

DOT 848

FRONTAL CRASH RESPONSES

A FRONTAL CRASH TEST
OF A 1984 VOLKSWAGEN RABBIT
INTO A FIXED LOAD MEASURING BARRIER
WITH A CLOSING VELOCITY OF 30.0 MPH

PREPARED BY:
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TEST REPORT
JULY 1985

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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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 a 1984 Volkswagen Rabbit 5-door Hatchback at the TRCO Crash Test Facility, East Liberty, Ohio. The Volkswagen Rabbit was towed into the load measuring barrier at 0° with a closing velocity of 30.0 mph. One Hybrid III dummy was located in the driver's designated seating position and one Hybrid III dummy was located in the right front seating position in the vehicle. The test date was June 28, 1985 and the ambient temperature was 78°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 ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
acres	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 ³	cubic inches	16	milliliters	ml.
fl oz	fluid ounces	30	milliliters	ml.
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C

Approximate Conversions From Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares	2.5	acres	
	(10 000 m ²)			
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 ³
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	degrees Celsius	9/5 (then degrees add 32)	Fahrenheit	°F

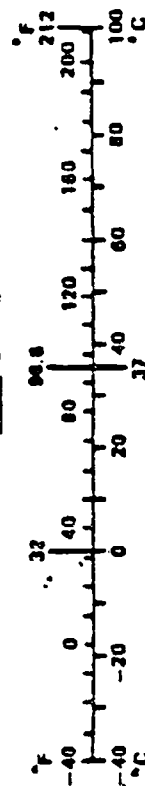


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SECTION 1.0
PURPOSE AND INTRODUCTION

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

A 1984 Volkswagen Rabbit 5-door hatchback was used in a frontal impact with a load measuring barrier at a closing velocity of 30.0 mph on June 28, 1985. The intended impact speed of the Volkswagen Rabbit was 30.0 mph. The actual test speed of the Volkswagen Rabbit was 30.0 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.

VEHICLE INFORMATION

VEHICLE MANUFACTURER: Volkswagen of America, Inc.

MAKE/MODEL: Volkswagen Rabbit Diesel VIN: 1VNEG9176EVO48031

BODY STYLE: 5-door Hatchback MODEL YEAR: 1984

NHTSA NO.: R & D COLOR: Burgundy

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT 1600 cc

TRANSMISSION DATA: 5-Speed Manual

DATE VEHICLE RECEIVED: 6/17/85 ODOMETER READING: 27,530

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	Yes
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: Volkswagen of America, Inc.

DATE OF MANUFACTURE: 12/83

GVWR: 2860 LBS.,

GAWR: FRONT 1675 LBS., REAR 1280 LBS.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 27 psi; REAR 31 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Goodyear Corsa GT P155/80R13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 4

IS SPARE TIRE "SPACE SAVER"? No

IS SPARE TIRE STANDARD EQUIPMENT? No

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

RIGHT FRONT	681	LBS.	RIGHT REAR	335	LBS.
LEFT FRONT	664	LBS.	LEFT REAR	327	LBS.
TOTAL FRONT WEIGHT	1345	LBS.	(67.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	662	LBS.	(33.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	2007	LBS.			

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 25 1/2	;LF 25 7/8	;RR 24 7/16	;LR 24 5/8
PRE-TEST ATTITUDE:	RF 24 7/16	;LF 25	;RR 23 7/8	;LR 24 1/8
POST-TEST ATTITUDE:	RF 27	;LF 24 3/4	;RR 22 1/8	;LR 22 15/16

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 371 LBS. CARGO:

RIGHT FRONT	775	LBS.	RIGHT REAR	572	LBS.
LEFT FRONT	771	LBS.	LEFT REAR	594	LBS.
TOTAL FRONT WEIGHT	1546	LBS.	(57.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1166	LBS.	(43.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	2712	LBS.			

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

VEHICLE TEST WEIGHT CALCULATION

Calculated Test Weight = Unloaded Delivered Weight +
 (Number of Hybrid III Dummies X 167 lbs.) +
 Cargo Weight
 = 2007 + (2 X 167) + 90 lbs.
 = 2431 lbs.

Actual Test Weight = 2712 lbs.

To achieve test weight, 10.6 gallons of stoddard solvent were added to the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Force Plate manufactured by K.J. Law Engineers, Inc., Detroit, Michigan.

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: 10.6 GALLONS (92-94% OF USEABLE)
FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 10.6 GALLONS
DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: No FUEL INJECTION: Yes

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 27 psi; REAR 31 psi

RECOMMENDED TIRE SIZE: P155/80R13 LOAD RANGE X B, C, A

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

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 2 FRONT
2 REAR
CARGO LOAD 90 LBS. 4 TOTAL

TOTAL 690 LBS.

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

VEHICLE TEST CONDITIONS

TEST NUMBER: 850628

DATE OF TEST: June 28, 1985

TIME OF TEST: 13:40

WIND VELOCITY: 2-4 mph 72° NE

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA:

78°F

TEMPERATURE IN OCCUPANT COMPARTMENT:

76°F

DRIVER DUMMY TEMPERATURE

75°F

PASSENGER DUMMY TEMPERATURE

74°F

VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
TEST WEIGHT (LBS.)	2712	2431
VEHICLE ORIENTATION (DEGREES)	0	0
VEHICLE VELOCITY (MPH)	30.0	30
MAXIMUM CRUSH (INCHES)	21 1/4	DNA

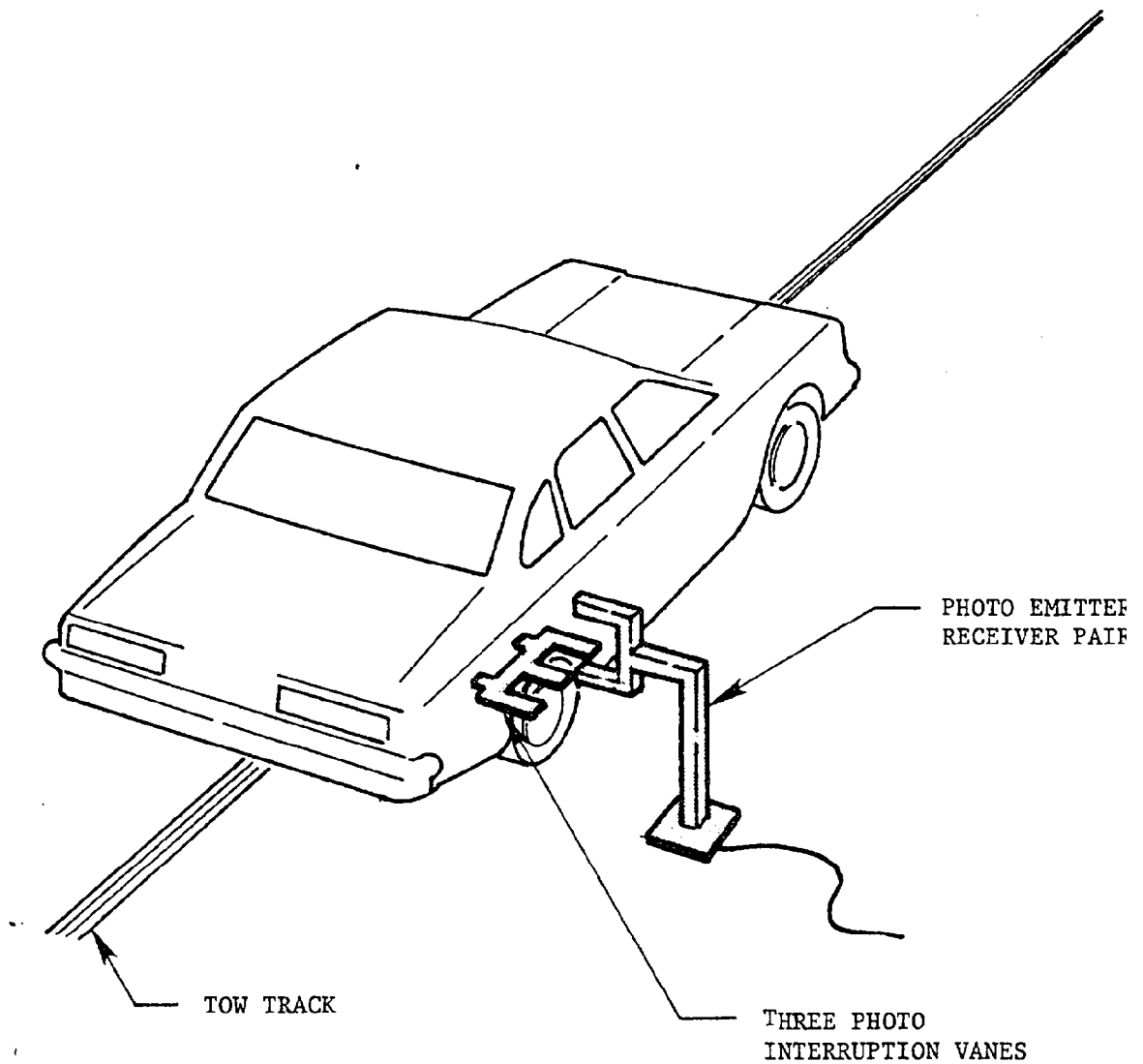
DUMMIES

	<u>DRIVER</u>	<u>MIDDLE PASSENGER</u>	<u>RT. FRONT PASSENGER</u>	<u>LEFT REAR PASSENGER</u>	<u>RT. REAR PASSENGER</u>
TYPE:	IIII		IIII		
SERIAL NO.:	45		48		
INSTRUMENTATION:					
HEAD ACCEL.:	4		7		
CHEST ACCEL.:	3		3		
FEMUR L.C.'S:	2		2		
OTHER:	3 Neck Channels		6 Neck Channels		
	1 Chest Disp.		1 Chest Disp.		
	14 Lower Leg Channels		14 Lower Leg Channels		
	2 Knee Shear		2 Knee Shear		

RESTRAINT SYSTEM: Both dummies were restrained with torso belt and knee bolster.

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

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

DUMMY DATA SUMMARY

	DRIVER DUMMY				PASSENGER DUMMY			
	SN: 45				SN: 48			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
HEAD ACCELERATION (g)								
LONGITUDINAL	39.11	187.75	62.46	84.63	13.55	287.50	78.13	108.38
LATERAL	17.91	70.00	34.09	190.63	12.19	178.75	16.27	108.25
VERTICAL	---	---x	45.79	77.50	10.89	14.88	65.11	82.75
RESULTANT		71.80 @ 83.13				83.44 @ 108.38		
HIC	602.93	from 65.75 to 101.75			902.35	from 70.63 to 123.25		
HEAD ANGULAR ACCELERATION								
POSITION 1								
LONGITUDINAL	---	---α	---	---α	6.01	44.63	63.81	82.63
VERTICAL	---	---α	---	---α	12.68	287.50	89.39	108.38
POSITION 2								
LATERAL	---	---α	---	---α	16.22	109.38	15.69	82.75
VERTICAL	8.54	97.13	48.75	69.13	10.20	123.50	70.61	82.63
POSITION 3								
LONGITUDINAL	---	---α	---	---α	---	---α	---	---α
LATERAL	---	---α	---	---α	---	---α	---	---α
NECK LOADS (1b)								
SHEAR (X)	154.26	79.13	41.21	94.00	288.37	85.50	24.12	218.00
SHEAR (Y)	---	---α	---	---α	78.27	96.38	36.21	183.75
AXIAL (Z)	629.20	90.63	26.87	126.88	534.89	87.00	39.84	50.75
NECK MOMENTS (1b-ft)								
ABOUT LONGITUDINAL	---	---α	---	---α	11.26	145.88	21.88	103.38
ABOUT LATERAL	26.15	94.50	32.37	199.75	22.20	127.63	41.43	81.75
ABOUT VERTICAL	---	---α	---	---α	12.81	139.50	6.66	214.38
CHEST ACCELERATION (g)								
LONGITUDINAL	7.72	196.25	55.51	79.88	3.11	208.50	46.32	76.63
LATERAL	6.71	76.00	3.86	194.88	2.49	229.38	16.90	83.00
VERTICAL	5.22	117.38	16.18	77.38	4.71	46.25	21.14	82.75
RESULTANT		56.85 @ 79.75				48.18 @ 78.63		
3 MSEC CLIP		53.53				47.88		
CHEST DISPLACEMENT (in)	1.06	@ 92.75				0.86 @ 89.88		
FEMUR LOADS (1b)								
LEFT	107.56	255.00	1266.37	64.38	128.68	167.25	1747.47	59.88
RIGHT	56.40	114.75	1103.23	58.63	79.99	193.13	1255.57	60.25

DUMMY DATA SUMMARY CONTD

	DRIVER DUMMY				PASSENGER DUMMY			
	SN: 45				SN: 48			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
KNEE LOADS (lb)								
LEFT LEG								
LEFT SENSOR	280.95	67.13	179.77	42.00	219.50	60.38	336.78	35.88
RIGHT SENSOR	205.49	69.38	203.34	40.25	100.38	80.13	132.99	33.75
RIGHT LEG								
LEFT SENSOR	260.74	77.00	230.52	46.13	120.58	78.88	275.08	42.50
RIGHT SENSOR	279.33	72.13	359.67	43.88	45.56	88.63	338.08	33.38
KNEE DISPLACEMENT (in)								
LEFT KNEE	0.09	72.88	0.02	18.13	0.25	61.00	0.02	30.13
RIGHT KNEE	0.62	72.88	0.02	18.00	0.06	59.25	0.01	18.13
TIBIA MOMENTS (lb-ft)								
LEFT LEG								
ABOUT LONGITUDINAL	39.65	62.63	19.29	187.75	31.52	67.50	31.62	45.88
ABOUT LATERAL	55.40	36.00	120.18	67.75	69.24	36.13	100.06	61.00
RIGHT LEG								
ABOUT LONGITUDINAL	11.27	118.38	45.23	71.50	18.09	33.00	38.09	41.88
ABOUT LATERAL	73.07	43.75	203.24	59.50	70.17	35.25	56.54	82.38
ANKLE LOADS (lb)								
LEFT LEG								
LATERAL	73.47	64.88	87.73	53.88	33.41	67.38	52.58	41.63
VERTICAL	403.69	39.38	99.39	60.75	567.66	33.88	158.09	61.50
RIGHT LEG								
LATERAL	33.98	39.75	60.21	45.50	58.46	32.88	59.87	41.63
VERTICAL	601.64	46.25	84.36	89.63	618.76	33.13	46.70	194.63
ANKLE MOMENTS (lb-ft)								
LEFT LEG								
ABOUT LONGITUDINAL	20.78	55.38	5.47	180.88	12.54	68.75	14.10	40.00
RIGHT LEG								
ABOUT LONGITUDINAL	46.02	59.50	8.10	71.38	10.97	30.75	46.20	36.25
* LONGITUDINAL:	FORWARD							
LATERAL:	LEFTWARD							
VERTICAL:	UPWARD							
**LONGITUDINAL:	REARWARD							
LATERAL:	RIGHTWARD							
VERTICAL:	DOWNWARD							

* There was no positive values in the time interval of interest.

α There was no instrumentation at this location.

VISIBLE DUMMY CONTACT POINTS:

	DRIVER 45	PASSENGER 48
Head	<u>Upper Steering Wheel Rim</u>	<u>Upper Instrument Panel</u>
Chest	<u>Steering Wheel Rim & Hub</u>	<u>None</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>No Tools Required</u>	<u>No Tools Required</u>
Rear	<u>DNA</u>	<u>DNA</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	<u>No</u>	<u>No</u>
Rear	<u>No</u>	<u>No</u>

GLAZING DAMAGE:

Windshield cracked.

OTHER NOTABLE IMPACT EFFECTS:

Hub cover broken off of steering wheel. Steering column

moved upward and glove box door was broken off.

DUMMY KINEMATIC SUMMARY

DRIVER

Upon impact, the driver slid forward on the seat as the knees went into the lower instrument panel. The dummy's torso continued forward as the chest contacted the steering wheel rim and hub even though the dummy was wearing a shoulder belt. Also, the head rotated forward and impacted the upper steering wheel rim. The dummy rebounded and came to rest sitting upright on the driver's seat.

PASSENGER

During impact, the passenger slid forward on the seat as its knees went into the lower instrument panel while the torso, simultaneously, went forward until it was restrained by the shoulder belt. While the torso's forward motion was stopped, the head continued to rotate forward until it contacted the upper instrument panel. The dummy rebounded and came to rest sitting on the seat and leaning forward slightly.

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle was taken outside to be hooked up to the tow cable at 12:50 PM the day of the test. At this point air conditioners were placed into the side windows to maintain the temperature. The vehicle remained in this position until approximately 13:35. The vehicle was then launched into the barrier building to impact the load cell barrier at 13:40.

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: Volkswagen Rabbit

SEAT TYPE: Bench
☒ Bucket
☐ Split Bench

ADJUSTER TYPE: ☒ Manual
☐ Power

TECHNICIANS:

BUCKET SEAT BACK TYPE: Fixed
☒ Adjustable Reclining

1. R. Benavides

2. B. Miller

POSITIONING DATE: June 28, 1985

3.

AMBIENT TEMP.: 74° F. TIME: 9:00

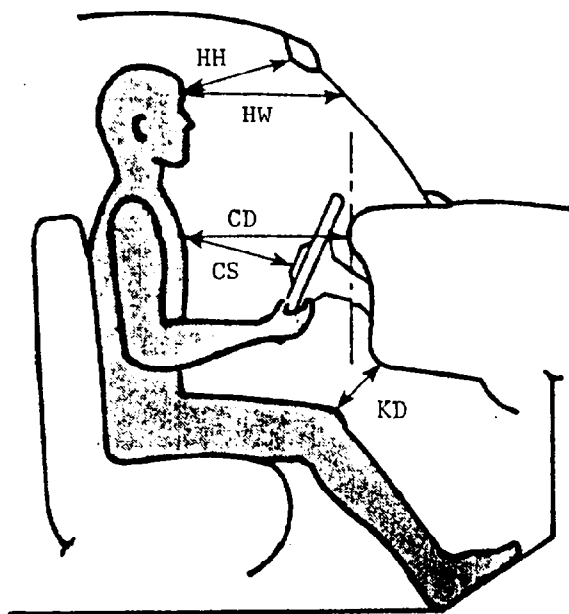
4.

DRIVER DUMMY # <u>45</u> TYPE <u>HIII</u> Head <u>16 3/8"</u> Pelvis Angle <u>23°</u> Target <u>19°</u> Seat Back <u>22°</u> Knee <u>24 3/8"</u> Joint <u>105°</u> Approx. "H" <u>14 1/2"</u> Point <u>144°</u>	PASSENGER DUMMY # <u>48</u> TYPE <u>HIII</u> Pelvis Angle <u>22°</u> Head <u>16 7/8"</u> Seat Back <u>22°</u> Target <u>17°</u> Knee <u>24 3/4"</u> Joint <u>102°</u> Approx. "H" <u>13 3/8"</u> Point <u>142°</u>
A = <u>49 3/4"</u> B = <u>37 1/4"</u> C = <u>11 3/4"</u> D = <u>12 1/2"</u> Door Glass Height* <u>9 1/4"</u> Door Glass Height* <u>9 1/4"</u>	

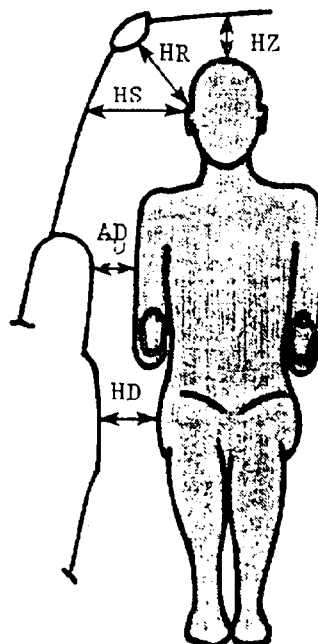
* Door glass height is equal on the right and left side of vehicle.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

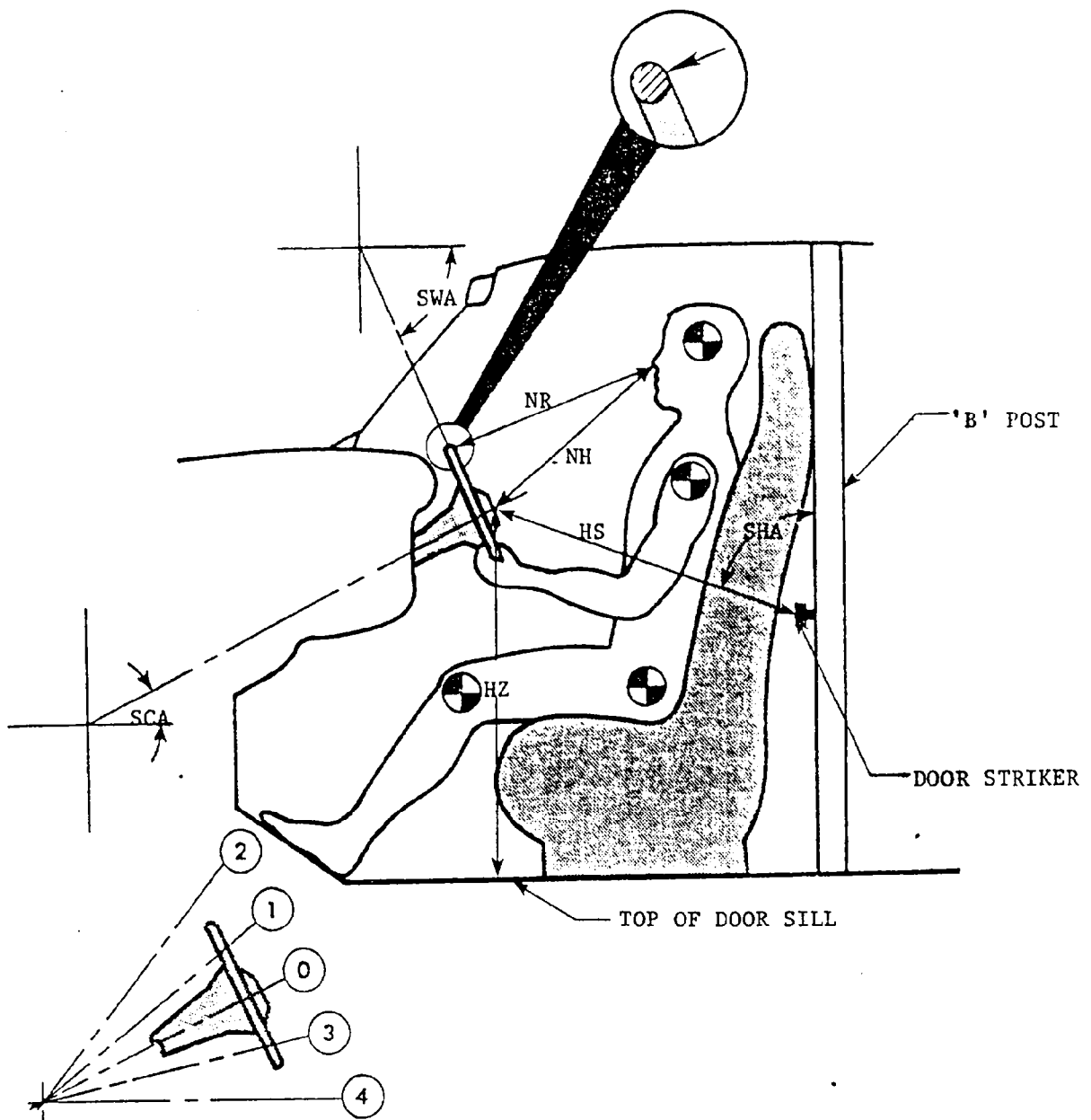
	DRIVER 45	PASSENGER 48
HH	14 1/16	14 1/2
HW	20	20 3/8
CD	17 15/16	18 7/8
CS	9 1/16	DNA
KDL	2 13/16	3 1/2
KDR	2 13/16	3 7/16



	DRIVER 45	PASSENGER 48
HR	7	7 3/16
HS	8 3/4	9 3/4
AD	3 1/8	3 3/4
HD	6 3/8	6
HZ	4 1/4	3 5/8

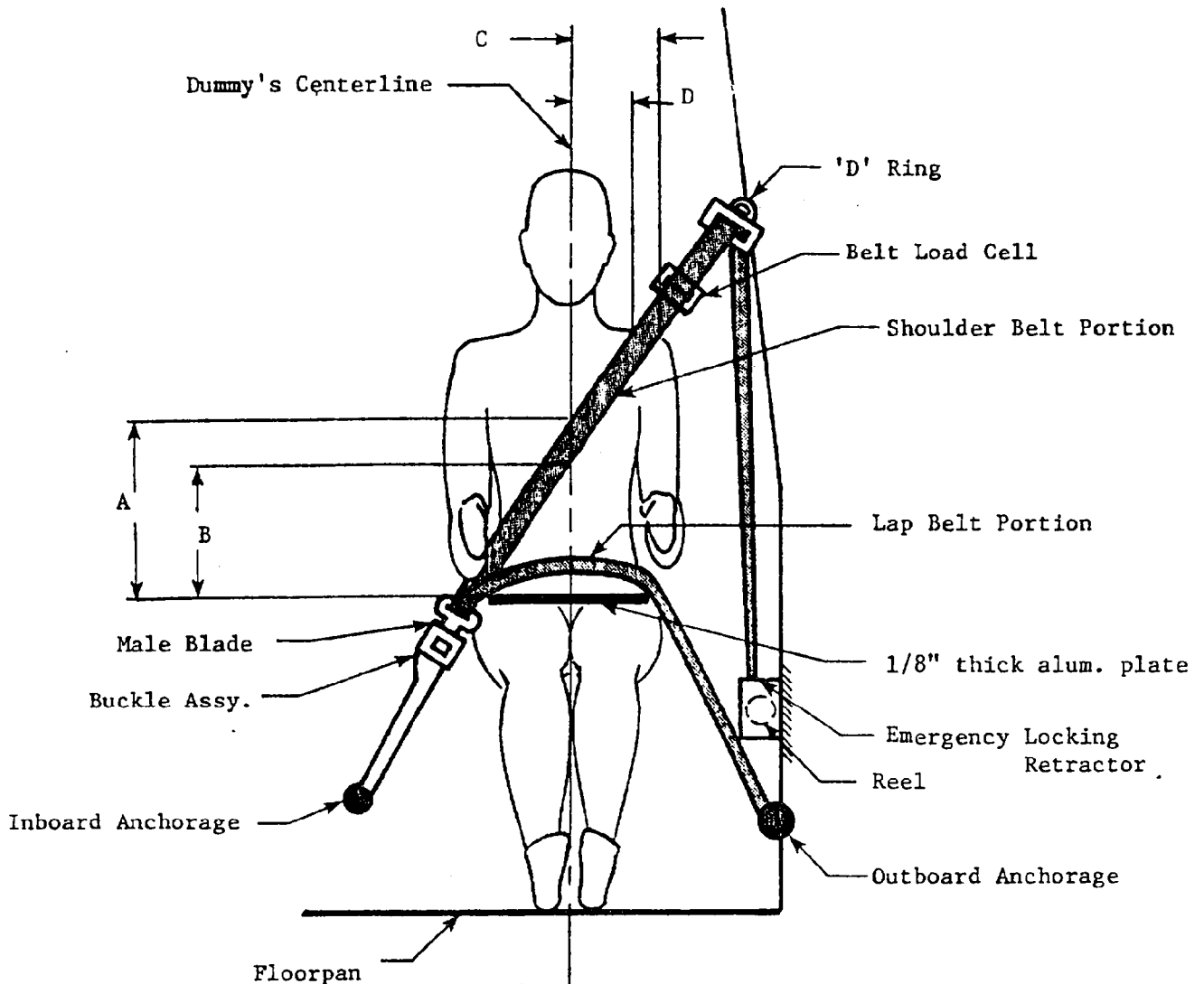


ALL MEASUREMENTS IN INCHES



	PRE-TEST	POST-TEST
NR	14 5/16"	DNA
NH	13 7/8"	DNA
HS	20 1/4"	23 3/16"
SCA	27°	30°
SWA	63°	29°
HZ	19 3/4"	23 3/8"
SHA	82°	72°

SEAT BELT POSITIONING DATA



NOTE: Dummies were restrained with shoulder belts only.

	DRIVER DUMMY	PASSENGER DUMMY
A - Top surface of alum. plate to belt upper edge (in)	11 1/4"	11 3/4"
B - Top surface of alum. plate to belt lower edge (in)	8 5/8"	9"
C - Dummy centerline to outer edge of belt at chest flesh top (in)	5 1/4"	5 1/4"
D - Dummy centerline to inner edge of belt at chest flesh top (in)	3"	3"
LAP BELT TENSION (lbs)	DNA	DNA
SHOULDER BELT TENSION (lbs)	1	1

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)	135.9	-20.0	21.0	38.86	39.75	114.79	21.00
2	FRONT FRAME CROSSMEMBER (LONGITUDINAL)				---	--- α	---	--- α
3	BRAKE CALIPER; FRONT RIGHT (LONGITUDINAL)	125.3	-23.1	9.9	18.29	62.50	107.29	45.25
4	ENGINE BOTTOM (LONGITUDINAL)	130.9	-2.3	6.2	4.59	37.38	83.38	30.13
5	ENGINE BLOCK TOP (LONGITUDINAL)	124.3	-0.8	29.5	---	--- Y	106.03	27.88
6	STEERING COLUMN; LOWER (A-P AXIS)	109.0	12.4	19.0	---	--- Y	---	--- Y
7	STEERING WHEEL HUB (A-P AXIS) (I-S AXIS)	93.7	12.5	33.6	---	--- Y	38.92	46.25
					32.61	46.50	38.44	21.88
8	STEERING COLUMN DISPLACEMENT (A-P AXIS)				---	--- α	---	--- α
9	DASH PANEL (LONGITUDINAL) (VERTICAL)	95.9	0.8	39.1	11.79	161.75	32.20	82.50
					31.49	53.00	48.06	82.88
10	PITCH RATE GYRO	96.3	0.4	17.8	173.24	59.13	60.23	27.75
11	B-PILLAR SILL - LEFT (LONGITUDINAL) (VERTICAL)	66.9	24.6	11.3	2.43	141.75	47.05	42.75
		ΔV = 32.4 mph @ 108.00 msec			8.78	46.25	21.02	54.13
12	B-PILLAR SILL - RIGHT (LONGITUDINAL) (VERTICAL)	66.5	24.3	11.4	2.62	129.88	42.37	43.50
		ΔV = 33.1 mph @ 120.75 msec						
13	REAR SEAT LEFT CROSSMEMBER (LONGITUDINAL) (VERTICAL)	54.6	11.8	16.5	2.98	140.25	29.92	37.50
		P** Δ V = 32.8 mph @ 108.63 msec			7.17	84.00	9.30	38.50
14	REAR SEAT LEFT CROSSMEMBER (LONGITUDINAL) (VERTICAL)	37.4	12.5	17.2	2.81	138.50	31.16	37.13
		R**						

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** $\Delta V = 36.2$ mph @ 339.13 msec	54.1	-11.8	16.4	1.11	140.75	26.95	56.63
16	REAR SEAT RIGHT CROSSMEMBER (LONGITUDINAL)R**	37.4	-13.0	17.3	2.12	141.38	29.36	37.25
17	REAR AXLE CENTERLINE (LONGITUDINAL)	14.8	0.6	8.3	234.32	39.25	34.42	206.50

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

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

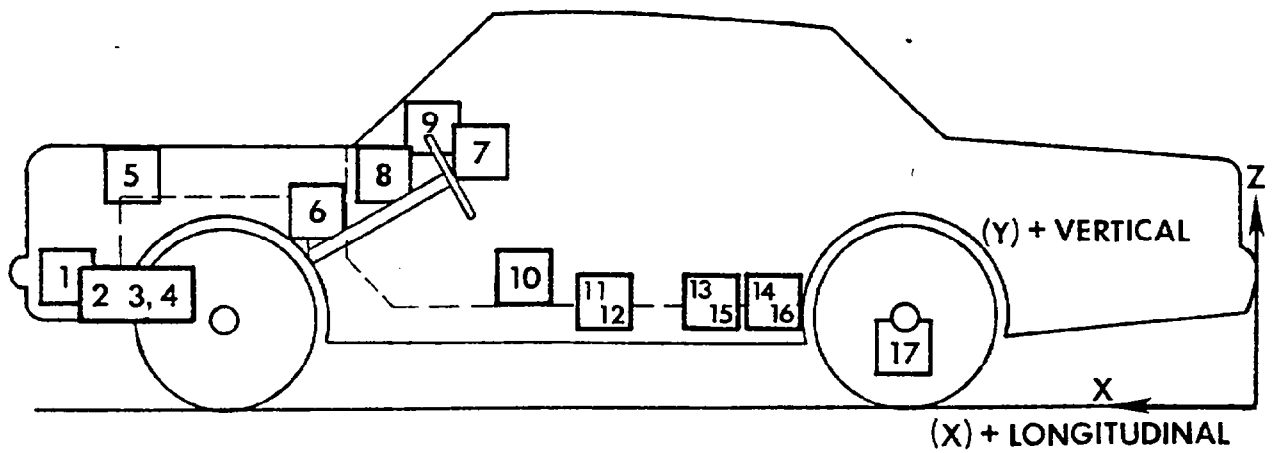
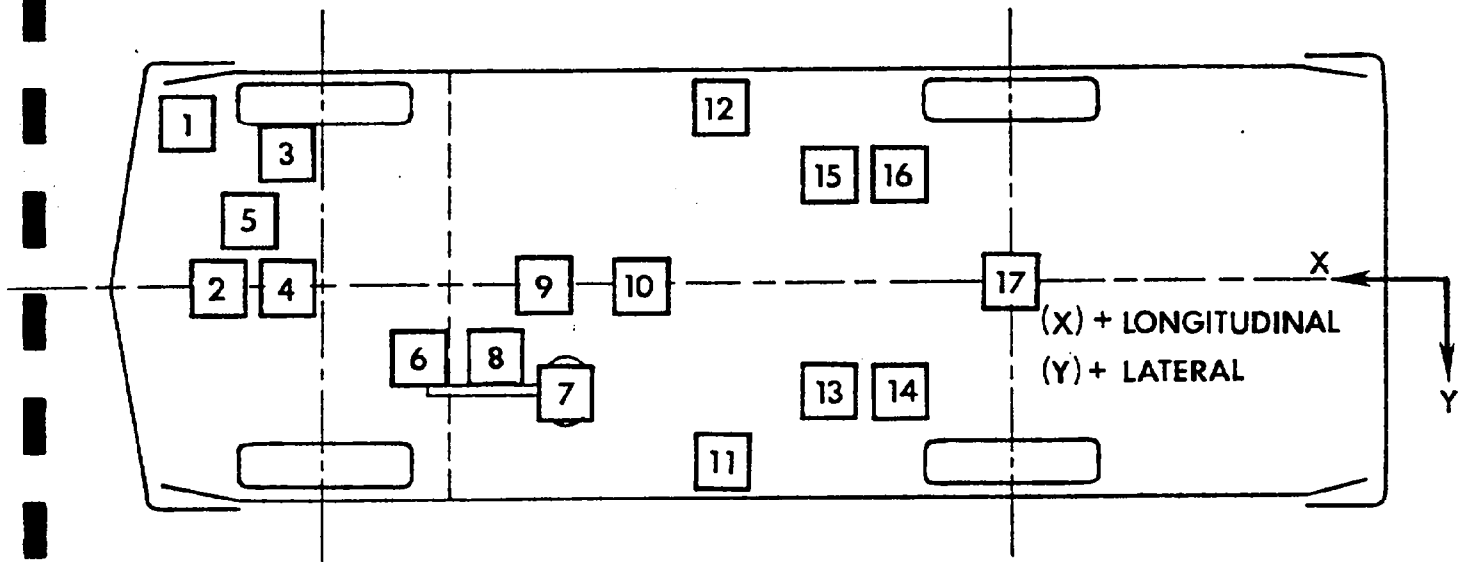
*** POSITIVE DIRECTION LONGITUDINAL: FORWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD
NEGATIVE DIRECTION LONGITUDINAL: REARWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

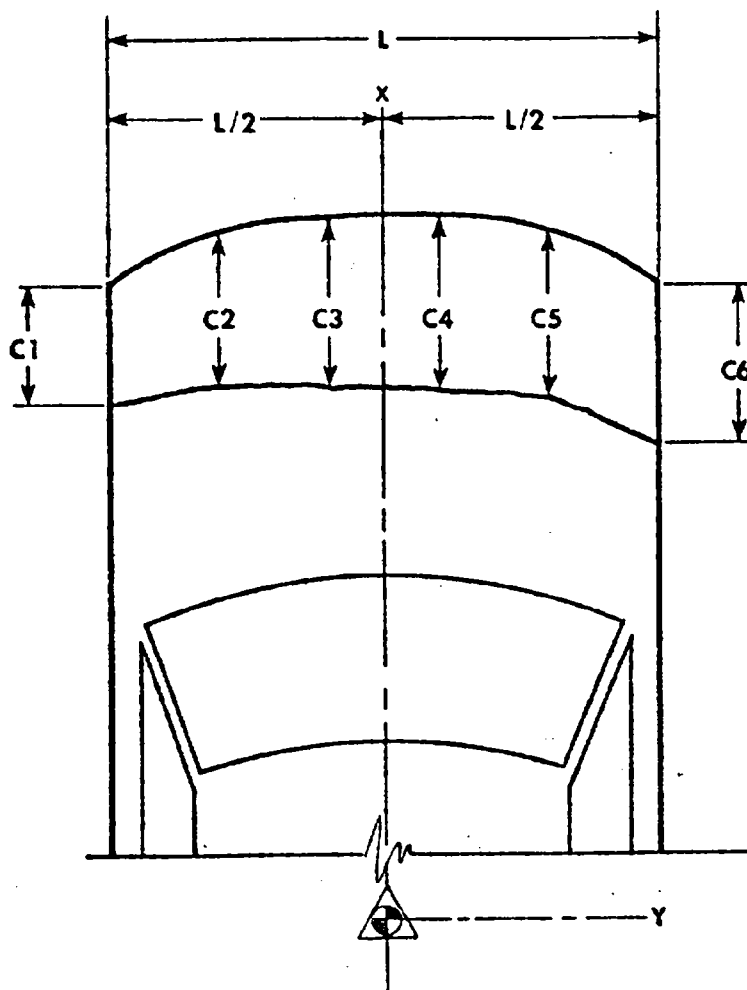
ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS IN INCHES.

^aThere was no instrumentation at this location.

^ySee TEST ANOMALIES

VEHICLE ACCELEROMETER LOCATIONS





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

VEHICLE Volkswagen Rabbit

<u>PRE-TEST</u>		<u>POST-TEST</u>		<u>CRUSH</u>	
L	<u>53 3/4</u>	L	<u>53 3/4</u>	L	<u>0</u>
C1	<u>150 3/16</u>	C1	<u>130 5/8</u>	C1	<u>19 9/16</u>
C2	<u>151 3/4</u>	C2	<u>131</u>	C2	<u>20 3/4</u>
C3	<u>151 7/8</u>	C3	<u>131 1/8</u>	C3	<u>20 3/4</u>
C4	<u>152</u>	C4	<u>130 3/4</u>	C4	<u>21 1/4</u>
C5	<u>151 3/8</u>	C5	<u>131 1/4</u>	C5	<u>20 1/8</u>
C6	<u>150 1/2</u>	C6	<u>130 1/2</u>	C6	<u>20</u>
D	<u>0</u>	D	<u>0</u>	D	<u>0</u>

Reference point is from the rear bumper forward.

IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL Volkswagen Rabbit

TEST NUMBER 850628

		DIMENSIONS IN INCHES	
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST
X 1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	151 7/8	131 1/8
X 2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	127 5/8	112 3/4
X 3	REAR SURFACE OF VEHICLE TO FIREWALL	115 7/8	111 13/16
X 4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	100 9/16	100 9/16
X 5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	100 5/16	101 1/4
X 6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	101 1/4	99 11/16
X 7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	101	100 5/8
X 8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	64 7/16	64 5/8
X 9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	64 5/16	65 1/4
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	65 1/16	63 1/2
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	65	64 1/2
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF RIGHT SIDE	100 1/2	99 1/4
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST OF LEFT SIDE	100 3/8	100 3/4
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	116 1/8	115
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	115 13/16	115
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	85 1/16	88 9/16
X17	STEERING COLUMN TO "A" POST	14 1/2	13 7/8

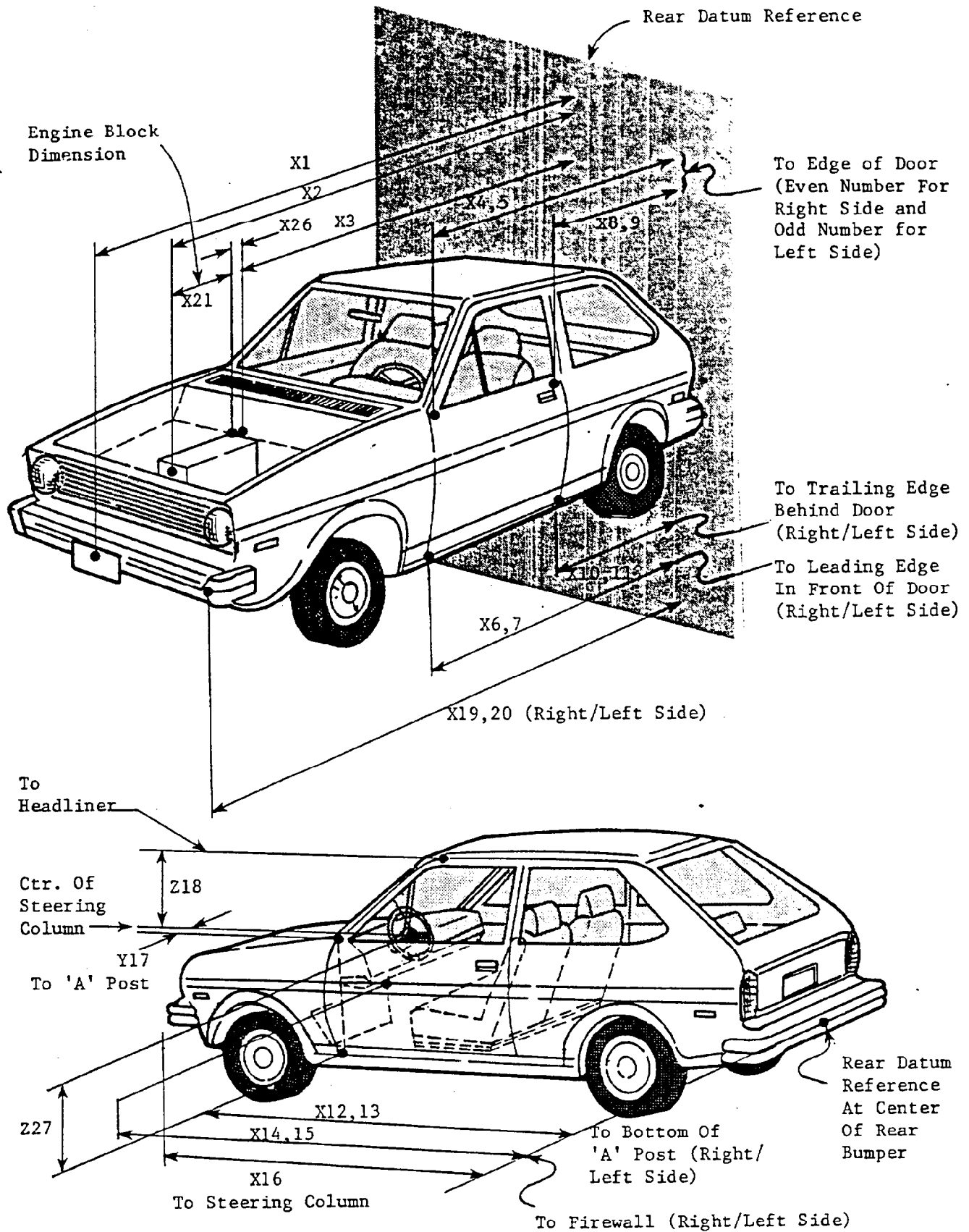
IMPACTED VEHICLE MEASUREMENTS CONTD

VEHICLE MAKE/MODEL Volkswagen Rabbit TEST NUMBER 850628

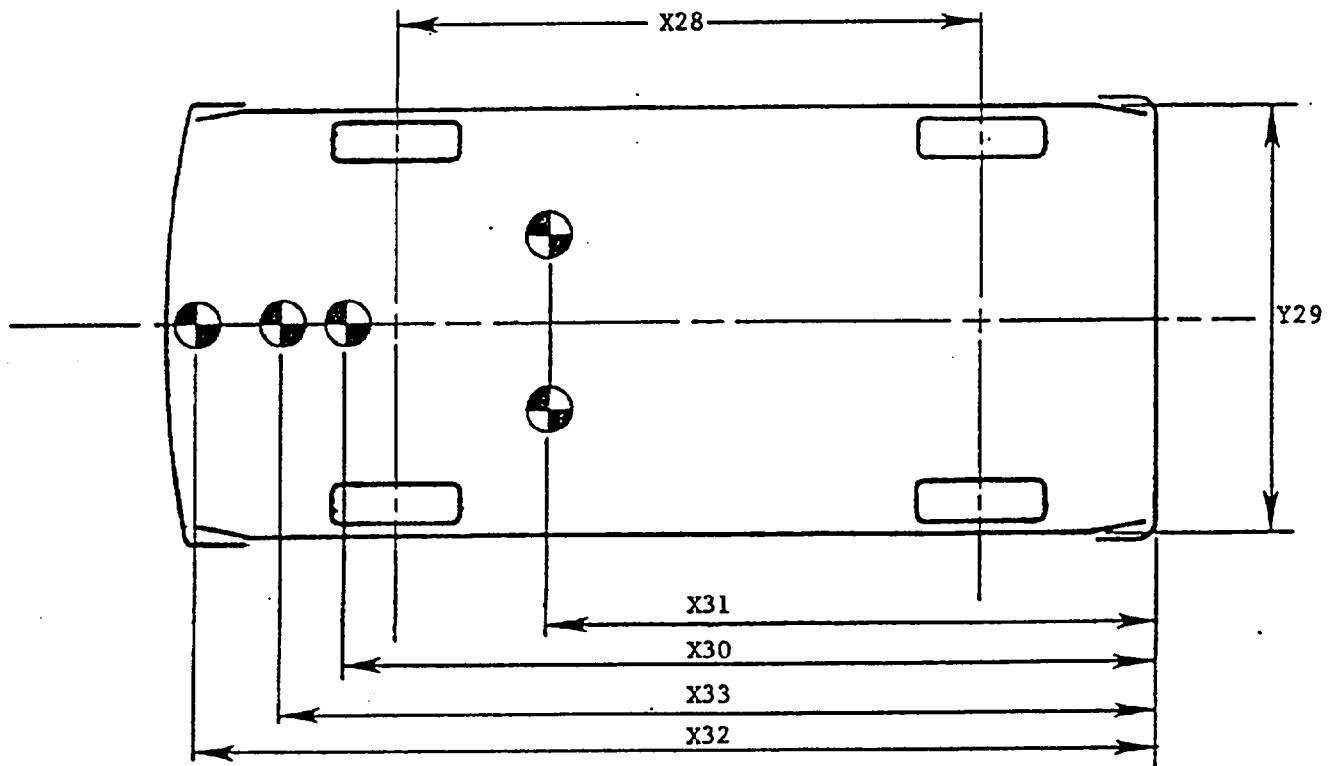
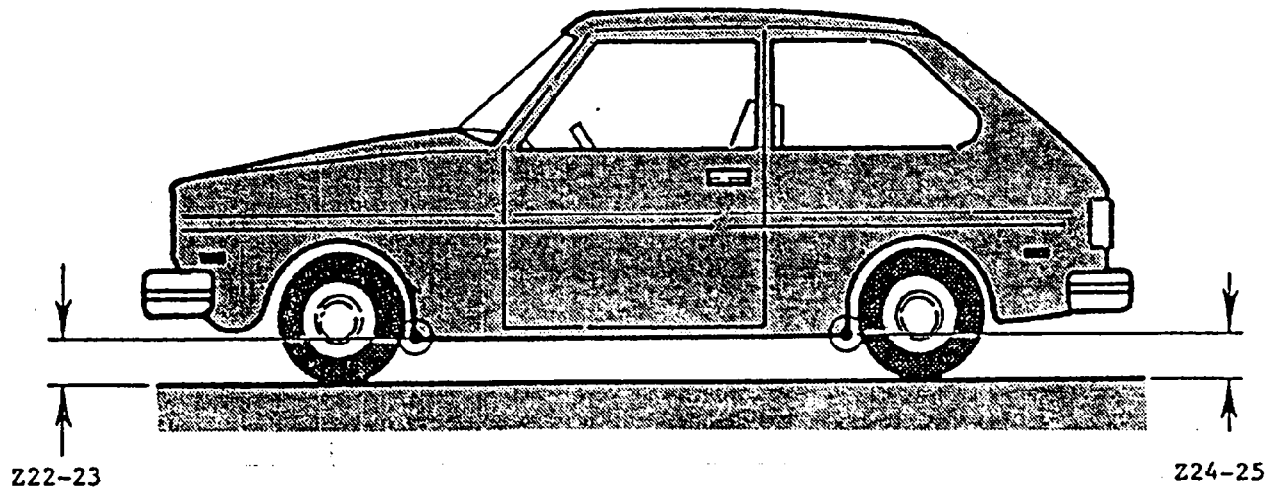
NO.	TYPE OF MEASUREMENT	DIMENSIONS IN INCHES	
		PRE-TEST	POST-TEST
Z18	REAR OF WINDSHIELD HEADER TO STEERING WHEEL CENTER	19 1/4	16 5/8
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	150 1/2	130 1/2
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	150 3/16	130 5/8
X21	WIDTH OF ENGINE BLOCK	5 1/4	5 1/4
Z22	RIGHT FRONT SILL TO GROUND PLANE	9 1/2	5 5/16
Z23	LEFT FRONT SILL TO GROUND PLANE	9 3/8	5 3/4
Z24	RIGHT REAR SILL TO GROUND PLANE	9 1/4	7 13/16
Z25	LEFT REAR SILL TO GROUND PLANE	9 7/16	7 1/2
X26	FIREWALL TO ENGINE OR TRANSAXLE	19 1/2	9
Z27	VERTICAL DIMENSION FROM DOOR SILL TO CENTERLINE OF STEERING COLUMN	19 3/4	23 3/8
X28	WHEELBASE OF VEHICLE	94 5/8	90 11/16
Y29	WIDTH OF VEHICLE AT MAXIMUM WIDTH POINT	63 1/8	74 1/4
X30	REAR SURFACE OF VEHICLE TO ENGINE TARGET	130	120 3/4
X31	REAR SURFACE OF VEHICLE TO COMPARTMENT TARGET	106 1/8	97 15/16
X32	REAR SURFACE OF VEHICLE TO BUMPER TARGET	149 15/16	129 7/8
X33	REAR SURFACE OF VEHICLE TO FRAME CROSSMEMBER	NR*	NR*

*There were no targets at this location.

PRE-TEST AND POST-TEST MEASUREMENT POINTS



PRE-TEST AND POST-TEST MEASUREMENT POINTS CONTD.



LOAD CELL BARRIER SUMMARY

POSITION	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	MAX (lb)	TIME (msec)	MIN (lb)	TIME (msec)
A1	86.20	202.25	64.19	160.63
A2	115.48	152.38	85.81	9.88
A3	132.60	21.13	118.93	9.88
A4	151.95	201.63	159.30	10.00
A5	146.21	5.13	9698.18	80.50
A6	166.20	5.00	1536.64	82.38
A7	153.56	151.00	120.84	172.00
A8	87.36	199.75	92.25	29.75
A9	99.42	25.63	135.56	29.25
B1	107.36	200.63	138.01	81.63
B2	123.65	250.75	2308.02	37.38
B3	147.24	138.63	5968.15	18.13
B4	155.93	199.88	11216.26	48.00
B5	162.87	200.75	11002.56	47.38
B6	116.40	199.13	11645.12	45.38
B7	118.45	199.75	15771.54	25.75
B8	145.36	200.13	1386.85	31.50
B9	146.76	199.38	350.61	48.38
C1	180.80	199.88	133.60	44.13
C2	177.10	199.00	3832.66	31.88
C3	205.11	199.63	2648.14	19.50
C4	76.27	197.00	1118.03	27.25
C5	98.93	197.63	1851.28	28.00
C6	115.97	65.88	4695.55	25.38
C7	---	--- ^x	9611.92	30.13
C8	128.44	136.38	4992.24	29.50
C9	119.76	198.00	151.89	278.25

LOAD CELL BARRIER SUMMARY CONTD

POSITION	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	MAX (lb)	TIME (msec)	MIN (lb)	TIME (msec)
D1	150.34	197.75	184.18	37.13
D2	---	---*	126.04	36.88
D3	---	---*	1943.89	28.75
D4	---	---*	1075.68	37.25
D5	---	---*	442.71	40.38
D6	---	---*	662.08	39.75
D7	---	---*	880.46	40.13
D8	---	---*	1016.80	31.00
D9	86.86	28.50	142.91	32.63

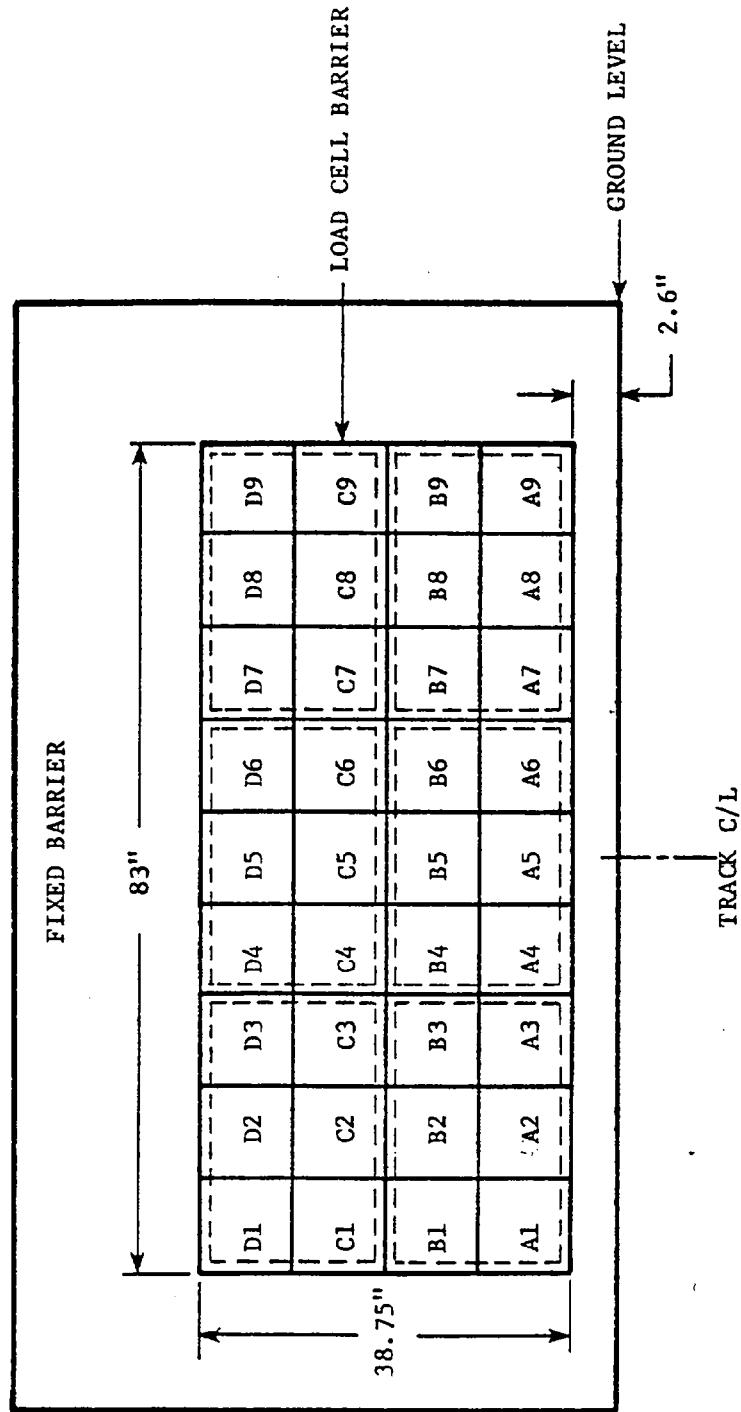
	POSITIVE		NEGATIVE	
GROUP 1	758.42	199.25	8269.34	28.13
GROUP 2	---	---*	8941.07	26.88
GROUP 3	---	---*	16199.49	30.25
GROUP 4	622.10	200.50	6664.40	18.25
GROUP 5	819.93	200.38	42296.75	47.75
GROUP 6	728.46	199.88	16934.23	26.13
TOTAL	3680.48	199.50	82549.25	29.38

*REFERENCE: COMPRESSION IS NEGATIVE
TENSION IS POSITIVE

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

36 LOAD CELLS
4 ROWS
9 COLUMNS

FRONT VIEW



BARRIER LOAD CELL CONFIGURATION

- GROUP 1: D1 thru C3
- GROUP 2: D4 thru C6
- GROUP 3: D7 thru C9
- GROUP 4: B1 thru A3
- GROUP 5: B4 thru A6
- GROUP 6: B7 thru A9

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right Wide	Photosonic 1B	13	1000	Vehicle Crush
2	Right Rear	Photosonic 1B	25	1000	Crush Measurement
3	Right Passenger	Photosonic 1B	50	1000	Dummy Kinematics
4	Right Angle	Hycam	50	1032	Dummy Kinematics
5	Left Wide	Photosonic 1B	17	1113	Vehicle Crush
6	Left Front	Photosonic 1B	25	1008	Vehicle Crush
7	Left Driver	Photosonic 1B	50	1100	Dummy Kinematics
8	Onboard Driver	Photosonic 1B	8	988	Dummy Kinematics
9	Barrier Top	Photosonic 1B	13	995	Dummy Kinematics
10	Overhead	Photosonic 1B	17	----*	Vehicle Crush
11	Pit	Photosonic 1B	13	1008	Vehicle Crush
12	Right Panning	Kodak	16	24	Real Time
13	Onboard Passenger	Photosonic 1B	8	998	Dummy Kinematics

*Camera Failure

NOTE: See page D-12 for camera LED information.

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	X*	Y*	Z*
1	4'7"	27'6"	3'9"
2	12'2"	20'6"	2'10"
3	5'5"	30'8"	5'4"
4	16'3"	35'6"	6'2"
5	27'12"	-26'5"	2'8"
6	4'4"	-20'11"	2'8"
7	8'4"	-28'2"	6'1"
8		Onboard	
9	6"	0	9'11"
10	4'2"	0	18'4"
11	6'3"	0	-12'3"
13		Onboard	

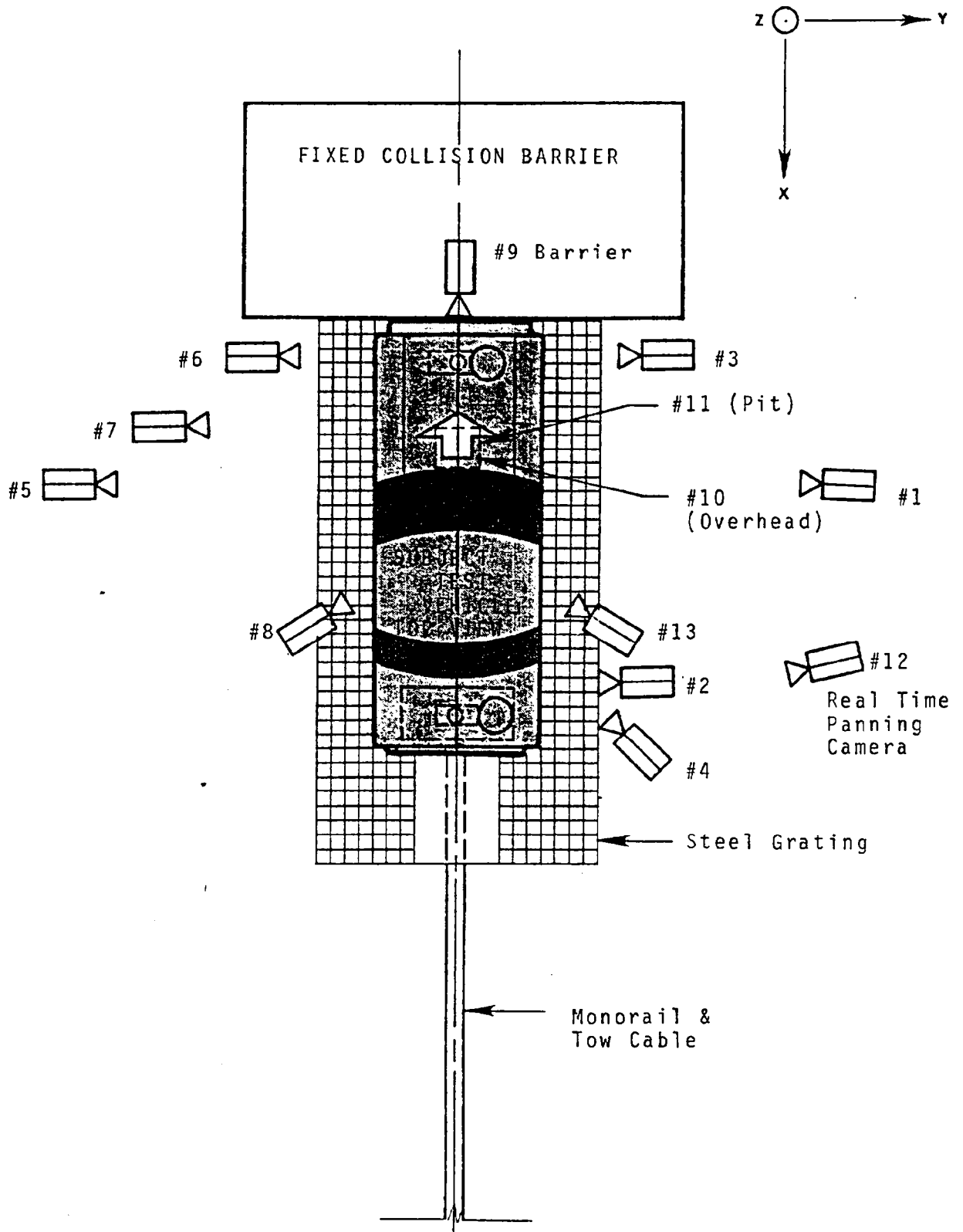
*Reference

+X = Rearward with respect to the barrier face.

+Y = Rightward from monorail center.

+Z = Upward from ground level

CAMERA POSITIONS



TEST ANOMALIES

All passenger data had some electronic noise during the test due to an output mixer amplifier circuit board, or associated cabling.

The upper engine X-axis accelerometer, ENGXG1, did not record data after 60 msec due to a cut cable.

The steering column A-P axis accelerometer, SCAPG, did not record data due to a crushed cable.

The steering wheel hub A-P axis accelerometer, SH1PG, recorded anomalous spikes at approximately 115 and 130 msec.

The rear axle X-axis accelerometer, RAXXG, recorded a large positive spike at approximately 40 msec. This spike seems unrealistic and should not be considered real data.

APPENDIX A
PHOTOGRAPHS



Figure A-1. PRE-TEST RIGHT SIDE OVERALL

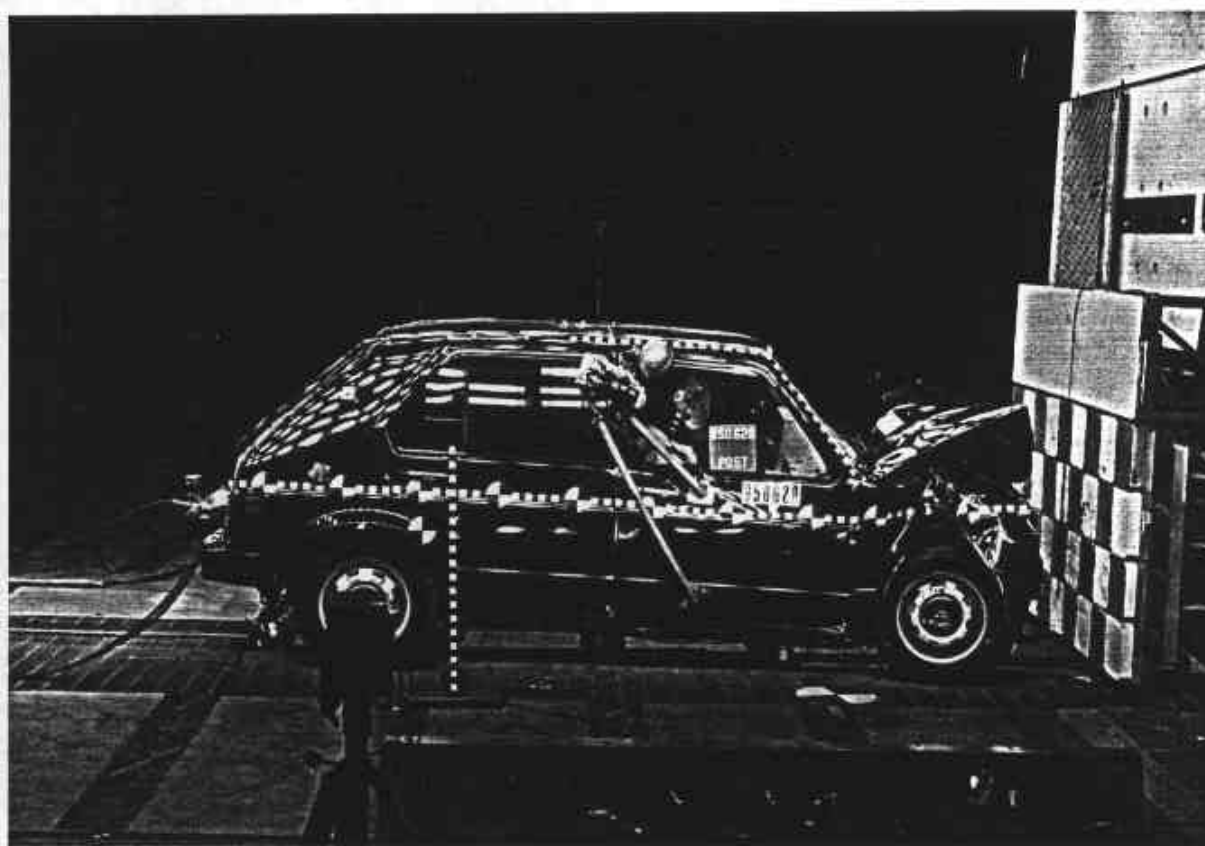


Figure A-2. POST-TEST RIGHT SIDE OVERALL
A-2



Figure A-3. PRE-TEST LEFT SIDE OVERALL



Figure A-4. POST-TEST LEFT SIDE OVERALL
A-3



Figure A-5. PRE-TEST VEHICLE FRONT

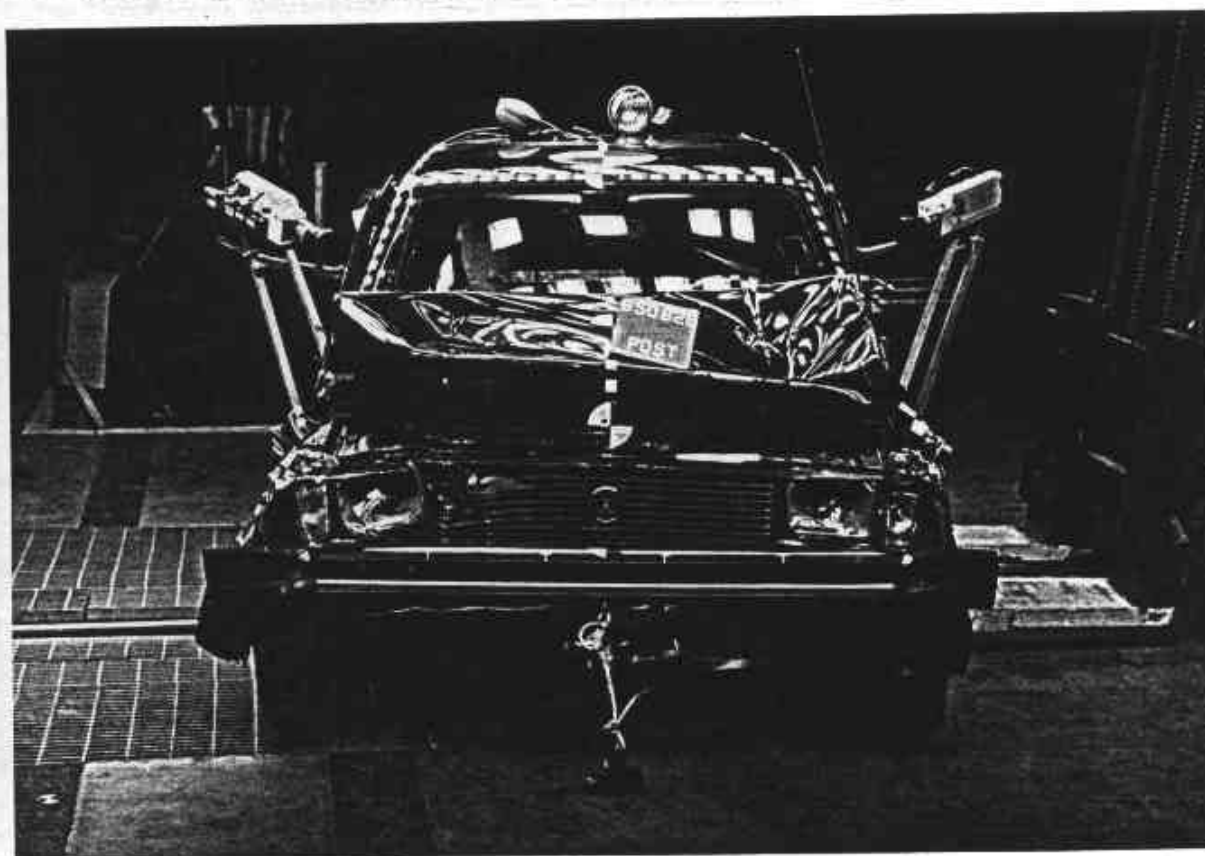


Figure A-6. POST-TEST VEHICLE FRONT
A-4

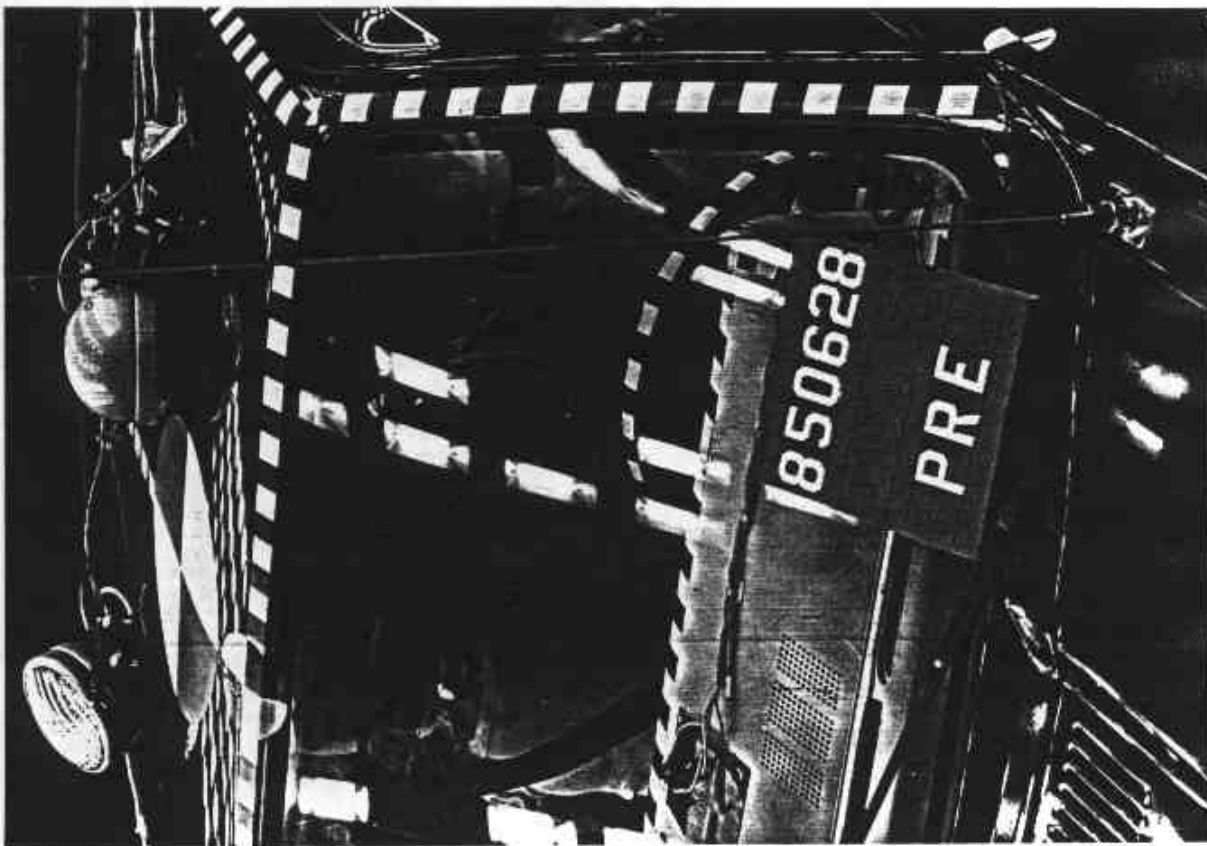


Figure A-7. PRE-TEST VEHICLE GLAZING - VIEW 1

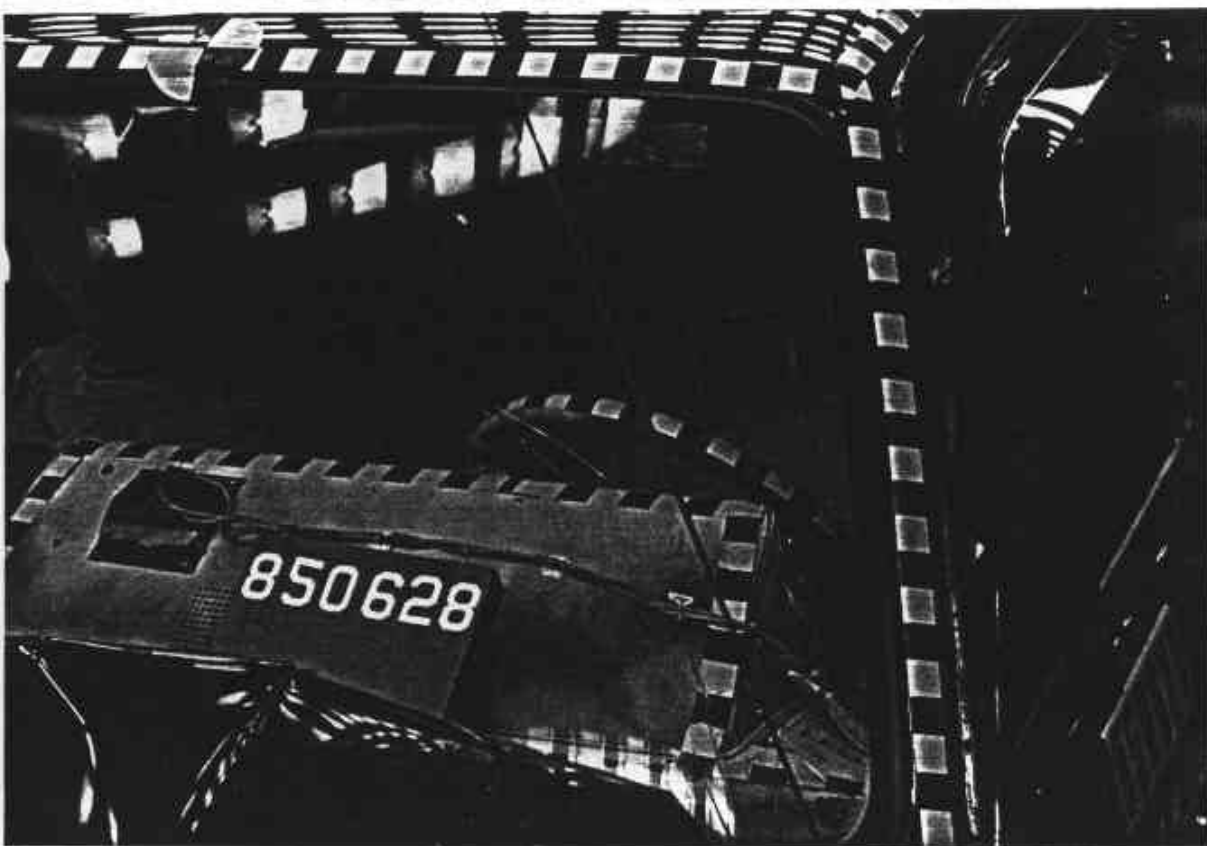


Figure A-8. POST-TEST VEHICLE GLAZING - VIEW 1
A-5

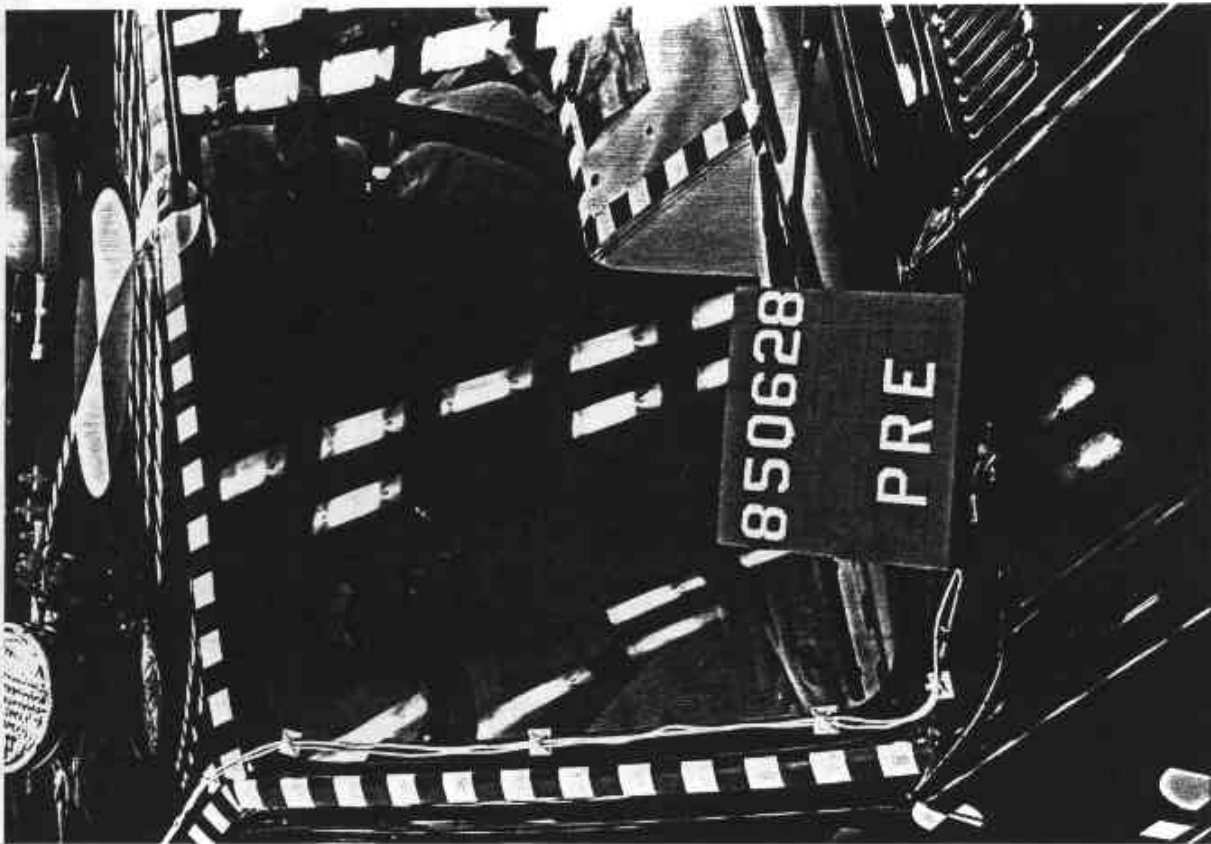


Figure A-9. PRE-TEST VEHICLE GLAZING - VIEW 2



Figure A-10. POST-TEST VEHICLE GLAZING - VIEW 2

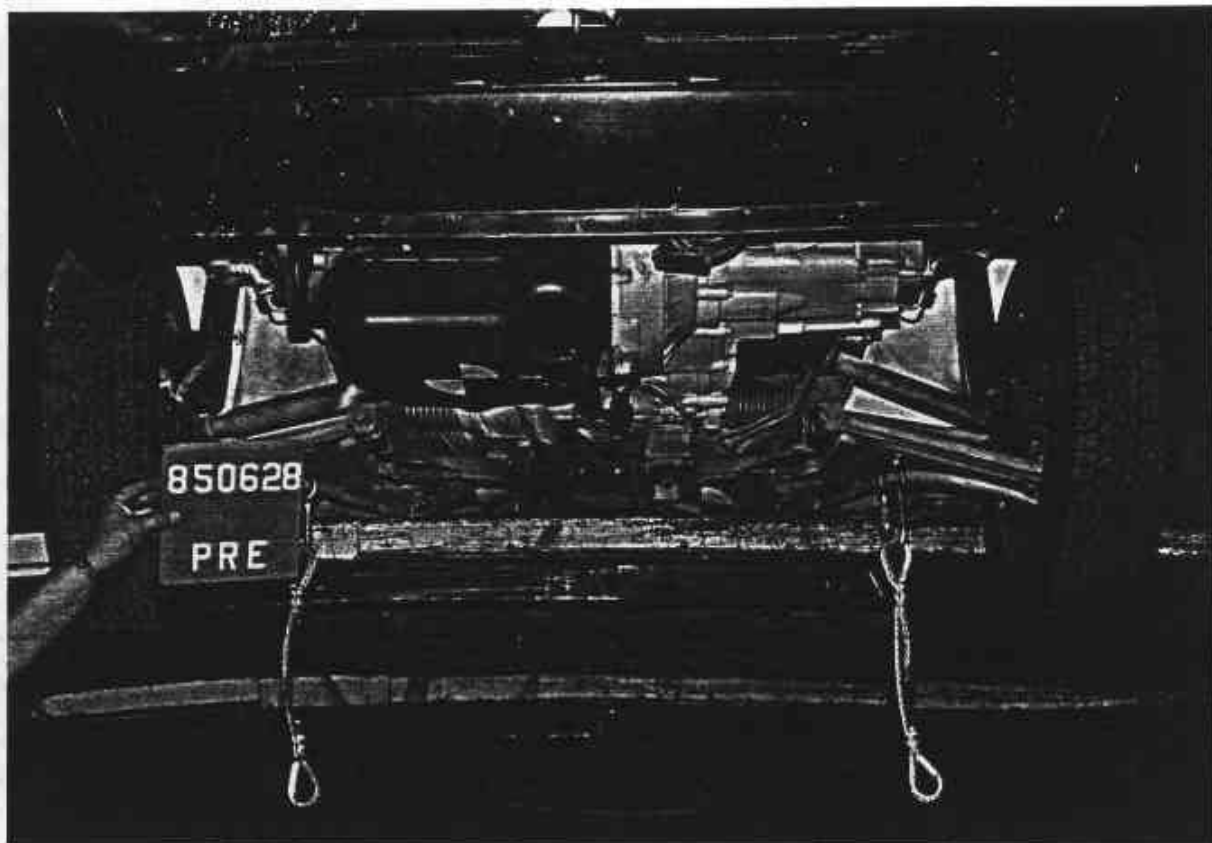


Figure A-11. PRE-TEST VEHICLE UNDERBODY - VIEW 1

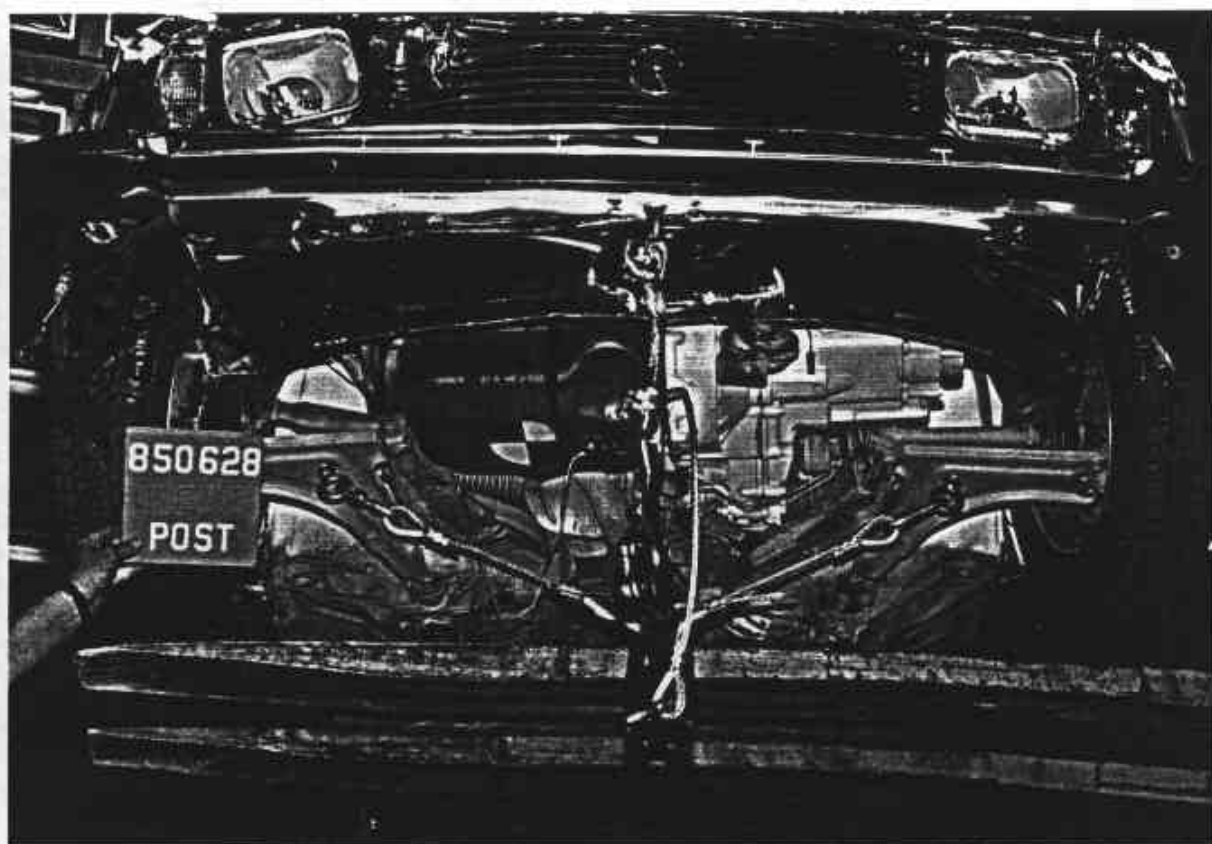


Figure A-12. POST-TEST VEHICLE UNDERBODY - VIEW 1

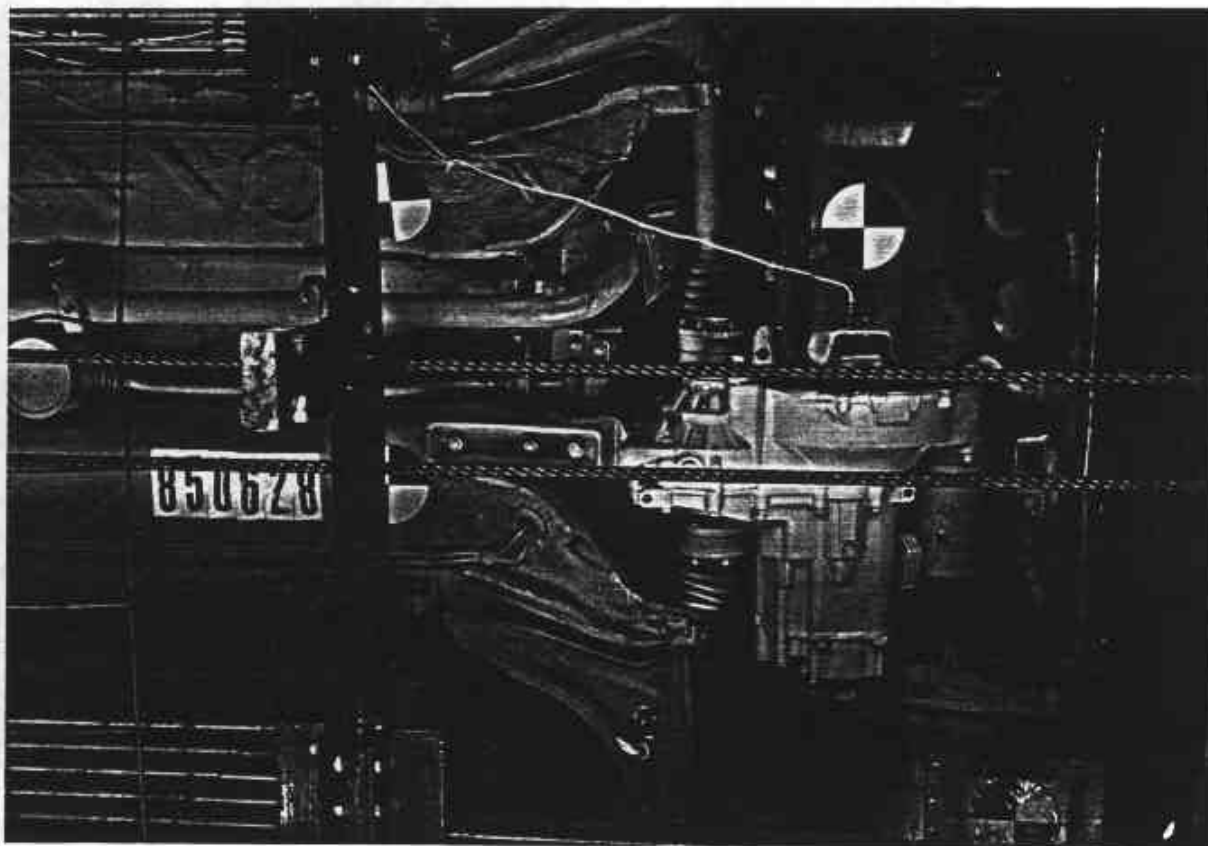


Figure A-13. PRE-TEST VEHICLE UNDERBODY - VIEW 2

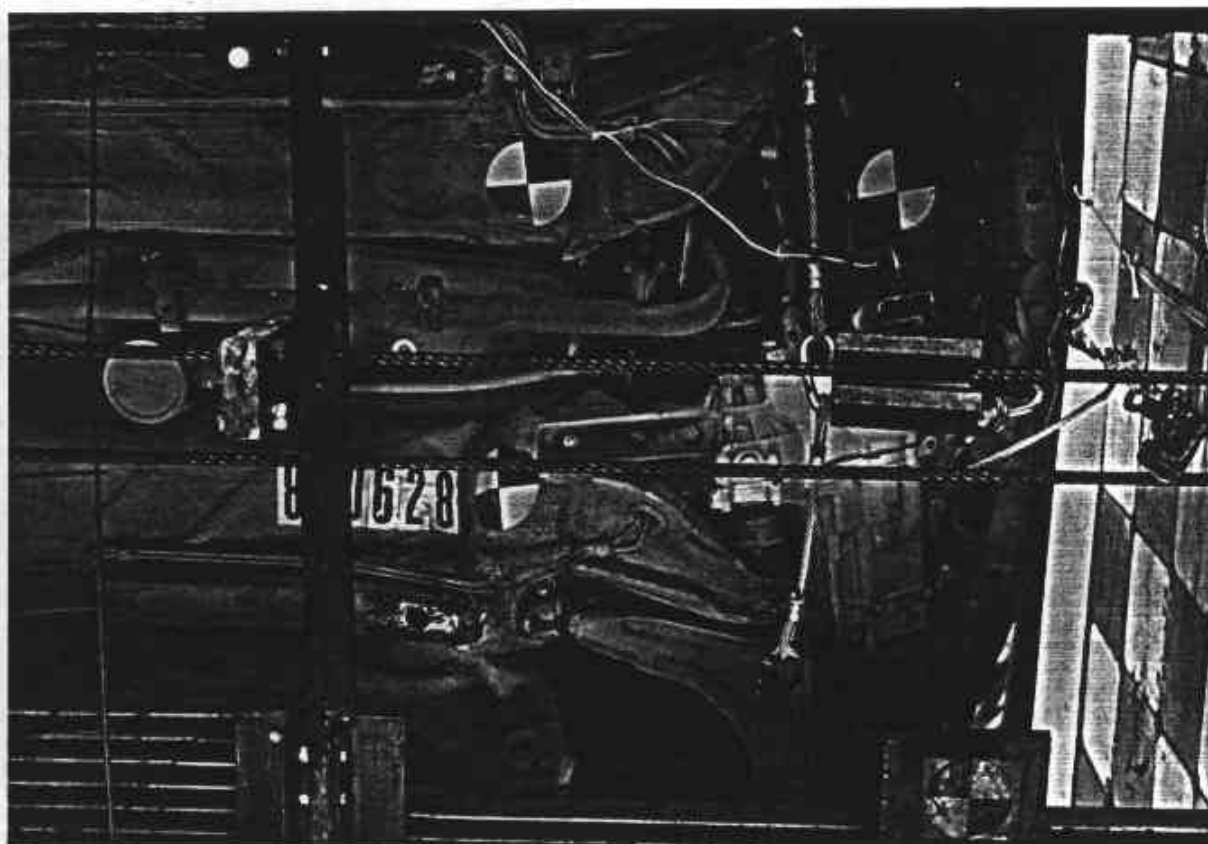


Figure A-14. POST-TEST VEHICLE UNDERBODY - VIEW 2



Figure A-15. PRE-TEST DRIVER DUMMY - VIEW 1



Figure A-16. POST-TEST DRIVER DUMMY - VIEW 1

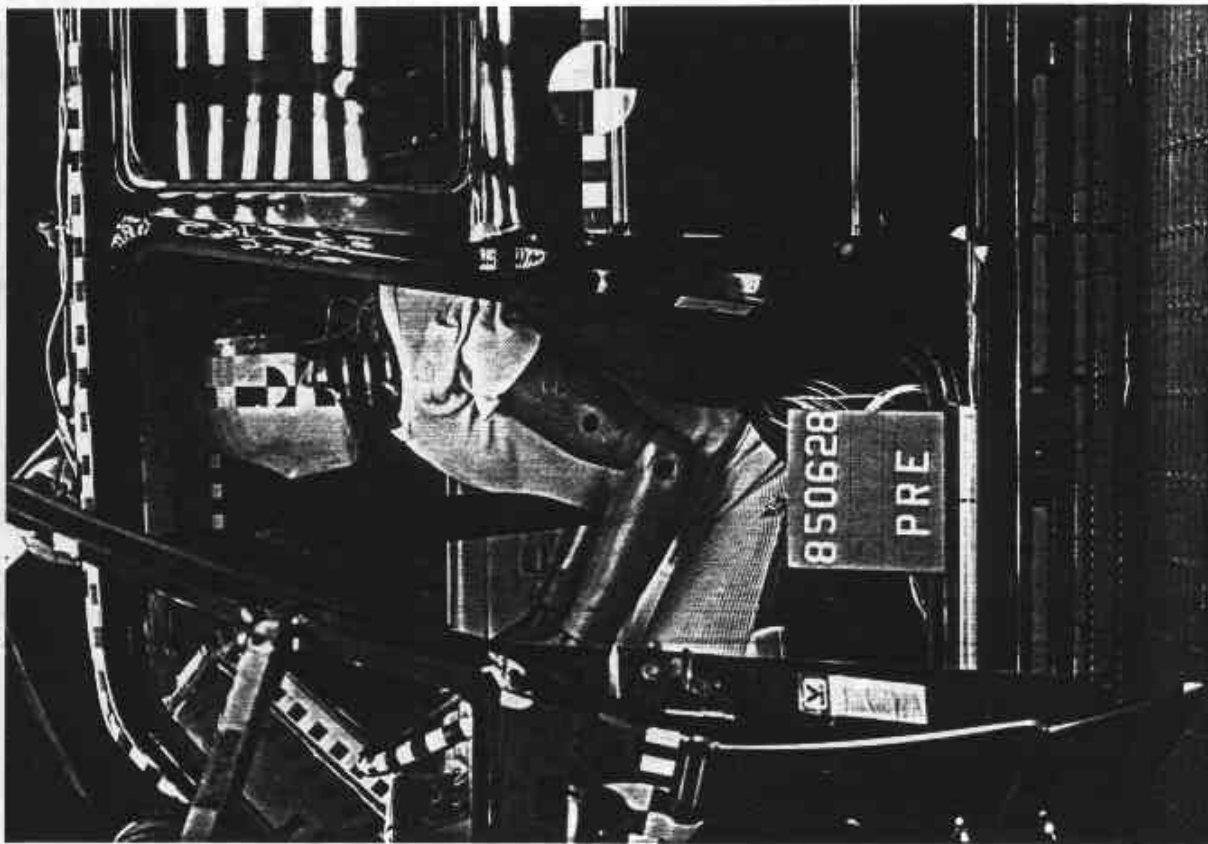


Figure A-17. PRE-TEST DRIVER DUMMY - VIEW 2



Figure A-18. POST-TEST DRIVER DUMMY - VIEW 2

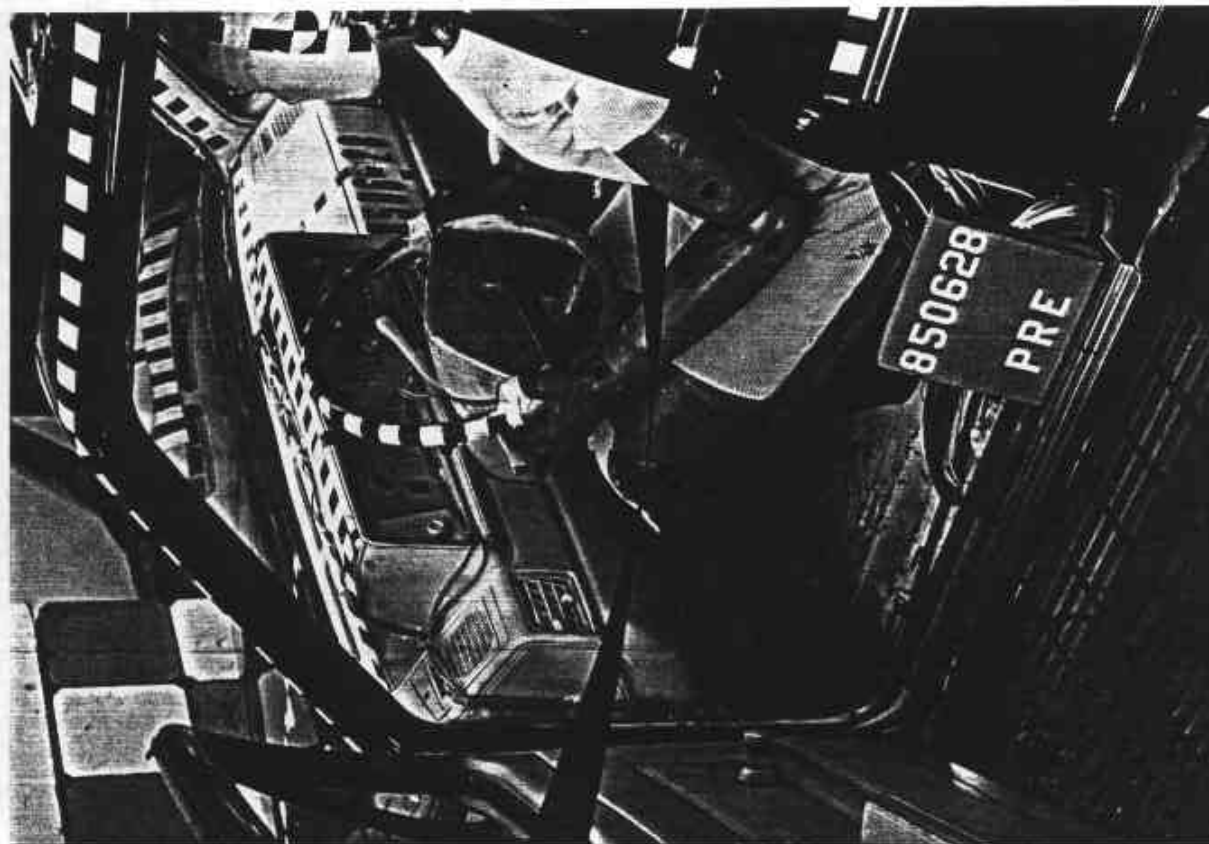


Figure A-19. PRE-TEST DRIVER DUMMY - VIEW 3

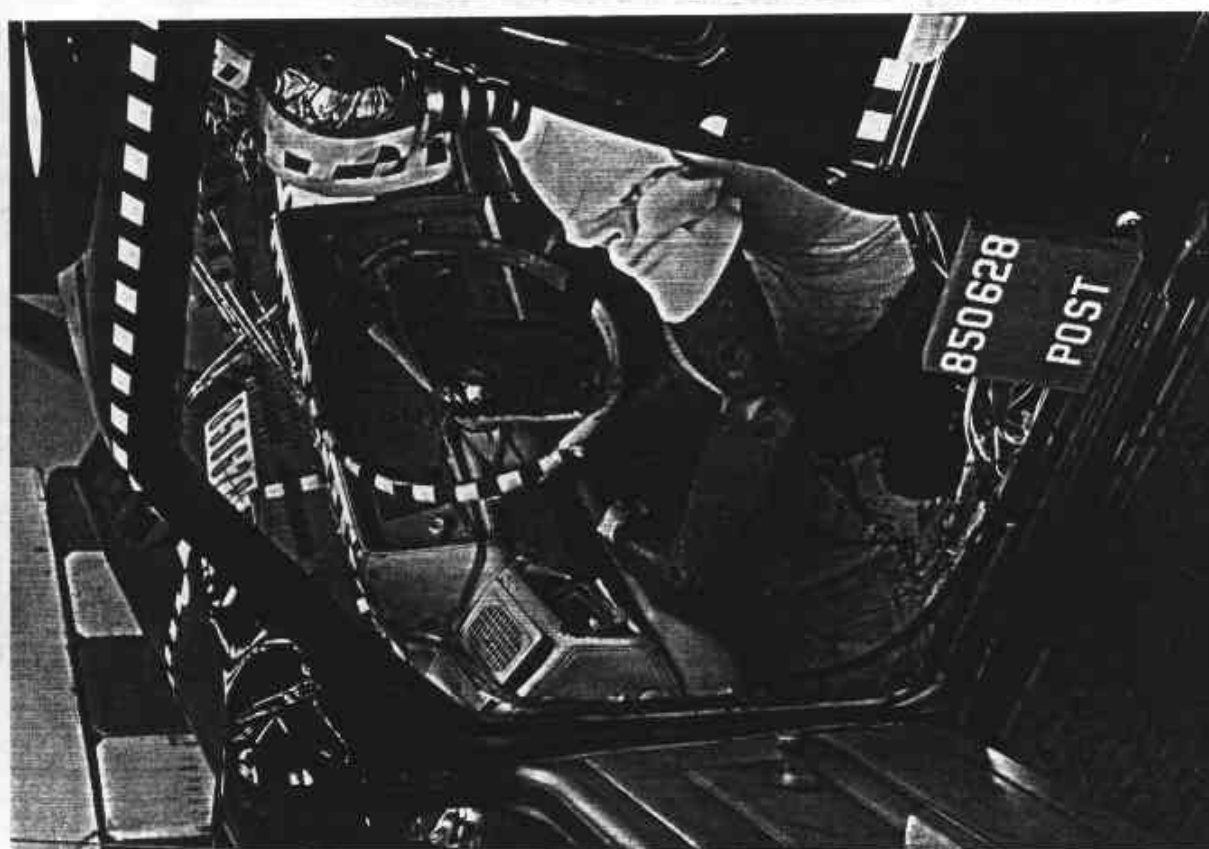


Figure A-20. POST-TEST DRIVER DUMMY - VIEW 3



Figure A-21. PRE-TEST PASSENGER DUMMY - VIEW 1

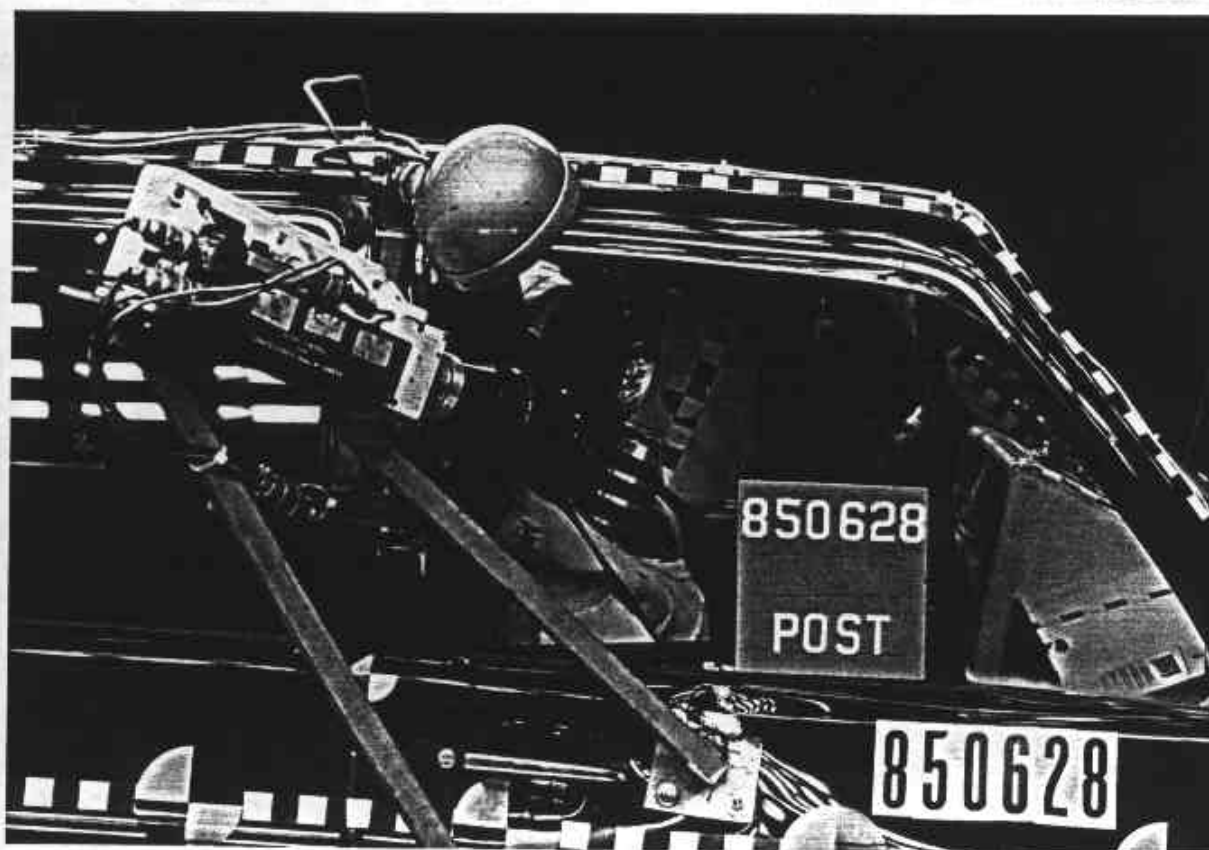


Figure A-22. POST-TEST PASSENGER DUMMY - VIEW 1

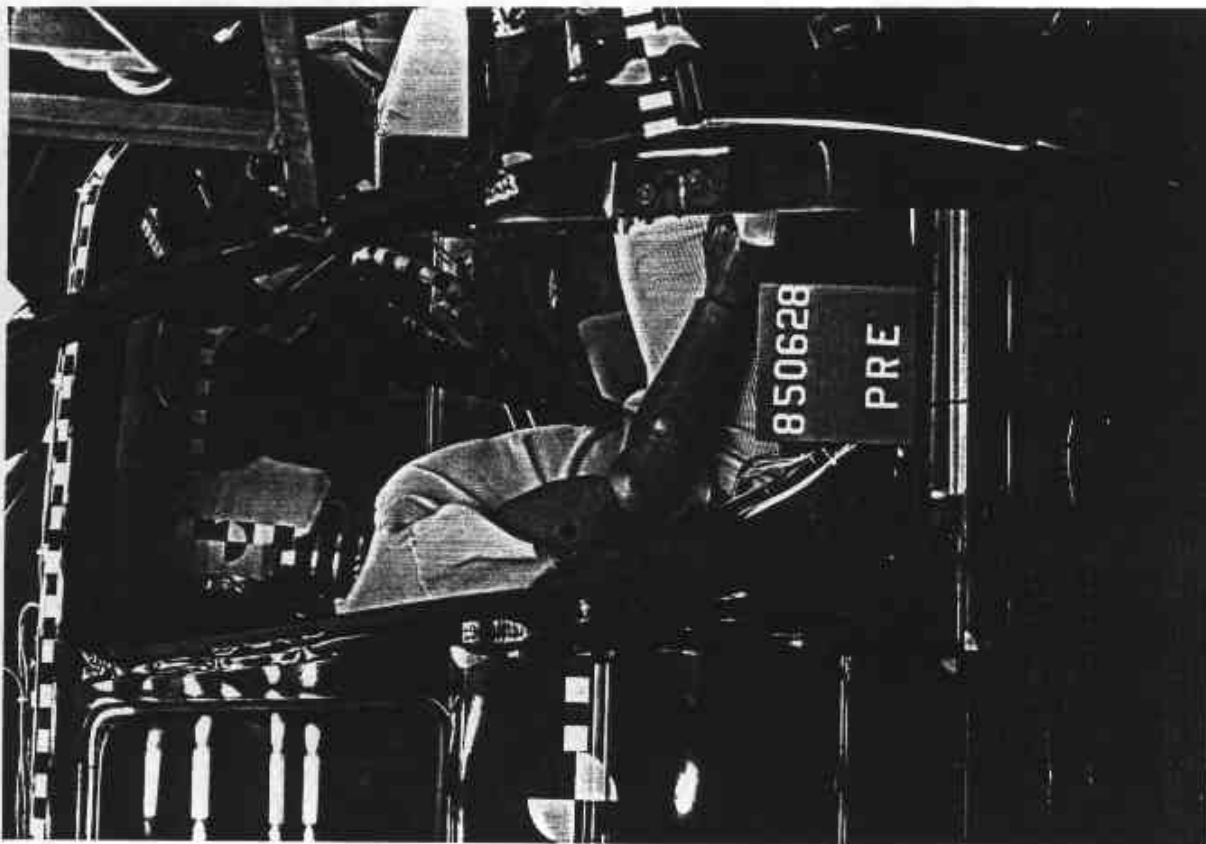


Figure A-23. PRE-TEST PASSENGER DUMMY - VIEW 2



Figure A-24. POST-TEST PASSENGER DUMMY - VIEW 2

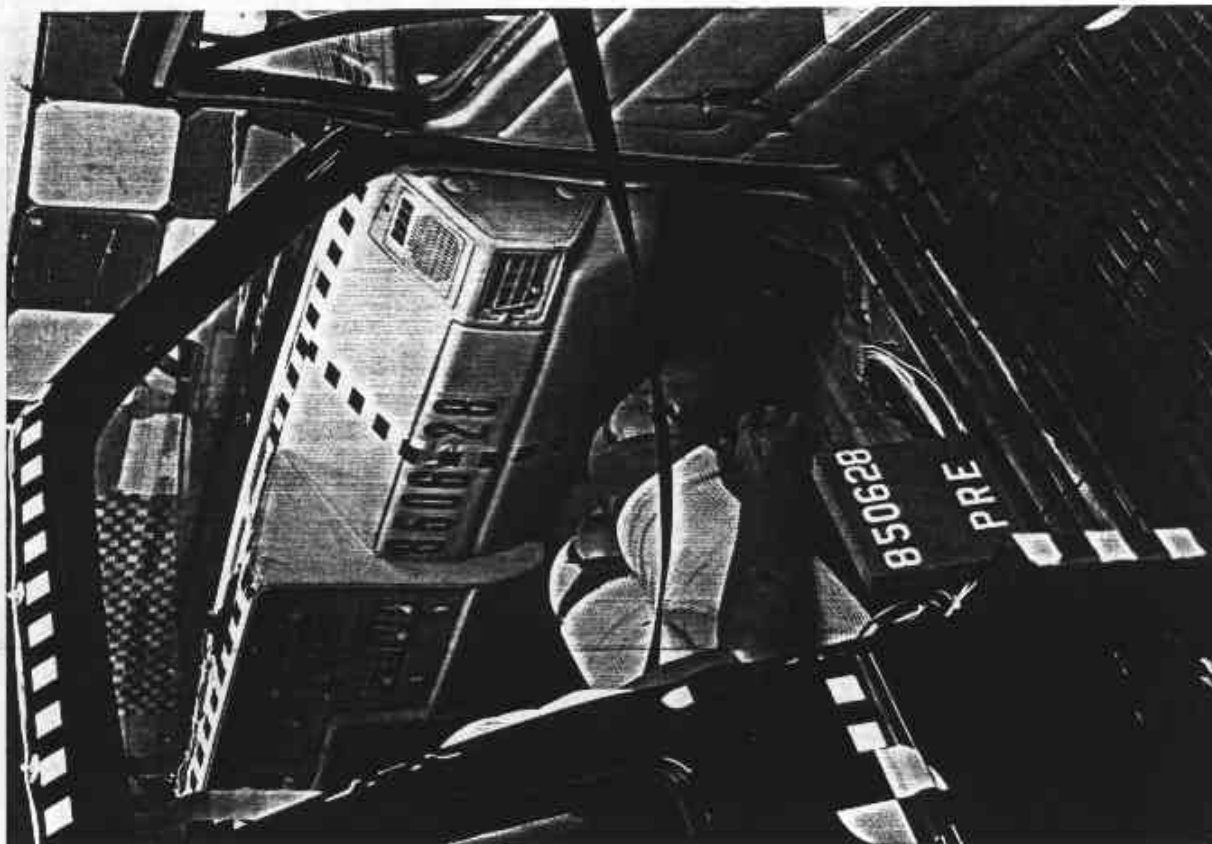


Figure A-25. PRE-TEST PASSENGER DUMMY - VIEW 3

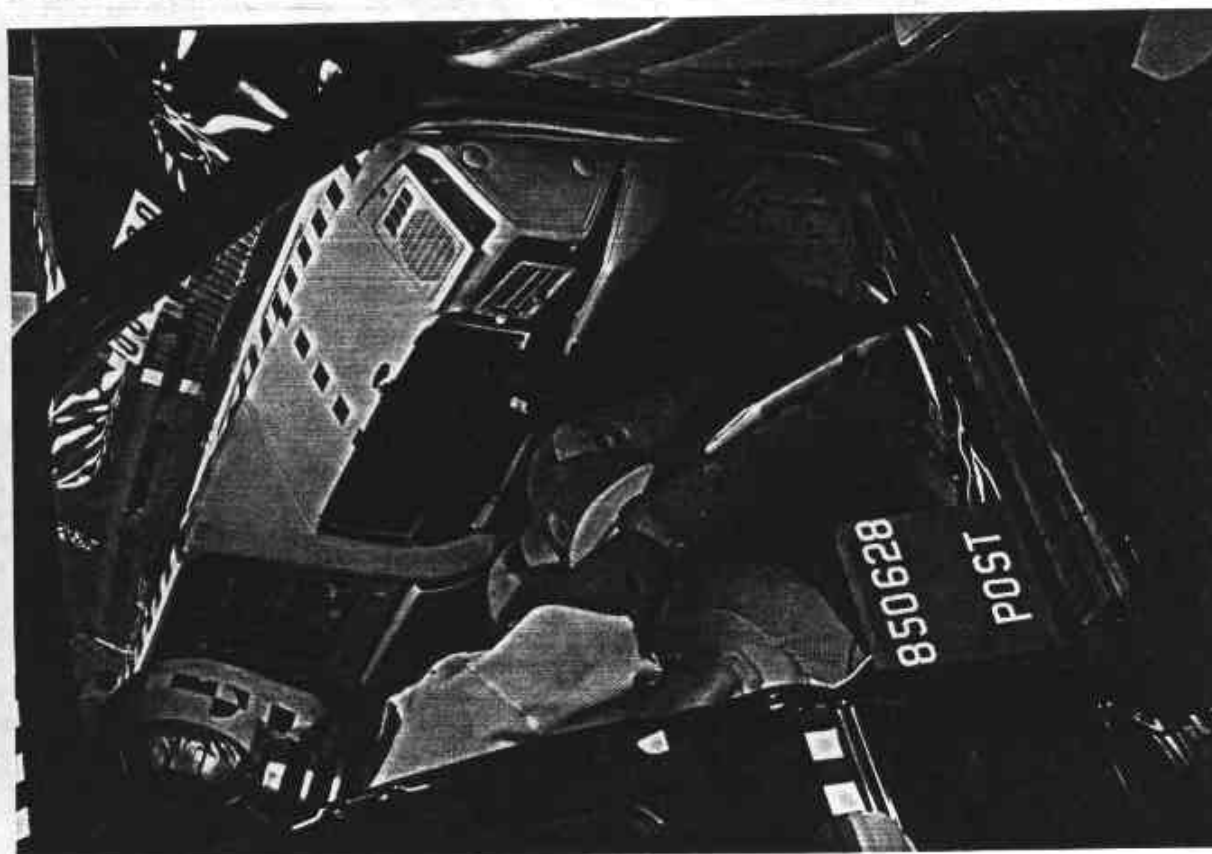


Figure A-26. POST-TEST PASSENGER DUMMY - VIEW 3



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

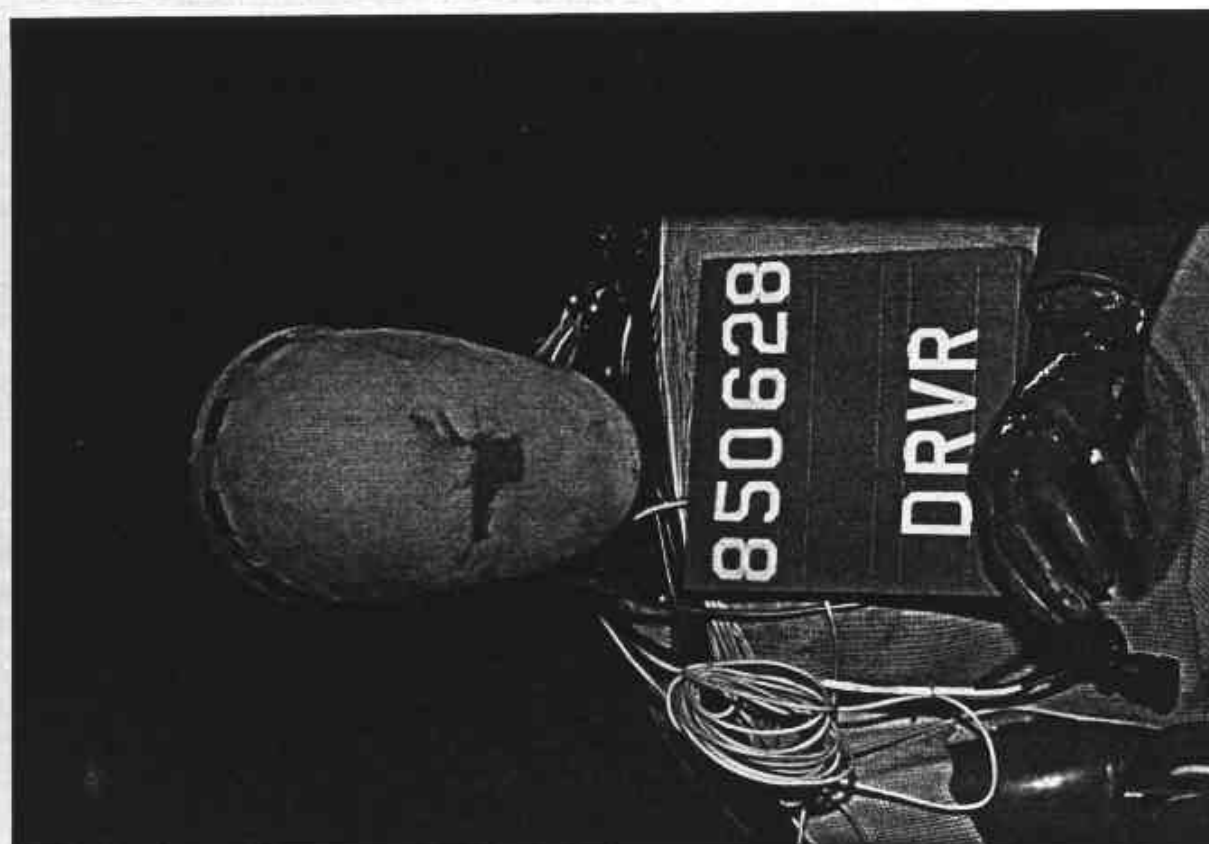


Figure A-28. POST-TEST DRIVER DUMMY - VIEW 5



Figure A-29. POST-TEST PASSENGER DUMMY - VIEW 4



Figure A-30. POST-TEST PASSENGER DUMMY - VIEW 5

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.

INTEGRAL 50620 3 JUL 83 10:05:33

RABBIT INTO FIXED LCB

85179000000

HEDXG1

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -62.46 84.63, 59.11 187.75

100.00

75.00

50.00

25.00

0.00

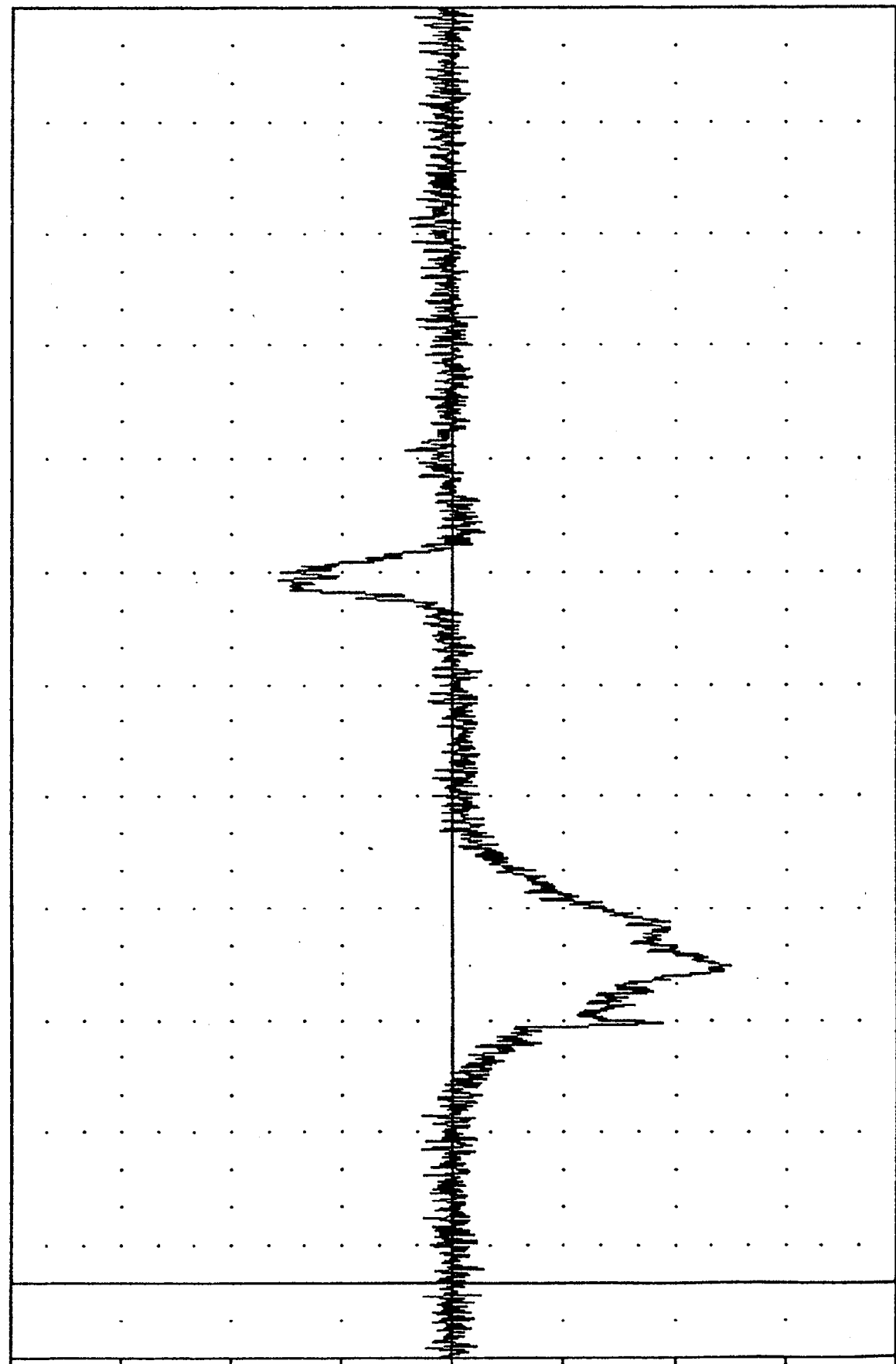
-25.00

-50.00

-75.00

-100.00

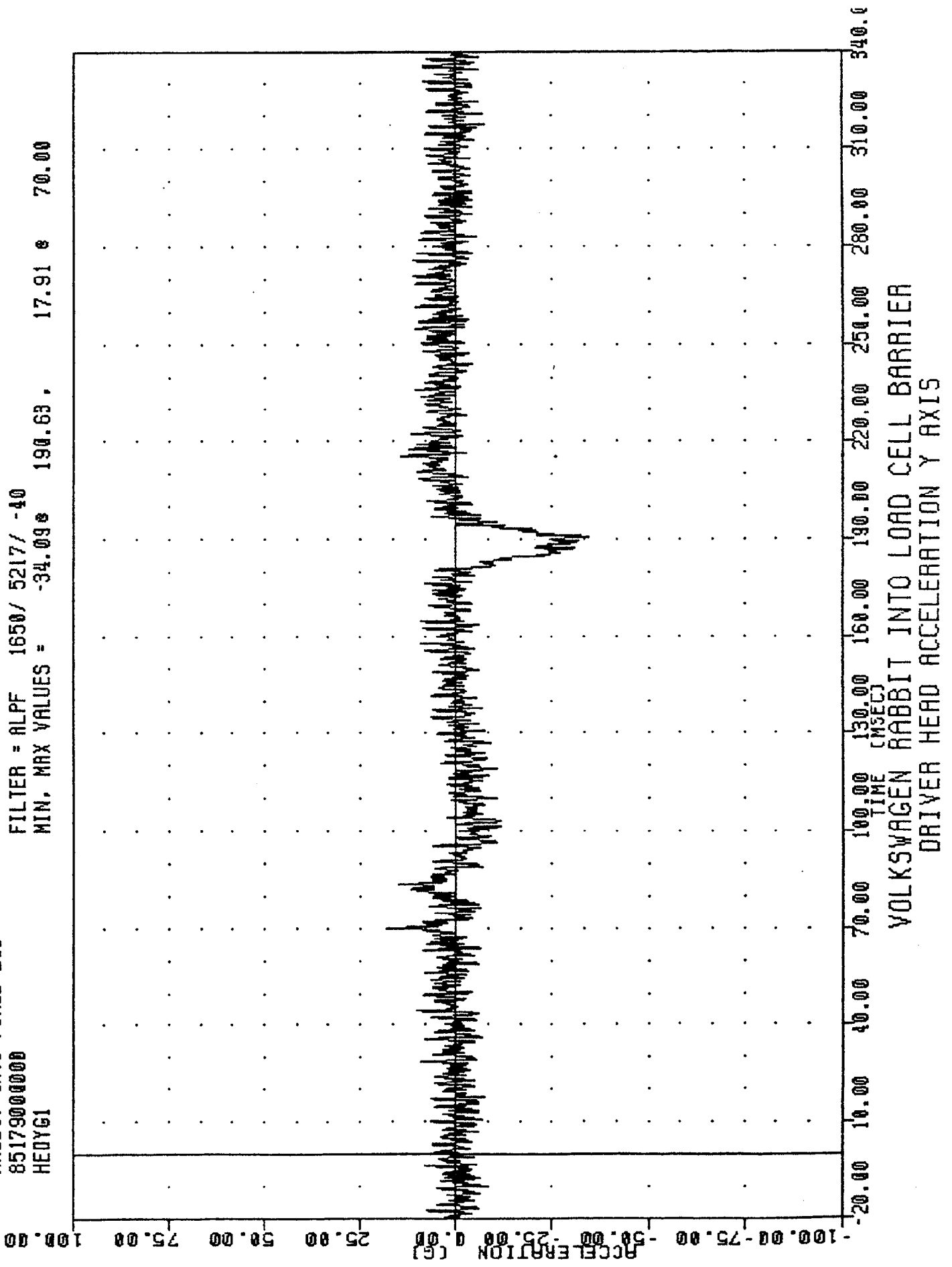
ACCELERATION (G)



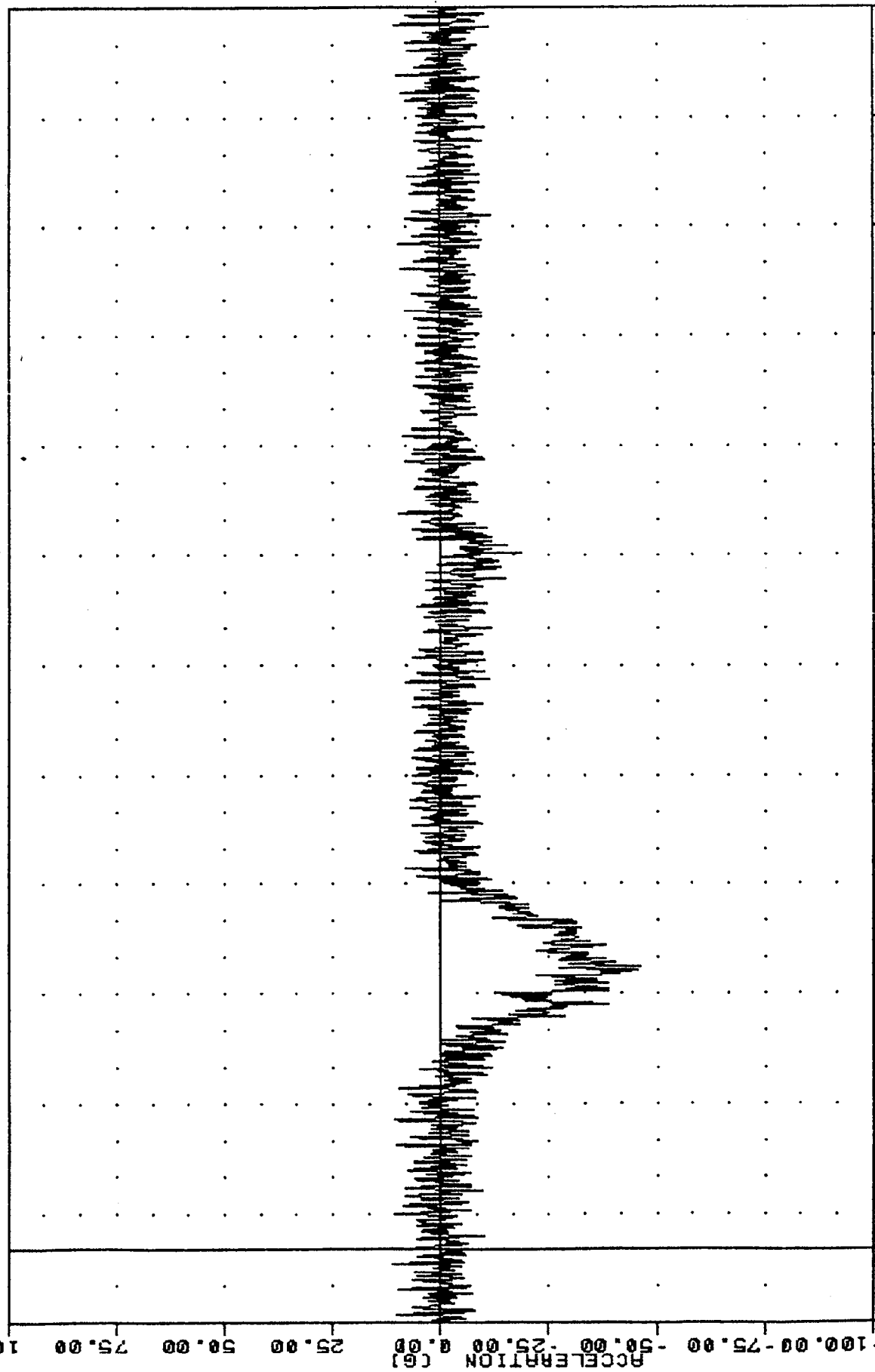
TIME (MSEC)

VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
DRIVER HEAD ACCELERATION X AXIS

VMM 1050620 PLOT DATE 9 JUL 83 10:05:33
 RABBIT INTO FIXED LCB
 85179000000
 HEDYG1
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -34.09 190.63 17.91 70.00



VHT 030620 03 JUL 83 10:05:53
 RABBIT INTO FIXED LCB
 85179000000
 HEDZ61
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -45.79 77.50 11.08 -3.88



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER HEAD ACCELERATION Z AXIS

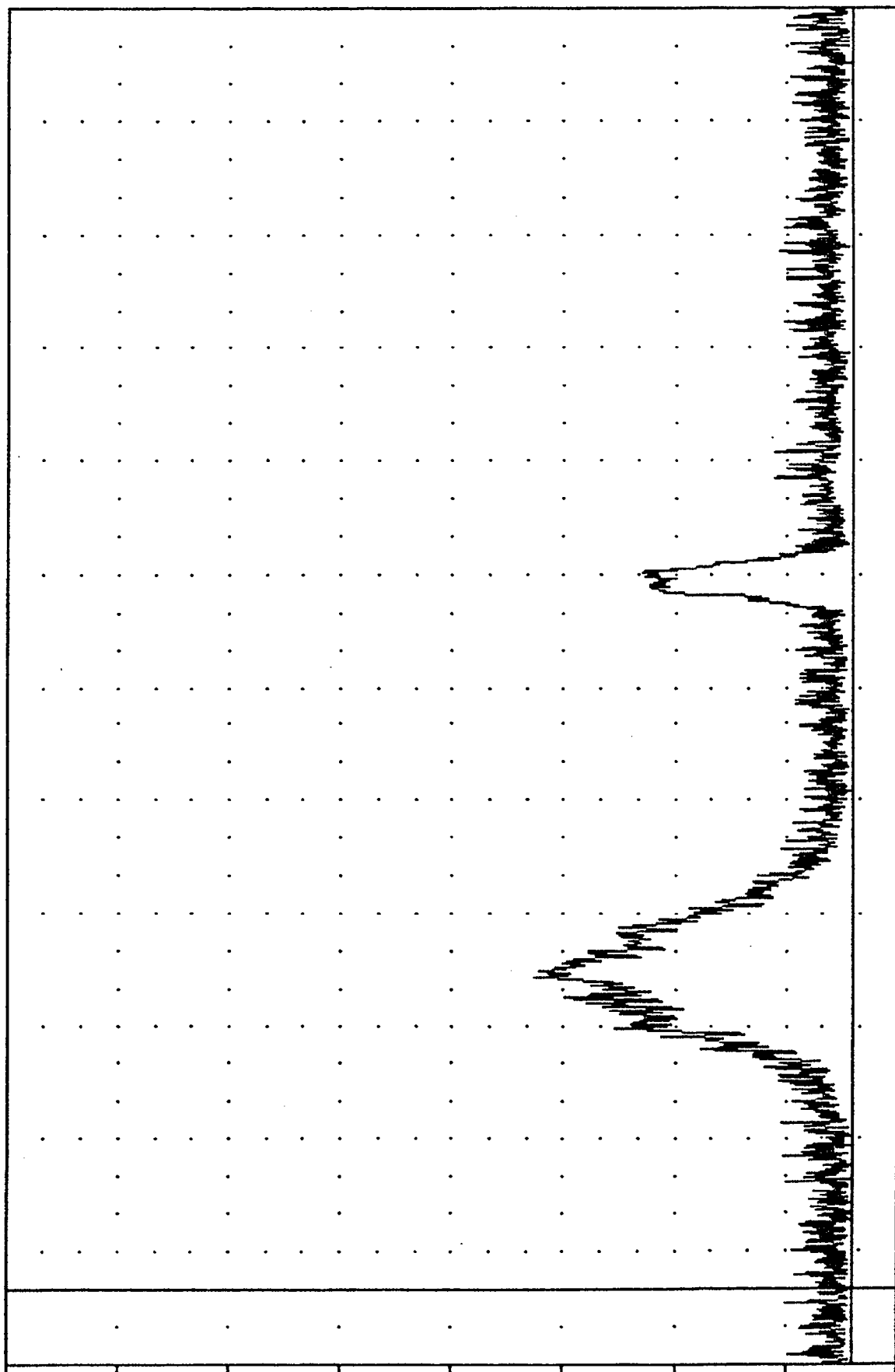
3 JUL 69 10:05:33

850626
RABBIT INTO FIXED LCB

85179000000
HEDRG1

FILTER = ALPF 1650/ 5217/ -40
MIN. MAX VALUES = 0.268 22.50, 71.80 & 83.13

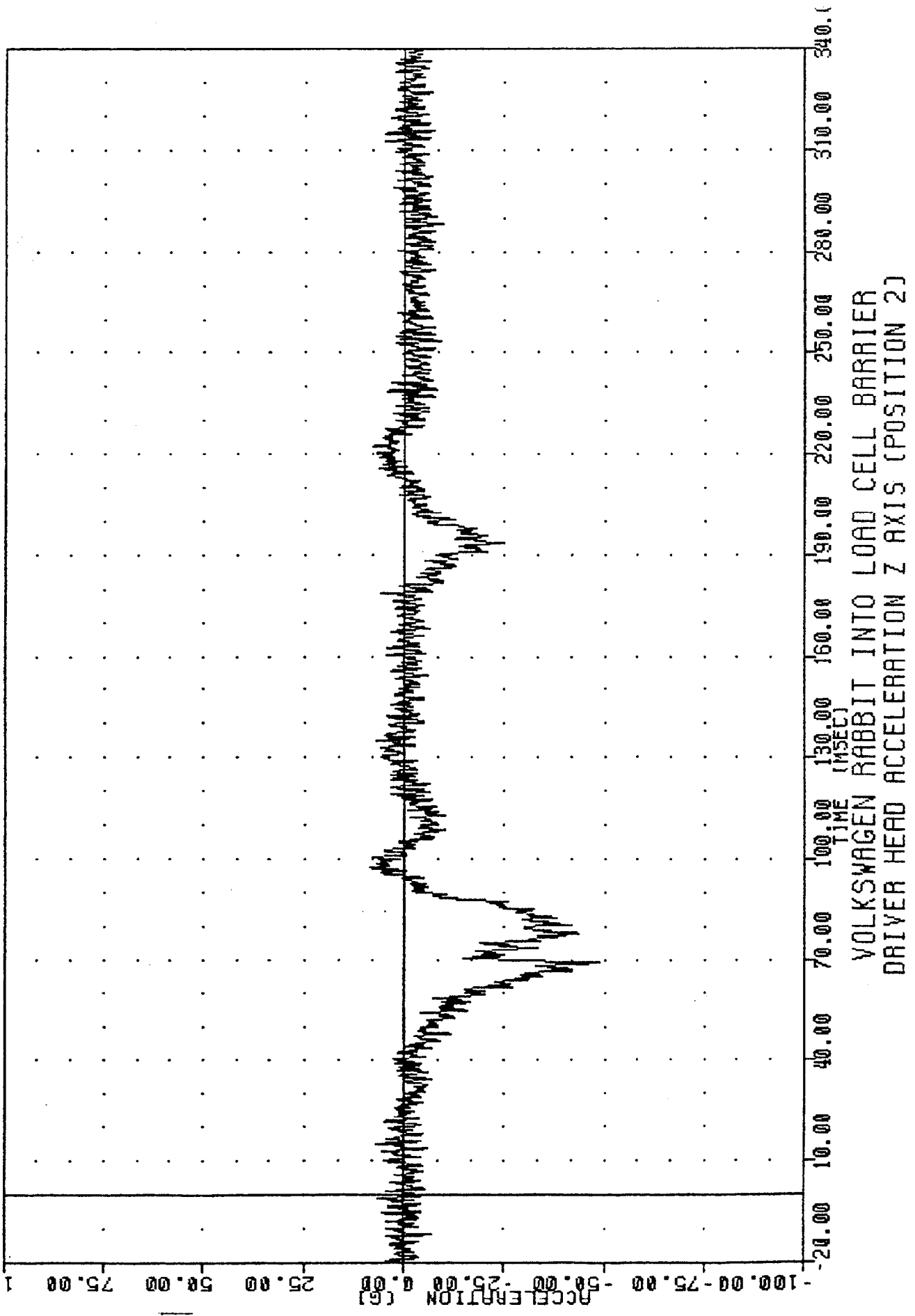
ACCELERATION (G)



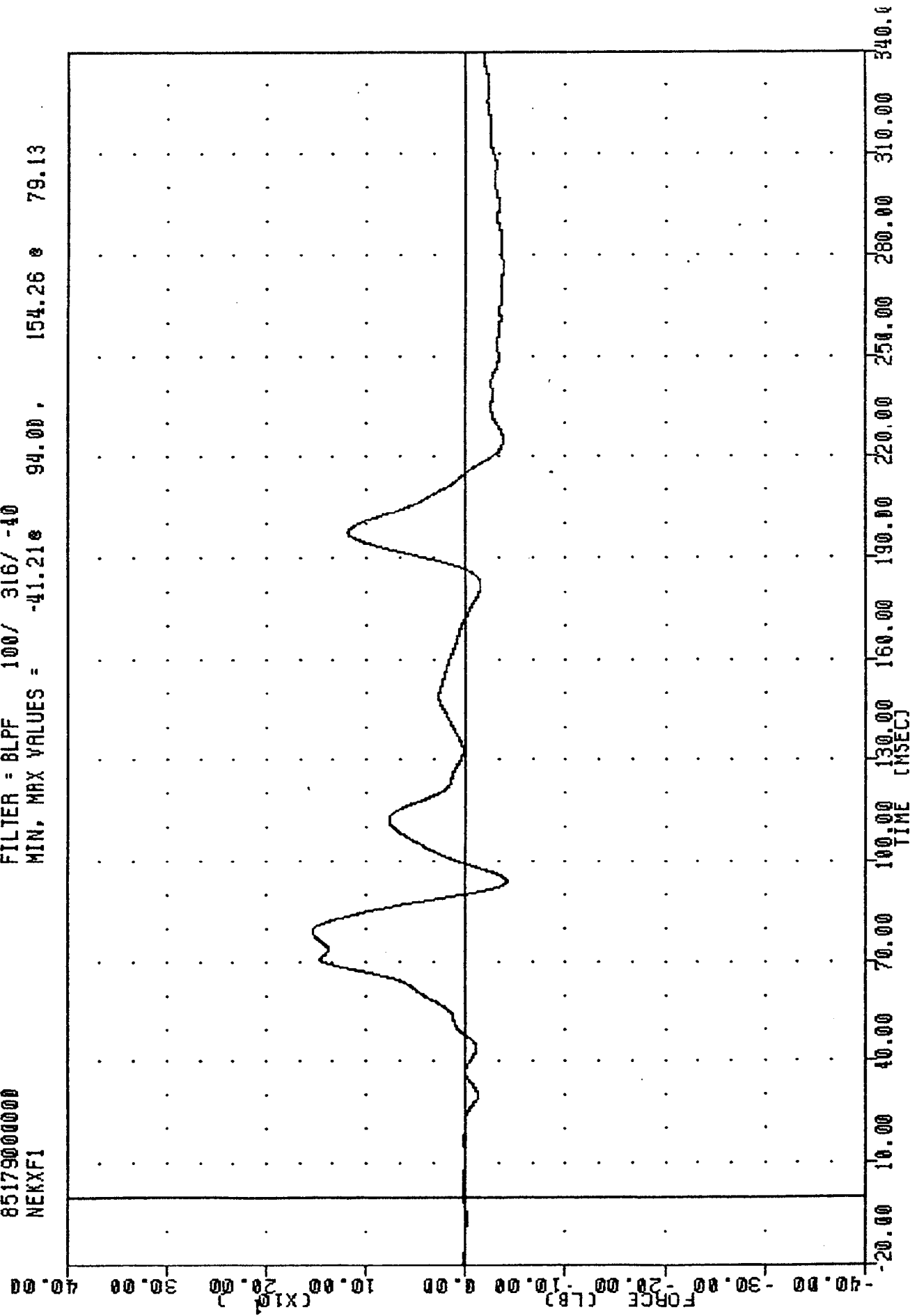
TIME (MSEC)

VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
DRIVER HEAD RESULTANT

7-30-80
 RABBIT INTO FIXED LCB
 85179000000
 HD2ZG1
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -48.75e 69.13. 8.54 e 97.13
 JUL 05 1980

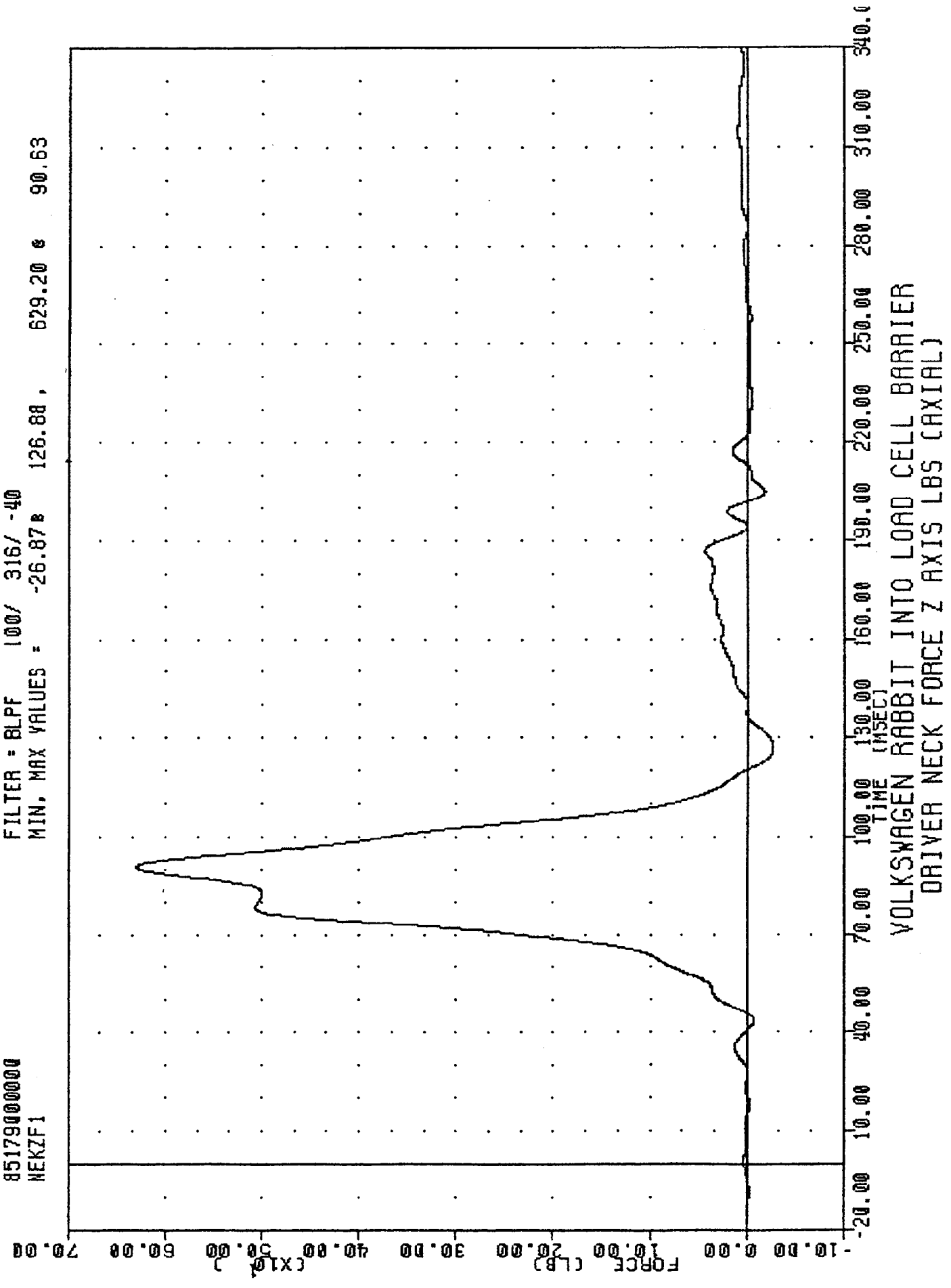


VNT 050620 3 JUL 63 10:05:33
 RABBIT INTO FIXED LCB
 85179000000
 NEKXF1
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -41.21e 94.00, 154.26 e 79.13

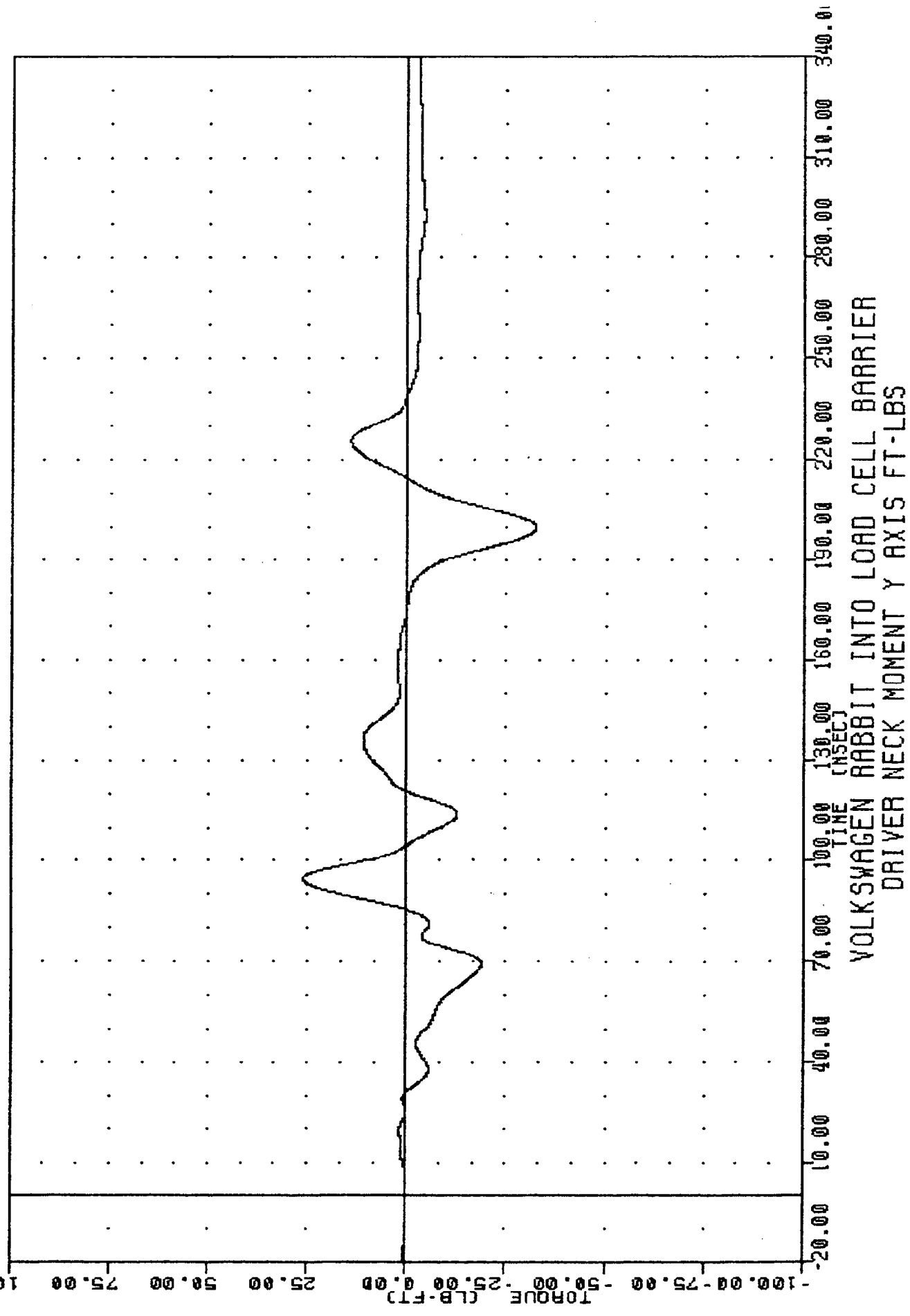


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER NECK FORCE X AXIS LBS (SHEAR)

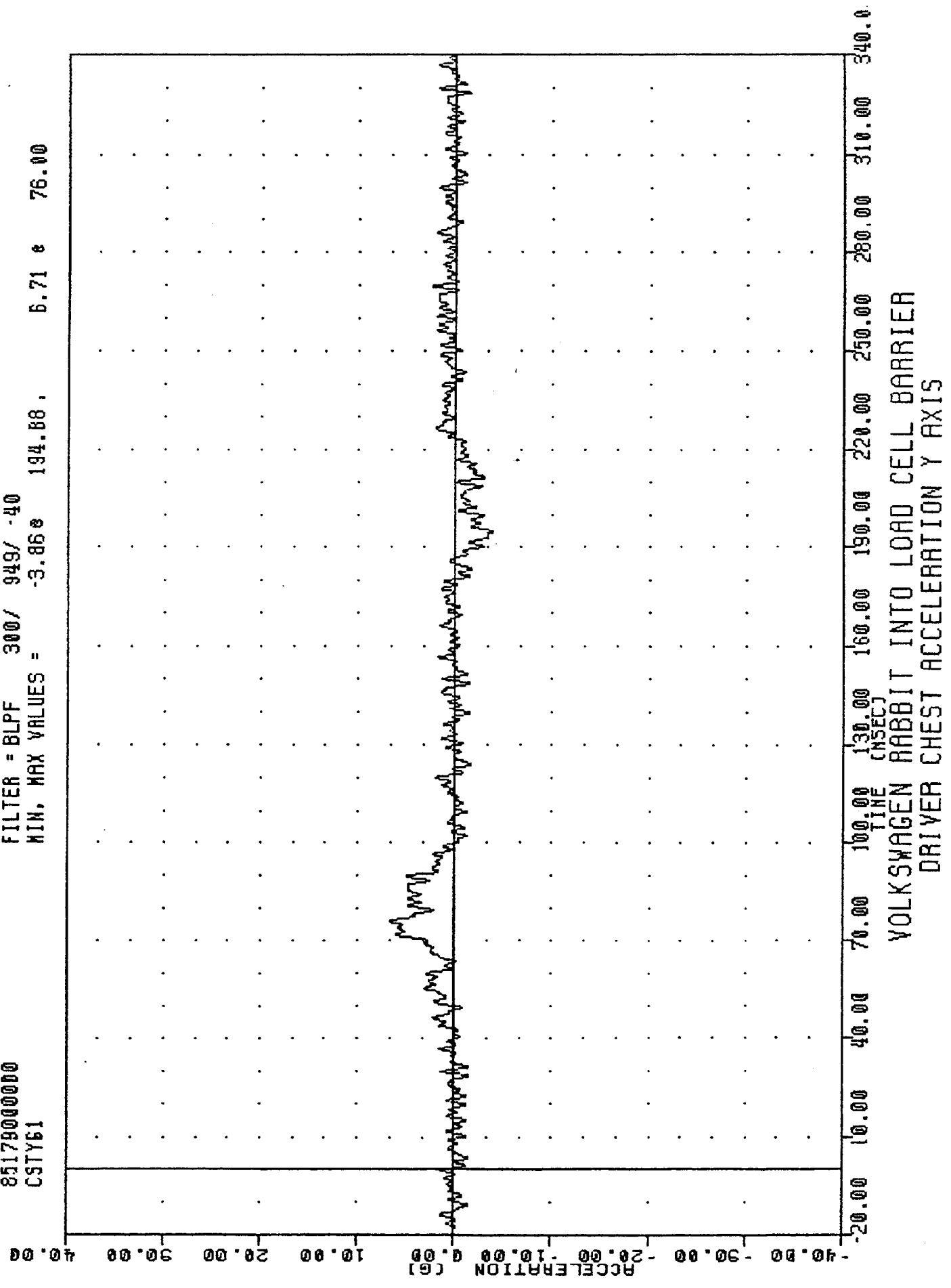
85179000000
 RABBIT INTO FIXED LCB
 7-830620
 3 JUL 83 10:05:33
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -26.87 126.88 629.20 90.63
 NEKZF1



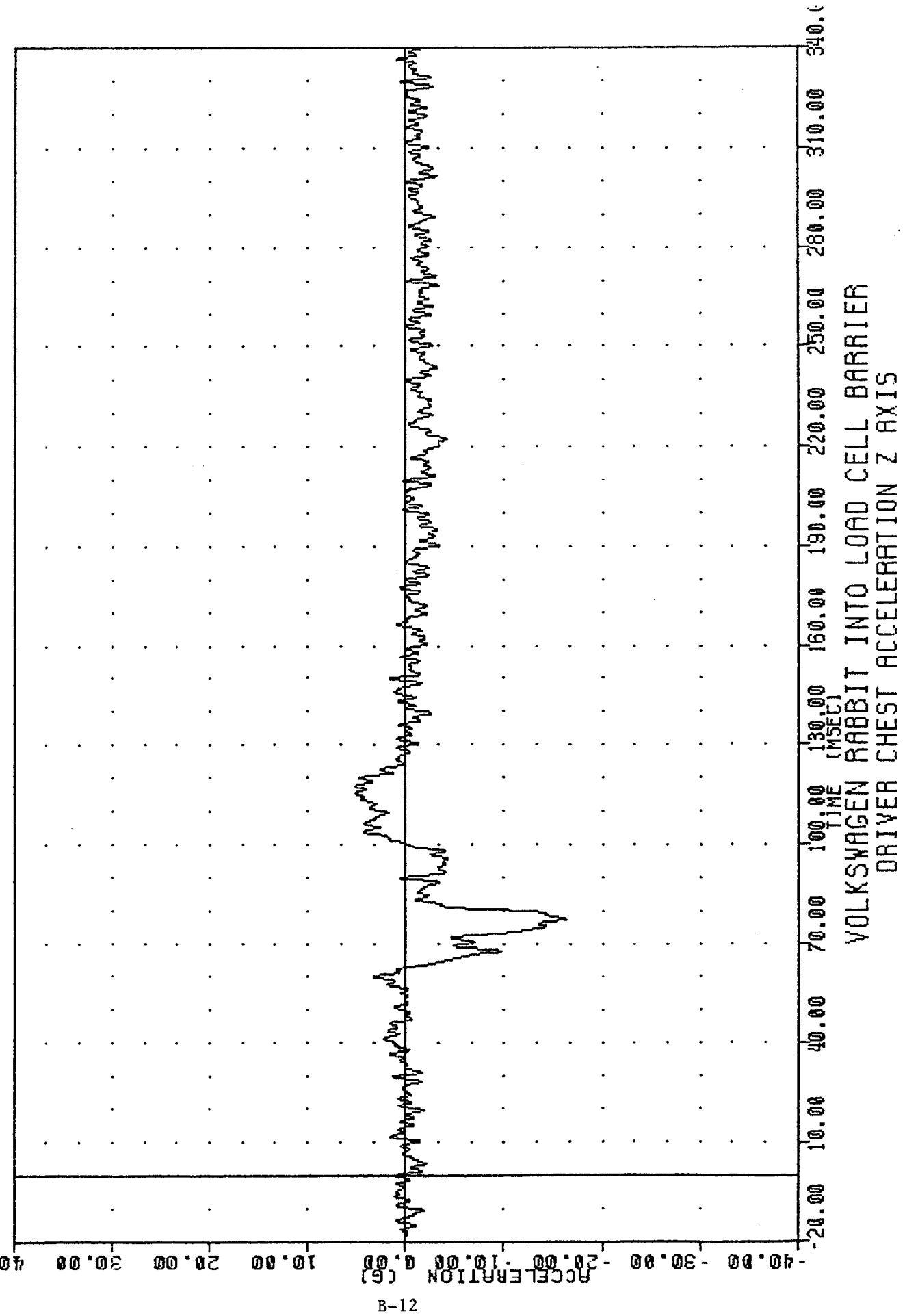
VHT 650620 5 JUL 83 10:05:33
 RABBIT INTO FIXED LCB
 85179000000
 NEKYH1
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -32.37e 199.75, 26.15 e 94.50



7050620 05 JUL 83 05:33
 RABBIT INTO FIXED LCB
 85179000000
 CSTY61
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -3.868 194.88 6.71 76.00

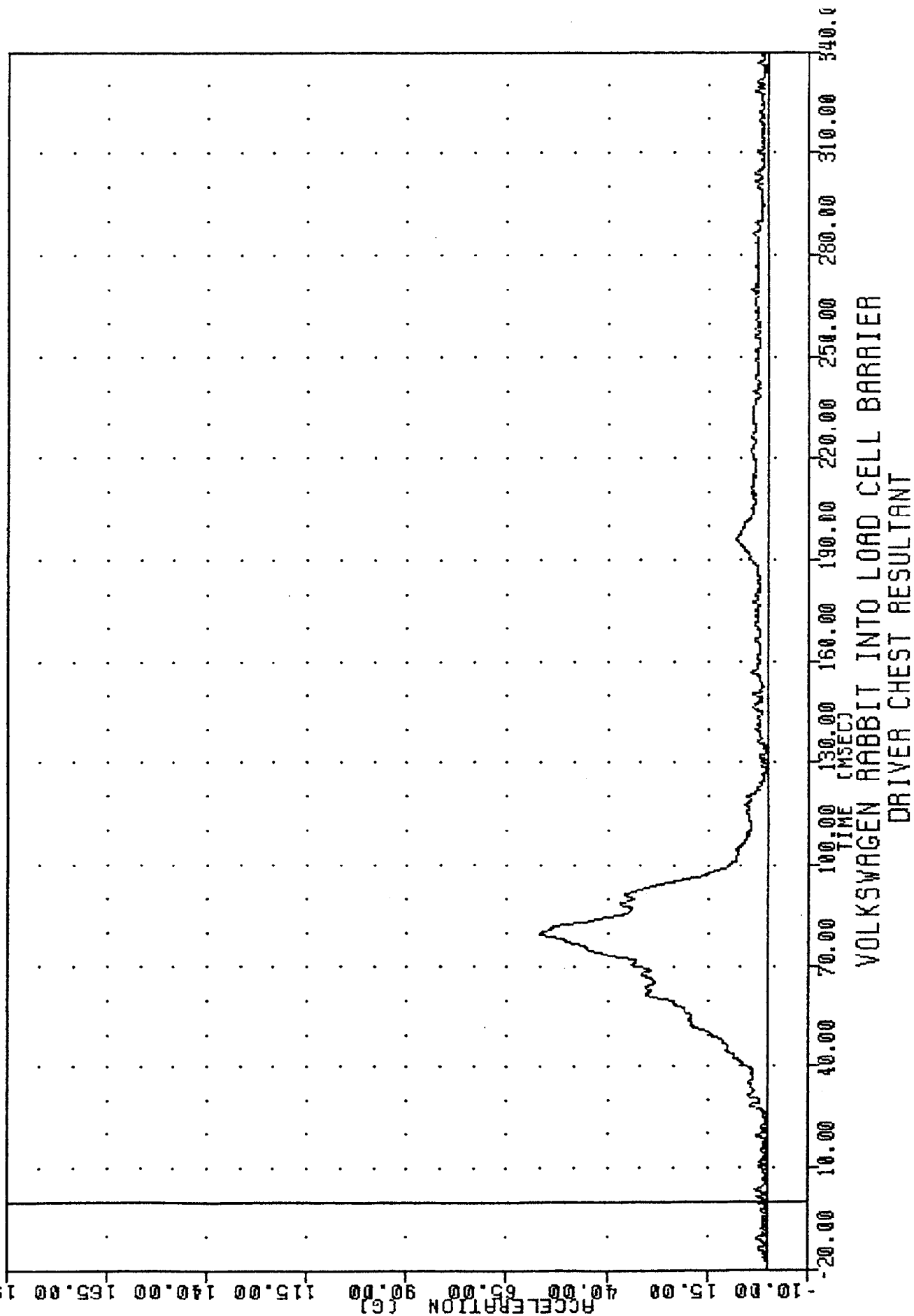


INI 030620 3 JUL 83 10:05:33
 RABBIT INTO FIXED LCB
 85179000000
 CSTZG1
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -16.18 77.38 5.22 117.38

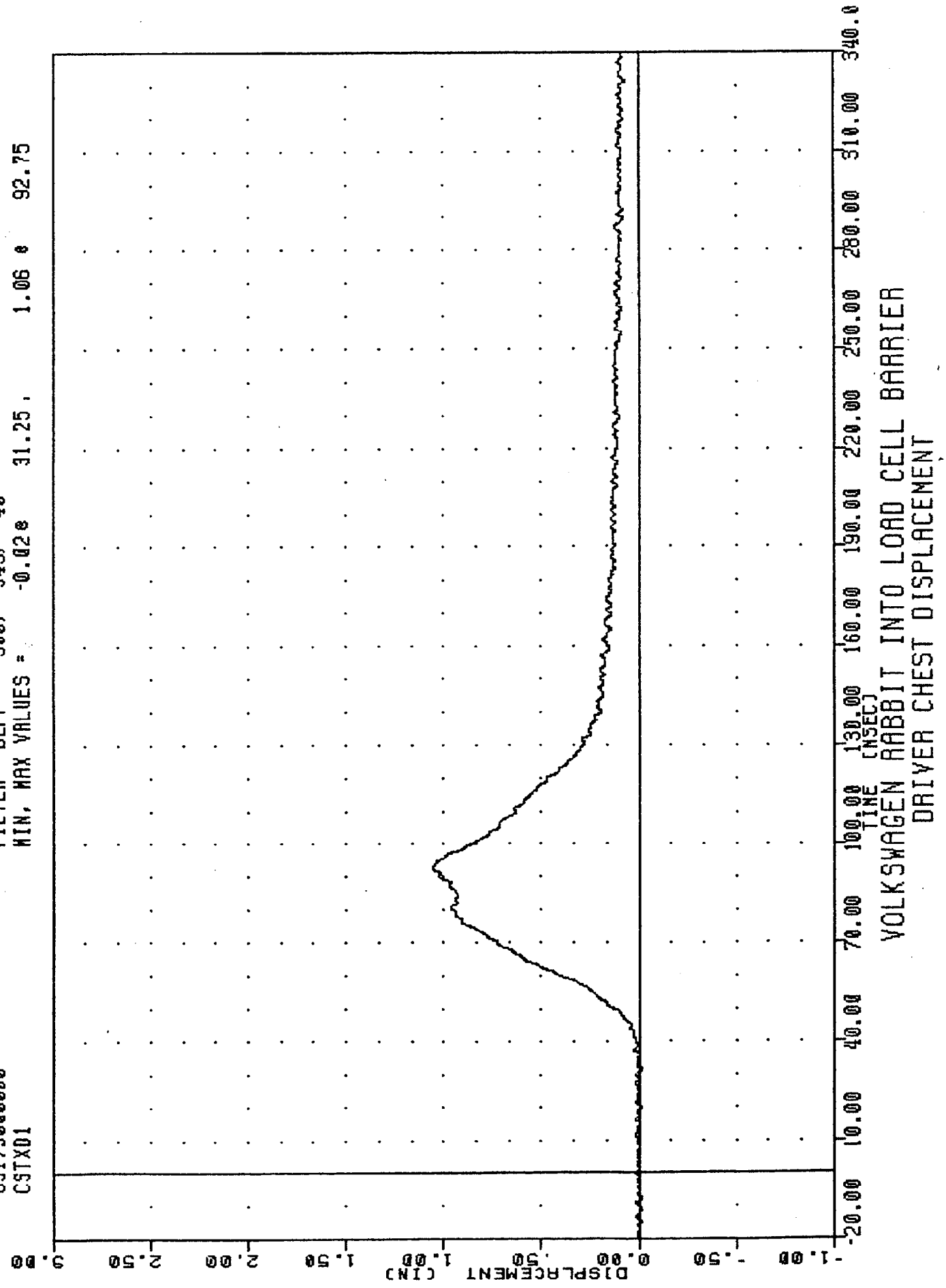


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER CHEST ACCELERATION Z AXIS

VHT 850628 3-JUL-83 10:05:33
 RABBIT INTO FIXED LCB
 85179000000
 CSTRG1
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 0.04e -20.00, 56.85 e 79.75

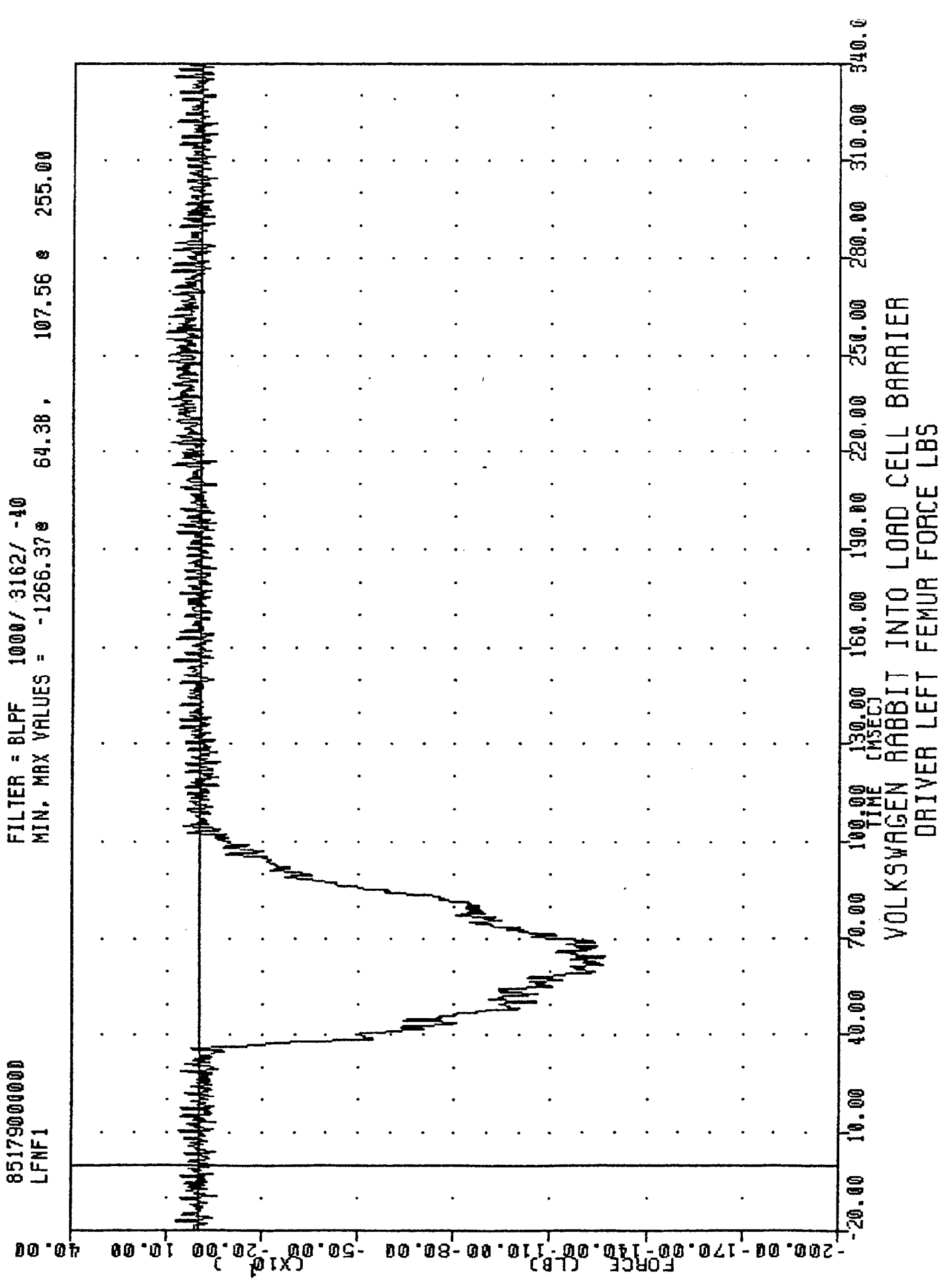


VNT 7030620 PEUT DATE 3 JUL 03 10:09:42
 RABBIT INTO FIXED LCB
 85179000000
 C5TX01
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -0.020 31.25 1.06 92.75

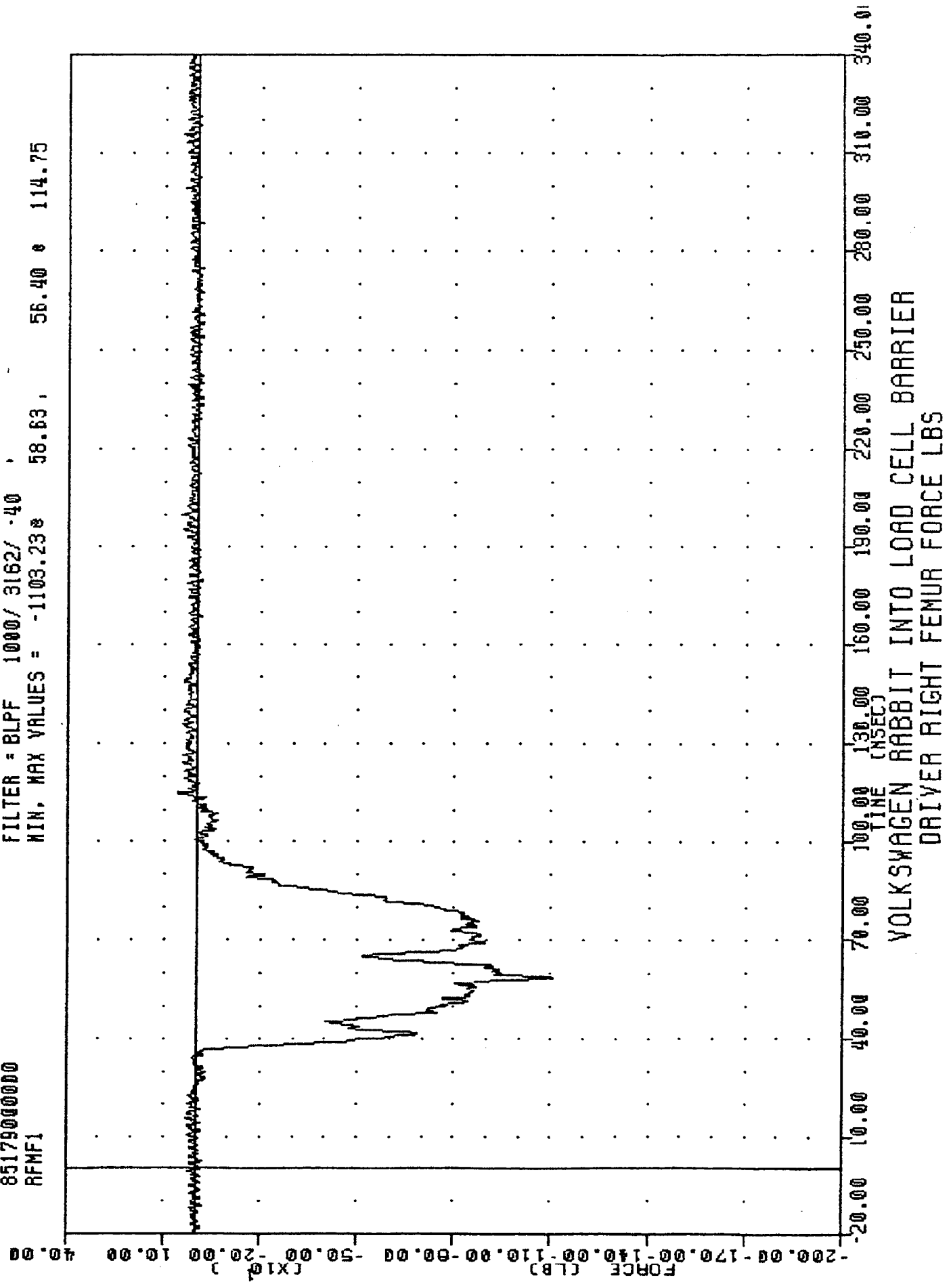


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER CHEST DISPLACEMENT

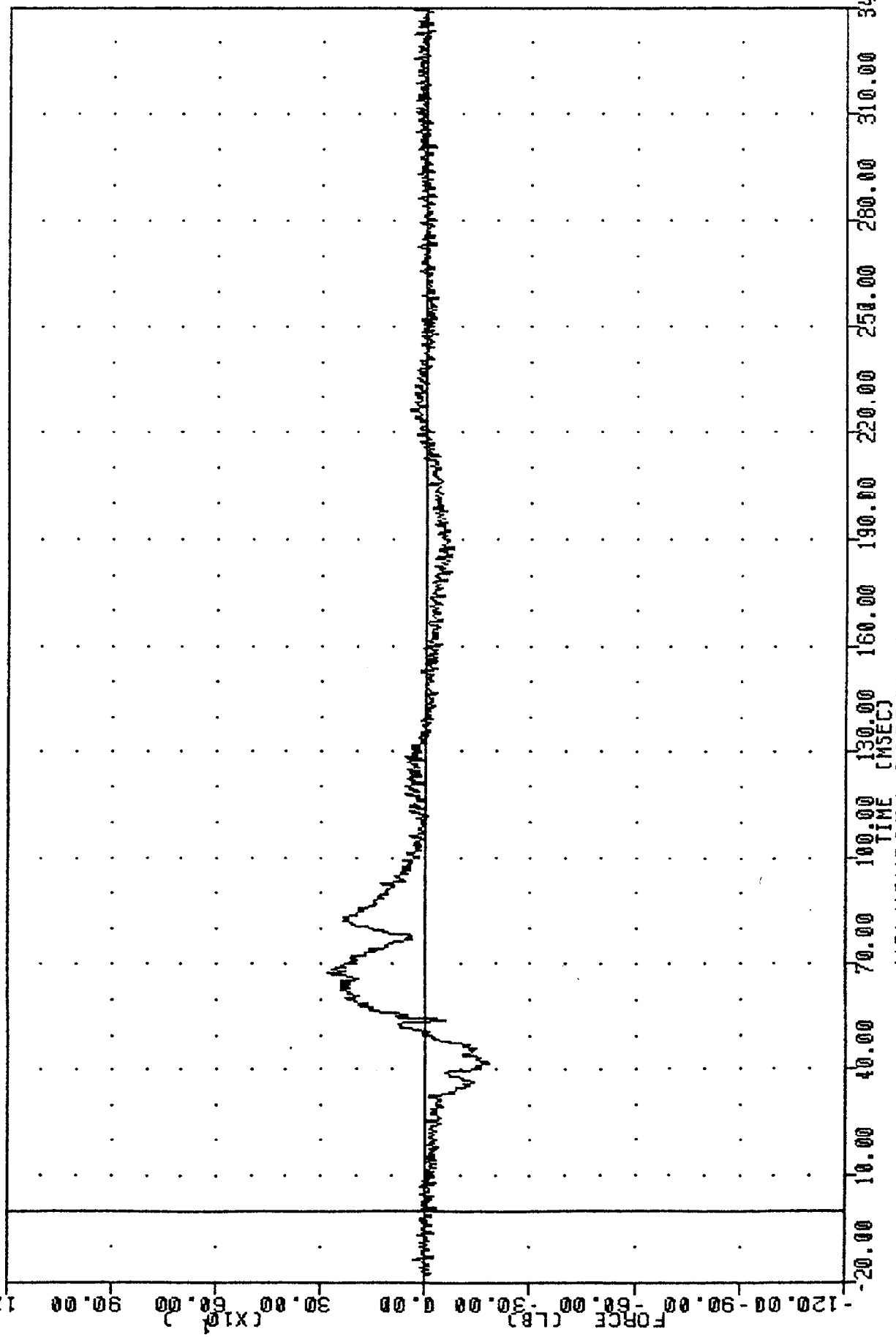
VRT 850620 3-JUL-83 10:05:33
 RABBIT INTO FIXED LCB
 85179000000
 LFNFI
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -1266.37e 64.38, 107.56 e 255.00



VNI 850628
 RABBIT INTO FIXED LCB
 85179000000
 RFMF1
 PLUT DATE 3 JUL 83 10:05:53
 FILTER = BLPF 1000/ 3162/ .40
 MIN. MAX VALUES = -1103.23 58.63 56.40 114.75

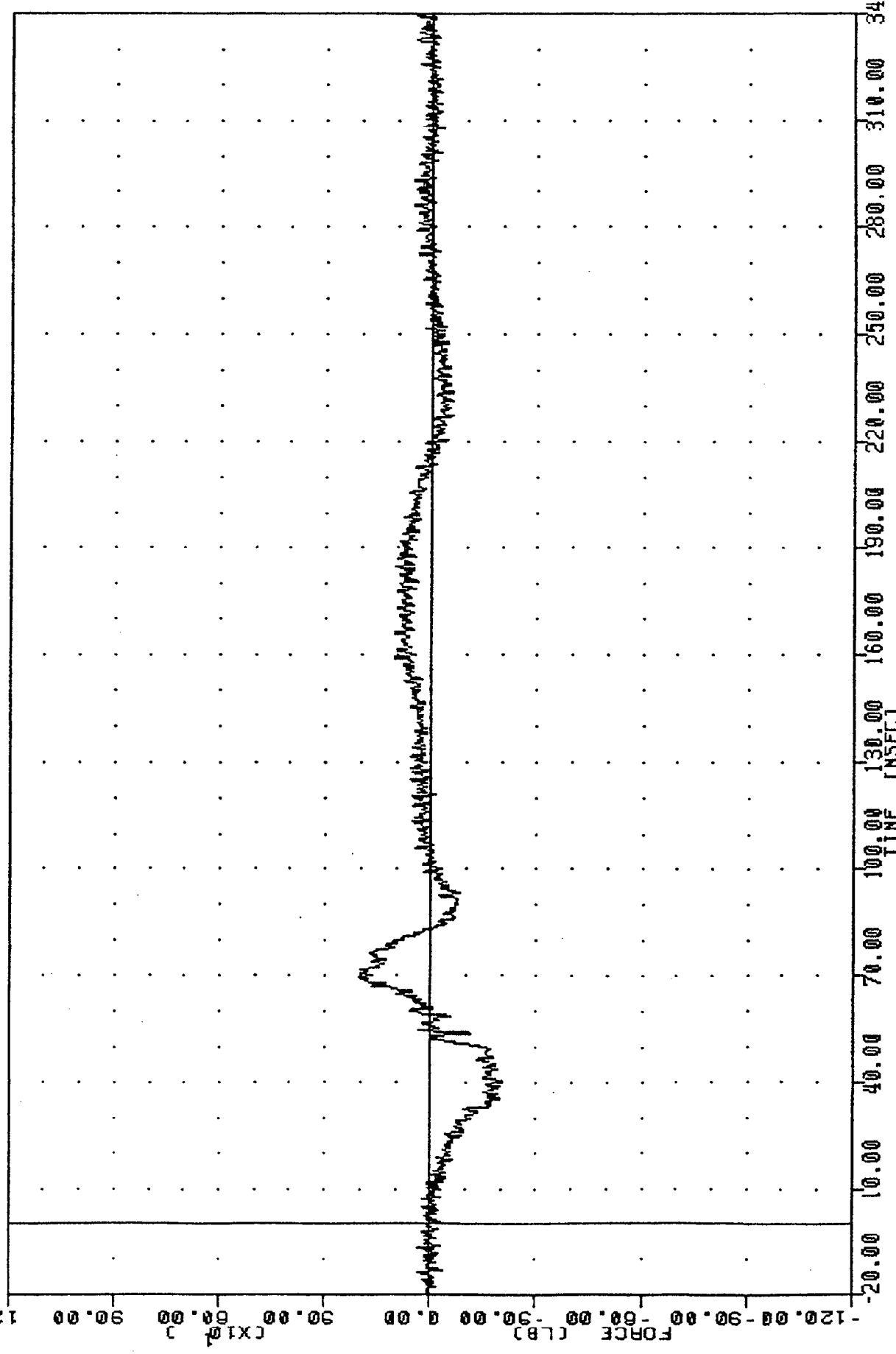


VRT
 RABBIT INTO FIXED LCB
 85179000000
 KNLF1
 850628
 3-JUL-83 10:05:33
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -179.77 42.00, 280.95 67.13



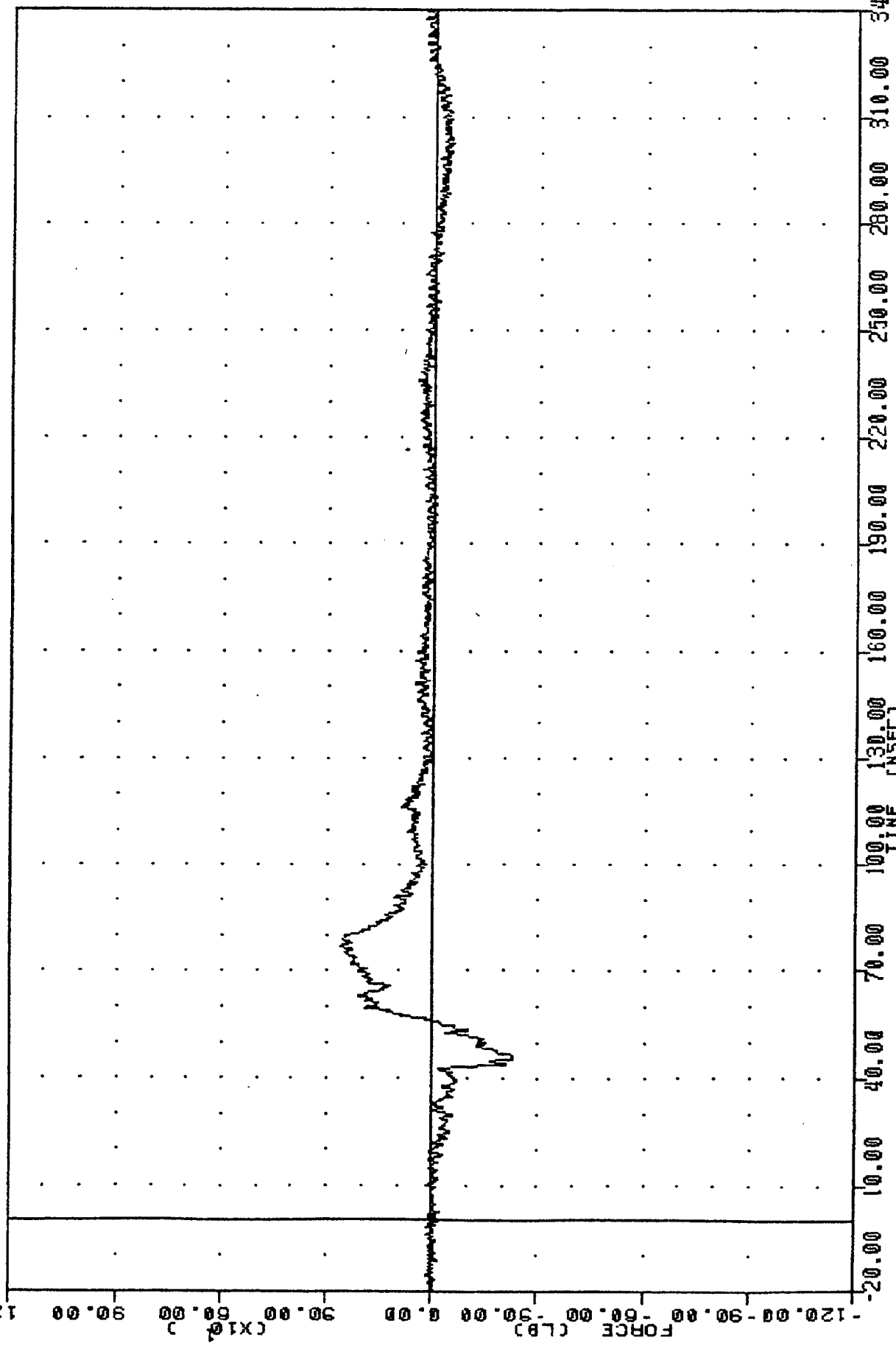
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER LEFT KNEE / LEFT SENSOR LBS

VMI 050620
 RABBIT INTO FIXED LCB
 85179000000
 KNLFR
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -203.34 40.25 , 205.49 69.38
 PLOT DATE 3 JUL 63 10-05-33



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER LEFT KNEE / RIGHT SENSOR LBS

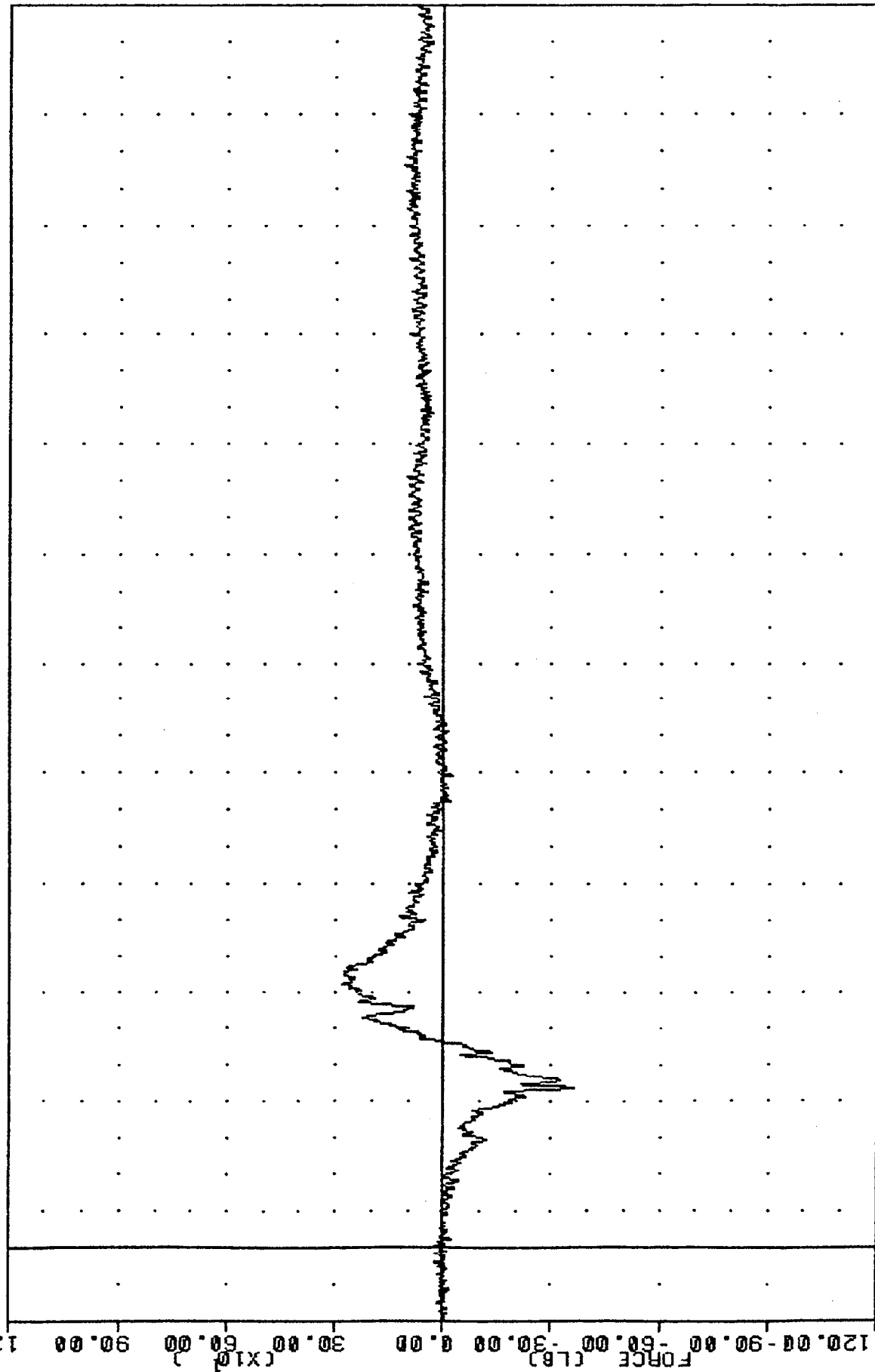
7 050620
 RABBIT INTO FIXED LCB
 85179000000
 KNRF1
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -230.52 46.13 260.74 77.00
 3 JUL 83 10:05:33



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER RIGHT KNEE / LEFT SENSOR LBS

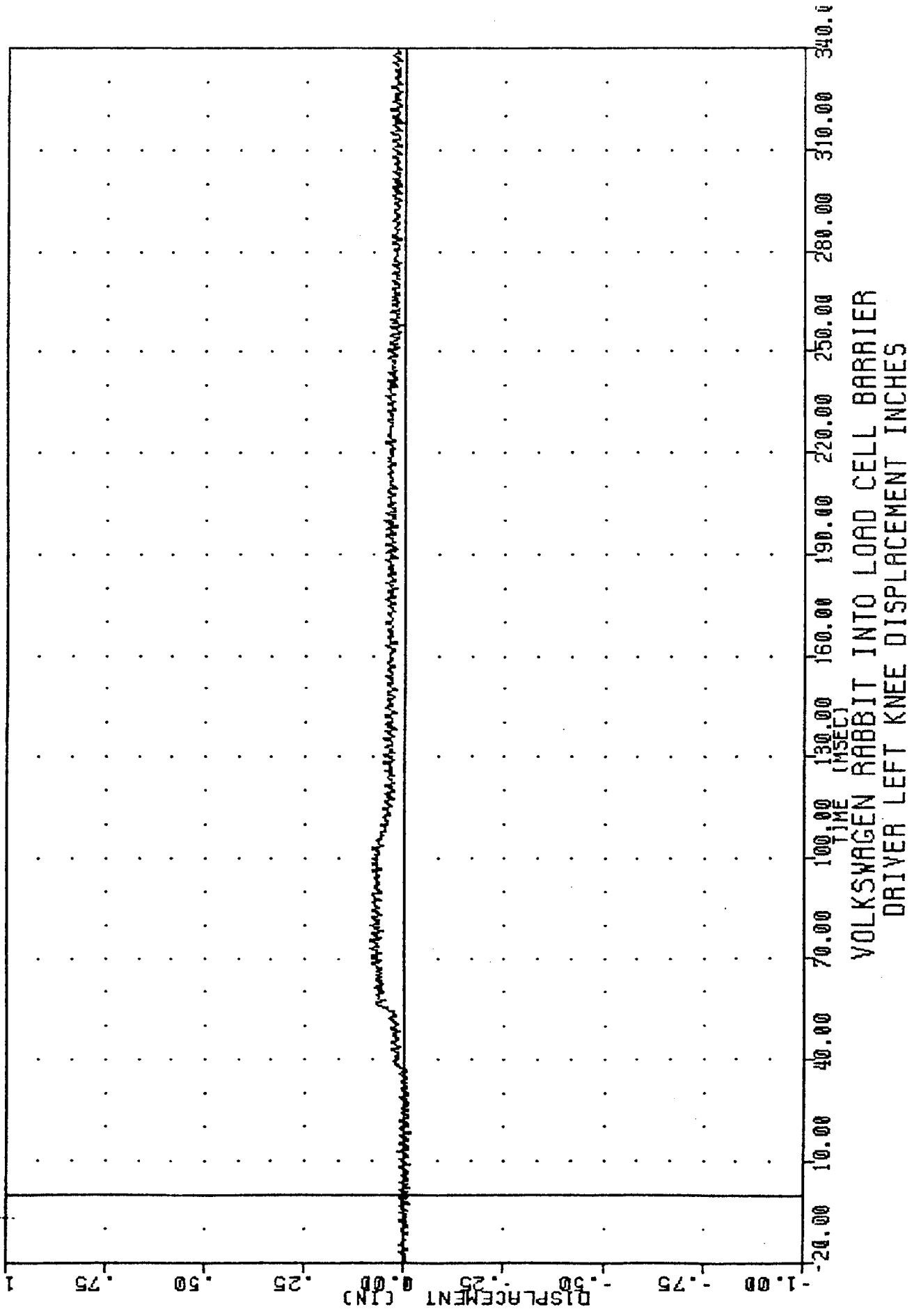
7050823
 RABBIT INTO FIXED LCB
 85179000000
 KNRFA
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -359.67 43.88, 279.33 72.13
 JUL 03 10:05:30

120.00
 90.00
 60.00
 30.00
 0.00
 -30.00
 -60.00
 -90.00
 -120.00

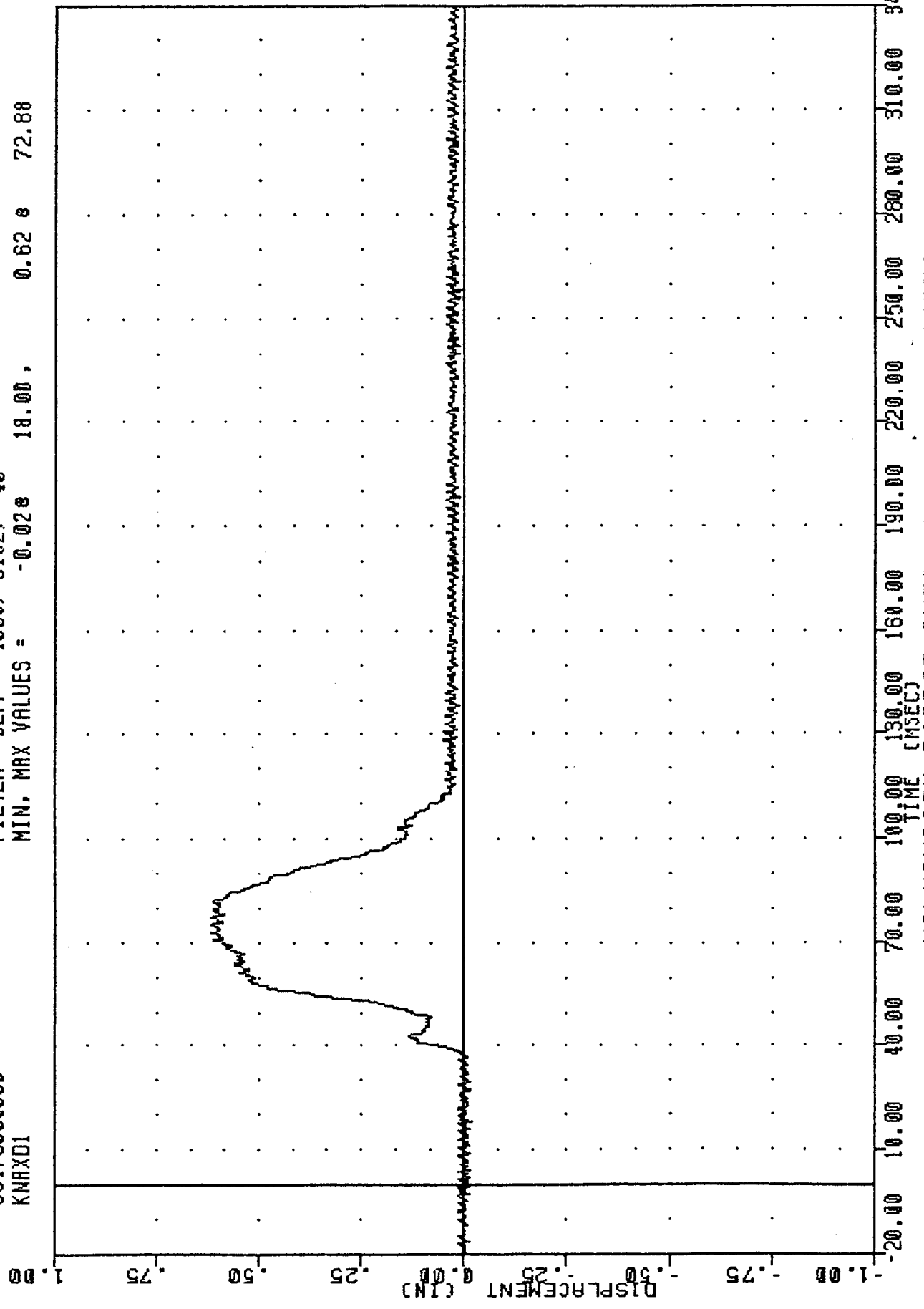


340.0
 310.00
 280.00
 250.00
 220.00
 190.00
 160.00
 130.00
 100.00
 70.00
 40.00
 10.00
 -20.00
 TIME (MSEC)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER RIGHT KNEE / RIGHT SENSOR LBS

VRI
 RABBIT INTO FIXED LCB
 85179000000
 KNLXD1
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -0.028 18.13, 0.09 e 72.88
 PLOT DATE 3-JUL-83 09:59:10

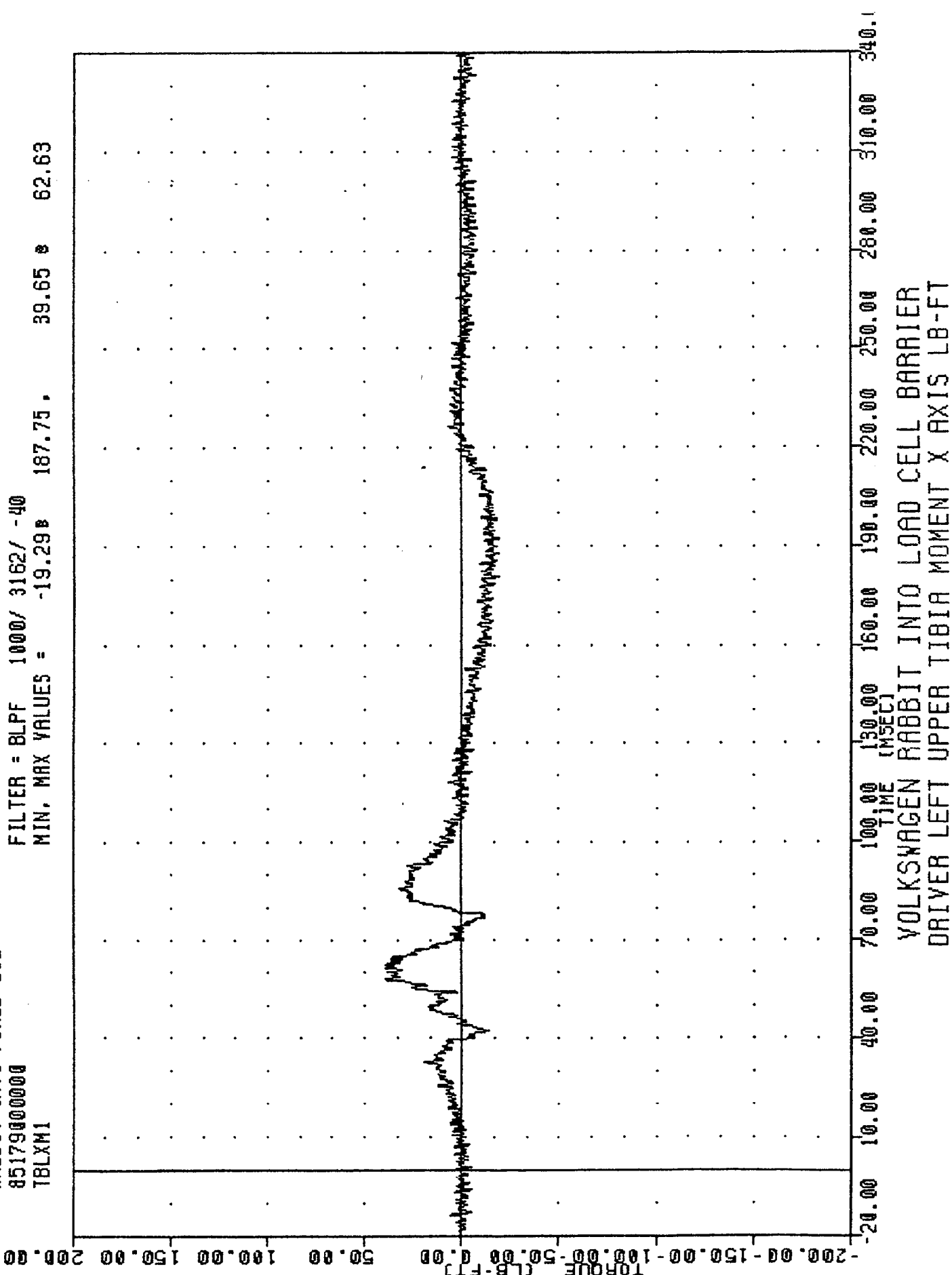


7 550020 3 JUL 83 03:59 PM
 RABBIT INTO FIXED LCB
 85179000000
 KNRXD1
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -0.028 18.00 0.62 72.88

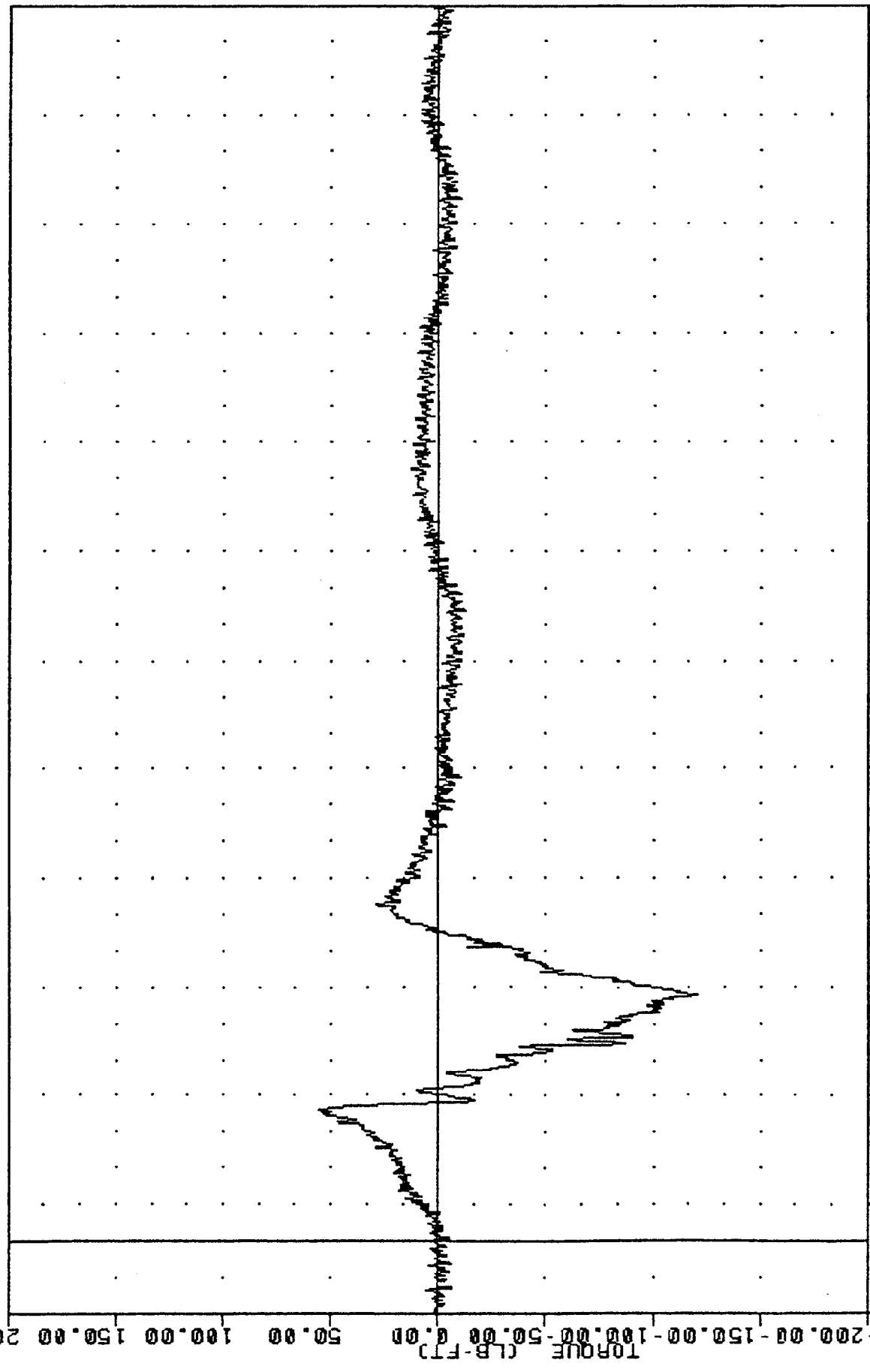


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER RIGHT KNEE DISPLACEMENT INCHES

7050620
 RABBIT INTO FIXED LCB
 85179000000
 TBLXW1
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -19.298 187.75. 39.65 62.63
 TEST DATE 3 JUL 83 10:05:33

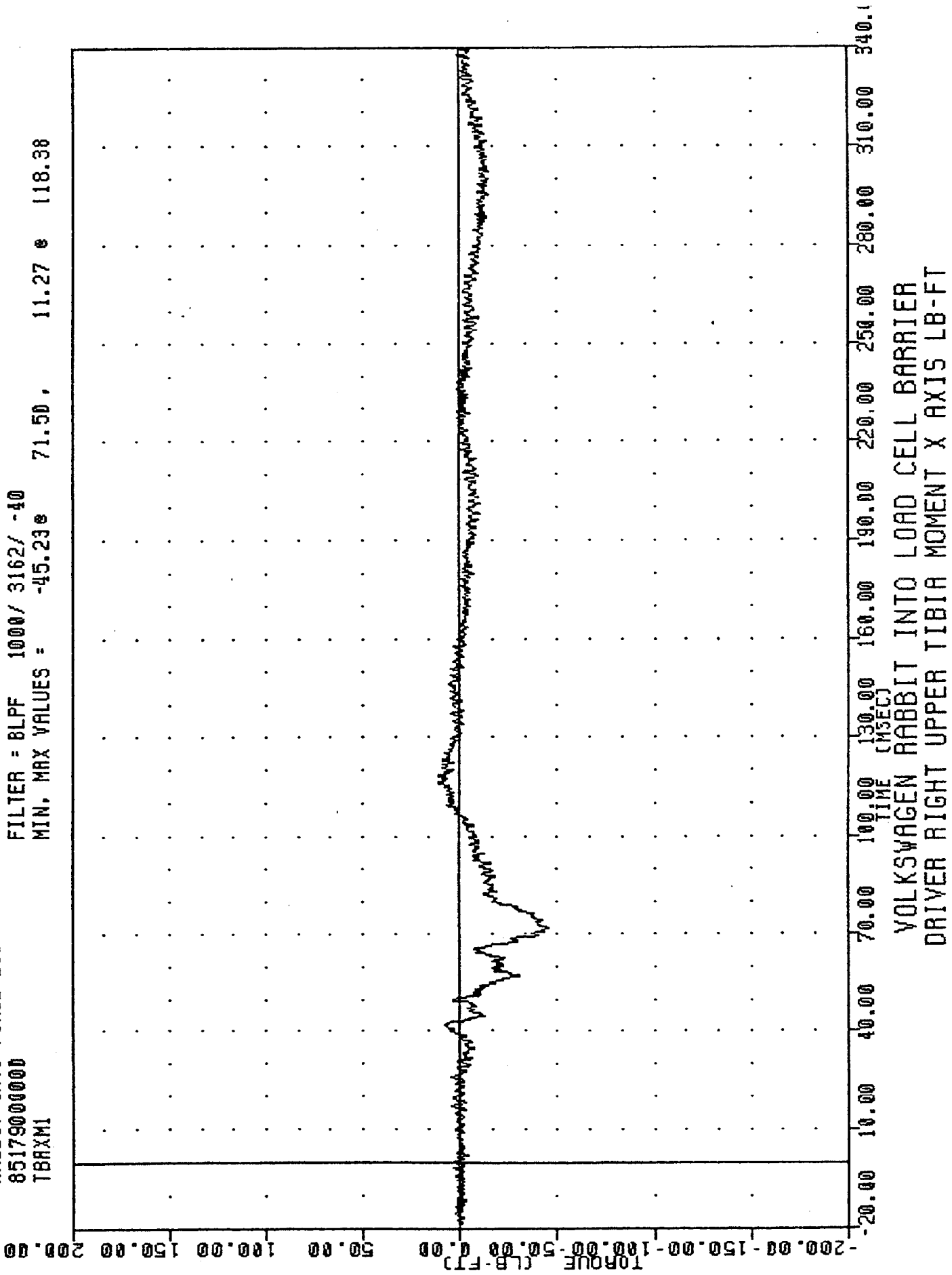


VHT 7 050620 5 JUL 03 10:05:33
 RABBIT INTO FIXED LCB
 85179000000
 TBLYM1
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -120.18 67.75, 55.40 36.00

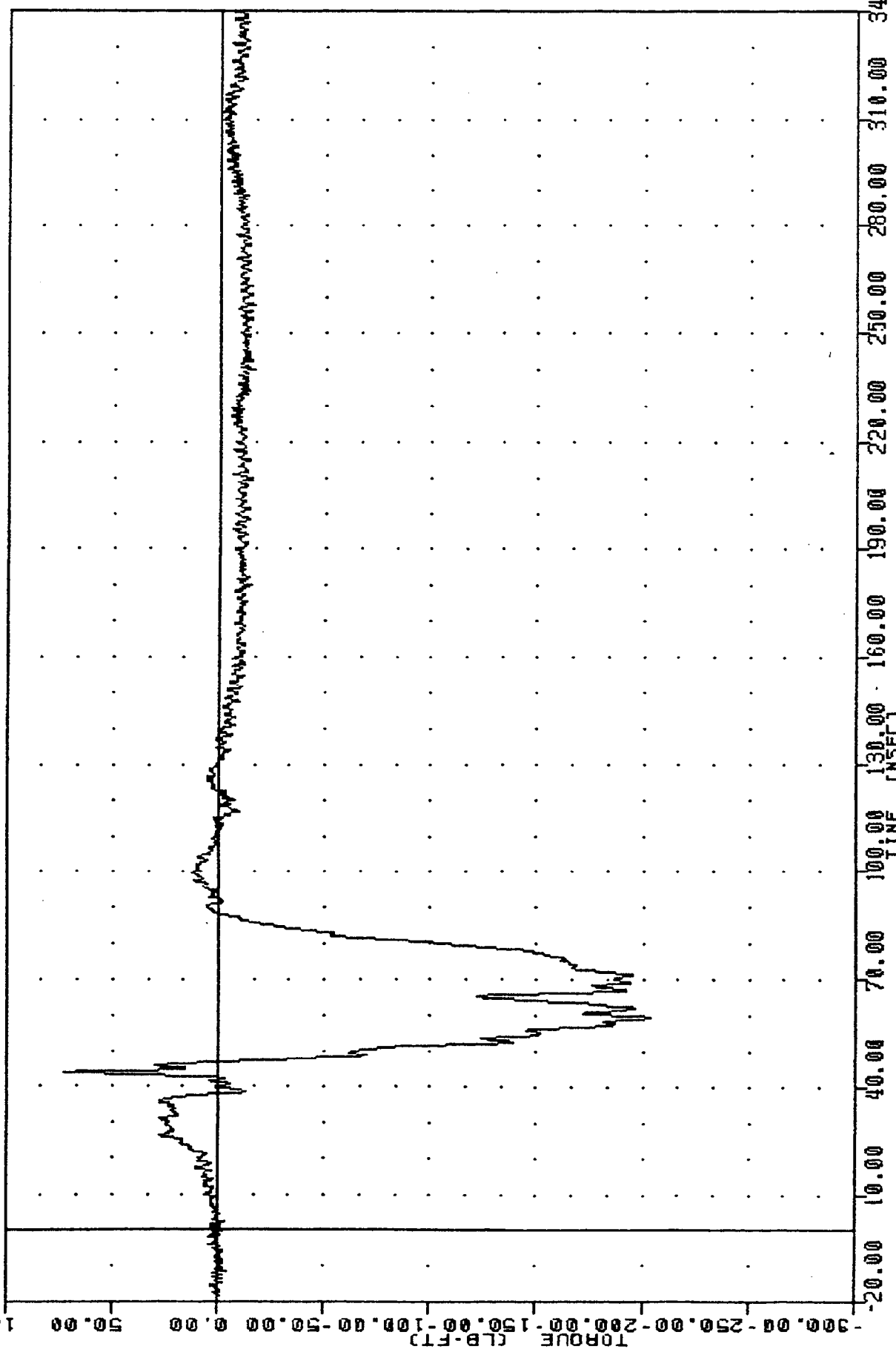


TORQUE (LB-FT)
 TIME (MSEC)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER LEFT UPPER TIBIA MOMENT Y AXIS LB-FT

VRT 850628 3-JUL-83 10:05:33
 RABBIT INTO FIXED LCB
 85179000000
 TBRXM1
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -45.23 71.50, 11.27 118.38



VHT 850628
 RABBIT INTO FIXED LCB
 85179000000
 TBRXH1
 3-JUL-83 10:05:55
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -203.24 59.50 73.07 43.75

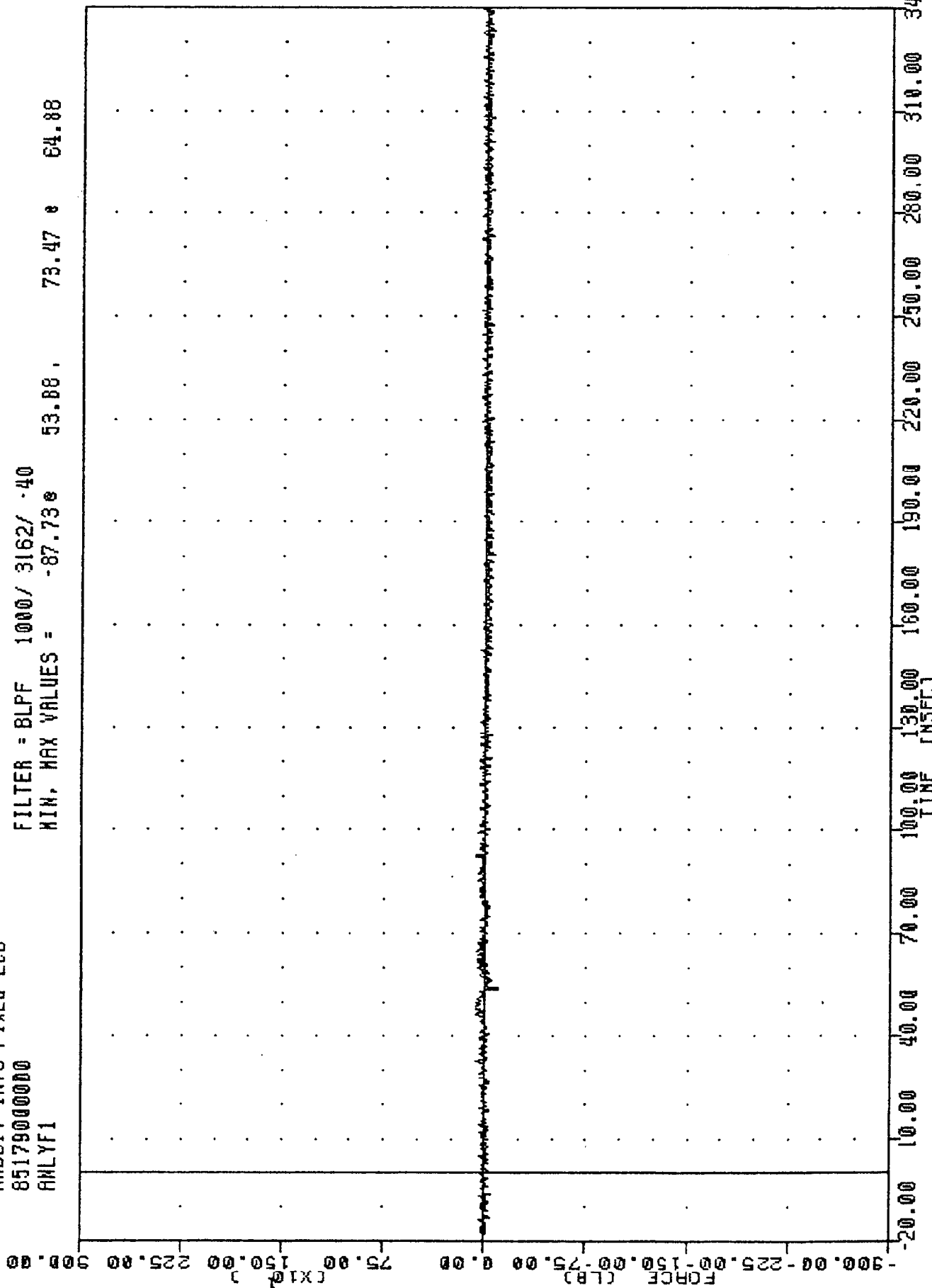


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER RIGHT UPPER TIBIA MOMENT Y AXIS LB-FT

VNT
 85179000000
 RABBIT INTO FIXED LCB
 ANALYF1

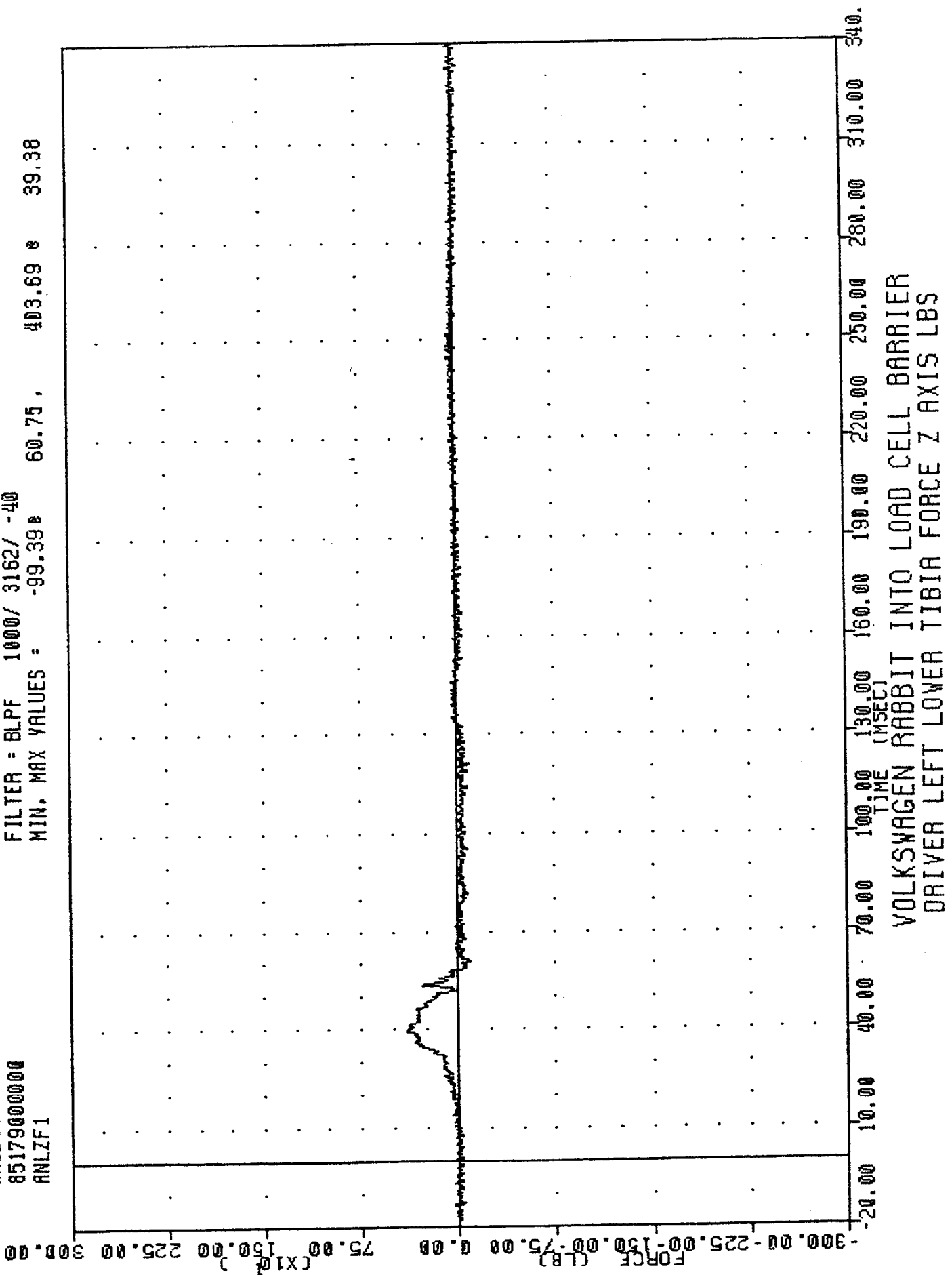
PLUT DATE 3-JUL-83 10:05:55

FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -87.73 53.88 73.47 84.88



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER LEFT LOWER TIBIA FORCE Y AXIS LBS

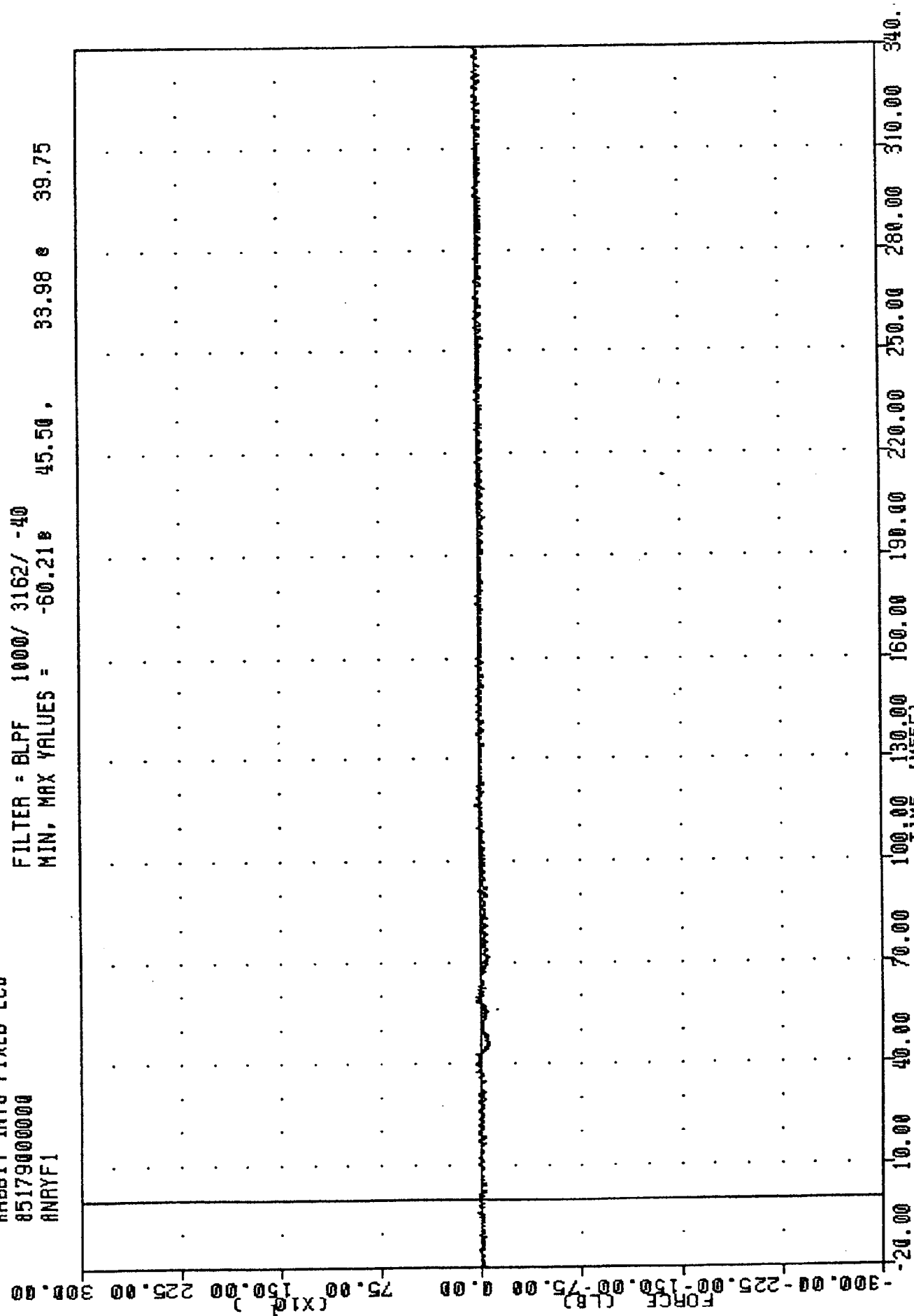
VRI 050620 3 JUL 68 10:05:30
 RABBIT INTO FIXED LCB
 85179000000
 ANLZF1
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -99.398 60.75, 403.69 39.38



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER LEFT LOWER TIBIA FORCE Z AXIS LBS

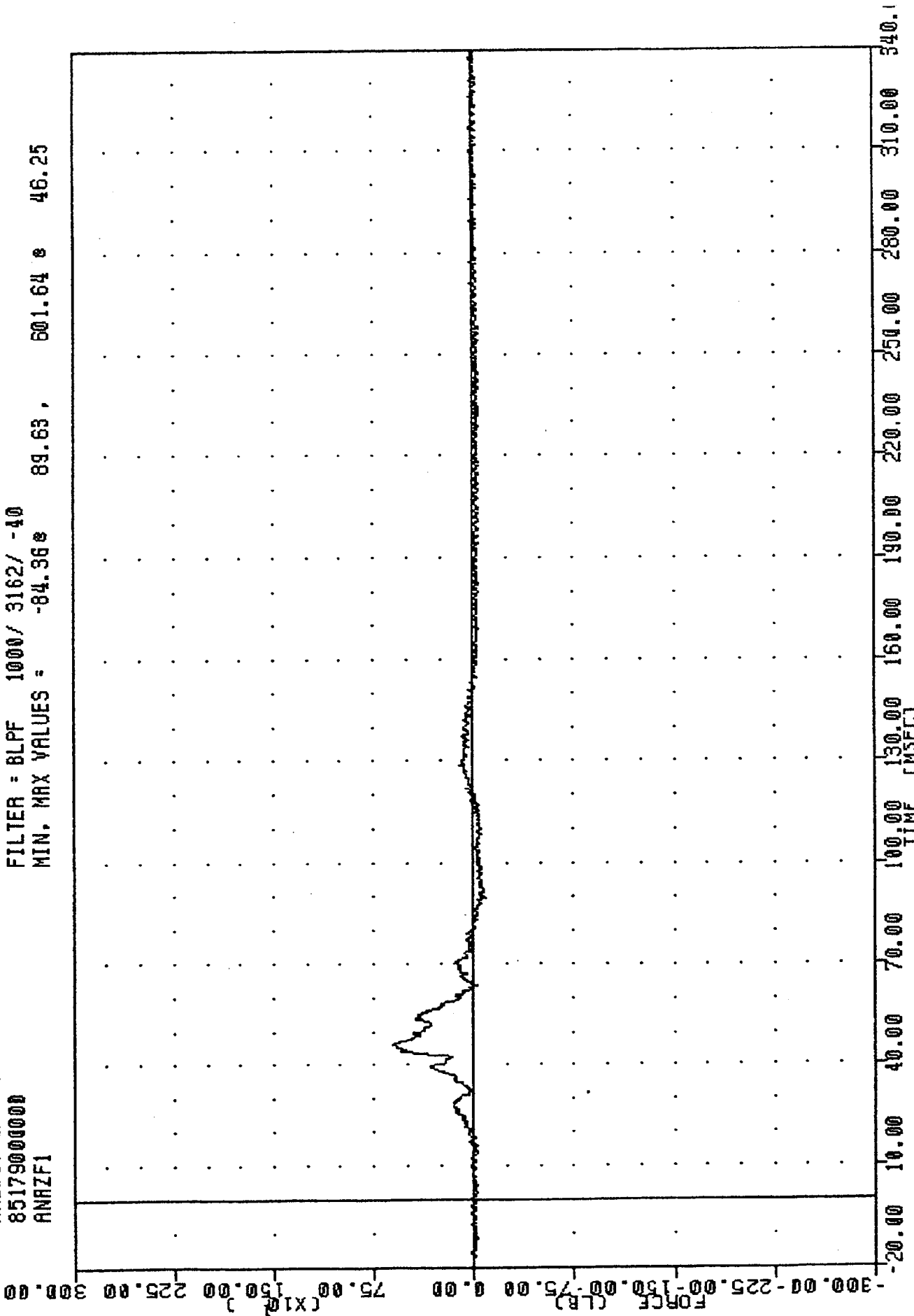
85179000000
 RABBIT INTO FIXED LCB
 050620
 05 JUL 66

FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -60.218 45.50, 33.98 e 39.75



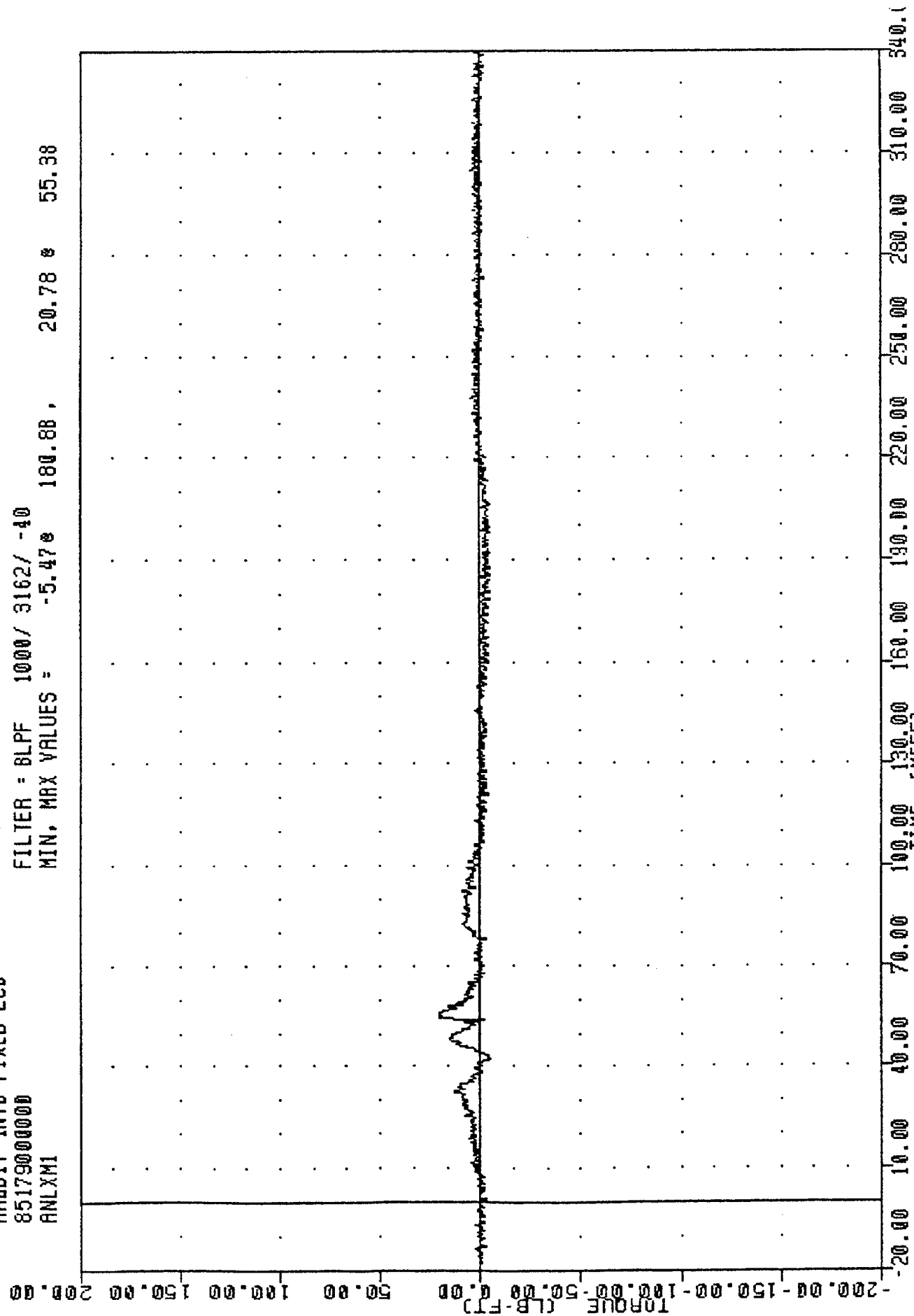
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER RIGHT LOWER TIBIA FORCE Y AXIS LBS

VHT 850620 3 JUL 63 10:05:33
 RABBIT INTO FIXED LCB
 85179000000
 ANRZF1
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -84.36 89.63 , 501.64 46.25



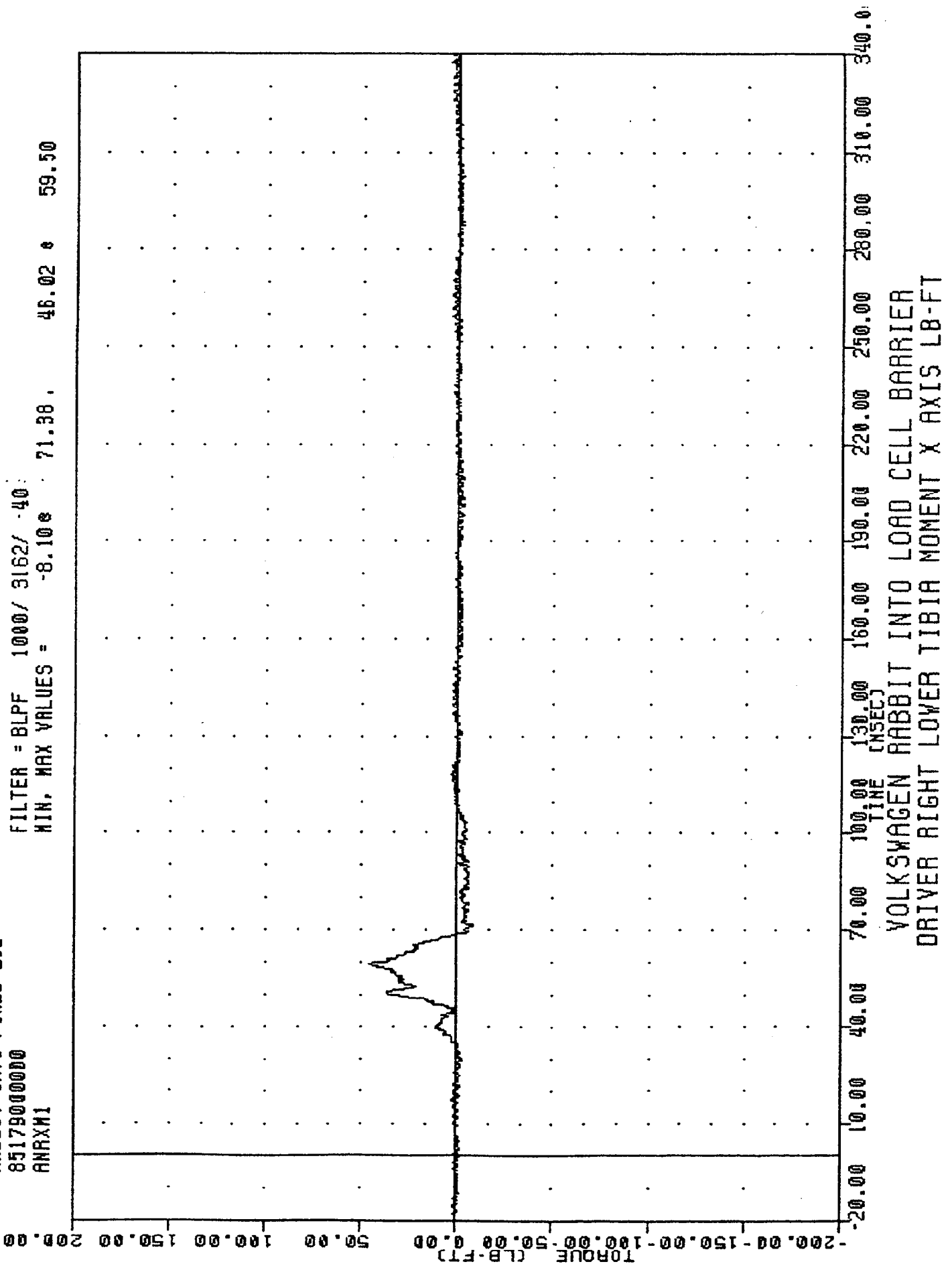
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER RIGHT LOWER TIBIA FORCE Z AXIS LBS

750620 9 JUL 80 1005:00
 RABBIT INTO FIXED LCB
 85179000000
 ANLXM1
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -5.47e 180.88, 20.78 e 55.38



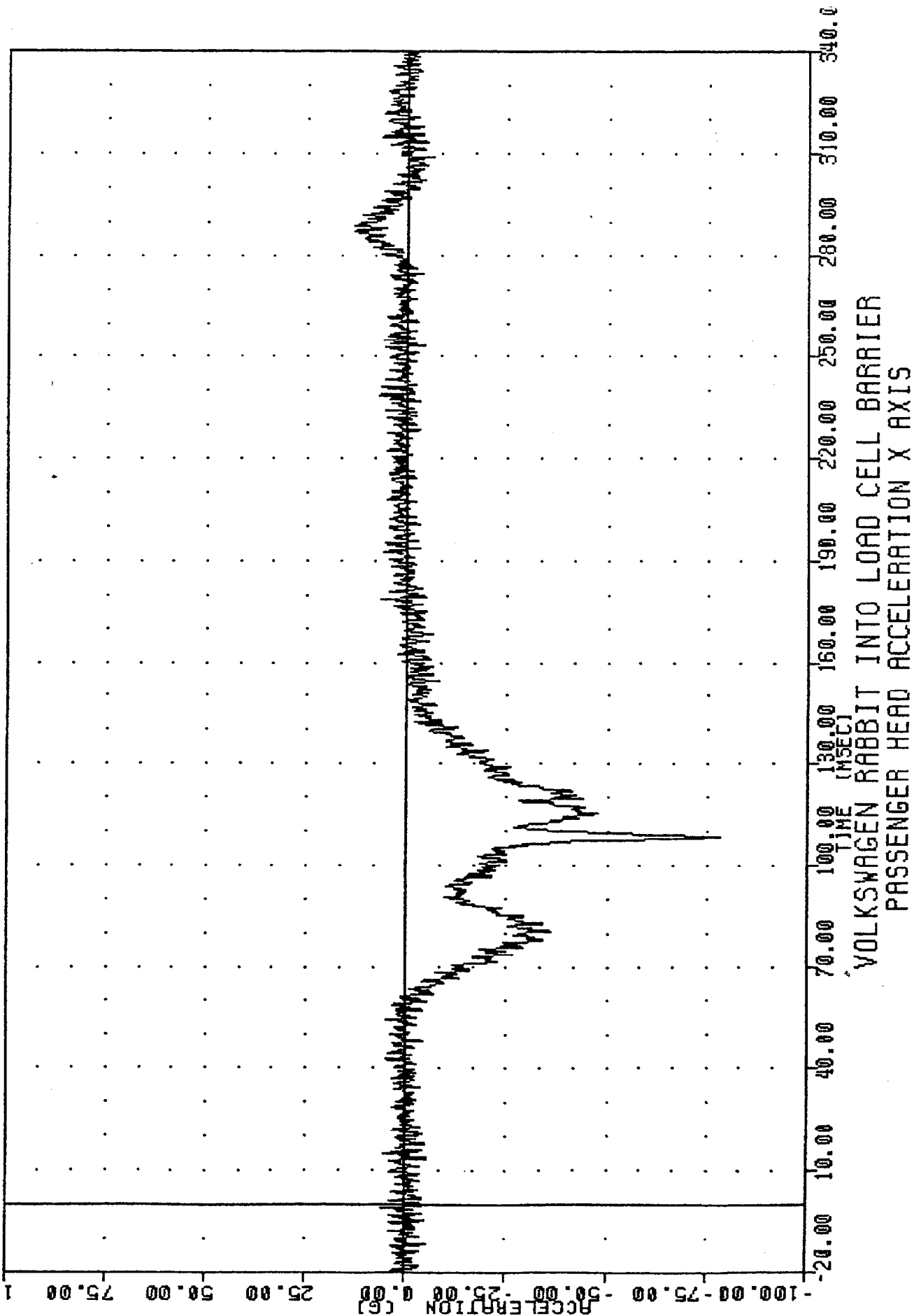
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER LEFT LOWER TIBIA MOMENT X AXIS LB-FT

VHT 850628 3-JUL-85 10:05:55
 RABBIT INTO FIXED LCB
 85179000000
 ANRXH1
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -8.10e 71.38 46.02 e 59.50

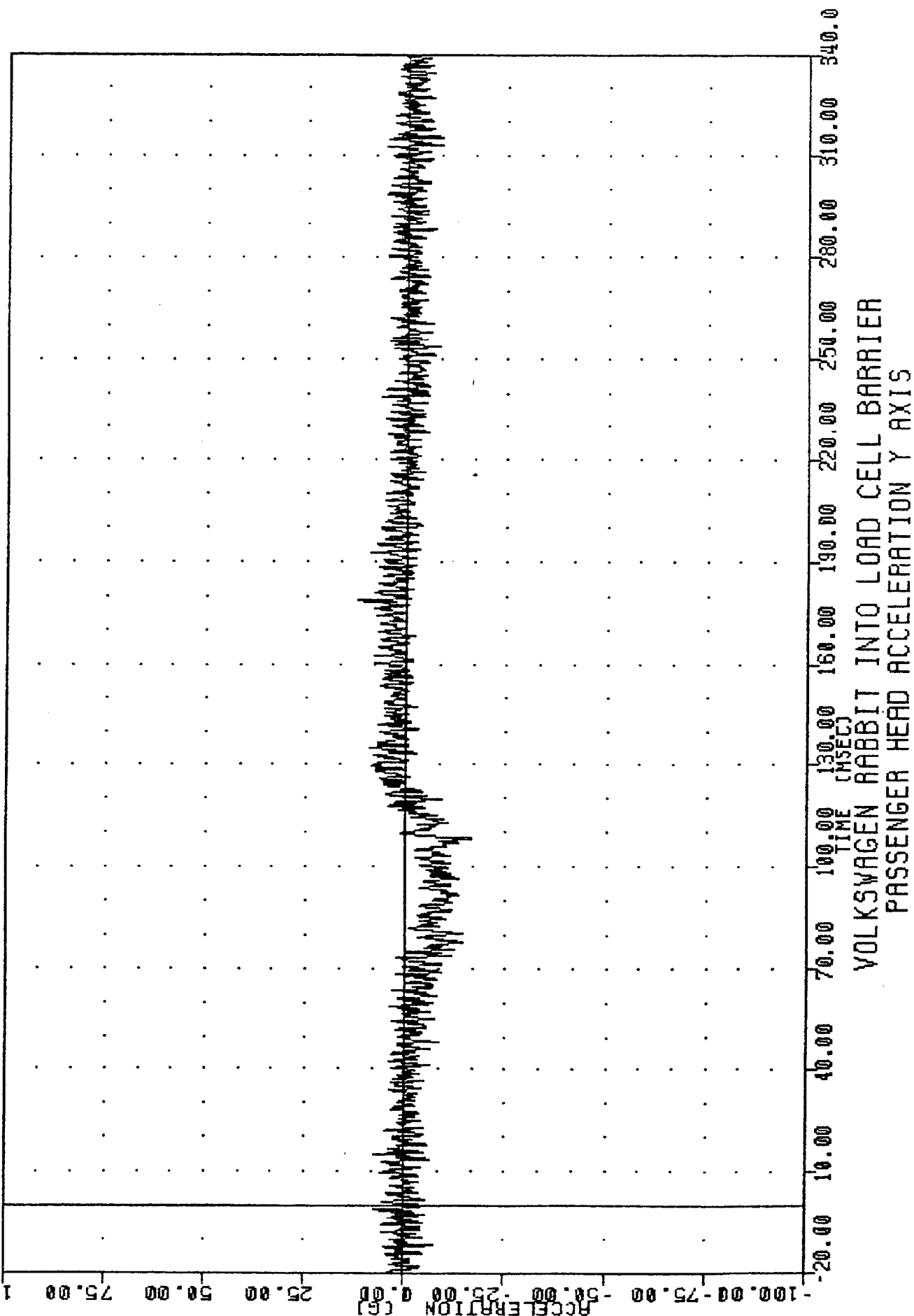


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DRIVER RIGHT LOWER TIBIA MOMENT X AXIS LB-FT

VNT 850620 3 JUL 83 10:05:33
 RABBIT INTO FIXED LCB
 85179000000
 HEDXG2
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -78.13e 108.38, 13.55 e 287.50



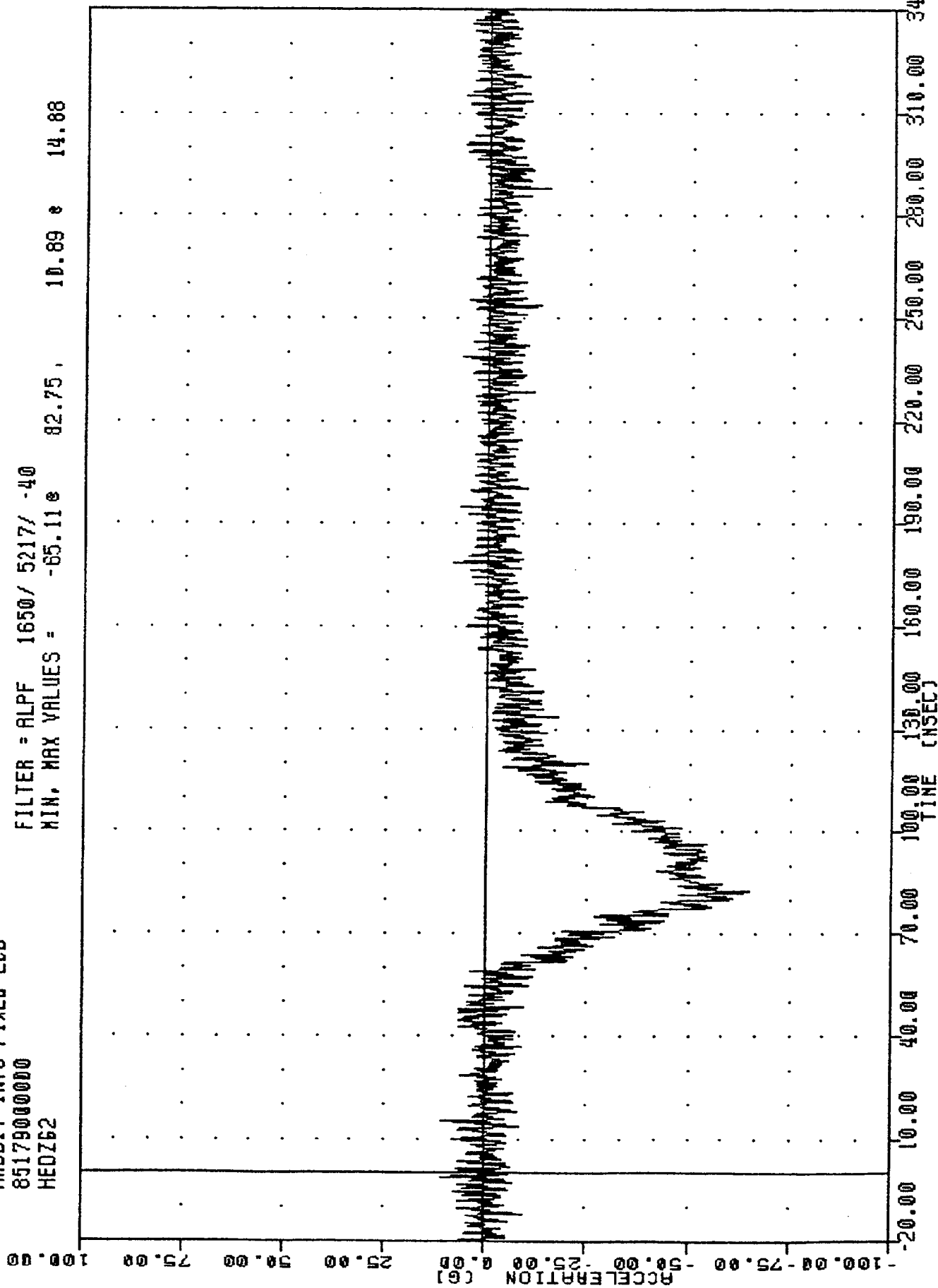
VHT 50620
 RABBIT INTO FIXED LCB
 85179000000
 HEDYG2
 PLOT DATE 3-JUL-83 10:05:33
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -16.27e 108.25, 12.19 e 178.75



VH1
850628
RABBIT INTO FIXED LCB
85179000000
HEAD62

PLUT DATE 3-JUL-85 10:05:55

FILTER = ALPF 1650/ 5217/ -40
MIN, MAX VALUES = -65.11e 82.75 , 10.89 e 14.88



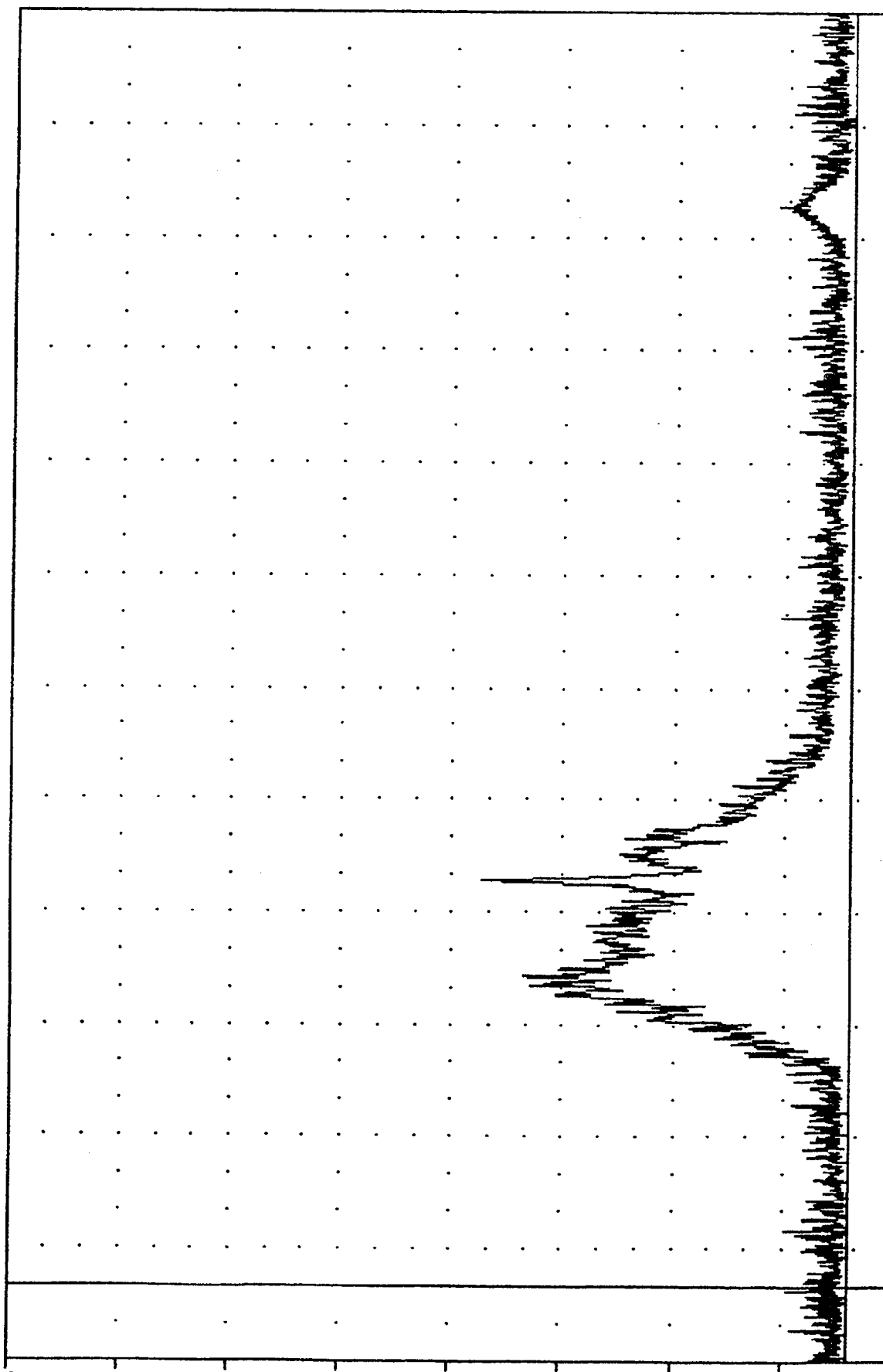
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER HEAD ACCELERATION Z AXIS

YAT
RABBIT INTO FIXED LCB
85179000000
HEDRG2

850628
3-JUL-85 10:05:55

FILTER = ALPF 1650/ 5217/ -40
MIN, MAX VALUES = 0.168 21.63, 83.44 e 108.38

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
105.00
110.00
115.00
120.00
125.00
130.00
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155.00
160.00
165.00
170.00
175.00
180.00
185.00
190.00



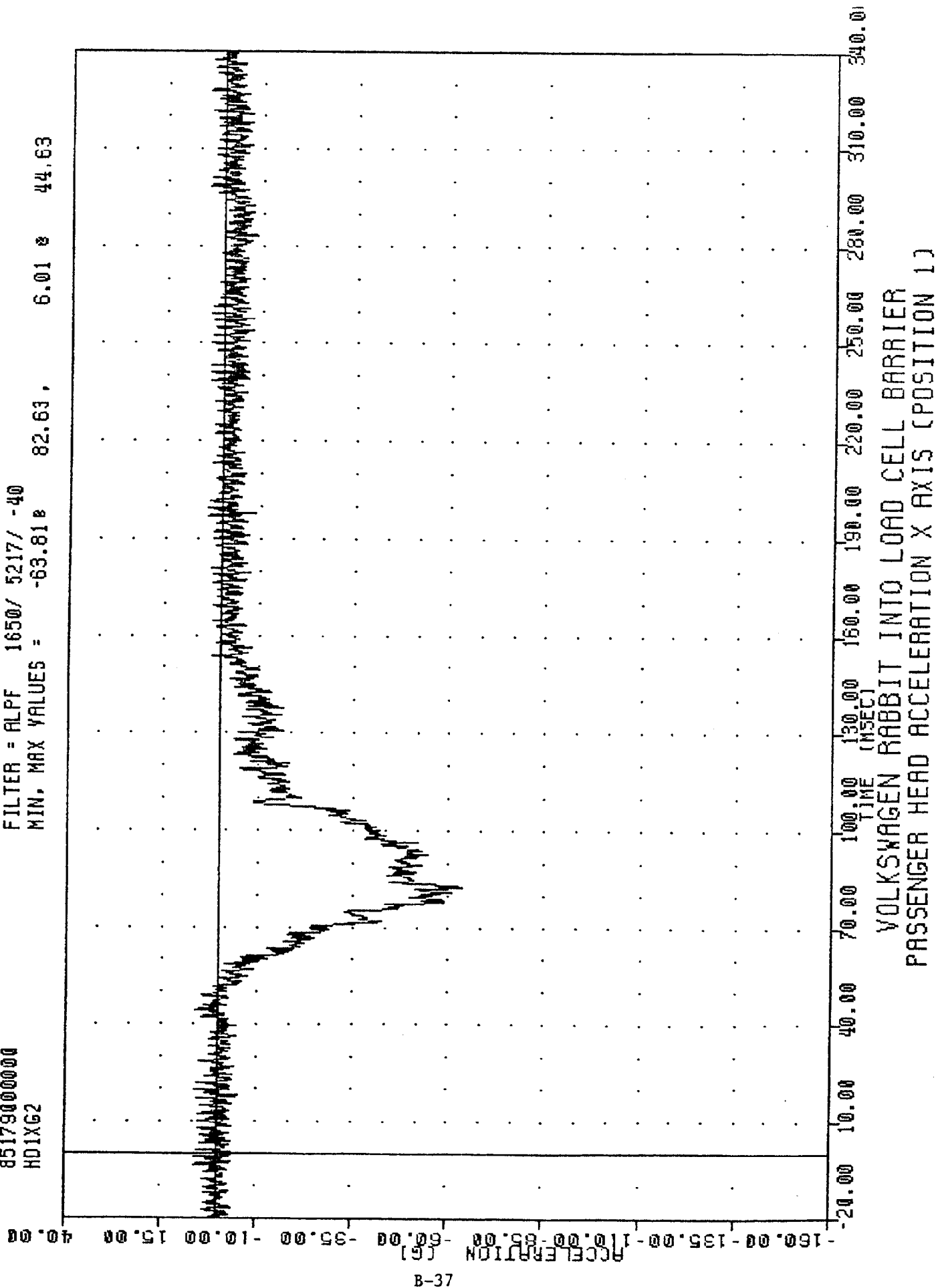
TIME (MSEC)
0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER HEAD RESULTANT

VW 0620
RABBIT INTO FIXED LCB
85179000000
HD1XG2

PEOT DATE 13 AUG 80 12:50:08

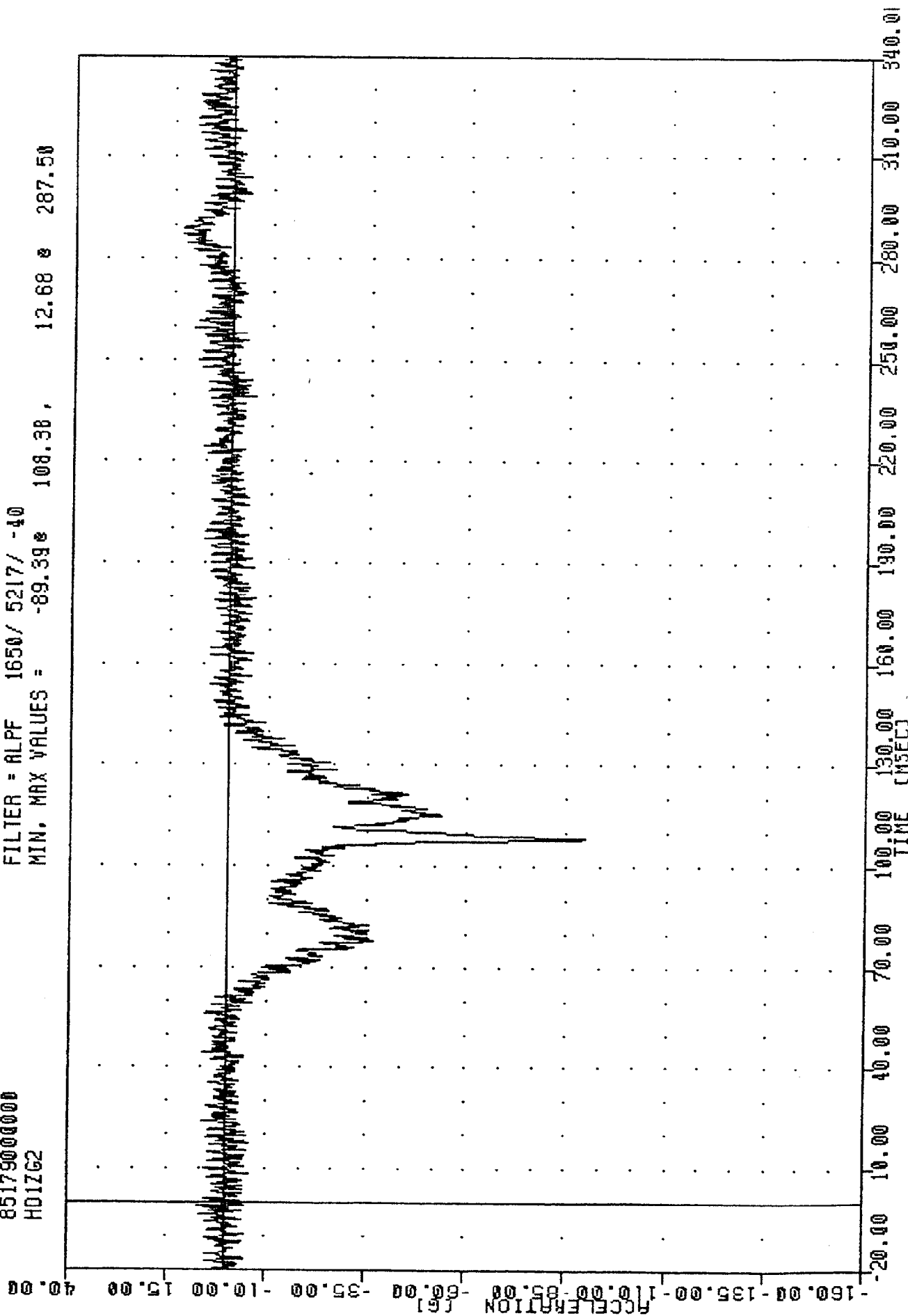
FILTER = ALPF 1650/ 5217/ -40
MIN. MAX VALUES = -63.81 82.63, 6.01 44.63



VW 0620
RABBIT INTO FIXED LCB
85179000000
HD1ZG2

PEST DATE 13 AUG 83 12:50:08

FILTER = ALPF 1650/ 5217/ -40
MIN. MAX VALUES = -89.39e 108.38 , 12.68 e 287.50

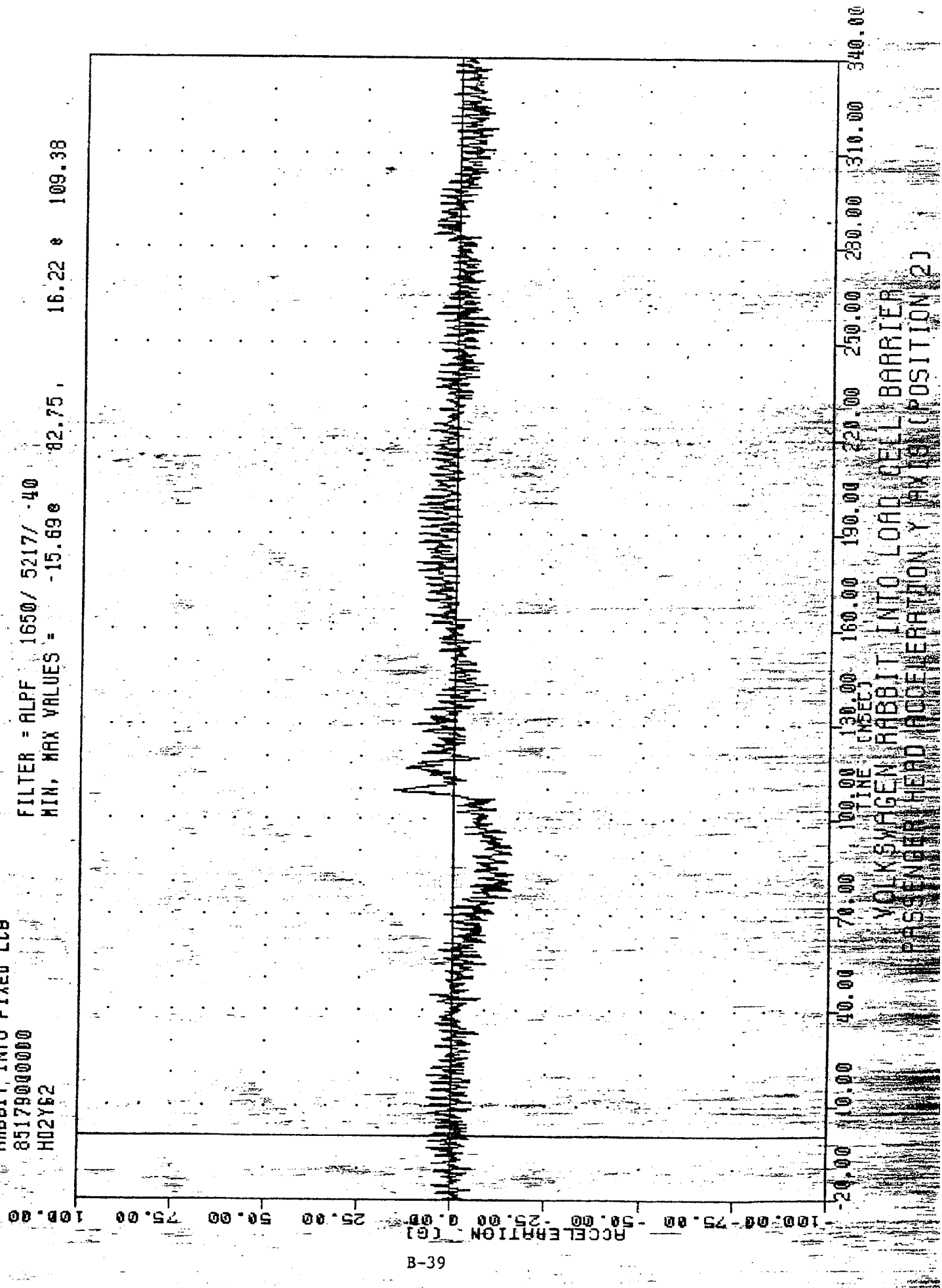


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER HEAD ACCELERATION Z AXIS (POSITION 1)

PLT DATE 15 AUG 68 12:50:08

85179000000
H02Y62
RABBIT INTO FIXED LCB

FILTER = ALPF 1650/ 5217/ -40
MIN, MAX VALUES = -15.69 82.75, 16.22 & 109.38

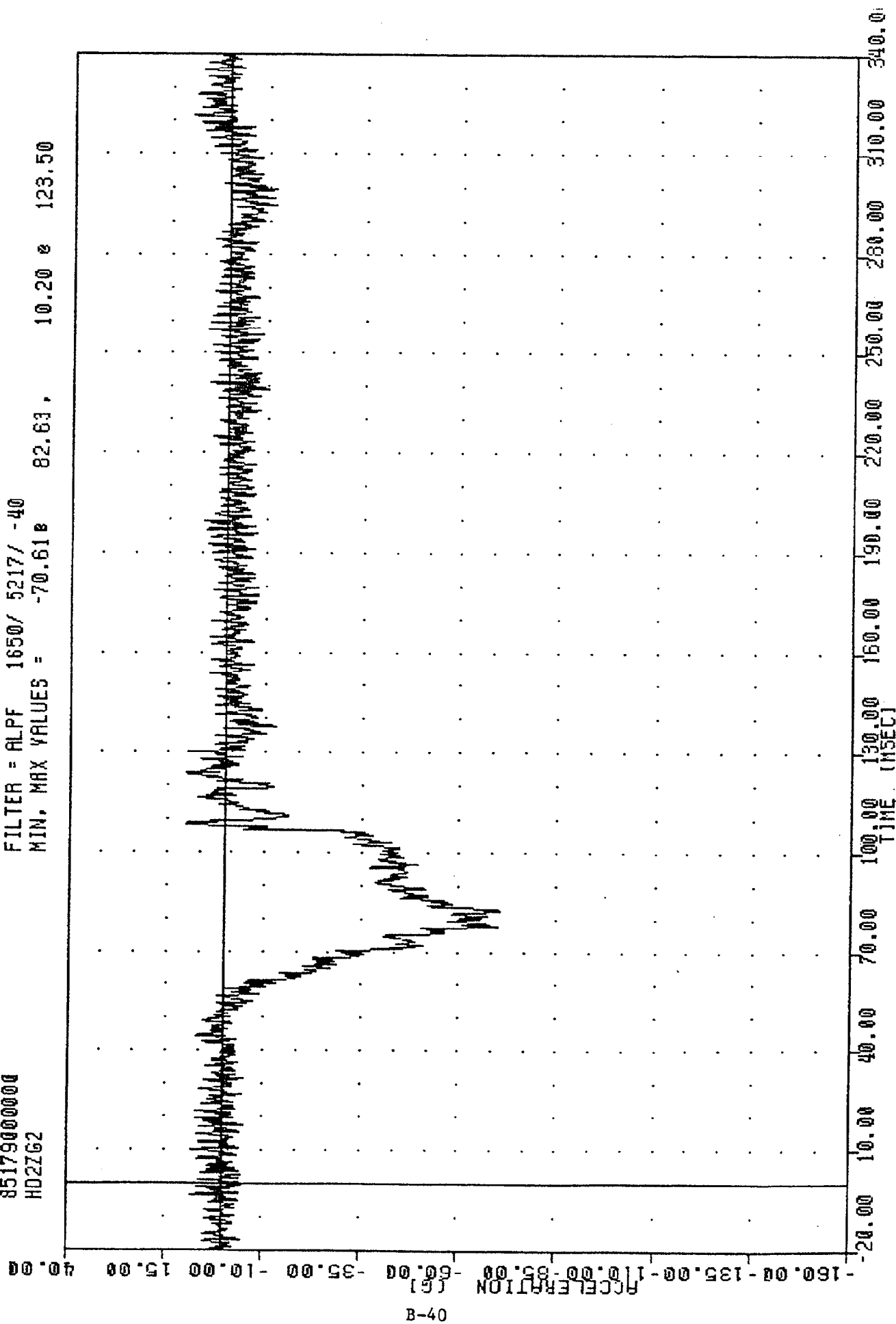


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER HEAD ACCELERATION Y AXIS (POSITION 2)

V 000620
RABBIT INTO FIXED LCB
85179000000
H02ZG2

PEST DATE 13 AUG 03 12:50:00

FILTER = ALPF 1650/ 5217/ -40
MIN. MAX VALUES = -70.618 82.63, 10.20 @ 123.50

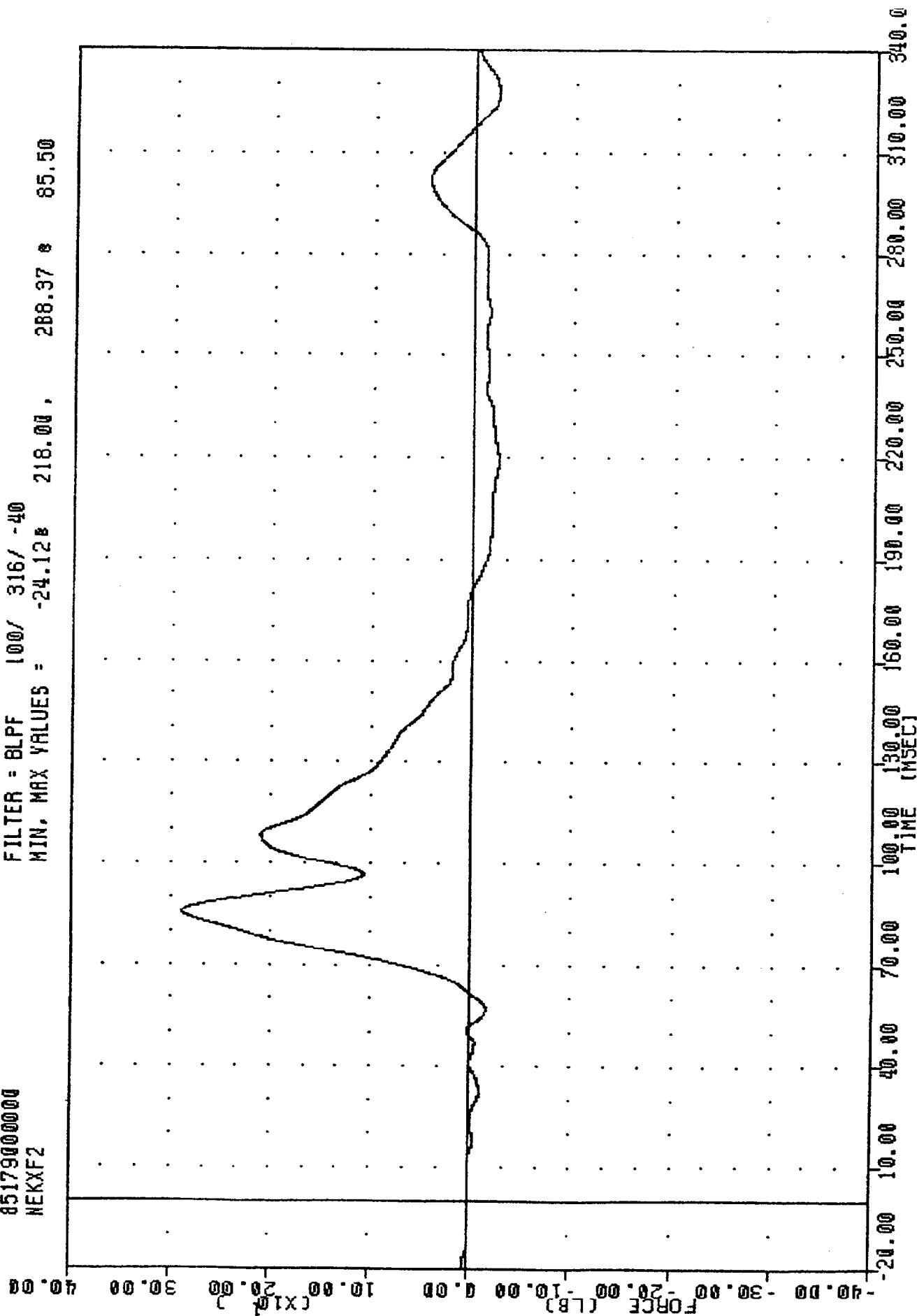


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER HEAD ACCELERATION Z AXIS (POSITION 2)

850628
 RABBIT INTO FIXED LCB
 851790000000
 NEKXF2

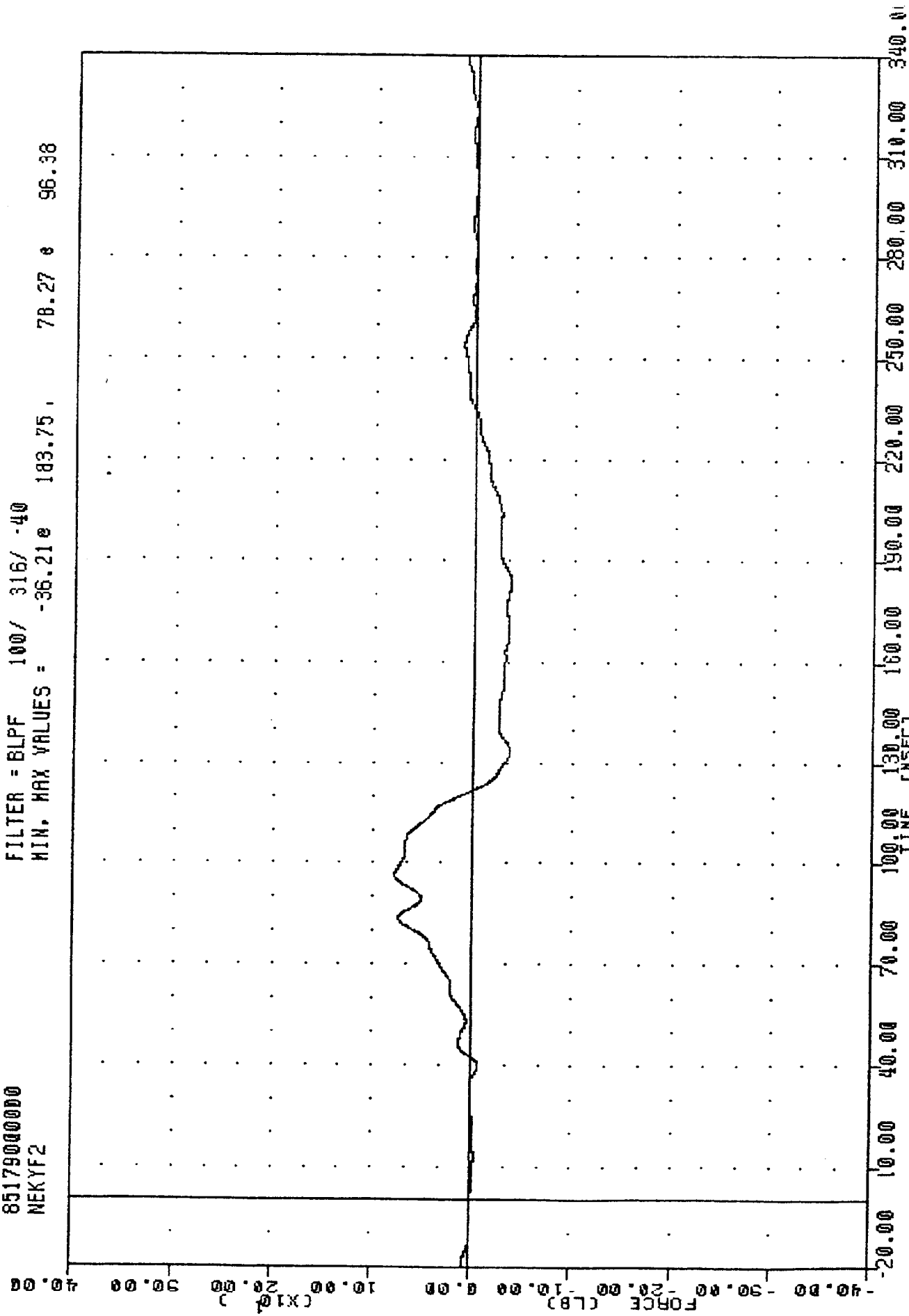
PLOT DATE 3-JUL-85 09:59:10

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -24.12 218.00, 288.37 85.50



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER NECK FORCE X AXIS LBS (SHEAR)

7050620
 RABBIT INTO FIXED LCB
 85179000000
 NEKYF2
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -36.21e 183.75, 78.27 e 96.38
 09:59:10



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER NECK FORCE Y AXIS LBS

7 650620 3 JUL 85 09:59:10

RABBIT INTO FIXED LCB

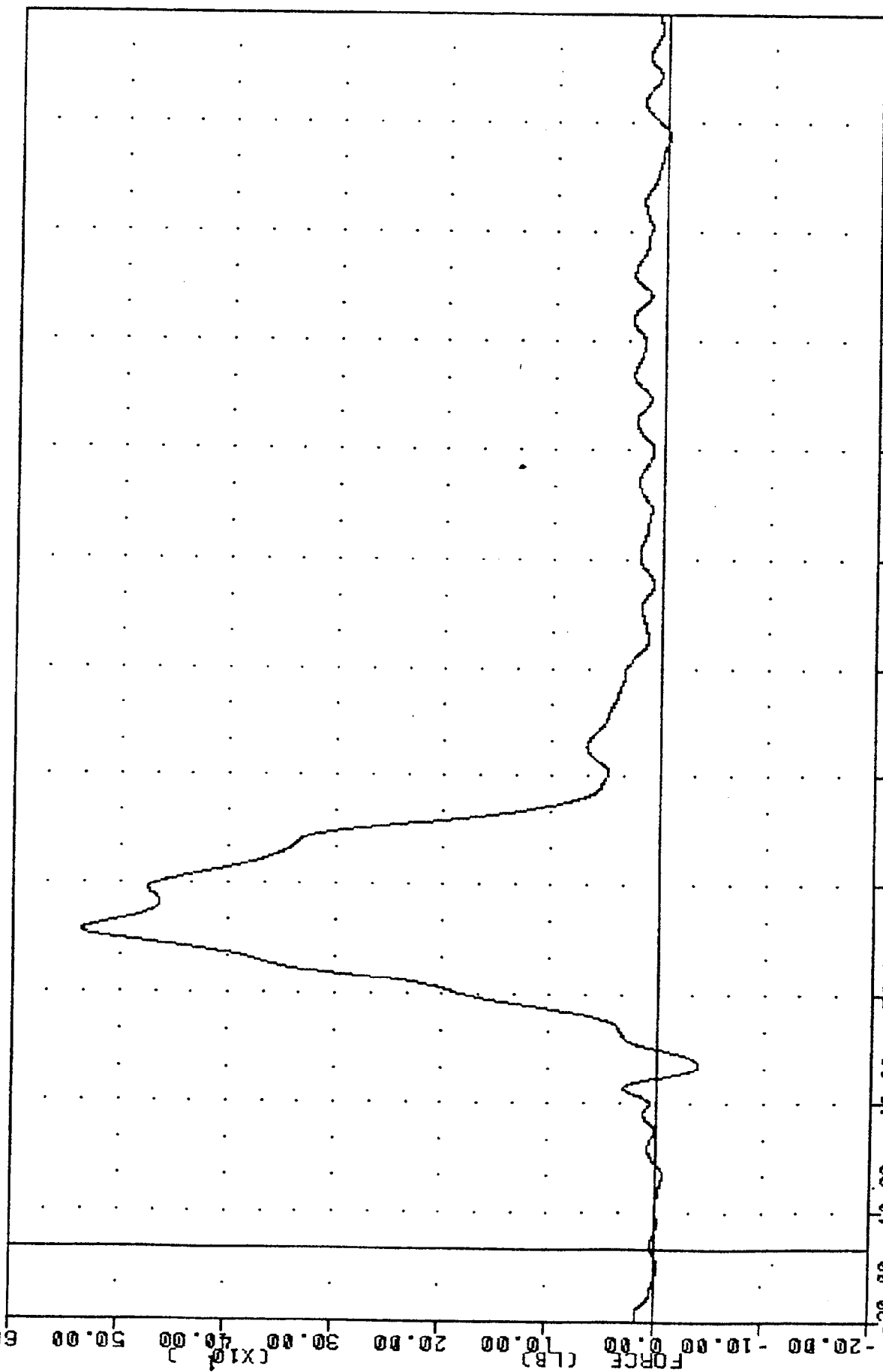
85179000000

NEKZF2

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -39.84 50.75 534.89 87.00

FORCE (LB) (X10³)



TIME (msec)

VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER NECK FORCE Z AXIS LBS (AXIAL)

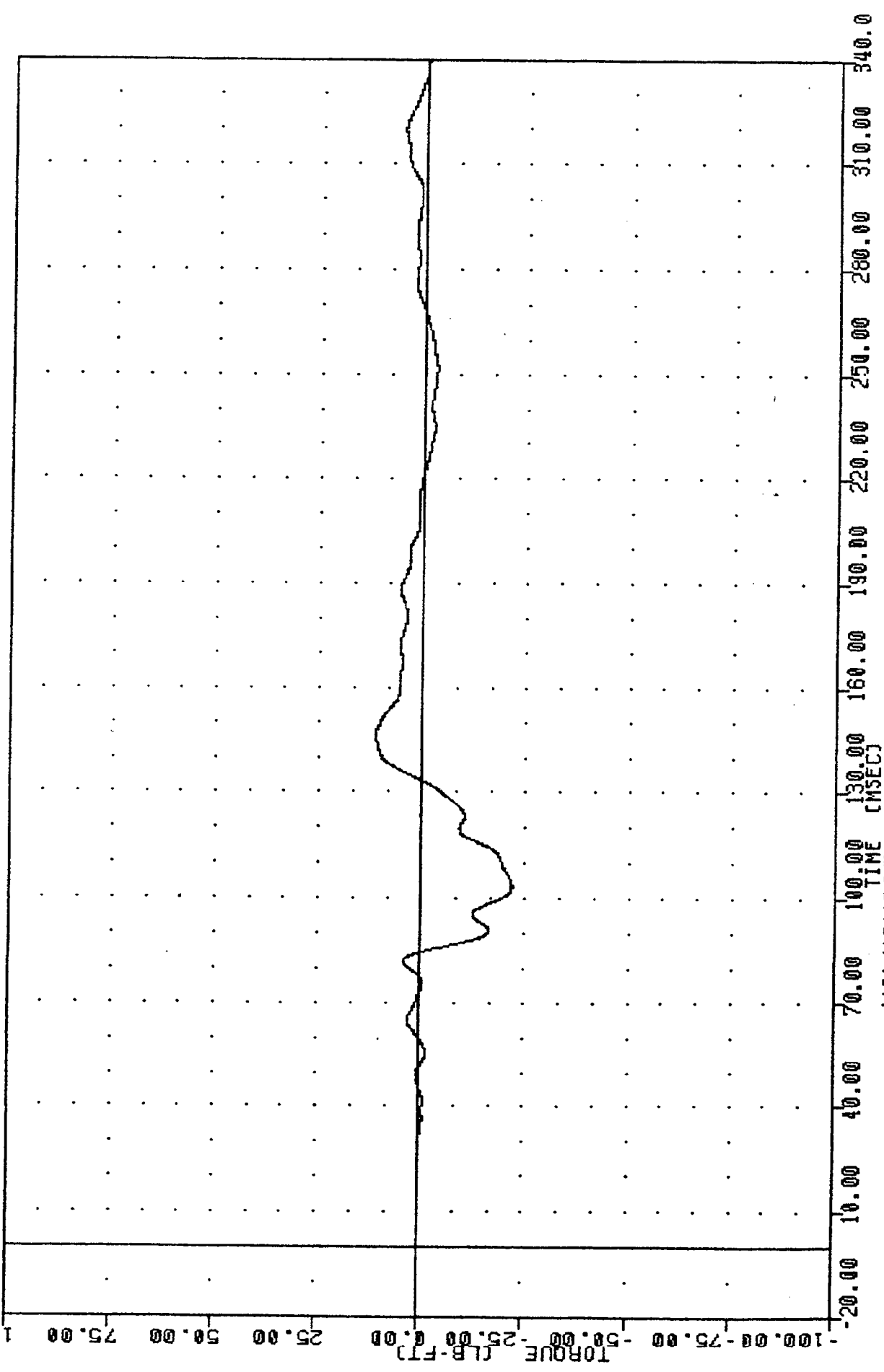
PLOT DATE 3-JUL-85 09:59:10

VNT 850620
RABBIT INTO FIXED LCB

85179000000
NEKXM2

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -21.88e 103.38, 11.26 e 145.88



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER NECK MOMENT X AXIS FT-LBS

TEST DATE 3 JUL 83 09:59:10

1050620
RABBIT INTO FIXED LCB

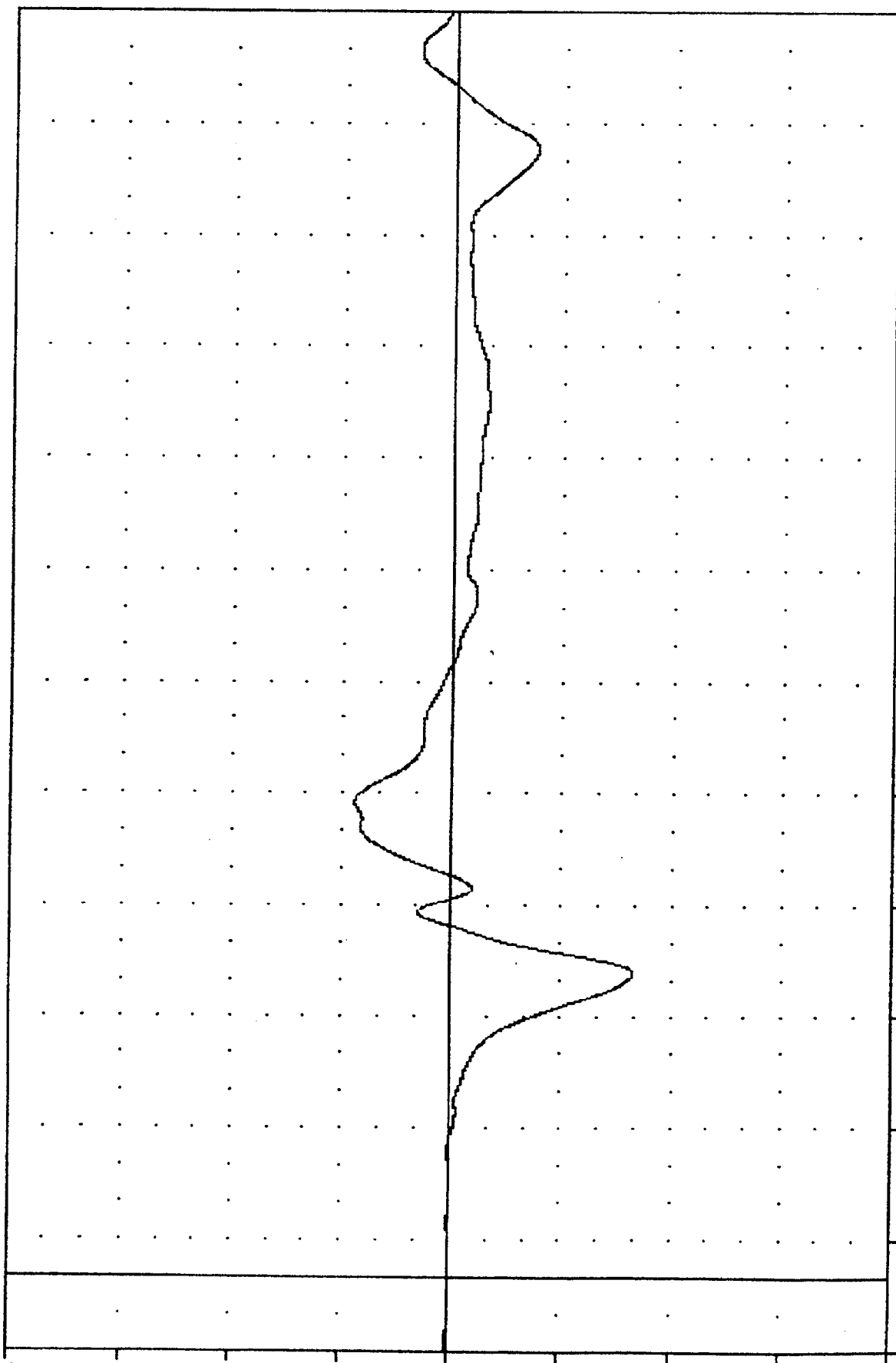
85179000000

NEKYM2

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -41.43 81.75, 22.20 127.63

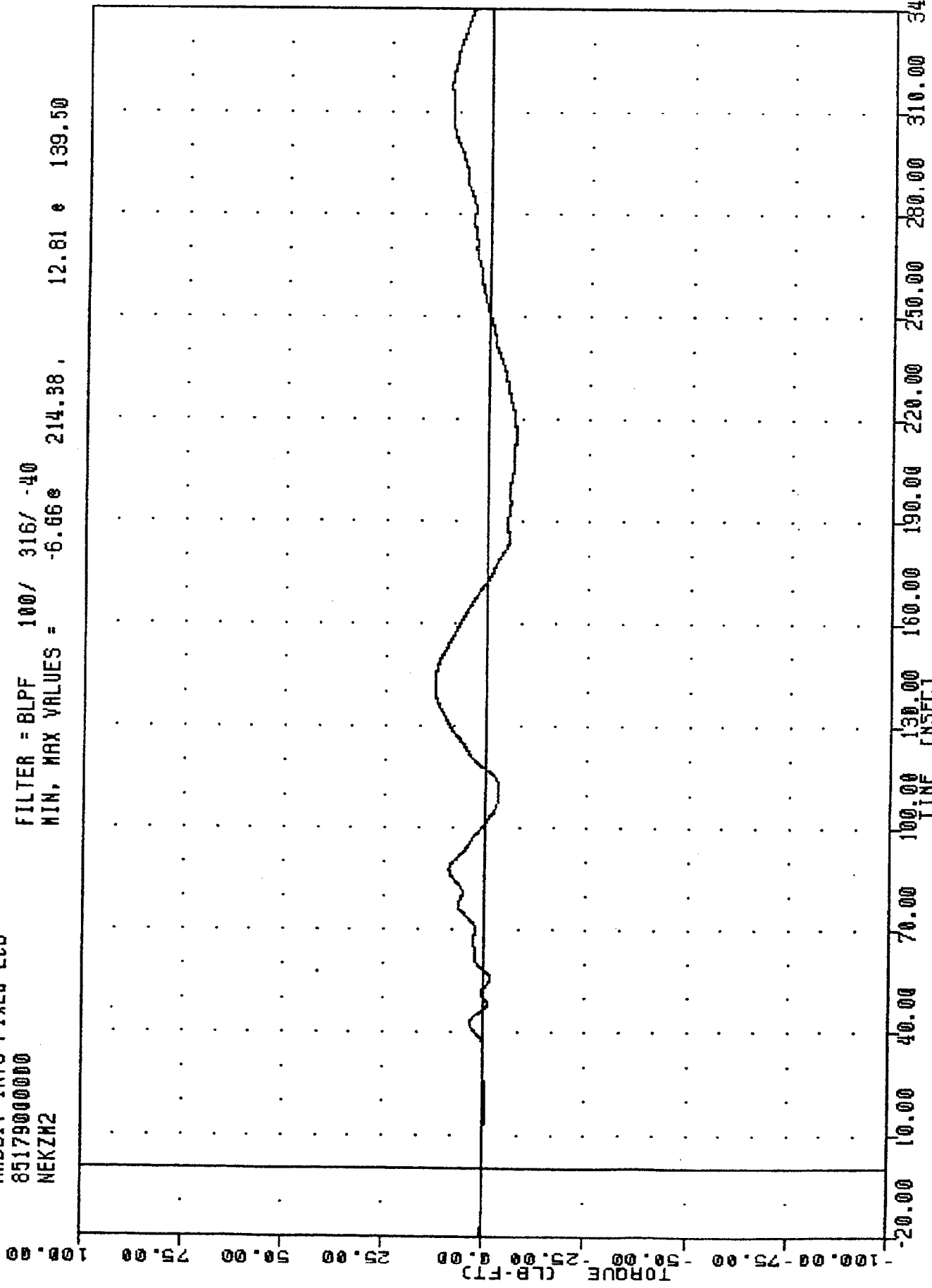
TORQUE (LB-FT)



TIME (MSEC)

VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER NECK MOMENT Y AXIS FT-LBS

VMT 850626 3-JUL-85 09:59:10
 RABBIT INTO FIXED LCB
 85179000000
 NEKZH2
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -6.66 214.38 12.81 139.50



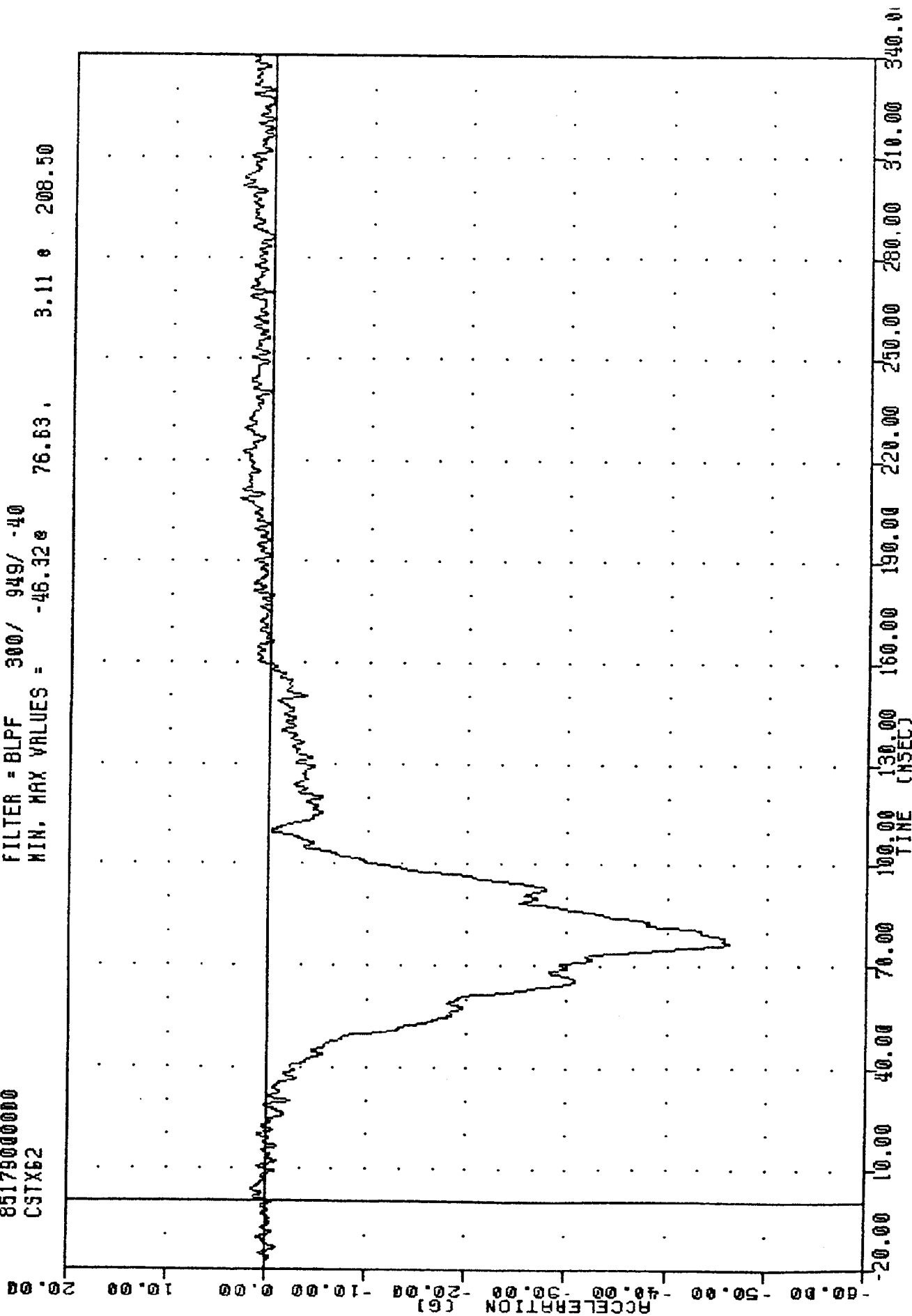
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER NECK MOMENT Z AXIS FT-LBS

VHT
, 850628
RABBIT INTO FIXED LCB
85179000000
CSTX62

PLUT DATE 3-JUL-85 10:05:55

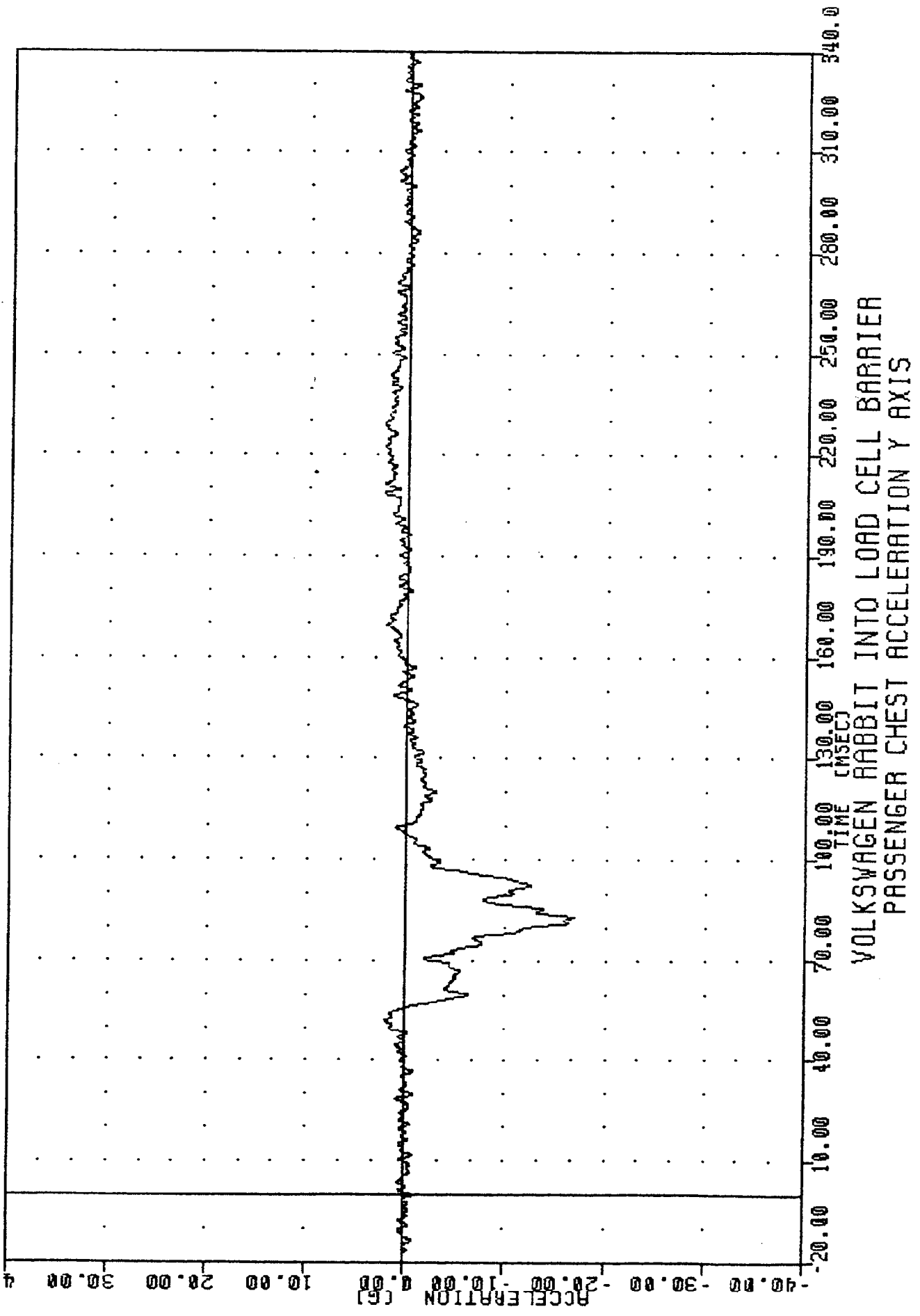
FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -46.32 76.63, 3.11 208.50



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER CHEST ACCELERATION X AXIS

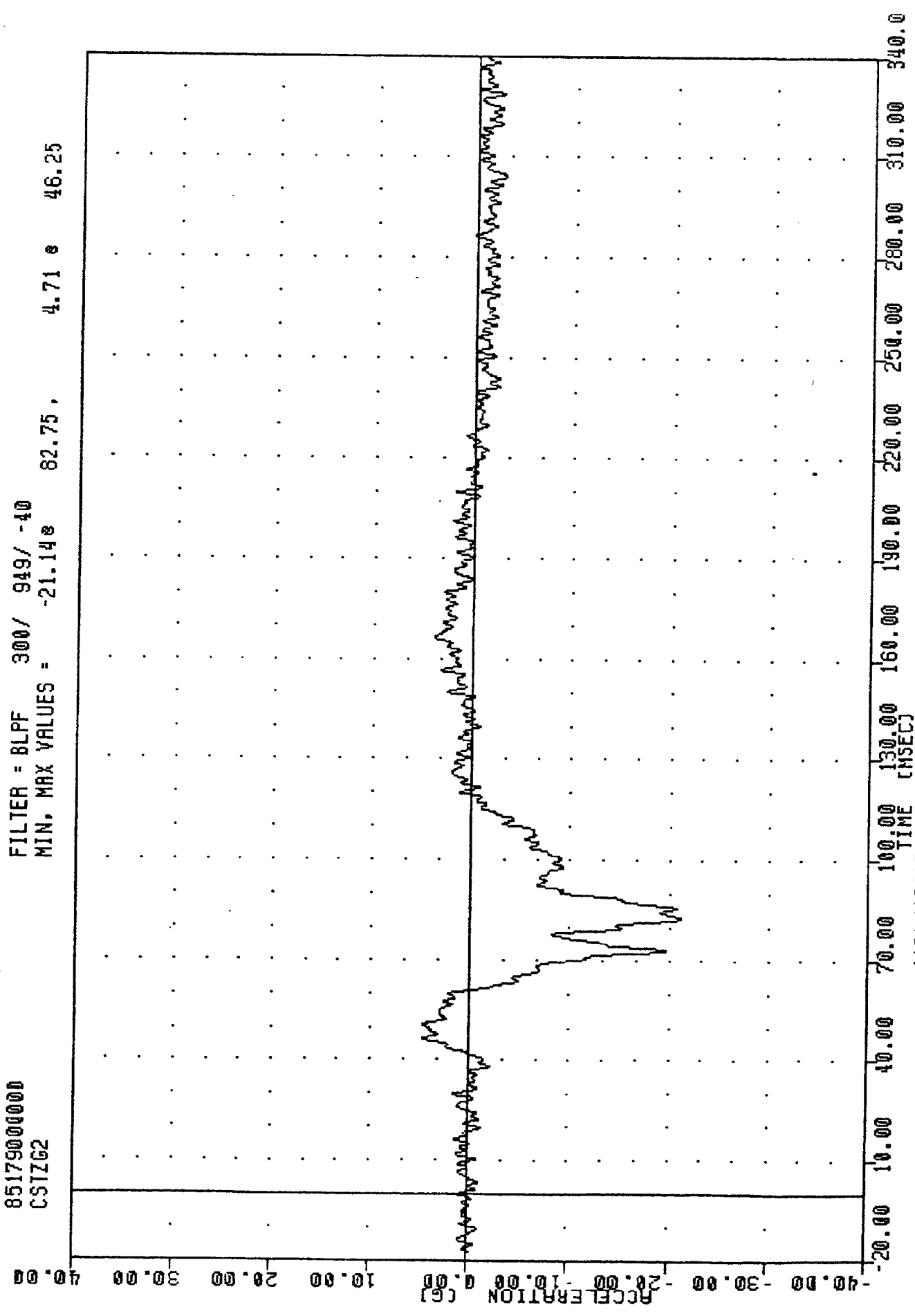
VNT
 85179000000
 CSTYG2
 RABBIT INTO FIXED LCB
 , 850628
 3-JUL-85
 10:05:55
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -16.90 83.00 2.49 229.38



VNT
 85179000000
 CSTZG2
 RABBIT INTO FIXED LCB
 , 850628

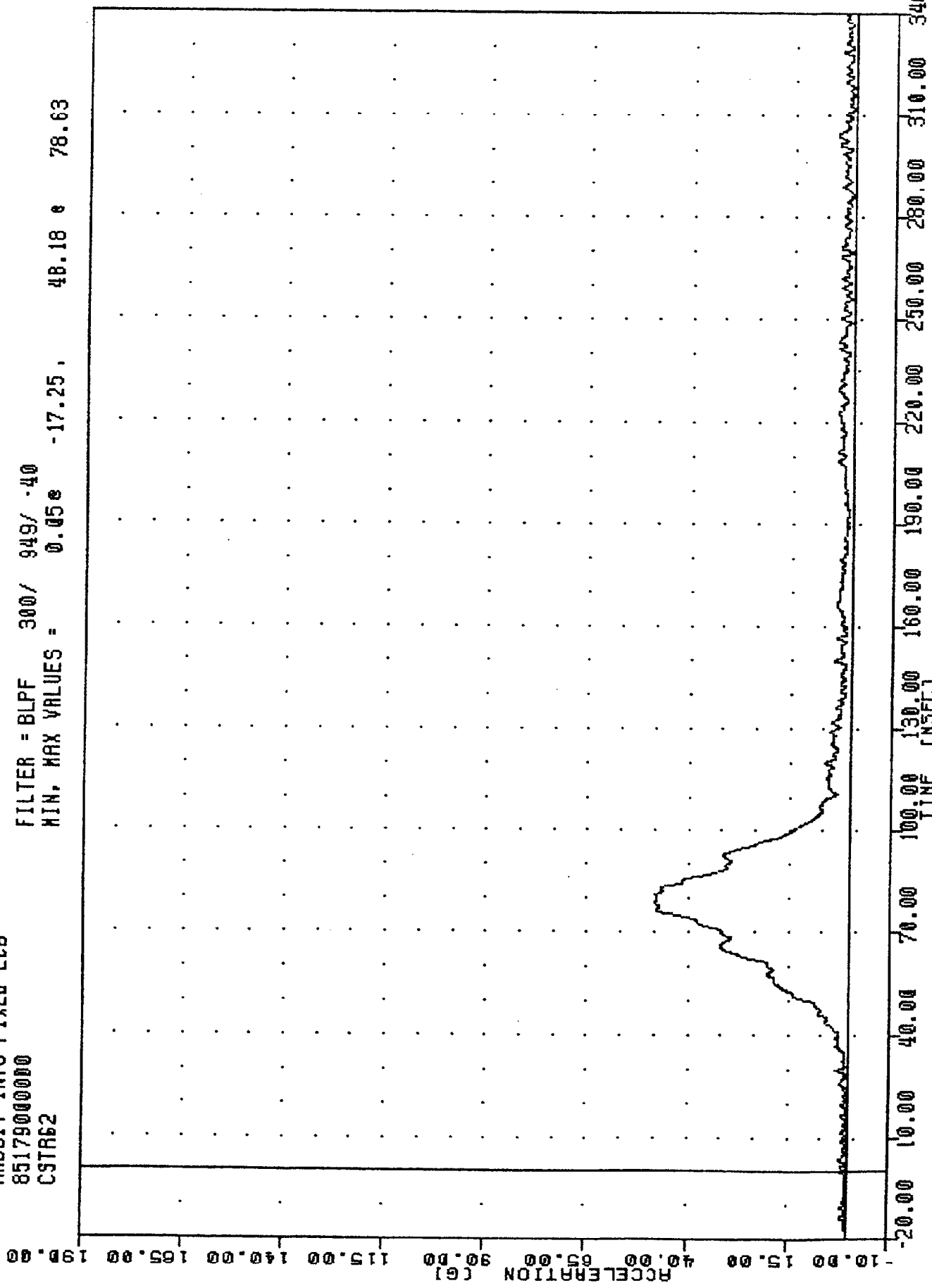
PLUT DATE 3-JUL-85 10:05:55

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -21.14e 82.75, 4.71 e 46.25



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER CHEST ACCELERATION Z AXIS

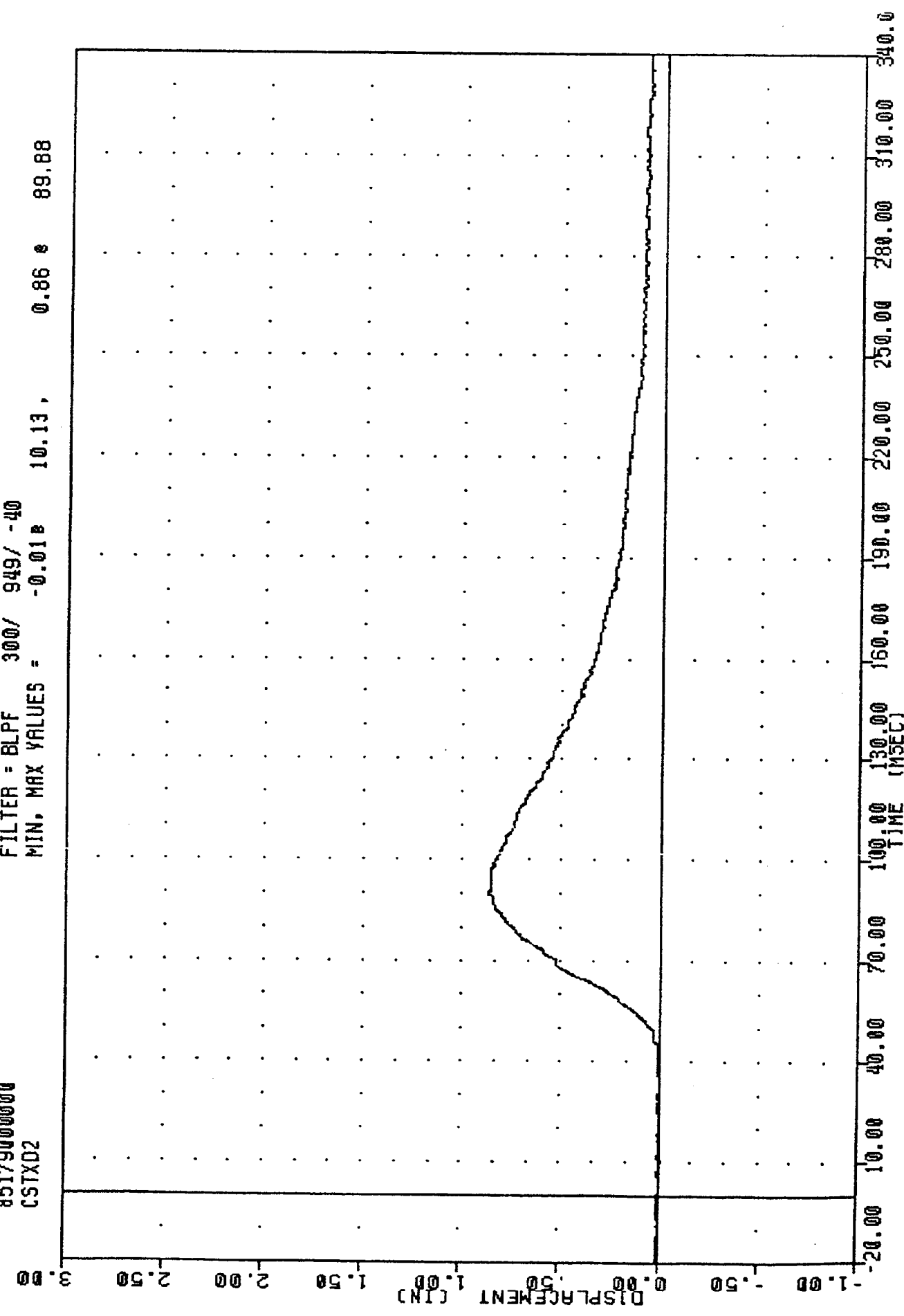
YHT 850628
 RABBIT INTO FIXED LCB
 85179000000
 CSTR62
 PCUT DATE 3-JUL-85 10:05:55
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 0.05e -17.25, 48.18 e 78.63



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER CHEST RESULTANT

VRT 850628
 RABBIT INTO FIXED LCB
 85179000000
 CSTXD2

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -0.018 10.13, 0.86 89.88

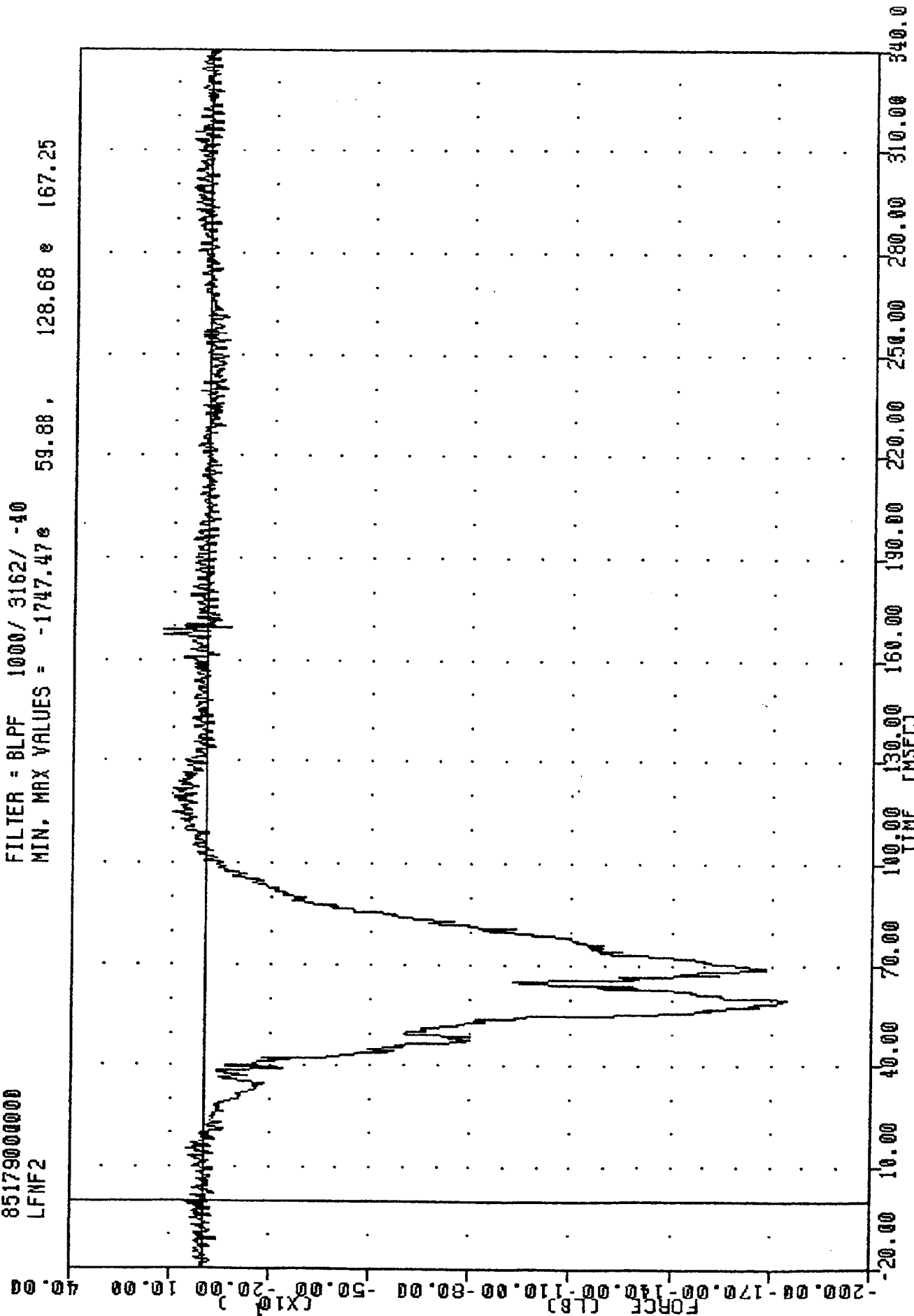


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER CHEST DISPLACEMENT INCHES

VNT
 850628
 RABBIT INTO FIXED LCB
 85179000000
 LFMF2

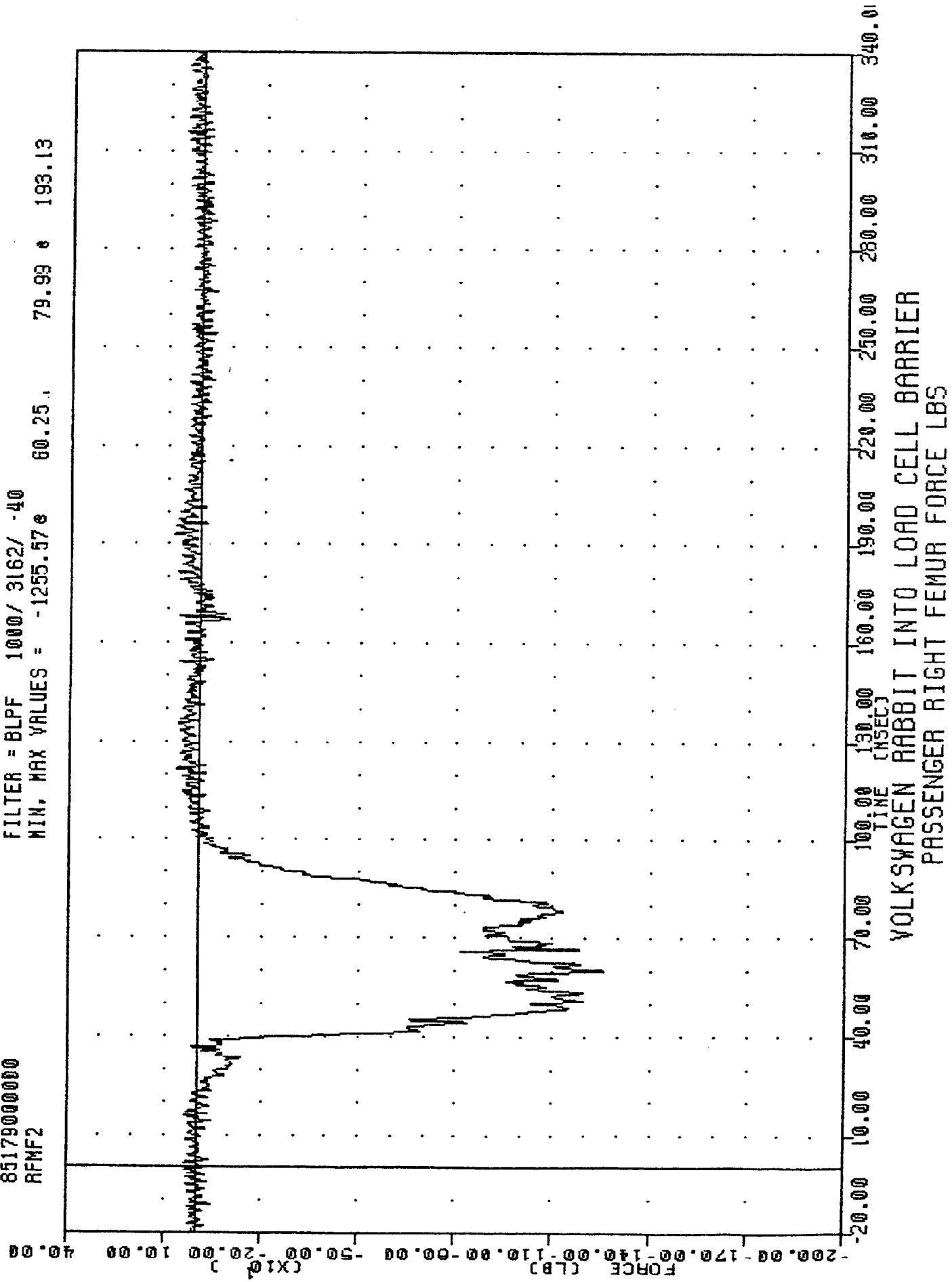
PLOT DATE 3-JUL-85 10:05:55

FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -1747.47 59.88 128.68 167.25



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER LEFT FEMUR FORCE LBS

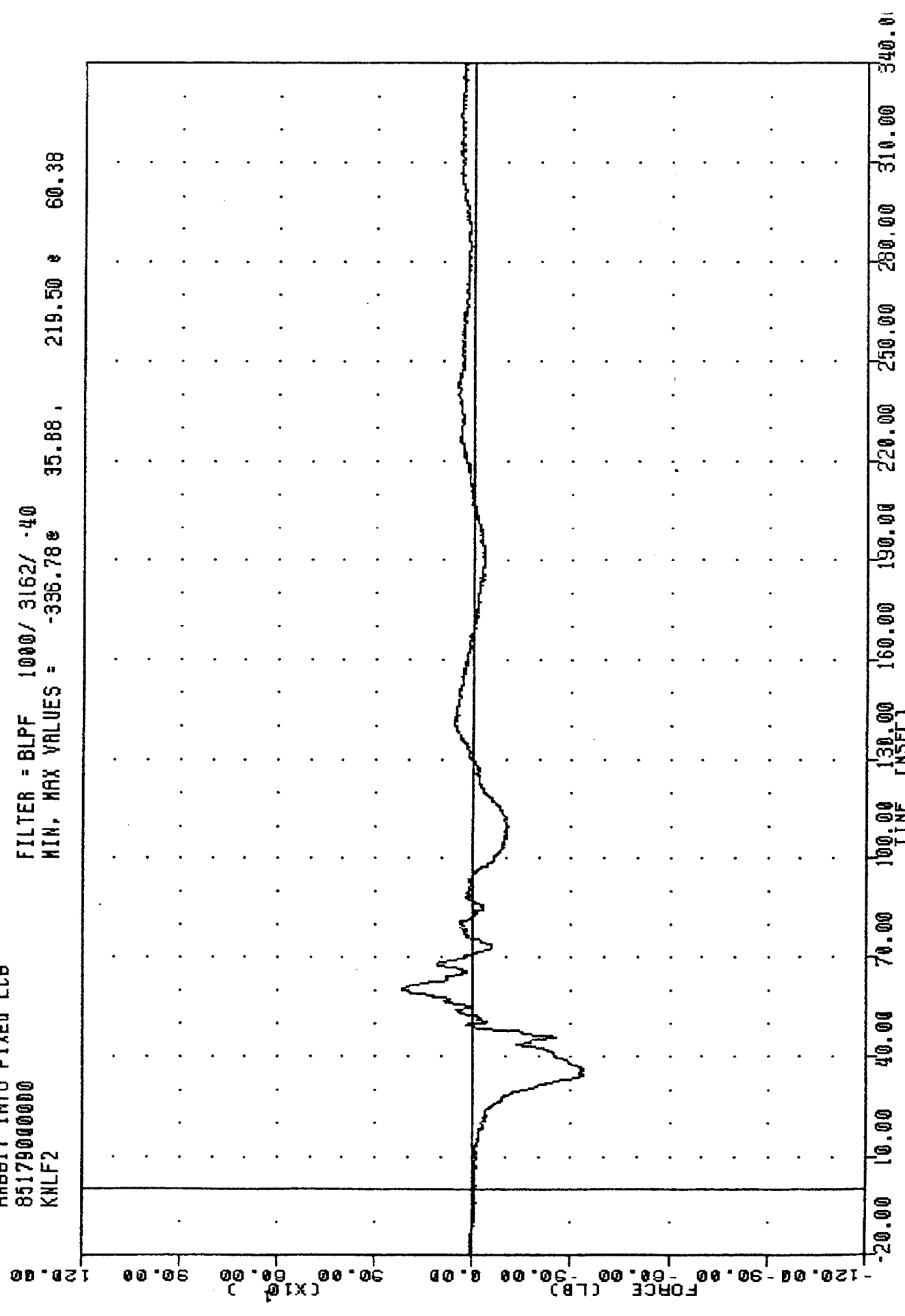
VMI 850628
 RABBIT INTO FIXED LCB
 85179000000
 RFMF2
 PLUT DATE 3-JUL-85 10:05:55
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -1255.57e 60.25, 79.93 e 193.13



VINT
 RABBIT INTO FIXED LCB
 85179000000
 KNLF2

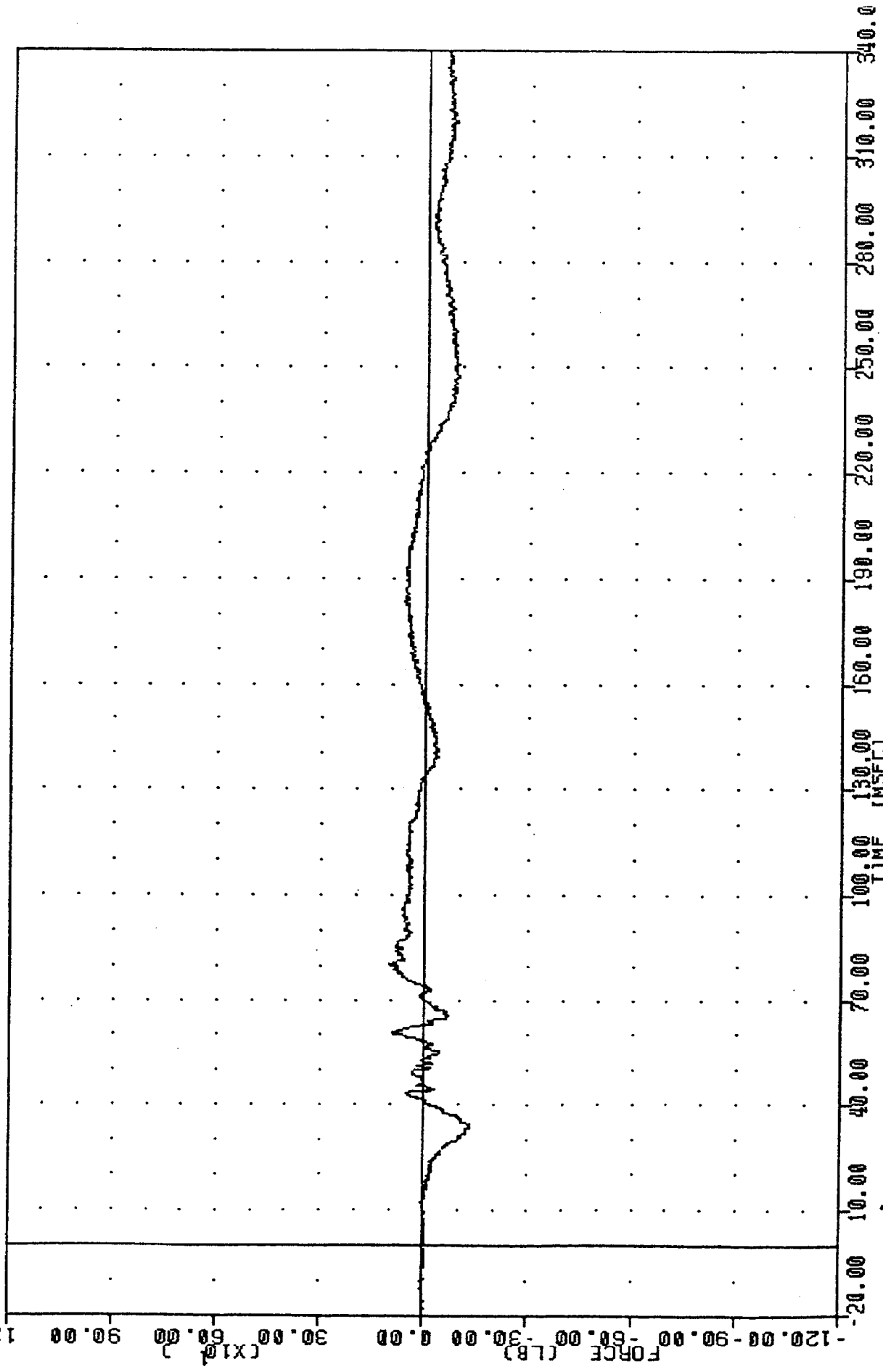
PLOT DATE 5-JUL-80 09:59:10

FILTER = BLPF 1000/ 3162/ .40
 MIN, MAX VALUES = -336.78e 35.88, 219.50 e 60.38



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER LEFT KNEE / LEFT SENSOR LBS

85179000000
 RABBIT INTO FIXED LCB
 030620
 3-JUL-85 09:59:10
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -132.99# 33.75, 100.38 # 80.13
 KNLF8

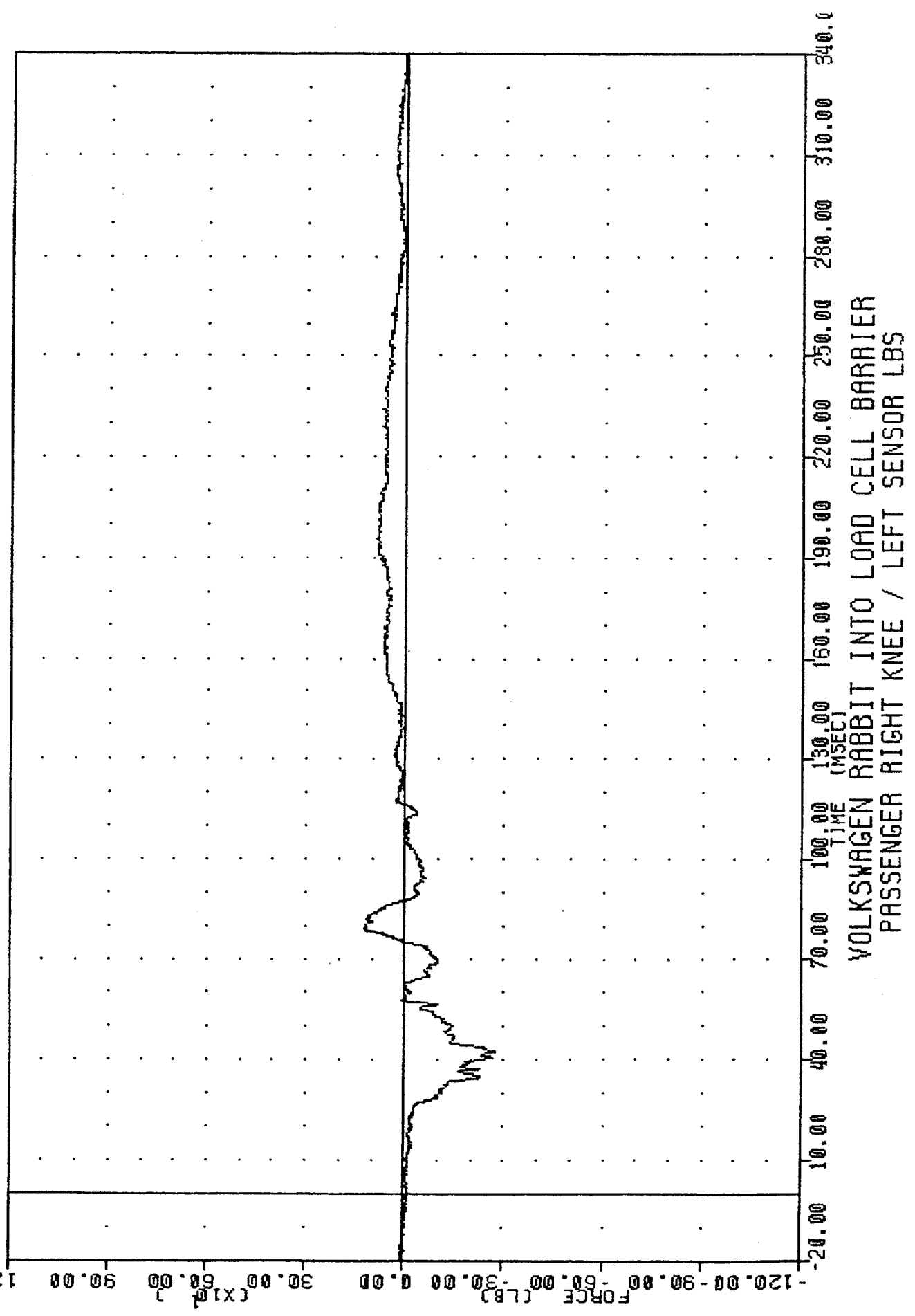


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER LEFT KNEE / RIGHT SENSOR LBS

YRT 850628 3-JUL-85 09:59:10

RABBIT INTO FIXED LCB
85179000000
KNRF2

FILTER = BLPF 1000/ 3162/ -40
MIN, MAX VALUES = -275.08 42.50 120.58 78.88



VNT 850628 3-JUL-85 09:59:10

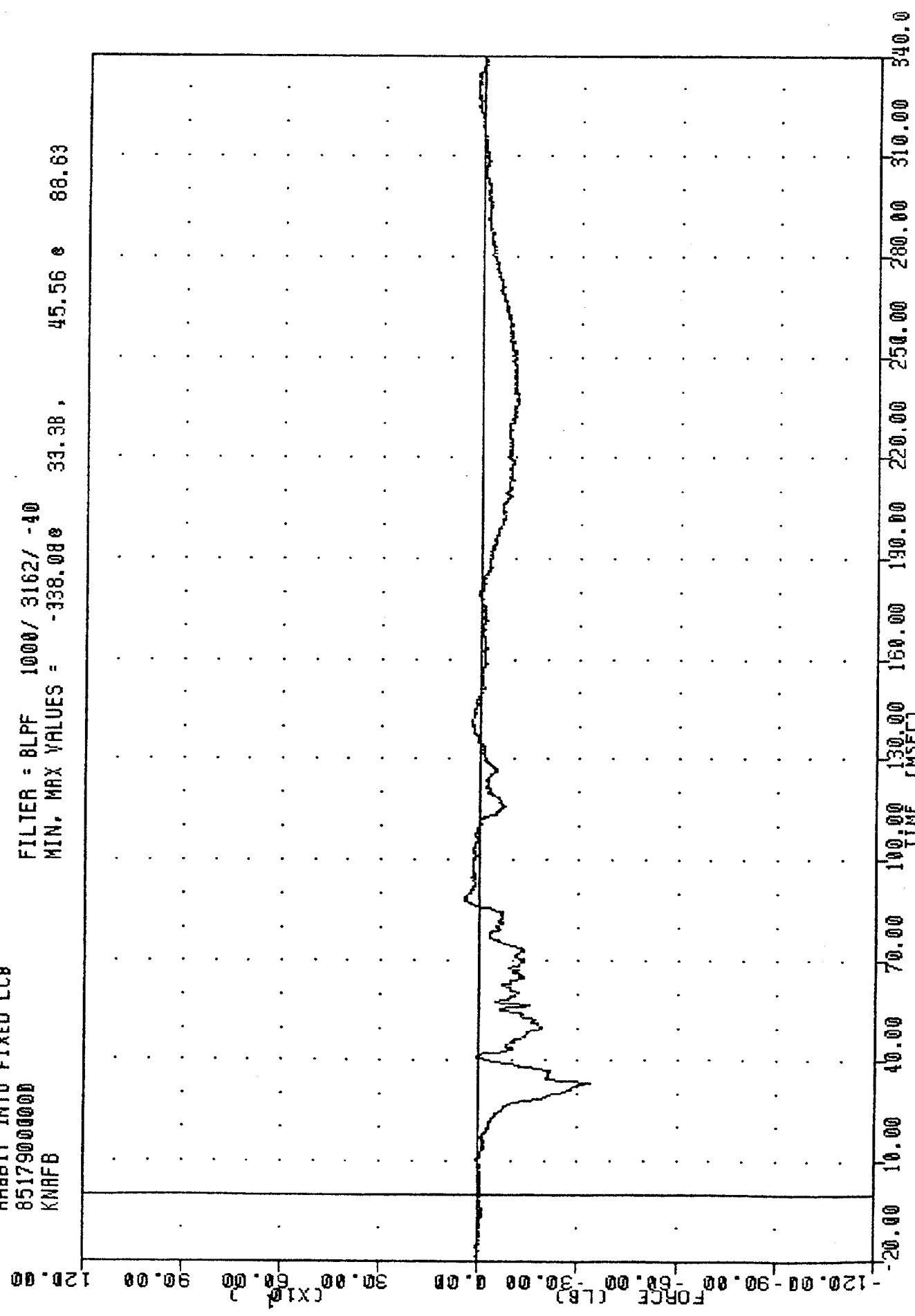
RABBIT INTO FIXED LCB

85179000000

KNRFB

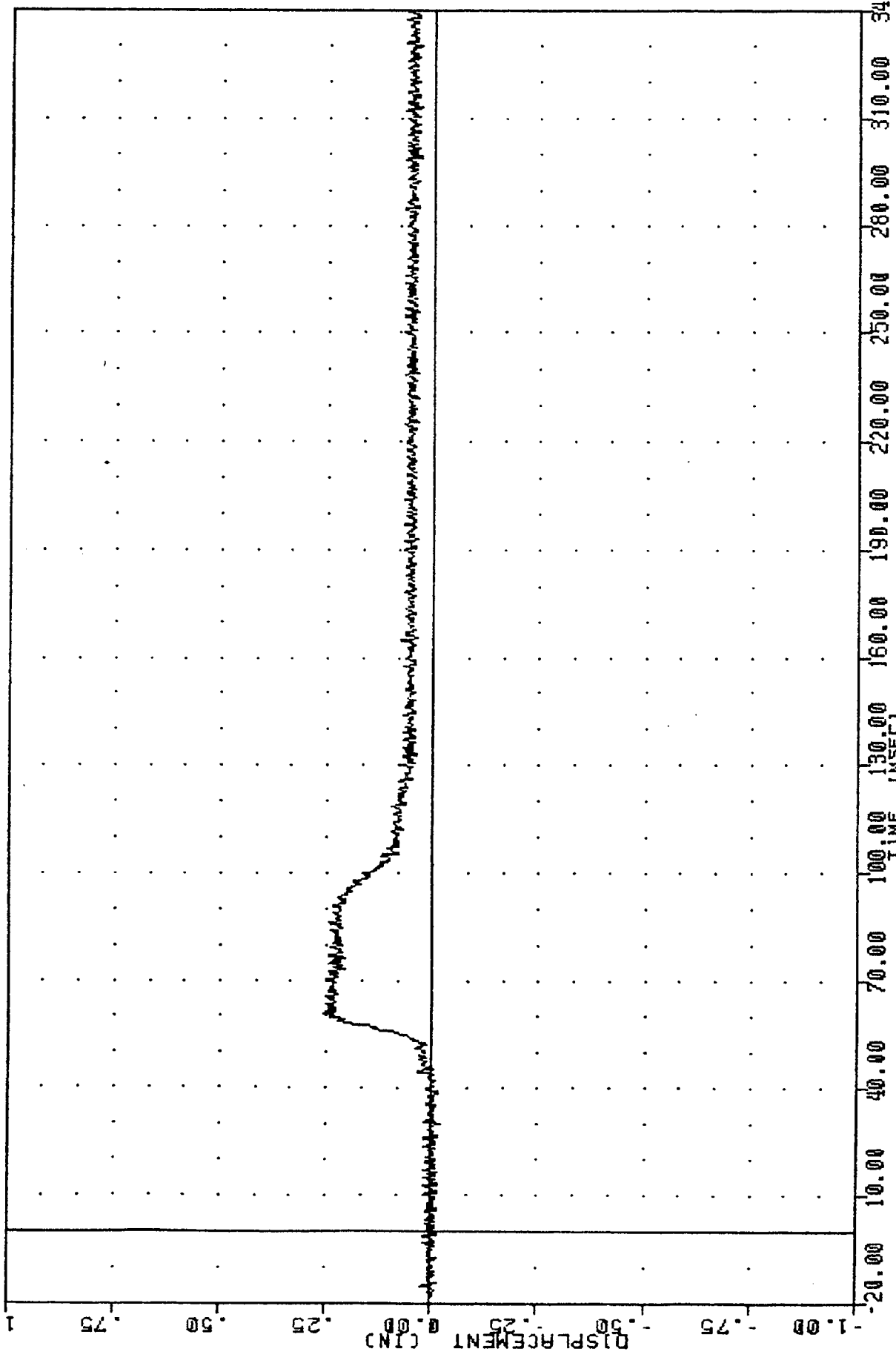
FILTER = BLPF 1000/ 3162/ -40

MIN. MAX VALUES = -338.080 33.38, 45.56 e 88.63



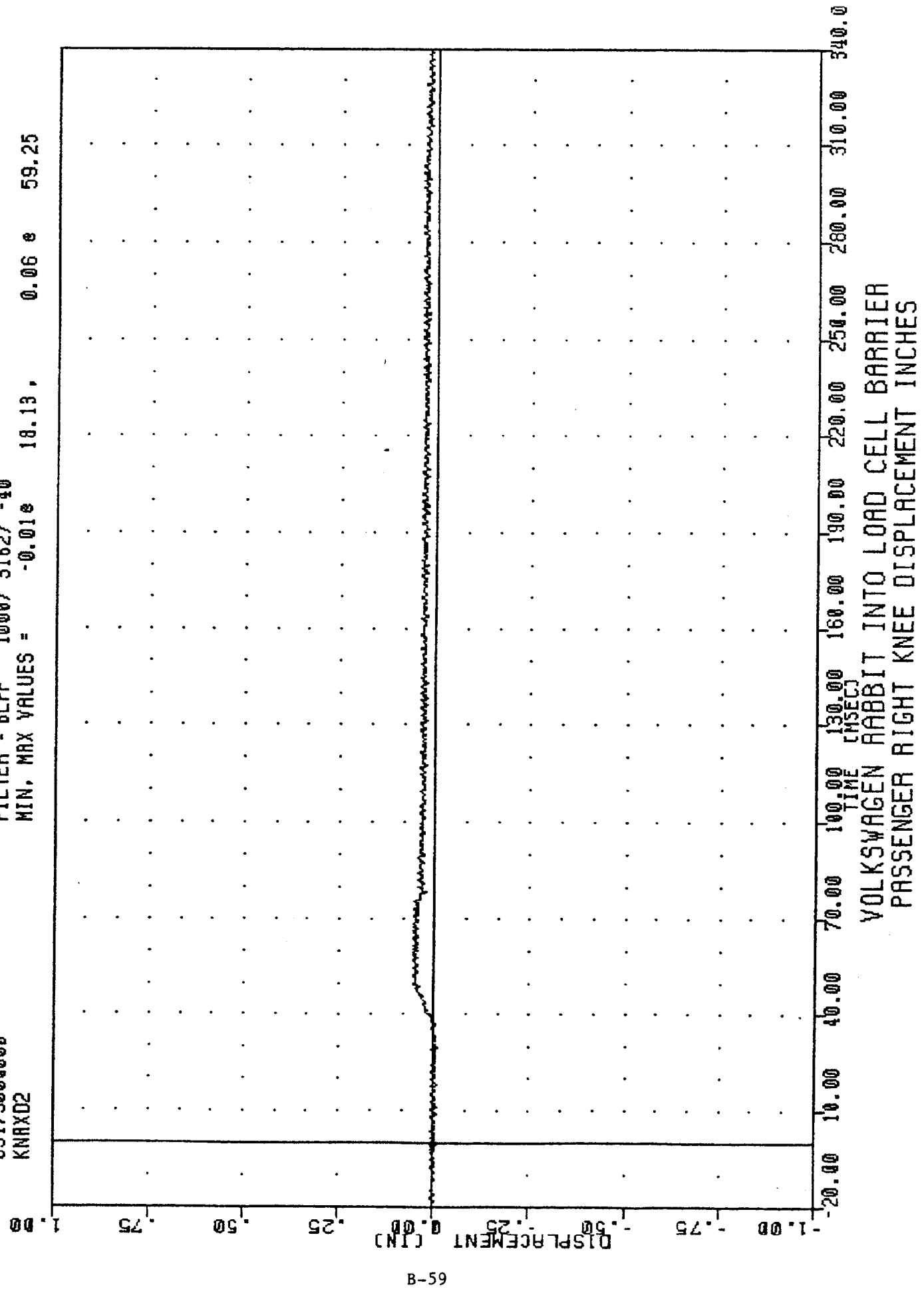
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER RIGHT KNEE / RIGHT SENSOR LBS

VNT
 85179000000
 KNLXD2
 RABBIT INTO FIXED LCB
 850628
 3-JUL-85
 09:59:10
 FILTER = BLPF 1000/ 3182/ -40
 MIN. MAX VALUES = -0.028 30.13, 0.25 & 61.00



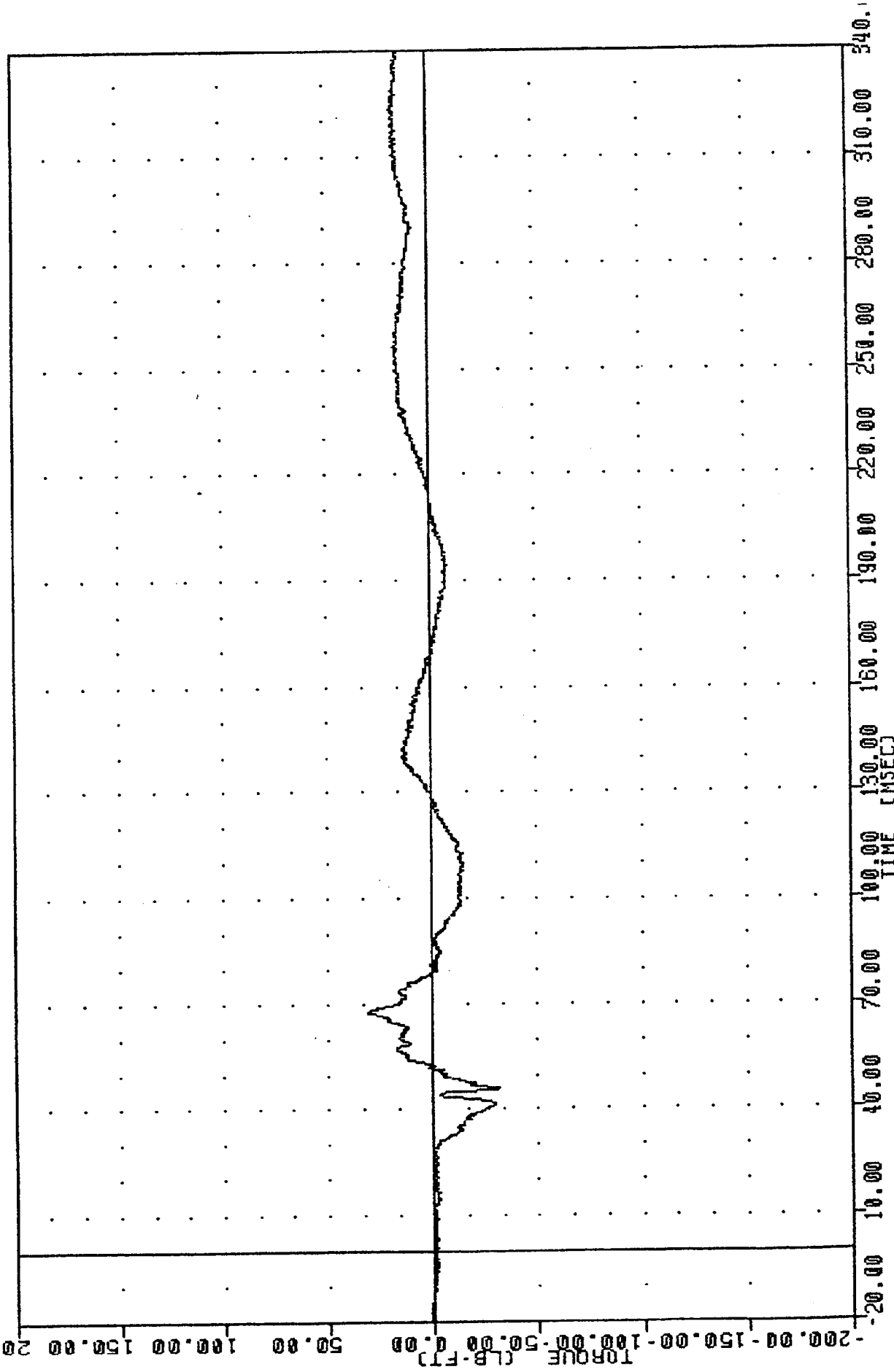
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER LEFT KNEE DISPLACEMENT INCHES

VNT 850620 3-JUL-83 09:59:10
 RABBIT INTO FIXED LCB
 85179000000
 KNAXD2
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -0.01e 18.13, 0.06 e 59.25



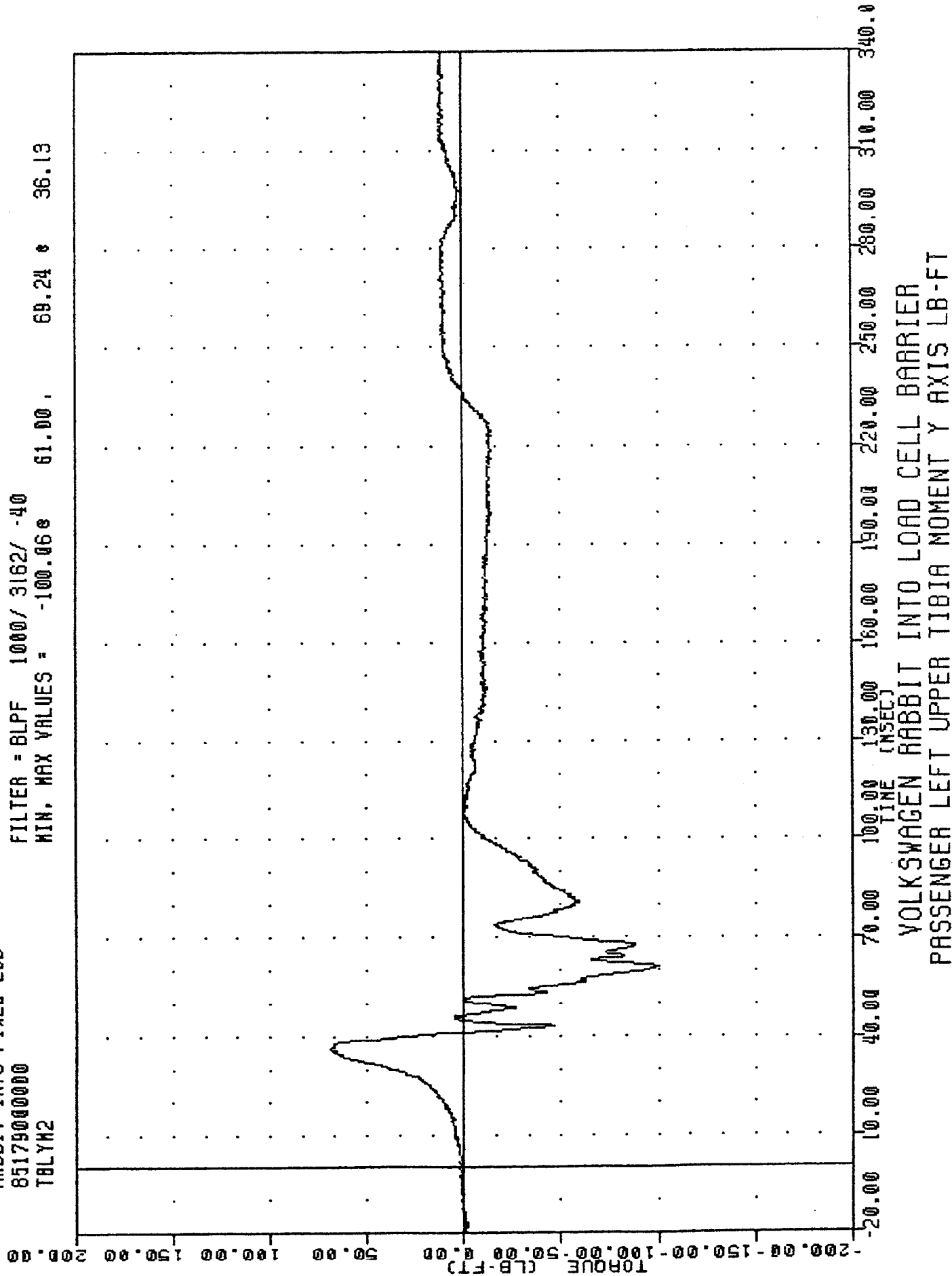
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER RIGHT KNEE DISPLACEMENT INCHES

VRT
 RABBIT INTO FIXED LCB
 85179000000
 TBLXM2
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -31.62 45.88 31.52 67.50
 PLOT DATE 5 JUL 68 09:59:40

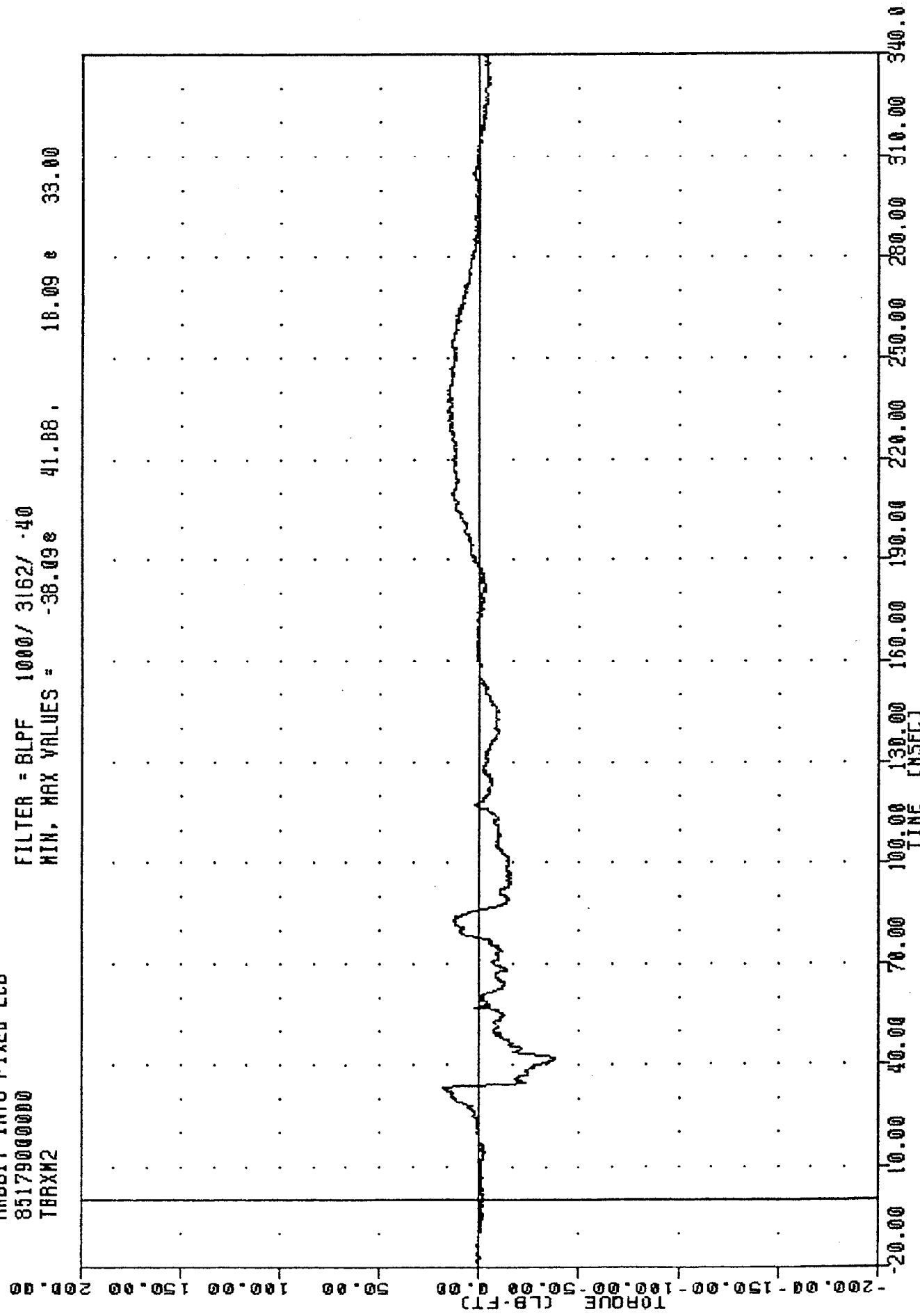


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER LEFT UPPER TIBIA MOMENT X AXIS LB-FT

VHT 851790000000 TBLYH2
 RABBIT INTO FIXED LCB
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -100.06 61.00 69.24 36.13
 PLOT DATE 3 JUL 63 05:59:10

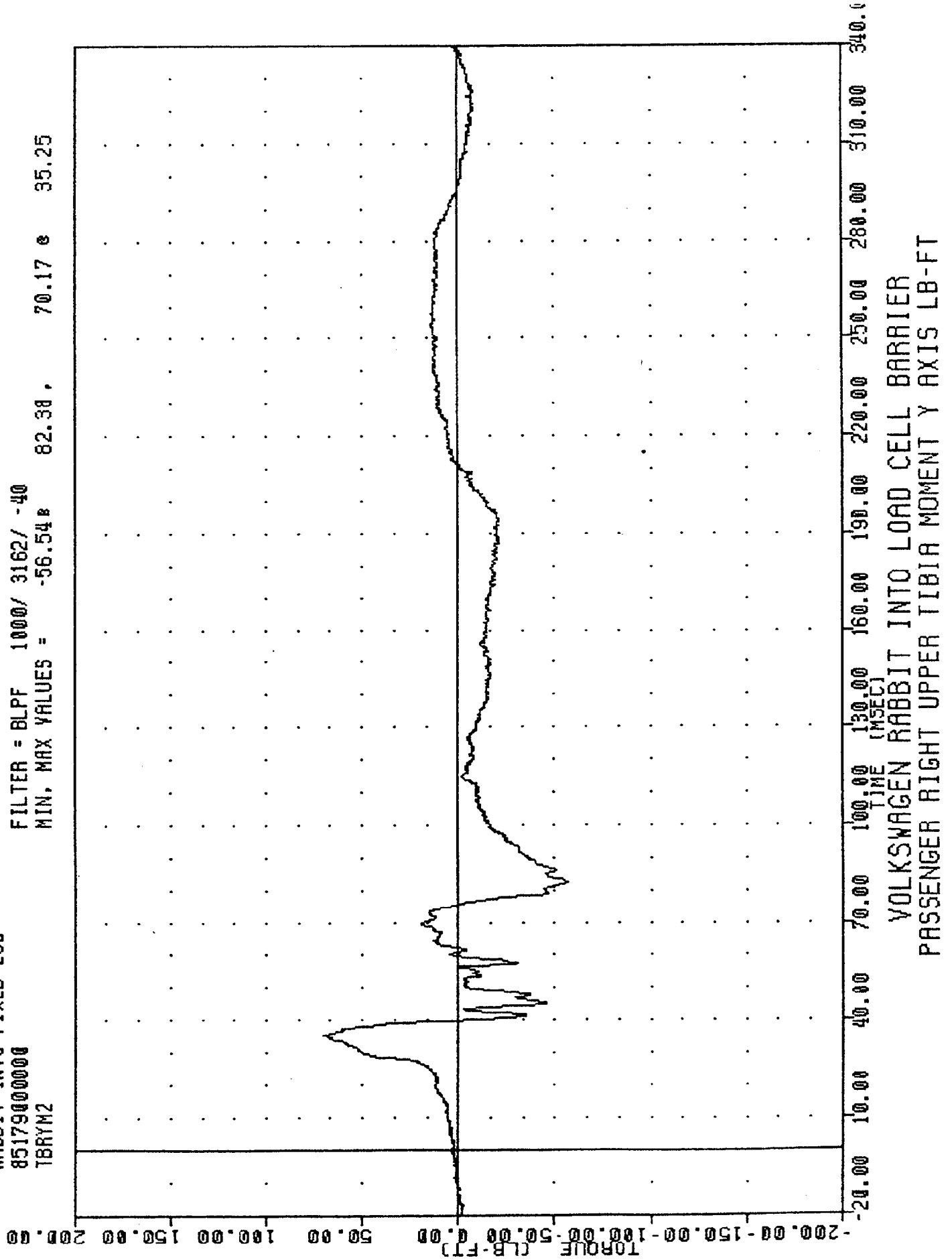


VINT 030620 03 JUL 83 03:59:10
 RABBIT INTO FIXED LCB
 85179000000
 TBRXN2
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -38.09e 41.88, 18.09 e 33.00



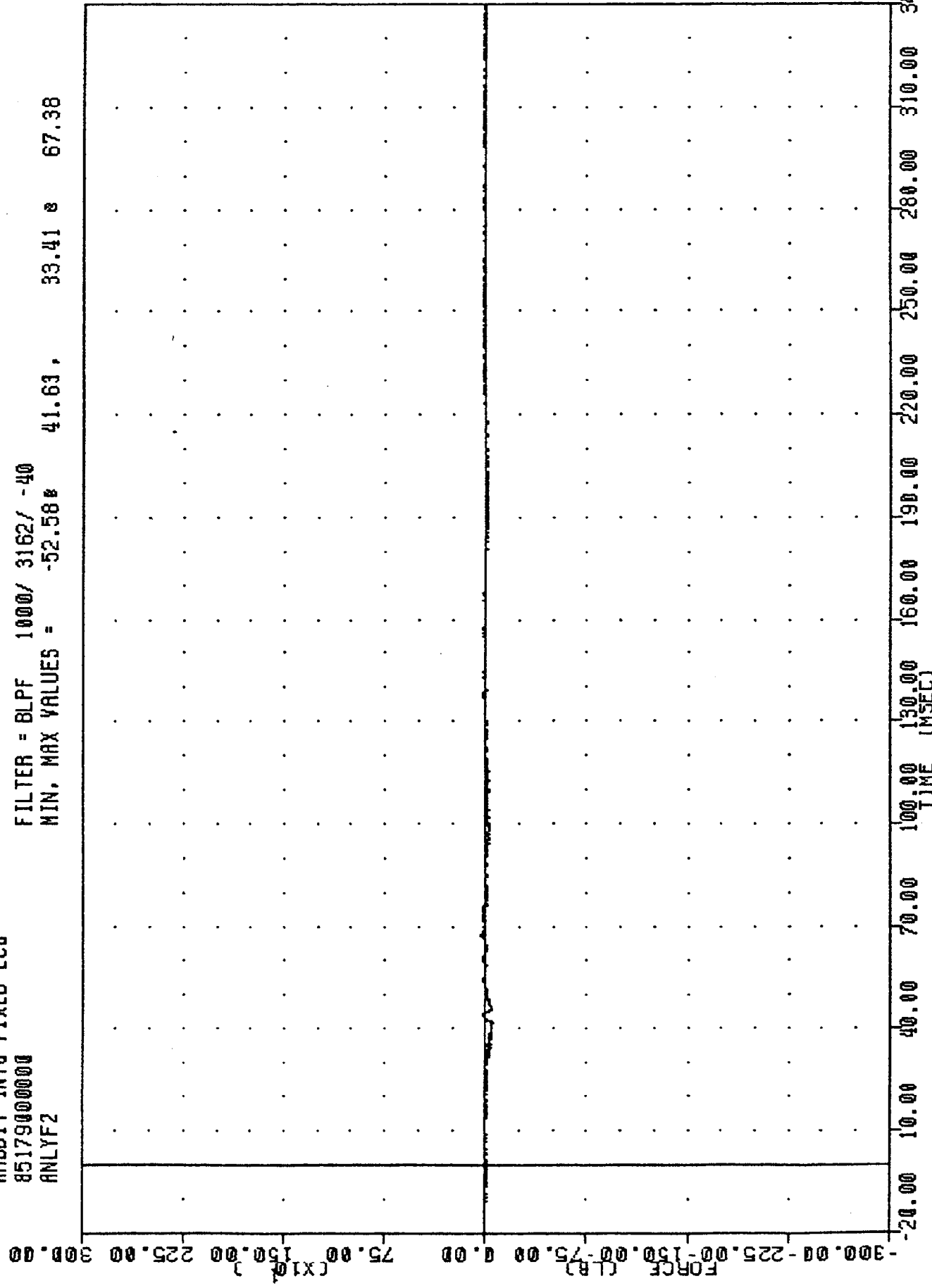
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER RIGHT UPPER TIBIA MOMENT X AXIS LB-FT

YHT 630620 PLOT DATE 3 JUL 63 03:59:10
 RABBIT INTO FIXED LCB
 85179000000
 TBRM2
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -56.54 82.38 70.17 35.25



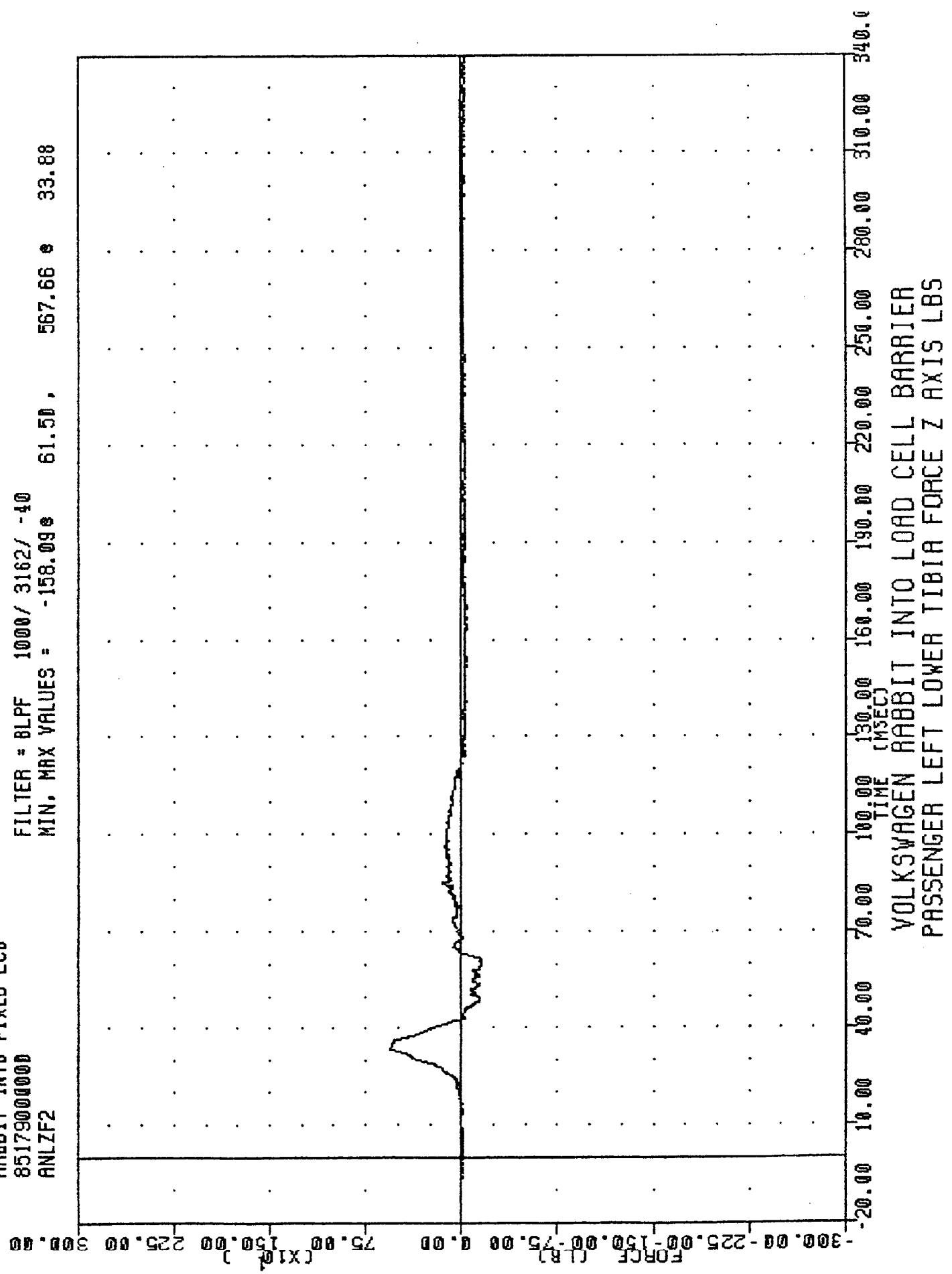
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER RIGHT UPPER TIBIA MOMENT Y AXIS LB-FT

VMT 7030620 PEET DATE 03 JUL 63 03:59:10
 RABBIT INTO FIXED LCB
 85179000000
 ANLYF2
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -52.58 41.63 33.41 67.38

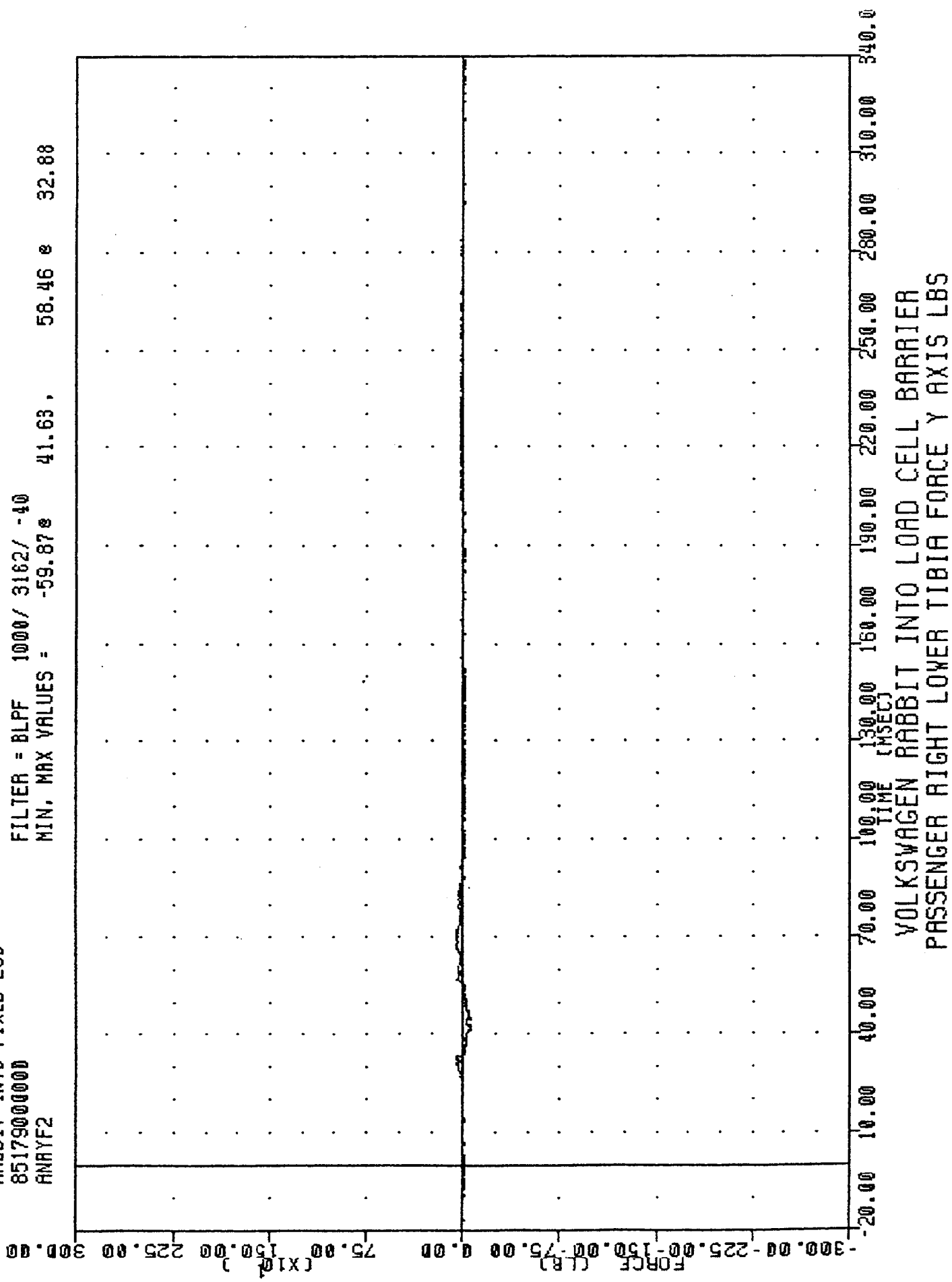


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER LEFT LOWER TIBIA FORCE Y AXIS LBS

VMI 030620 PEET DATE 0 JUL 83 03:59:10
 RABBIT INTO FIXED LCB
 85179000000
 ANLZF2
 FILTER = BLPF 1000/ 3162/ -40
 MIN. MAX VALUES = -158.09 61.50, 567.66 33.88



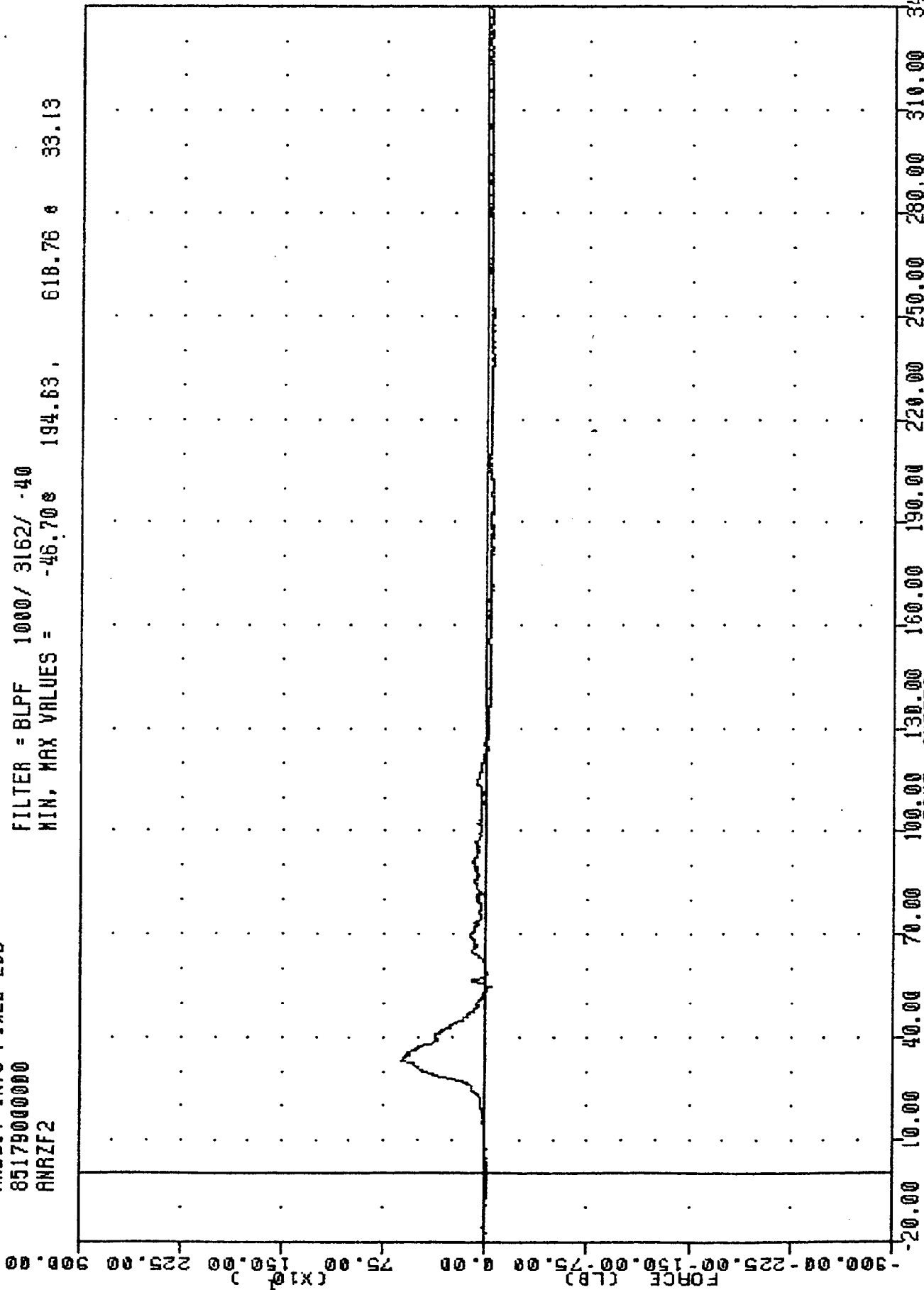
VHT 830628
 RABBIT INTO FIXED LCB
 85179000000
 ANRYF2
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -59.87 41.63, 58.46 32.88
 3 JUL 63 09:59:10



VHT
 85179000000
 RABBIT INTO FIXED LCB
 ANRZF2

PLUT DATE 3-JUL-85 09:59:10

FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -46.70e 194.63, 618.76 e 33.13



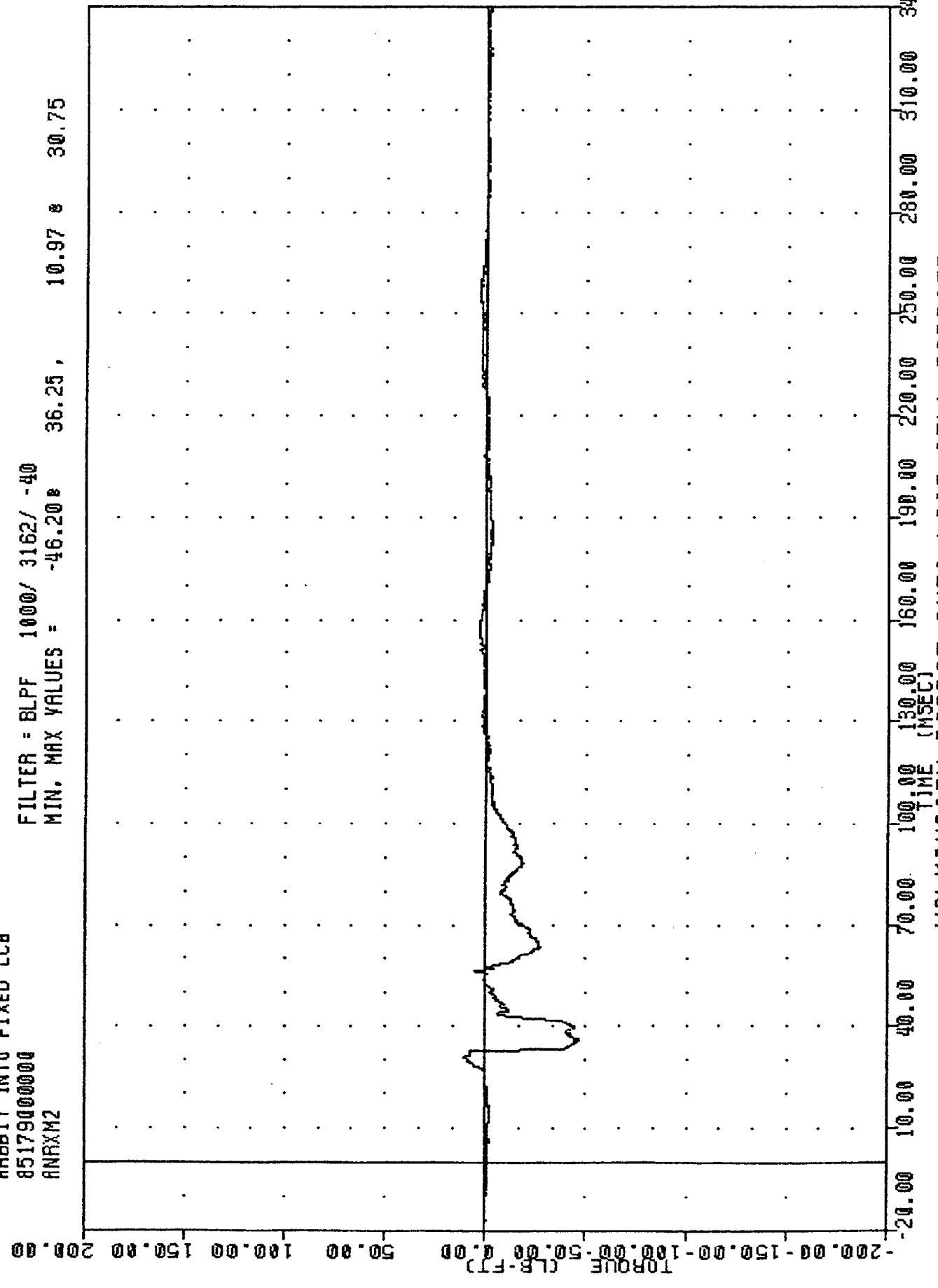
1

68.75



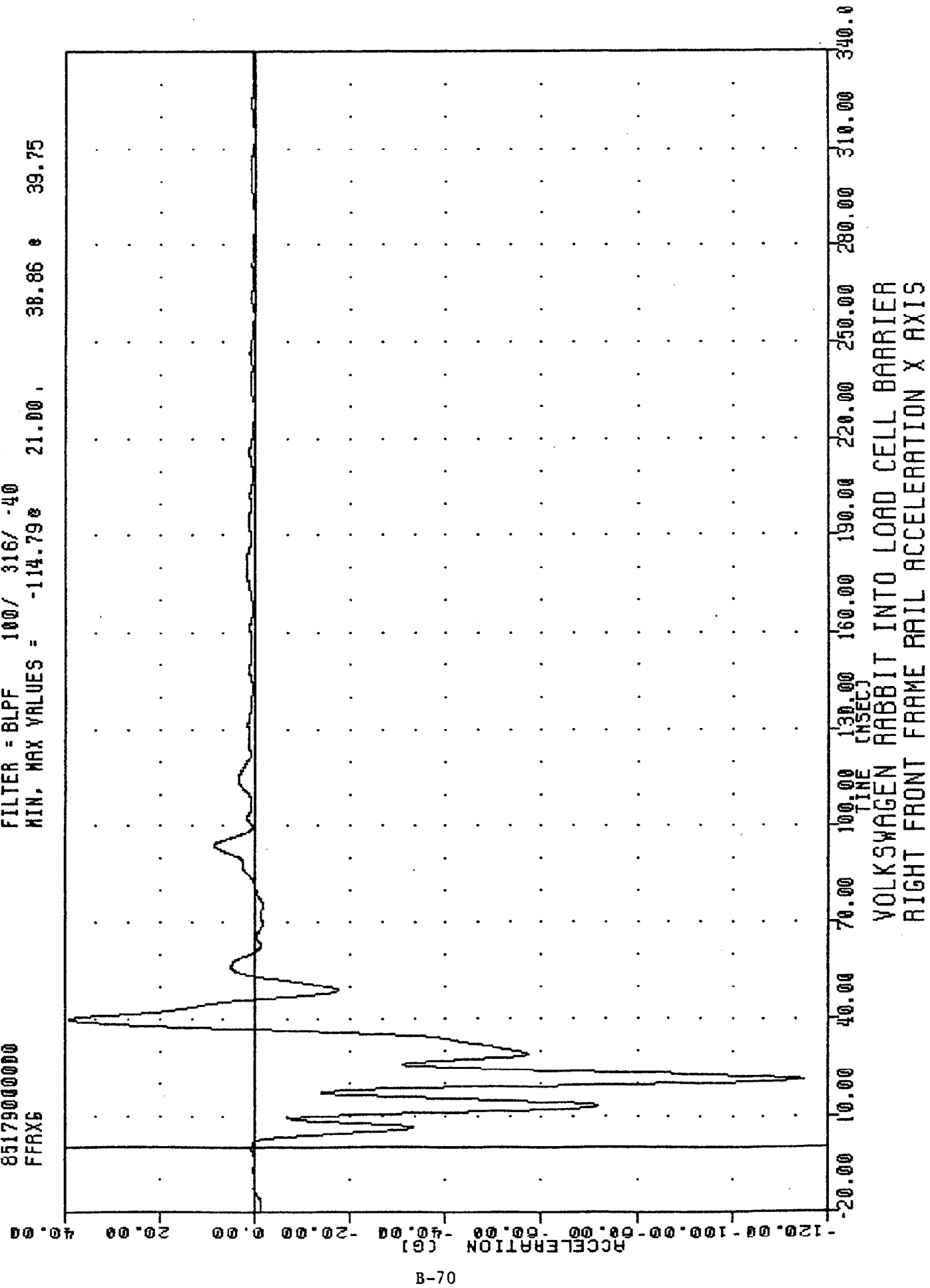
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
PASSENGER LEFT LOWER TIBIA MOMENT X AXIS LB-FT

850620 3-JUL-83 09:59:10
 RABBIT INTO FIXED LCB
 85179000000
 ANRXM2
 FILTER = BLPF 1000/ 3162/ -40
 MIN, MAX VALUES = -46.20 36.25, 10.97 30.75



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 PASSENGER RIGHT LOWER TIBIA MOMENT X AXIS LB-FT

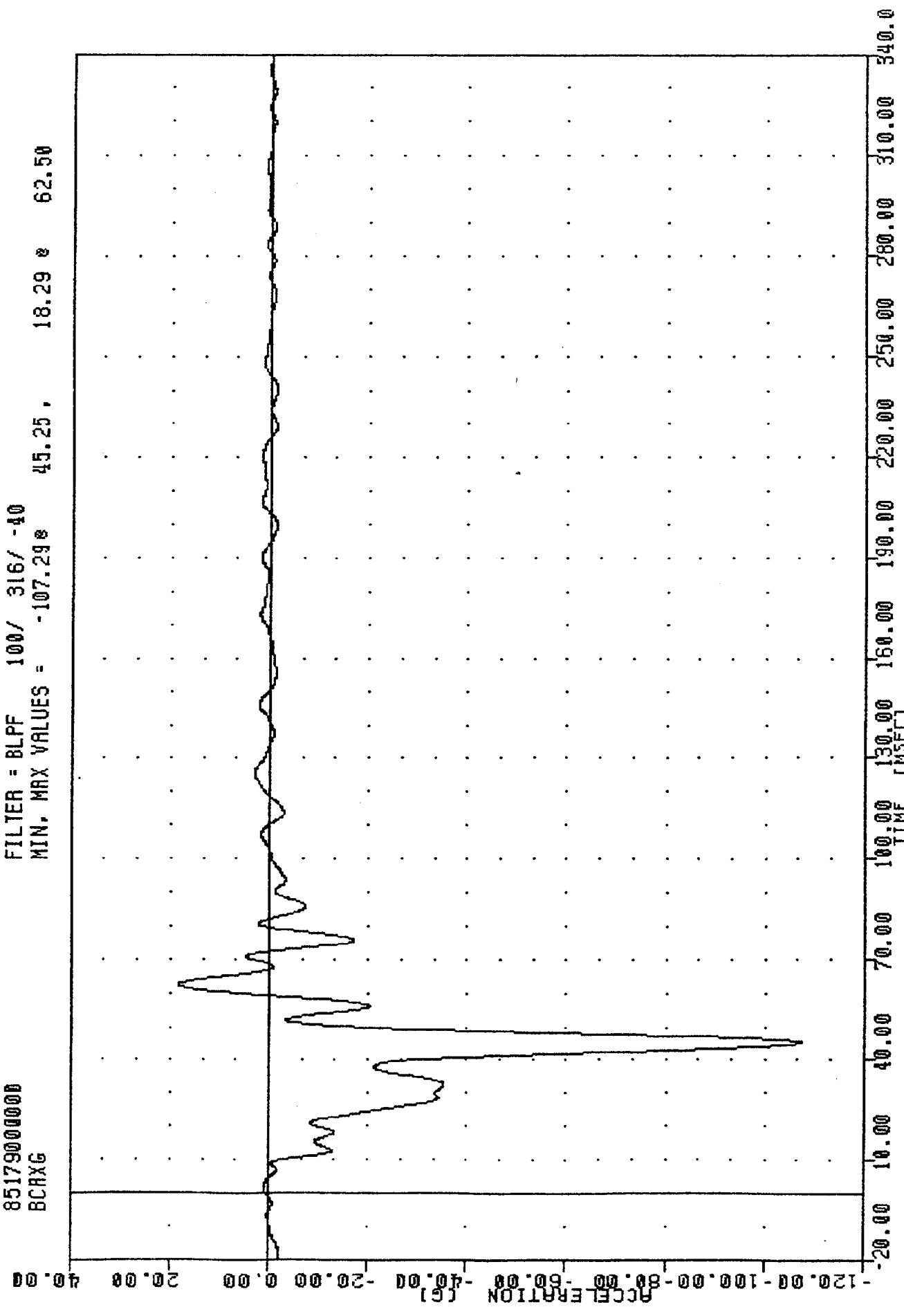
VHT 830620 3-JUL-83 10:09:42
 RABBIT INTO FIXED LCB
 85179000000
 FFRXS
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -114.790 21.00, 38.86 39.75



VII 50620
RABBIT INTO FIXED LCB
85179000000
BCRXG

PLOT DATE 3 JUL 83 10:09:42

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -107.298 45.25, 18.29 e 62.50

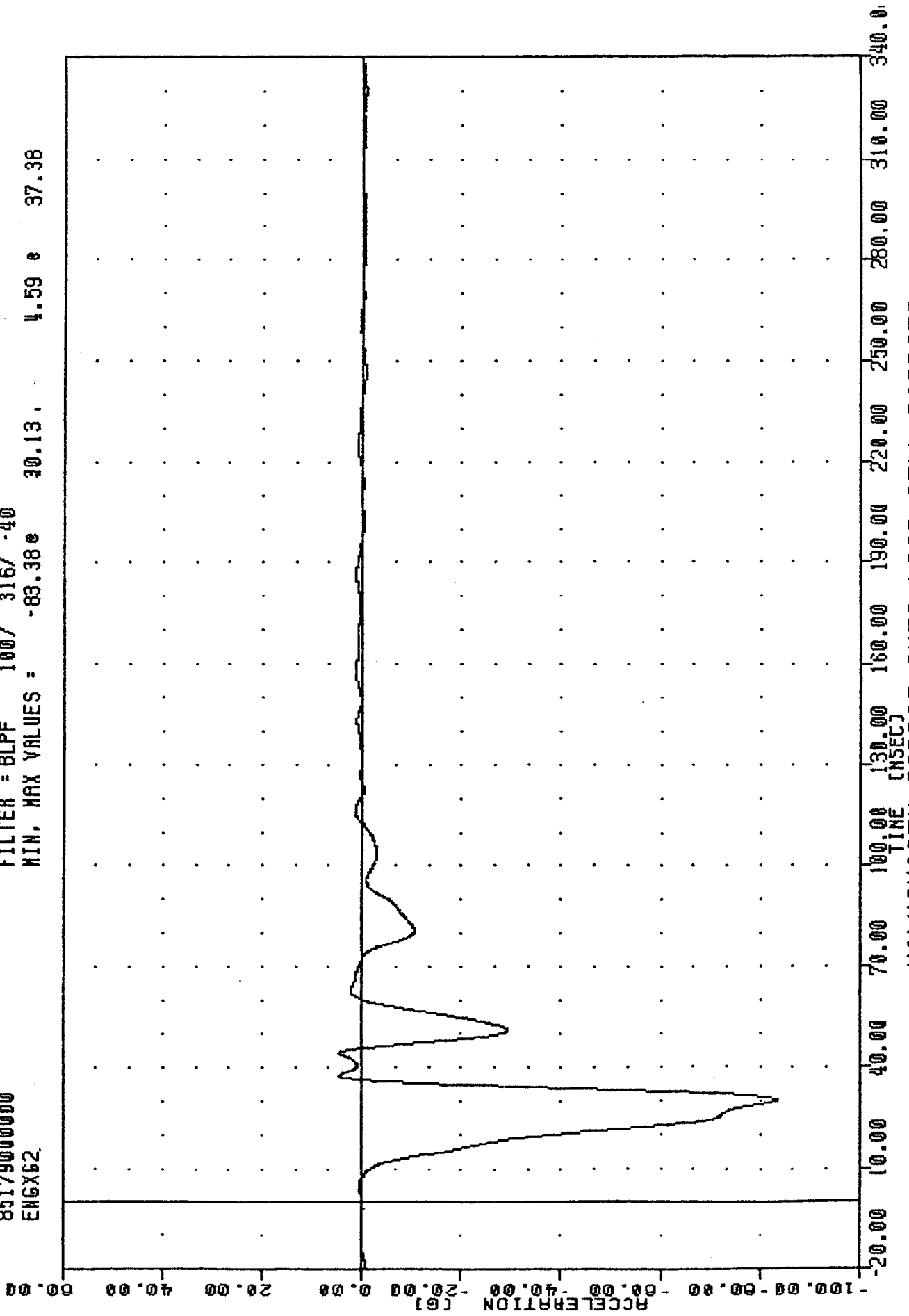


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
RIGHT BRAKE CALIPER ACCELERATION X AXIS

VHT
85179000000
RABBIT INTO FIXED LCB
ENGX52

PLUT DATE 3-JUL-80 10:09:42

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -83.38e 30.13. 4.59 e 37.38

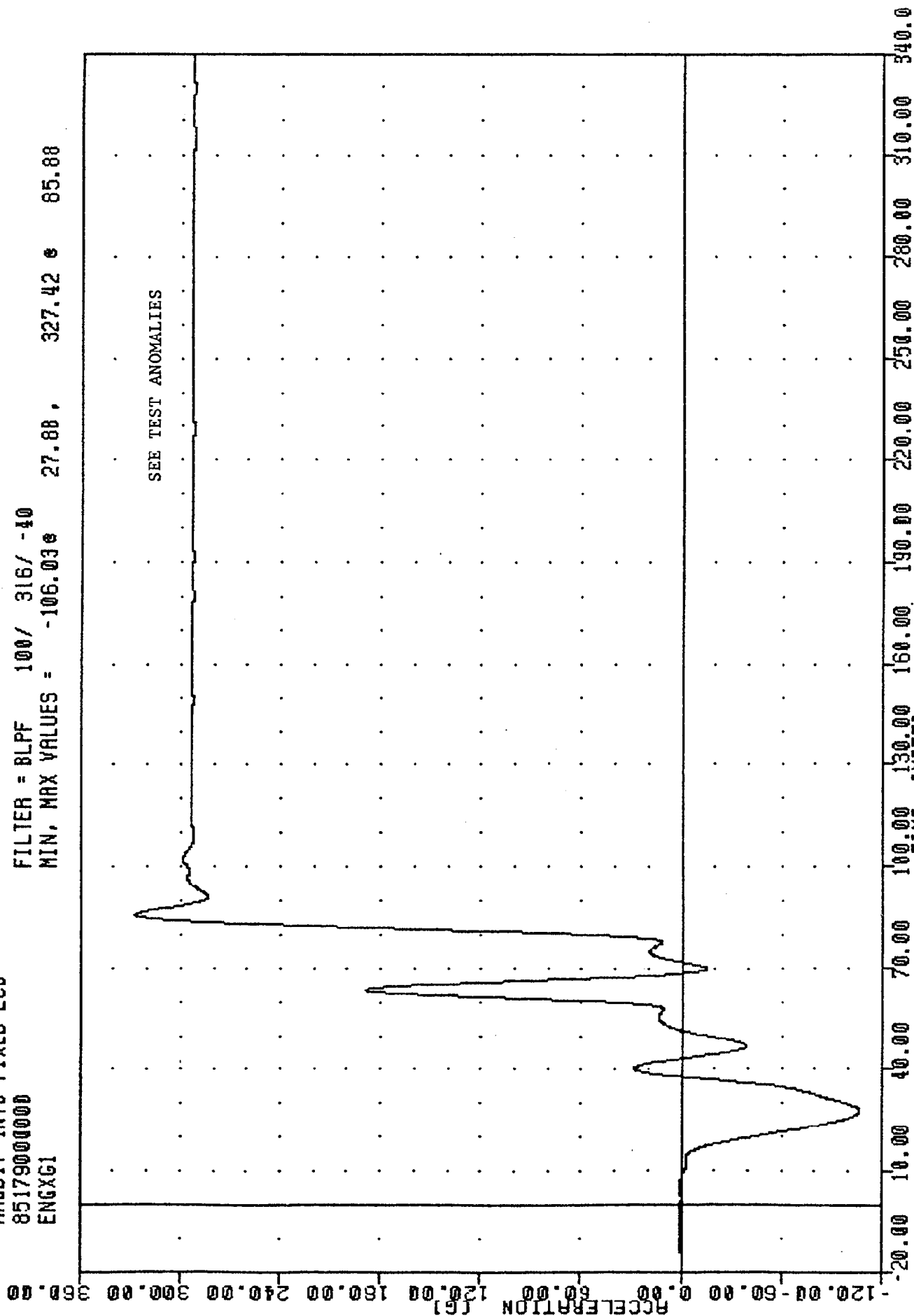


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
ENGINE BLOCK LOWER ACCELERATION X AXIS

VHT
850628
RABBIT INTO FIXED LCB
85179000000
ENGXG1

PLUT DATE 3-JUL-85 10:09:42

FILTER = 8LPF 100/ 316/ -40
MIN, MAX VALUES = -106.03e 27.88, 327.42 e 85.88



VHT
85179000000
RABBIT INTO FIXED LCB
SCAP6

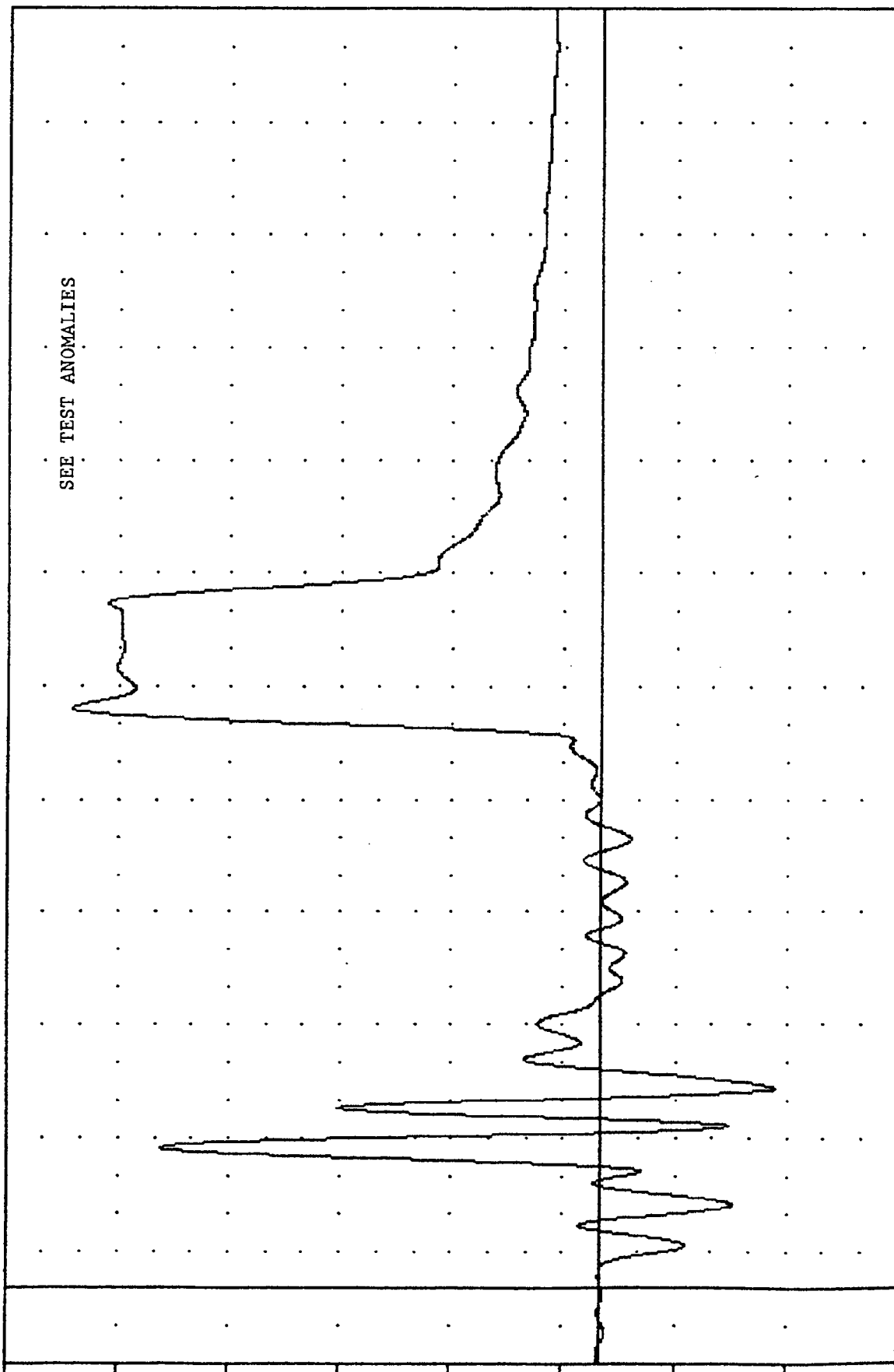
PLUT DATE

3-JUL-85

10:09:42

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -46.80 53.25 142.75 154.13

ACCELERATION (G)

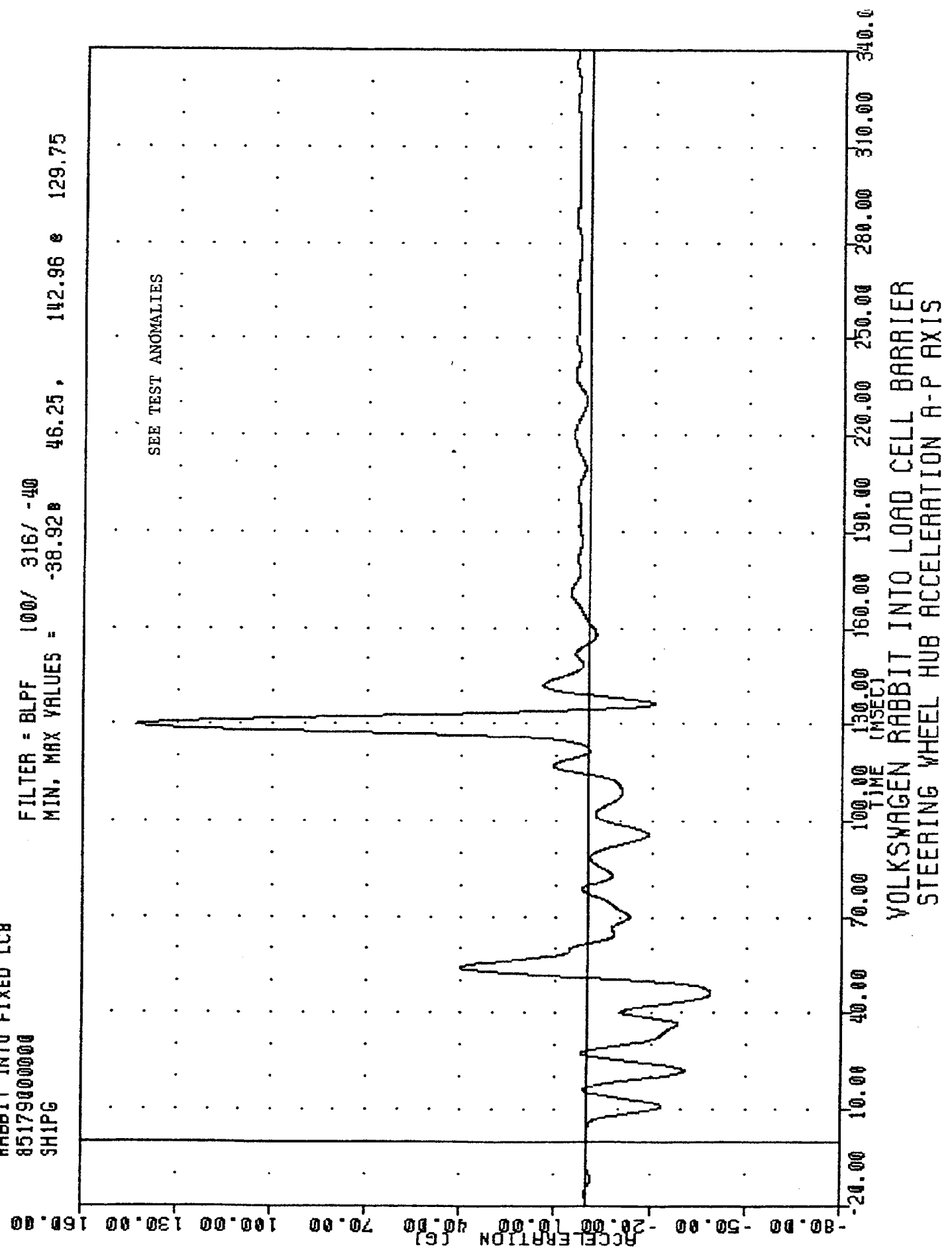


20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

TIME (msec)

VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
STEERING COLUMN ACCELERATION A-P AXIS

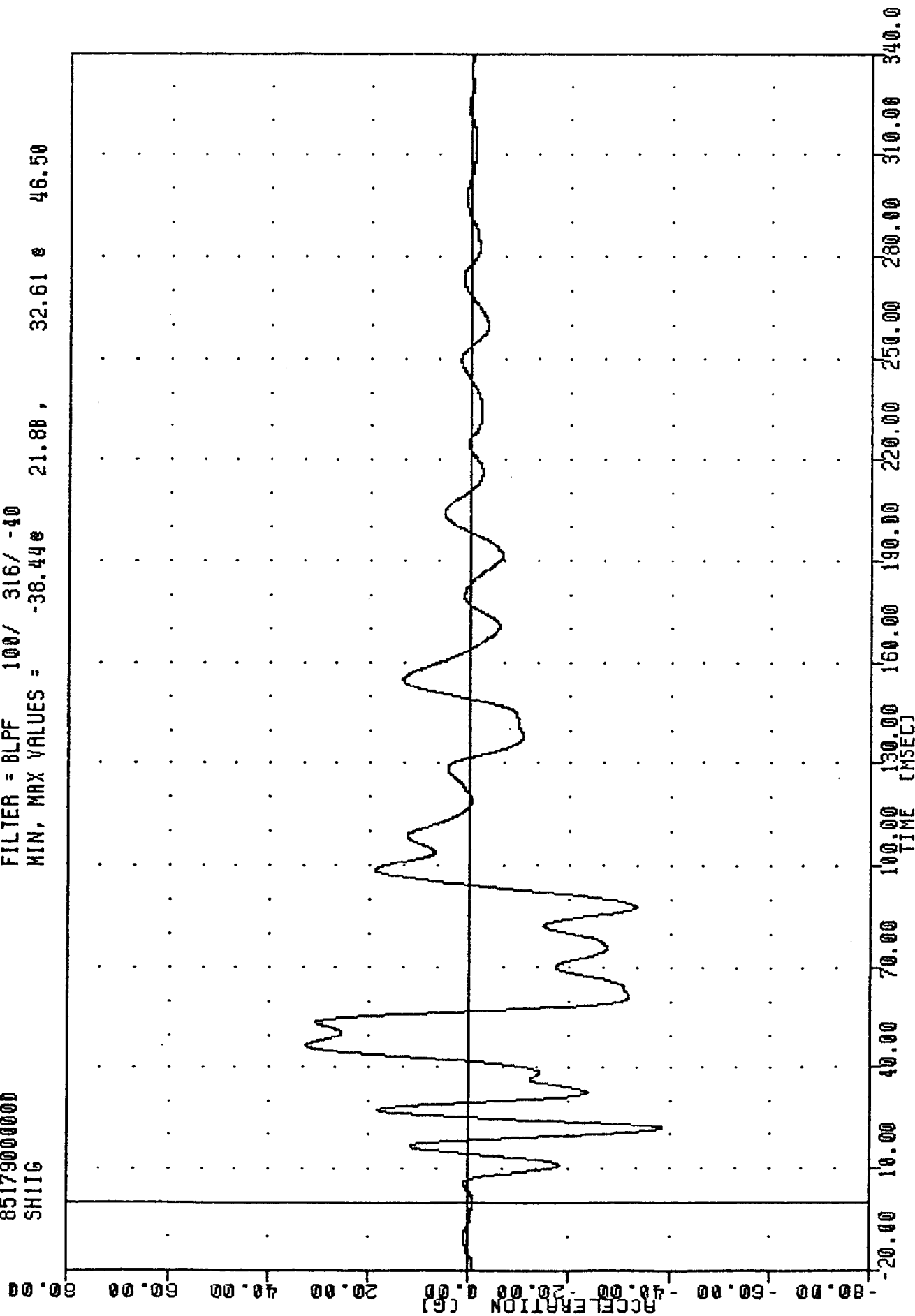
VNT 850628
 RABBIT INTO FIXED LCB
 85179000000
 3H1PG
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -38.92 46.25 142.96 129.75
 3-JUL-85 10:09:42



VNT 850620
RABBIT INTO FIXED LCB
85179000000
SH11G

PLOT DATE 5 JUL 83 10:09:42

FILTER = 8LPF 100/ 316/ -40
MIN, MAX VALUES = -38.44e 21.88, 32.61 e 46.50

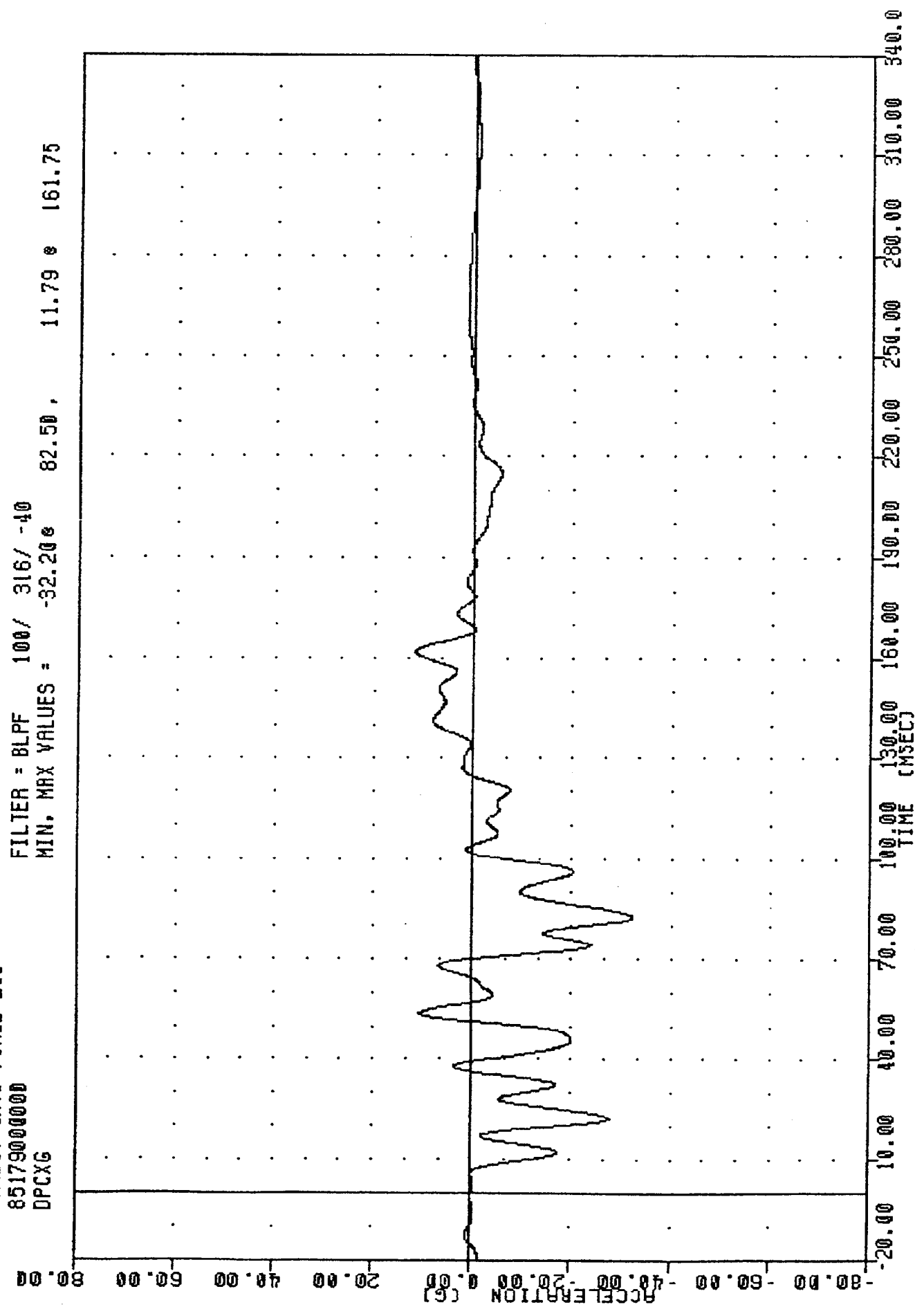


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
STEERING WHEEL HUB ACCELERATION I-S AXIS

VHT
RABBIT INTO FIXED LCB
85179000000
DPCXG

PLOT DATE 3-JUL-85 10:09:42

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -32.20 82.50 11.79 161.75

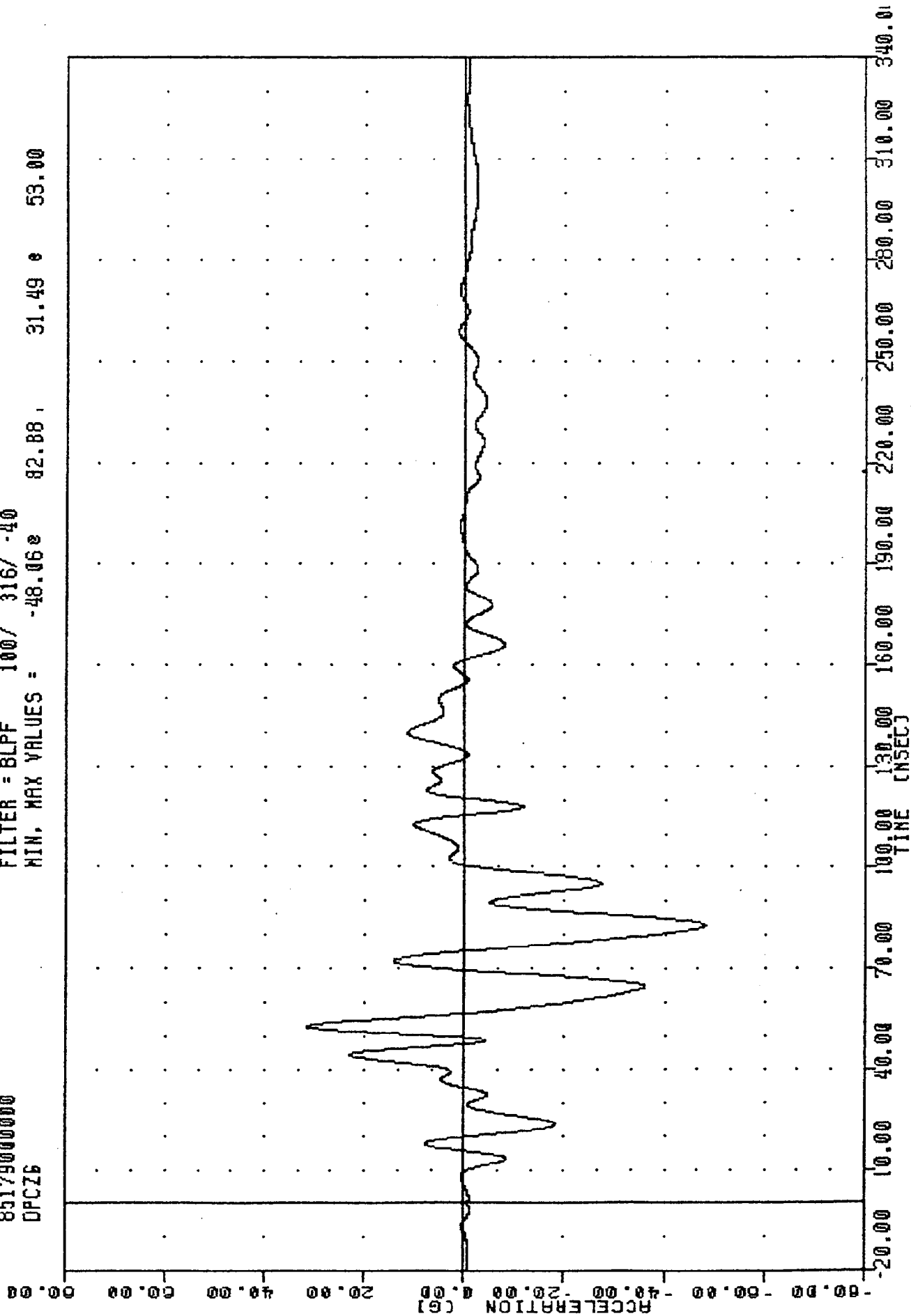


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
DASH PANEL CENTER ACCELERATION X AXIS

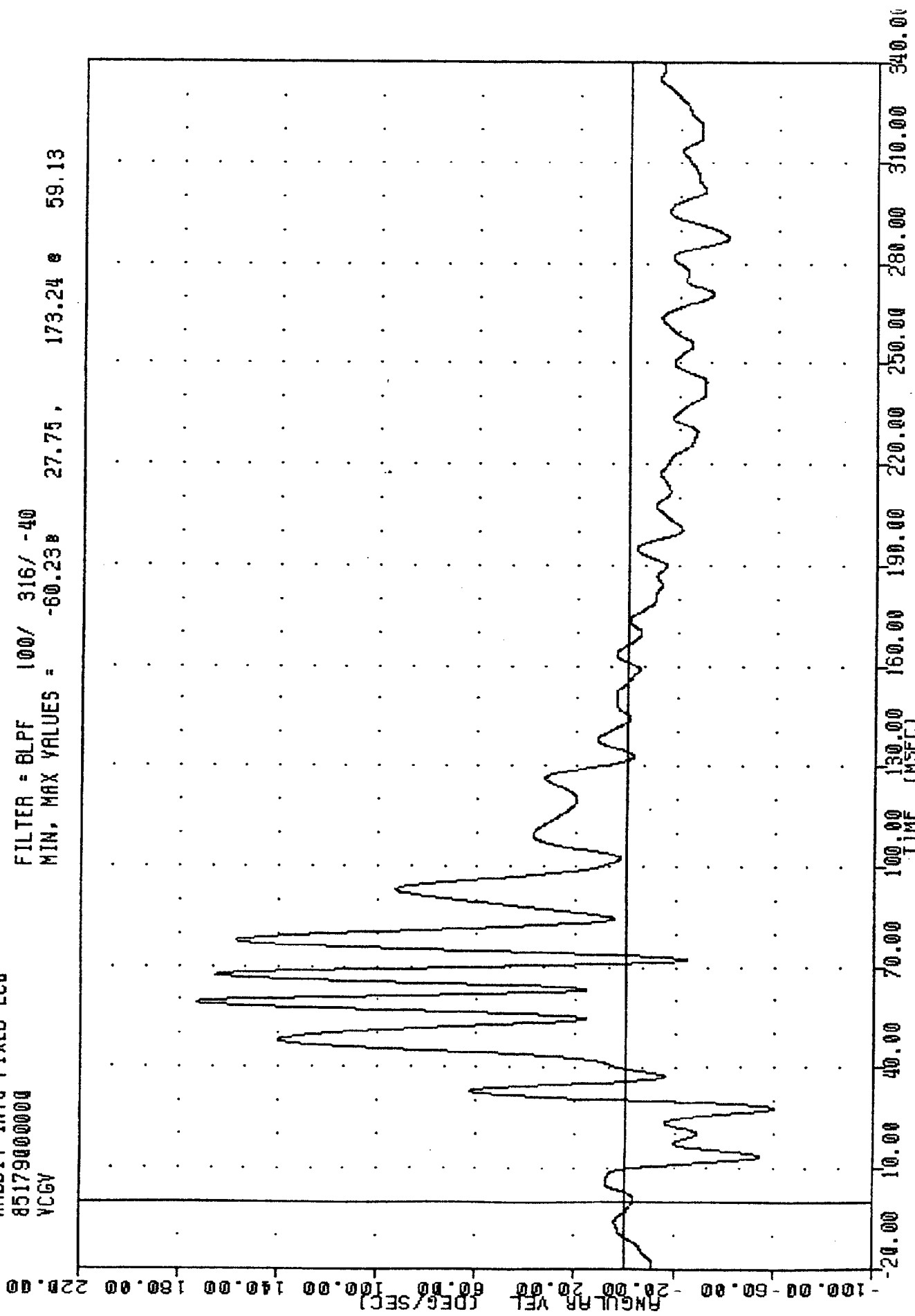
VHT
85179000000
DPCZS
RABBIT INTO FIXED LCB

PLUT DATE 3-JUL-85 10:09:42

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -48.06 82.88 31.49 53.00

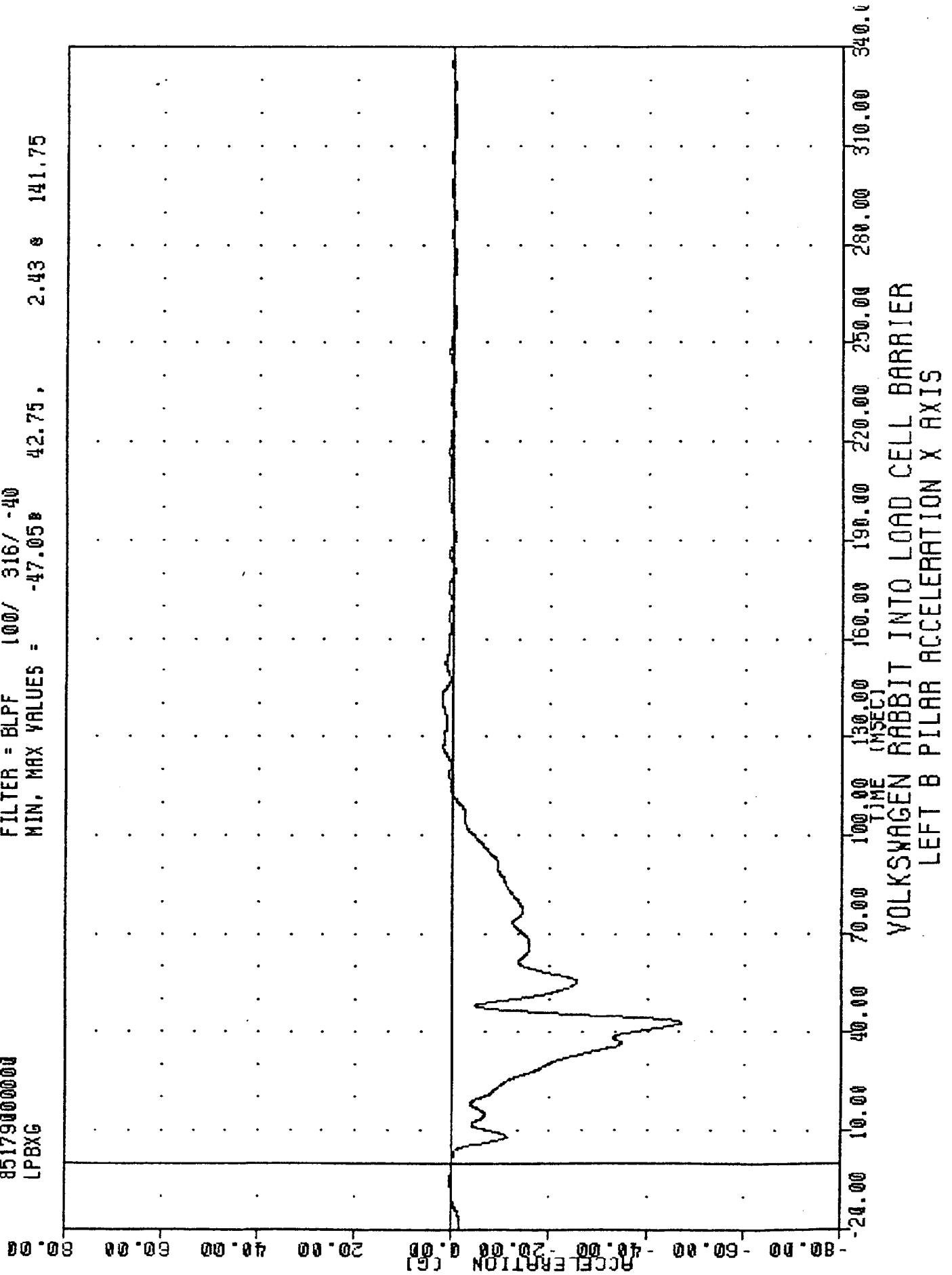


VHT 0620
 RABBIT INTO FIXED LCB
 85179000000
 VCGV
 PEUT DATE 20 JUL 80 07:09:21
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -60.23 27.75, 173.24 59.13



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 VEHICLE PITCH RATE DEGREES/SECOND

85179000000
 LPBXC
 RABBIT INTO FIXED LCB
 850620
 3-JUL-83 10:09:42
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -47.05 42.75, 2.43 141.75



VHT 030620
 RABBIT INTO FIXED LCB
 85179000000
 LPBX

PLUT DATE 3-JUL-83 10:21:53

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -32.42 108.00, 0.00 0.00

20.00

10.00

0.00

-10.00

-20.00

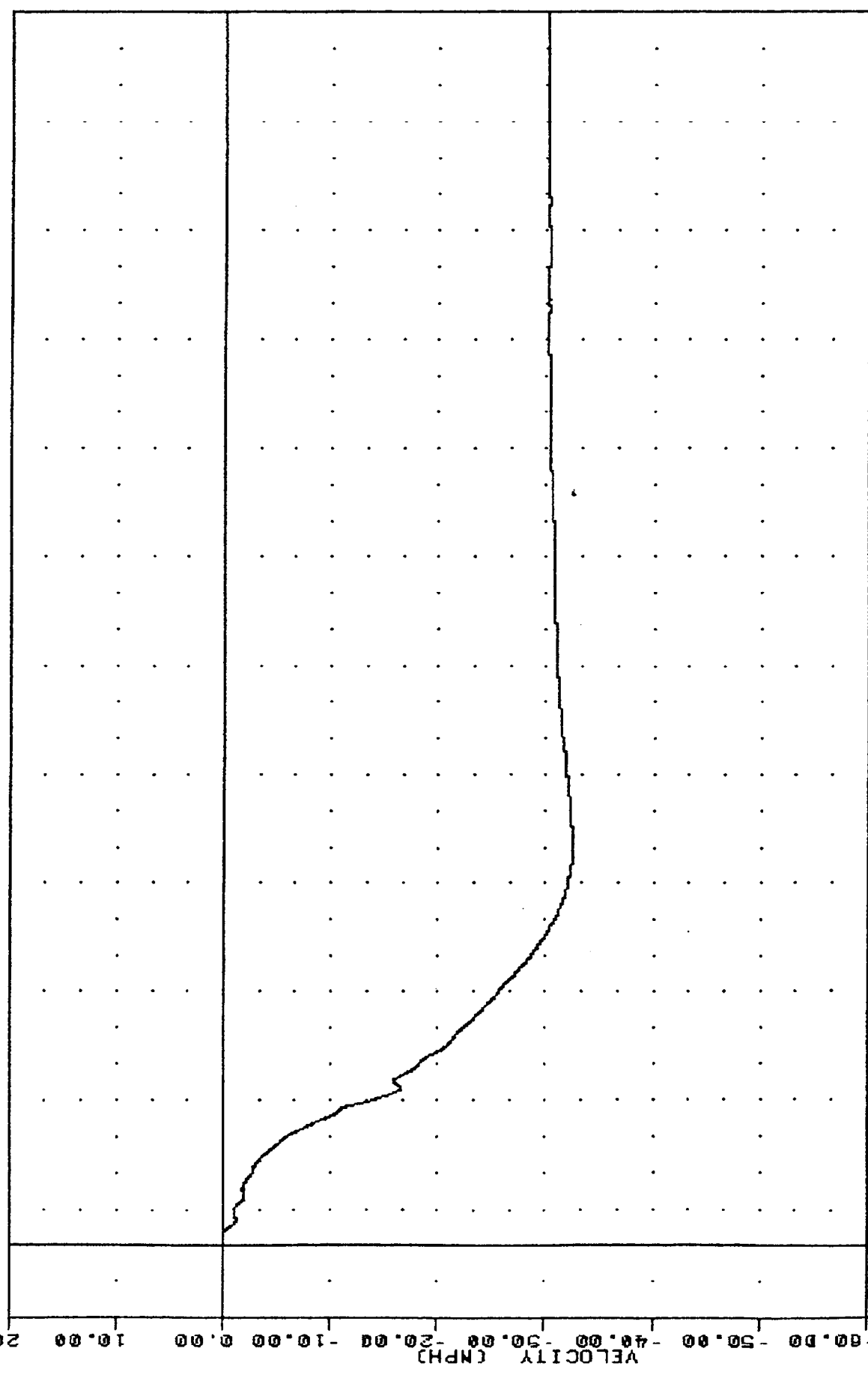
-30.00

-40.00

-50.00

-60.00

18-8

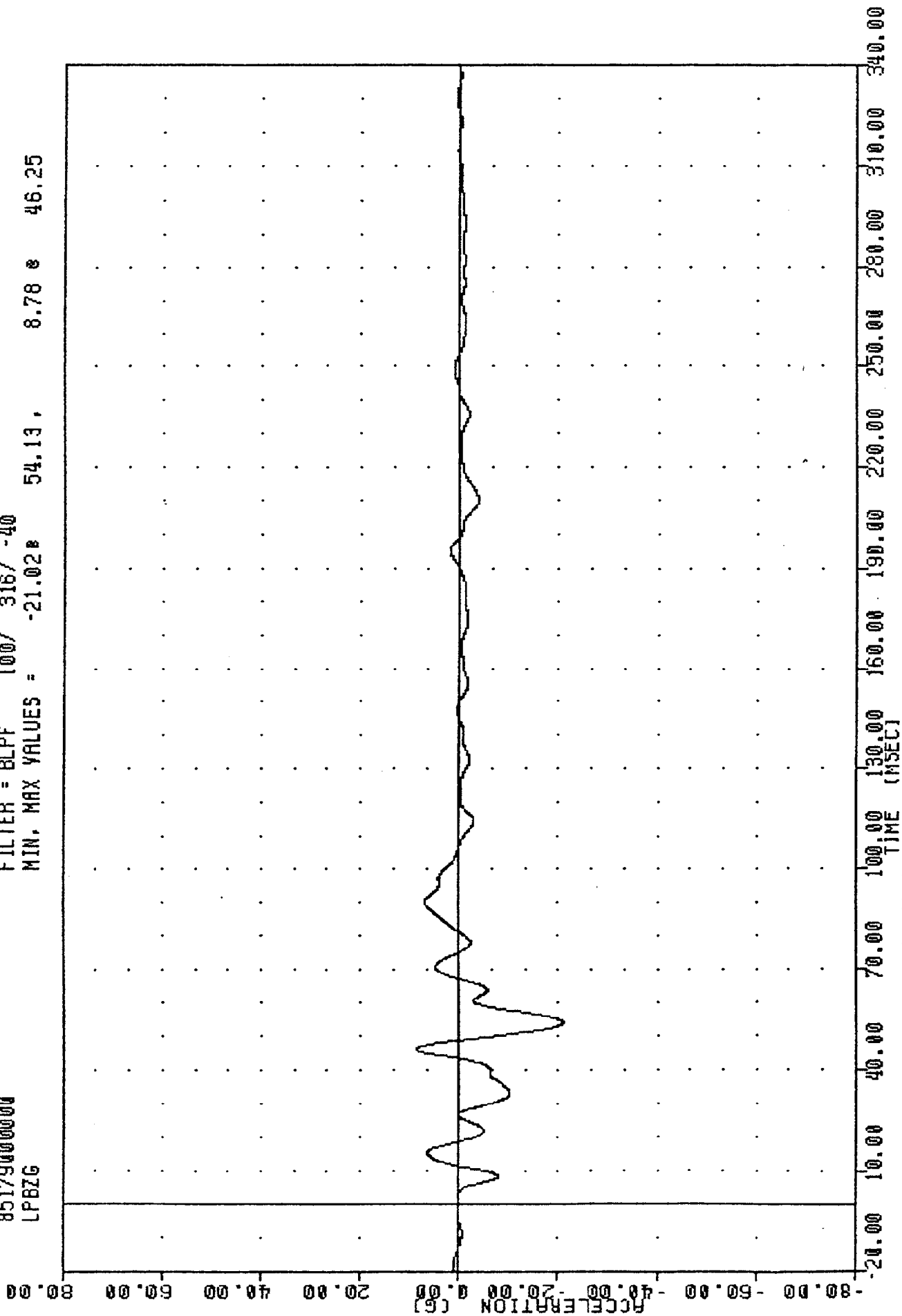


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME INSEC
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 DELTA V USING LPBXG

VR 628
RABBIT INTO FIXED LCB
85179000000
LPBZG

PLC DATE 19 8 10 23:18

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -21.02 54.13, 8.78 46.25



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
LEFT B PILLAR ACCELERATION Z AXIS

INTEGRAL 850620 3-JUL-85 10:09:42

RABBIT INTO FIXED LCB

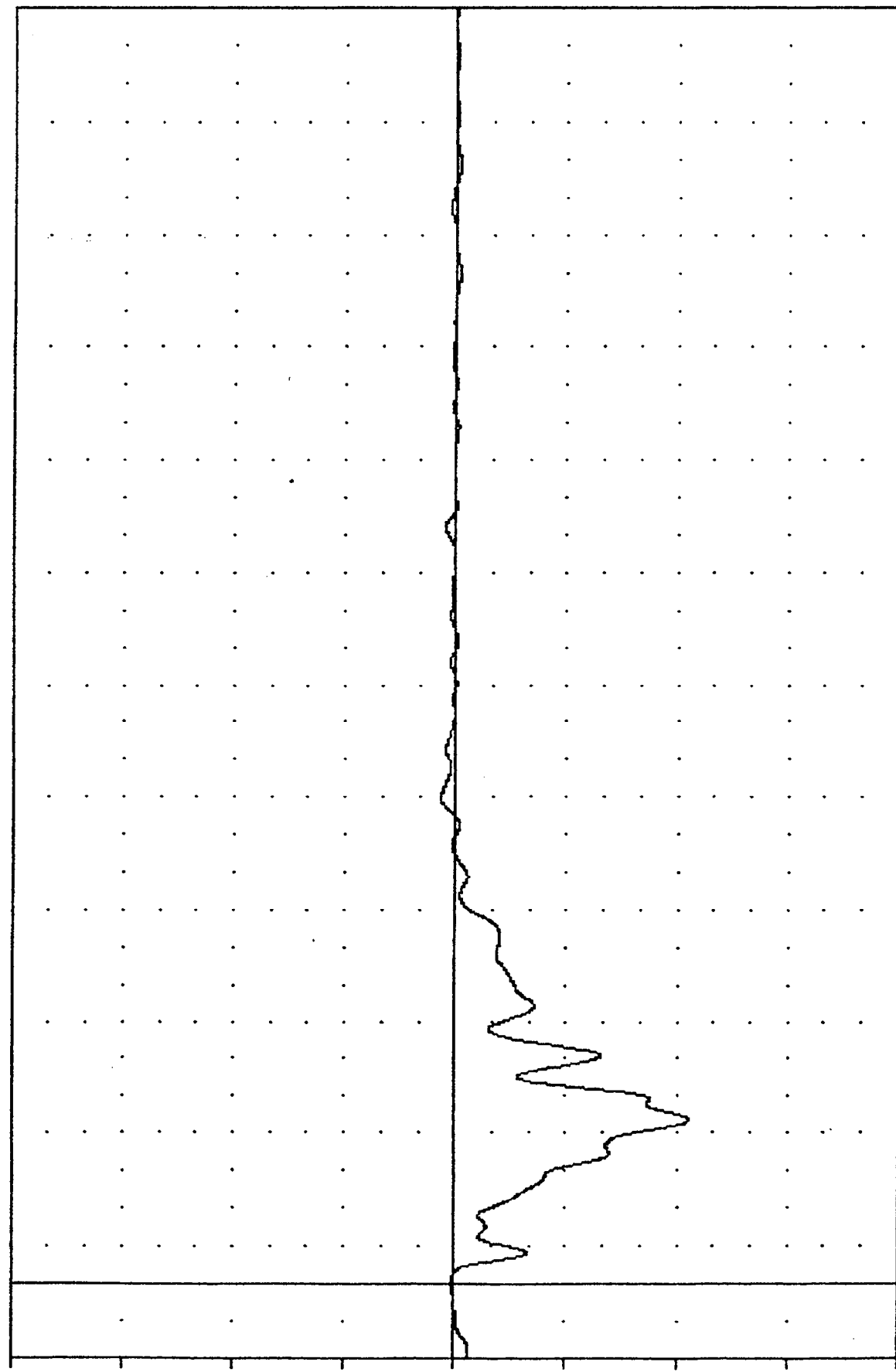
851790000000

APBXG

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -42.37 43.50, 2.62 129.88

ACCELERATION (G)



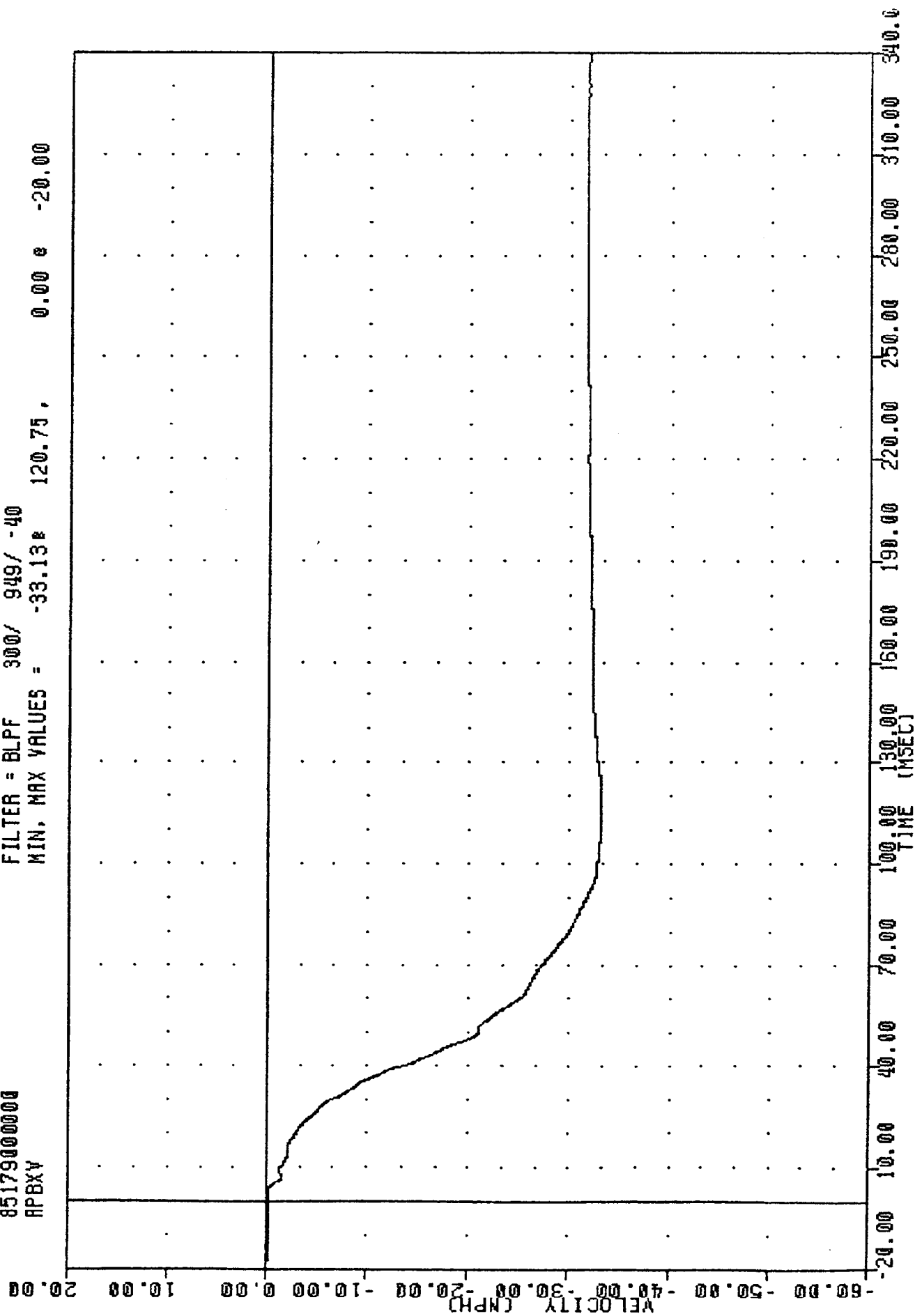
TIME (MSEC)

VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
RIGHT B PILLAR ACCELERATION X AXIS

[REDACTED]
 [REDACTED], 050620
 RABBIT INTO FIXED LCB
 8517900000
 APBXV

PLUT DATE 3-JUL-83 10:21:55

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -33.13 120.75, 0.00 0 -20.00



YHT 850620 3-JUL-85 10:09:42

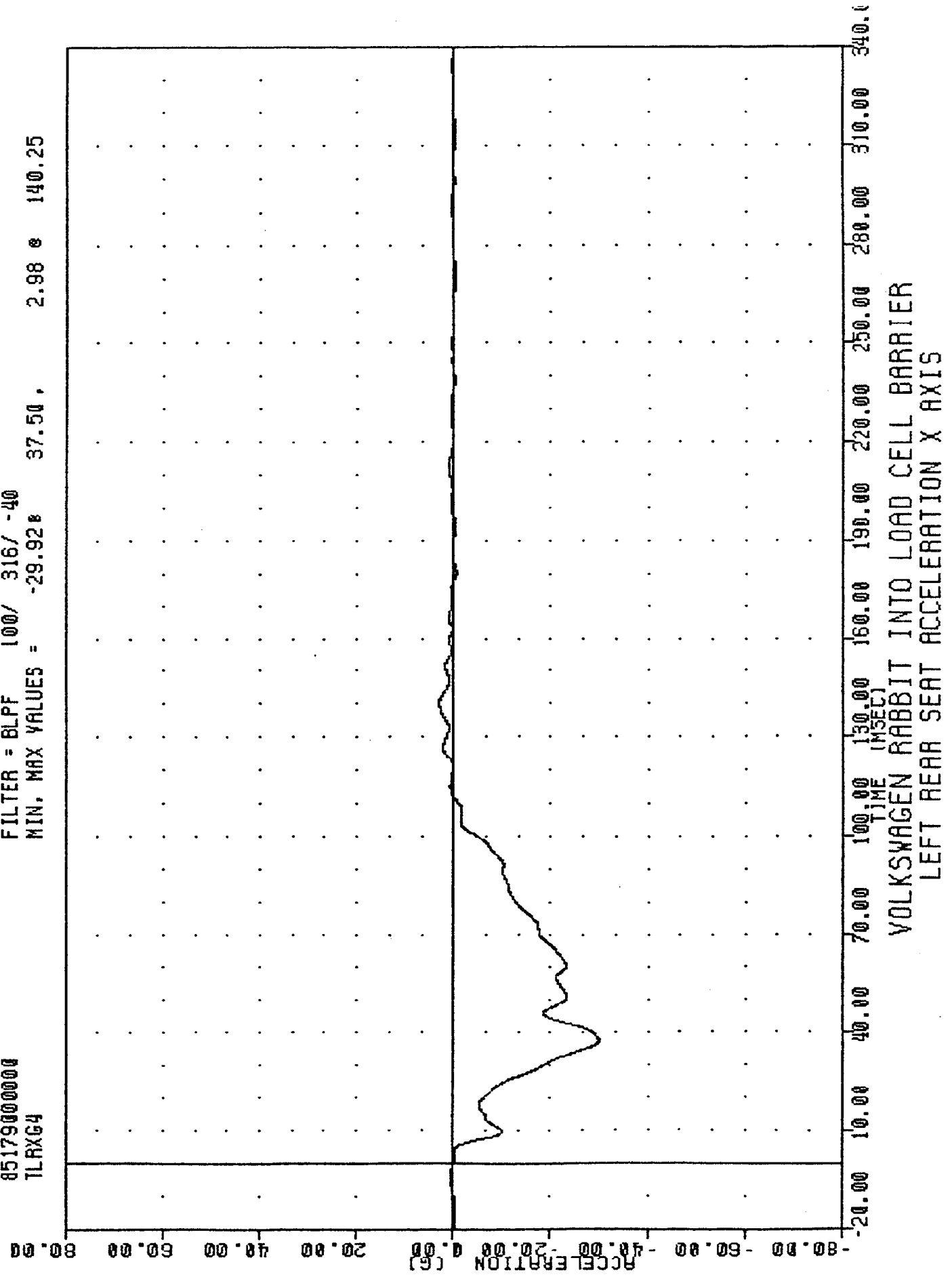
RABBIT INTO FIXED LCB

85179000000

TLRXG4

FILTER = BLPF 100/ 316/ -40

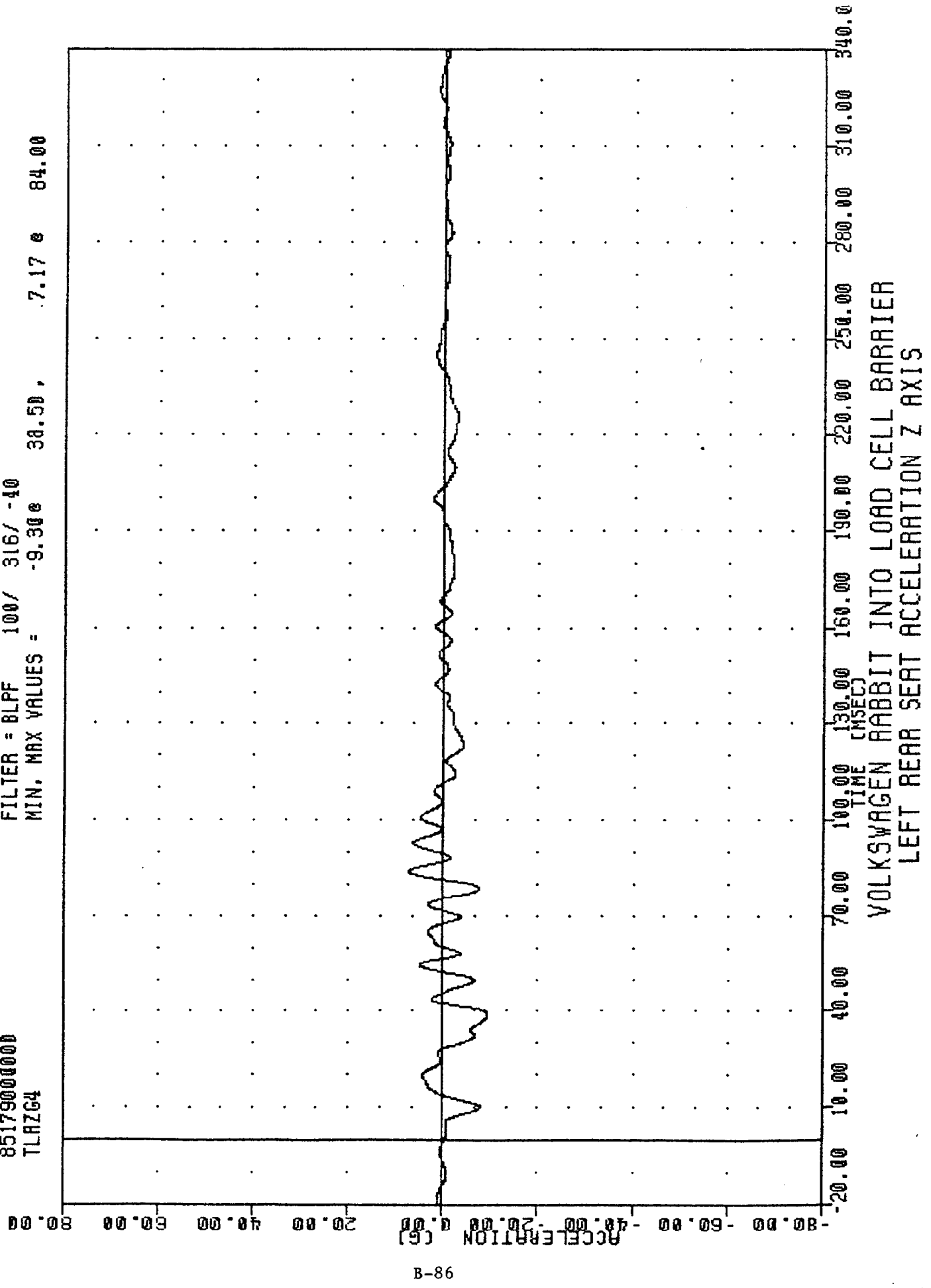
MIN, MAX VALUES = -29.92% 37.50, 2.98 @ 140.25



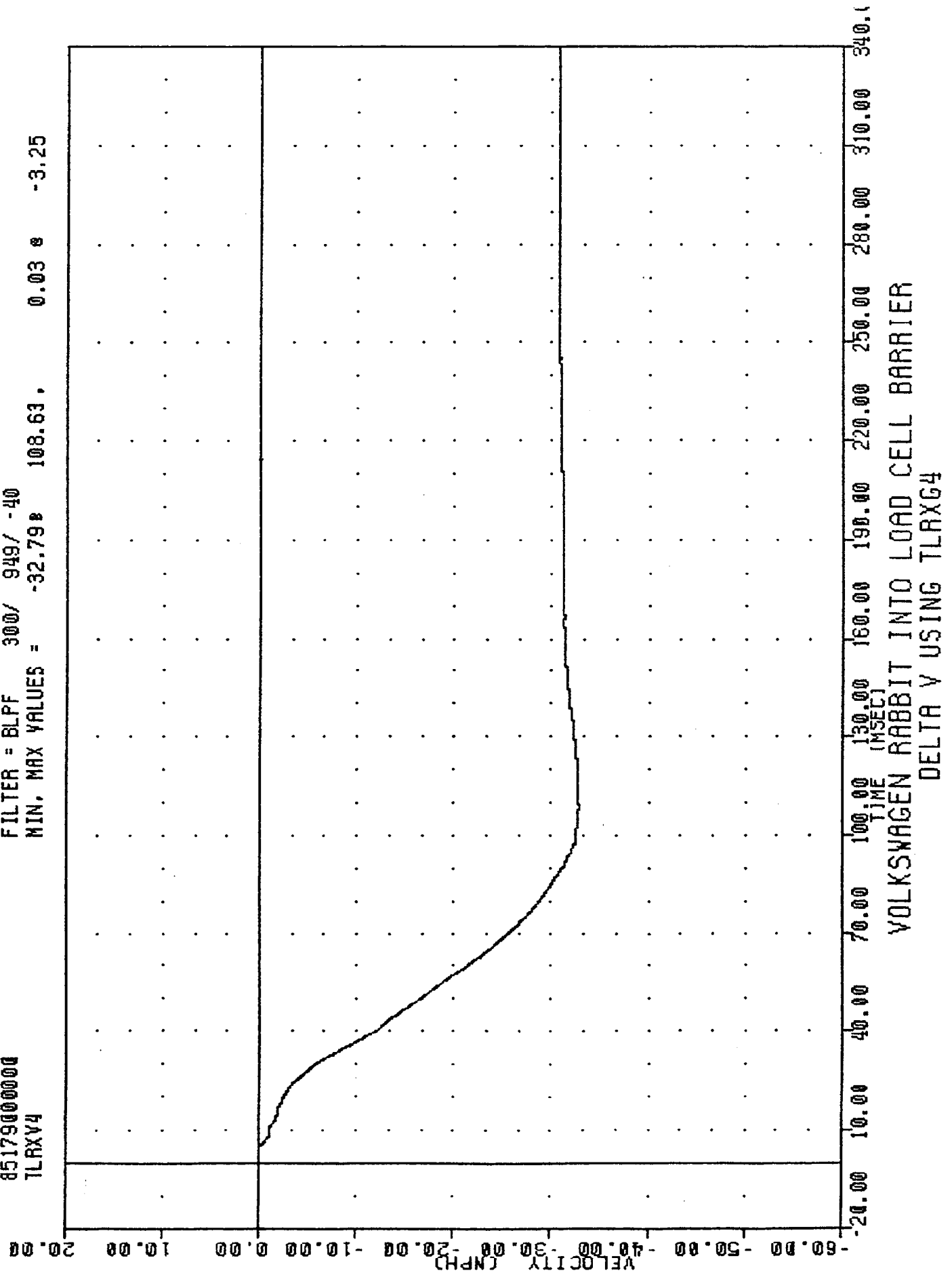
VNT
RABBIT INTO FIXED LCB
85179000000
TLAZG4

PLUT DATE 3-JUL-85 10:09:42

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -9.30e 38.50, 7.17 e 84.00



VNT 850628 3-JUL-85 10:21:55
 RABBIT INTO FIXED LCB
 85179000000
 TLRXV4
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -32.79 108.63, 0.03 -3.25



VHT
85179000000
TLRX6D

RABBIT INTO FIXED LCB

PLUT DATE

3-JUL-85

10:09:42

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -31.16e 37.13, 2.81 e 138.50

ACCELERATION (G)

60.00

50.00

40.00

20.00

0.00

-20.00

-40.00

-60.00

-80.00

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

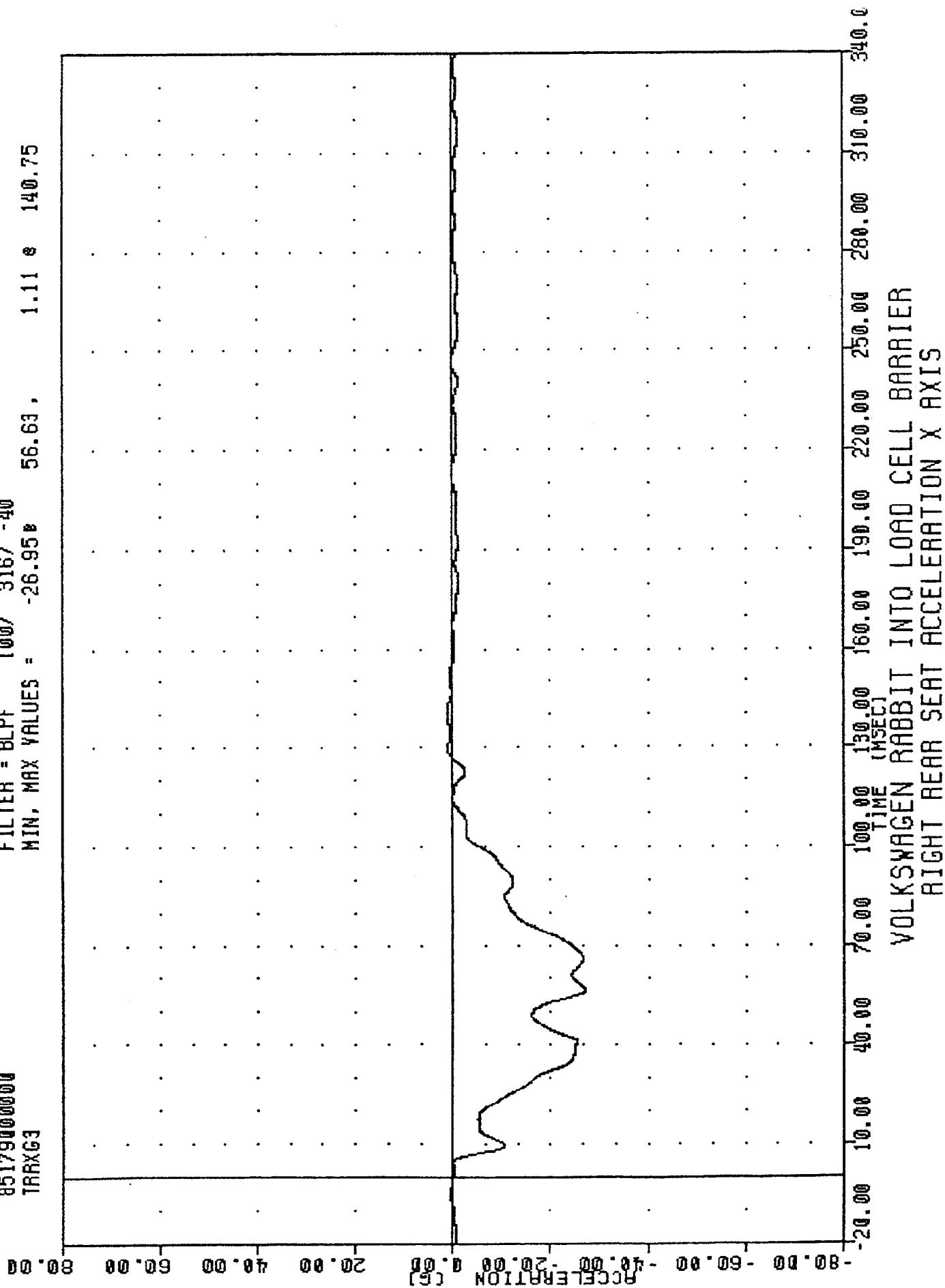
340.00

VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
LEFT REAR SEAT ACCELERATION #2 X AXIS

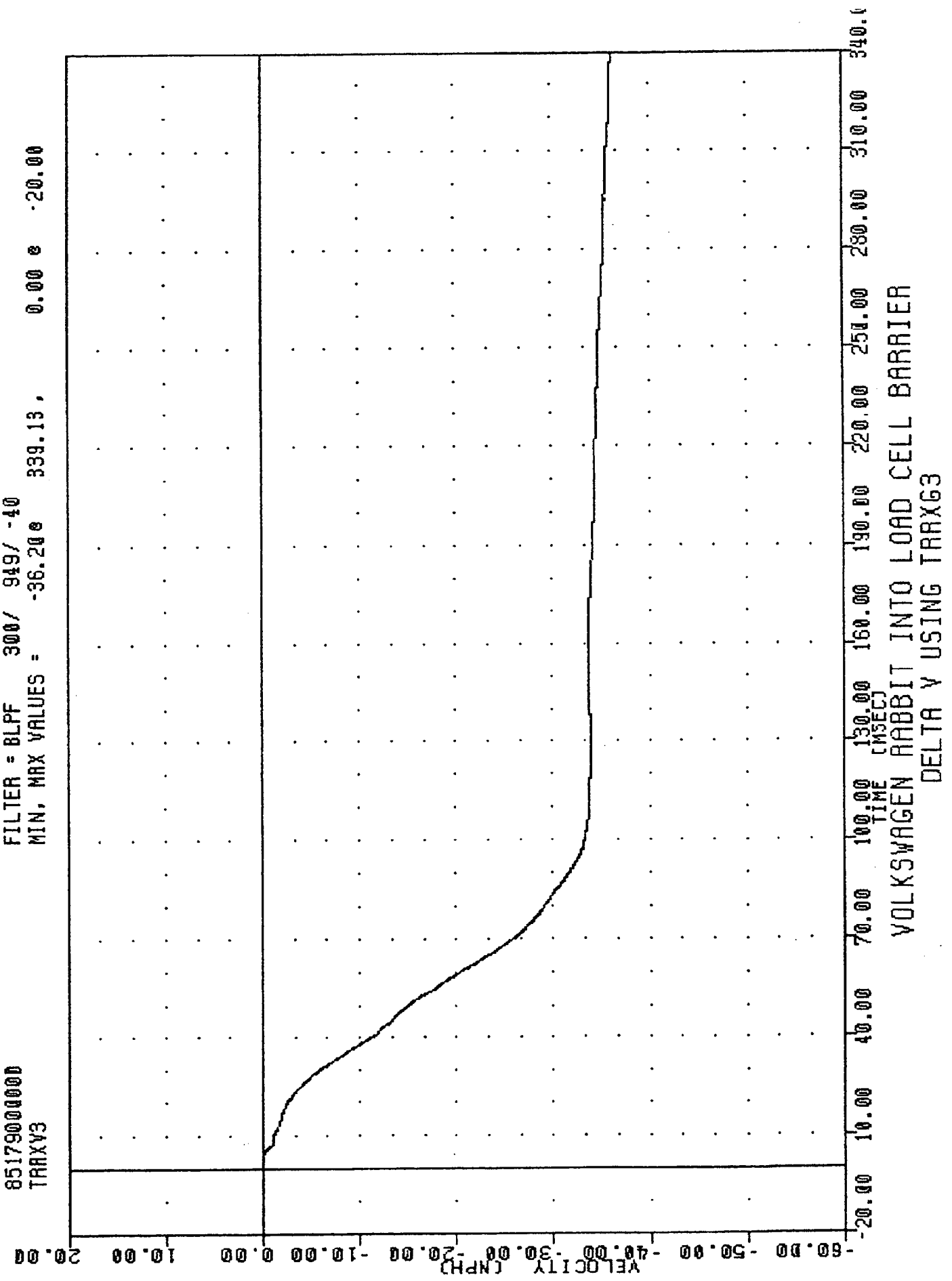
VRT
850628
RABBIT INTO FIXED LCB
85179000000
TRXG3

PLOT DATE 3-JUL-85 10:09:42

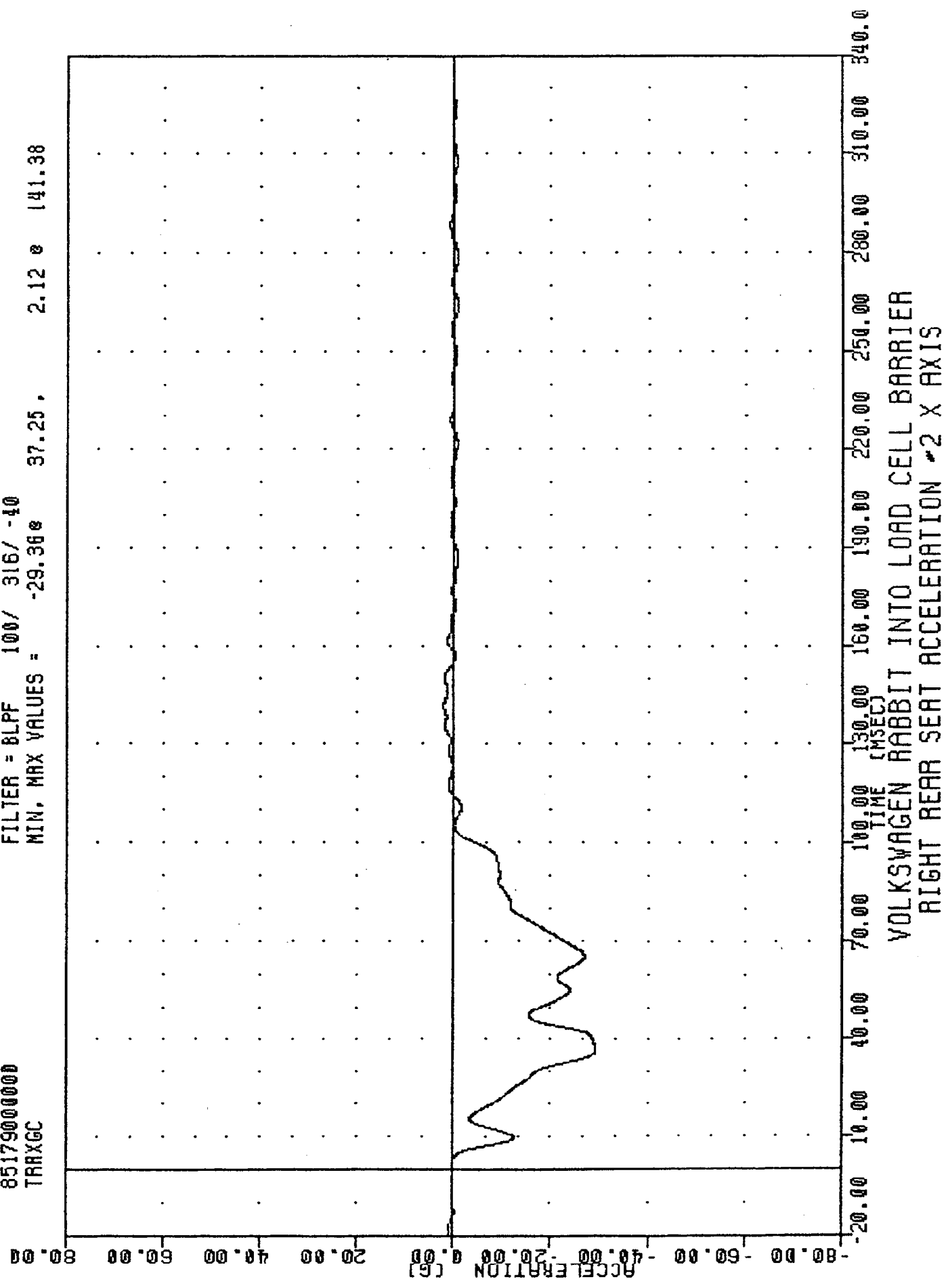
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -26.95 56.63, 1.11 140.75



VHT 030620
 RABBIT INTO FIXED LCB
 85179000000
 TRAXV3
 PLOT DATE 3 JUL 83 10:21:53
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -36.200 339.13, 0.00 0 -20.00



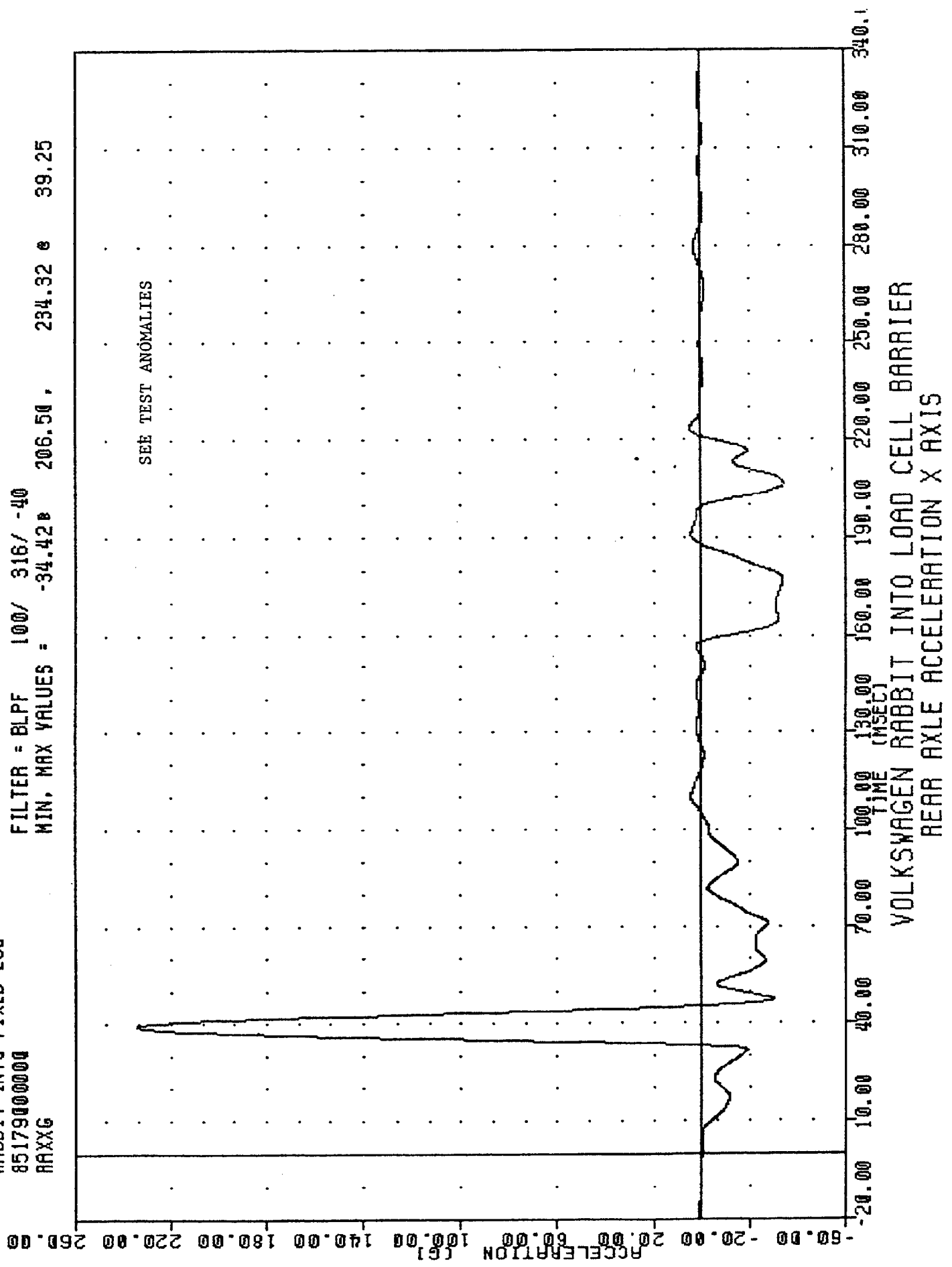
VRT 050620
 RABBIT INTO FIXED LCB
 85179000000
 TRXGC
 FILTER = 8LPF 100/ 316/ -40
 MIN. MAX VALUES = -29.36 37.25, 2.12 141.38
 PLOT DATE 3 JUL 83 10:09:42



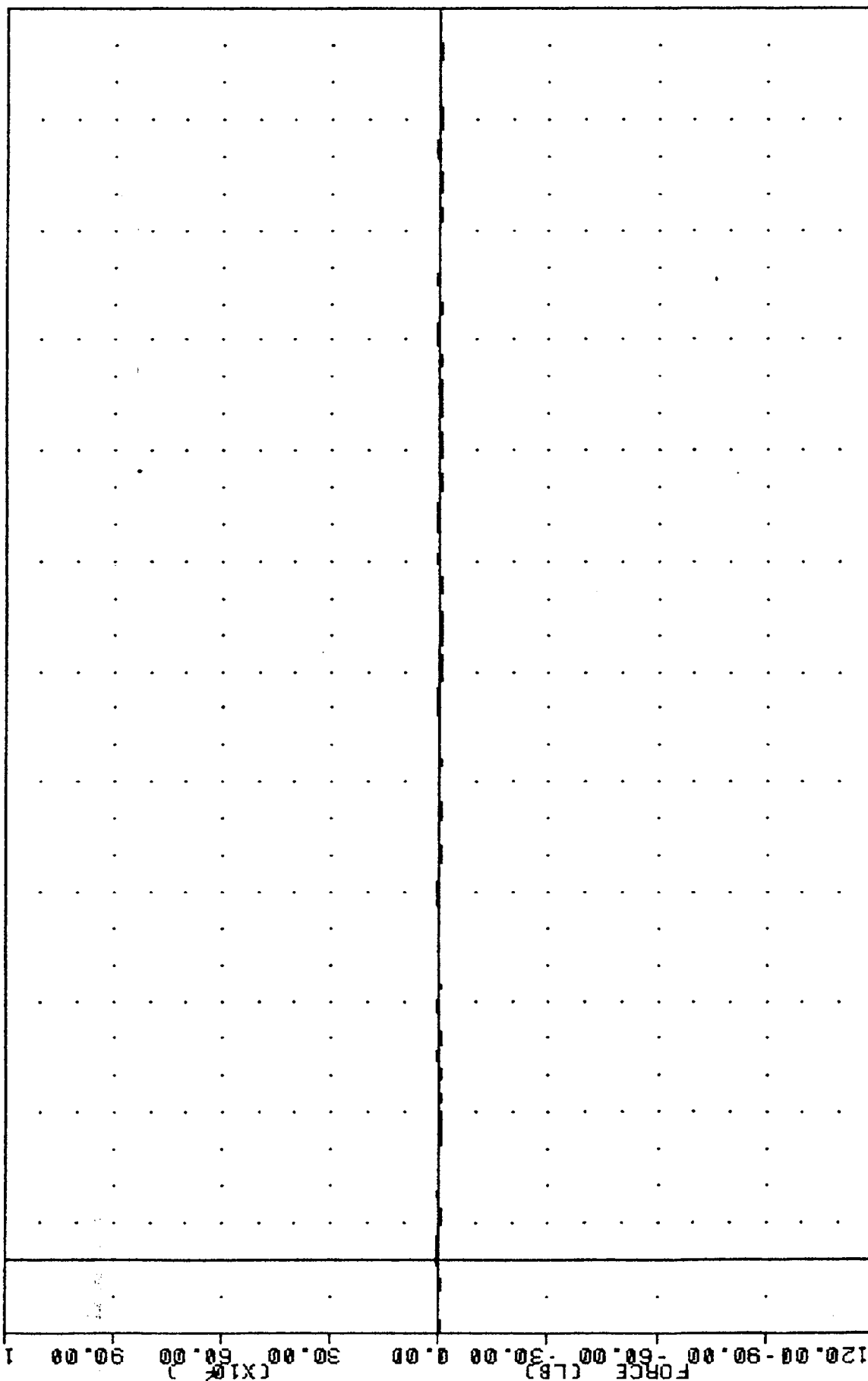
PRINT DATE 3 JUL 83 10:09:42

VHT 050620
RABBIT INTO FIXED LCB
85179000000
RAXXG

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -34.42 206.50 234.32 39.25

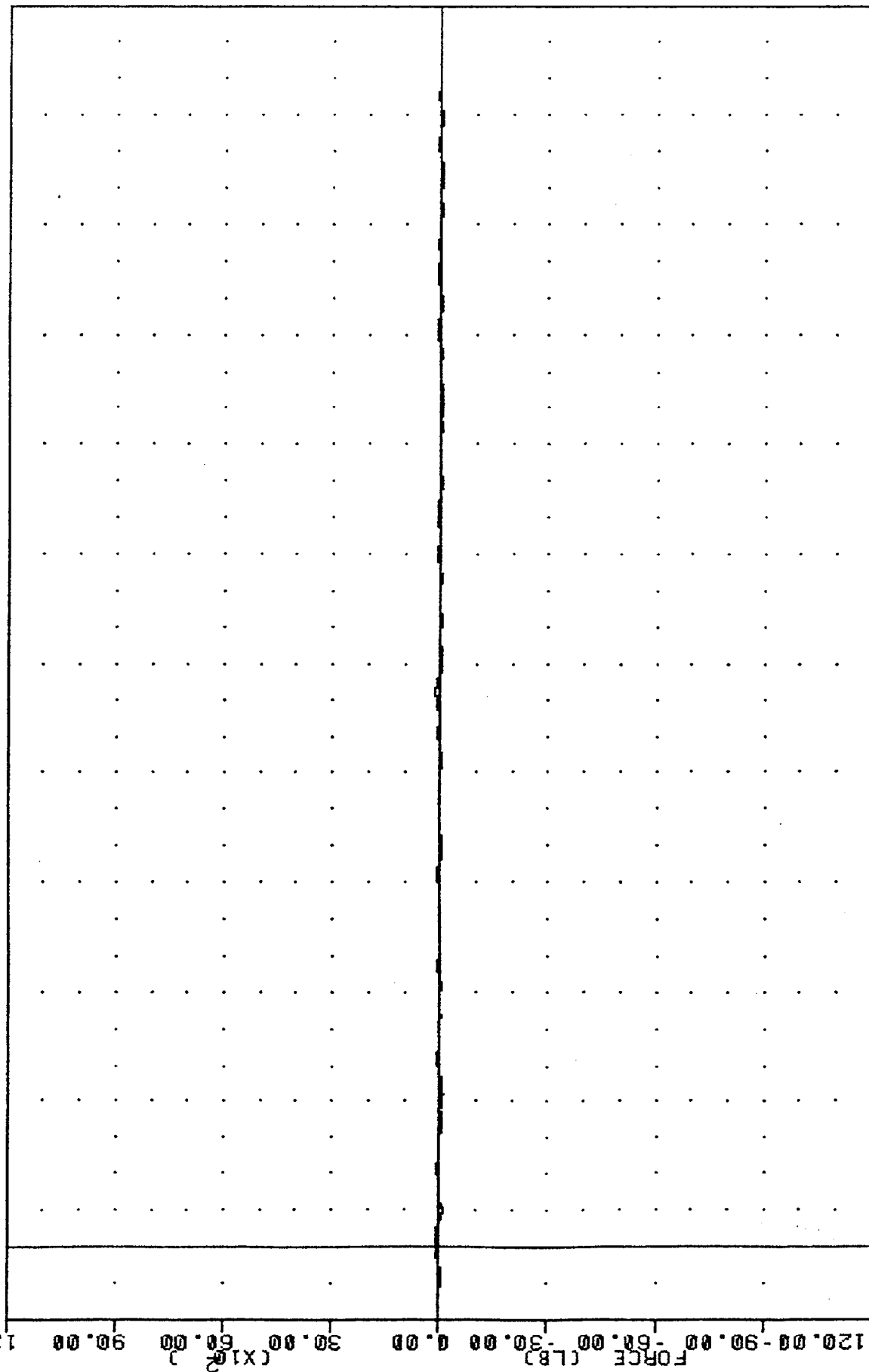


INT 850620 3 JUL 63 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 BA1F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -64.19 160.63, 86.20 202.25



-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)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A1 LBS

VRI 850628 3-JUL-83 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 BA2F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -85.81 9.88, 115.48 152.38



-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 (CMSEC)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A2 LBS

VMT
 7030620
 RABBIT INTO FIXED LCB
 85179000000
 BR3F

PLUT DATE 3 JUL 83 10:14:10

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -118.93 9.88, 132.60 21.13

120.00

90.00

60.00
 (X10³)

30.00

0.00

FORCE (LB)

-30.00

-60.00

-90.00

-120.00

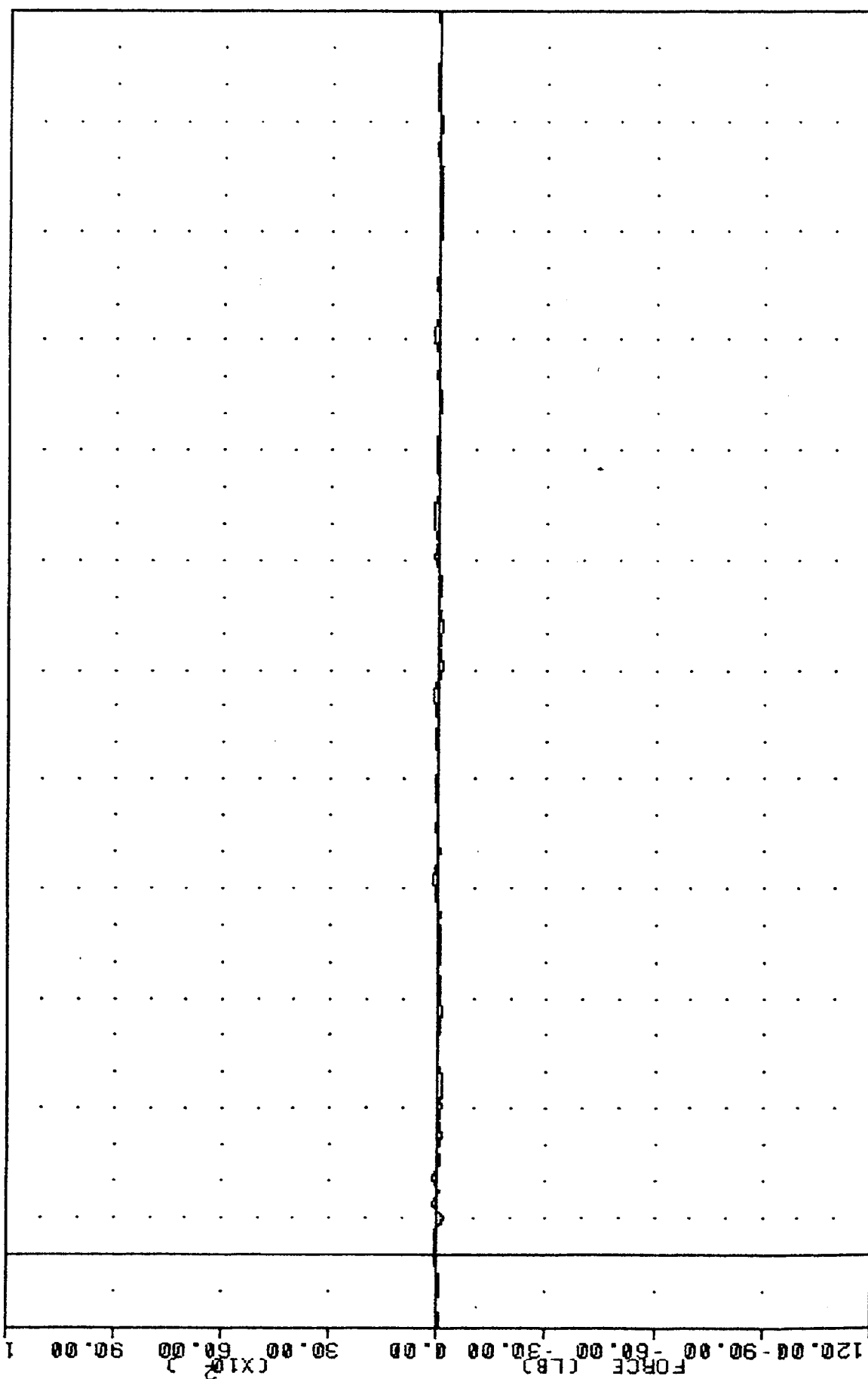
-20.00

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)

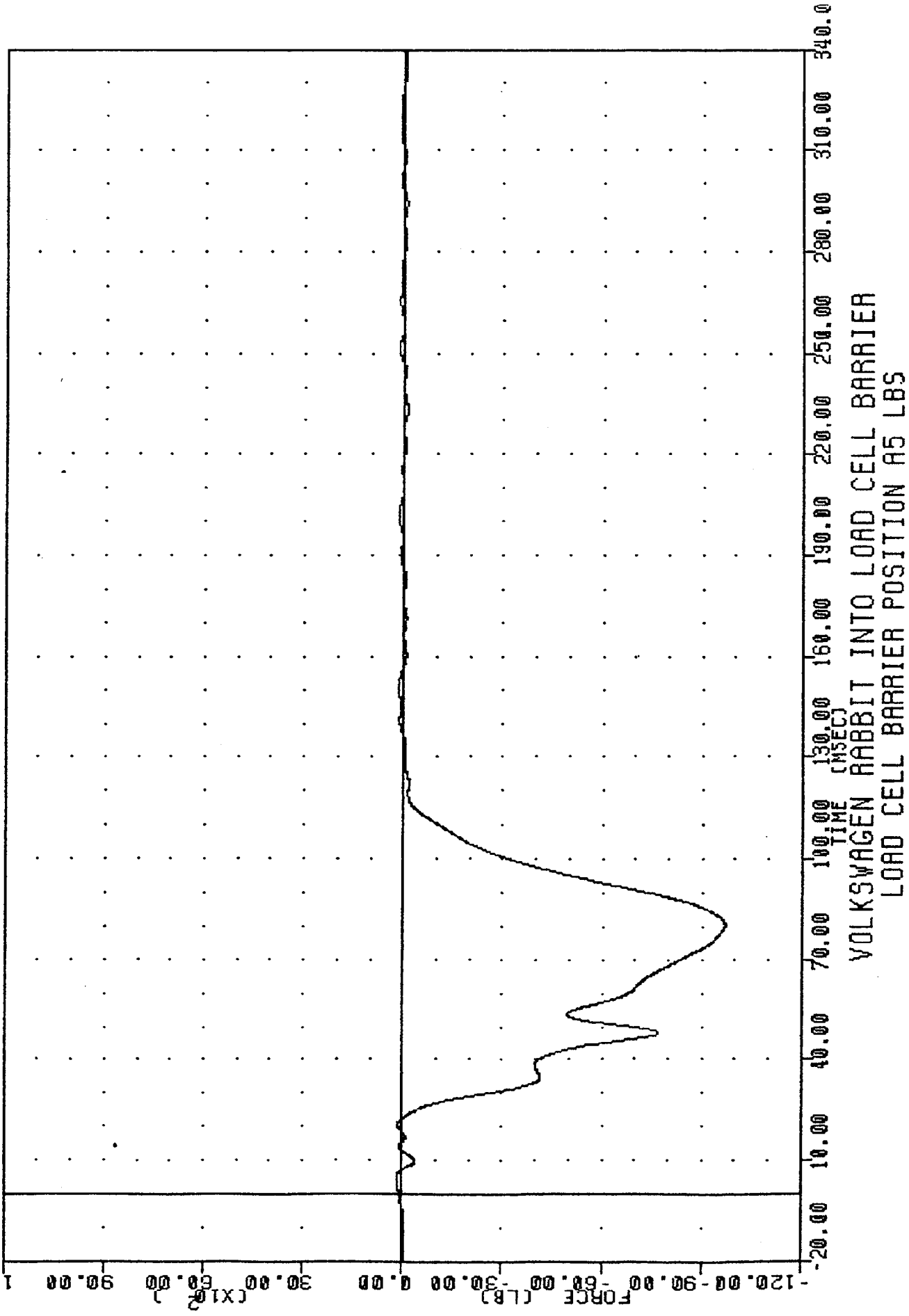
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A3 LBS

VRI
 85179000000
 RABBIT INTO FIXED LCB
 850628
 3-JUL-83
 10:14:10
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -159.30 10.00, 151.95 201.63



-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)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A4 LBS

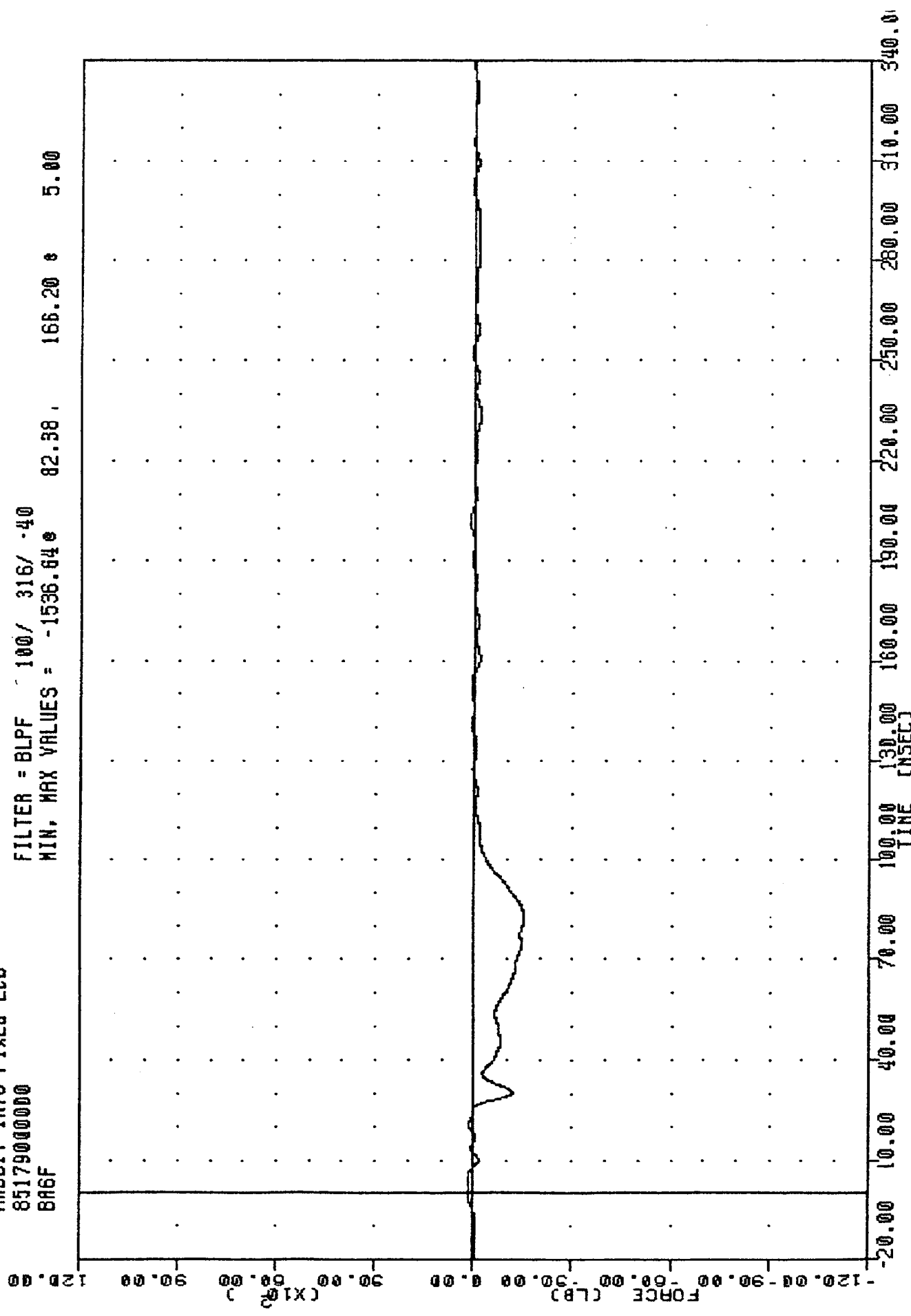
VNT 850620 3 JUL 83 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 8A5F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -9698.18e 80.50, 146.21 e 5.13



VHT
850628
RABBIT INTO FIXED LCB
85179000000
886F

PLUT DATE 3-JUL-85 10:14:10

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -1536.64 82.38 166.20 5.00

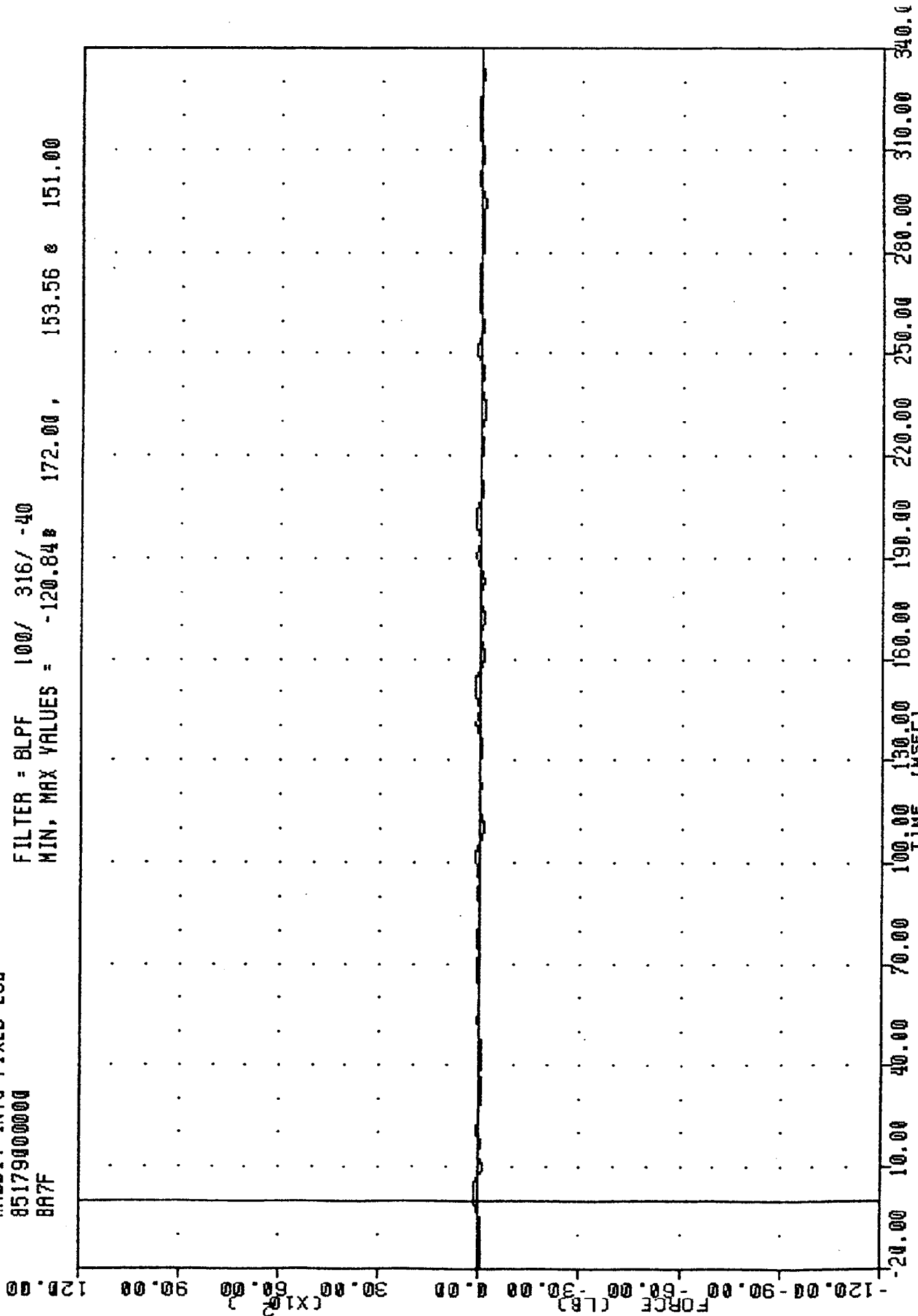


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A6 LBS

YRI
 85179000000
 RABBIT INTO FIXED LCB
 850628

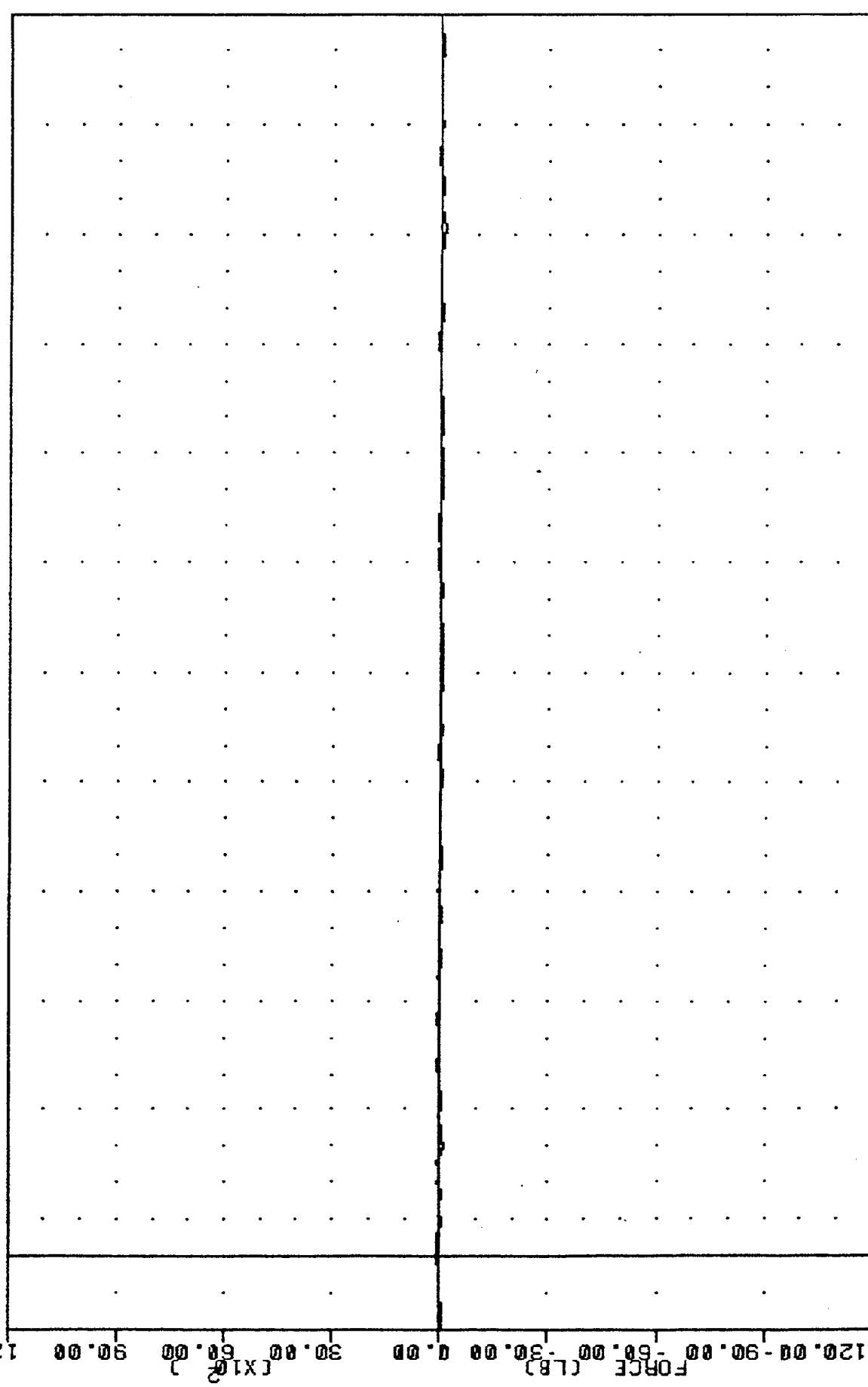
PLOT DATE 3-JUL-85 10:14:10

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -120.84 172.00 153.56 151.00



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A7 LBS

VRT
 850628
 RABBIT INTO FIXED LCB
 85179000000
 B88F
 PLUT DATE 3-JUL-85 10:14:10
 FILTER = 8LPF 100/ 316/ -40
 MIN, MAX VALUES = -92.25e 29.75, 87.36 e 199.75



-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)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A8 LBS

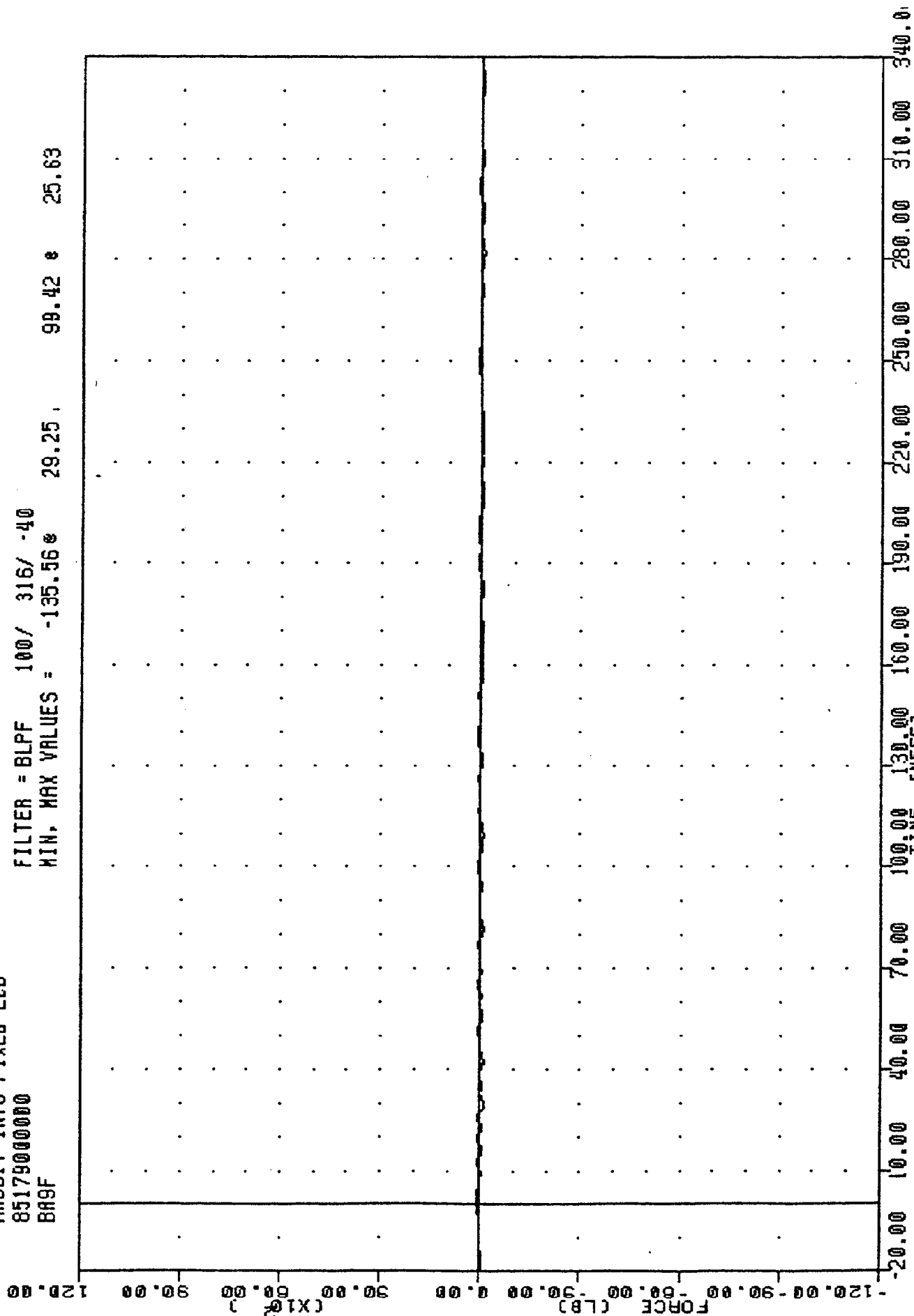
VH1
RABBIT INTO FIXED LCB
85179000000
BAGF

PLUT DATE

3-JUL-80

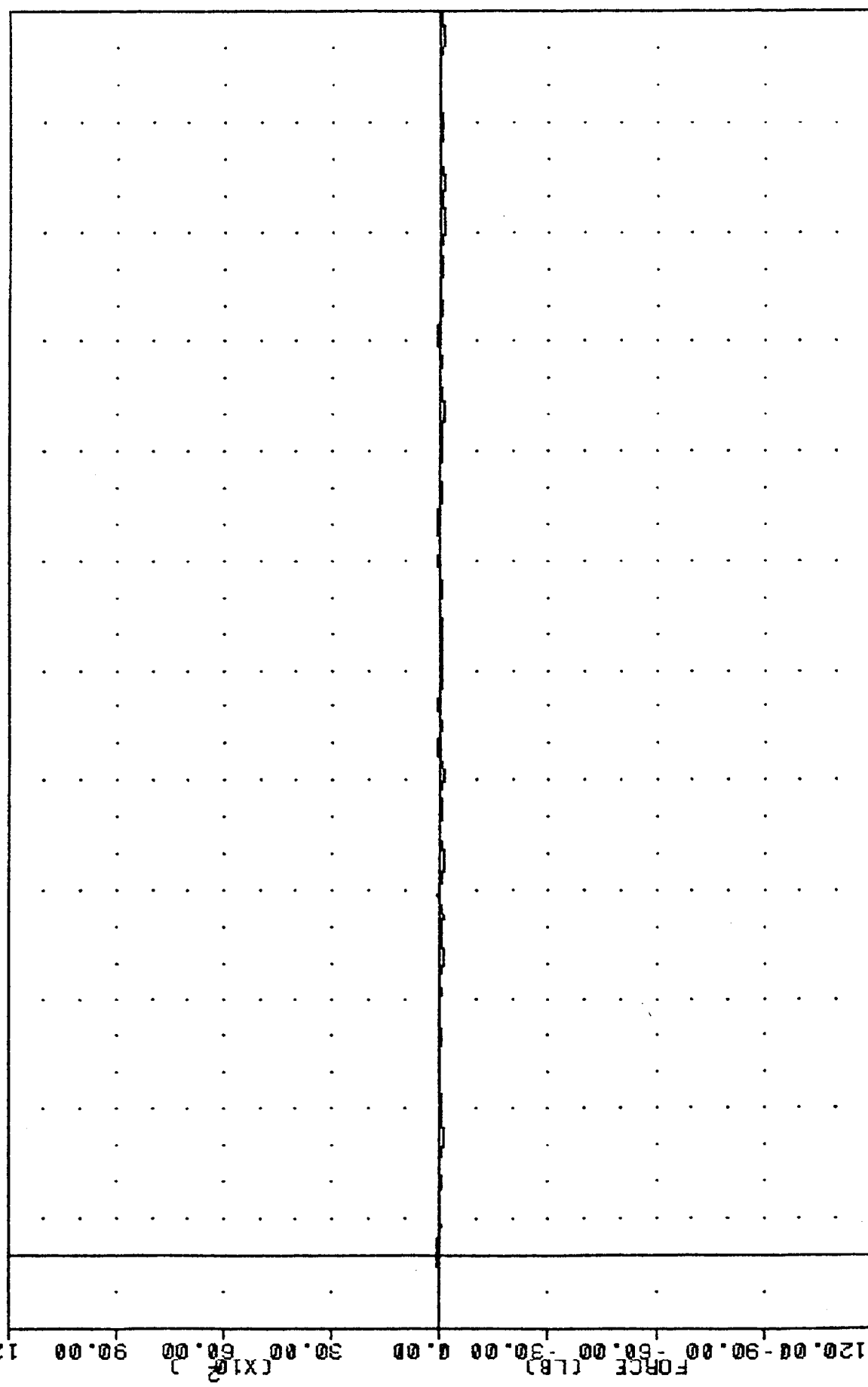
10:14:10

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -135.56 99.42 25.63



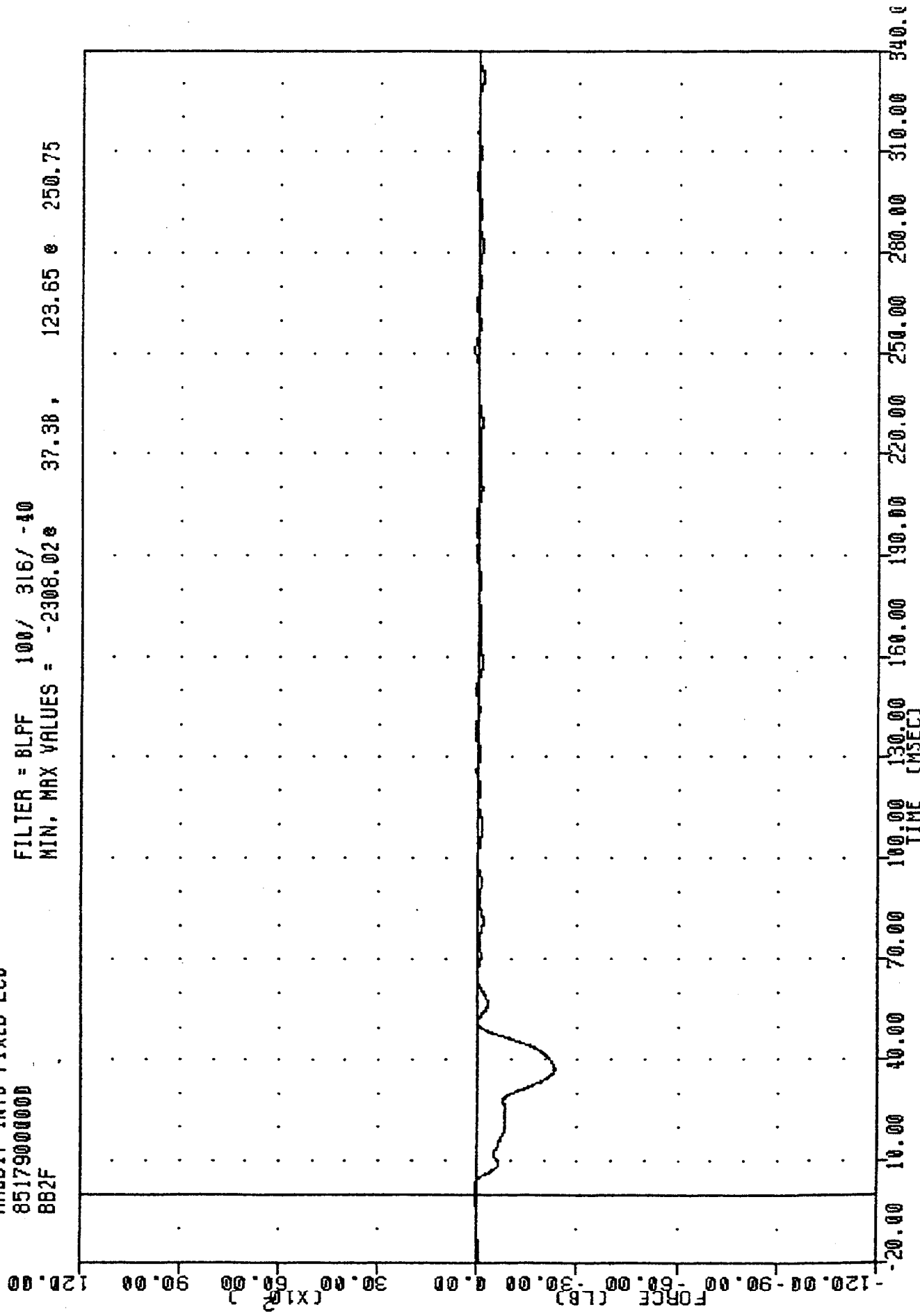
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A9 LBS

VHT
 850628
 RABBIT INTO FIXED LCB
 85179000000
 BB1F
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -138.01 81.63, 107.36 200.63
 PLOT DATE 3-JUL-85 10:14:10



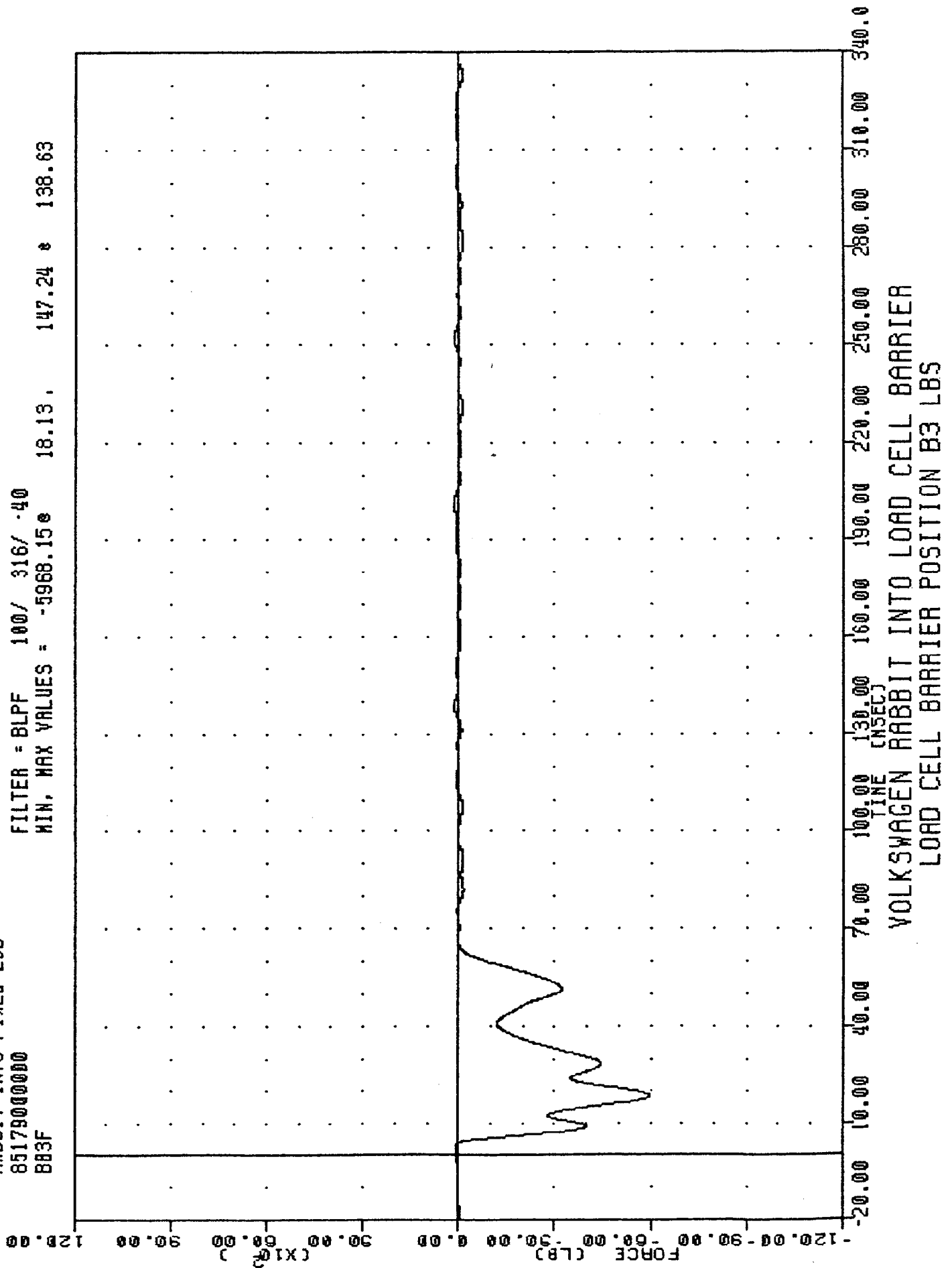
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B1 LBS

VRT 850628 3-JUL-85 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 BBZF
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -2308.02e 37.38, 123.65 e 250.75

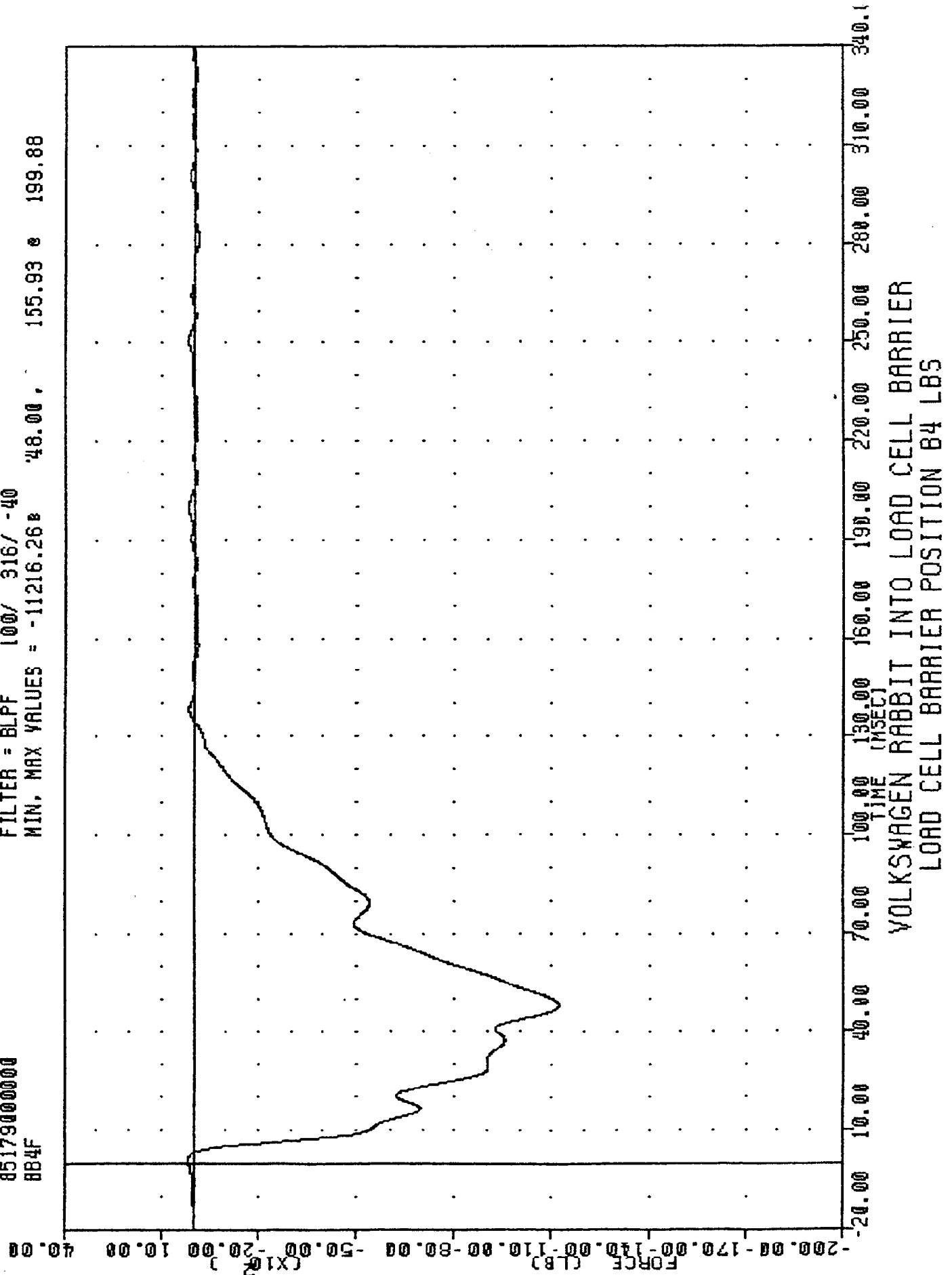


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B2 LBS

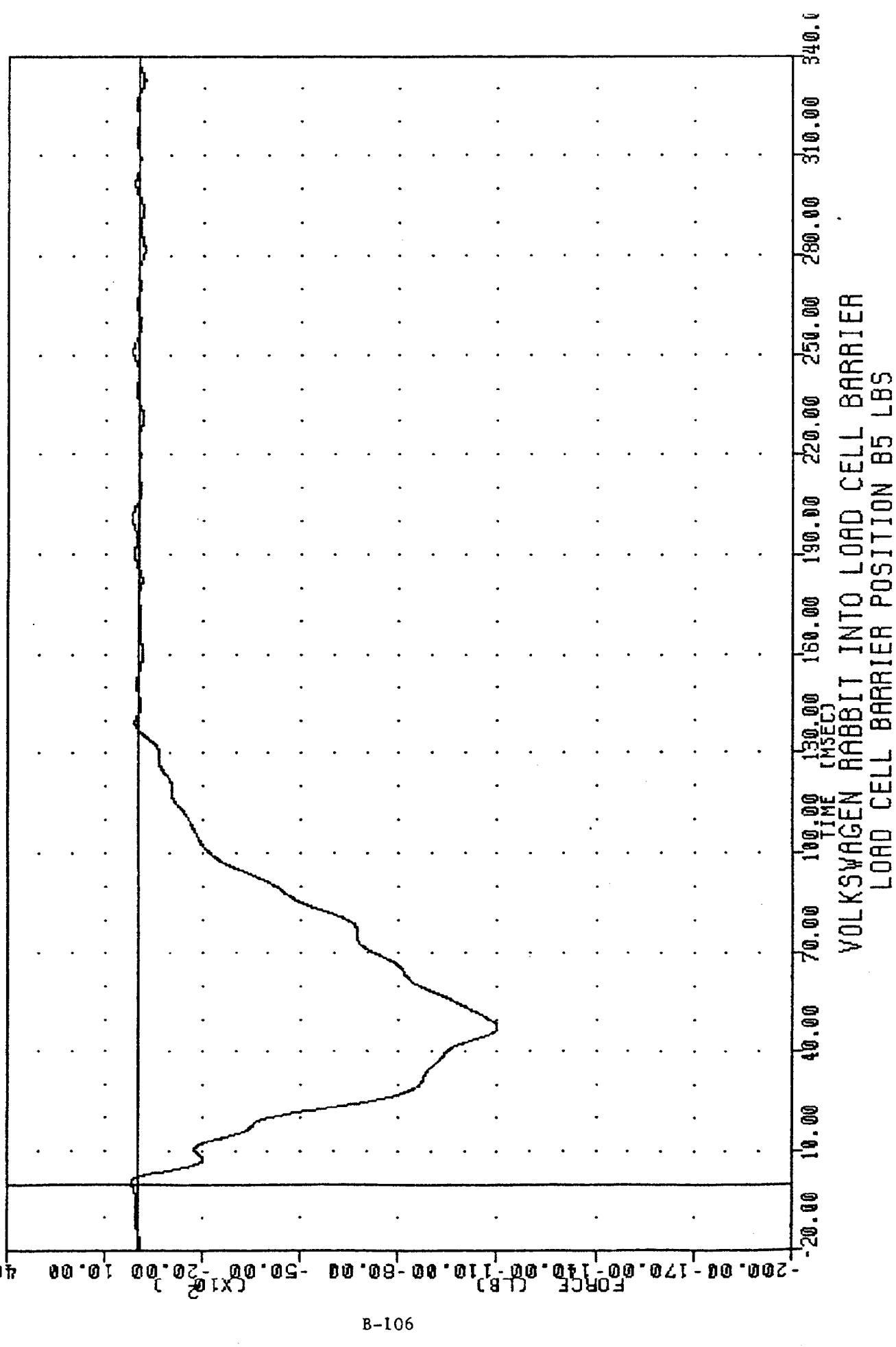
VMT 030620 3 JUL 83 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 B83F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -5968.15 18.13 147.24 138.63



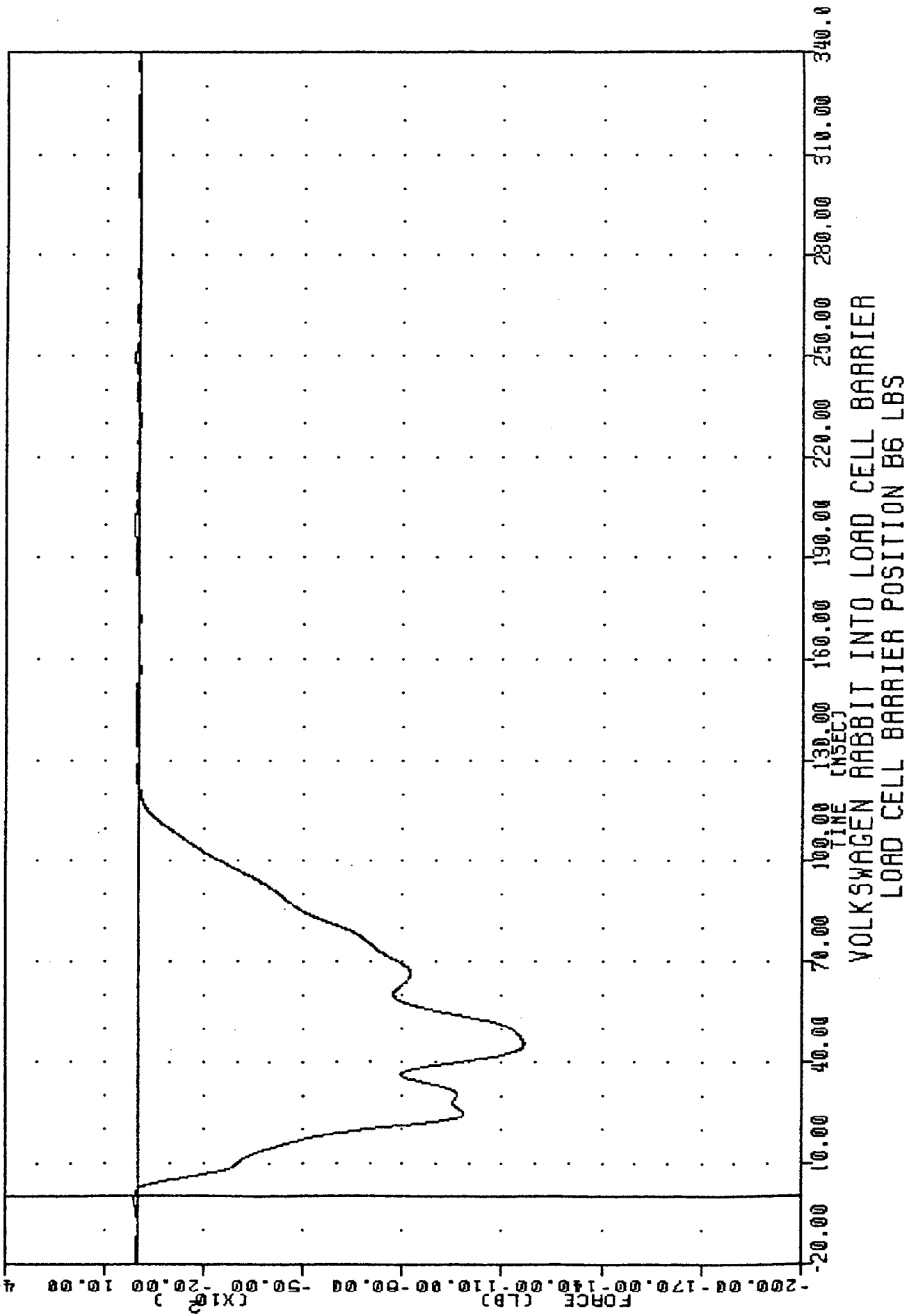
YMI 7 030620 3 JUL 63 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 BB4F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -11216.268 48.00, 155.93 199.88



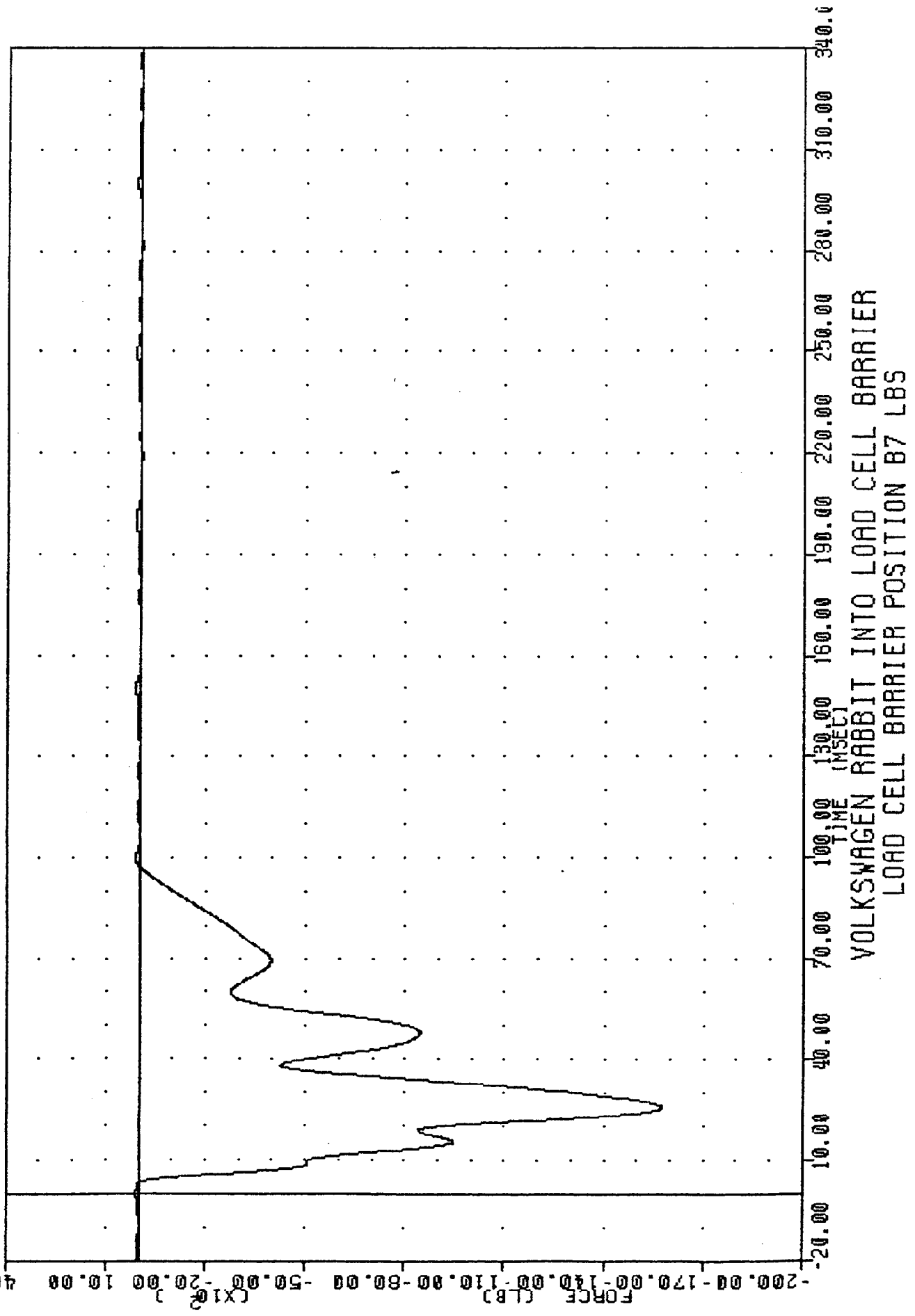
VRI
 85179000000
 RABBIT INTO FIXED LCB
 BB5F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -11002.56e 47.38, 162.87 e 200.75
 PLOT DATE 3-JUL-83 10:14:10



VMT 851790000000
 RABBIT INTO FIXED LCB
 B86F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -11645.120 45.38, 116.40 & 199.13
 PLOT DATE 3-JUL-83 10:14:10

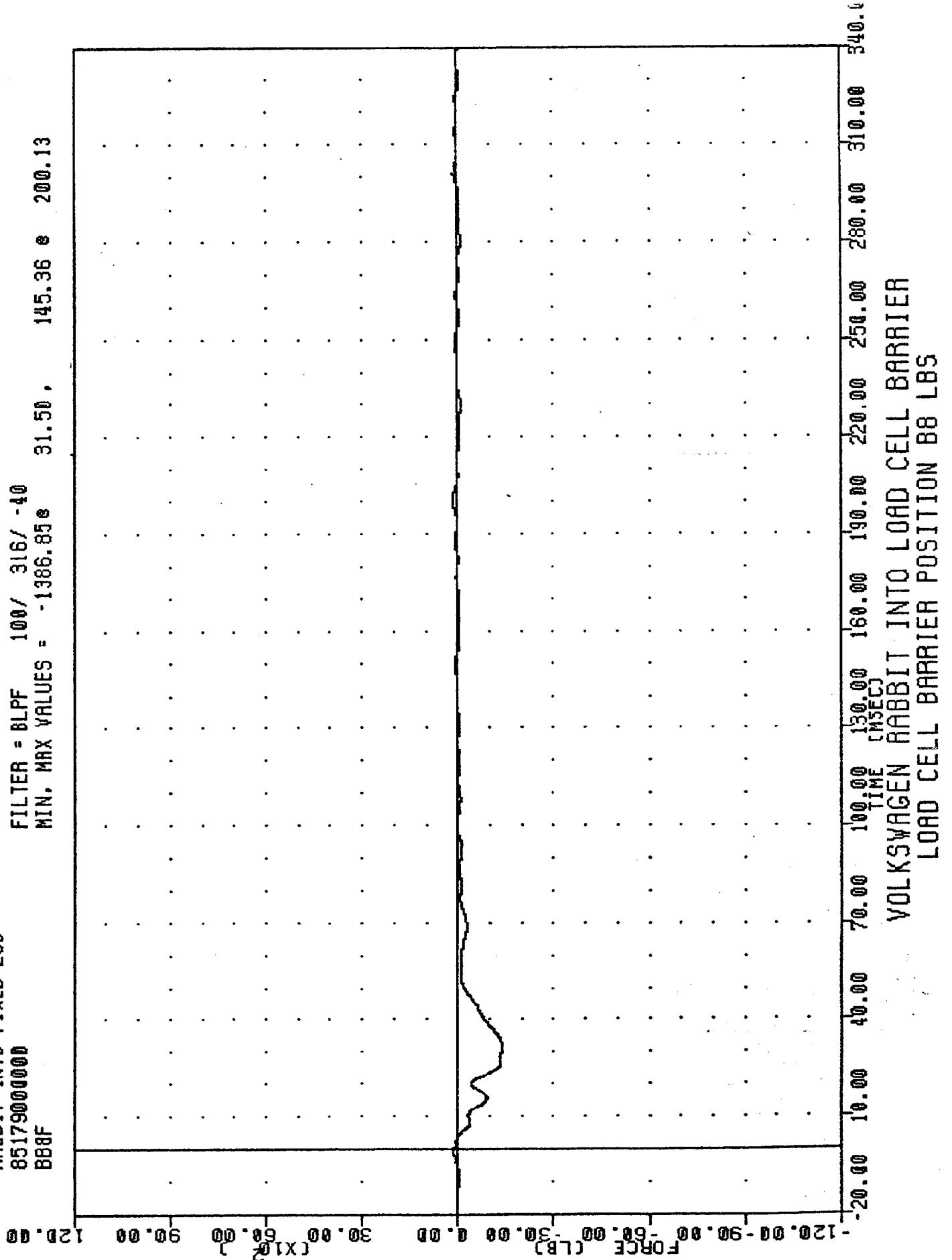


VRT 830628 3-JUL-83 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 887F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -15771.54 25.75, 118.45 199.75



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B7 LBS

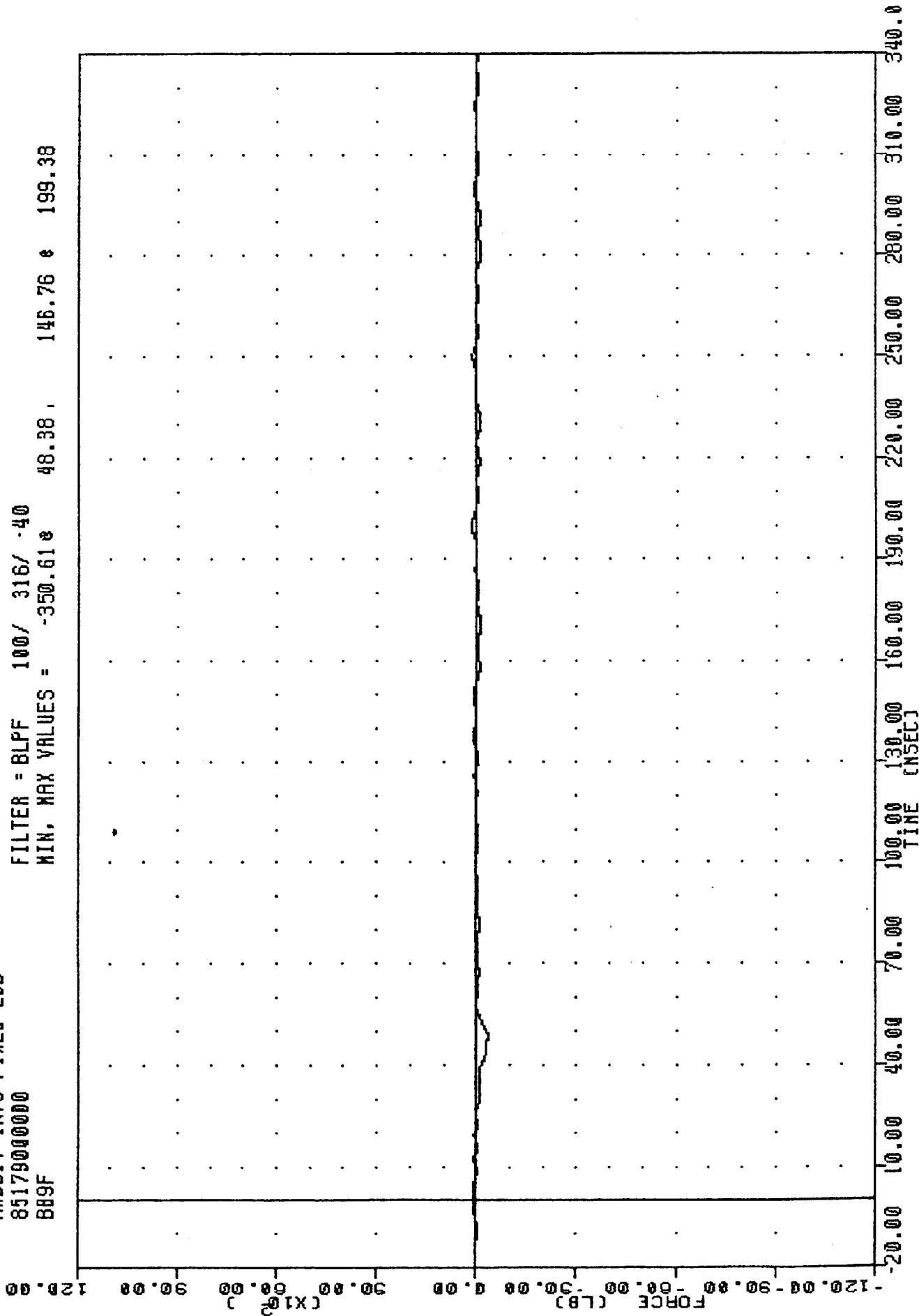
VHT 030620 3 JUL 83 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 BB8F
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -1386.85 31.50, 145.36 200.13



VAT 850628
 RABBIT INTO FIXED LCB
 85179000000
 BB9F

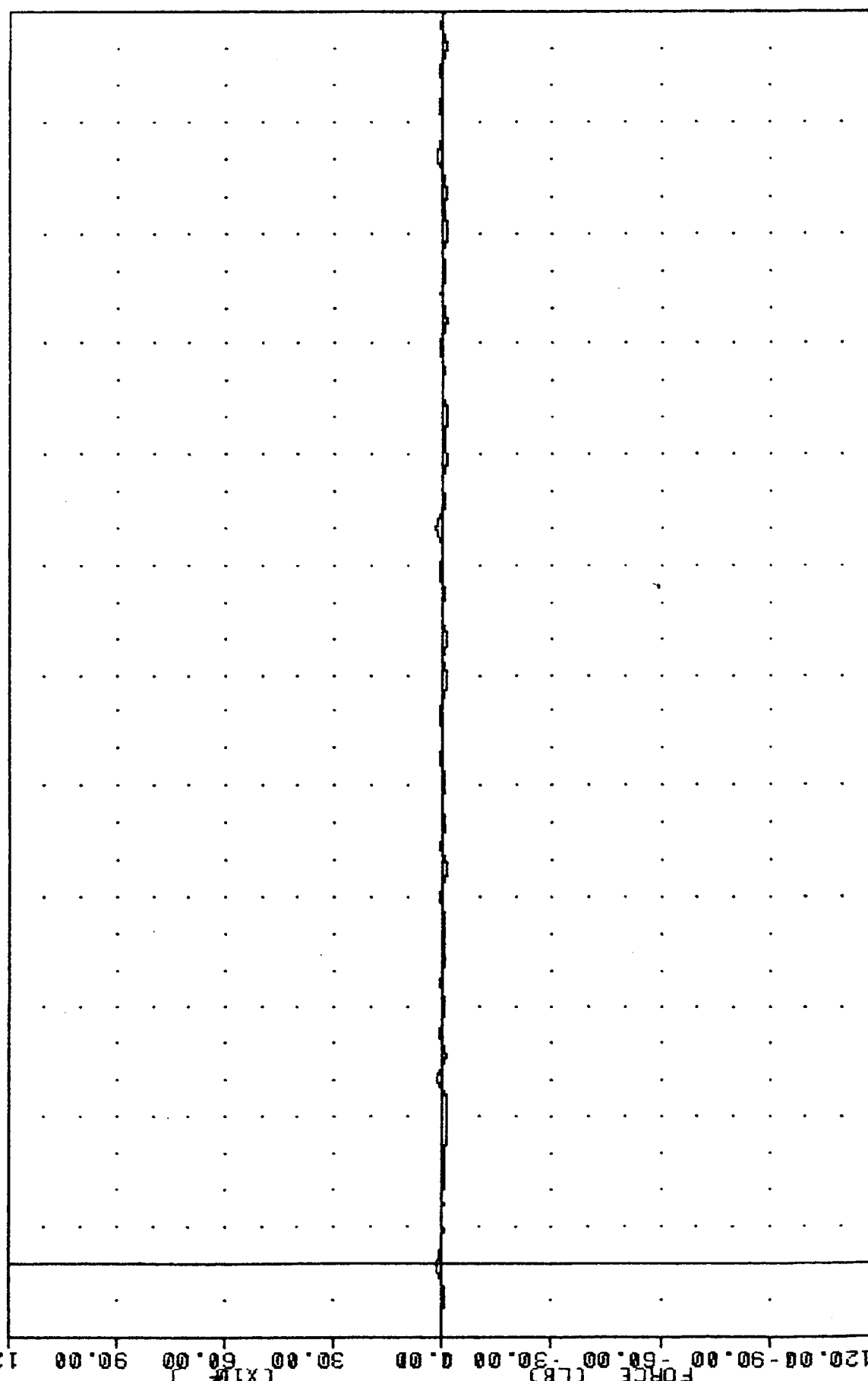
PLUT DATE 3-JUL-85 10:14:10

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -350.61 e 48.38 , 146.76 e 199.38



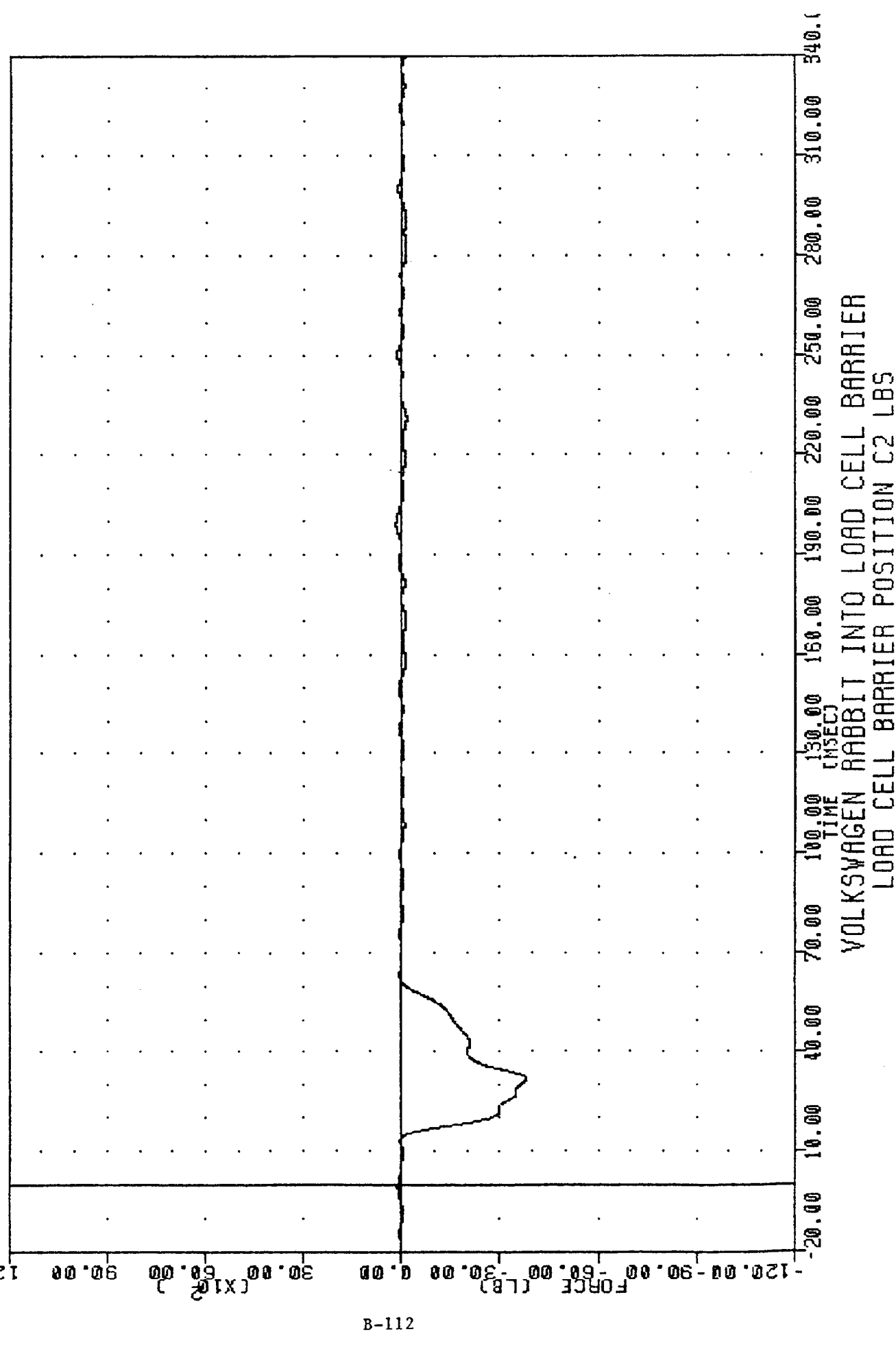
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B9 LBS

VRT
 850628
 RABBIT INTO FIXED LCB
 85179000000
 BCIF
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -133.60 44.13, 180.80 199.88
 PLOT DATE 3-JUL-83 10:14:10



-120.00 -90.00 -60.00 -30.00 0.00 30.00 60.00 90.00 120.00
 (X10)
 FORCE (LB)
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C1 LBS

VRT 850628 3-JUL-85 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 BC2F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -3832.66e 31.88, 177.10 e 199.00



VHT
 85179000000
 BC3F

RABBIT INTO FIXED LCB

PLUT DATE

3-JUL-85

10:14:10

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -2648.14e 19.50, 205.11 e 199.63

120.00

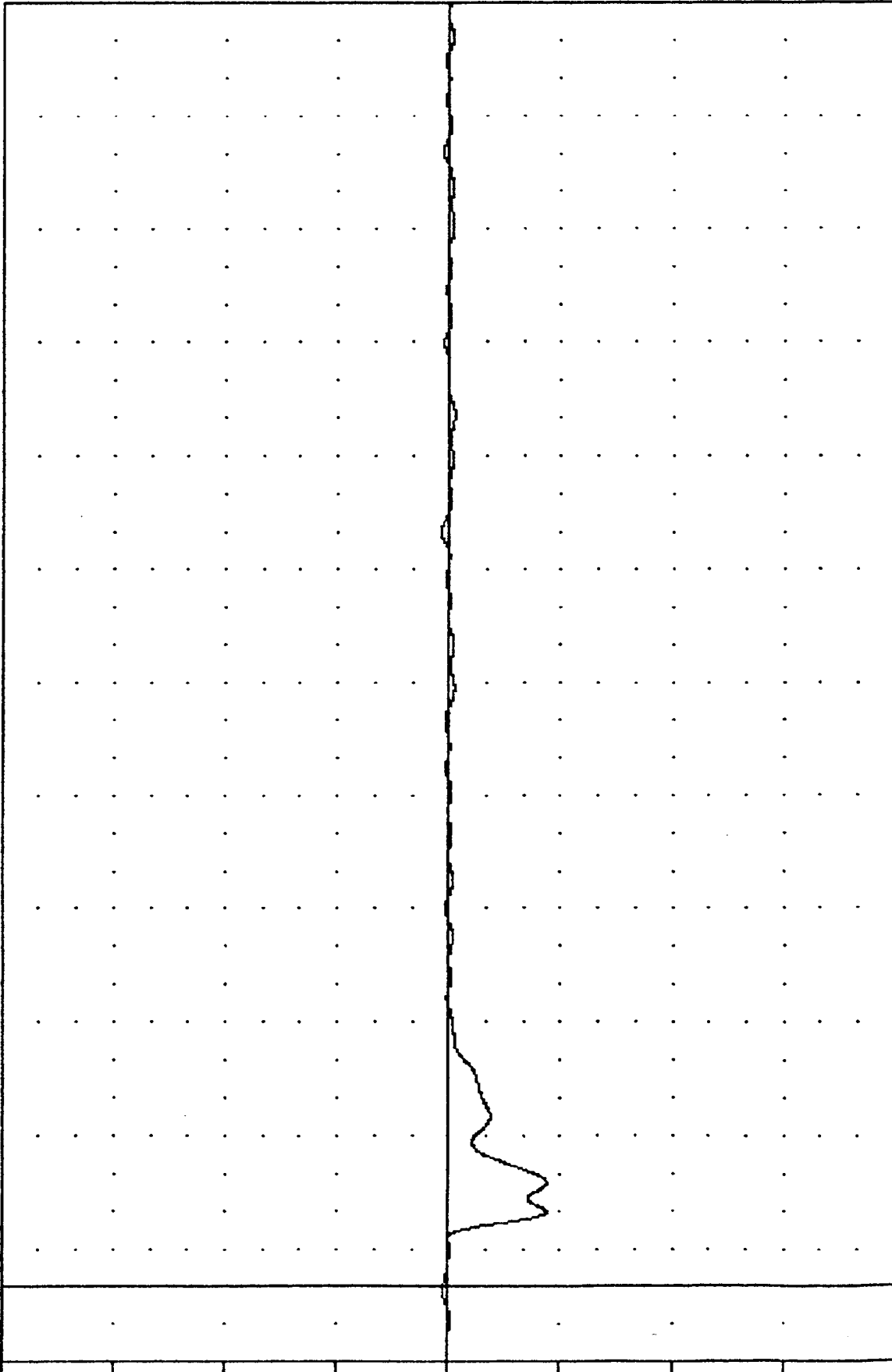
90.00

60.00
 (X10²)

30.00

0.00

FORCE (LB)
 -30.00
 -60.00
 -90.00
 -120.00



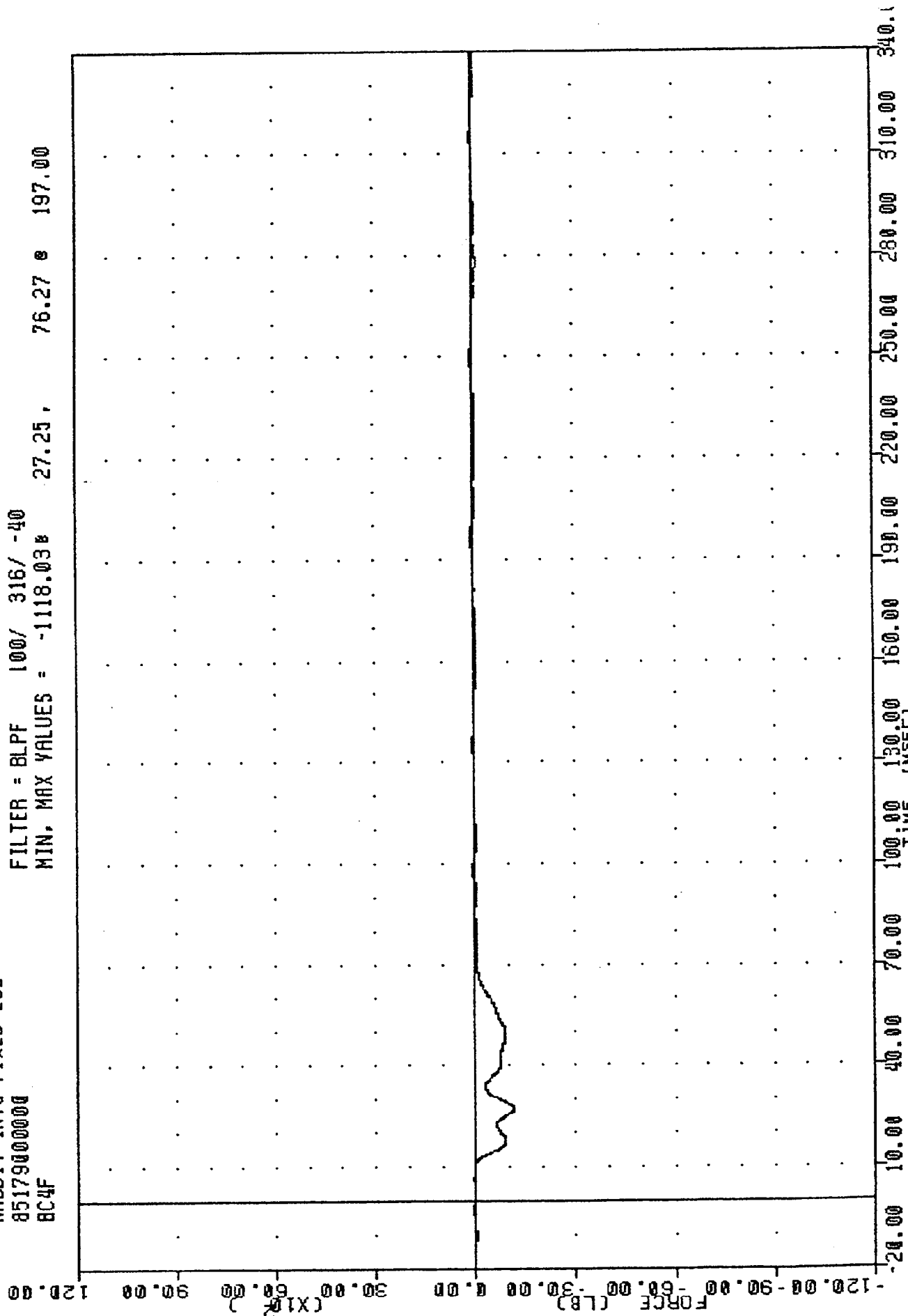
-20.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C3 LBS

VRT
 85179000000
 BC4F
 RABBIT INTO FIXED LCB
 850628
 , 850628

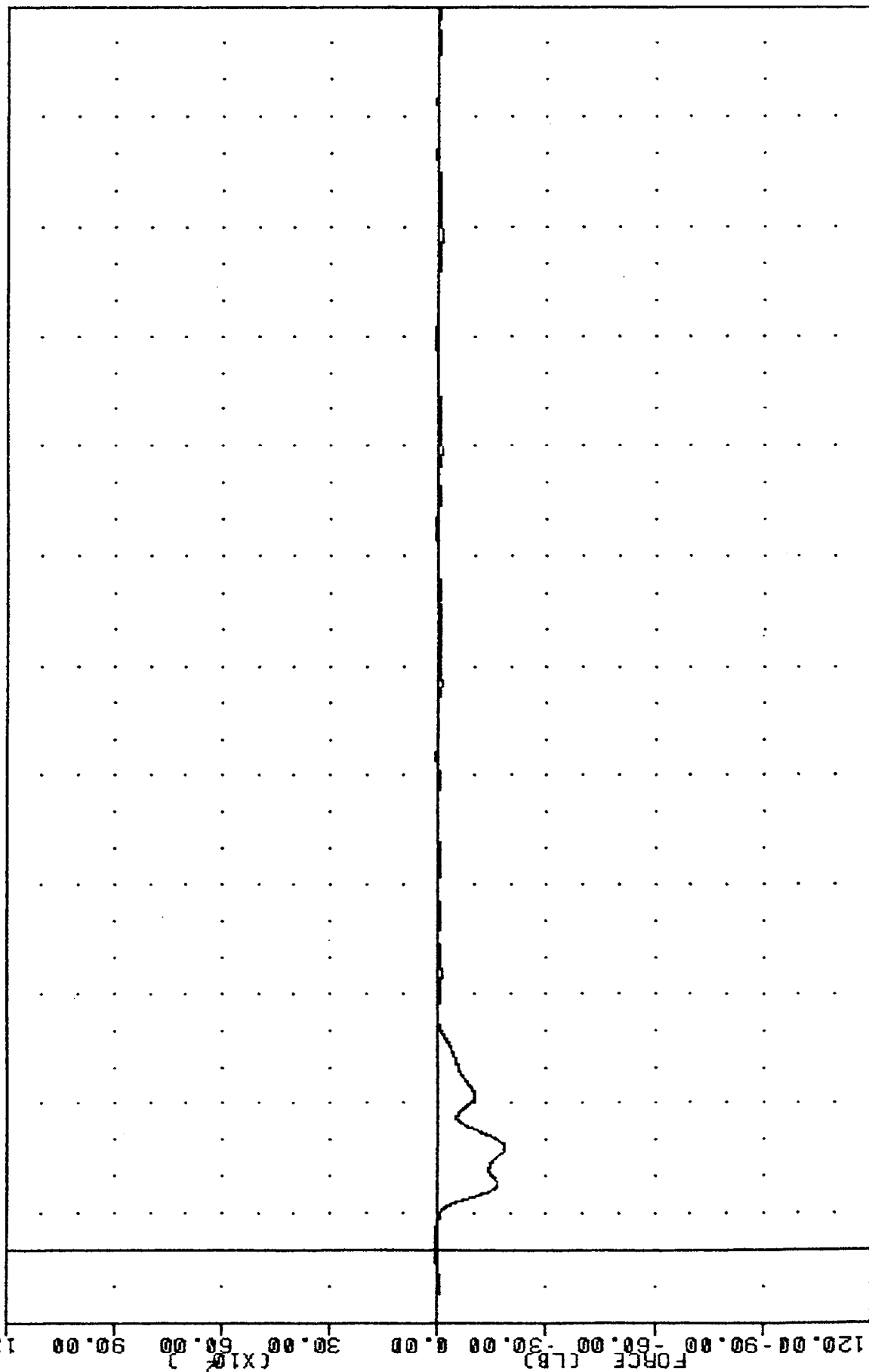
PLOT DATE 3-JUL-85 10:14:10

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -1118.03 27.25, 76.27 197.00



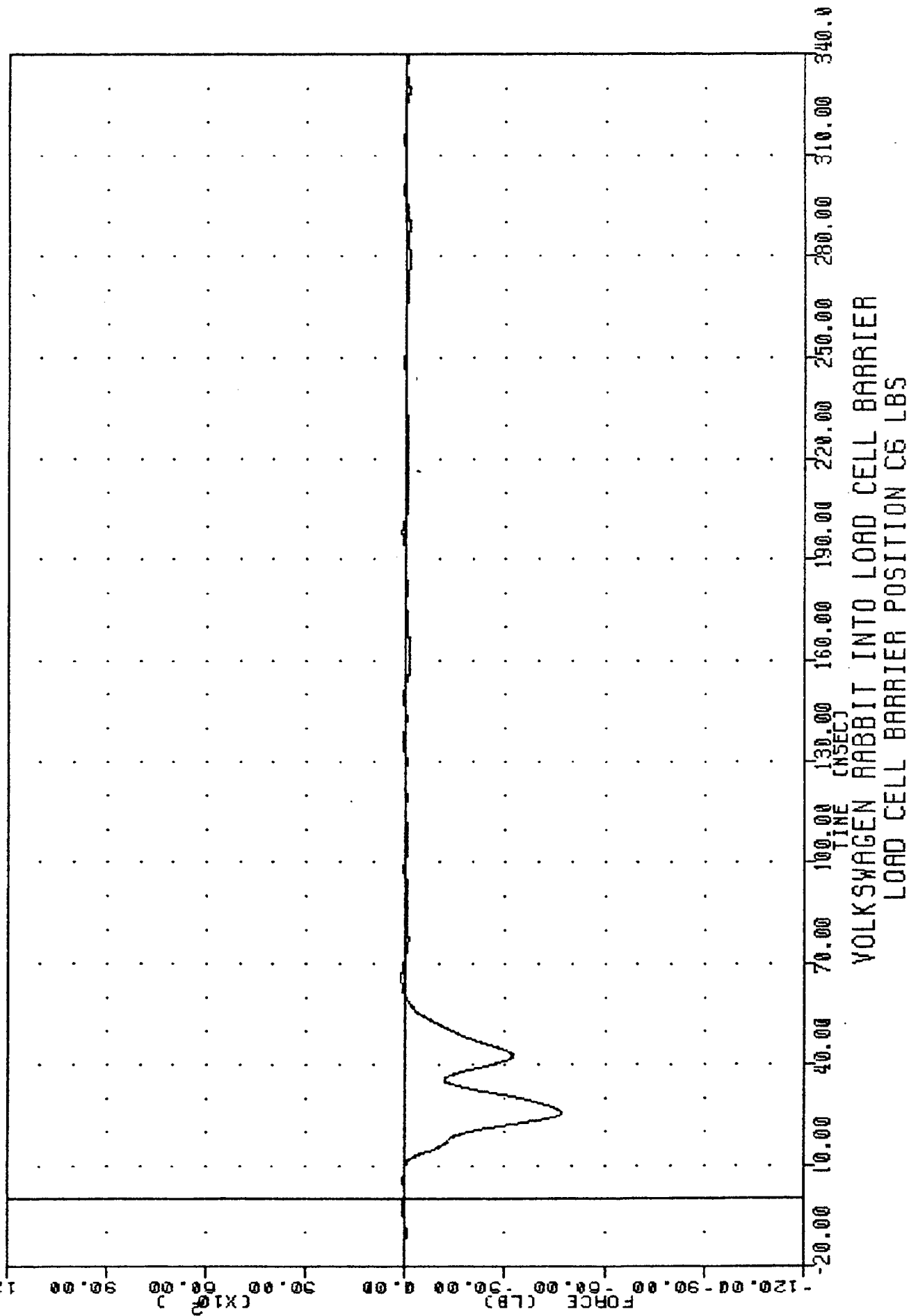
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C4 LBS

VRT
 85179000000
 BC5F
 RABBIT INTO FIXED LCB
 85179000000
 BC5F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -1851.28e 28.00, 98.93 e 197.63
 3-JUL-85 10:14:10



-20.00 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)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C5 LBS

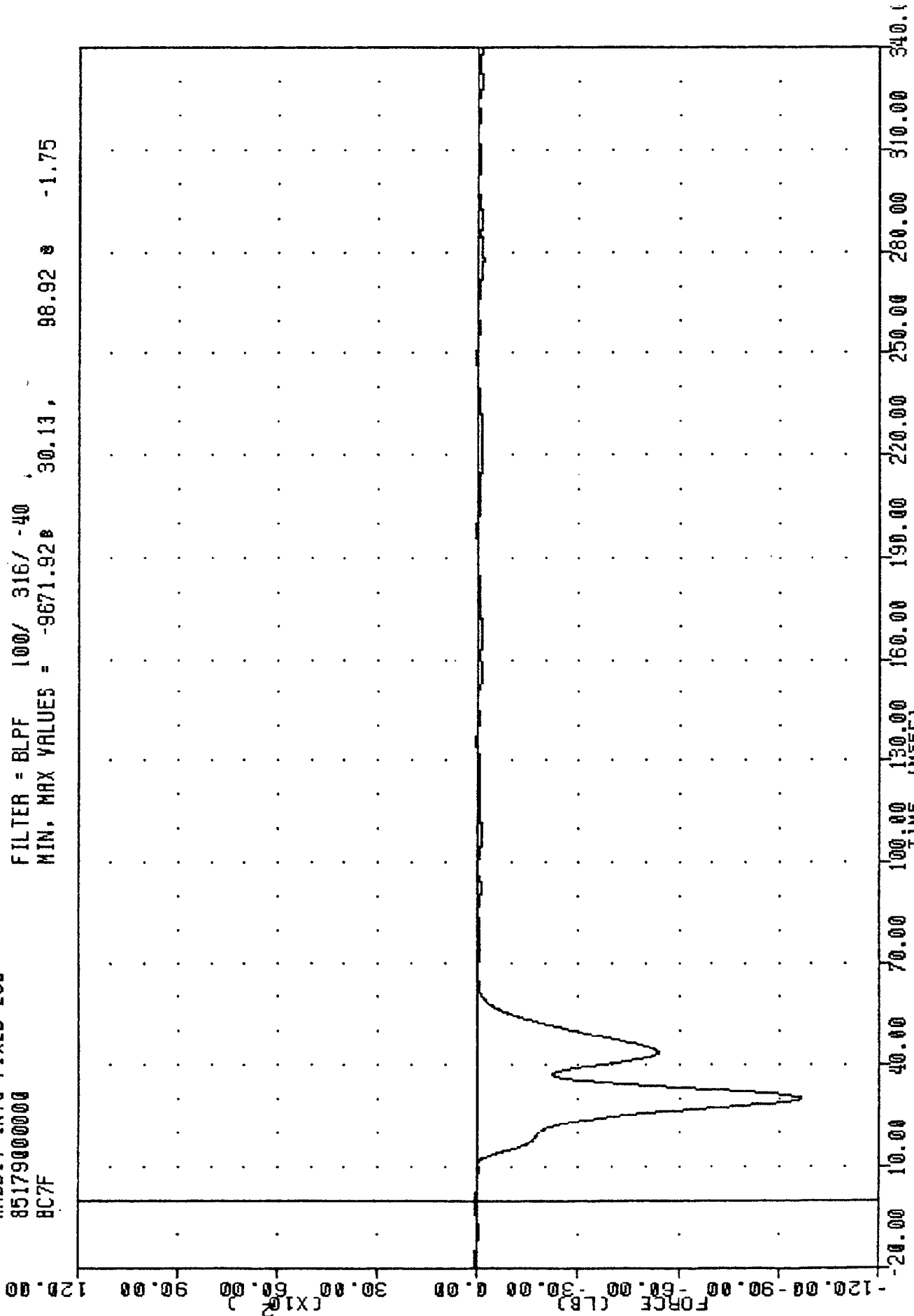
VHT 850628
 RABBIT INTO FIXED LCB
 85179000000
 BC6F
 PLUT DATE 3-JUL-85 10:14:10
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -4695.55 25.38 115.97 65.88



VRT
 850628
 RABBIT INTO FIXED LCB
 85179000000
 BC7F

PLOT DATE 3-JUL-85 10:14:10

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -9671.92 98.92 -1.75

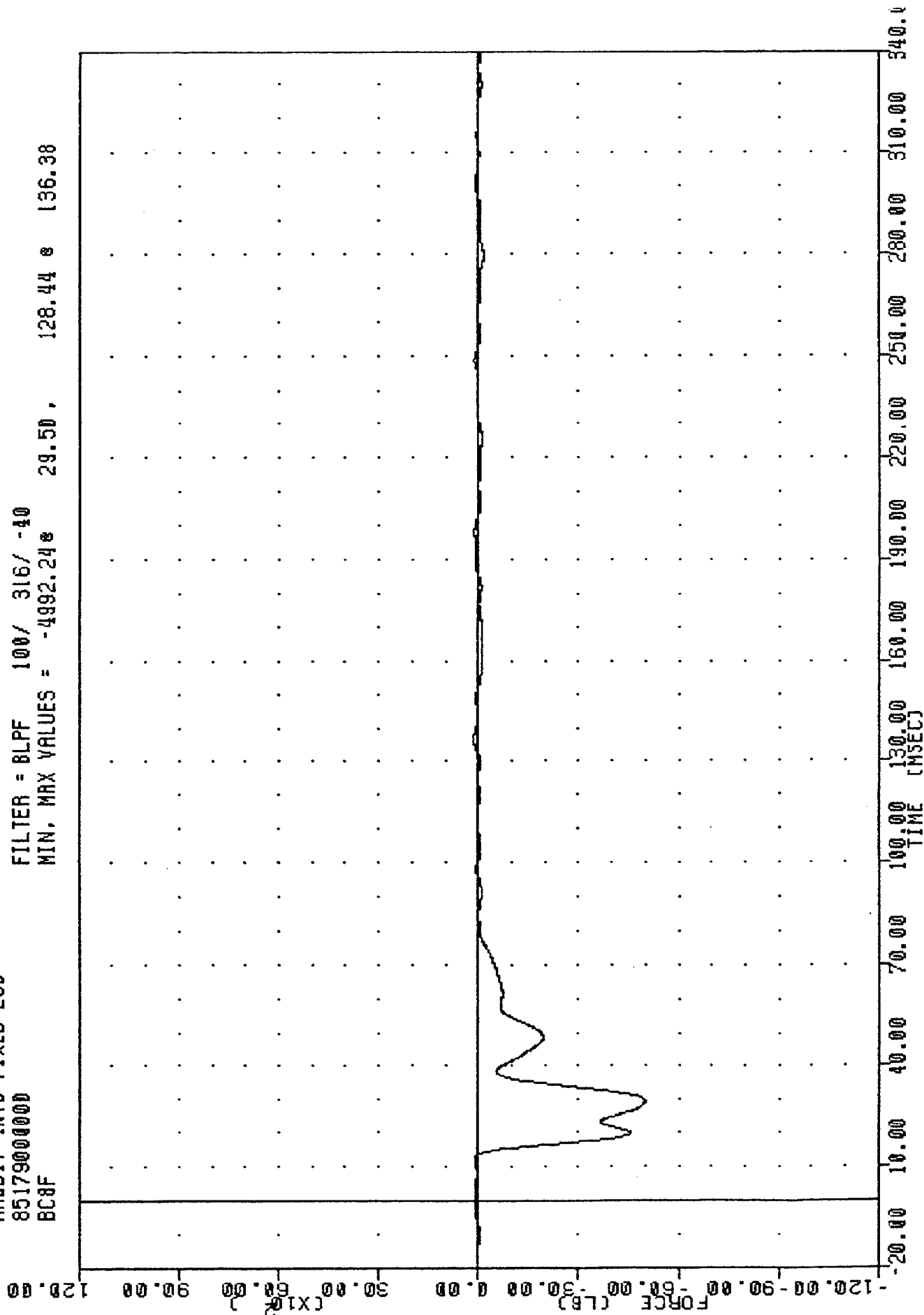


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C7 LBS

VRT
 85179000000
 RABBIT INTO FIXED LC8
 BC8F

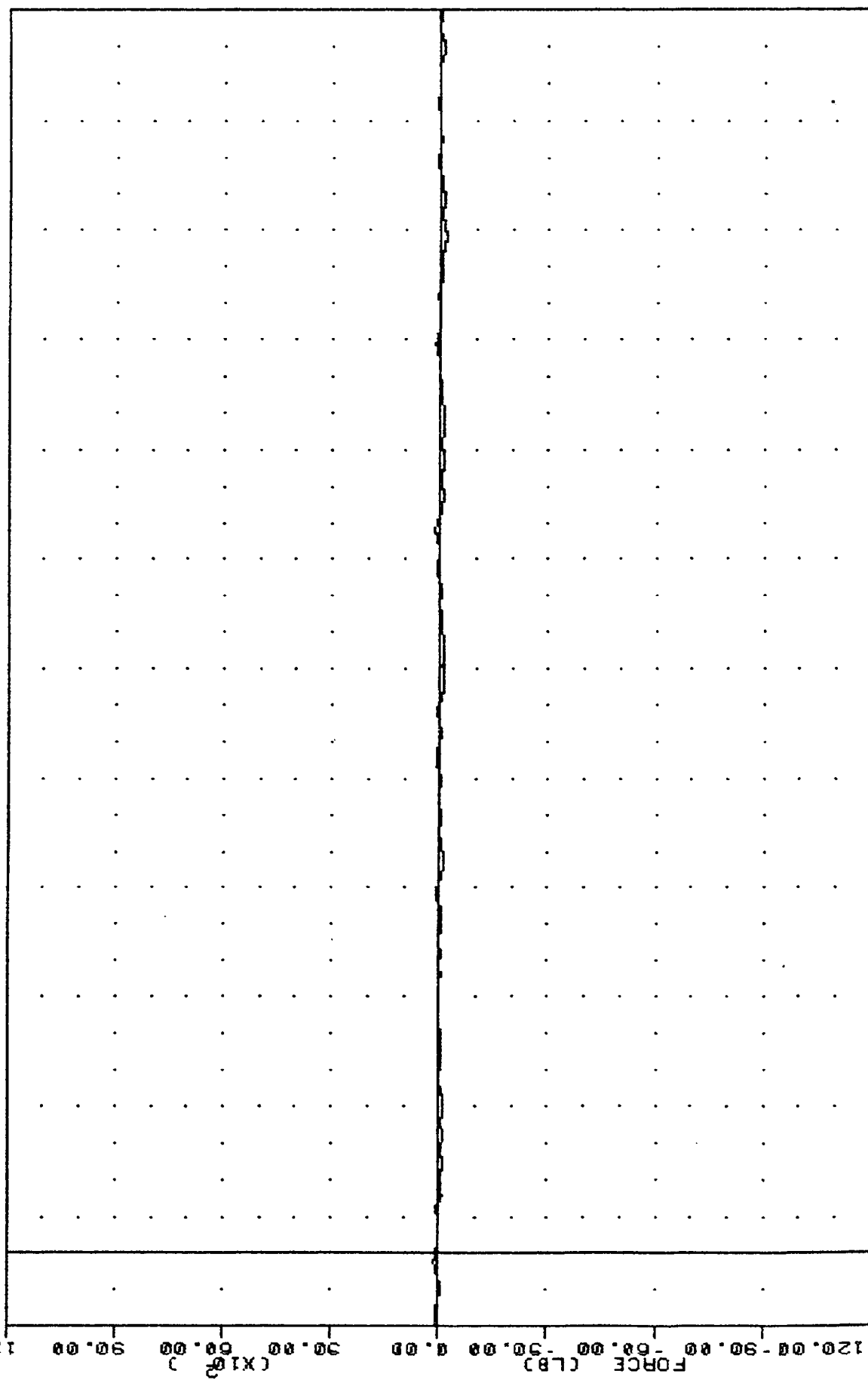
PLUT DATE 3-JUL-85 10:14:10

FILTER = 8LPF 100/ 316/ -40
 MIN, MAX VALUES = -4992.24 128.44 136.38



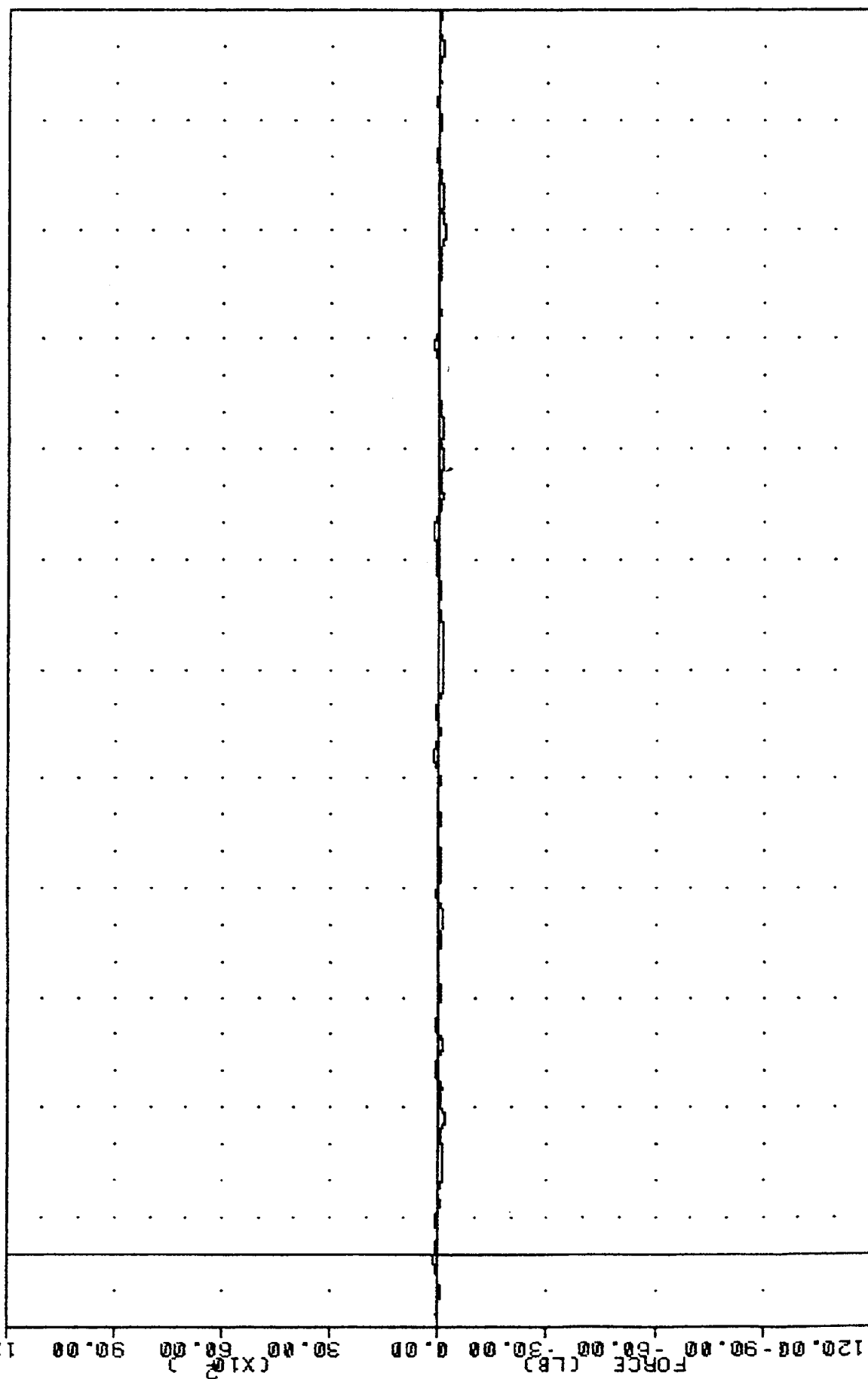
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C8 LBS

VHT
 85179000000
 RABBIT INTO FIXED LCB
 BC9F
 , 830620
 3-JUL-83
 10:14:10
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -151.890 278.25 , 119.76 198.00



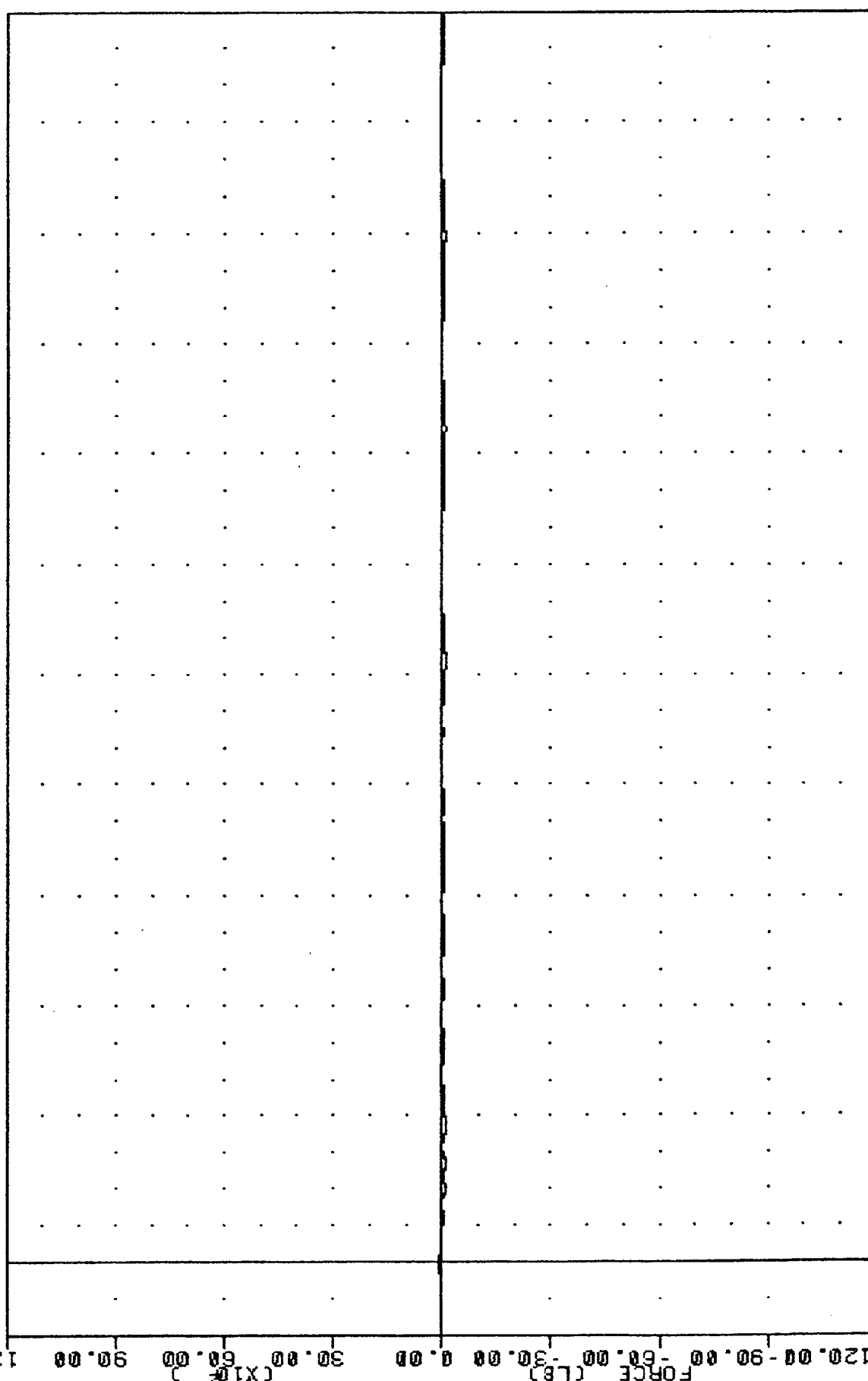
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (msec)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C9 LBS

VHT
 85179000000
 RABBIT INTO FIXED LCB
 85179000000
 80IF
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -189.18 37.13, 150.34 197.75
 PLOT DATE 3-JUL-83 10:14:10



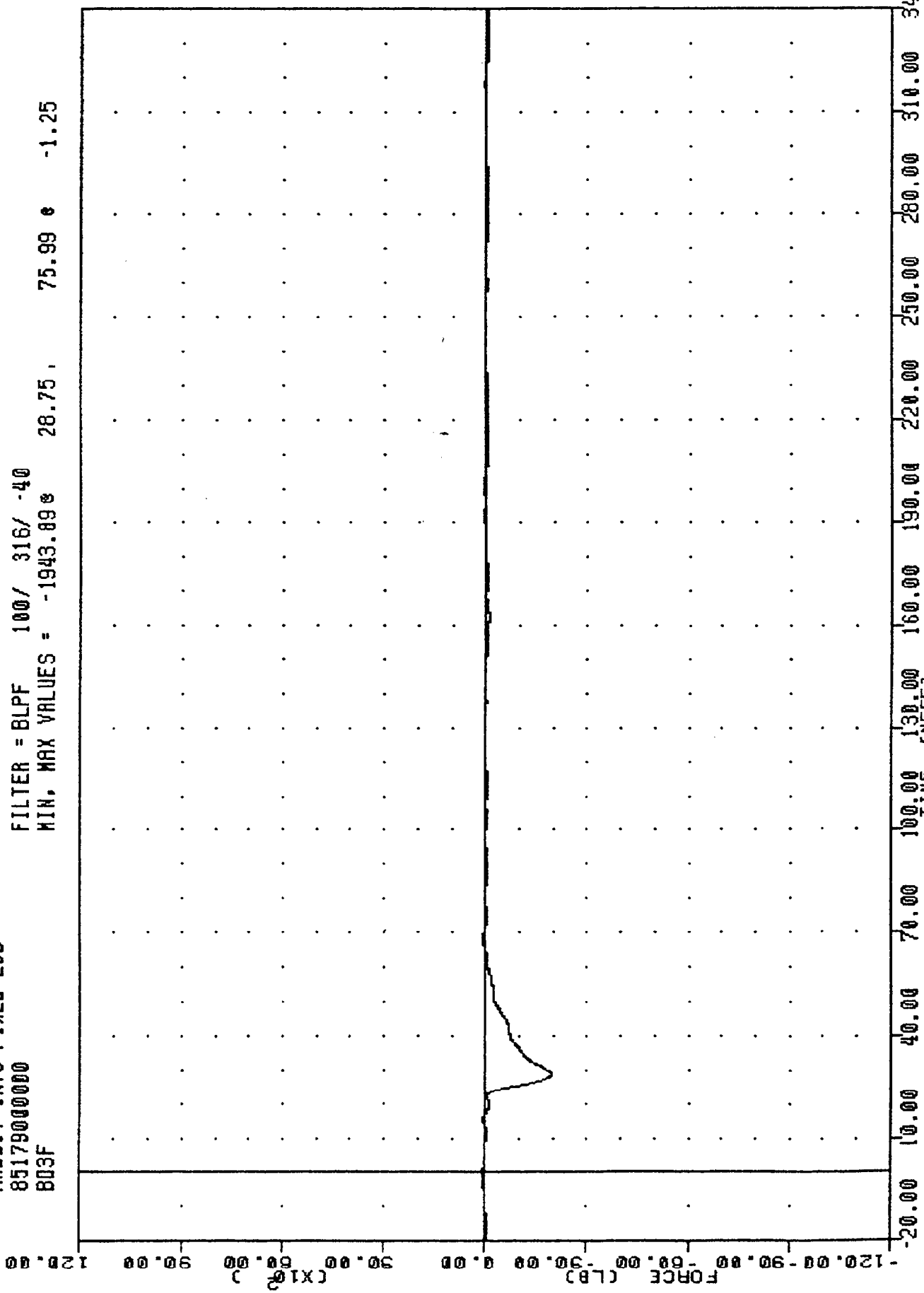
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 01 LBS

VRT 850628 3-JUL-83 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 802F
 FILTER = 8LPF 100/ 316/ -40
 MIN. MAX VALUES = -126.04 36.88 62.56 -0.63



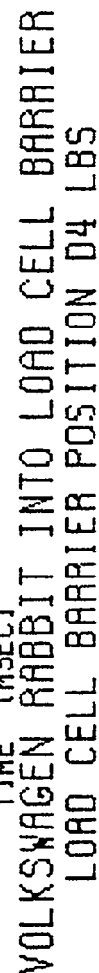
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D2 LBS

VHT
 850628
 RABBIT INTO FIXED LCB
 85179000000
 B03F
 PCUT DATE 3-JUL-85 10:14:10
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -1943.89 28.75 75.99 -1.25

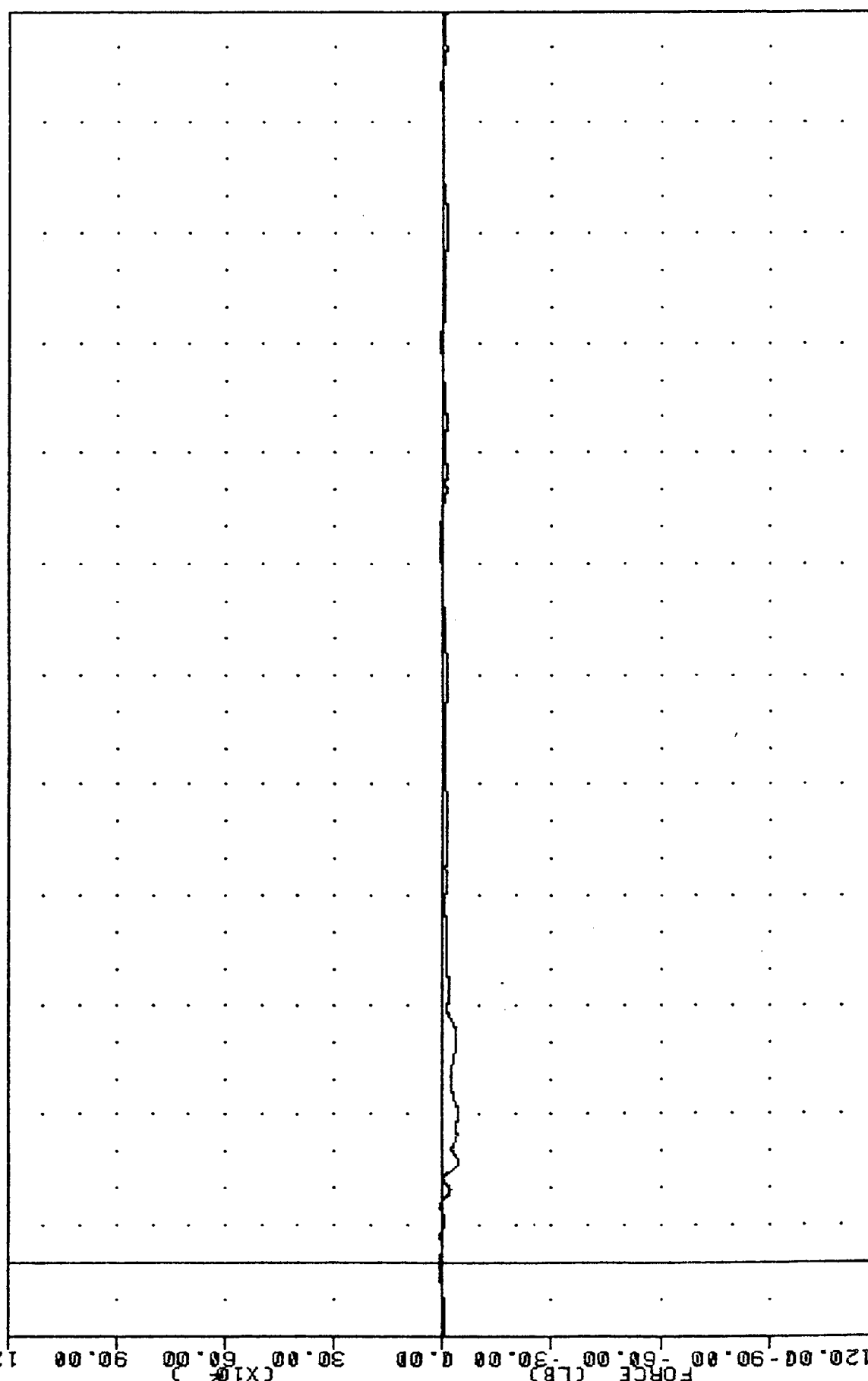


VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D3 LBS

FILTER = BLPF	100/ 316/ -40		
MIN, MAX VALUES =	-1075.68	37.25,	102.03
			-2.25

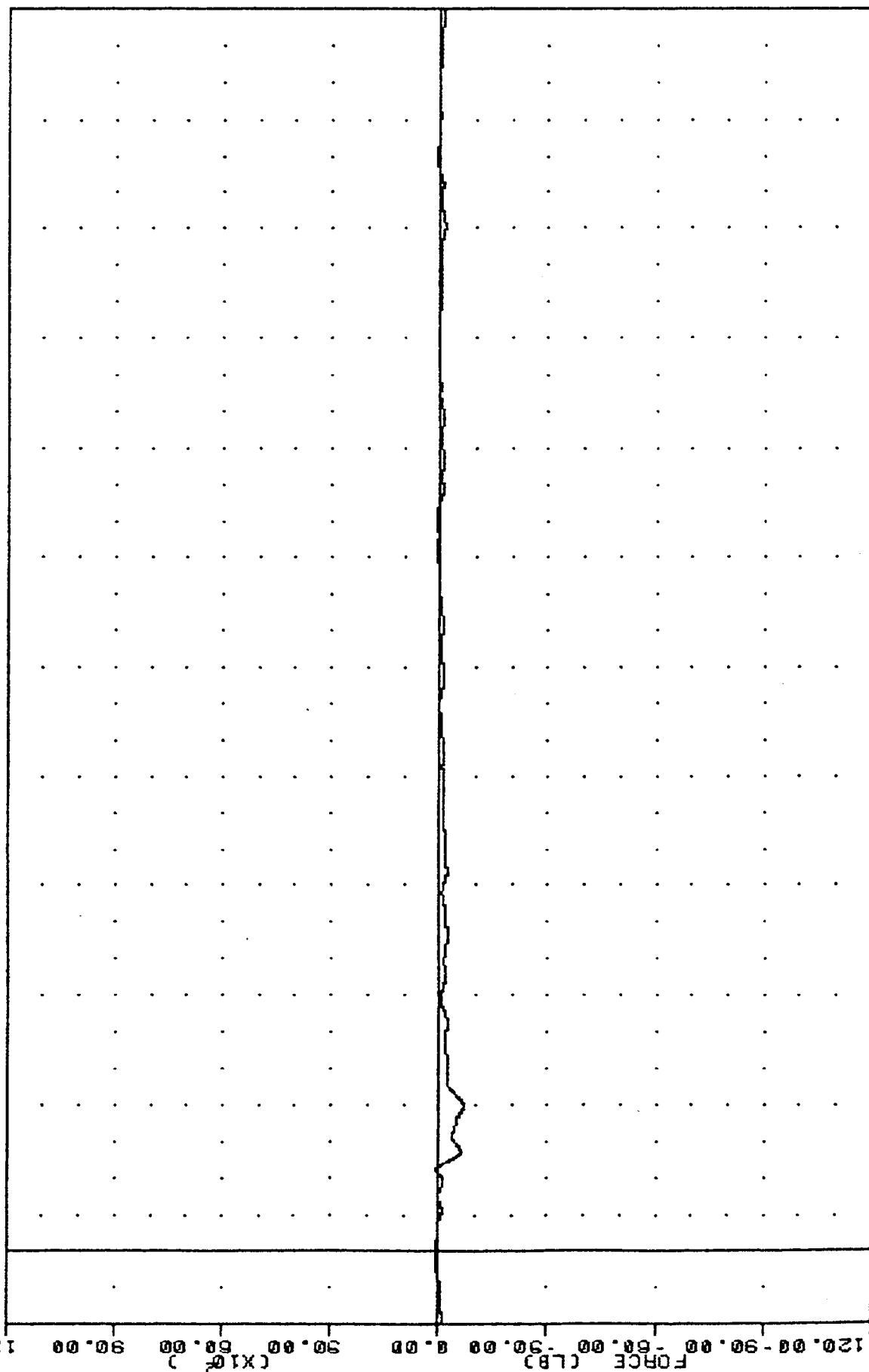


VRT 850628 3-JUL-83 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 BD5F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -442.71e 40.38, 83.56 e -1.75



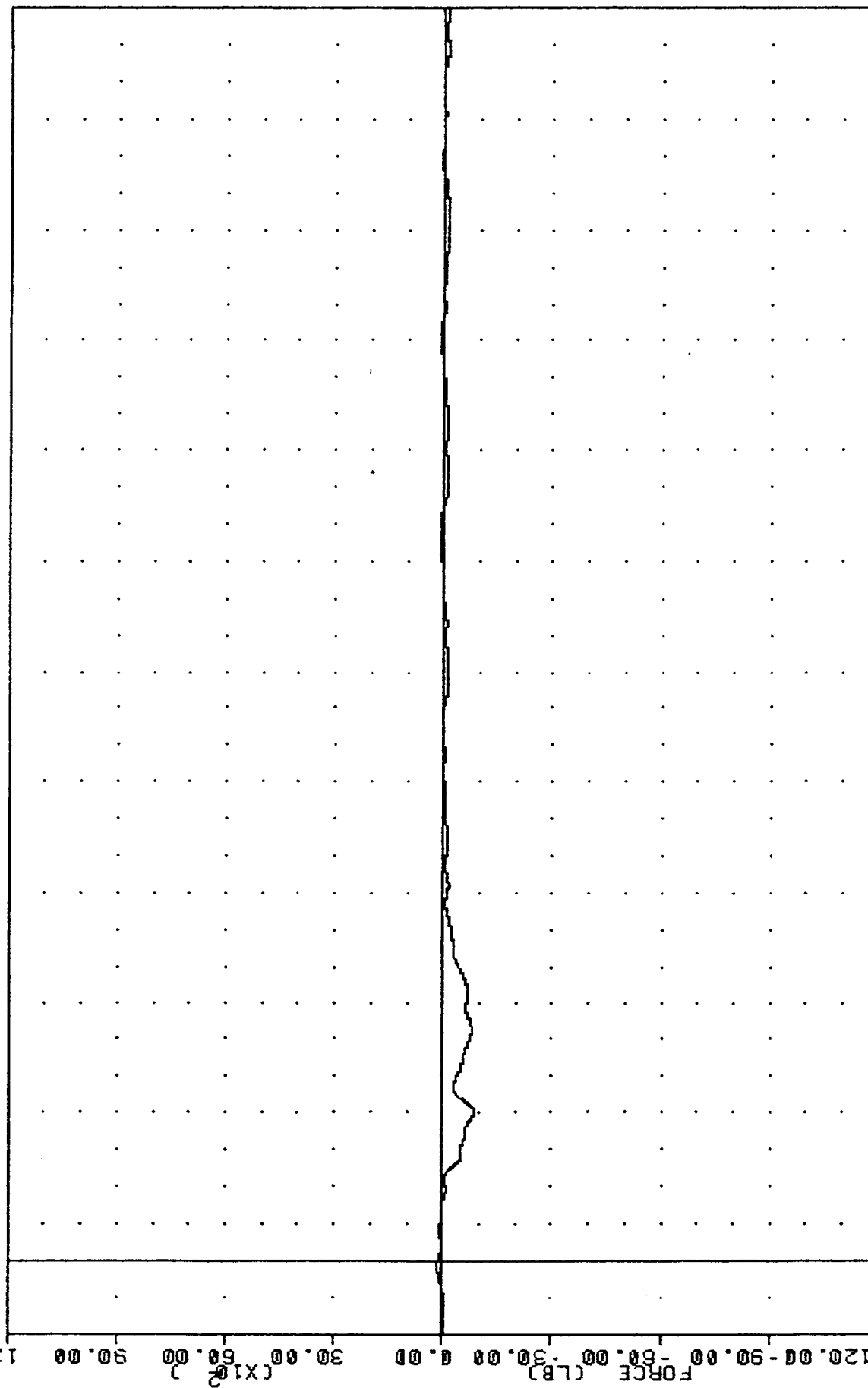
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 05 LBS

VHT 850628 3-JUL-85 10:14:10
 RABBIT INTO FIXED LCB
 85179000000
 806F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -662.08e 39.75, 109.15 e -1.00



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D6 LBS

VRT
 850628
 RABBIT INTO FIXED LCB
 85179000000
 807F
 PLOT DATE 3-JUL-85 10:14:10
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -880.46 40.13, 121.56 -1.88



-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)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 07 LBS

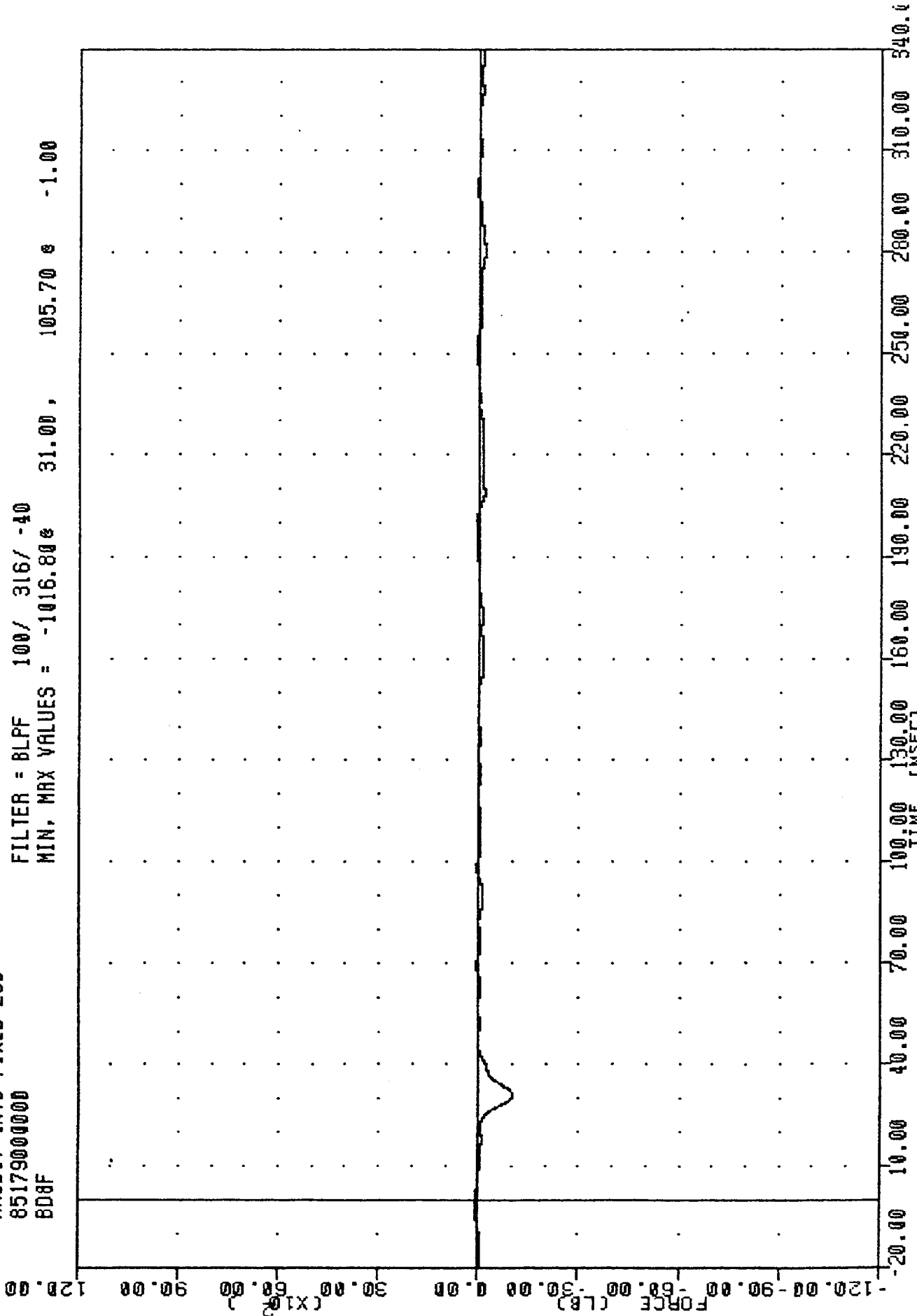
VHT
 85179000000
 RABBIT INTO FIXED LCB
 BD8F

PLOT DATE

3-JUL-85

10:14:10

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -1016.800 31.00, 105.700 -1.00



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D8 LBS

VHT
 851790000000
 RABBIT INTO FIXED LCB
 851790000000
 809F

PLUT DATE 3-JUL-85 10:14:10

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -142.91e 32.63, 86.86 e 28.50

120.00

90.00

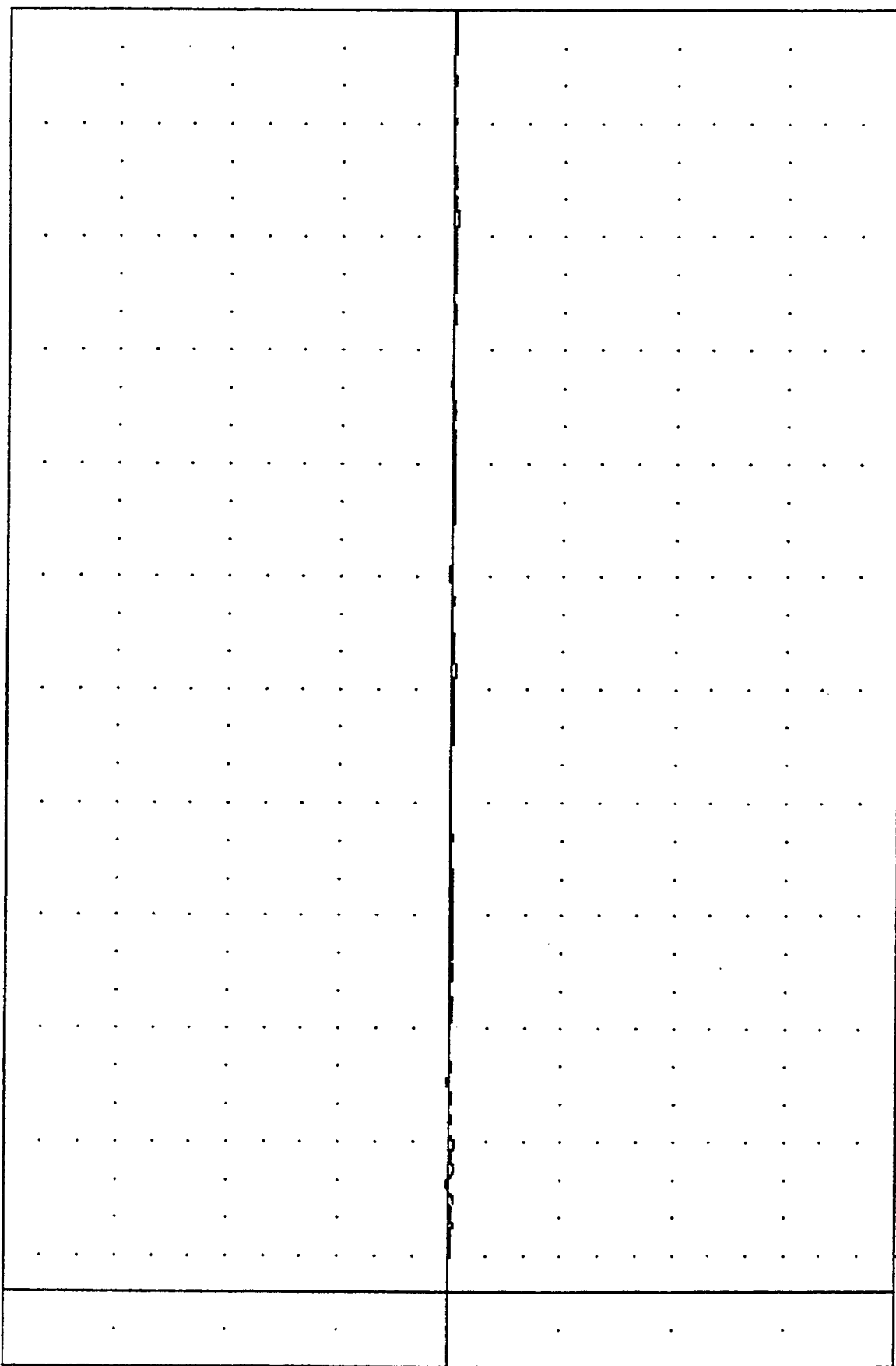
(X10²)

30.00

0.00

FORCE (LB)

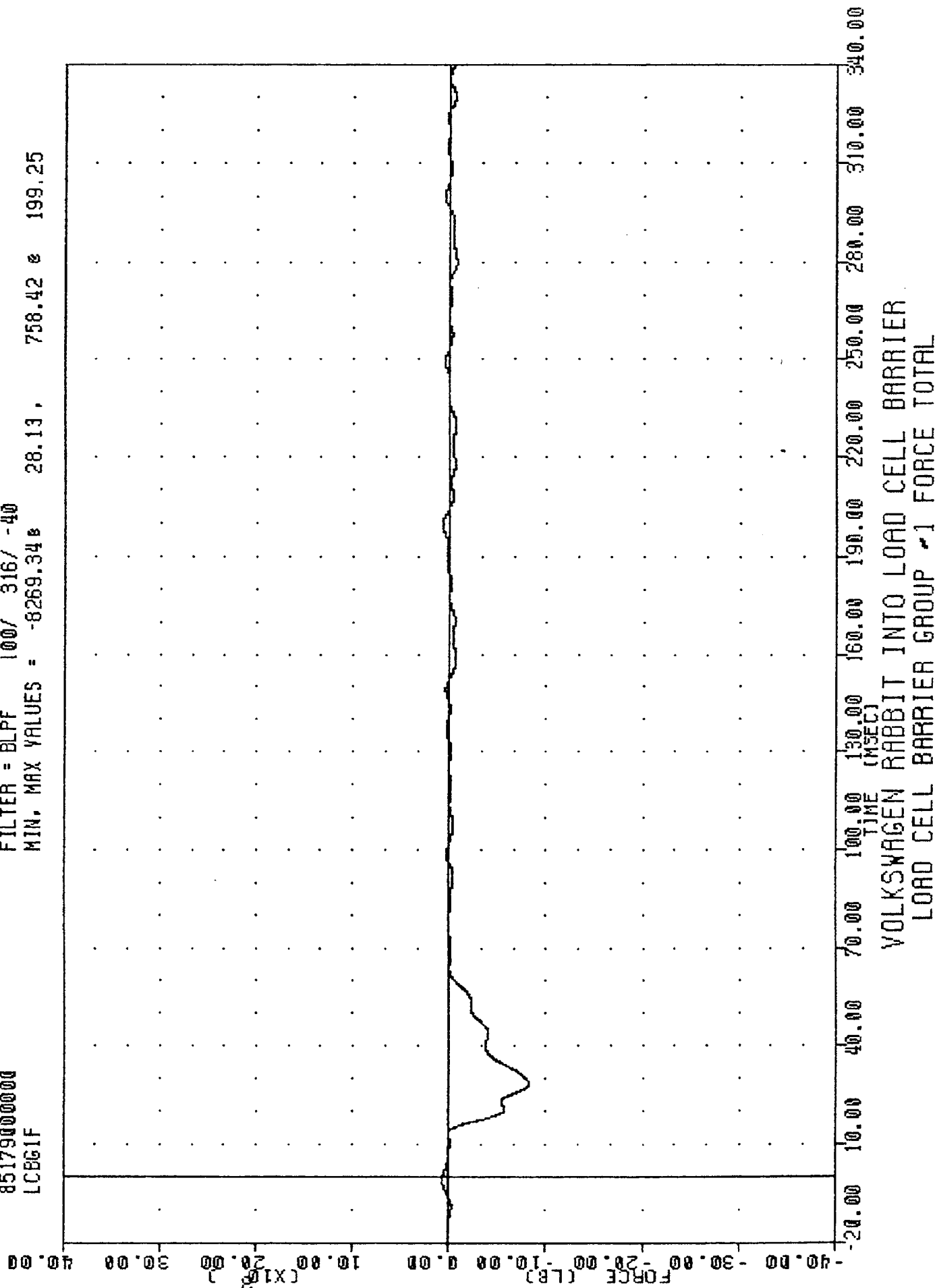
-120.00 -90.00 -60.00 -30.00 0.00 30.00 60.00 90.00 120.00



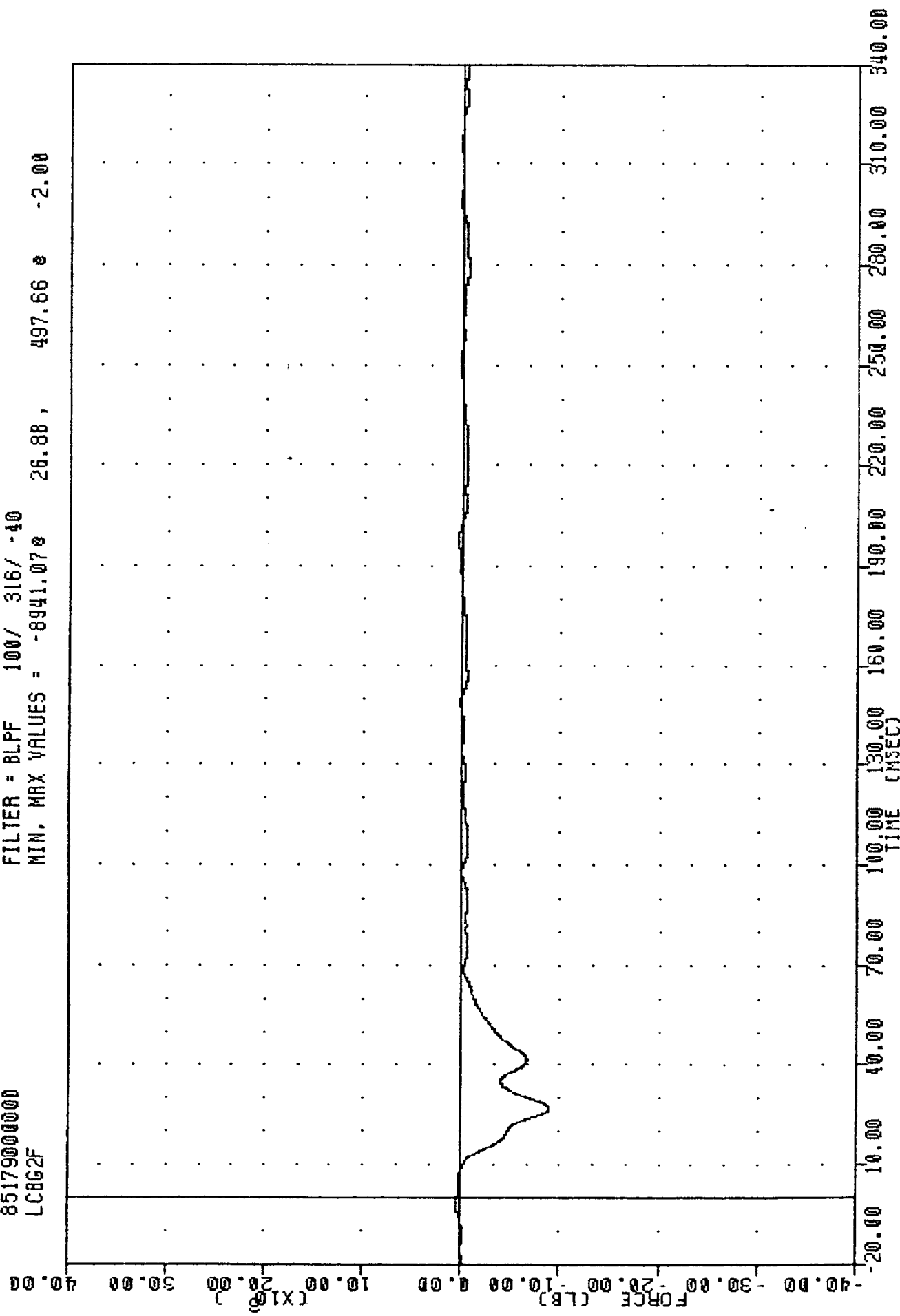
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D9 LBS

VR, 030628, 18 JUL 85 09:23:10
 RABBIT INTO FIXED LCB
 85179000000
 LCBG1F
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -8269.34 28.13, 758.42 199.25

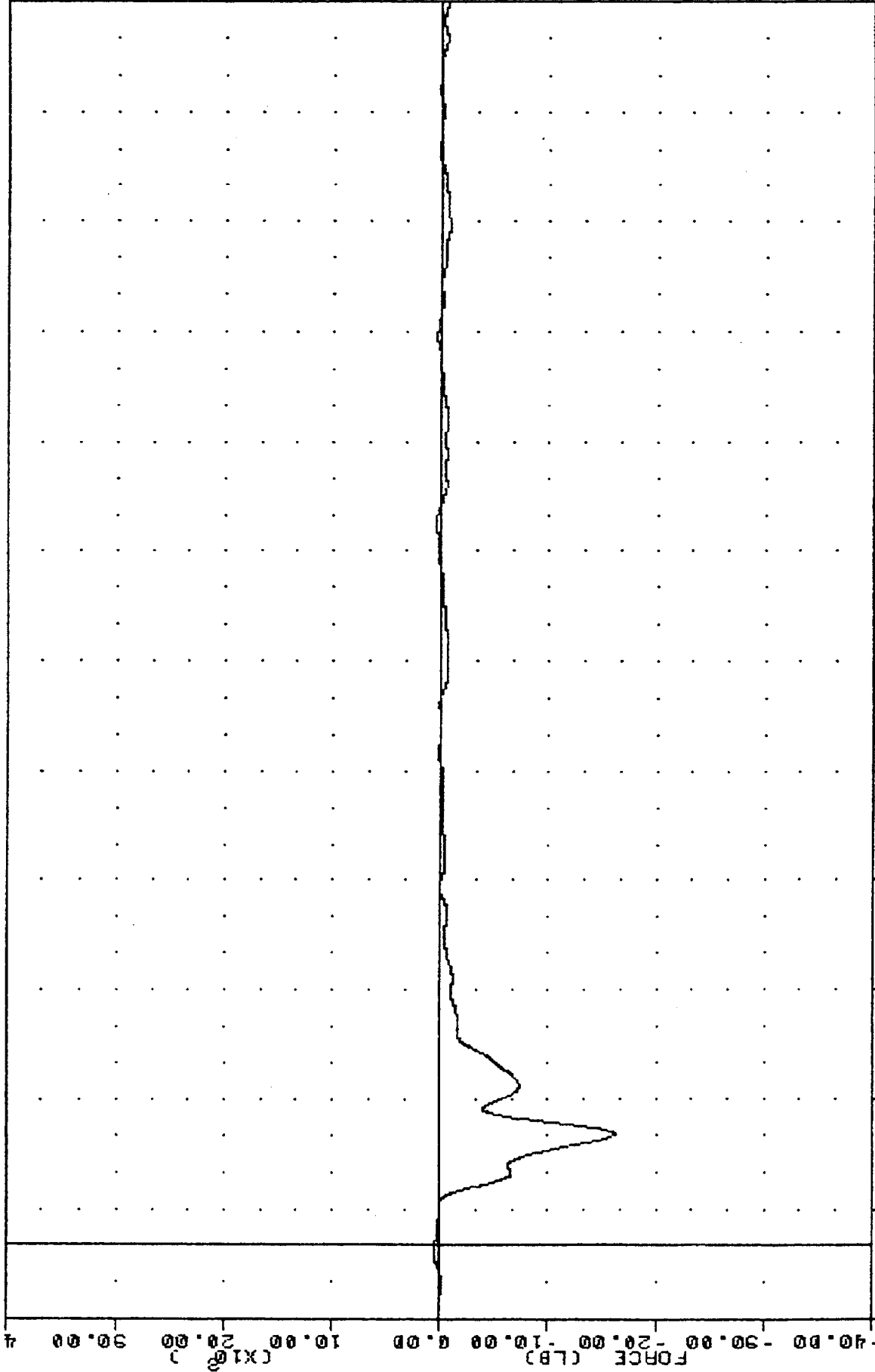


VRI 650628 18-JUL-85 09:23:10
 RABBIT INTO FIXED LCB
 85179000000
 LCBG2F
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -8941.07 26.88, 497.66 -2.00



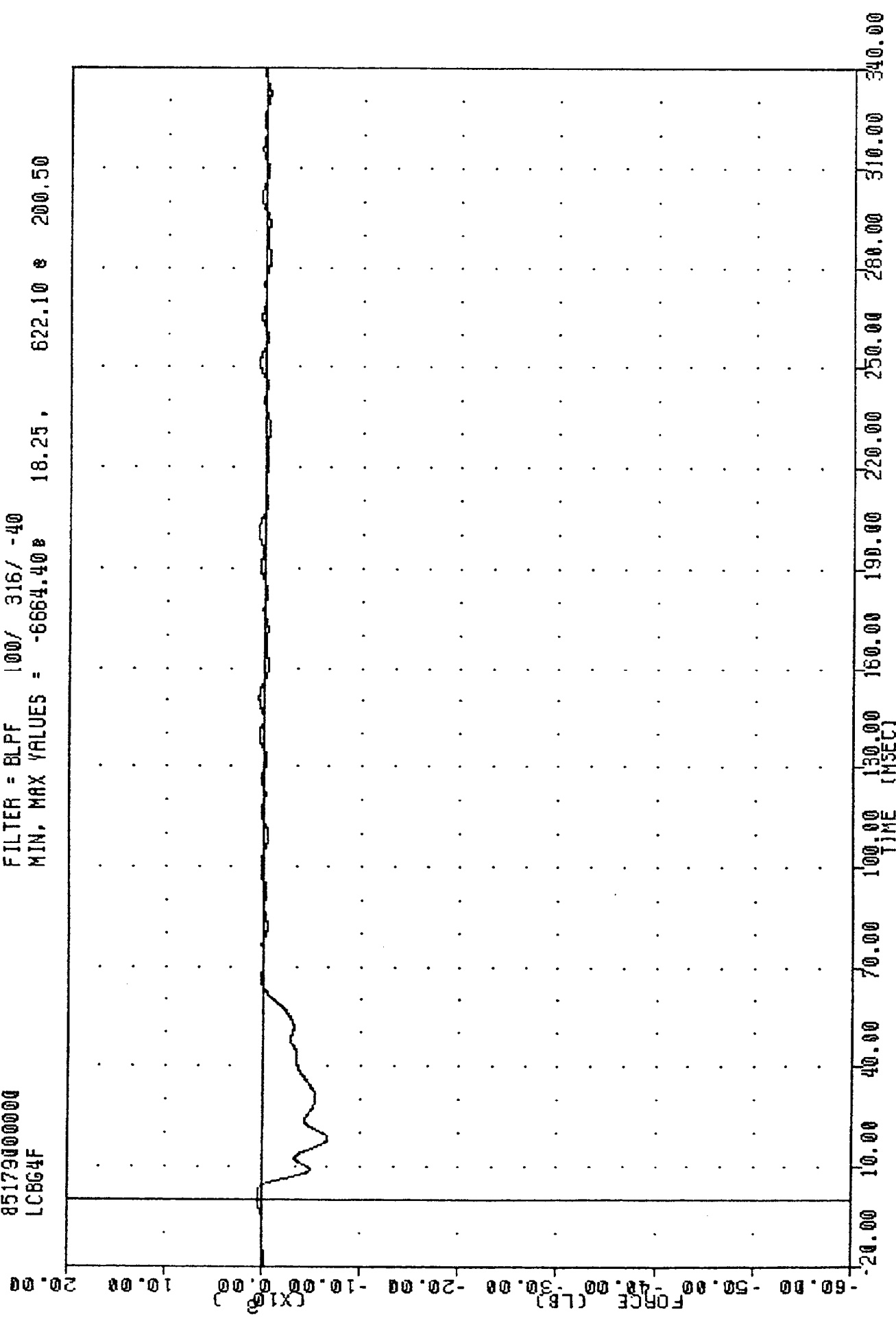
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP #2 FORCE TOTAL

VRT, 850828, PLOT DATE 18 OCT 88 09:23:10
 RABBIT INTO FIXED LCB
 85179000000
 LCBG3F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -16199.49 30.25, 560.59 -1.88



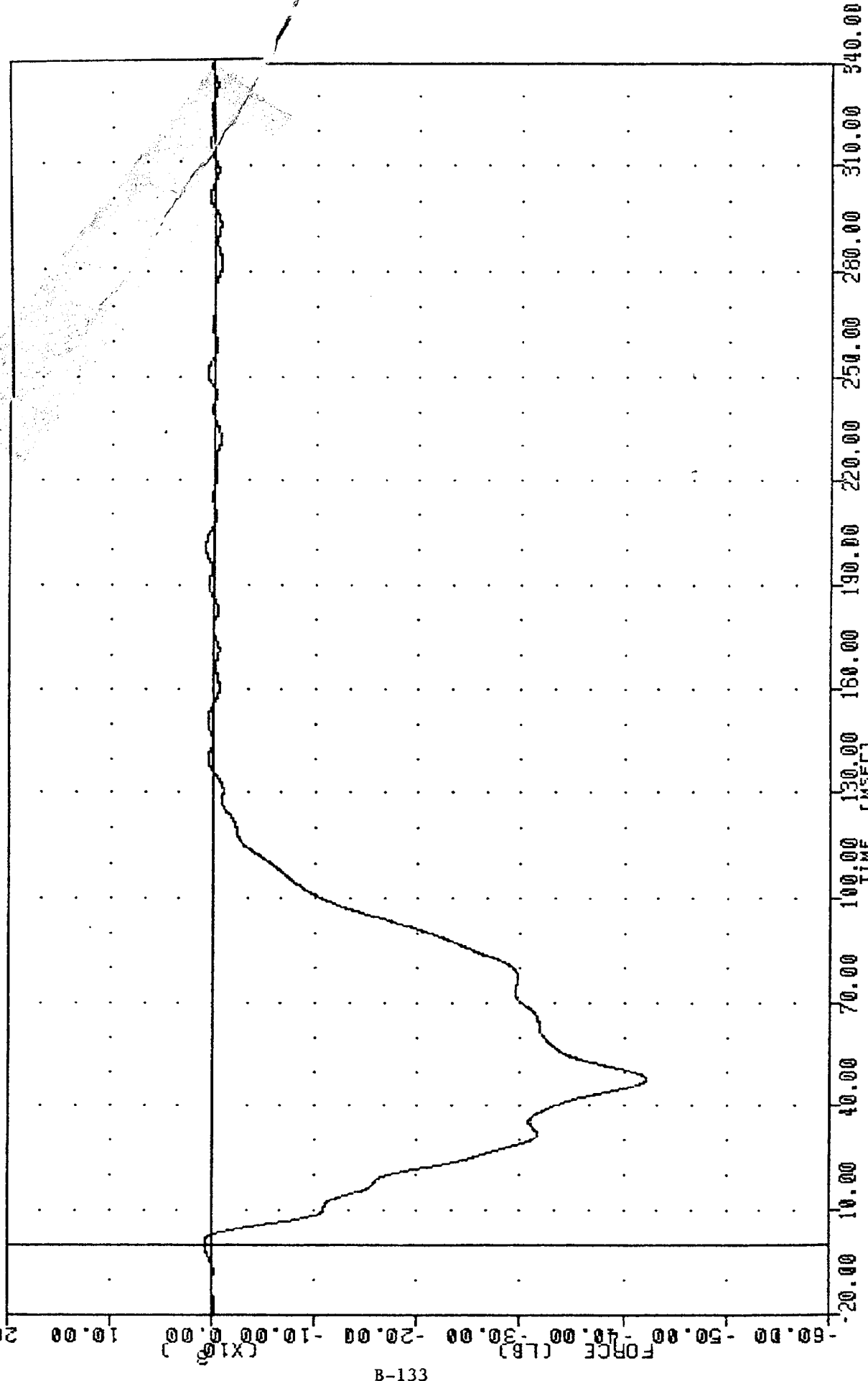
-40.00 -30.00 -20.00 -10.00 0.00 10.00 20.00 30.00 40.00
 (X10³)
 -20.00 10.00 30.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (INSEC)
 VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP #3 FORCE TOTAL

YRI 850628
 RABBIT INTO FIXED LCB
 85179000000
 LCBG4F
 PLOT DATE 18-JUL-85 09:23:10
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -6664.408 18.25, 622.10 e 200.50



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP #4 FORCE TOTAL

VRI 60W628 PLOT DATE 18 JUL 85 08:23:10
 RABBIT INTO FIXED LCB
 85179000000
 LC8G5F
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -42296.75 47.75, 819.93 200.38



VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP #5 FORCE TOTAL

VRT , 850628
RABBIT INTO FIXED LCB
85179000000
LCB66F

PLOT DATE 18-JUL-85 09:23:10

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -16934.238 26.13, 728.46 199.88

20.00

10.00

(X10³)

B-134

FORCE (LB)

-60.00
-50.00
-40.00
-30.00
-20.00
-10.00
0.00
10.00
20.00

-20.00

40.00

100.00

130.00

160.00

190.00

220.00

250.00

280.00

310.00

340.00

TIME (NSEC)

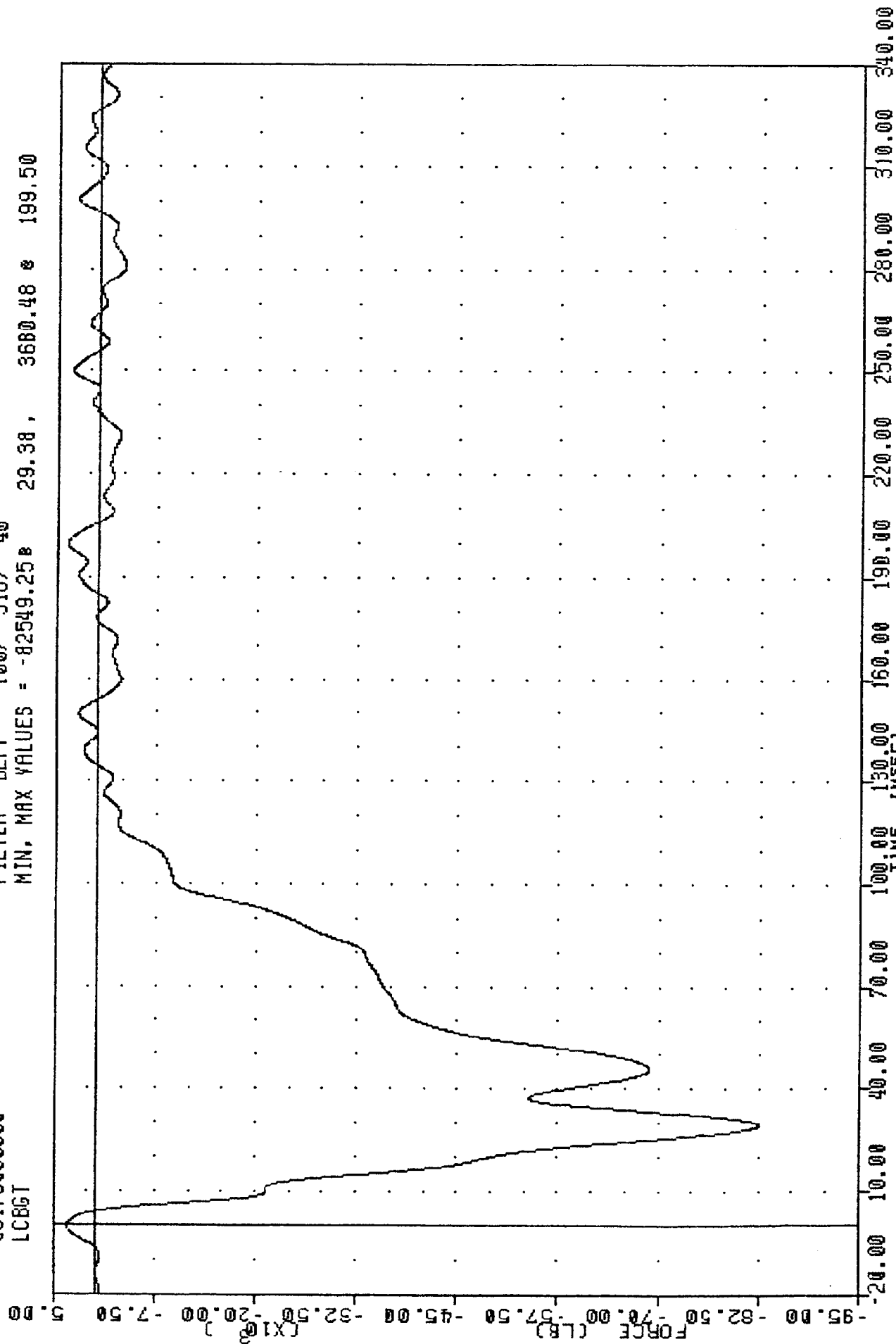
VOLKSWAGEN RABBIT INTO LOAD CELL BARRIER
LOAD CELL BARRIER GROUP #6 FORCE TOTAL

VRI , 850628
RABBIT INTO FIXED LCB
85179000000
LCBGT

PLOT DATE 18-JUL-85 09:23:10

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -82549.25 29.38, 3680.48 199.50



APPENDIX C
DUMMY CERTIFICATION

PRE-TEST CALIBRATION

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

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

28-MAY-85

VRTC SRL98 45C10HD1

HY3 SN45 HEAD#U1 DAL 10

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	254.90 G
PEAK LATERAL ACCELERATION	15 G MAX	-7.00 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Mary L. Phelps*

TEST SUPERVISOR *V. L. Watters*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

28-MAY-85

VRTC SRL98 45C10NF1

HY3 SN45 CAL10 NECK FLEXION 01

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	10 MS 22.50 - 27.50 G	23.09 G
DECELERATION	20 MS 17.40 - 22.60 G	20.68 G
	30 MS 12.50 - 18.50 G	17.68 G
MAXIMUM PENDULUM G	29 G MAX	23.48 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 46 MS	41.63 MS
D PLANE	MAX 67 - 79 DEGREES	77.24 DEGREES
ROTATION	TIME 54 - 64 MS	60.13 MS
MOMENT ABOUT	MAX 70 - 90 FT.LBS	74.64 FT.LBS
OCCIPITAL	TIME 46 - 56 MS	53.75 MS
CONDYLES	MIN -22.2/-14.0 FT.LBS	-14.44 FT.LBS
	TIME 12 - 16 MS	13.88 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	109 - 119 MS	123.00 MS **
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	95 - 105 MS	105.50 MS **

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN

Harry S. Phelps

TEST SUPERVISOR

V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

28-MAY-85

VRTC SRL98 45C10NE1

HY3 SN45 CAL10 NECK EXTEN. 01

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	10 MS 17.20 - 21.20 G	18.85 G
DECELERATION	20 MS 14.00 - 19.00 G	17.22 G
	30 MS 11.00 - 16.00 G	15.69 G
MAXIMUM PENDULUM G	22 G MAX	19.27 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 50 MS	42.25 MS
D PLANE	MAX 94 - 106 DEGREES	88.91 DEGREES **
ROTATION	TIME 72 - 82 MS	74.88 MS
MOMENT ABOUT	MAX 11.75 - 17.75 FT.LBS	14.11 FT.LBS
OCCIPITAL	TIME 12 - 18 MS	13.88 MS
CONDYLES	MIN -61.2/-50.8 FT.LBS	-49.85 FT.LBS **
	TIME 69 - 77 MS	71.00 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	151 - 167 MS	157.25 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 144 MS	134.13 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN

Harry L. Phelps

TEST SUPERVISOR

V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

29-MAY-85

VRTC SRL98 45C10TH1

HY3 SN45 CAL10 H.S.THORAX 01

HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	67.00 %
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
DEFLECTION AT 25 MSEC	2.51 - 2.75 INCHES	2.618 INCHES
RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1131.6 POUNDS *
INTERNAL HYSTERESIS	75% - 85%	73.5% *

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN

Larry L. Phelps

TEST SUPERVISOR

V. L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

26-JUN-85

LEFT KNEE
VRTC SRL98 45C10LK2

HY3 SN45 L.KNEE 11LB CAL 10

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	63.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1492.39 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR P. L. Watters

NOTE: New, fully instrumented, knee and lower leg installed.

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

26-JUN-85

RIGHT KNEE
VRTC SRL98 45C10RK2

HY3 SN45 R.KNEE 11LB CAL 10

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	63.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.94 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1525.82 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR J. L. Watters

NOTE: New, fully instrumented, knee and lower leg installed.

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

24-JUN-85

VRTC SRL98 48C14HD1

HY3 SN48/HEAD#48 CAL 14

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	71.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	69.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	270.87 G
PEAK LATERAL ACCELERATION	15 G MAX	3.42 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Mary J. Phelps

TEST SUPERVISOR

P.L. Waters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

6 AXIS NECK TRANSDUCER

24-JUN-85

VRTC SRL98 48C14NF1

HY3 SN48 CAL14 NECK FLEXION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	68.00 %
IMPACT VELOCITY	22.53 - 22.97 FPS	22.92 FPS
PENDULUM	10 MS 22.50 - 27.50 G	25.29 G
DECELERATION	20 MS 17.40 - 22.60 G	19.40 G
	30 MS 12.50 - 18.50 G	17.43 G
MAXIMUM PENDULUM G	29 G MAX	28.14 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 46 MS	40.63 MS
D PLANE	MAX 67 - 79 DEGREES	74.42 DEGREES
ROTATION	TIME 54 - 64 MS	61.00 MS
MOMENT ABOUT	MAX 70 - 90 FT.LBS	72.99 FT.LBS
OCCIPITAL	TIME 46 - 56 MS	55.13 MS
CONDYLES	MIN -22.2/-14.0 FT.LBS	-14.99 FT.LBS
	TIME 12 - 16 MS	15.63 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	109 - 119 MS	117.75 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	95 - 105 MS	105.00 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Harry L. Phelps

TEST SUPERVISOR

V.L. Watter

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

6 AXIS NECK TRANSDUCER

25-JUN-85

VRTC SRL98 48C14NE1

HY3 SN48 CAL14 NECK EXTENSION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	73.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	67.00 %
IMPACT VELOCITY	19.50 - 19.90 FPS	19.90 FPS
PENDULUM DECELERATION	10 MS 17.20 - 21.20 G	19.27 G
	20 MS 14.00 - 19.00 G	18.07 G
	30 MS 11.00 - 16.00 G	15.19 G
MAXIMUM PENDULUM G	22 G MAX	19.83 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	38 - 50 MS	41.63 MS
D PLANE	MAX 94 - 106 DEGREES	96.48 DEGREES
ROTATION	TIME 72 - 82 MS	78.25 MS
MOMENT ABOUT OCCIPITAL	MAX 11.75 - 17.75 FT.LBS	14.83 FT.LBS
	TIME 12 - 18 MS	15.88 MS
CONDYLES	MIN -61.2/-50.8 FT.LBS	-49.88 FT.LBS **
	TIME 69 - 77 MS	74.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	151 - 167 MS	161.88 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	120 - 144 MS	140.75 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN *Gary L. Phelps*

TEST SUPERVISOR *V.L. Watters*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

25-JUN-85

VRTC SRL98 48C14TH1

HY3 SN48 CAL14 H.S.THORAX 01

	HIGH SPEED TEST	
TEST PARAMETER	SPECIFICATION	TEST RESULTS
=====		
TEMPERATURE	66 - 78 DEGREES	72.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	63.00 %
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
DEFLECTION AT 25 MSEC	2.51 - 2.75 INCHES	2.615 INCHES
RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1170.4 POUNDS *
INTERNAL HYSTERESIS	75% - 85%	77.5%

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN Mary J. Phelps

TEST SUPERVISOR P.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

26-JUN-85

LEFT KNEE
VRTC SRL98 48C14LK2

HY3 SN49 L.KNEE 11LB CAL 14

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	71.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	63.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1472.26 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Gary L. Phelps

TEST SUPERVISOR

D. L. Waters

NOTE: New, fully instrumented, knee and lower leg installed.

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

26-JUN-85

RIGHT KNEE
VRTC SRL98 48C14RK2

HY3 SN48 R.KNEE 11LB CAL 14

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	63.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.96 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1390.28 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Harry L. Phelps*

TEST SUPERVISOR *V.L. Waters*

NOTE: New, fully instrumented, knee and lower leg installed.

POST-TEST CALIBRATION

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:

Rib 13 on Right side and Rib 1 on Left side have cracks

TRC Personnel

Checked By:

Gregg Wills
Signature

7-2-85
Date

VRTC Personnel

Checked and Approved for Testing By:

Signature

Date

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

02-JUL-85

VRTC SRL98 45C11HD1

HY3 SN45 HEAD#U1 CAL 11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	72.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	245.38 G
PEAK LATERAL ACCELERATION	15 G MAX	-5.53 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Gary S. Phelps

TEST SUPERVISOR

V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

02-JUL-85

VRTC SRL98 45C11NF1

HY3 SN45 CAL11 NECK FLEXION 01

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	22.86 FPS
PENDULUM	10 MS 22.50 - 27.50 G	26.93 G
DECELERATION	20 MS 17.40 - 22.60 G	21.04 G
	30 MS 12.50 - 18.50 G	17.04 G
MAXIMUM PENDULUM G	29 G MAX	28.93 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 46 MS	42.50 MS
D PLANE	MAX 67 - 79 DEGREES	72.97 DEGREES
ROTATION	TIME 54 - 64 MS	60.88 MS
MOMENT ABOUT	MAX 70 - 90 FT.LBS	73.94 FT.LBS
OCCIPITAL	TIME 46 - 56 MS	54.50 MS
CONDYLES	MIN -22.2/-14.0 FT.LBS	-14.80 FT.LBS
	TIME 12 - 16 MS	14.13 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	109 - 119 MS	122.88 MS **
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	95 - 105 MS	105.13 MS **

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN *Harry L. Phelps*

TEST SUPERVISOR *V.L. Waters*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

02-JUL-85

VRTC SRL98 45C11NE1

HY3 SN45 CAL11 NECK EXTEN. 01

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	19.79 FPS
PENDULUM	10 MS 17.20 - 21.20 G	18.28 G
DECELERATION	20 MS 14.00 - 19.00 G	17.56 G
	30 MS 11.00 - 16.00 G	14.54 G
MAXIMUM PENDULUM G	22 G MAX	21.88 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 50 MS	46.75 MS
D PLANE	MAX 94 - 106 DEGREES	90.64 DEGREES **
ROTATION	TIME 72 - 82 MS	77.25 MS
MOMENT ABOUT	MAX 11.75 - 17.75 FT.LB	13.32 FT.LBS
OCCIPITAL	TIME 12 - 18 MS	14.00 MS
CONDYLES	MIN -61.2/-50.8 FT.LBS	-47.96 FT.LBS **
	TIME 69 - 77 MS	72.75 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	151 - 167 MS	161.88 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 144 MS	140.25 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN

Harry L. Phelps

TEST SUPERVISOR

V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

03-JUL-85

VRTC SRL98 45C11TH1

HY3 SN45 CAL11 H.S.THORAX 01

TEST PARAMETER	HIGH SPEED TEST	
	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC
DEFLECTION AT 25 MSEC	2.51 - 2.75 INCHES	2.753 INCHES
RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1117.5 POUNDS *
INTERNAL HYSTERESIS	75% - 85%	72.7% *

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN *Harry L. Phelps*

TEST SUPERVISOR *P. L. Watters*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

03-JUL-85

RIGHT KNEE
VRTC SRL98 45C11RK1

HY3 SN45 R.KNEE 11LB CAL 11

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	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1350.13 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. Phelps

TEST SUPERVISOR K.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

03-JUL-85

LEFT KNEE
VRTC SRL98 45C11LK1

HY3 SN45 L.KNEE 11LB CAL 11

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	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1401.18 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Larry L. Phelps*

TEST SUPERVISOR *V.L. Watters*

Hybrid III Dummy
Damage Checklist

Dummy S/N 48

<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>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:

Visual OK

New Lower Leg Instrumentation

TRC Personnel

Checked By:

Garry Wills
Signature

7-2-85
Date

VRTC Personnel

Checked and Approved for Testing By:

Signature

Date

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

02-JUL-85

VRTC SRL98 48C15HD1

HY3 SN48/HEAD#48 CAL 15

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	72.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	268.94 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.63 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Gary L. Phelps

TEST SUPERVISOR

V.L. Waters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

6 AXIS NECK TRANSDUCER

02-JUL-85

VRTC SRL98 48C15NF1

HY3 SN48 CAL15 NECK FLEXION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	73.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
IMPACT VELOCITY	22.53 - 22.97 FPS	22.86 FPS
PENDULUM	10 MS 22.50 - 27.50 G	25.44 G
DECELERATION	20 MS 17.40 - 22.60 G	19.66 G
	30 MS 12.50 - 18.50 G	17.93 G
MAXIMUM PENDULUM G	29 G MAX	26.16 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 46 MS	39.50 MS
D PLANE	MAX 67 - 79 DEGREES	72.51 DEGREES
ROTATION	TIME 54 - 64 MS	58.75 MS
MOMENT ABOUT	MAX 70 - 90 FT.LBS	73.85 FT.LBS
OCCIPITAL	TIME 46 - 56 MS	53.00 MS
CONDYLES	MIN -22.2/-14.0 FT.LBS	-15.65 FT.LBS
	TIME 12 - 16 MS	15.75 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	109 - 119 MS	117.25 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	95 - 105 MS	102.50 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Harry T. Phelps

TEST SUPERVISOR

V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

6 AXIS NECK TRANSDUCER

03-JUL-85

VRTC SRL98 48C15NE1

HY3 SN48 CAL15 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	19.90 FPS
PENDULUM	10 MS 17.20 - 21.20 G	19.73 G
DECELERATION	20 MS 14.00 - 19.00 G	17.17 G
	30 MS 11.00 - 16.00 G	15.51 G
MAXIMUM PENDULUM G	22 G MAX	20.19 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 50 MS	42.25 MS
D PLANE	MAX 94 - 106 DEGREES	94.09 DEGREES
ROTATION	TIME 72 - 82 MS	78.50 MS
MOMENT ABOUT	MAX 11.75 - 17.75 FT.LBS	14.17 FT.LBS
OCCIPITAL	TIME 12 - 18 MS	15.63 MS
CONDYLES	MIN -61.2/-50.8 FT.LBS	-50.00 FT.LBS **
	TIME 69 - 77 MS	75.00 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	151 - 167 MS	160.13 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 144 MS	141.88 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN

Harry L. Phelps

TEST SUPERVISOR

V.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

03-JUL-85

VRTC SRL98 48C15TH1

HY3 SN48 CAL15 H.S.THORAX 01

	HIGH SPEED TEST	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
=====		
TEMPERATURE	66 - 78 DEGREES	70.00 DEGREES

RELATIVE HUMIDITY	10% - 70%	70.00 %

PENDULUM VELOCITY	21.78-22.22 FT/SEC	22.22 FT/SEC

DEFLECTION AT 25 MSEC	2.51 - 2.75 INCHES	2.653 INCHES

RESISTIVE FORCE AT 19 MSEC	1186 - 1298 POUNDS	1169.9 POUNDS *

INTERNAL HYSTERESIS	75% - 85%	76.3%

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN

Larry L. Phelps

TEST SUPERVISOR

J. L. Waters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

03-JUL-85

RIGHT KNEE

VRTC SRL98 48C15RK1

HY3 SN48 R.KNEE 11LB CAL 15

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	71.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1255.62 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Larry L. Phelps

TEST SUPERVISOR P.L. Watters

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

03-JUL-85

LEFT KNEE

VRTC SRL98 48C15LK1

HY3 SN48 L.KNEE 11LB CAL 15

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEGREES	71.00 DEGREES
RELATIVE HUMIDITY	10% - 70%	70.00 %
PROBE VELOCITY	6.83 - 6.96 FT/SEC	6.95 FT/SEC
PEAK KNEE IMPACT FORCE	1000 - 1560 LBS.	1484.77 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Gary L. PhelpsTEST SUPERVISOR V.L. Watters

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° and 25° to the horizontal. This may be accomplished by raising the legs or flexing the upper torso forward and allowing the pelvis to rotate. The lateral pelvis angle should be horizontal.

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

3.1.3 If the H-point cannot be placed at the desired coordinates, adjust the pelvis angle within the 5° 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.

ACCELEROMETER PLACEMENT

Dummy Chest Humanoid		45 , in Body Humanoid		45	
(MFR)		(S/N)		(MFR)	
(S/N)		(MFR)		(S/N)	
Mnemonic	Label No.	Location	Orientation (+Sensing)	Serial No.	Mfr/Model
<u>LFMF1</u>	<u>716</u>	Left Femur	Tension	<u>716</u>	<u>2430</u>
<u>RFMF1</u>	<u>726</u>	Right Femur	Tension	<u>726</u>	<u>2430</u>
<u>CSTXG1</u>	<u>W</u>	Chest (X)	Rear	<u>AN03</u>	<u>7264</u>
<u>CSTYG1</u>	<u>V</u>	Chest (Y)	Right	<u>AP96</u>	<u>7264</u>
<u>CSTZG1</u>	<u>U</u>	Chest (Z)	Up	<u>AK12</u>	<u>7264</u>
<u>HEDXG1</u>	<u>X</u>	Head (X)	Front	<u>AP48</u>	<u>7264</u>
<u>HEDYG1</u>	<u>Y</u>	Head (Y)	Right	<u>AN71</u>	<u>7264</u>
<u>HEDZG1</u>	<u>Z</u>	Head (Z)	Up	<u>AN92</u>	<u>7264</u>
<u>NEKXF1</u>	<u>XF</u>	Neck (X)	Front	<u>049</u>	<u>186</u>
<u>NEKYM1</u>	<u>YM</u>	Neck (Y)	Left	<u>049</u>	<u>186</u>
<u>NEKZF1</u>	<u>ZF</u>	Neck (Z)	Tension	<u>049</u>	<u>186</u>
<u>KNLF1</u>	<u>35L</u>	Left Knee	Tension	<u>035</u>	<u>1587</u>
<u>KNLFA</u>	<u>35R</u>	Left Knee	Tension	<u>035</u>	<u>1587</u>
<u>KNRF1</u>	<u>34L</u>	Right Knee	Tension	<u>034</u>	<u>1587</u>
<u>KNRFA</u>	<u>35R</u>	Right Knee	Tension	<u>035</u>	<u>1587</u>
<u>TBLXM1</u>	<u>38X</u>	Left Tibia	Left	<u>038</u>	<u>1583</u>
<u>TBLYM1</u>	<u>38Y</u>	Left Tibia	Rear	<u>038</u>	<u>1583</u>
<u>TBRXM1</u>	<u>37X</u>	Right Tibia	Left	<u>037</u>	<u>1583</u>
<u>TBRYM1</u>	<u>37Y</u>	Right Tibia	Rear	<u>037</u>	<u>1583</u>

*With 10 Vdc input (2000 g range).

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>ANLYF1</u>	<u>32Y</u>	Left Ankle	Left	<u>032</u>	<u>1584</u>
<u>ANLZF1</u>	<u>32Z</u>	Left Ankle	Tension	<u>032</u>	<u>1584</u>
<u>ANLXM1</u>	<u>32X</u>	Left Ankle	Left	<u>032</u>	<u>1584</u>
<u>ANRYF1</u>	<u>31Y</u>	Right Ankle	Left	<u>031</u>	<u>1584</u>
<u>ANRZF1</u>	<u>31Z</u>	Right Ankle	Tension	<u>031</u>	<u>1584</u>
<u>ANRXM1</u>	<u>31X</u>	Right Ankle	Left	<u>031</u>	<u>1584</u>
<u>CSTXD1</u>	<u>ZP2</u>	Chest		<u>CP2</u>	<u>Bournes</u>

*With 10 Vdc input (2000 g range).

ACCELEROMETER PLACEMENT

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

Mnemonic	Label No.	Location	Orientation (+Sensing)	Serial No.	Mfr/Model
<u>LFMF2</u>	<u>756</u>	Left Femur	Tension	<u>756</u>	<u>2430</u>
<u>RFMF2</u>	<u>721</u>	Right Femur	Tension	<u>721</u>	<u>2430</u>
<u>CSTXG2</u>	<u>10</u>	Chest (X)	Rear	<u>AB62</u>	<u>7264</u>
<u>CSTYG2</u>	<u>11</u>	Chest (Y)	Right	<u>AL08</u>	<u>7264</u>
<u>CSTZG2</u>	<u>12</u>	Chest (Z)	Up	<u>AL46</u>	<u>7264</u>
<u>HEDXG2</u>	<u>8</u>	Head (X)	Front	<u>AH58</u>	<u>7264</u>
<u>HEDYG2</u>	<u>9</u>	Head (Y)	Left	<u>AH77</u>	<u>7264</u>
<u>HEDZG2</u>	<u>13</u>	Head (Z)	Up	<u>AH88</u>	<u>7264</u>
<u>HD1XG</u>	<u>4</u>	Head (X)	Front	<u>AK52</u>	<u>7264</u>
<u>HD1ZG</u>	<u>6</u>	Head (Z)	Up	<u>AJ49</u>	<u>7264</u>
<u>HD2YG</u>	<u>2</u>	Head (Y)	Left	<u>AC88</u>	<u>7264</u>
<u>HD2ZG</u>	<u>3</u>	Head (Z)	Up	<u>AK48</u>	<u>7264</u>
<u>NEKXM2</u>	<u>XF</u>	Neck (X)	Front	<u>076</u>	<u>1716</u>
<u>NEKXM</u>	<u>XM</u>	Neck (X)	Right	<u>076</u>	<u>1716</u>
<u>NEKYM2</u>	<u>YM</u>	Neck (Y)	Front	<u>076</u>	<u>1716</u>
<u>NEKYF2</u>	<u>YF</u>	Neck (Y)	Left	<u>076</u>	<u>1716</u>
<u>NEKZF2</u>	<u>ZF</u>	Neck (Z)	Tension	<u>076</u>	<u>1716</u>
<u>NEKZM2</u>	<u>ZM</u>	Neck (Z)	Tension	<u>076</u>	<u>1716</u>

*With 10 Vdc input (2000 g range).

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>KNLRF2</u>	<u>37L</u>	Left Knee	Tension	<u>037</u>	<u>1587</u>
<u>KNLFB</u>	<u>37R</u>	Left Knee	Tension	<u>037</u>	<u>1587</u>
<u>KNLXD2</u>		Left Knee			<u>Carter</u>
<u>KNRFF2</u>	<u>36R</u>	Right Knee	Tension	<u>036</u>	<u>1587</u>
<u>KNRFB2</u>	<u>36L</u>	Right Knee	Tension	<u>036</u>	<u>1587</u>
<u>KNRDX2</u>		Right Knee			<u>Carter</u>
<u>TBLXM2</u>	<u>40X</u>	Left Tibia	Left	<u>040</u>	<u>1583</u>
<u>TBLYM2</u>	<u>40Y</u>	Left Tibia	Rear	<u>040</u>	<u>1583</u>
<u>TBRXM2</u>	<u>39X</u>	Right Tibia	Left	<u>039</u>	<u>1583</u>
<u>TBYM2</u>	<u>39Y</u>	Right Tibia	Rear	<u>039</u>	<u>1583</u>
<u>ANLYF2</u>	<u>34Y</u>	Left Ankle	Left	<u>034</u>	<u>1584</u>
<u>ANLZF2</u>	<u>34Z</u>	Left Ankle	Tension	<u>034</u>	<u>1584</u>
<u>ANLXM2</u>	<u>34X</u>	Left Ankle	Left	<u>034</u>	<u>1584</u>
<u>ANRYF2</u>	<u>33Y</u>	Right Ankle	Left	<u>033</u>	<u>1584</u>
<u>ANRZF2</u>	<u>33Z</u>	Right Ankle	Tension	<u>033</u>	<u>1584</u>
<u>ANRXM2</u>	<u>33X</u>	Right Ankle	Left	<u>033</u>	<u>1584</u>
<u>CSTXD2</u>		Chest			<u>Bournes</u>

*With 10 Vdc input (2000 g range).

VEHICLE ACCELEROMETER INFORMATION

<u>MNEMONIC</u>	<u>DESCRIPTION</u>	<u>SERIAL NO.</u>	<u>MODEL NO.</u>
FFRXG	FRONT FRAME RAIL X-DIR	AK14	2264
BCRXG	BRAKE CALIPER; RIGHT X-DIR	AN06	2264
ENGXG2	ENGINE BOTTOM X-DIR	AZ48	7264
ENGXG1	ENGINE BLOCK TOP X-DIR	AK87	7264
SCAPG	STEERING COLUMN LOWER A-P AXIS	AJ02	2264
SH1PG	STEERING WHEEL HUB A-P AXIS	AJ92	2264
SH1IG	STEERING WHEEL HUB I-S AXIS	AJ97	2264
DPCXG	DASH PANEL X-DIR	AS58	2264
DPCZG	DASH PANEL Z-DIR	AS86	2264
VCGV	PITCH RATE GYRO		
LPBXG	LEFT B-PILLAR X-DIR	BA99	2264
LPBZG	LEFT B-PILLAR Z-DIR	AK61	2264
RPBXG	RIGHT B-PILLAR X-DIR	AJ45	2264
TLRXG4	LEFT REAR CROSS MEMBER X-DIR	AR87	2264
TLRZG4	LEFT REAR CROSS MEMBER Z-DIR	AF22	2264
TLRXGD	LEFT REAR CROSS MEMBER RED.	AG05	2264
TRRXG3	RIGHT REAR CROSS MEMBER X-DIR	AU15	2264
RAXXG	REAR AXLE X-DIR	AK66	2264

CAMERA INFORMATION

CAMERA IDENTIFICATION

TIME ZERO ON HIGH SPEED FILM

Photosonics

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

Back 4 frames from frame where verticle event bar stops.

Hycam

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

Back 5 frames from frame where vertical event bar stops.

Stalex

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

Back 2 frames from frame where vertical event bar stops.

SIGN CONVENTION

Sign convention for SRL 98 neck load cells and transducers.

Compression (-) on femur load cells and load cells in barrier face.

Neck Transducer Notation

3 channel neck transducer

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

6 channel neck transducers

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

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

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

SIGN CONVENTION CONTD

Knee loads are 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