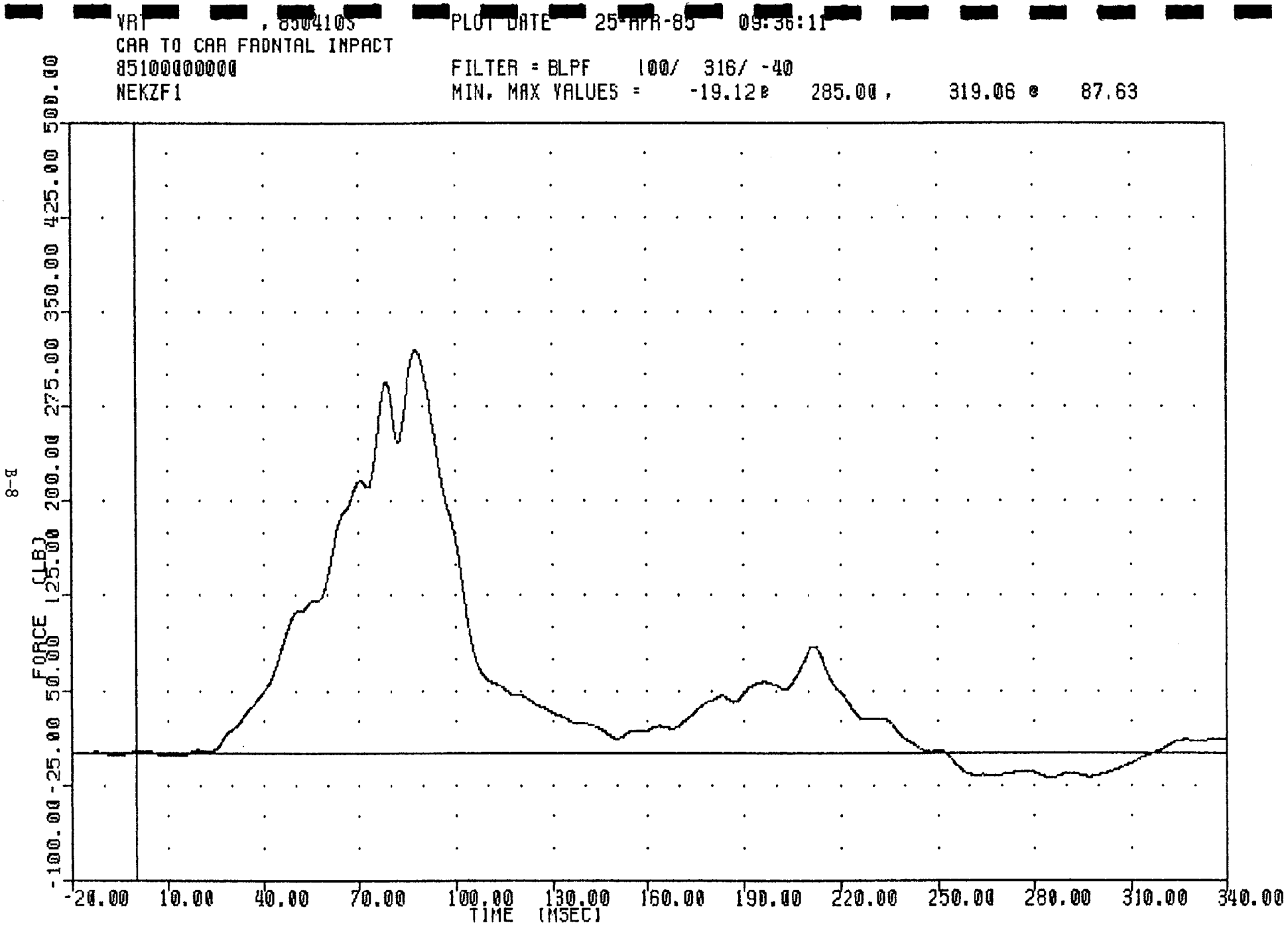
SUBJECT VEHICLE - OMNI
DRIVER HEAD ACCELERATION Z AXIS


VRI , 8504105
PLOT DATE 25-APR-85 09:36:11
CAR TO CAR FRONTAL IMPACT
851000000001
FILTER = ALPF 1650/ 5217/ -40
HEDRG1
MIN, MAX VALUES = 0.42 @ 321.25 , 81.73 @ 79.63
ACCELERATION (G)
-10.00 15.00 40.00 65.00 90.00 115.00 140.00 165.00 190.00
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME (MSEC)
SUBJECT VEHICLE - OMNI
DRIVER HEAD RESULTANT



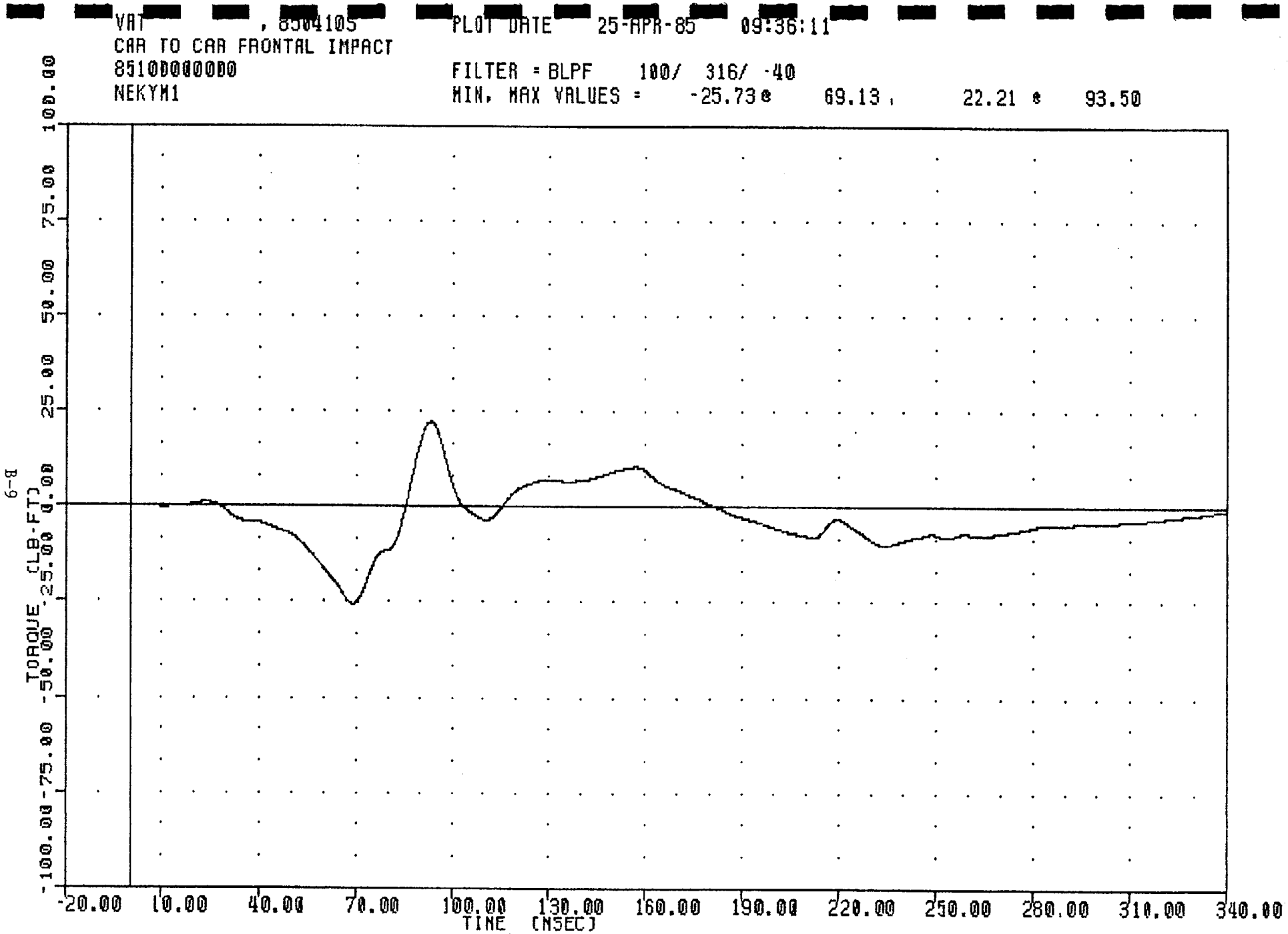
SUBJECT VEHICLE - OMNI

DRIVER NECK FORCE X AXIS LBS (SHEAR)

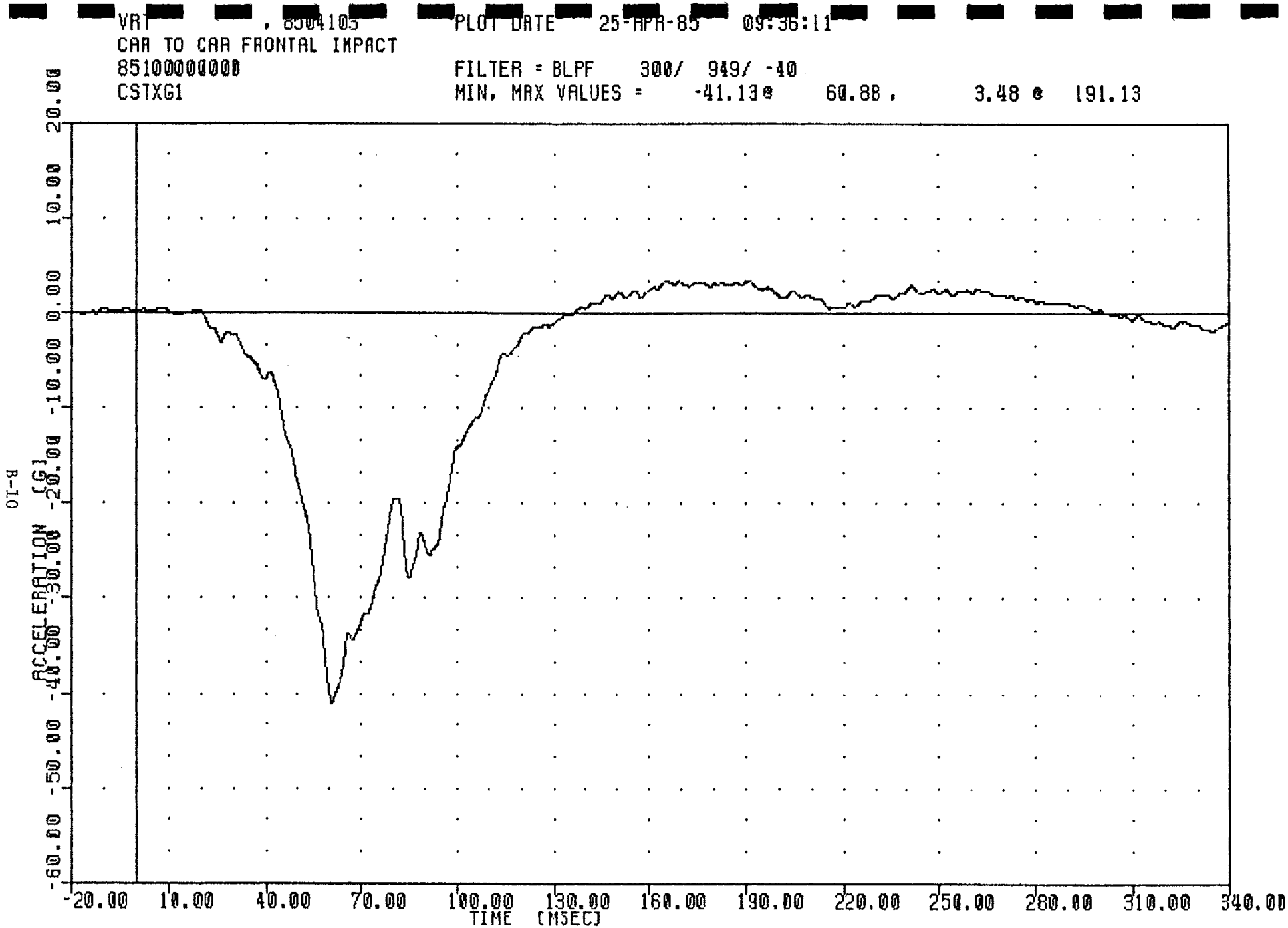


SUBJECT VEHICLE - OMNI

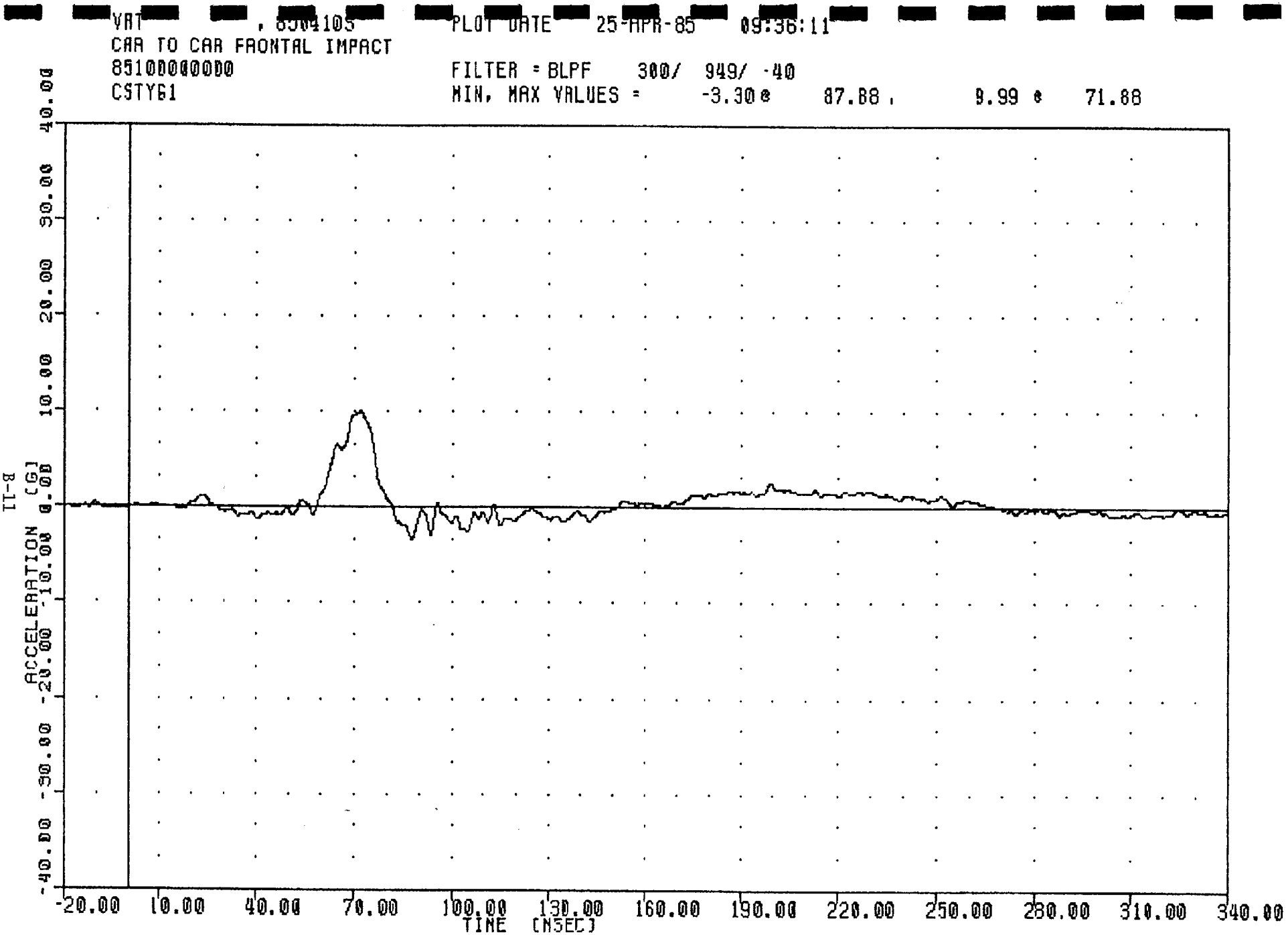
DRIVER NECK FORCE Z AXIS LBS (AXIAL)



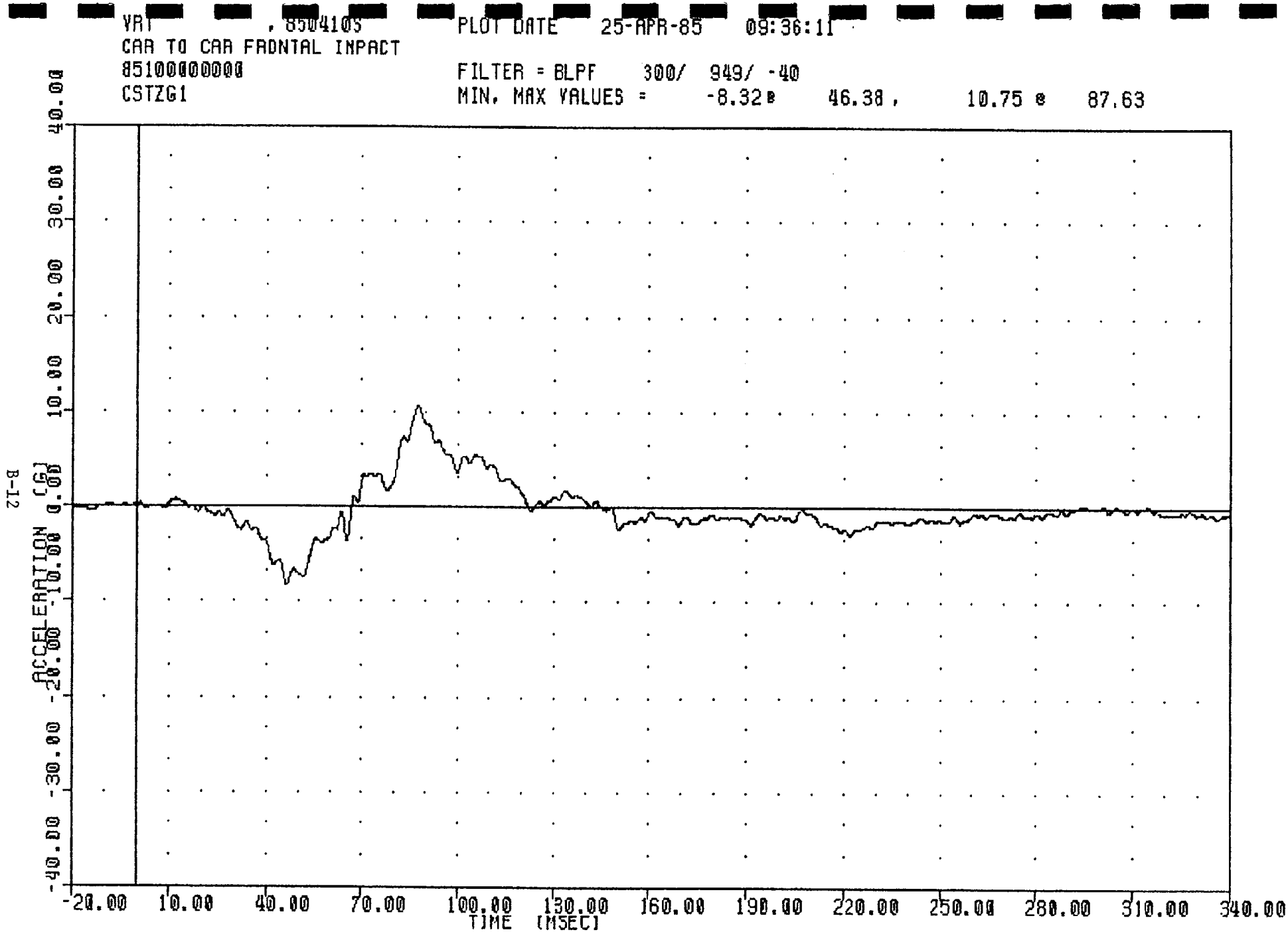
SUBJECT VEHICLE - OMNI
DRIVER NECK MOMENT Y AXIS FT-LBS



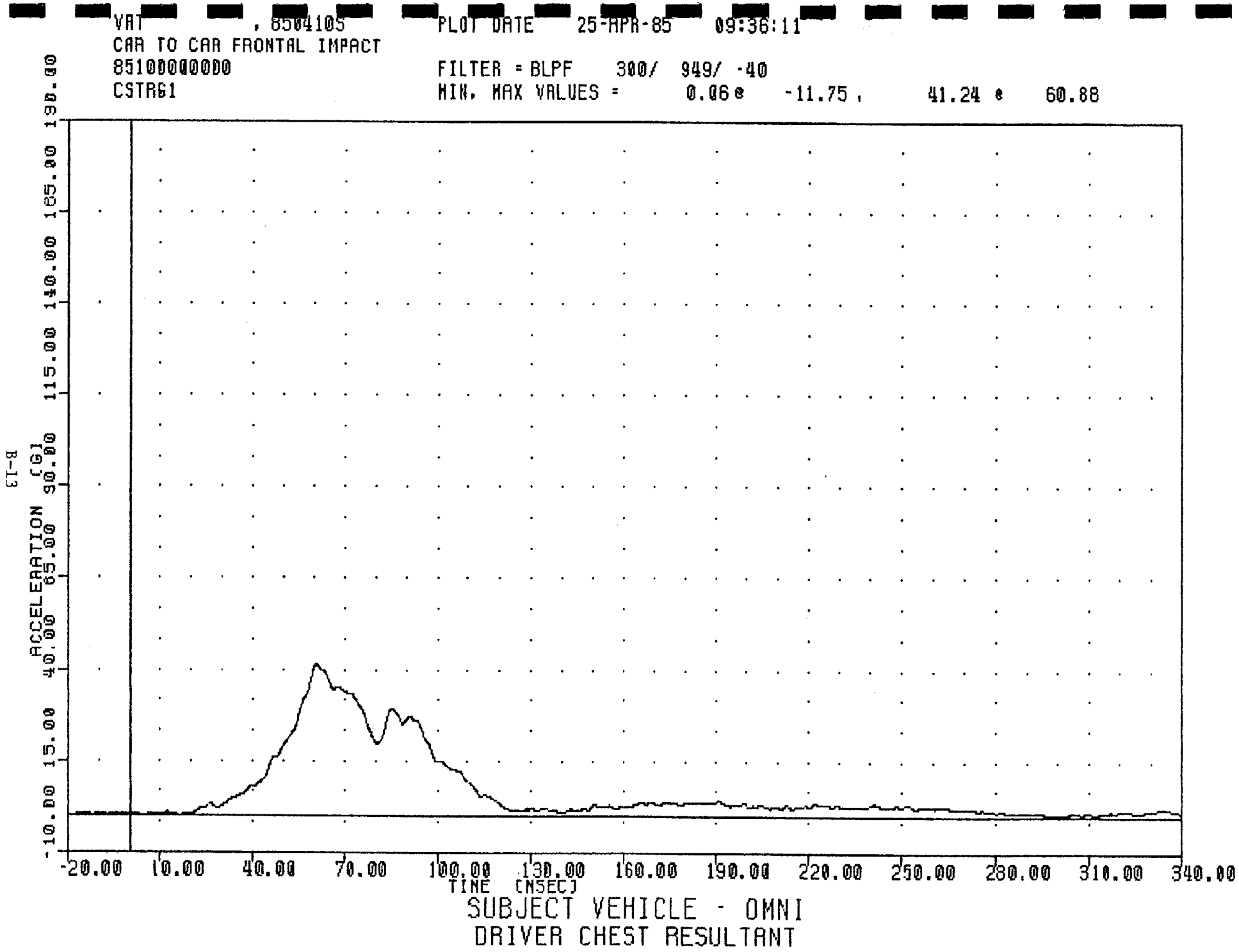
SUBJECT VEHICLE - OMNI
DRIVER CHEST ACCELERATION X AXIS

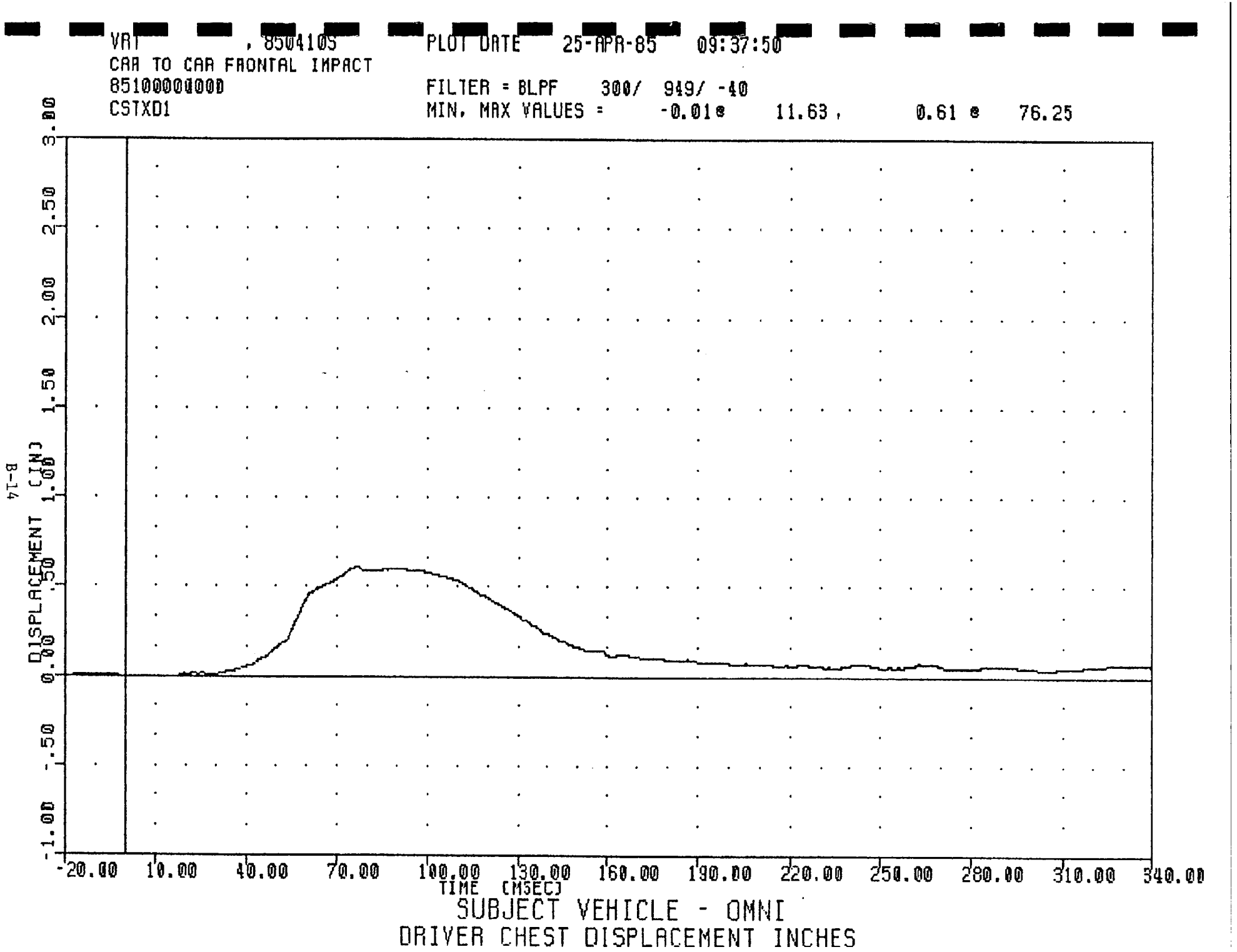


SUBJECT VEHICLE - OMNI
DRIVER CHEST ACCELERATION Y AXIS

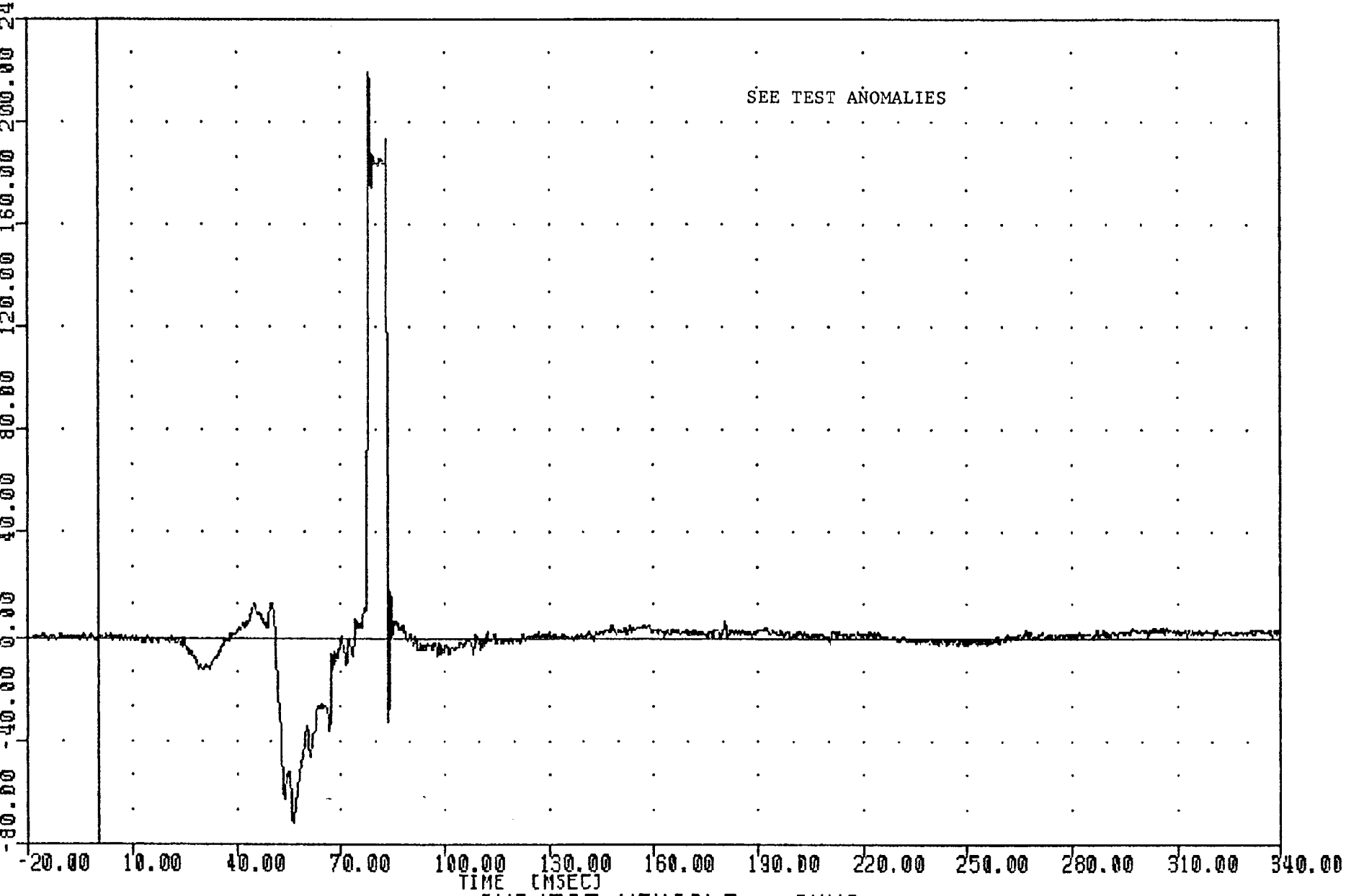


SUBJECT VEHICLE - OMNI
DRIVER CHEST ACCELERATION Z AXIS

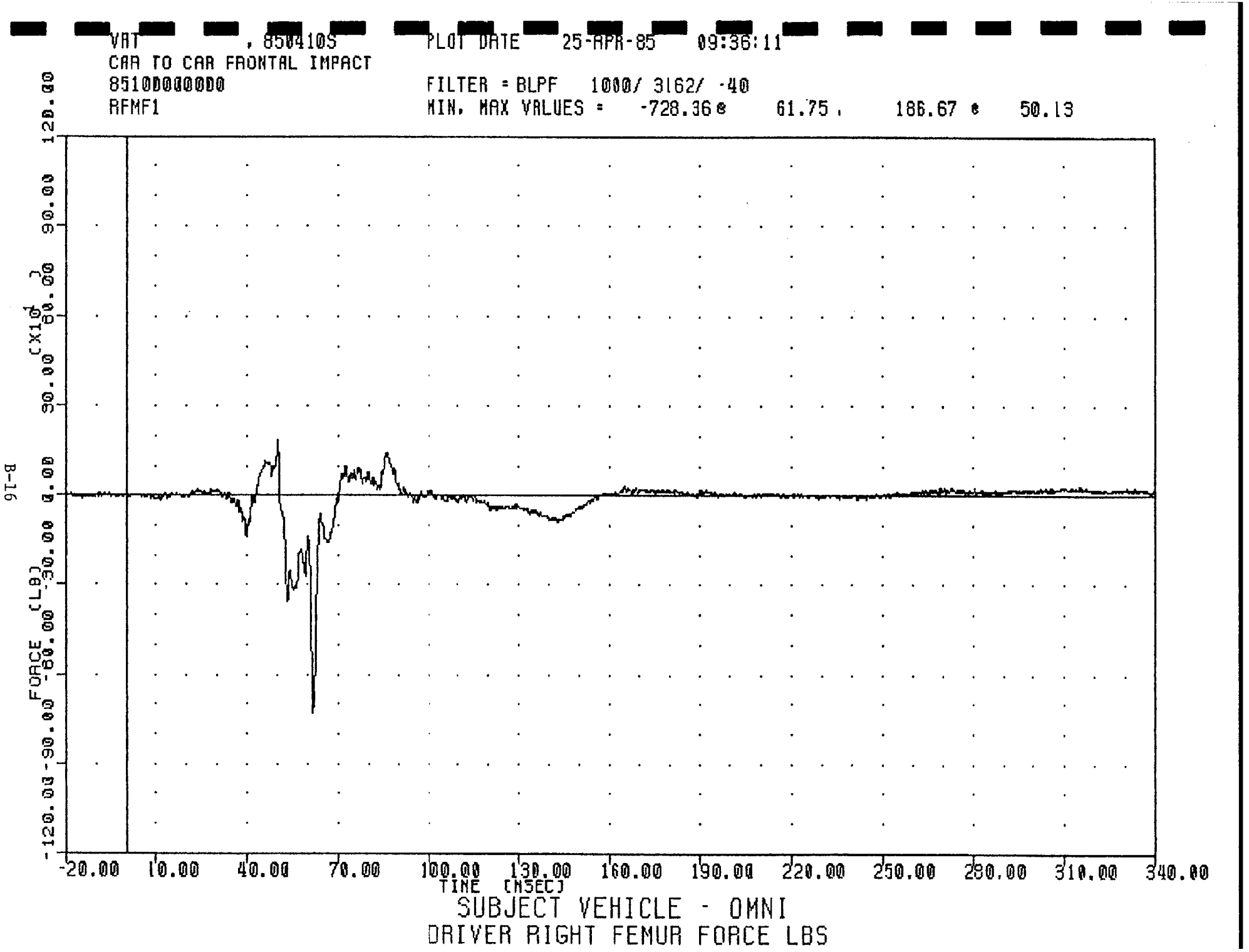

VRT , 8504105
PLOT DATE 25-APR-85 09:36:11
CAR TO CAR FRONTAL IMPACT
851000000000
FILTER = BLPF 300/ 949/ -40
CSTR61
MIN, MAX VALUES = 0.06 @ -11.75 , 41.24 @ 60.88
190.00
185.00
140.00
115.00
90.00
65.00
40.00
15.00
-10.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
SUBJECT VEHICLE - OMNI
DRIVER CHEST RESULTANT

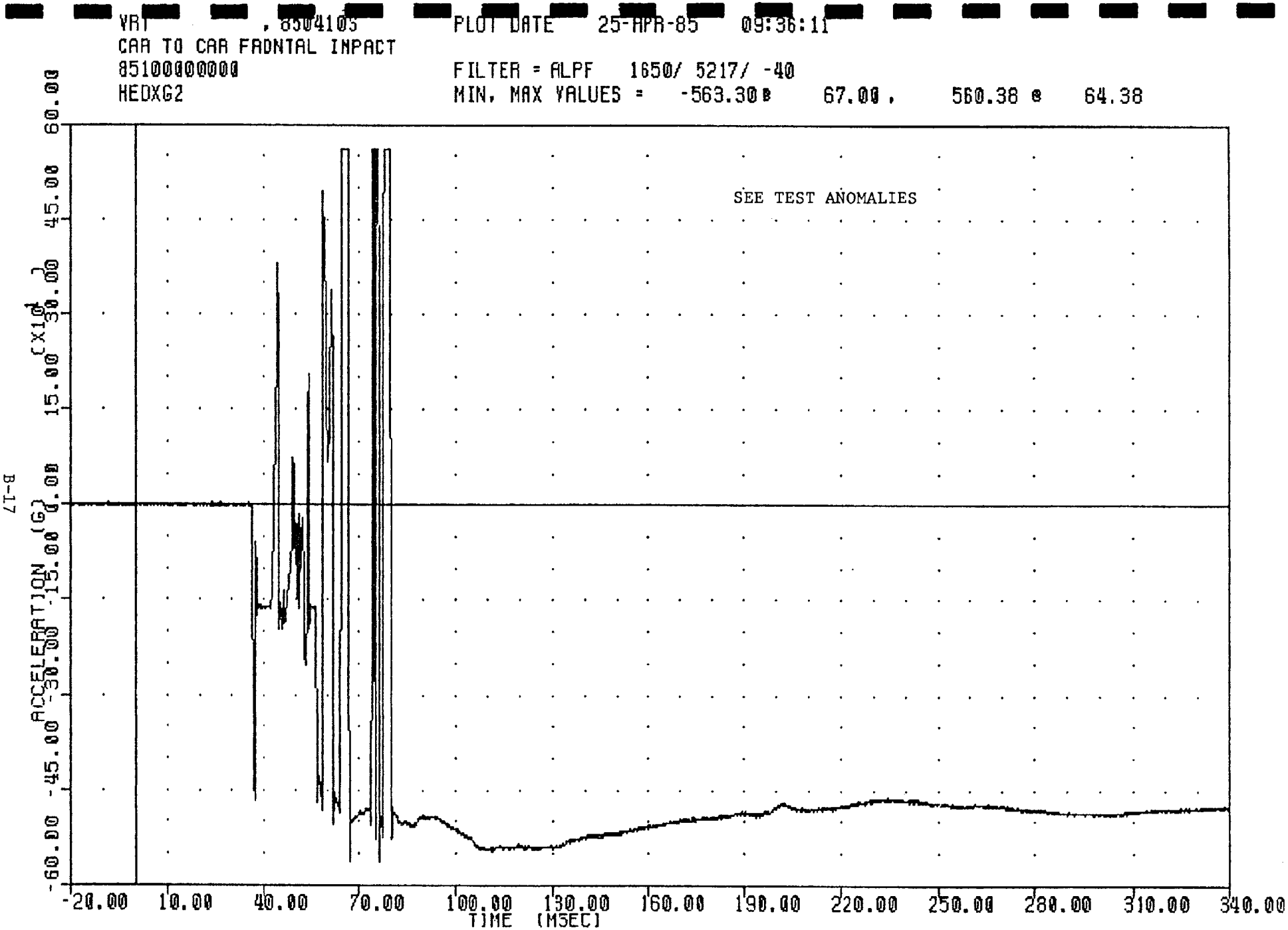

VRT , 8504105 PLOT DATE 25-APR-85 09:37:50
CAR TO CAR FRONTAL IMPACT
8510000100D FILTER = BLPF 300/ 949/ -40
CSTXD1 MIN, MAX VALUES = -0.01@ 11.63 , 0.61 @ 76.25
DISPLACEMENT (IN)
3.00
2.50
2.00
1.50
1.00
.50
0.00
-.50
-1.00
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
SUBJECT VEHICLE - OMNI
DRIVER CHEST DISPLACEMENT INCHES

VRT , 8504105 PLOT DATE 25-APR-85 09:36:11
CAR TO CAR FRONTAL IMPACT
85100000000 FILTER = BLPF 1000/ 3162/ -40
LFNF1 MIN, MAX VALUES = -720.39 @ 56.50 , 2192.55 @ 78.00



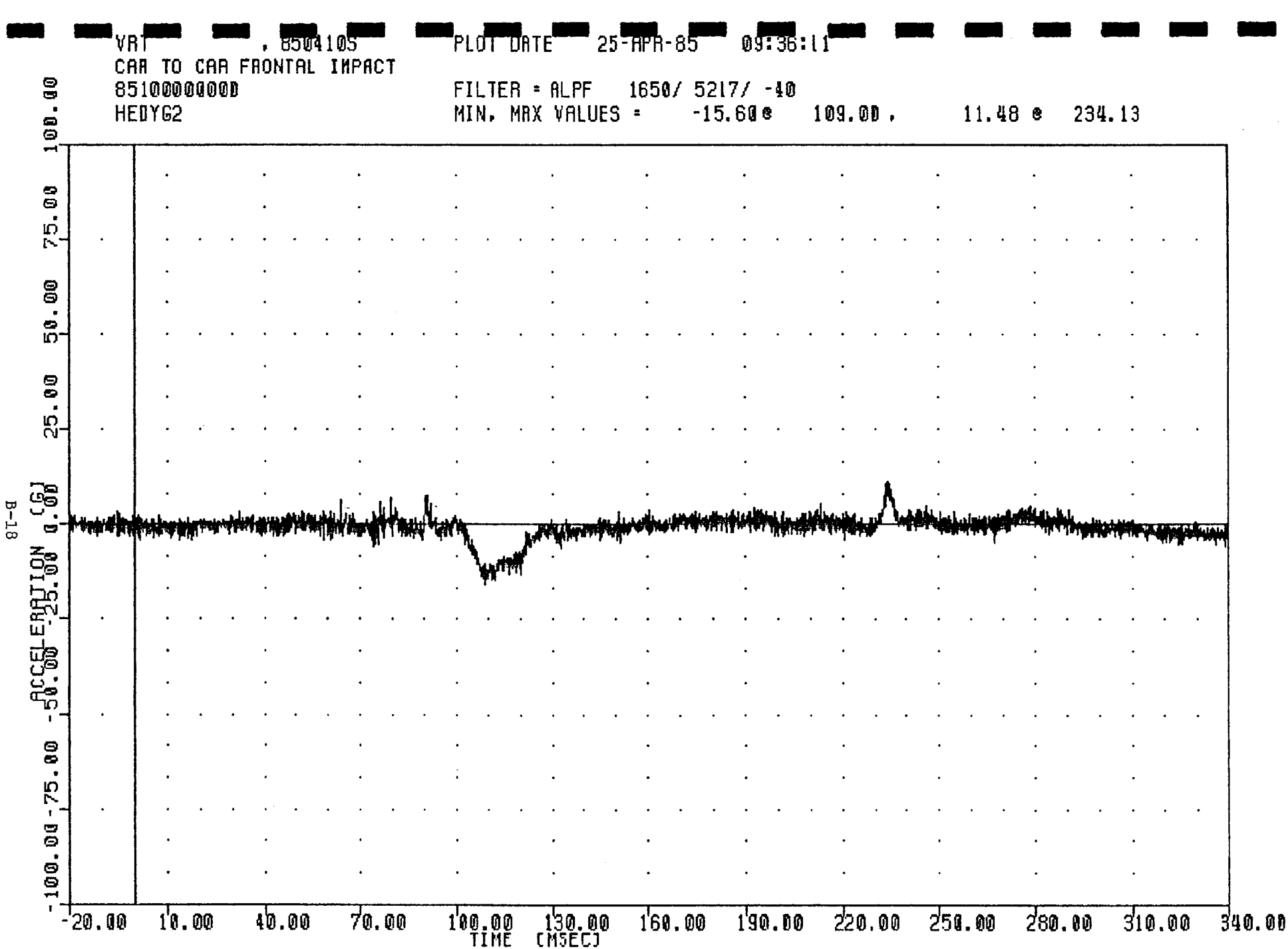
SUBJECT VEHICLE - OMNI
DRIVER LEFT FEMUR FORCE LBS


VRT , 850410S
PLOT DATE 25-APR-85 09:36:11
CAR TO CAR FRONTAL IMPACT
85100000000
FILTER = BLPF 1000/ 3162/ -40
RFMF1
MIN, MAX VALUES = -728.36 @ 61.75 , 186.67 @ 50.13
120.00
90.00
60.00
30.00
0.00
-30.00
-60.00
-90.00
-120.00
(X10^1)
FORCE (LB)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
SUBJECT VEHICLE - OMNI
DRIVER RIGHT FEMUR FORCE LBS



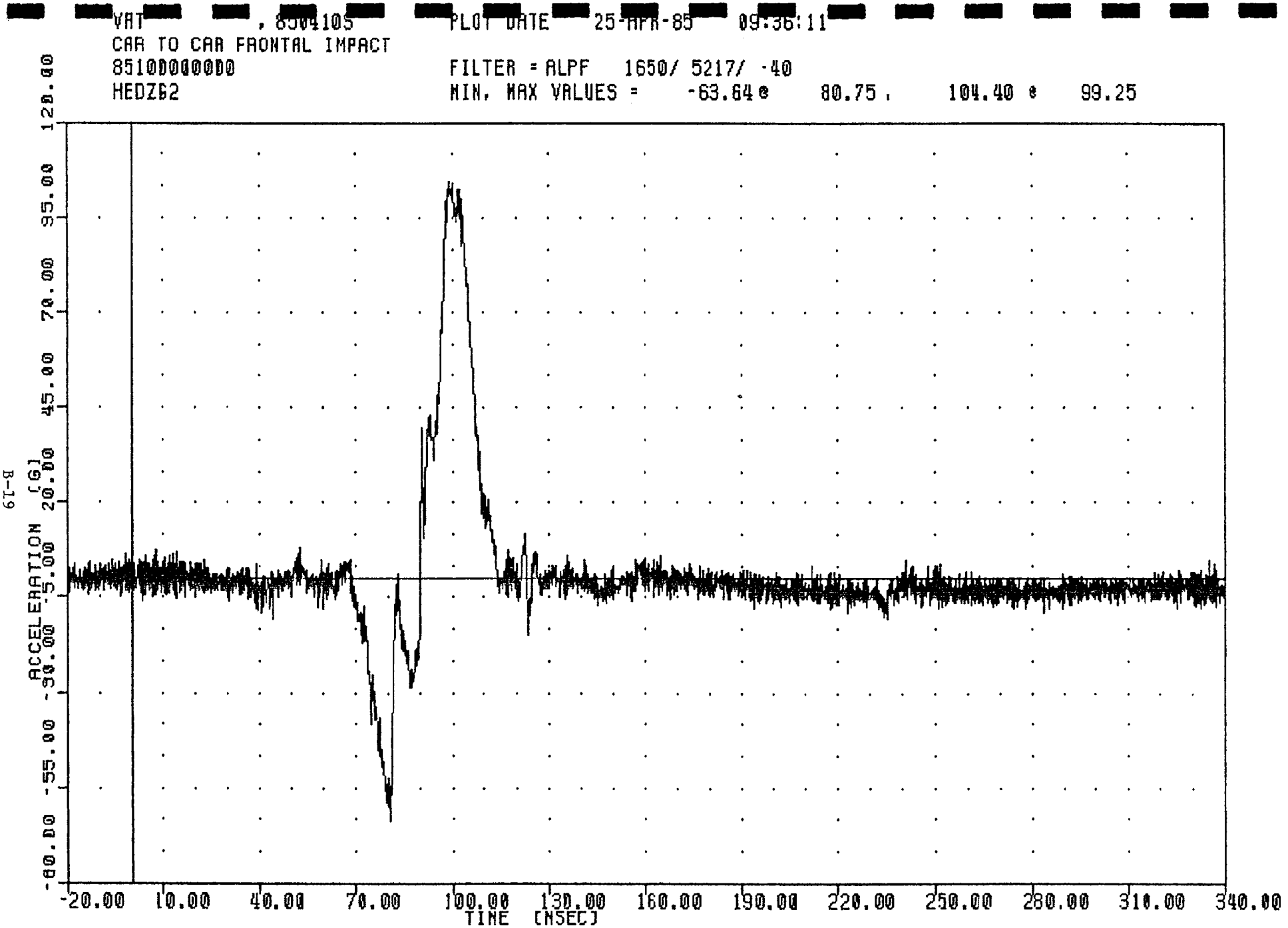
SUBJECT VEHICLE - OMNI

PASSENGER HEAD ACCELERATION X AXIS

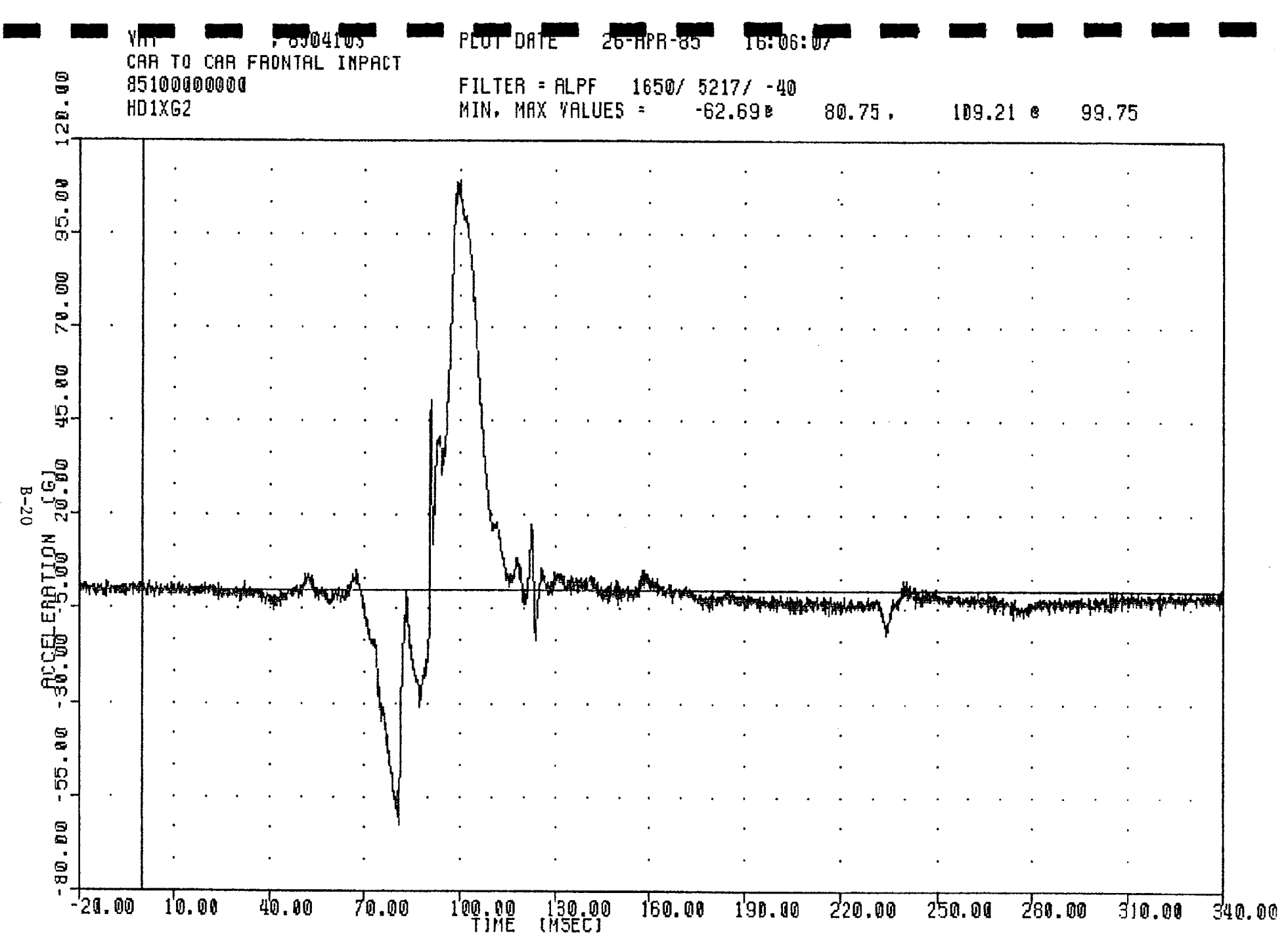


SUBJECT VEHICLE - OMNI

PASSENGER HEAD ACCELERATION Y AXIS

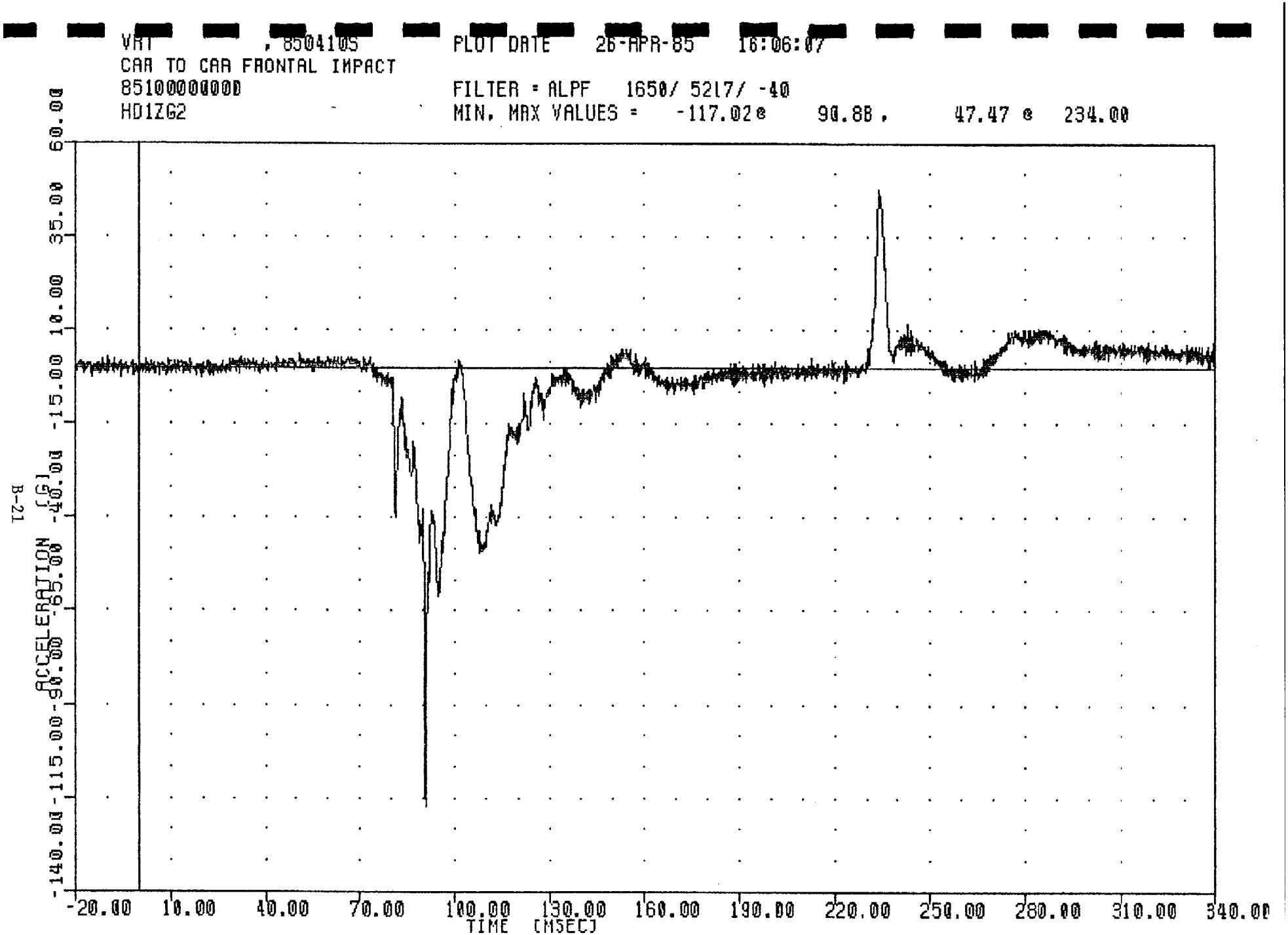


SUBJECT VEHICLE - OMNI
PASSENGER HEAD ACCELERATION Z AXIS



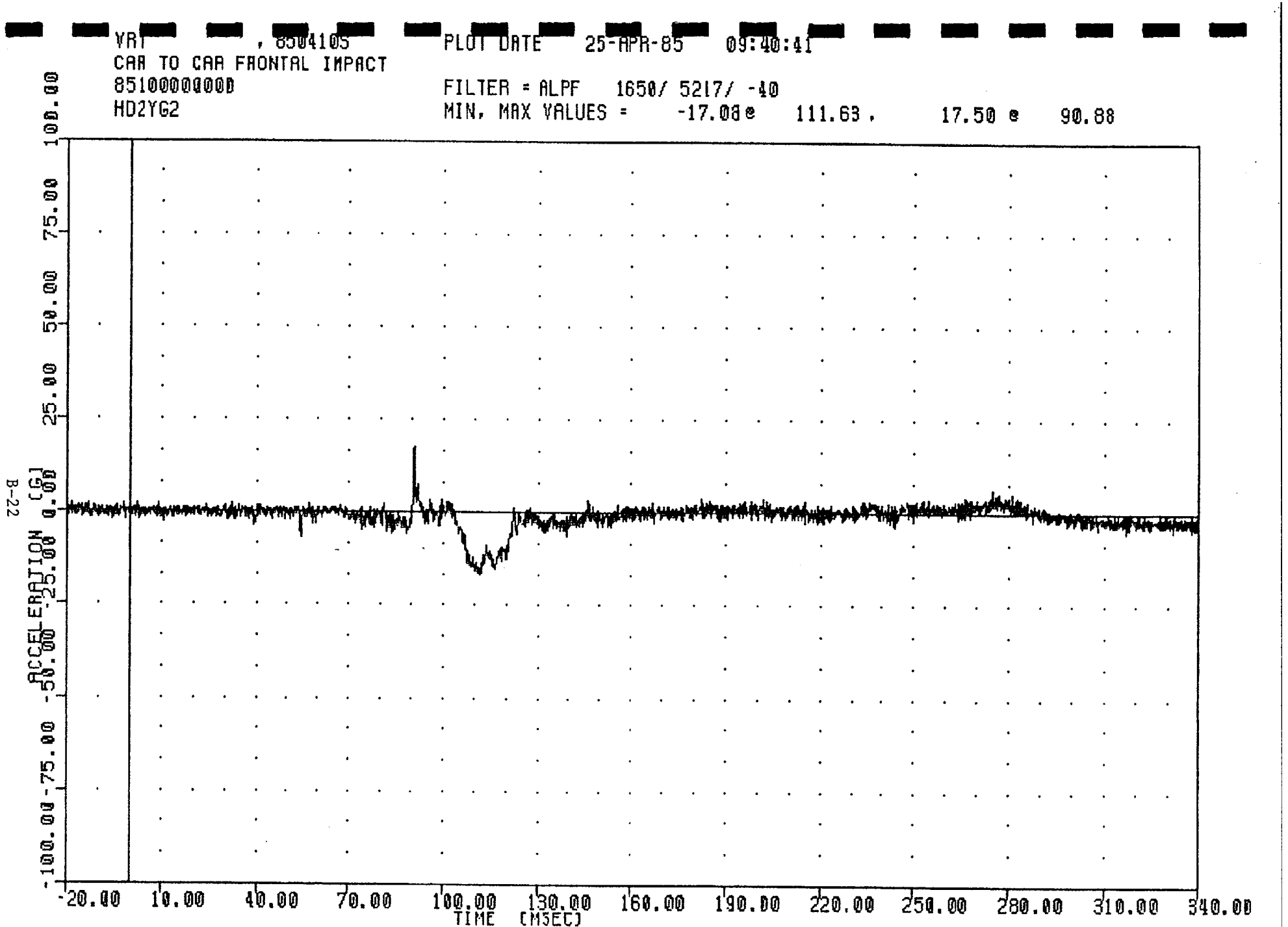
SUBJECT VEHICLE - OMNI

PASSENGER HEAD ACCELERATION X AXIS (POSITION 1)



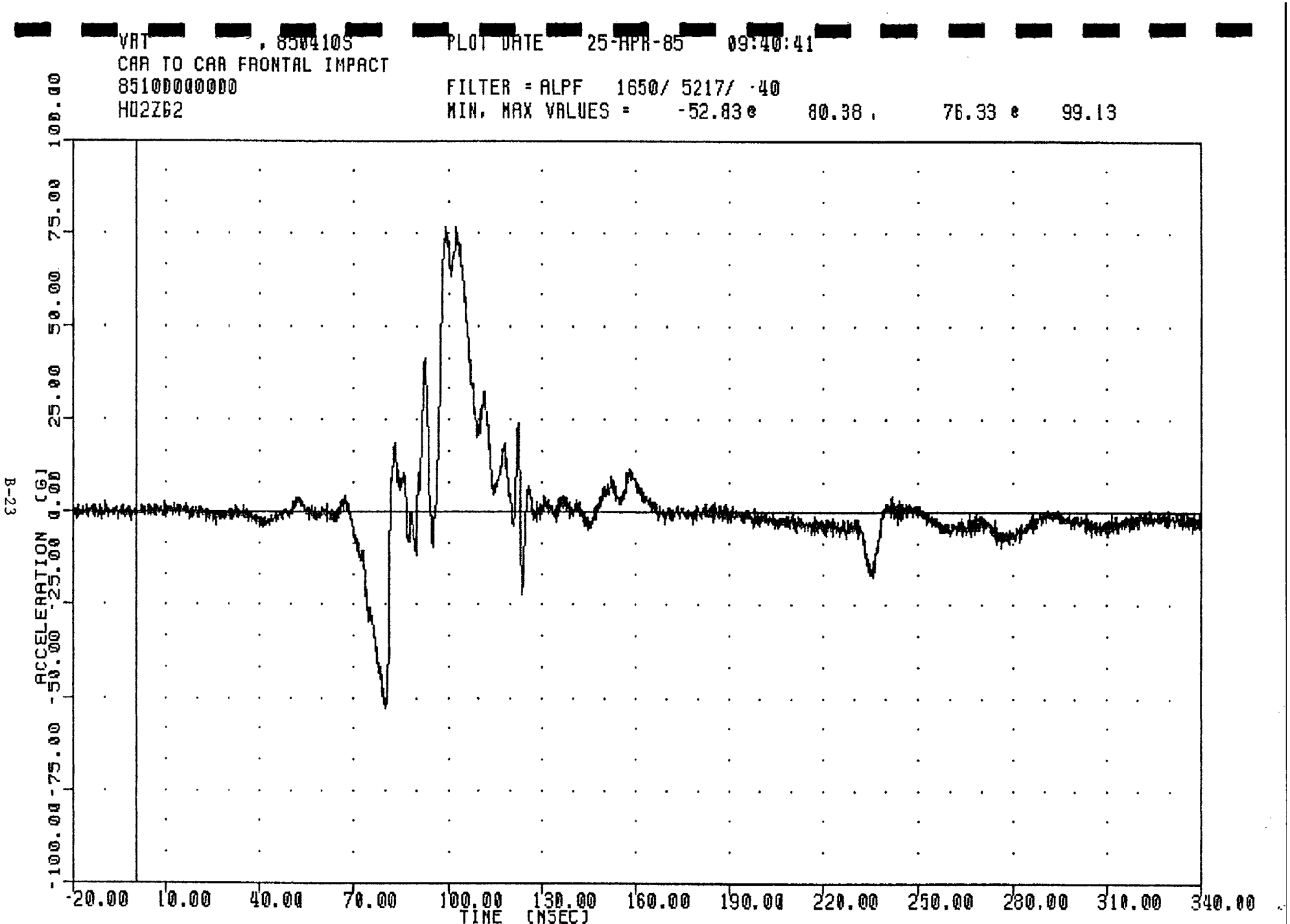
SUBJECT VEHICLE - OMNI

PASSENGER HEAD ACCELERATION Z AXIS (POSITION 1)



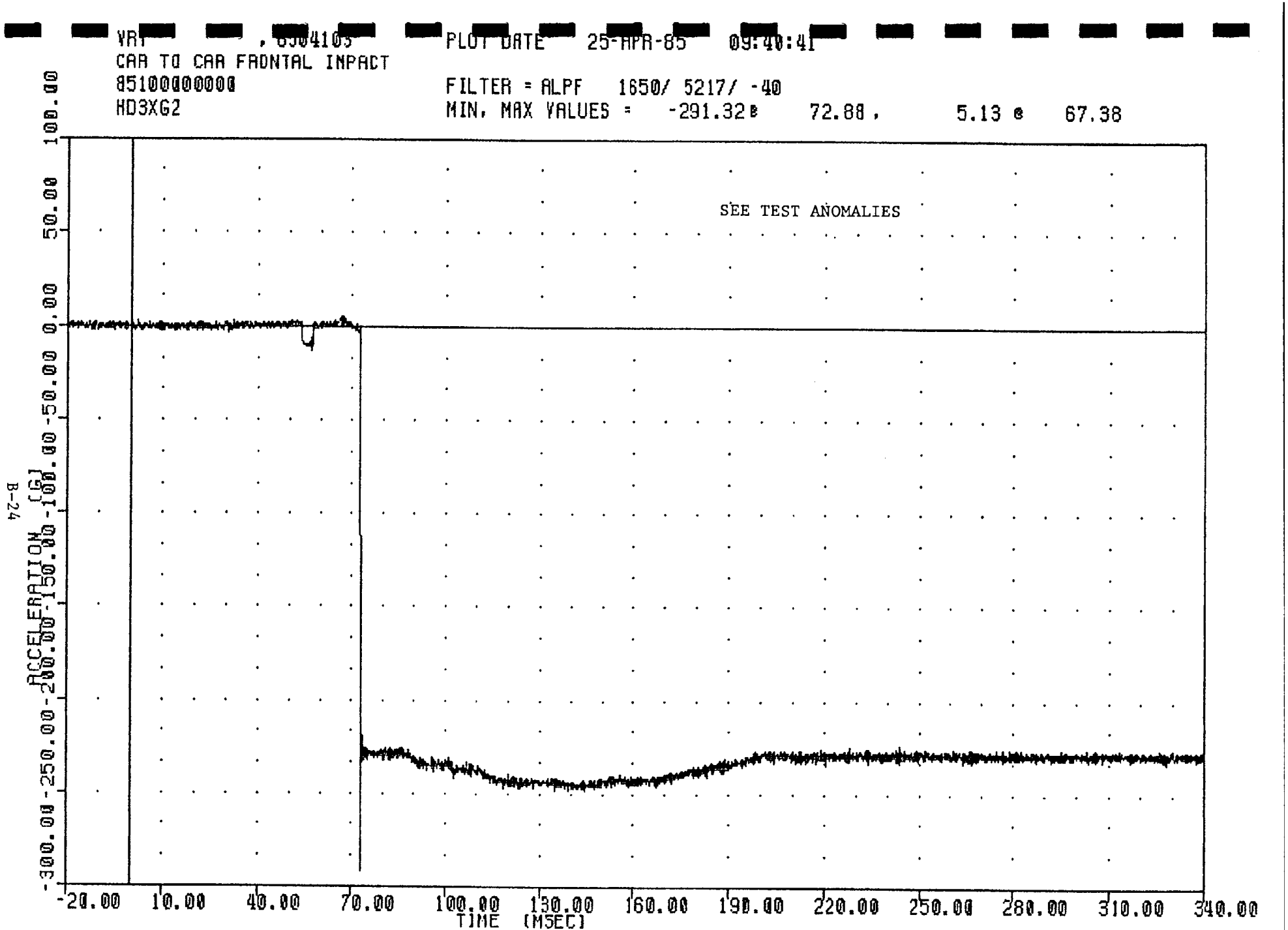
SUBJECT VEHICLE - OMNI

PASSENGER HEAD ACCELERATION Y AXIS (POSITION 2)



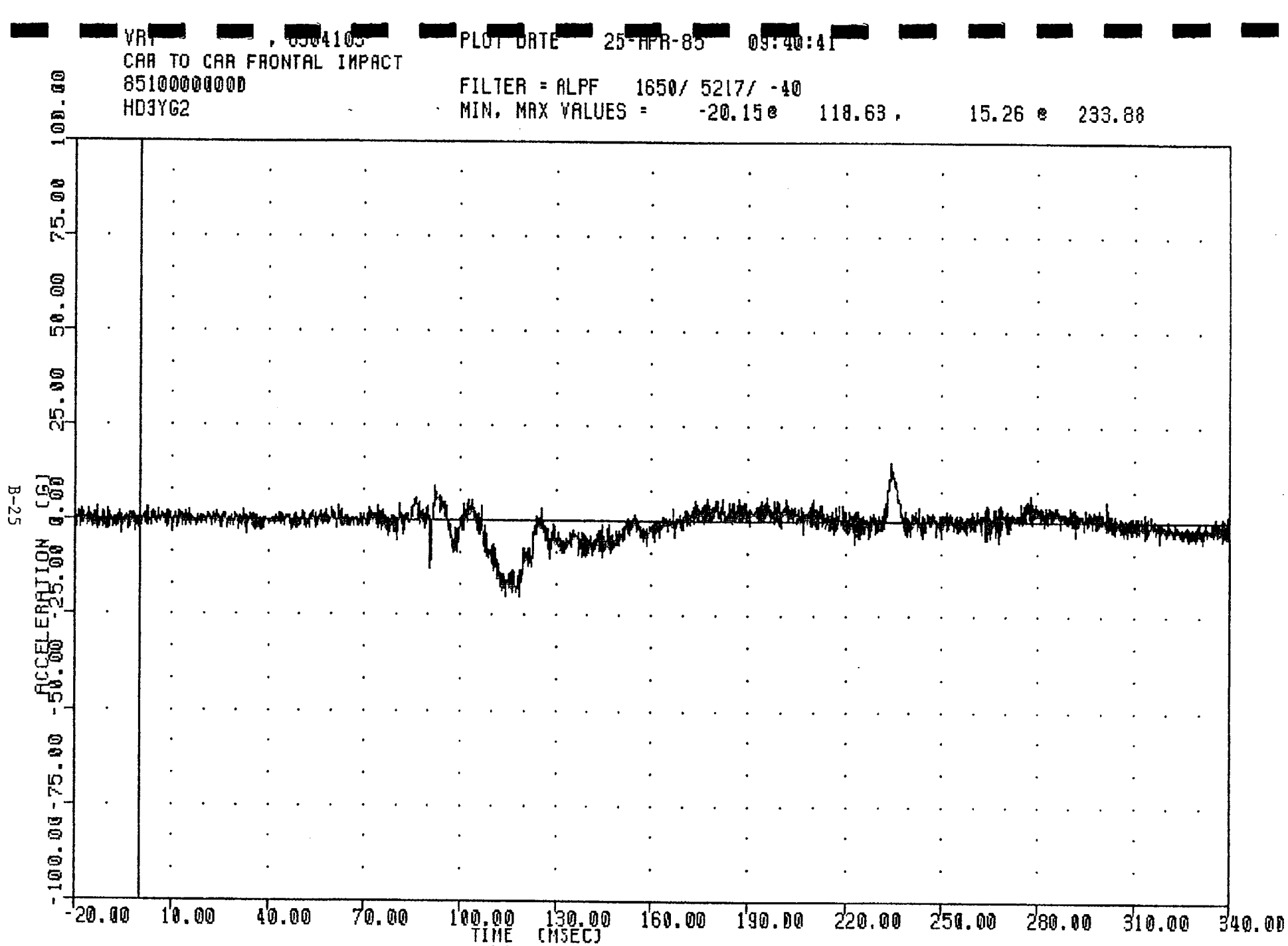
SUBJECT VEHICLE - OMNI

PASSENGER HEAD ACCELERATION Z AXIS (POSITION 2)

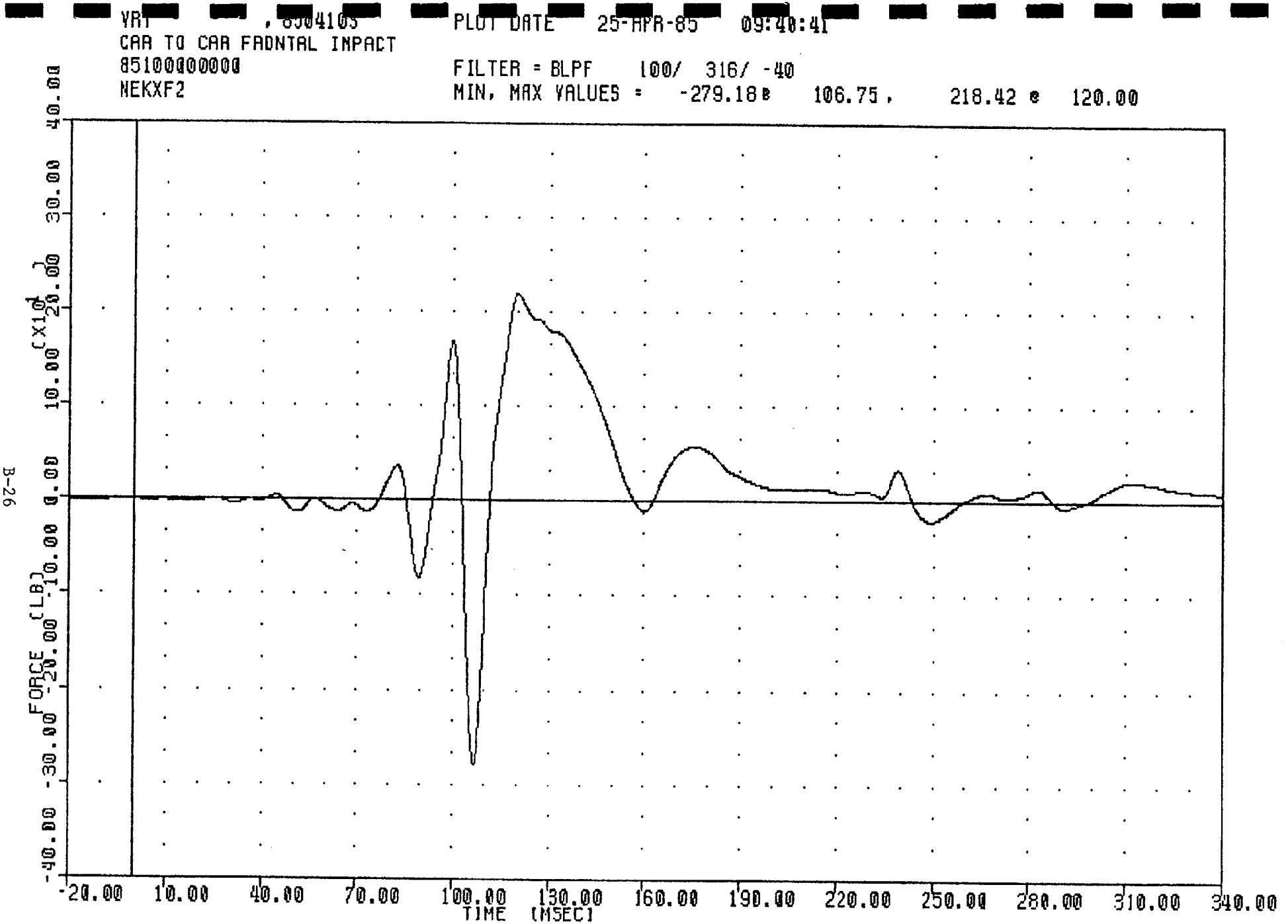


SUBJECT VEHICLE - OMNI

PASSENGER HEAD ACCELERATION X AXIS (POSITION 3)



SUBJECT VEHICLE - OMNI
PASSENGER HEAD ACCELERATION Y AXIS (POSITION 3)



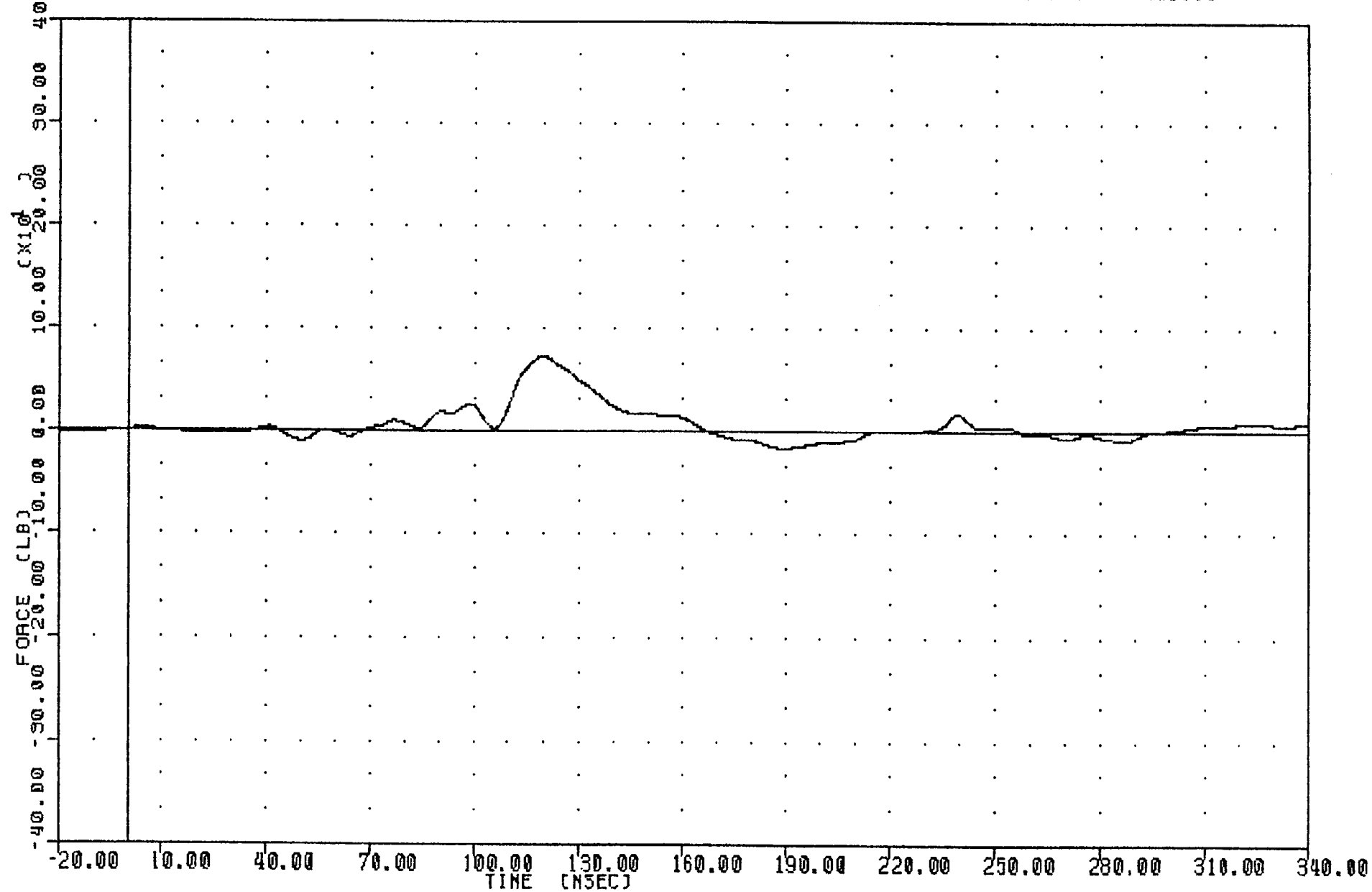
SUBJECT VEHICLE - OMNI

PASSENGER NECK FORCE X AXIS LBS (SHEAR)

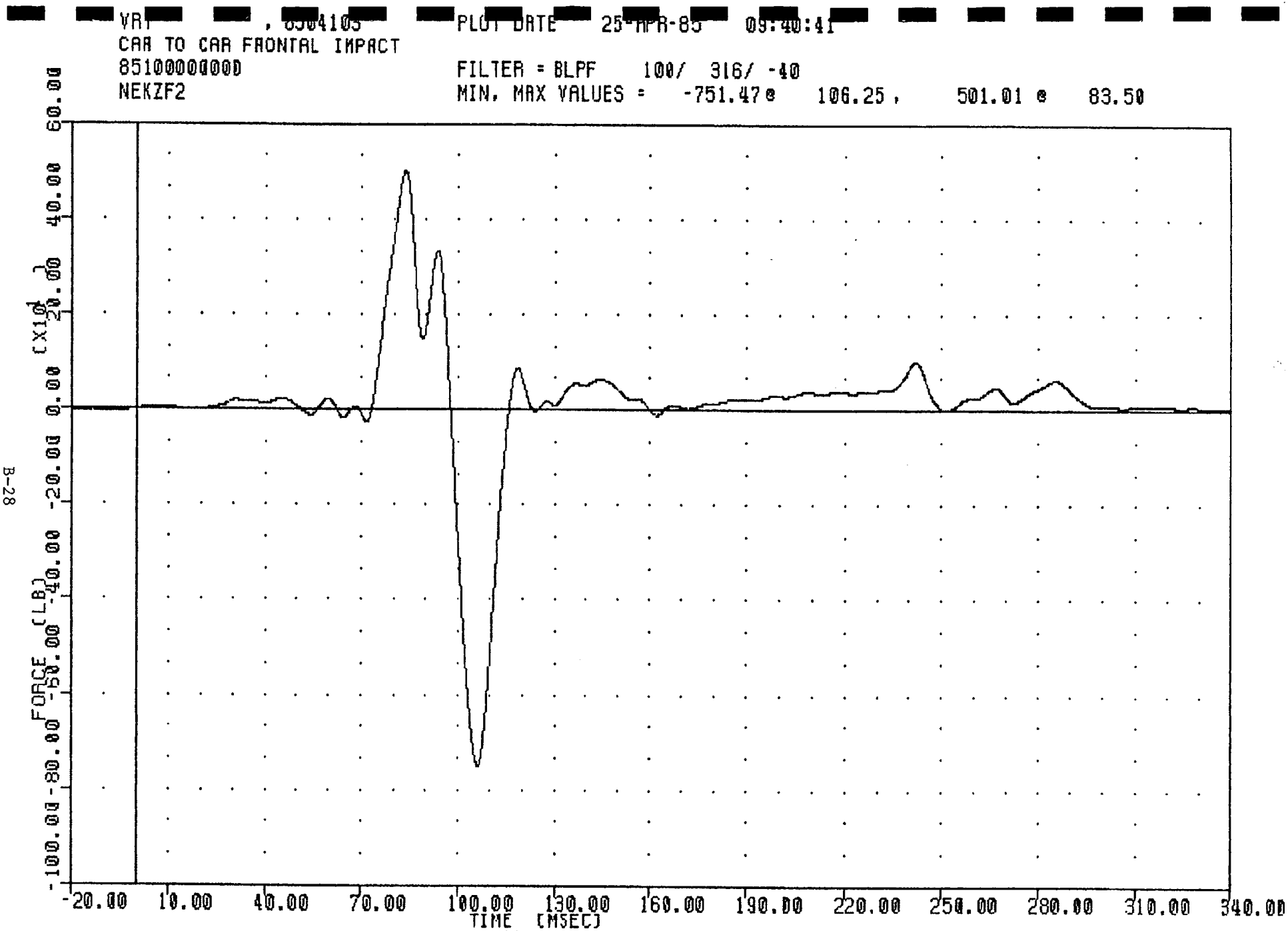
[redacted] VA[redacted] [redacted] , [redacted] [redacted] PLOT DATE [redacted] 25 [redacted]-85 [redacted] 09:40:41 [redacted]

CAR TO CAR FRONTAL IMPACT
85100000000
NEKYF2

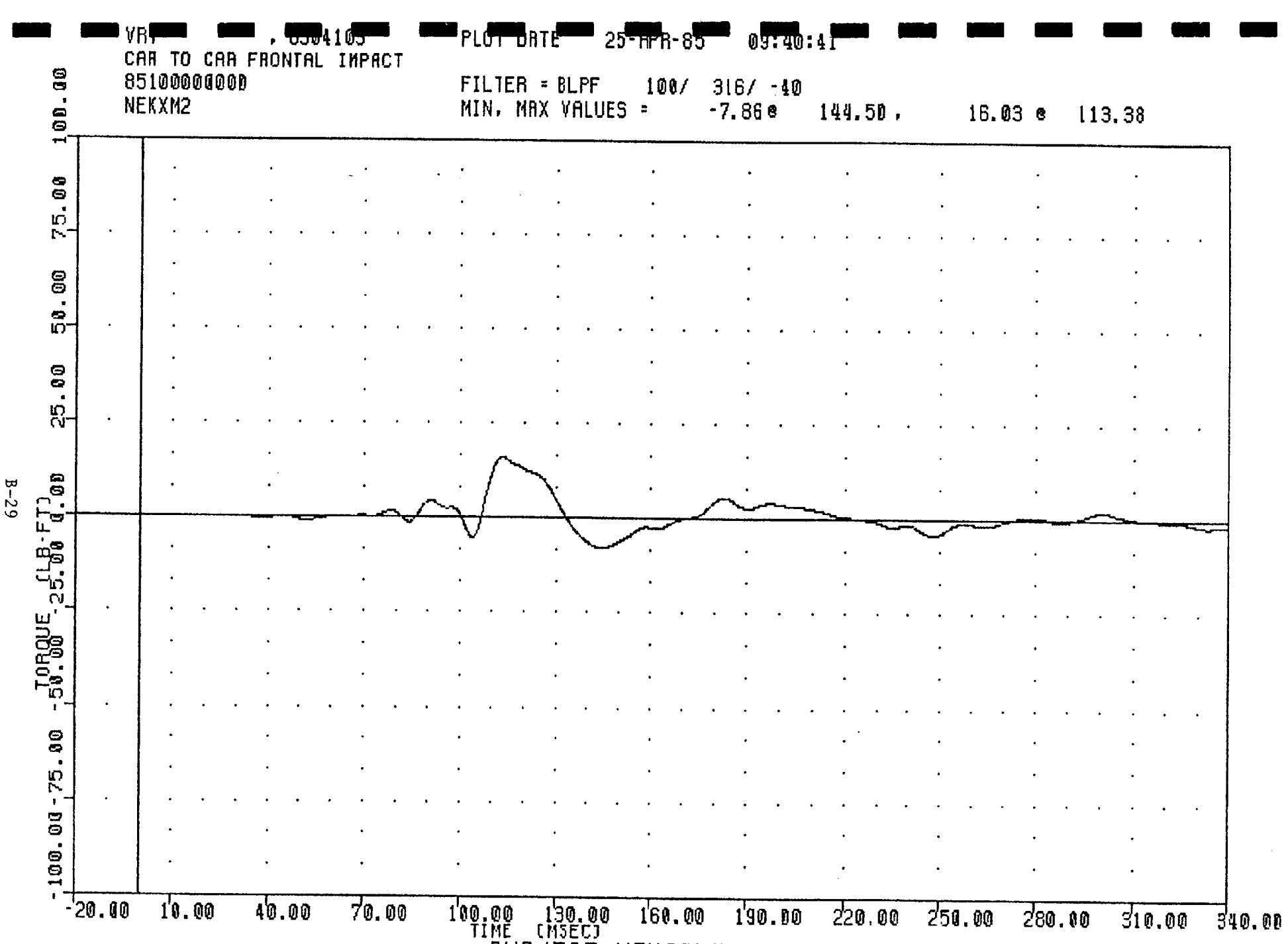
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -16.01 @ 189.63 , 72.39 @ 119.50



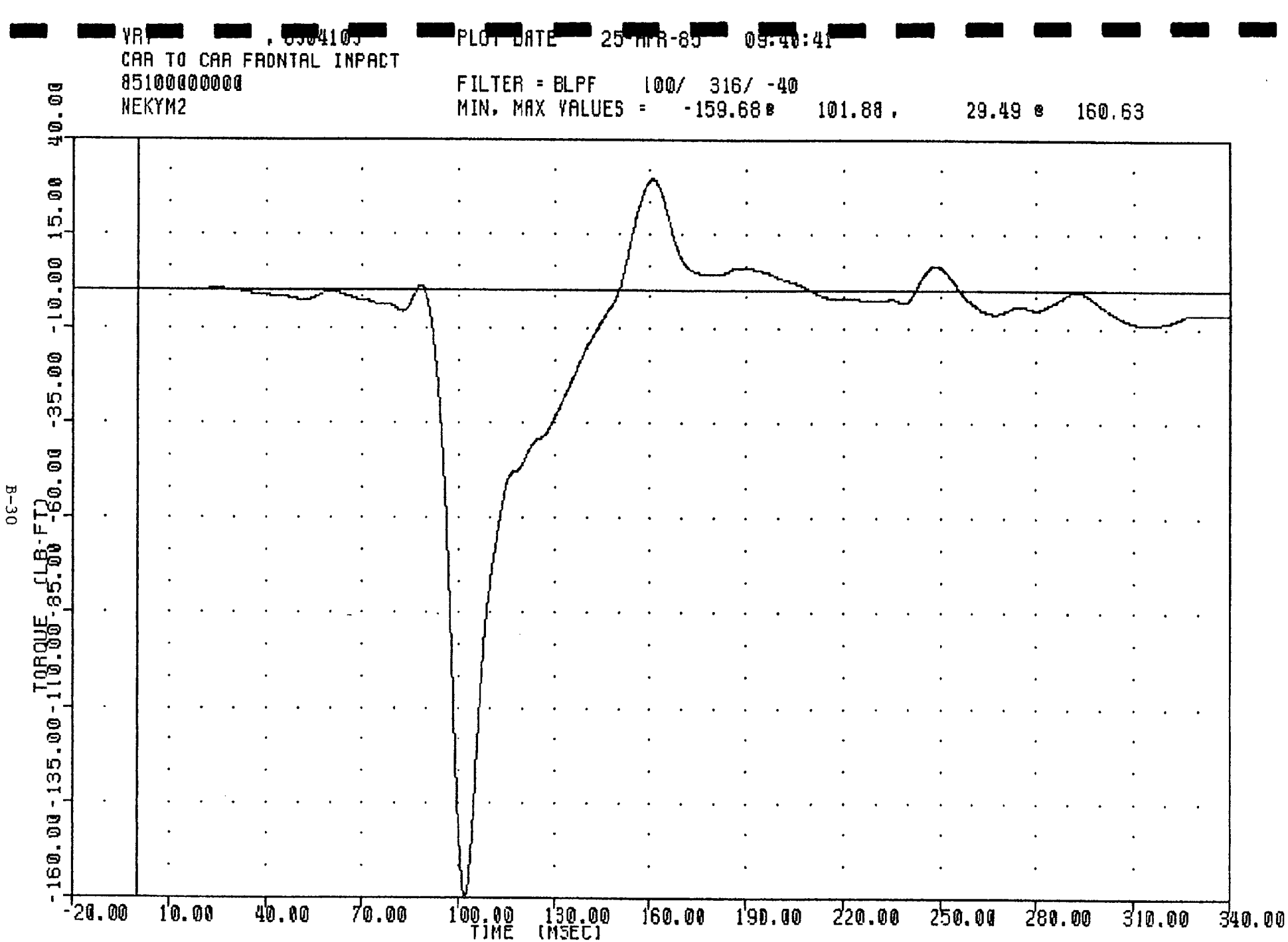
SUBJECT VEHICLE - OMNI
PASSENGER NECK FORCE Y AXIS LBS



SUBJECT VEHICLE - OMNI
PASSENGER NECK FORCE Z AXIS LBS (AXIAL)

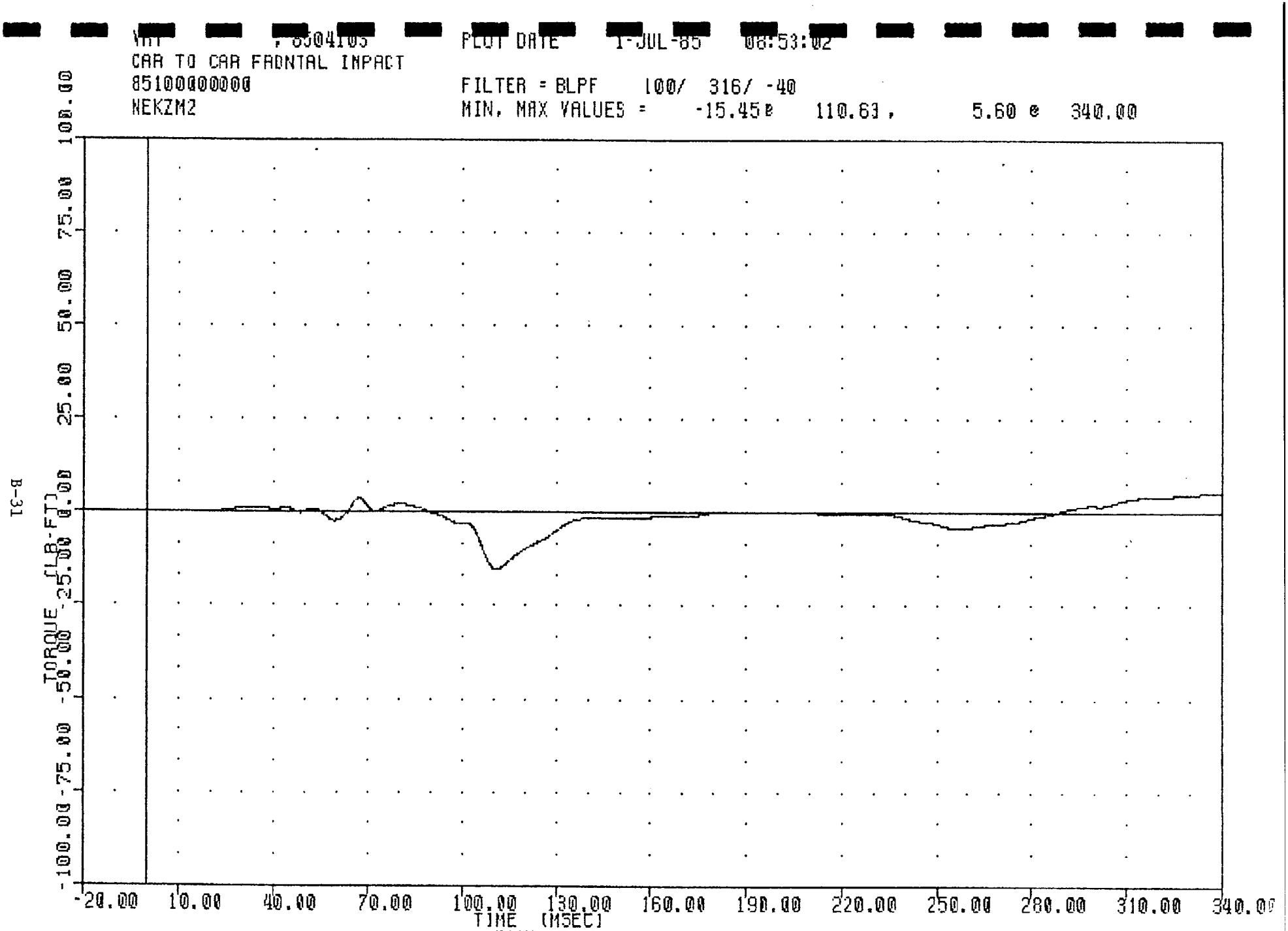


SUBJECT VEHICLE - OMNI
PASSENGER NECK MOMENT X AXIS FT-LBS



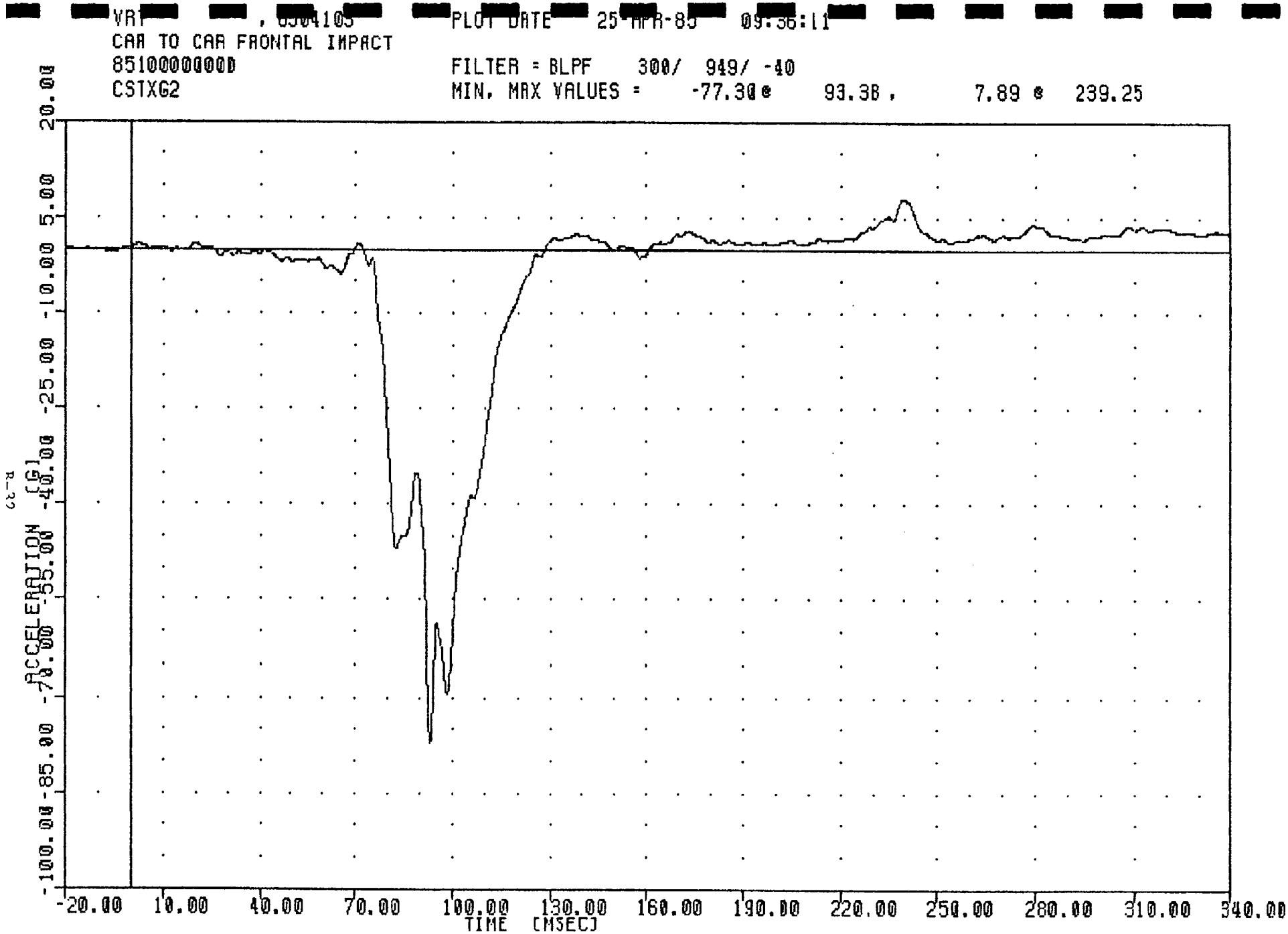
SUBJECT VEHICLE - OMNI

PASSENGER NECK MOMENT Y AXIS FT-LBS



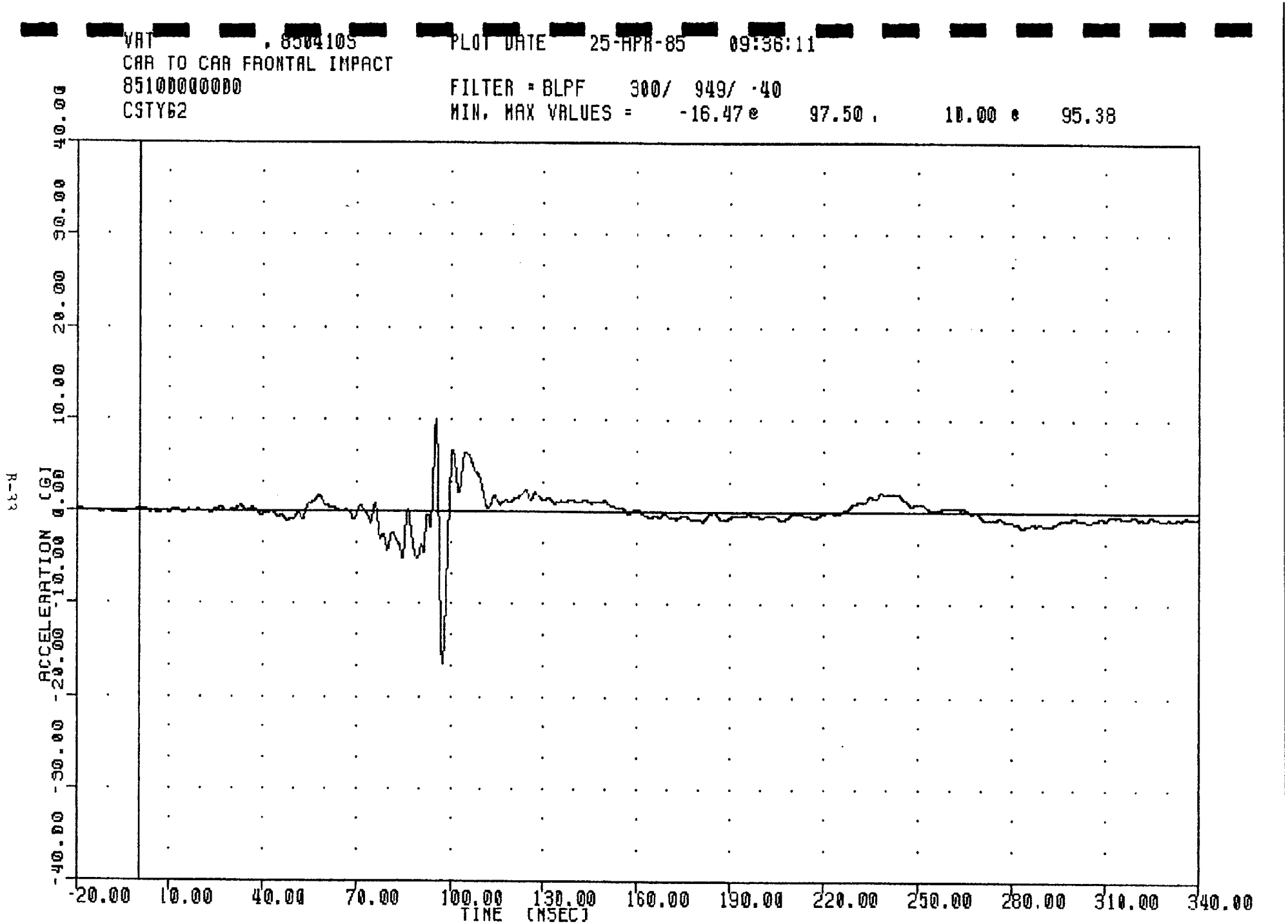
SUBJECT VEHICLE - OMNI

PASSENGER NECK MOMENT Z AXIS FT-LBS

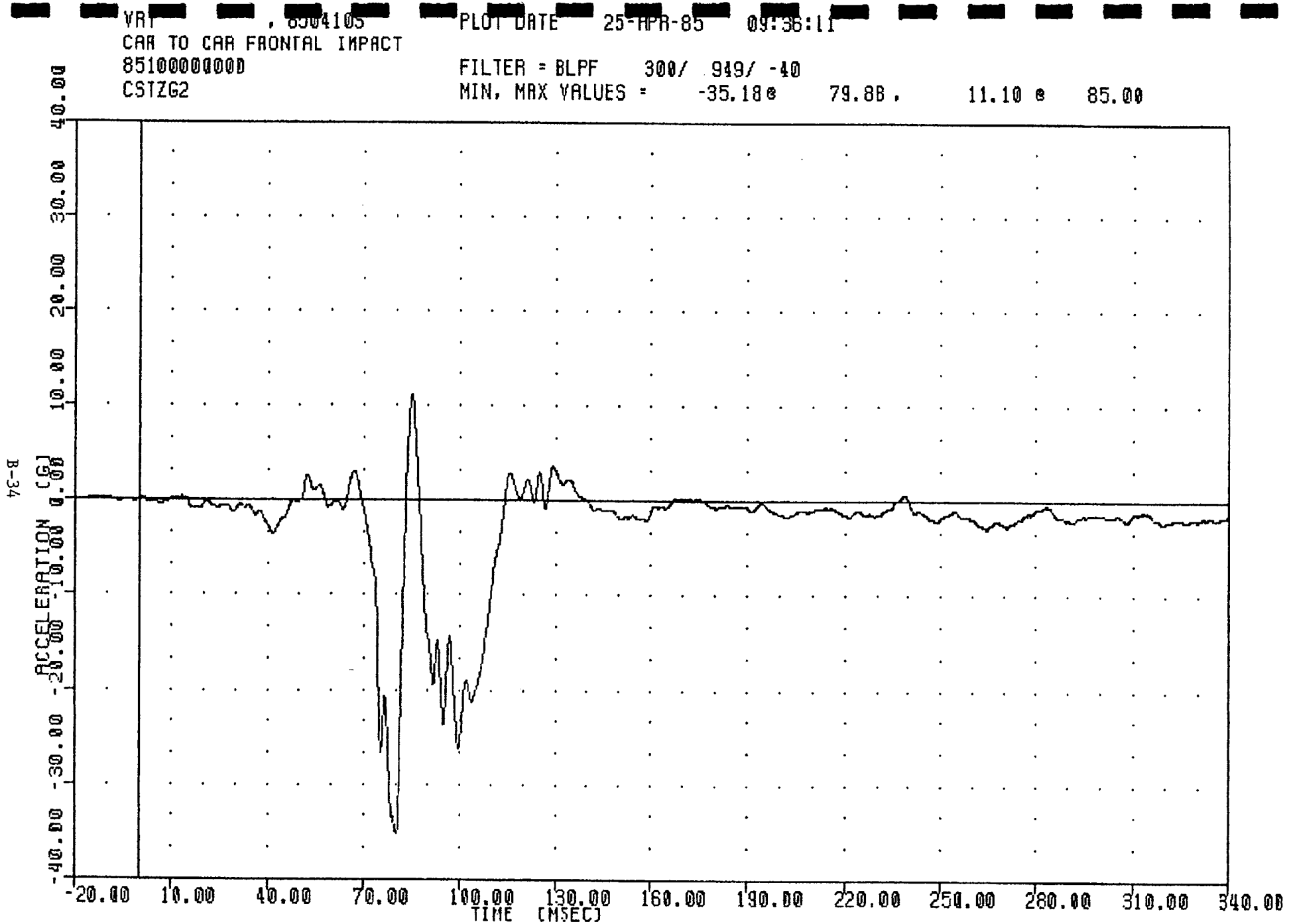


SUBJECT VEHICLE - OMNI

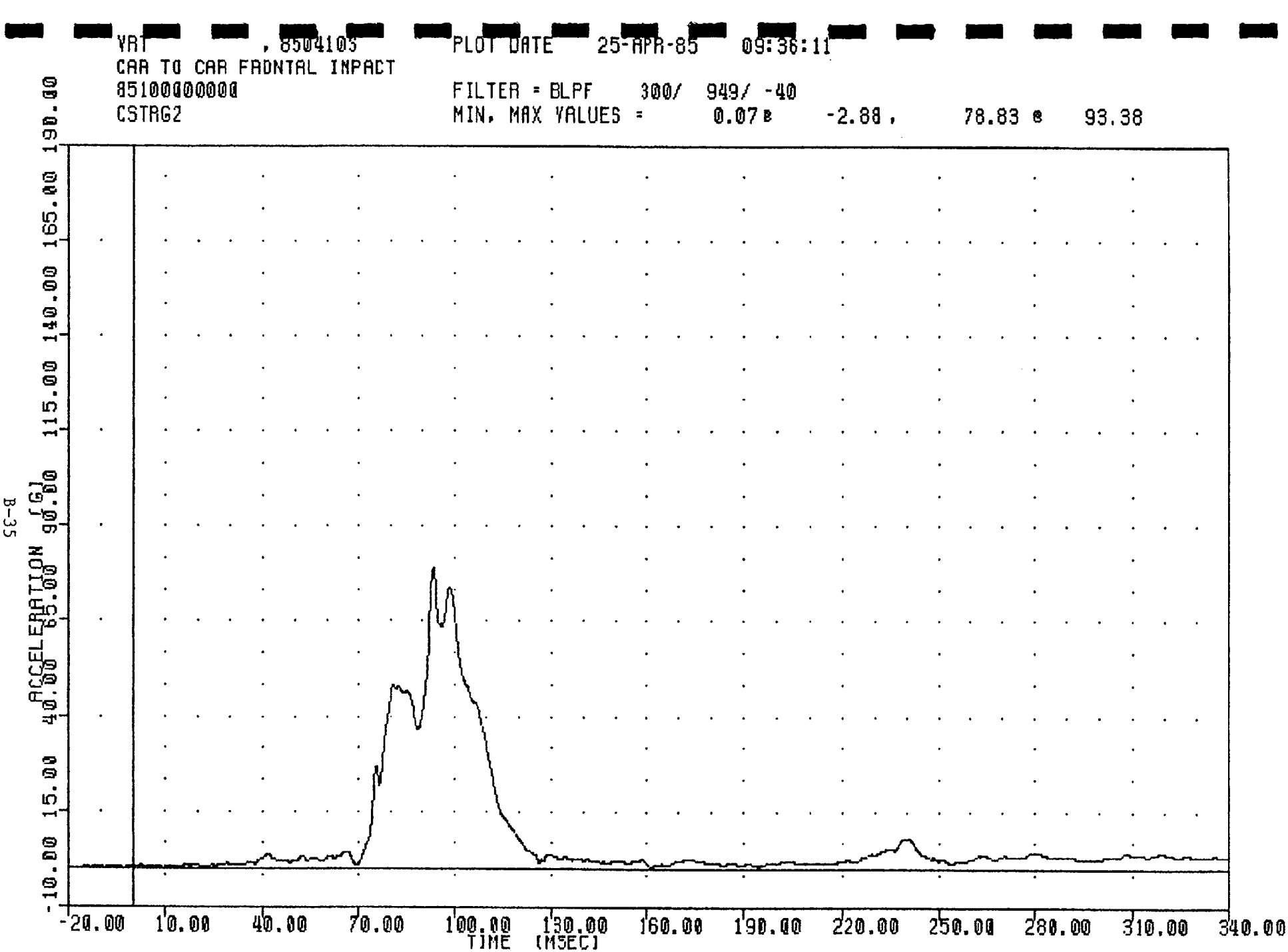
PASSENGER CHEST ACCELERATION X AXIS



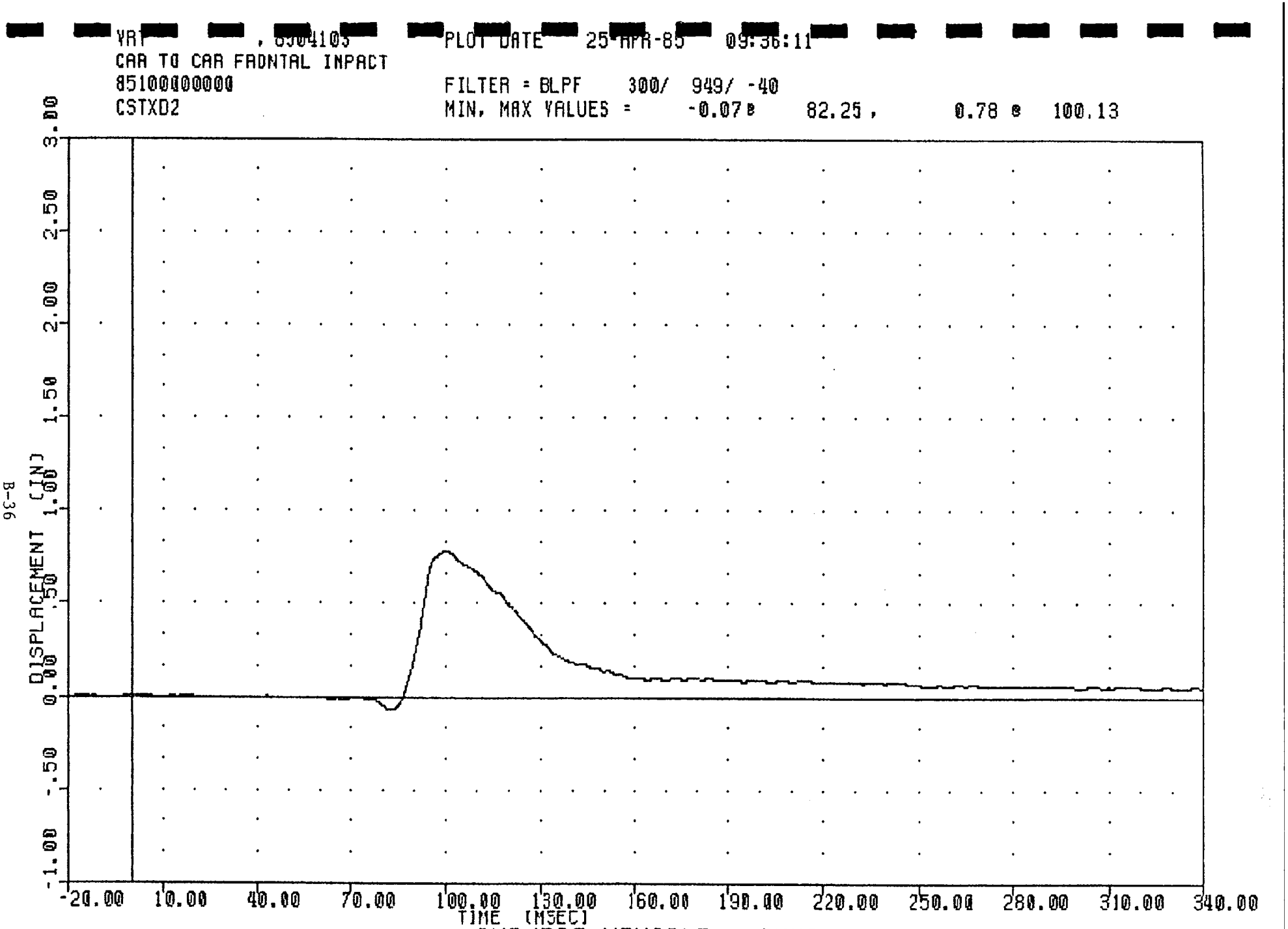
SUBJECT VEHICLE - OMNI
PASSENGER CHEST ACCELERATION Y AXIS



SUBJECT VEHICLE - OMNI
PASSENGER CHEST ACCELERATION Z AXIS

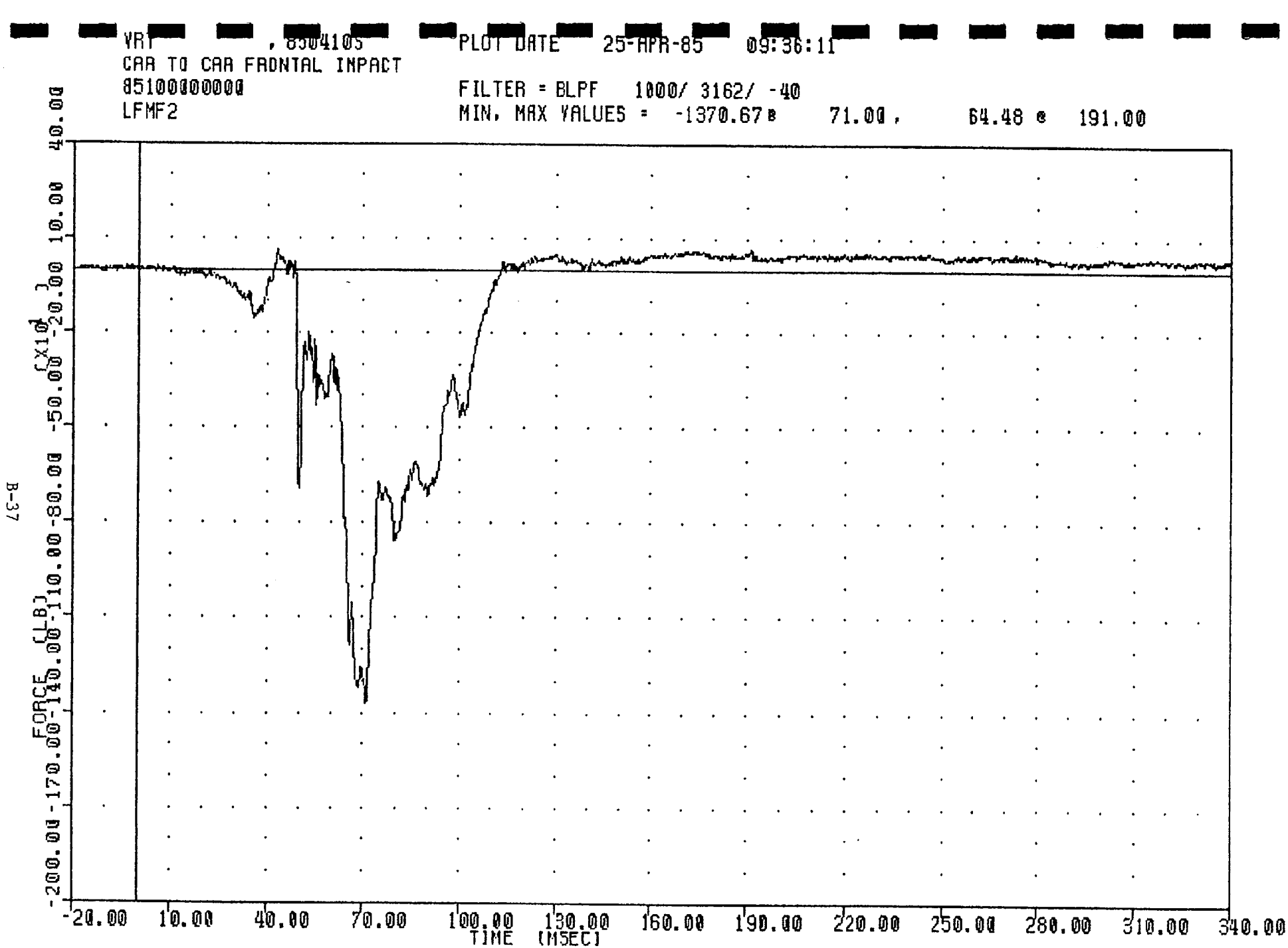


SUBJECT VEHICLE - OMNI
PASSENGER CHEST RESULTANT

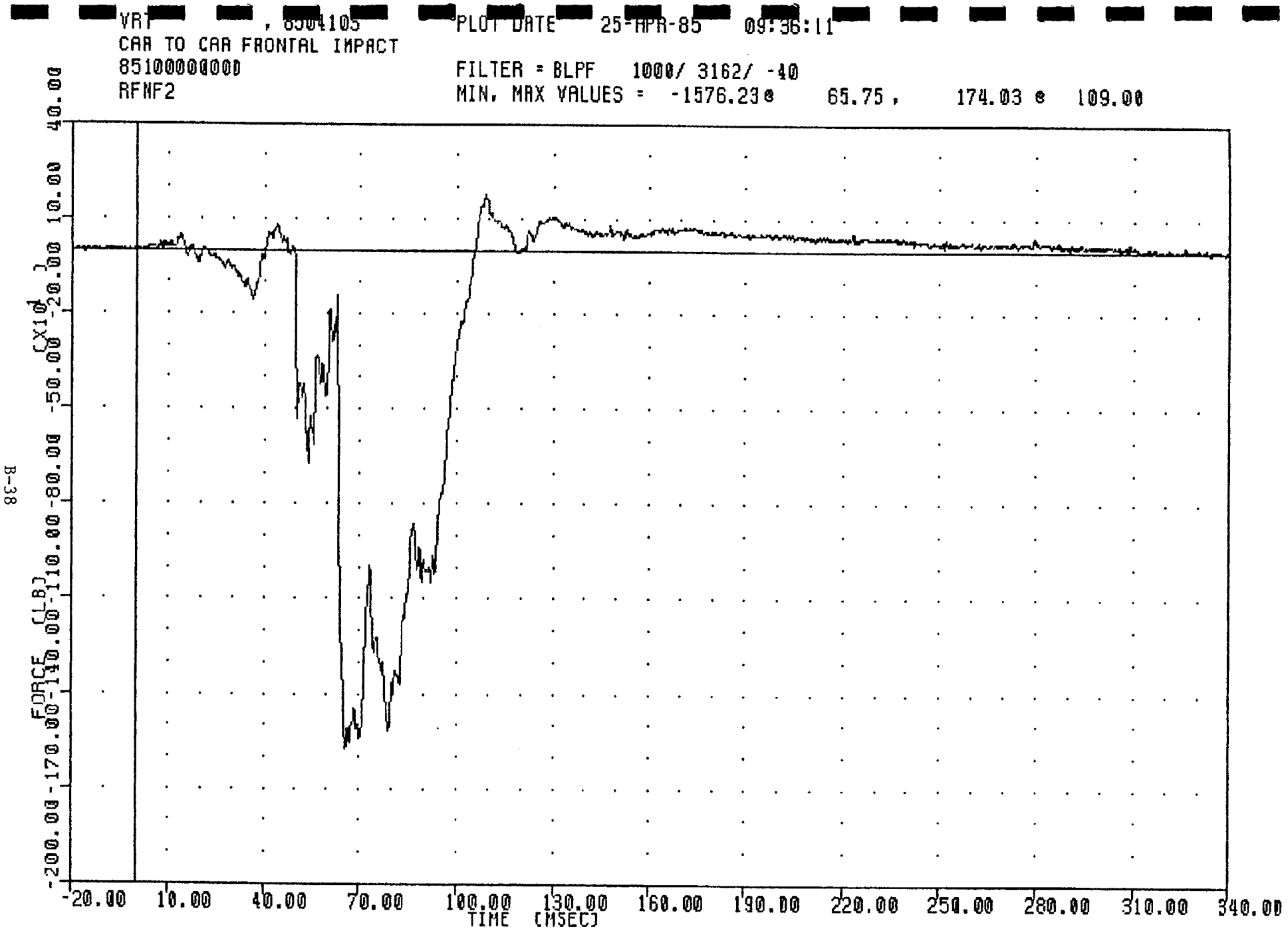


SUBJECT VEHICLE - OMNI

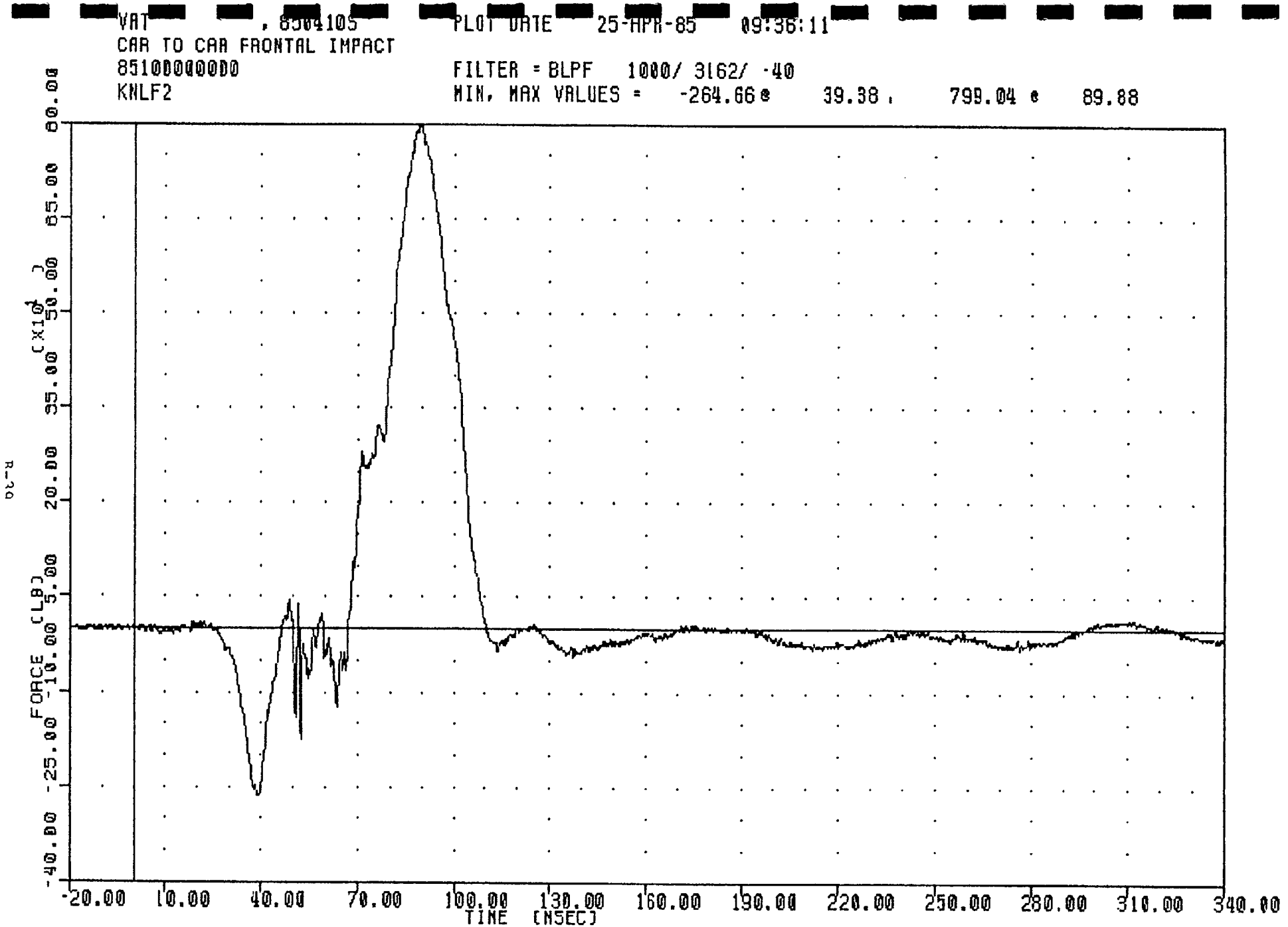
PASSENGER CHEST DISPLACEMENT INCHES



SUBJECT VEHICLE - OMNI
PASSENGER LEFT FEMUR FORCE LBS

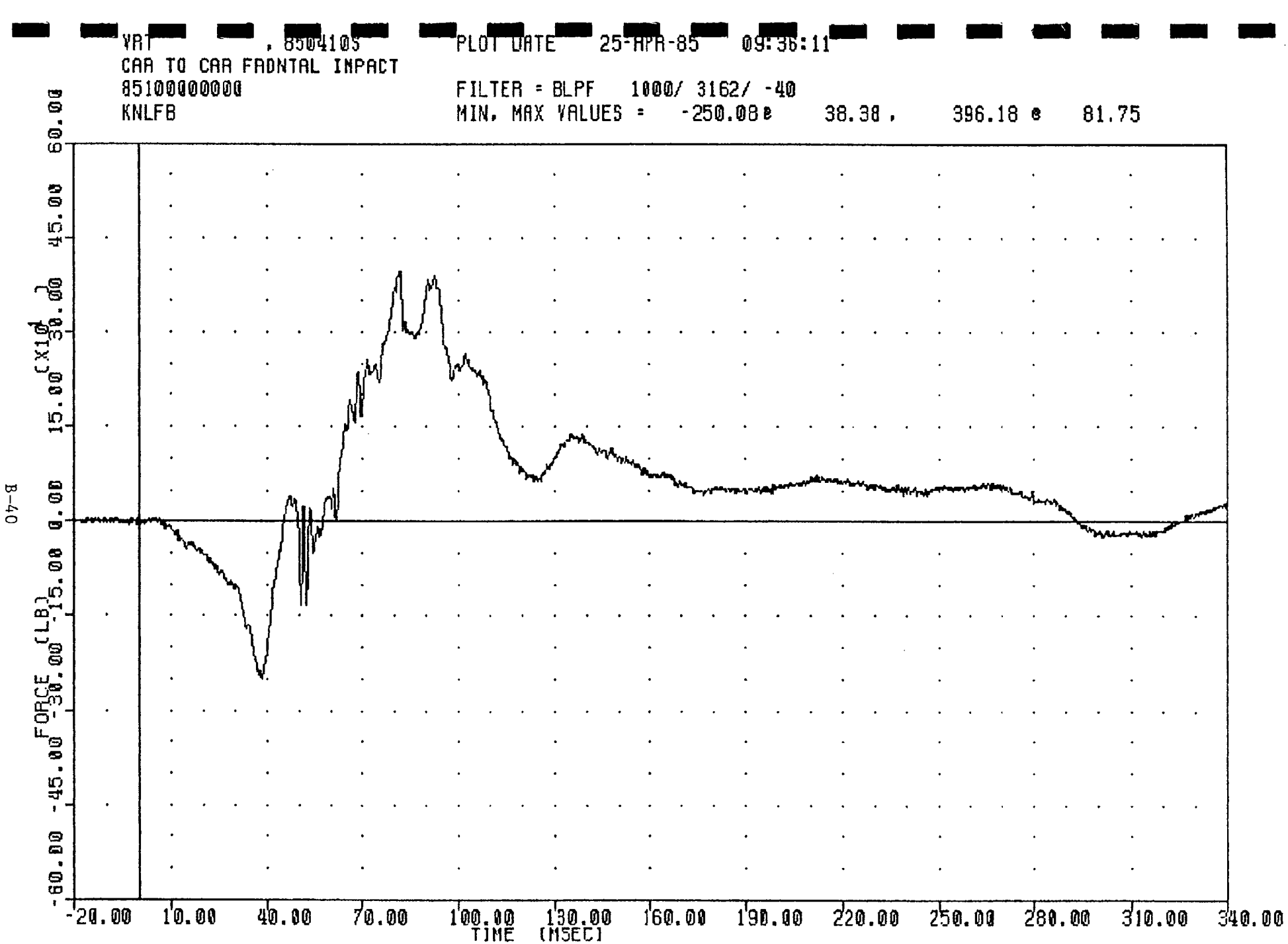


SUBJECT VEHICLE - OMNI
PASSENGER RIGHT FEMUR FORCE LBS



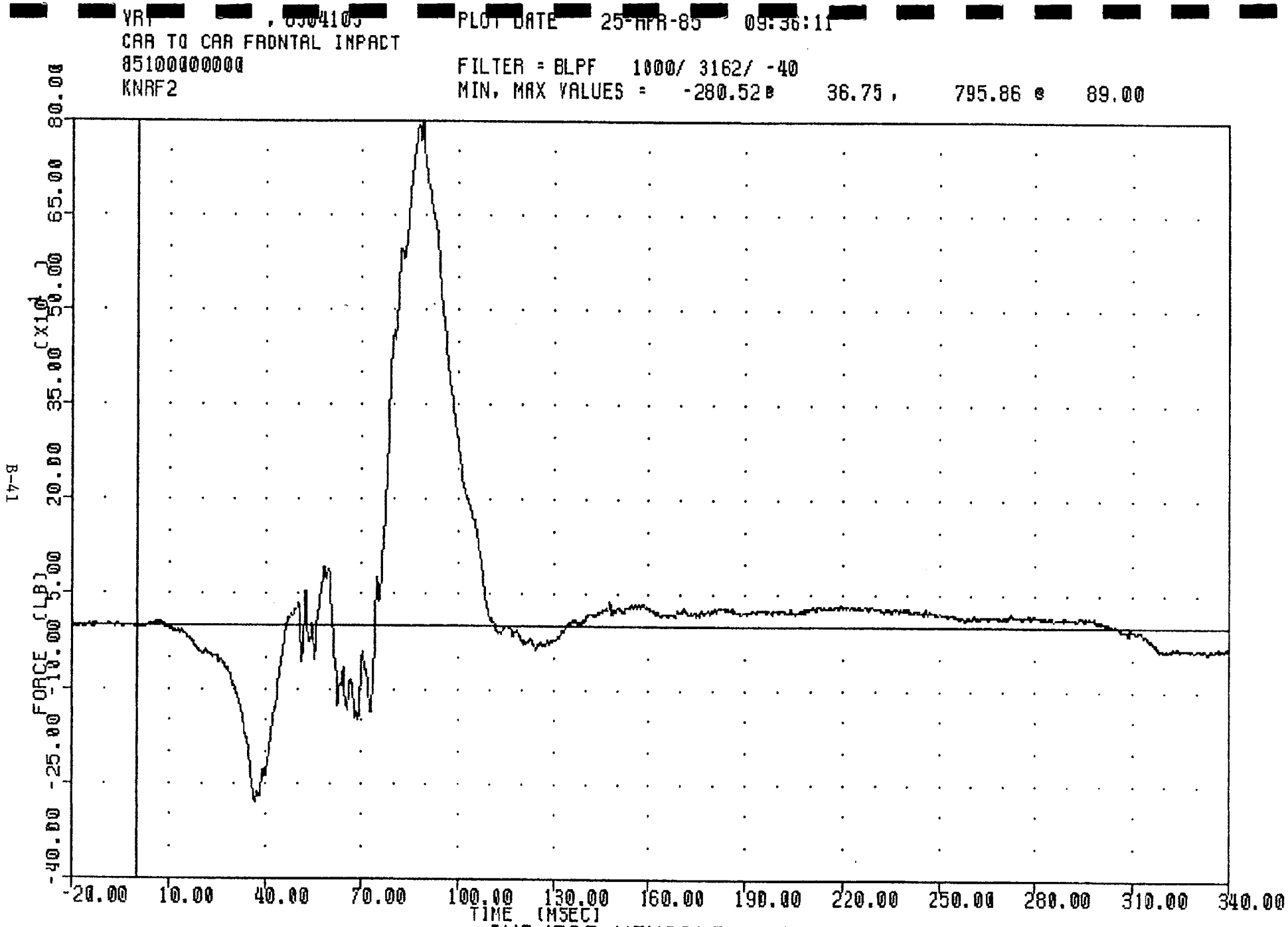
SUBJECT VEHICLE - OMNI

PASSENGER LEFT KNEE / LEFT SENSOR LBS



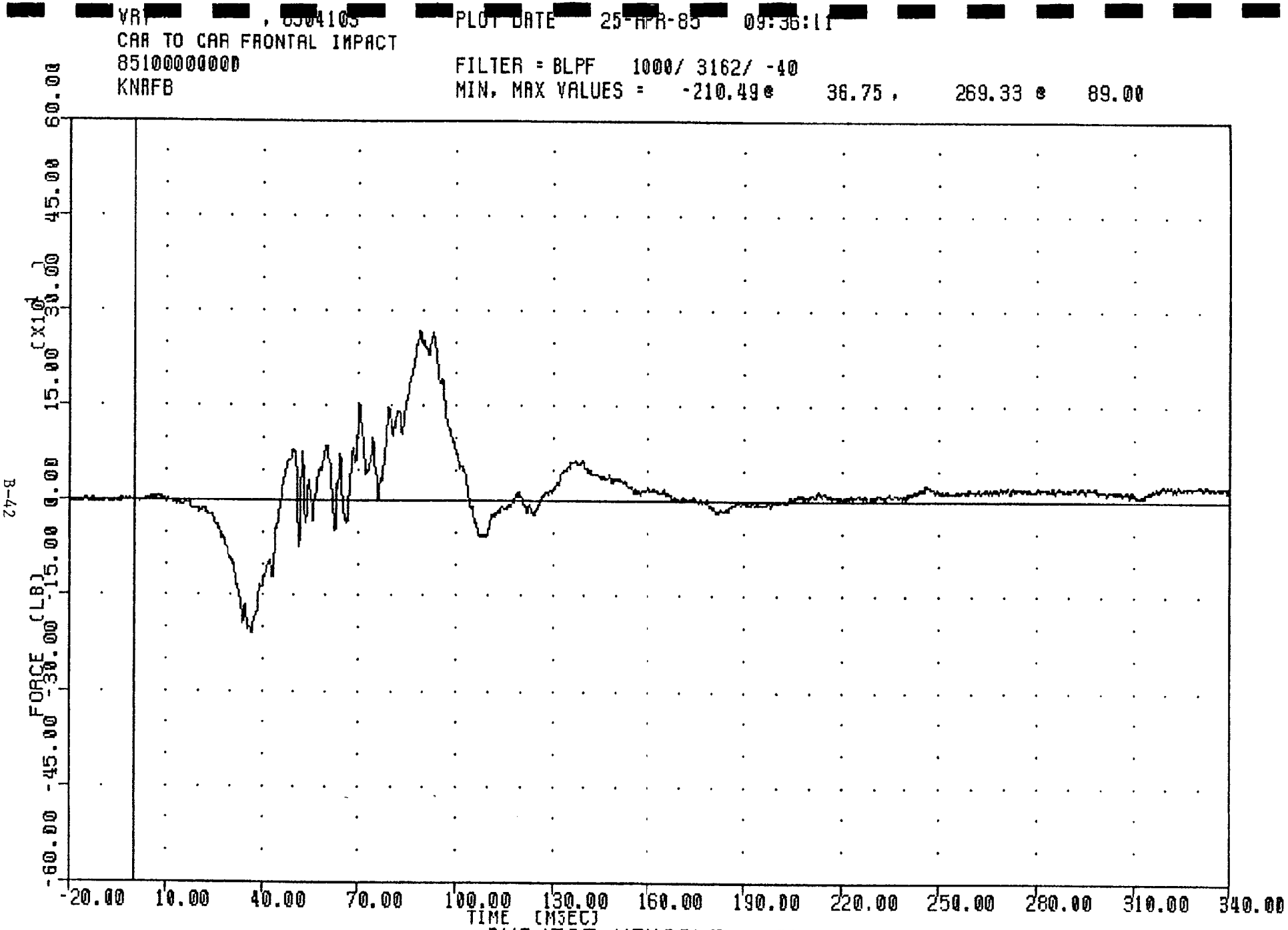
SUBJECT VEHICLE - OMNI

PASSENGER LEFT KNEE / RIGHT SENSOR LBS

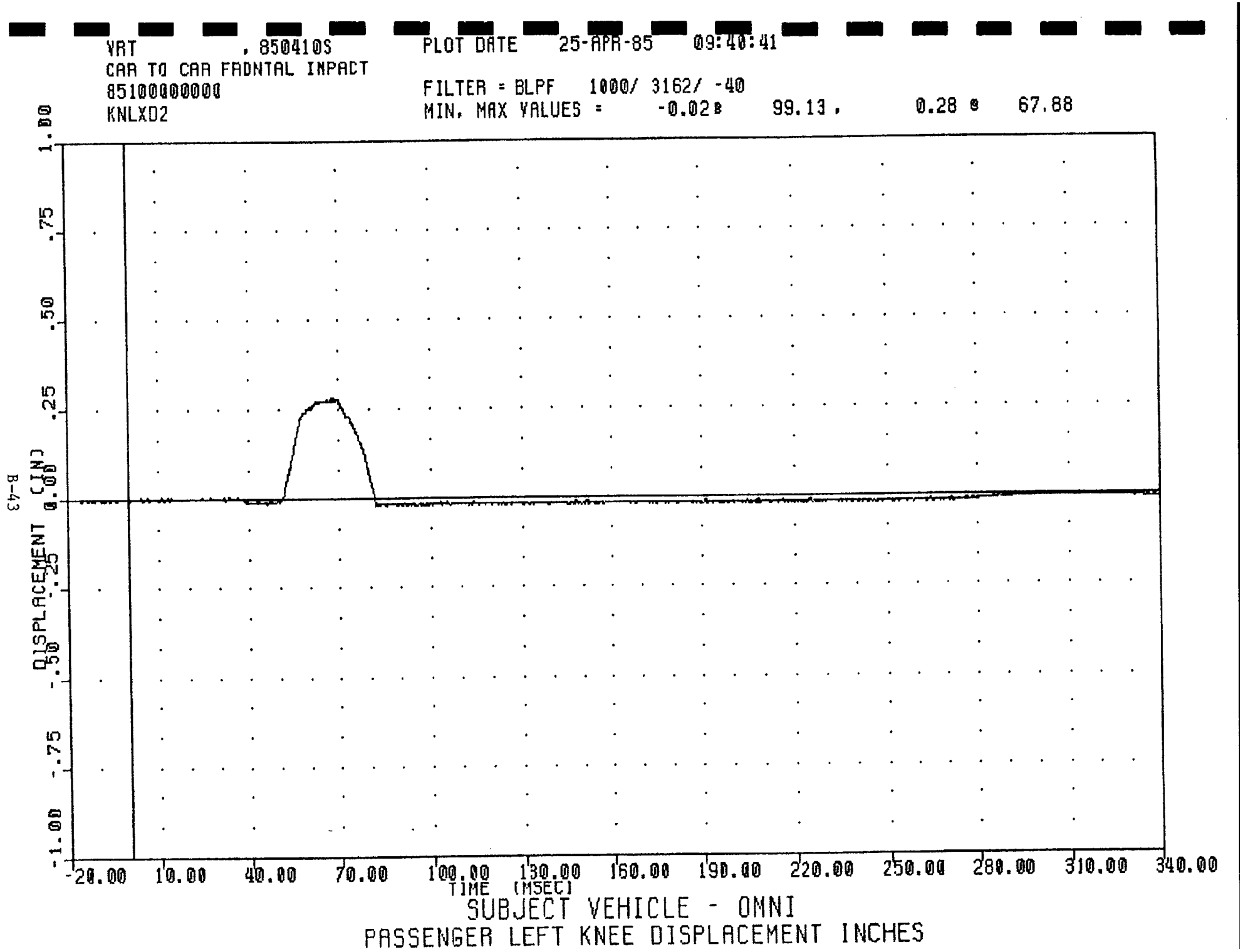


SUBJECT VEHICLE - OMNI

PASSENGER RIGHT KNEE / LEFT SENSOR LBS



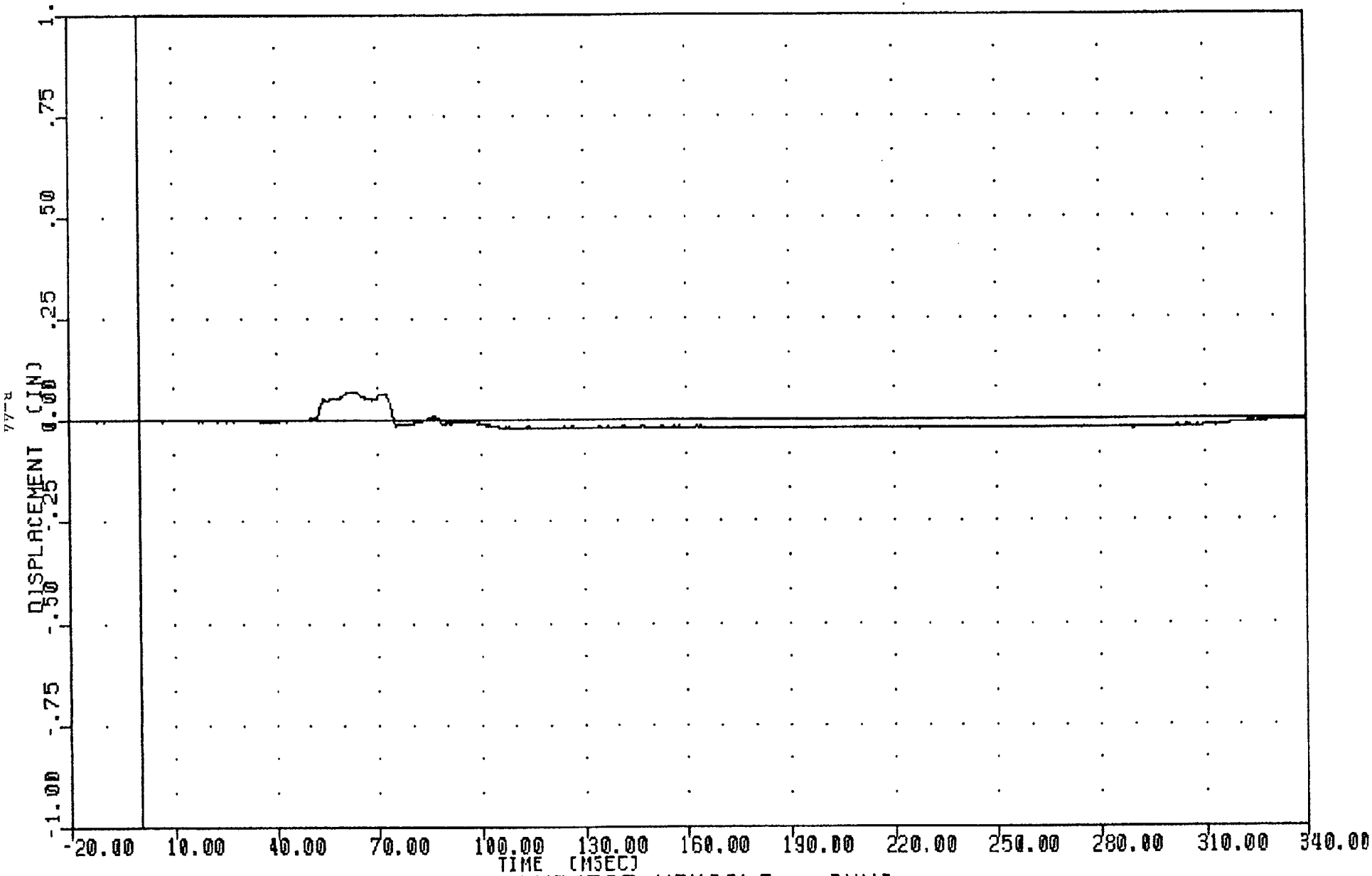
SUBJECT VEHICLE - OMNI
PASSENGER RIGHT KNEE / RIGHT SENSOR LBS



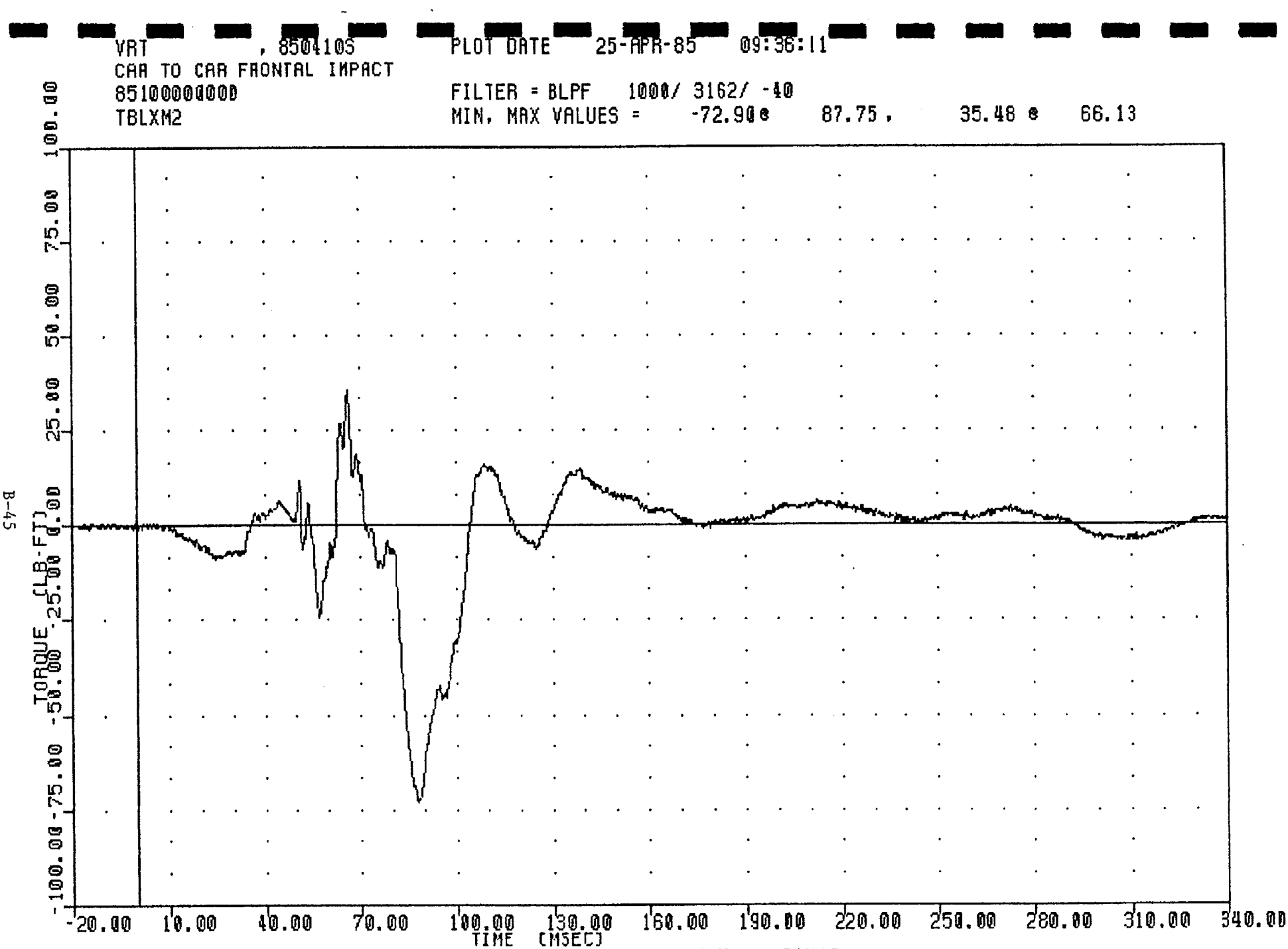
SUBJECT VEHICLE - OMNI

PASSENGER LEFT KNEE DISPLACEMENT INCHES

VRT , 8504105 PLOT DATE 25-APR-85 09:40:41
CAR TO CAR FRONTAL IMPACT
85100000000 FILTER = BLPF 1000/ 3162/ -40
KNRXD2 MIN, MAX VALUES = -0.02 @ 289.88 , 0.07 @ 63.63

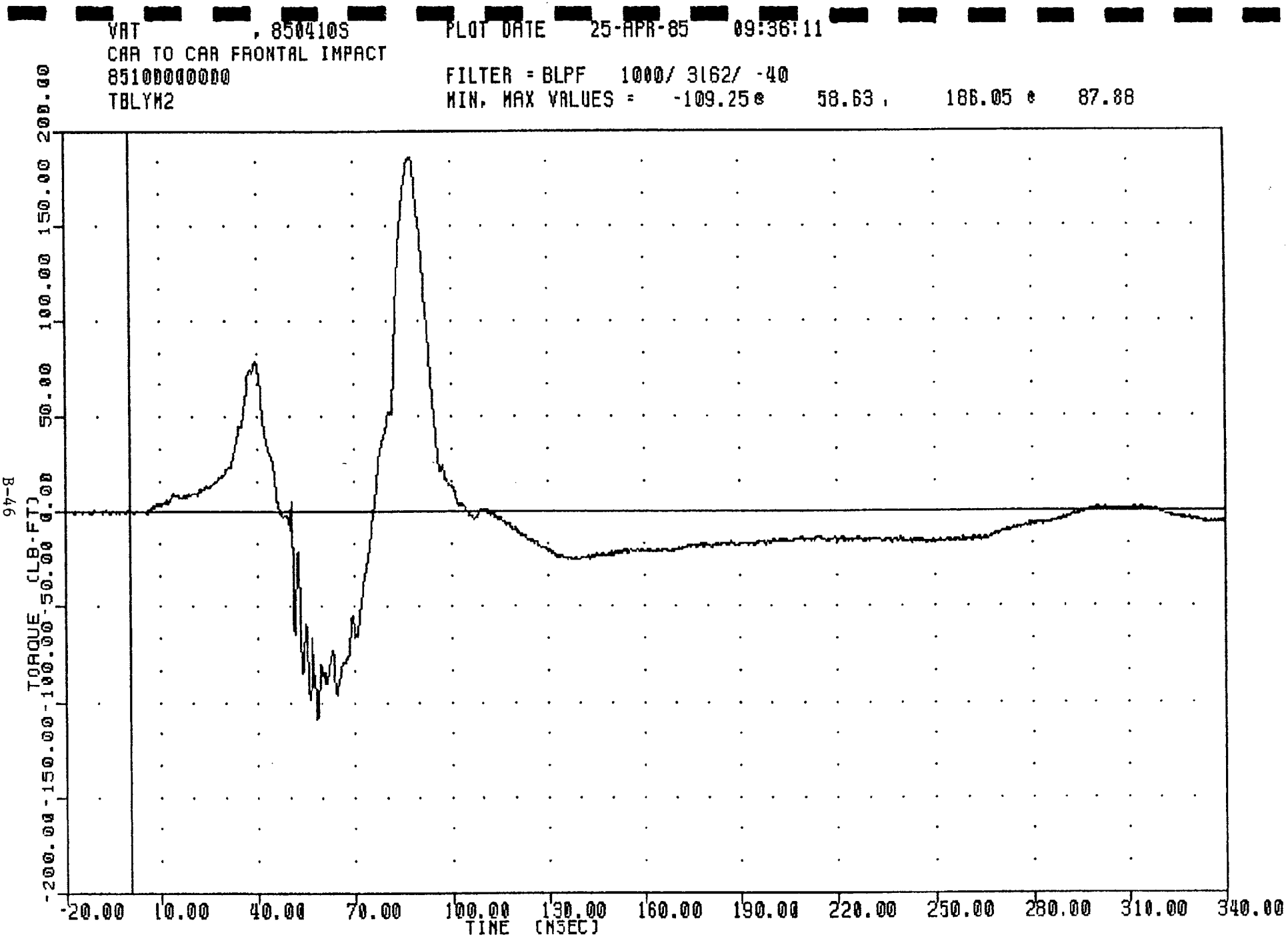


SUBJECT VEHICLE - OMNI
PASSENGER RIGHT KNEE DISPLACEMENT INCHES



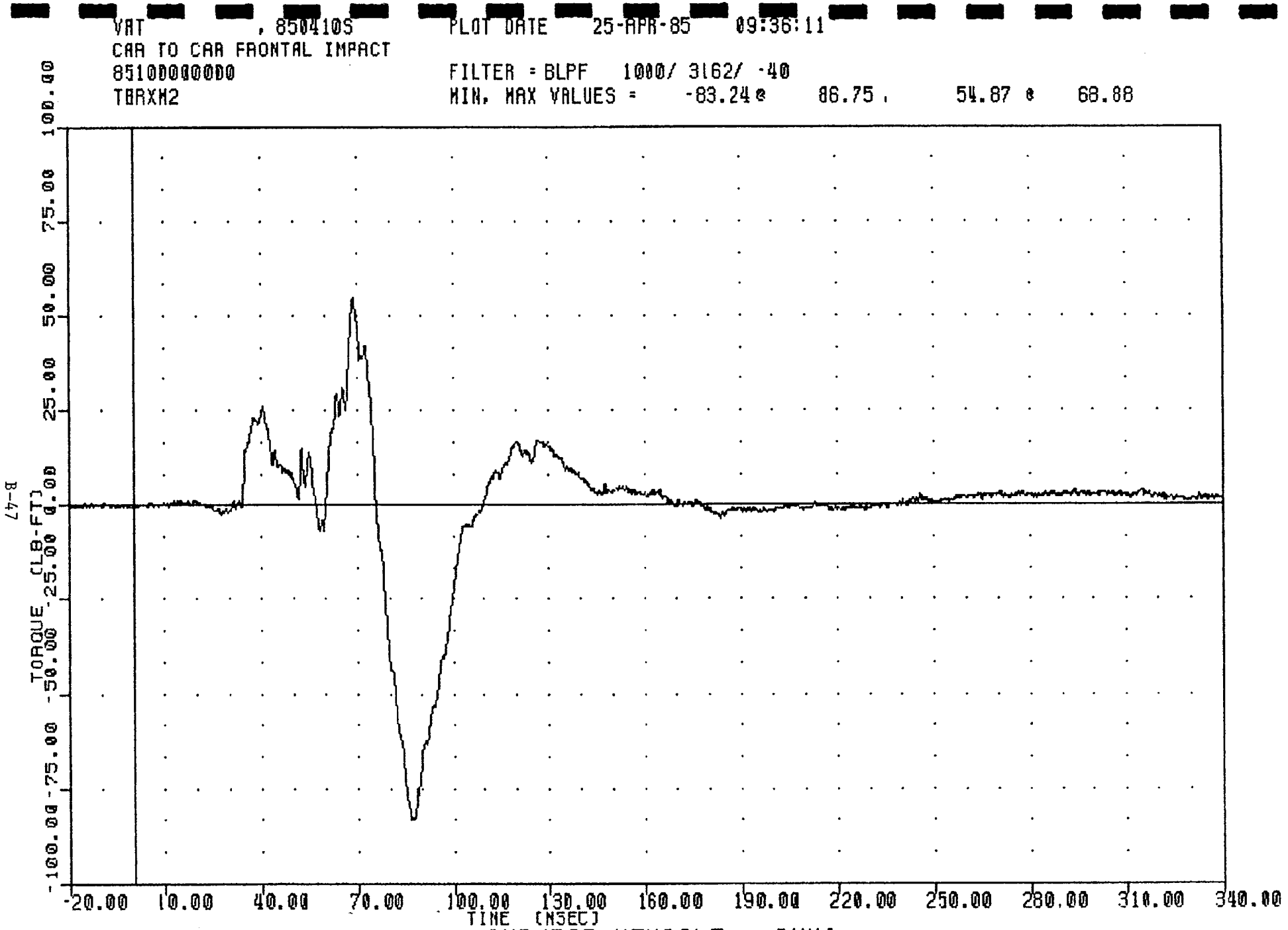
SUBJECT VEHICLE - OMNI

PASSENGER LEFT UPPER TIBIA MOMENT X AXIS LB-FT



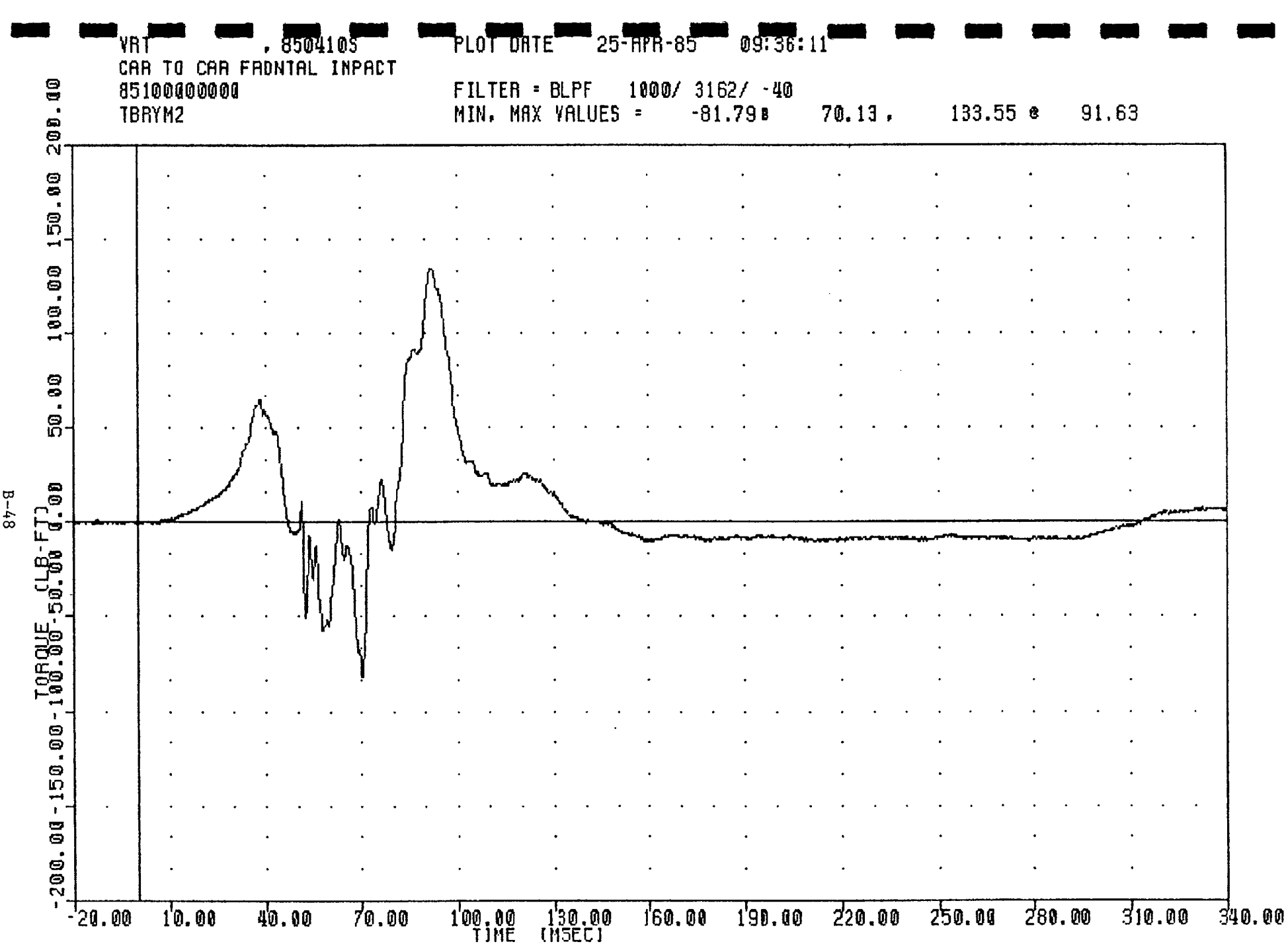
SUBJECT VEHICLE - OMNI

PASSENGER LEFT UPPER TIBIA MOMENT Y AXIS LB-FT



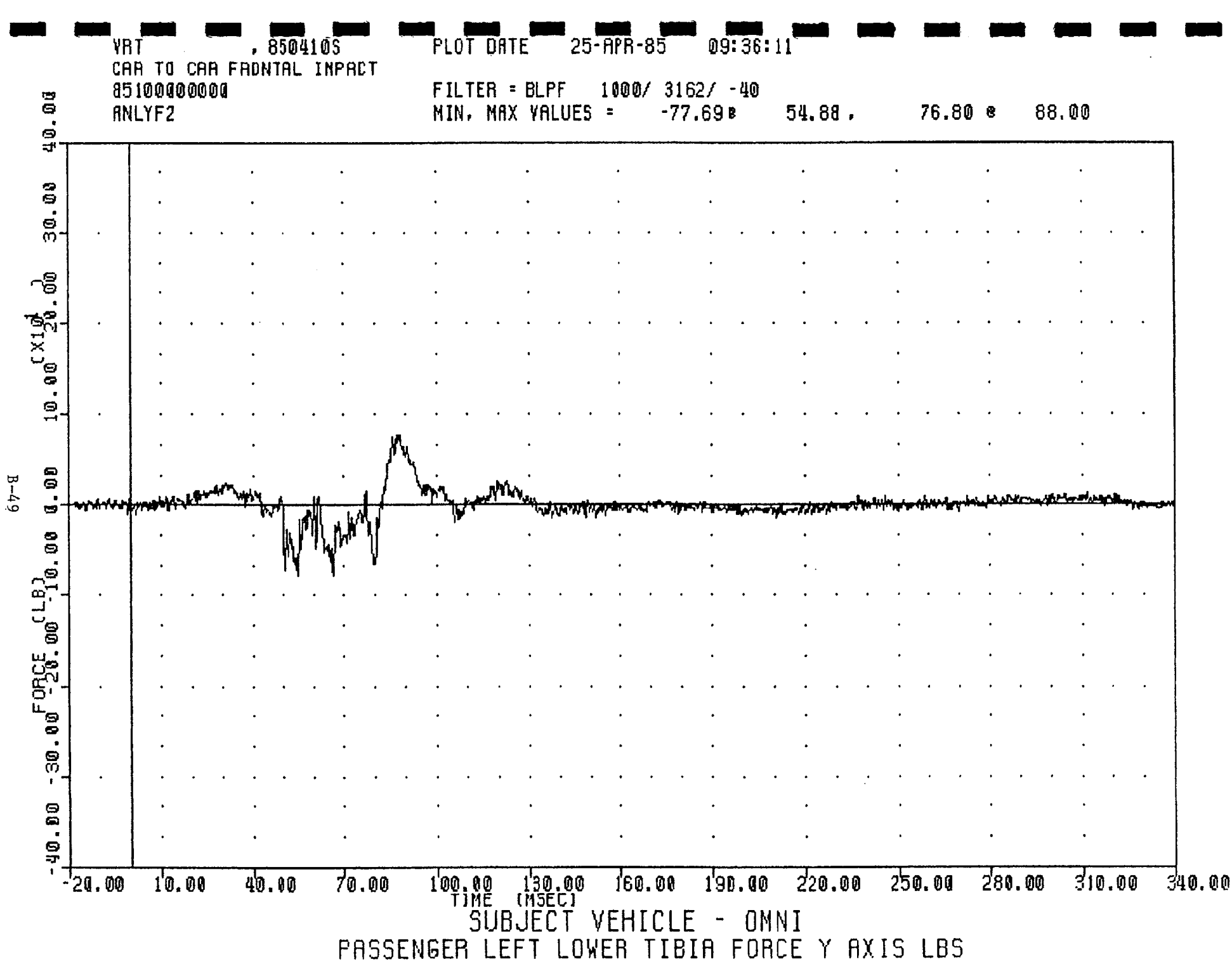
SUBJECT VEHICLE - OMNI

PASSENGER RIGHT UPPER TIBIA MOMENT X AXIS LB-FT



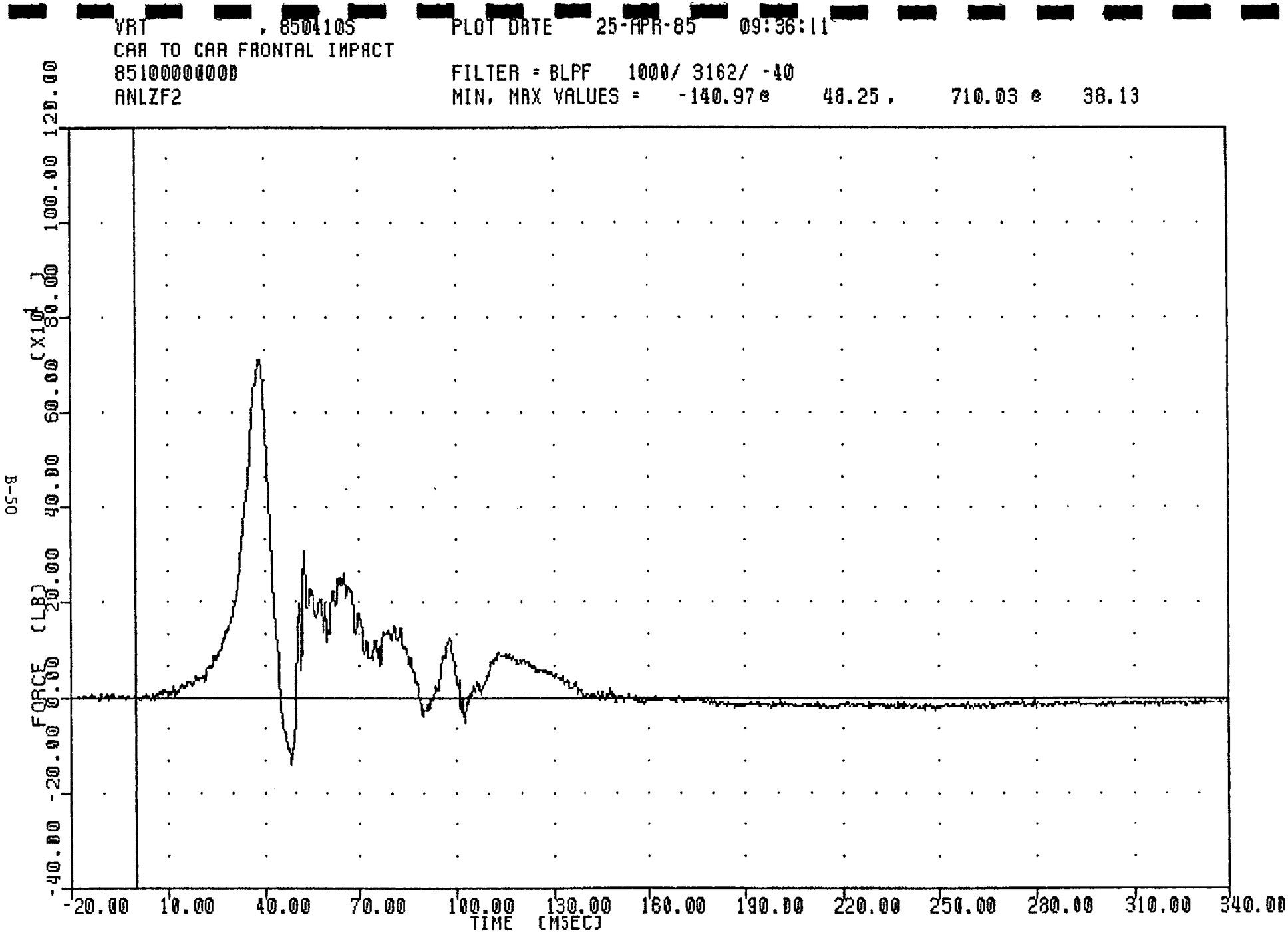
SUBJECT VEHICLE - OMNI

PASSENGER RIGHT UPPER TIBIA MOMENT Y AXIS LB-FT



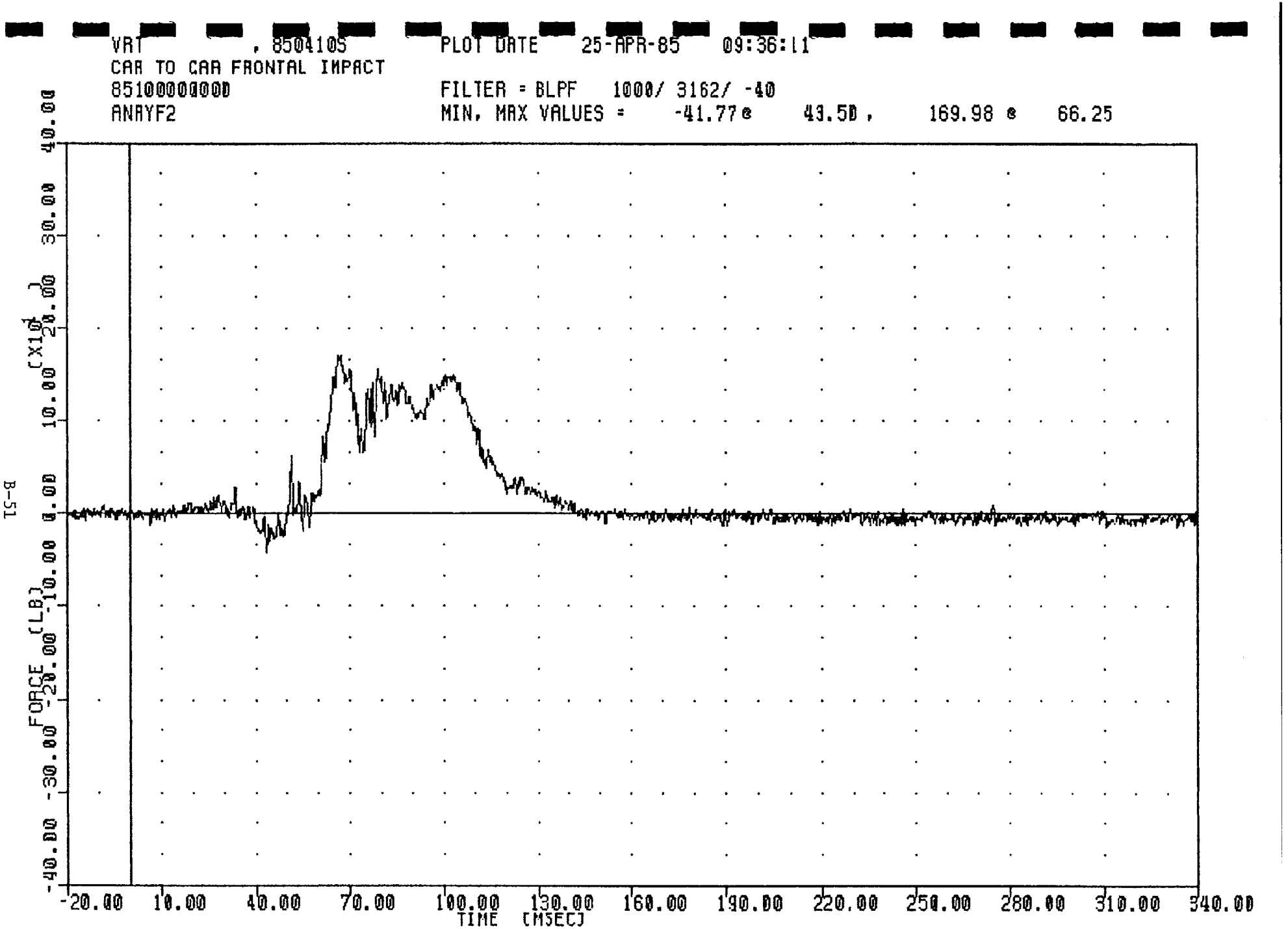
SUBJECT VEHICLE - OMNI

PASSENGER LEFT LOWER TIBIA FORCE Y AXIS LBS



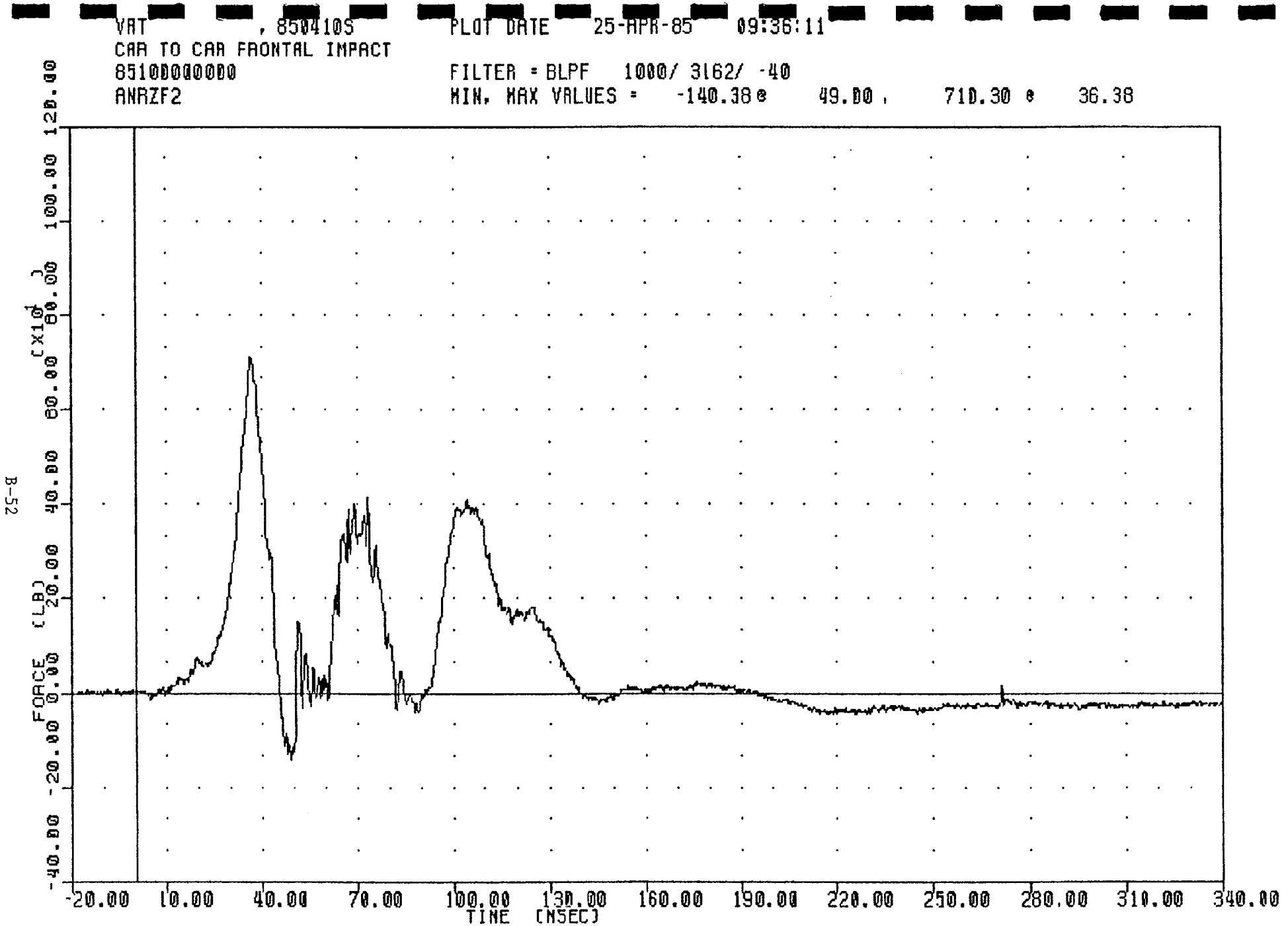
SUBJECT VEHICLE - OMNI

PASSENGER LEFT LOWER TIBIA FORCE Z AXIS LBS



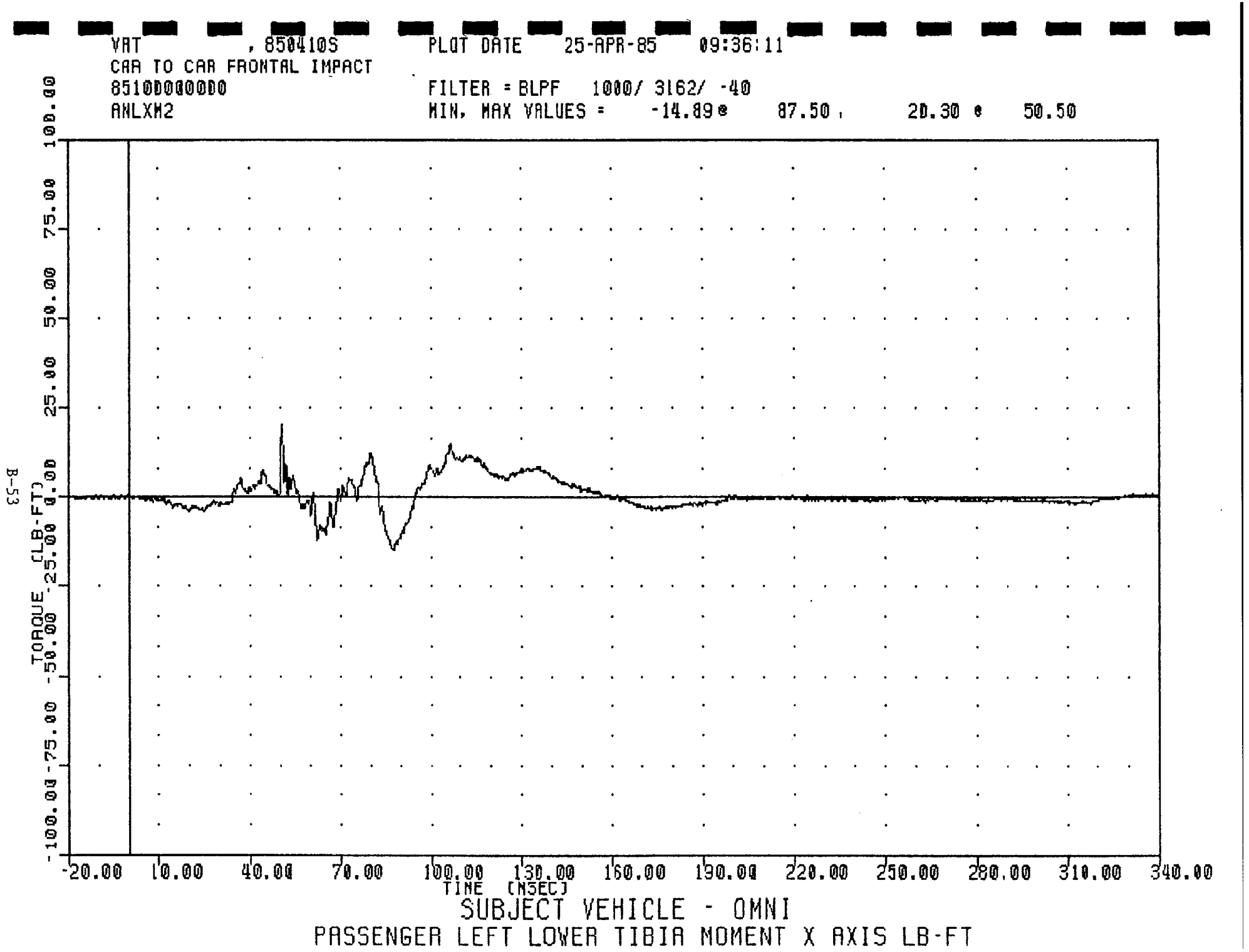
SUBJECT VEHICLE - OMNI

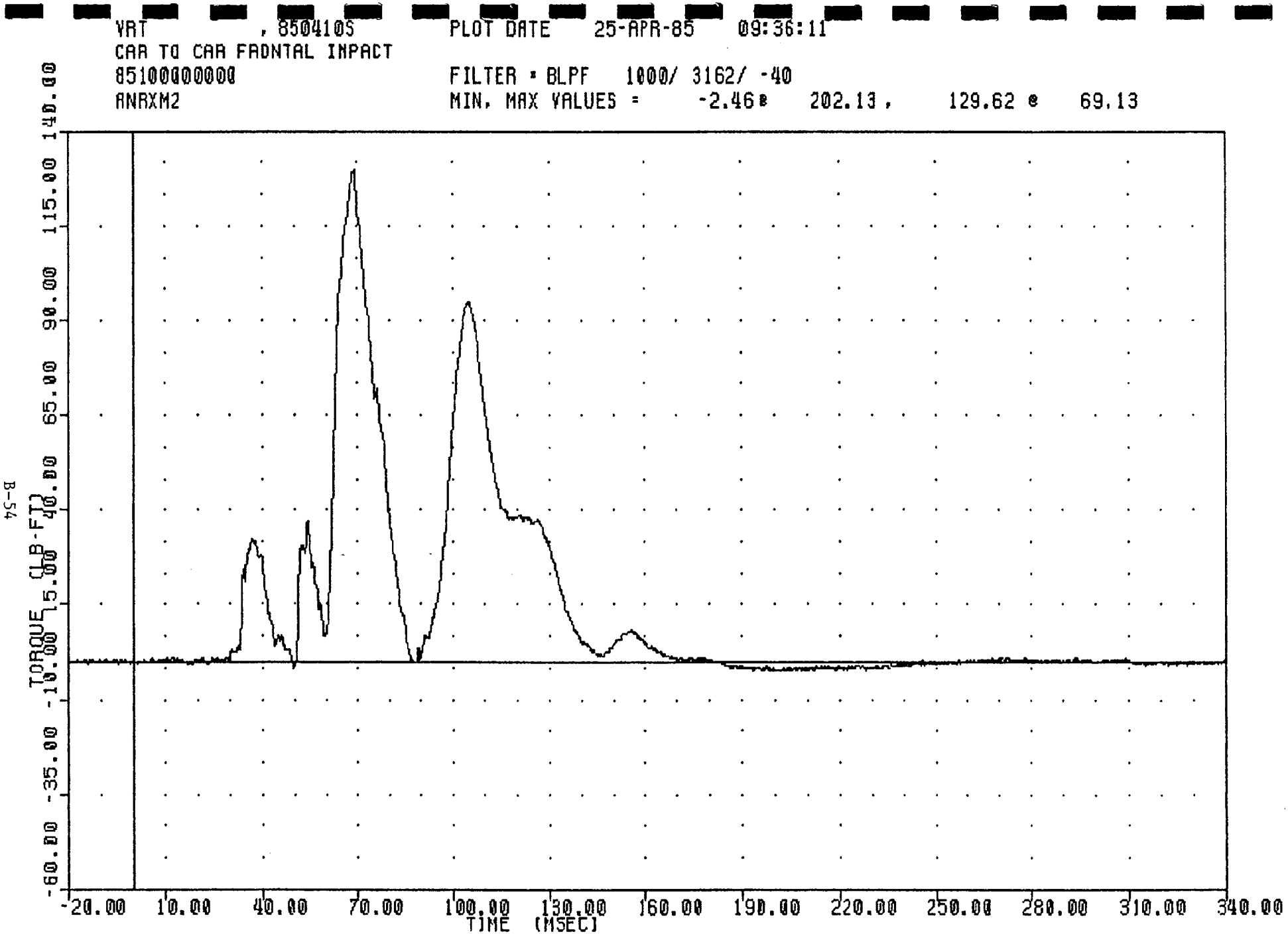
PASSENGER RIGHT LOWER TIBIA FORCE Y AXIS LBS



SUBJECT VEHICLE - OMNI

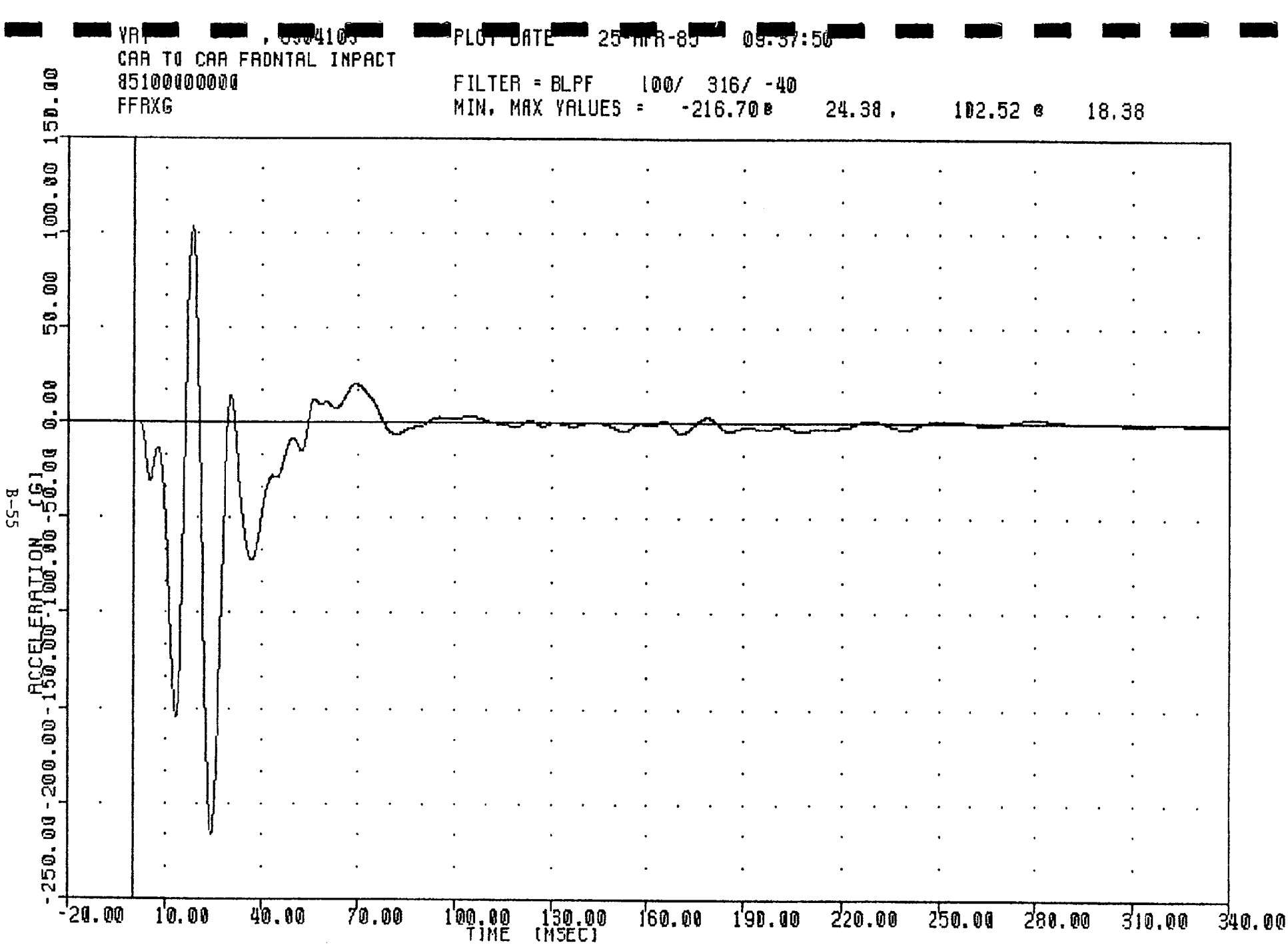
PASSENGER RIGHT LOWER TIBIA FORCE Z AXIS LBS


VRT , 850410S
CAR TO CAR FRONTAL IMPACT
8510D0G0DD0
ANLXM2
PLOT DATE 25-APR-85 09:36:11
FILTER = BLPF 1000/ 3162/ -40
MIN, MAX VALUES = -14.89 @ 87.50 , 20.30 @ 50.50
100.00
75.00
50.00
25.00
0.00
-25.00
-50.00
-75.00
-100.00
TORQUE (LB-FT)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
SUBJECT VEHICLE - OMNI
PASSENGER LEFT LOWER TIBIA MOMENT X AXIS LB-FT

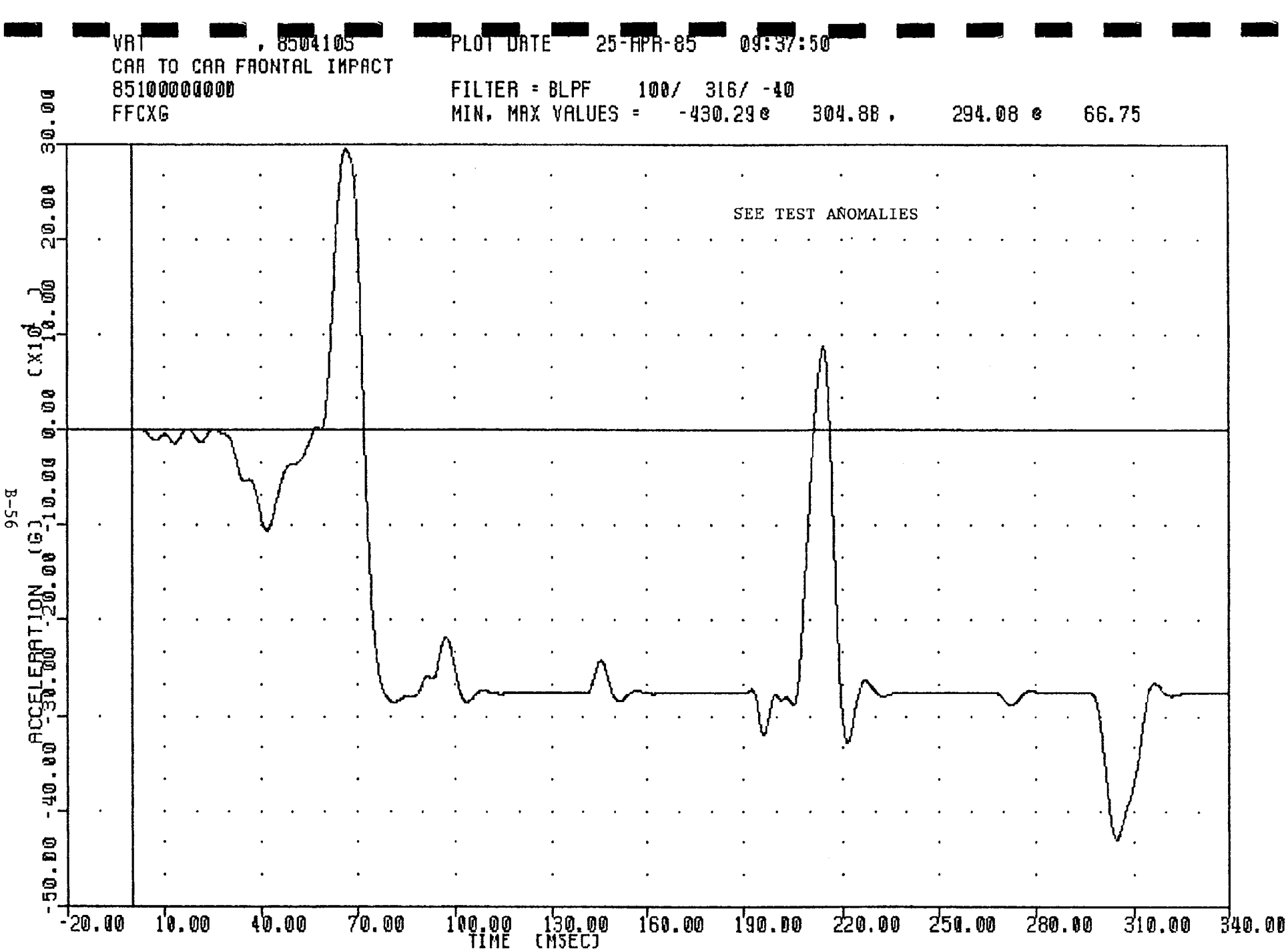


SUBJECT VEHICLE - OMNI

PASSENGER RIGHT LOWER TIBIA MOMENT X AXIS LB-FT



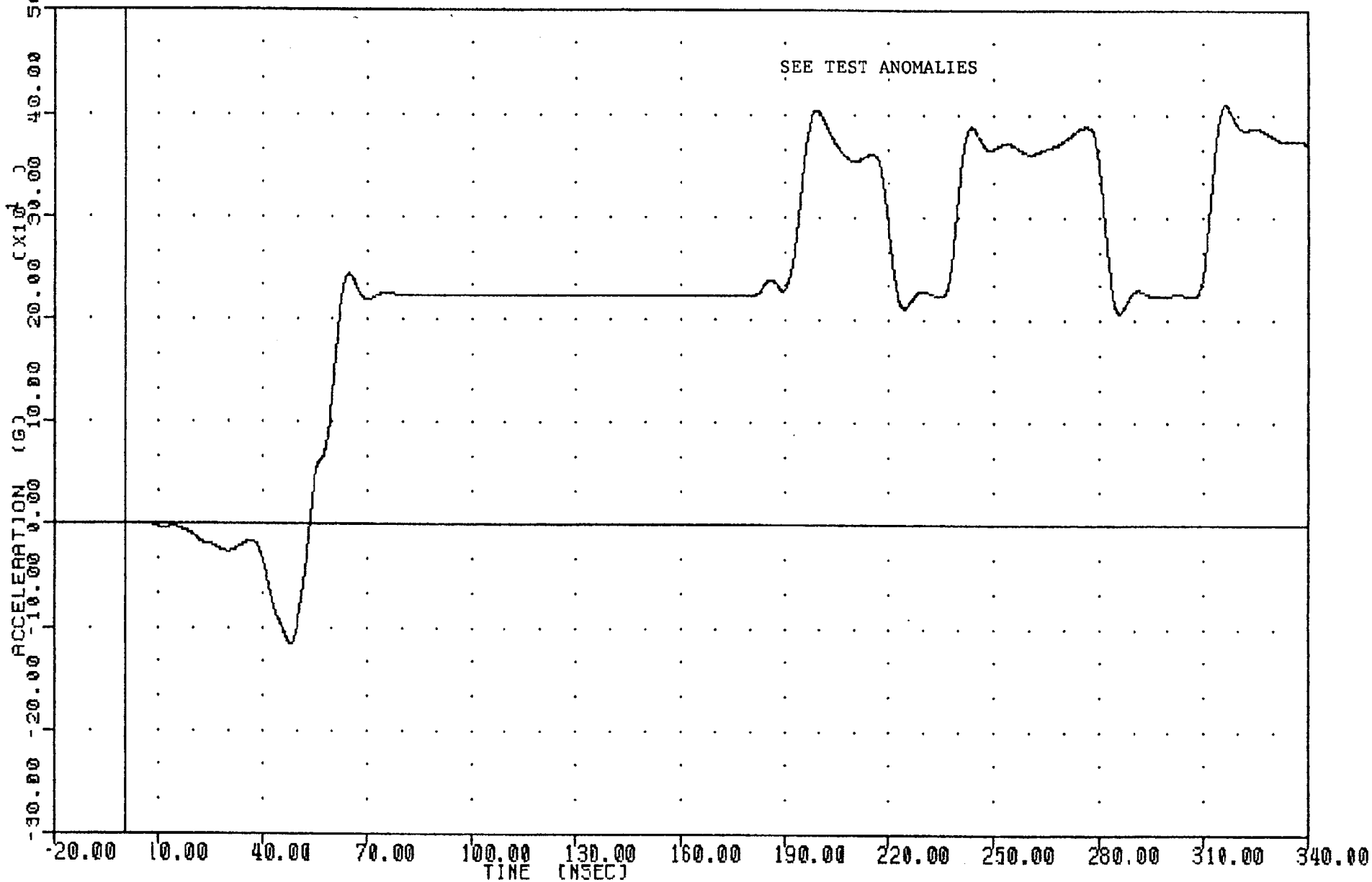
SUBJECT VEHICLE - OMNI
RIGHT FRONT FRAME RAIL ACCELERATION X AXIS



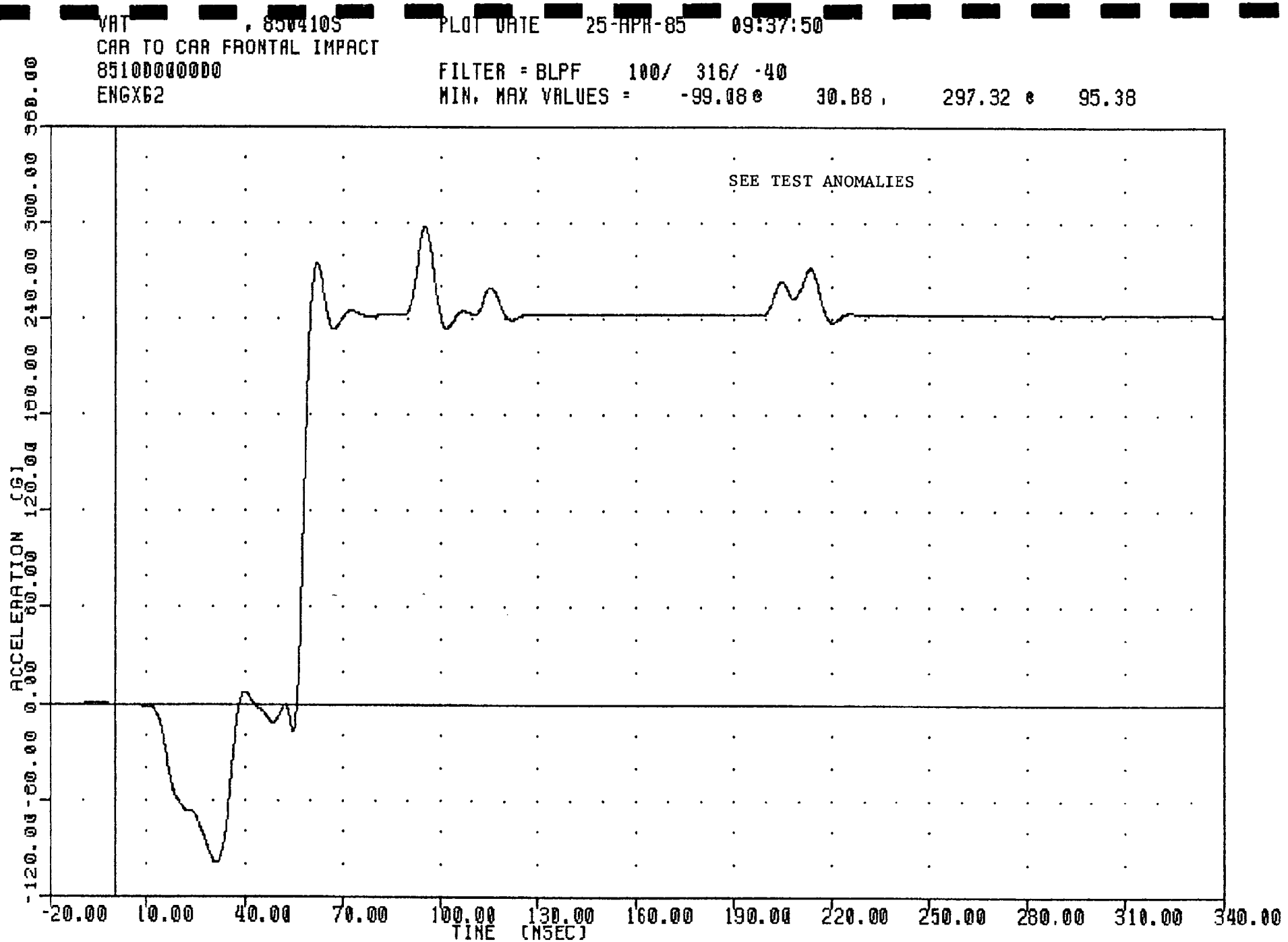
SUBJECT VEHICLE - OMNI

FRONT FRAME CROSSMEMBER ACCELERATION X AXIS

VRT , 85W4105 PLOT DATE 25-APR-85 09:37:50
CAR TO CAR FRONTAL IMPACT
8510D000000 FILTER = BLPF 100/ 316/ -40
BCRX6 MIN, MAX VALUES = -116.79 @ 48.00 , 409.68 @ 316.13

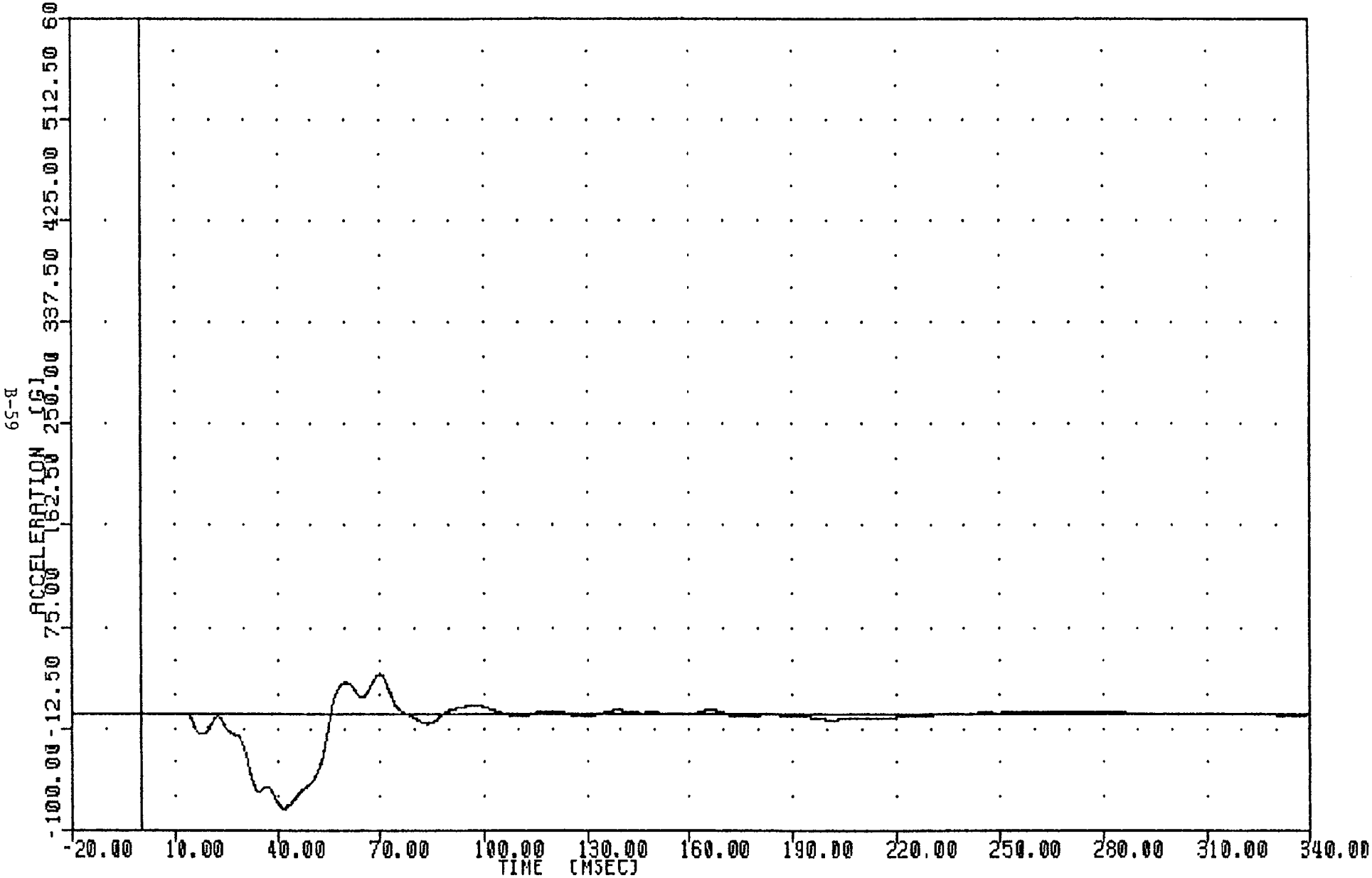


SUBJECT VEHICLE - OMNI
RIGHT BRAKE CALIPER ACCELERATION X AXIS



SUBJECT VEHICLE - OMNI
ENGINE BLOCK LOWER ACCELERATION X AXIS

VRT , 8504105 PLOT DATE 25-APR-85 09:37:50
CAR TO CAR FRONTAL IMPACT
85100000000 FILTER = BLPF 100/ 316/ -40
ENGXG1 MIN, MAX VALUES = -81.24 @ 41.75 , 34.38 @ 69.88



SUBJECT VEHICLE - OMNI
ENGINE BLOCK UPPER ACCELERATION X AXIS

[redacted] VAT [redacted] , 850410[redacted] PLOT DATE [redacted] 25-APR-85 [redacted] 09:37:50 [redacted]

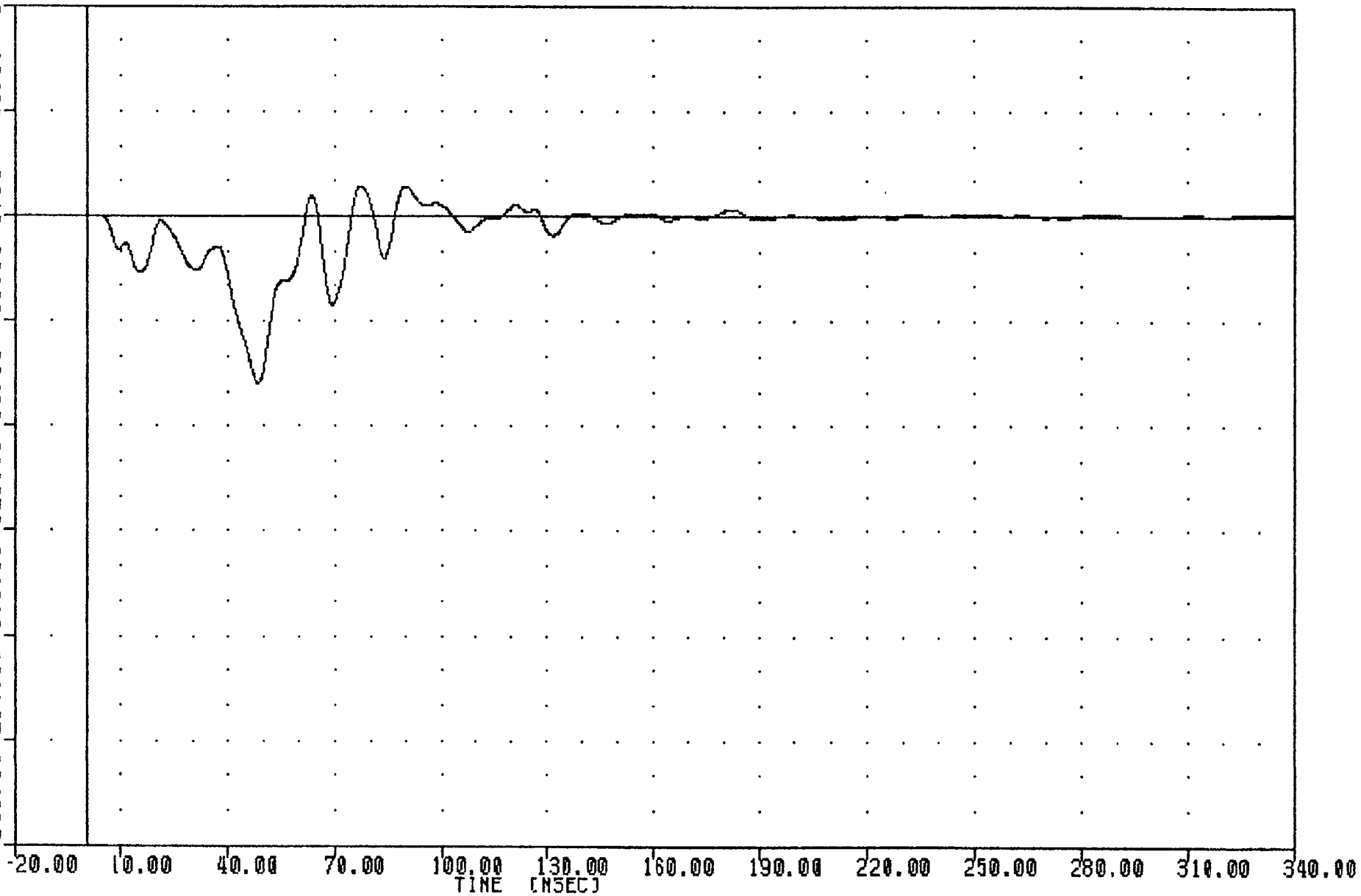
CAR TO CAR FRONTAL IMPACT

8510000000D0

SCAP6

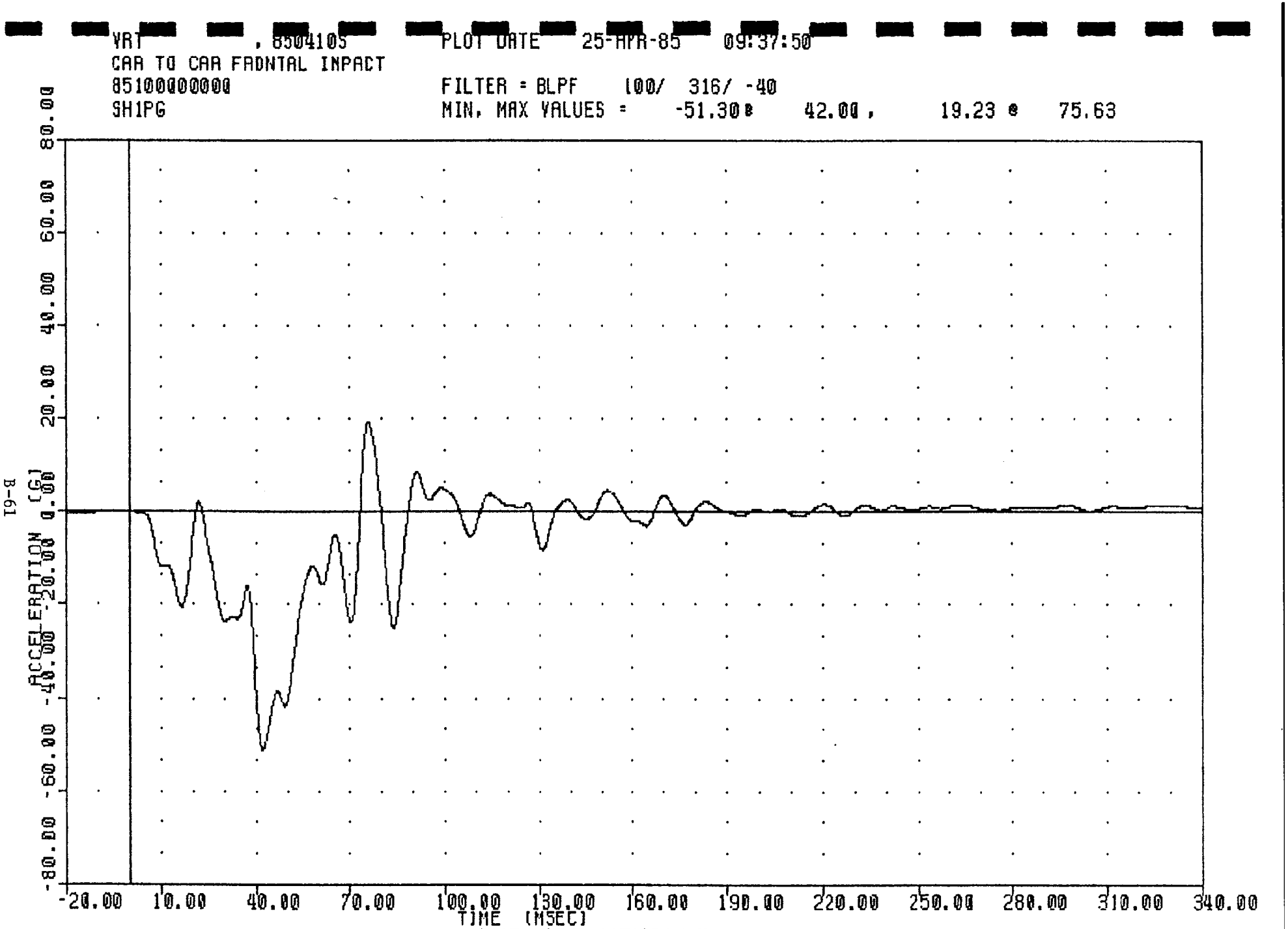
FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -63.58 @ 48.38 , 11.37 @ 90.13



SUBJECT VEHICLE - OMNI

STEERING COLUMN ACCELERATION A-P AXIS



SUBJECT VEHICLE - OMNI

STEERING WHEEL HUB ACCELERATION A-P AXIS

[redacted] VRT [redacted] , 850410[redacted] PLOT DATE 25 APR-85 09:57:50

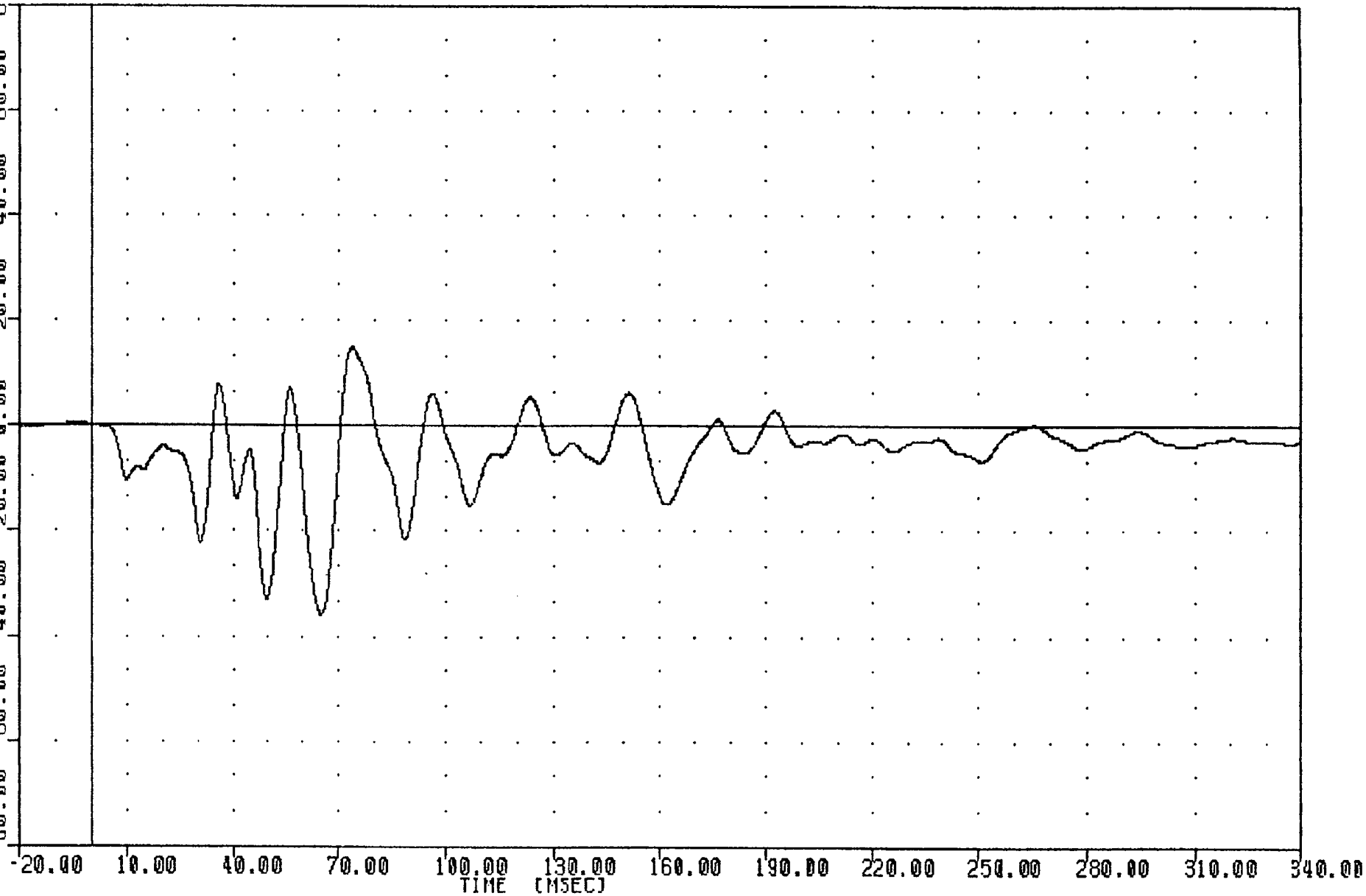
CAR TO CAR FRONTAL IMPACT

8510000[redacted]

SHIIG

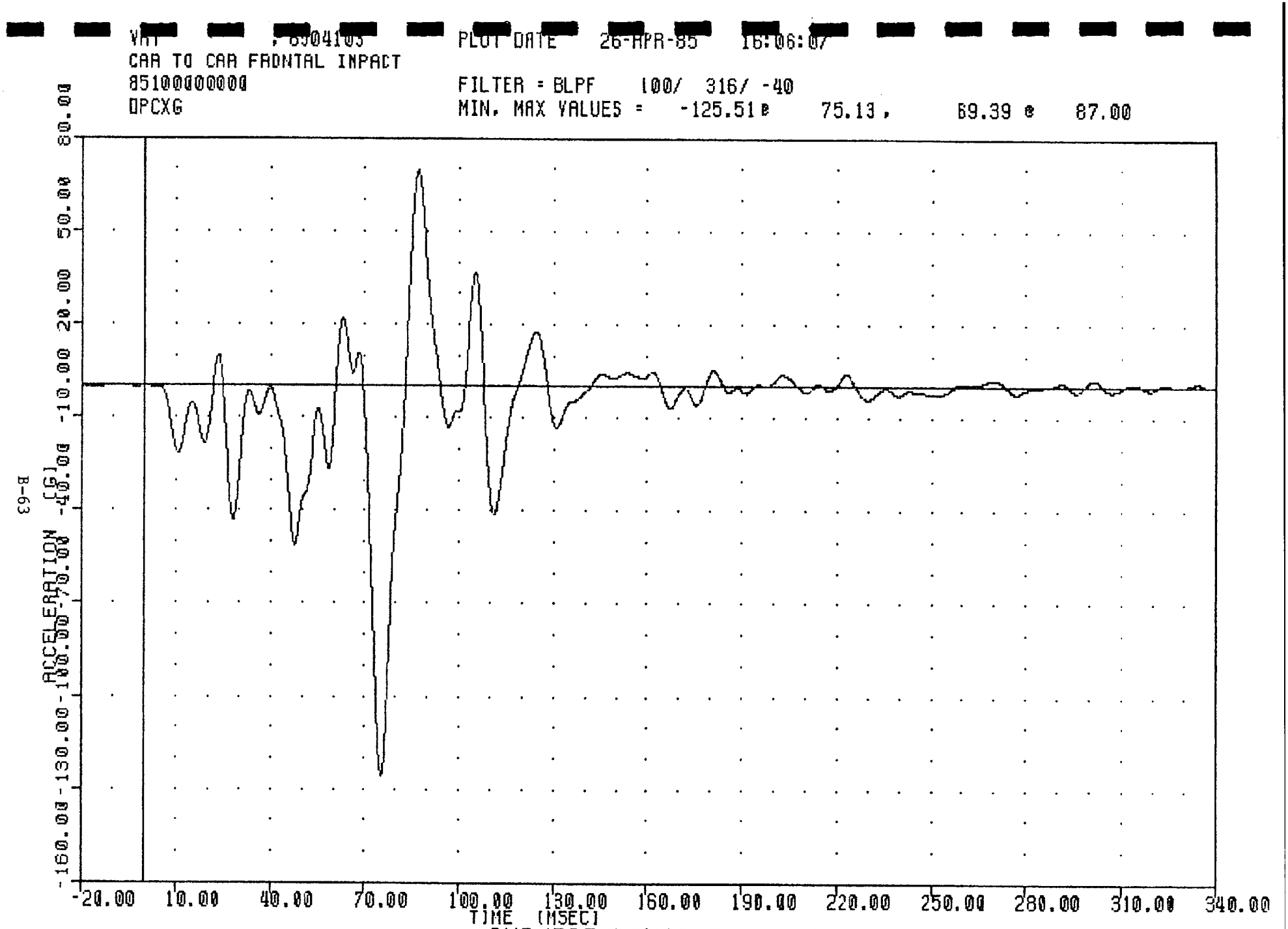
FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -35.89 @ 65.13 , 14.84 @ 73.63

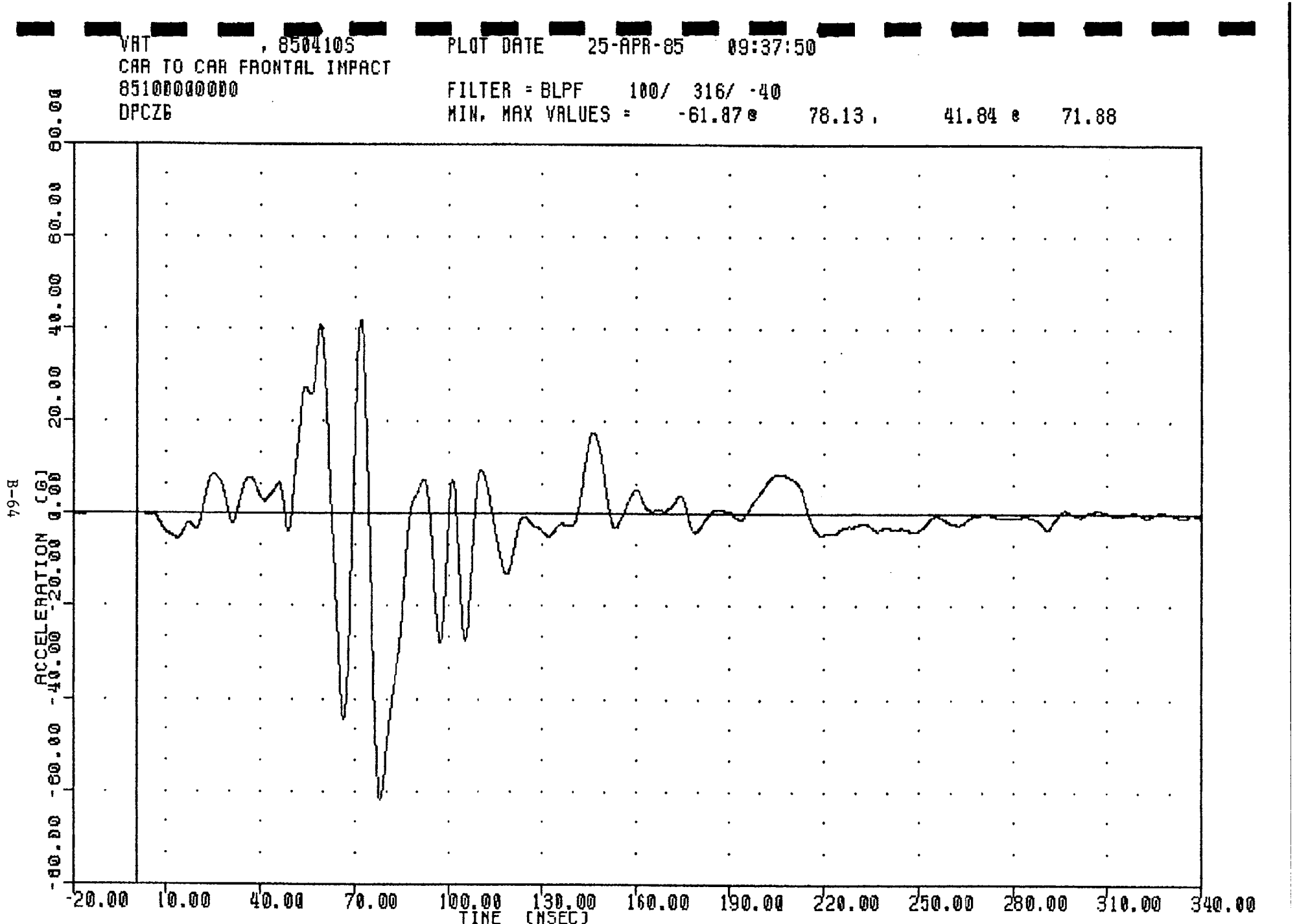


SUBJECT VEHICLE - OMNI

STEERING WHEEL HUB ACCELERATION I-S AXIS

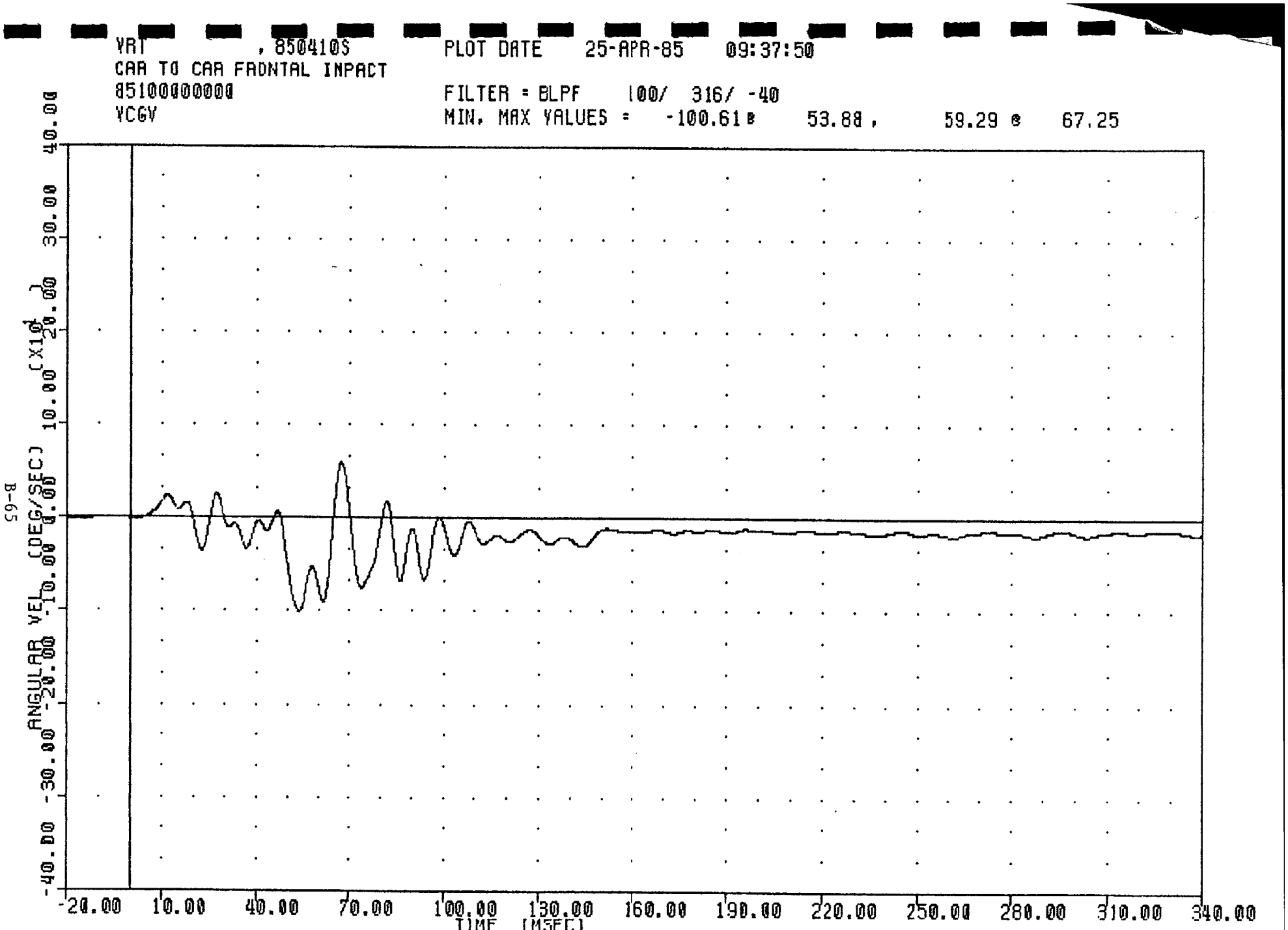


SUBJECT VEHICLE - OMNI
DASH PANEL CENTER ACCELERATION X AXIS



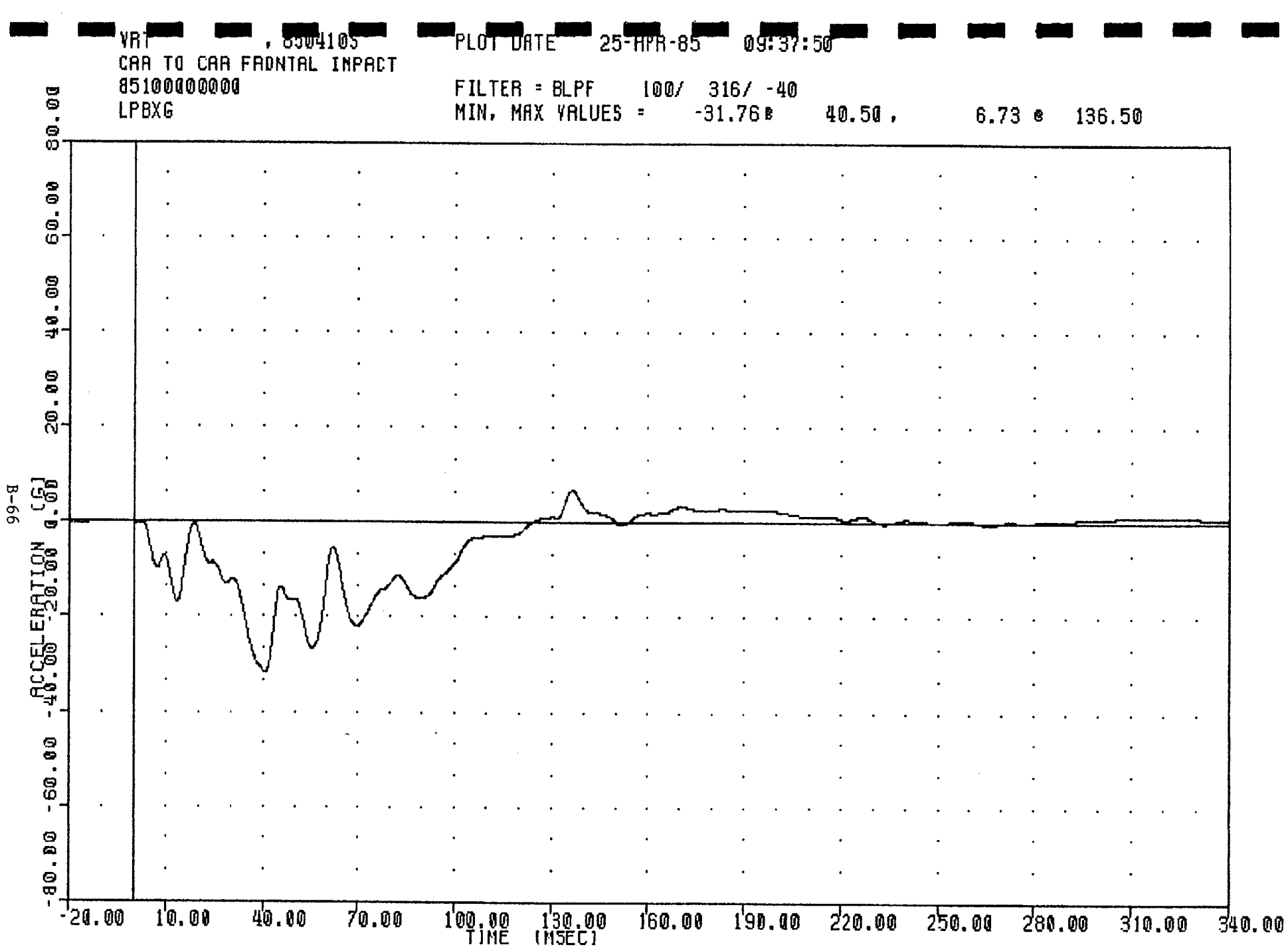
SUBJECT VEHICLE - OMNI

DASH PANEL CENTER ACCELERATION Z AXIS

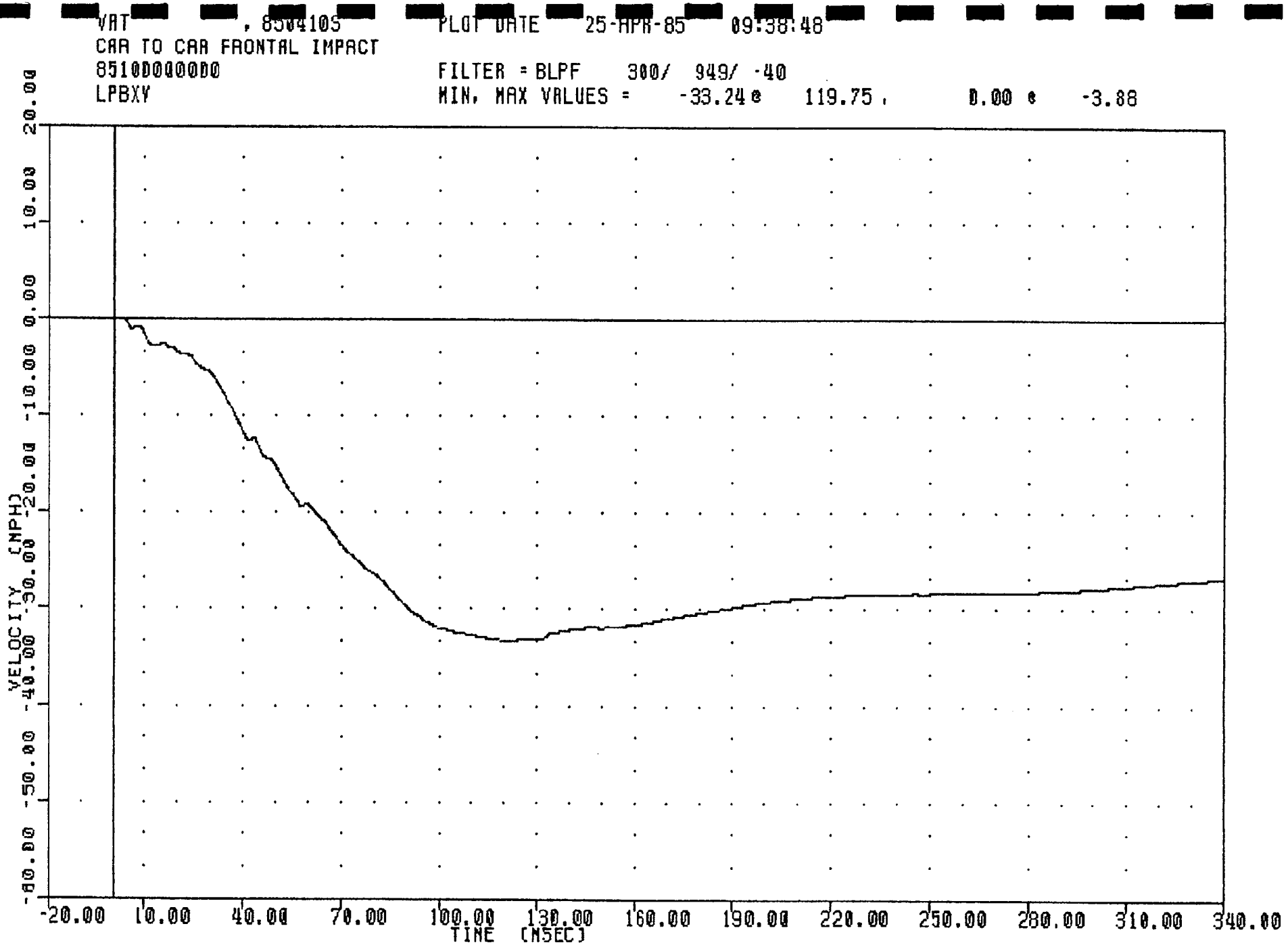


SUBJECT VEHICLE - OMNI

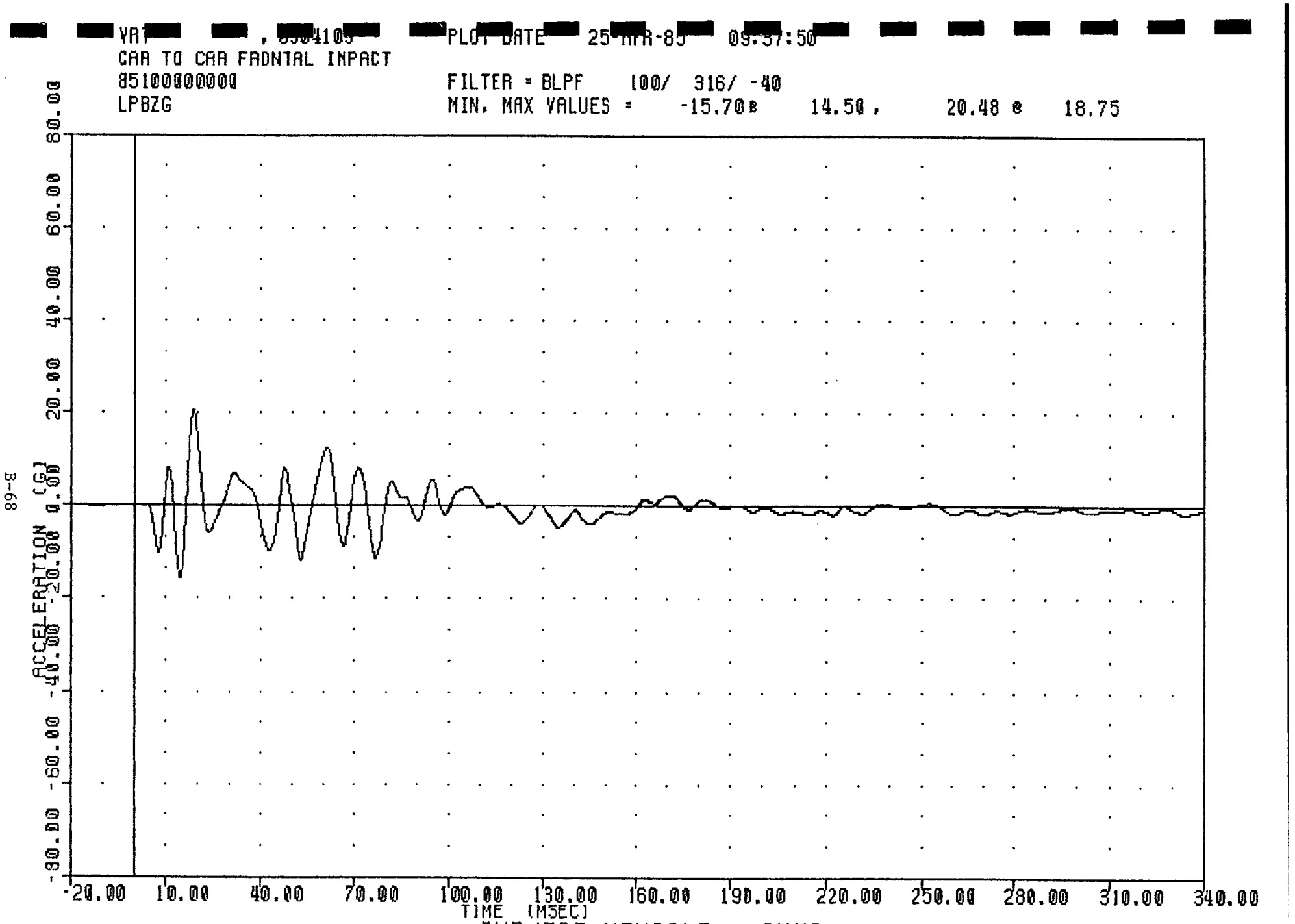
VEHICLE PITCH RATE DEGREES/SECOND



SUBJECT VEHICLE - OMNI
LEFT B PILLAR ACCELERATION X AXIS

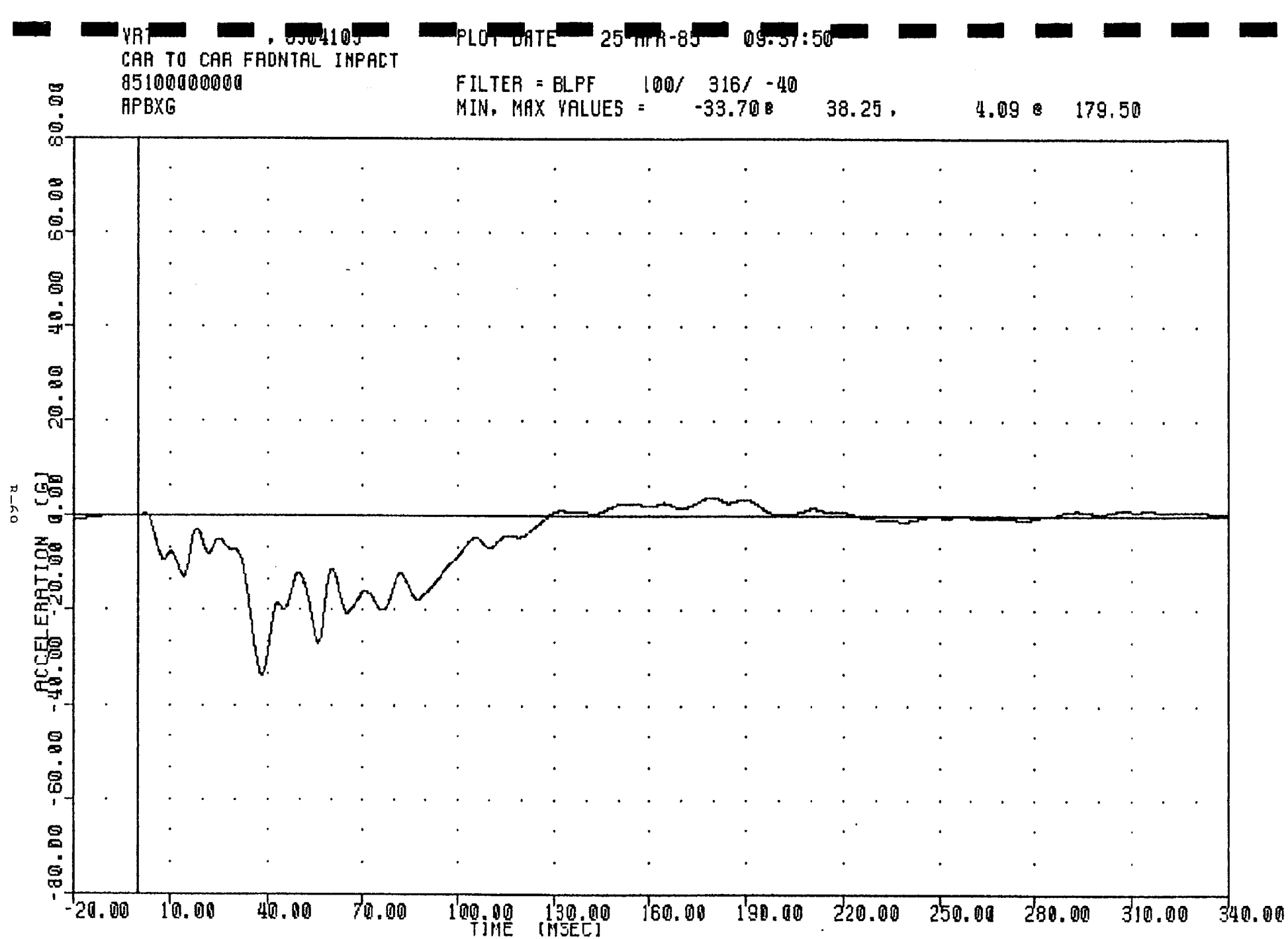


SUBJECT VEHICLE - OMNI
DELTA V USING LPBXG



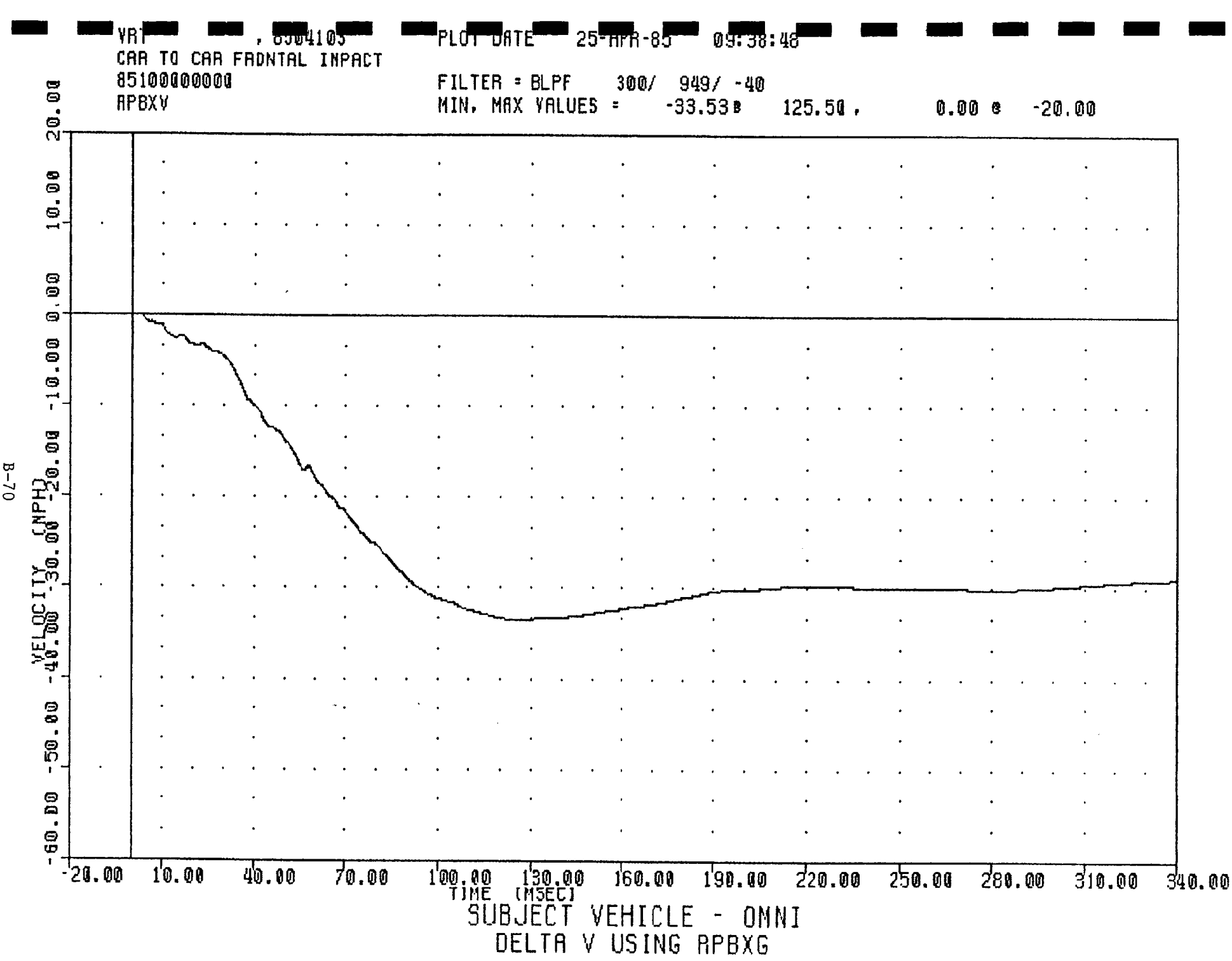
SUBJECT VEHICLE - OMNI

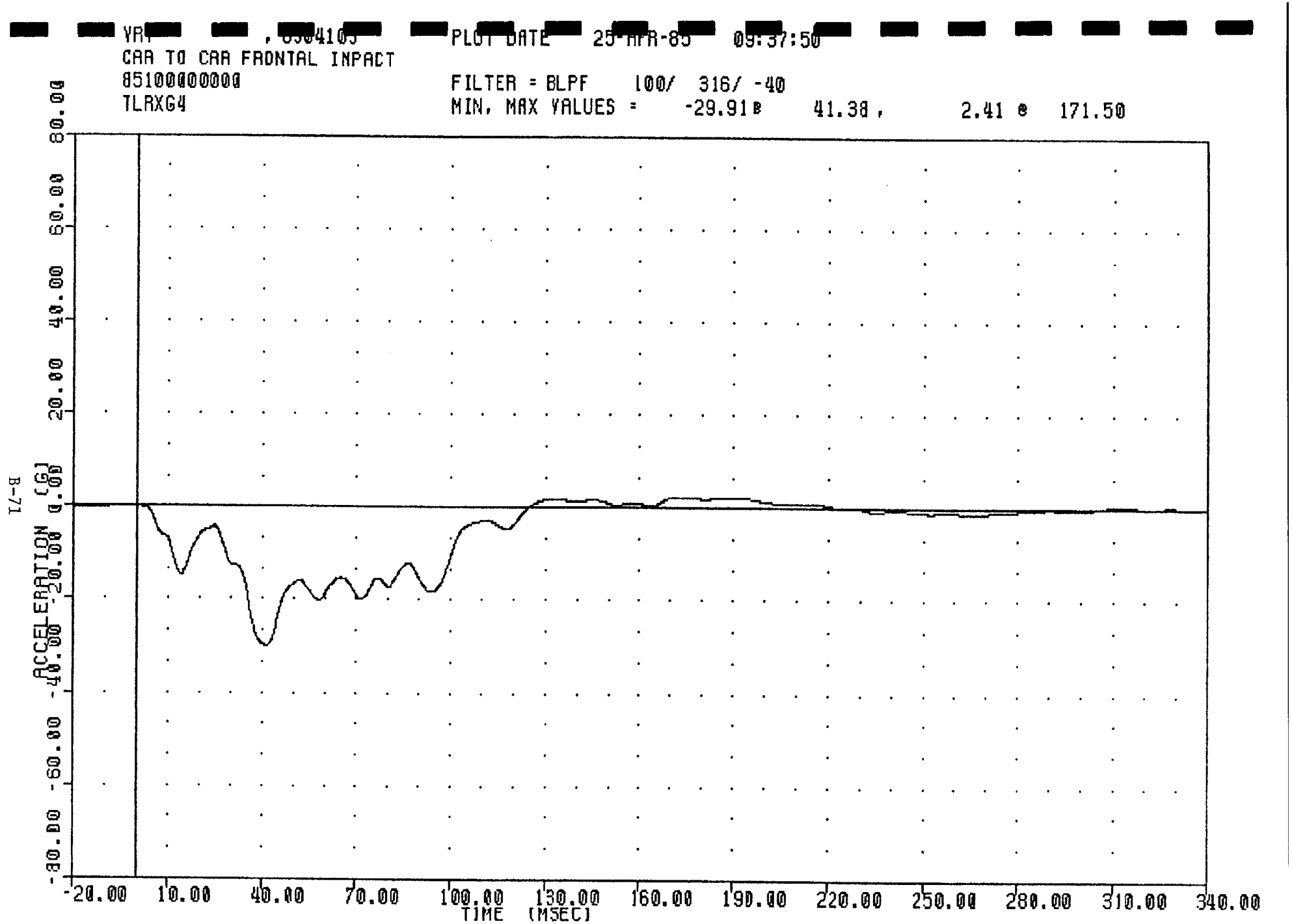
LEFT B PILLAR ACCELERATION Z AXIS



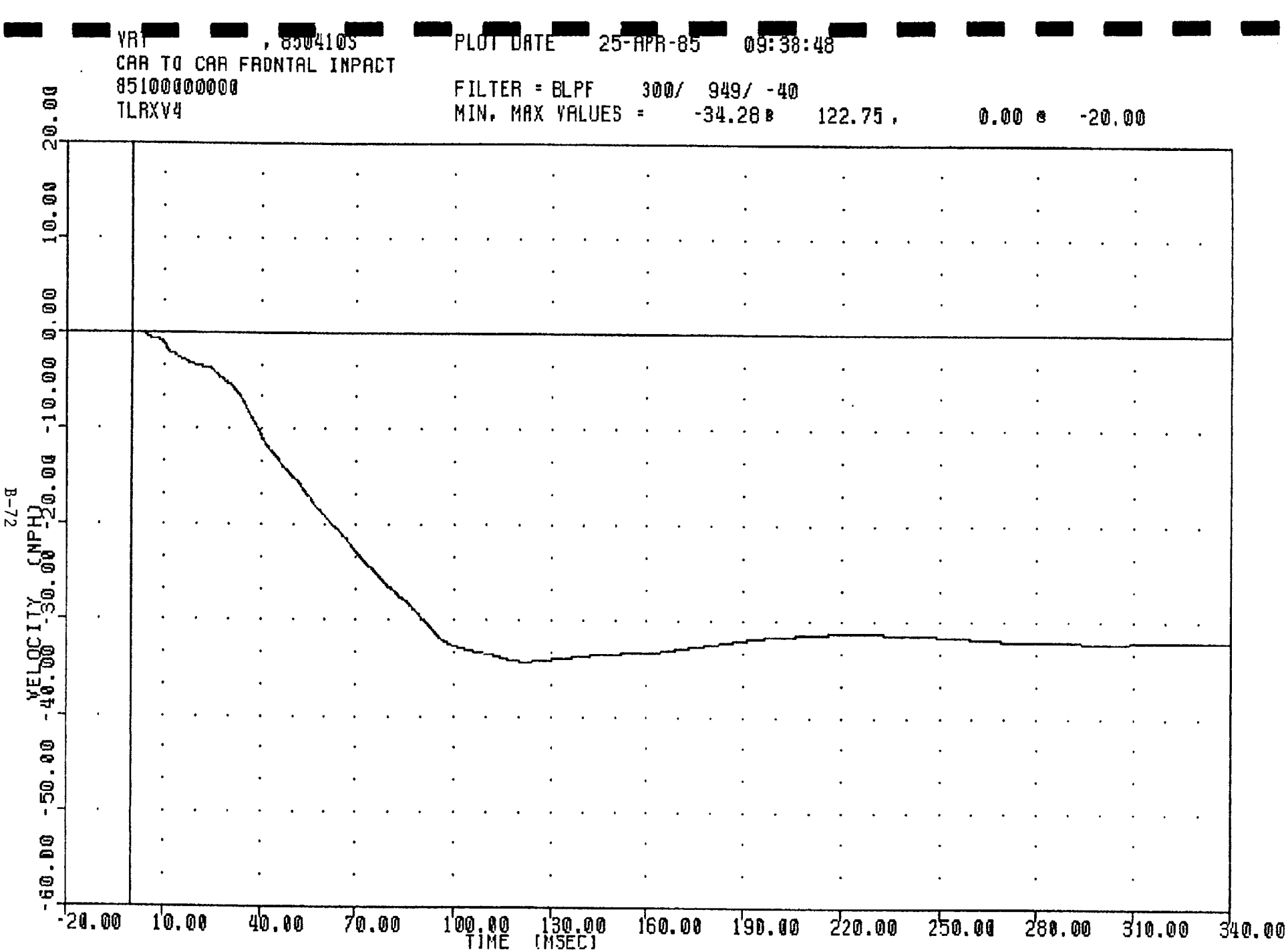
SUBJECT VEHICLE - OMNI

RIGHT B PILLAR ACCELERATION X AXIS


VRT , 8504105
PLOT DATE 25-APR-85 09:38:48
CAR TO CAR FRONTAL IMPACT
851000000000
RPBXV
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -33.53 @ 125.50 , 0.00 @ -20.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
VELOCITY (MPH)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
SUBJECT VEHICLE - OMNI
DELTA V USING RPBXG



SUBJECT VEHICLE - OMNI
LEFT REAR SEAT ACCELERATION X AXIS

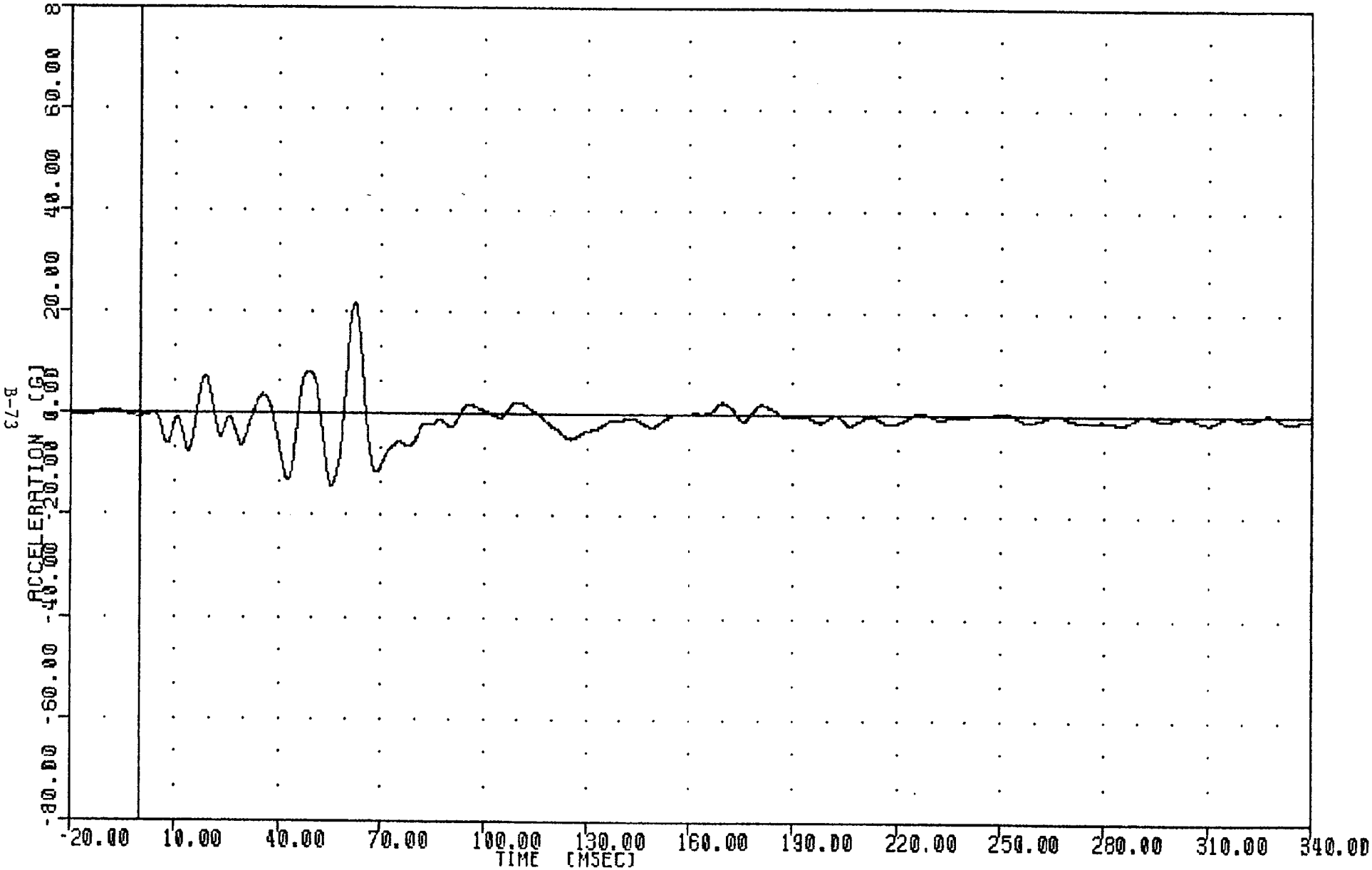


SUBJECT VEHICLE - OMNI
DELTA V USING TLRXG4

[redacted] VR[redacted] [redacted] , [redacted]4105 [redacted] PLOT DATE [redacted] 25 APR-85 [redacted] 09:57:50 [redacted]

CAR TO CAR FRONTAL IMPACT
85100000000
TLAZG4

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -14.33 @ 55.63 , 21.55 @ 62.38



SUBJECT VEHICLE - OMNI
LEFT REAR SEAT ACCELERATION Z AXIS

[redacted] VAT [redacted] , 850410 [redacted] PLOT DATE [redacted] 25-APR-85 [redacted] 09:37:50 [redacted]

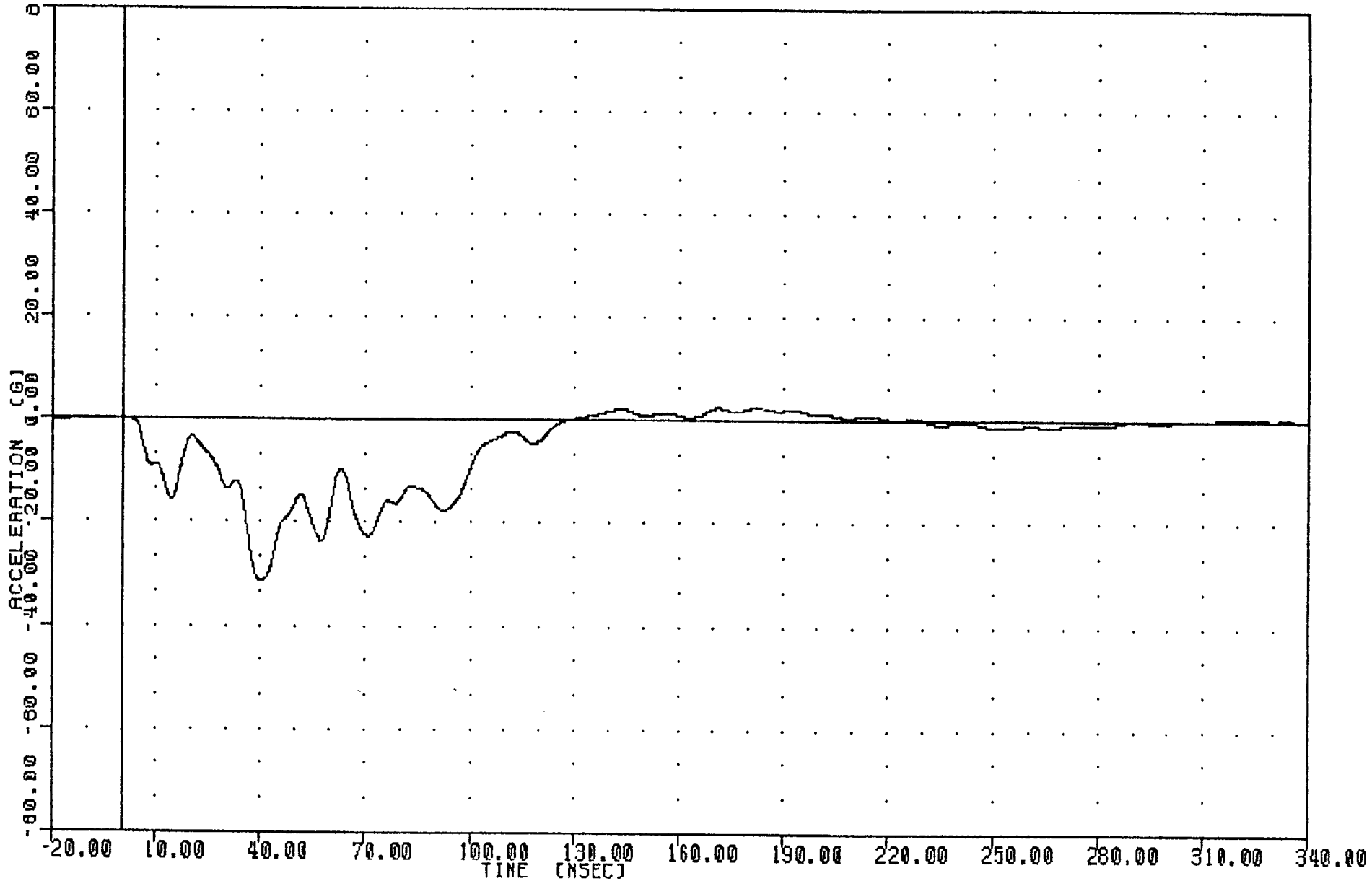
CAR TO CAR FRONTAL IMPACT

8510D0G00D0

TLRX6D

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -31.33 @ 40.25 , 2.57 @ 182.13



SUBJECT VEHICLE - OMNI

LEFT REAR SEAT ACCELERATION -2 X AXIS

[redacted] VR[redacted] [redacted], 850410[redacted] [redacted] PLOT DATE [redacted] 25 [redacted] MAR-85 [redacted] 09:37:50

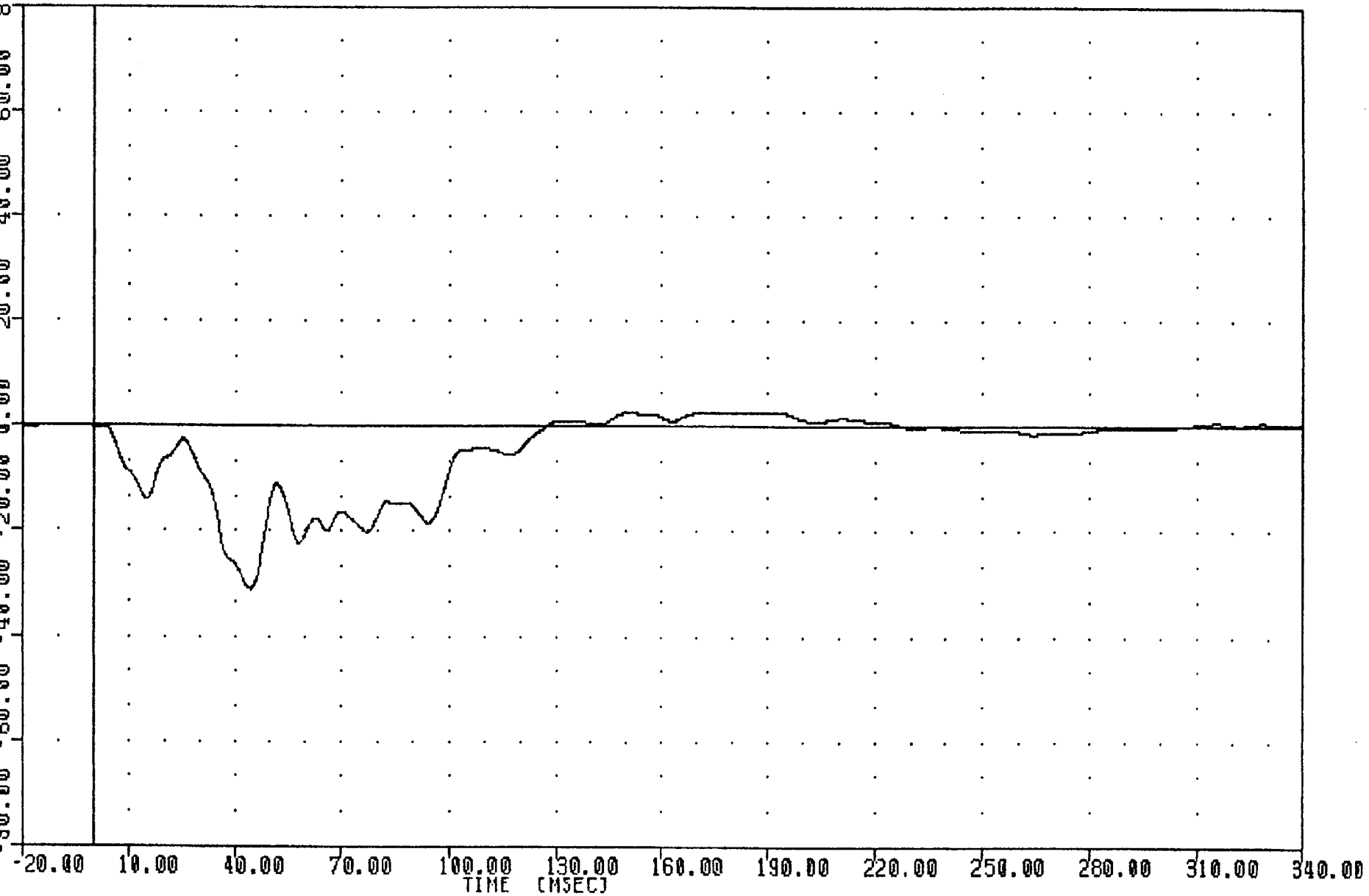
CAR TO CAR FRONTAL IMPACT

8510000[redacted]

TRAXG3

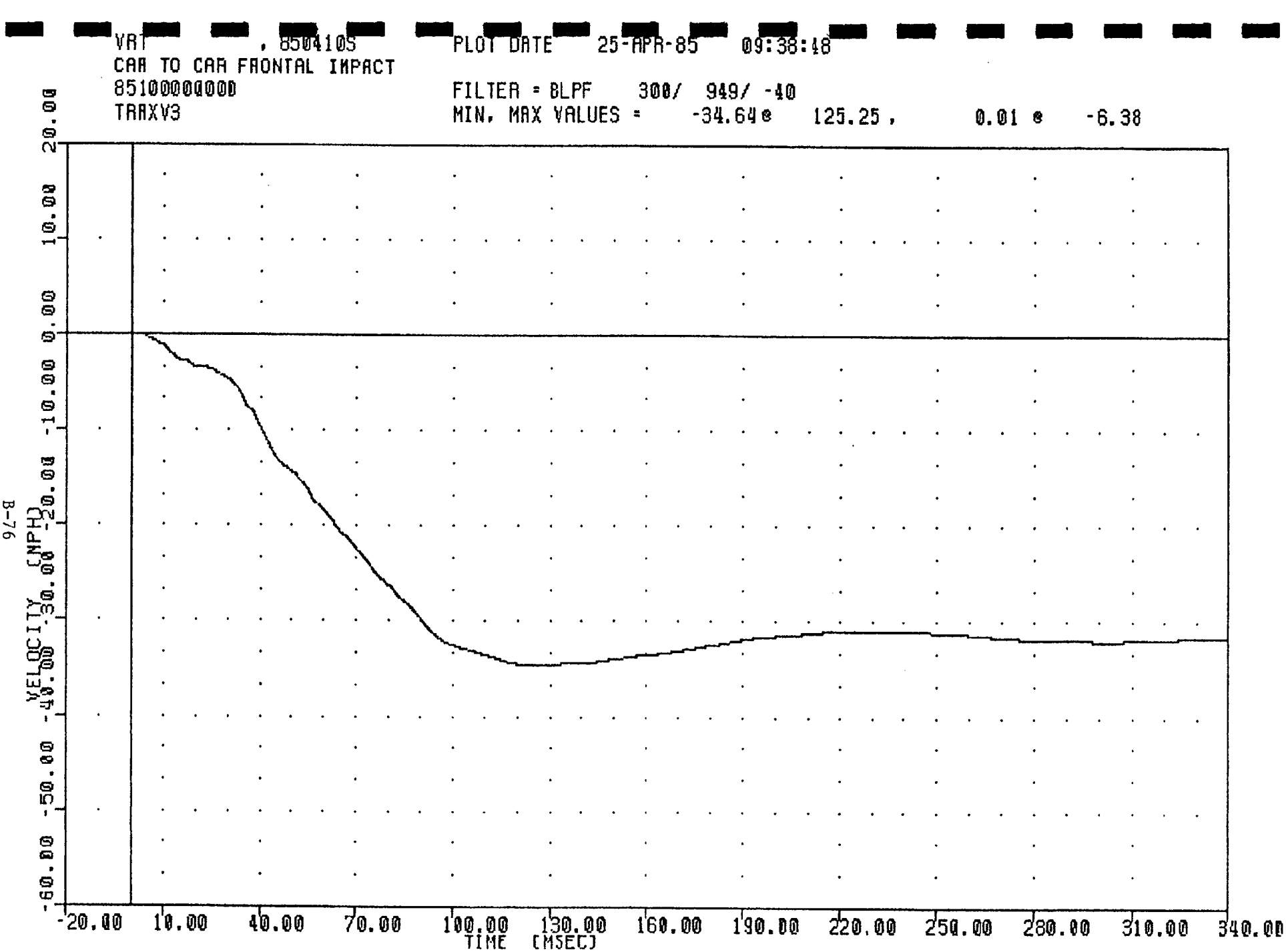
FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -31.10 @ 44.38 , 2.79 @ 179.13



SUBJECT VEHICLE - OMNI

RIGHT REAR SEAT ACCELERATION X AXIS



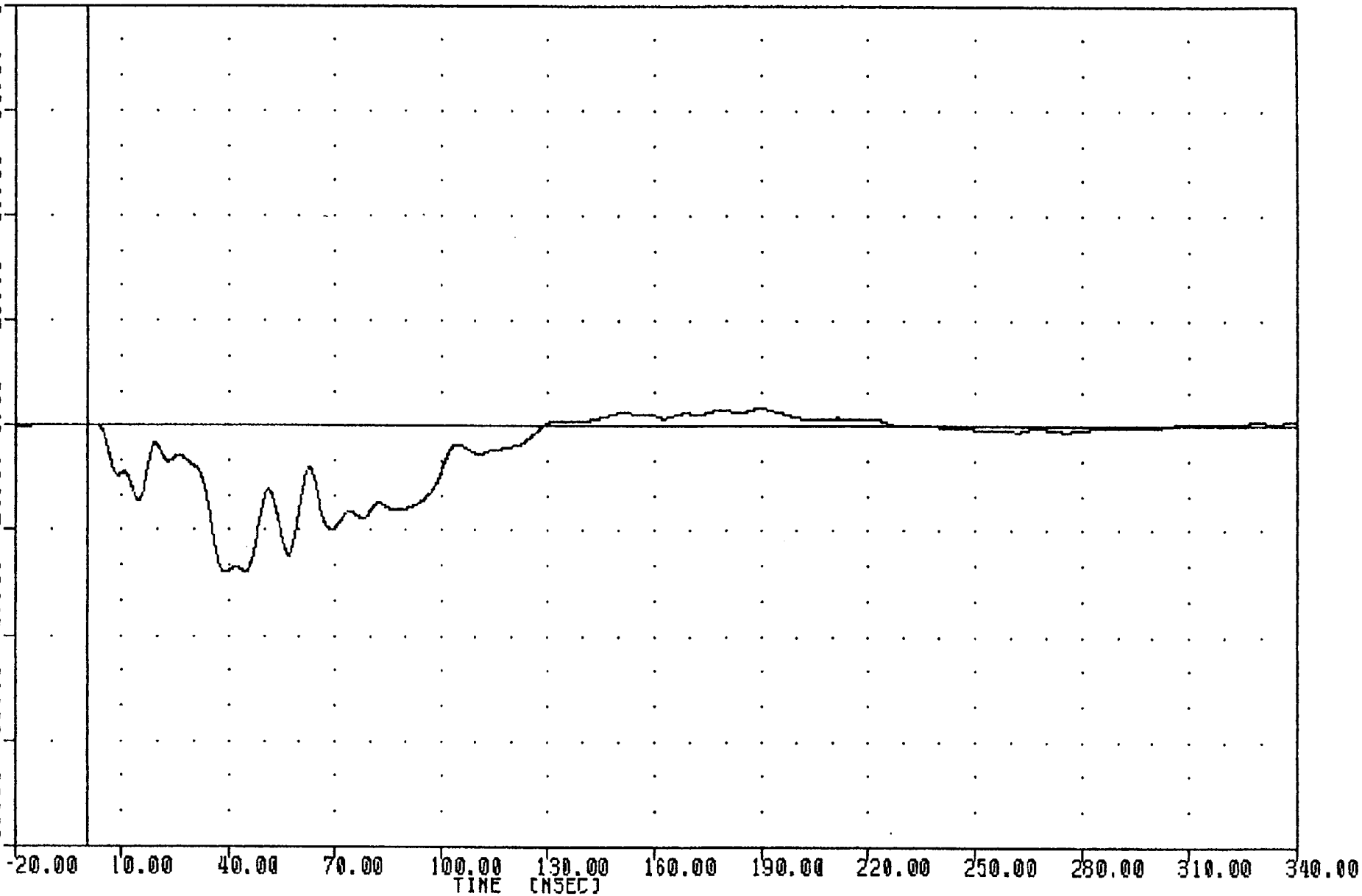
SUBJECT VEHICLE - OMNI
DELTA V USING TRRXG3

[redacted] VAT [redacted] , 8504109 [redacted] PLOT DATE [redacted] 25-APR-85 [redacted] 09:57:50 [redacted]

CAR TO CAR FRONTAL IMPACT

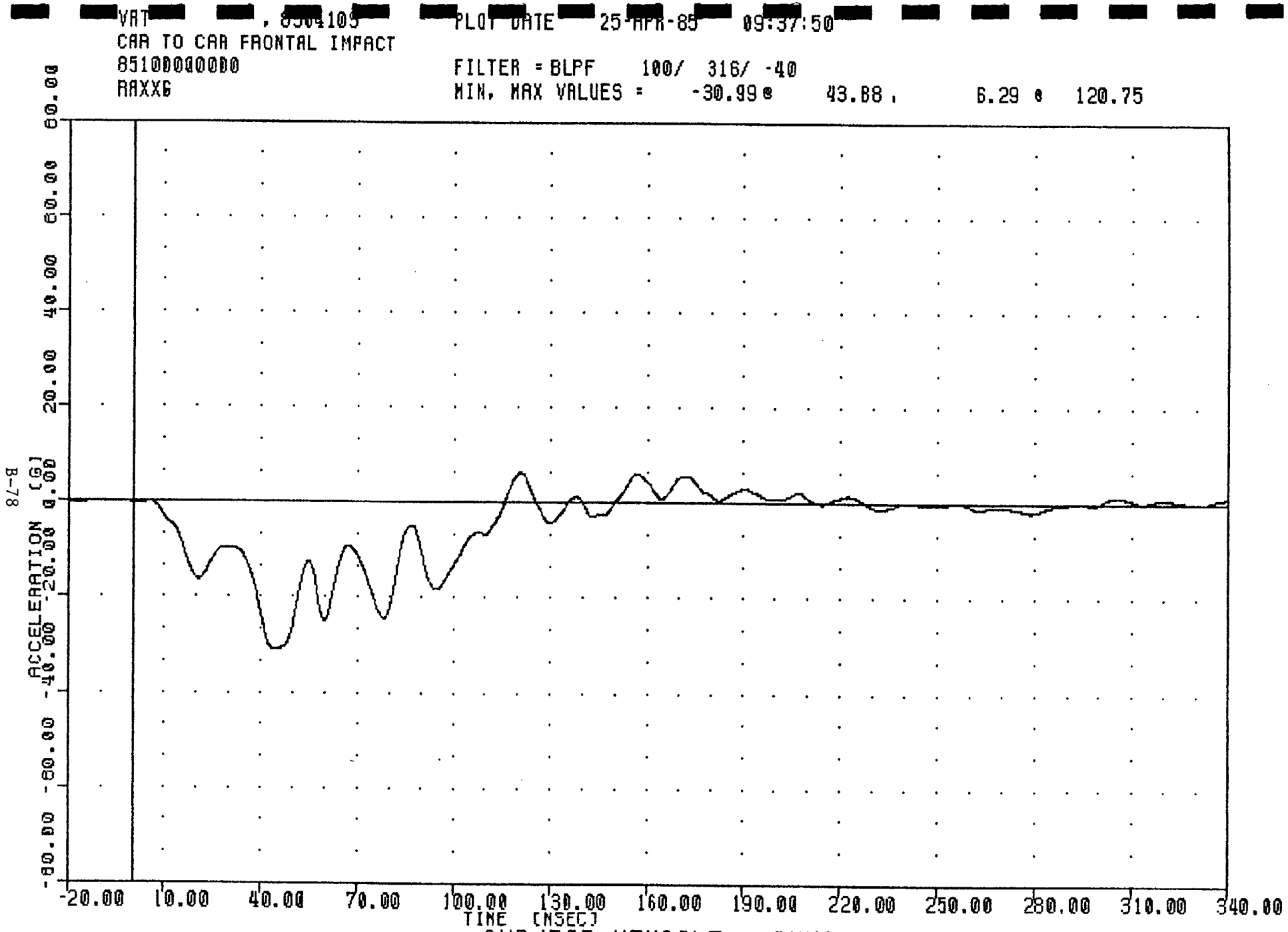
8510D0Q00D0 FILTER = BLPF 100/ 316/ -40

TARX6C MIN, MAX VALUES = -28.02 @ 38.75 , 3.47 @ 189.75



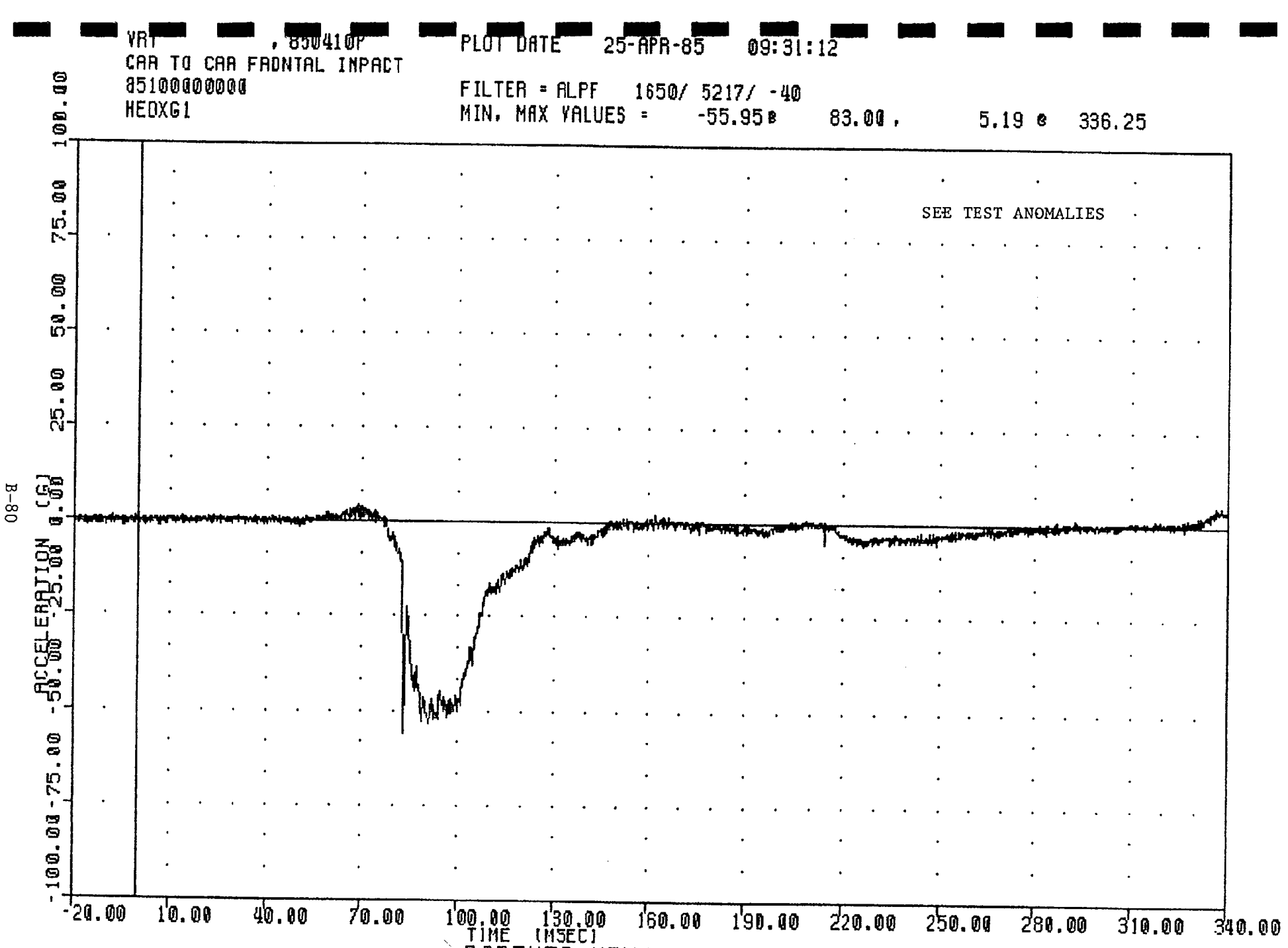
SUBJECT VEHICLE - OMNI

RIGHT REAR SEAT ACCELERATION -2 X AXIS

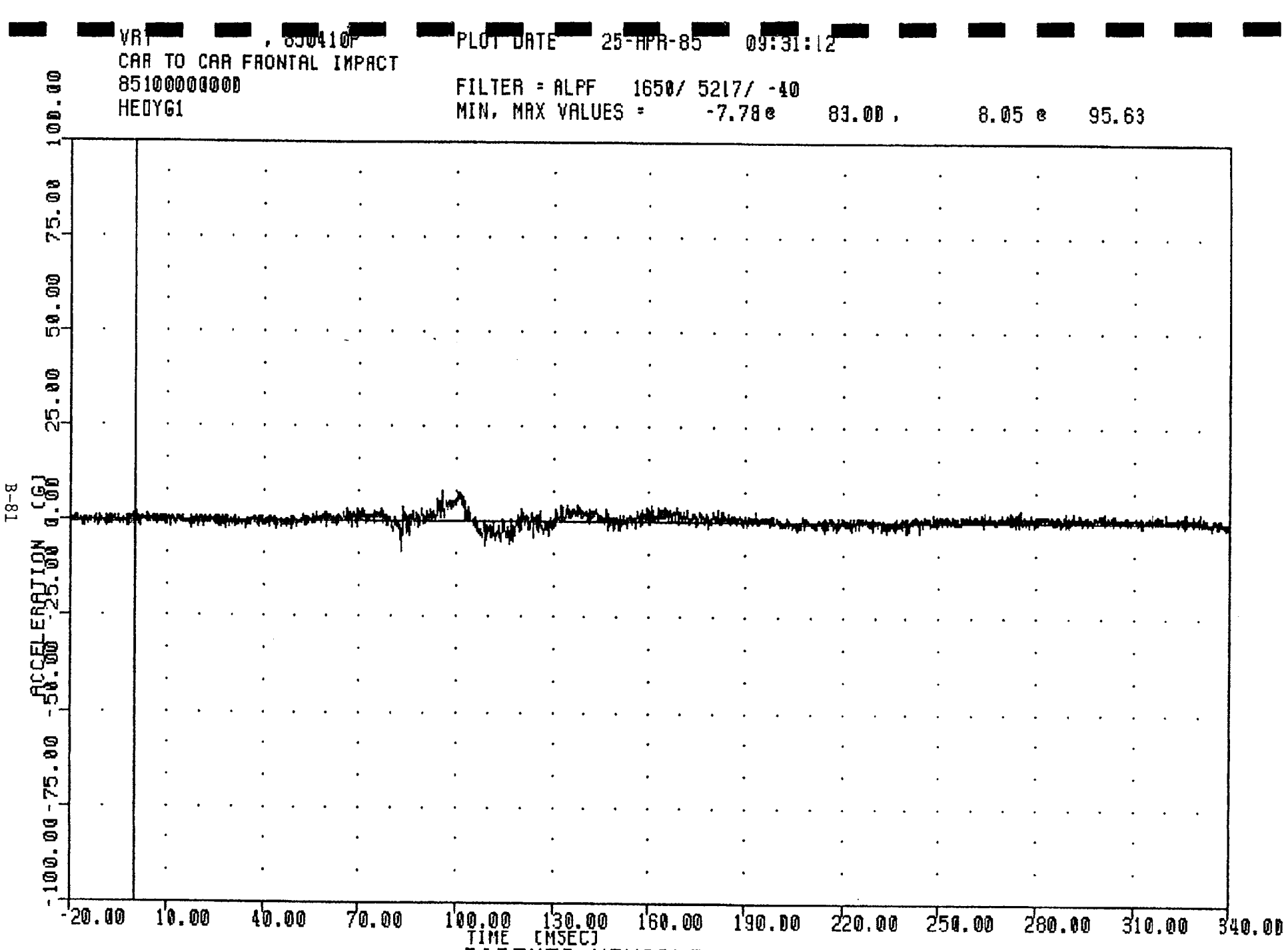


SUBJECT VEHICLE - OMNI
REAR AXLE ACCLERATION X AXIS

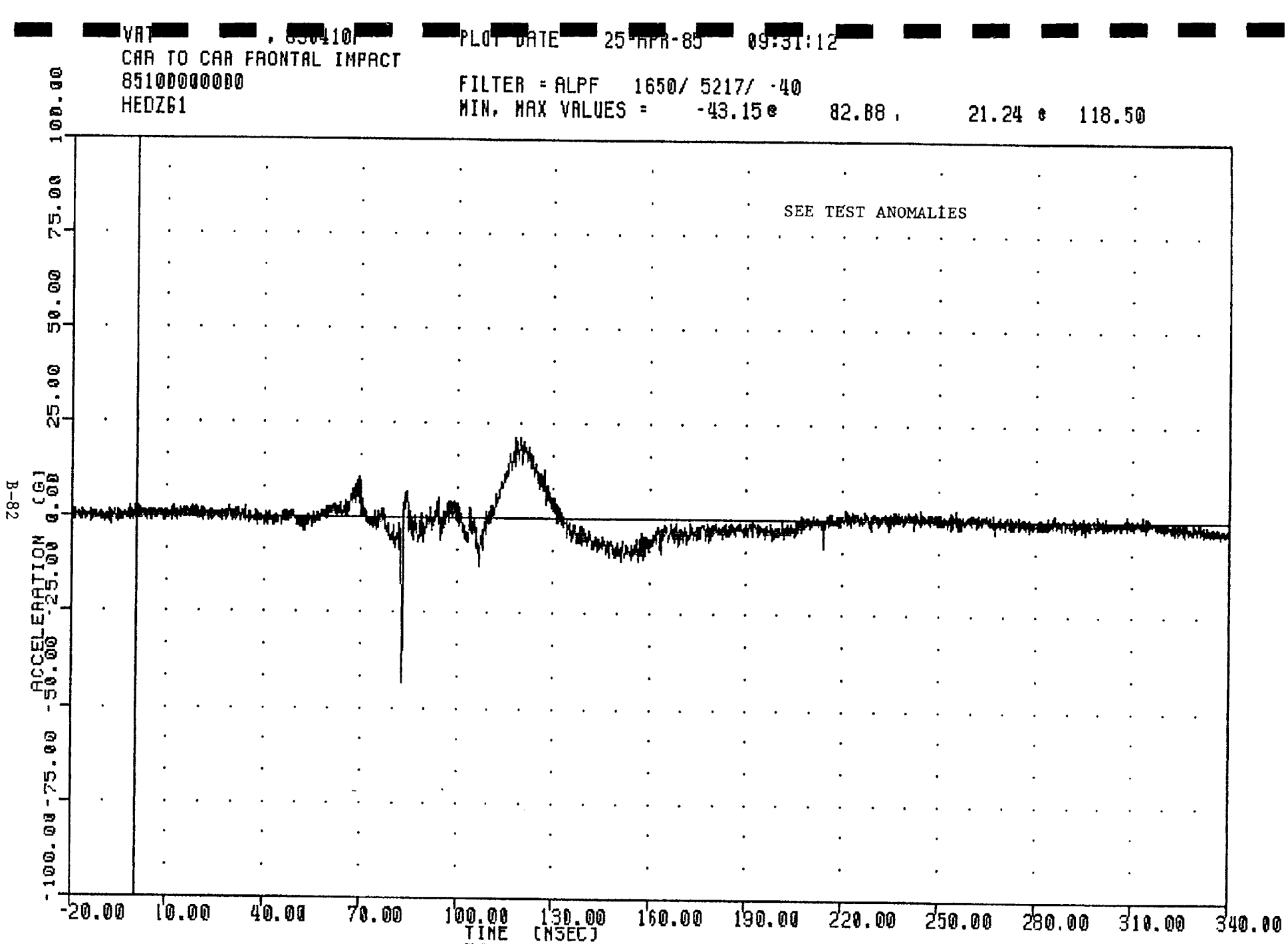
PARTNER VEHICLE DATA PLOTS



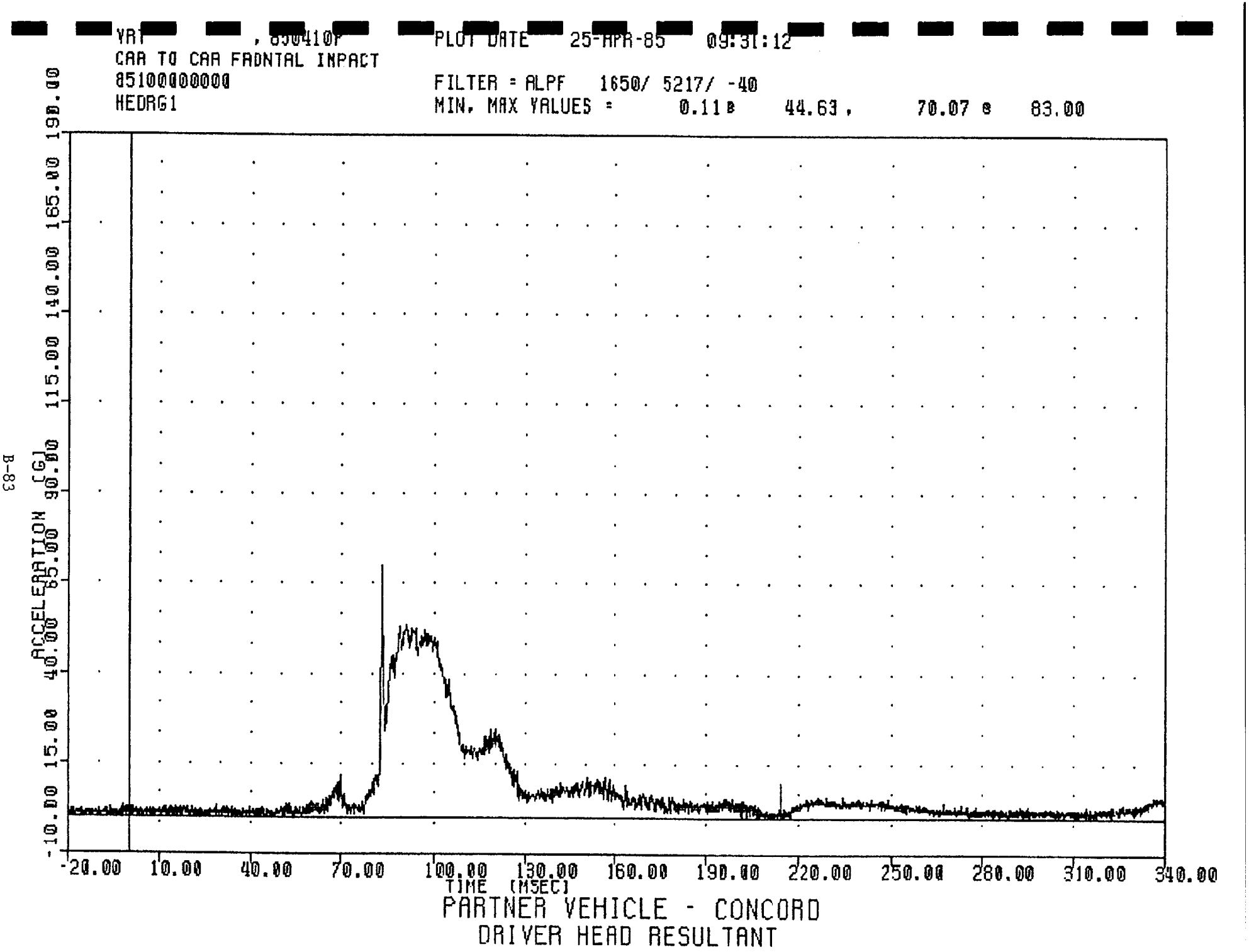
PARTNER VEHICLE - CONCORD
DRIVER HEAD ACCELERATION X AXIS



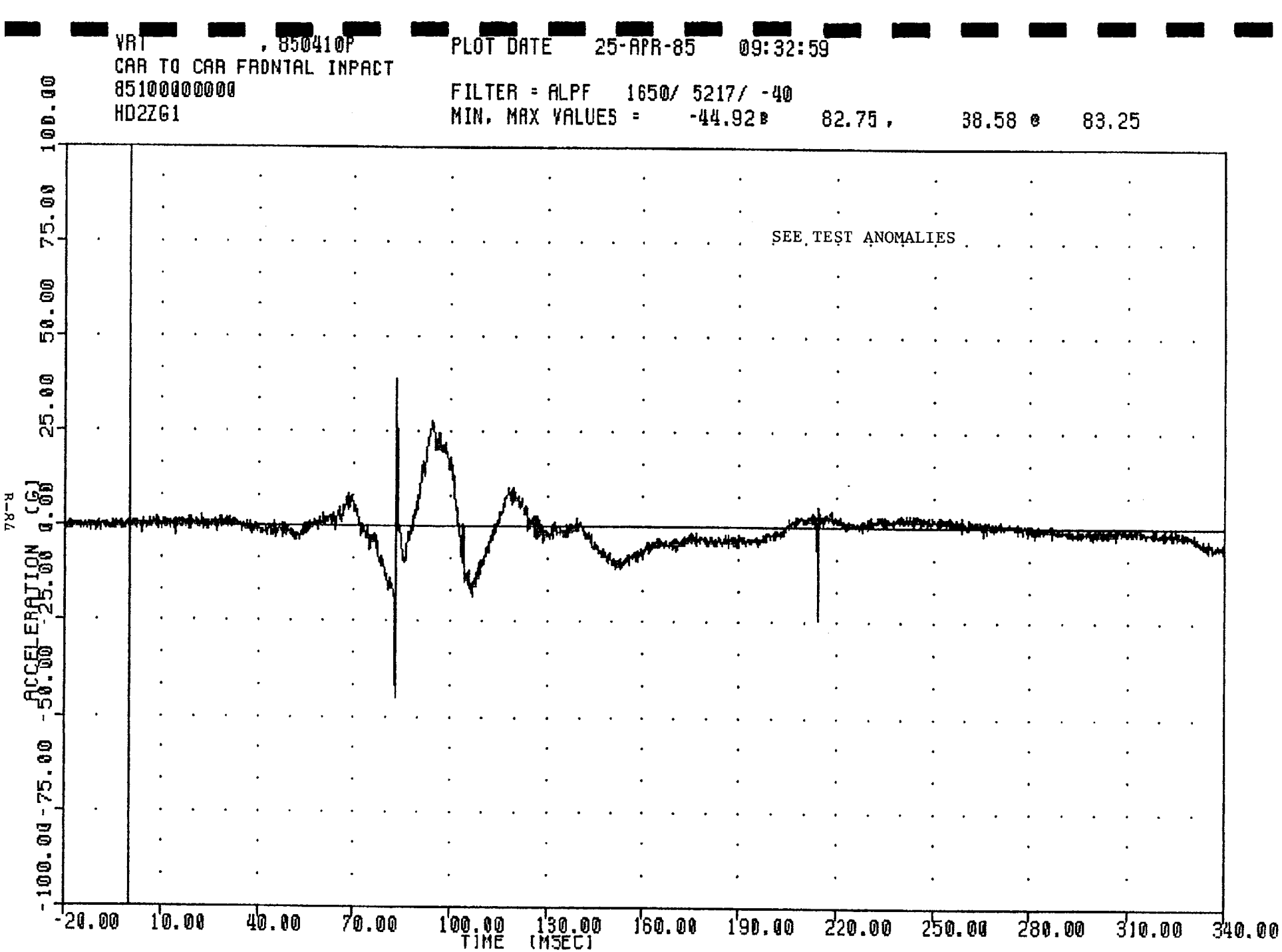
PARTNER VEHICLE - CONCORD
DRIVER HEAD ACCELERATION Y AXIS



PARTNER VEHICLE - CONCORD
DRIVER HEAD ACCELERATION Z AXIS

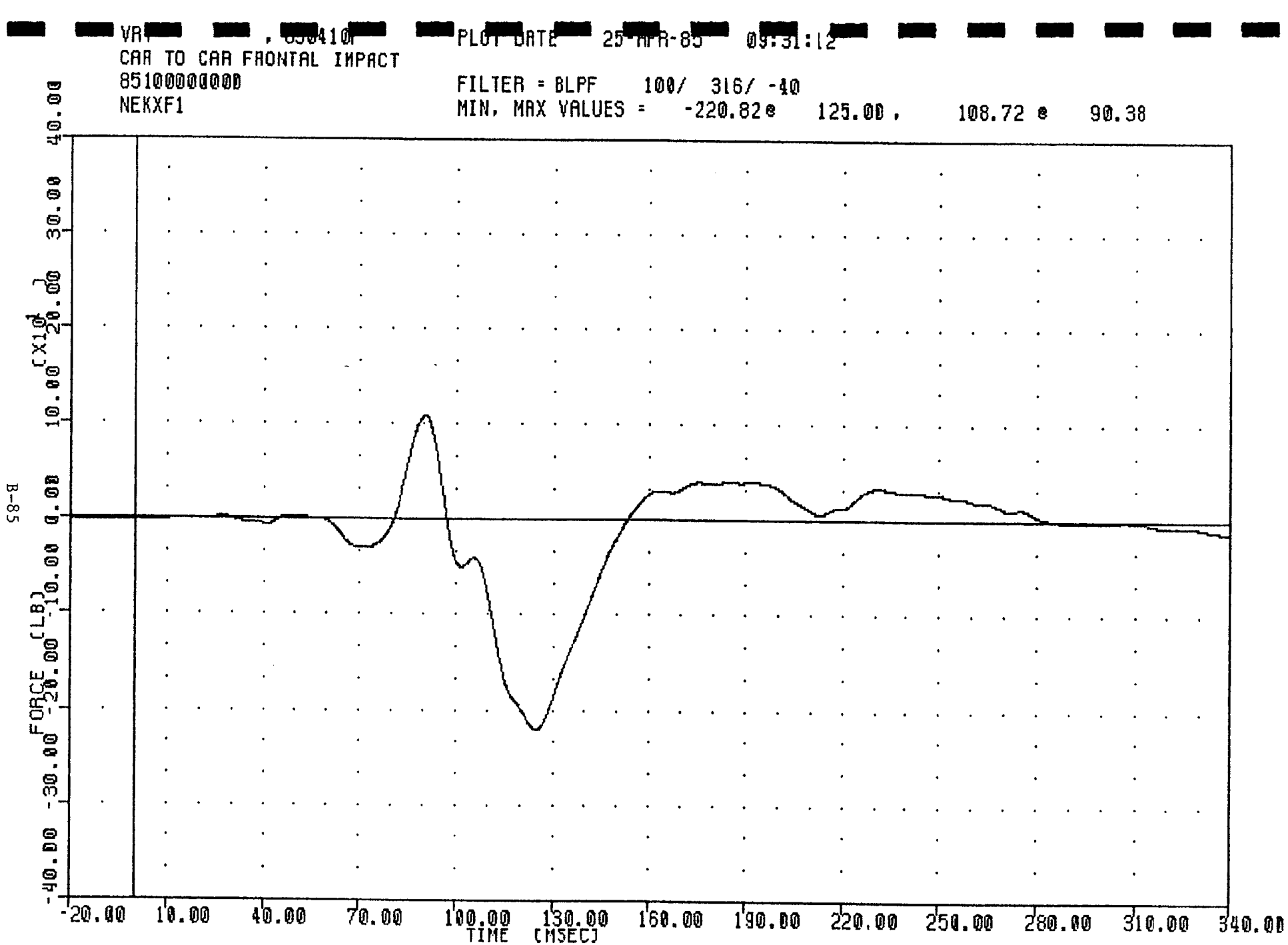


PARTNER VEHICLE - CONCORD
DRIVER HEAD RESULTANT



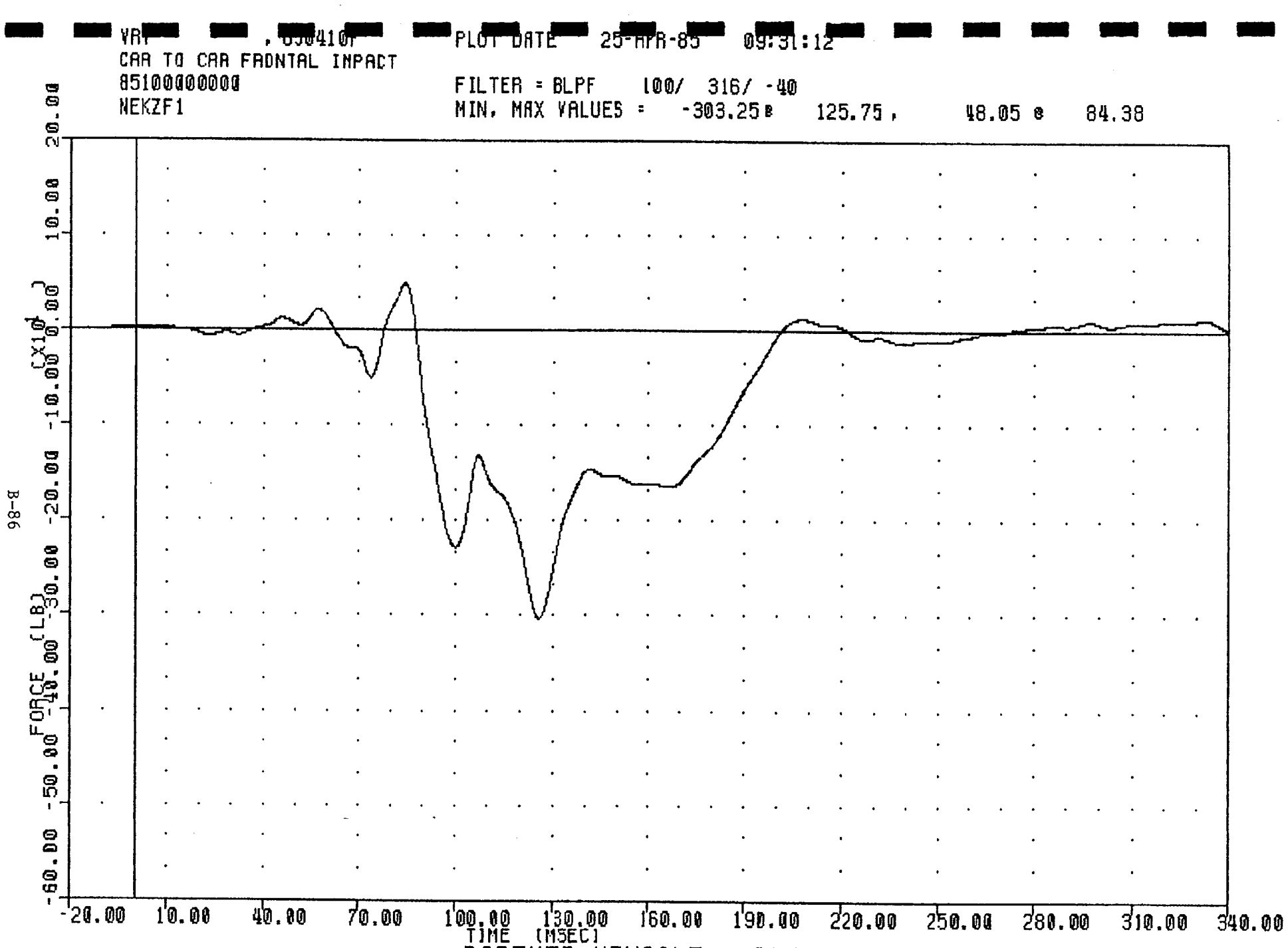
R-84

PARTNER VEHICLE - CONCORD
DRIVER HEAD ACCELERATION Z AXIS (POSITION 2)



PARTNER VEHICLE - CONCORD

DRIVER NECK FORCE X AXIS LBS (SHEAR)



PARTNER VEHICLE - CONCORD

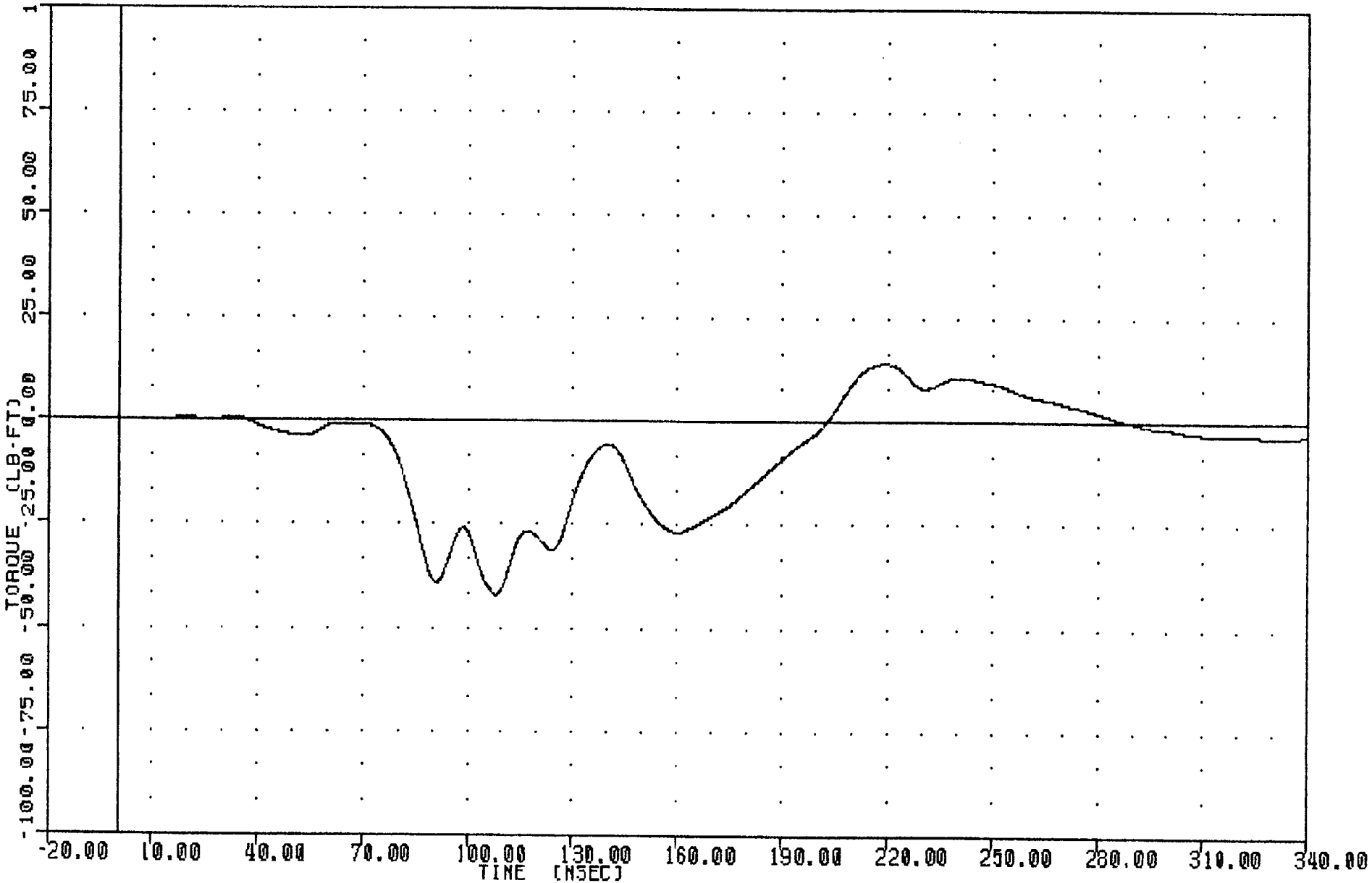
DRIVER NECK FORCE Z AXIS LBS (AXIAL)

[redacted] VAR [redacted] , 850410 [redacted] PLOT DATE 25 APR-85 09:51:12

CAR TO CAR FRONTAL IMPACT

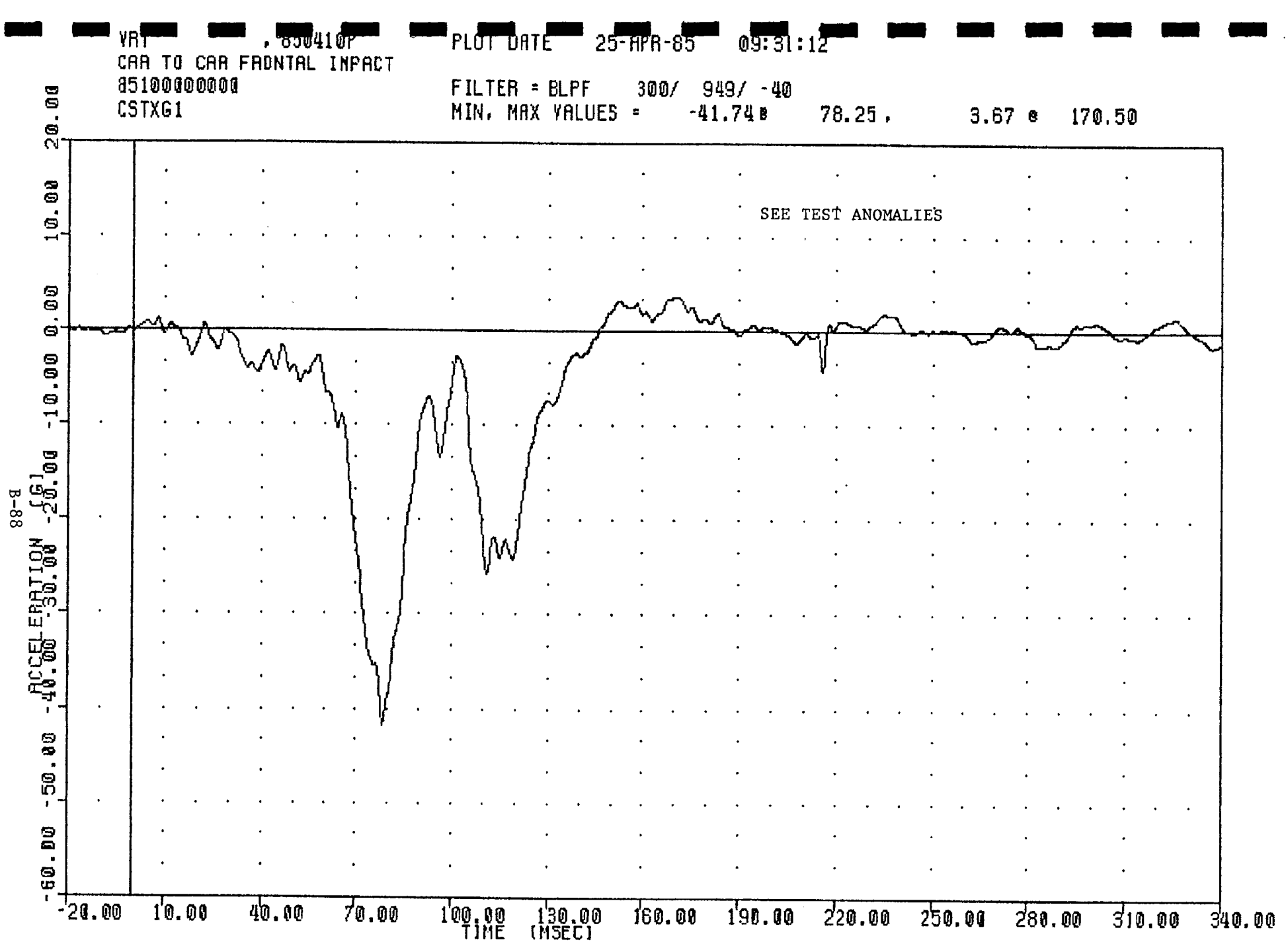
851000000000 FILTER = BLPF 100/ 316/ -40

NEKYM1 MIN. MAX VALUES = -42.16 @ 108.25 , 14.30 @ 218.88

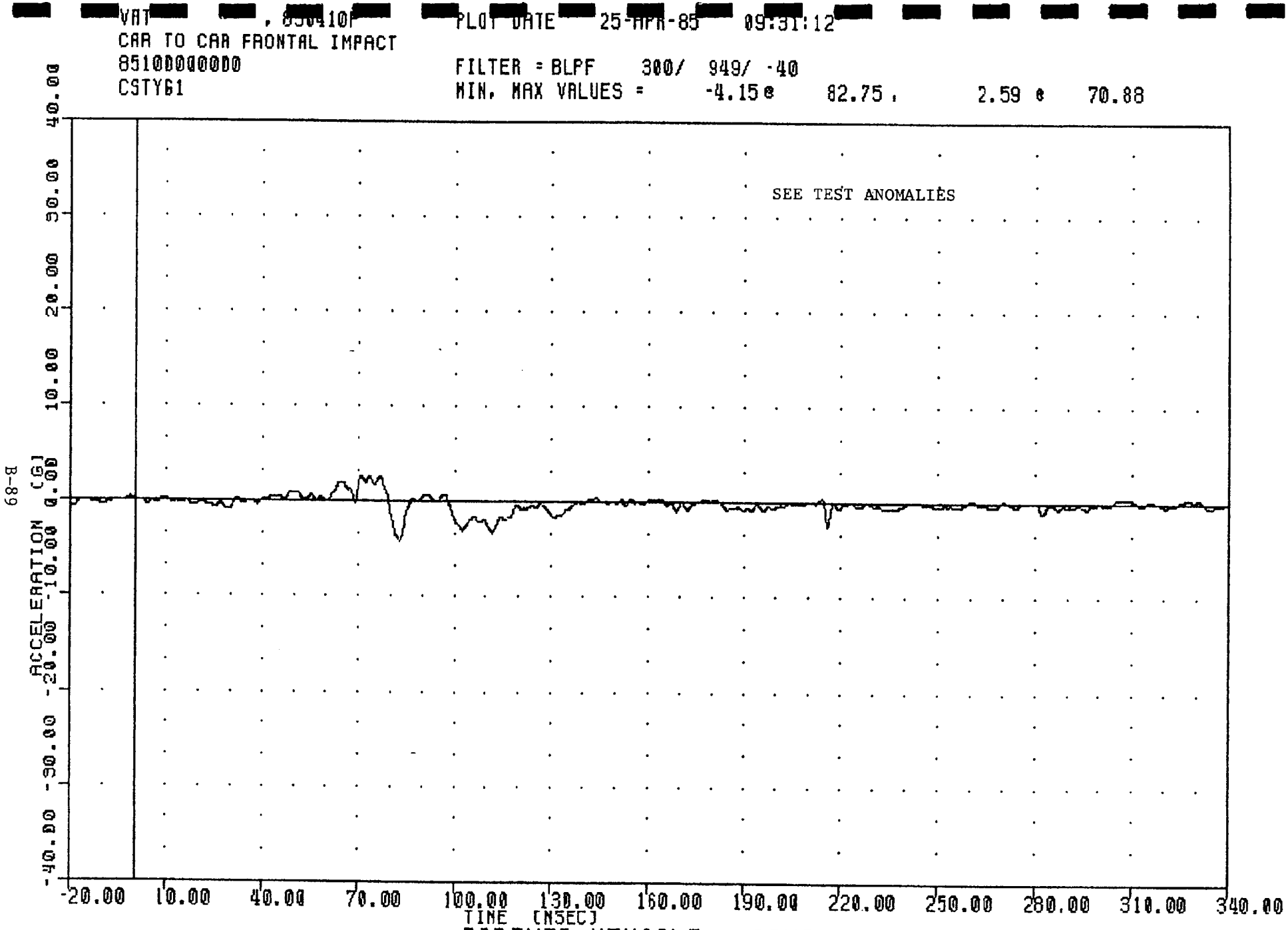


PARTNER VEHICLE - CONCORD

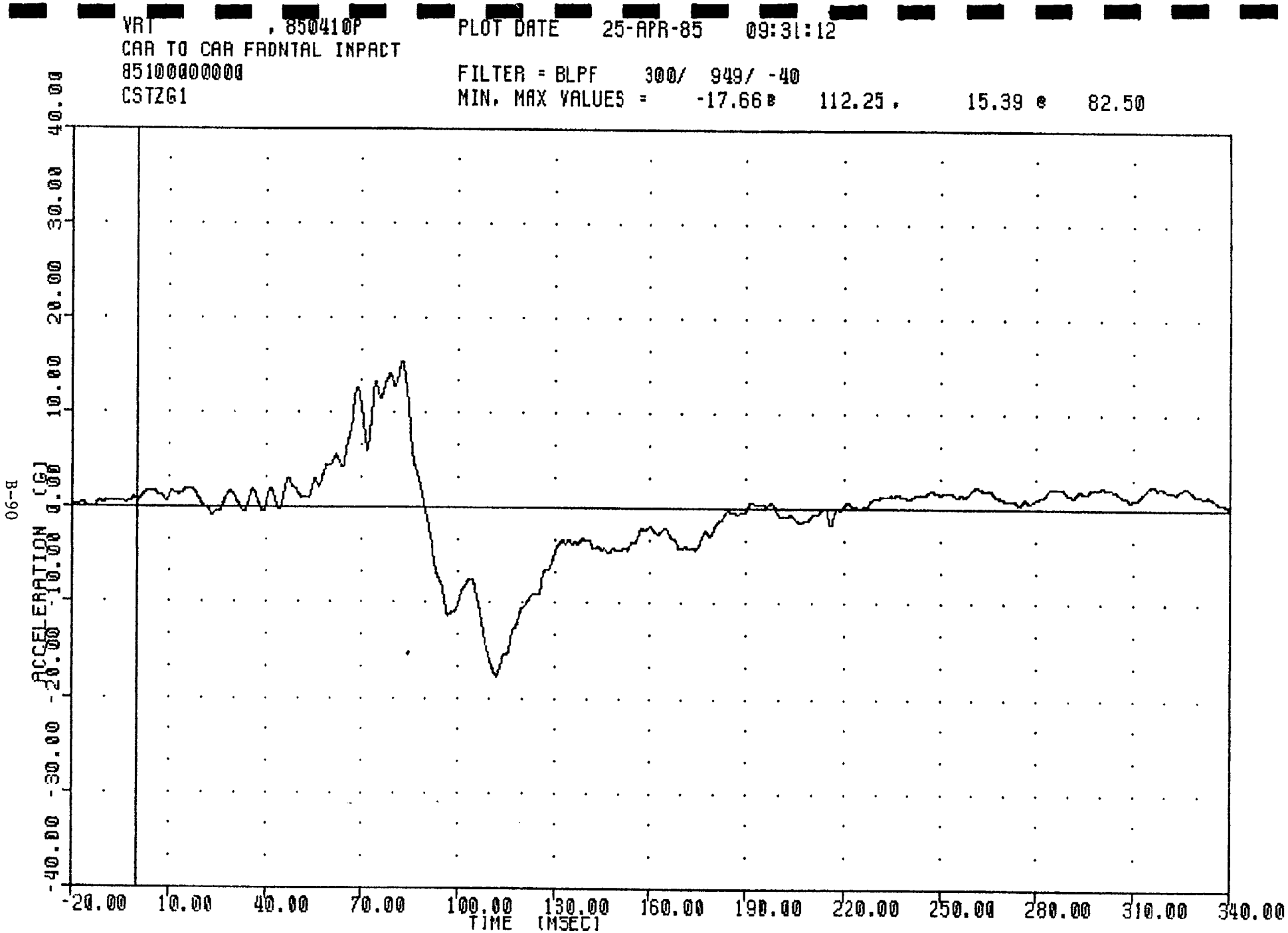
DRIVER NECK MOMENT Y AXIS FT-LBS



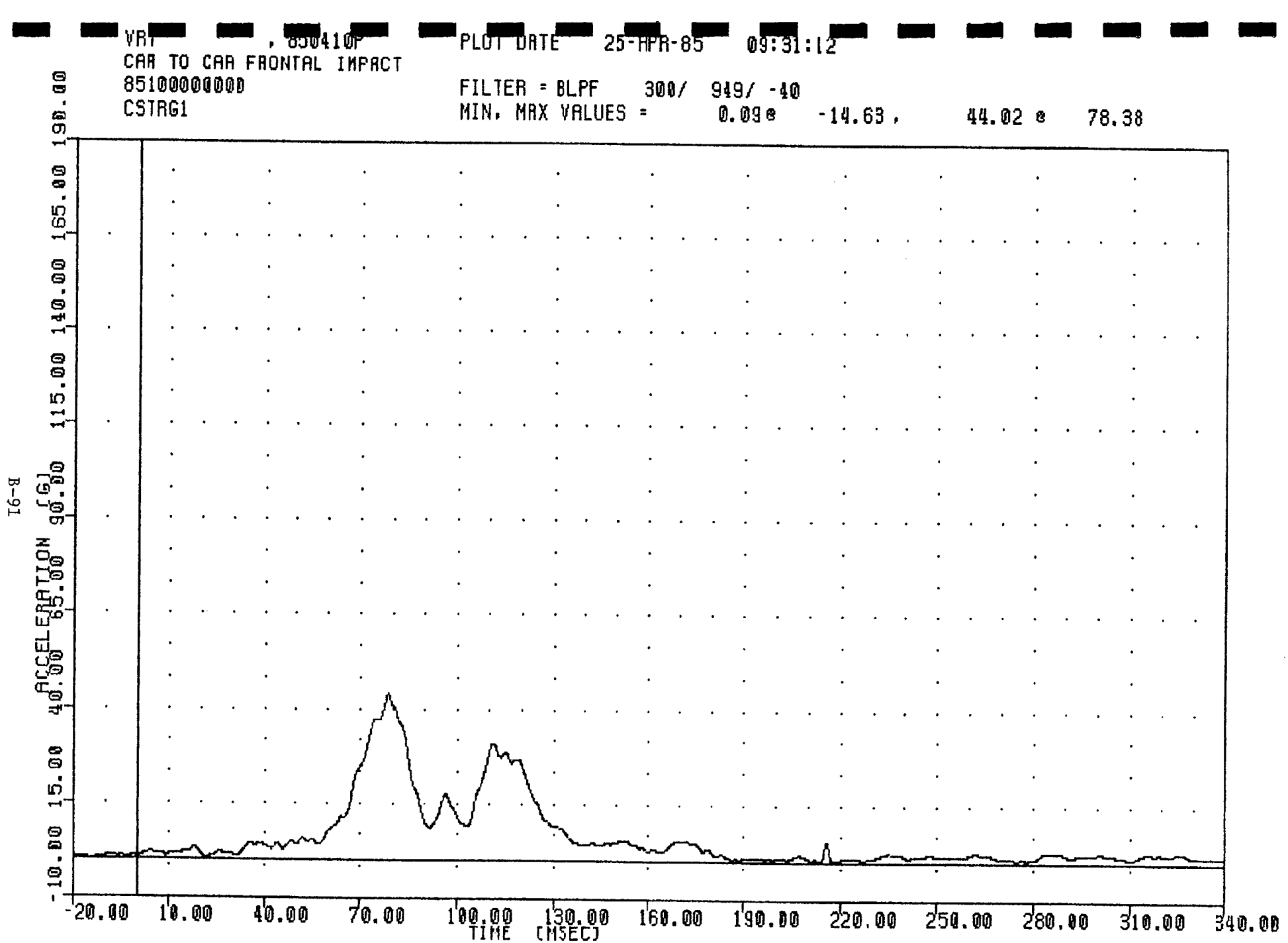
PARTNER VEHICLE - CONCORD
DRIVER CHEST ACCELERATION X AXIS



PARTNER VEHICLE - CONCORD
DRIVER CHEST ACCELERATION Y AXIS



PARTNER VEHICLE - CONCORD
DRIVER CHEST ACCELERATION Z AXIS



PARTNER VEHICLE - CONCORD
DRIVER CHEST RESULTANT

[redacted] VR[redacted] [redacted] ,C50410[redacted] [redacted] PLOT DATE [redacted] 25 APR-89 [redacted] 09:31:12 [redacted]

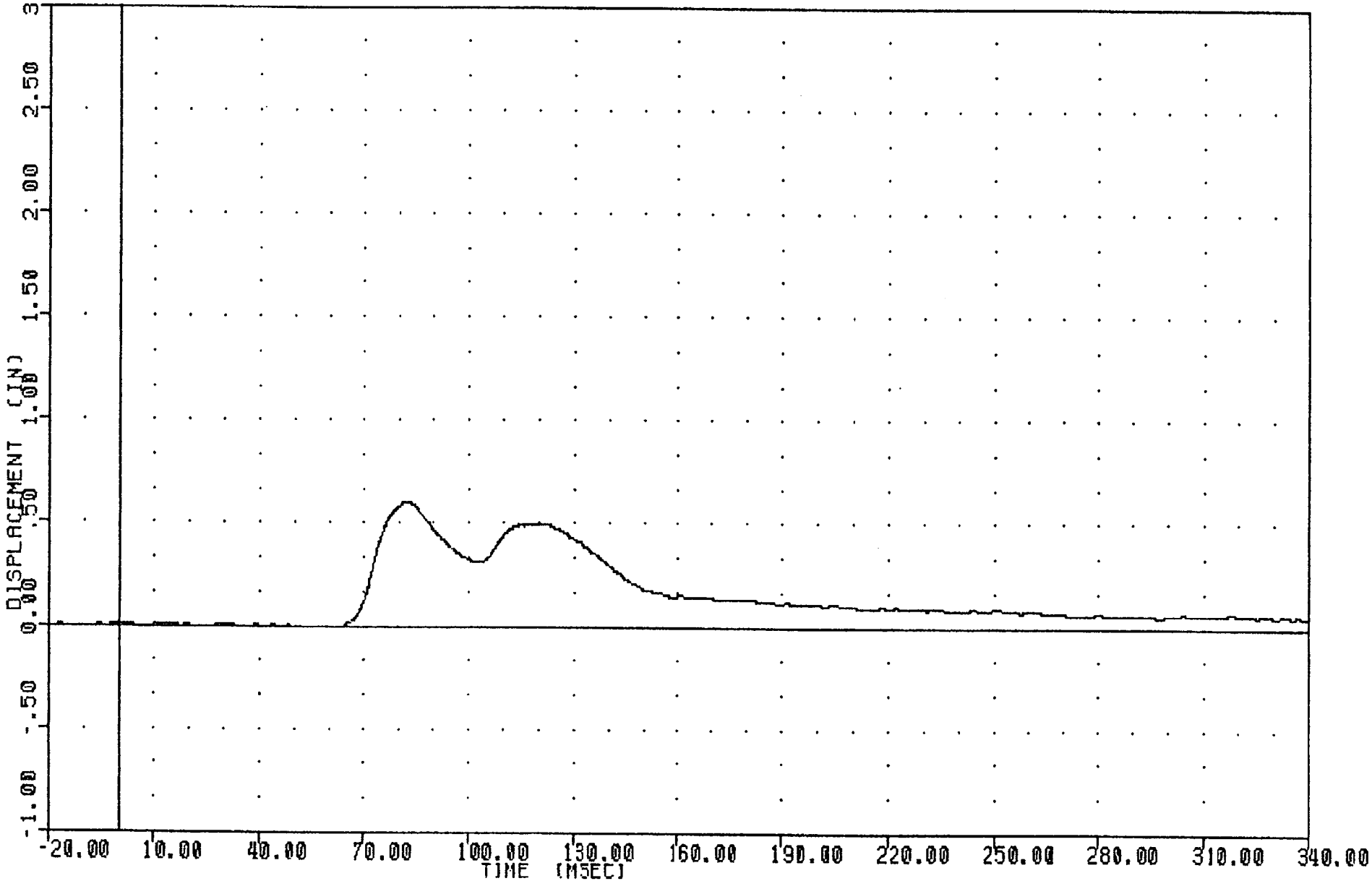
CAR TO CAR FRONTAL IMPACT

85100400000

CSTXD1

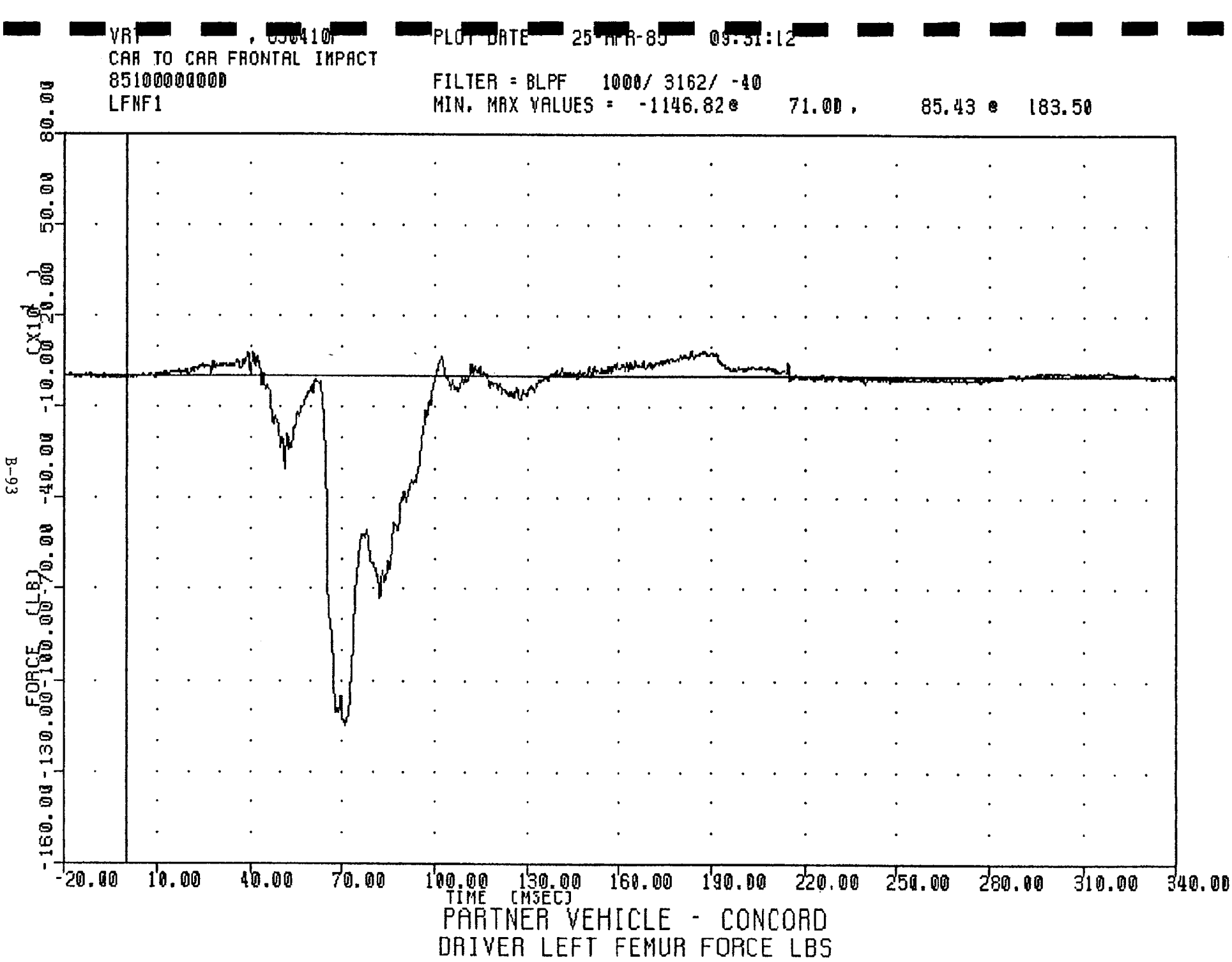
FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -0.01 @ 52.00 , 0.60 @ 82.13

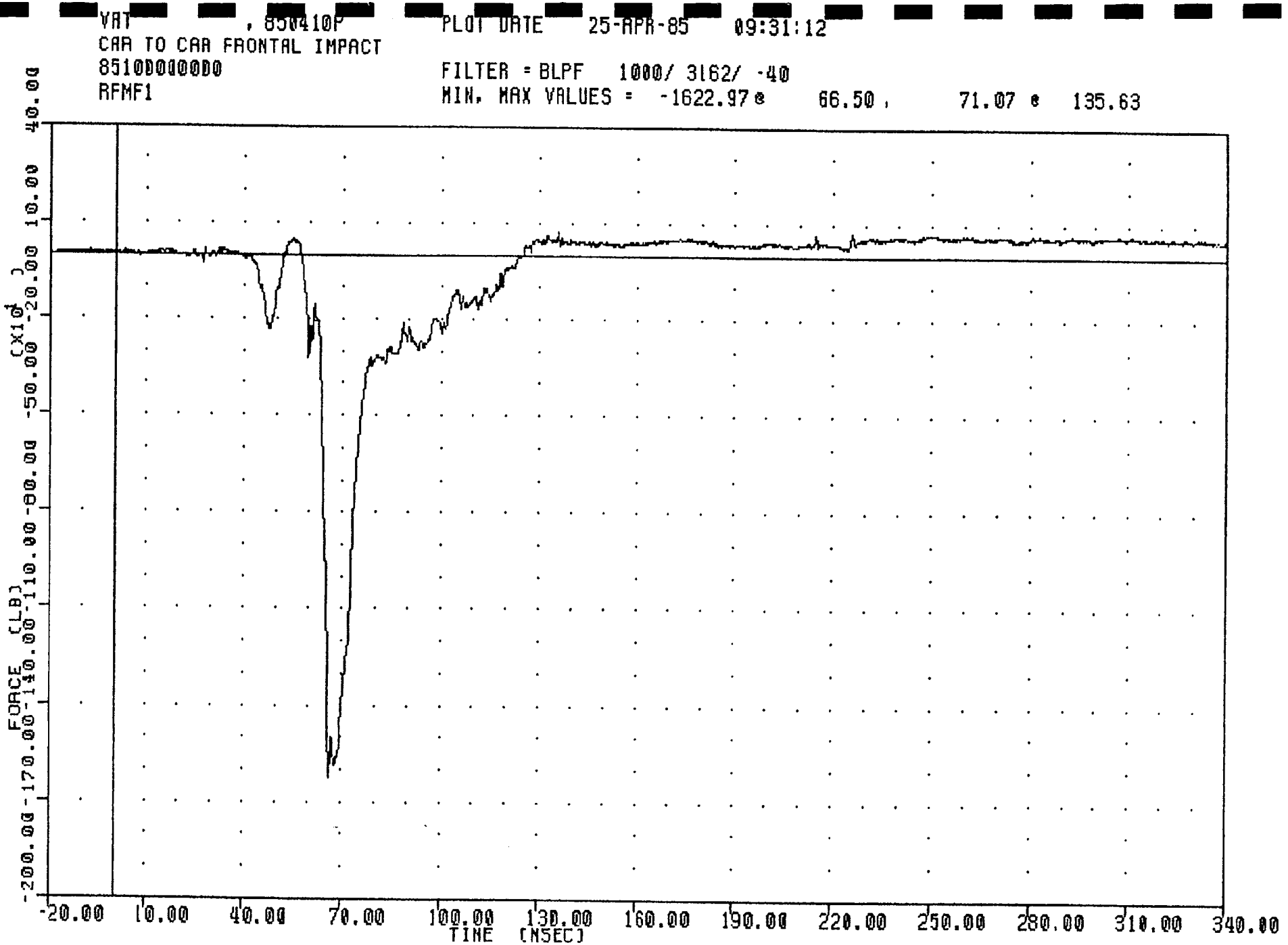


PARTNER VEHICLE - CONCORD

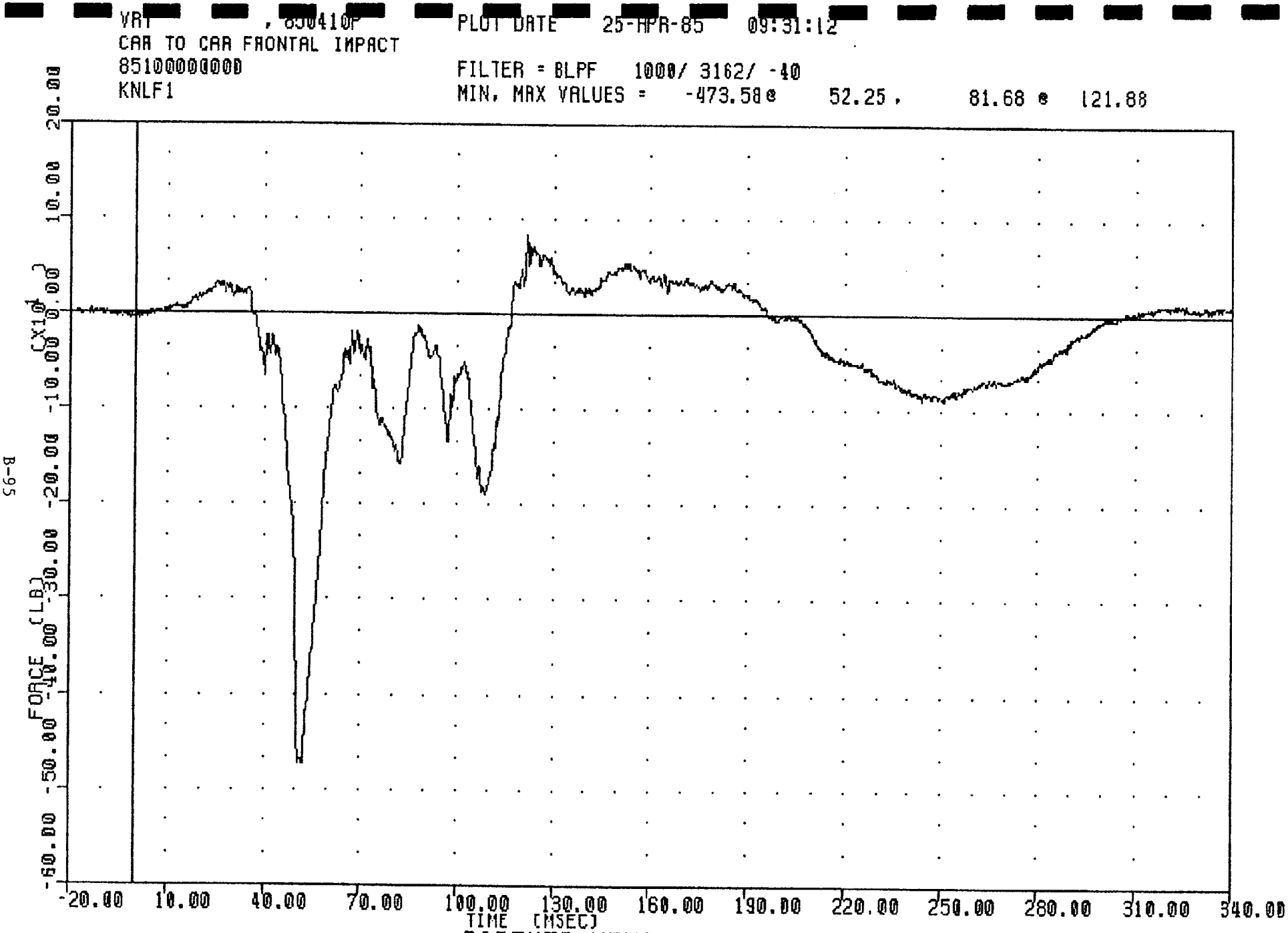
DRIVER CHEST DISPLACEMENT INCHES



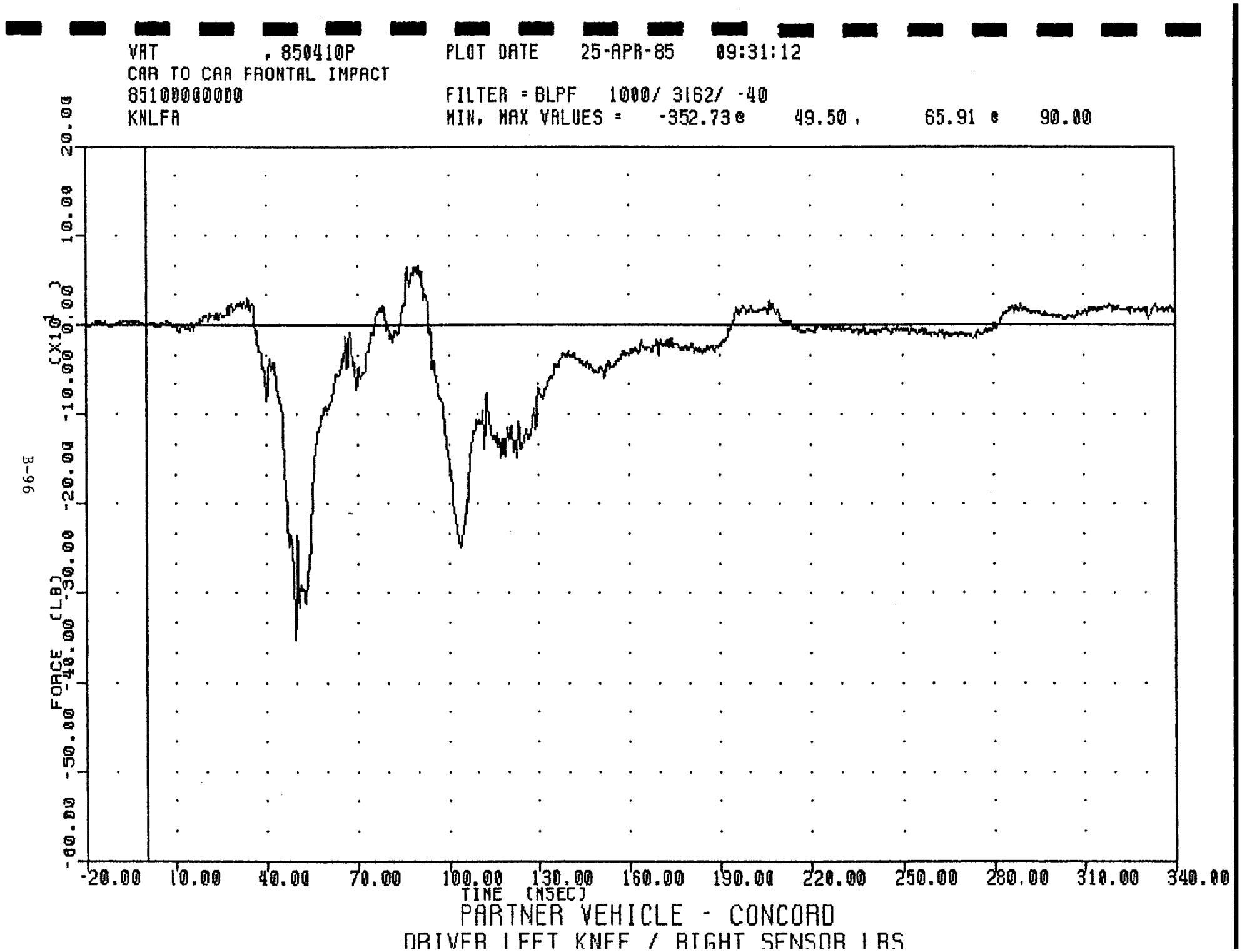
PARTNER VEHICLE - CONCORD
DRIVER LEFT FEMUR FORCE LBS

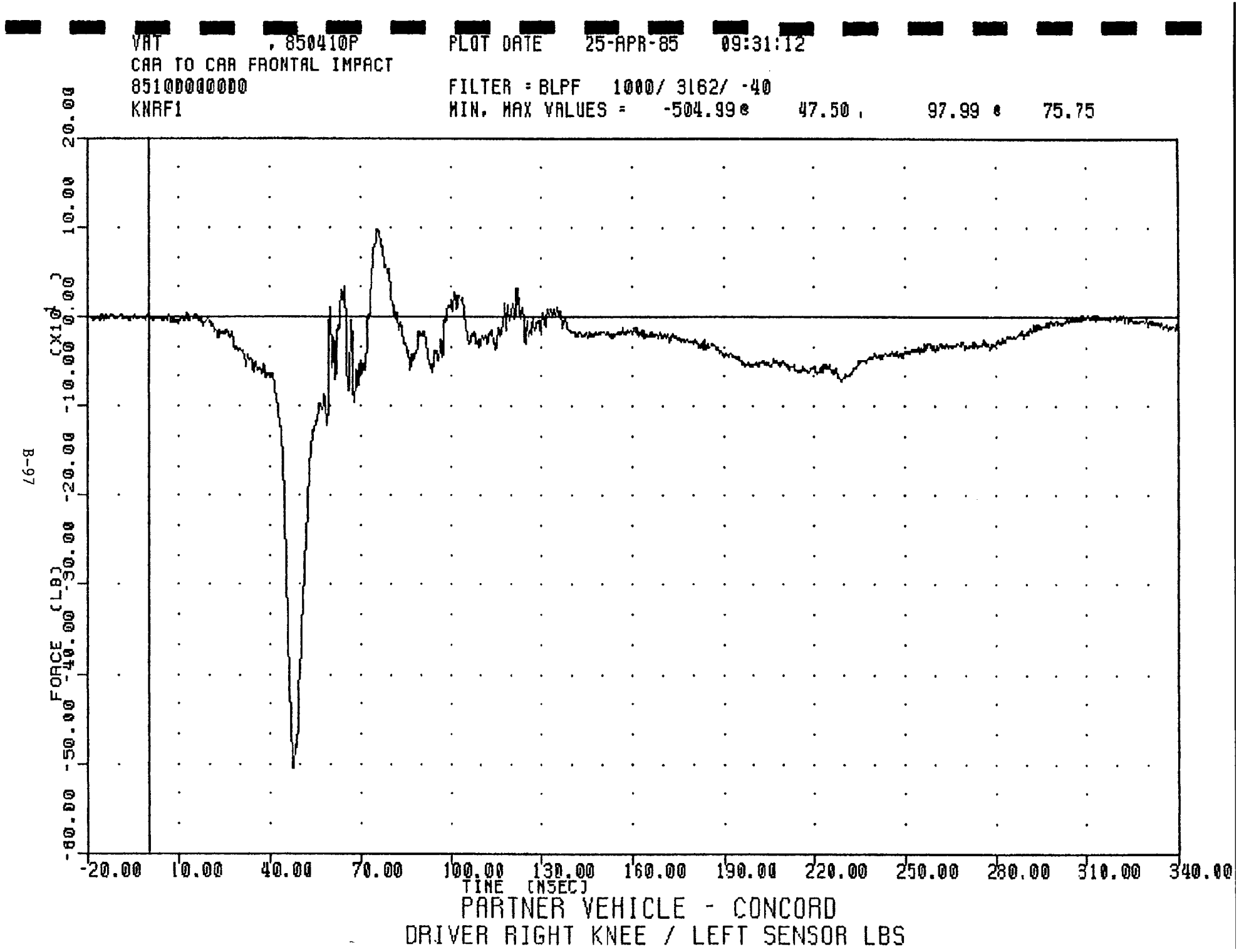


PARTNER VEHICLE - CONCORD
DRIVER RIGHT FEMUR FORCE LBS



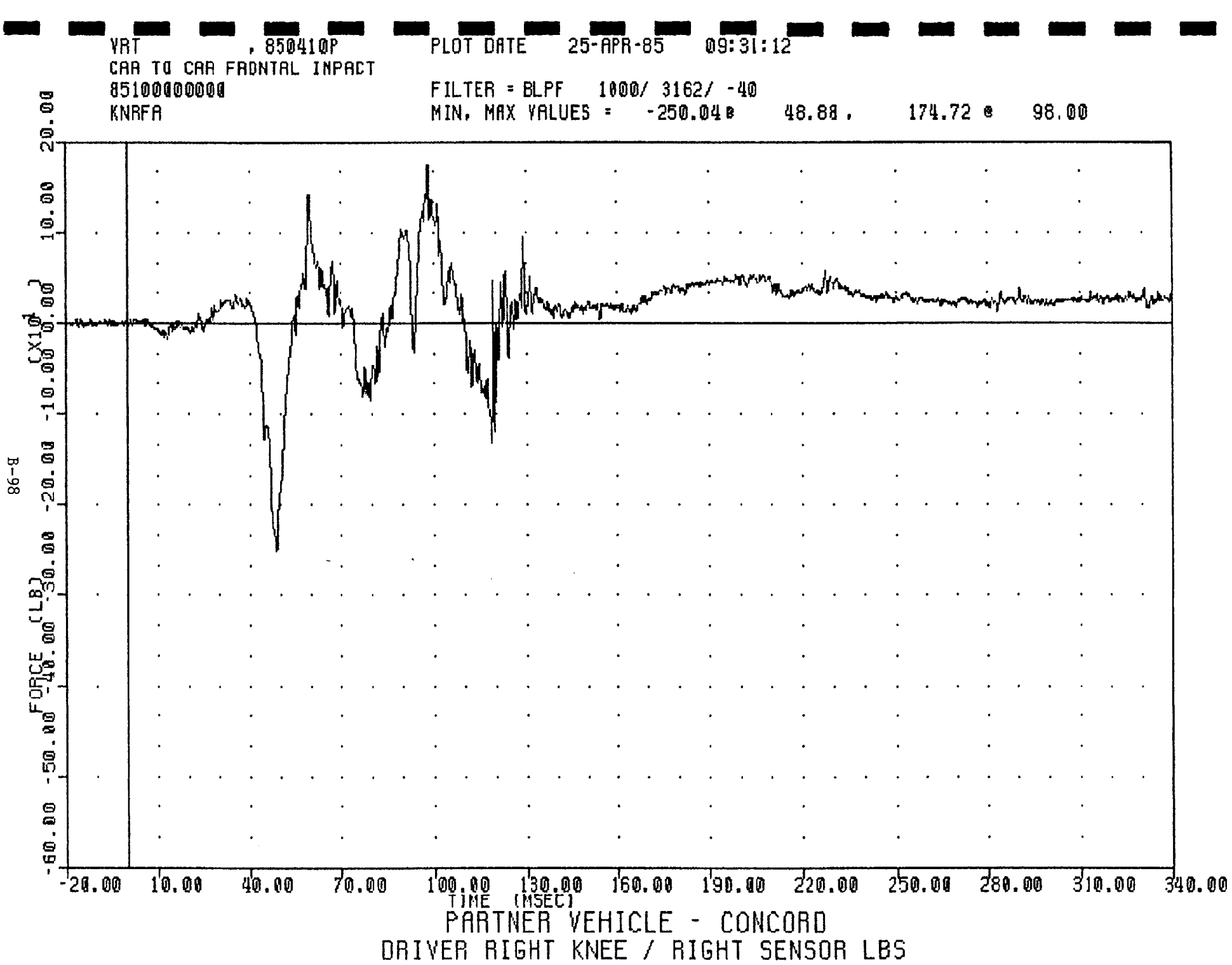
PARTNER VEHICLE - CONCORD
DRIVER LEFT KNEE / LEFT SENSOR LBS


VRT , 850410P
CAR TO CAR FRONTAL IMPACT
851000000000
KNLFR
PLOT DATE 25-APR-85 09:31:12
FILTER = BLPF 1000/ 3162/ -40
MIN, MAX VALUES = -352.73 @ 49.50 , 65.91 @ 90.00
FORCE (LB) (X10^1)
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
PARTNER VEHICLE - CONCORD
DRIVER LEFT KNEE / RIGHT SENSOR LRS



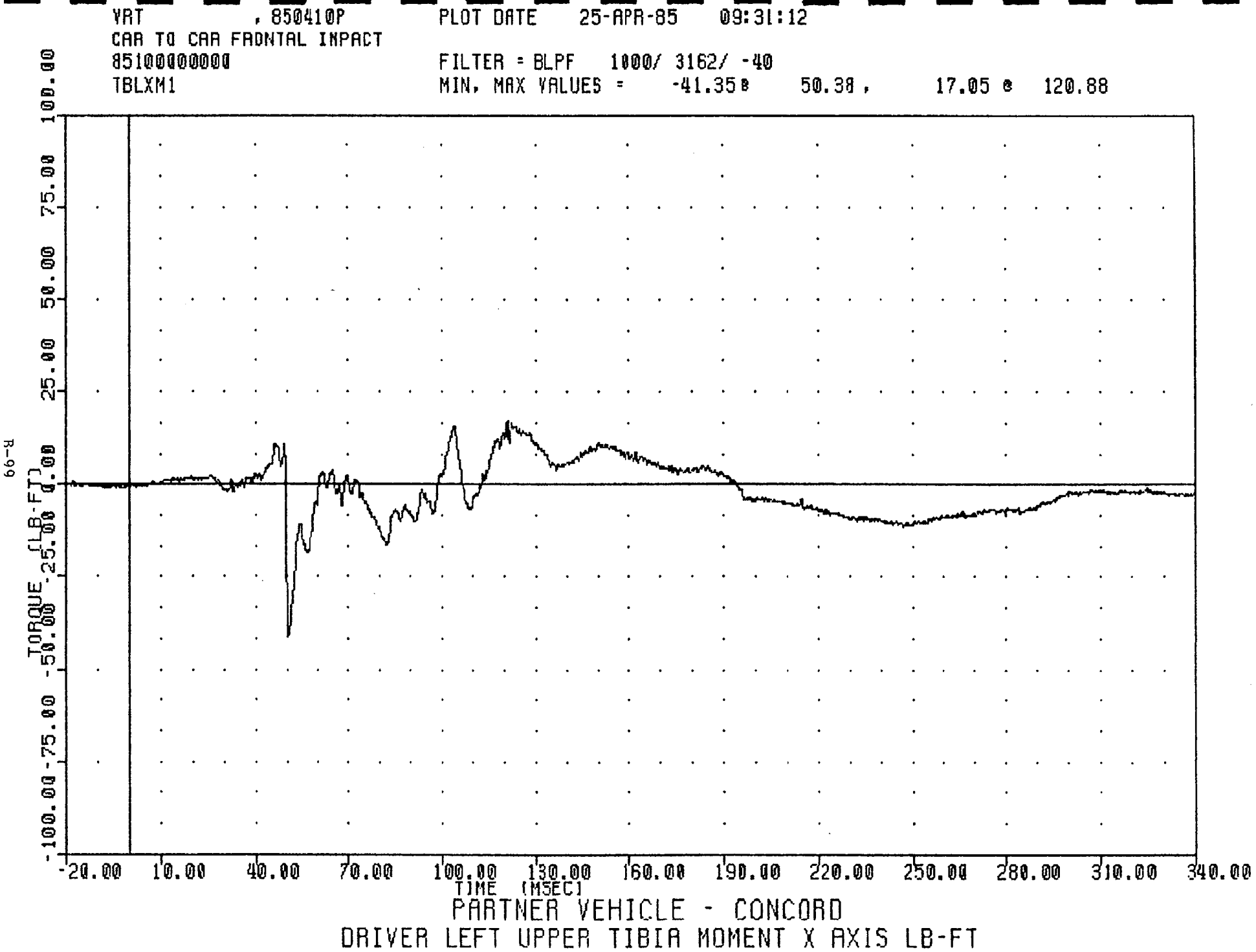
PARTNER VEHICLE - CONCORD

DRIVER RIGHT KNEE / LEFT SENSOR LBS



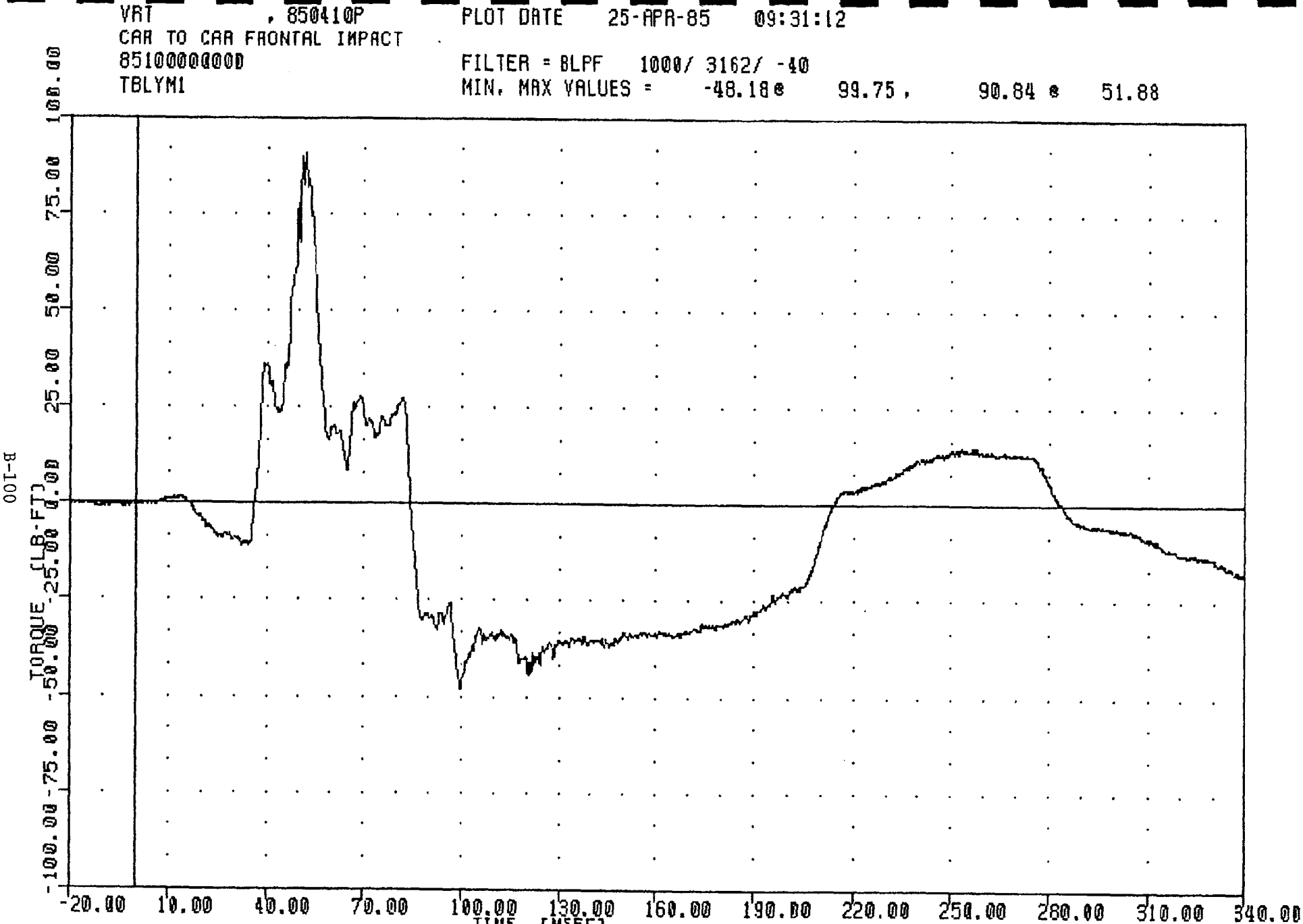
PARTNER VEHICLE - CONCORD

DRIVER RIGHT KNEE / RIGHT SENSOR LBS



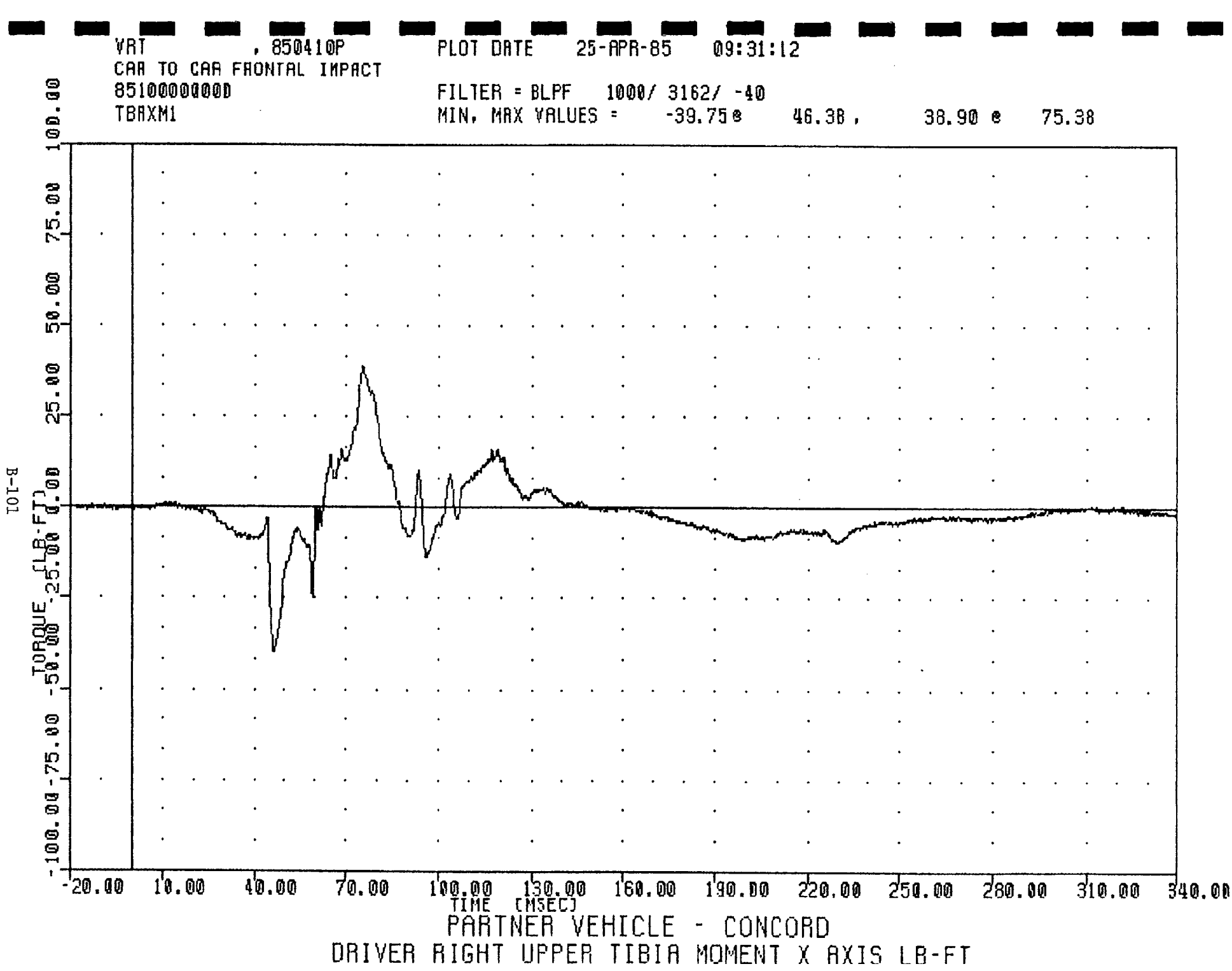
PARTNER VEHICLE - CONCORD

DRIVER LEFT UPPER TIBIA MOMENT X AXIS LB-FT



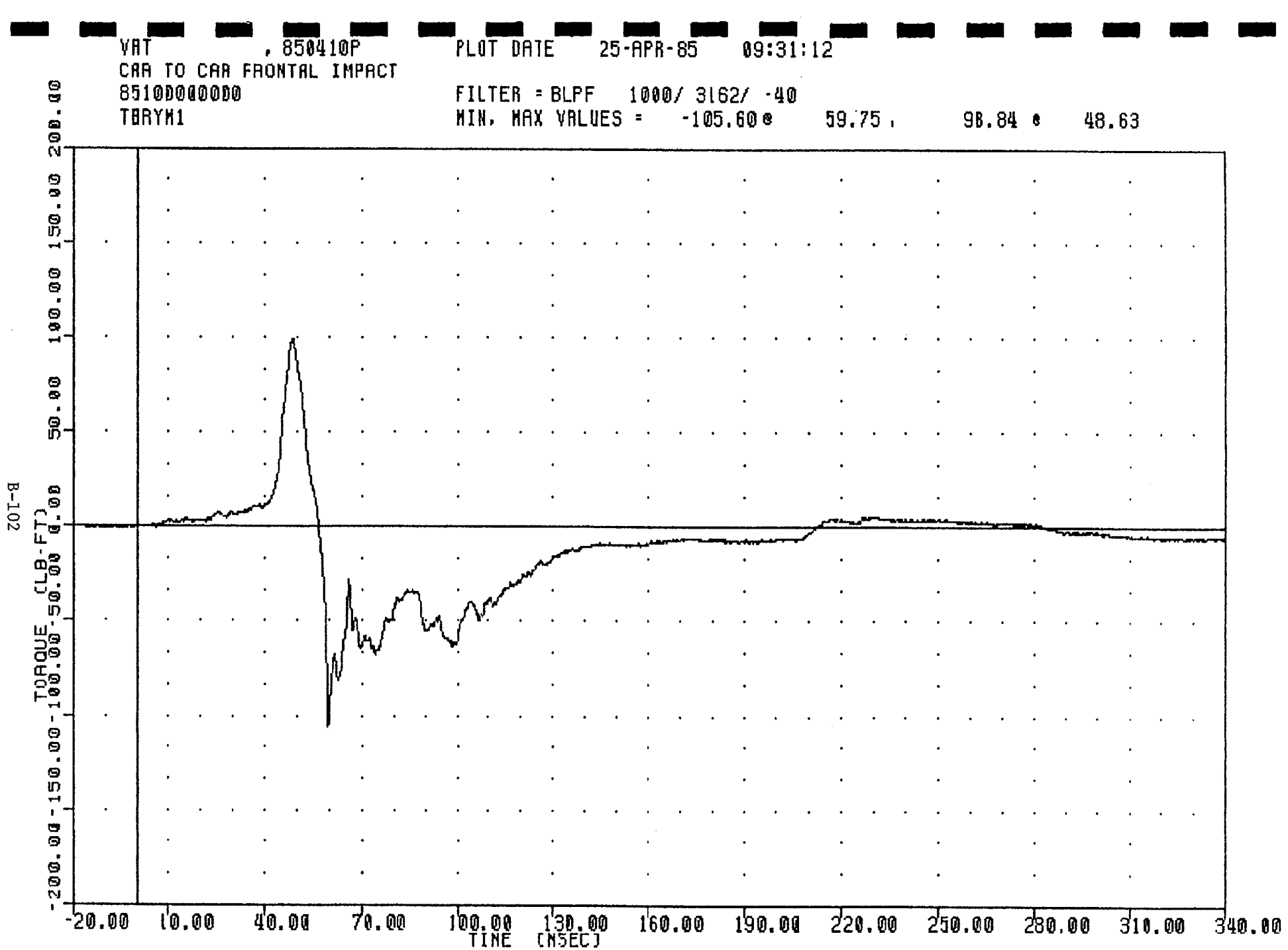
PARTNER VEHICLE - CONCORD

DRIVER LEFT UPPER TIBIA MOMENT Y AXIS LB-FT



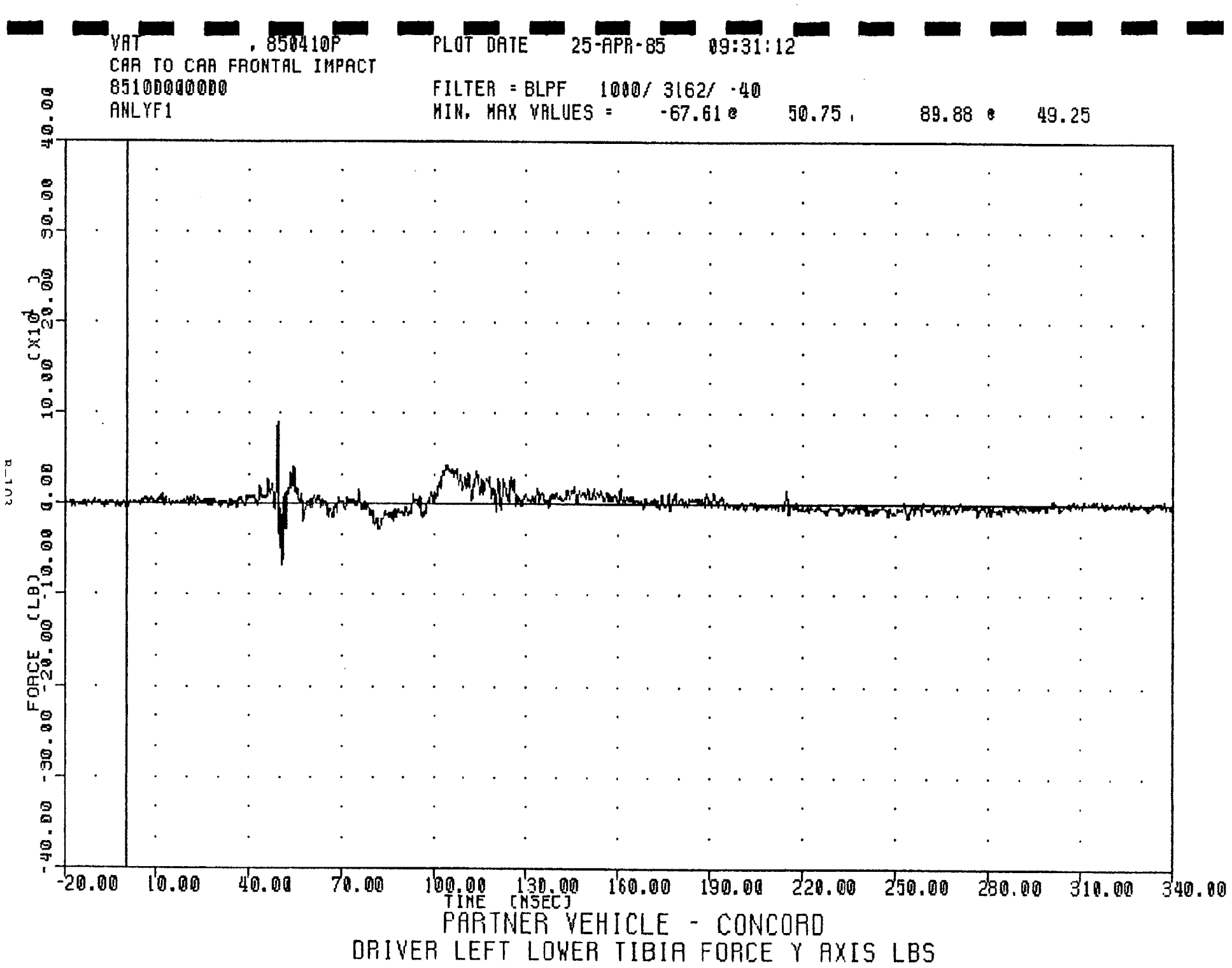
PARTNER VEHICLE - CONCORD

DRIVER RIGHT UPPER TIBIA MOMENT X AXIS LB-FT



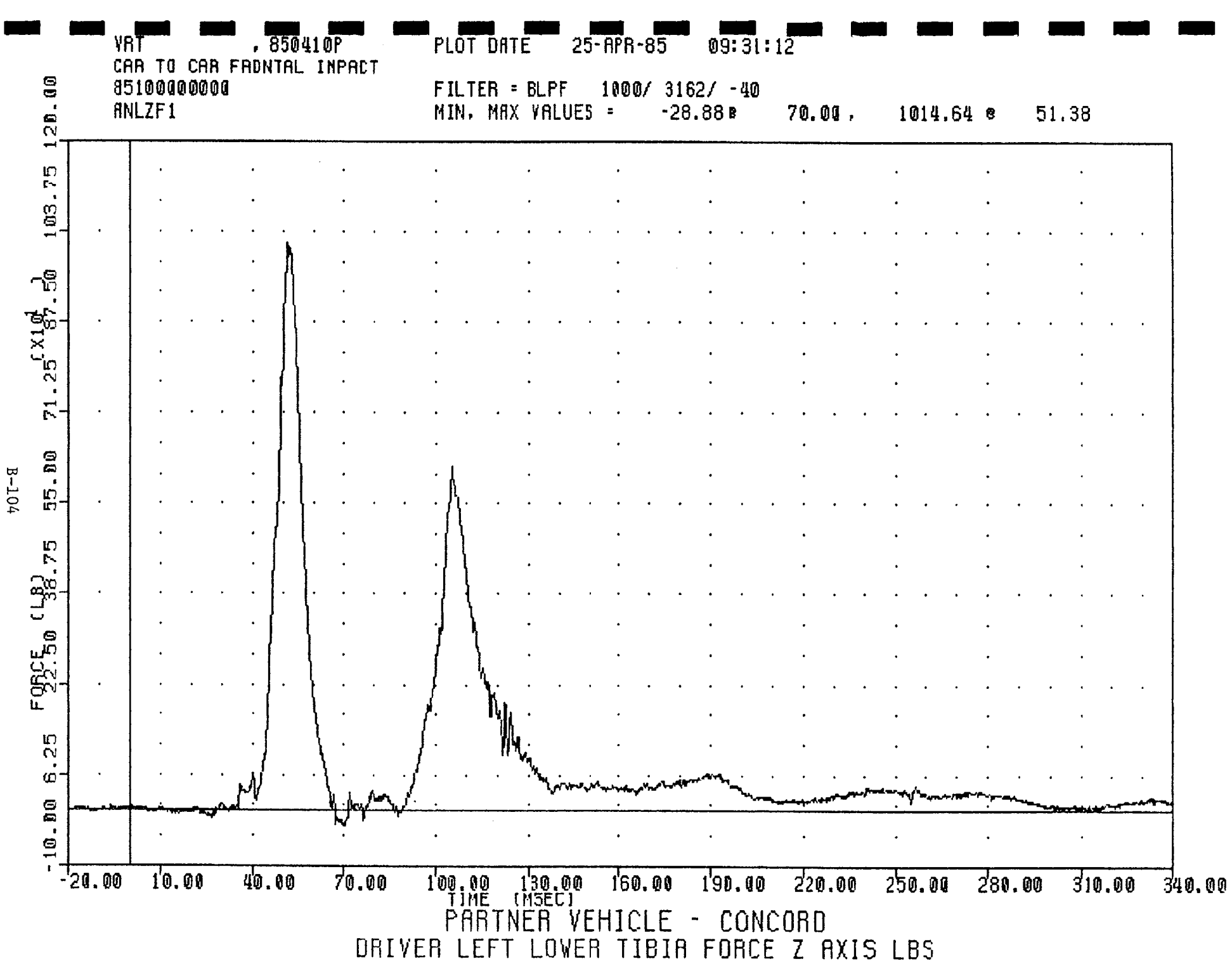
PARTNER VEHICLE - CONCORD

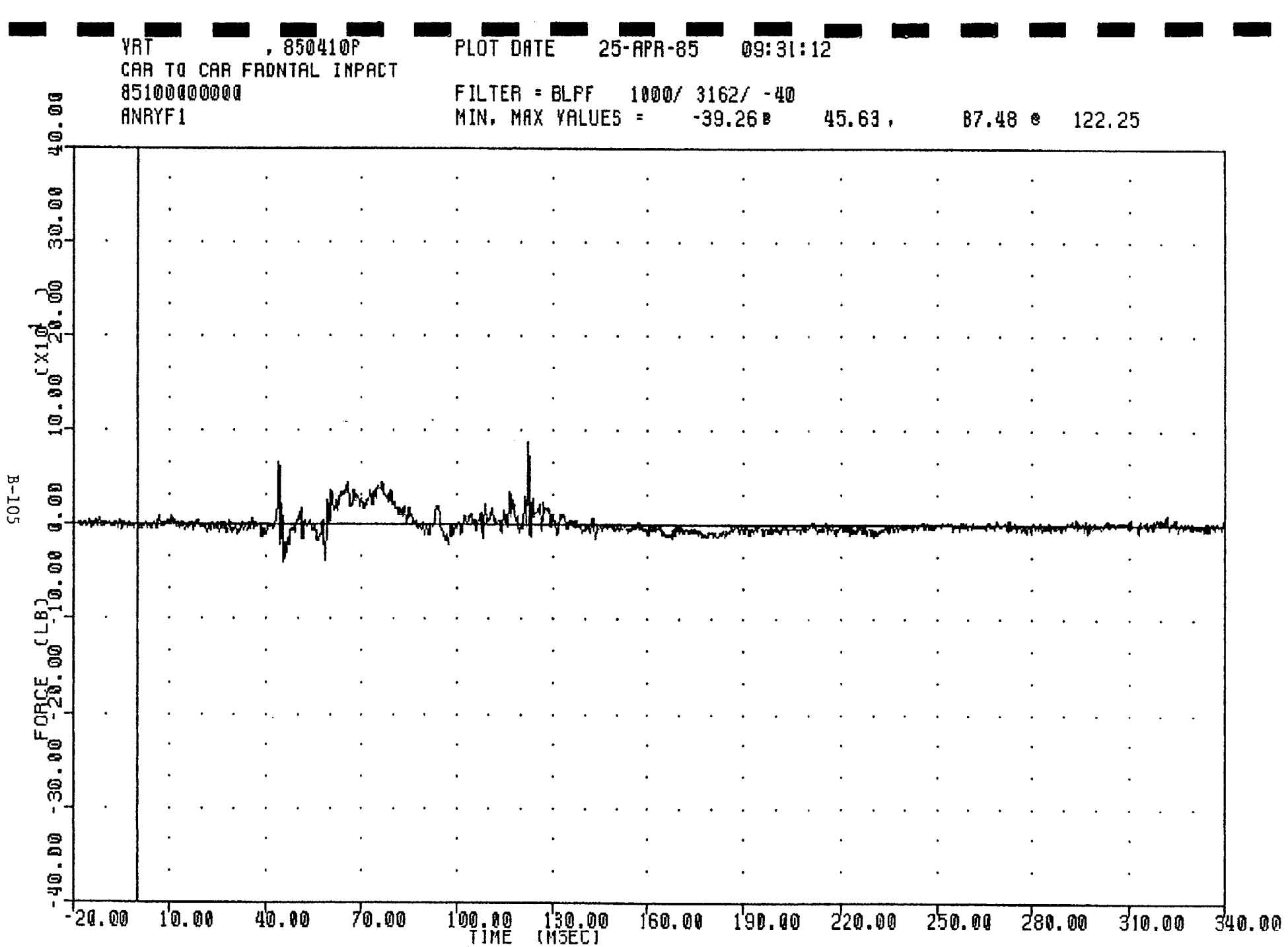
DRIVER RIGHT UPPER TIBIA MOMENT Y AXIS LB-FT



PARTNER VEHICLE - CONCORD

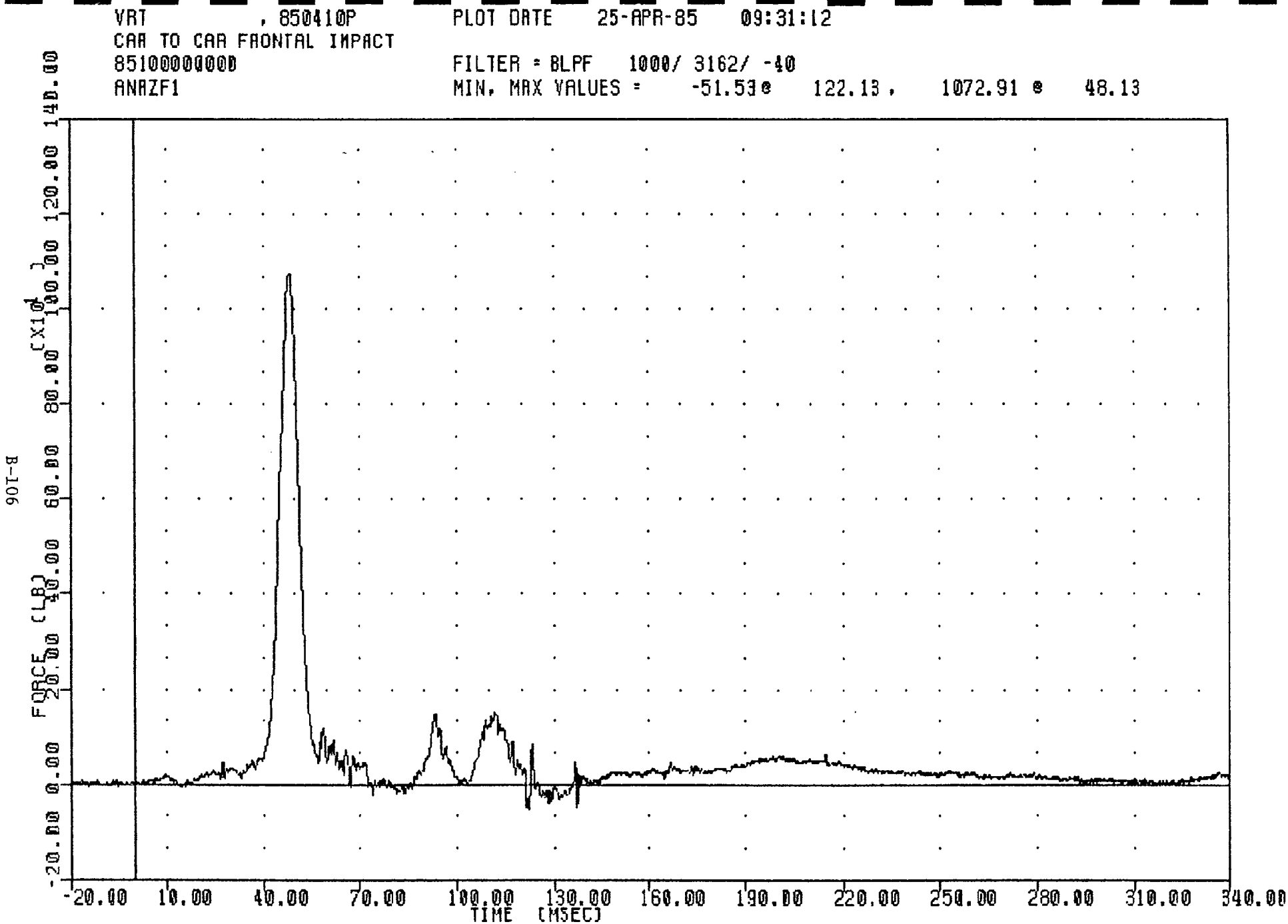
DRIVER LEFT LOWER TIBIA FORCE Y AXIS LBS


VRT , 850410P
CAR TO CAR FRONTAL IMPACT
851000000000
ANLZF1
PLOT DATE 25-APR-85 09:31:12
FILTER = BLPF 1000/ 3162/ -40
MIN, MAX VALUES = -28.88 @ 70.00 , 1014.64 @ 51.38
FORCE (LB) (X10^1)
120.00
103.75
87.50
71.25
55.00
38.75
22.50
6.25
-10.00
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
B-104
PARTNER VEHICLE - CONCORD
DRIVER LEFT LOWER TIBIA FORCE Z AXIS LBS



PARTNER VEHICLE - CONCORD

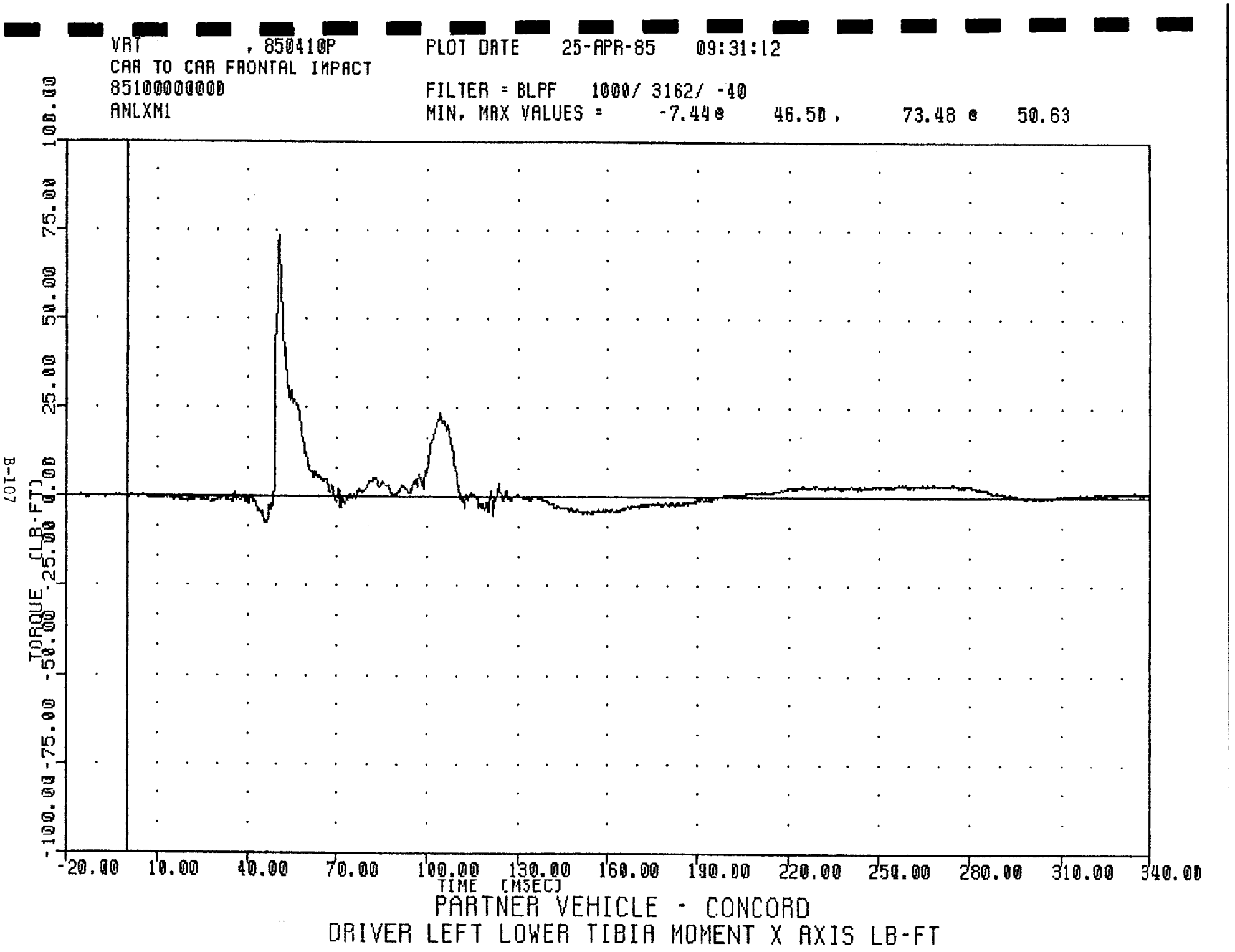
DRIVER RIGHT LOWER TIBIA FORCE Y AXIS LBS

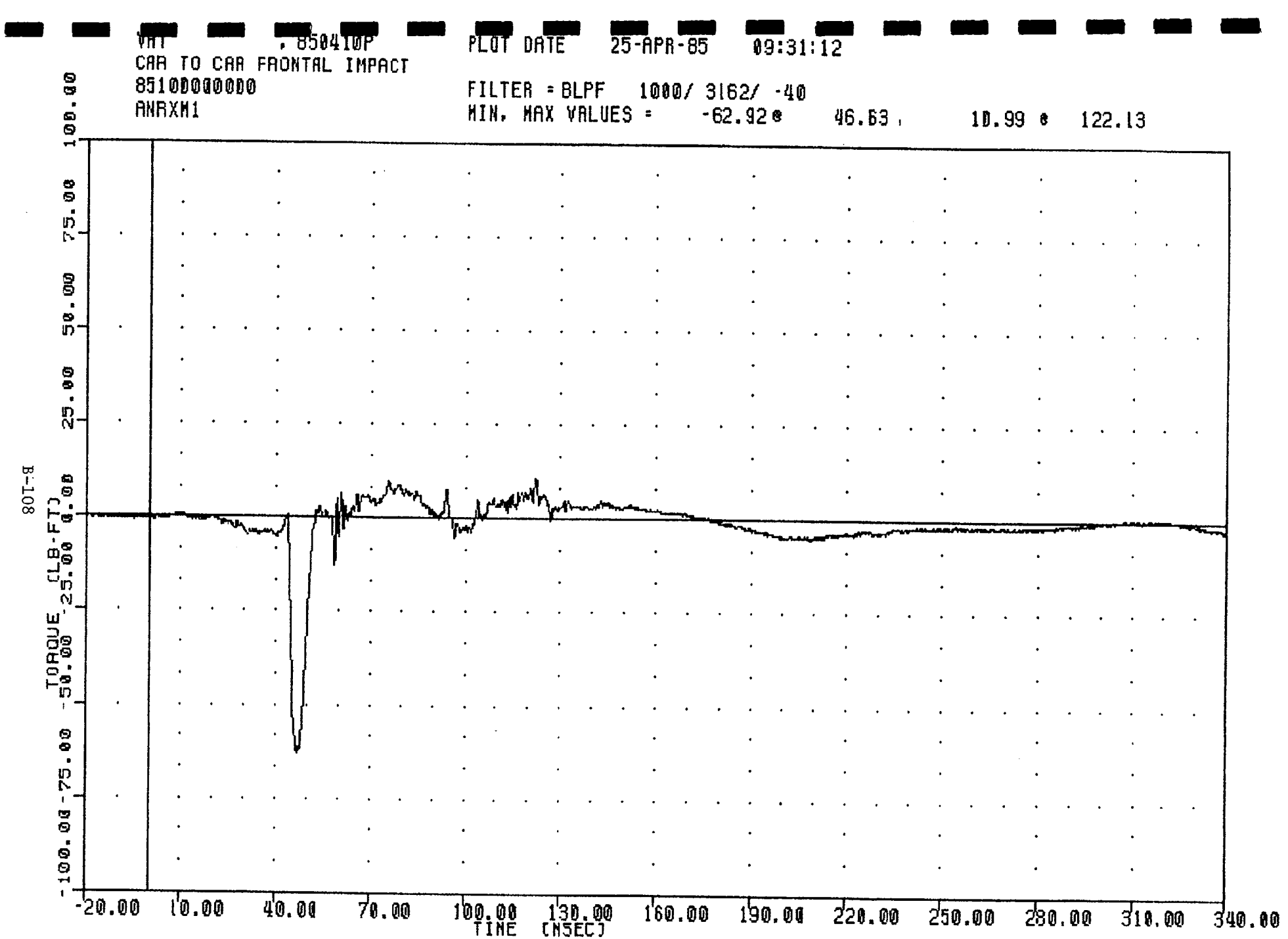


B-106

PARTNER VEHICLE - CONCORD

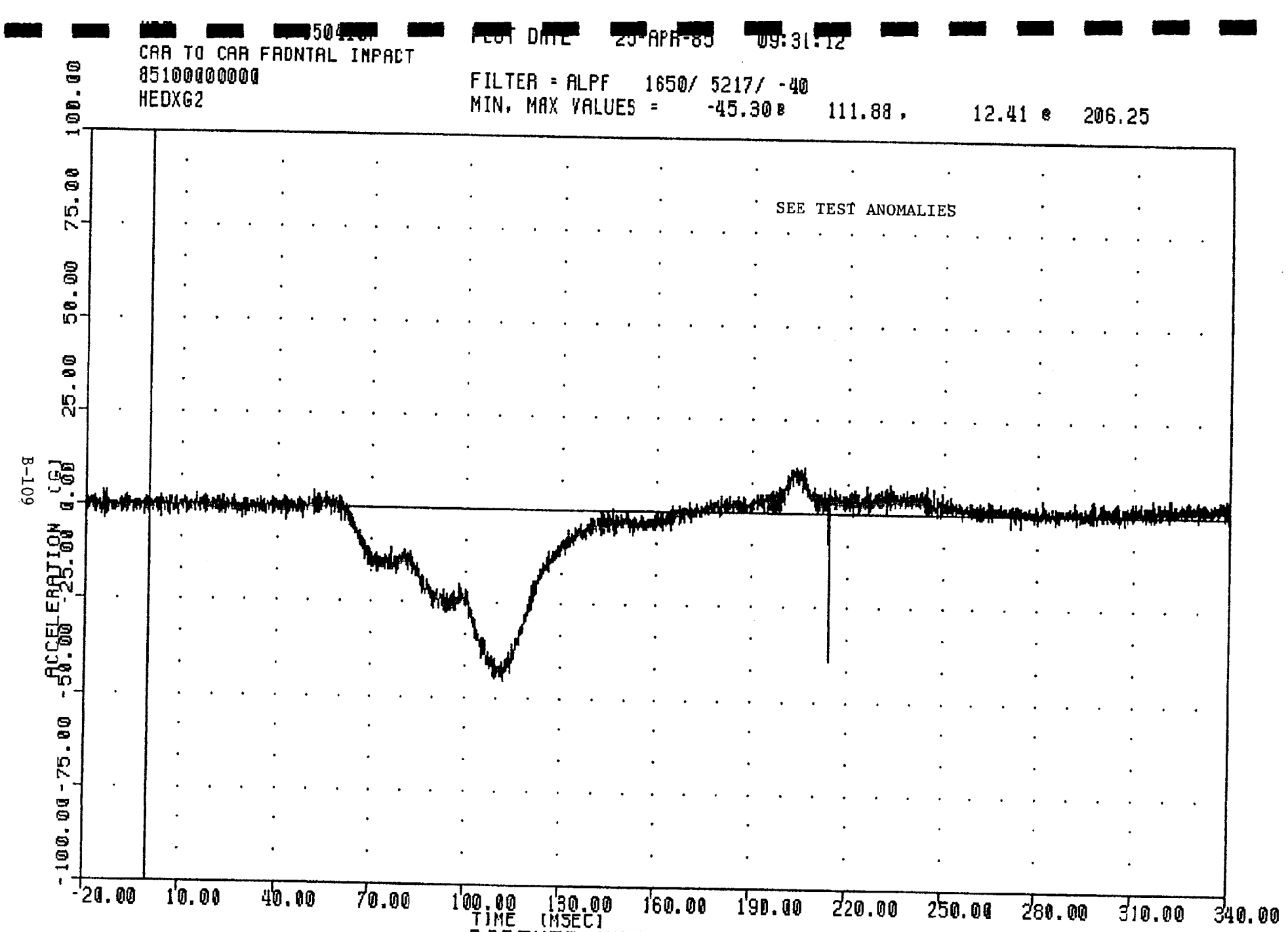
DRIVER RIGHT LOWER TIBIA FORCE Z AXIS LBS


VRT , 850410P
CAR TO CAR FRONTAL IMPACT
85100000000
ANLXM1
PLOT DATE 25-APR-85 09:31:12
FILTER = BLPF 1000/ 3162/ -40
MIN, MAX VALUES = -7.44 @ 46.50 , 73.48 @ 50.63
100.00
75.00
50.00
25.00
0.00
-25.00
-50.00
-75.00
-100.00
TORQUE [LB-FT]
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME [MSEC]
PARTNER VEHICLE - CONCORD
DRIVER LEFT LOWER TIBIA MOMENT X AXIS LB-FT

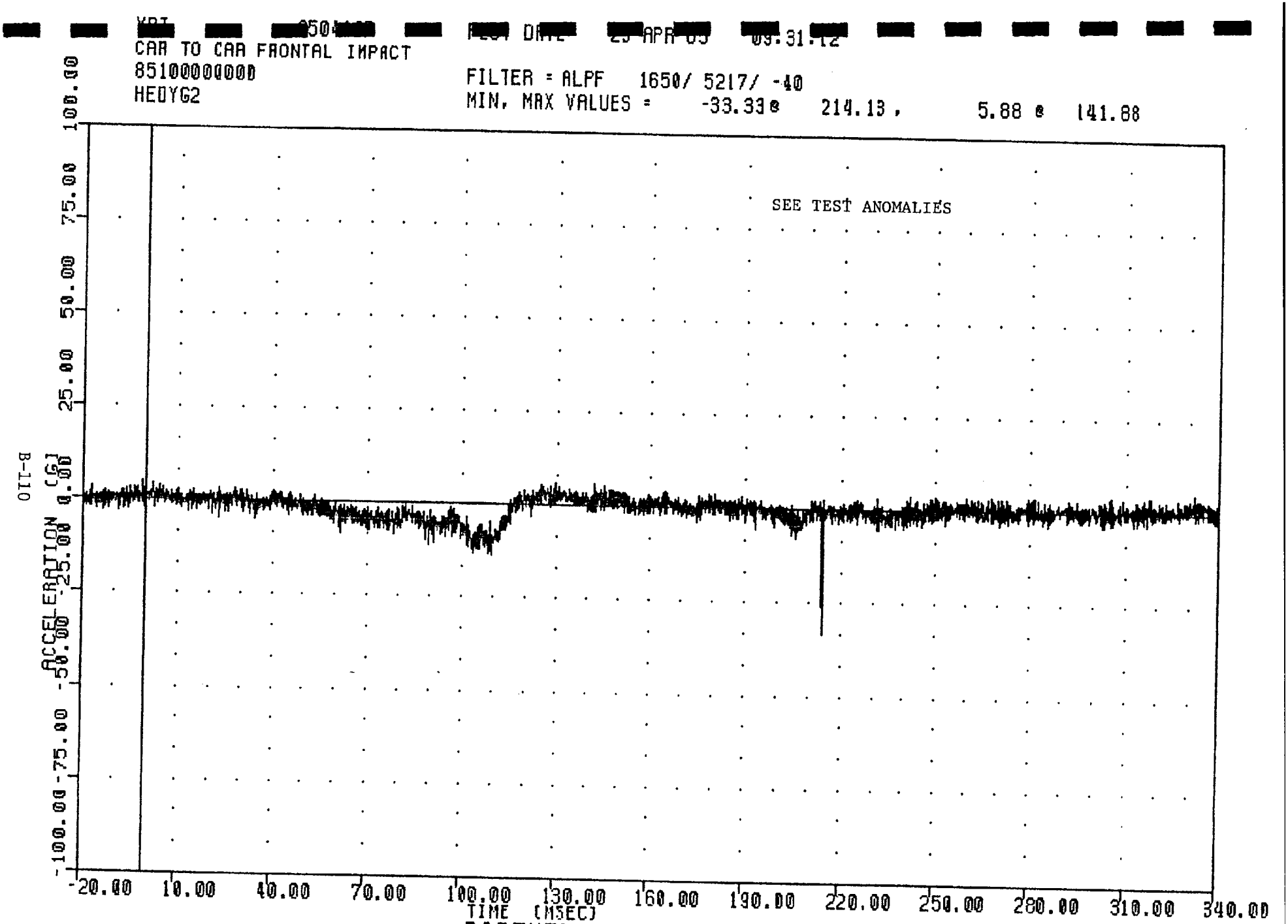


PARTNER VEHICLE - CONCORD

DRIVER RIGHT LOWER TIBIA MOMENT X AXIS LB-FT



PARTNER VEHICLE - CONCORD
PASSENGER HEAD ACCELERATION X AXIS

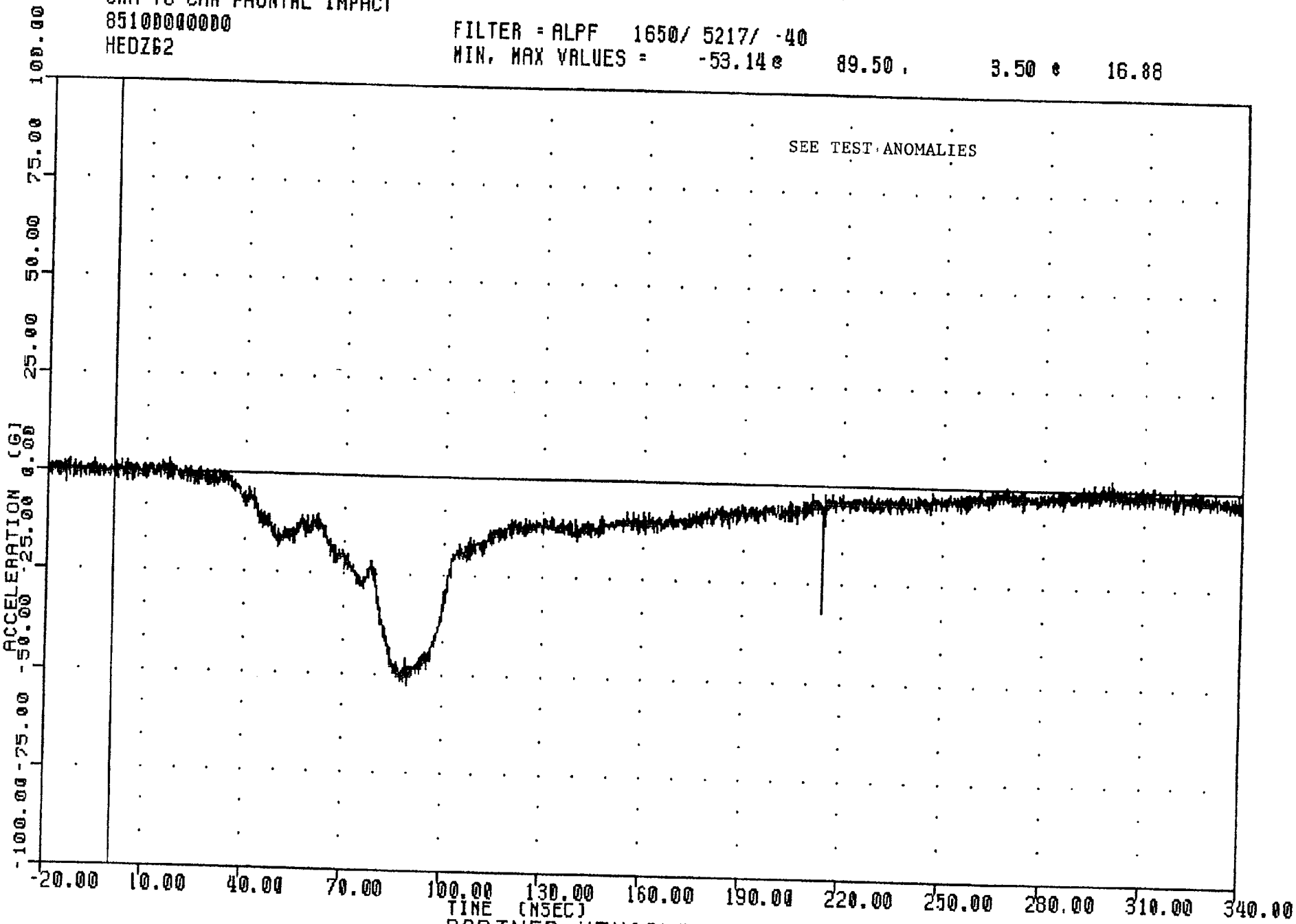


PARTNER VEHICLE - CONCORD
PASSENGER HEAD ACCELERATION Y AXIS

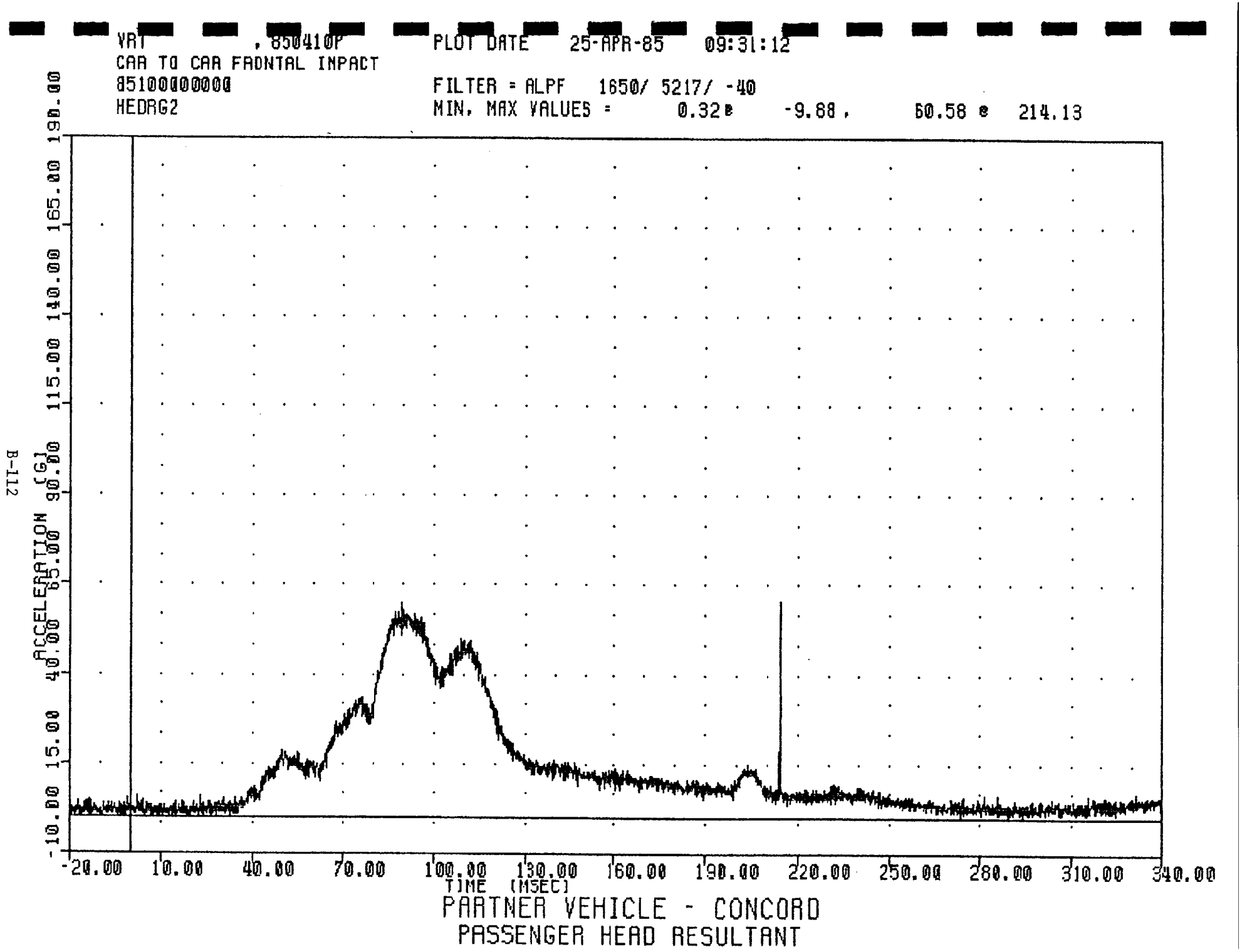
[redacted] VAT [redacted] 850410D [redacted] DA[redacted] [redacted] APR [redacted] 05:31:12

CAR TO CAR FRONTAL IMPACT
85100000000
HEDZ62

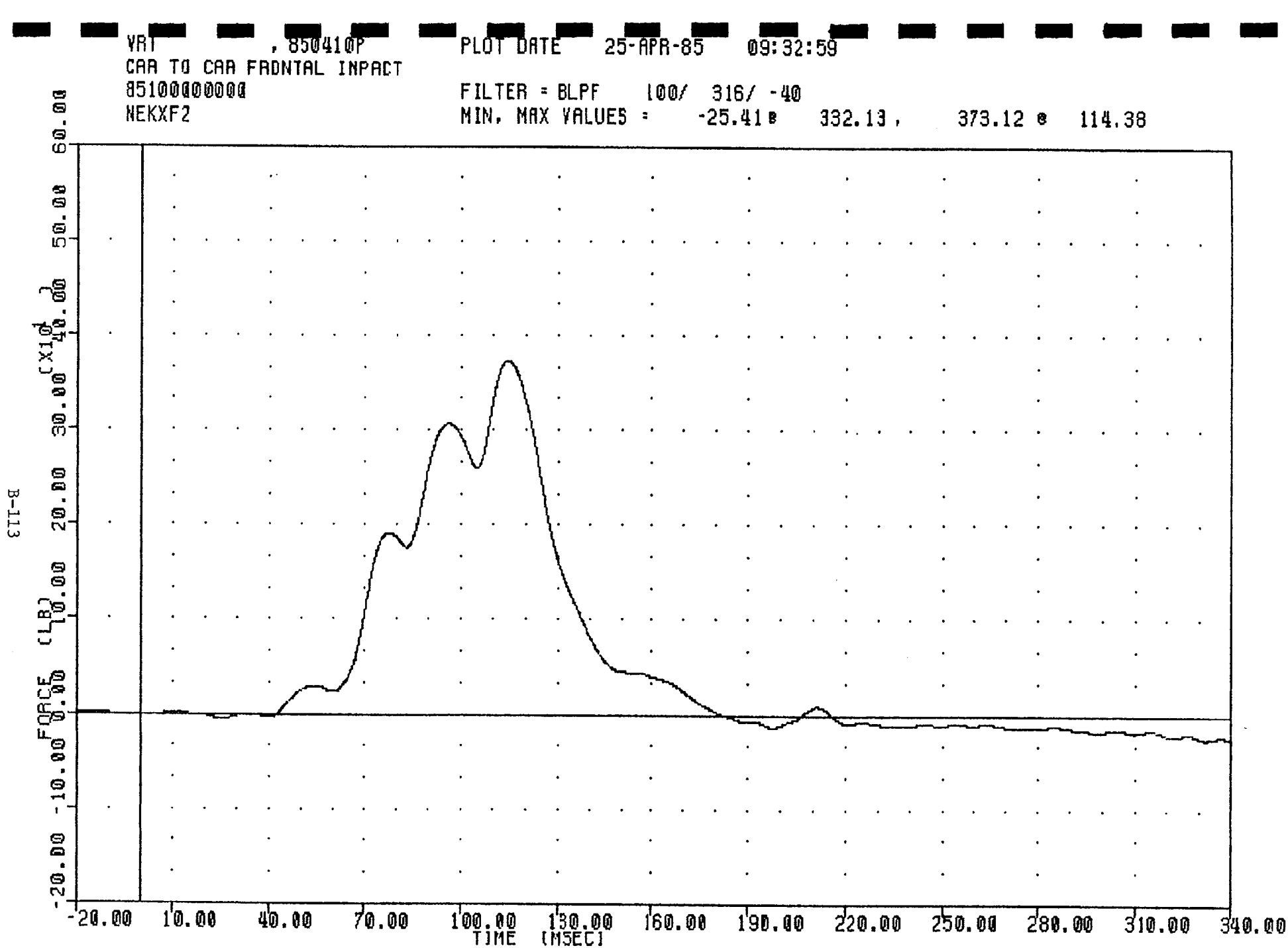
FILTER = ALPF 1650/ 5217/ -40
MIN, MAX VALUES = -53.14 @ 89.50 , 3.50 @ 16.88



PARTNER VEHICLE - CONCORD
PASSENGER HEAD ACCELERATION Z AXIS

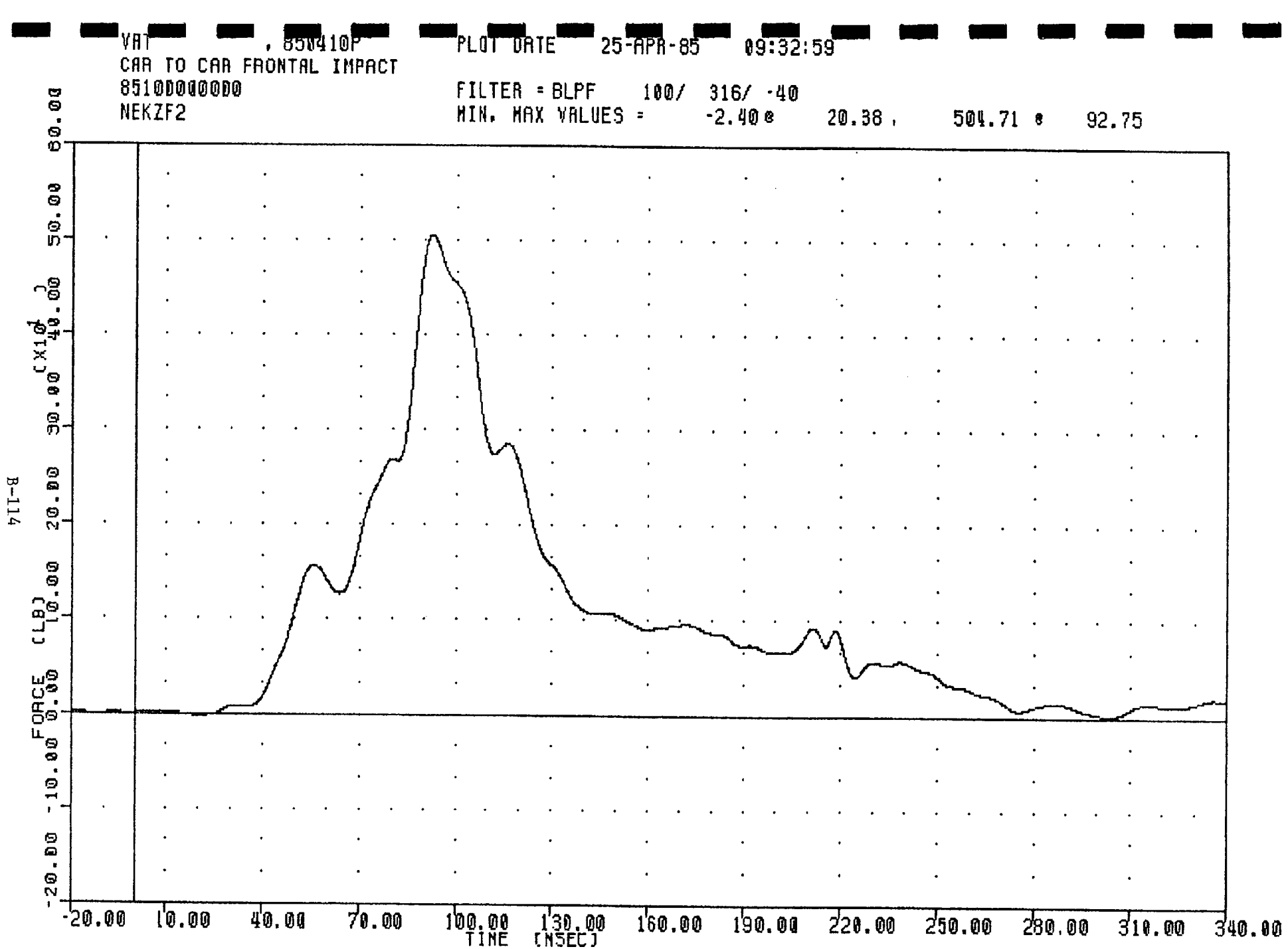


PARTNER VEHICLE - CONCORD
PASSENGER HEAD RESULTANT



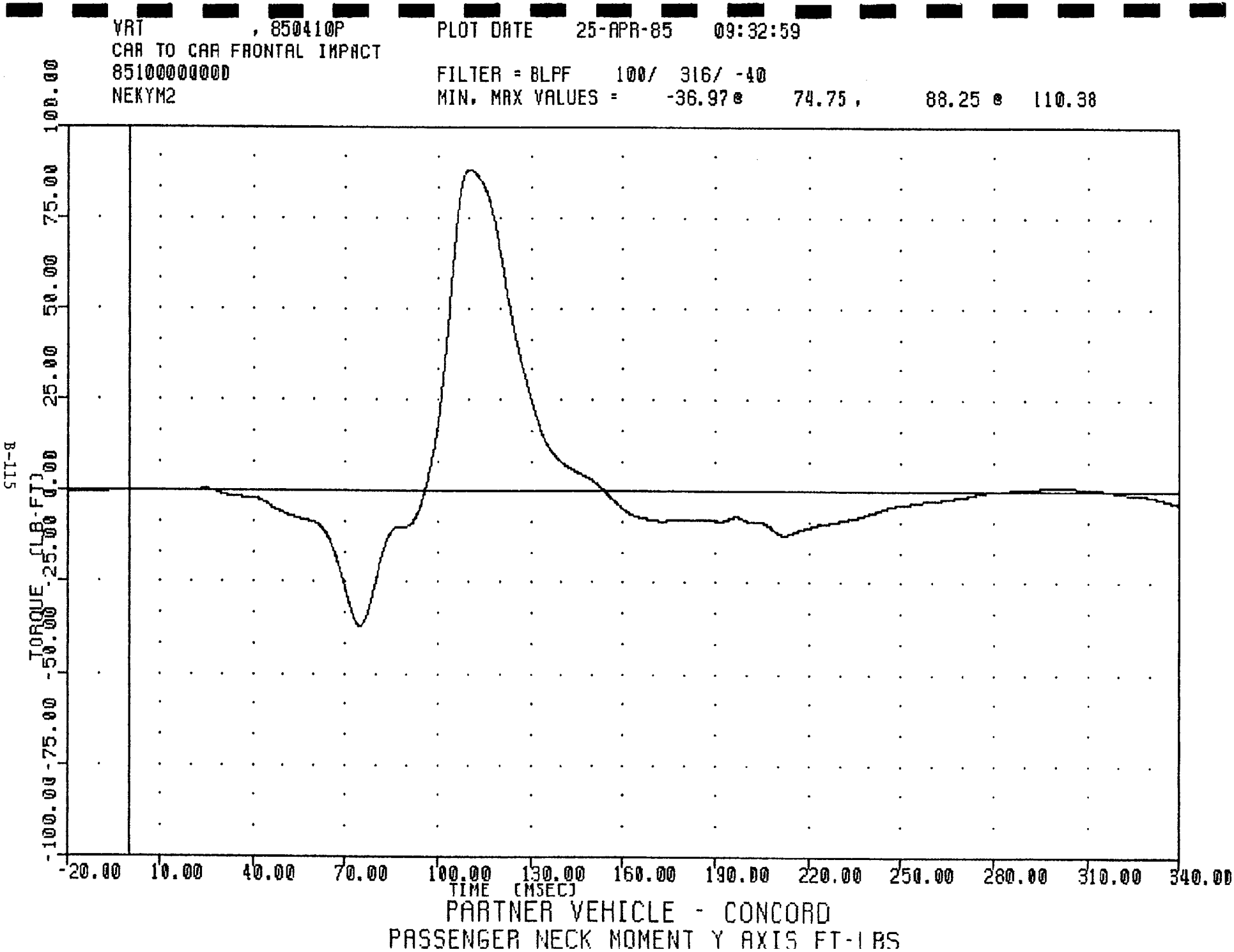
PARTNER VEHICLE - CONCORD

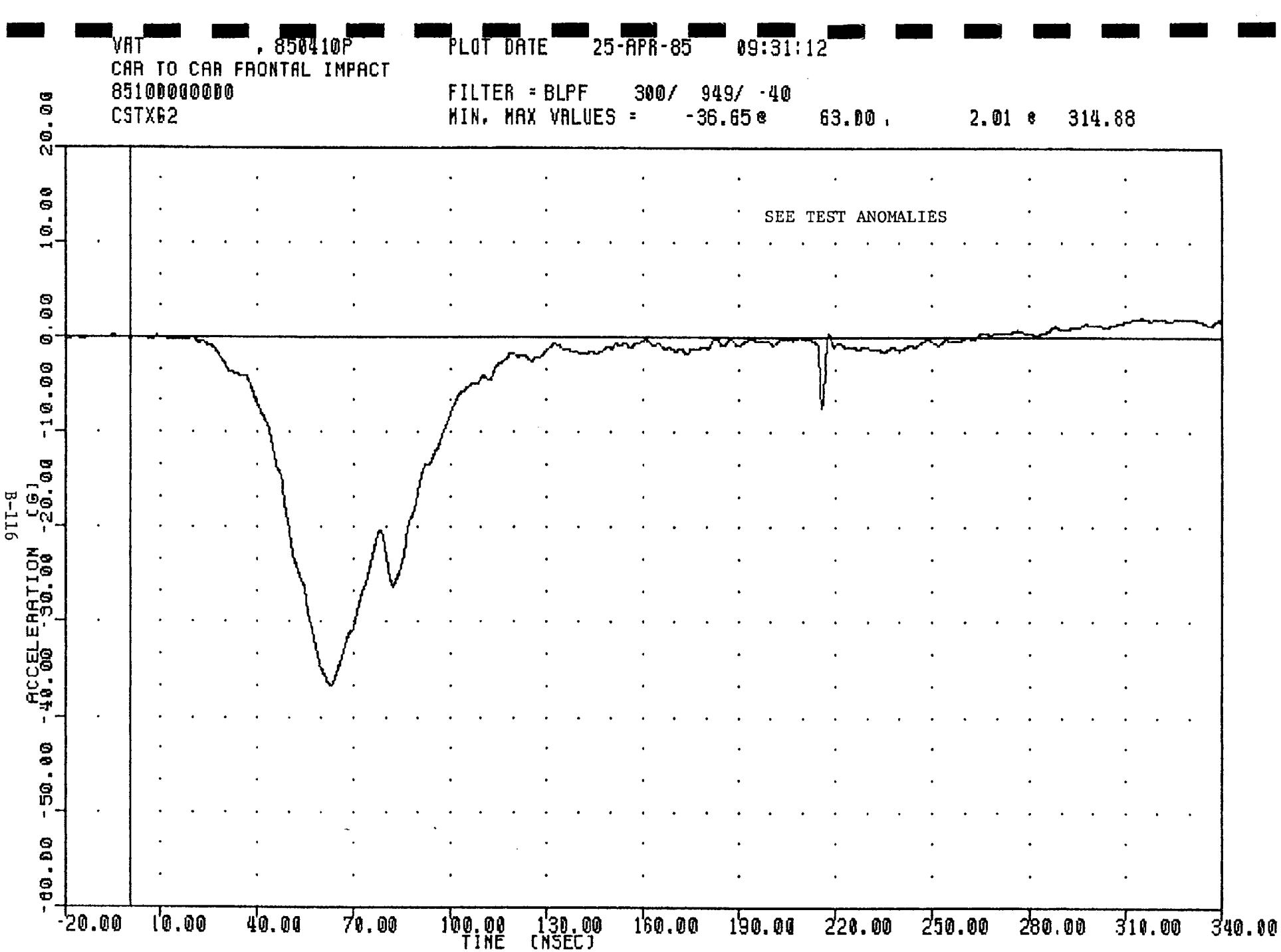
PASSENGER NECK FORCE X AXIS LBS (SHEAR)



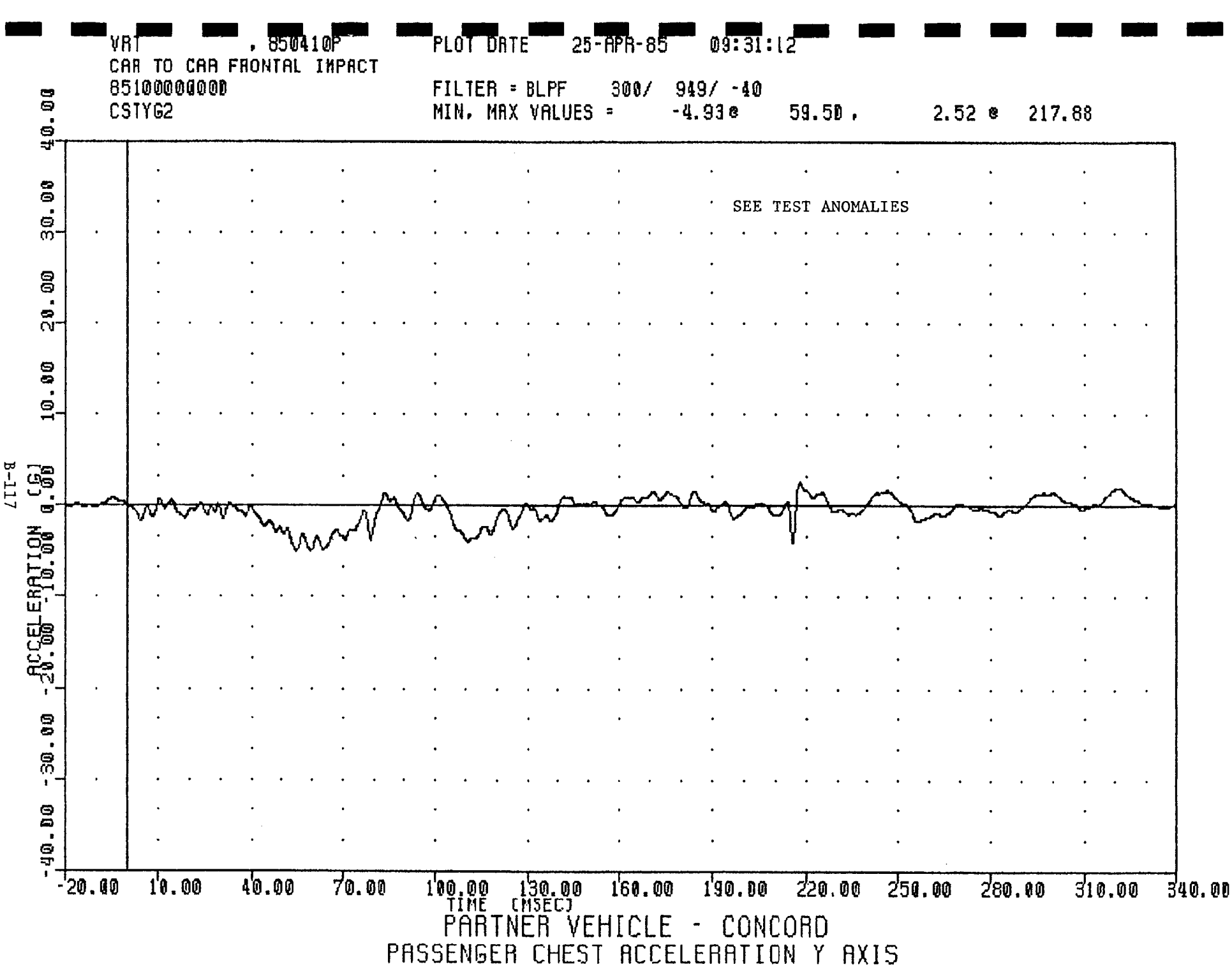
PARTNER VEHICLE - CONCORD

PASSENGER NECK FORCE Z AXIS LBS (AXIAL)

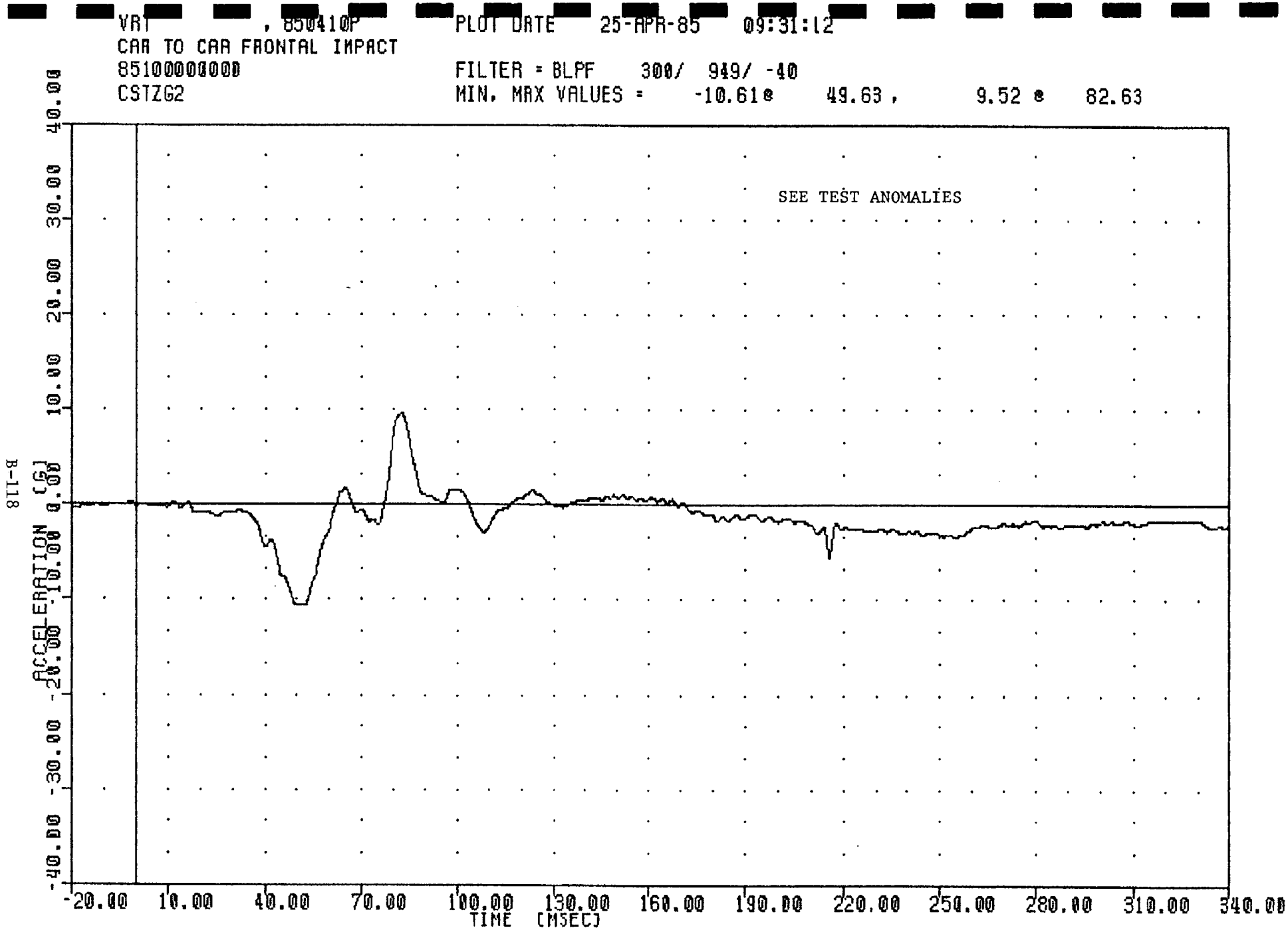

VRT , 850410P
CAR TO CAR FRONTAL IMPACT
8510000000D
NEKYM2
PLOT DATE 25-APR-85 09:32:59
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -36.97 @ 74.75 , 88.25 @ 110.38
100.00
75.00
50.00
25.00
0.00
-25.00
-50.00
-75.00
-100.00
TORQUE (LB-FT)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
PARTNER VEHICLE - CONCORD
PASSENGER NECK MOMENT Y AXIS FT-LBS



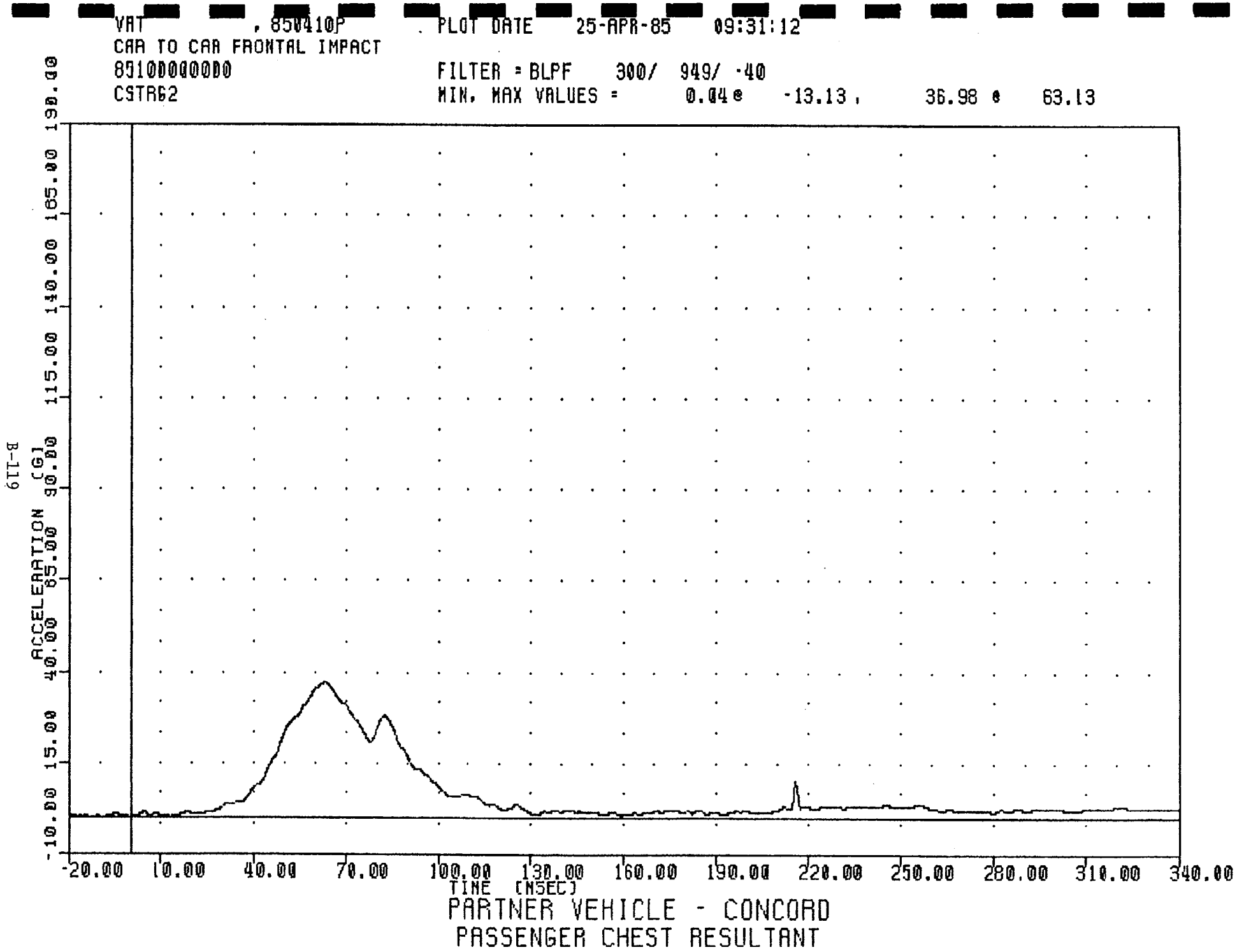
PARTNER VEHICLE - CONCORD
PASSENGER CHEST ACCELERATION X AXIS



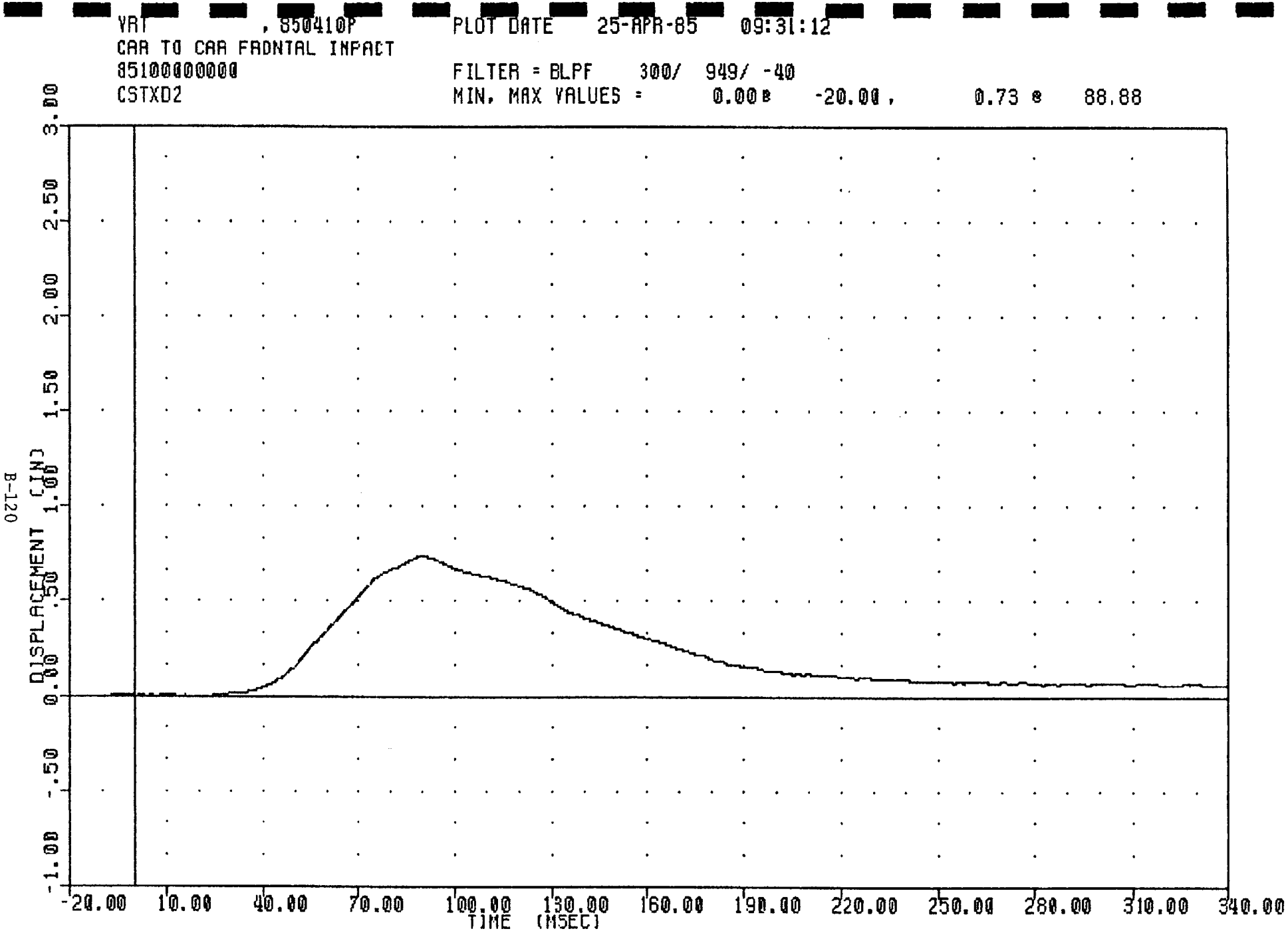
PARTNER VEHICLE - CONCORD
PASSENGER CHEST ACCELERATION Y AXIS



PARTNER VEHICLE - CONCORD
PASSENGER CHEST ACCELERATION Z AXIS

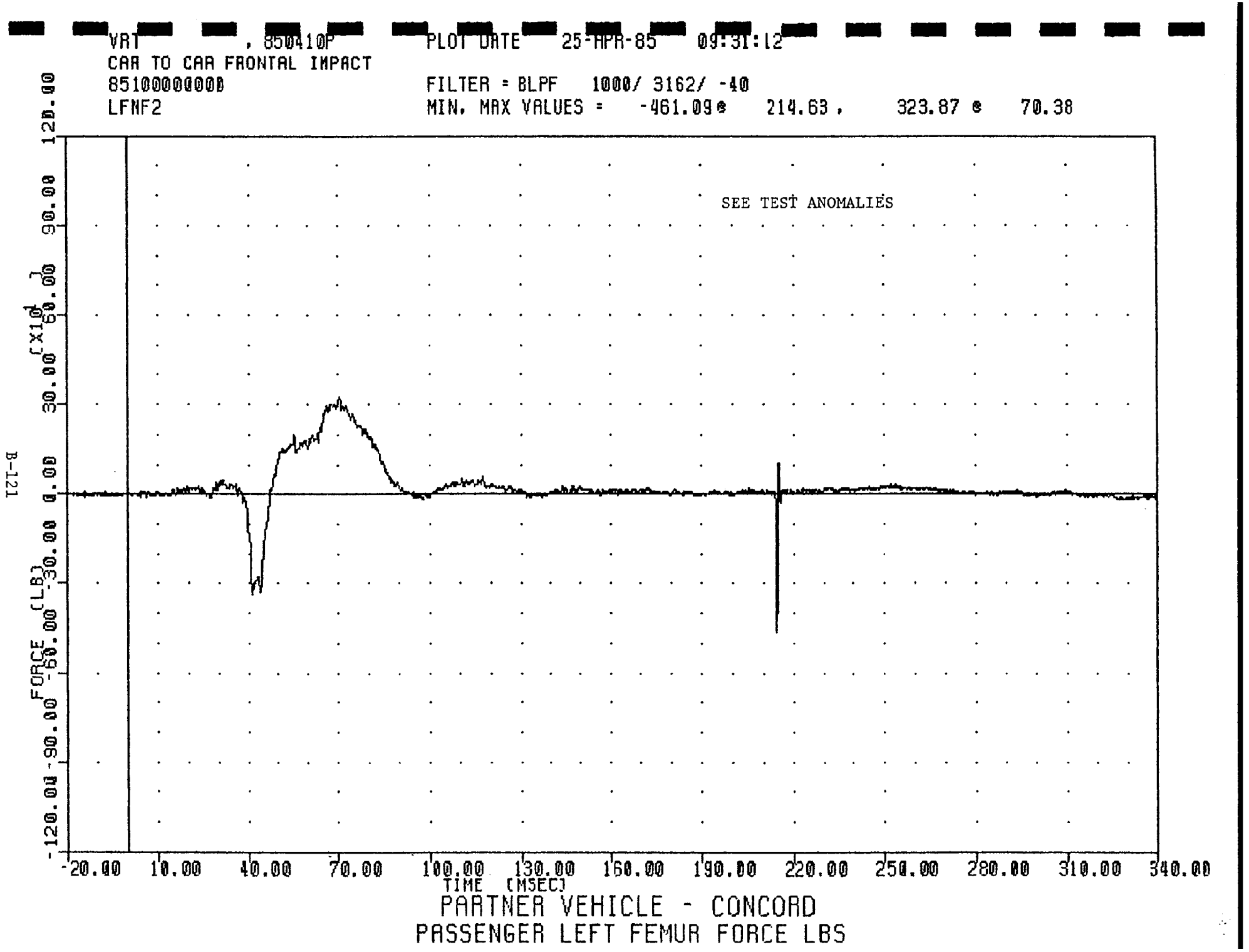


PARTNER VEHICLE - CONCORD
PASSENGER CHEST RESULTANT

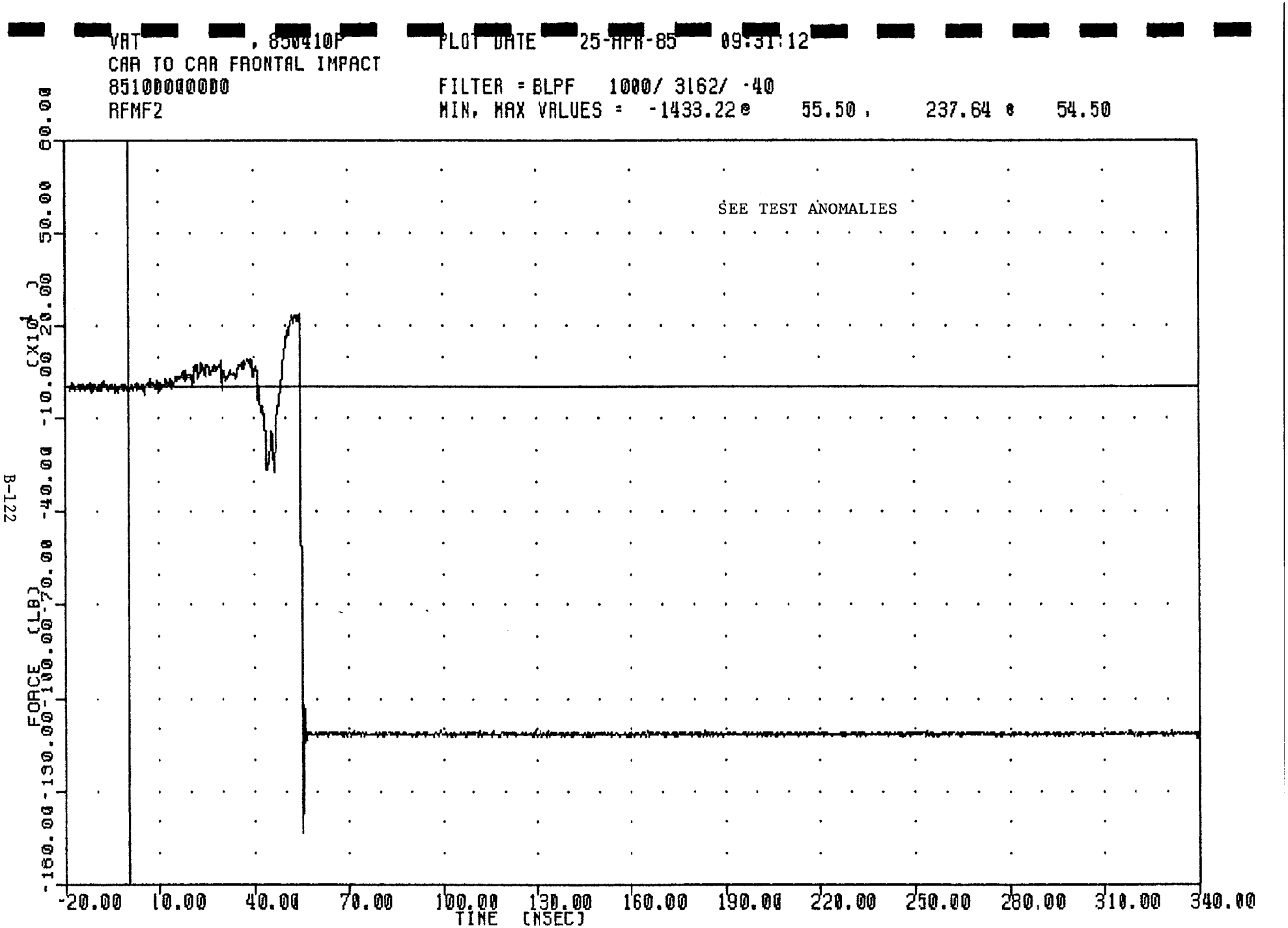


PARTNER VEHICLE - CONCORD

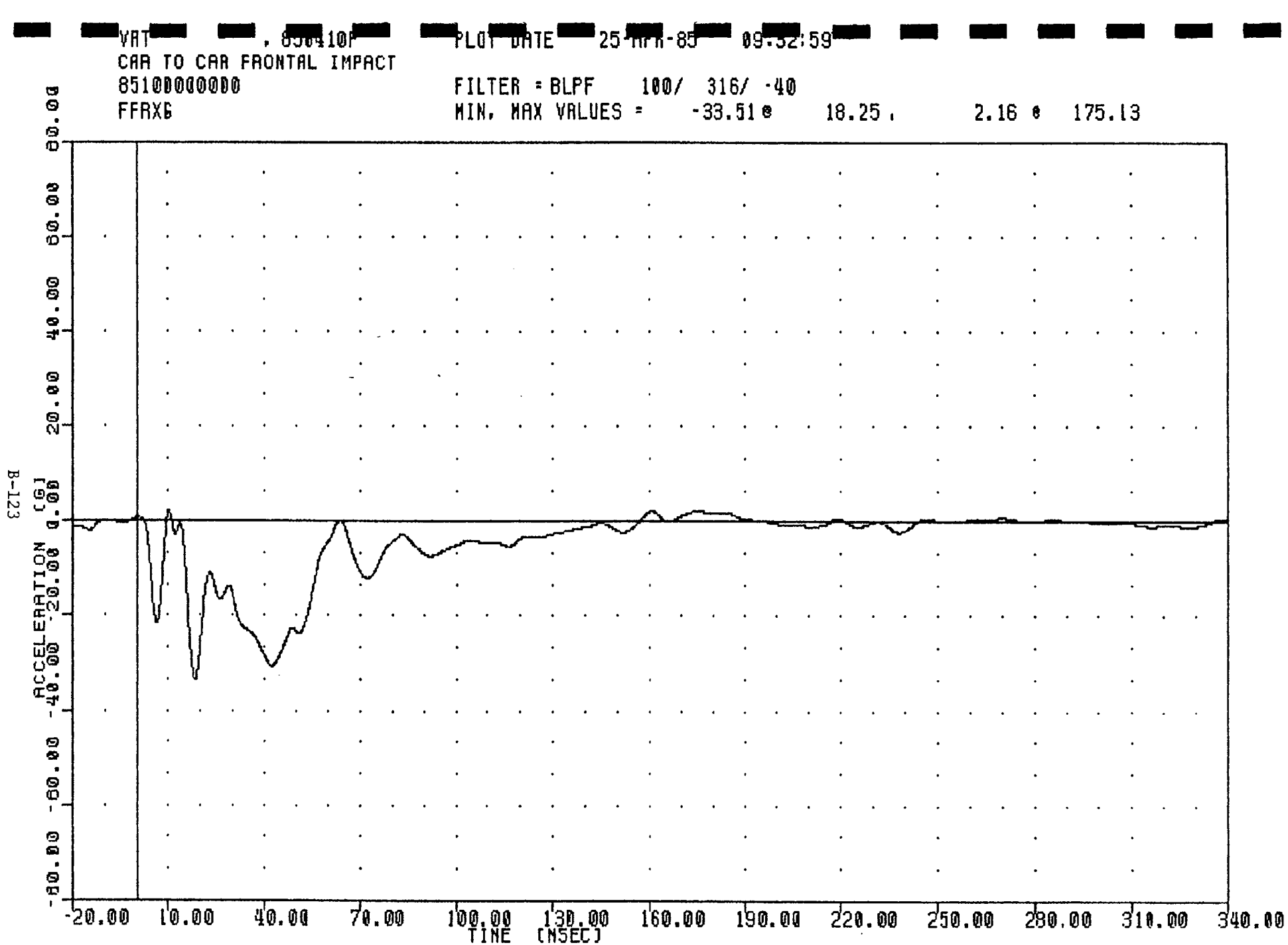
PASSENGER CHEST DISPLACEMENT INCHES



PARTNER VEHICLE - CONCORD
PASSENGER LEFT FEMUR FORCE LBS



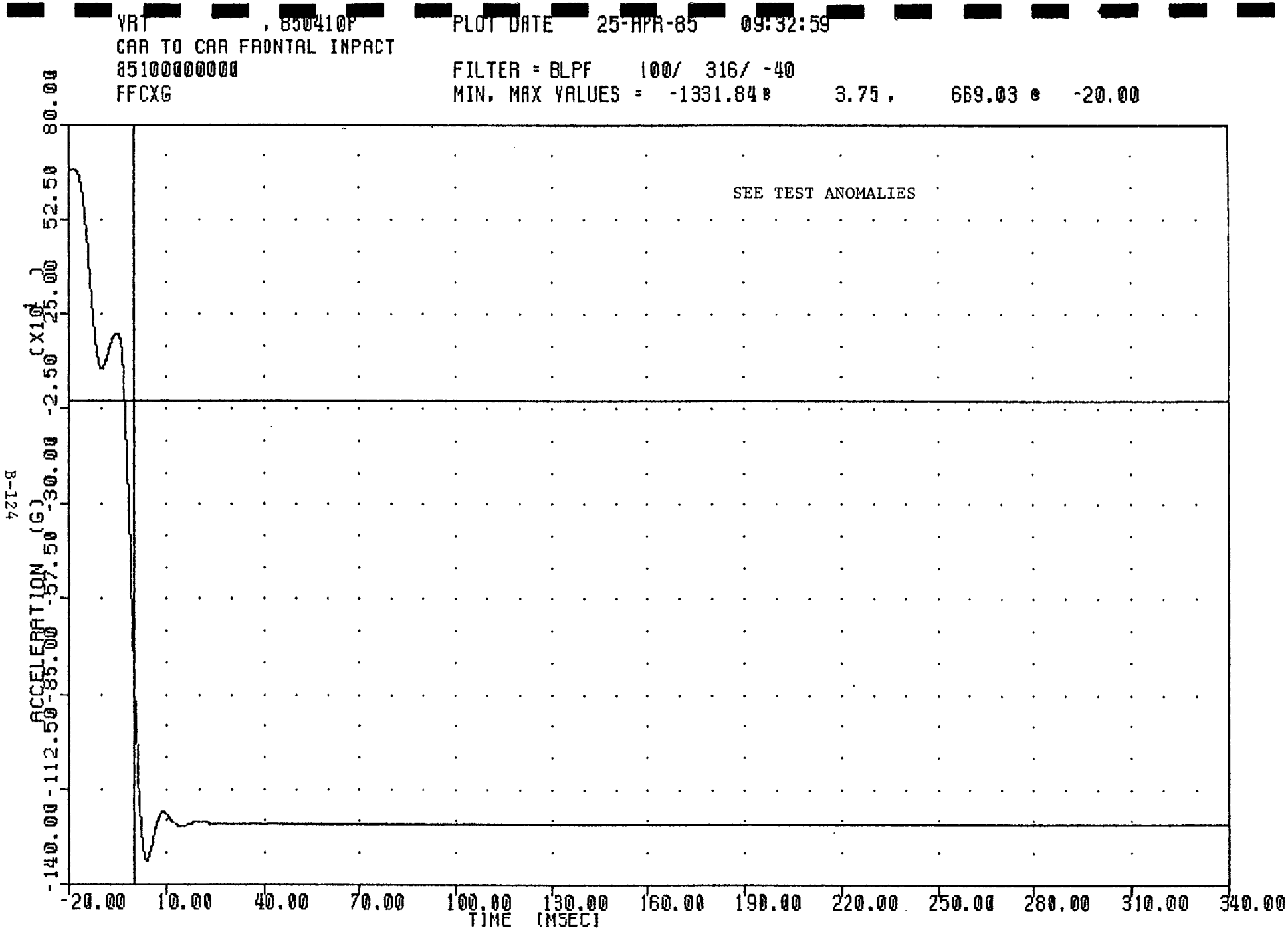
PARTNER VEHICLE - CONCORD
PASSENGER RIGHT FEMUR FORCE LBS



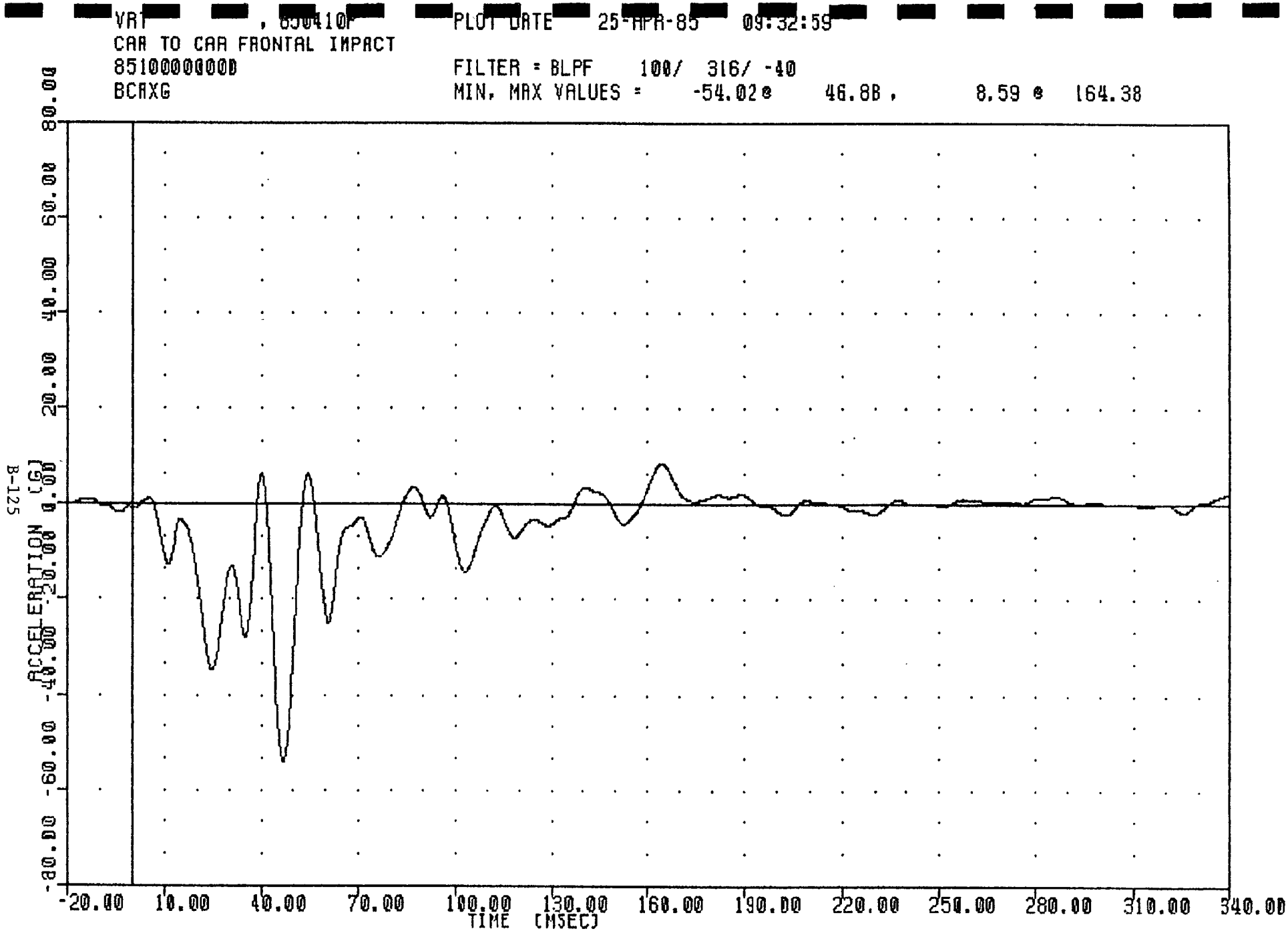
B-123

PARTNER VEHICLE - CONCORD

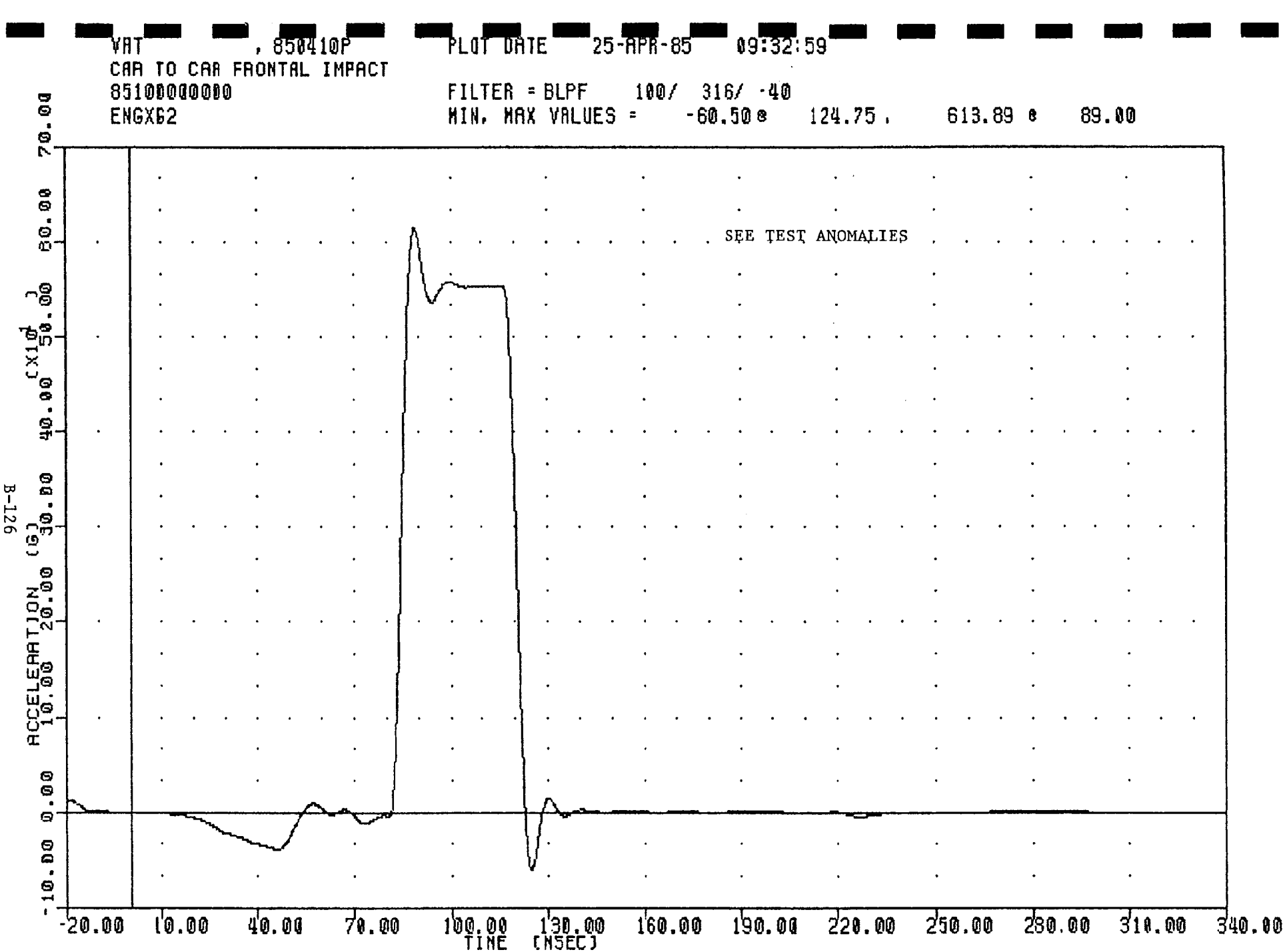
RIGHT FRONT FRAME RAIL ACCELERATION X AXIS



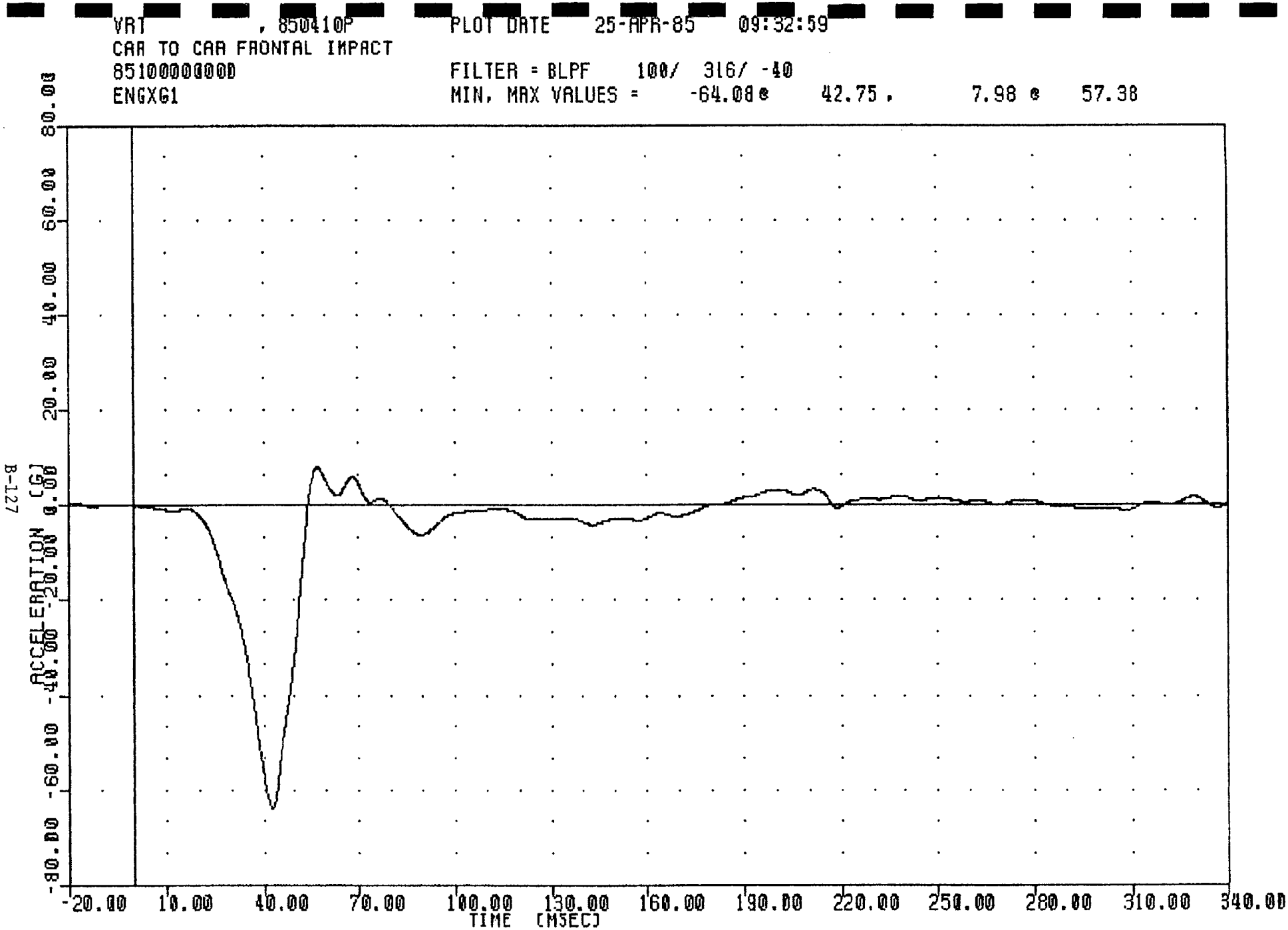
PARTNER VEHICLE - CONCORD
FRONT FRAME CROSSMEMBER ACCELERATION X AXIS



PARTNER VEHICLE - CONCORD
RIGHT BRAKE CALIPER ACCELERATION X AXIS

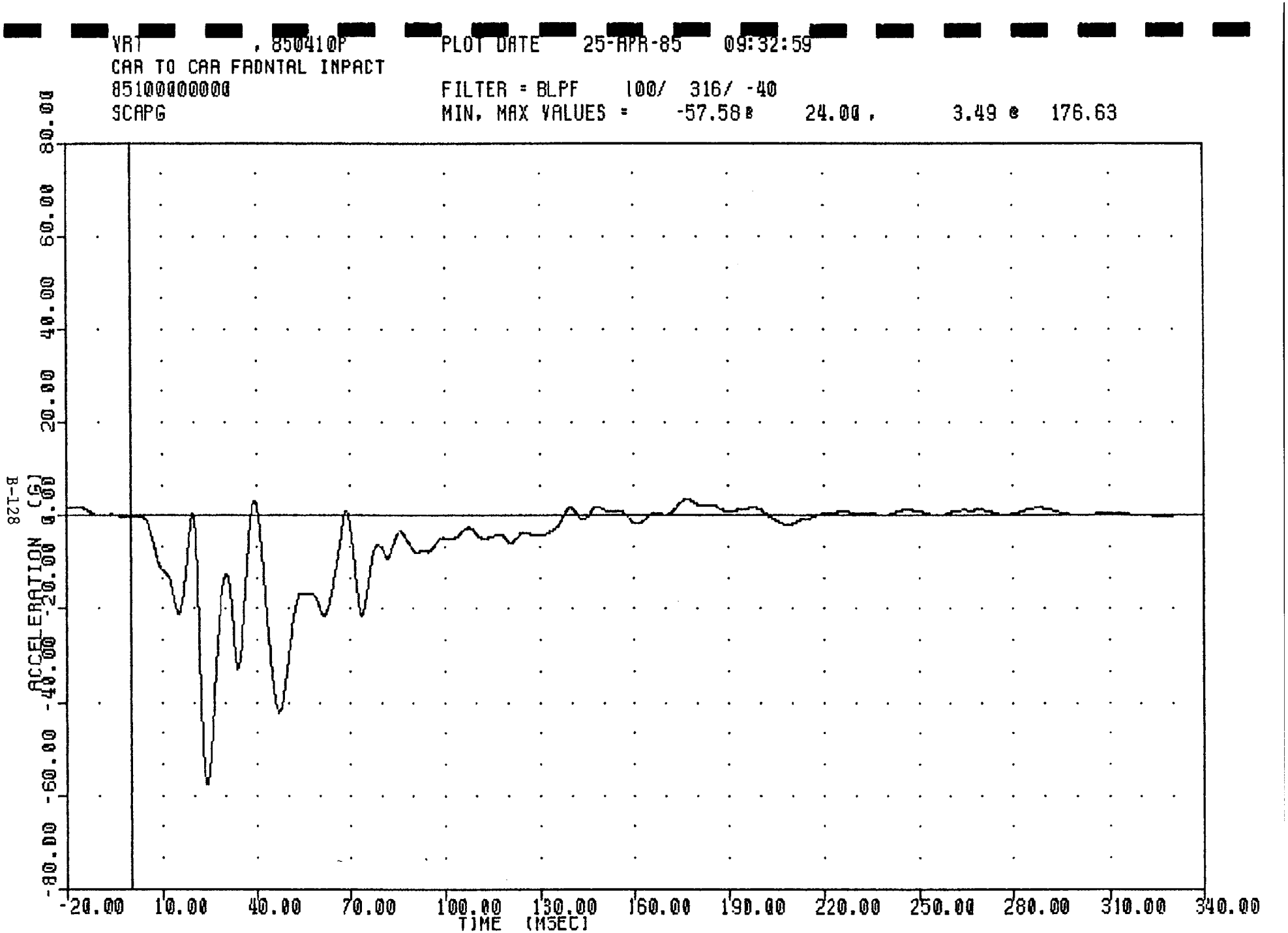


PARTNER VEHICLE - CONCORD
ENGINE BLOCK LOWER ACCELERATION X AXIS



PARTNER VEHICLE - CONCORD

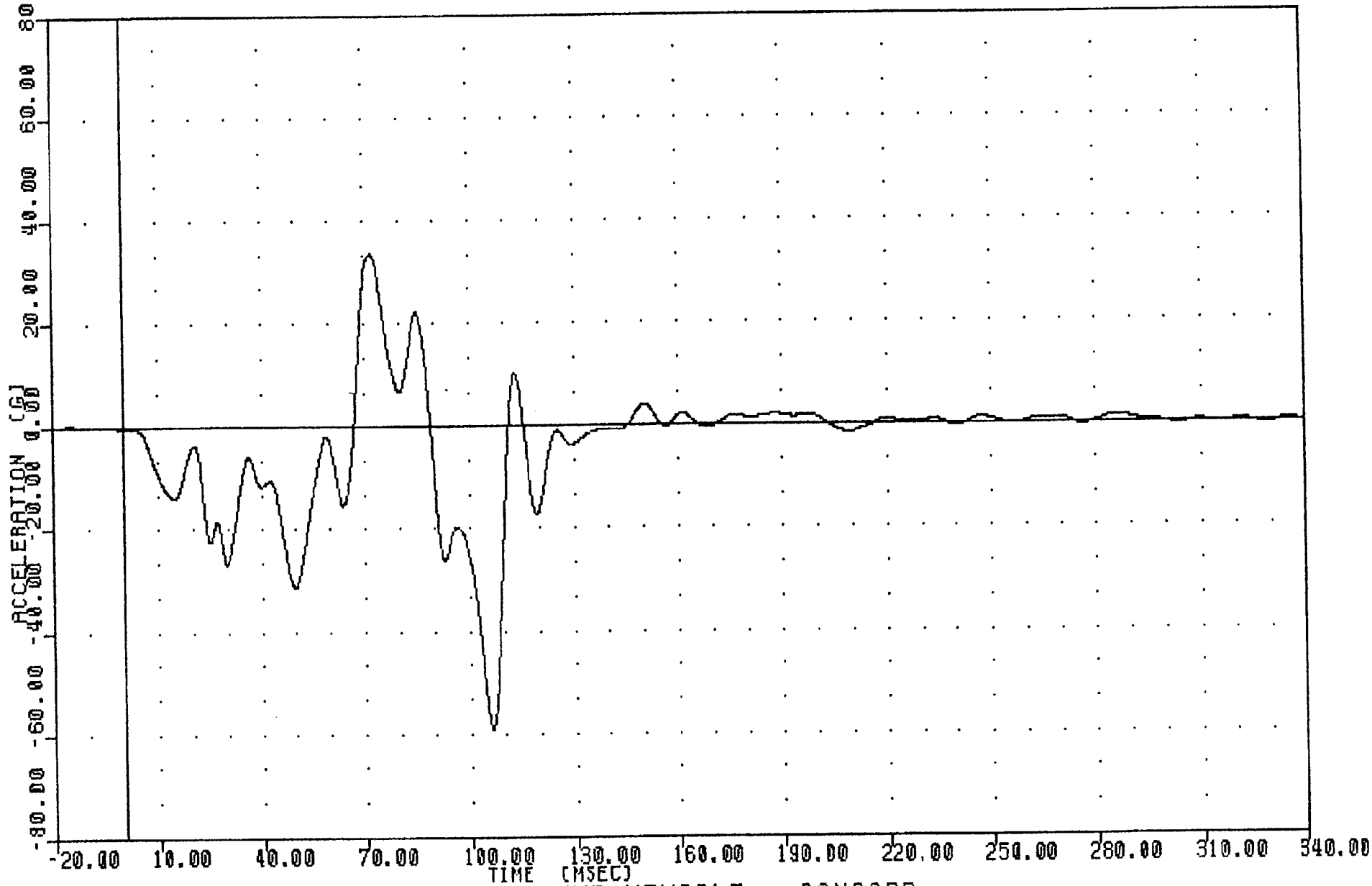
ENGINE BLOCK UPPER ACCELERATION X AXIS



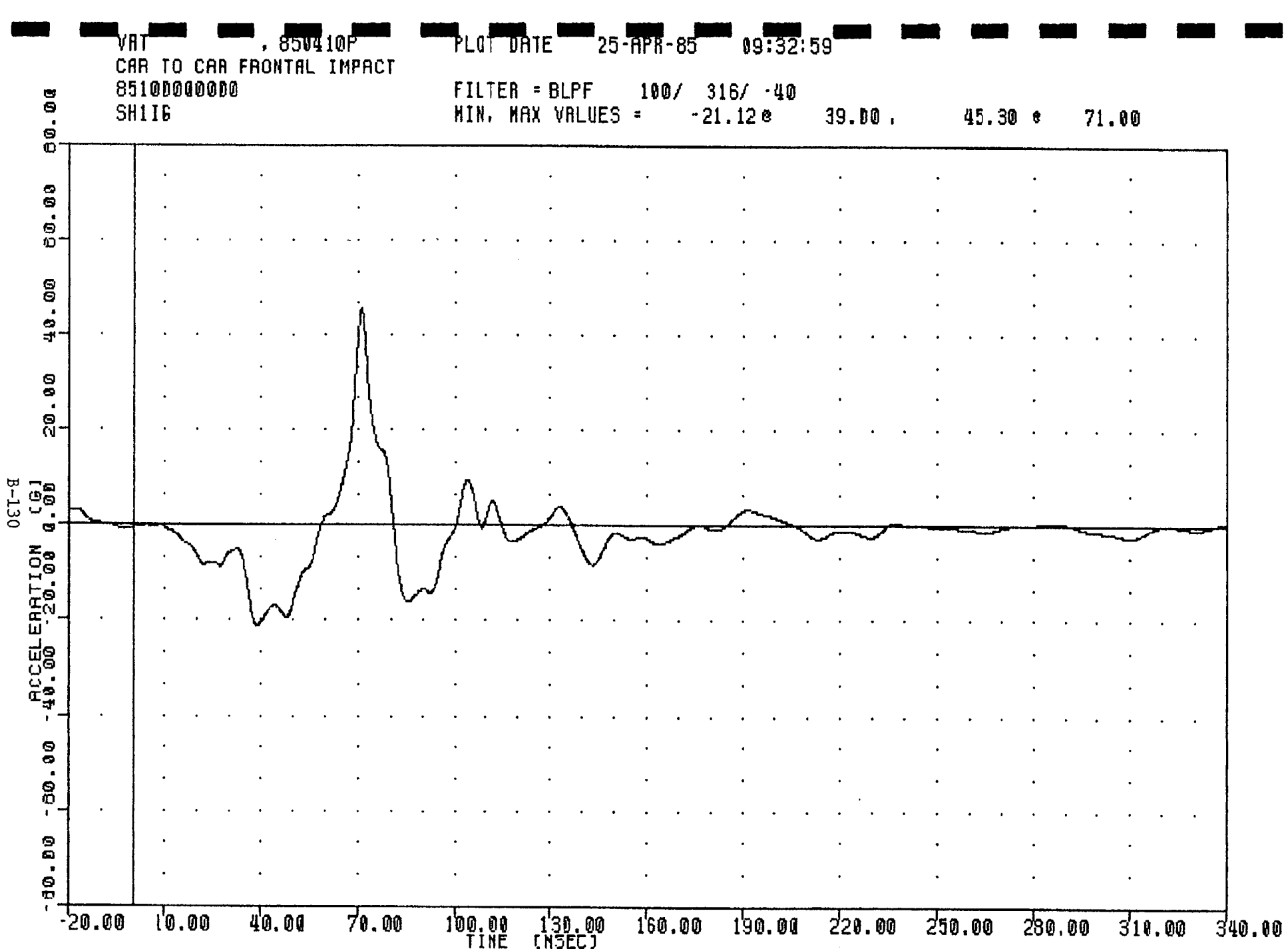
PARTNER VEHICLE - CONCORD

STEERING COLUMN ACCELERATION A-P AXIS

VRT , 850410P PLOT DATE 25-APR-85 09:32:59
CAR TO CAR FRONTAL IMPACT
85100000000
SH1PG
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -59.14 @ 106.13 , 33.43 @ 72.00



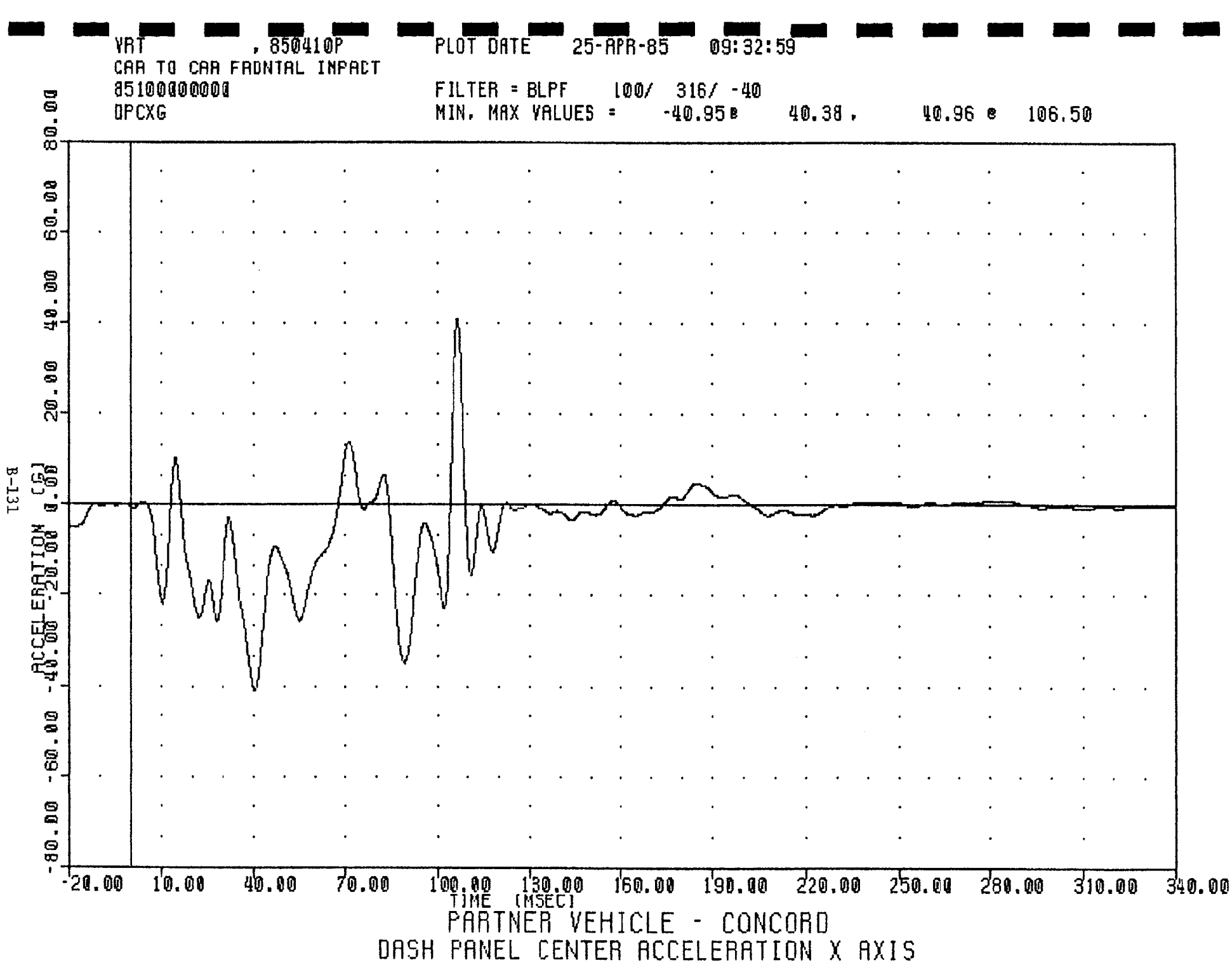
PARTNER VEHICLE - CONCORD
STEERING WHEEL HUB ACCELERATION A-P AXIS



B-130

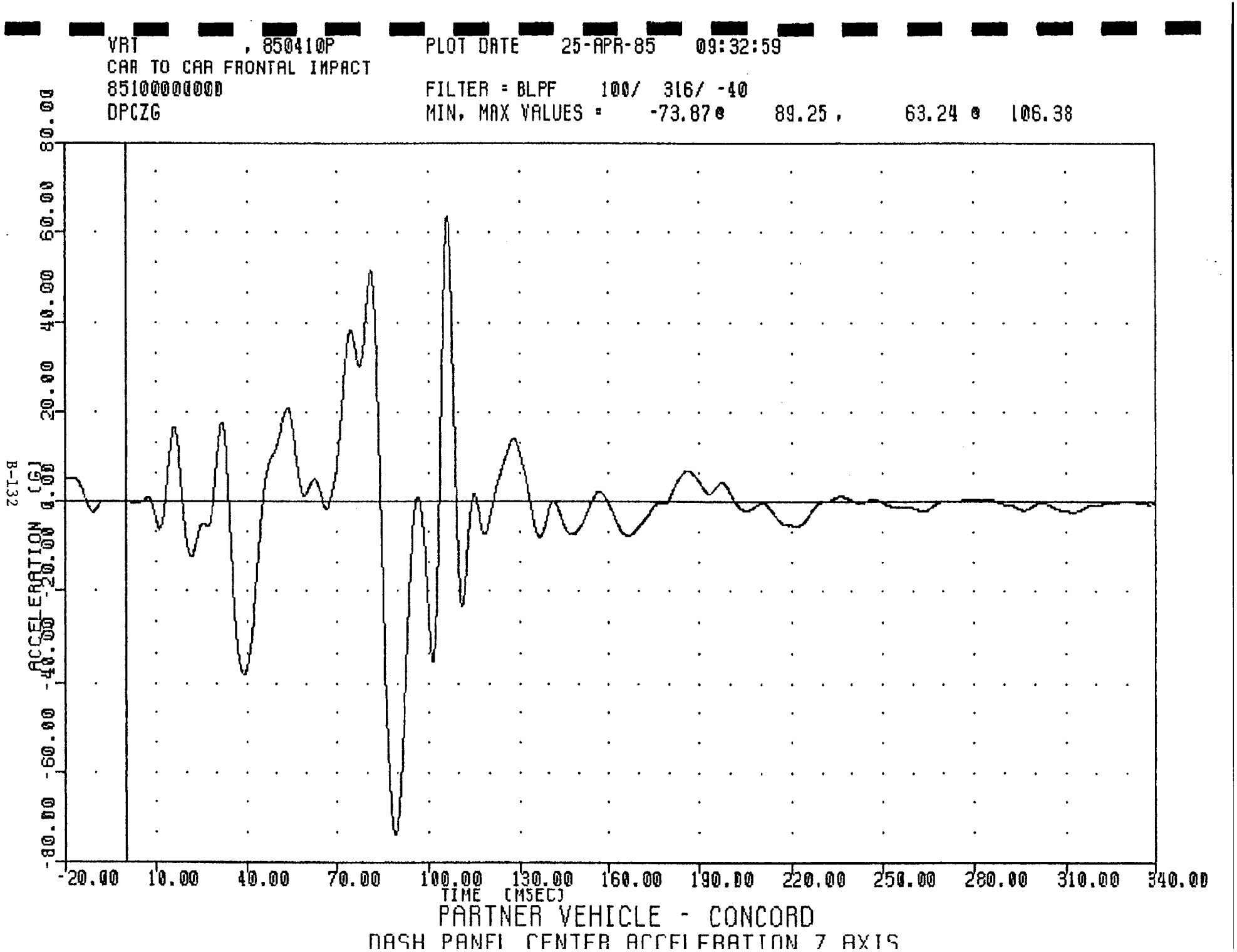
PARTNER VEHICLE - CONCORD

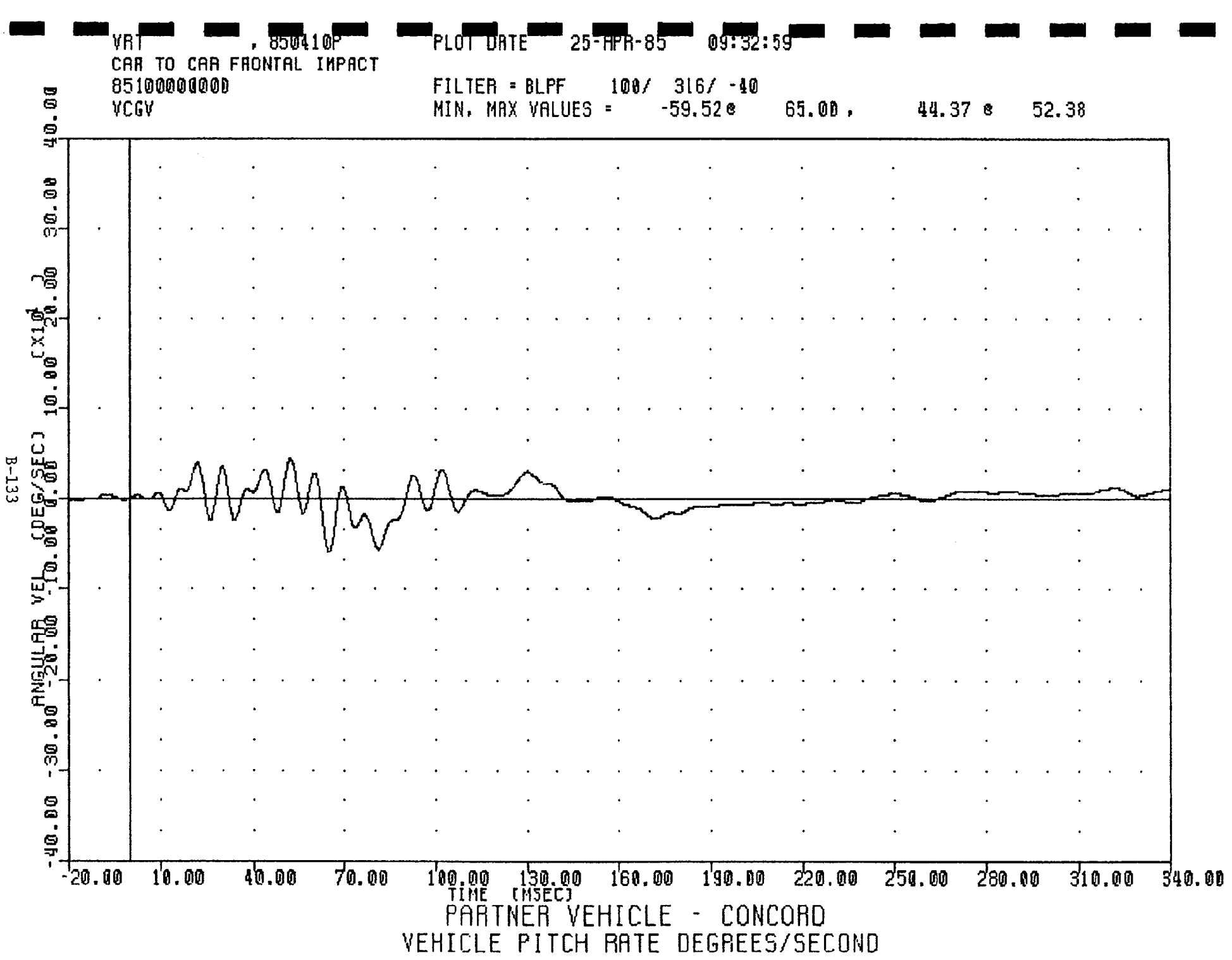
STEERING WHEEL HUB ACCELERATION I-S AXIS



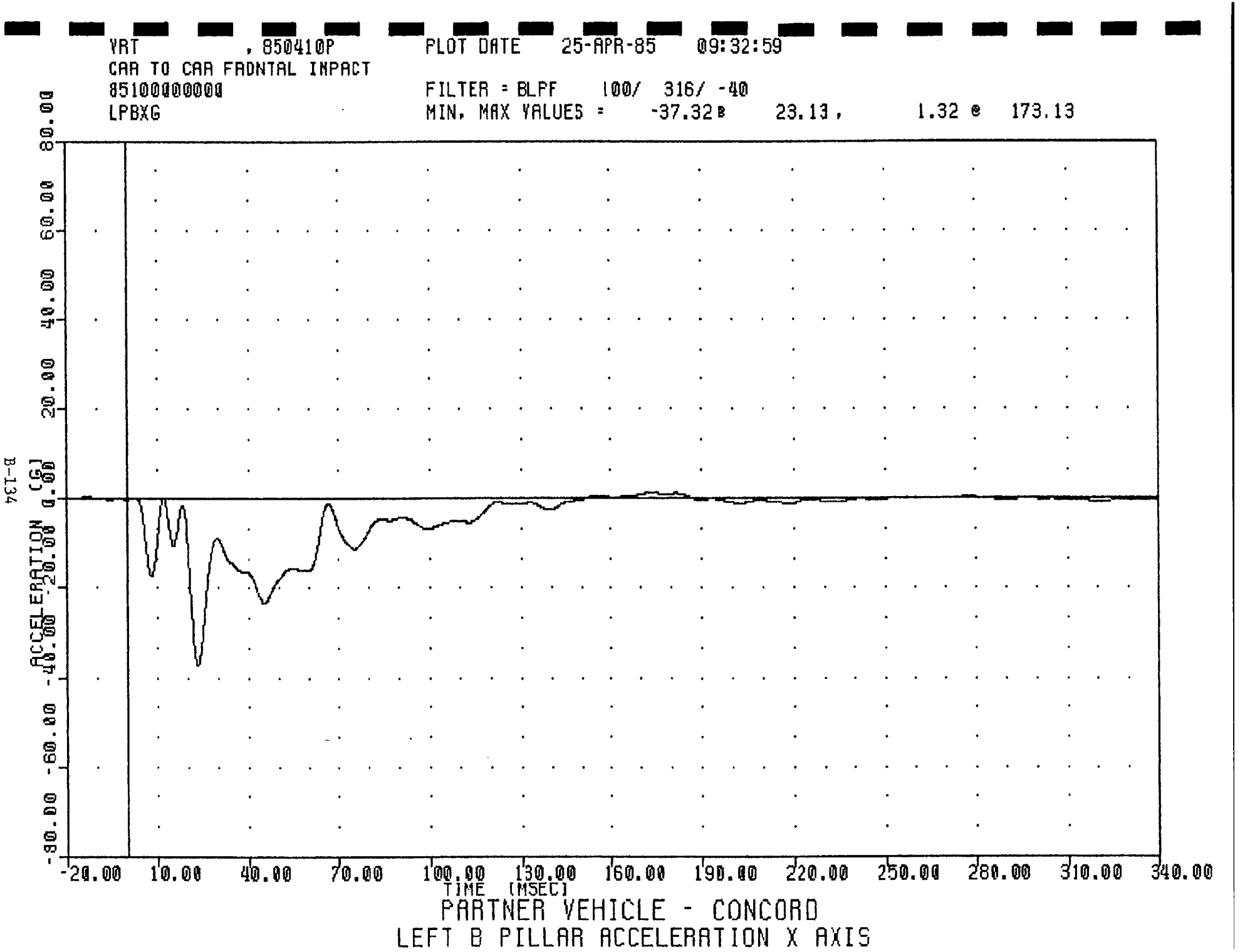
PARTNER VEHICLE - CONCORD

DASH PANEL CENTER ACCELERATION X AXIS


VRT , 850410P
PLOT DATE 25-APR-85 09:32:59
CAR TO CAR FRONTAL IMPACT
85100000000
FILTER = BLPF 100/ 316/ -40
DPCZG
MIN, MAX VALUES = -73.87 @ 89.25 , 63.24 @ 106.38
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
PARTNER VEHICLE - CONCORD
DASH PANEL CENTER ACCELERATION Z AXIS

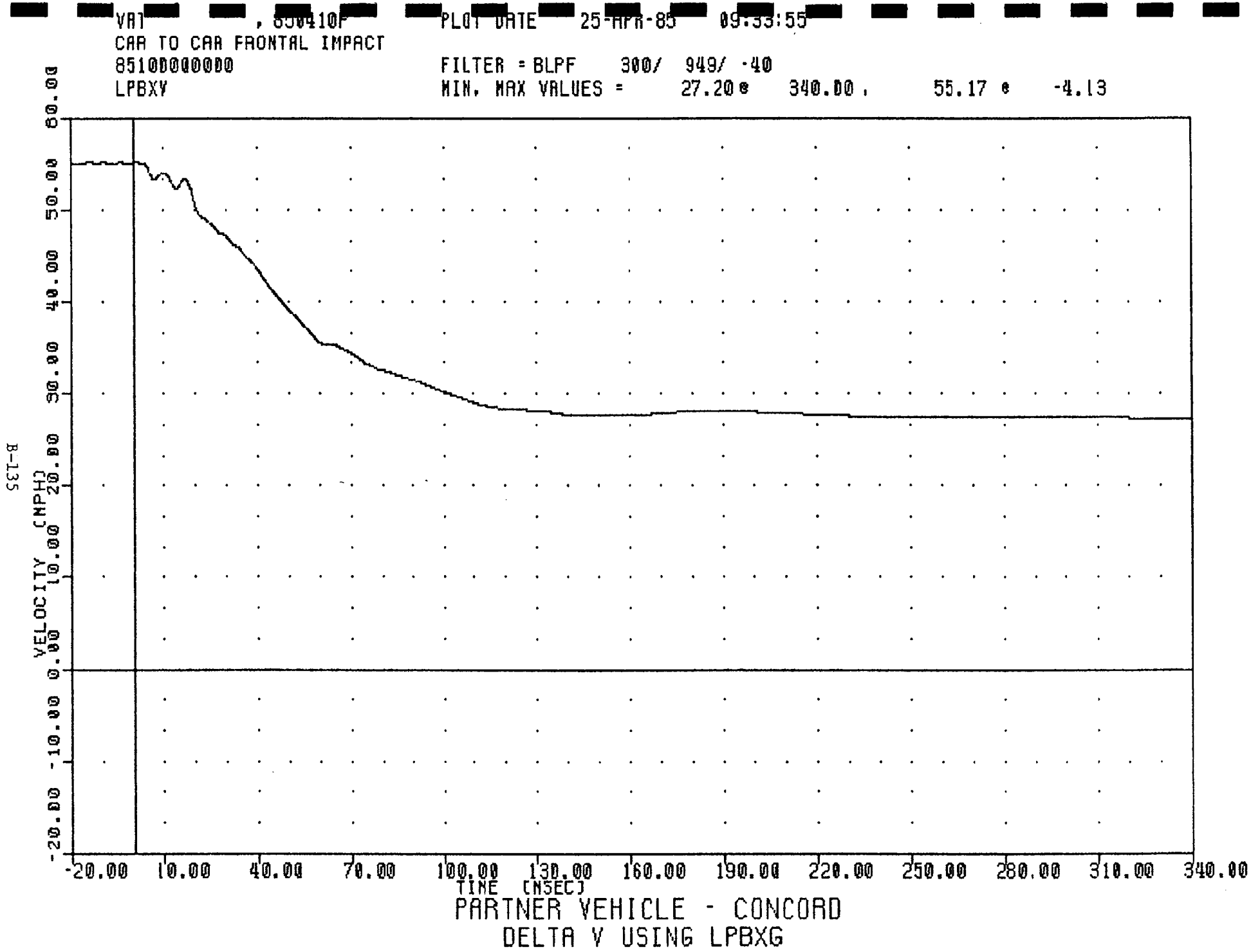


PARTNER VEHICLE - CONCORD
VEHICLE PITCH RATE DEGREES/SECOND

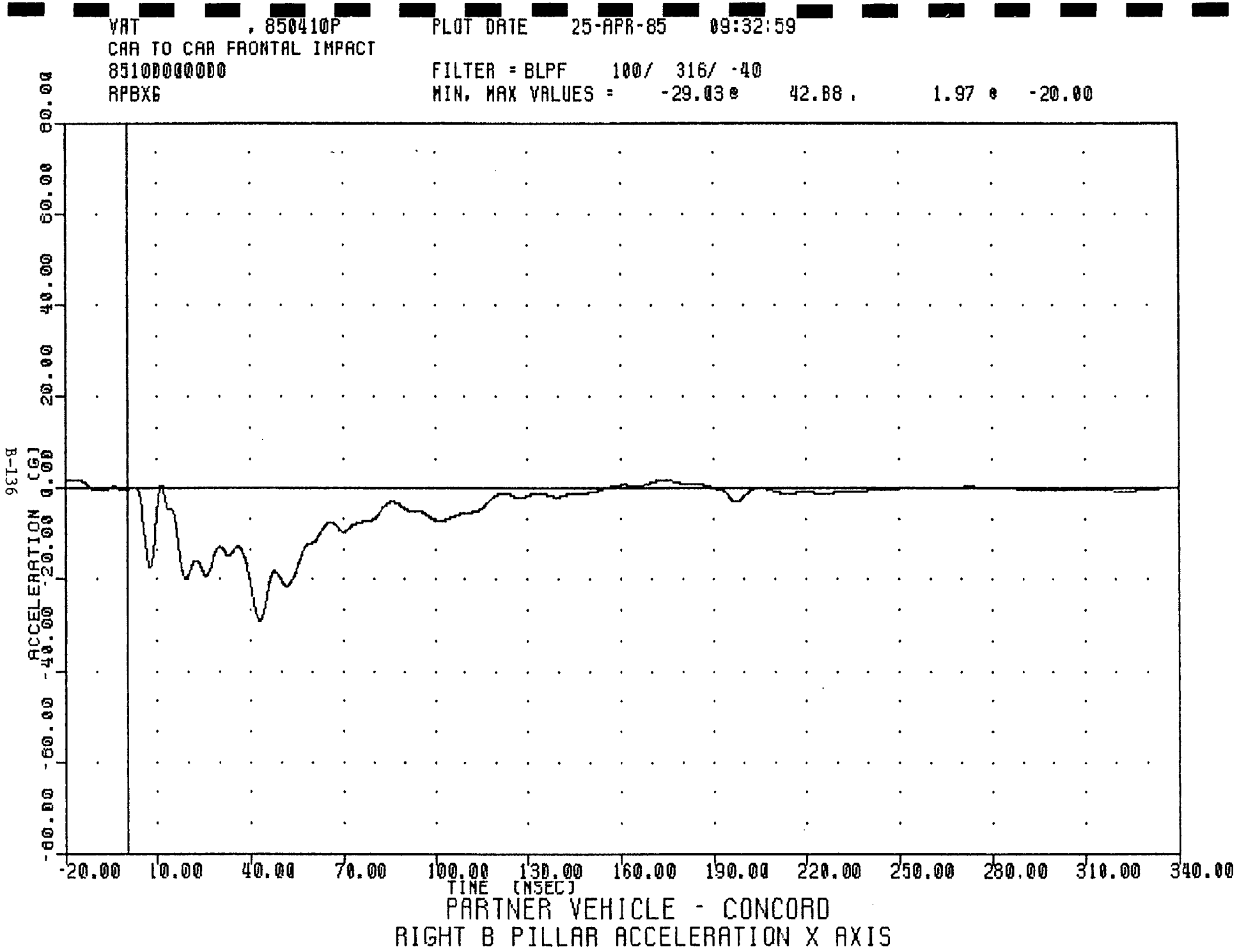


PARTNER VEHICLE - CONCORD

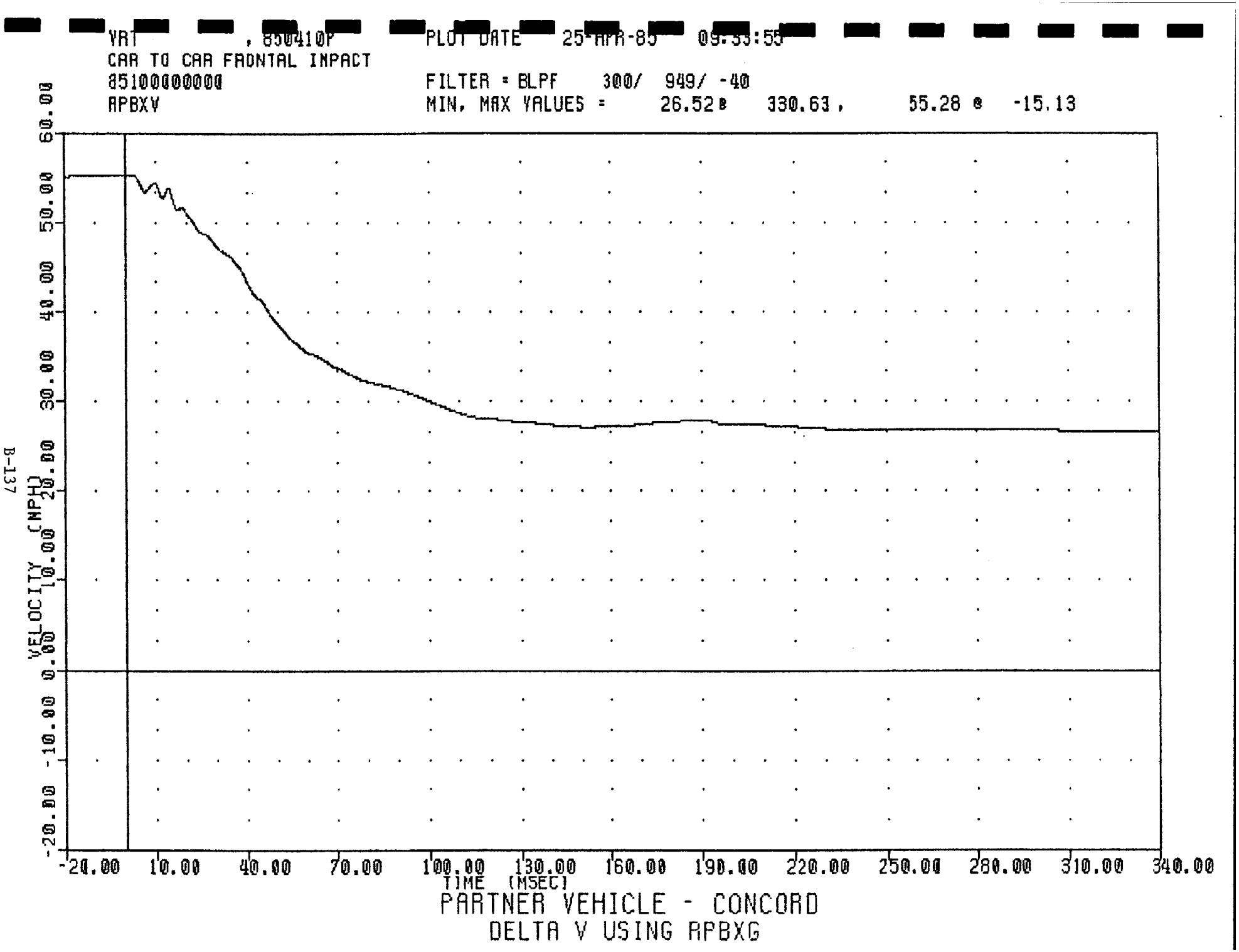
LEFT B PILLAR ACCELERATION X AXIS

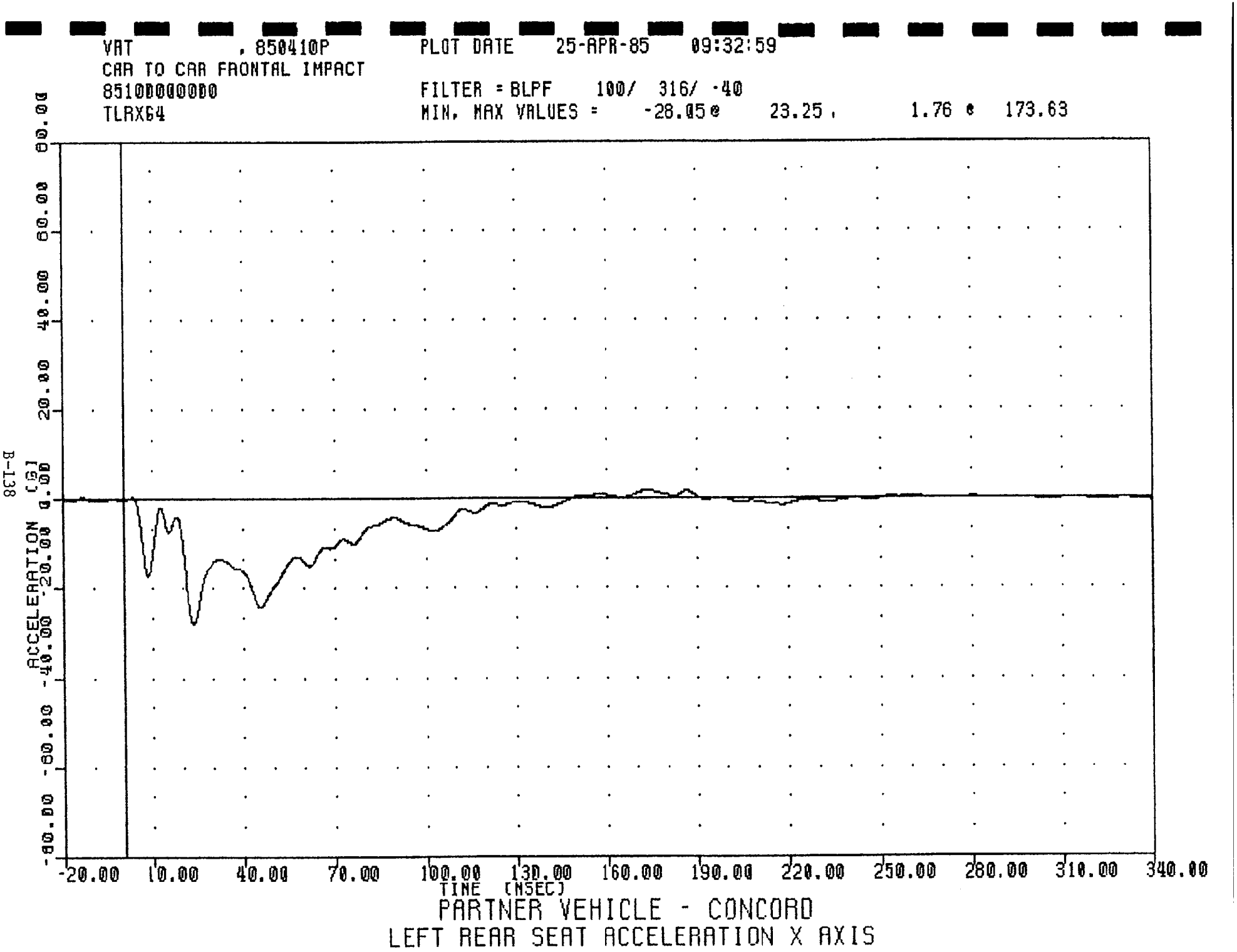


PARTNER VEHICLE - CONCORD
DELTA V USING LPBXG



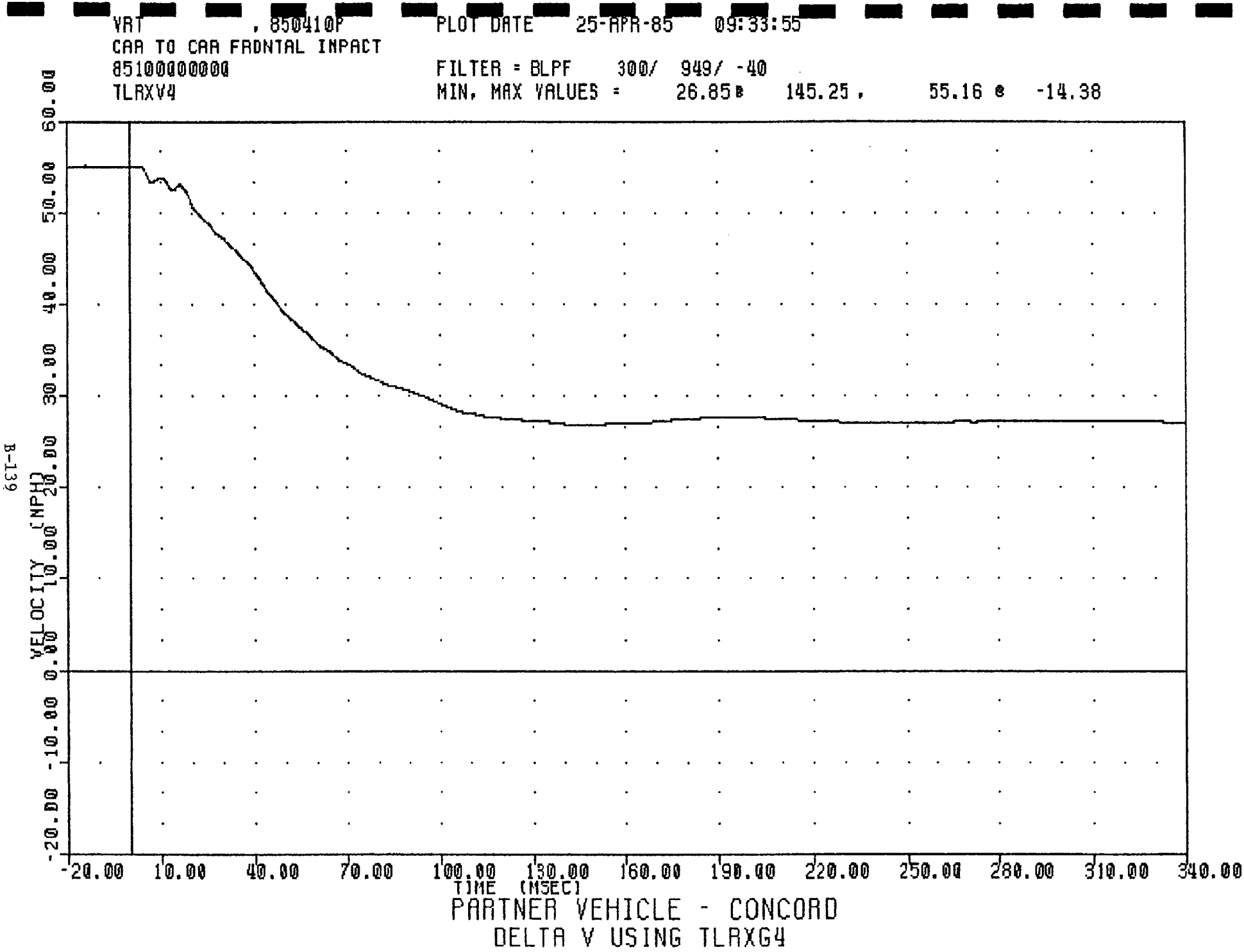
PARTNER VEHICLE - CONCORD
RIGHT B PILLAR ACCELERATION X AXIS

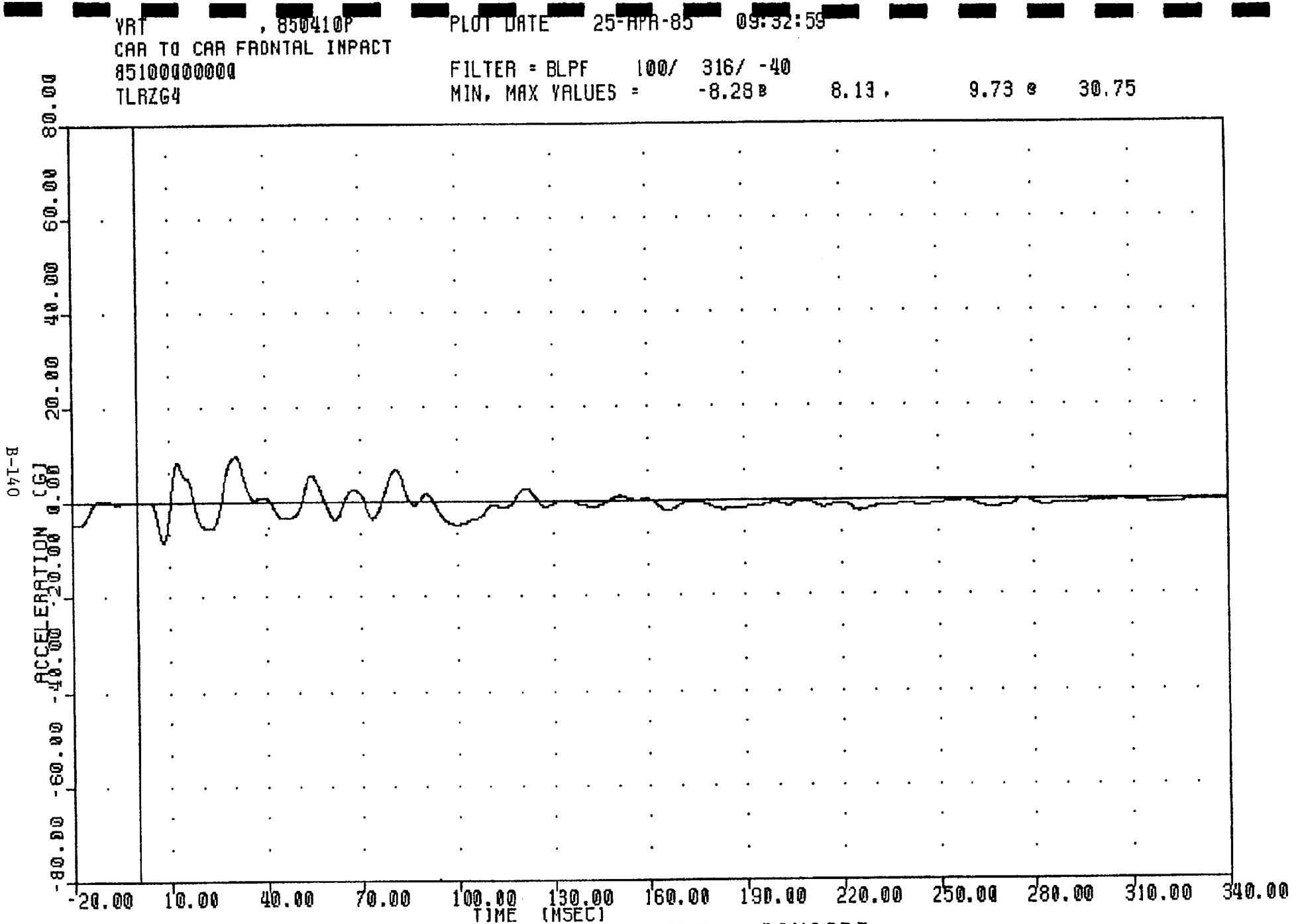

VRT , 850410P
PLOT DATE 25-APR-85 09:33:55
CAR TO CAR FRONTAL IMPACT
85100000000
FILTER = BLPF 300/ 949/ -40
RPBXV
MIN, MAX VALUES = 26.52 @ 330.63 , 55.28 @ -15.13
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
VELOCITY (MPH)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
PARTNER VEHICLE - CONCORD
DELTA V USING RPBXG



PARTNER VEHICLE - CONCORD

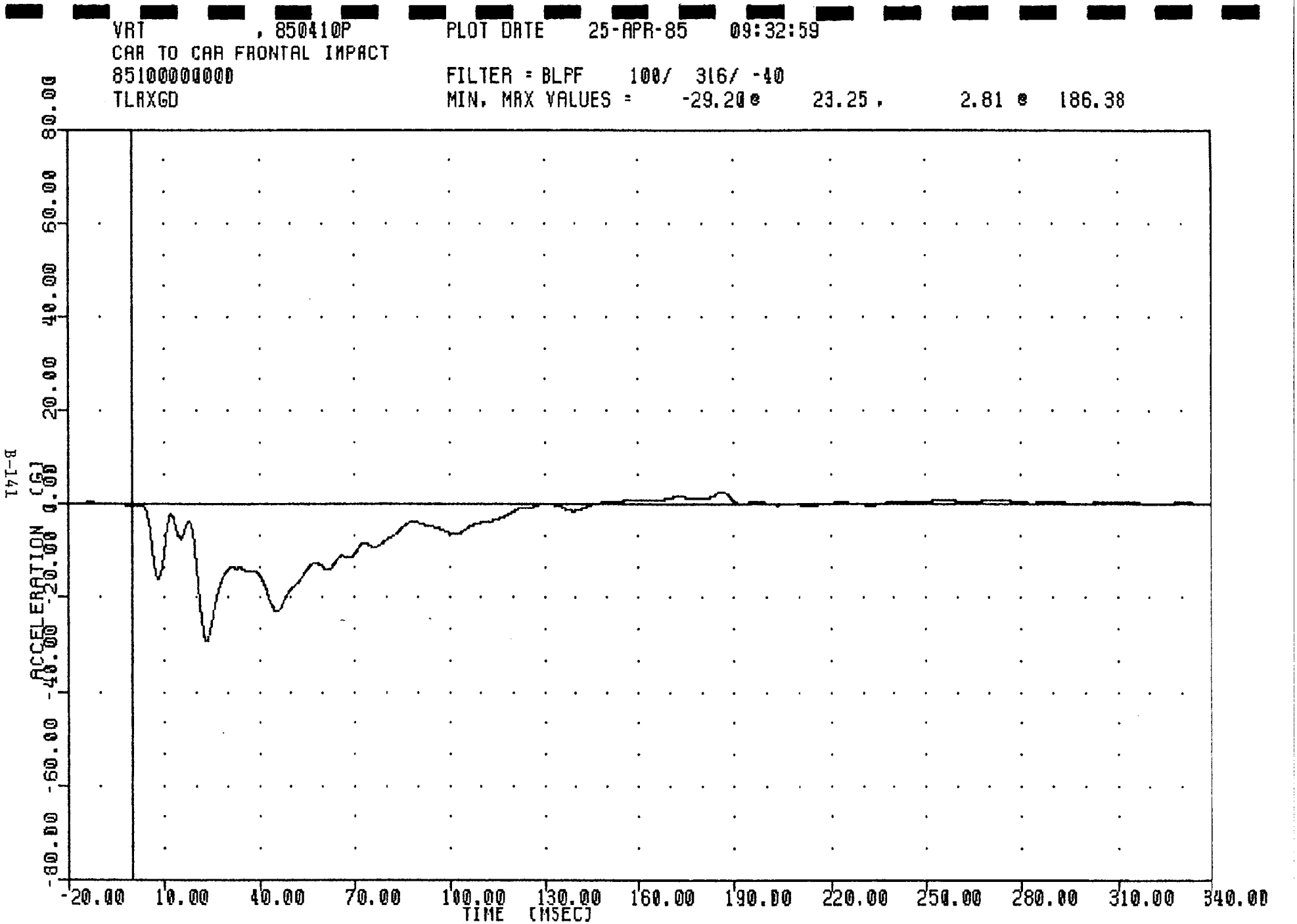
LEFT REAR SEAT ACCELERATION X AXIS


VRT , 850410P
PLOT DATE 25-APR-85 09:33:55
CAR TO CAR FRONTAL IMPACT
851000000000
FILTER = BLPF 300/ 949/ -40
TLRXV4
MIN, MAX VALUES = 26.85 @ 145.25 , 55.16 @ -14.38
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
VELOCITY (MPH)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
PARTNER VEHICLE - CONCORD
DELTA V USING TLRXG4



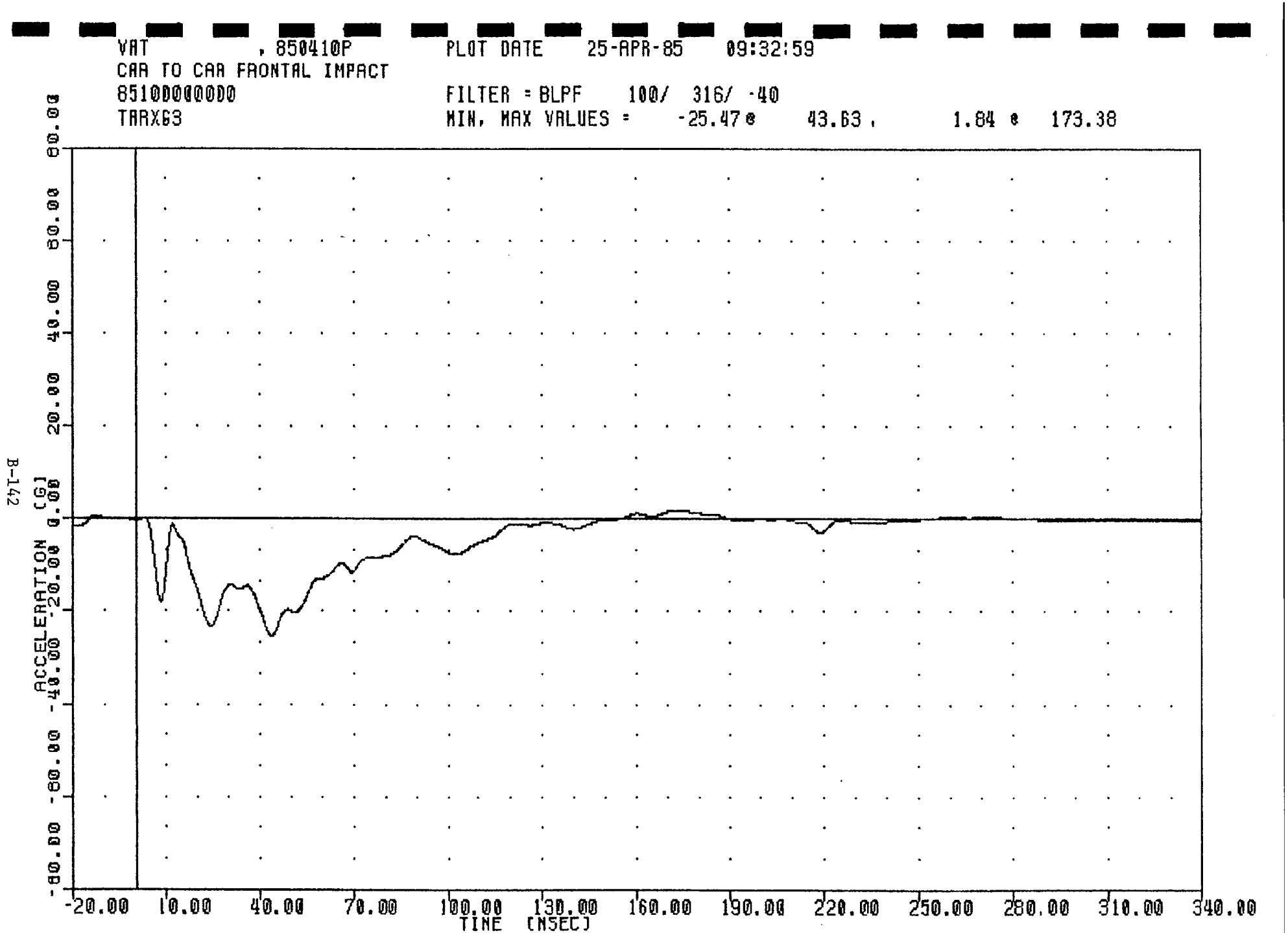
PARTNER VEHICLE - CONCORD

LEFT REAR SEAT ACCELERATION Z AXIS

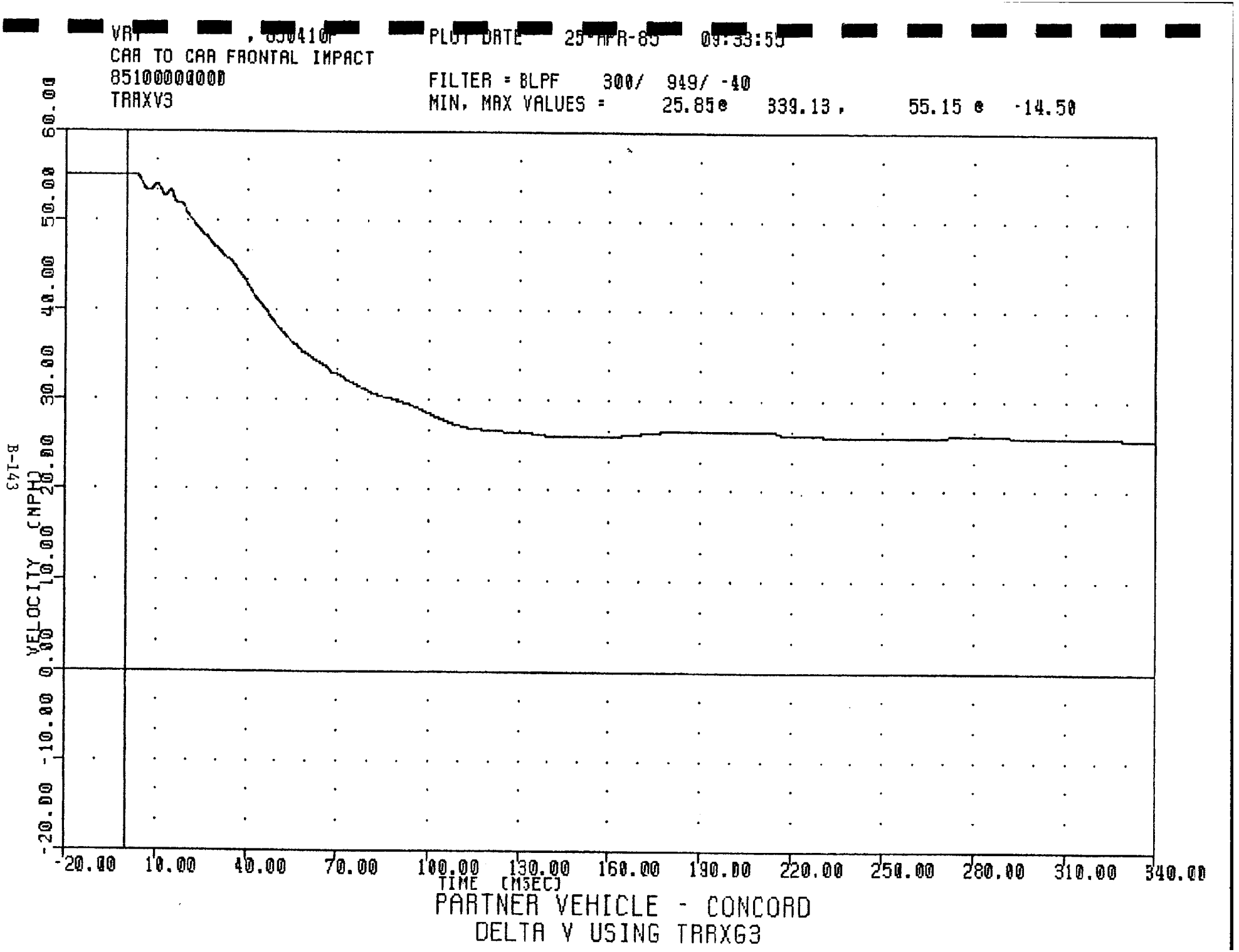


PARTNER VEHICLE - CONCORD

LEFT REAR SEAT ACCELERATION -2 X AXIS



PARTNER VEHICLE - CONCORD
RIGHT REAR SEAT ACCELERATION X AXIS


VRT , 850410
PLOT DATE 25-APR-85 09:33:55
CAR TO CAR FRONTAL IMPACT
8510000Q000
TRRXV3
FILTER = 8LPF 300/ 949/ -40
MIN, MAX VALUES = 25.85@ 339.13 , 55.15 @ -14.50
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
VELOCITY (MPH)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
PARTNER VEHICLE - CONCORD
DELTA V USING TRRXG3

APPENDIX C

DUMMY CERTIFICATION

PRE-TEST CALIBRATION

SUBJECT VEHICLE

This section contains dummy calibration data for the driver dummy in the subject vehicle. The passenger dummy was not calibrated prior to this test. The dummies used in this program are now scheduled for recalibration after each dummy has been through two crash tests. Between times in which the dummy is not scheduled to be calibrated a post-test inspection is completed. If no parts are needed, the dummy is ready to be used in the next crash test.

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III 03-APR-85

VRTC SRL98 43C7HD1 HY3 SN43/HEAD#45 CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	46.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	243.65 G
PEAK LATERAL ACCELERATION	15 G MAX	-2.72 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR K. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER 04-APR-85

VRTC SRL98 43C7NF1 HY3 SN43 CAL7 NECK FLEXION 01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		66 - 78 DEGREES	75.00 DEGREES
RELATIVE HUMIDITY		10% - 70%	57.00 %
IMPACT VELOCITY		22.53 - 22.97 FPS	22.86 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.42 G
	20 MS	17.40 - 22.60 G	19.22 G
	30 MS	12.50 - 18.50 G	17.40 G
MAXIMUM PENDULUM G		29 G MAX	25.42 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 46 MS	41.75 MS
D PLANE ROTATION	MAX	67 - 79 DEGREES	74.19 DEGREES
	TIME	54 - 64 MS	61.13 MS
MOMENT ABOUT OCCIPITAL CONDYLES	MAX	70 - 90 FT.LBS	71.91 FT.LBS
	TIME	46 - 56 MS	55.38 MS
	MIN	-22.2/-14.0 FT.LBS	-16.30 FT.LBS
	TIME	12 - 16 MS	16.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		109 - 119 MS	124.63 MS **
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		95 - 105 MS	103.75 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR P. L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER 04-APR-85

VRTC SRL98 43C7NE1 HY3 SN43 CAL7 NECK EXTEN. 01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		66 - 78 DEGREES	76.00 DEGREES
RELATIVE HUMIDITY		10% - 70%	61.00 %
IMPACT VELOCITY		19.50 - 19.90 FPS	19.90 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.54 G
	20 MS	14.00 - 19.00 G	17.28 G
	30 MS	11.00 - 16.00 G	15.59 G
MAXIMUM PENDULUM G		22 G MAX	20.72 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 50 MS	42.00 MS
D PLANE ROTATION	MAX	94 - 106 DEGREES	95.37 DEGREES
	TIME	72 - 82 MS	80.00 MS
MOMENT ABOUT OCCIPITAL CONDYLES	MAX	11.75 - 17.75 FT.LB	14.28 FT.LBS
	TIME	12 - 18 MS	16.25 MS
	MIN	-61.2/-50.8 FT.LBS	-49.21 FT.LBS **
	TIME	69 - 77 MS	75.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		151 - 167 MS	168.38 MS **
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 144 MS	142.88 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR K. E. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III 05-APR-85

VRTC SRL98 43C7TH1 HY3 SN43 CAL07 H.S.THORAX 01

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	61.00 %
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
DEFLECTION AT 25 MSEC	2.51 - 2.75 INCHES	2.823 INCHES *
RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1179.6 POUNDS *
INTERNAL HYSTERESIS	75% - 85%	72.4% *

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V. L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III 05-APR-85

RIGHT KNEE
VRTC SRL98 43C7RK1 HY3 SN43 R.KNEE 11LB CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	59.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1515.70 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V. L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III 05-APR-85

LEFT KNEE
VRTC SRL98 43C7LK1 HY3 SN43 L.KNEE 11LB CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	59.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1231.38 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V. L. Watkins

PRE-TEST CALIBRATION

PARTNER VEHICLE

This section contains dummy calibration data for the passenger dummy in the partner vehicle. The driver dummy was not calibrated prior to this test. The dummies used in this program are now scheduled for recalibration after each dummy has been through two crash tests. Between times in which the dummy is not scheduled to be calibrated a post-test inspection is completed. If no parts are needed, the dummy is ready to be used in the next crash test.

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III 03-APR-85

VRTC SRL98 61C9HD1 HY3 SN61 HEAD DROP CAL 09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	49.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	256.26 G
PEAK LATERAL ACCELERATION	15 G MAX	3.05 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Mary L. Phelps

TEST SUPERVISOR V. L. Wolters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER 04-APR-85

VRTC SRL98 61C9NF2 HY3 SN61 CAL9 NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY		10% - 70%	51.00 %
IMPACT VELOCITY		22.53 - 22.97 FPS	22.86 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	26.72 G
	20 MS	17.40 - 22.60 G	20.31 G
	30 MS	12.50 - 18.50 G	17.16 G
MAXIMUM PENDULUM G		29 G MAX	27.67 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 46 MS	41.13 MS
D PLANE ROTATION	MAX	67 - 79 DEGREES	64.54 DEGREES **
	TIME	54 - 64 MS	60.13 MS
MOMENT ABOUT OCCIPITAL CONDYLES	MAX	70 - 90 FT.LBS	69.90 FT.LBS **
	TIME	46 - 56 MS	53.88 MS
	MIN	-22.2/-14.0 FT.LBS	-14.39 FT.LBS
	TIME	12 - 16 MS	14.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		109 - 119 MS	120.50 MS **
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		95 - 105 MS	102.63 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V. E. Watters

NOTE: New front nodding block installed.

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER 03-APR-85

VRTC SRL98 61C9NE1 HY3 SN61 CAL9 NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		66 - 78 DEGREES	73.00 DEGREES
RELATIVE HUMIDITY		10% - 70%	45.00 %
IMPACT VELOCITY		19.50 - 19.90 FPS	19.90 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	20.49 G
	20 MS	14.00 - 19.00 G	16.66 G
	30 MS	11.00 - 16.00 G	14.90 G
MAXIMUM PENDULUM G		22 G MAX	20.80 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 50 MS	44.00 MS
D PLANE ROTATION	MAX	94 - 106 DEGREES	89.48 DEGREES **
	TIME	72 - 82 MS	79.25 MS
MOMENT ABOUT OCCIPITAL CONDYLES	MAX	11.75 - 17.75 FT.LB	13.44 FT.LBS
	TIME	12 - 18 MS	15.00 MS
	MIN	-61.2/-50.8 FT.LBS	-42.62 FT.LBS **
	TIME	69 - 77 MS	75.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		151 - 167 MS	161.00 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 144 MS	140.88 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V. L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III 05-APR-85

VRTC SRL98 61C9TH1 HY3 SN61 CAL 09 H.S.THORAX 01

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	61.00 %
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
DEFLECTION AT 25 MSEC	2.51 - 2.75 INCHES	2.796 INCHES *
RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1137.4 POUNDS *
INTERNAL HYSTERESIS	75% - 85%	73.9% *

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III 05-APR-85

RIGHT KNEE
VRTC SRL98 61C9RK1 HY3 SN61 R.KNEE 11LB CAL 09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	59.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1419.71 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Mary L. Phelps

TEST SUPERVISOR K. L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III 05-APR-85

LEFT KNEE
VRTC SRL98 61C9LK1 HY3 SN61 L.KNEE 11LB CAL 09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	59.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1402.91 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V.L. Watters

POST-TEST CALIBRATION

SUBJECT VEHICLE

Dummy Damage Checklist

HyB III 4/3

OK	Damaged	
____	____	Outer skin on entire dummy (gashes, rips, etc.)
____	____	Head - Gashes, rips, general appearance, etc.
____	____	Neck - broken or cracks in rubber
____	____	Spine - broken or cracks in rubber
____	____	Ribs - check all ribs for damage (bent or broken), damping material separation.
____	____	
____	____	Bourns Pot. - bent shaft - electrical discontinuity
____	____	Accelerometer Leads - torn cables
____	____	Accelerometer Mountings (Head, Thorax, Pelvis) - check for secure mounting
____	____	
____	____	
____	____	
____	____	Other

If upon visual examination, damage is apparent in any of these areas, a VRTC representative is to be consulted for a decision on repair or replacement of parts.

Repair or Replacement Approved By:

_____ _____

Signature Date

Comments on repair or replacement of parts:

RIB # 1 SMALL + 1 LARGE CRACK (RH)

SMALL CRACKS IN RIBS # 3+4 RH LH 3+4

SMALL

No calibration data; full calibration every other test.

TRC Personnel
Checked By:

Lynn Wells 12 APR 85

Signature Date

VRTC Personnel
Checked and Approved for Testing BY:

_____ _____

Signature Date

"SID" Dummy Damage Checklist

48

OK	Damaged	
____	____	Outer skin on entire dummy (gashes, rips, etc.)
____	____	Head - Gashes, rips, general appearance, etc.
____	____	Neck - broken or cracks in rubber
____	____	Spine - broken or cracks in rubber
____	____	Ribs - check all ribs for damage (bent or broken), damping material separation.
____	____	Rib Attach Leather - breaks in leather at ribs
____	____	Bourns Pot. - bent shaft - electrical discontinuity
____	____	Accelerometer Leads - torn cables
____	____	Accelerometer Mountings (Head, Thorax, Pelvis) - check for secure mounting
____	____	Retrofit Kit (Calspan) - check for bent brackets, sagging rib cage
____	____	Thorax support wire and springs - check for damage
____	____	Overall smooth stroking of thorax left to right (no interference)
____	____	Other

If upon visual examination, damage is apparent in any of these areas, a VRTC representative is to be consulted for a decision on repair or replacement of parts.

Repair or Replacement Approved By:

_____ _____

Signature Date

Comments on repair or replacement of parts:

RIBS #1 2 CRACKS (RH side) LH RIB #1 CRACKS LH RIBS 2-5 SMALL SURFACE CRACK RH RIBS 4 & 6 SMALL CRACKS.

TPC Personnel
Checked By:

Signature

12 APR 85
Date

VRTC Personnel
Checked and Approved for Testing BY:

_____ _____

Signature Date

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

15-APR-85

VRTC SRL98 48C11HD1

HY3 SN48/HEAD#48 CAL 11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	77.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	65.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	261.24 G
PEAK LATERAL ACCELERATION	15 G MAX	4.83 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L Phelps

TEST SUPERVISOR V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

15-APR-85

6 AXIS NECK TRANSDUCER

VRTC SRL98 48C11NF1

HY3 SN48 CAL11 NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY		10% - 70%	65.00 %
IMPACT VELOCITY		22.53 - 22.97 FPS	22.86 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	24.10 G
	20 MS	17.40 - 22.60 G	19.81 G
	30 MS	12.50 - 18.50 G	17.40 G
MAXIMUM PENDULUM G		29 G MAX	24.52 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 46 MS	42.63 MS
D PLANE ROTATION	MAX	67 - 79 DEGREES	71.84 DEGREES
	TIME	54 - 64 MS	60.75 MS
MOMENT ABOUT OCCIPITAL CONDYLES	MAX	70 - 90 FT.LBS	75.45 FT.LBS
	TIME	46 - 56 MS	55.75 MS
	MIN	-22.2/-14.0 FT.LBS	-14.46 FT.LBS
	TIME	12 - 16 MS	15.25 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		109 - 119 MS	121.13 MS **
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		95 - 105 MS	104.38 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR K. E. Weiter

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

6 AXIS NECK TRANSDUCER 15-APR-85

VRTC SRL98 48C11NE1 HY3 SN48 CAL11 NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		66 - 78 DEGREES	76.00 DEGREES
RELATIVE HUMIDITY		10% - 70%	65.00 %
IMPACT VELOCITY		19.50 - 19.90 FPS	19.51 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.87 G
	20 MS	14.00 - 19.00 G	18.06 G
	30 MS	11.00 - 16.00 G	14.81 G
MAXIMUM PENDULUM G		22 G MAX	20.64 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 50 MS	39.75 MS
D PLANE ROTATION	MAX	94 - 106 DEGREES	94.84 DEGREES
	TIME	72 - 82 MS	79.38 MS
MOMENT ABOUT OCCIPITAL CONDYLES	MAX	11.75 - 17.75 FT.LB	15.22 FT.LBS
	TIME	12 - 18 MS	16.13 MS
	MIN	-61.2/-50.8 FT.LBS	-51.46 FT.LBS
	TIME	69 - 77 MS	74.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		151 - 167 MS	165.00 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 144 MS	139.63 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

16-APR-85

VRTC SRL98 48C11TH1 HY3 SN48 CAL11 H.S.THORAX 01

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
DEFLECTION AT 25 MSEC	2.51 - 2.75 INCHES	2.888 INCHES *
RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1129.9 POUNDS *
INTERNAL HYSTERESIS	75% - 85%	78.6%

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Mary L. Phelps

TEST SUPERVISOR V. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III 15-APR-85

RIGHT KNEE
VRTC SRL98 48C11RK1 HY3 SN48 R.KNEE 11LB CAL 11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	65.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1449.74 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V. L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III 15-APR-85

LEFT KNEE
VRTC SRL98 49C11LK1 HY3 SN48 L.KNEE 11LB CAL 11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	76.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	65.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1390.34 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR W. L. Watters

POST-TEST CALIBRATION

PARTNER VEHICLE

Dummy Damage Checklist

HyB III 45

OK	Damaged	
✓		Outer skin on entire dummy (gashes, rips, etc.)
		Head - Gashes, rips, general appearance, etc.
		Neck - broken or cracks in rubber
		Spine - broken or cracks in rubber
		Ribs - check all ribs for damage (bent or broken), damping material separation.
		Bourns Pot. - bent shaft - electrical discontinuity
		Accelerometer Leads - torn cables
		Accelerometer Mountings (Head, Thorax, Pelvis) - check for secure mounting
		Other

If upon visual examination, damage is apparent in any of these areas, a VRTC representative is to be consulted for a decision on repair or replacement of parts.

Repair or Replacement Approved By:

_____ _____

Signature Date

Comments on repair or replacement of parts:

SMALL CUT ON FOREHEAD (BY PIECE OF GLASS)
USUAL OK.

TRC Personnel
Checked By:

_____ 12/85

Signature Date

VRTC Personnel
Checked and Approved for Testing BY:

_____ _____

Signature Date

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III 15-APR-85

VRTC SRL98 45C8HD1 HY3 SN45 HEAD#U1 CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	77.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	64.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.88 G
PEAK LATERAL ACCELERATION	15 G MAX	-5.12 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR K. F. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER 12-APR-85

VRTC SRL98 45C8NF1 HY3 SN45 CAL8 NECK FLEXION 01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY		10% - 70%	63.00 %
IMPACT VELOCITY		22.53 - 22.97 FPS	22.86 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	26.20 G
	20 MS	17.40 - 22.60 G	21.34 G
	30 MS	12.50 - 18.50 G	17.83 G
MAXIMUM PENDULUM G		29 G MAX	28.45 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 46 MS	41.00 MS
D PLANE ROTATION	MAX	67 - 79 DEGREES	77.45 DEGREES
	TIME	54 - 64 MS	60.00 MS
MOMENT ABOUT OCCIPITAL CONDYLES	MAX	70 - 90 FT.LBS	77.52 FT.LBS
	TIME	46 - 56 MS	53.75 MS
	MIN	-22.2/-14.0 FT.LBS	-14.71 FT.LBS
	TIME	12 - 16 MS	14.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		109 - 119 MS	121.25 MS **
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		95 - 105 MS	103.25 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V.L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER 12-APR-85

VRTC SRL98 45C8NE1 HY3 SN45 CAL8 NECK EXTEN. 01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		66 - 78 DEGREES	76.00 DEGREES
RELATIVE HUMIDITY		10% - 70%	61.00 %
IMPACT VELOCITY		19.50 - 19.90 FPS	19.90 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	20.59 G
	20 MS	14.00 - 19.00 G	18.86 G
	30 MS	11.00 - 16.00 G	15.93 G
MAXIMUM PENDULUM G		22 G MAX	21.62 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 50 MS	38.63 MS
D PLANE ROTATION	MAX	94 - 106 DEGREES	91.61 DEGREES **
	TIME	72 - 82 MS	73.88 MS
MOMENT ABOUT OCCIPITAL CONDYLES	MAX	11.75 - 17.75 FT.LB	14.81 FT.LBS
	TIME	12 - 18 MS	14.75 MS
	MIN	-61.2/-50.8 FT.LBS	-54.24 FT.LBS
	TIME	69 - 77 MS	70.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		151 - 167 MS	157.38 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 144 MS	134.63 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR K. L. Watts

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III 16-APR-85

VRTC SRL98 45C8TH1 HY3 SN45 CAL08 H.S.THORAX 01

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	71.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
DEFLECTION AT 25 MSEC	2.51 - 2.75 INCHES	2.563 INCHES
RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1163.4 POUNDS *
INTERNAL HYSTERESIS	75% - 85%	75.5%

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III 12-APR-85

RIGHT KNEE
VRTC SRL98 45C8RK1 HY3 SN45 R.KNEE 11LB CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	62.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1155.34 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR V. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III 12-APR-85

LEFT KNEE
VRTC SRL98 45C8LK1 HY3 SN45 L.KNEE 11LB CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	74.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	62.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1405.29 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR K. E. Watters

Dummy Damage Check List

Hyb 61

OK	Damaged	
		Outer skin on entire dummy (gashes, rips, etc.)
		Head - Gashes, rips, general appearance, etc.
		Neck - broken or cracks in rubber
		Spine - broken or cracks in rubber
		Ribs - check all ribs for damage (bent or broken), damping material separation.
		Rib Attach Leather - breaks in leather at ribs
		Bourns Pot. - bent shaft - electrical discontinuity
		Accelerometer Leads - torn cables
		Accelerometer Mountings (Head, Thorax, Pelvis) - check for secure mounting
		Retrofit Kit (Calspan) - check for bent brackets, sagging rib cage
		Thorax support wire and springs - check for damage
		Overall smooth stroking of thorax left to right (no interference)
		Other

If upon visual examination, damage is apparent in any of these areas, a VRTC representative is to be consulted for a decision on repair or replacement of parts.

Repair or Replacement Approved By:

Signature Date

Comments on repair or replacement of parts:

UBAC OK

No calibration data; full calibration after every other test.

TRC Personnel
Checked By:

Signature Date 12/85

VRTC Personnel
Checked and Approved for Testing BY:

Signature Date

APPENDIX D

MISCELLANEOUS TEST INFORMATION

GM HYBRID III DUMMY POSITIONING

The following procedure was used for positioning a Hybrid III dummy (GM50H) in the vehicle seat for impact testing. The procedure utilizes seat parameters for a specific vehicle body style, and if available, parameters for the individual seat being used in the test. The dummy head is positioned to keep the longitudinal accelerometers horizontal.

1. Preliminary Data

1.1 Obtain the body coordinates for the S.A.E. three dimensional manikin (Oscar) H-point at the specific seat travel location used for the test. Typically when using the Hybrid III dummy, this will be the manual seat adjuster mid travel position. If no detent is available at mid travel, use the position which would lock the seat adjuster one notch rear of mid.

1.2 If specific Oscar data is not available, design drawing information will be used to determine the design H-point location at a specified seat adjuster position.

2. Initial Dummy Placement

2.1 The Hybrid III dummies are placed in the seats of the test buck or vehicle. The pelvis is positioned such that a lateral line passing through the dummy H-point is perpendicular to the longitudinal centerplane of the vehicle.

2.1.1 Vehicle equipped with front bucket seats. The dummy is centered on the seat cushion of the bucket seat and its midsagittal plane is vertical and longitudinal.

2.1.1.1 Driver position placement. At the driver's position, the knees of the dummy are initially set 370 mm apart, measured between the outer surfaces of the knee pivot bolt heads, with the left outer surface 150 mm from the midsagittal plane of the dummy.

2.1.1.2 Passenger position placement. At the right front designated seating positon, the femur, tibia, and foot centerlines of each of the dummy's legs fall in a vertical longitudinal plane. The knees are spaced 215 mm centerline to centerline.

2.1.2 Vehicle equipped with bench seating.

2.1.2.1 Driver position placement. The dummy is placed at the left front outboard designated seating position so that its midsagittal plane is vertical and longitudinal, and passes through the center point of the plane described by the steering wheel rim.

2.1.2.2 Passenger position placement. The dummy is placed at the right front outboard designated seating position as specified in 2.1.1.2, except that the midsaggital plane of the dummy is vertical, longitudinal, and the same distance from the longitudinal centerline as the midsagittal plane of the dummy at the driver's position.

2.2 Measure the seat back angle by placing an inclinometer against the rear of the seat back cushion. Measure the angle at a point midway up the cushion and supported by a rigid portion of the seat back pan.

3. Initial Dummy Positioning

3.1 H-point positioning.

3.1.1 With the dummy laterally positioned as described in Section 2, insert the pelvis angle indicator bar in the hole provided above, and to the rear of the dummy H-point. Position the longitudinal pelvis angle betweeen 20° and 25° to the horizontal. This may be accomplished by raising the legs or flexing the upper torso forward and allowing the pelvis to rotate. The lateral pelvis angle should be horizontal.

3.1.2 Apply sufficient force on the lower torso in a horizontal and vertical direction to place the dummy H-point at the coordinates obtained in Section 1.

3.1.3 If the H-point cannot be placed at the desired coordinates, adjust the pelvis angle within the 5^{o} band and reposition to the coordinates. After repositioning the H-point, any deviation from the desired coordinates should be recorded and used to indicate actual H-point locations.

3.2 Head CG positioning. While maintaining the H-point location, adjust the Hybrid III upper torso so as to place the head accelerometer mounting surface level.

3.2.1 Remove the rear skull cap to expose the machined surface of the head. Place an inclinometer on this surface. The skull surface should be within $.5^{o}$ of vertical to maintain a proper head orientation.

4. Final Positioning

4.1 Place the dummy feet in contact with the toe pan with the heel placed at the intersection of the toe pan and floor pan. The driver right foot should be placed on the undepressed accelerator pedal, with the heel in contact with the floor pan.

If the feet cannot be placed against the toe pan without causing hip and head movement, the knee will have to be positioned first. Press down on the knees until the underside of knee joint contacts the seat cushion, or the thighs behind the joint depress the seat cushion. Place the foot perpendicular to the tibia and allow the lower leg to pivot at the knee until the heel rests on the floor pan.

4.2 The driver dummy hands are raised from the seat and, without moving the dummy are placed on the steering wheel. The hands are placed at the horizontal centerline of the steering wheel with the thumbs over the wheel rim. The wrists are outside of the steering wheel plane. Planes described by each upper and lower arm should be at or near vertical.

4.3 Prior to conducting the test, the dummy is visually checked to make certain the dummy midsagittal plane is vertical and longitudinal, the desired head, hip and knee coordinates have been maintained, the pelvis is laterally horizontal and longitudinally within the pelvis angle range, and the engineer responsible for the test is satisfied with the dummy position.

HEAD CHAMOIS USE PROCEDURE

1. Using the GM template, two 0.125 inch thick chamois from Hydra-Sponge, St. Louis, MO. were cut.

2. The chamois were soaked in water to make them soft and pliable.

3. The chamois were molded around the facial features of the dummy head and pulled taut. Both pieces of chamois were placed in the same manner.

4. Periphery of chamois were taped to the dummy's head.

5. Both chamois were allowed to dry prior to the test.

SUBJECT VEHICLE ACCELEROMETER PLACEMENT

Dummy Chest Humanoid (MFR) 43 (S/N), in Body Humanoid (MFR) 43 (S/N)

Mnenomic	Label No.	Location	Orientation (+Sensing)	Serial No.	Mfr/Model
LFMF1	718	Left Femur	Tension	718	2430
RFMF1	761	Right Femur	Tension	761	2430
CSTXG1	X	Chest (X)	Front	AK58	7264
CSTYG1	X	Chest (Y)	Right	AE04	7264
CSTZG1	Y	Chest (Z)	Up	AA33	7264
HEDXG1	A	Head (X)	Front	AK29	7264
HEDYG1	B	Head (Y)	Left	AJ34	7264
HEDZG1	C	Head (Z)	Up	AH89	7264
NEKXF1	XF	Neck (X)	Front	050	186
NEKYM1	YM	Neck (Y)	Left	050	186
NEKZF1	ZF	Neck (Z)	Tension	050	186
CSTXD1	CP1	Chest		CP1	Bournes

*With 10 Vdc input (2000 g range).

SUBJECT VEHICLE ACCELEROMETER PLACEMENT

Dummy Chest Humanoid (MFR) 48 (S/N), In Body Humanoid (MFR) 48 (S/N)

Mnenomic	Label No.	Location	Orientation (+Sensing)	Serial No.	Mfr/Model
LFMF2	756	Left Femur	Tension	756	2430
RFMF2	721	Right Femur	Tension	721	2430
CSTXG2	10	Chest (X)	Rear	AB62	7264
CSTYG2	11	Chest (Y)	Right	AL08	7264
CSTZG2	12	Chest (Z)	Up	AL46	7264
HEDXG2	8	Head (X)	Front	AH58	7264
HEDYG2	9	Head (Y)	Left	AH77	7264
HEDZG2	13	Head (Z)	Up	AH88	7264
HD1XG	4	Head (X)	Front	AK52	7264
HD1ZG	6	Head (Z)	Up	AU49	7264
HD2YC	2	Head (Y)	Left	AC88	7264
HD2ZG	3	Head (Z)	Up	AK48	7264
HD3XG	1	Head (X)	Front	AJ37	7264
HD3YG	5	Head (Y)	Left	AK30	7264
NEKXF2		Neck (X)	Front	076	1716
NEKXM2		Neck (X)	Right	076	1716

*With 10 Vdc input (2000 g range).

SUBJECT VEHICLE ACCELEROMETER PLACEMENT CONTD

Dummy Chest Humanoid (MFR) 48 (S/N), in Body Humanoid (MFR) 48 (S/N)

Mnenomic	Label No.	Location	Orientation (+Sensing)	Serial No.	Mfr/Model
NEKYM2		Neck (Y)	Front	076	1716
NEKYF2		Neck (Y)	Left	076	1716
NEKZF2		Neck (Z)	Tension	076	1716
NEKZM2		Neck (Z)	Tension	076	1716
KNLF2	14L	Left Knee	Tension	014	1587
KNLFB	14R	Left Knee	Tension	014	1587
KNLXD		Left Knee			Carter
KNRF2	221	Right Knee	Tension	022	1587
KNRFB	22R	Right Knee	Tension	022	1587
KNRXD		Right Knee			Carter
TBLXM2	16X	Left Tibia	Left	016	1583
TBLYM2	16Y	Left Tibia	Rear	016	1583
TBRXM2	23X	Right Tibia	Left	023	1583
TBRYM2	23Y	Right Tibia	Rear	023	1583
ANLYF2	12Y	Left Ankle	Left	012	1584
ANLZF2	12Z	Left Ankle	Tension	012	1584
ANLXM2	12X	Left Ankle	Left	012	1584
ANRYF2	19Y	Right Ankle	Left	019	1584
NARZF2	19Z	Right Ankle	Tension	019	1584
ANRXM2	19X	Right Ankle	Left	019	1584
CSTXD2		Chest			Bournes

*With 10 Vdc input (2000 g range).

PARTNER VEHICLE ACCELEROMETER PLACEMENT

Dummy Chest Humanoid (MFR) 45 (S/N), in Body Humanoid (MFR) 45 (S/N)

Mnenomic	Label No.	Location	Orientation (+Sensing)	Serial No.	Mfr/Model
LFMF1	716	Left Femur	Tension	716	2430
RFMF1	726	Right Femur	Tension	726	2430
CSTXG1	U	Chest (X)	Front	AN03	7264
CSTYG1	V	Chest (Y)	Right	AP96	7264
CSTZG1	W	Chest (Z)	Up	AD12	7264
HEDXG1	X	Head (X)	Front	AP48	7264
HEDYG1	Y	Head (Y)	Left	AN71	7264
HEDZG1	Z	Head (Z)	Up	AN92	7264
NEKXF1	XF	Neck (X)	Front	049	186
NEKYM1	YM	Neck (Y)	Left	049	186
NEKZF1	ZF	Neck (Z)	Up	049	186
KNLF1	13L	Left Knee	Tension	013	1587
KNLFA	13R	Left Knee	Tension	013	1587
KNRF1	21L	Right Knee	Tension	021	1587
KNRFA	21R	Right Knee	Tension	021	1587
TBLXM1	15X	Left Tibia	Left	015	1583
TBLYM1	15Y	Left Tibia	Rear	015	1583
TBRXM1	24X	Right Tibia	Left	024	1583
TBRYM1	24Y	Right Tibia	Rear	024	1583

*With 10 Vdc input (2000 g range).

PARTNER VEHICLE ACCELEROMETER PLACEMENT CONTD

Dummy Chest Humanoid (MFR) 45 (S/N), in Body Humanoid (MFR) 45 (S/N)

Mnenomic	Label No.	Location	Orientation (+Sensing)	Serial No.	Mfr/Model
ANLYF1	11Y	Left Ankle	Left	011	1584
ANLZF1	11Z	Left Ankle	Tension	011	1584
ANLXM1	11X	Left Ankle	Left	011	1584
ANRYF1	20Y	Right Ankle	Left	020	1584
ANRZF1	20Z	Right Ankle	Tension	020	1584
ANRXM1	20X	Right Ankle	Left	020	1584
CSTXD1	CP2	Chest		CP2	Bournes

*With 10 Vdc input (2000 g range).

PARTNER VEHICLE ACCELEROMETER PLACEMENT

Dummy Chest Humanoid (MFR) 61 (S/N), in Body Humanoid (MFR) 61 (S/N)

Mnenomic	Label No.	Location	Orientation (+Sensing)	Serial No.	Mfr/Model
LFMF2	742	Left Femur	Tension	742	2430
RFMF2	610	Right Femur	Tension	610	2430
CSTXG2	B	Chest (X)	Front	AR17	7264
CSTYG2	C	Chest (Y)	Left	AH65	7264
CSTZG2	E	Chest (Z)	Up	AP62	7264
HEDXG2	13	Head (X)	Front	AB67	7264
HEDYG2	14	Head (Y)	Left	AA05	7264
HEDZG2	15	Head (Z)	Up	AK96	7264
NEKXF2		Neck (X)	Front	051	186
NEKYM2		Neck (Y)	Left	051	186
NEKZF2		Neck (Z)	Up	051	186

*With 10 Vdc input (2000 g range).

SUBJECT VEHICLE ACCELEROMETER INFORMATION

MNEMONIC	DESCRIPTION	SERIAL NO.	MODEL NO.
FFRXG	FRONT FRAME RAIL X-DIR	AL31	2264
FFCXG	FRONT CROSS MEMBER X-DIR	AL43	2264
BCRXG	BRAKE CALIPER; RIGHT X-DIR	AN06	2264
ENGXG2	ENGINE BOTTOM X-DIR	AN02	2264
ENGXG1	ENGINE BLOCK TOP X-DIR	AK87	7264
SCAPG	STEERING COLUMN LOWER A-P AXIS	AJ02	2264
SH1PG	STEERING WHEEL HUB A-P AXIS	AJ92	2264
SH1IG	STEERING WHEEL HUB I-S AXIS	AJ97	2264
DPCXG	DASH PANEL X-DIR	AL14	7264
DPCZG	DASH PANEL Z-DIR	AS86	2264
VCGV	PITCH RATE GYRO		
LPBXG	LEFT B-PILLAR X-DIR	BA99	2264
LPBZG	LEFT B-PILLAR Z-DIR	AK61	2264
RPBXG	RIGHT B-PILLAR X-DIR	AJ45	2264
TLRXG4	LEFT REAR CROSS MEMBER X-DIR	AR87	2264
TLRZG4	LEFT REAR CROSS MEMBER Z-DIR	AF22	2264
TLRXGD	LEFT REAR CROSS MEMBER RED.	AG05	2264
TRRXG3	RIGHT REAR CROSS MEMBER X-DIR	AT75	2264
TRRXGC	RIGHT REAR CROSS MEMBER RED.	BA51	2264
RAXXG	REAR AXLE X-DIR	AK66	2264

PARTNER VEHICLE ACCELEROMETER INFORMATION

MNEMONIC	DESCRIPTION	SERIAL NO.	MODEL NO.
FFRXG	FRONT FRAME RAIL X-DIR	BK30	2264
FFCXG	FRONT CROSS MEMBER X-DIR	AJ25	7264
BCRXG	BRAKE CALIPER; RIGHT X-DIR	AN36	2264
ENGXG2	ENGINE BOTTOM X-DIR	AU15	7264
ENGXG1	ENGINE BLOCK TOP X-DIR	AA34	7264
SCAPG	STEERING COLUMN LOWER A-P AXIS	AS95	2264
SH1PG	STEERING WHEEL HUB A-P AXIS	AU19	2264
SH1IP	STEERING WHEEL HUB I-S AXIS	AK68	2264
DPCXG	DASH PANEL X-DIR	AL38	7264
DPCZG	DASH PANEL Z-DIR	AT11	2264
VCGV	PITCH RATE GYRO		
LPBXG	LEFT B-PILLAR X-DIR	AT21	2264
RPBXG	RIGHT B-PILLAR X-DIR	AS36	2264
TLRXG4	LEFT REAR CROSS MEMBER X-DIR	AK78	2264
TLRZG4	LEFT REAR CROSS MEMBER Z-DIR	AJ31	7264
TLRXGD	LEFT REAR CROSS MEMBER RED.	AA32	7264
TRRXG3	RIGHT REAR CROSS MEMBER X-DIR	AJ90	2264

CAMERA INFORMATION

CAMERA IDENTIFICATION	TIME ZERO ON HIGH SPEED FILM
Photosonics	
Circular timing pulses on one side, verticle event bar on other side.	Back 4 frames from frame where verticle event bar stops.
Hycam	
Square shaped timing pulses on one side, verticle event bar on other side.	Back 5 frames from frame where vertical event bar stops.
Stalex	
Square shaped timing pulses on one side, verticle event bar on other side.	Back 2 frames from frame where vertical event bar stops.

SIGN CONVENTION

Sign convention for SRL 98 neck load cells and transducers.
Compression (-) on femur load cells and load cells in barrier face.

Neck Transducer Notation

3 channel neck transducer

F_x (shear force)	(+) head translating forward
	(-) head translating rearward
F_z (axial force)	(+) tension on neck
	(-) compression on neck
M_y (moment)	(+) forward rotation about neck (chin to thorax, flexion)
	(-) rearward rotation about neck (back of head to spine, extension)

6 channel neck transducers

F_x (shear force)	(+) same as 3 channel transducer
	(-) same as 3 channel transducer
F_y (latereal force)	(+) head translating to left relative to top of neck
	(-) head translating to right relative to top of neck
F_z (axial force)	(+) same as 3 channel transducer
	(-) same as 3 channel transducer
M_x (moment)	(+) head rotation toward right shoulder
	(-) head rotation toward left shoulder
M_y (moment)	(+) same as 3 channel transducer
	(-) same as 3 channel transducer
M_z (moment)	(+) chin rotation to left shoulder
	(-) chin rotation to right shoulder

All other channels in dummies or vehicle are to follow right hand rule.

(+) Forward X
(+) Left Y
(+) Up Z
(+) Pitch Rate (nose down)

SIGN CONVENTION CONTD

Knee loads are measusred along a line between the knee pivot and the ankle pivot.

F_z (axial force)	(+) tension
	(-) compression

Tibia Moments

M_x (moment about X)	(+) tibia rotation to dummy's left
	(-) tibia rotation to dummy's right
M_y (moment about Y)	(+) tibia rotation reaward
	(-) tibia rotation forward

Ankle Loads

F_y (force in Y dir.)	(+) ankle translation to dummy's left
	(-) ankle translation to dummy's right
F_z (force in Z dir.)	(+) tension
	(-) compression

Ankle Moments

M_x (moment about X)	(+) ankle rotation to dummy's left
	(-) ankle rotation to dummy's right

FILTERING DATA

J211 SAE

Vehicle structual accelerations Class 60

Occupant

- Head Accelerometer Class 1000
- Chest Accelerometer Class 180
- Chest Deflection Class 180
- Femur Force Class 600
- Pelvis Accelerometer Class 180
- Lower Leg Class 600