

REPORT NO. TRC-85-N07

DOT 0977

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

FORD MOTOR COMPANY
1987 FORD AEROSTAR
CARGO VAN
NHTSA NO. CG0613
TRCO TEST NO. 861230

THE TRANSPORTATION RESEARCH CENTER OF OHIO
ST. RT. 33, LOGAN COUNTY
EAST LIBERTY, OHIO 43319



JANUARY 1987
TEST REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
400 SEVENTH STREET, S.W.
ROOM NO. 5313 (NRM-22)
WASHINGTON, DC 20590

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16. Abstract A 35 mph frontal barrier impact test using a load cell barrier was conducted on a 1987 Ford Aerostar Cargo Van at the Transportation Research Center of Ohio in East Liberty, Ohio on December 30, 1986. The barrier impact velocity was 35.1 mph, and the ambient temperature at the barrier face at the time of impact was 70°F. The post-test vehicle crush maximum was 19.5 inches and intrusion of the firewall into the compartment was 0.7 inches. The test vehicle appeared to comply with the indicant requirements of the following Federal Motor Vehicle Safety Standards: 1. FMVSS No. 212, "Windshield Mounting" 2. FMVSS No. 219 (Partial), "Windshield Zone Intrusion" 3. FMVSS No. 301-75, "Fuel System Integrity" Driver HIC: 1568 Passenger HIC: 1070					
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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	cup	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)	degrees Fahrenheit	°F

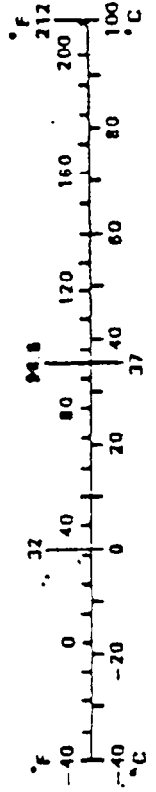


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SECTION 1.0
PURPOSE AND TEST SUMMARY

This 35 mph frontal barrier impact test is part of the Composite FY'36 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-34-D-11149. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph FMVSS 212/219/301-75 requirements.

The 35 mph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test Procedure. Standard Enforcement Indicant Test Program data for FMVSS No. 212, "Windshield Mounting", FMVSS No. 219 (Partial), "Windshield Zone Intrusion", FMVSS No. 310-75, "Fuel System Integrity", as well as occupant performance data are provided herein.

SECTION 2.0
SUMMARY OF TEST NUMBER CG0613

A load cell barrier consisting of 35 load cells was impacted by a 1987 Ford Aerostar Cargo van at a velocity of 35.1 mph. The test was performed at the Transportation Research Center of Ohio on December 30, 1985. Pre- and post-test photographs of the vehicle and occupants can be found in Appendix A.

Two Part 572, 50th percentile 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 April 1, 1985.

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 dummy calibration test data can be found in Appendix C.

The crash event was recorded by one real-time camera and 16 high-speed cameras. Camera locations and other pertinent camera information are found in Section 4 of this report.

The 56 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. 861230 PROJECT: CG0613
DATE: December 30, 1986 TIME: 14:07 TEMP: 70°F
VEHICLE: 1987 Ford Aerostar Cargo Van
TEST WEIGHT (LBS): 3618
IMPACT ANGLE (DEG)*: 0
IMPACT VELOCITY (MPH)**: 35.1
MAX CRUSH (IN) STATIC: 19.5

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:	66	
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 Ford Aerostar cargo van was equipped with a 2300 cubic centimeter, 4-cylinder inline engine, 5-speed manual transmission. The total test weight with two 50th percentile male dummies, instrumentation and two on-board cameras was 3613 pounds.

The test vehicle impacted the frontal load cell barrier at a velocity of 35.1 mph and appeared to comply with FMVSS No. 301-75, "Fuel System Integrity". There were 100 percent windshield retention and fuel leakage during the rollover test was within the requirements of FMVSS No. 301-75.

The vehicle sustained 19.5 inches of static crush. Maximum load cell barrier force measured by the 36 load cells was 167146 pounds at 41.3 milliseconds.

The driver's "Head Injury Criteria" was 1568, the maximum chest deceleration over 3 milliseconds was 49 g's. The right and left femur loads were 252 and 312 pounds, respectively.

The passenger's "Head Injury Criteria" was 1070, the maximum chest deceleration over 3 milliseconds was 54 g's. The right and left femur loads were 342 and 421 pounds, respectively.

The belt-related data for each occupant are presented in Section 4.0 of this report.

DATA ACQUISITION EXPLANATIONS

After the initial pulse, data channel BC5F, Load Cell Barrier Position C5, did not return to baseline.

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Aerostar

VIN: 1FTCA14A0HZA02258

BODY STYLE: Cargo Van

MODEL YEAR: 1987

NHTSA NO.: CG0613

COLOR: Red

ENGINE DATA: TYPE: Inline CYLINDERS: 4 DISPLACEMENT: 2300 cc

X GAS, DIESEL, TURBOCHARGE

TRANSMISSION DATA: 5 SPEED, X MANUAL, AUTOMATIC, FWD X RWD

DATE VEHICLE RECEIVED: 12/12/86

ODOMETER READING: 123

DEALER'S NAME AND ADDRESS: Bob Chapman Ford
1255 Columbus, Street
Marysville, Ohio 43040

ACCESSORIES:

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

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

VEHICLE MANUFACTURED : Ford Motor Company

DATE OF MANUFACTURE: 9/86

GVWR: 4200 LBS.

GAWR: FRONT 2200 LBS., REAR 2160 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: P185/75R14SL LOAD RANGE X B, C, D

TIRES ON VEHICLE (MFR., LINE, SIZE): Michelin P185/75R14

IS SPARE TIRE A "SPACE SAVER": Yes

IS SPARE TIRE STANDARD EQUIPMENT: Yes

VEHICLE CAPACITY: TYPES OF SEATS Front - Bucket

TYPE OF FRONT SEAT BACKS Fixed

NUMBER OF OCCUPANTS 2 FRONT 0 REAR 2 TOTAL

CARGO LOAD NA* LBS. TOTAL NA* LBS.

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

RIGHT FRONT 864 LBS. RIGHT REAR 588 LBS.

LEFT FRONT 926 LBS. LEFT REAR 635 LBS.

TOTAL FRONT WEIGHT 1790 LBS. (59.4 % OF TOTAL VEHICLE WEIGHT)

TOTAL REAR WEIGHT 1223 LBS. (40.6 % OF TOTAL VEHICLE WEIGHT)

TOTAL DELIVERED WEIGHT 3013 LBS.

CALCULATION FOR TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT

UDW = UNLOADED DELIVERED WEIGHT (3013 LBS)

VCW = VEHICLE CAPACITY WEIGHT NA*

DSC = DESIGNATED SEATING CAPACITY (2)

RCLW = VCW - 150 (DCS) = NA*

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

= 3013 + 300 + 328 LBS**

TARGET TEST WEIGHT = 3641 LBS

*Safety Compliance Certification Label did not contain this information.

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

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 277 LBS. CARGO:

RIGHT FRONT	1003	LBS.	RIGHT REAR	806	LBS.
LEFT FRONT	1022	LBS.	LEFT REAR	787	LBS.
TOTAL FRONT WEIGHT	2025		LBS. (56.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1593		LBS. (44.0 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	3618		LBS. (0.6 % UNDER 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 27.4	;LF 27.4	;RR 28.4	;LR 27.9
PRE-TEST ATTITUDE:	RF 26.6	;LF 26.7	;RR 26.8	;LR 26.8
POST-TEST ATTITUDE:	RF 27.9	;LF 28.8	;RR 25.6	;LR 25.9
WHEELBASE:	118.5	INCHES		

CG = 52.1 INCHES REARWARD OF FRONT WHEEL CENTERLINE

TEST CONDITIONS

TEST NUMBER: 861230

DATE OF TEST: December 30, 1986

TIME OF TEST: 14:15

TYPE OF TEST: Frontal Load Cell Barrier Impact

IMPACT ANGLE: 0°

AMBIENT TEMPERATURE AT IMPACT AREA: 70°F

TEMPERATURE IN OCCUPANT COMPARTMENT: 72°F

IMPACT VELOCITY: PRIMARY = 35.1 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 171.8	;C 175.9	;L 170.9
	POST-TEST:	R 155.5	;C 156.4	;L 154.1
	TOTAL CRUSH:	R 16.3	;C 19.5	;L 16.8

FOR FRONTAL IMPACTS, DISTANCE FROM FRONT OF TEST VEHICLE TO BARRIER AFTER IMPACT: R: 28.3 ;C: 28.2 ;L: 29.1

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #411	PASSENGER #880
Head	<u>Lower steering wheel rim</u> <u>Steering wheel hub</u>	<u>Right knee</u>
Chest	<u>None</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:

Passenger dummy left clavicle casting fractured

during impact.

SECTION 3.0

SUMMARY OF RESULTS FOR - - -

FMVSS 212, "Windshield Mounting"

FMVSS 219 (Partial), "Windshield Zone Intrusion"

FMVSS 301-75, "Fuel System Integrity"

SUMMARY OF FMVSS 212 AND 301 DATA

PRE-IMPACT DATA

MAKE/MODEL: Ford Aerostar

BODY STYLE: Cargo Van

MODEL YEAR: 1987

NHTSA NO.: CG0613

COLOR: Red

DATA FROM CERTIFICATION LABEL

VEHICLE MANUFACTURER: Ford Motor Company

DATE OF MANUFACTURE: 9/86

VIN: 1FTCA14AOHZAO2258

GVWR: 4200 LBS., GAWR: FRONT 2200 LBS., REAR 2160 LBS.

POST-IMPACT DATA

TYPE OF TEST: Frontal Load Cell Barrier Impact

DATE OF TEST: 12/30/86 TIME: 14:15 TEMP: 70°F

REQUIRED IMPACT VELOCITY RANGE: 34.5 MPH TO 35.5 MPH

IMPACT VELOCITY: PRIMARY = 35.1 MPH

TEST WEIGHT = 3618 LBS., STATIC CRUSH MAX. = 19.5 IN., REBOUND = 29.1 IN.

FUEL SYSTEM DATA

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

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: 17.0 GALLONS (FURNISHED BY CTM)

TEST VOLUME: 15.8 GALLONS (92-94% OF USEABLE)

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 17.0 GALLONS

DETAILS OF FUEL SYSTEM: Fuel tank centrally located beneath cargo area.

Filler cap located on left side forward of rear axle. Filler neck enters tank on left rear side.

ELECTRIC FUEL PUMP: YES

FUEL INJECTION: YES

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

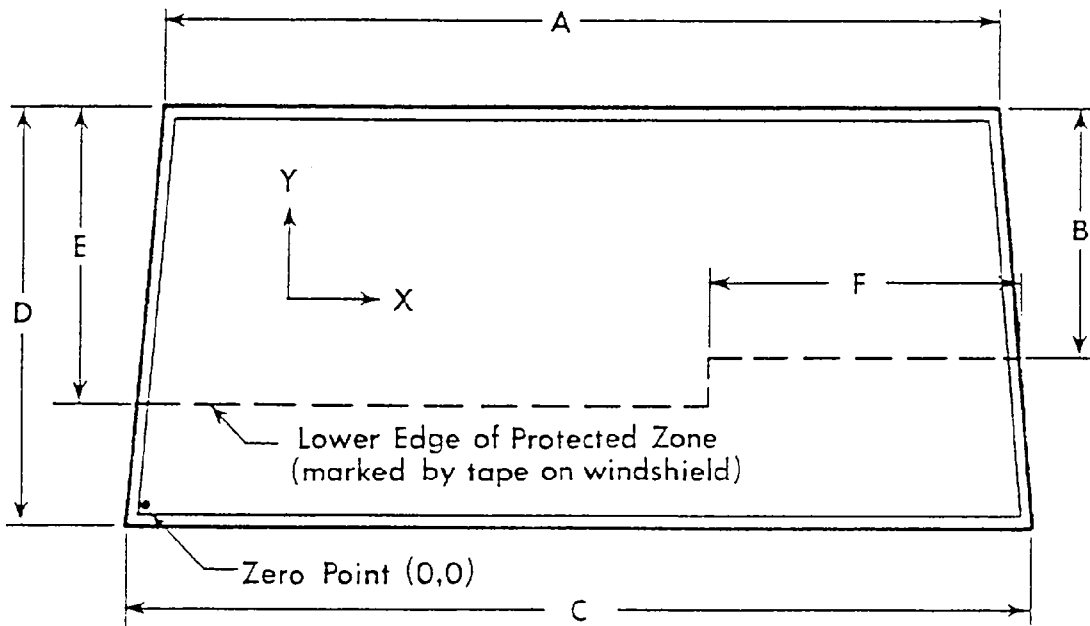
*WITH ENTIRE FUEL SYSTEM FILLED FROM FUEL TANK THROUGH CARBURETOR BOWL.

FMVSS NO. 219, "WINDSHIELD ZONE INTRUSION", DATA SHEET

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the windshield and top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 1/2" distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

FMVSS 219 TEST DATA:



FRONT VIEW

A = 53.2"

C = 62.9"

E = 25.8"

B = 17.6"

D = 34.6"

F = 25.8"

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":
(Show location of penetration on above sketch)

COORDINATES
X Y

- 1.
- 2.
- 3.
- 4.

FMVSS NO. 212, "WINDSHIELD MOUNTING", DATA SHEET

Details of windshield mounting such as retention method, trim type, etc.:

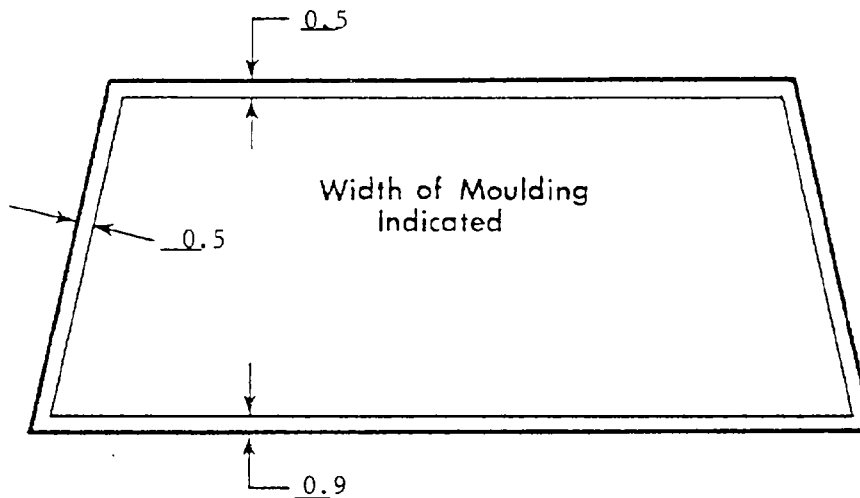
FMVSS 212 REQUIREMENTS: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

WINDSHIELD PERIPHERY

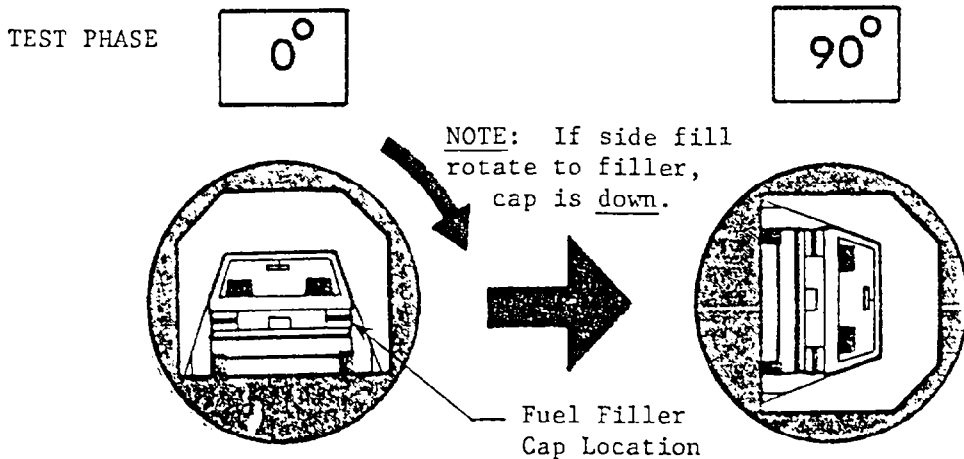
	PRE-TEST (in.)	POST-TEST (in.)	PERCENT RETENTION
RIGHT SIDE	89.6	89.6	100.0%
LEFT SIDE	89.6	89.6	100.00%
TOTAL	179.2	179.2	100.00%

AREA OF RETENTION FAILURE:



FAILURE DETAILS:

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1 to 3 min.)

Time req. for machine to rotate 90° = 2 minutes, 00 seconds
 FMVSS 301-75 Position Hold Time = 5 minutes, 00 seconds
 TOTAL - - - - - = 7 minutes, 00 seconds
 Next Whole Minute Interval - - - - = 7 minutes

FMVSS 301-75 REQUIREMENTS

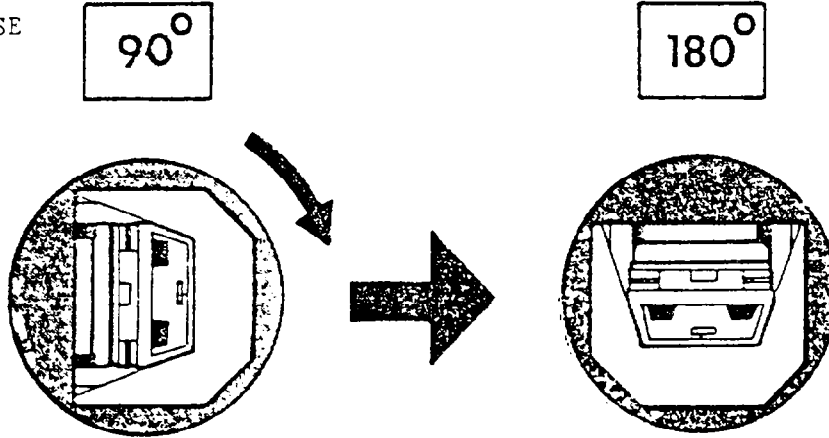
	First 5 Minutes FROM ONSET OF ROTATION	6th Minute	7th Minute
Maximum Allowable Solvent Spillage - -	5 oz.	1 oz.	1 oz.
0 to 90° (filler cap down) - - - - -	1.4 oz.	0.2 oz.	0.2 oz.

SOLVENT SPILLAGE LOCATION(S)

Fuel filler neck/fuel tank connection.

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1 to 3 min.)

Time req. for machine to rotate 90° = 2 minutes, 00 seconds
 FMVSS 301-75 Position Hold Time = 5 minutes, 00 seconds
 TOTAL - - - - - = 7 minutes, 00 seconds
 Next Whole Minute Interval - - - - = 14 minutes

FMVSS 301-75 REQUIREMENTS

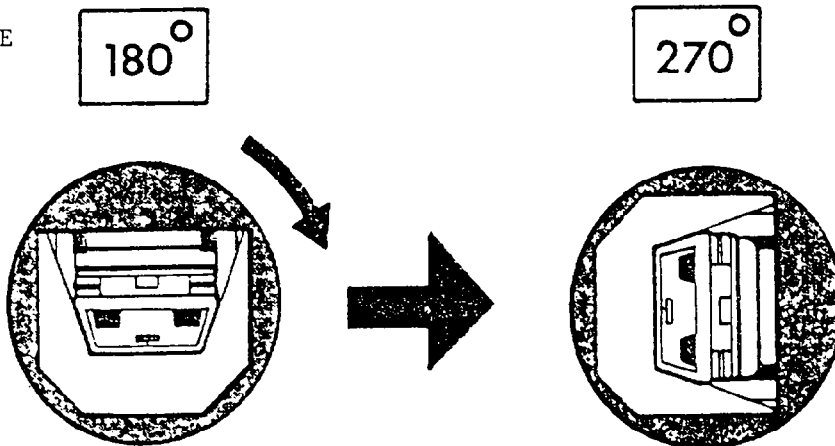
	First 5 Minutes FROM ONSET OF ROTATION	6th Minute	7th Minute
Maximum Allowable Solvent Spillage -	5 oz.	1 oz.	1 oz.
90° to 180° (filler cap down) - - -	0.1 oz.	0 oz.	0 oz.

SOLVENT SPILLAGE LOCATION(S)

Fuel filler neck/fuel tank connection.

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1 to 3 min.)

Time req. for machine to rotate 90° = 2 minutes, 00 seconds
 FMVSS 301-75 Position Hold Time = 5 minutes, 00 seconds
 TOTAL - - - - - = 7 minutes, 00 seconds
 Next Whole Minute Interval - - - - = 21 minutes

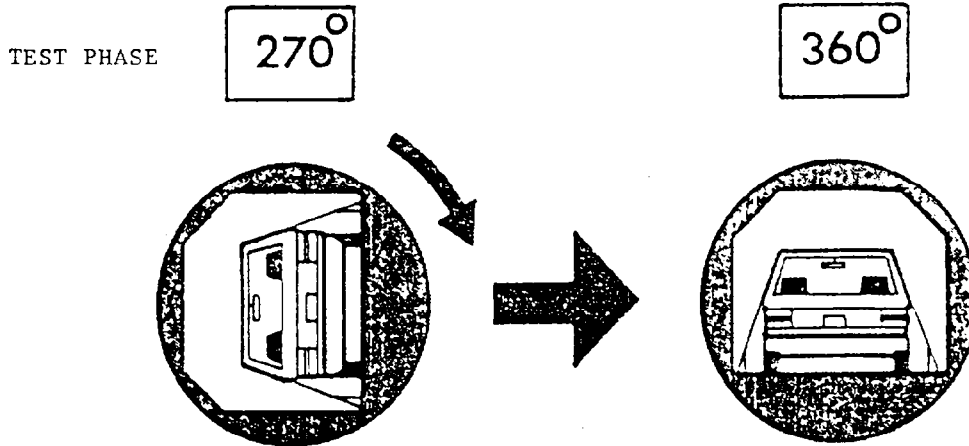
FMVSS 301-75 REQUIREMENTS

	First 5 Minutes FROM ONSET OF ROTATION	6th Minute	7th Minute
Maximum Allowable Solvent Spillage - -	5 oz.	1 oz.	1 oz.
180° to 270° (filler cap down) - - - -	0.4 oz.	0.2 oz.	Trace

SOLVENT SPILLAGE LOCATION(S)

Fuel filler neck/fuel tank connection.

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1 to 3 min.)

Time req. for machine to rotate 90° = 2 minutes, 00 seconds
 FMVSS 301-75 Position Hold Time = 5 minutes, 00 seconds
 TOTAL - - - - - = 7 minutes, 00 seconds
 Next Whole Minute Interval - - - - - = 28 minutes

FMVSS 301-75 REQUIREMENTS

	First 5 Minutes FROM ONSET OF ROTATION	6th Minute	7th Minute
Maximum Allowable Solvent Spillage - -	5 oz.	1 oz.	1 oz.
270° to 360° (filler capdown) - - - -	0.7 oz.	0 oz.	0 oz.

SOLVENT SPILLAGE LOCATION(S)

Fuel filler neck/fuel tank connection.

VEHICLE STATIC ROLLOVER DATA SUMMARY:

<u>MAXIMUM ALLOWABLE SOLVENT SPILLAGE</u>	<u>FIRST 5 MINUTES FROM ONSET OF ROTATION 5 OZ</u>	<u>6TH MIN. 1 OZ</u>	<u>7TH MIN. 1 OZ</u>
0 TO 90° (FILLER CAP DOWN) - - - - -	1.4	0.2	0.2
90 TO 180° - - - - -	0.1	0	0
180 to 270° - - - - -	0.4	0.2	Trace
270 to 360° - - - - -	0.7	0	0

SECTION 4.0
OCCUPANT, VEHICLE AND LOAD CELL BARRIER INFORMATION

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 steering wheel hub and lower wheel rim. Just prior to contact, the steering column had rotated upward. The dummy rebounded rearward into the seatback. The head contacted the head restraint. The dummy fell over onto its right side and came to rest lying on its right side.

PASSENGER

During impact, the knees translated forward and struck the instrument panel. The head and upper torso rotated forward until arrested by the restraint system and the head contacted the right knee. The dummy rebounded from the restraint system until the upper torso contacted the seatback. The dummy came to rest seated upright and facing forward.

DUMMY INJURY CRITERIA

	MAXIMUM ACCELERATION ('G')							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DRIVER	-119.2	28.9	-115.0	149.6	-48.3	27.9	17.5	49
PASSENGER	-33.3	-26.3	-85.3	85.6	-55.5	-42.8	19.9	54

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DRIVER	252	812
PASSENGER	342	421

	MAXIMUM FORCE-SEAT BELT LOADS (LBS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DRIVER	1952	---	2100
PASSENGER	2241	2478	---

	HEAD INJURY CRITERIA**		
	HIC	t ₁ (MSEC)	t ₂ (MSEC)
DRIVER	1568	77.9	88.4
PASSENGER	1070	69.5	105.5

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

DUMMY POSITIONING DATA FOR
35 MPH FRONTAL BARRIER IMPACT TEST

PRE-IMPACT DATA:

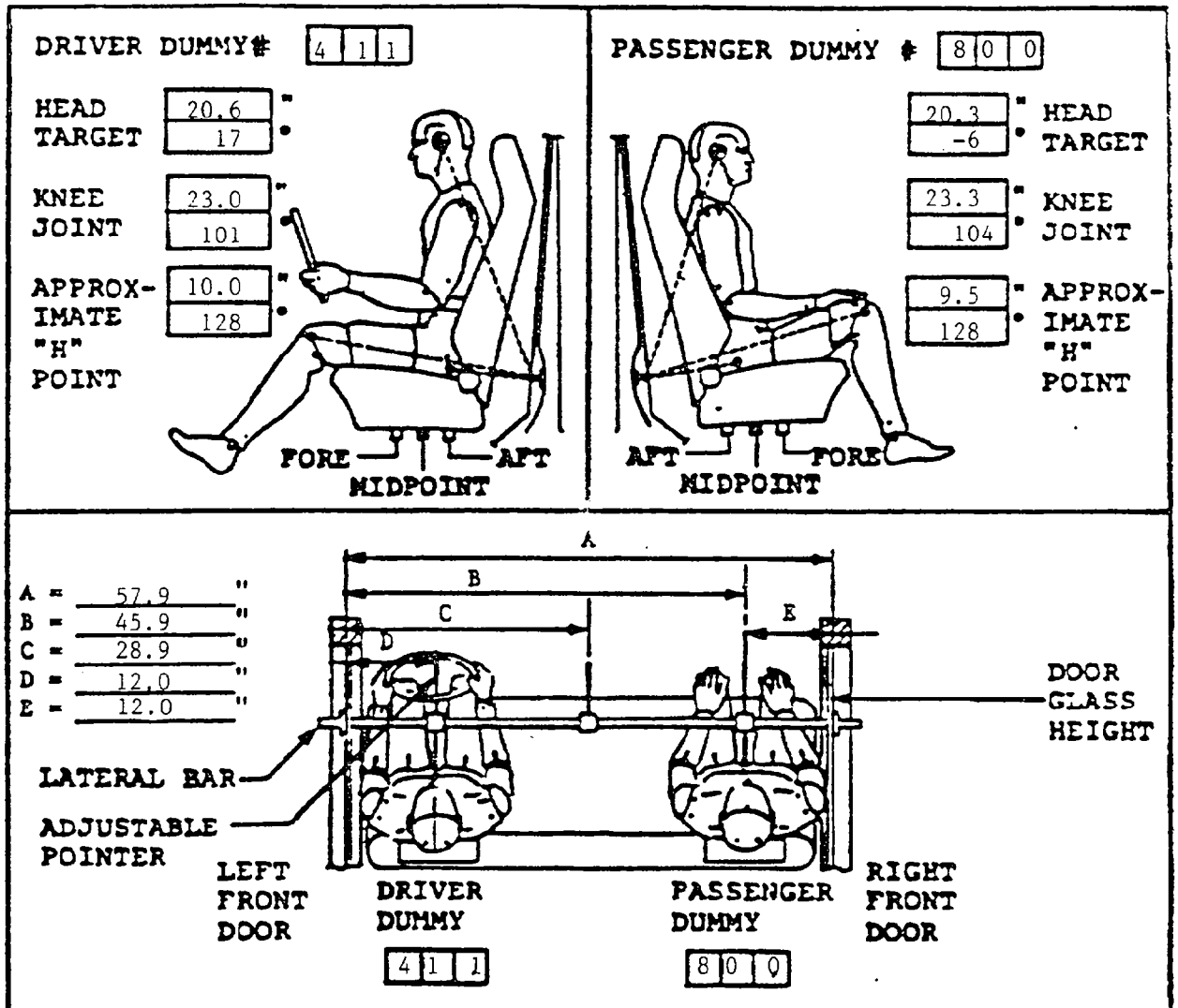
Make/Model: Ford Aerostar
Body Style: Cargo Van **Model Year:** 1987
NHTSA No.: CG0613 **Color:** Red

DATA FROM CERTIFICATION LABEL:

Vehicle Manufacturer: Ford Motor Company
Date of Manufacture: 9/86 **VIN:** 1FTCA14A0HZAO2258
GVWR: 4200 **lb;** **GAWR:** **Front =** 2200 **lb;** **Rear =** 2160 **lb**

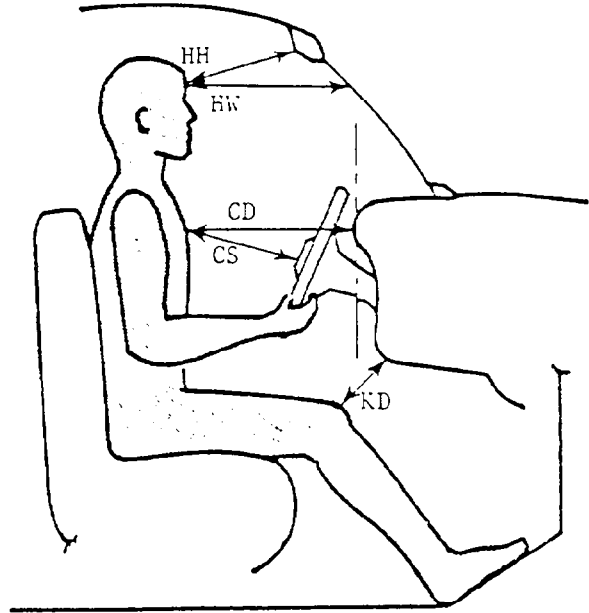
POST-IMPACT DATA:

Date of Test: 12/30/86 **Time:** 14:07 **Temperature** 70° **°F**
Required Impact Velocity Range: 34.5 **mph** **to** 35.5 **mph**
Impact Velocity: **Primary =** 35.1 **mph** **Secondary =** **mph**
Seat Type: bucket **Adjuster Type:** manual
Bucket Seat Back Type: Driver side manually adjustable, passenger side fix
Technicians: B. Crabtree, D. LeValley, J. Clarridge

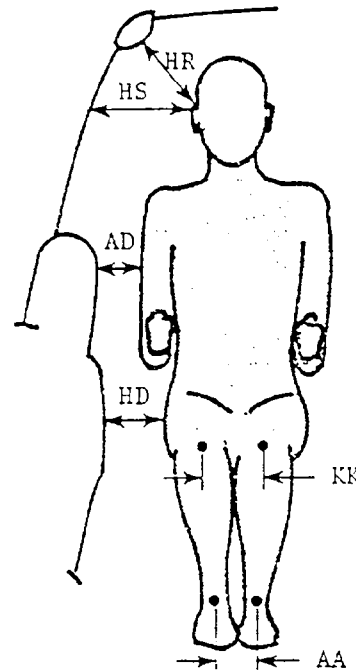


DUMMY IN-VEHICLE POSITION RECORDING SHEET

	DRIVER #411	PASSENGER #880
HH	18.9	22.8
HW	23.9	27.8
CD	23.3	27.6
CS	15.1	DNA
KDL	5.8	9.1
KDR	5.6	8.9
TA	21°	21°
SA	20°	19°



	DRIVER #411	PASSENGER #880
HR	7.6	6.4
HS	7.6	7.1
AD	4.1	4.3
HD	6.1	5.1
KK	9.9	8.3
AA	9.9	7.4



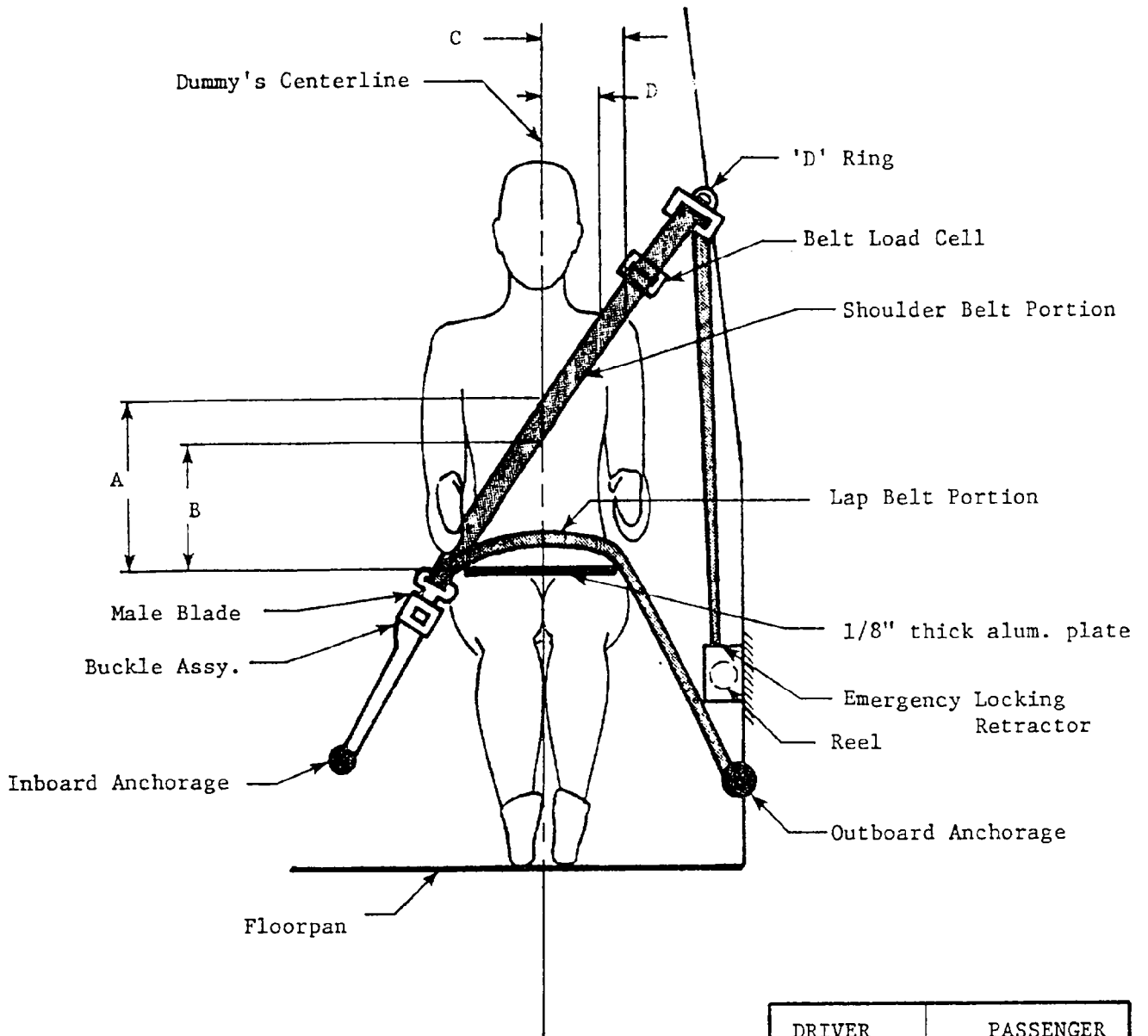
HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD = Knees to Dash
 TA = Torso Angle
 SA = Seat Back Angle

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.

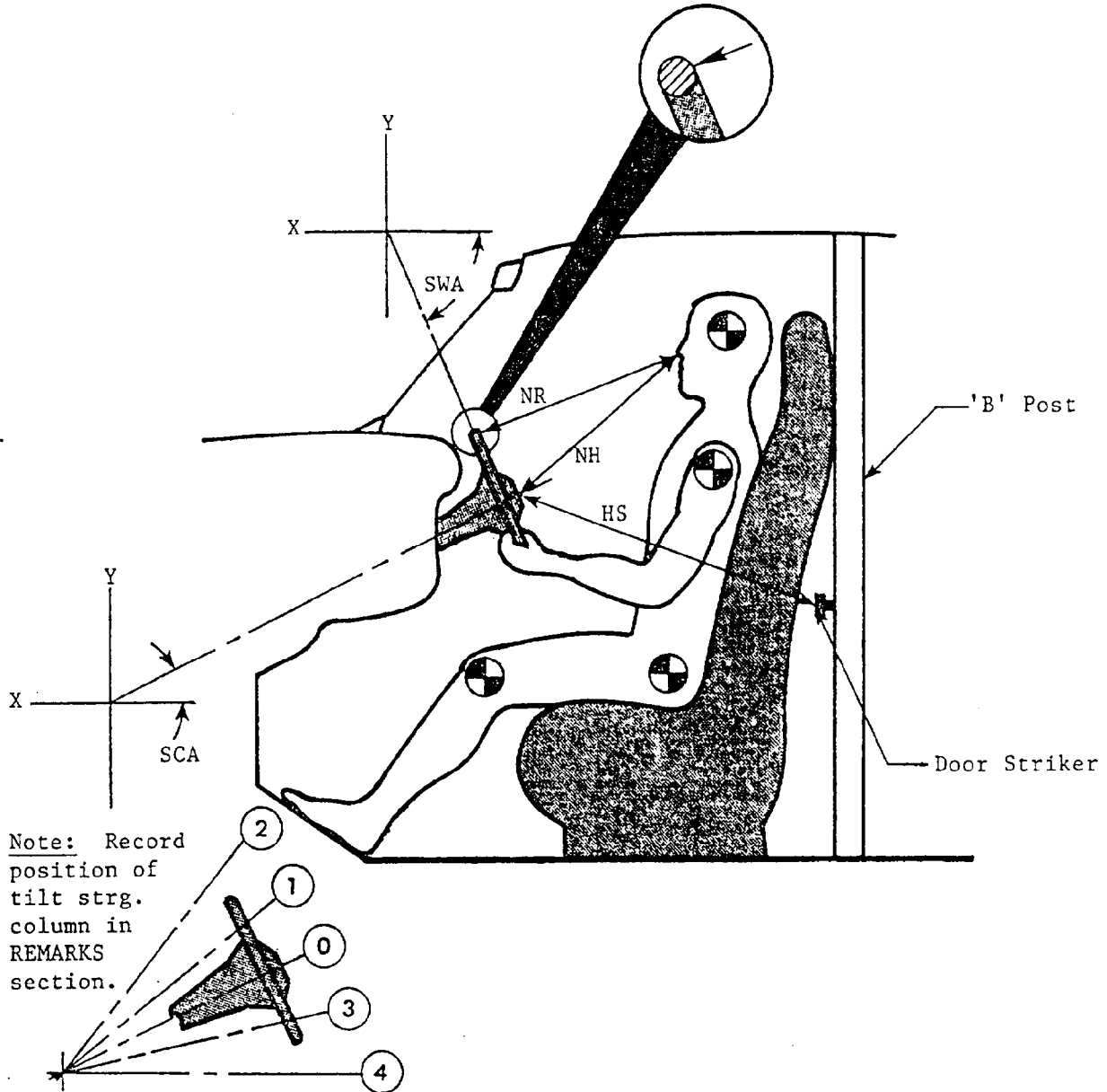
ALL MEASUREMENTS IN INCHES

SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - Top surface of alum. plate to belt upper edge (in)	13.8"	13.8"
B - Top surface of alum. plate to belt lower edge (in)	10.8"	10.5"
C - Dummy centerline to outer edge of belt at chest flesh top (in)	6.3"	6.8"
D - Dummy centerline to inner edge of belt at chest flesh top (in)	3.5"	4.5"
LAP BELT TENSION (lbs)	4	4
SHOULDER BELT TENSION (lbs)	4	4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS

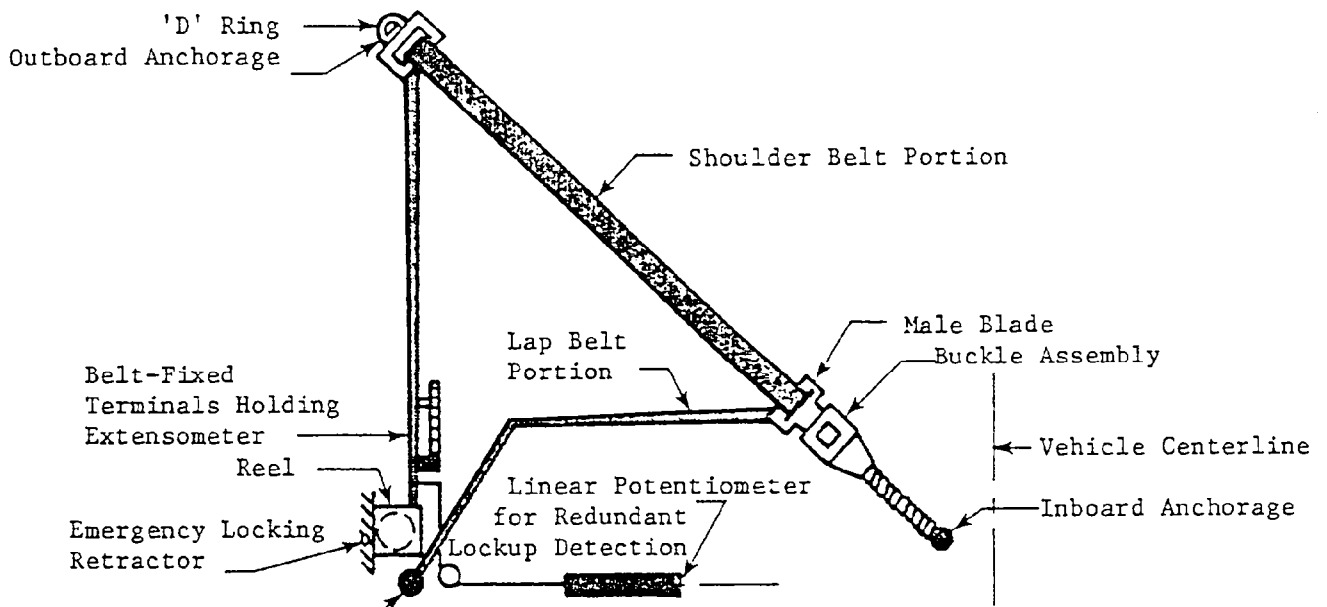


	<u>MEASUREMENTS</u>
NR - Distance from tip of dummy's nose to top rear surface of steering wheel rim.	18.7"
NH - Distance from tip of dummy's nose to center of steering column hub.	18.6"
HS - Distance from center of steering column hub to the forward surface of the door lock striker pin.	22.6"
SCA - Angle of steering column relative to the horizontal X axis.	29°
SWA - Angle of steering wheel relative to the horizontal X axis.	59°

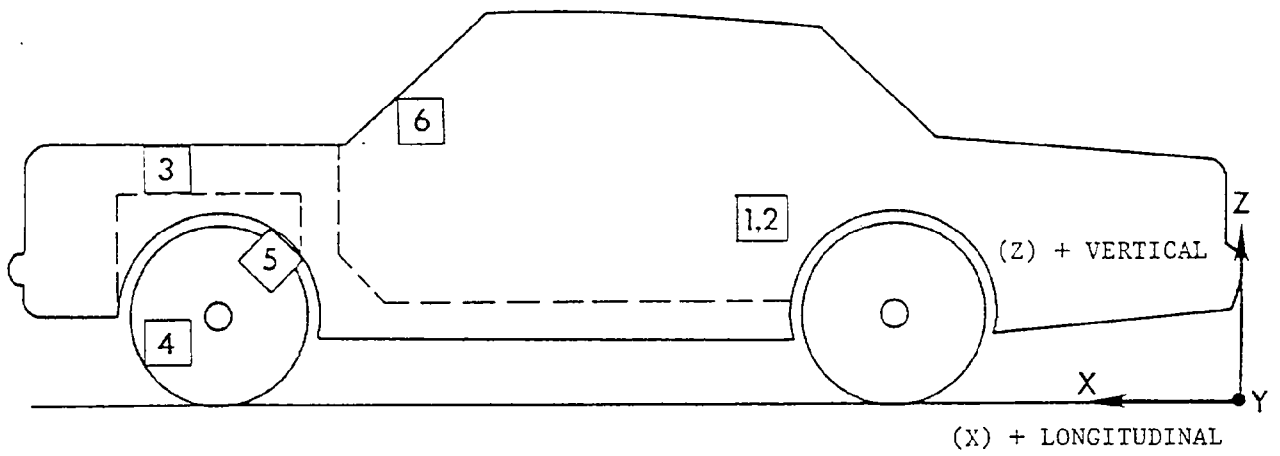
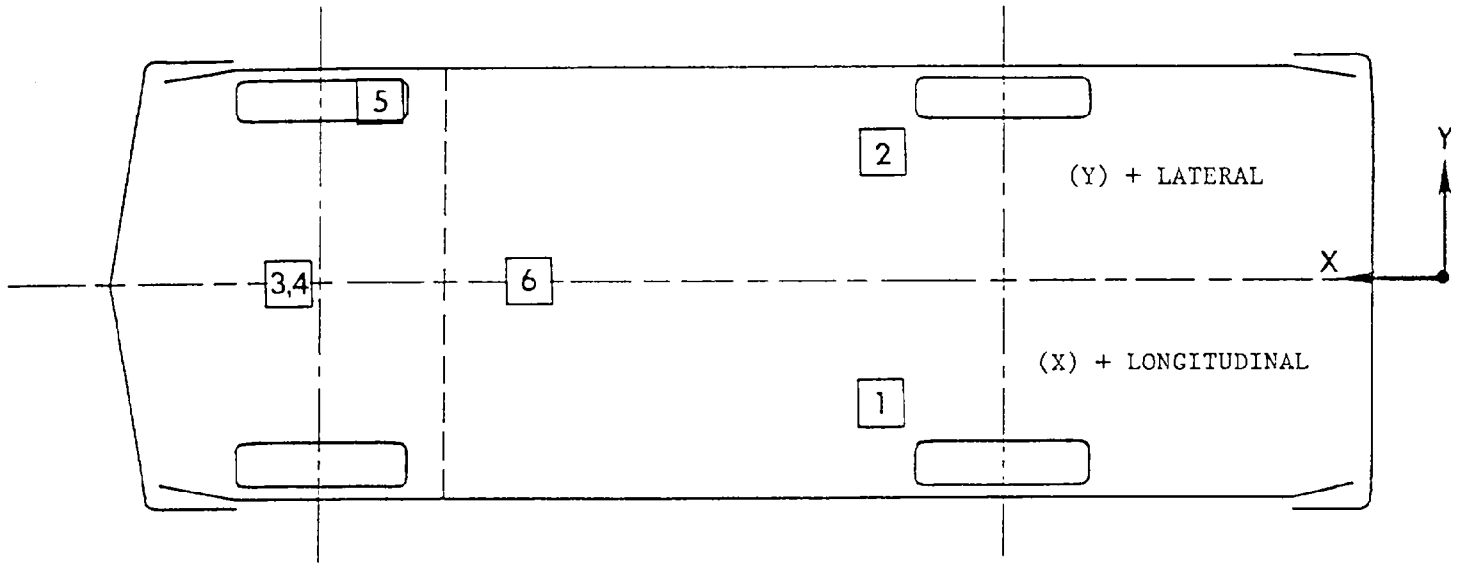
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

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.	128.3	129.0	126.1	124.5
Retractor reel to 'D' ring as measured on Part 572 dummy.	28.0	26.6	27.6	26.0
Shoulder belt length as measured on Part 572 dummy.	37.4	40.0	34.5	36.5
Lap belt length as measured on Part 572 dummy.	37.8	38.0	35.5	36.0
Remainder of belt webbing left on retractor reel.	25.1	24.4	28.5	26.0
<u>BELT SPOOL-OFF DATA:</u>				
As determined by film analysis	DNA	2.7	DNA	2.5
As determined electronically	DNA	3.9	DNA	3.2
<u>BELT STRAIN DATA:</u>				
Measured between retractor reel and 'D' ring.	DNA	0.7 in/ft	DNA	0.8 in/ft



VEHICLE ACCELEROMETER LOCATIONS



VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

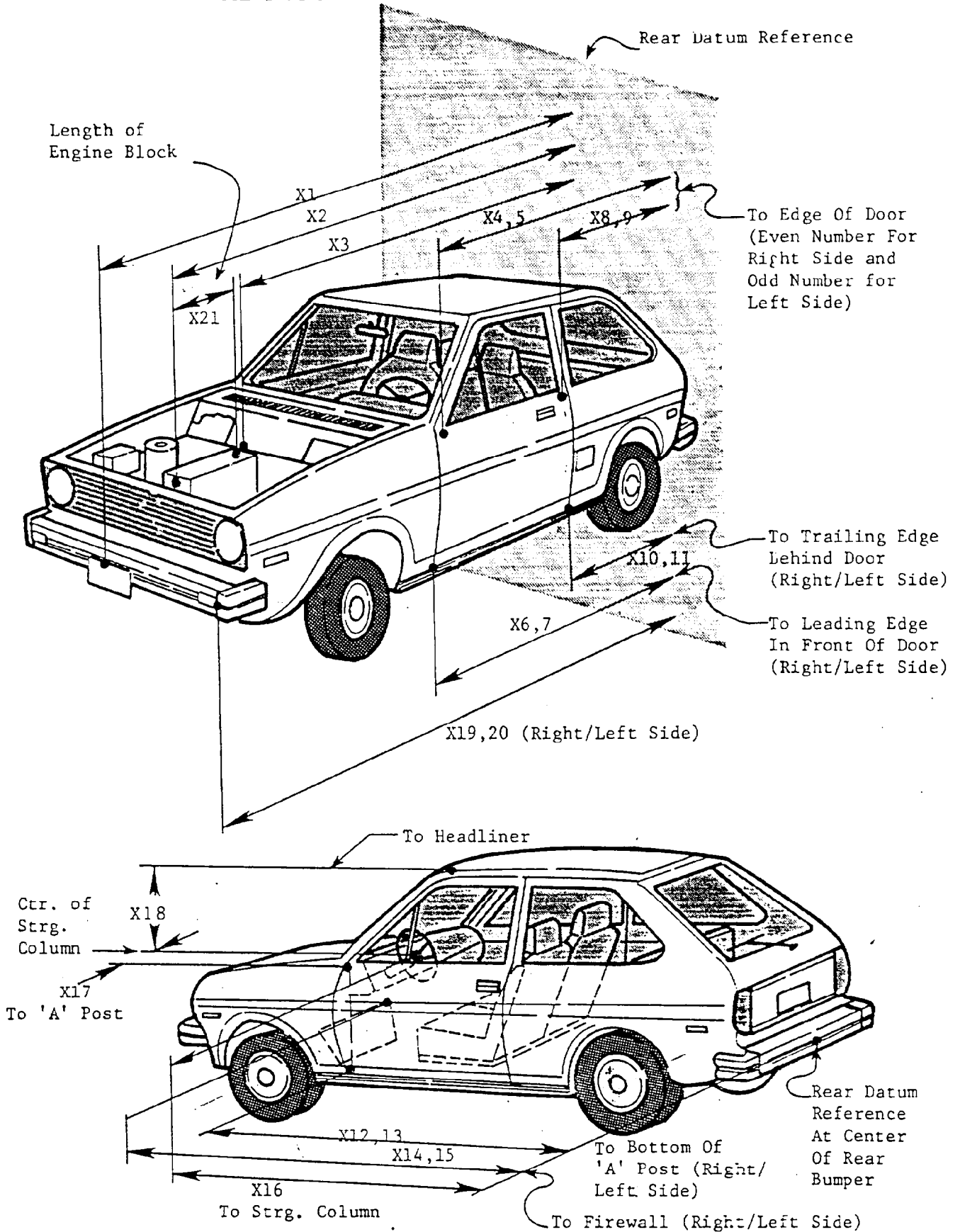
NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION**		NEGATIVE DIRECTION**	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	REAR SEAT X-MEMBER AT LEFT SIDE LONGITUDINAL	79.5	12.8	21.6	2.2	110.0	49.9	56.4
2	REAR SEAT X-MEMBER AT RIGHT SIDE LONGITUDINAL	79.1	-12.8	21.6	2.1	106.9	49.9	55.6
3	TOP OF ENGINE BLOCK LONGITUDINAL	144.4	-2.3	33.8	19.7	48.9	133.6	40.0
4	BOTTOM OF ENGINE BLOCK LONGITUDINAL	135.3	2.5	8.3	51.5	50.5	143.6	42.3
5	BRAKE CALIPER AT RIGHT SIDE LONGITUDINAL	146.4	-26.5	12.9	116.0	56.6	139.2	41.1
6	DASH PANEL LONGITUDINAL	126.8	-0.4	47.5	12.3	94.9	49.1	56.1

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

** LONGITUDINAL: FORWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

MEASUREMENTS IN INCHES

PRE-TEST AND POST-TEST MEASUREMENT POINTS



IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL Ford Aerostar Cargo Van TEST NUMBER CG0613

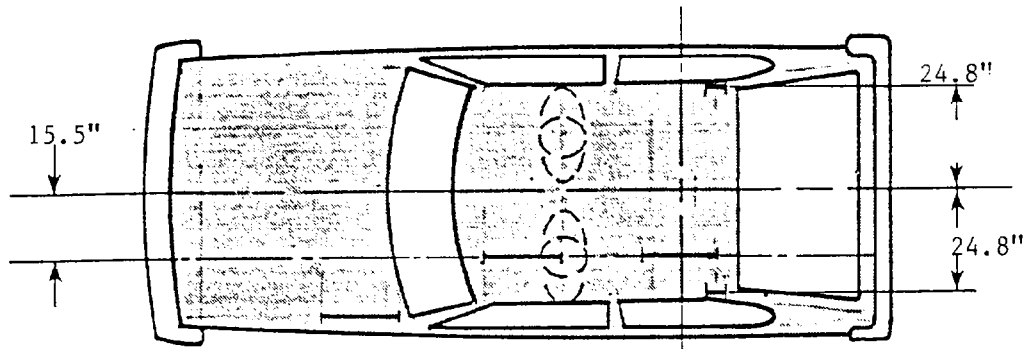
		DIMENSIONS IN INCHES		
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X 1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	175.9	156.4	19.5
X 2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	150.5	147.4	3.1
X 3	REAR SURFACE OF VEHICLE TO FIREWALL	149.9	149.2	0.7
X 4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	131.0	131.5	-0.5
X 5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	130.9	131.5	-0.6
X 6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	129.5	129.8	-0.3
X 7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	129.5	129.4	0.1
X 8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	90.8	91.4	-0.6
X 9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	90.6	91.2	-0.6
X 10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	90.2	90.2	0.0
X 11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE ON LEFT DOOR	90.2	89.9	0.3
X 12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	127.6	127.8	-0.2
X 13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	127.6	127.8	-0.2
X 14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	142.9	140.5	2.4
X 15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	142.5	140.9	1.6
X 16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	115.0	116.6	-1.6
X 17	CENTER OF STEERING COLUMN TO "A" POST	16.0	16.0	0.0

IMPACTED VEHICLE MEASUREMENTS CONTD

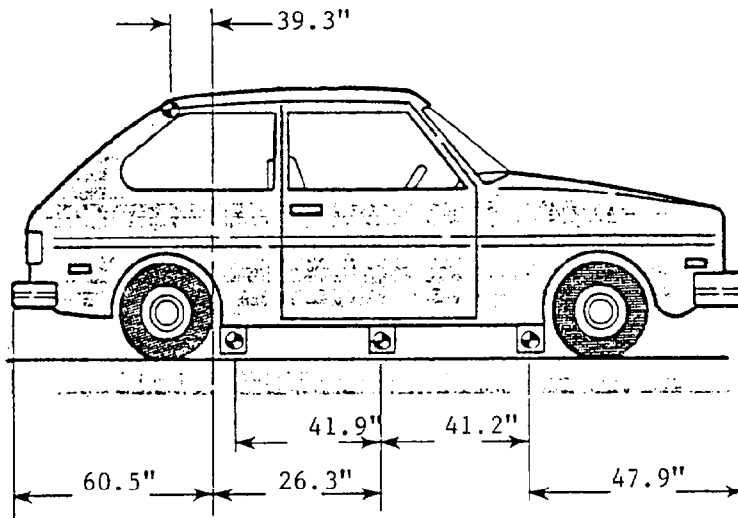
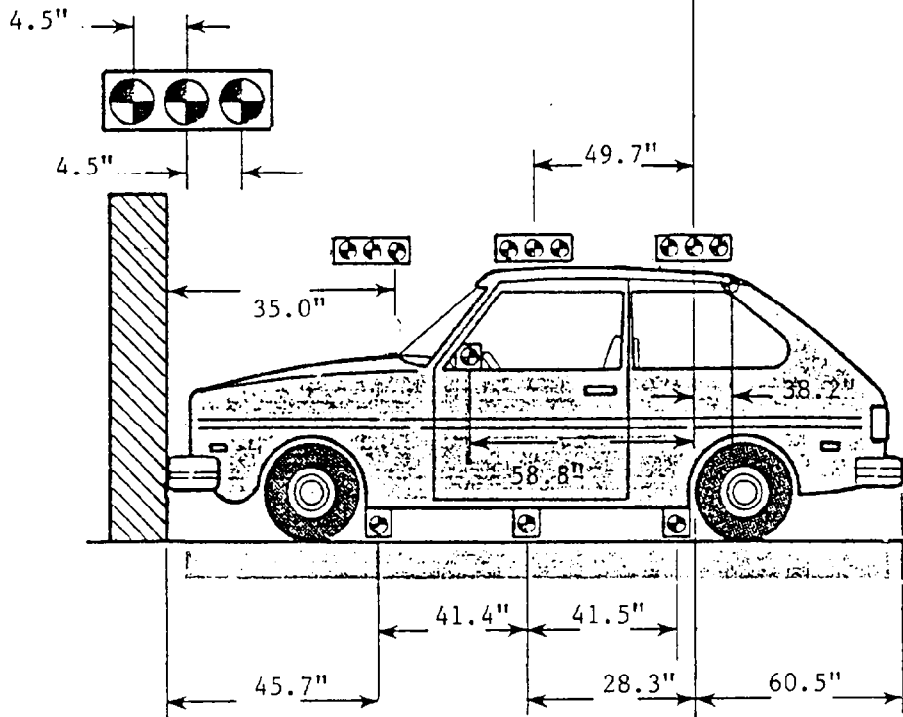
VEHICLE MAKE/MODEL Ford Aerostar Cargo Van TEST NUMBER CG0613

NO.	TYPE OF MEASUREMENT	DIMENSIONS IN INCHES		
		PRE-TEST	POST-TEST	DIFF.
X18	CENTER OF STEERING COLUMN TO HEADLINING	18.5	14.8	3.7
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	171.8	155.5	16.3
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	170.9	154.1	16.8
X21	LENGTH OF ENGINE BLOCK	17.0	17.0	0.0

VEHICLE TARGET LOCATIONS



Target Dia. 4"



ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Ford Aerostar Cargo Van
 VEH. NHTSA NO.: CG0613; VIN: 1FTCA14A0HZA02258
 MODEL YEAR: 1987; BUILD DATE: 9/86; TEST DATE 12/30/86
 VEH. SIZE CATEGORY: Van; TEST WEIGHT: 3618
 VEH. WHEELBASE: 118.5

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE: 12FDEW4

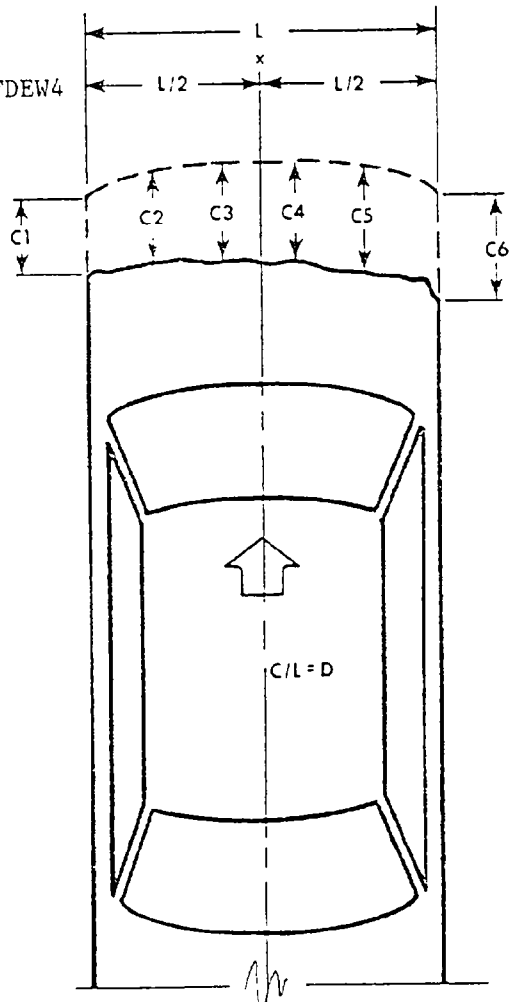
F (Frontal)

CRUSH DEPTH
DIMENSIONS:

C1 = 16.8 inches
 C2 = 18.5 inches
 C3 = 18.9 inches
 C4 = 19.1 inches
 C5 = 18.9 inches
 C6 = 16.3 inches

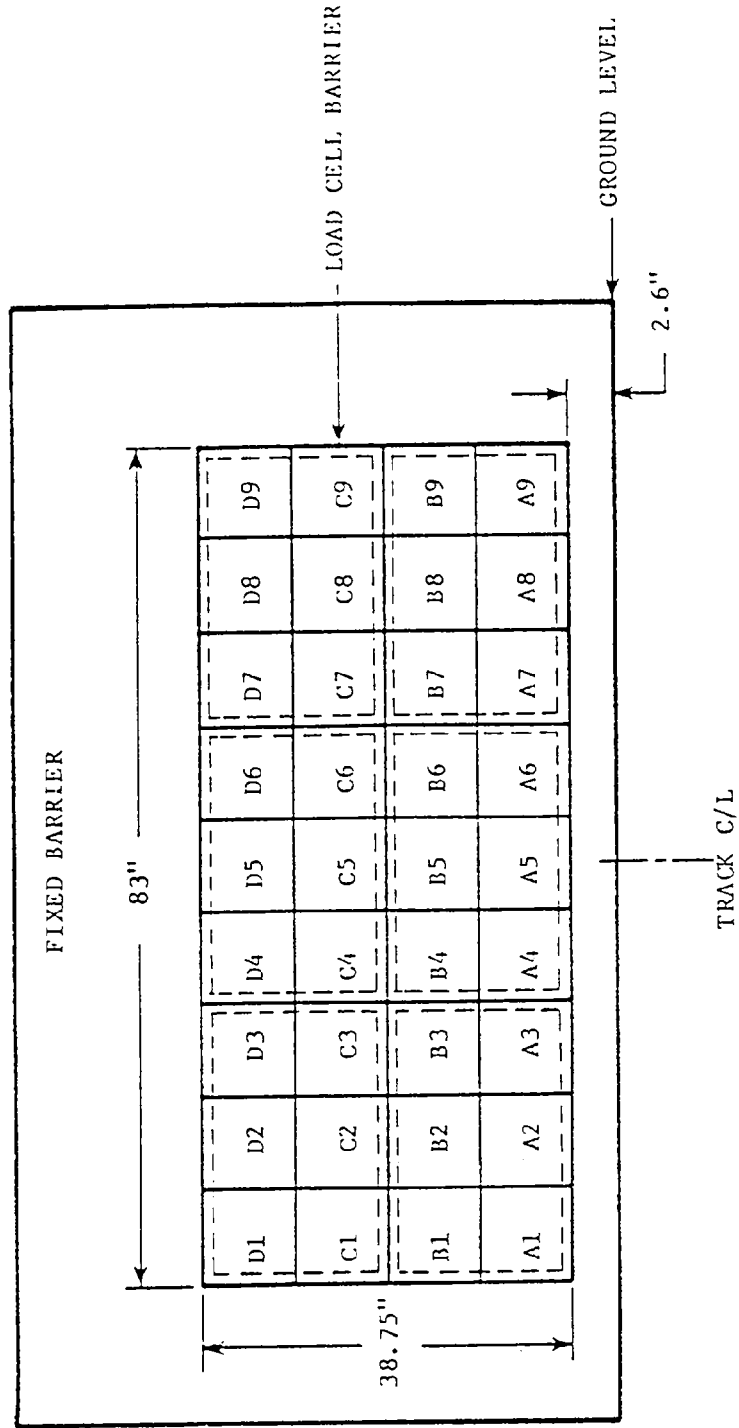
MIDPOINT OF DAMAGE: D = Vehicle Centerline
(Longitudinal)

LENGTH OF DAMAGED
REGION: L = 68.5 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

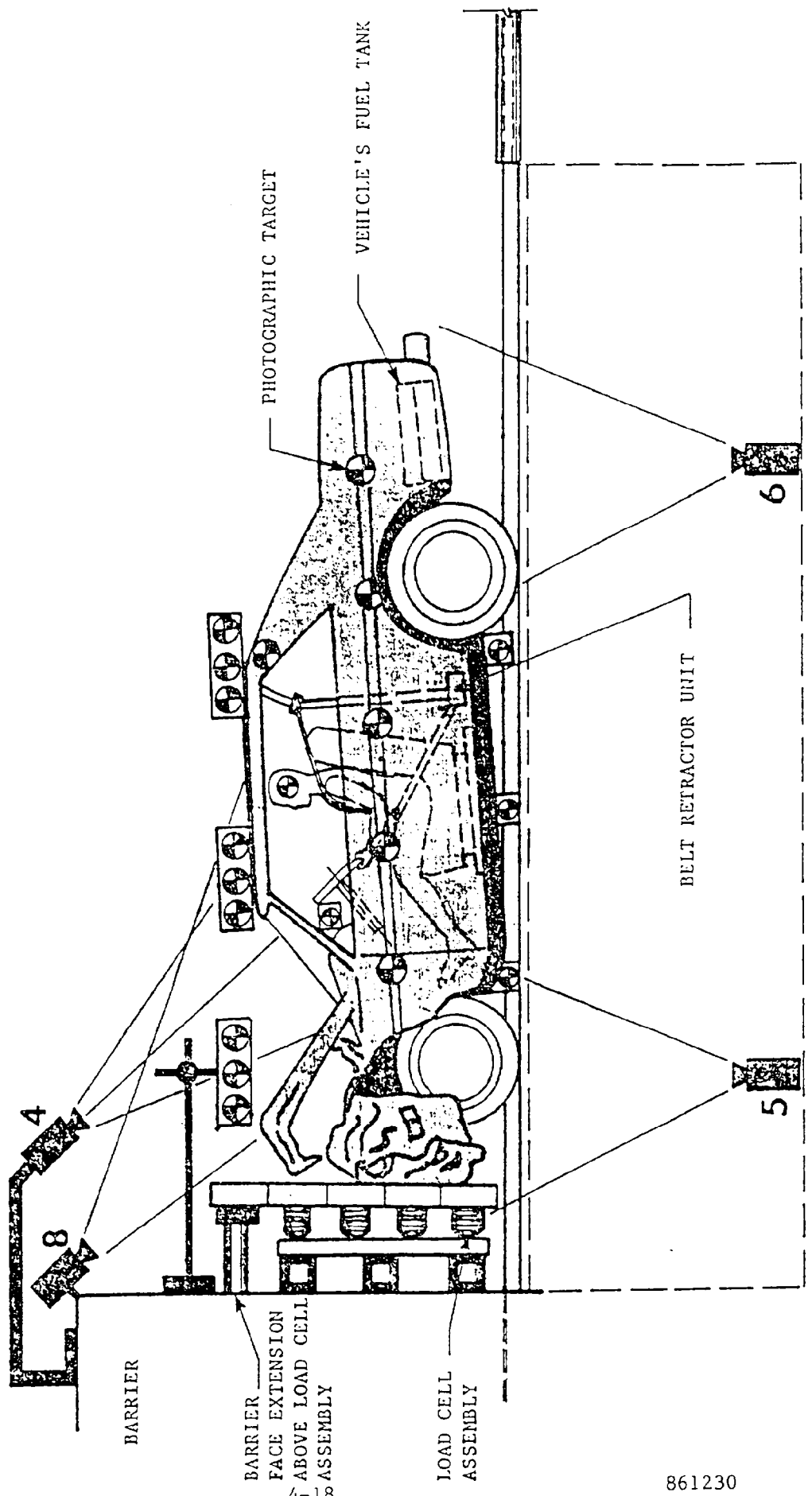
POSITION	POSITIVE DIRECTION*		NEGATIVE DIRECTION*	
	MAX (lb)	TIME (msec)	MIN (lb)	TIME (msec)
TOTAL GROUP 1	17820.5	30.3	175.1	229.6
TOTAL GROUP 2	48586.7	41.6 Y	-168.5	23.6
TOTAL GROUP 3	10480.8	41.6	153.4	228.4
TOTAL GROUP 4	25735.0	42.5	206.3	264.4
TOTAL GROUP 5	41745.6	40.8	---	--- ε
TOTAL GROUP 6	31482.5	40.1	---	--- ε
TOTAL LOAD CELL FORCE	167145.6	41.3	---	--- ε

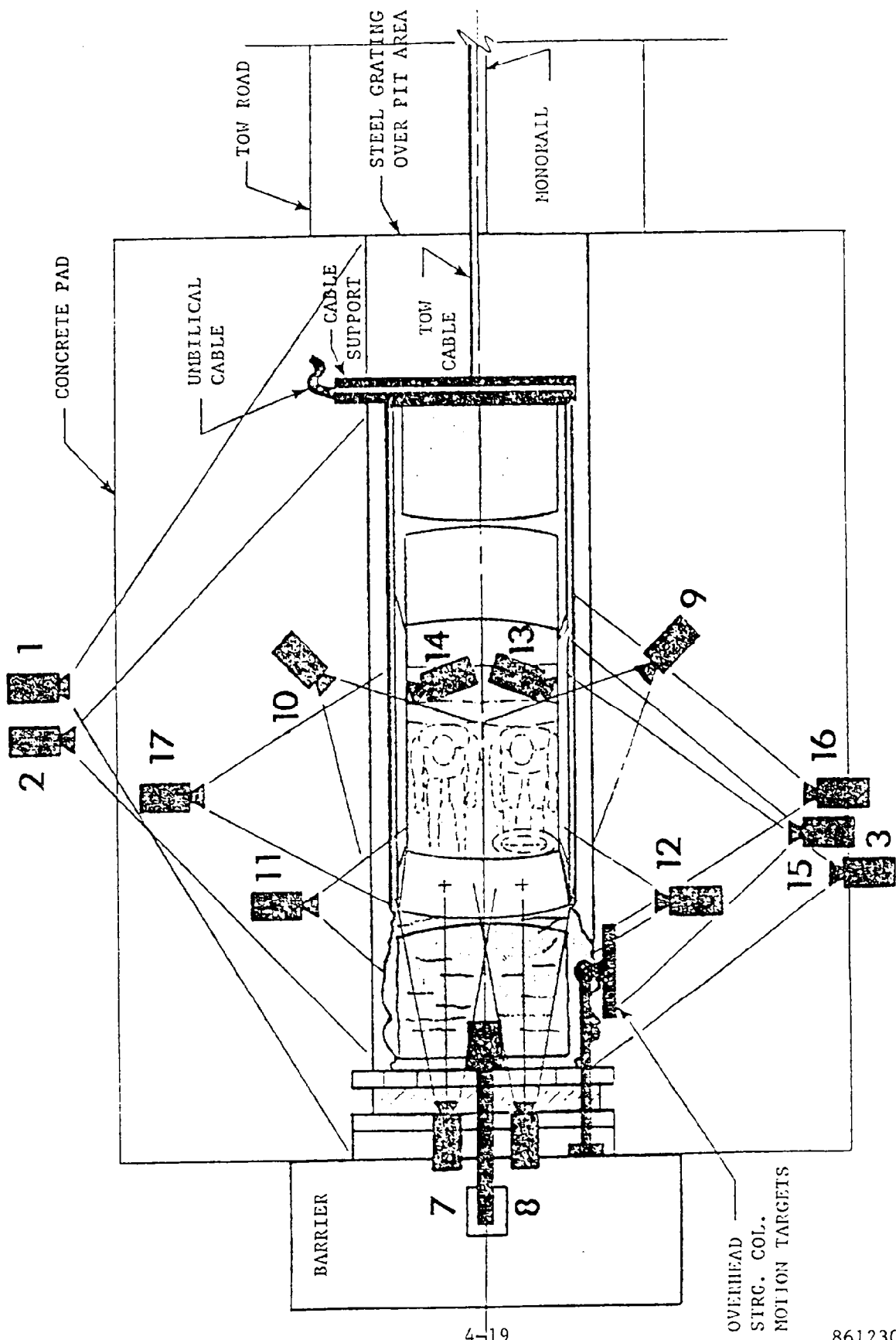
ε No negative value in range of interest

Y See DATA ACQUISITION EXPLANATIONS

*REFERENCE: COMPRESSION IS POSITIVE
TENSION IS NEGATIVE

CAMERA POSITIONS





CAMERA POSITIONS

HIGH SPEED CAMERA LOCATIONS

TEST NO.: 861230 VEHICLE: Ford Aerostar Cargo Van CG0613

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	502
3	Dummy kinematics	-41.5	-295.0	44.0	-12	288.5"	25	489
4	Windshield damage	-36.4	0.0	120.0	-83	NA	13	498
5	Crush & fluid spillage	-50.5	0.0	-92.4	90	NA	13	1002
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	495
8	Driver kinematics	6.8	-14.5	113.3	-60	NA	17	498
9	Driver kinematics	-157.3	-166.9	74.1	-10	105"	25	495
10	Passenger kinematics	-152.1	167.9	76.0	-13	95"	25	495
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	498
14	Passenger seatbelt movement	NA	NA	NA	NA	NA	13	498
15	Column movement	-90.0	-286.0	103.0	-14	NA	25	500
16	Column movement	-90.0	-286.0	75.1	-9	NA	25	498
17	Passenger kinematics	-38.8	210.0	45.3	7	291.5"	13	480

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

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. POST-TEST TOP VIEW (VEHICLE ON ROLLOVER MACHINE)
12. PRE-TEST WINDSHIELD VIEW
13. POST-TEST WINDSHIELD VIEW
14. PRE-TEST ENGINE COMPARTMENT VIEW
15. POST-TEST ENGINE COMPARTMENT VIEW
16. PRE-TEST FUEL FILLER CAP VIEW
17. PRE-TEST FRONT UNDERBODY VIEW
18. POST-TEST FRONT UNDERBODY VIEW
19. PRE-TEST REAR UNDERBODY VIEW
20. POST-TEST REAR UNDERBODY VIEW
21. PRE-TEST DRIVER DUMMY POSITION VIEW
22. POST-TEST DRIVER DUMMY POSITION VIEW
23. PRE-TEST PASSENGER DUMMY POSITION VIEW
24. POST-TEST PASSENGER DUMMY POSITION VIEW
25. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)
26. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)
27. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)
28. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)
29. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT
30. POST-TEST PASSENGER KNEE CONTACT
31. POST-TEST FUEL LEAKAGE - VIEW 1
32. POST-TEST FUEL LEAKAGE - VIEW 2
33. POST-TEST TOTAL LEAKAGE



Figure 1. PRE-TEST FRONT VIEW

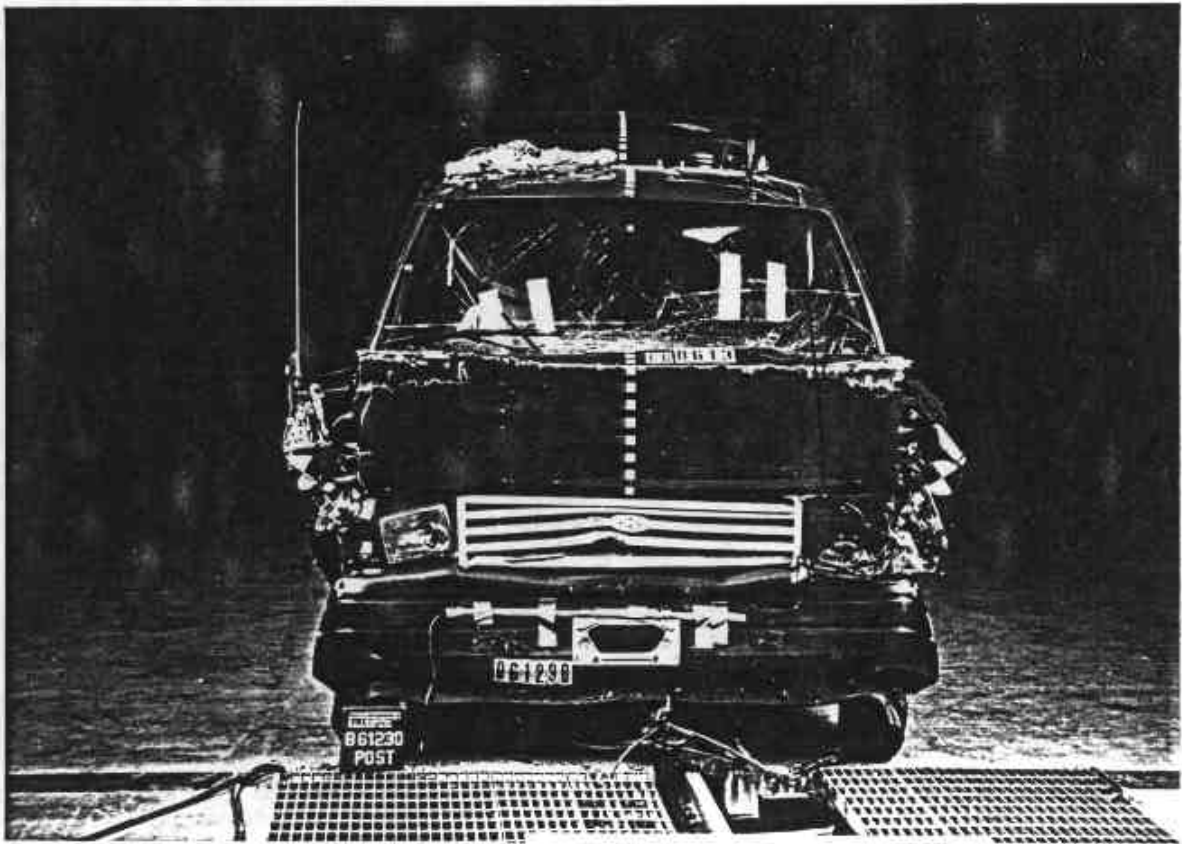


Figure 2. POST-TEST FRONT VIEW

A-2

851230

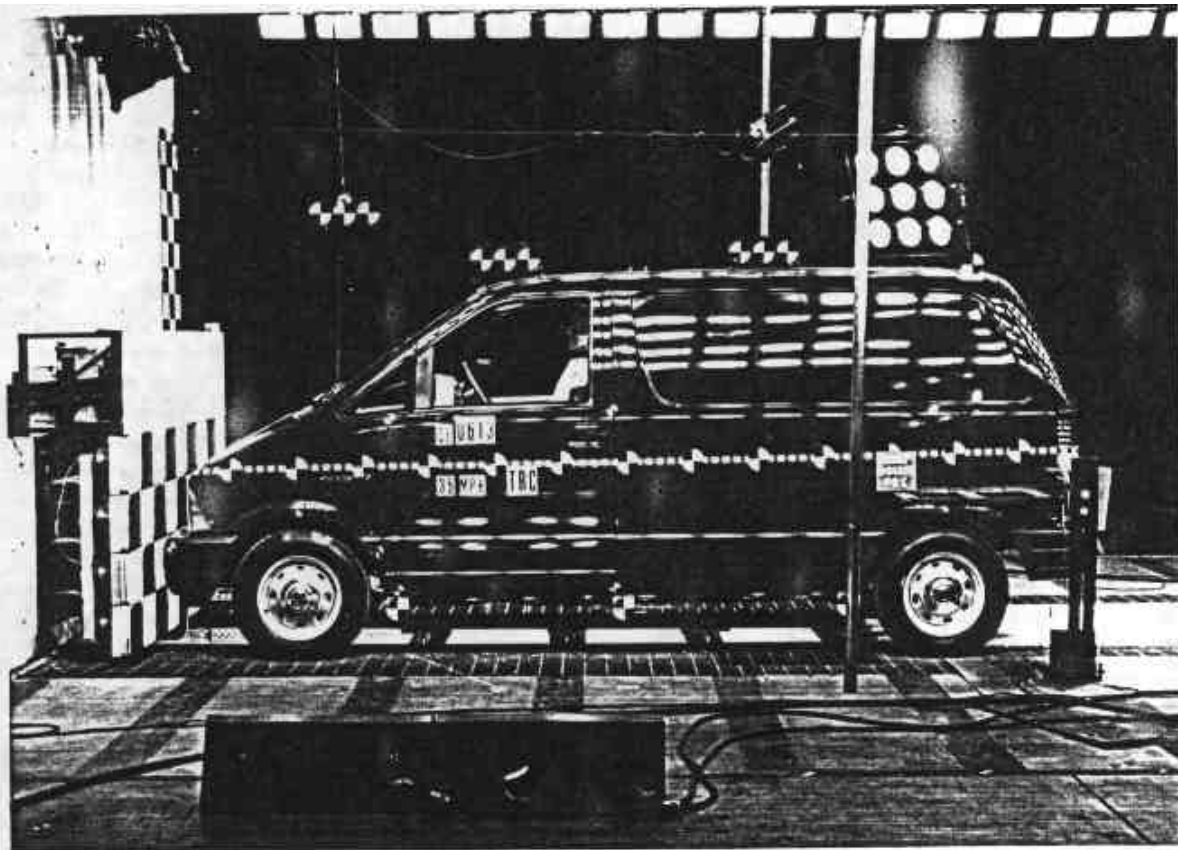


Figure 3. PRE-TEST LEFT SIDE VIEW

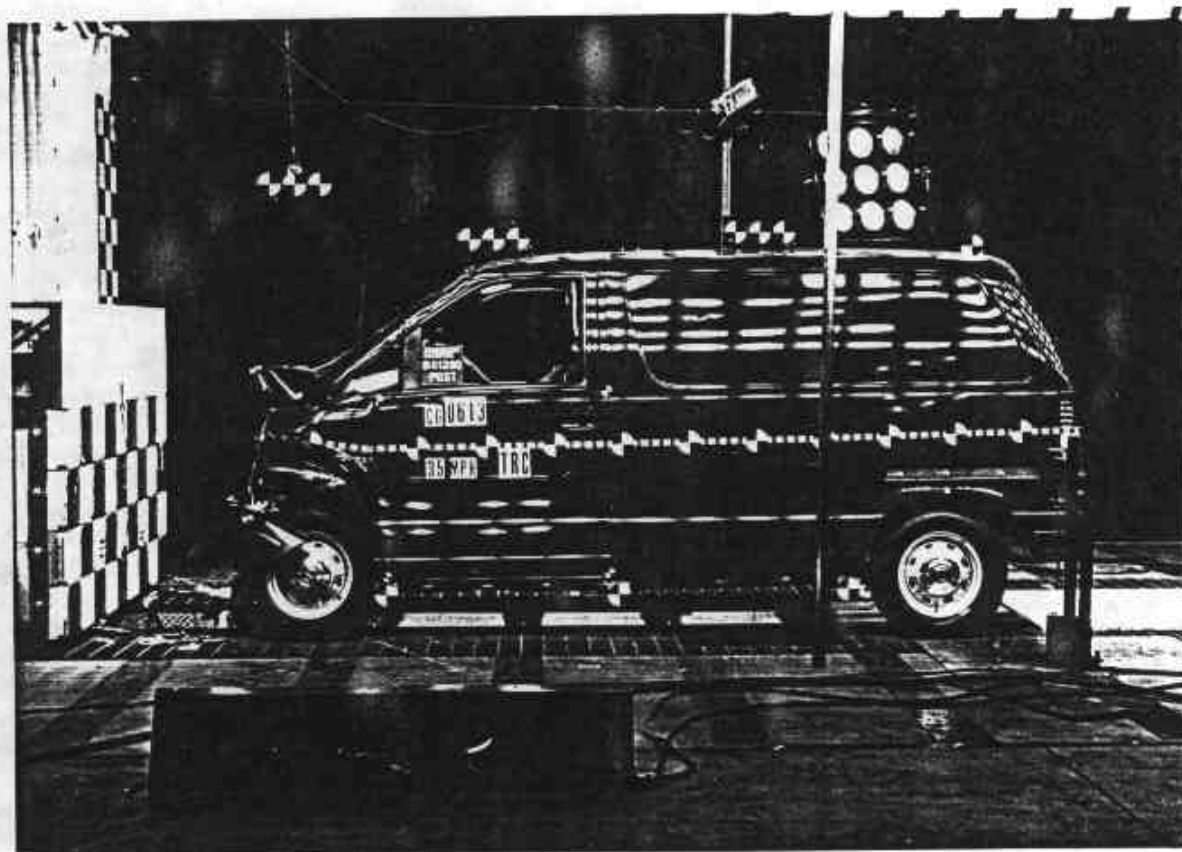


Figure 4. POST-TEST LEFT SIDE VIEW
A-3

861230

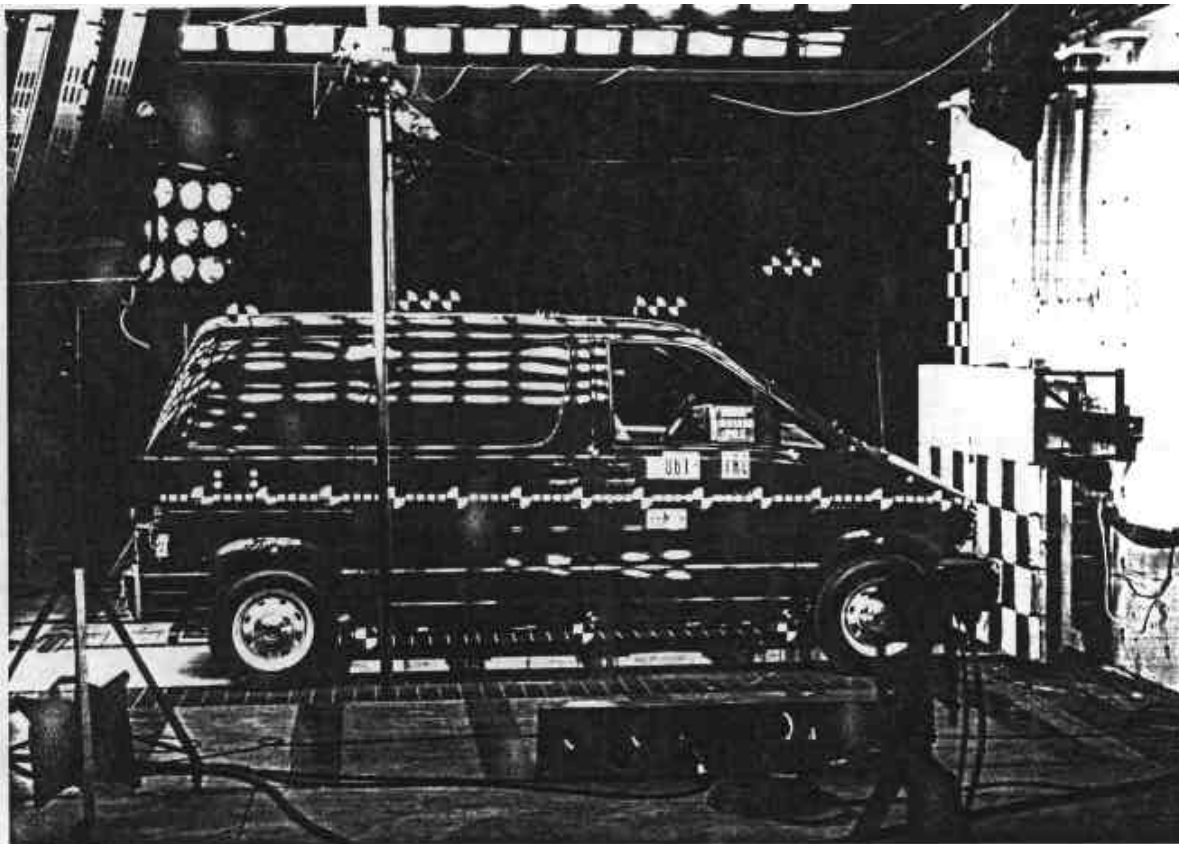


Figure 5. PRE-TEST RIGHT SIDE VIEW

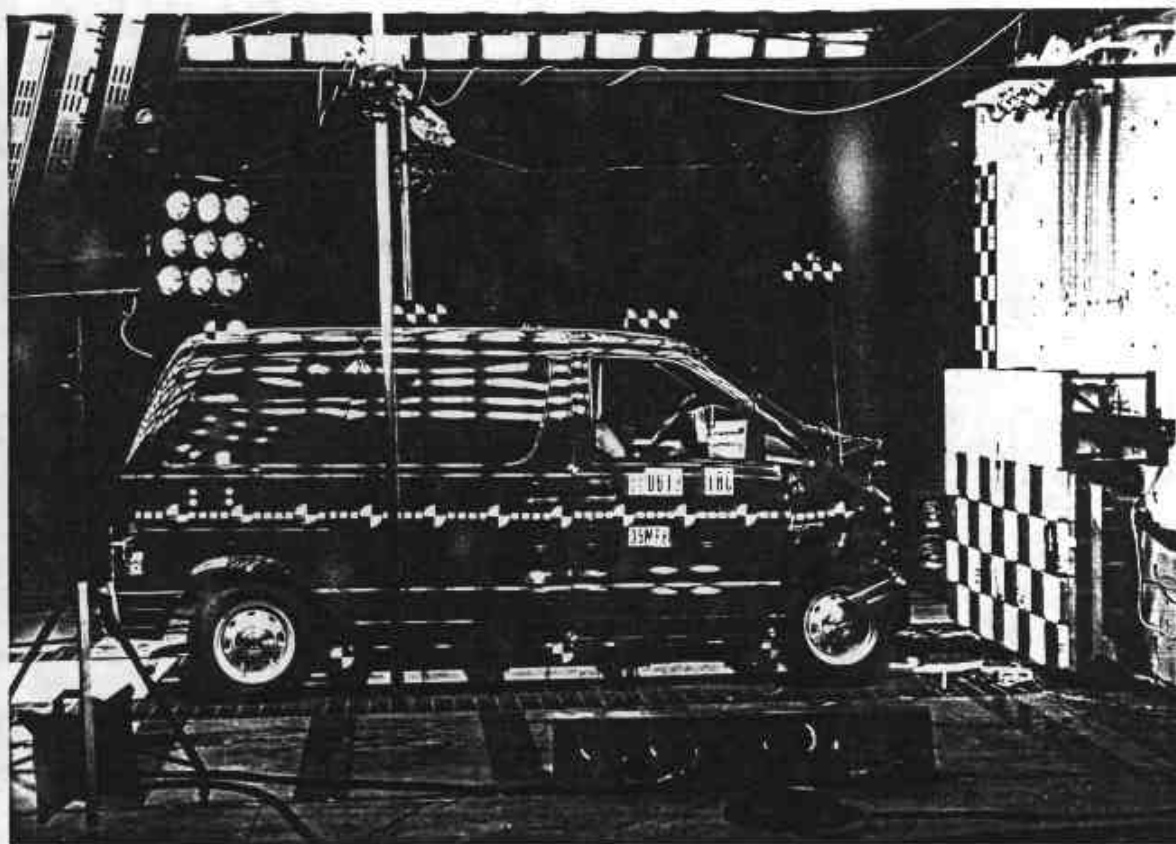


Figure 6. POST-TEST RIGHT SIDE VIEW
A-4

351230

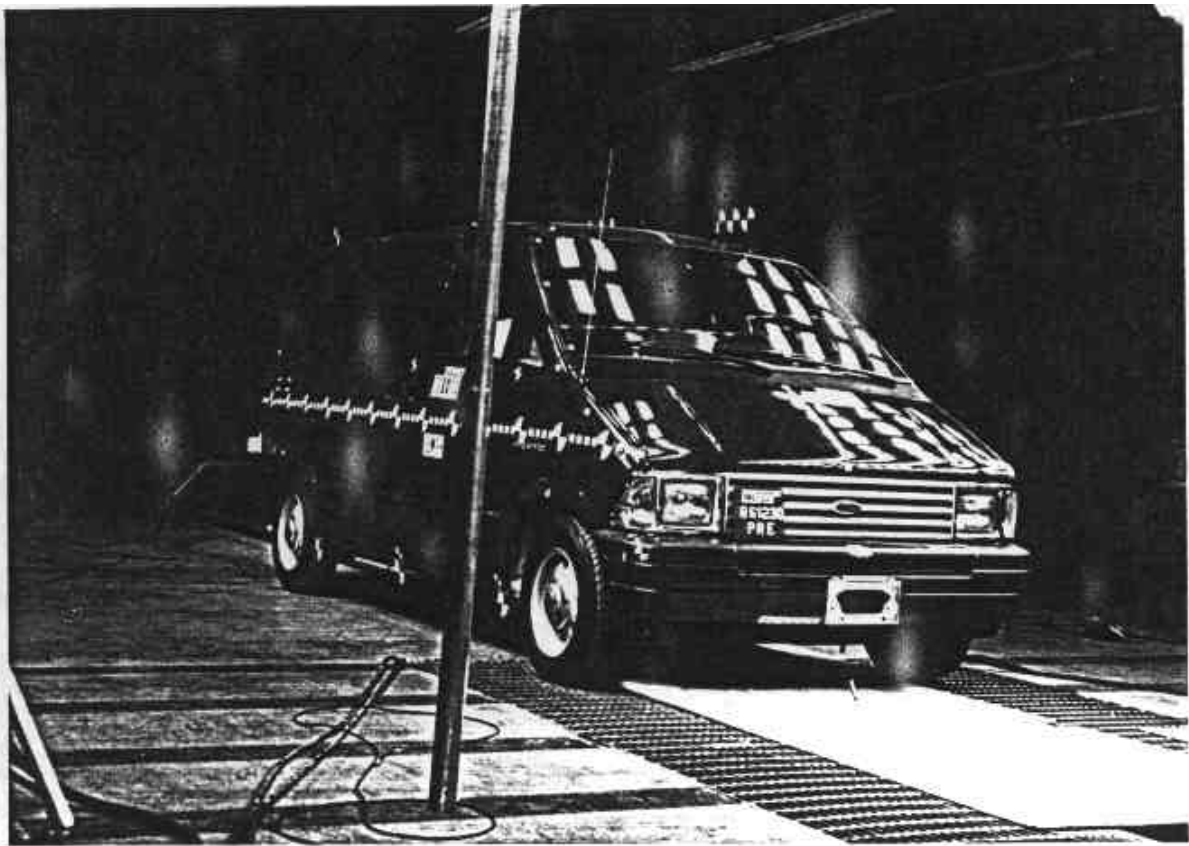


Figure 7. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



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

861230



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

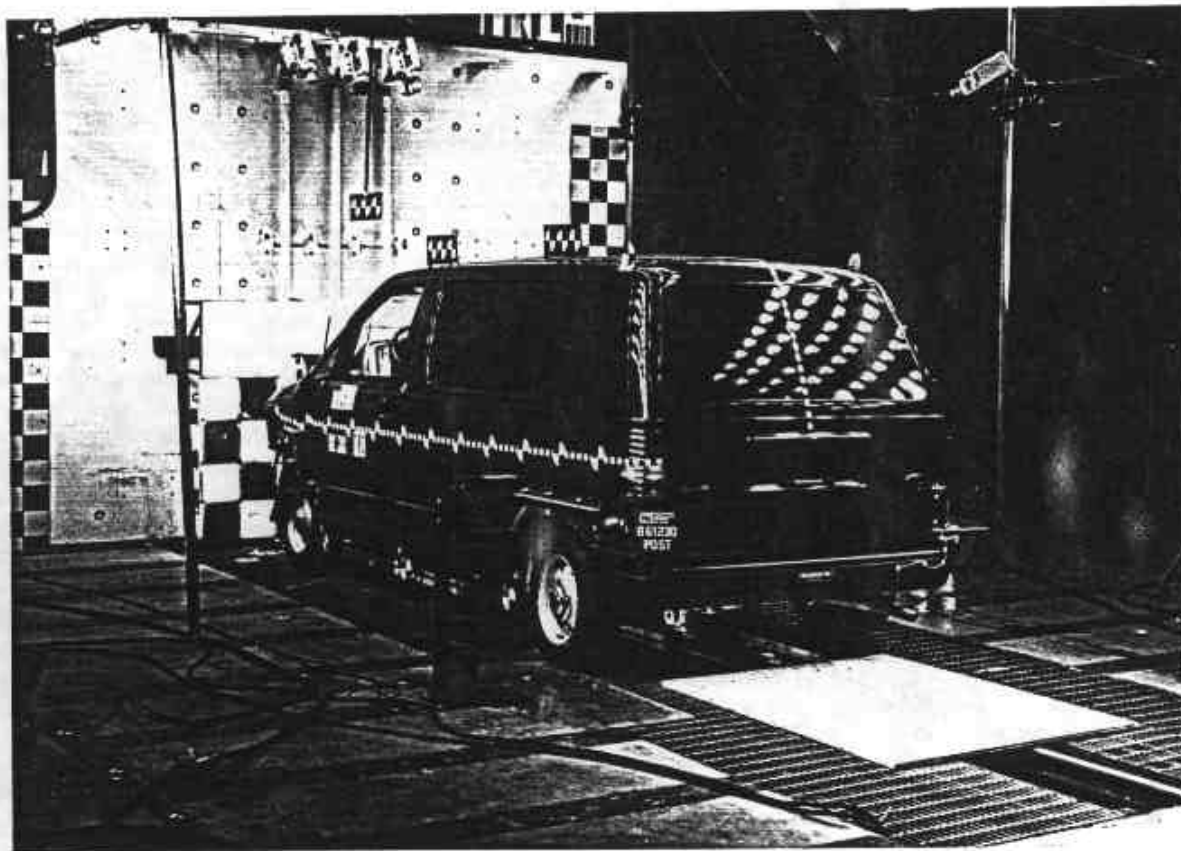


Figure 10. POST-TEST LEFT REAR THREE-QUARTER VIEW
A-6

861230

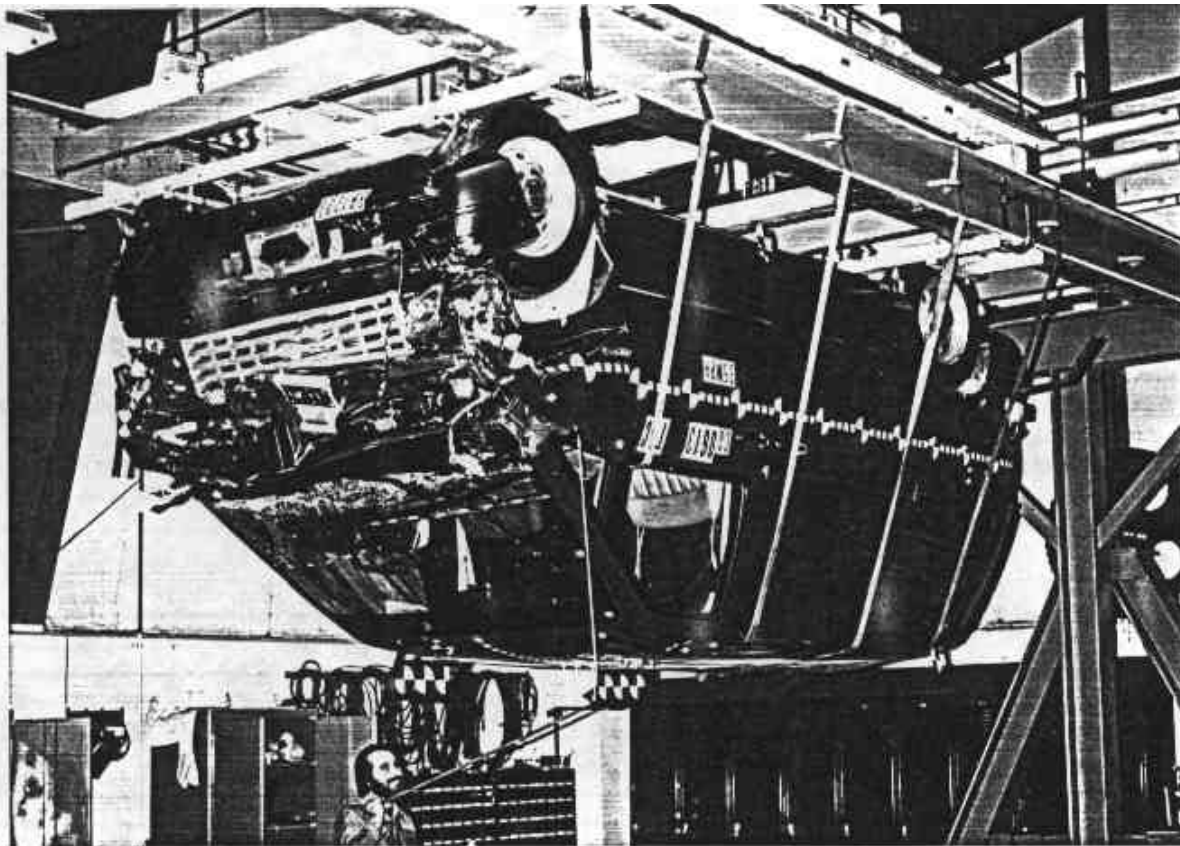


Figure 11. POST-TEST TOP VIEW (VEHICLE ON ROLLOVER MACHINE)



Figure 12. PRE-TEST WINDSHIELD VIEW
A-7

861230

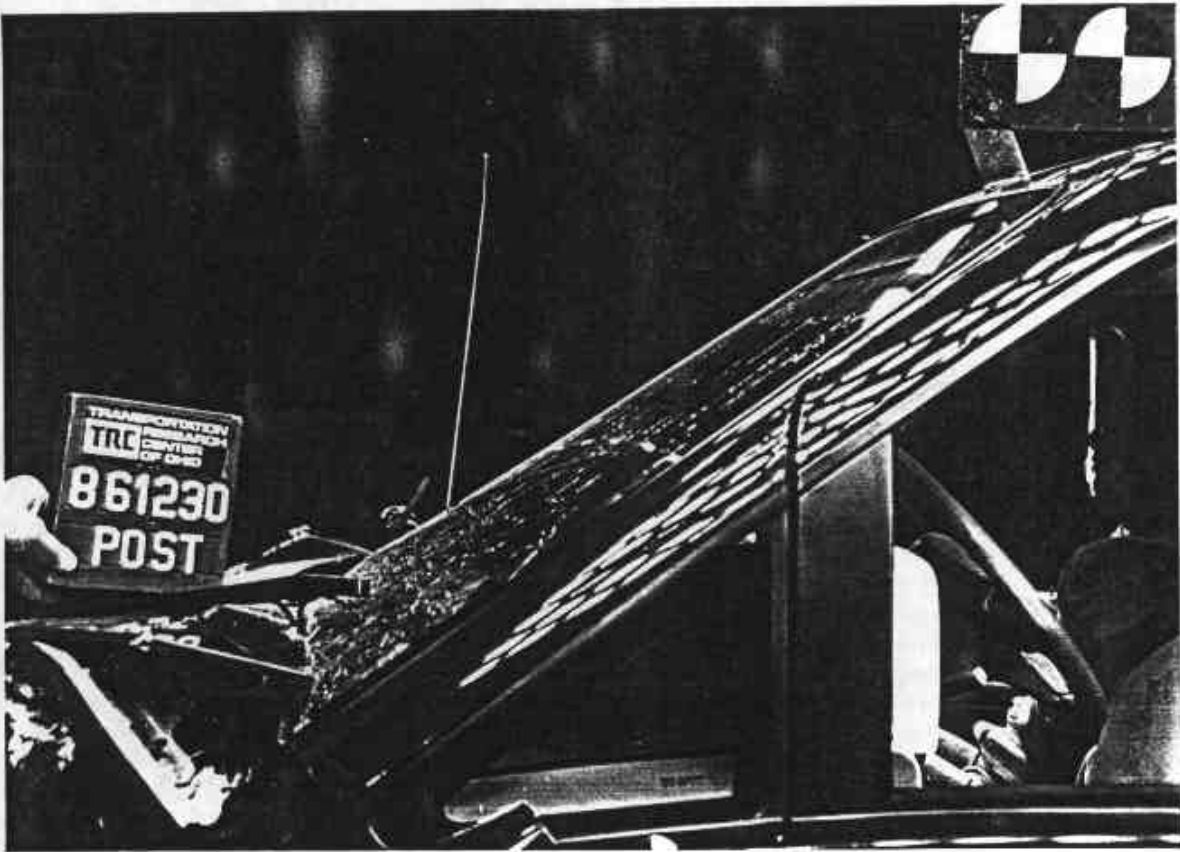


Figure 13. POST-TEST WINDSHIELD VIEW

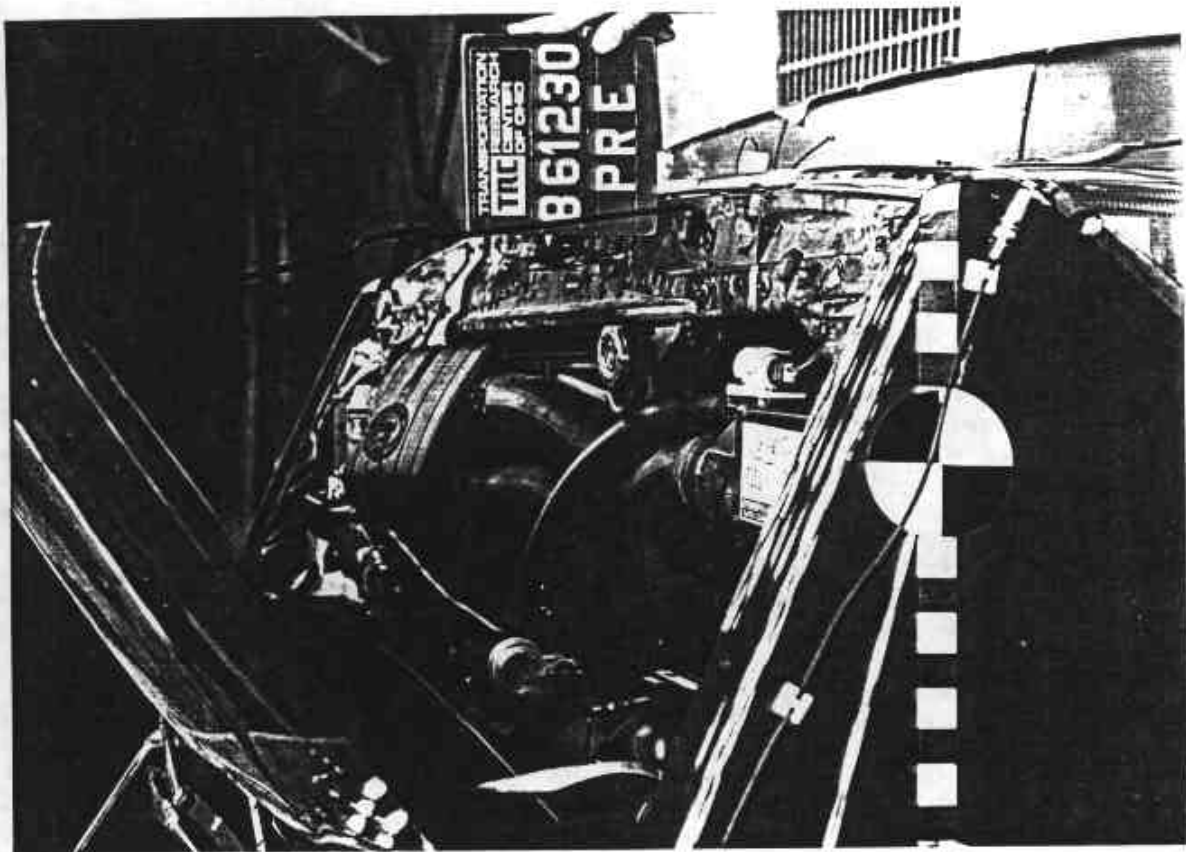


Figure 14. PRE-TEST ENGINE COMPARTMENT VIEW
A-8

851230

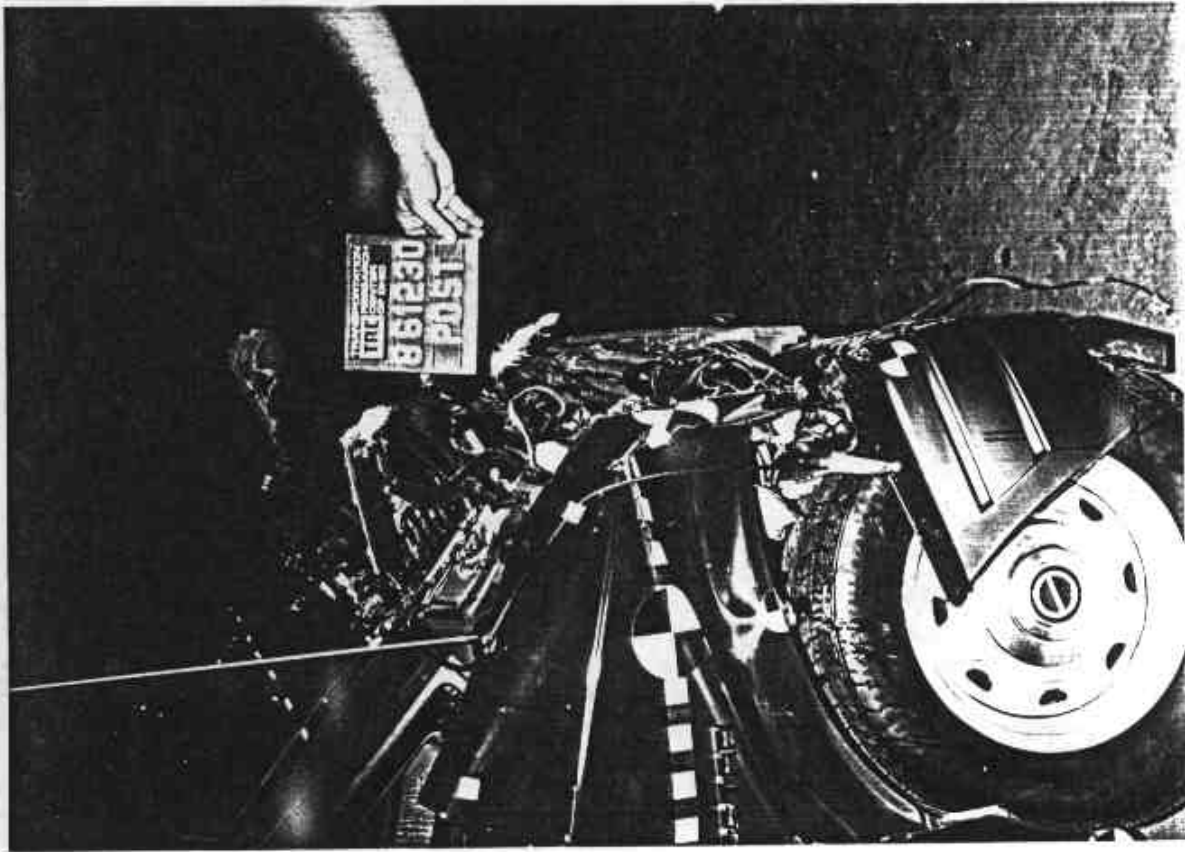


Figure 15. POST-TEST ENGINE COMPARTMENT VIEW



Figure 16. PRE-TEST FUEL FILLER CAP VIEW

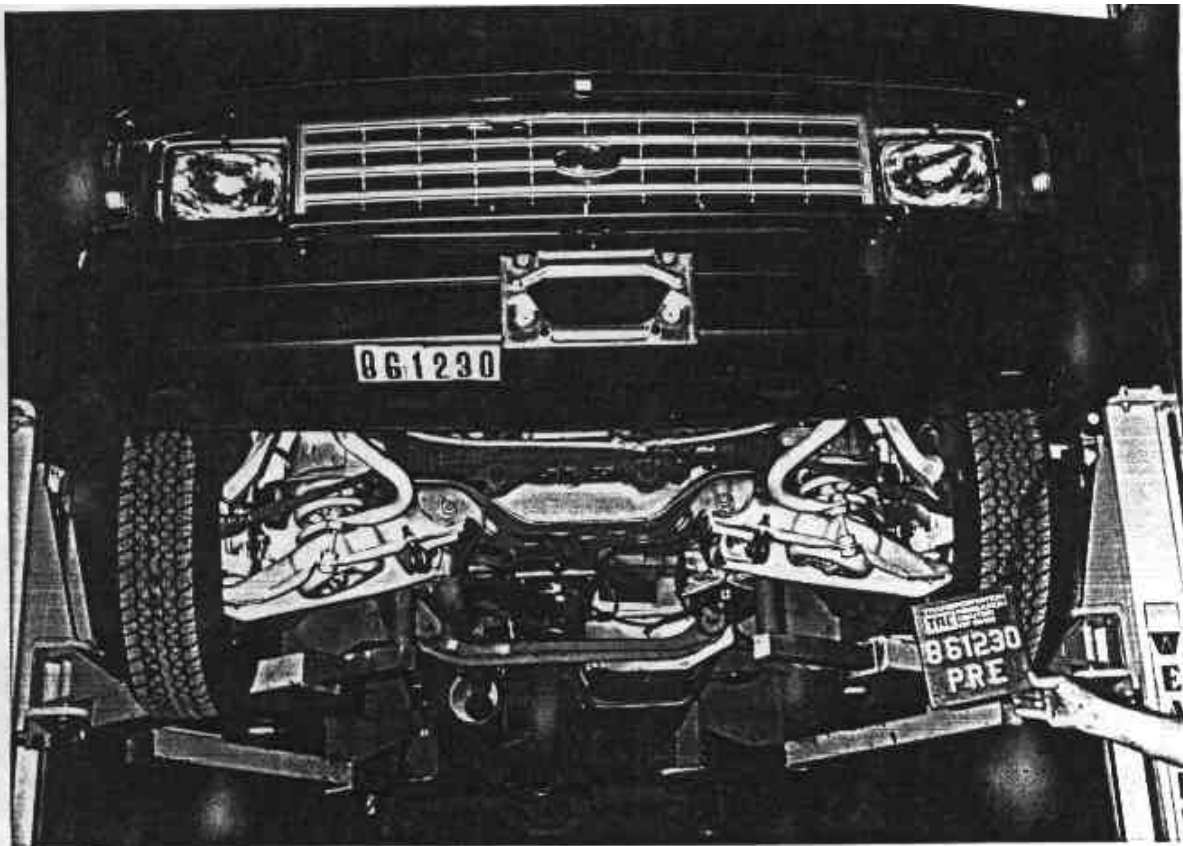


Figure 17. PRE-TEST FRONT UNDERBODY VIEW

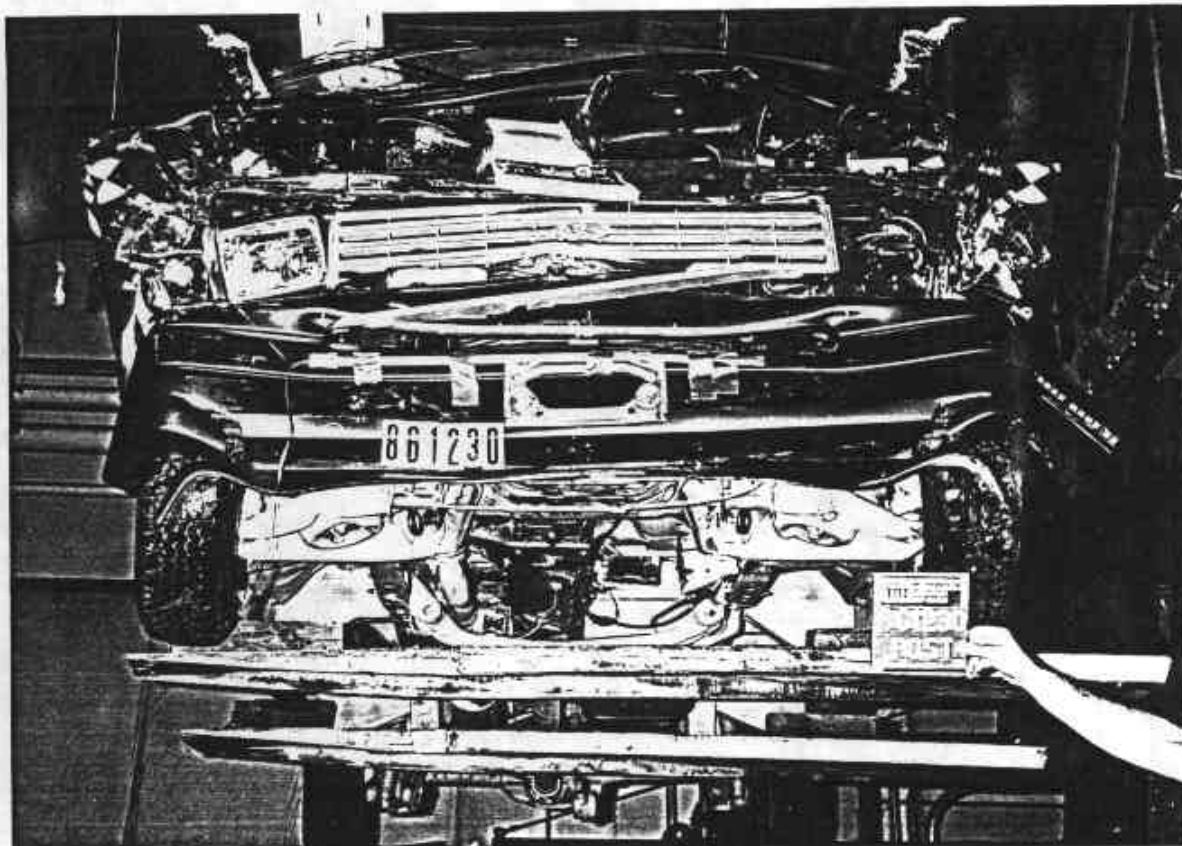


Figure 18. POST-TEST FRONT UNDERBODY VIEW
A-10

861230

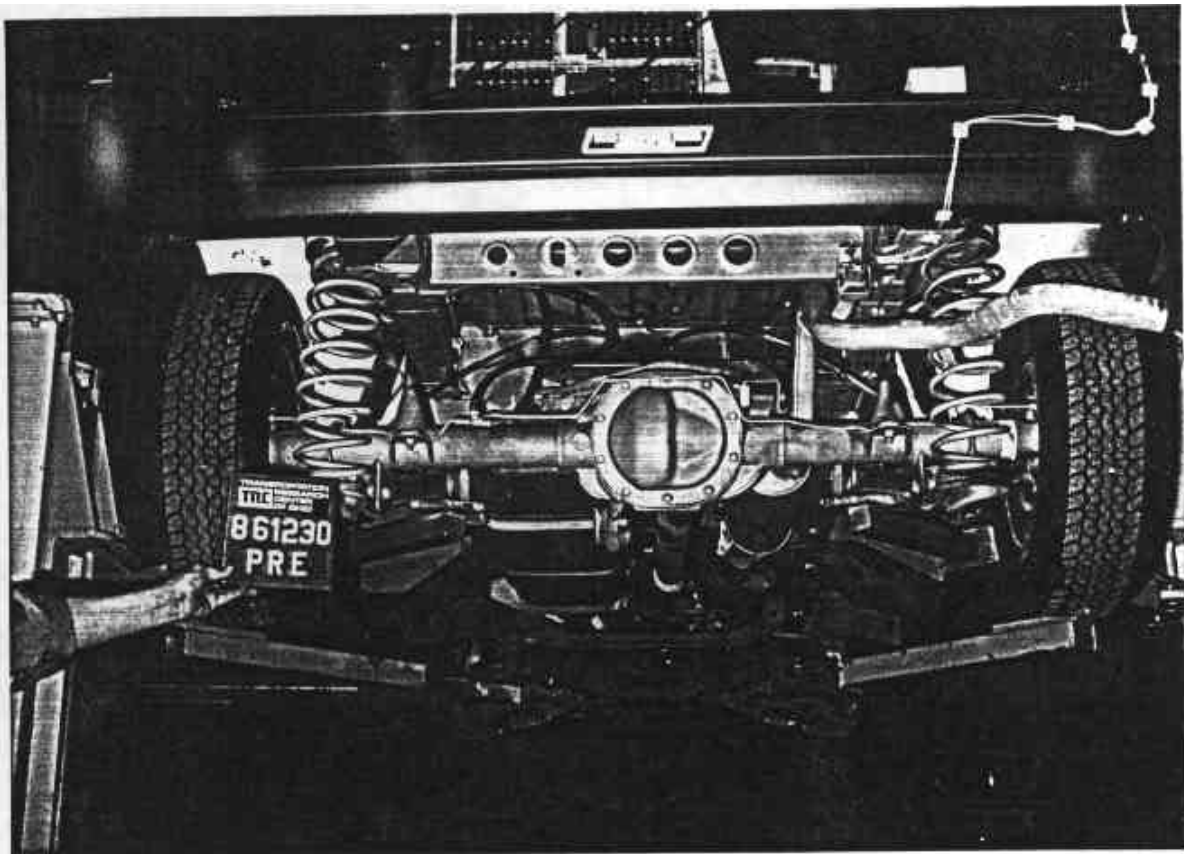


Figure 19. PRE-TEST REAR UNDERBODY VIEW

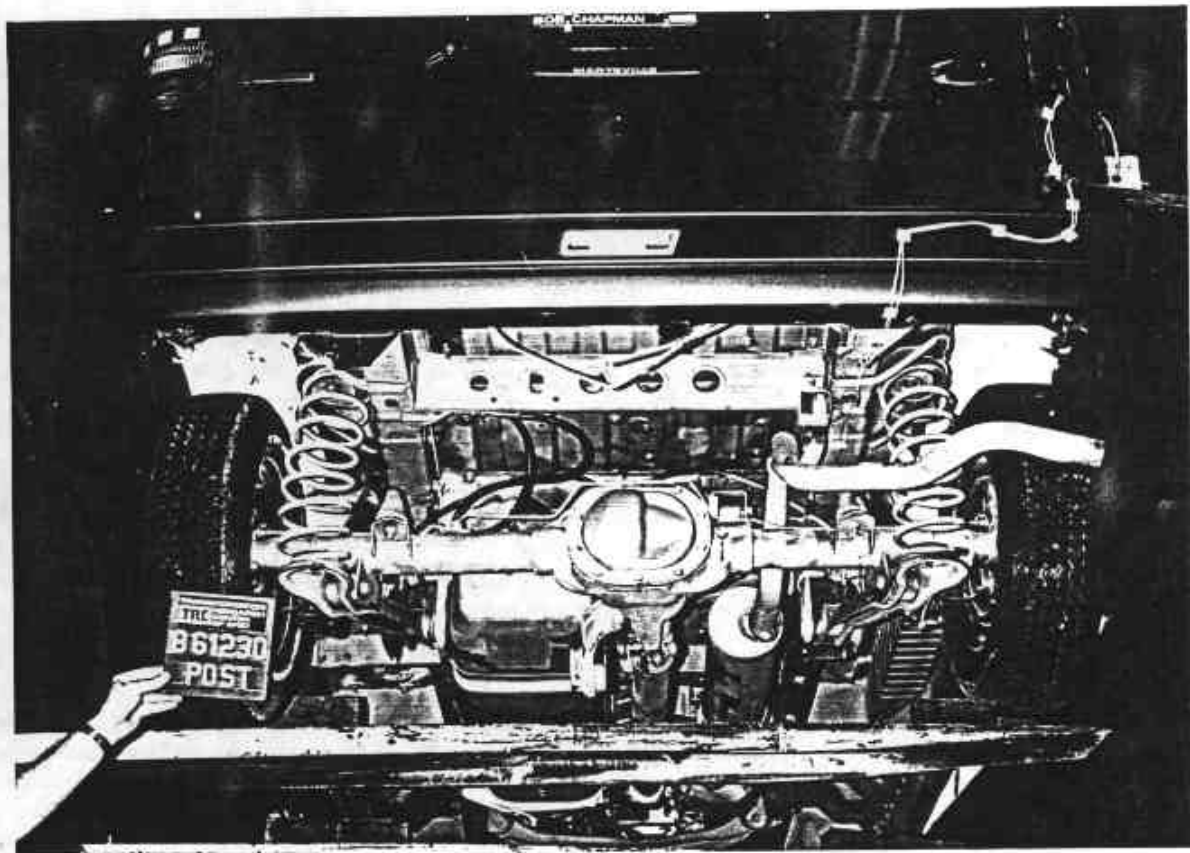


Figure 20. POST-TEST REAR UNDERBODY VIEW
A-11

861230



Figure 21. PRE-TEST DRIVER DUMMY POSITION VIEW



Figure 22. POST-TEST DRIVER DUMMY POSITION VIEW

A-12

861230



Figure 23. PRE-TEST PASSENGER DUMMY POSITION VIEW



Figure 24. POST-TEST PASSENGER DUMMY POSITION VIEW
A-13

861230

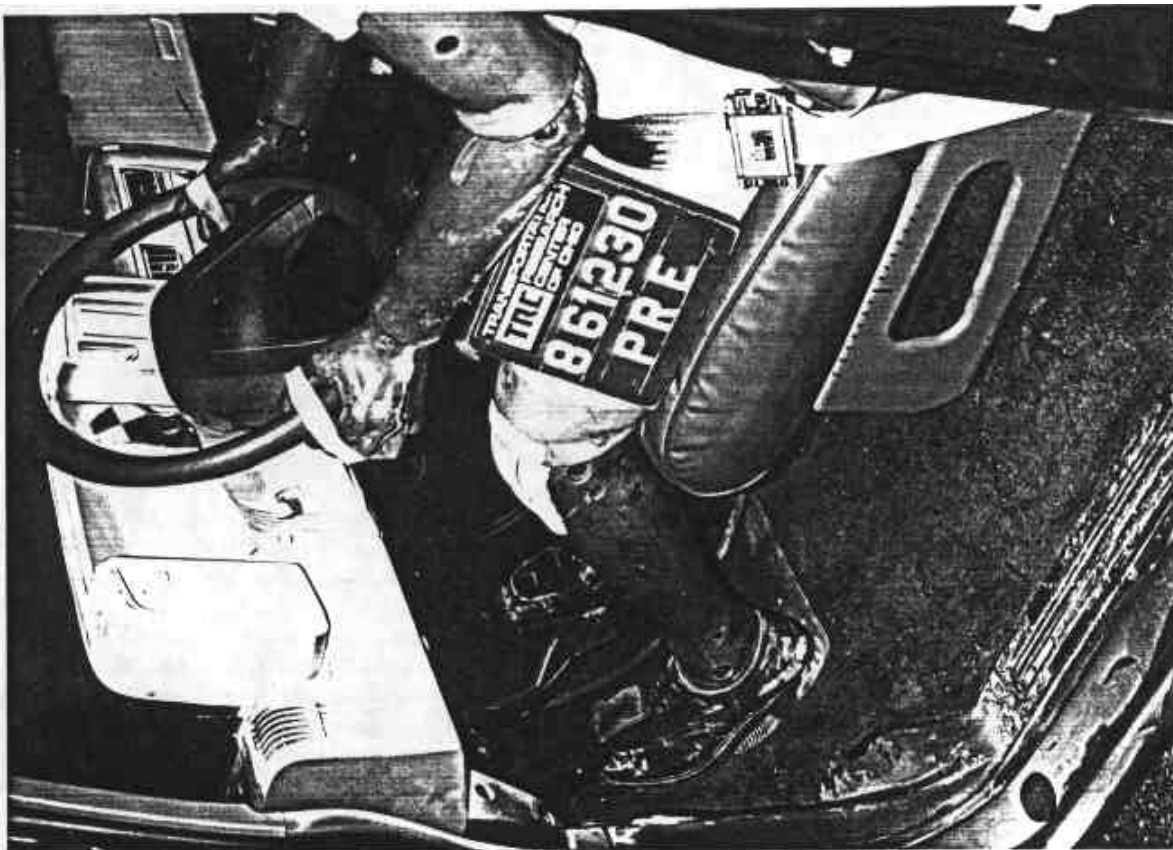


Figure 25. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)

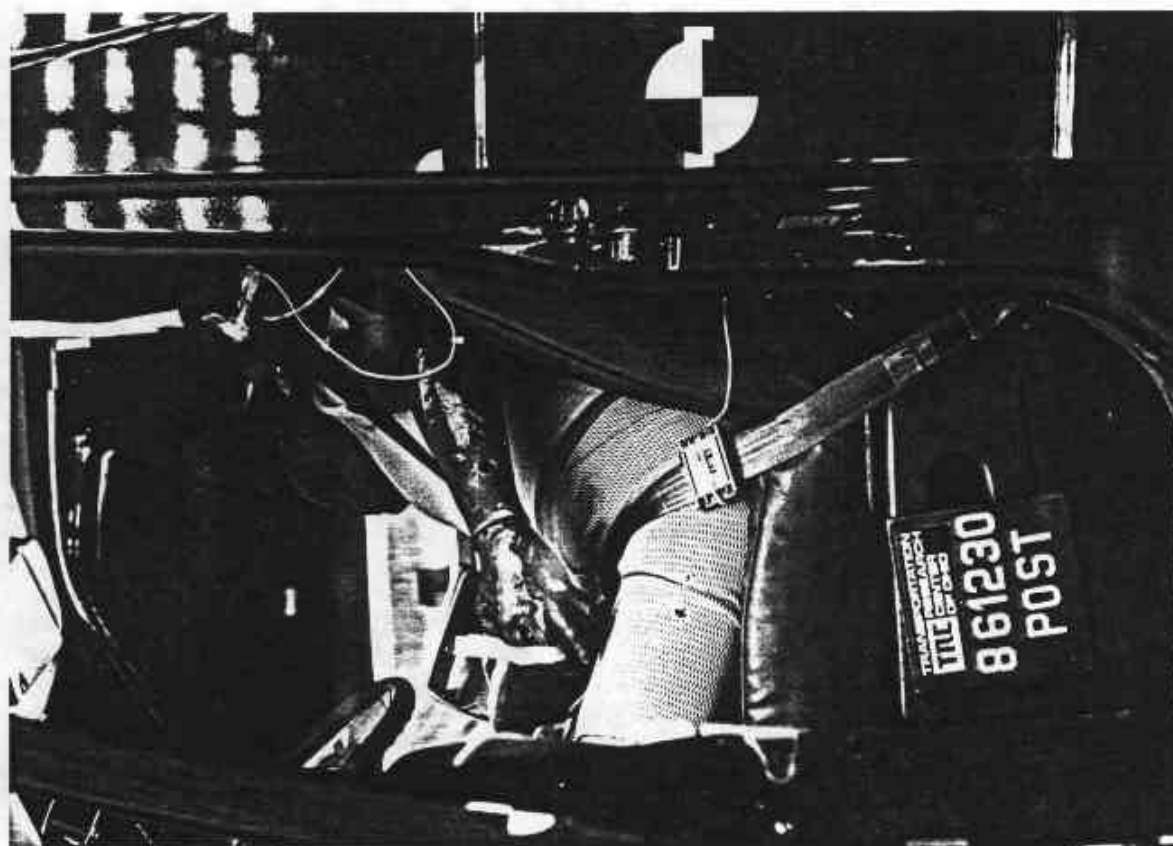


Figure 26. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)

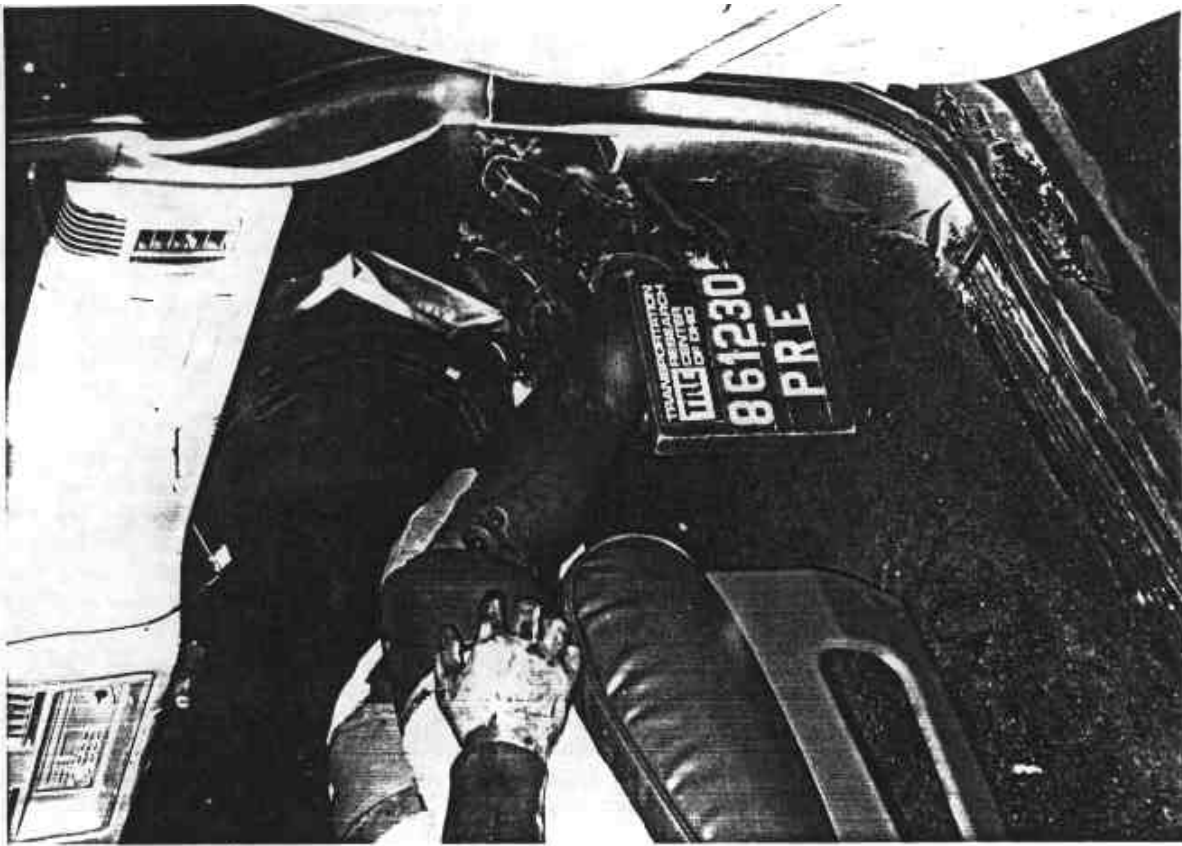


Figure 27. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)

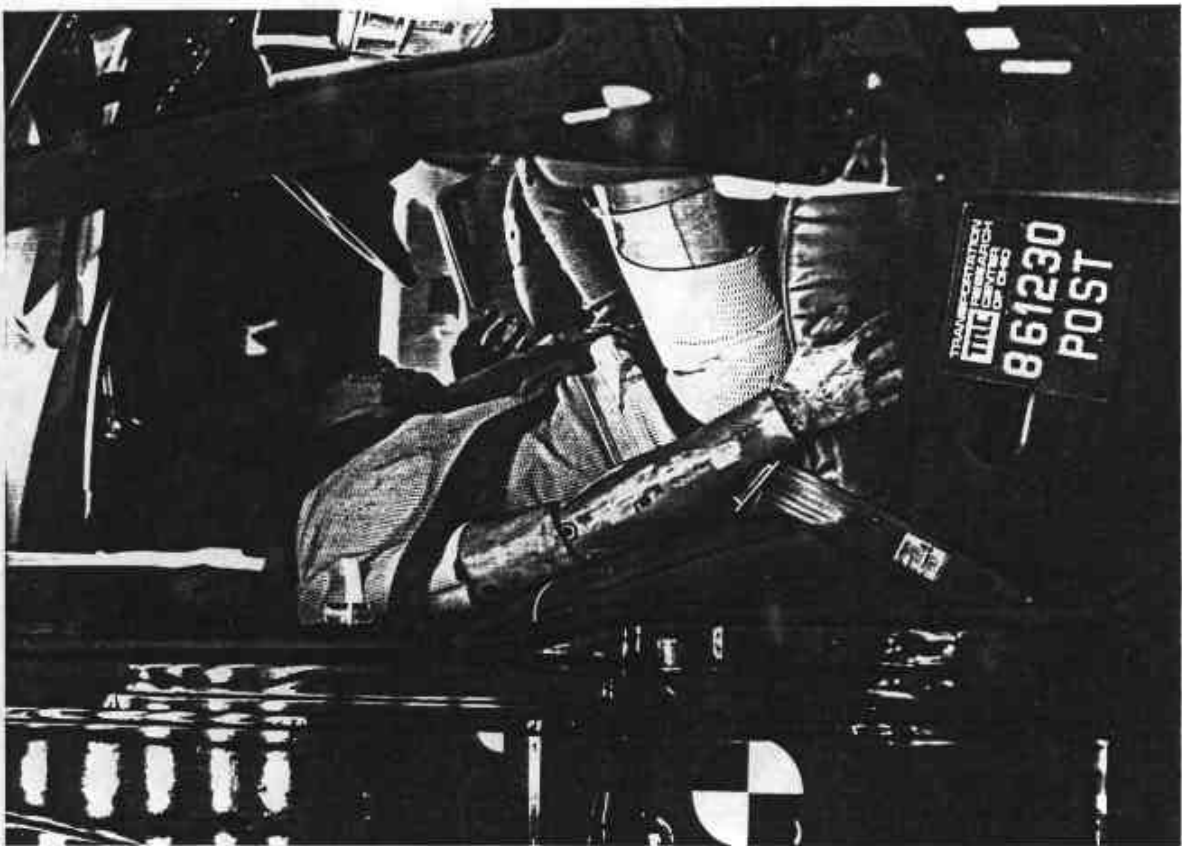


Figure 28. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR VIEW (DOOR OPEN)



Figure 29. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT

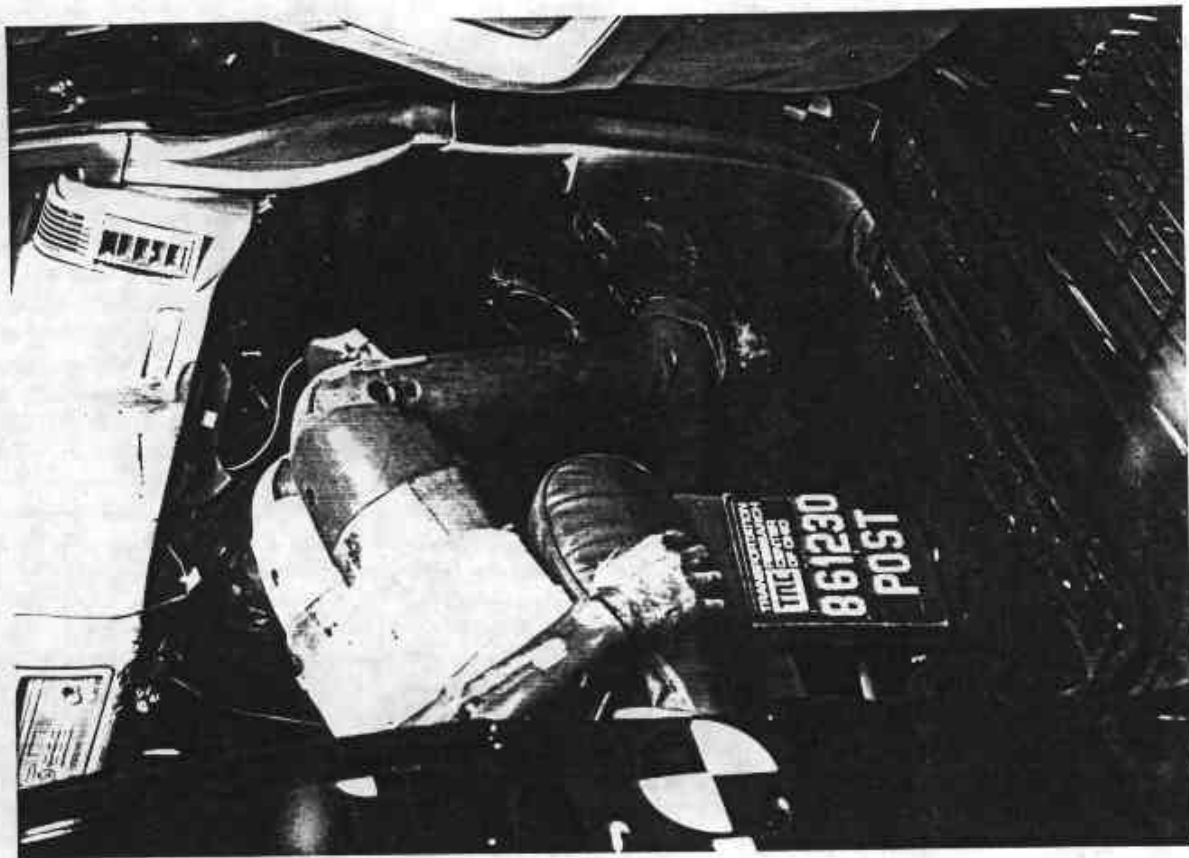


Figure 30. POST-TEST PASSENGER KNEE CONTACT
A-16

861230

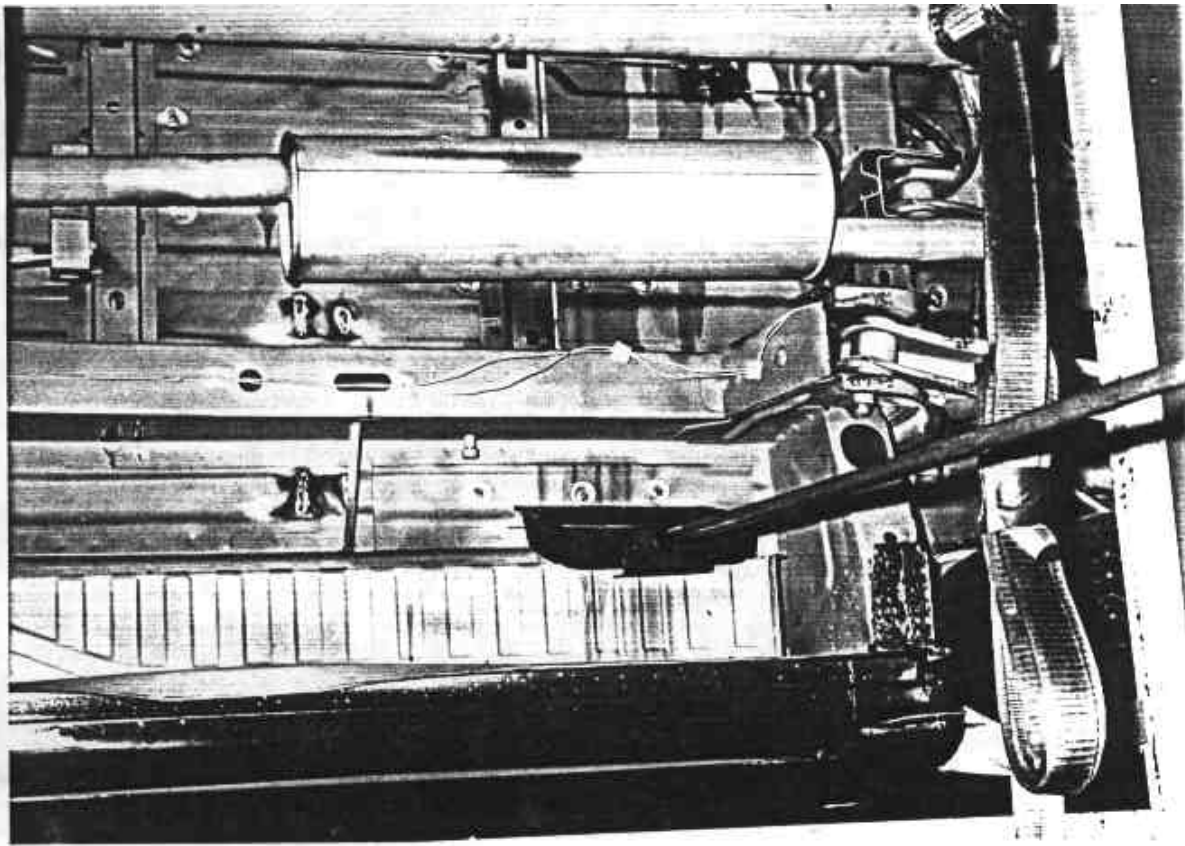


Figure 31. POST-TEST FUEL LEAKAGE - VIEW 1

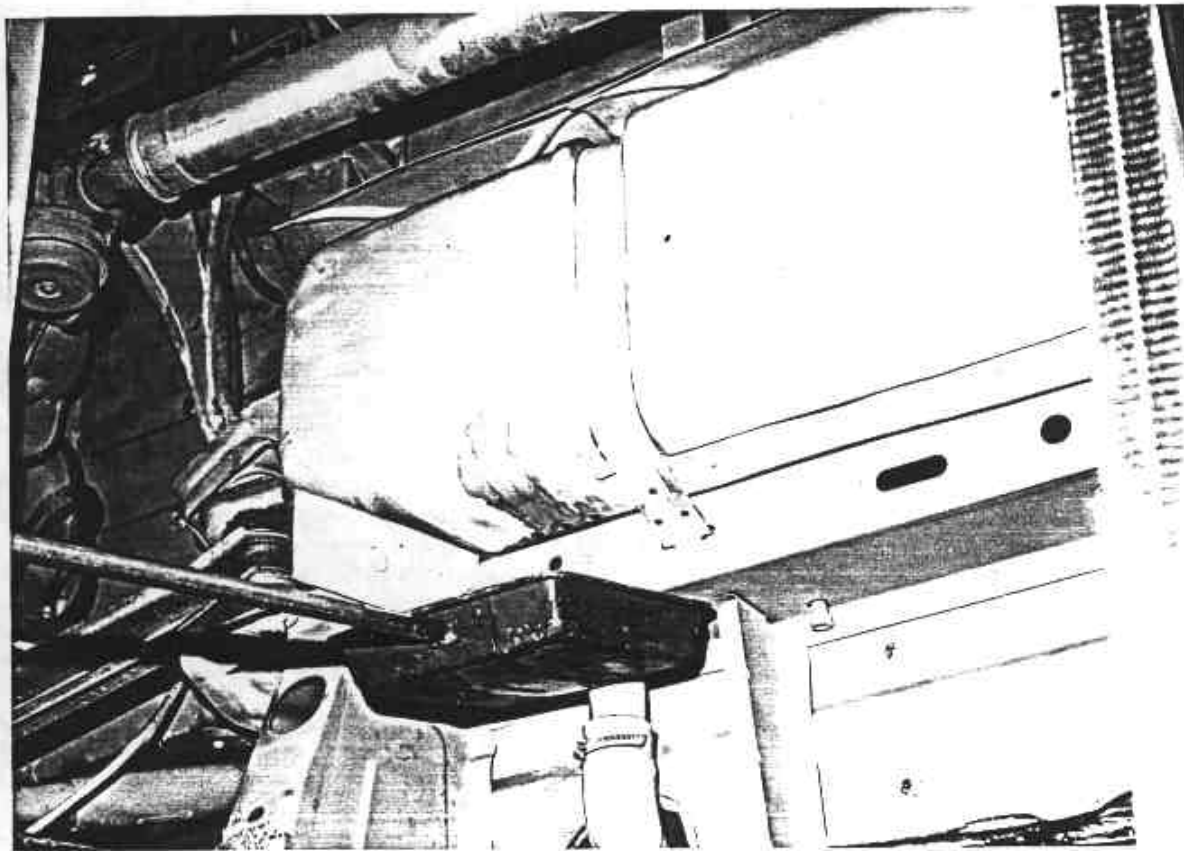


Figure 32. POST-TEST FUEL LEAKAGE - VIEW 2
A-17

861230

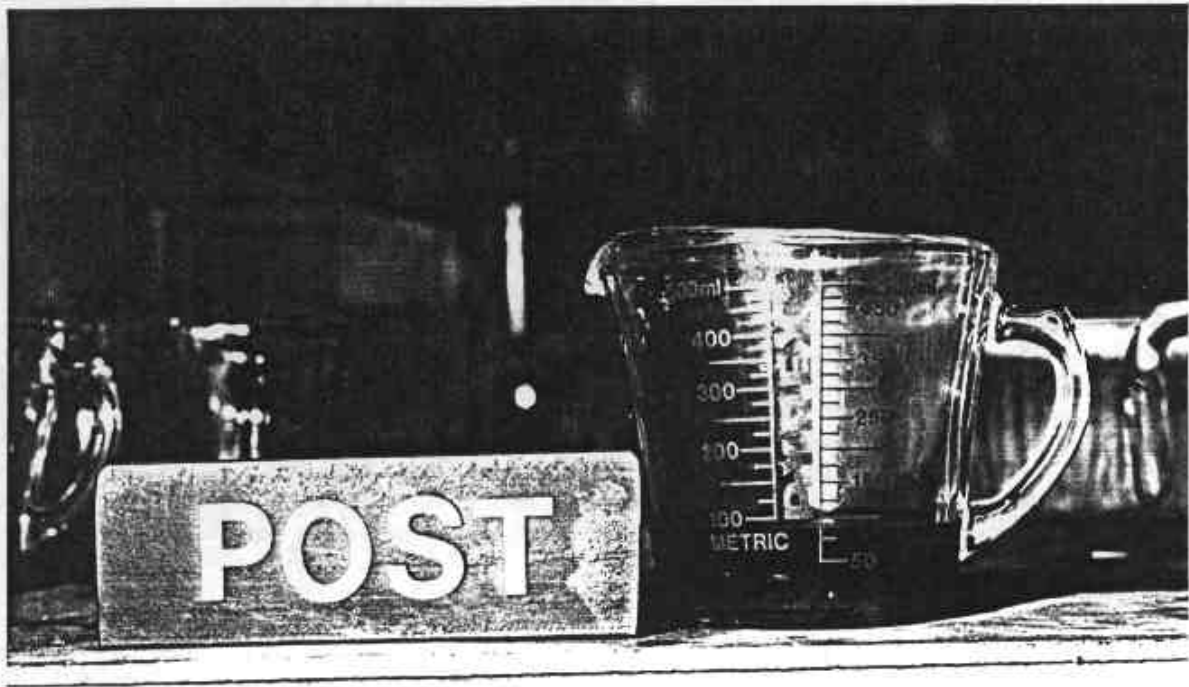


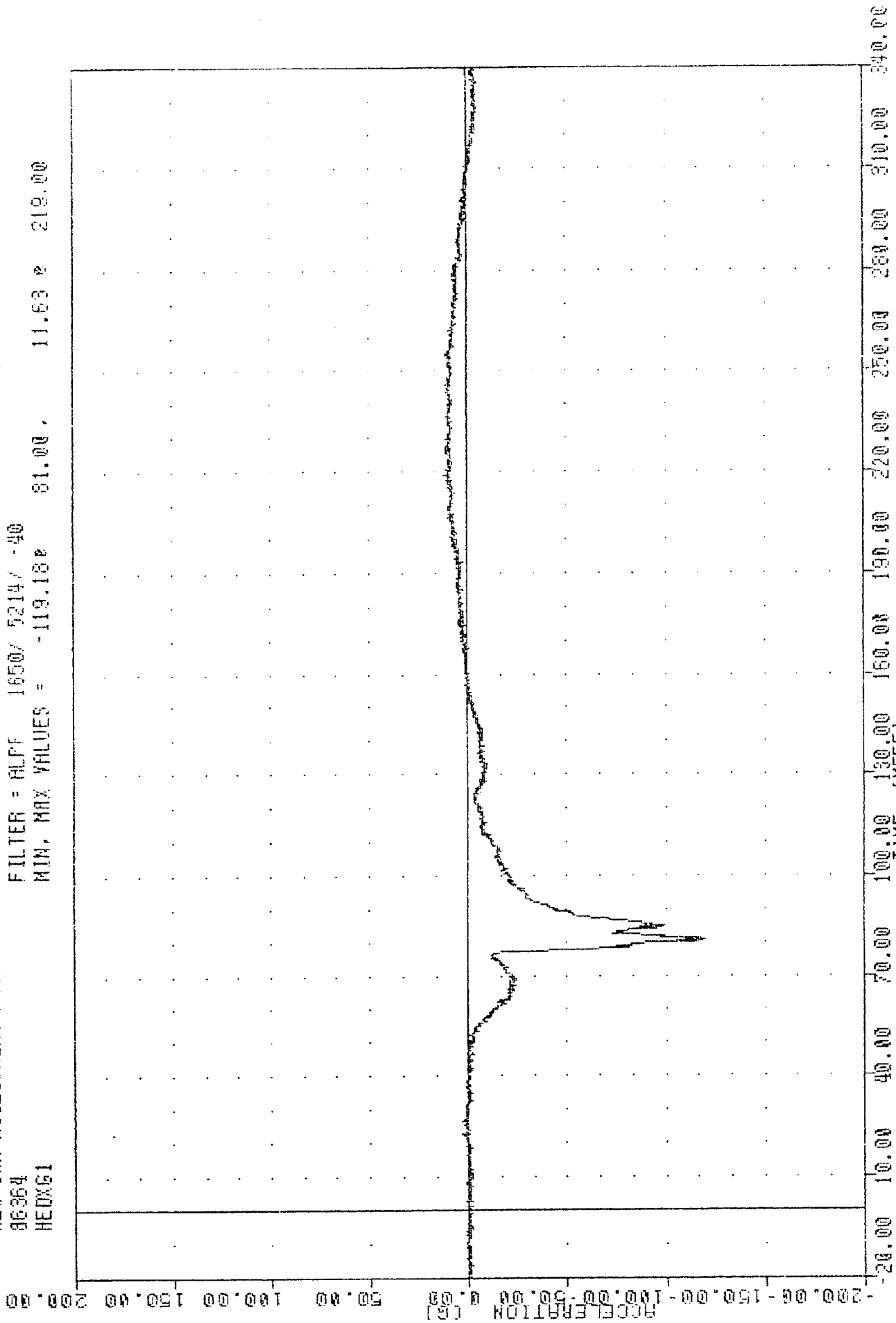
Figure 33. POST-TEST TOTAL LEAKAGE

APPENDIX B

DATA PLOTS

TRC , 861230
NEW CAR ASSESSMENT PROGRAM
86384
HEDXG1

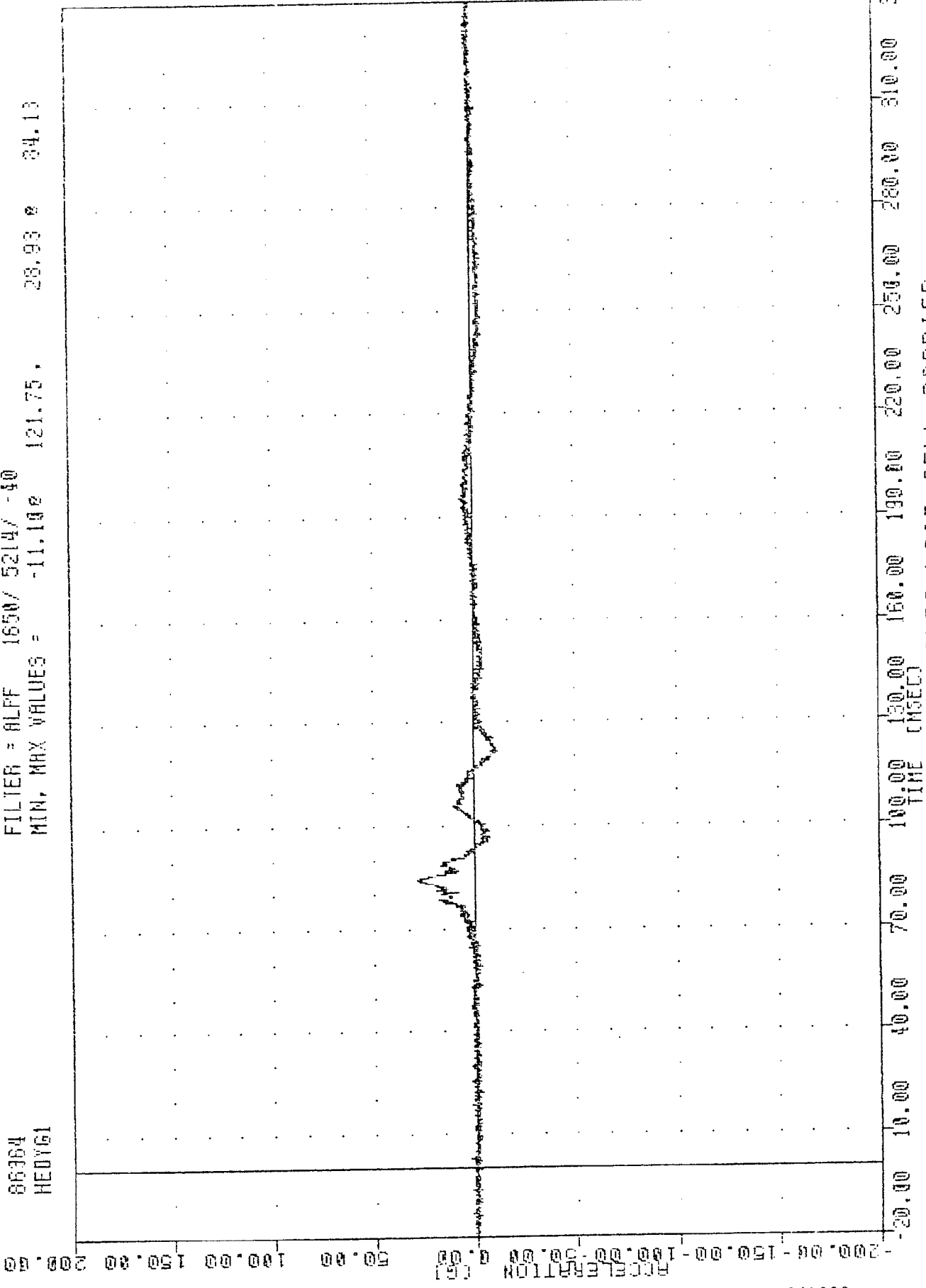
FILTER = HLPF 1650/ 5214/ -40
MIN. MAX VALUES = -119.18g 81.00g 11.63g 219.00g



FORD AEROSTAR INTO LOAD CELL BARRIER
DRIVER HEAD ACCELERATION X AXIS

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86384
 HEDY61

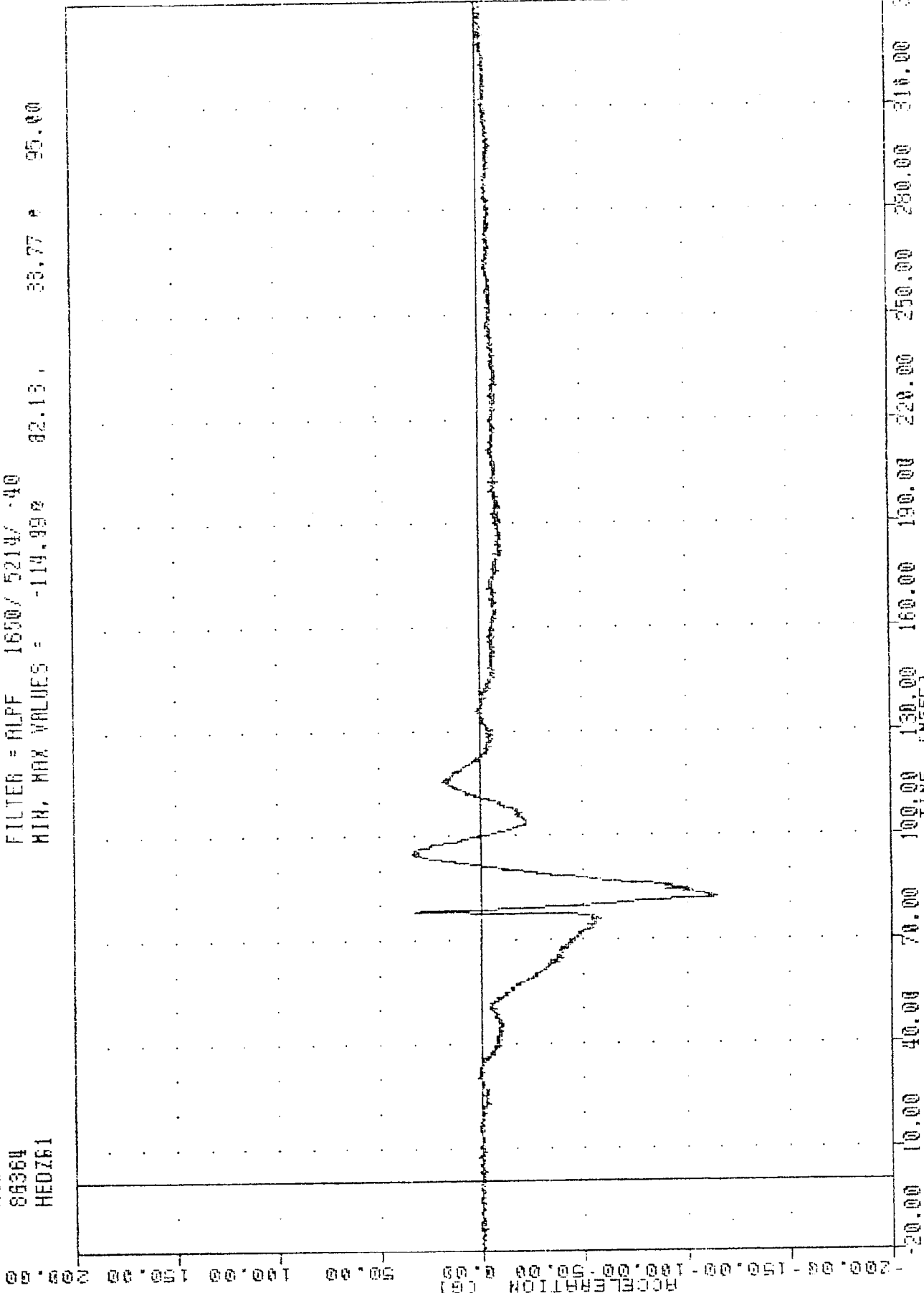
FILTER = ALPF 165N/ 5214/ -40
 MIN, MAX VALUES = -11.10e 121.75, 28.93 e 34.13



FORD AEROSTAR INTO LOAD CELL BARRIER
 NOTICE MEAN ACCELERATION Y AVTS

TAC 861230
NEW CAR ASSESSMENT PROGRAM
86364
MEDZ61

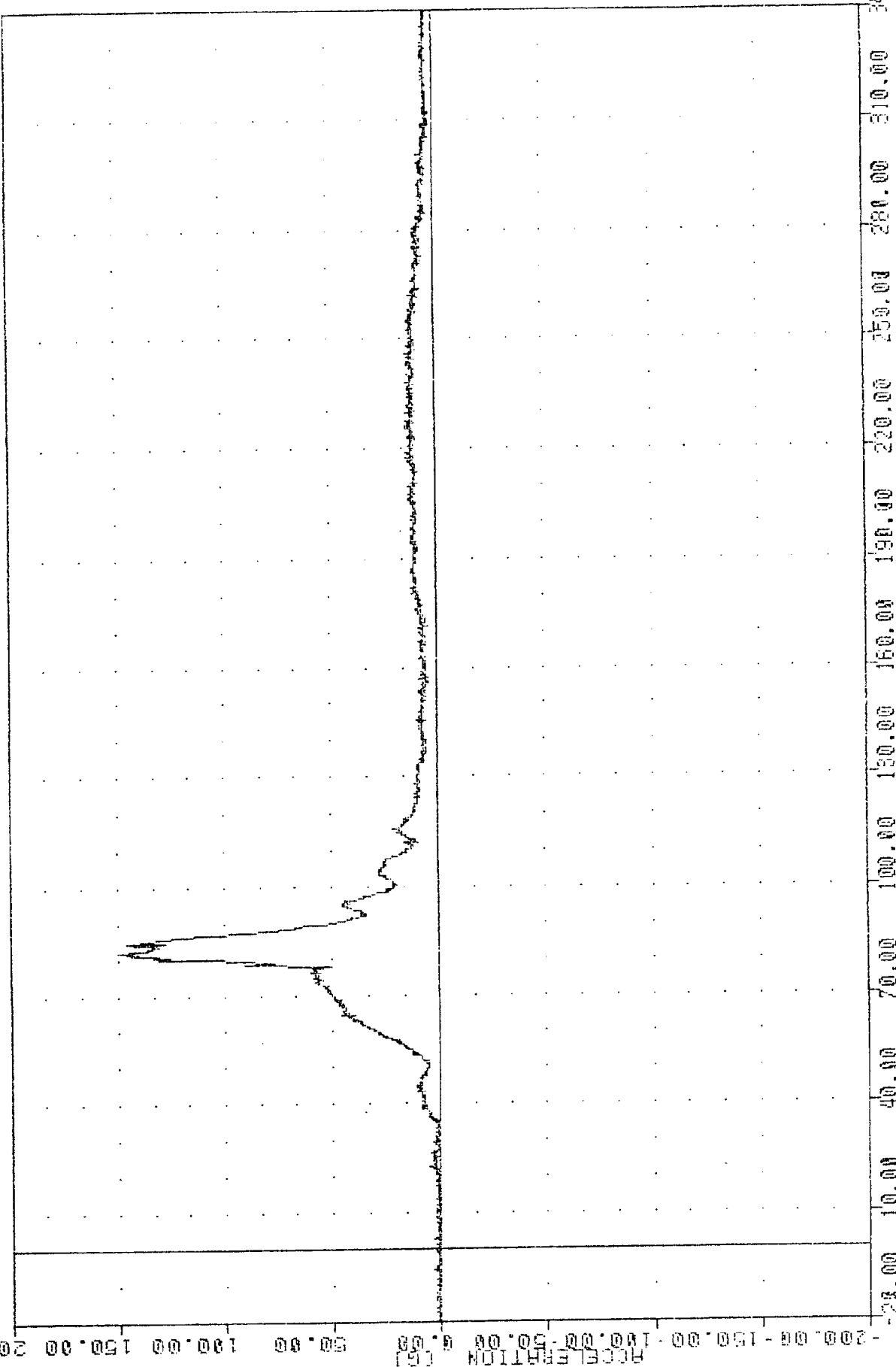
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -114.998 82.13 33.77 95.00



FORD AEROSTAR INTO LOAD CELL BARRIER
MATWER HEAD ACCELERATION 7 AXIS

TRC 861230
NEW CAR ASSESSMENT PROGRAM
06364
HEAD1

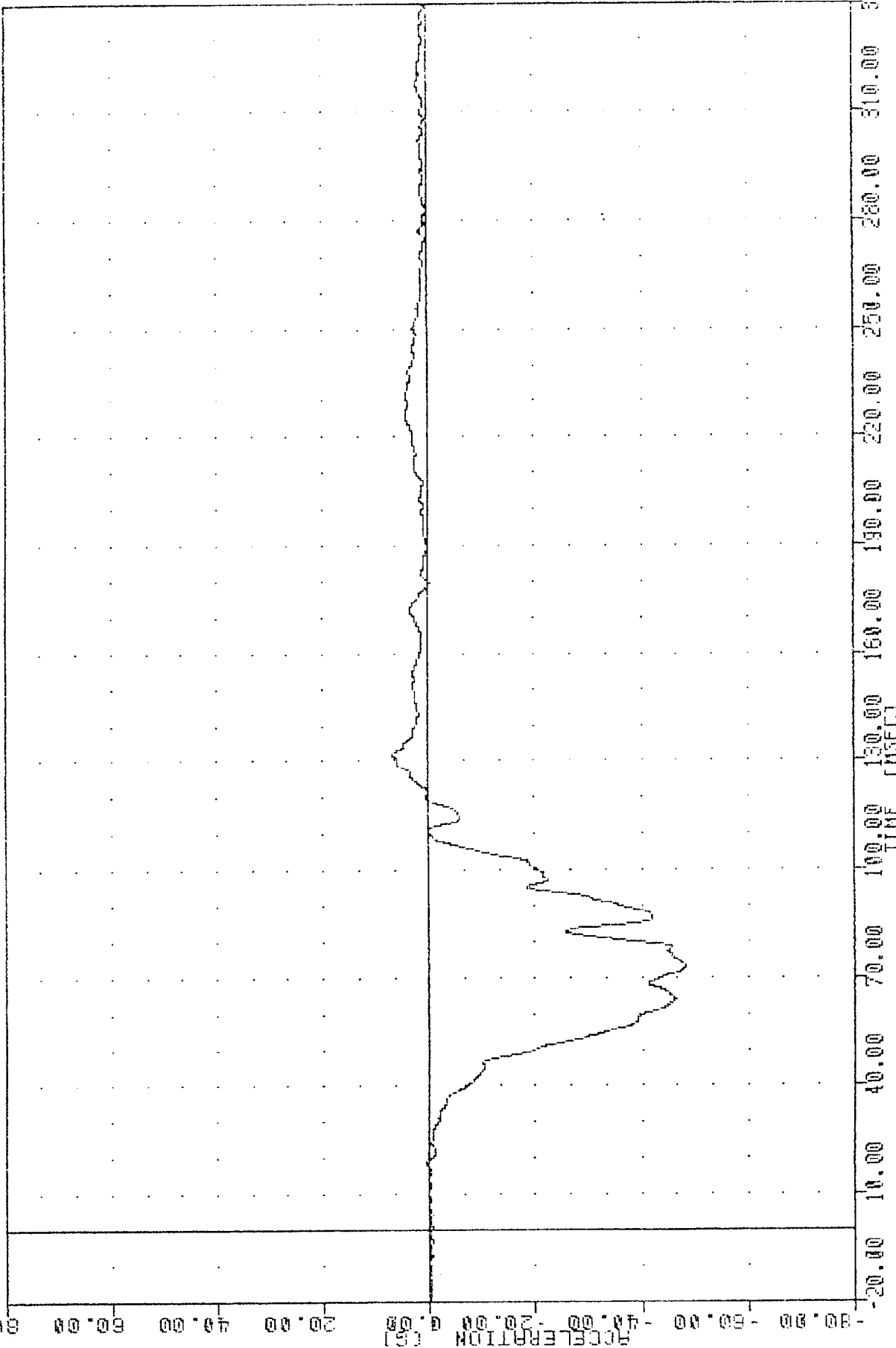
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.128 16.75, 149.62 g 82.00



FORD AEROSTAR INTO LOAD CELL BARRIER
DRIVER HEAD RESISTANT OCCUPATION

TRC , 861230
NEW CAR ASSESSMENT PROGRAM
86364
CSTX61

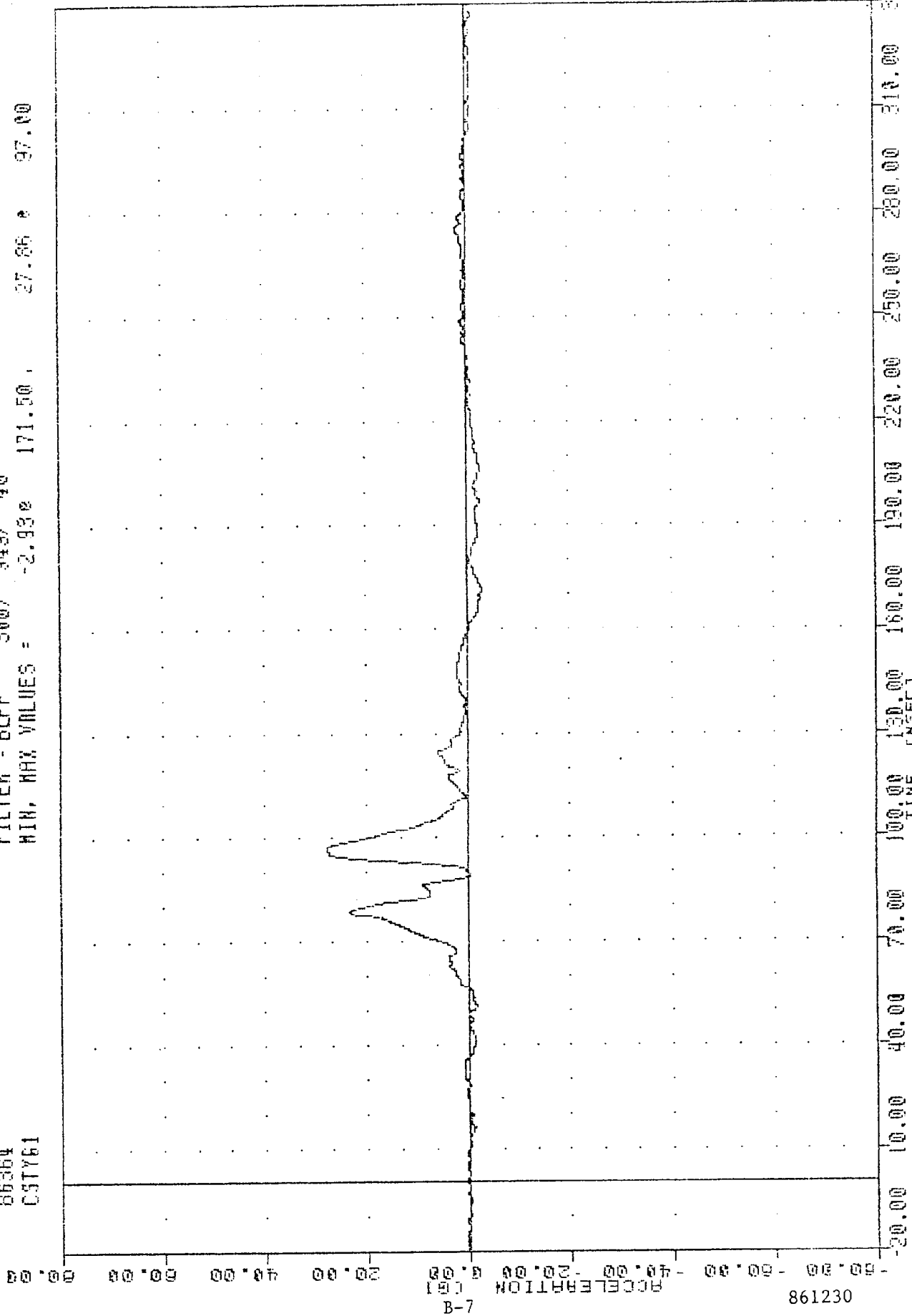
FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -48.26e 73.25 , 6.79 e 131.75



FORD AEROSTAR INTO LOAD CELL BARRIER
DRIVER CHEST ACCELERATION X AXIS

TAC , 861230
NEW CAR ASSESSMENT PROGRAM
86364
C5TY61

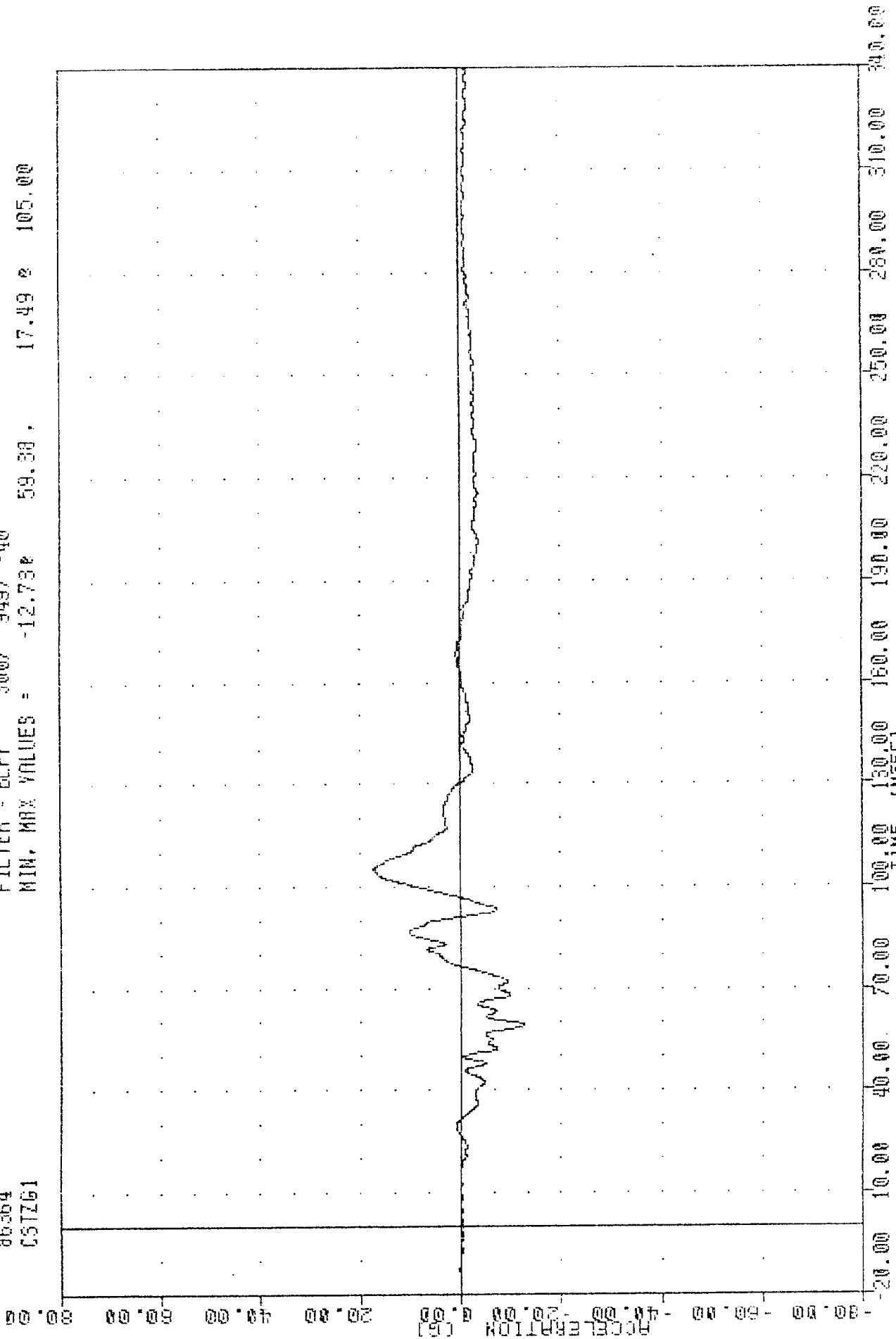
FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -2.93% 171.50, 27.86 e 97.00



FORD AEROSTAR INTO LOAD CELL BARRIER
DRIVER CHEST ACCELERATION Y AXIS

TRC
861230
NEW CAR ASSESSMENT PROGRAM
86364
CSTZG1

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -12.73e 59.38, 17.49 e 105.00



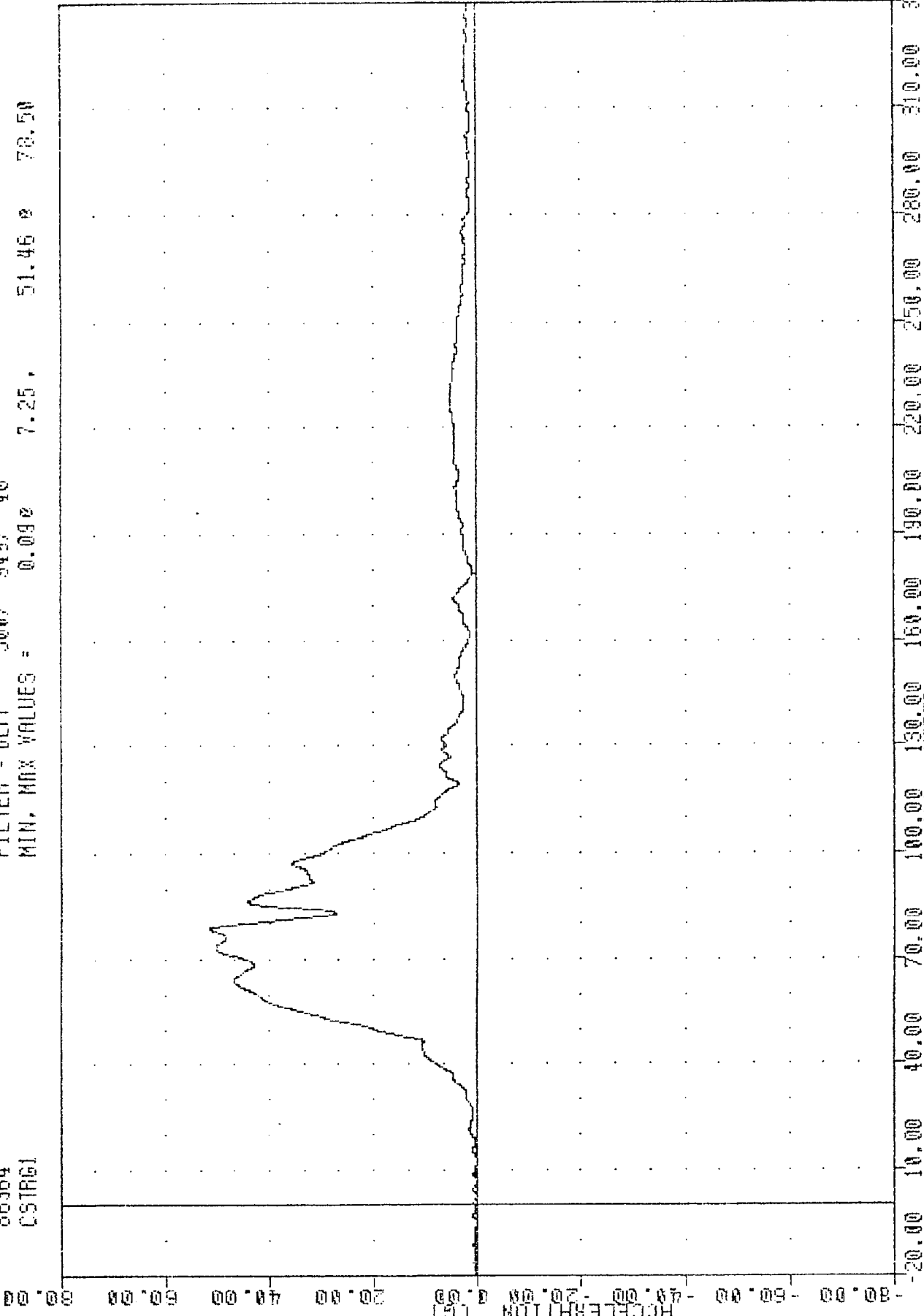
ACCELERATION (G)

TIME (MSEC)

FORD AEROSTAR INTO LOAD CELL BARRIER
DRIVER CHEST ACCELERATION Z AXIS

TRC
861230
NEW CAR ASSESSMENT PROGRAM
86364
CSTRG1

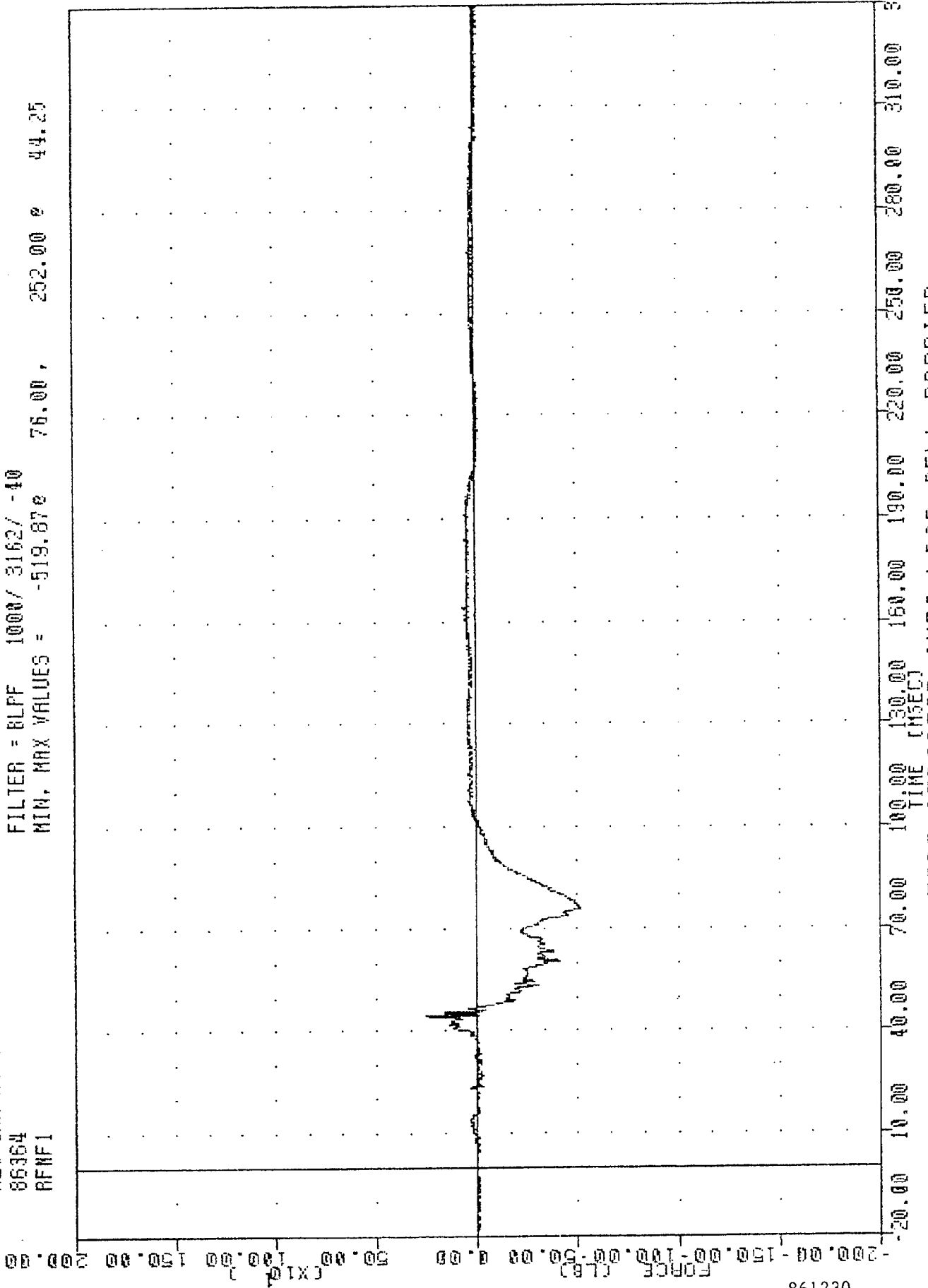
FILTER = BLPF 300/ 949/ -10
MIN. MAX VALUES = 0.090 7.25, 51.46 78.50



FORD AEROSTAR INTO LOAD CELL BARRIER
DRIVER CHEST RESULTANT ACCELERATION

TRC , 861230
NEW CAR ASSESSMENT PROGRAM
86364
RFNF1

FILTER = BLPF 1000/ 3162/ -40
MIN, MAX VALUES = -519.87e 76.00, 252.00 e 44.25



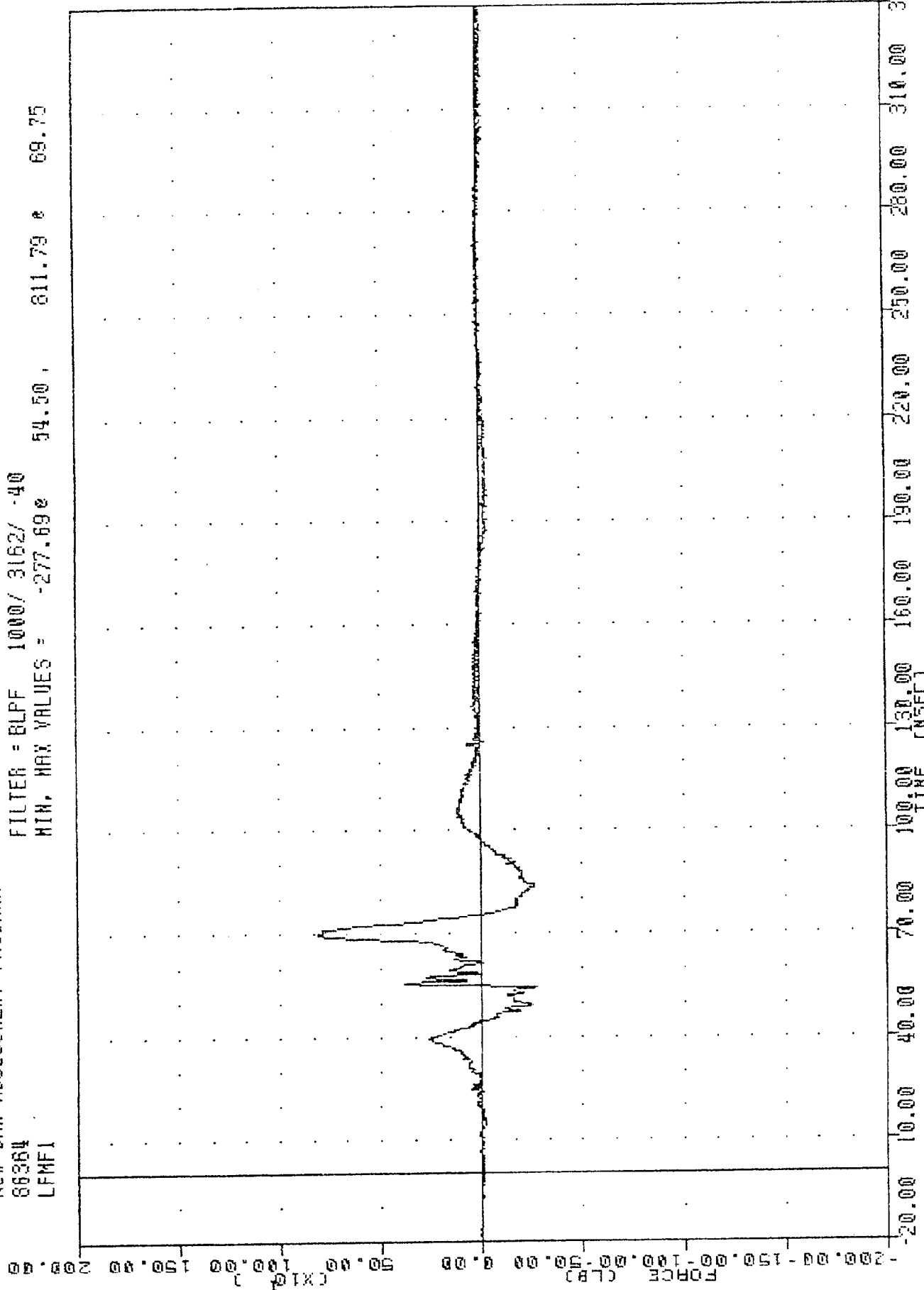
B-10

861230

FORD AEROSTAR INTO LOAD CELL BARRIER
DRIVER RIGHT FEMUR FORCE

TAC , 861230
NEW CAR ASSESSMENT PROGRAM
86364
LFMFI

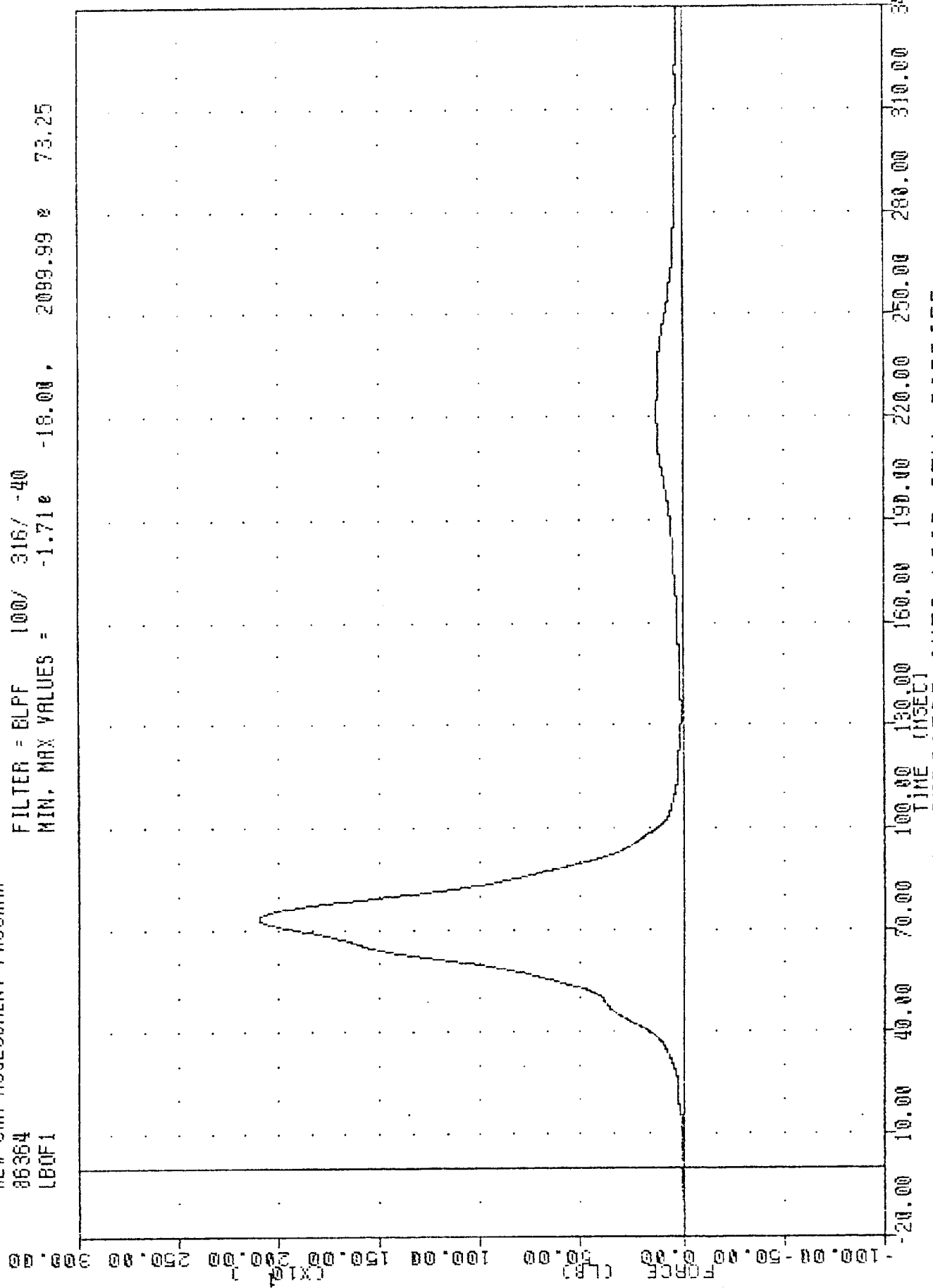
FILTER = BLPF 1000/ 3162/ -40
MIN, MAX VALUES = -277.69e 54.50 , 811.79 e 69.75



FORD AEROSTAR INTO LOAD CELL BARRIER
DRIVER LEFT FEMUR FORCE

IRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 LBDF1

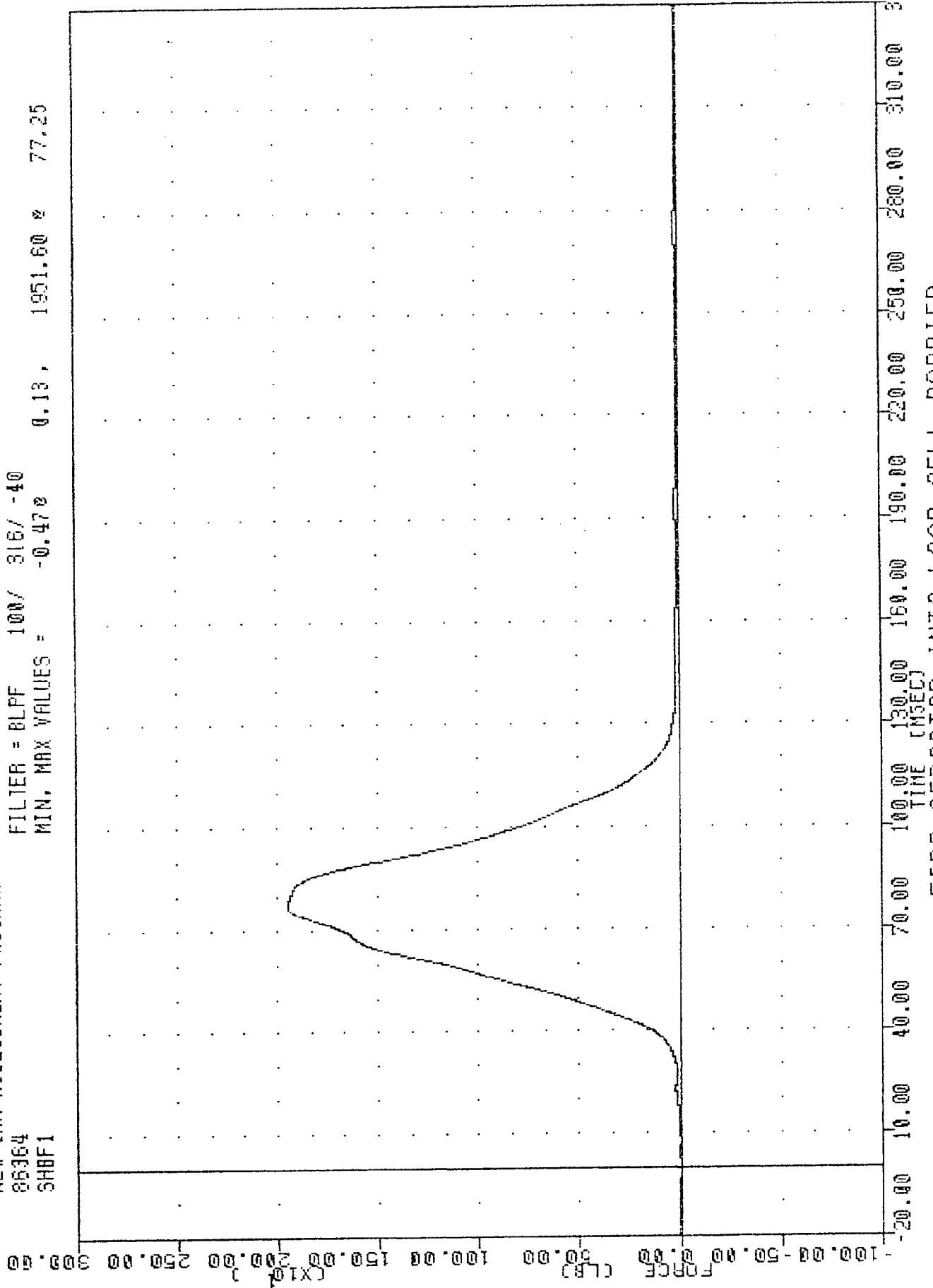
FILTER = BLPF 100/ 3167 -40
 MIN. MAX VALUES = -1.71e -18.00 , 2099.99 e 73.25



FORD AEROSTAR INTO LOAD CELL BARRIER
 NATVER IAP AFIT OUTWARD FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 85364
 SHBF1

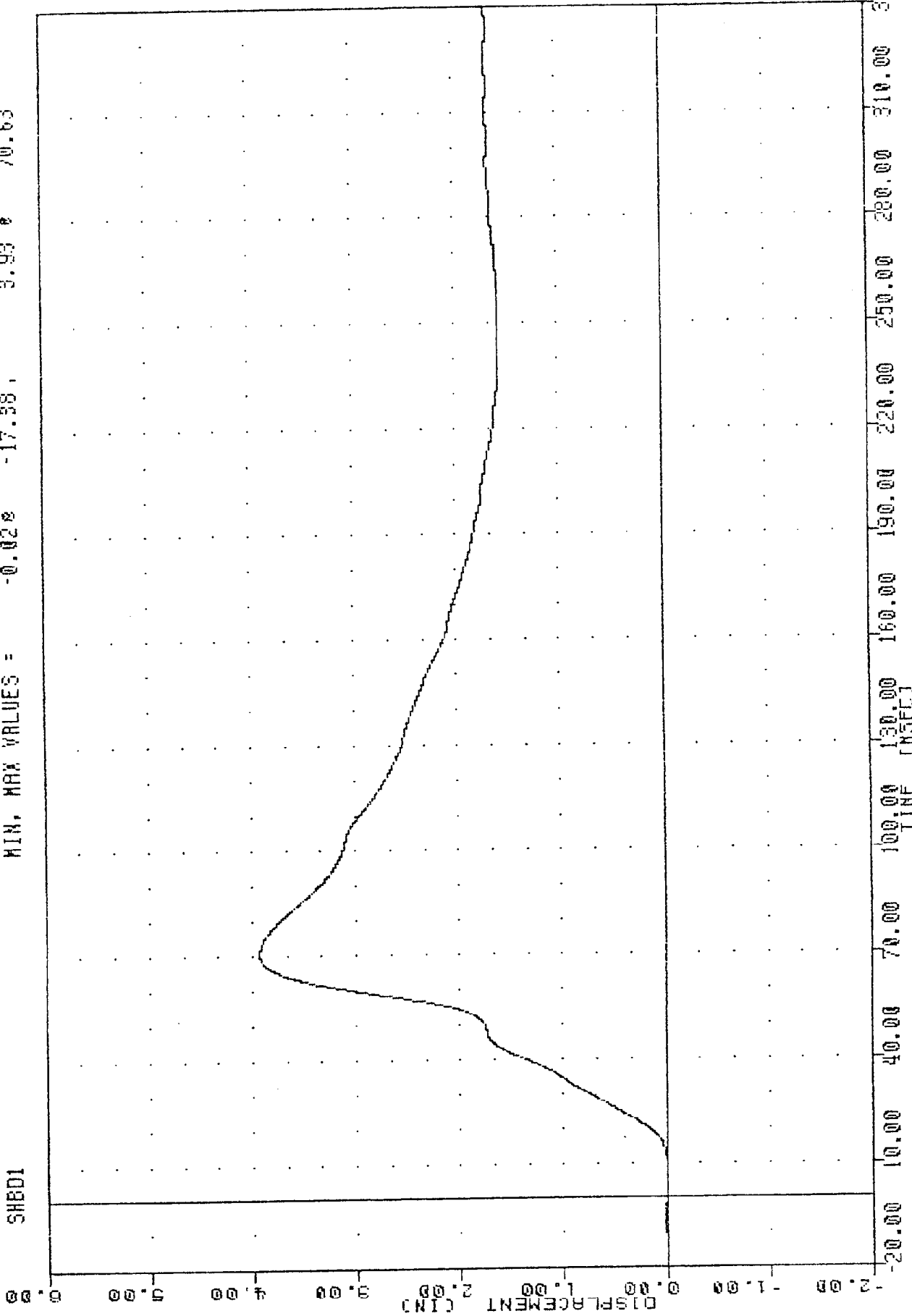
FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -0.478 0.13, 1951.60 77.25



FORD AEROSTAR INTO LOAD CELL BARRIER
 DRIVER SHOULDER BELT FORCE

TAC 861230
NEW CAR ASSESSMENT PROGRAM
86364
SHBD1

FILTER = BLFF 100/ 316/ 40
MIN. MAX VALUES = -0.028 3.93 70.63

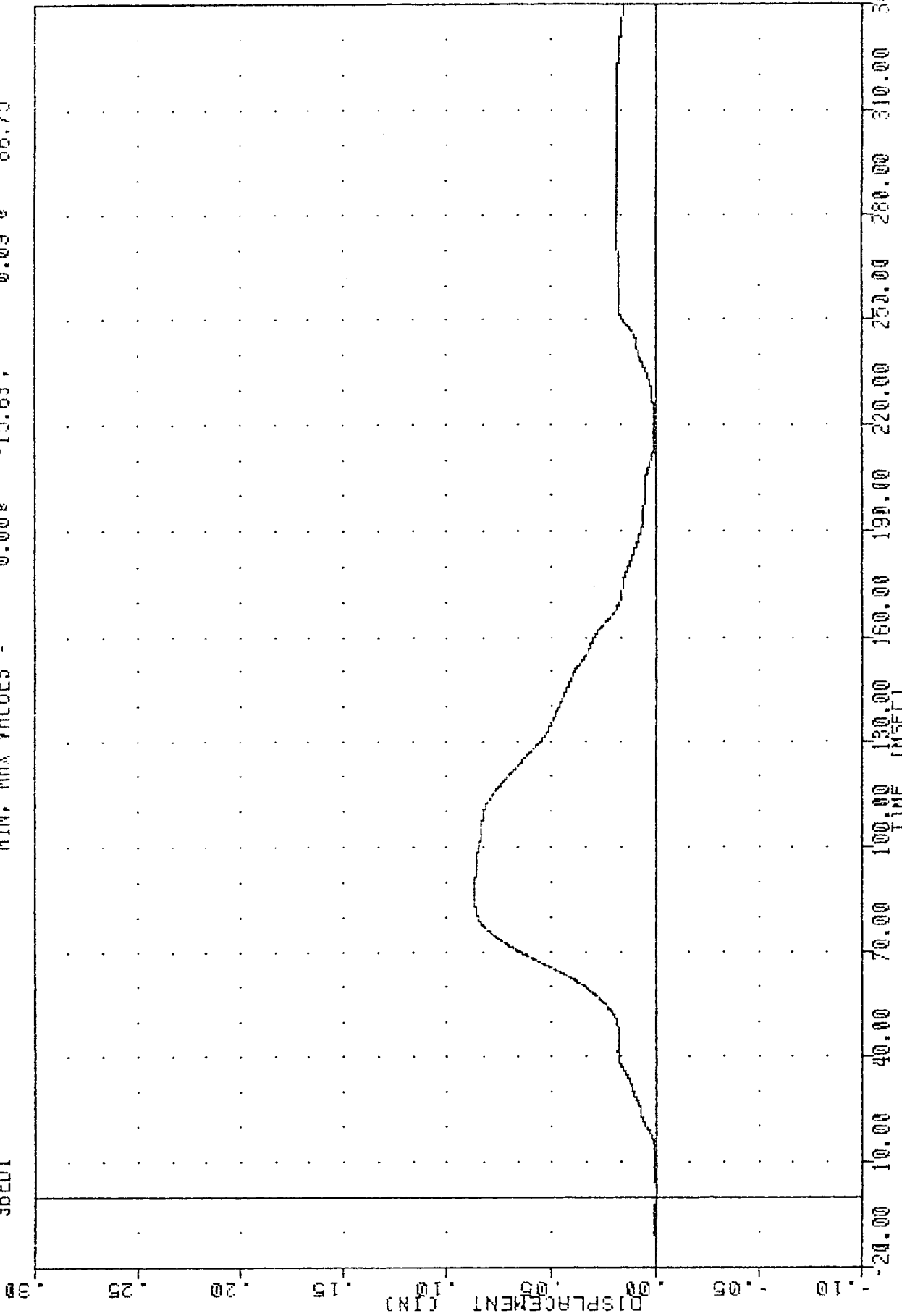


FORD AEROSTAR INTO LOAD CELL BARRIER
DRIVER SHOWN PER FIT DISPLACEMENT

TRC
 NEW CAR ASSESSMENT PROGRAM
 86364
 8BED1

861230

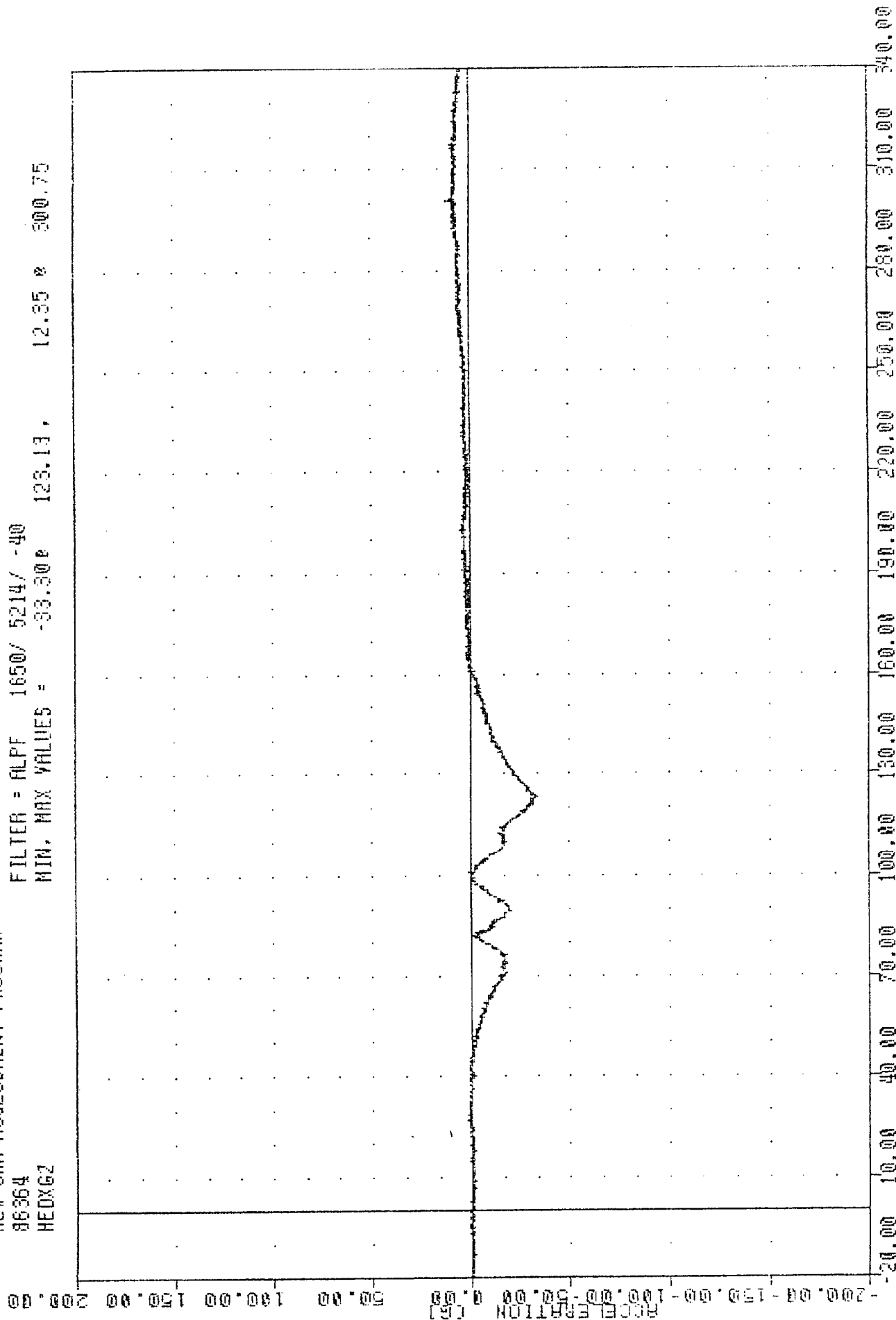
FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = 0.00e -15.63, 0.09 e 86.75



FORD AEROSTAR INTO LOAD CELL BARRIER
 DRIVER SEAT REIT EXTENSION

TRC
861230
NEW CAR ASSESSMENT PROGRAM
86364
HEDXG2

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -83.30E 123.13, 12.35 E 300.75

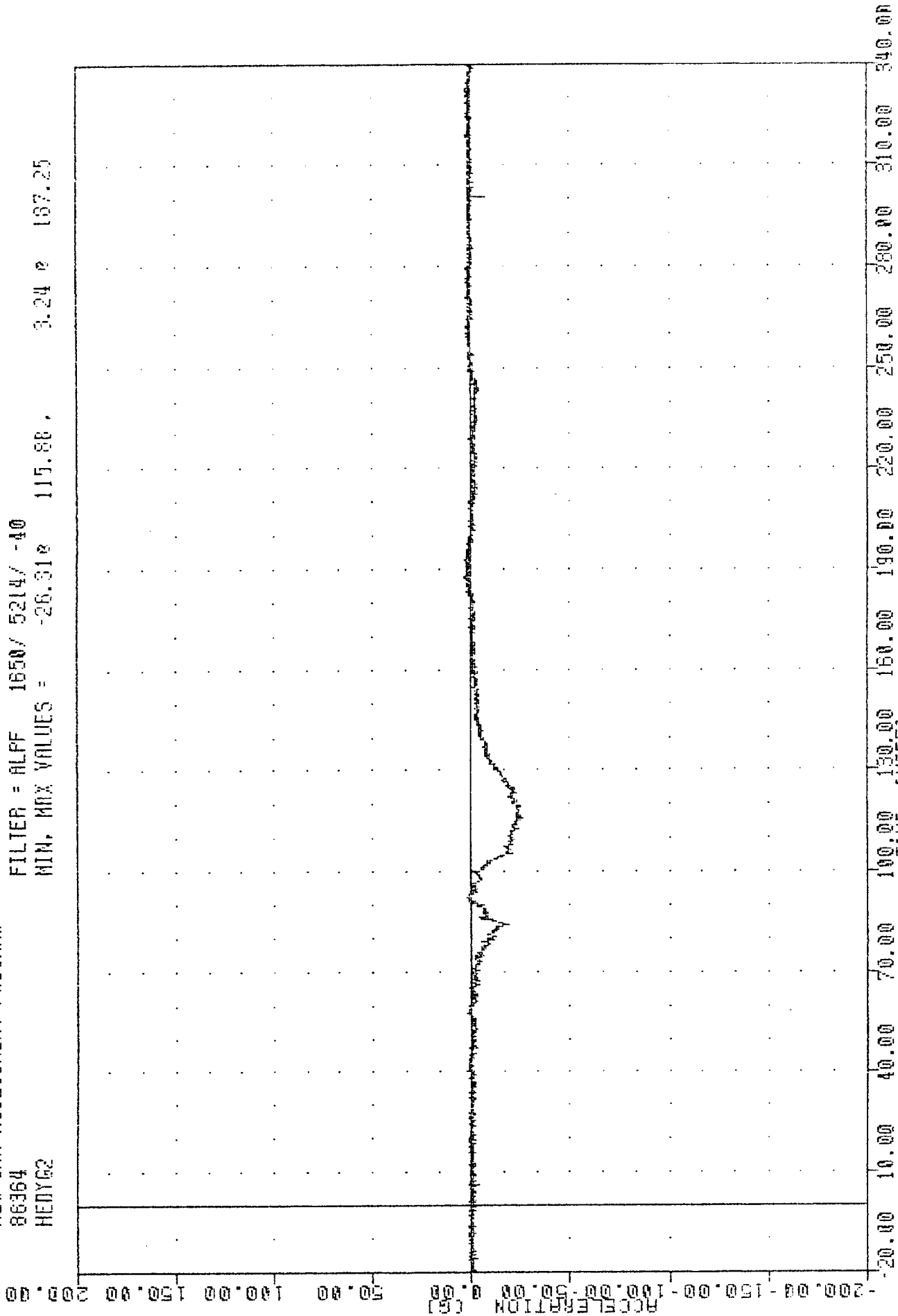


FORD AEROSTAR INTO LOAD CELL BARRIER
PASSENGER HEAD ACCELERATION X AXIS

TRC
NEW CAR ASSESSMENT PROGRAM
86364
HEDYG2

, 861230

FILTER = ALFF 1650/ 5214/ -40
MIN. MAX VALUES = -26.31e 3.24 e 167.25

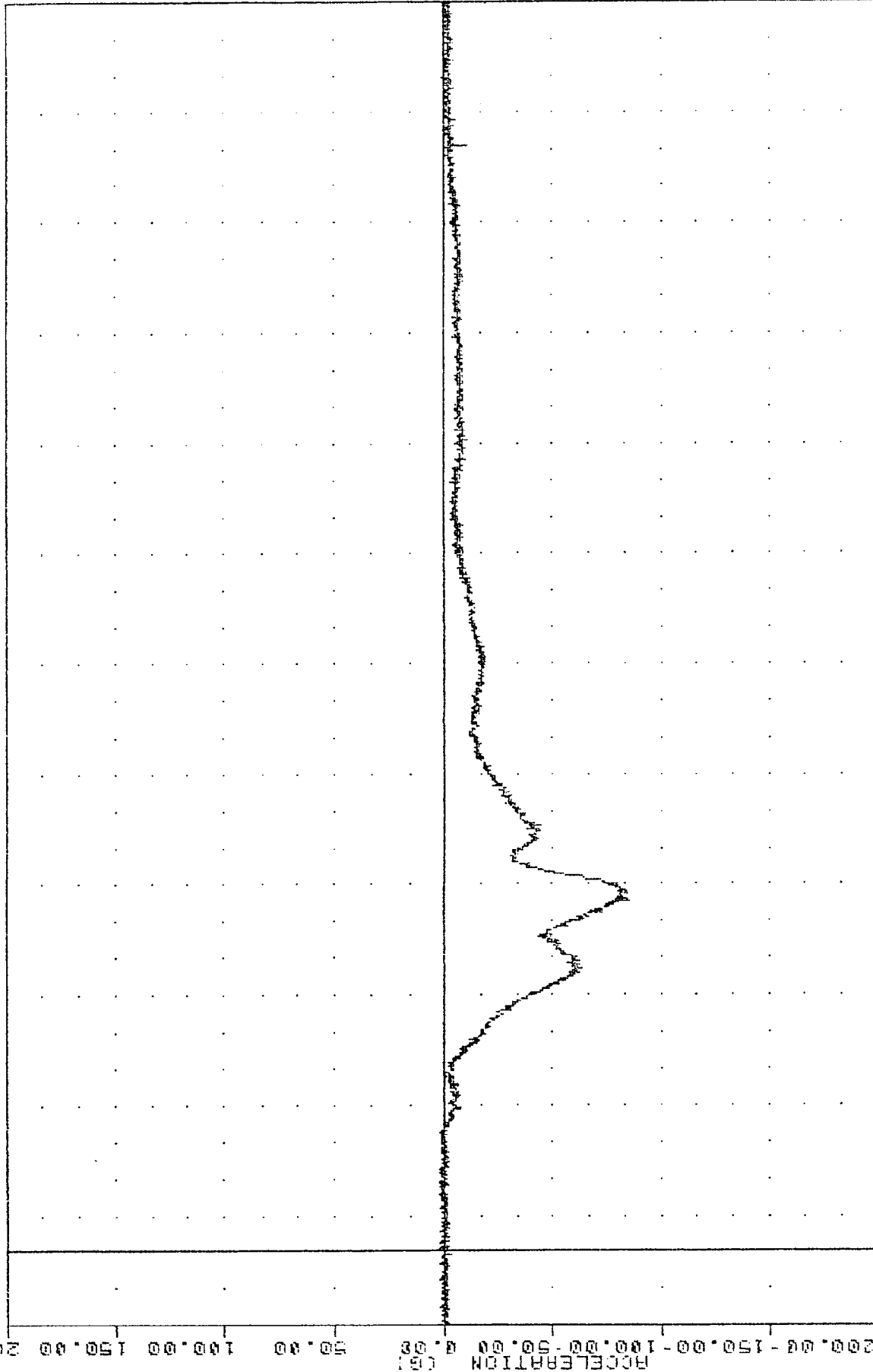


FORD AEROSTAR INTO LOAD CELL BARRIER
PASSENGER HEAD ACCELERATION Y AXIS

TAC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 HED762

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -85.29% 95.75 , 2.84 % 17.75

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

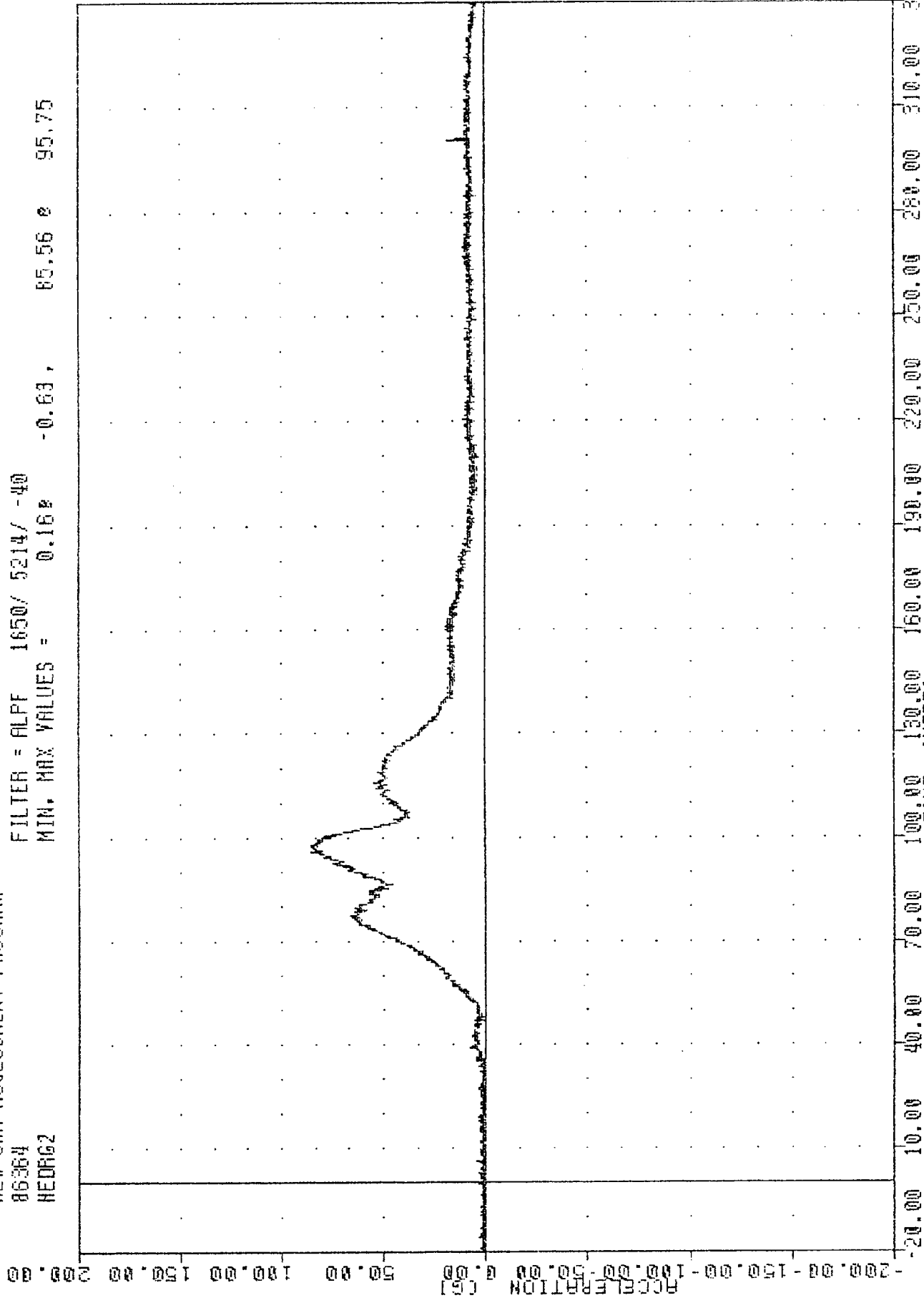


FORD AEROSTAR INTO LOAD CELL BARRIER
 PASSENGER HEAD ACCELERATION 7 AXIS

TRC
NEW CAR ASSESSMENT PROGRAM
86364
HEAD62

, 861230

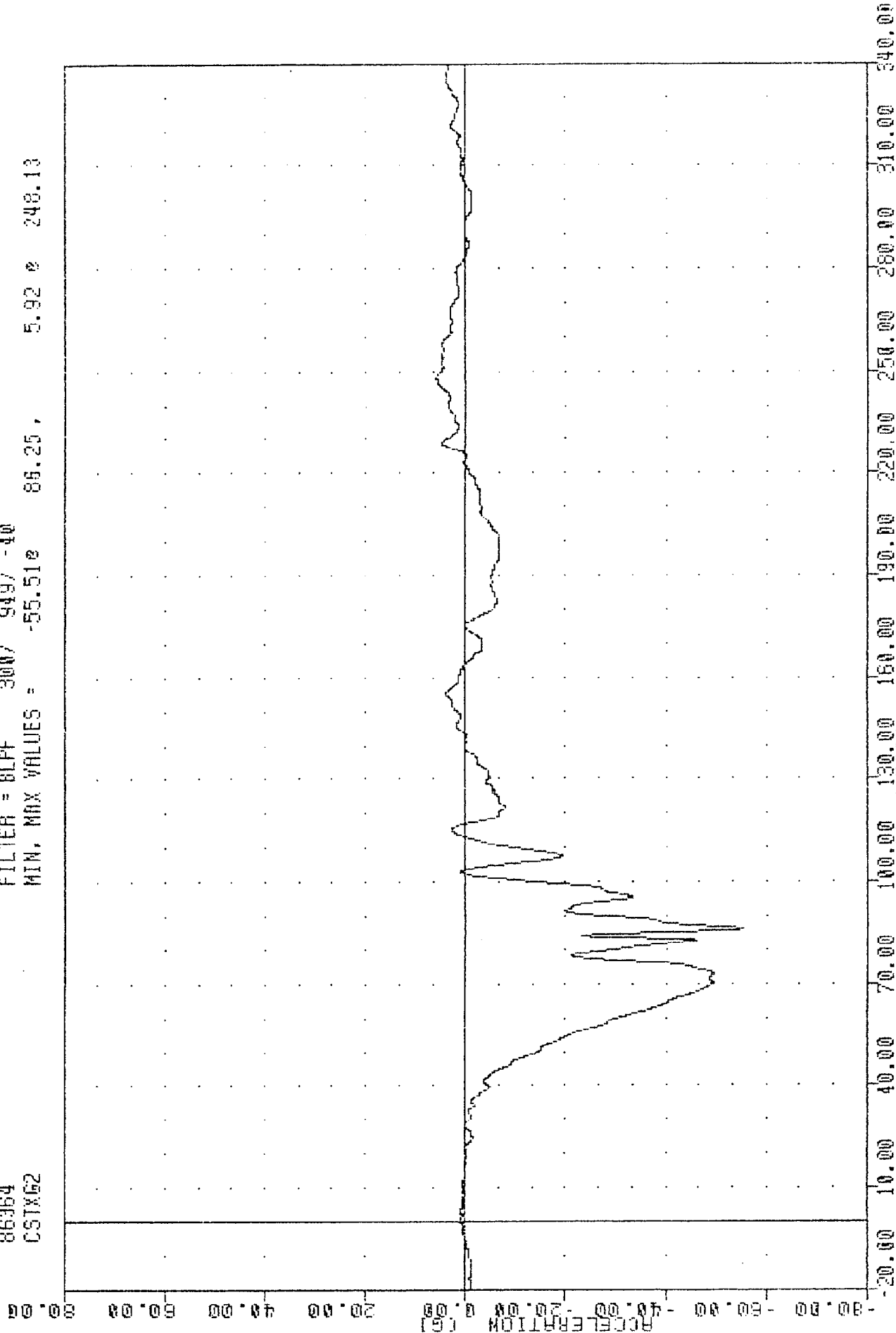
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 0.16% -0.63% 85.56 @ 95.75



FORD AEROSTAR INTO LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION

TRC
NEW CAR ASSESSMENT PROGRAM
861230
86364
CSTX62

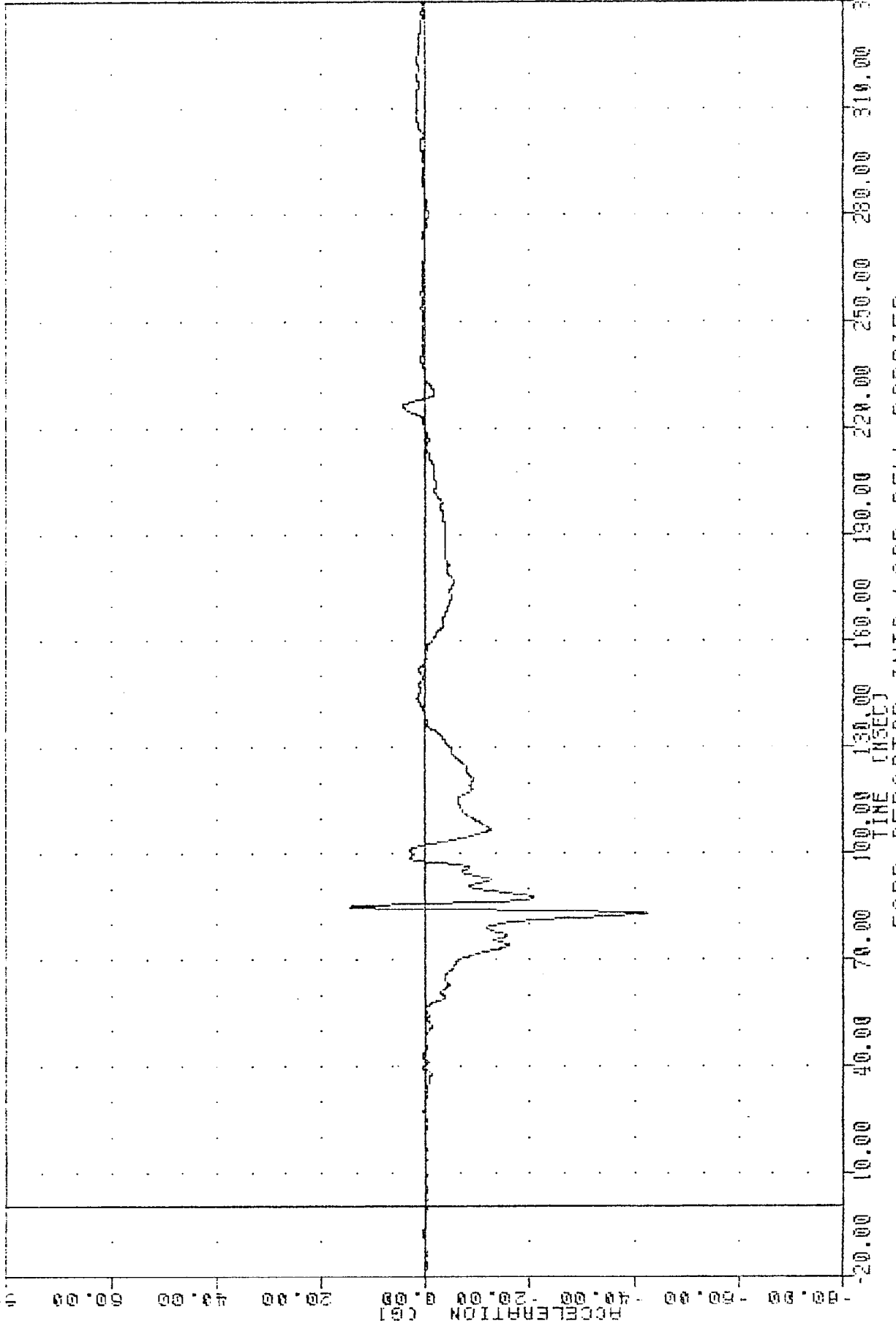
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -55.512 86.25, 5.92 248.13



FORD AEROSTAR INTO LOAD CELL BARRIER
PASSENGER CHEST ACCELERATION Y AXIS

TAC , 861230
NEW CAR ASSESSMENT PROGRAM
86364
C5TYE2

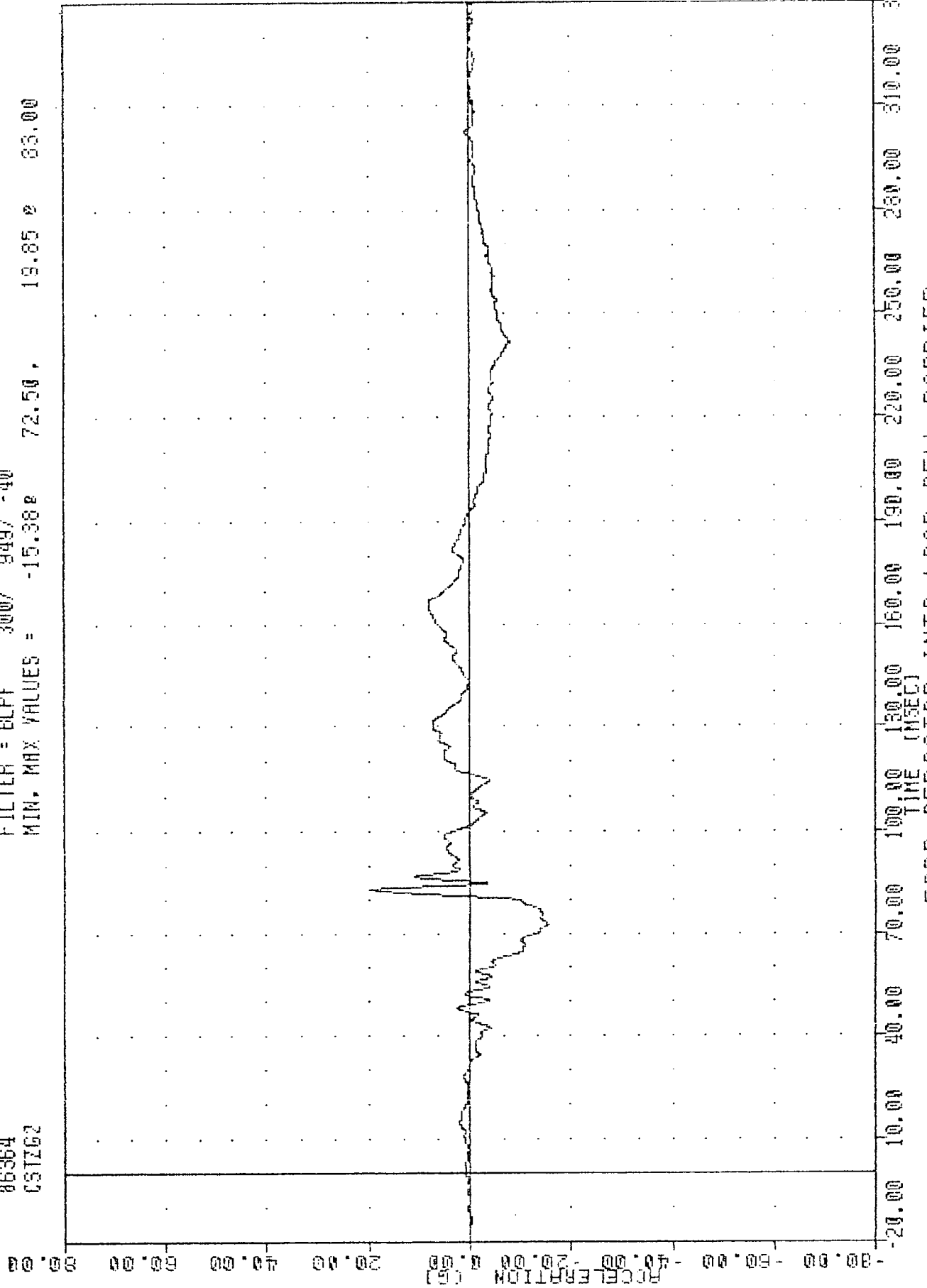
FILTER = ELFF 300/ 949/ -40
MIN. MAX VALUES = -42.77e 83.00 , 14.61 e 85.13



FORD AEROSTAR INTO LOAD CELL BARRIER
PASSENGER CHEST ACCELERATION Y AXIS

TRC , 861230
NEW CAR ASSESSMENT PROGRAM
86364
C3T262

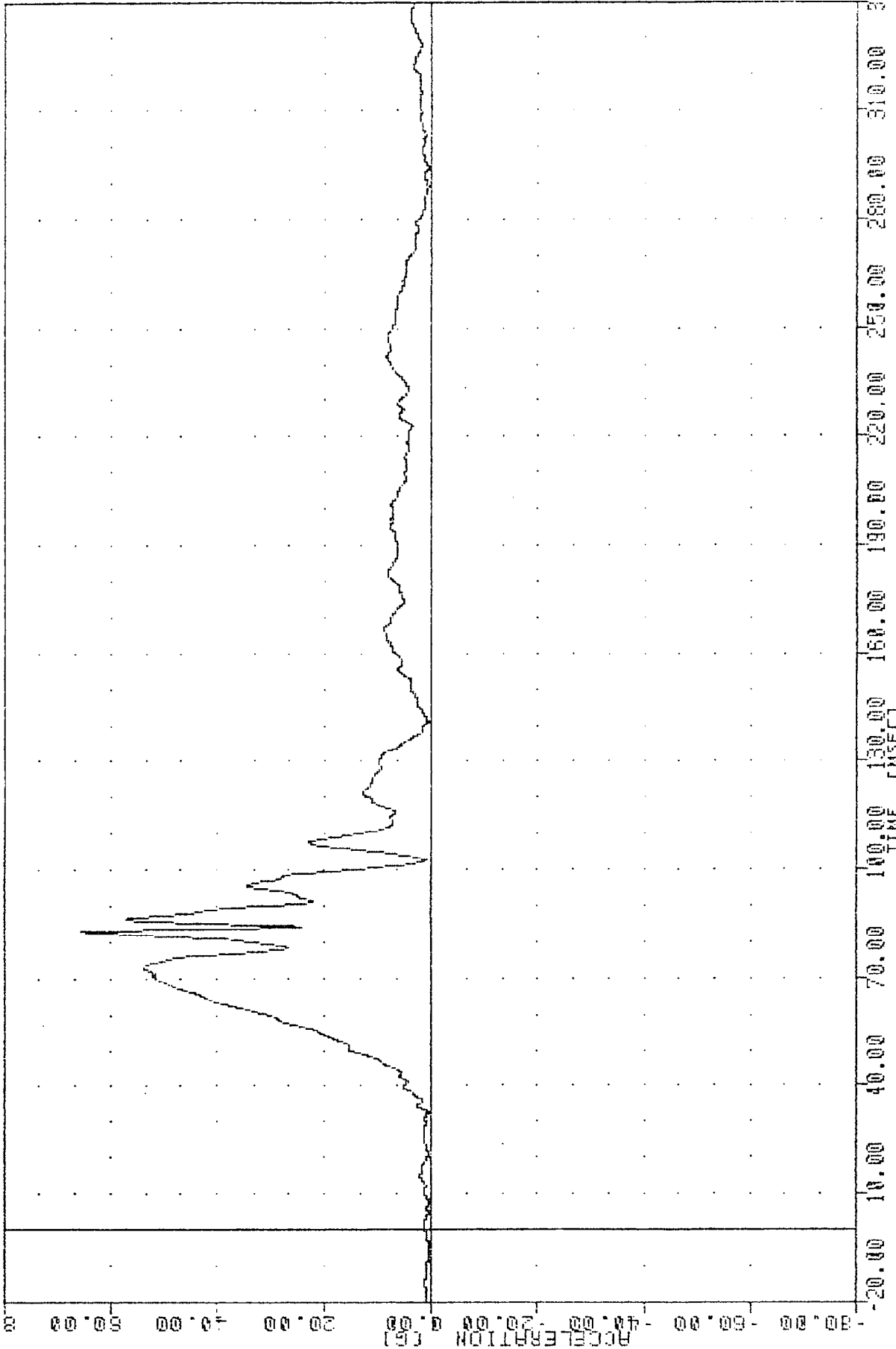
FILTER = BLFF 300/ 949/ -40
MIN. MAX VALUES = -15.38e 72.50 , 19.85 e 63.00



FORD AEROSTAR INTO LOAD CELL BARRIER
PASSENGER CHEST AFFECTION 7 AYTS

TRC
861230
NEW CAR ASSESSMENT PROGRAM
86364
CSTRG2

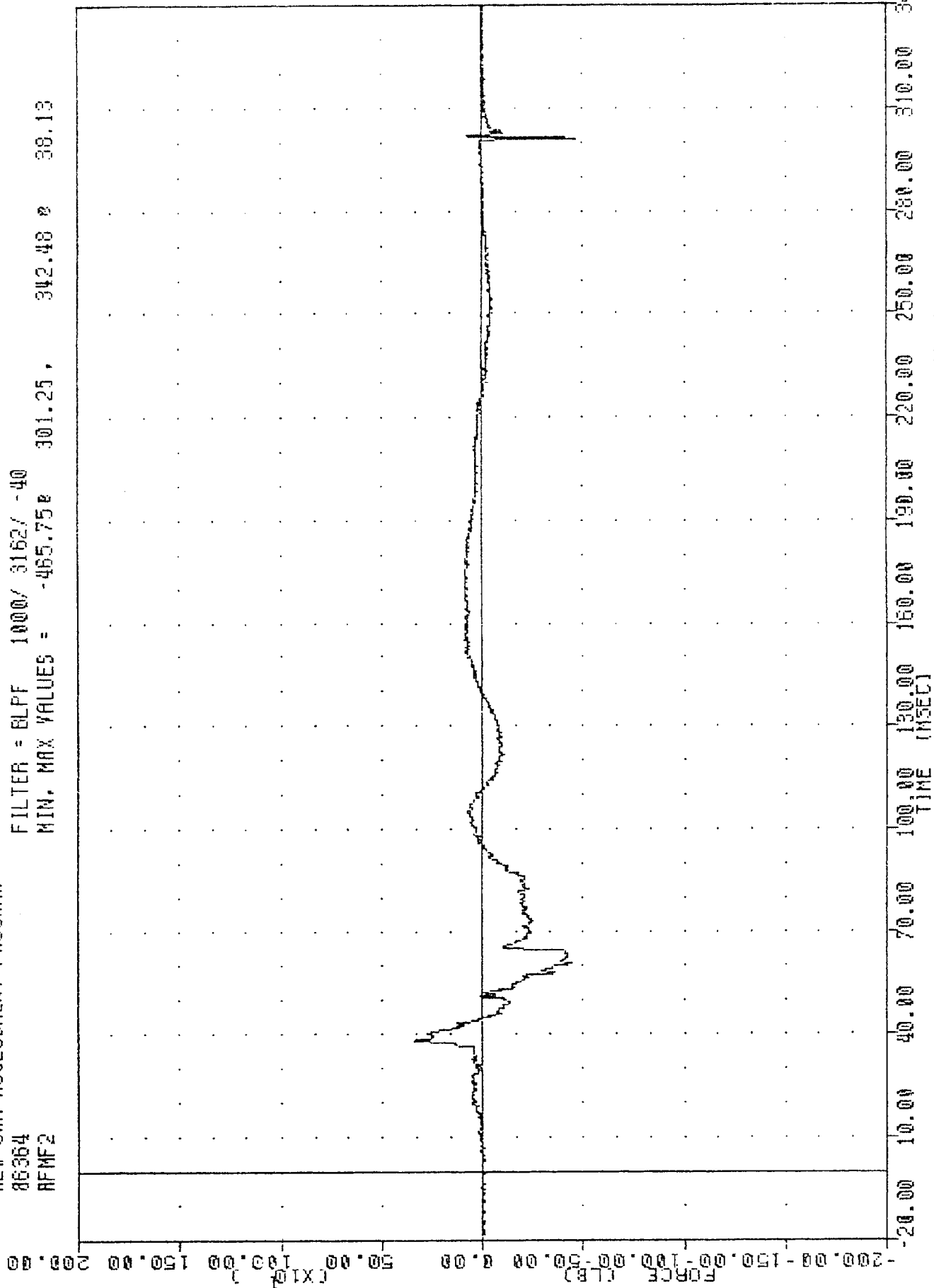
FILTER = BLFF 300/ 949/ -40
MIN. MAX VALUES = 0.36e -4.13, 65.47 e 82.88



FORD AEROSTAR INTO LOAD CELL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION

TRC , 861230
NEW CAR ASSESSMENT PROGRAM
86364
AFMF2

FILTER = BLPF 1000/ 3162/ -40
MIN. MAX VALUES = -465.750 301.25, 342.48 0 38.13

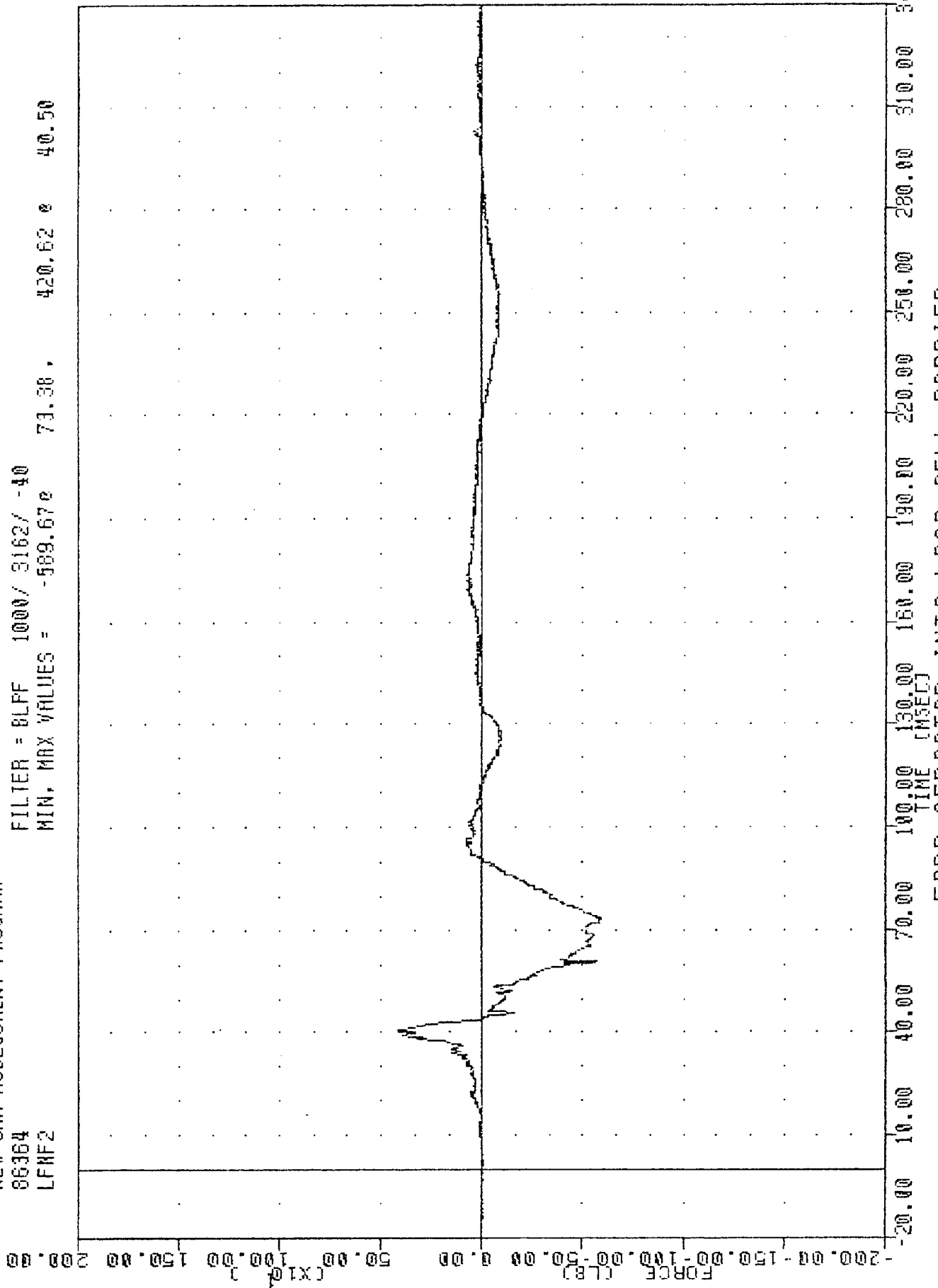


FORD AEROSTAR INTO LOAD CELL BARRIER
DESCENDING BUTT SEMIIP ENRFE

TRC
NEW CAR ASSESSMENT PROGRAM
86364
LFHF2

861230

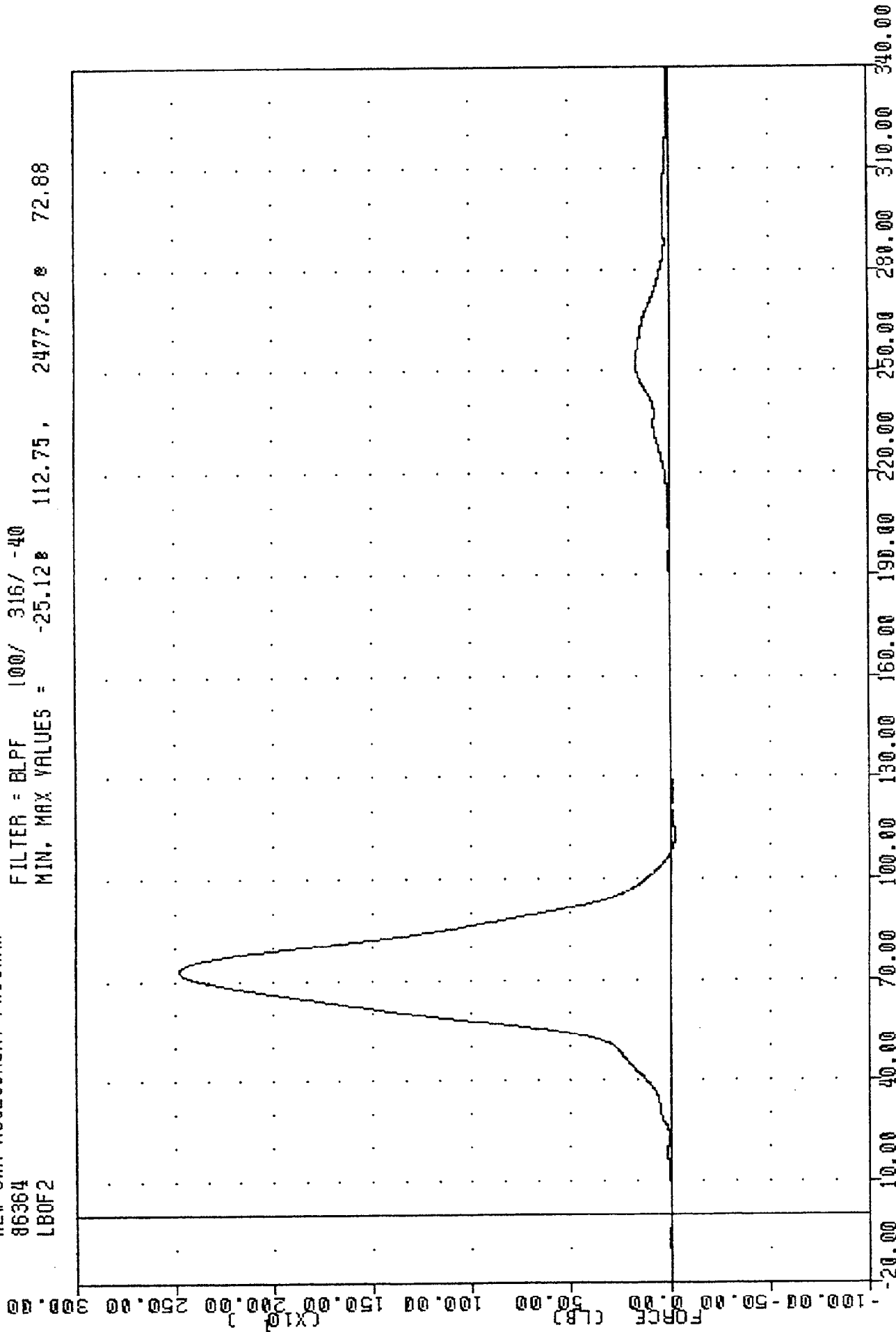
FILTER = 8LFF 1000/ 3162/ -40
MIN. MAX VALUES = -589.67e 73.38, 420.62 e 40.50



FORD AEROSTAR INTO LOAD CELL BARRIER
PASSENGER LEFT FEMUR FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 LB0F2

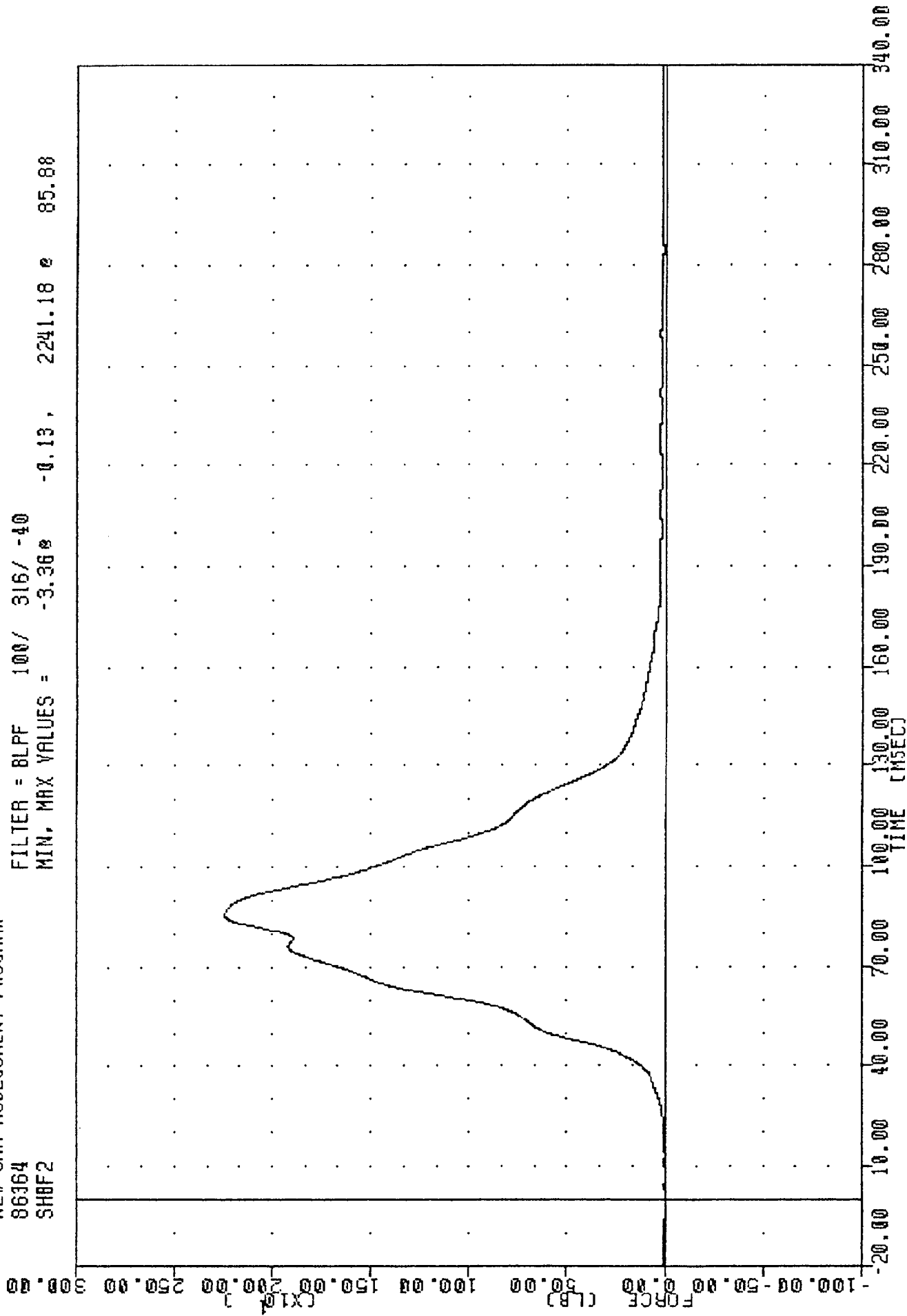
FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -25.12 112.75 , 2477.82 72.88



FORD AEROSTAR INTO LOAD CELL BARRIER
 PASSENGER LAP BELT OUTBOARD FORCE

TRC
861230
NEW CAR ASSESSMENT PROGRAM
86364
SHBF2

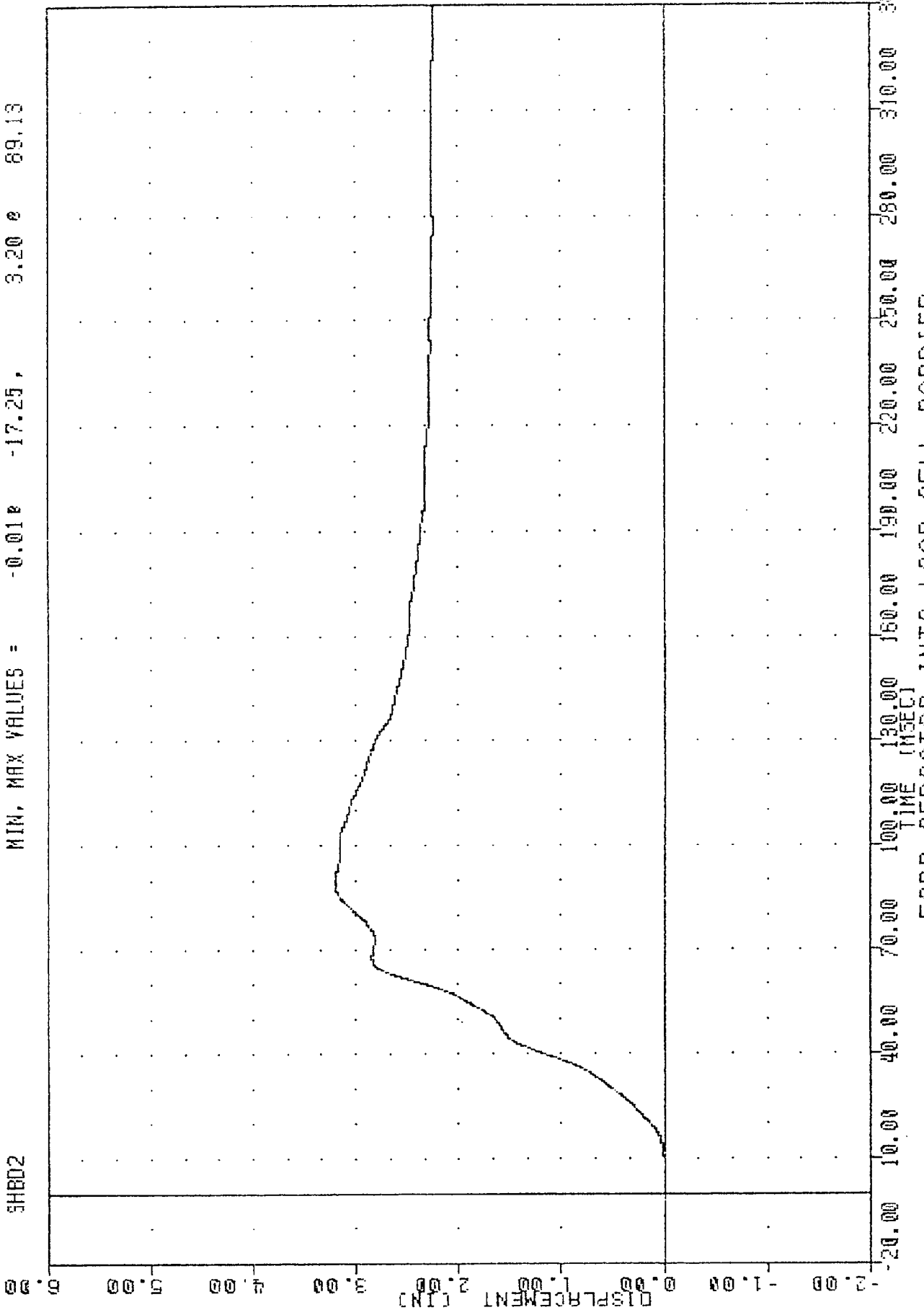
FILTER = 8LPF 100/ 316/ -40
MIN. MAX VALUES = -3.36e -0.13, 2241.18 e 85.88



FORD AEROSTAR INTO LOAD CELL BARRIER
PASSENGER SHOULDER BELT FORCE

TRC , 861230
NEW CAR ASSESSMENT PROGRAM
86364
SHBD2

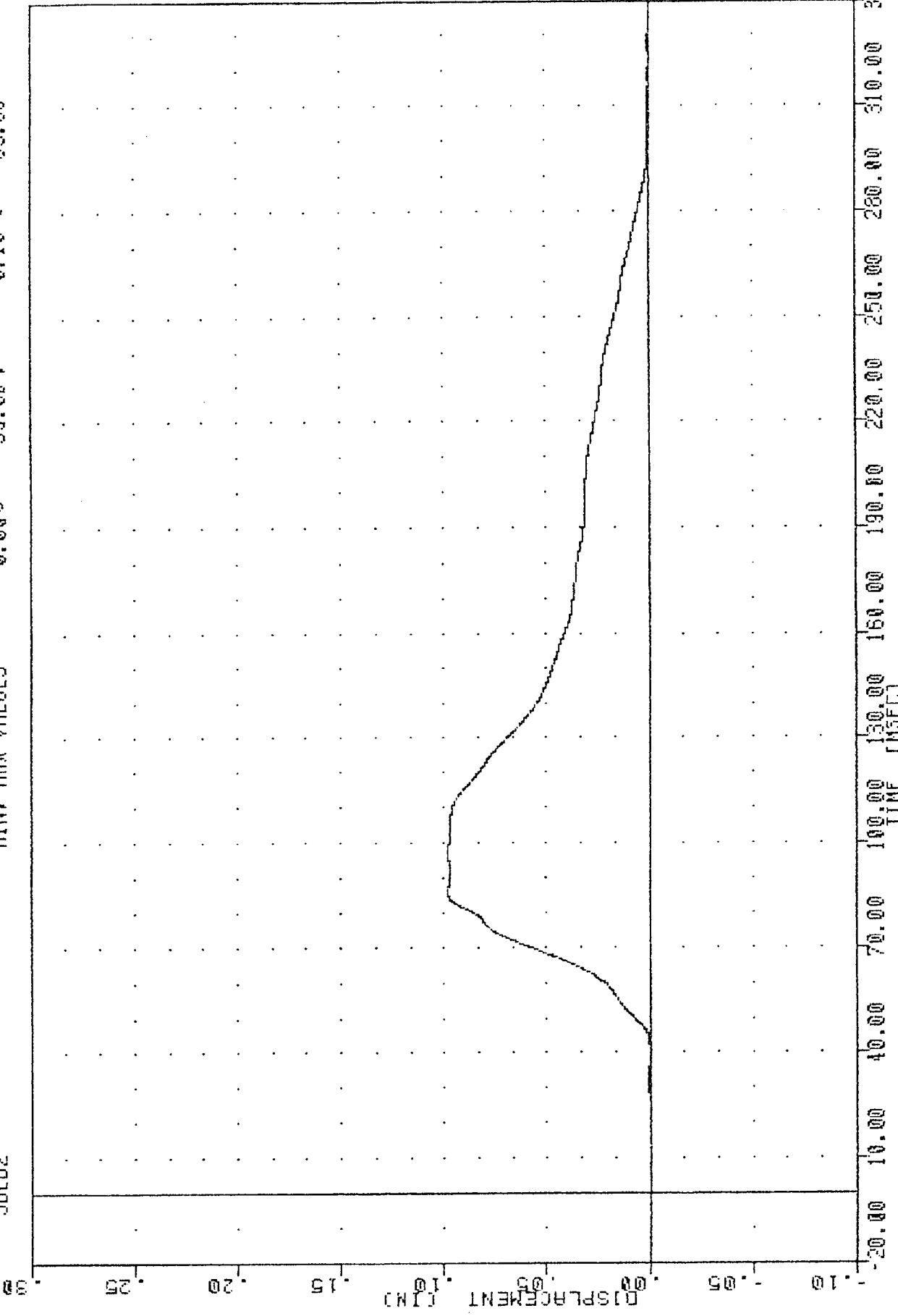
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -0.01e -17.25, 3.20 e 89.13



FORD AEROSTAR INTO LOAD CELL BARRIER
PASSENGER SHOULDER BELT DISPLACEMENT

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86384
 SBED2

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = 0.00e 38.00 . 0.10 e 85.88

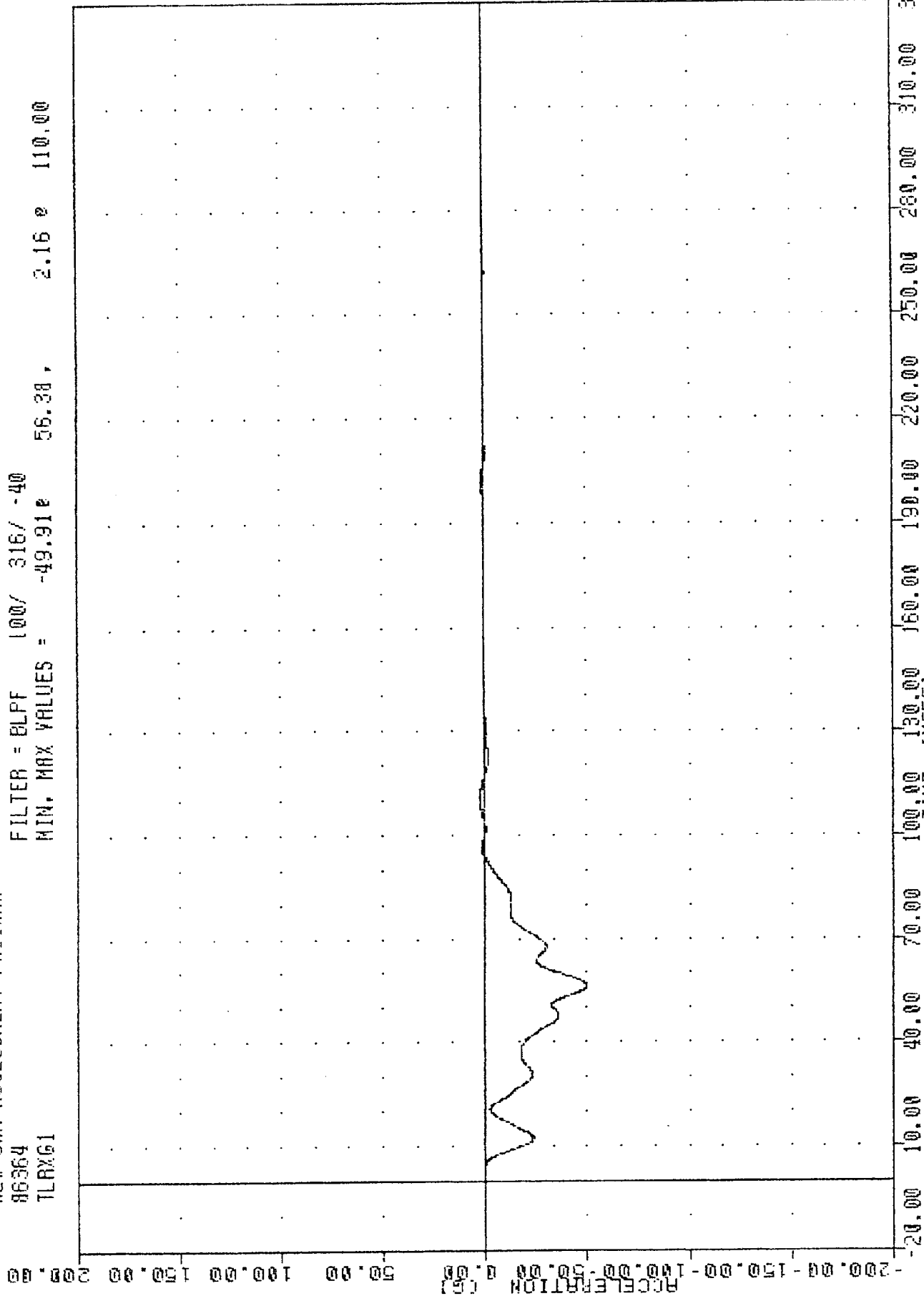


FORD AEROSTAR INTO LOAD CELL BARRIER
 PASSENGER SEAT REIT EXTENSION

TRC
NEW CAR ASSESSMENT PROGRAM
86364
TLRX61

861230

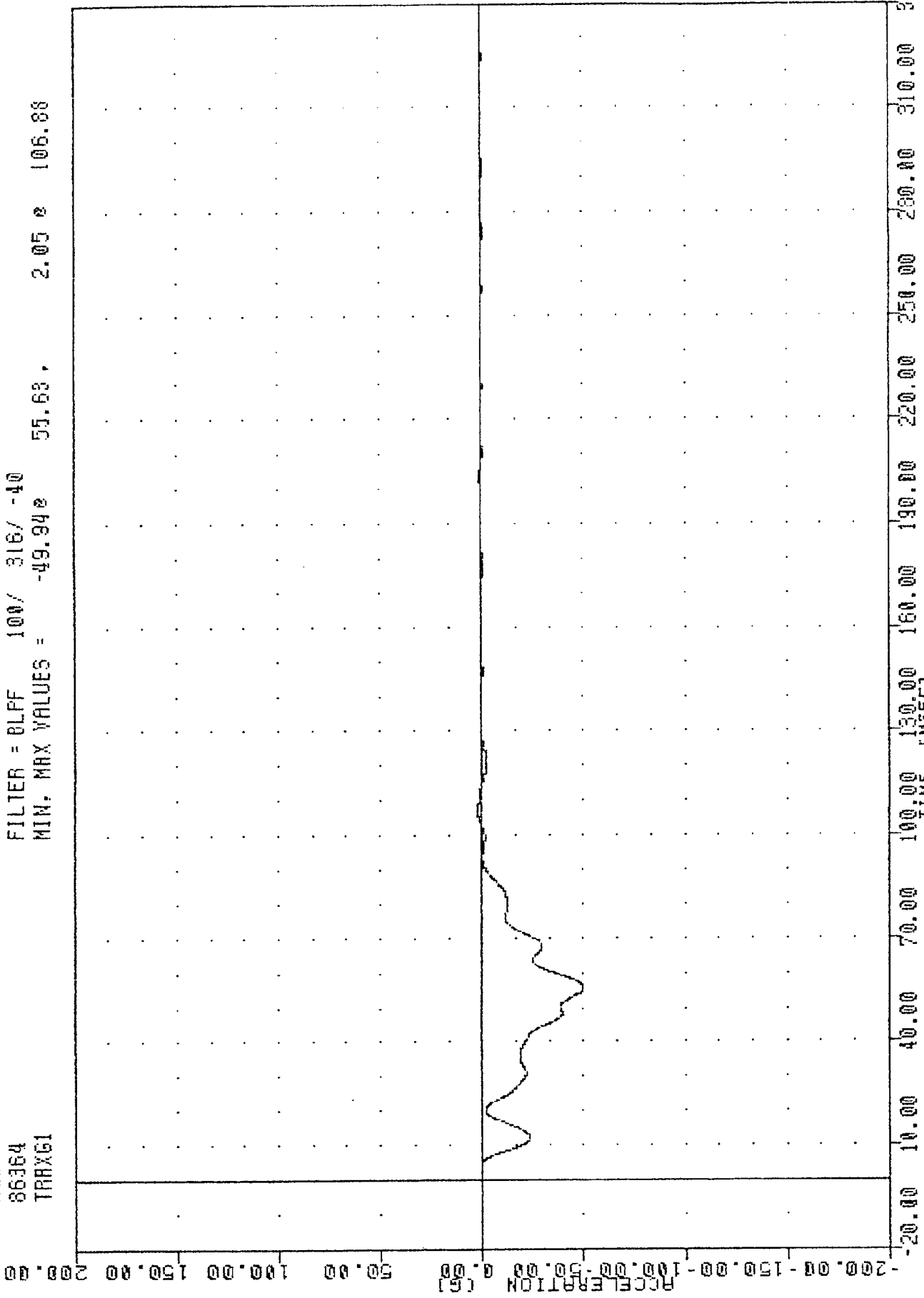
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -49.91e 56.38, 2.16 e 110.00



FORD AEROSTAR INTO LOAD CELL BARRIER
LEFT REAR SEAT ACCELERATION X AXIS

TRC
NEW CAR ASSESSMENT PROGRAM
861230
86364
TRX61

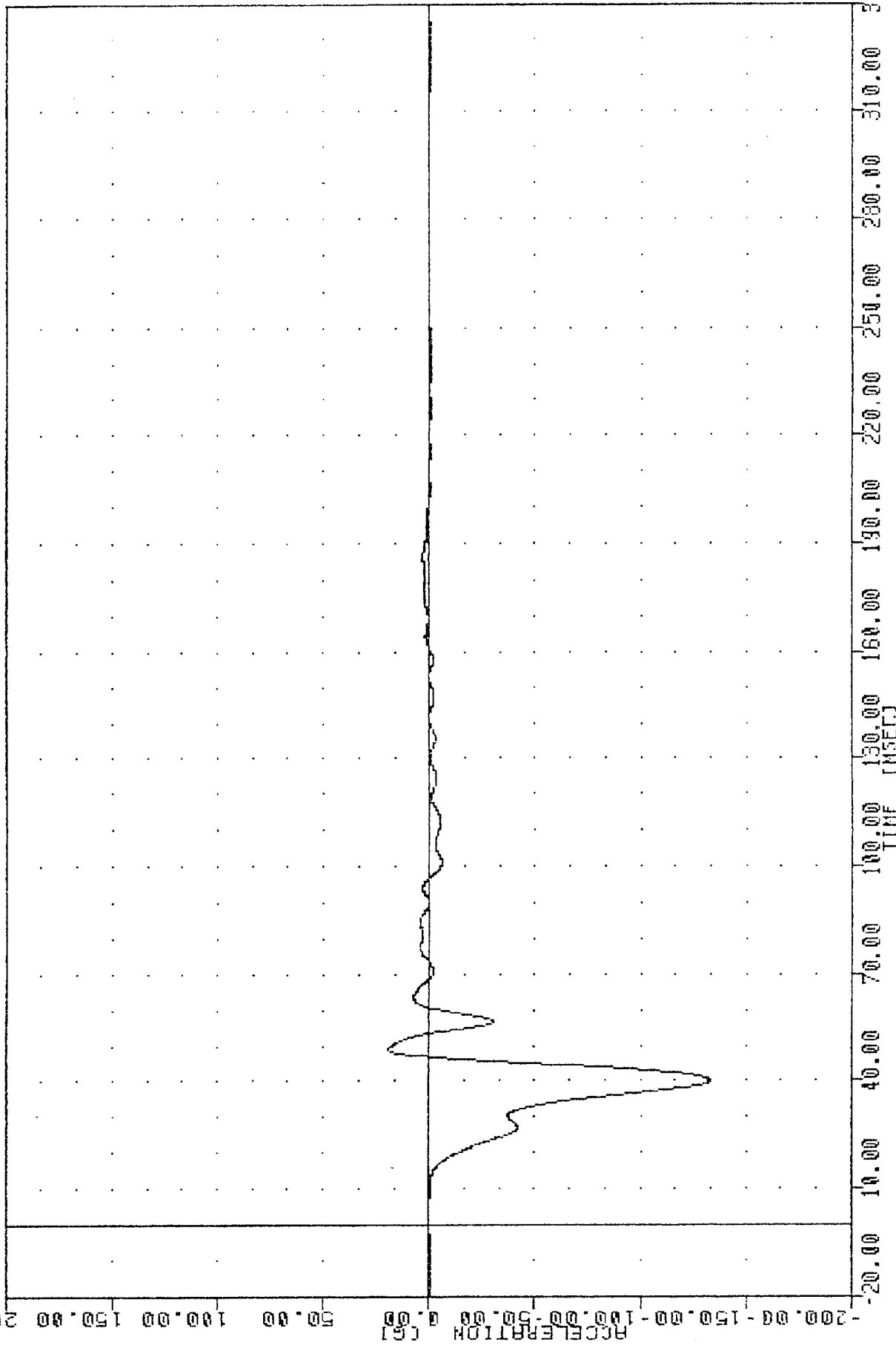
FILTER = BLFF 100/ 316/ -40
MIN. MAX VALUES = -49.94 55.63 2.05 106.88



FORD AEROSTAR INTO LOAD CELL BARRIER
RIGHT REAR SEAT ACCELERATION X AXIS

TAC 861230
NEW CAR ASSESSMENT PROGRAM
86364
ENGXG1

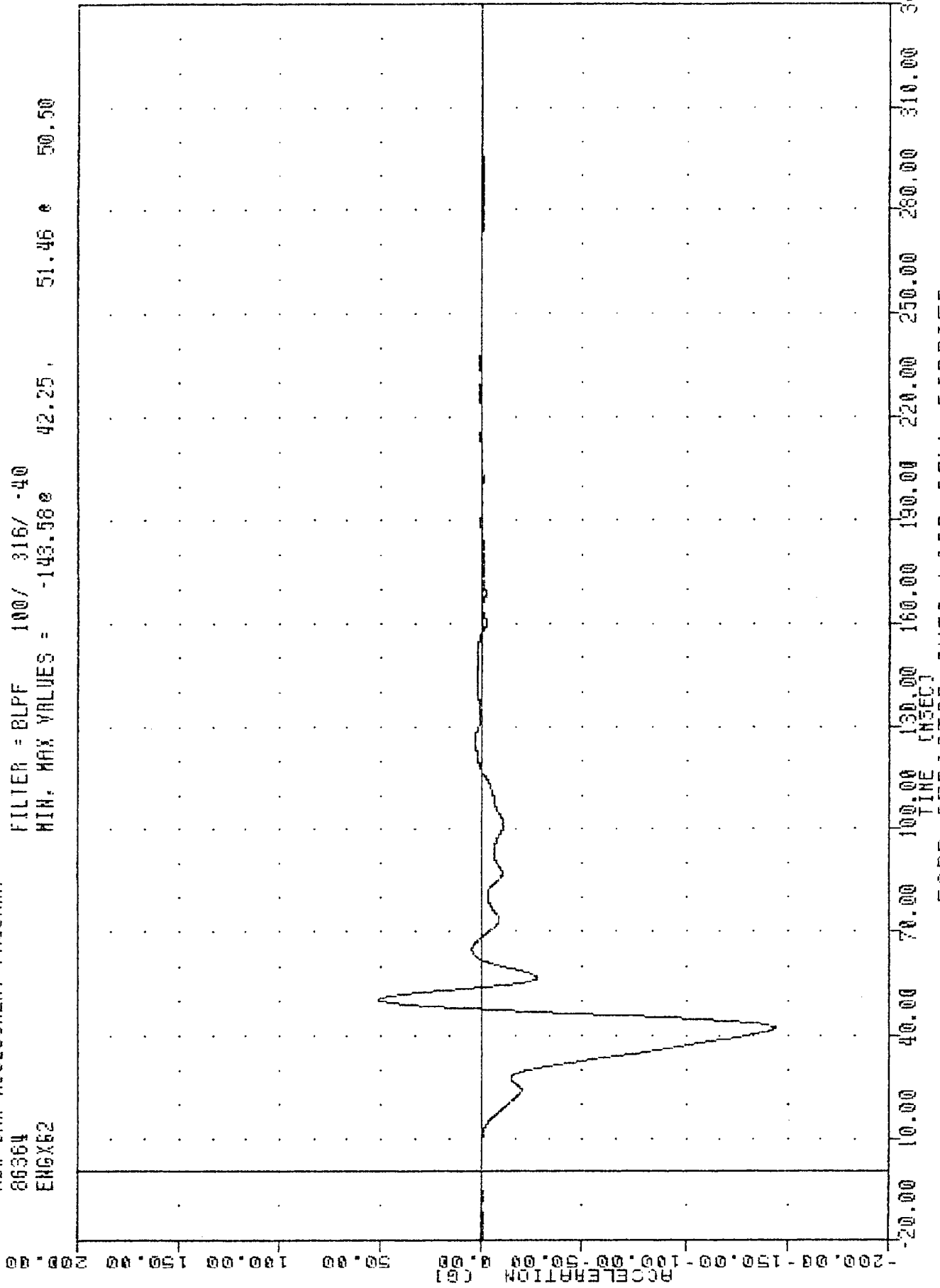
FILTER = 6LFF 100/ 316/ -40
MIN. MAX VALUES = -133.56 40.00 19.67 48.88



FORD AEROSTAR INTO LOAD CELL BARRIER
ENGINE UPPER BLOCK ACCELERATION X AXIS

THC
861230
NEW CAR ASSESSMENT PROGRAM
86364
ENGX62

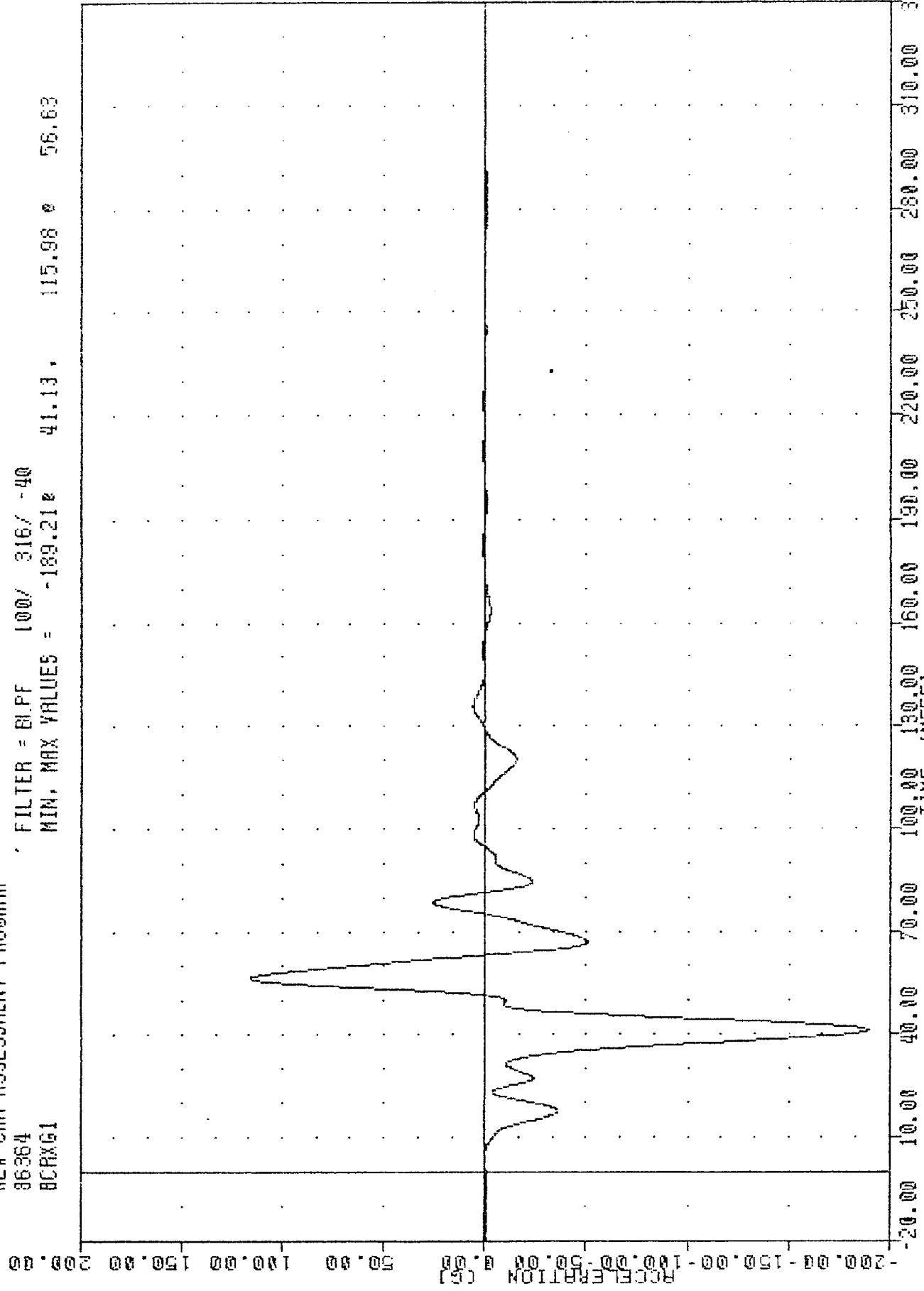
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -149.58 51.46 50.50



FORD AEROSTAR INTO LOAD CELL BARRIER
ENGINE LOWER BLOCK ACCELERATION X AXIS

TRC , 861230
NEW CAR ASSESSMENT PROGRAM
86364
BCRXG1

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -189.21 41.13, 115.98 56.63

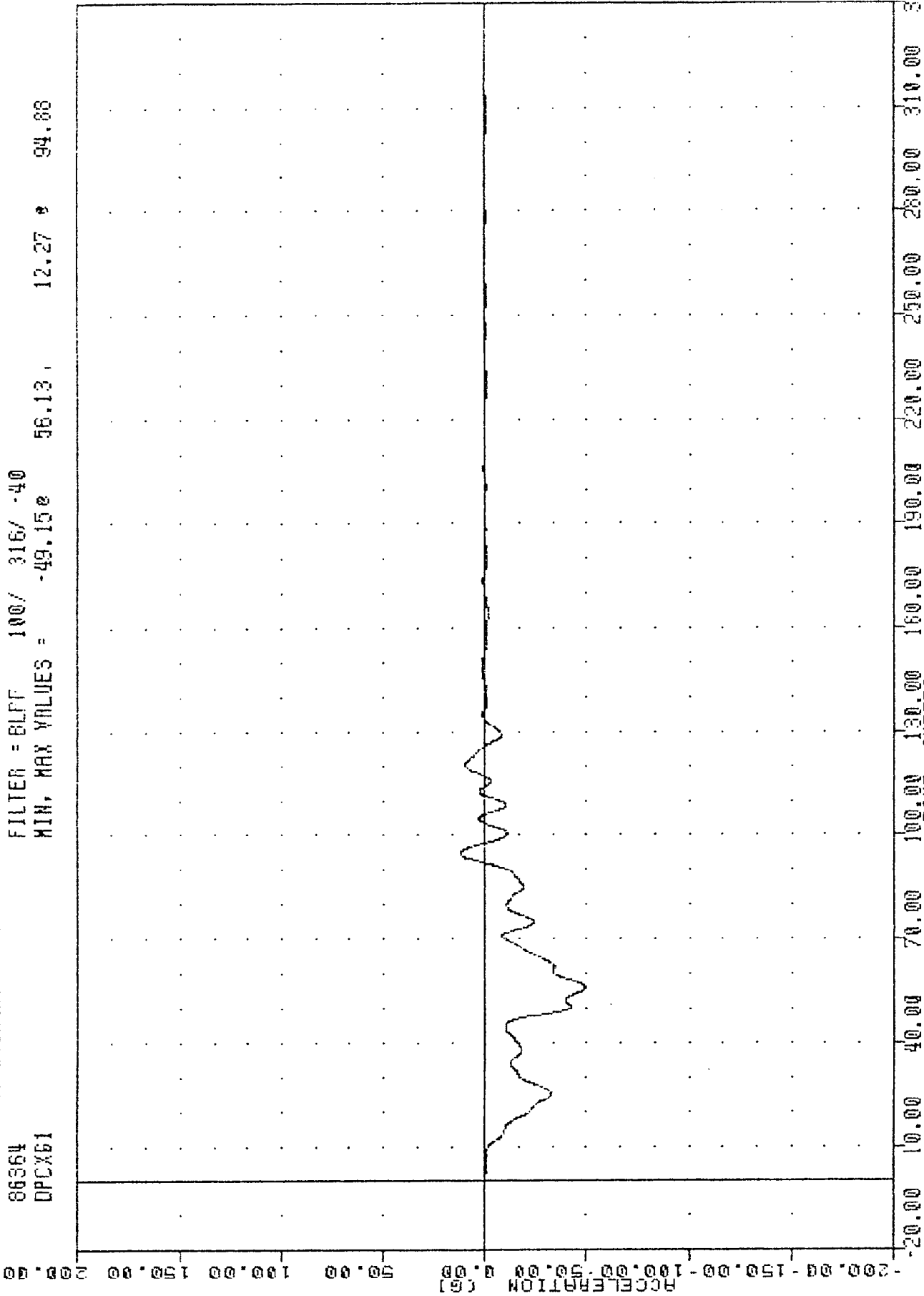


FORD AEROSTAR INTO LOAD CELL BARRIER
RIGHT BRAKE CALIPER ACCELERATION X AXIS

TAC
NEW CAR ASSESSMENT PROGRAM
86364
DPCX61

, 861230

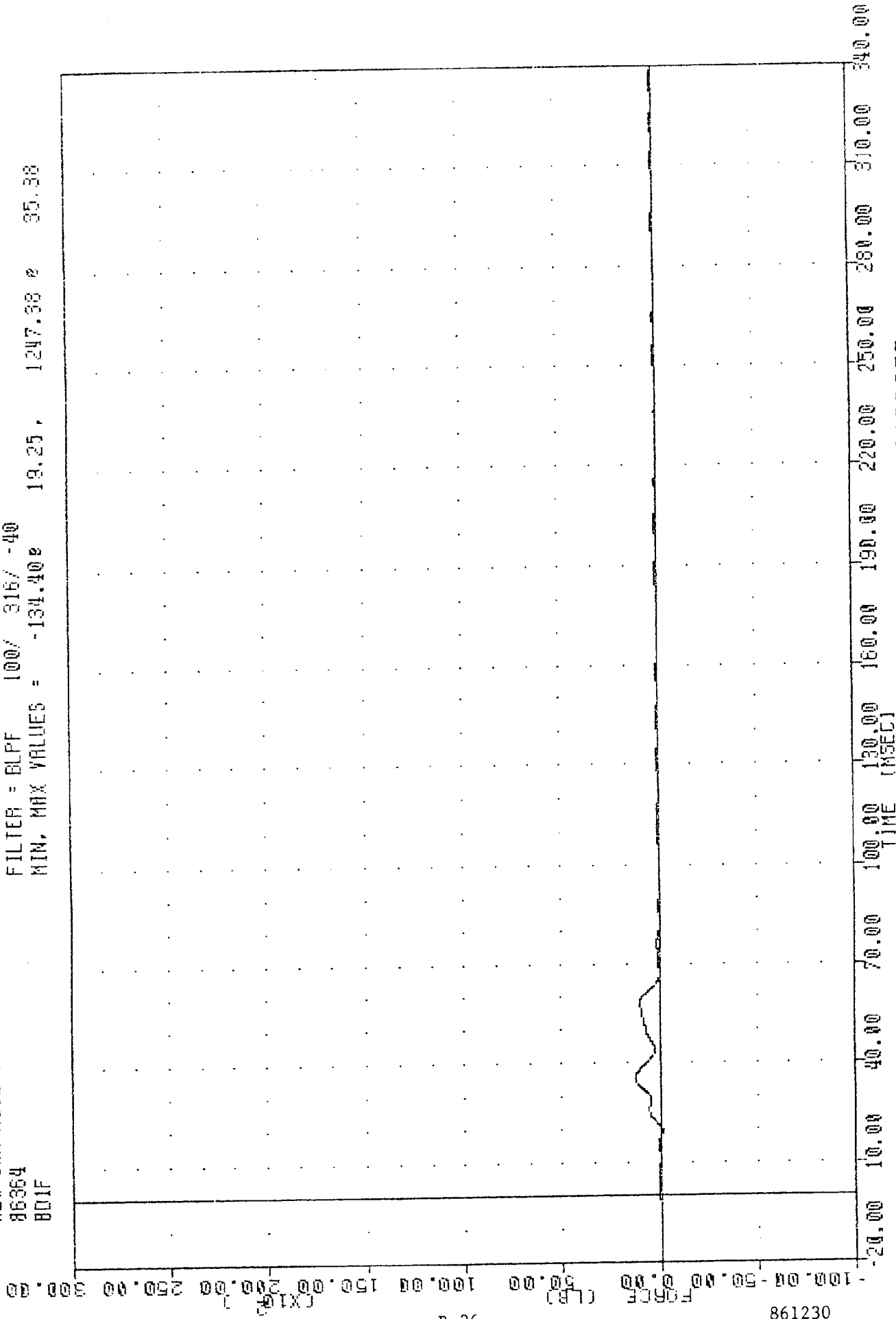
FILTER = BLFF 100/ 316/ -40
MIN, MAX VALUES = -49.15e 56.13 , 12.27 * 94.88



FORD AEROSTAR INTO LOAD CELL BARRIER
DASH PANEL CENTER ACCELERATION X AXIS

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BDIF

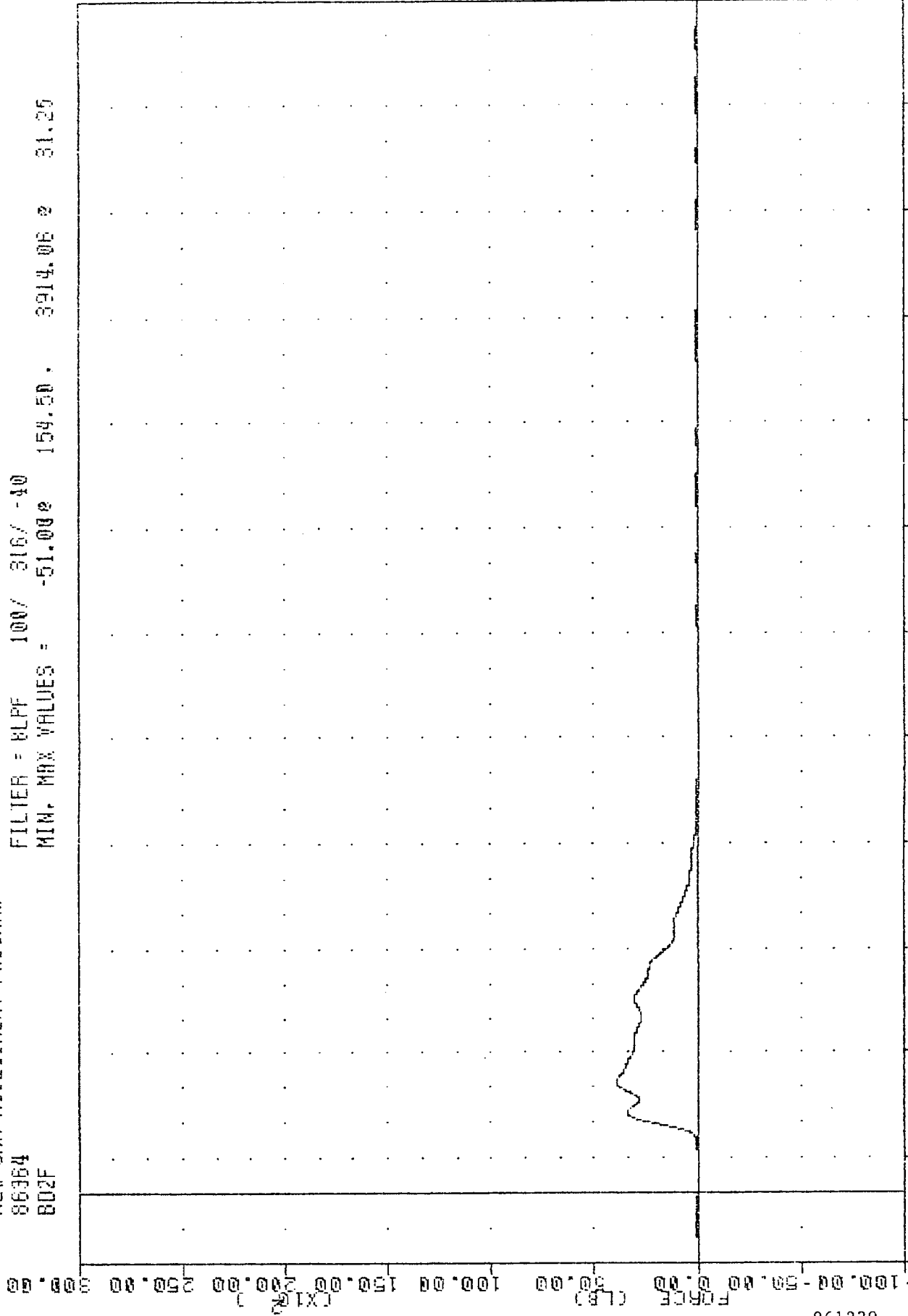
FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -134.40e 1247.38 e 35.38



FORD AEROSTAR INTO LOAD CELL BARRIER
 10AN CELL BARRIER POSITION 01 FORCE

TRC
 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 B02F

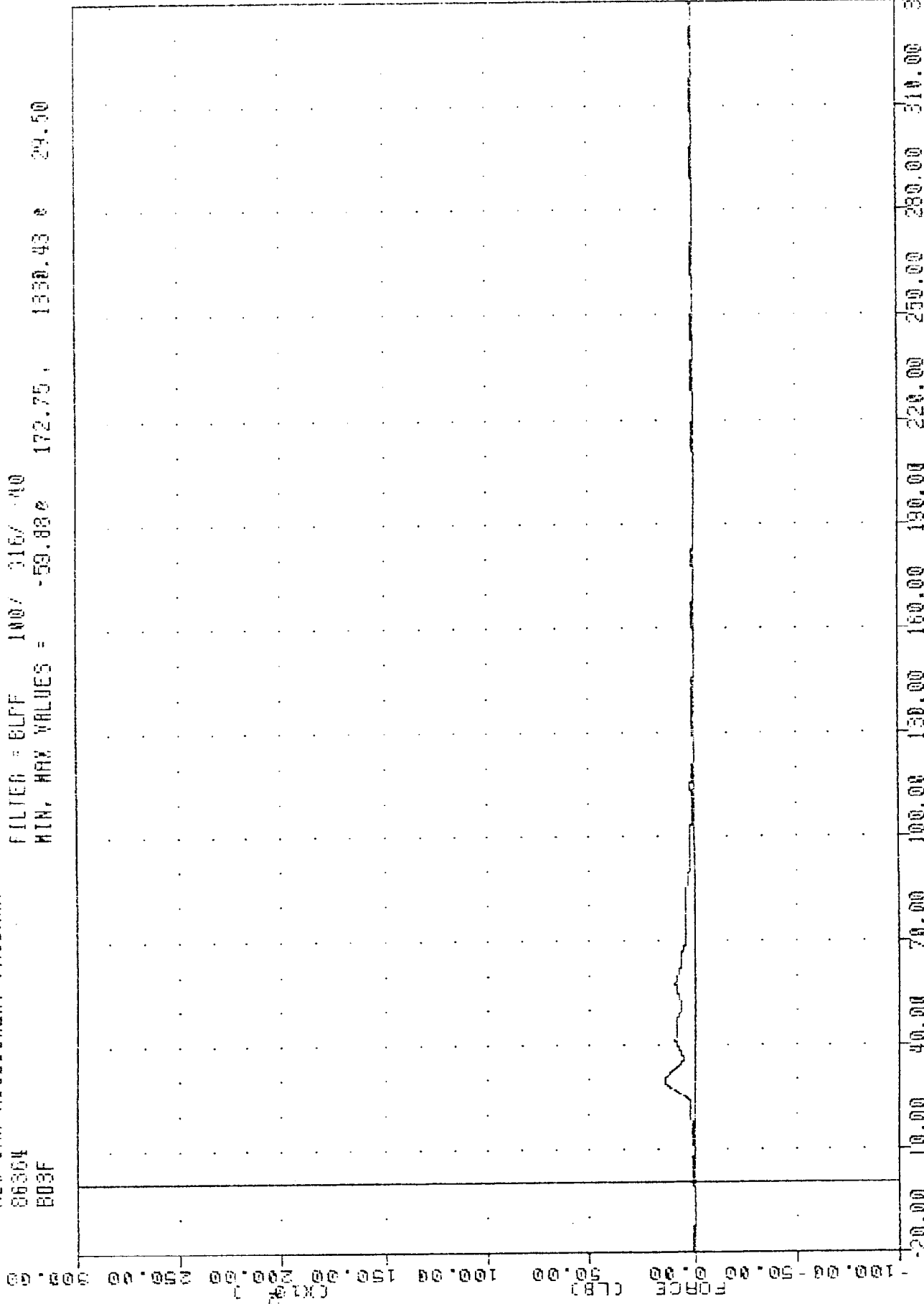
FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -51.00e 3914.06 e 31.25



861230
 -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)
 FORCE (LB)
 FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 02 FORCE

TAC 861230
 NEW CAR ASSESSMENT PROGRAM
 86304
 B03F

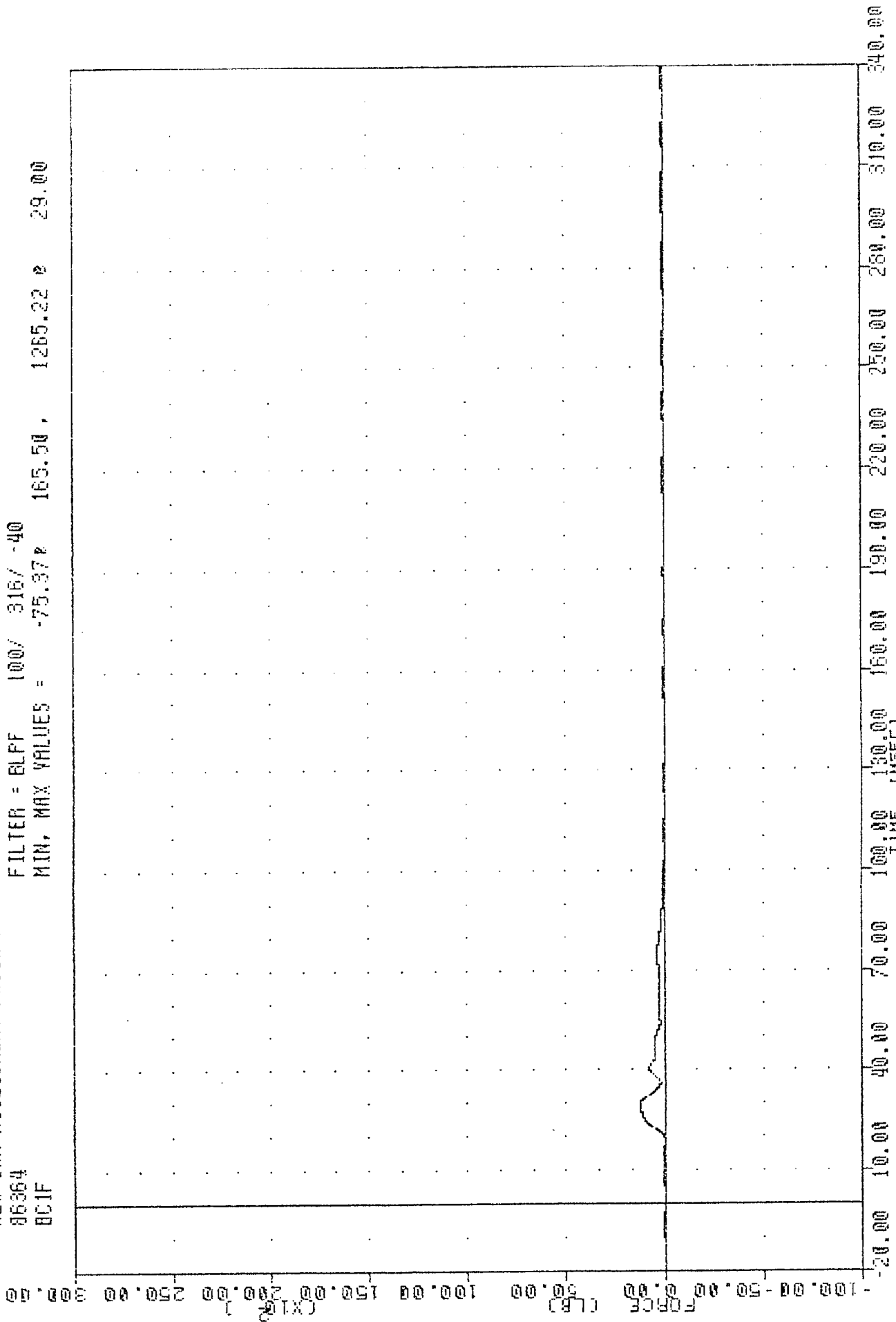
FILTER = 6LFF 1ND/ 316/ 100
 MIN, MAX VALUES = -59.88 e 172.75 , 1330.43 e 24.50



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 03 FORCE

TRC
 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BCIF

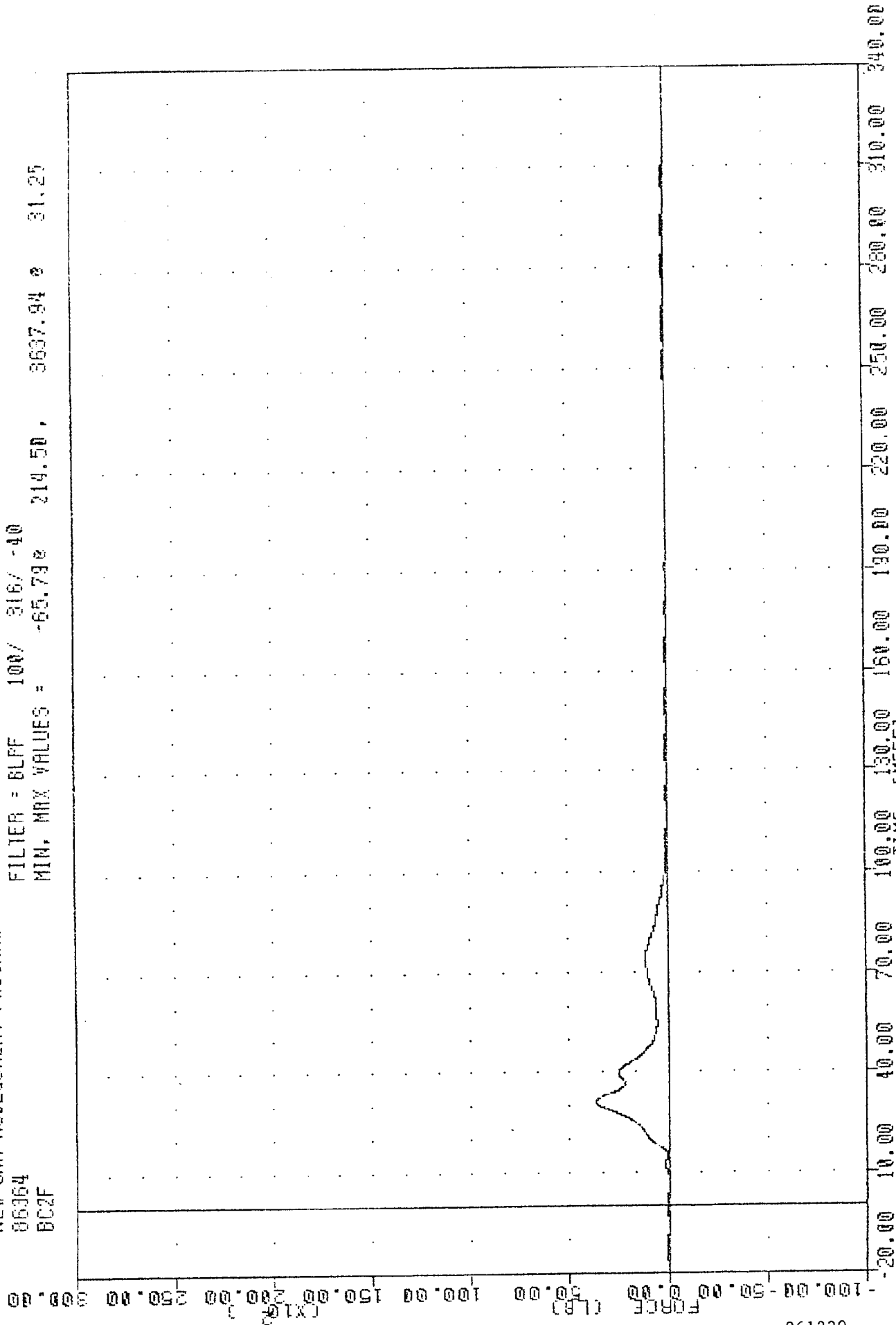
FILTER = BLFF 100/ 316/ -40
 MIN, MAX VALUES = -75.37 165.50, 1265.22 29.00



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C) FORCE

TRC
NEW CAR ASSESSMENT PROGRAM
861230
BC2F

FILTER = BLFF 100/ 316/ -40
MIN. MAX VALUES = -65.79e 214.50, 3637.94 e 31.25



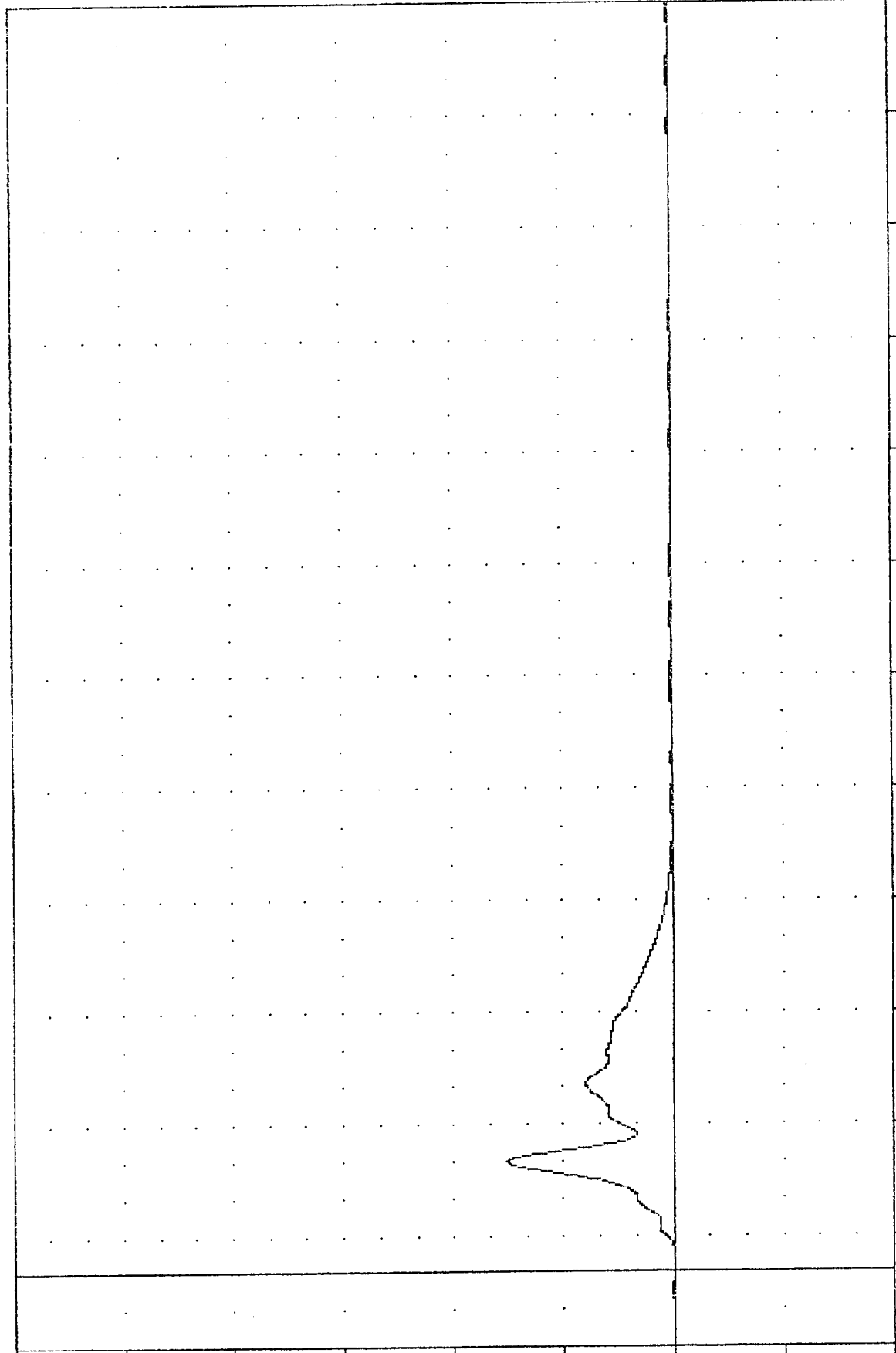
FORD AEROSTAR INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION 02 FORCE

TAC
 NEW CAR ASSESSMENT PROGRAM
 86364
 BC3F

861230

FILTER = BLPF 1ND/ 316/ -40
 MIN. MAX VALUES = -51.05% 247.88 7538.85 29.75

FORCE (LB) [X10³]
 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00 250.00 300.00

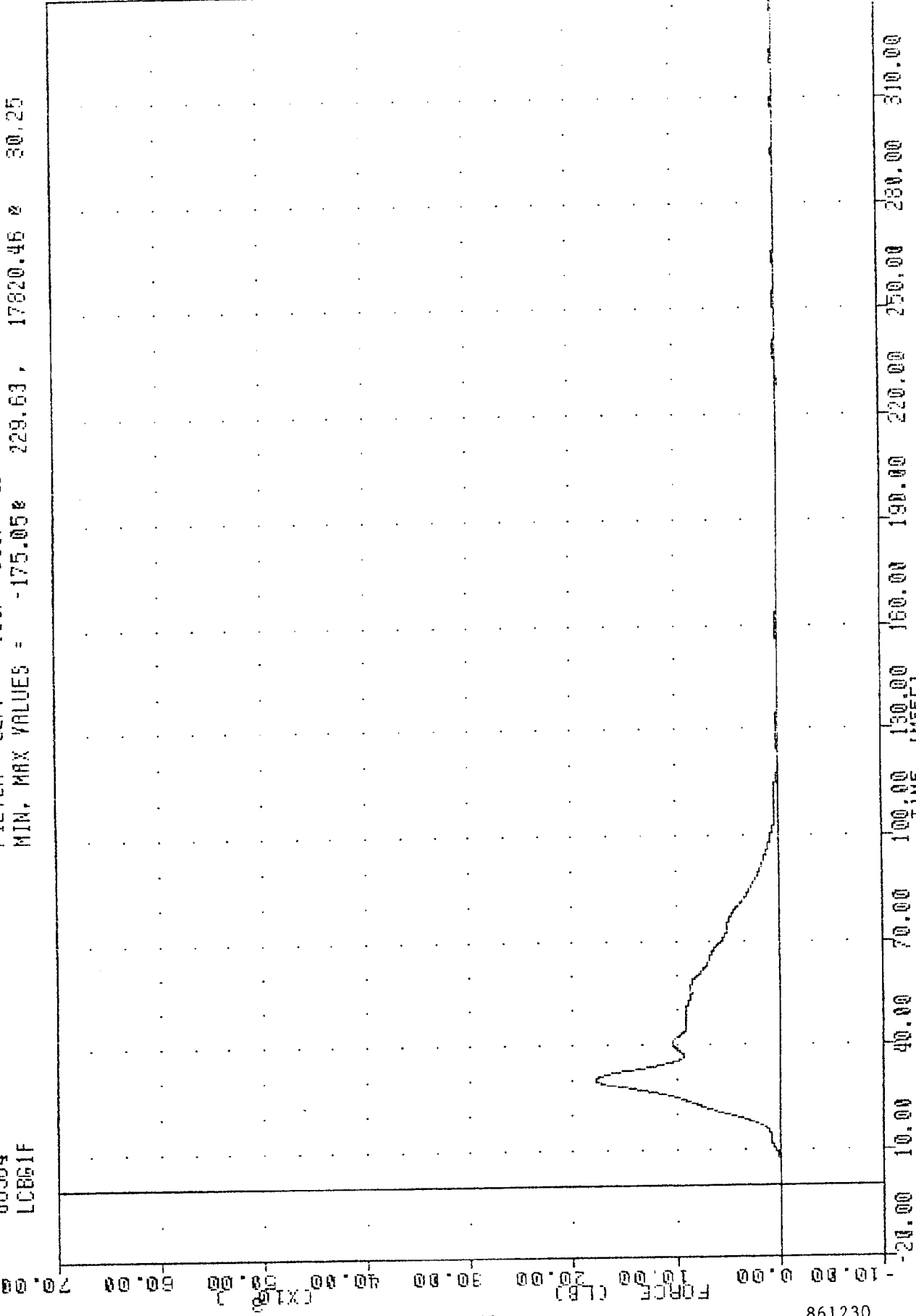


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)

FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C3 FORCE

TRC
NEW CAR ASSESSMENT PROGRAM
86354
LC861F

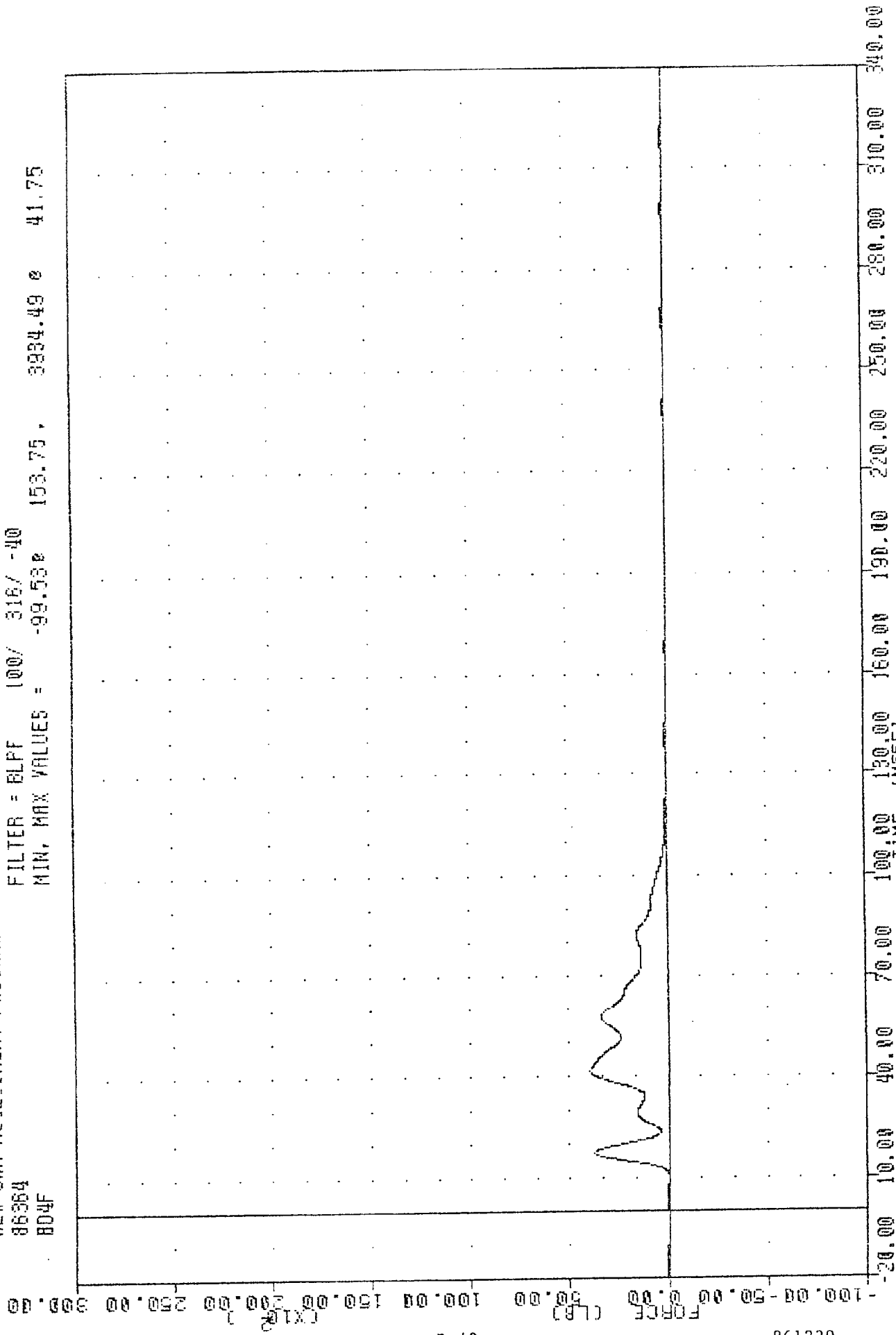
FILTER = 8LPF 100/ 316/ -40
MIN. MAX VALUES = -175.05e 229.63, 17820.46 e 30.25



FORD AEROSTAR INTO LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 1 FORCE TOTAL

TRC
 NEW CAR ASSESSMENT PROGRAM
 86364
 804F

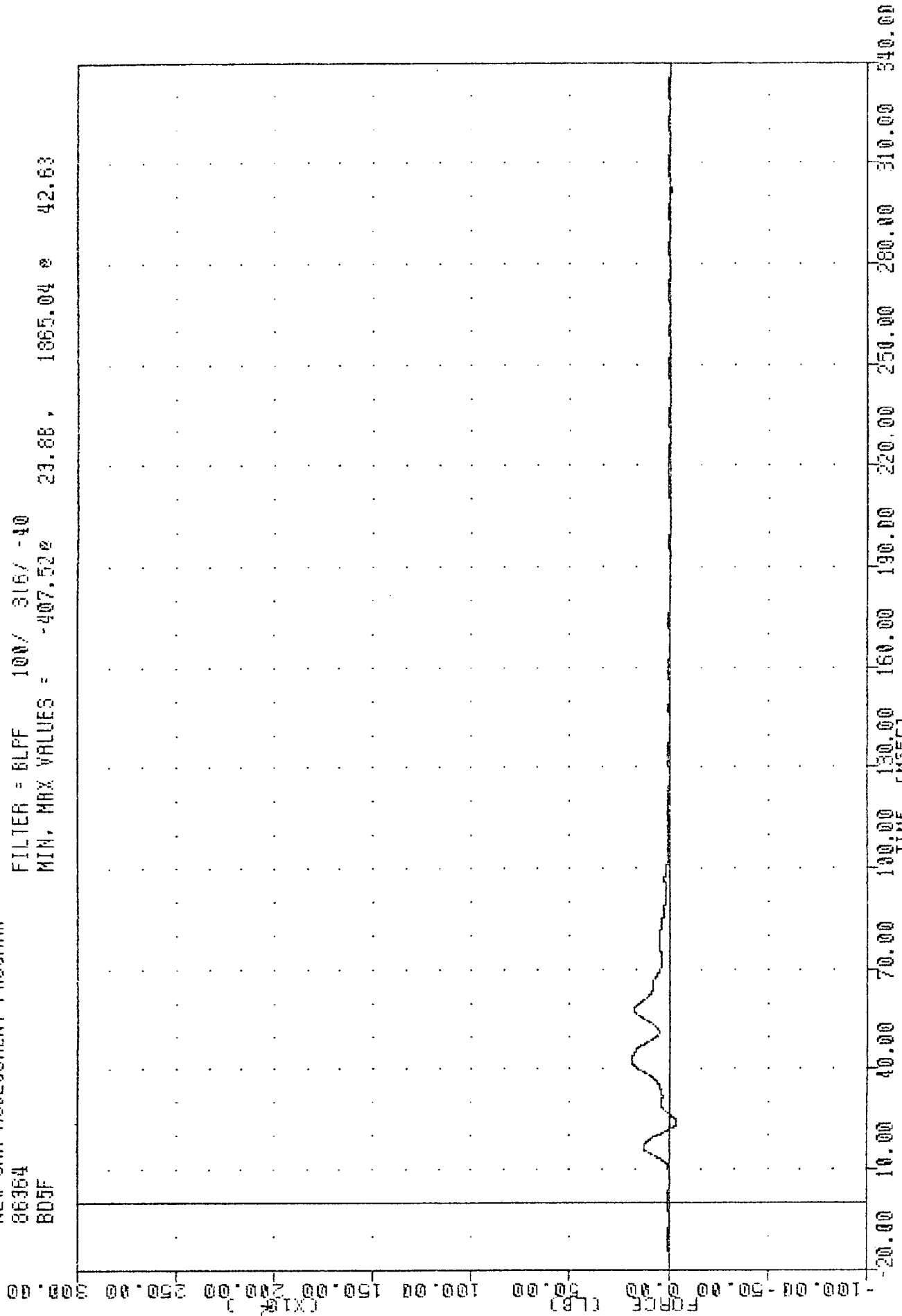
FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -99.53e 153.75, 3934.49 e 41.75



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 04 FORCE

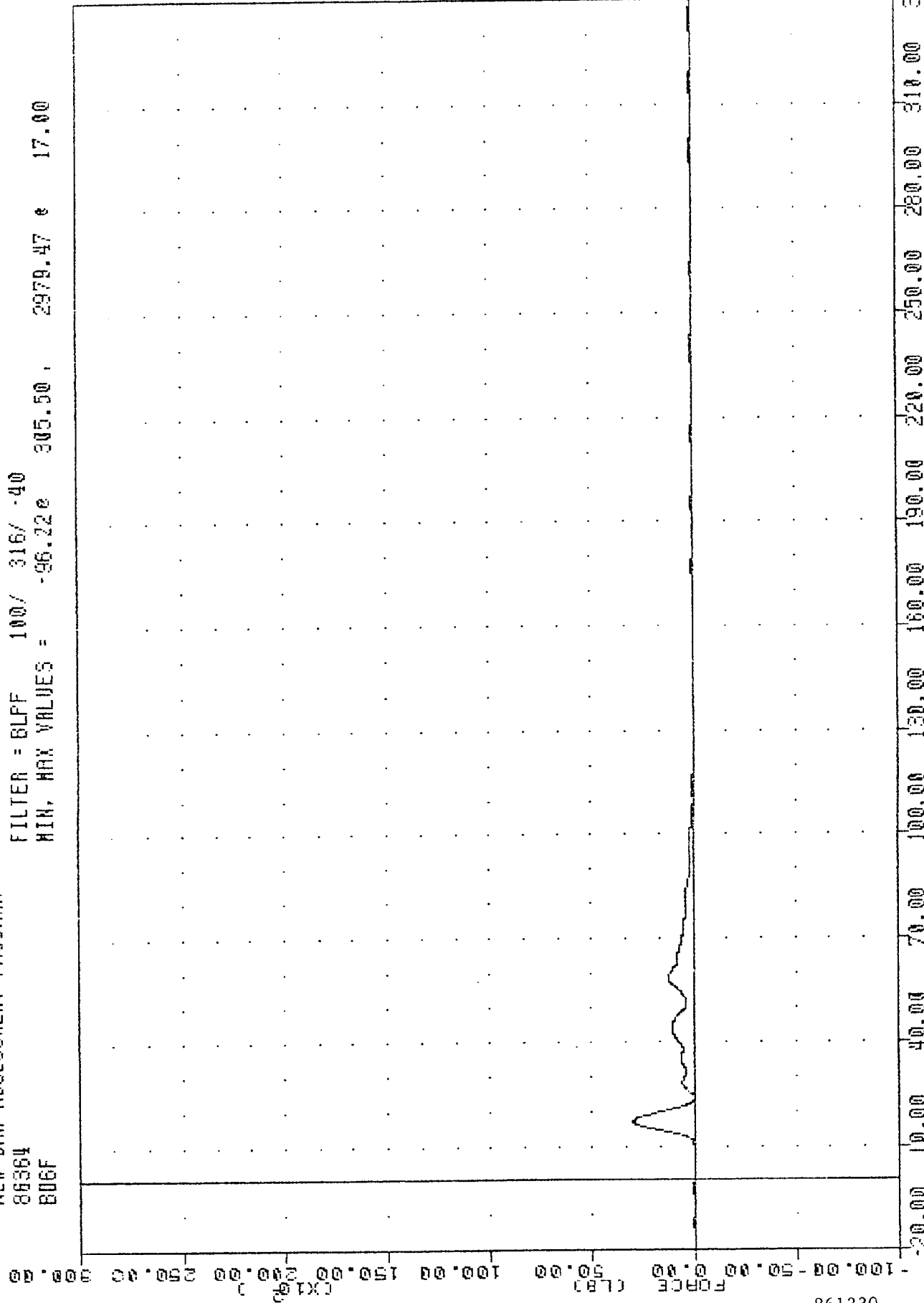
TRC
 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 B05F

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -407.52% 23.88, 1865.04% 42.63



TAC
NEW CAR ASSESSMENT PROGRAM
861230
86364
B06F

FILTER = 6LFF 100/ 316/ -40
MIN, MAX VALUES = -96.22e 305.50 , 2979.47 e 17.00

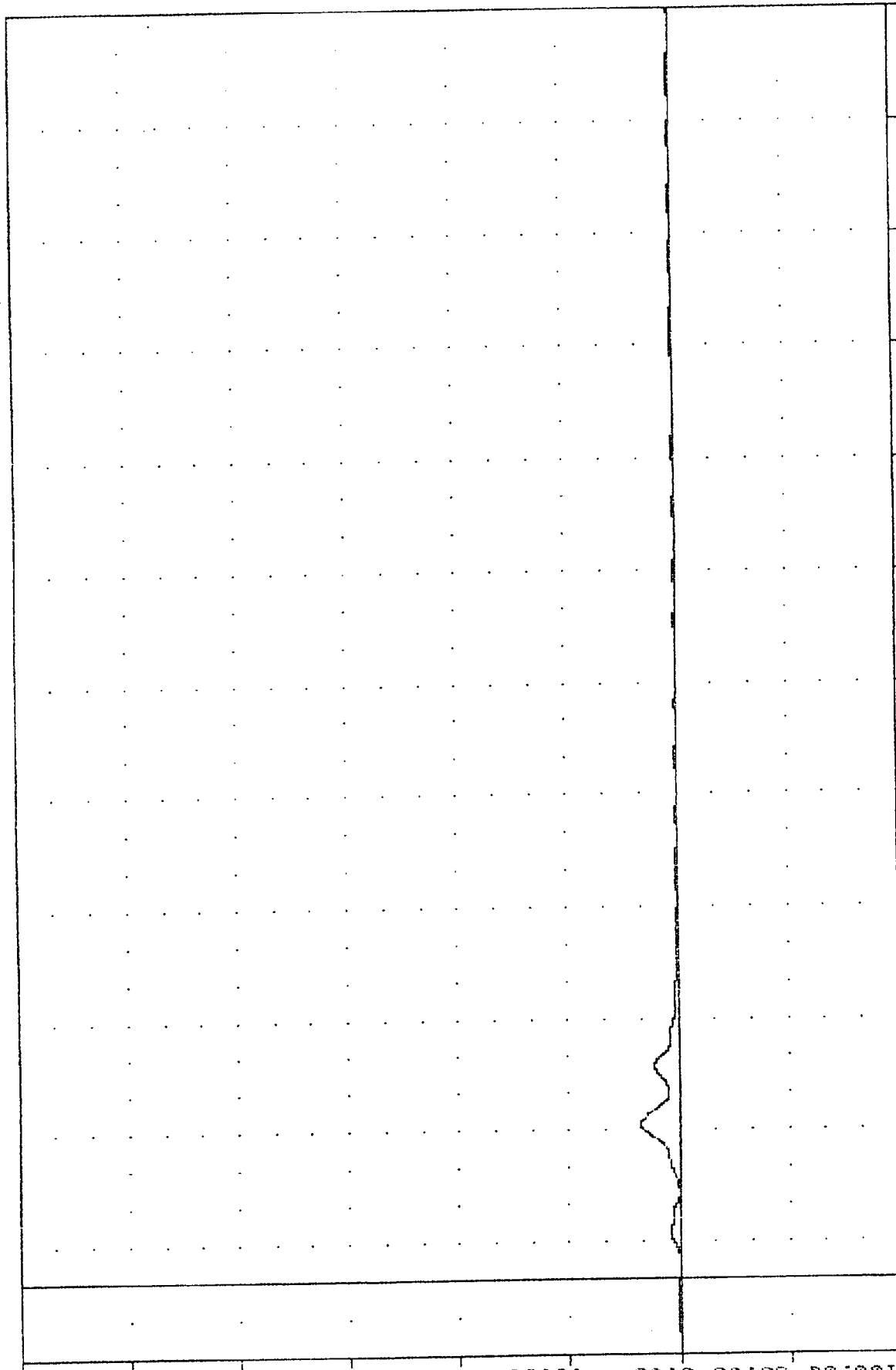


FORD AEROSTAR INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION 06 FORCE

TAC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BC4F

FILTER = 6LFF 100/ 316/ -40
 MIN. MAX VALUES = -64.15e 164.13, 1729.08 e 41.38

100.00 50.00 0.00 FORCE (LB)
 100.00 200.00 300.00 TIME (MSECT)

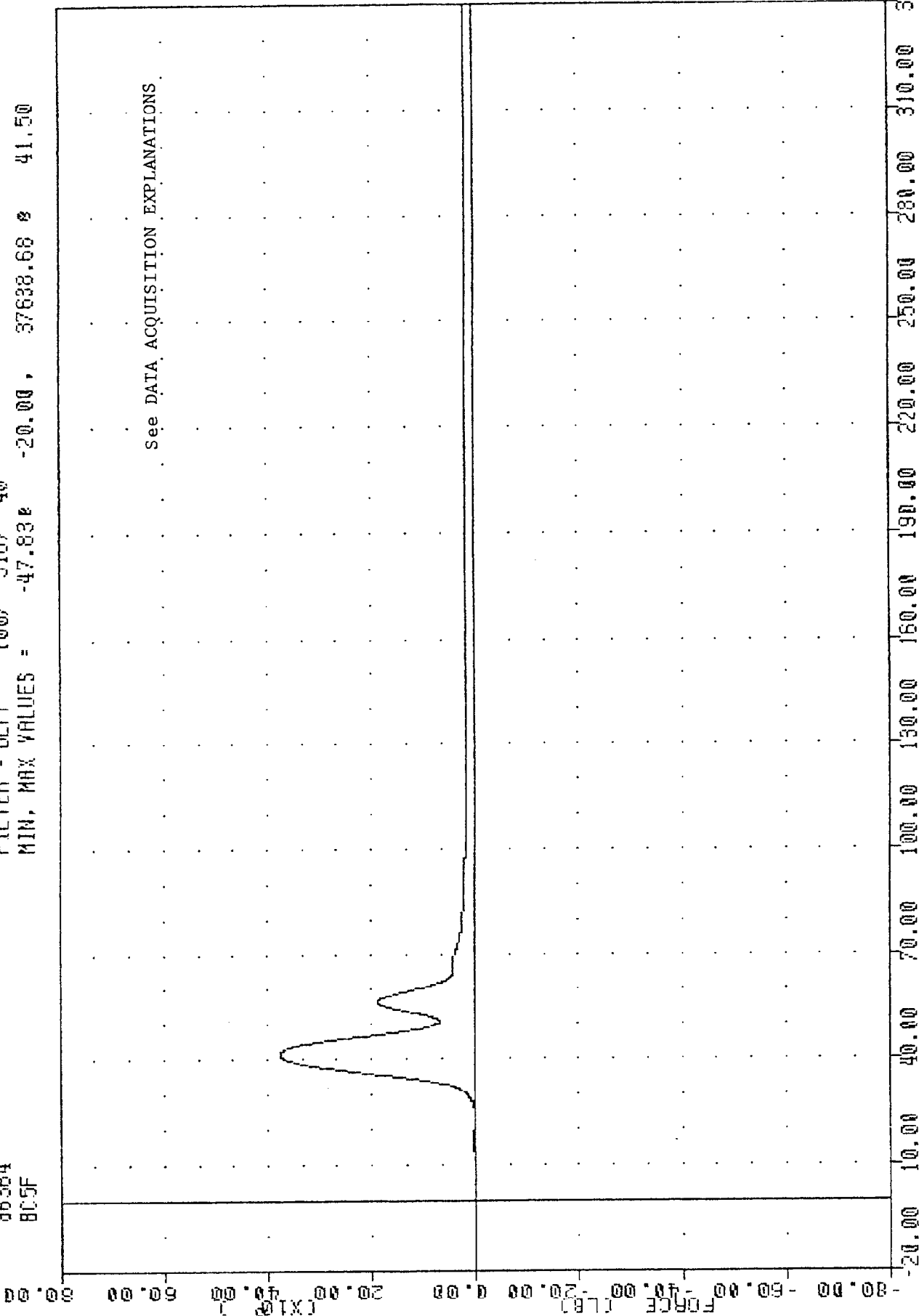


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C4 FORCE

TRC . 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BC5F

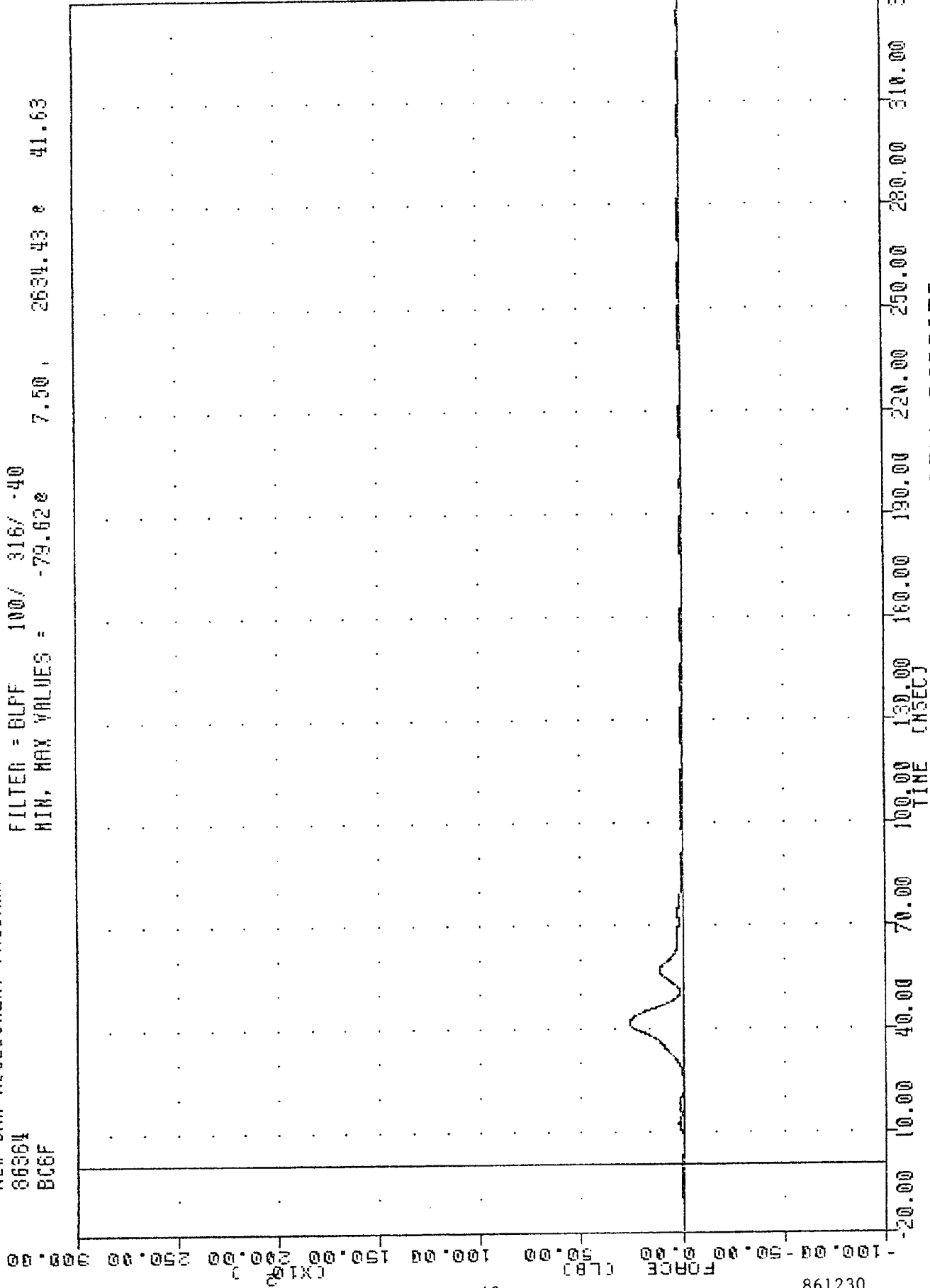
FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -47.83e -20.00, 37638.68 e 41.50



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C5 FORCE

TAC , 861230
NEW CAR ASSESSMENT PROGRAM
06364
BC6F

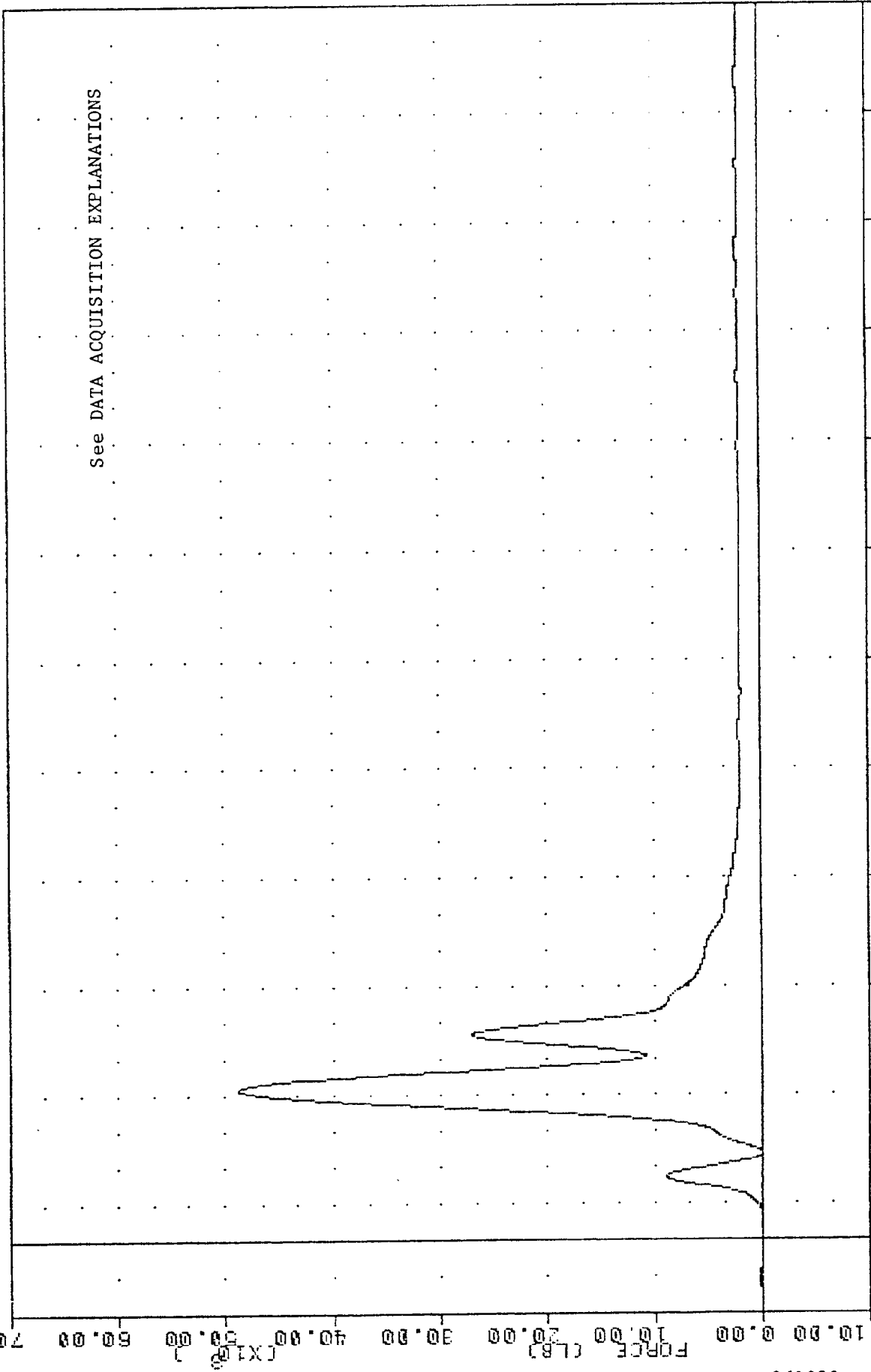
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -79.62e 7.50 , 2634.43 e 41.63



FORD AEROSTAR INTO LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C6 FORCE

TRC
 NEW CAR ASSESSMENT PROGRAM
 86364
 LCBG2F

FILTER = BLFF 100/ 316/ -40
 MIN, MAX VALUES = -168.52e 23.63, 48886.73 e 41.63

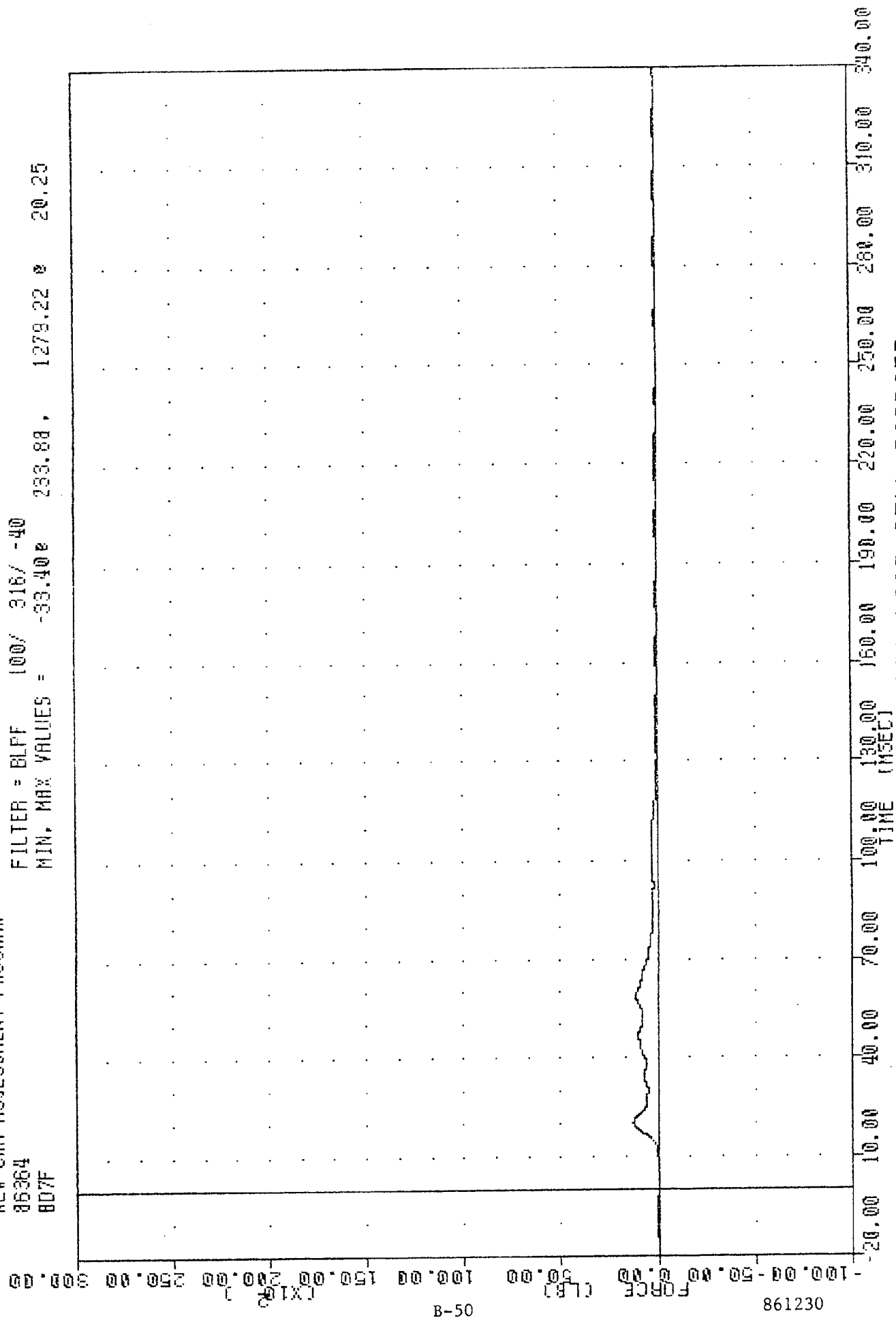


-20.00 10.00 40.00 70.00 100.00 130.00 150.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)

FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP ~ 2 FORCE TOTAL

TRC
 NEW CAR ASSESSMENT PROGRAM
 861230
 86364
 807F

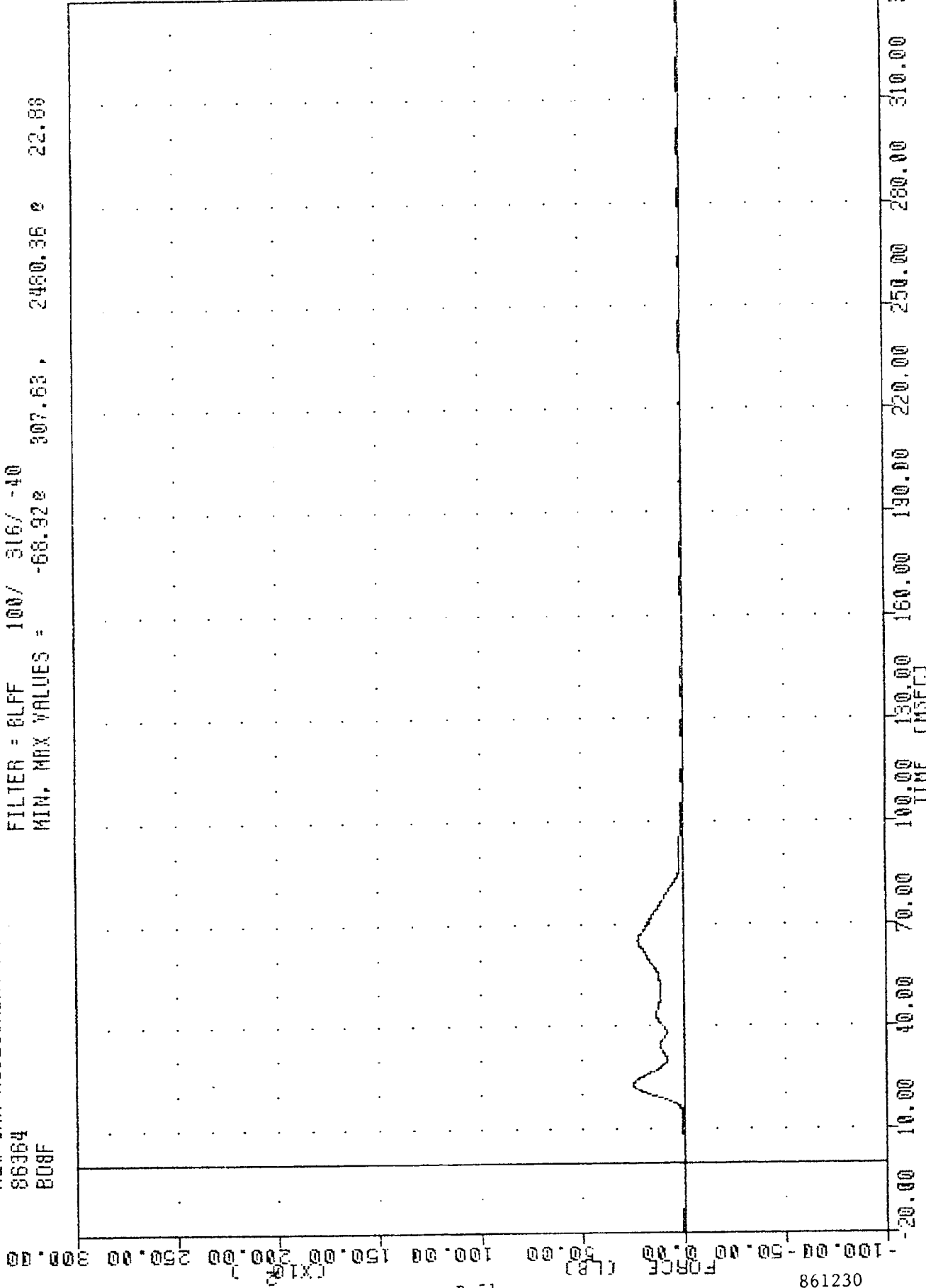
FILTER = BLPF 100% 316/-40
 MIN. MAX VALUES = -33.40e 1279.22 e 20.25



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 07 FORCE

TAC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BDRF

FILTER = BLFF 100/ 316/ -40
 MIN. MAX VALUES = -68.92e 307.63 , 2460.36 e 22.88

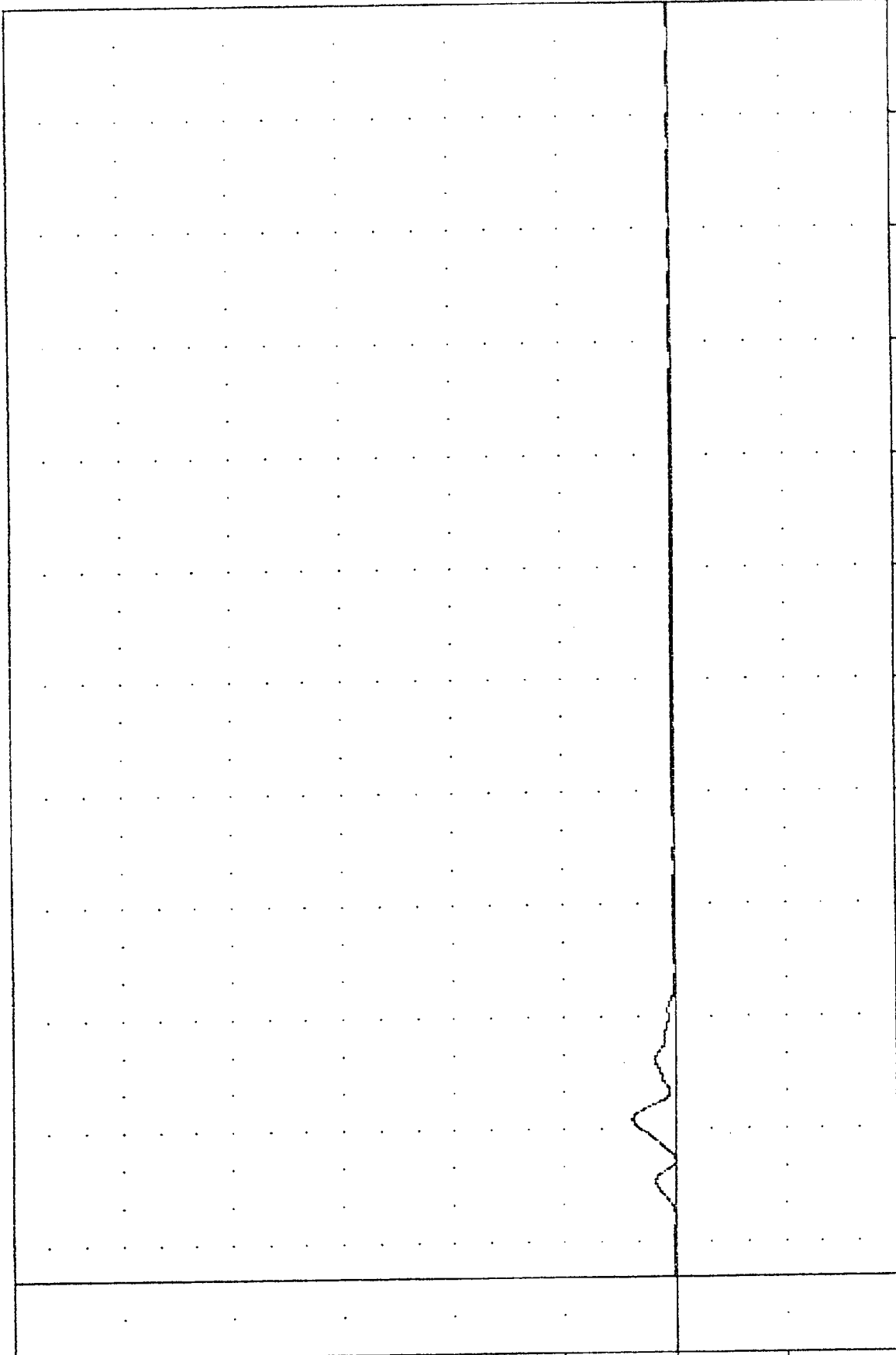


FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION OR FORCE

TAC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 B09F

FILTER = 6LFF 100/ 316/ .40
 MIN. MAX VALUES = -45.19% 16.50 , 1920.31 e 42.25

FORCE (LB) (X100)
 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00 250.00 300.00



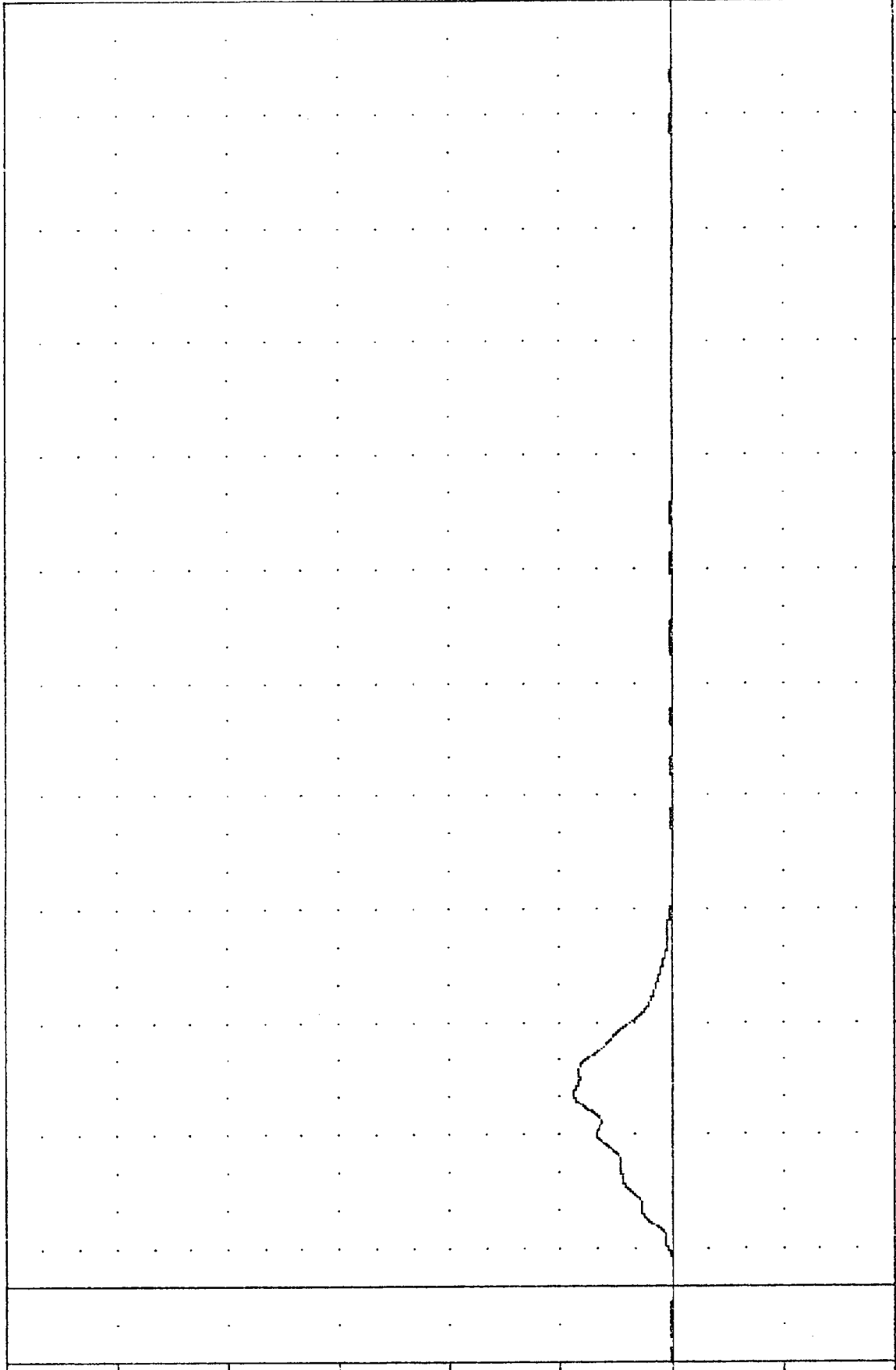
-20.00 10.00 40.00 70.00 100.00 130.00 150.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)

FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D9 FORCE

TAC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BC7F

FILTER = BLFF 100/ 316/ -40
 MIN. MAX VALUES = -59.49% 298.38 , 4411.00 e 50.63

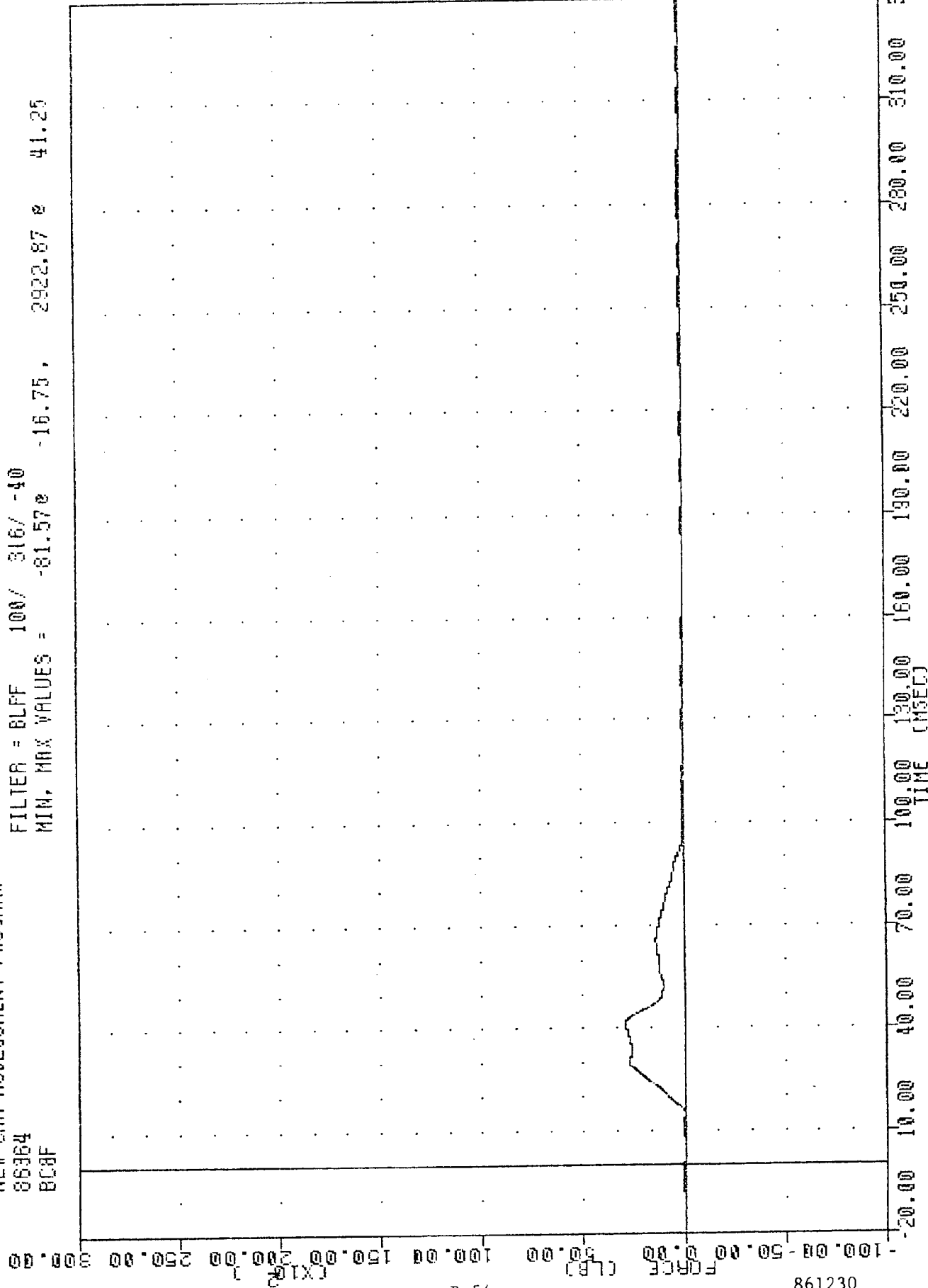
300.00
 250.00
 200.00
 150.00
 100.00
 50.00
 0.00
 -50.00
 -100.00



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C7 FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BC8F

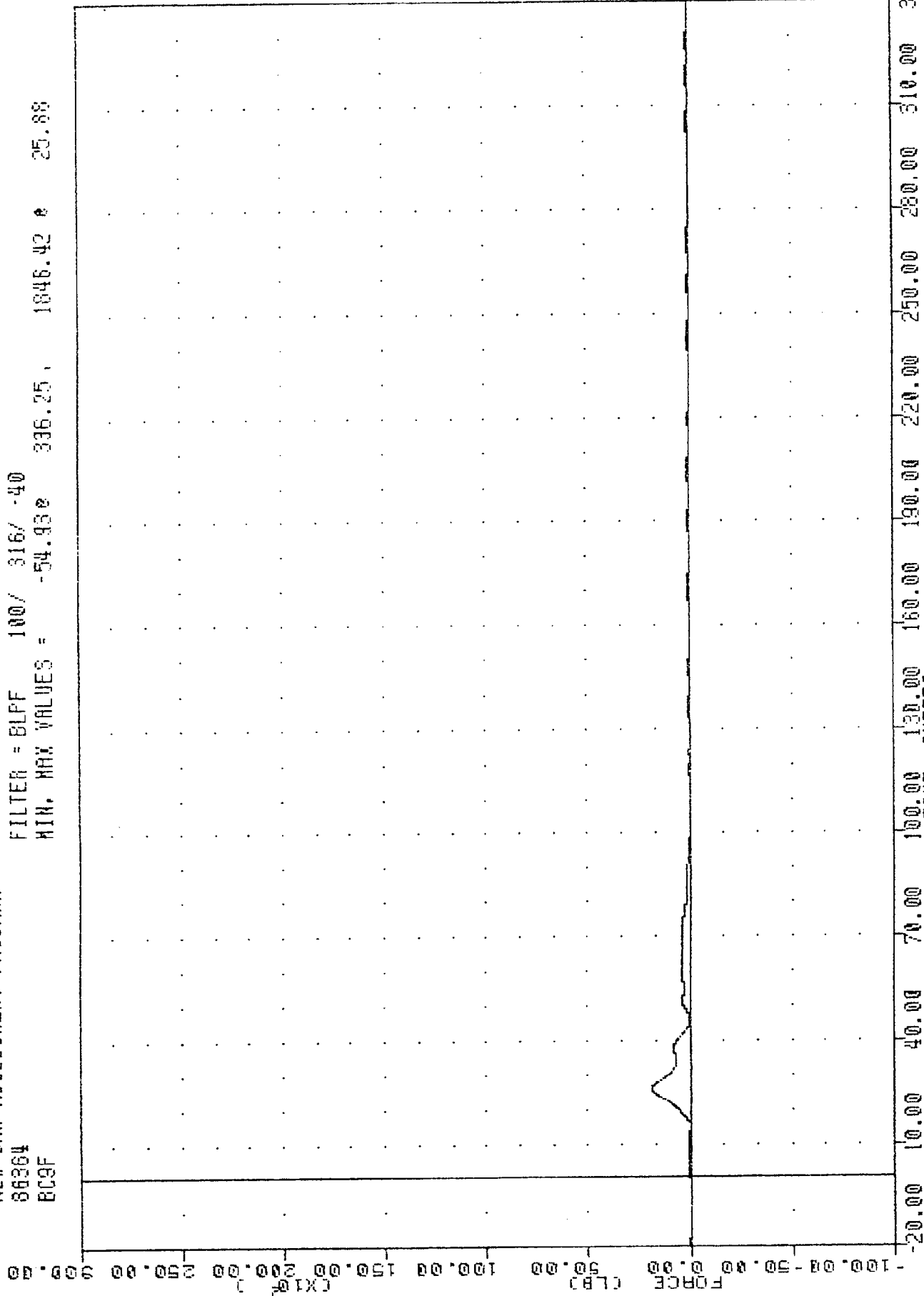
FILTER = BLFF 100/ 316/ -40
 MIN. MAX VALUES = -81.57e -16.75, 2922.87 e 41.25



FORD AEROSTAR INTO LOAD CELL BARRIER
 IN AN CELL BARRIER POSITION C8 FORCE

TAC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86264
 BC9F

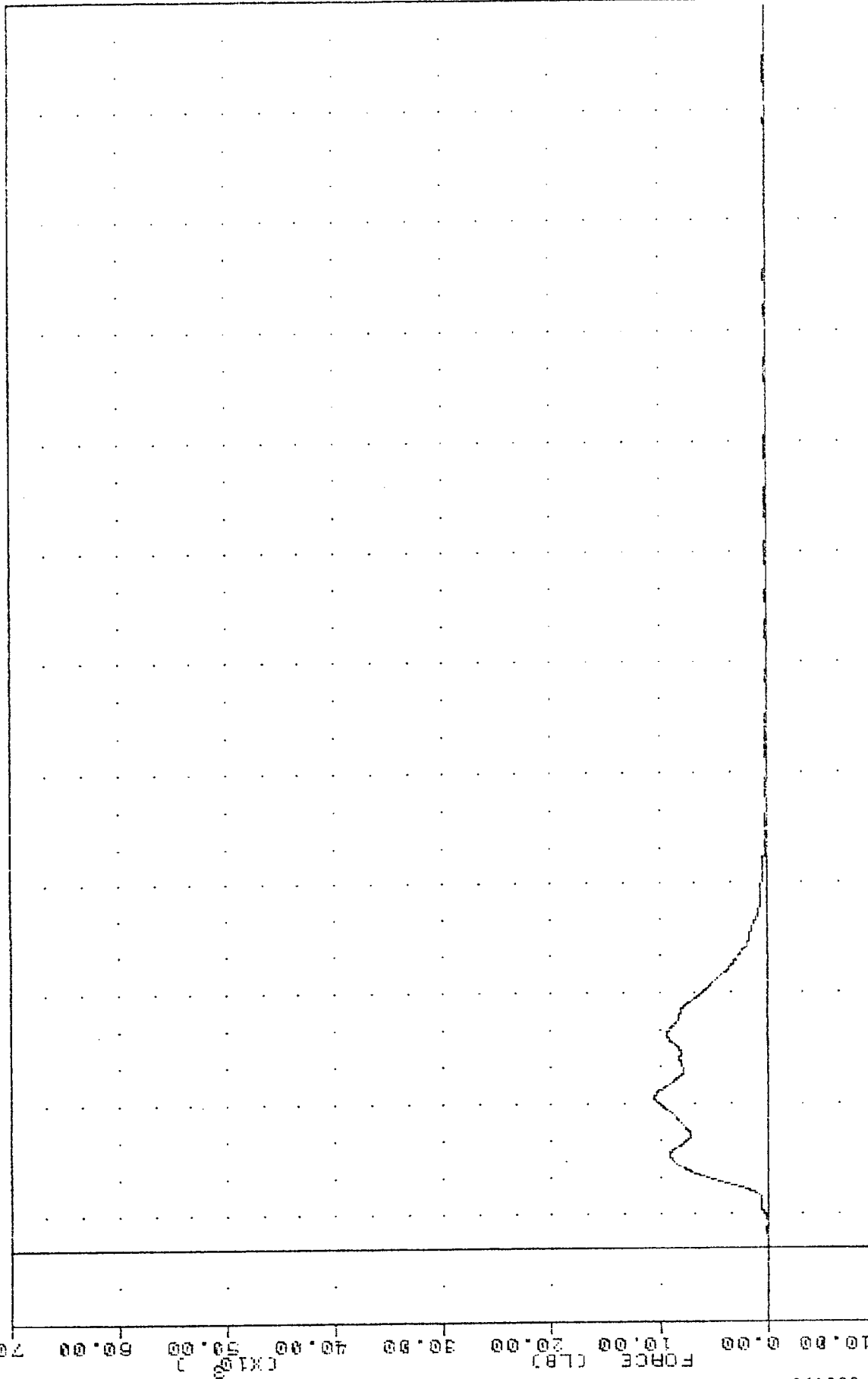
FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -54.93e 336.25 , 1846.42 e 25.88



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C9 FORCE

TAC
 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 LCC63F

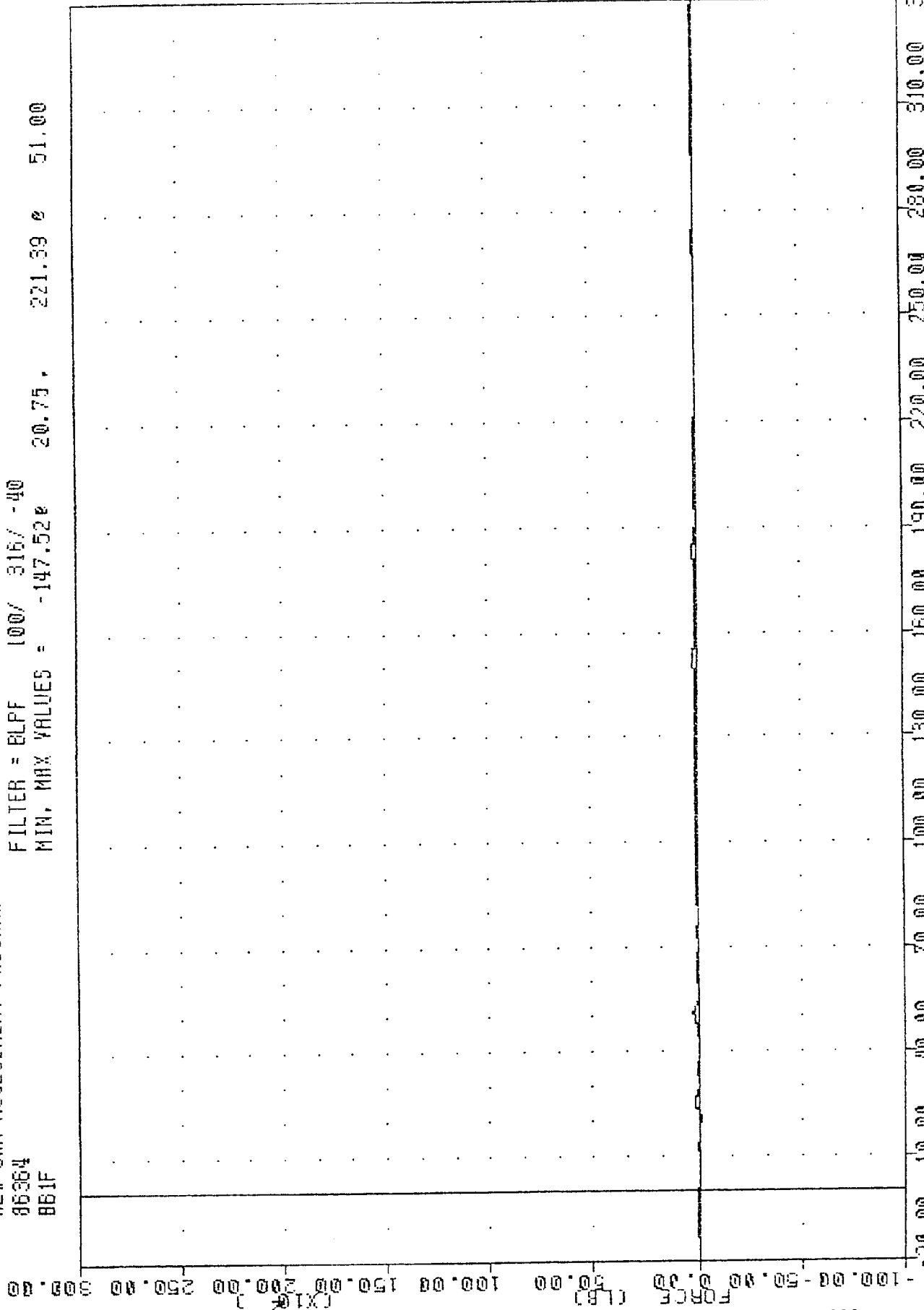
FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -153.43e 228.58 10480.76 e 41.63



-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)
 FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP - 3 FORCE TOTAL

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 85364
 861F

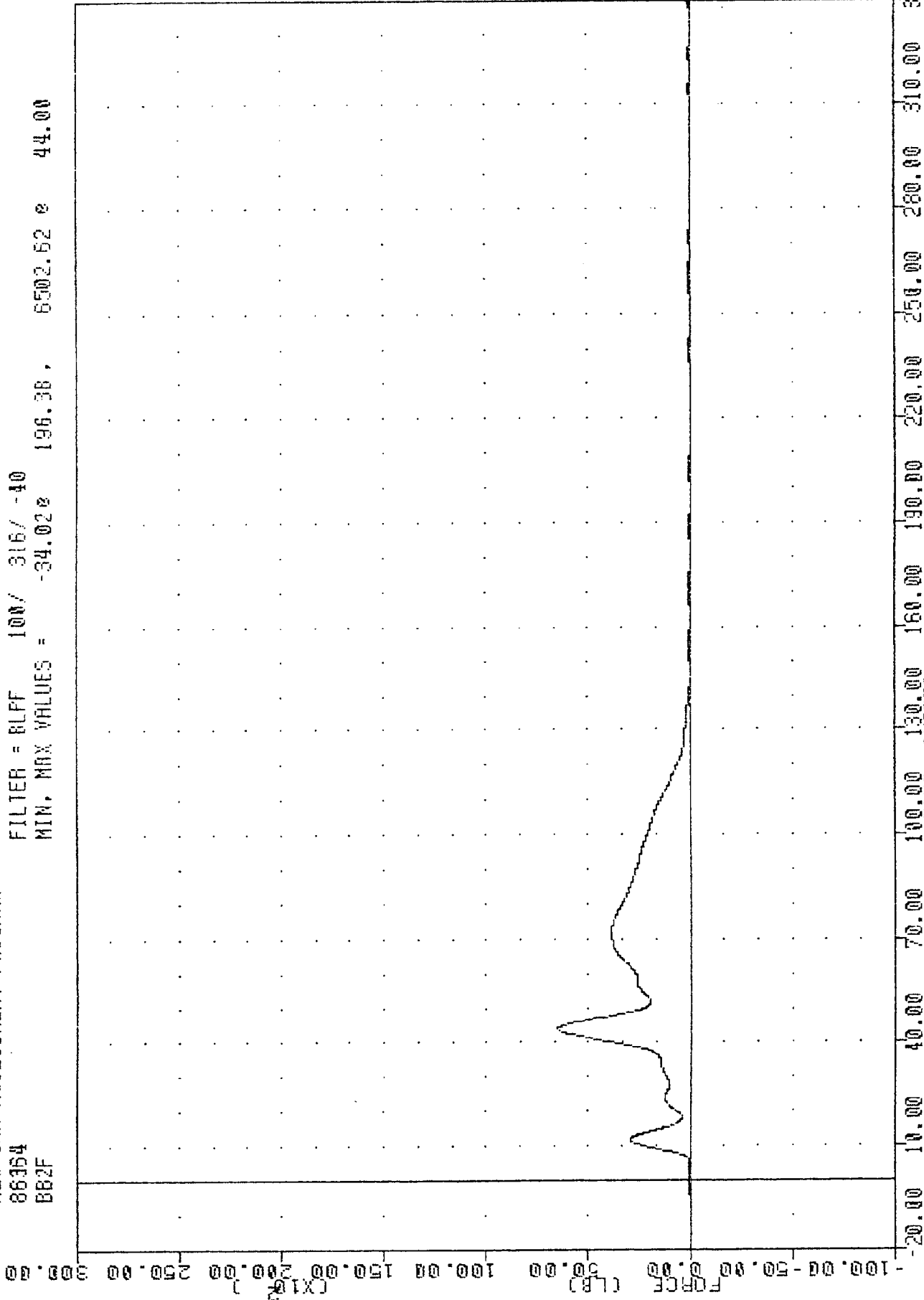
FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -147.52e 20.75e 221.39e 51.00



FORD AEROSTAR INTO LOAD CELL BARRIER
 INAN CELL BARRIER POSITION R1 FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86354
 BB2F

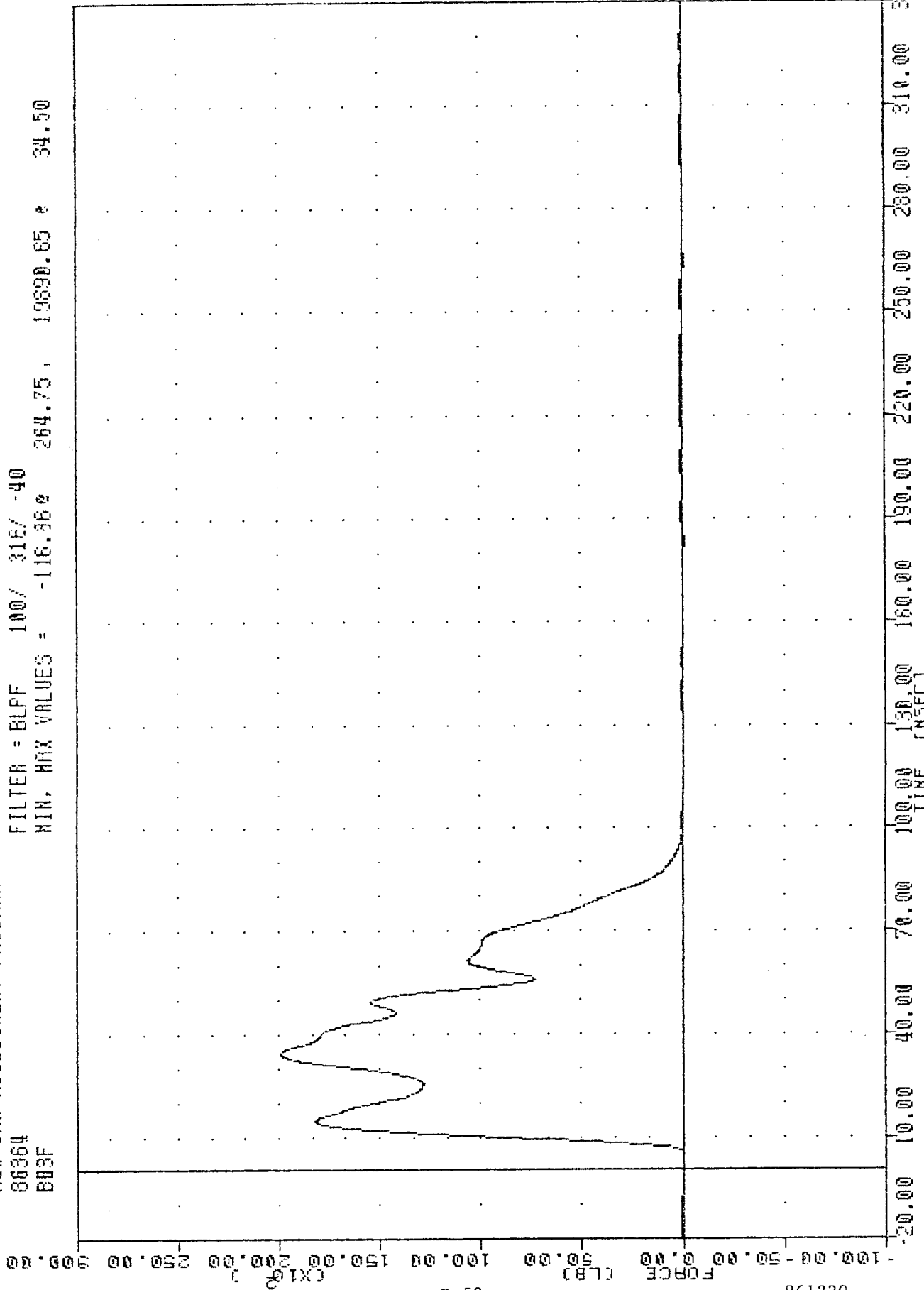
FILTER = 8LFF 10M/ 316/ -40
 MIN. MAX VALUES = -34.028 196.38 , 6502.52 e 44.00



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B2 FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 683F

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -116.86 264.75, 19890.65 * 34.50

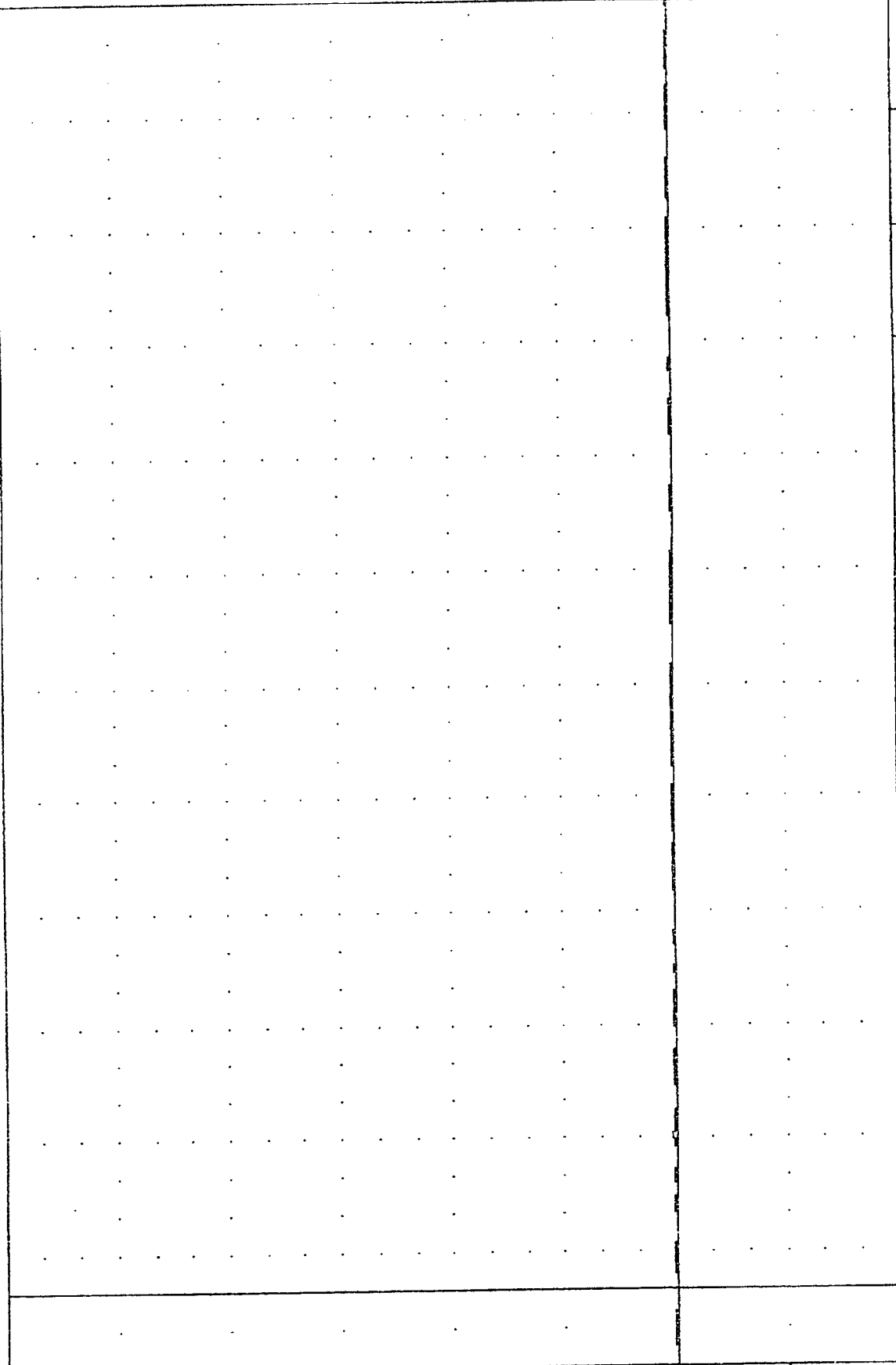


FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION R3 FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BRIF

FILTER = BLFF 1007 3167 -40
 MIN, MAX VALUES = -86.51e 34.50 , 130.32 e 40.25

300.00
 250.00
 200.00
 150.00
 100.00
 50.00
 0.00
 -50.00
 -100.00

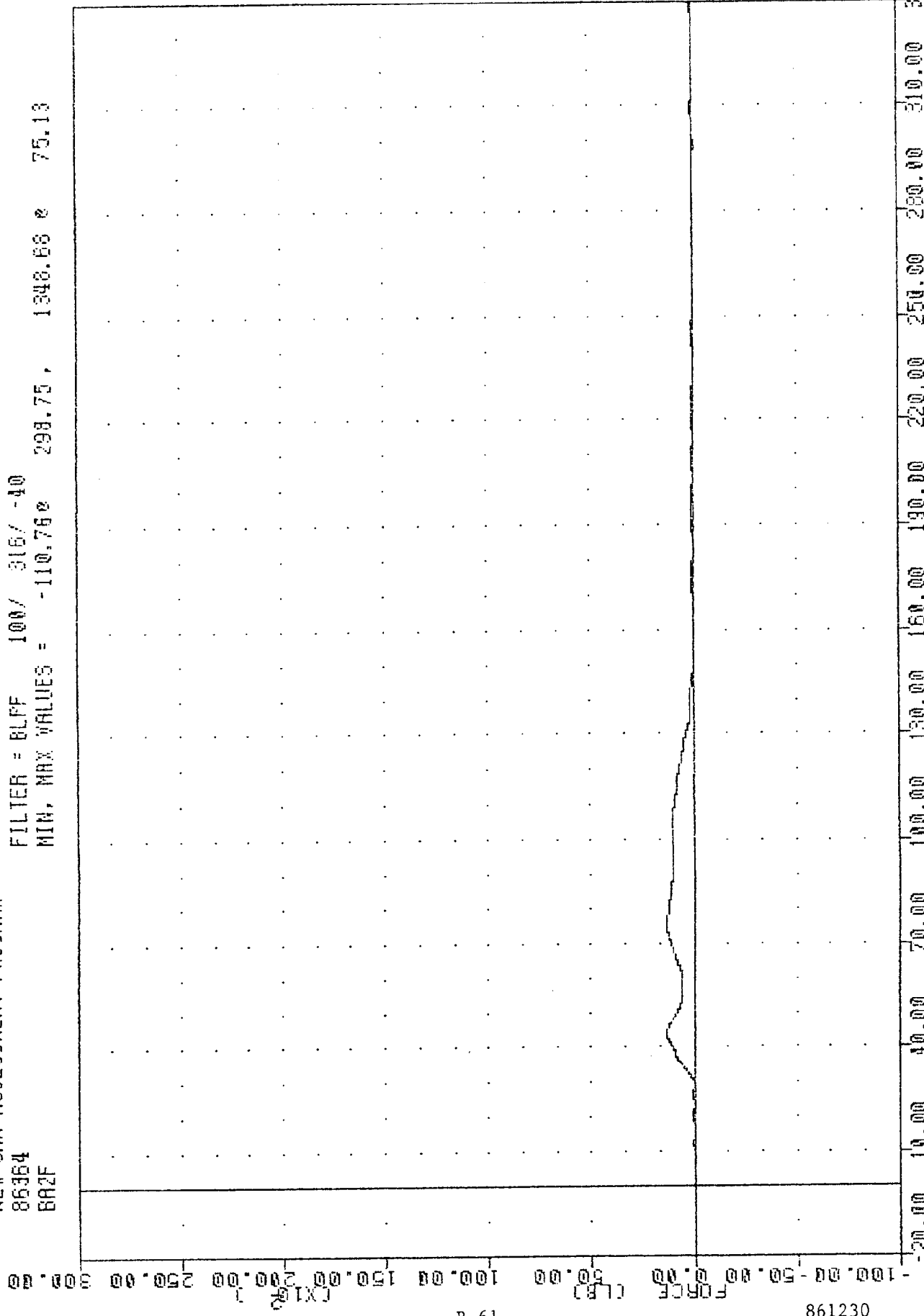


20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

FORD AEROSTAR INTO LOAD CELL BARRIER
 10AN CELL BARRIER POSITION A1 FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 8A2F

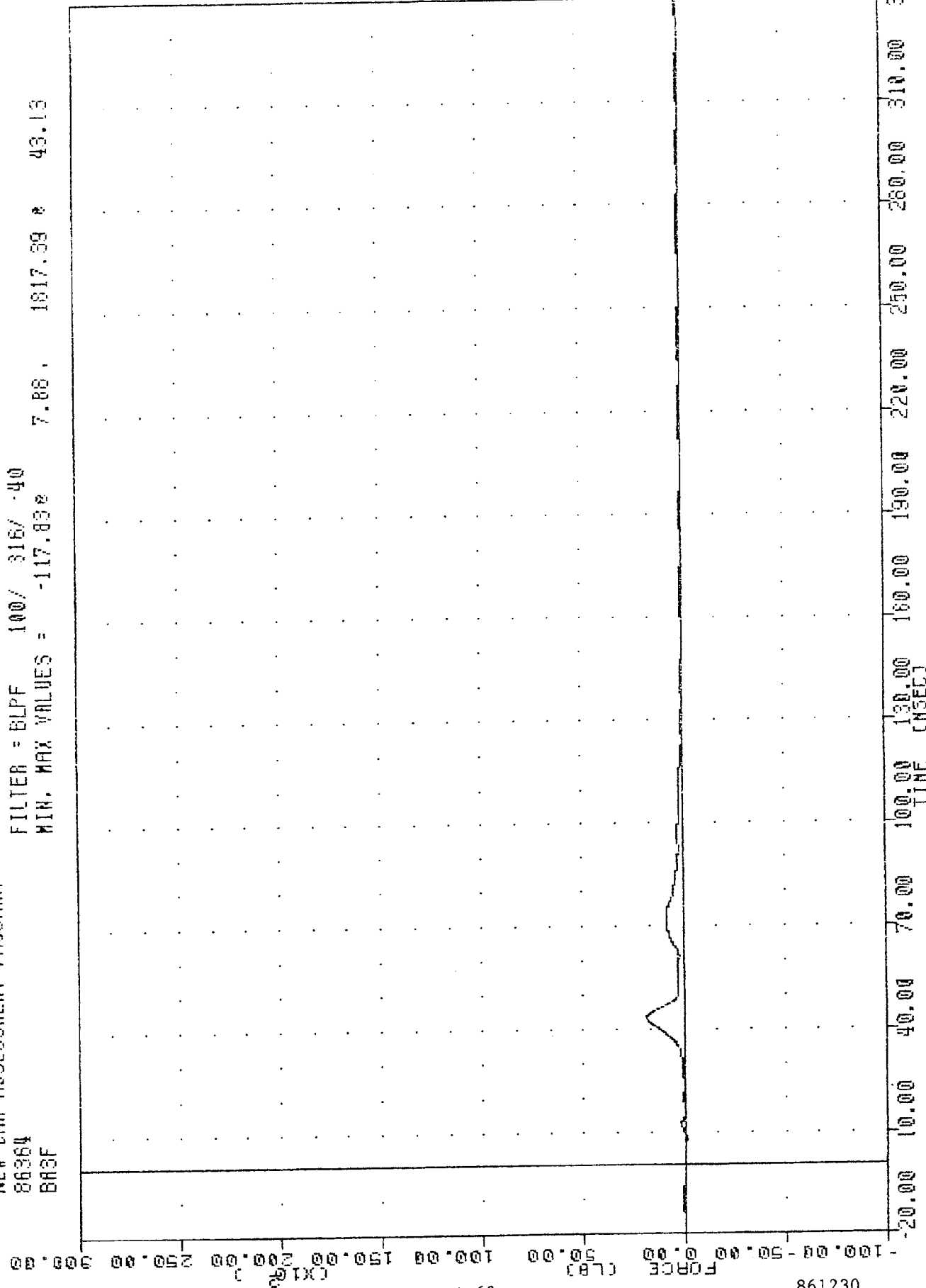
FILTER = BLFF 100/ 316/ -40
 MIN, MAX VALUES = -110.76 298.75, 1348.66 75.13



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A2 FORCE

TAC 861230
NEW CAR ASSESSMENT PROGRAM
86364
BR3F

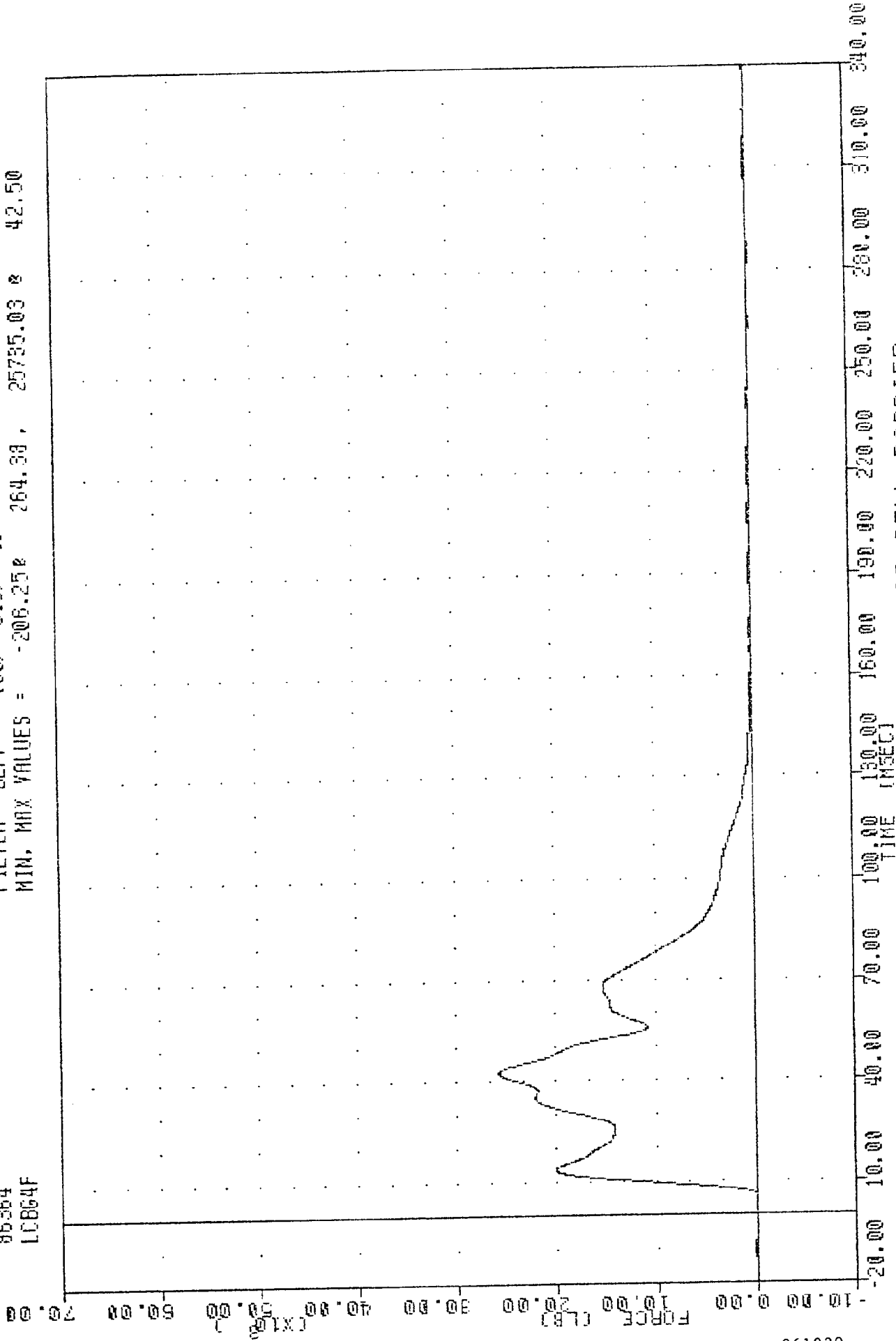
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -117.83e 7.88 . 1817.39 e 43.13



FORD AEROSTAR INTO LOAD CELL BARRIER
IN AN CELL BARRIER POSITION A3 FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 LC864F

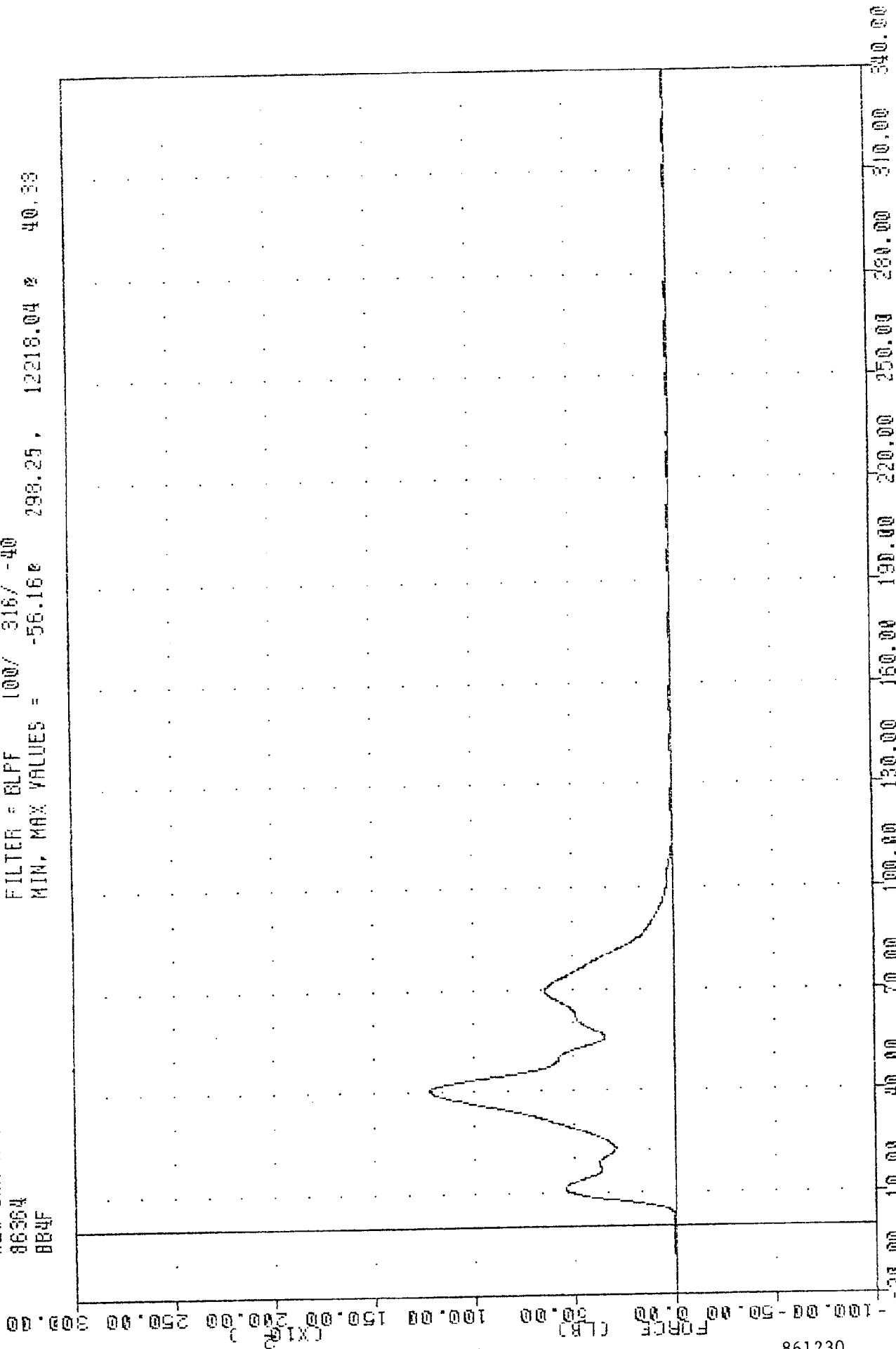
FILTER = BLPF 100/ 3167 -40
 MIN. MAX VALUES = -206.250 264.30 , 25735.03 42.50



FORD AEROSTAR INTO LOAD CELL BARRIER
 1 MAN CELL BARRIER GROUP - 4 FORCE TOTAL

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BB4F

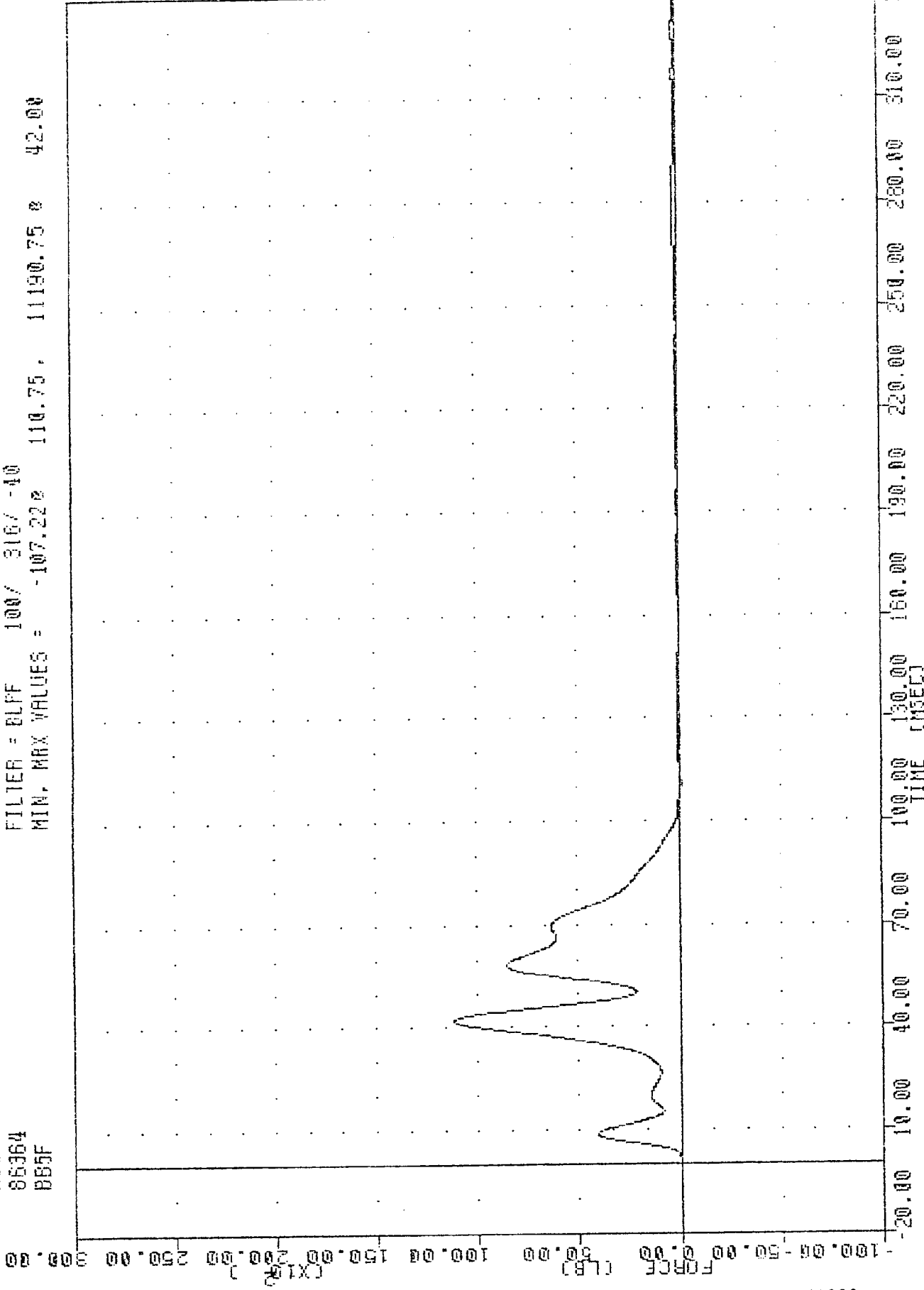
FILTER = 6LFF 100/ 316/ -40
 MIN. MAX VALUES = -56.16e 298.25 , 12218.04 e 40.33



FORD AEROSTAR INTO LOAD CELL BARRIER
 INAN CFII BARRIER POSITION BY FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BB5F

FILTER = BLFF 100/ 316/ -40
 MIN. MAX VALUES = -107.222 110.75, 11190.75 42.00

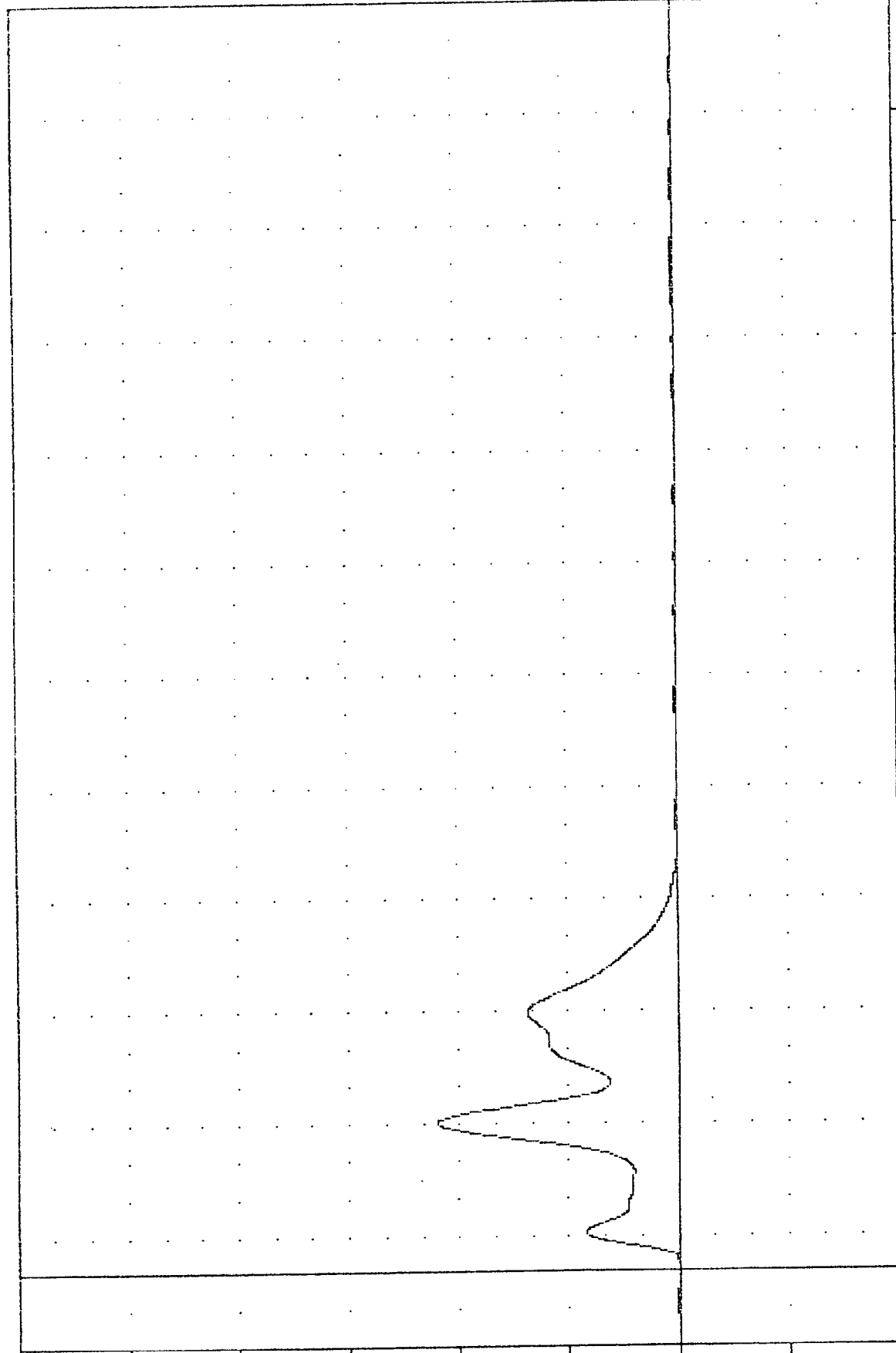


FORD AEROSTAR INTO LOAD CELL BARRIER
 1 INAN CELL BARRIER POSITION B5 FORCE

TAC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BDRF

FILTER = 8LFF 100/ 316/ -40
 MIN. MAX VALUES = -74.86e -20.00, 11008.43 e 40.25

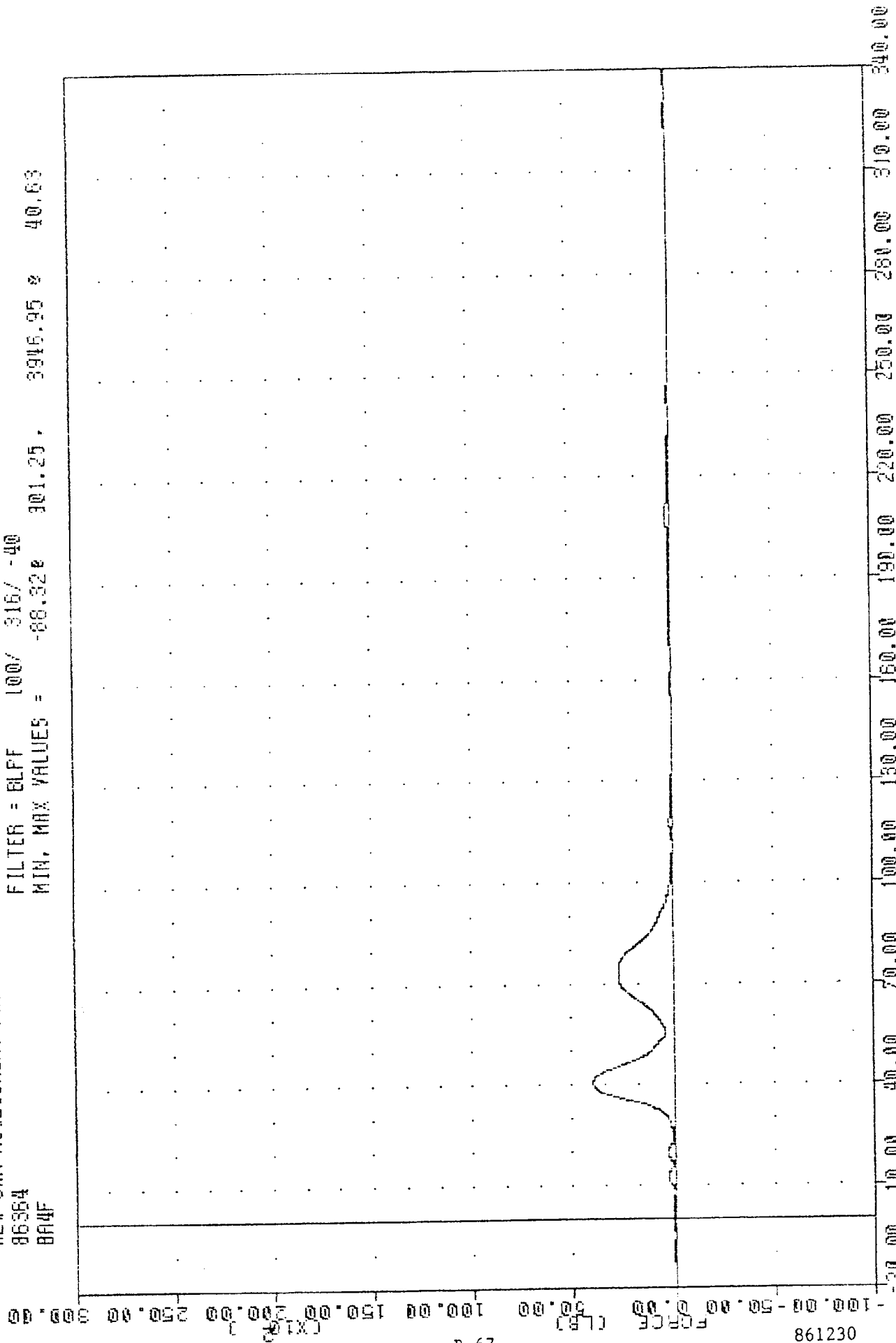
861230
 B-66
 FORCE (LBS)
 (X10³)
 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00 250.00 300.00 350.00



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B6 FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BFA4F

FILTER = BLFF 100V 316/ -40
 MIN. MAX VALUES = -88.32e 301.25 , 3945.95 % 40.63

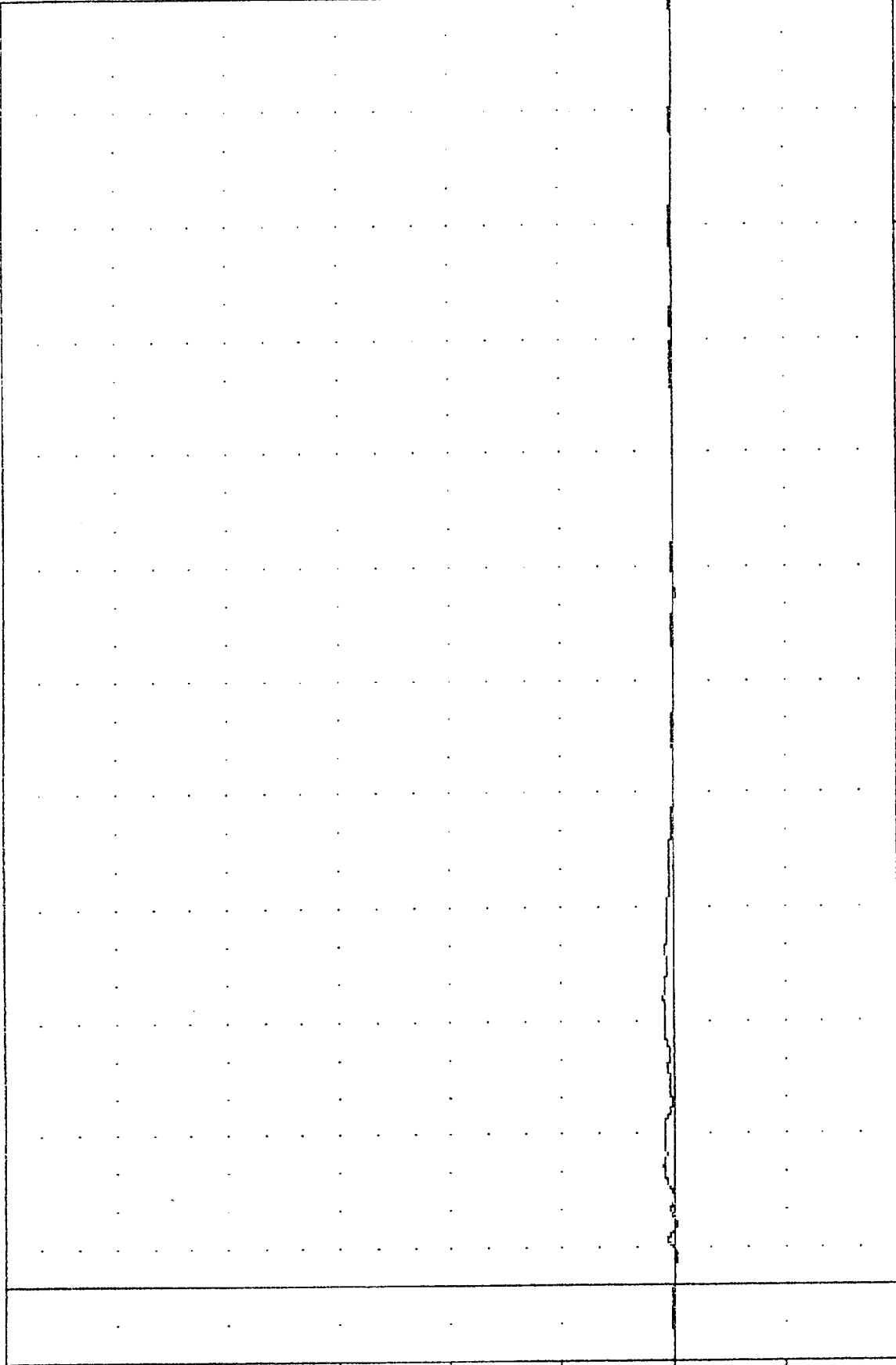


FORD AEROSTAR INTO LOAD CELL BARRIER
 10AN CELL BARRIER POSITION #4 FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BR5F

FILTER = BLFF 100/ 316/ -40
 MIN. MAX VALUES = -166.402 7.68 435.29 75.75

300.00
 250.00
 200.00
 150.00
 100.00
 50.00
 0.00
 -50.00
 -100.00

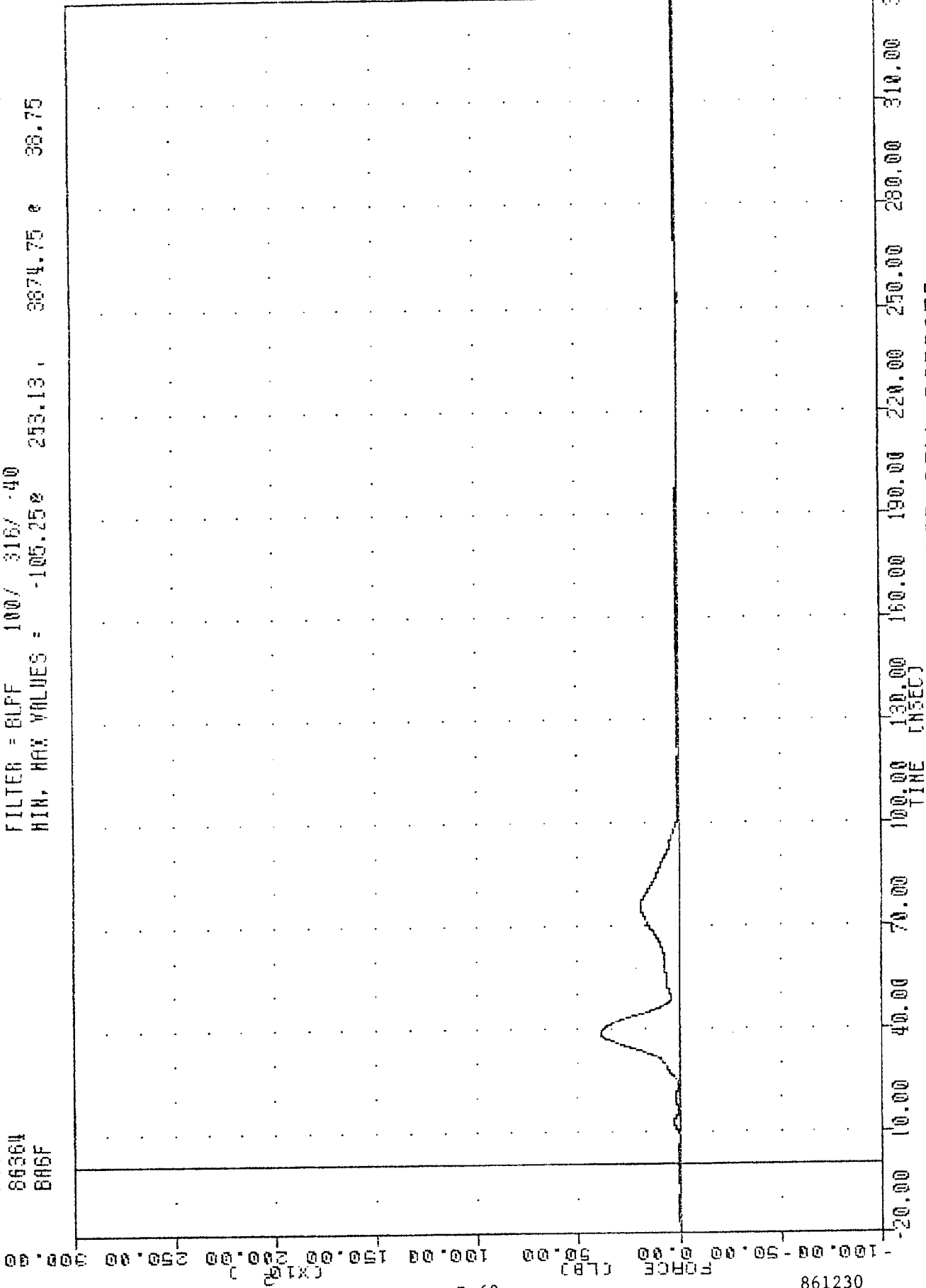


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)

FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A5 FORCE

TAC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BASF

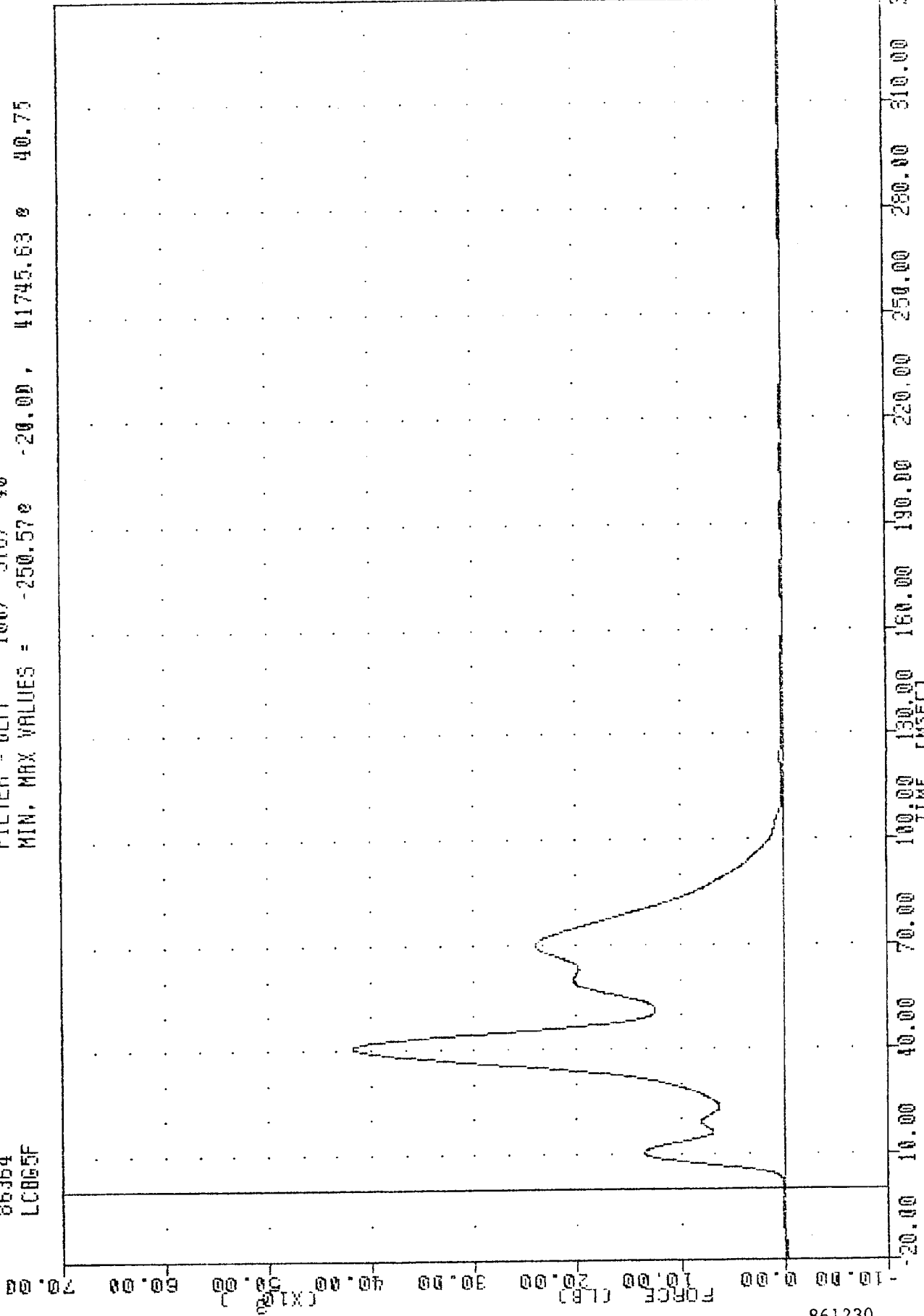
FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -105.250 253.13 3874.75 e 38.75



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION #6 FORCE

TRC
NEW CAR ASSESSMENT PROGRAM
861230
LC065F

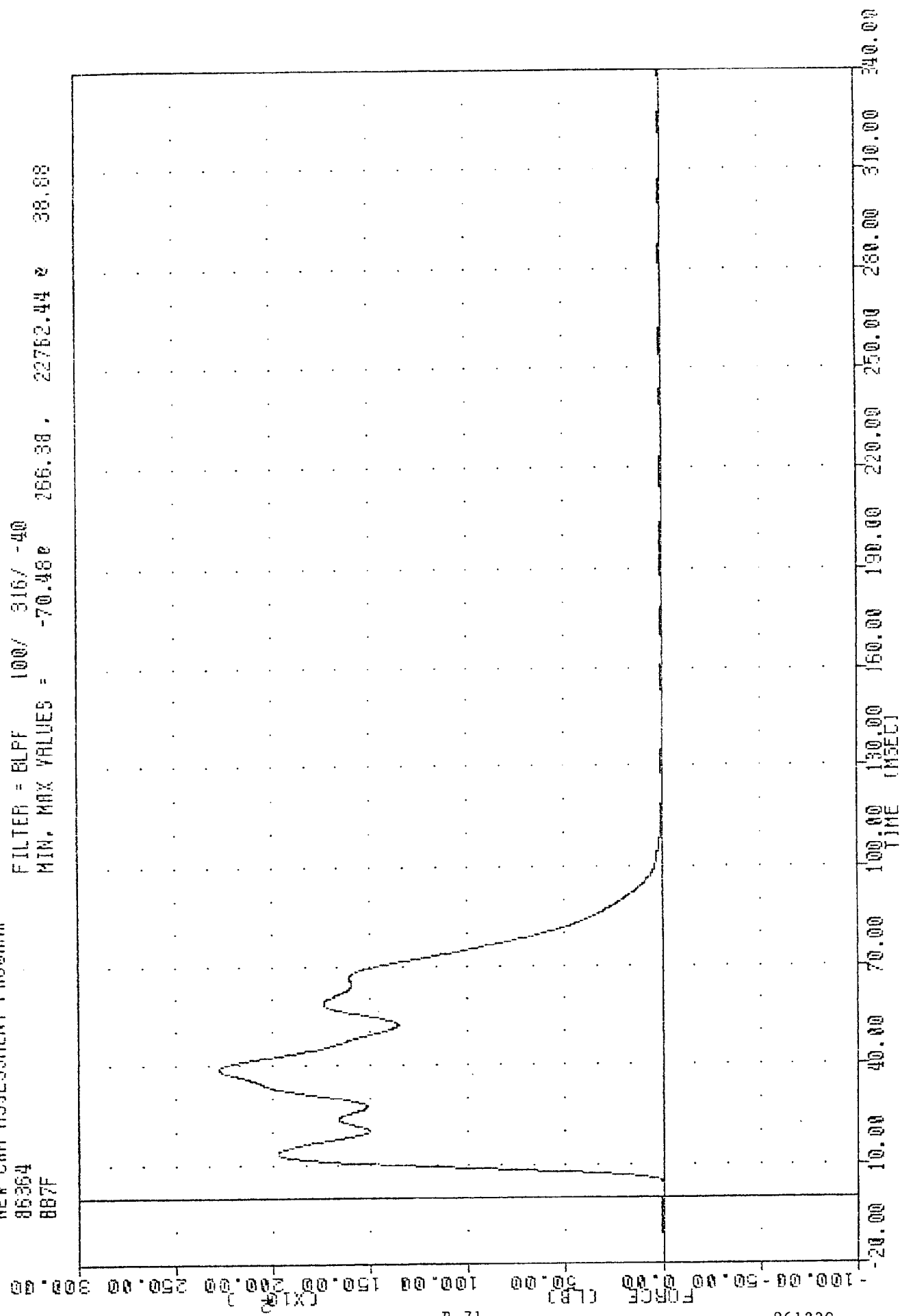
FILTER = 6LFF 100/ 316/ -40
MIN. MAX VALUES = -250.57e -20.00, 41745.63 e 40.75



FORD AEROSTAR INTO LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 5 FORCE TOTAL

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 887F

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -70.48e 22762.44 e 38.88



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B7 FORCE

TRC , 861230
NEW CAR ASSESSMENT PROGRAM
86364
BBBF

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -66.92 231.25, 5791.40 43.13

300.00

250.00

200.00

150.00

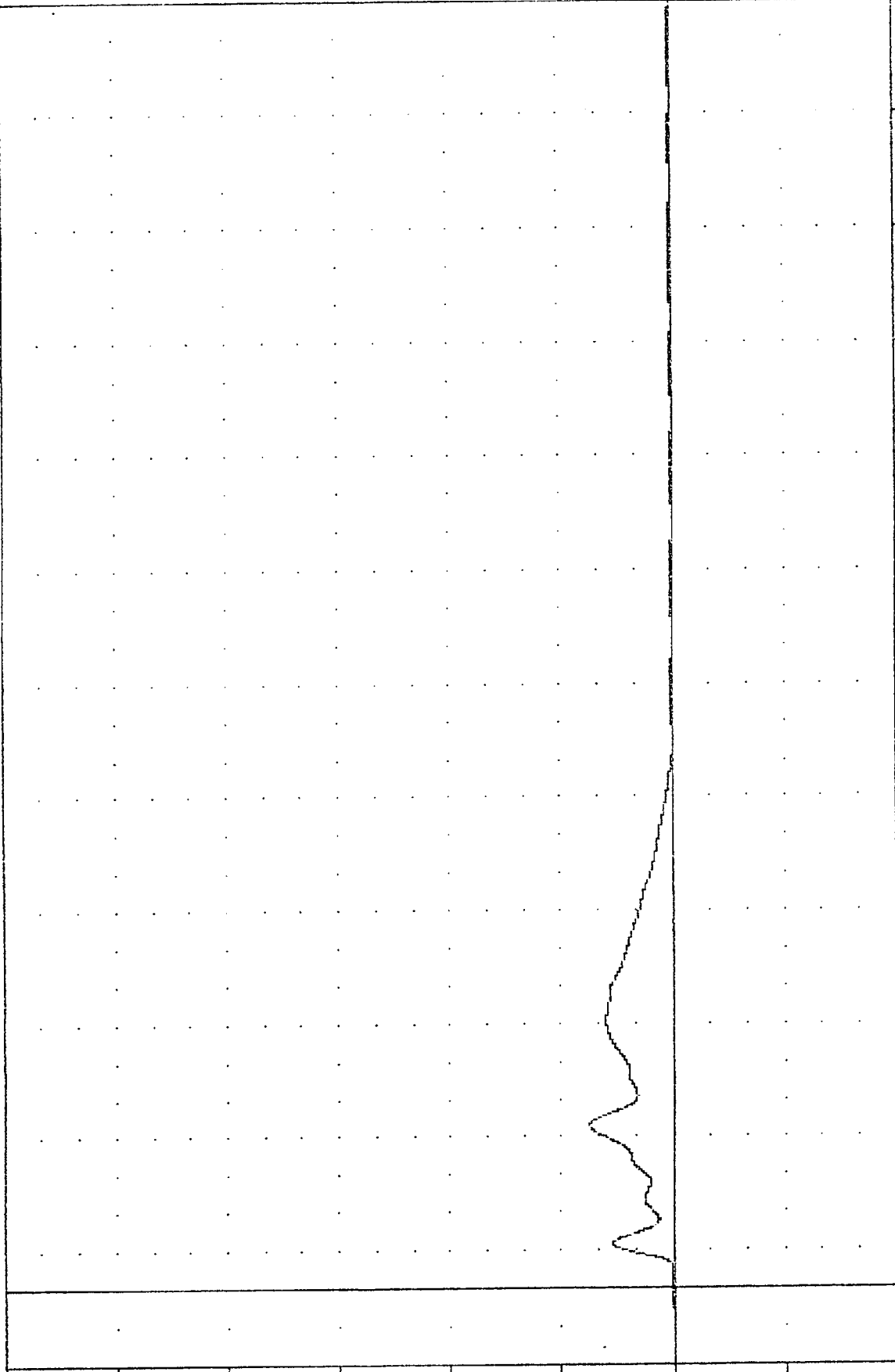
100.00

50.00

0.00

-50.00

-100.00

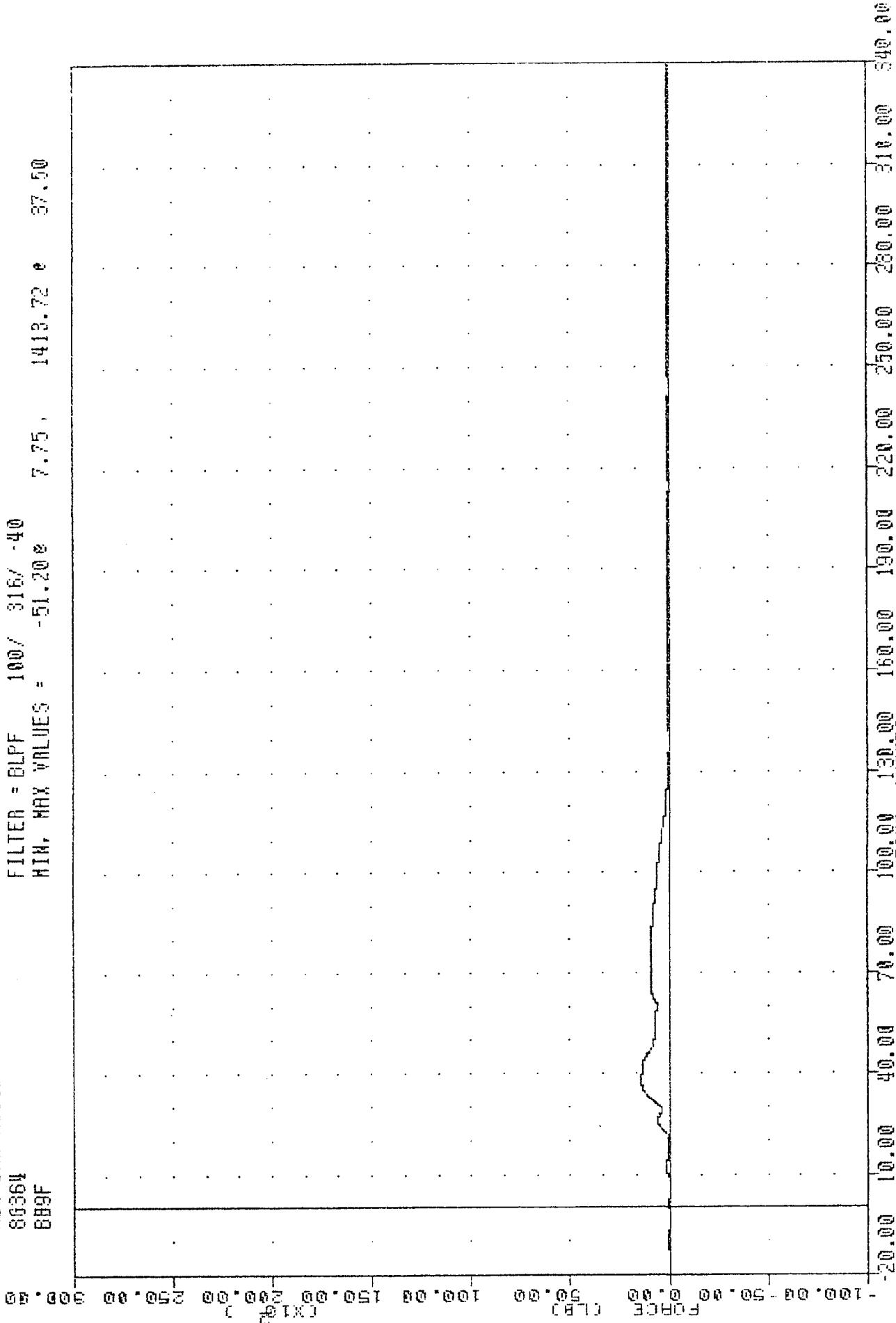


340.00

FORD AEROSTAR INTO LOAD CELL BARRIER
1 INAN CELL BARRIER POSITION BB FORCE

TAC
 NEW CAR ASSESSMENT PROGRAM
 861230
 BB9F

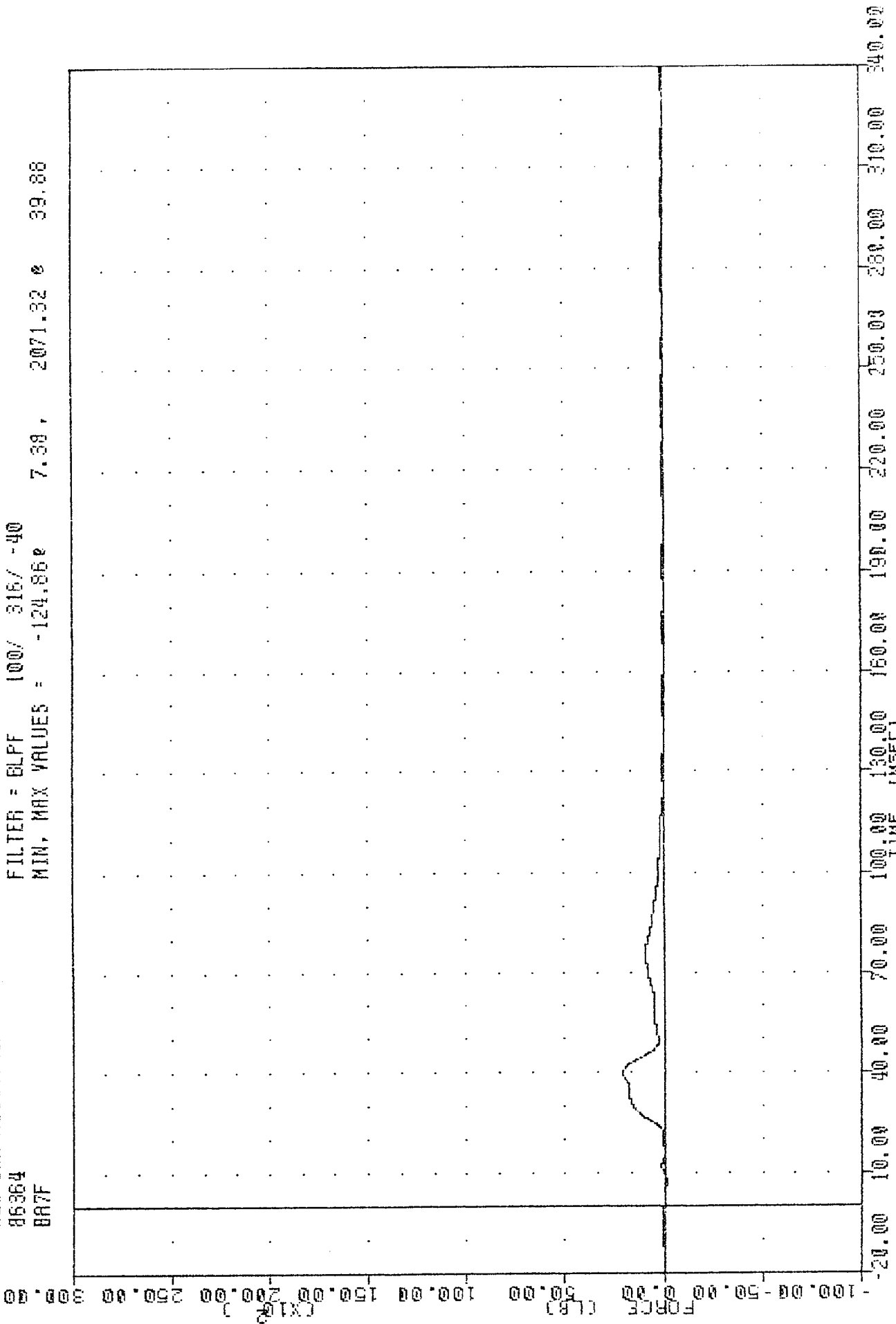
FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -51.20e 7.75, 1413.72 e 37.50



FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B9 FORCE

TRC . 861230
 NEW CAR ASSESSMENT PROGRAM
 85364
 BRTF

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -124.86e 7.38, 2071.32 e 39.88

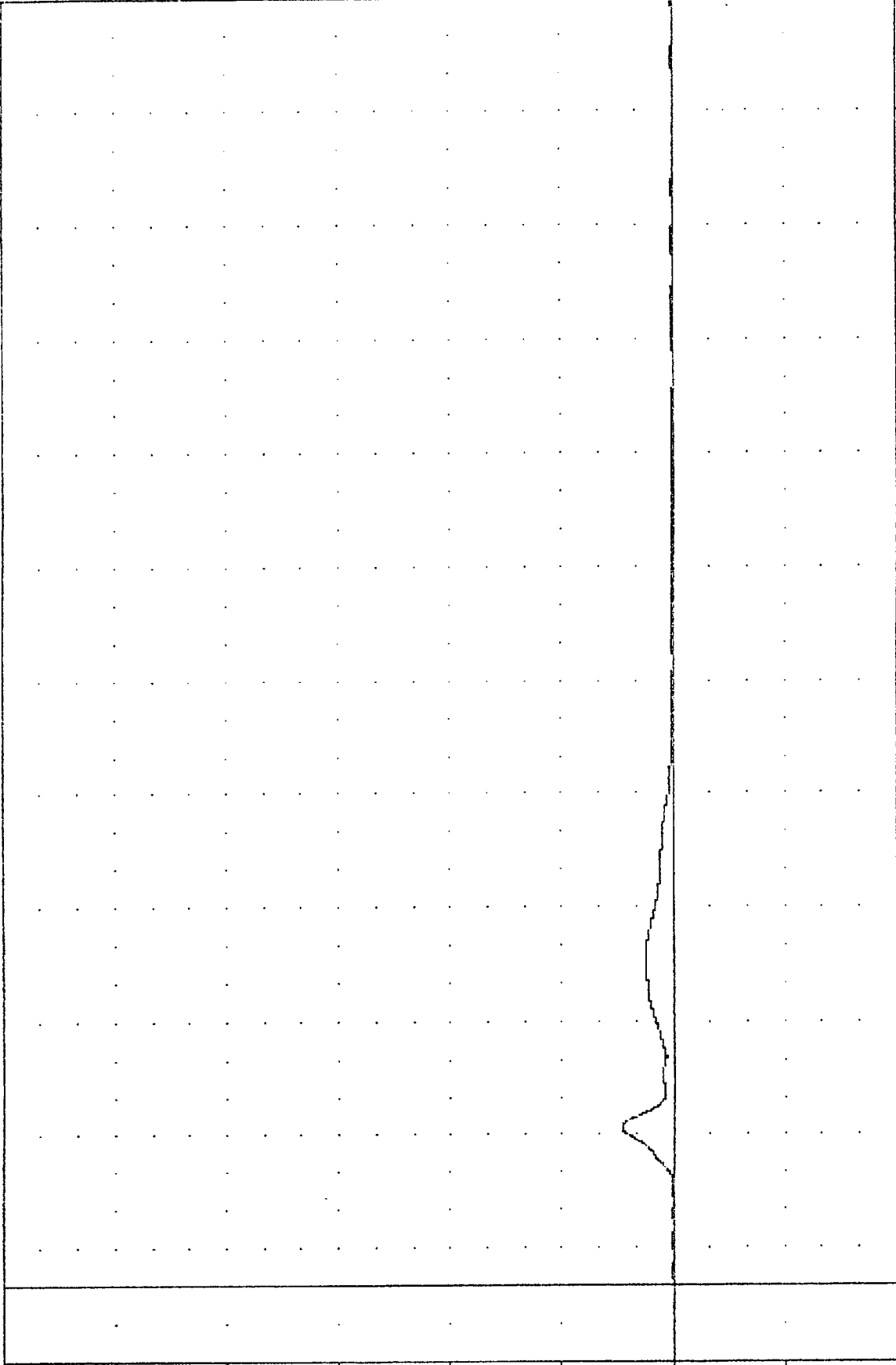


FORD AEROSTAR INTO LOAD CELL BARRIER
 1 INCH CELL BARRIER POSITION A7 FORCE

TRC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BARF

FILTER = 8LFF 1007 316/ -40
 MIN, MAX VALUES = -92.90% 2317.16% 42.00

300.00
 250.00
 200.00
 150.00
 100.00
 50.00
 0.00
 -50.00
 -100.00

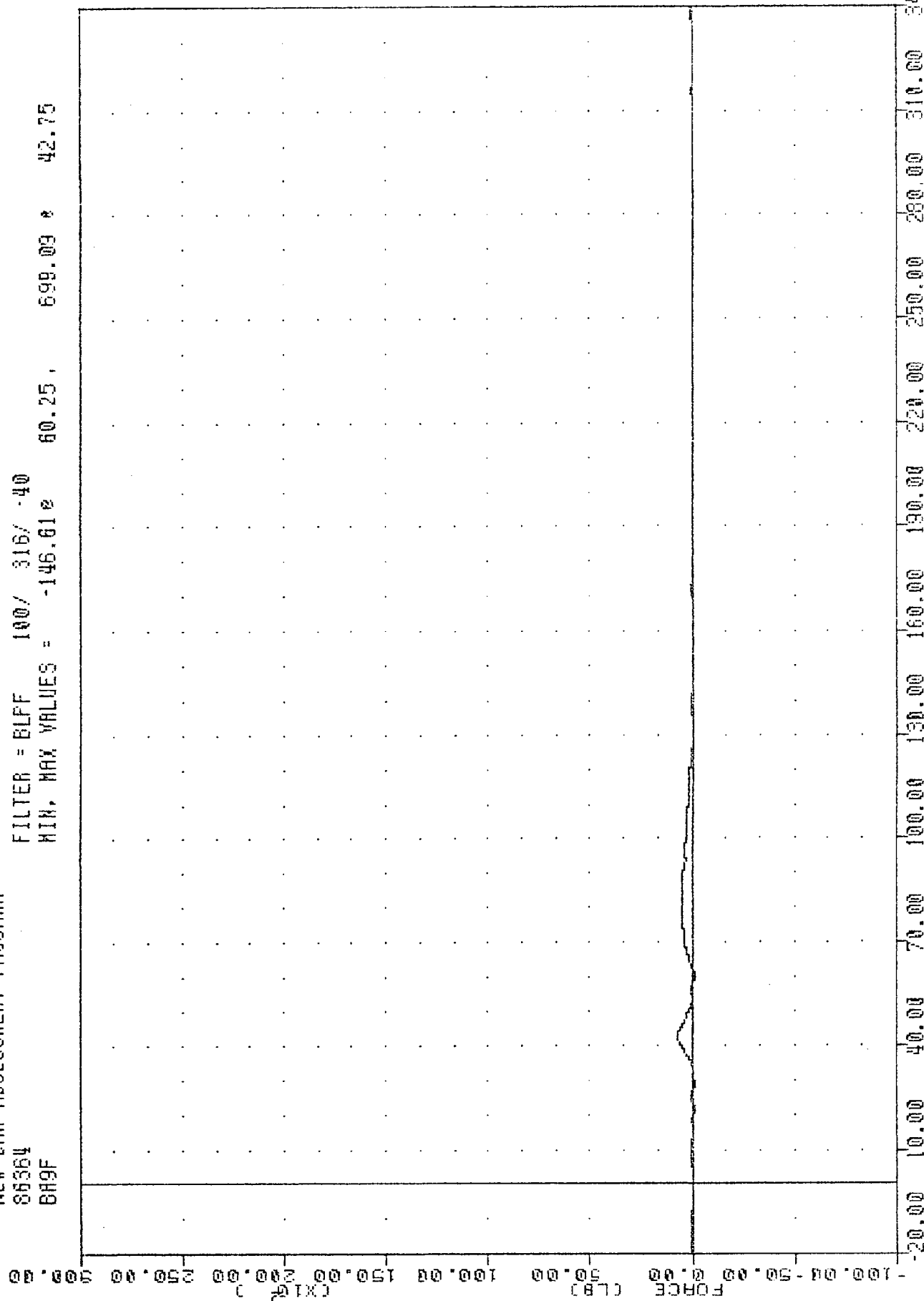


-20.00 10.00 40.00 70.00 100.00 150.00 180.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)

FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A8 FORCE

THC , 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 BA9F

FILTER = BLFF 100/ 316/ -40
 MIN. MAX VALUES = -146.61e 60.25 , 699.09 * 42.75

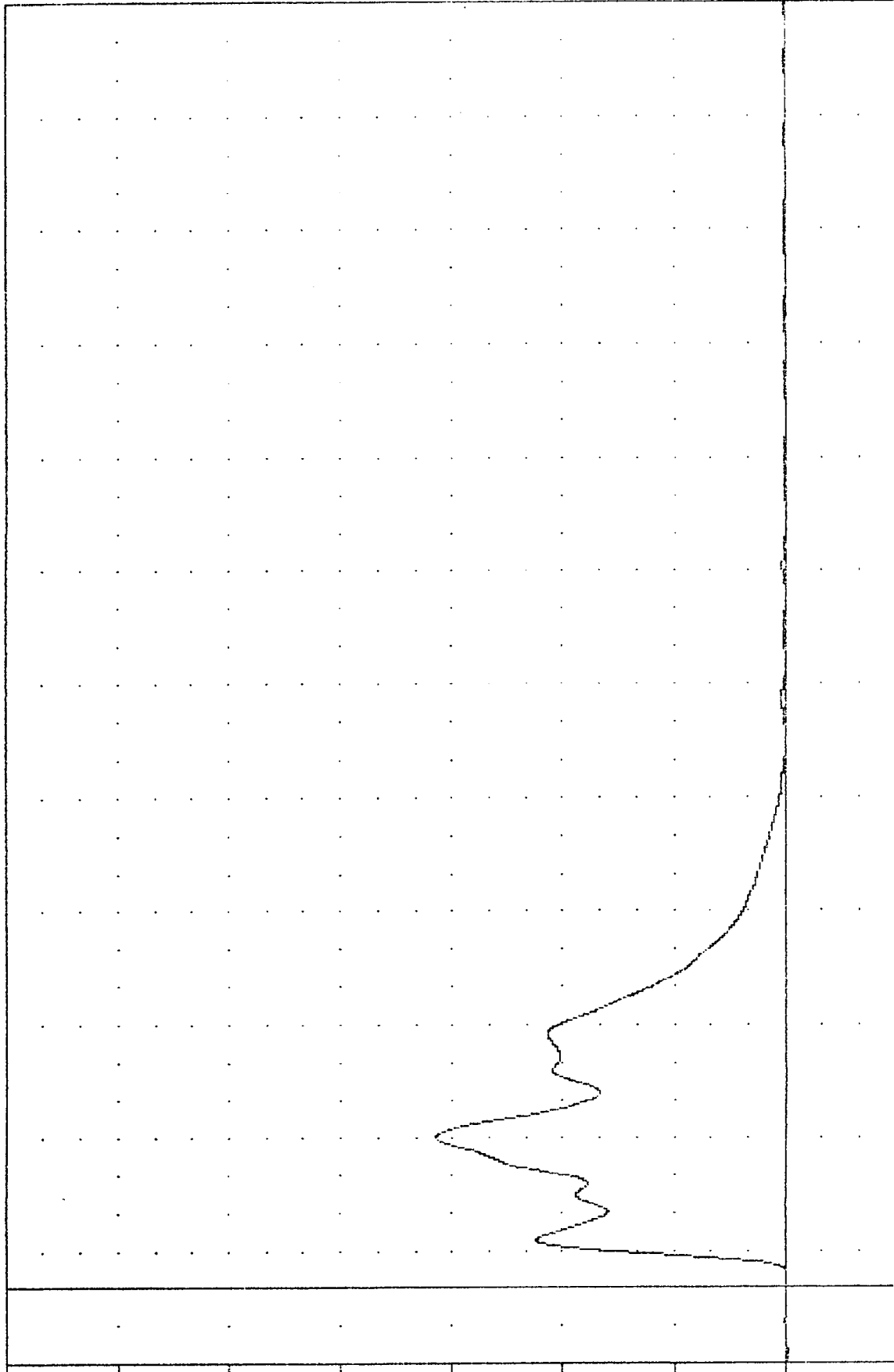


FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A9 FORCE

TAC
 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 LCB66F

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -198.17 31482.45 e 40.13

70.00

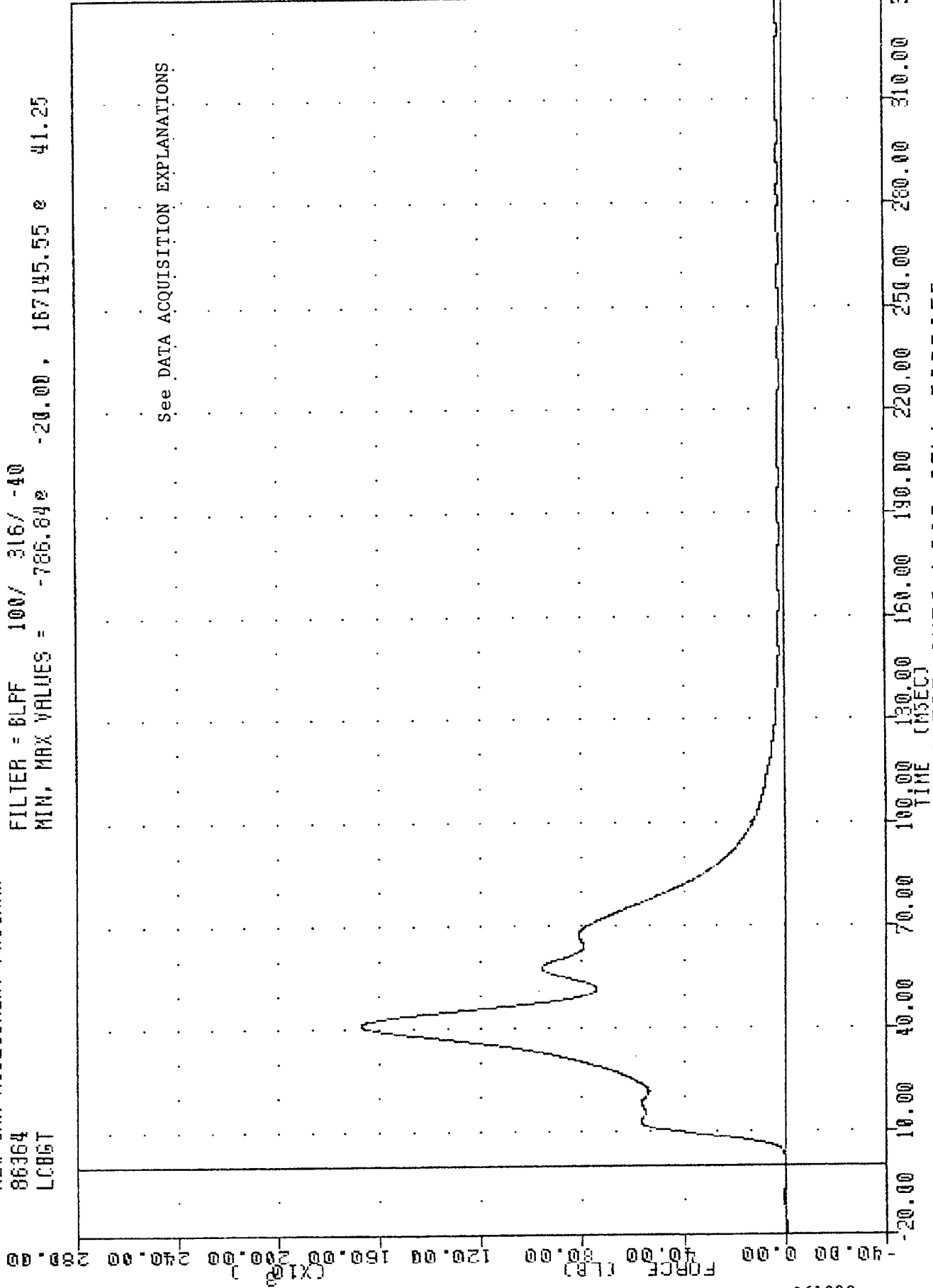


-10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

FORD AEROSTAR INTO LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 6 FORCE TOTAL

TRC
 861230
 NEW CAR ASSESSMENT PROGRAM
 86364
 LC86T

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -786.84e -20.00, 167145.55 e 41.25



See DATA ACQUISITION EXPLANATIONS

FORD AEROSTAR INTO LOAD CELL BARRIER
 SUM OF LOAD CELL BARRIER FORCES

APPENDIX C

DUMMY CERTIFICATION

TRANSPORTATION RESEARCH CENTER OF OHIO

EXTERNAL DIMENSIONS

PART 572

27-DEC-86

TEMPERATURE 70.00 F
NCA ED411111

RELATIVE HUMIDITY 22.00 %
572 SN 411 EXT.DIMENSION CAL11

DESCRIPTION	SPECIFICATION	TEST RESULTS
SN HUMANOID 411		
Sitting Height	35.6 - 35.8IN	35.6 INS
Shoulder Pivot Height	21.8 - 22.4IN	22.3 INS
Hip Pivot Height	3.9 IN (ref.)	3.9 INS
Hip Pivot From Backline	4.8 IN (ref.)	4.8 INS
Knee Pivot From Backline	20.1 - 20.7IN	20.3 INS
Rear of Head From Backline	1.7 IN (ref)	1.7 INS
Chest Depth	9.1 - 9.6IN	9.4 INS
Shoulder Width	17.8 - 18.4IN	18.0 INS
Chest Circumference Over Nipples	36.8 - 40.0IN	37.3 INS
Waist Circumference at Min. Girth	31.4 - 32.6IN	32.5 INS
Hip Width	14.0 - 15.4IN	14.8 INS
Knee Pivot From Floor	19.3 - 19.9IN	19.5 INS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

LUMBAR FLEXION TEST

PART 572

26-DEC-86

TEMPERATURE 70.00 F
NCA LF41111

RELATIVE HUMIDITY 25.00 %
572 SN 411 LUMBAR FLEX CAL11

DEFLECTION	SPECIFICATION	TEST RESULTS
0 Deg.	0 LBS	0.00 LBS
20 Deg	22.00 - 34.00 LBS	26.00 LBS
30 Deg	34.00 - 46.00 LBS	35.00 LBS
40 Deg	46.00 - 58.00 LBS	47.00 LBS
NET RETURN ANGLE	< 12 DEG	11.90 DEG

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

PART 572

26-DEC-86

TEMPERATURE 71 F
NCA HD41111

RELATIVE HUMIDITY 28 %
572 SN 411 HEAD DROP CAL 11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
IPEAK RESULTANT ACCELERATION	210 - 260 G	227.74 G
ITIME ABOVE 100 G LEVEL	0.9 - 1.5 MS	1.24 MS
IPEAK LATERAL ACCELERATION	10 G MAX	-6.13 G
IIS ACCELERATION CURVE IUNIMODAL?		YES

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chris Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

ABDOMINAL COMPRESSION TEST

PART 572

27-DEC-86

TEMPERATURE 71.00 F
NCA AB41111

RELATIVE HUMIDITY 27.00 %
572 SN 411 ABDOM COMPR CAL 11

TEST CORRIDORS		TEST RESULTS
DISPLACEMENT	FORCE	
0 IN.	10 LBS	10 LBS
.50 IN.	23.00 - 36.00 LBS	27.11 LBS
.75 IN.	36.00 - 50.00 LBS	39.04 LBS
1.00 IN.	50.00 - 63.00 LBS	54.68 LBS
1.30 IN.	73.00 - 88.00 LBS	79.31 LBS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK PENDULUM TEST

PART 572

26-DEC-86

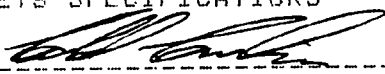
TEMPERATURE 71.00 F
NCA HN41111

RELATIVE HUMIDITY 26.00 %
572 SN 411 HEAD/NECK CAL 11

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	2.70 ms.
T2 - T3: 20 - 20 G	25 - 30 ms.	28.47 ms.
T3 - T4: 20 - 5 G	10 ms. max	5.79 ms.
Avg. G level T2 - T3	20 - 24 G	23.55 G
Maximum Rotation Angle	63 - 73 deg.	67.21 deg.
Peak Head Resultant Accel	26 G max	21.50 G

Test Parameter	Specification		Test Results	
Rotation Angle (degrees)	Time (ms.)	Chordal Disp. (in.)	Time (ms.)	Chordal Disp. (in.)
0	-2.0 - +2.0	-0.5 - +0.5	0.13	0.01
30	25.6 - 34.4	2.1 - 3.1	30.92	2.49
60	40.3 - 51.7	4.3 - 5.3	48.09	4.69
max	53.2 - 66.8	5.0 - 6.0	61.63	5.41
60	67.0 - 83.0	4.3 - 5.3	75.07	4.86
30	85.4 - 104.4	2.1 - 3.1	94.47	2.34
0	101.0 - 123.0	-0.5 - +0.5	108.05	0.15

* DUMMY MEETS SPECIFICATIONS

TECHNICIAN 

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 322

27-DEC-86

TEMPERATURE 70 F
LEFT KNEE
NCA LK41111

RELATIVE HUMIDITY 23 %
572 SN 411 L.KNEE IMP CAL 11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.88 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	1982.63 LBS.
DURATION ABOVE 1000 LBS.	>=1.7 MS.	1.88 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 072

27-DEC-86

TEMPERATURE 70 F
RIGHT KNEE
NCA RK41111

RELATIVE HUMIDITY 23 %
572 SN 411 R.KNEE IMP CAL 11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	2173.79 LBS.
DURATION ABOVE 1000 LBS.	≥ 1.7 MS.	1.74 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

27-DEC-86

TEMPERATURE 70 F
NCA TL411111

RELATIVE HUMIDITY 25 %
572 SN 411 L.S.THORAX CAL 11

TEST PARAMETER	LOW SPEED TEST SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	13.86-14.14 FT/SEC	14.07 FT/SEC
PEAK DEFLECTION	1.1 INCHES MAX.	0.95 INCHES
PEAK RESISTIVE FORCE	1,450. POUNDS MAX.	1325. POUNDS
INTERNAL HYSTERESIS	50% - 70%	59.7%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Char Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

27-DEC-86

TEMPERATURE 70 F
NCA TH41111

RELAT HUMIDITY 24 %
572 SN 411 H.S. THORAX CAL 11

HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	17.78-22.22 FT/SEC	22.01 FT/SEC
PEAK DEFLECTION	1.7 INCHES MAX	1.44 INCHES
PEAK RESISTIVE FORCE	2,250. POUNDS MAX.	2025. POUNDS
INTERNAL HYSTERESIS	50% - 70%	56.5%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Char. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

EXTERNAL DIMENSIONS

PART 572

27-DEC-86

TEMPERATURE 70.00 F
NCA ED88008

RELATIVE HUMIDITY 22.00 %
572 SN 880 EXT.DIMENSION CAL08

DESCRIPTION	SPECIFICATION	TEST RESULTS
SN ALDERSON 880		
Sitting Height	35.6 - 35.9IN	35.6 INS
Shoulder Pivot Height	21.8 - 22.4IN	22.1 INS
Hip Pivot Height	3.9 IN (ref.)	3.9 INS
Hip Pivot From Backline	4.8 IN (ref.)	4.8 INS
Knee Pivot From Backline	20.1 - 20.7IN	20.4 INS
Rear of Head From Backline	1.7 IN (ref)	1.7 INS
Chest Depth	9.1 - 9.6IN	9.2 INS
Shoulder Width	17.8 - 18.4IN	17.9 INS
Chest Circumference Over Nipples	36.8 - 40.0IN	37.8 INS
Waist Circumference at Min. Girth	31.4 - 32.6IN	32.3 INS
Hip Width	14.0 - 15.4IN	14.5 INS
Knee Pivot From Floor	19.3 - 19.9IN	19.5 INS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Chris Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

LUMBAR FLEXION TEST

PART 572

26-DEC-86

TEMPERATURE 71.00 F
NCA LF88008

RELATIVE HUMIDITY 25.00 %
572 SN 880 LUMBAR FLEX CAL08

DEFLECTION	SPECIFICATION	TEST RESULTS
0 Deg.	0 LBS	0.00 LBS
20 Deg	22.00 - 34.00 LBS	25.00 LBS
30 Deg	34.00 - 46.00 LBS	35.00 LBS
40 Deg	46.00 - 58.00 LBS	46.00 LBS
NET RETURN ANGLE	< 12 DEG	9.80 DEG

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

ABDOMINAL COMPRESSION TEST

PART 572

26-DEC-86

TEMPERATURE 70.00 F
NCA ABBB00B

RELATIVE HUMIDITY 25.00 %
572 SN 880 ABDOM COMPR CAL 08

TEST CORRIDORS		TEST RESULTS
DISPLACEMENT	FORCE	
0 IN.	10 LBS	10 LBS
.50 IN.	23.00 - 36.00 LBS	30.12 LBS
.75 IN.	36.00 - 50.00 LBS	43.47 LBS
1.00 IN.	50.00 - 63.00 LBS	60.24 LBS
1.30 IN.	73.00 - 88.00 LBS	86.63 LBS

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

PART 572

26-DEC-86

TEMPERATURE 71 F
NDA HD88008

RELATIVE HUMIDITY 27 %
572 SN 880 HEAD DROP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PEAK RESULTANT ACCELERATION	210 - 260 G	241.60 G
TIME ABOVE 100 G LEVEL	0.9 - 1.5 MS	1.17 MS
PEAK LATERAL ACCELERATION	10 G MAX	-7.54 G
IS ACCELERATION CURVE UNIMODAL?		YES

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middle

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK PENDULUM TEST

PART 572

20-DEC-86


TEMPERATURE 70.00 F
NCA HN41110

RELATIVE HUMIDITY 26.00 %
572 SN 411 HEAD/NECK CAL 10

Test Parameter	Specification	Test Results
Pendulum velocity	21.5 to 25.5 fps	23.42 fps
Pendulum Deceleration:		
T1 - T2: 5 - 20 G	3 ms. max	2.82 ms.
T2 - T3: 20 - 20 G	25 - 30 ms.	27.48 ms.
T3 - T4: 20 - 5 G	10 ms. max	6.69 ms.
Avg. G level T2 - T3	20 - 24 G	23.77 G
Maximum Rotation Angle	63 - 73 deg.	68.08 deg.
Peak Head Resultant Accel	26 G max	21.97 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 

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 072

27-DEC-86

TEMPERATURE 70 F
LEFT KNEE
NCA LK88008

RELATIVE HUMIDITY 23 %
572 SN 880 L.KNEE IMP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	2106.26 LBS.
DURATION ABOVE 1000 LBS.	≥ 1.7 MS.	1.85 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Chas. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

27-DEC-86

TEMPERATURE 70 F
RIGHT KNEE
NCA RKBS008

RELATIVE HUMIDITY 23 %
572 SN 880 R.KNEE IMP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	2061.17 LBS.
DURATION ABOVE 1000 LBS.	≥ 1.7 MS.	1.94 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Chas. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

27-DEC-86

TEMPERATURE 71 F
NCA TL88008

RELATIVE HUMIDITY 26 %
572 SN 880 L.S. THORAX CAL 08

TEST PARAMETER	LOW SPEED TEST	
	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	13.86-14.14 FT/SEC	14.06 FT/SEC
PEAK DEFLECTION	1.1 INCHES MAX.	0.90 INCHES
PEAK RESISTIVE FORCE	1,450. POUNDS MAX.	1386. POUNDS
INTERNAL HYSTERESIS	50% - 70%	61.3%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN *Chris Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

PART 572

27-DEC-86

TEMPERATURE 70 F
NCA 1H88008

RELATIVE HUMIDITY 26 %
572 SN 880 H.S. THORAX CAL 08

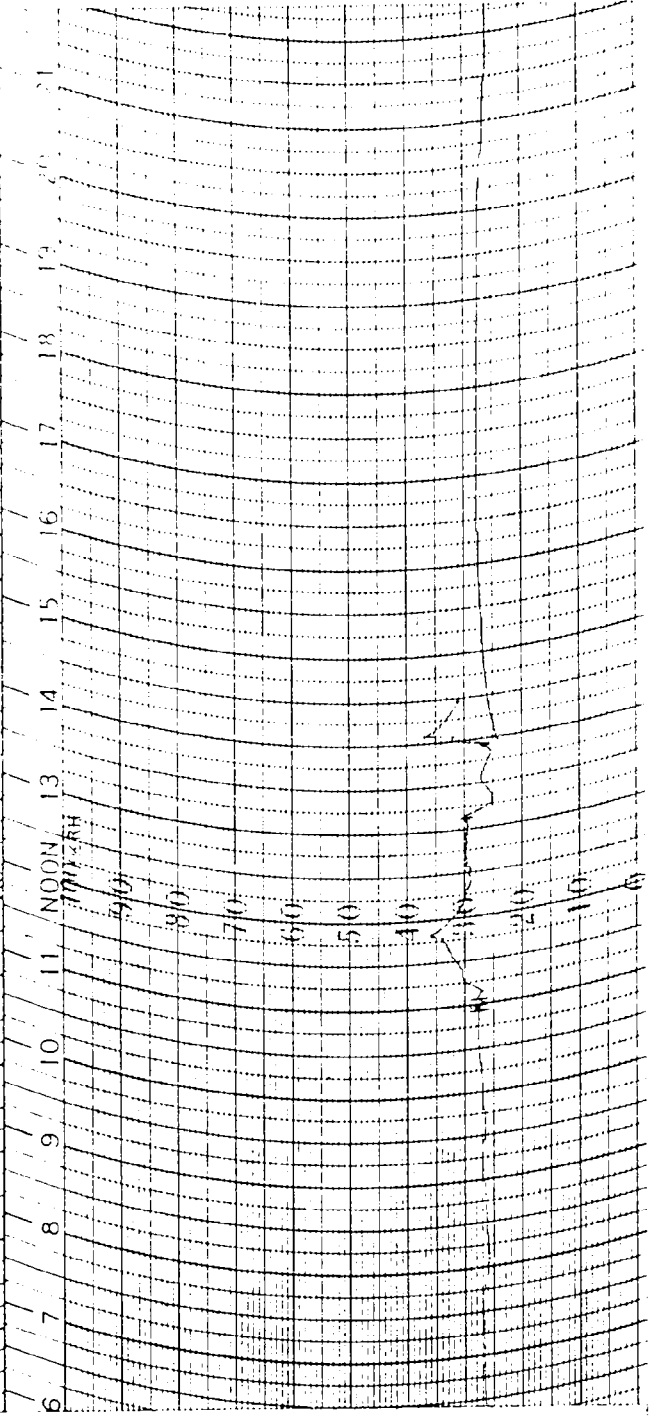
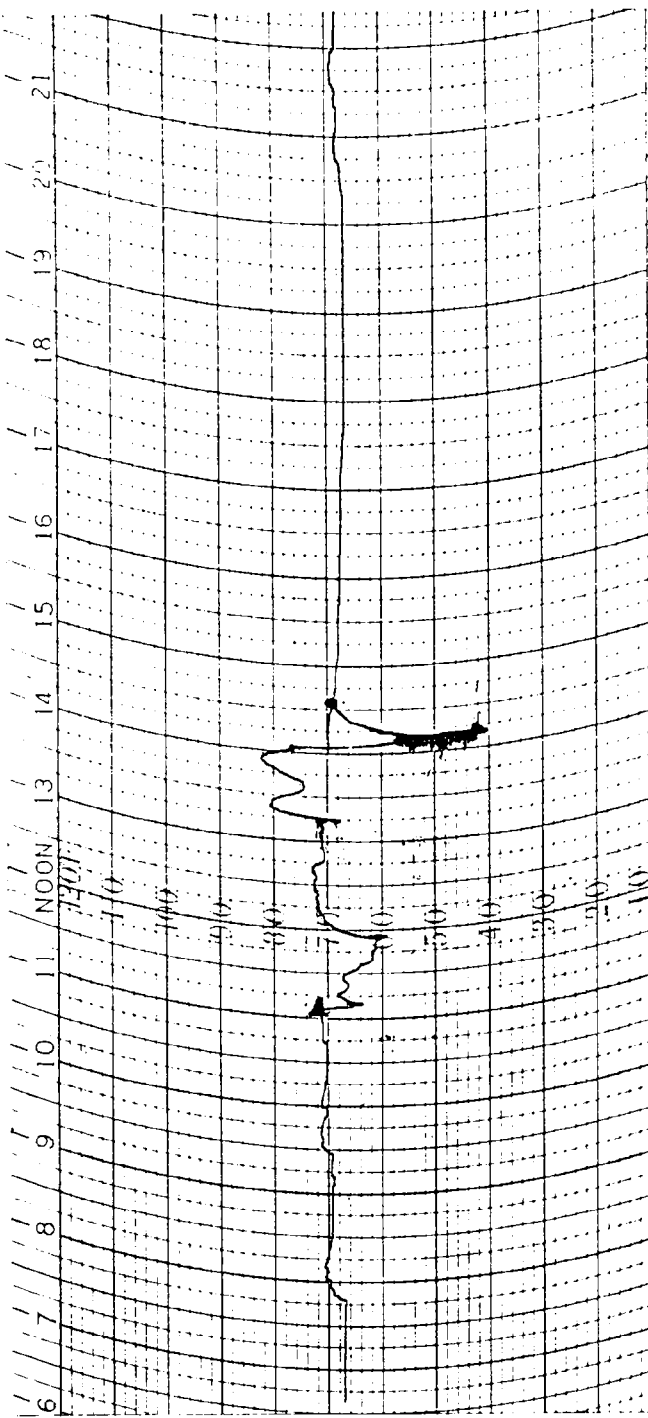
HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
PENDULUM VELOCITY	21.78-22.22 FT/SEC	21.98 FT/SEC
PEAK DEFLECTION	1.7 INCHES MAX.	1.31 INCHES
PEAK RESISTIVE FORCE	2,250. POUNDS MAX.	2124. POUNDS
INTERNAL HYSTERESIS	50% - 70%	60.6%

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

APPENDIX D

RESTRAINT INSTRUCTIONS FROM OWNER'S MANUAL



STATION *NCAP AEROSTAN* DATE ON *12-24-86* DATE OFF *12-30-86*

BEFORE DRIVING YOUR VEHICLE

OCCUPANT RESTRAINT SYSTEMS

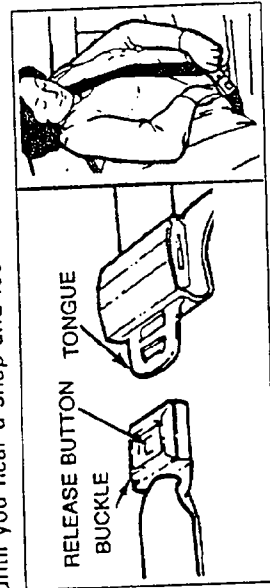
Ford Motor Company recommends that you always "buckle up." In some areas restraint system use is required by law.

WARNING — All vehicle occupants should wear their seat belts for maximum protection in the event of a collision. For young children, infant and child restraints should be obtained and used in accordance with the instructions furnished by the manufacturer of the infant and child restraint. See the section headed "Infant and Child Restraints."

Front Lap-Shoulder Belts

The belt system allows freedom of movement, locking tight only on hard braking or impacts of approximately 5 mph (8 km/h) or more. The system cannot be made to lock by jerking on the belt.

After entering your vehicle, close the door and adjust the front seat to obtain the best position for your driving comfort, access to controls and visibility. Then pull the lap-shoulder belt from the retractor so the shoulder portion of the belt crosses your shoulder and chest and insert the belt tongue into the proper buckle until you hear a snap and feel it latch.



Pull up on the shoulder portion of the belt to tighten the lap portion to a snug fit. Be sure the belt is as low on your hips as possible. If the shoulder belt is

BEFORE DRIVING YOUR VEHICLE

uncomfortably tight, a comfort regulator is provided in the shoulder belt retractor to reduce belt pressure against your chest. The shoulder belt can be adjusted much like a window shade to maintain a small amount of slack in the belt. The adjacent door must be closed to use this comfort regulator feature.

Adjustment Procedure

To set the comfort regulator, the shoulder belt initially should be positioned snug against the chest. If the belt is not snug, the comfort regulator may already be engaged. Disengagement is accomplished by the following procedure:

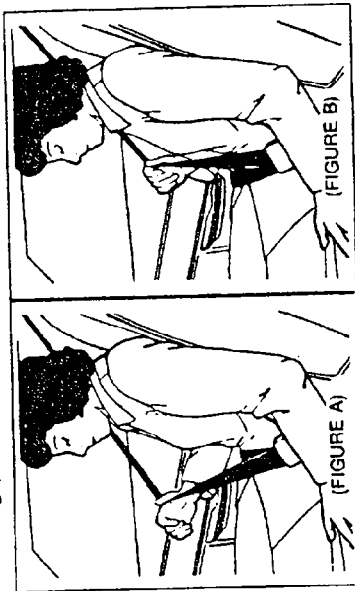


Figure A — Pull the shoulder belt outward 4 or 5 inches (10 to 13 cm), then release it and allow belt to fully retract. Repeat procedure if belt is not snug to the chest.

Figure B — Now the belt tension may be adjusted by pulling down slightly on the shoulder belt and releasing. The least amount of slack needed to relieve tension, but not more than 1-1/2 inches (3.8 cm) should be pulled out when using the comfort regulator system.

If the desired setting is not achieved or excess slack develops as you change seat position, repeat the above procedure.