

DOT 1000

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

JEEP CORPORATION

1987 Jeep Comanche
SHORTBOX PICKUP
NHTSA NO. MH0400
TRCO TEST NO. 870324

THE TRANSPORTATION RESEARCH CENTER OF OHIO
U.S. ROUTE 33, LOGAN COUNTY
EAST LIBERTY, OHIO 43319



APRIL 1987
FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
400 SEVENTH STREET, S.W.
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16. Abstract A 35 mph frontal barrier impact test using a load cell barrier was conducted on a 1987 Jeer Comanche Shortbox Pickup at the Transportation Research Center of Ohio in East Liberty, Ohio on March 24, 1987. The barrier impact velocity was 35.2 mph, and the ambient temperature at the barrier face at the time of impact was 70°F. The post-test vehicle crush maximum was 20.5 inches, and intrusion of the firewall into the compartment was 2.5 inches. Driver HIC: 1052 Passenger HIC: 2700		
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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	degrees Celsius	°C
		9	subtracting	
		32		

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 add 32)	degrees Fahrenheit	°F

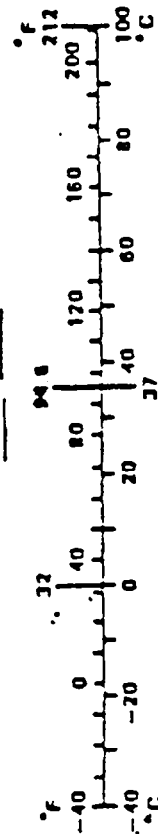


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SECTION 1.0
PURPOSE AND TEST SUMMARY

This 35 mph frontal barrier impact test is part of the Composite FY'87 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-87-R-02012. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data.

The 35 mph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test Procedure. Occupant performance data are provided herein.

SECTION 2.0
SUMMARY OF TEST NUMBER MH0400

A load cell barrier consisting of 36 load cells was impacted by a 1987 Jeep Comanche Shortbox Pickup at a velocity of 35.2 mph. The test was performed at the Transportation Research Center of Ohio on March 24, 1987. Pre- and post-test photographs of the vehicle and occupants are presented in Appendix A.

Two Part 572, 50th percentile adult male Anthropomorphic Test Devices (ATDs) were placed in the driver and right-front passenger designated seating positions, according to dummy placement procedures specified in Laboratory Indicant Test Procedure dated September 1, 1986.

Both ATDs were instrumented with head and chest triaxial accelerometers and right/left femur load cells. In addition, load cells were placed on the driver's and passenger's lap and shoulder belts to measure dummy upper torso and pelvic section loading. A summary of the dummy performance verification test data is presented in Appendix C.

The crash event was recorded by one real-time camera and 15 high-speed cameras. Camera locations and other pertinent camera information are found in Section 3.0 of this report.

The 67 channels of data were recorded on two 14-track tape drives. Appendix B contains the vehicle, load cell barrier and dummy response data plots.

CRASH TEST SUMMARY

TEST NO. 870324 PROJECT: MH0400
DATE: March 24, 1987 TIME: 12:40 TEMP: 70°F
VEHICLE: 1987 Jeep ComancheShortbox Pickup
TEST WEIGHT (LBS): 3554
IMPACT ANGLE (DEG)*: 0
IMPACT VELOCITY (MPH)**: 35.2
MAX CRUSH (IN) STATIC: 20.5

DUMMIES:	DRIVER	PASSENGER
TYPE:	Part 572	Part 572
LOCATION:	Front Left	Front Right
RESTRAINT:	3-pt. Production Seat Belt	3-pt. Production Seat Belt
NUMBER OF DATA CHANNELS: 67		
NUMBER OF HIGH SPEED CAMERAS: 16 and 1 real-time camera		

*With respect to tow track centerline.

**Speed trap measurement ($\pm$.05% accuracy).

GENERAL COMMENTS

The 1987 Jeep Comanche Shortbox Pickup was equipped with a 2.5 liter, 4-cylinder inline engine, 4-speed manual transmission, and power brakes. The total test weight with two 50th percentile male dummies, instrumentation and two on-board cameras was 3554 pounds. The test vehicle impacted the frontal load cell barrier at a velocity of 35.2 mph.

The vehicle sustained 20.5 inches of static crush. Maximum load cell barrier force measured by the 36 load cells was 132978 pounds at 35.9 milliseconds.

The driver's "Head Injury Criteria" was 1052; the maximum chest deceleration over 3 milliseconds was 62 g's. The right and left femur loads were 923 and 925 pounds, respectively.

The passenger's "Head Injury Criteria" was 2700; the maximum chest deceleration over 3 milliseconds was 48 g's. The right and left femur loads were 761 and 319 pounds, respectively.

The belt-related data for each occupant are presented in Section 3.0 of this report.

DATA ACQUISITION EXPLANATIONS

The transducer (linear potentiometer) used to measure the belt stretch in data channel SBED2, Passenger Seat Belt Extension, failed at approximately 30 msec into the crash event. The failure was verified to be caused by off-axis loading on the sliding rod assembly applied by the belt. There was not any belt stretch indicated by the redundant thread sewn into the shoulder belt as described in the NCAP procedure.

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Jeep Corporation

MAKE/MODEL: Jeep Comanche

VIN: 1JTHS641XHT085473

BODY STYLE: Shortbox Pickup

MODEL YEAR: 1987

NHTSA NO.: MH0400

COLOR: Olympic White

ENGINE DATA: TYPE: Inline CYLINDERS: 4 DISPLACEMENT: 2.5 liter

 X GAS, DIESEL, TURBOCHARGE

TRANSMISSION DATA: 4 SPEED, X MANUAL, AUTOMATIC, FWD X RWD

DATE VEHICLE RECEIVED: 2/10/87

ODOMETER READING: 70

DEALER'S NAME AND ADDRESS: Dick Clifton Motors, Inc.
1390 West Broad Street
Columbus, Ohio 43222

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	No	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	No	REAR WINDOW DEFROSTER	No
OTHER			

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

VEHICLE MANUFACTURED : Jeep Corporation

DATE OF MANUFACTURE: 1/87

GVWR: 4103 LBS.

GAWR: FRONT 2500 LBS., REAR 2700 LBS.

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

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

RECOMMENDED TIRE SIZE: P205/75R15 LOAD RANGE X B, C, D

TIRES ON VEHICLE (MFGR., LINE, SIZE): Goodyear Vector P205/75R15

IS SPARE TIRE A "SPACE SAVER": No

IS SPARE TIRE STANDARD EQUIPMENT: Yes

VEHICLE CAPACITY: TYPES OF SEATS Bench

TYPE OF FRONT SEAT BACKS Fixed

NUMBER OF OCCUPANTS 3 FRONT 0 REAR 3 TOTAL

CARGO LOAD NA* LBS. TOTAL NA* LBS.

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

RIGHT FRONT	807	LBS.	RIGHT REAR	636	LBS.
LEFT FRONT	838	LBS.	LEFT REAR	626	LBS.
TOTAL FRONT WEIGHT	1645	LBS.	(56.6 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1262	LBS.	(43.4 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	2907	LBS.			

CALCULATION FOR TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT

UDW = UNLOADED DELIVERED WEIGHT (2907 LBS)

VCW = VEHICLE CAPACITY WEIGHT (NA* LBS)

DSC = DESIGNATED SEATING CAPACITY (3)

RCLW = VCW - 150 (DCS) = (NA* LBS)

TARGET TEST WEIGHT = UDW + RCLW + (2 DUMMIES X 164 LBS/DUMMY)

= 2907 + 300 + 328 LBS**

TARGET TEST WEIGHT = 3535 LBS

* Safety Compliance Certification Label did not contain this information.

** A cargo capacity of 300 pound was used for this test as specified in the NCAP Laboratory Procedure.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 319 LBS. CARGO:

RIGHT FRONT	897	LBS.	RIGHT REAR	911	LBS.
LEFT FRONT	881	LBS.	LEFT REAR	865	LBS.
TOTAL FRONT WEIGHT	1778		LBS. (50.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1776		LBS. (50.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	3554		LBS. (0.5 % OVER TARGET WEIGHT)		

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

COMPONENTS REMOVED TO MEET TARGET WEIGHT: None

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	'RF 31.1	;LF 30.9	;RR 32.6	;LR 32.5
PRE-TEST ATTITUDE:	RF 30.8	;LF 30.5	;RR 30.5	;LR 30.6
POST-TEST ATTITUDE:	RF 29.6	;LF 30.3	;RR 29.4	;LR 31.5
WHEELBASE:	113.0	INCHES		

CG = 56.5 INCHES REARWARD OF FRONT WHEEL CENTERLINE

TEST CONDITIONS

TEST NUMBER: 870324

DATE OF TEST: March 24, 1987

TIME OF TEST: 12:40

TYPE OF TEST: Frontal Load Cell Barrier Impact

IMPACT ANGLE: 0°

AMBIENT TEMPERATURE AT IMPACT AREA: 70°F

TEMPERATURE IN OCCUPANT COMPARTMENT: 68°F

IMPACT VELOCITY: PRIMARY = 35.2 MPH

(SPECIFIED RANGE = 34.5 TO 35.5 MPH)

VEHICLE REBOUND AND CRUSH (ALL DIMENSIONS IN INCHES)

OVERALL LENGTH OF TEST VEHICLE:	PRE-TEST:	R 177.0	;C 179.8	;L 177.1
	POST-TEST:	R 160.0	;C 159.8	;L 159.3
	TOTAL CRUSH:	R 17.0	;C 20.0	;L 17.8

FOR FRONTAL IMPACTS, DISTANCE FROM FRONT OF TEST VEHICLE TO BARRIER AFTER IMPACT: R: 47.9 ;C: 48.0 ;L: 47.1

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #758	PASSENGER #759
Head	<u>Upper steering wheel rim and steering wheel hub</u>	<u>Instrument panel</u>
Chest	<u>Lower steering wheel rim</u>	<u>None</u>
Abdomen	<u>None</u>	<u>None</u>
Left Knee	<u>Instrument panel</u>	<u>Instrument panel</u>
Right Knee	<u>Instrument panel</u>	<u>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>DNA</u>	<u>DNA</u>

GLAZING DAMAGE: Entire windshield cracked. No other glazing
damage.

OTHER NOTABLE IMPACT EFFECTS:

Spare tire fell off during impact.

SECTION 3.0

OCCUPANT, VEHICLE AND LOAD CELL BARRIER INFORMATION

DUMMY INJURY CRITERIA

	MAXIMUM ACCELERATION ('G')							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DRIVER	-272.5	57.2	-62.2	280.9	-62.0	35.9	-19.1	62
PASSENGER	-162.4	-79.5	-131.3	214.7	-48.8	-35.0	-28.6	48

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DRIVER	923	925
PASSENGER	761	319

	MAXIMUM FORCE-SEAT BELT LOADS (LBS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DRIVER	1586	---	1332
PASSENGER	1642	1446	---

	HEAD INJURY CRITERIA**		
	HIC	t ₁ (MSEC)	t ₂ (MSEC)
DRIVER	1052	63.6	99.6
PASSENGER	2700	87.9	101.8

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

DUMMY KINEMATIC SUMMARY

DRIVER

During impact, the knees translated forward and struck the instrument panel. The dummy's head and upper torso rotated forward until the dummy's face struck the upper steering wheel rim and the steering wheel hub. The dummy's chest contacted the lower steering wheel rim. Just prior to contact, the steering column had rotated upward. The dummy rebounded rearward into the seatback. There were no head restraints and the head rotated rearward but did not contact any vehicle surface. The dummy came to rest seated upright and facing forward.

PASSENGER

During impact, the knees translated forward and struck the instrument panel. The head and upper torso rotated forward until the head struck the instrument panel and the upper torso was arrested by the restraint system. The dummy rebounded from the restraint system until the upper torso contacted the seatback. There were no head restraints and the head rotated rearward but did not contact any vehicle surface. The dummy came to rest seated upright and facing forward.

DUMMY POSITIONING DATA FOR
35 MPH FRONTAL BARRIER IMPACT TEST

PRE-IMPACT DATA:

Make/Model: Jeep Comanche
Body Style: Shortbox Pickup Model Year: 1987
NHTSA No.: MHQ400 Color: Olympic White

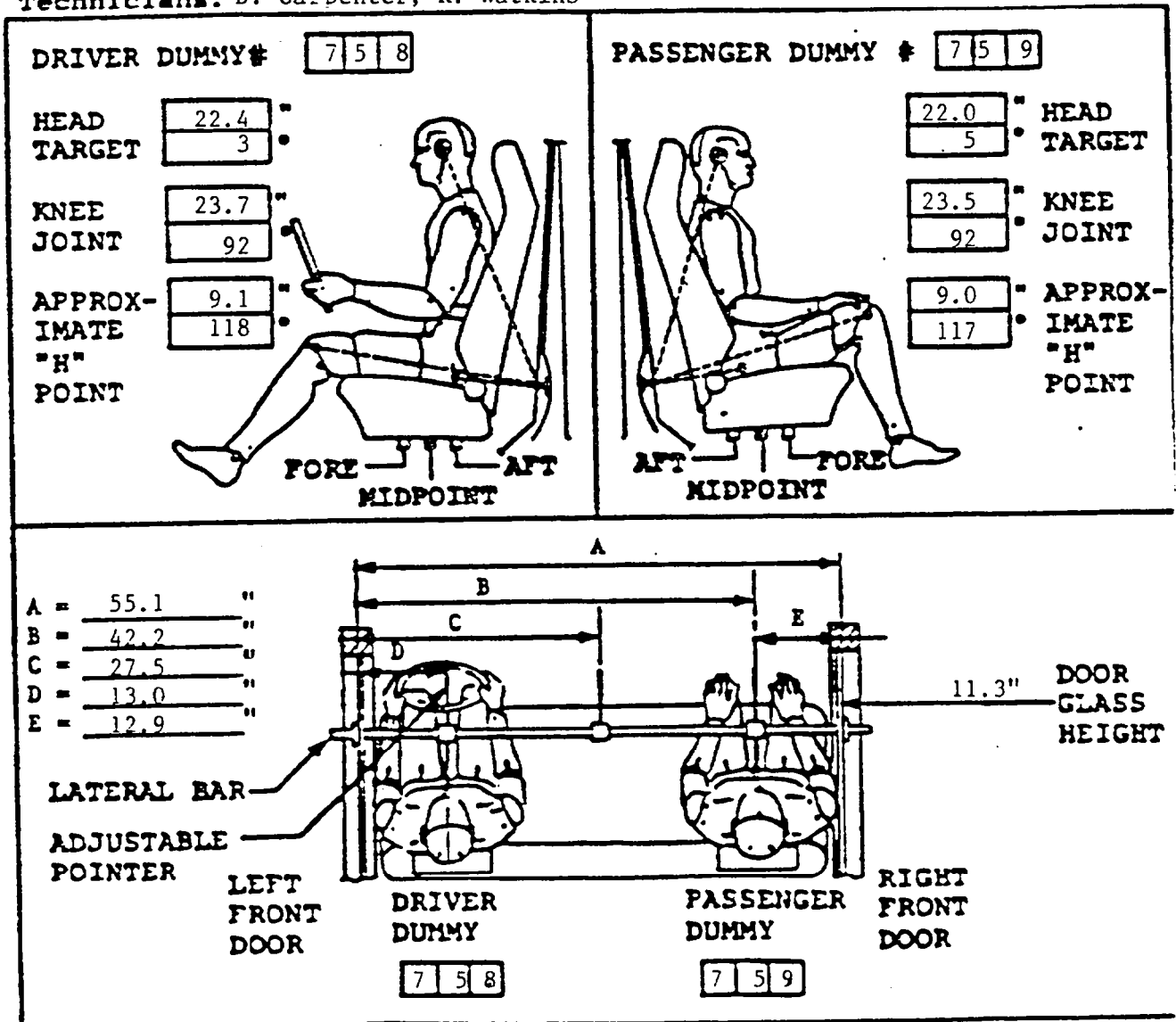
DATA FROM CERTIFICATION LABEL:

Vehicle Manufacturer: Jeep Corporation
Date of Manufacture: 1/87; VIN: 1JTHS641XHT085473
GVWR: 4103 lb; GAWR: Front = 2500 lb; Rear = 2700 lb

POST-IMPACT DATA:

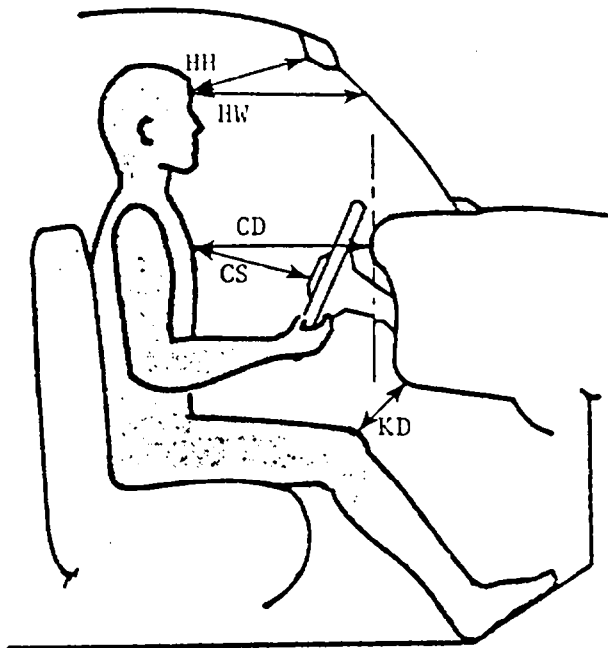
Date of Test: 3/24/87 Time: 12:40 Temperature 70 °F
Required Impact Velocity Range: 34.5 to 35.5 mph
Impact Velocity: Primary = 35.2 mph Secondary = 35.2 mph
Seat Type: adjustable Adjuster Type: manual
Bucket Seat Back Type: fixed

Technicians: D. Carpenter, K. Watkins

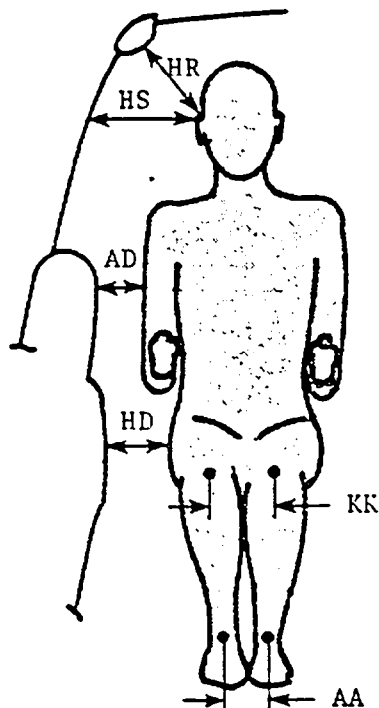


DUMMY IN-VEHICLE POSITION RECORDING SHEET

	DRIVER #758	PASSENGER #759
HH	16.4	15.3
HW	20.7	19.6
CD	22.3	22.0
CS	11.8	DNA
KDL	4.4	5.3
KDR	4.4	5.9
TA	19°	16°
SA	13°	13°



	DRIVER #758	PASSENGER #759
HR	7.9	7.8
HS	9.9	10.1
AD	3.8	4.5
HD	6.3	6.3
KK	10.8	8.0
AA	10.4	7.5



Knee outerbolt to outer bolt
head spacing:
Driver = 14.8
Passenger = 12.0

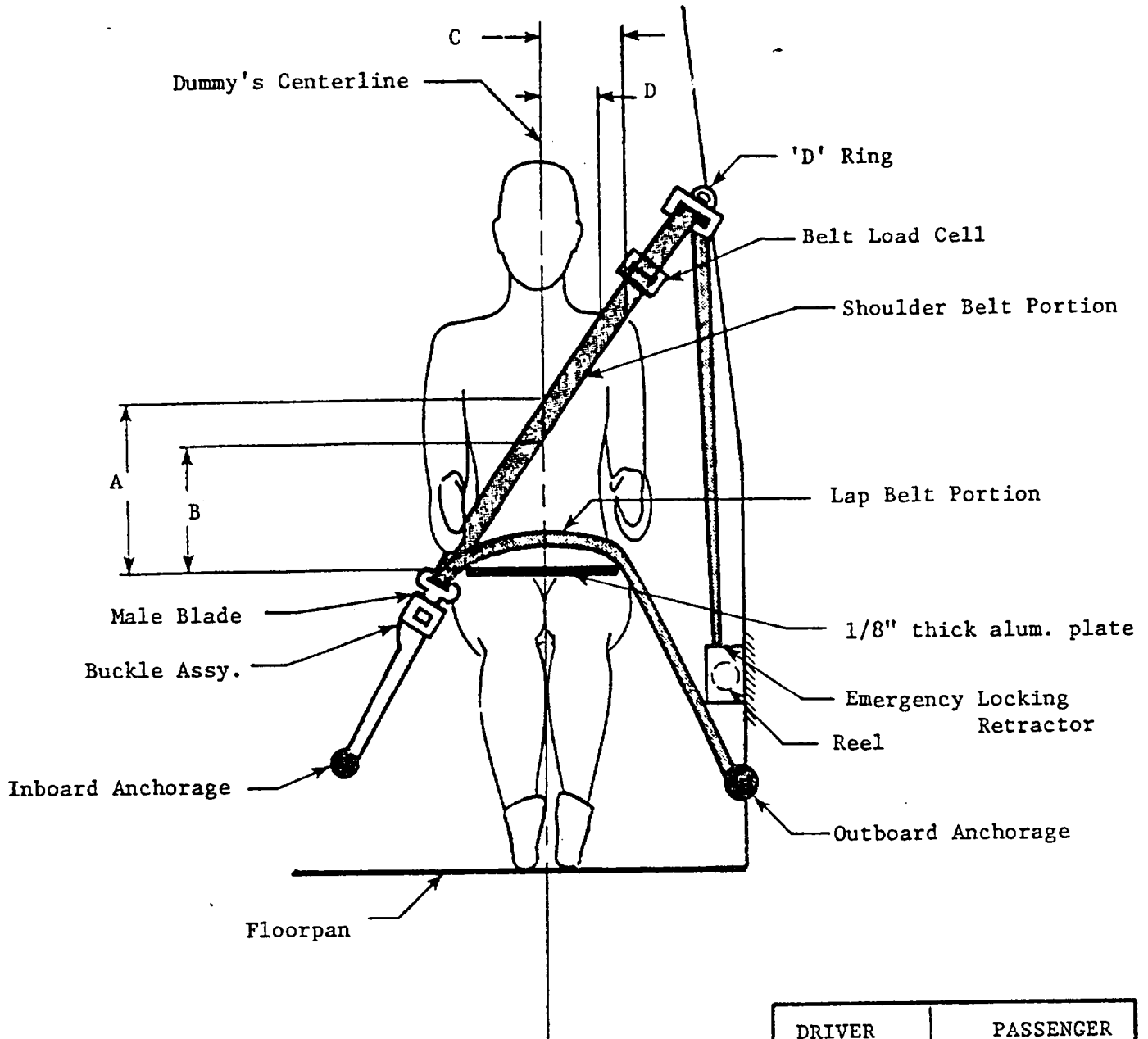
HH = Head to Windshield Header
HW = Head to Windshield
CD = Chest to Dash
CS = Chest to Steering Wheel
KD = Knees to Dash
TA = Torso Angle
SA = Seat Back Angle

HR = Head to Side Roof
HS = Head to Side Window
AD = Arm to Door
HD = Hip to Door
KK = Knee to Knee
AA = Ankle to Ankle

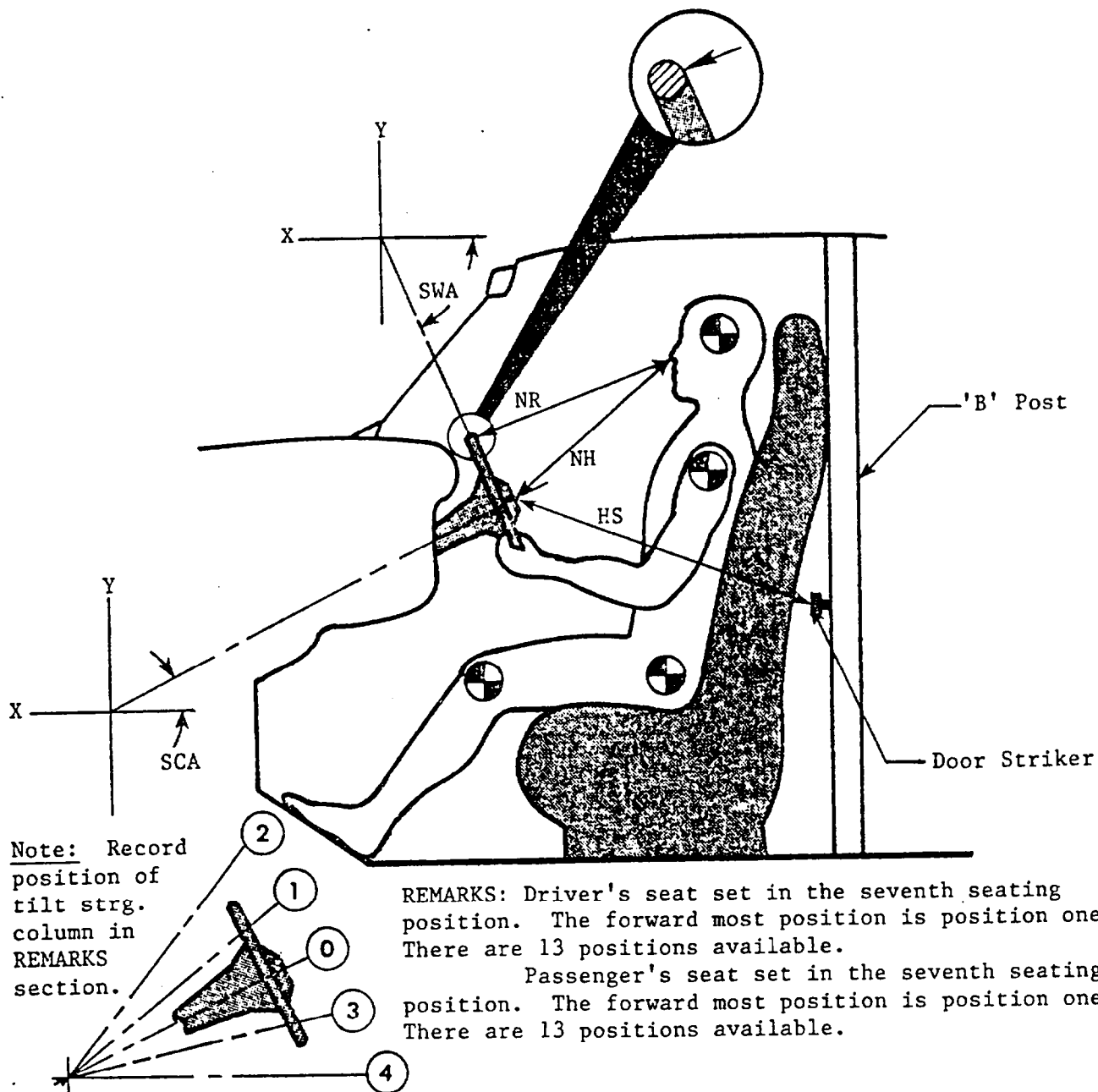
Torso and seat back angles are relative to vertical.

ALL MEASUREMENTS IN INCHES

SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - Top surface of alum. plate to belt upper edge (in)	14.8"	15.4"
B - Top surface of alum. plate to belt lower edge (in)	11.3"	12.0"
C - Dummy centerline to outer edge of belt at chest flesh top (in)	4.4"	5.5"
D - Dummy centerline to inner edge of belt at chest flesh top (in)	1.8"	2.6"
LAP BELT TENSION (lbs)	4	4
SHOULDER BELT TENSION (lbs)	4	4



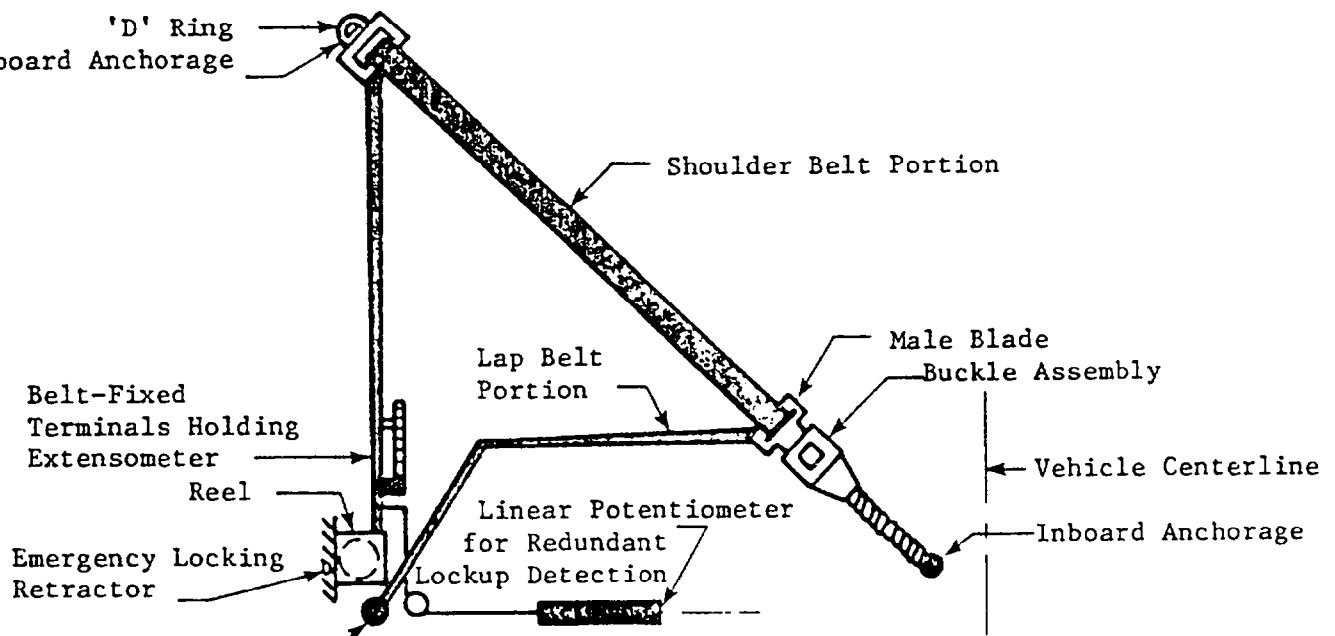
MEASUREMENTS	
NR - Distance from tip of dummy's nose to top rear surface of steering wheel rim.	15.0"
NH - Distance from tip of dummy's nose to center of steering column hub.	15.8"
HS - Distance from center of steering column hub to the forward surface of the door lock striker pin.	22.8"
SCA - Angle of steering column relative to the horizontal X axis.	24°
SWA - Angle of steering wheel relative to the horizontal X axis.	66°

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

	DRIVER SIDE		PASSENGER SIDE	
	PRE-TEST	POST-TEST	PRE-TEST	POST-TEST
Total belt length from retractor reel to bolt hole anchor point for continuous webbing systems.	95.1	93.6	95.9	93.5
Retractor reel to 'D' ring as measured on Part 572 dummy.	9.3	8.8	9.3	8.5
Shoulder belt length as measured on Part 572 dummy.	32.9	35.8	33.5	36.2
Lap belt length as measured on Part 572 dummy.	29.0	28.2	29.8	28.8
Remainder of belt webbing left on retractor reel.	23.9	20.8	23.3	20.0
<u>BELT SPOOL-OFF DATA:</u>				
As determined by film analysis	DNA	4.6	DNA	4.3
As determined electronically	DNA	6.9	DNA	5.0
<u>BELT STRAIN DATA:</u>				
Measured between retractor reel and 'D' ring.	DNA	--- γ	DNA	0.4 in/ft

γ See DATA ACQUISITION EXPLANATIONS



PRE-IMPACT DATA

MAKE/MODEL: Jeep Comanche

BODY STYLE: Shortbox Pickup

MODEL YEAR: 1987

NHTSA NO.: MH0400

COLOR: Olympic White

DATA FROM CERTIFICATION LABEL

VEHICLE MANUFACTURER: Jeep Corporation

DATE OF MANUFACTURE: 1/87

VIN: 1JTHS641XHT085473

GVWR: 4103 LBS., GAWR: FRONT 2500 LBS., REAR 2700 LBS.

POST-IMPACT DATA

TYPE OF TEST: Frontal Load Cell Barrier Impact

DATE OF TEST: 3/24/87

TIME: 12:40

TEMP:

70°F

REQUIRED IMPACT VELOCITY RANGE: 34.5 MPH TO 35.5 MPH

IMPACT VELOCITY: PRIMARY = 35.2 MPH

TEST WEIGHT = 3554 LBS., STATIC CRUSH MAX. = 20.5 IN., REBOUND = 48.0 IN.

FUEL SYSTEM DATA

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

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: 16.0 GALLONS (FURNISHED BY CTM)

TEST VOLUME: 14.9 GALLONS (92-94% OF USEABLE)

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 18.5 GALLONS

DETAILS OF FUEL SYSTEM: Fuel tank located on left side under cargo bed

forward of rear axle. Filler cap located forward of rear axle on left hand

side. Fuel filler neck enters tank on left side of tank.

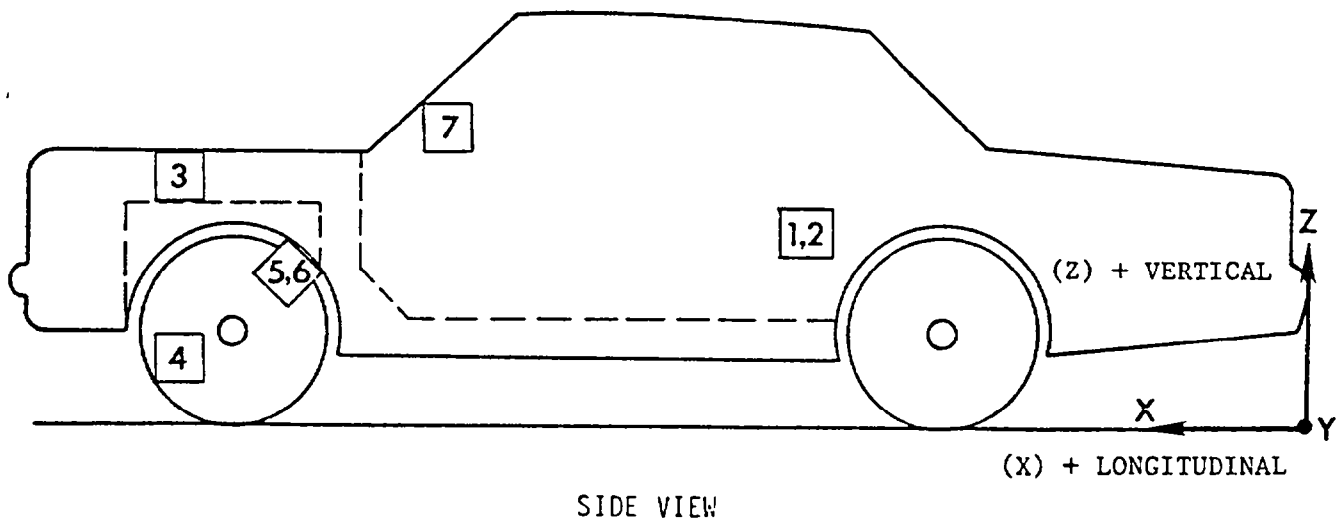
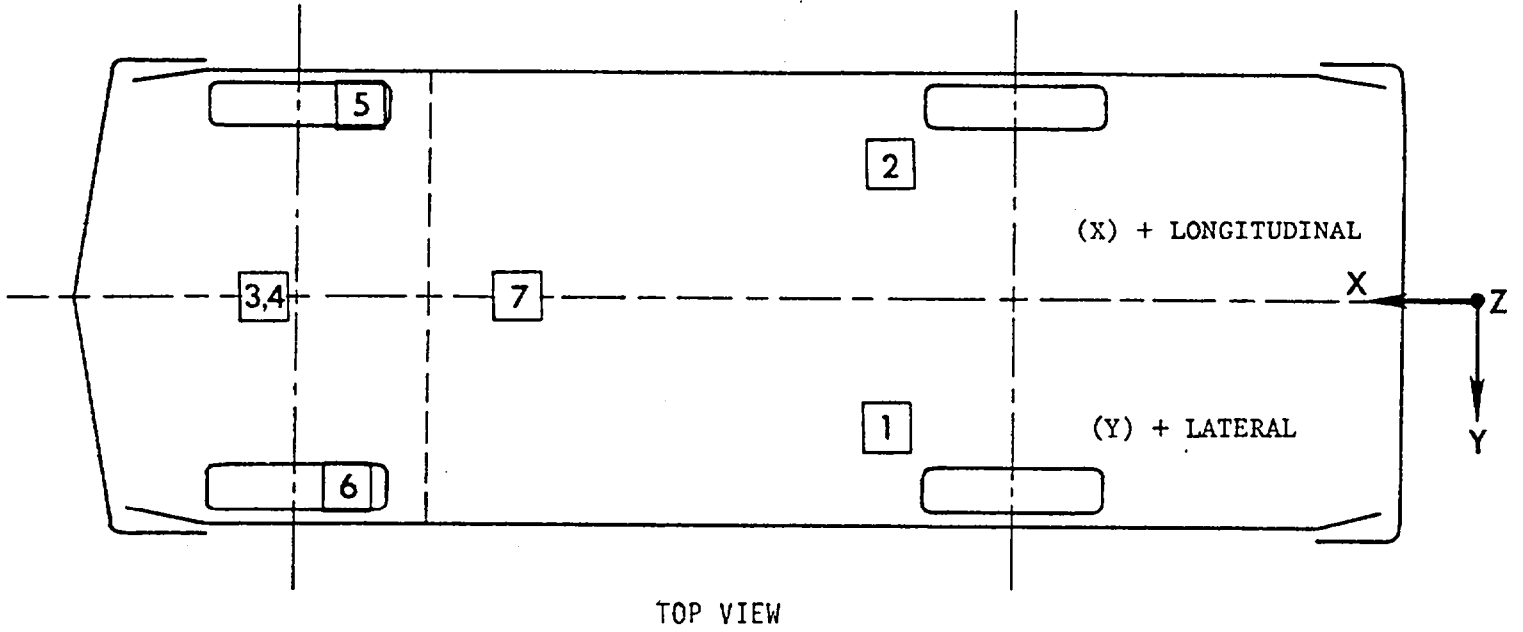
ELECTRIC FUEL PUMP: YES

FUEL INJECTION: NO

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

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

VEHICLE ACCELEROMETER LOCATIONS



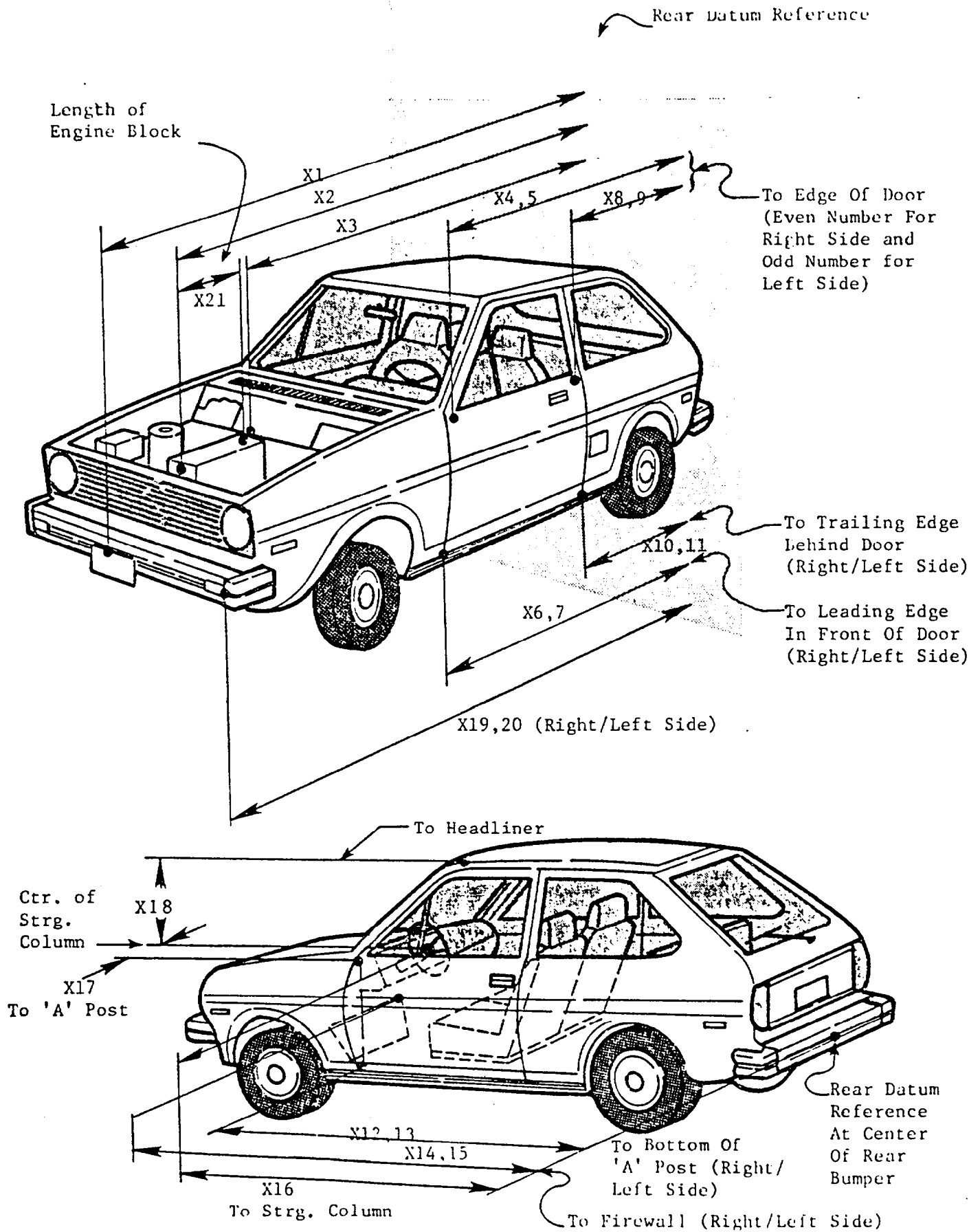
VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION**		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	REAR SEAT X-MEMBER AT LEFT SIDE LONGITUDINAL	82.5	25.0	18.7	7.2	16.4	44.5	51.4
2	REAR SEAT X-MEMBER AT RIGHT SIDE LONGITUDINAL	81.9	-24.9	18.8	3.5	152.2	44.3	48.6
3	TOP OF ENGINE BLOCK LONGITUDINAL	155.5	1.8	36.8	11.3	46.4	112.1	34.5
4	BOTTOM OF ENGINE BLOCK LONGITUDINAL	145.7	-3.5	13.4	33.2	45.8	127.7	37.1
5	BRAKE CALIPER AT RIGHT SIDE LONGITUDINAL	147.8	-24.0	14.1	34.9	46.6	114.4	41.5
6	BRAKE CALIPER AT LEFT SIDE LONGITUDINAL	148.1	24.0	13.8	17.6	44.9	85.3	32.2
7	DASH PANEL LONGITUDINAL	121.8	0.0	46.5	52.7	100.8	79.7	57.2

* X + Forward from rear bumper
Y + Left from vehicle centerline
Z + Up from ground level

** LONGITUDINAL: FORWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

MEASUREMENTS IN INCHES



IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL Jeep Comanche Shortbox Test Number MH0400
Pickup

DIMENSIONS IN INCHES

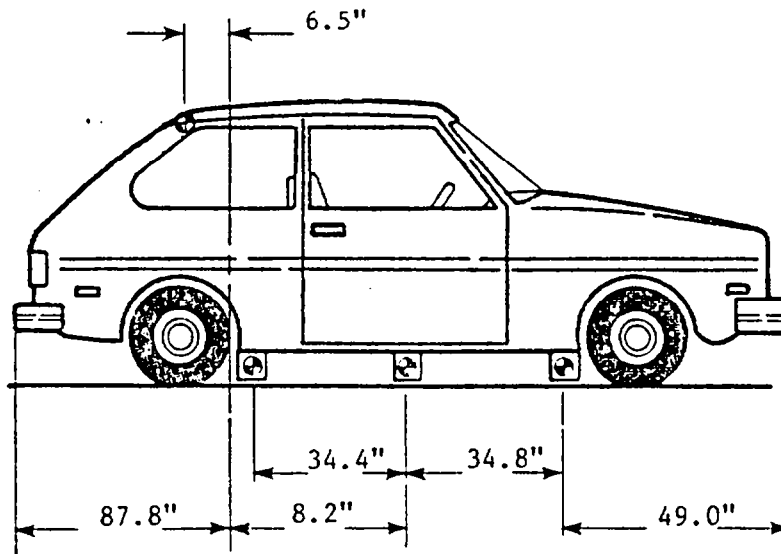
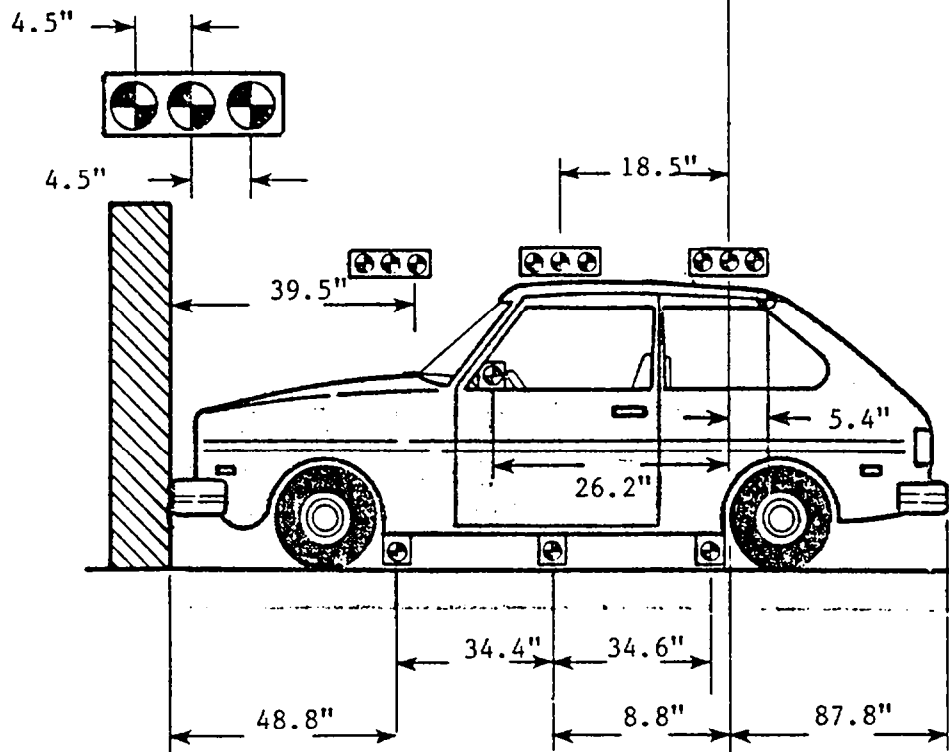
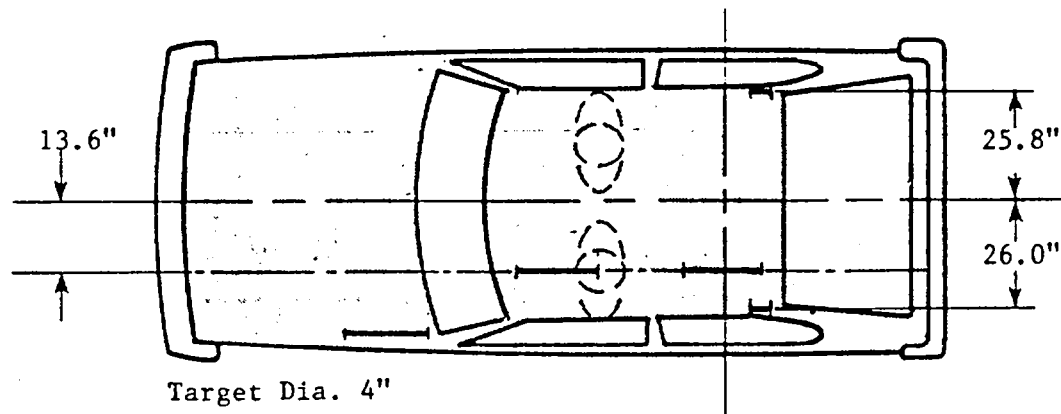
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X 1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	179.8	159.8	20.0
X 2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	156.0	149.3	6.7
X 3	REAR SURFACE OF VEHICLE TO FIREWALL	133.5	131.1	2.4
X 4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	125.8	125.1	0.7
X 5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	126.1	125.0	1.1
X 6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	126.6	125.5	1.1
X 7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	126.8	125.5	1.3
X 8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	88.0	87.4	0.6
X 9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	88.5	88.0	0.5
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	88.4	87.3	1.1
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE ON LEFT DOOR	88.5	87.8	0.7
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	126.5	125.3	1.2
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	126.4	125.6	0.8
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	138.1	135.8	2.3
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	138.0	135.5	2.5
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	109.9	107.8	2.1
X17	CENTER OF STEERING COLUMN TO "A" POST	14.0	14.6	-0.6

IMPACTED VEHICLE MEASUREMENTS CONTD

VEHICLE MAKE/MODEL Jeep Comanche Shortbed Pickup
 PROJECT NUMBER MH0400

NO.	TYPE OF MEASUREMENT	DIMENSIONS IN INCHES		
		PRE-TEST	POST-TEST	DIFF.
X18	CENTER OF STEERING COLUMN TO HEADLINING	16.4	19.9	-3.5
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	177.0	160.0	17.0
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	177.1	159.3	17.8
X21	LENGTH OF ENGINE BLOCK	18.0	18.0	0.0

VEHICLE TARGET LOCATIONS



ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Jeep Comanche Shortbox Pickup
 VEH. NHTSA NO.: MH0400; VIN: 1JTHS641XHT085473
 MODEL YEAR: 1987; BUILD DATE: 1/87; TEST DATE 03/24/87
 VEH. SIZE CATEGORY: Standard Pickup; TEST WEIGHT: 3554
 VEH. WHEELBASE: 113.0

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE: 12FDEW3

F (Frontal)

CRUSH DEPTH
DIMENSIONS:

C1 = 17.8 inches

C2 = 19.6 inches

C3 = 20.5 inches

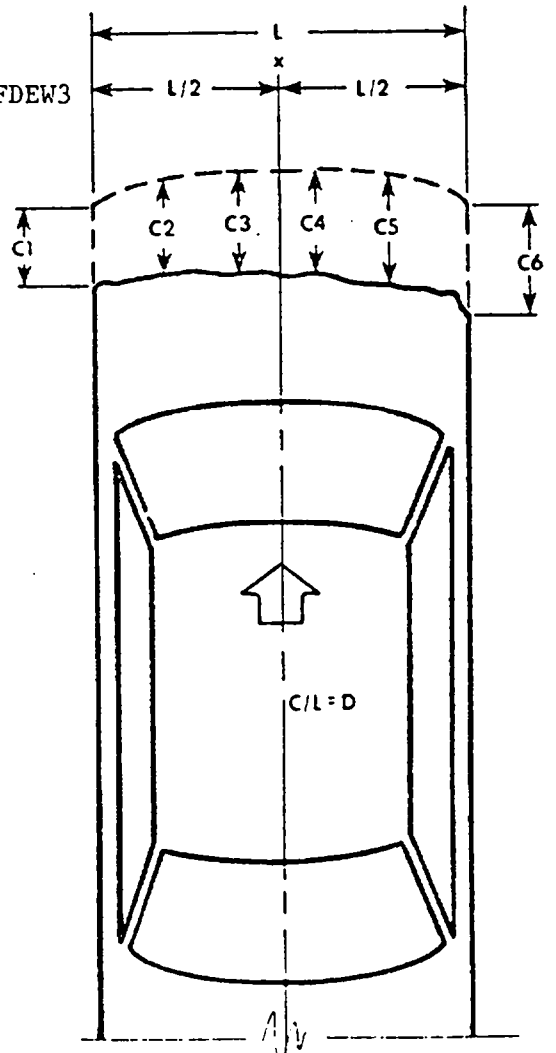
C4 = 20.0 inches

C5 = 19.0 inches

C6 = 17.0 inches

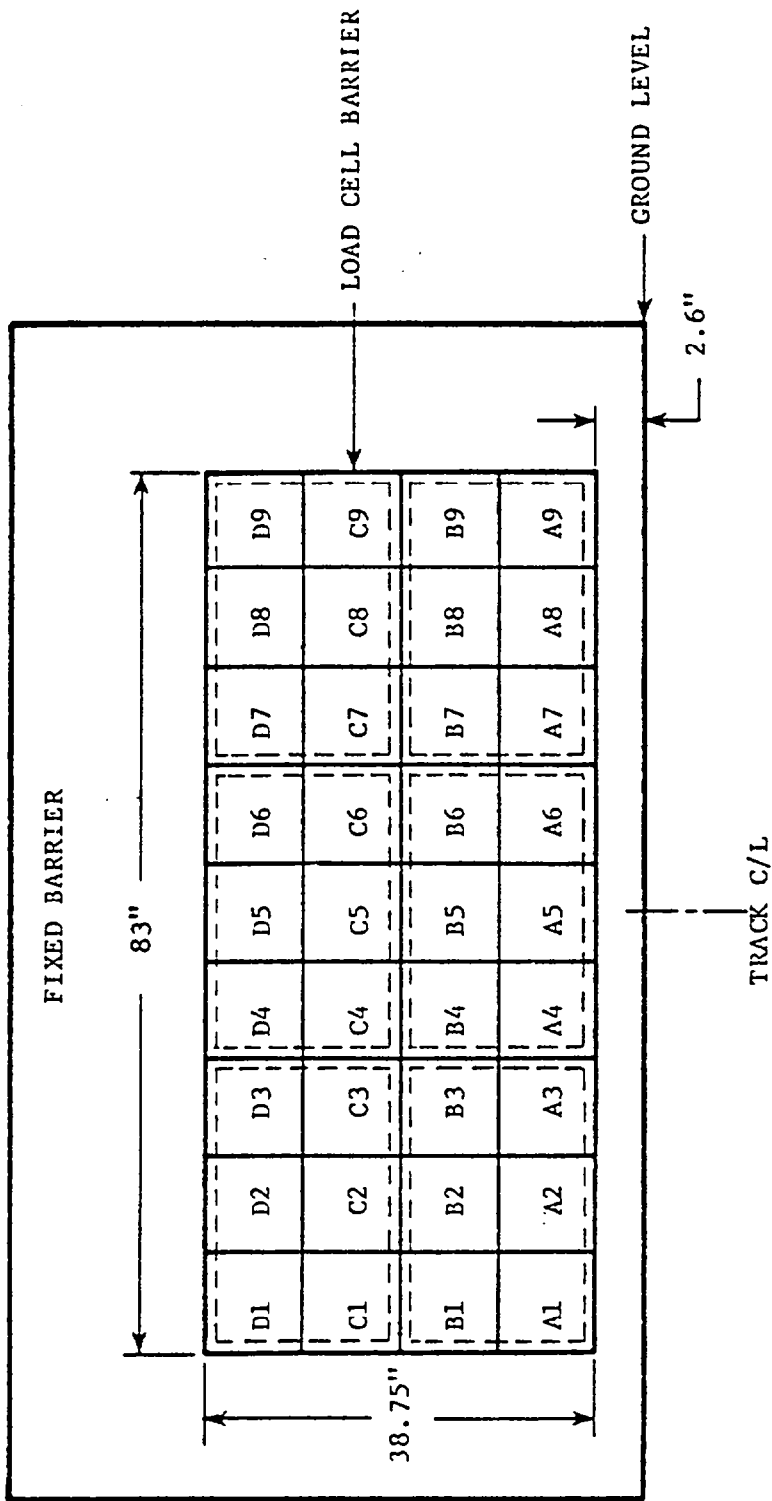
MIDPOINT OF DAMAGE: D = Vehicle Centerline (Longitudinal)

LENGTH OF DAMAGED
REGION: L = 61.8 inches



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

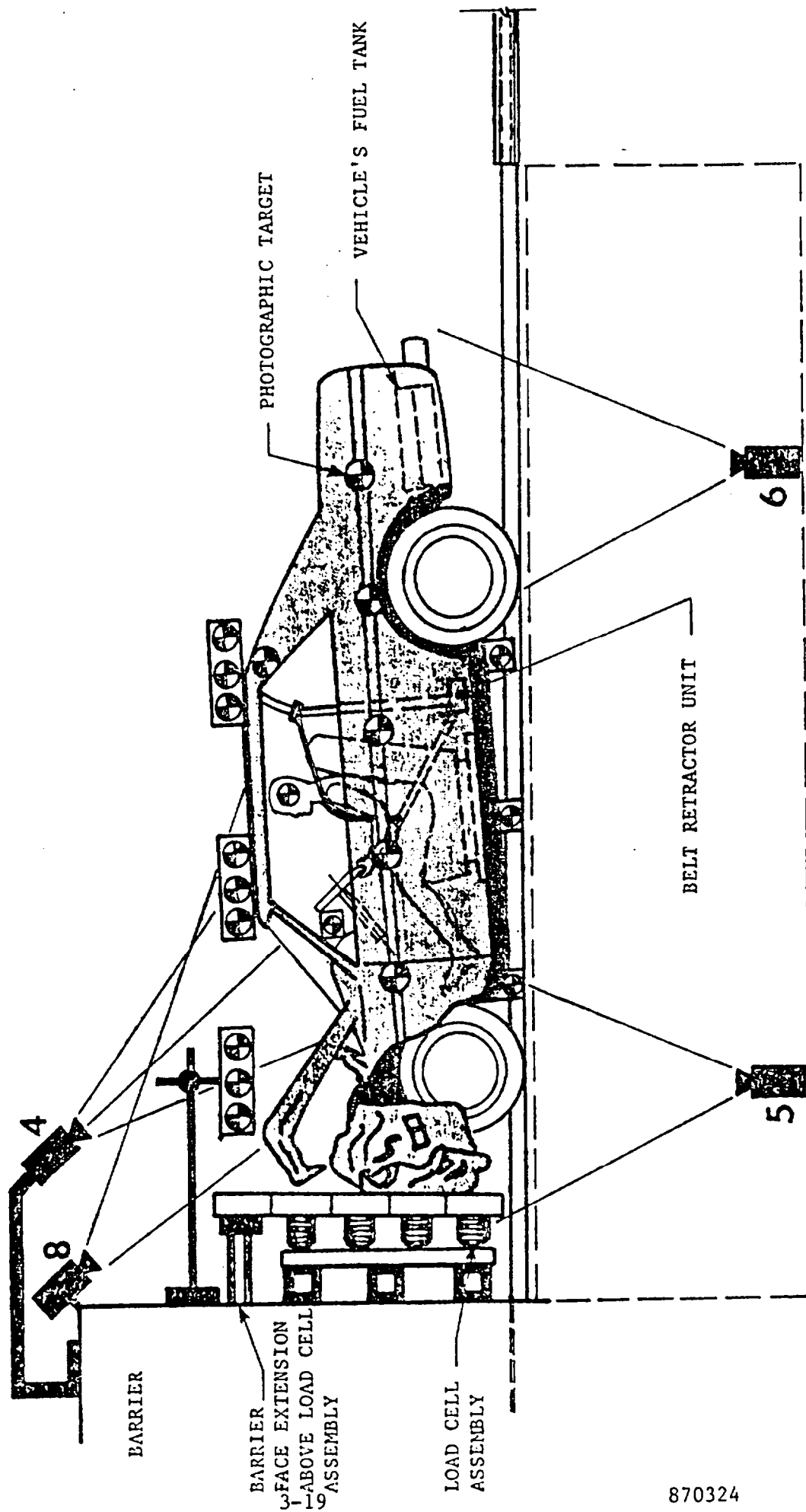
LOAD CELL BARRIER SUMMARY

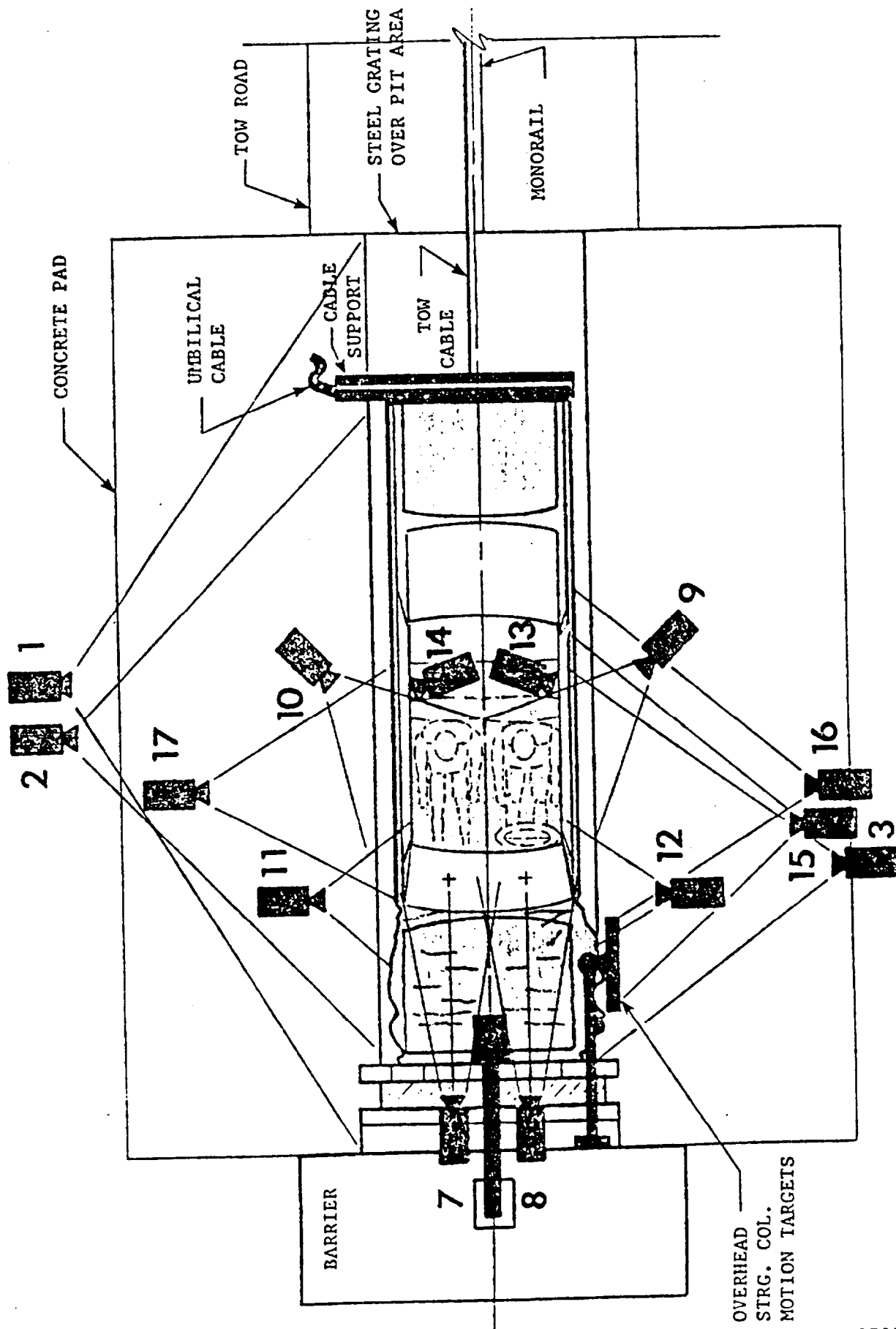
POSITION	POSITIVE DIRECTION*		NEGATIVE DIRECTION*	
	MAX (lb)	TIME (msec)	MIN (lb)	TIME (msec)
TOTAL GROUP 1	231.0	233.1	11369.0	15.0
TOTAL GROUP 2	---	--- ε	58299.1	36.5
TOTAL GROUP 3	---	--- ε	27998.3	17.0
TOTAL GROUP 4	245.5	170.9	12874.0	51.4
TOTAL GROUP 5	---	--- ε	28802.4	35.1
TOTAL GROUP 6	331.7	171.4	20191.7	62.9
TOTAL LOAD CELL FORCE	---	--- ε	132977.5	35.9

ε No positive value in range of interest

*REFERENCE: TENSION IS POSITIVE
COMPRESSION IS NEGATIVE

CAMERA POSITIONS





CAMERA POSITIONS

HIGH SPEED CAMERA LOCATIONS

TEST NO.: 870324 VEHICLE: Jeep Comanche Shortbox pickup MH0400

CAMERA NO.	VIEW	CAMERA POSITIONS (IN)*			ANGLE ** (DEG)	FILM PLANE TO HEAD TARGET	LENS (MM)	SPEED (FPS)
		X	Y	Z				
1	Real time panning	-142.0	504.0	61.0	NA	NA	16	24
2	Vehicle crush	-81.3	266.4	37.1	-2	NA	13	498
3	Dummy kinematics	-41.5	-295.0	44.0	-4	278.0"	25	498
4	Windshield damage	-36.4	0.0	120.0	-83	NA	13	495
5	Crush & fluid spillage	-50.5	0.0	-99.0	90	NA	17	1000
6	Fluid spillage	-99.3	0.0	-99.0	90	NA	17	1002
7	Passenger kinematics	4.5	13.8	115.0	-60	NA	17	493
8	Driver kinematics	6.8	-14.5	113.3	-60	NA	17	495
9	Driver kinematics	-157.3	-166.9	74.1	-10	127.8"	25	495
10	Passenger kinematics	-152.1	167.9	76.0	-13	120.5"	25	492
11	Windshield intrusion	-38.1	306.1	44.0	0	NA	50	510
12	Windshield intrusion	-53.0	-309.4	42.3	0	NA	50	498
13	Driver seatbelt movement	NA	NA	NA	NA	NA	13	495
14	Passenger seatbelt movement	NA	NA	NA	NA	NA	13	500
15	Column movement	-135.0	-286.0	103.0	-14	NA	25	495
16	Column movement	-135.0	-286.0	75.1	-9	NA	25	498
17	Passenger kinematics	-38.8	293.0	45.3	-4	274.0"	25	507

* X = Film plane to plane of barrier face
Y = Film plane to monorail centerline
Z = Film plane to ground
** Referenced to horizontal plane

APPENDIX A

PHOTOGRAPHS

1. PRE-TEST FRONT VIEW
2. POST-TEST FRONT VIEW
3. PRE-TEST LEFT SIDE VIEW
4. POST-TEST LEFT SIDE VIEW
5. PRE-TEST RIGHT SIDE VIEW
6. POST-TEST RIGHT SIDE VIEW
7. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW
8. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
9. PRE-TEST LEFT REAR THREE-QUARTER VIEW
10. POST-TEST LEFT REAR THREE-QUARTER VIEW
11. PRE-TEST WINDSHIELD VIEW
12. POST-TEST WINDSHIELD VIEW
13. PRE-TEST ENGINE COMPARTMENT VIEW
14. POST-TEST ENGINE COMPARTMENT VIEW
15. PRE-TEST FUEL FILLER CAP VIEW
16. PRE-TEST FRONT UNDERBODY VIEW
17. POST-TEST FRONT UNDERBODY VIEW
18. PRE-TEST REAR UNDERBODY VIEW
19. POST-TEST REAR UNDERBODY VIEW
20. PRE-TEST DRIVER DUMMY POSITION VIEW
21. POST-TEST DRIVER DUMMY POSITION VIEW
22. PRE-TEST PASSENGER DUMMY POSITION VIEW
23. POST-TEST PASSENGER DUMMY POSITION VIEW
24. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)
25. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)
26. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)
27. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)
28. POST-TEST DRIVER DUMMY HEAD CONTACT
29. POST-TEST DRIVER DUMMY KNEE CONTACT
30. POST-TEST PASSENGER HEAD/KNEE CONTACT



Figure 1. PRE-TEST FRONT VIEW



Figure 2. POST-TEST FRONT VIEW

A-2

870324

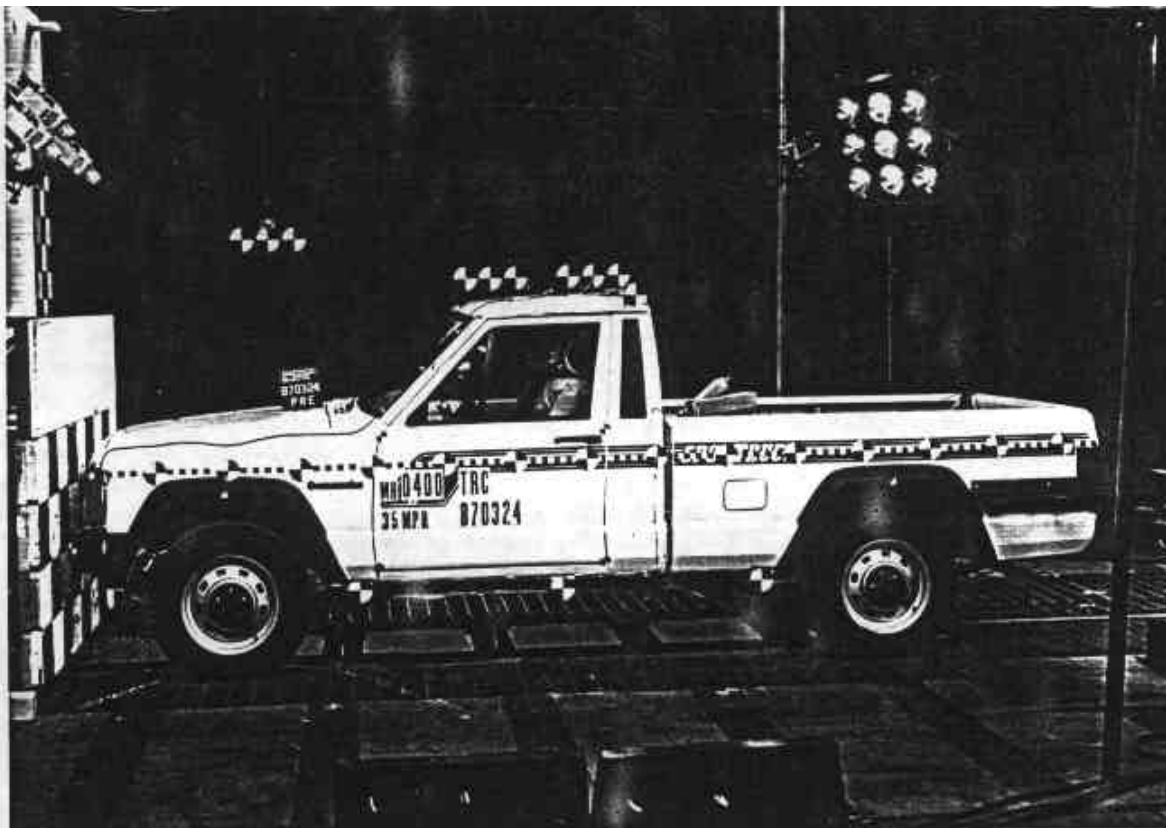


Figure 3. PRE-TEST LEFT SIDE VIEW



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

870324

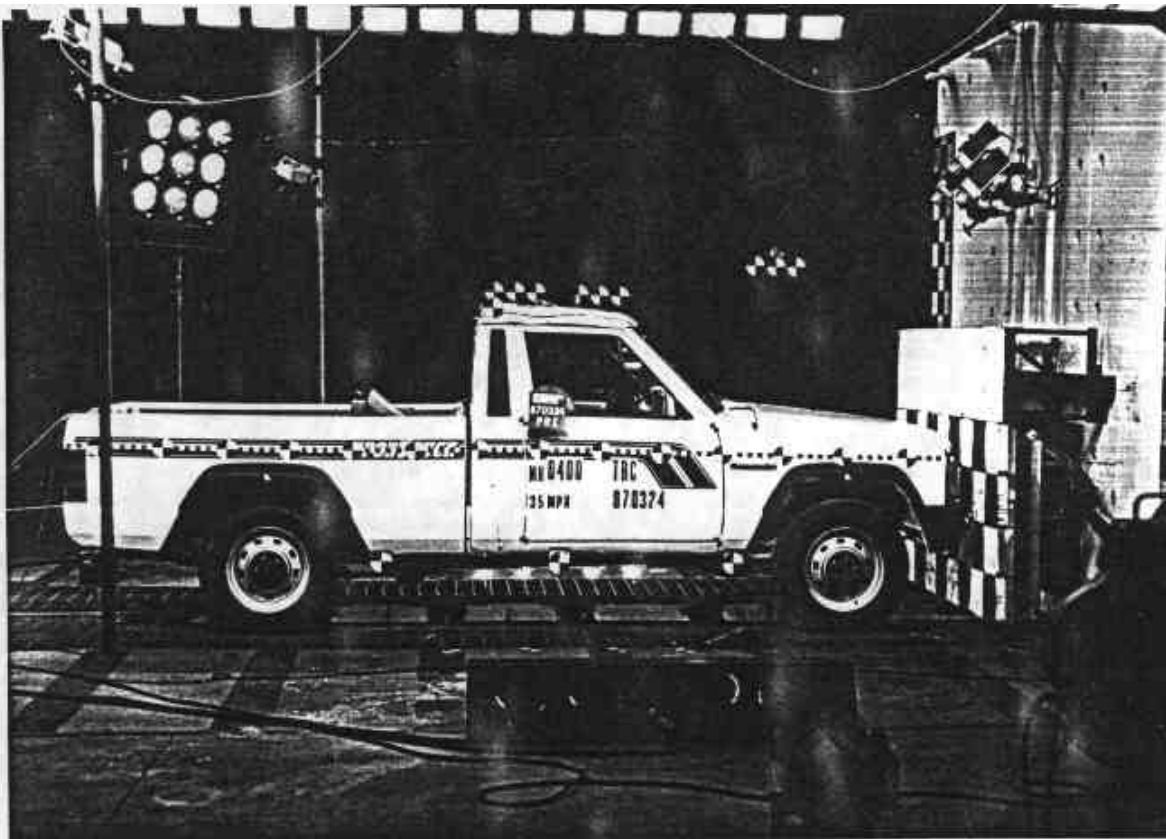


Figure 5. PRE-TEST RIGHT SIDE VIEW



Figure 6. POST-TEST RIGHT SIDE VIEW

A-4

870324



Figure 7. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure 8. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
A-5

870324



Figure 9. PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure 10. POST-TEST LEFT REAR THREE-QUARTER VIEW
A-6

870324



Figure 11. PRE-TEST WINDSHIELD VIEW



Figure 12. POST-TEST WINDSHIELD VIEW
A-7

870324

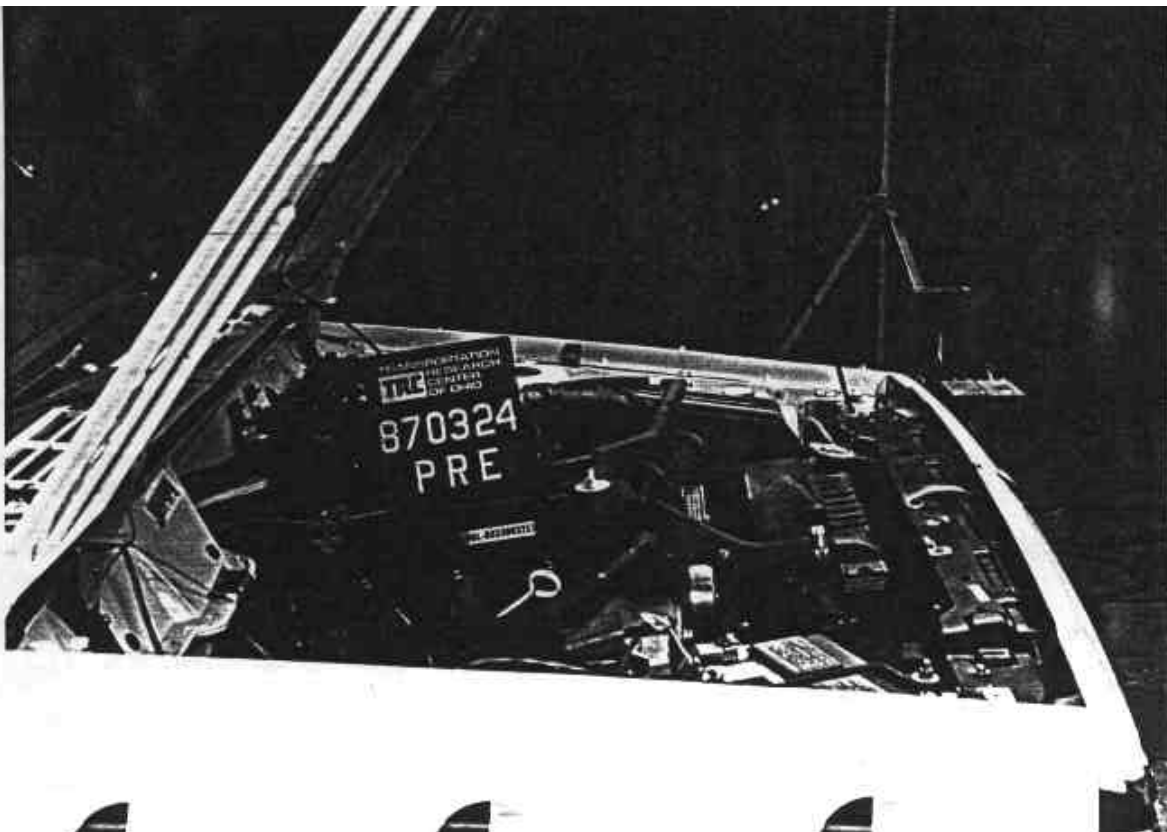


Figure 13. PRE-TEST ENGINE COMPARTMENT VIEW

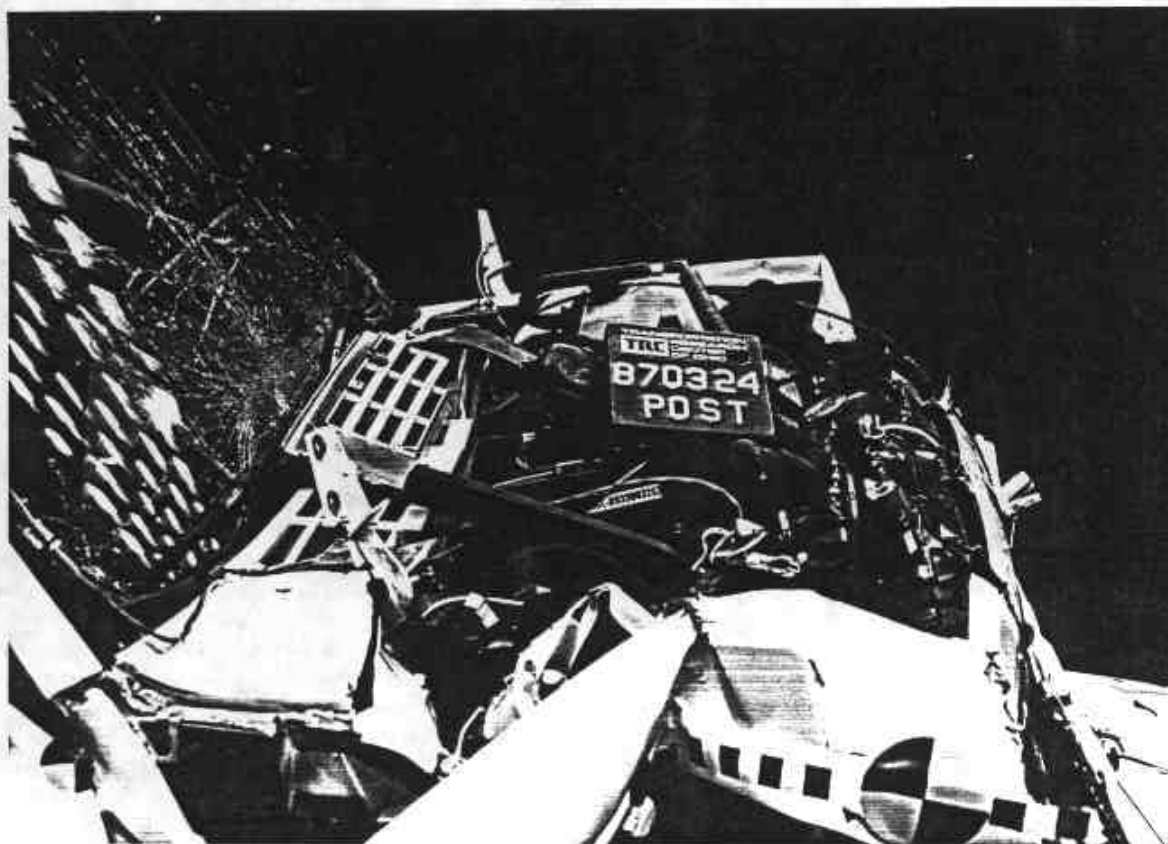


Figure 14. POST-TEST ENGINE COMPARTMENT VIEW
A-8

870324



Figure 15. PRE-TEST FUEL FILLER CAP VIEW

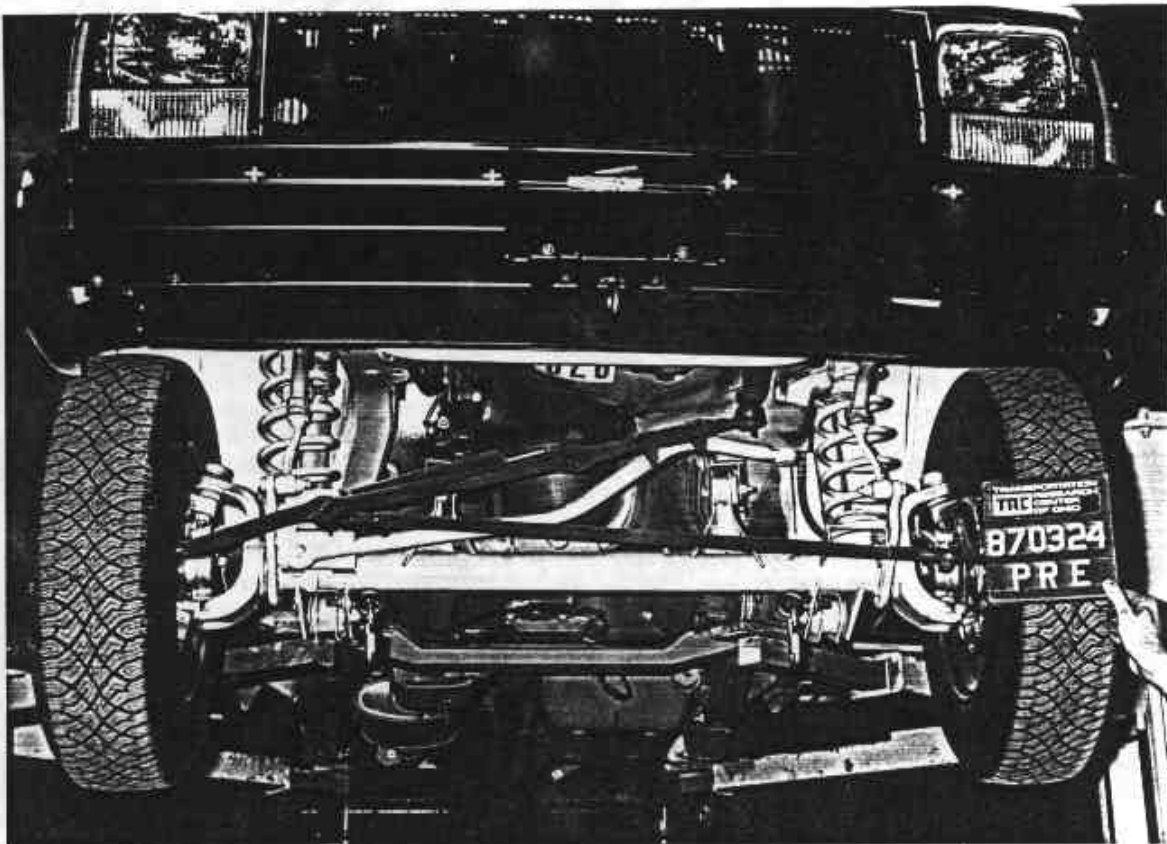


Figure 16. PRE-TEST FRONT UNDERBODY VIEW
A-9

870324

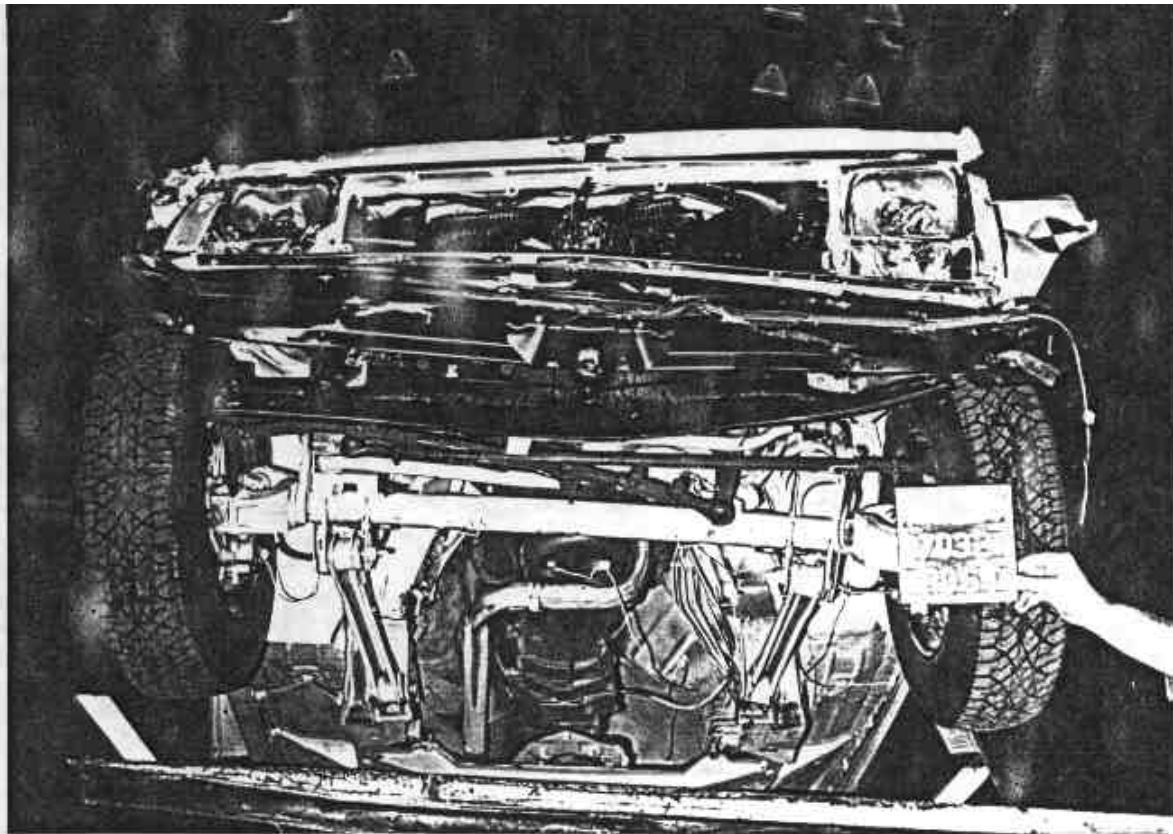


Figure 17. POST-TEST FRONT UNDERBODY VIEW

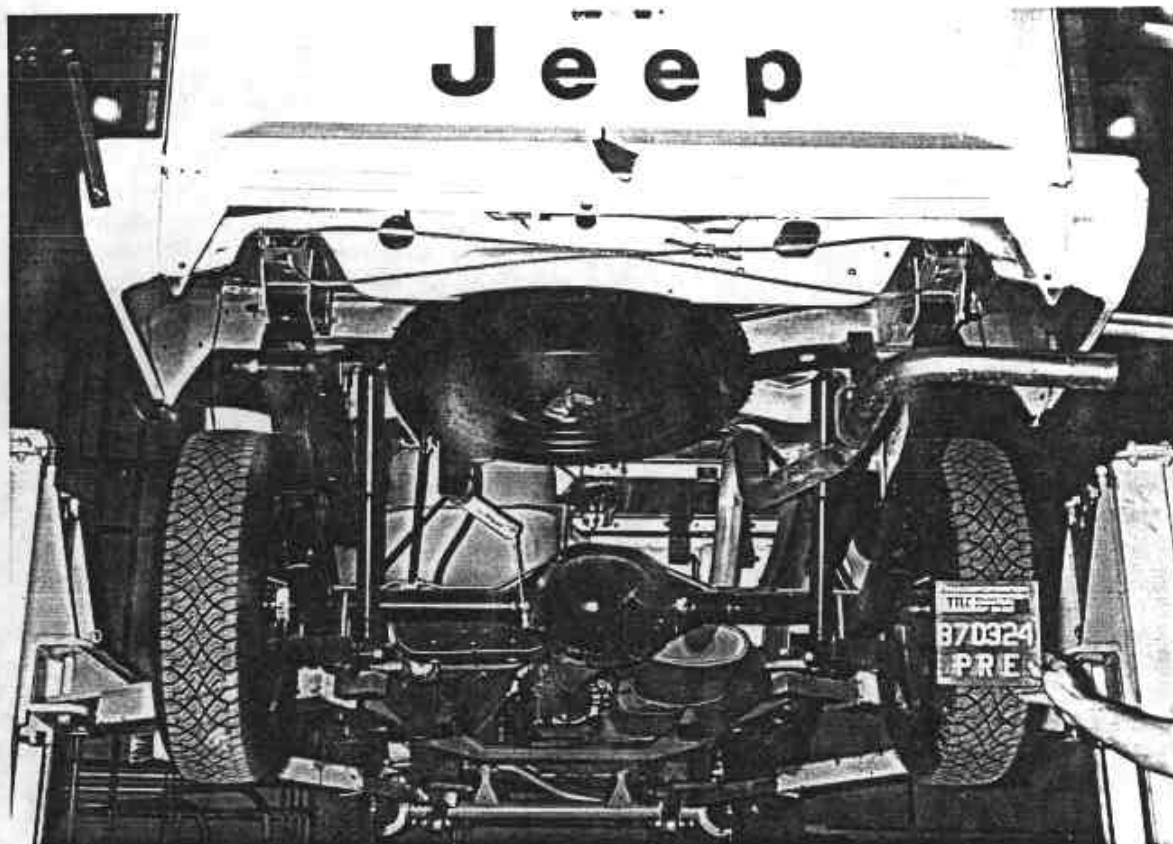


Figure 18. PRE-TEST REAR UNDERBODY VIEW
A-10

870324

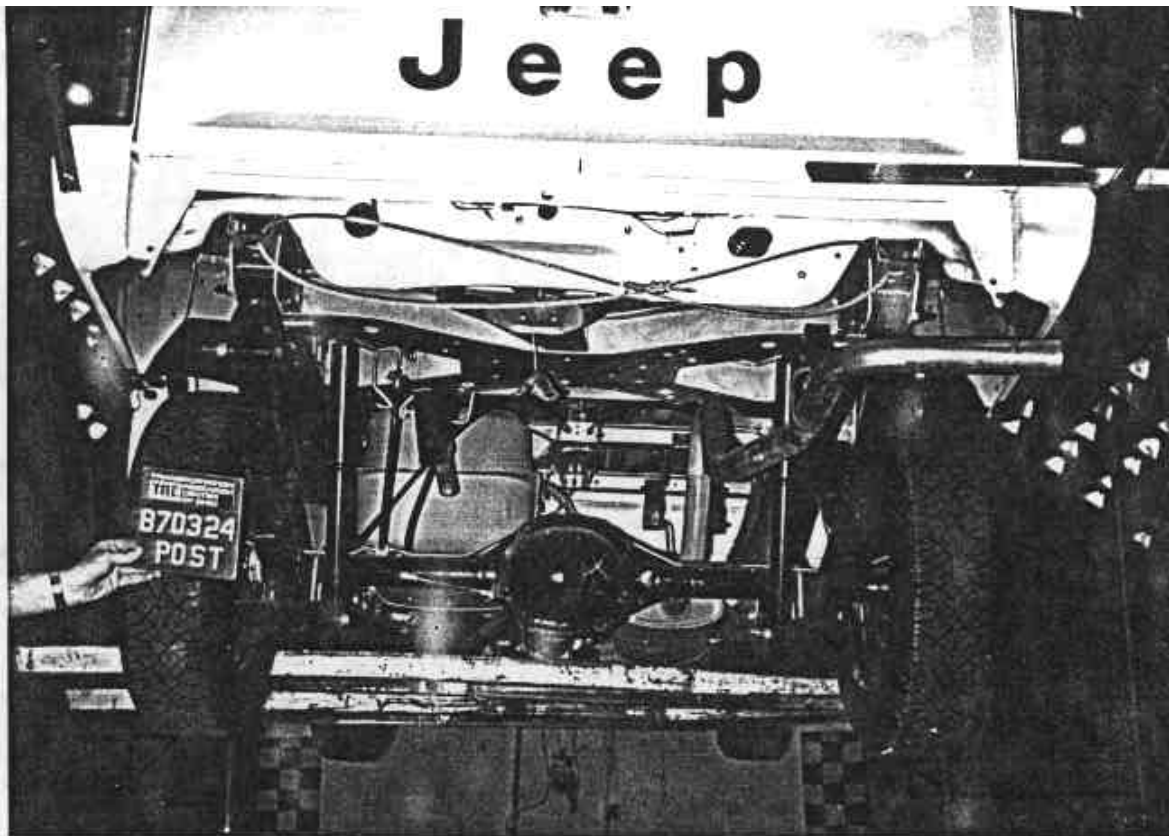


Figure 19. POST-TEST REAR UNDERBODY VIEW



Figure 20. PRE-TEST DRIVER DUMMY POSITION VIEW
A-11

870324



Figure 21. POST-TEST DRIVER DUMMY POSITION VIEW

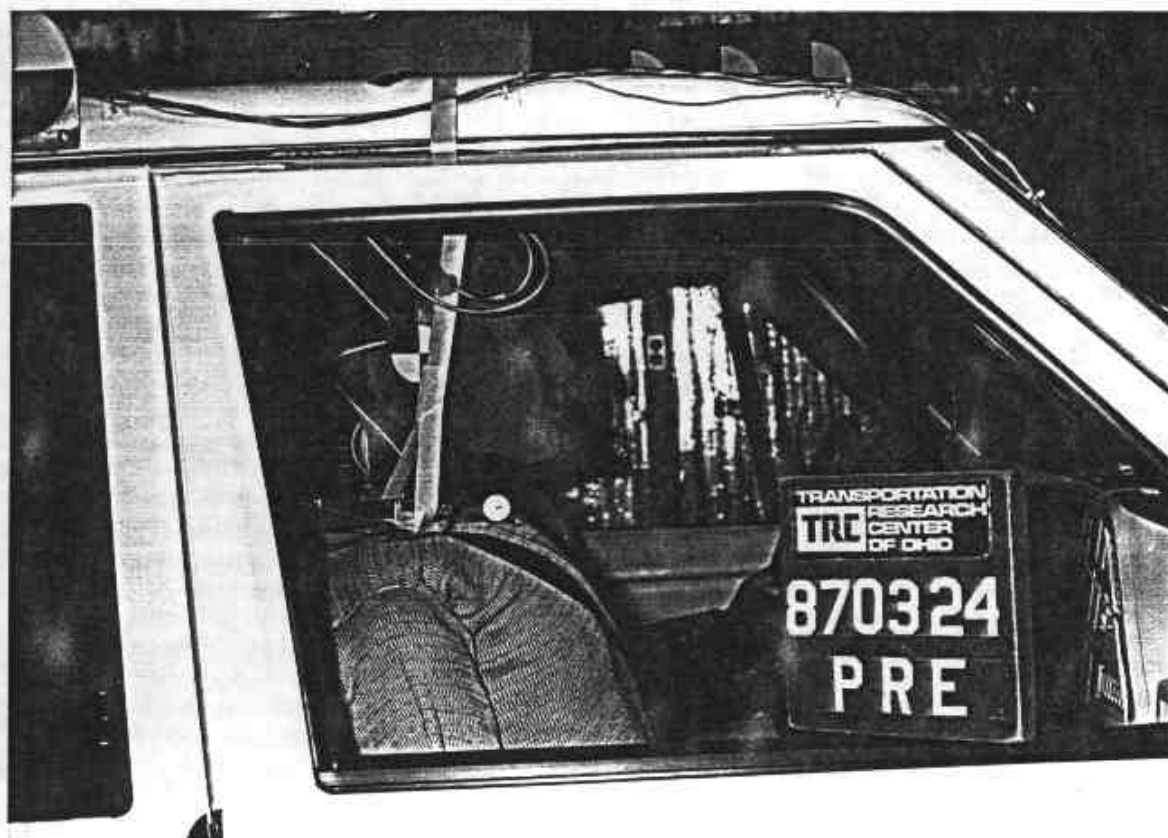


Figure 22. PRE-TEST PASSENGER DUMMY POSITION VIEW
A-12

870324



Figure 23. POST-TEST PASSENGER DUMMY POSITION VIEW



Figure 24. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)

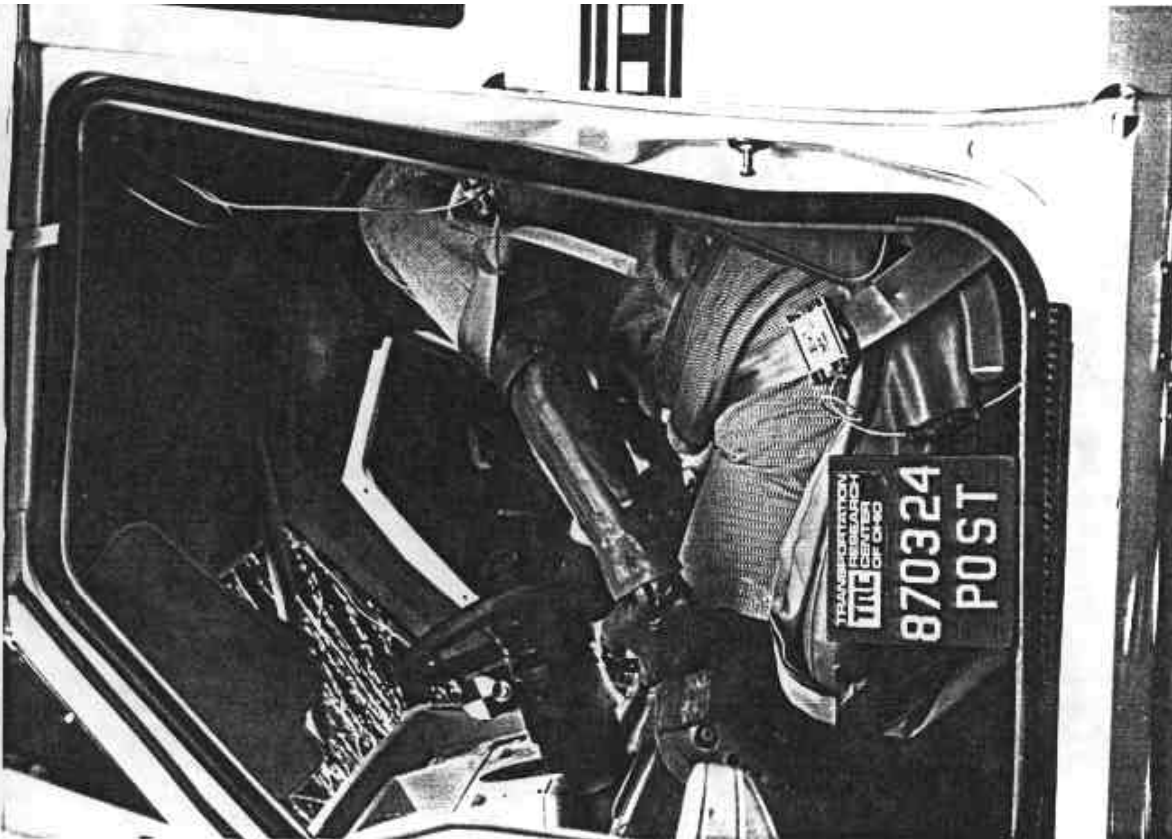


Figure 25. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)



Figure 26. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)



Figure 27. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)



Figure 28. POST-TEST DRIVER DUMMY HEAD CONTACT
A-15

870324



Figure 29. POST-TEST DRIVER DUMMY KNEE CONTACT



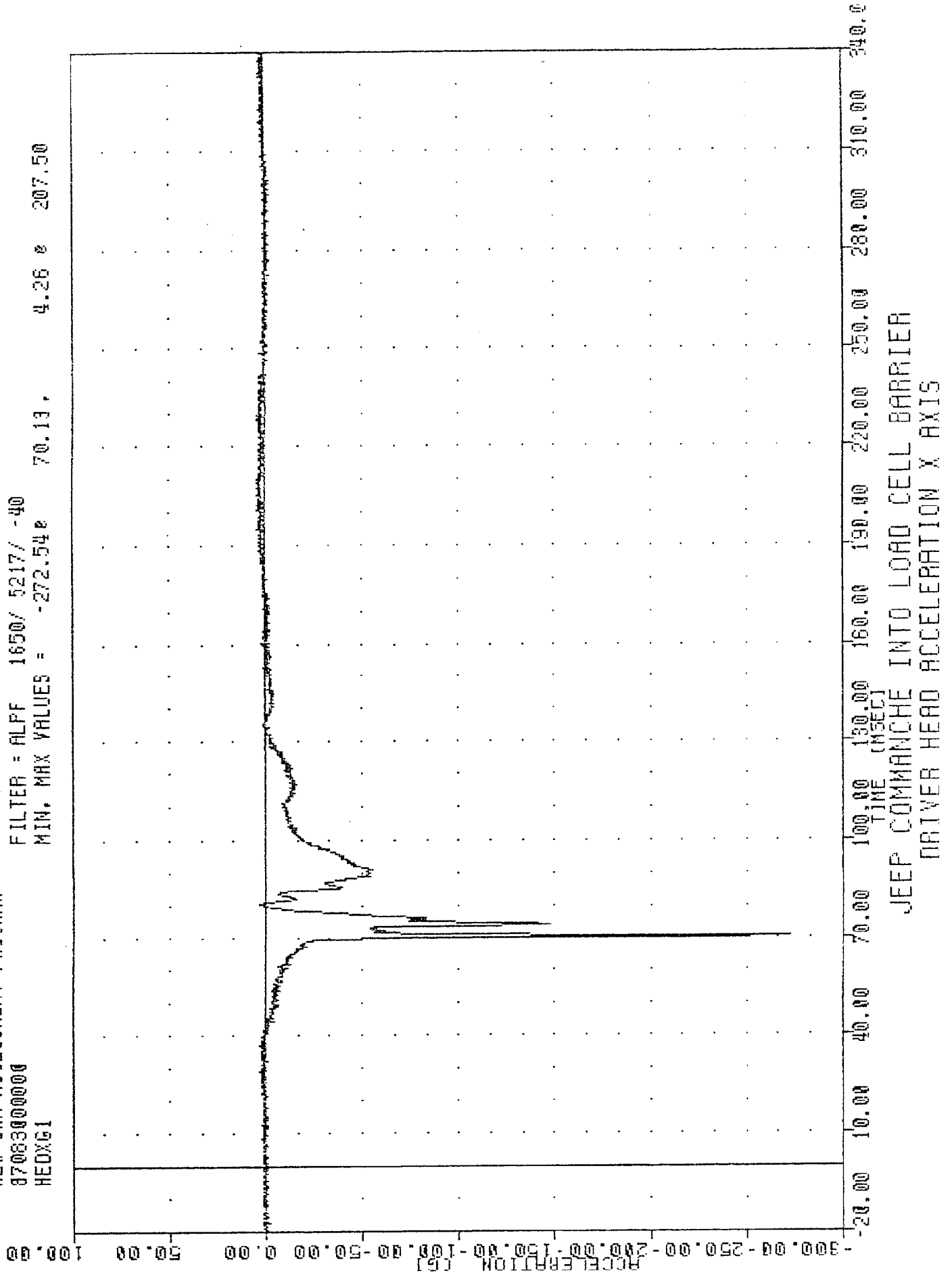
Figure 30. POST-TEST PASSENGER HEAD/KNEE CONTACT

APPENDIX B

DATA PLOTS

TRC
 NEW CAR ASSESSMENT PROGRAM
 87083000000
 HEDXG1

FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -272.54e 70.13, 4.26 e 207.50



TRC 870324

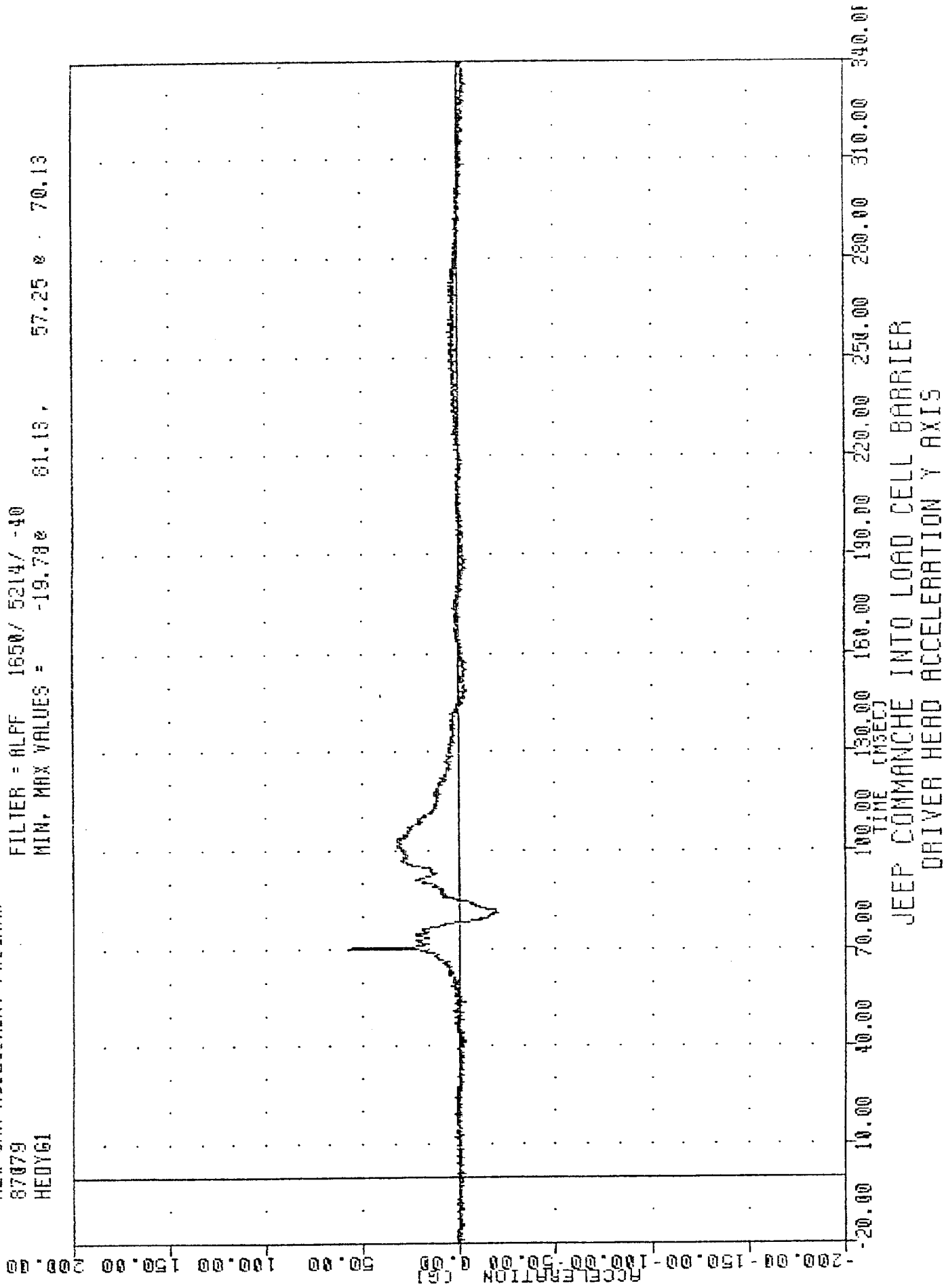
NEW CAR ASSESSMENT PROGRAM

87079

HEDY61

FILTER = 8LFF 1650/ 5214/ -40

MIN. MAX VALUES = -19.780 61.13, 57.250 70.13



THC 870324

NEW CAR ASSESSMENT PROGRAM

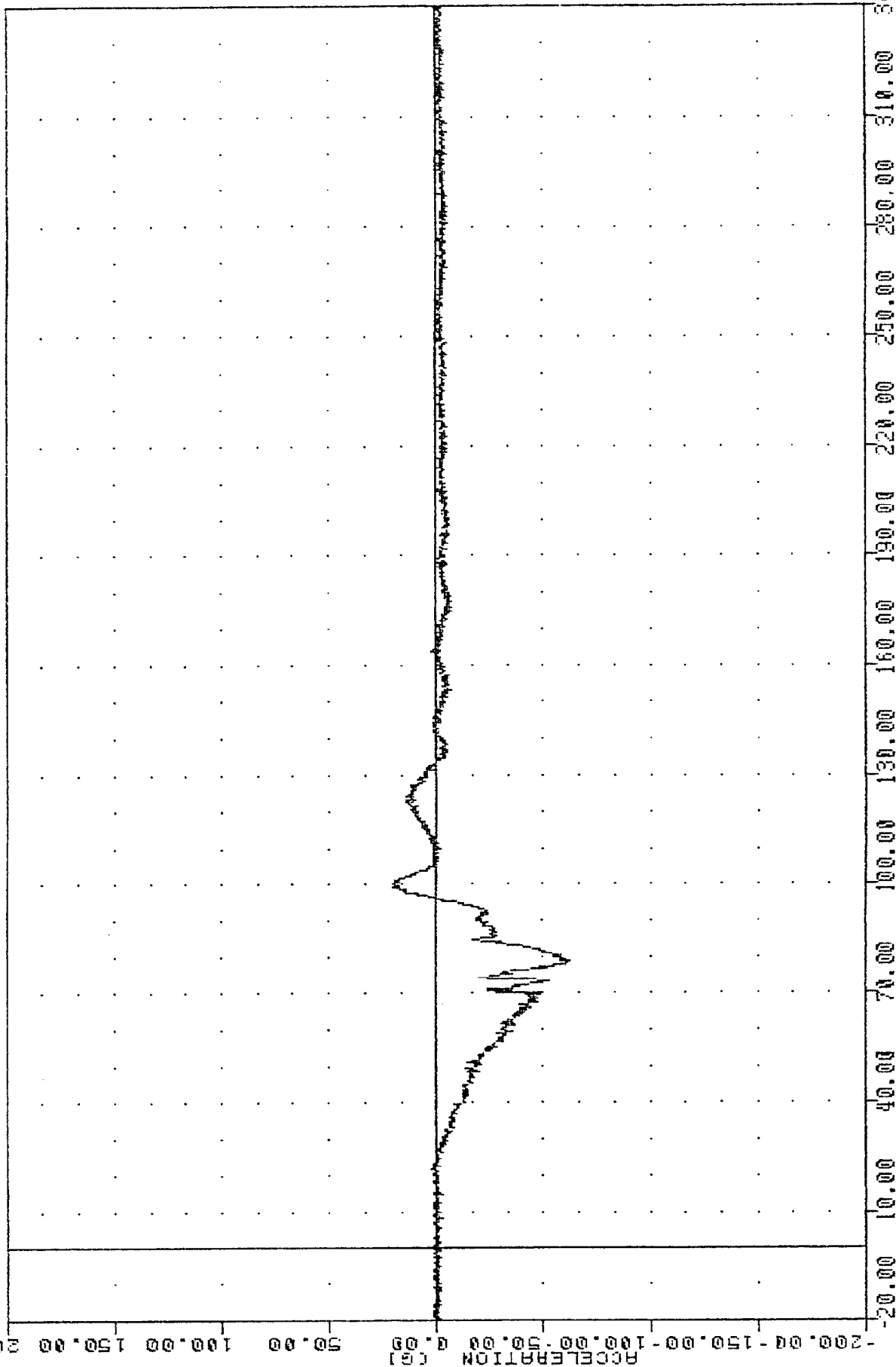
87079

HEDZ61

FILTER = ALPF 1650/ 5214/ -40

MIN. MAX VALUES = -62.15 78.88 20.46 99.38

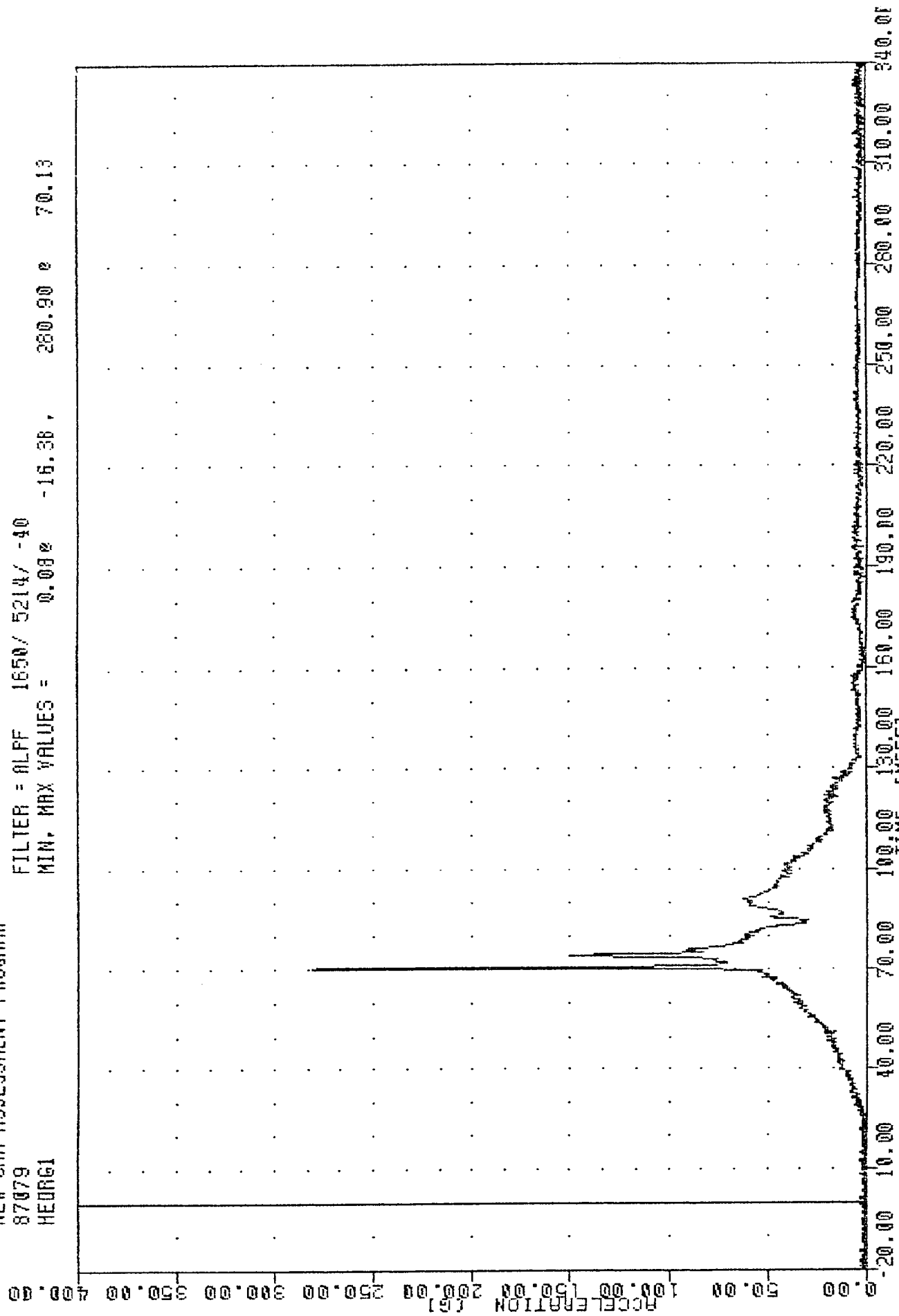
ACCELERATION (G)



JEEP COMMANCHE INTO LOAD CELL BARRIER
DRIVER HEAD ACCELERATION Z AXIS

TRC 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 HEADG1

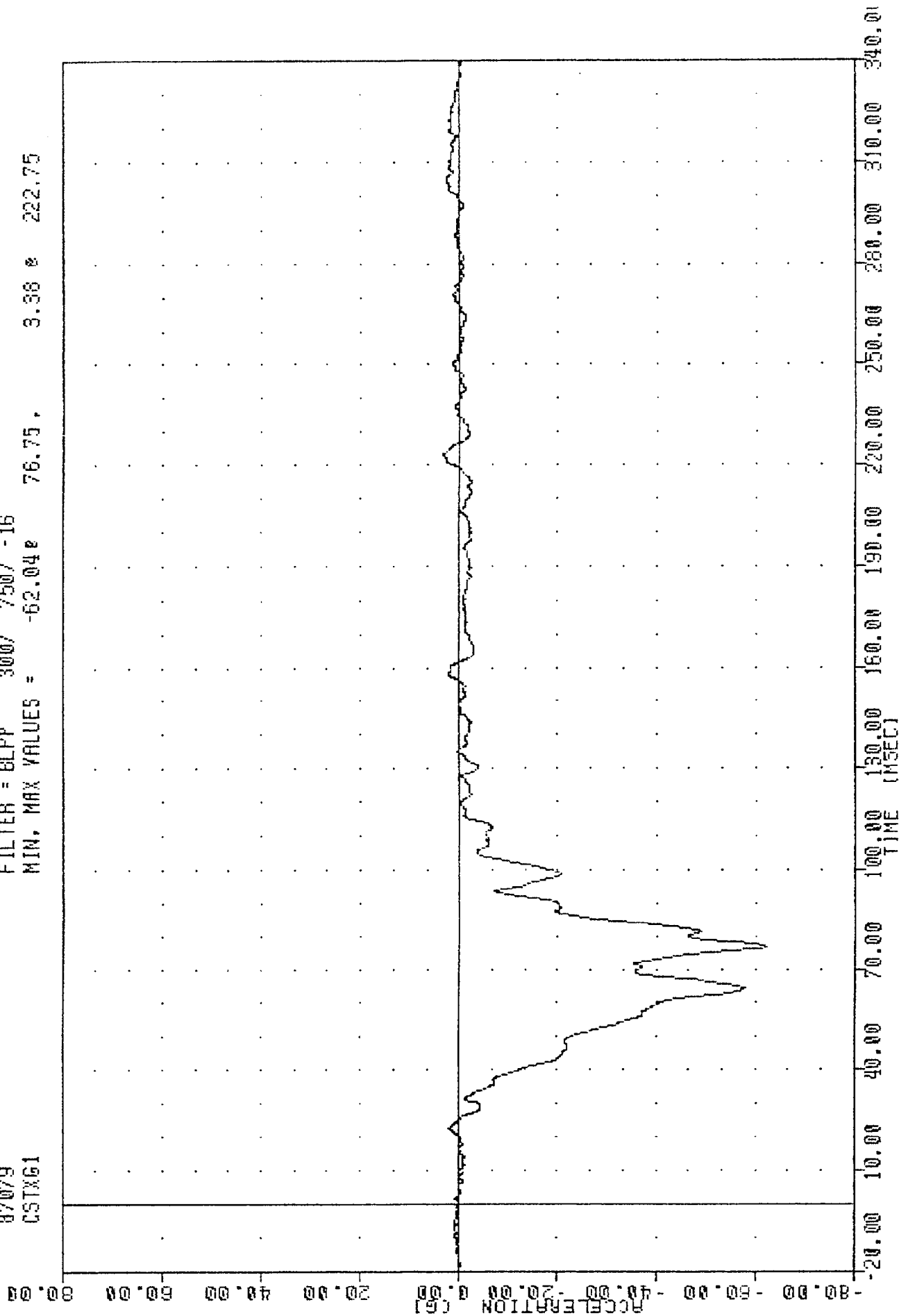
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.082 -16.38 , 280.90 e 70.13



JEEP COMMANCHE INTO LOAD CELL BARRIER
 DRIVER HEAD RESULTANT ACCELERATION

TRC 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 CSTXG1

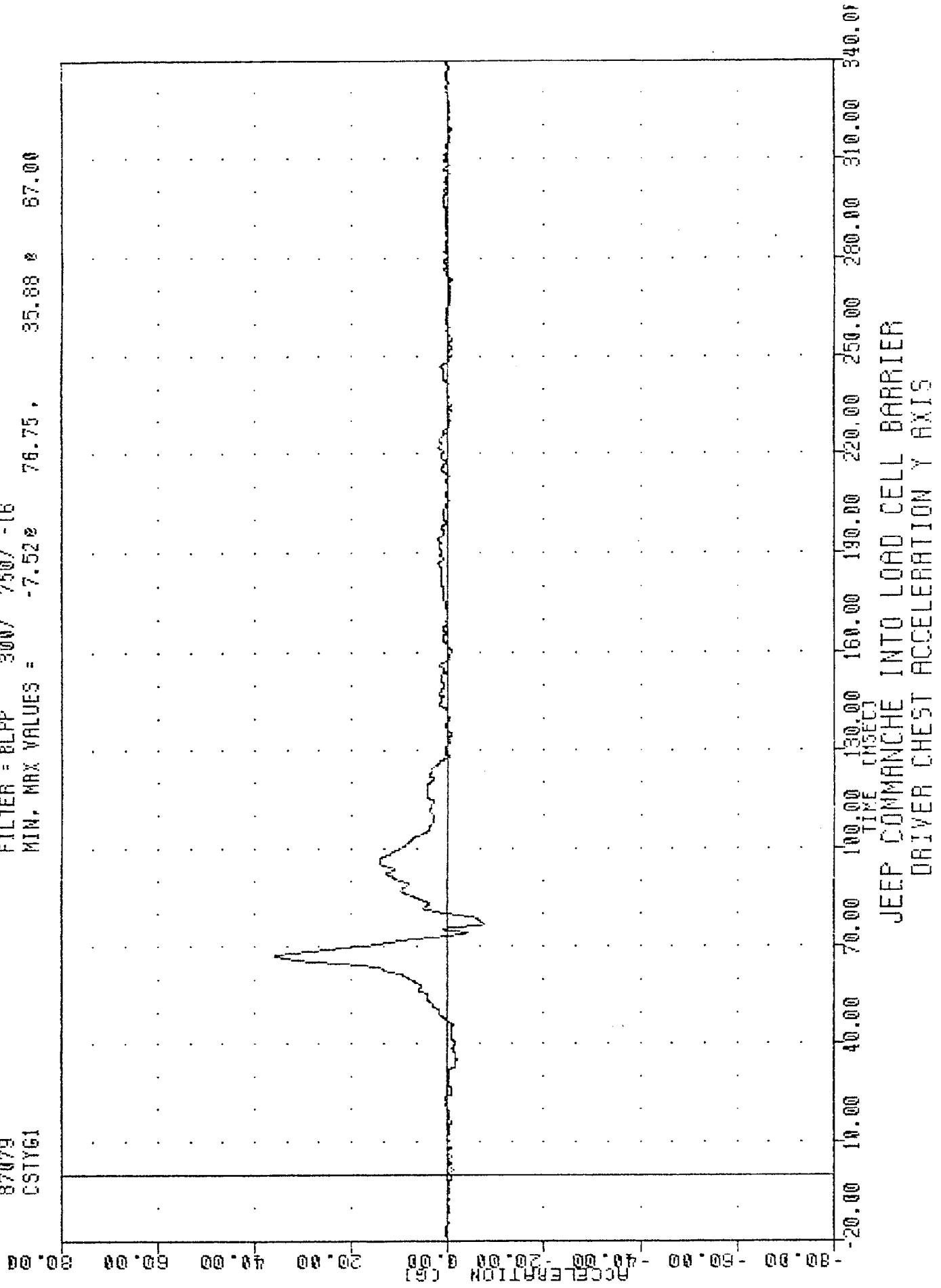
FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -62.04e 76.75, 3.36 e 222.75



JEEP COMMANCHE INTO LOAD CELL BARRIER
 DRIVER CHEST ACCELERATION X AXIS

TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 CSTY61

FILTER = BLFP 300/ 750/ -16
 MIN, MAX VALUES = -7.52 35.88 67.00



TAC 870324

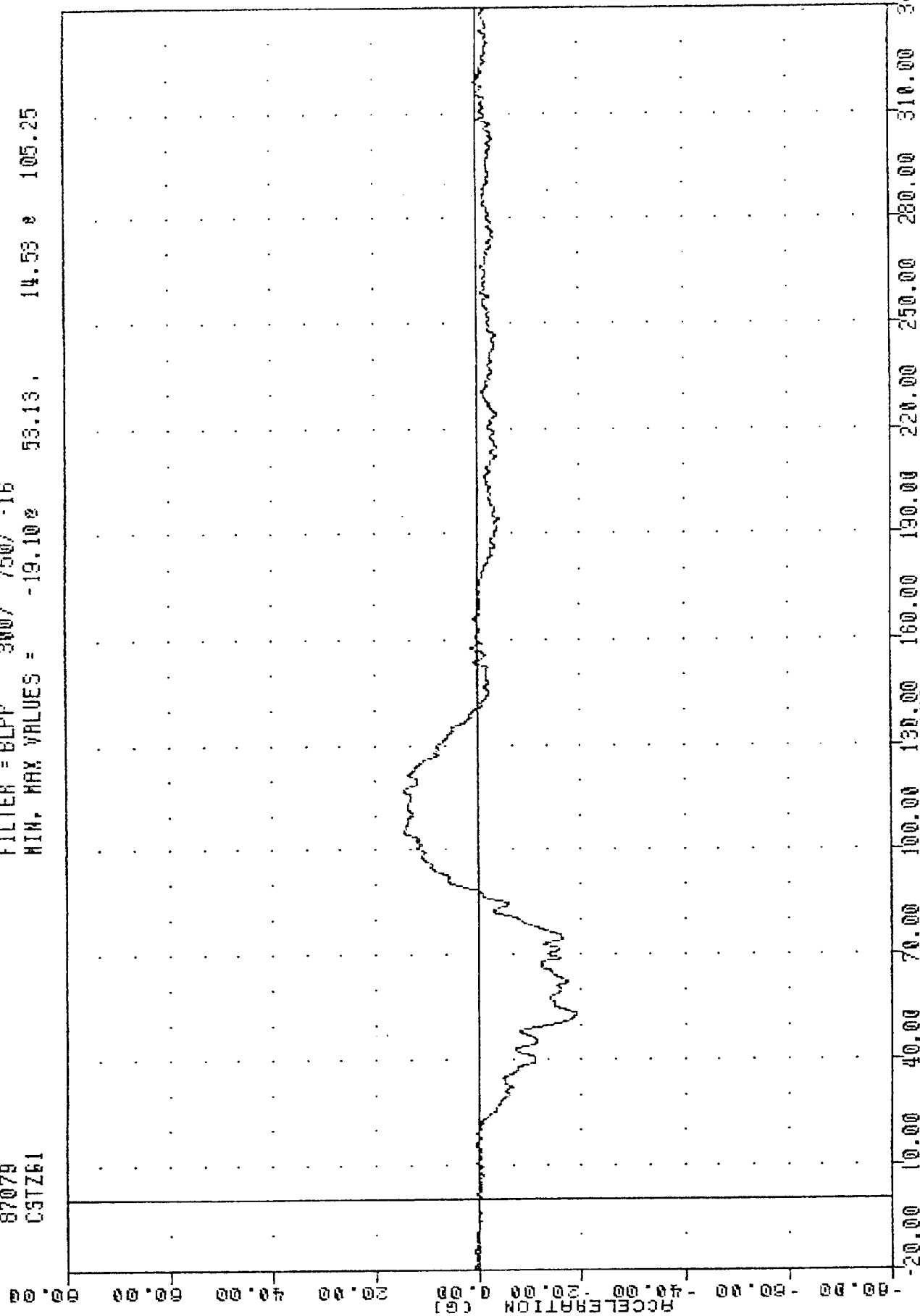
NEW CAR ASSESSMENT PROGRAM

87079

C3TZ61

FILTER = BLPP 300/ 750/ -16

HIN, MAX VALUES = -19.10% 53.13, 14.53 @ 105.25

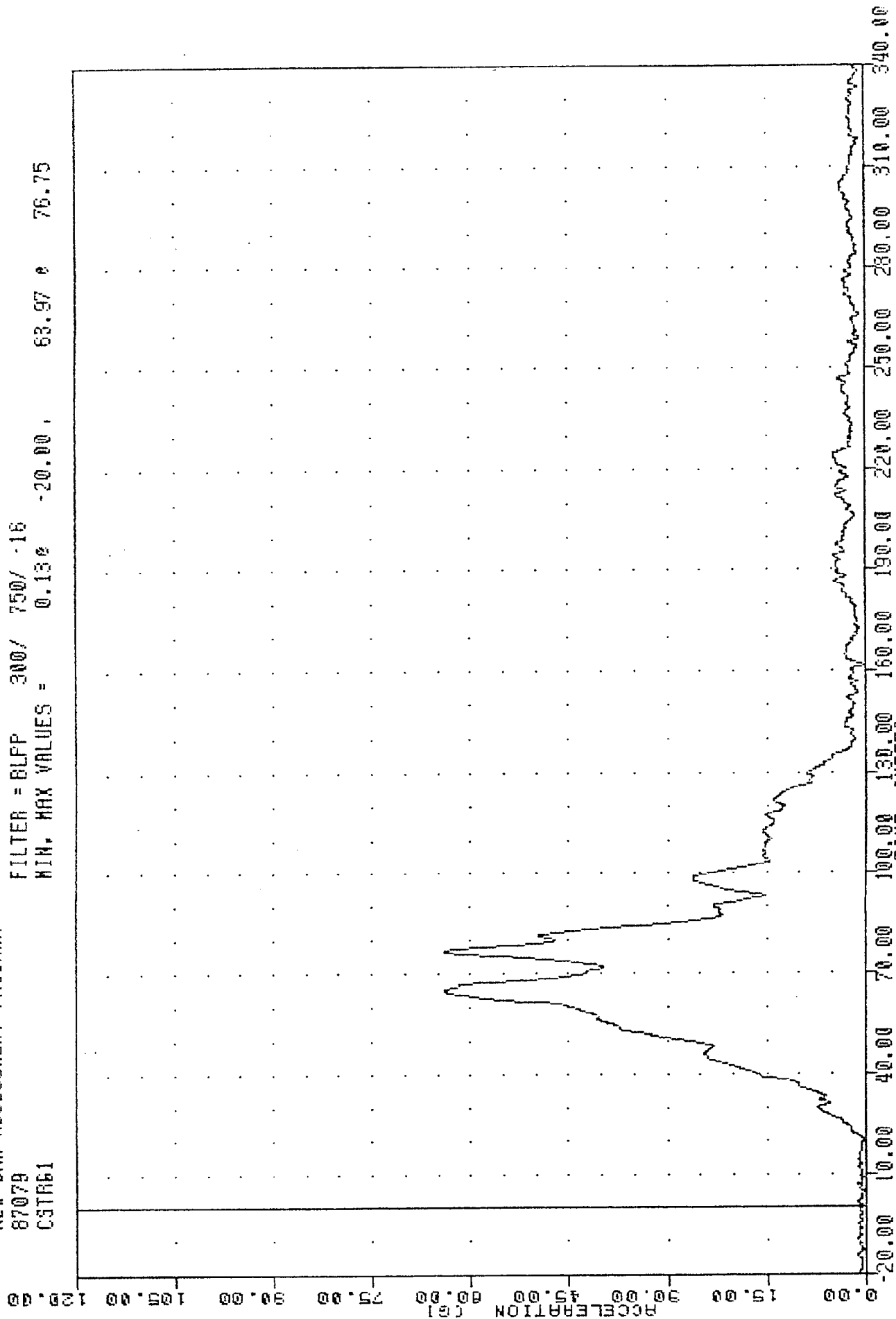


JEEP COMMANCHE INTO LOAD CELL BARRIER
DRIVER CHEST ACCELERATION Z AXIS

TAC
 NEW CAR ASSESSMENT PROGRAM
 87079
 CSTR61

, 870324

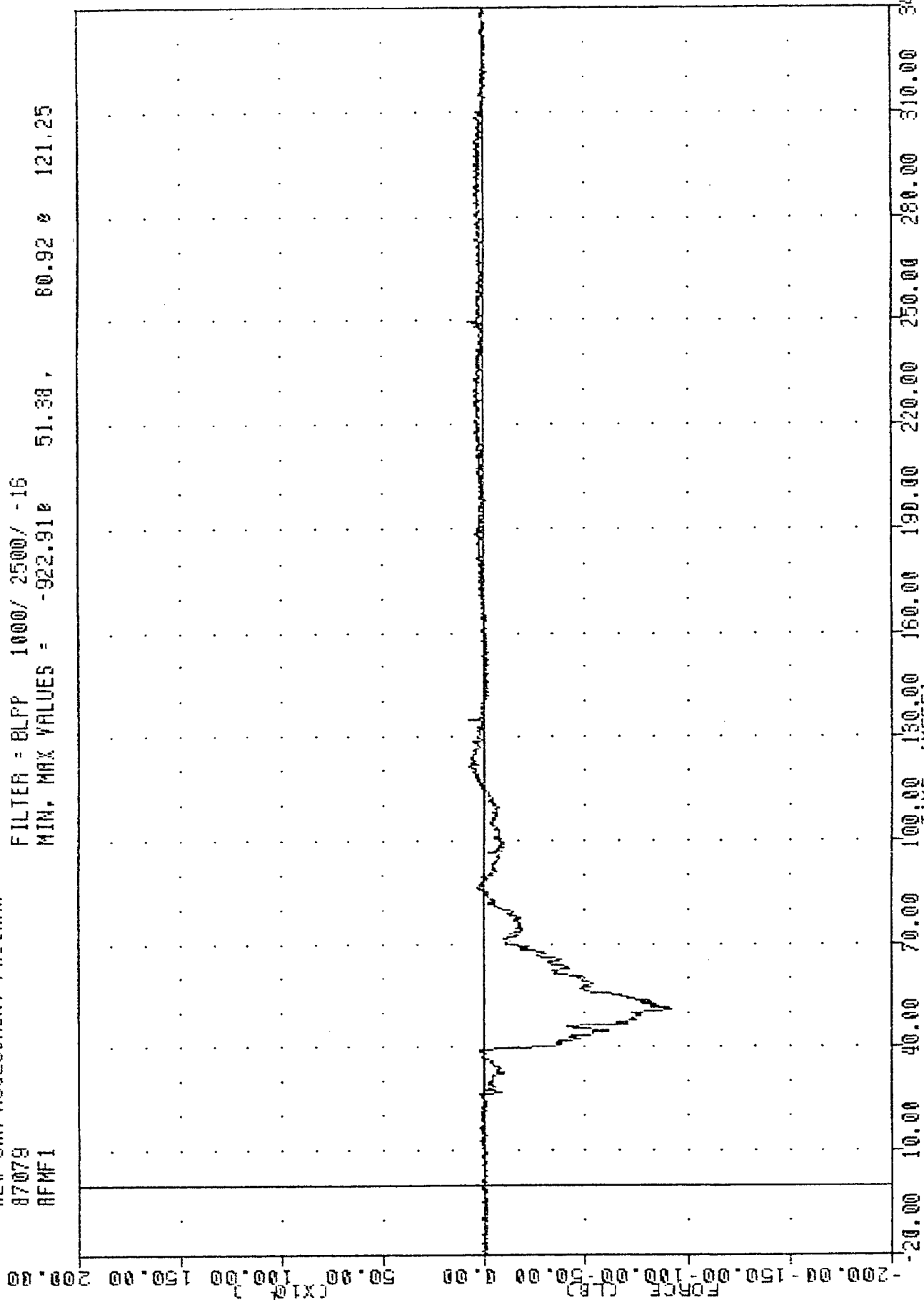
FILTER = BLFP 300/ 750/ -16
 MIN. MAX VALUES = 0.130 -20.00, 63.97 0 76.75



JEEP COMANCHE INTO LOAD CELL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION

TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 AFMF1

FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -922.910 51.38, 80.92 121.25



JEEP COMMANCHE INTO LOAD CELL BARRIER
 DRIVER RIGHT FEMUR FORCE

TAC , 870324

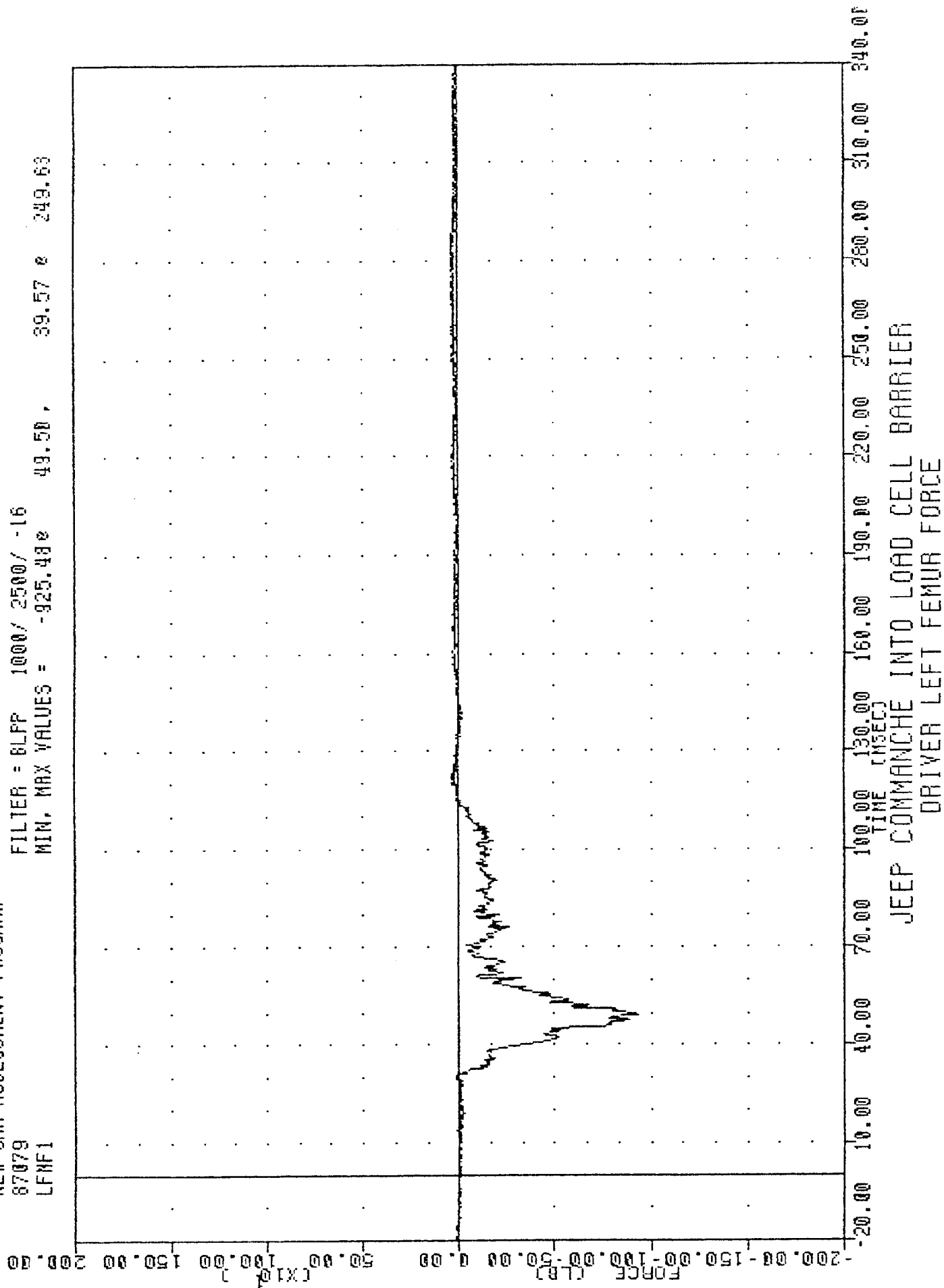
NEW CAR ASSESSMENT PROGRAM

87079

LFNF1

FILTER = 6LPP 1000/ 2500/ -16

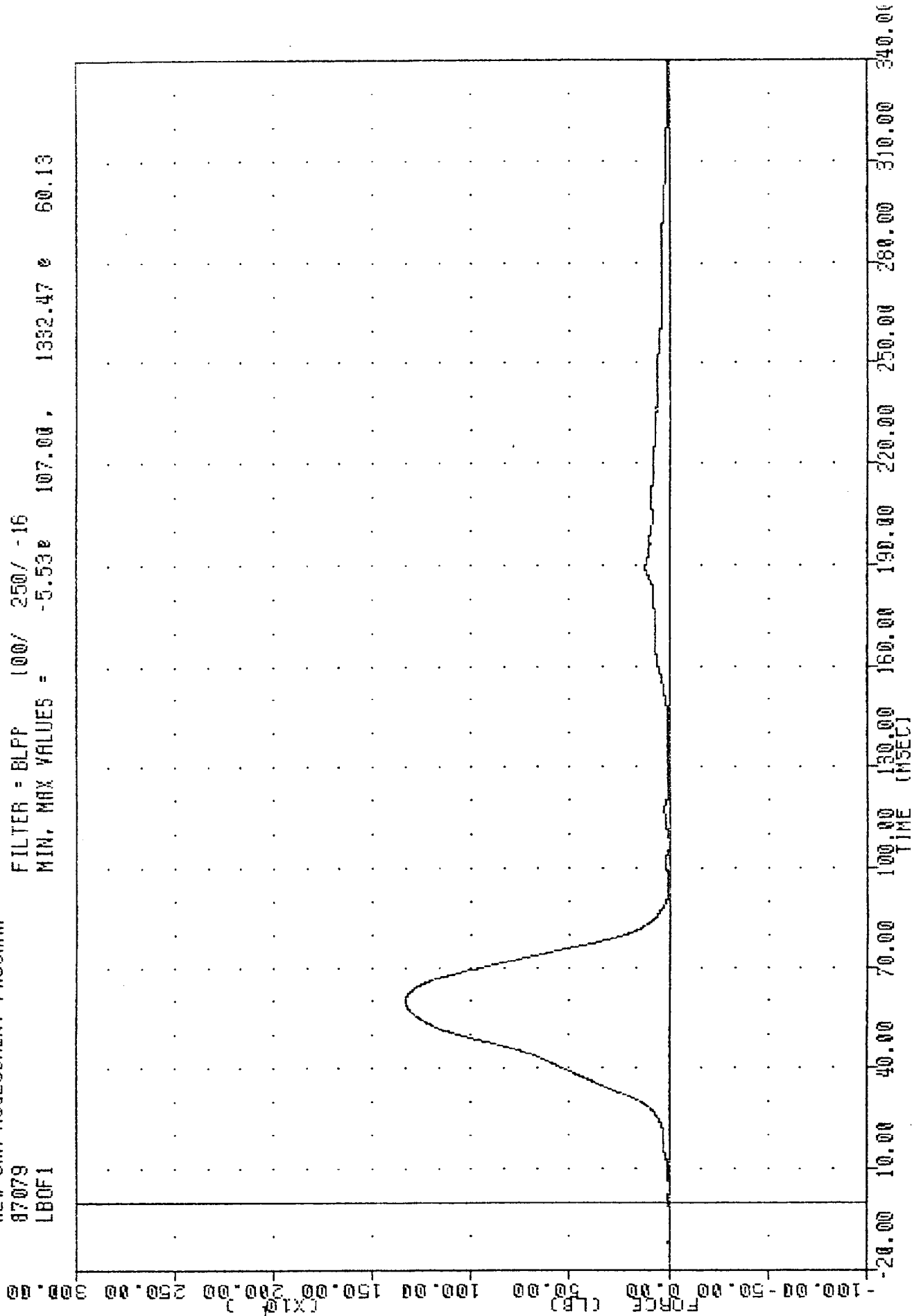
MIN. MAX VALUES = -925.48 48.50 , 39.57 249.63



JEEP COMANCHE INTO LOAD CELL BARRIER
DRIVER LEFT FEMUR FORCE

TRC 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 LBOFI

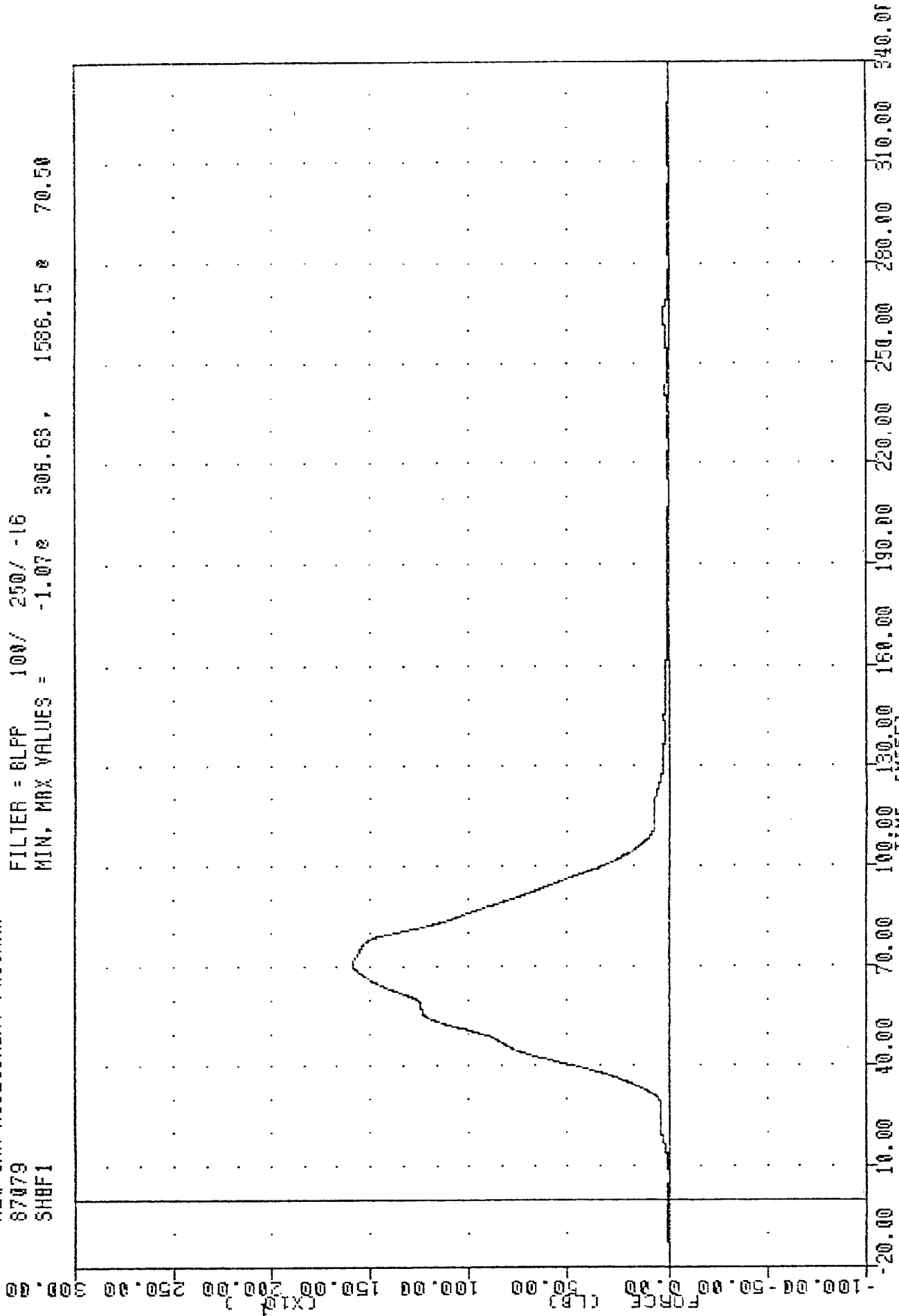
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -5.53e 107.00, 1332.47 e 60.13



JEEP COMMANCHE INTO LOAD CELL BARRIER
 DRIVER LAP BELT OUTBOARD FORCE

TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 SHBF1

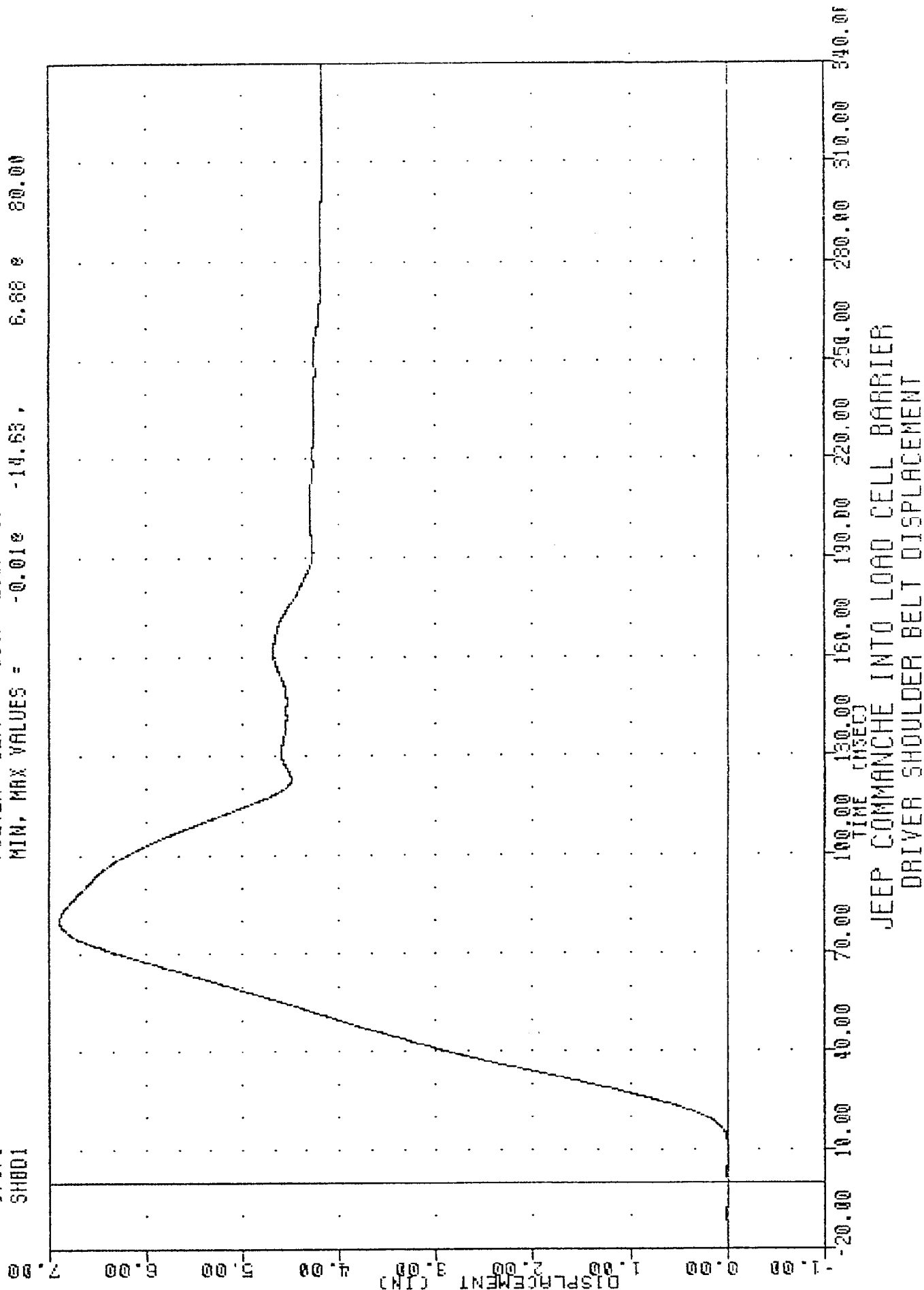
FILTER = BLFF 100/ 250/ -16
 MIN. MAX VALUES = -1.072 306.63 1586.15 70.50



JEEP COMMANCHE INTO LOAD CELL BARRIER
 DRIVER SHOULDER BELT FORCE

TRC
NEW CAR ASSESSMENT PROGRAM
87079
SH001

FILTER = BLFP 100/ 250/ -16
MIN, MAX VALUES = -0.010 -14.63, 6.88 0 80.00



JEEP COMMANCHE INTO LOAD CELL BARRIER
DRIVER SHOULDER BELT DISPLACEMENT

TRC

870324

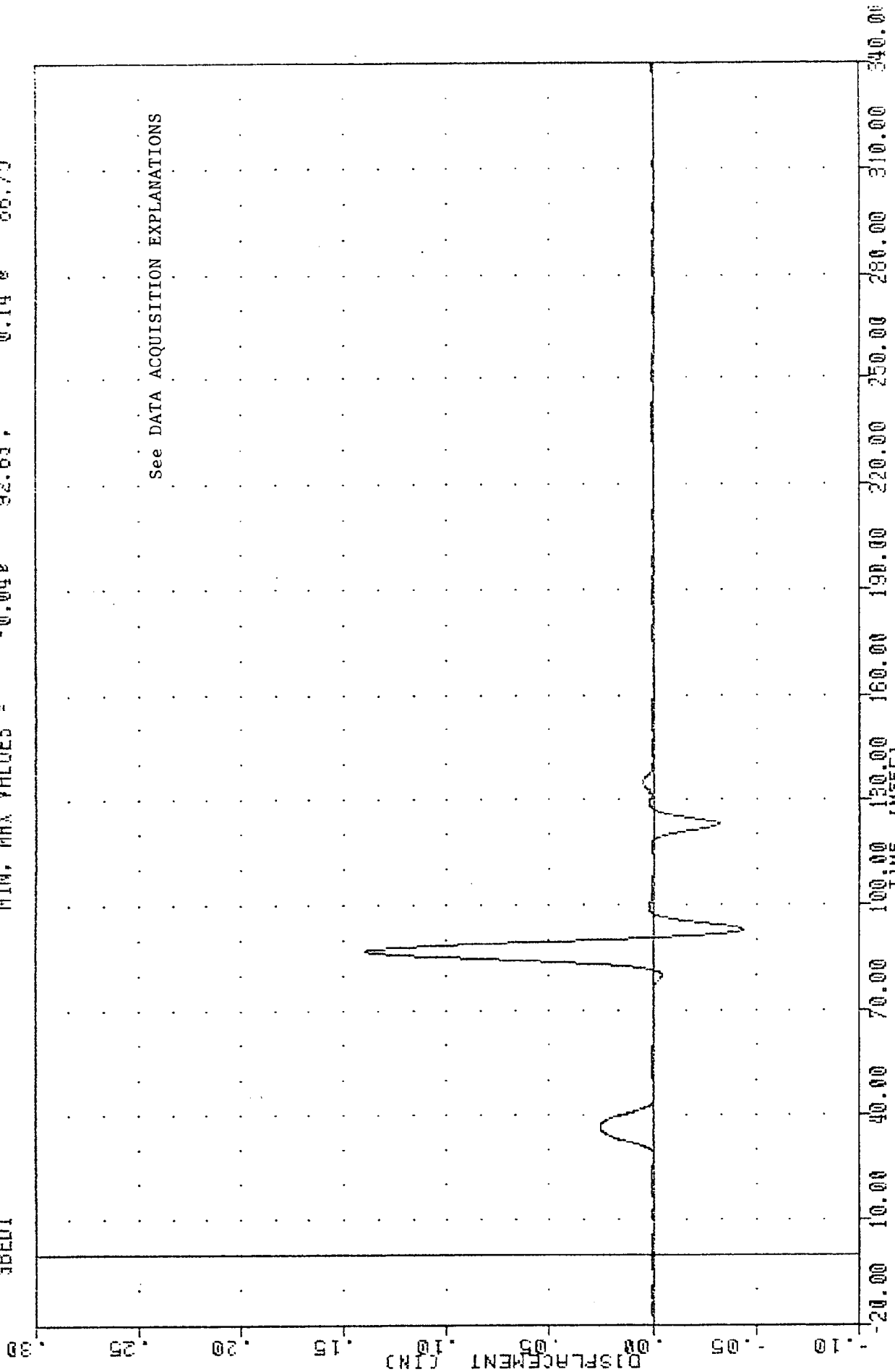
NEW CAR ASSESSMENT PROGRAM

87079

5BED1

FILTER = BLFP 100/ 250/ -16

MIN, MAX VALUES = -0.040 92.63, 0.14 86.75



JEEP COMMANDCHE INTO LOAD CELL BARRIER
DRIVER SEAT BELT EXTENSION

TAC , 870324

NEW CAR ASSESSMENT PROGRAM

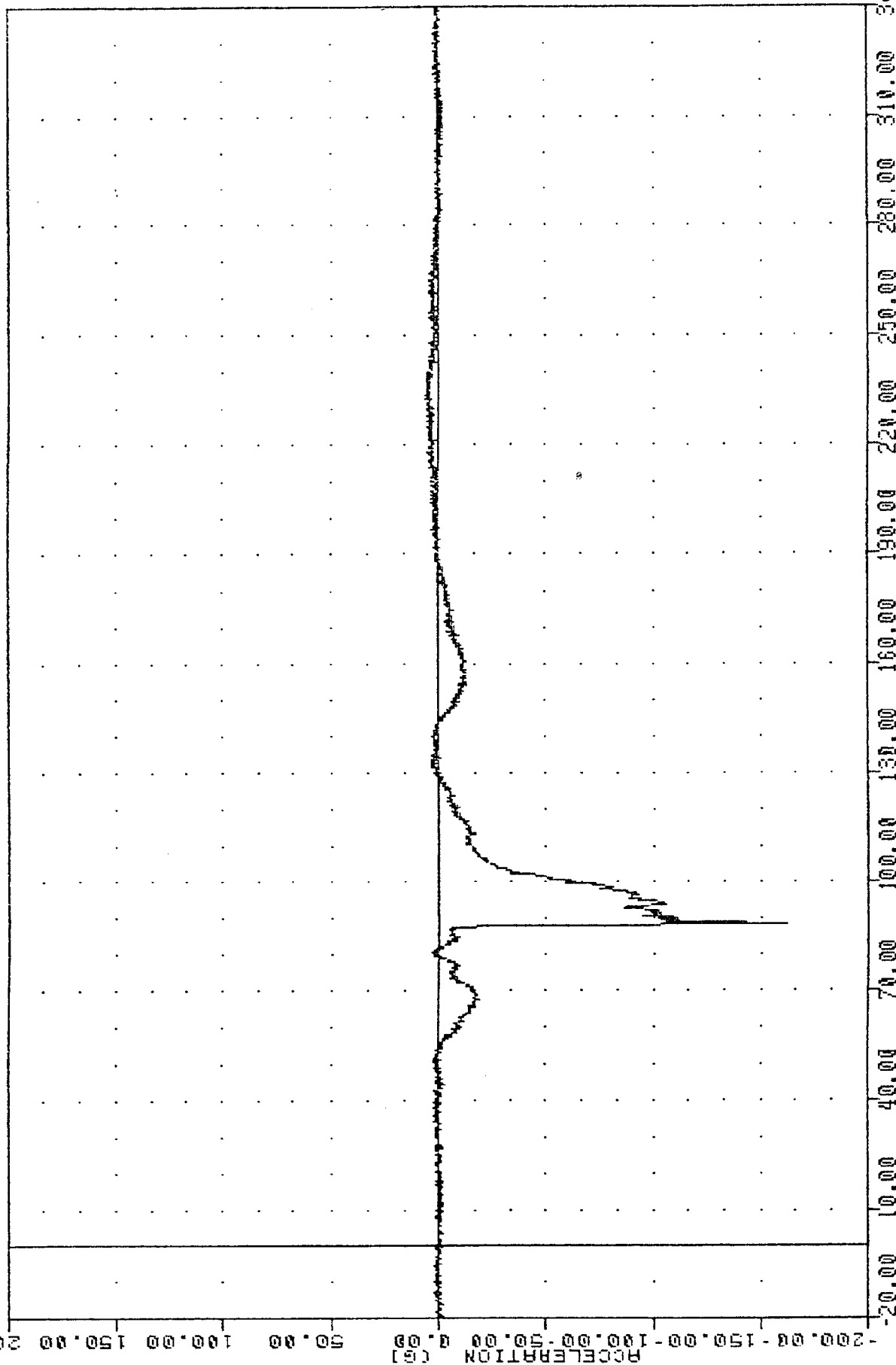
87079

HEDX6B

FILTER = ALPF 1650/ 5214/ -40

HIN, MAX VALUES = -162.40 88.75, 6.66 233.75

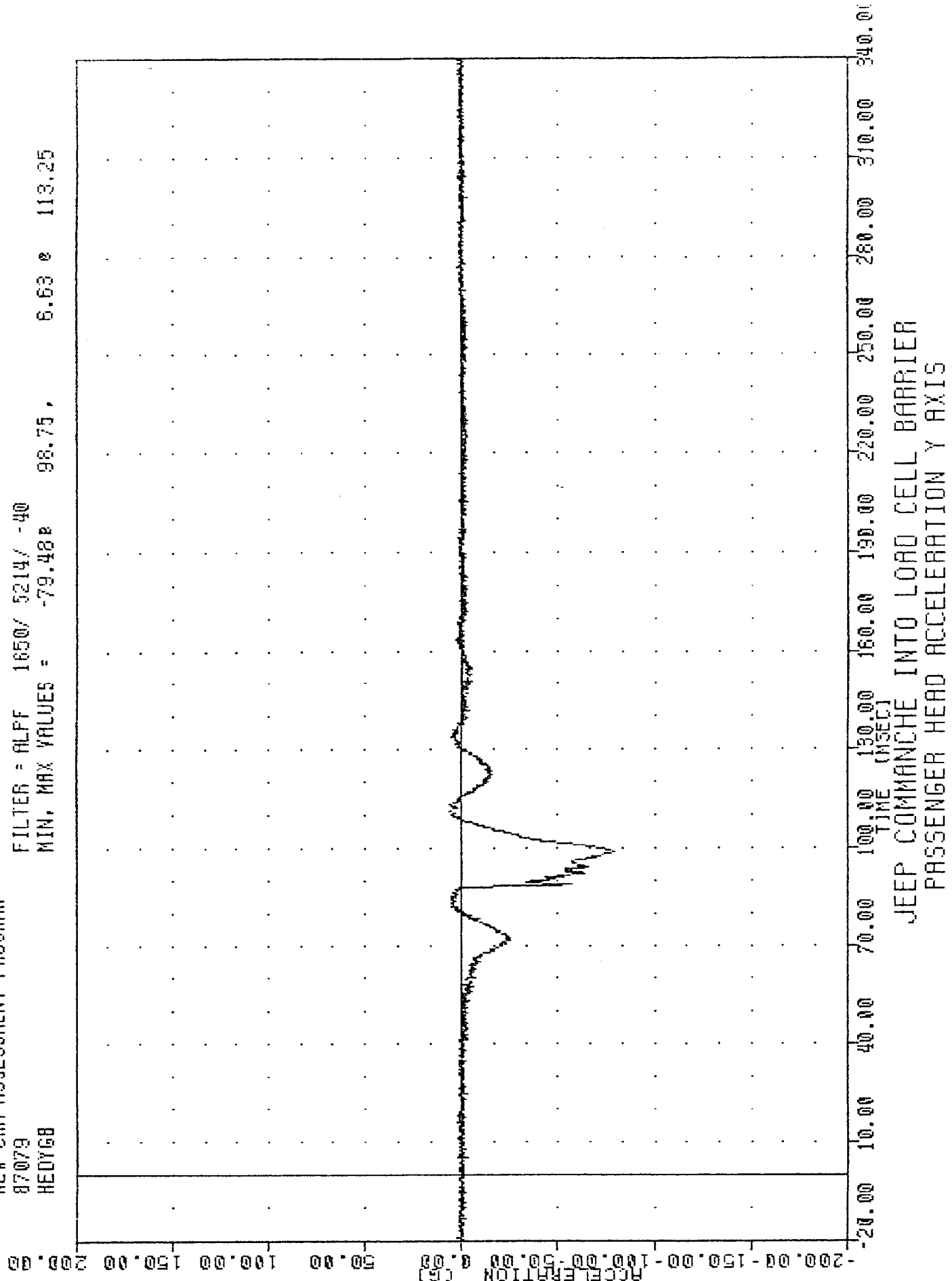
ACCELERATION (G)



JEEP COMMANCHE INTO LOAD CELL BARRIER
PASSENGER HEAD ACCELERATION X AXIS

TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 HEDYGB

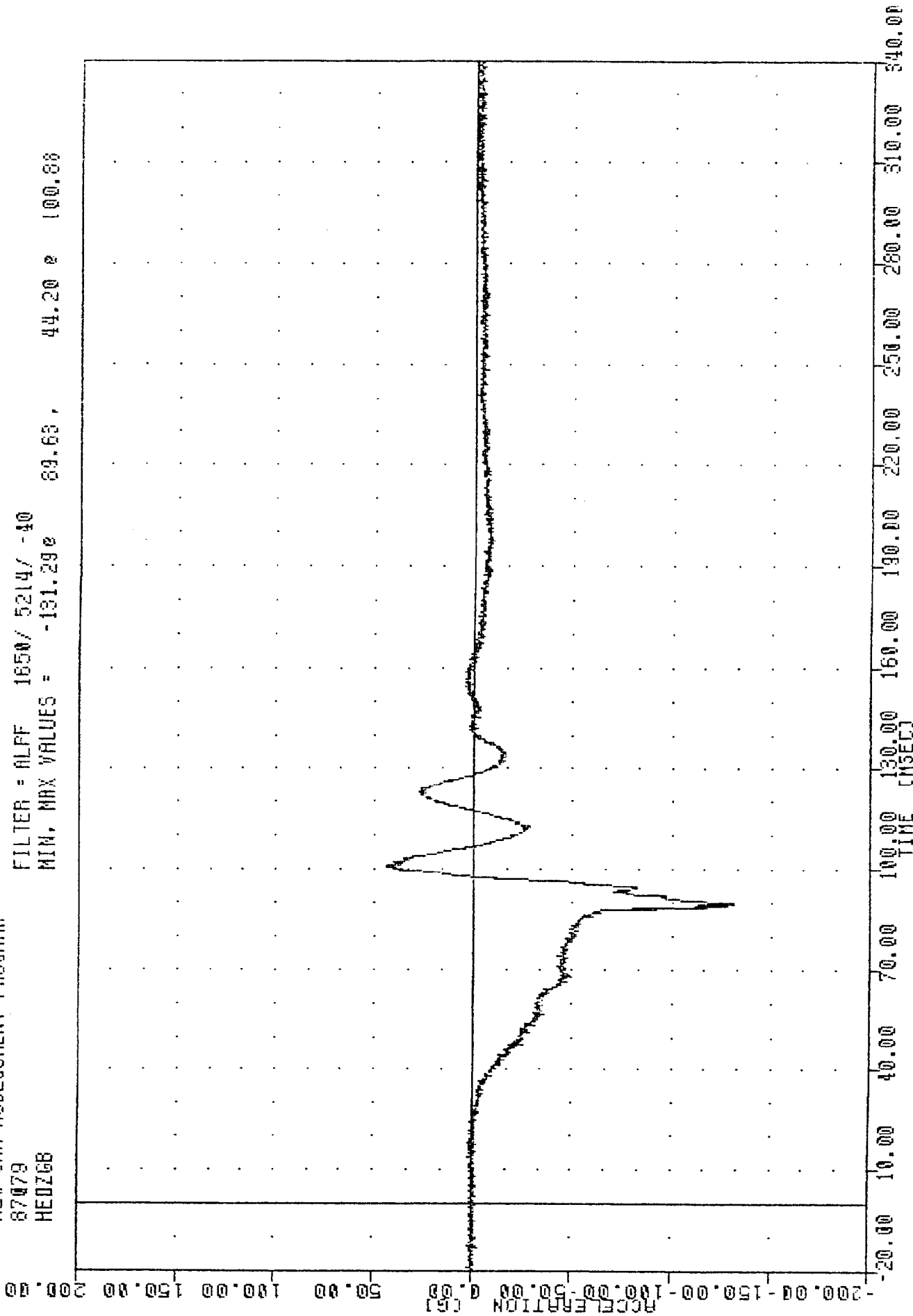
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -79.48 98.75, 6.63 113.25



TRC 870324
NEW CAR ASSESSMENT PROGRAM

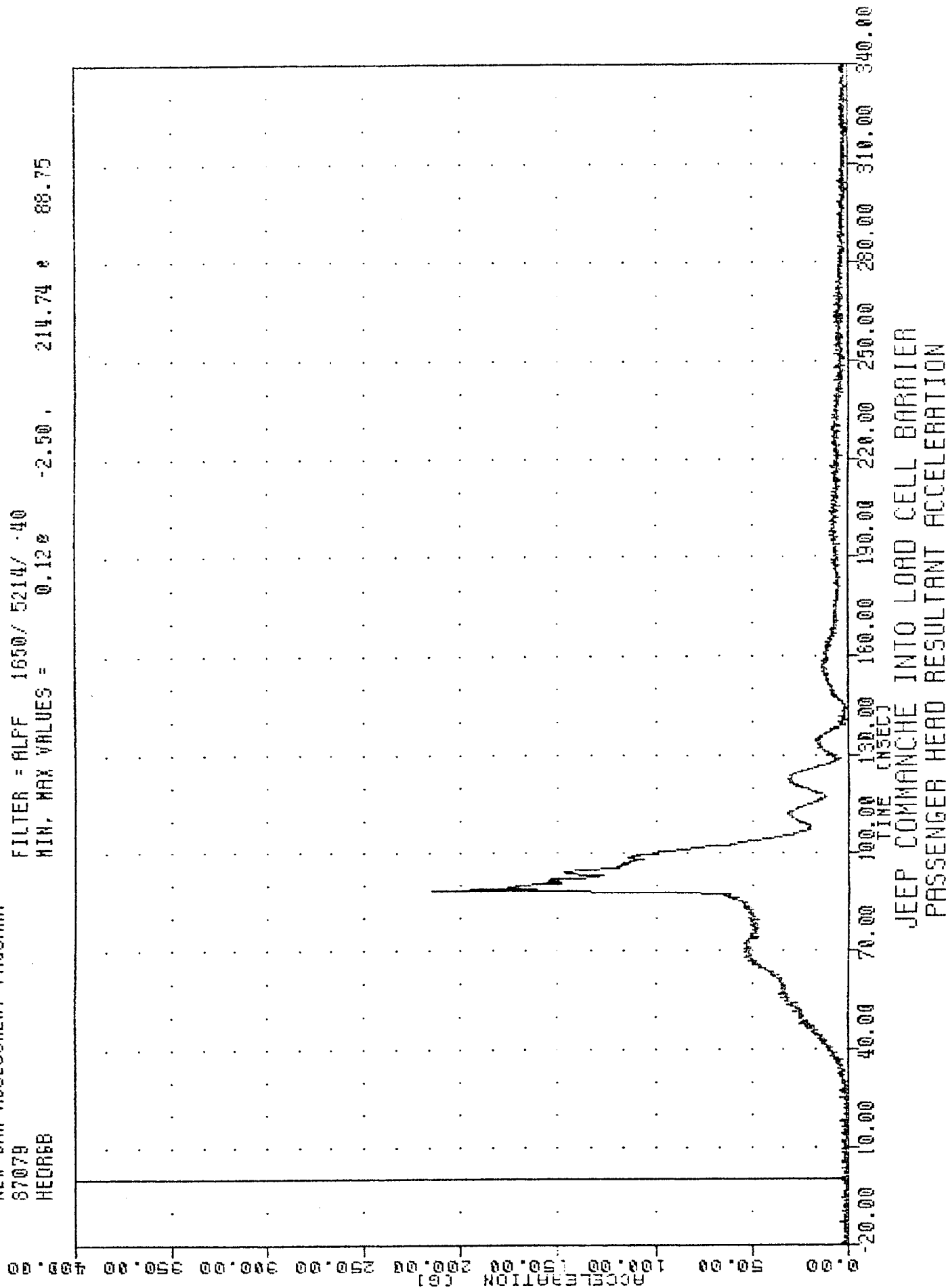
87079
HEADZGB

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -131.29e 89.63, 44.20 e 100.00



TAC
NEW CAR ASSESSMENT PROGRAM
87079
HEAD6B

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 0.128 -2.50 214.74 e 88.75



TAC , 870324

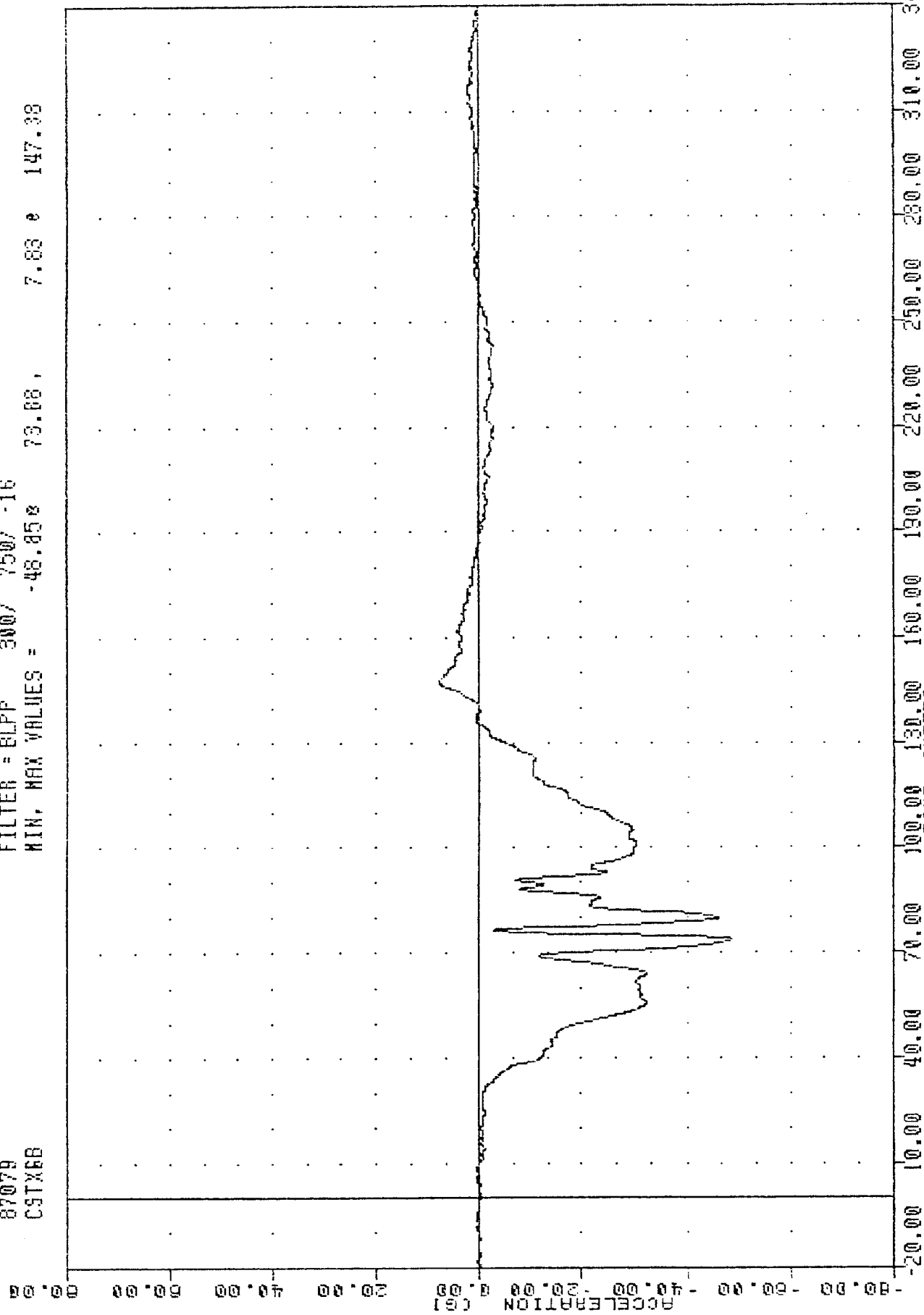
NEW CAR ASSESSMENT PROGRAM

87079

CSTX68

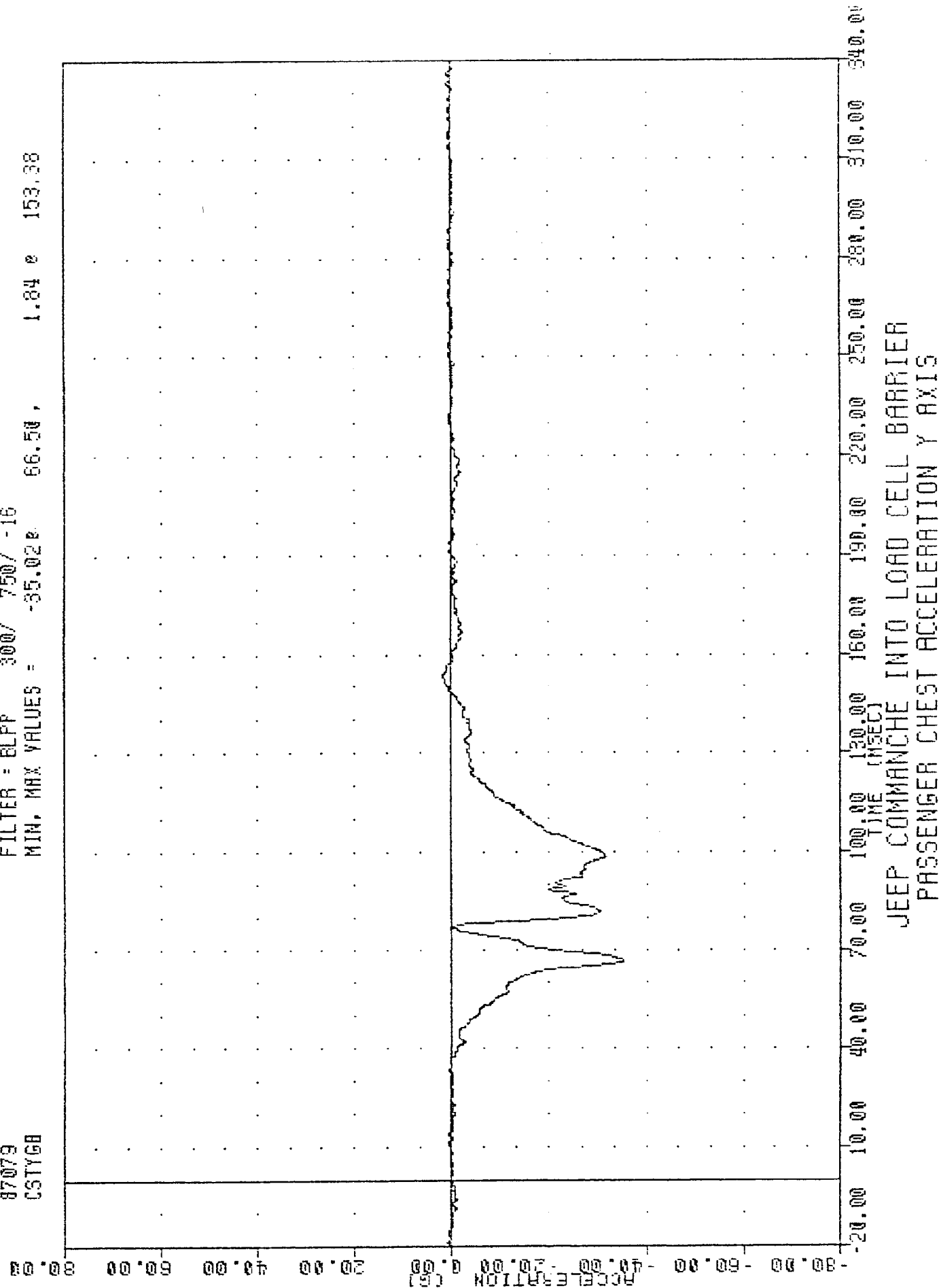
FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = -48.858 73.88 , 7.83 e 147.38



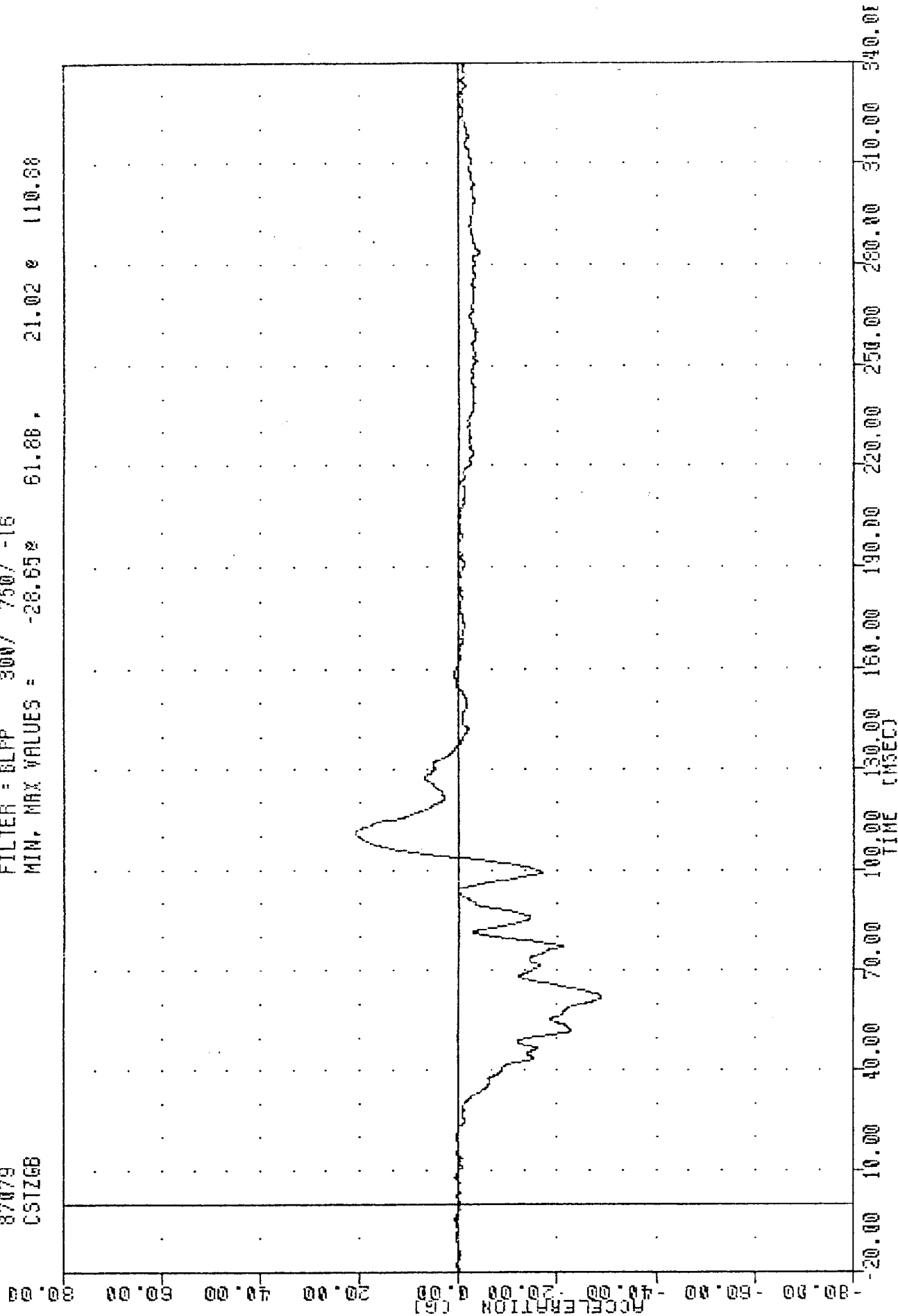
TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 CSTYGB

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -35.028 66.58, 1.84 153.38



TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 CSTZGB

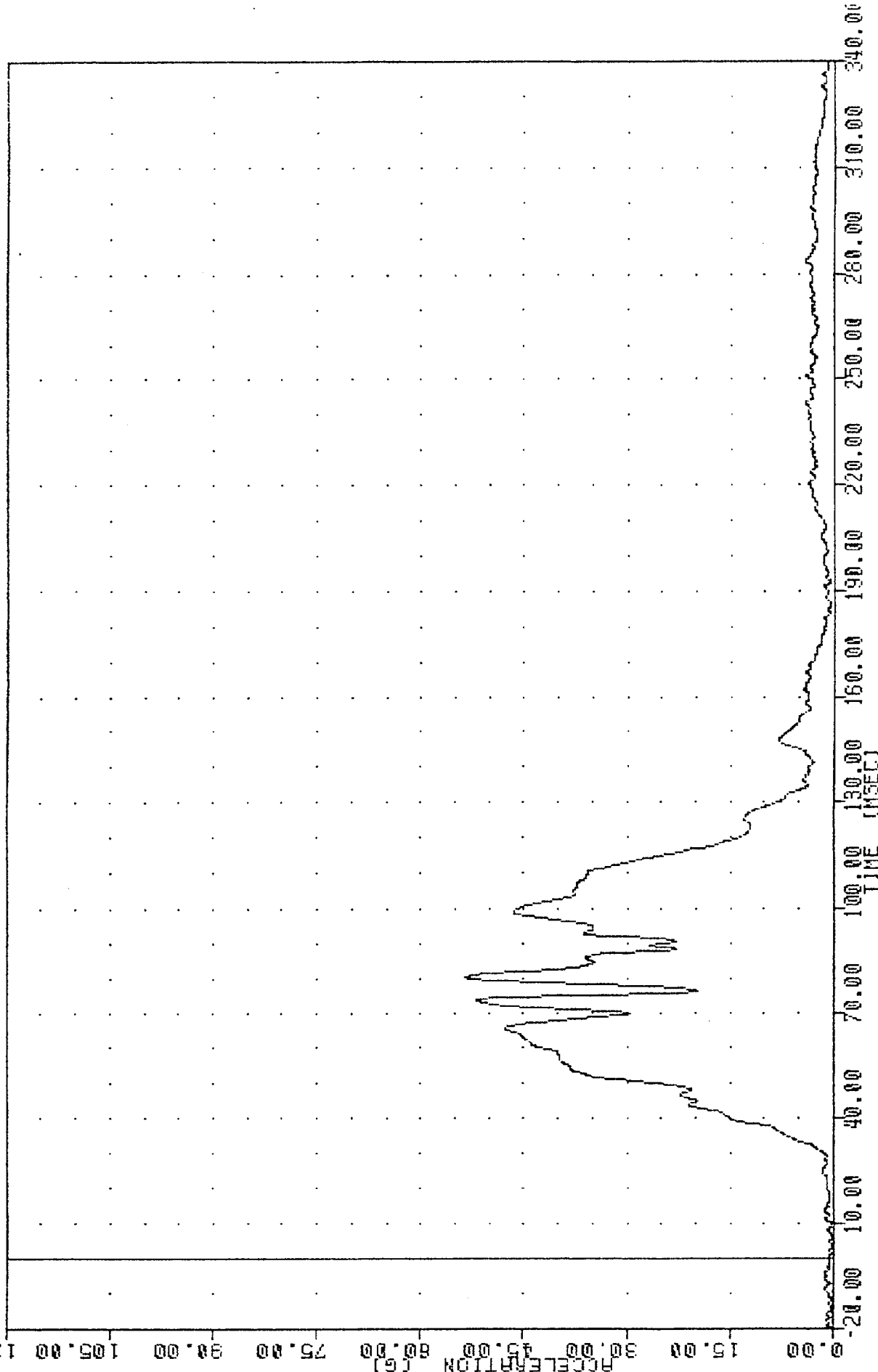
FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -28.65% 61.88, 21.02 e 110.68



JEEP COMMANDCHE INTO LOAD CELL BARRIER
 PASSENGER CHEST ACCELERATION Z AXIS

INC 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 CSTR68

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.06e 3.13. 53.30 e 80.25



JEEP COMMANCHE INTO LOAD CELL BARRIER
 PASSENGER CHEST RESULTANT ACCELERATION

TAC 870324

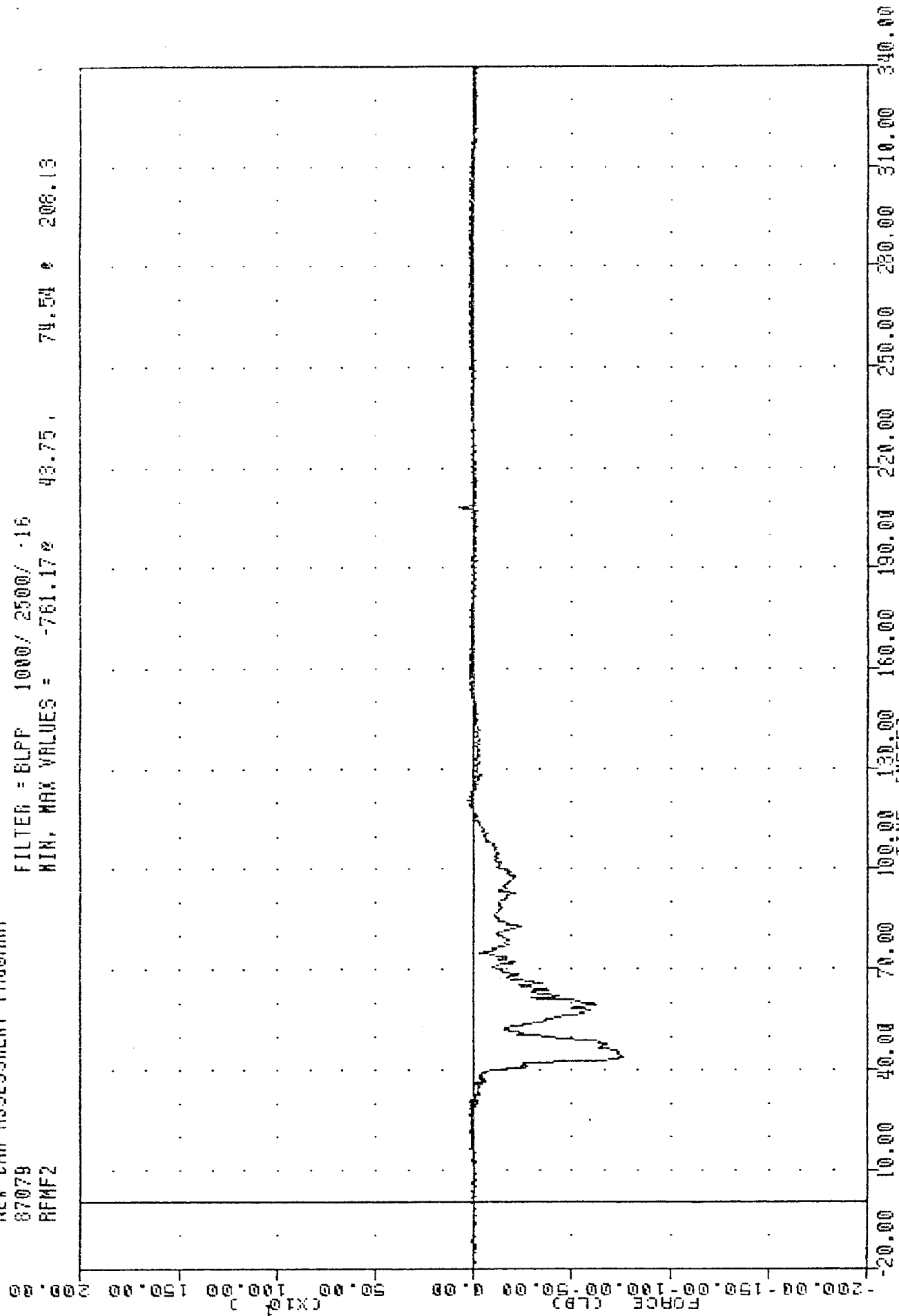
NEW CAR ASSESSMENT PROGRAM

87079

RFMF2

FILTER = BLPP 1000/ 2500/ .16

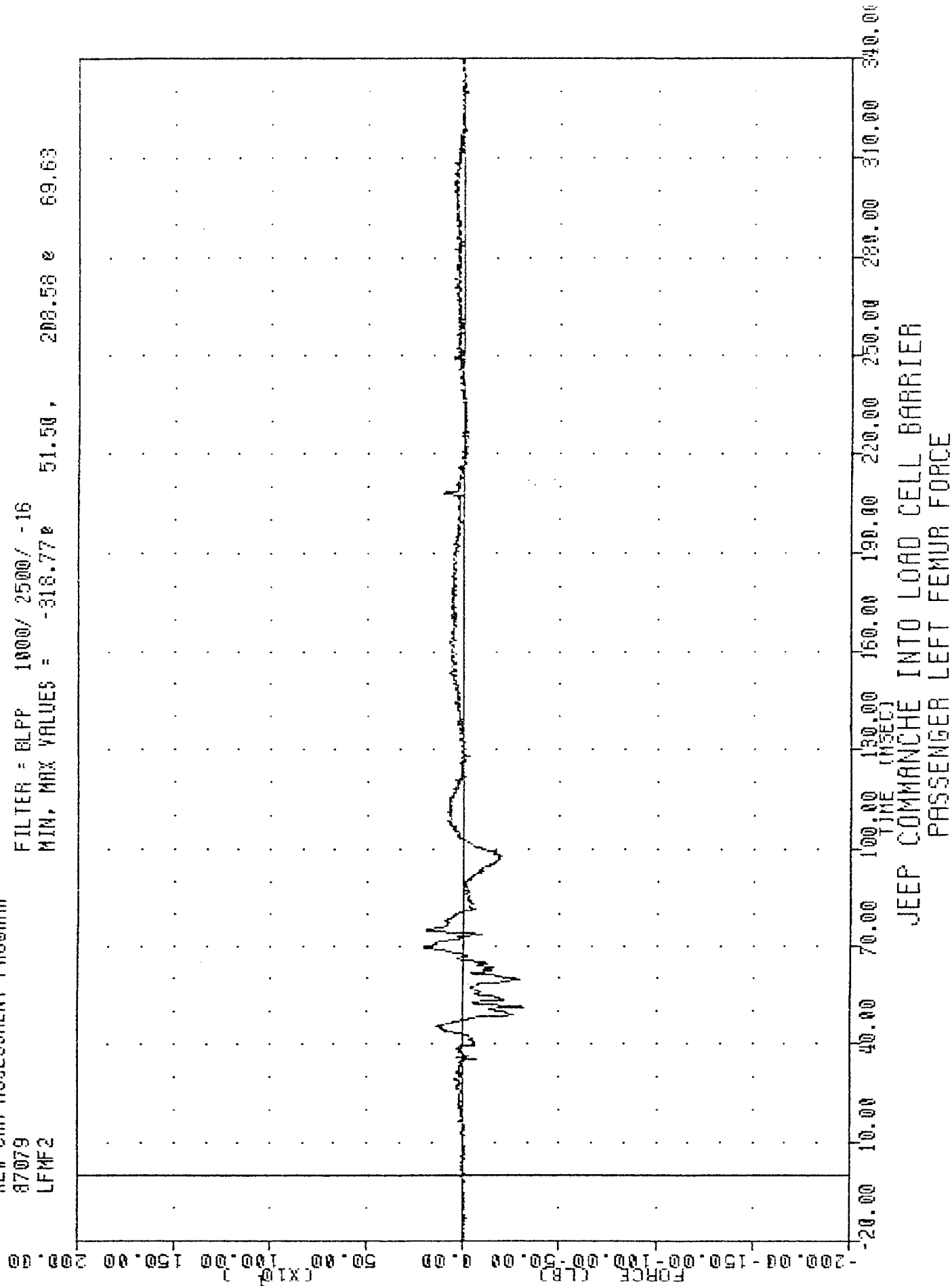
MIN. MAX VALUES = -761.17 43.75 74.54 208.13



JEEP COMMANCHE INTO LOAD CELL BARRIER
PASSENGER RIGHT FEMUR FORCE

TRC 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 LFMF2

FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -318.77 51.50, 208.58 e 69.63



TAC 870324

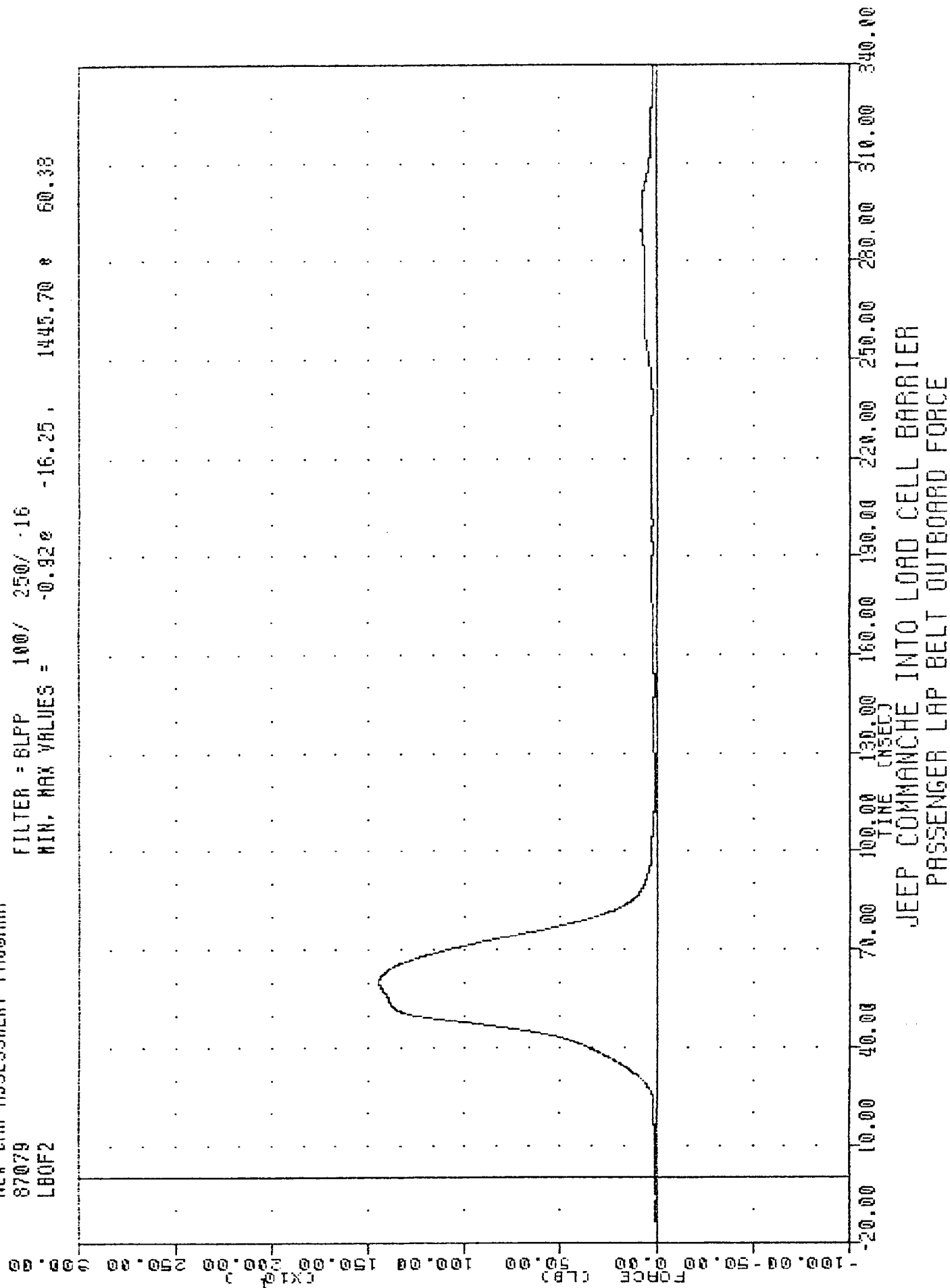
NEW CAR ASSESSMENT PROGRAM

87079

LB0F2

FILTER = BLPP 100/ 250/ -16

HIN, MAX VALUES = -0.920 -16.25, 1445.70 & 60.38

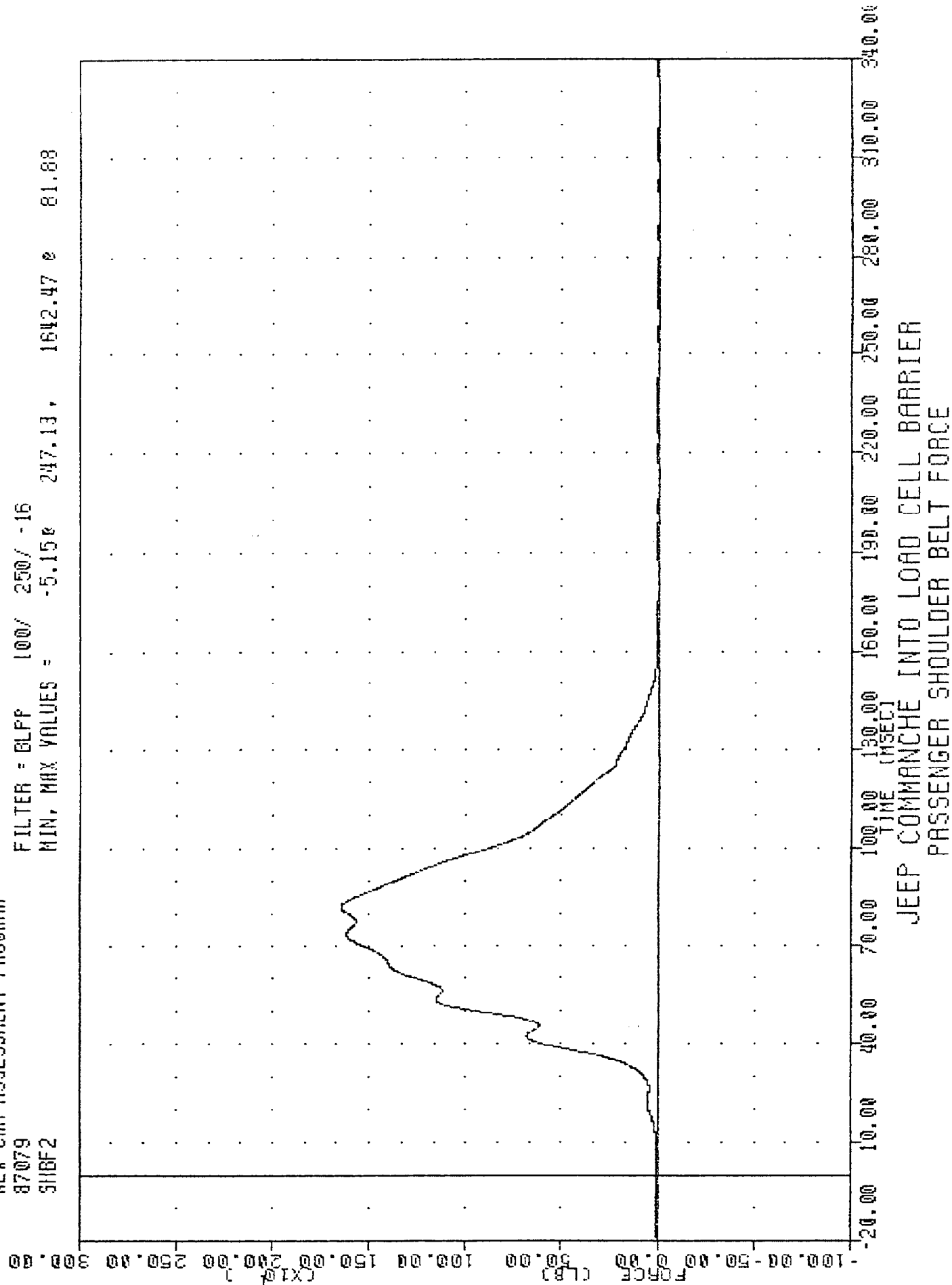


JEEP COMMANCHE INTO LOAD CELL BARRIER
PASSENGER LAP BELT OUTBOARD FORCE

TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 SHBF2

870324

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -5.15e 247.13, 1642.47 e 81.88



JEEP COMMANCHE INTO LOAD CELL BARRIER
 PASSENGER SHOULDER BELT FORCE

THC 870324

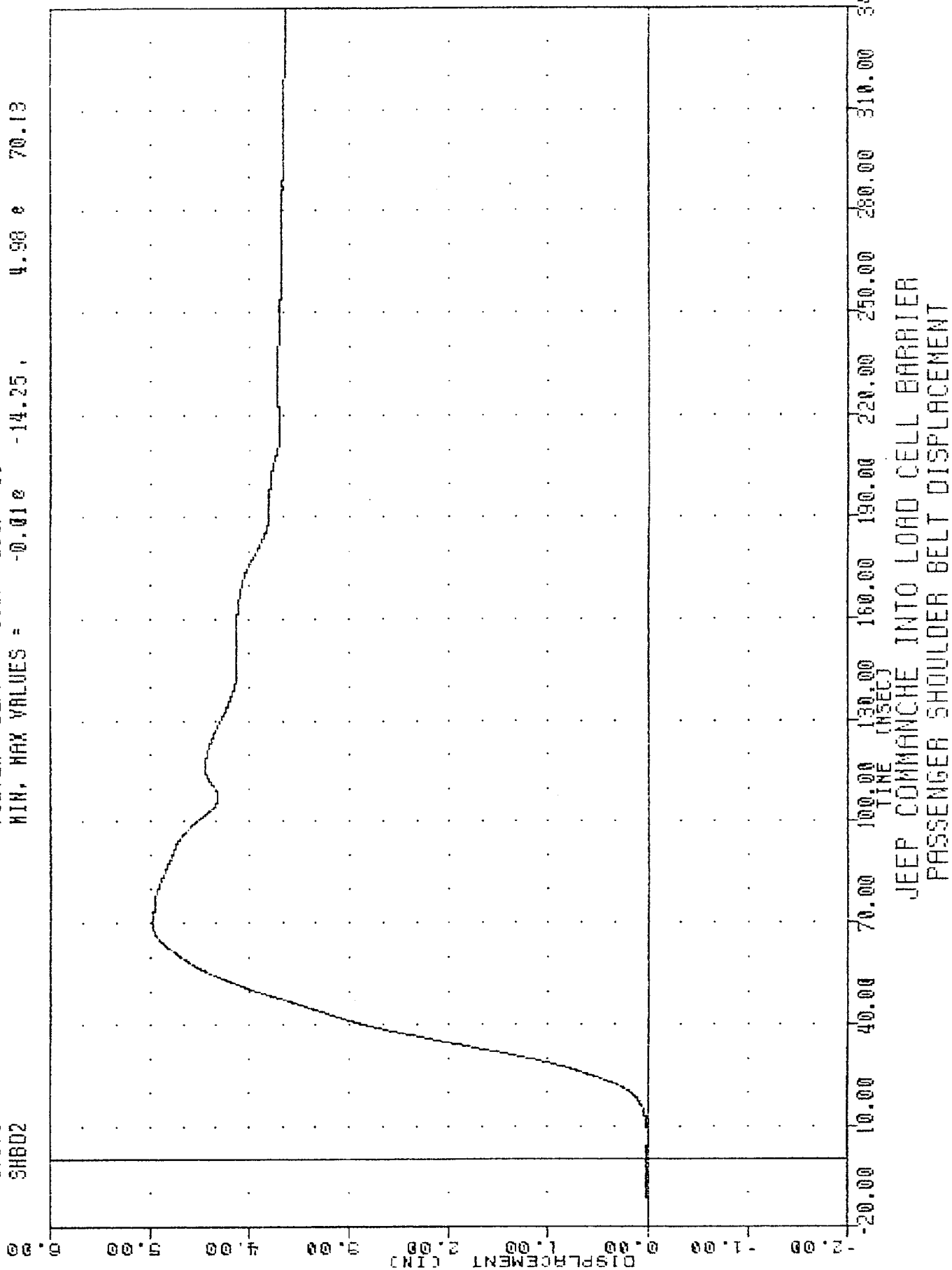
NEW CAR ASSESSMENT PROGRAM

87079

SHBD2

FILTER = BLPP 100/ 250/ -16

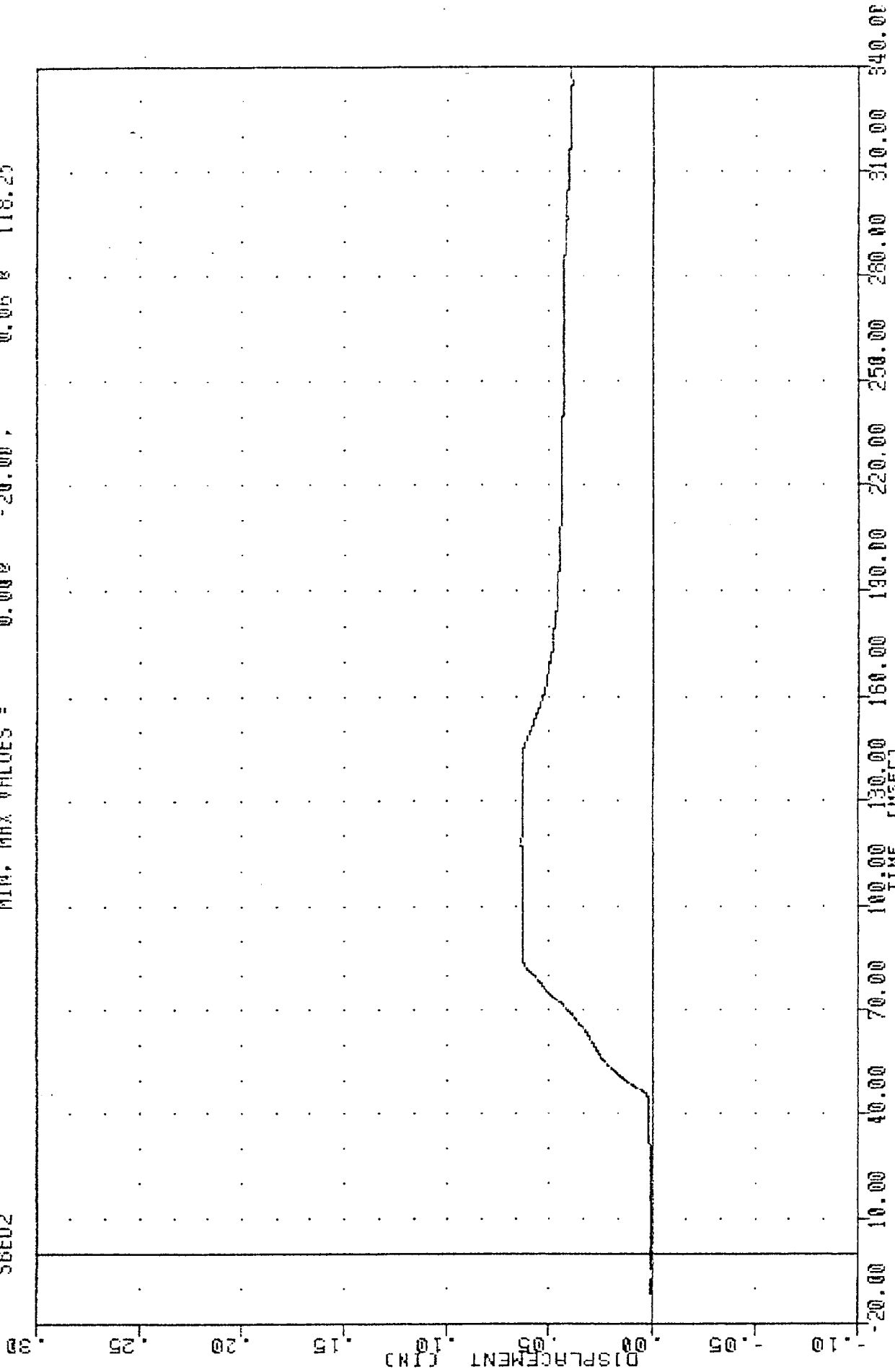
MIN. MAX VALUES = -0.01e -14.25, 4.90 e 70.13



JEEP COMMANCHE INTO LOAD CELL BARRIER
PASSENGER SHOULDER BELT DISPLACEMENT

TRC , 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 SBED2

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = 0.002 -20.00 0.06 118.25

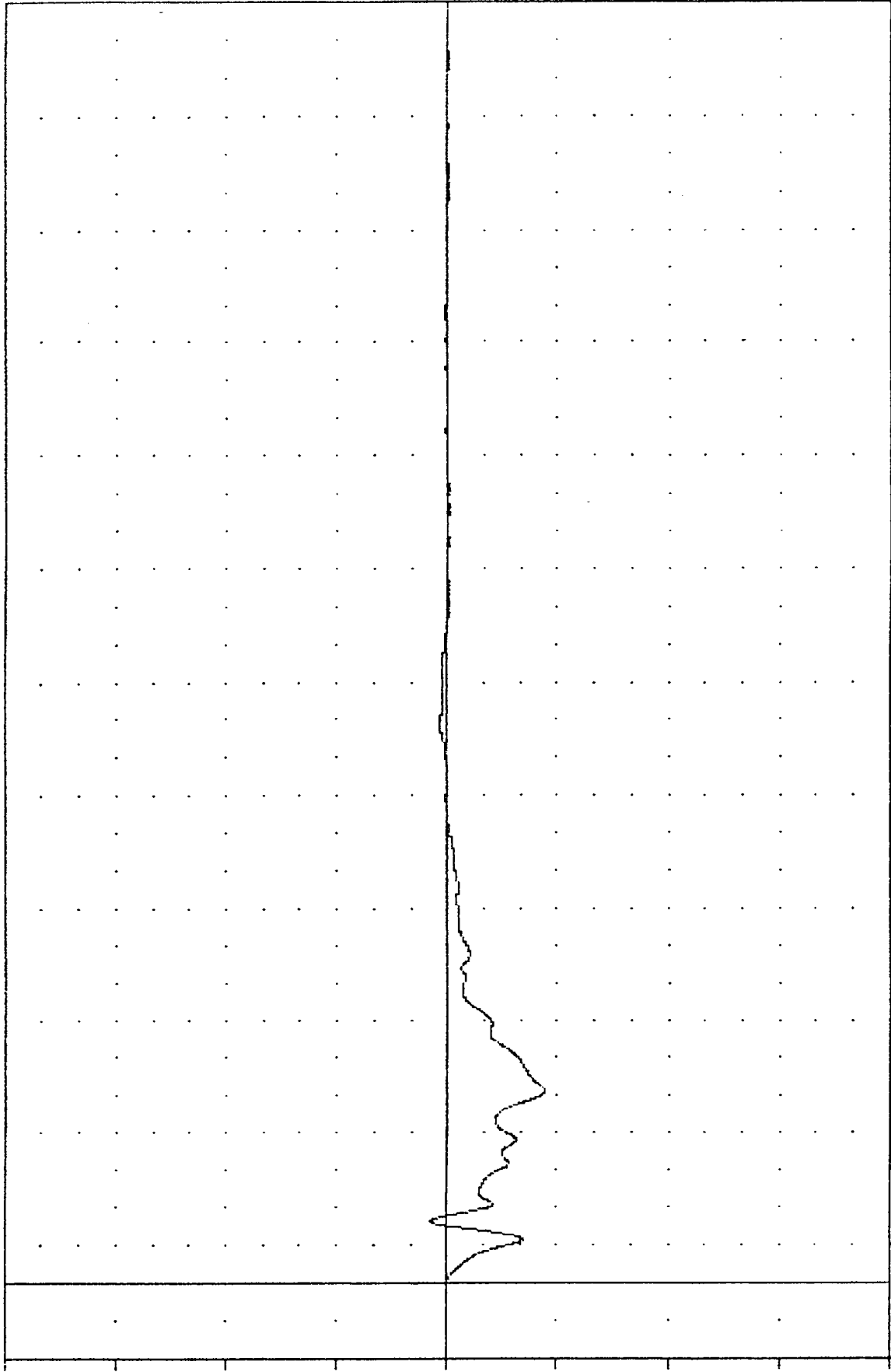


JEEP COMMANCHE INTO LOAD CELL BARRIER
 PASSENGER SEAT BELT EXTENSION

TRC 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 TLX61

FILTER = BLPF 100/ 250/ -16
 MIN, MAX VALUES = -44.47e 51.38, 7.25 e 16.38

ACCELERATION (G)



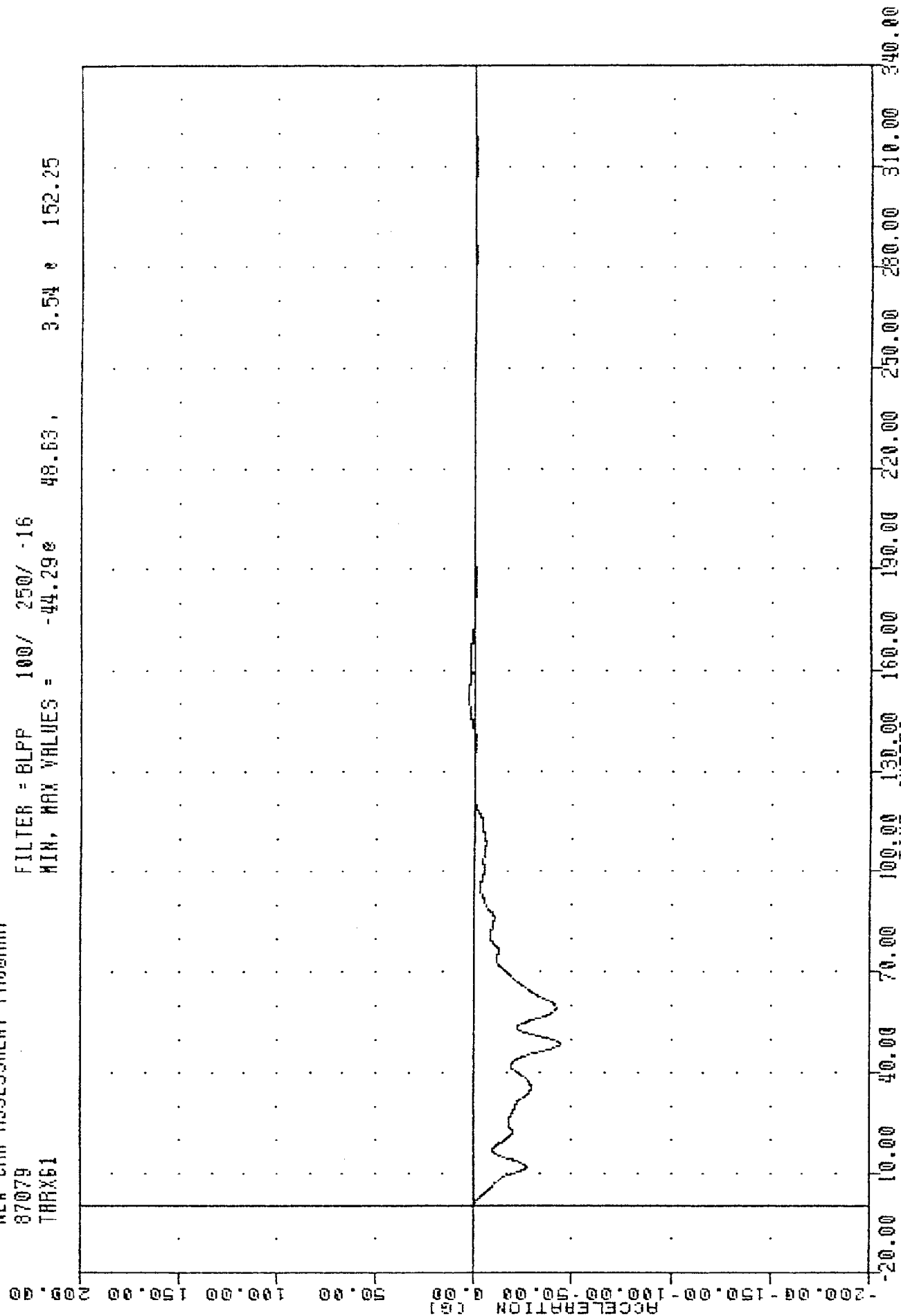
TIME (MSEC)

JEEP COMMANDCHE INTO LOAD CELL BARRIER
 LEFT REAR SEAT ACCELERATION X AXIS

TAC
NEW CAR ASSESSMENT PROGRAM
87079
THRX61

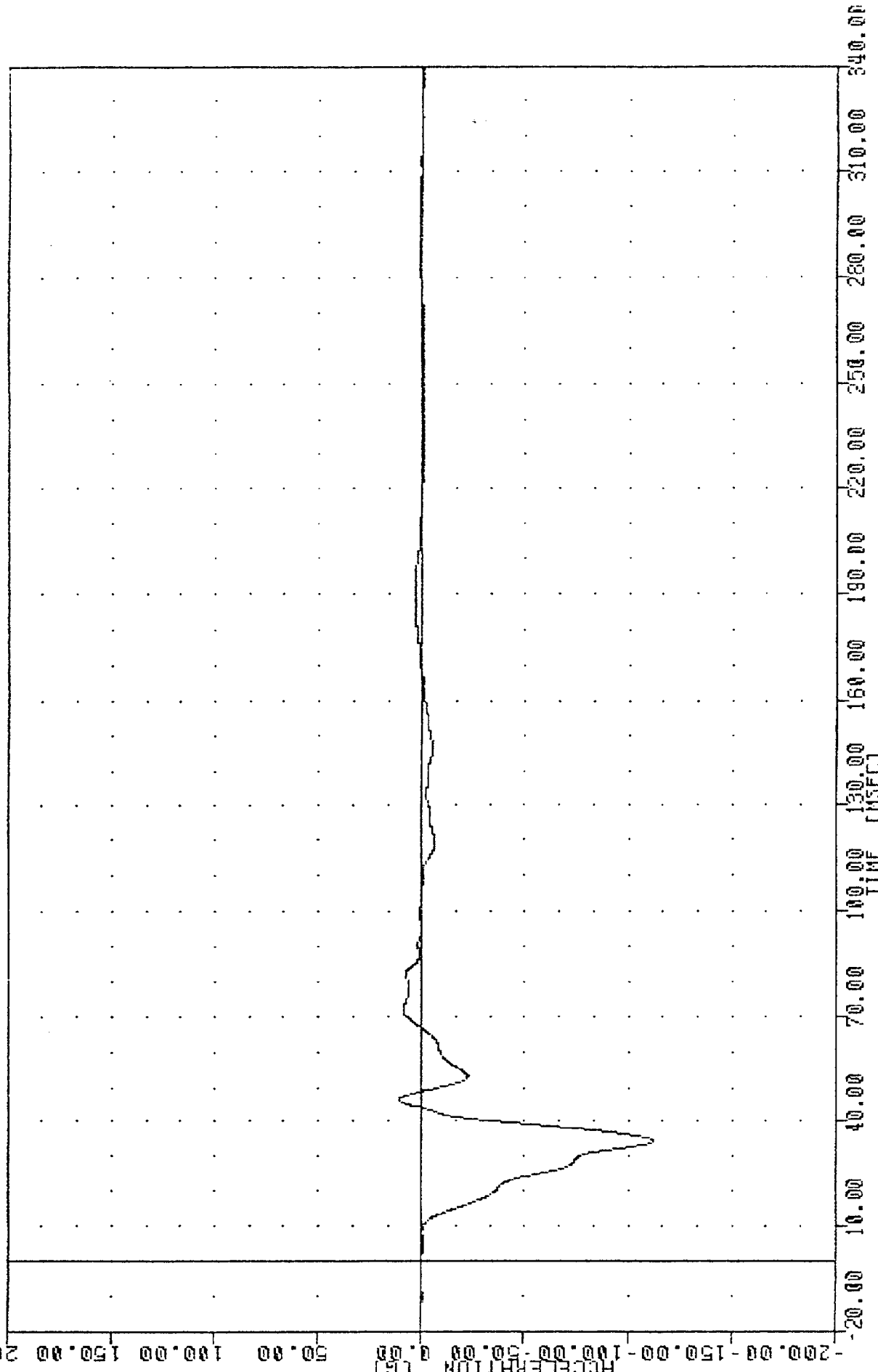
, 870324

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -44.290 48.63, 3.54 152.25



TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 ENG61

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -112.072 34.50 , 11.34 45.38

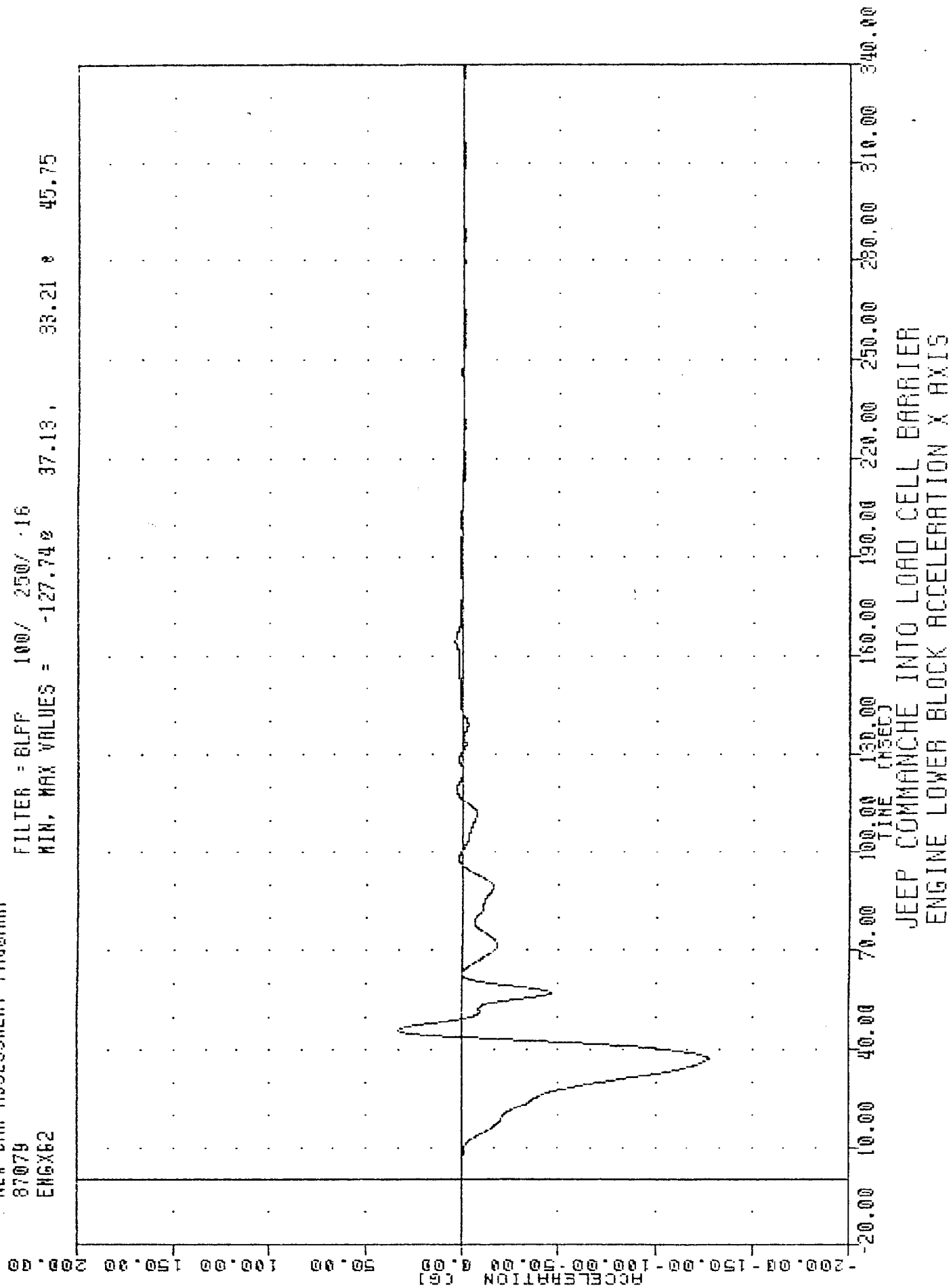


JEEP COMMANDCHE INTO LOAD CELL BARRIER
 ENGINE UPPER BLOCK ACCELERATION X AXIS

TAC
 NEW CAR ASSESSMENT PROGRAM
 87079
 ENG62

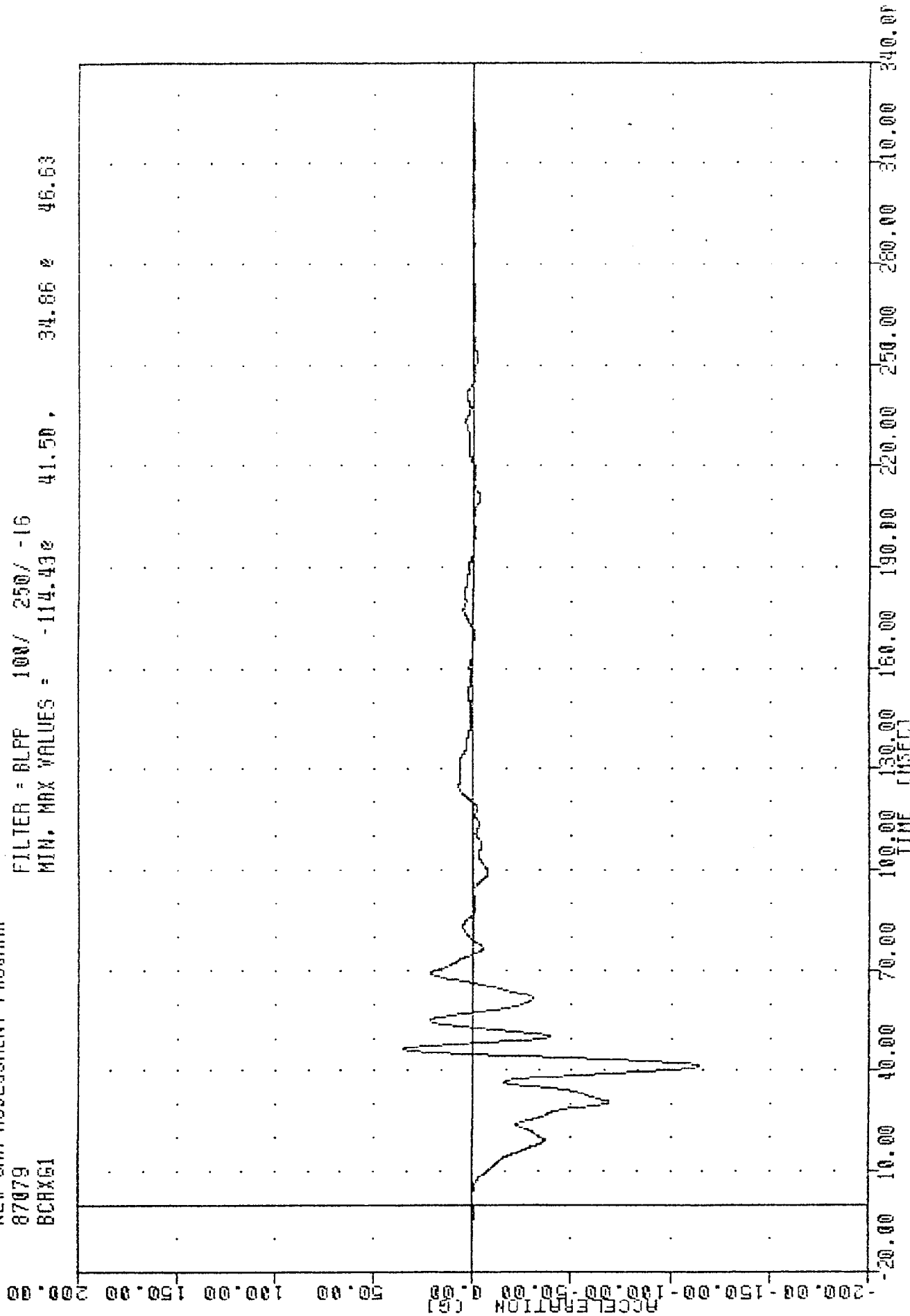
870324

FILTER = BLFF 100/ 250/ .16
 MIN, MAX VALUES = -127.74 37.13 , 33.21 45.75



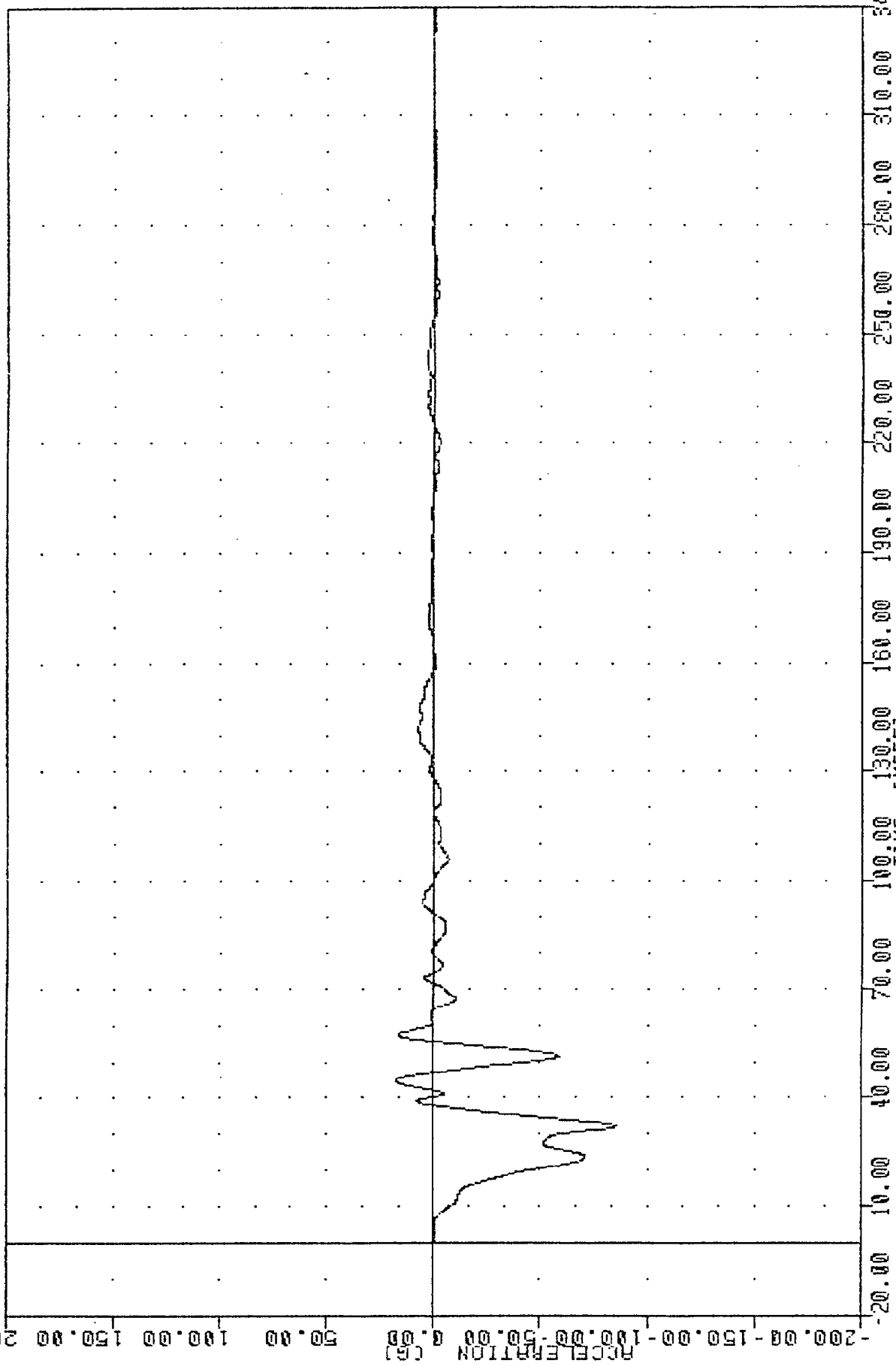
TRC
 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 BCHXG1

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -114.43e 41.50, 34.86 e 46.63



NEW CAR ASSESSMENT PROGRAM
 87079
 BCLX61

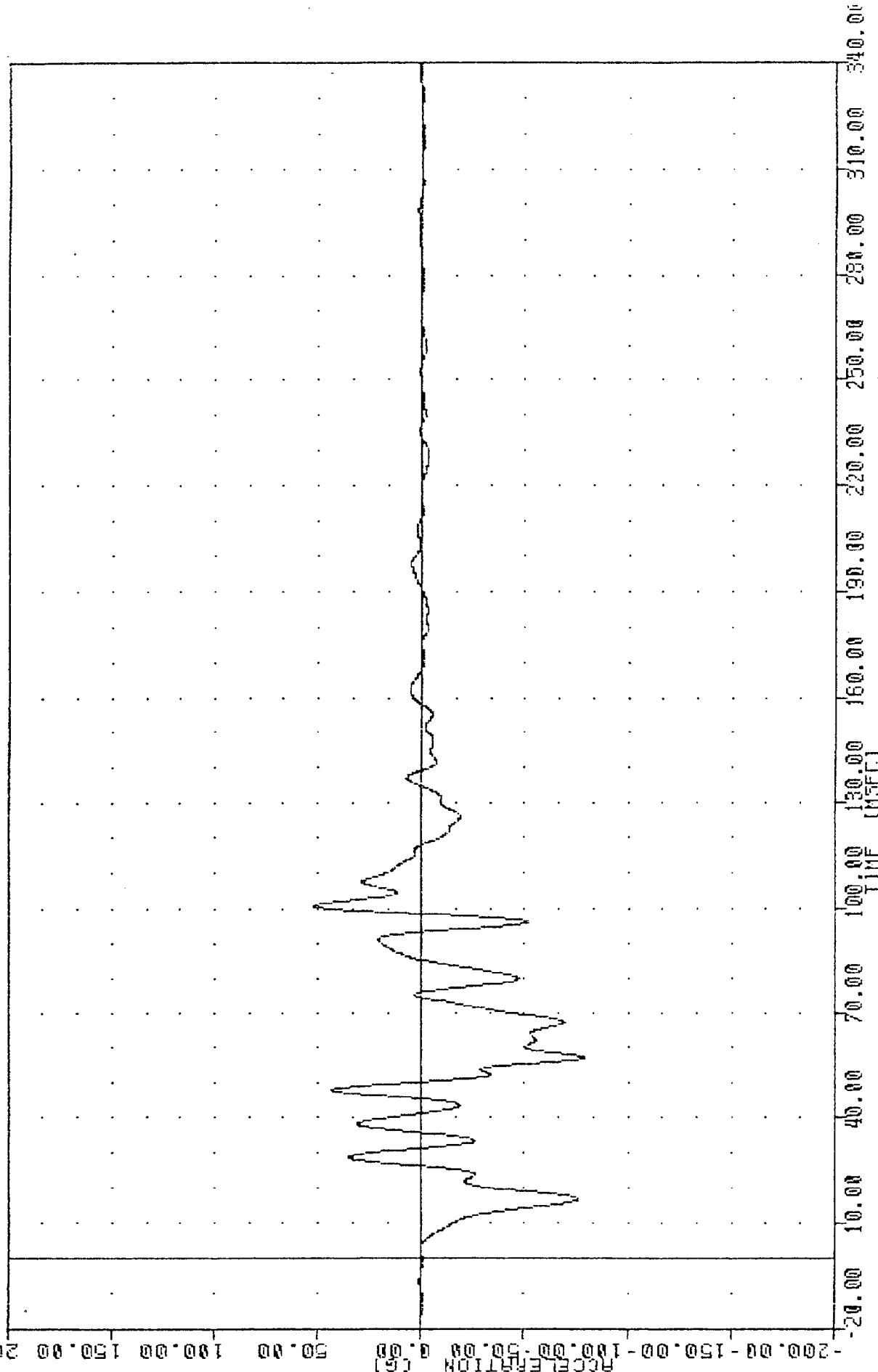
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -85.320 32.25, 17.610 44.80



JEEP COMMANCHE INTO LOAD CELL BARRIER
 LEFT BRAKE CALIPER ACCELERATION X AXIS

TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 DPCXG1

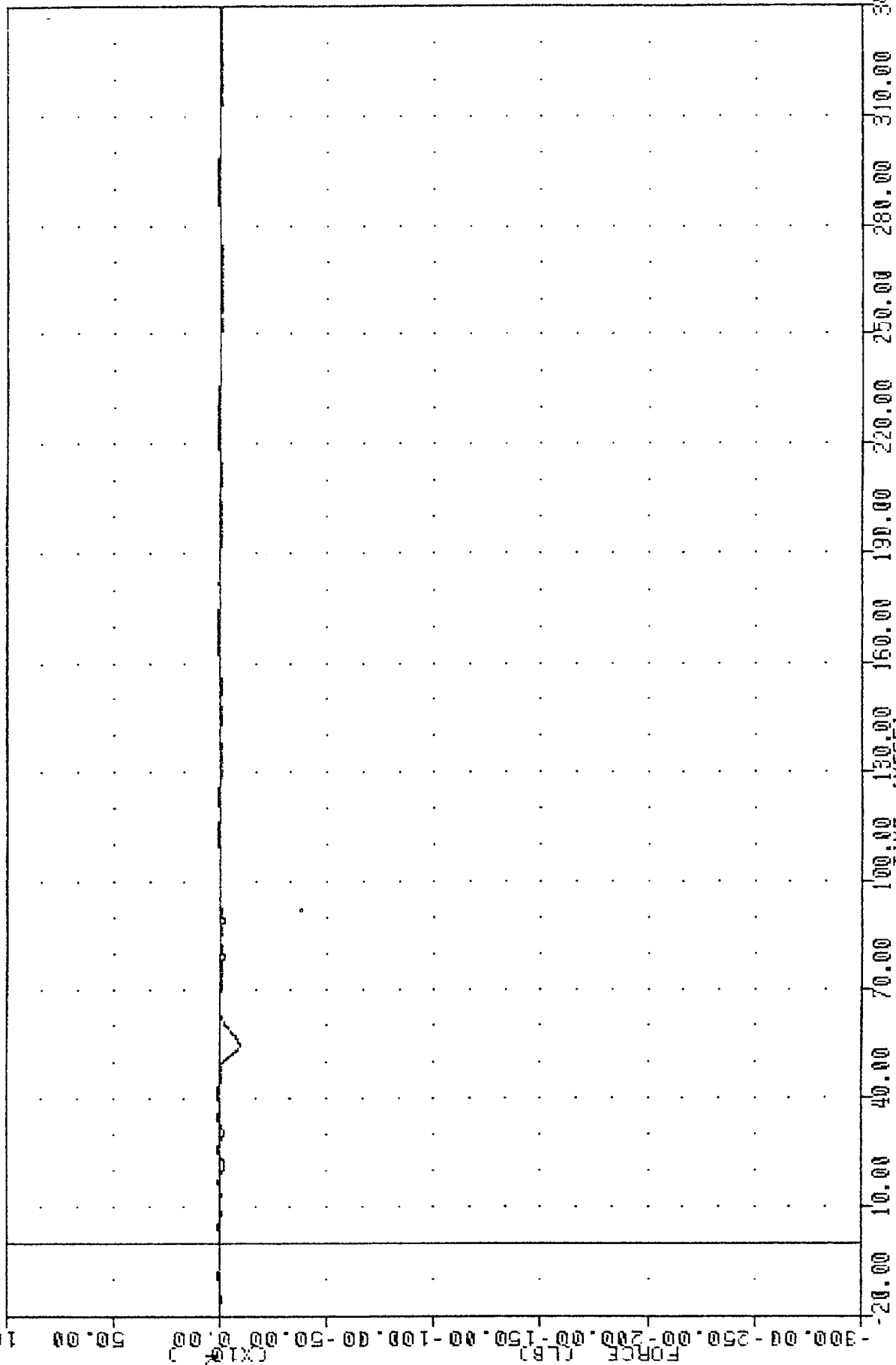
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -79.72 52.72 5 100.75



JEEP COMMANCHE INTO LOAD CELL BARRIER
 DASH PANEL CENTER ACCELERATION X AXIS

TRC
 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 BDIF

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -935.698 54.68 138.08 41.88



JEEP COMMANDCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 01 FORCE

TRC 870324

NEW CAR ASSESSMENT PROGRAM

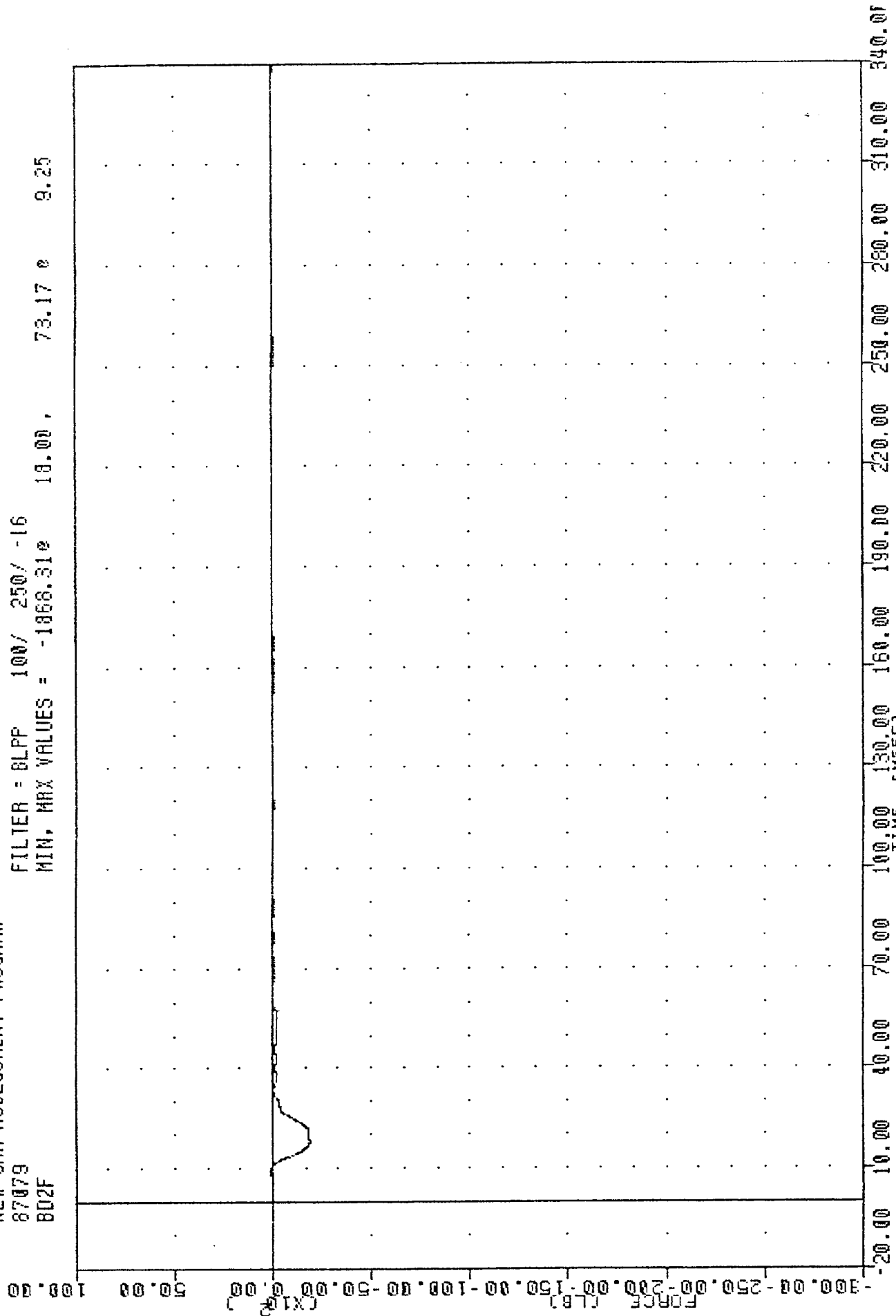
87079

802F

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -1858.310

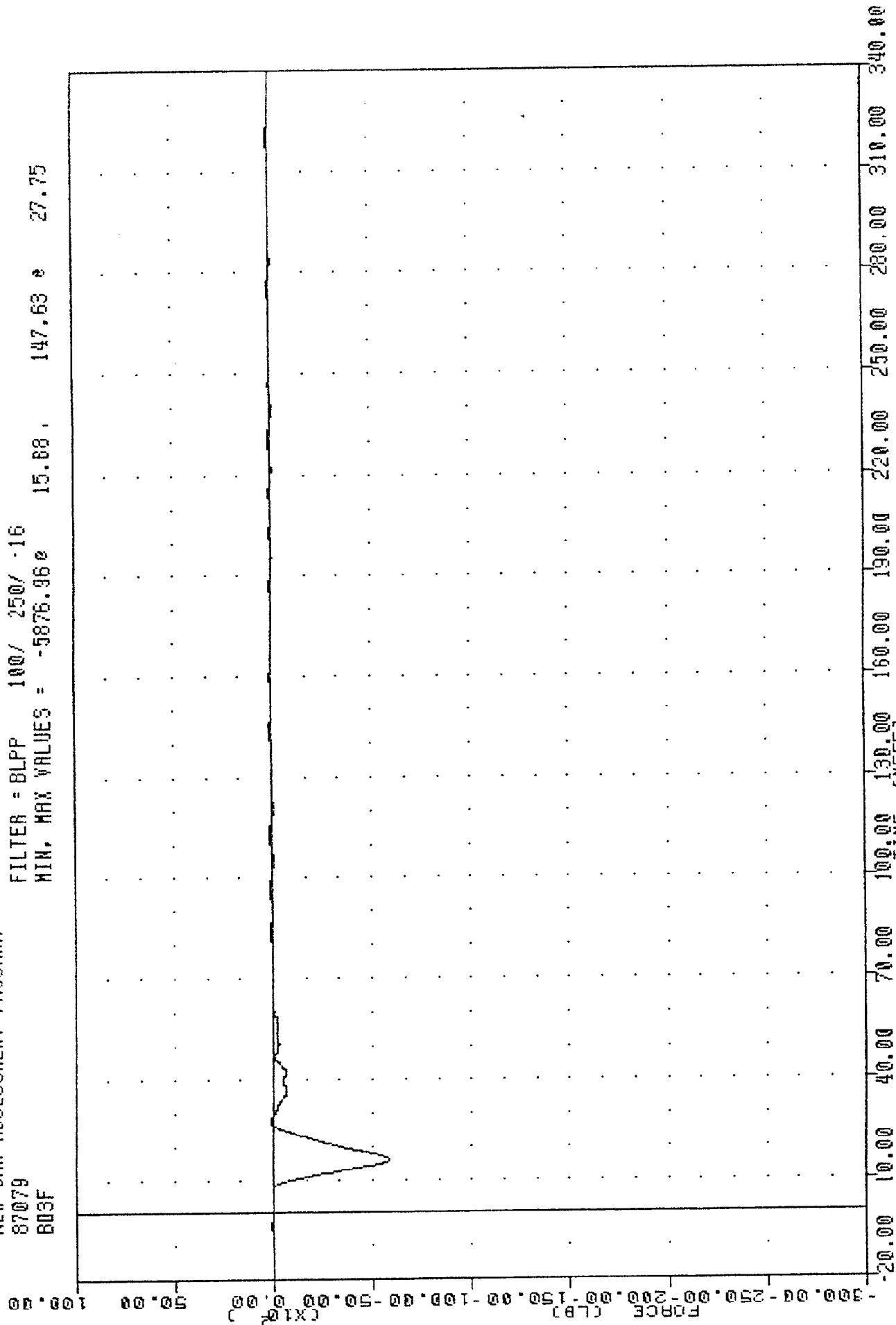
18.00 , 73.17 e 9.25



JEEP COMMANDCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D2 FORCE

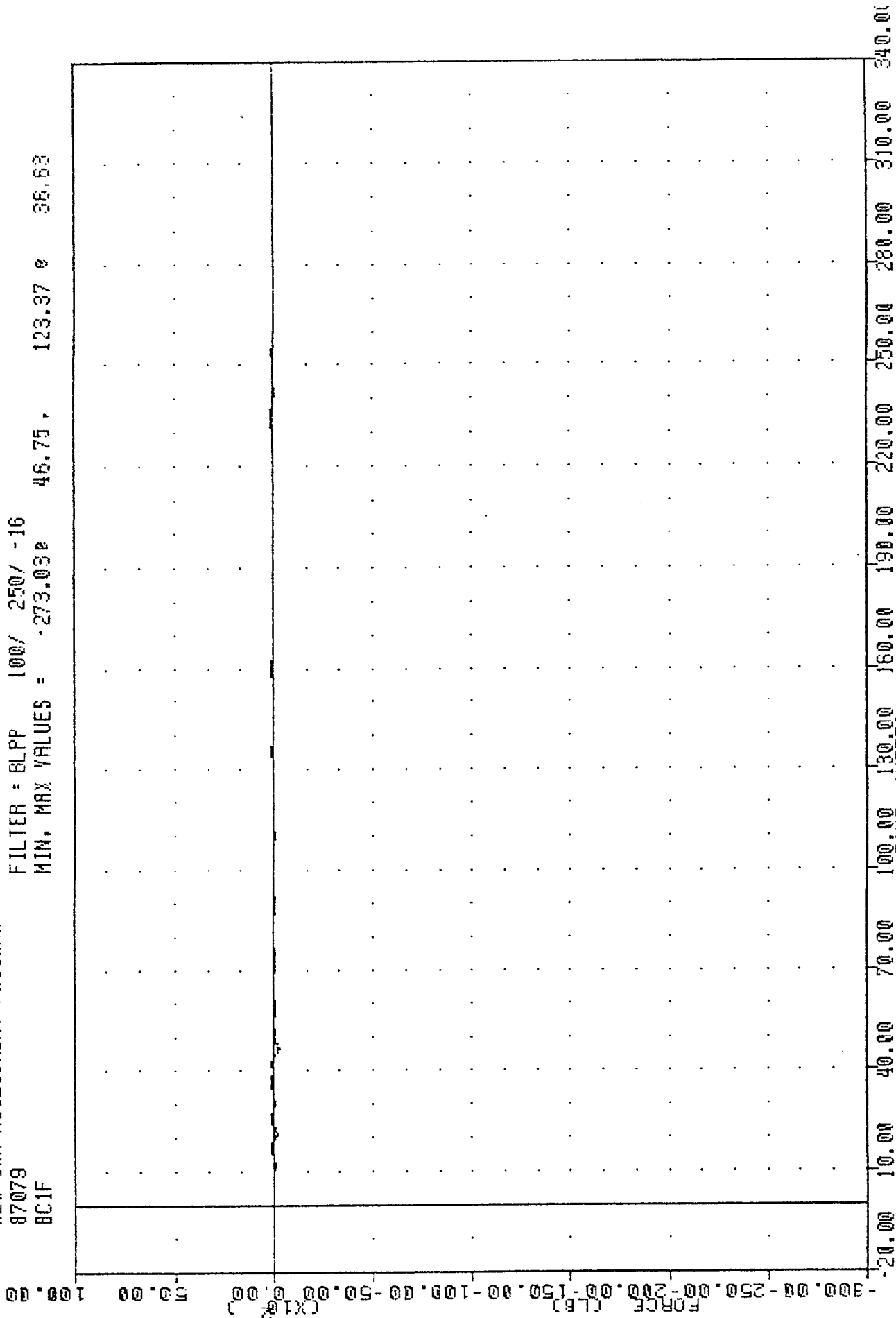
TAC
NEW CAR ASSESSMENT PROGRAM
870324
87079
B03F

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -5876.960 15.88 147.63 27.75



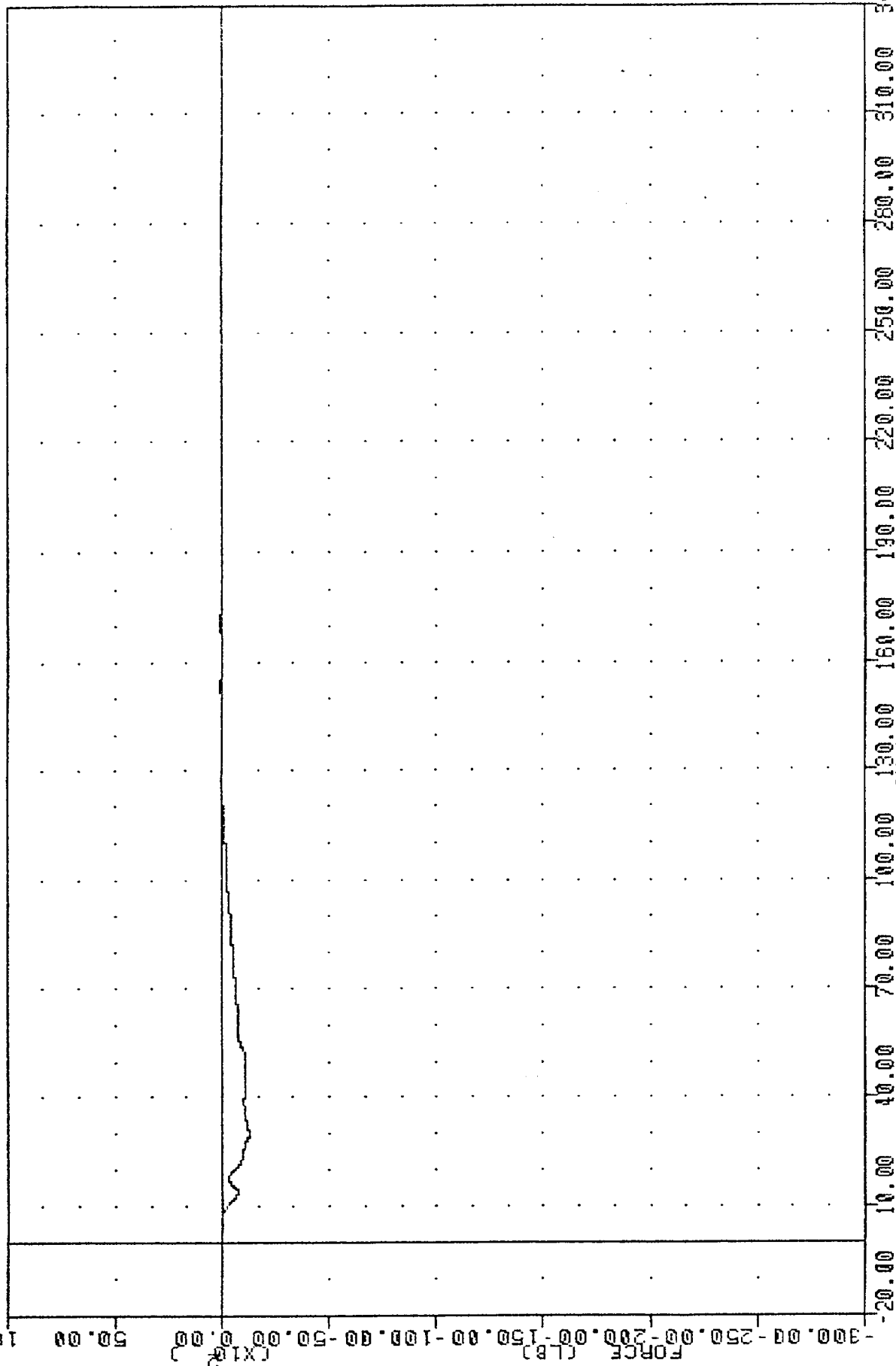
TRC
NEW CAR ASSESSMENT PROGRAM
87079
BC1F

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -273.03e 46.75, 123.37 % 36.63



TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 BC2F

FILTER = BLPF 100/ 250/ -16
 MIN, MAX VALUES = -1252.89 30.25 82.16 170.50



JEEP COMMANDCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C2 FORCE

TAC 870324

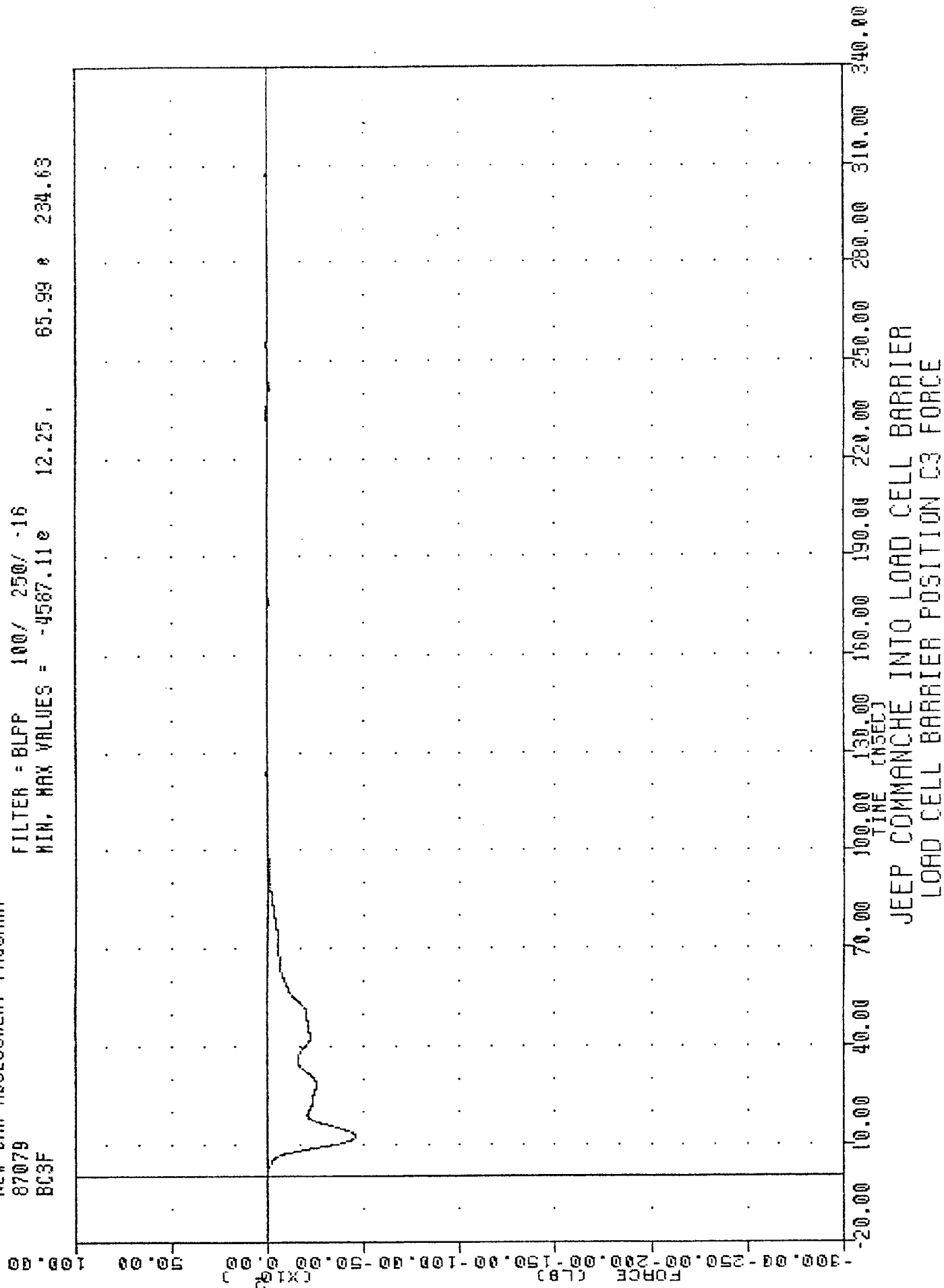
NEW CAR ASSESSMENT PROGRAM

87079

BC3F

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -4587.11e 12.25, 65.99 e 234.63



JEEP COMMANCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C3 FORCE

TRC
NEW CAR ASSESSMENT PROGRAM

870324

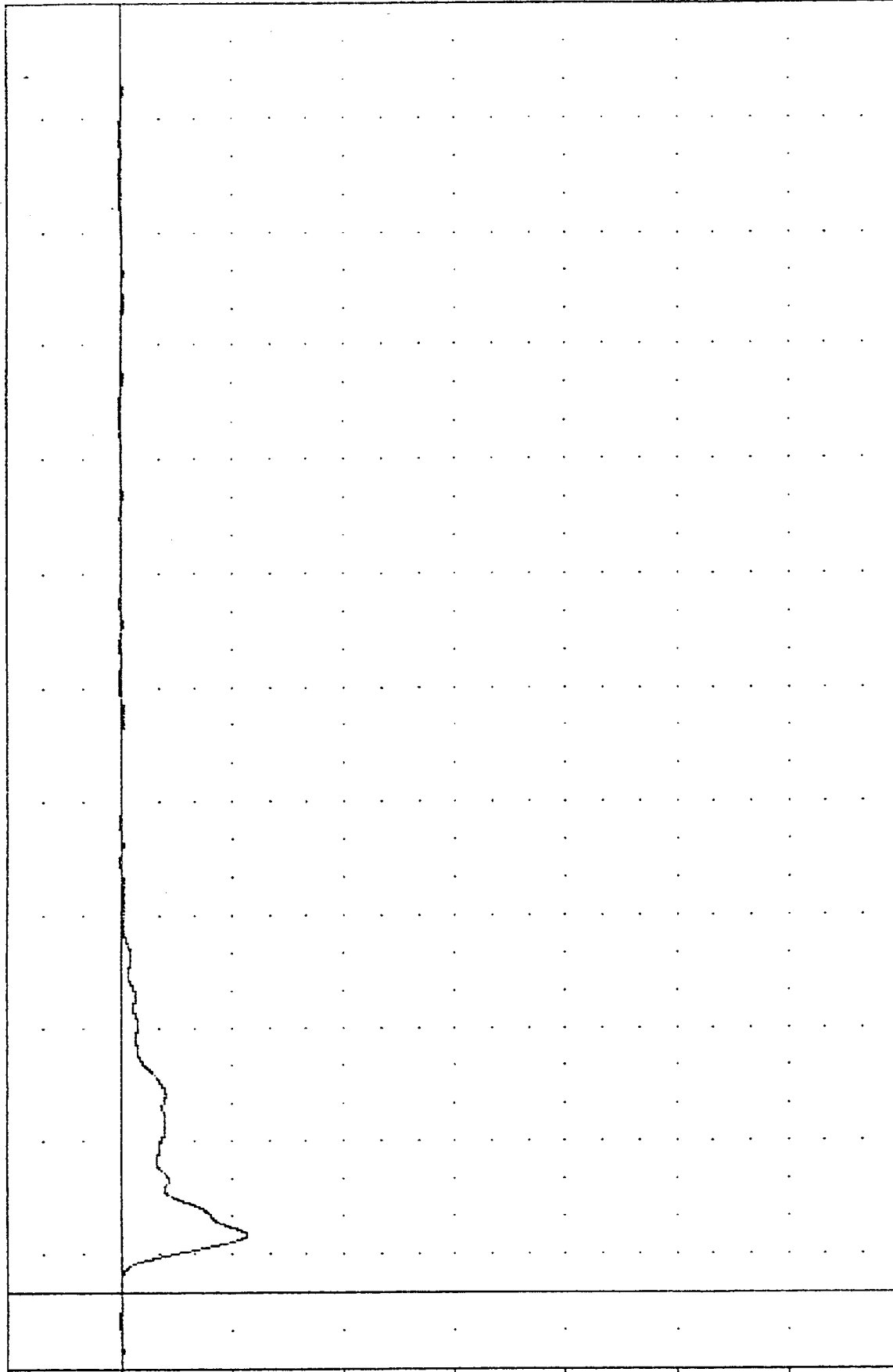
87079

LCB61F

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -11369.032 15.00 , 231.04 233.13

10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
-80.00
-90.00
-100.00
-110.00
-120.00
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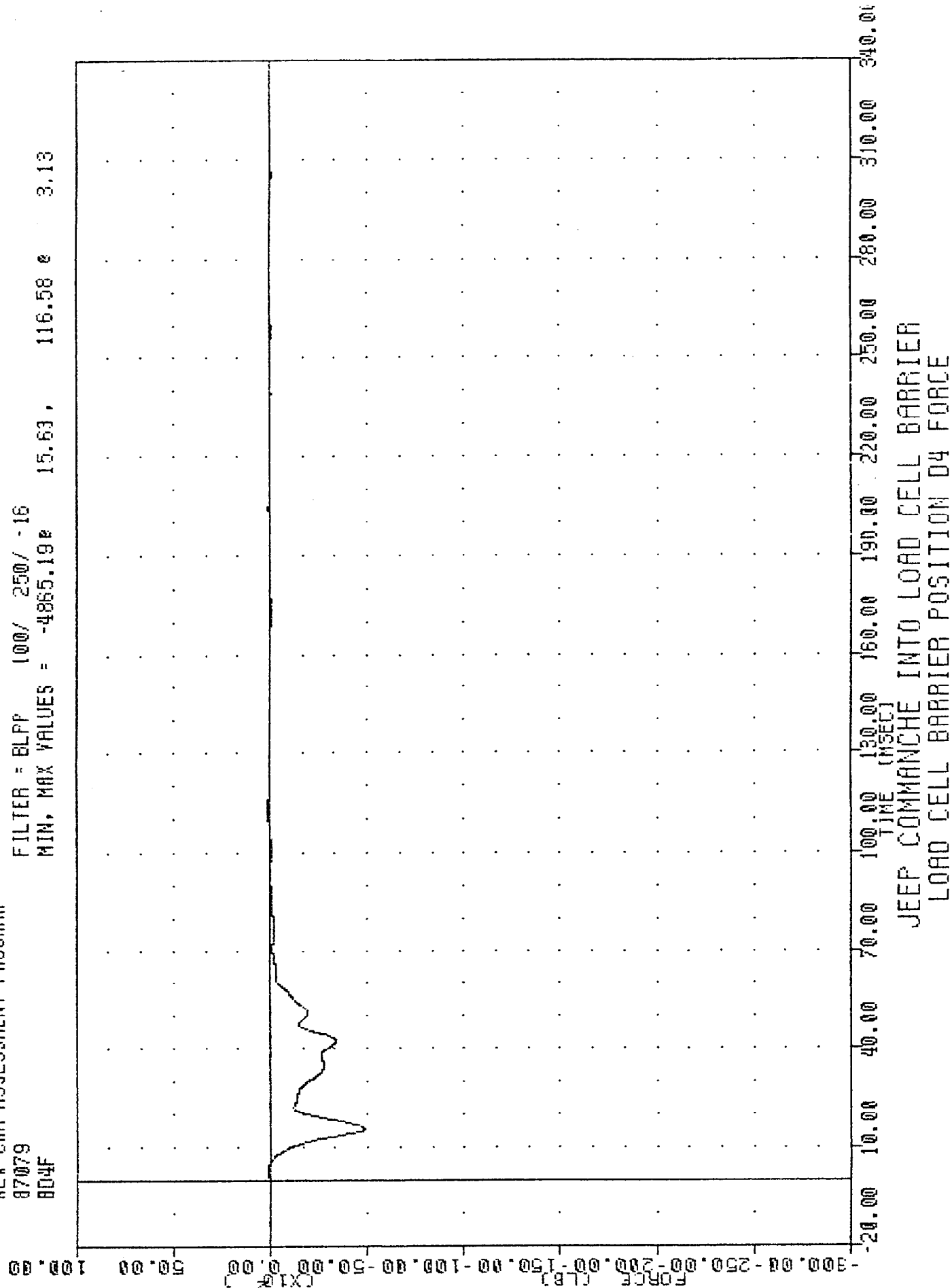


0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

JEEP COMMANDACHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 1 FORCE TOTAL

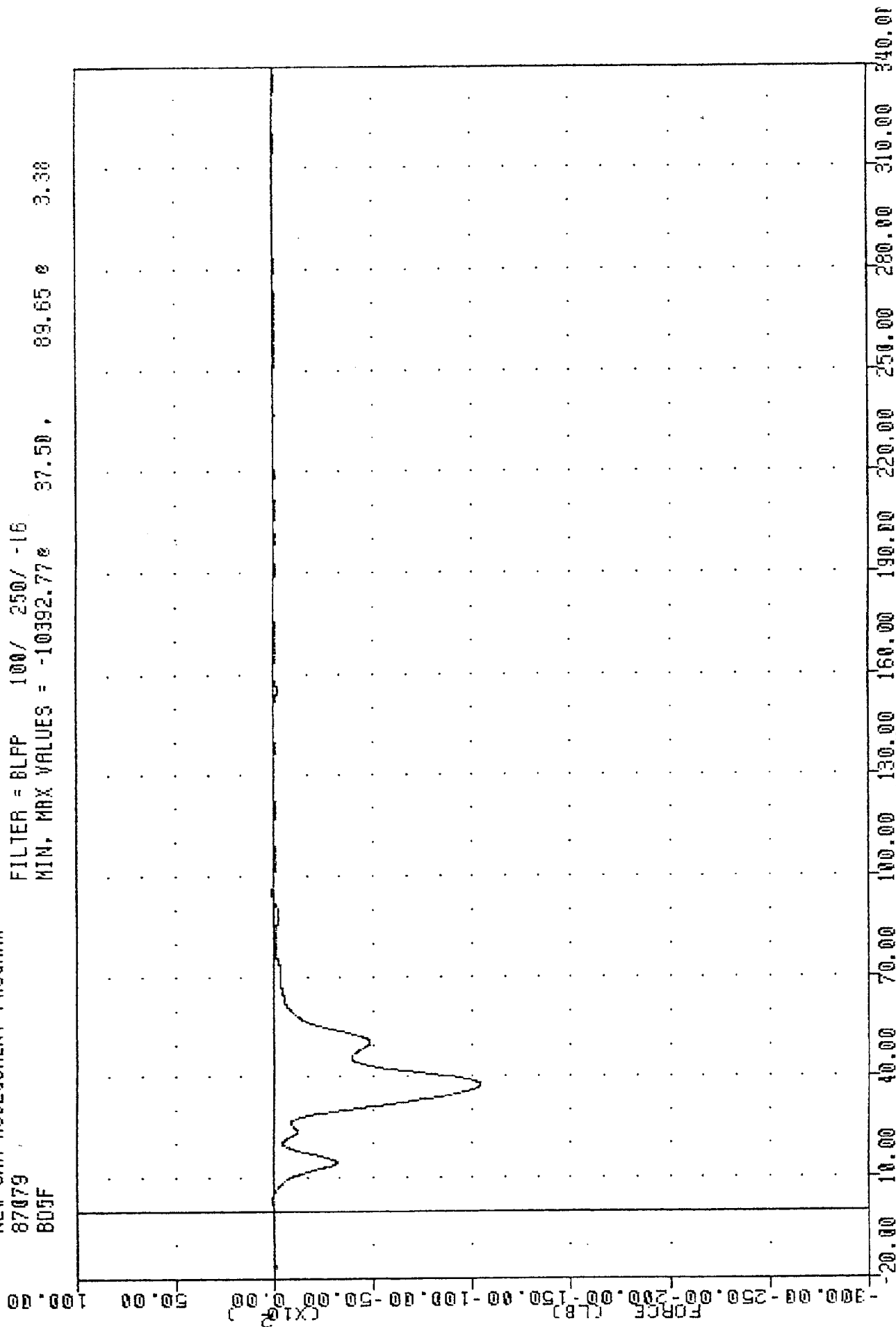
TRC
NEW CAR ASSESSMENT PROGRAM
87079
804F

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -4865.19e 15.63, 116.58 e 3.13



TTC , 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 B05F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -10392.77e 37.50, 89.65 e 3.38



JEEP COMMANDCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D5 FORCE

TAC 870324

NEW CAR ASSESSMENT PROGRAM

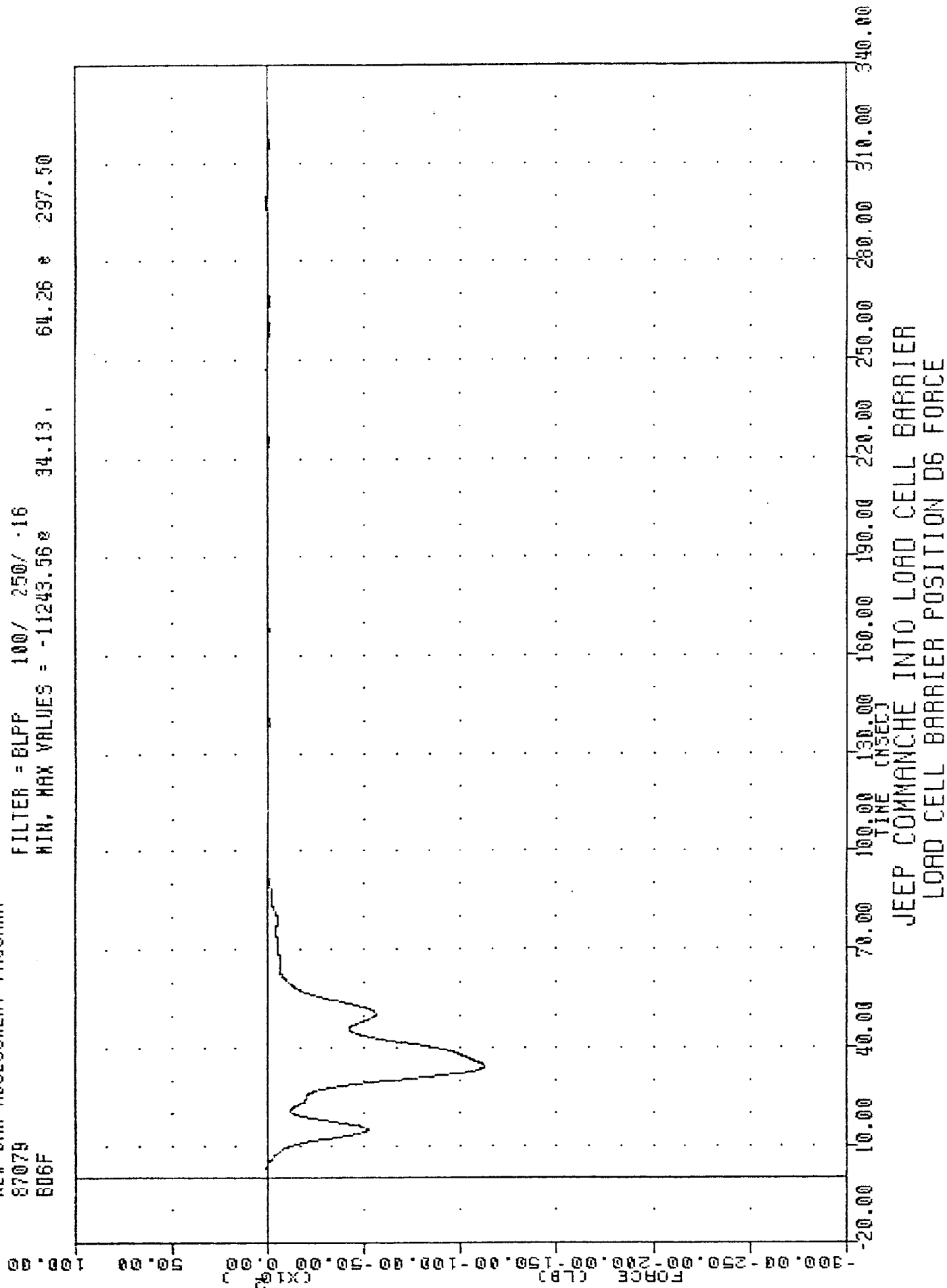
87079

806F

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -11243.56 34.13

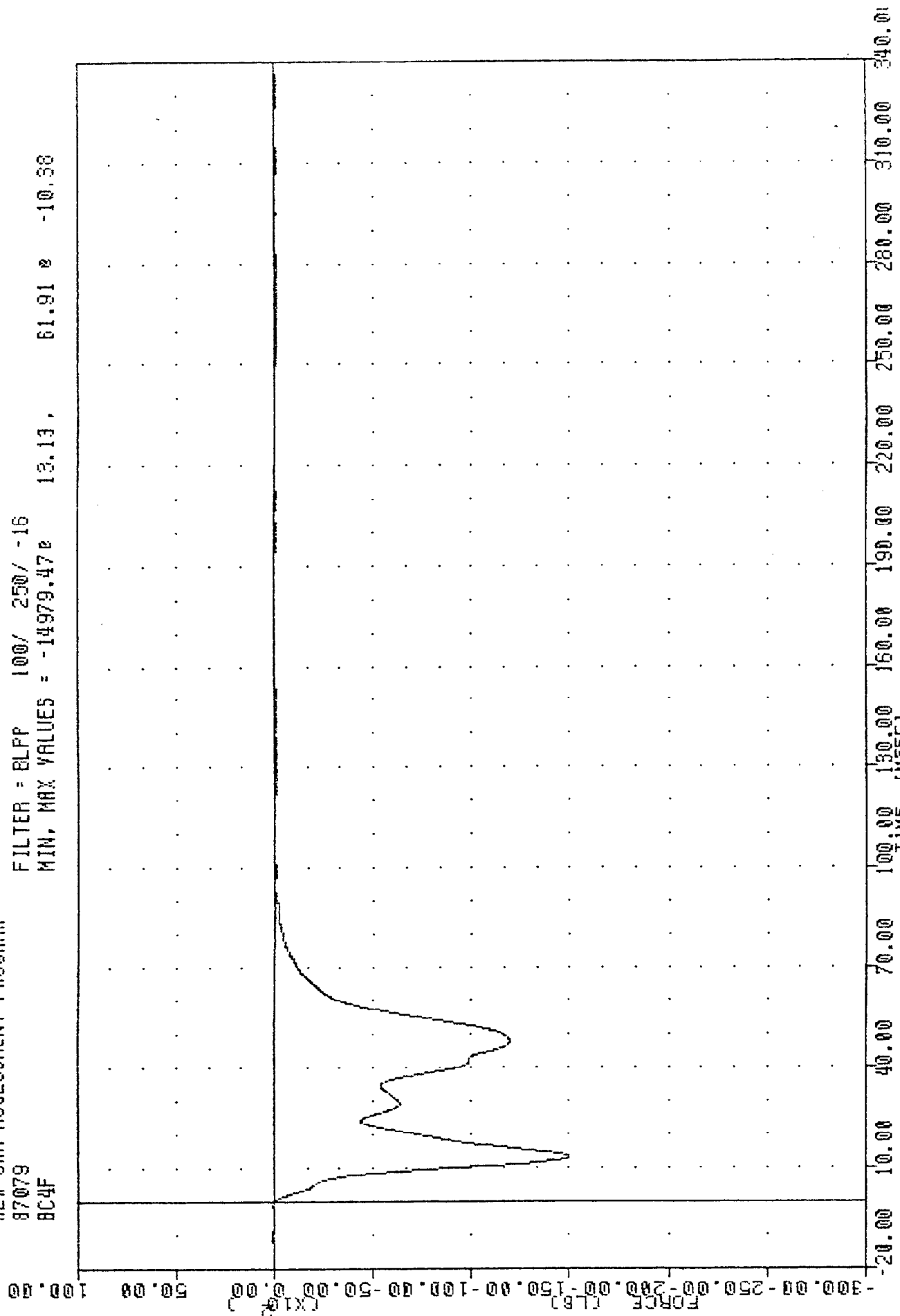
64.26 297.50



JEEP COMMANCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D6 FORCE

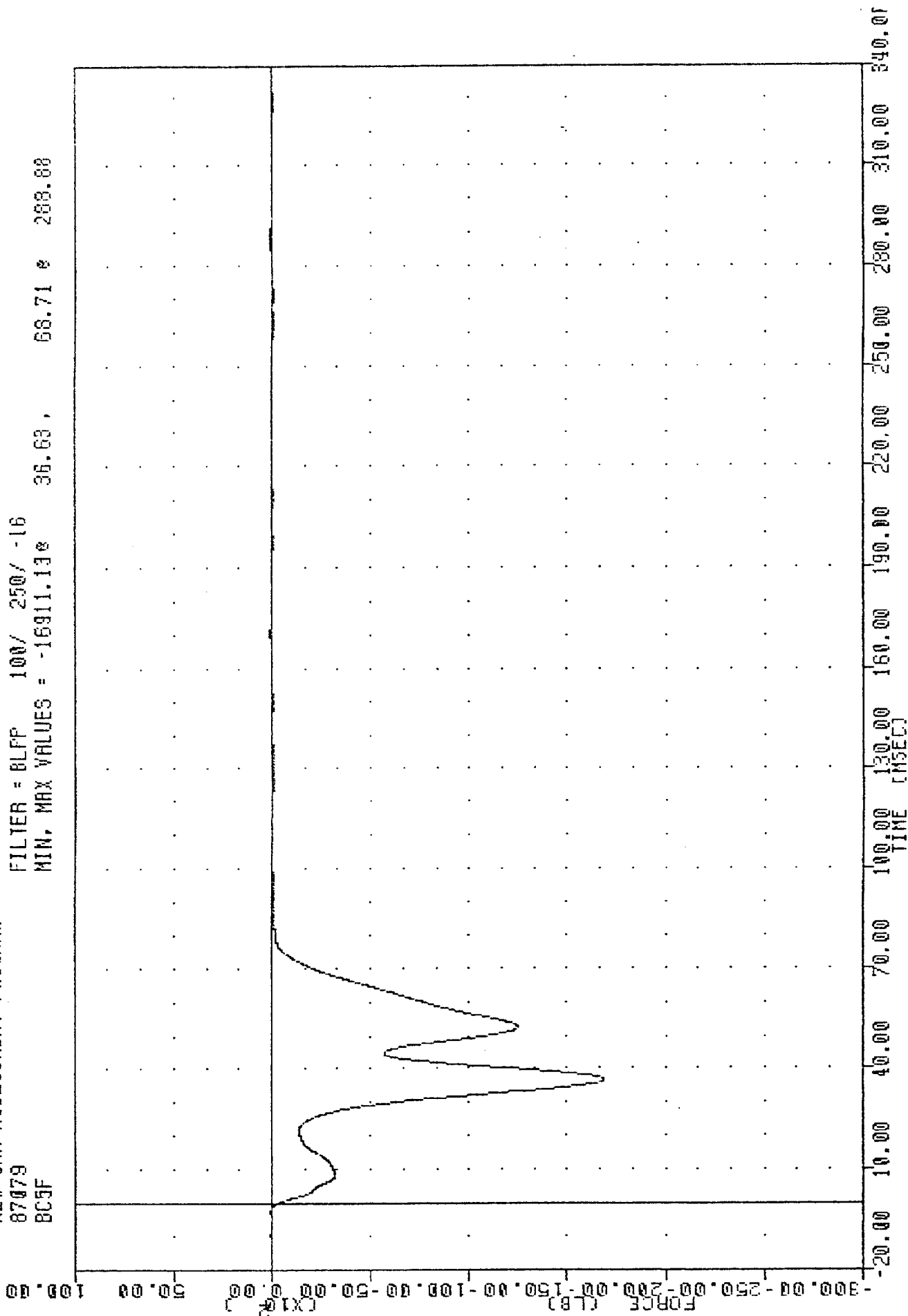
TRC
 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 BC4F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -14979.470 13.13, 61.91 0 -10.38



TRC 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 BC9F

FILTER = BLFP 100/ 250/ -16
 MIN, MAX VALUES = -16911.13 35.63, 68.71 288.80



JEEP COMMANDCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C5 FORCE

TAC 870324

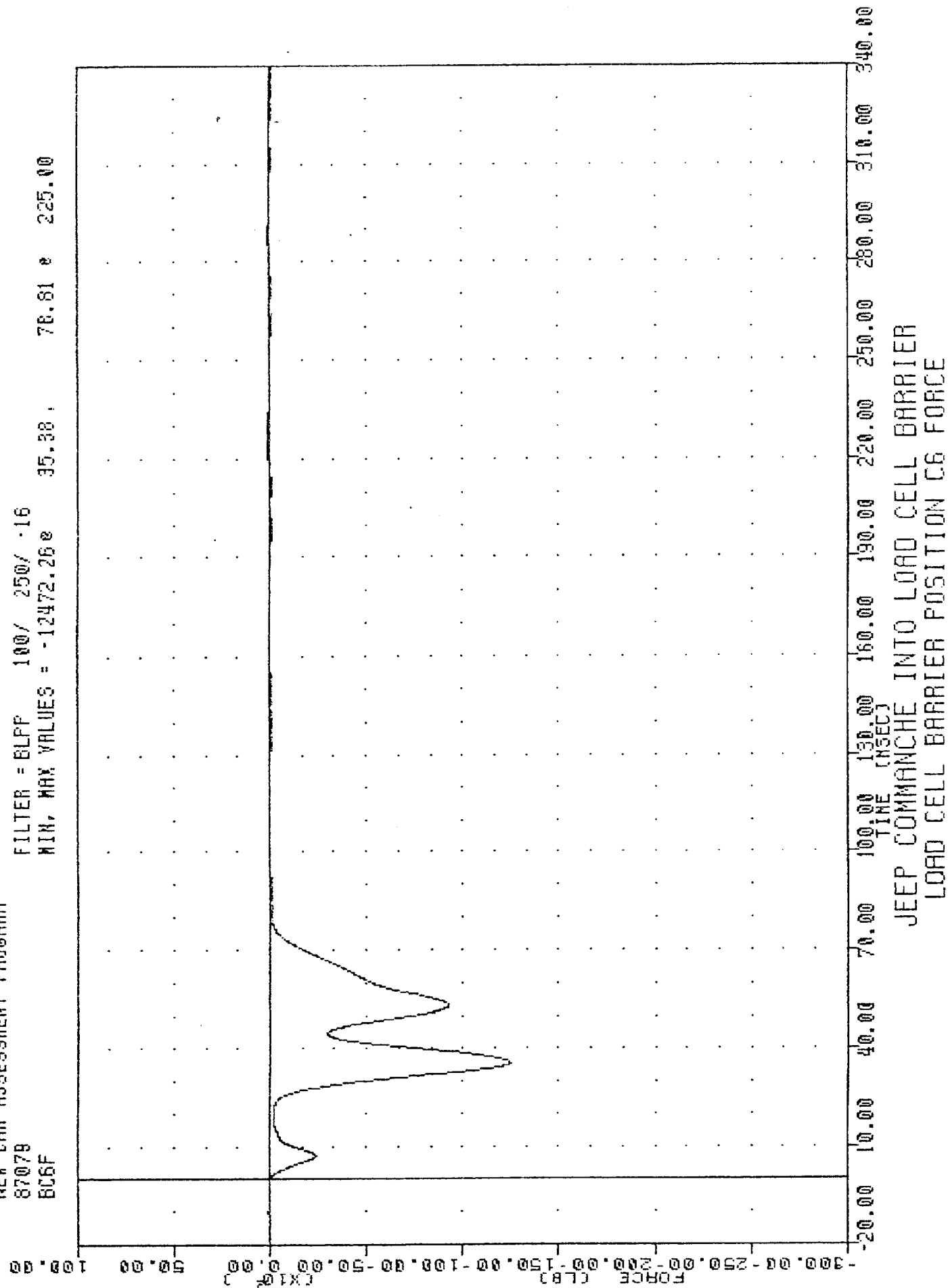
NEW CAR ASSESSMENT PROGRAM

87078

BC6F

FILTER = BLPF 100/ 250/ .16

MIN, MAX VALUES = -12472.26 35.38, 78.81 225.00



JEEP COMMANCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C6 FORCE

TRC 870324

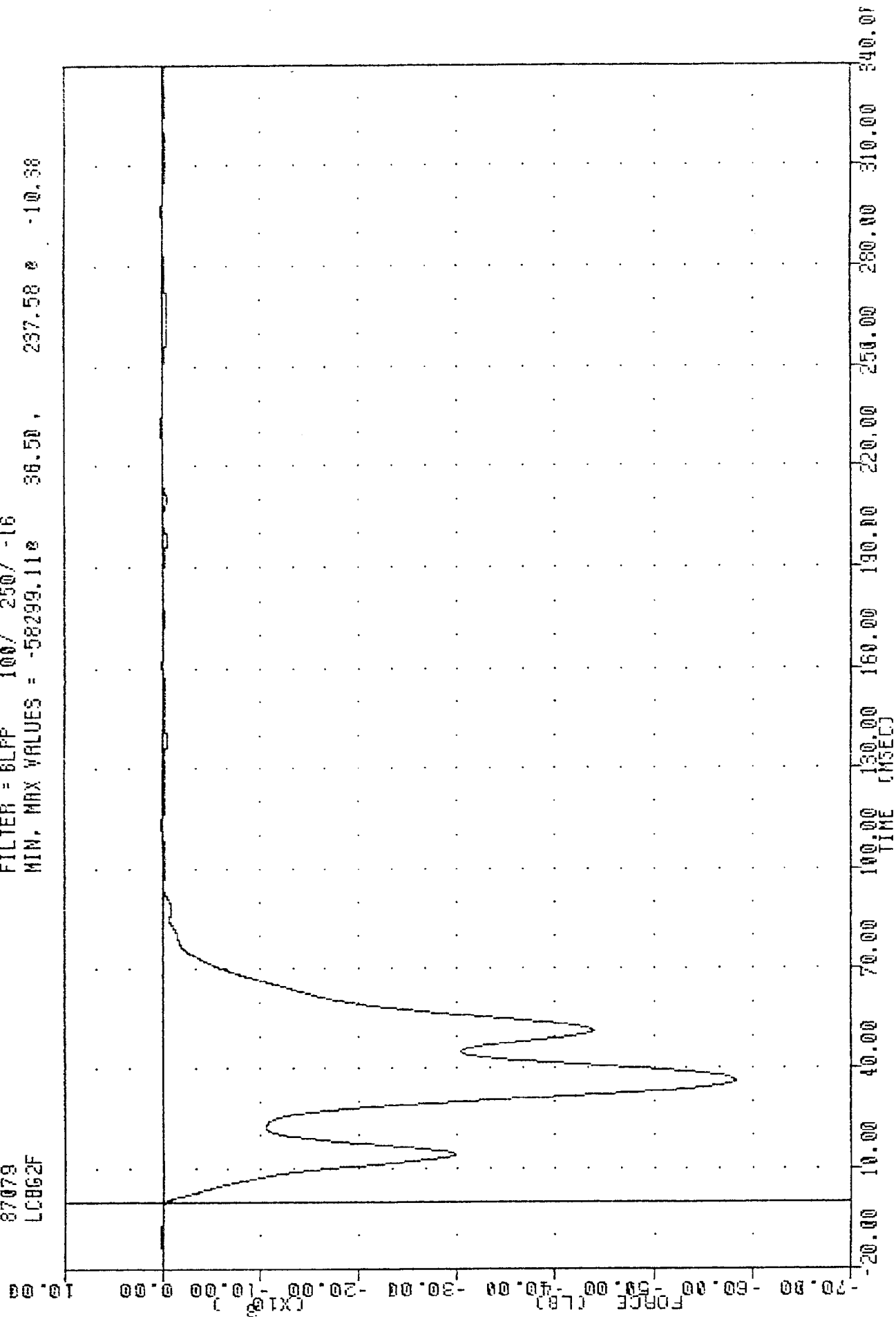
NEW CAR ASSESSMENT PROGRAM

87079

LC862F

FILTER = BLFP 100/ 250/ -16

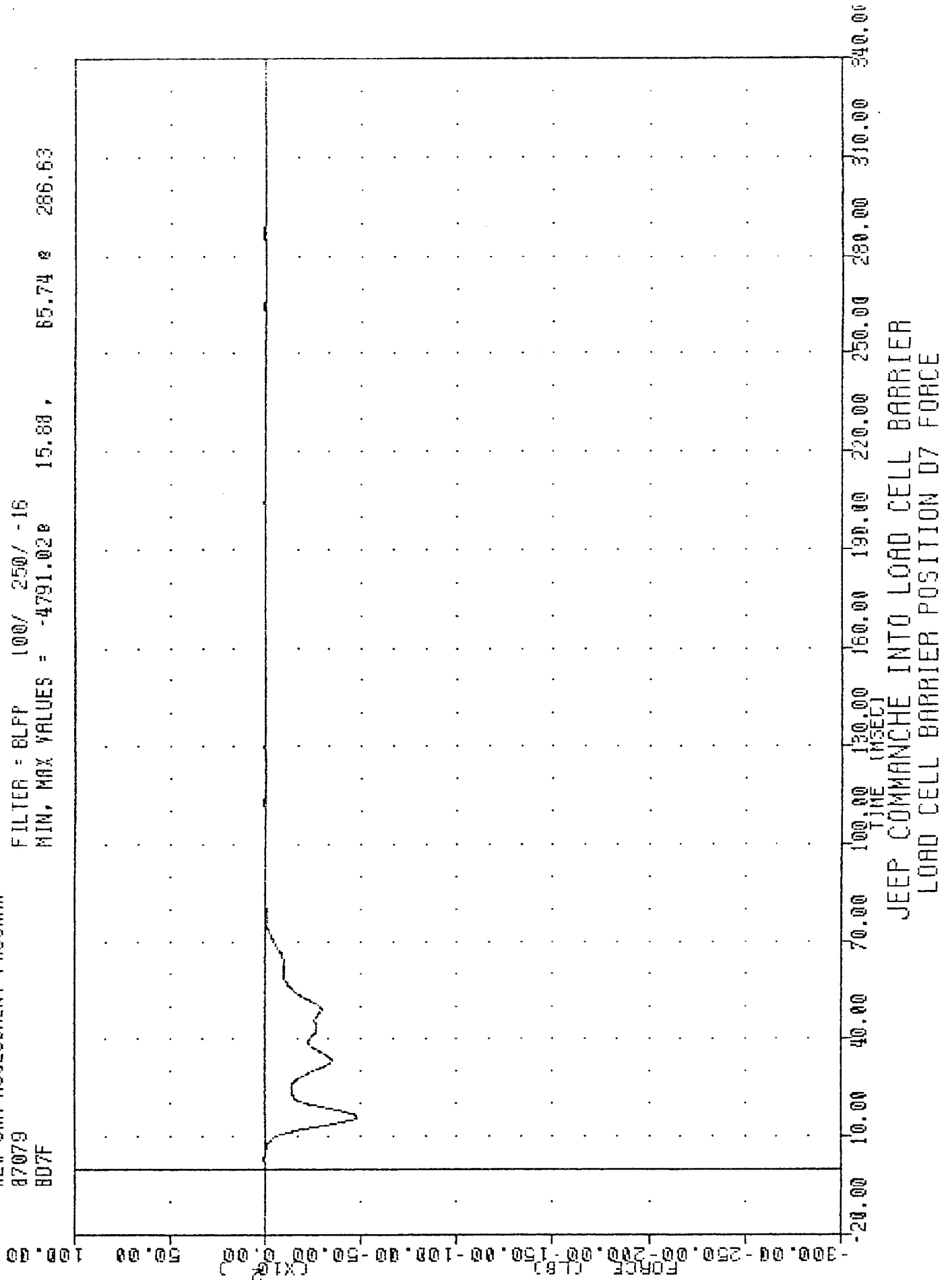
MIN. MAX VALUES = -58299.118 36.50 237.58 2 -10.38



JEEP COMMANDCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 2 FORCE TOTAL

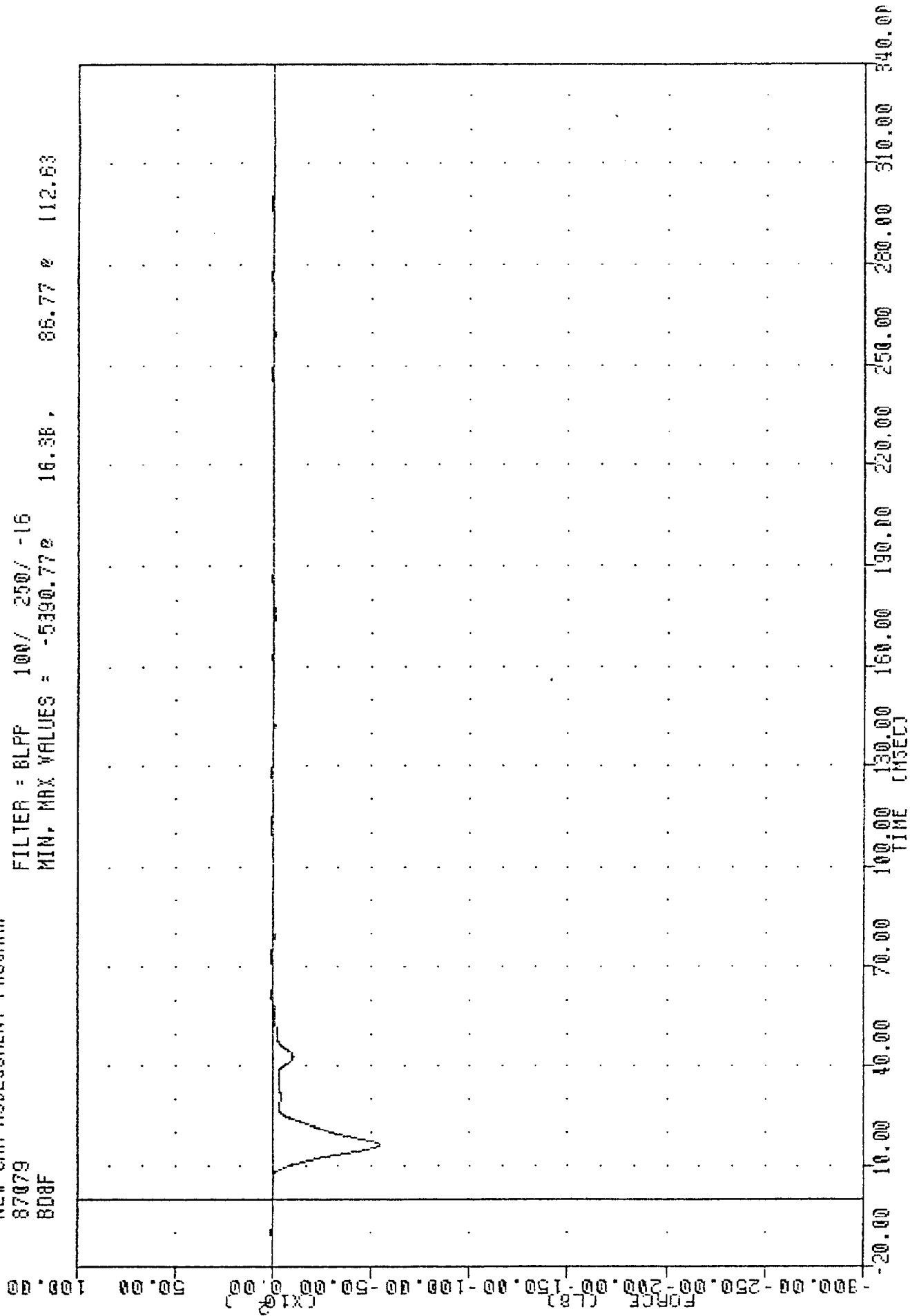
TRC
NEW CAR ASSESSMENT PROGRAM
87079
807F

FILTER = BLFP 100/ 250/ -16
MIN, MAX VALUES = -4791.02e 15.88, 85.74 e 286.63



TRC , 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 BDBF

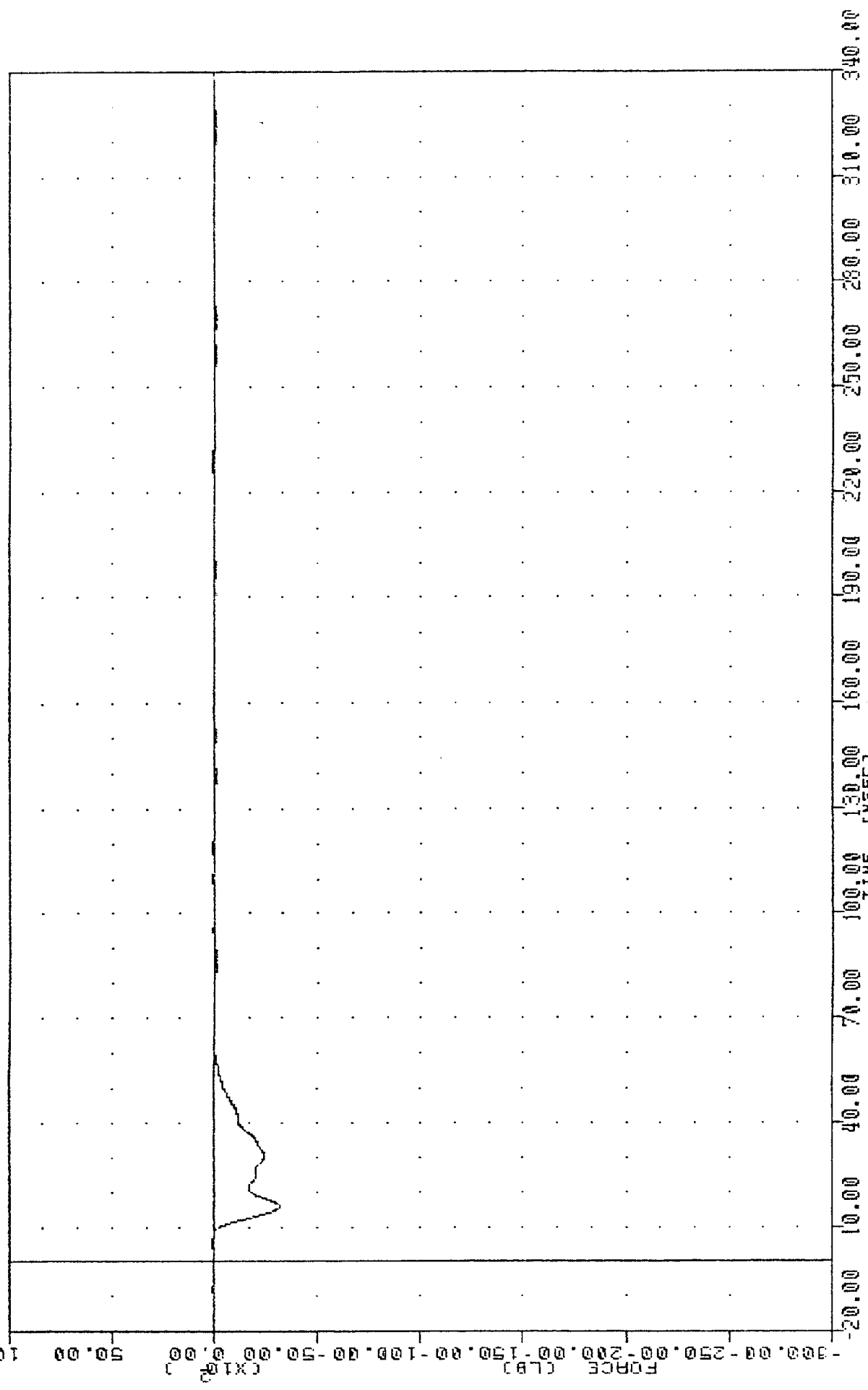
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -5390.772 16.38, 86.77 112.63



JEEP COMMANDCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 08 FORCE

TAC
870324
NEW CAR ASSESSMENT PROGRAM
87079
809F

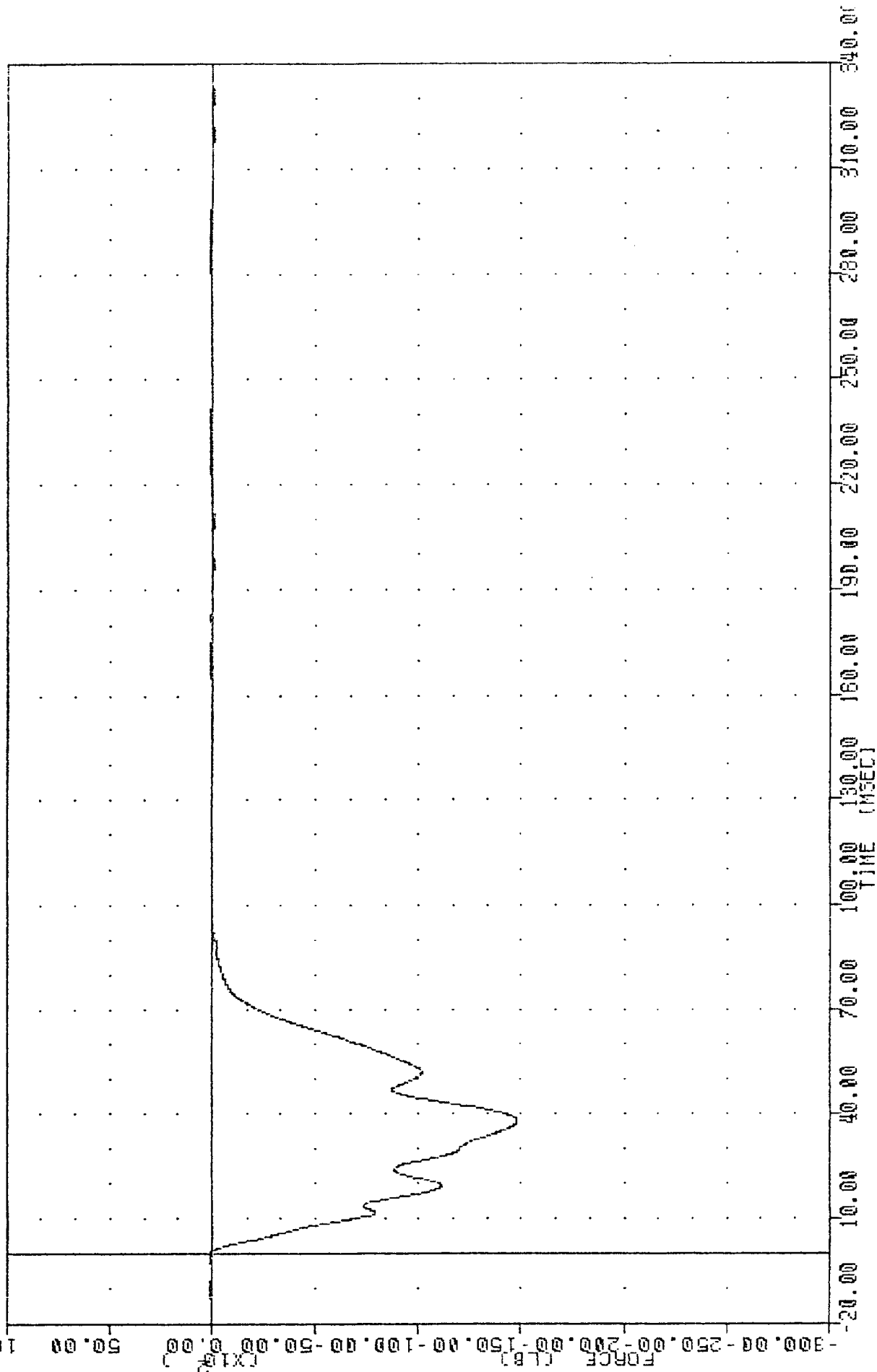
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -3193.01 15.88 79.05 229.75



JEEP COMMANDACHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D9 FORCE

TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 BC7F

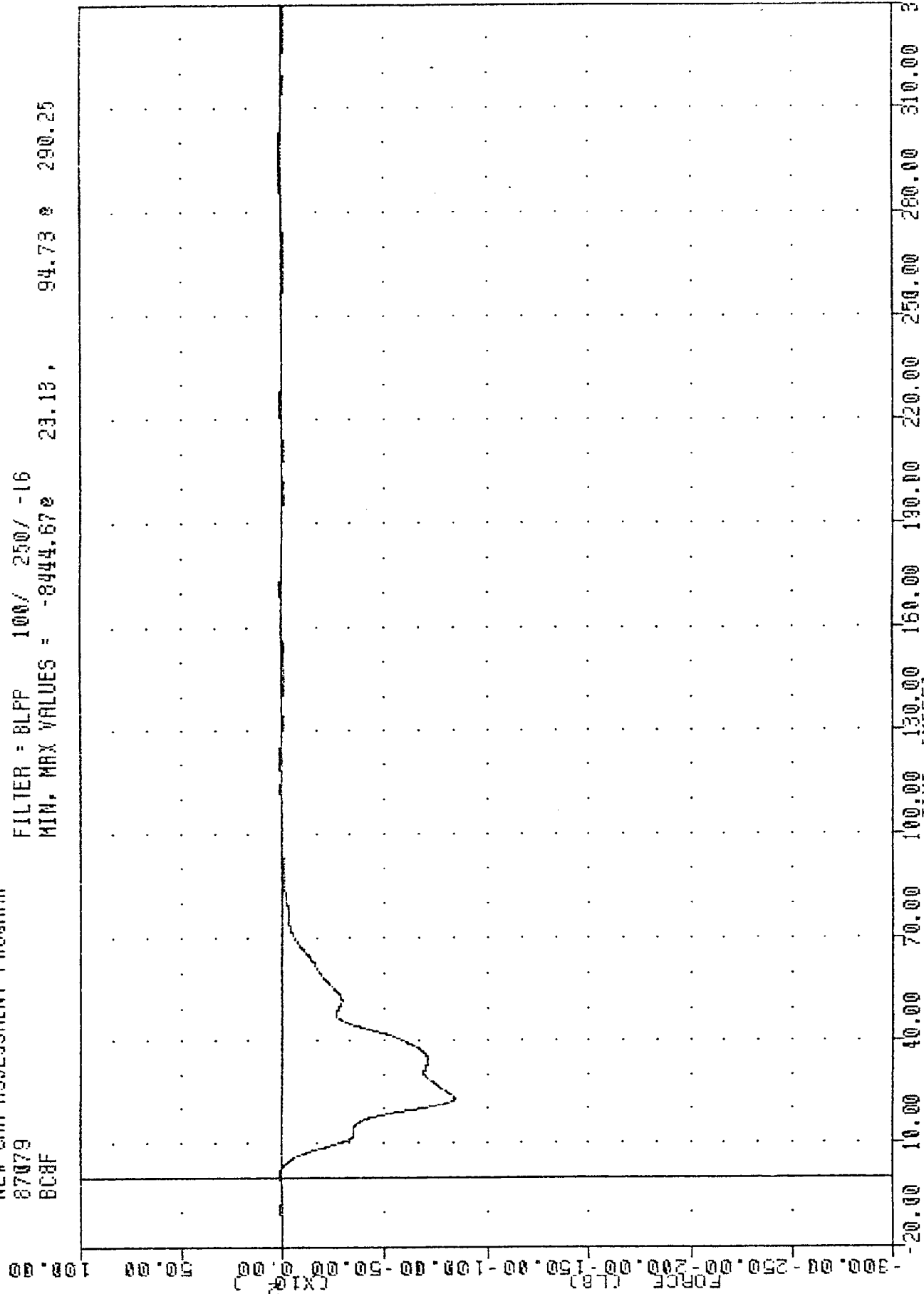
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -14787.20e 32.00, 113.60 e -0.75



JEEP COMMANCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C7 FORCE

TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 BC8F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -8444.670 23.13, 94.73 290.25



JEEP COMMANDCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 08 FORCE

TAC 870324

NEW CAR ASSESSMENT PROGRAM

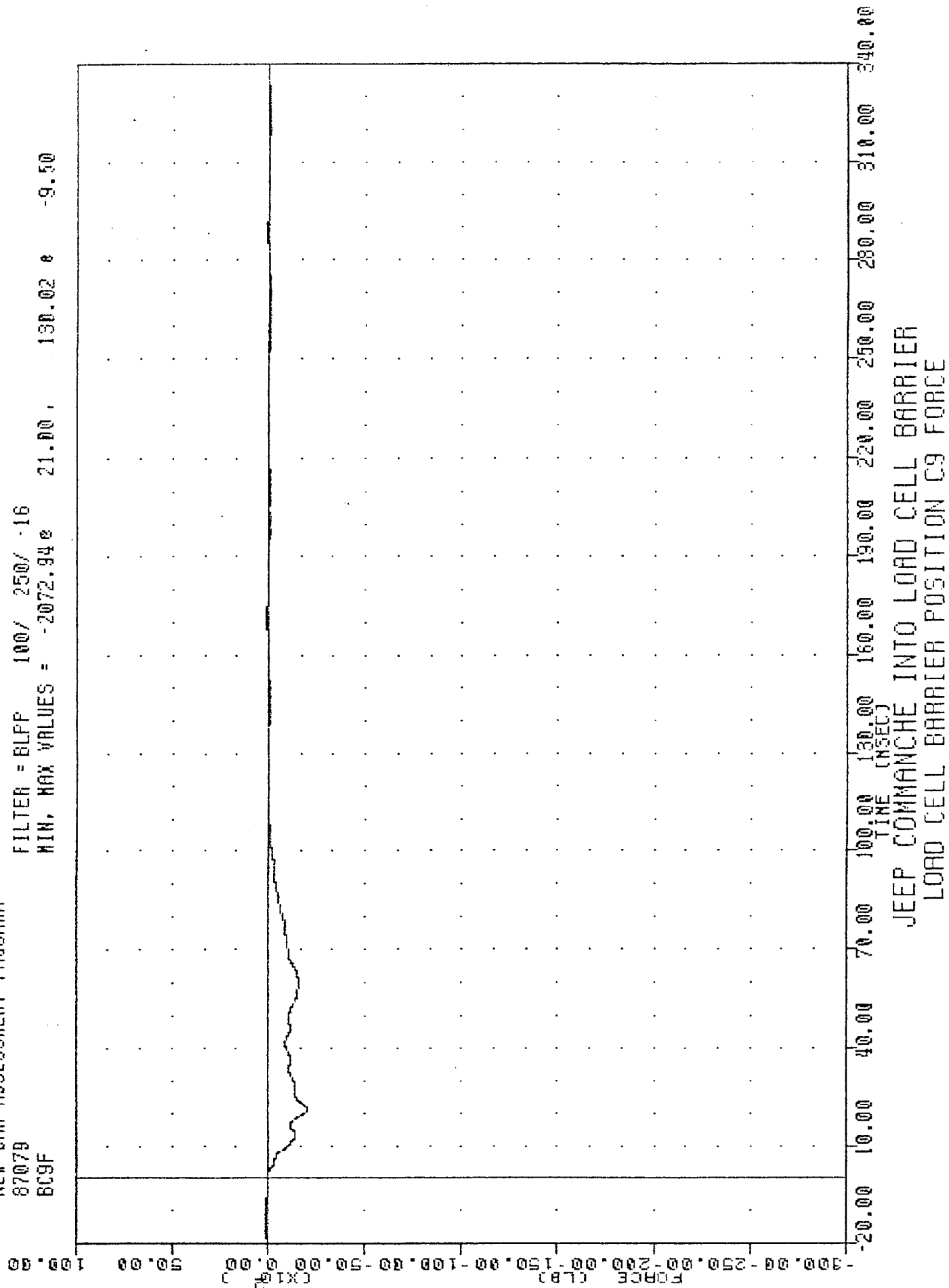
87079

BC9F

FILTER = BLFP 100/ 250/ -16

MIN, MAX VALUES = -2072.94 21.00

130.02 8 -9.50



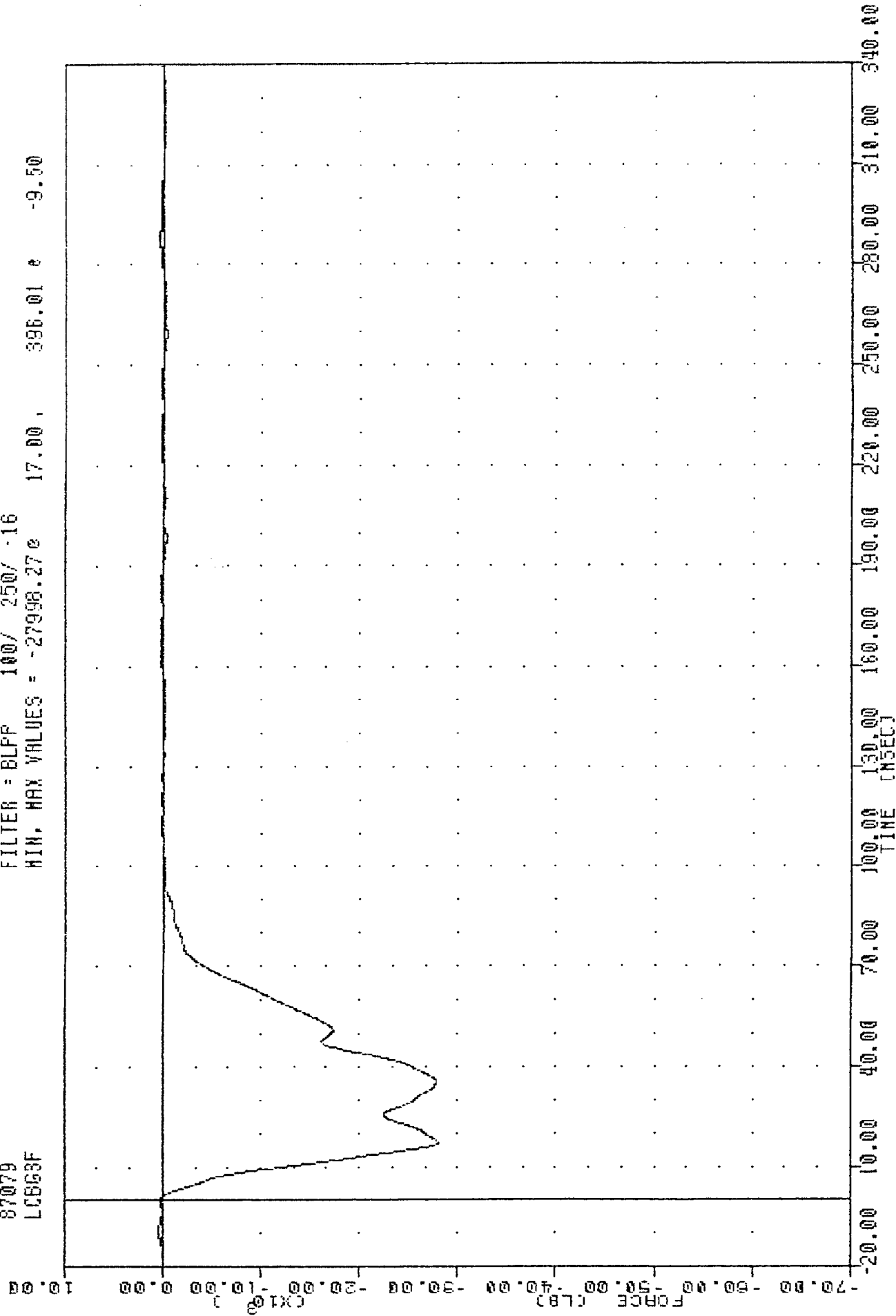
JEEP COMMANCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C9 FORCE

THC 870324
NEW CAR ASSESSMENT PROGRAM

87079
LCB63F

FILTER = BLPP 100/ 250/ -16

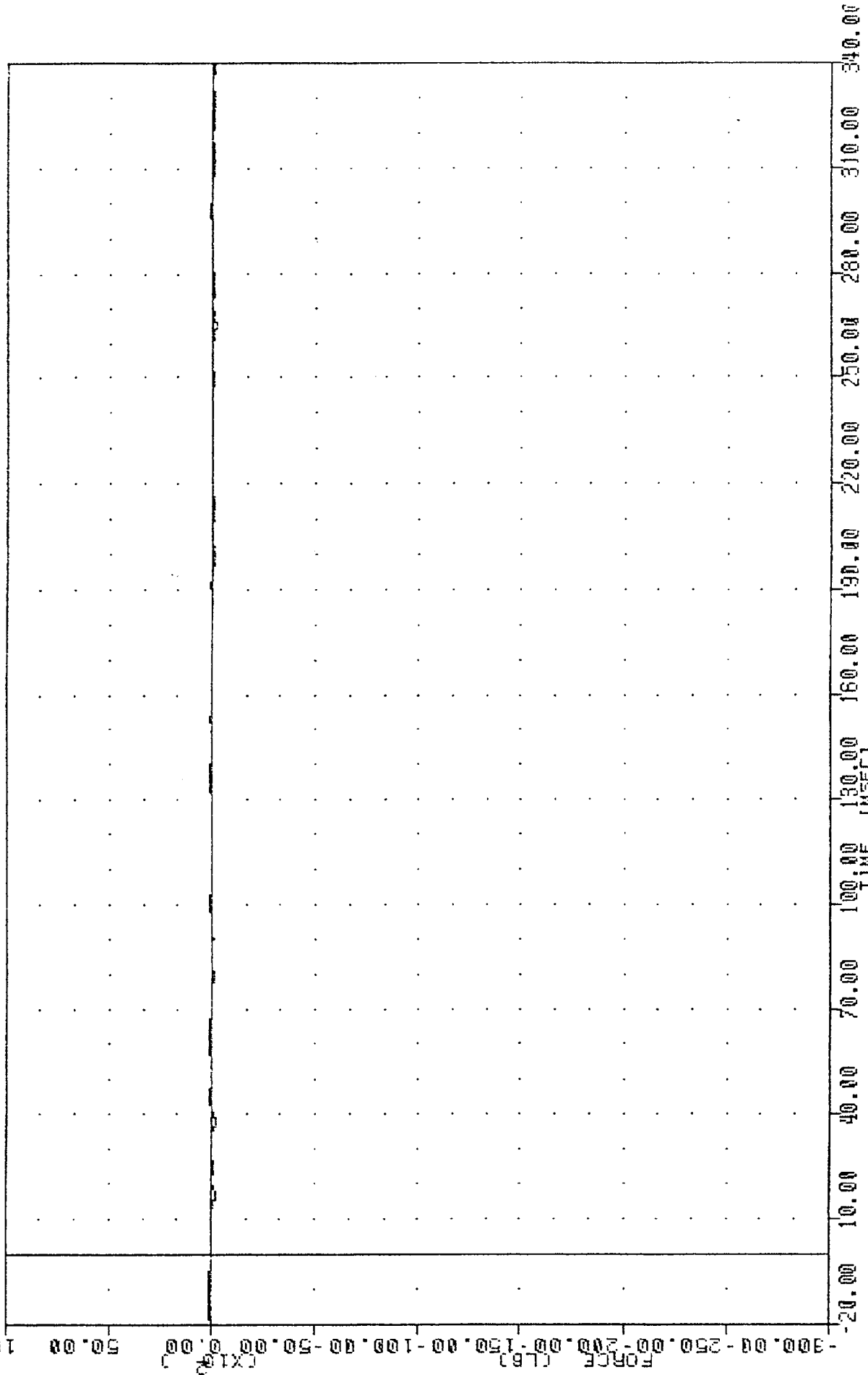
HIN, MAX VALUES = -27998.27e 17.00, 396.01 e -9.50



JEEP COMMANCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 3 FORCE TOTAL

IRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 BB1F

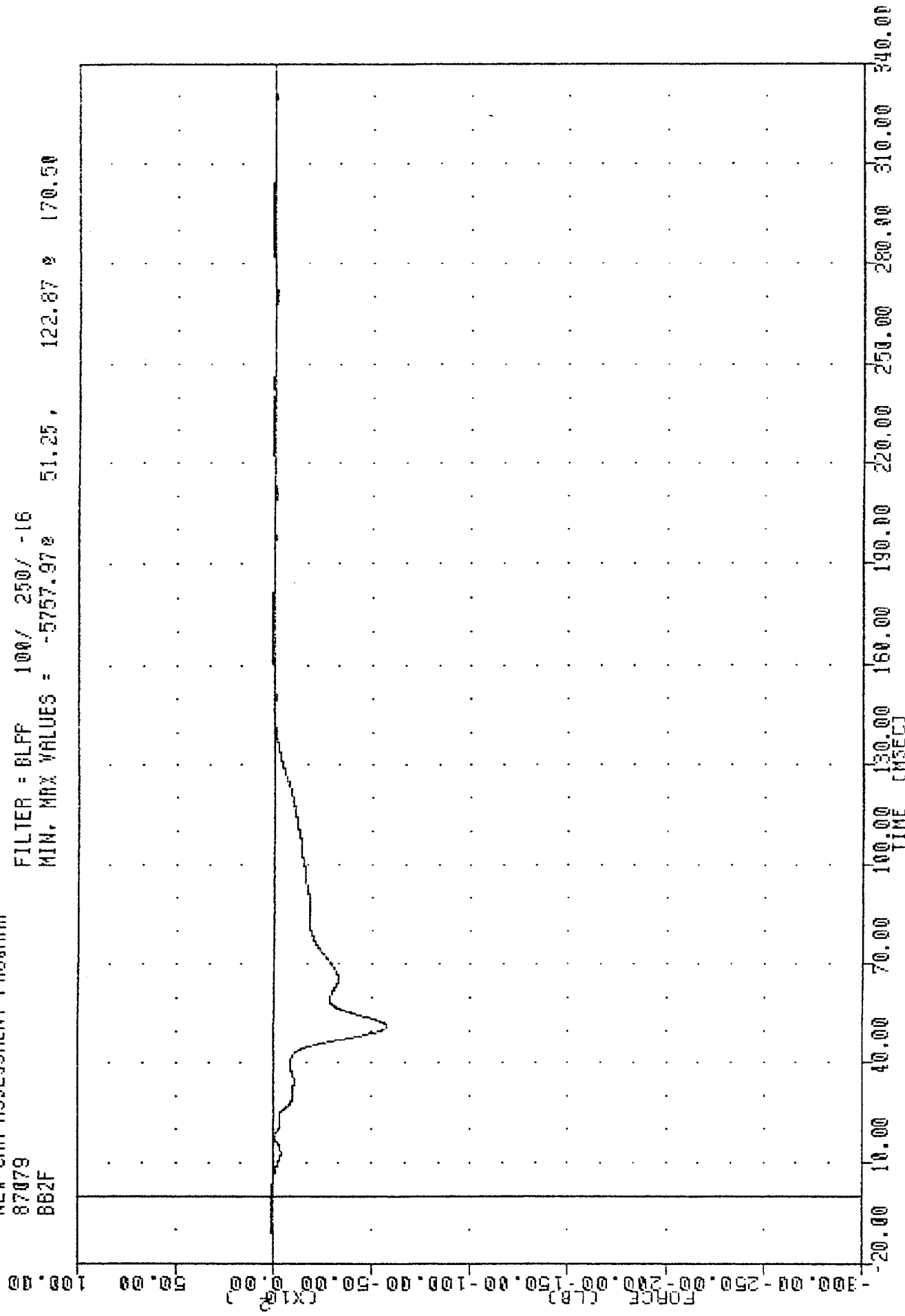
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -217.95e 37.75, 113.00 e 45.63



JEEP COMMANDCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B1 FORCE

INC 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 B62F

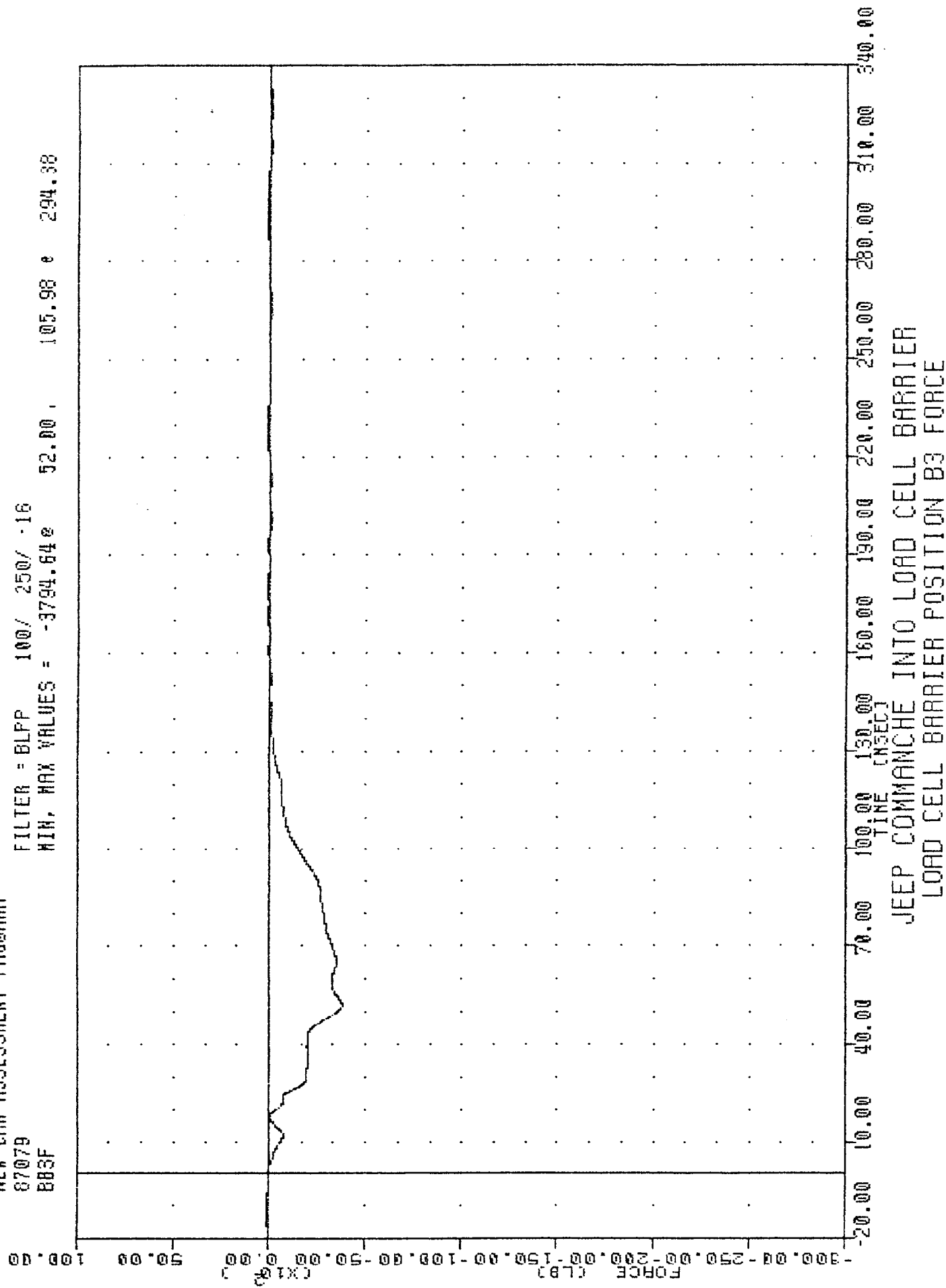
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -5757.97 51.25, 122.87 170.50



JEEP COMMANCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B2 FORCE

THE NEW CAR ASSESSMENT PROGRAM
 87079
 BB3F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -3794.64e 52.00 , 105.98 e 294.38



TRC 870324
NEW CAR ASSESSMENT PROGRAM

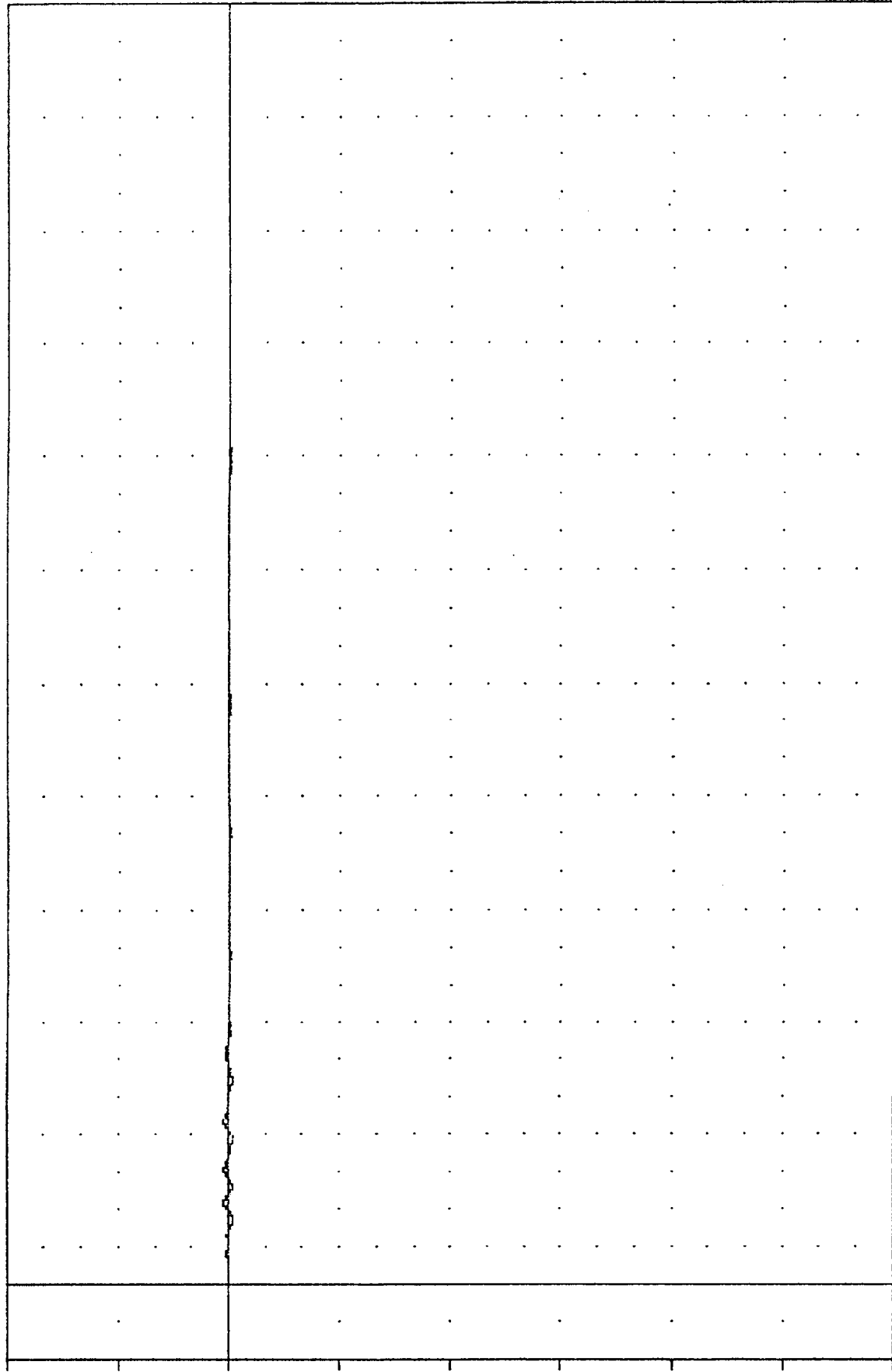
87079

BA1F

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -225.90e 17.13, 180.61 e 21.88

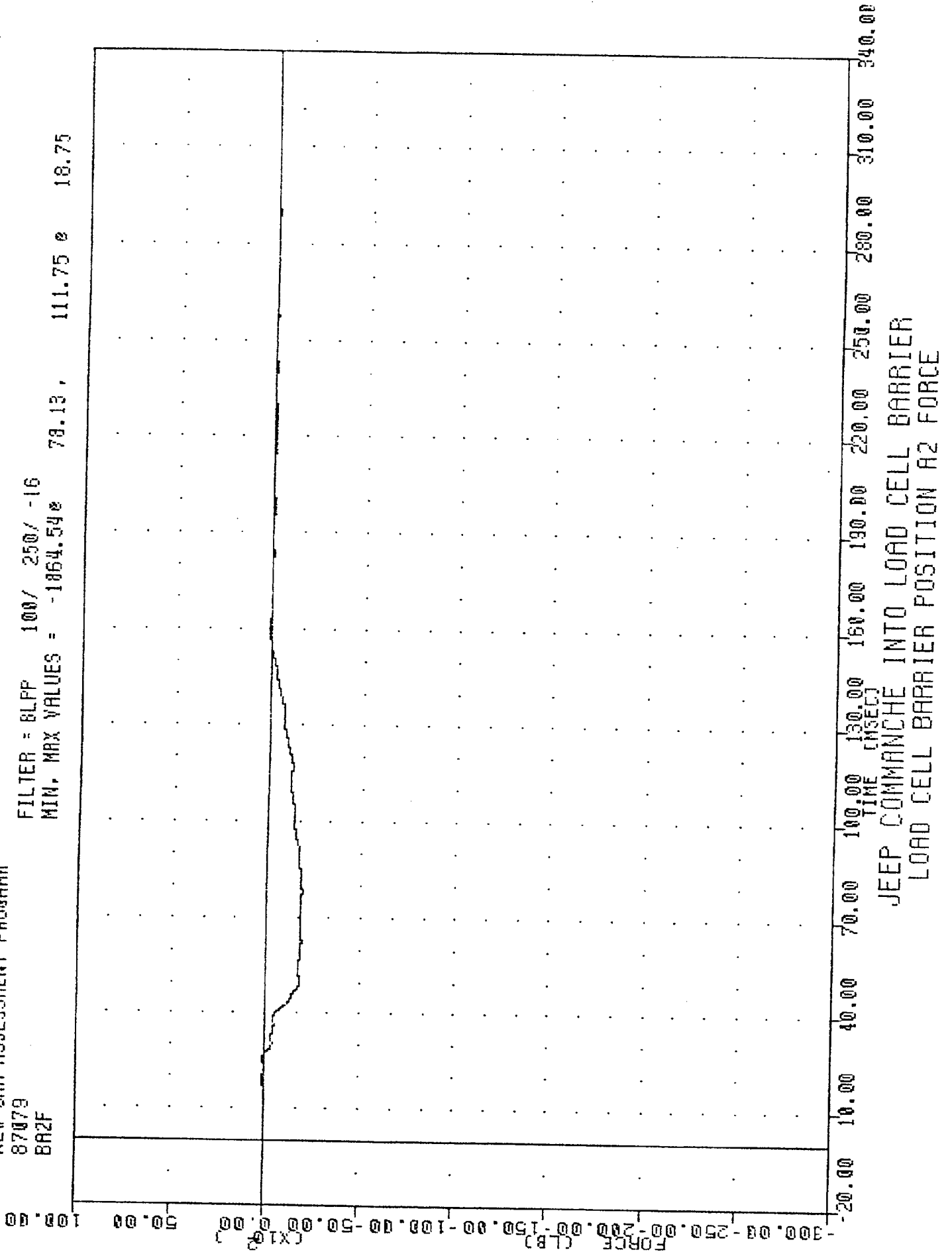
FORCE (LB)
(X10³)



JEEP COMMANDCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A1 FORCE

INC 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 BR2F

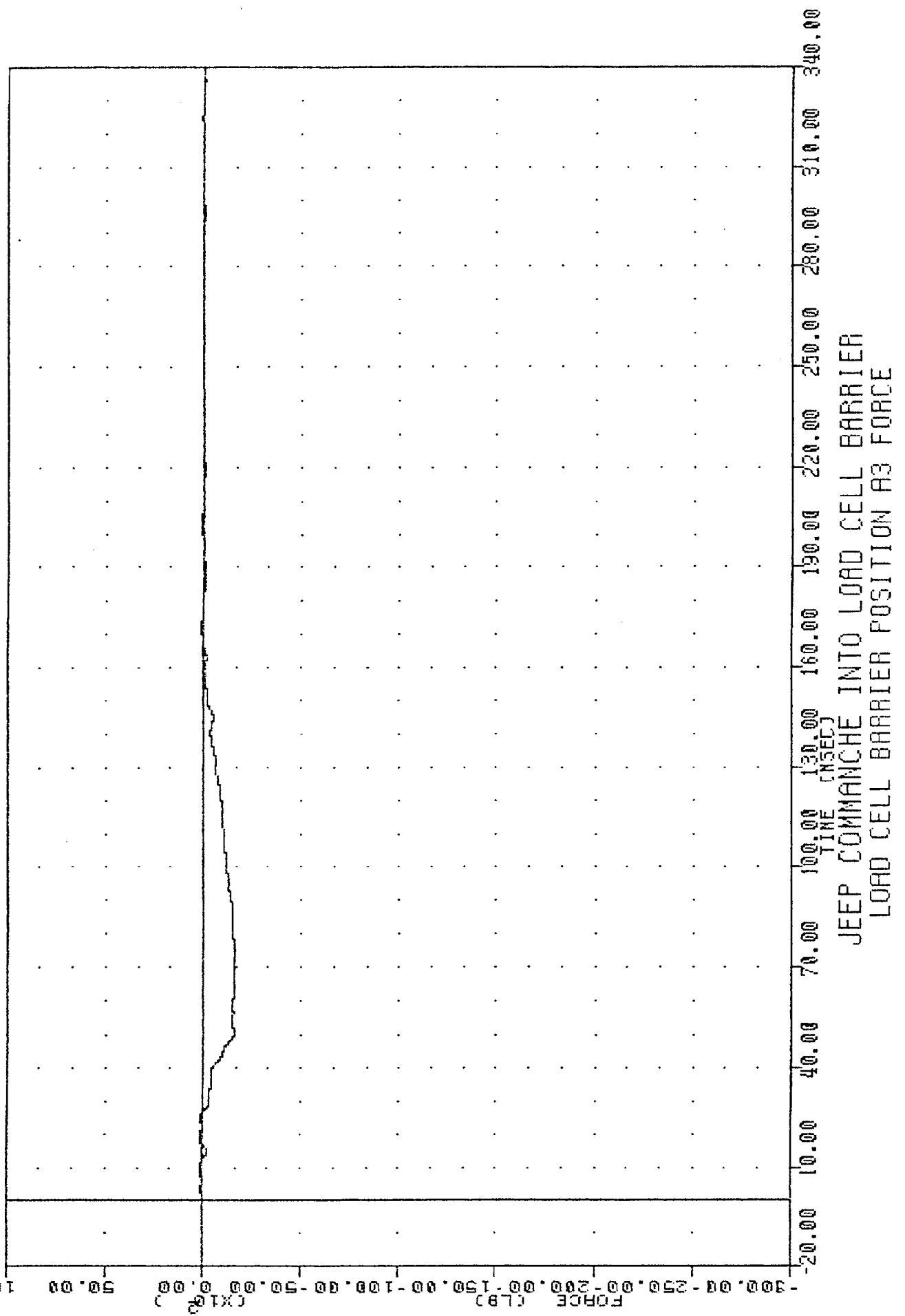
FILTER = 8LPP 100/ 250/ -16
 MIN. MAX VALUES = -1864.54 78.13, 111.75 18.75



JEEP COMMANCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A2 FORCE

870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 BA3F

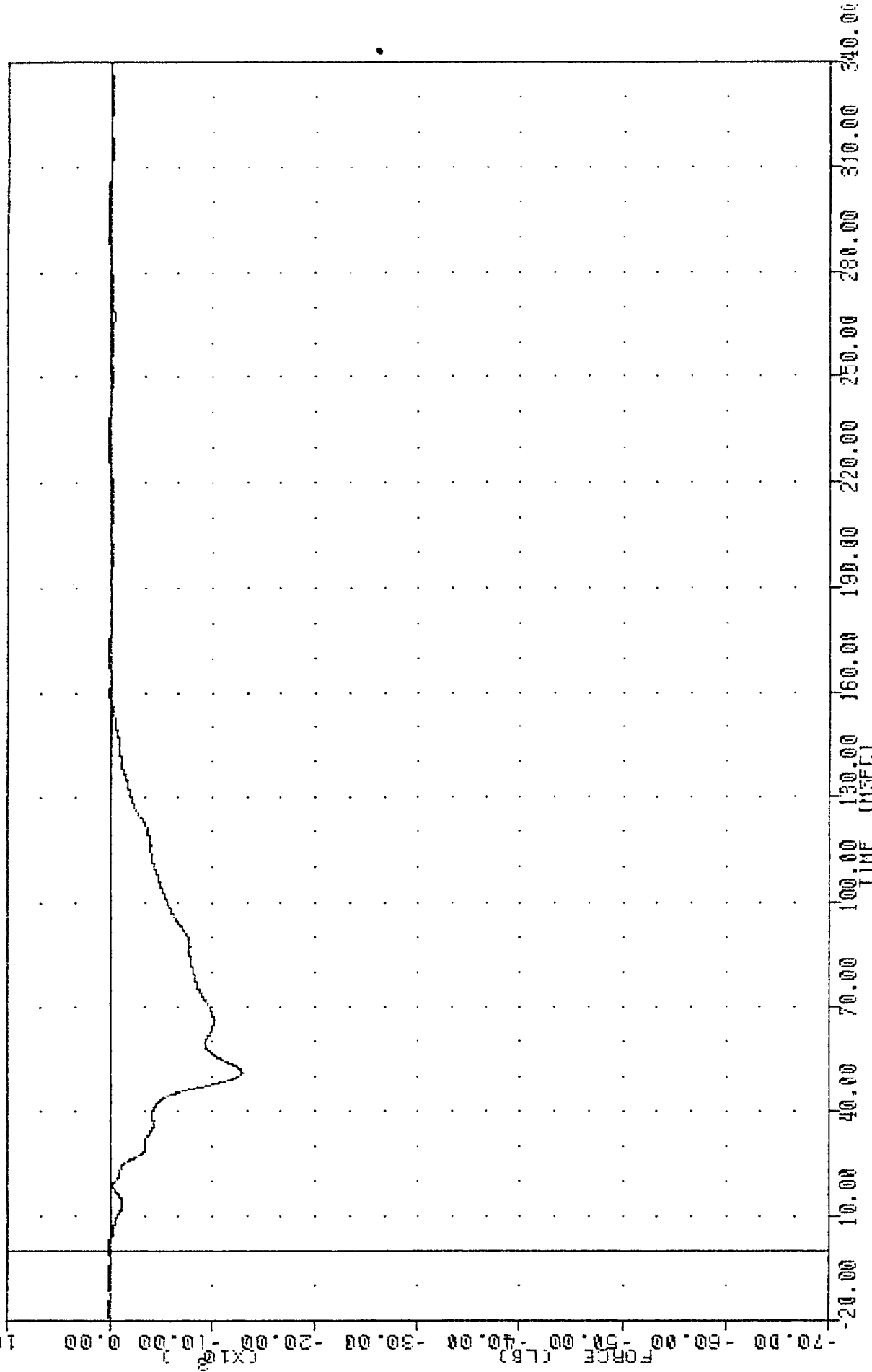
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1622.55e 63.00 , 148.97 e 18.88



JEEP COMMANCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A3 FORCE

TRC
 NEW CAR ASSESSMENT PROGRAM
 87079
 LCB54F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -12874.02e 51.38, 245.51 e 170.88



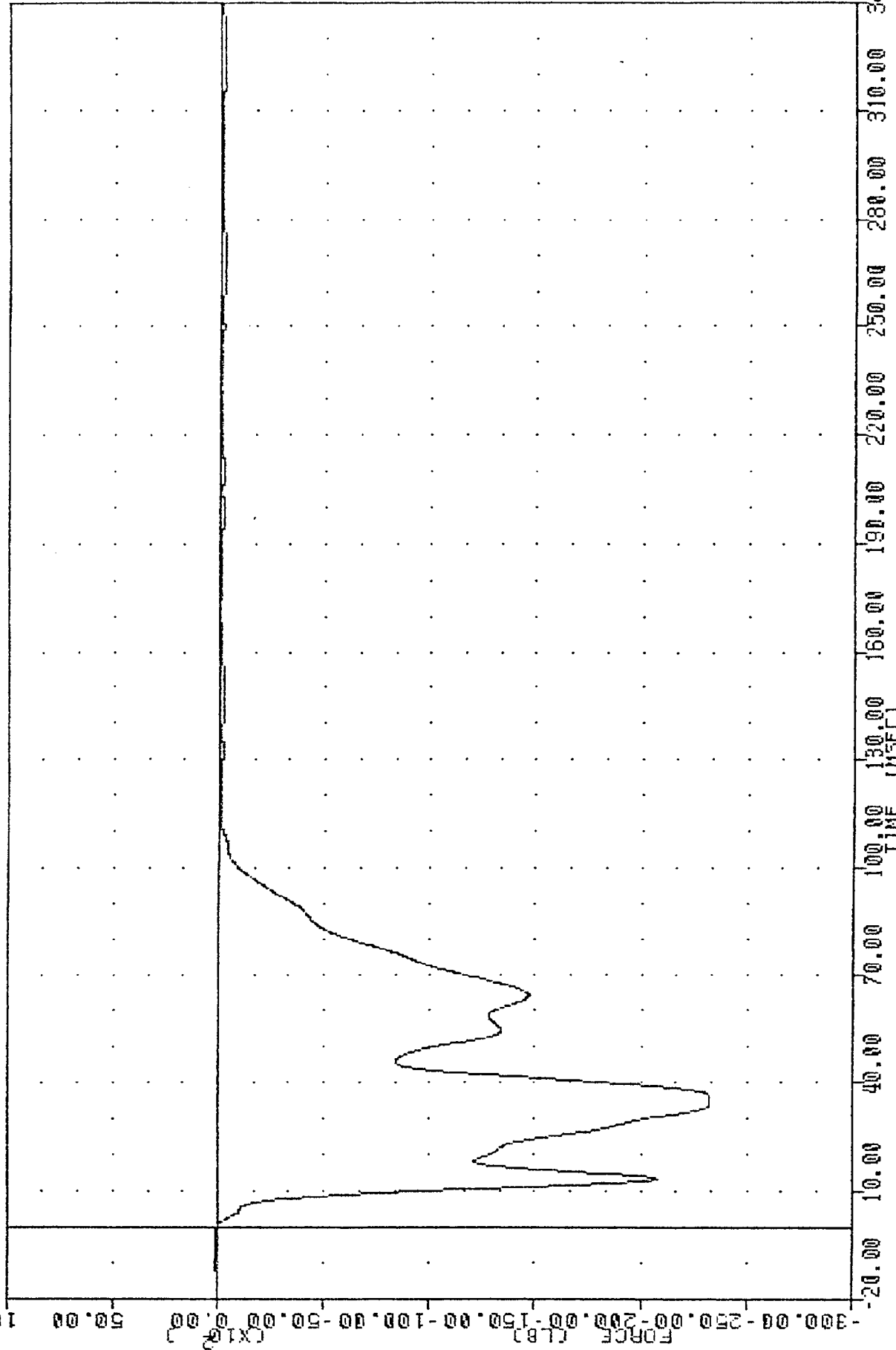
JEEP COMMANCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP - 4 FORCE TOTAL

TRC 870324
NEW CAR ASSESSMENT PROGRAM

87079
BB4F

FILTER = BLPP 100/ 250/ -16

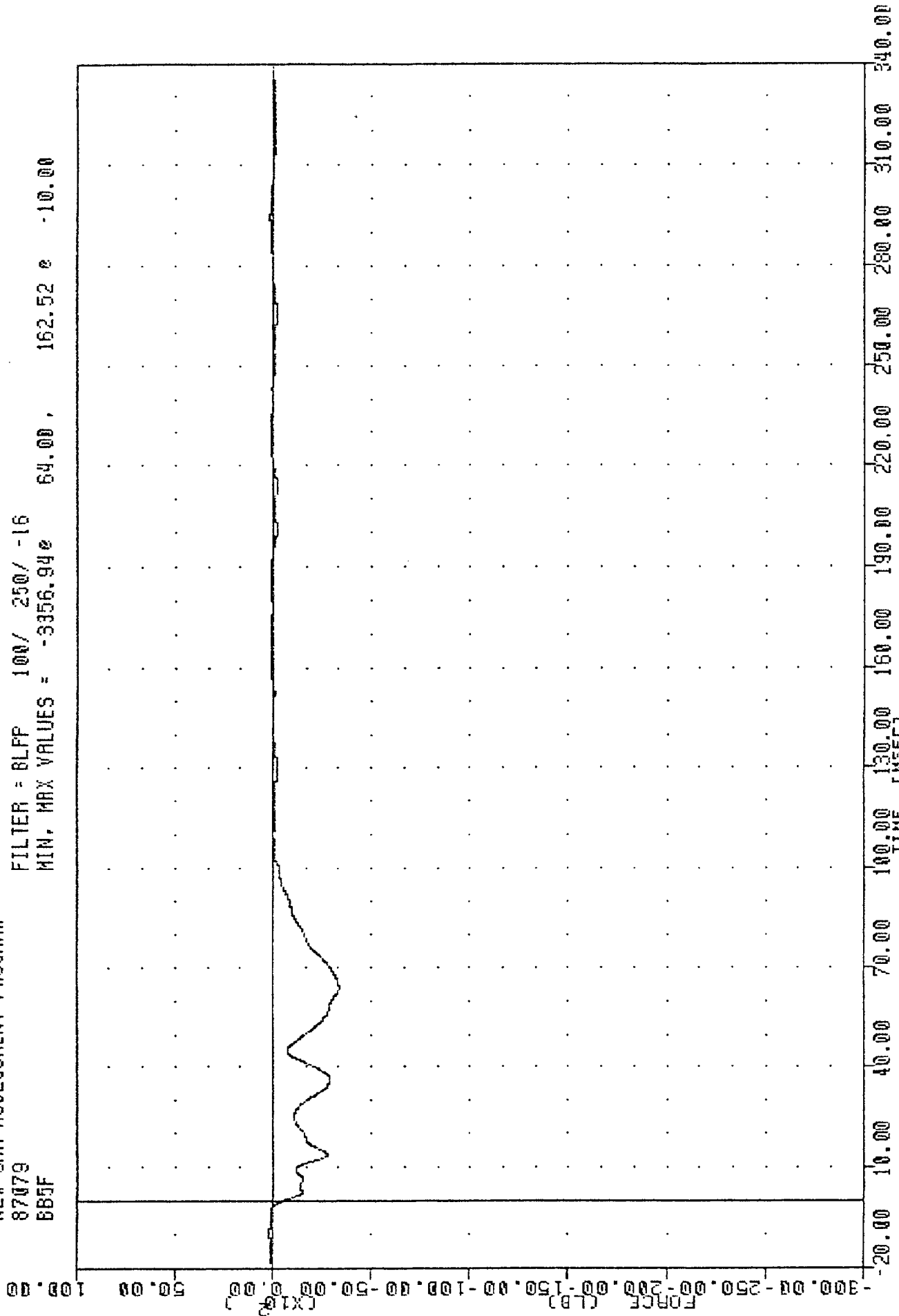
MIN, MAX VALUES = -23271.64# 34.75, 96.18# -1.38



JEEP COMMANDCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B4 FORCE

TRC 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 BB5F

FILTER = BLFF 100/ 250/ -16
 MIN, MAX VALUES = -3356.94 64.00, 162.52 0 -10.00



THC 870324

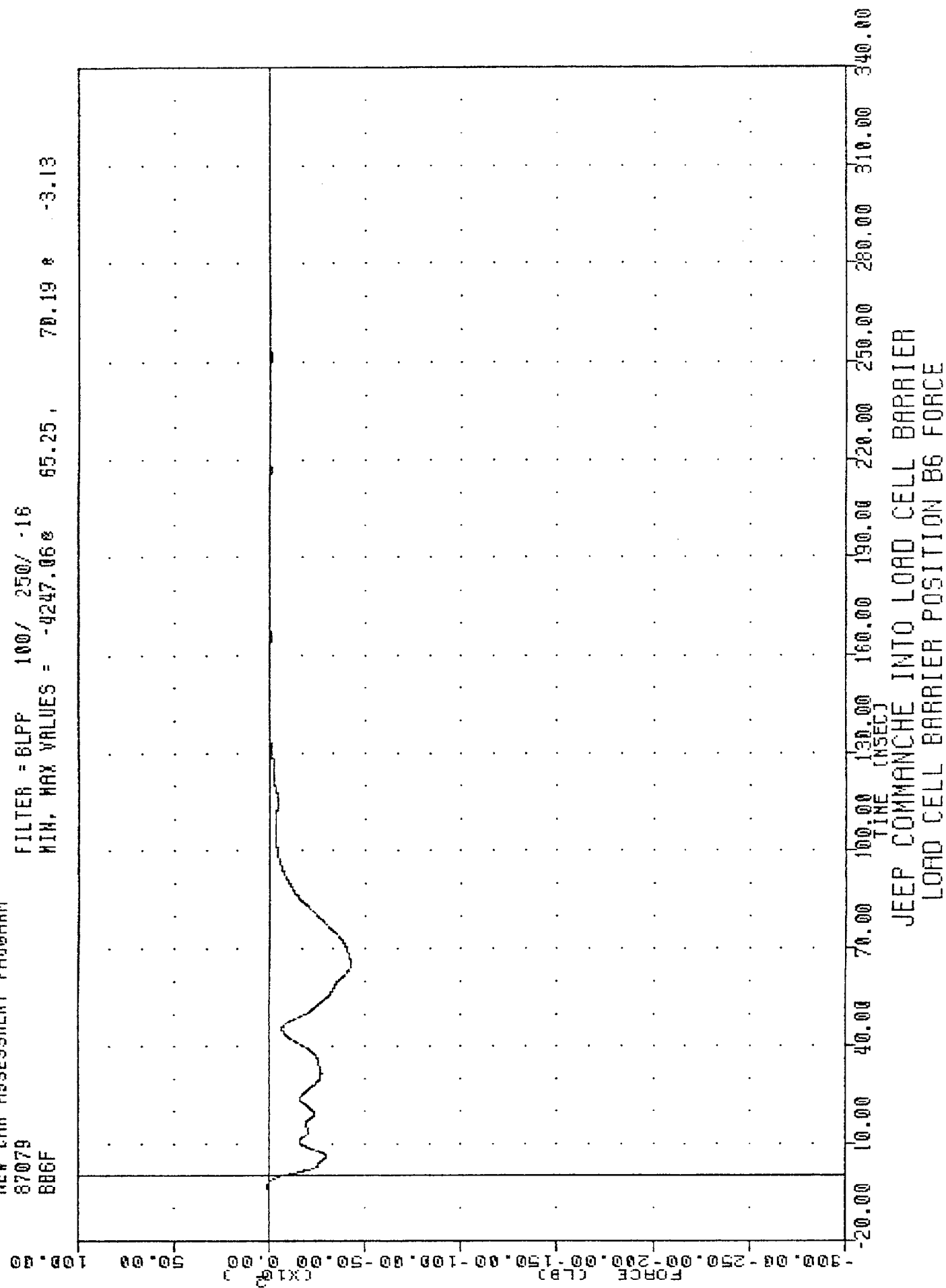
NEW CAR ASSESSMENT PROGRAM

87079

BBGF

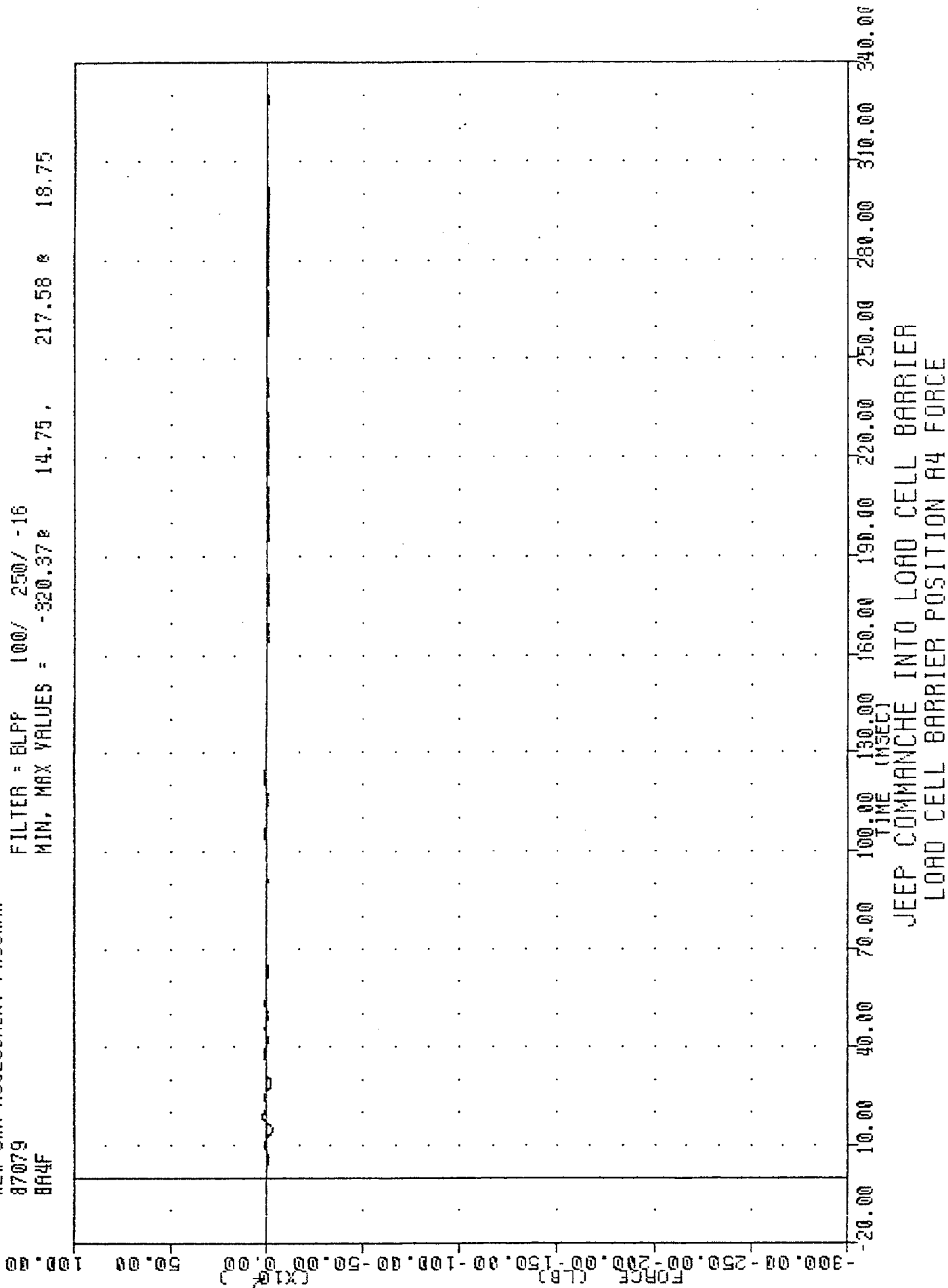
FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -4247.06 65.25, 70.19 -3.13



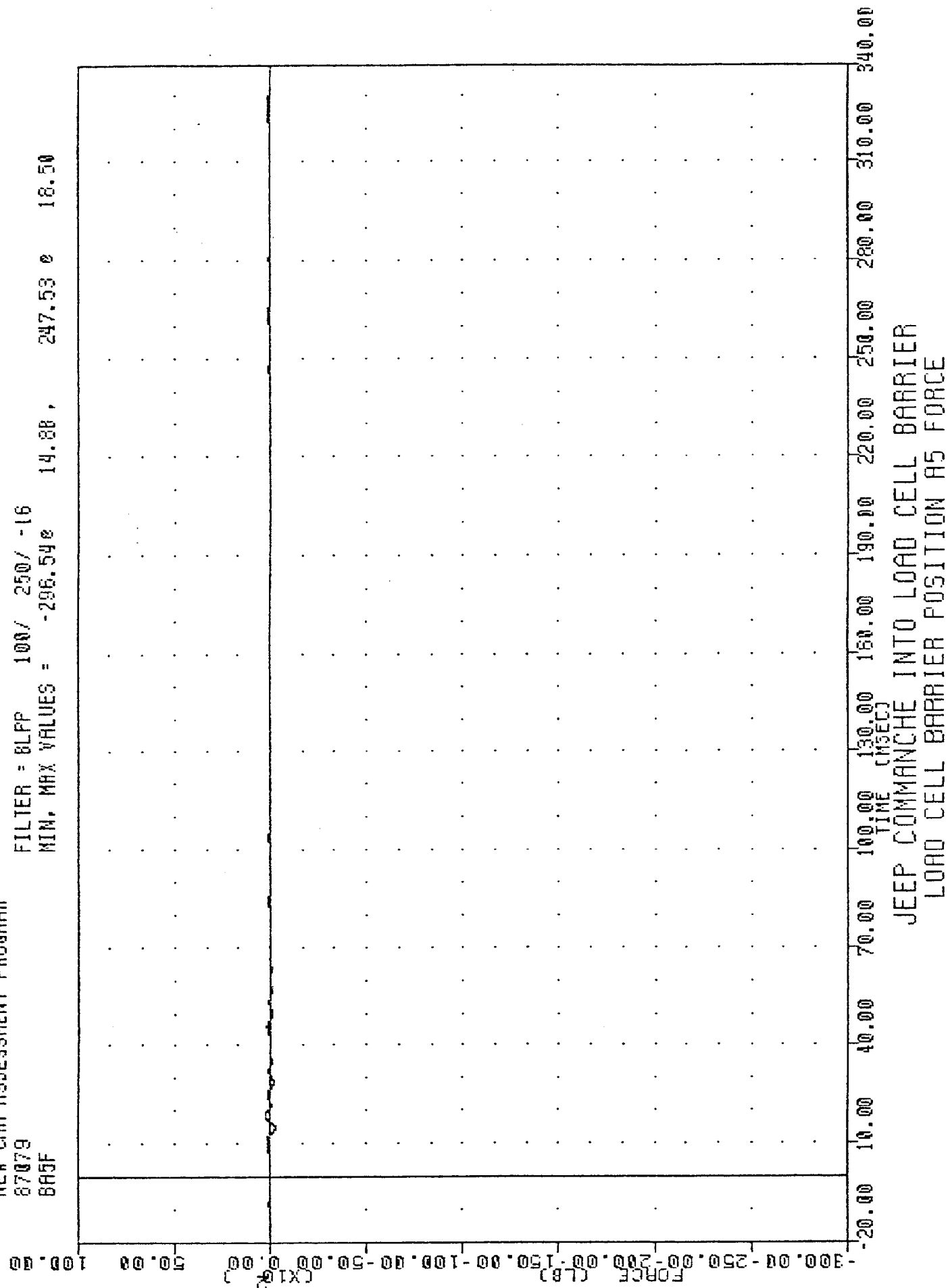
TRC
 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 BA4F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -320.37 14.75 , 217.58 19.75



TRC
NEW CAR ASSESSMENT PROGRAM
870324
87079
885F

FILTER = BLFP 100/ 250/ -16
MIN, MAX VALUES = -296.540 14.88, 247.53 0 18.50



TAC , 870324

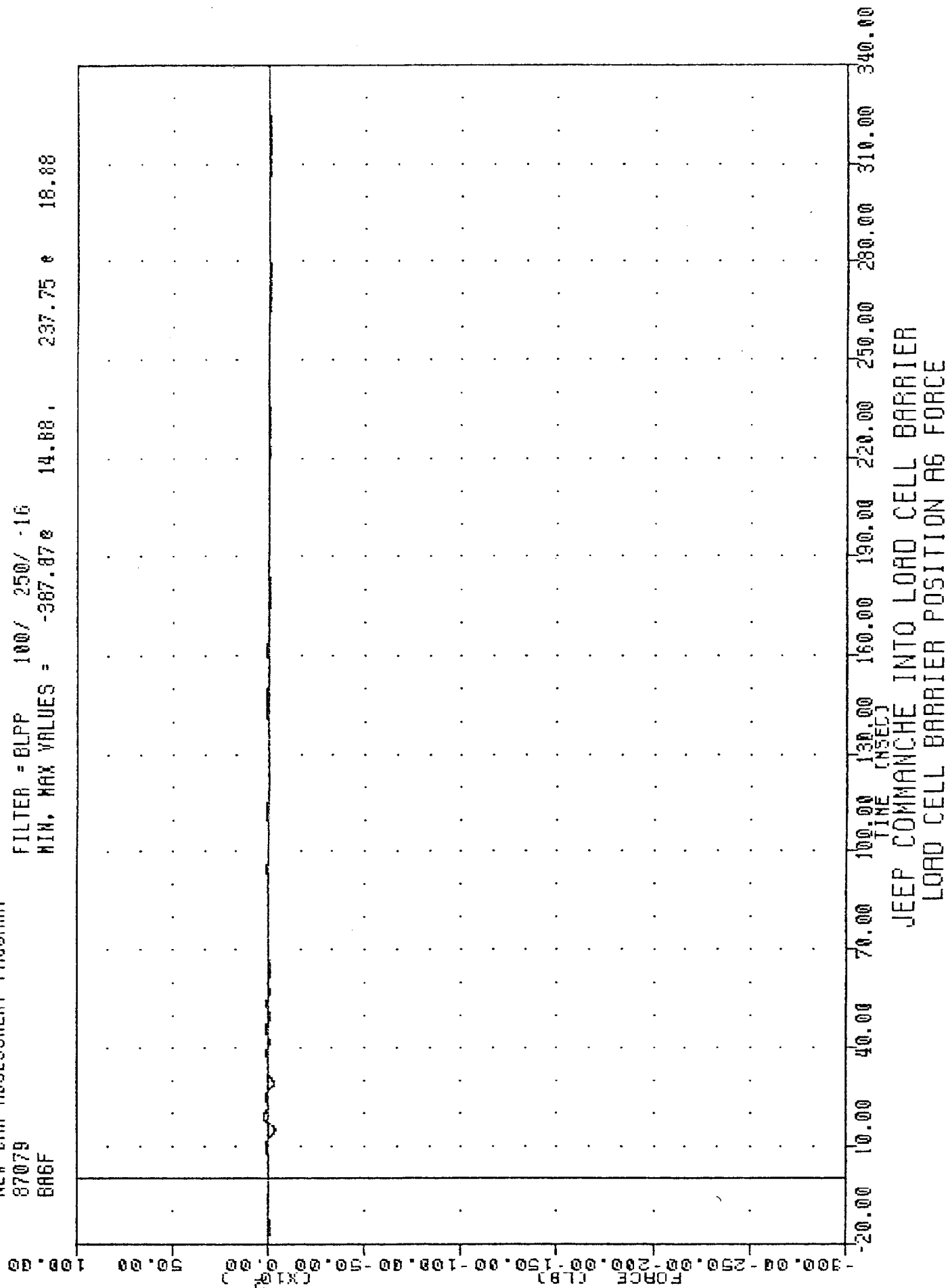
NEW CAR ASSESSMENT PROGRAM

87079

BA6F

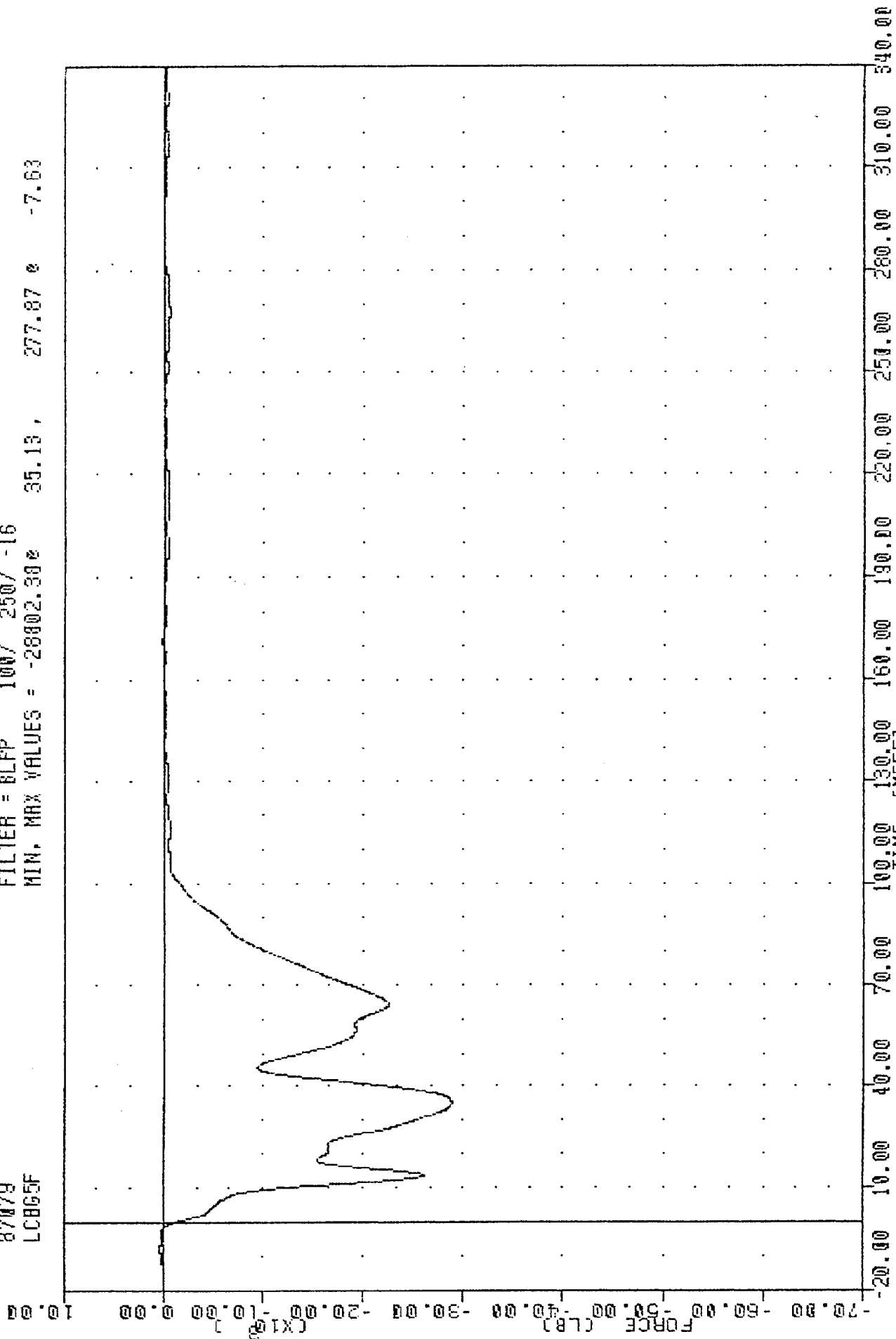
FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -387.87 14.88, 237.75 18.88



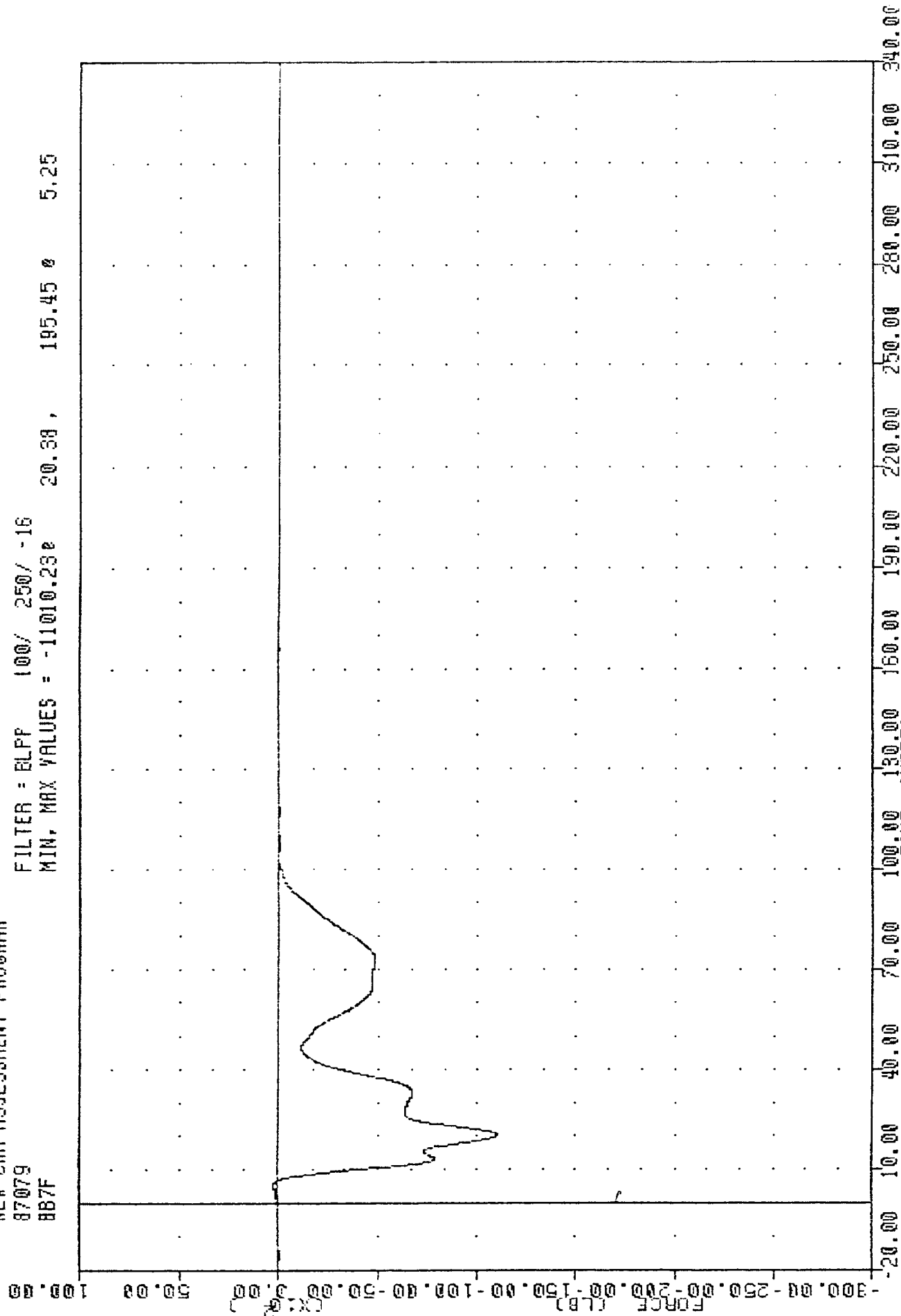
IHC
 NEW CAR ASSESSMENT PROGRAM
 87079
 LC865F

FILTER = BLFP 100/ 250/ -16
 MIN. MAX VALUES = -28802.30e 35.13, 277.87 e -7.63



TRC
NEW CAR ASSESSMENT PROGRAM
87079
BB7F

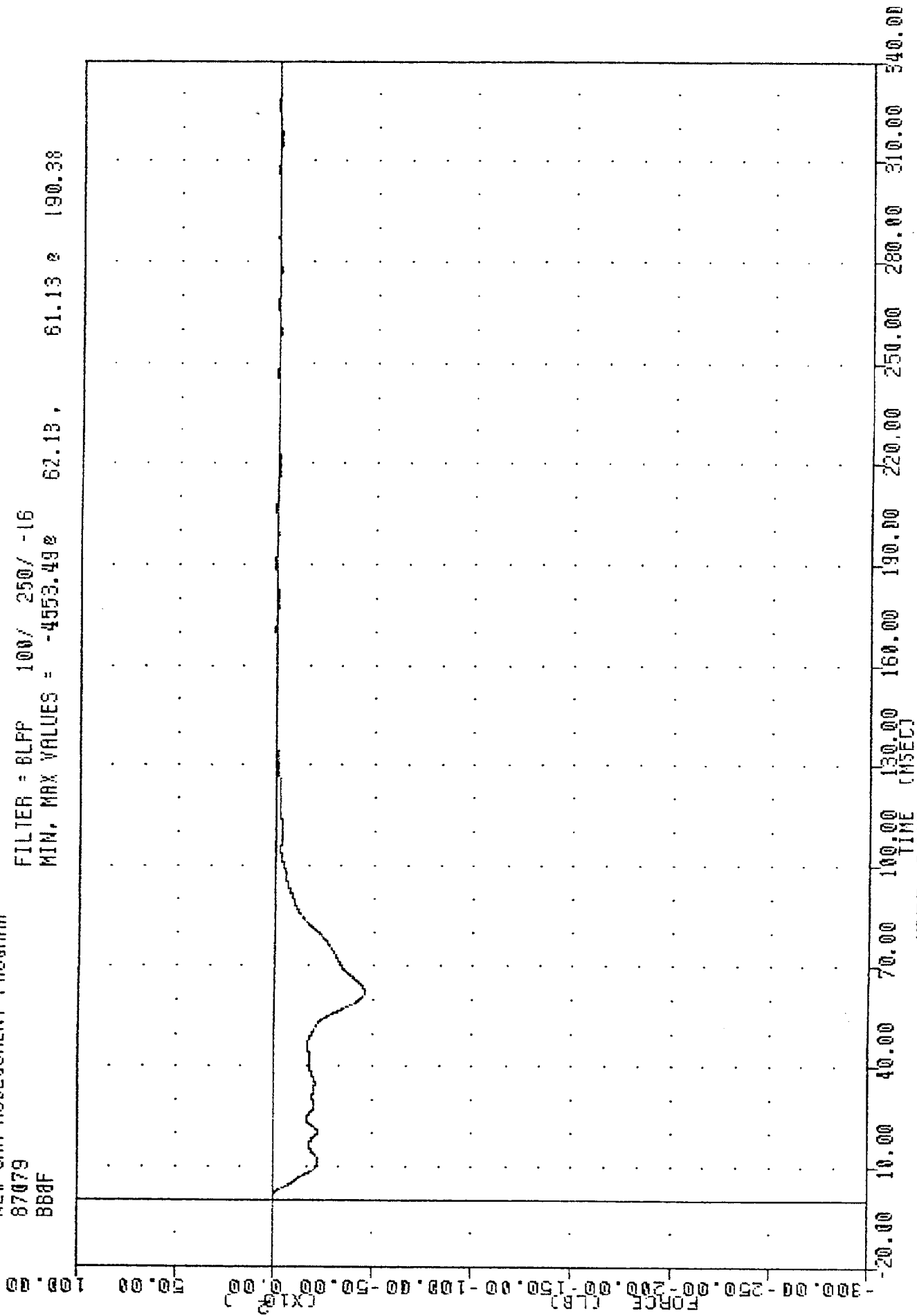
FILTER = BLPP 100/ 250/ -18
MIN, MAX VALUES = -11010.230 20.38, 195.45 0 5.25



JEEP COMMANCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B7 FORCE

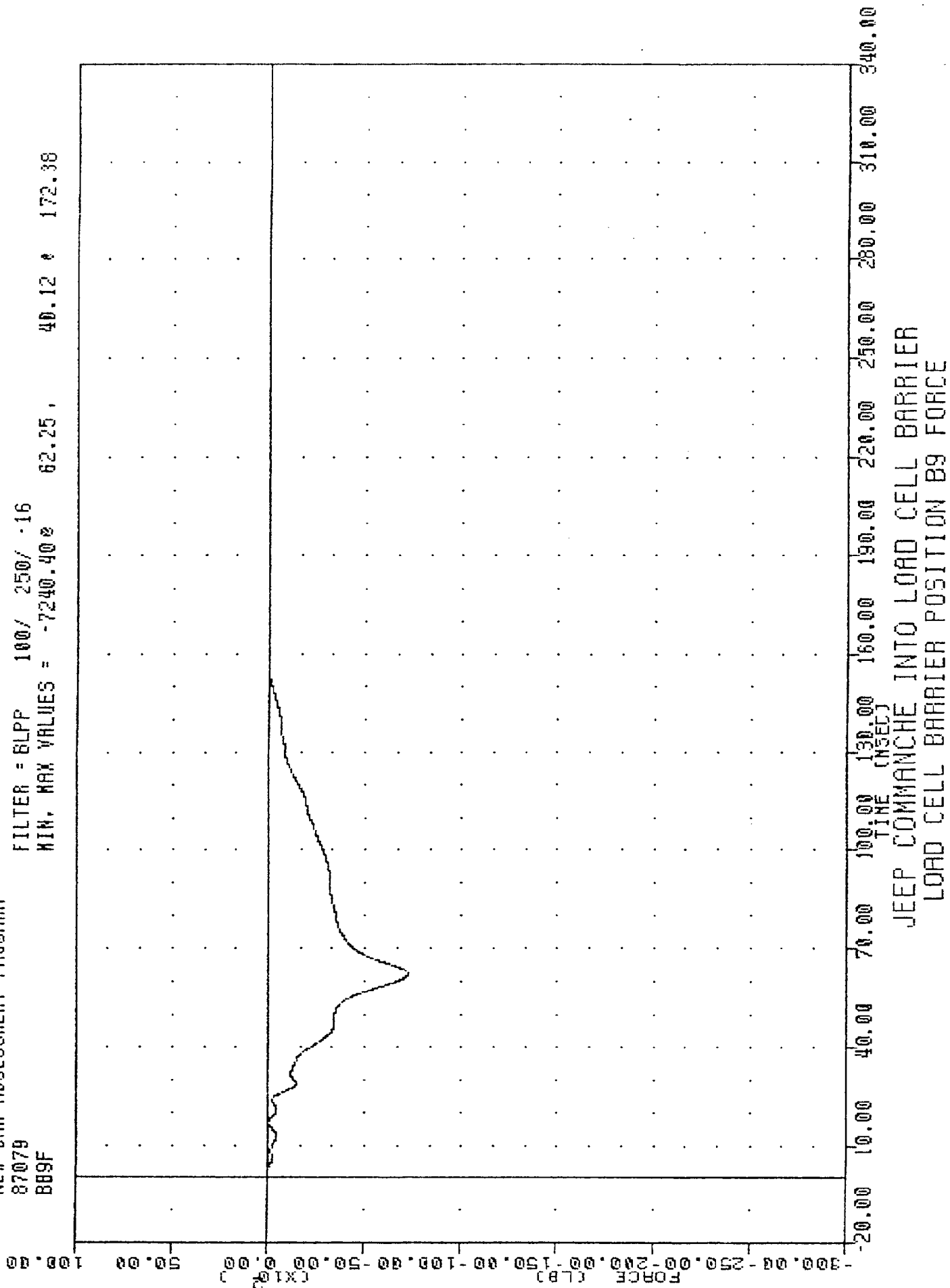
TRC , 870324
 NEW CAR ASSESSMENT PROGRAM
 87079
 B88F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -4553.490 62.13, 61.13 2 190.38



THC
870324
NEW CAR ASSESSMENT PROGRAM
87079
BB9F

FILTER = BLPP 100/ 250/ .16
MIN, MAX VALUES = -7240.400 62.25 , 40.12 172.38

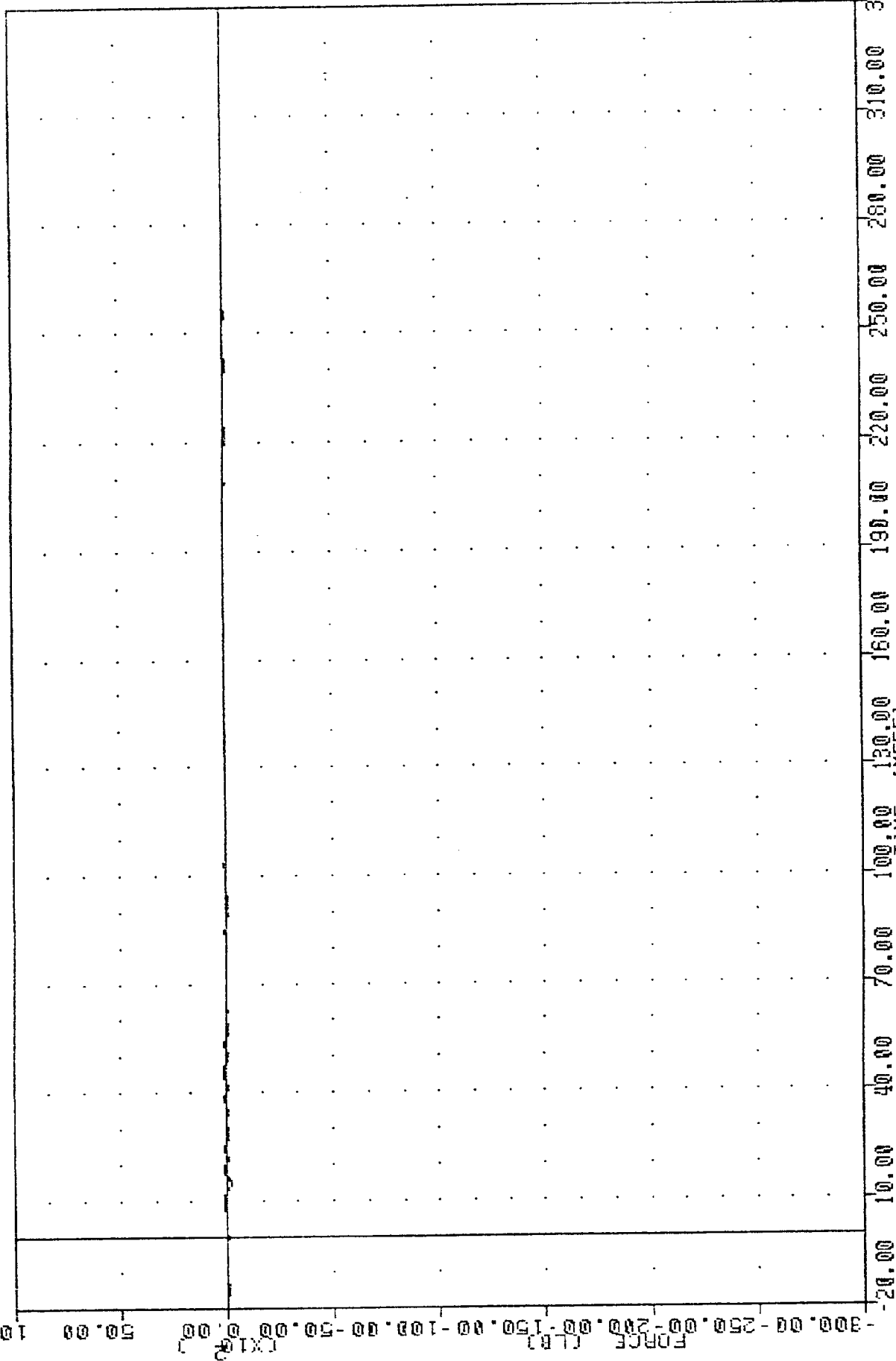


TRC
NEW CAR ASSESSMENT PROGRAM

87079
BR7F

870324

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -205.16 14.88, 143.86 18.63

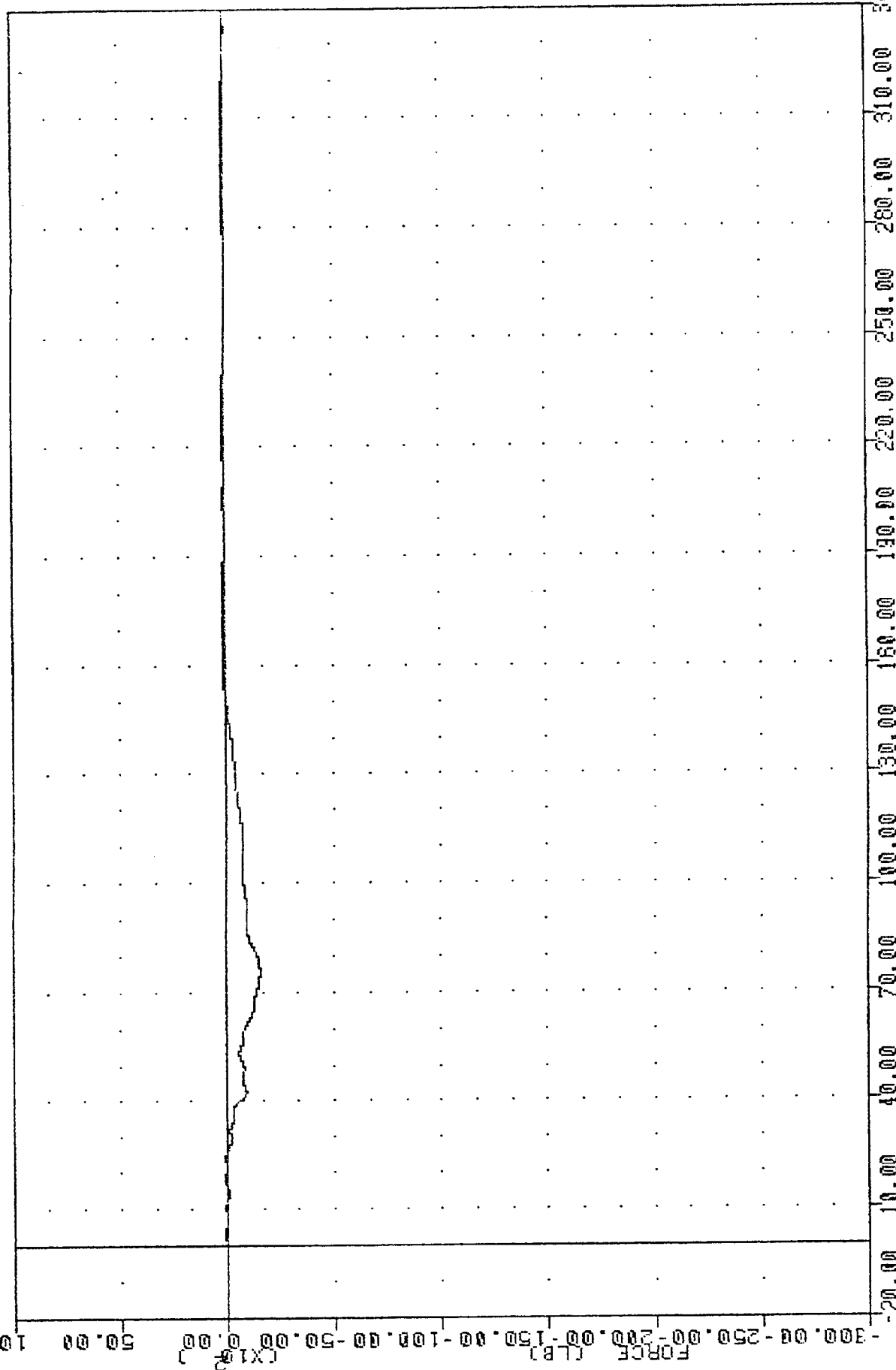


JEEP COMMANCHE INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A7 FORCE

TRC , 870324
 NEW CAR ASSESSMENT PROGRAM

87079
 B88F

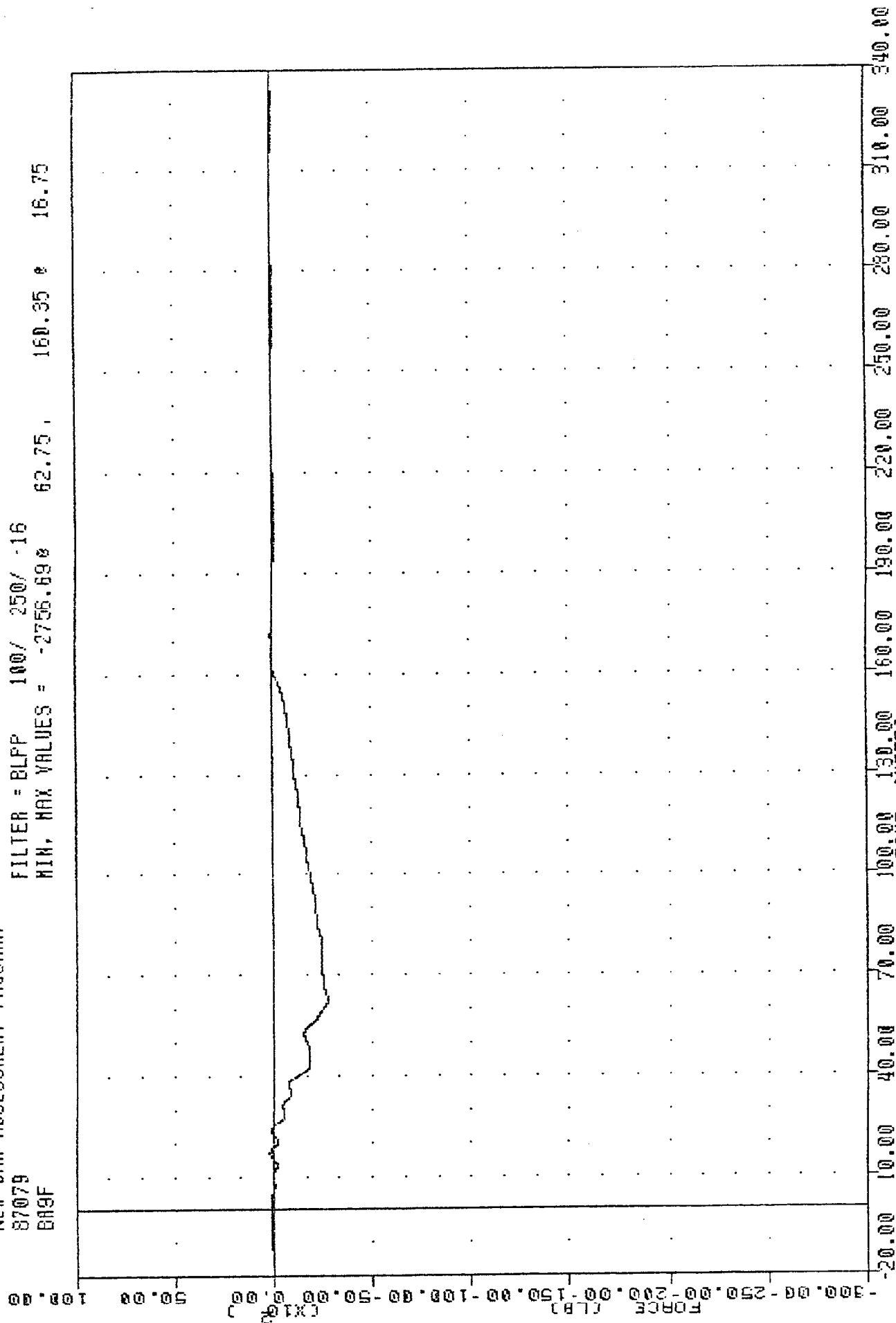
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -1552.310 75.25 , 147.49 e 170.88



JEEP COMMANDCHE INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A8 FORCE

TAC
NEW CAR ASSESSMENT PROGRAM
87079
BAGF

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -2756.690 62.75, 160.35 16.75



TAC
NEW CAR ASSESSMENT PROGRAM

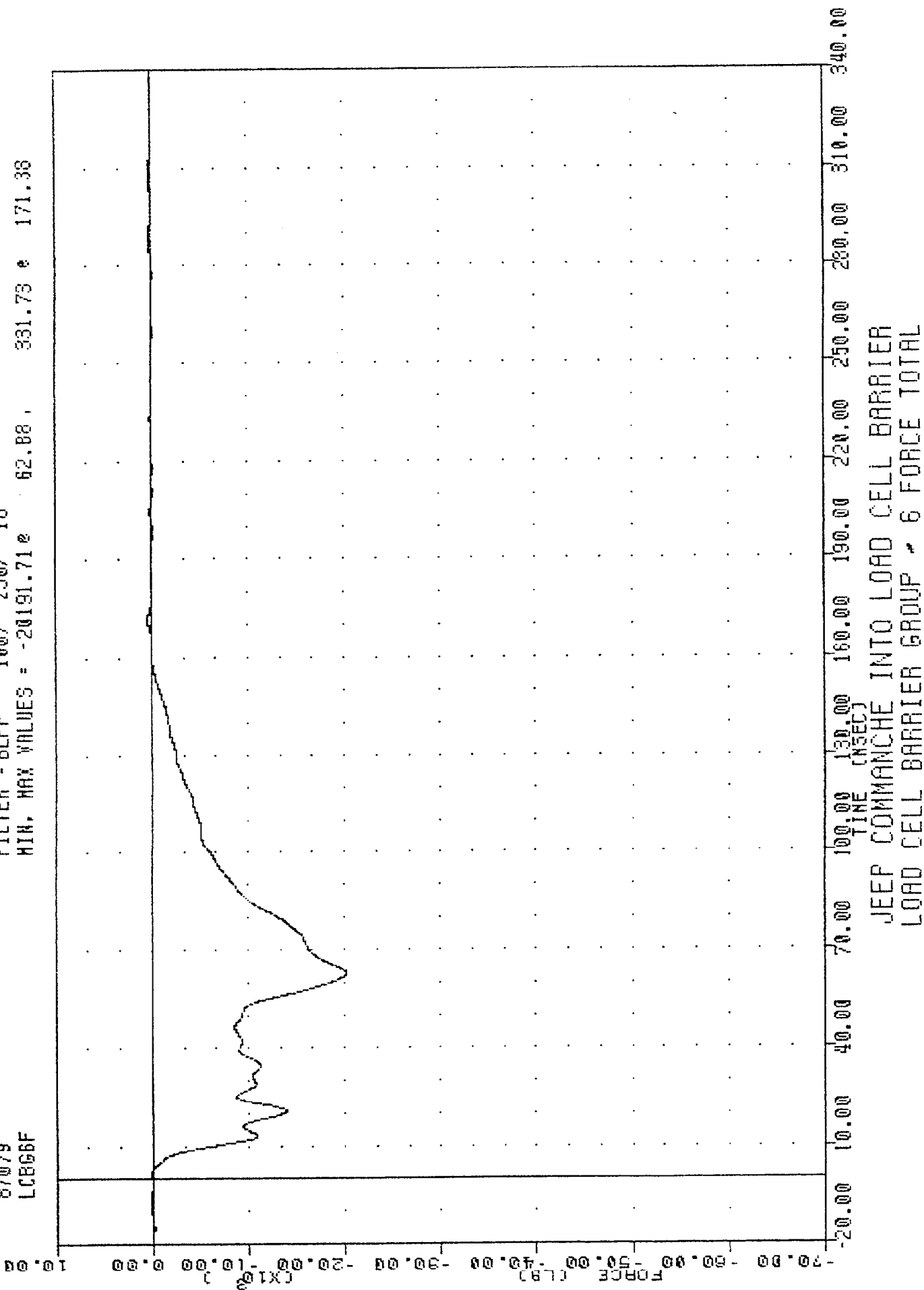
870324

87079

LCBGBF

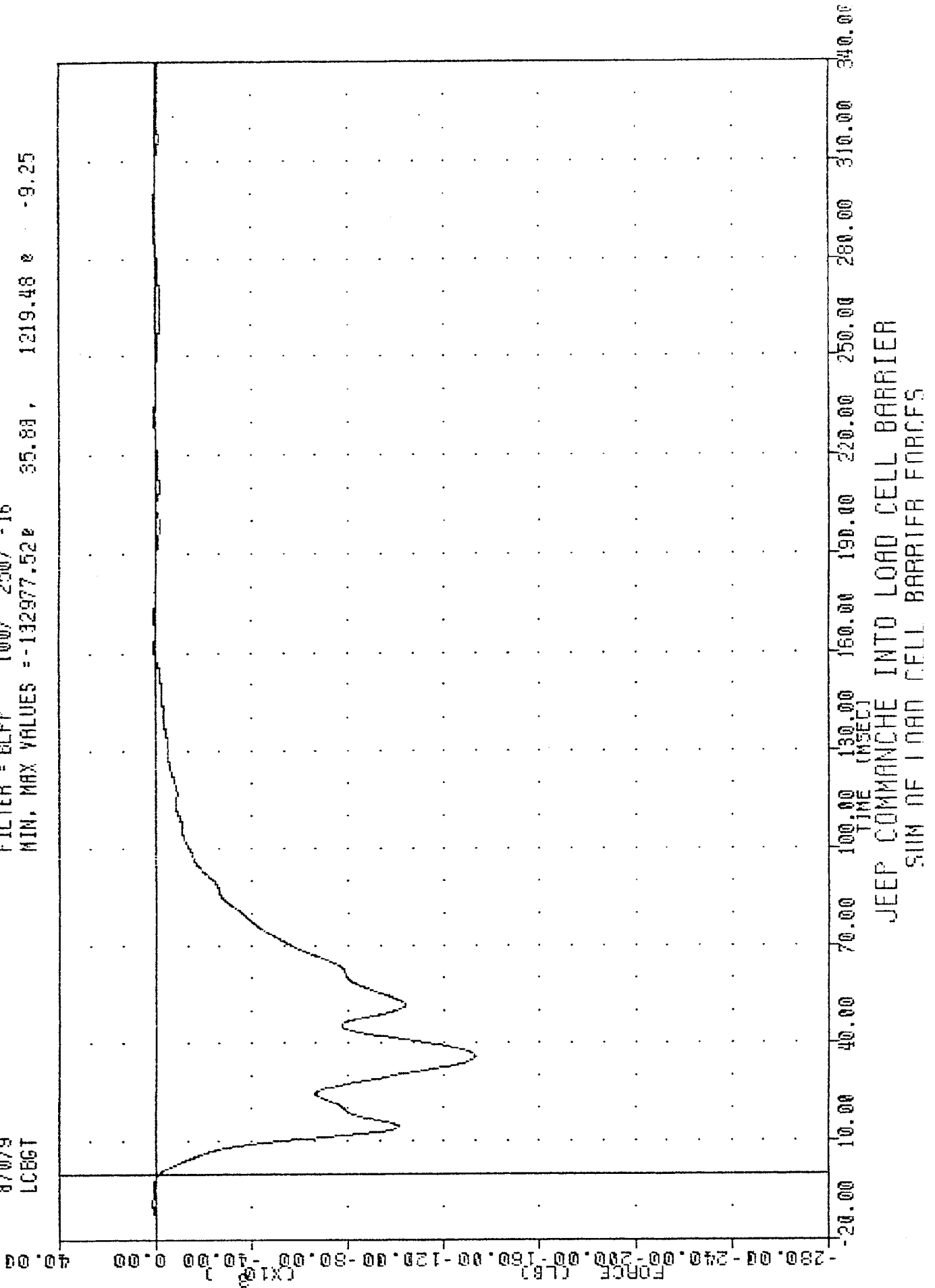
FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -20191.71e 62.88, 331.73 e 171.38



INC , 070324
 NEW CAR ASSESSMENT PROGRAM
 87079
 LC8GT

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -132977.520 35.80 , 1219.48 0 -9.25



APPENDIX C

DUMMY CERTIFICATION

TRANSPORTATION RESEARCH CENTER OF OHIO

EXTERNAL DIMENSIONS

PART 572

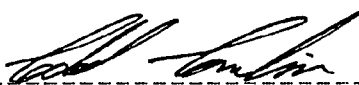
27-FEB-87

TEMPERATURE 70.00 F
NCA ED75814

RELATIVE HUMIDITY 19.00 %
572 SN 758 EXT.DIMENSION CAL14

DESCRIPTION	SPECIFICATION	TEST RESULTS
SN ALDERSON 758		
Sitting Height	35.6 - 35.8 IN	35.6 IN
Shoulder Pivot Height	21.8 - 22.4 IN	22.2 IN
Hip Pivot Height	3.9 IN (ref.)	3.9 IN
Hip Pivot From Backline	4.8 IN (ref.)	4.8 IN
Knee Pivot From Backline	20.1 - 20.7 IN	20.5 IN
Rear of Head From Backline	1.7 IN (ref)	1.7 IN
Chest Depth	9.1 - 9.6 IN	9.3 IN
Shoulder Width	17.8 - 18.4 IN	17.9 IN
Chest Circumference Over Nipples	36.8 - 40.0 IN	37.5 IN
Waist Circumference at Min. Girth	31.4 - 32.6 IN	32.4 IN
Hip Width	14.0 - 15.4 IN	14.9 IN
Knee Pivot From Floor	19.3 - 19.9 IN	19.4 IN

DUMMY MEETS SPECIFICATIONS

TECHNICIAN 

TRANSPORTATION RESEARCH CENTER OF OHIO

LUMBAR FLEXION TEST

PART 572

03-MAR-87

TEMPERATURE 70.00 F
NCA LF75814

RELATIVE HUMIDITY 20.00 %
572 SN 758 LUMBAR FLEX CAL14

DEFLECTION	SPECIFICATION	TEST RESULTS
0 Deg.	0 LBS	0.00 LBS
20 Deg	22.00 - 34.00 LBS	33.00 LBS
30 Deg	34.00 - 46.00 LBS	43.00 LBS
40 Deg	46.00 - 58.00 LBS	55.00 LBS
NET RETURN ANGLE	< 12 DEG	4.54 DEG

DUMMY MEETS SPECIFICATIONS

TECHNICIAN



TRANSPORTATION RESEARCH CENTER OF OHIO

ABDOMINAL COMPRESSION TEST

PART 572

04-MAR-87

TEMPERATURE 71.00 F
NCA AB75814

RELATIVE HUMIDITY 23.00 %
572 SN 758 ABDOM COMPR CAL 14

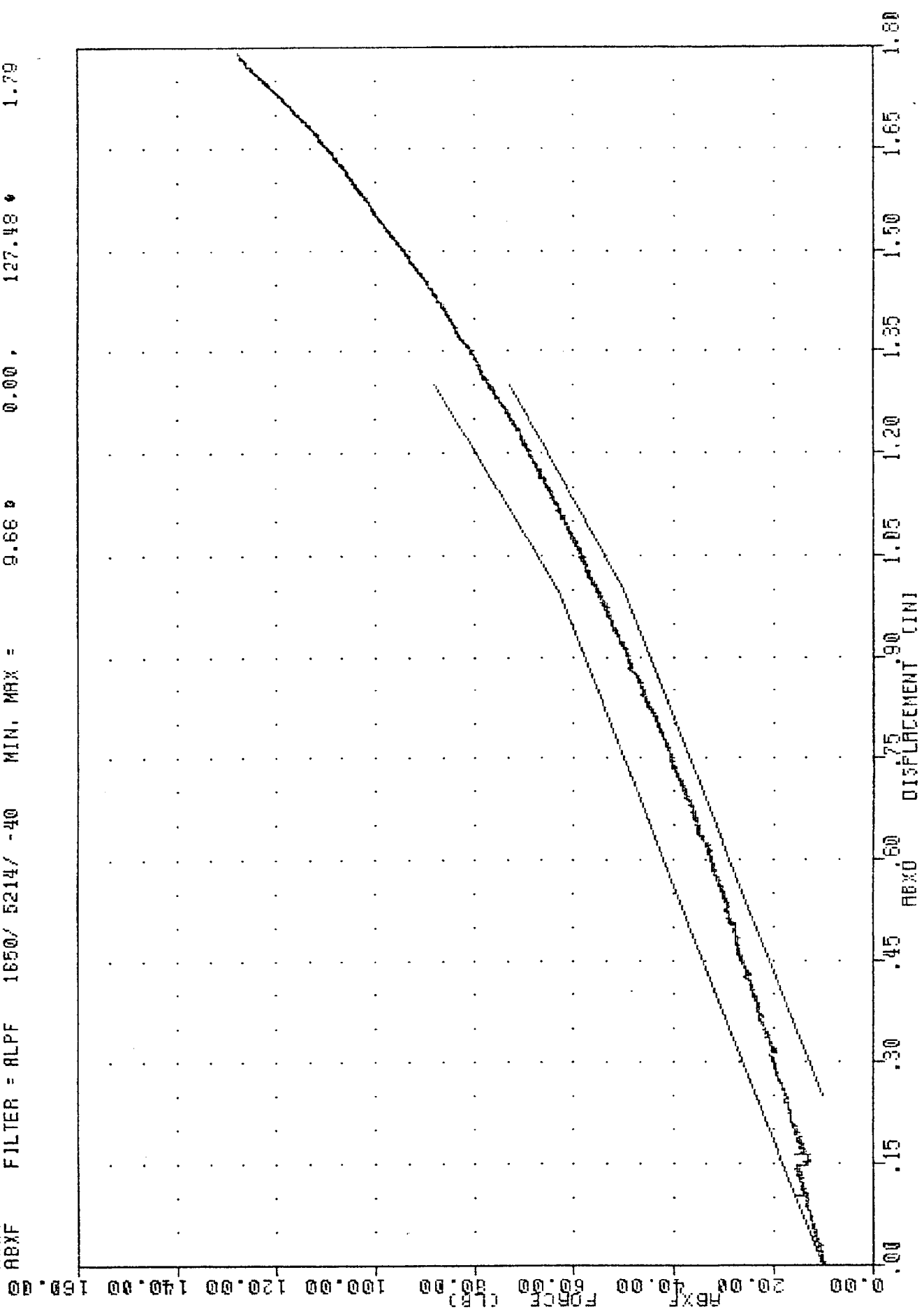
TEST CORRIDORS		
DISPLACEMENT	FORCE	TEST RESULTS
0 IN.	10 LB	10 LB
.50 IN.	23.00 - 36.00 LB	27.56 LB
.75 IN.	36.00 - 50.00 LB	40.54 LB
1.00 IN.	50.00 - 63.00 LB	54.95 LB
1.30 IN.	73.00 - 88.00 LB	76.81 LB

DUMMY MEETS SPECIFICATIONS

TECHNICIAN



NAME	UNIT	VALUE	UNIT	VALUE	UNIT	VALUE	UNIT	VALUE
WCA		372	W	758	W	800	W	870
ABXD		1650	/	-40	MIN, MAX		0.00	%
ABXF		1650	/	-40	MIN, MAX		0.00	%



ABDOMINAL COMPRESSION VS DISPLACEMENT

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

PART 572

03-MAR-87

TEMPERATURE 70 F
NCA HD75814

RELATIVE HUMIDITY 21 %
572 SN 758 HEAD DROP CAL 14

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PEAK RESULTANT ACCELERATION	210 - 260 G	228.59 G
TIME ABOVE 100 G LEVEL	0.9 - 1.5 MS	1.26 MS
PEAK LATERAL ACCELERATION	10 G MAX	3.55 G
IS ACCELERATION CURVE UNIMODAL?		YES

DUMMY MEETS SPECIFICATIONS

TECHNICIAN



TRANSPORTATION RESEARCH CENTER OF OHIO

NECK PENDULUM TEST

PART 572

04-MAR-87

TEMPERATURE 71.40 F
NCA HN75814

RELATIVE HUMIDITY 23.00 %
572 SN 758 HEAD/NECK CAL 14

Test Parameter	Specification	Test Results
Pendulum velocity	21.5 to 25.5 fps	23.30 fps
Pendulum Deceleration:		
T1 - T2: 5 - 20 G	3 ms. max	2.23 ms.
T2 - T3: 20 - 20 G	25 - 30 ms.	27.23 ms.
T3 - T4: 20 - 5 G	10 ms. max	7.44 ms.
Avg. G level T2 - T3	20 - 24 G	23.23 G
Maximum Rotation Angle	63 - 73 deg.	65.00 deg.
Peak Head Resultant Accel	26 G max	24.23 G

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

* DUMMY MEETS SPECIFICATIONS

TECHNICIAN *[Signature]*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

05-MAR-87

TEMPERATURE 71 F
RIGHT KNEE
NCA RK75814

RELATIVE HUMIDITY 23 %
572 SN 758 R.KNEE IMP CAL 14

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.92 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LB.	1862.83 LB.
DURATION ABOVE 1000 LB.	≥ 1.7 MS.	1.94 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Bob Lambin

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

05-MAR-87

TEMPERATURE 71 F
LEFT KNEE
NCA LK75814

RELATIVE HUMIDITY 23 %
572 SN 758 L.KNEE IMP CAL 14

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.92 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LB.	1939.25 LB.
DURATION ABOVE 1000 LB.	>=1.7 MS.	1.87 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN



TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

04-MAR-87

TEMPERATURE 71 F
NCA TL75814

RELATIVE HUMIDITY 21 %
572 SN 758 L.S.THORAX CAL 14

TEST PARAMETER	LOW SPEED TEST	
	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	13.86-14.14 FT/SEC	14.05 FT/SEC
PEAK DEFLECTION	1.1 IN. max.	1.02 IN.
PEAK RESISTIVE FORCE	1,450. LB. max.	1322. LB.
INTERNAL HYSTERESIS	50% - 70%	62.3%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN



TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

05-MAR-87

TEMPERATURE 71 F
NCA TH75814

RELATIVE HUMIDITY 24 %
572 SN 758 H.S.THORAX CAL 14

HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	21.78-22.22 FT/SEC	21.97 FT/SEC
PEAK DEFLECTION	1.7 IN. max.	1.53 IN.
PEAK RESISTIVE FORCE	2,250. LB. max.	2089. LB.
INTERNAL HYSTERESIS	50% - 70%	60.4%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Ed Berlin

TRANSPORTATION RESEARCH CENTER OF OHIO

EXTERNAL DIMENSIONS

PART 572

27-FEB-87

TEMPERATURE 70.00 F
NCA ED75901RELATIVE HUMIDITY 19.00 %
572 SN 759 EXT.DIMENSION CAL01

DESCRIPTION	SPECIFICATION	TEST RESULTS
SN ALDERSON 759		
Sitting Height	35.6 - 35.8 IN	35.7 IN
Shoulder Pivot Height	21.8 - 22.4 IN	22.1 IN
Hip Pivot Height	3.9 IN (ref.)	3.9 IN
Hip Pivot From Backline	4.8 IN (ref.)	4.8 IN
Knee Pivot From Backline	20.1 - 20.7 IN	20.4 IN
Rear of Head From Backline	1.7 IN (ref)	1.7 IN
Chest Depth	9.1 - 9.6 IN	9.5 IN
Shoulder Width	17.8 - 18.4 IN	17.9 IN
Chest Circumference Over Nipples	36.8 - 40.0 IN	37.7 IN
Waist Circumference at Min. Girth	31.4 - 32.6 IN	32.3 IN
Hip Width	14.0 - 15.4 IN	15.1 IN
Knee Pivot From Floor	19.3 - 19.9 IN	19.7 IN

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

LUMBAR FLEXION TEST

PART 572

03-MAR-87

TEMPERATURE 70.00 F
NCA LF75901RELATIVE HUMIDITY 20.00 %
572 SN 759 LUMBAR FLEX CAL01

DEFLECTION	SPECIFICATION	TEST RESULTS
0 Deg.	0 LBS	0.00 LBS
20 Deg	22.00 - 34.00 LBS	34.00 LBS
30 Deg	34.00 - 46.00 LBS	42.00 LBS
40 Deg	46.00 - 58.00 LBS	50.00 LBS
NET RETURN ANGLE	< 12 DEG	9.20 DEG

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

ABDOMINAL COMPRESSION TEST

PART 572

04-MAR-87

TEMPERATURE 71.00 F
NCA AB75901

RELATIVE HUMIDITY 23.00 %
572 SN 759 ABDOM COMPRESS CAL 01

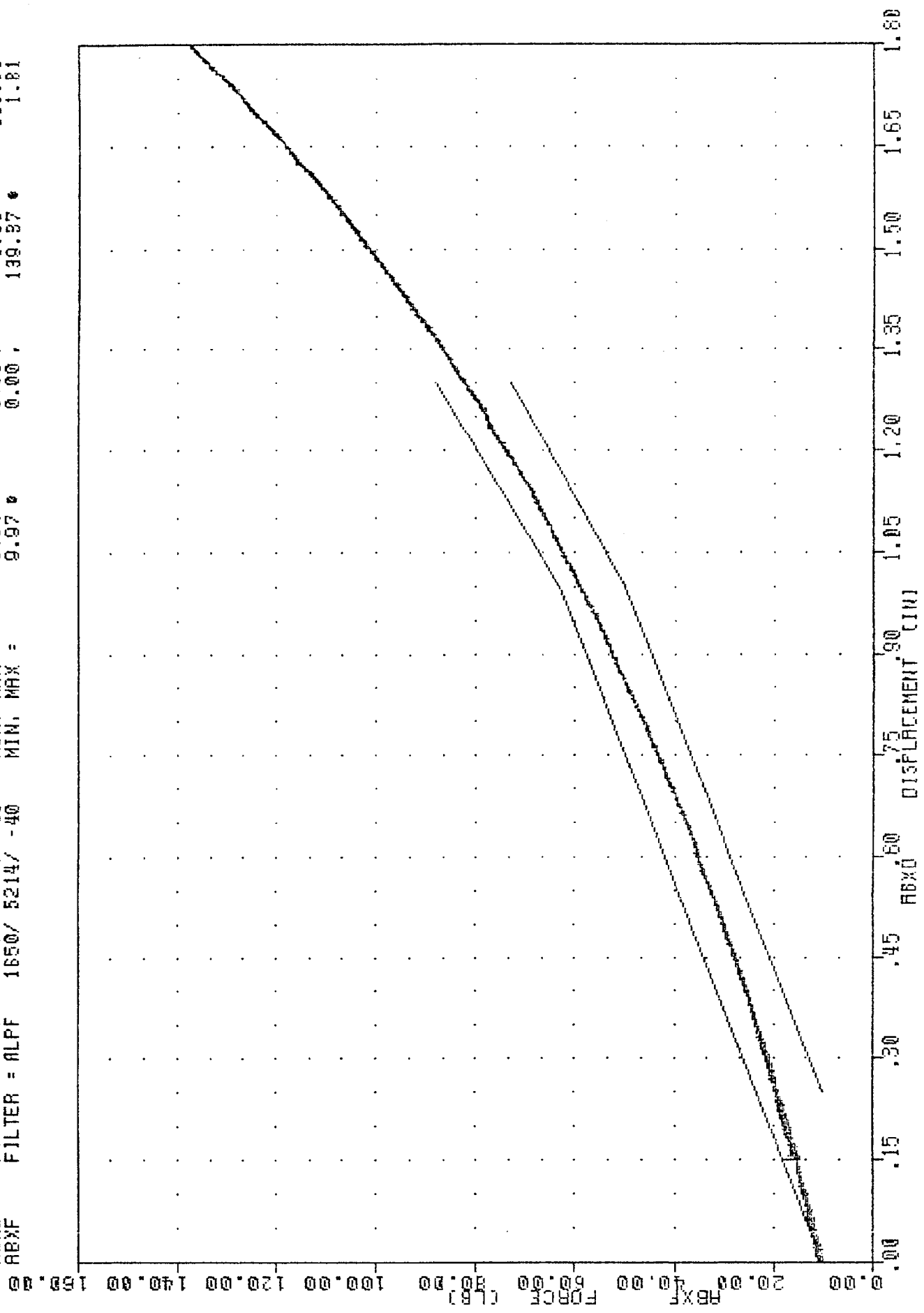
TEST CORRIDORS		
DISPLACEMENT	FORCE	TEST RESULTS
0 IN.	10 LB	10 LB
.50 IN.	23.00 - 36.00 LB	30.22 LB
.75 IN.	36.00 - 50.00 LB	43.03 LB
1.00 IN.	50.00 - 63.00 LB	59.16 LB
1.30 IN.	73.00 - 88.00 LB	82.26 LB

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

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ABDOMINAL COMPRESSION VS DISPLACEMENT

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

PART 572

03-MAR-87

TEMPERATURE 70 F
NCA HD75901

RELATIVE HUMIDITY 20 %
572 SN 759 HEAD DROP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PEAK RESULTANT ACCELERATION	210 - 260 G	258.98 G
TIME ABOVE 100 G LEVEL	0.9 - 1.5 MS	1.24 MS
PEAK LATERAL ACCELERATION	10 G MAX	-2.74 G
IS ACCELERATION CURVE UNIMODAL?		YES

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK PENDULUM TEST

PART 572

04-MAR-87

TEMPERATURE 71.70 F
NCA HN75901

RELATIVE HUMIDITY 23.00 %
572 SN 759 HEAD/NECK CAL 01

Test Parameter	Specification	Test Results
Pendulum velocity	21.5 to 25.5 fps	23.27 fps
Pendulum Deceleration:		
T1 - T2: 5 - 20 G	3 ms. max	2.47 ms.
T2 - T3: 20 - 20 G	25 - 30 ms.	27.99 ms.
T3 - T4: 20 - 5 G	10 ms. max	6.64 ms.
Avg. G level T2 - T3	20 - 24 G	23.07 G
Maximum Rotation Angle	63 - 73 deg.	65.75 deg.
Peak Head Resultant Accel	26 G max	22.68 G

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

* DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

05-MAR-87

TEMPERATURE 71 F
LEFT KNEE
NCA LK75901

RELATIVE HUMIDITY 22 %
572 SN 759 L.KNEE IMP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.94 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LB.	2017.29 LB.
DURATION ABOVE 1000 LB.	≥ 1.7 MS.	1.80 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

05-MAR-87

TEMPERATURE 71 F
RIGHT KNEE
NCA RK75901

RELATIVE HUMIDITY 23 %
572 SN 759 R.KNEE IMP CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.93 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LB.	2009.56 LB.
DURATION ABOVE 1000 LB.	≥ 1.7 MS.	1.84 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

04-MAR-87

TEMPERATURE 71 F
NCA TL75901

RELATIVE HUMIDITY 21 %
572 SN 759 L.S.THORAX CAL 01

	LOW SPEED TEST	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
=====		
PENDULUM VELOCITY	13.86-14.14 FT/SEC	14.04 FT/SEC

PEAK DEFLECTION	1.1 IN. max.	1.06 IN.

PEAK RESISTIVE FORCE	1,450. LB. max.	1287. LB.

INTERNAL HYSTERESIS	50% - 70%	57.1%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

04-MAR-87

TEMPERATURE 71 F
NCA TH75901

RELATIVE HUMIDITY 21 %
572 SN 759 H.S.THORAX CAL 01

TEST PARAMETER	HIGH SPEED TEST	
	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	21.78-22.22 FT/SEC	21.96 FT/SEC
PEAK DEFLECTION	1.7 IN. max.	1.59 IN.
PEAK RESISTIVE FORCE	2,250. LB. max.	2045. LB.
INTERNAL HYSTERESIS	50% - 70%	58.2%

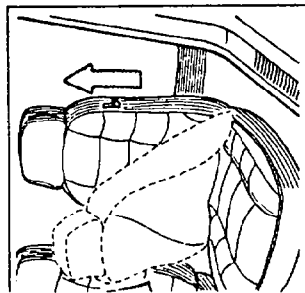
DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

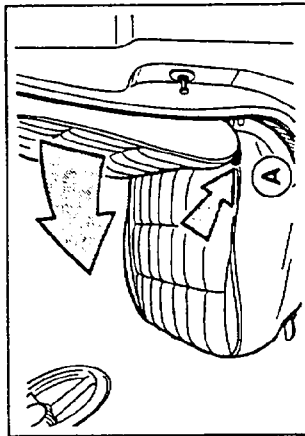
APPENDIX D

RESTRAINT INSTRUCTIONS FROM OWNER'S MANUAL



Release

up to fold the seatback in the seatback is returned position, make sure it is latching to move the seatback using the lever.



Fold-Down Seatback

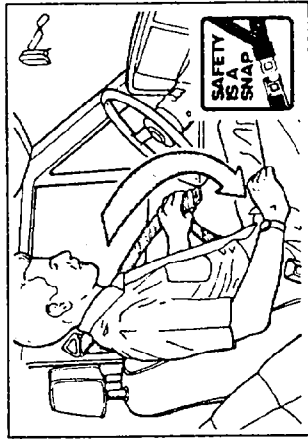
Press down release lever (A) and pull seatback forward.

To replace seatback, firmly push backward until seatback is latched. Be sure seat belts are placed so they can be used properly.



Headrests

Move headrest up or down to adjust to correct height for driver and passenger. The top of the headrest should be level with the top of the seat occupant's ears.

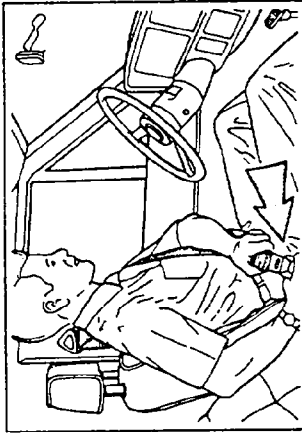


Seat Belts

For your safety, drive with properly adjusted seat belts. Many states and all Canadian provinces require belt use. Check the laws of the area in which you drive.

The outboard seating positions are equipped with a one-piece combination lap/shoulder belt with a connector that slides up and down the belt for proper

Seats and Passenger Safety Restraints



fit. This continuous loop system has a single emergency-locking retractor reel which locks upon very rapid acceleration or deceleration of the vehicle.

Seat Belt Adjustment: For proper seat belt fit, buckle up after adjusting the front seat.

- Sit straight and well back in the seat.
- Position the lap belt across the hips as low as possible. Insert the seat belt clip

into the buckle until a definite "snap" is heard. Grasp the shoulder portion of the belt under the connector and pull it snug across lap and chest.

Seat Belt Reminder: An indicator light and buzzer or chime alerts you to buckle the seat belts.

Seat Belt Warnings

Failure to use seat belts properly may result in added or unnecessary injuries in the event of an accident. Always follow these warnings:

- Do not operate vehicle unless seat belts for driver and all passengers are securely fastened. Movement of an unrestrained occupant during an accident can result in severe injury or death for other vehicle occupants as well as for the unrestrained occupant.
- Adjust seat belts low and snug across the hips. Never adjust seat belts loosely.

- Never adjust seats while driver or passengers are wearing seat belts, which could cause excessive slack. Always fasten seat belts after seat is adjusted.

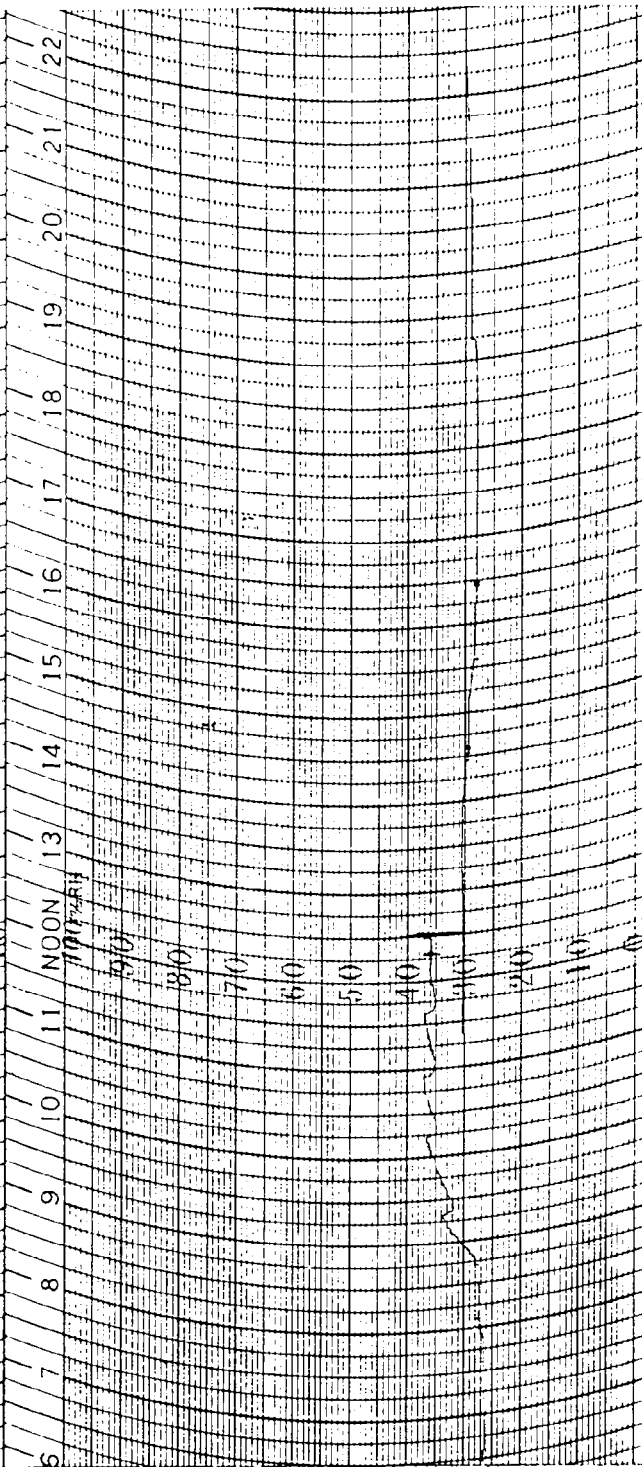
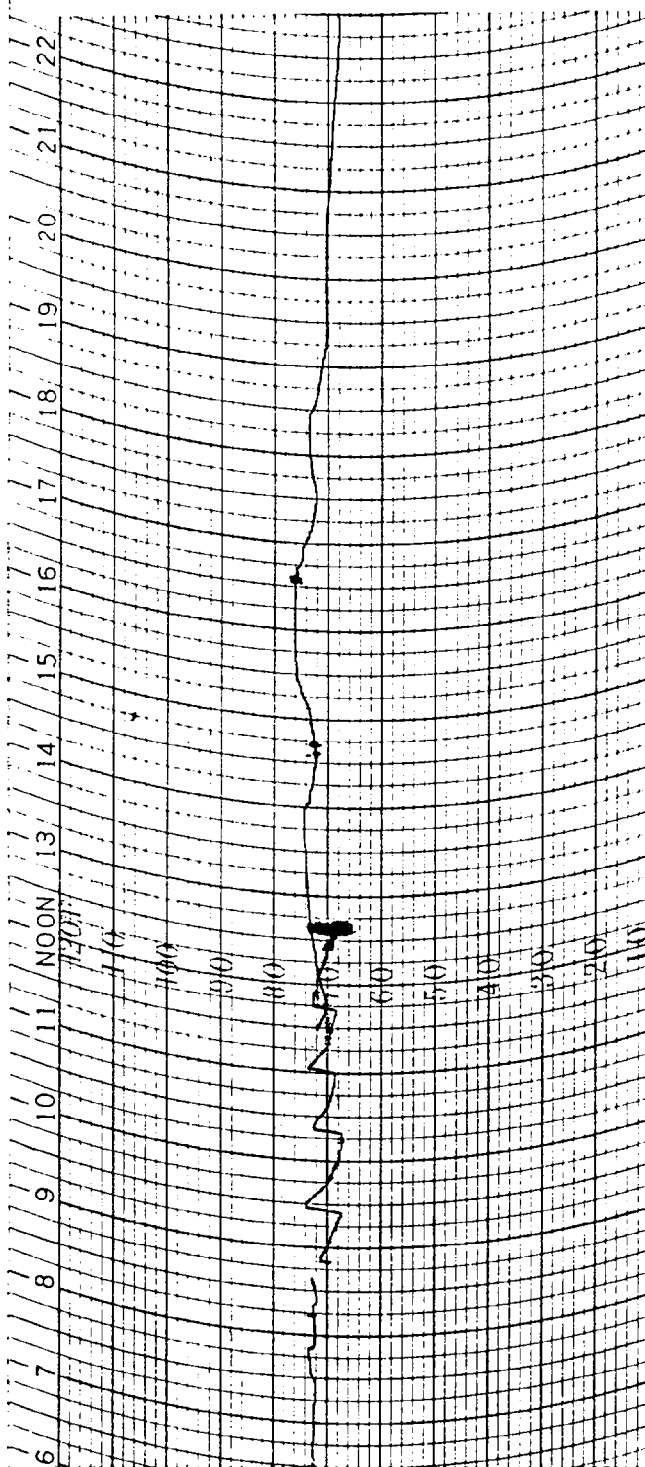
- Do not operate the vehicle with a seatback in the reclined position, if equipped. The occupant could slide under the seat belt in event of an abrupt stop or accident.

- Do not position shoulder belts under the arms.

- Do not use the same belt on more than one person, and never attach a belt over an infant or child held in your lap. Such use increases the chance and severity of injury in the event of an accident or sudden stop.
- Be sure each seat belt connector is inserted in the correct buckle. It is possible, especially for children, to cross the buckles on bench-type seats.

Seat Belt Care

- Inspect belts, b retractors, remi connecting bolt periodically. Hi replace any bel been involved i load or is frayet deteriorated.
- Clean belts wit warm water. Ri dry in the shad bleach the belts weaken the fabr



STATION NCAF MHOY00 DATE ON 01-02-97 DATE OFF 3-04-97