

DOT 48 '1' 1

FRONTAL CRASH RESPONSES

A FULL FRONTAL CRASH TEST  
OF TWO 1983 DODGE OMNIS  
WITH A CLOSING VELOCITY OF 59.9 MPH

PREPARED BY:  
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EAST LIBERTY, OHIO 43319



TEST REPORT  
DECEMBER 1985

PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
400 SEVENTH STREET, S.W.  
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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 two 1983 Dodge Omni 5-door hatch backs at the TRCO Crash Test Facility, East Liberty, Ohio. One Dodge Omni was towed into the other Dodge Omni at 0° with a closing velocity of 59.9 mph. One Hybrid III dummy was located in the driver's designated seating position and one Part 572 dummy was located in the right front position in the Subject vehicle. One Part 572 dummy was located in the driver's designated position and one Hybrid III dummy was located in the right front position in the Partner vehicle. The test date was November 6, 1985 and the ambient temperature was 46° F.					
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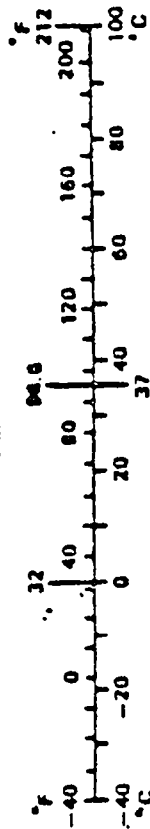
# METRIC CONVERSION FACTORS

## 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 <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
acres	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	metric ton	t
	(2000 lb)			
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
in <sup>3</sup>	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 <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>
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 <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
km <sup>2</sup>	square kilometers	0.4	square miles	mi <sup>2</sup>
ha	hectares	2.5	acres	
	(10 000 m <sup>2</sup> )			
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton	1.1	short tons	
	(1000 kg)			
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
ml	milliliters	0.06	cubic inches	in <sup>3</sup>
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m <sup>3</sup>	cubic meters	35	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.3	cubic yards	yd <sup>3</sup>
TEMPERATURE (exact)				
°C	degrees Celsius	9/5 (then degrees add 32)	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

Two 1983 Dodge Omni 5-door hatchbacks were used in a full frontal impact with a closing velocity of 59.9 mph on November 6, 1985. The intended impact speed of the Dodge Omni was 59.9 mph. The actual test speed of the Dodge Omni was 59.9 mph.

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: 1B3BZ18C7DD168463

BODY STYLE: 5-door Hatchback

MODEL YEAR: 1983

NHTSA NO.: R & D

COLOR: red

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT 135CID

TRANSMISSION DATA: 5-Speed

DATE VEHICLE RECEIVED: NA

ODOMETER READING: 228

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	No	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	Yes	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
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: 1/83

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 III P175/75R13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 3 ply

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? Yes

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 24 1/8	;LF 23 13/16	;RR 24 1/4	;LR 24 1/4
PRE-TEST ATTITUDE:	RF 23 5/16	;LF 23 1/4	;RR 23 3/8	;LR 23 3/8
POST-TEST ATTITUDE:	RF 25 15/16	;LF 26 3/8	;RR 21 3/4	;LR 24 1/4

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 219 LBS. CARGO:

RIGHT FRONT	775	LBS.	RIGHT REAR	601	LBS.
LEFT FRONT	827	LBS.	LEFT REAR	592	LBS.
TOTAL FRONT WEIGHT	1602	LBS.	(57.3 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1193	LBS.	(42.7 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	2795	LBS.			

WEIGHT OF BALLAST SECURED IN VEHICLE BACK SEAT AREA: 50 LBS.

\* This weight is taken from a previous Omni which was weighed earlier in the program. Delivered weight was not required to achieve target weight, and therefore, was not recorded.



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: 13.0 GALLONS (92-94% OF USEABLE)  
FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 13.0 GALLONS  
DETAILS OF FUEL SYSTEM: DNA

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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: P175/75R13 LOAD RANGE X B, C,  
VEHICLE CAPACITY: TYPES OF SEATS: Front - bucket  
Rear - bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 2 FRONT  
3 REAR  
CARGO LOAD 115 LBS. 5 TOTAL  
TOTAL 865 LBS.

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

SUBJECT VEHICLE TEST CONDITIONS

TEST NUMBER: 851106

DATE OF TEST: November 6, 1985

TIME OF TEST: 14:33

WIND VELOCITY: 0-3 mph @ 230°

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA:

46° F

TEMPERATURE IN OCCUPANT COMPARTMENT:

78° F

DRIVER DUMMY TEMPERATURE

78° F

PASSENGER DUMMY TEMPERATURE

78° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
TEST WEIGHT (LBS.)	2795	2930*
VEHICLE ORIENTATION (DEGREES)	0	0
VEHICLE VELOCITY (MPH)	0	0
MAXIMUM CRUSH (INCHES)	20.9	DNA

DUMMIES

	<u>DRIVER</u>	<u>MIDDLE PASSENGER</u>	<u>RT. FRONT PASSENGER</u>	<u>LEFT REAR PASSENGER</u>	<u>RT. REAR PASSENGER</u>
TYPE:	HYBIII		P572		
SERIAL NO.:	48		411		
INSTRUMENTATION:					
HEAD ACCEL.:	3		3		
CHEST ACCEL.:	3		3		
FEMUR L.C.'S:	2		2		
OTHER:	3 Neck Channels				
	14 Lower Leg Channels				
	2 Knee Displacement				
	1 Chest Displacement				

RESTRAINT SYSTEM: Both dummies were 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: Chrysler Corporation

MAKE/MODEL: 1983 Dodge Omni

VIN: 1B3BZ18C5DD265323

BODY STYLE: 5-door hatchback

MODEL YEAR: 1983

NHTSA NO.: R & D

COLOR: blue

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT 135CID

TRANSMISSION DATA: 5 speed

DATE VEHICLE RECEIVED: 9/23/85

ODOMETER READING: 25

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	No	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? Yes  
Rocker panel below the right front passenger's door was damaged and had to be repaired.
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.

PARTNER VEHICLE TIRE DATA

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

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Goodyear, Viva II P175/75R13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 3 ply

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? Yes

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.	(63.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	820	LBS.	(37.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	2245*	LBS.			

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 25 1/8	;LF 25 1/2	;RR 25 1/8	;LR 25 1/2
PRE-TEST ATTITUDE:	RF 23 1/2	;LF 23 3/4	;RR 23 7/16	;LR 23 7/8
POST-TEST ATTITUDE:	RF 23 5/8	;LF 21 3/8	;RR 24 1/2	;LR 23 3/16

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 231 LBS. CARGO:

RIGHT FRONT	786	LBS.	RIGHT REAR	624	LBS.
LEFT FRONT	832	LBS.	LEFT REAR	565	LBS.
TOTAL FRONT WEIGHT	1618	LBS.	(57.6 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1189	LBS.	(42.3 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	2807	LBS.			

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

\* This weight is taken from a previous Omni which was weighed earlier in the program. Delivered weight was not required to achieve test weight, and therefore, was not recorded.



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: 13.0 GALLONS (92-94% of Useable)  
FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 13 GALLONS  
DETAILS OF FUEL SYSTEM: DNA

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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: P175/75R13 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  
CARGO LOAD   115   LBS.   5   TOTAL  
TOTAL   865   LBS.

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

PARTNER VEHICLE TEST CONDITIONS

TEST NUMBER: 851106

DATE OF TEST: November 6, 1985

TIME OF TEST: 14:33

WIND VELOCITY: 0-3 mph @ 230°

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA:

46° F

TEMPERATURE IN OCCUPANT COMPARTMENT:

68° F

DRIVER DUMMY TEMPERATURE

68° F

PASSENGER DUMMY TEMPERATURE

68° F

PARTNER VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
TEST WEIGHT (LBS.)	2807	2930*
VEHICLE ORIENTATION (DEGREES)	0	0
VEHICLE VELOCITY (MPH)	59.9	59.9
MAXIMUM CRUSH (IN.)	21.8	DNA

DUMMIES

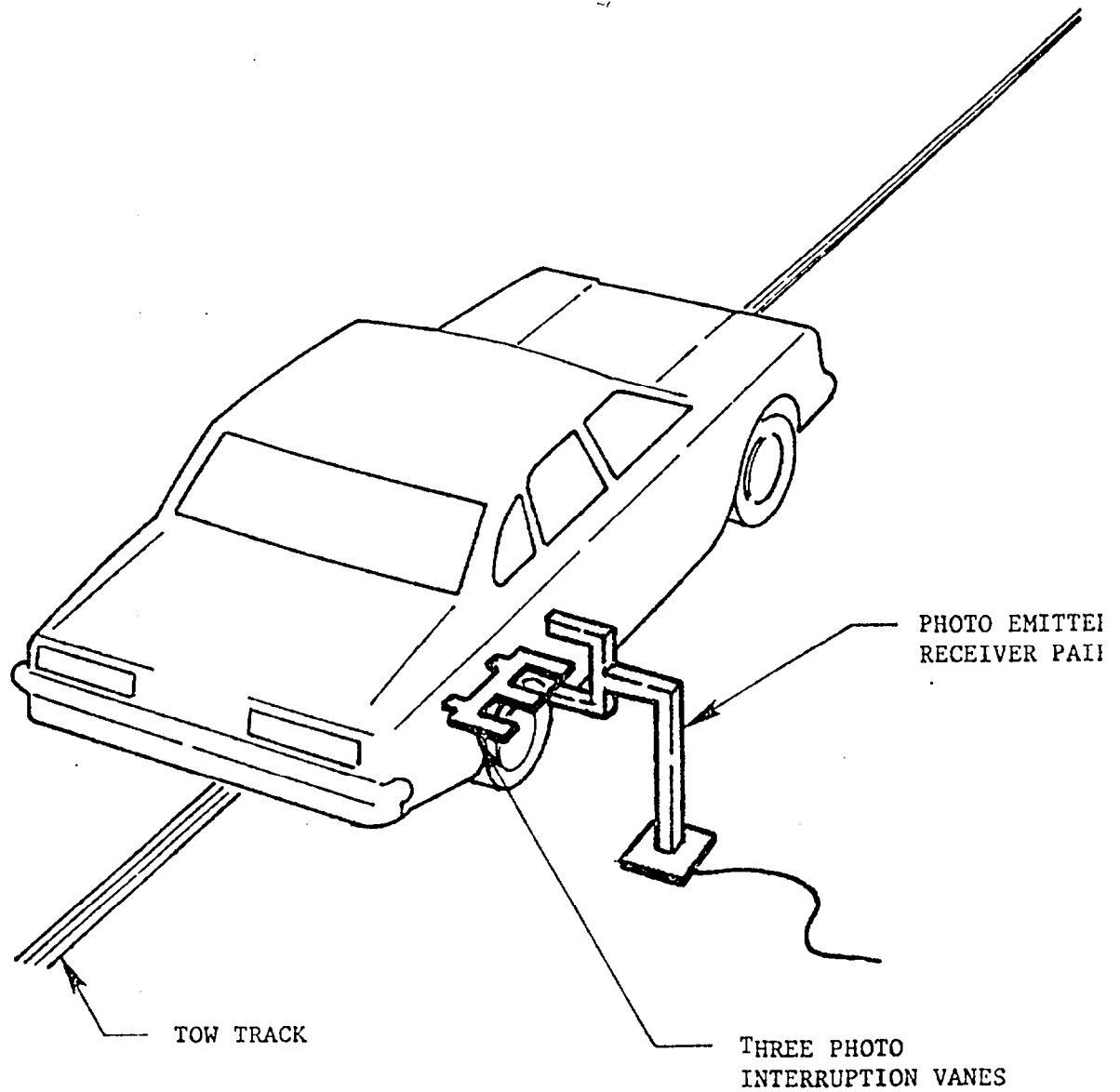
	<u>DRIVER</u>	<u>MIDDLE PASSENGER</u>	<u>RT. FRONT PASSENGER</u>	<u>LEFT REAR PASSENGER</u>	<u>RT. REAR PASSENGER</u>
TYPE:	P572		HYBIII		
SERIAL NO.:	830		45		
INSTRUMENTATION:					
HEAD ACCEL.:	3		3		
CHEST ACCEL.:	3		3		
FEMUR L.C.'S:	2		2		
OTHER:			1 Chest Disp. 14 Lower leg 2 Knee shear 3 Neck ch.		

RESTRAINT SYSTEM: Both dummies were unrestrained

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

\* Intended test weight is based on the weight of a Renault Fuego.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver two 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				PASSENGER DUMMY			
	SN: 48				SN: 411			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
HEAD ACCELERATION (g)								
LONGITUDINAL	32.63	183.88	74.30	90.38	222.77	239.50	69.83	91.25
LATERAL	7.64	209.75	24.27	97.00	75.07	82.75	27.39	110.63
VERTICAL	7.81	209.75	37.15	92.63	197.10	116.00	94.91	239.63
RESULTANT		84.23 @	90.38			245.27 @	239.50	
HIC	712.15 from 72.25 to 105.38				2255.69 from 111.38 to 119.00			
NECK LOADS (lb)								
SHEAR (X)	147.09	211.13	146.99	91.50	---	---	α	---
AXIAL (Z)	744.36	96.88	193.85	210.38	---	---	α	---
NECK MOMENTS (lb-ft)								
ABOUT LATERAL	54.06	90.38	16.42	262.75	---	---	α	---
CHEST ACCELERATION (g)								
LONGITUDINAL	---	---	γ	---	11.00	166.88	125.87	110.38
LATERAL	12.21	75.00	4.74	64.00	4.20	114.88	27.64	104.38
VERTICAL	8.69	98.75	7.81	90.50	5.88	272.50	18.61	98.38
RESULTANT		12.65 @	74.88 <sup>σ</sup>			126.44 @	110.38	
3 MSEC CLIP		7.09 <sup>σ</sup>				106.67		
CHEST DISPLACEMENT (in)	0.34 @	77.63			---	---	α	---
FEMUR LOADS (lb)								
LEFT	92.99	52.63	1001.49	101.63	144.61	52.13	1054.64	78.63
RIGHT	200.88	118.13	998.70	62.13	82.90	56.88	1206.97	89.38

SUBJECT VEHICLE DUMMY DATA SUMMARY CONTD

	DRIVER DUMMY			
	SN: 48			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX	TIME	MAX	TIME
KNEE LOADS (lb)				
LEFT LEG				
LEFT SENSOR	211.40	107.75	299.21	45.00
RIGHT SENSOR	543.63	100.88	157.53	47.25
RIGHT LEG				
LEFT SENSOR	204.03	88.50	179.53	53.75
RIGHT SENSOR	399.13	94.00	151.96	31.38
KNEE DISPLACEMENT (in)				
LEFT KNEE	0.21	81.63	---	--- ε
RIGHT KNEE	0.07	72.75	---	--- ε

TIBIA MOMENTS (lb-ft)				
LEFT LEG				
ABOUT LONGITUDINAL	44.81	62.88	50.01	101.63
ABOUT LATERAL	107.13	103.13	72.86	62.13
RIGHT LEG				
ABOUT LONGITUDINAL	14.73	63.75	54.12	92.75
ABOUT LATERAL	277.90	96.63	52.76	62.75

ANKLE LOADS (lb)				
LEFT LEG				
LATERAL	52.74	60.00	95.34	72.38
VERTICAL	443.47	46.38	376.05	59.13
RIGHT LEG				
LATERAL	39.90	27.88	96.88	92.50
VERTICAL	365.31	40.00	213.80	106.25

ANKLE MOMENTS (lb-ft)				
LEFT LEG				
ABOUT LONGITUDINAL	90.50	61.88	9.88	92.75
RIGHT LEG				
ABOUT LONGITUDINAL	27.17	56.88	17.08	103.63

\* LONGITUDINAL: FORWARD  
 LATERAL: LEFTWARD  
 VERTICAL: UPWARD

\*\*LONGITUDINAL: REARWARD  
 LATERAL: RIGHTWARD  
 VERTICAL: DOWNWARD

Y See TEST ANOLMALIES

α No instrumentation at this location

ε No negative value in the time interval of interest

σ Using Y and Z only

## PARTNER VEHICLE DUMMY DATA SUMMARY

	DRIVER DUMMY				PASSENGER DUMMY			
	SN: 830				SN: 45			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
HEAD ACCELERATION (g)								
LONGITUDINAL	43.74	198.50	82.91	73.50	30.47	233.388	111.93	81.63
LATERAL	---	--- Y	---	--- Y	19.97	240.50	17.83	114.50
VERTICAL	7.43	201.25	111.59	88.13 $\sigma$	113.59	107.63	80.87	88.50
RESULTANT		118.14 @	88.13			119.08 @	81.63	
HIC	670.96	from 86.88 to 106.38			1432.46	from 85.13 to 113.13		
NECK LOADS (lb)								
SHEAR (X)	---	--- $\alpha$	---	--- $\alpha$	94.53	179.38	514.59	107.63
AXIAL (Z)	---	--- $\alpha$	---	--- $\alpha$	1065.55	89.00	640.72	107.25
NECK MOMENTS (lb-ft)								
ABOUT LATERAL	---	--- $\alpha$	---	--- $\alpha$	29.32	160.38	141.09	102.75
CHEST ACCELERATION (g)								
LONGITUDINAL	7.38	224.50	51.23	97.13	3.10	192.88	84.75	98.75
LATERAL	---	--- Y	---	--- Y	11.34	99.88	9.38	88.25
VERTICAL	15.58	102.25	---	--- Y	4.42	63.38	52.19	86.13
RESULTANT		---	@	---		87.39 @	98.75	
3 MSEC CLIP		---	Y			82.22		
CHEST DISPLACEMENT (in)		---	@	---		0.60 @	106.25	
FEMUR LOADS (lb)								
LEFT	182.59	335.50	1034.69	84.25	515.42	104.25	1072.83	72.25
RIGHT	113.17	335.50	1562.53	85.38	121.47	194.00	1400.98	79.50

## PARTNER VEHICLE DUMMY DATA SUMMARY CONTD

	PASSENGER DUMMY			
	SN: 45			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX	TIME	MAX	TIME
KNEE LOADS (lb)				
LEFT LEG				
LEFT SENSOR	739.94	84.88	137.47	42.50
RIGHT SENSOR	624.09	86.75	179.85	33.88
RIGHT LEG				
LEFT SENSOR	683.42	90.25	161.68	40.88
RIGHT SENSOR	1189.48	87.63	258.19	64.13
KNEE DISPLACEMENT (in)				
LEFT KNEE	0.15	74.00	---	--- ε
RIGHT KNEE	0.07	67.38	---	--- ε

---

TIBIA MOMENTS (lb-ft)				
LEFT LEG				
ABOUT LONGITUDINAL	86.91	85.00	35.28	71.50
ABOUT LATERAL	275.51	87.38 γ	116.85	65.63
RIGHT LEG				
ABOUT LONGITUDINAL	37.86	64.25	82.30	86.00
ABOUT LATERAL	283.40	85.63	65.97	60.00

---

ANKLE LOADS (lb)				
LEFT LEG				
LATERAL	91.45	85.50	42.39	71.75
VERTICAL	391.04	34.25	196.65	63.63
RIGHT LEG				
LATERAL	36.98	59.75	88.30	85.88
VERTICAL	362.28	34.25	135.15	88.50

ANKLE MOMENTS (lb-ft)				
LEFT LEG				
ABOUT LONGITUDINAL	20.12	91.38	11.36	71.88
RIGHT LEG				
ABOUT LONGITUDINAL	25.36	60.00	23.40	108.25

---

\* LONGITUDINAL: FORWARD  
 LATERAL: LEFTWARD  
 VERTICAL: UPWARD

\*\*LONGITUDINAL: REARWARD  
 LATERAL: RIGHTWARD  
 VERTICAL: DOWNWARD

γ See TEST ANOMALIES

α No instrumentation at this location

ε No negative value in the time interval of interest

σ Using X and Z only

VISIBLE DUMMY CONTACT POINTS:

	DRIVER	PASSENGER
Head	<u>Steering wheel rim</u>	<u>Windshield</u>
Chest	<u>Steering wheel</u>	<u>Upper instrument panel</u>
Abdomen	<u>None</u>	<u>None</u>
Left Knee	<u>Lower instrument panel</u>	<u>Lower instrument panel</u>
Right Knee	<u>Lower instrument panel</u>	<u>Lower instrument panel</u>

DOOR OPENING:

	LEFT	RIGHT
Front	<u>Normal</u>	<u>Normal</u>
Rear	<u>Normal</u>	<u>Normal</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Driver	<u>None</u>	<u>None</u>
Passenger	<u>None</u>	<u>None</u>

GLAZING DAMAGE:

Windshield was shattered  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

OTHER NOTABLE IMPACT EFFECTS:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

PARTNER VEHICLE

VISIBLE DUMMY CONTACT POINTS:

	DRIVER	PASSENGER
Head	<u>Steering wheel rim, instrument panel, windshield</u>	<u>Windshield</u>
Chest	<u>Steering wheel</u>	<u>Knees</u>
Abdomen	<u>Steering wheel rim</u>	<u>None</u>
Left Knee	<u>Lower instrument panel</u>	<u>Lower instrument panel</u>
Right Knee	<u>Lower instrument panel</u>	<u>Lower instrument panel</u>

DOOR OPENING:

	LEFT	RIGHT
Front	<u>Difficult</u>	<u>Tools required</u>
Rear	<u>Normal</u>	<u>Normal</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Driver	<u>None</u>	<u>None</u>
Passenger	<u>None</u>	<u>None</u>

GLAZING DAMAGE:

Windshield was shattered  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

OTHER NOTABLE IMPACT EFFECTS:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## SUBJECT VEHICLE DUMMY KINEMATIC SUMMARY

### DRIVER

During impact, the dummy slid forward on the seat as its knees contacted the lower instrument panel. The dummy continued forward as its chest contacted the steering wheel and its head struck the upper steering wheel rim. The dummy rebounded and came to rest with its knees embedded in the lower instrument panel, lower back resting on the seat cushion and leaning back against the seatback.

### PASSENGER

During impact, the dummy slid forward on the seat as its knees struck the lower instrument panel. The dummy continued forward as its head struck the windshield. The dummy's head then rotated backward, allowing the dummy's chest to contact the upper instrument panel. The dummy rebounded and came to rest with its knees embedded in the lower instrument panel, buttocks on the front edge of the seat cushion and leaning back against the seatback.

## PARTNER VEHICLE DUMMY KINEMATIC SUMMARY

### DRIVER

During impact, the dummy slid forward on the seat as its knees contacted the lower instrument panel. The dummy's forward motion continued as its chest struck the steering wheel and its head struck the upper steering wheel rim, the upper instrument panel and windshield. The dummy rebounded and came to rest with its knees embedded in the lower instrument panel, buttocks on the front edge of the seat cushion and leaning back against the seatback.

### PASSENGER

During impact the dummy slid forward on the seat as its knees impacted the lower instrument panel. The dummy's forward motion continued as its head struck the windshield. The dummy's head then rotated backward, allowing the dummy's chest to contact the upper instrument panel and its knees. The dummy rebounded and came to rest sitting upright and slightly forward on the seat.

## DUMMY TEMPERATURE CONTROL AND POSITIONING

Both vehicles were taken outside and positioned at the impact area between 11:00 and 11:30 hours on the day of the test. At this point heaters were placed into the windows of the vehicles to maintain the temperature. The vehicles remained in this position until approximately 13:10. 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 14:33.

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.

DUMMY IN-VEHICLE POSITION  
RECORDING SHEET

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

SEAT TYPE: Bench ADJUSTER TYPE:  Manual  
 Bucket Power  
 Split Bench

BUCKET SEAT BACK TYPE: Fixed  
 Adjustable Reclining

TECHNICIANS:

1. R. Benavides
2. B. Miller
3. \_\_\_\_\_
4. \_\_\_\_\_

POSITIONING DATE: November 6, 1985

AMBIENT TEMP.: 70° F. TIME: 8:00

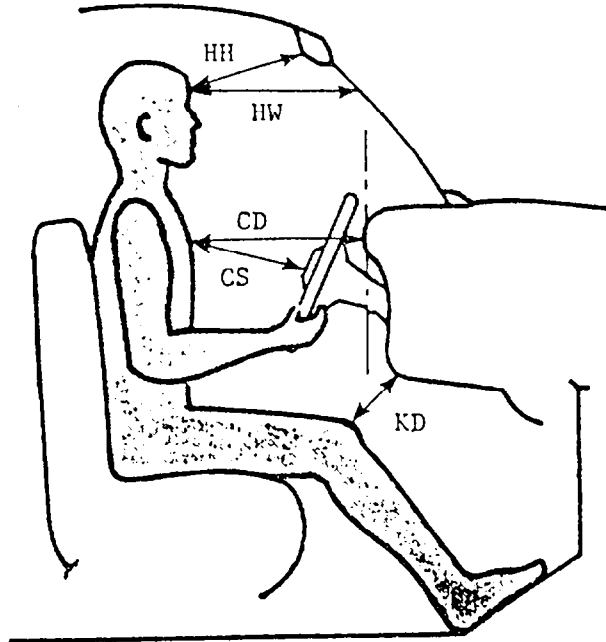
<p>DRIVER DUMMY # <u>830</u> TYPE <u>P572</u>                  Seatback Angle <u>24°</u>                  Head <u>20 7/16"</u>                   Target <u>11°</u>                   Knee <u>25 3/8"</u>                   Joint <u>101°</u>                   Approx. "H" <u>10 9/16"</u>                   Point <u>131°</u></p>	<p>PASSENGER DUMMY # <u>45</u> TYPE <u>HI11</u>                  Seatback Angle <u>24°</u>                  Pelvis Angle <u>24°</u> Head <u>20 1/4"</u>                   Target <u>29°</u>                   Knee <u>27 5/16"</u>                   Joint <u>93°</u>                   Approx. "H" <u>13 7/16"</u>                   Point <u>116°</u></p>
<p>A = <u>48 3/4"</u>                  B = <u>36 3/4"</u>                  C = <u>11"</u>                  D = <u>12"</u></p> <p>Door Glass Height* <u>11 1/8"</u>                  Lateral Bar                  Adjustable Pointer</p> <p>Left Front Door      Driver Dummy# 830      Passenger Dummy# 45      Right Front Door</p>	

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

DUMMY IN-VEHICLE POSITION RECORDING SHEET

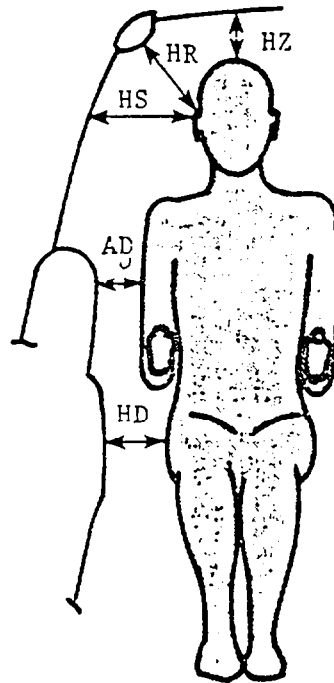
DRIVER PASSENGER  
48 411

HH	10 1/4	12 5/8
HW	14 11/16	16 7/8
CD	19 1/4	25
CS	14 3/4	NA
KDL	5 1/4	6 11/16
KDR	5 11/16	6 11/16



DRIVER PASSENGER  
48 411

HR	6 1/2	5 3/4
HS	8 1/4	8 3/16
AD	3 3/16	4 1/4
HD	6 5/16	6 1/2
HZ	3 1/2	2 5/8

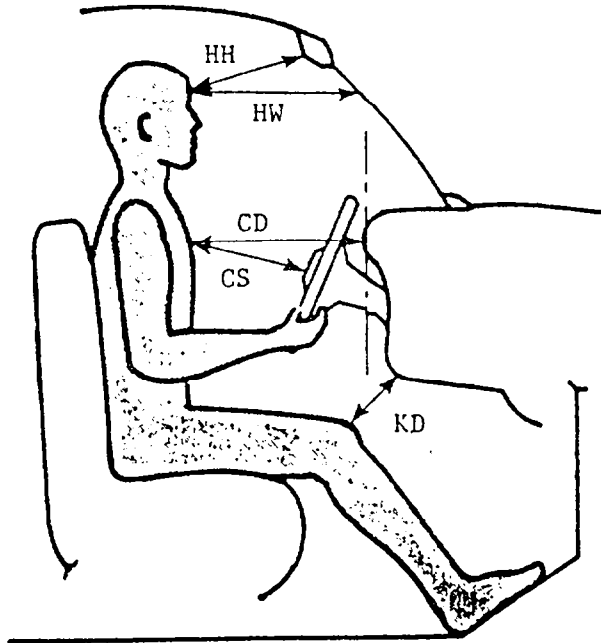


ALL MEASUREMENTS IN INCHES

PASSENGER VEHICLE  
DUMMY IN-VEHICLE POSITION RECORDING SHEET

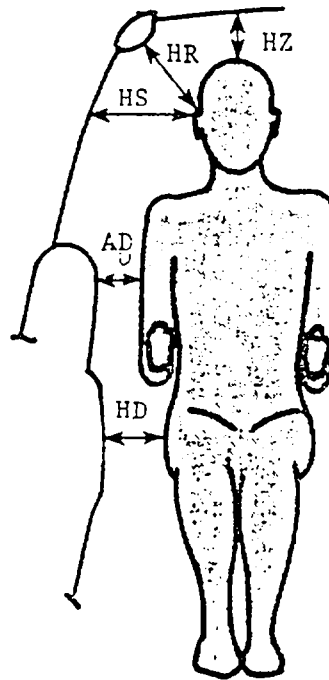
DRIVER	PASSENGER
830	45

HH	11 7/8	9 15/16
HW	16 1/8	16
CD	19 1/16	21 5/8
CS	18 5/16	NA
KDL	7 1/2	5
KDR	6 15/16	4 9/16

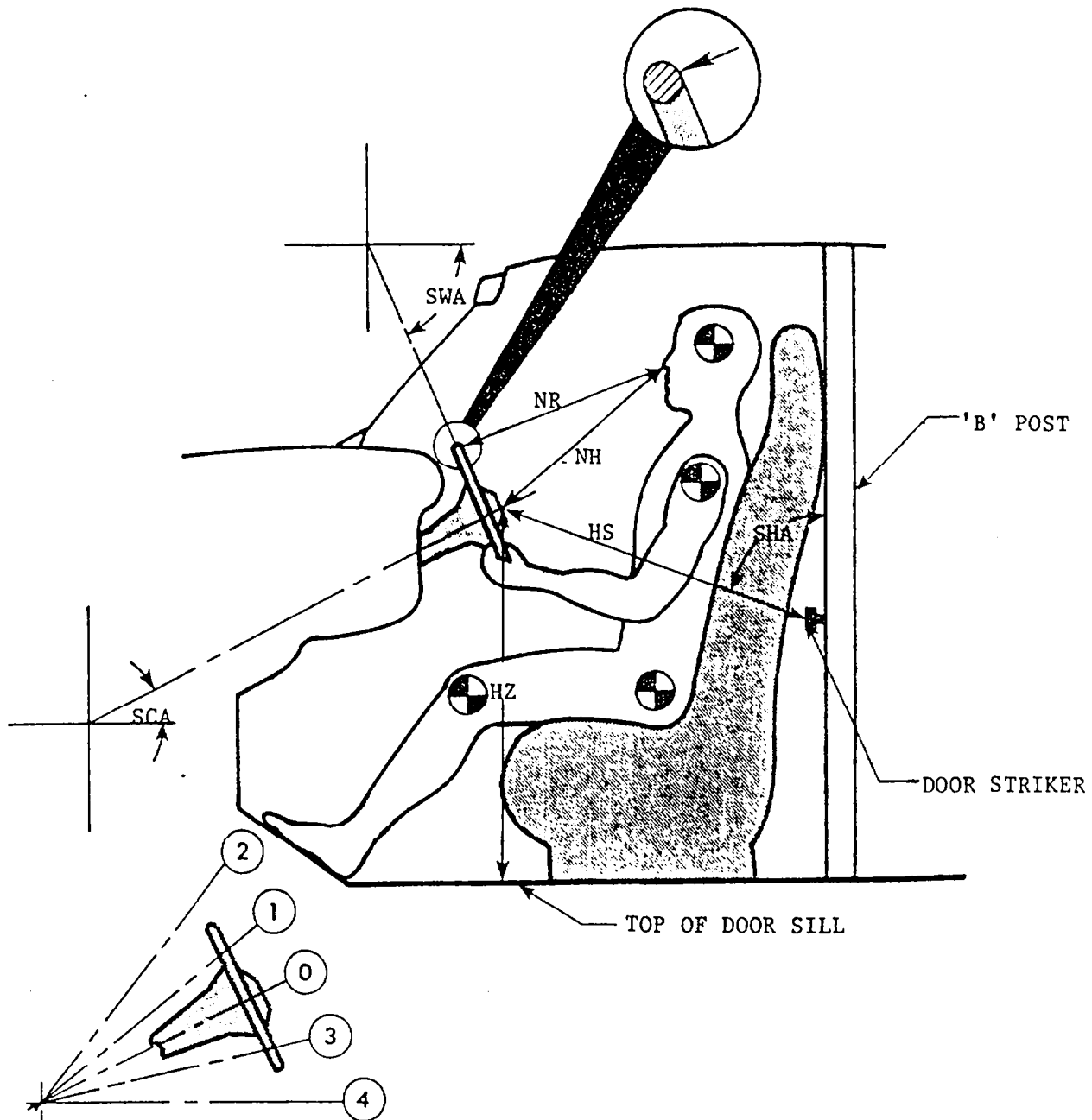


DRIVER	PASSENGER
830	45

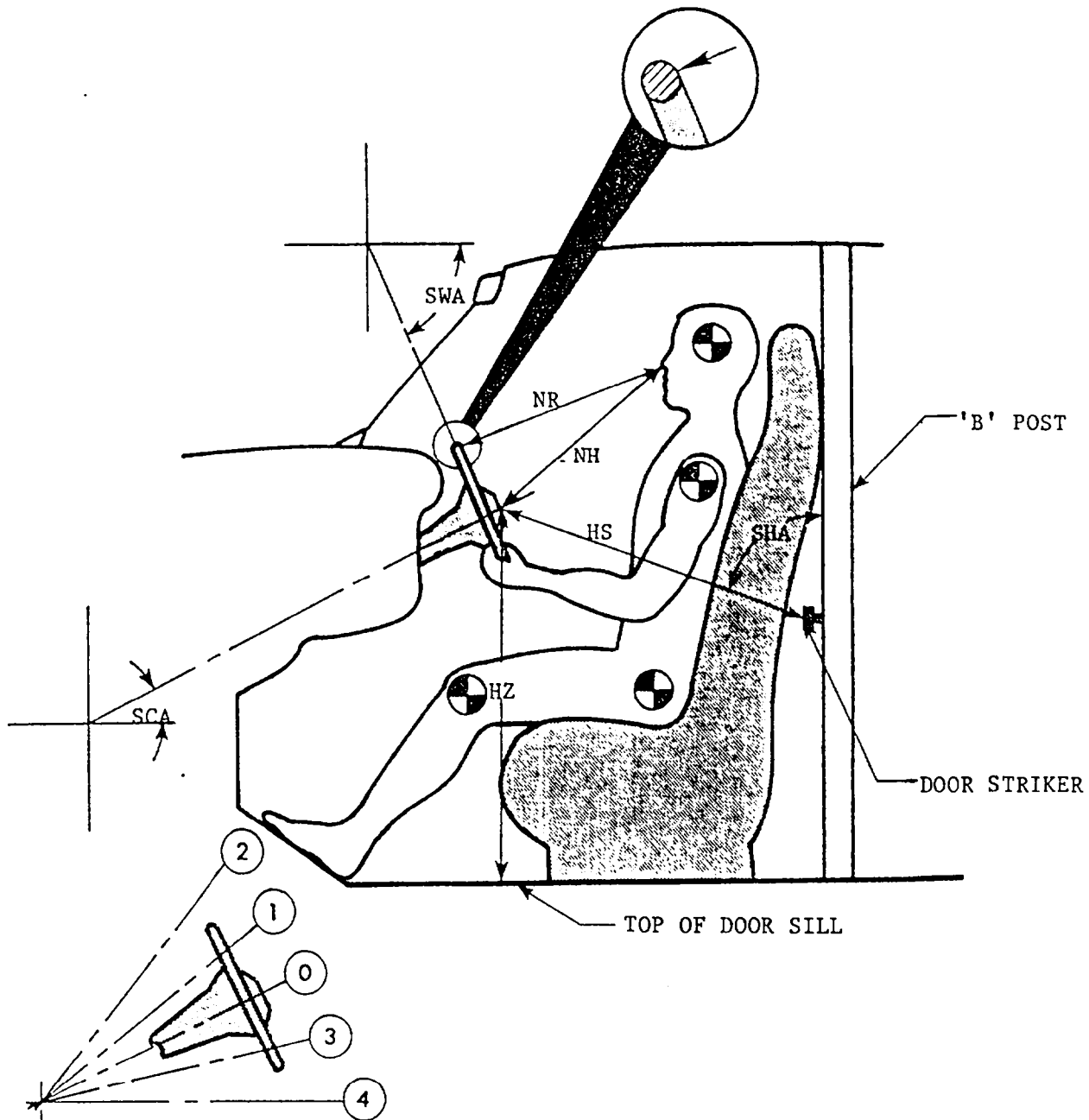
HR	5 5/8	7 5/16
HS	7 13/16	9 1/16
AD	3 3/16	4 1/16
HD	7 1/8	6 1/8
HZ	2 1/2	4 1/2



ALL MEASUREMENTS IN INCHES



	PRE-TEST	POST-TEST
NR	13 13/16"	NA
NH	18 3/4"	NA
HS	26 1/4"	25 1/2"
SCA	26°	33°
SWA	64°	63°
HZ	21 1/4"	23 7/16"
SHA	19°	26°



	PRE-TEST	POST-TEST
NR	17 7/16"	NA
NH	22 3/4"	NA
HS	27 1/16"	25
SCA	26°	39°
SWA	64°	51°
HZ	18 7/8"	23"
SHA	79°	66°

SUBJECT VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION***		NEGATIVE DIRECTION***	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	FORWARD FRAME RAIL (LONGITUDINAL)	142.5	-18.5	19.8	44.73	66.88	204.00	13.38
2	FRONT FRAME CROSSMEMBER (LONGITUDINAL)	127.8	0.0	4.6	26.38	41.50	133.90	46.75 Y
3	BRAKE CALIPER; FRONT RIGHT (LONGITUDINAL)	134.3	-24.9	10.5	58.85	64.00	131.05	51.00
4	ENGINE BOTTOM (LONGITUDINAL)	140.8	0.0	5.5	28.32	47.50	217.75	22.25 Y
5	ENGINE BLOCK TOP (LONGITUDINAL)	138.5	-1.5	30.8	30.11	63.00	93.37	43.50
6	STEERING COLUMN; LOWER (A-P AXIS)	118.3	12.8	33.3	12.77	70.13	98.53	43.75
7	STEERING WHEEL HUB (A-P AXIS) (I-S AXIS)	100.9	13.4	31.0	26.61 19.83	70.50 31.50	84.99 66.23	44.50 87.13
8	STEERING COLUMN DISPLACEMENT (A-P AXIS)				---	--- α	---	--- α
9	DASH PANEL (LONGITUDINAL) (VERTICAL)	108.8	0.0	34.3	31.13 40.84	107.50 59.25	44.46 36.48	48.13 68.25
10	PITCH RATE GYRO	87.5	0.0	16.3	38.97	30.88	435.26	61.63
11	B-PILLAR SILL - LEFT (LONGITUDINAL) (VERTICAL)	71.8	23.6	9.8	5.13 18.88	105.88 62.00	25.56 7.11	56.50 Y 6.75
12	B-PILLAR SILL - RIGHT (LONGITUDINAL) (VERTICAL)	71.5	-23.5	10.0	7.25	112.38	35.47	49.00 Y
13	REAR SEAT LEFT CROSSMEMBER (LONGITUDINAL)P** (VERTICAL)	60.9	13.5	14.8	3.46 8.78	106.25 87.88	31.10 5.72	63.88 36.88
14	REAR SEAT LEFT CROSSMEMBER (LONGITUDINAL)R**	49.9	13.5	12.3	---	--- Y	---	--- Y

SUBJECT VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY CONTD

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION***		NEGATIVE DIRECTION***	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
15	REAR SEAT RIGHT CROSSMEMBER (LONGITUDINAL)P**	61.0	-13.0	14.6	3.06	17.13	29.44	37.00
	(LONGITUDINAL)P** $\Delta V = 32.7 \text{ mph @ } 103.63 \text{ msec}$							
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

$\alpha$  No instrumentation at this location

## PARTNER VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION***		NEGATIVE DIRECTION***	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	FORWARD FRAME RAIL (LONGITUDINAL)	143.1	-18.0	21.0	---	--- Y	95.73	17.38
2	FRONT FRAME CROSSMEMBER (LONGITUDINAL)	128.0	0.0	5.3	11.87	15.75	80.35	37.50
3	BRAKE CALIPER; FRONT RIGHT (LONGITUDINAL)	133.5	-23.5	10.4	43.43	35.88	100.87	46.13
4	ENGINE BOTTOM (LONGITUDINAL)	140.0	-0.5	6.4	24.61	49.88	95.26	24.00
5	ENGINE BLOCK TOP (LONGITUDINAL)	137.6	0.9	30.6	12.27	59.25	87.75	40.75
6	STEERING COLUMN; LOWER (A-P AXIS)	115.5	12.3	22.4	170.43	40.63	63.68	52.25
7	STEERING WHEEL HUB (A-P AXIS) (I-S AXIS)	101.3	13.0	32.0	41.74 40.87	76.50 64.50	87.74 53.90	36.50 59.38
8	STEERING COLUMN DISPLACEMENT (A-P AXIS)				---	--- $\alpha$	---	--- $\alpha$
9	DASH PANEL (LONGITUDINAL) (VERTICAL)	108.5	0.0	35.8	---	--- Y	---	--- Y
					129.47	98.00	38.52	103.75
10	PITCH RATE GYRO	131.0	0.0	18.0	129.73	65.63	383.19	45.13
11	B-PILLAR SILL - LEFT (LONGITUDINAL) (VERTICAL)	71.3	24.0	11.1				
		$\Delta V = 33.9 \text{ mph @ } 108.75 \text{ msec}$			1.53	148.00	27.01	38.25
					14.70	64.25	15.23	58.00
12	B-PILLAR SILL - RIGHT (LONGITUDINAL)	70.8	-23.5	10.5				
		$\Delta V = 31.3 \text{ mph @ } 118.63 \text{ msec}$			10.47	28.13	33.04	39.00
13	REAR SEAT LEFT CROSSMEMBER (LONGITUDINAL)P** (VERTICAL)	59.6	11.3	15.4				
		$\Delta V = 33.9 \text{ mph @ } 107.75 \text{ msec}$			2.46	127.00	27.38	66.13
					8.04	92.63	12.27	43.00
14	REAR SEAT LEFT CROSSMEMBER (LONGITUDINAL)R**	49.4	12.0	13.2				
					1.09	224.50	29.04	66.38

PARTNER VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY CONTD

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION***		NEGATIVE DIRECTION***	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
15	REAR SEAT RIGHT CROSSMEMBER (LONGITUDINAL)P**	59.8	-12.0	15.4				
	$\Delta V = 37.0 \text{ mph @ } 125.00 \text{ msec}$				7.42	128.13	41.22	40.13
16	REAR SEAT RIGHT CROSSMEMBER (LONGITUDINAL)R**	49.3	-12.9	12.9				
					2.42	126.50	33.95	40.13
17	REAR AXLE CENTERLINE (LONGITUDINAL)	42.5	0.0	6.3				
					7.80	113.88	31.48	43.25

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

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

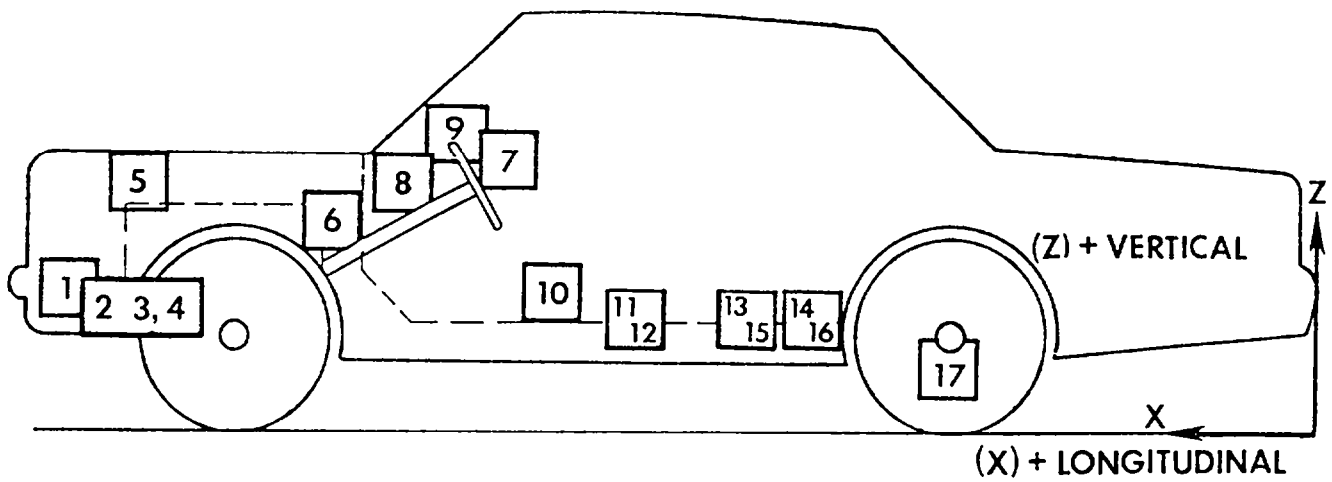
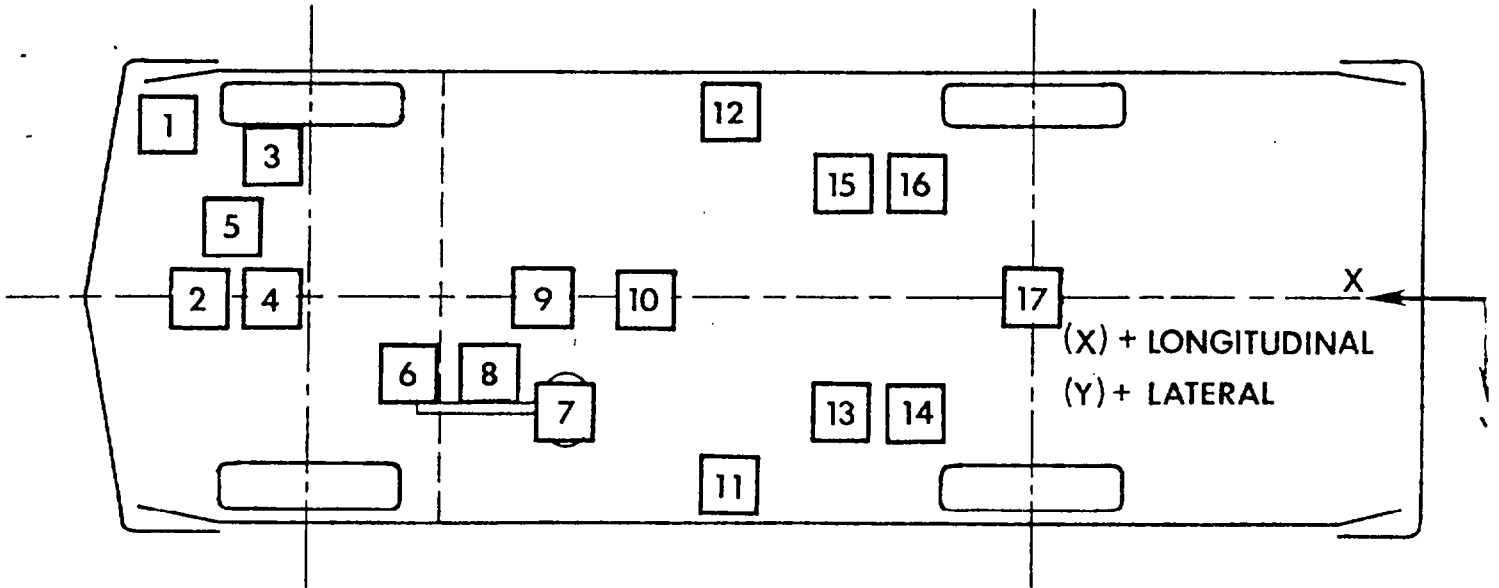
\*\*\* POSITIVE DIRECTION LONGITUDINAL: FORWARD  
LATERAL: LEFTWARD  
VERTICAL: UPWARD  
NEGATIVE DIRECTION LONGITUDINAL: REARWARD  
LATERAL: RIGHTWARD  
VERTICAL: DOWNWARD

ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS IN INCHES.

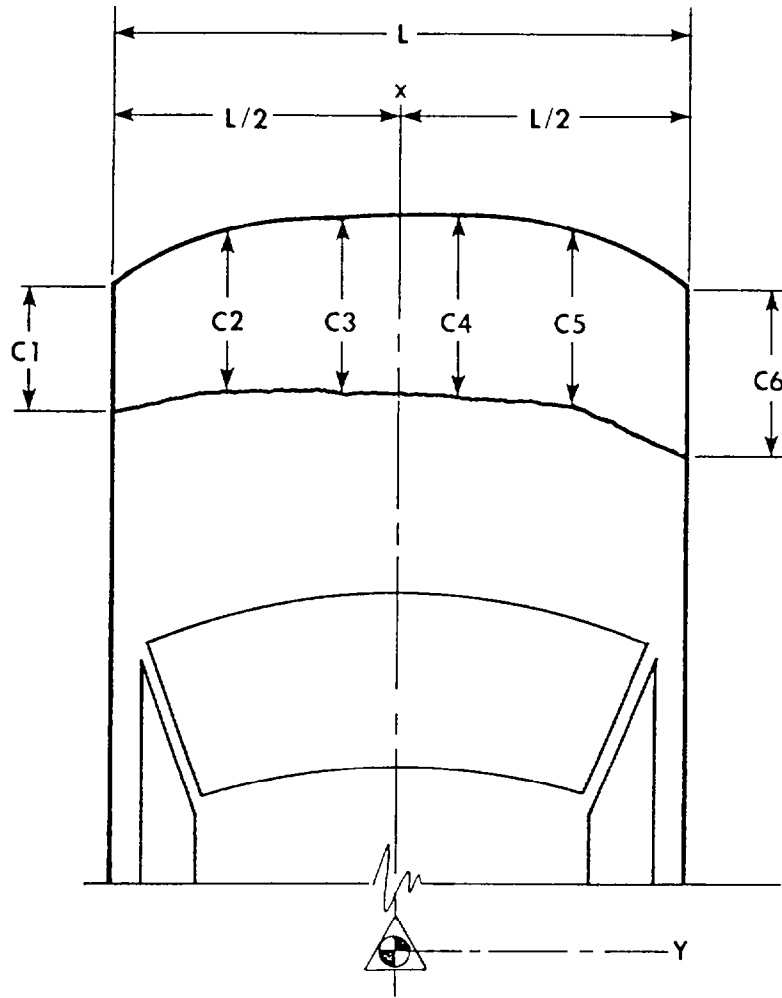
Y See TEST ANOMALIES

<sup>α</sup> No instrumentaiton at this location

# VEHICLE ACCELEROMETER LOCATIONS



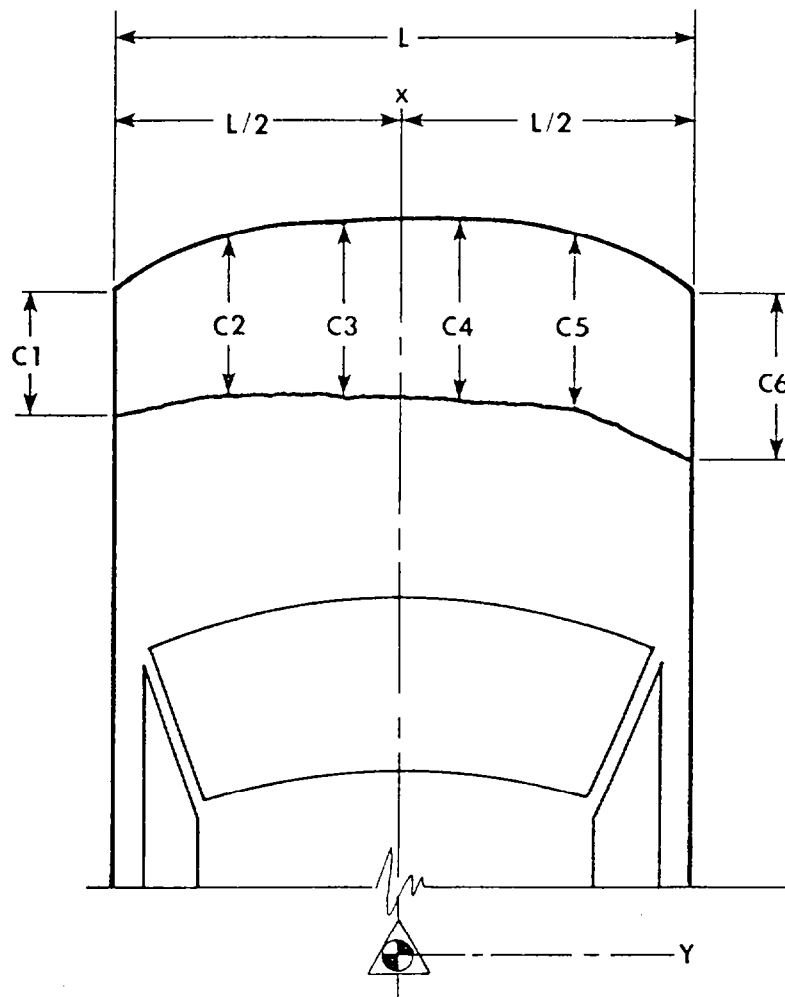
SUBJECT VEHICLE



VEHICLE Red Dodge Omni

	<u>PRE-TEST</u>	<u>POST-TEST</u>	<u>CRUSH</u>
L	<u>55 1/4</u>	<u>L</u>	<u>L</u>
C1	<u>162 1/4</u>	<u>C1 142 13/16</u>	<u>C1 19 7/16</u>
C2	<u>162 7/8</u>	<u>C2 142 1/4</u>	<u>C2 20 5/8</u>
C3	<u>163 5/16</u>	<u>C3 142 3/8</u>	<u>C3 20 15/16</u>
C4	<u>163 5/16</u>	<u>C4 142 3/8</u>	<u>C4 20 15/16</u>
C5	<u>162 7/8</u>	<u>C5 142 15/16</u>	<u>C5 19 15/16</u>
C6	<u>162 1/8</u>	<u>C6 142 3/4</u>	<u>C6 19 3/8</u>
D	<u>0</u>	<u>D 0</u>	<u>D 0</u>

PARTNER VEHICLE



VEHICLE Blue Dodge Omni

	<u>PRE-TEST</u>	<u>POST-TEST</u>	<u>CRUSH</u>
L	<u>55</u>	<u>                    </u>	<u>                    </u>
C1	<u>161 3/4</u>	<u>141 7/16</u>	<u>20 5/16</u>
C2	<u>162 13/16</u>	<u>142 15/16</u>	<u>19 7/8</u>
C3	<u>163 7/16</u>	<u>142 7/8</u>	<u>20 9/16</u>
C4	<u>163 5/8</u>	<u>142</u>	<u>21 5/8</u>
C5	<u>162 15/16</u>	<u>141 1/8</u>	<u>21 13/16</u>
C6	<u>161 13/16</u>	<u>140 3/4</u>	<u>21 1/16</u>
D	<u>0</u>	<u>                    </u>	<u>                    </u>

SUBJECT VEHICLE  
IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL Dodge Omni TEST NUMBER 851106

		DIMENSIONS IN INCHES	
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST
X 1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	163 3/16	142 1/2
X 2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	138 5/8	134 1/4
X 3	REAR SURFACE OF VEHICLE TO FIREWALL	125	NA
X 4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	108 3/8	107 1/2
X 5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	108 3/8	107 5/8
X 6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	110	109 13/16
X 7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	110 1/2	110 3/8
X 8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	71 7/8	71
X 9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	71 15/16	70 7/8
X 10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	71 3/4	71 3/8
X 11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	71 1/2	71 1/2
X 12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF RIGHT SIDE	110 1/2	110 7/16
X 13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF LEFT SIDE	111 1/16	110 13/16
X 14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	126	122 11/16
X 15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	125 15/16	124 5/8
X 16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	99 3/4	98 1/2
Y 17	STEERING COLUMN TO "A" POST	15 1/4	14 7/8

SUBJECT VEHICLE

IMPACTED VEHICLE MEASUREMENTS CONTD

VEHICLE MAKE/MODEL Dodge Omni

TEST NUMBER 851106

		DIMENSIONS IN INCHES	
NO	TYPE OF MEASUREMENT	PRE TEST	POST TEST
Z18	REAR OF WINDSHIELD HEADER TO STEERING WHEEL CENTER	20 1/4	16 5/8
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	162 1/8	142 3/4
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	162 1/4	142 13/16
X21	WIDTH OF ENGINE BLOCK	4	4
Z22	RIGHT FRONT SILL TO GROUND PLANE	8 3/4	7 3/4
Z23	LEFT FRONT SILL TO GROUND PLANE	8 5/8	8 1/2
Z24	RIGHT REAR SILL TO GROUND PLANE	9 7/16	9 3/8
Z25	LEFT REAR SILL TO GROUND PLANE	9 3/8	9 1/2
X26	FIREWALL TO ENGINE OR TRANSAXLE	10 1/2	0
Z27	VERTICAL DIMENSION FROM DOOR SILL TO CENTERLINE OF STEERING COLUMN	21 1/4	23 7/16
X28	WHEELBASE OF VEHICLE	99 3/8	96
Y29	WIDTH OF VEHICLE AT MAXIMUM WIDTH POINT	65 13/16	70 1/8
X30	REAR SURFACE OF VEHICLE TO ENGINE TARGET	NA	NA
X31	REAR SURFACE OF VEHICLE TO COMPARTMENT TARGET	NA	NA
X32	REAR SURFACE OF VEHICLE TO BUMPER TARGER	NA	NA
X33	REAR SURFACE OF VEHICLE TO FRAME CROSSMEMBER	NA	NA

PARTNER VEHICLE  
IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL    Dodge Omni                      TEST NUMBER 851106

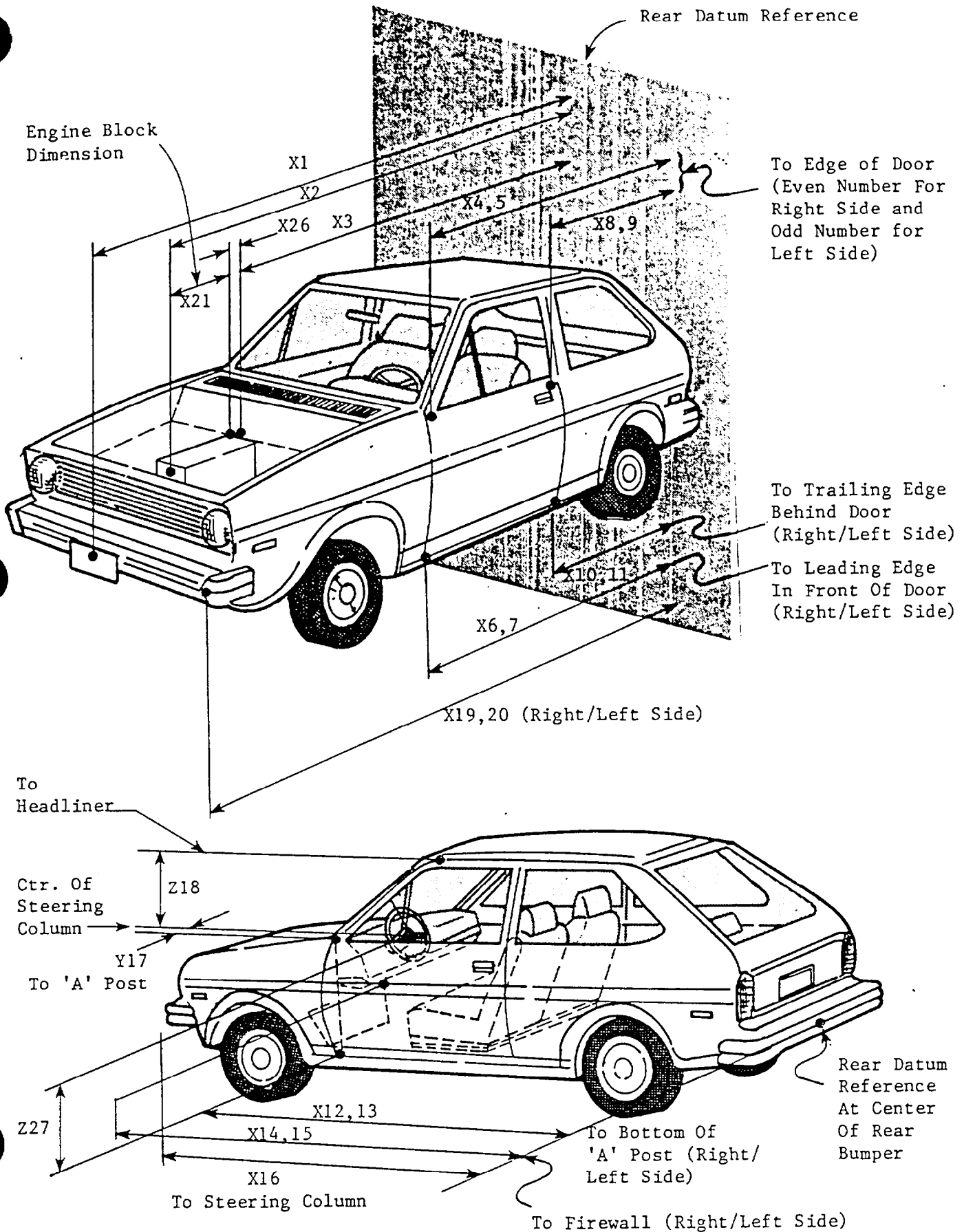
NO.	TYPE OF MEASUREMENT	DIMENSIONS IN INCHES	
		PRE-TEST	POST-TEST
X 1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	163 5/8	142
X 2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	139 3/4	134 3/4
X 3	REAR SURFACE OF VEHICLE TO FIREWALL	125	119 1/2
X 4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	108	107 5/8
X 5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	108	108 5/8
X 6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	110 3/8	109 7/8
X 7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	110 3/8	110
X 8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	71 3/8	71 5/16
X 9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	71 1/4	71 3/4
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	71 1/2	71 1/4
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	71 1/2	71
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF RIGHT SIDE	110 3/8	109 7/8
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF LEFT SIDE	110 7/16	110 5/16
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	125 1/2	121
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	123 1/4	120 7/8
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	99 1/2	98
X17	STEERING COLUMN TO "A" POST	14 5/8	12 1/4

PARTNER VEHICLE  
IMPACTED VEHICLE MEASUREMENTS CONTD

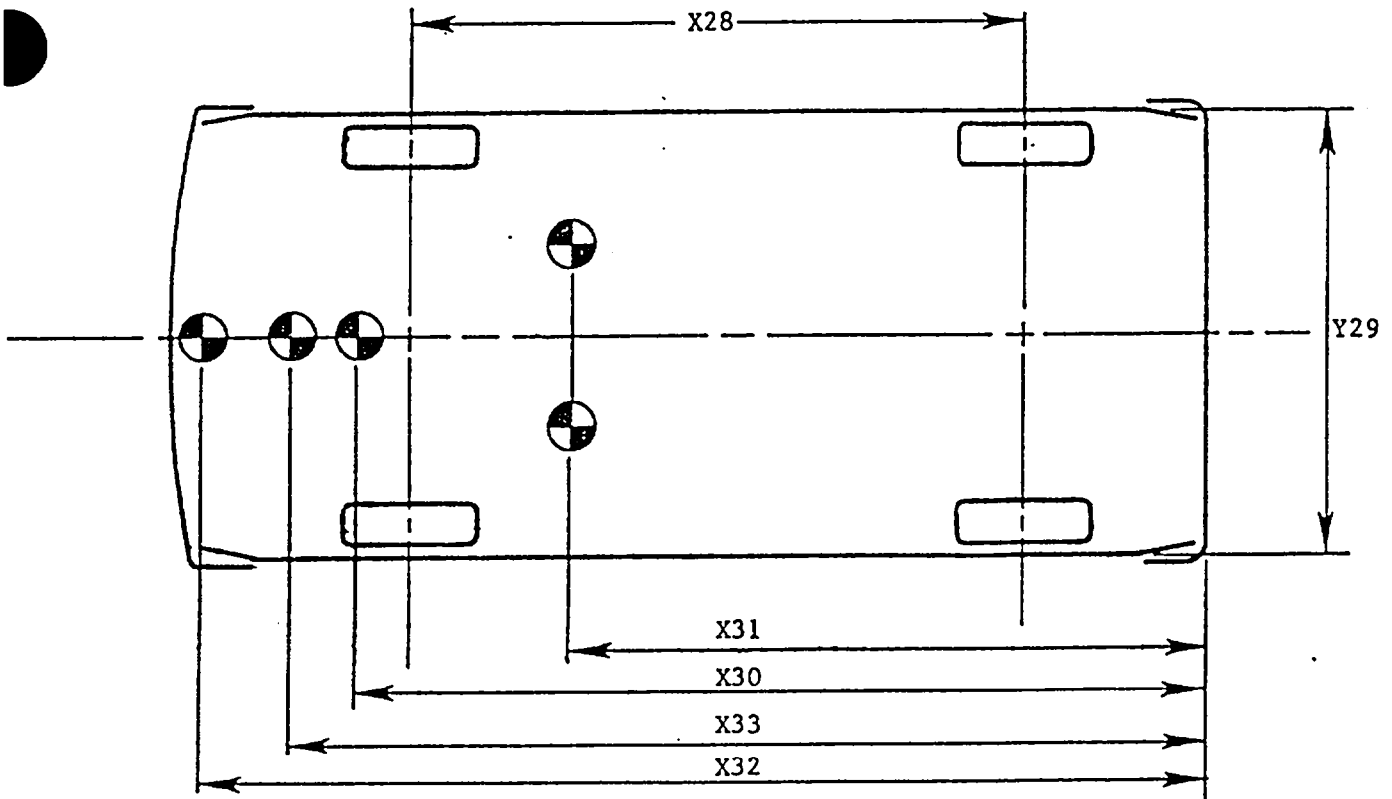
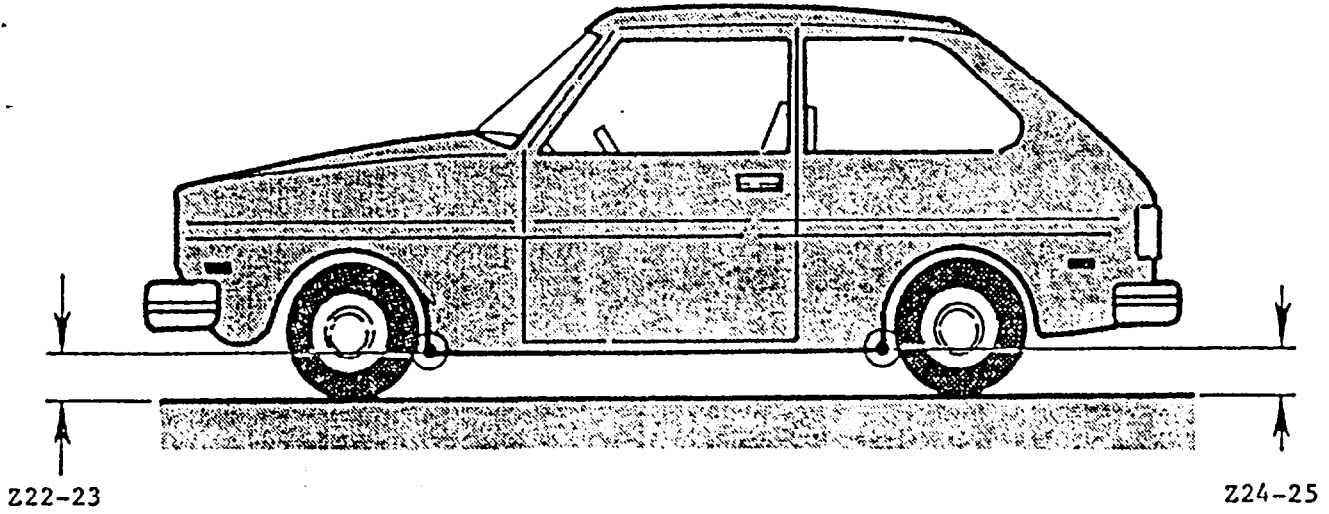
VEHICLE MAKE/MODEL Dodge Omni TEST NUMBER 851106

		DIMENSIONS IN INCHES	
NO	TYPE OF MEASUREMENT	PRE TEST	POST TEST
Z18	REAR OF WINDSHIELD HEADER TO STEERING WHEEL CENTER	20 1/2	17 1/8
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	161 13/16	140 3/4
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	161 3/4	141 7/16
X21	WIDTH OF ENGINE BLOCK	4	4
Z22	RIGHT FRONT SILL TO GROUND PLANE	9 1/8	4 1/8
Z23	LEFT FRONT SILL TO GROUND PLANE	9 1/4	5 3/4
Z24	RIGHT REAR SILL TO GROUND PLANE	9 1/2	8 7/8
Z25	LEFT REAR SILL TO GROUND PLANE	9 5/8	10 1/8
X26	FIREWALL TO ENGINE OR TRANSAXLE	11 1/2	2 1/2
Z27	VERTICAL DIMENSION FROM DOOR SILL TO CENTERLINE OF STEERING COLUMN	18 7/8	23
X28	WHEELBASE OF VEHICLE	99 3/16	94 7/16
Y29	WIDTH OF VEHICLE AT MAXIMUM WIDTH POINT	66	70 1/4
X30	REAR SURFACE OF VEHICLE TO ENGINE TARGET	NA	NA
X31	REAR SURFACE OF VEHICLE TO COMPARTMENT TARGET	NA	NA
X32	REAR SURFACE OF VEHICLE TO BUMPER TARGER	NA	NA
X33	REAR SURFACE OF VEHICLE TO FRAME CROSSMEMBER	NA	NA

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 Close-up	Photosonic 1B	25	498	Bumper Engagement
2	Left Subject Vehicle	Photosonic 1B	13	500	Vehicle Crush
3	Left Close-up Partner	Photosonic 1B	25	500	Dummy Kinematics
4	Onboard Partner Driver	Photosonic 1B	8	1001	Dummy Kinematics
5	Right Partner Vehicle	Photosonic 1B	17	1005	Bumper Engagement
6	Onboard Subject Passenger	Photosonic 1B	8	1000	Dummy Kinematics
7	Right Overall	Hycam	13	1002	Vehicle Dynamics
8	Right Close-up Partner	Photosonic 1B	50	1005	Dummy Kinematics
9	Onboard Partner Passenger	Photosonic 1B	8	1003	Dummy Kinematics
10	Right Close-up Subject	Hycam	50	1010	Dummy Kinematics
11	Onboard Subject Driver	Photosonic 1B	8	1003	Dummy Kinematics
12	Left Close-up Subject	Photosonic 1B	50	498	Dummy Kinematics
13	Overhead	Photosonic 1B	13	513	Vehicle Crush
14	Right	Kodak	16	24	Real Time

NOTE: All camera locations are relative to the partner vehicle.  
 For camera information see page D-15

HIGH SPEED CAMERA INFORMATION

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CAMERA NO.	X*	Y*	Z*
1	0"	-17' 11"	31"
2	4' 6"	-24'	32"
3	-12' 5"	-14' 4"	64"
5	-4' 6"	24'	32"
7	0"	47'	45"
8	-14' 4"	24' 2"	72"
10	-15' 9"	32'	71"
12	14' 5"	-24' 4"	75"
13	0	0	18'
14	-27"	0	-12' 2"

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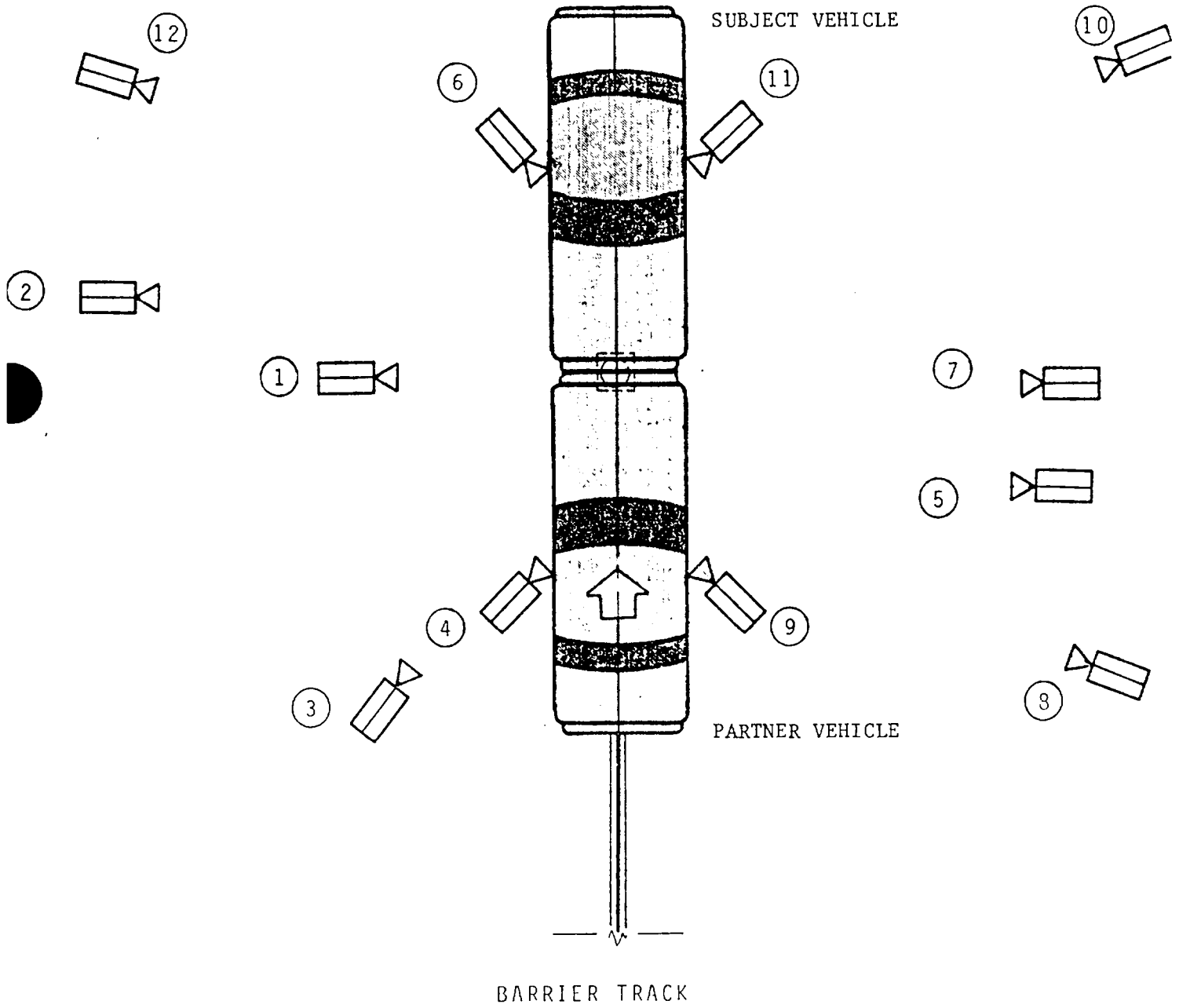
\*Reference

+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 X axis chest accelerometer, CSTXG1, did not record data after 90 msec due to the cable being pulled out of the connector.

The following channels did not return to zero following impact.

Front frame rail, X axis, FFRXG

Front frame crossmember, X axis, FFCXG

Lower engine, X axis, ENGXG2

Upper engine, X axis, ENGXG1

Steering column, A-P axis, SCAPG

Steering wheel hub, I-S axis, SH1IG

Left B pillar, X axis, LPBXG

Right B pillar, X axis, RPBXG

The redundant X axis left rear seat accelerometer, TLRXGD, did not record data due to a failed transducer.

The driver's right upper tibia Y axis moment, TBRYM1, reached its full scale value.

### PARTNER VEHICLE

The driver's Y axis head accelerometer, HEDYG1, did not record data after 78 msec due to a failed transducer.

The driver's Y axis chest accelerometer, CSTYG1, recorded anomalous spikes at approximately 26 and 116 msec.

The driver's Z axis chest accelerometer, CSTZG1, recorded an anomalous spike at approximately 65 msec.

The passenger's right upper tibia Y axis moment, TBRYM2, reached its full scale value.

The passenger's left upper tibia Y axis moment, TBLYM2, reached its full scale value.

The dash panel X axis accelerometer, DPCXG, did not record data throughout the test.

The front frame rail X axis accelerometer, FFRXG, recorded an anomalous spike at 45 msec due to a pinched cable.

APPENDIX A  
PHOTOGRAPHS

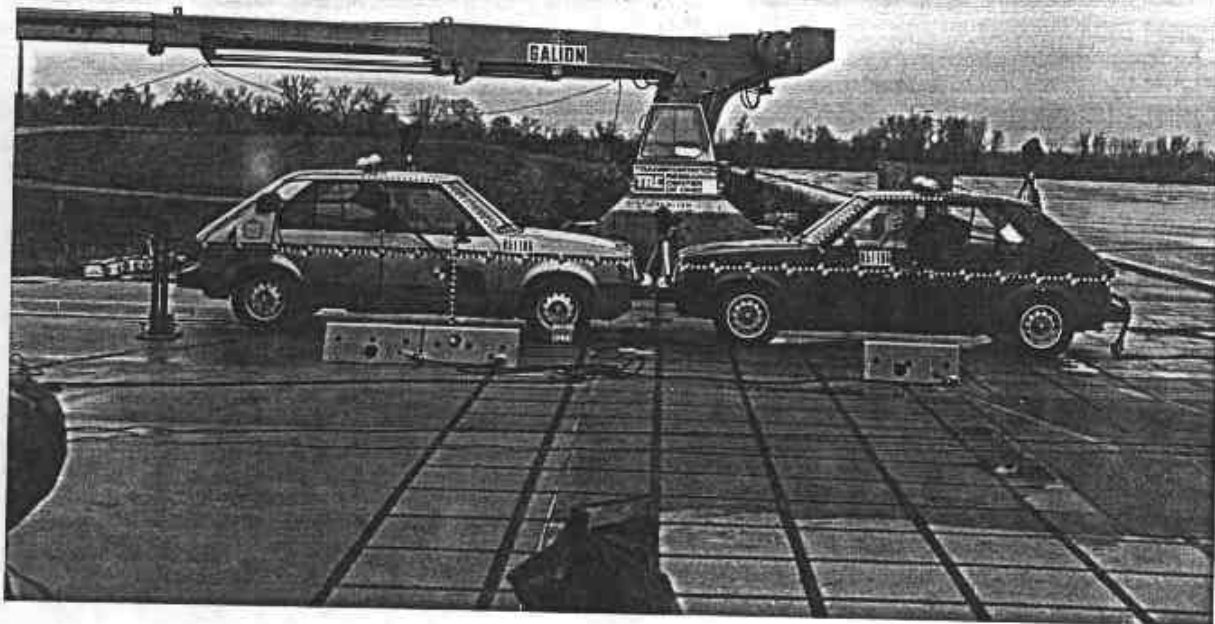


Figure A-1. PRE-TEST GENERAL OVERALL



Figure A-2. POST-TEST GENERAL OVERALL  
A-2

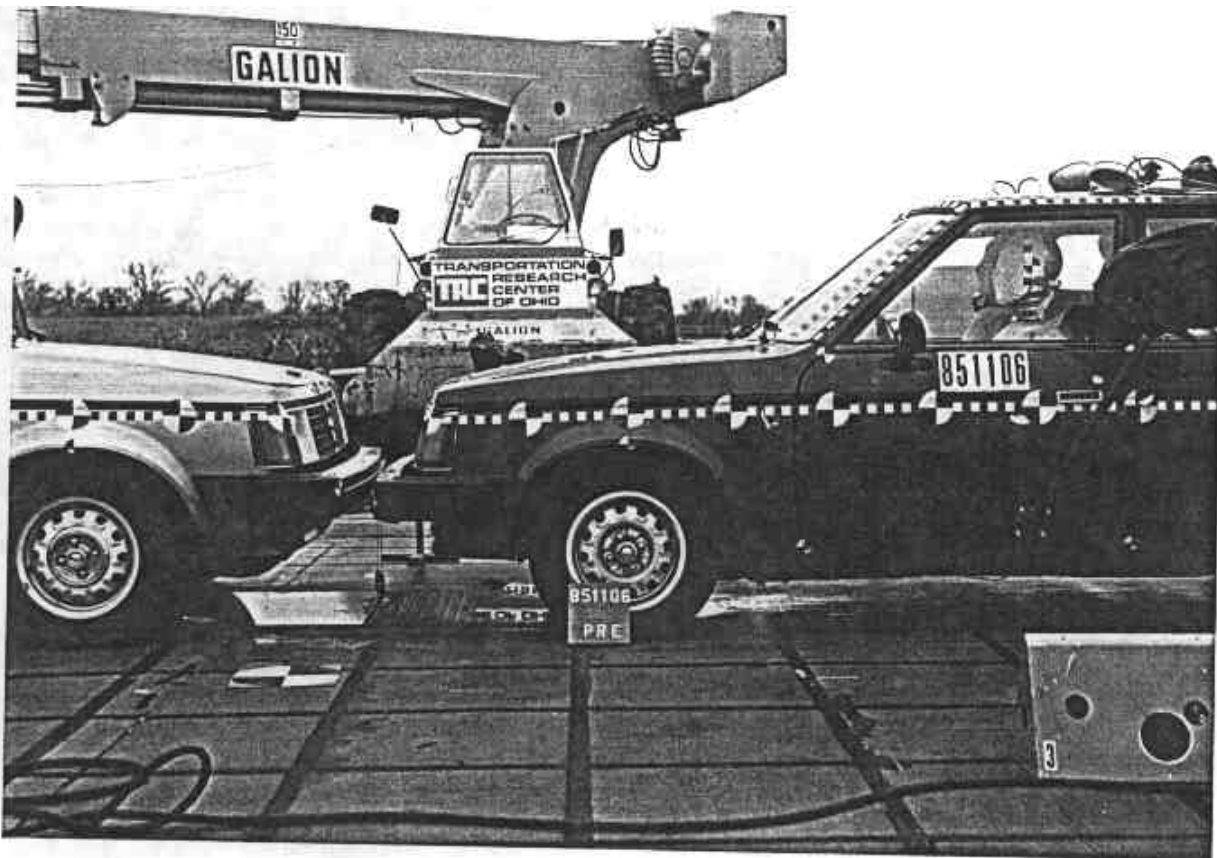


Figure A-3. PRE-TEST SUBJECT VEHICLE LEFT SIDE

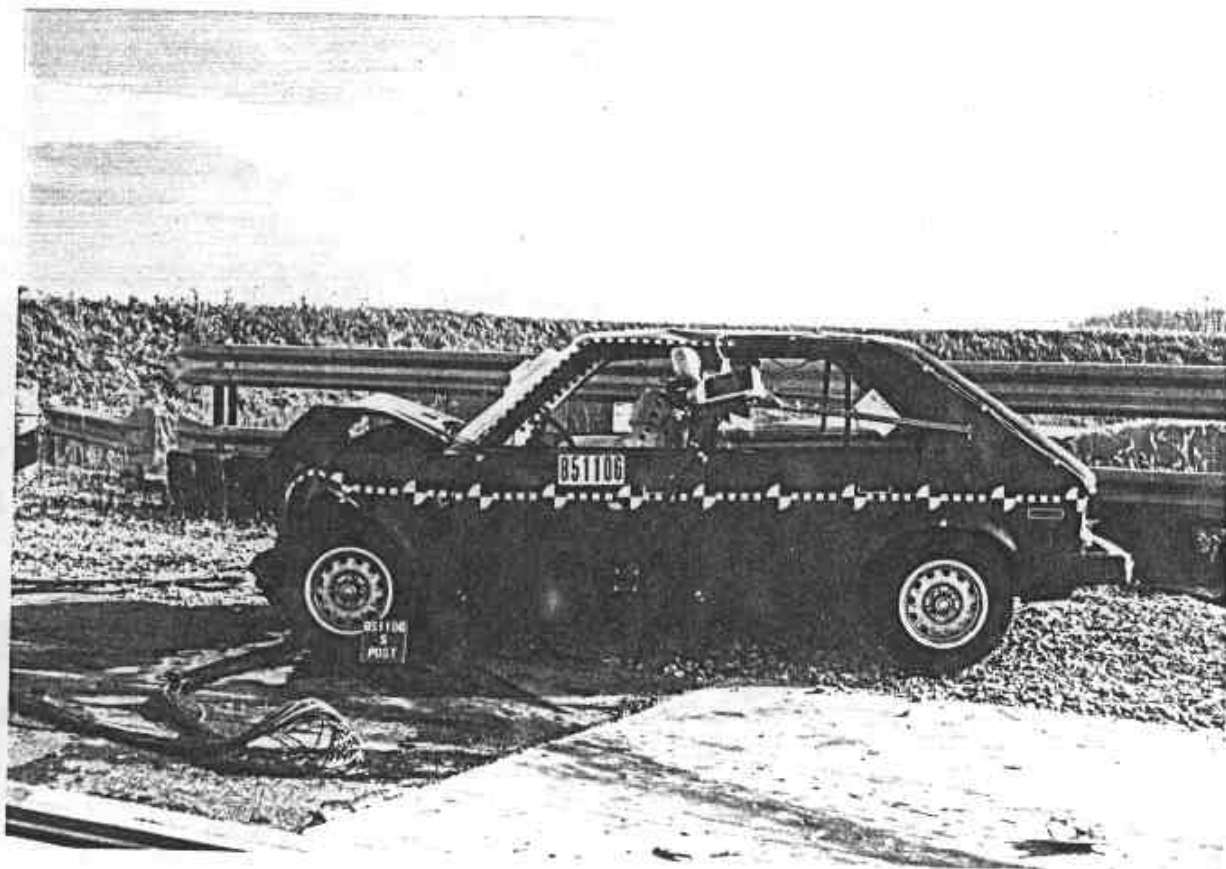


Figure A-4. POST-TEST SUBJECT VEHICLE LEFT SIDE  
A-3

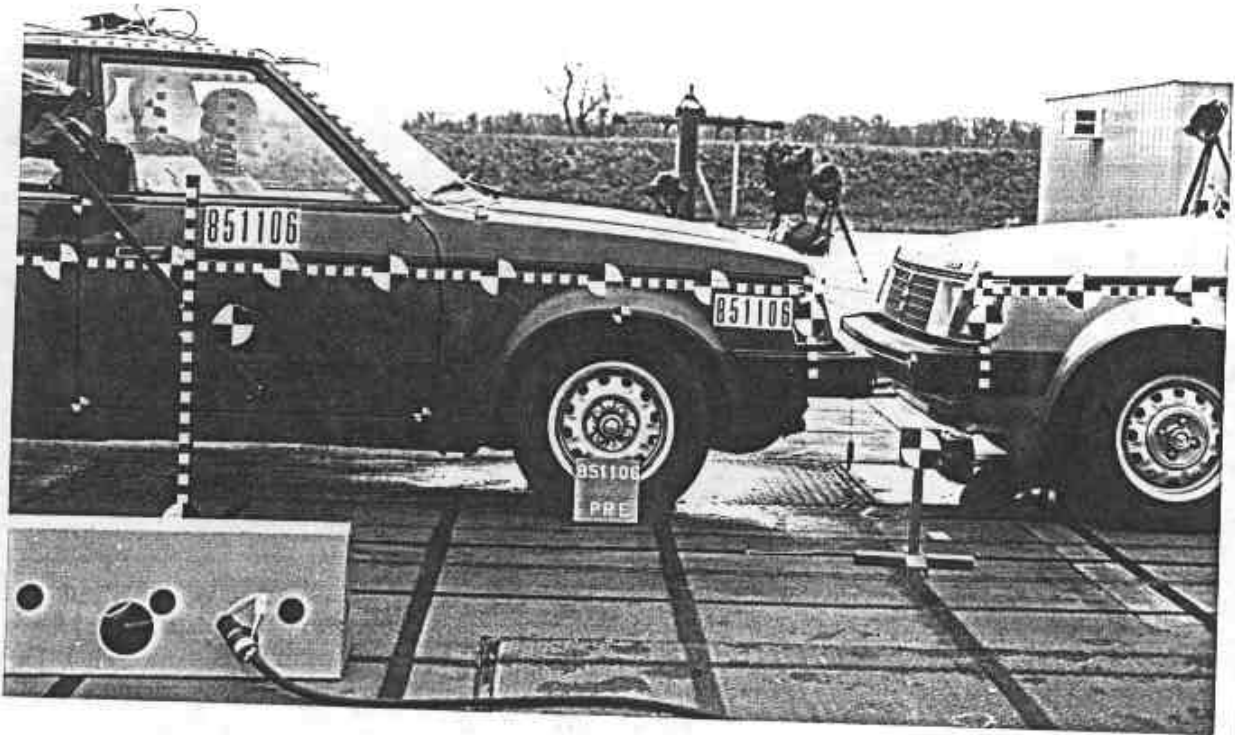
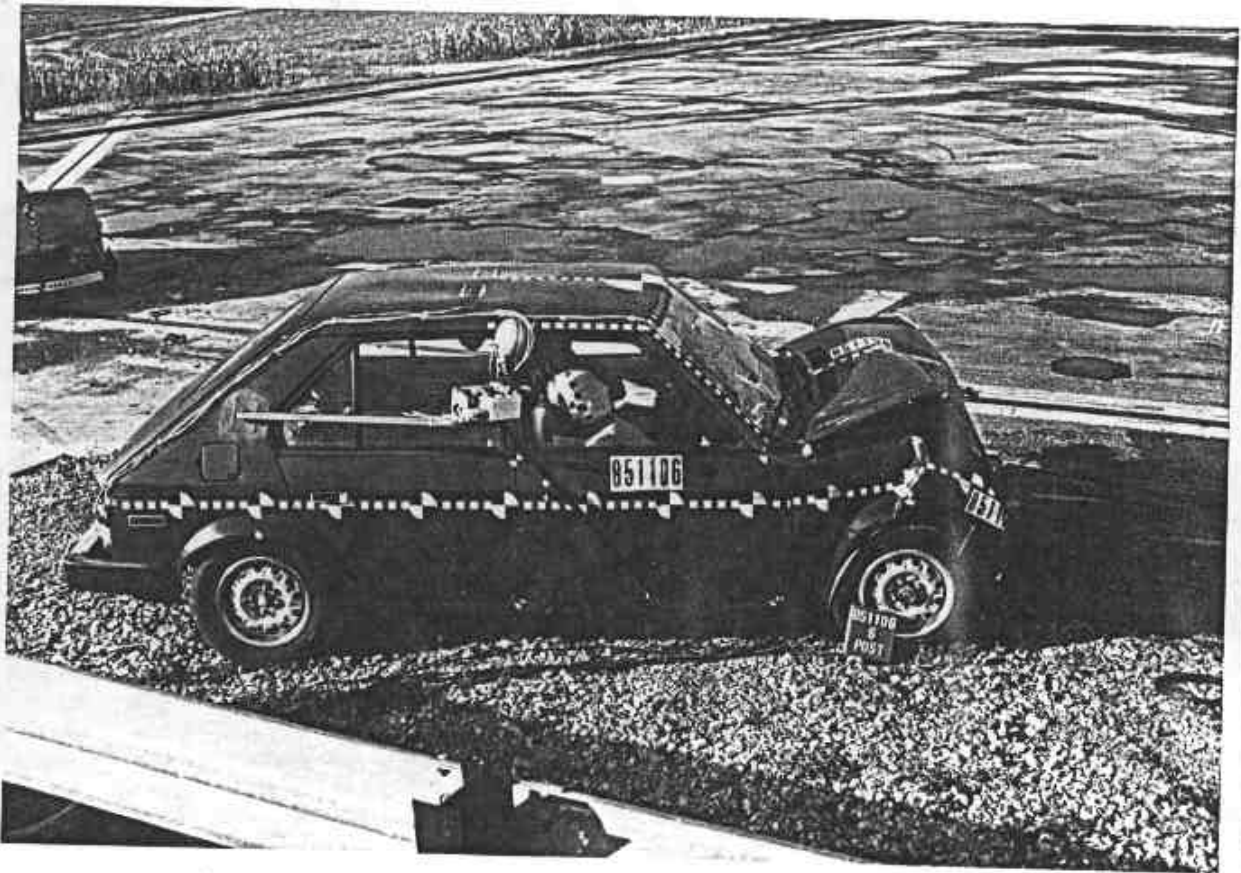


Figure A-5. PRE-TEST SUBJECT VEHICLE RIGHT SIDE



A-6. POST-TEST SUBJECT VEHICLE RIGHT SIDE  
A-4



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



Figure A-8. POST-TEST SUBJECT VEHICLE FRONT VIEW  
A-5



Figure A-9. PRE-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 1

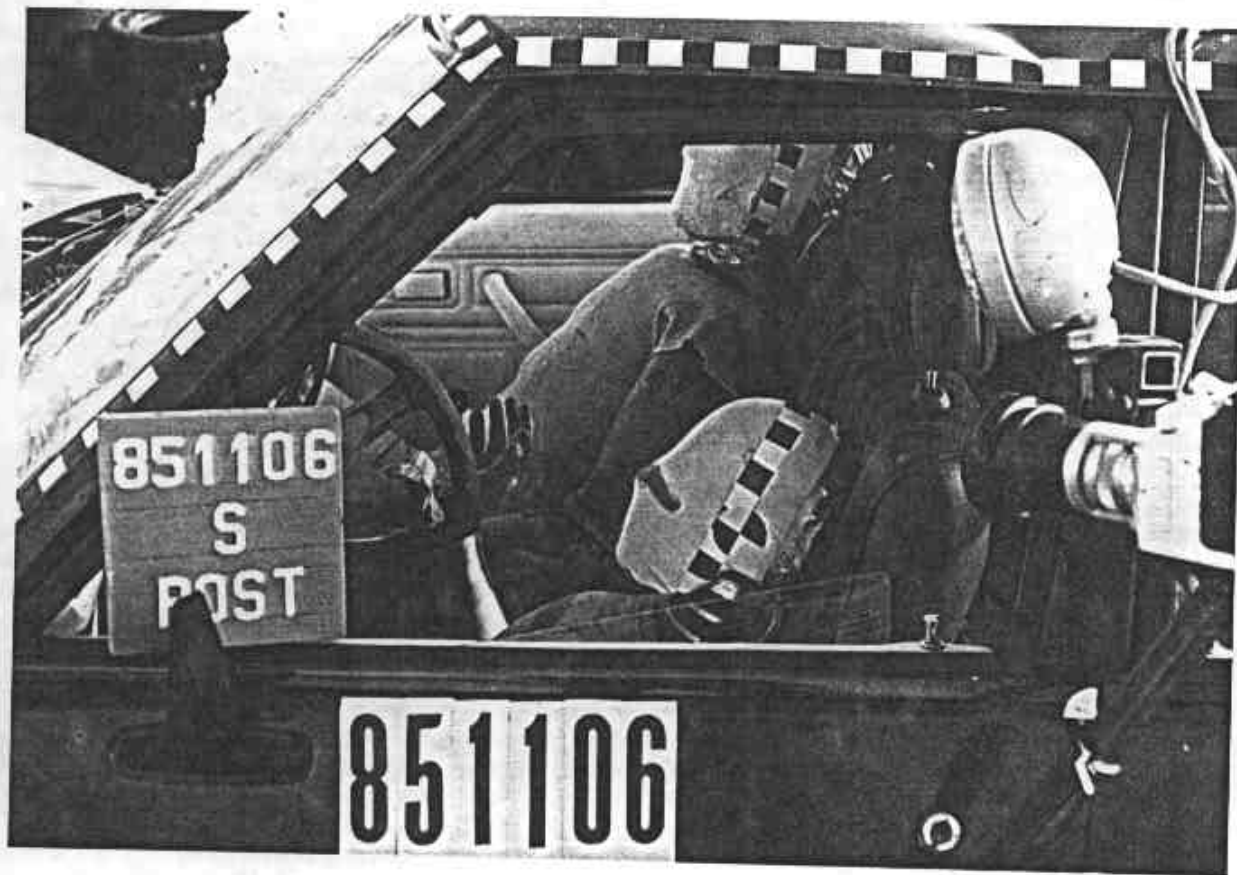


Figure A-10. POST-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 1  
A-6

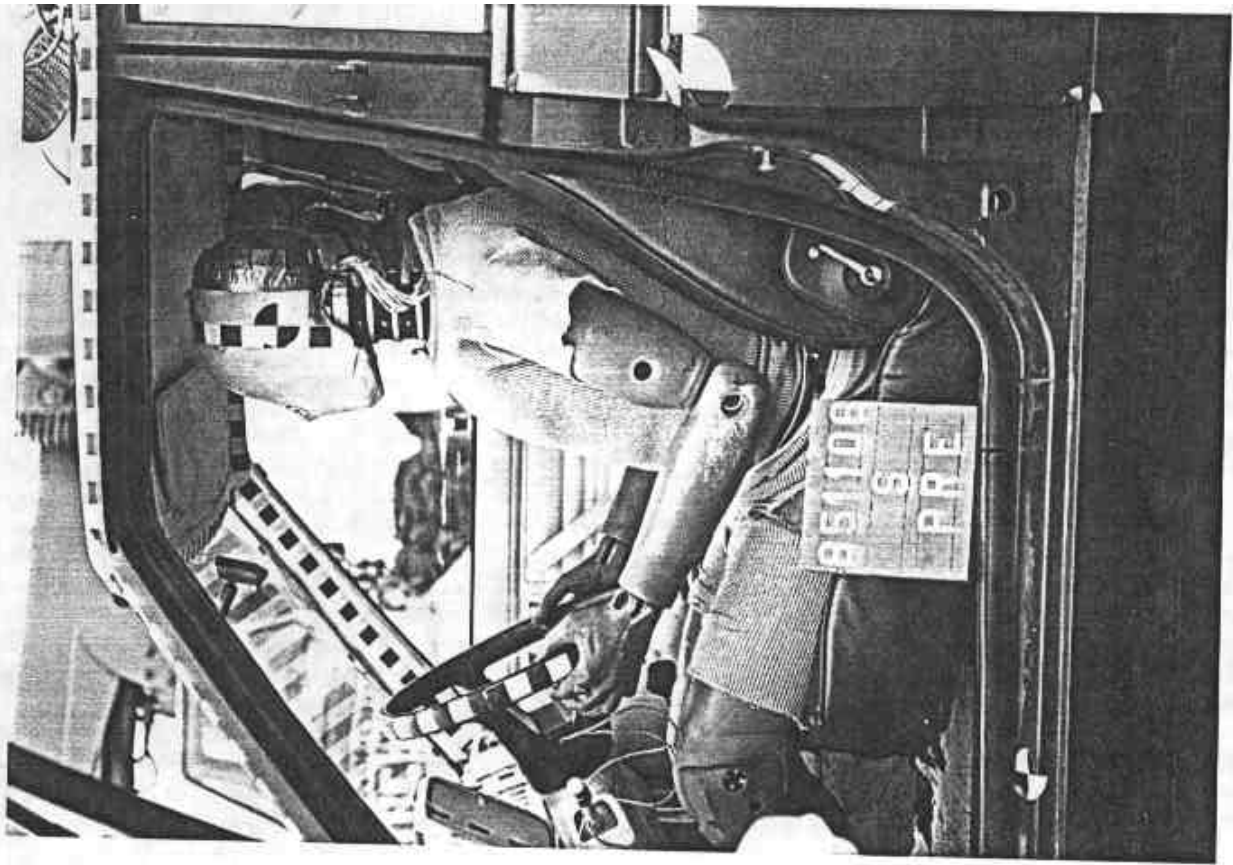


Figure A-11. PRE-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 2

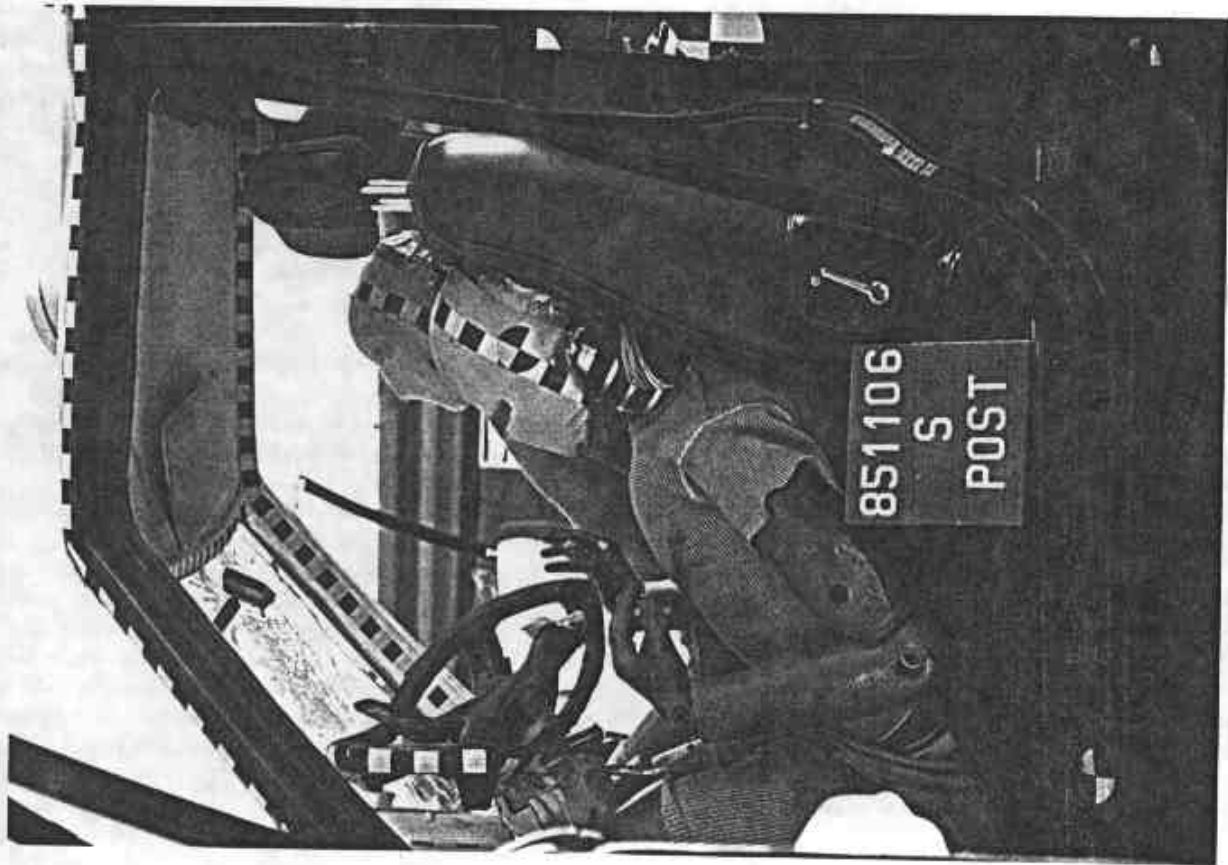


Figure A-12. POST-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 2  
A-7

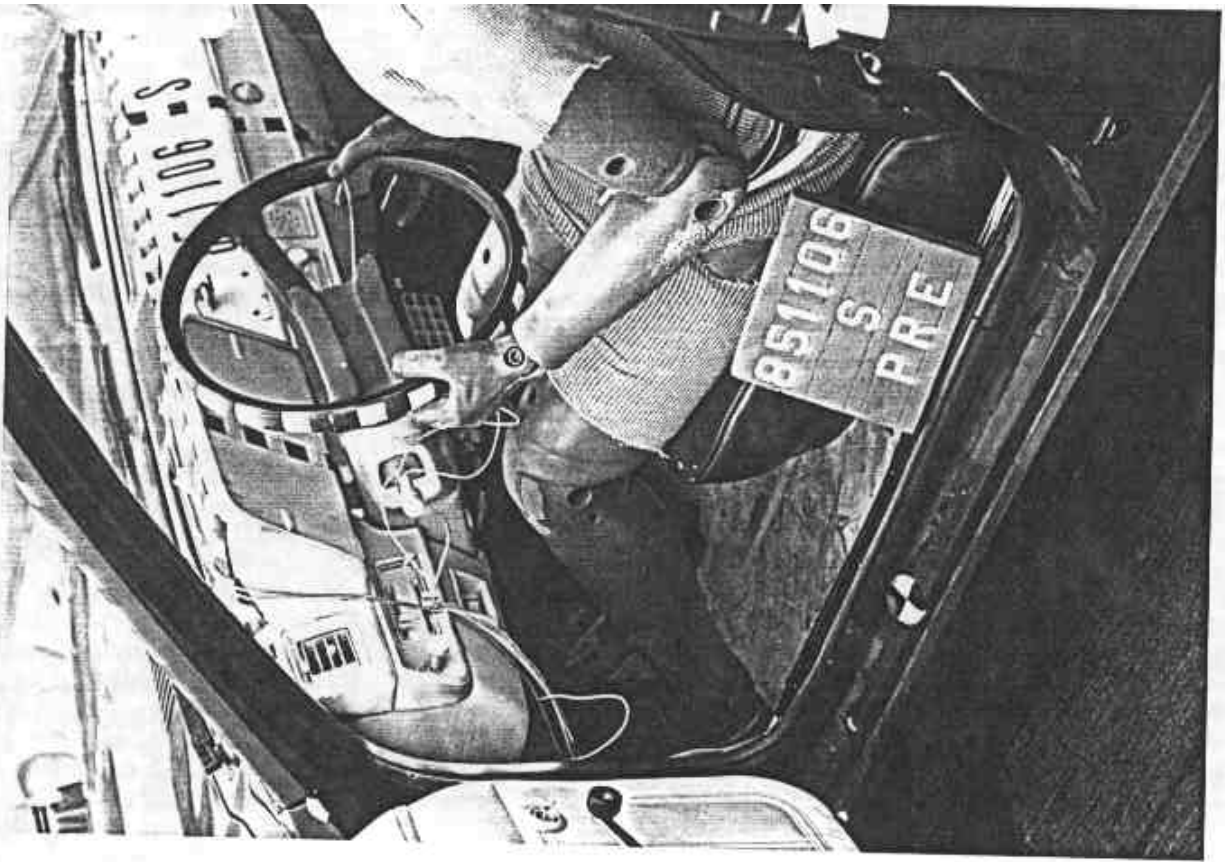


Figure A-13. PRE-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 3

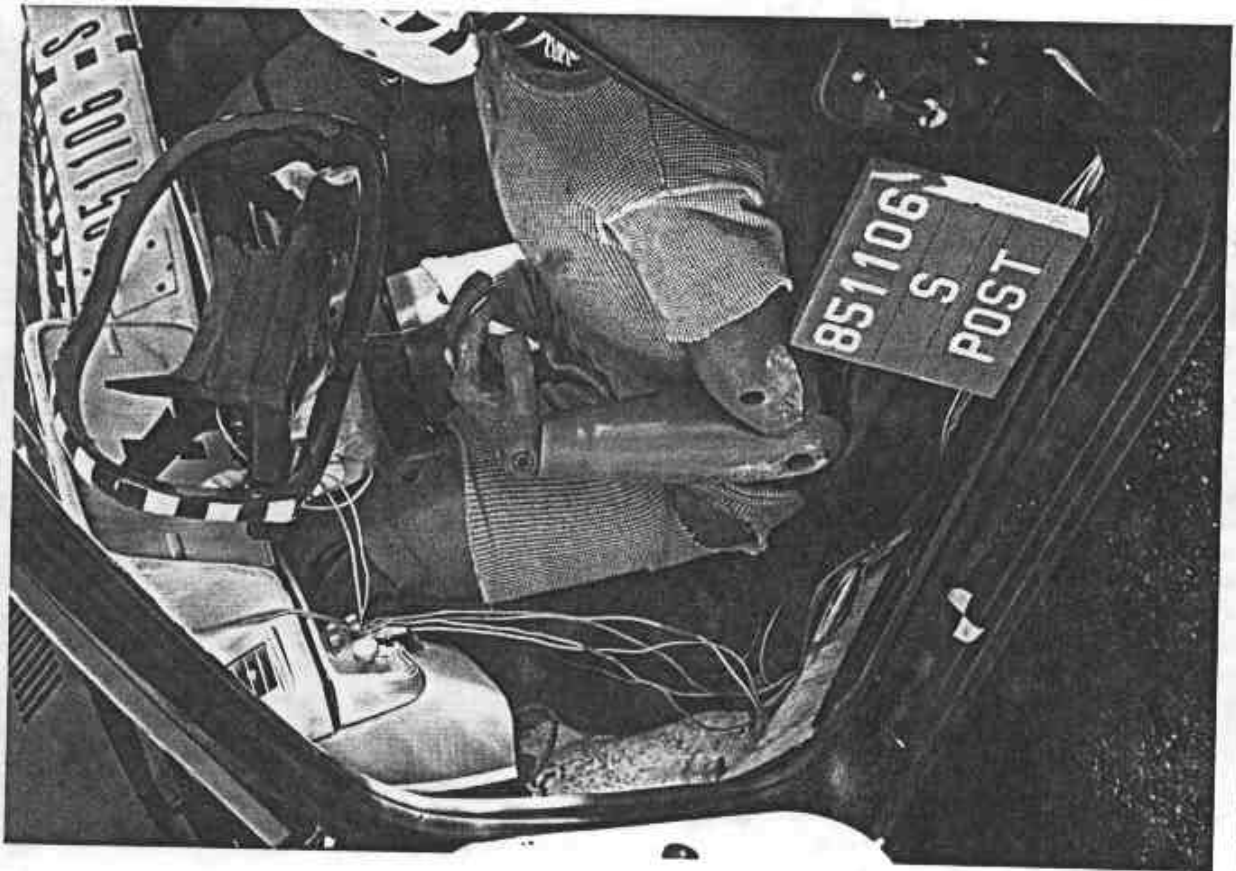


Figure A-14. POST-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 3



Figure A-15. PRE-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 1



Figure A-16. POST-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 1

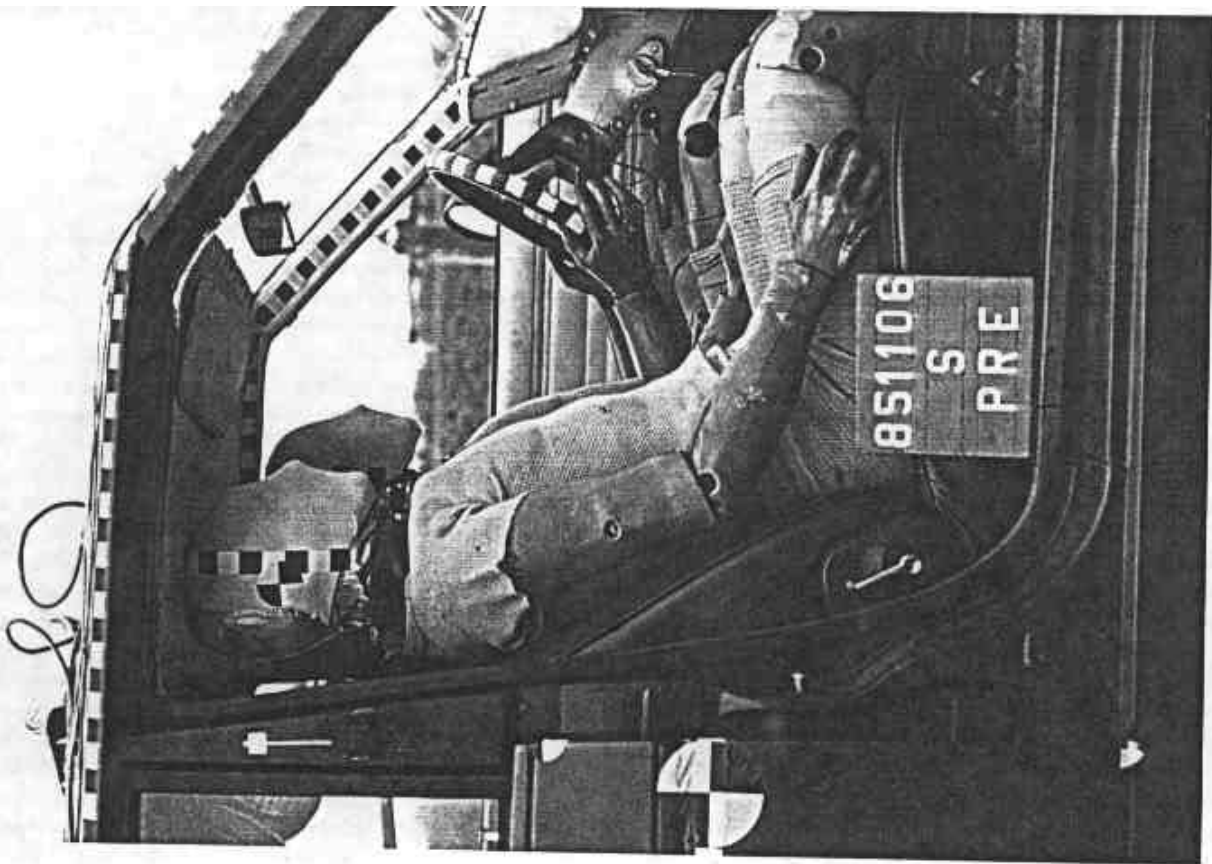


Figure A-17. PRE-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 2

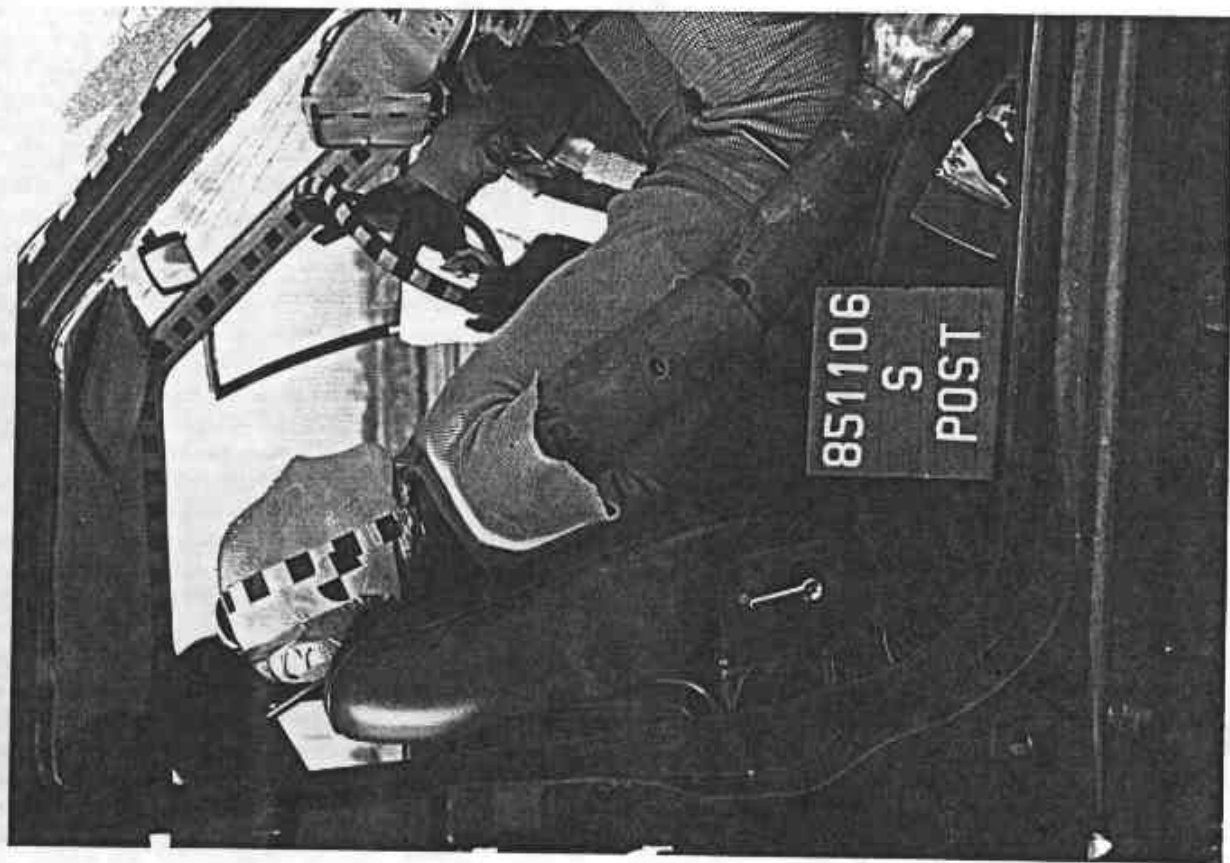


Figure A-18. POST-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 2



Figure A-19. PRE-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 3

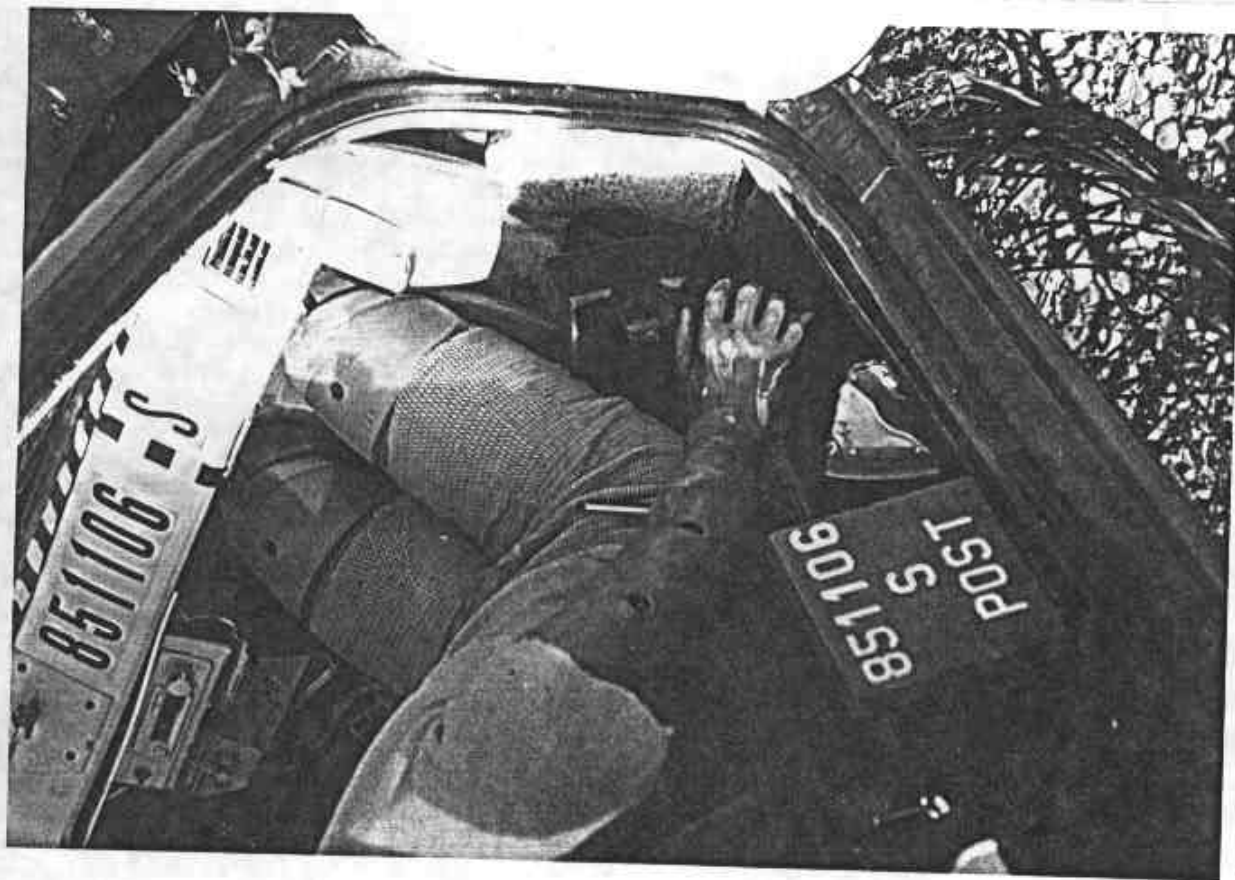


Figure A-20. POST-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 3



Figure A-21. PRE-TEST SUBJECT VEHICLE GLAZING - VIEW 1

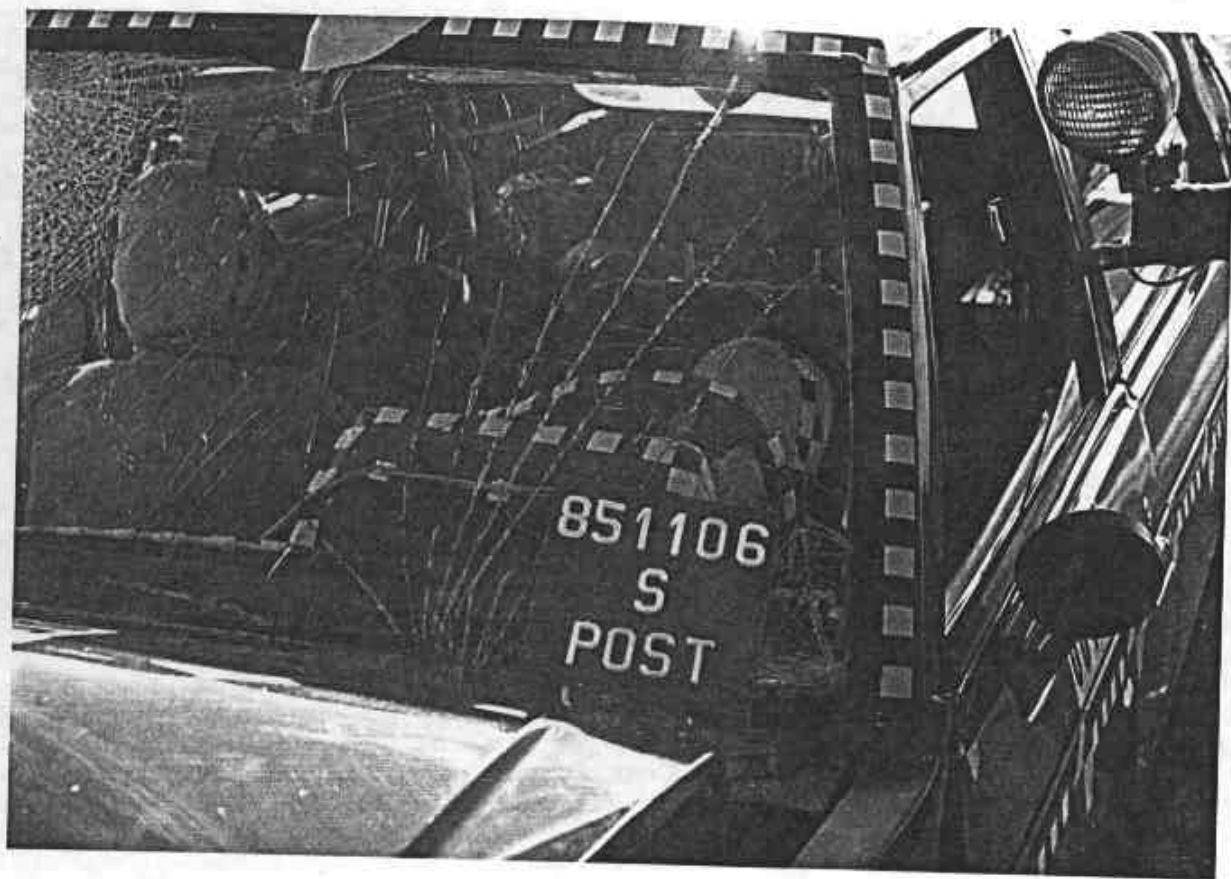


Figure A-22. POST-TEST SUBJECT VEHICLE GLAZING - VIEW 1

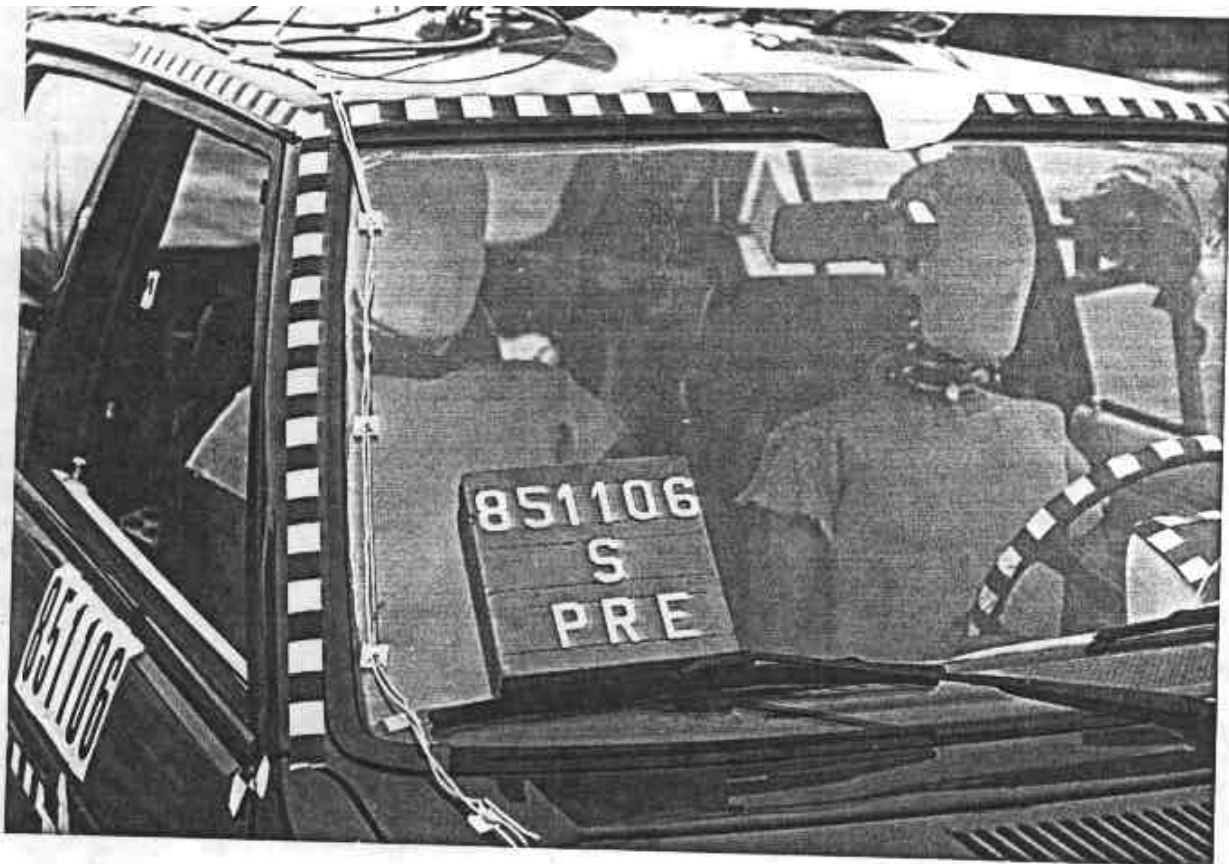


Figure A-23. PRE-TEST SUBJECT VEHICLE GLAZING - VIEW 2

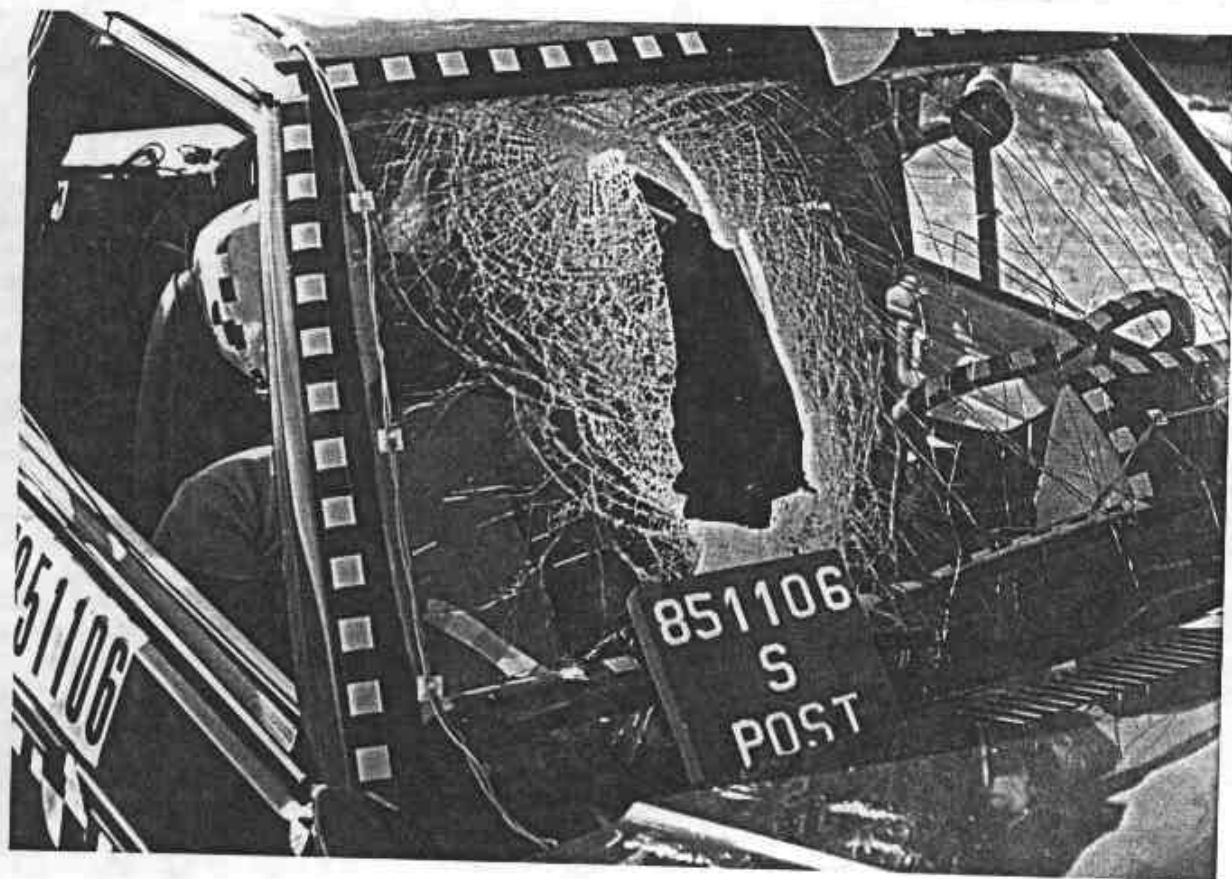


Figure A-24. POST-TEST SUBJECT VEHICLE GLAZING - VIEW 2  
A-13



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



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

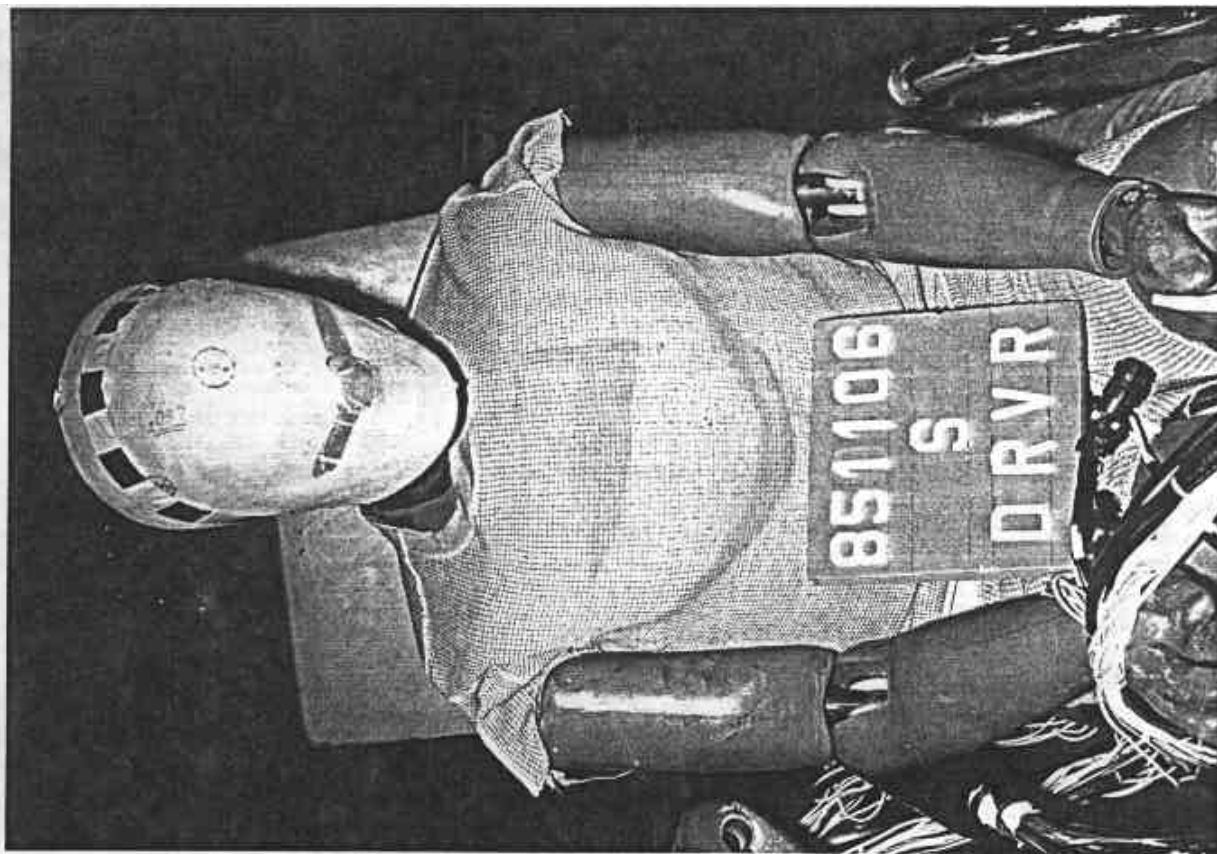


Figure A-27. POST-TEST SUBJECT VEHICLE DRIVER DUMMY - VIEW 4

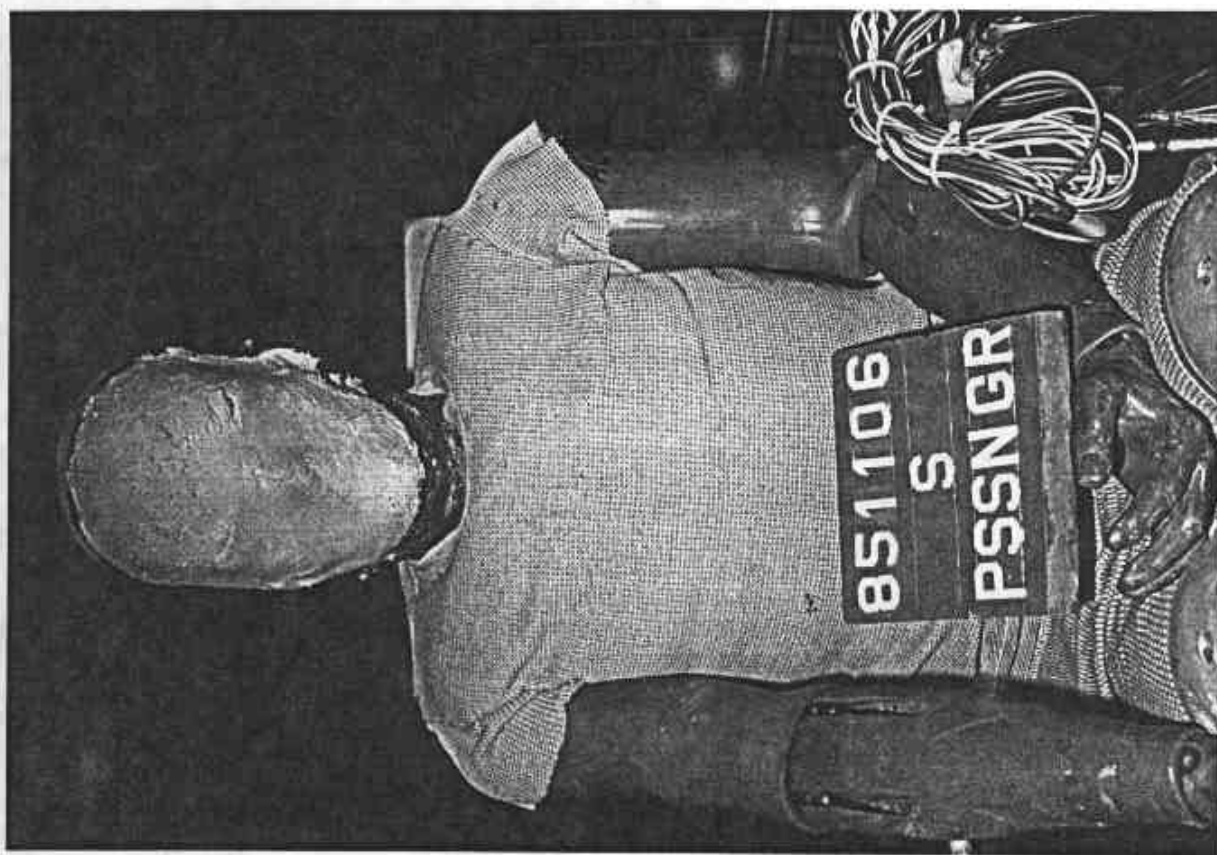


Figure A-28. POST-TEST SUBJECT VEHICLE PASSENGER DUMMY - VIEW 4

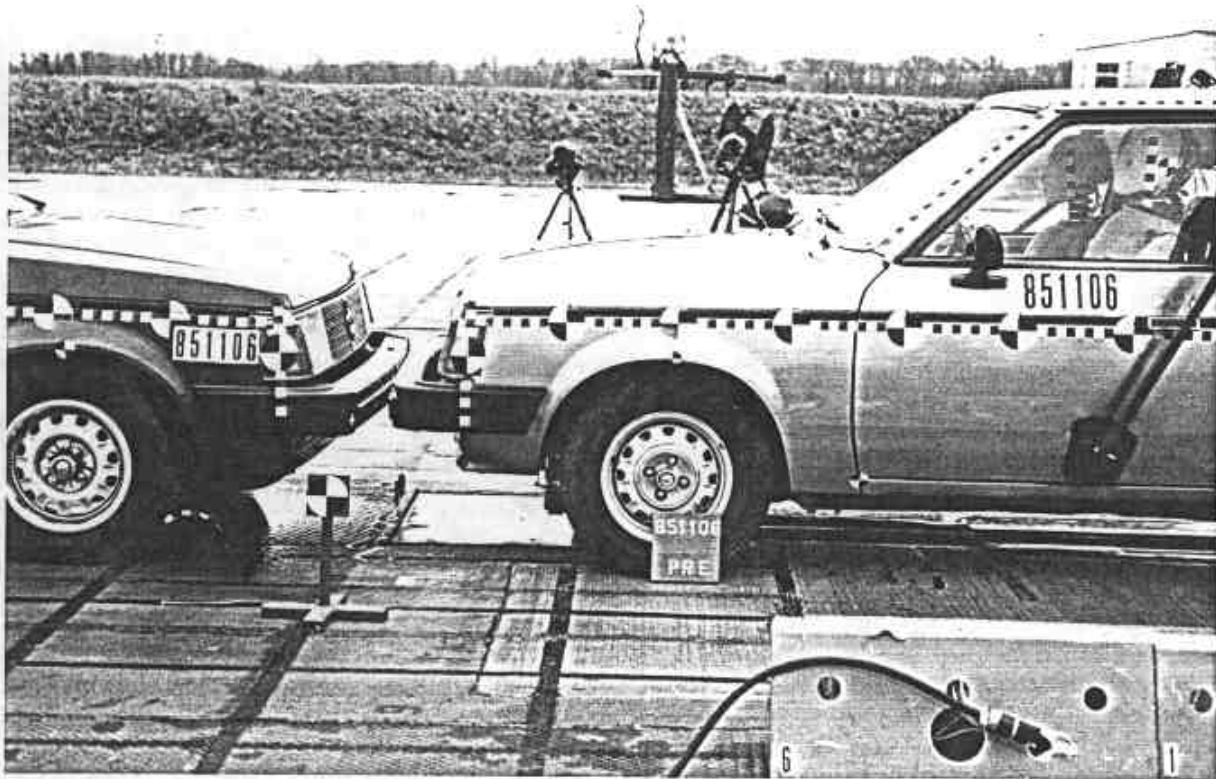


Figure A-29. PRE-TEST PARTNER VEHICLE LEFT SIDE



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

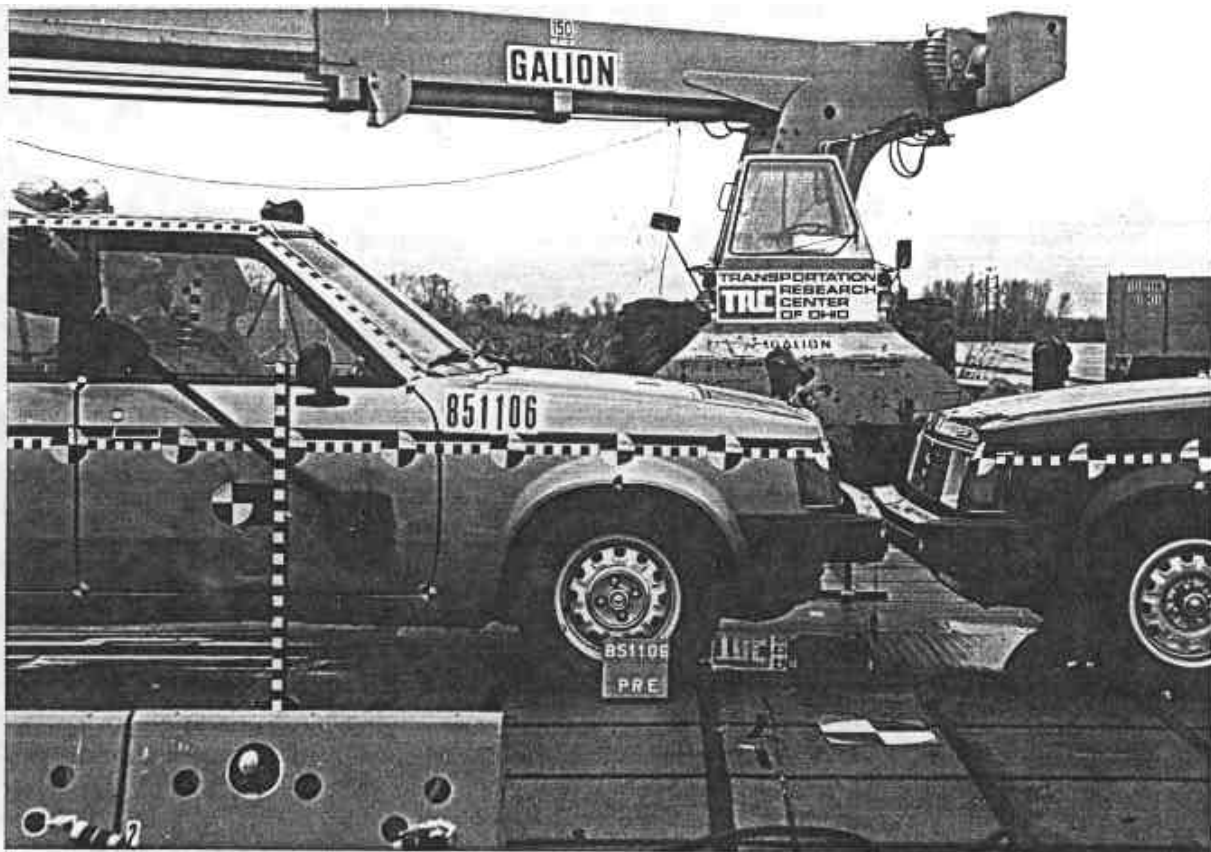


Figure A-31. PRE-TEST PARTNER VEHICLE RIGHT SIDE



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  
A-18



Figure 35. PRE-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 1



Figure A-36. POST-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 1

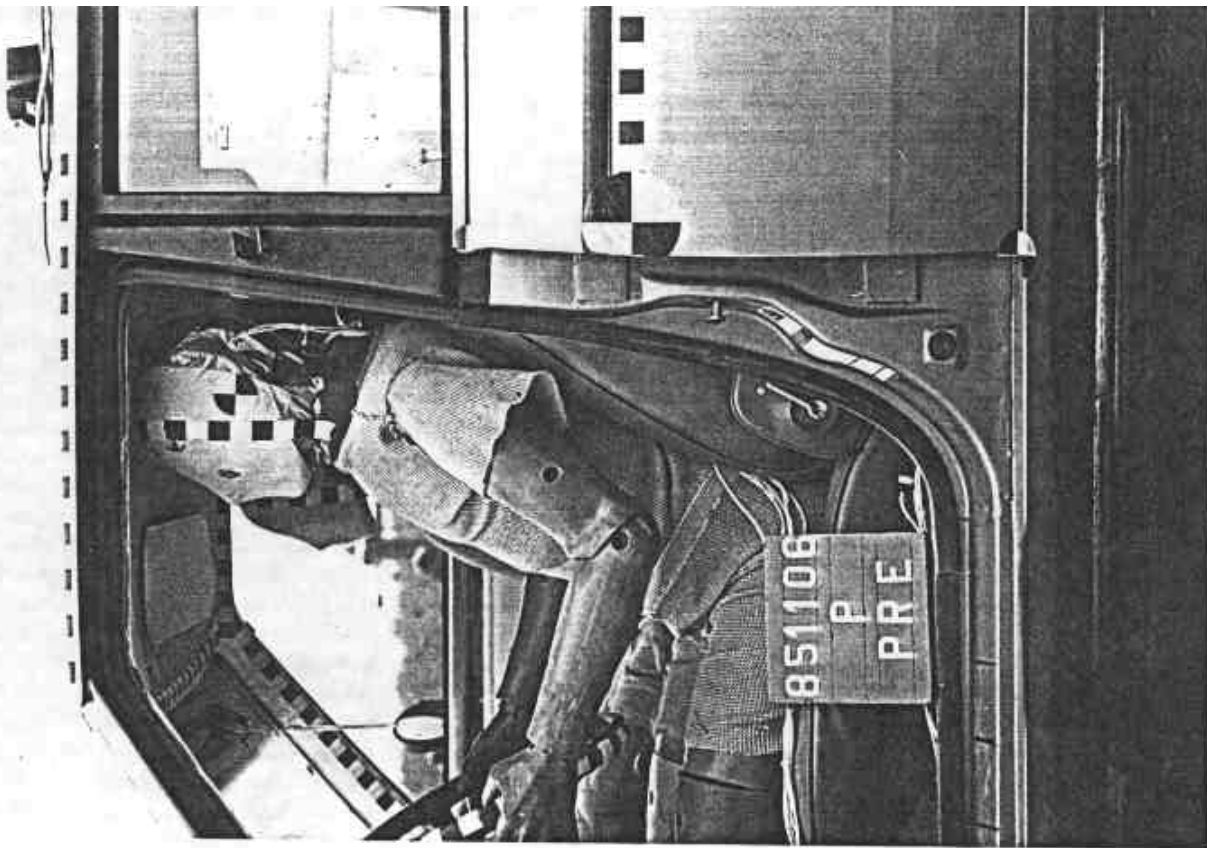


Figure A-37. PRE-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 2

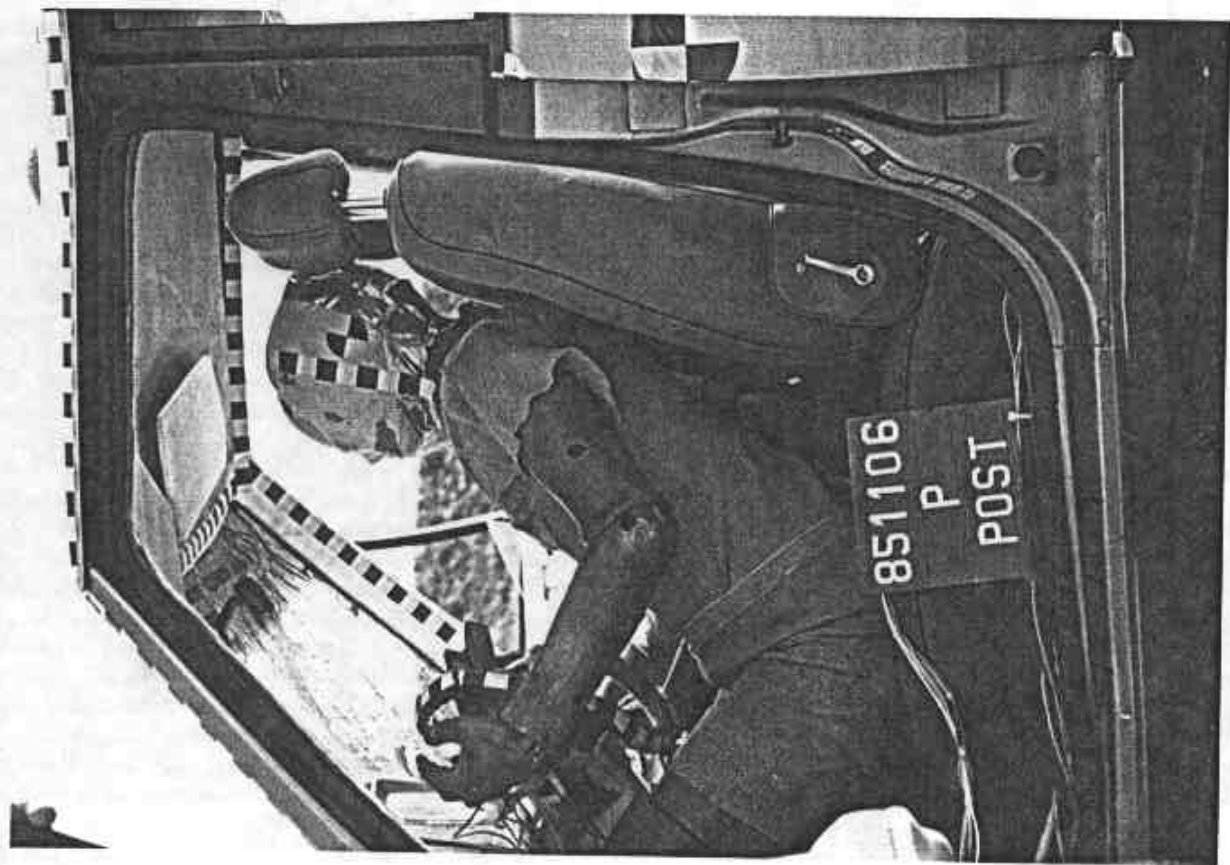


Figure A-38. POST-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 2



Figure A-39. PRE-TEST PARTNER VEHICLE DRIVER DUMMY - VIEW 3

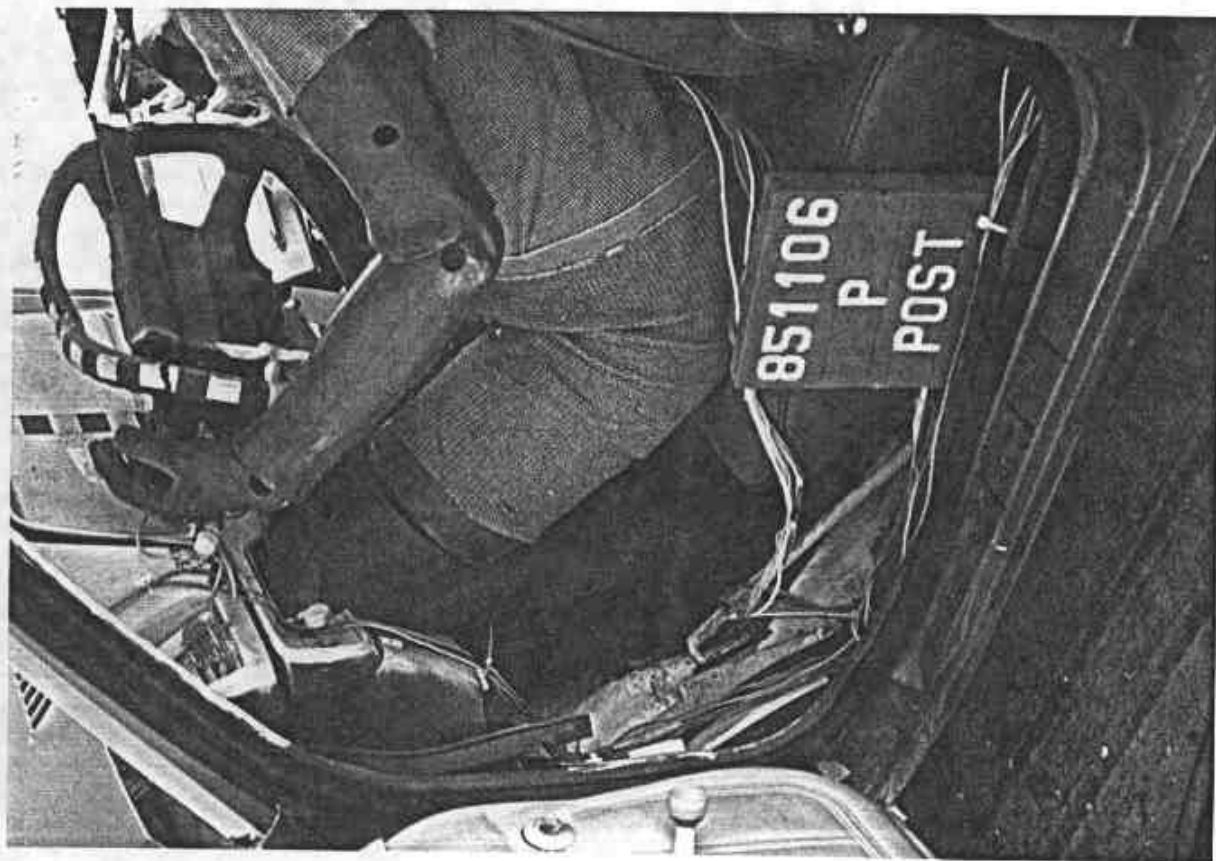


Figure A-40. POST-TEST PARTNER VEHICLE DRIVER DUMMY VIEW - 3  
A-21



Figure A-41. PRE-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 1



Figure A-42. POST-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 1

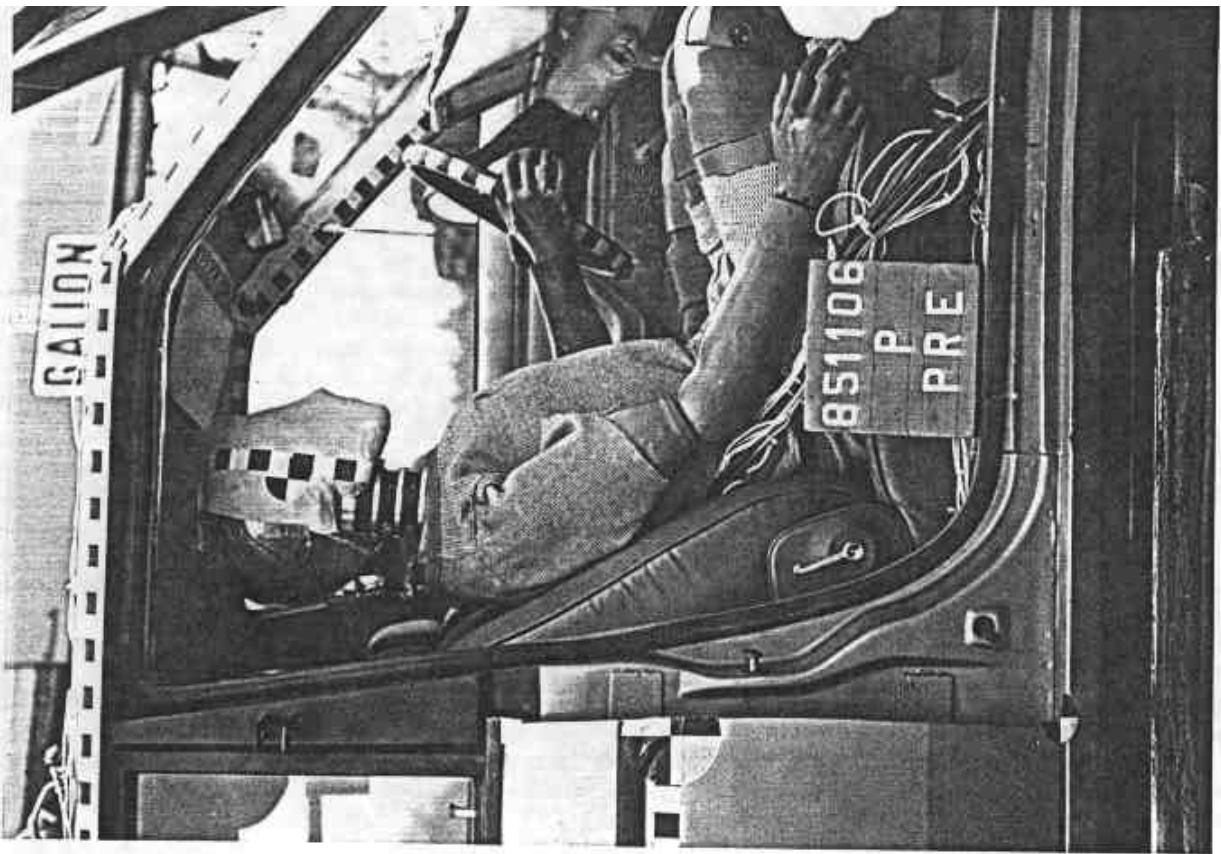


Figure A-43. PRE-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 2

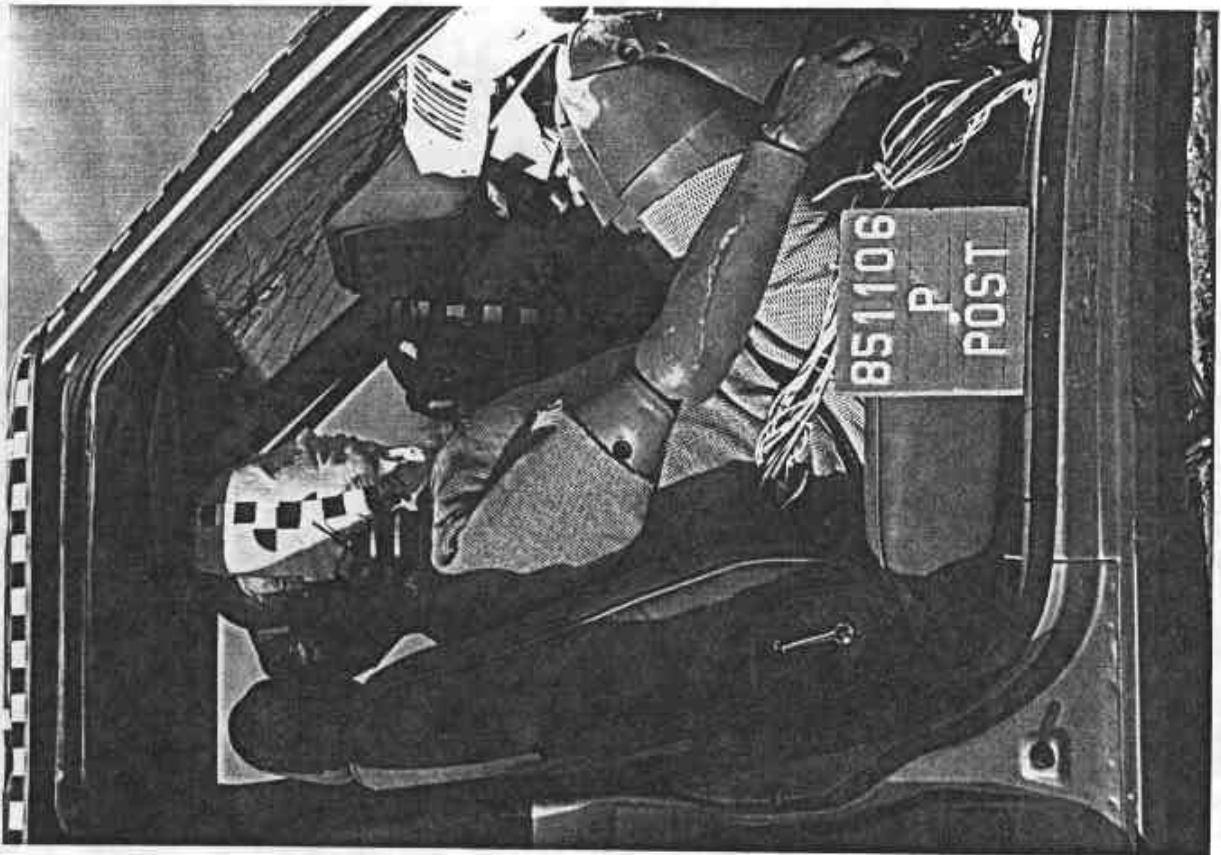


Figure A-44. POST-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 2



Figure A-45. PRE-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 3

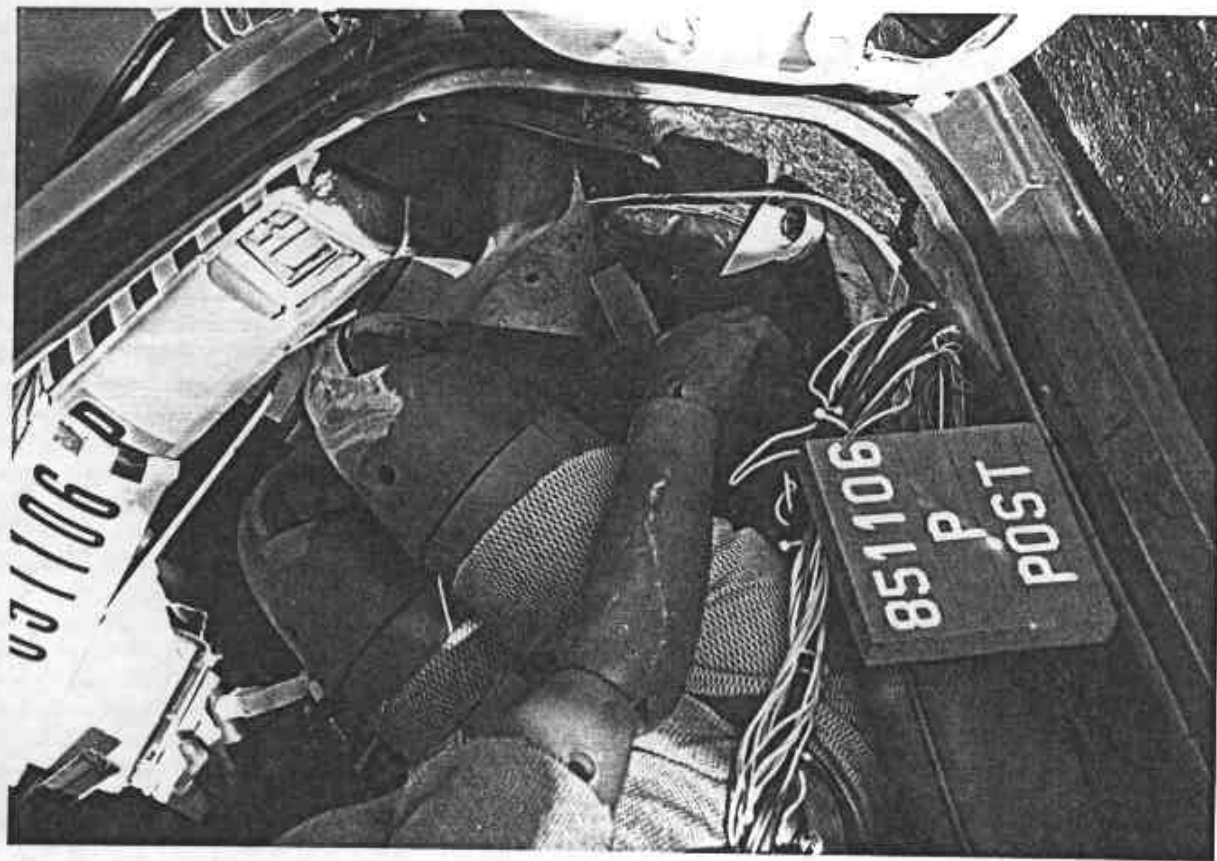


Figure A-46. POST-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 3

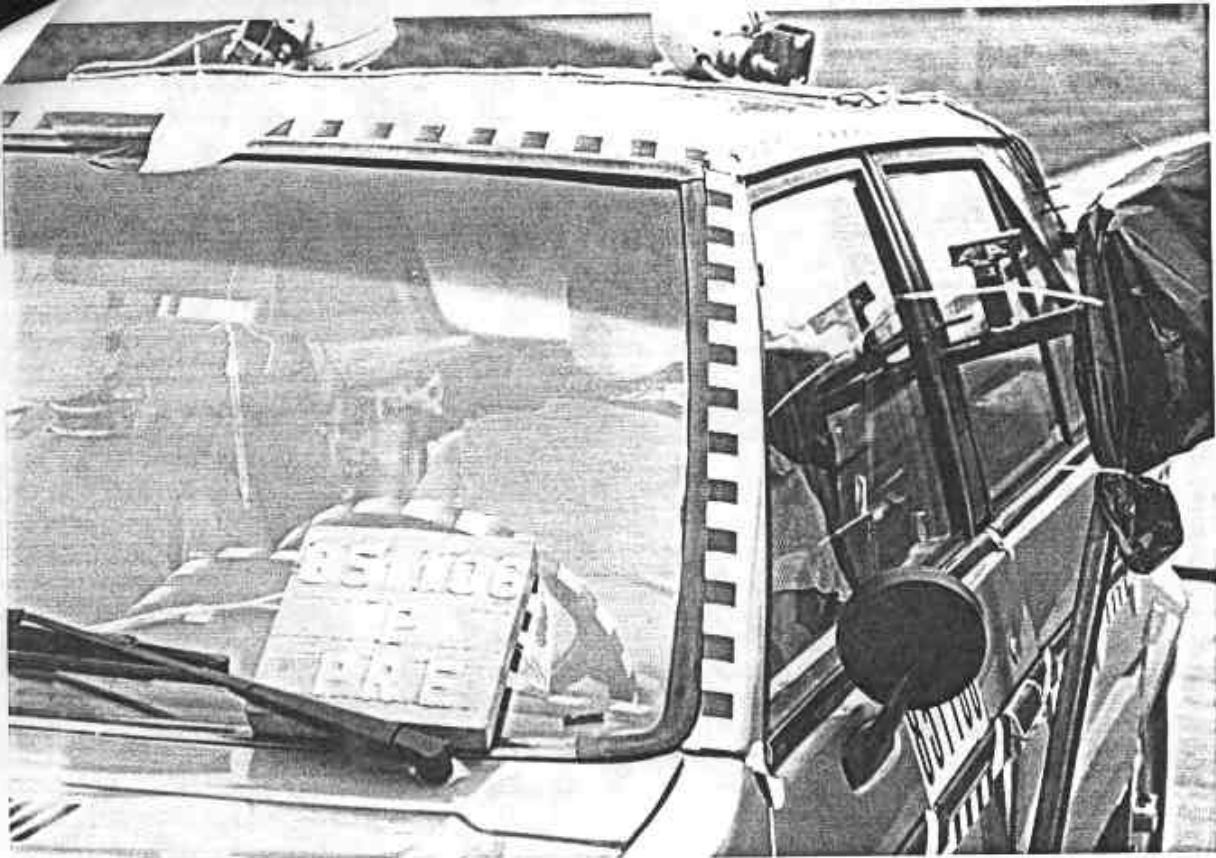


Figure A-47. PRE-TEST PARTNER VEHICLE GLAZING - VIEW 1

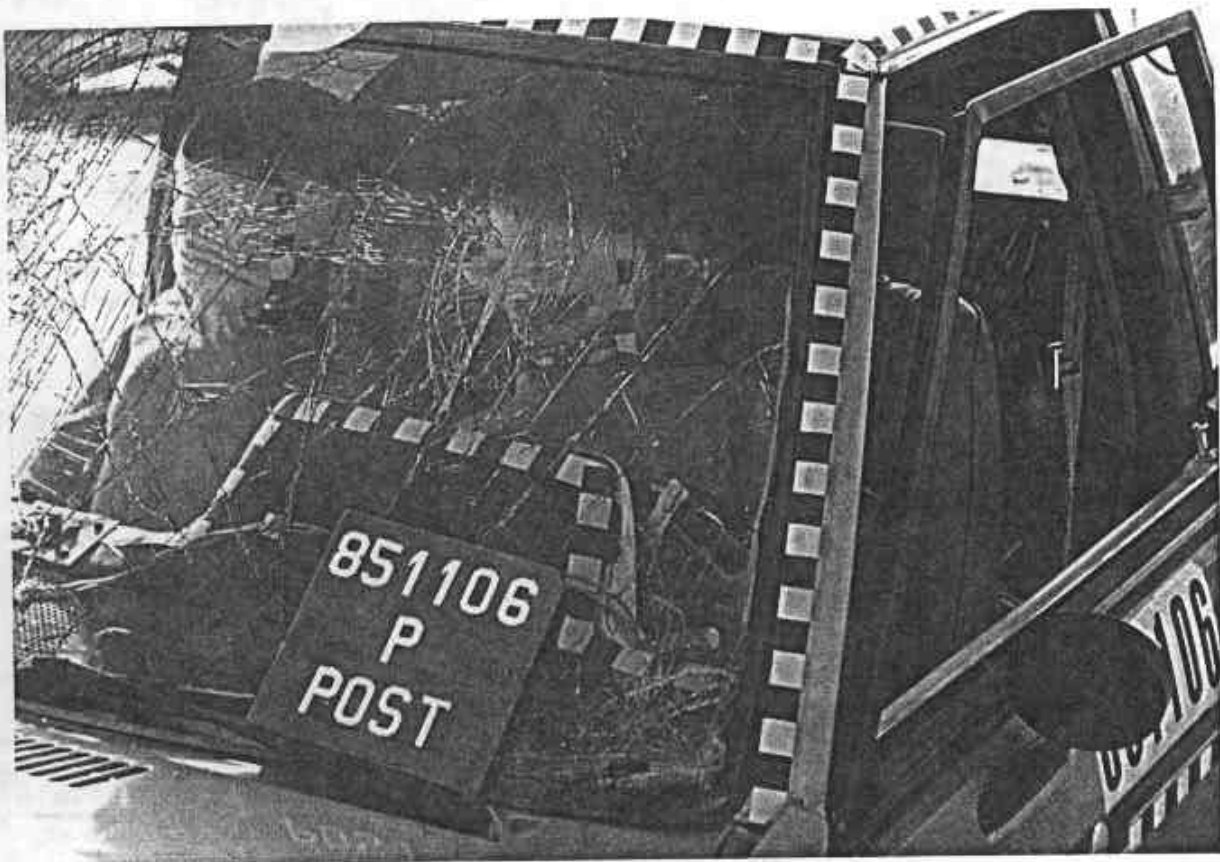


Figure A-48. POST-TEST PARTNER VEHICLE GLAZING - VIEW 1  
A-25



Figure A-49. PRE-TEST PARTNER VEHICLE GLAZING - VIEW 2

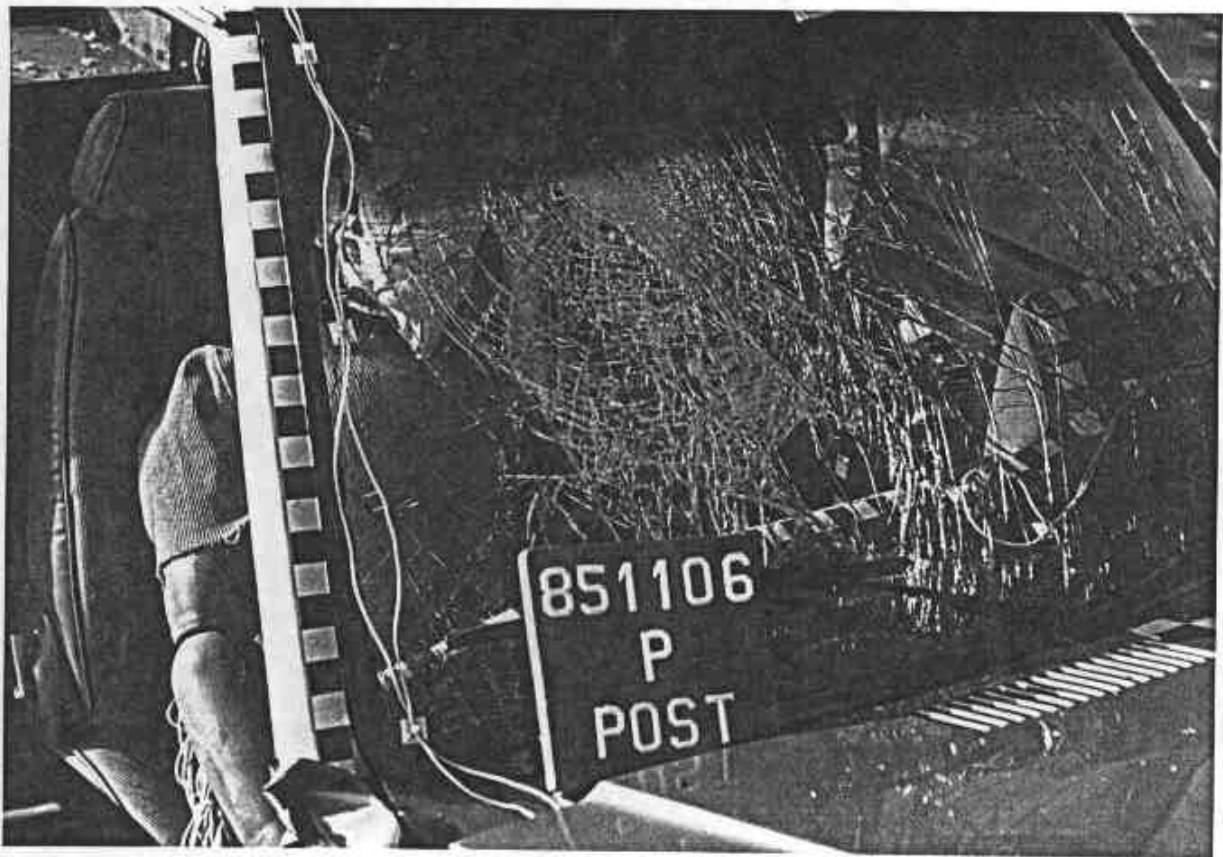


Figure A-50. POST-TEST PARTNER VEHICLE GLAZING - VIEW 2

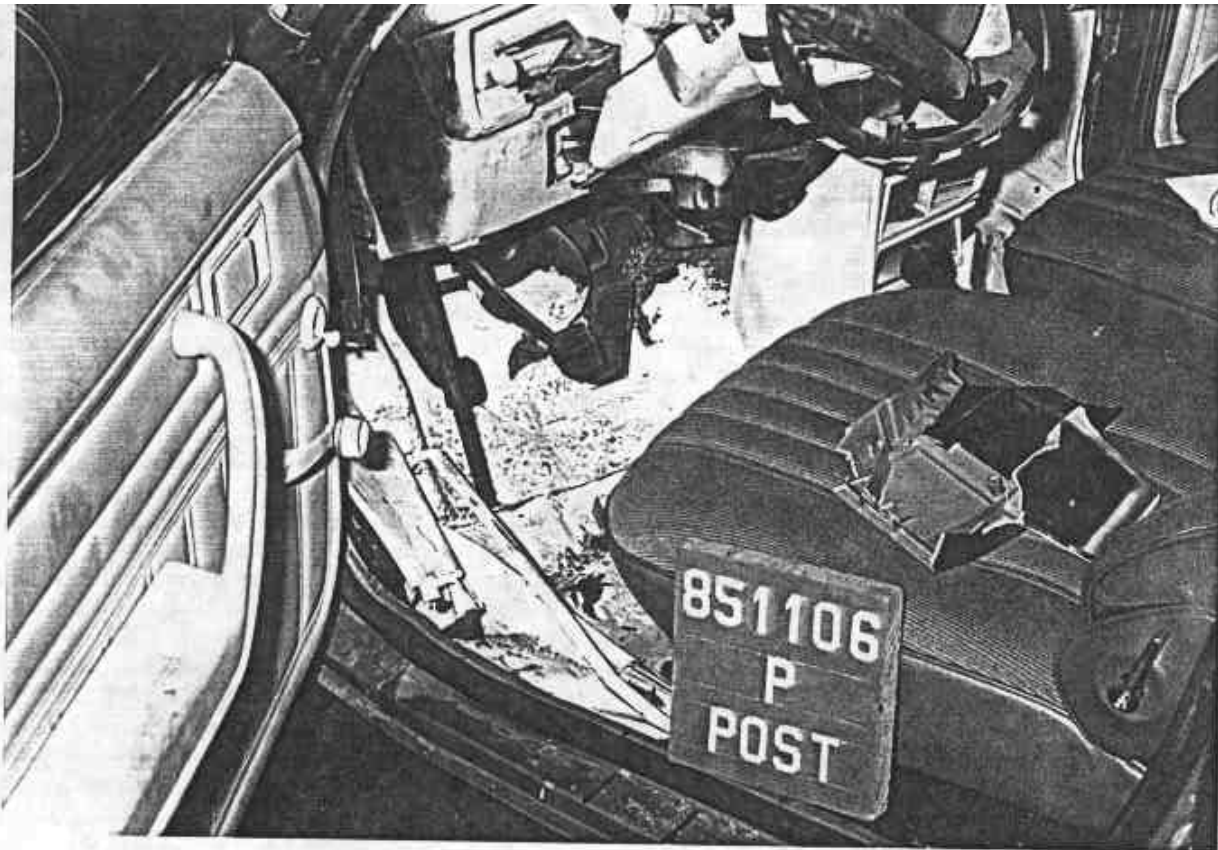


Figure A-51. POST-TEST PARTNER VEHICLE INTERIOR DAMAGE - VIEW 1

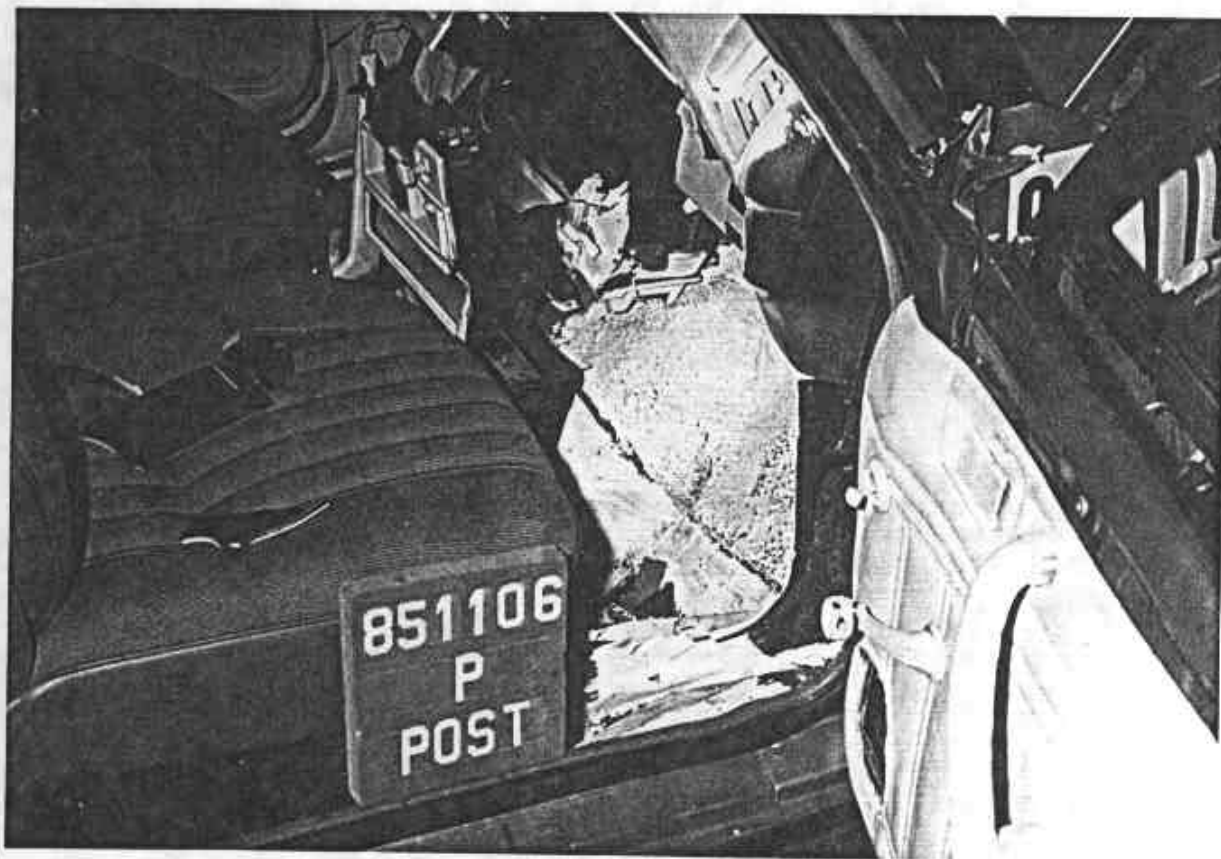


Figure A-52. POST-TEST PARTNER VEHICLE INTERIOR DAMAGE - VIEW 2  
A-27



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

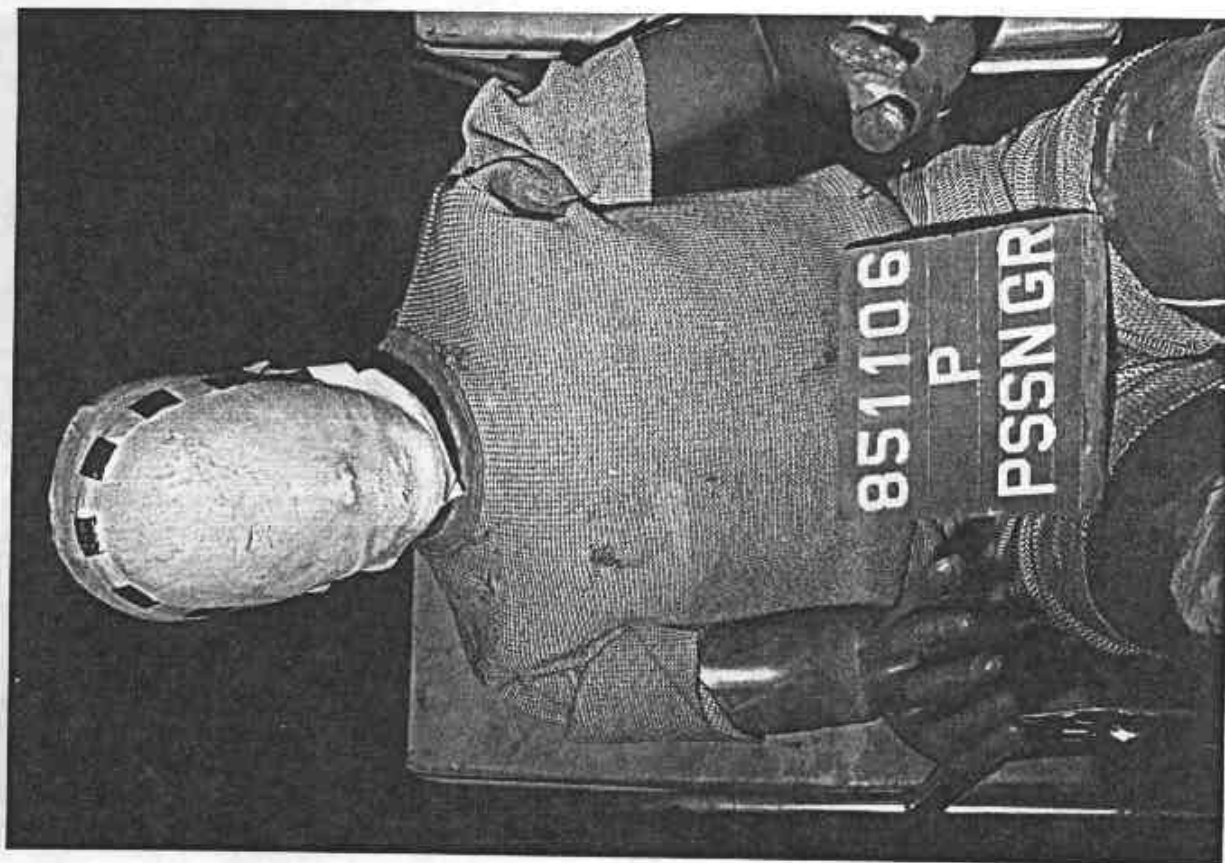


Figure A-54. POST-TEST PARTNER VEHICLE PASSENGER DUMMY - VIEW 4

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

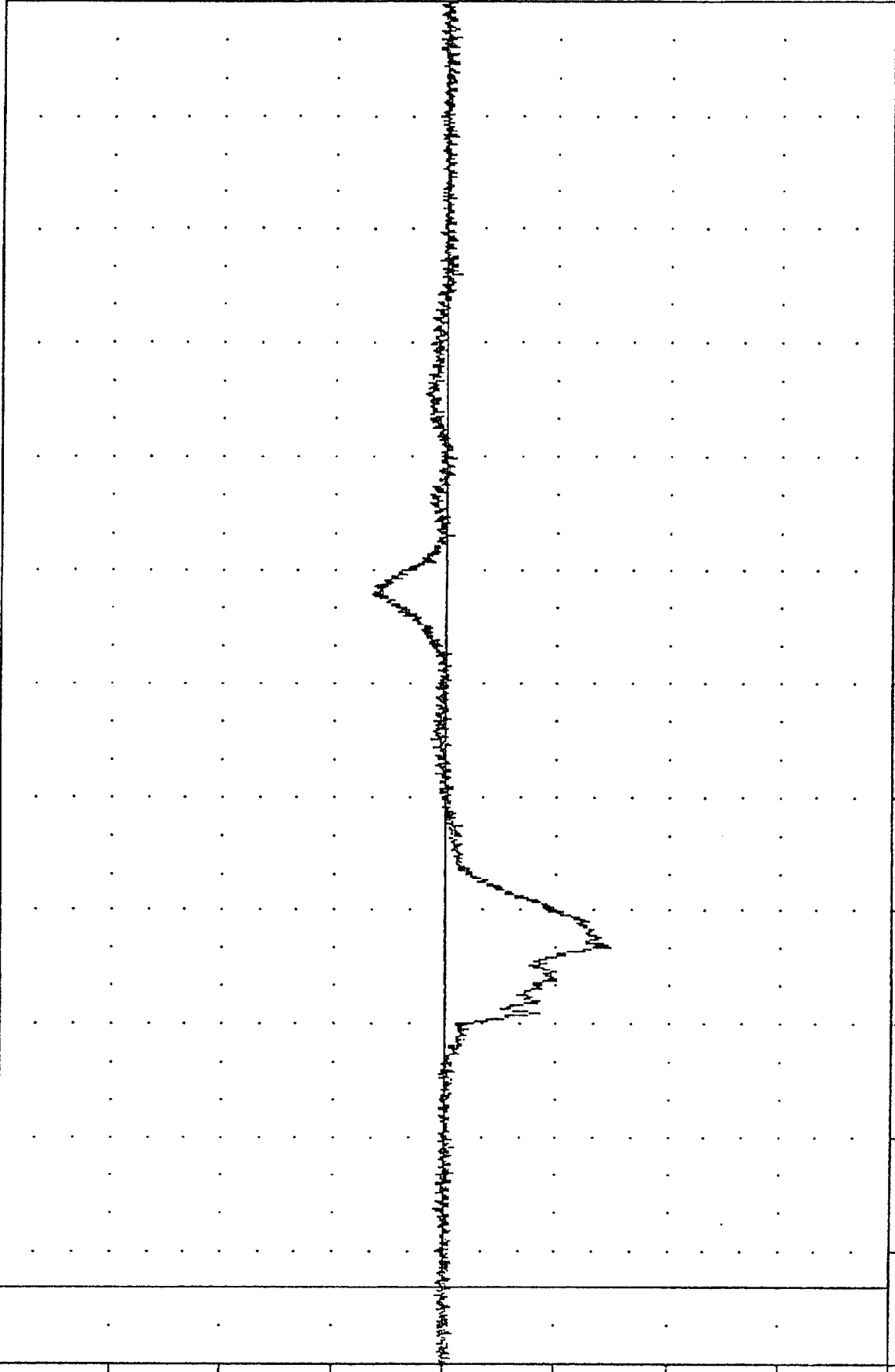
851106S  
INITIAL CRASH RESPONSES  
8531000000  
HEDX61

PLOT DATE 14-08-95 15:56:23

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -74.30 e 90.38 , 32.63 e 183.88

200.00  
150.00  
100.00  
50.00  
0.00  
-50.00  
-100.00  
-150.00  
-200.00



-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 (SECS)

SUBJECT VEHICLE - OMNI 68463  
DRIVER HEAD ACCELERATION X AXIS

851106S  
FRONTAL CRASH RESPONSES  
85310000000  
HEDYG1

PLOT DATE 14 85 15:56:23

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -24.27g 97.00, 7.64g 209.75

209.00

150.00

100.00

50.00

0.00

-50.00

-100.00

-150.00

-200.00

-250.00

-300.00

-350.00

-400.00

-450.00

-500.00

-550.00

-600.00

-650.00

-700.00

-750.00

-800.00

-850.00

-900.00

-950.00

-1000.00

-1050.00

-1100.00

-1150.00

-1200.00

-1250.00

-1300.00

-1350.00

-1400.00

-1450.00

-1500.00

-1550.00

-1600.00

-1650.00

-1700.00

-1750.00

-1800.00

-1850.00

-1900.00

-1950.00

-2000.00

-2050.00

-2100.00

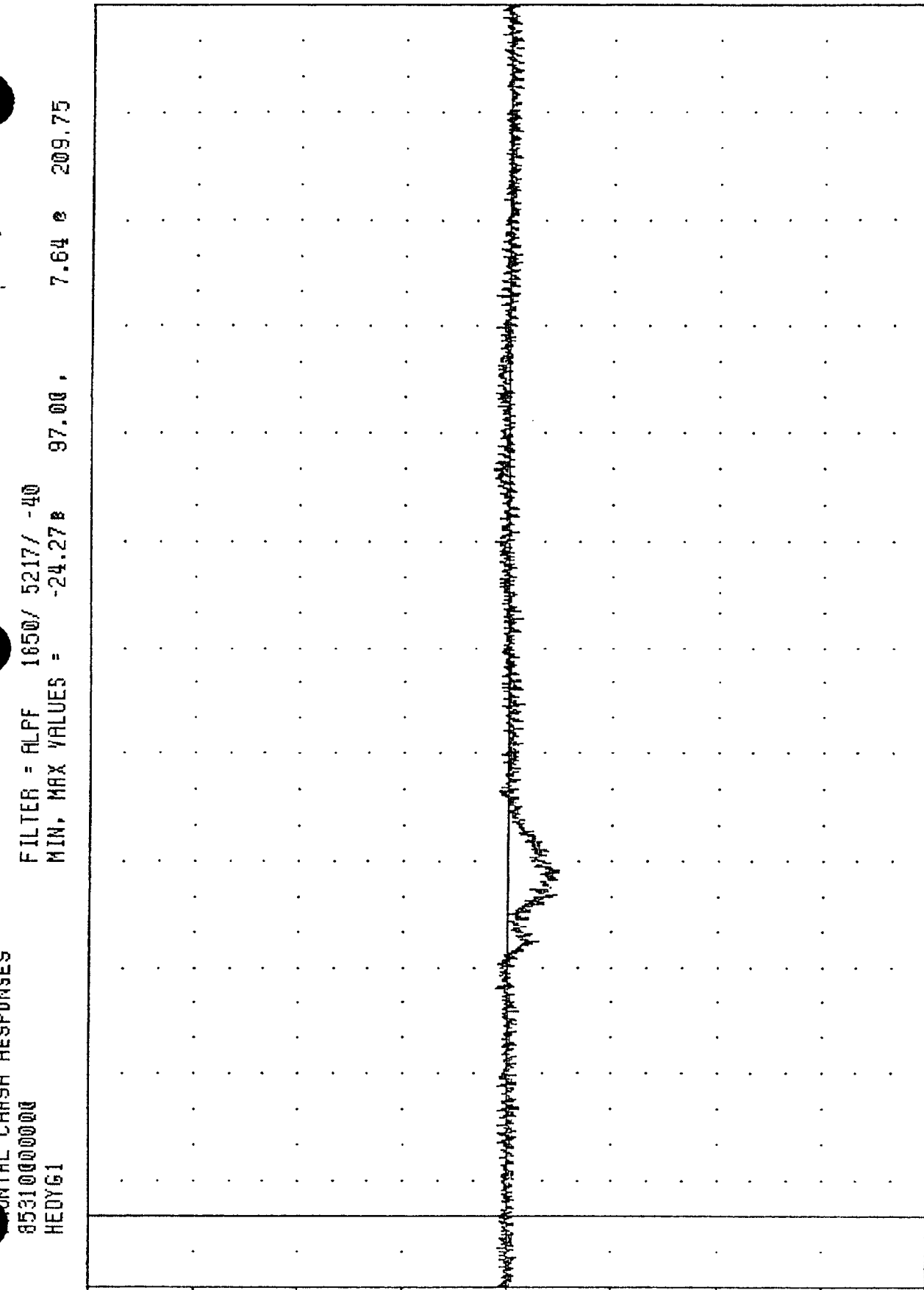
-2150.00

-2200.00

-2250.00

-2300.00

-2350.00



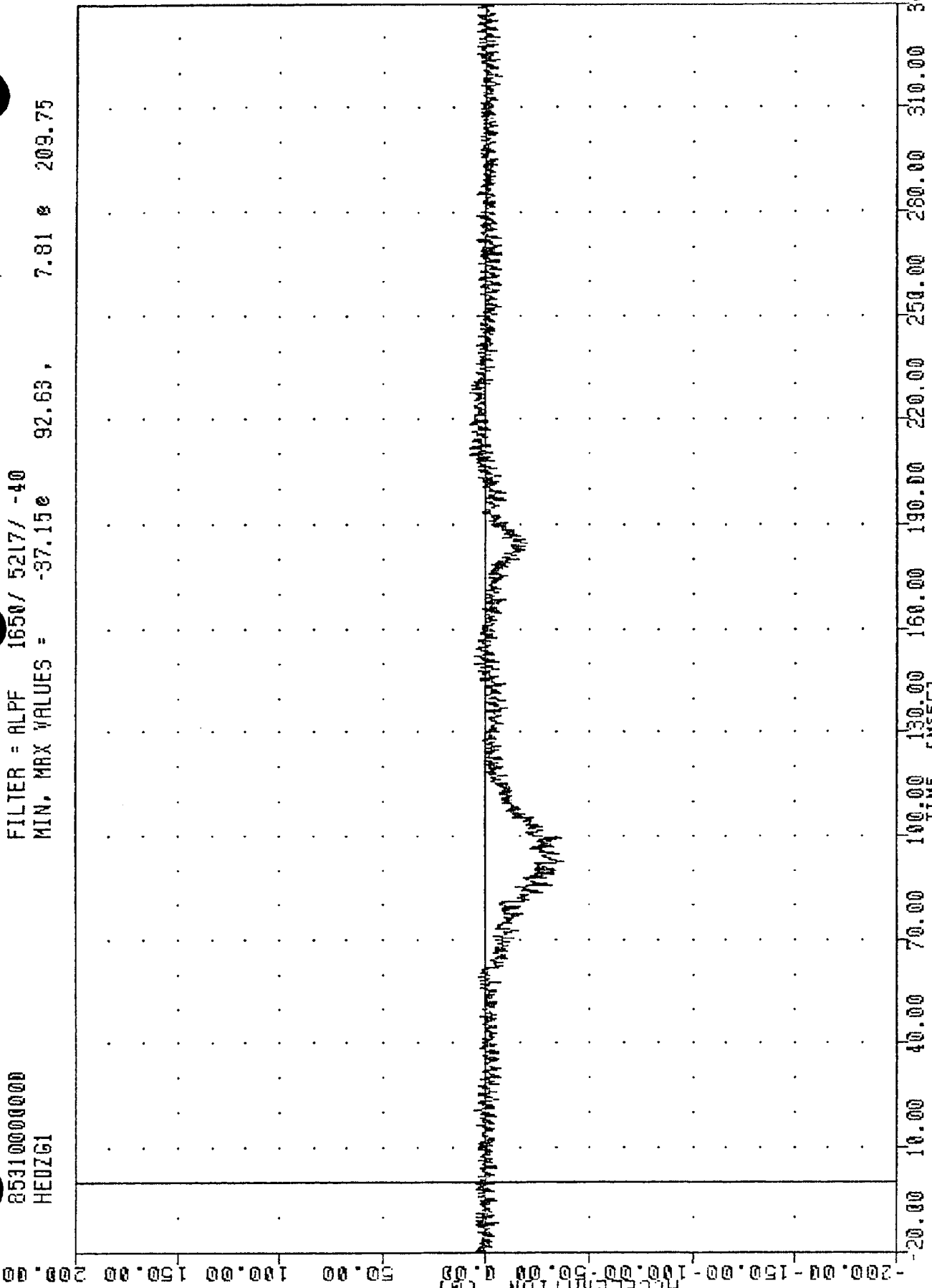
209.00 150.00 100.00 50.00 0.00 -50.00 -100.00 -150.00 -200.00 -200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00 250.00 300.00 340.00

SUBJECT VEHICLE - OMNI 68463  
DRIVER HEAD ACCELERATION Y AXIS

8511065  
CENTRAL CRASH RESPONSES  
853100000000  
HEU2G1

PLOT DATE 14-085 15:56:23

FILTER = ALPF 1650/ 5217/ -40  
MIN. MAX VALUES = -37.15e 92.63, 7.81 e 209.75



ACCELERATION (G) -200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00

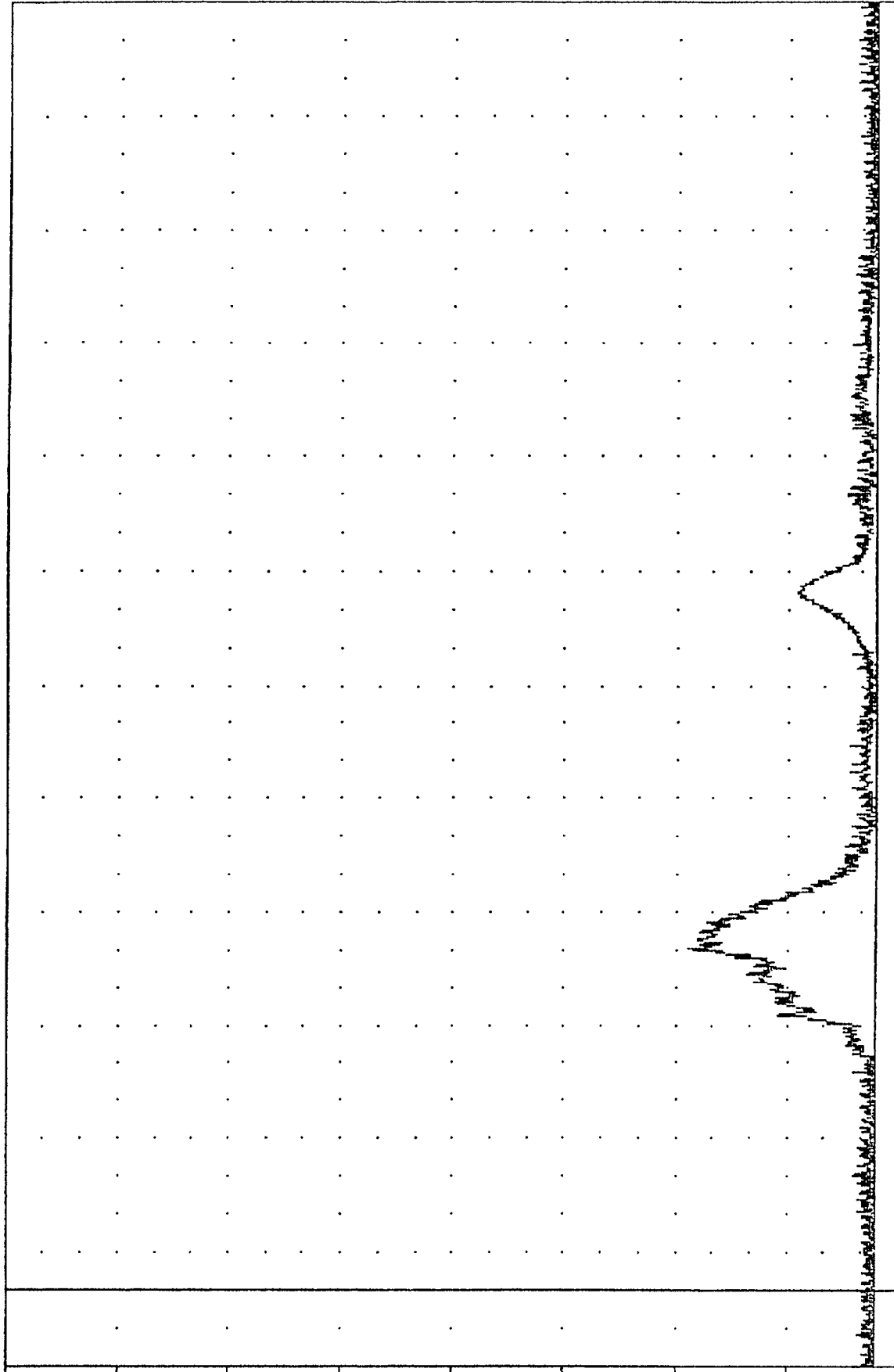
TIME (MSEC) 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

SUBJECT VEHICLE - OMNI 68463  
DRIVER HEAD ACCELERATION Z AXIS

851106S  
CENTRAL CRASH RESPONSES  
8531000000  
HEADG1

FLOT DATE 14-08-85 15:56:23  
FILTER = ALLPF 1650/ 5217/ -40  
MIN. MAX VALUES = 0.12g 279.88, 84.23 g 90.38

ACCELERATION (G)  
-10.00  
-5.00  
0.00  
5.00  
10.00  
15.00  
20.00  
25.00  
30.00  
35.00  
40.00  
45.00  
50.00  
55.00  
60.00  
65.00  
70.00  
75.00  
80.00  
85.00  
90.00  
95.00  
100.00  
110.00  
120.00  
130.00  
140.00  
150.00  
160.00  
170.00  
180.00  
190.00  
200.00  
210.00  
220.00  
230.00  
240.00  
250.00  
260.00  
270.00  
280.00  
290.00  
300.00  
310.00  
320.00  
330.00  
340.00  
350.00  
360.00  
370.00  
380.00  
390.00



TIME (MSEC)  
SUBJECT VEHICLE - OMNI 68463  
DRIVER HEAD RESULTANT

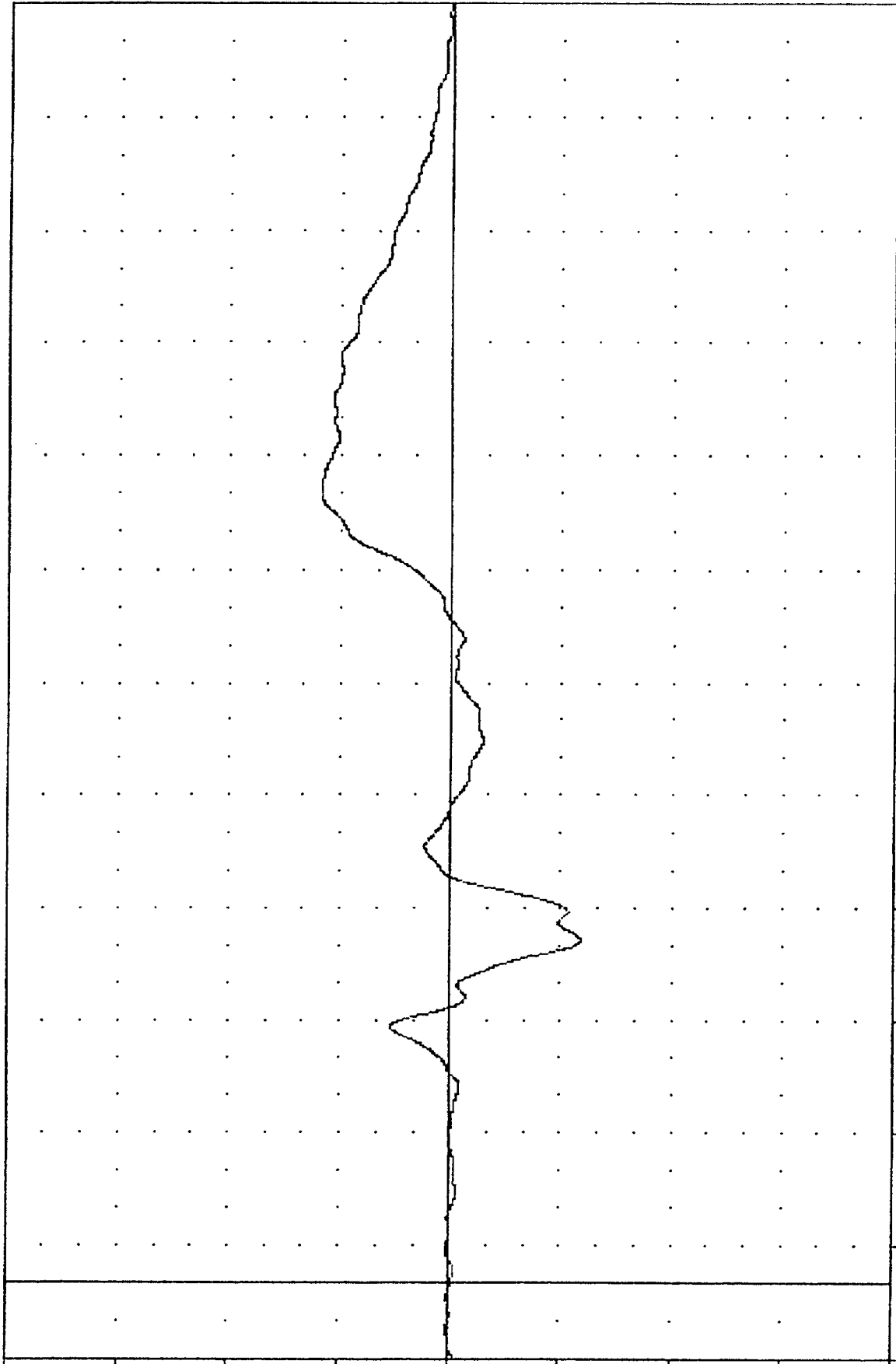
851106S  
FRONTAL CRASH RESPONSES  
853100000000  
MEKXF1

PLOT DATE 4-85 14:32:28

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -146.99# 91.50, 147.09 e 211.13

50.00  
37.50  
25.00  
12.50  
0.00  
-12.50  
-25.00  
-37.50  
-50.00



B-7

340.00  
310.00  
280.00  
250.00  
220.00  
190.00  
160.00  
130.00  
100.00  
70.00  
40.00  
10.00  
-20.00

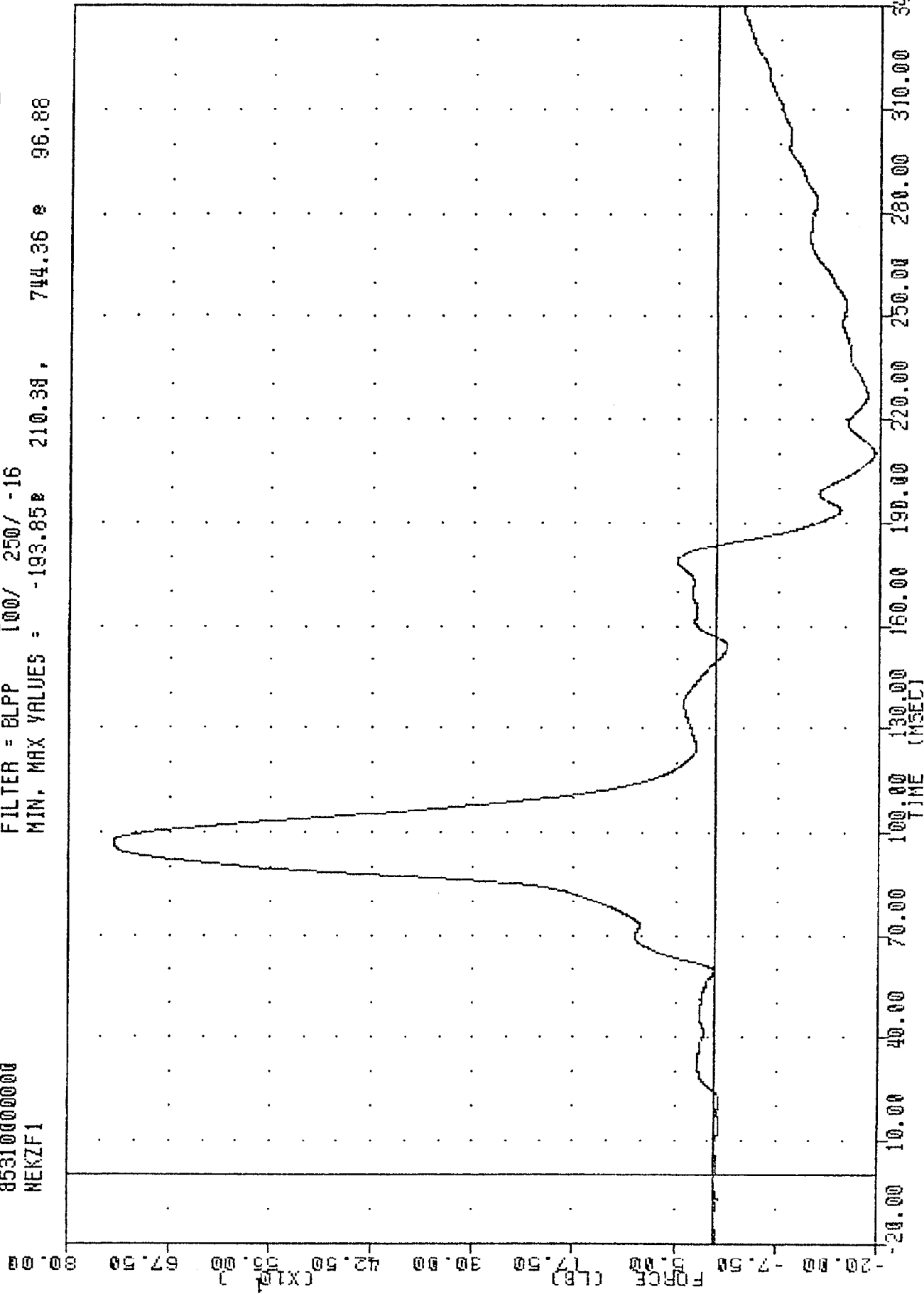
SUBJECT VEHICLE - OMNI 68463  
DRIVER NECK FORCE X AXIS LBS

8511063  
INITIAL CRASH RESPONSES  
85310000000  
NEKZF1

PLOT DATE 14-85 15:56:23

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -193.85# 210.38# 744.36# 96.88



SUBJECT VEHICLE - OMNI 68463  
DRIVER NECK FORCE Z AXIS LBS

851106S  
FRONTAL CRASH RESPONSES  
85310000000  
MEKYM1

PLOT DATE 15-08-85 08:25:51

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -16.42 262.75 54.06 90.38

100.00

75.00

50.00

25.00

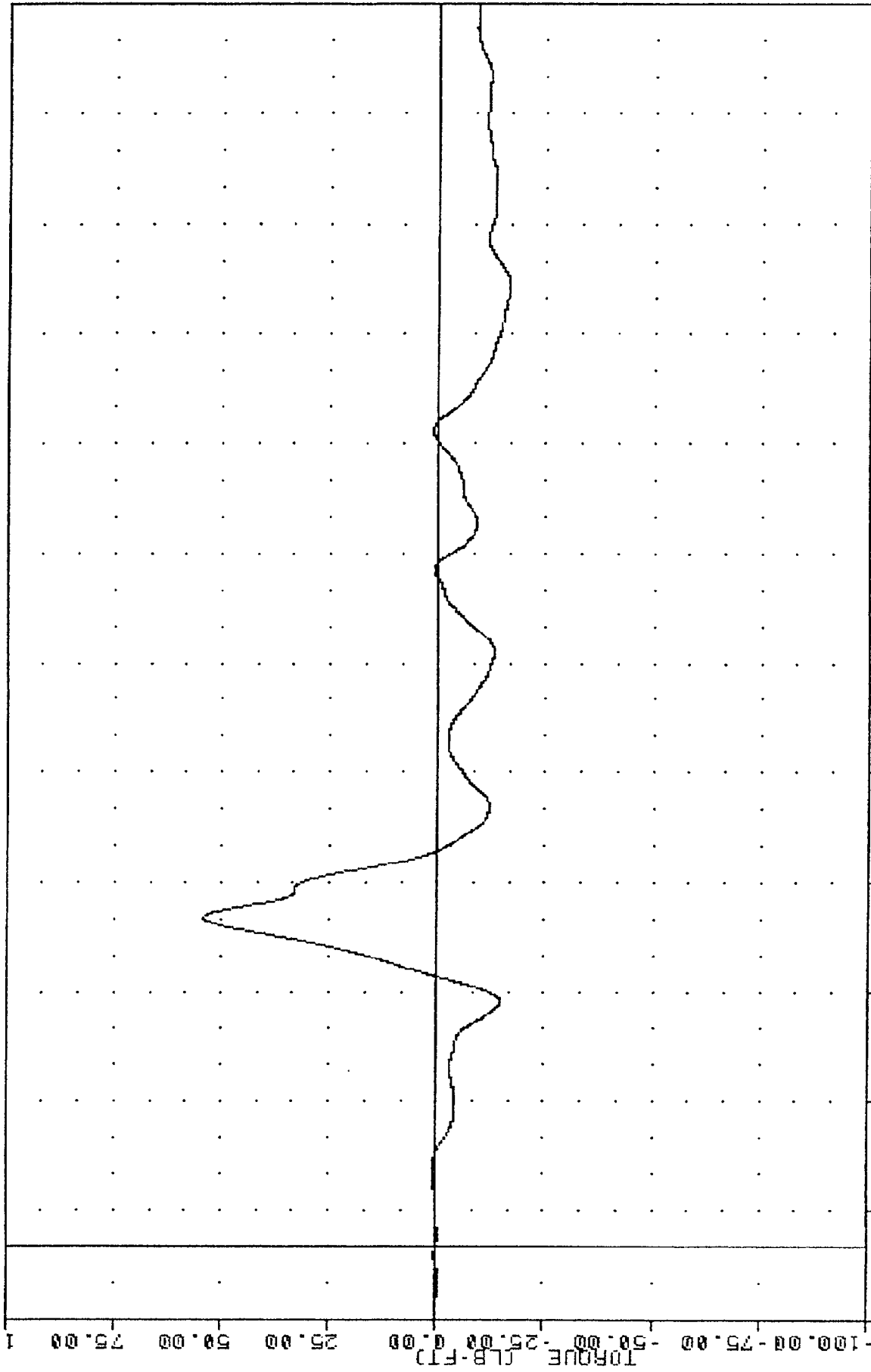
0.00

-25.00

-50.00

-75.00

-100.00



-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 (MSECT)  
SUBJECT VEHICLE - OMNI 68463  
DRIVER NECK MOMENT Y AXIS LB-FT

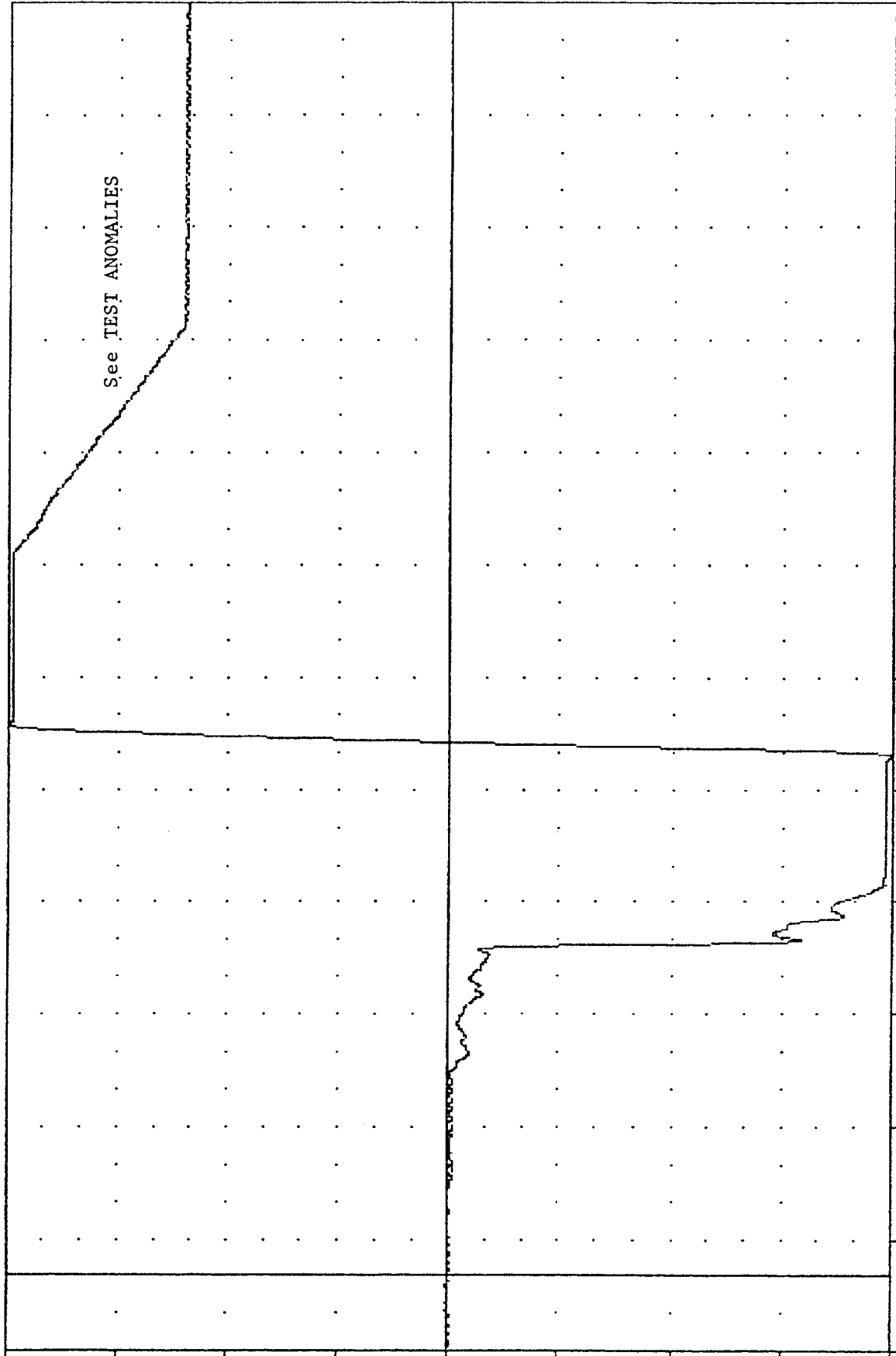
8511063  
INITIAL CRASH RESPONSES  
85310000000  
CSTX61

PLOT DATE 14 85 15:56:23

FILTER = BLPP 300 / 750 / -16

MIN, MAX VALUES = -399.138 139.00 , 397.85 e 147.25

ACCELERATION (G)  
(X10<sup>-2</sup>)



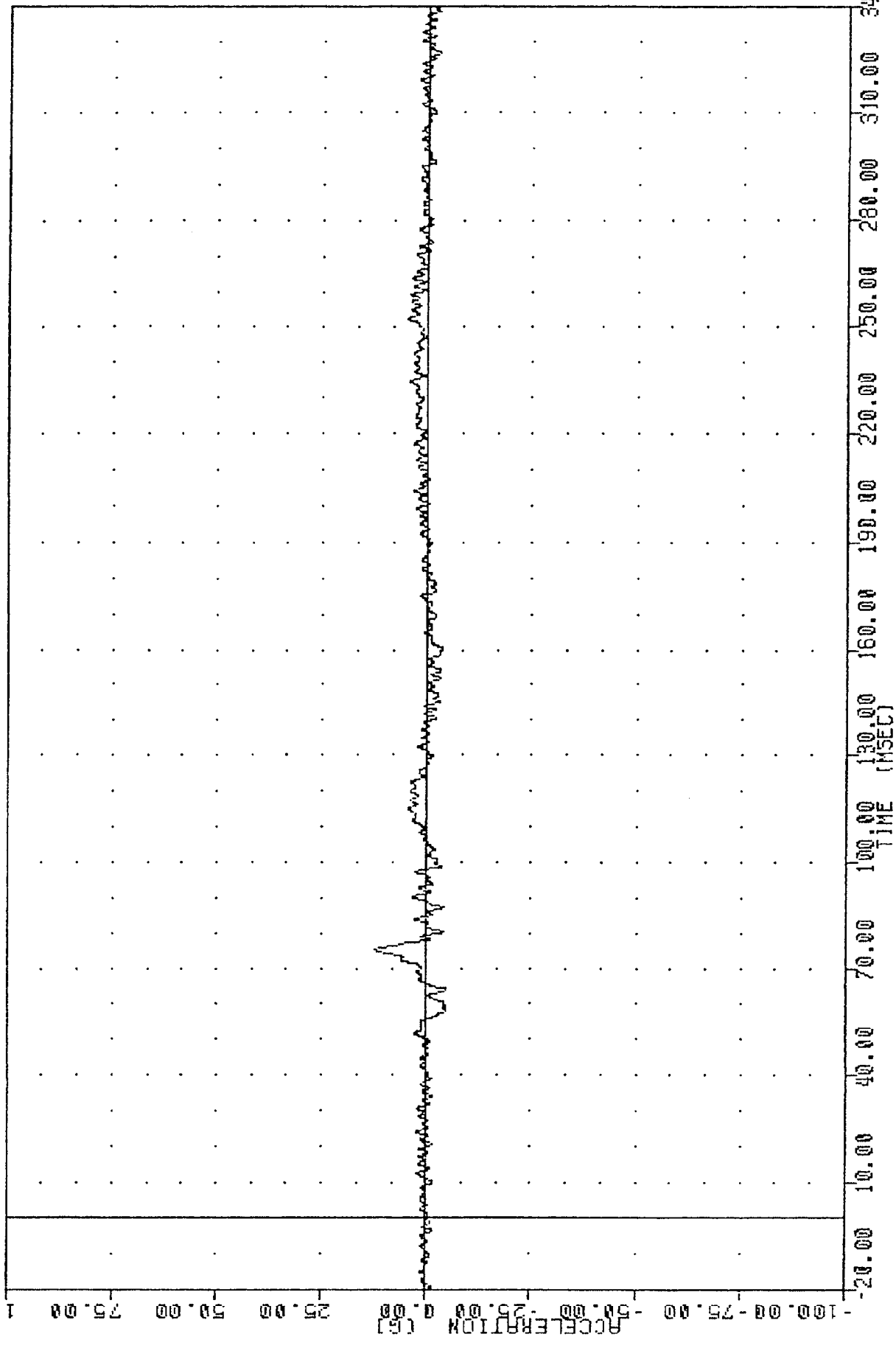
TIME (MSEC)

SUBJECT VEHICLE - OMNI 68463  
DRIVER CHEST ACCELERATION X AXIS

851106S  
 MONTAL CRASH RESPONSES  
 85310000000  
 CSTY61

PLOT DATE 14-85 15:56:23

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -4.74e 64.00, 12.21 e 75.00



SUBJECT VEHICLE - OMNI 68463  
 DRIVER CHEST ACCELERATION Y AXIS

851106S  
CENTRAL CRASH RESPONSES  
85310000000  
CSTZG1

PLOT DATE 14 85 15:56:23

FILTER = 8LPP 300/ 750/ -16

MIN. MAX VALUES = -7.81e 90.50, 8.69 e 98.75

100.00

75.00

50.00

25.00

0.00

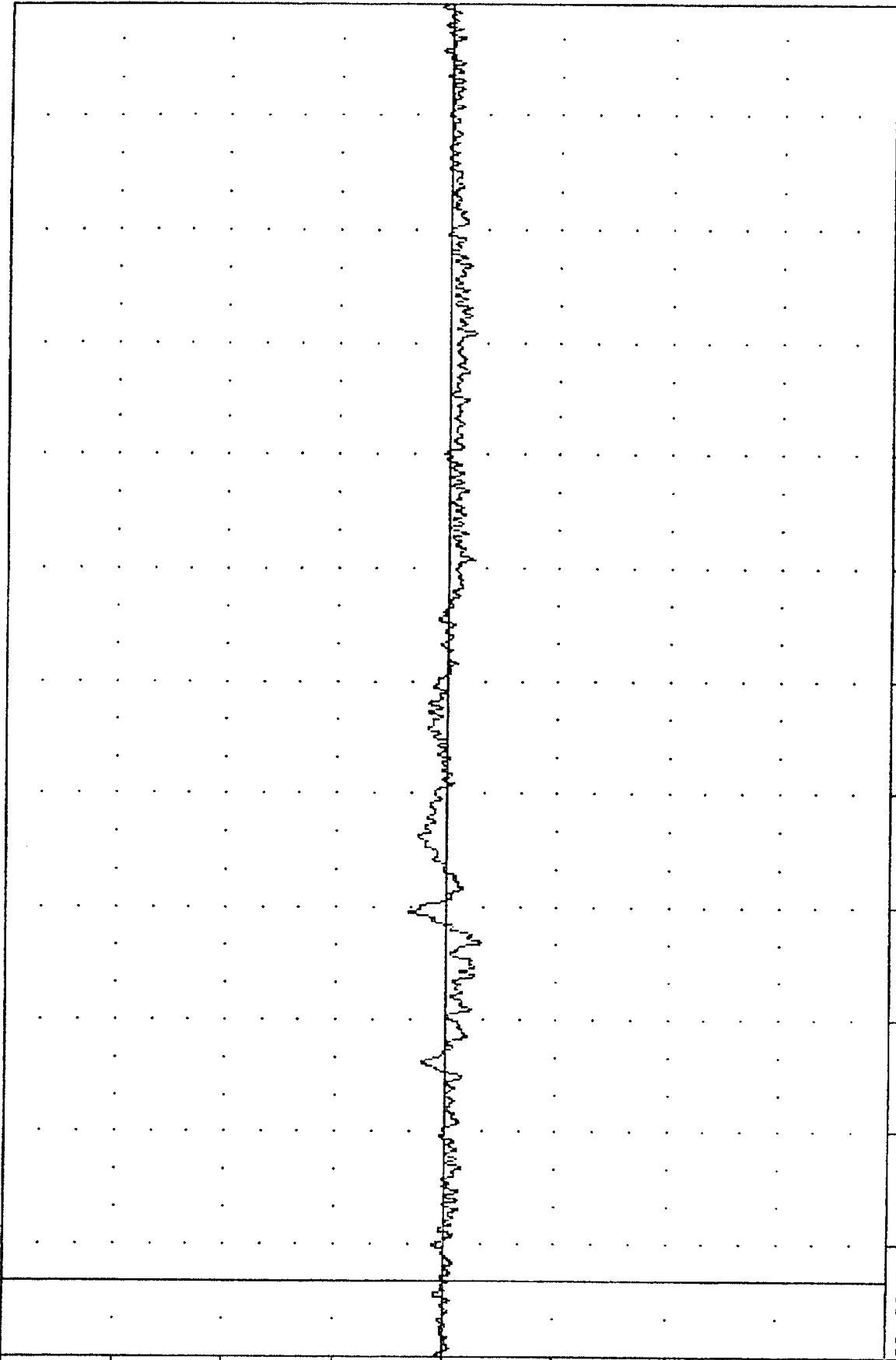
ACCELERATION (G)

-25.00

-50.00

-75.00

-100.00



-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 68463  
DRIVER CHEST ACCELERATION Z AXIS

8511063  
FATAL CRASH RESPONSES

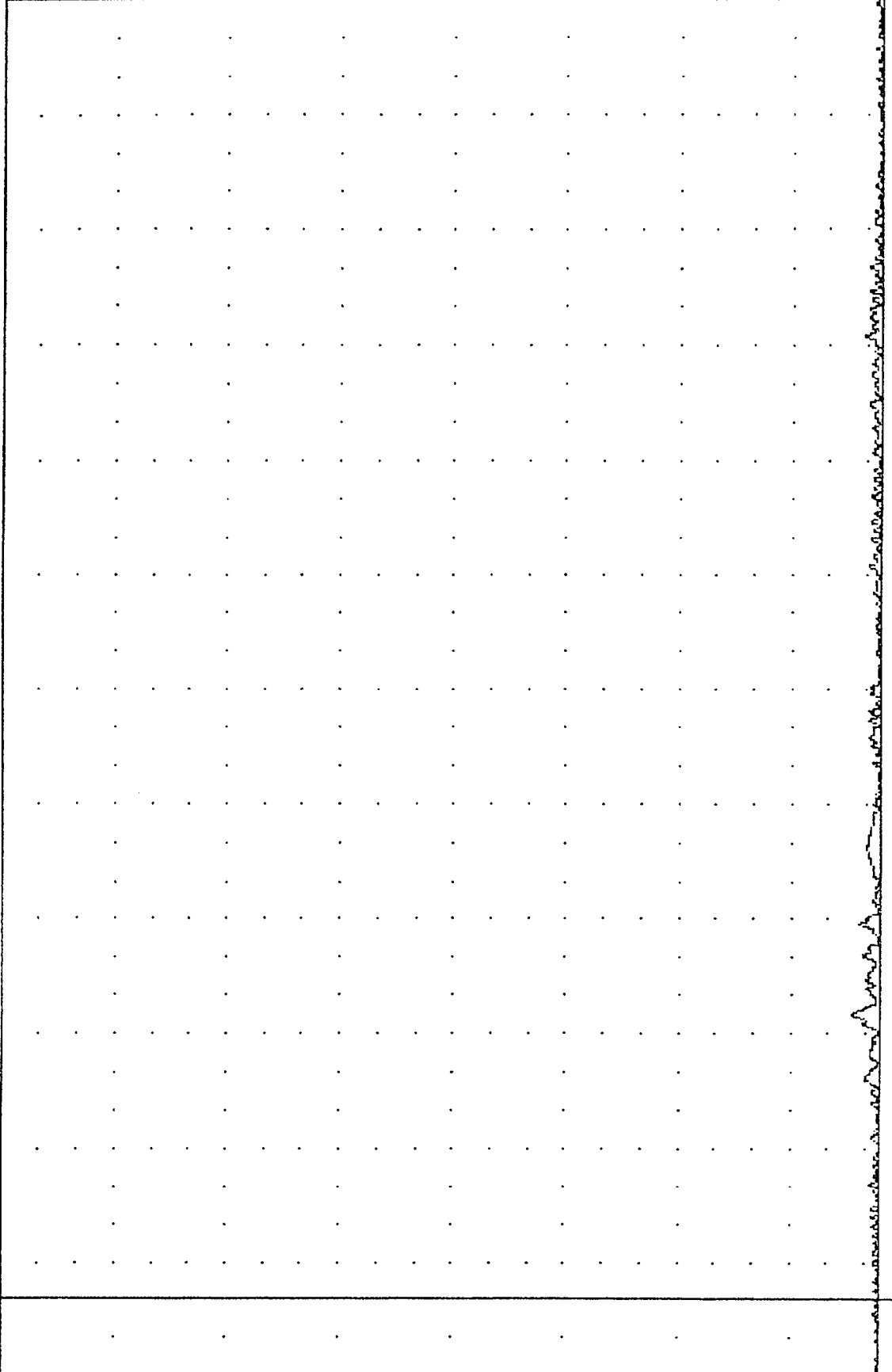
8531000000  
CSTR61

PLOT DATE 14 85 15:56:23

FILTER = BLPP 300/ 750/ .16

MIN. MAX VALUES = 0.03e 173.88, 12.65 e 74.88

ACCELERATION (G)  
-10.00  
-4.00  
0.00  
4.00  
8.00  
12.00  
16.00  
19.00  
23.00  
27.00  
29.00  
34.00  
39.00



-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)

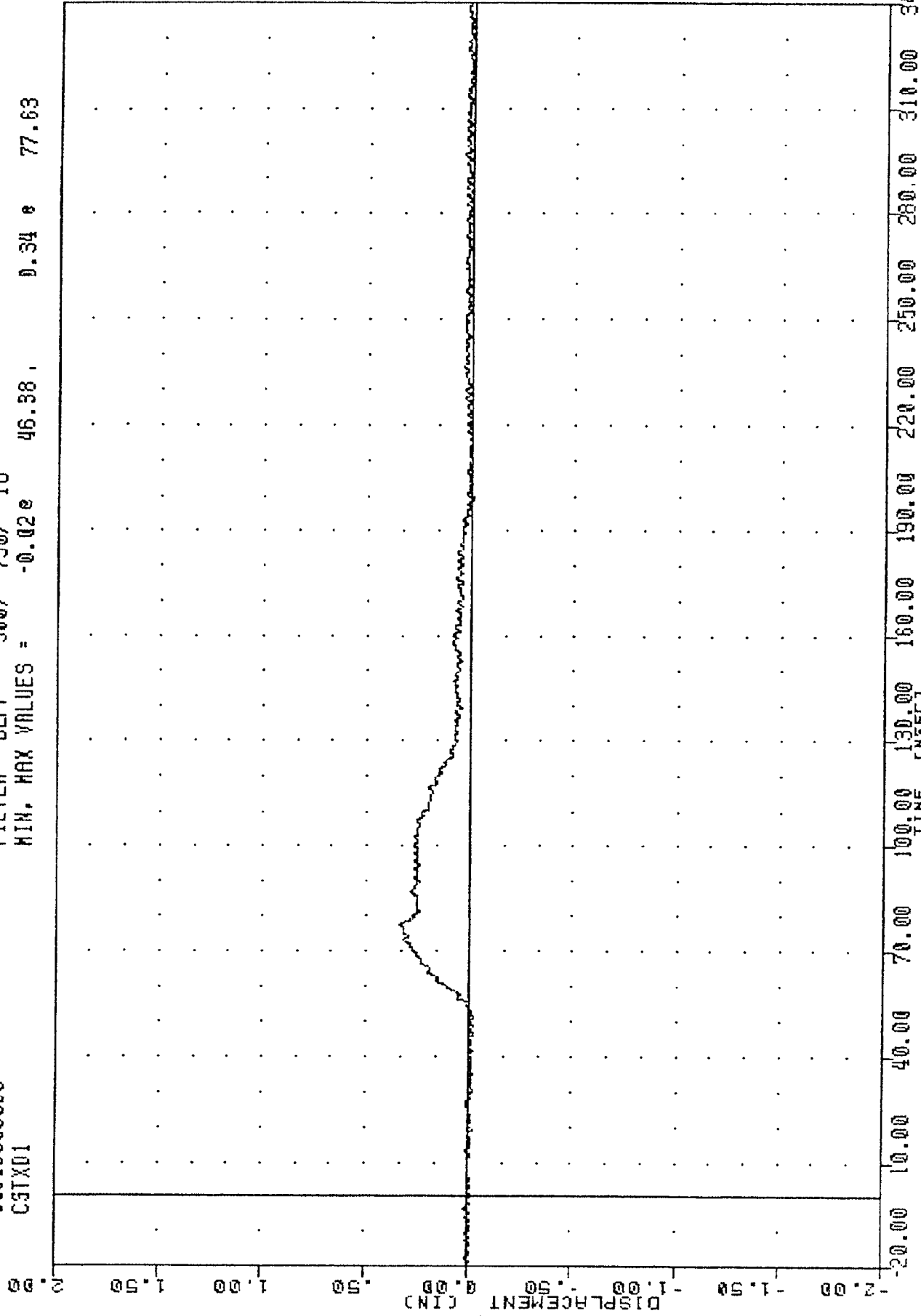
SUBJECT VEHICLE - OMNI 68463  
DRIVER CHEST RESULTANT USING ONLY Y AND Z

8511063  
CENTRAL CRASH RESPONSES  
8310000000  
CSTXD1

PLOT DATE 14-11-85 15:56:23

FILTER = BLPP 300 / 750 / -16

MIN. MAX VALUES = -0.02e 46.88 , 0.34 e 77.63



SUBJECT VEHICLE - OMNI 68463  
DRIVER CHEST DISPLACEMENT

8511063  
FRONTAL CRASH RESPONSES

85310000000  
LFMF1

PLOT DATE 14-85 15:56:23

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -1001.498 101.63, 92.99 @ 52.63

80.00

20.00

0.00

-20.00

-40.00

-60.00

-80.00

-100.00

-120.00

-140.00

-160.00

-180.00

-200.00

-220.00

-240.00

-260.00

-280.00

-300.00

-320.00

-340.00

-360.00

-380.00

-400.00

-420.00

-440.00

-460.00

-480.00

-500.00

-520.00

-540.00

-560.00

-580.00

-600.00

-620.00

-640.00

-660.00

-680.00

-700.00

-720.00

-740.00

-760.00

-780.00

-800.00

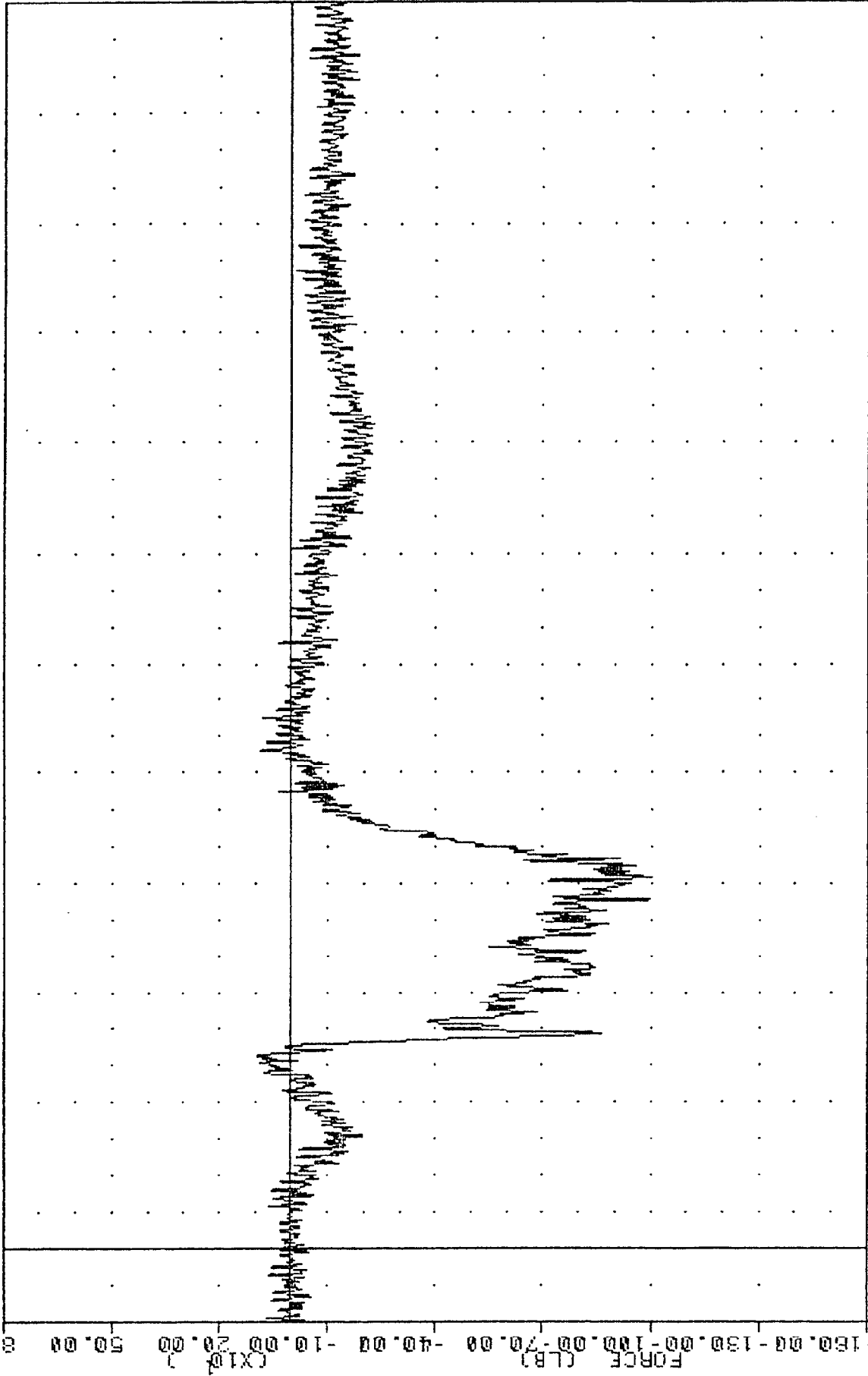
-820.00

-840.00

-860.00

-880.00

-900.00



80.00 20.00 0.00 -20.00 -40.00 -60.00 -80.00 -100.00 -120.00 -140.00 -160.00

0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

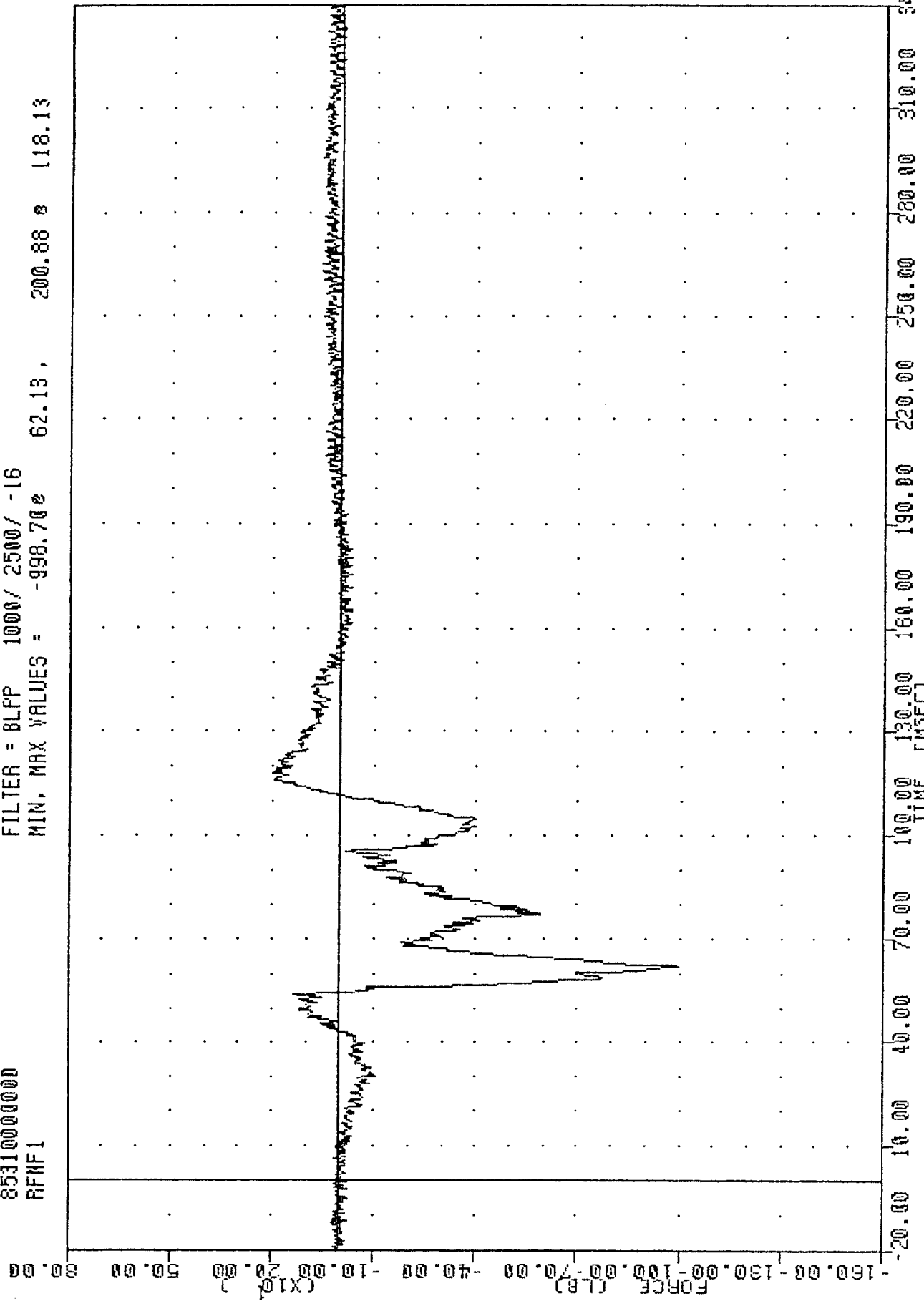
SUBJECT VEHICLE - OMNI 68463  
DRIVER LEFT FEMUR FORCE LBS

851106S  
 CENTAL CRASH RESPONSES  
 8531000000  
 RFXF1

PLOT DATE 14 85 15:56:23

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -998.700 62.13, 200.88 118.13



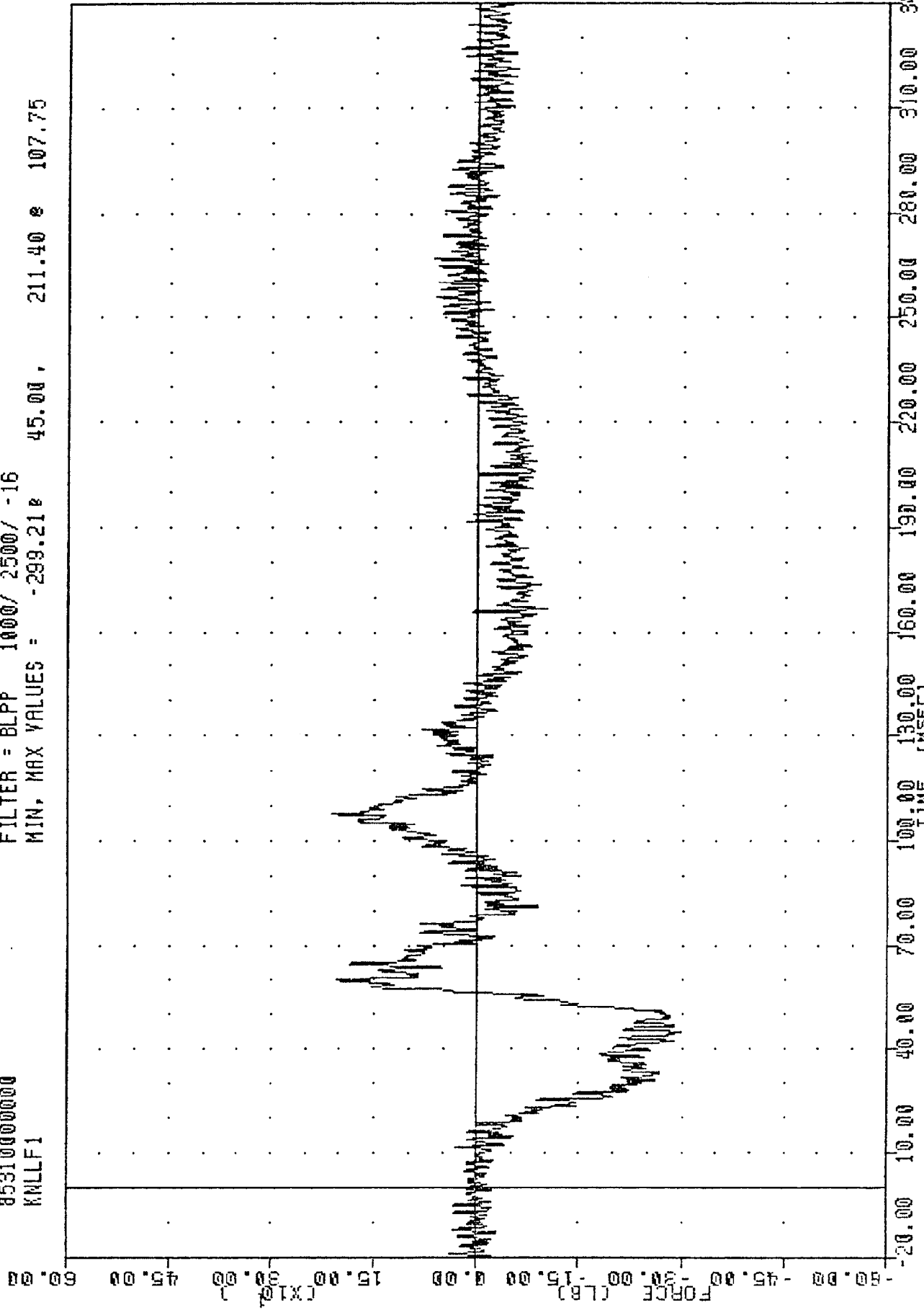
SUBJECT VEHICLE - OMNI 68463  
 DRIVER RIGHT FEMUR FORCE LBS

851106S  
CENTRAL CRASH RESPONSES  
85310000000  
KNLLF1

PLOT DATE 15-08-85 10:18:16

FILTER = BLPP 1000/ 2500/ -16

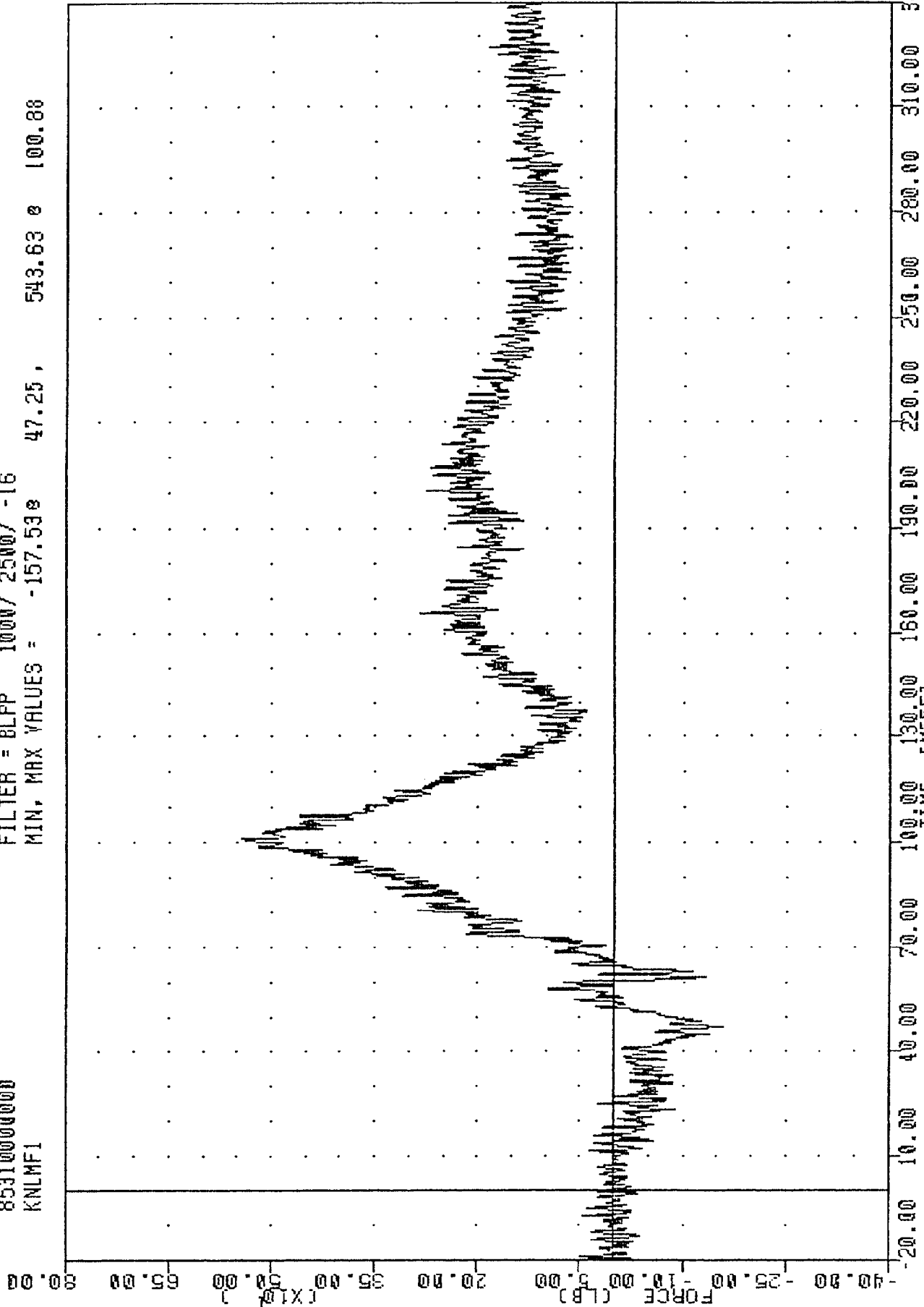
MIN. MAX VALUES = -298.21# 45.00, 211.40 # 107.75



SUBJECT VEHICLE - OMNI 68483  
DRIVER LEFT KNEE / LEFT SENSOR FORCE LBS

8511063  
CENTRAL CRASH RESPONSES  
85310000000  
KNLMF1

PLOT DATE 157 85 10:18:16  
FILTER = BLPP 1000 / 2500 / -16  
MIN, MAX VALUES = -157.53 543.63 0 100.88



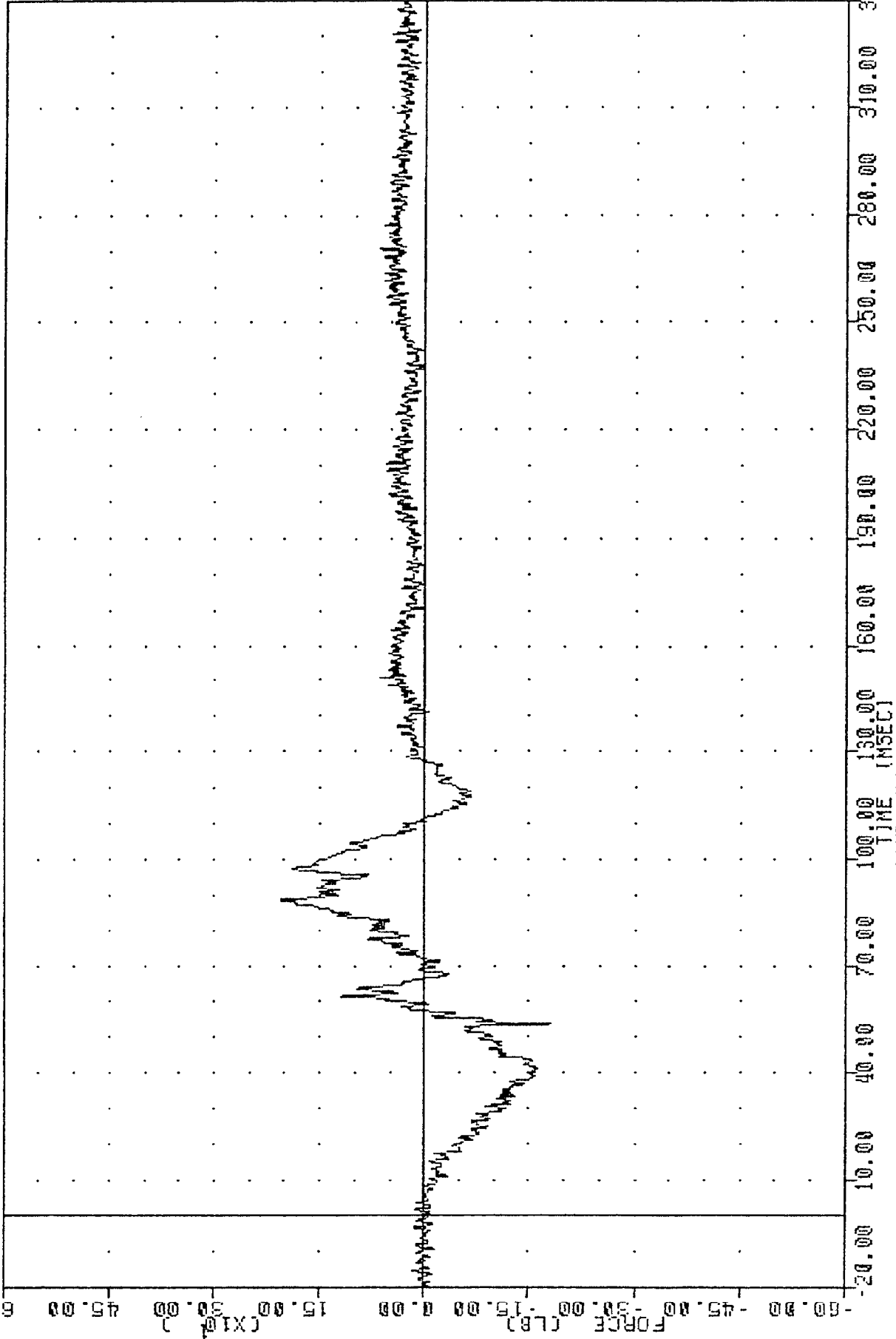
SUBJECT VEHICLE - OMNI 68463  
DRIVER LEFT KNEE / RIGHT SENSOR FORCE LBS

8511065  
INITIAL CRASH RESPONSES  
85310000000  
KNRMF1

PLOT DATE 14-85 15:56:23

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -179.53B 53.75, 204.03 e 88.50



SUBJECT VEHICLE - OMNI 68463

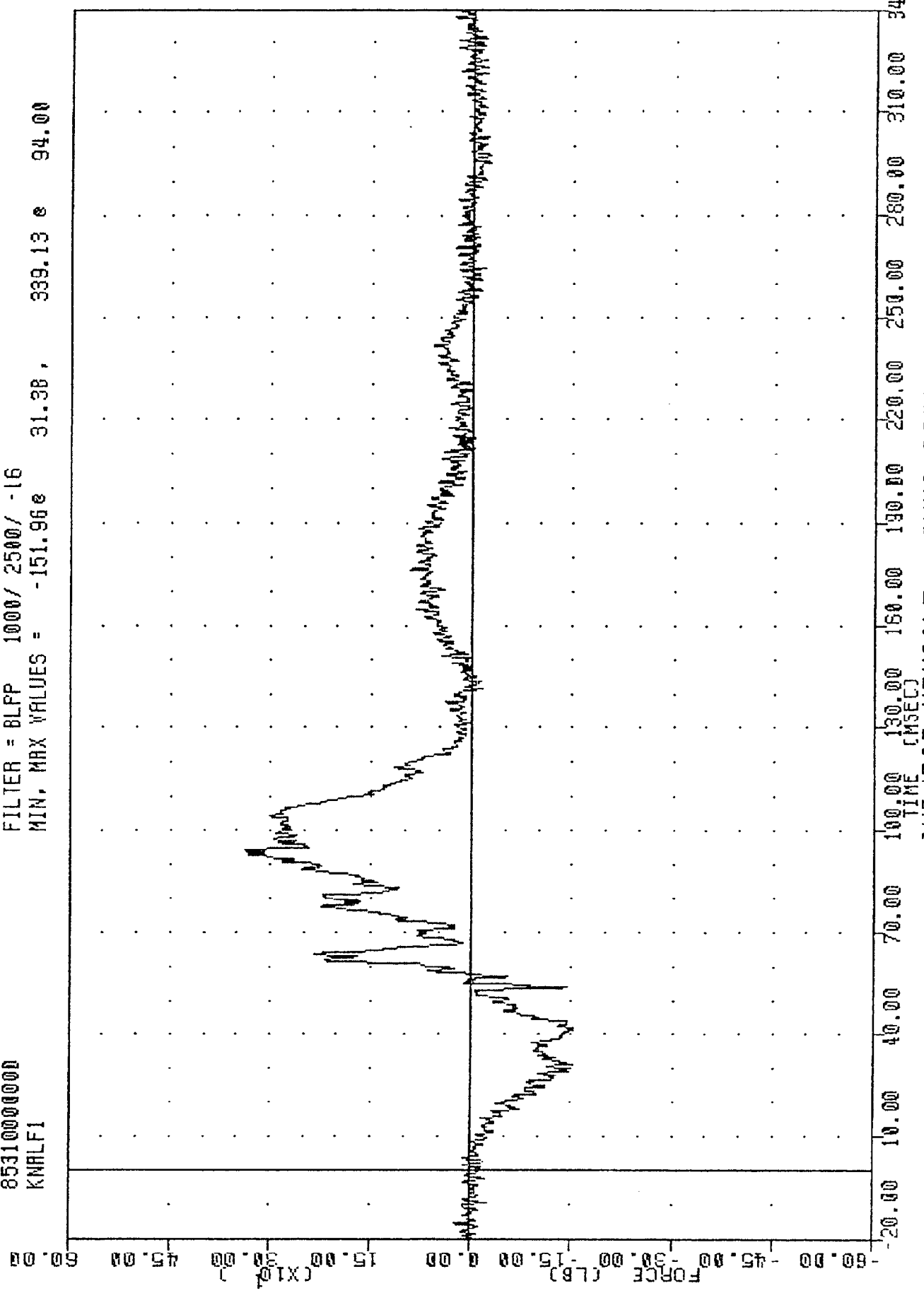
DRIVER RIGHT KNEE / LEFT SENSOR FORCE LBS

851106S  
CENTRAL CRASH RESPONSES  
85310000000  
KNRLF1

PLOT DATE 14 85 15:56:23

FILTER = BLFP 1000/ 2500/ -16

MIN, MAX VALUES = -151.96e 31.38, 339.13 e 94.00



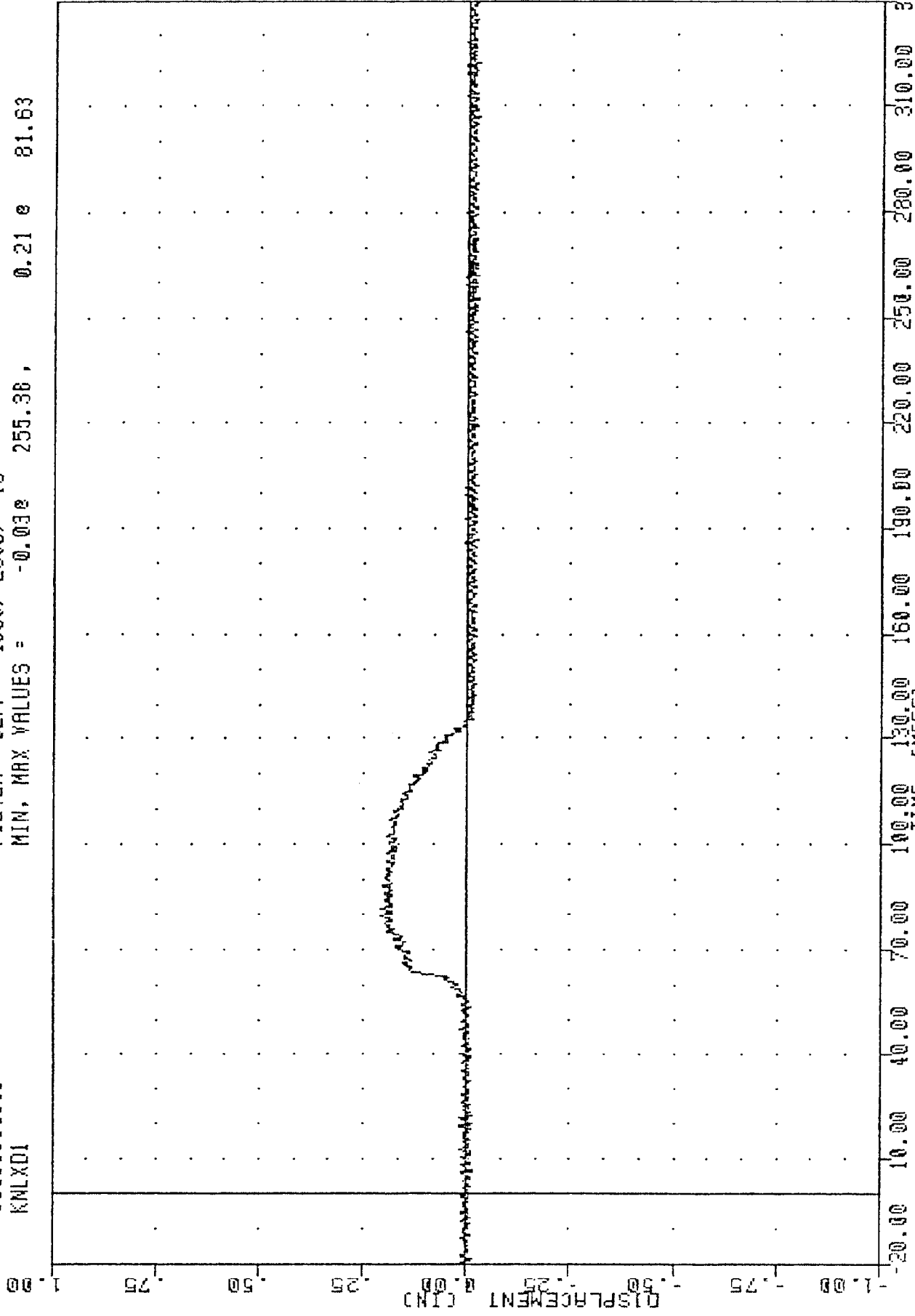
SUBJECT VEHICLE - OMNI 68463  
DRIVER RIGHT KNEE / RIGHT SENSOR FORCE LBS

8511063  
CENTRAL CRASH RESPONSES  
85310000000  
KNLXD1

PLOT DATE 14 85 16:01:25

FILTER = BLPP 100N/ 2500/ -16

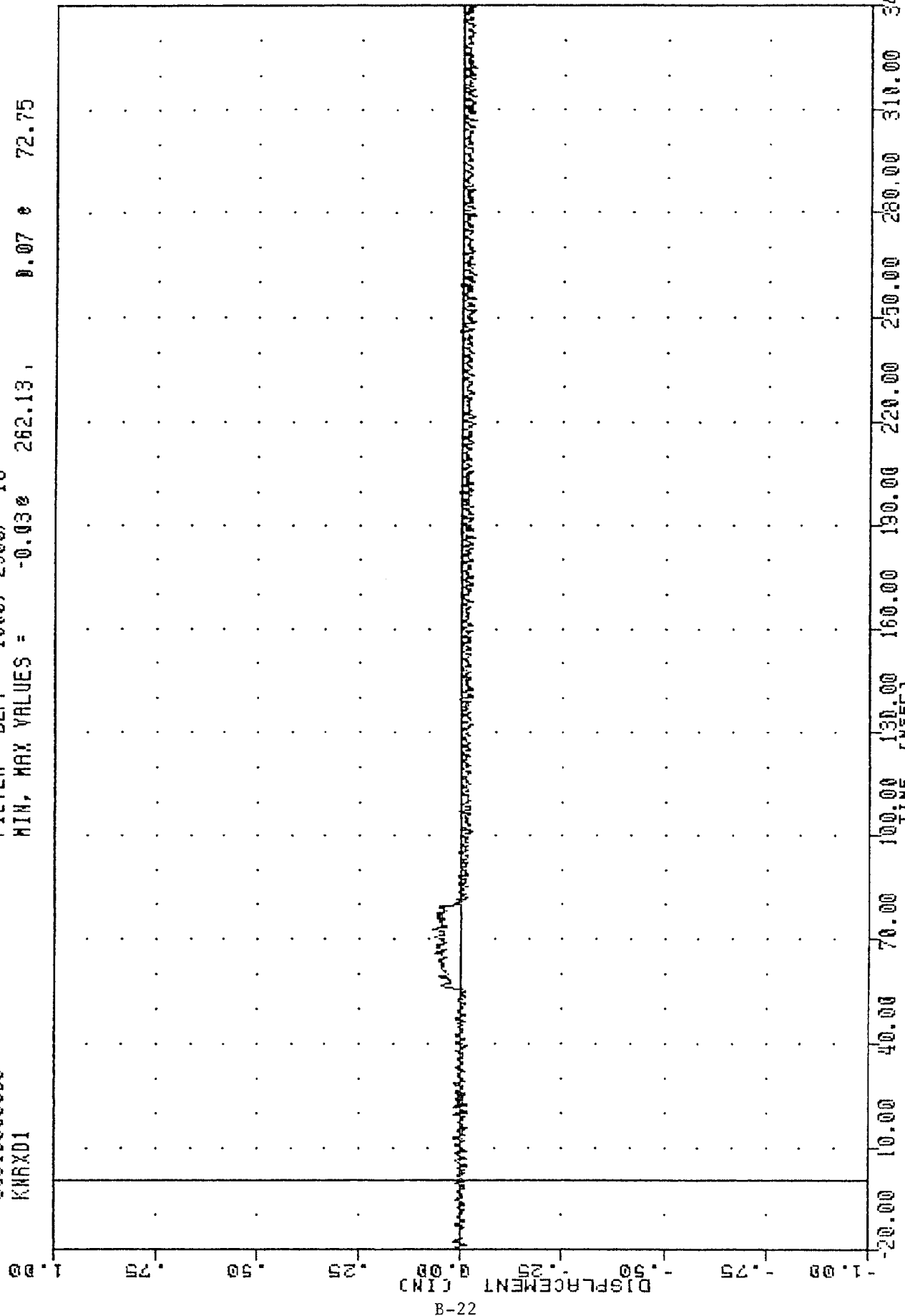
MIN, MAX VALUES = -0.03e 255.36, 0.21 e 81.63



SUBJECT VEHICLE - OMNI 68463  
DRIVER LEFT KNEE DISPLACEMENT X AXIS

8511065  
INITIAL CRASH RESPONSES  
8510000000  
KHXD1

PLOT DATE 14-085 16:01:25  
FILTER = BLPP 1000/ 2500/ .16  
MIN, MAX VALUES = -0.030 262.13, 0.070 72.75



SUBJECT VEHICLE - OMNI 68463  
DRIVER RIGHT KNEE DISPLACEMENT X AXIS

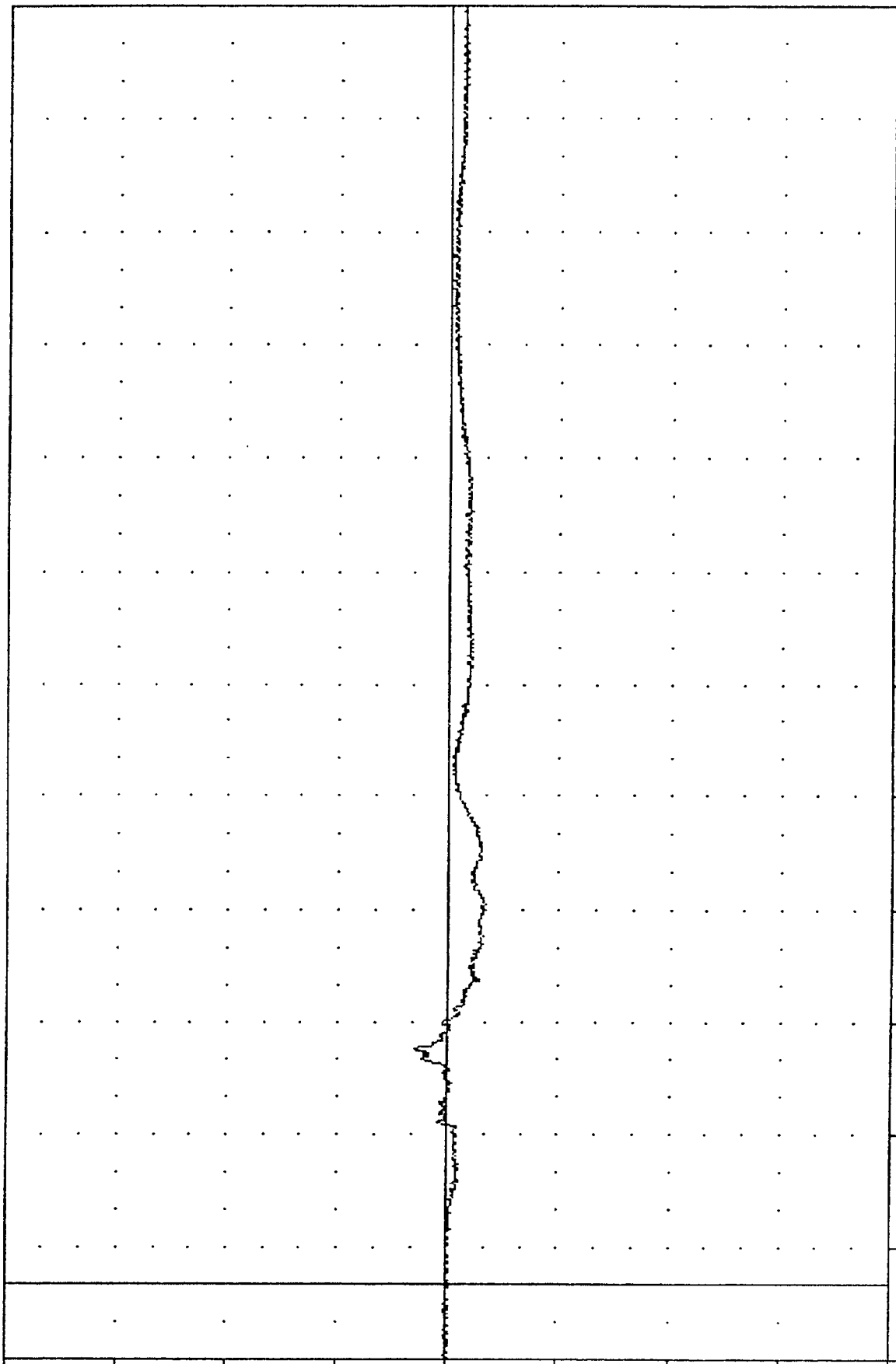
8511003  
 ONTAL CRASH RESPONSES  
 85310000000  
 TBLXMI

PLOT DATE 4-85 14:32:28

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -50.018 101.63, 44.81 e 62.88

TORQUE (LB-FT) (X10<sup>3</sup>)



-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

SUBJECT VEHICLE - OMNI 68463

DRIVER LEFT UPPER TIBIA MOMENT X AXIS LB-FT

8511069 4 85 14:32:28

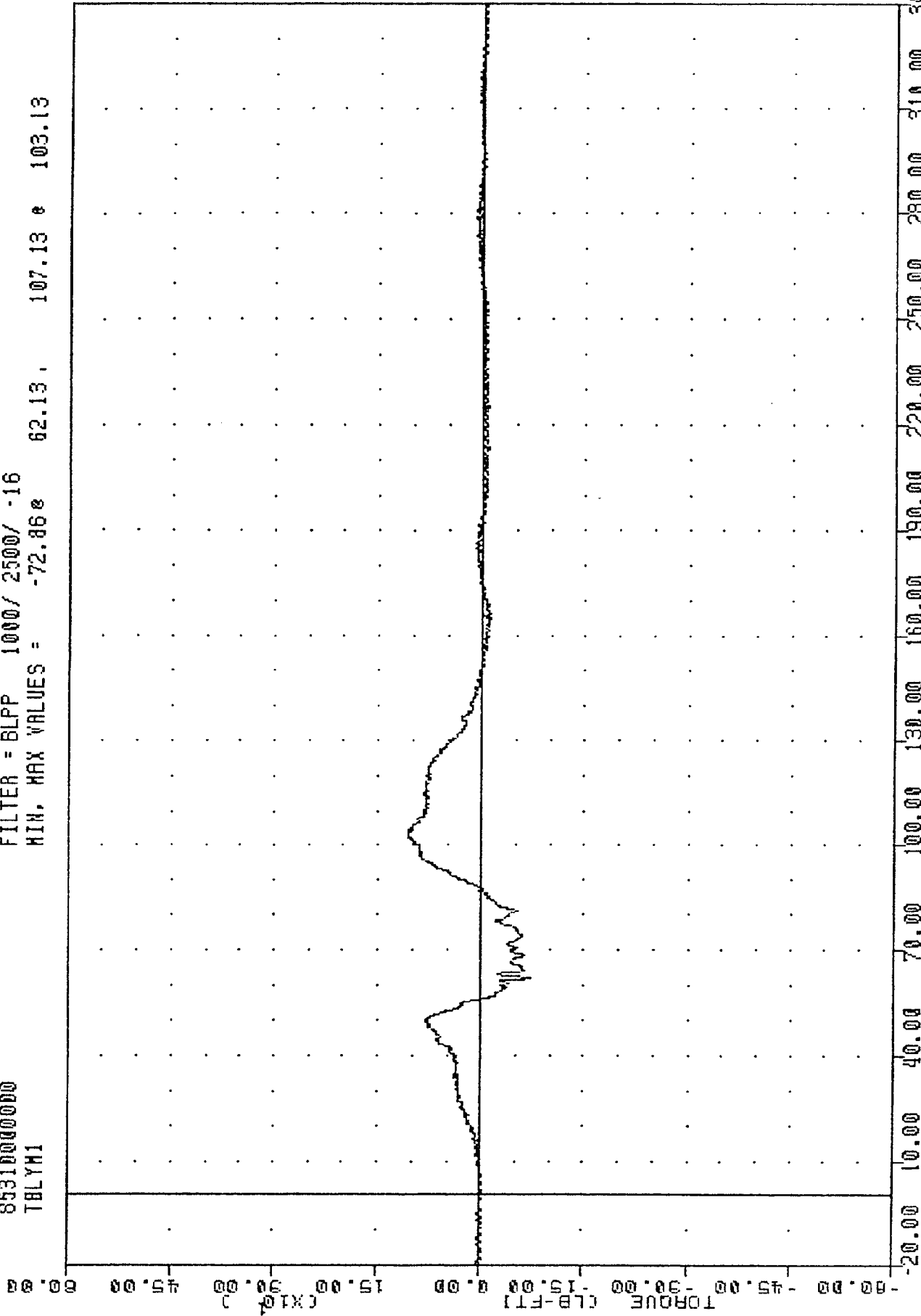
CENTRAL CRASH RESPONSES

8531000000

TBL1H1

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -72.86e 62.13, 107.13 e 103.13



SUBJECT VEHICLE - OMNI 68463  
DRIVER LEFT UPPER TIBIA MOMENT Y AXIS LB-FT

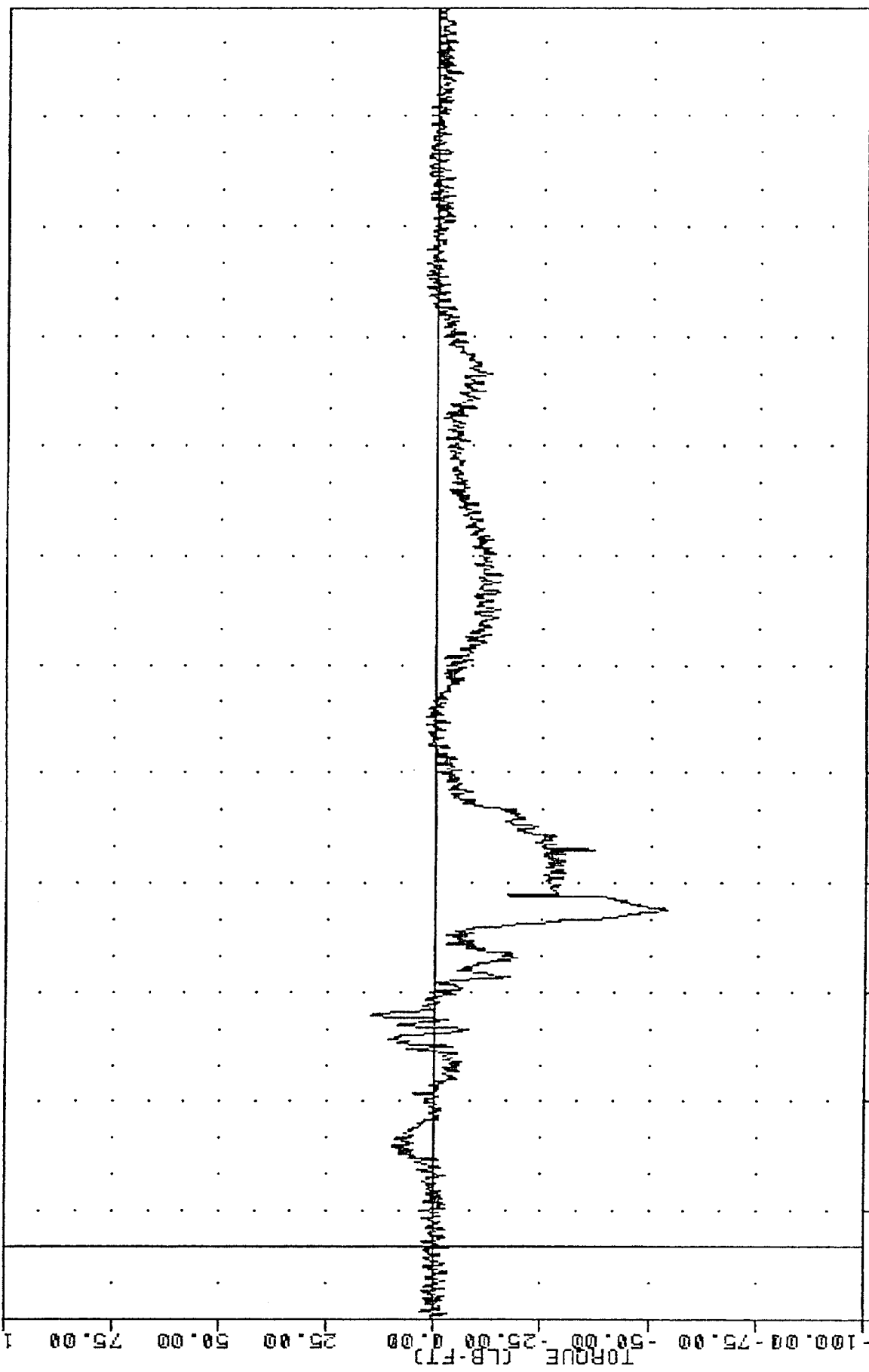
851106S  
CENTRAL CRASH RESPONSES  
25310000000  
TBRXMI

PLOT DATE 4-85 14:32:28

FILTER = BLFP 1000/ 2500/ -16

MIN, MAX VALUES = -54.12e 92.75, 14.73 e 63.75

100.00



-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 68463

DRIVER RIGHT UPPER TIBIA MOMENT X AXIS LB-FT

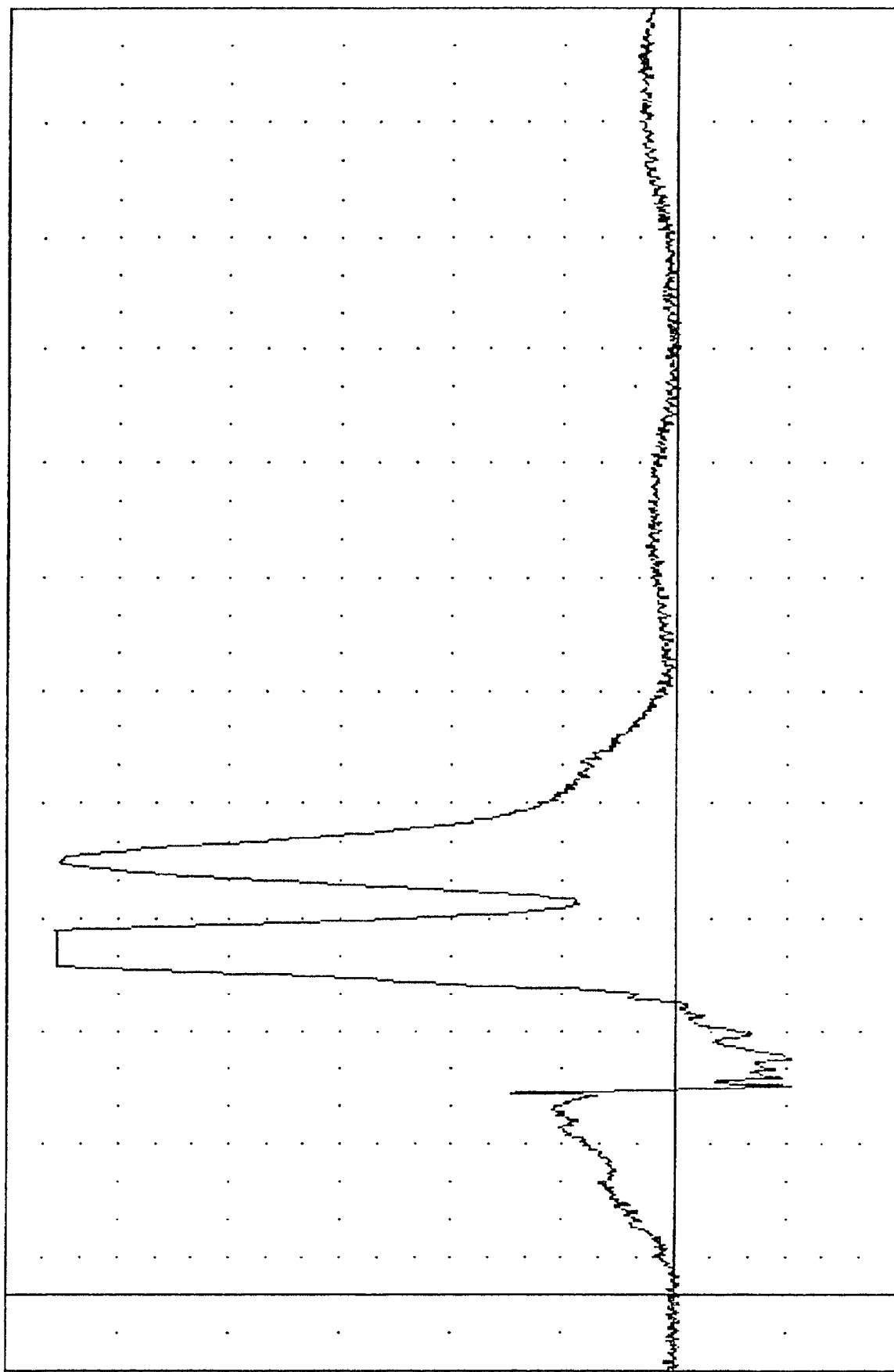
851106\$  
FRONTAL CRASH RESPONSES  
85310000000  
TBRM1

PLOT DATE 4-85 14:32:28

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -52.76e 62.75, 277.90 e 96.63

1000.00  
750.00  
500.00  
250.00  
0.00  
-250.00  
-500.00  
-750.00  
-1000.00

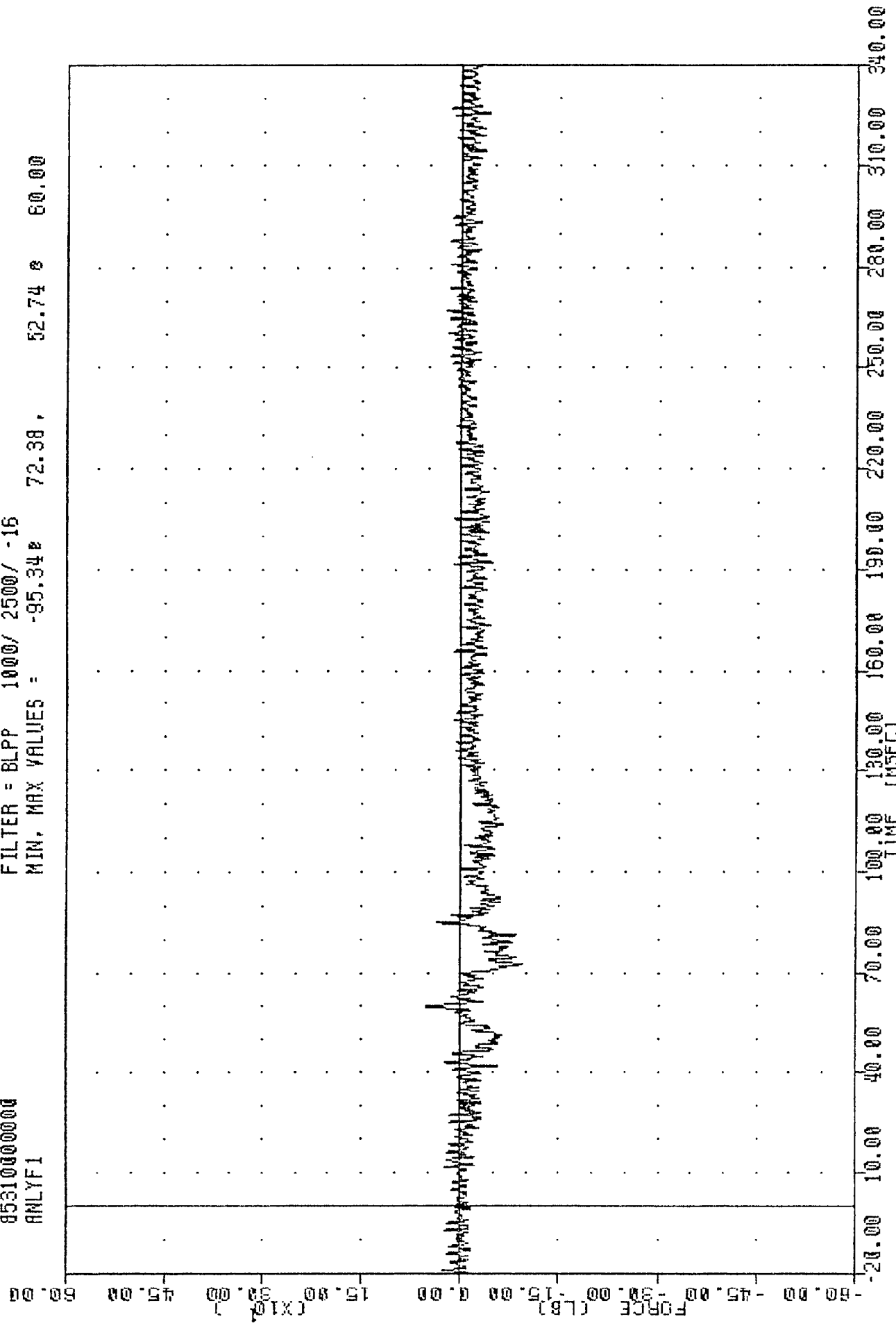


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)

SUBJECT VEHICLE - OMNI 68463  
DRIVER RIGHT UPPER TIBIA MOMENT Y AXIS LB-FT

8511063  
 CENTRAL CRASH RESPONSES  
 85310000000  
 ANLYF1

PLOT DATE 14-85 15:56:23  
 FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -95.348 72.38, 52.74 8 60.00



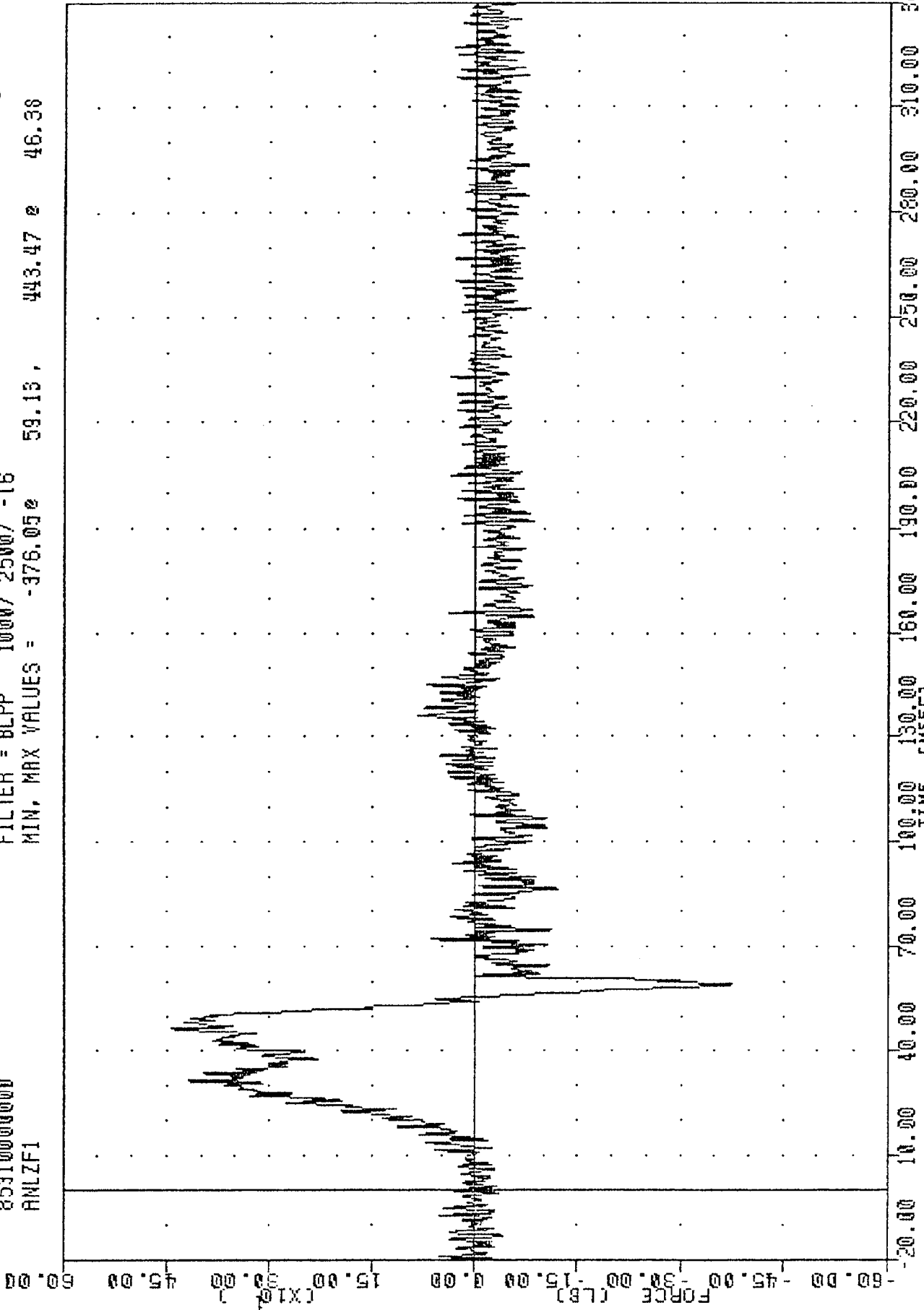
SUBJECT VEHICLE - OMNI 68463  
 DRIVER LEFT LOWER TIBIA FORCE Y AXIS LBS

8511065  
CENTRAL CRASH RESPONSES  
25310000000  
ANLZF1

PLOT DATE 14-08-85 15:56:23

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -376.05e 59.13, 443.47 e 46.38



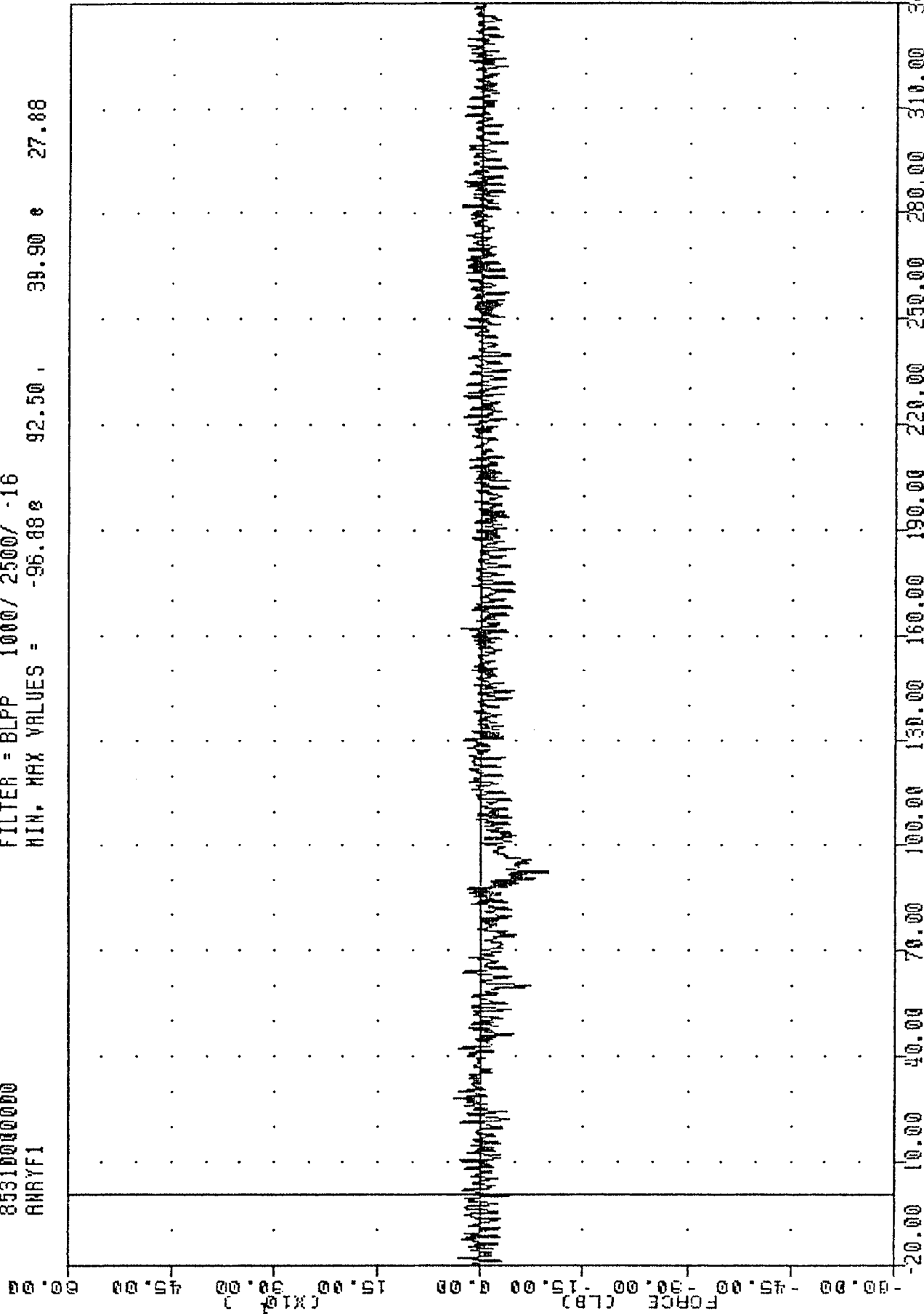
SUBJECT VEHICLE - OMNI 68463  
DRIVER LEFT LOWER TIBIA FORCE Z AXIS LBS

851106S.  
CENTRAL CRASH RESPONSES  
85310000000  
ANRYF1

PLOT DATE 14-08 15:56:23

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -95.88 92.50 39.90 27.88



SUBJECT VEHICLE - OMNI 68463

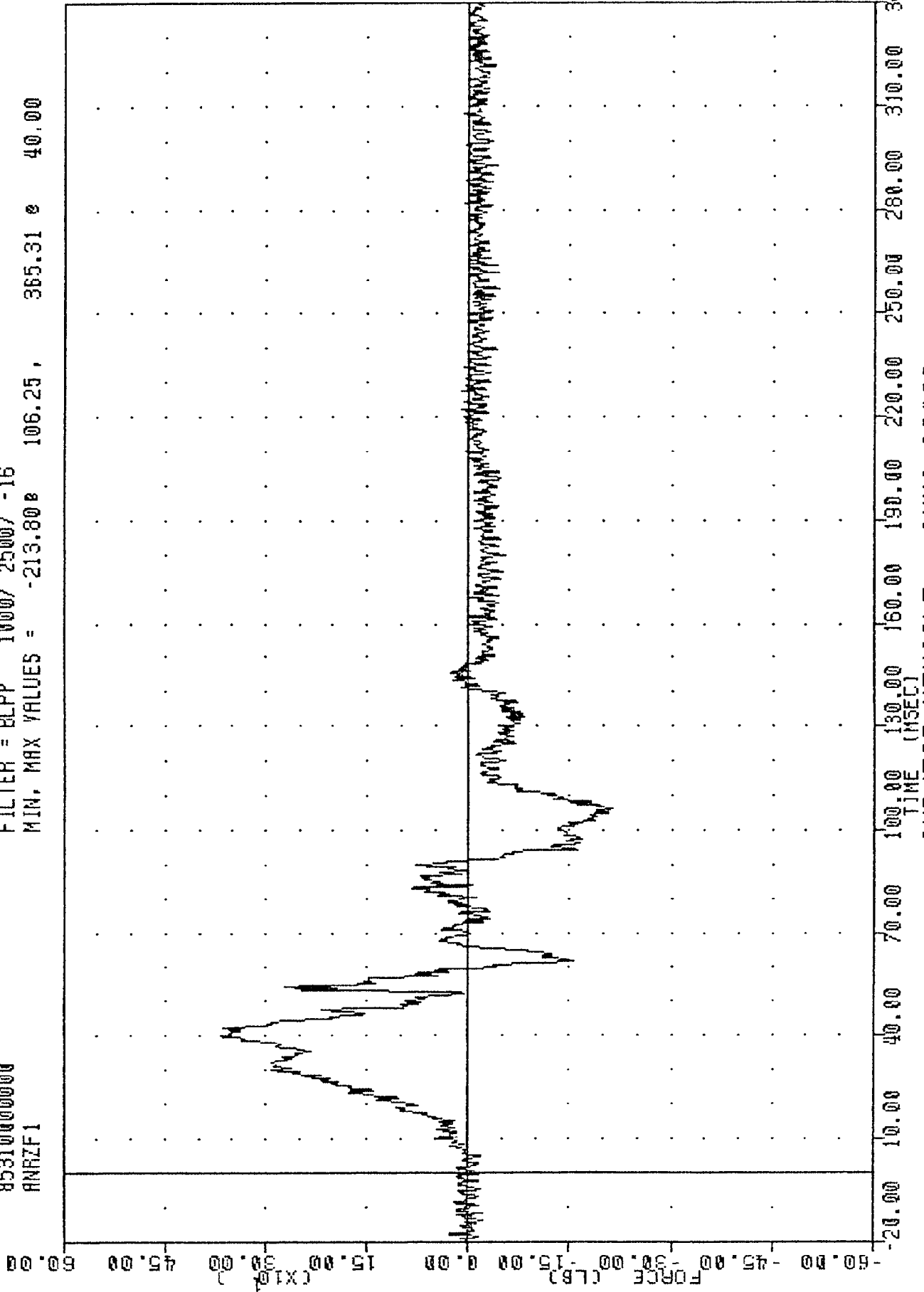
DRIVER RIGHT LOWER TIBIA FORCE Y AXIS LBS

851106\$  
CENTAL CRASH RESPONSES  
8531000000  
ANRZF1

PLOT DATE 14-85 15:58:23

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -213.808 106.25, 365.31 @ 40.00

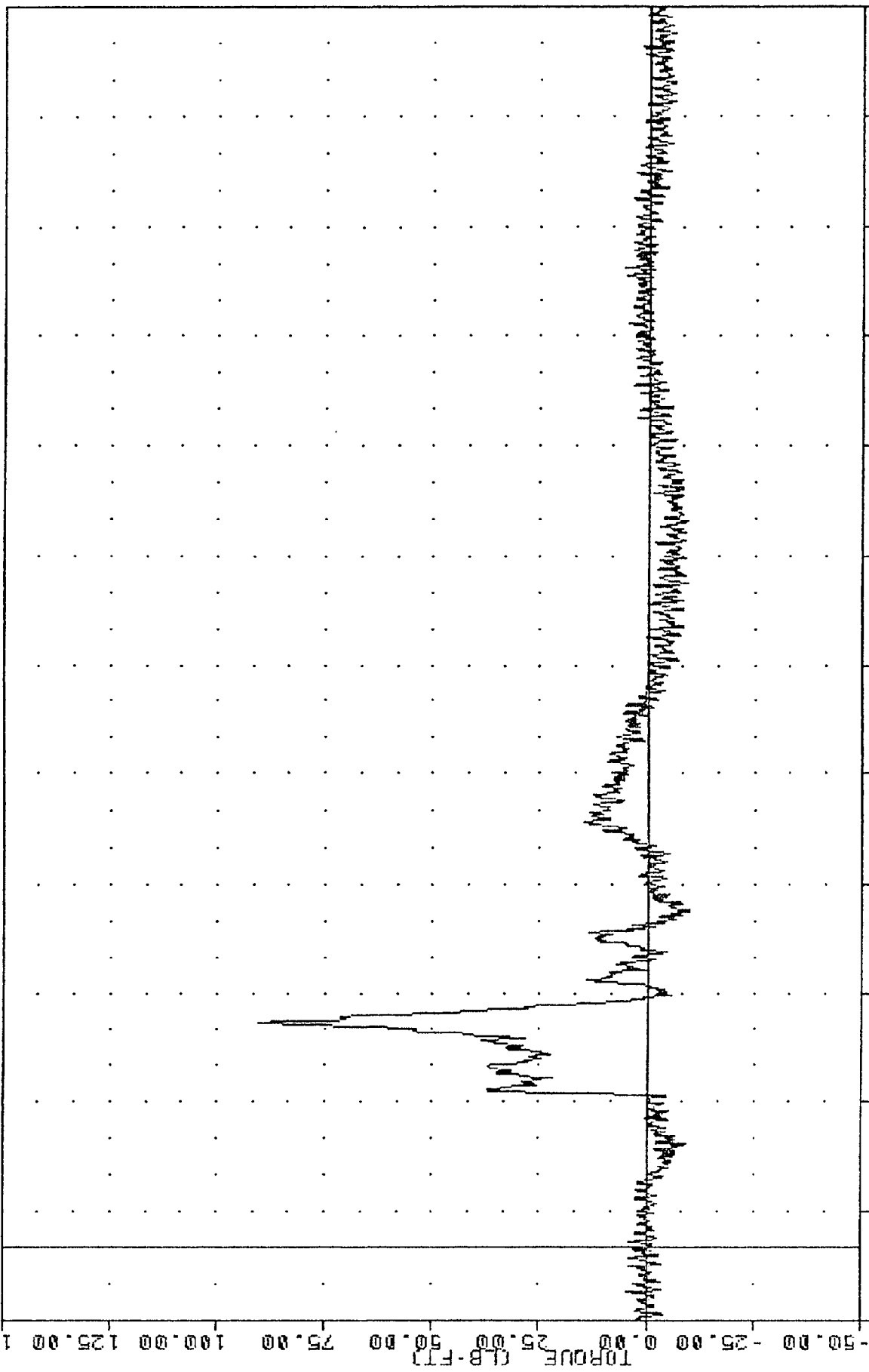


SUBJECT VEHICLE - OMNI 68463  
DRIVER RIGHT LOWER TIBIA FORCE Z AXIS LBS

8511063  
CENTRAL CRASH RESPONSES  
85310000000  
ANLXM1

PLOT DATE 15-85 08:25:51  
FILTER = BLPP 1000/ 2500/ -16  
MIN, MAX VALUES = -9.888 92.75, 90.50 e 61.88

159.00

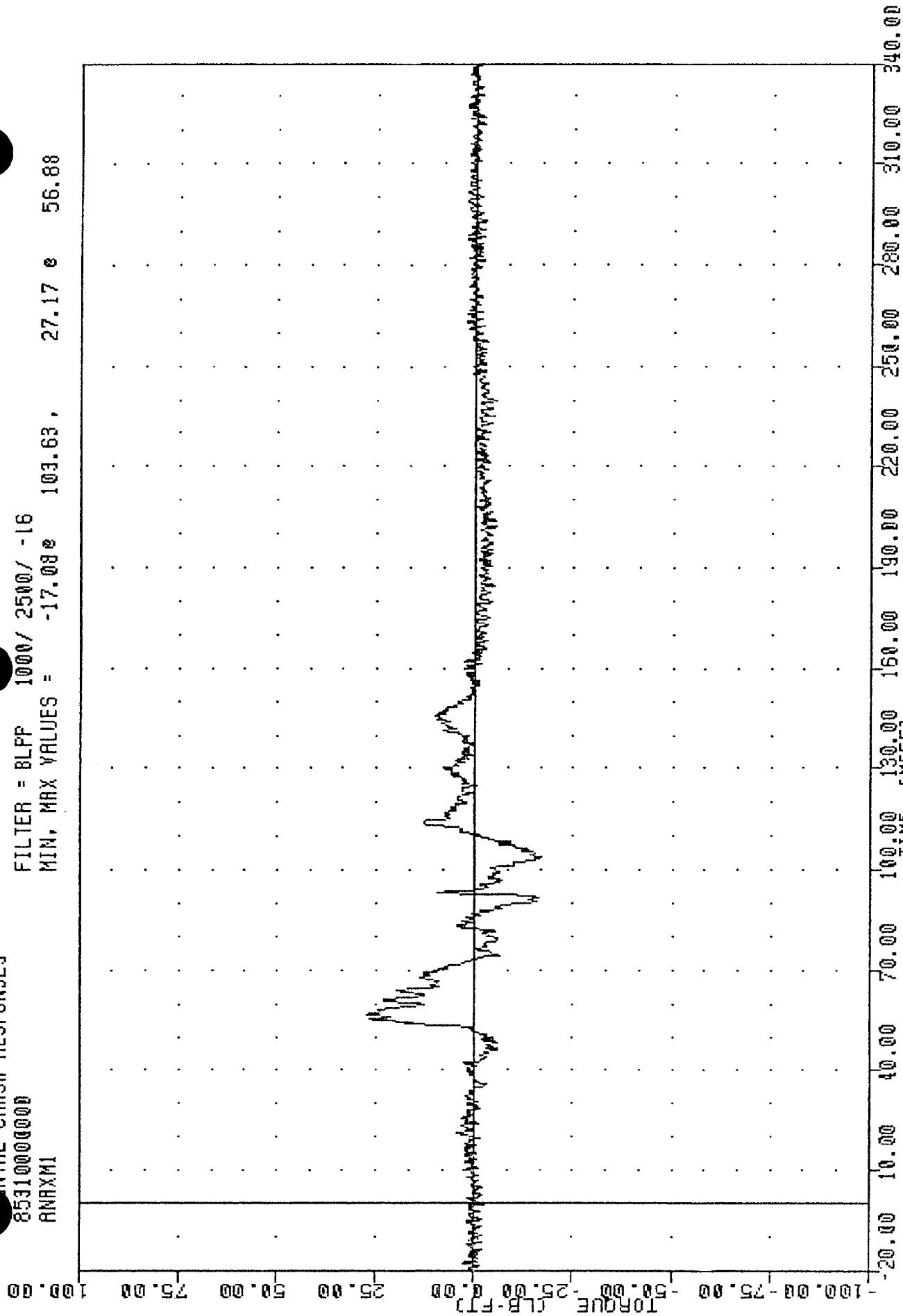


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)

SUBJECT VEHICLE - OMNI 68463  
DRIVER LEFT LOWER TIBIA MOMENT X AXIS LB-FT

8511063  
CENTRAL CRASH RESPONSES  
85310000000  
ANAXMI

PLOT DATE 15 85 08:25:51  
FILTER = BLPP 1000/ 2500/ -16  
MIN, MAX VALUES = -17.08e 103.63, 27.17 e 56.88



SUBJECT VEHICLE - OMNI 68463  
DRIVER RIGHT LOWER TIBIA MOMENT X AXIS LB-FT

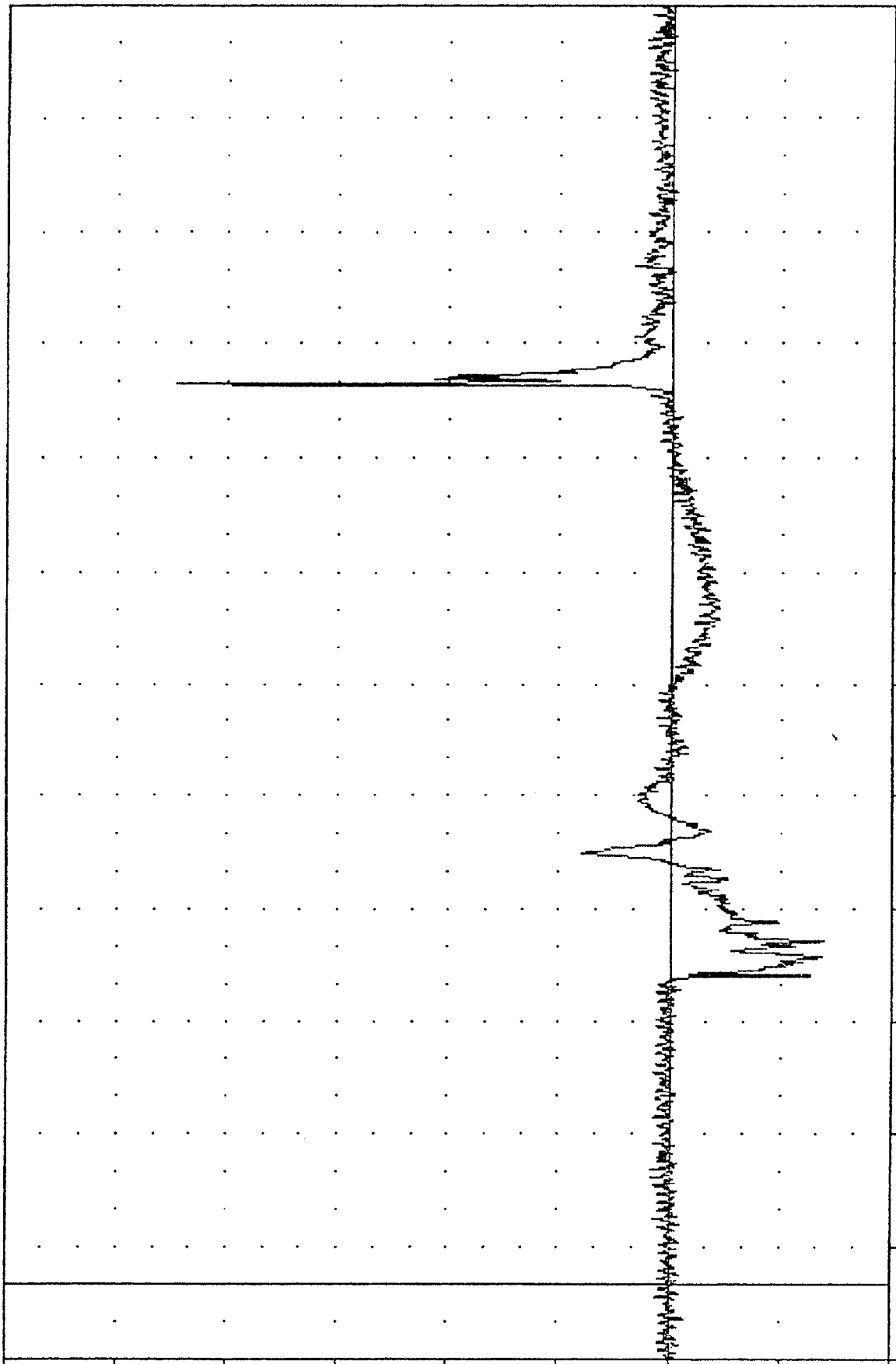
8511069  
CENTRAL CRASH RESPONSES  
85310000000  
HEDX62

PLOT DATE 14-85 15:56:23

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -69.838 91.25, 222.77 e 239.50

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 68463  
PASSENGER HEAD ACCELERATION X AXIS

8511063  
FATAL CRASH RESPONSES  
85310000000  
HEDY62

PLOT DATE 14-08 15:56:23

FILTER = ALPF 1650/ 5217/ .40

MIN, MAX VALUES = -27.39 110.63, 75.07 82.75

200.00  
150.00  
100.00  
50.00  
0.00  
-50.00  
-100.00  
-150.00  
-200.00



B-34

ACCELERATION (G)  
TIME (NSEC)

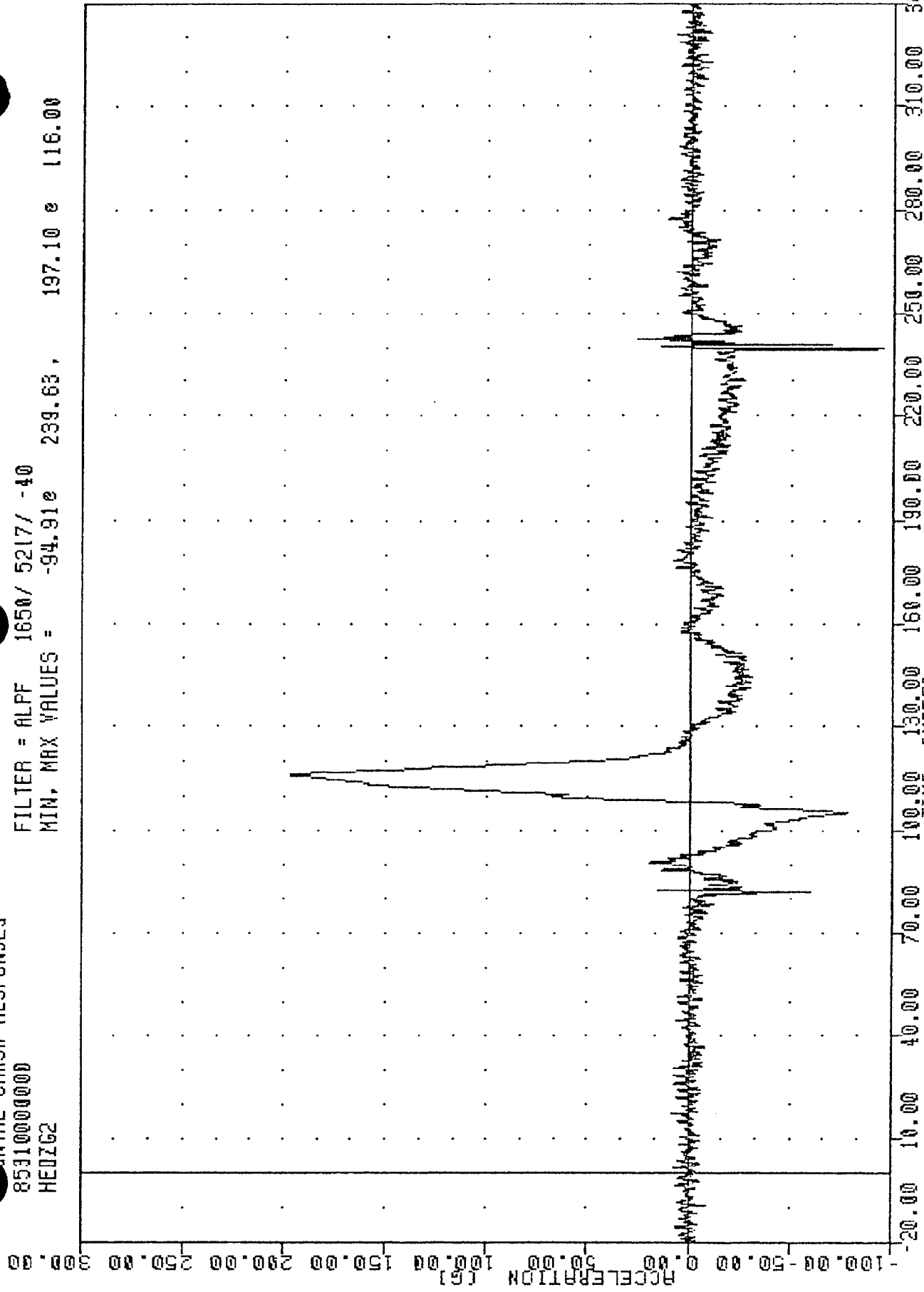
SUBJECT VEHICLE - OMNI 68463  
PASSENGER HEAD ACCELERATION Y AXIS

8511063  
ANTAL CRASH RESPONSES  
8531000000  
HEADZG2

PLOT DATE 14 85 15:56:23

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -94.91e 239.63, 197.10 e 116.00



SUBJECT VEHICLE - OMNI 68463  
PASSENGER HEAD ACCELERATION Z AXIS

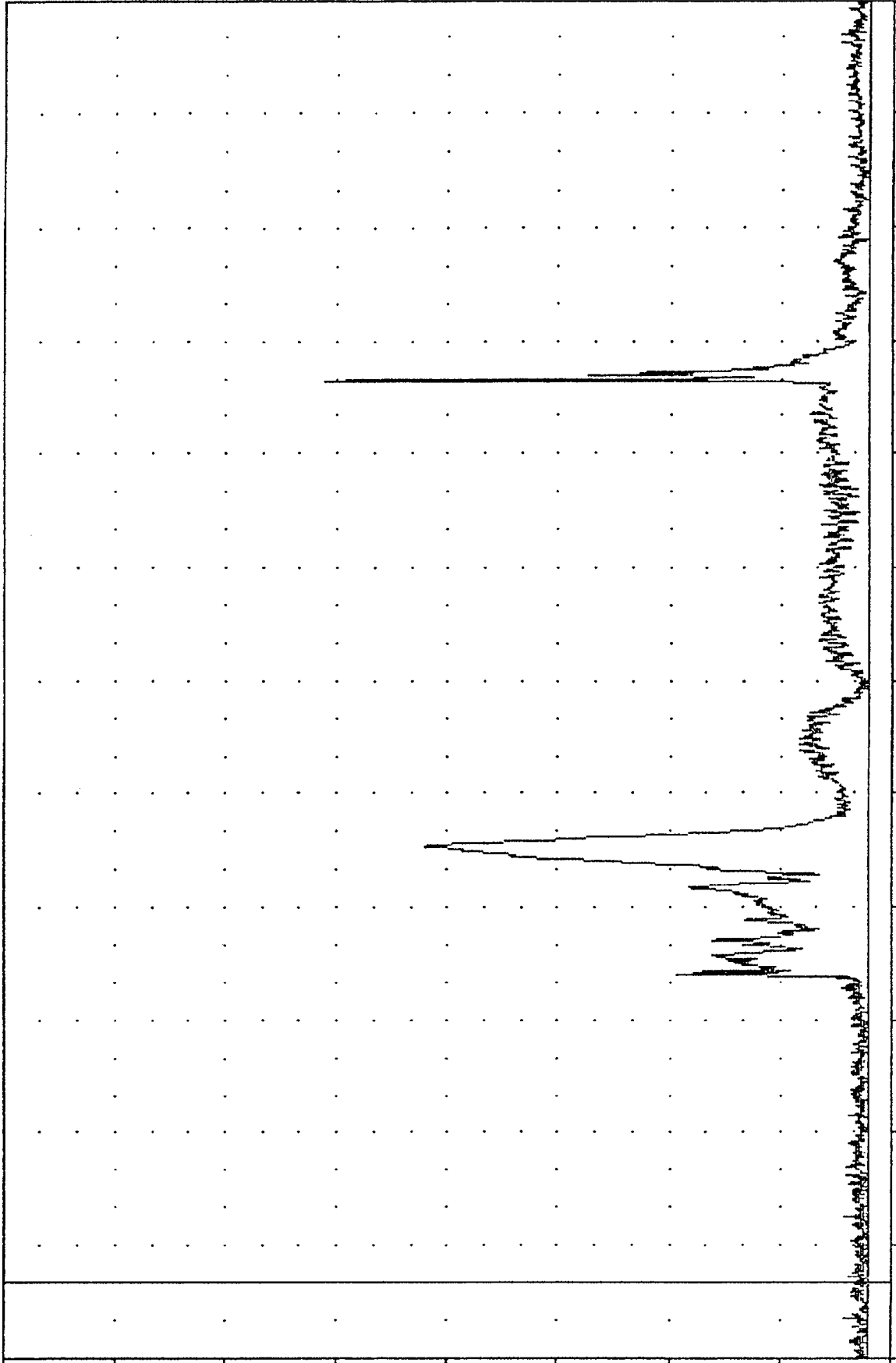
8511063  
CENTRAL CRASH RESPONSES  
85310000000  
HEAD62

PLOT DATE 14 85 15:56:23

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = 0.29g 64.25, 245.27 g 239.50

ACCELERATION (G)



-20.00 10.00 40.00 70.00 100.00 130.00 150.00 180.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)

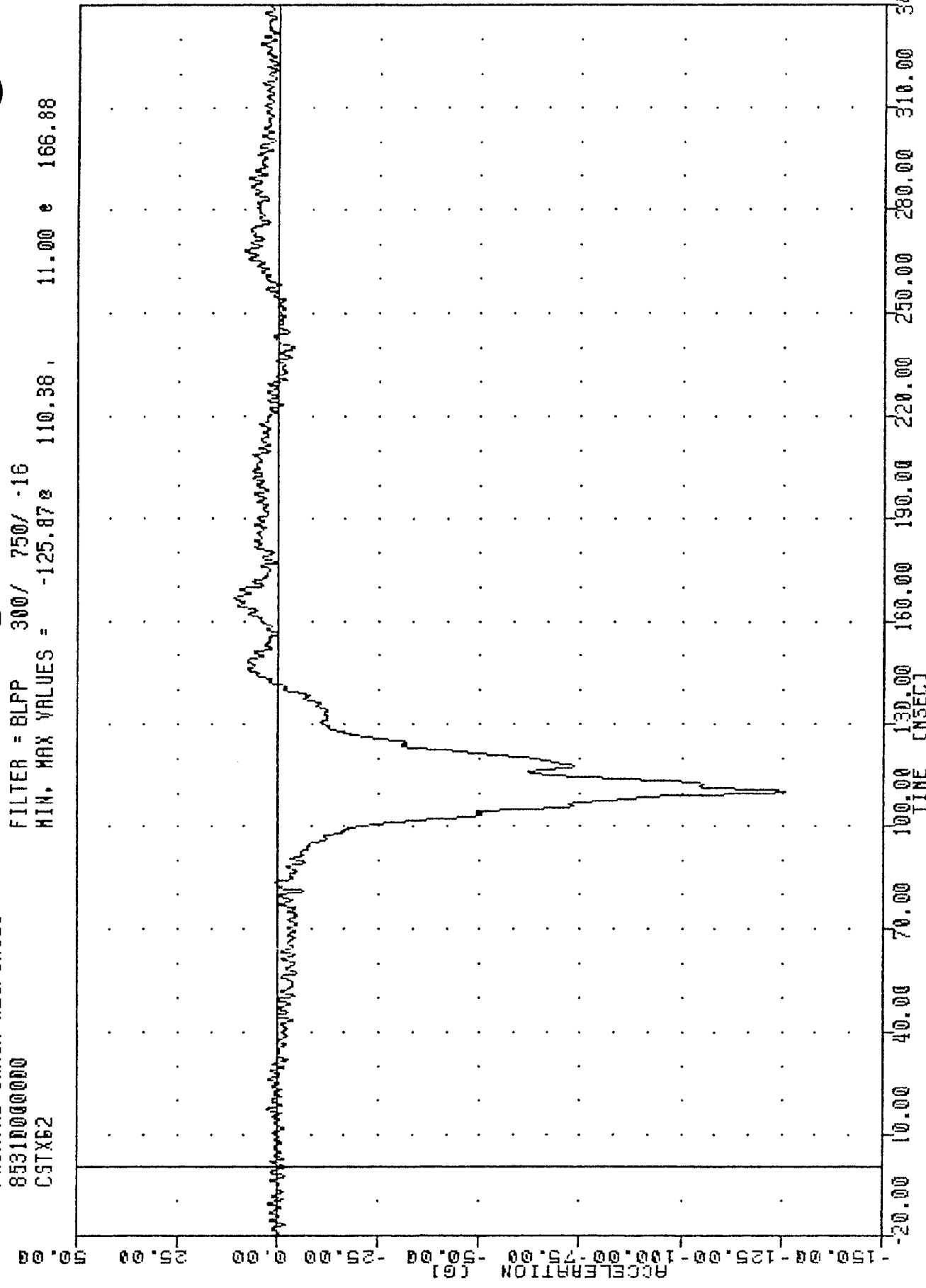
SUBJECT VEHICLE - OMNI 68463  
PASSENGER HEAD RESULTANT



8511065 . PLOT DATE 14 85 15:56:23

8531000000  
 CSTX62

FILTER = BLPP 300 / 750 / .16  
 MIN. MAX VALUES = -125.87 e 110.38 , 11.00 e 166.88



SUBJECT VEHICLE - OMNI 68463  
 PASSENGER CHEST ACCELERATION X AXIS

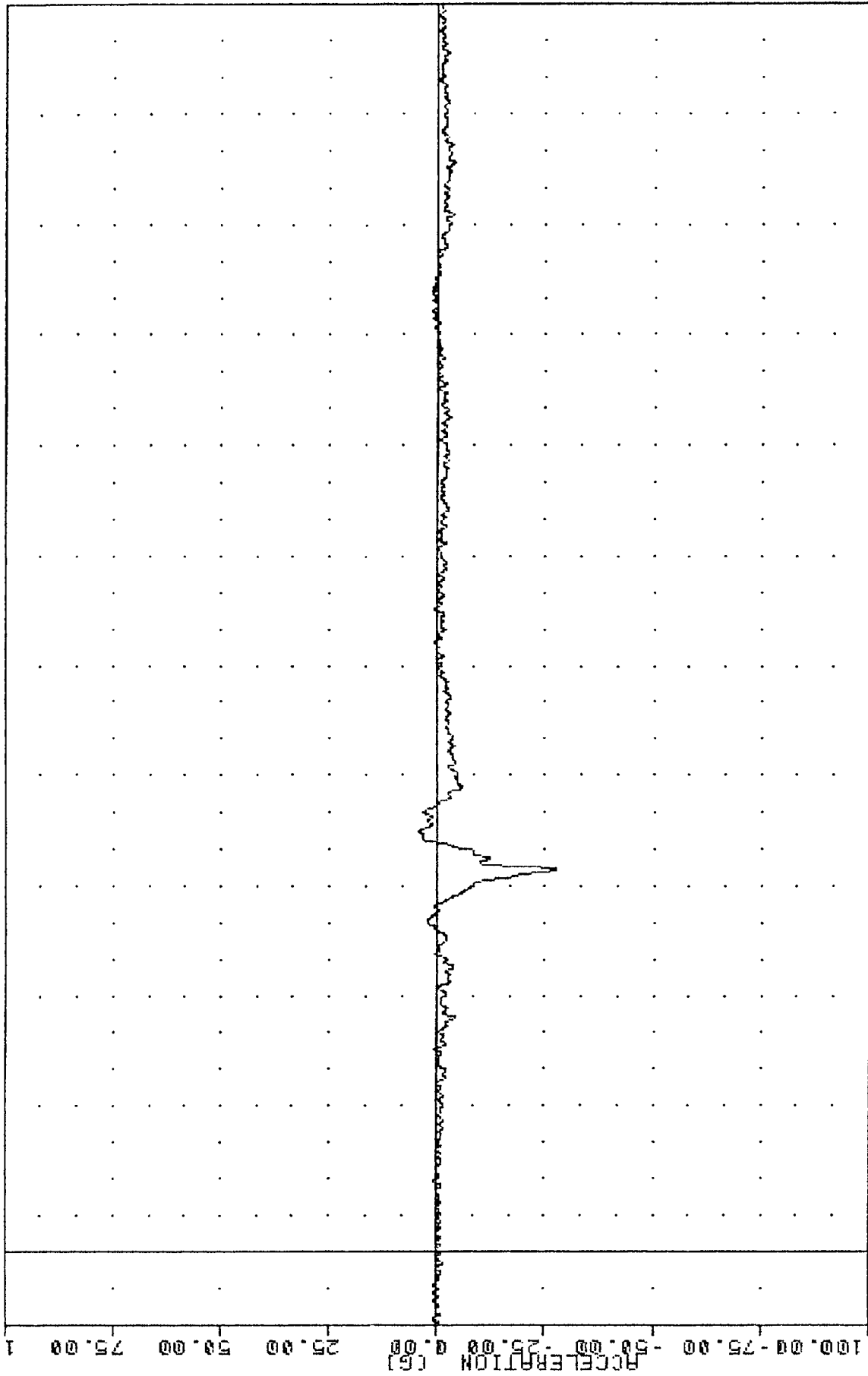
8511065  
CENTRAL CRASH RESPONSES  
85310000000  
CSTY62

PLOT DATE 14-01-85 15:56:23

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = -27.64e 104.38e 4.20e 114.88

100.00



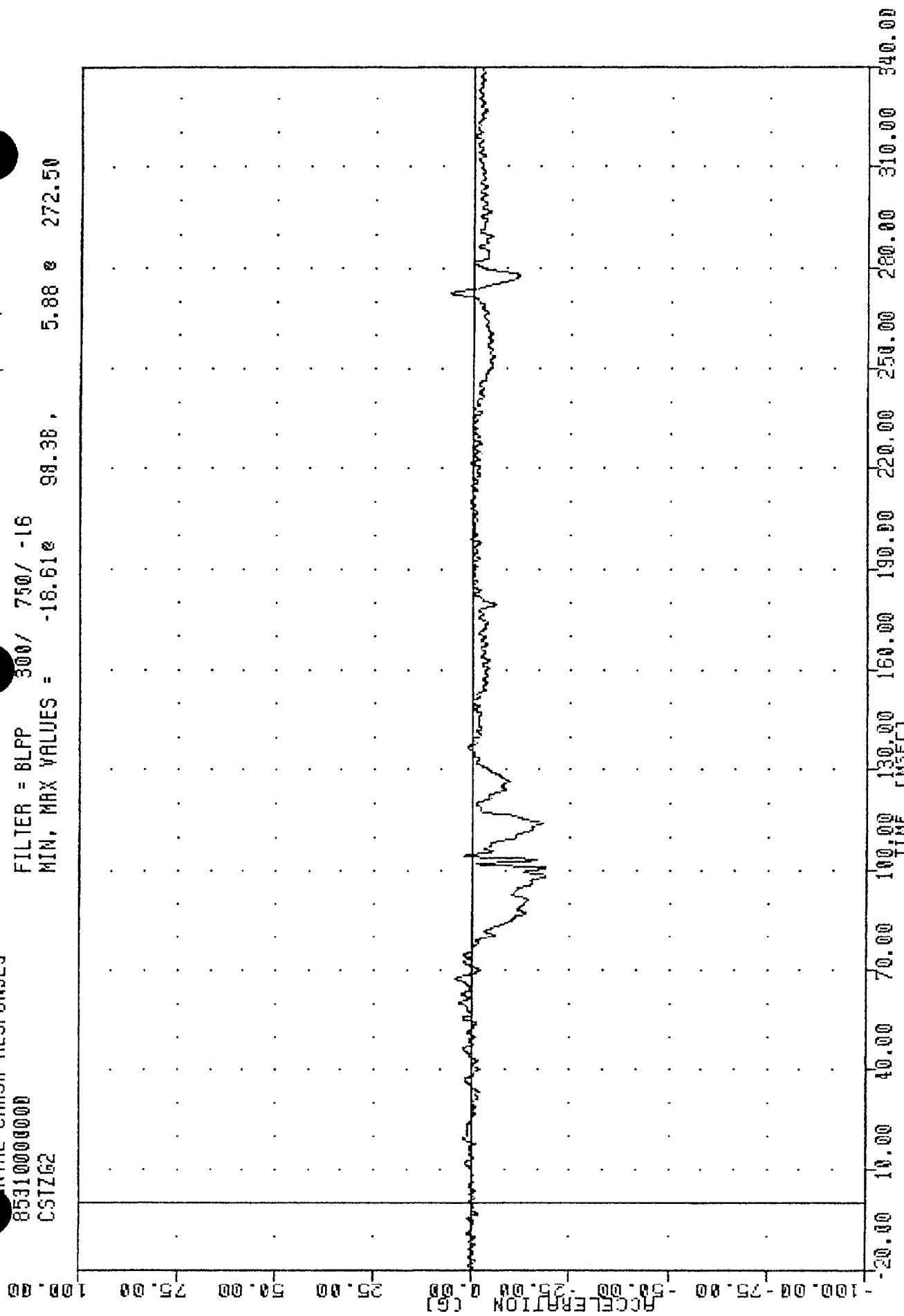
ACCELERATION (G)

-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 68463  
PASSENGER CHEST ACCELERATION Y AXIS

8511063  
INITIAL CRASH RESPONSES  
85310000000  
CSTZG2

PLOT DATE 14-08-85 15:56:23  
FILTER = BLFP 300/ 750/ -16  
MIN. MAX VALUES = -18.61e 98.38 5.88 e 272.50



SUBJECT VEHICLE - OMNI 68463  
PASSENGER CHEST ACCELERATION Z AXIS

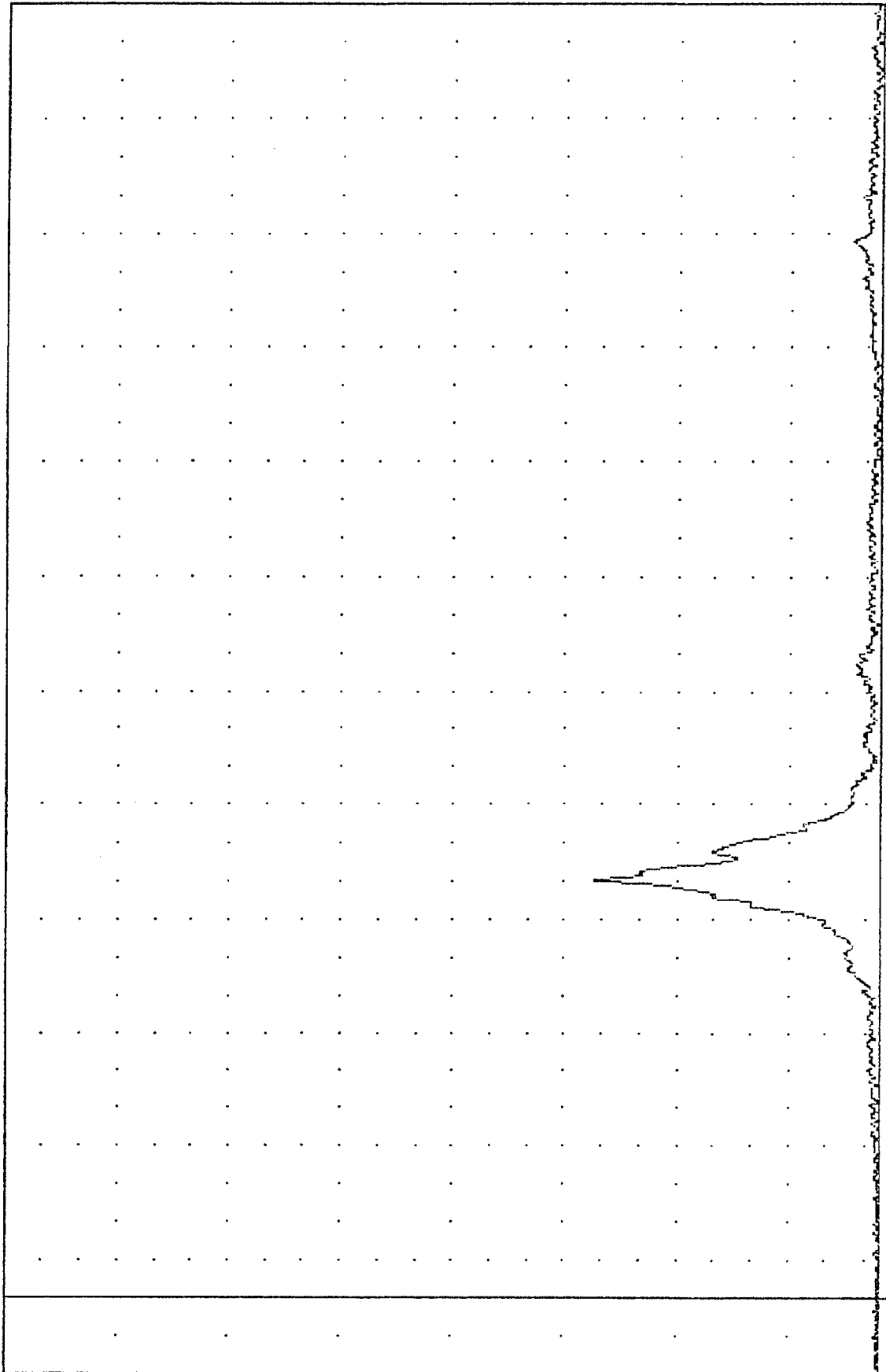
8511063  
FRONTAL CRASH RESPONSES  
85310000000  
CSTRG2

PLOT DATE 14-08-85 15:58:23

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = 0.06e 27.75, 126.44 e 110.38

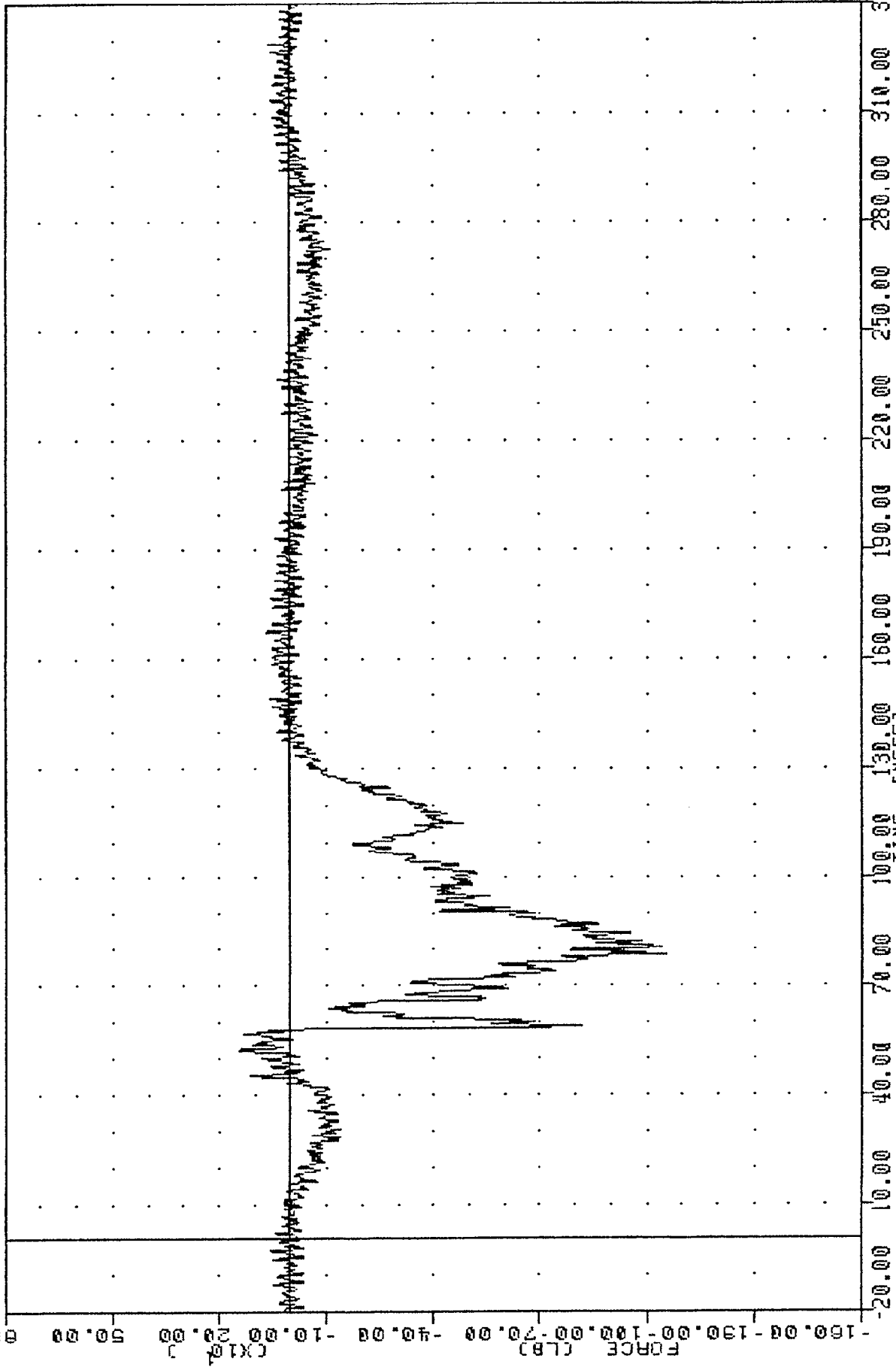
ACCELERATION (G)  
-10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00



TIME (MSEC) 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

SUBJECT VEHICLE - OMNI 68463  
PASSENGER CHEST RESULTANT

851106S  
 CENTRAL CRASH RESPONSES  
 8531000000  
 LFMF2  
 PLOT DATE 14-08-85 15:56:23  
 FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -1054.64 78.63, 144.61 52.13



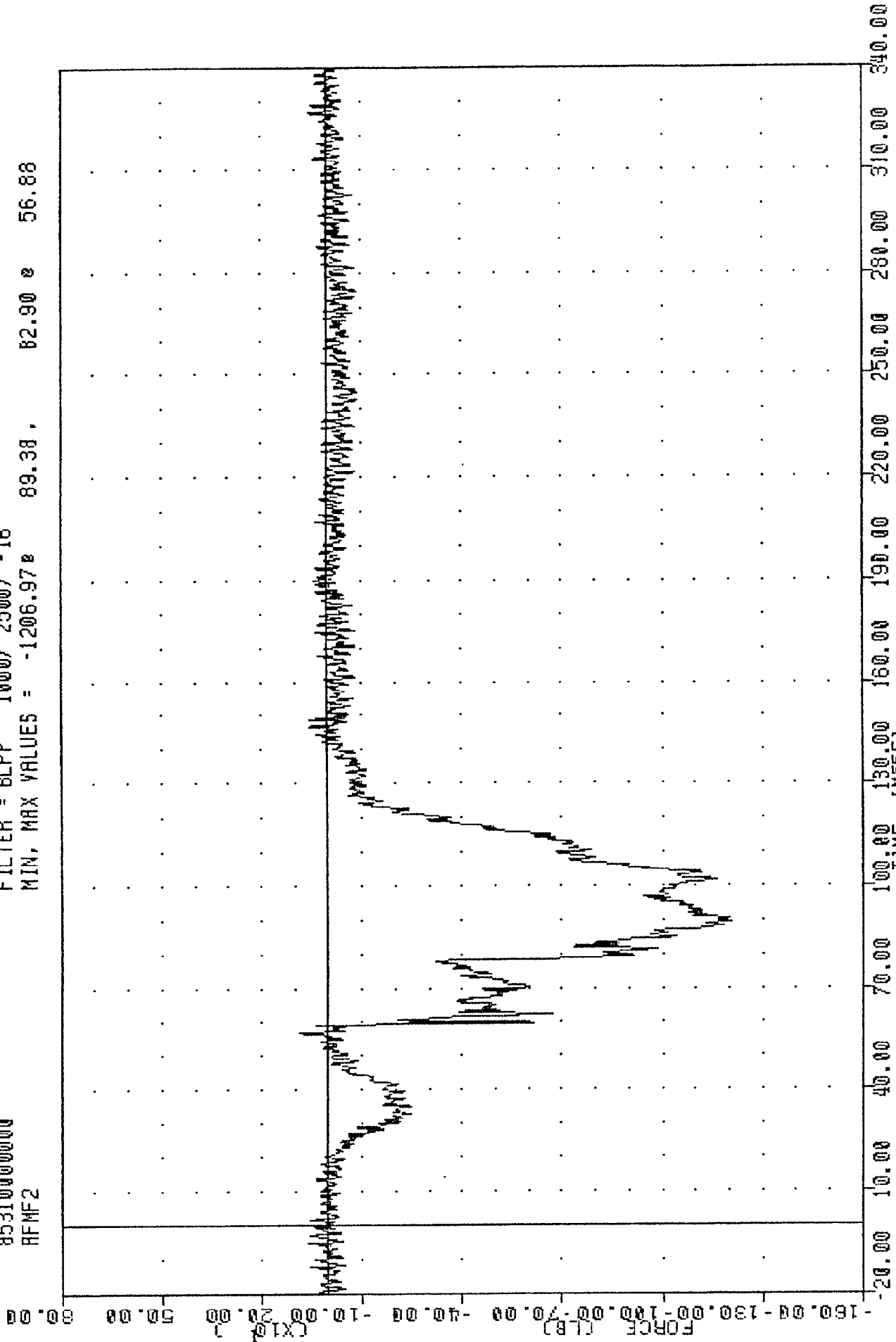
SUBJECT VEHICLE - OMNI 68463  
 PASSENGER LEFT FEMUR FORCE LBS

8511063  
FRONTAL CRASH RESPONSES  
8531000000  
RFMF2

PLOT DATE 14-08-85 15:56:23

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -1206.97 89.38, 82.90 56.88



SUBJECT VEHICLE - OMNI 68463  
PASSENGER RIGHT FEMUR FORCE LBS

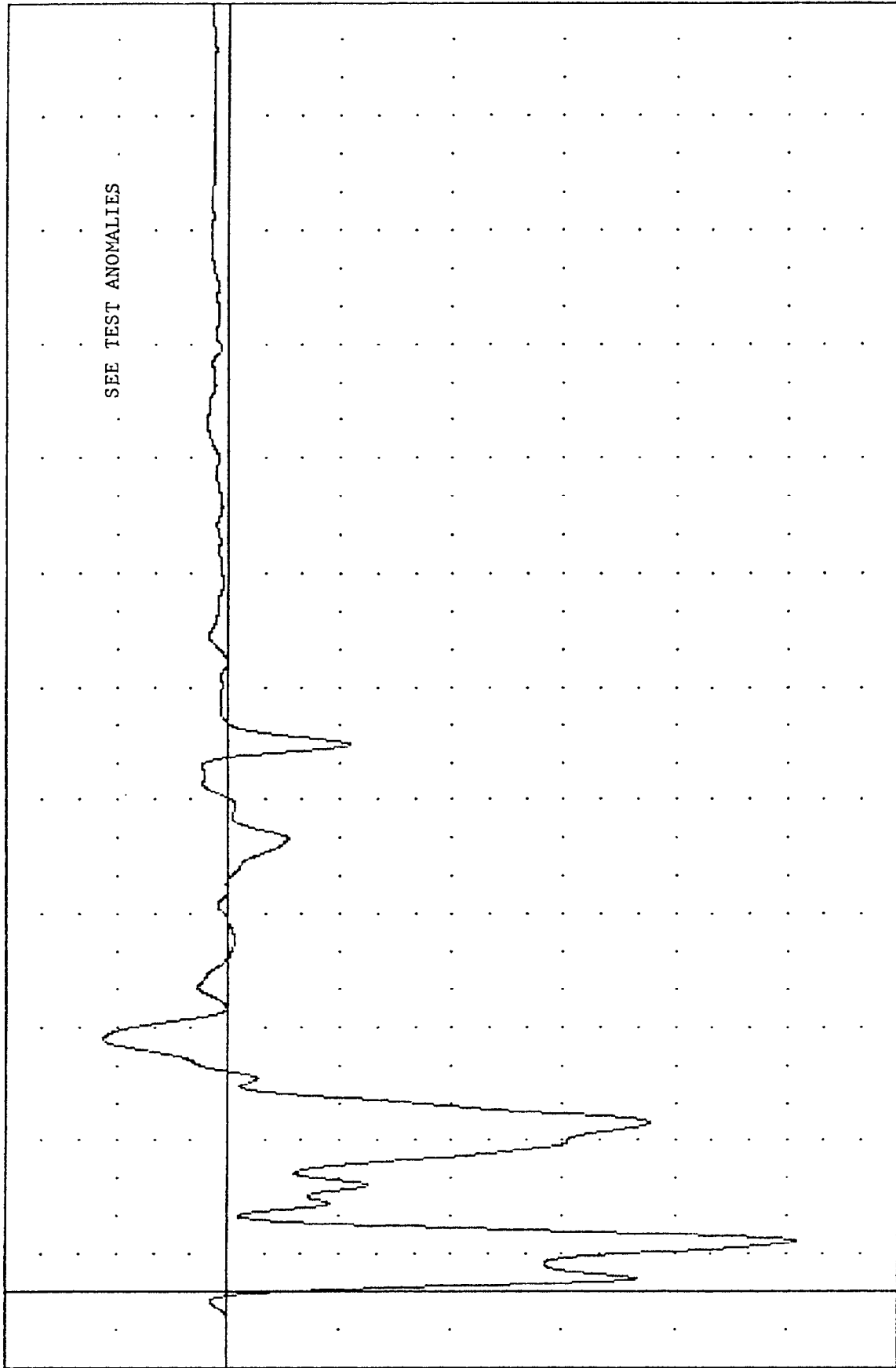
851106S  
CENTRAL CRASH RESPONSES  
85310000000  
FFRXG

PLOT DATE 14 85 16:01:25

FILTER = BLPF 100 / 250 / -16

MIN, MAX VALUES = -204.00 13.38, 44.73 66.88

ACCELERATION (G)



SEE TEST ANOMALIES

-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 68463  
RIGHT FRONT FRAME RAIL ACCELERATION X AXIS

8511065  
CENTRAL CRASH RESPONSES

PLOT DATE 14-085 16:01:25

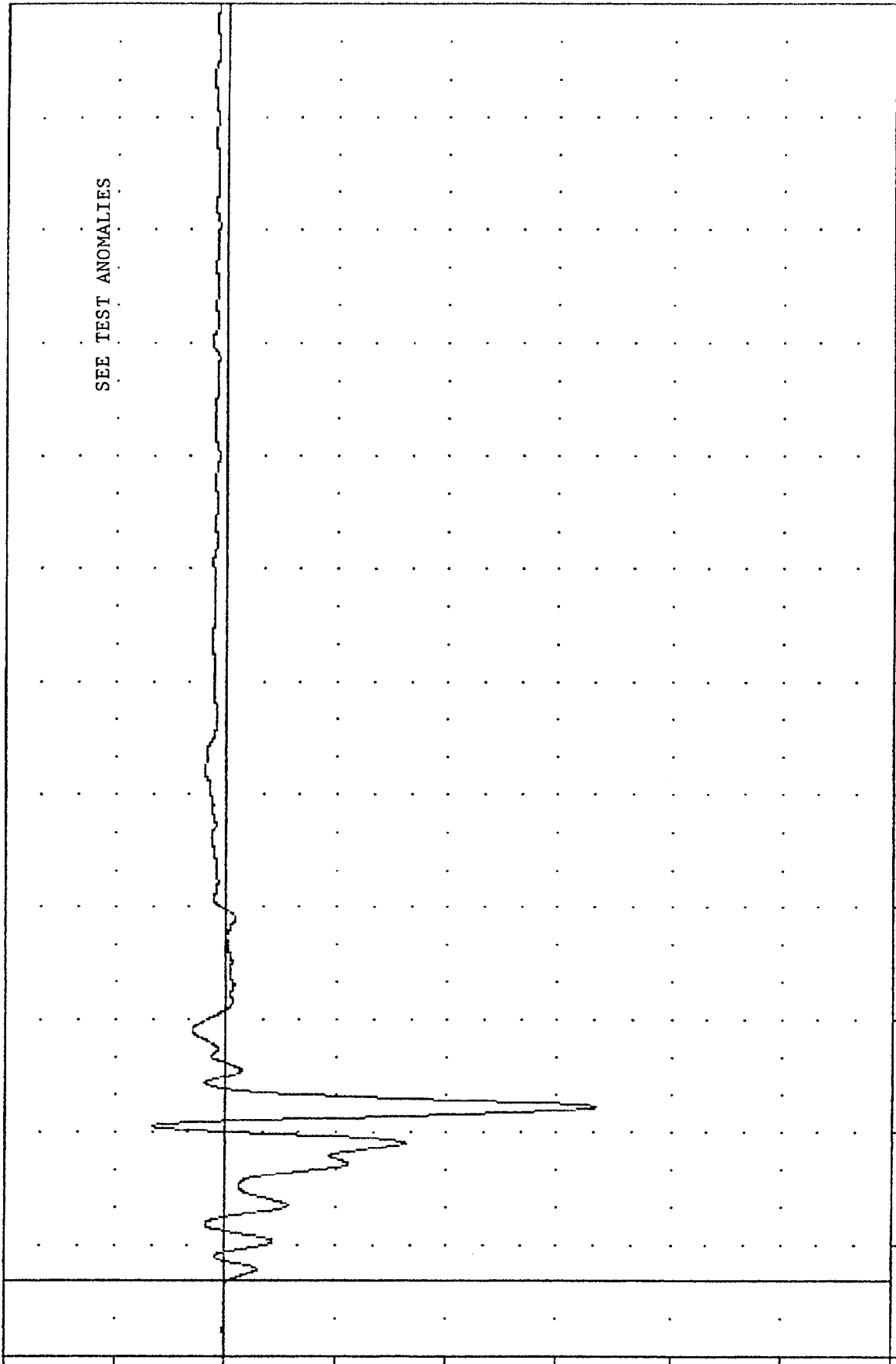
8531000000

FILTER = BLPF 100/ 250/ -16

FFCXE

MIN. MAX VALUES = -133.90e 46.75, 26.38 e 41.50

ACCELERATION [G]



-240.00 -200.00 -160.00 -120.00 -80.00 -40.00 0.00 40.00

TIME (MSEC)

100.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

SUBJECT VEHICLE - OMNI 68463  
FRONT FRAME CROSSMEMBER ACCELERATION X AXIS

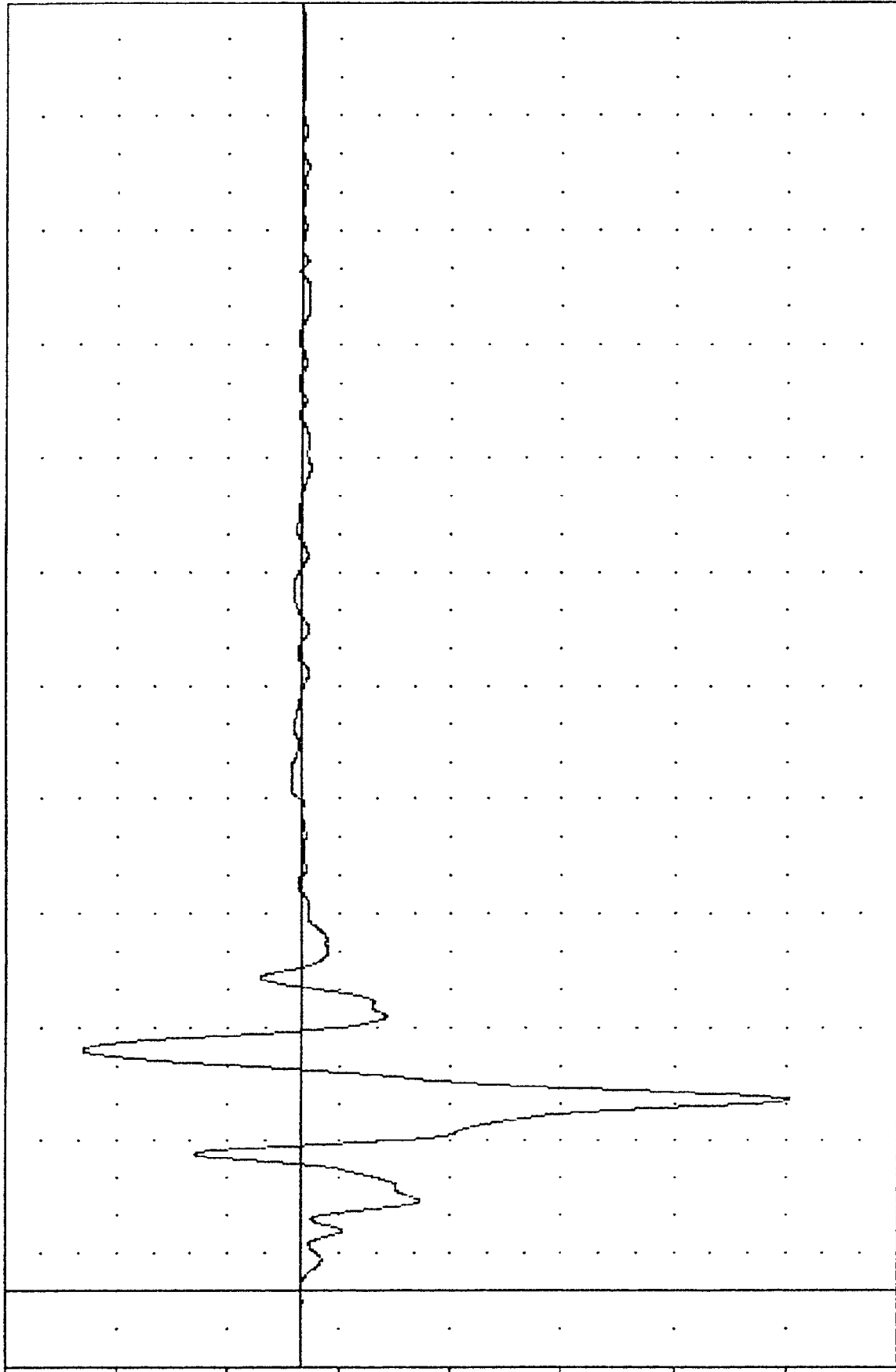
8511063  
CENTRAL CRASH RESPONSES  
85310000000  
BCRXG

PLOT DATE 14 85 16:01:25

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -131.05g 51.00, 58.85 & 64.00

ACCELERATION (G)



TIME (MSEC)

SUBJECT VEHICLE - OMNI 68463  
RIGHT BRAKE CALIPER ACCELERATION X AXIS

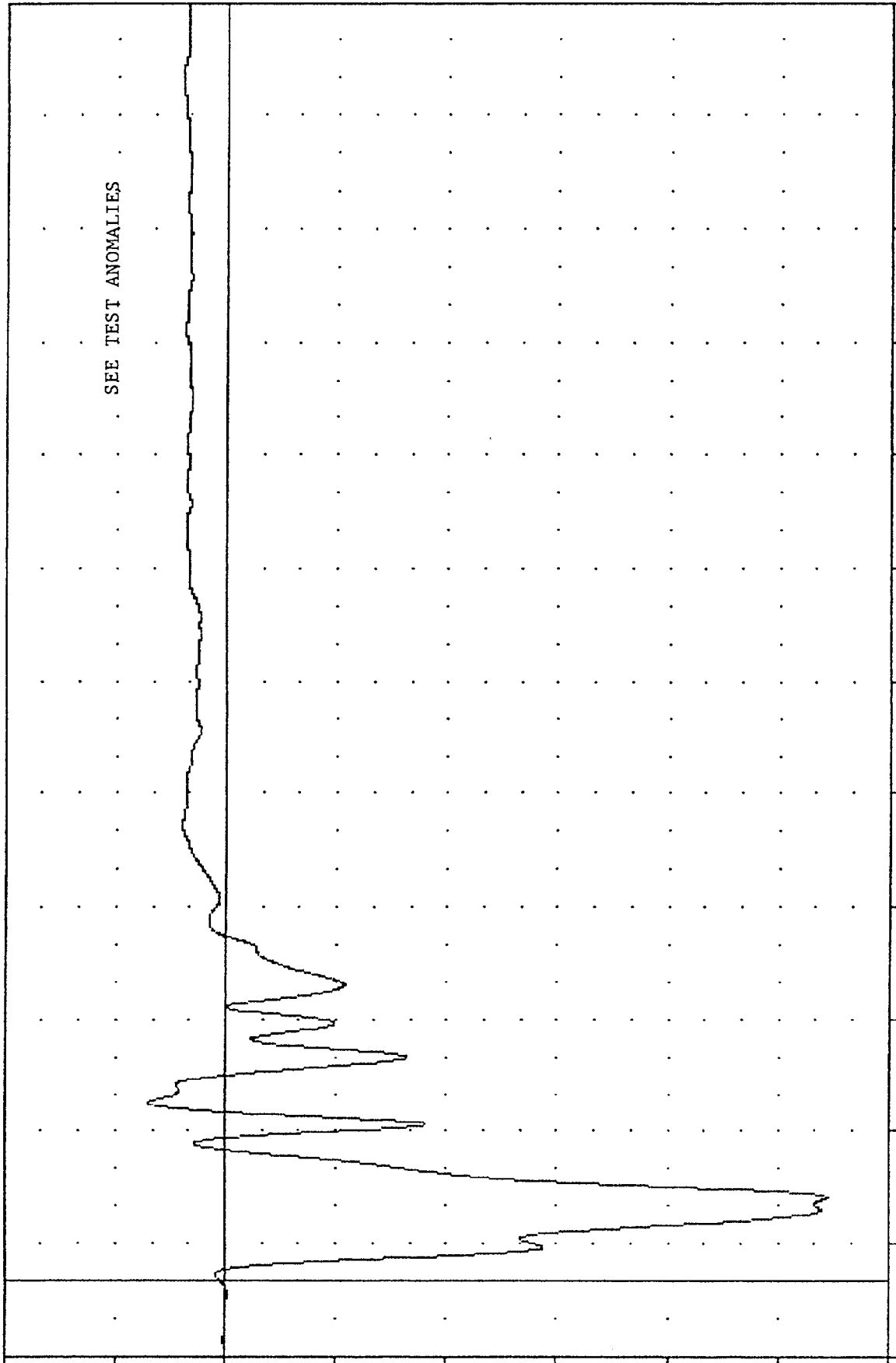
8511065  
CENTRAL CRASH RESPONSES  
85310000000  
ENGX62

PLOT DATE 14 16:01:25

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -217.75e 22.25, 28.32 e 47.50

ACCELERATION [G]

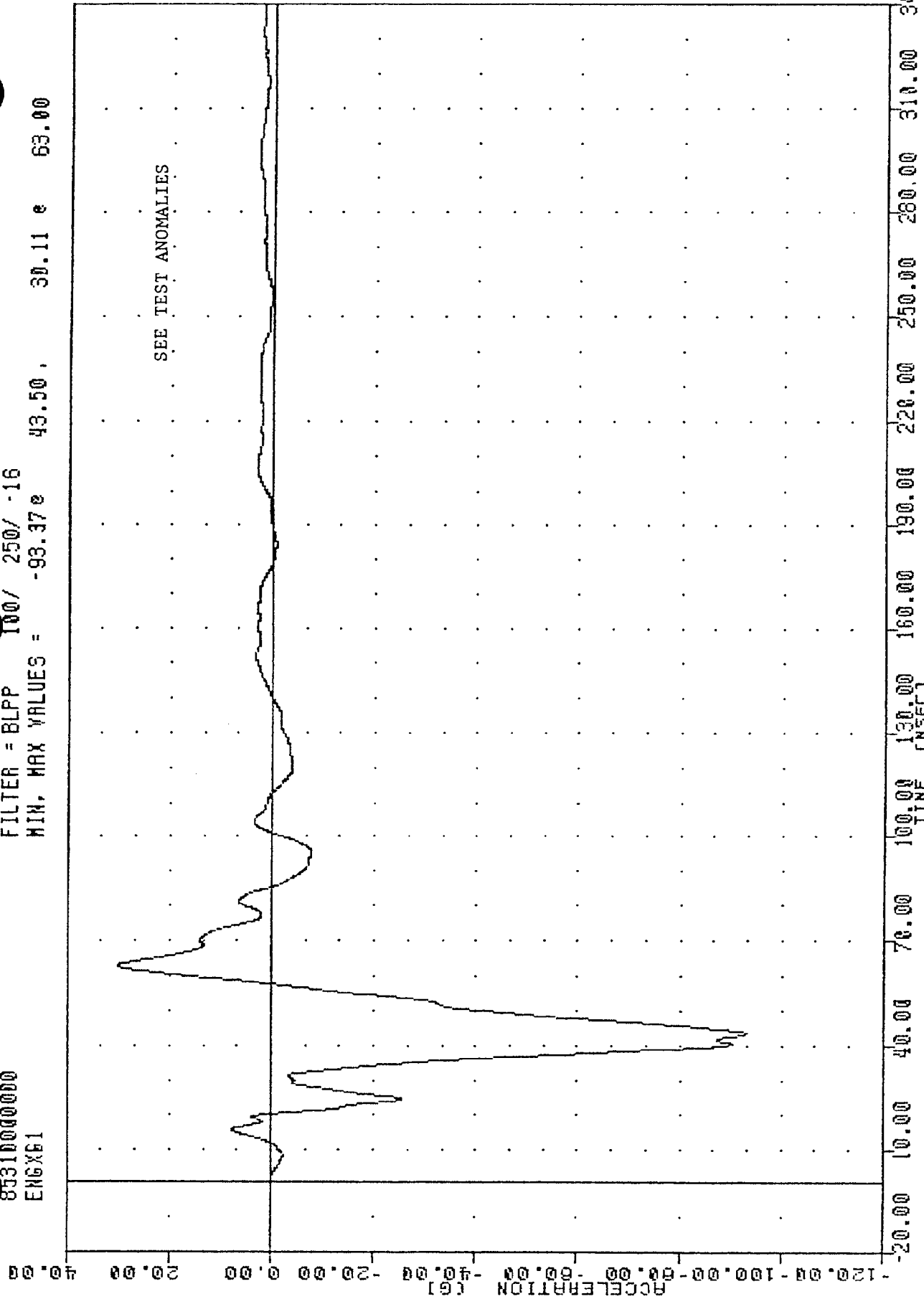


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)

SUBJECT VEHICLE - OMNI 68463  
LOWER ENGINE BLOCK ACCELERATION X AXIS

8511053  
INITIAL CRASH RESPONSES  
85310000000  
ENGX61

PLOT DATE 14-08-85 16:01:25  
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -93.37e 43.50, 30.11 e 63.00



SUBJECT VEHICLE - OMNI 68463  
UPPER ENGINE BLOCK ACCELERATION X AXIS

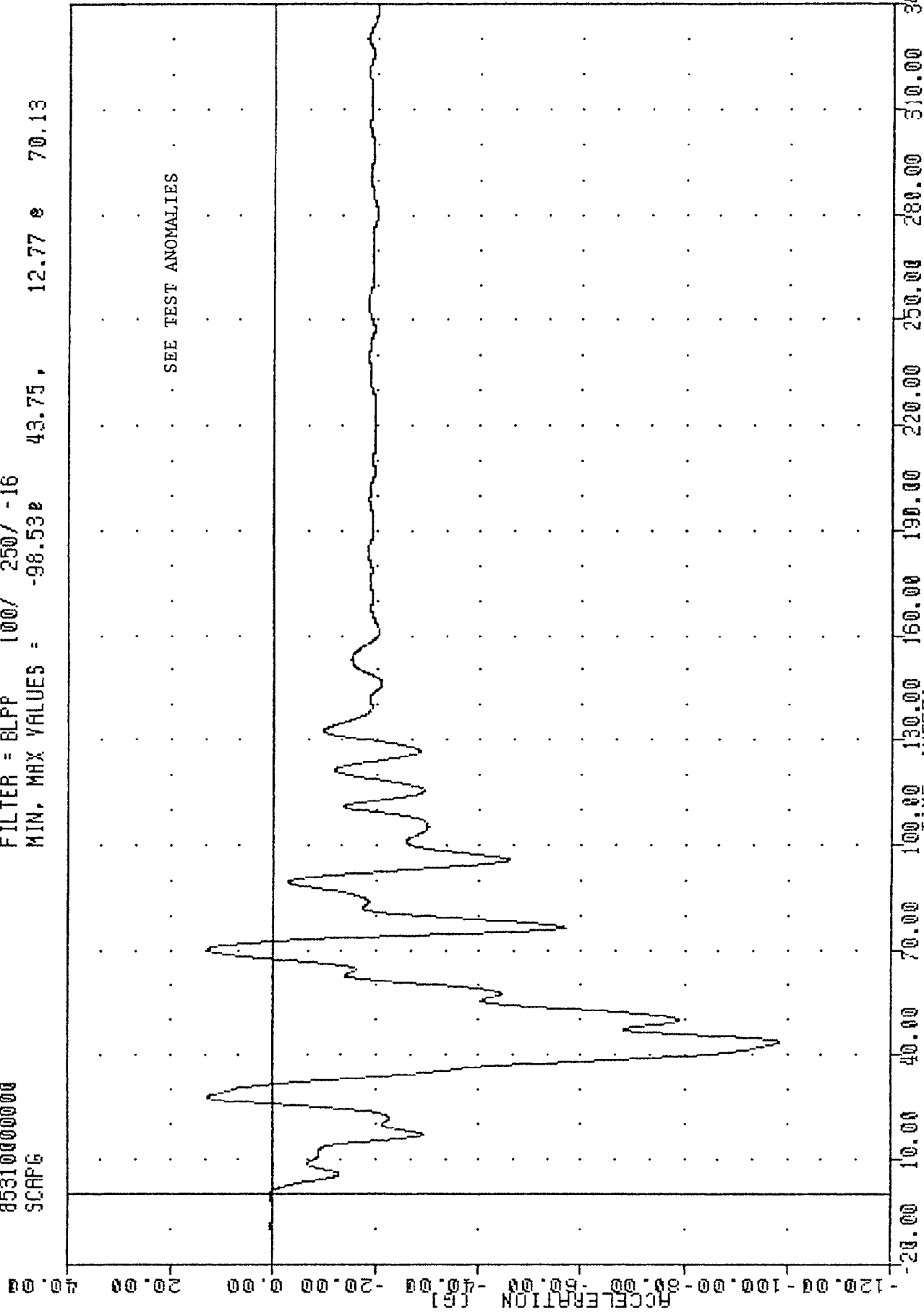
8511068  
 UNTAL CRASH RESPONSES  
 85310000000  
 SCAPG

PLOT DATE 14-85 16:01:25

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -98.53e 43.75, 12.77 e 70.13

SEE TEST ANOMALIES



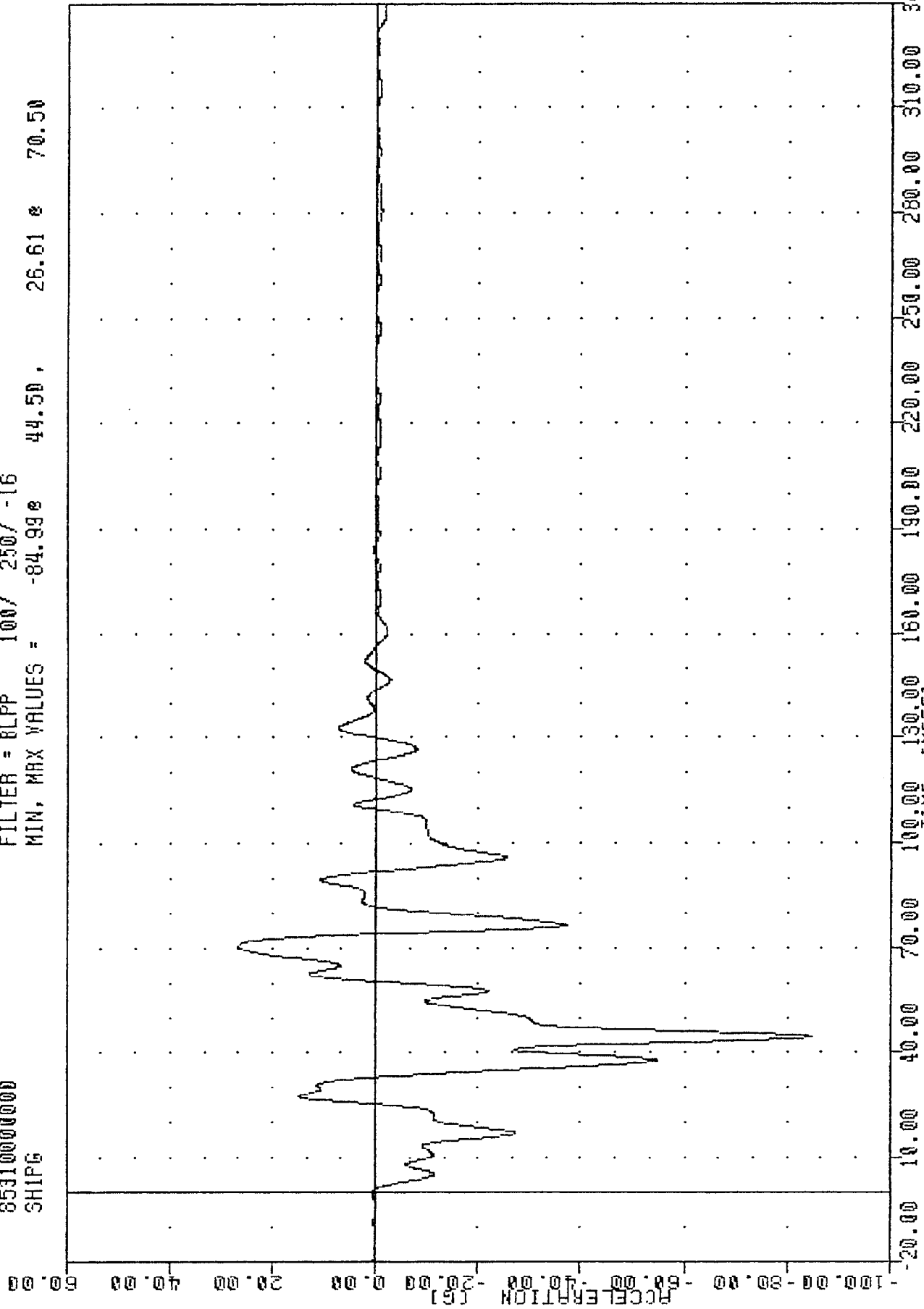
SUBJECT VEHICLE - OMNI 68463  
 STEERING COLUMN ACCELERATION A-P AXIS

851106S  
FATAL CRASH RESPONSES  
8531000000  
SHIP

PLOT DATE 14 85 16:01:25

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -84.99g 44.50, 26.61g 70.50



SUBJECT VEHICLE - OMNI 68463  
STEERING WHEEL HUB ACCELERATION R-P AXIS

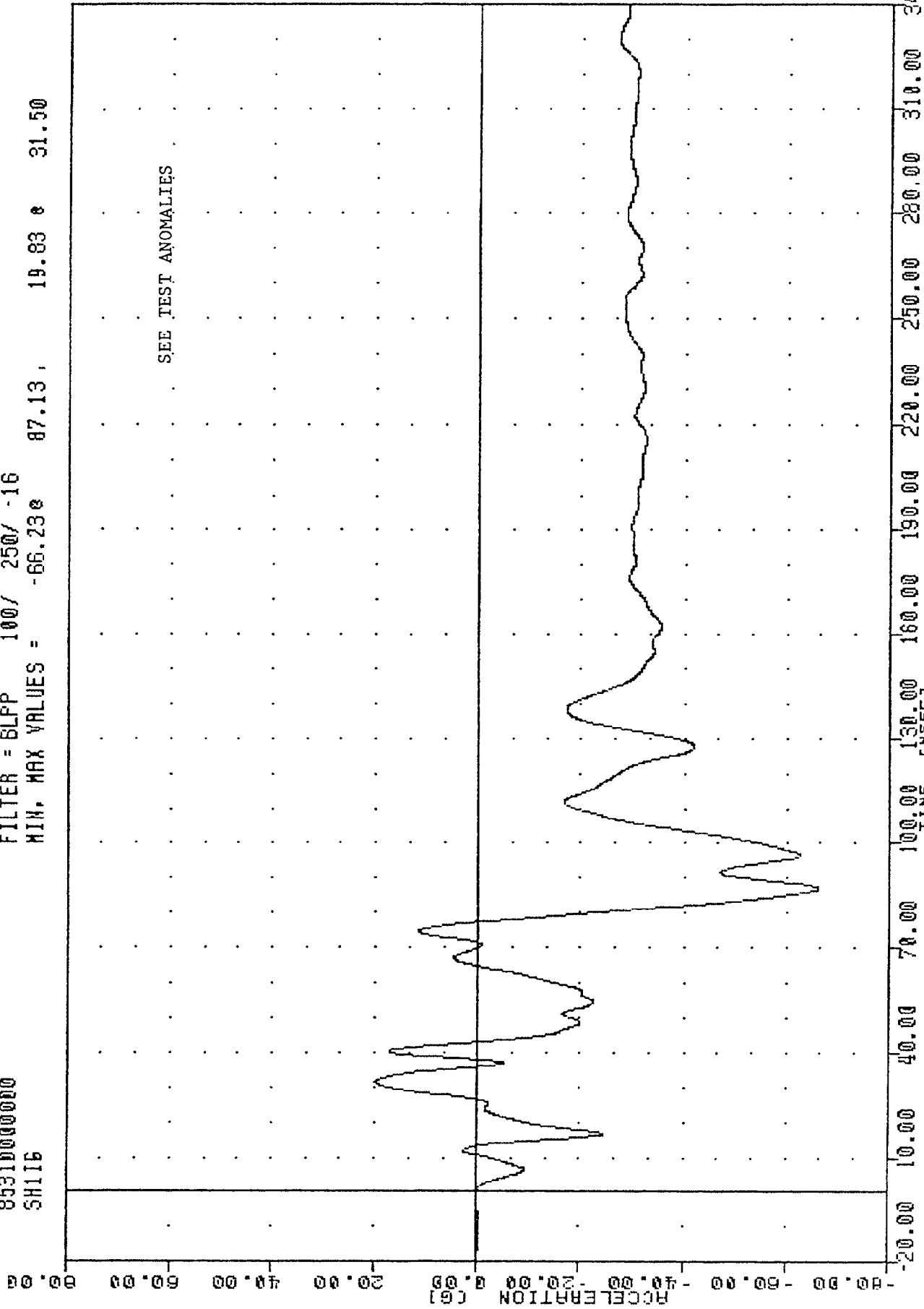
8511063  
INITIAL CRASH RESPONSES

85310000000  
SH116

PLOT DATE 14 85 16:01:25

FILTER = 5LPP 100/ 250/ -16

MIN. MAX VALUES = -66.23e 87.13, 19.83 e 31.50



B-50

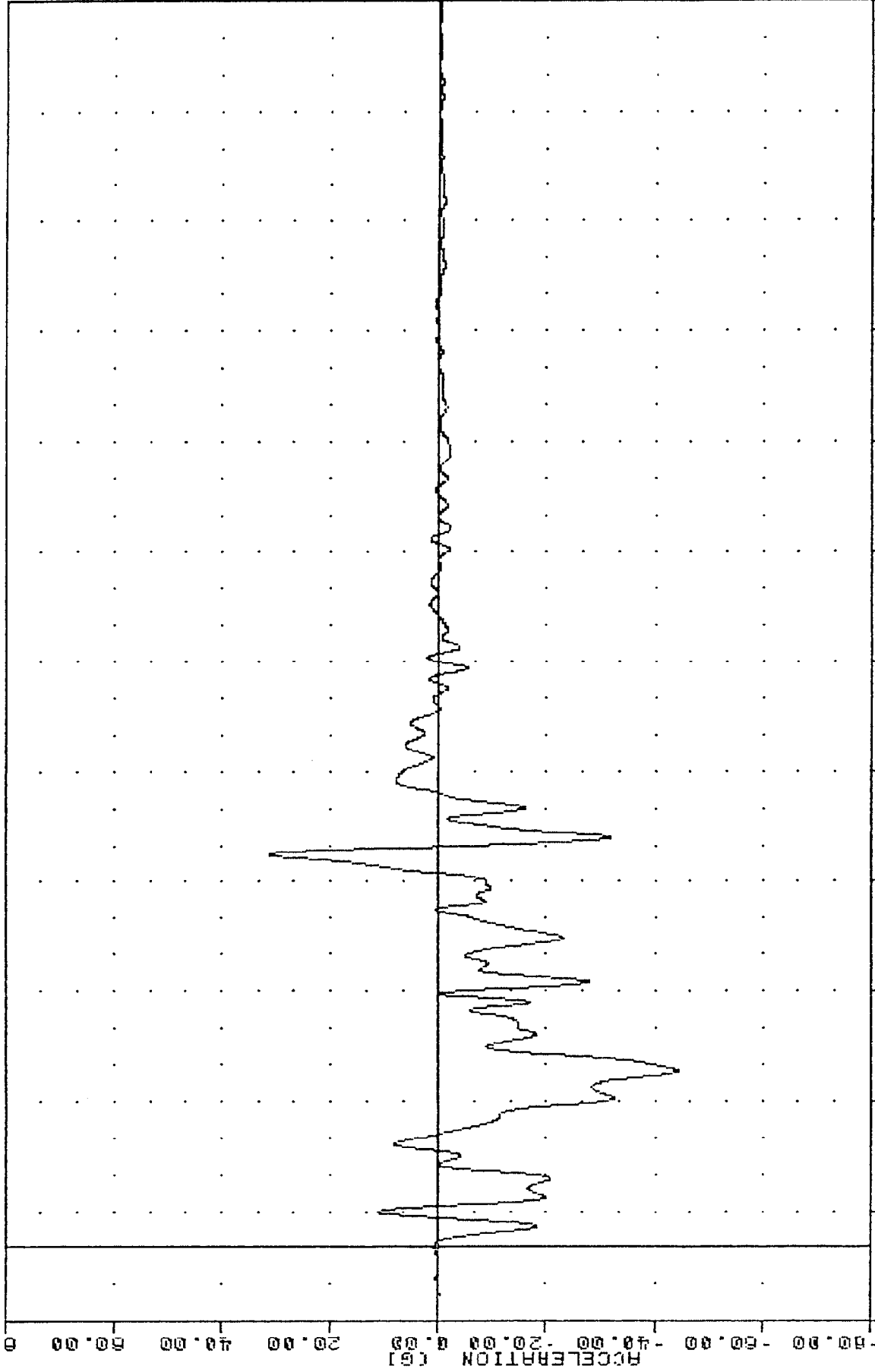
SUBJECT VEHICLE - OMNI 68463  
STEERING WHEEL HUB ACCELERATION I-S AXIS

8511063  
CENTRAL CRASH RESPONSES  
8531000000  
DPCX6

PLOT DATE 14-085 16:01:25

FILTER = BLPP 100/ 250/ -16

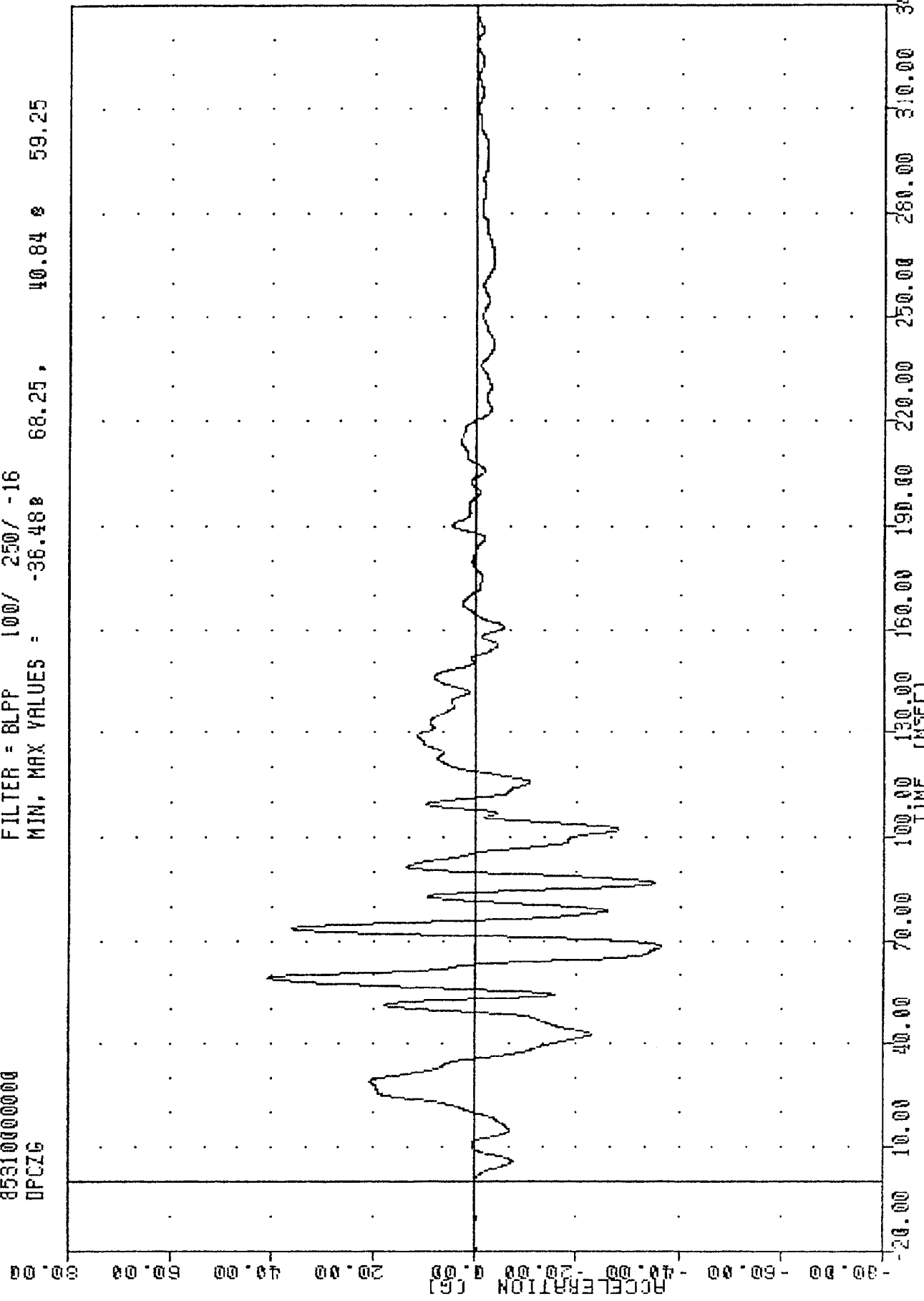
MIN, MAX VALUES = -44.46 48.13, 31.13 & 107.50



8511063  
CENTRAL CRASH RESPONSES  
8531000000  
DPCX6  
PLOT DATE 14-085 16:01:25  
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -44.46 48.13, 31.13 & 107.50  
SUBJECT VEHICLE - OMNI 68463  
DASHBOARD ACCELERATION X AXIS

8511063  
INITIAL CRASH RESPONSES  
853100000000  
DPCZG

PLOT DATE 14-85 16:01:25  
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -36.488 68.25, 40.84 & 59.25



SUBJECT VEHICLE - OMNI 68463  
DASHBOARD ACCELERATION Z AXIS

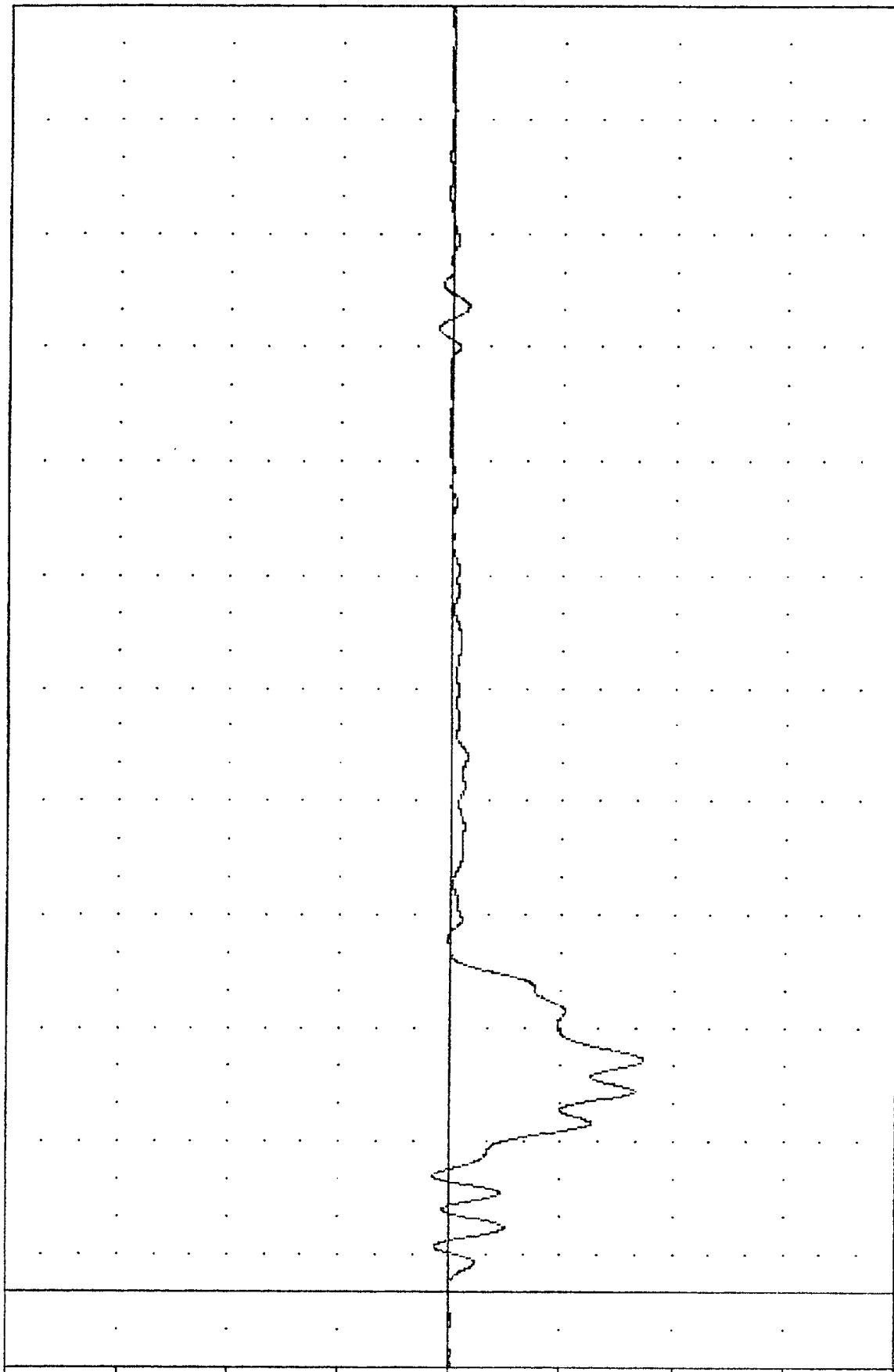
8511063  
INITIAL CRASH RESPONSES  
8531000000  
VCGV

PLOT DATE 14-08-95 16:01:25

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -435.260 61.63, 38.97 30.88

ANGULAR VEL (DEG/SEC) (X10<sup>2</sup>)

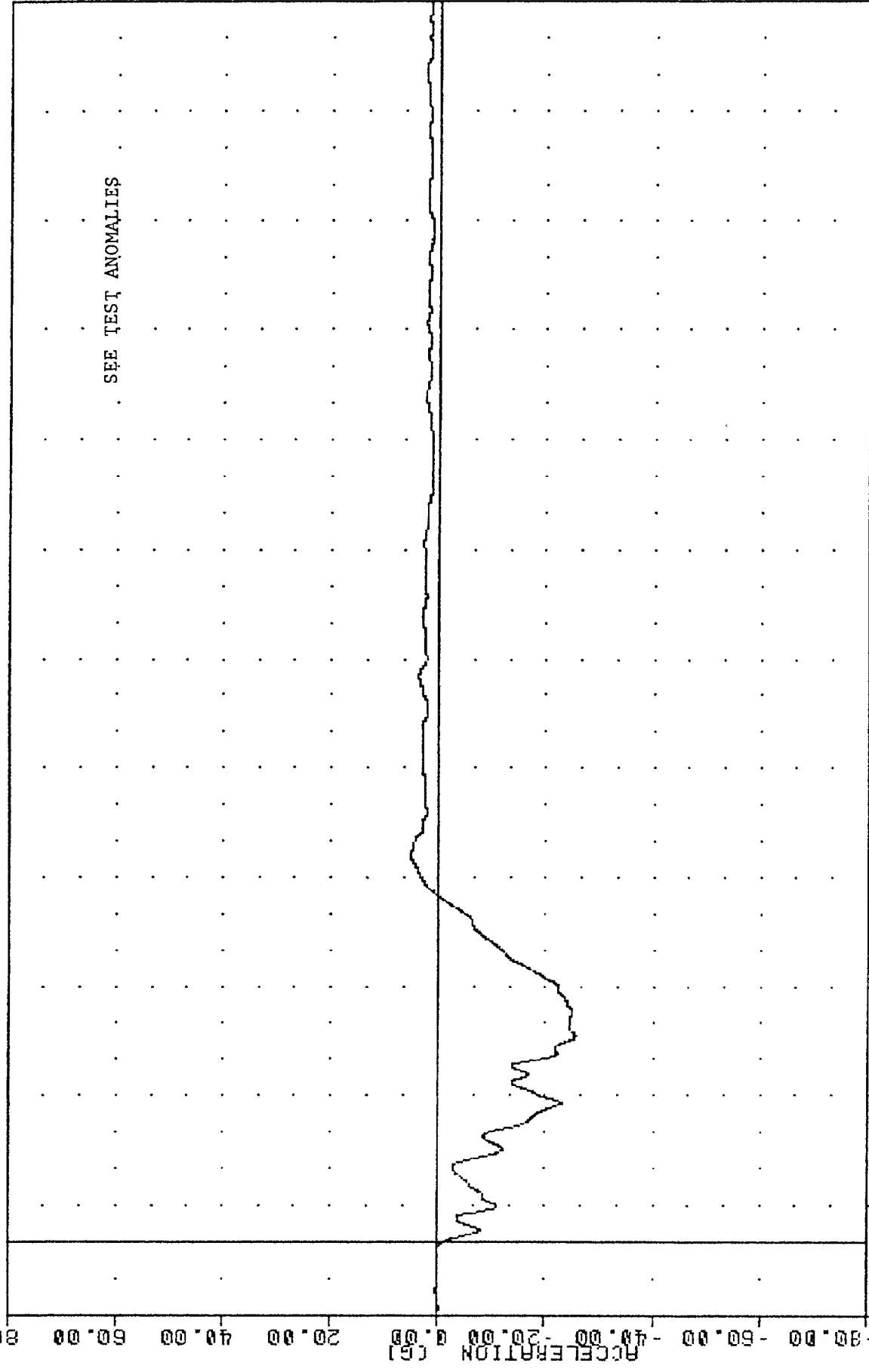


-100.00 -75.00 -50.00 -25.00 0.00 25.00 50.00 75.00 100.00  
TIME (MSEC) 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

SUBJECT VEHICLE - OMNI 68463  
VEHICLE PITCH RATE DEGREES/SECOND

8511065  
 HORIZONTAL CRASH RESPONSES  
 85310000000  
 LPBXG

PLOT DATE 14-08-85 16:01:25  
 FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -25.56 56.50, 5.13 105.88



80.00 70.00 60.00 50.00 40.00 30.00 20.00 10.00 0.00 -10.00 -20.00 -30.00 -40.00 -50.00 -60.00 -70.00 -80.00  
 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
 SUBJECT VEHICLE - OMNI 68463  
 LEFT B PILLAR ACCELERATION X AXIS

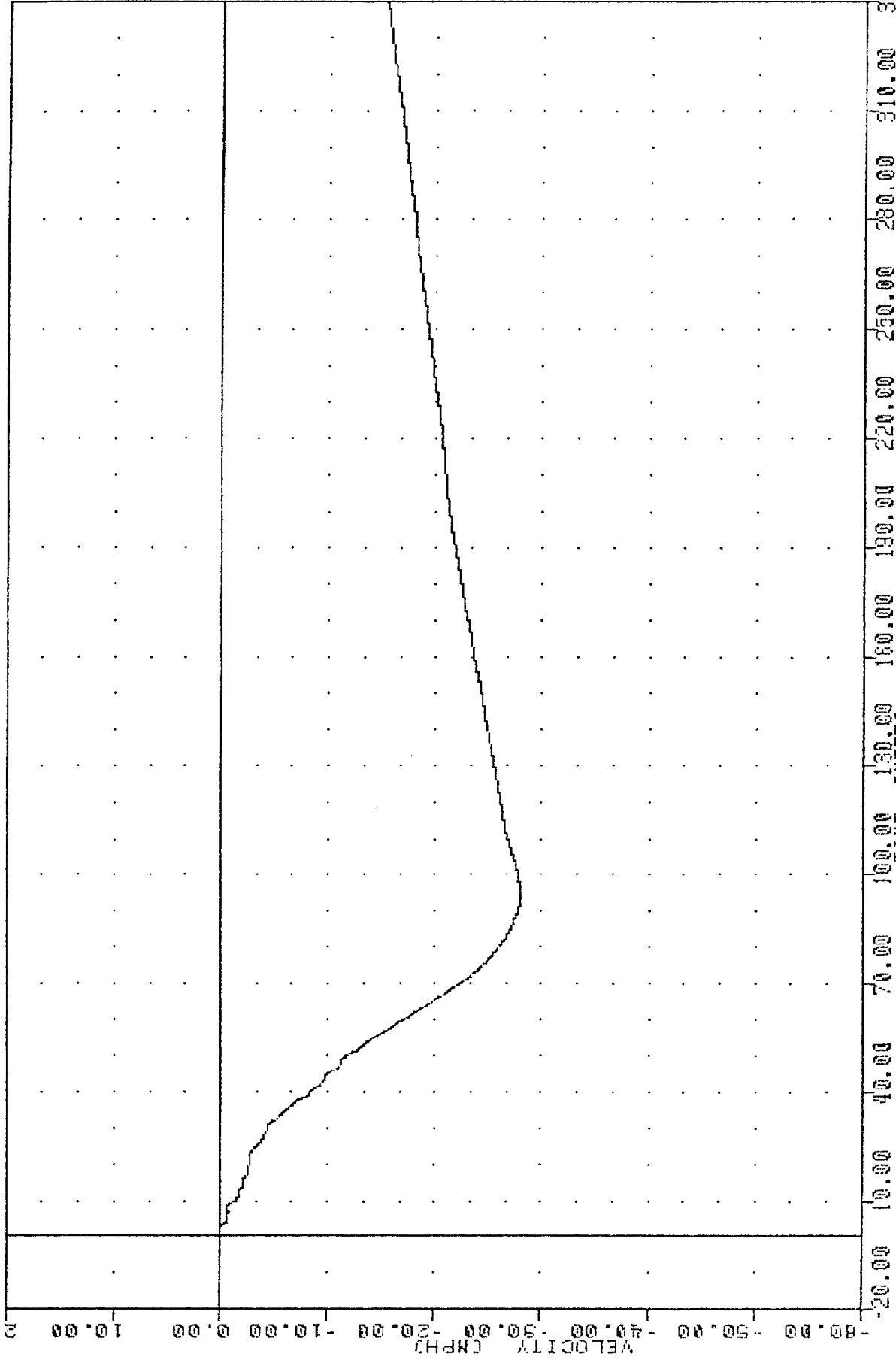
8511063  
CENTAL CRASH RESPONSES

PLOT DATE 14-08-85 16:04:24

85310000000  
LPBXV

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = -26.04 94.13 0.04 -4.38



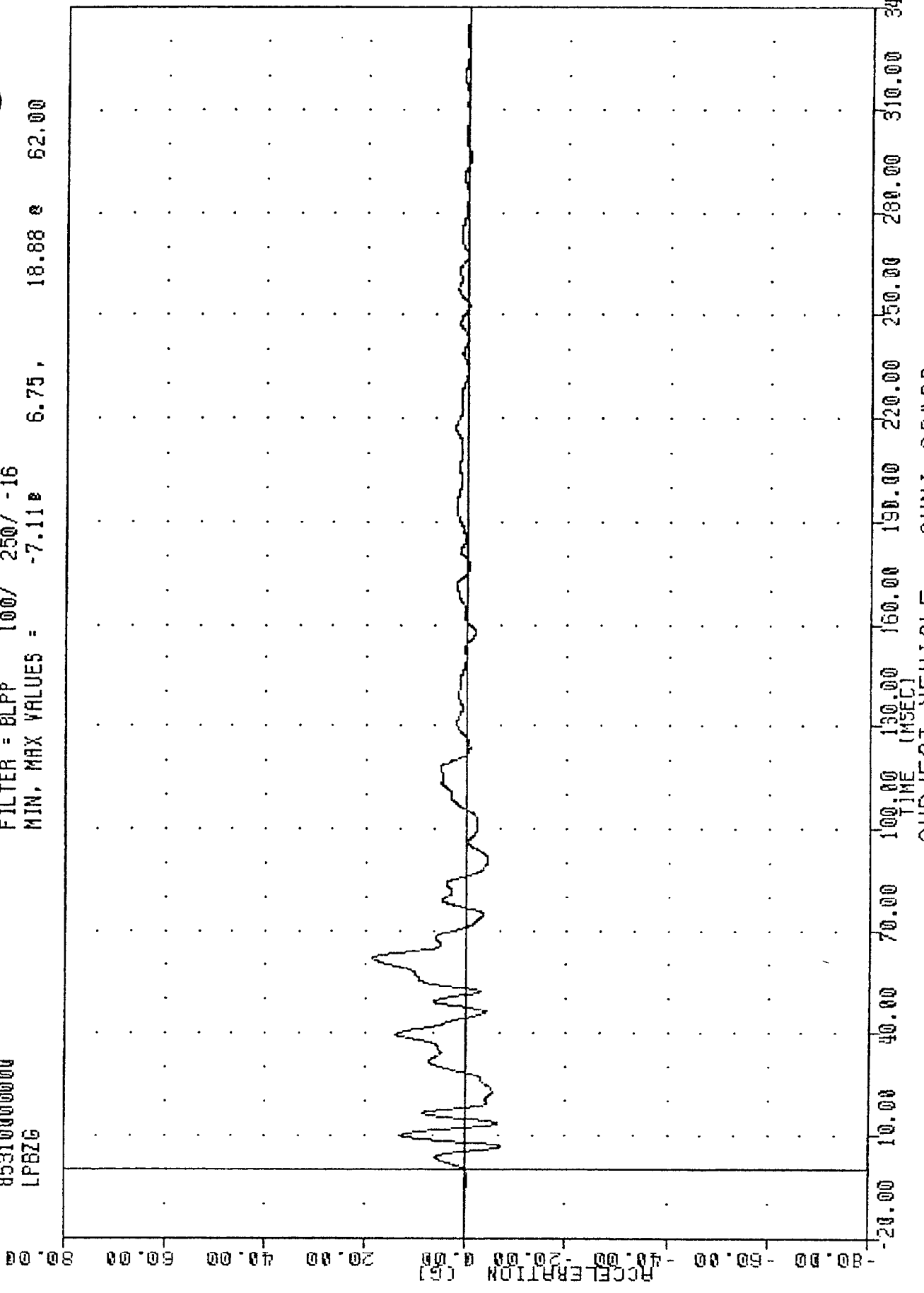
SUBJECT VEHICLE - OMNI 68463  
DELTA V USING LPBXG

8511063  
CENTRAL CRASH RESPONSES  
85310000000  
LP826

PLOT DATE 14-08-85 16:01:25

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -7.11g 6.75g 18.88g 62.00



SUBJECT VEHICLE - OMNI 68463  
LEFT B PILLAR ACCELERATION Z AXIS

851106\$  
CENTRAL CRASH RESPONSES  
8510000000  
APBXG

PLOT DATE 15-11-85 09:59:09

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -35.47 49.00, 7.25 112.38

80.00

60.00

40.00

20.00

0.00

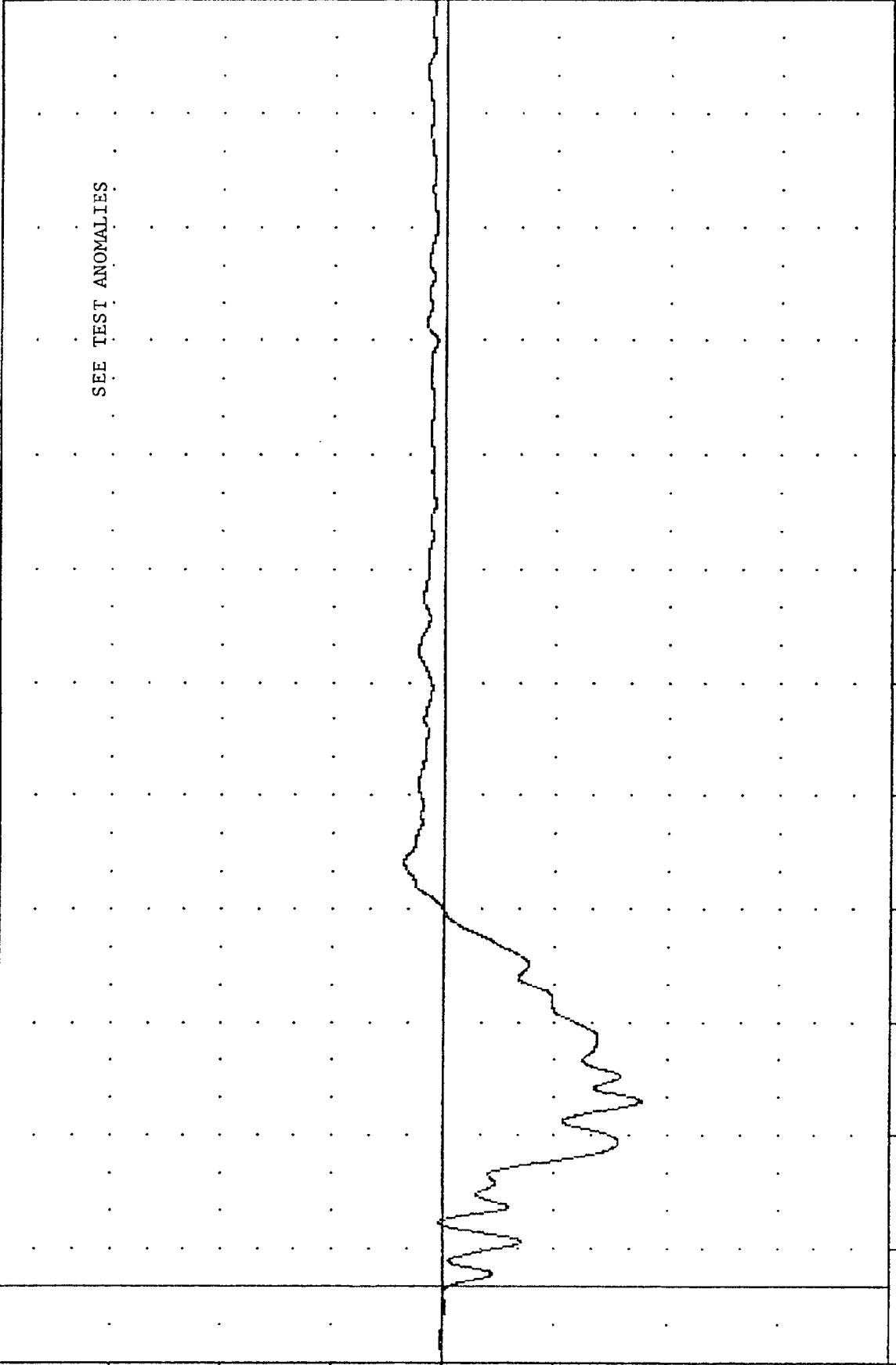
-20.00

-40.00

-60.00

-80.00

ACCELERATION [G]



SEE TEST ANOMALIES

-20.00 10.00 40.00 70.00 100.00 130.00 150.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)

SUBJECT VEHICLE - OMNI 68463  
RIGHT B PILLAR ACCELERATION X AXIS

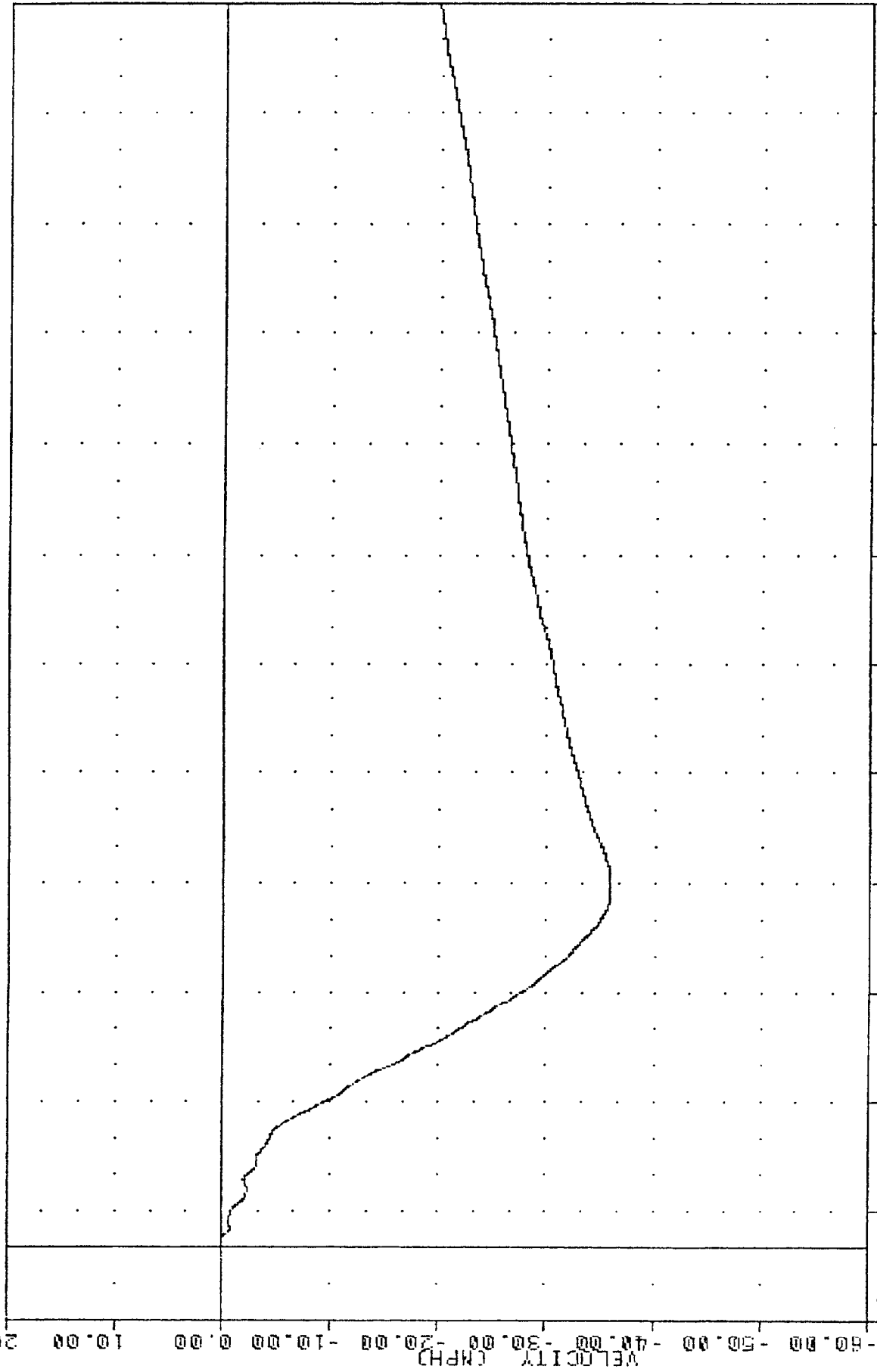
8511063  
CENTRAL CRASH RESPONSES  
853100000000  
APEXY

PLOT DATE 14-85 16:04:24

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -35.940 100.75, 0.07 e -8.25

20.00



100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)

SUBJECT VEHICLE - OMNI 68463  
DELTA V USING RPBXG

8511065  
 MENTAL CRASH RESPONSES  
 85310000000  
 TLXG4

PLOT DATE 14-85 16:01:25

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -31.10e 63.88, 3.46 \* 106.25

00.00

10.00

20.00

30.00

40.00

50.00

60.00

70.00

80.00

90.00

100.00

110.00

120.00

130.00

140.00

150.00

160.00

170.00

180.00

190.00

200.00

210.00

220.00

230.00

240.00

250.00

260.00

270.00

280.00

290.00

300.00

310.00

320.00

330.00

340.00

ACCELERATION (G)

20.00 10.00 40.00 70.00 100.00 130.00 150.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

TIME (MSEC)

SUBJECT VEHICLE - OMNI 68463  
 LEFT REAR SEAT ACCELERATION X AXIS

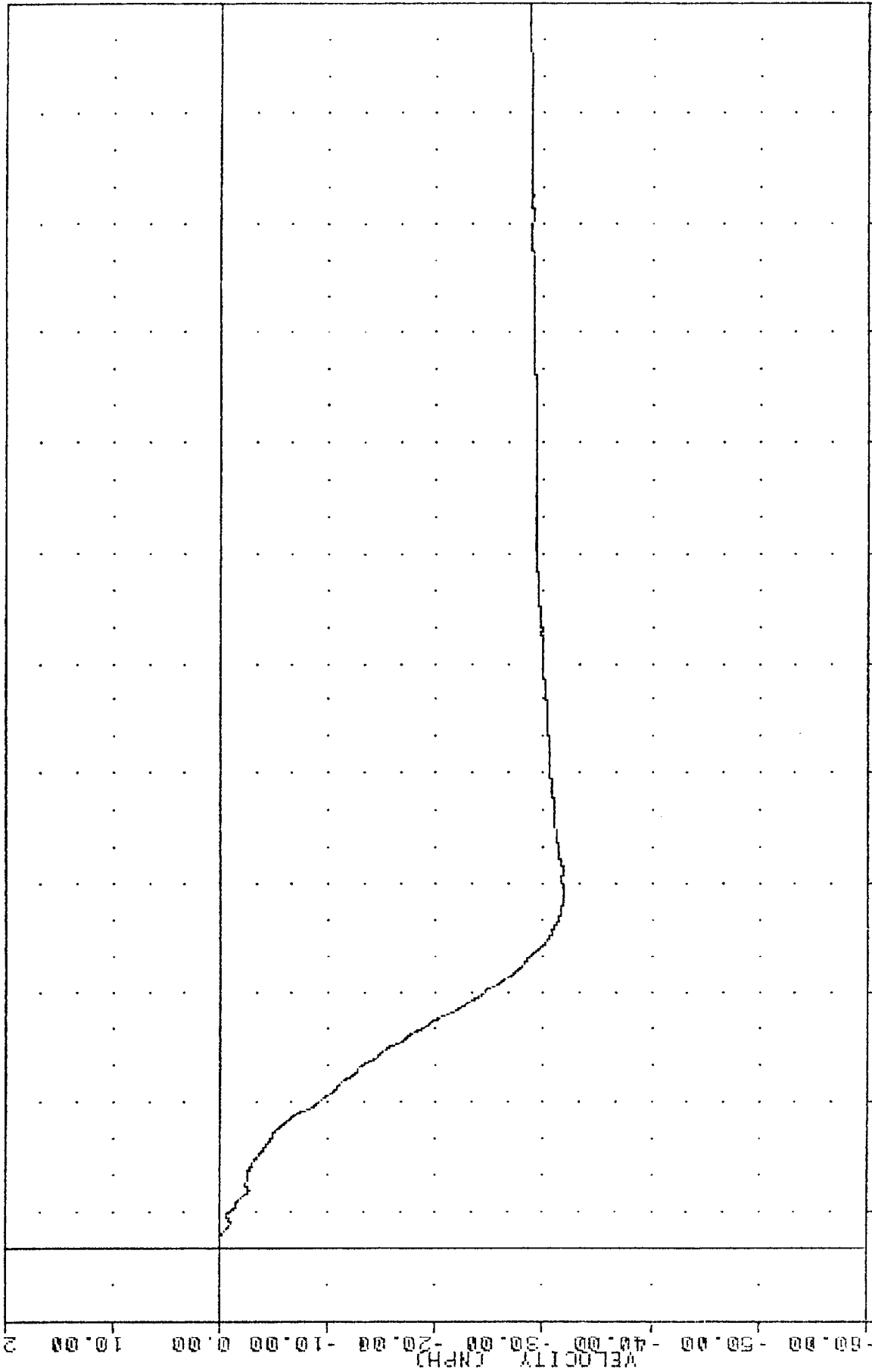
8531000000  
 TLRXV4  
 CENTAL CRASH RESPONSES  
 00.1063

PLOT DATE 14 085 16:04:24

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -31.84e 97.38, 0.01 e -13.38

20.00



-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 68463  
 DELTA V USING TLRXG4

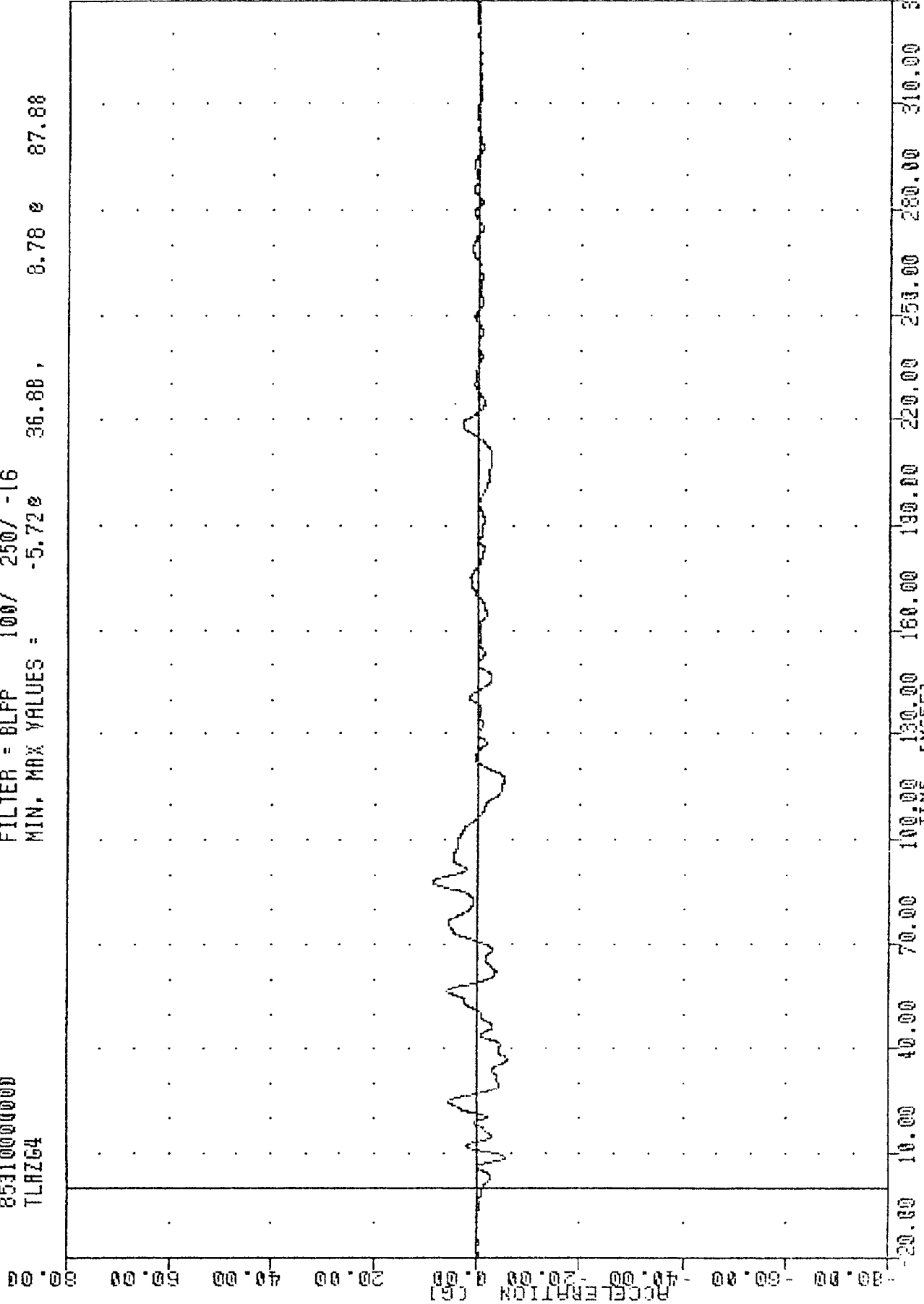
8511063  
CENTAL CRASH RESPONSES

PLOT DATE 14 85 16:01:25

8531000000  
TLRZG4

FILTER = BLFF 100/ 250/ -16

MIN. MAX VALUES = -5.72e 36.88, 8.78 e 87.88

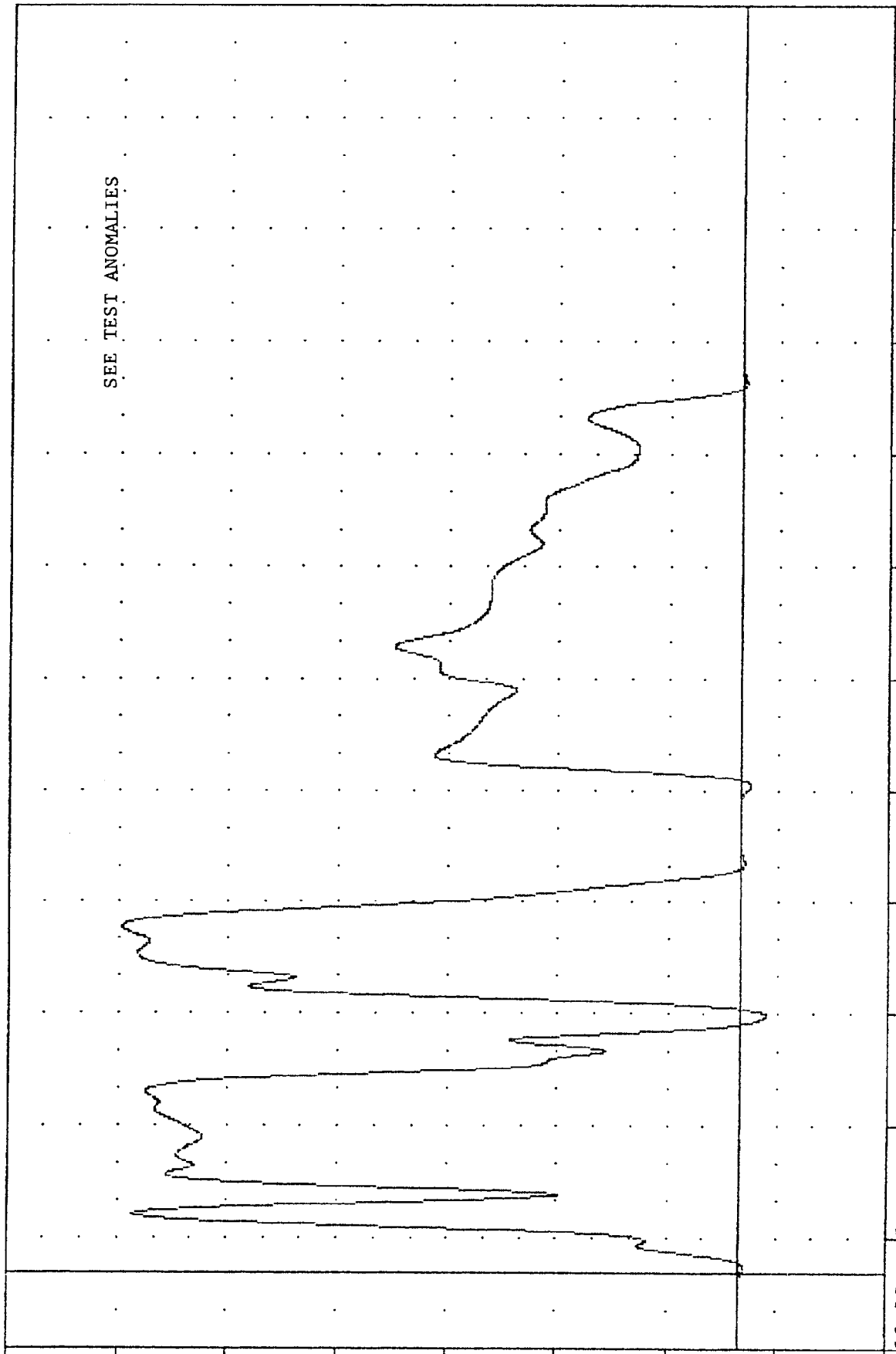


SUBJECT VEHICLE - OMNI 68463  
LEFT REAR SEAT ACCELERATION Z AXIS

8511055  
INITIAL CRASH RESPONSES  
85310000000  
TLRX6D

PLOT DATE 14-85 16:01:25  
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -13.87g 69.50, 338.05 g 93.25

ACCELERATION (G)



-40.00 -20.00 0.00 20.00 40.00 60.00 80.00 100.00 120.00 140.00 160.00 180.00 200.00 220.00 240.00 260.00 280.00 300.00 320.00 340.00  
TIME (MSEC)

SUBJECT VEHICLE - OMNI 68463  
LEFT REAR SEAT ACCELERATION #2 X AXIS

8511068  
CENTRAL CRASH RESPONSES  
85310000000  
TRAX63

PLOT DATE 14 OCT 85 16:01:25

FILTER = BLFP 100/ 250/ -16

MIN. MAX VALUES = -29.44g 37.00, 3.06g 17.13

90.00

60.00

40.00

20.00

ACCELERATION (G)

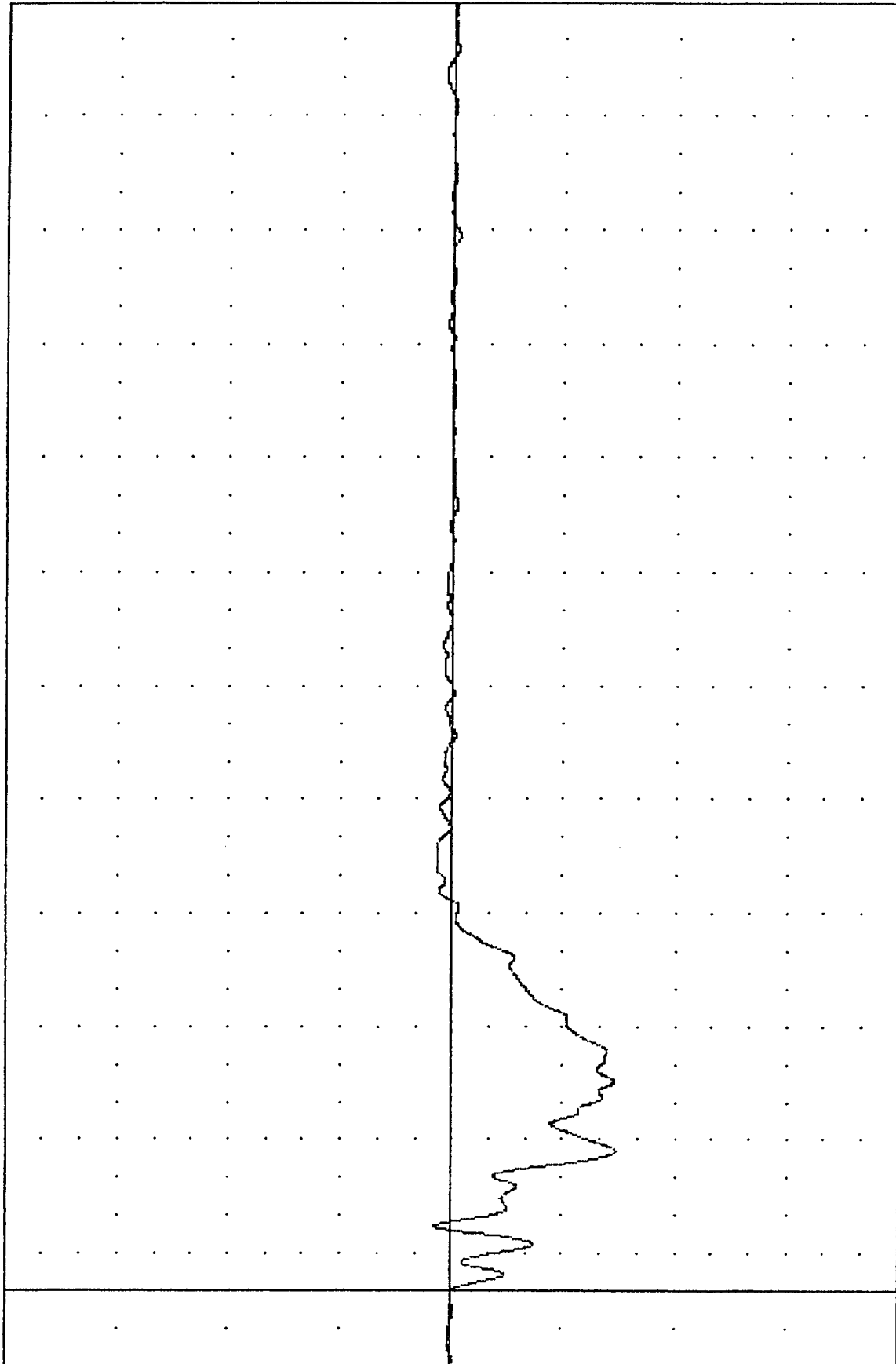
0.00

-20.00

-40.00

-60.00

-80.00



-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 68463  
RIGHT REAR SEAT ACCELERATION X AXIS

8511068  
CENTRAL CRASH RESPONSES

FL0T DATE 14 85 16:04:24

85310000000

FILTER = BLPP 300/ 750/ -16

TRAXVS

MIN, MAX VALUES = -32.73e 103.63, 0.07 e -8.30

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

-20.00

10.00

0.00

-10.00

-20.00

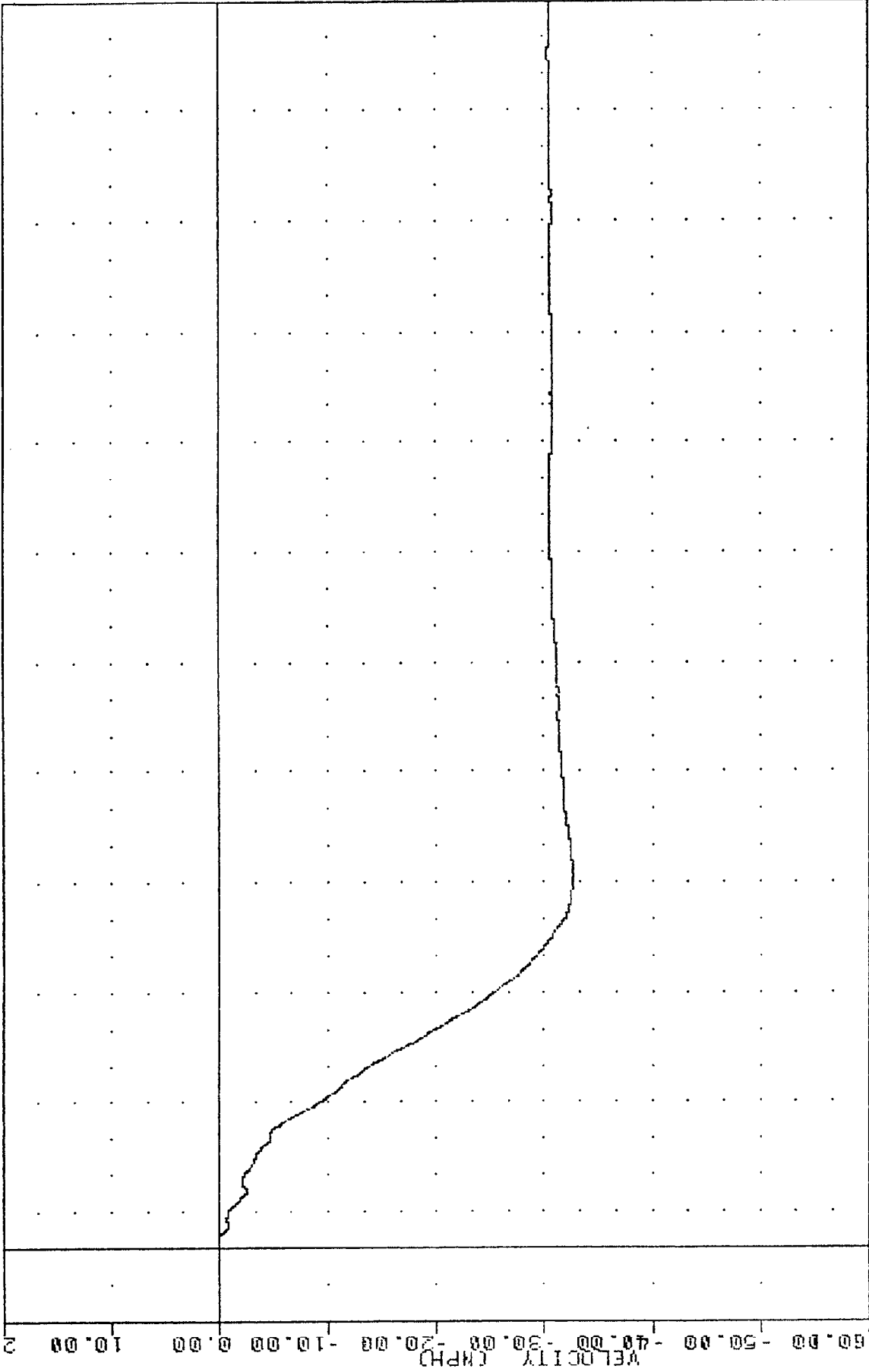
-30.00

-40.00

-50.00

-60.00

B-64



340.00 310.00 280.00 250.00 220.00 190.00 160.00 130.00 100.00 70.00 40.00 10.00 -20.00

SUBJECT VEHICLE - OMNI 68463  
DELTA Y USING TRAX63

PARTNER VEHICLE DATA PLOTS

851106P  
CENTRAL CRASH RESPONSES

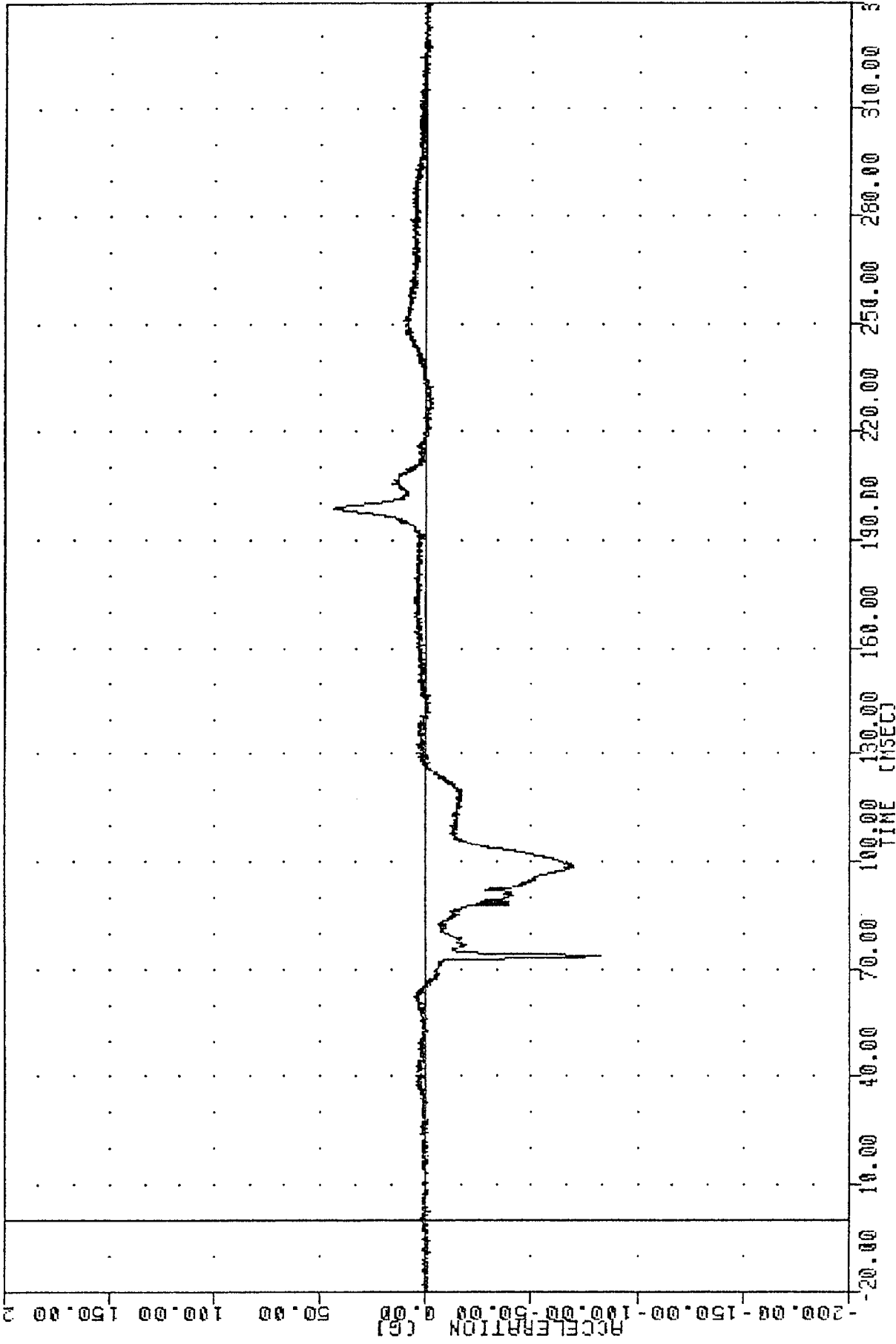
853100000000

HE0XG1

PLOT DATE 14 85 16:20:31

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -82.91e 73.50, 43.74 e 198.50



PARTNER VEHICLE - OMNI 65323  
DRIVER HEAD ACCELERATION X AXIS

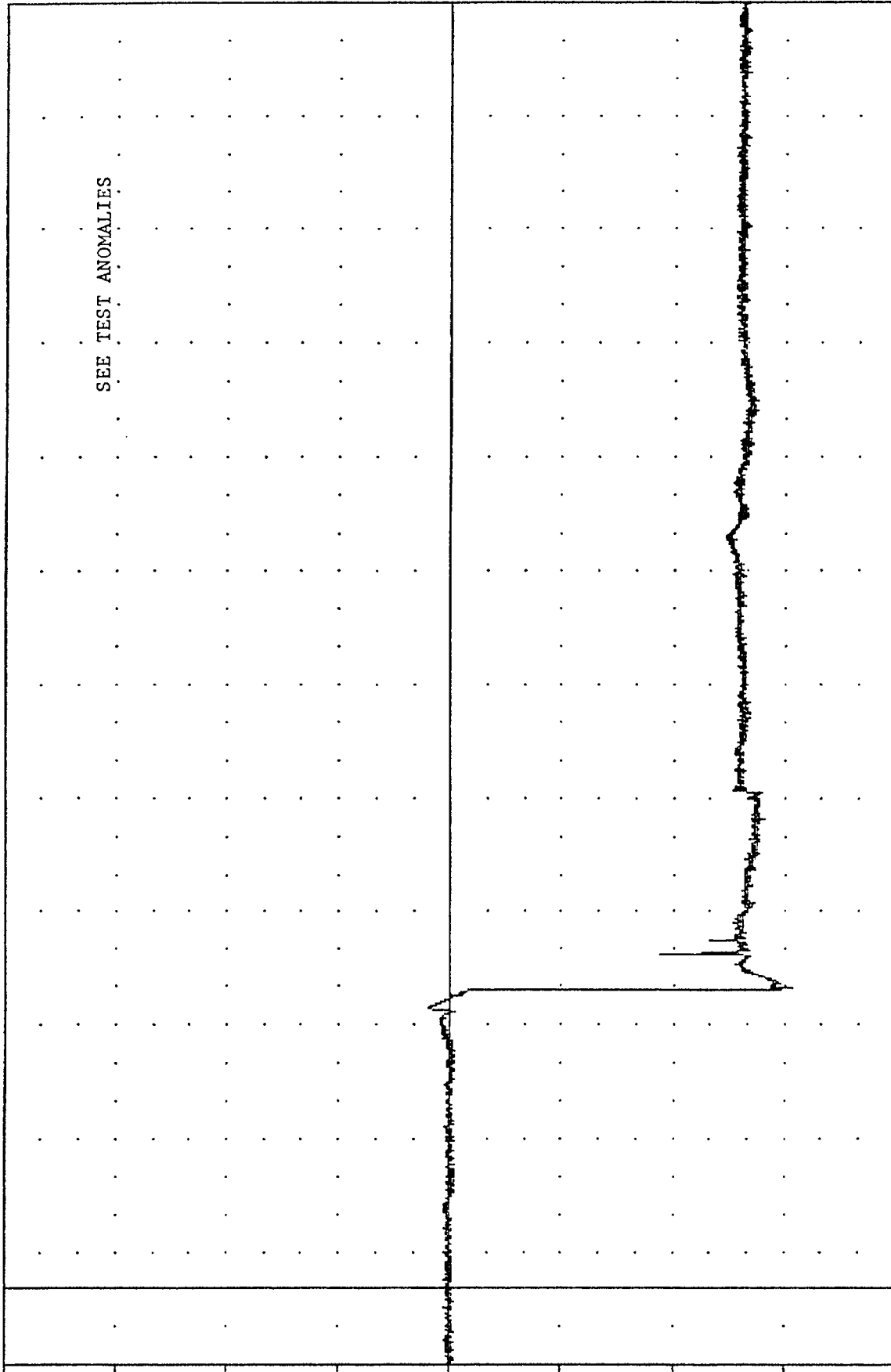
851106P  
INITIAL CRASH RESPONSES  
85310000000  
HEDY61

PLUT DATE 14-85 16:20:31

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -153.21e 79.38, 10.12 e 74.38

200.00  
150.00  
100.00  
50.00  
0.00  
-50.00  
-100.00  
-150.00  
-200.00



SEE TEST ANOMALIES

340.00  
310.00  
280.00  
250.00  
220.00  
190.00  
160.00  
130.00  
100.00  
70.00  
40.00  
10.00  
-20.00

TIME (MSEC)

PARTNER VEHICLE - OMNI 65923  
DRIVER HEAD ACCELERATION Y AXIS

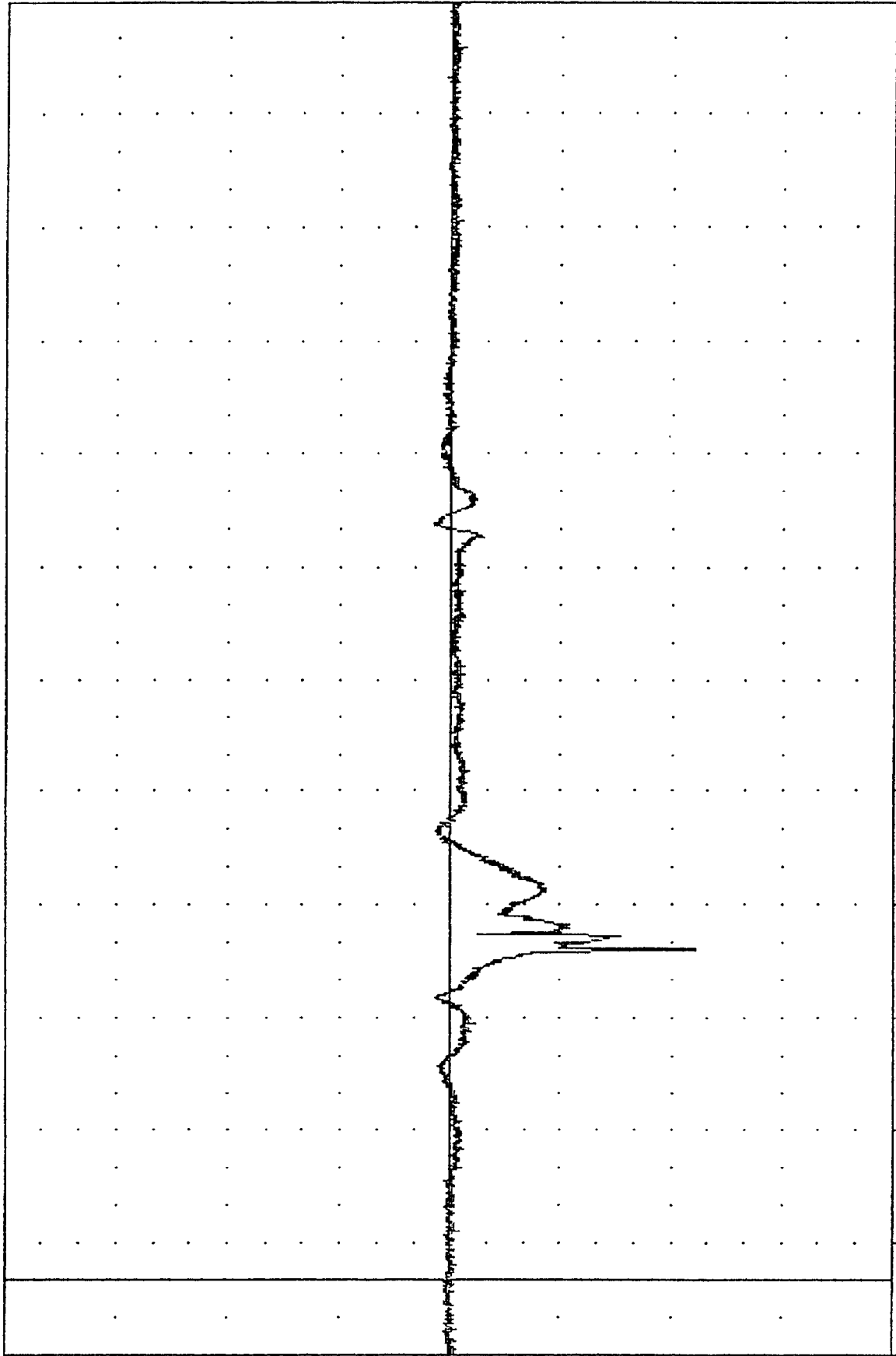
851106P  
CENTRAL CRASH RESPONSES  
85310000000  
HE0ZG1

PLOT DATE 14 85 16:20:31

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -111.59e 88.13, 7.43 e 201.25

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 - OMNI 65323  
DRIVER HEAD ACCELERATION Z AXIS

851106P  
FRONTAL CRASH RESPONSES

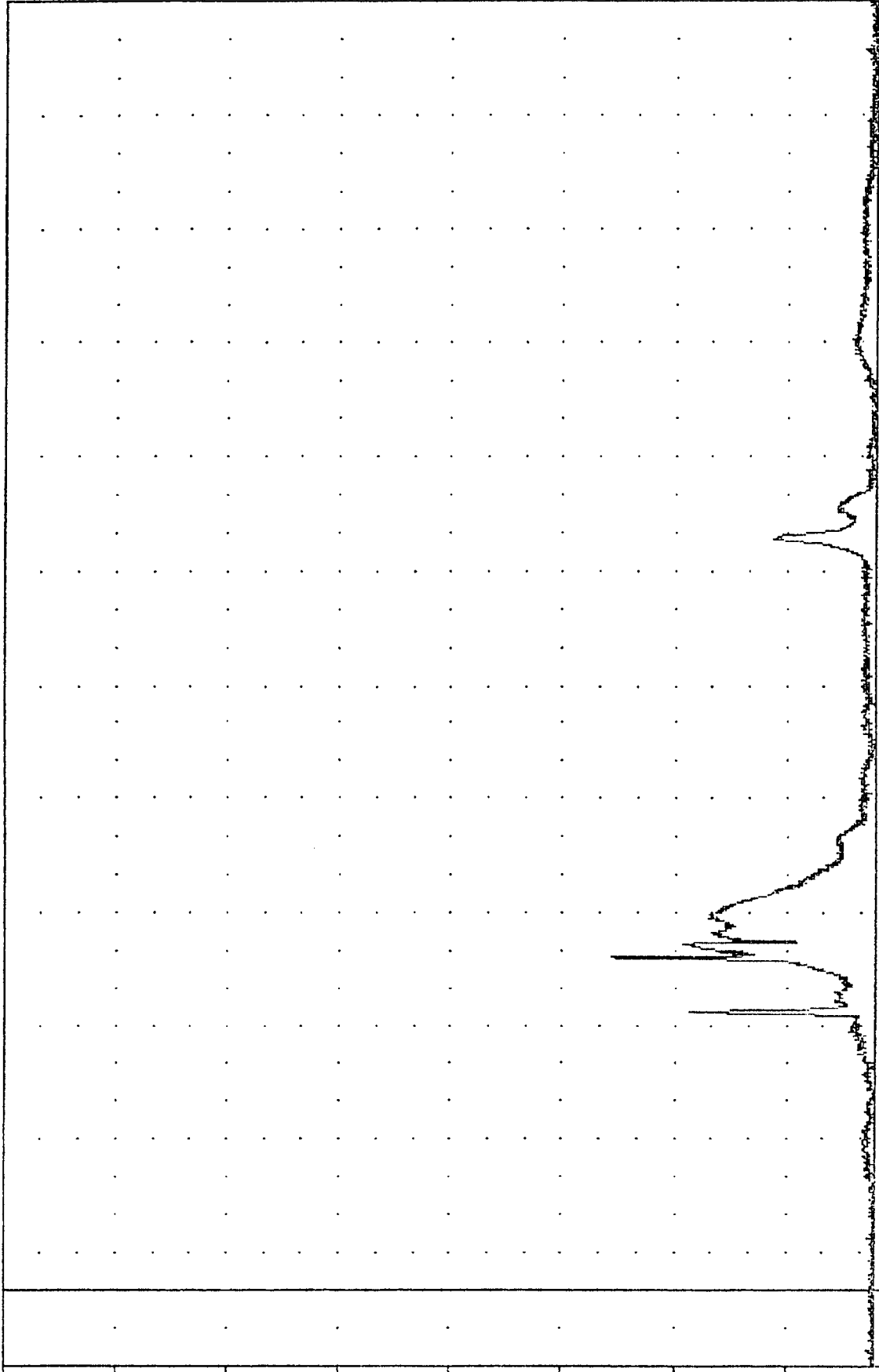
8531000000  
HEADG1

PLOT DATE 15-07-85 09:01:49

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = 0.09g -19.50, 118.14 g 88.13

ACCELERATION (G)  
-10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00 390.00



-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 - OMNI 65323

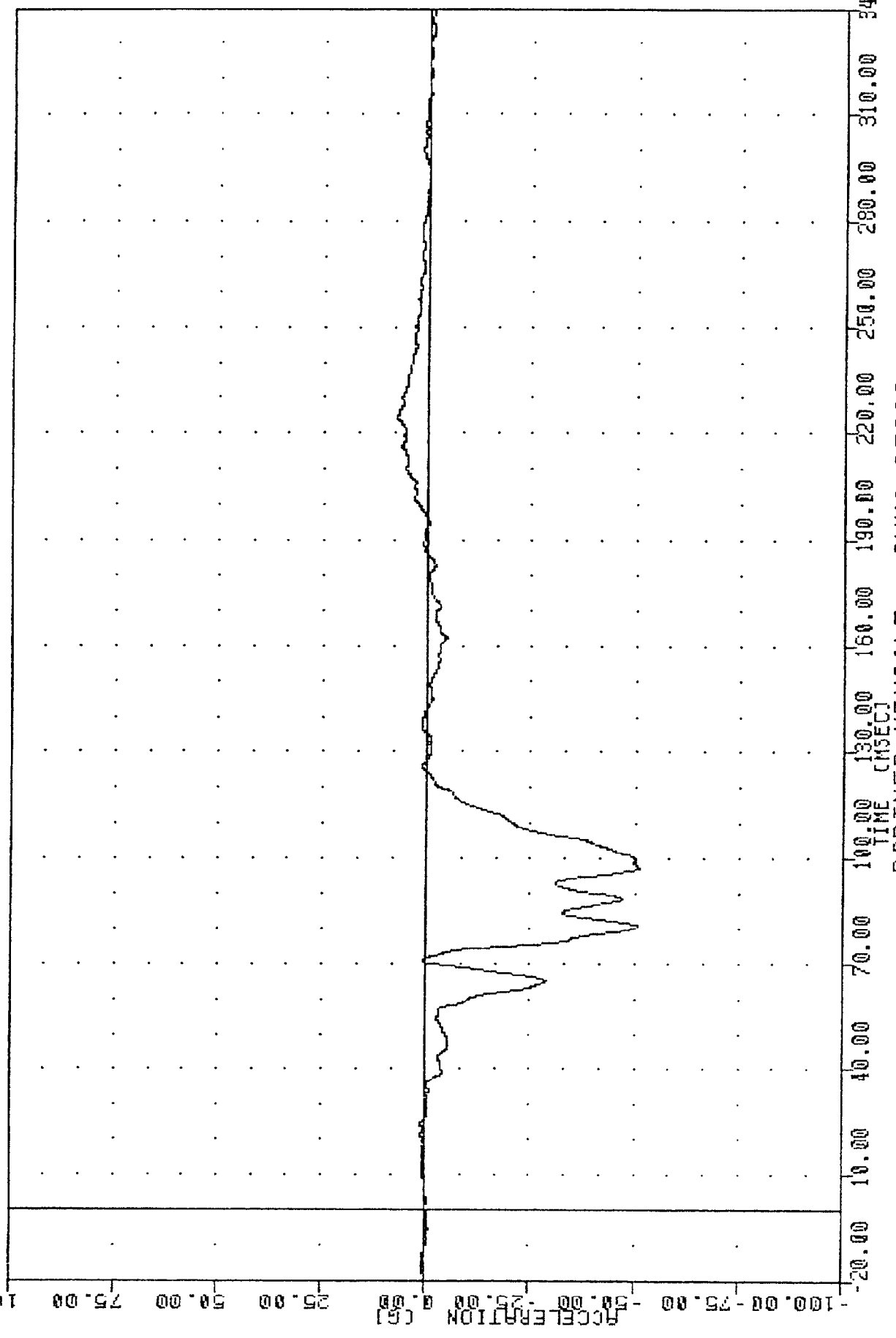
DRIVER HEAD RESULTANT USING ONLY X AND Y

851106P  
CENTRAL CRASH RESPONSES  
853100000000  
C5TX61

PLOT DATE 14-08-85 16:20:31

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -51.23e 97.13, 7.38 e 224.50

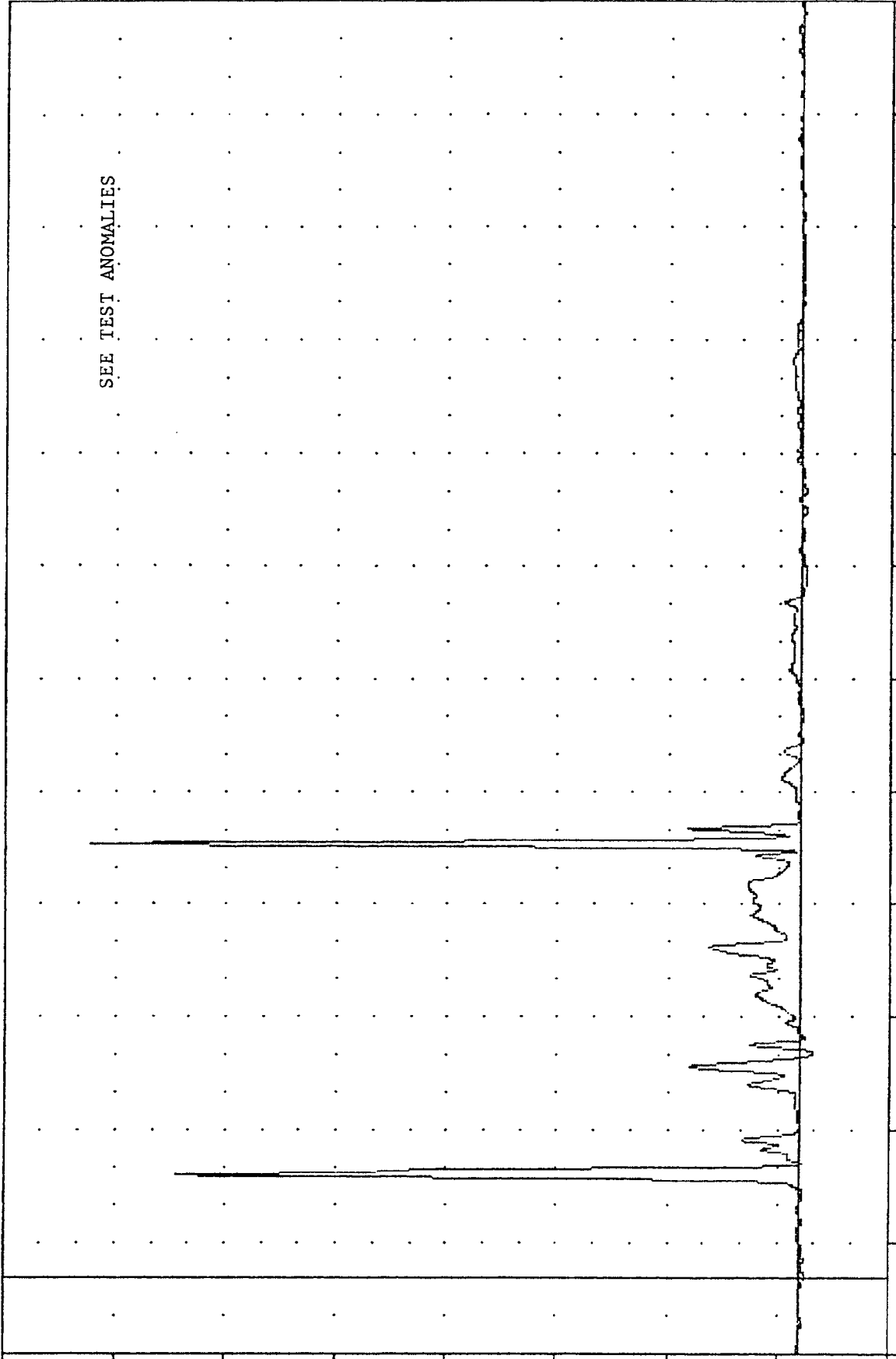


PARTNER VEHICLE - OMNI 65923  
DRIVER CHEST ACCELERATION X AXIS

851106P  
INITIAL CRASH RESPONSES  
85310000000  
CSTY61

PLOT DATE 14 85 16:20:31  
FILTER = BLPP 300 / 750 / -16  
MIN. MAX VALUES = -2.778 60.50 160.78 116.13

ACCELERATION (G)  
-20.00 5.00 30.00 55.00 80.00 105.00 130.00 155.00 180.00



-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)

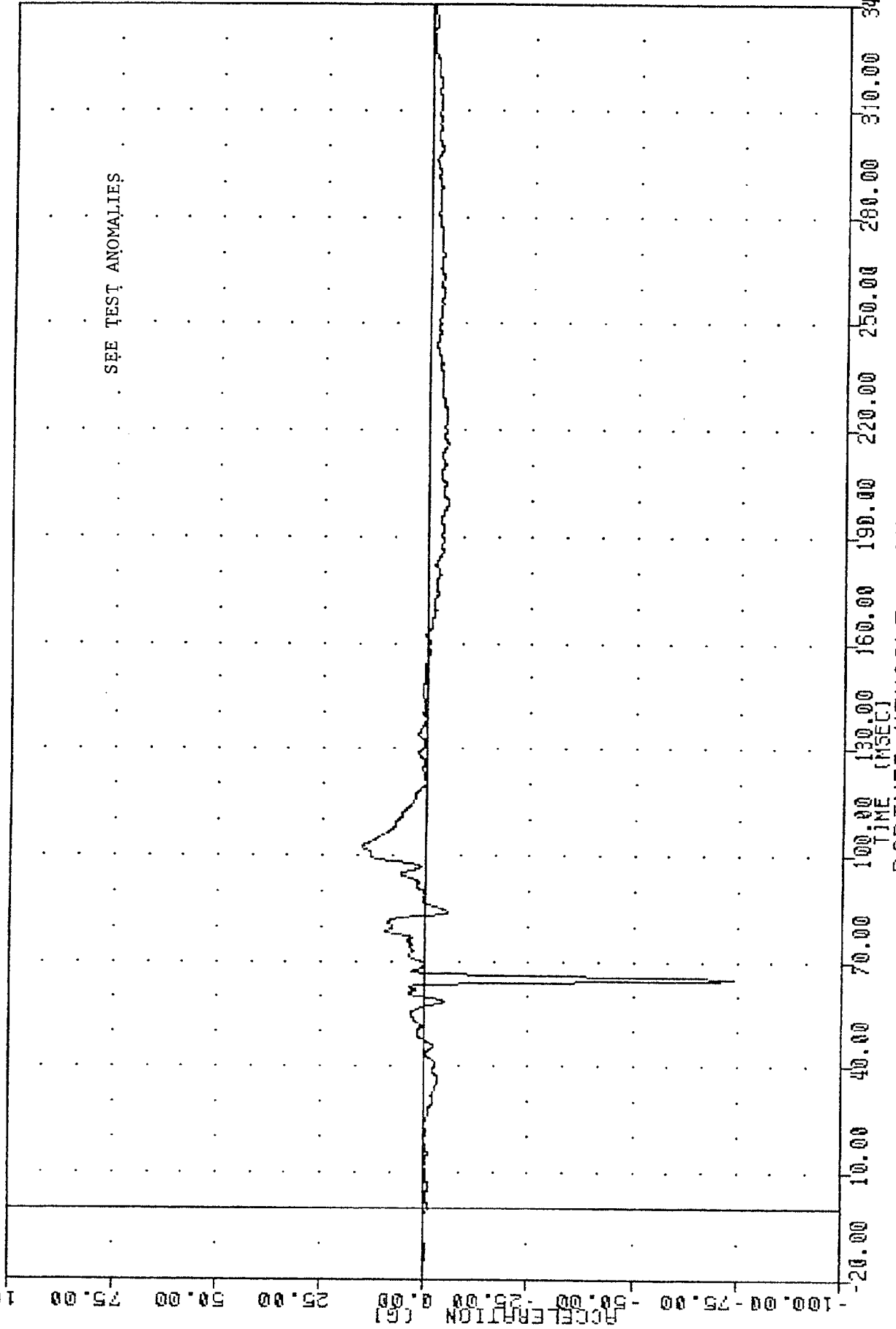
PARTNER VEHICLE - OMNI 65323  
DRIVER CHEST ACCELERATION Y AXIS

851106P  
FRONTAL CRASH RESPONSES  
853100000000  
CSTZG1

PLOT DATE 14-85 16:20:31

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -74.32g 65.00g 15.58g 102.25



PARTNER VEHICLE - OMNI 65323  
DRIVER CHEST ACCELERATION Z AXIS

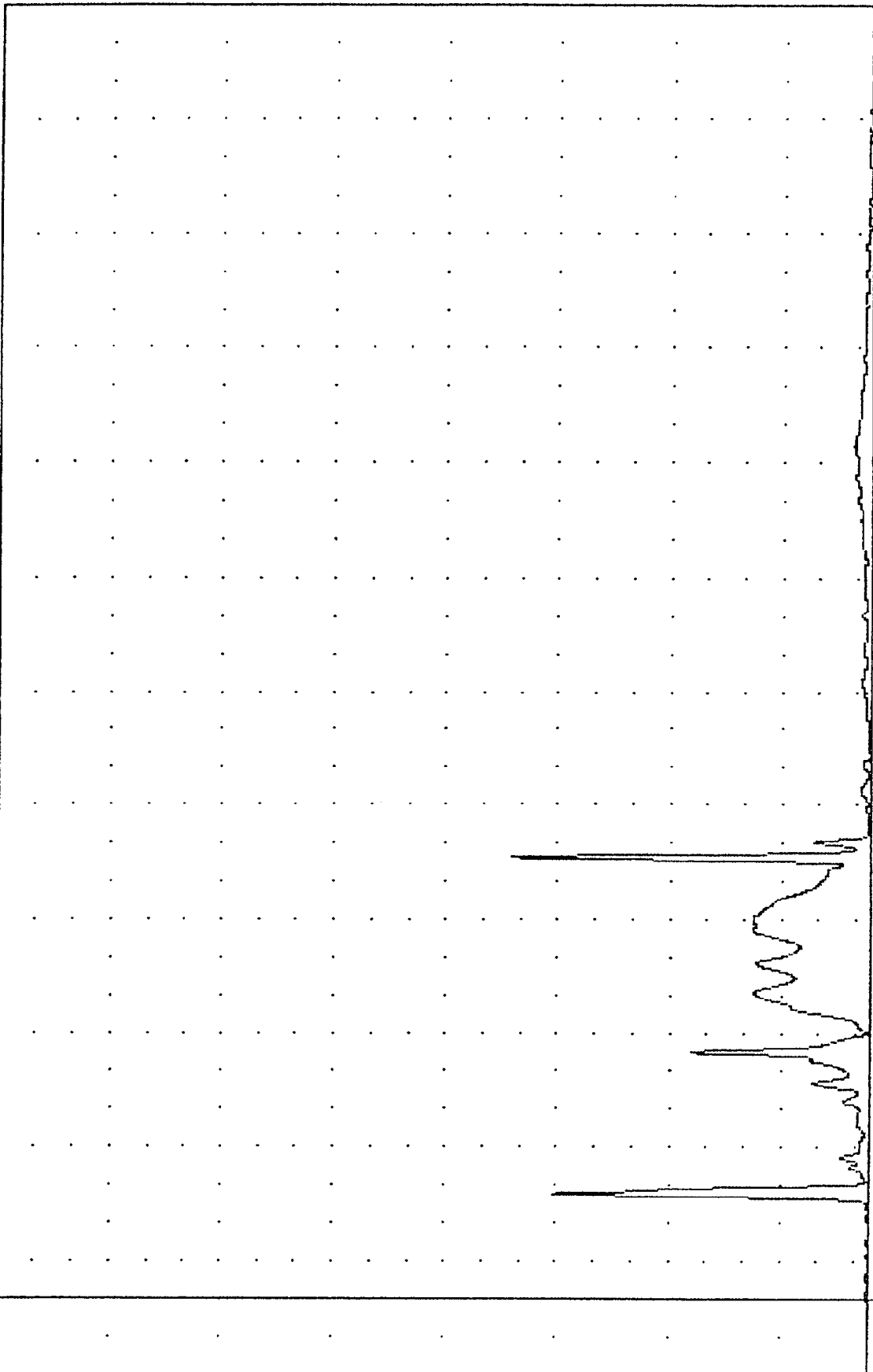
851106P  
FRONTAL CRASH RESPONSES  
85310000000  
CSTRG1

PLOT DATE 14-08-85 16:20:31

FILTER = ELPP 300/ 750/ -16

MIN, MAX VALUES = 0.09g -20.00, 161.02 g 116.13

ACCELERATION (G)  
-10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00 390.00



-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)

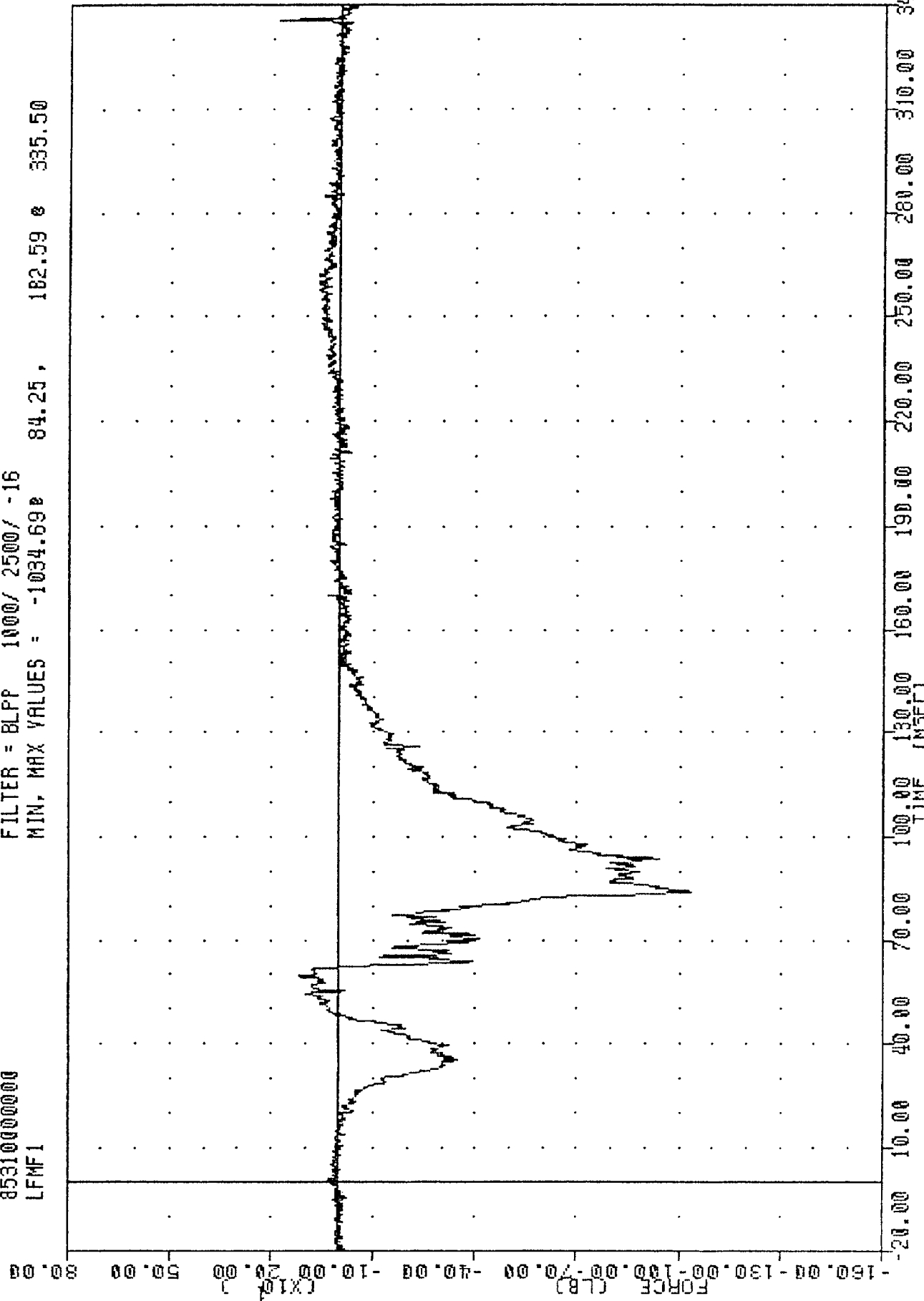
PARTNER VEHICLE - OMNI 65323  
DRIVER CHEST RESULTANT

851106P  
CENTRAL CRASH RESPONSES  
85310000000  
LFMF1

PLOT DATE 14-85 16:20:31

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -1034.690 84.25, 182.59 @ 335.50



B-74

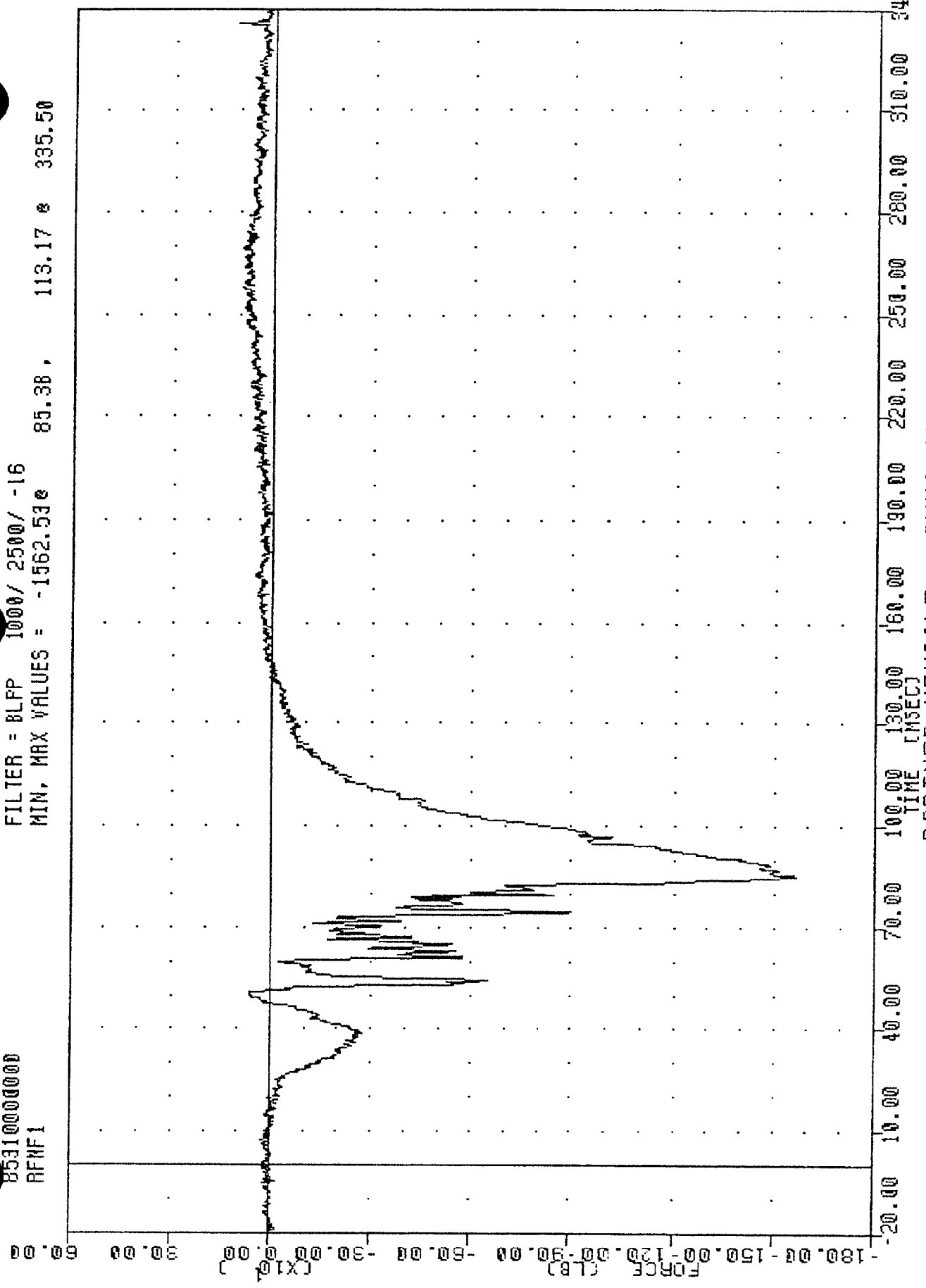
PARTNER VEHICLE - OMNI 65323  
DRIVER LEFT FEMUR FORCE LBS

851106P  
CENTRAL CRASH RESPONSES  
85310000000  
RFMF1

PLOT DATE 14-08-85 16:20:31

FILTER = BLFP 1000/ 2500/ -16

MIN, MAX VALUES = -1562.53e 85.38, 113.17 e 335.50



PARTNER VEHICLE - OMNI 65323  
DRIVER RIGHT FEMUR FORCE LBS

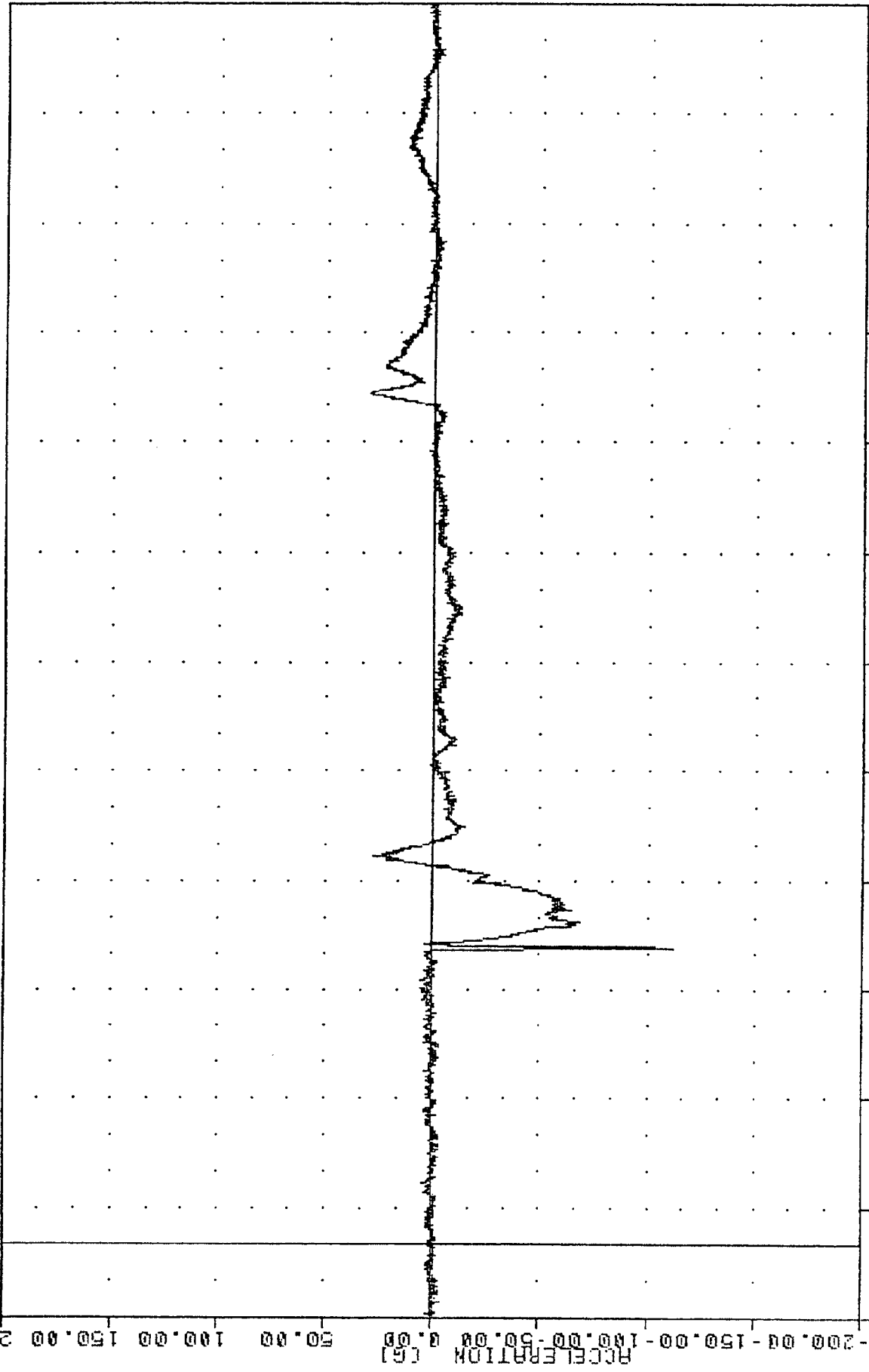
851105P  
HORIZONTAL CRASH RESPONSES  
85310000000  
HEDX52

PLOT DATE 14-85 16:20:31

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -111.93e 81.63, 30.47 e 233.98

200.00  
150.00  
100.00  
50.00  
0.00  
-50.00  
-100.00  
-150.00  
-200.00



B-76

340.00  
310.00  
280.00  
250.00  
220.00  
200.00  
190.00  
180.00  
170.00  
160.00  
150.00  
140.00  
130.00  
120.00  
110.00  
100.00  
90.00  
80.00  
70.00  
60.00  
50.00  
40.00  
30.00  
20.00  
10.00  
0.00

PARTNER VEHICLE - OMNI 65323  
PASSENGER HEAD ACCELERATION X AXIS

851106P  
CENTRAL CRASH RESPONSES

8531000000  
HEDY62

PLOT DATE 14 85 16:20:31

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -17.83g 114.50 19.97 g 240.50

200.00

150.00

100.00

50.00

0.00

-50.00

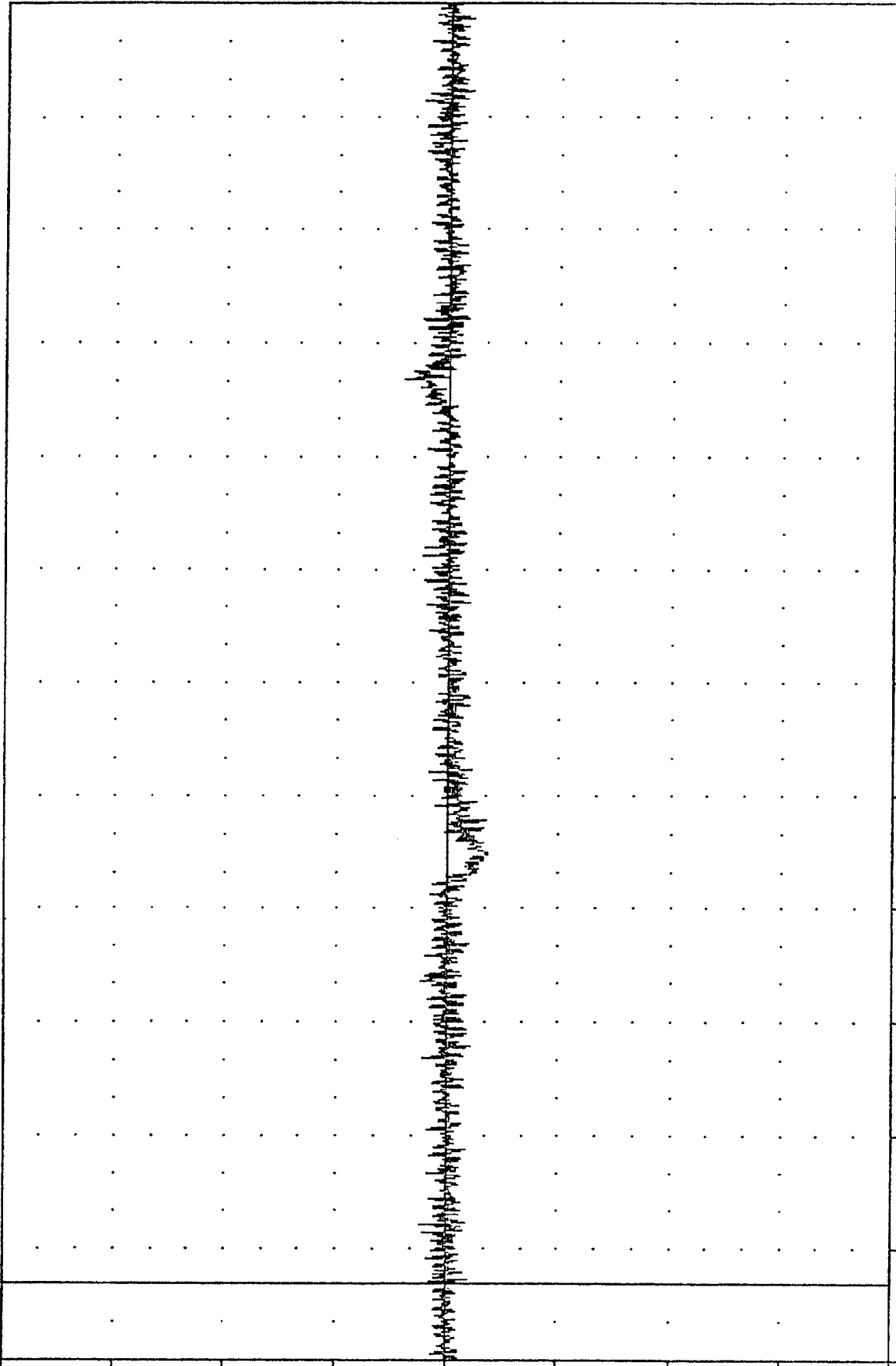
-100.00

-150.00

-200.00

ACCELERATION (G)

B-77



-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

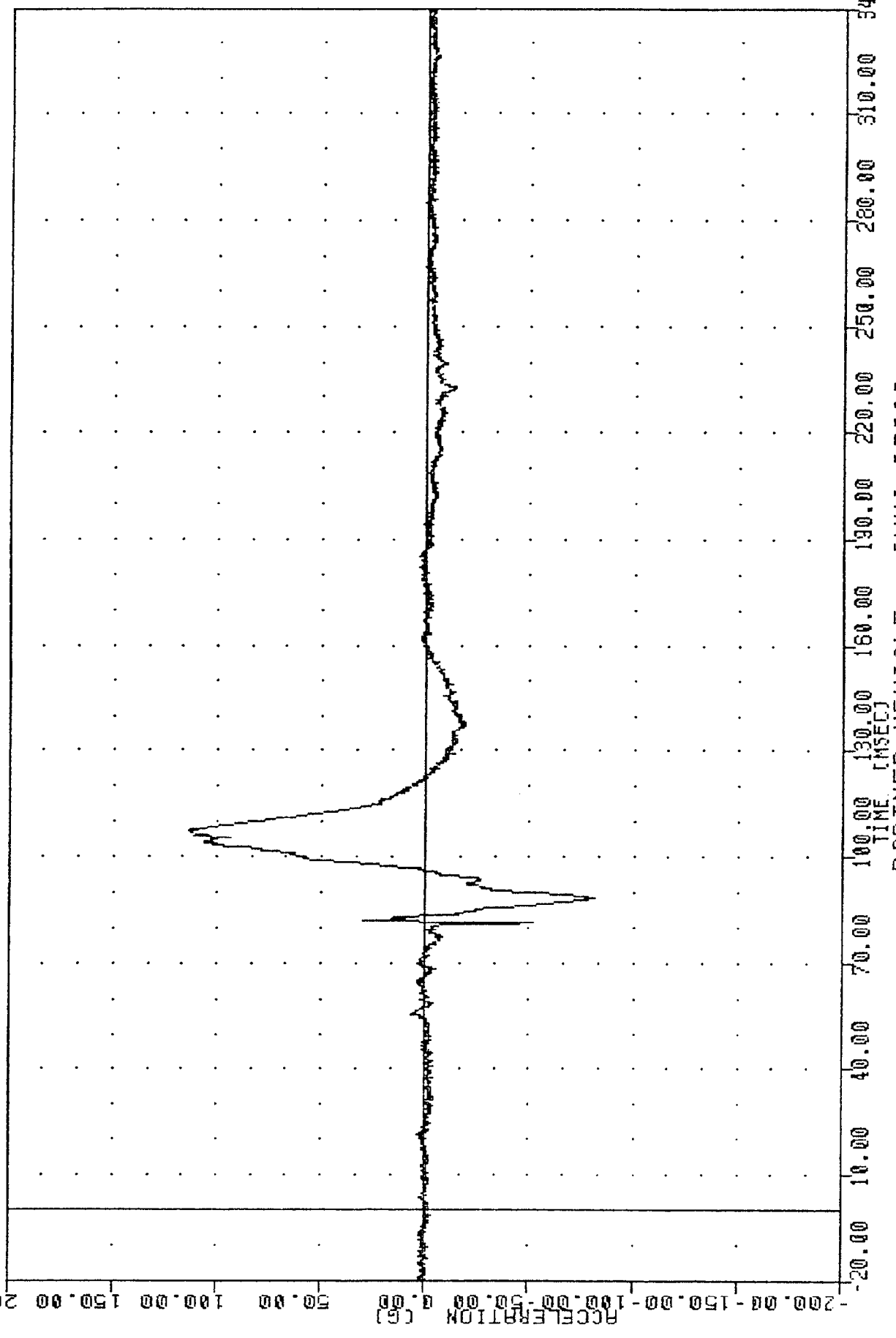
PARTNER VEHICLE - OMNI 65323  
PASSENGER HEAD ACCELERATION Y AXIS

851106P  
CENTRAL CRASH RESPONSES  
853100000000  
HEADZ62

PLOT DATE 14-85 16:20:31

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -80.87e 68.50, 113.59 e 107.63



PARTNER VEHICLE - OMNI 65923  
PASSENGER HEAD ACCELERATION Z AXIS

PLOT DATE 14 85 16:20:31

FILTER = ALPF 1650/ 5217/ -40

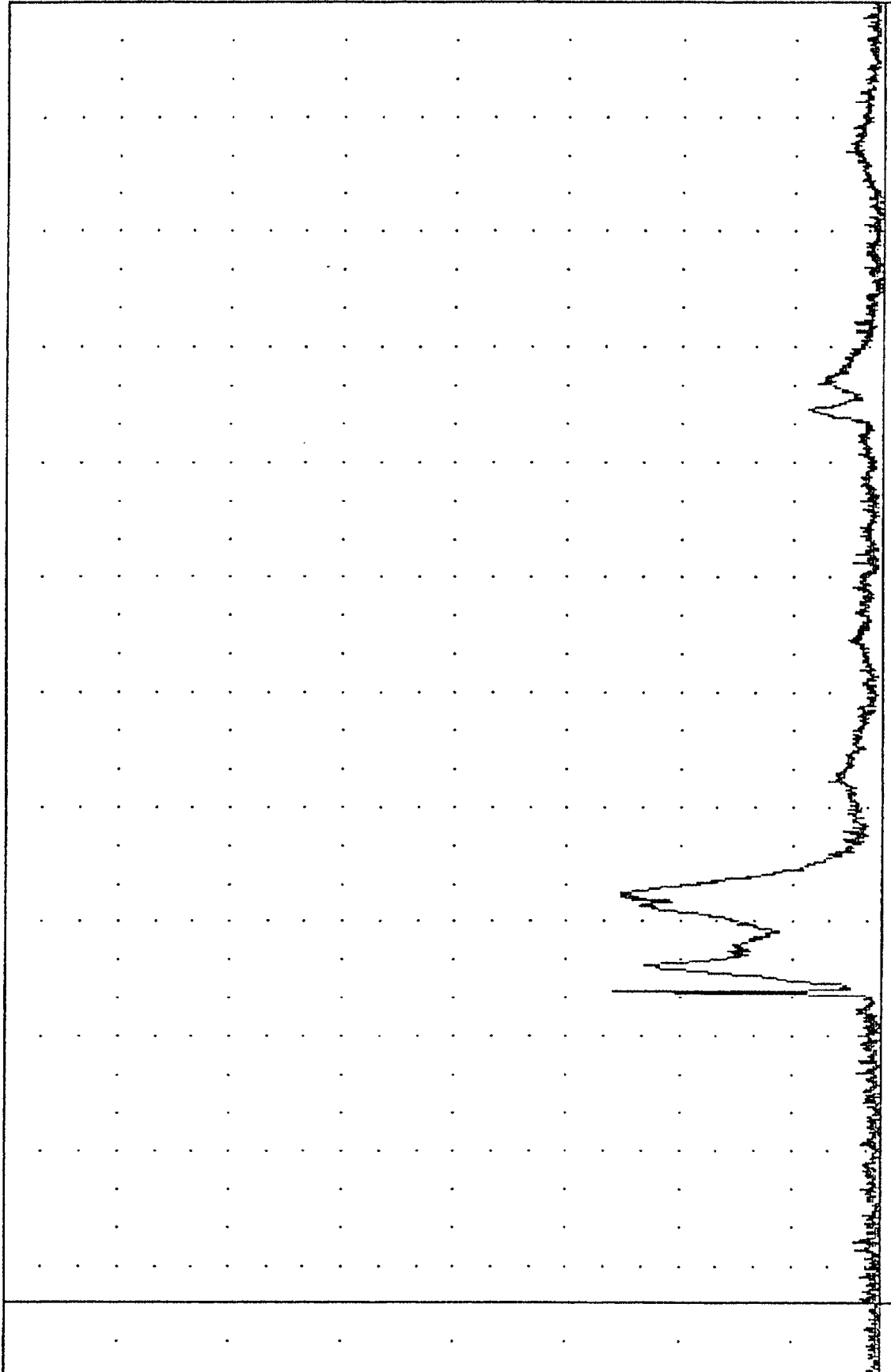
MIN, MAX VALUES = 0.12e 8.75, 119.08 e 81.63

INITIAL CRASH RESPONSES

8531000000

HEAD62

ACCELERATION (G)



-10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00

TIME (MSEC)

PARTNER VEHICLE - OMNI 65923

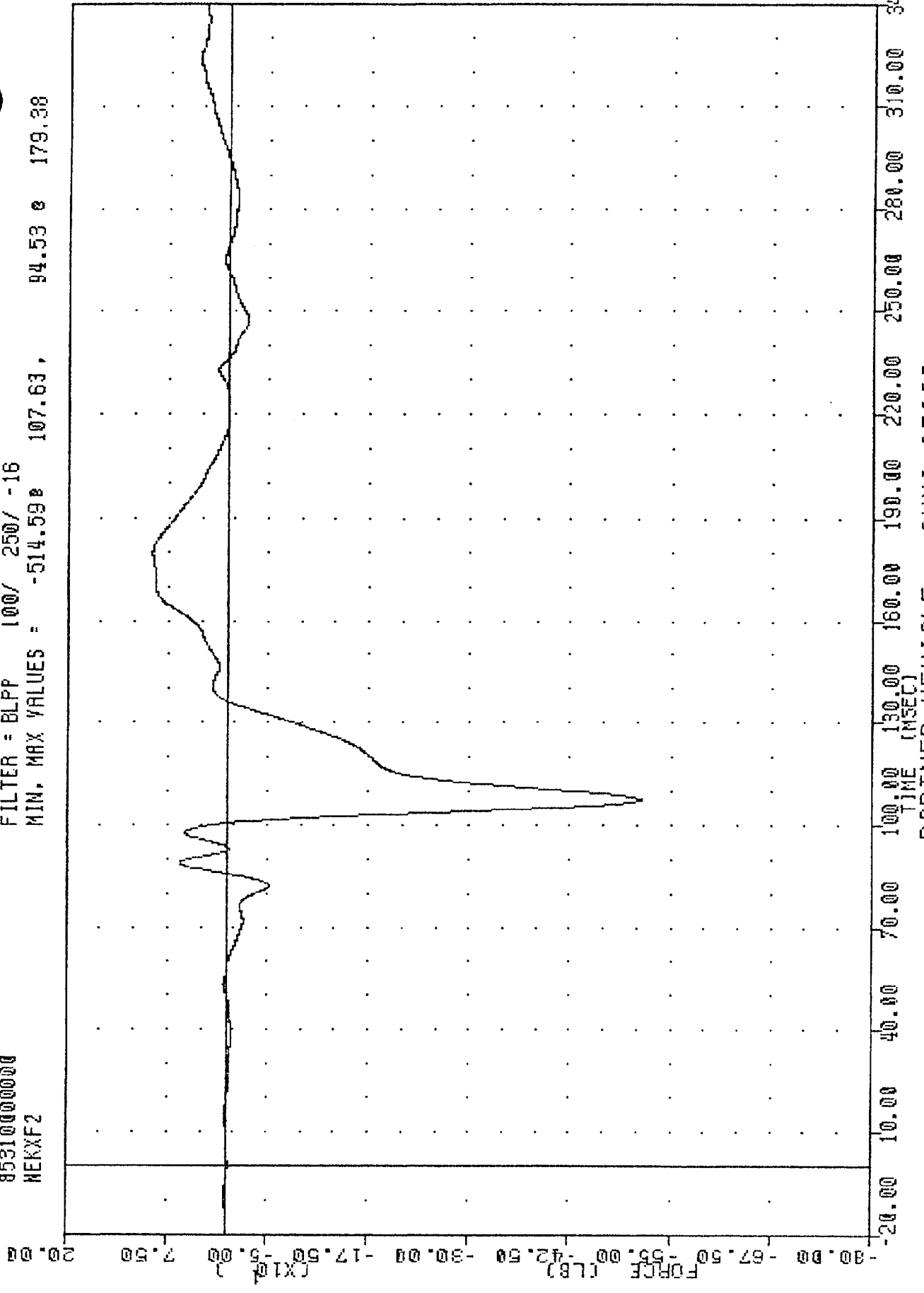
PASSENGER HEAD RESULTANT

FRONTAL CRASH RESPONSES  
85310000000  
MEKXF2

PLOT DATE 14-08-85 16:25:08

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -514.598 107.63, 94.53 @ 179.38



PARTNER VEHICLE - OMNI 65323  
PASSENGER NECK FORCE X AXIS LBS

PLOT DATE 14 85 16:25:08

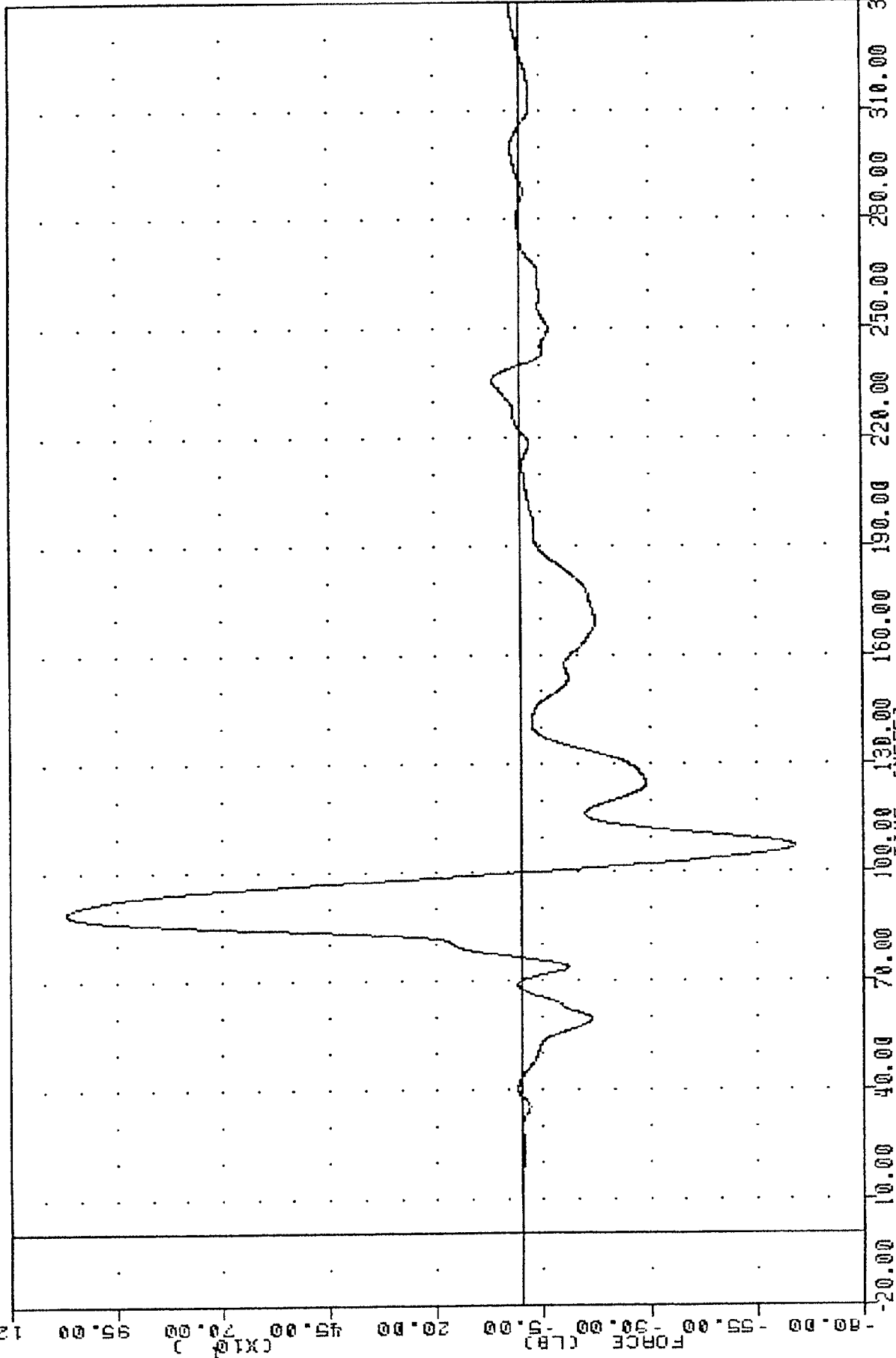
FILTER = BLPP 100/ 250/ .16

MIN. MAX VALUES = -640.72e 107.25, 1065.55 e 89.00

85115555  
CENTRAL CRASH RESPONSES

8531000000

NEKZF2



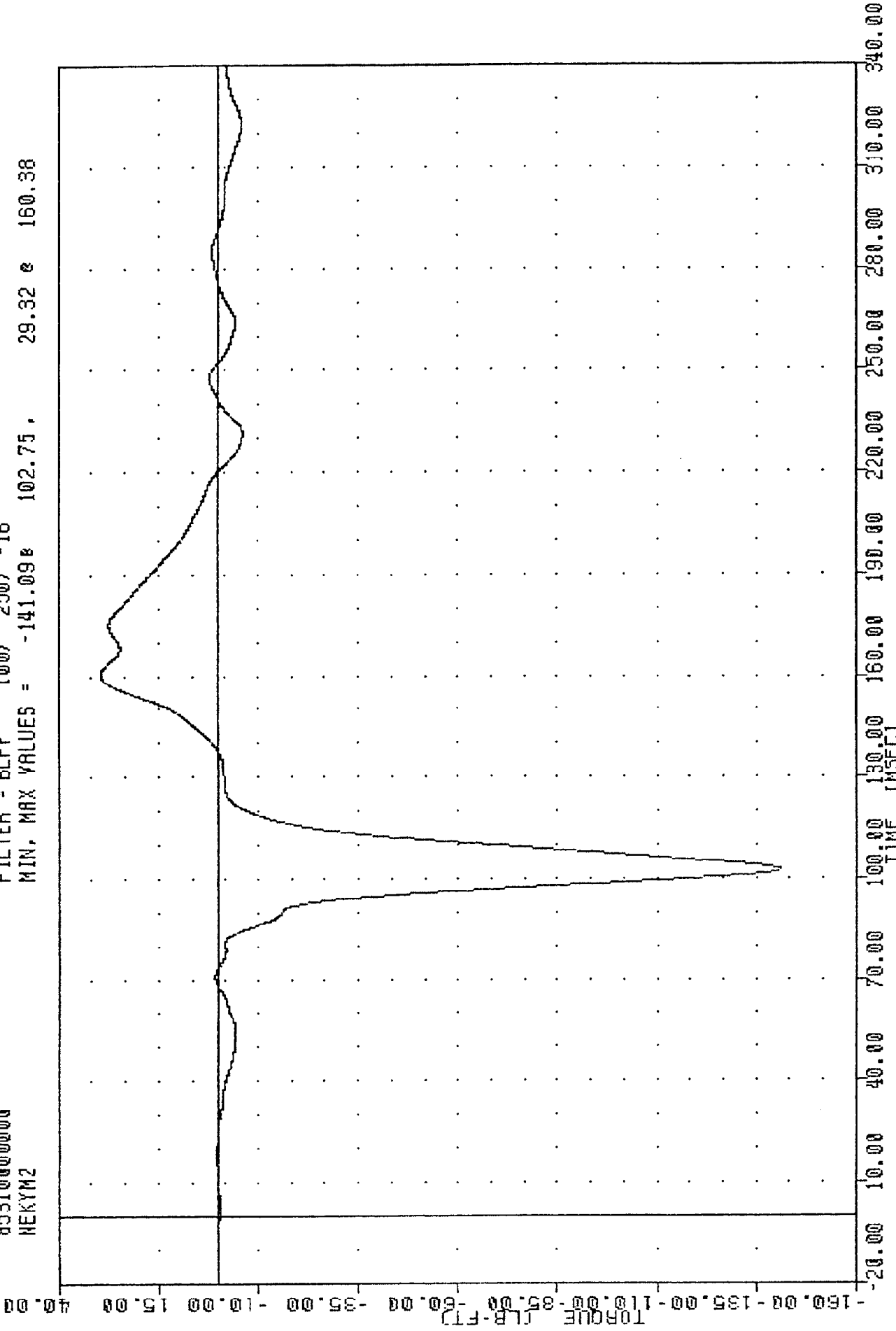
PARTNER VEHICLE - OMNI 65323  
PASSENGER NECK FORCE Z AXIS LBS

PLOT DATE 14-85 16:20:31

FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -141.098 102.75, 29.32 e 160.38

853100000000  
FRONTAL CRASH RESPONSES

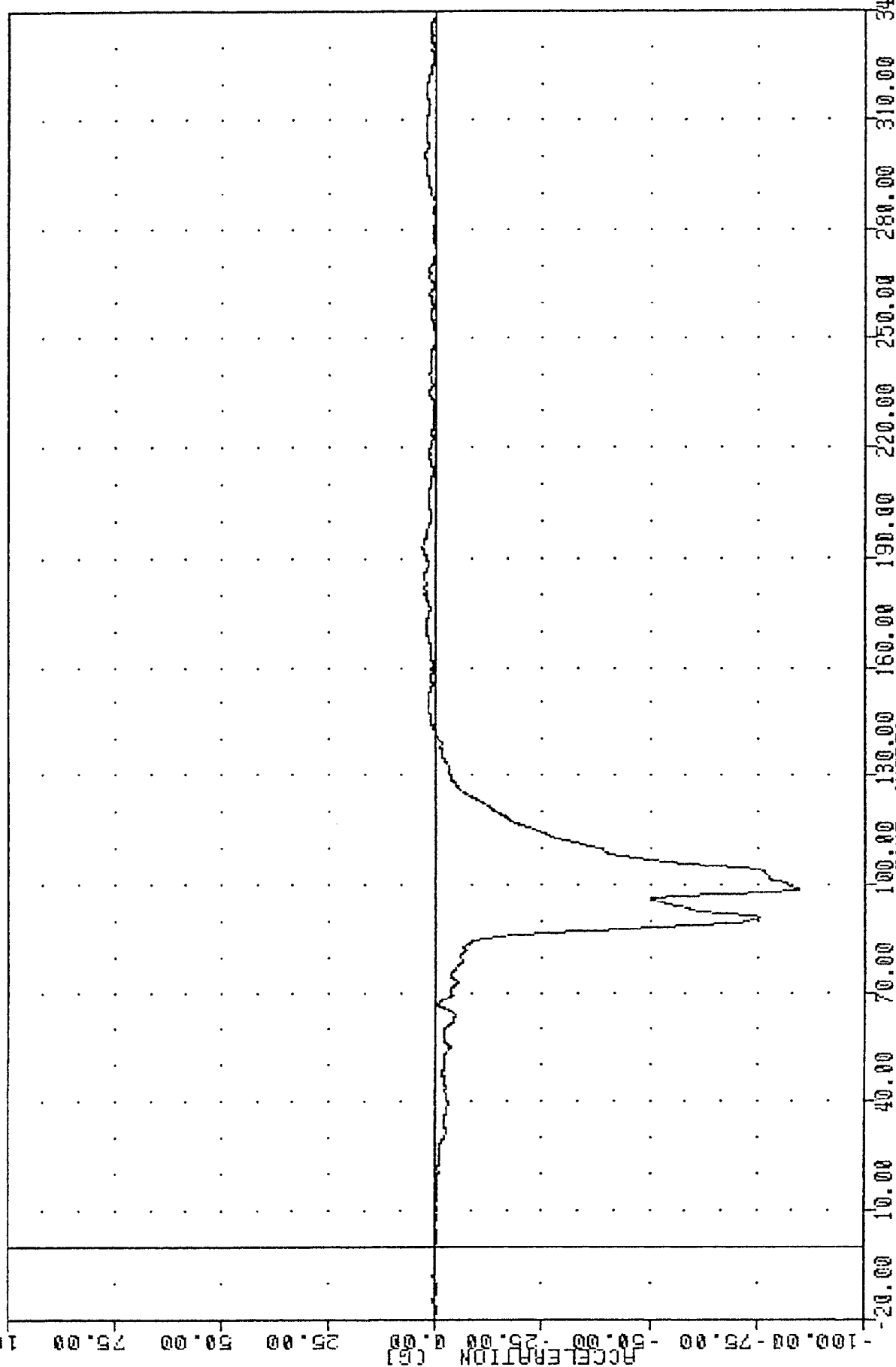
853100000000  
NEKYM2



PARTNER VEHICLE - OMNI 65323  
PASSENGER NECK MOMENT Y AXIS

851100  
FRONTAL CRASH RESPONSES  
8531000000  
CSTXG2

PLOT DATE 14-85 16:20:31  
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -84.75 98.75, 3.10 e 192.88



PARTNER VEHICLE - OMNI 65323  
PASSENGER CHEST ACCELERATION X AXIS

PLOT DATE 14-85 16:20:31

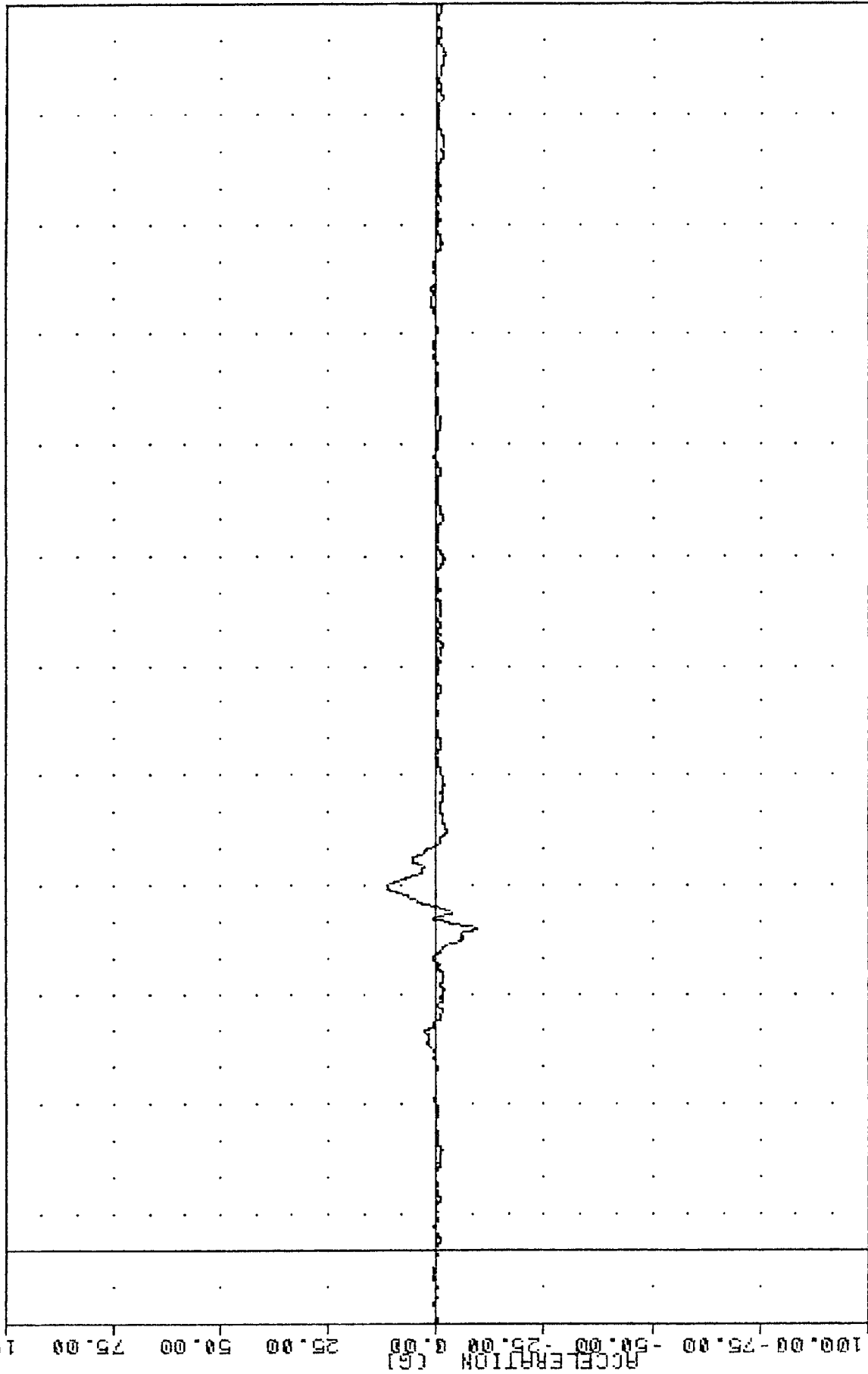
FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = -9.38 88.25 11.34 99.88

85110000  
FRONTAL CRASH RESPONSES

853100000000

CSTY62



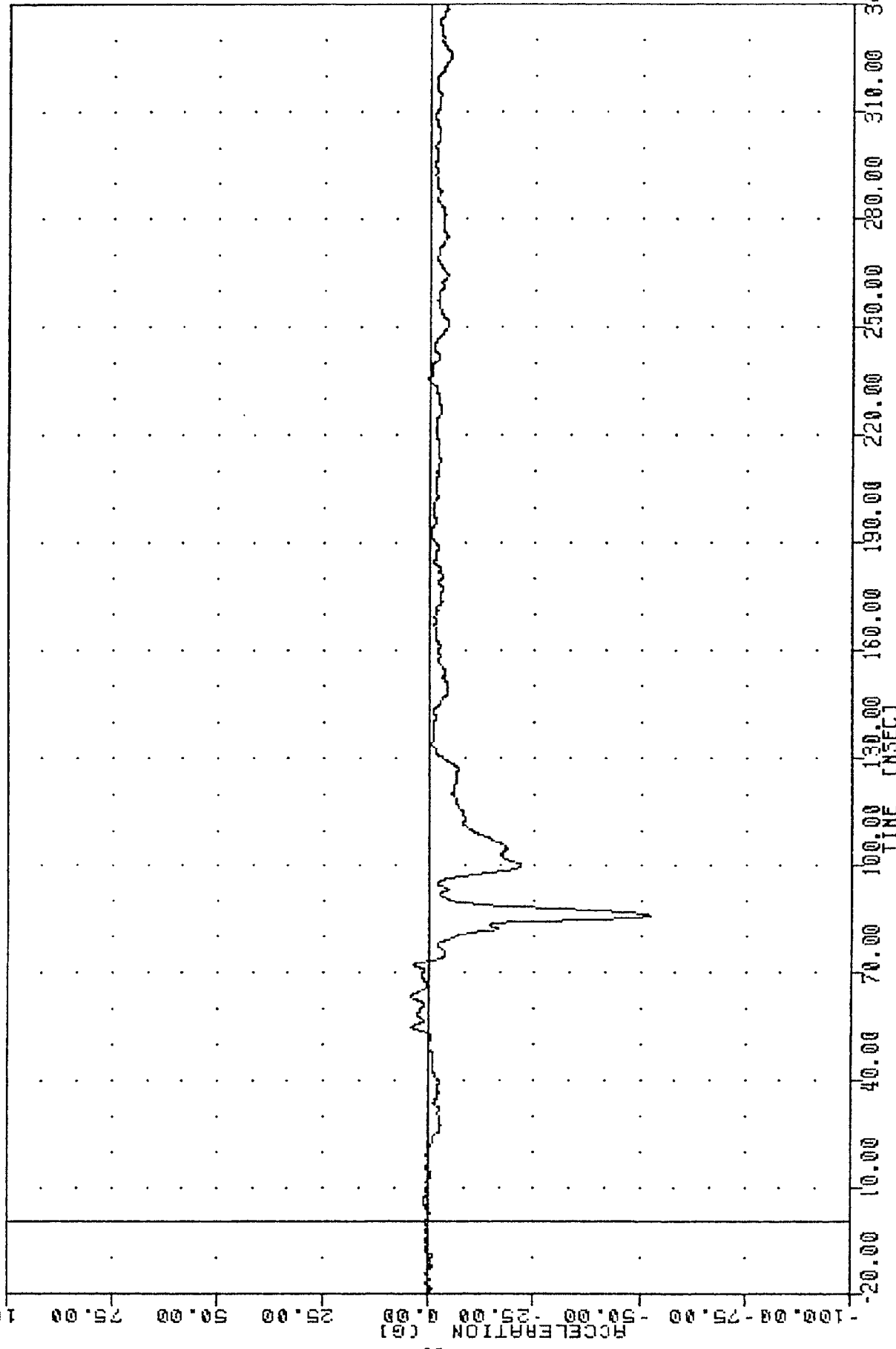
PARTNER VEHICLE - OMNI 65323  
PASSENGER CHEST ACCELERATION Y AXIS

85110000  
CENTAL CRASH RESPONSES  
85310000000  
CSTZ62

PLOT DATE 14 85 16:20:31

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = -52.19e 86.13, 1.42 e 63.38

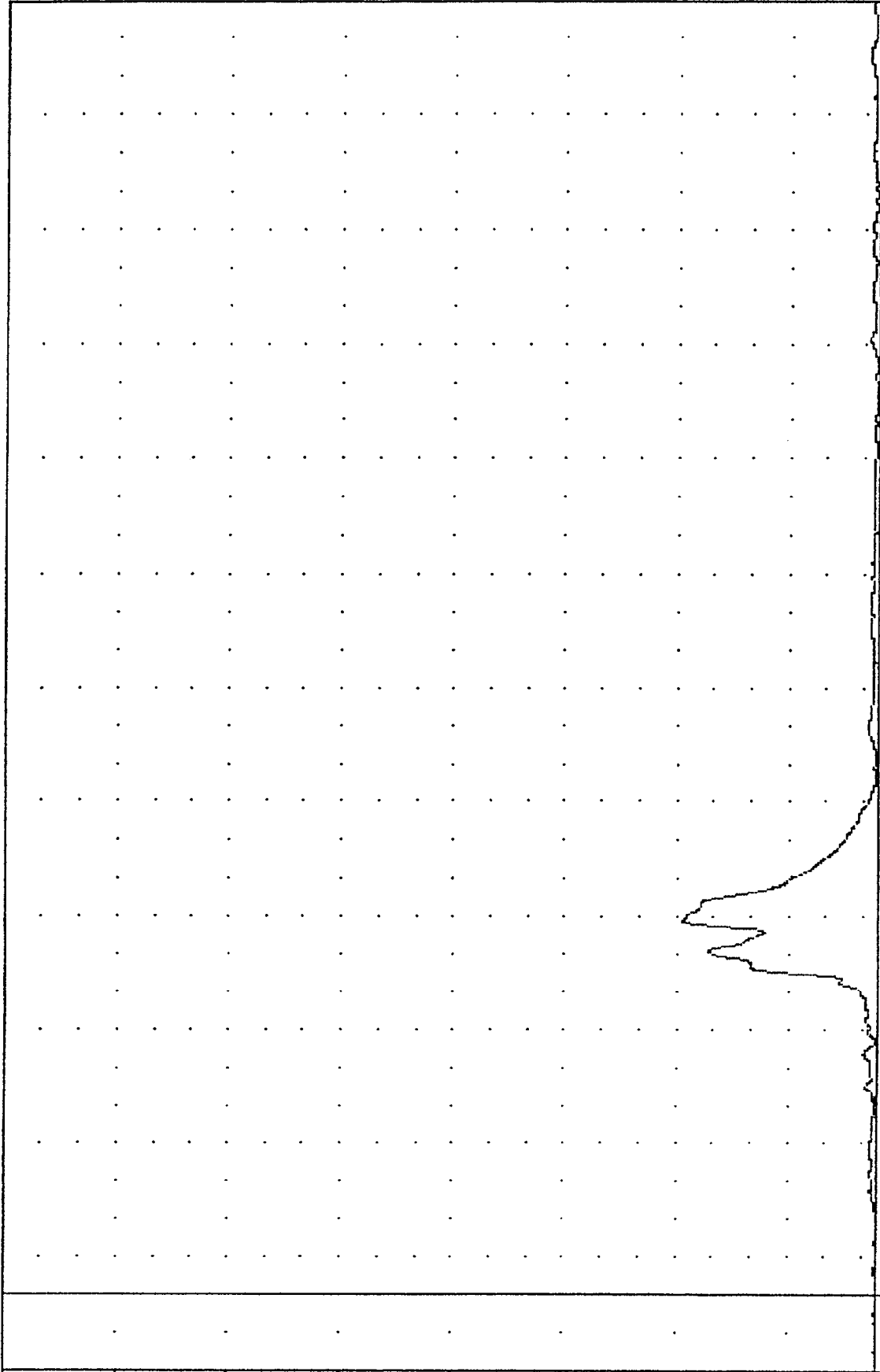


PARTNER VEHICLE - OMNI 65323  
PASSENGER CHEST ACCELERATION Z AXIS

85116  
CONTAL CRASH RESPONSES  
85310000000  
CSTR62

PLOT DATE 14 85 16:20:31  
FILTER = BLFP 300/ 750/ -16  
MIN, MAX VALUES = 0.07e -20.00, 87.39 e 98.75

ACCELERATION (G)  
-10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00 390.00



-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 - OMNI 65323  
PASSENGER CHEST RESULTANT

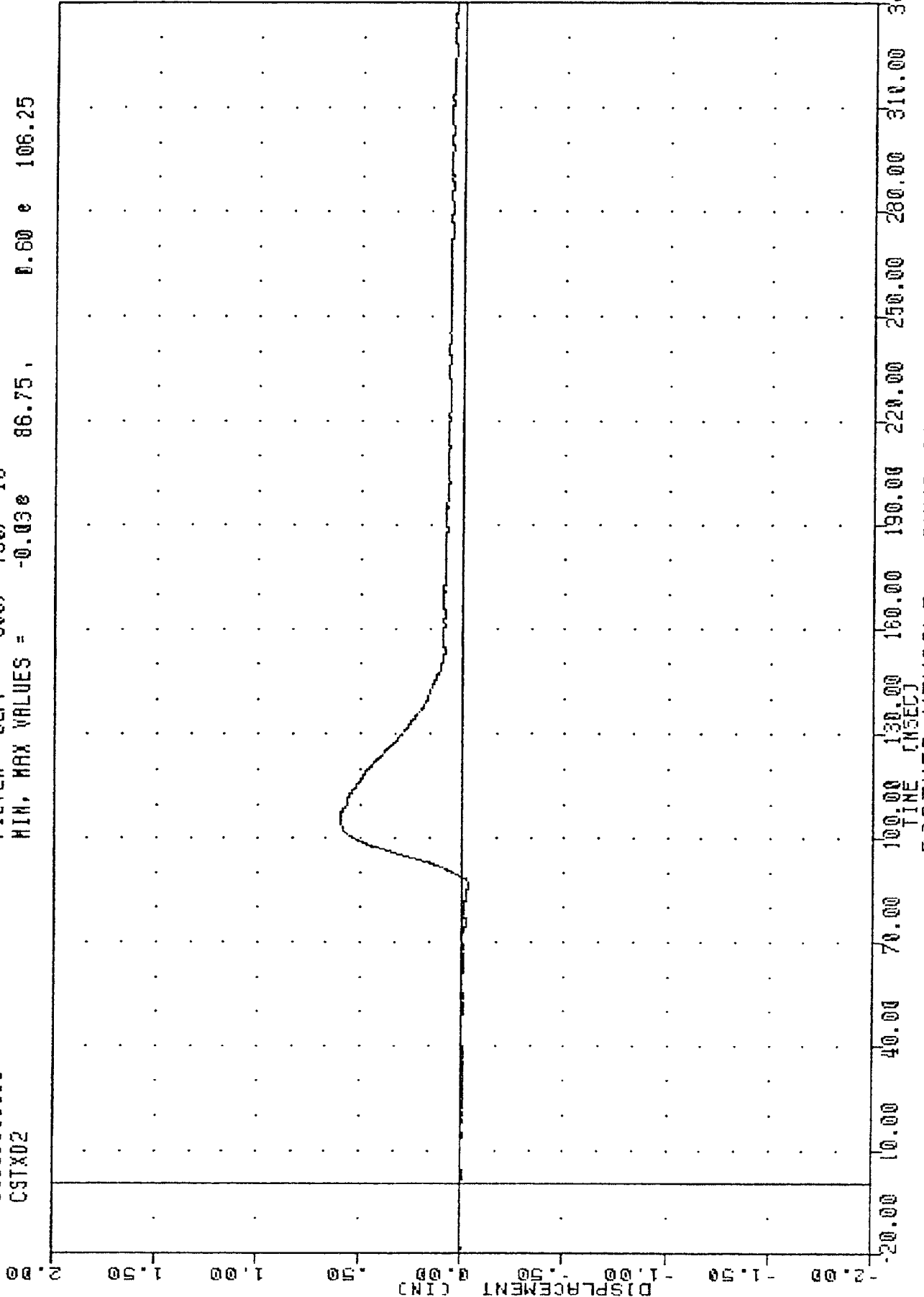
85110000  
CENTRAL CRASH RESPONSES

85310000000  
CSTX02

PLOT DATE 14 85 16:20:31

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -0.03e 86.75, 0.60 e 106.25



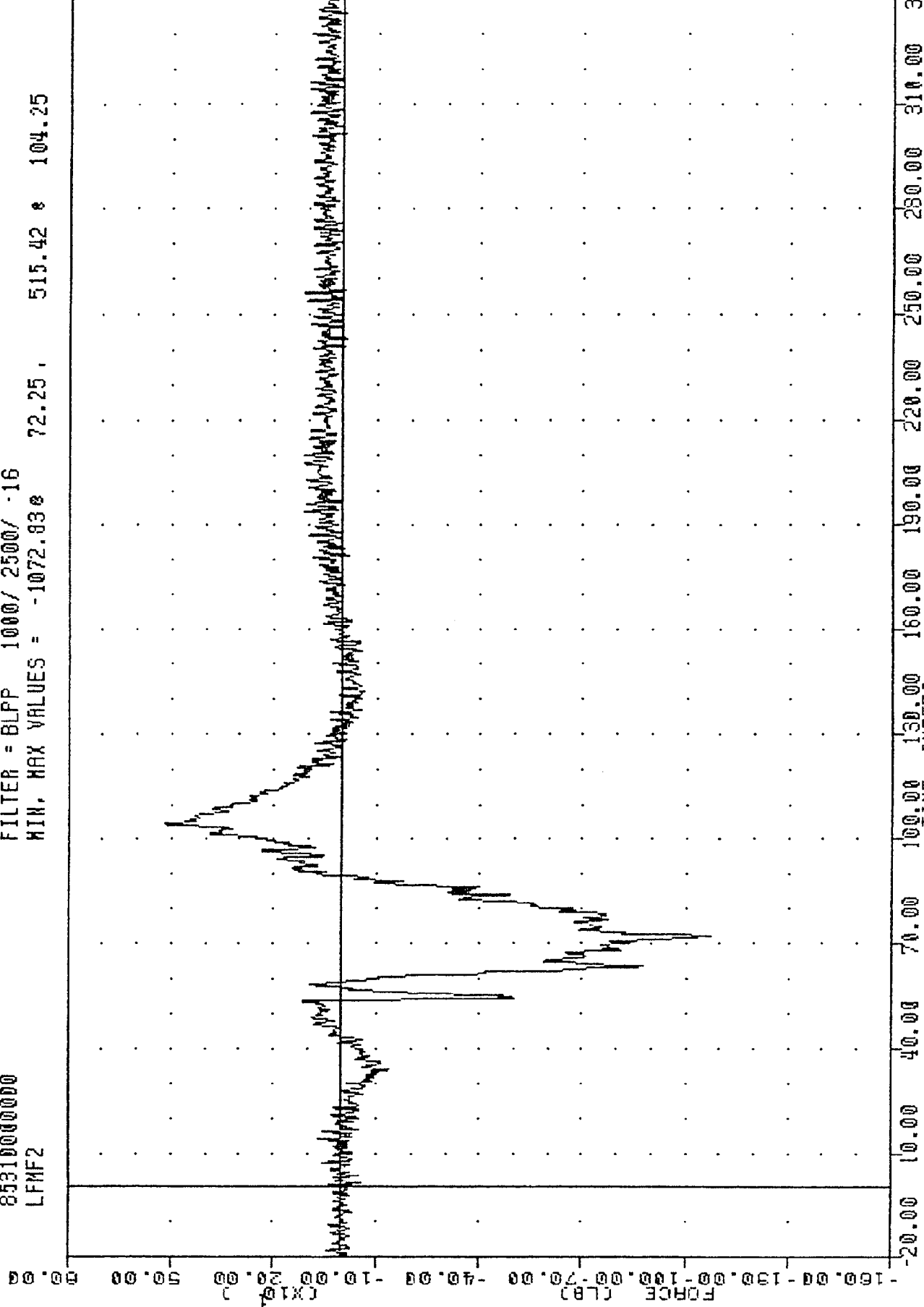
PARTNER VEHICLE - OMNI 65323  
PASSENGER CHEST DISPLACEMENT X AXIS INCHES

8511062  
CENTRAL CRASH RESPONSES  
85310000000  
LFMF2

PLOT DATE 14 85 16:20:31

FILTER = BLPP 1000/ 2500/ .16

MIN, MAX VALUES = -1072.93 72.25, 515.42 104.25



88-B

PARTNER VEHICLE - OMNI 85323  
PASSENGER LEFT FEMUR FORCE LBS

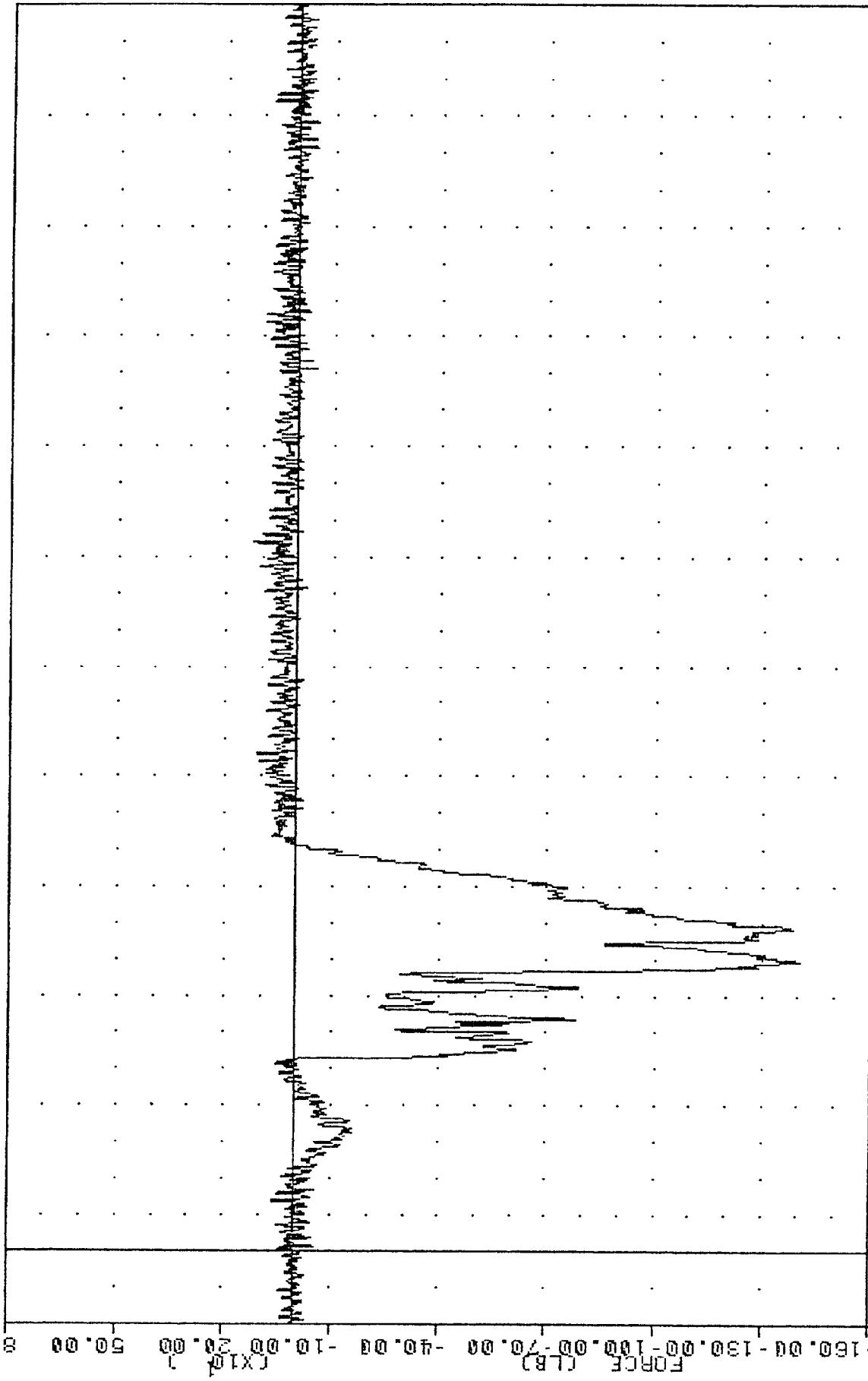
851105P  
FRONTAL CRASH RESPONSES  
853100000000  
RFMF2

PLOT DATE 14-85 16:20:31

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -1400.98e 79.50, 121.47 e 194.00

80.00



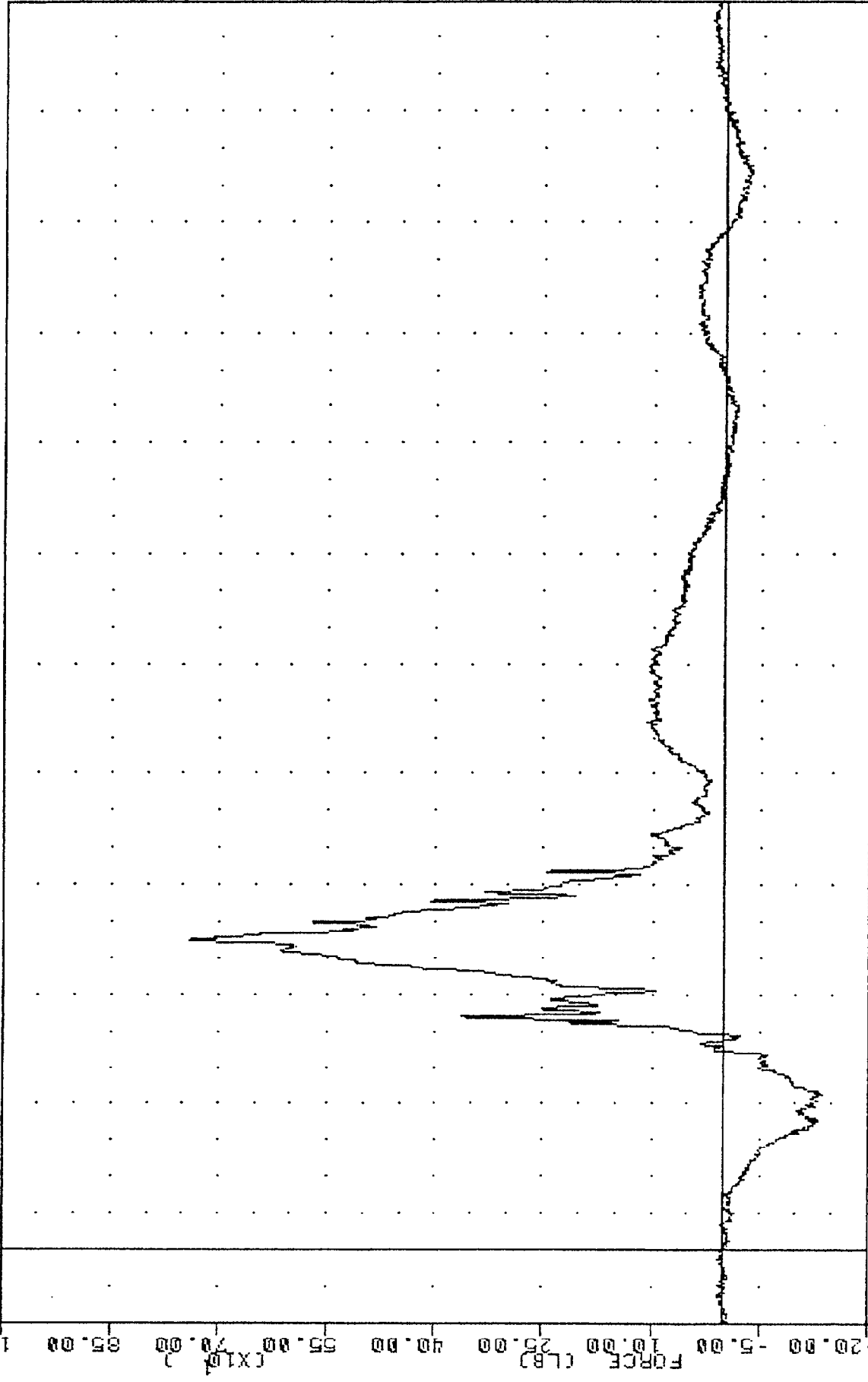
100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

PARTNER VEHICLE - OMNI 65323  
PASSENGER RIGHT FEMUR FORCE LBS

851106P  
CENTRAL CRASH RESPONSES  
85310000000  
KNLLF2

PLOT DATE 14 85 16:20:31  
FILTER = BLPP 1000/ 2500/ -16  
MIN. MAX VALUES = -137.478 42.50, 739.94 8 84.88

100.00



-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)

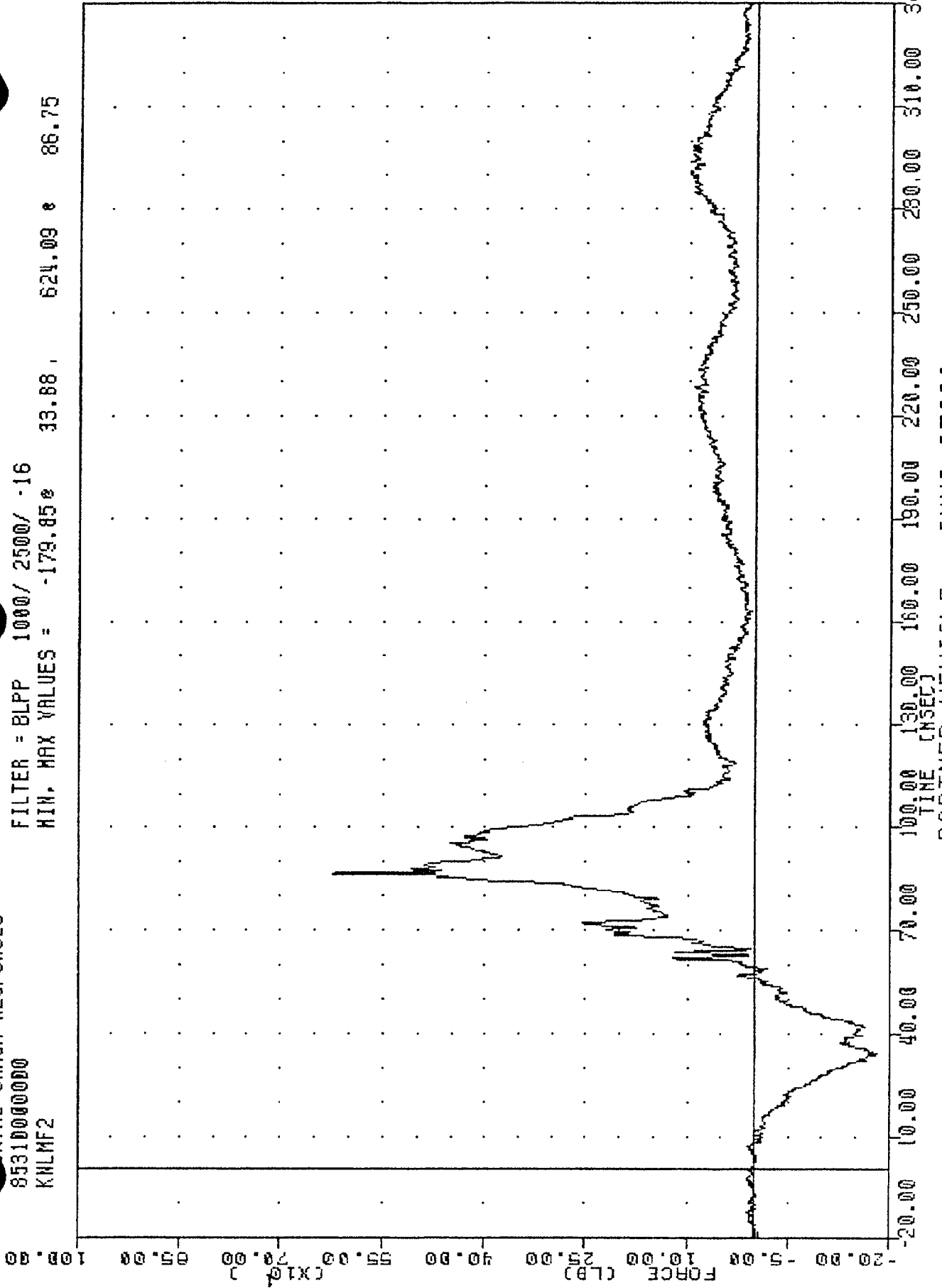
PARTNER VEHICLE - OMNI 65323  
PASSENGER LEFT KNEE / LEFT SENSOR FORCE LBS

851106P  
 CENTRAL CRASH RESPONSES  
 85310000000  
 KNLMF2

PLOT DATE 14 85 16:20:31

FILTER = BLPP 1000 / 2500 / -16

MIN. MAX VALUES = -179.85 33.68 624.09 86.75



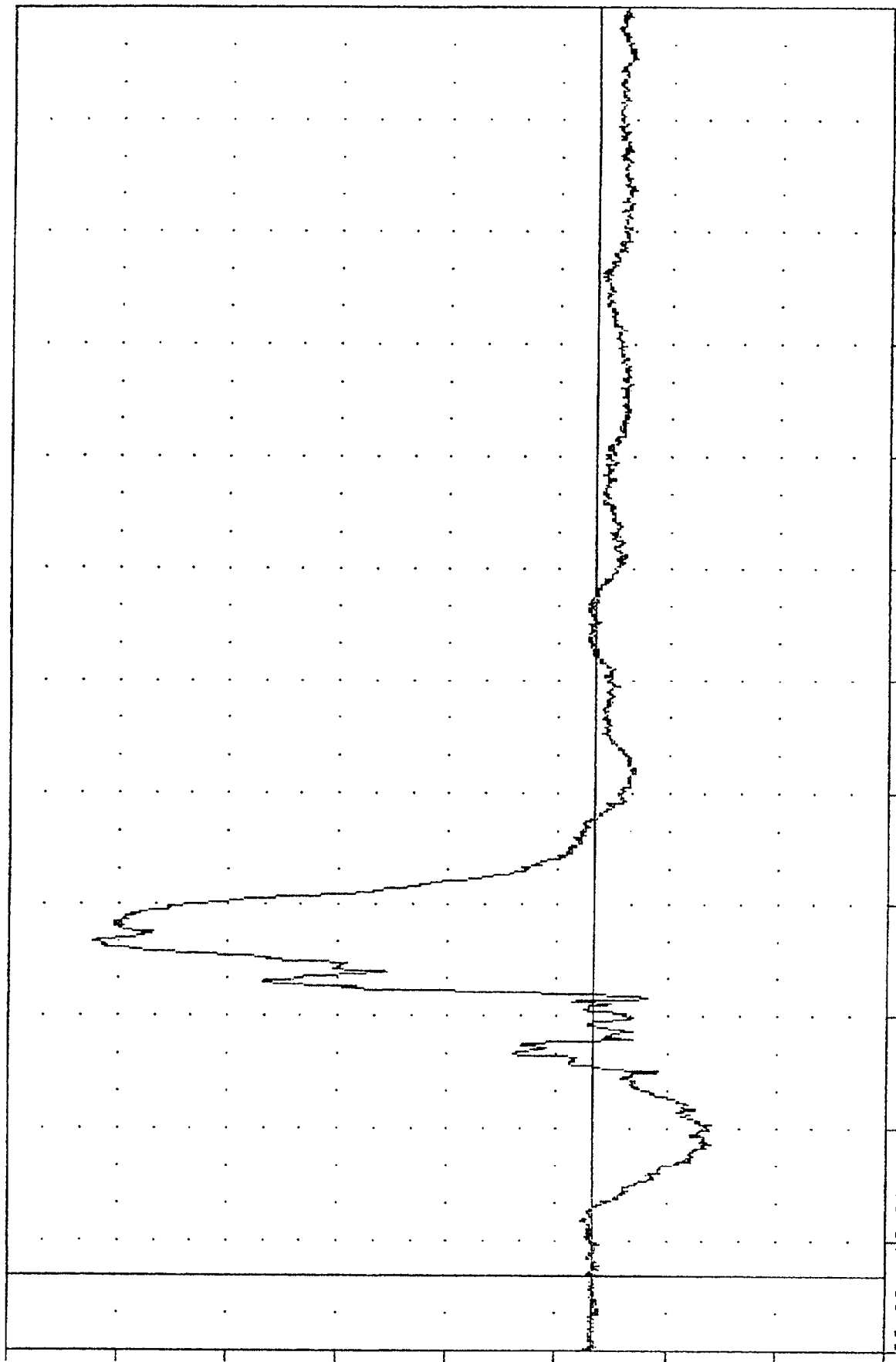
PARTNER VEHICLE - OMNI 65323  
 PASSENGER LEFT KNEE / RIGHT SENSOR FORCE LBS

851105P  
CENTRAL CRASH RESPONSES  
85310000000  
KNRMF2

14 85 16:20:31

FILTER = BLPP 1000 / 2500 / .16  
MIN, MAX VALUES = -161.68 40.88 683.42 90.25

00.00  
05.00  
10.00  
15.00  
20.00  
25.00  
30.00  
35.00  
40.00  
45.00  
50.00  
55.00  
60.00  
65.00  
70.00  
75.00  
80.00  
85.00  
90.00



00.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00  
-20.00 -15.00 -10.00 -5.00 0.00 5.00 10.00 15.00 20.00 25.00 30.00 35.00 40.00  
100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)

PARTNER VEHICLE - OMNI 65323  
PASSENGER RIGHT KNEE / LEFT SENSOR FORCE LBS

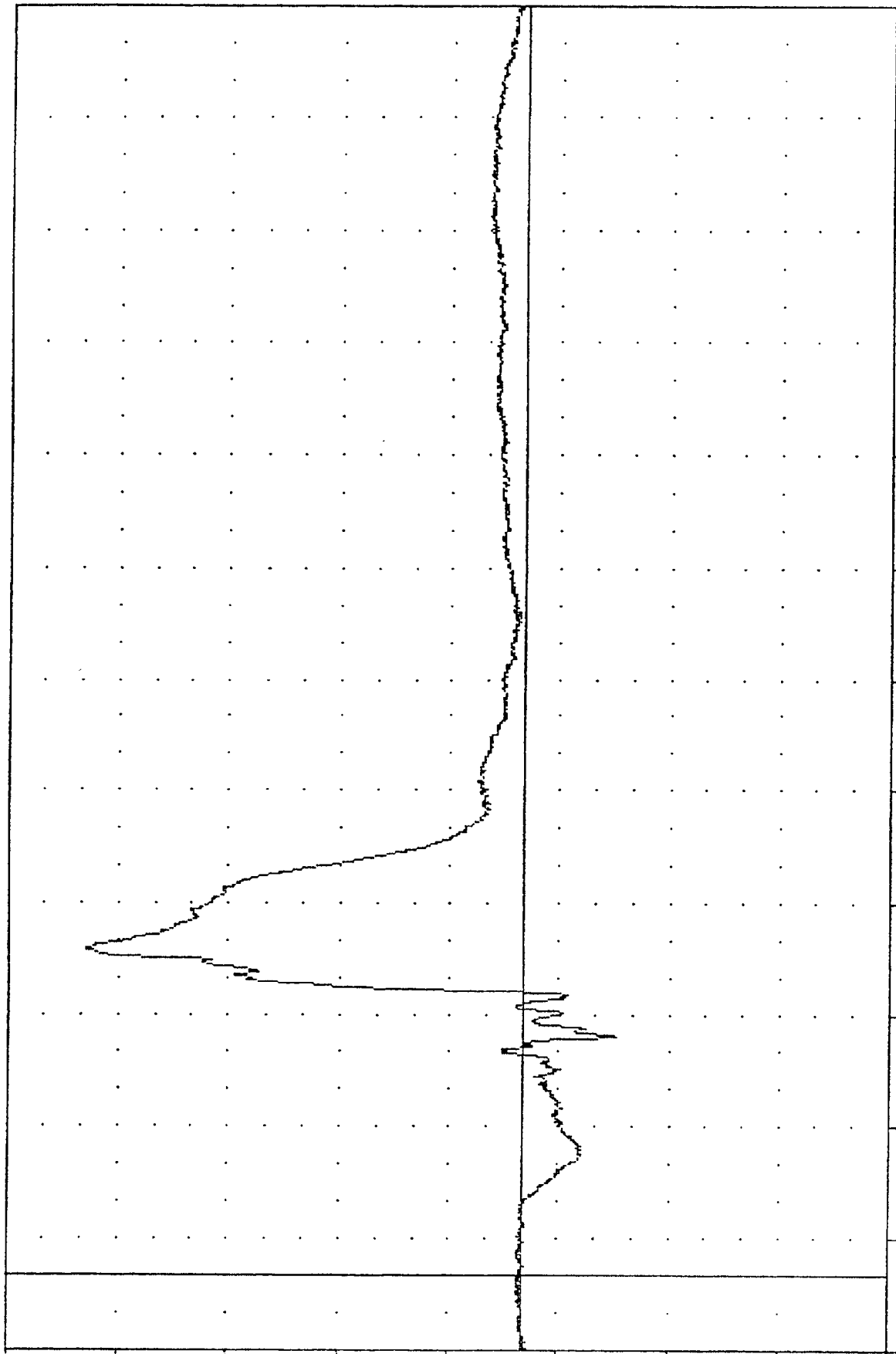
851106P  
FRONTAL CRASH RESPONSES  
85310000000  
KNR1F2

PLOT DATE 14-08-85 16:20:31

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -258.190 64.13, 1189.48 0 67.63

FORCE (LBS)  
TIME (MSEC)



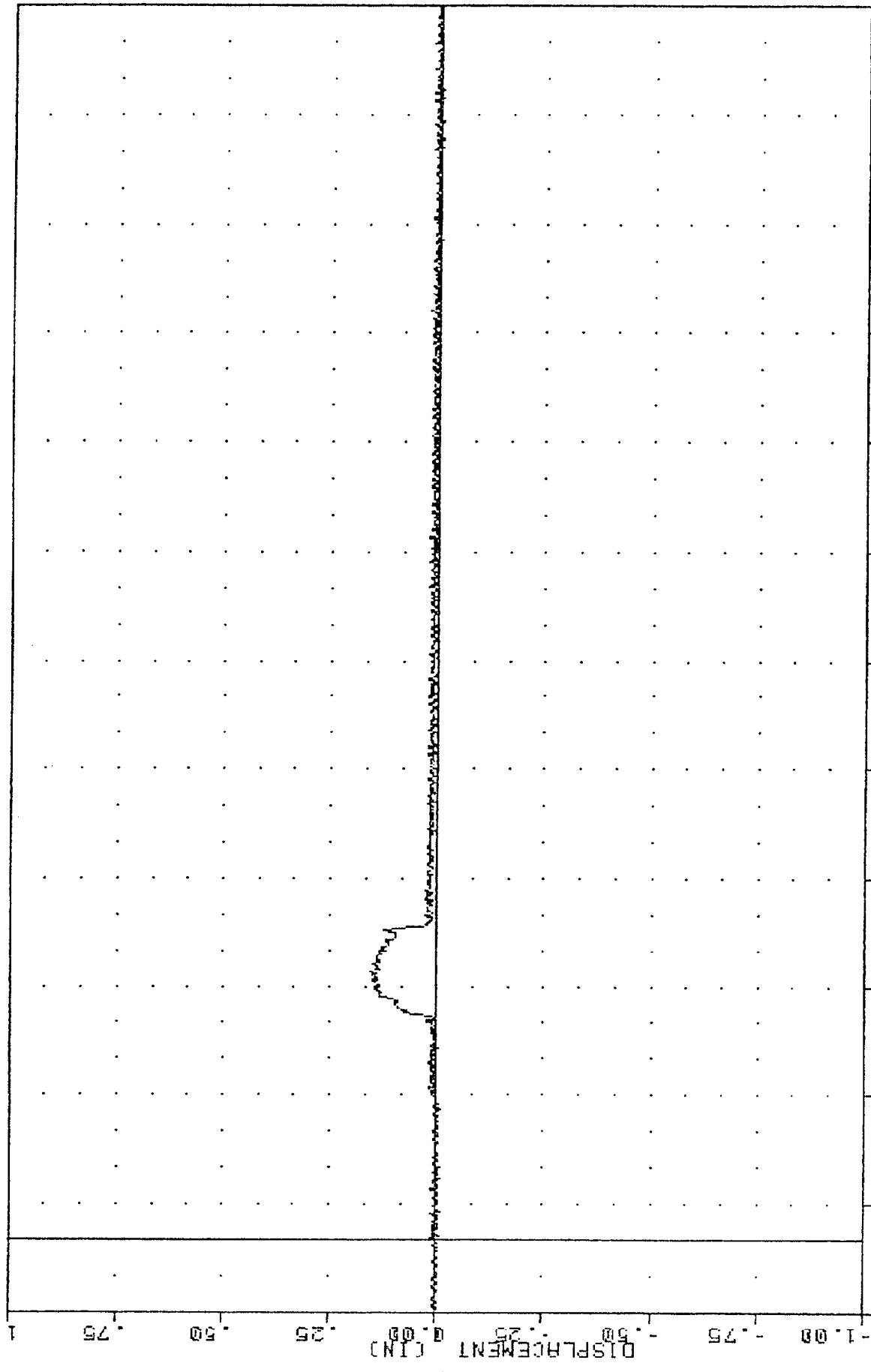
-20.00 10.00 40.00 70.00 100.00 130.00 150.00 190.00 220.00 250.00 280.00 310.00 340.00

PARTNER VEHICLE - OMNI 65323  
PASSENGER RIGHT KNEE / RIGHT SENSOR FORCE LBS

851106P  
FRONTAL CRASH RESPONSES  
853100000000  
KMLXD2

PLOT DATE 14-85 16:20:31

FILTER = BLPP 1000/ 2500/ -16  
MIN, MAX VALUES = -0.018 16.75, 0.15 e 74.00



-1.00  
-.75  
-.50  
-.25  
0.00  
.25  
.50  
.75  
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)

PARTNER VEHICLE - OMNI 65323  
PASSENGER LEFT KNEE DISPLACEMENT INCHES

851106P  
INITIAL CRASH RESPONSES

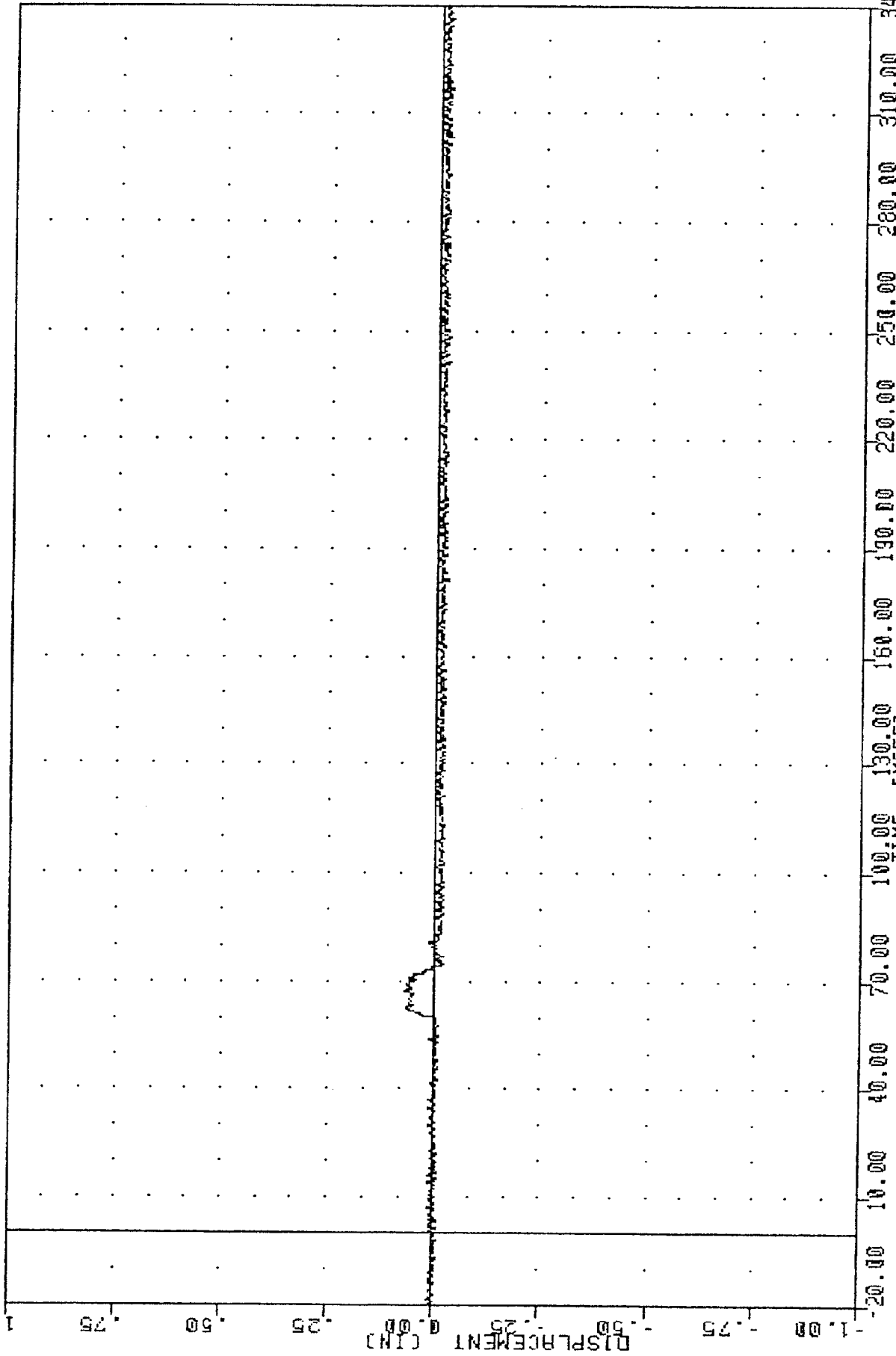
8531000000

KNRX02

PLOT DATE 14-08-85 16:20:31

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -0.03e 181.25, 0.07 e 67.38



B-95

PARTNER VEHICLE - OMNI 65923

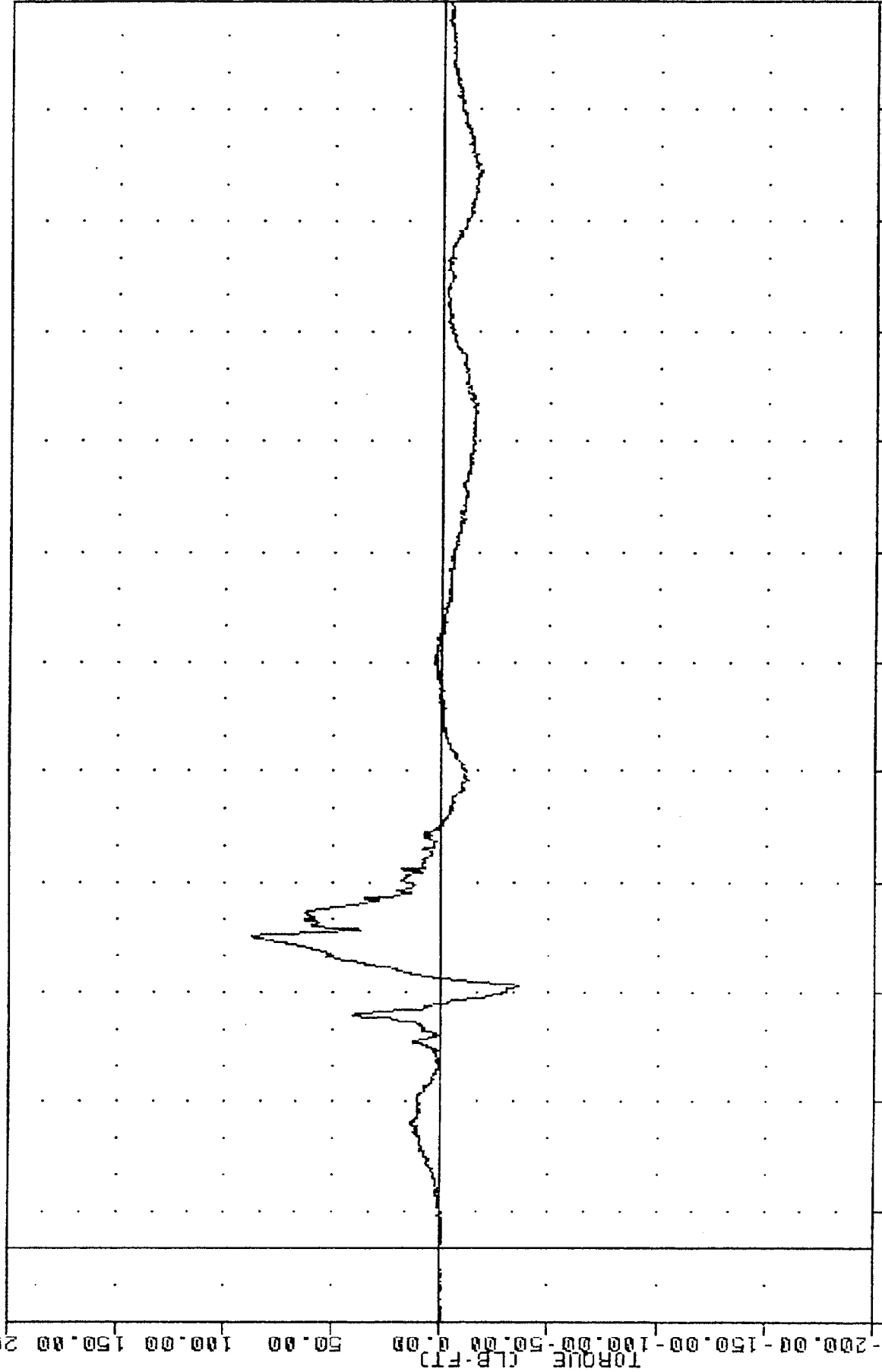
PASSENGER RIGHT KNEE DISPLACEMENT INCHES

851106P  
FRONTAL CRASH RESPONSES  
853100000000  
TBLXM2

PLOT DATE 4-85 14:32:28

FILTER = BLPP 1000/ 2500/ -16  
MIN, MAX VALUES = -35.28 71.50, 86.91 85.00

200.00  
150.00  
100.00  
50.00  
0.00  
-50.00  
-100.00  
-150.00  
-200.00



-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 - OMNI 65323  
PASSENGER LEFT UPPER TIBIA MOMENT X AXIS LB-FT

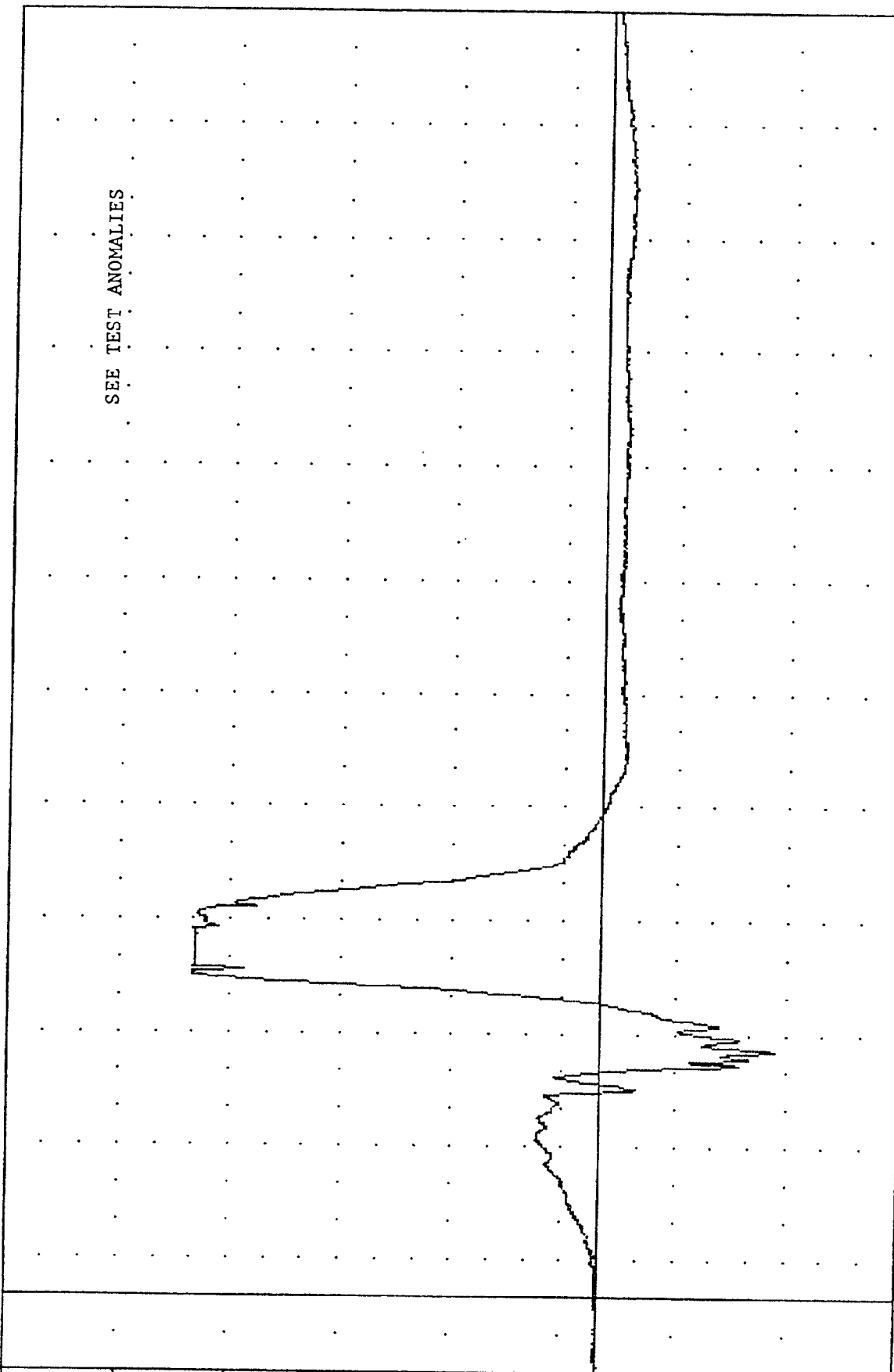
UNIT 851106P  
CENTRAL CRASH RESPONSES  
03310000000  
TBLYM2

PLOT DATE 4-25-85 14:32:28

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -116.85P 65.63, 275.51 @ 87.38

TORQUE (LB-FT) 200.00 125.00 50.00 25.00 100.00 175.00 250.00 325.00 400.00



-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 - OMNI 65323  
PASSENGER LEFT UPPER TIBIA MOMENT Y AXIS LB-FT

851106F  
CENTRAL CRASH RESPONSES

PLOT DATE 14 85 16:20:31

8531000000  
TBAXM2

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -82.30 86.00, 37.86 64.25

100.00

75.00

50.00

25.00

0.00

-25.00

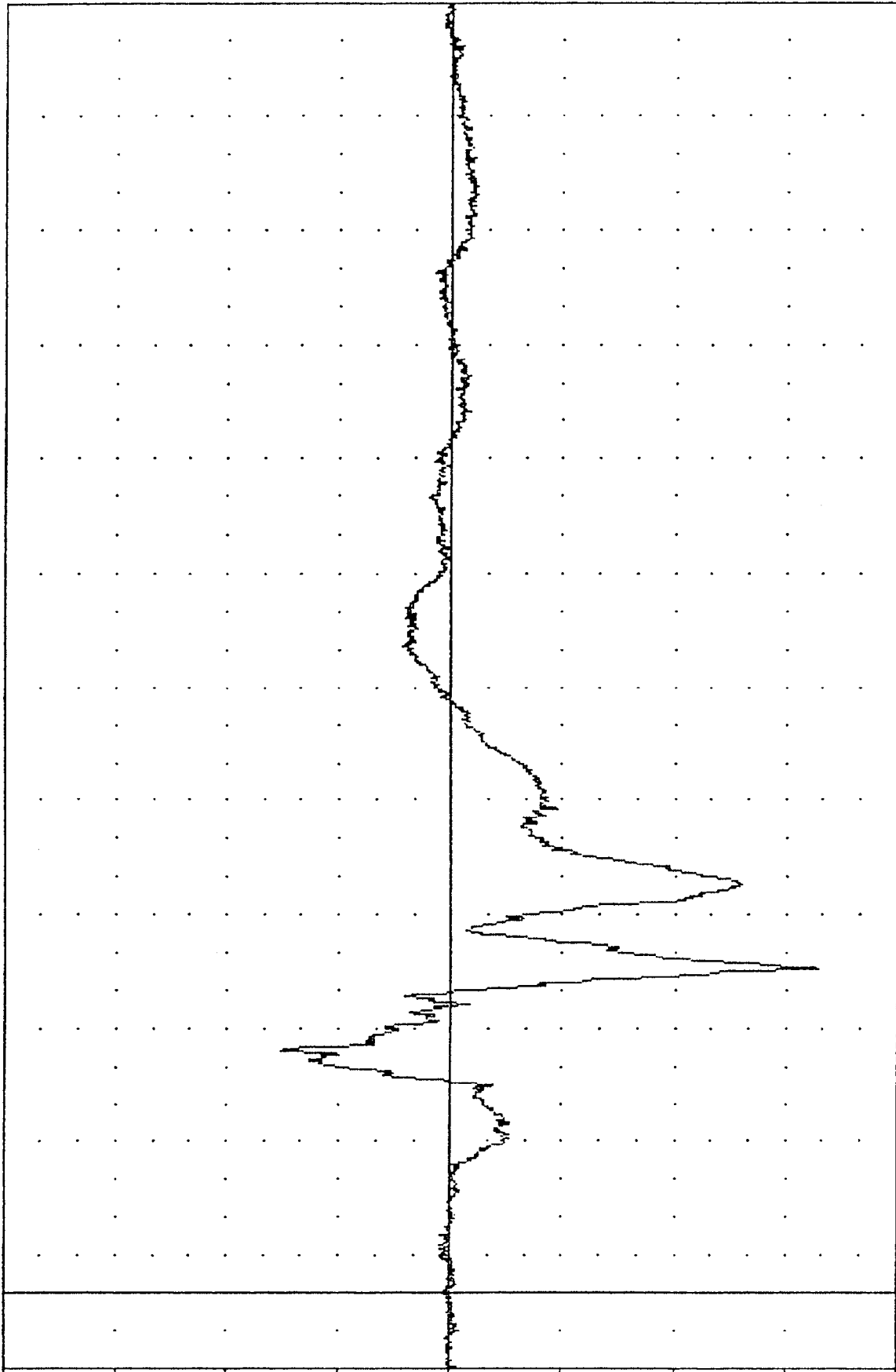
-50.00

-75.00

-100.00

B-98

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

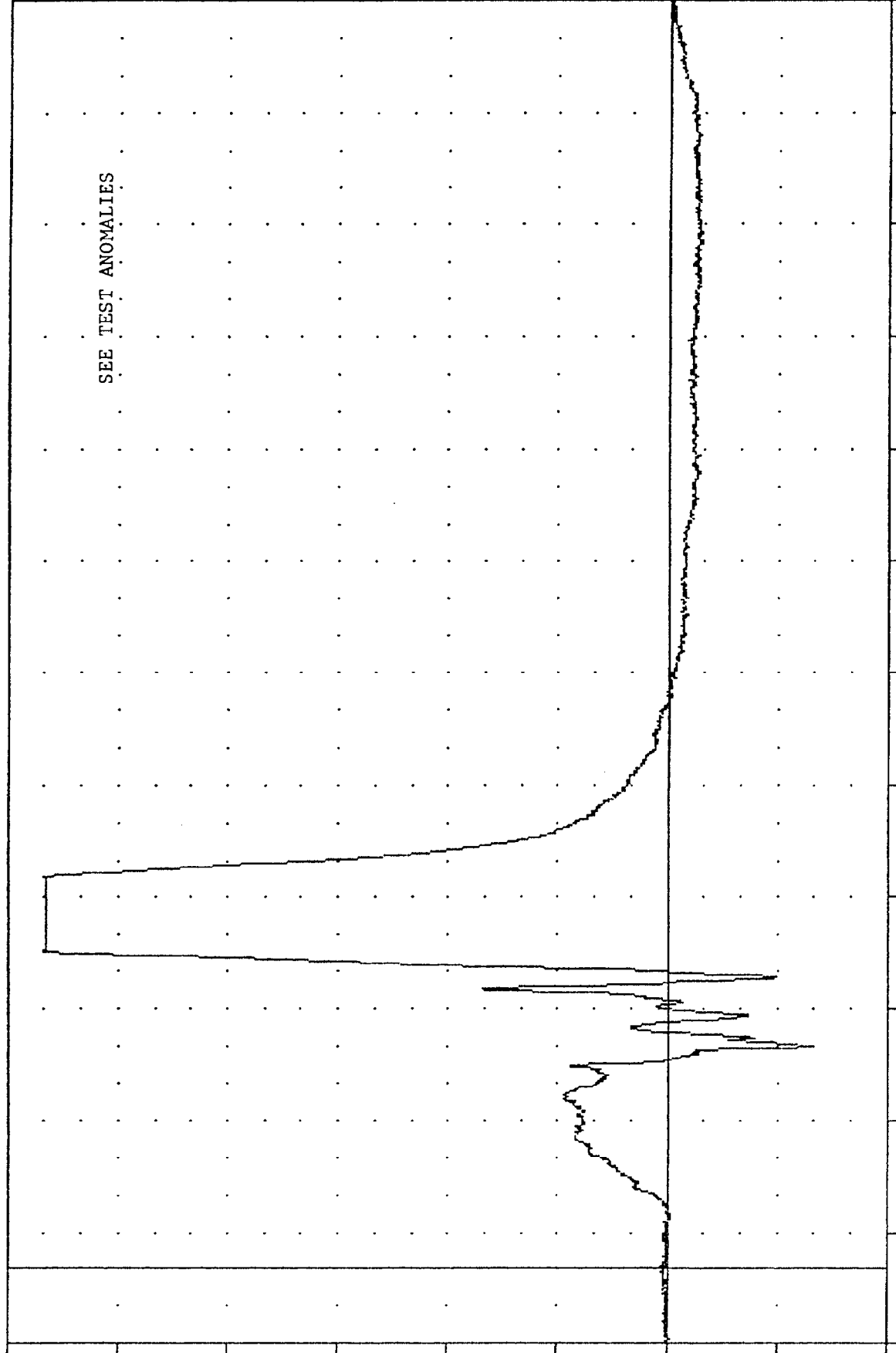
TIME (MSEC)

PARTNER VEHICLE - OMNI 65323  
PASSENGER RIGHT UPPER TIBIA MOMENT X AXIS LB-FT

851106P  
INITIAL CRASH RESPONSES  
8531000000  
T8RYH2

PLOT DATE 14-085 16:20:31  
FILTER = BLPP 1000/ 2500/ -16  
MIN. MAX VALUES = -65.970 60.00, 283.40 e 85.63

66-B  
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)

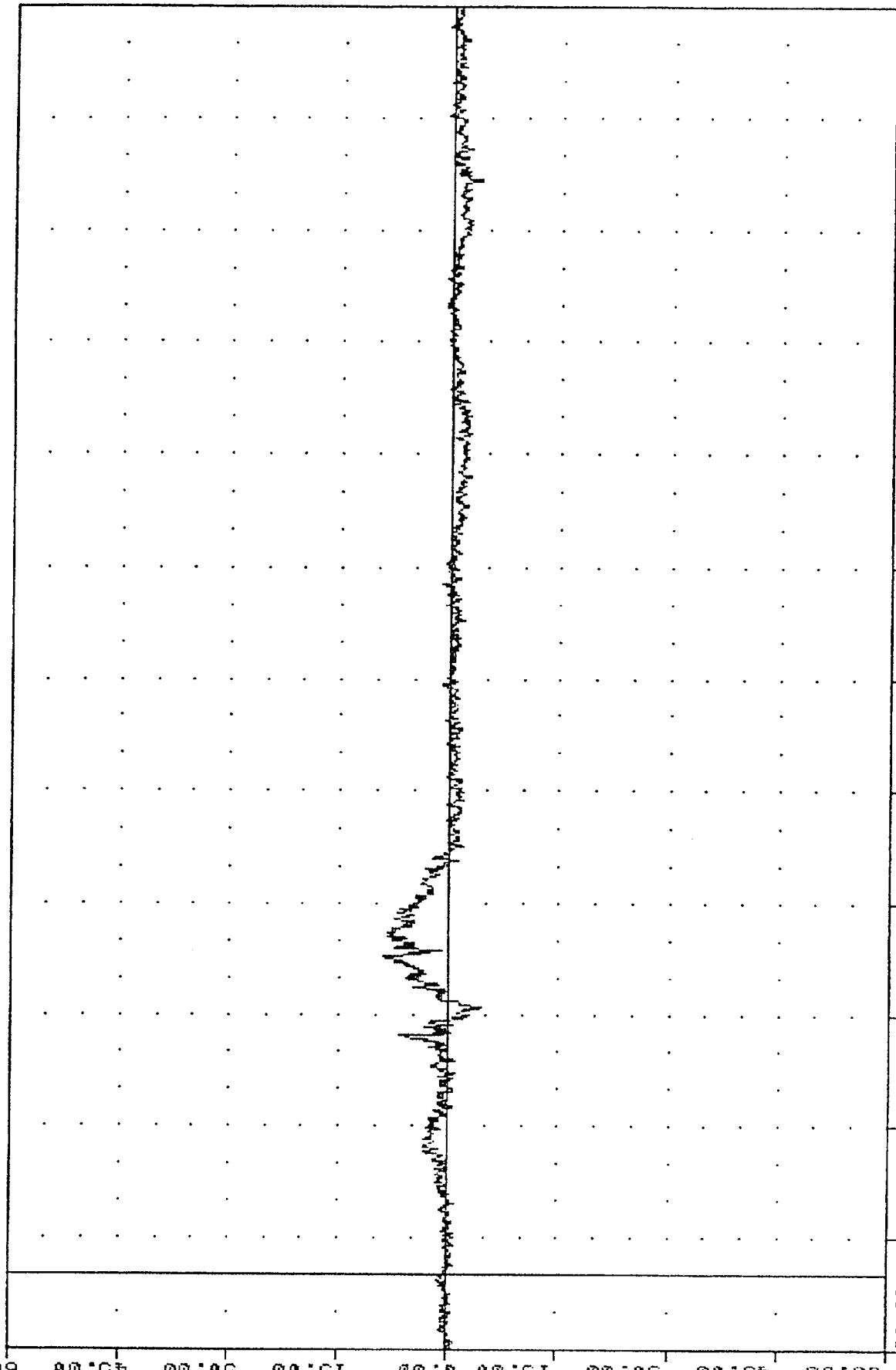
PARTNER VEHICLE - OMNI 65323  
PASSENGER RIGHT UPPER TIBIA MOMENT Y AXIS LB-FT

851106P  
 CENTRAL CRASH RESPONSES  
 85310000000  
 ANALYF2

PLOT DATE 14-85 16:20:31

FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -42.398 71.75, 91.45 e 85.50

50.00  
 45.00  
 40.00  
 35.00  
 30.00  
 25.00  
 20.00  
 15.00  
 10.00  
 5.00  
 0.00  
 -5.00  
 -10.00  
 -15.00  
 -20.00  
 -25.00  
 -30.00  
 -35.00  
 -40.00  
 -45.00  
 -50.00



-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

PARTNER VEHICLE - OMNI 65323  
 PASSENGER LEFT LOWER TIBIA FORCE Y AXIS LBS

851106P  
CENTRAL CRASH RESPONSES

8531000000  
ANLZF2

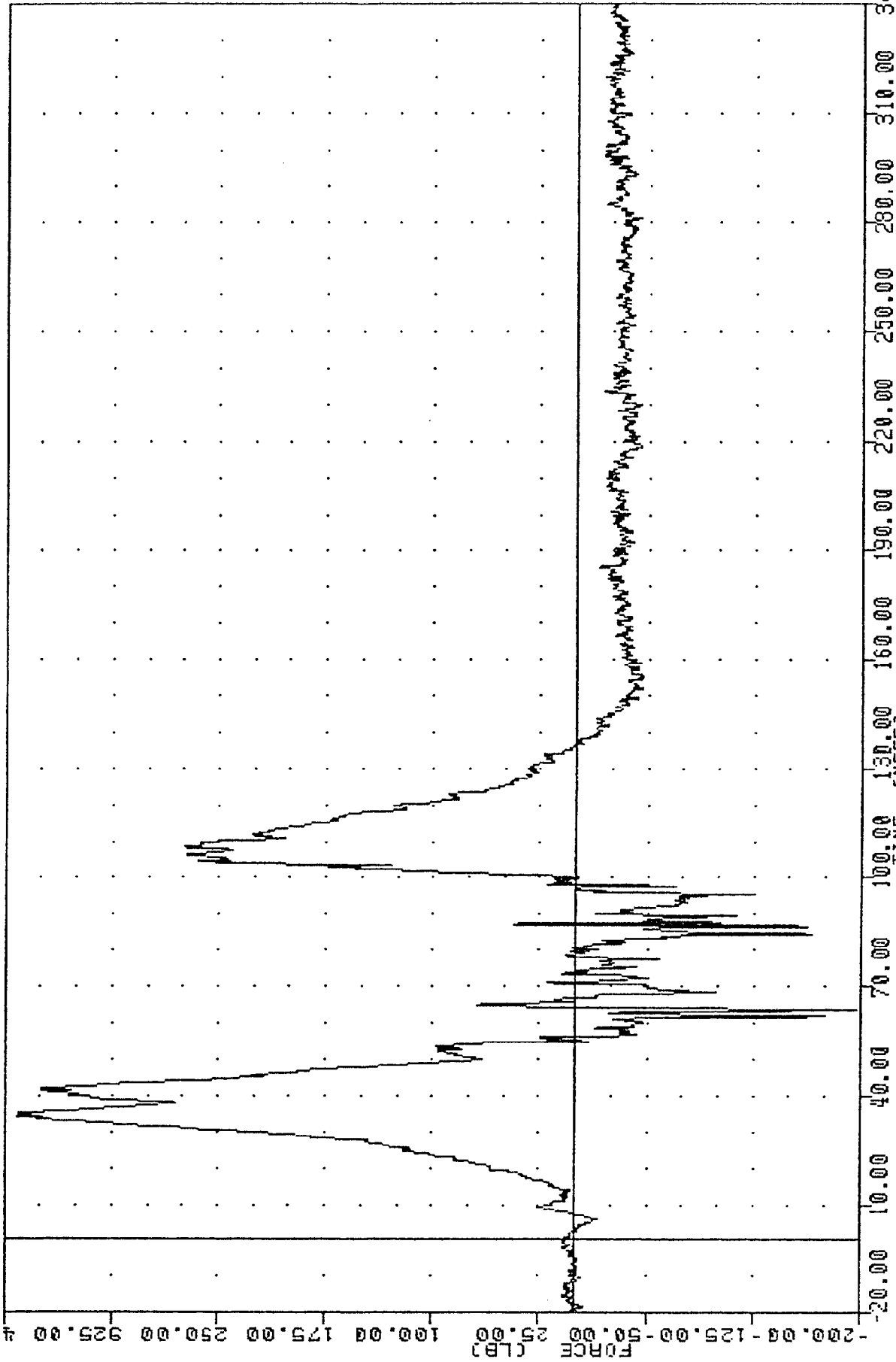
PLOT DATE 4 85 14:32:28

FILTER = BLPP 1000 / 2500 / .16

MIN, MAX VALUES = -196.65e 63.63 , 391.04 e 34.25

400.00

101-B



PARTNER VEHICLE - OMNI 85323

PASSENGER LEFT LOWER TIBIA FORCE Z AXIS LBS

851106P  
 INITIAL CRASH RESPONSES  
 8531000000  
 ANRYF2

PLOT DATE 14 85 16:20:31

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -88.30e 85.88, 36.98 e 59.75

60.00

45.00

30.00

(X10<sup>4</sup>)

15.00

0.00

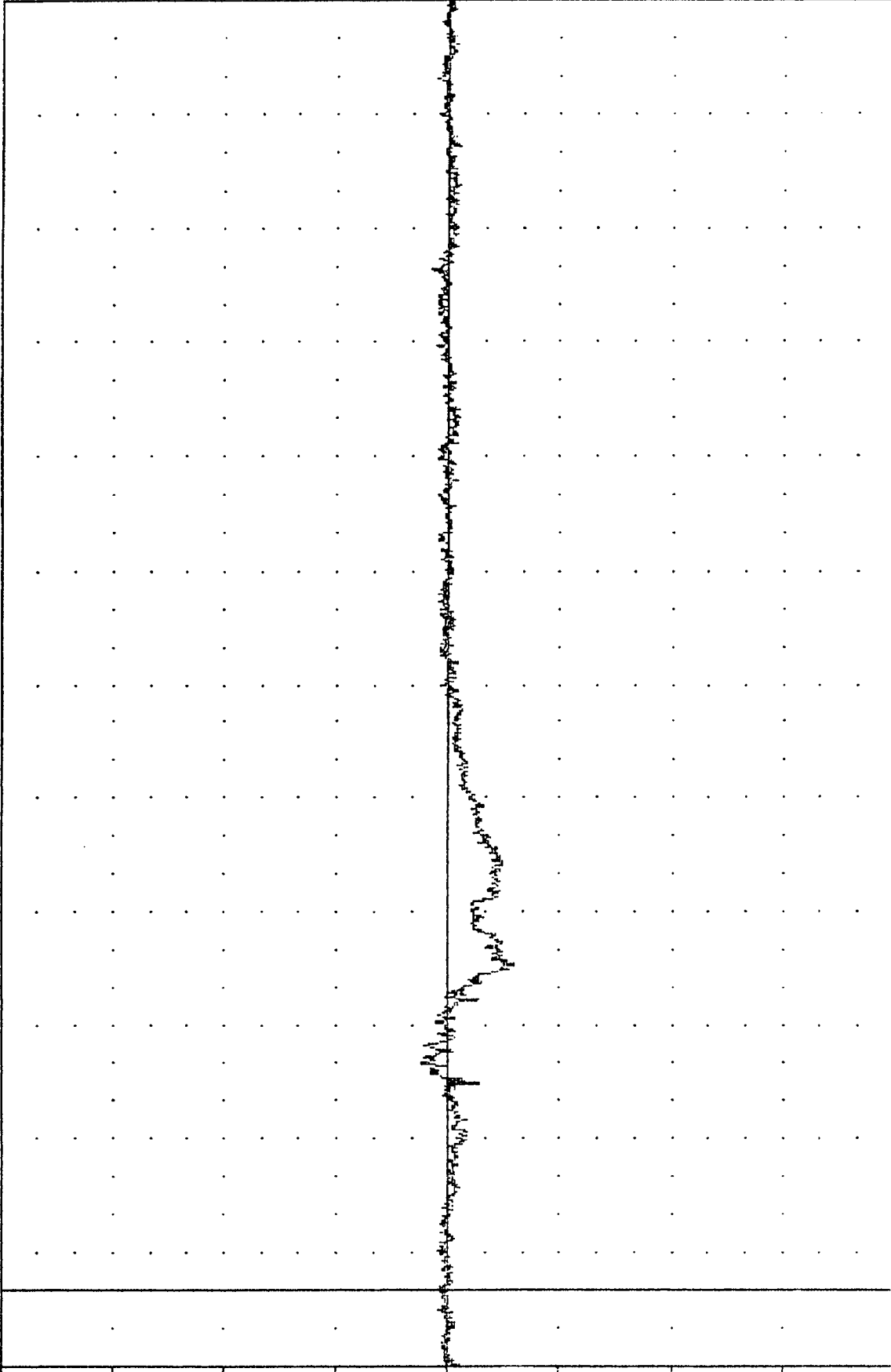
-15.00

FORCE (LBS)

-30.00

-45.00

-50.00



-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)

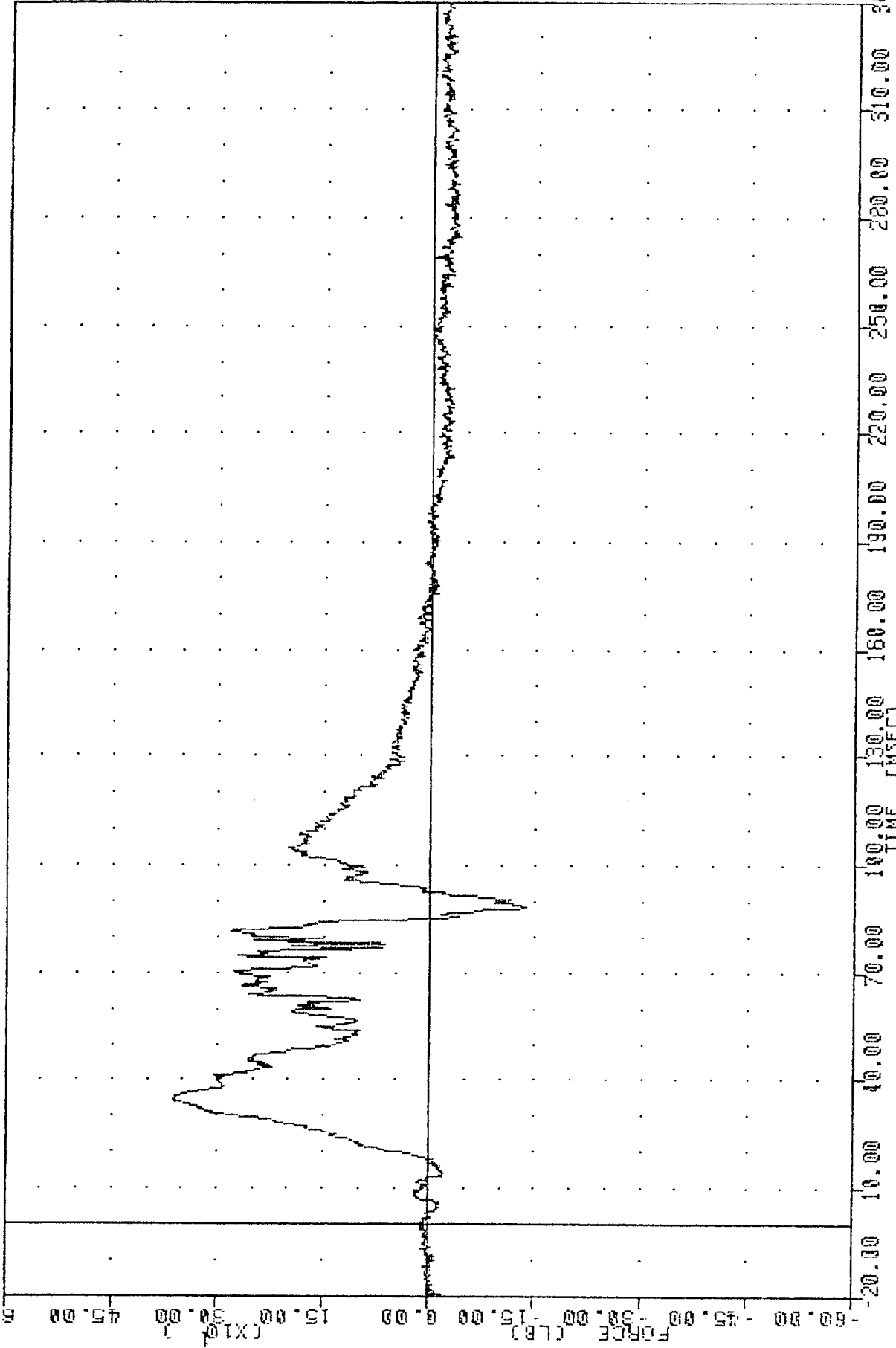
PARTNER VEHICLE - OMNI 65323  
 PASSENGER RIGHT LOWER TIBIA FORCE LBS

851106P  
CENTRAL CRASH RESPONSES  
8531000000  
ANAZF2

PLOT DATE 14-85 16:20:31

FILTER = 0LPP 1000/ 2500/ -16

MIN. MAX VALUES = -135.15e 88.50, 362.28 e 34.25



PARTNER VEHICLE - OMNI 65929  
PASSENGER RIGHT LOWER TIBIA FORCE LBS

851106P  
NTAL CRASH RESPONSES  
85310000000  
ANLXH2

PLOT DATE 14 85 16:20:31

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -11.36e 71.88, 20.12 e 91.38

100.00

75.00

50.00

25.00

0.00

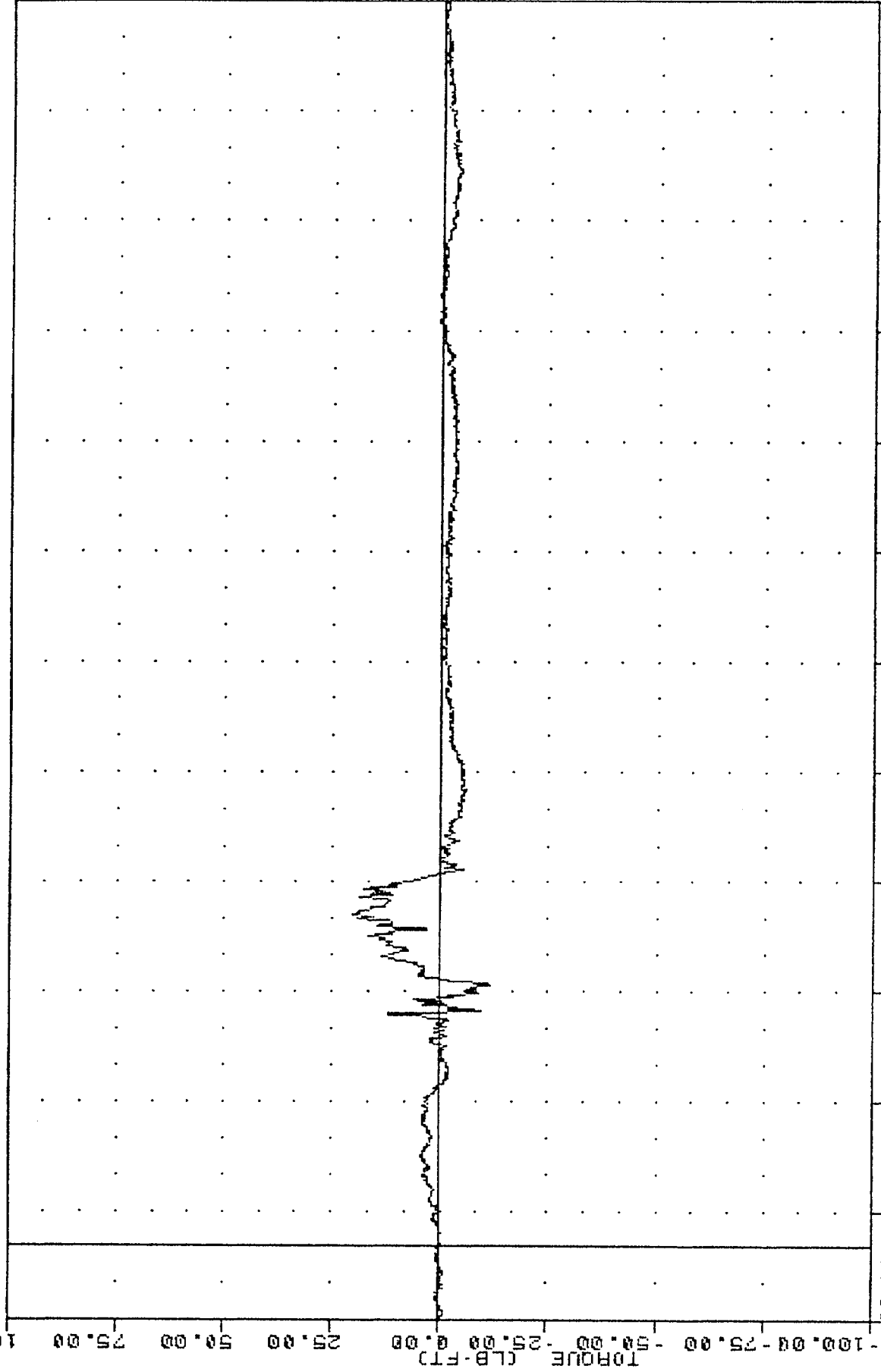
-25.00

-50.00

-75.00

-100.00

B-104



-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

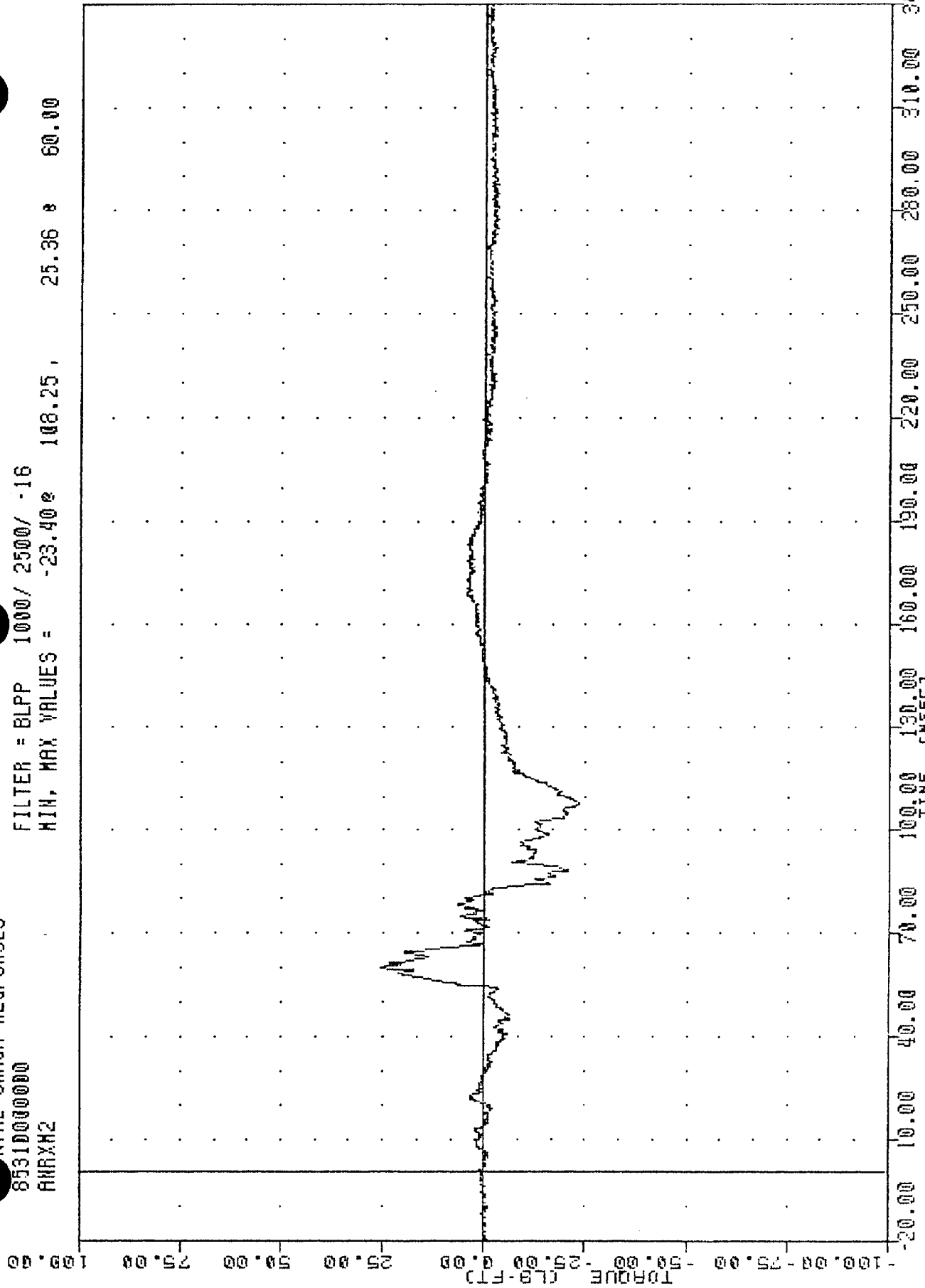
TIME (NSEC)

PARTNER VEHICLE - OMNI 65323

PASSENGER LEFT LOWER TIBIA MOMENT X AXIS LB-FT

851105P  
CENTRAL CRASH RESPONSES  
85310000000  
AHRXH2

PLOT DATE 14 85 16:20:31  
FILTER = BLPP 1000/ 2500/ -16  
MIN, MAX VALUES = -23.40e 108.25, 25.36 e 60.00



PARTNER VEHICLE - OMNI 65323  
PASSENGER RIGHT LOWER TIBIA MOMENT X AXIS LB-FT

851106P  
INITIAL CRASH RESPONSES

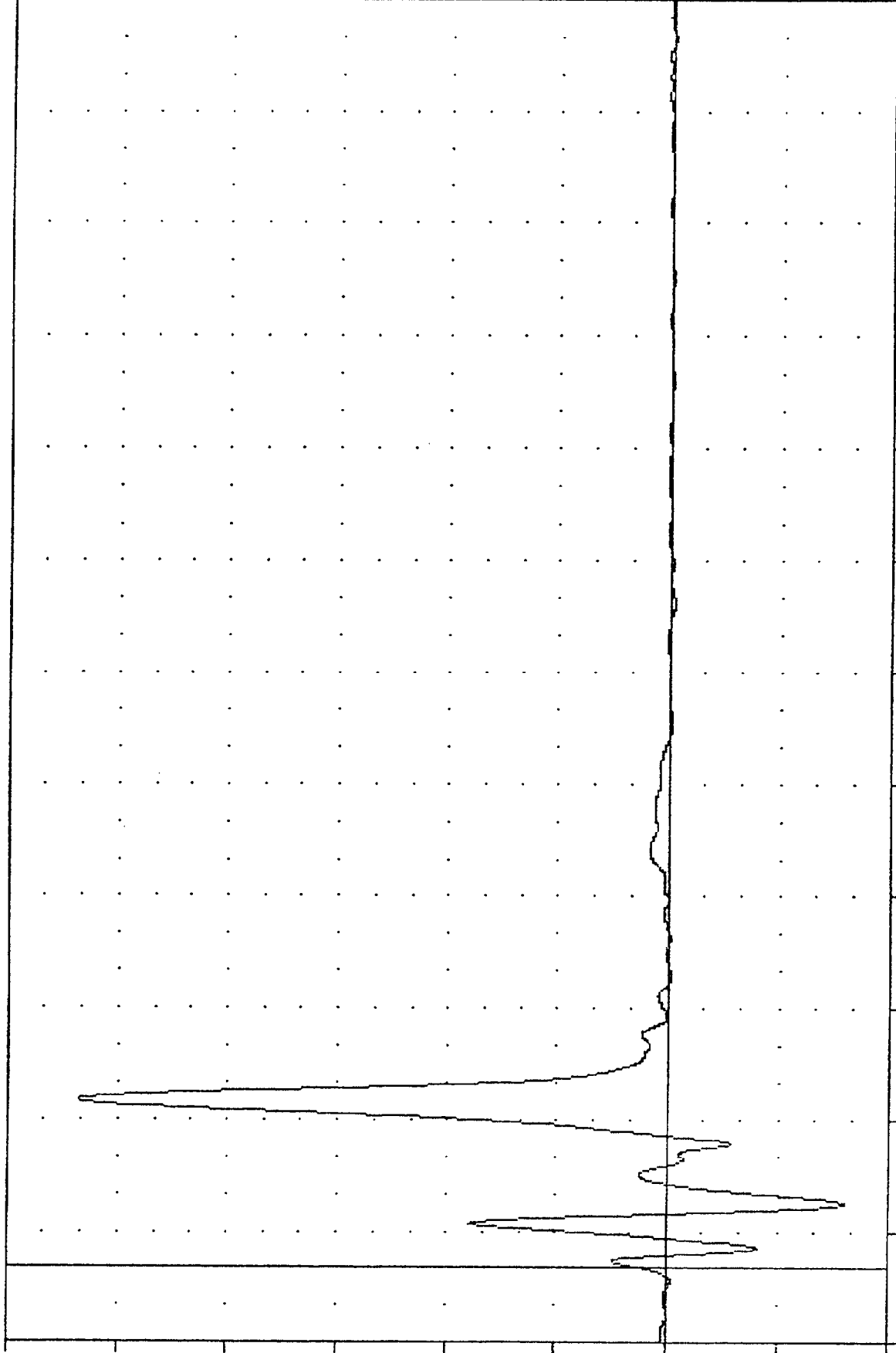
85310000000  
FFRXE

PLOT DATE 14 85 16:25:08

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -95.73 17.38 321.78 45.25

ACCELERATION (G)  
-120.00 -60.00 0.00 60.00 120.00 180.00 240.00 300.00 360.00



TIME (MSEC)  
-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

PARTNER VEHICLE - OMNI 65323  
FRONT FRAME RAIL ACCELERATION X AXIS

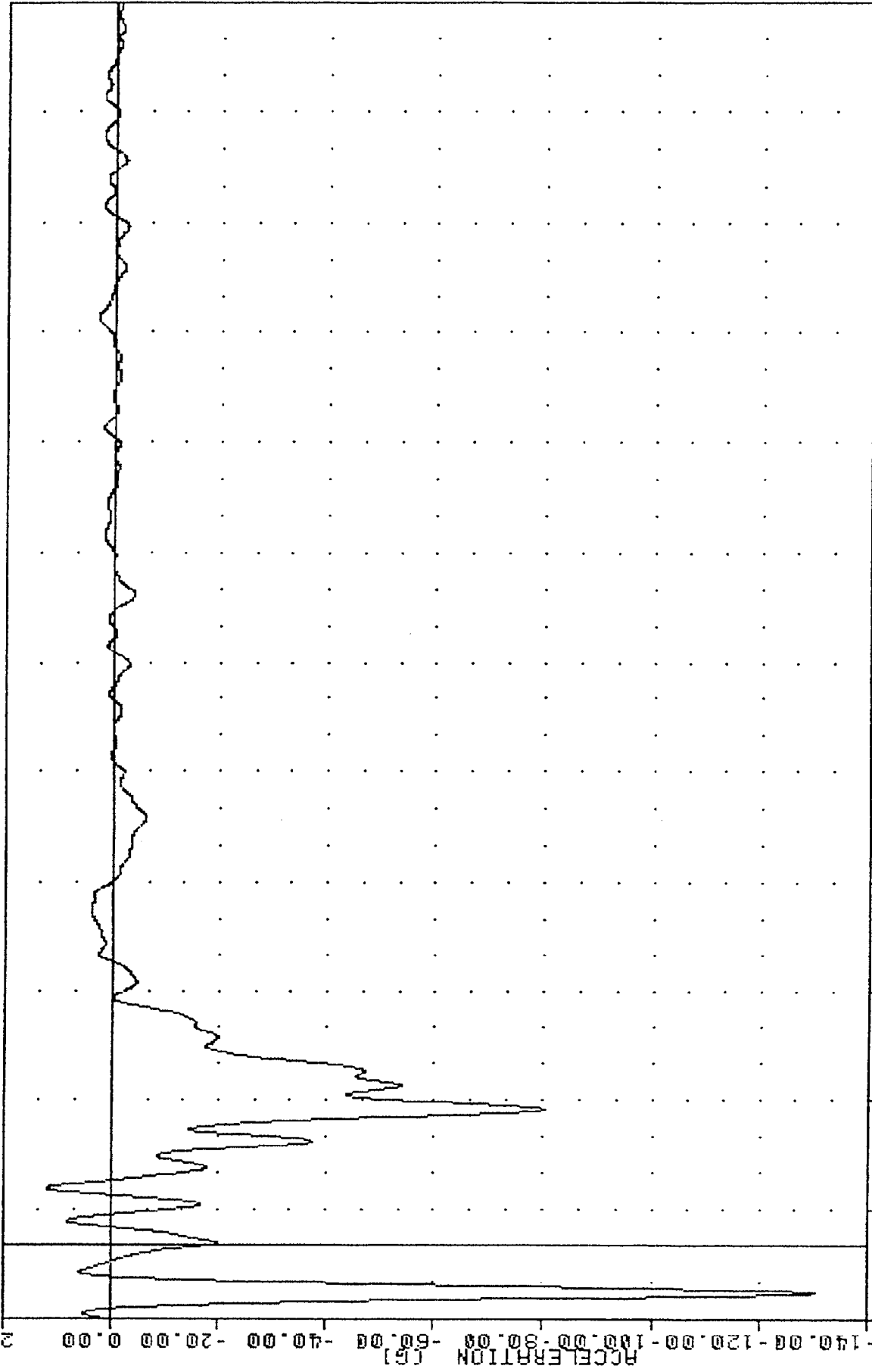
851106P  
CENTRAL CRASH RESPONSES  
853100000000  
FFCXG

PLOT DATE 5-85 09:39:28

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -130.26e -13.00, 11.87e 15.75

20.00



-140.00 -120.00 -100.00 -80.00 -60.00 -40.00 -20.00 0.00 20.00  
100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)

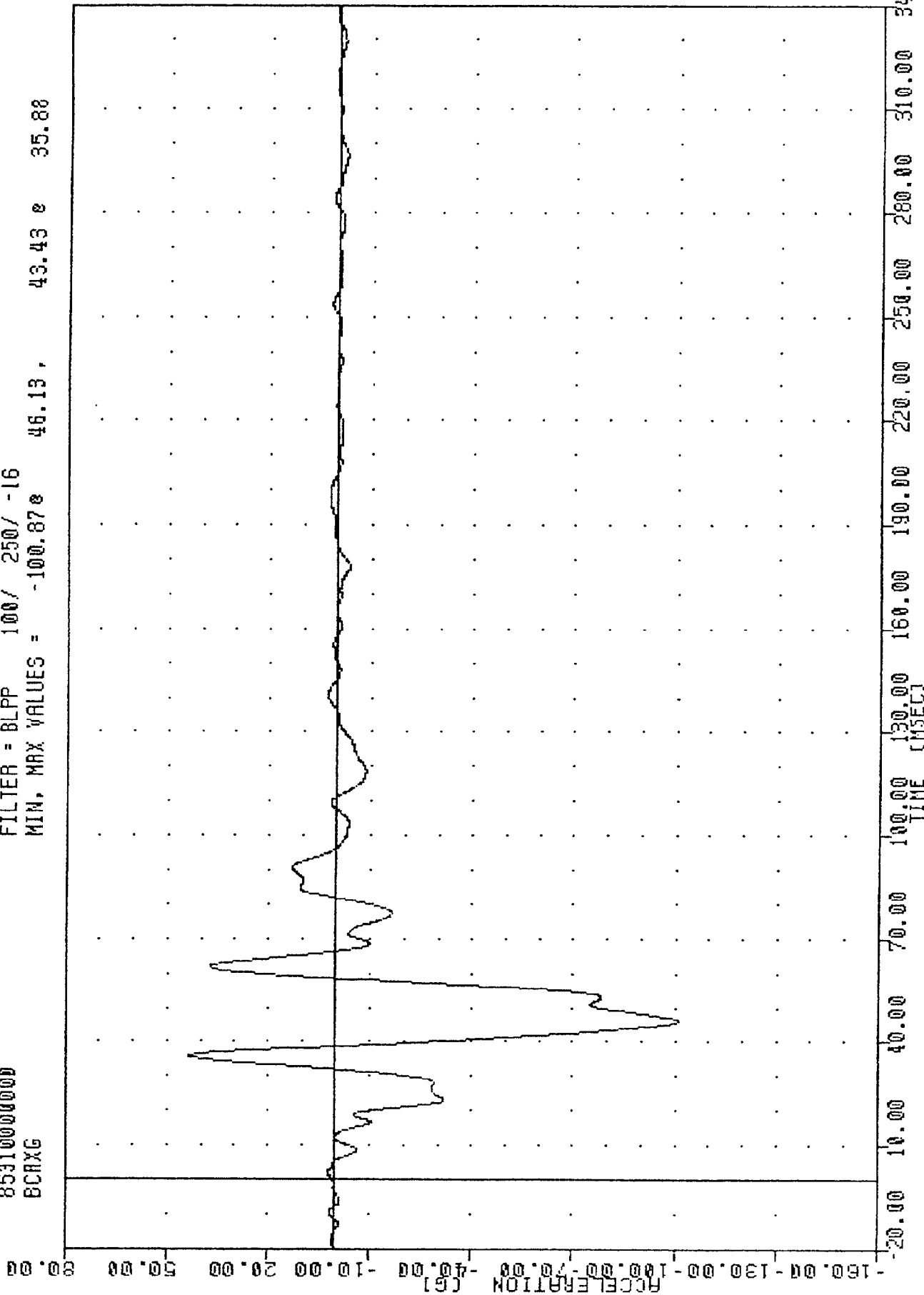
PARTNER VEHICLE - OMNI 65323  
FRONT FRAME CROSSMEMBER X AXIS

851106P  
CENTRAL CRASH RESPONSES  
8531000000  
BCRXG

PLOT DATE 14 85 16:25:08

FILTER = BLPP 100 / 250 / -16

MIN, MAX VALUES = -100.87 e 43.43 e 35.88



PARTNER VEHICLE - OMNI 65323  
RIGHT BRAKE CALIPER ACCELERATION X AXIS

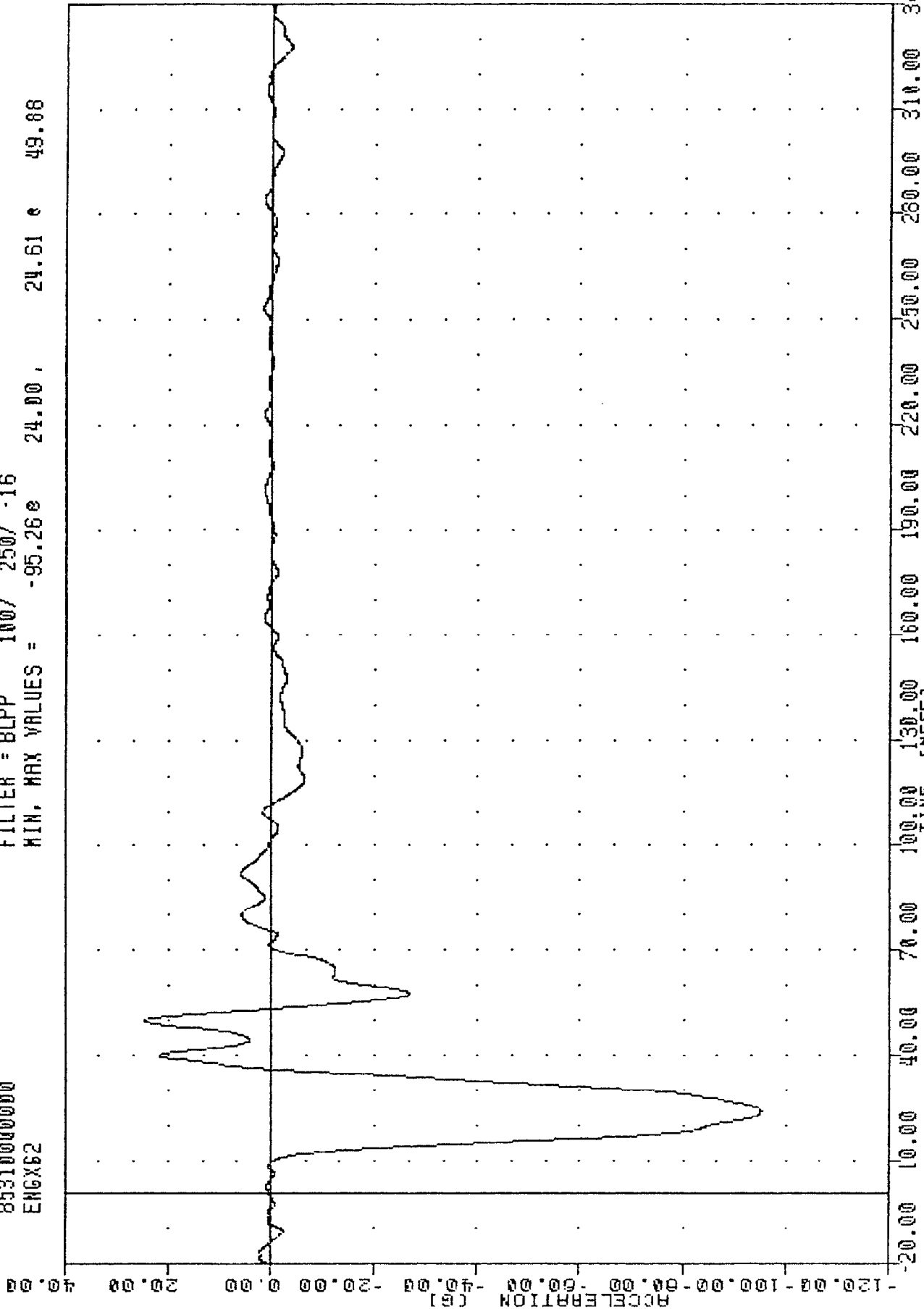
851106P  
CENTRAL CRASH RESPONSES

8531000000  
ENGX62

PLOT DATE 14 85 16:25:08

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -95.26e 24.00, 24.61 e 49.88



PARTNER VEHICLE - OMNI 85323  
LOWER ENGINE BLOCK ACCELERATION X AXIS

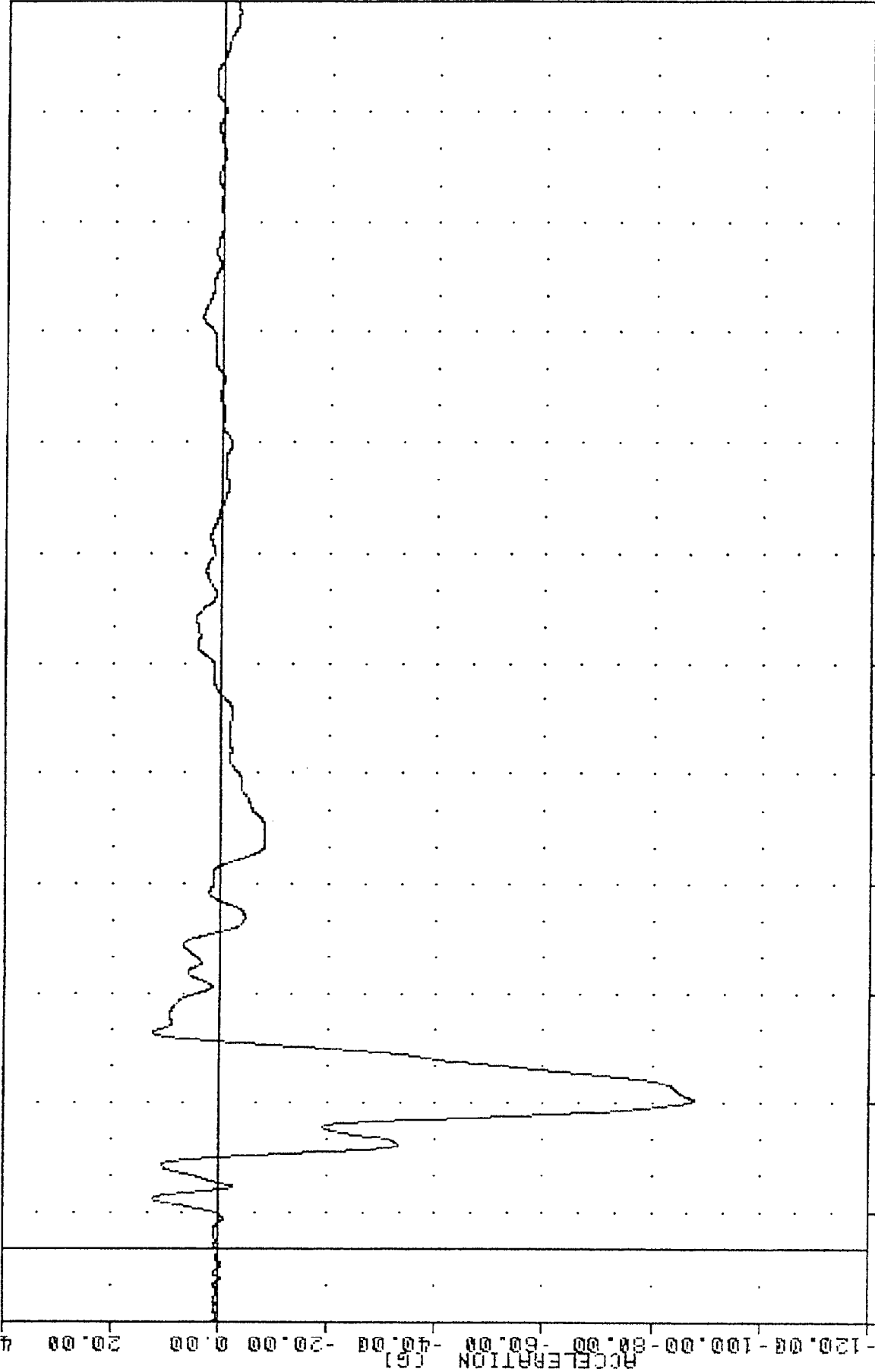
851106P  
FATAL CRASH RESPONSES  
85310000000  
ENGX61

PLOT DATE 15-08-85 08:52:12

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -87.75e 40.75, 12.27e 59.25

40.00



B-110

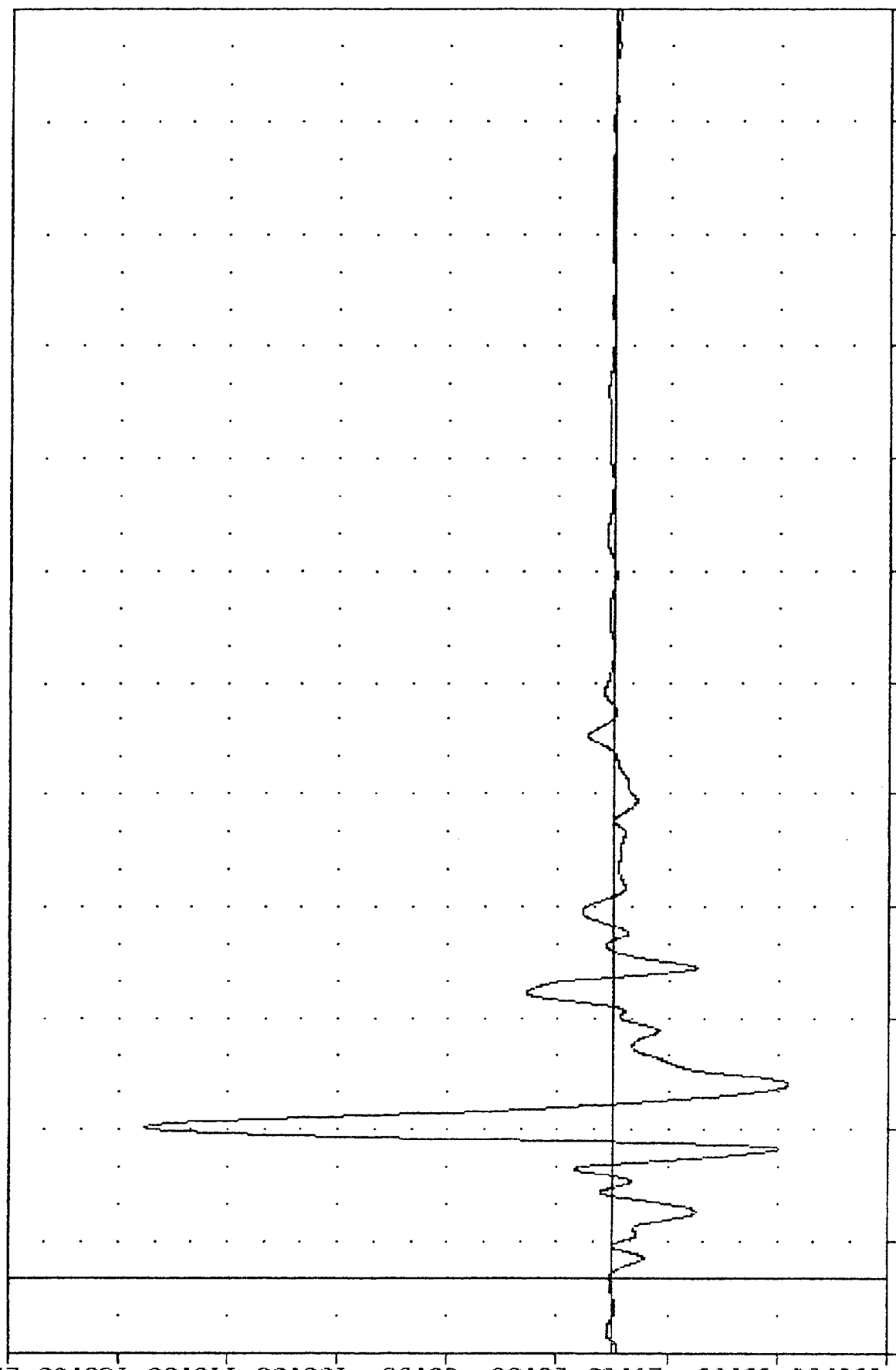
ACCELERATION (G)  
-120.00 -100.00 -80.00 -60.00 -40.00 -20.00 0.00 20.00 40.00  
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)

PARTNER VEHICLE - OMNI 65323  
UPPER ENGINE BLOCK ACCELERATION X AXIS

851106P  
CENTRAL CRASH RESPONSES  
85310000000  
SCAPG

PLOT DATE 14-085 16:25:08  
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -63.680 52.25, 170.43 e 40.63

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)

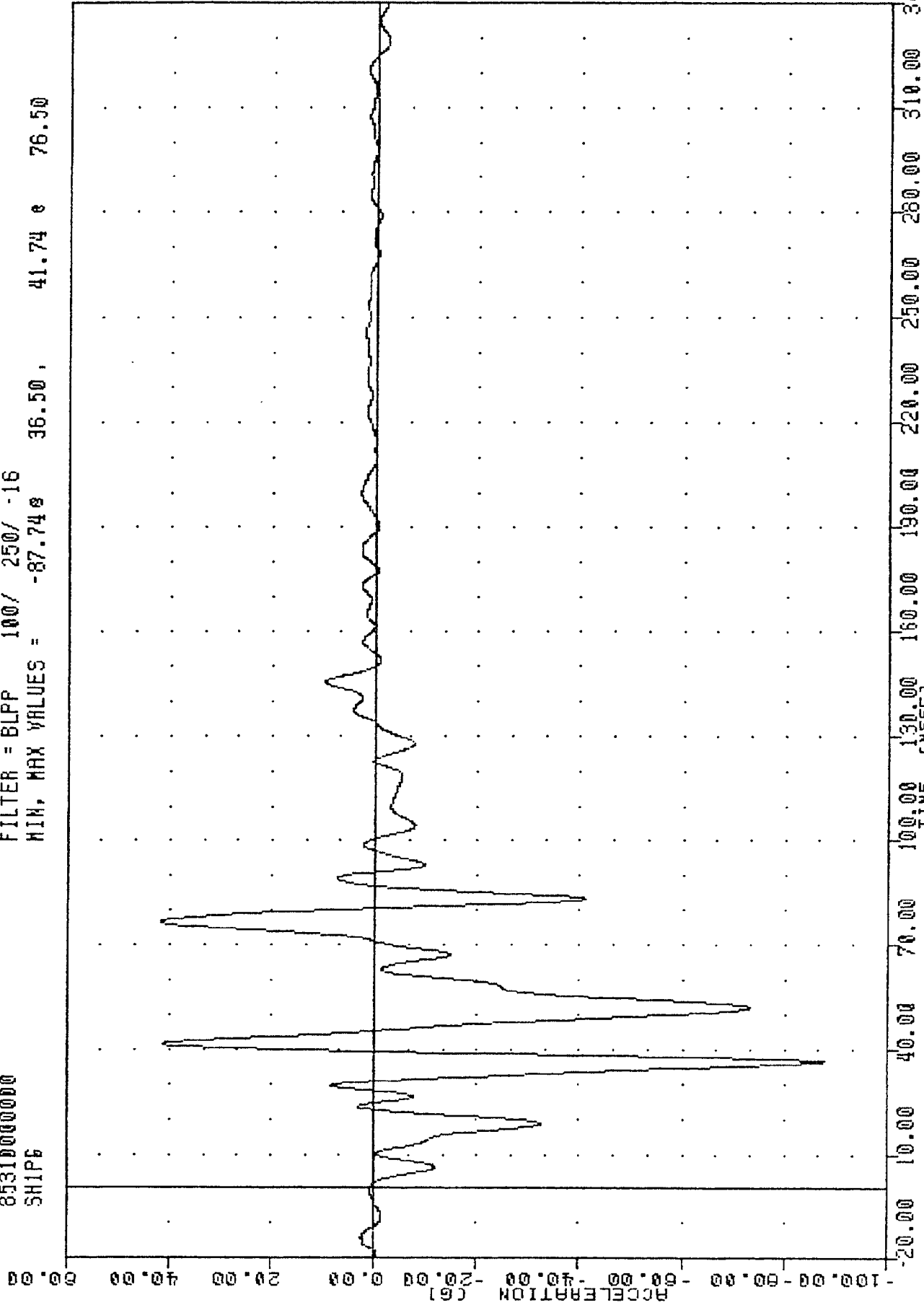
PARTNER VEHICLE - OMNI 65323  
STEERING COLUMN ACCELERATION A-P AXIS

851106P  
FATAL CRASH RESPONSES  
85310000000  
SH1P6

PLOT DATE 14-08-85 16:25:08

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -87.74 36.50, 41.74 76.50



PARTNER VEHICLE - OMNI 65323  
STEERING WHEEL HUB ACCELERATION R-P AXIS

851106P  
CENTRAL CRASH RESPONSES

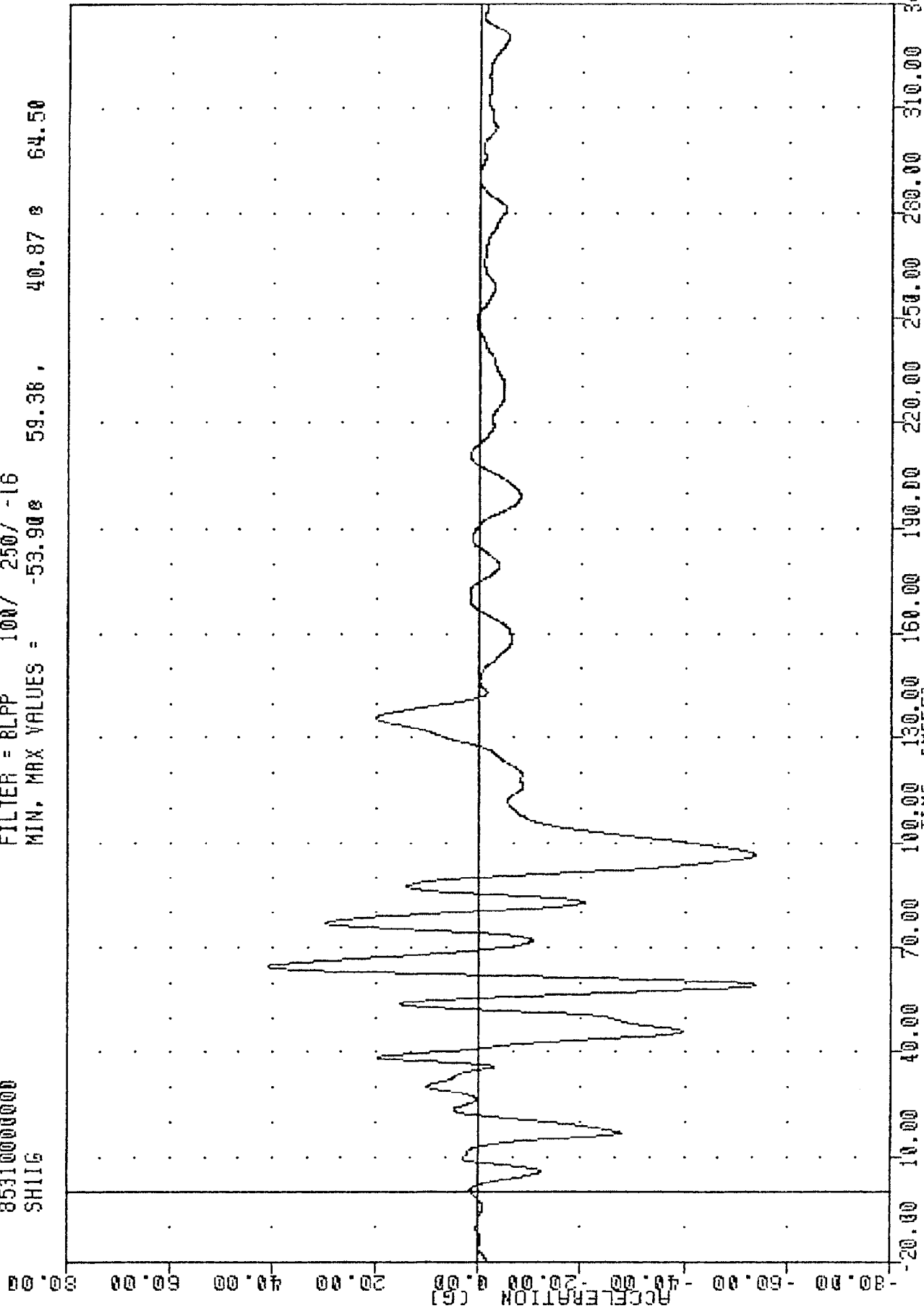
PLOT DATE 14 85 16:25:08

85310000000

FILTER = 8LPP 100/ 250/ -16

SH11G

MIN. MAX VALUES = -53.90 59.38 , 40.87 64.50



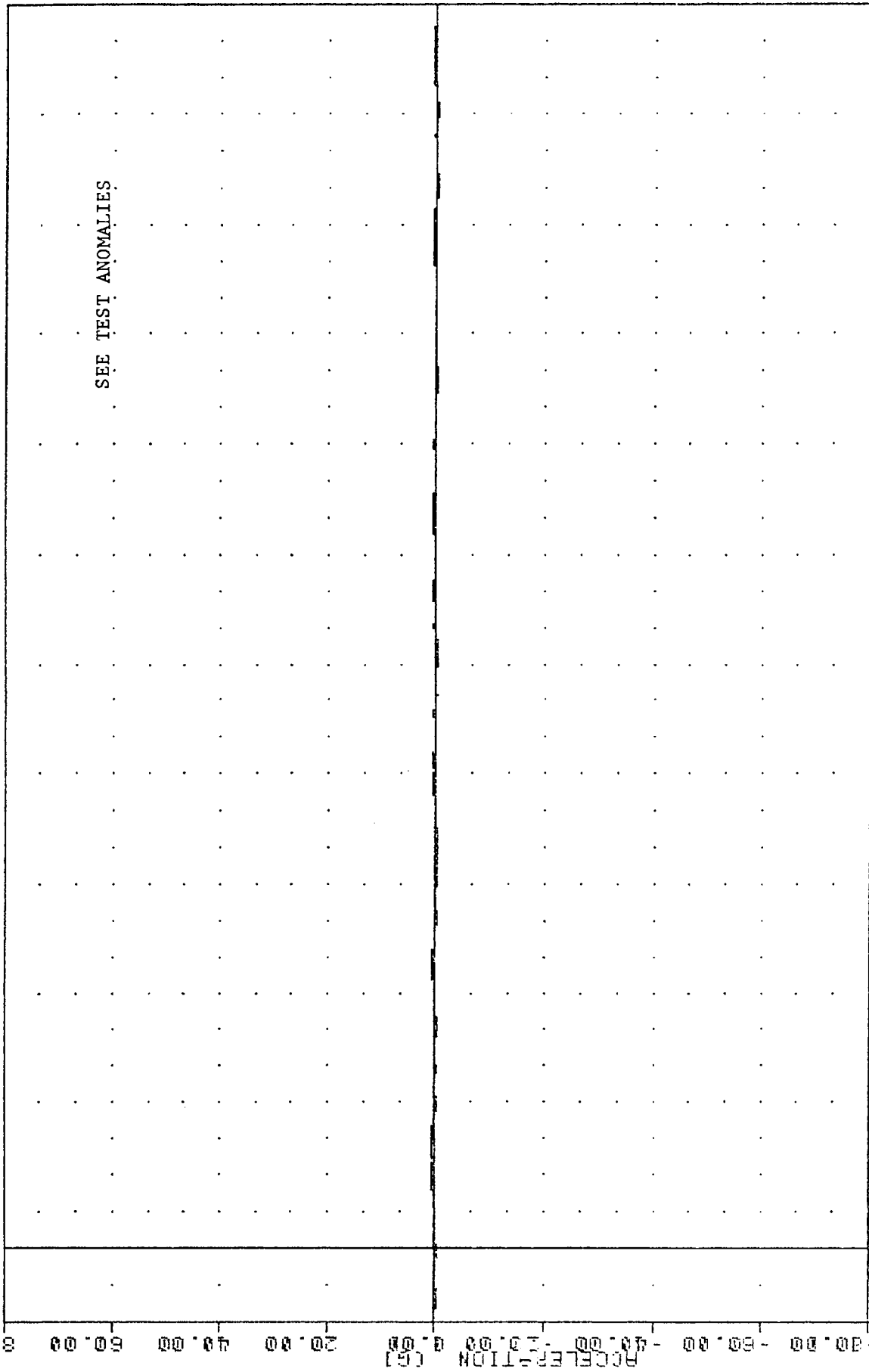
PARTNER VEHICLE - OMNI 65323  
STEERING WHEEL HUB ACCELERATION I-S AXIS

851106P  
 MENTAL CRASH RESPONSES  
 8531000000  
 UPCXG

PLOT DATE 14-85 16:25:08

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -0.46 163.00 0.71 327.75



100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
 TIME (MSEC)

PARTNER VEHICLE - OMNI 65323  
 DASHBOARD ACCELERATION X AXIS

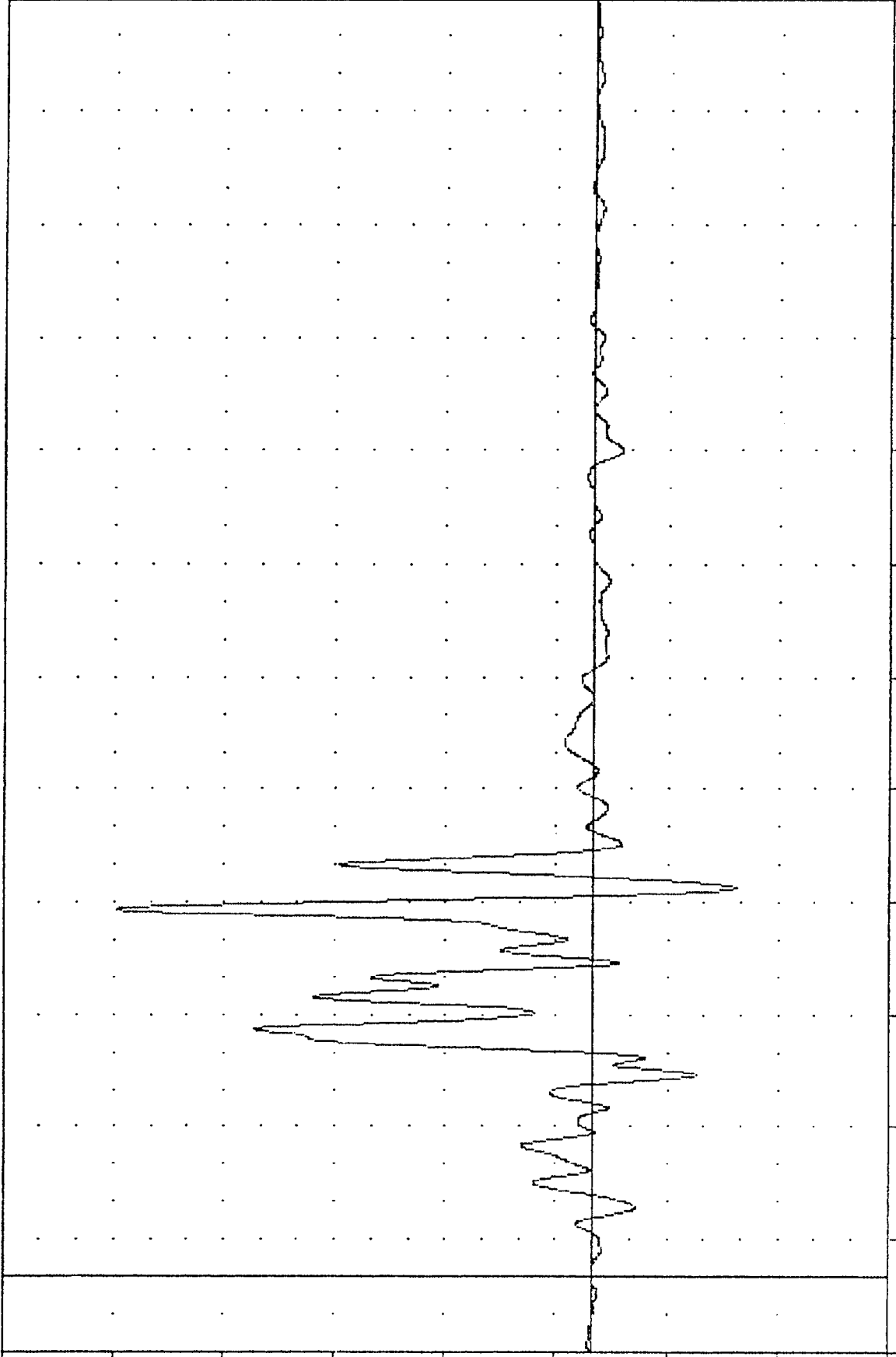
851106P  
CENTRAL CRASH RESPONSES  
85310000000  
DPCZG

PLOT DATE 14 85 16:25:08

FILTER = BLFP 100/ 250/ -16

MIN, MAX VALUES = -38.52e 103.75, 129.47 e 98.00

ACCELERATION (G)



TIME (MSEC) 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

PARTNER VEHICLE - OMNI 65929  
DASHBOARD ACCELERATION Z AXIS

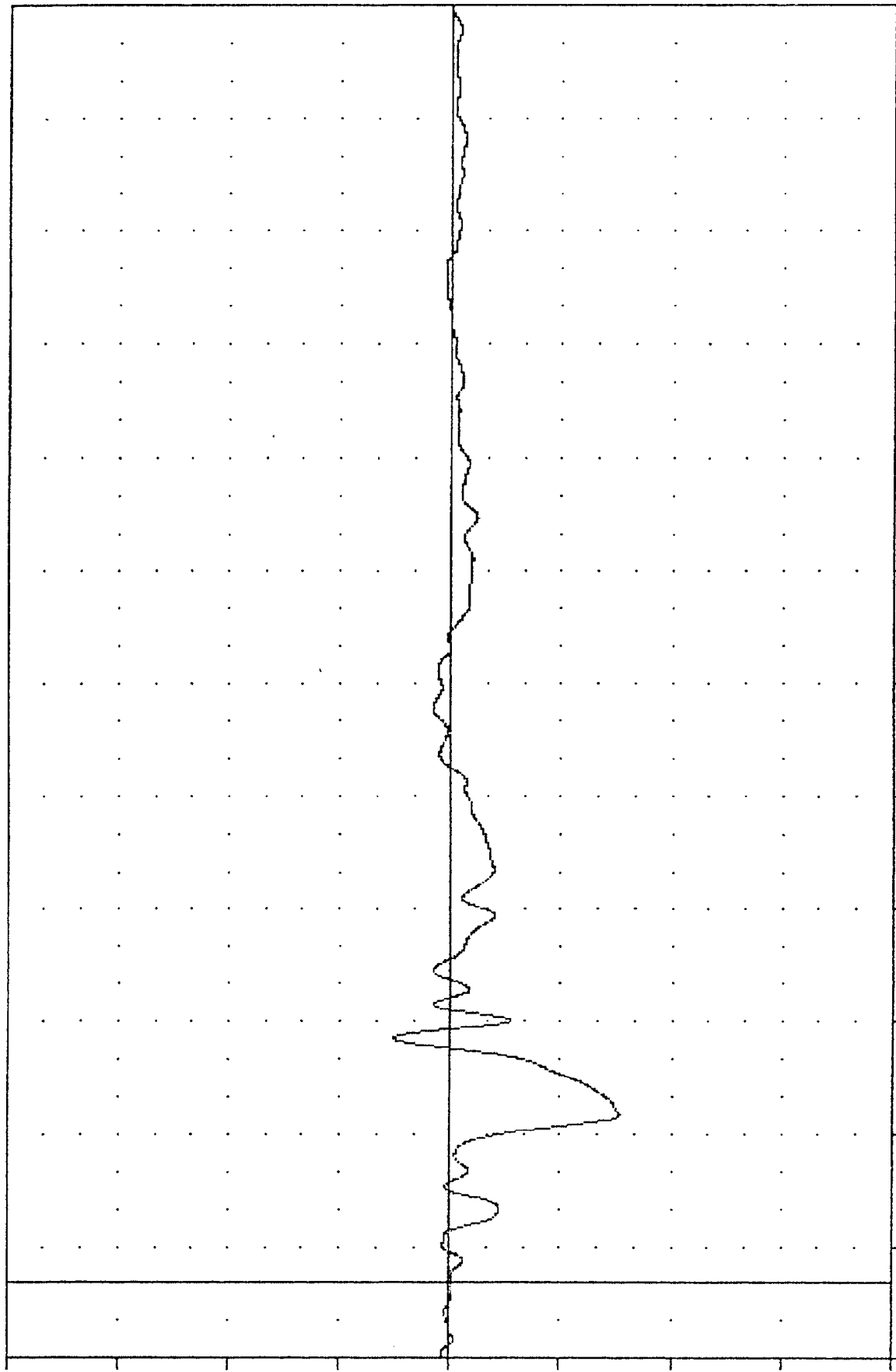
851106P  
 FATAL CRASH RESPONSES  
 8531000000  
 VCGY

PLOT DATE 14-085 16:25:08

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -363.19e 45.13, 129.73 e 65.63

ANGULAR VEL. (DEG/SECC) 100.00 -75.00 -50.00 -25.00 0.00 25.00 50.00 75.00 100.00  
 (X10<sup>-1</sup>)



-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 (NSEC)

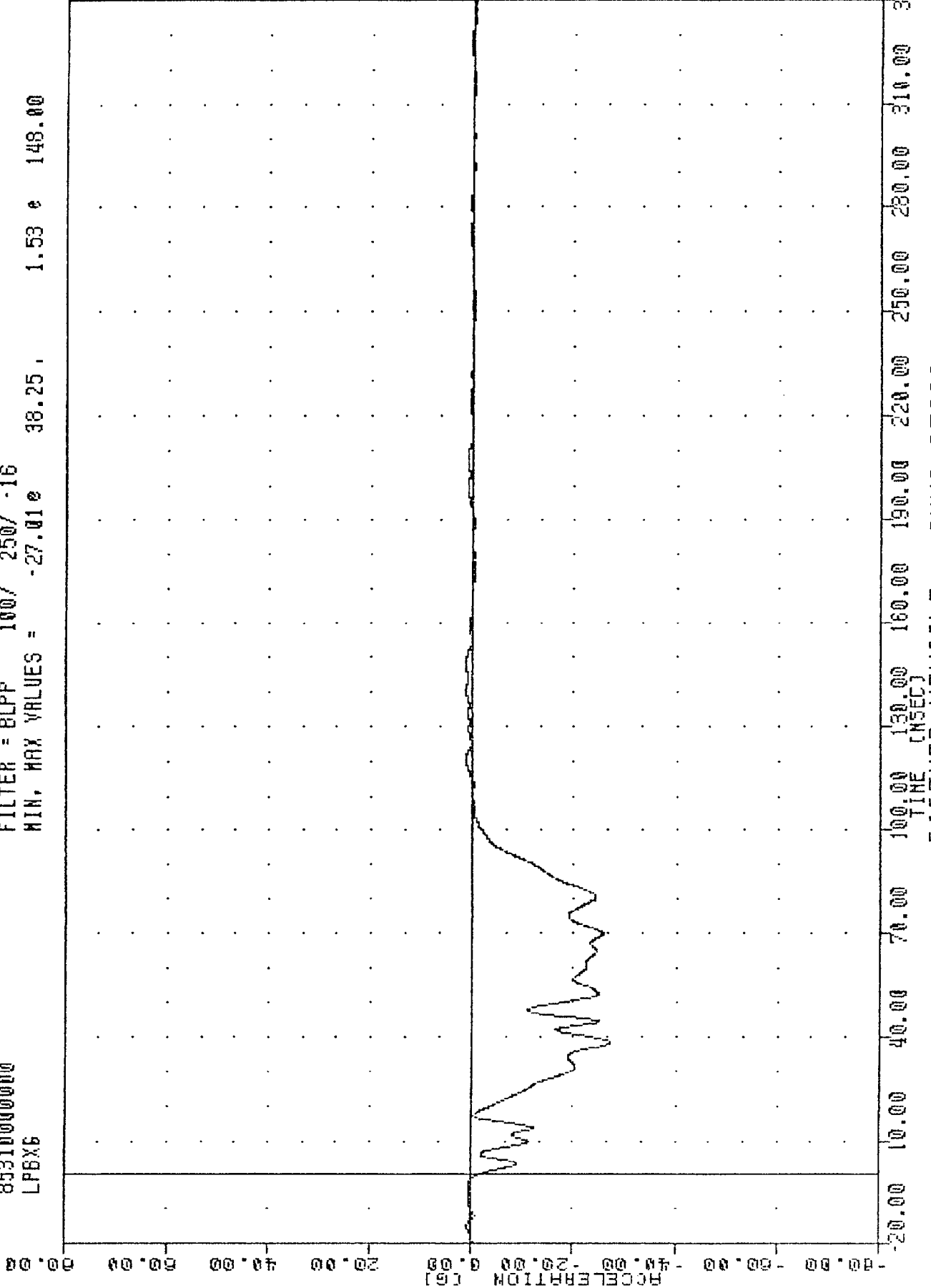
PARTNER VEHICLE - OMNI 65323  
 VEHICLE CENTER OF GRAVITY DEGREES/SECOND

851106P  
CENTRAL CRASH RESPONSES  
8531000000  
LP6X6

PLOT DATE 14 85 16:25:08

FILTER = BLPF 100/ 250/ -16

MIN, MAX VALUES = -27.01e 38.25, 1.53 e 148.00



PARTNER VEHICLE - OMNI 65323  
LEFT B PILLAR ACCELERATION X AXIS

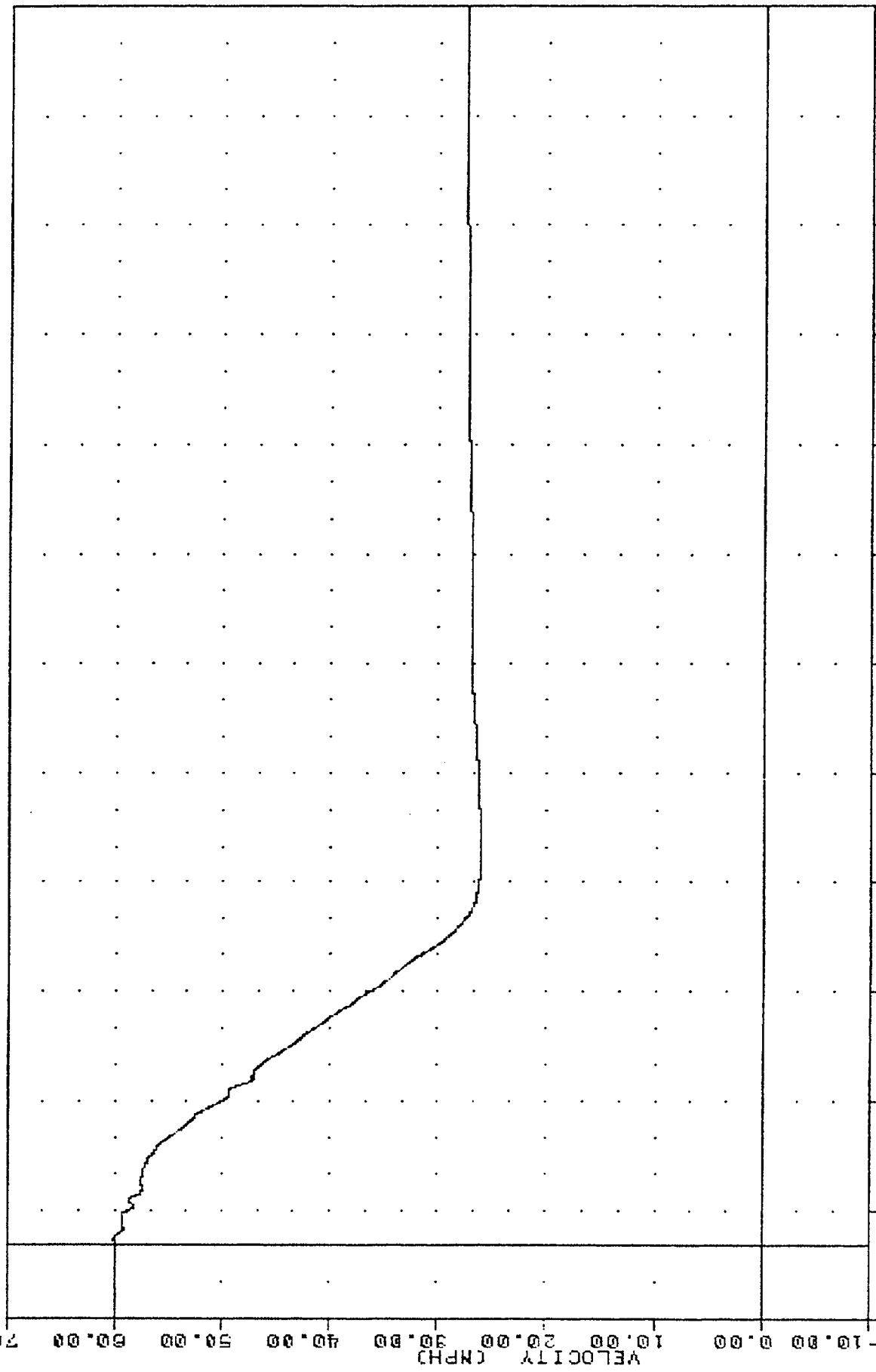
851106P  
CENTRAL CRASH RESPONSES  
03310000000  
LPBXY

PLOT DATE 14-08-85 16:27:00

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = 26.020 108.75, 60.07 1.50

811-B



-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

PARTNER VEHICLE - OMNI 85323  
DELTA V USING LPBXG

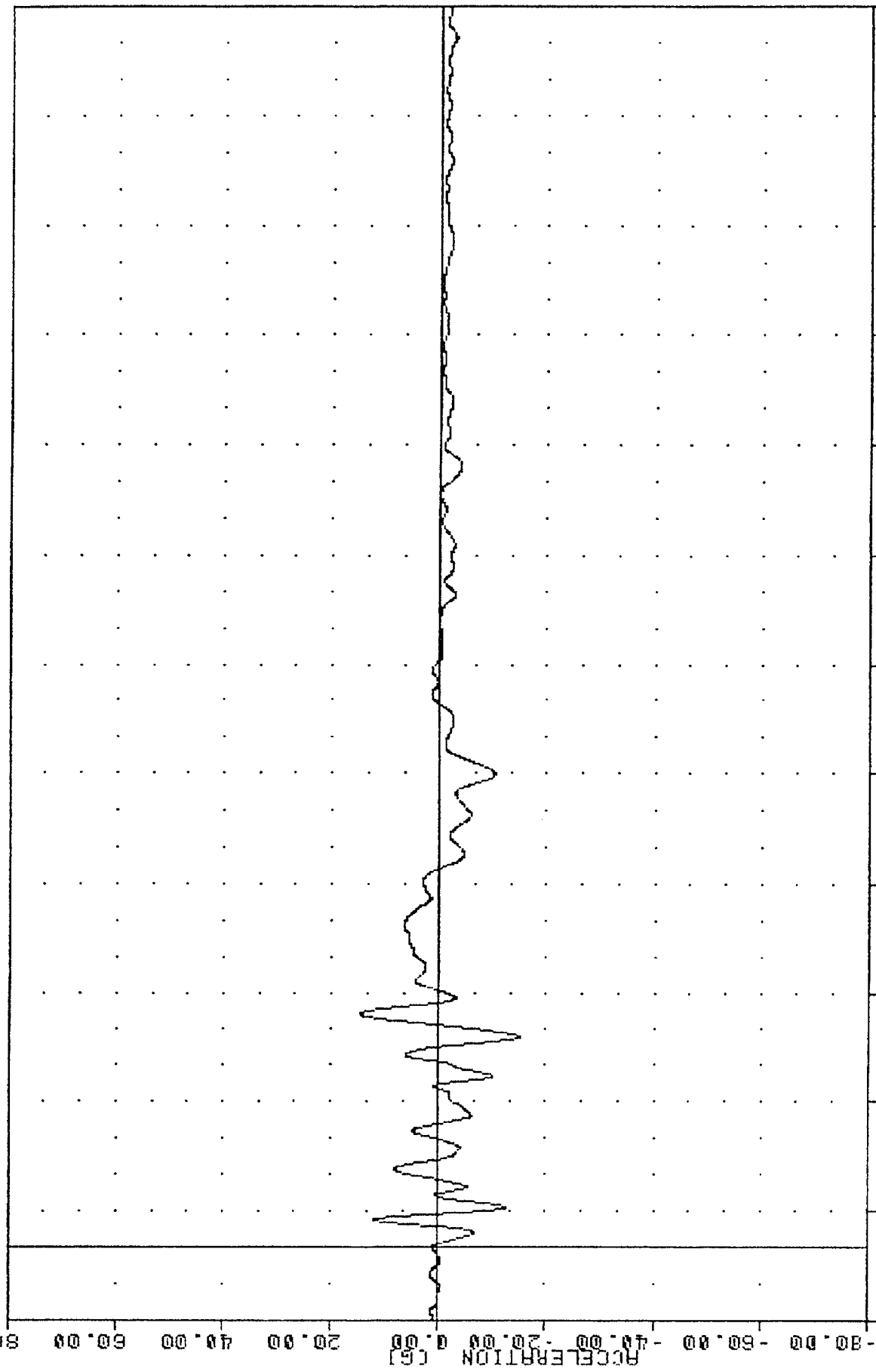
851106P  
CENTRAL CRASH RESPONSES  
853100000000  
LPBZG

FLOT DATE 14-01-85 16:25:08

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -15.23e 58.00, 14.70 e 64.25

80.00  
60.00  
40.00  
20.00  
0.00  
-20.00  
-40.00  
-60.00  
-80.00

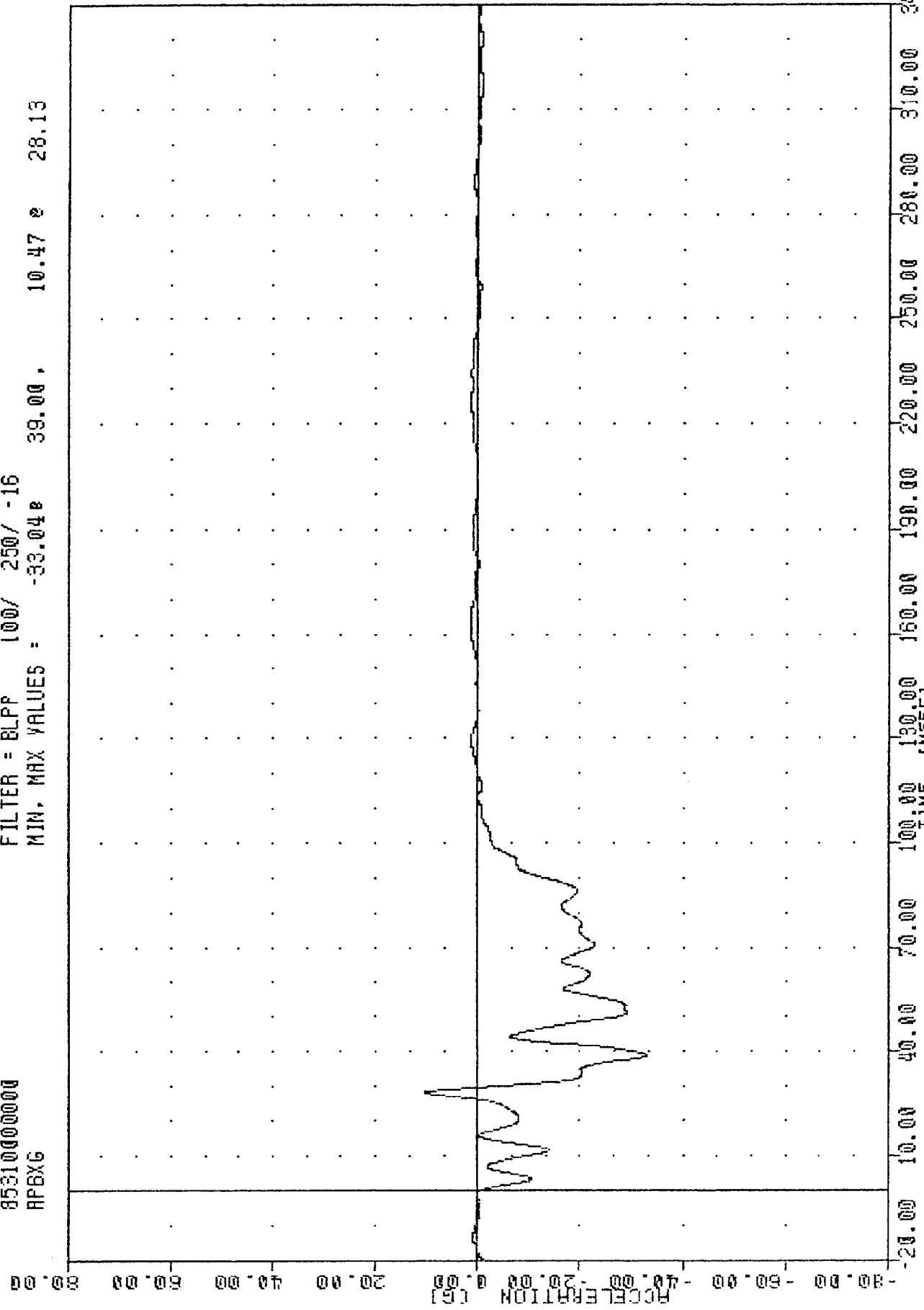


ACCELERATION (G)  
TIME (MSEC)  
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

PARTNER VEHICLE - OMNI 65329  
LEFT B PILLAR ACCELERATION Z AXIS

851106P  
 CENTAL CRASH RESPONSES  
 85310000000  
 APBXG

PLOT DATE 14-85 16:25:08  
 FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -33.048 39.00 , 10.47 e 28.13



PARTNER VEHICLE - OMNI 65323  
 RIGHT B PILLAR ACCELERATION X AXIS

851106P  
 FRONTAL CRASH RESPONSES  
 8531000000  
 APBXY

PLOT DATE 14-85 16:27:00

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = 28.58 118.63 60.05 8 -9.63

70.00

60.00

50.00

40.00

30.00

20.00

10.00

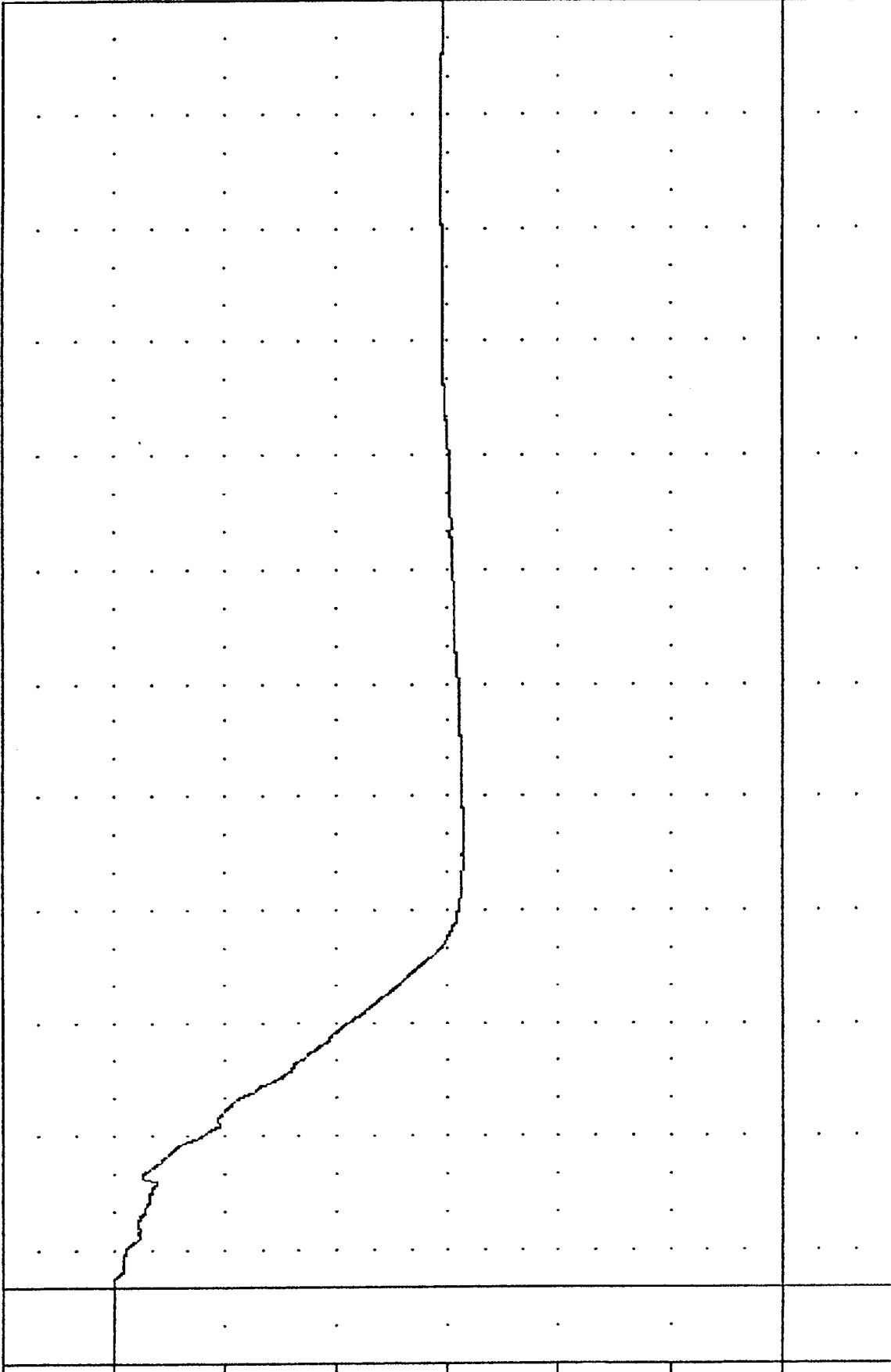
0.00

-10.00

-20.00

121-B

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

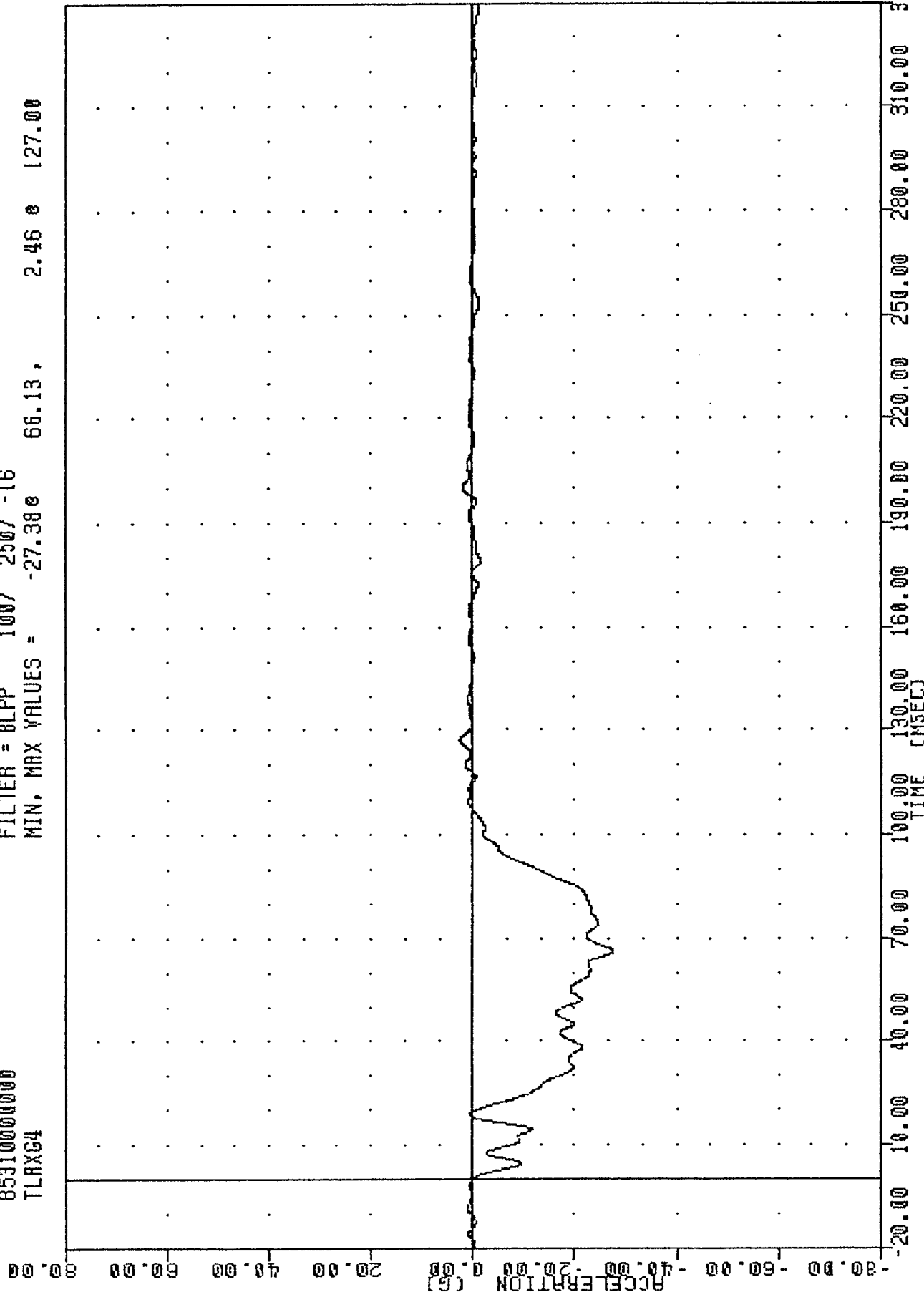
PARTNER VEHICLE - OMNI 65323  
 PFITR V USING RPRXG

851106P  
ANTAL CRASH RESPONSES  
8531000000  
TLRXG4

PLOT DATE 14-85 16:25:08

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -27.38e 66.13, 2.46 e 127.00



PARTNER VEHICLE - OMNI 65323  
LEFT REAR SEAT ACCELERATION X AXIS

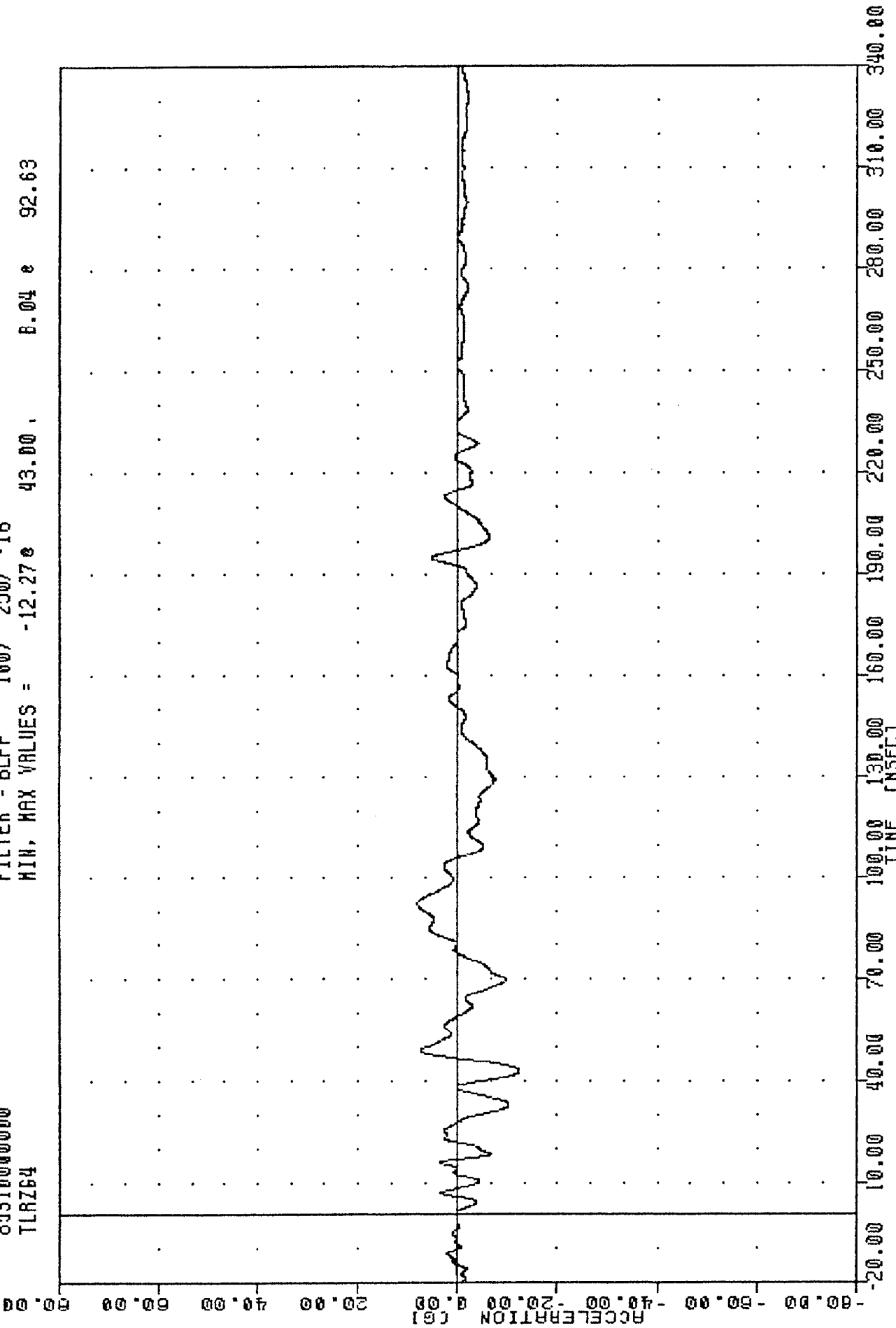
851106P  
CENTRAL CRASH RESPONSES

85310000000  
TLRZ64

PLLOT DATE 14 85 16:25:08

FILTER = BLPP 100/ 250/ .16

MIN, MAX VALUES = -12.27e 43.00, B.04 e 92.63



PARTNER VEHICLE - OMNI 65323  
LEFT REAR SEAT ACCELERATION Z AXIS

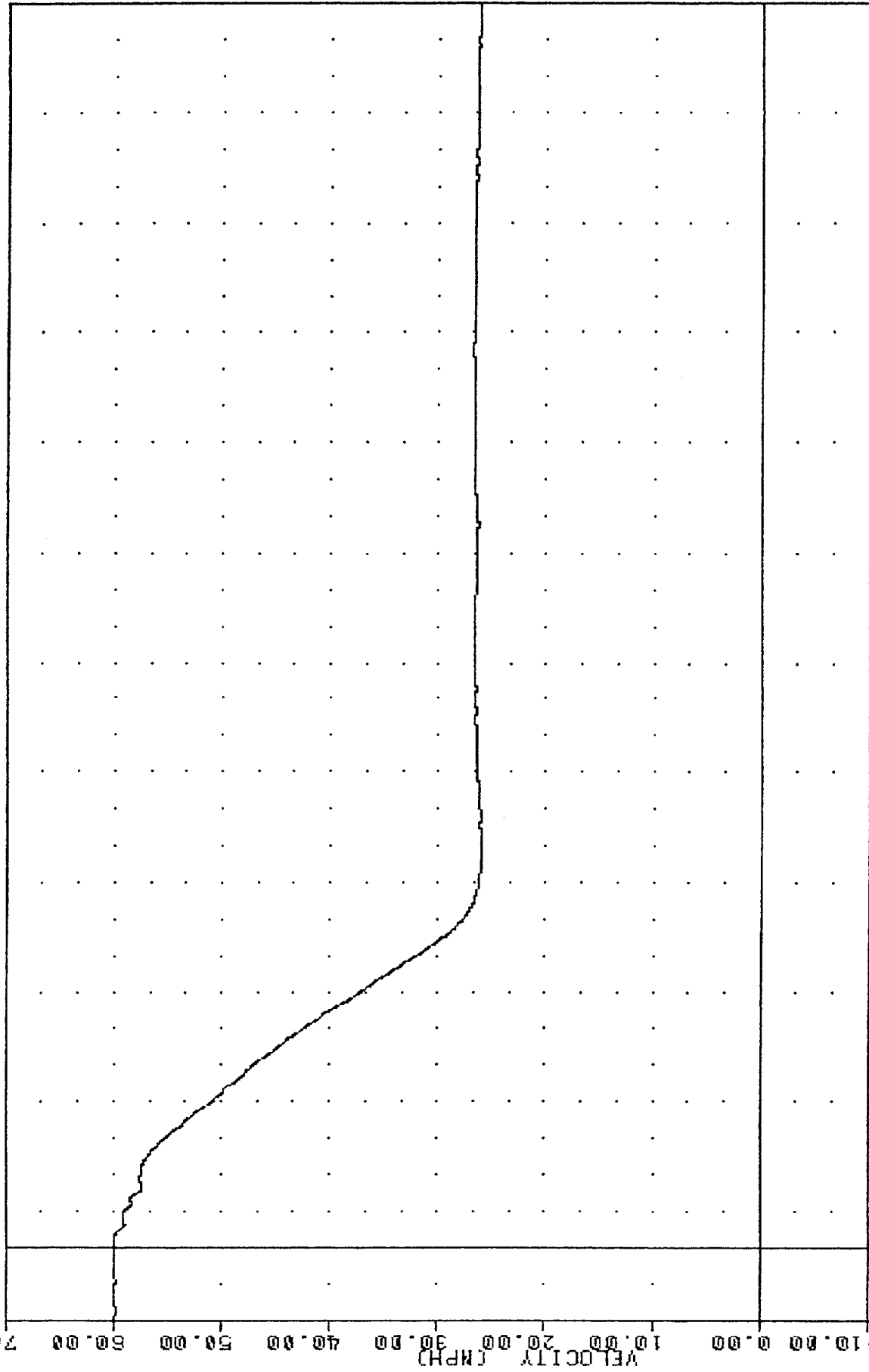
851106P  
 CENTAL CRASH RESPONSES  
 85310000000  
 TLRXV4

PLOT DATE 14-85 16:27:00

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = 25.98 107.75 59.98 -1.38

70.00



B-124

-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 - OMNI 65323

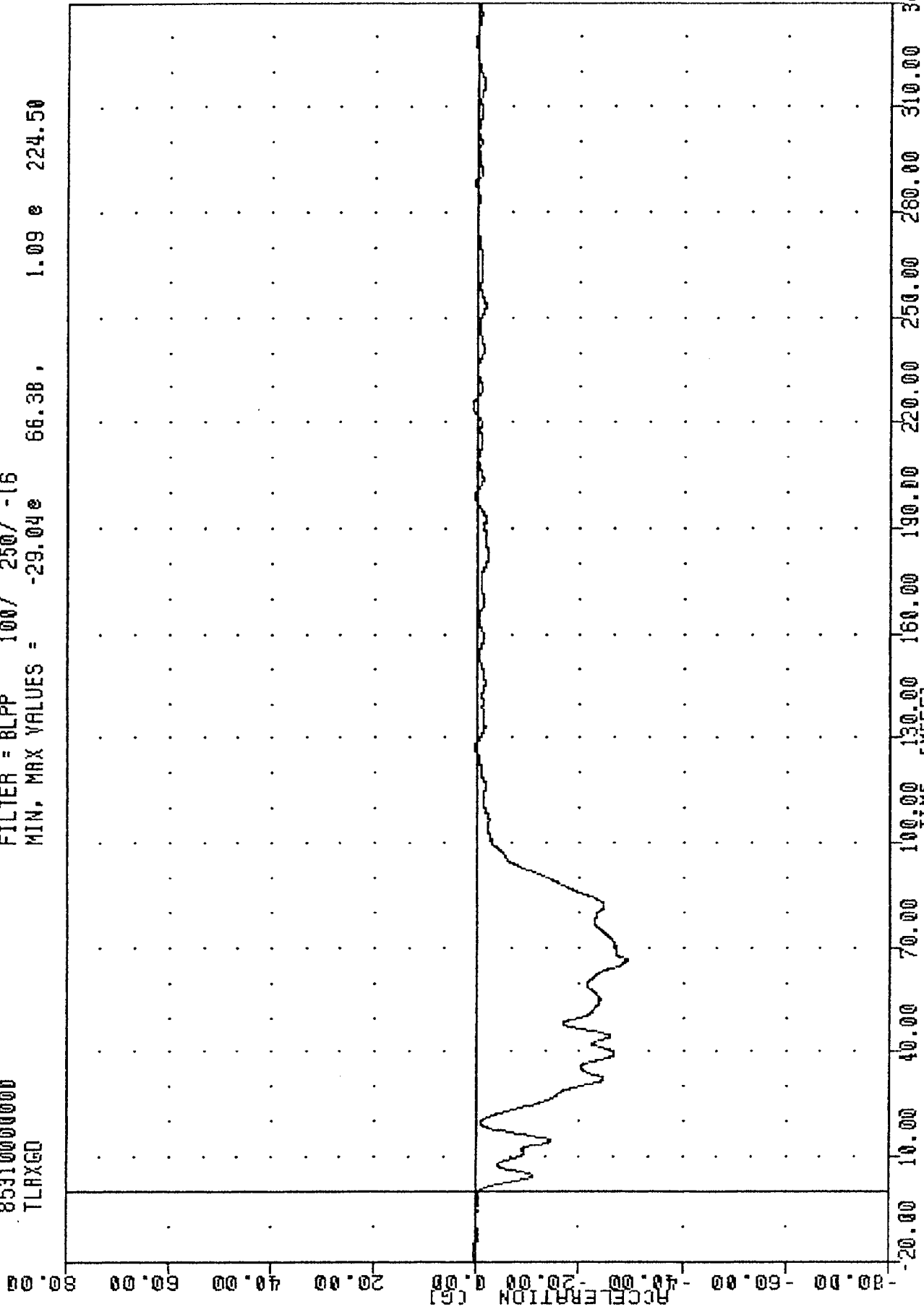
DELTA V USING TLRXG4

851106P  
CENTRAL CRASH RESPONSES  
8531000000  
TLRXGD

PLOT DATE 14-85 16:25:08

FILTER = BLPP 100/ 250/ -16

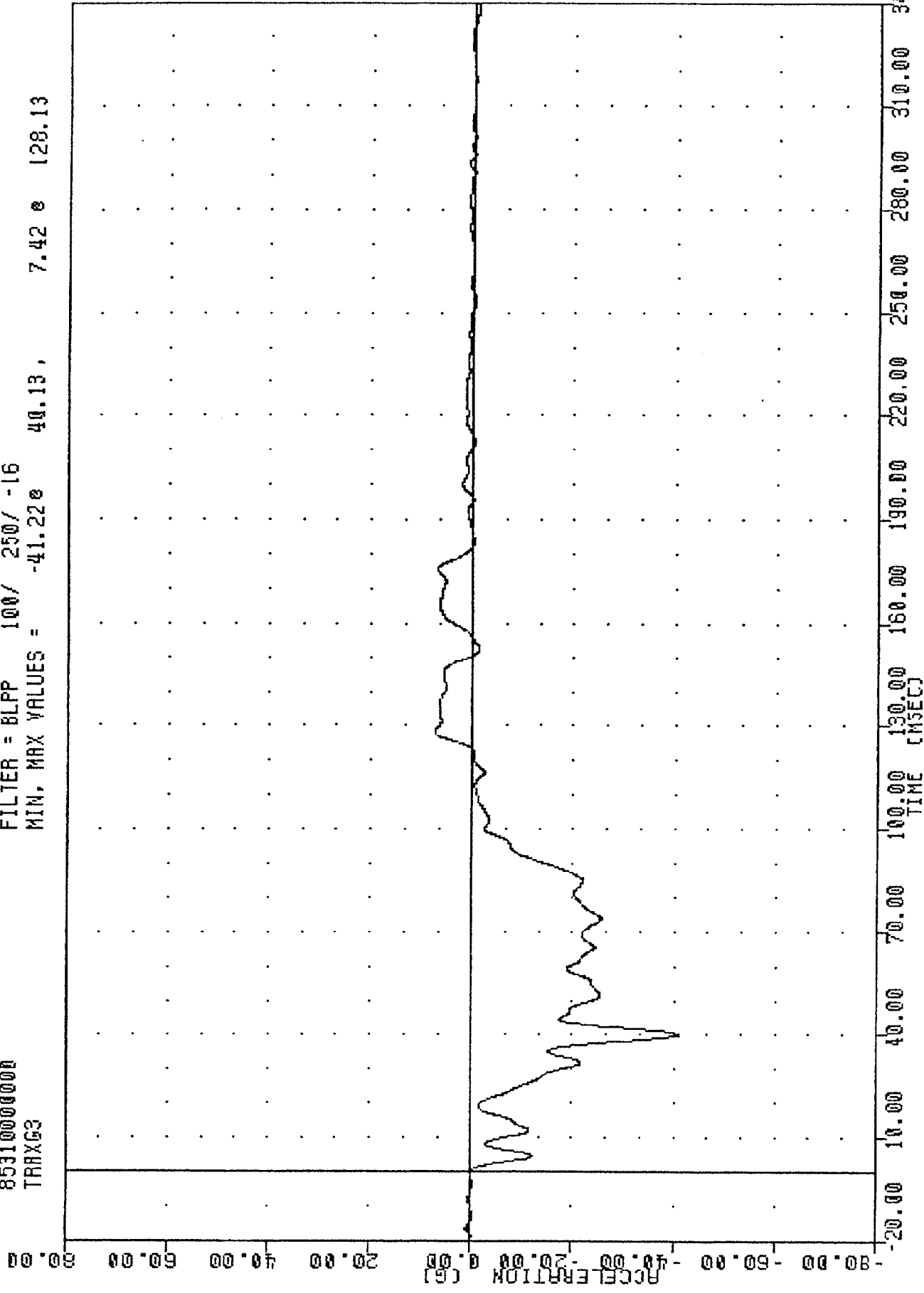
MIN. MAX VALUES = -29.04e 66.38, 1.09 e 224.50



PARTNER VEHICLE - OMNI 65323  
LEFT REAR SEAT ACCELERATION - 2 X AXIS

851106P  
CENTRAL CRASH RESPONSES  
853100000000  
TRAX63

PLOT DATE 14-85 16:25:08  
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = 40.13, 7.42 e 128.13



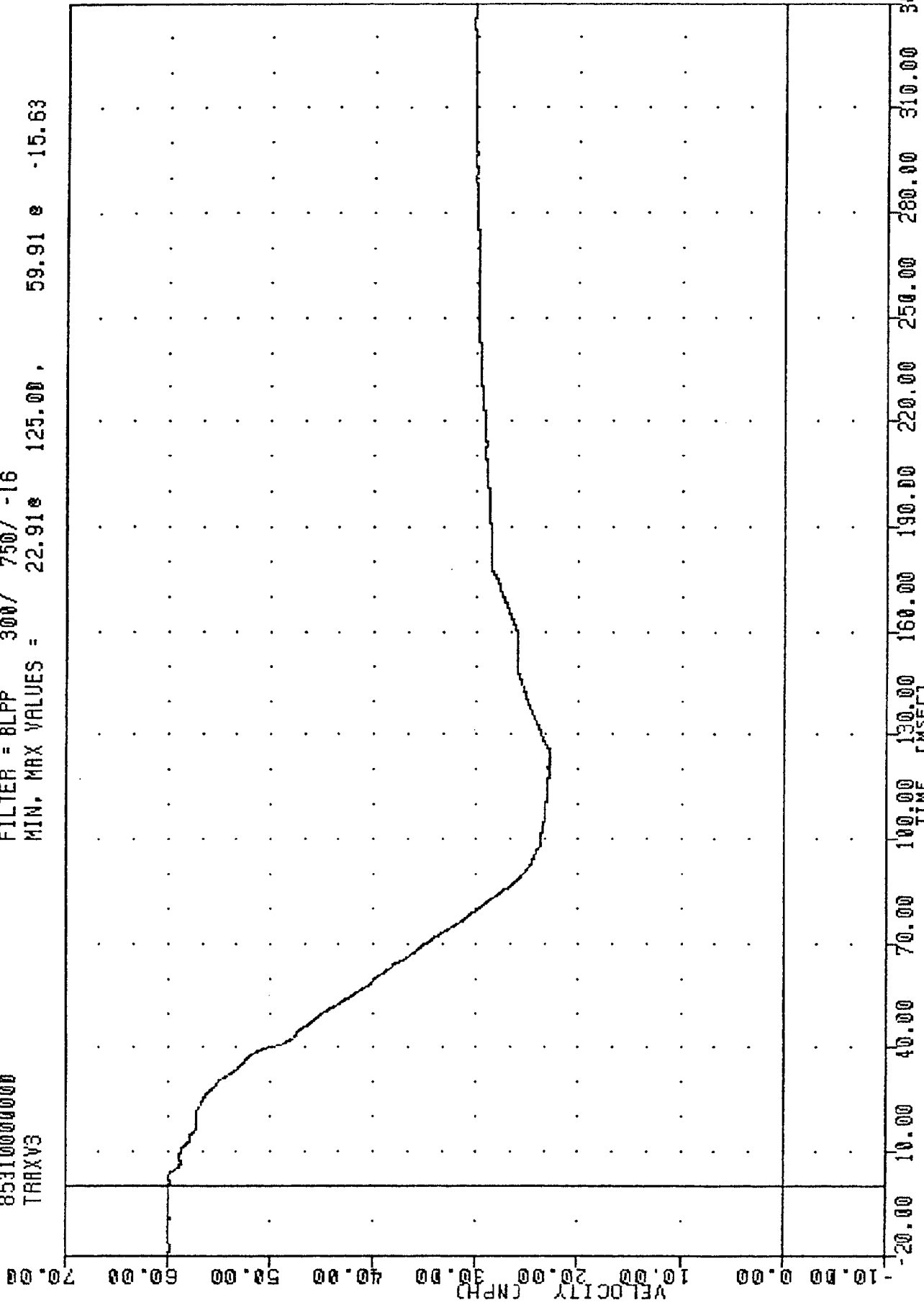
PARTNER VEHICLE - OMNI 65323  
RIGHT REAR SEAT ACCELERATION X AXIS

851106P  
CENTRAL CRASH RESPONSES  
85310000000  
TRRXV3

PLOT DATE 14-85 16:27:00

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = 22.91 125.00 , 59.91 -15.63



100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)  
PARTNER VEHICLE - OMNI 65923  
DELTA Y USING TRRXG3

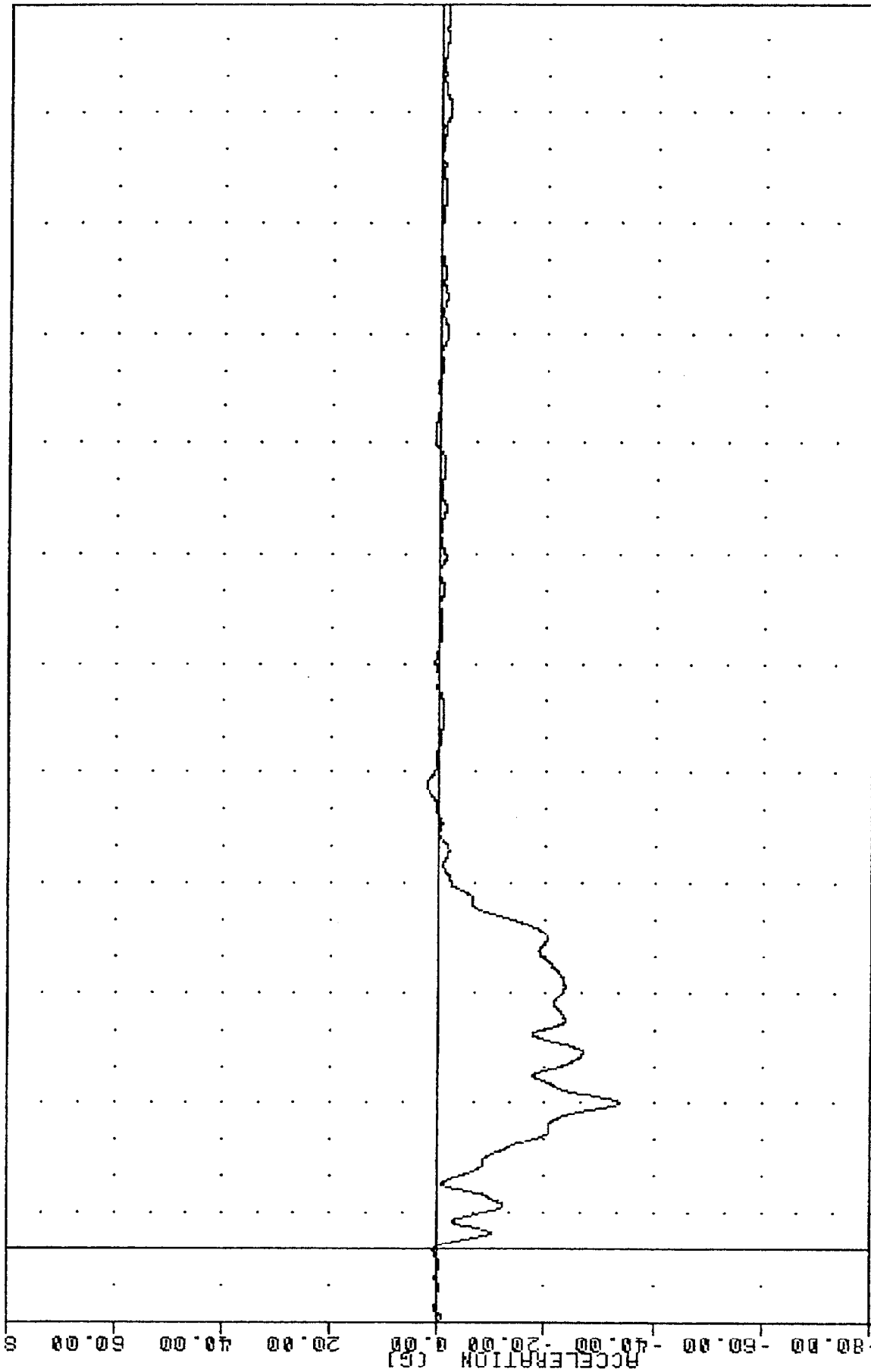
851106P  
CENTRAL CRASH RESPONSES  
85310000000  
TRAX6C

PLOT DATE 14-08-85 16:20:31

FILTER = 8LPP 100/ 250/ -16

MIN. MAX VALUES = -33.95e 40.13, 2.42 e 126.50

80.00  
-80.00



ACCELERATION (G)

TIME (MSEC) 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

PARTNER VEHICLE - OMNI 65923  
RIGHT REAR SEAT ACCELERATION #2 X AXIS

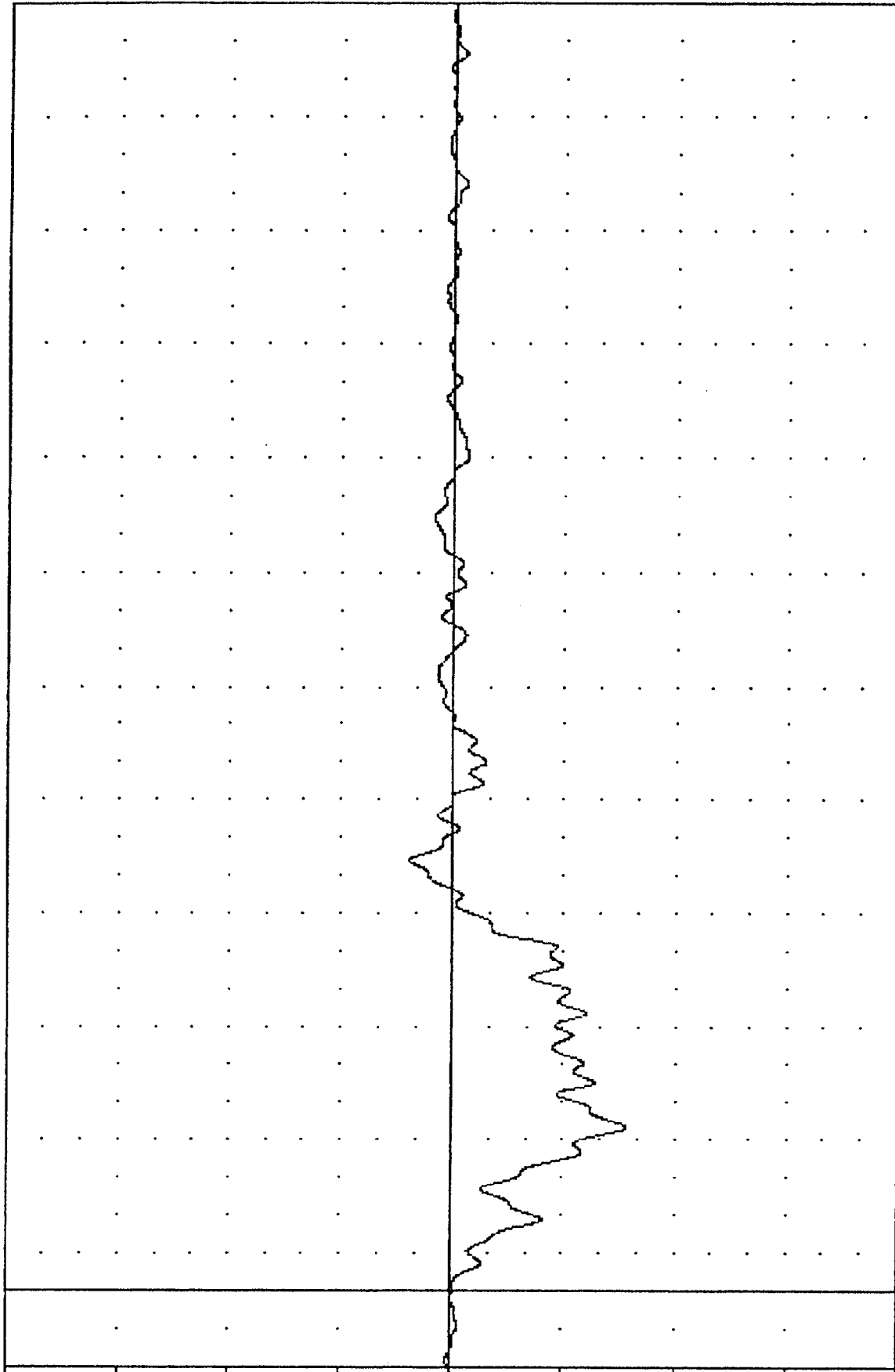
851106P  
FRONTAL CRASH RESPONSES  
853100000000  
RAXXG

PLOT DATE 14-08-85 16:25:08

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -31.48 43.25, 7.80 113.88

ACCELERATION (G)



TIME (MSEC) 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

PARTNER VEHICLE - OMNI 65323  
REAR AXLE ACCELERATION X AXIS

APPENDIX C  
DUMMY CERTIFICATION

PRE-TEST CALIBRATION

SUBJECT 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

EXTERNAL DIMENSIONS

PART 572

20-JUN-85

TEMPERATURE 68.00 F  
VRTC SRL 98 ED41104

RELATIVE HUMIDITY 70.00 %  
572 SN411 EXT.DIMENSIONS 04

DESCRIPTION	SPECIFICATION	TEST RESULTS
SN HUMANOID 411		
Sitting Height	35.6 - 35.8IN	35.6 INS
Shoulder Pivot Height	21.8 - 22.4IN	22.4 INS
Hip Pivot Height	3.9 IN (ref.)	3.9 INS
Hip Pivot From Backline	4.8 IN (ref.)	4.8 INS
Knee Pivot From Backline	20.1 - 20.7IN	20.2 INS
Rear of Head From Backline	1.7 IN (ref)	1.7 INS
Chest Depth	9.1 - 9.6IN	9.4 INS
Shoulder Width	17.8 - 18.4IN	17.9 INS
Chest Circumference Over Nipples	36.8 - 40.0IN	37.1 INS
Waist Circumference at Min. Girth	31.4 - 32.6IN	32.2 INS
Hip Width	14.0 - 15.4IN	14.6 INS
Knee Pivot From Floor	19.3 - 19.9IN	19.3 INS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Todd Tomlin

TEST SUPERVISOR V.F. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

LUMBAR FLEXION TEST

PART 572

20-JUN-85

TEMPERATURE 68.00 F  
VRTC SRL 98 LF41104

RELATIVE HUMIDITY 70.00 %  
572 SN411 LUMBAR FLEX CAL 04

DEFLECTION	SPECIFICATION	TEST RESULTS
0 Deg.	0 LBS	0.00 LBS
20 Deg	22.00 - 34.00 LBS	31.00 LBS
30 Deg	34.00 - 46.00 LBS	37.00 LBS
40 Deg	46.00 - 58.00 LBS	49.00 LBS
NET RETURN ANGLE	< 12 DEG	10.45 DEG

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Bob Taylor*

TEST SUPERVISOR *V.L. Waters*

TRANSPORTATION RESEARCH CENTER OF OHIO

ABDOMINAL COMPRESSION TEST

PART 572

20-JUN-85

TEMPERATURE 70.00 F  
VRTC SRL 98 AB41104

RELATIVE HUMIDITY 68.00 %  
572 SN411 ABDOM COMPR CAL 04

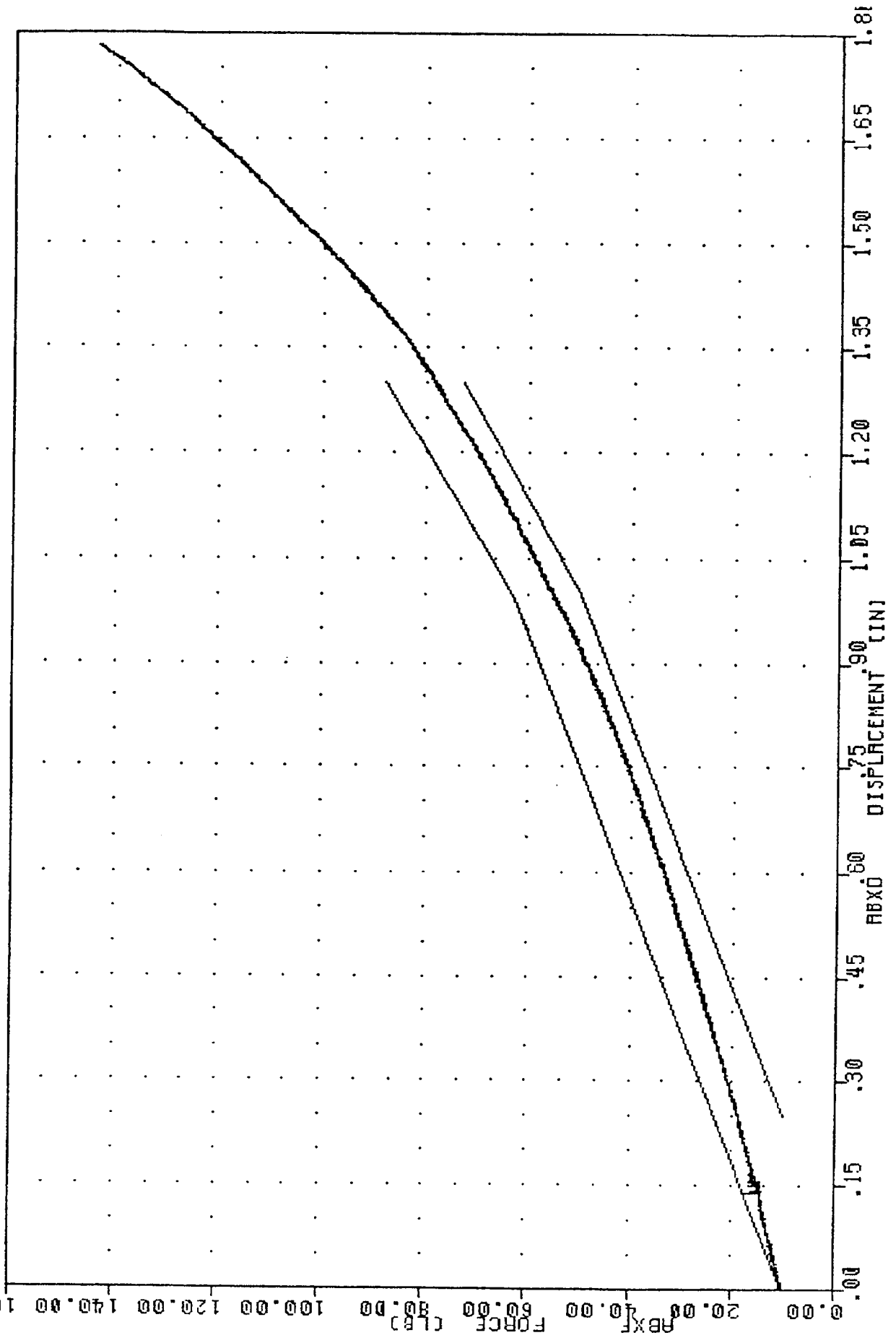
TEST CORRIDORS		
DISPLACEMENT	FORCE	TEST RESULTS
0 IN.	10 LBS	10 LBS
.50 IN.	23.00 - 36.00 LBS	29.13 LBS
.75 IN.	36.00 - 50.00 LBS	40.54 LBS
1.00 IN.	50.00 - 63.00 LBS	55.55 LBS
1.30 IN.	73.00 - 88.00 LBS	78.53 LBS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Todd Tondin*

TEST SUPERVISOR *V.L. Watters*

NCA : AB41104  
 FILTER = ALPF  
 FILTER = ALPF  
 572 SN411 ABDOM COMPR  
 1650/ 5214/ -40  
 1650/ 5214/ -40  
 85171  
 0.00  
 8.91  
 04  
 MIN, MAX =  
 MIN, MAX =  
 20-JUN-85  
 0.00  
 0.00  
 1.78  
 143.59  
 1.78  
 12:24:10



ABDOMINAL COMPLIANCE VS DISPLACEMENT

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

PART 572

20-JUN-85

TEMPERATURE 71 F  
VRTC SRL 98 HD41104

RELATIVE HUMIDITY 66 %  
572 SN 411 HEAD DROP CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PEAK RESULTANT ACCELERATION	210 - 260 G	236.99 G
TIME ABOVE 100 G LEVEL	0.9 - 1.5 MS	1.25 MS
PEAK LATERAL ACCELERATION	10 G MAX	4.94 G
IS ACCELERATION CURVE UNIMODAL?		YES

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Todd Tomlin

TEST SUPERVISOR V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK PENDULUM TEST

PART 572

20-JUN-85

TEMPERATURE 72.00 F  
VRTC SRL 98 HN41104

RELATIVE HUMIDITY 62.00 %  
572 SN 411 HEAD/NECK CAL 04

Test Parameter	Specification	Test Results
Pendulum velocity	21.5 to 25.5 fps	22.22 fps
Pendulum Deceleration:		
T1 - T2: 5 - 20 G	3 ms. max	2.14 ms.
T2 - T3: 20 - 20 G	25 - 30 ms.	26.11 ms.
T3 - T4: 20 - 5 G	10 ms. max	8.06 ms.
Avg. G level T2 - T3	20 - 24 G	21.71 G
Maximum Rotation Angle	63 - 73 deg.	65.10 deg.
Peak Head Resultant Accel	26 G max	21.03 G

Test Parameter	Specification		Test Results	
Rotation Angle (degrees)	Time (ms.)	Chordal Disp. (in.)	Time (ms.)	Chordal Disp. (in.)
0	-2.0 - +2.0	-0.5 - +0.5	0.25	0.08
30	25.6 - 34.4	2.1 - 3.1	31.42	2.45
60	40.3 - 51.7	4.3 - 5.3	49.28	4.76
max	53.2 - 66.8	5.0 - 6.0	60.25	5.30
60	67.0 - 83.0	4.3 - 5.3	72.95	4.87
30	85.4 - 104.6	2.1 - 3.1	94.10	2.40
0	101.0 - 123.0	-0.5 - +0.5	108.41	0.13

\* DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Paul Loulin*

TEST SUPERVISOR *K. J. Watters*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

21-JUN-85

TEMPERATURE 74 F  
VRTC SRL 98 TL41104

RELATIVE HUMIDITY 66 %  
572 SN 411 L.S.THORAX CAL 04

LOW SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	13.86-14.14 FT/SEC	14.04 FT/SEC
PEAK DEFLECTION	1.1 INCHES MAX.	0.99 INCHES
PEAK RESISTIVE FORCE	1,450. POUNDS MAX.	1283. POUNDS
INTERNAL HYSTERESIS	50% - 70%	59.3%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Todd Tomlin*

TEST SUPERVISOR *V.L. Watters*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

21-JUN-85

TEMPERATURE 73 F  
VRTC SRL 98 TH41104

RELATIVE HUMIDITY 66 %  
572 SN 411 H.S. THORAX CAL 04

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
PENDULUM VELOCITY	21.78-22.22 FT/SEC	21.78 FT/SEC
PEAK DEFLECTION	1.7 INCHES MAX.	1.47 INCHES
PEAK RESISTIVE FORCE	2,250. POUNDS MAX.	1991. POUNDS
INTERNAL HYSTERESIS	50% - 70%	61.3%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Todd Tomlin

TEST SUPERVISOR V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

21-JUN-85

TEMPERATURE 73 F  
LEFT KNEE  
VRTC SRL 98 LK41104

RELATIVE HUMIDITY 66 %  
572 SN 411 L.KNEE IMP CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	1855.50 LBS.
DURATION ABOVE 1000 LBS.	$\geq 1.7$ MS.	1.73 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Todd Tomlin

TEST SUPERVISOR V.J. Waters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

21-JUN-85

TEMPERATURE 71 F  
 RIGHT KNEE  
 YRTC SRL 98 RK41104

RELATIVE HUMIDITY 67 %  
 572 SN 411 R.KNEE IMP CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	2092.78 LBS.
DURATION ABOVE 1000 LBS.	>=1.7 MS.	1.70 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Todd Tomlin*

TEST SUPERVISOR *V.L. Waters*

PRE-TEST CALIBRATION

PARTNER VEHICLE

TRANSPORTATION RESEARCH CENTER OF OHIO

EXTERNAL DIMENSIONS

PART 572

19-JUN-85

TEMPERATURE 69.00 F  
VRTC SRL 98 ED83007

RELATIVE HUMIDITY 65.00 %  
572 SN830 EXT.DIMENSIONS 07

DESCRIPTION	SPECIFICATION	TEST RESULTS
SN ALDERSON RESEARCH LAB 830		
Sitting Height	35.6 - 35.8 IN	35.7 INS
Shoulder Pivot Height	21.8 - 22.4 IN	22.4 INS
Hip Pivot Height	3.9 IN (ref.)	3.9 INS
Hip Pivot From Backline	4.8 IN (ref.)	4.8 INS
Knee Pivot From Backline	20.1 - 20.7 IN	20.5 INS
Rear of Head From Backline	1.7 IN (ref)	1.7 INS
Chest Depth	9.1 - 9.6 IN	9.4 INS
Shoulder Width	17.8 - 18.4 IN	17.8 INS
Chest Circumference Over Nipples	36.8 - 40.0 IN	37.4 INS
Waist Circumference at Min. Girth	31.4 - 32.6 IN	32.2 INS
Hip Width	14.0 - 15.4 IN	14.4 INS
Knee Pivot From Floor	19.3 - 19.9 IN	19.4 INS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Bob Tomlin*

TEST SUPERVISOR *K.F. Watters*

TRANSPORTATION RESEARCH CENTER OF OHIO

LUMBAR FLEXION TEST

PART 572

23-SEP-85

TEMPERATURE 69.00 F  
VRTC SRL 98 LFB3007B

RELATIVE HUMIDITY 70.00 %  
572 SN 830 LUMBAR FLEX CAL 07

DEFLECTION	SPECIFICATION	TEST RESULTS
0 Deg.	0 LBS	0.00 LBS
20 Deg	22.00 - 34.00 LBS	32.00 LBS
30 Deg	34.00 - 46.00 LBS	40.00 LBS
40 Deg	46.00 - 58.00 LBS	46.00 LBS
NET RETURN ANGLE	< 12 DEG	9.38 DEG

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Larry J. Phelps*

TEST SUPERVISOR *Vernon J. Walters*

TRANSPORTATION RESEARCH CENTER OF OHIO

ABDOMINAL COMPRESSION TEST

PART 572

23-SEP-85

TEMPERATURE 69.00 F  
 YRIC SRL 98 AB83007B

RELATIVE HUMIDITY 69.00 %  
 572 SN 830 ABDOM COMPR CAL 07B

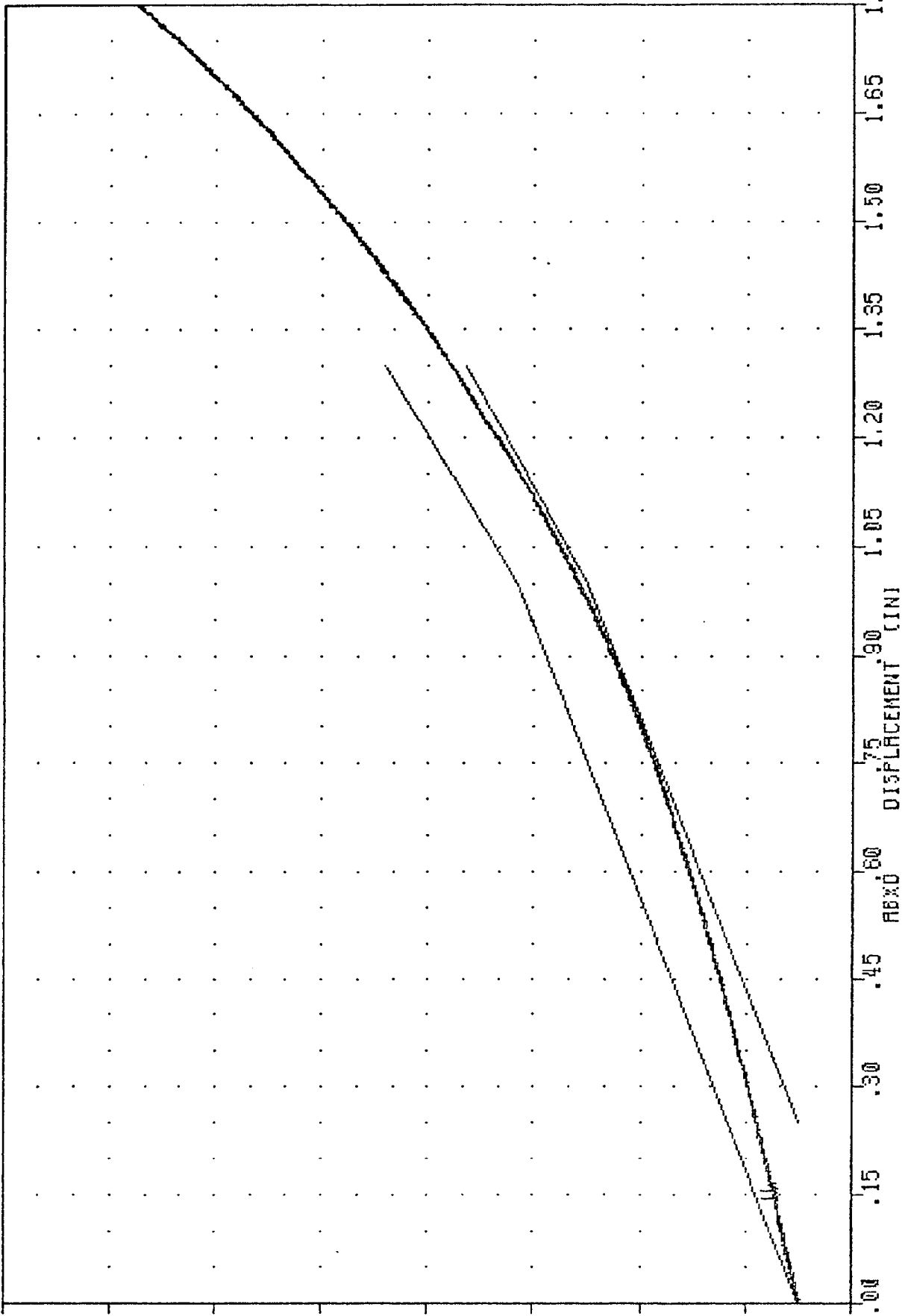
TEST CORRIDORS		TEST RESULTS
DISPLACEMENT	FORCE	
0 IN.	10 LBS	10 LBS
.50 IN.	23.00 - 36.00 LBS	26.95 LBS
.75 IN.	36.00 - 50.00 LBS	37.62 LBS
1.00 IN.	50.00 - 63.00 LBS	51.59 LBS
1.30 IN.	73.00 - 88.00 LBS	75.46 LBS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Harry J. Phelps*  
 TEST SUPERVISOR *Virginia J. Watters*

SN: AB830078      572 SN 830 ABDOM COMP      078      85266      PLOT DATE 23-SEP-85      5:48:37  
 FILTER = ALPF      1650/ 5214/ -40      MIN. MAX =      0.00 8      0.00 8      136.92  
 FILTER = ALPF      1650/ 5214/ -40      MIN. MAX =      9.81 0      0.00 8      137.30 8      1.82

ABXF      0.00      20.00      40.00      60.00      80.00      100.00      120.00      140.00      160.00      180.00  
 FORCE (LB)      0.00      1.00      2.00      3.00      4.00      5.00      6.00      7.00      8.00      9.00      10.00      11.00      12.00      13.00      14.00      15.00      16.00      17.00      18.00  
 ABXD      0.00      0.15      0.30      0.45      0.60      0.75      0.90      1.05      1.20      1.35      1.50      1.65      1.80



ABDOMINAL COMPRESSION VS DISPLACEMENT

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

PART 572

20-JUN-85

TEMPERATURE 71 F  
 VRTC SRL 98 HD83007

RELATIVE HUMIDITY 68 %  
 572 SN 830 HEAD DROP CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PEAK RESULTANT ACCELERATION	210 - 260 G	213.97 G
TIME ABOVE 100 G LEVEL	0.9 - 1.5 MS	1.27 MS
PEAK LATERAL ACCELERATION	10 G MAX	-7.52 G
IS ACCELERATION CURVE UNIMODAL?		YES

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Ed Lamb*

TEST SUPERVISOR *V.L. Watters*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK PENDULUM TEST

PART 572

20-JUN-85

TEMPERATURE 71.00 F  
VRTC SRL 98 HNB3007

RELATIVE HUMIDITY 63.00 %  
572 SN 830 HEAD/NECK CAL 07

Test Parameter	Specification	Test Results
Pendulum velocity	21.5 to 25.5 fps	25.00 fps
Pendulum Deceleration:		
T1 - T2: 5 - 20 G	3 ms. max	2.20 ms.
T2 - T3: 20 - 20 G	25 - 30 ms.	28.11 ms.
T3 - T4: 20 - 5 G	10 ms. max	6.54 ms.
Avg. G level T2 - T3	20 - 24 G	23.76 G
Maximum Rotation Angle	63 - 73 deg.	68.77 deg.
Peak Head Resultant Accel	26 G max	25.55 G

Test Parameter	Specification	Test Results
Rotation Angle (degrees)	Time (ms.)	Chordal Disp. (in.)
0	-2.0 - +2.0	-0.5 - +0.5
30	25.6 - 34.4	2.1 - 3.1
60	40.3 - 51.7	4.3 - 5.3
max	53.2 - 66.8	5.0 - 6.0
60	67.0 - 83.0	4.3 - 5.3
30	85.4 - 104.6	2.1 - 3.1
0	101.0 - 123.0	-0.5 - +0.5

\* DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Todd Tomlin*

TEST SUPERVISOR *V. J. Watters*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

21-JUN-85

TEMPERATURE 74 F  
VRTC SRL 98 TL83007

RELATIVE HUMIDITY 65 %  
572 SN 830 L.S.THORAX CAL 07

LOW SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	13.86-14.14 FT/SEC	14.04 FT/SEC
PEAK DEFLECTION	1.1 INCHES MAX.	0.92 INCHES
PEAK RESISTIVE FORCE	1,450. POUNDS MAX.	1356. POUNDS
INTERNAL HYSTERESIS	50% - 70%	62.3%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Ed Tomlin*

TEST SUPERVISOR *V.L. Watters*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

21-JUN-85

TEMPERATURE 74 F  
VRTC SRL 98 TH83007

RELATIVE HUMIDITY 66 %  
572 SN 830 H.S.THORAX CAL 07

HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	21.78-22.22 FT/SEC	21.78 FT/SEC
PEAK DEFLECTION	1.7 INCHES MAX.	1.37 INCHES
PEAK RESISTIVE FORCE	2,250. POUNDS MAX.	2045. POUNDS
INTERNAL HYSTERESIS	50% - 70%	59.8%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Todd Tomlin

TEST SUPERVISOR K.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

20-JUN-85

TEMPERATURE 72 F  
 LEFT KNEE  
 VRTC SRL 98 LK83007

RELATIVE HUMIDITY 62 %  
 572 SN 830 L.KNEE IMP CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.94 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	2175.00 LBS.
DURATION ABOVE 1000 LBS.	>=1.7 MS.	1.73 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Todd Tomlin*

TEST SUPERVISOR *V.L. Wetters*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

21-JUN-85

TEMPERATURE 71 F  
 RIGHT KNEE  
 VRTC SRL 98 RK83007

RELATIVE HUMIDITY 67 %  
 572 SN 830 R.KNEE IMP CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	2222.11 LBS.
DURATION ABOVE 1000 LBS.	>=1.7 MS.	1.81 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Todd Tomlin

TEST SUPERVISOR V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

19-SEP-85

VRTC SRL98 45C16HD1

HY3 SN45 HEAD#U1 CAL 16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	68.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	260.46 G
PEAK LATERAL ACCELERATION	15 G MAX	-6.82 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Harry S. Phelps*

TEST SUPERVISOR *V. E. Walters*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

26-JUL-85

VRTC SRL98 61C12NF1

HY3 SN61 CAL12 NECK FLEXION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	69.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
IMPACT VELOCITY	22.53 - 22.97 FPS	22.86 FPS
PENDULUM DECELERATION	10 MS   22.50 - 27.50 G	24.67 G
	20 MS   17.40 - 22.60 G	21.46 G
	30 MS   12.50 - 18.50 G	18.20 G
MAXIMUM PENDULUM G	29 G MAX	24.78 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	34 - 46 MS	41.88 MS
D PLANE ROTATION	MAX   67 - 79 DEGREES	74.14 DEGREES
	TIME   54 - 64 MS	61.38 MS
MOMENT ABOUT OCCIPITAL	MAX   70 - 90 FT. LBS	69.94 FT. LBS **
	TIME   46 - 56 MS	54.88 MS
CONDYLES	MIN   -22.2/-14.0 FT. LBS	-14.49 FT. LBS
	TIME   12 - 16 MS	15.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	109 - 119 MS	119.25 MS **
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	95 - 105 MS	103.13 MS

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN *Mary L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

26-JUL-85

VRTC SRL9B 61C12NE1

HY3 SN61 CAL12 NECK EXTENSION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	69.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
IMPACT VELOCITY	19.50 - 19.90 FPS	19.51 FPS
PENDULUM DECELERATION	10 MS   17.20 - 21.20 G	19.15 G
	20 MS   14.00 - 19.00 G	16.56 G
	30 MS   11.00 - 16.00 G	15.26 G
MAXIMUM PENDULUM G	22 G MAX	20.71 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	38 - 50 MS	42.50 MS
D PLANE ROTATION	MAX   94 - 106 DEGREES TIME   72 - 82 MS	92.45 DEGREES ** 76.63 MS
MOMENT ABOUT OCCIPITAL	MAX   11.75 - 17.75 FT. LB	13.76 FT. LBS
	TIME   12 - 18 MS	15.25 MS
CONDYLES	MIN   -61.2/-50.8 FT. LBS	-45.37 FT. LBS **
	TIME   69 - 77 MS	74.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	151 - 167 MS	159.00 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	120 - 144 MS	139.63 MS

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN Gay S. Phelps

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

11-OCT-85

VRTC SRL98 45C18TH1

HY3 SN 45 H. S. THORAX CAL 18

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	66 - 78 DEGREES	71.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	64.00 %
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
DEFLECTION AT 25 MSEC	2.51 - 2.75 INCHES	2.666 INCHES
RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1172.6 POUNDS *
INTERNAL HYSTERESIS	75% - 85%	74.6% *

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN Gary L. Phelps

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

20-SEP-85

LEFT KNEE  
VRTC SRL98 45C16LN1

HY3 SN45 L.KNEE 11LB CAL 16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	68.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	69.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1492.37 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Harry L. Phelps

TEST SUPERVISOR K. L. Walters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

20-SEP-85

RIGHT KNEE  
VRTC SRL98 45C16RK1

HY3 SN45 R.KNEE 11LB CAL 16

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	68.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	69.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1474.47 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Harry L. Phelps*

TEST SUPERVISOR *W. E. W. Otter*

POST-TEST CALIBRATION

SUBJECT VEHICLE



TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

12-NOV-85

VRTC SRL98 48C21HD1

HY3 SN48/HEAD#48 CAL 21

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	72.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	267.10 G
PEAK LATERAL ACCELERATION	15 G MAX	2.61 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Gay L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

6 AXIS NECK TRANSDUCER

12-NOV-85

VRTC SRL98 48C21NF1

HY3 SN48 CAL21 NECK FLEXION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	72.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
IMPACT VELOCITY	22.53 - 22.97 FPS	22.94 FPS
PENDULUM DECELERATION	10 MS   22.50 - 27.50 G	24.18 G
	20 MS   17.40 - 22.60 G	20.73 G
	30 MS   12.50 - 18.50 G	16.53 G
MAXIMUM PENDULUM G	29 G MAX	27.98 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	34 - 46 MS	42.13 MS
D PLANE ROTATION	MAX   67 - 79 DEGREES	74.63 DEGREES
	TIME   54 - 64 MS	60.38 MS
MOMENT ABOUT OCCIPITAL	MAX   70 - 90 FT.LBS	74.45 FT.LBS
	TIME   46 - 56 MS	56.00 MS
CONDYLES	MIN   -22.2/-14.0 FT.LBS	-15.61 FT.LBS
	TIME   12 - 16 MS	15.88 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	104.25 MS

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN *Gay L Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

13-NOV-85

VRTC SRL98 48C21TH1

HY3 SN48 CAL21 H.S.THORAX 01

HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	72.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.00 FT/SEC
DEFLECTION AT 25 MSEC	2.51 - 2.75 INCHES	2.607 INCHES
RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1162.7 POUNDS *
INTERNAL HYSTERESIS	75% - 85%	77.8%

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN *Harry L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

13-NOV-85

RIGHT KNEE  
VRTC SRL98 48C21RK1

HY3 SN48 R.KNEE 11LB CAL 21

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	72.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1342.58 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Harry L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

13-NOV-85

LEFT KNEE  
VRTC SRL98 48C21LK1

HY3 SN48 L.KNEE 11LB CAL 21

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	73.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1422.25 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Mary L. Phelps*



TRANSPORTATION RESEARCH CENTER OF OHIO

EXTERNAL DIMENSIONS

PART 572

13-NOV-85

TEMPERATURE 73.00 F  
VRTC SRL98 ED41105

RELATIVE HUMIDITY 70.00 %  
572 SN 411 EXT. DIMENSIONS 05

DESCRIPTION	SPECIFICATION	TEST RESULTS
SN HUMANIOD 411		
Sitting Height	35.6 - 35.8IN	35.6 INS
Shoulder Pivot Height	21.8 - 22.4IN	22.4 INS
Hip Pivot Height	3.9 IN (ref.)	3.9 INS
Hip Pivot From Backline	4.8 IN (ref.)	4.8 INS
Knee Pivot From Backline	20.1 - 20.7IN	20.3 INS
Rear of Head From Backline	1.7 IN (ref)	1.7 INS
Chest Depth	9.1 - 9.6IN	9.4 INS
Shoulder Width	17.8 - 18.4IN	17.9 INS
Chest Circumference Over Nipples	36.8 - 40.0IN	37.8 INS
Waist Circumference at Min. Girth	31.4 - 32.6IN	32.4 INS
Hip Width	14.0 - 15.4IN	15.1 INS
Knee Pivot From Floor	19.3 - 19.9IN	19.5 INS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

*Harry L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

LUMBAR FLEXION TEST

PART 572

13-NOV-85

TEMPERATURE 74.00 F  
 URTC SRL98 LF41105

RELATIVE HUMIDITY 70.00 %  
 572 SN 411 LUMBAR FLEX CAL 05

DEFLECTION	SPECIFICATION	TEST RESULTS
0 Deg.	0 LBS	0.00 LBS
20 Deg	22.00 - 34.00 LBS	30.00 LBS
30 Deg	34.00 - 46.00 LBS	38.00 LBS
40 Deg	46.00 - 58.00 LBS	47.00 LBS
NET RETURN ANGLE	< 12 DEG	8.76 DEG

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Mary L. Phelps

TRANSPORTATION RESEARCH CENTER OF OHIO

ABDOMINAL COMPRESSION TEST

PART 572

14-NOV-85

TEMPERATURE 72.00 F  
VRTC SRL98 AB41105

RELATIVE HUMIDITY 70.00 %  
572 SN411 ABDOM COMPR CAL 05

TEST CORRIDORS		
DISPLACEMENT	FORCE	TEST RESULTS
0 IN.	10 LBS	10 LBS
.50 IN.	23.00 - 36.00 LBS	29.14 LBS
.75 IN.	36.00 - 50.00 LBS	42.57 LBS
1.00 IN.	50.00 - 63.00 LBS	59.65 LBS
1.30 IN.	73.00 - 88.00 LBS	86.81 LBS

DUMMY MEETS SPECIFICATIONS

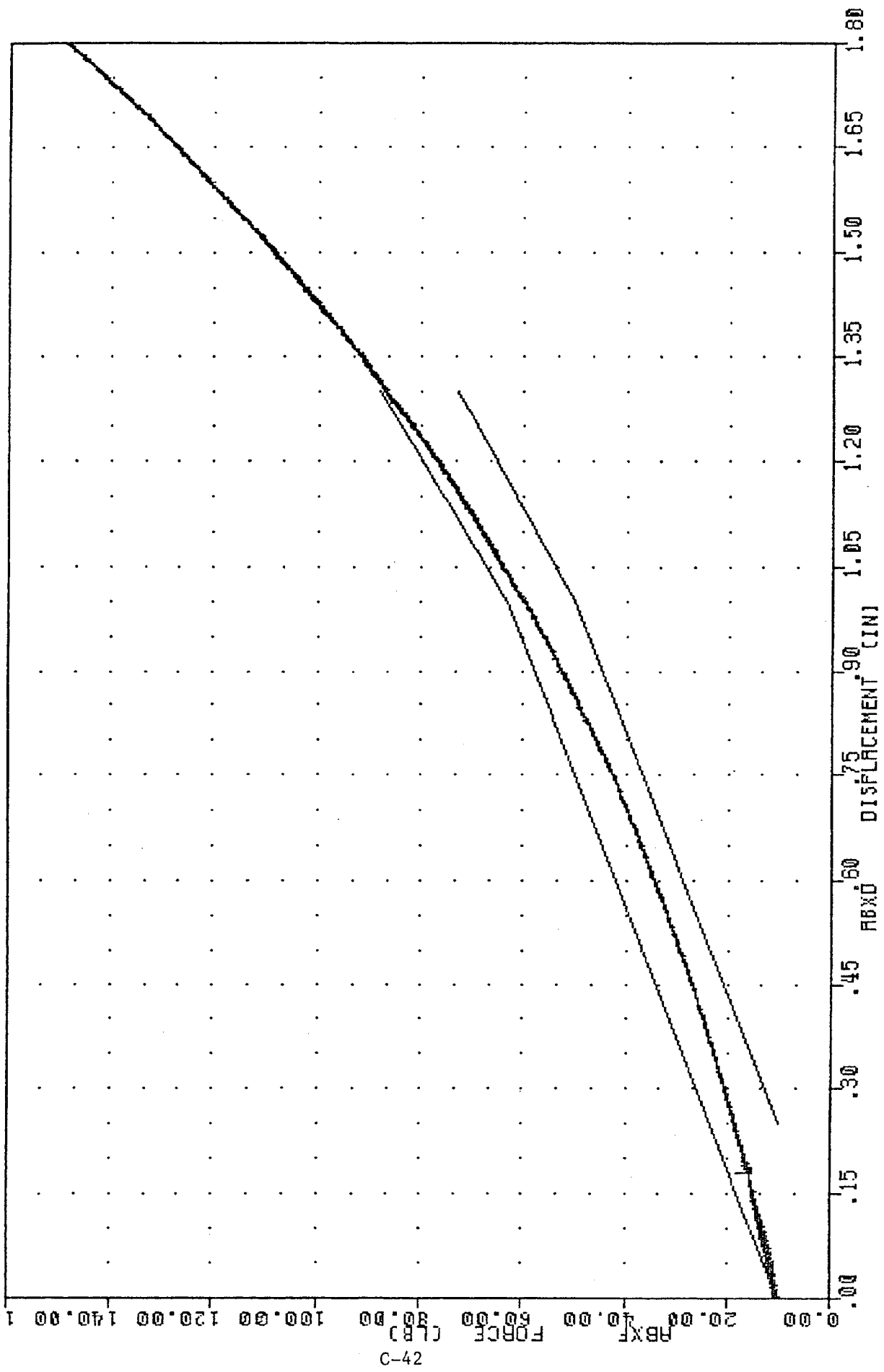
TECHNICIAN Gay S. Phelps

VRI L98 AB41105 572 SN411 ABDOM COMPRA C 85318 25:31  
 ABXF FILTER = ALPF 1650/ 5214/ -40 MIN, MAX 0.00 0 150.58  
 ABXF FILTER = ALPF 1650/ 5214/ -40 MIN, MAX 9.76 0 151.04 1.81

14-NOV-85

PLOT DATE

0.00 0.00 0.00 0.00



24-C

ABDOMINAL COMPRESSION VS DISPLACEMENT

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

PART 572

14-NOV-85

TEMPERATURE 73 F  
VRTC SRL98 HD41105

RELATIVE HUMIDITY 70 %  
572 SN 411 HEAD DROP CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PEAK RESULTANT ACCELERATION	210 - 260 G	236.97 G
TIME ABOVE 100 G LEVEL	0.9 - 1.5 MS	1.27 MS
PEAK LATERAL ACCELERATION	10 G MAX	-3.85 G
IS ACCELERATION CURVE UNIMODAL?		YES

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

*Mary L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK PENDULUM TEST

PART 572

14-NOV-85

TEMPERATURE 73.00 F  
VRTC SRL98 HN41105

RELATIVE HUMIDITY 70.00 %  
572 SN 411 HEAD/NECK CAL 05

Test Parameter	Specification	Test Results
Pendulum velocity	21.5 to 25.5 fps	21.99 fps
Pendulum Deceleration:		
T1 - T2: 5 - 20 G	3 ms. max	2.30 ms.
T2 - T3: 20 - 20 G	25 - 30 ms.	26.59 ms.
T3 - T4: 20 - 5 G	10 ms. max	7.11 ms.
Avg. G level T2 - T3	20 - 24 G	21.44 G
Maximum Rotation Angle	63 - 73 deg.	64.49 deg.
Peak Head Resultant Accel	26 G max	22.00 G

Test Parameter	Specification		Test Results	
Rotation Angle (degrees)	Time (ms.)	Chordal Disp. (in.)	Time (ms.)	Chordal Disp. (in.)
0	-2.0 - +2.0	-0.5 - +0.5	0.38	0.05
30	25.6 - 34.4	2.1 - 3.1	31.47	2.46
60	40.3 - 51.7	4.3 - 5.3	50.57	4.82
max	53.2 - 66.8	5.0 - 6.0	60.38	5.31
60	67.0 - 83.0	4.3 - 5.3	70.73	4.95
30	85.4 - 104.6	2.1 - 3.1	92.56	2.53
0	101.0 - 123.0	-0.5 - +0.5	107.08	0.18

\* DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Harry L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

14-NOV-85

TEMPERATURE 72 F  
VRTC SRL98 TL41105

RELATIVE HUMIDITY 70 %  
572 SN 411 L.S.THORAX CAL 05

LOW SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	13.86-14.14 FT/SEC	14.12 FT/SEC
PEAK DEFLECTION	1.1 INCHES MAX.	1.00 INCHES
PEAK RESISTIVE FORCE	1,450. POUNDS MAX.	1352. POUNDS
INTERNAL HYSTERESIS	50% - 70%	62.4%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

*Gay L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

14-NOV-85

TEMPERATURE 72 F  
VRTC SRL98 TH41105

RELATIVE HUMIDITY 70 %  
572 SN 411 H.S.THORAX CAL 05

HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
PEAK DEFLECTION	1.7 INCHES MAX.	1.41 INCHES
PEAK RESISTIVE FORCE	2,250. POUNDS MAX.	2065. POUNDS
INTERNAL HYSTERESIS	50% - 70%	59.0%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Ray L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

15-NOV-85

TEMPERATURE 71 F  
RIGHT KNEE  
VRTC SRL98 RK41105

RELATIVE HUMIDITY 49 %  
572 SN 411 R.KNEE IMP CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	2215.10 LBS.
DURATION ABOVE 1000 LBS.	$\geq 1.7$ MS.	1.73 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Gay L. Phelps

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

15-NOV-85

TEMPERATURE 71 F  
LEFT KNEE  
VRTC SRL98 LK41105

RELATIVE HUMIDITY 49 %  
572 SN 411 L.KNEE IMP CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.93 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	2168.70 LBS.
DURATION ABOVE 1000 LBS.	>=1.7 MS.	1.71 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

*Gary L. Phelps*

POST-TEST CALIBRATION  
PARTNER VEHICLE

Part 572 Dummy  
Damage Checklist

Dummy S/N 830

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

Visual O.K.  
\_\_\_\_\_  
\_\_\_\_\_

TRC Personnel  
Checked By:

Gregg Wills                      Nov. 7, 1985  
Signature                              Date

VRTC Personnel  
Checked and Approved for Testing By:

Signature \_\_\_\_\_ Date \_\_\_\_\_

TRANSPORTATION RESEARCH CENTER OF OHIO

EXTERNAL DIMENSIONS

PART 572

13-NOV-85

TEMPERATURE 73.00 F  
VRTC SRL98 ED83008

RELATIVE HUMIDITY 70.00 %  
572 SN 830 EXT. DIMENSIONS 08

DESCRIPTION	SPECIFICATION	TEST RESULTS
SN ALDERSON RESEARCH LAB 830		
Sitting Height	35.6 - 35.8IN	35.7 INS
Shoulder Pivot Height	21.8 - 22.4IN	22.2 INS
Hip Pivot Height	3.9 IN (ref.)	3.9 INS
Hip Pivot From Backline	4.8 IN (ref.)	4.8 INS
Knee Pivot From Backline	20.1 - 20.7IN	20.4 INS
Rear of Head From Backline	1.7 IN (ref)	1.7 INS
Chest Depth	9.1 - 9.6IN	9.5 INS
Shoulder Width	17.8 - 18.4IN	17.9 INS
Chest Circumference Over Nipples	36.8 - 40.0IN	37.4 INS
Waist Circumference at Min. Girth	31.4 - 32.6IN	32.3 INS
Hip Width	14.0 - 15.4IN	14.9 INS
Knee Pivot From Floor	19.3 - 19.9IN	19.4 INS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Mary L Phelps

TRANSPORTATION RESEARCH CENTER OF OHIO

LUMBAR FLEXION TEST

PART 572

13-NOV-85

TEMPERATURE 74.00 F  
VRTC SRL98 LFB3008

RELATIVE HUMIDITY 70.00 %  
572 SN 830 LUMBAR FLEX CAL 08

DEFLECTION	SPECIFICATION	TEST RESULTS
0 Deg.	0 LBS	0.00 LBS
20 Deg	22.00 - 34.00 LBS	34.00 LBS
30 Deg	34.00 - 46.00 LBS	41.00 LBS
40 Deg	46.00 - 58.00 LBS	48.00 LBS
NET RETURN ANGLE	< 12 DEG	7.62 DEG

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

*Mary L Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

ABDOMINAL COMPRESSION TEST

PART 572

14-NOV-85

TEMPERATURE 72.00 F  
VRTC SRL98 AB83008

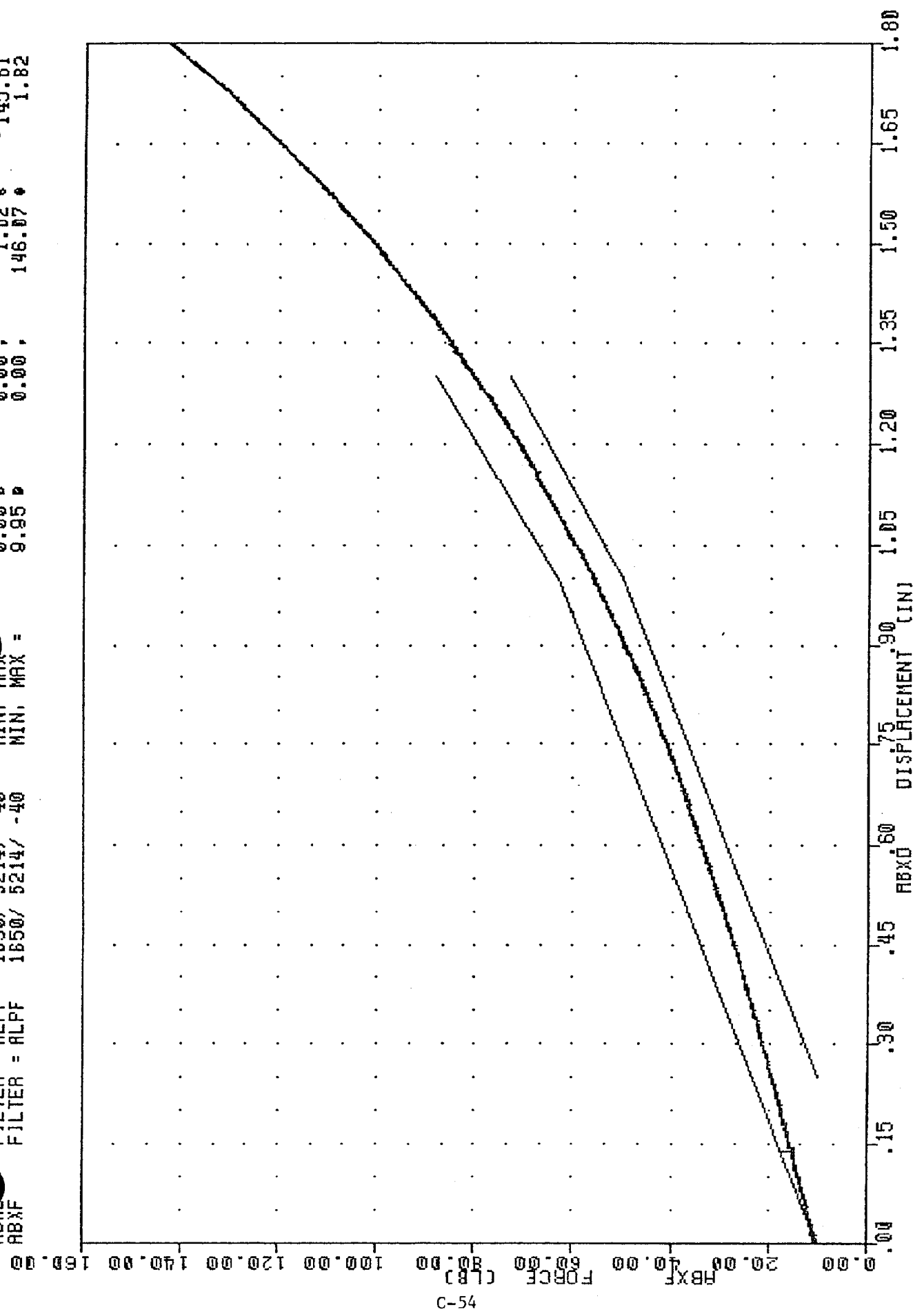
RELATIVE HUMIDITY 70.00 %  
572 SN 830 ABDOM COMPR CAL 08

TEST CORRIDDRS		
DISPLACEMENT	FORCE	TEST RESULTS
0 IN.	10 LBS	10 LBS
.50 IN.	23.00 - 36.00 LBS	29.35 LBS
.75 IN.	36.00 - 50.00 LBS	40.96 LBS
1.00 IN.	50.00 - 63.00 LBS	56.08 LBS
1.30 IN.	73.00 - 88.00 LBS	80.37 LBS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Larry L. Phelps

VRT L98 ; AB83008 572 SM 830 ABDDOM COMPR 0 85318 14-NOV-85 035:03  
 ABXF FILTER = ALPF 1650/ 5214/ -40 MIN, MAX 0.00 B 0.00 145.61  
 ABXF FILTER = ALPF 1650/ 5214/ -40 MIN, MAX 9.95 D 0.00 146.07 1.82



ABDOMINAL COMPRESSION VS DISPLACEMENT

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

PART 572

14-NOV-85

TEMPERATURE 72 F  
VRTC SRL98 HD83008

RELATIVE HUMIDITY 70 %  
572 SN 830 HEAD DROP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
IPEAK RESULTANT ACCELERATION	210 - 260 G	218.66 G
ITIME ABOVE 100 G LEVEL	0.9 - 1.5 MS	1.17 MS
IPEAK LATERAL ACCELERATION	10 G MAX	6.42 G
IIS ACCELERATION CURVE IUNIMODAL?		YES

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

*Aary L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK PENDULUM TEST

PART 572

14-NOV-85

TEMPERATURE 73.00 F  
VRTC SRL98 HN83008

RELATIVE HUMIDITY 70.00 %  
572 SN 830 HEAD/NECK CAL 08

Test Parameter	Specification	Test Results
Pendulum velocity	21.5 to 25.5 fps	24.30 fps
Pendulum Deceleration:		
T1 - T2: 5 - 20 G	3 ms. max	2.04 ms.
T2 - T3: 20 - 20 G	25 - 30 ms.	28.23 ms.
T3 - T4: 20 - 5 G	10 ms. max	6.15 ms.
Avg. G level T2 - T3	20 - 24 G	23.78 G
Maximum Rotation Angle	63 - 73 deg.	66.47 deg.
Peak Head Resultant Accel	26 G max	23.38 G

Test Parameter	Specification	Test Results
Rotation Angle (degrees)	Time (ms.)	Chordal Disp. (in.)
0	-2.0 - +2.0	-0.5 - +0.5
30	25.6 - 34.4	2.1 - 3.1
60	40.3 - 51.7	4.3 - 5.3
max	53.2 - 66.8	5.0 - 6.0
60	67.0 - 83.0	4.3 - 5.3
30	85.4 - 104.6	2.1 - 3.1
0	101.0 - 123.0	-0.5 - +0.5

\* DUMMY MEETS SPECIFICATIONS

TECHNICIAN Gary S. Phelps

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

14-NOV-85

TEMPERATURE 73 F  
VRTC SRL98 TL83008

RELATIVE HUMIDITY 70 %  
572 SN 830 L.S.THORAX CAL 08

TEST PARAMETER	LOW SPEED TEST	
	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	13.86-14.14 FT/SEC	14.11 FT/SEC
PEAK DEFLECTION	1.1 INCHES MAX.	0.86 INCHES
PEAK RESISTIVE FORCE	1,450. POUNDS MAX.	1376. POUNDS
INTERNAL HYSTERESIS	50% - 70%	58.6%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Harry S. Phelps

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

14-NOV-85

TEMPERATURE 72 F  
VRTC SRL98 TH83008

RELATIVE HUMIDITY 70 %  
572 SN 830 H.S.THORAX CAL 08

HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
PEAK DEFLECTION	1.7 INCHES MAX.	1.37 INCHES
PEAK RESISTIVE FORCE	2,250. POUNDS MAX.	2105. POUNDS
INTERNAL HYSTERESIS	50% - 70%	56.8%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Larry L. Phelps

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

15-NOV-85

TEMPERATURE 72 F  
RIGHT KNEE  
VRTC SRL98 RK83008

RELATIVE HUMIDITY 49 %  
572 SN 830 R.KNEE IMP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	2183.87 LBS.
DURATION ABOVE 1000 LBS.	$\geq 1.7$ MS.	1.95 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Gay S. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

15-NOV-85

TEMPERATURE 71 F  
LEFT KNEE  
VRTC SRL98 LK83008

RELATIVE HUMIDITY 48 %  
572 SN 830 L.KNEE IMP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.83 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	1957.20 LBS.
DURATION ABOVE 1000 LBS.	>=1.7 MS.	1.87 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Mary L. Phelps

Hybrid III Dummy  
Damage Checklist

Dummy S/N 45

<u>OK</u>	<u>Damaged</u>	
<u>X</u>	<u>      </u>	Outer skin on entire dummy (gashes, rips, etc.)
<u>X</u>	<u>      </u>	Head - Gashes, rips, general appearance, etc.
<u>X</u>	<u>      </u>	Neck - broken or cracks in rubber
<u>X</u>	<u>      </u>	Spine - broken or cracks in rubber
<u>      </u>	<u>  X  </u>	Ribs - check all ribs for damage (bent or broken), damping material separation.
<u>X</u>	<u>      </u>	Bourns Pot. - bent shaft - electrical discontinuity
<u>X</u>	<u>      </u>	Accelerometer Leads - torn cables
<u>X</u>	<u>      </u>	Accelerometer Mountings (Head, Thorax, Pelvis) - check for secure mounting
<u>X</u>	<u>      </u>	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 - cracks on #1 rib both sides, #5,4 right side, #5 left side

TRC Personnel

Checked By:

Gregg Wills  
Signature

Nov. 6, 1985  
Date

VRTC Personnel

Checked and Approved for Testing By:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

12-NOV-85

VRTC SRL98 45C19HD1

HY3 SN45 HEAD#U1 CAL 19

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	72.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	267.48 G
PEAK LATERAL ACCELERATION	15 G MAX	6.24 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Harry L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

08-NOV-85

VRTC SRL98 45C19NF1

HY3 SN45 CAL19 NECK FLEXION 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	71.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	41.00 %
IMPACT VELOCITY	22.53 - 22.97 FPS	22.84 FPS
PENDULUM DECELERATION	10 MS   22.50 - 27.50 G	24.54 G
	20 MS   17.40 - 22.60 G	19.11 G
	30 MS   12.50 - 18.50 G	17.28 G
MAXIMUM PENDULUM G	29 G MAX	26.23 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	34 - 46 MS	42.88 MS
D PLANE ROTATION	MAX   67 - 79 DEGREES	75.60 DEGREES
	TIME   54 - 64 MS	60.75 MS
MOMENT ABOUT OCCIPITAL	MAX   70 - 90 FT,LBS	70.45 FT,LBS
	TIME   46 - 56 MS	55.25 MS
CONDYLES	MIN   -22.2/-14.0 FT,LBS	-13.48 FT,LBS **
	TIME   12 - 16 MS	16.38 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	106.50 MS **

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN Larry L. Phelps

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

08-NOV-85

VRTC SRL98 45C19NE1

HY3 SN45 CAL19 NECK EXTEN. 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	71.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	42.00 %
IMPACT VELOCITY	19.50 - 19.90 FPS	19.65 FPS
PENDULUM DECELERATION	10 MS   17.20 - 21.20 G	20.08 G
	20 MS   14.00 - 19.00 G	16.80 G
	30 MS   11.00 - 16.00 G	14.68 G
MAXIMUM PENDULUM G	22 G MAX	20.64 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	38 - 50 MS	45.75 MS
D PLANE ROTATION	MAX   94 - 106 DEGREES	96.47 DEGREES
	TIME   72 - 82 MS	78.88 MS
MOMENT ABOUT OCCIPITAL	MAX   11.75 - 17.75 FT.LBS	11.36 FT.LBS **
	TIME   12 - 18 MS	16.38 MS
CONDYLES	MIN   -61.2/-50.8 FT.LBS	-43.75 FT.LBS **
	TIME   69 - 77 MS	76.25 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	151 - 167 MS	163.50 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	120 - 144 MS	145.38 MS **

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN

*Larry L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

6 AXIS NECK TRANSDUCER

12-NOV-85

VRTC SRL98 48C21NE1

HY3 SN48 CAL21 NECK EXTENSION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	72.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
IMPACT VELOCITY	19.50 - 19.90 FPS	19.59 FPS
PENDULUM DECELERATION	10 MS   17.20 - 21.20 G	18.86 G
	20 MS   14.00 - 19.00 G	16.14 G
	30 MS   11.00 - 16.00 G	14.13 G
MAXIMUM PENDULUM G	22 G MAX	19.04 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	38 - 50 MS	45.13 MS
D PLANE ROTATION	MAX   94 - 106 DEGREES TIME   72 - 82 MS	94.70 DEGREES 78.88 MS
MOMENT ABOUT OCCIPITAL	MAX   11.75 - 17.75 FT.LBS	13.58 FT.LBS
	TIME   12 - 18 MS	15.38 MS
CONDYLES	MIN   -61.2/-50.8 FT.LBS	-46.89 FT.LBS **
	TIME   69 - 77 MS	76.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	151 - 167 MS	165.38 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	120 - 144 MS	138.25 MS

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN Harry L Phelps

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

12-NOV-85

VRTC SRL98 45C19TH1

HY3 SN45 CAL19 H.S.THORAX 01

HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	72.00 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	2.708 INCHES
RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1174.5 POUNDS *
INTERNAL HYSTERESIS	75% - 85%	74.1% *

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN *Larry L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

13-NOV-85

RIGHT KNEE  
VRTC SRL98 45C19RK1

HY3 SN45 R.KNEE 11LB CAL 19

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	73.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.88 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1350.77 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Harry L. Phelps*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

13-NOV-85

LEFT KNEE  
VRTC SRL98 45C19LK1

HY3 SN45 L.KNEE 11LB CAL 19

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	73.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.87 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1455.36 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Larry L. Phelps*

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 position, 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 midsagittal 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 between  $20^{\circ}$  and  $25^{\circ}$  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  $5^{\circ}$  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  $.5^{\circ}$  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 48, In Body Humanoid 48  
 (MFR) (S/N) (MFR) (S/N)

<u>Mnemonic</u>	<u>Label No.</u>	<u>Location</u>	<u>Orientation (+Sensing)</u>	<u>Serial No.</u>	<u>Mfr/Model</u>
<u>LFMF1</u>	<u>756</u>	Left Femur	Tension	<u>756</u>	<u>2430</u>
<u>RFMF1</u>	<u>761</u>	Right Femur	Tension	<u>761</u>	<u>2430</u>
<u>CSTXG1</u>	<u>10</u>	Chest (X)	Rear	<u>AB62</u>	<u>7264</u>
<u>CSTYG1</u>	<u>11</u>	Chest (Y)	Right	<u>AL08</u>	<u>7264</u>
<u>CSTZG1</u>	<u>12</u>	Chest (Z)	Up	<u>AL46</u>	<u>7264</u>
<u>HEDXG1</u>	<u>8</u>	Head (X)	Front	<u>AH58</u>	<u>7264</u>
<u>HEDYG1</u>	<u>9</u>	Head (Y)	Left	<u>AH77</u>	<u>7264</u>
<u>HEDZG1</u>	<u>13</u>	Head (Z)	Up	<u>AH88</u>	<u>7264</u>
<u>NEKXF1</u>	<u>XF</u>	Neck (X)	Right	<u>085</u>	<u>1716</u>

\*With 10 Vdc input (2000 g range).

SUBJECT VEHICLE ACCELEROMETER PLACEMENT CONTD

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

<u>Mnemonic</u>	<u>Label No.</u>	<u>Location</u>	<u>Orientation (+Sensing)</u>	<u>Serial No.</u>	<u>Mfr/Model</u>
<u>NEKYM1</u>	<u>YM</u>	Neck (Y)	Front	<u>085</u>	<u>1716</u>
<u>NEKZF1</u>	<u>ZF</u>	Neck (Z)	Tension	<u>085</u>	<u>1716</u>
<u>KNLLF1</u>	<u>37L</u>	Left Knee	Tension	<u>037</u>	<u>1587</u>
<u>KNLMF1</u>	<u>37R</u>	Left Knee	Tension	<u>037</u>	<u>1587</u>
<u>KNLXD1</u>	<u>14</u>	Left Knee			<u>Carter</u>
<u>KNRMF1</u>	<u>36L</u>	Right Knee	Tension	<u>036</u>	<u>1587</u>
<u>KNRLF1</u>	<u>36R</u>	Right Knee	Tension	<u>036</u>	<u>1587</u>
<u>KNRXD1</u>	<u>15</u>	Right Knee			<u>Carter</u>
<u>TBLXM1</u>	<u>XM</u>	Left Tibia	Left	<u>040</u>	<u>1583</u>
<u>TBLYM1</u>	<u>YM</u>	Left Tibia	Rear	<u>040</u>	<u>1583</u>
<u>TBRXM1</u>	<u>XM</u>	Right Tibia	Left	<u>039</u>	<u>1583</u>
<u>TBRYM1</u>	<u>YM</u>	Right Tibia	Rear	<u>039</u>	<u>1583</u>
<u>ANLYF1</u>	<u>YF</u>	Left Ankle	Left	<u>034</u>	<u>1584</u>
<u>ANLZF1</u>	<u>ZF</u>	Left Ankle	Tension	<u>034</u>	<u>1584</u>
<u>ANLXF1</u>	<u>XM</u>	Left Ankle	Left	<u>034</u>	<u>1584</u>
<u>ANRYF1</u>	<u>YF</u>	Right Ankle	Left	<u>033</u>	<u>1584</u>
<u>ANRZF1</u>	<u>ZF</u>	Right Ankle	Tension	<u>033</u>	<u>1584</u>
<u>ANRXM1</u>	<u>XM</u>	Right Ankle	Left	<u>033</u>	<u>1584</u>
<u>CSTXD1</u>	<u>39</u>	Chest			<u>Bournes</u>

\*With 10 Vdc input (2000 g range).

SUBJECT VEHICLE ACCELEROMETER PLACEMENT CONTD

Dummy Chest ARL 411 , in Body ARL 411  
 (MFR) (S/N) (MFR) (S/N)

<u>Mnemonic</u>	<u>Label No.</u>	<u>Location</u>	<u>Orientation (+Sensing)</u>	<u>Serial No.</u>	<u>Mfr/Model</u>
<u>LFMF2</u>	<u>744</u>	Left Femur	Tension	<u>744</u>	<u>2430</u>
<u>RFMF2</u>	<u>718</u>	Right Femur	Tension	<u>718</u>	<u>2430</u>
<u>CSTXG2</u>	<u>25</u>	Chest (X)	Front	<u>AH39</u>	<u>2264</u>
<u>CSTYG2</u>	<u>24</u>	Chest (Y)	Right	<u>AU68</u>	<u>2264</u>
<u>CSTZG2</u>	<u>26</u>	Chest (Z)	Up	<u>AV27</u>	<u>2264</u>
<u>HEDXG2</u>	<u>C</u>	Head (X)	Front	<u>AH65</u>	<u>7264</u>
<u>HEDYG2</u>	<u>E</u>	Head (Y)	Left	<u>AP62</u>	<u>7264</u>
<u>HEDZG2</u>	<u>B</u>	Head (Z)	Up	<u>AR17</u>	<u>2264</u>

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\*With 10 Vdc input (2000 g range).



PARTNER VEHICLE ACCELEROMETER PLACEMENT CONTD

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

Mnemonic	Label No.	Location	Orientation (+Sensing)	Serial No.	Mfr/Model
<u>LFMF2</u>	<u>716</u>	Left Femur	Tension	<u>716</u>	<u>2430</u>
<u>RFMF2</u>	<u>726</u>	Right Femur	Tension	<u>726</u>	<u>2430</u>
<u>CSTXG2</u>	<u>W</u>	Chest (X)	Front	<u>AN03</u>	<u>7264</u>
<u>CSTYG2</u>	<u>V</u>	Chest (Y)	Left	<u>AP96</u>	<u>7264</u>
<u>CSTZG2</u>	<u>U</u>	Chest (Z)	Up	<u>AK12</u>	<u>7264</u>
<u>HEDXG2</u>	<u>X</u>	Head (X)	Front	<u>AP48</u>	<u>7264</u>
<u>HEDYG2</u>	<u>Y</u>	Head (Y)	Left	<u>AN71</u>	<u>7264</u>
<u>HEDZG2</u>	<u>Z</u>	Head (Z)	Up	<u>AN92</u>	<u>7264</u>
<u>NEKXF2</u>	<u>XF</u>	Neck (X)	Front	<u>049</u>	<u>186</u>
<u>NEKYM2</u>	<u>YM</u>	Neck (Y)	Left	<u>049</u>	<u>186</u>
<u>NWKZF2</u>	<u>ZF</u>	Neck (Z)	Up	<u>049</u>	<u>186</u>
<u>KNLLF2</u>	<u>35L</u>	Left Knee	Tension	<u>035</u>	<u>1587</u>
<u>KNLMF2</u>	<u>35R</u>	Left Knee	Tension	<u>035</u>	<u>1587</u>
<u>KNRMF2</u>	<u>34L</u>	Right Knee	Tension	<u>034</u>	<u>1587</u>
<u>KNRLF2</u>	<u>34R</u>	Right Knee	Tension	<u>034</u>	<u>1587</u>
<u>TBLXM2</u>	<u>38X</u>	Left Tibia	Left	<u>038</u>	<u>1583</u>
<u>TBLYM2</u>	<u>38Y</u>	Left Tibia	Rear	<u>038</u>	<u>1583</u>
<u>TBRXM2</u>	<u>37X</u>	Right Tibia	Left	<u>037</u>	<u>1583</u>
<u>TBRYM2</u>	<u>37Y</u>	Right Tibia	Rear	<u>037</u>	<u>1583</u>

\*With 10 Vdc input (2000 g range).

PARTNER VEHICLE ACCELEROMETER PLACEMENT CONTD

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

<u>Mnemonic</u>	<u>Label No.</u>	<u>Location</u>	<u>Orientation (+Sensing)</u>	<u>Serial No.</u>	<u>Mfr/Model</u>
<u>ANLYF2</u>	<u>32Y</u>	Left Ankle	Left	<u>032</u>	<u>1584</u>
<u>ANLZF2</u>	<u>32Z</u>	Left Ankle	Tension	<u>032</u>	<u>1584</u>
<u>ANLXM2</u>	<u>32X</u>	Left Ankle	Left	<u>032</u>	<u>1584</u>
<u>ANRYF2</u>	<u>31Y</u>	Right Ankle	Left	<u>031</u>	<u>1584</u>
<u>ANRZF2</u>	<u>31Z</u>	Right Ankle	Tension	<u>031</u>	<u>1584</u>
<u>ANRXM2</u>	<u>31X</u>	Right Ankle	Left	<u>031</u>	<u>1584</u>
<u>CSTXD2</u>	<u>Chpt</u>	Chest			<u>Bournes</u>

\*With 10 Vdc input (2000 g range).

SUBJECT VEHICLE ACCELEROMETER INFORMATION

<u>MNEMONIC</u>	<u>DESCRIPTION</u>	<u>SERIAL NO.</u>	<u>MODEL NO.</u>
FFRXG	FRONT FRAME RAIL X-DIR	AR20	2264
FFCXG	FRONT CROSS MEMBER X-DIR	AS55	2264
BCRXG	BRAKE CALIPER; RIGHT X-DIR	AE04	7264
ENXG2	ENGINE BOTTOM X-DIR	AR83	2264
ENXG1	ENGINE BLOCK TOP X-DIR	AM74	7264
SCAPG	STEERING COLUMN LOWER A-P AXIS	AT84	2264
SH1PG	STEERING WHEEL HUB A-P AXIS	AC03	7264
SH1IG	STEERING WHEEL HUB I-S AXIS	AT21	2264
DPCXG	DASH PANEL X-DIR	AZ77	2264
DPCZG	DASH PANEL Z-DIR	AN47	2264
VCGV	PITCH RATE		
LPBXG	LEFT B-PILLAR X-DIR	AT26	2264
LPBZG	LEFT B-PILLAR Z-DIR	AY90	2264
RPBXG	RIGHT B-PILLAR X-DIR	AN86	7264
TLRXG4	LEFT REAR CROSS MEMBER X-DIR	AZ24	2264
TLRZG4	LEFT REAR CROSS MEMBER Z-DIR	AZ41	2264
TLRXGD	LEFT REAR CROSS MEMBER RED.	BA26	2264
TRRXG3	RIGHT REAR CROSS MEMBER X-DIR	AS36	2264

## PARTNER VEHICLE ACCELEROMETER INFORMATION

<u>MNEMONIC</u>	<u>DESCRIPTION</u>	<u>SERIAL NO.</u>	<u>MODEL NO.</u>
FFRXG	FRONT FRAME RAIL X-DIR	BK65	7264
FFCXG	FRONT CROSS MEMBER X-DIR	AS95	2264
BCRXG	BRAKE CALIPER; RIGHT X-DIR	AW52	2264
ENXG1	ENGINE BLOCK TOP X-DIR	BA99	2264
ENXG2	ENGINE BOTTOM X-DIR	BC49	2264
SCAPG	STEERING COLUMN LOWER A-P AXIS	AZ83	2264
SH1PG	STEERING WHEEL HUB A-P AXIS	BA51	2264
SH1IG	STEERING WHEEL HUB I-S AXIS	AR68	2264
DPCXG	DASH PANEL X-DIR	AZ68	2264
DPCZG	DASH PANEL Z-DIR	AZ58	2264
VCGV	PITCH RATE GYRO		
LPBXG	LEFT B-PILLAR X-DIR	AK61	2264
LPBZZ	LEFT B-PILLAR Z-DIR	AK87	2264
RPBXG	RIGHT B-PILLAR X-DIR	AJ97	2264
TLRXG4	LEFT REAR CROSS MEMBER X-DIR	AJ42	7264
TLRZG4	LEFT REAR CROSS MEMBER Z-DIR	AJ31	7264
TRRXG3	RIGHT REAR CROSS MEMBER X-DIR	AJ90	2264
RAXXG	REAR AXLE X-DIR	AJ45	7264
TRRXGC	RIGHT REAR CROSS MEMBER RED.	AN06	2264

CAMERA INFORMATION

CAMERA IDENTIFICATION

TIME ZERO ON HIGH SPEED FILM

Photosonics

Circular timing pulses on one side, vertical event bar on other side.

Back 4 frames from frame where vertical event bar stops.

Hycam

Square shaped timing pulses on one side, vertical event bar on other side.

Back 5 frames from frame where vertical event bar stops.

Stalex

Square shaped timing pulses on one side, vertical 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
$F_y$ (lateral 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 measured 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 rearward  
(-) 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 structural 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