

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

GENERAL MOTORS DE MEXICO S.A. DE C.V.

1991 BUICK CENTURY

4-DOOR SEDAN

NHTSA NO. MM0103

TRC TEST NO. 910108

PREPARED BY:

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JANUARY 28, 1991

FINAL REPORT

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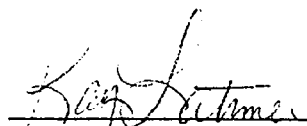
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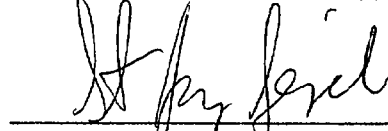
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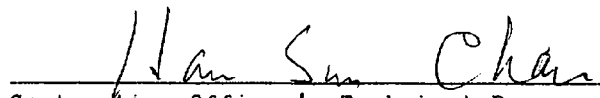
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16. Abstract A 35 mph frontal load cell barrier impact test was conducted on a 1991 Buick Century 4-door sedan, NHTSA No. MM0103, at the Transportation Research Center of Ohio on January 8, 1991. This test was conducted to obtain new car assessment and research data indicant of FMVSS No. 208 performance. The barrier impact velocity was 35.1 mph. The vehicle's maximum crush was 25.5 inches. The ambient temperature was 71° F. The driver's head injury criteria (HIC) was 815. The driver's maximum chest deceleration over three (3) milliseconds was 46.8 g. The driver's chest displacement was 2.0 inches. The driver's maximum left and right femur forces were 1340 pounds and 1014 pounds, respectively. The passenger's head injury criteria (HIC) was 1144. The passenger's maximum chest deceleration over three (3) milliseconds was 40.2 g. The passenger's chest displacement was 1.3 inches. The passenger's maximum left and right femur forces were 315 pounds and 179 pounds, respectively			
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SECTION 1.0

PURPOSE AND TEST PROCEDURE

. PURPOSE

This 35 mph frontal barrier impact test is part of the New Car Assessment Program (NCAP) conducted for the National Highway Traffic Safety Administration's (NHTSA) Office of Market Incentives by the Transportation Research Center of Ohio (TRC) under Contract No. DTNH22-90-D-22121.

The purpose of this test was to obtain new car assessment and research data for vehicle crashworthiness and occupant restraint system performance for the subject vehicle, a 1991 Buick Century 4-door sedan, NHTSA No. MM0103, at an impact speed in excess of the current 30 mph FMVSS 208 requirements.

TEST PROCEDURE

This test was conducted in accordance with NHTSA's Laboratory Indicant Test Procedure, New Car Assessment Program, dated January 1, 1990. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection" performance.

The test vehicle was instrumented with seven (7) accelerometers to measure longitudinal axis accelerations and two (2) accelerometers to measure vertical axis accelerations. The driver's and passenger's restraint systems were instrumented with four (4) seat belt load cells to measure lap belt tension and shoulder belt tension, two (2) string potentiometers to measure shoulder belt displacement, and two (2) linear potentiometers to measure shoulder belt stretch. The vehicle impacted a frontal load cell barrier instrumented with thirty-six (36) barrier face load cells. The vehicle's specified impact velocity range was 34.5 to 35.5 mph.

The test vehicle contained two (2) Part 572 E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedures specified in Appendices VII and VIII of the Laboratory Indicant Test Procedures.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations, and with left and right femur load cells to measure axial forces. Instrumentation also included chest potentiometers to measure longitudinal displacement and six-axis neck load cells to measure longitudinal, lateral and vertical forces and moments.

The eighty-three (83) data channels were multiplexed and recorded on two (2) 14-track tape drives. The data was digitally sampled at 8000 samples per second and processed per section IP11 of the Laboratory Indicant Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and sixteen (16) high-speed motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle, occupant, and load cell barrier data are presented in Section 2.0. The vehicle, occupant, and camera measurements are presented in Section 3.0. Appendix A contains the still photographic prints. Appendix B contains the dummy, vehicle, and load cell barrier data plots. Appendix C contains the dummy certification data. Appendix D contains miscellaneous test information. Appendix E contains the restraint system instructions from the owner's manual.

.SECTION 2.0

FRONTAL BARRIER IMPACT TEST SUMMARY

TEST RESULTS SUMMARY

This frontal load cell barrier test was conducted at TRC on January 8, 1991.

The test vehicle, a 1991 Buick Century 4-door sedan, NHTSA No. MM0103, was equipped with a 3.3 liter transverse engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 3475 pounds. The vehicle's impact speed was 35.1 mph. The vehicle sustained 25.5 inches of static crush during the impact.

The driver's head injury criteria (HIC) was 815. The driver's maximum chest resultant acceleration over three (3) milliseconds was 46.8 g. The driver's chest displacement was 2.0 inches. The driver's maximum left and right femur forces were 1340 pounds and 1014 pounds, respectively.

The passenger's HIC was 1144. The passenger's maximum chest resultant acceleration over three (3) milliseconds was 40.2 g. The passenger's chest displacement was 1.3 inches. The passenger's maximum left and right femur forces were 315 pounds and 179 pounds, respectively.

No fluid spilled from the vehicle's fuel system following the crash test event.

DATA ACQUISITION EXPLANATIONS

The engine top X-axis accelerometer, ENGXG1, data was lost due to the motion of the vehicle's hood with respect to the firewall stretching the accelerometer cable and causing a loss of continuity in this data channel.

TABLE 1. CRASH TEST SUMMARY

NHTSA NO.: MM0103 TEST TYPE: Frontal Load Cell Barrier

TEST DATE: 01/08/91 TEST TIME: 1410 AMBIENT TEMP. (°F): 71

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1991/Buick/Century/4-door sedan

VEHICLE TEST WEIGHT (LBS): 3475

IMPACT ANGLE (DEG)*: 0

IMPACT VELOCITY (MPH)**: PRIMARY = 35.1 SECONDARY = 35.0

MAXIMUM STATIC CRUSH (IN): 25.5

AVERAGE REBOUND (IN): 16.1

DUMMIES:	Driver #192	Passenger #142
TYPE:	Part 572 E	Part 572 E
LOCATION:	Left front	Right front
RESTRAINT:	3-point passive belt	3-point passive belt

NUMBER OF DATA CHANNELS: 83

NUMBER OF CAMERAS: HIGH-SPEED 16 REAL-TIME 2

*With respect to tow track centerline.

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

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: General Motors De Mexico S.A. De C.V.

MAKE/MODEL: Buick/Century

VIN: 3G4AH54N3MS604331

BODY STYLE: 4-door sedan

MODEL YEAR: 1991

NHTSA NO.: MM0103

COLOR: Red

ENGINE DATA: TYPE: Transverse CYLINDERS: 6 DISPLACEMENT: 3.3 liter

TRANSMISSION DATA: 3 SPEED, MANUAL, X AUTOMATIC, X FWD, RWD, 4WD

DATE VEHICLE RECEIVED: 12/19/90

ODOMETER READING: 104.0

DEALER'S NAME AND ADDRESS: Len Immke Buick
300 N. Hamilton Rd.
Columbus, OH 43213

ACCESSORIES:

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

REMARKS:

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

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: General Motors De Mexico S.A. De C.V.

DATE OF MANUFACTURE: 09/90

VIN: 3G4AH54N3MS604331

GVWR: 4078 LBS

GAWR: FRONT: 2214 LBS., REAR: 1864 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Goodyear Invicta GS P185/75R14

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 44 PSI
REAR: 44 PSI

SPARE TIRE (MFR., LINE, SIZE): Goodyear Temp T125/70D15

TYPE OF SEATS: FRONT: Split bench
REAR: Bench

TYPE OF FRONT SEAT BACKS: Non-adjustable

MAXIMUM WIDTH: 69.4 INCHES

WHEELBASE: 105.0 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA:

The label was located on the driver's door.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P185/75R14

RECOMMENDED COLD TIRE PRESSURE: FRONT: 32 PSI; REAR: 32 PSI

DESIGNATED SEATING CAPACITY: 3 FRONT 3 REAR 6 TOTAL

VEHICLE CAPACITY WEIGHT: 1063 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 26.5; RF 27.0; LR 27.5; RR 27.6

PRE-TEST ATTITUDE: LF 26.2; RF 26.5; LR 25.2; RR 25.8

POST-TEST ATTITUDE: LF 31.0; RF 30.8; LR 24.0; RR 25.5

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	967 LBS.	RIGHT REAR	498 LBS.
LEFT FRONT	998 LBS.	LEFT REAR	529 LBS.
TOTAL FRONT WEIGHT	1965 LBS.	(65.7% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1027 LBS.	(34.3% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 2992 LBS.			

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (2992 LBS)

VCW = VEHICLE CAPACITY WEIGHT (1063 LBS)

DSC = DESIGNATED SEATING CAPACITY (6)

$RCLW* = VCW - 150 (DSC) = 1063 - 150(6) = 163$

TARGET TEST WEIGHT = UDW + RCLW* + (NO. OF HYBRID III DUMMIES X 167 LBS/DUMMY)

TARGET TEST WEIGHT = 2992 + 163 + 334

TARGET TEST WEIGHT = 3489 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 149 LBS. OF CARGO WEIGHT:

RIGHT FRONT	1046 LBS.	RIGHT REAR	683 LBS.
LEFT FRONT	1046 LBS.	LEFT REAR	700 LBS.
TOTAL FRONT WEIGHT	2092 LBS.	(60.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1383 LBS.	(39.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	3475 LBS.	(0.4% UNDER TARGET TEST WEIGHT)	

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

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: Rear bumper and trunk lid

CG = 41.8 INCHES REARWARD OF FRONT WHEEL CENTERLINE

*Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 300 pounds, whichever is less.

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 910108 NHTSA NO.: MM0103
TEST DATE: 01/08/91 TEST TIME: 1410
TEST TYPE: Frontal load cell barrier IMPACT ANGLE: 0°
AMBIENT TEMPERATURE AT IMPACT AREA: 71° F
TEMPERATURE IN OCCUPANT COMPARTMENT: 71° F
IMPACT VELOCITY: PRIMARY = 35.1 MPH SECONDARY = 35.0 MPH
(SPECIFIED RANGE = 34.5 TO 35.5 MPH)
DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 26.0 IN.
EXITING VELOCITY TRAP = 2.0 IN.

TEST VEHICLE STATIC CRUSH (ALL MEASUREMENTS ARE IN INCHES):

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 187.5; C 192.2; R 187.6
POST-TEST: L 166.8; C 166.8; R 166.2
TOTAL CRUSH: L 20.7; C 25.4; R 21.4
AVERAGE CRUSH: 22.5

TEST VEHICLE REBOUND FROM FLAT BARRIER (ALL MEASUREMENTS ARE IN INCHES):

DISTANCE FROM TEST VEHICLE TO BARRIER: L 16.5; C 16.1; R 15.8; AVG. 16.1

TABLE 4 FUEL SYSTEM DATA

MAKE/MODEL: Buick/Century

NHTSA NO.: MM0103

FUEL SYSTEM CAPACITY: 13.5 GALLONS (FROM OWNER'S MANUAL)

USABLE CAPACITY: 15.7 GALLONS (FURNISHED BY COTR)

TEST VOLUME RANGE: 14.4 GALLONS TO 14.8 GALLONS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 14.7 GALLONS (WITH ENTIRE FUEL SYSTEM FILLED)

TEST FLUID TYPE: STODDARD SOLVENT

SPECIFIC GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

TEST FLUID COLOR: PURPLE

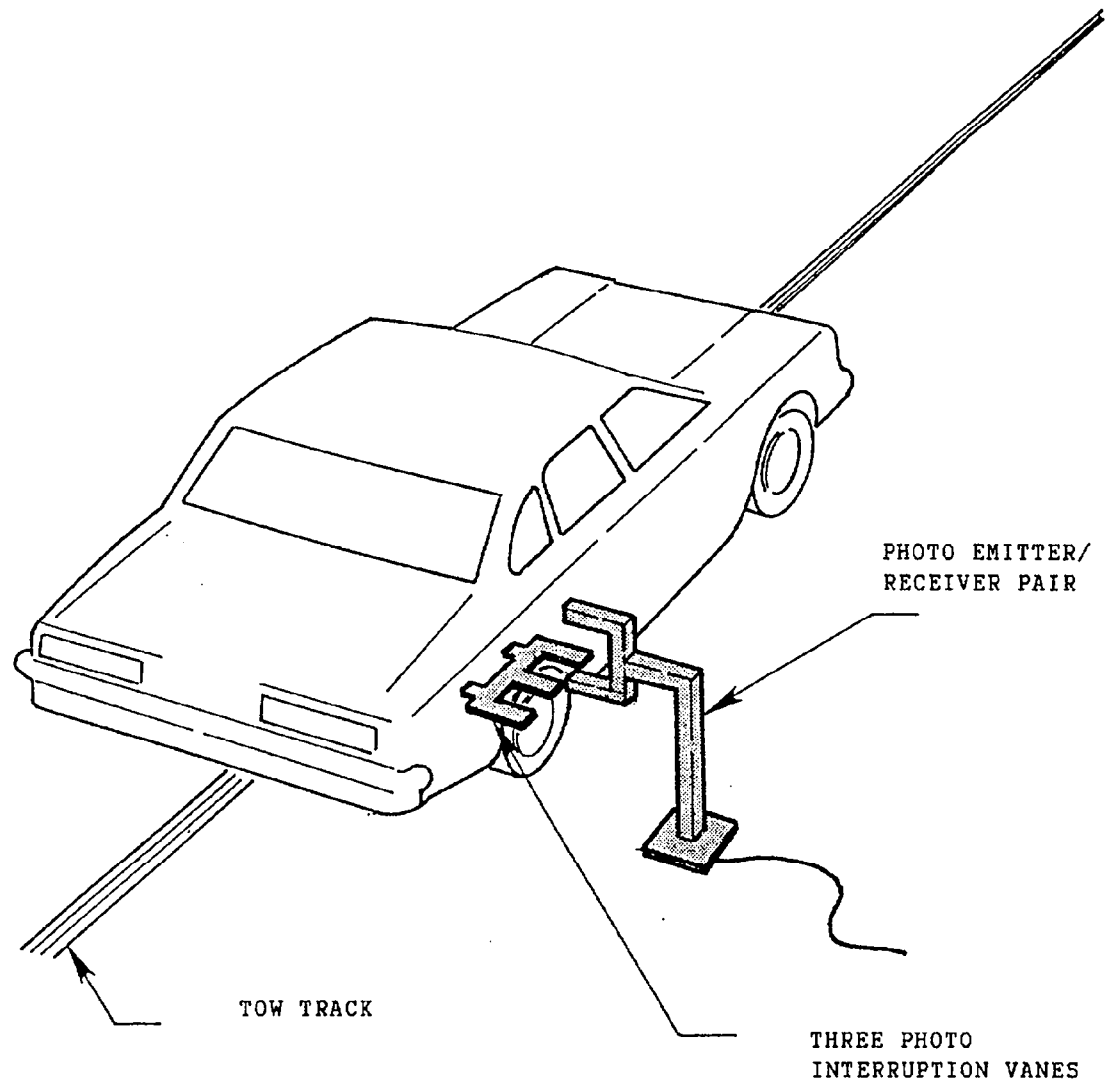
DETAILS OF FUEL SYSTEM: The fuel tank is located in front of the rear
axle. The fuel filler neck is on the left side. The fuel lines run
along the left and right door sills to the front.

ELECTRIC FUEL PUMP: Yes

FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT
OPERATING? No

FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



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

The vanes have one foot spacing.

FIGURE 2 ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Buick/Century/4-door sedan

VEHICLE NHTSA NO.: MM0103; VIN: 3G4AH54N3MS604331

MODEL YEAR: 1991; BUILD DATE: 09/90; TEST DATE: 01/08/91

VEHICLE SIZE CATEGORY: Mid-size; TEST WEIGHT: 3475 LBS.

VEHICLE WHEELBASE: 105.0 INCHES

MAXIMUM WIDTH: 69.4 INCHES

FRONT OVERHANG: 42.5 INCHES

COLLISION DEFORMATION
 CLASSIFICATION (CDC) CODE: 12FDEW3

CRUSH DEPTH
 MEASUREMENTS:

C1 = 20.7 INCHES

C2 = 23.9 INCHES

C3 = 25.5 INCHES

C4 = 24.9 INCHES

C5 = 23.3 INCHES

C6 = 21.4 INCHES

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE
(LONGITUDINAL)

LENGTH OF DAMAGED
 REGION: L = 63.5 INCHES

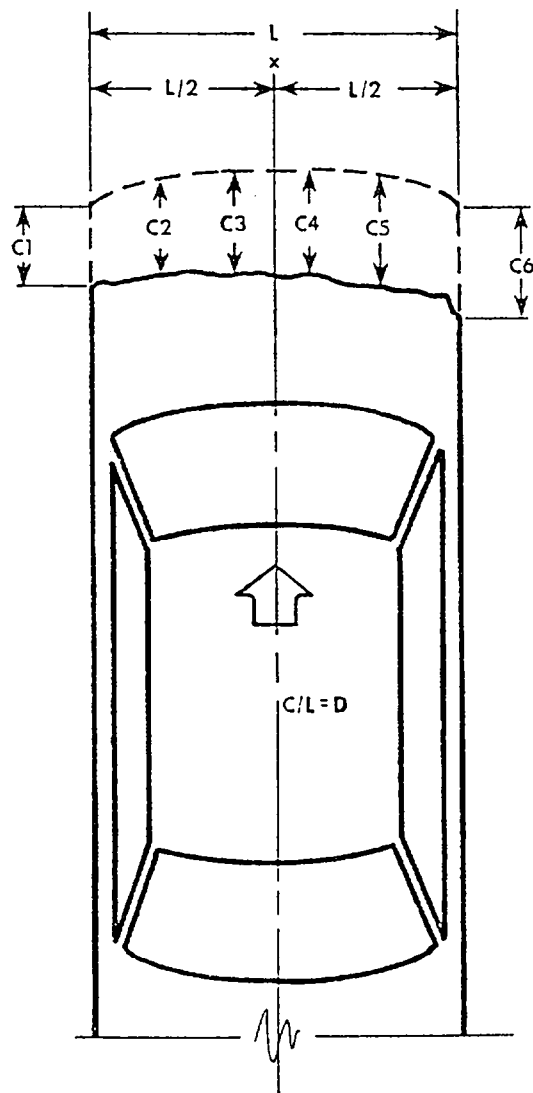
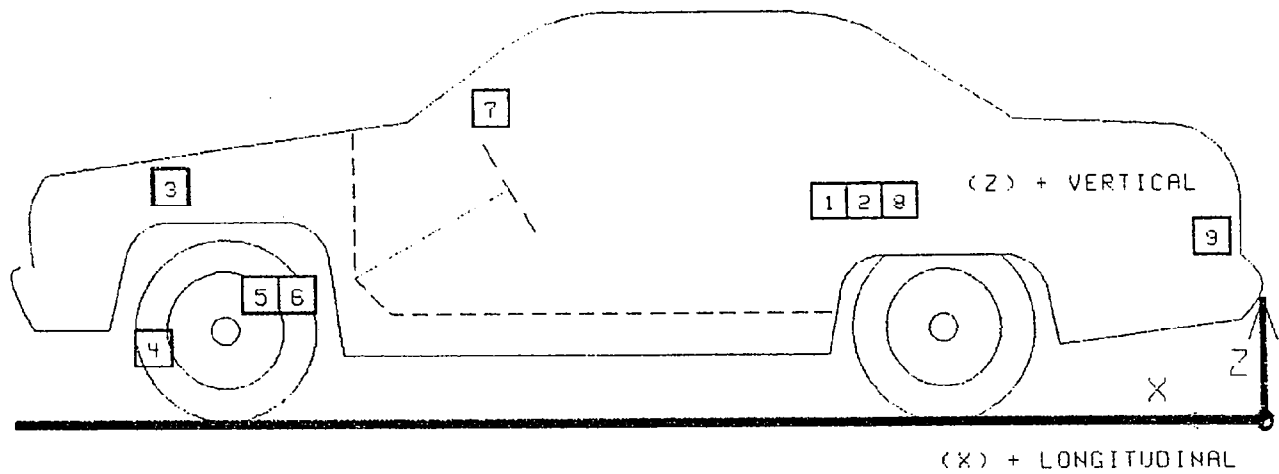
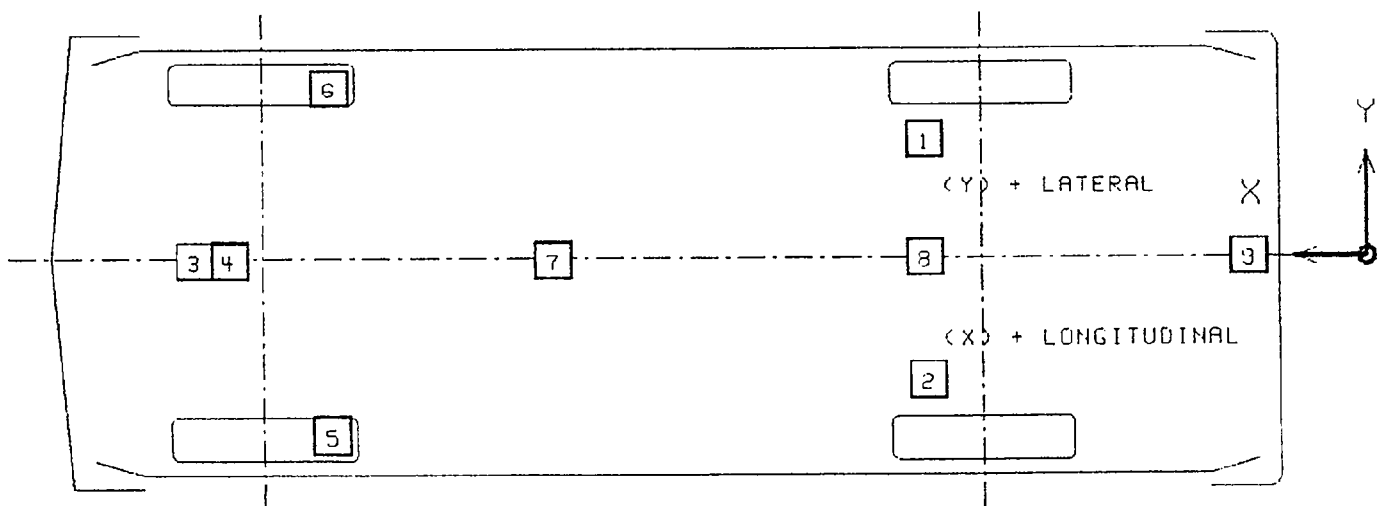


FIGURE 3
VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 5

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 910108

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G	MSEC	MAX G	MSEC
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	116.6	15.9	15.5	3.2	162.9	27.0	63.3
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	115.9	-15.5	15.0	3.5	137.8	29.5	64.8
3	ENGINE TOP LONGITUDINAL	33.4	-2.5	31.5	---	---Y	---	---Y
4	ENGINE BOTTOM LONGITUDINAL	32.7	-6.8	7.6	31.2	53.9	91.0	33.0
5	RIGHT BRAKE CALIPER LONGITUDINAL	37.7	-25.9	12.8	6.5	83.8	59.8	43.3
6	LEFT BRAKE CALIPER LONGITUDINAL	38.0	25.9	12.8	12.9	86.5	58.3	31.5
7	INSTRUMENT PANEL CENTER LONGITUDINAL	64.0	0.0	37.5	9.0	94.0	66.2	76.9
8	REAR SEAT CROSSMEMBER CENTER VERTICAL	116.0	0.0	15.2	13.6	71.6	11.3	86.8
9	VEHICLE REAR CENTER VERTICAL	178.8	1.6	12.0	12.5	60.6	8.6	30.6

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES. X-AXIS LOCATIONS ARE MEASURED REARWARD FROM THE FRONT BUMPER.

REFERENCE: X: + FORWARD ACCELERATION
Y: + LEFT FROM VEHICLE CENTERLINE
Z: + UP FROM GROUND LEVEL

YSee DATA ACQUISITION EXPLANATIONS

TABLE 6 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #192	PASSENGER #142
HEAD	<u>Upper steering wheel rim & hub</u>	<u>Instrument panel</u>
CHEST	<u>Steering wheel</u>	<u>None</u>
ABDOMEN	<u>Lower steering wheel rim</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>Easy</u>	<u>Easy</u>
REAR	<u>Easy</u>	<u>Easy</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT Driver's seat shifted full forward, passenger's seat shifted 1 notch forward
FRONT	<u>None</u>	<u>forward</u>
REAR	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE:

The entire windshield was cracked upon impact.

OTHER NOTABLE IMPACT EFFECTS:

None

TABLE 7 EMVSS 208 DATA SUMMARY

VEH. YR./MAKE/MODEL/BODY STYLE: 1991/Buick/Century/4-door sedan

VEH. NHTSA NO.: MM0103; TEST DATE: 01/08/91

	DRIVER	PASSENGER
<u>MAXIMUM ACCELERATIONS (G):</u>	<u>DUMMY #192</u>	<u>DUMMY #142</u>
HEAD X-AXIS	-52.2	-71.2
HEAD Y-AXIS	13.4	7.0
HEAD Z-AXIS	-52.1	-66.3
HEAD RESULTANT	69.9	89.4
CHEST X-AXIS	-46.6	-40.8
CHEST Y-AXIS	7.2	15.9
CHEST Z-AXIS	-8.8	-7.7
CHEST RESULTANT*	46.8	40.2
CHEST RESULTANT TIME INTERVAL (SEC.)*	.003	.003

HEAD INJURY CRITERIA (HIC) VALUES:

HIC**	815	1144
HIC STARTING TIME (SEC.)	72.6	75.9
HIC ENDING TIME (SEC.)	108.6	110.1
AVG. HEAD RESULTANT ACCEL. DURING HIC TIME INTERVAL (G)	55.1	64.4

MAXIMUM CHEST DEFLECTIONS (IN):

CHEST X-AXIS	-2.0	-1.3
MAXIMUM CHEST DEFLECTION TIME (SEC.)	.091	.096

MAXIMUM FEMUR FORCES (LBS):

LEFT FEMUR	-1340	-315
RIGHT FEMUR	-1014	-179

MAXIMUM SEAT BELT FORCES (LBS):

LAP BELT	584	1314
SHOULDER BELT	1853	1827

NOTE: ALL VALUES LISTED MUST BE OCCURRING DURING PRIMARY IMPACT EVENT.
(HEAD ACCELERATIONS LISTED MUST BE DURING HIC TIME INTERVAL.)

*0.003 SEC. MINIMUM DURATION.

**THE MAXIMUM HIC TIME INTERVAL IS 36 MILLISECONDS.

TABLE 8 HYBRID III NECK DATA SUMMARY

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1991/Buick/Century/4-door sedan

VEHICLE NHTSA NO.: MM0103; TEST DATE: 01/08/91

<u>MAXIMUM VALUES:</u>	<u>DRIVER DUMMY #192</u>	<u>PASSENGER DUMMY #142</u>
NECK X-AXIS FORCE (LBS.)	112	323
NECK Y-AXIS FORCE (LBS.)	77	39
NECK Z-AXIS FORCE (LBS.)	569	604
NECK MOMENT ABOUT X AXIS (IN.-LBS.)	287	144
NECK MOMENT ABOUT Y AXIS (IN.-LBS.)	486	540
NECK MOMENT ABOUT Z AXIS (IN.-LBS.)	85	-79

NOTE: ALL VALUES LISTED MUST BE OCCURRING DURING PRIMARY IMPACT EVENT.

DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

Upon impact, the driver dummy translated forward on the seat, impacting both knees into the instrument panel. The dummy's head rotated forward impacting the steering wheel and the dummy's chest and abdomen impacted the steering wheel as the dummy's torso was restrained by the three-point passive belt. The dummy's head rotated rearward as the dummy rebounded into the seat back. The dummy came to rest seated in the driver's seat, restrained by the three-point passive belt.

RIGHT FRONT PASSENGER DUMMY

Upon impact, the right front passenger dummy translated forward on the seat, impacting both knees into the instrument panel. The dummy's head rotated forward, impacting the instrument panel as the dummy's torso was restrained by the three-point passive belt. The dummy's torso rotated counterclockwise and the dummy's head rotated rearward as the dummy rebounded into the seat back. The dummy came to rest seated in the right front passenger's seat, leaning slightly to the right, restrained by the three-point passive belt.

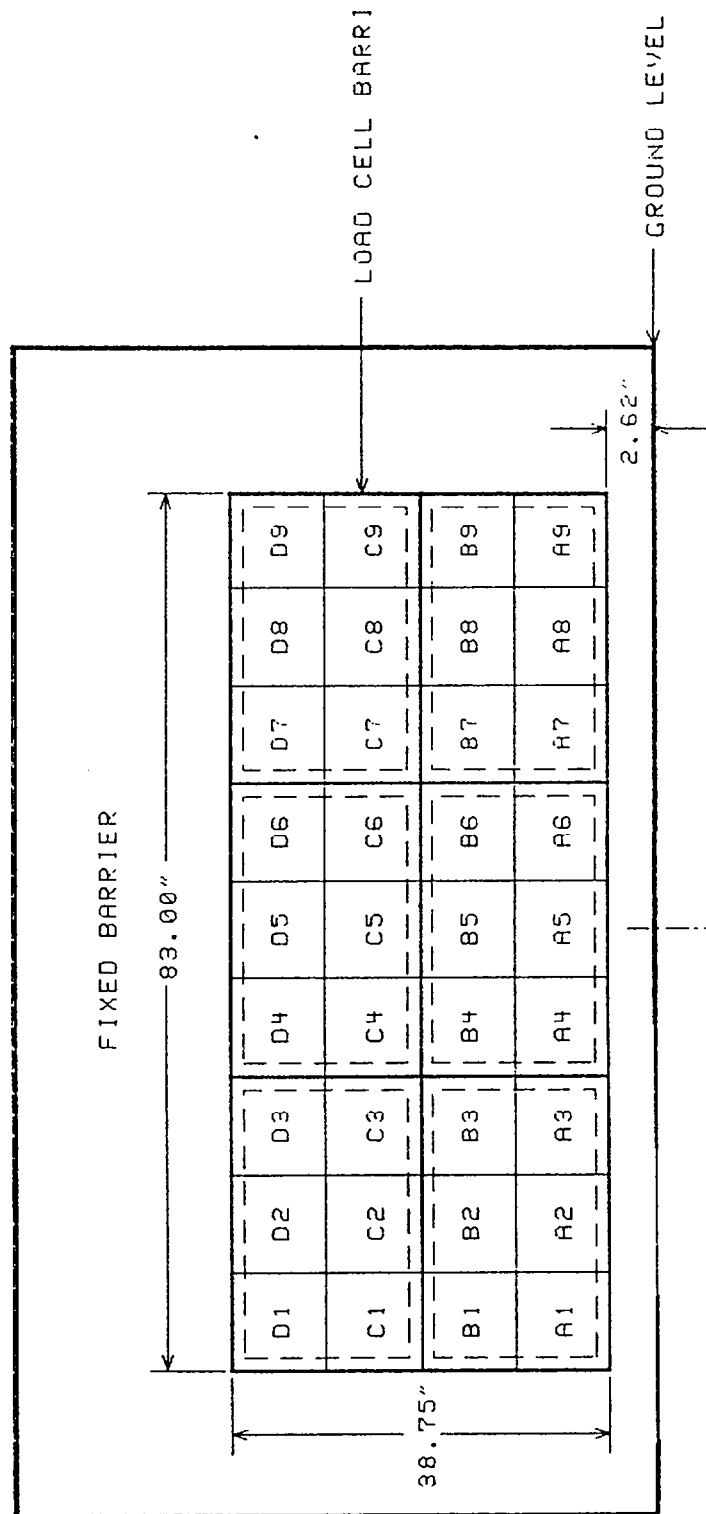
TABLE 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

	DRIVER	PASSENGER
<u>BELT LENGTH DATA:</u>		
BELT LENGTH FROM TRIM PANEL EXIT TO TRIM PANEL EXIT FOR CONTINUOUS WEBBING SYSTEMS.	145.5	145.2
SHOULDER BELT LENGTH AS MEASURED ON PART 572 DUMMY.	31.8	32.0
LAP BELT LENGTH AS MEASURED ON PART 572 DUMMY.	22.5	24.0
<u>SHOULDER BELT SPOOL-OFF LENGTH:</u>		
AS DETERMINED BY FILM ANALYSIS	3.0	3.2
AS DETERMINED MECHANICALLY	2.9	5.9
AS DETERMINED ELECTRONICALLY	0.9	0.3
<u>BELT STRETCH LENGTH (IN/FT):</u>		
AS MEASURED MECHANICALLY	0.01	0.01
AS MEASURED ELECTRONICALLY	0.00	0.00
<u>RETRACTOR LOCK-UP TIME (MS):</u>		
AS DETERMINED BY SHOULDER BELT SPOOL-OFF	90	98

ALL MEASUREMENTS ARE IN INCHES UNLESS OTHERWISE NOTED.

FIGURE 4
LOAD CELL BARRIER CONFIGURATION
FRONT VIEW

36 LOAD CELLS
4 ROWS
9 COLUMNS



GROUP 1: A1 THRU B3
GROUP 2: A4 THRU B6
GROUP 3: A7 THRU B9
GROUP 4: C1 THRU D3
GROUP 5: C4 THRU D6
GROUP 6: C7 THRU D9

TABLE 10
LOAD CELL BARRIER DATA SUMMARY

TEST NUMBER 910108

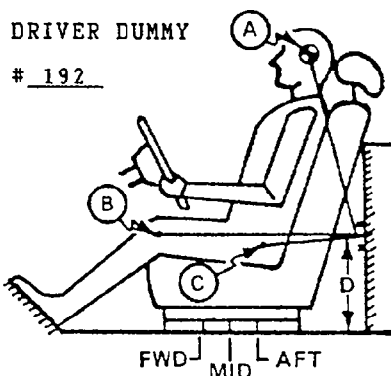
LOCATION	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	LB	MSEC	LB	MSEC
TOTAL GROUP 1	802	254.8	24492	32.1
TOTAL GROUP 2	994	320.9	23182	41.5
TOTAL GROUP 3	892	195.8	33313	39.0
TOTAL GROUP 4	1026	318.5	13582	27.3
TOTAL GROUP 5	801	319.4	29431	41.0
TOTAL GROUP 6	1019	251.9	14186	27.3
TOTAL LOAD CELL FORCE	5060	195.4	129010	41.4
TENSION IS POSITIVE				
COMPRESSION IS NEGATIVE				

SECTION 3.0

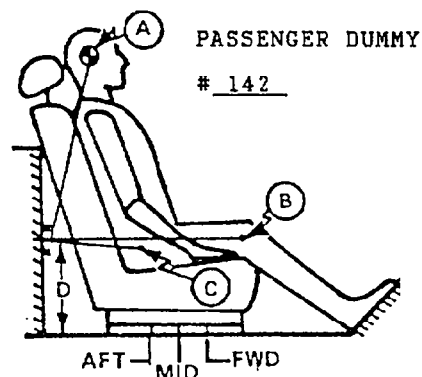
VEHICLE, OCCUPANT, AND CAMERA MEASUREMENTS

FIGURE 5 DUMMY AND SEAT POSITIONING DATA

TEST NO.: 910108; VEHICLE: 1991 Buick Century
 SEAT TYPE: BENCH BUCKET X SPLIT BENCH
 ADJUSTER TYPE: X MANUAL POWER
 FRONT SEAT BACK TYPE: X NON-ADJUSTABLE ADJUSTABLE RECLINING



MEASUREMENT
LOCATION
 A - HEAD TARGET
 B - KNEE JOINT
 C - APPROXIMATE
 'H' POINT
 D - SILL TO DOOR
 STRIKER
 REFERENCE
 POINT

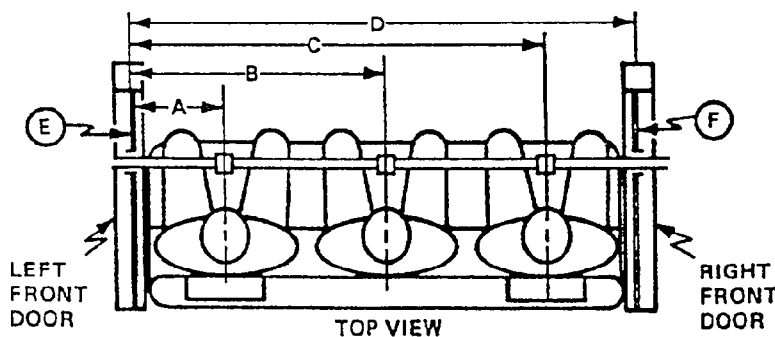


A = 22.0 IN. 6 DEGREES
 B = 24.1 IN. 94 DEGREES
 C = 9.5 IN. 121 DEGREES
 D = 10.4 IN.

A = 20.6 IN. 7 DEGREES
 B = 25.2 IN. 94 DEGREES
 C = 10.2 IN. 124 DEGREES
 D = 10.4 IN.

SEAT TRACK REARWARD: 6 NOTCHES

SEAT TRACK REARWARD: 6 NOTCHES



A = LEFT DOOR TO DRIVER CENTERLINE 13.0 IN.
 B = LEFT DOOR TO CENTER PASSENGER CENTERLINE NA IN.
 C = LEFT DOOR TO RIGHT PASSENGER CENTELRINE 40.9 IN.
 D = LEFT DOOR TO RIGHT DOOR 54.5 IN.
 E,F = WINDOW GLASS HEIGHT (RIGHT AND LEFT MUST BE EQUAL) 9.5 IN.

ALL ANGLES ARE RELATIVE TO VERTICAL PLANE THROUGH DOOR STRIKER.

FIGURE 6 DUMMY IN-VEHICLE POSITIONING DATA

	DRIVER	PASSENGER
HH	12.5	12.4
HW	18.5	18.5
CD	19.5	19.5
CS	12.5	NA
KDL	5.2	7.7
KDR	5.8	7.2
TA	18°	22°
SA	25°	25°
HSW	16.2	NA

	DRIVER	PASSENGER
HR	5.8	7.0
HS	10.2	10.8
AD	4.4	4.9
HD	3.8	3.8
KK	8.5	8.4
AA	9.0	7.8
HA	16.4	19.1

KNEE OUTER CLEVIS TO OUTER CLEVIS SPACING:

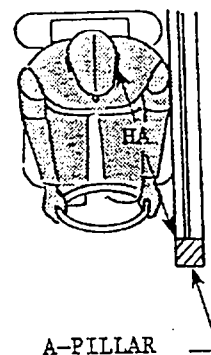
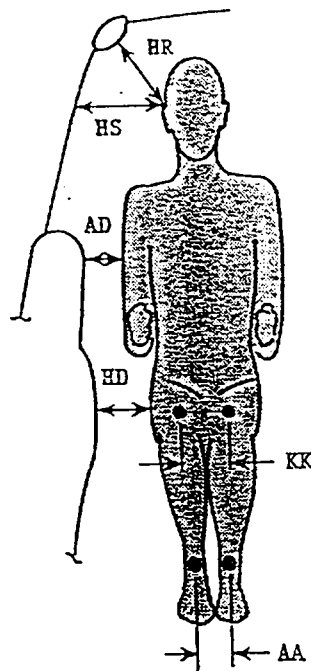
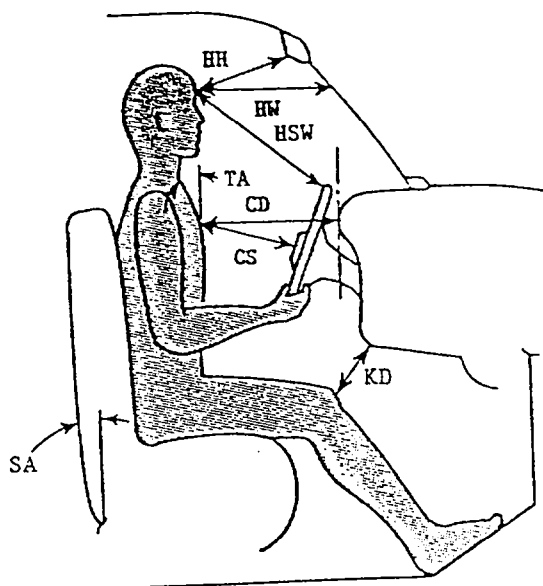
DRIVER = 10.6

PASSENGER = 10.6

PELVIS ANGLE:

DRIVER = 22°

PASSENGER = 25°

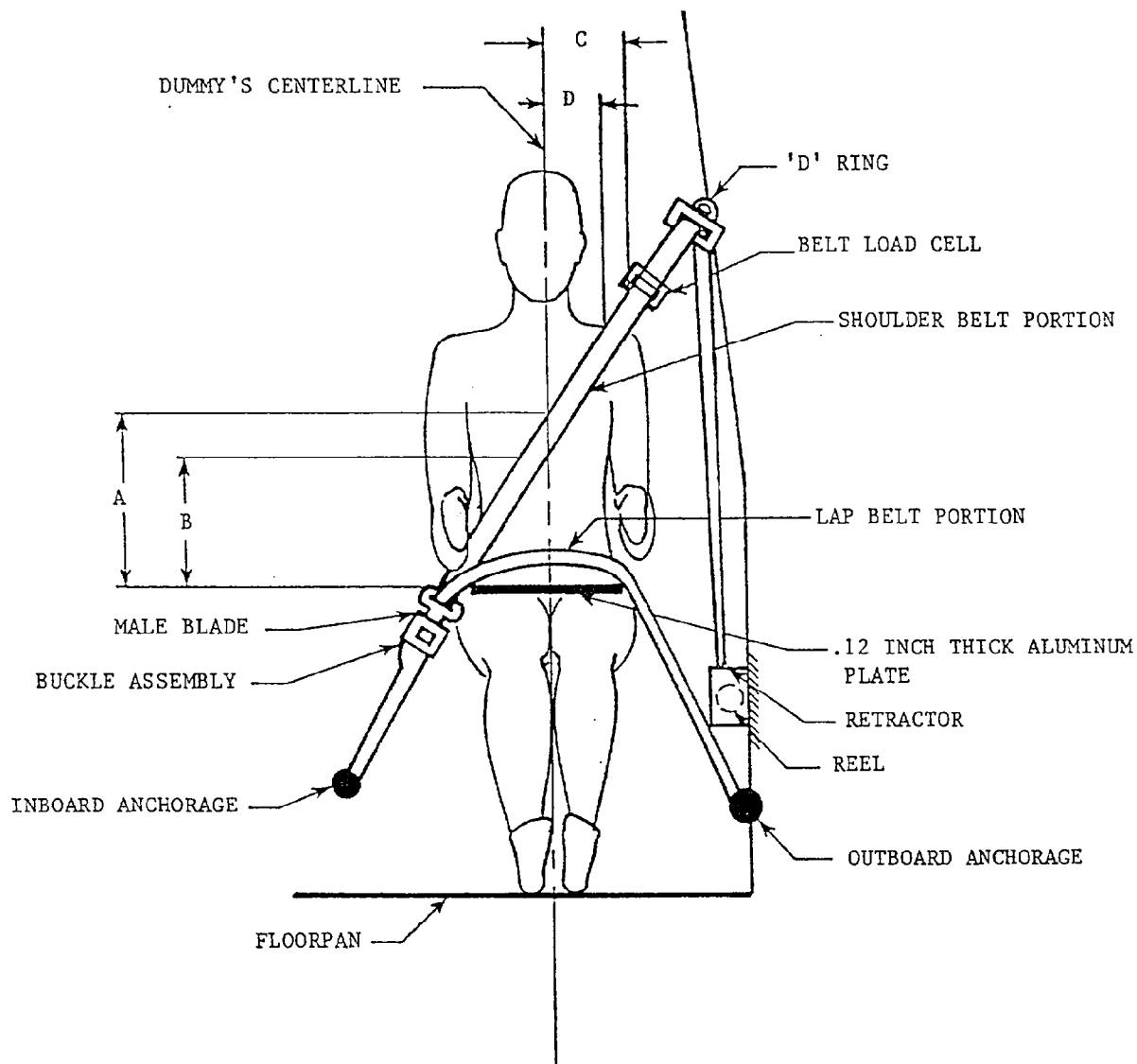


HH = HEAD TO WINDSHIELD HEADER
 HW = HEAD TO WINDSHIELD
 CD = CHEST TO DASH
 CS = CHEST TO STEERING WHEEL
 KD = KNEE TO DASH
 TA = TORSO ANGLE
 SA = SEAT BACK ANGLE
 HSW = HEAD TO STEERING WHEEL

HR = HEAD C.G. TARGET TO SIDE ROOF HEADER
 HS = HEAD C.G. TARGET TO SIDE WINDOW
 AD = ARM TO DOOR
 HD = HIP TO DOOR
 KK = KNEE TO KNEE
 AA = ANKLE TO ANKLE
 HA = HEAD C.G. TARGET TO A-PILLAR

TORSO AND SEAT BACK ANGLES ARE RELATIVE TO VERTICAL.
 ALL DISTANCE MEASUREMENTS ARE IN INCHES.

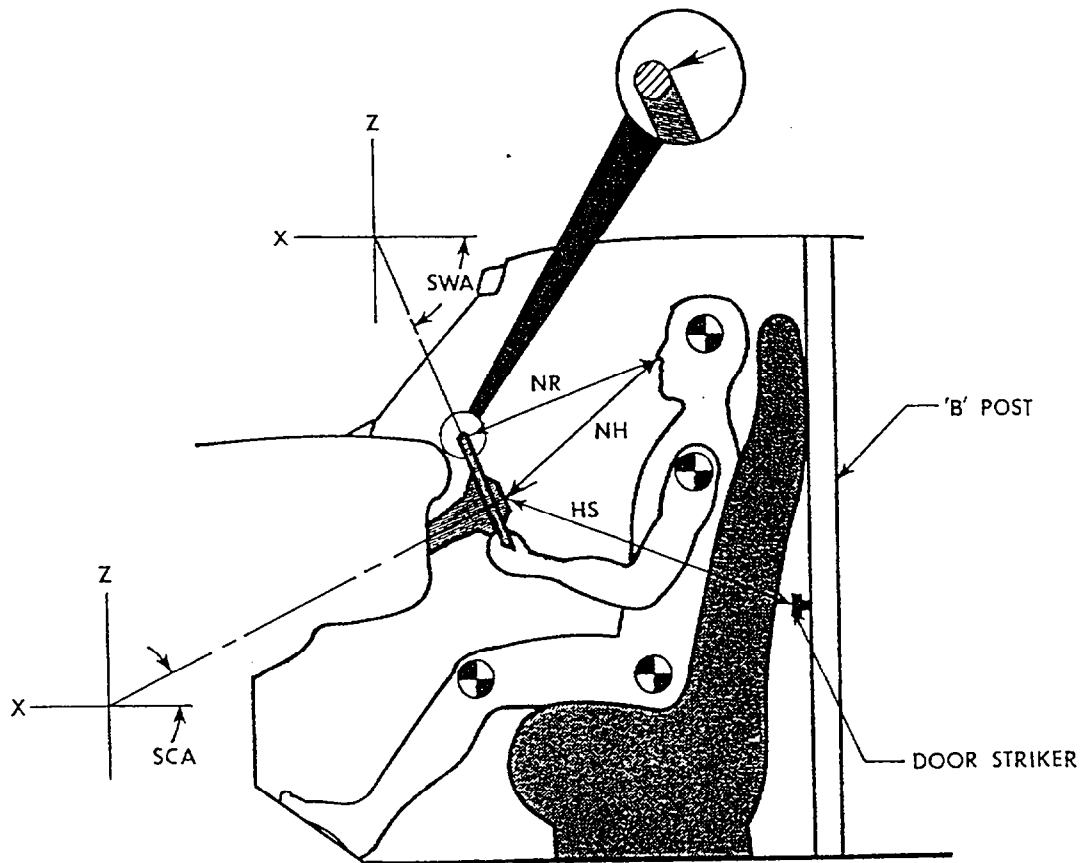
FIGURE 7 SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	12.6	13.4
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	9.4	10.4
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	4.3	4.9
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	2.0	2.4

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 8 DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY DATA



POSITION OF STEERING COLUMN TILTING AND TELESCOPING ADJUSTMENTS, IF ANY:

The steering column was latched in the fourth position downward of six tilt positions.

MEASUREMENTS

NR	- DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	14.9
NH	- DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	17.0
HS	- DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	22.7
SCA	- ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	21°
SWA	- ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	69°

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 9
CAMERA POSITIONS

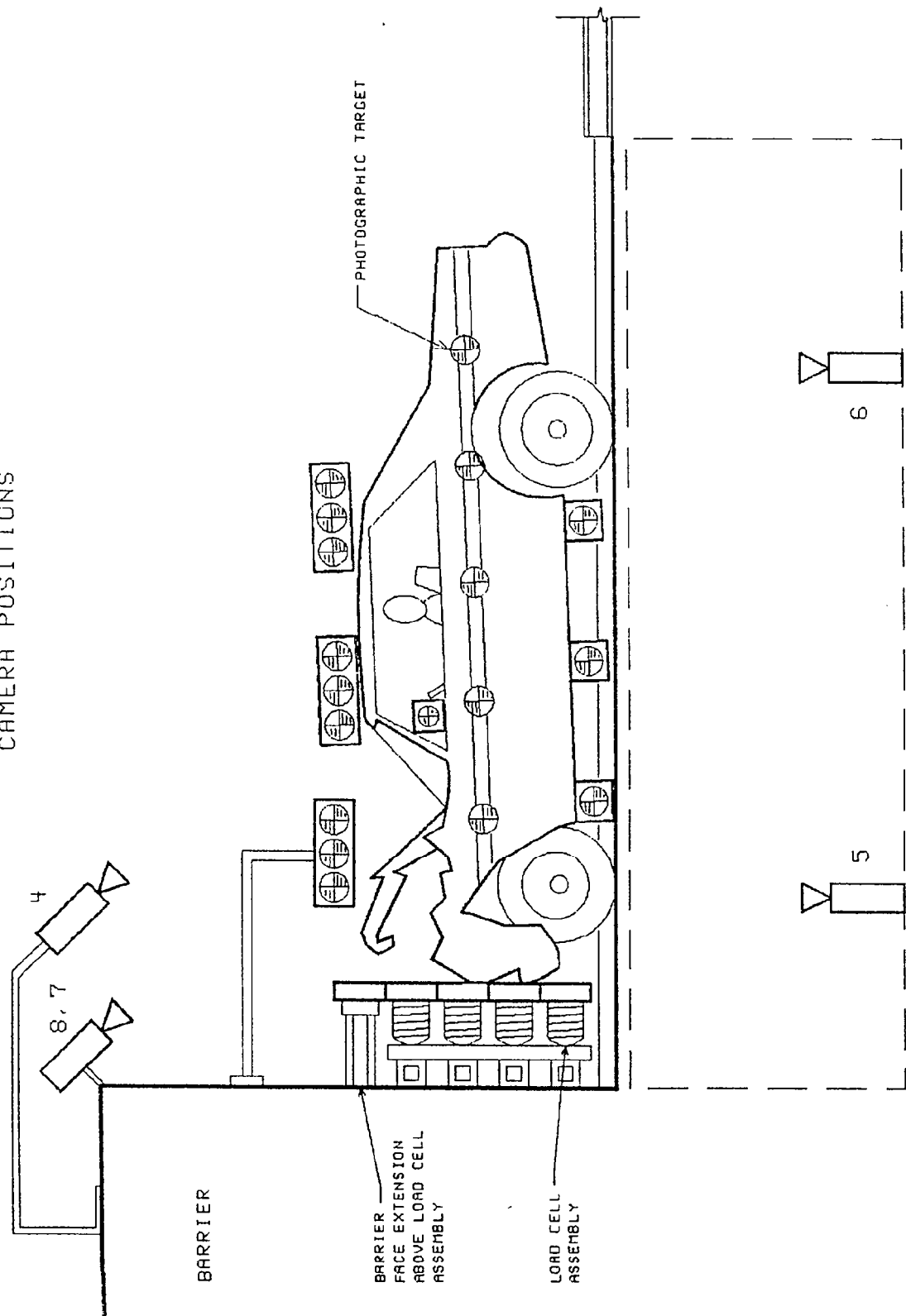


FIGURE 9
CAMERA POSITIONS, CONTINUED

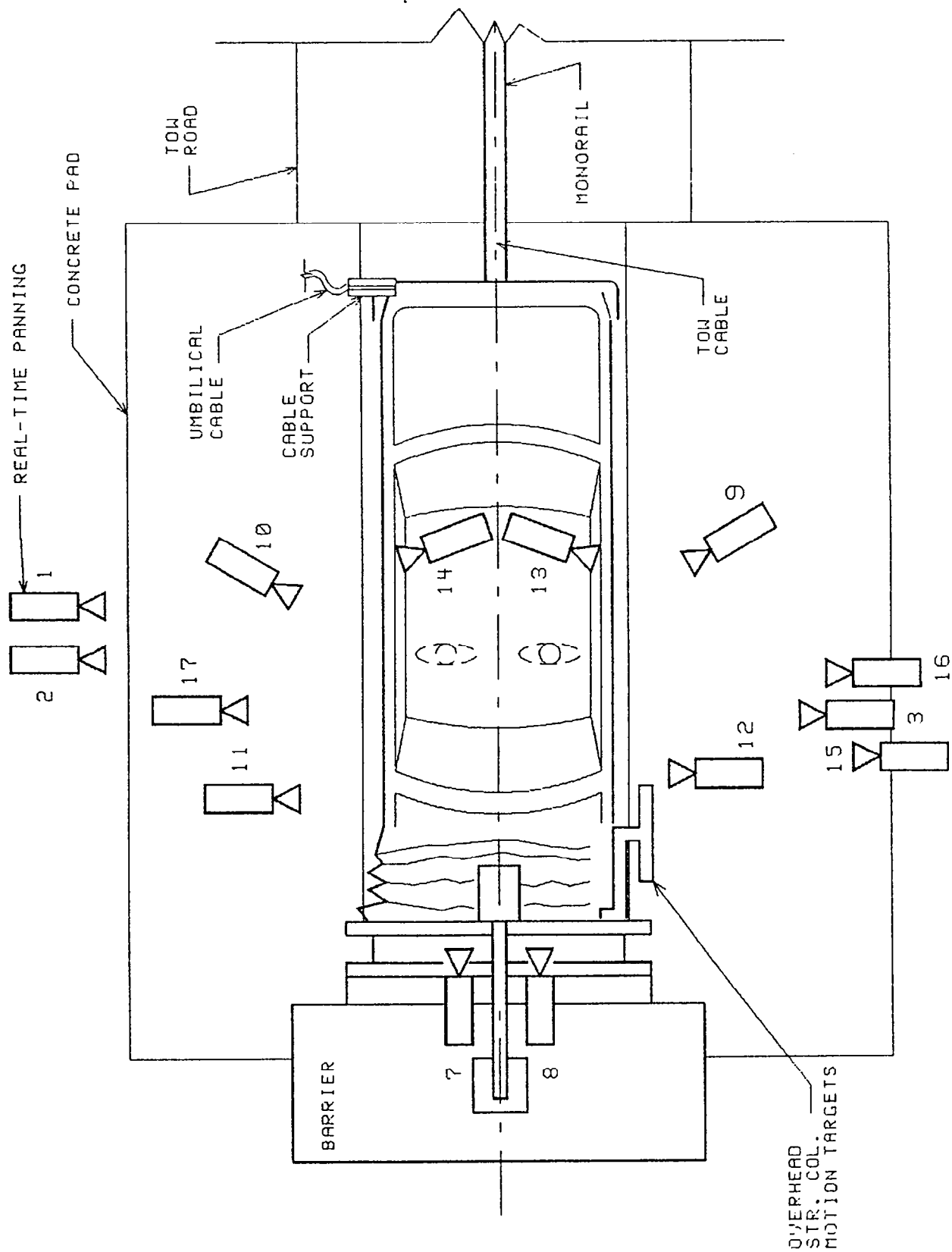


TABLE 11 MOTION PICTURE CAMERA LOCATIONS

TEST NO.:		910108		VEHICLE: 1991 Buick/Century 4-door sedan					FILM PLANE		FILM
CAMERA NO.	VIEW	CAMERA POSITIONS (IN)*			ANGLE** (DEG)	TO HEAD		LENS (MM)	SPEED (FPS)		
		X	Y	Z		TARGET (IN)					
1	Real-time panning	-142.0	-504.0	61.0	NA	NA	16	24			
2	Right side	-81.3	-266.4	37.1	-2	NA	13	485			
3	Left side	-41.5	295.0	44.0	-12	231.0	25	502			
4	Overhead	-36.4	0.0	98.0	-40	NA	8.5	500			
5	Pit - engine	-50.5	0.0	-92.4	90	NA	13	1000			
6	Pit - fuel tank	-99.3	0.0	-99.0	90	NA	13	1002			
7	Front - passenger	-4.5	-13.8	85.0	-40	NA	17	502			
8	Front - driver	-6.8	14.5	85.0	-41	NA	17	500			
9	Left side - driver	-180.0	73.0	102.0	-27	98.0	25	500			
10	Right side - passenger	-184.0	-74.0	100.0	-26	93.0	25	498			
11	Right side - A-pillar	-38.1	-306.1	44.0	0	NA	50	510			
12	Left side - A-pillar	-53.0	309.4	42.3	0	NA	50	500			
13	Onboard - left side	NA	NA	NA	NA	NA	13	500			
14	Onboard - right side	NA	NA	NA	NA	NA	13	502			
15	Left side - steering column	-124.0	286.0	103.0	-14	NA	25	498			
16	Left side - steering column	-124.0	286.0	75.1	-9	NA	25	500			
17	Right side - passenger	-38.8	-210.8	45.3	7	254.0	25	498			

**X = Film plane forward of barrier face

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

**Angle = Film plane angled upward from horizontal plane

FIGURE 10
VEHICLE TARGET LOCATIONS

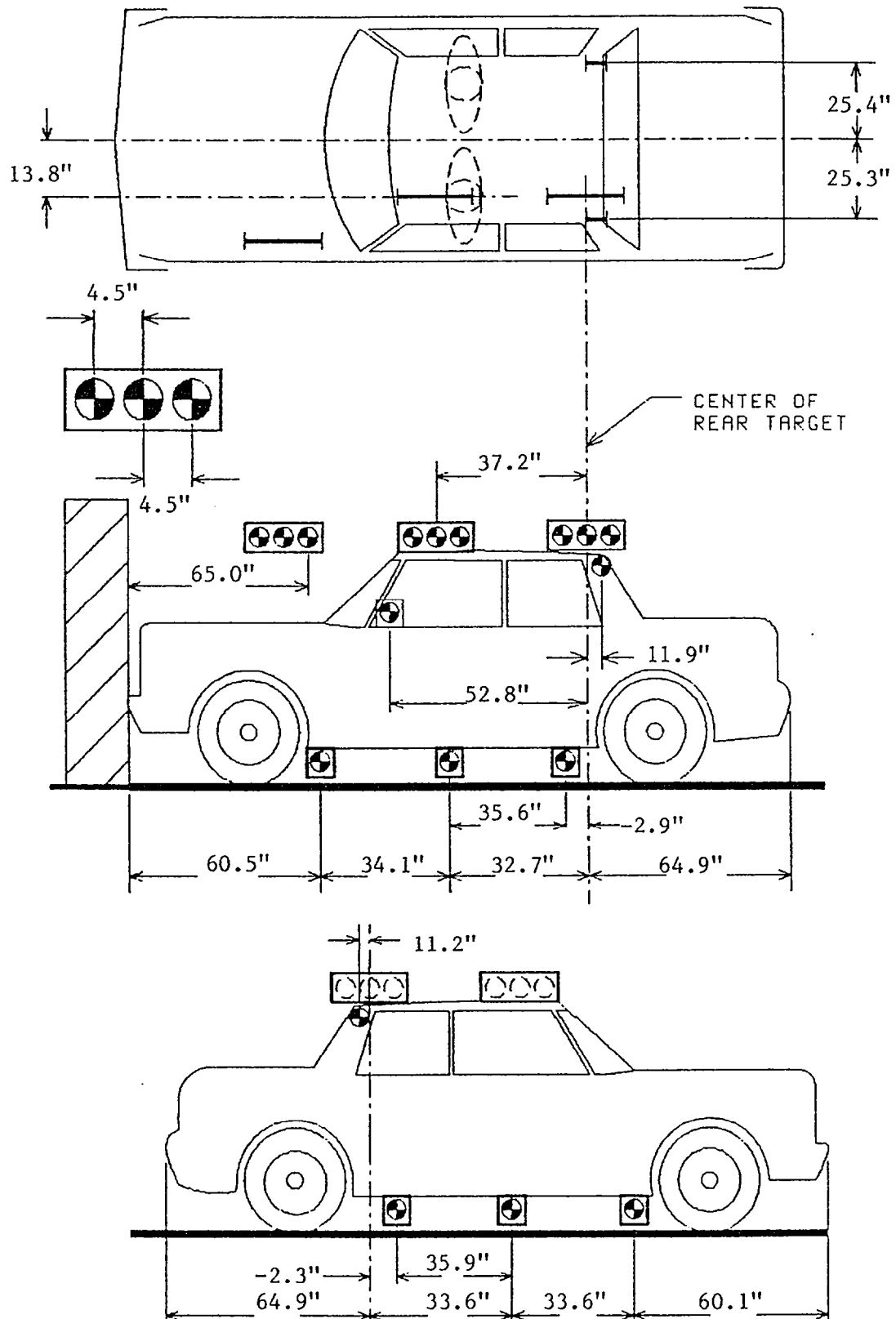


FIGURE 11

PRE-TEST AND POST-TEST MEASUREMENT POINTS

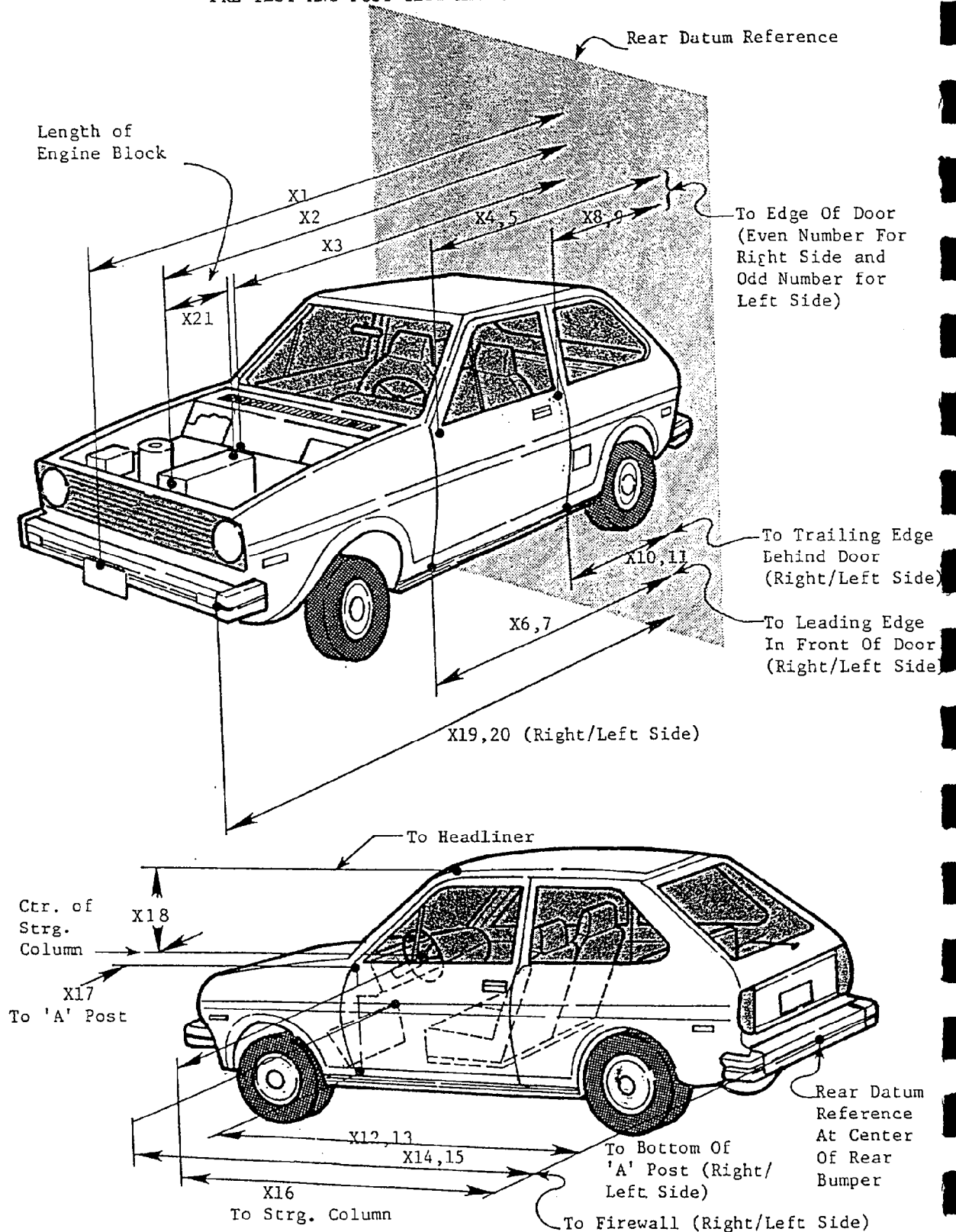


TABLE 12 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Buick/Century		TEST NUMBER: 910108	ALL MEASUREMENTS ARE IN INCHES		
NO.	TYPE OF MEASUREMENT		PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE		192.2	166.8	25.4
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK		171.1	160.8	10.3
X3	REAR SURFACE OF VEHICLE TO FIREWALL		140.8	136.8	4.0
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR		129.9	129.5	0.4
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR		130.2	129.8	0.4
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR		129.9	129.4	0.5
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR		129.9	129.2	0.7
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR		88.6	88.2	0.4
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR		88.6	88.0	0.6
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR		90.6	90.0	0.6
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR		90.9	90.2	0.7
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE		129.6	129.8	-0.2
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE		129.8	129.0	0.8
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE		140.4	139.8	0.6
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE		137.6	137.0	0.6
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER		116.8	112.8	4.0
X17	CENTER OF STEERING COLUMN TO "A" POST		13.8	11.4	2.4
X18	CENTER OF STEERING COLUMN TO HEADLINER		17.0	17.1	-0.1
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER		187.6	166.2	21.4
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER		187.5	166.8	20.7
X21	LENGTH OF ENGINE BLOCK		23.0	23.0	0.0

APPENDIX A

PHOTOGRAPHS

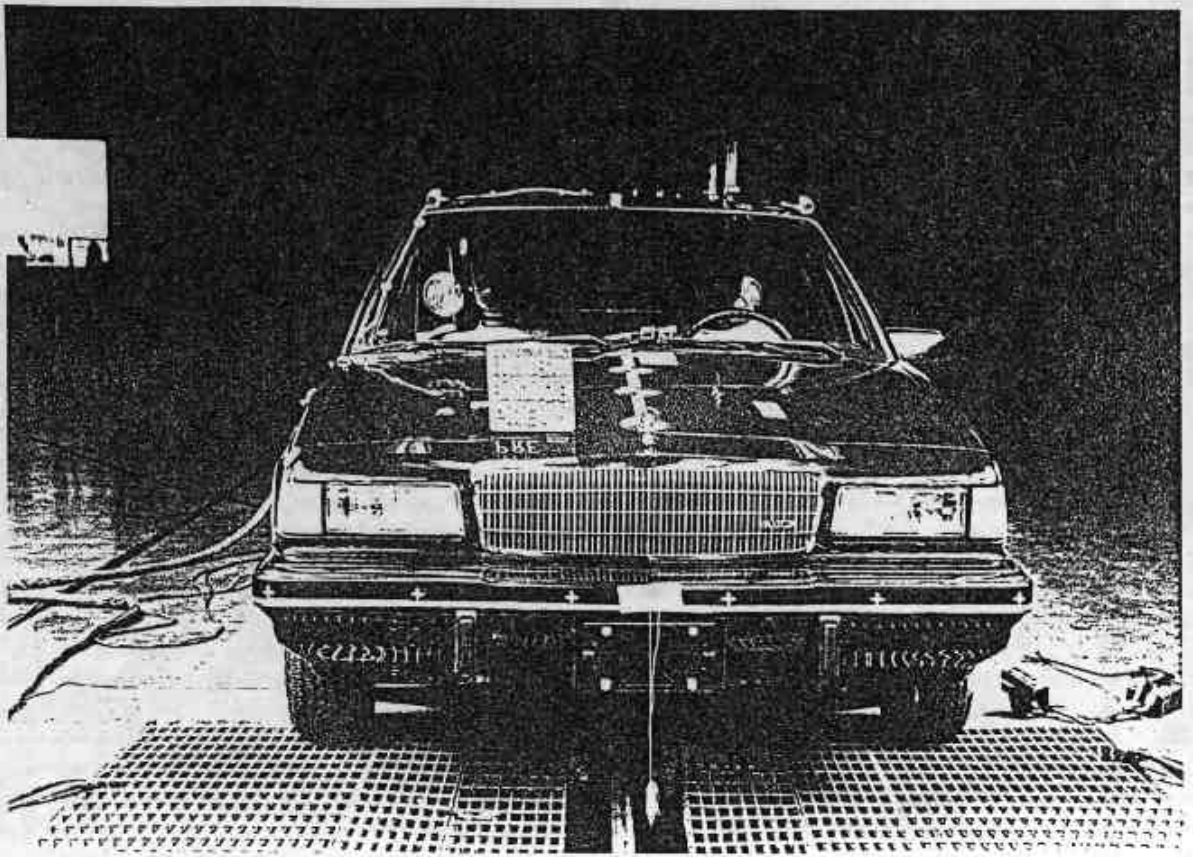


Figure A-1. PRE-TEST FRONT VIEW

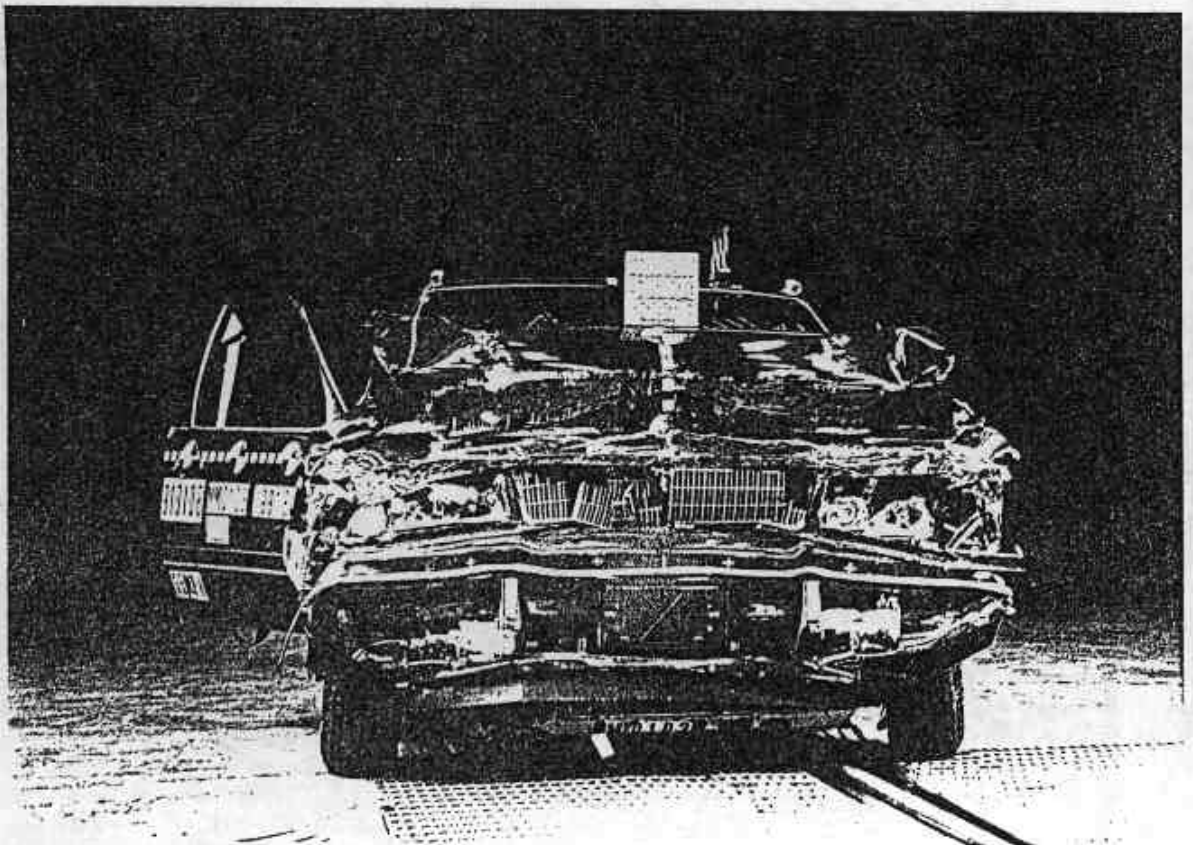


Figure A-2. POST-TEST FRONT VIEW

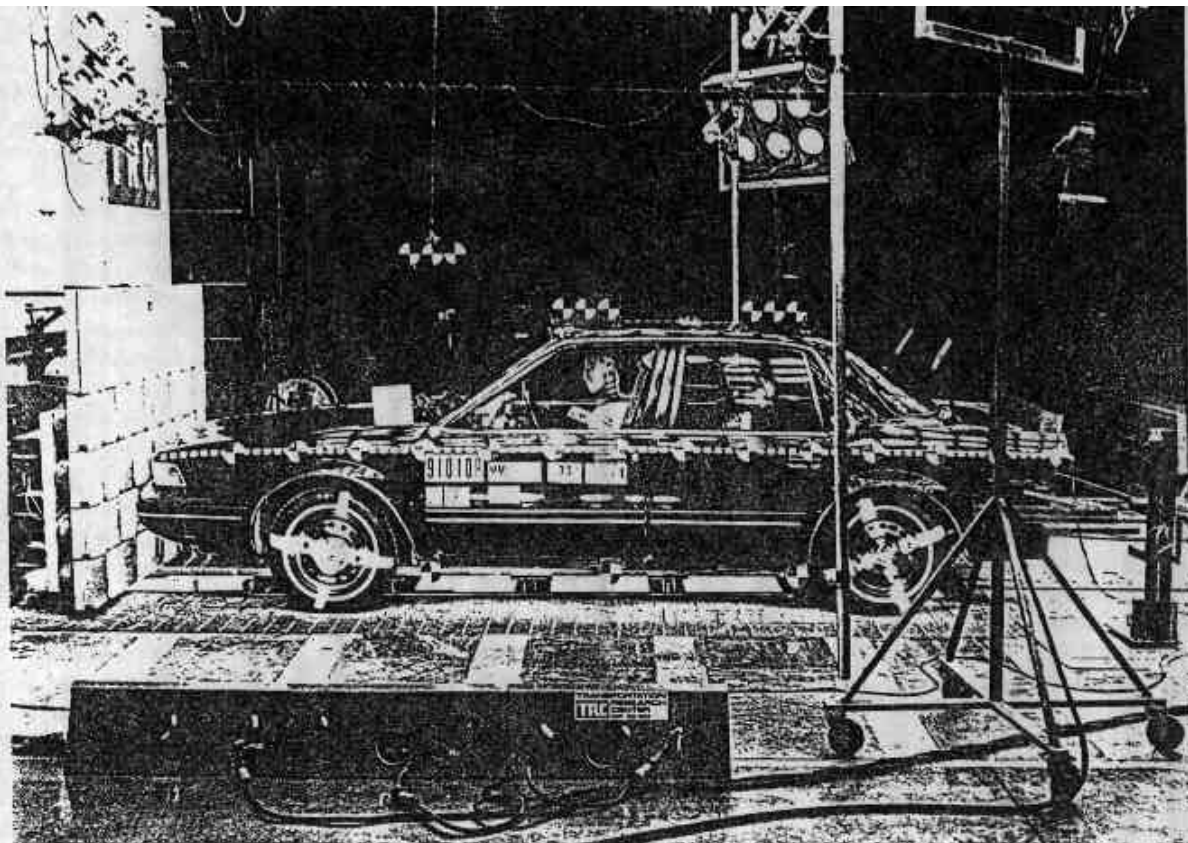


Figure A-3. PRE-TEST LEFT SIDE VIEW

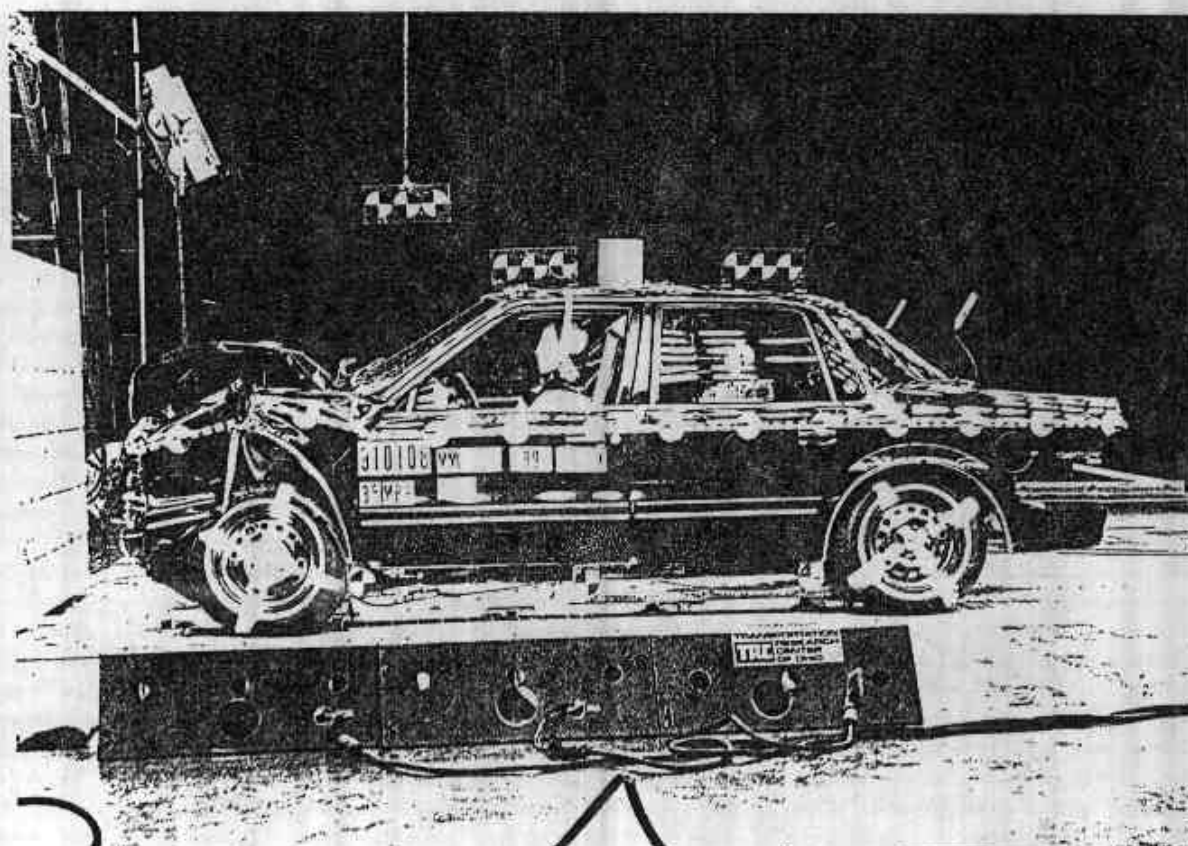


Figure A-4. POST-TEST LEFT SIDE VIEW

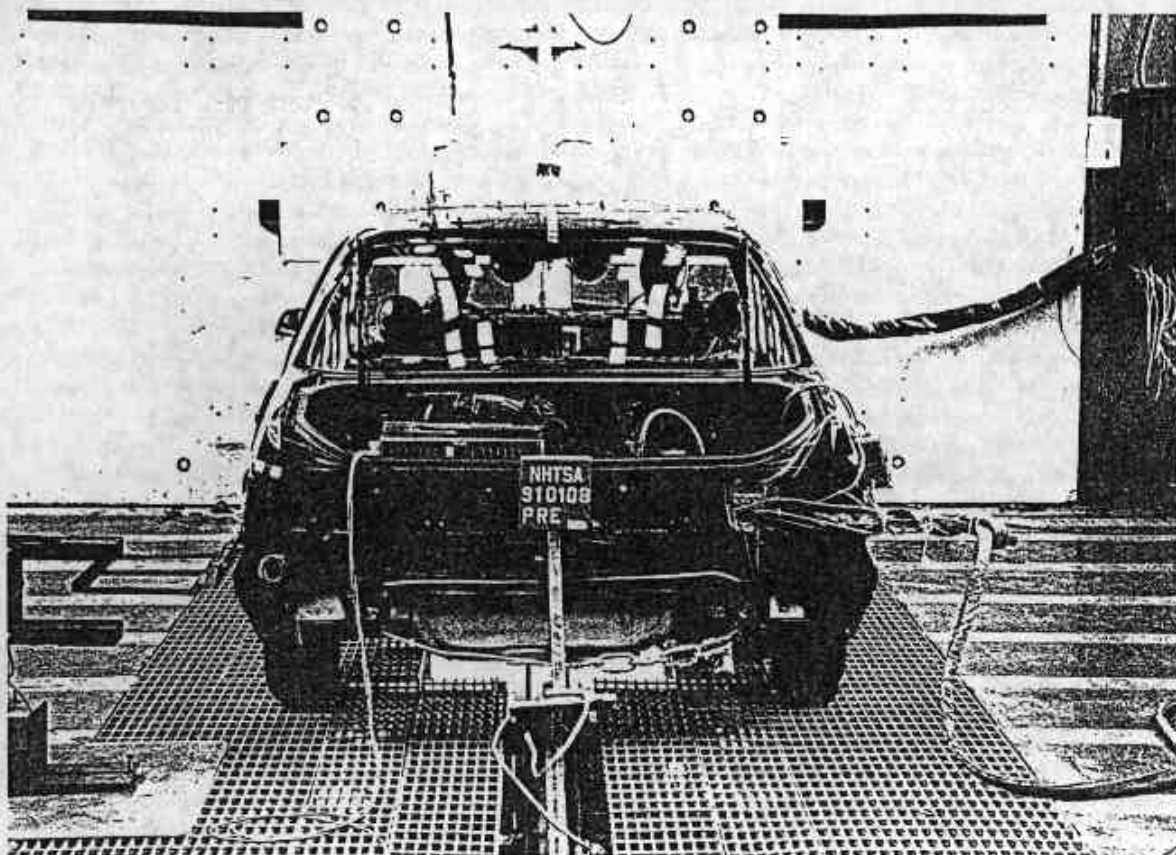


Figure A-5. PRE-TEST REAR VIEW

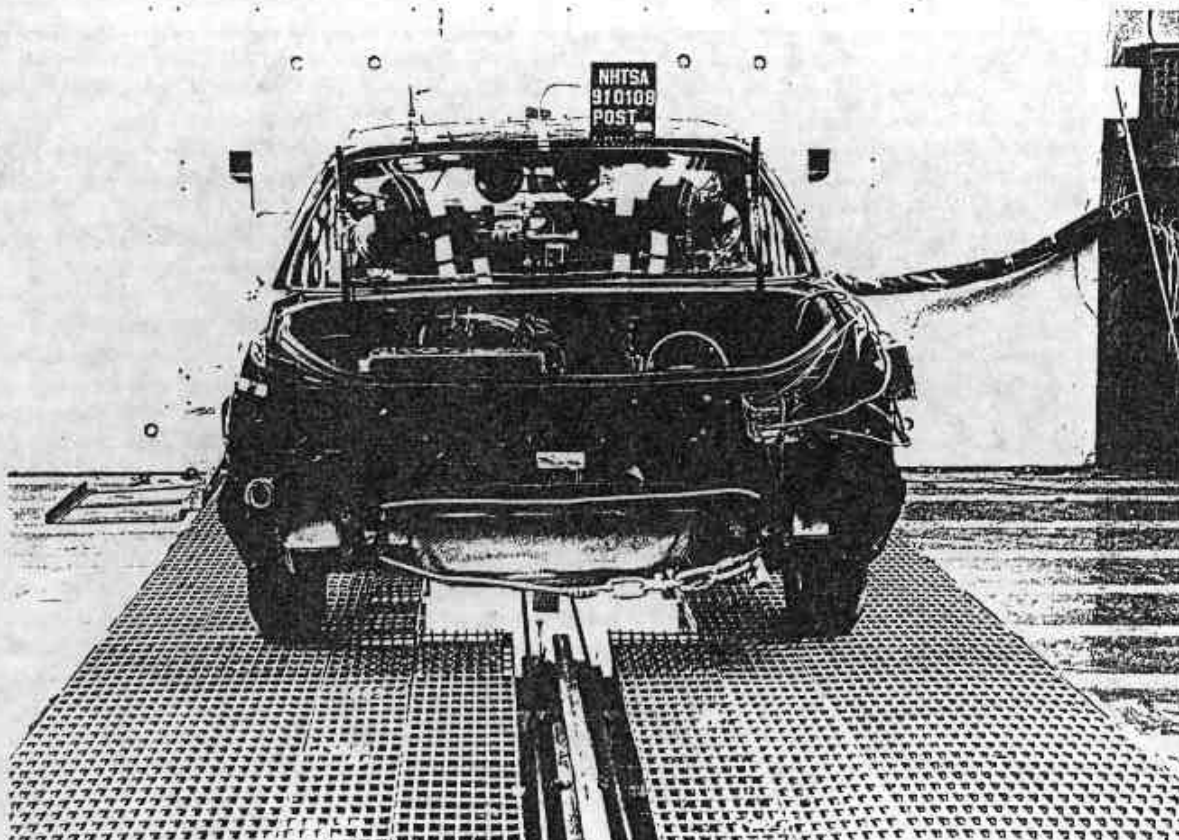


Figure A-6. POST-TEST REAR VIEW

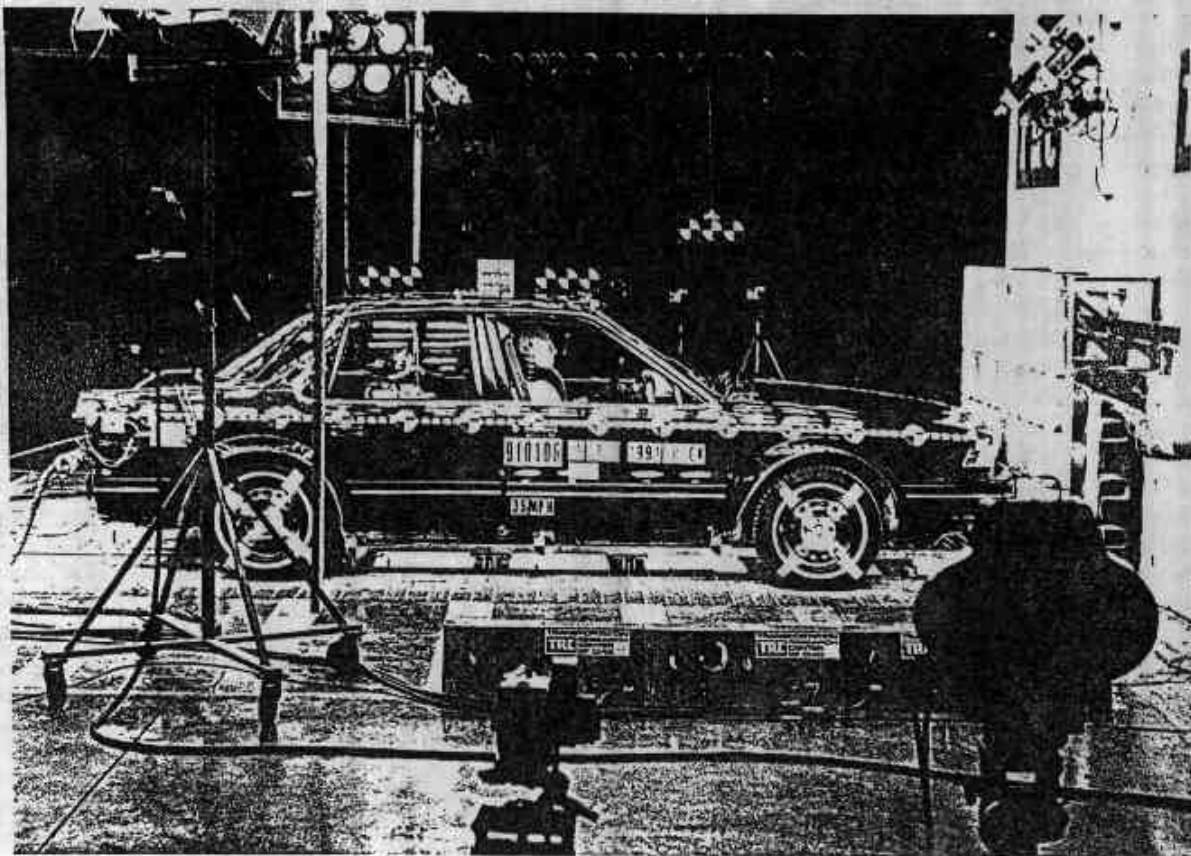


Figure A-7. PRE-TEST RIGHT SIDE VIEW



Figure A-8. POST-TEST RIGHT SIDE VIEW



Figure A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

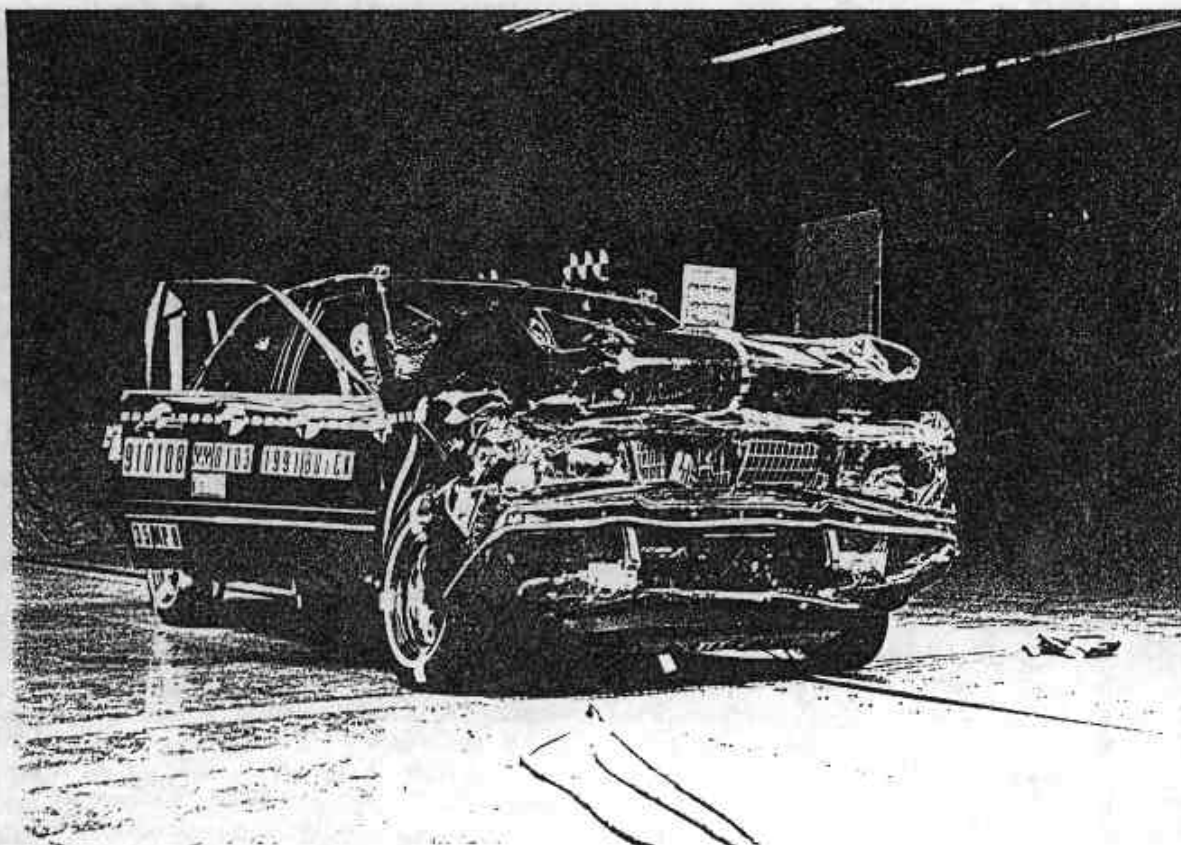


Figure A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW

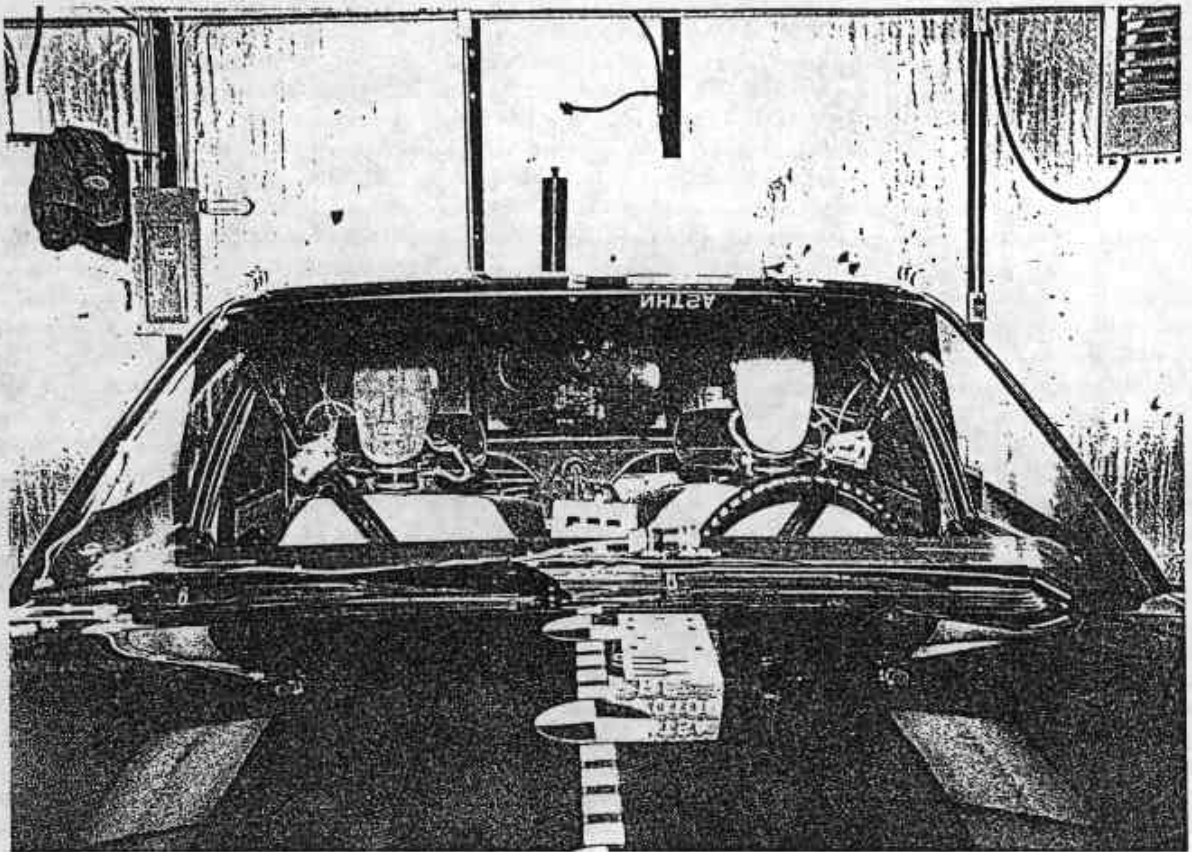


Figure A-13. PRE-TEST WINDSHIELD VIEW

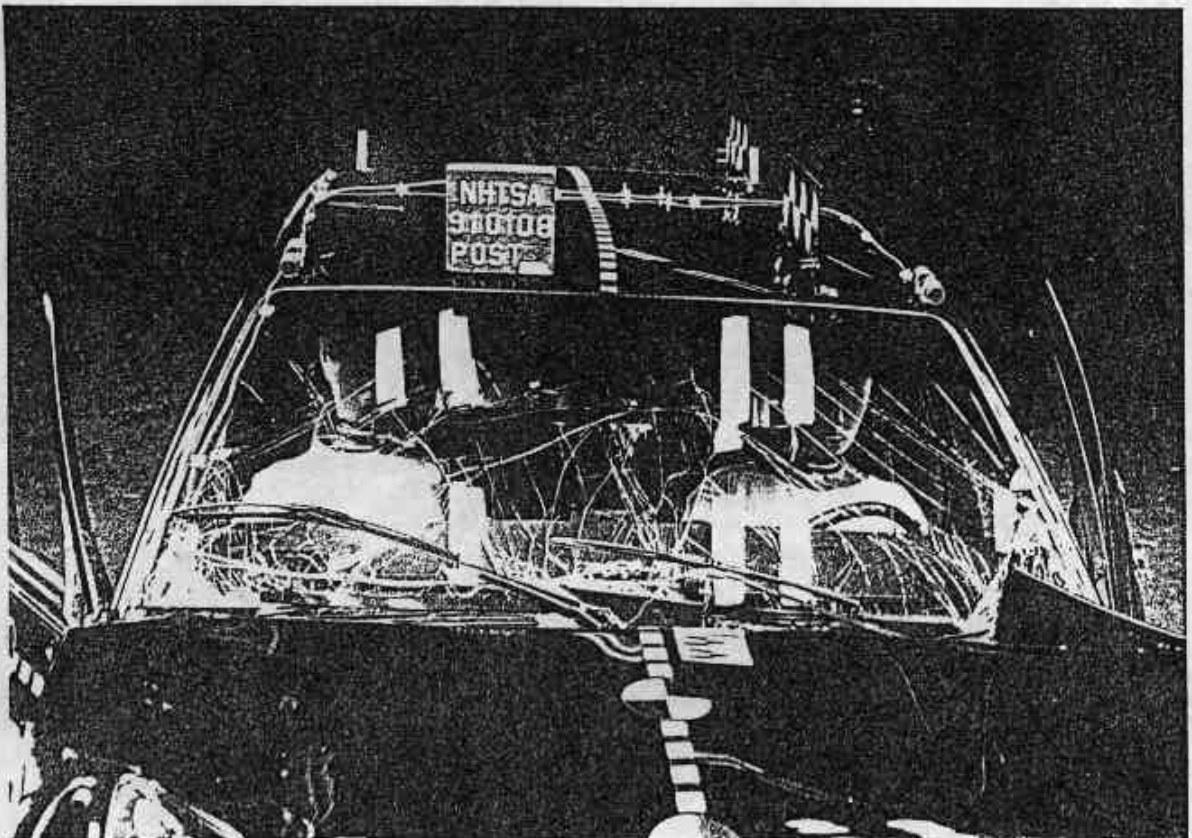


Figure A-14. POST-TEST WINDSHIELD VIEW

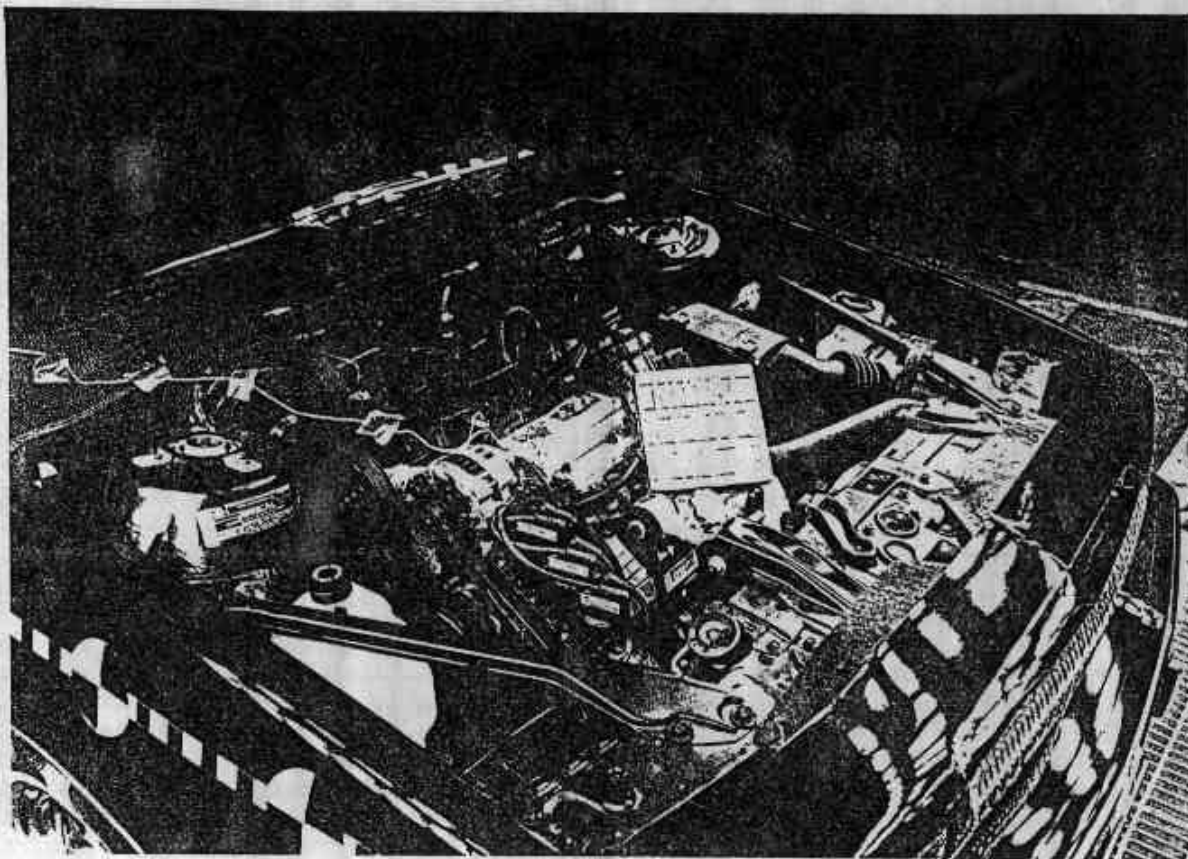


Figure A-15. PRE-TEST ENGINE COMPARTMENT VIEW

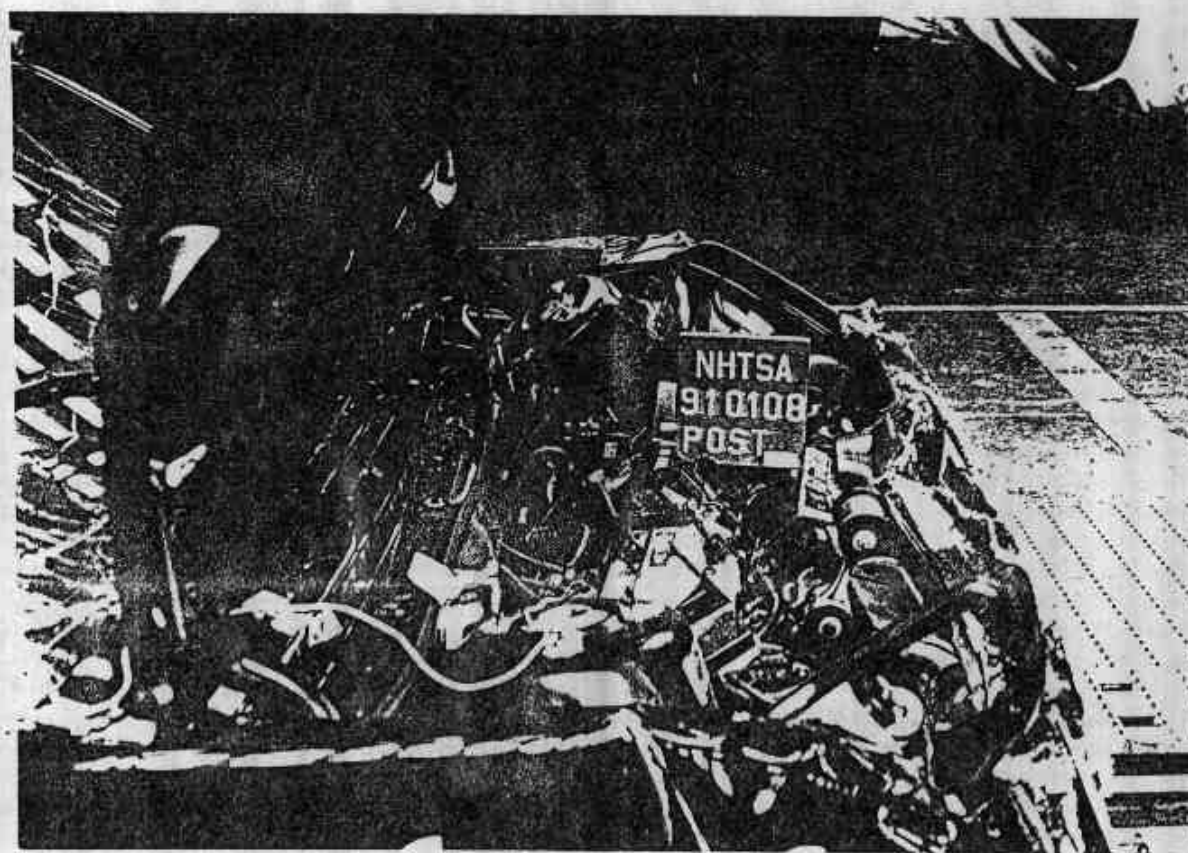


Figure A-16. POST-TEST ENGINE COMPARTMENT VIEW

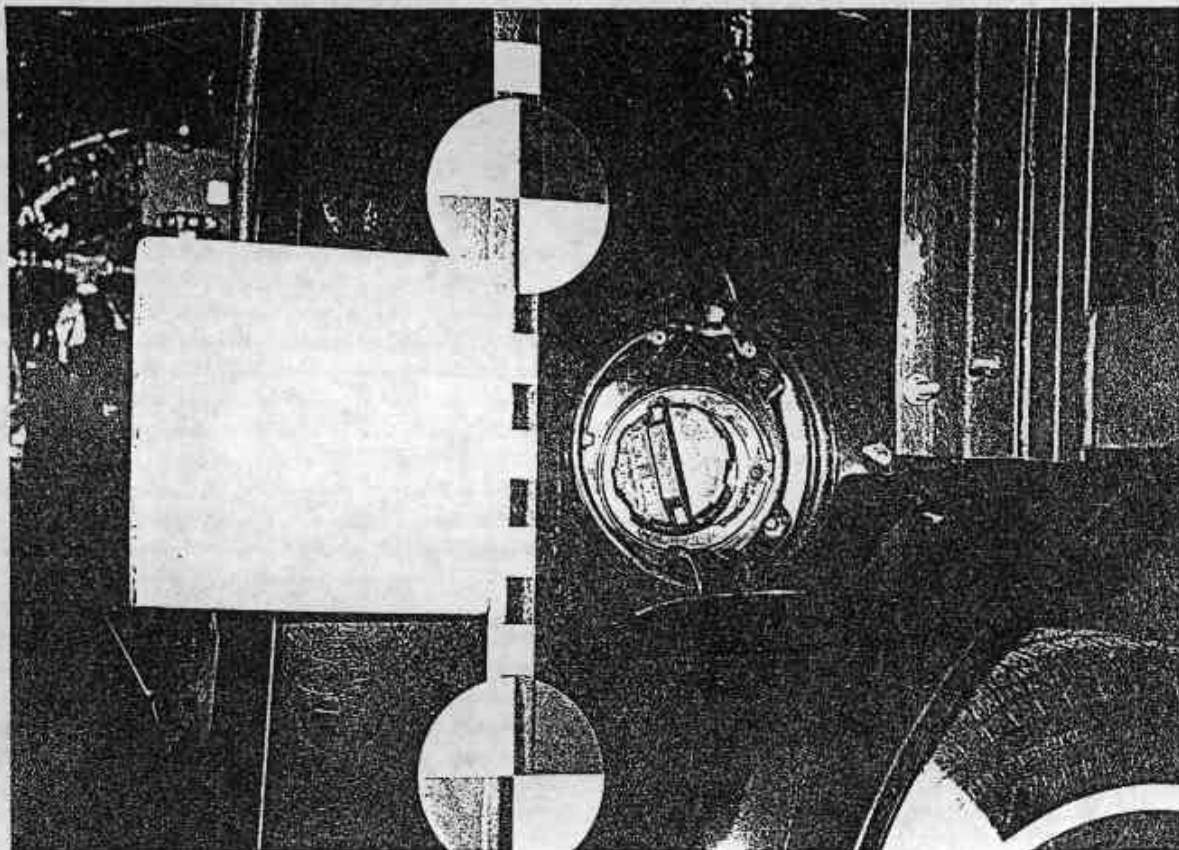


Figure A-17. PRE-TEST FUEL FILLER CAP VIEW

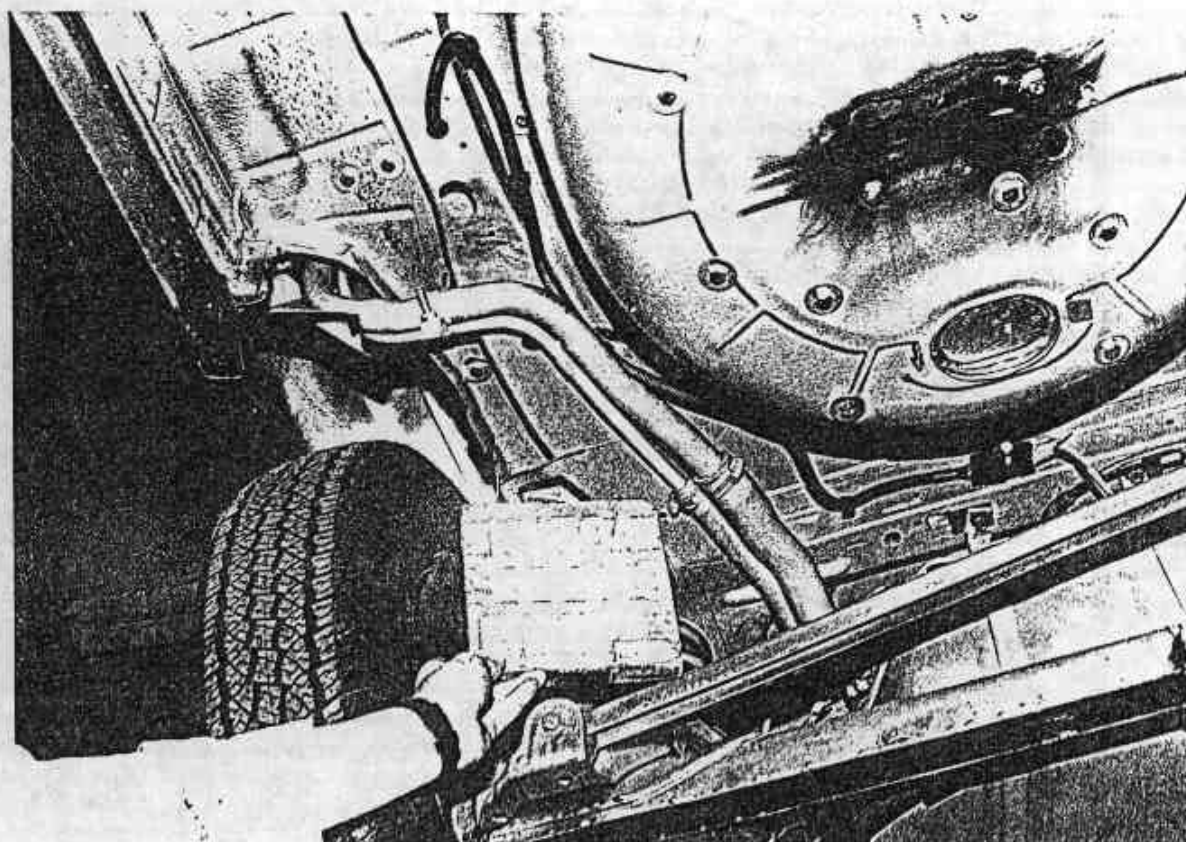


Figure A-18. PRE-TEST FUEL FILLER NECK VIEW

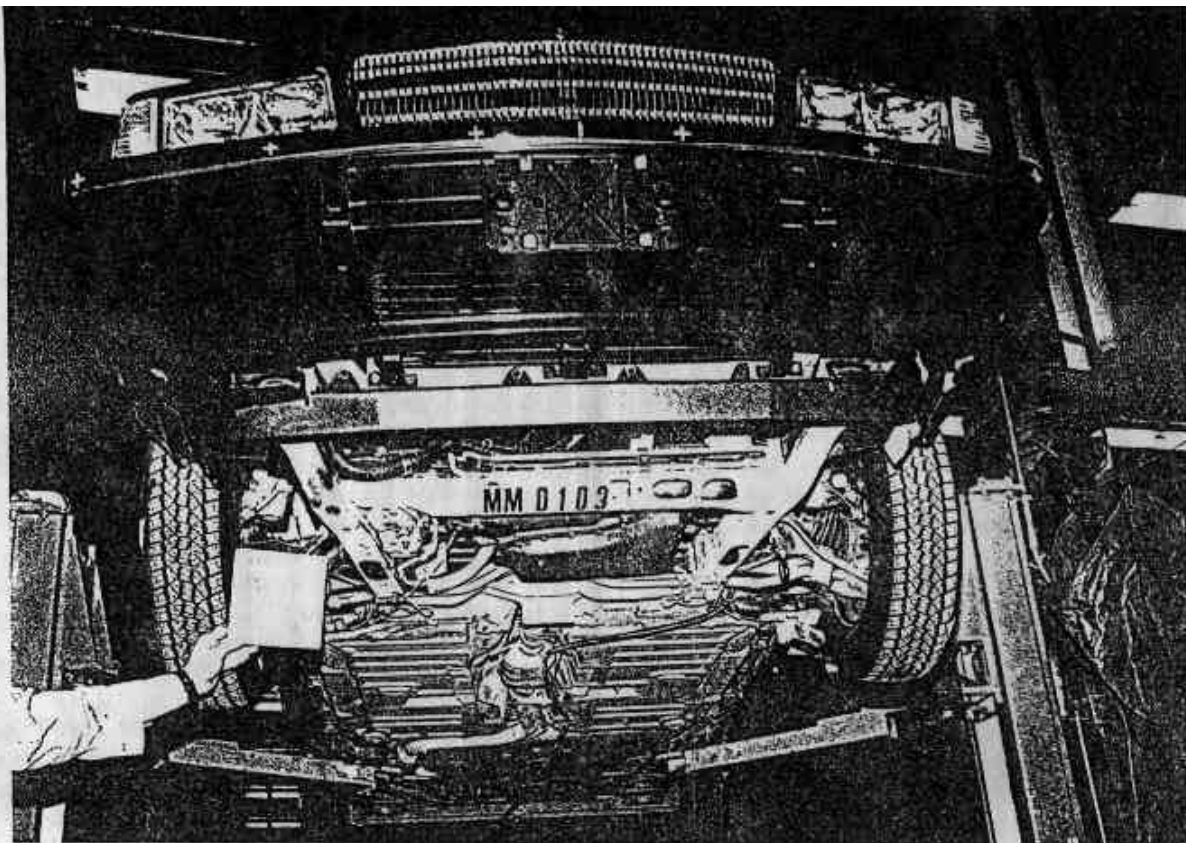


Figure A-19. PRE-TEST FRONT UNDERBODY VIEW

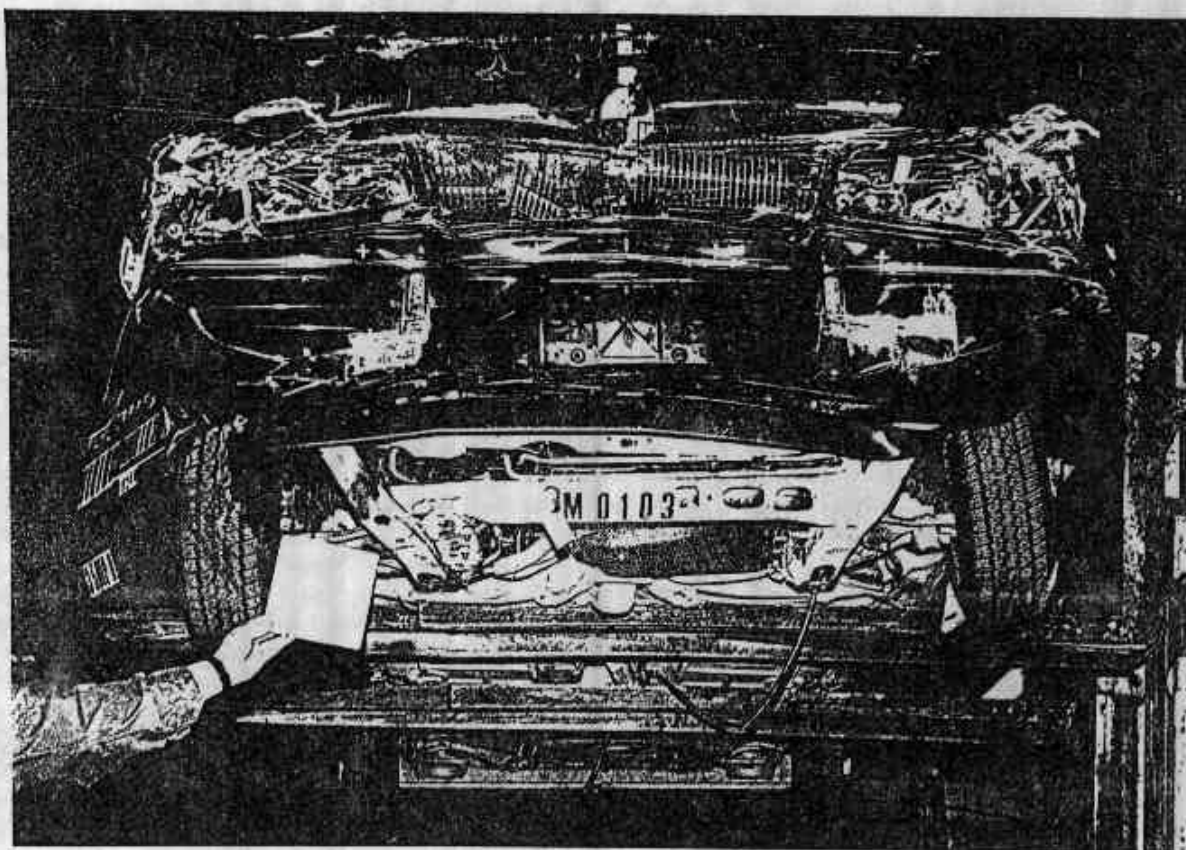


Figure A-20. POST-TEST FRONT UNDERBODY VIEW

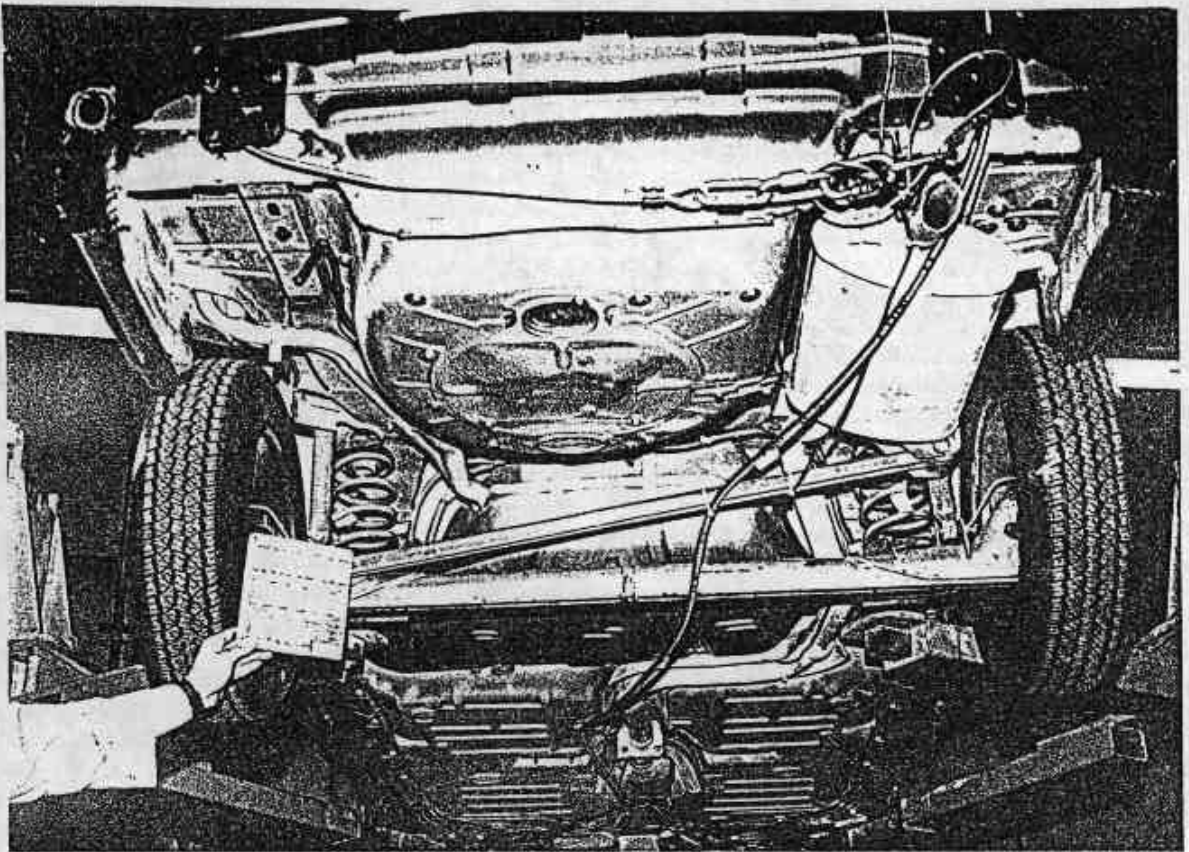


Figure A-21. PRE-TEST REAR UNDERBODY VIEW

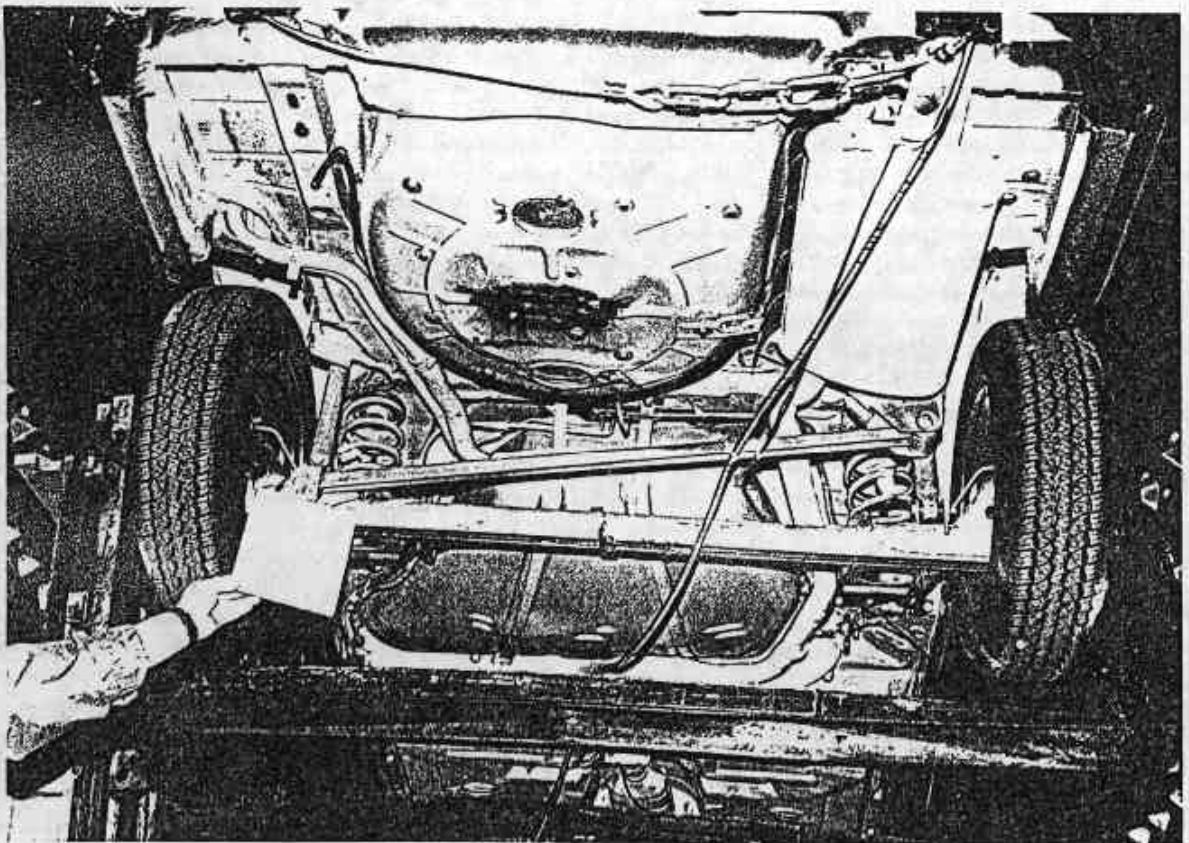


Figure A-22. POST-TEST REAR UNDERBODY VIEW

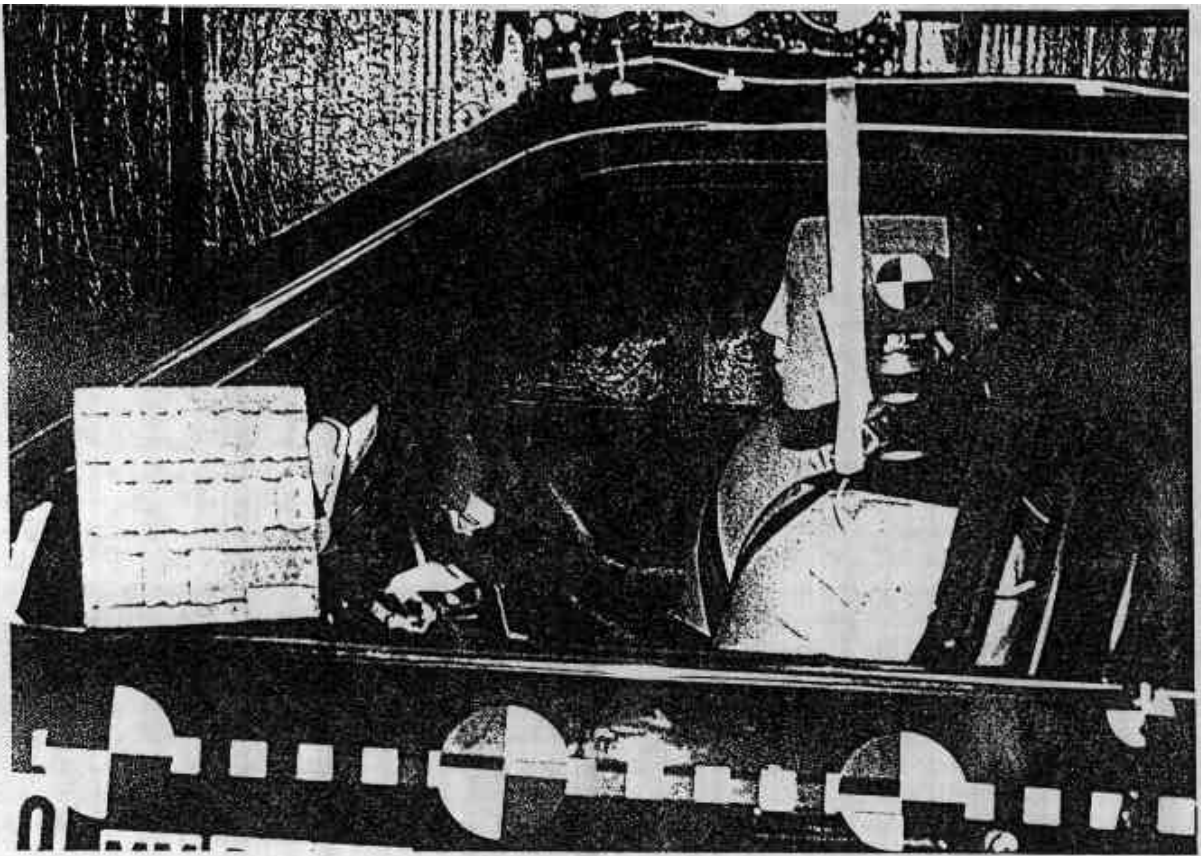


Figure A-23. PRE-TEST DRIVER DUMMY POSITION VIEW



Figure A-24. POST-TEST DRIVER DUMMY POSITION VIEW



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



Figure A-26. PRE-TEST PASSENGER DUMMY POSITION VIEW

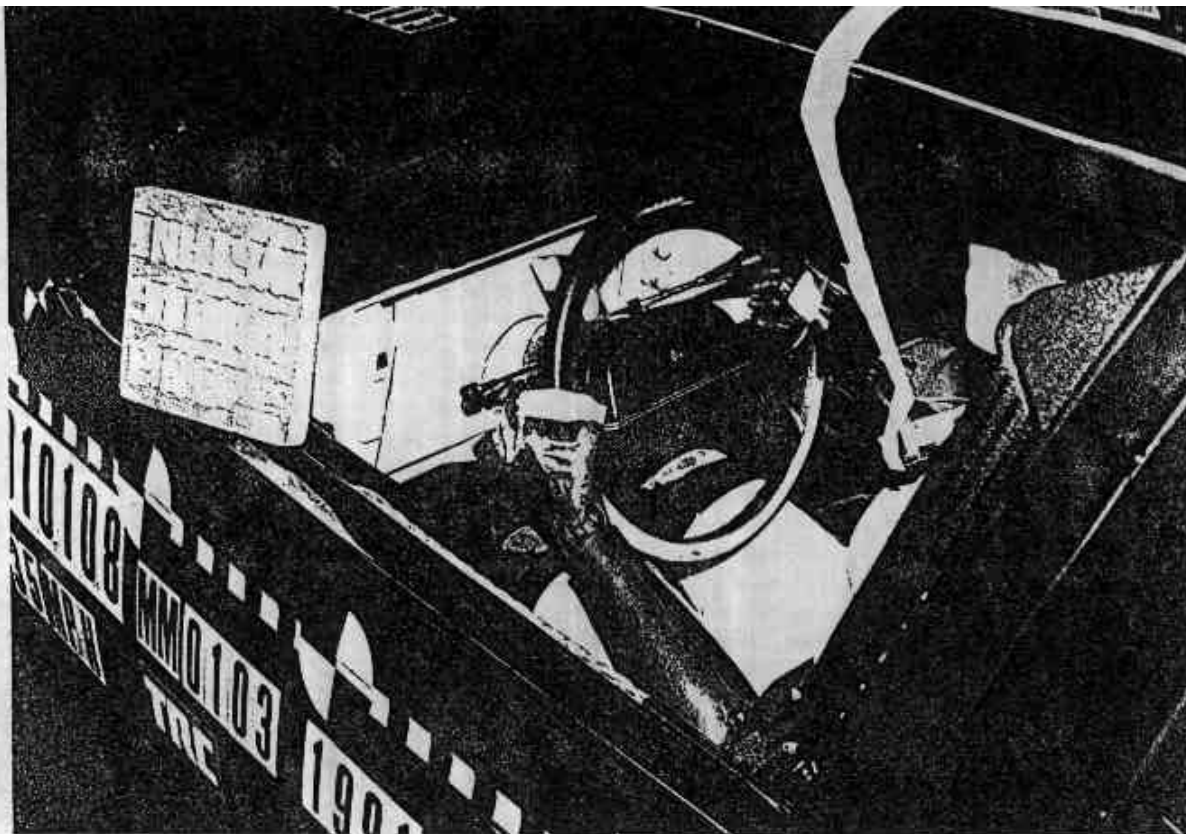


Figure A-27. PRE-TEST DRIVER DUMMY AND VEHICLE INTERIOR VIEW

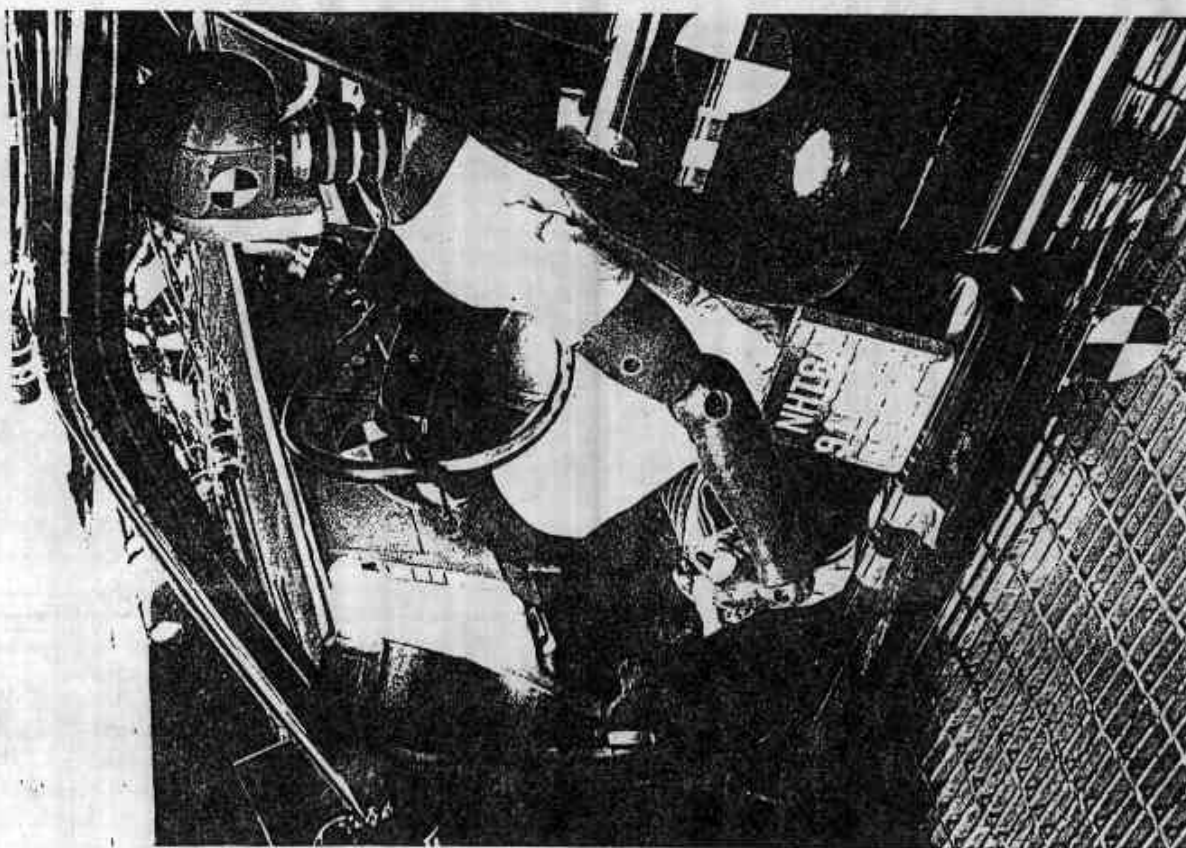


Figure A-28. POST-TEST DRIVER DUMMY AND VEHICLE INTERIOR VIEW

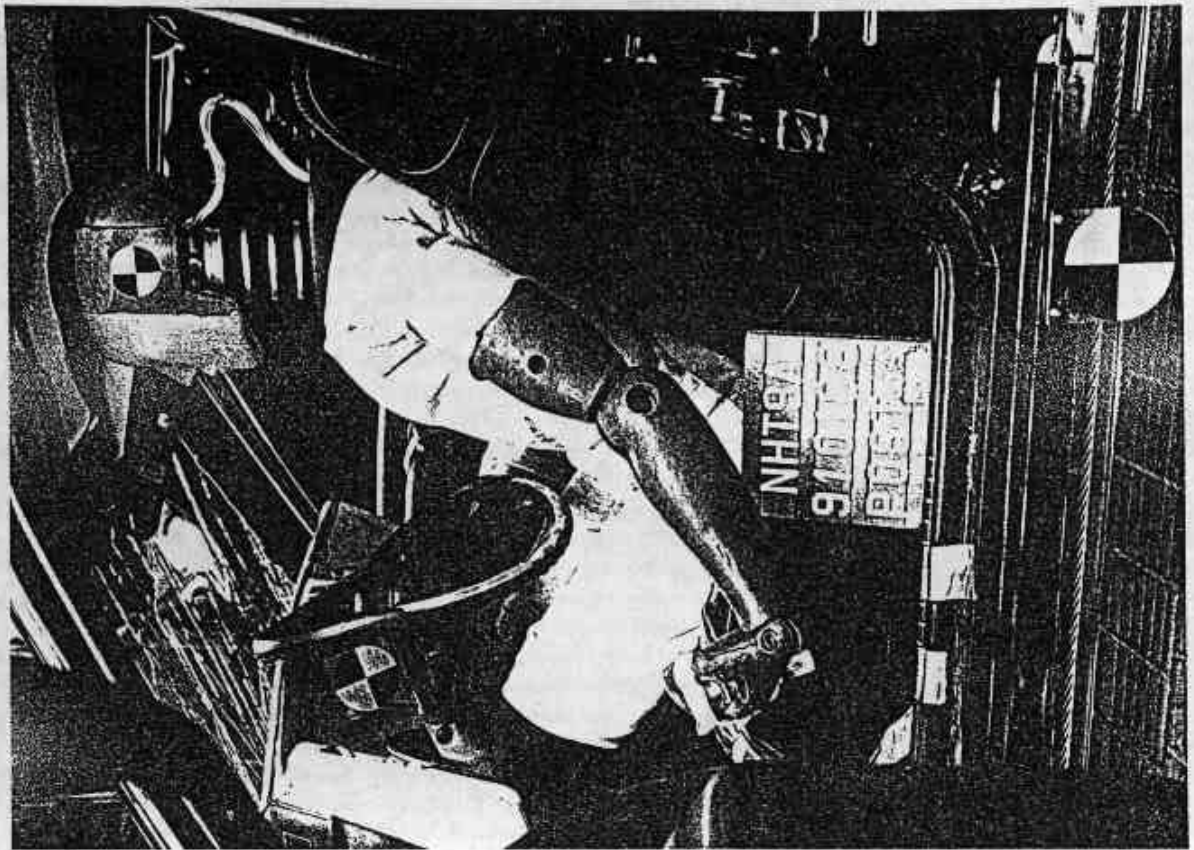


Figure A-29. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2



Figure A-30. PRE-TEST DASHBORO DUMMY & VEHICLE EXTERIOR VIEW

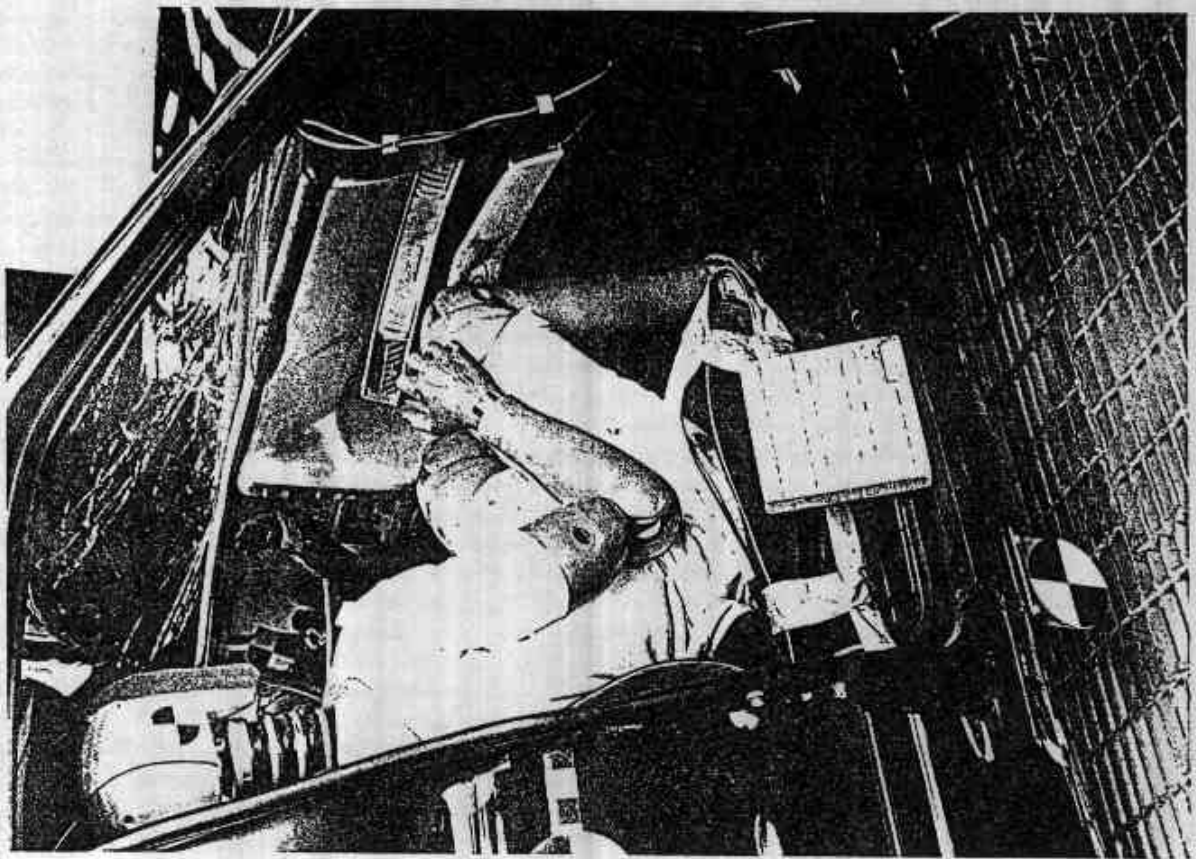


Figure A-31. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

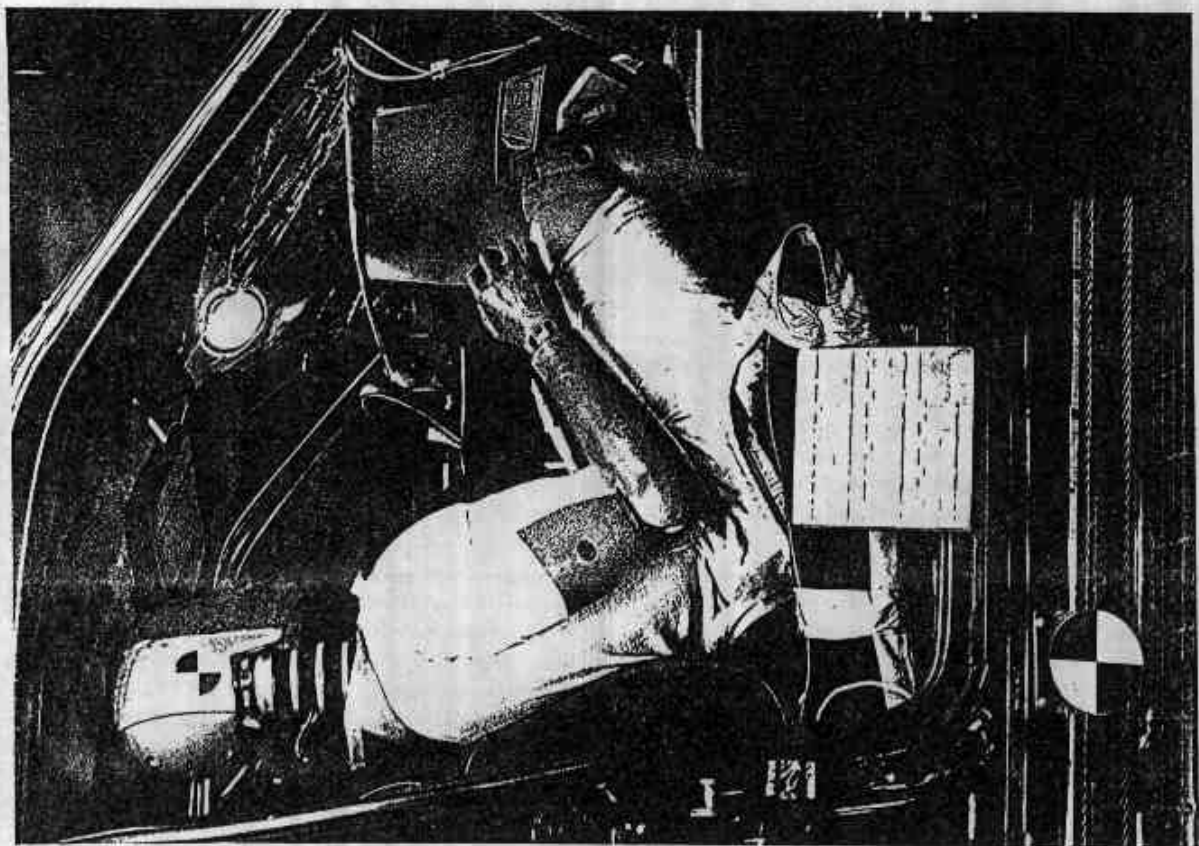


Figure A-32. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

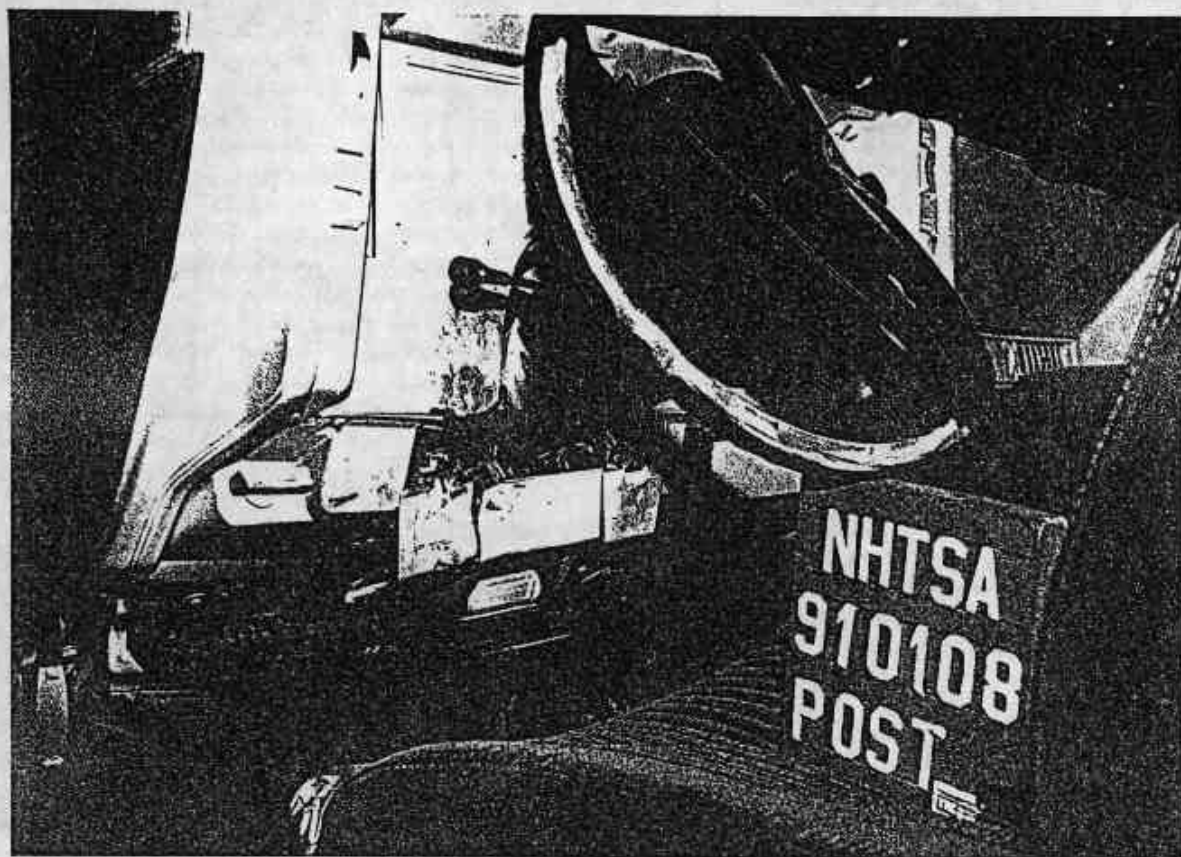


Figure A-33. POST-TEST DRIVER DUMMY HEAD AND KNEE CONTACT VIEW



Figure A-34. POST-TEST DRIVER DUMMY HEAD CONTACT VIEW



Figure A-35. POST-TEST DRIVER DUMMY KNEE CONTACT VIEW



Figure A-36. POST-TEST PASSENGER DUMMY HEAD AND KNEE CONTACT VIEW

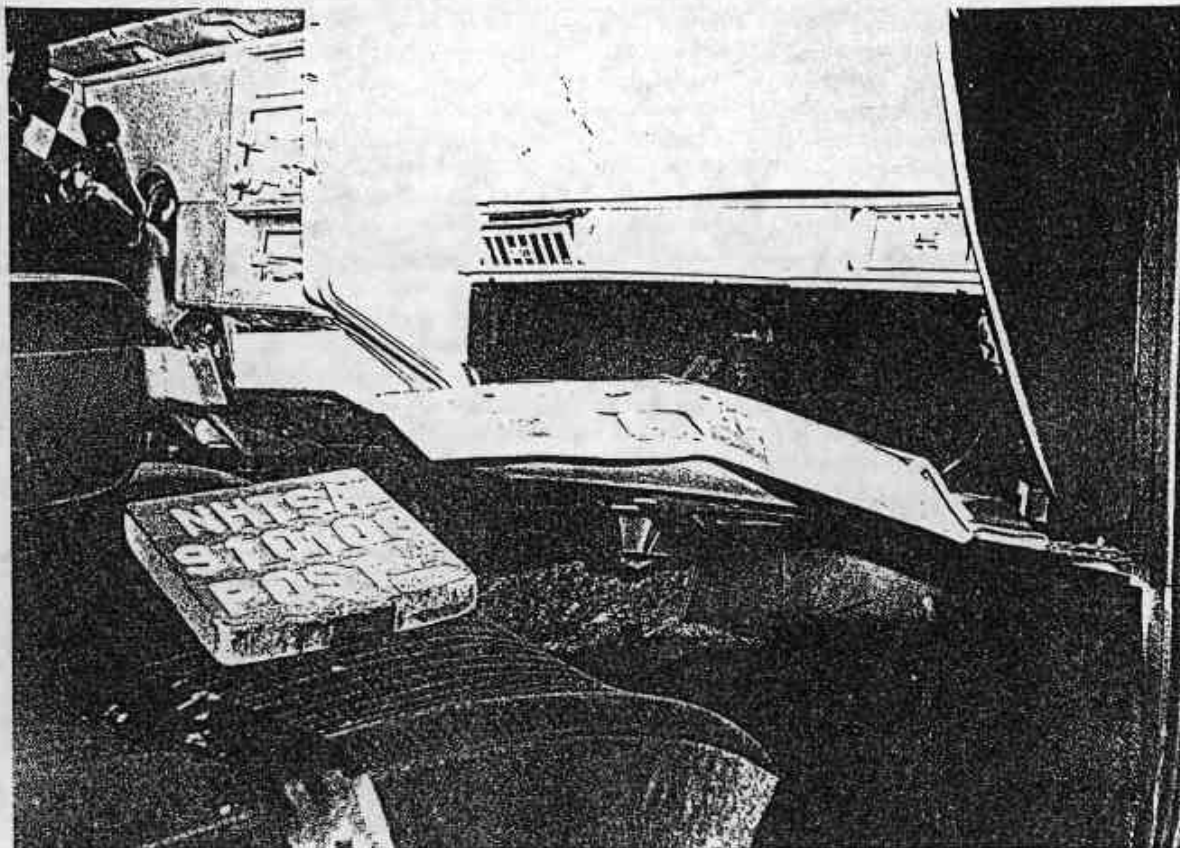


Figure A-37. POST-TEST PASSENGER DUMMY KNEE CONTACT VIEW

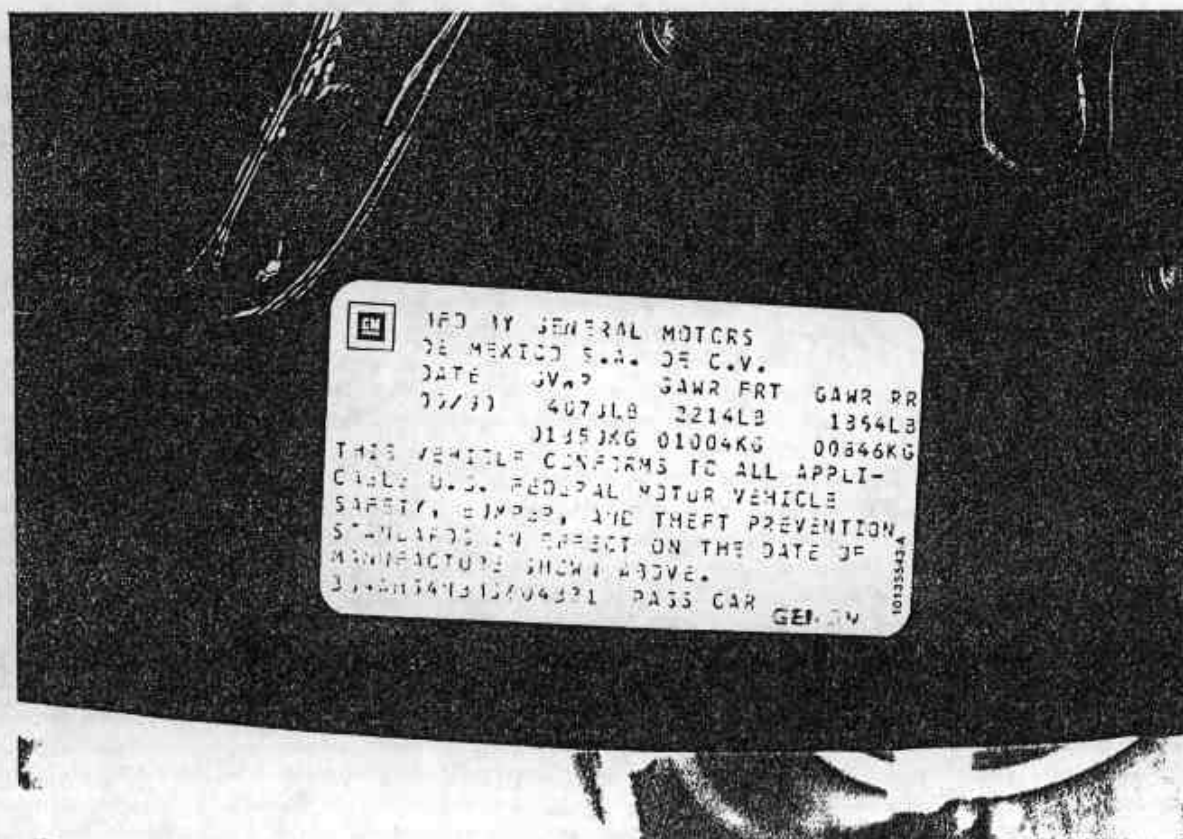


Figure A-38. PRE-TEST VEHICLE CERTIFICATION LABEL VIEW

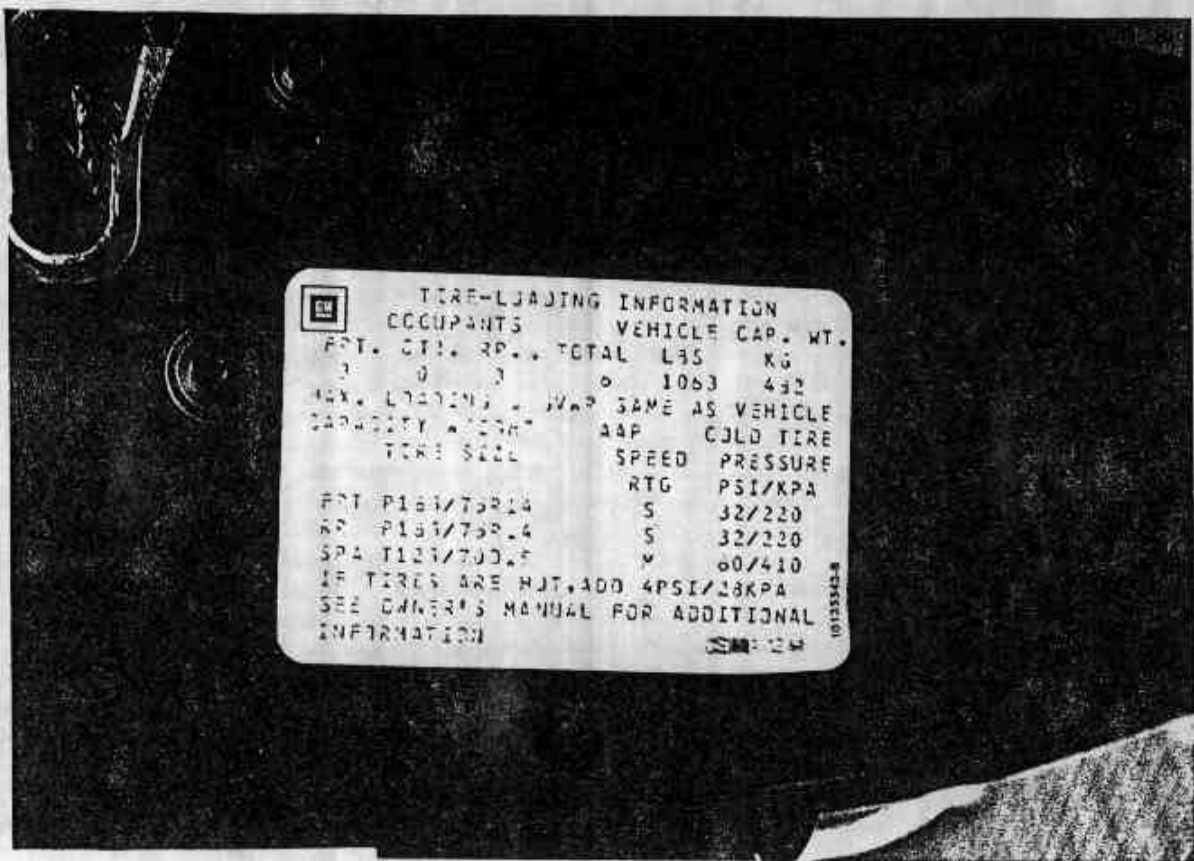


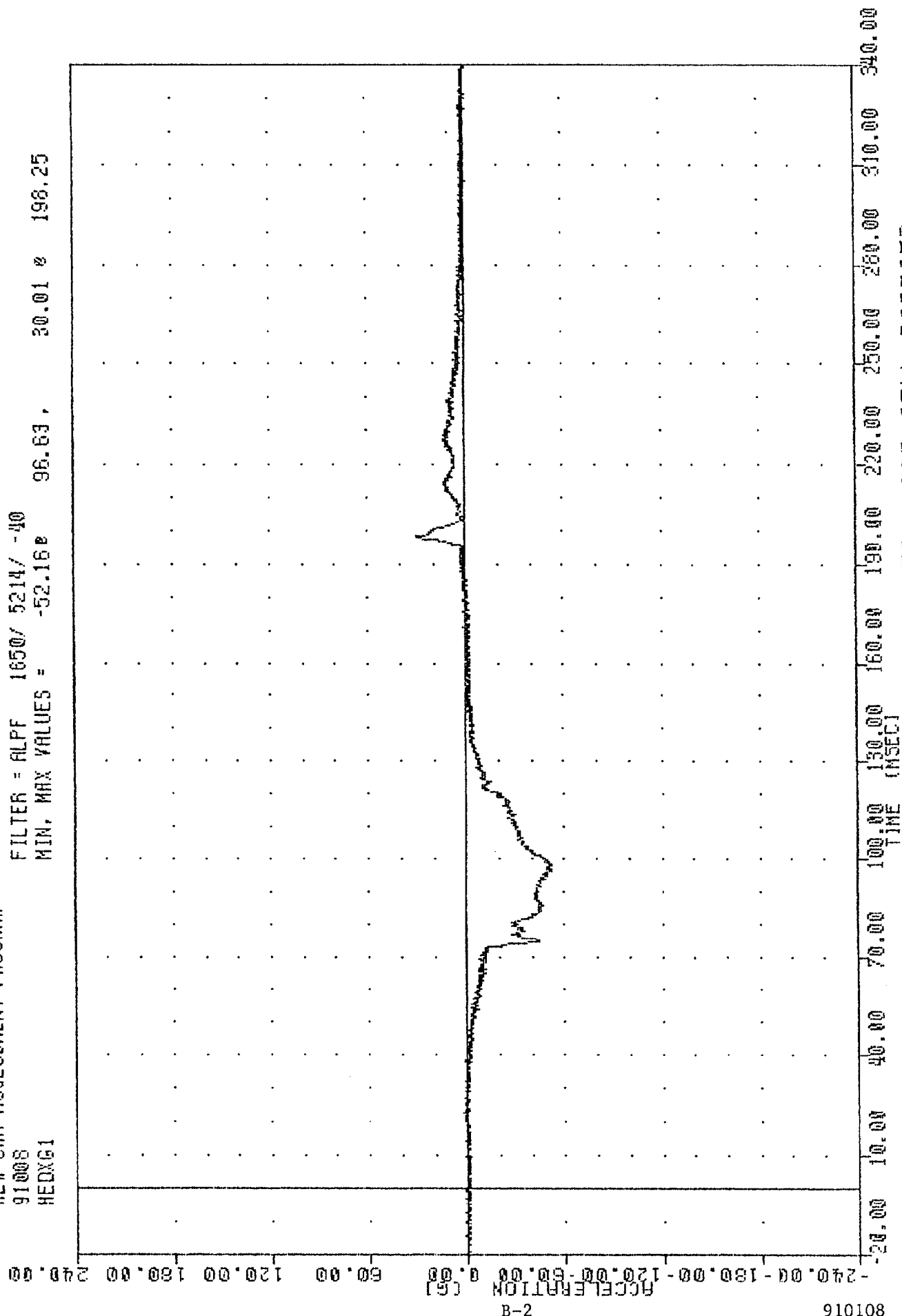
Figure A-39. PRE-TEST VEHICLE RECOMMENDED TIRE PRESSURE LABEL VIEW

APPENDIX B

DATA PLOTS

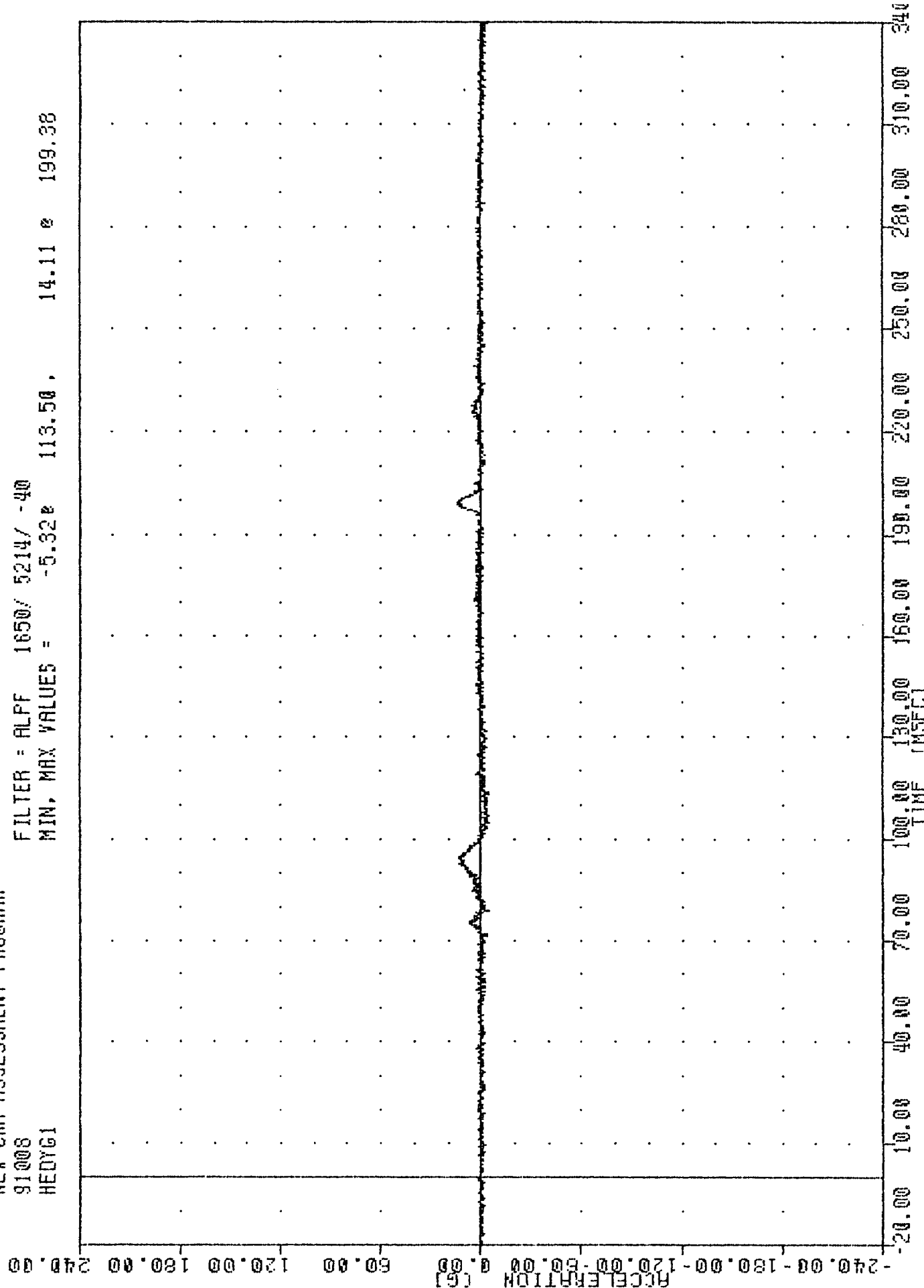
TRC , 910103
 NEW CAR ASSESSMENT PROGRAM
 91008
 HEDX61

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -52.16e 96.63, 30.01 e 198.25



NEW CAR ASSESSMENT PROGRAM
 91008
 HEDY61

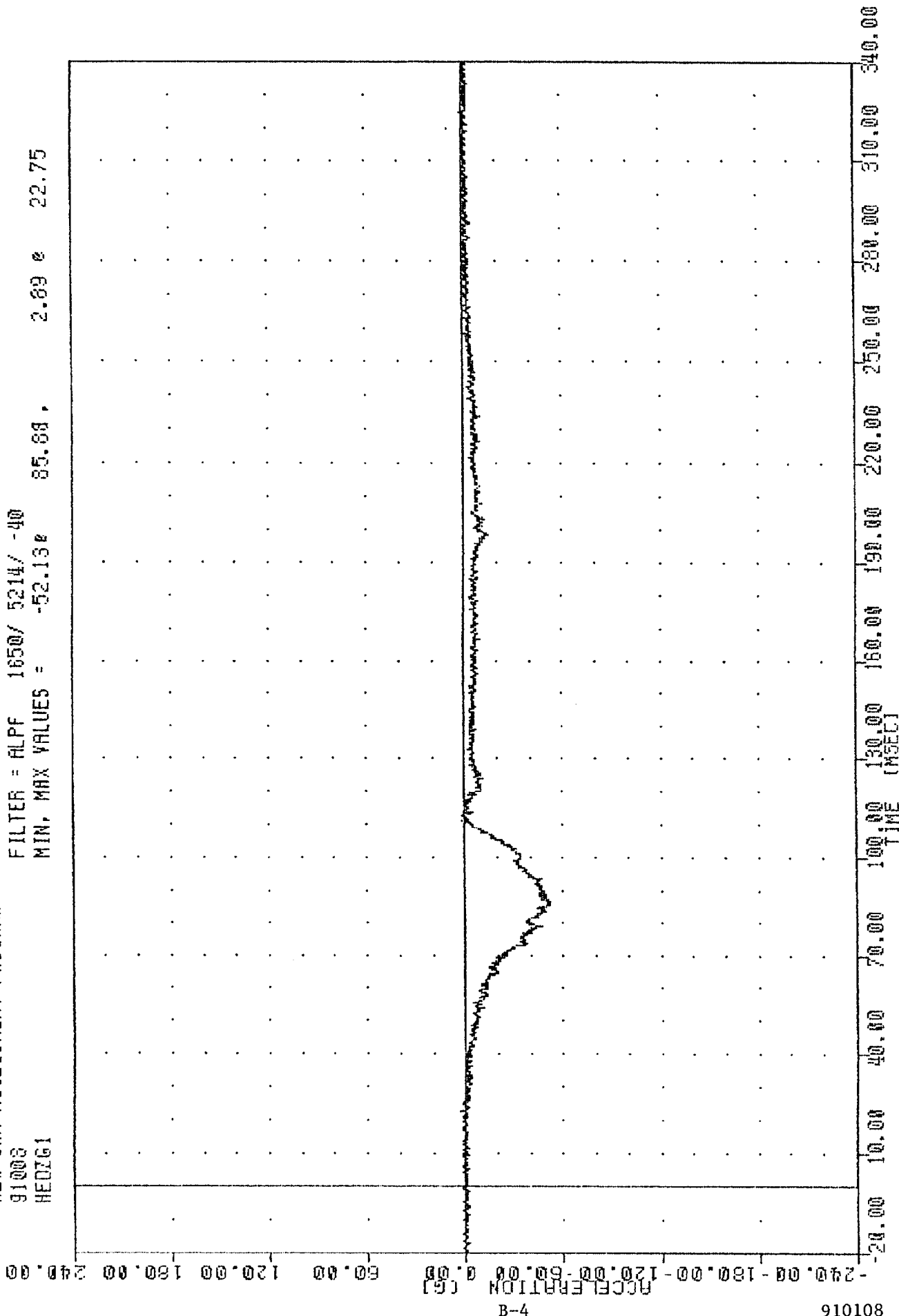
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -5.32e 113.50, 14.11 e 199.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD Y-AXIS ACCELERATION

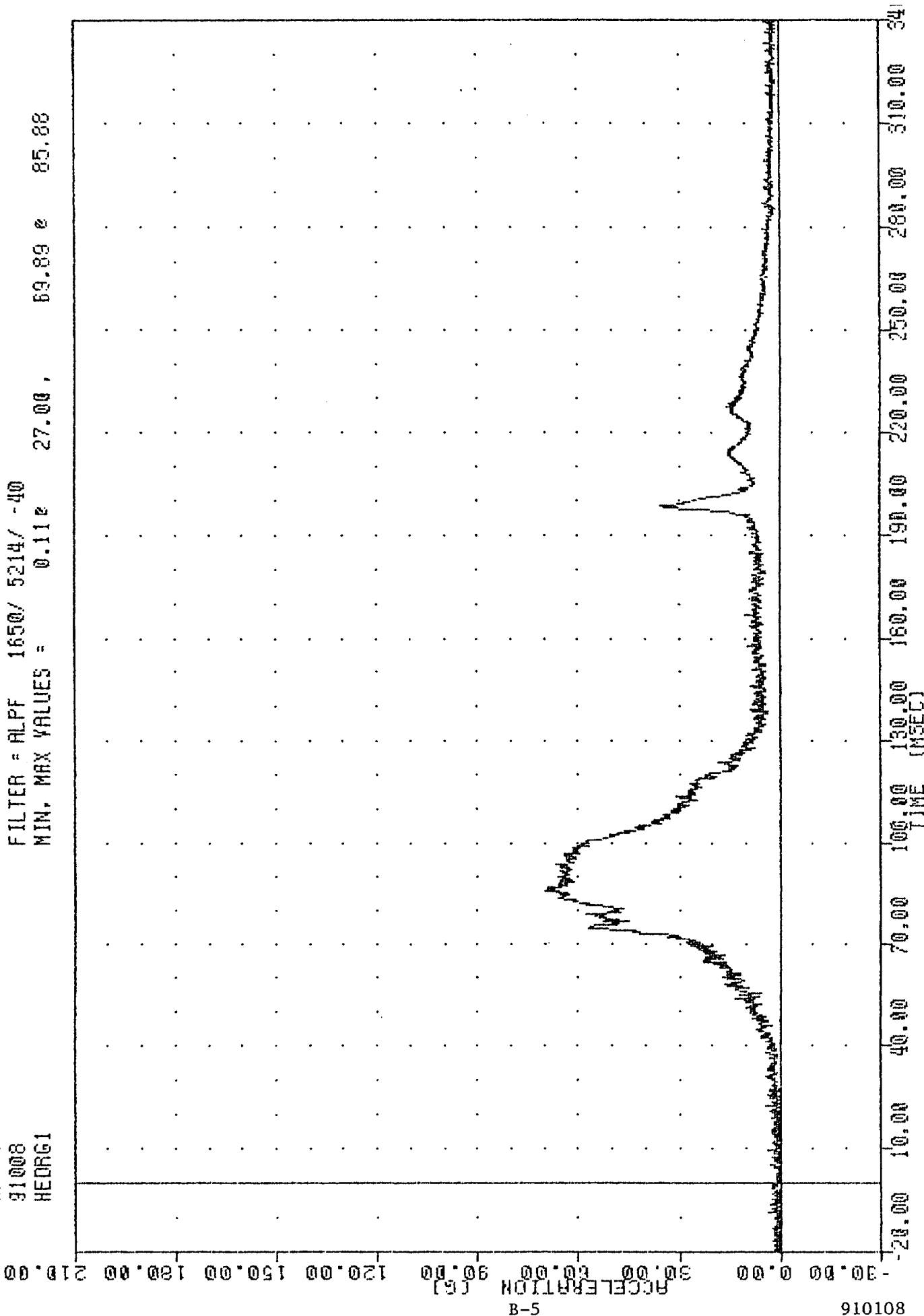
TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 HEDZG1

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -52.13e 85.88 , 2.89 e 22.75



NEW CAR ASSESSMENT PROGRAM
 91008
 HEDRG1

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.112 27.00 , 69.89 85.88

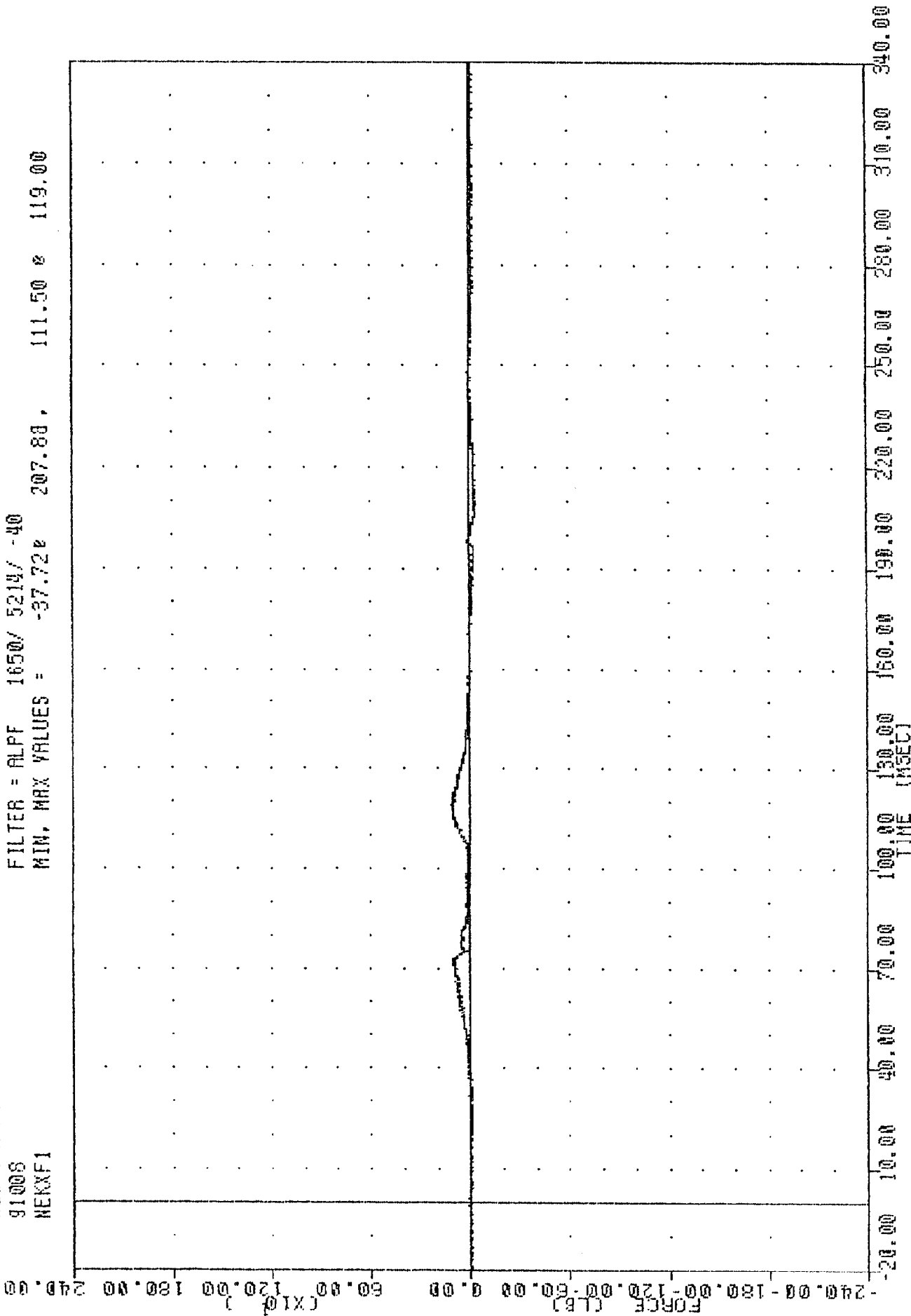


1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD RESULTANT ACCELERATION

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM

91008
 NEXCF1

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -37.72 207.83 , 111.50 119.00



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK Y-AXIS SHEAR FORCE

NEW CAR ASSESSMENT PROGRAM

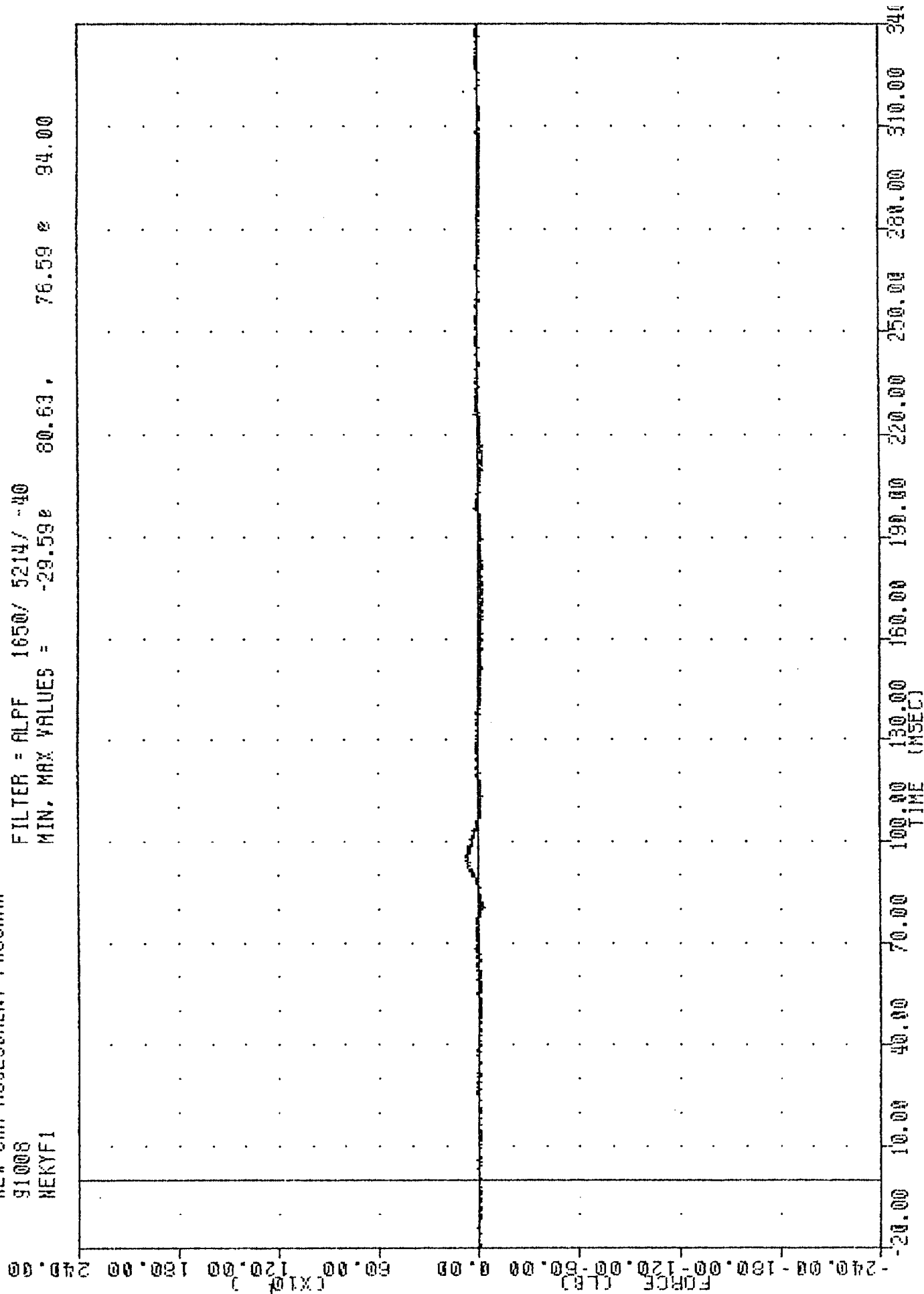
91008

KEYF1

FILTER = ALPF 1650/ 5214/ -40

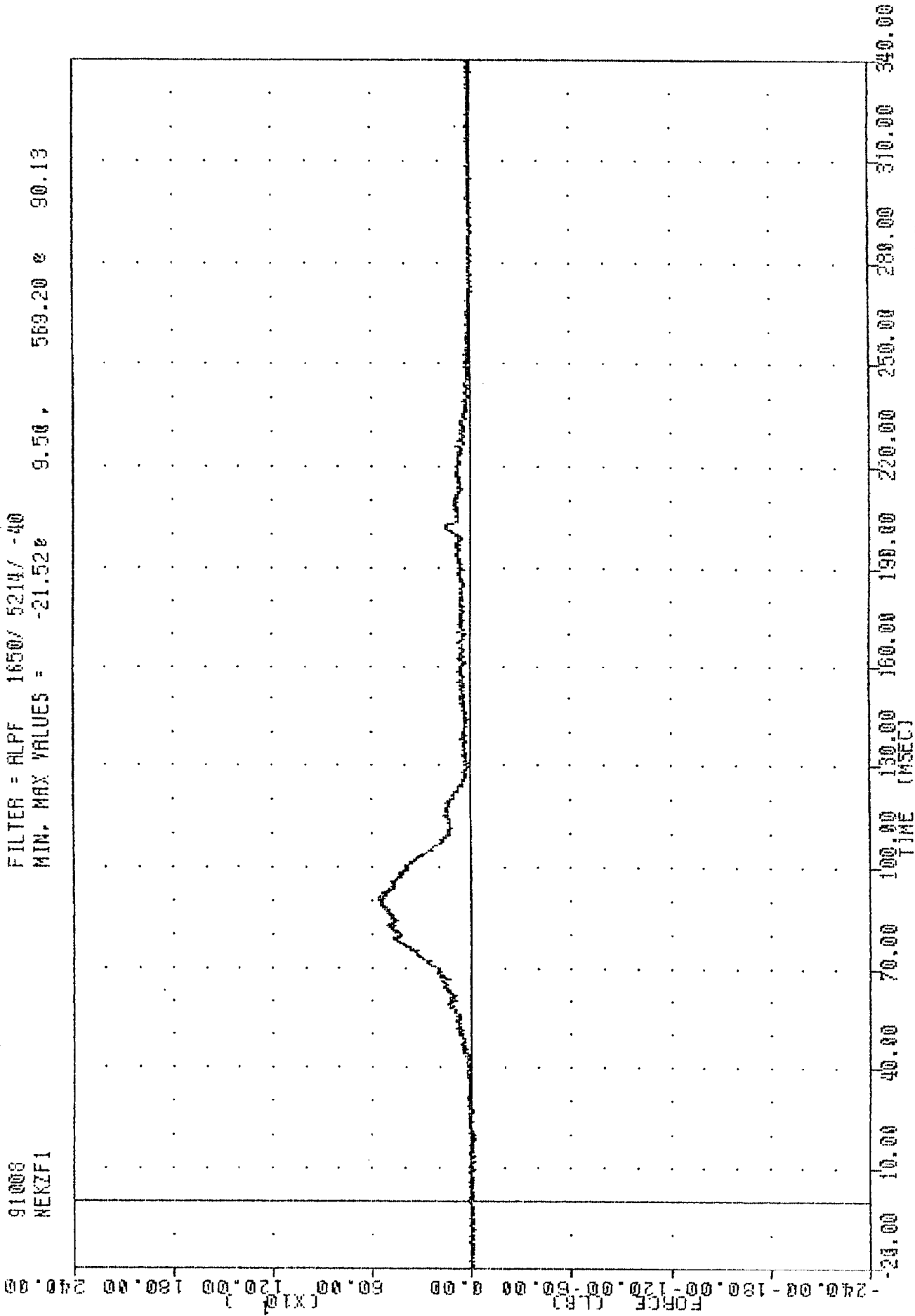
MIN. MAX VALUES = -29.59e 80.63.

76.59 e 94.00



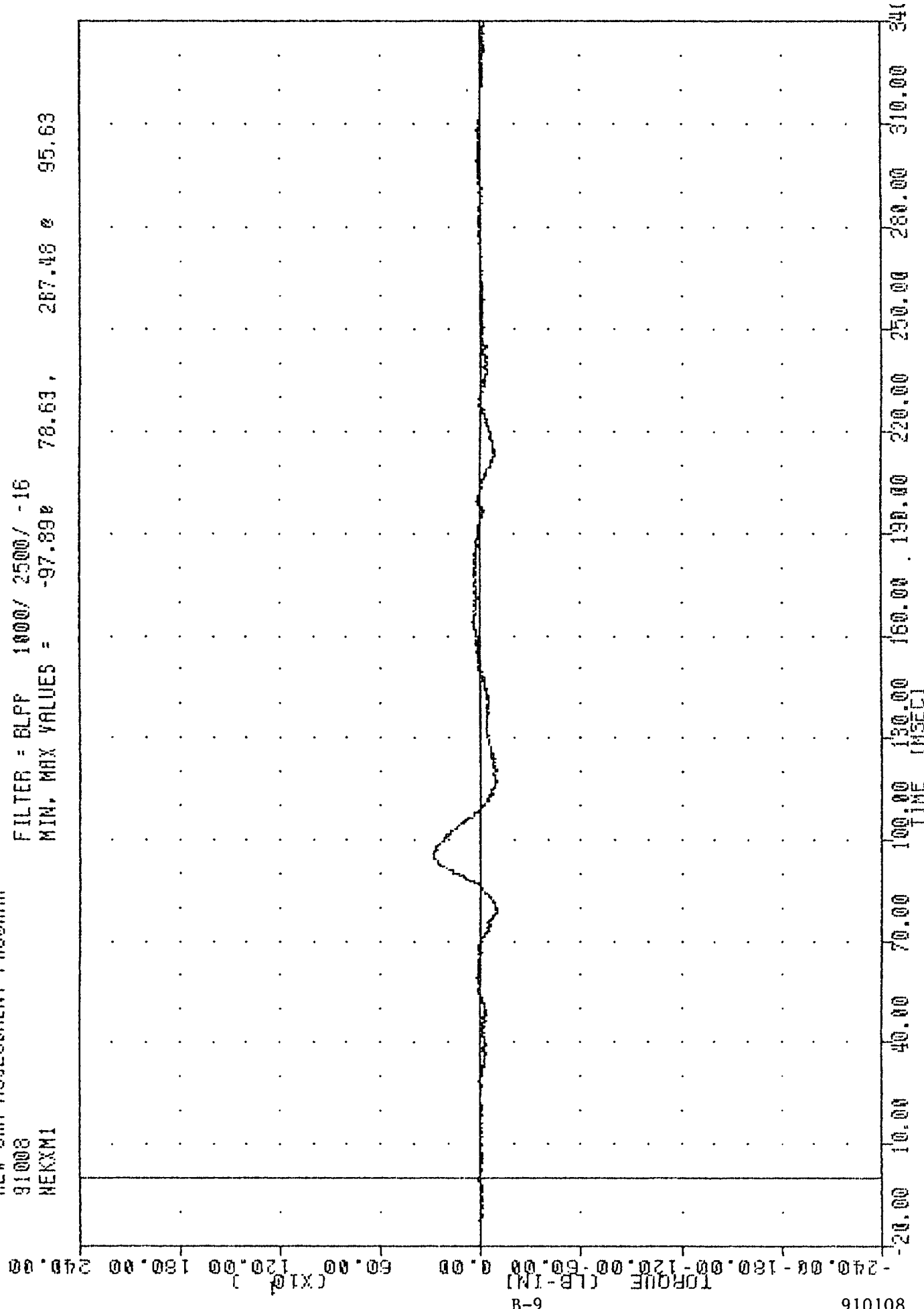
TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 NEKZF1

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -21.520 9.50, 569.20 0 90.13



NEW CAR ASSESSMENT PROGRAM
 91008
 HEKXMI

FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -97.89 78.63 , 287.48 95.63



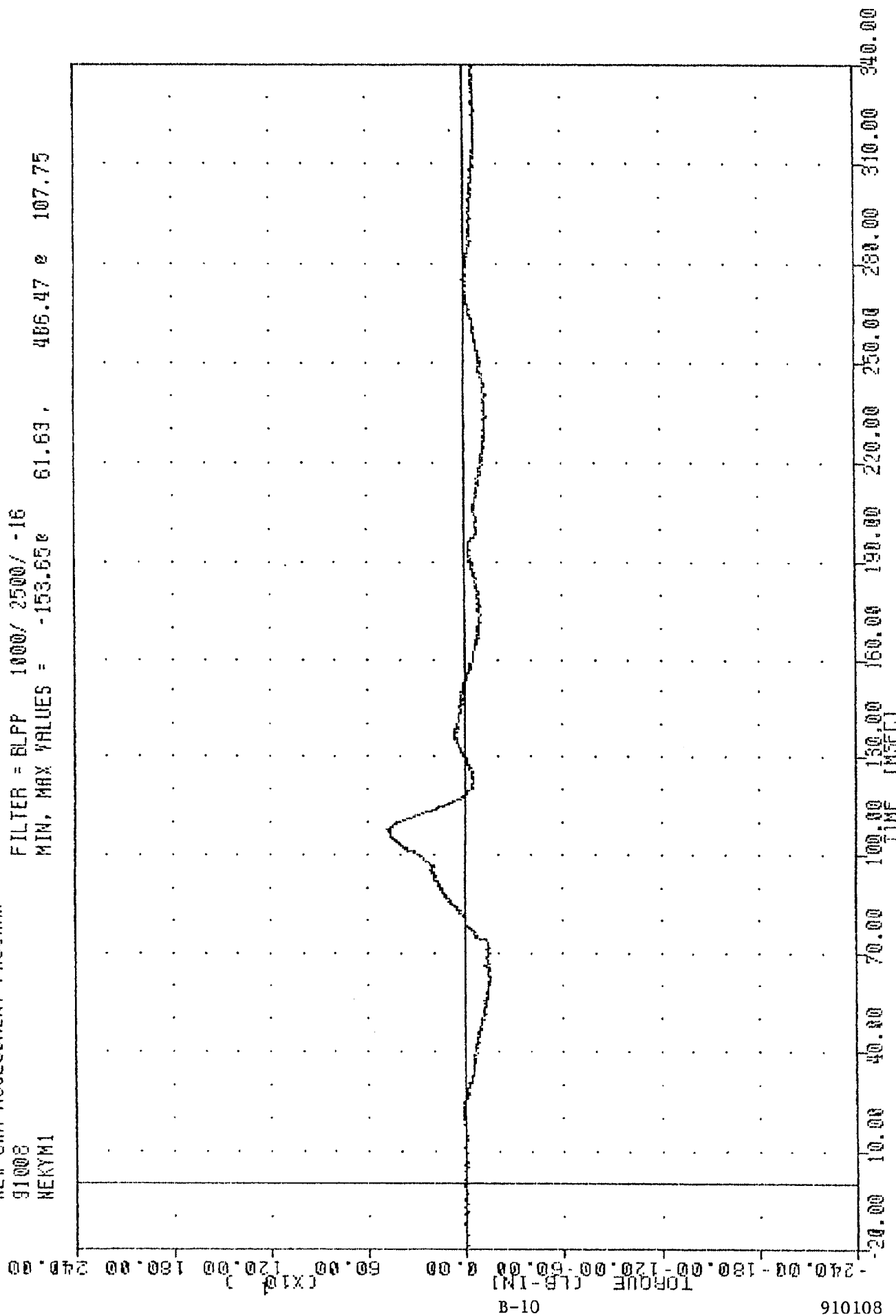
910108

B-9

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT X AXIS

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 HEKYM1

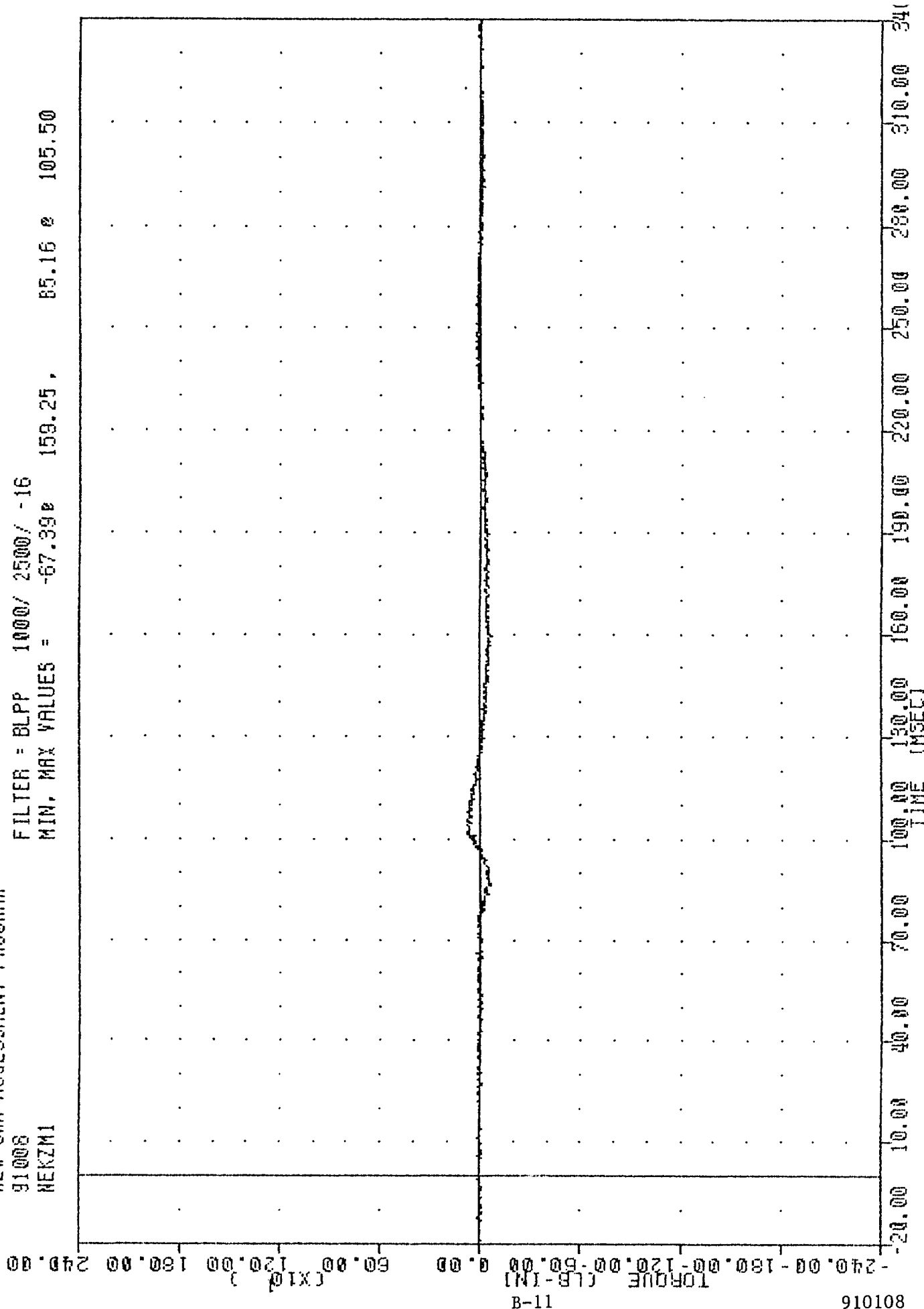
FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -153.650 61.63, 486.47 0 107.75



801016

NEW CAR ASSESSMENT PROGRAM
 91008
 NEKZM1

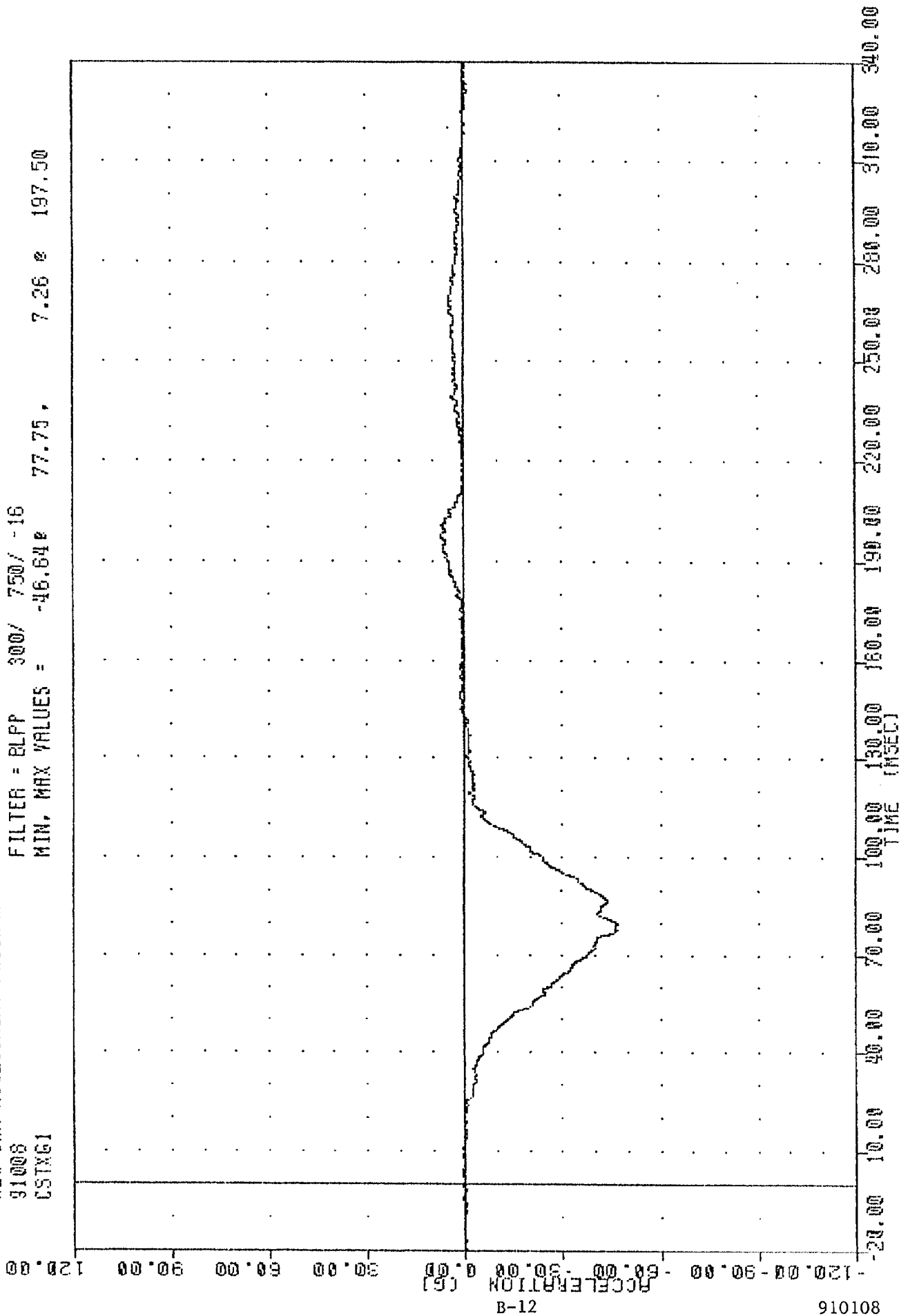
FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -67.390 159.25, 85.16 105.50



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT Z AXIS

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 CSTXG1

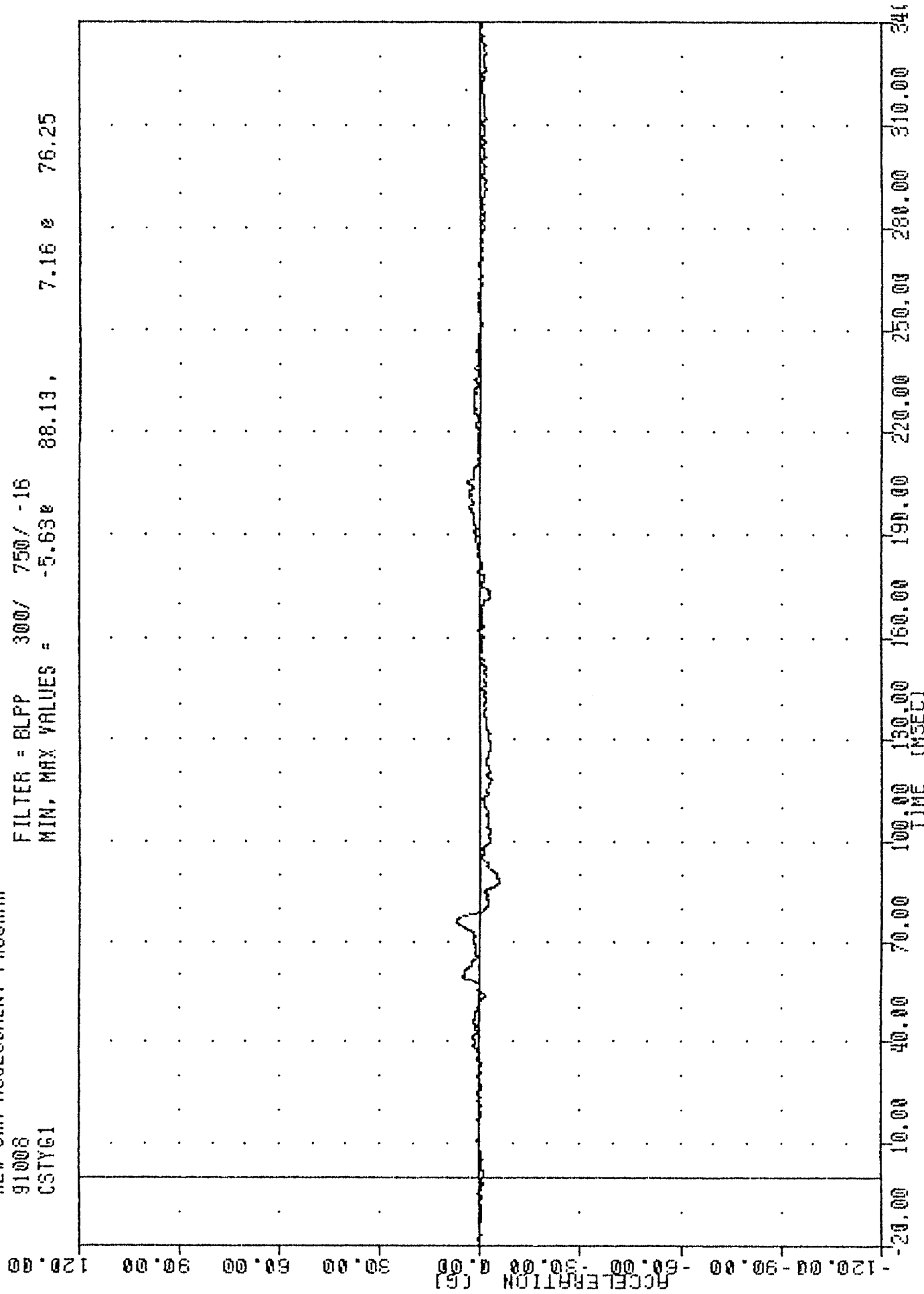
FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -46.64 77.75, 7.26 197.50



NEW CHR ASSESSMENT PROGRAM

91008
CSTY61

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -5.63 88.13 , 7.16 76.25



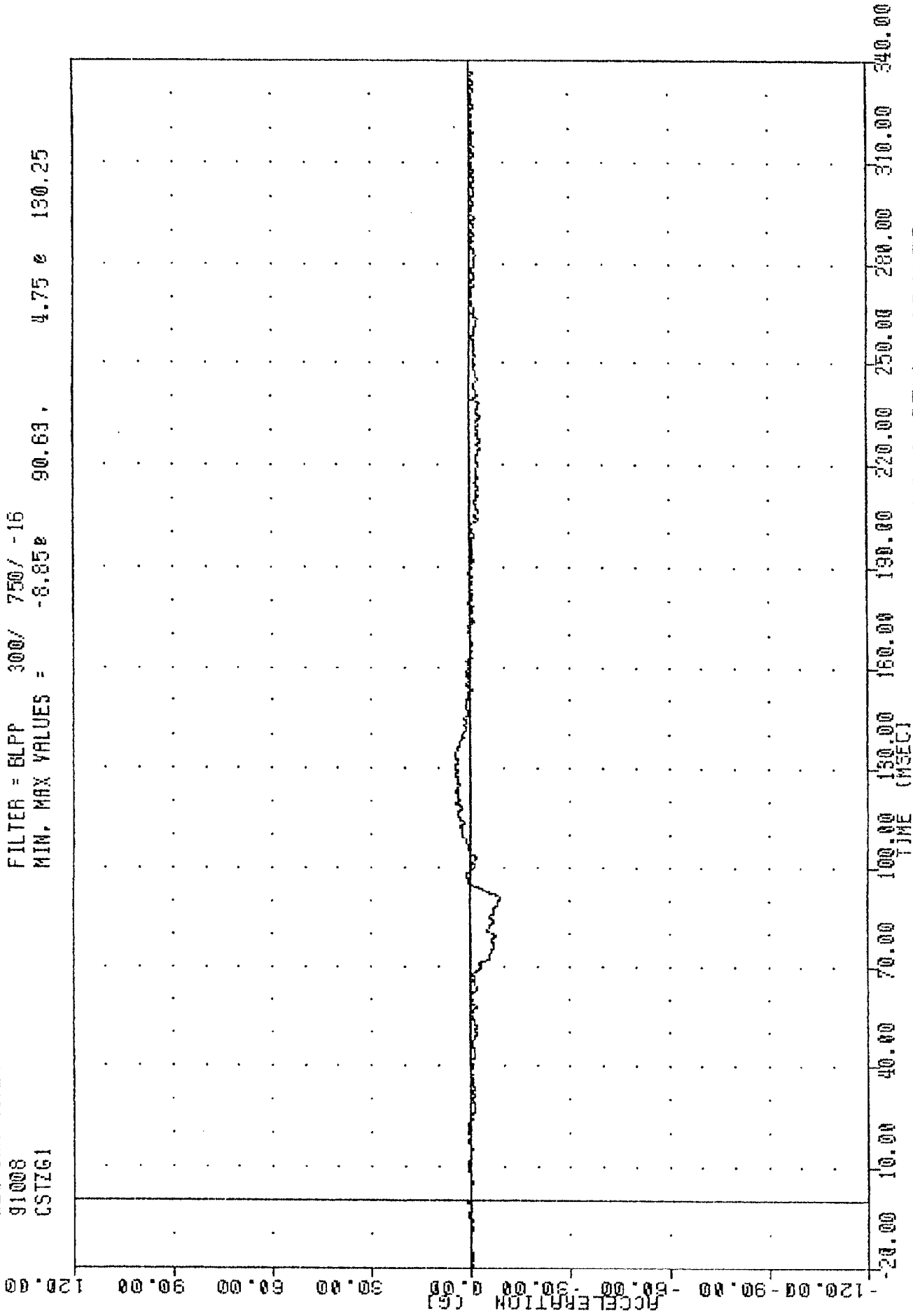
910108

B-13

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION

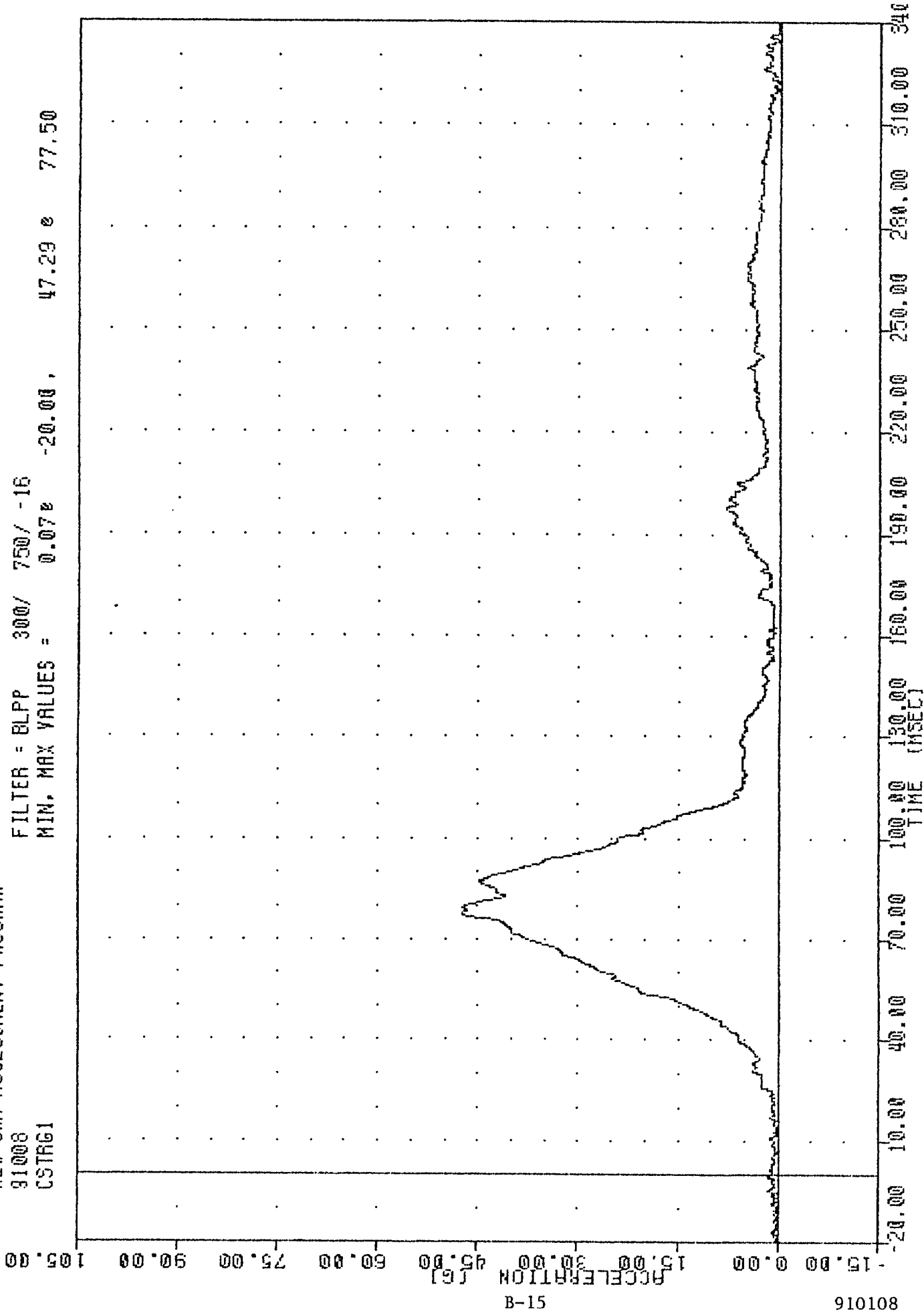
TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 CSTZG1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 90.63, 4.75 e 130.25



NEW CAR ASSESSMENT PROGRAM
 91008
 CSTRG1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.07% -20.00, 47.29 e 77.50



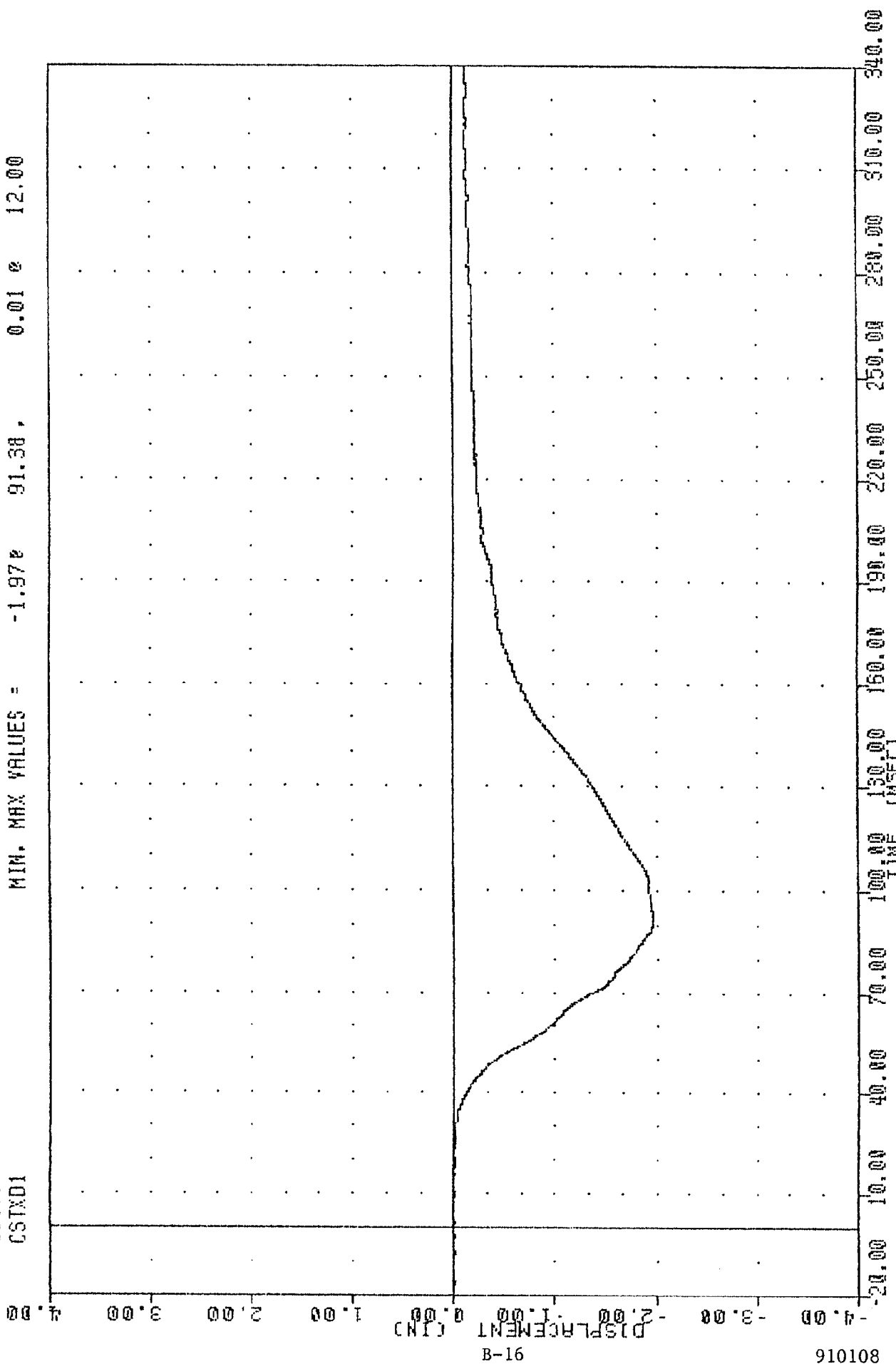
51-B

910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 CSTXD1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -1.97e 91.38, 0.01 e 12.00



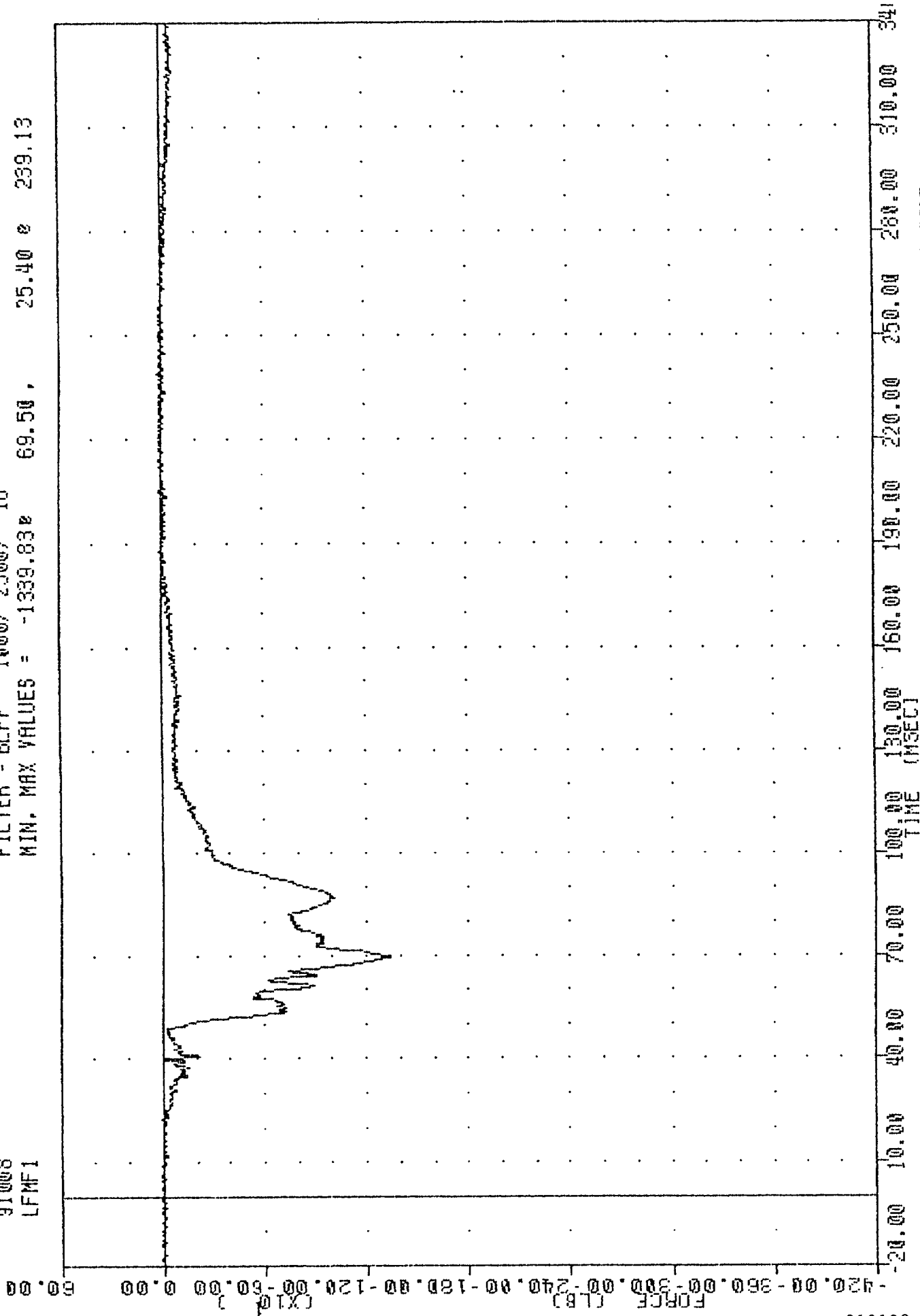
1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST DISPLACEMENT

NEW CAR ASSESSMENT PROGRAM

91008
LFMF1

FILTER = BLPP 1000/ 2500/ -16

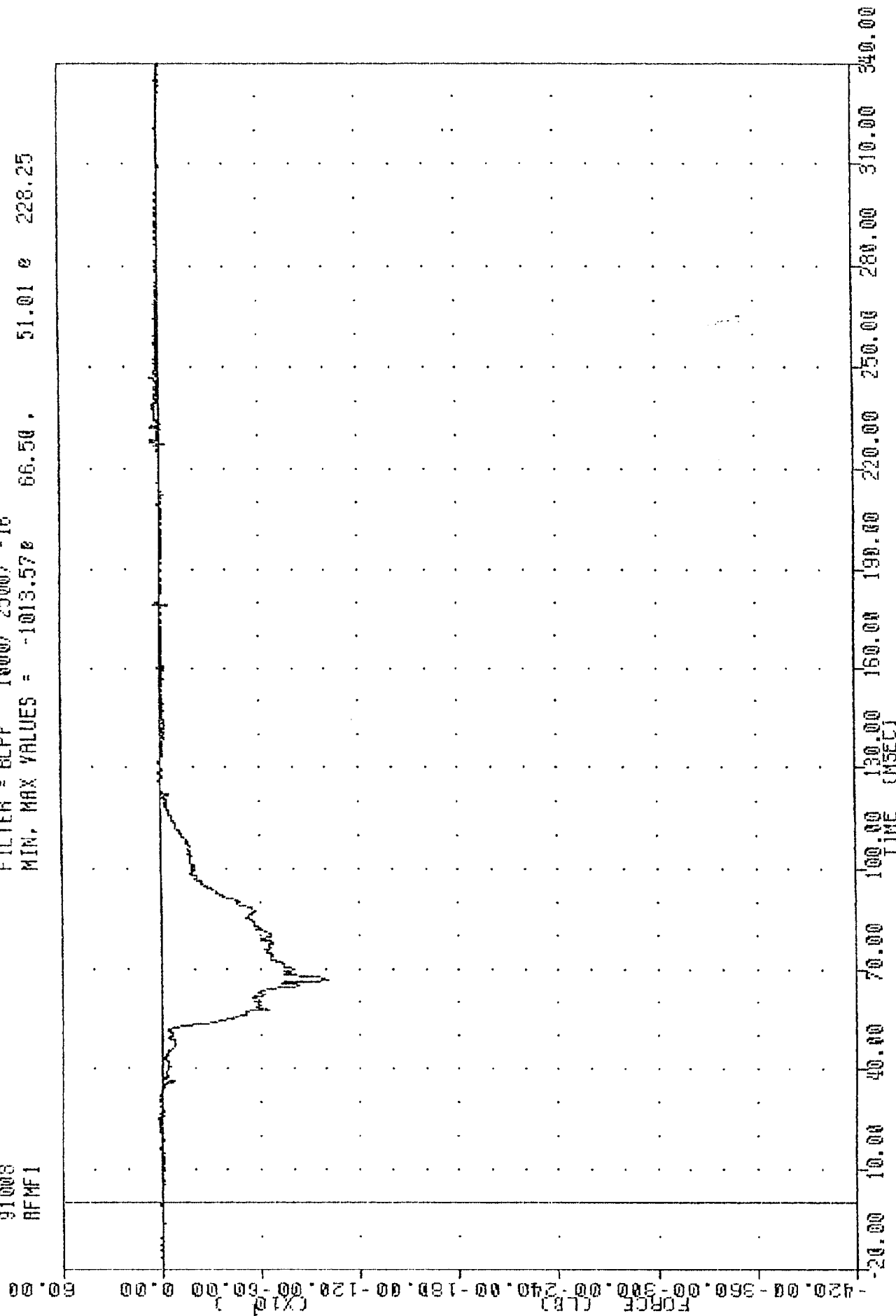
MIN. MAX VALUES = -1339.83 69.50 , 25.40 239.13



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT FEMUR FORCE

TRC 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 RFMF1

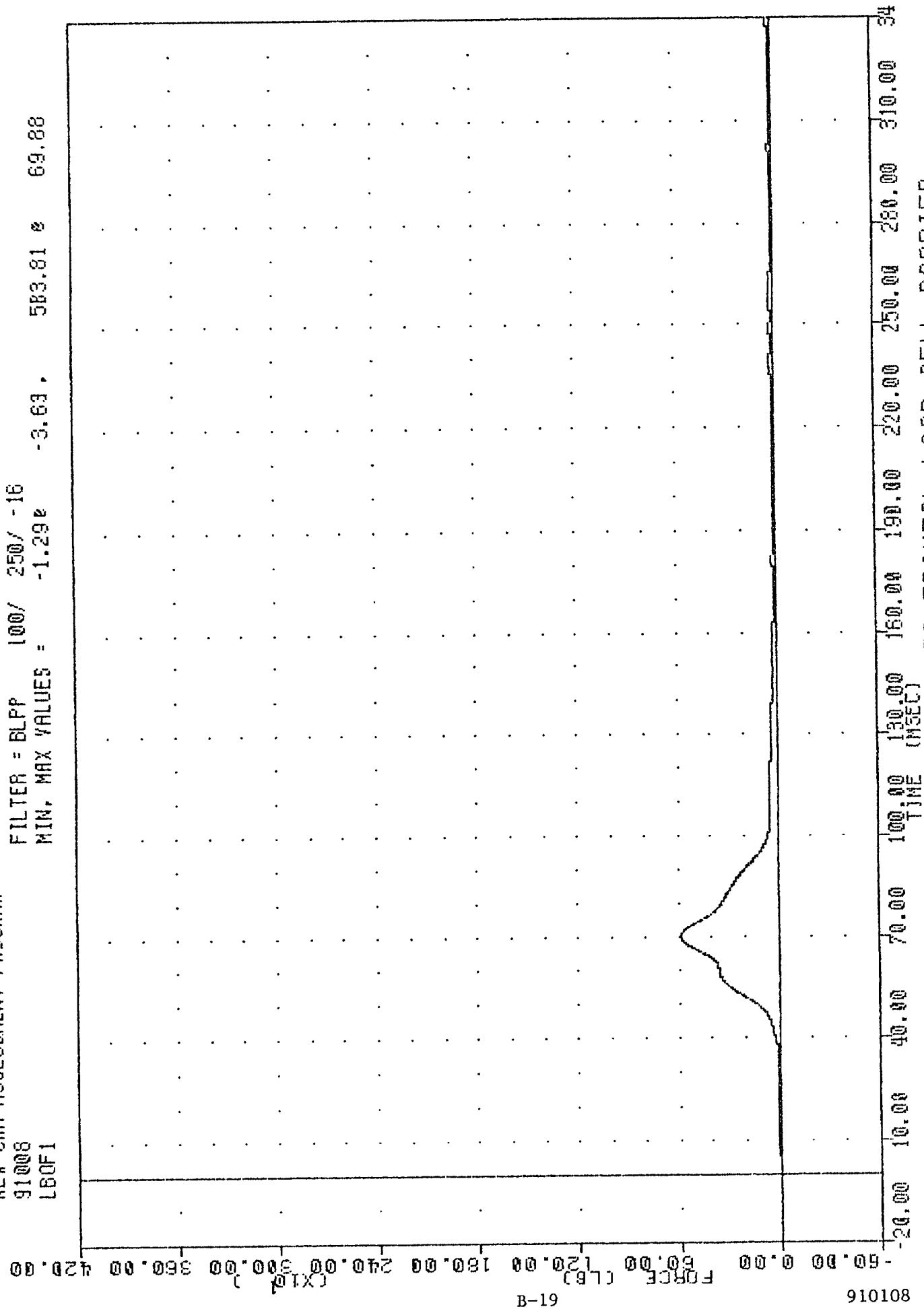
FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -1013.570 66.50 51.01 0 228.25



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER RIGHT FEMUR FORCE

NEW CAR ASSESSMENT PROGRAM
 91008
 LBQF1

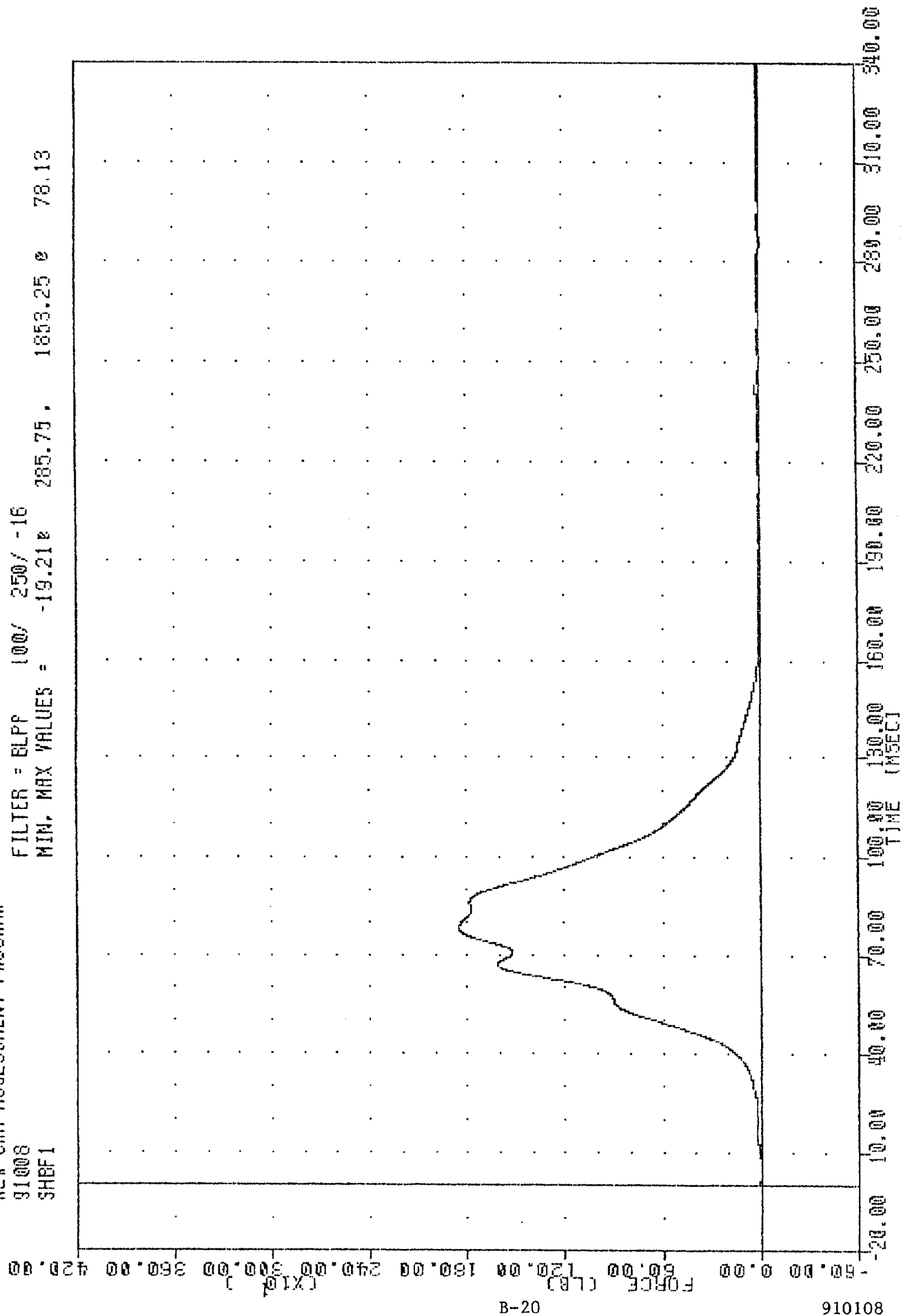
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -1.29e -3.63, 583.81 e 69.88



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER LAP BELT OUTBOARD FORCE

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 SHBF1

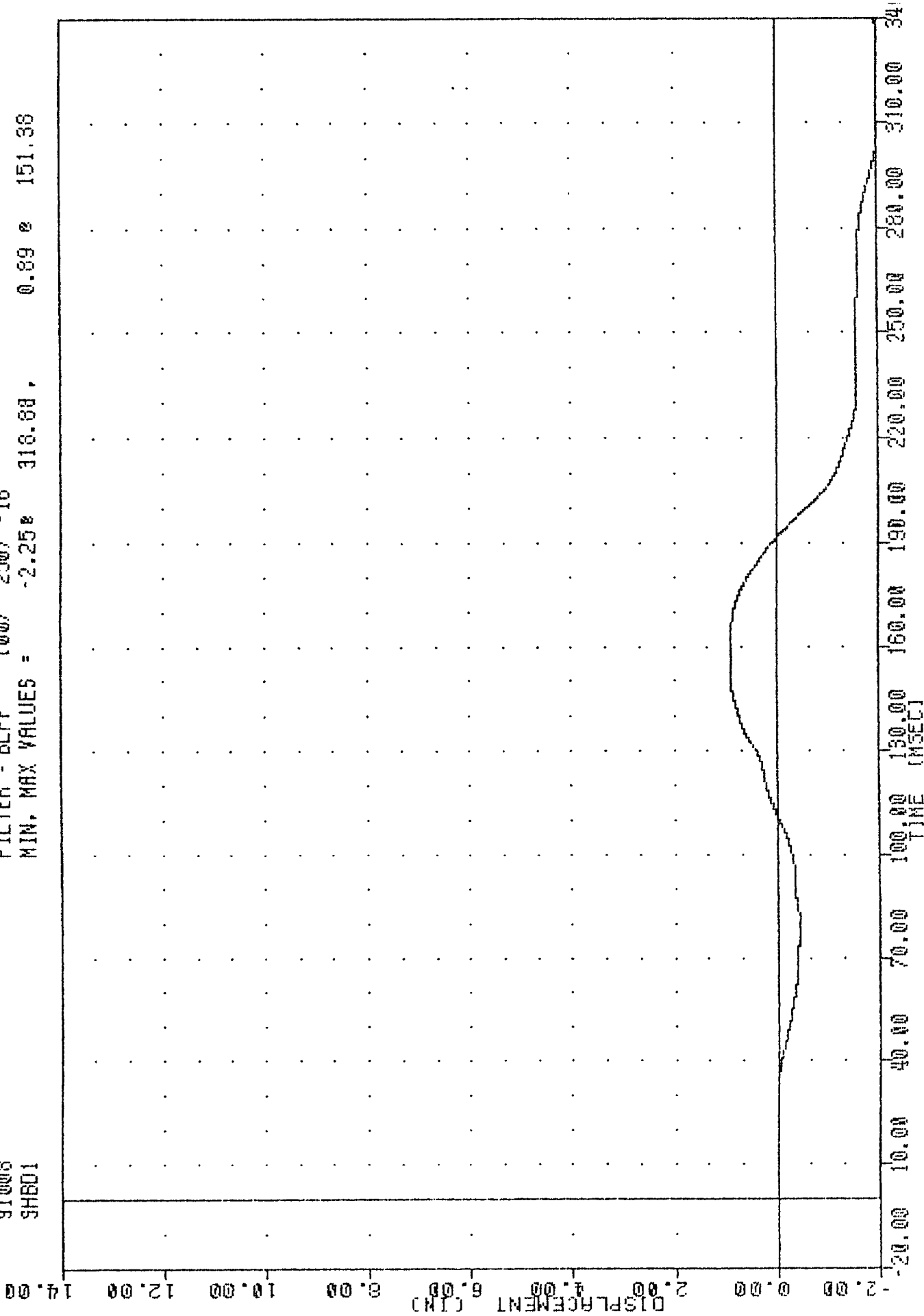
FILTER = BLPF 100/ 250/ -16
 MIN. MAX VALUES = -19.21e 285.75. 1853.25 e 78.13



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER SHOULDER BELT FORCE

INC , 910100
 NEW CAR ASSESSMENT PROGRAM
 91008
 SHED1

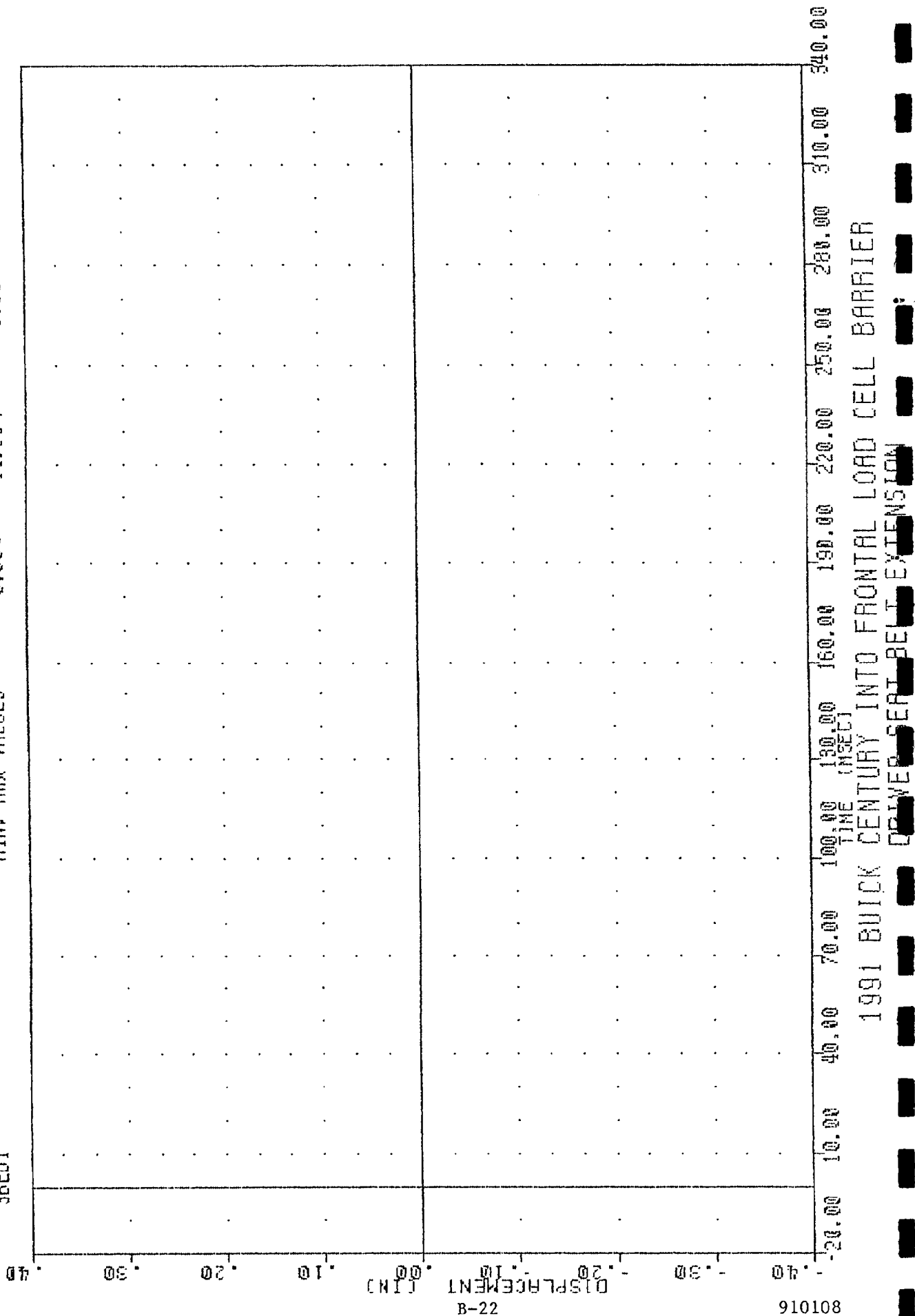
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -2.25% 318.88, 0.89 @ 151.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 DRIVER SHOULDER BELT DISPLACEMENT

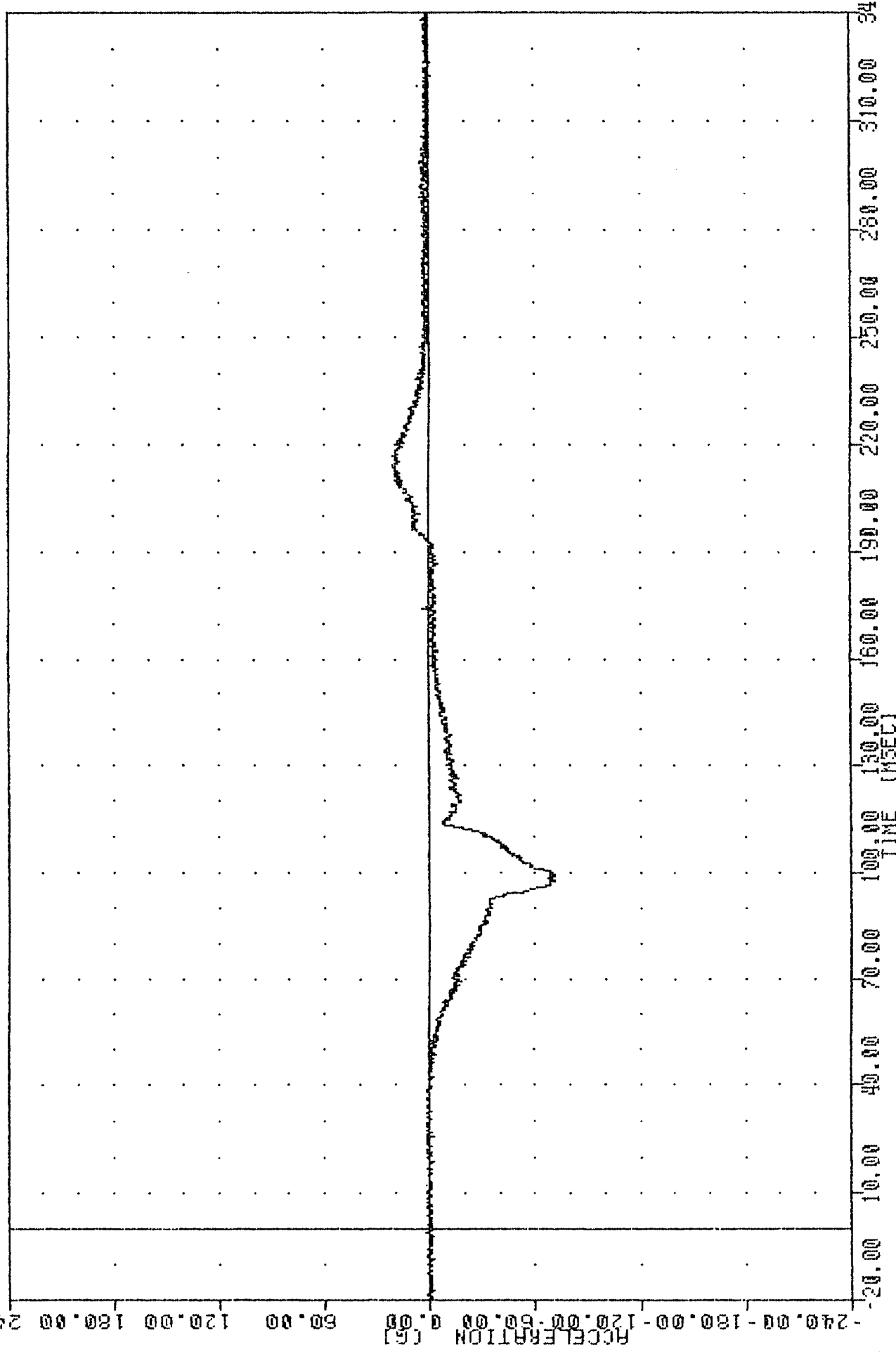
TRC 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 SBED1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = 0.000 44.63 0.000 189.25



NEW CAR ASSESSMENT PROGRAM
 91008
 HEDXG2

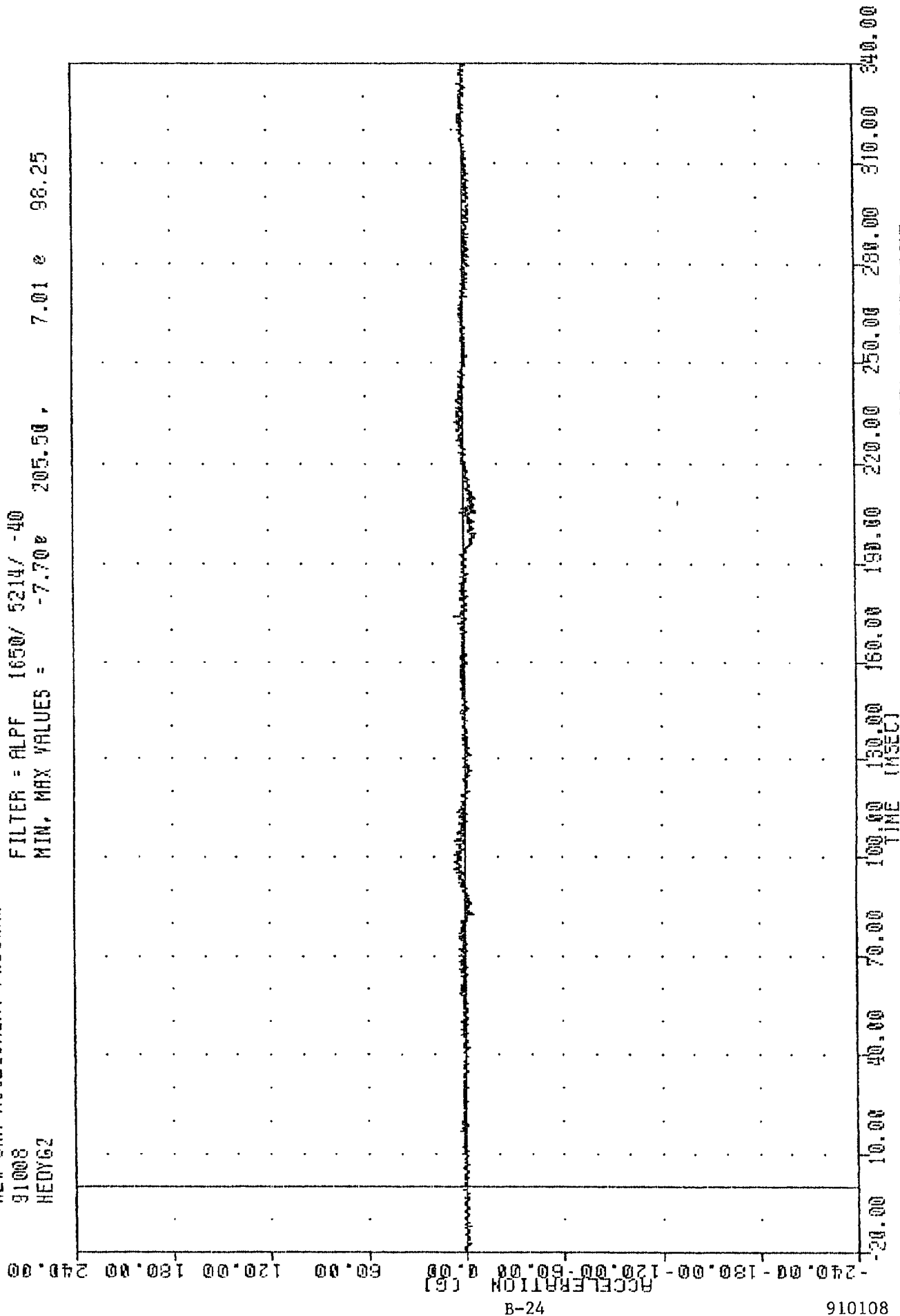
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -71.21 97.38 , 20.50 214.00



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 PASSENGER HEAD X-AXIS ACCELERATION

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 HEDY62

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -7.70% 205.50, 7.01 e 98.25

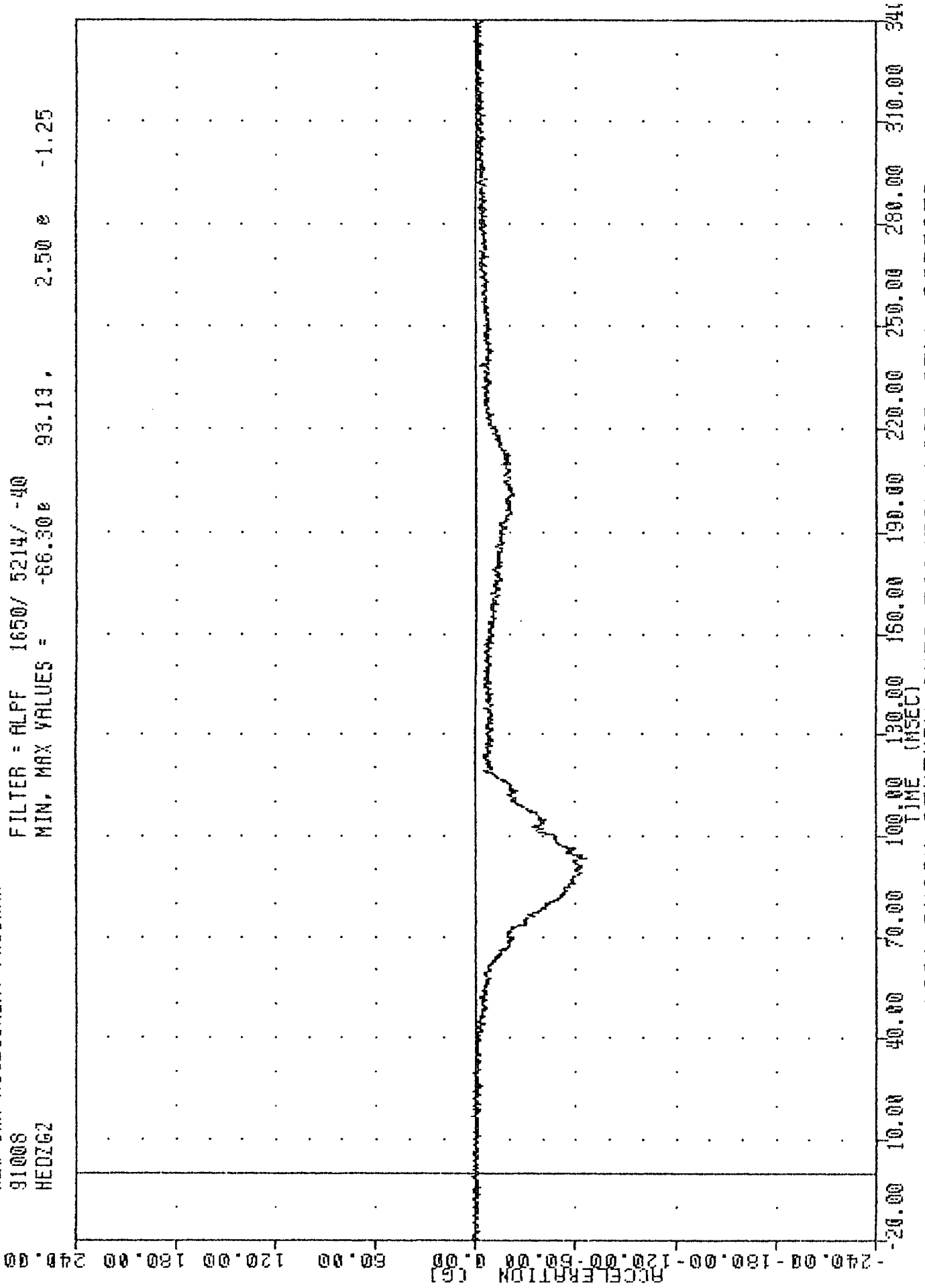


NEW CAR ASSESSMENT PROGRAM

91008
HE02G2

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -66.30e 93.13.

2.50 e -1.25

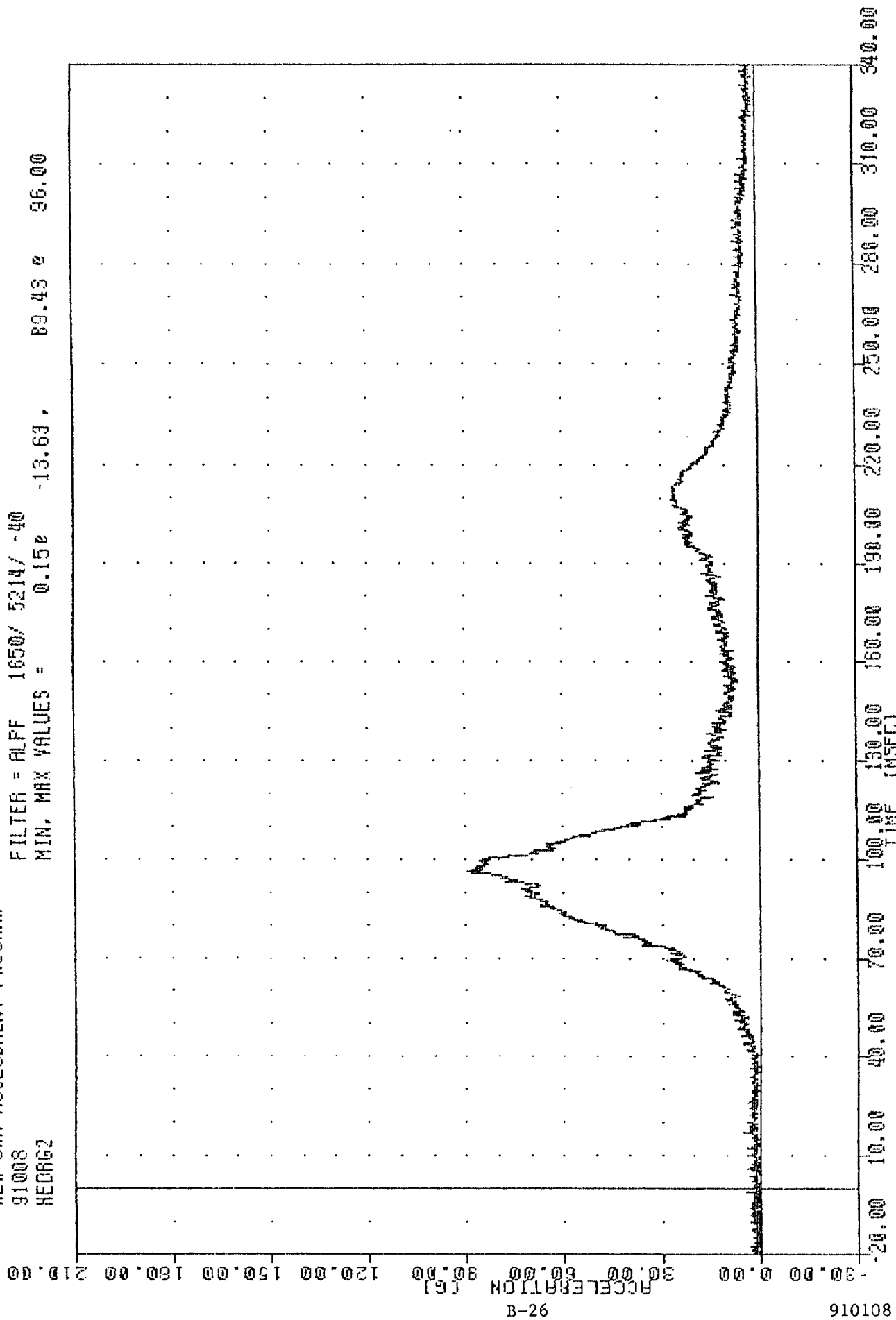


1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION

TRC
 NEW CAR ASSESSMENT PROGRAM
 91008
 HEDRG2

910108

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.15% -13.63, 89.43 @ 96.00



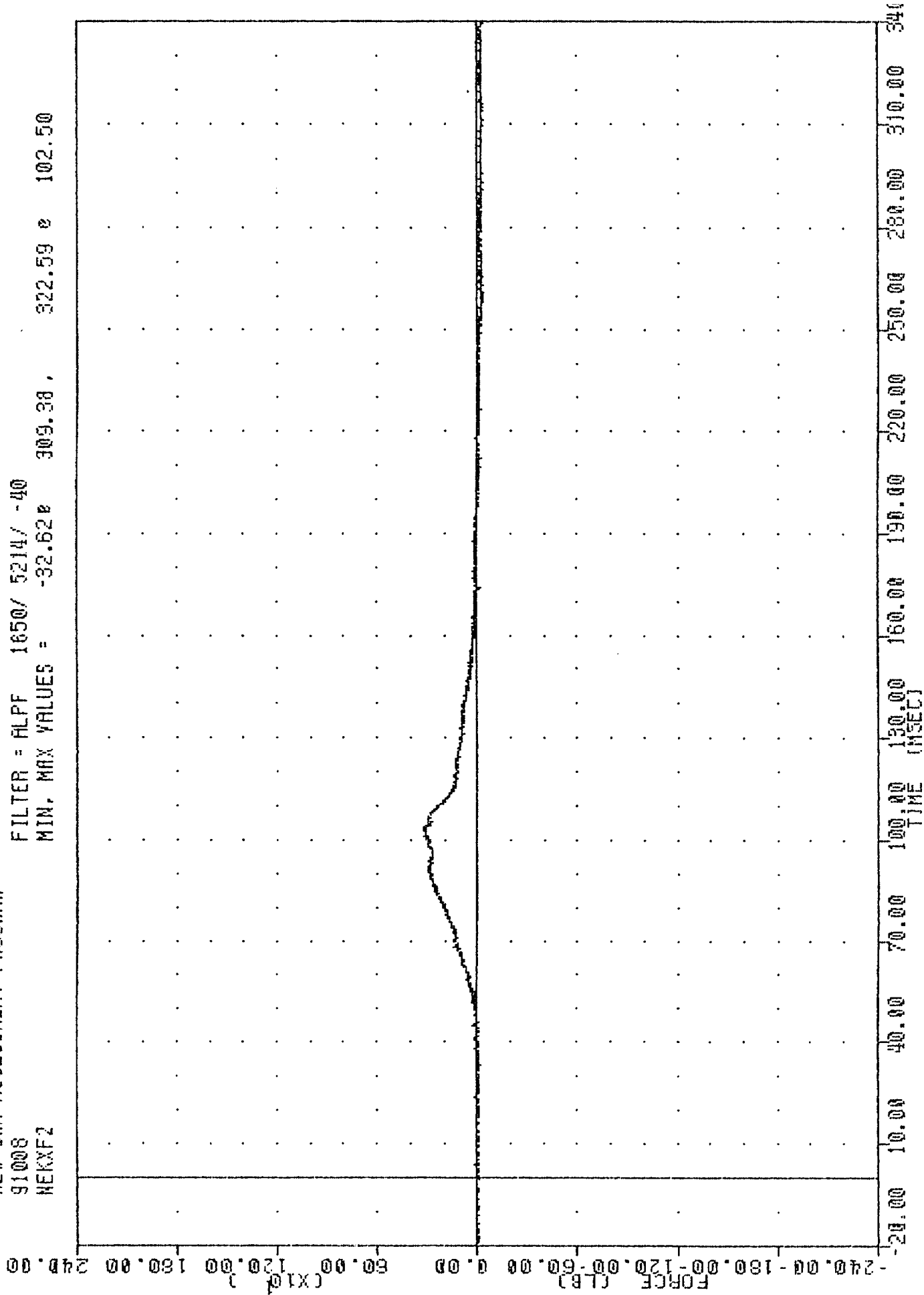
NEW CAR ASSESSMENT PROGRAM

91008

FILTER = HLPF 1650/ 5214/ -40

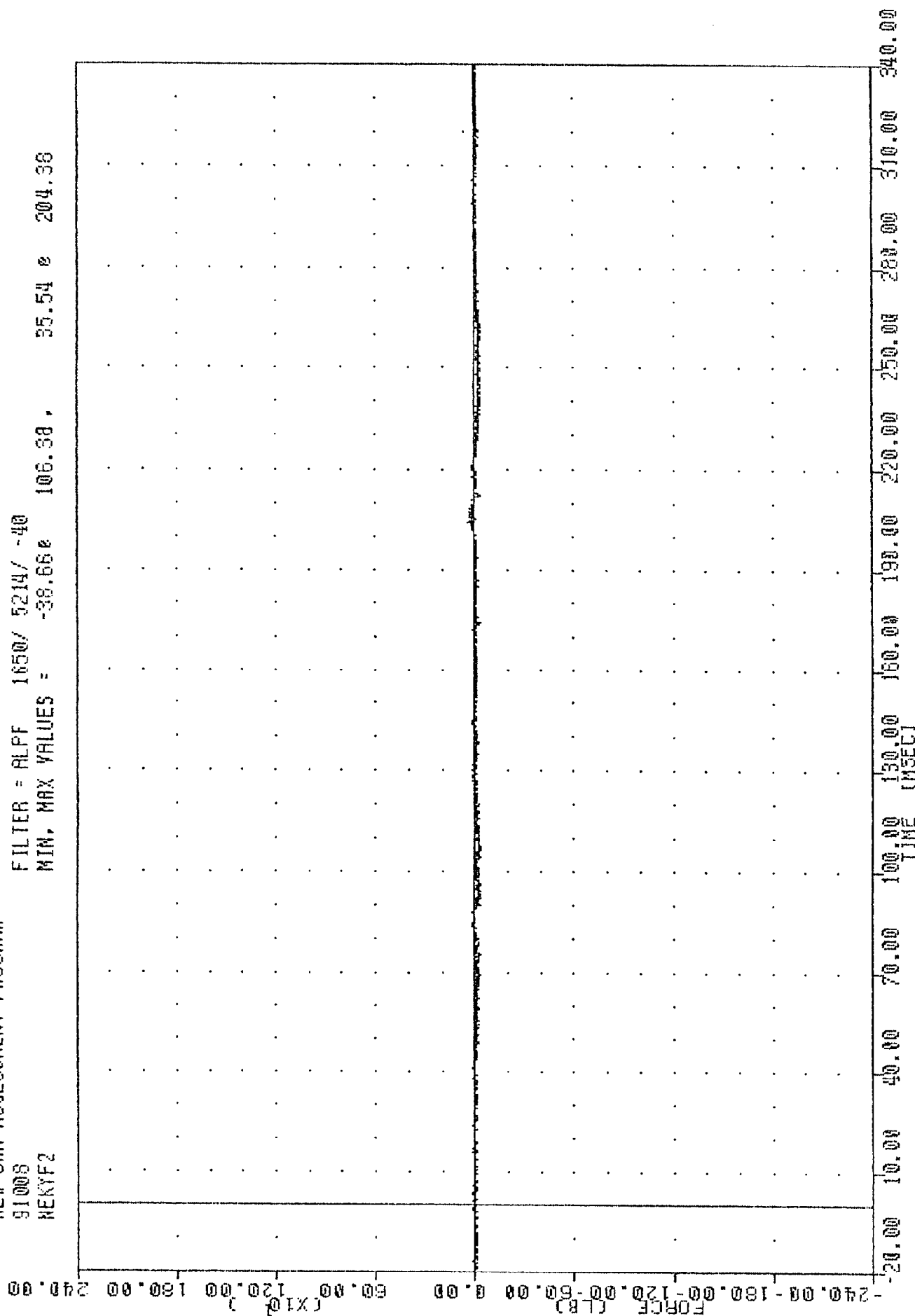
HEKXF2

MIN. MAX VALUES = -32.62 309.38 , 322.59 102.50



TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 HEKVF2

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -38.66 106.38 , 35.54 204.38



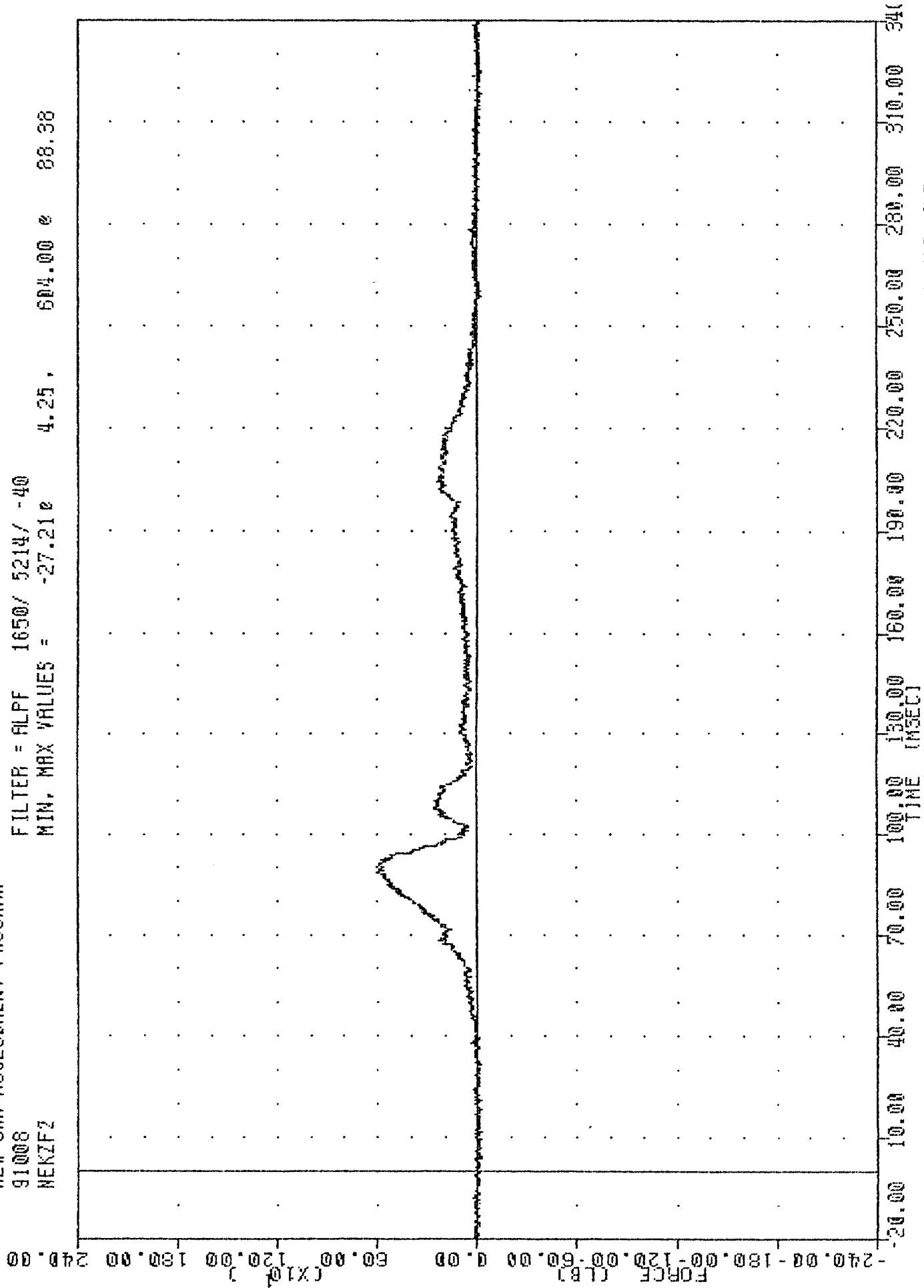
NEW CAR ASSESSMENT PROGRAM

91008

NEKZF2

FILTER = ALPF 1650/ 5214/ -40

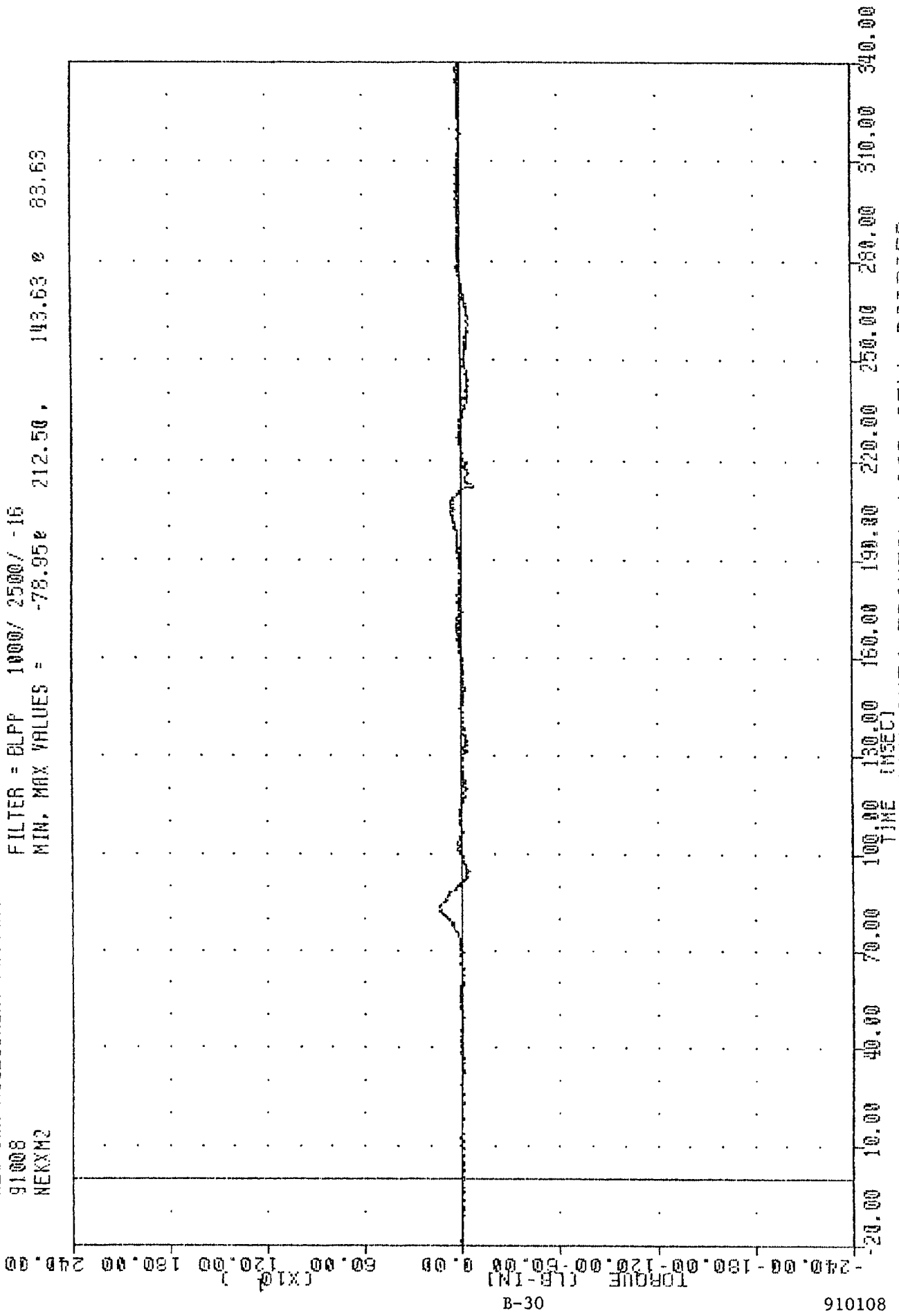
MIN, MAX VALUES = -27.21e 4.25, 604.00 e 88.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Z-AXIS AXIAL FORCE

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 NEKYM2

FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -78.95 212.50 143.63 83.63



NEW CAR ASSESSMENT PROGRAM

91008

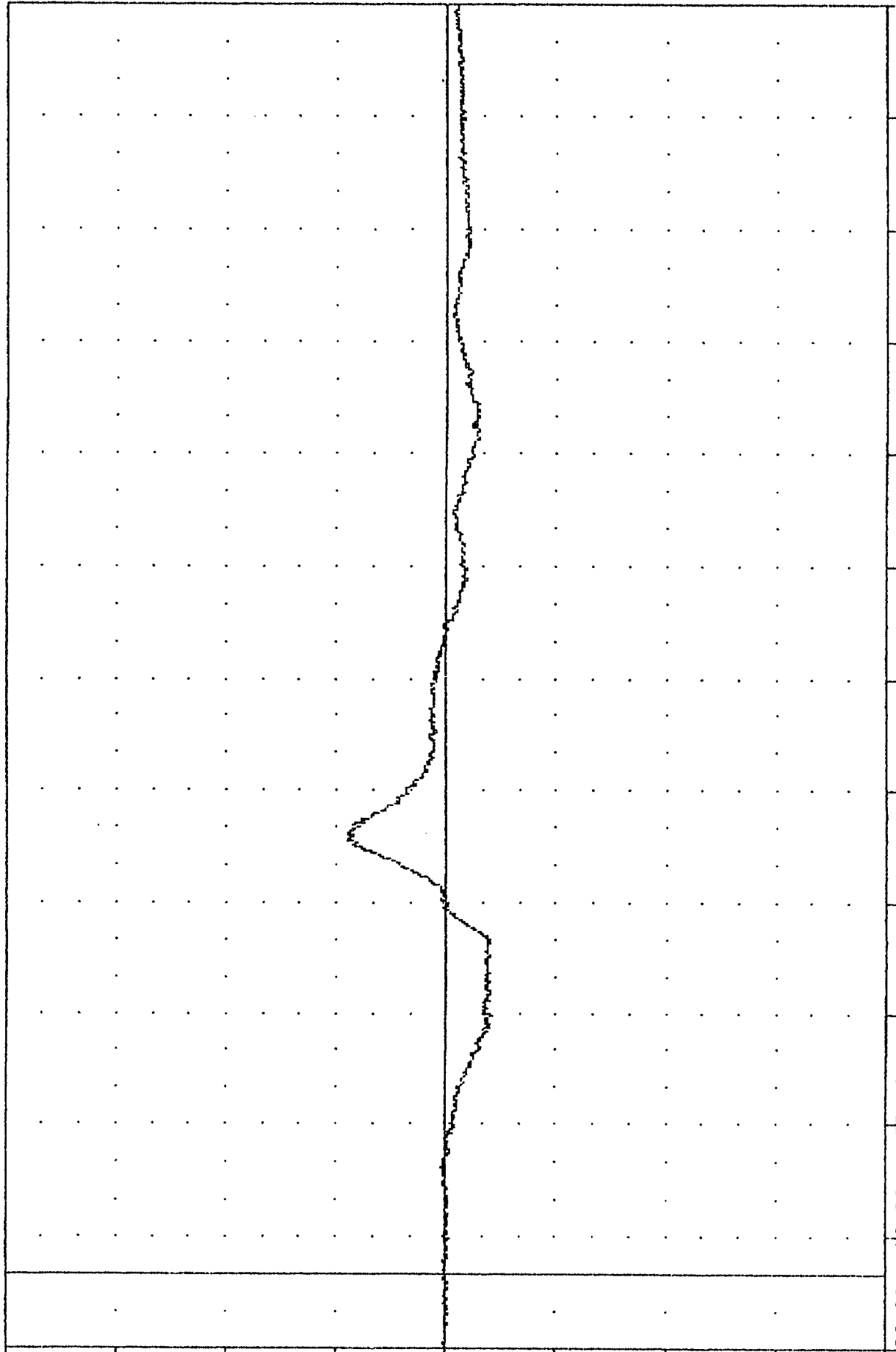
HEKYM2

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -257.11e 69.38,

540.49 e 118.25

TORQUE (LB-IN) (X10³)



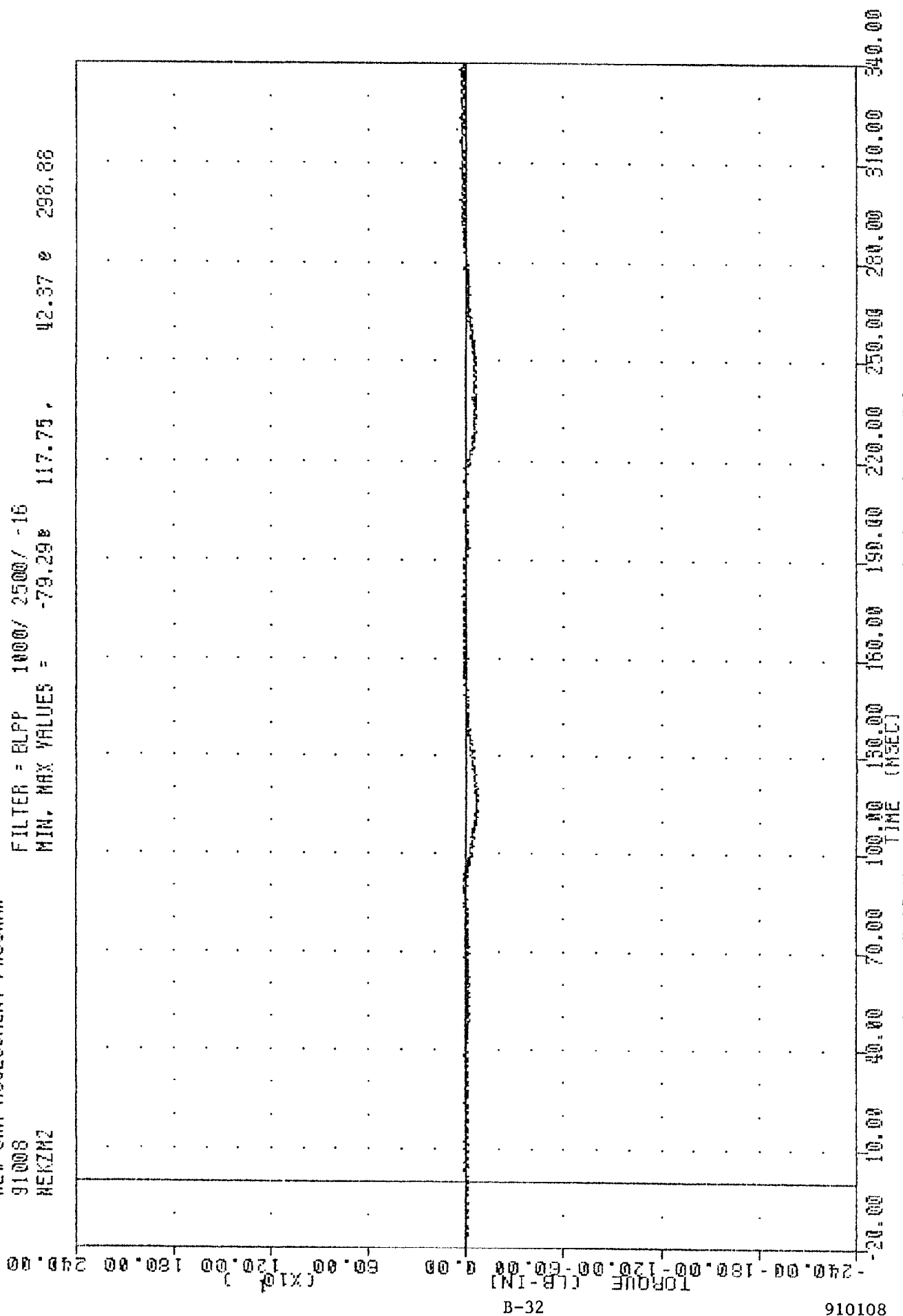
B-31

910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Y AXIS

TBC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 NEKZM2

FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -79.29 117.75 42.37 298.88



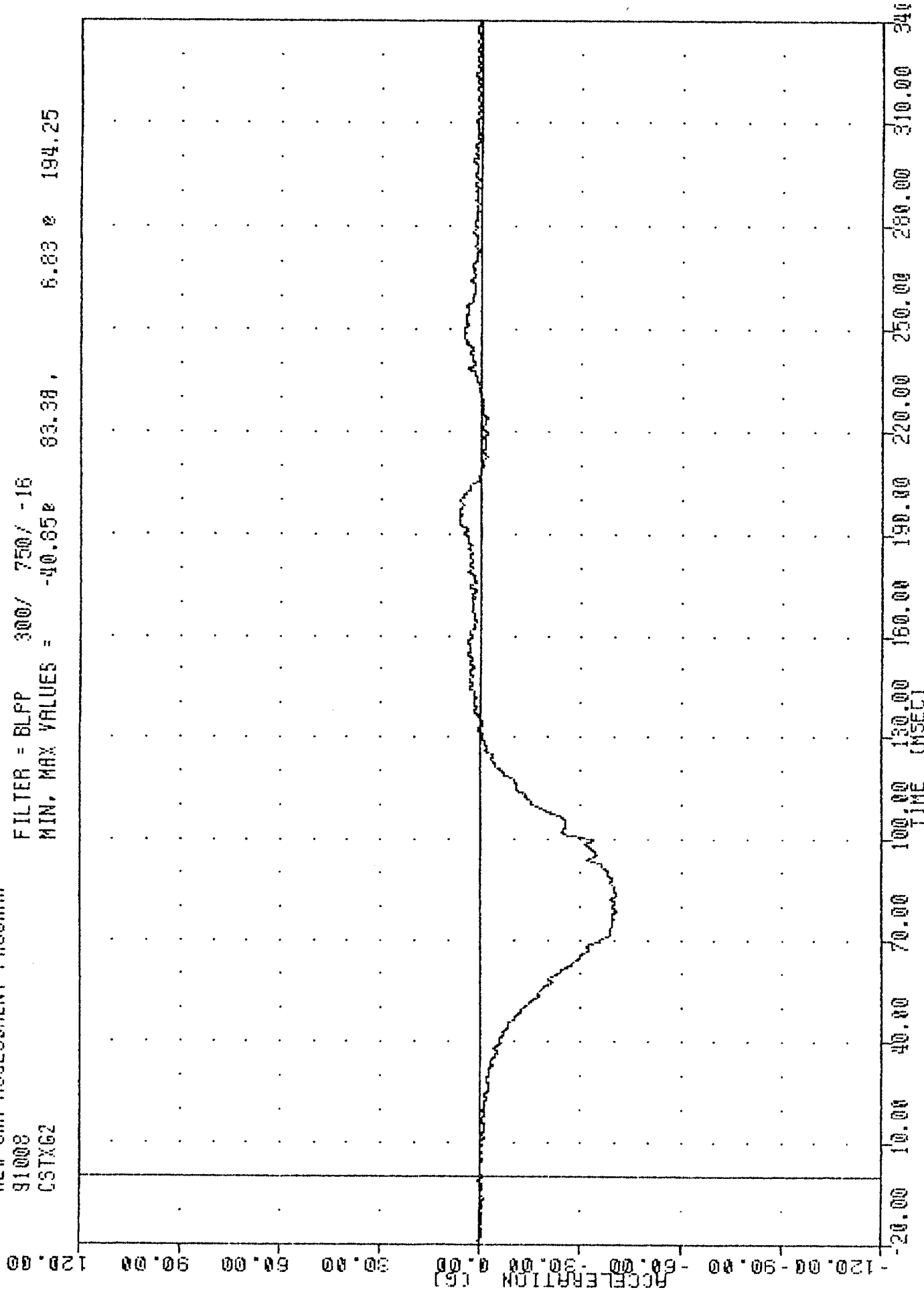
NEW CAR ASSESSMENT PROGRAM

91008

CSTXG2

FILTER = BLPP 300/ 750/ -16

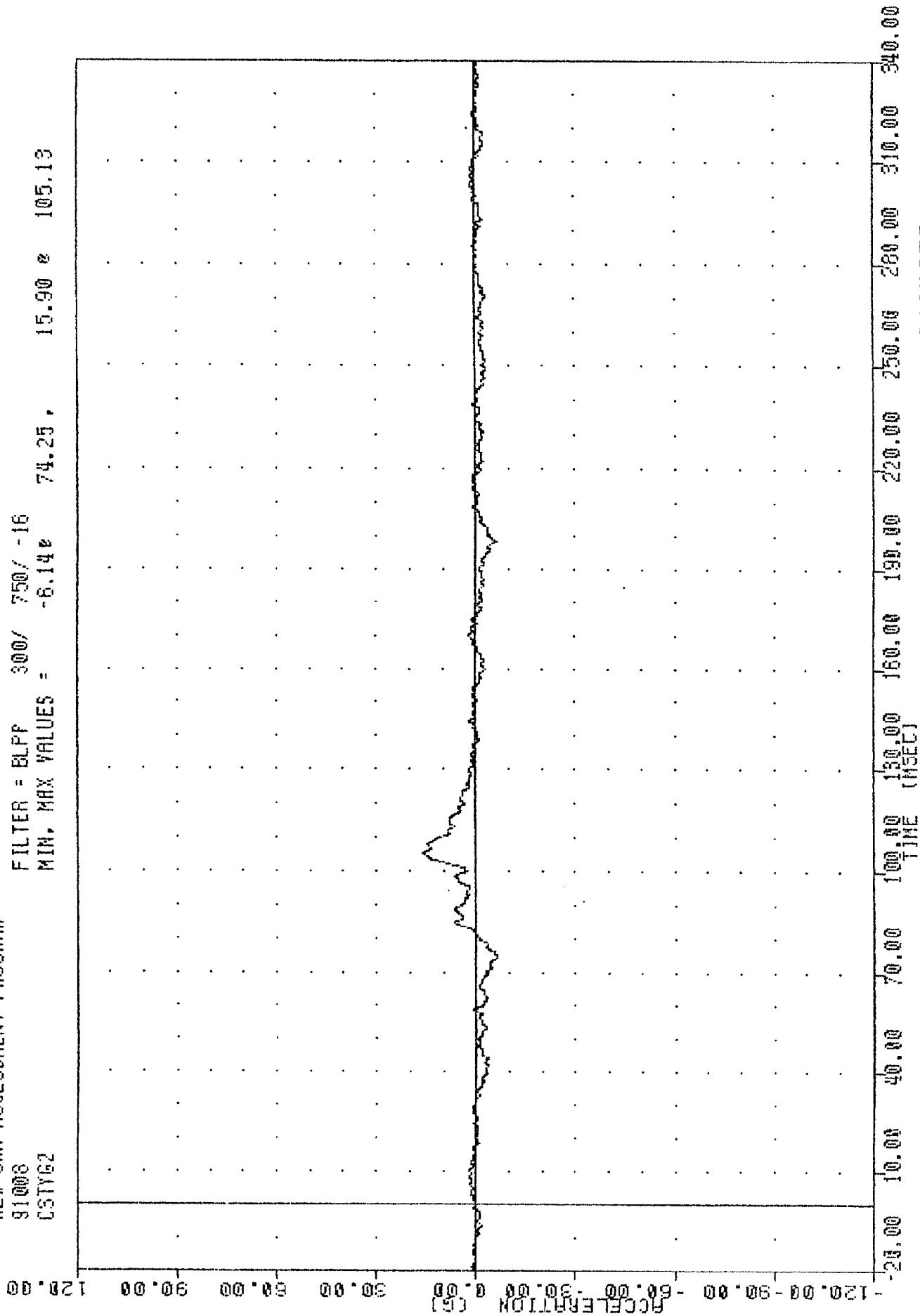
MIN, MAX VALUES = -40.85 83.38 , 6.83 194.25



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 CSTY62

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -8.14% 74.25 , 15.90 & 105.13



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST Y-AXIS ACCELERATION

NEW CAR ASSESSMENT PROGRAM

91008

CSTZ62

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES =

-7.680

93.00,

6.62 @

101.75

120.00

90.00

60.00

30.00

0.00

ACCELERATION (G)

-30.00

-60.00

-90.00

-120.00

TIME (MSEC)

-20.00

10.00

40.00

70.00

100.00

130.00

160.00

190.00

220.00

250.00

280.00

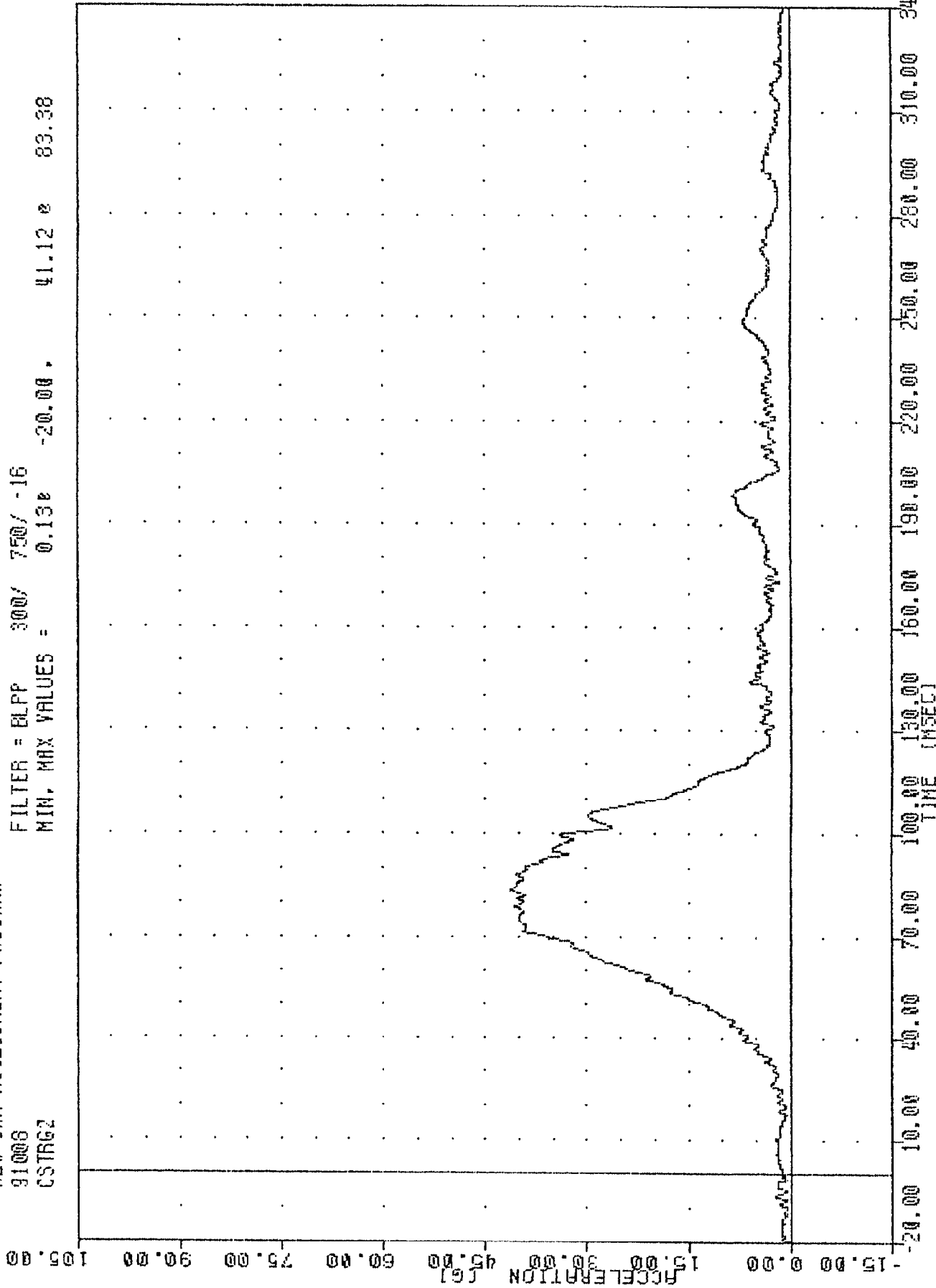
310.00

340

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 CSTRG2

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.13e -20.00 , 41.12 e 83.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST RESULTANT ACCELERATION

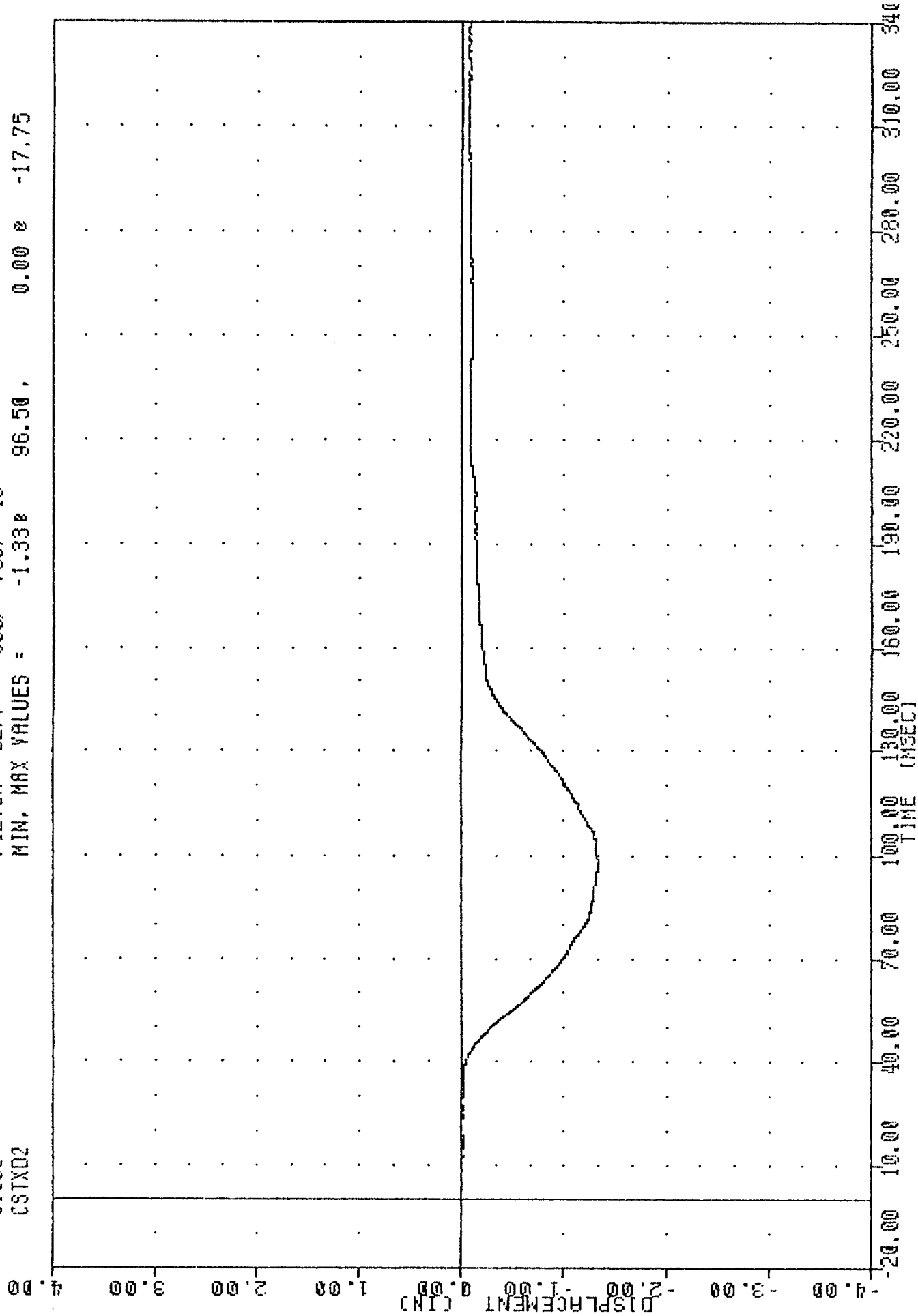
NEW CAR ASSESSMENT PROGRAM

91008

CSTXD2

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = -1.338 96.50, 0.00 2 -17.75



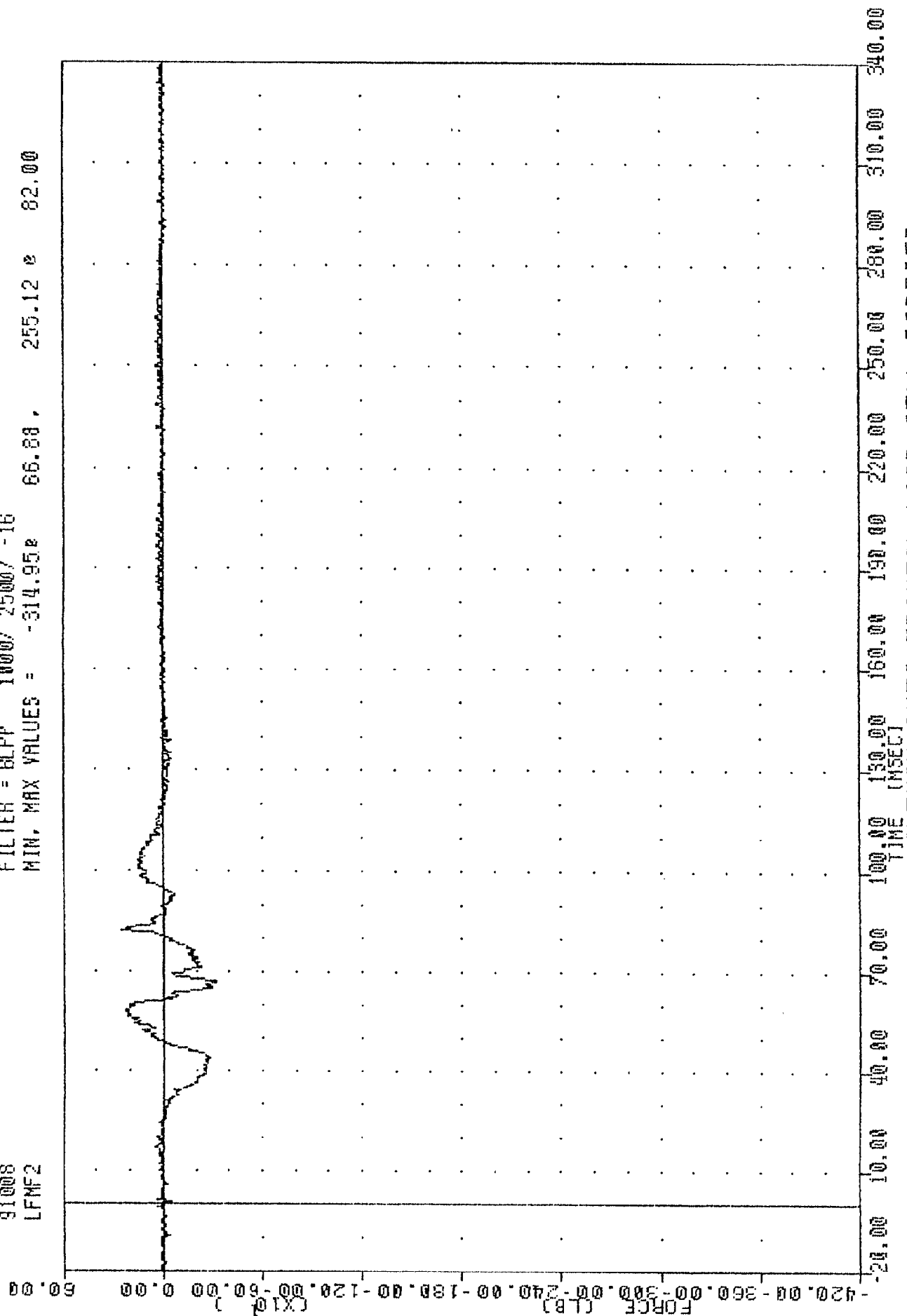
B-37

910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST DISPLACEMENT

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 LFNF2

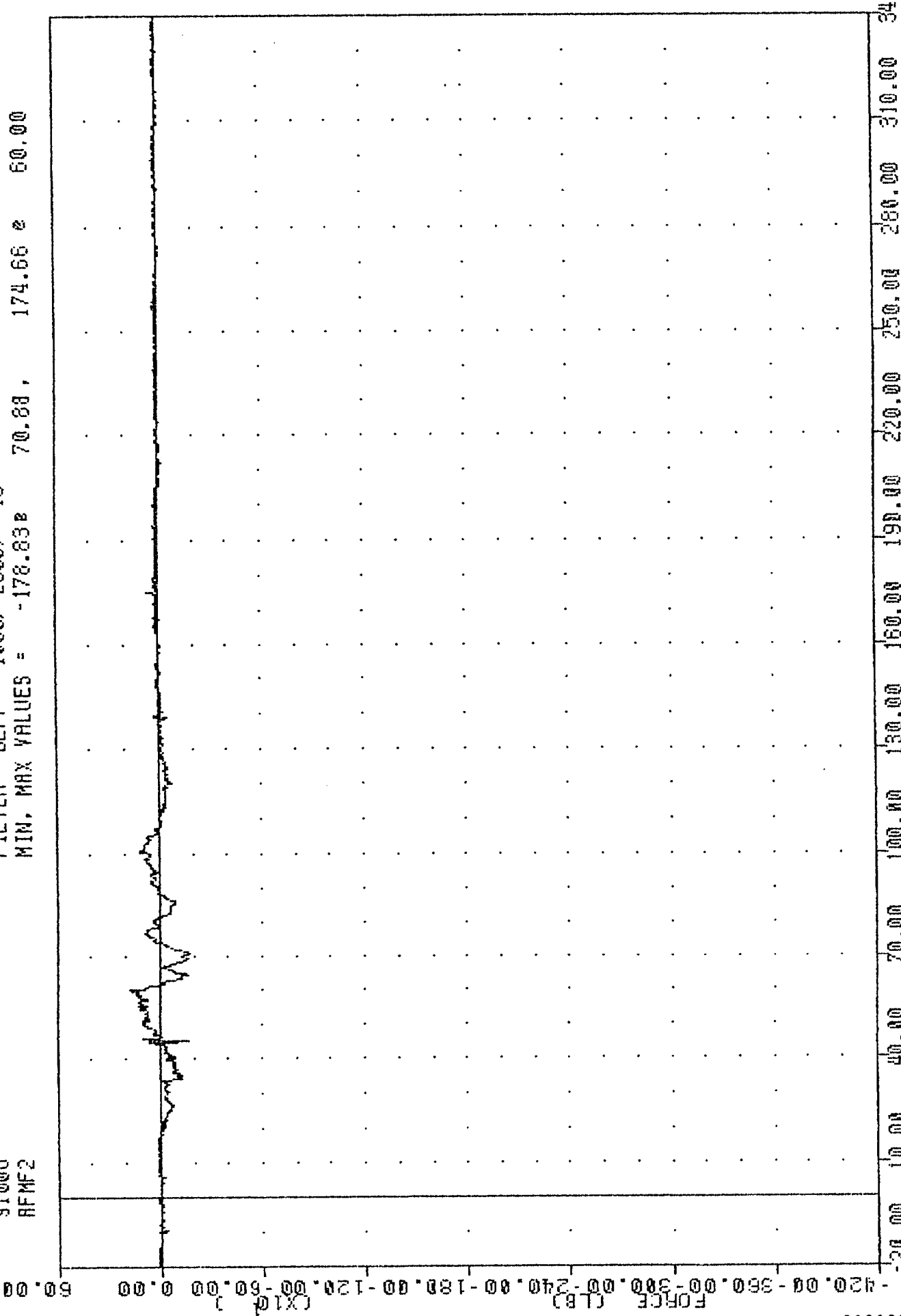
FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -314.95e 66.00, 255.12 e 82.00



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 PASSENGER LEFT FEMUR FORCE

INL 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 AFMF2

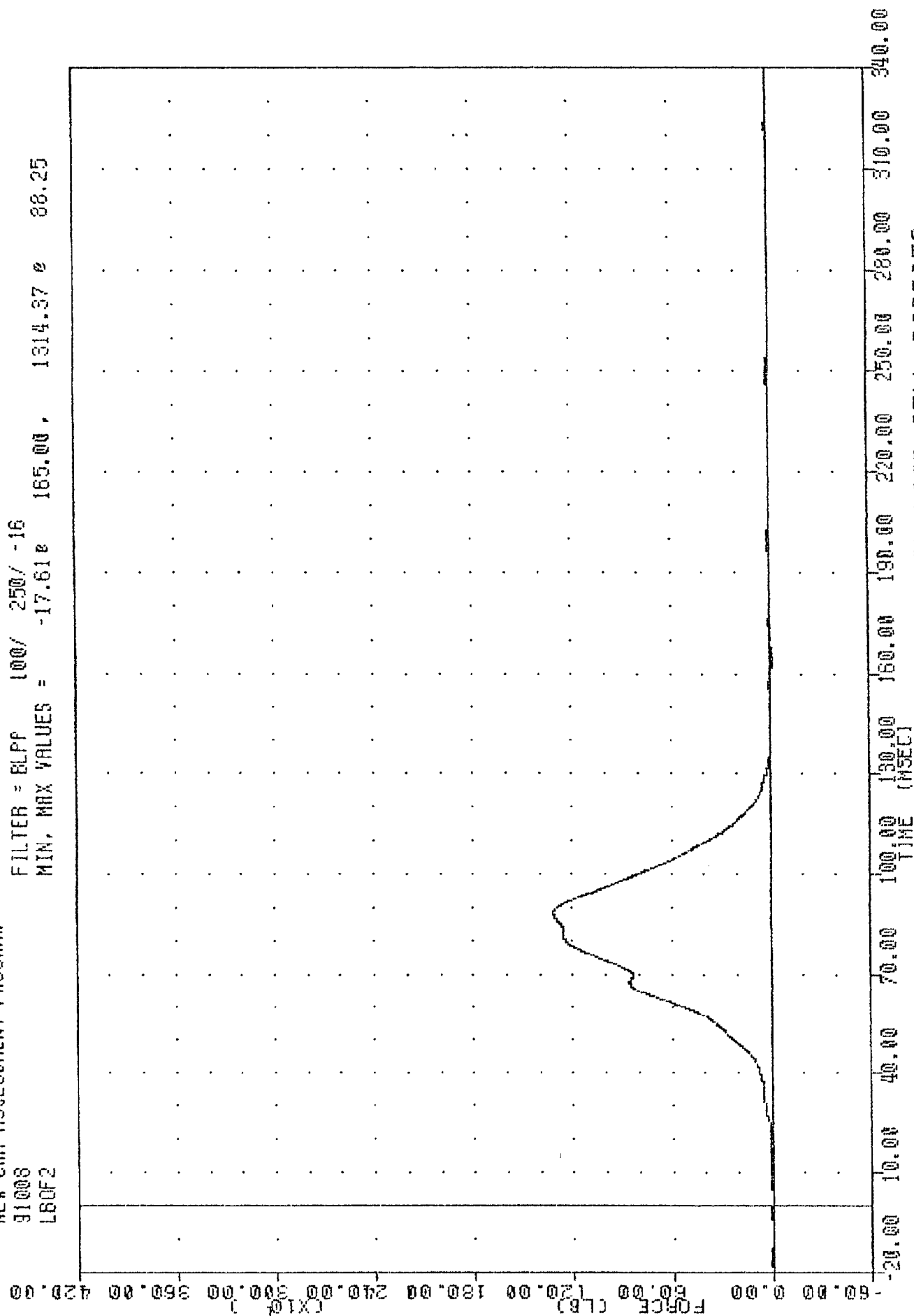
FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -178.83 70.88 , 174.66 60.00



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 PASSENGER RIGHT FEMUR FORCE

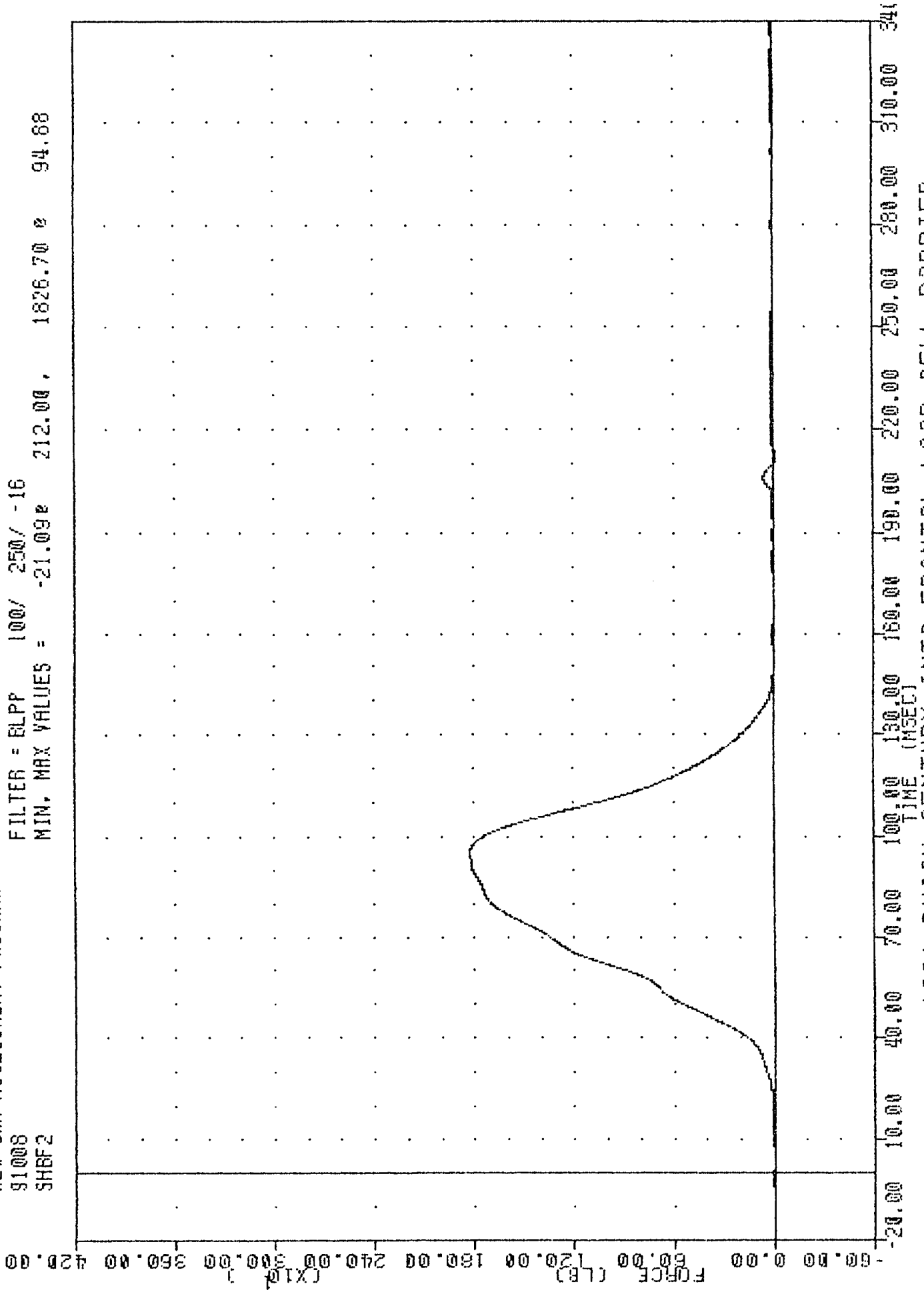
TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 LBQF2

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -17.61e 165.00 , 1314.37 e 88.25



INL
 NEW CAR ASSESSMENT PROGRAM
 91008
 SHBF2

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -21.09 212.00 1826.70 94.88



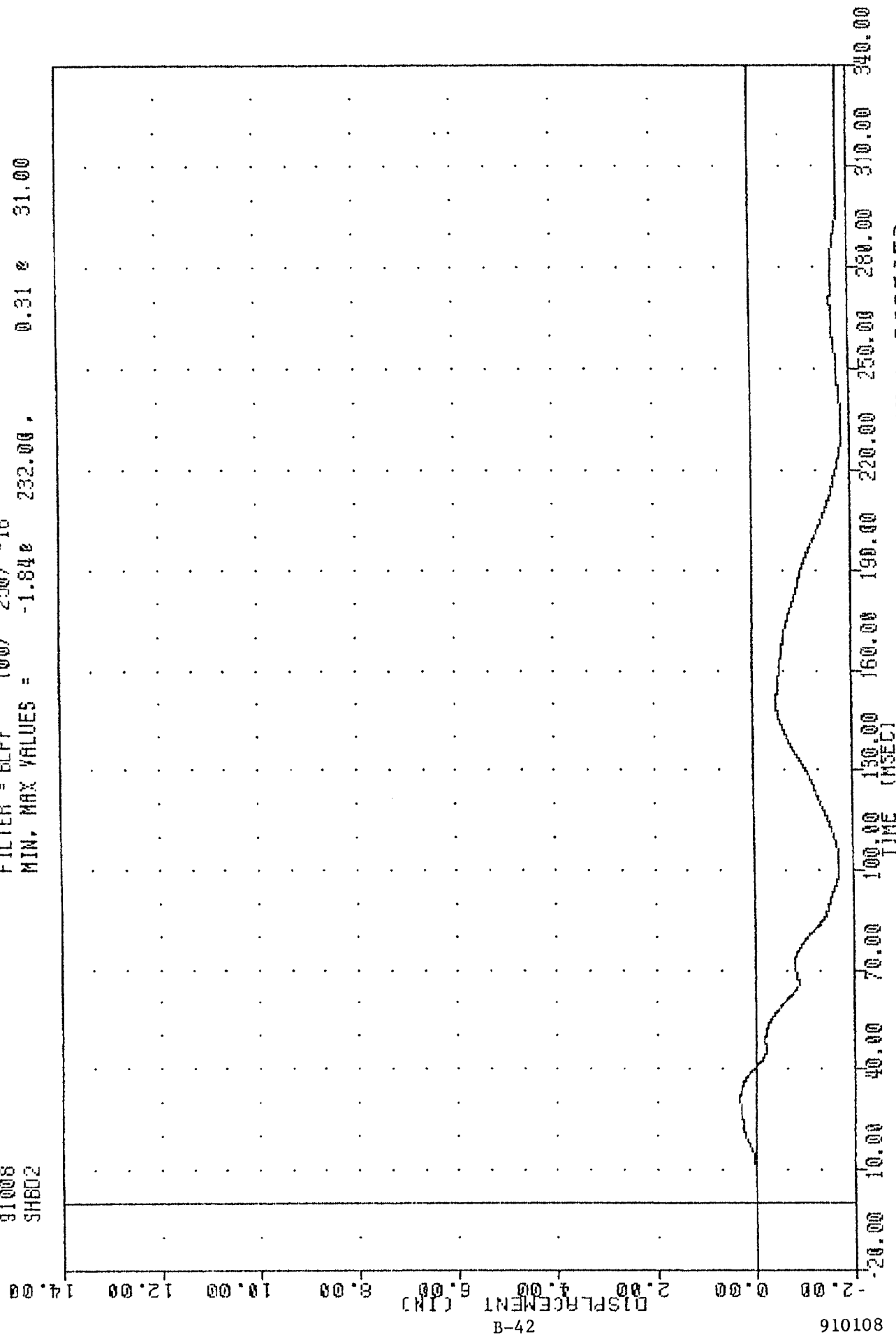
B-41

910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 PASSENGER SHOULDER BELT FORCE

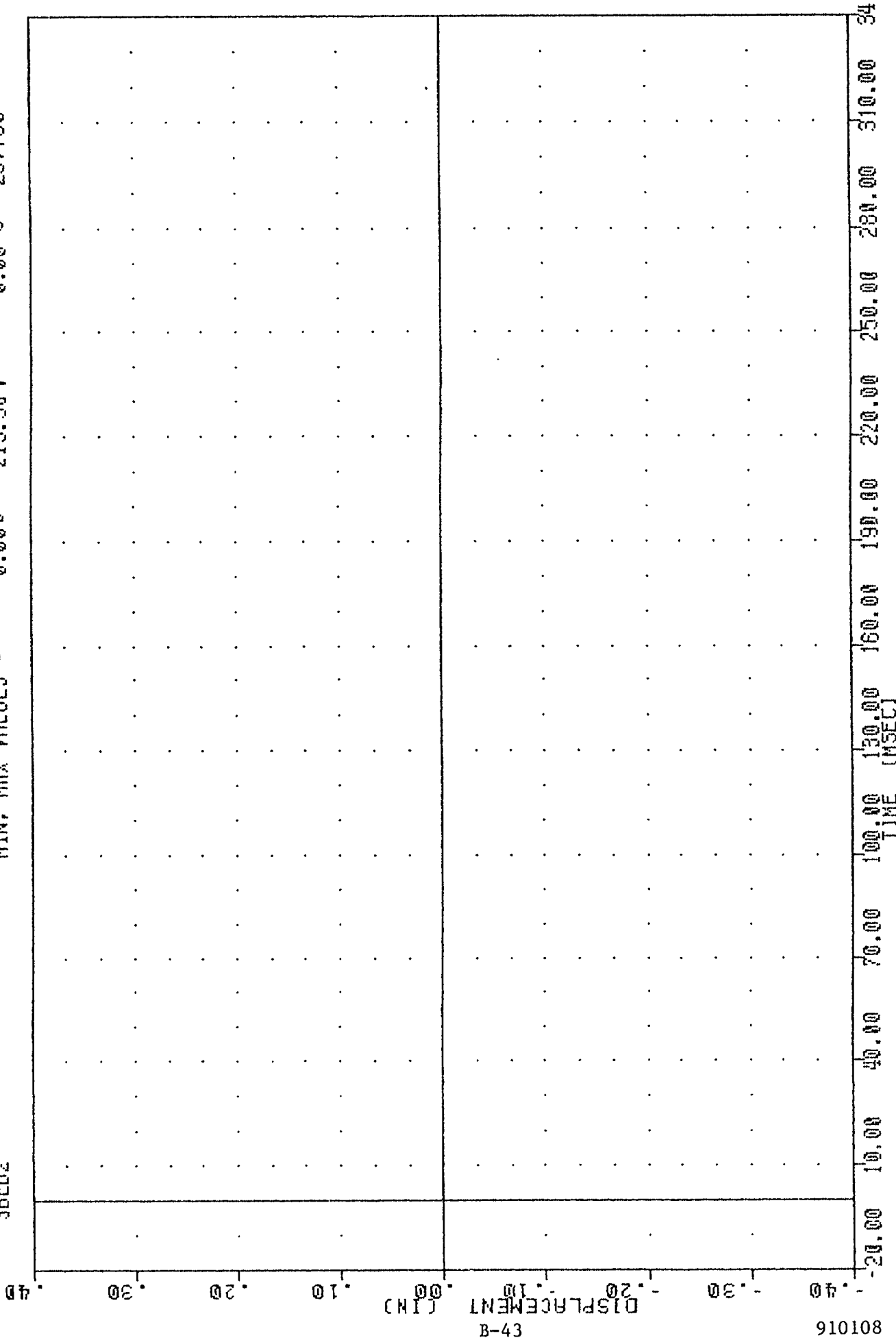
TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 SHB02

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -1.84e 232.00, 0.31 e 31.00



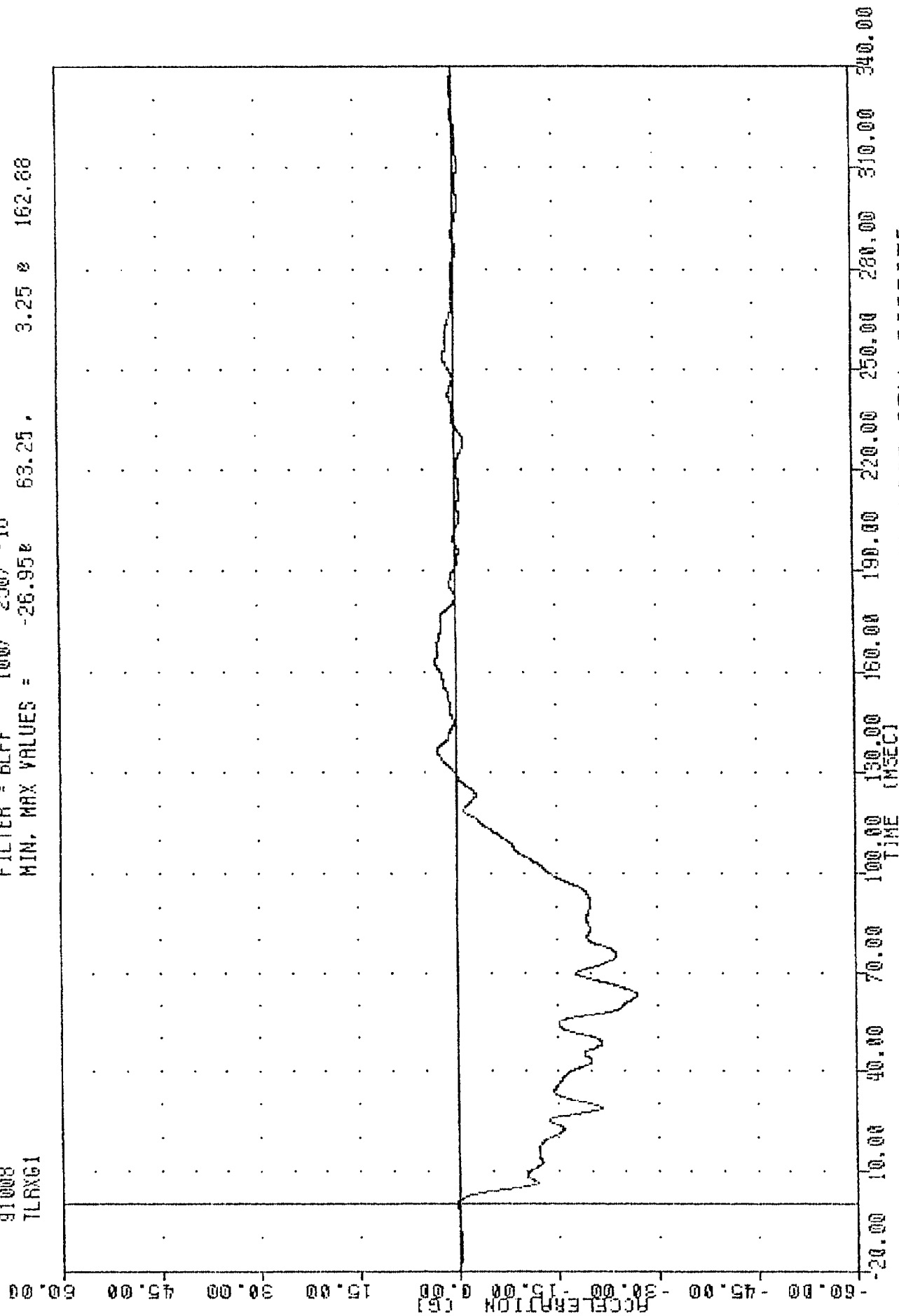
NEW CAR ASSESSMENT PROGRAM
 91008
 9BED2

FILTER = ELFP 100/ 250/ -16
 MIN, MAX VALUES = 0.00 213.38, 0.00 257.50



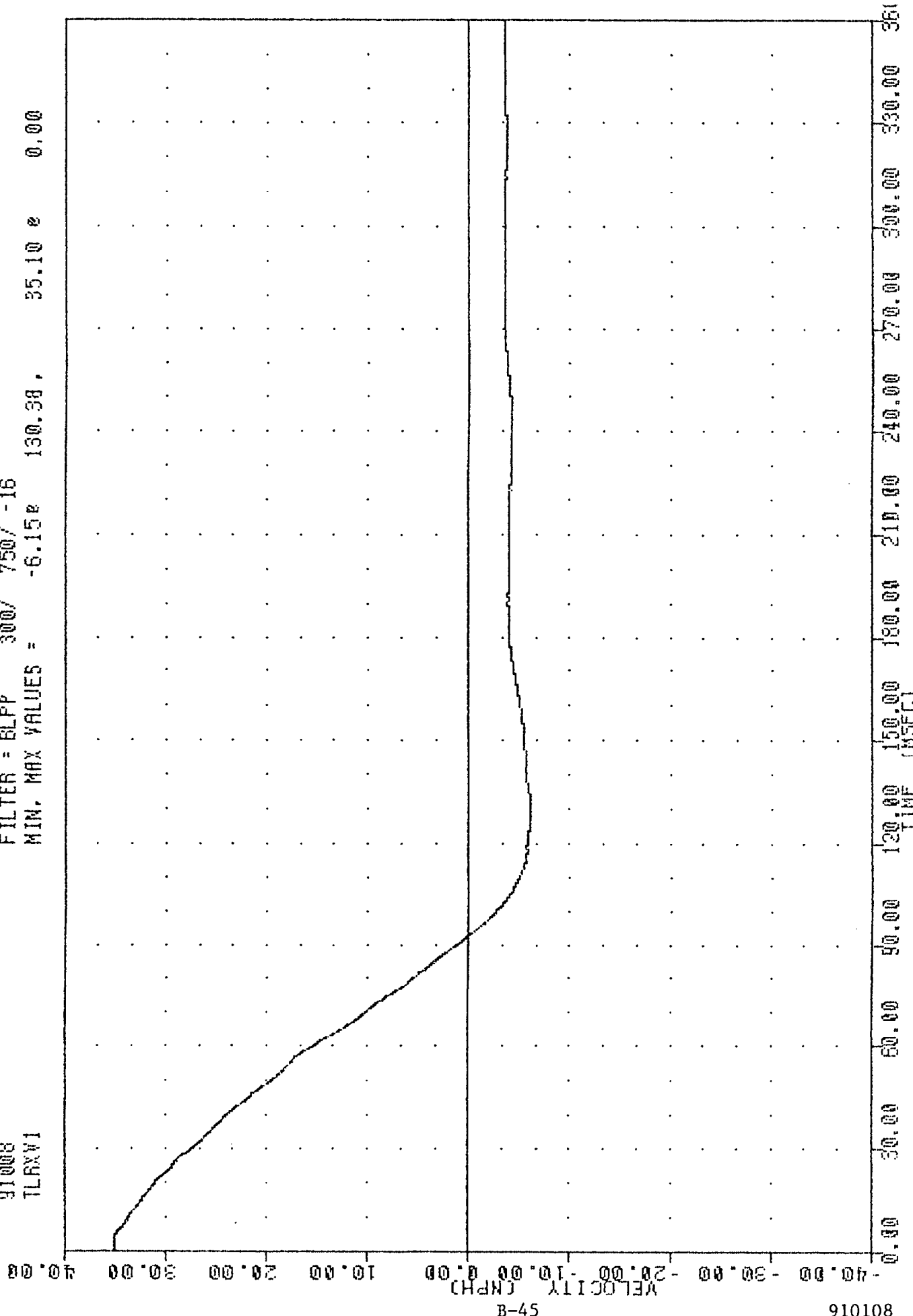
TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 TLXG1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -26.95e 63.25e 3.25 e 162.68



NEW CAR ASSESSMENT PROGRAM
91008
TLRXV1

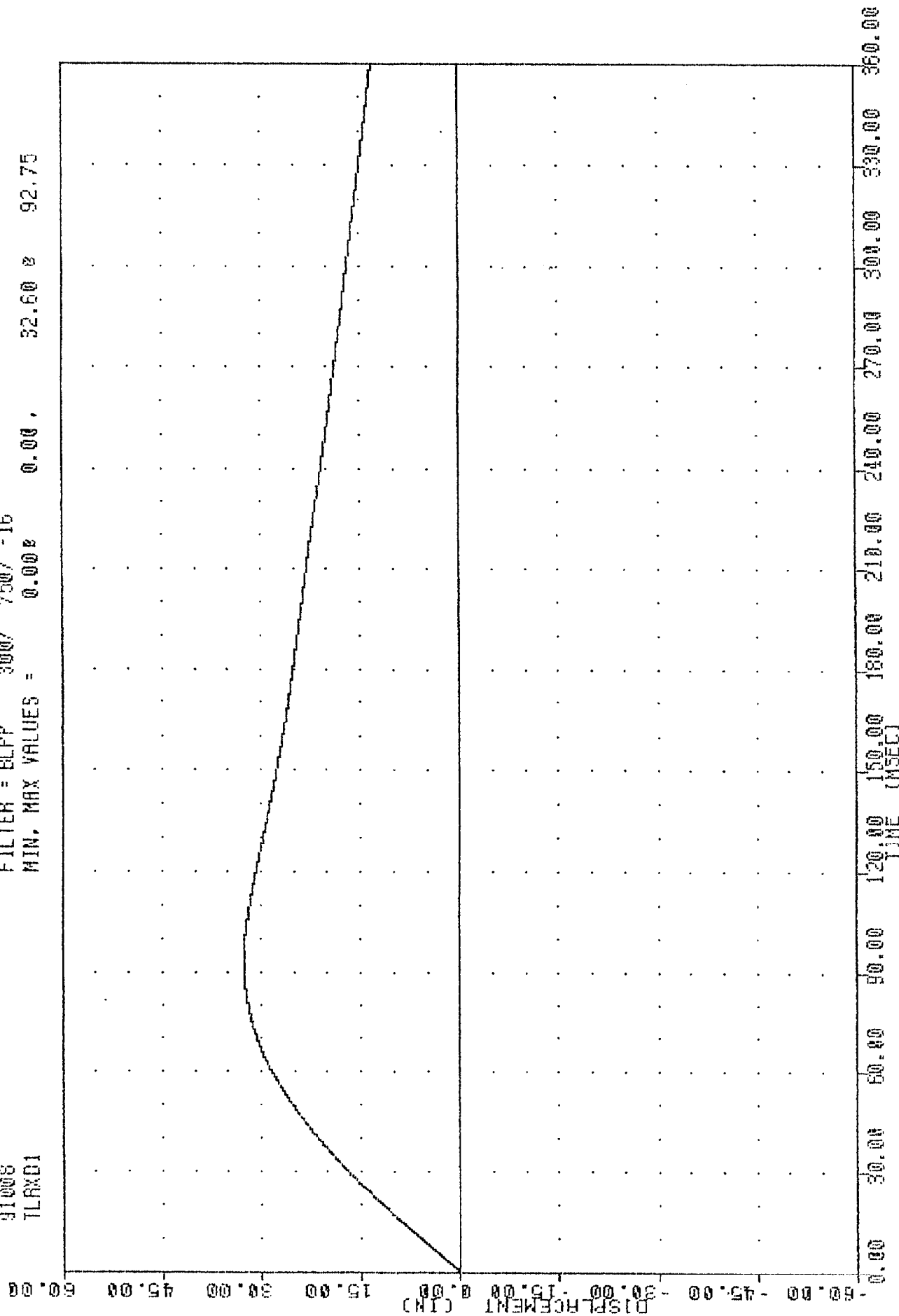
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -6.15e 130.38, 35.10 e 0.00



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS VELOCITY

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 TLRXD1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.00 0.00 32.60 92.75



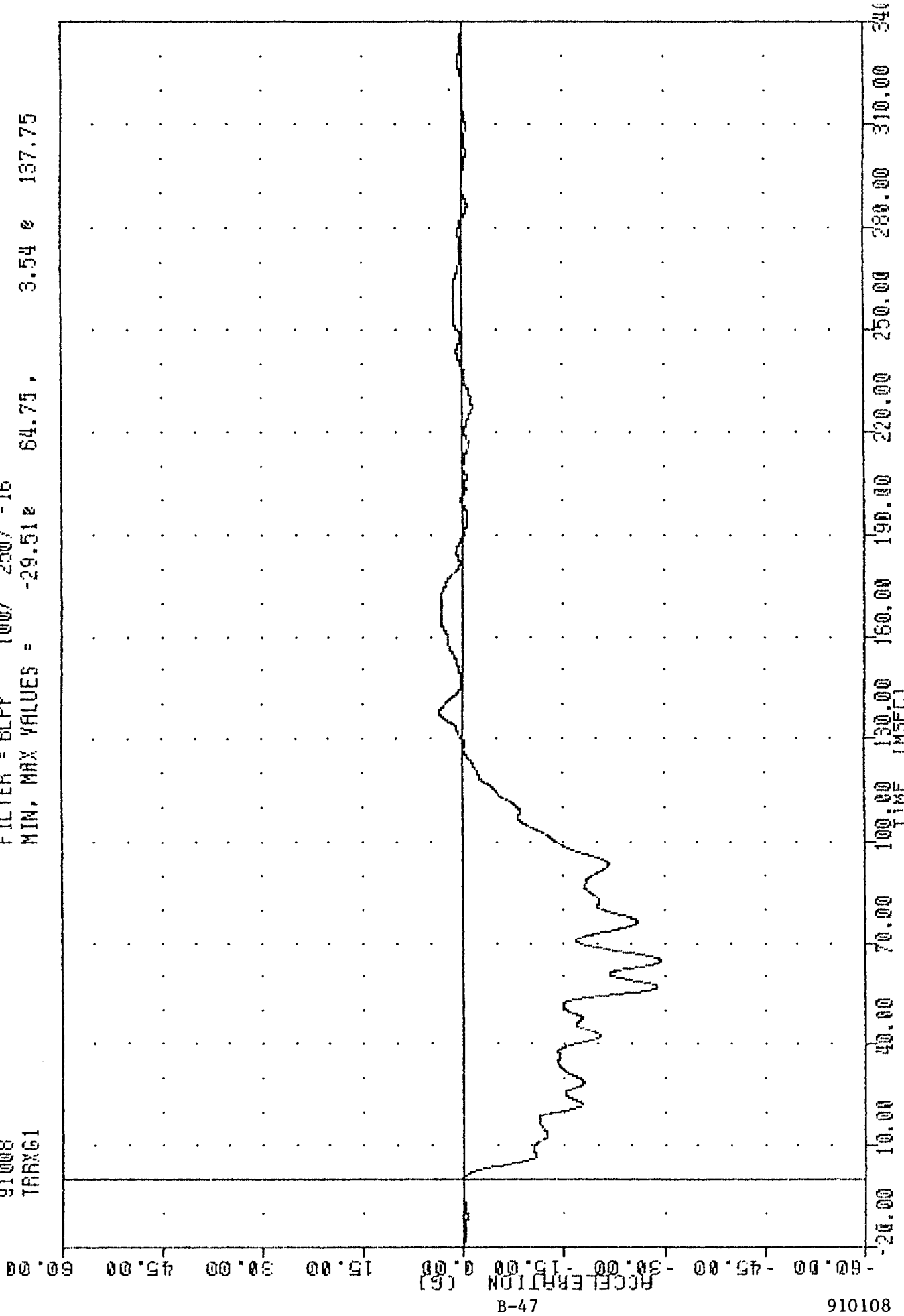
B-46

910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS DISPLACEMENT

NEW CAR ASSESSMENT PROGRAM
 91008
 TRXG1

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -29.51 64.75, 3.54 137.75

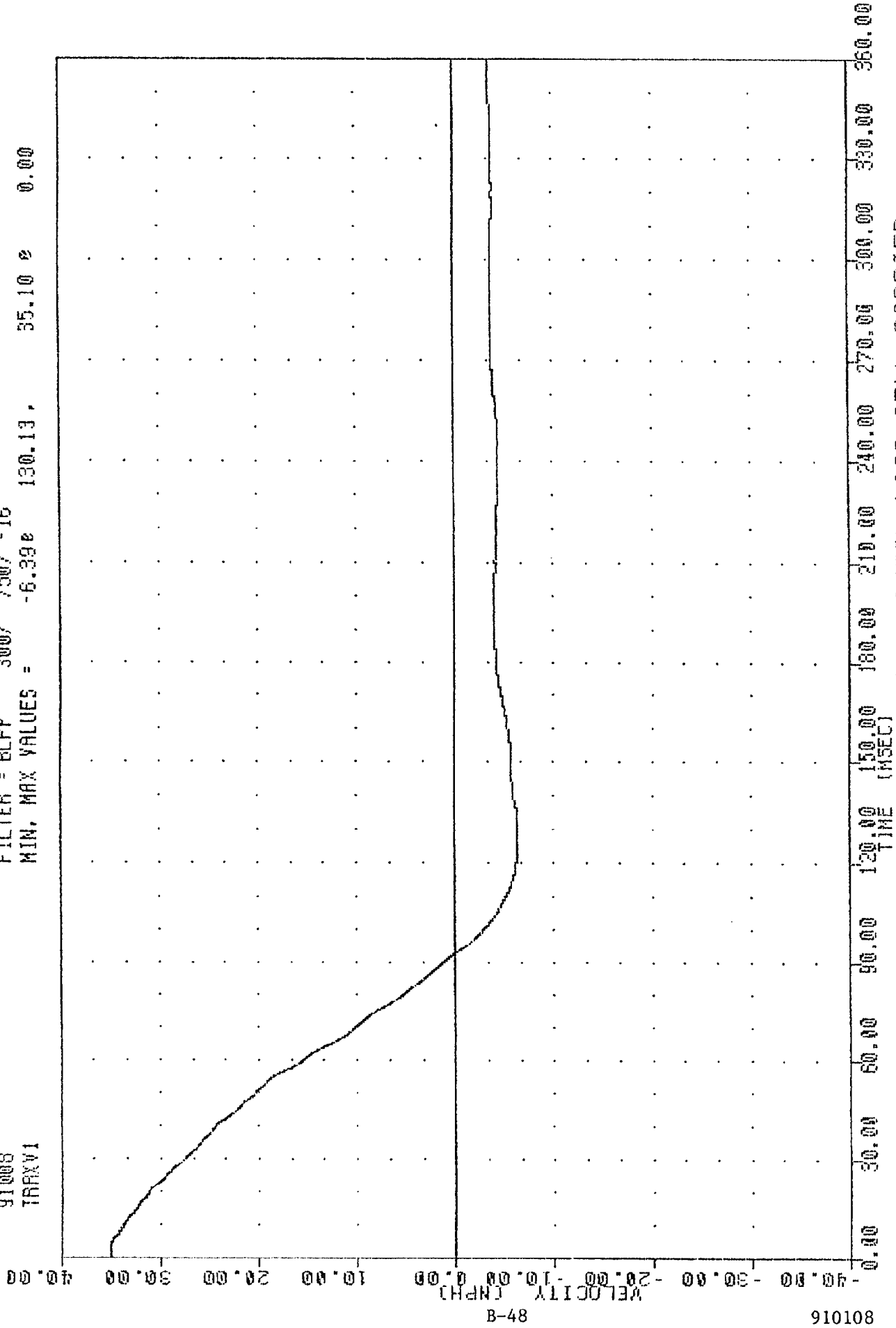


1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS ACCELERATION

TRC , 910108
NEW CAR ASSESSMENT PROGRAM

91008
TRAXV1

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -6.39e 130.13, 35.10 e 0.00



B-48

910108

NEW CAR ASSESSMENT PROGRAM

91008

TRAX01

FILTER = BLPP 300/ 750/ -16

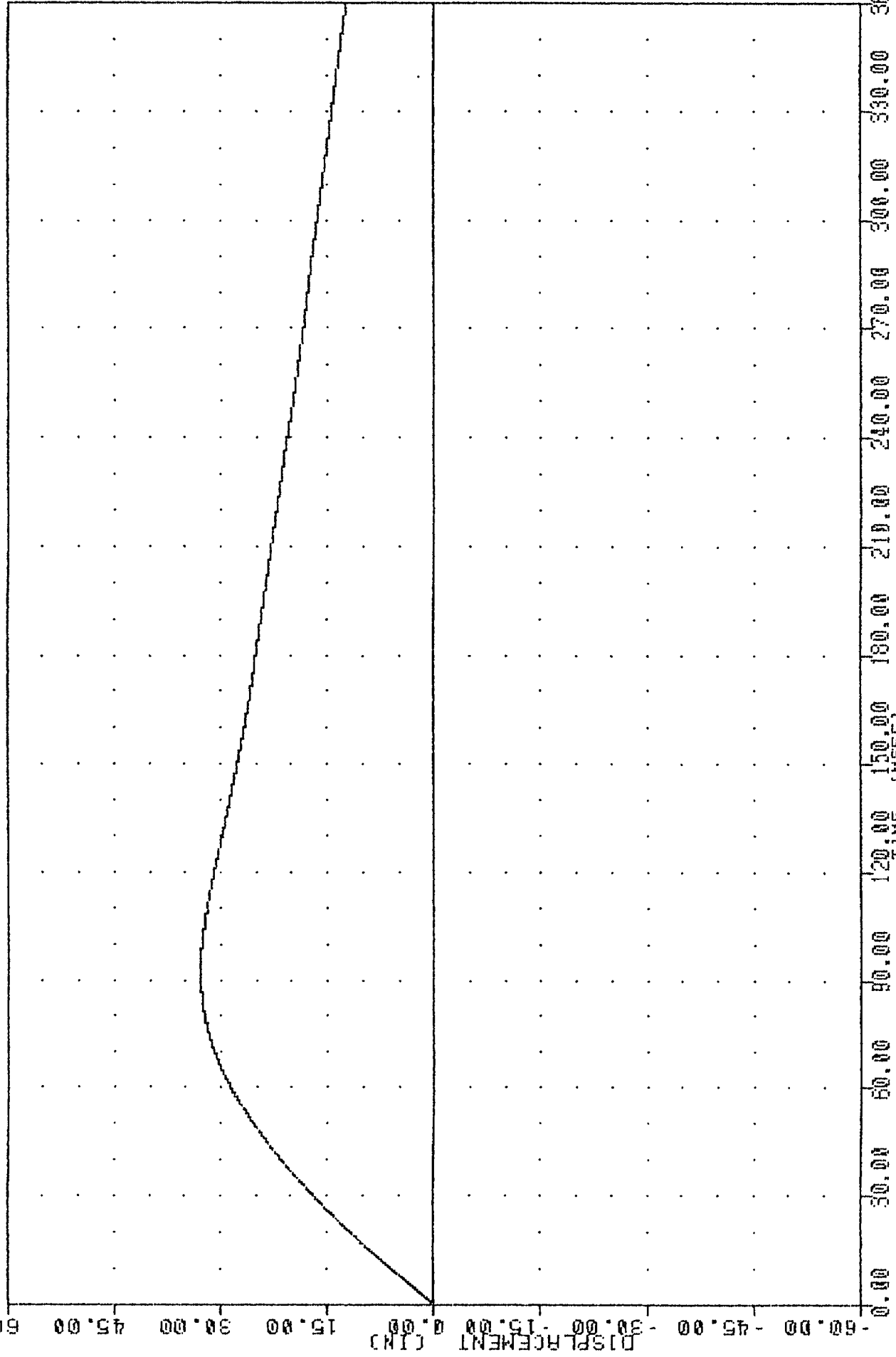
MIN. MAX VALUES = 0.000

0.00,

32.84

92.63

DISPLACEMENT (IN)



B-49

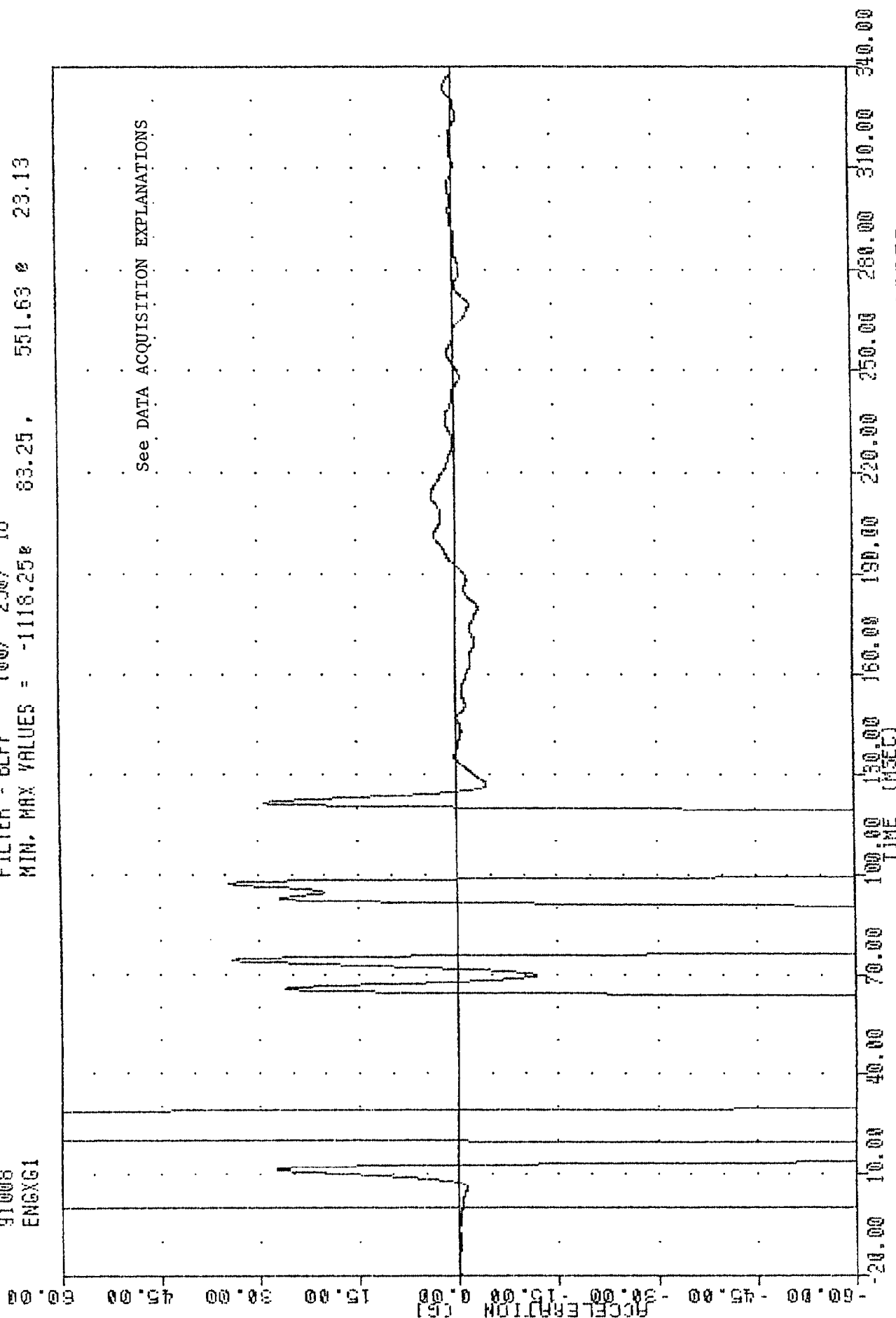
910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS DISPLACEMENT

TRC
NEW CAR ASSESSMENT PROGRAM
91008
ENGXG1

, 910108

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -1118.25e 83.25, 551.63 e 23.13



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
ENGINE TOP X-AXIS ACCELERATION

NEW CAR ASSESSMENT PROGRAM

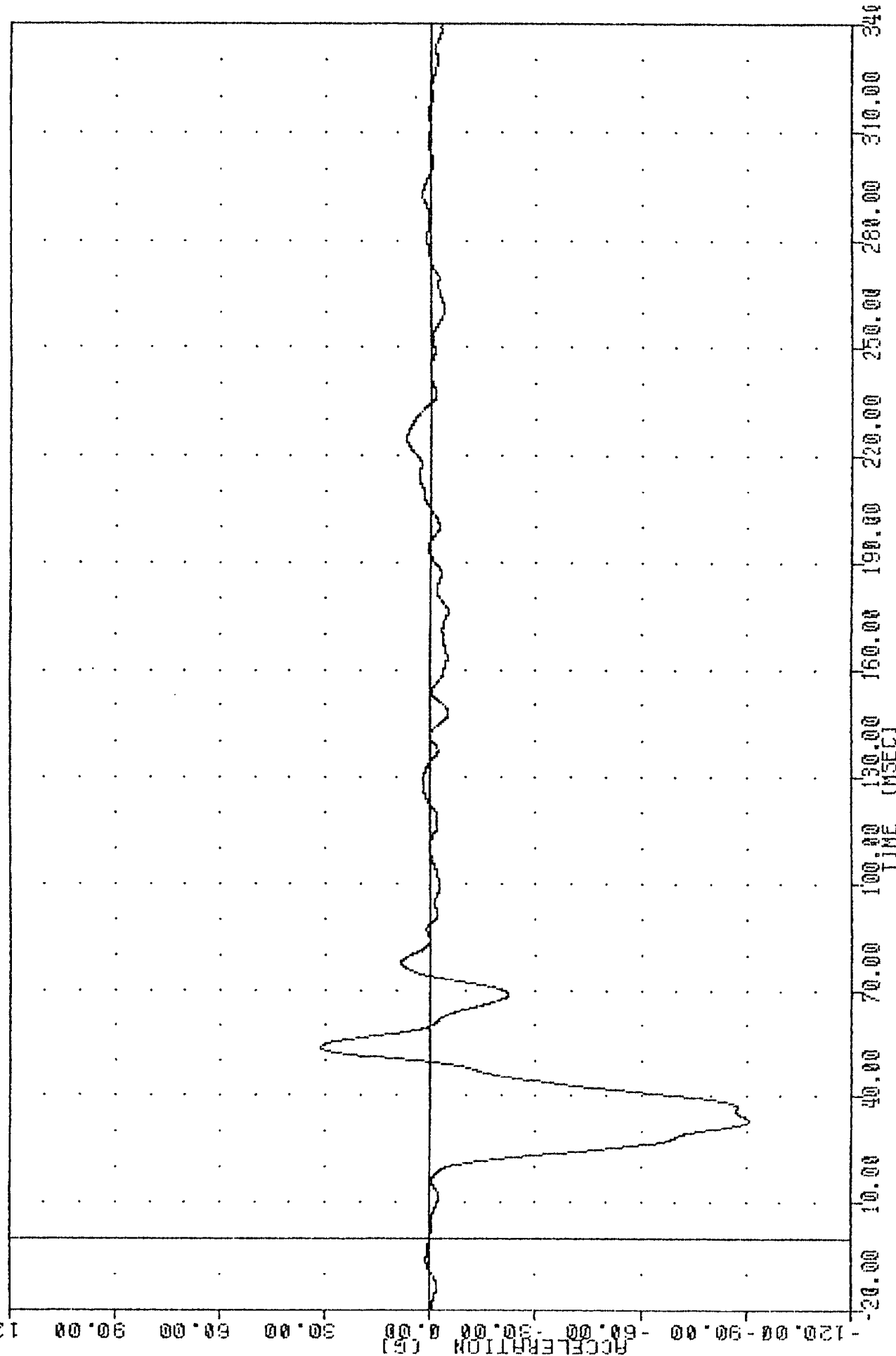
91008

ENGXG2

FILTER = BLPP 100/ 250/ -15

MIN. MAX VALUES = -91.05 33.00 ,

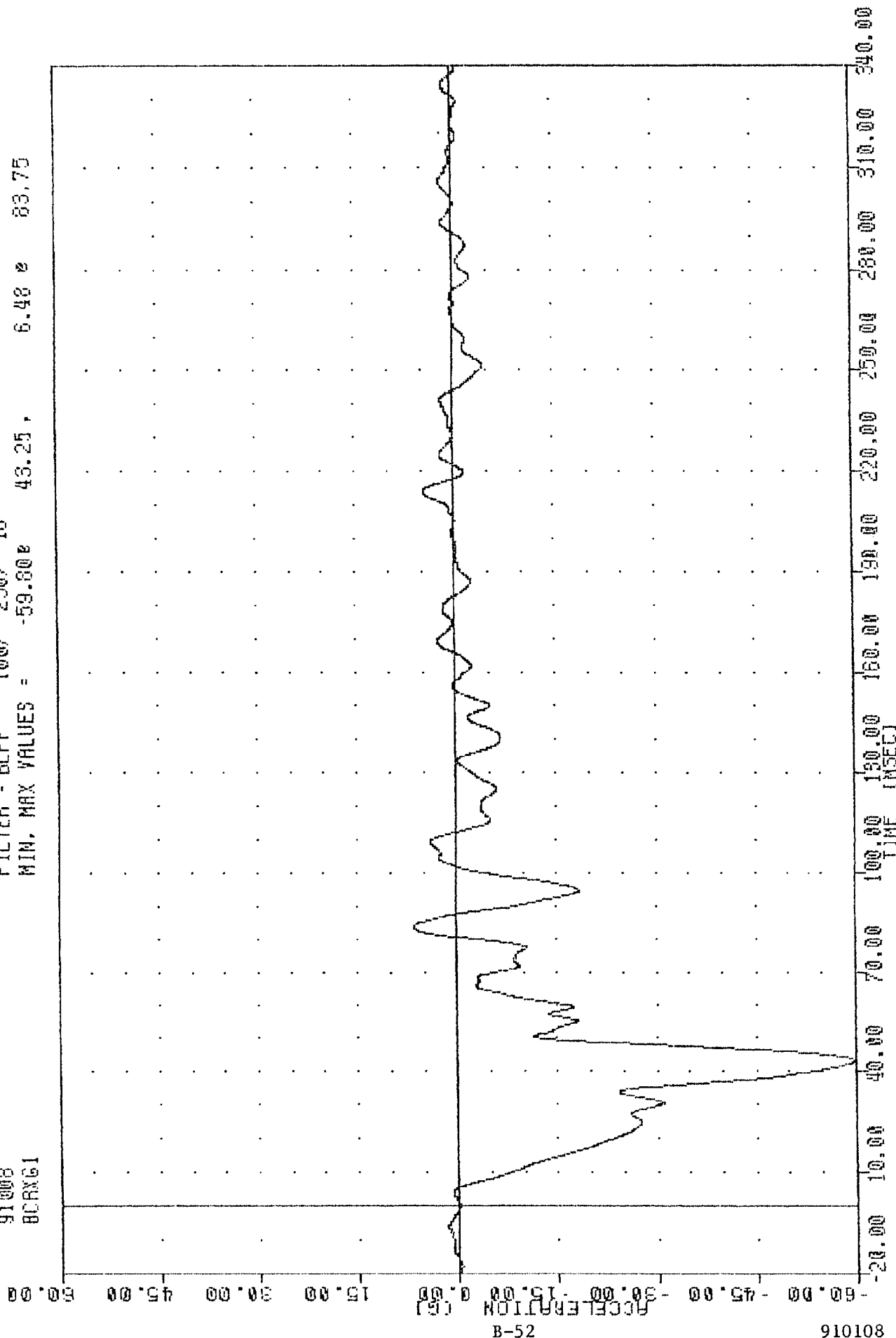
31.20 53.88



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION

TRC 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 BCXG1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -59.300 43.25 6.48 83.75



B-52

910108

NEW CAR ASSESSMENT PROGRAM

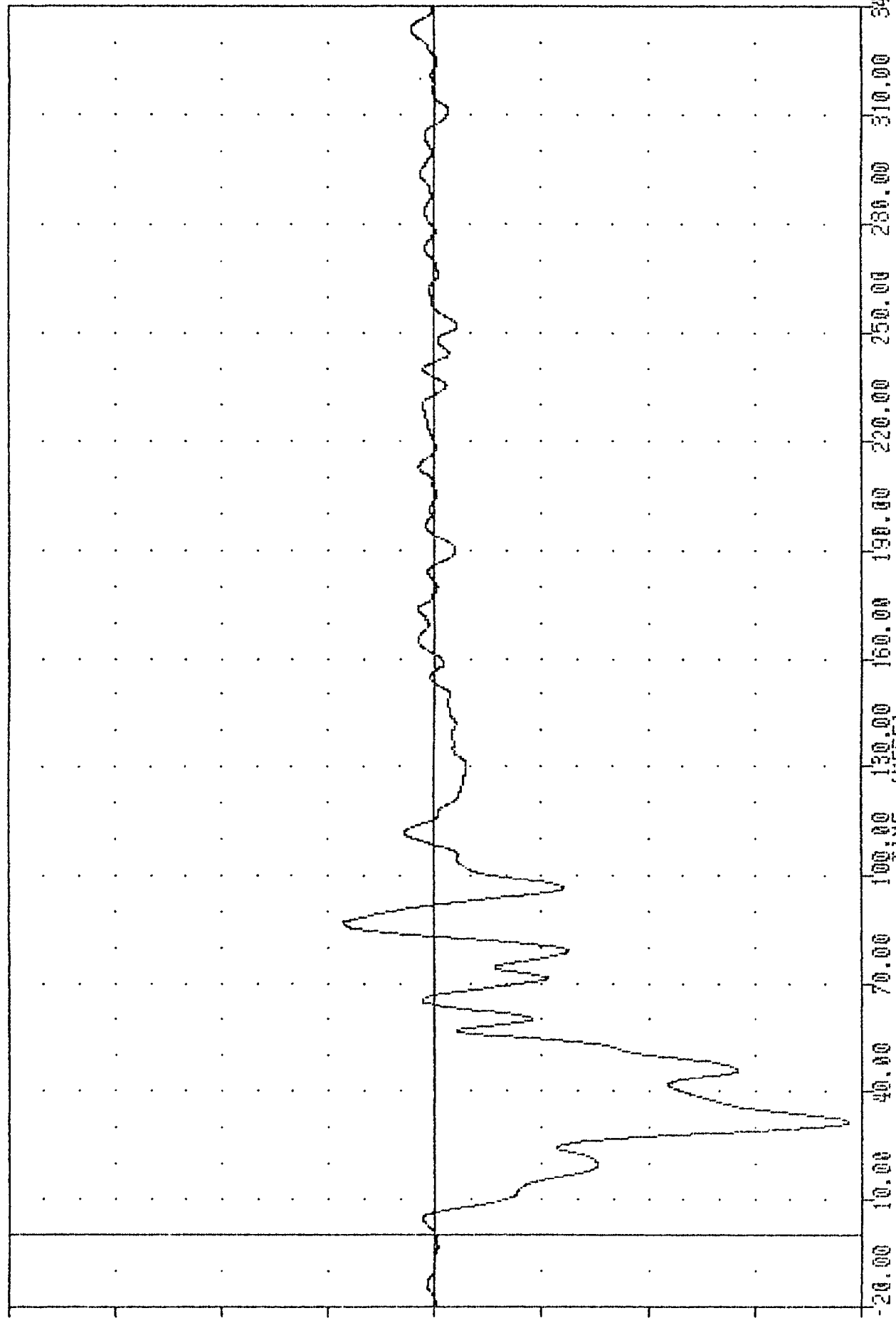
91008

BCLXG1

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -58.26 31.50 12.86 26.50

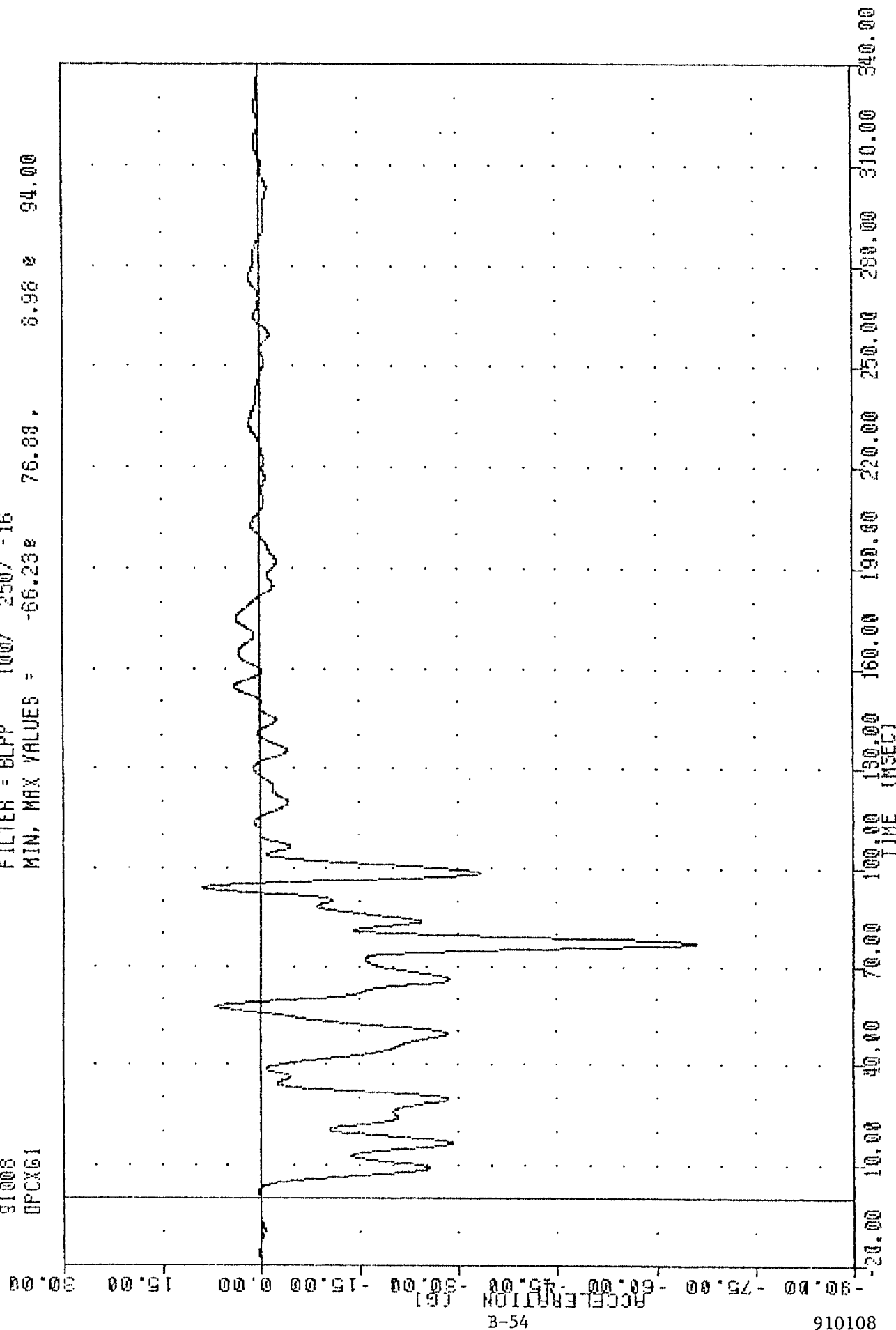
ACCELERATION (G)



TRC , 910108
 NEW CAR ASSESSMENT PROGRAM

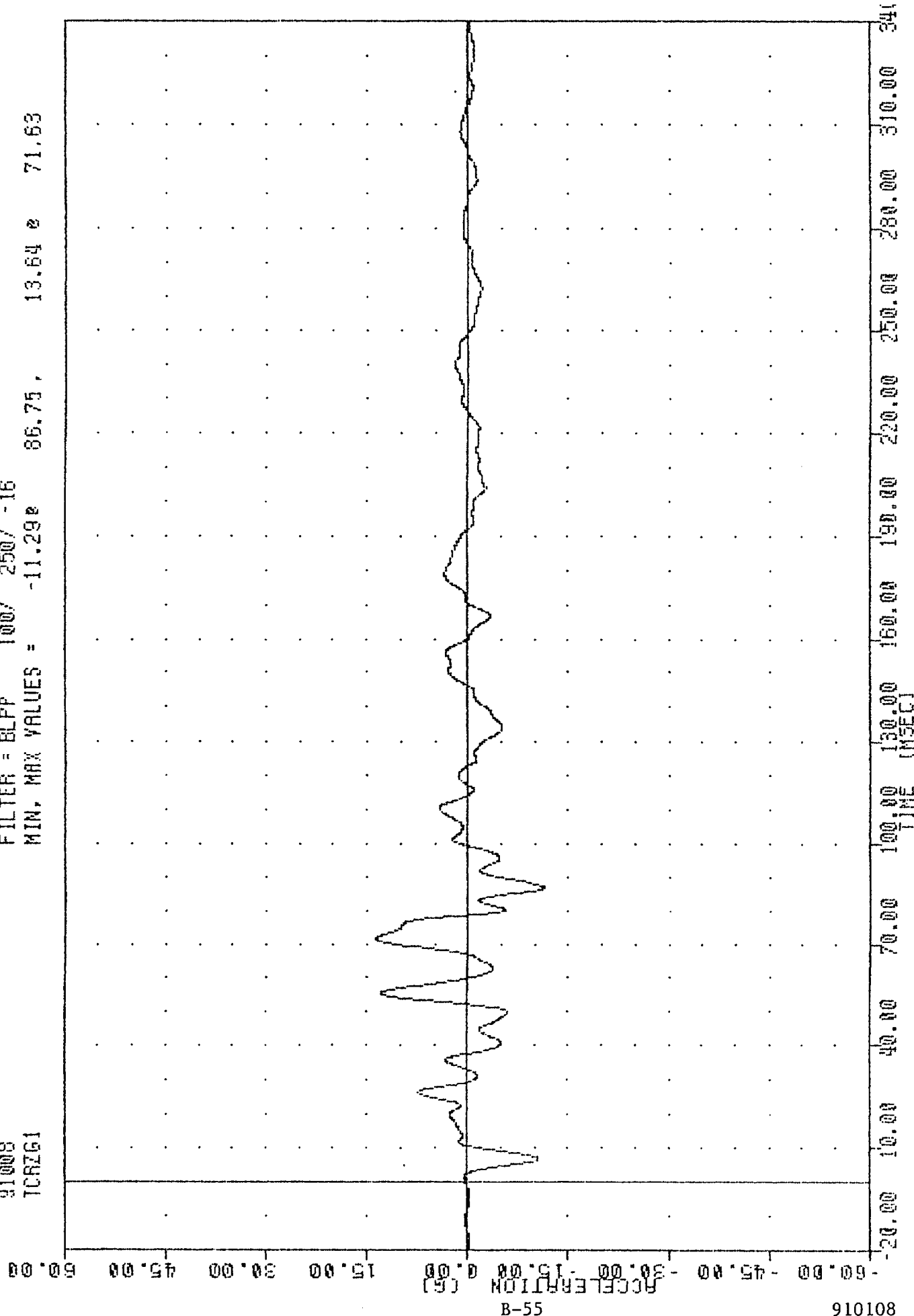
31008 FILTER = BLPP 100/ 250/ -16

0PCXG1 MIN, MAX VALUES = -66.23 76.88 , 8.98 94.00



NEW CAR ASSESSMENT PROGRAM
 31008
 TCRZG1

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -11.29e 86.75, 13.64 e 71.63



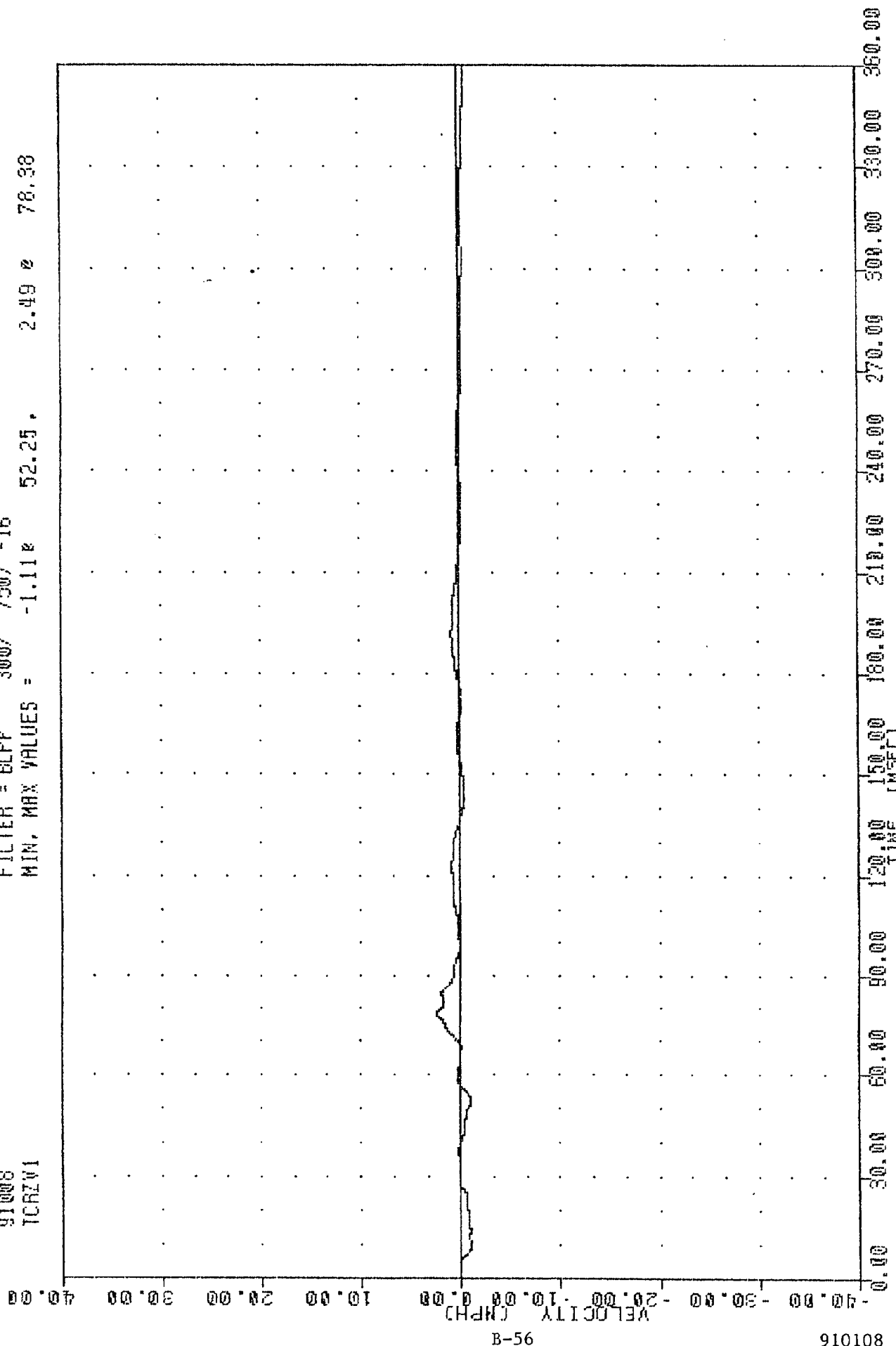
B-55

910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 REAR SEAT CROSSMEMBER Z-AXIS ACCELERATION

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 TCRZV1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 52.25, 2.49 78.38

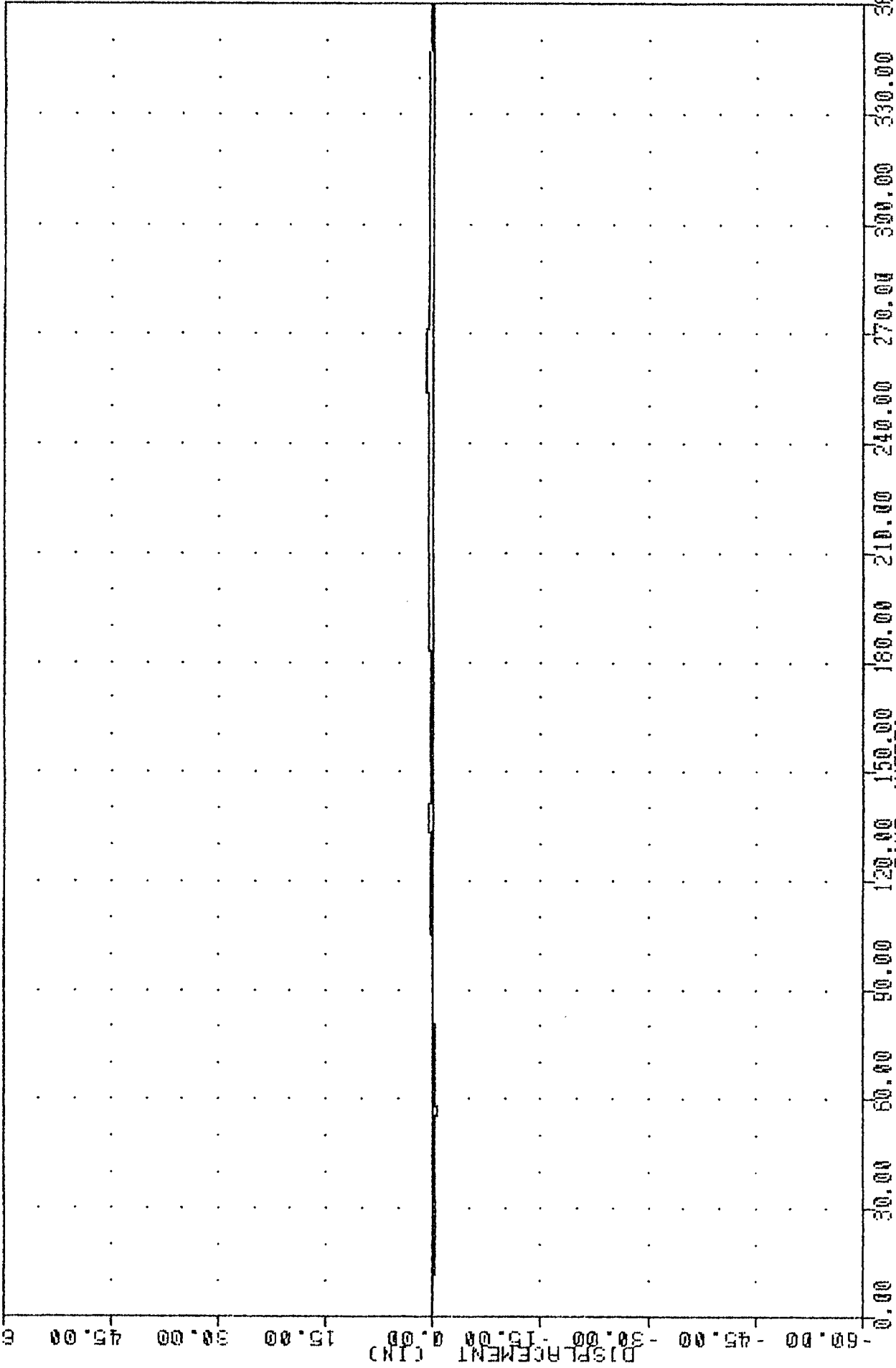


NEW CAR ASSESSMENT PROGRAM

91008
TCRZD1

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -0.40 56.75, 0.90 262.25

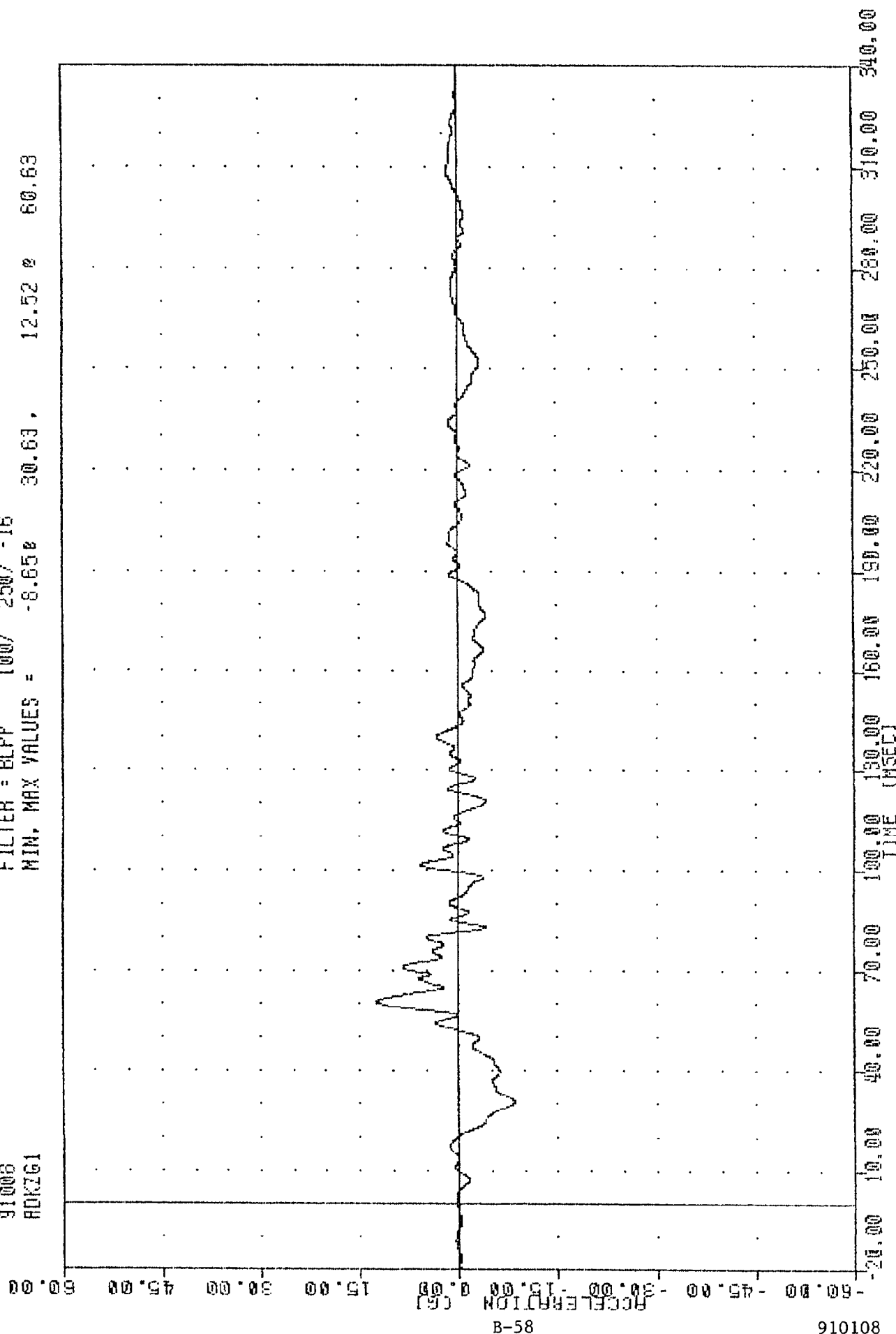
DISPLACEMENT (IN)



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
REAR SEAT CROSSMEMBER Z-AXIS DISPLACEMENT

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 ADKZG1

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -8.650 30.63, 12.52 2 60.63



B-58

910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 VEHICLE REAR CENTER Z-AXIS ACCELERATION

NEW CAR ASSESSMENT PROGRAM

91008

ADKZV1

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = -3.21e 53.00,

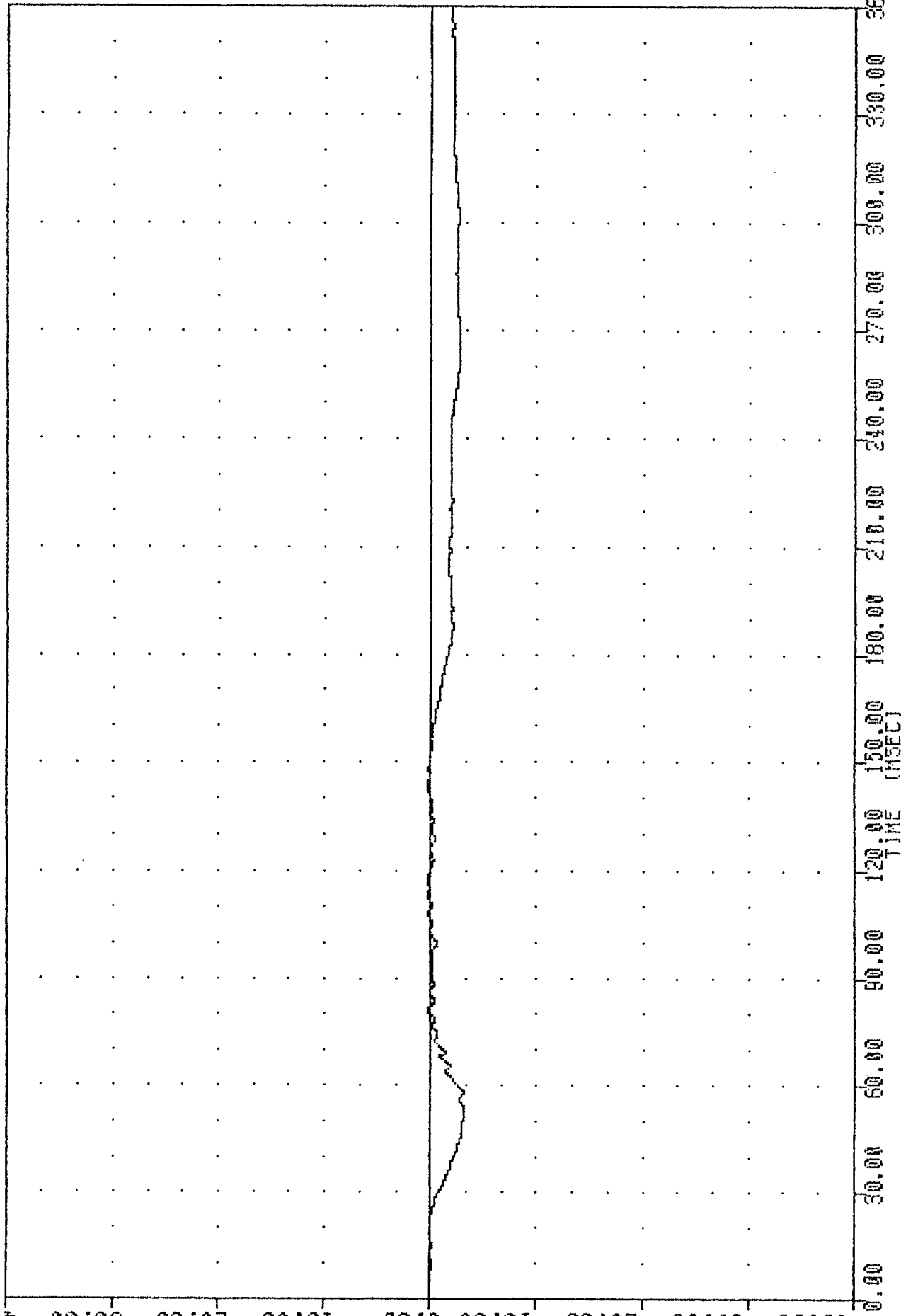
0.35 e 113.25

40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00

VELOCITY (MPH)

B-59

910108

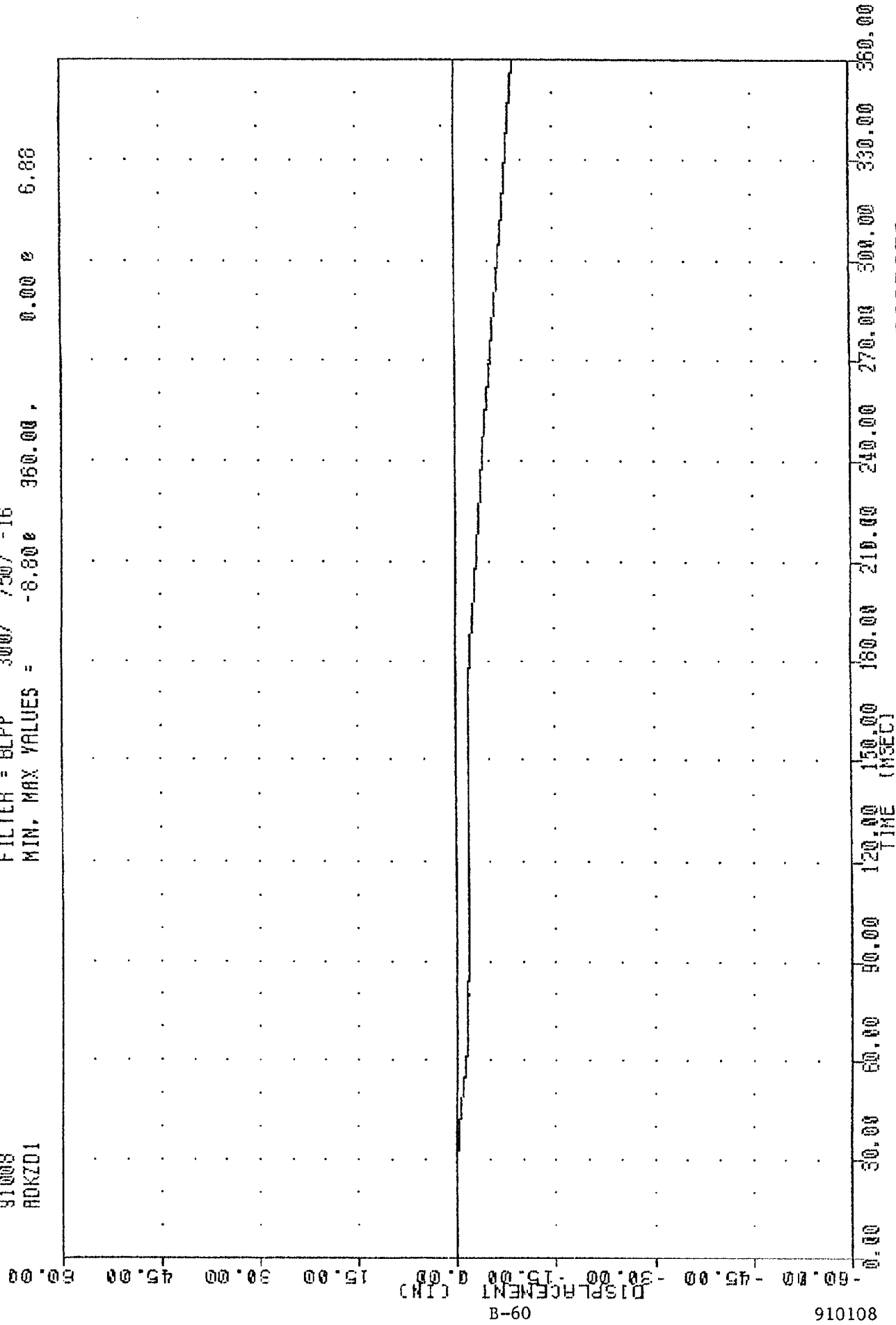


1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
VEHICLE REAR CENTER Z-AXIS VELOCITY

TRC , 910108
NEW CAR ASSESSMENT PROGRAM

91008 FILTER = BLPP 300/ 750/ -16

ADKZD1 MIN, MAX VALUES = -8.800 360.00, 0.00 6.88

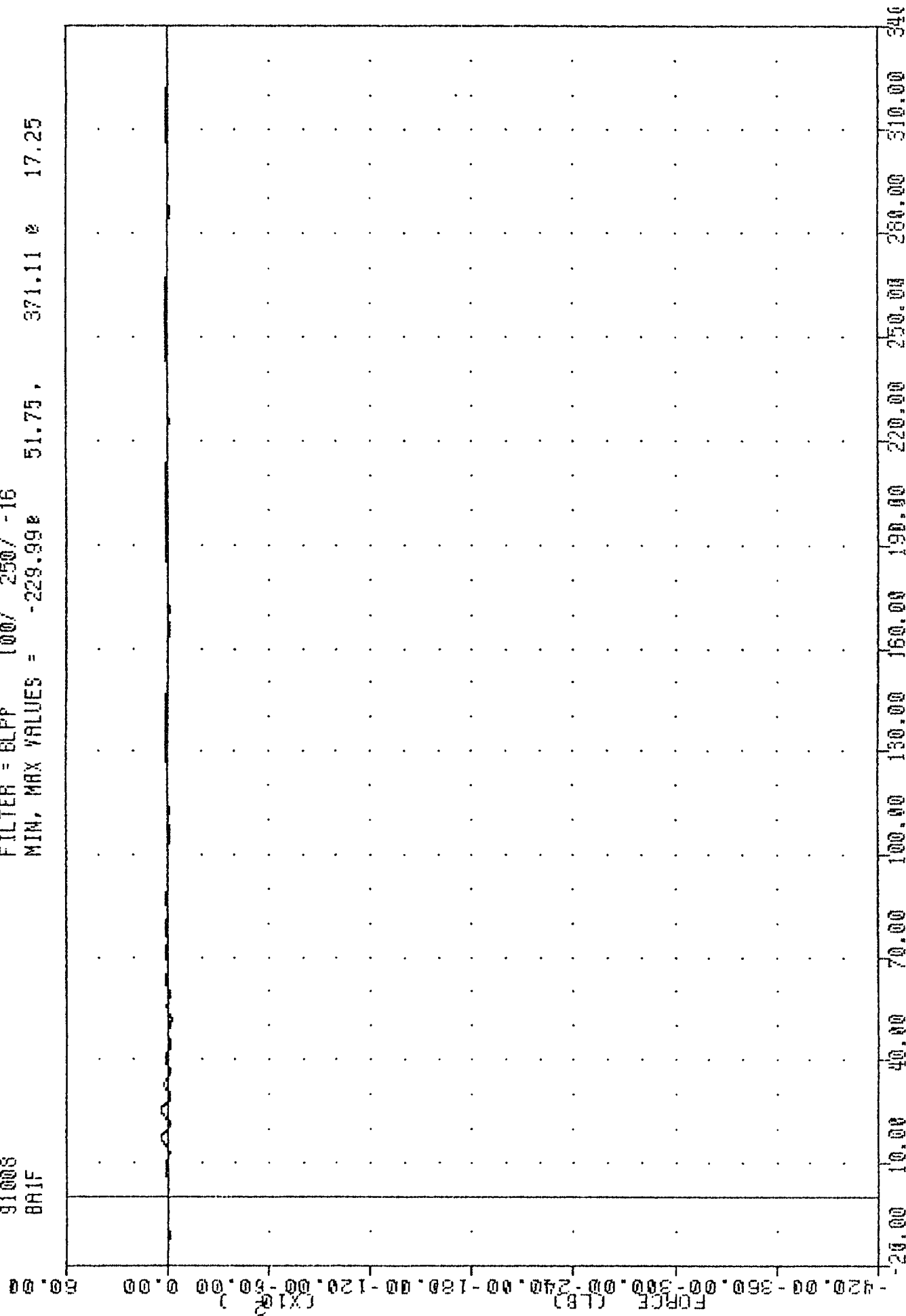


B-60

910108

NEW CAR ASSESSMENT PROGRAM
 91008
 BR1F

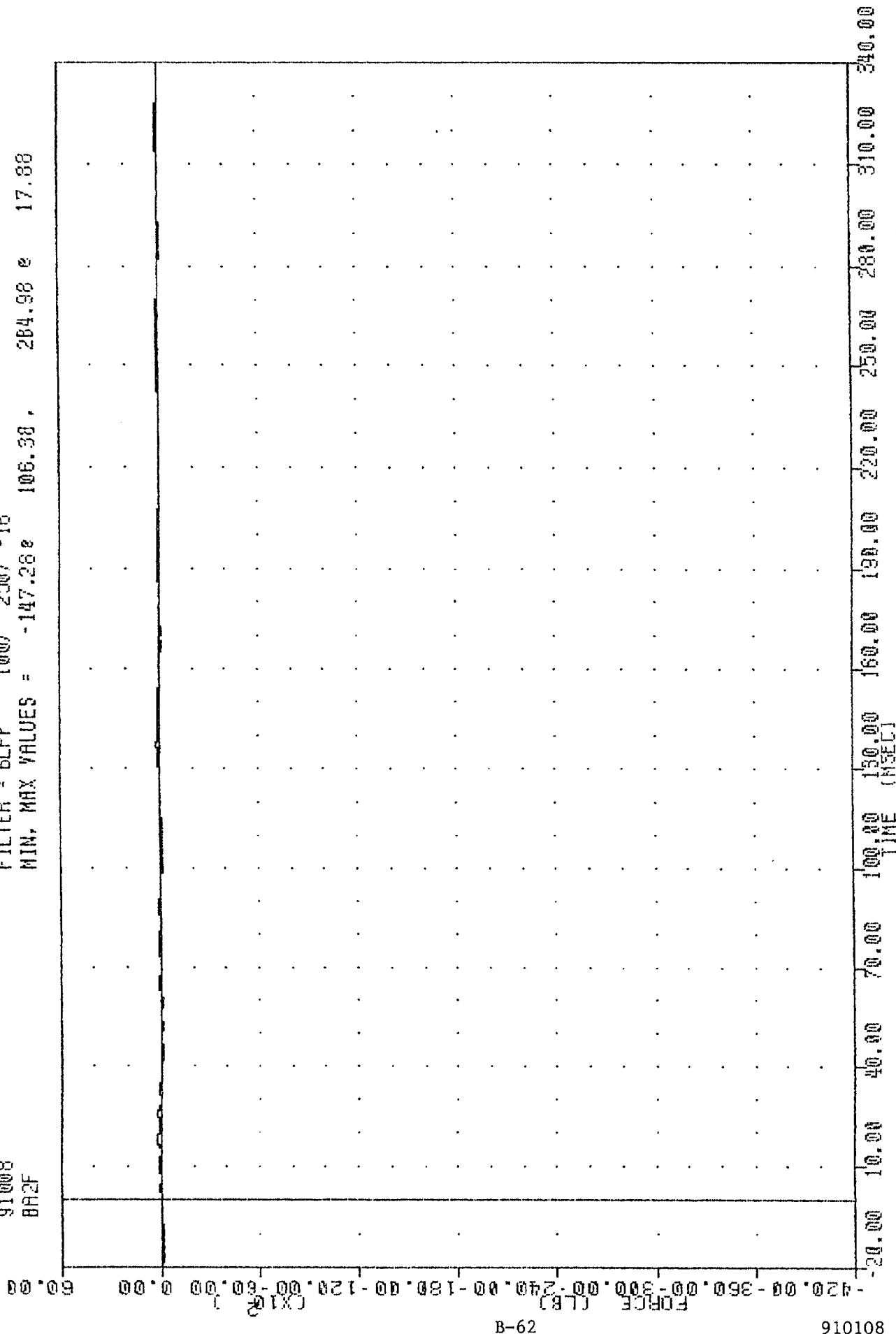
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -229.99 51.75, 371.11 0 17.25



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION AT FORCE

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 BR2F

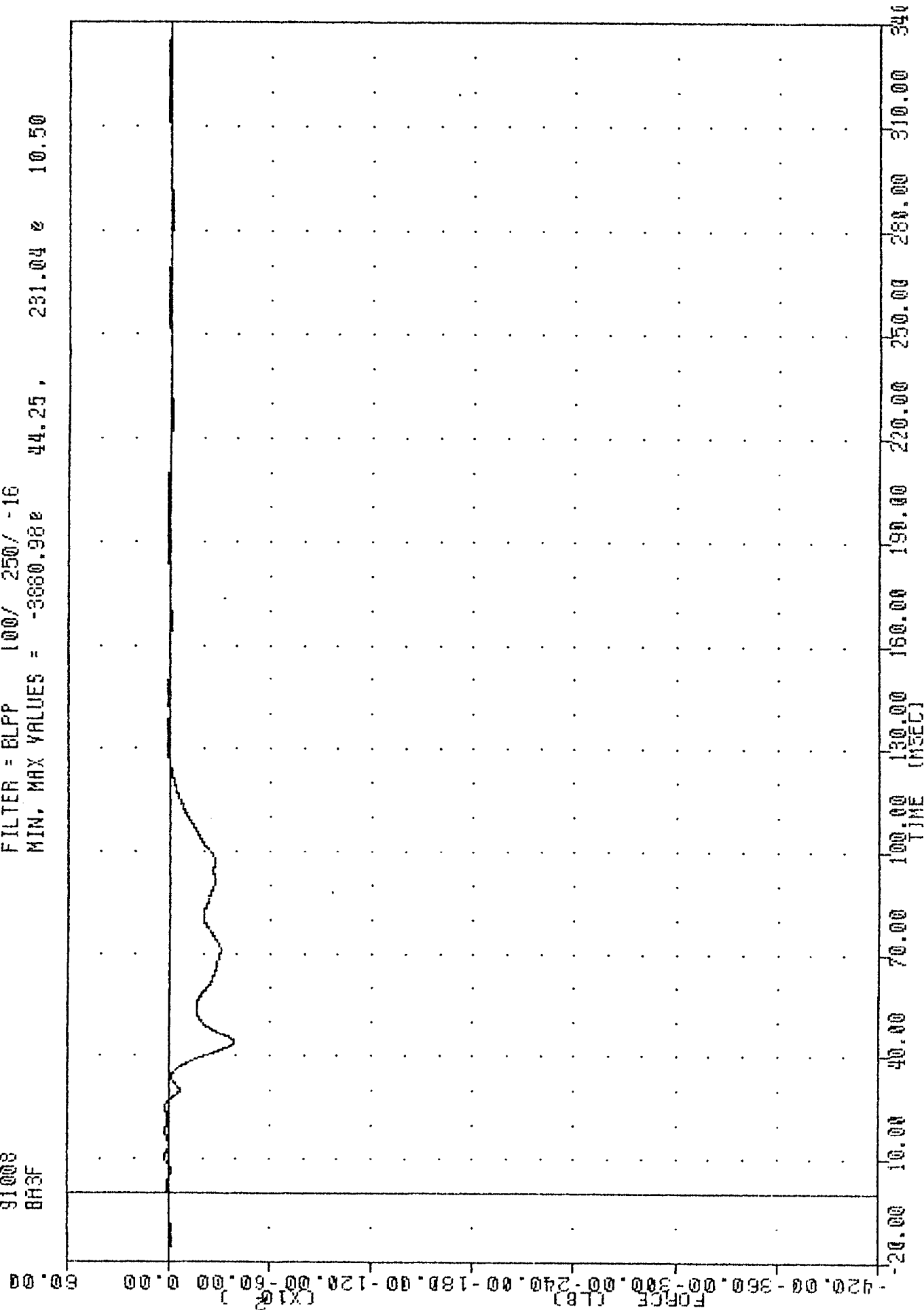
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -147.26e 106.38 , 284.98 e 17.88



NEW CAR ASSESSMENT PROGRAM

91008
BR3F

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -3880.98e 44.25 , 231.04 e 10.50



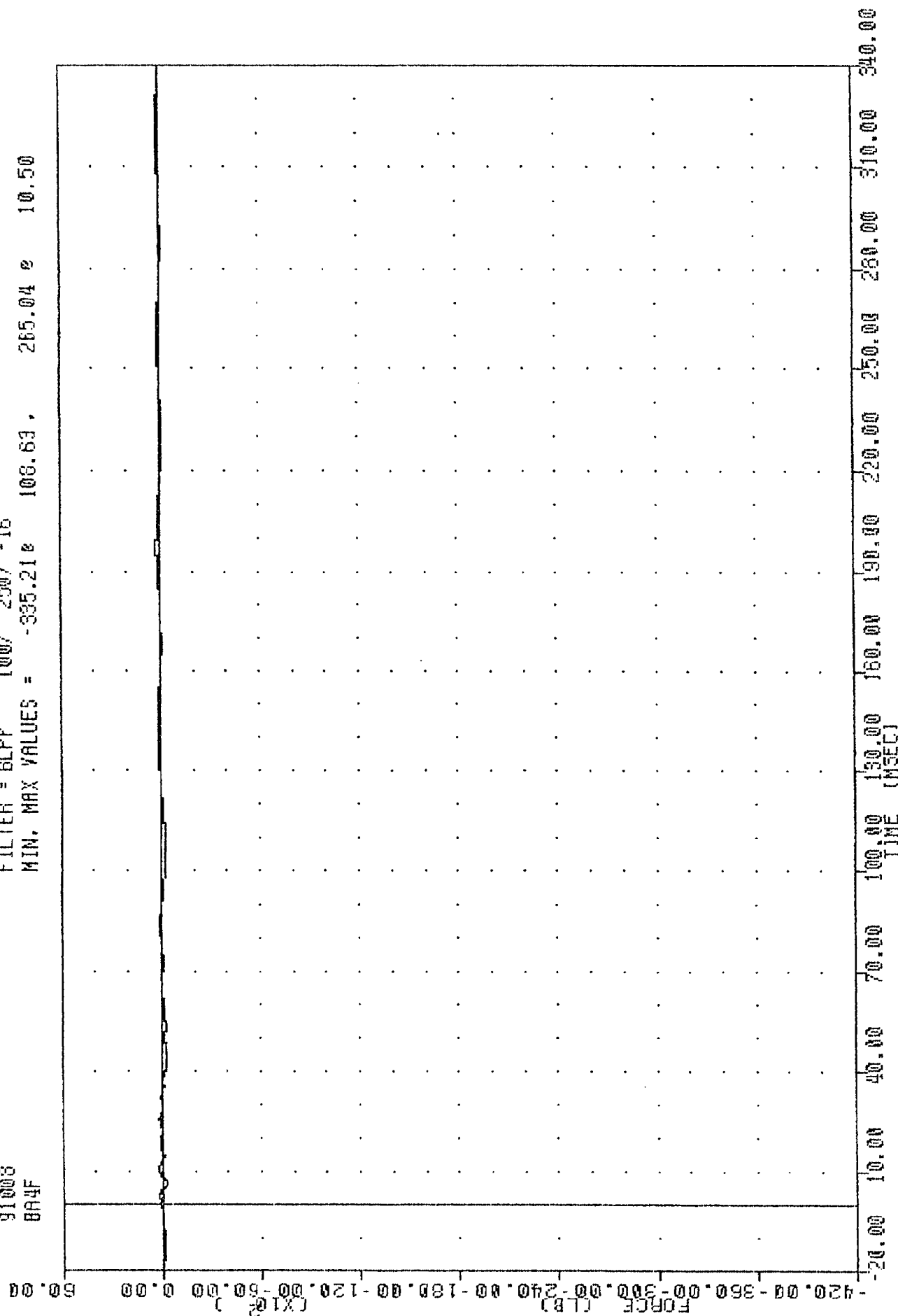
910108

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1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A3 FORCE ;

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 BR4F

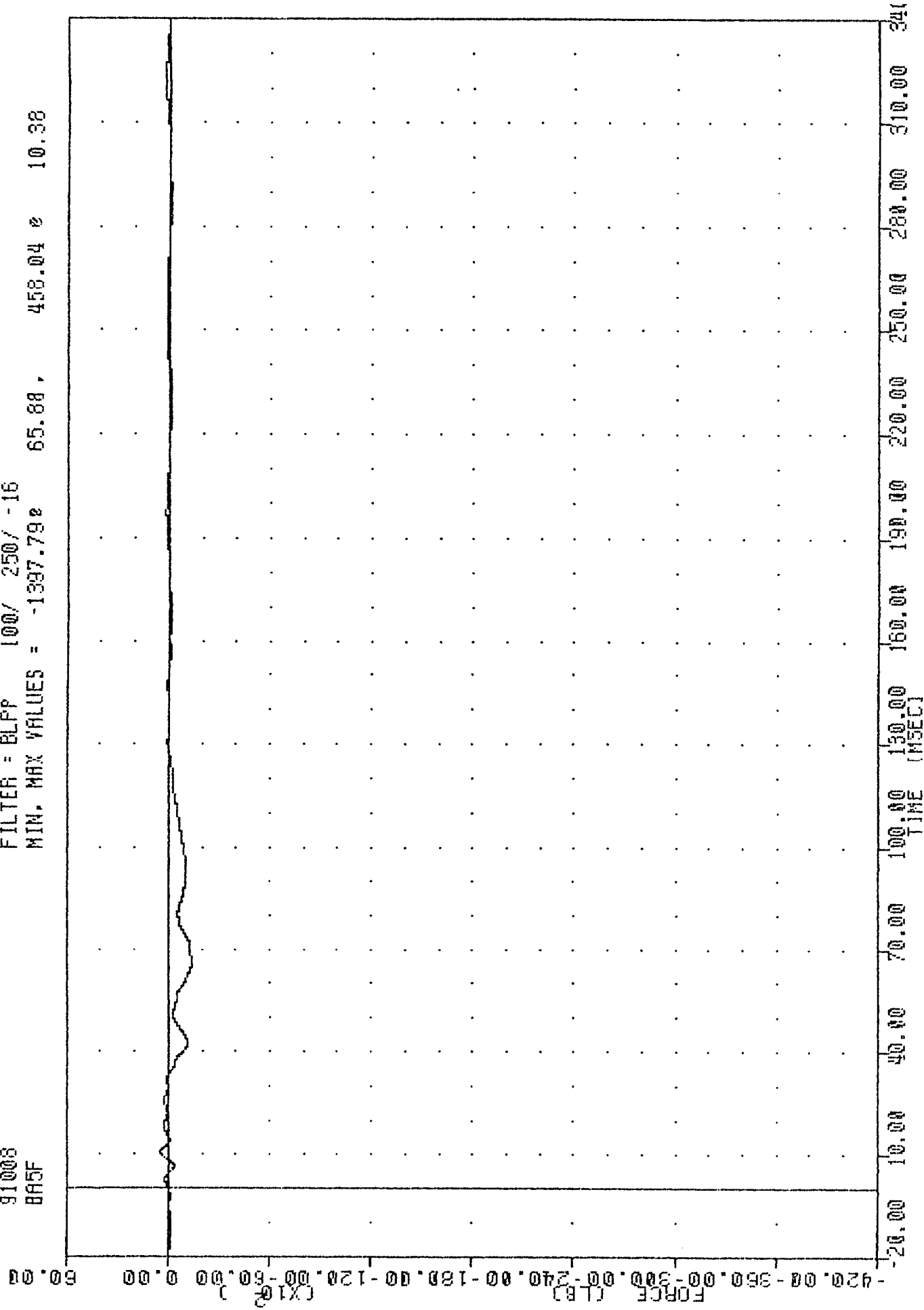
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -335.21e 108.63 , 265.04 e 10.50



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL POSITION FULL FORCE

NEW CAR ASSESSMENT PROGRAM
 91008
 BAF5F

FILTER = BLFP 100/ 250/ -16
 MIN. MAX VALUES = -1397.792 65.88, 458.04 2 10.38

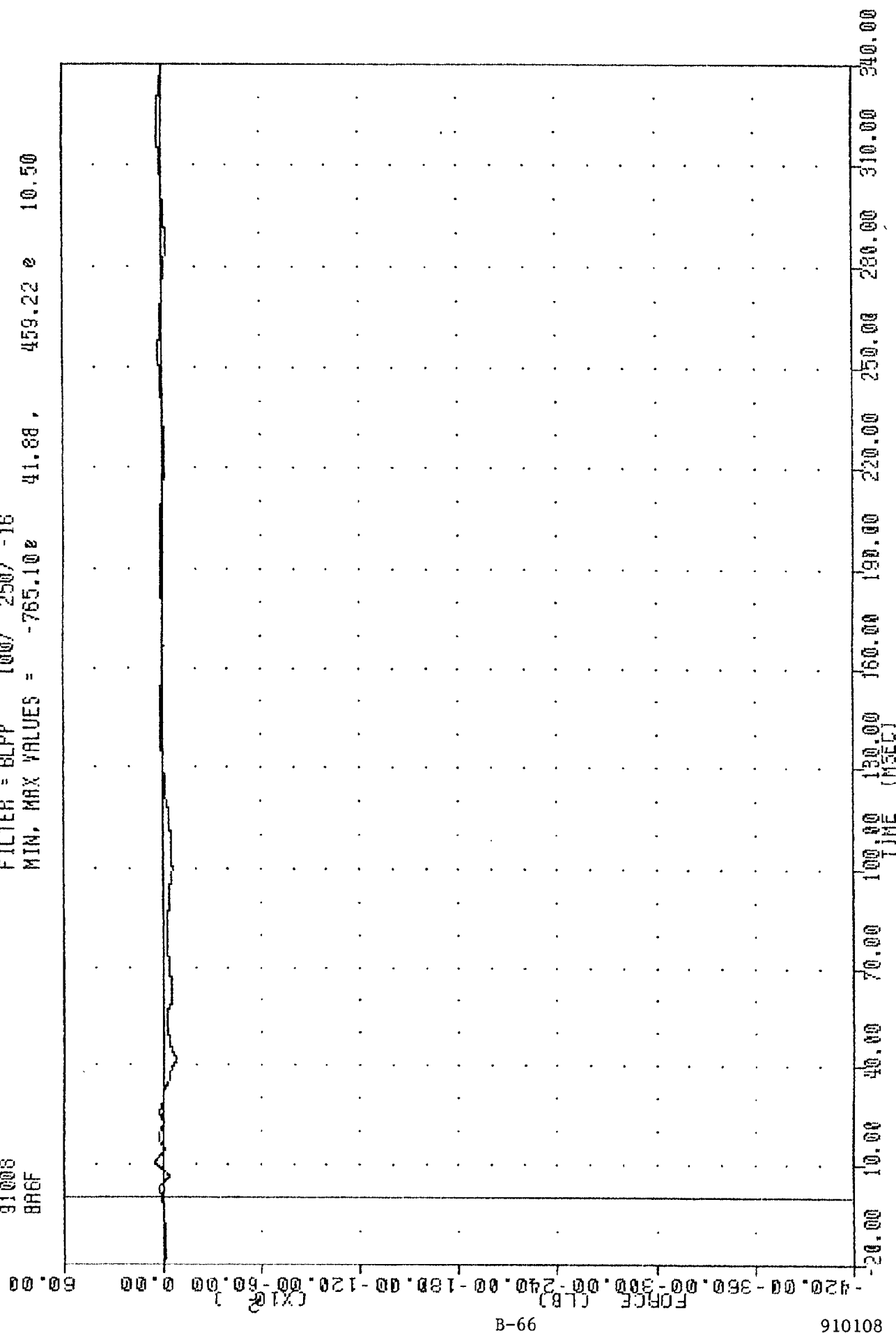


1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A5 FORCE

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM

91008 FILTER = BLPP 100/ 250/ -16

BR6F MIN. MAX VALUES = -765.10e 41.88 , 459.22 e 10.50



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION AS FORCE

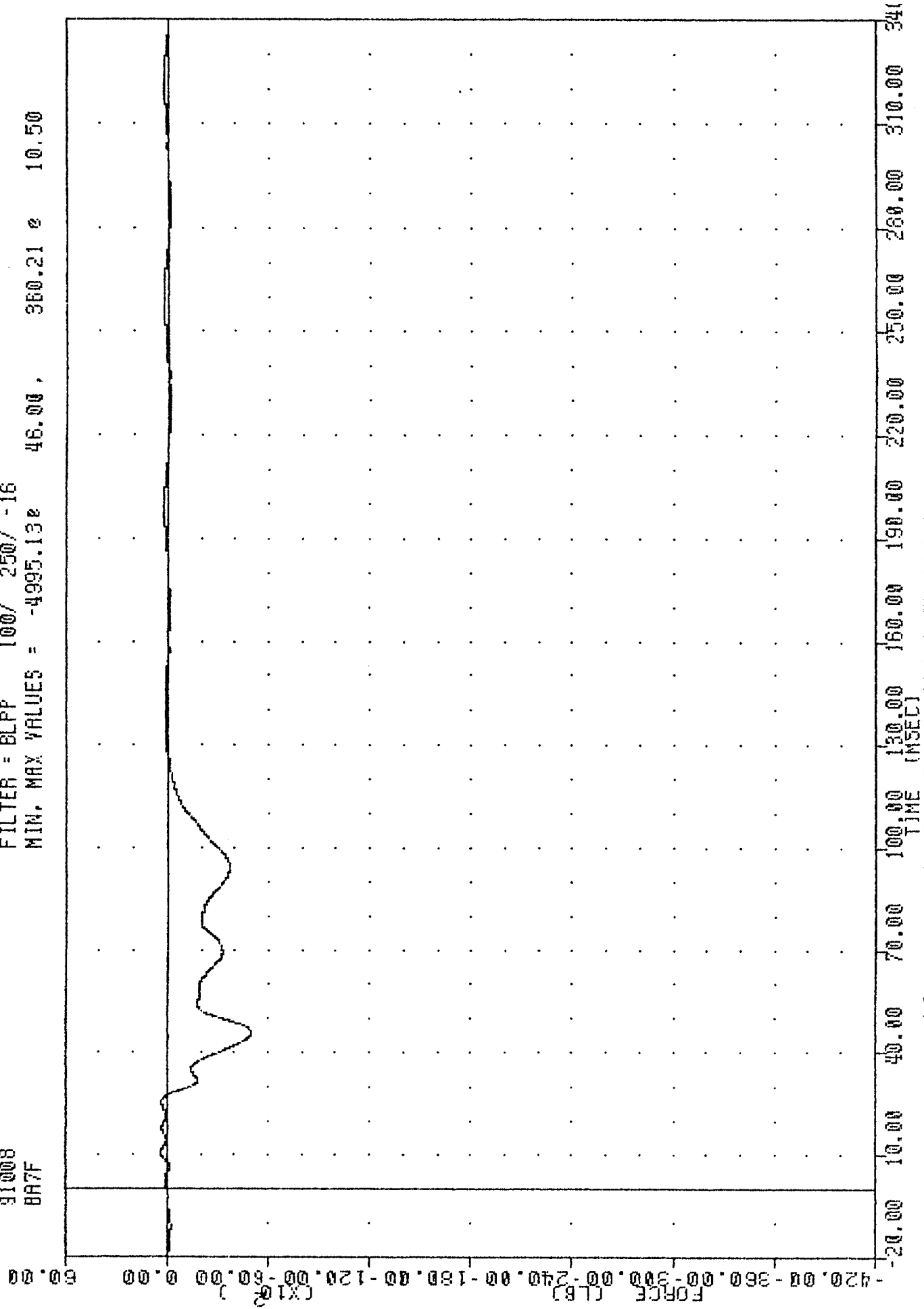
NEW CAR ASSESSMENT PROGRAM

91008

BR7F

FILTER = BLPP 100/ 250/ -16

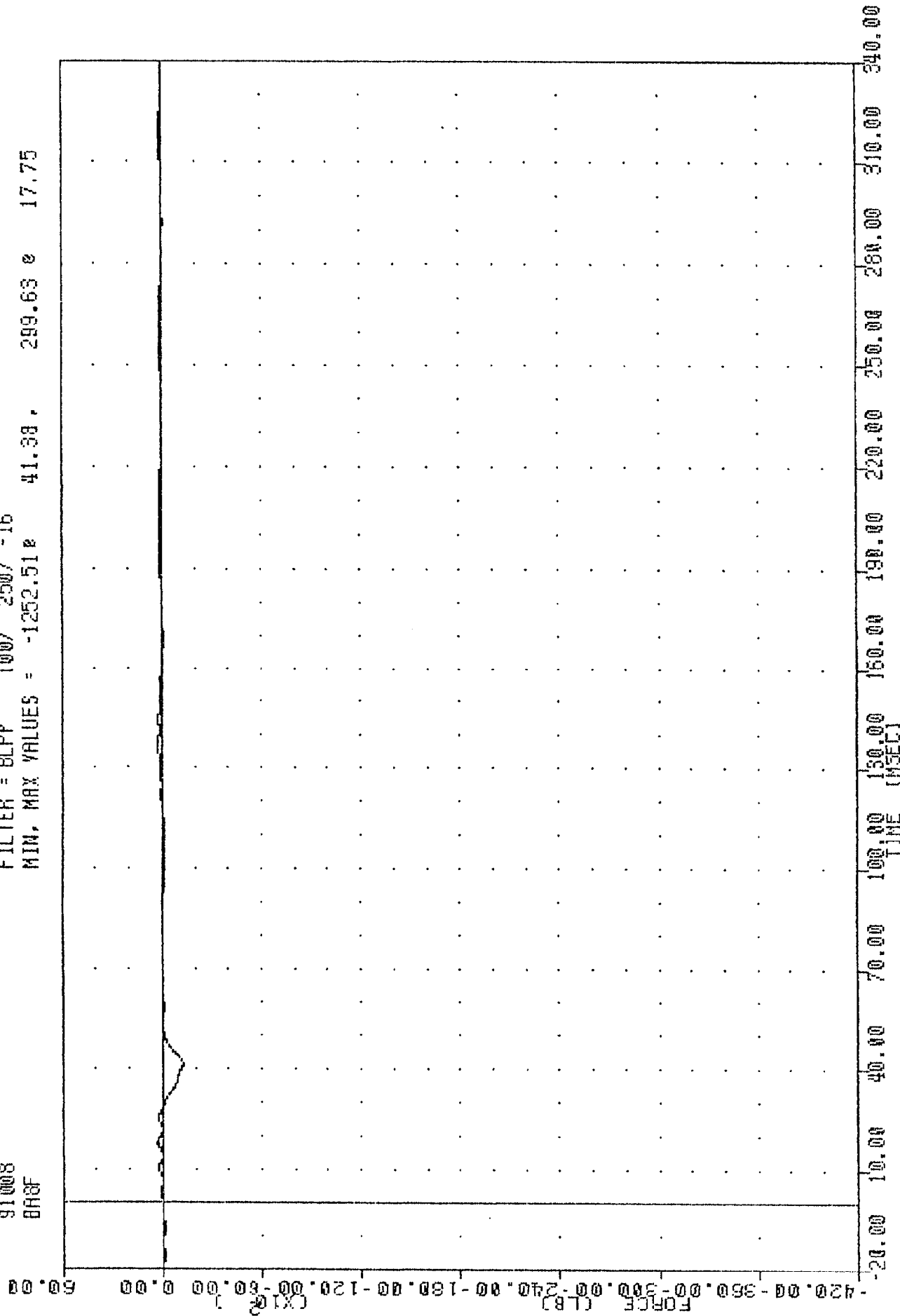
MIN. MAX VALUES = -4995.13e 46.00, 360.21 e 10.50



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A7 FORCE

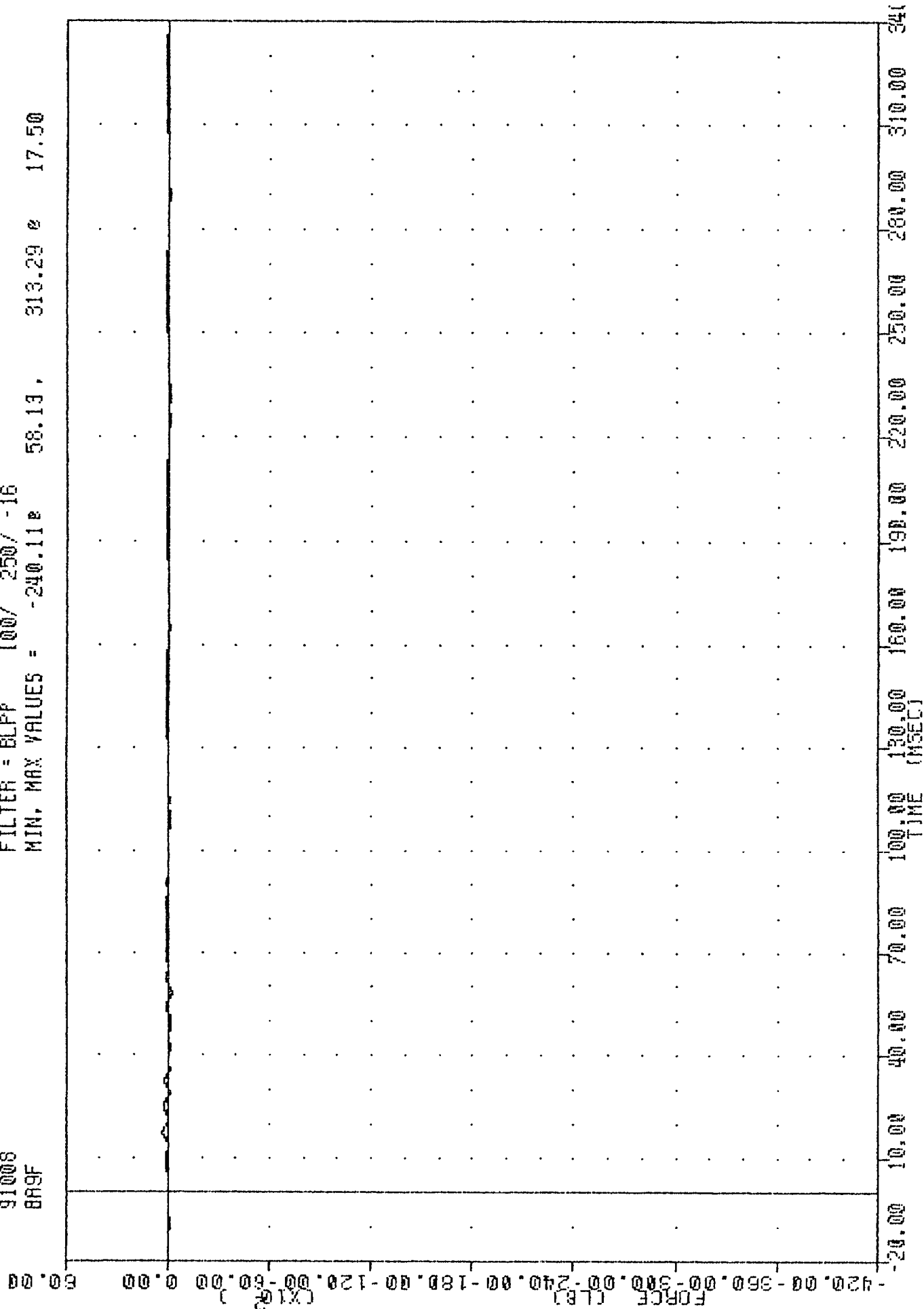
TAC , 910108
 NEW CAR ASSESSMENT PROGRAM

91008
 BARF
 FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -1252.51 41.38, 299.63 17.75



NEW CAR ASSESSMENT PROGRAM
 91008
 BR9F

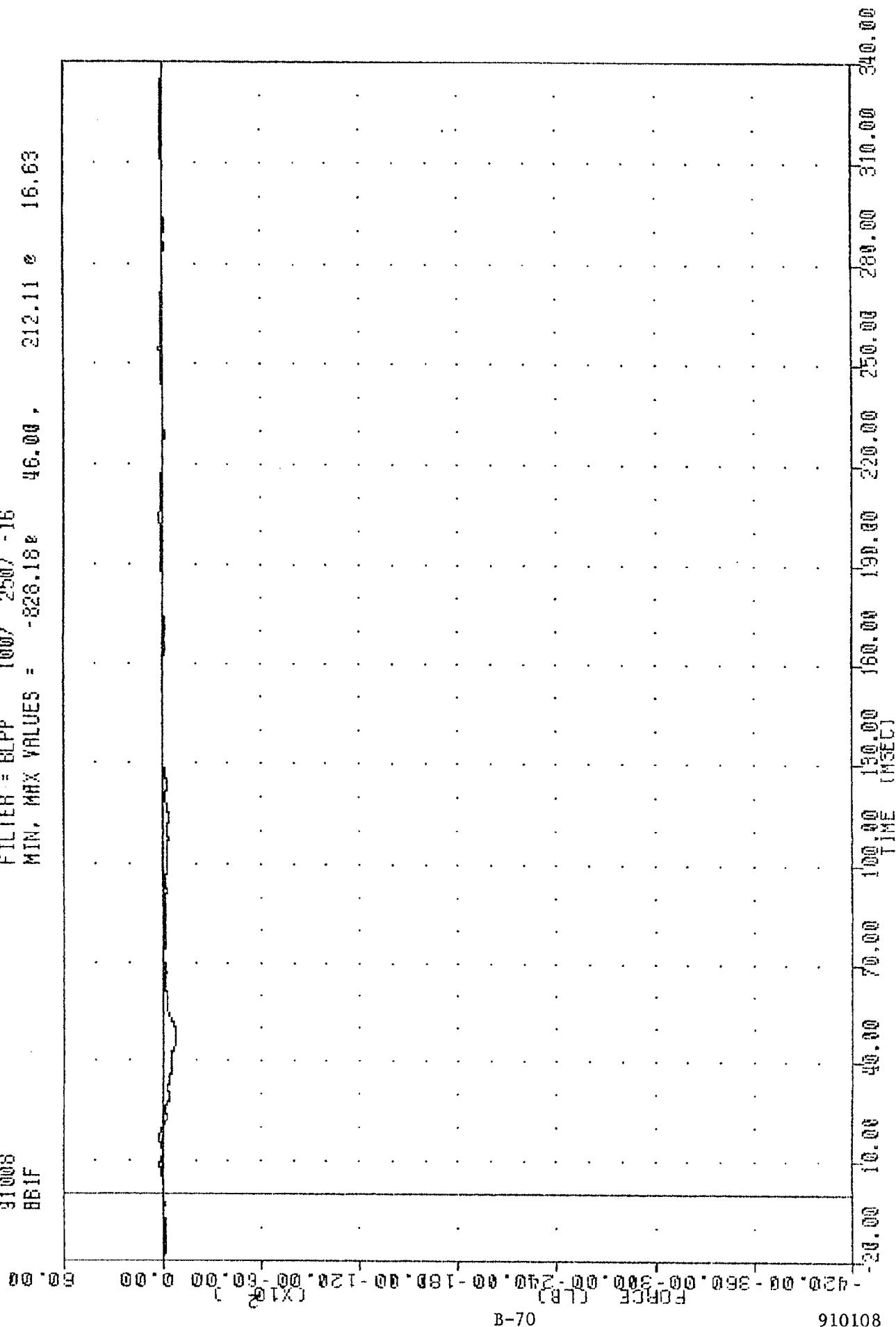
FILTER = BLPF 100/ 250/ -16
 MIN. MAX VALUES = -240.11 58.13, 313.29 17.50



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A9 FORCE

TRC 310108
 NEW CAR ASSESSMENT PROGRAM
 31008
 BBIF

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -828.18 46.00 212.11 16.63



NEW CAR ASSESSMENT PROGRAM

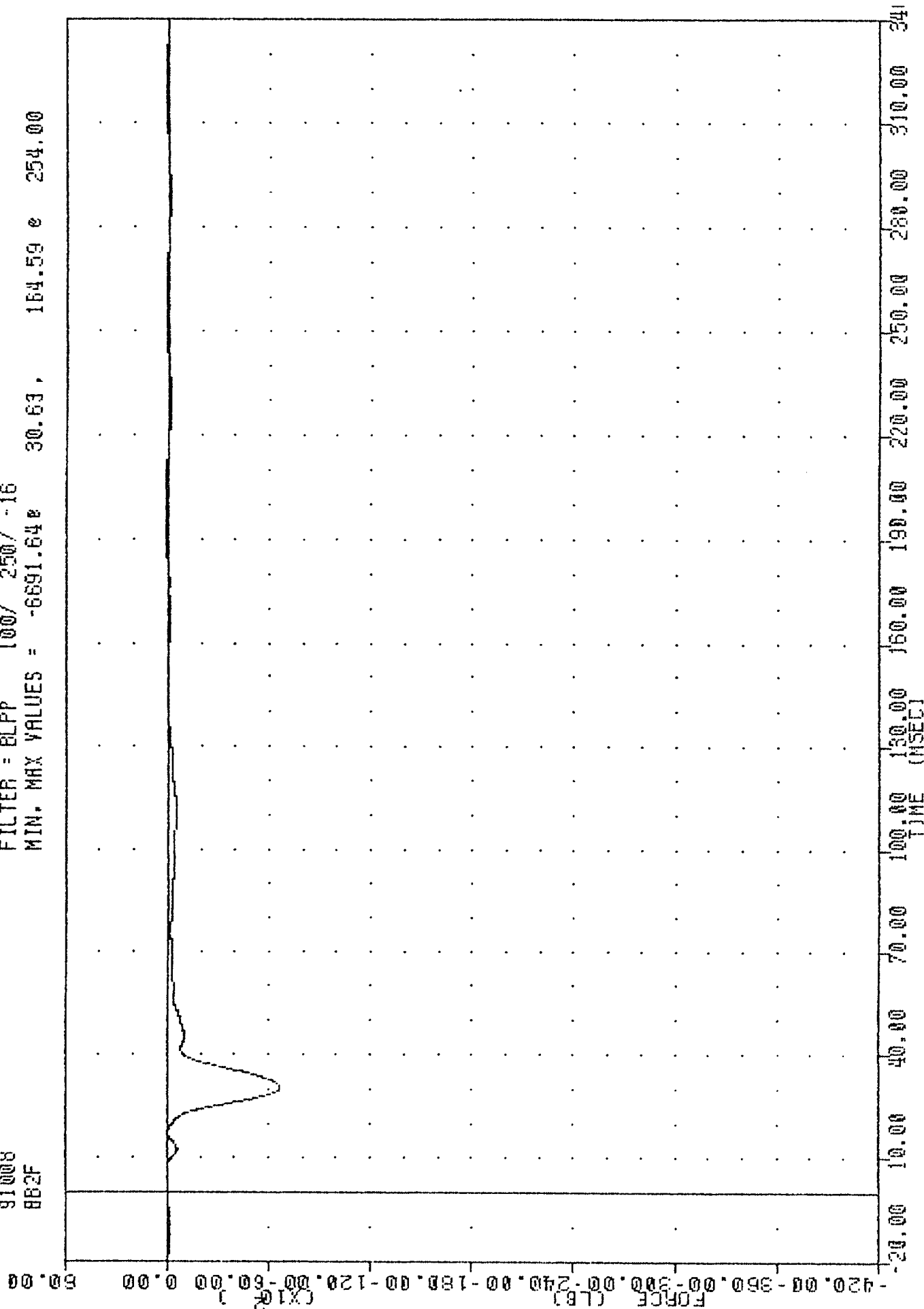
91008

BB2F

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -6691.64e 30.63,

164.59 e 254.00

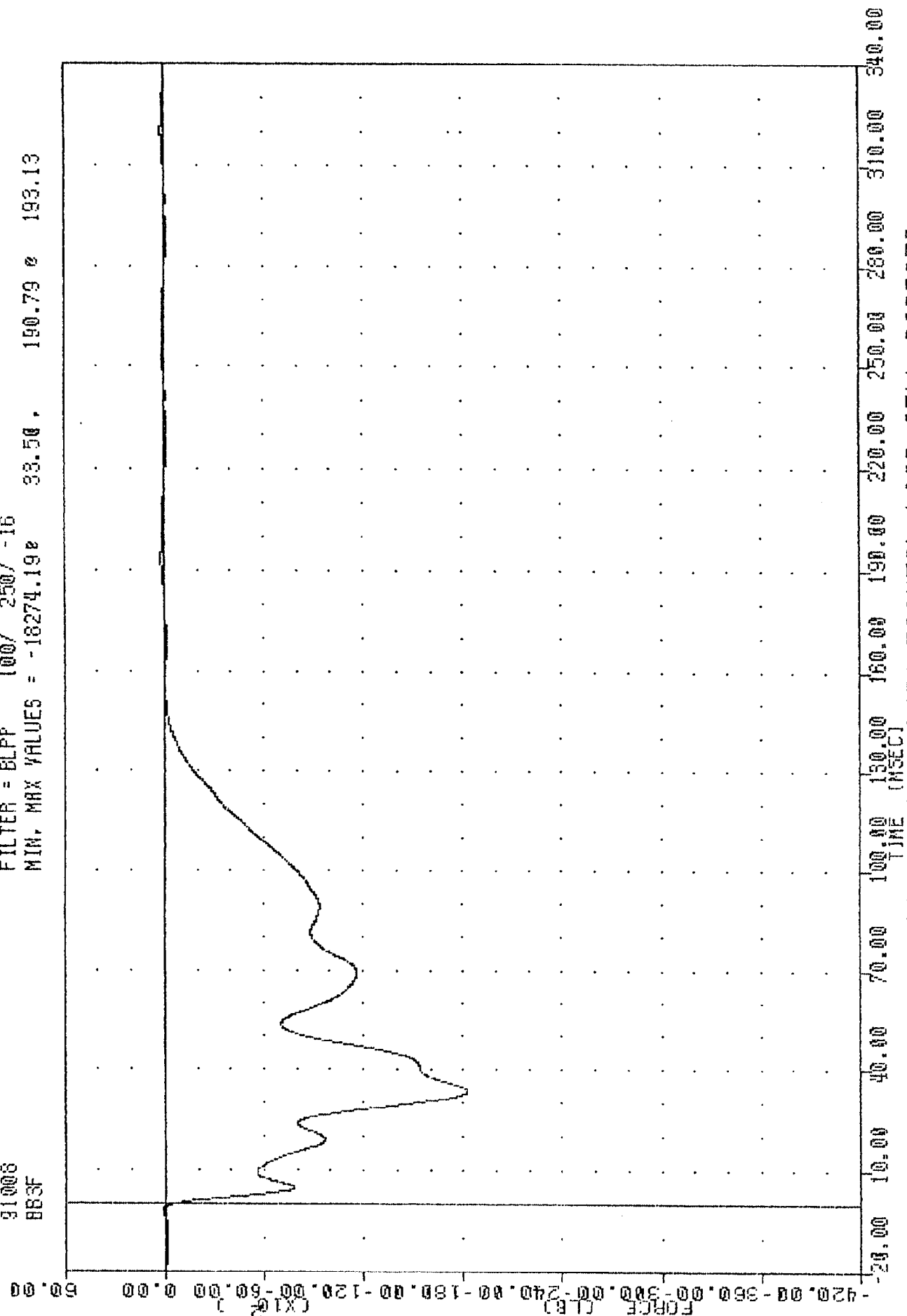


1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION B2 FORCE

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 BE3F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -18274.19e 33.50 , 190.79 e 193.13



NEW CAR ASSESSMENT PROGRAM

91008

BB4F

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -4657.49e 41.13, 211.20 e 255.13

50.00

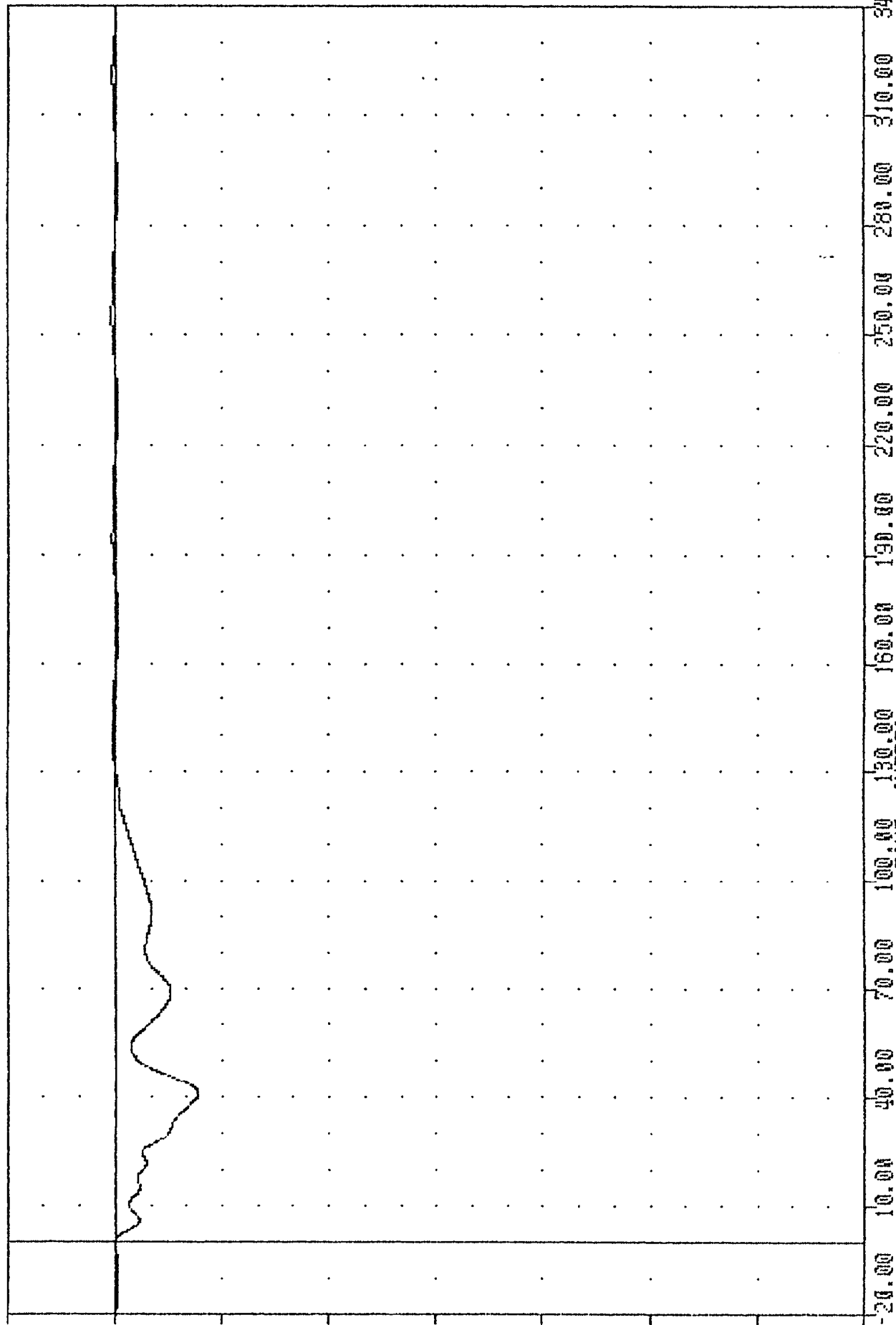
0.00

(X10³)

FORCE (LB)

910108

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1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION B4 FORCE

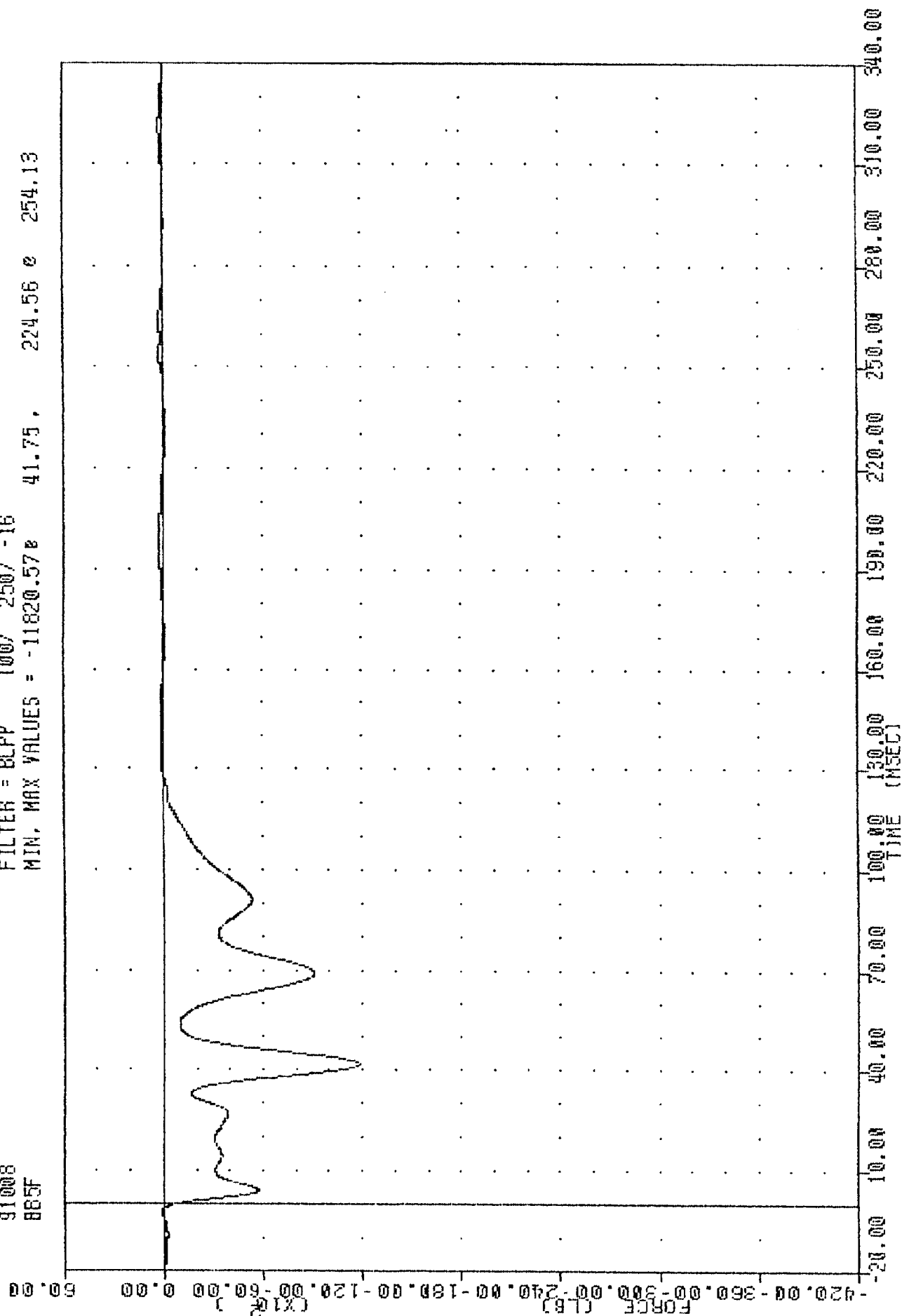
;

TRC
NEW CAR ASSESSMENT PROGRAM
91008
885F

* 910108

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -11820.57 41.75, 224.56 254.13



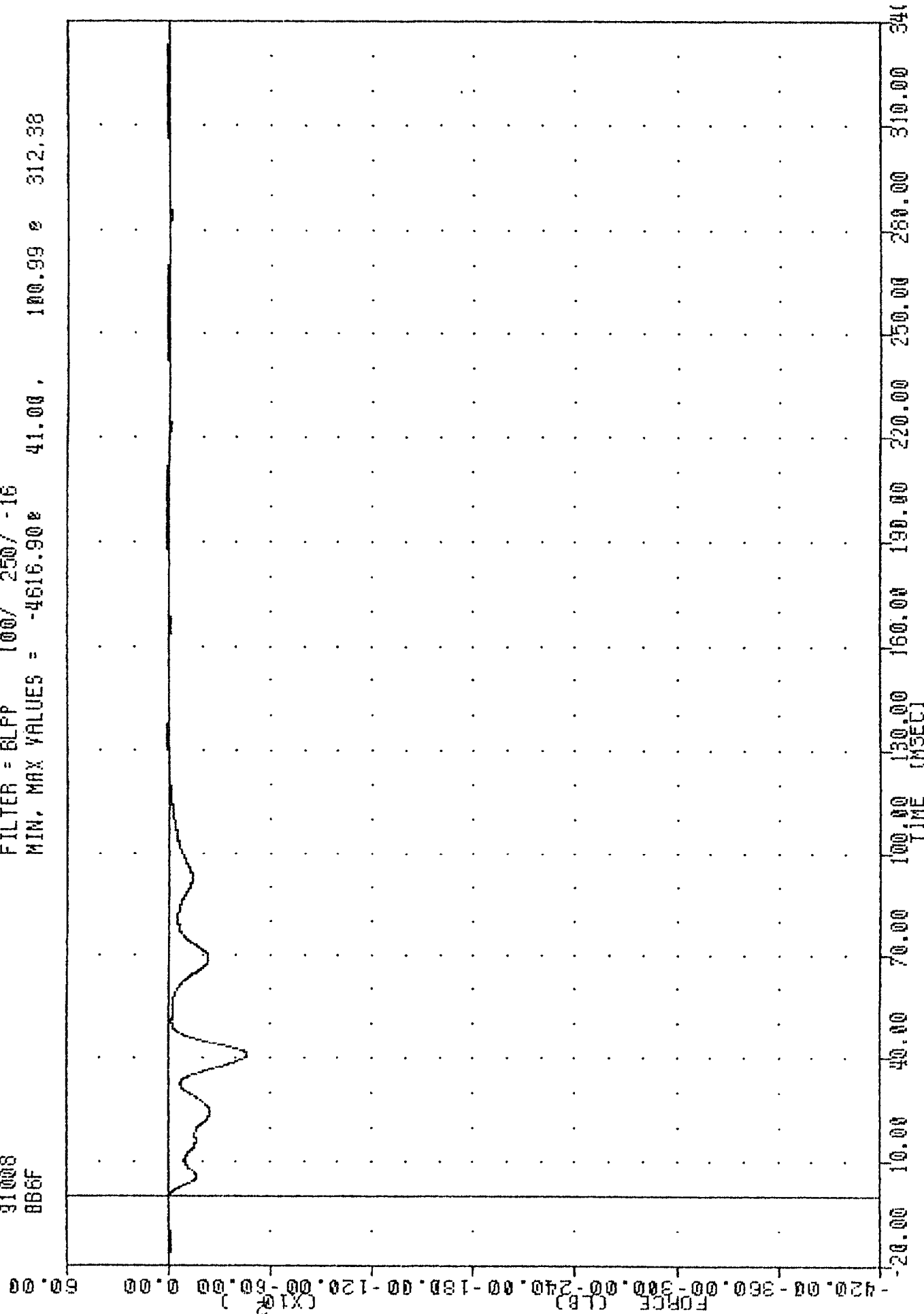
NEW CAR ASSESSMENT PROGRAM

31008

BB6F

FILTER = BLPP 100/ 250/ -16

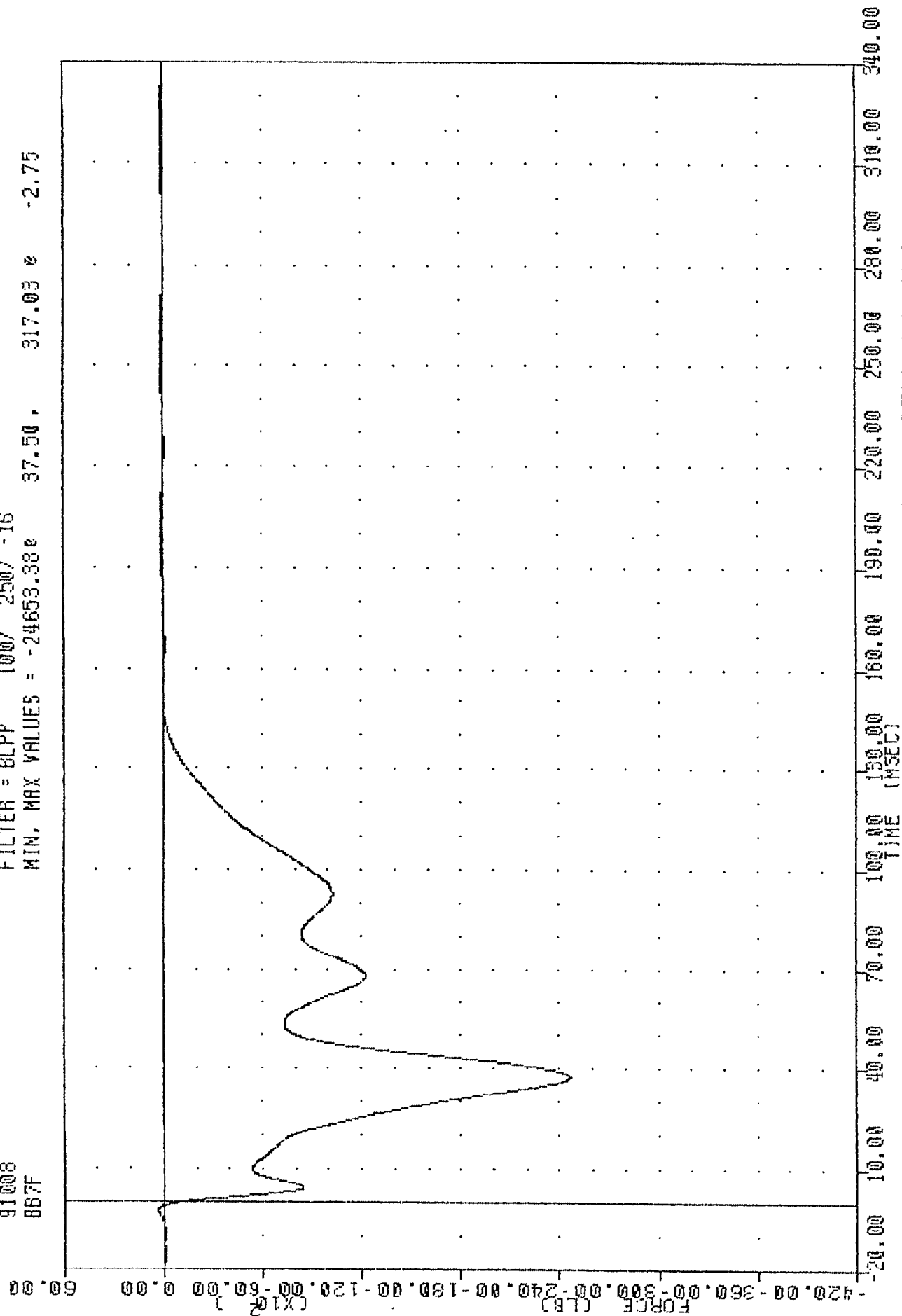
MIN, MAX VALUES = -4616.90e 41.00, 100.99 e 312.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B6 FORCE

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 BB7F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -24653.38e 37.50 , 317.03 e -2.75



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B7 FORCE

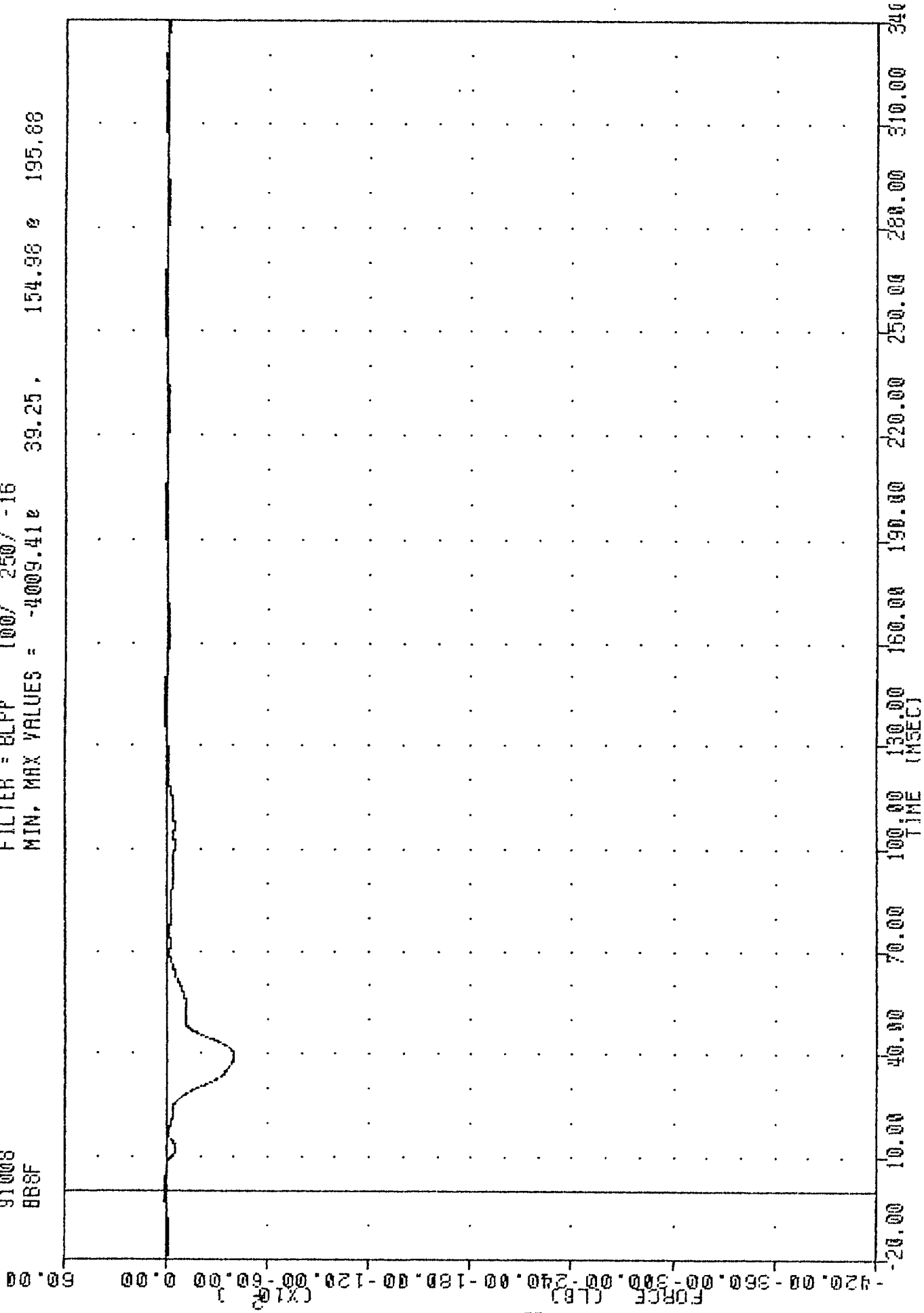
NEW CAR ASSESSMENT PROGRAM

91008

BB8F

FILTER = BLPP 100/ 250/ -16

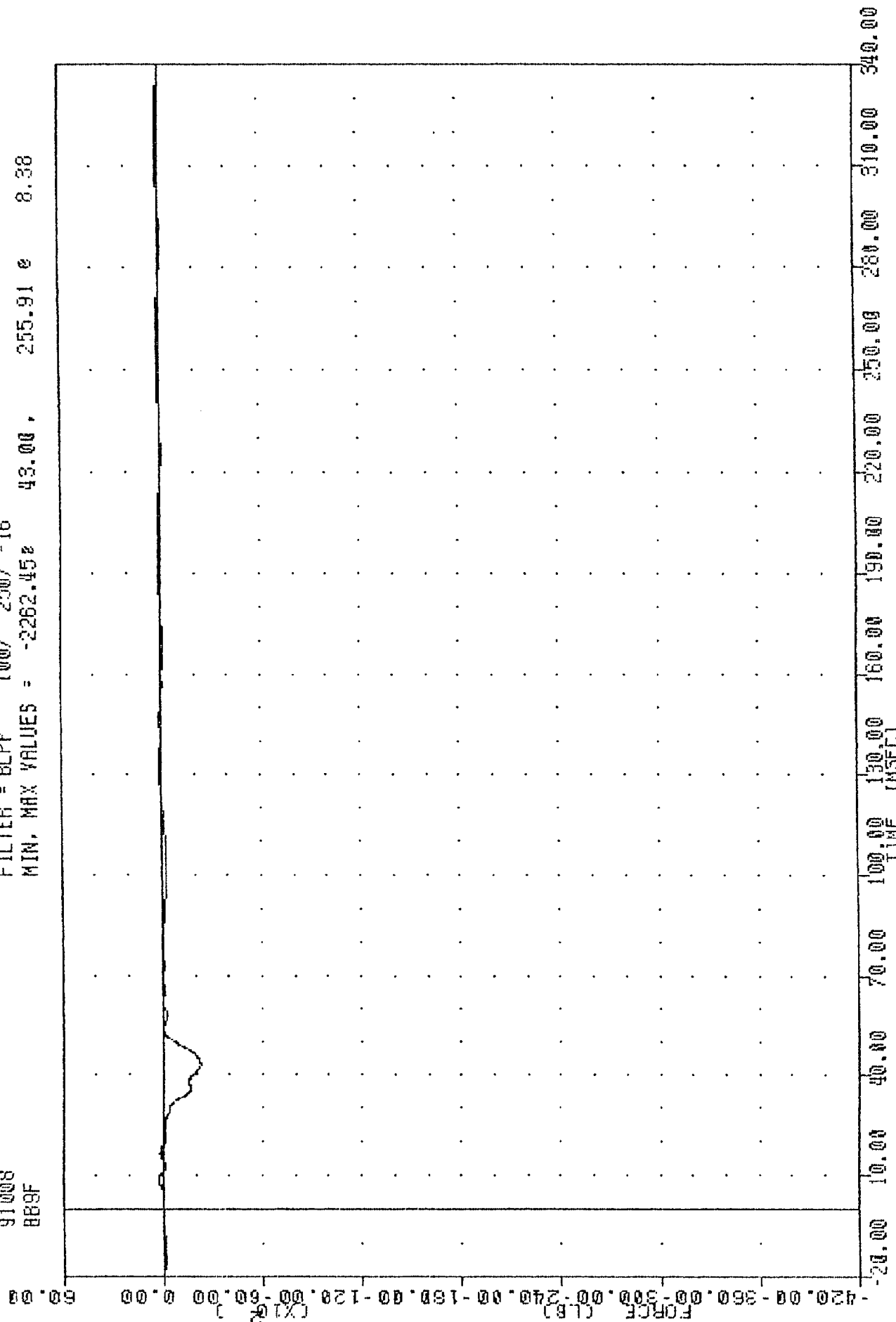
MIN. MAX VALUES = -4009.41e 39.25, 154.98 e 195.88



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B8 FORCE ;

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 BB9F

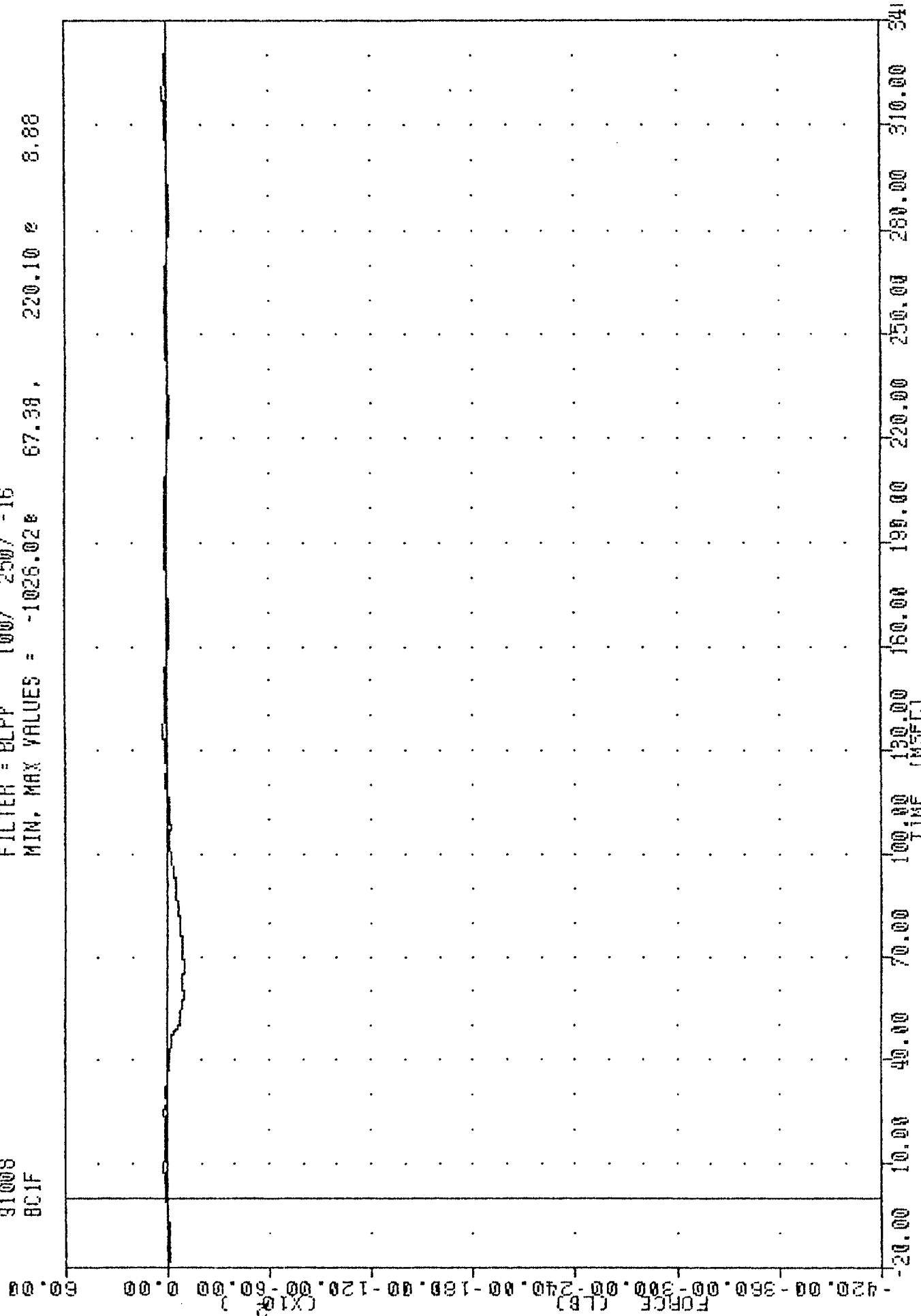
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -2262.45 43.00 , 255.91 e 8.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 20 FORCE

INC
NEW CAR ASSESSMENT PROGRAM
91008
BC1F

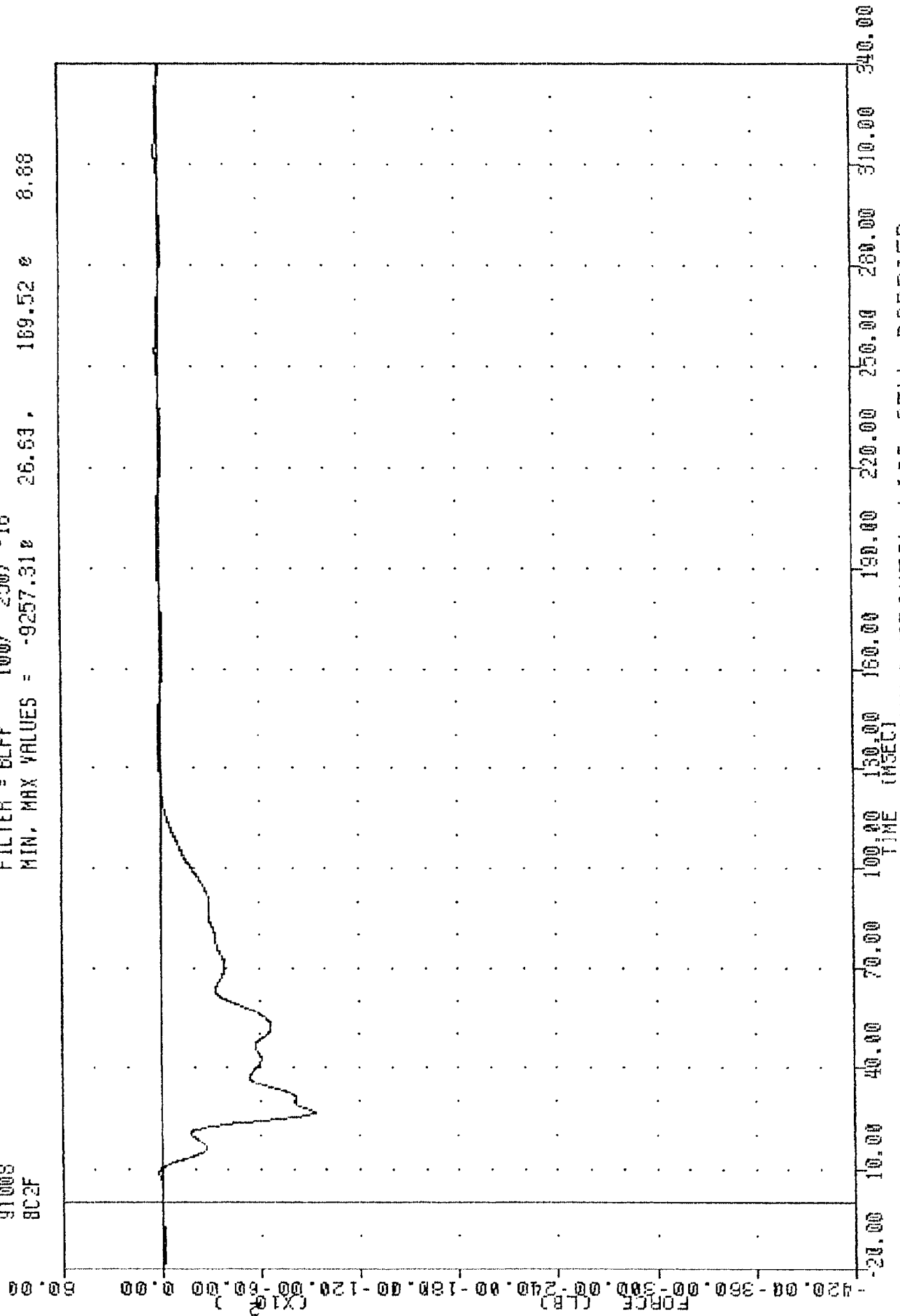
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -1026.02 67.38 220.10 8.88



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C1 FORCE

TRC , 910108
NEW CAR ASSESSMENT PROGRAM

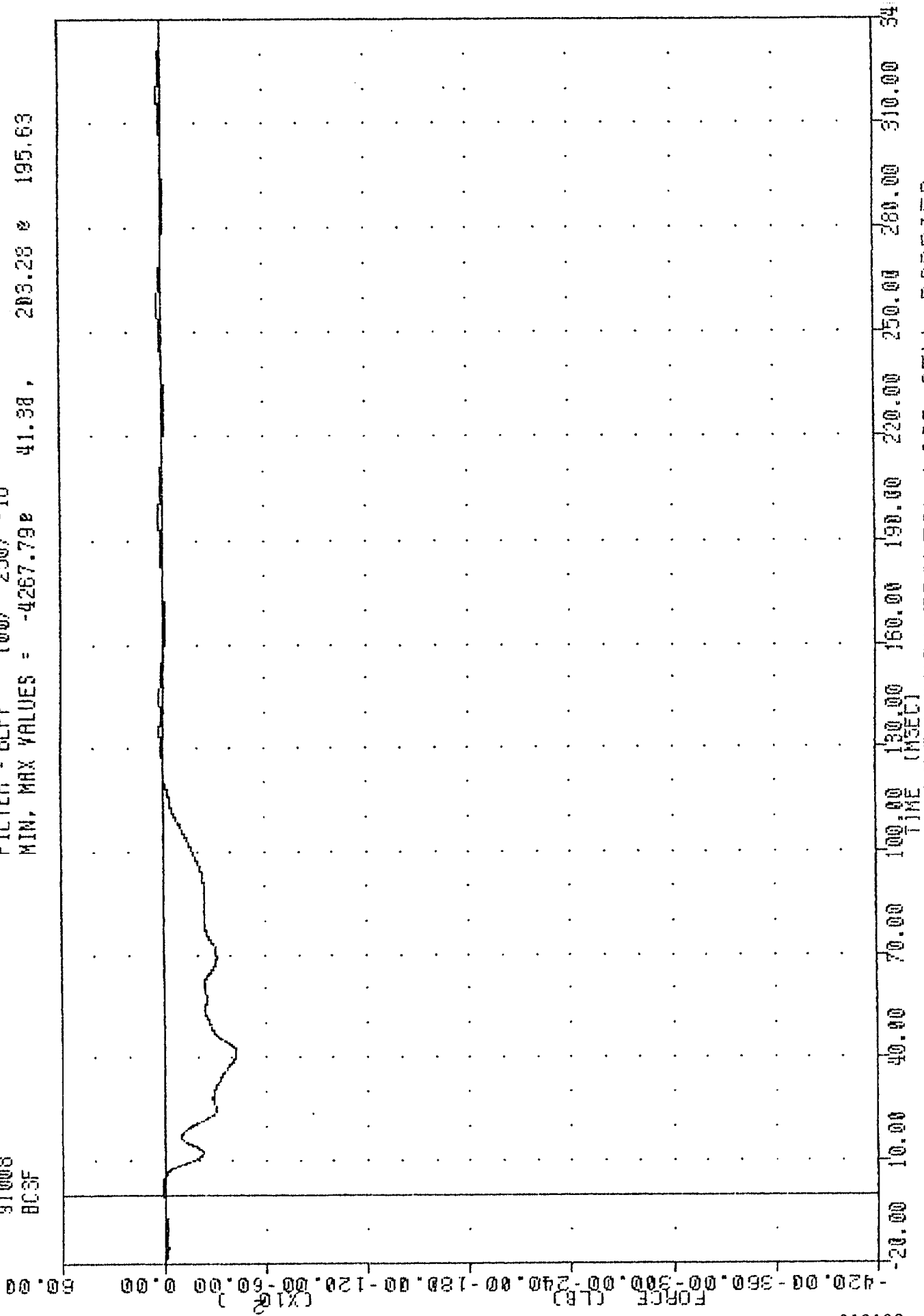
91008
802F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -9257.31% 26.63, 169.52 % 8.68



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION FORCE

NEW CAR ASSESSMENT PROGRAM
 91008
 BC3F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -4267.79 41.38 , 203.28 195.63



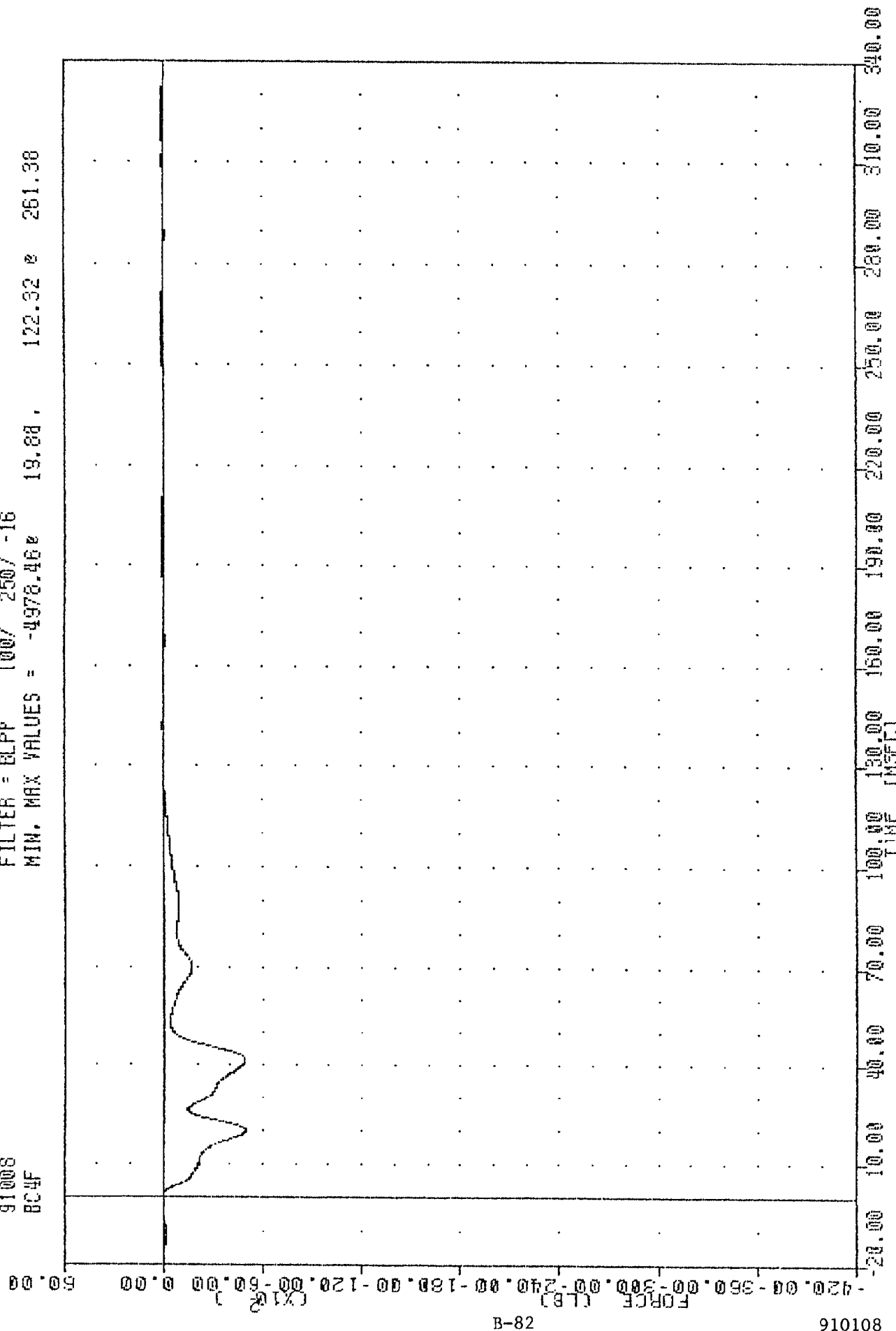
910108

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1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C3 FORCE

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 BC4F

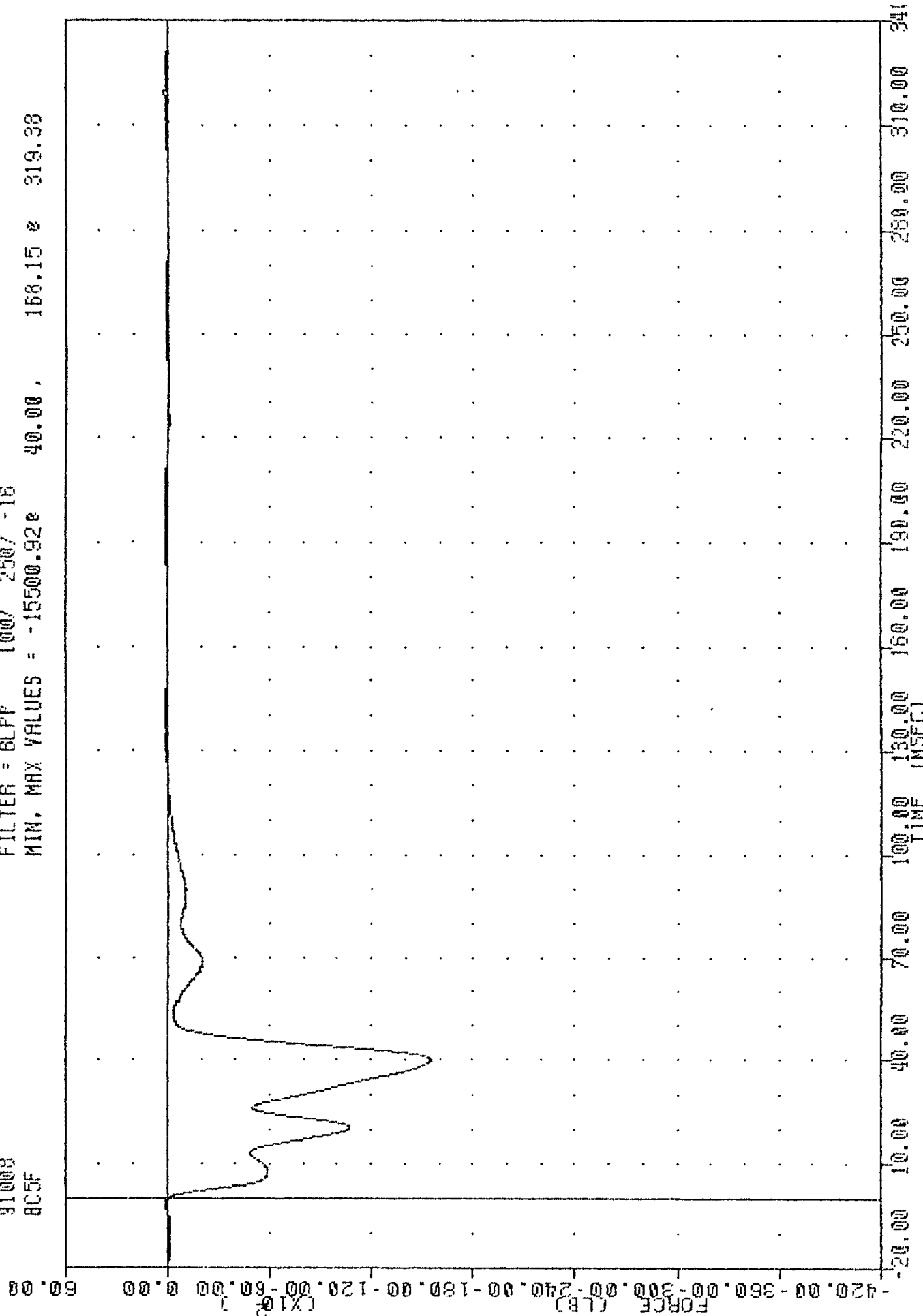
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -4978.46e 19.88 , 122.32 e 261.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION FORCE

NEW CAR ASSESSMENT PROGRAM
 91008
 BC5F

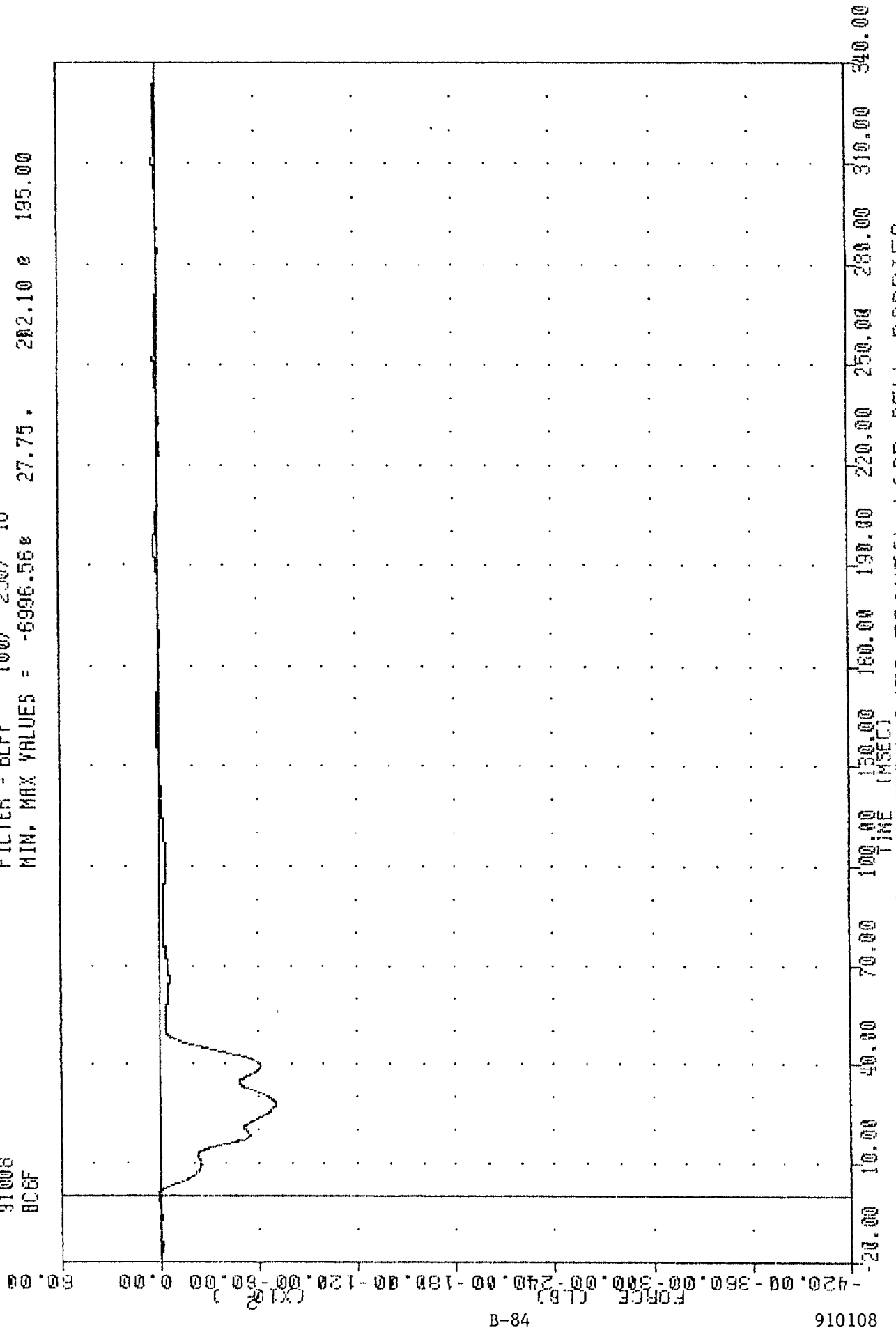
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -15500.92e 40.00, 168.15 e 319.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C5 FORCE

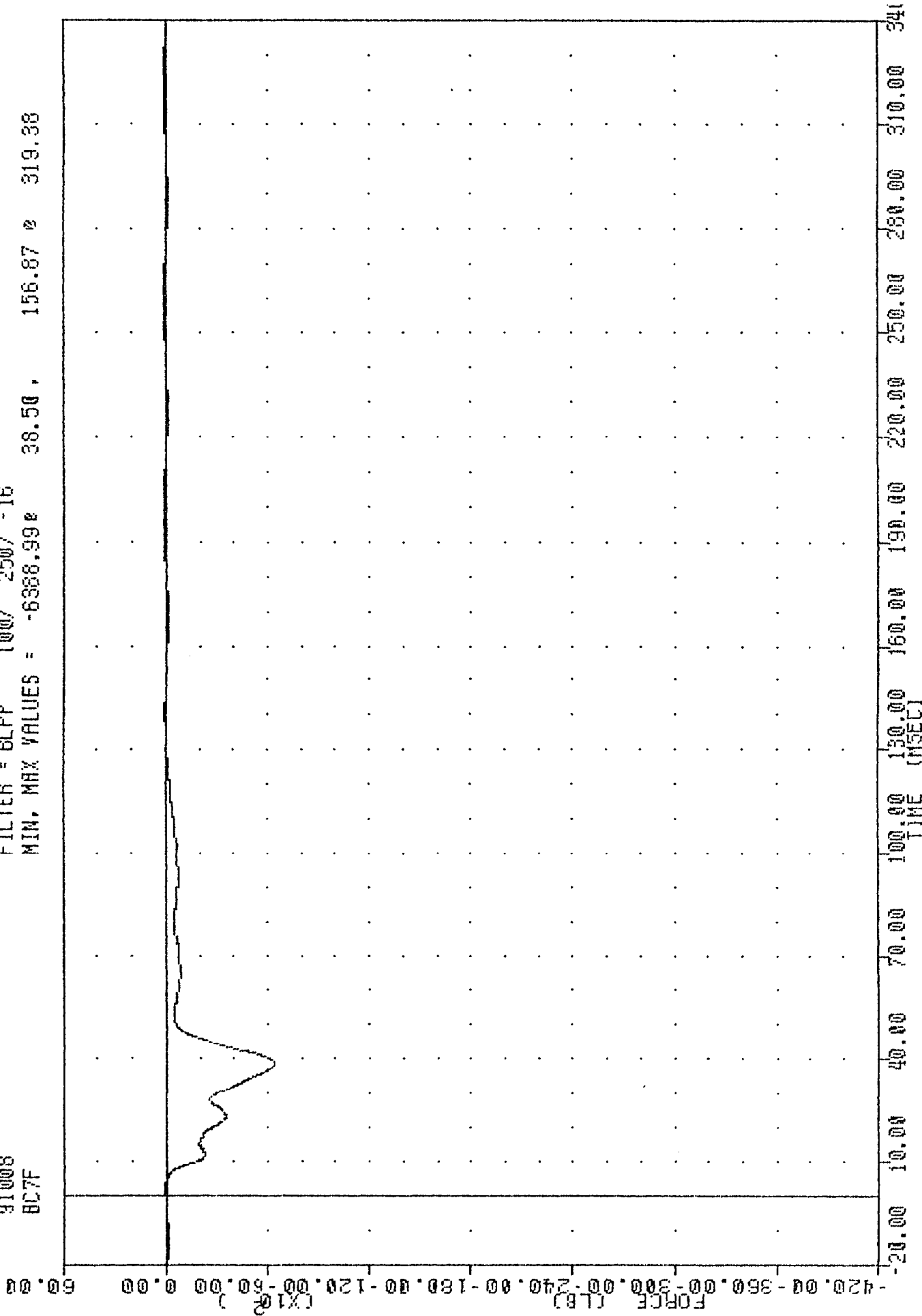
TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 BCGF

FILTER = BLFF 100/ 250/ -16
 MIN. MAX VALUES = -6996.56 27.75, 202.10 195.00



NEW CAR ASSESSMENT PROGRAM
 91008
 BC7F

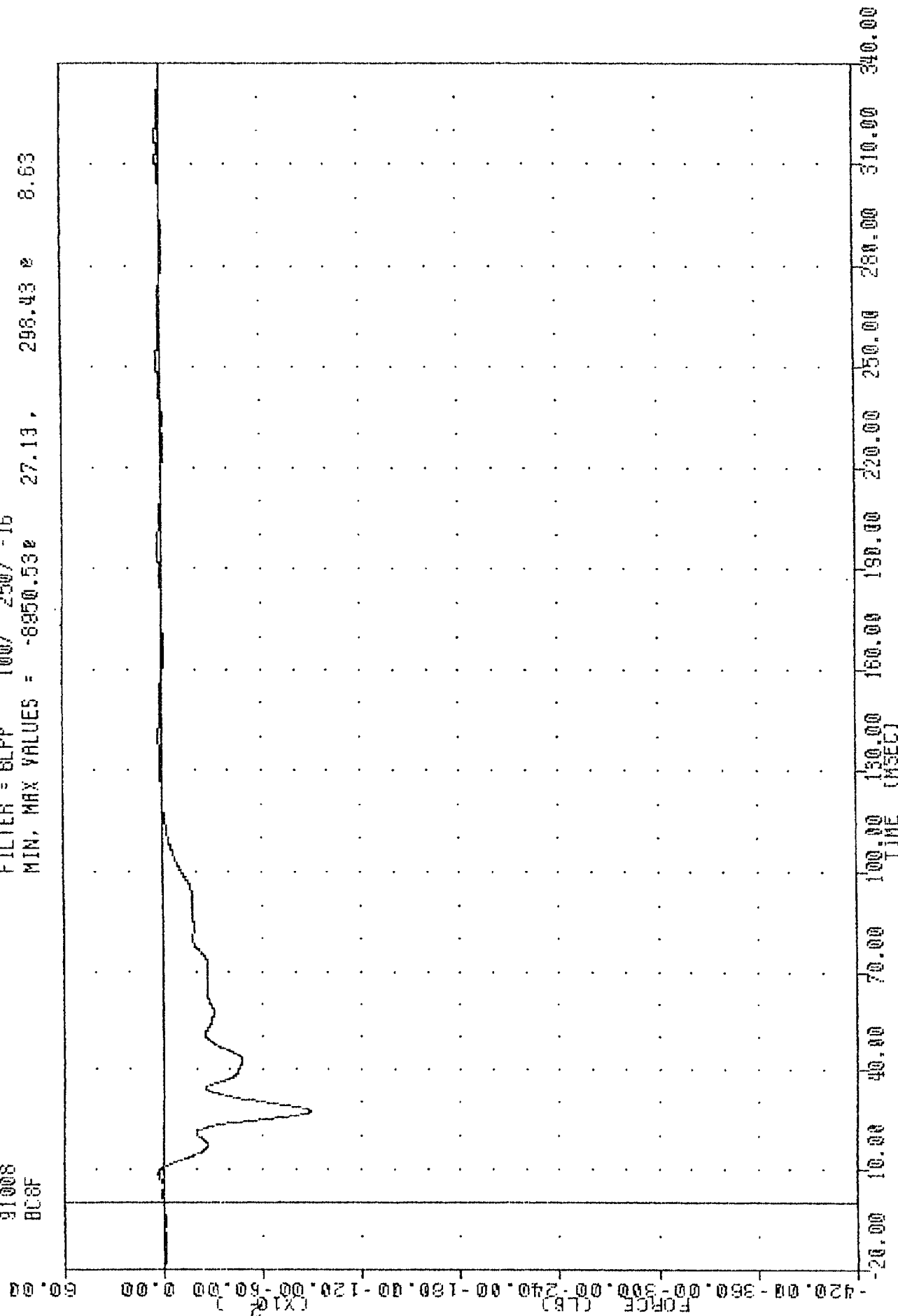
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -6368.99 38.50 , 156.87 319.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C7 FORCE

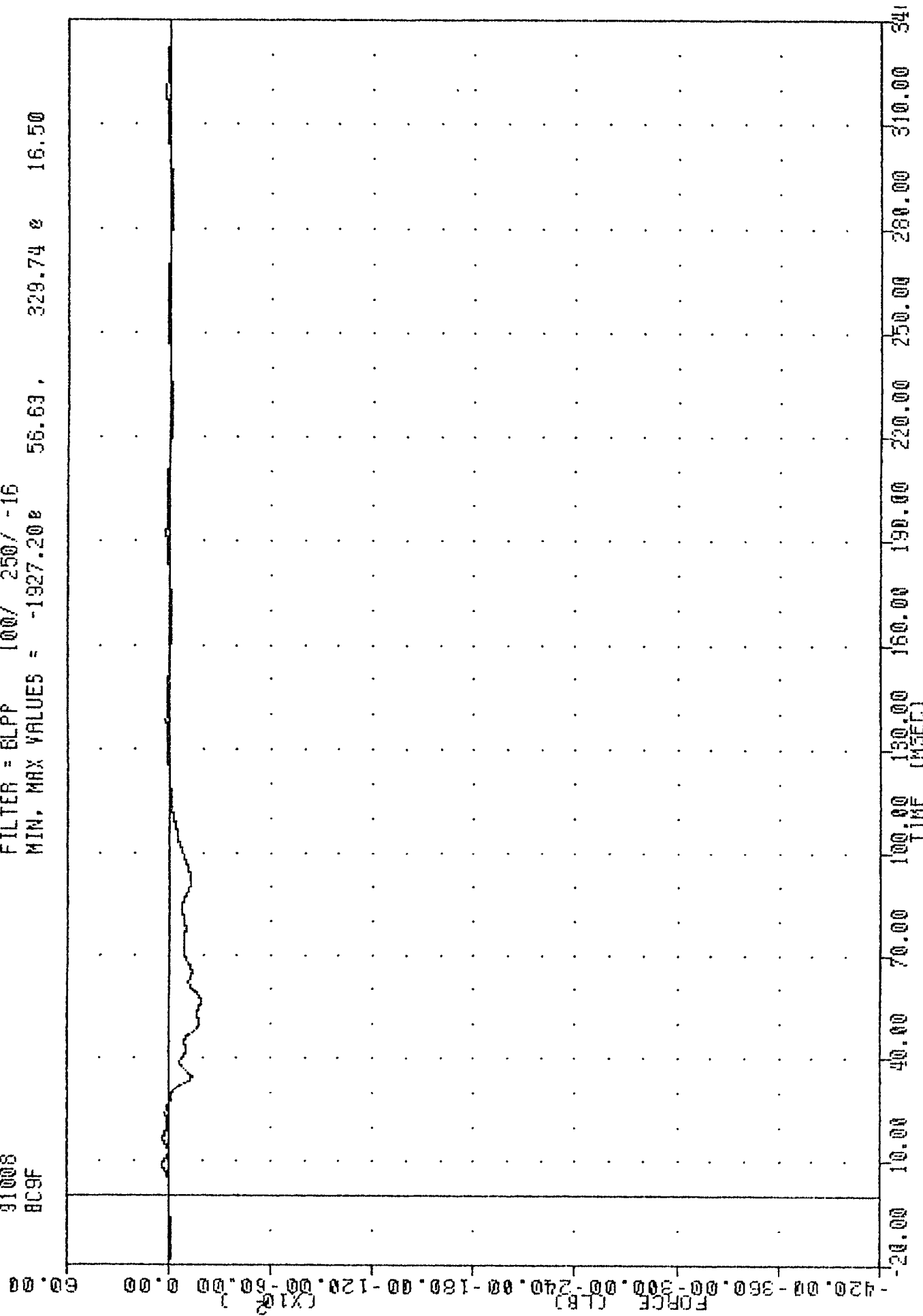
TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 BC8F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -8950.530 27.13, 298.43 8 8.63



NEW CAR ASSESSMENT PROGRAM
 91008
 BC9F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1927.200 56.63, 329.74 16.50



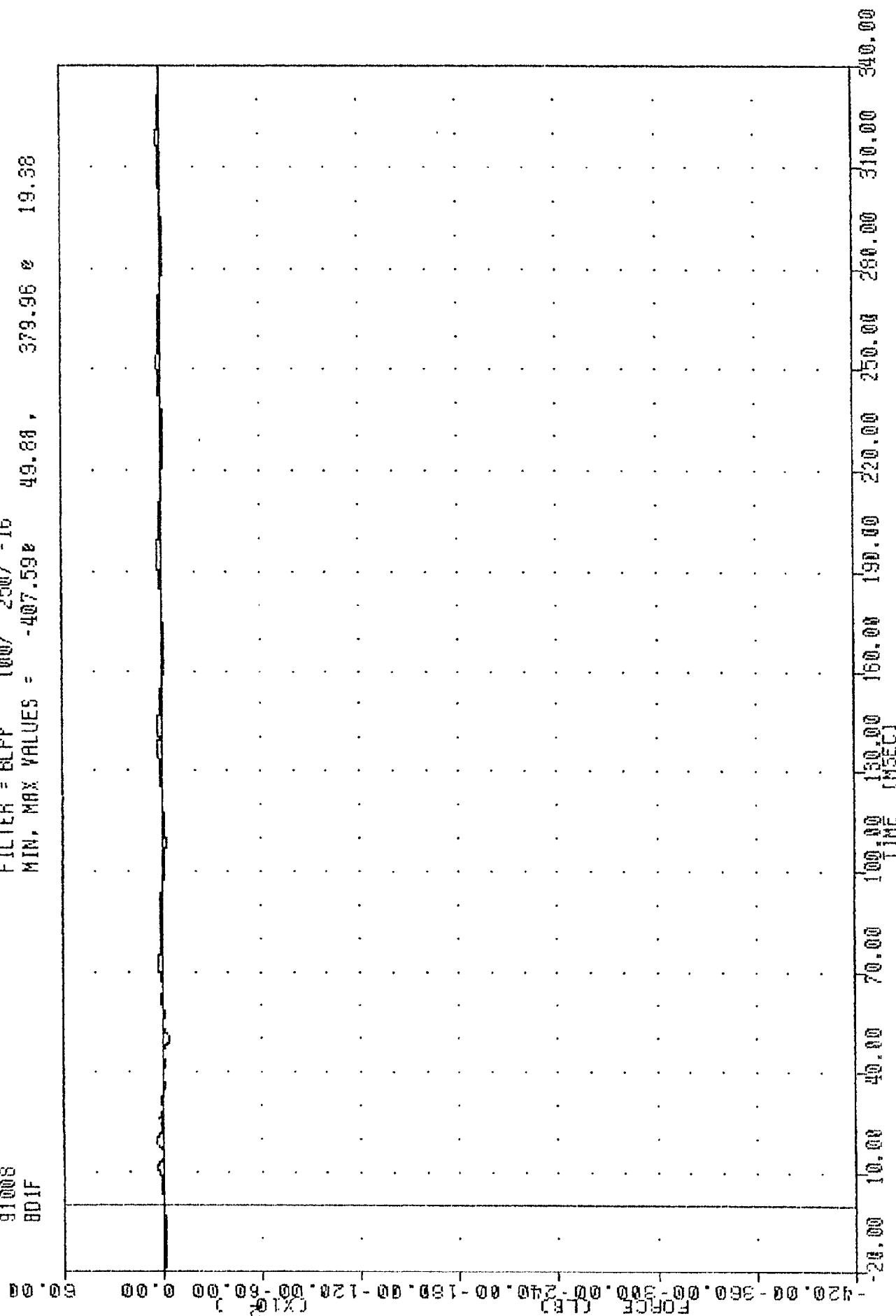
1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C9 FORCE

TRC
NEW CAR ASSESSMENT PROGRAM
91008
BD1F

910108

FILTER = BLFP 100/ 250/ -16

MIN, MAX VALUES = -407.59 49.88, 379.96 19.38

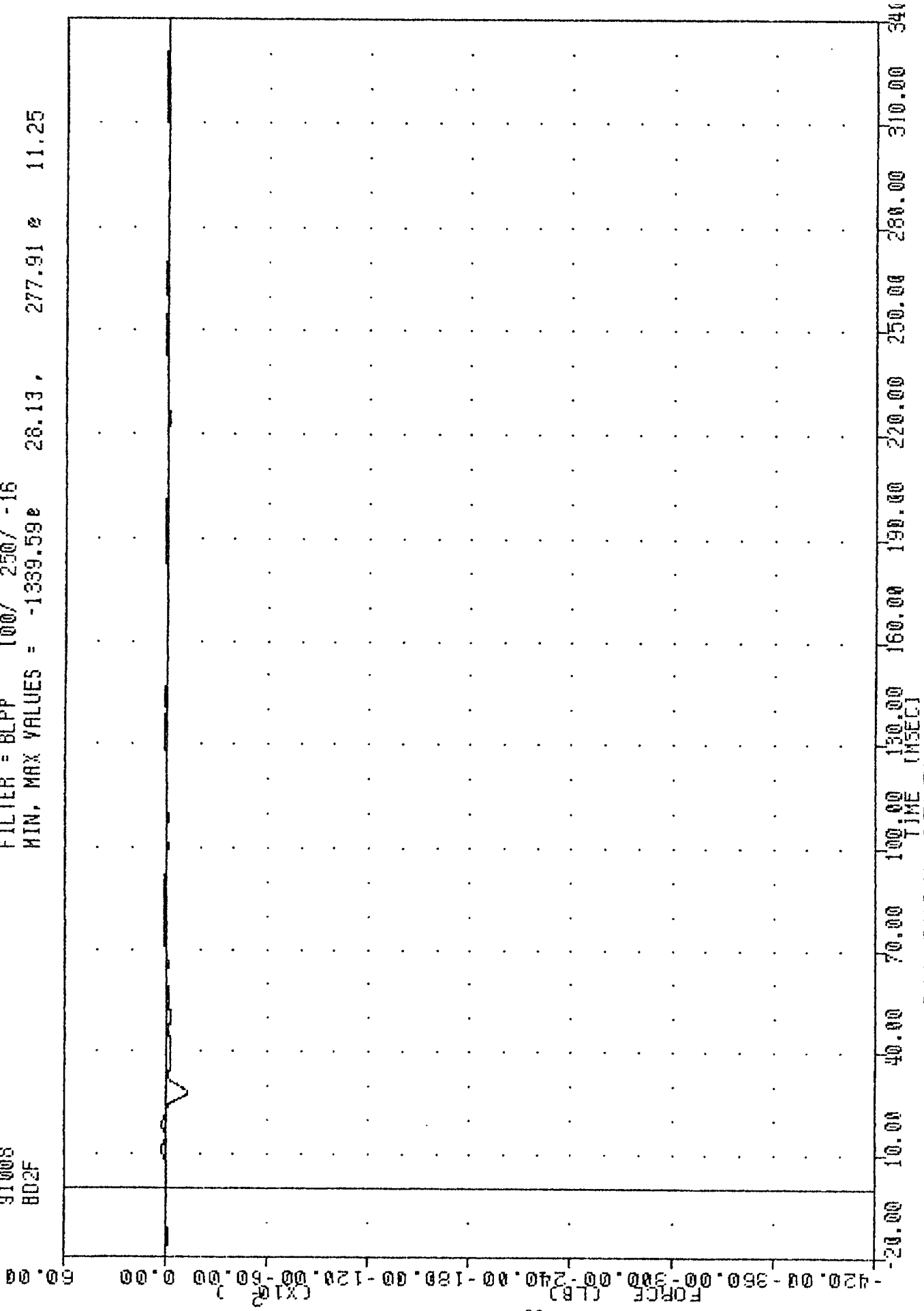


1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION PL FORCE

NEW CAR ASSESSMENT PROGRAM

91008
BD2F

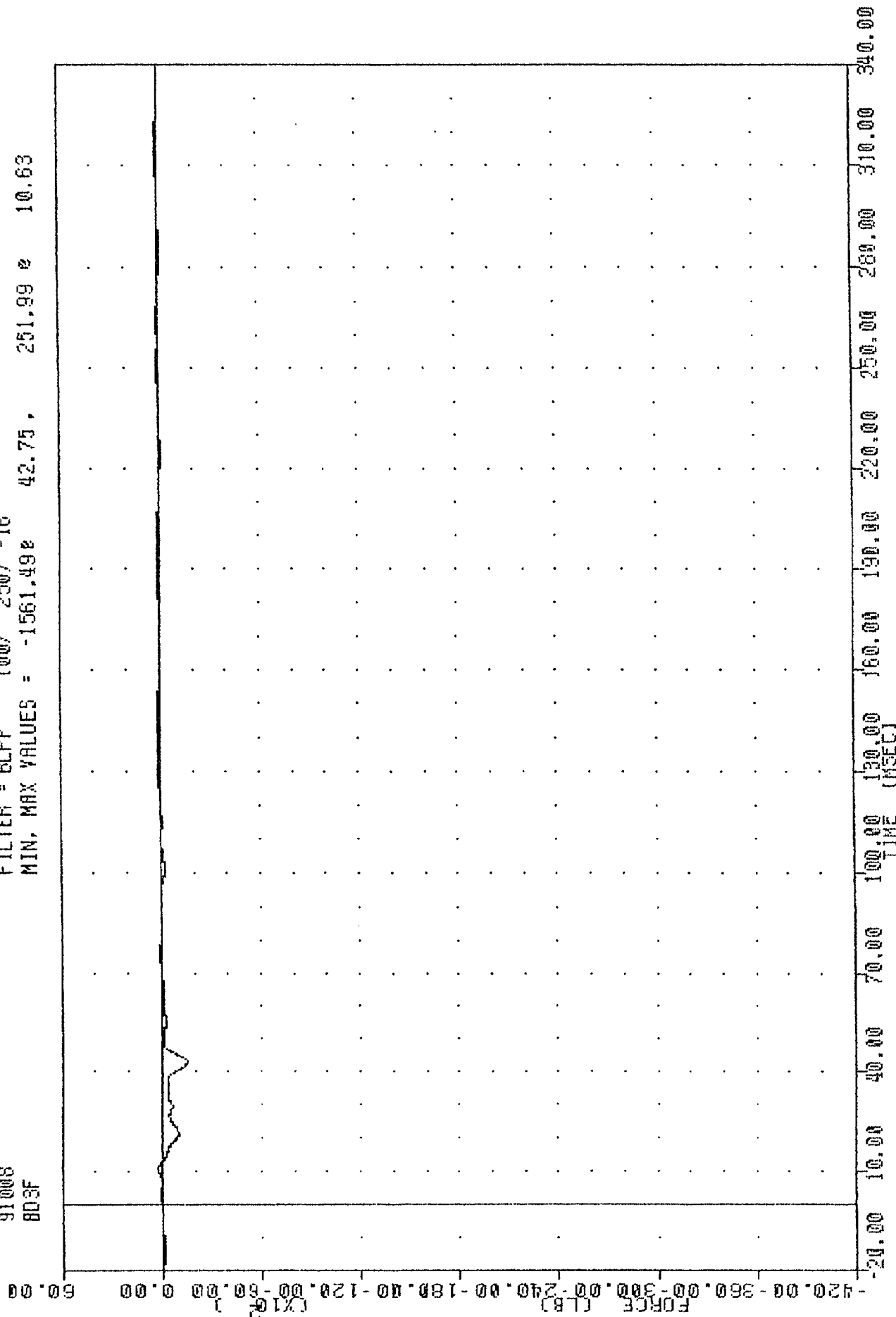
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -1339.59e 28.13, 277.91 e 11.25



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D2 FORCE

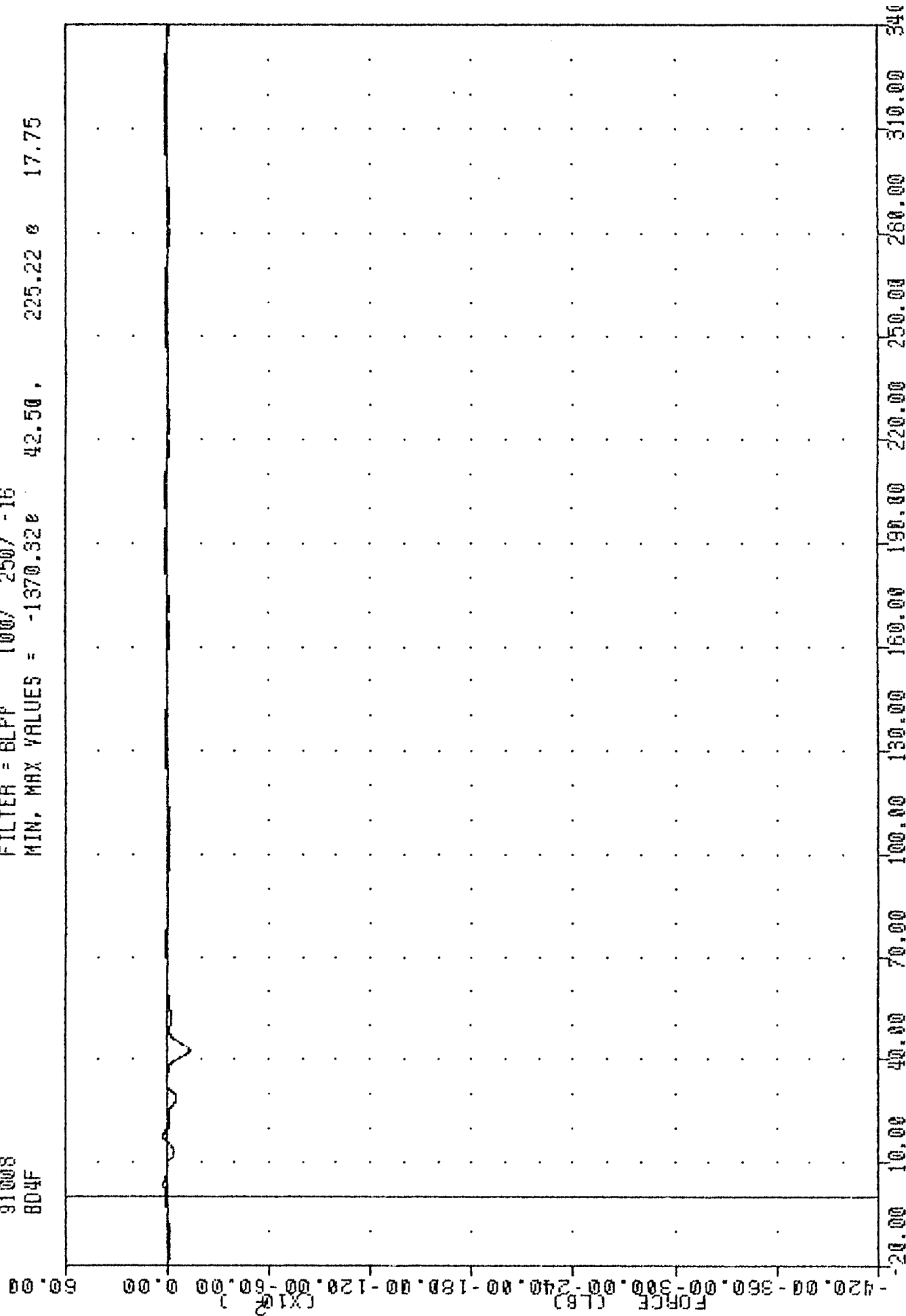
TRC 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 803F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -1561.49 42.75 251.99 10.63



NEW CAR ASSESSMENT PROGRAM
 91008
 804F

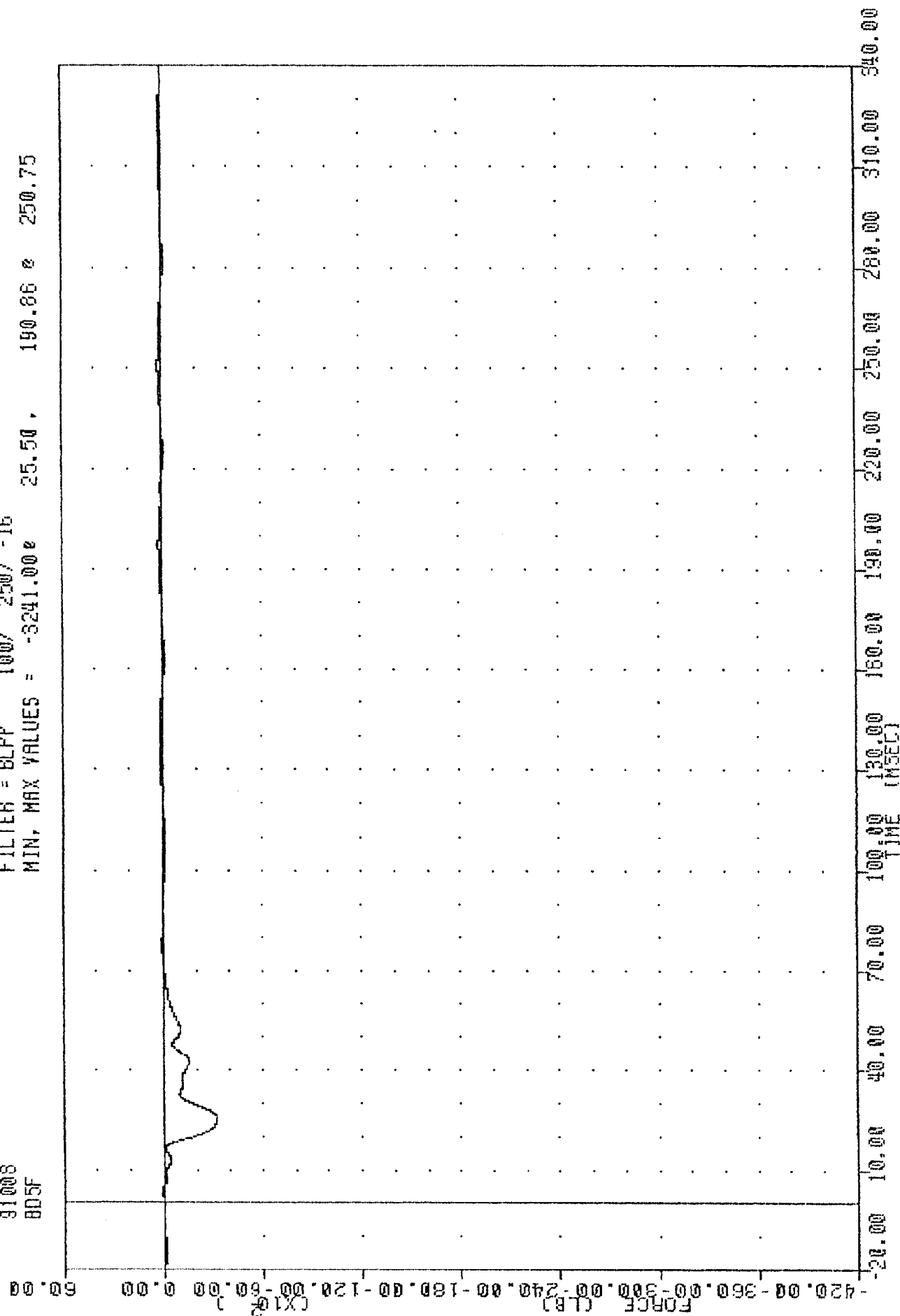
FILTER = BLFP 100/ 250/ -16
 MIN, MAX VALUES = -1370.32 42.50, 225.22 17.75



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D4 FORCE

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 805F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -3241.00e 25.50 , 190.86 e 250.75

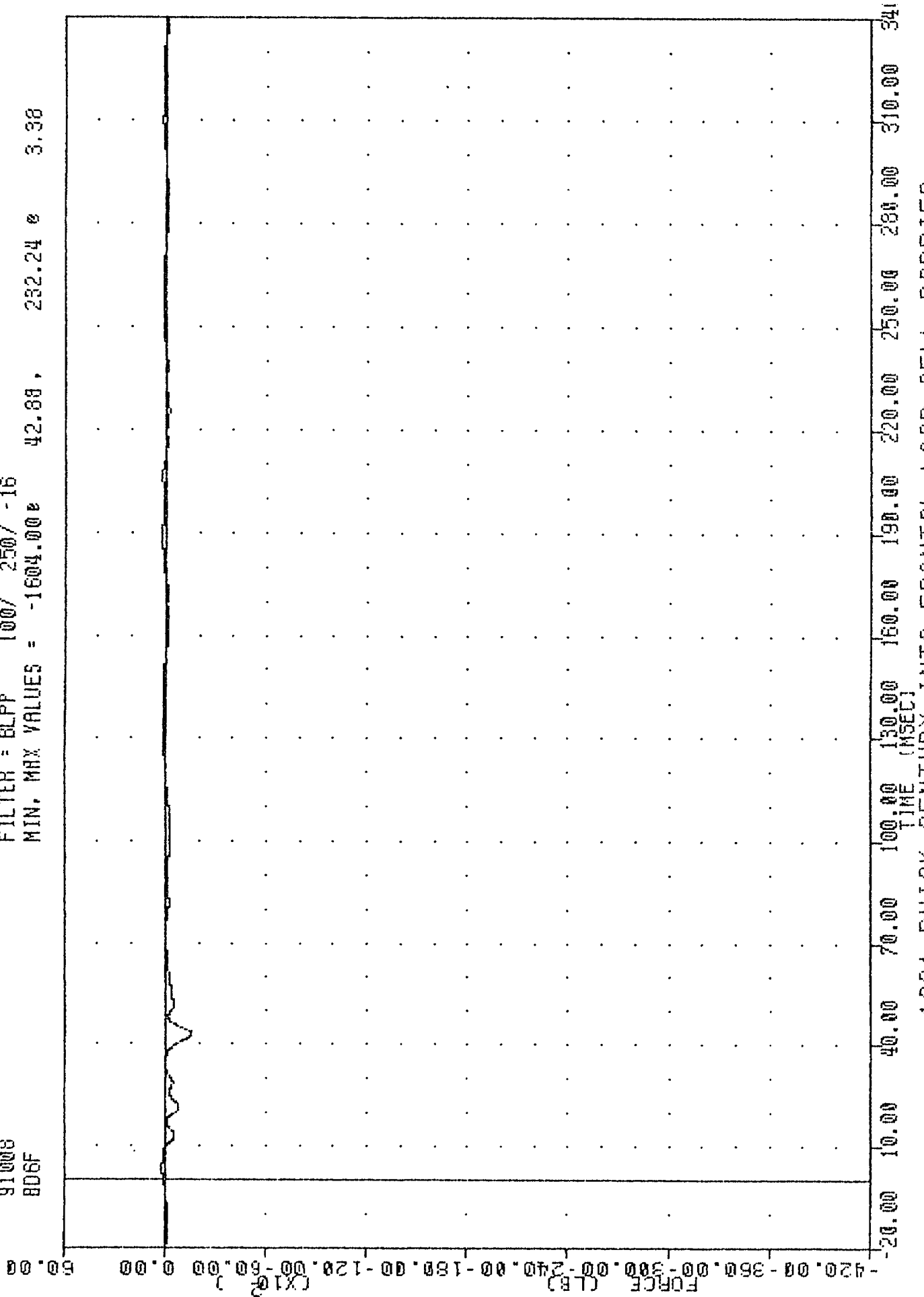


1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION FORCE

INC , 3JW1W0
 NEW CAR ASSESSMENT PROGRAM
 91008
 B06F

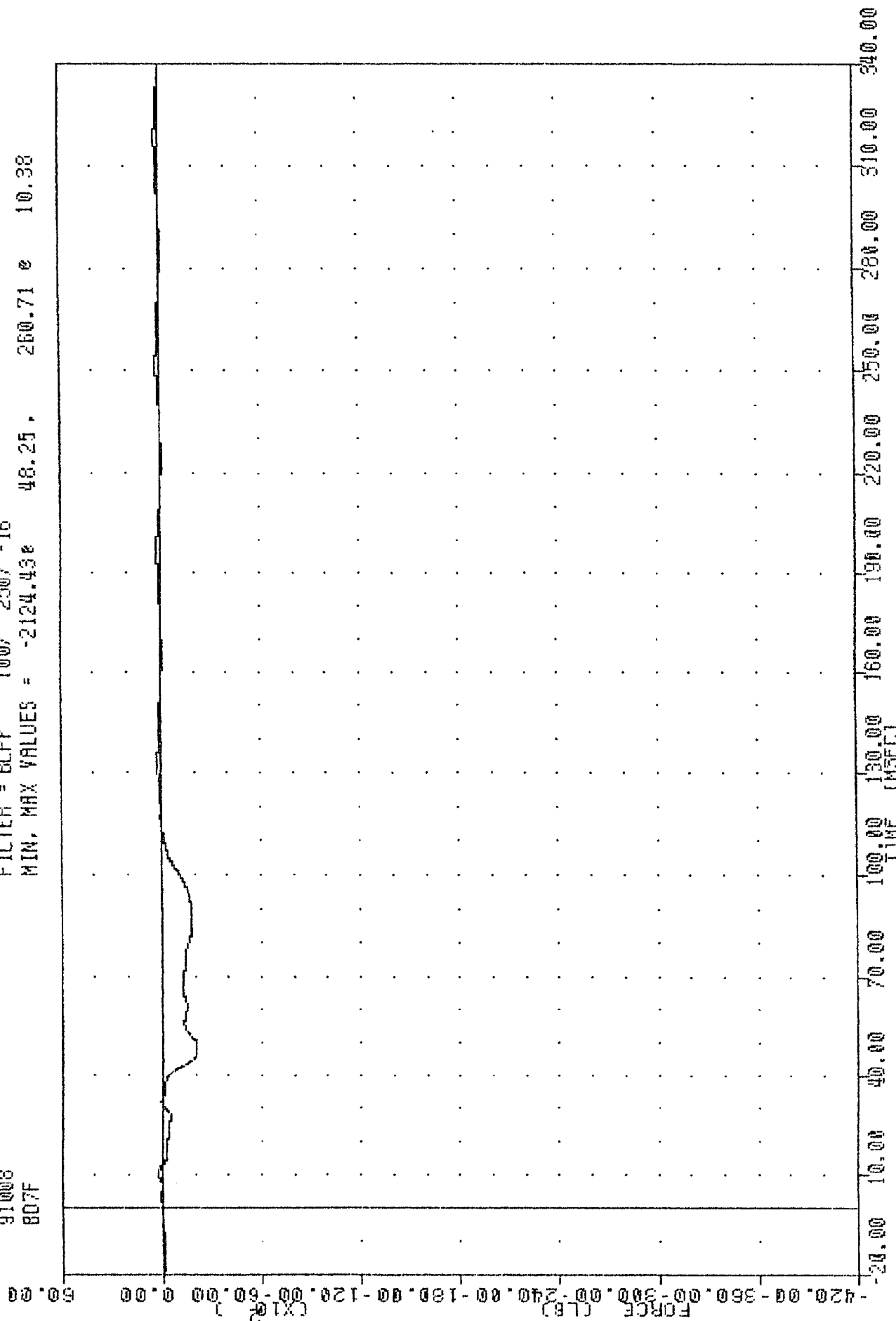
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1604.00e 42.88, 232.24 e 3.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D6 FORCE

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 807F

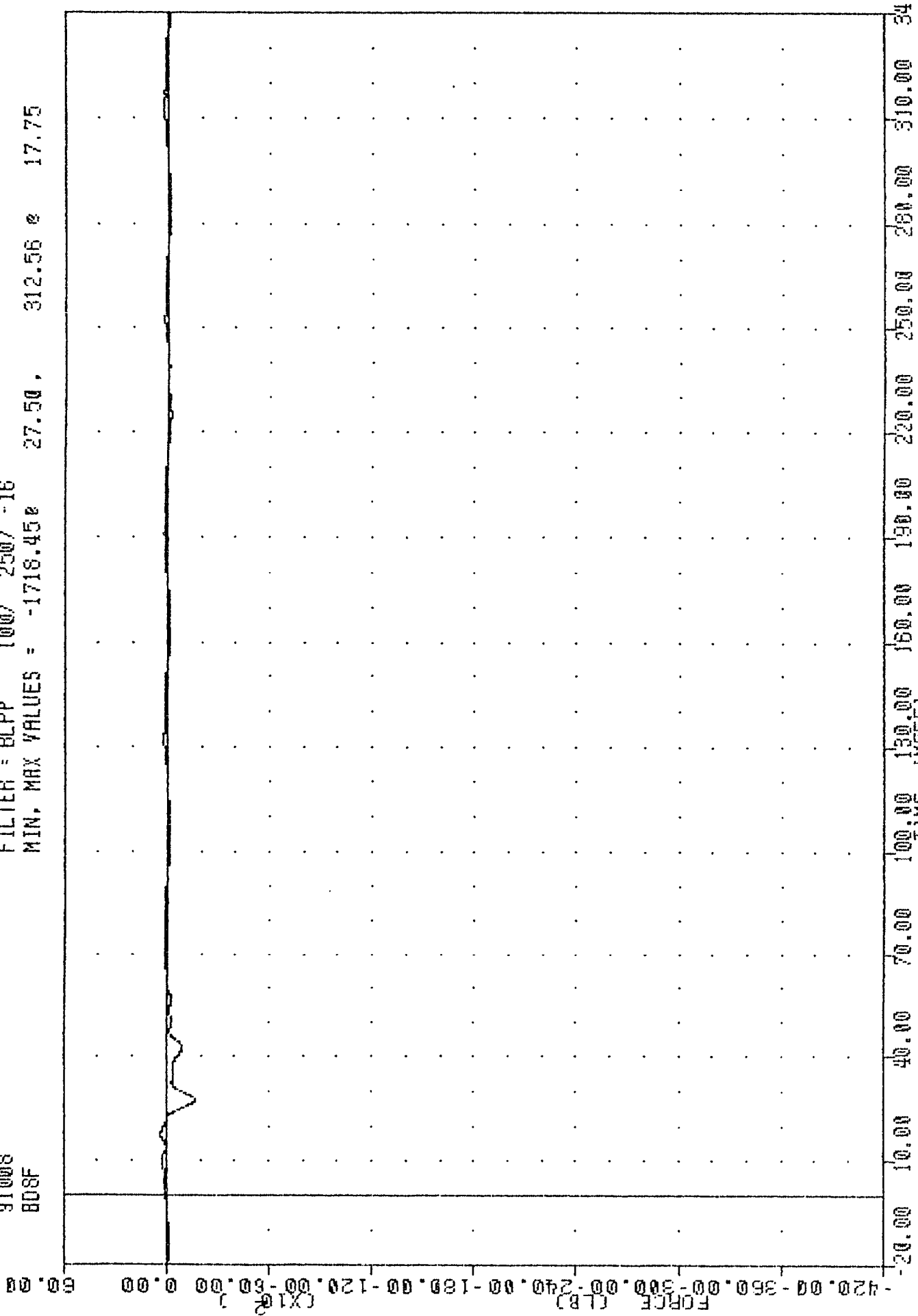
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -2124.43e 48.25 , 260.71 e 10.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 02 FORCE

NEW CAR ASSESSMENT PROGRAM
 91008
 B08F

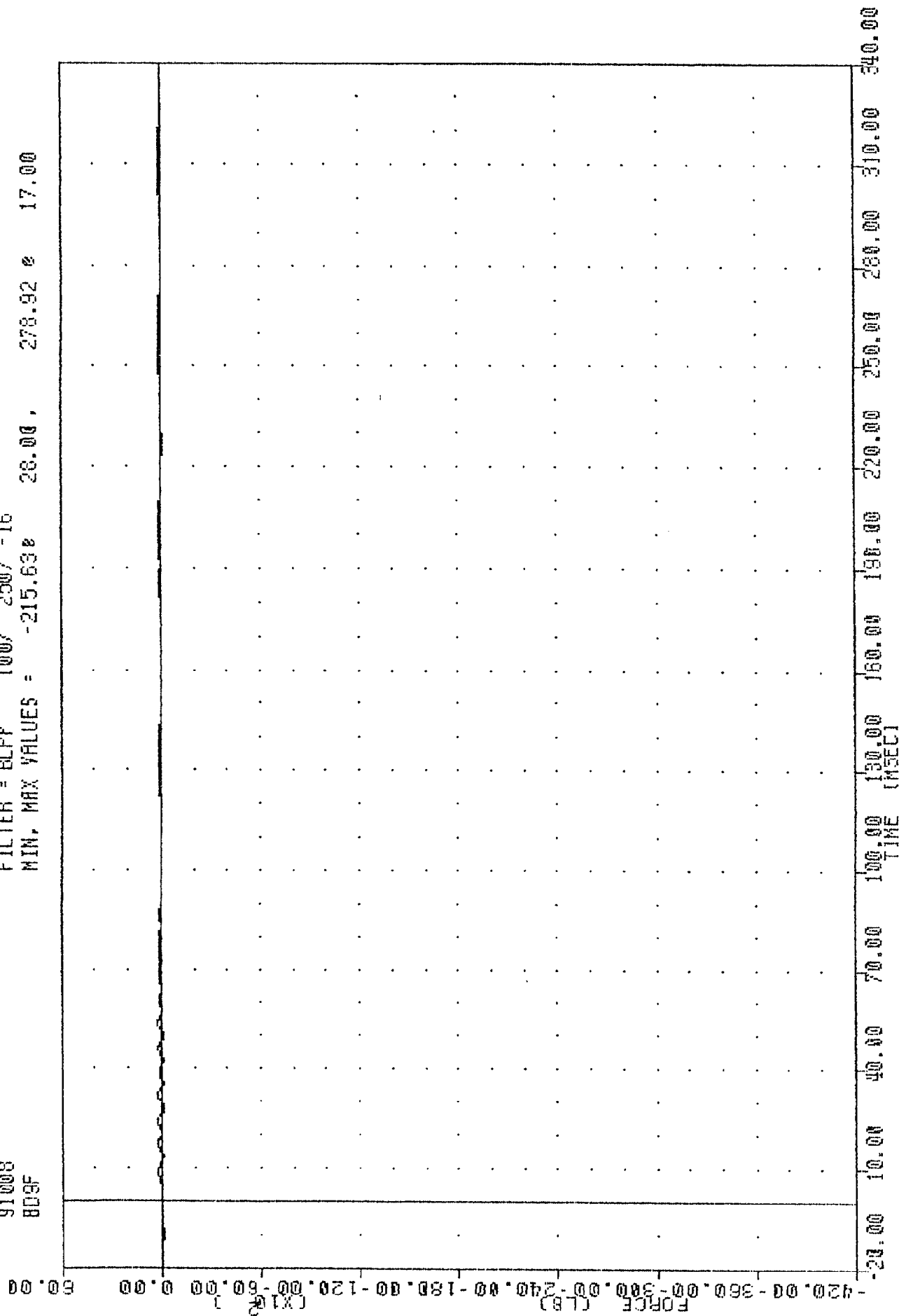
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1718.450 27.50, 312.56 0 17.75



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 08 FORCE

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 BDCF

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -215.63 28.00 , 278.92 17.00



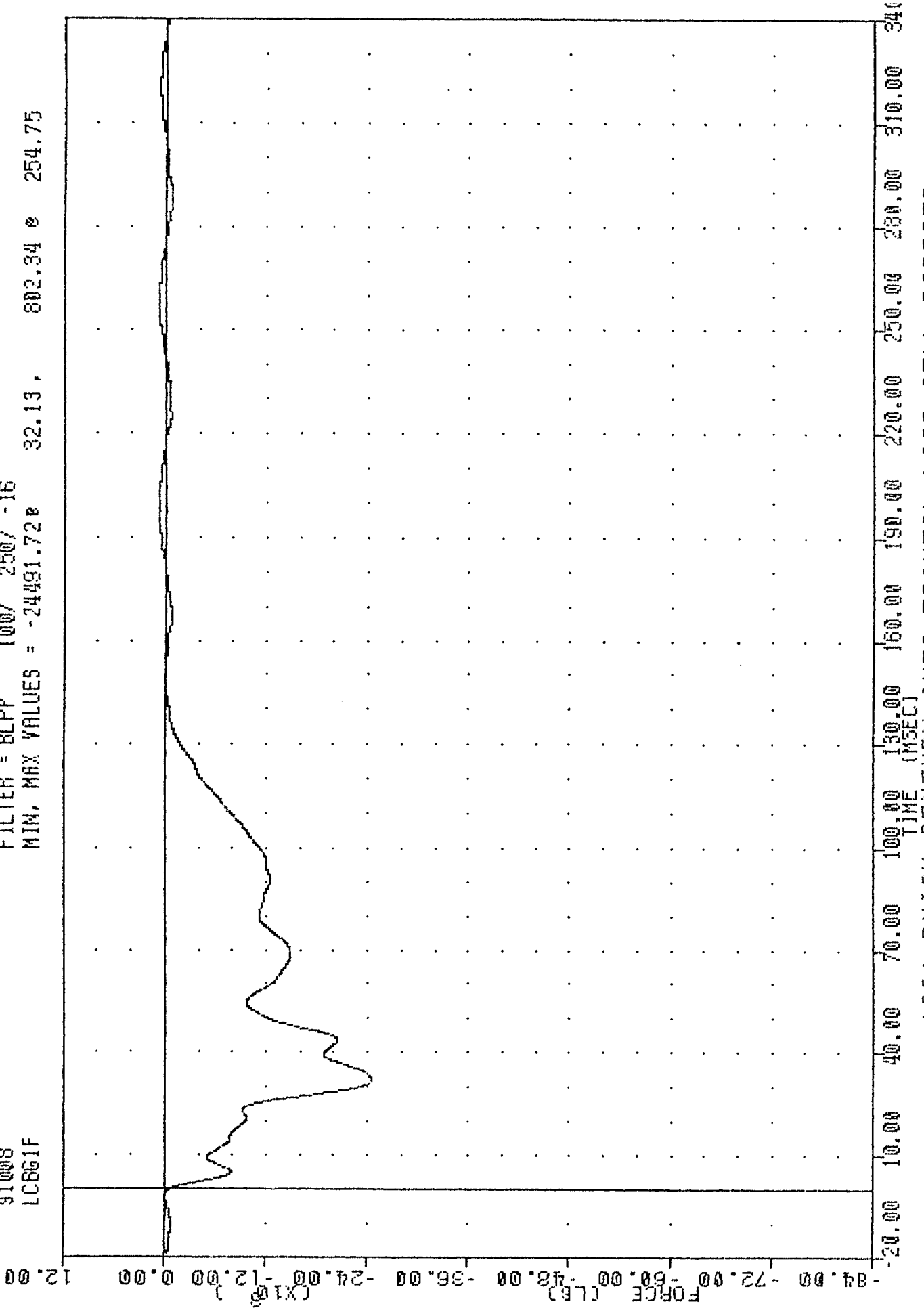
B-96

910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 1991 CELL BARRIER POSITION ON FORCE

NEW CAR ASSESSMENT PROGRAM
 91008
 LC861F

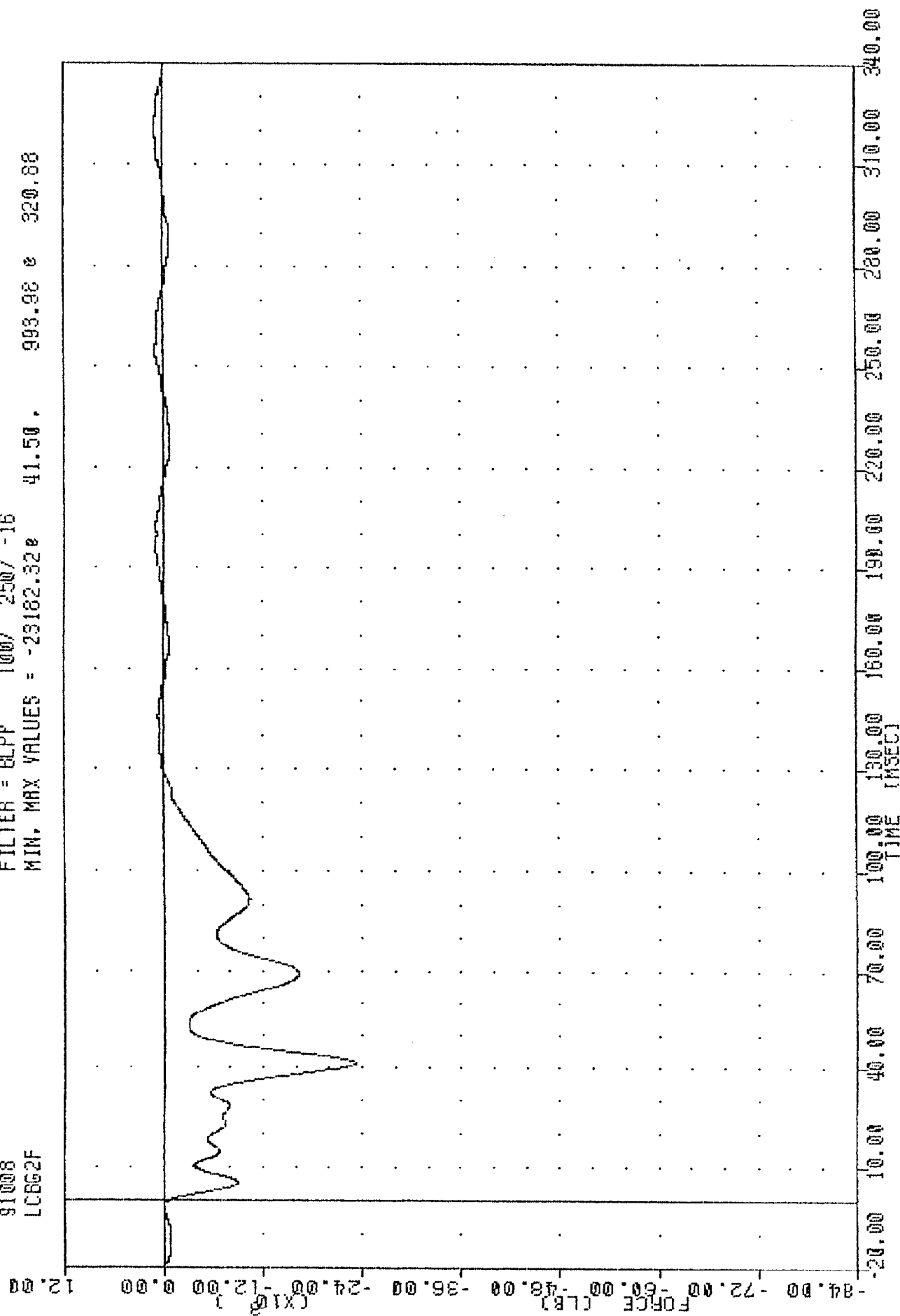
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -24491.72 802.34 254.75



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP - 1 FORCE TOTAL

TRC , 910108
NEW CAR ASSESSMENT PROGRAM
91008
LCBG2F

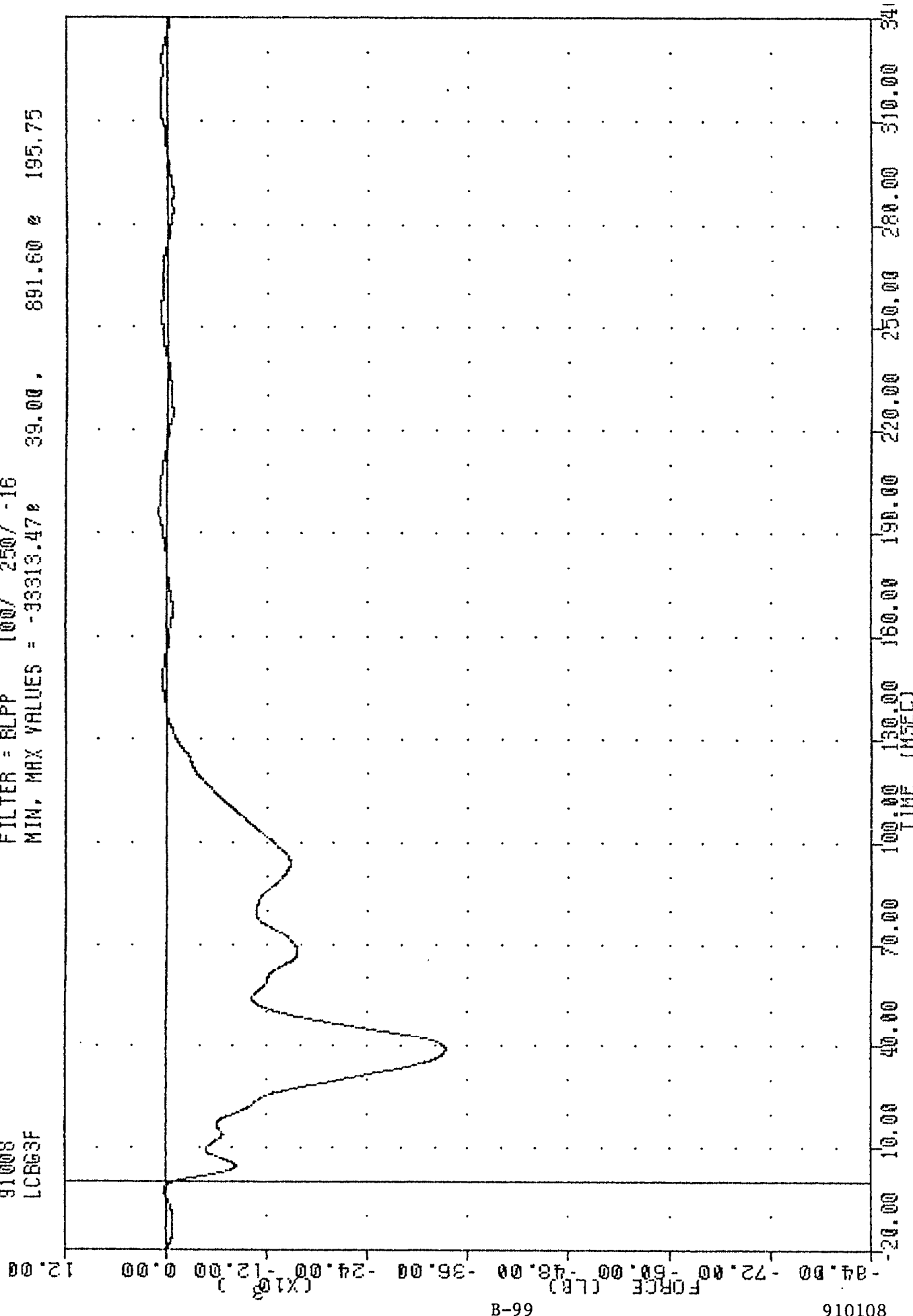
FILTER = BLPF	100/	250/	-16
MIN. MAX VALUES =	-23182.320	41.50	993.98 & 320.88



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 1991 BUICK CENTURY BARRIER GRADE 40000 LBS. FORCE TOTAL: 40000

INC
NEW CAR ASSESSMENT PROGRAM
91008
LCB63F

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -33313.47# 39.00# 891.60# 195.75



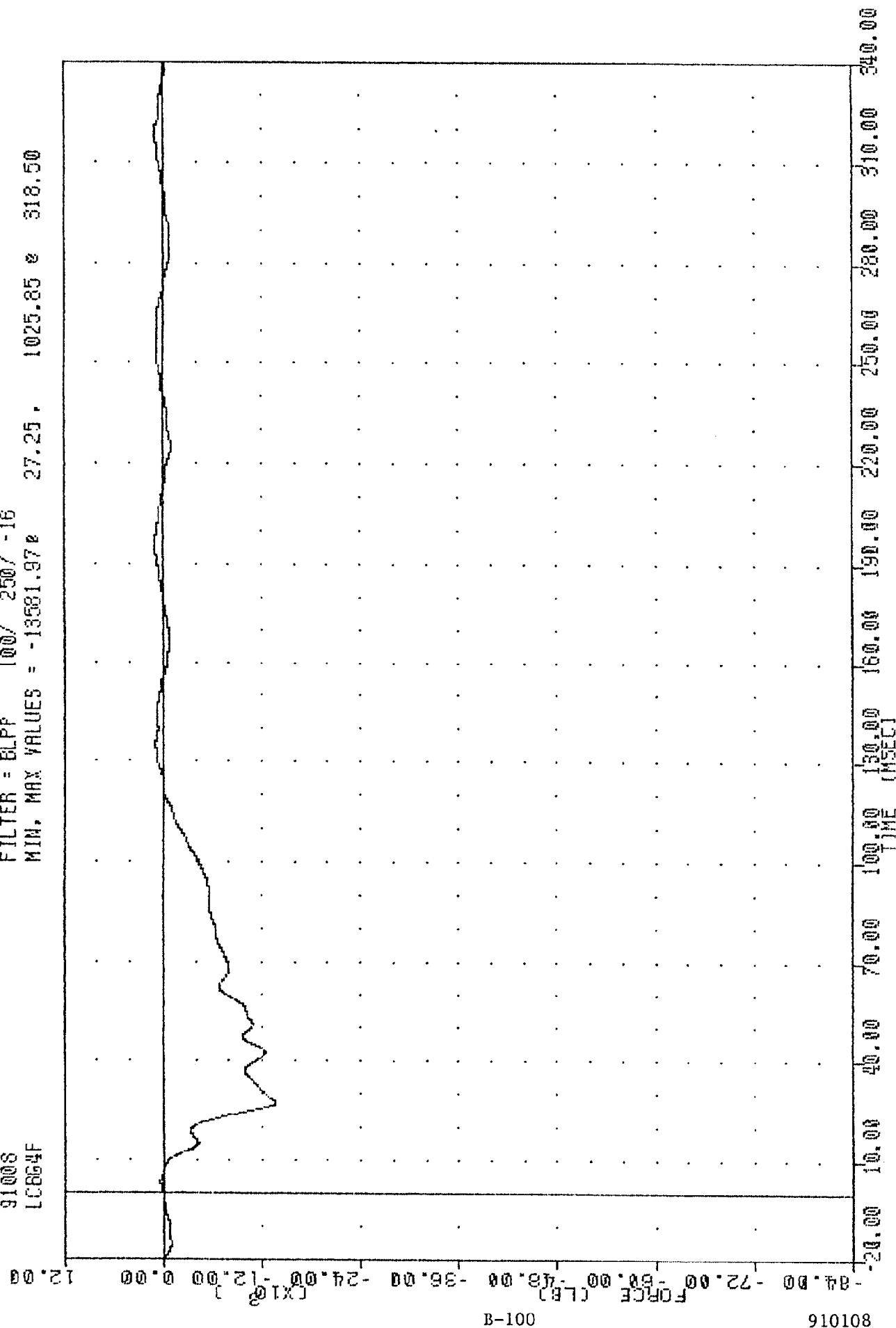
66-B

910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 3 FORCE TOTAL

TRC , 910108
 NEW CAR ASSESSMENT PROGRAM

91008
 LCRG4F
 FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -13581.97 27.25 1025.85 318.50

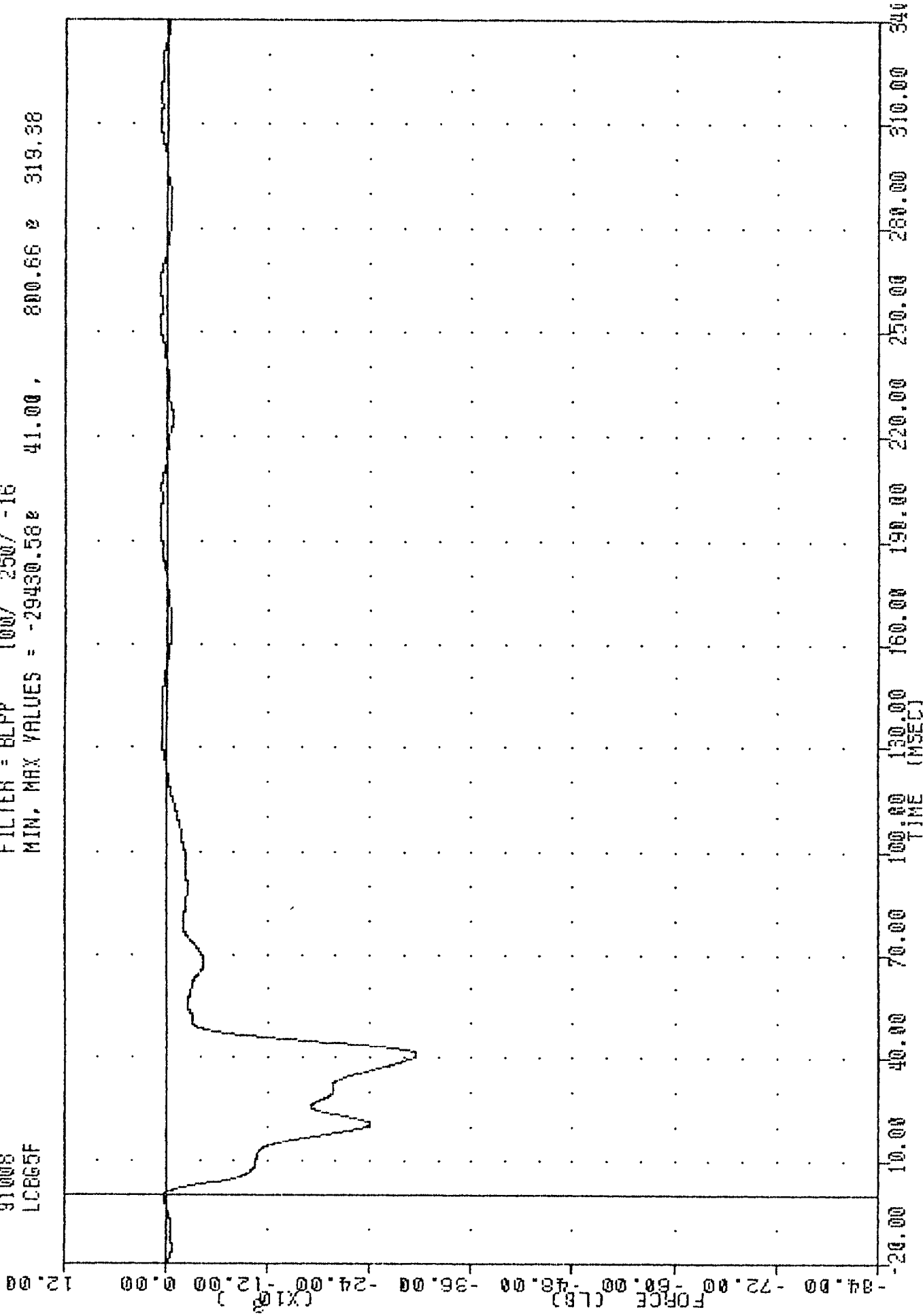


1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER GROUP "A" FORCE TOTAL

NEW CAR ASSESSMENT PROGRAM
 91008
 LC865F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -29430.58 41.00, 800.66 319.38



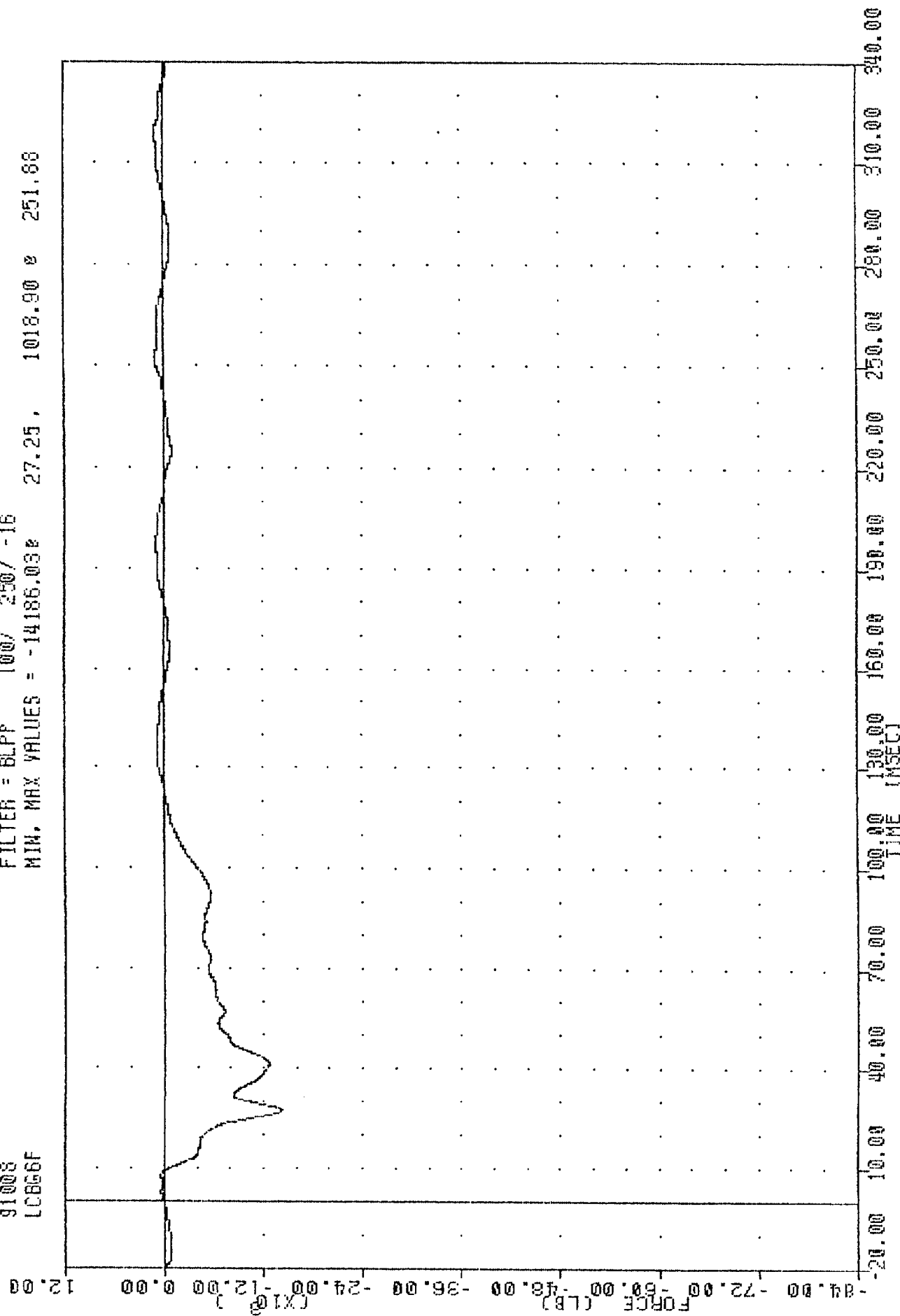
B-101

910108

1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP - 5 FORCE TOTAL

TAC , 910108
 NEW CAR ASSESSMENT PROGRAM
 91008
 LCBG6F

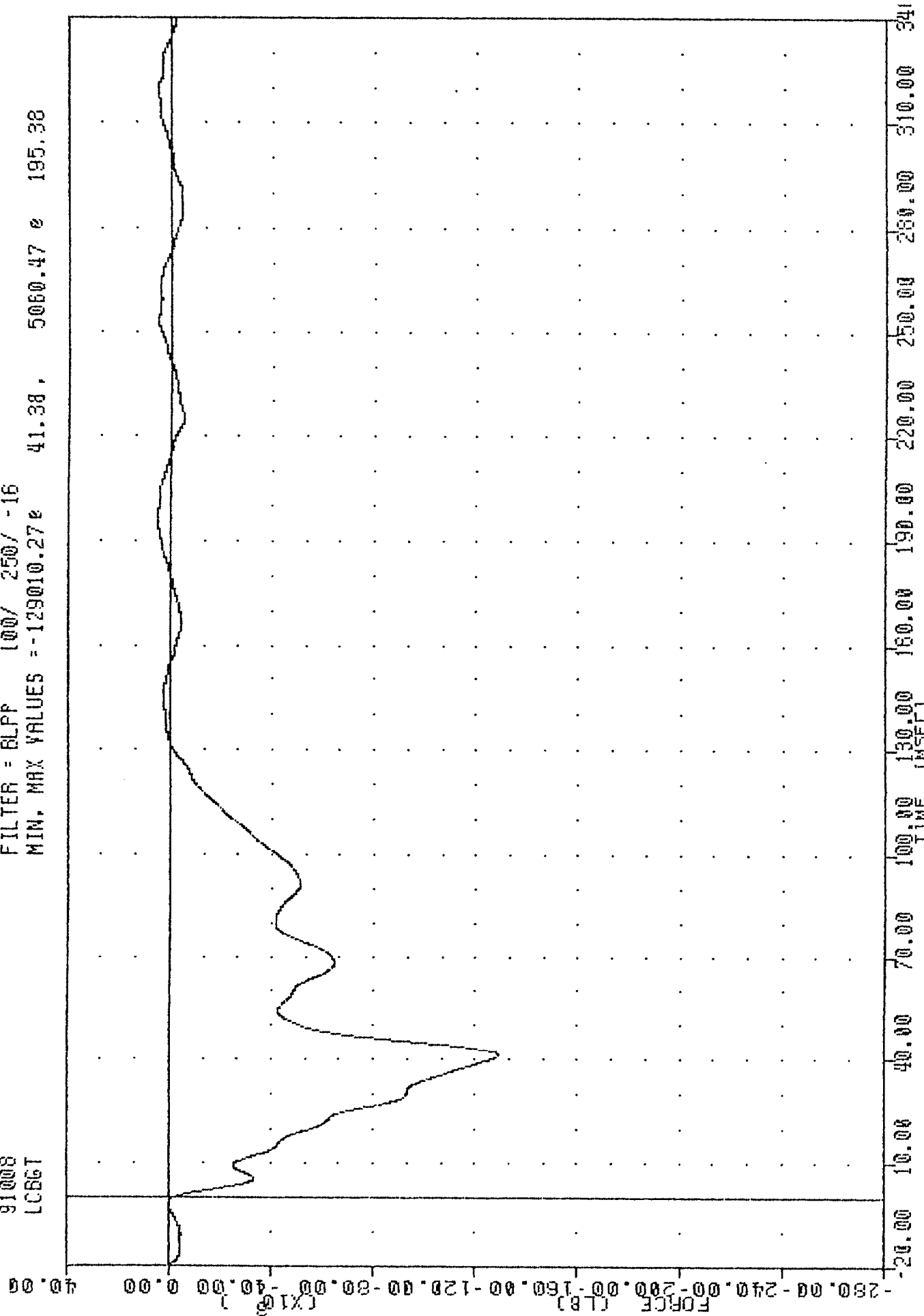
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -14186.03# 27.25, 1018.90 # 251.88



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP 2'S FORCE TOTAL

NEW CAR ASSESSMENT PROGRAM
 91008
 LCBST

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -129010.27e 41.38, 5060.47 e 195.38



1991 BUICK CENTURY INTO FRONTAL LOAD CELL BARRIER
 SUM OF LOAD CELL BARRIER FORCES

APPENDIX C

DUMMY CERTIFICATION DATA

PRE-TEST CERTIFICATION DATA

DRIVER DUMMY S/N: 192

TRANSPORTATION RESEARCH CENTER OF OHIO
HYBRID III EXTERNAL DIMENSIONS
192 ALDERSON

03-DEC-90

NHTSA 192C1ED1 572E SN192 EXT. DIMENSION CAL01

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
TEMPERATURE			72.0 DEG. F
RELATIVE HUMIDITY			55.0 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)		16.9-17.1 IN	17.0 IN
LOCATION FOR WAIST CIRCUMFERENCE (BB)		8.9- 9.1 IN	9.0 IN
CHEST CIRCUMFERENCE (Y)		38.2-39.4 IN	38.5 IN
WAIST CIRCUMFERENCE (Z)		32.9-34.1 IN	33.5 IN
CHEST DEPTH (O)		8.4- 9.0 IN	8.6 IN
H-POINT HEIGHT (C)		3.3- 3.5 IN	3.4 IN
H-POINT FROM SEATBACK (D)		5.3- 5.5 IN	5.4 IN
SKULL CAP TO BACKLINE (H)		1.6- 1.8 IN	1.7 IN
TOTAL SITTING HEIGHT (A)		34.6-35.0 IN	34.8 IN
THIGH CLEARANCE (F)		5.5- 6.1 IN	5.8 IN
BUTTOCK KNEE LENGTH (K)		22.8-23.8 IN	23.7 IN
BUTTOCK POPLITEAL LENGTH (N)		17.8-18.8 IN	18.6 IN
POPLITEAL HEIGHT (L)		16.9-17.9 IN	17.7 IN
KNEE PIVOT HEIGHT (M)		19.1-19.7 IN	19.4 IN
FOOT LENGTH (P)		9.9-10.5 IN	10.2 IN
FOOT BREADTH (W)		3.6- 4.2 IN	4.0 IN
SHOULDER PIVOT FROM BACKLINE (E)		3.3- 3.7 IN	3.6 IN
SHOULDER BREADTH (V)		16.6-17.2 IN	16.8 IN
SHOULDER PIVOT HEIGHT (B)		19.9-20.5 IN	20.1 IN
ELBOW REST HEIGHT (J)		7.5- 8.3 IN	8.1 IN
SHOULDER-ELBOW LENGTH (I)		13.0-13.6 IN	13.4 IN
BACK OF ELBOW TO WRIST PIVOT (G)		11.4-12.0 IN	11.6 IN

TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

17-Dec-90

NHTSA

192C1HD1

572E SN192 HEAD DROP CAL 01

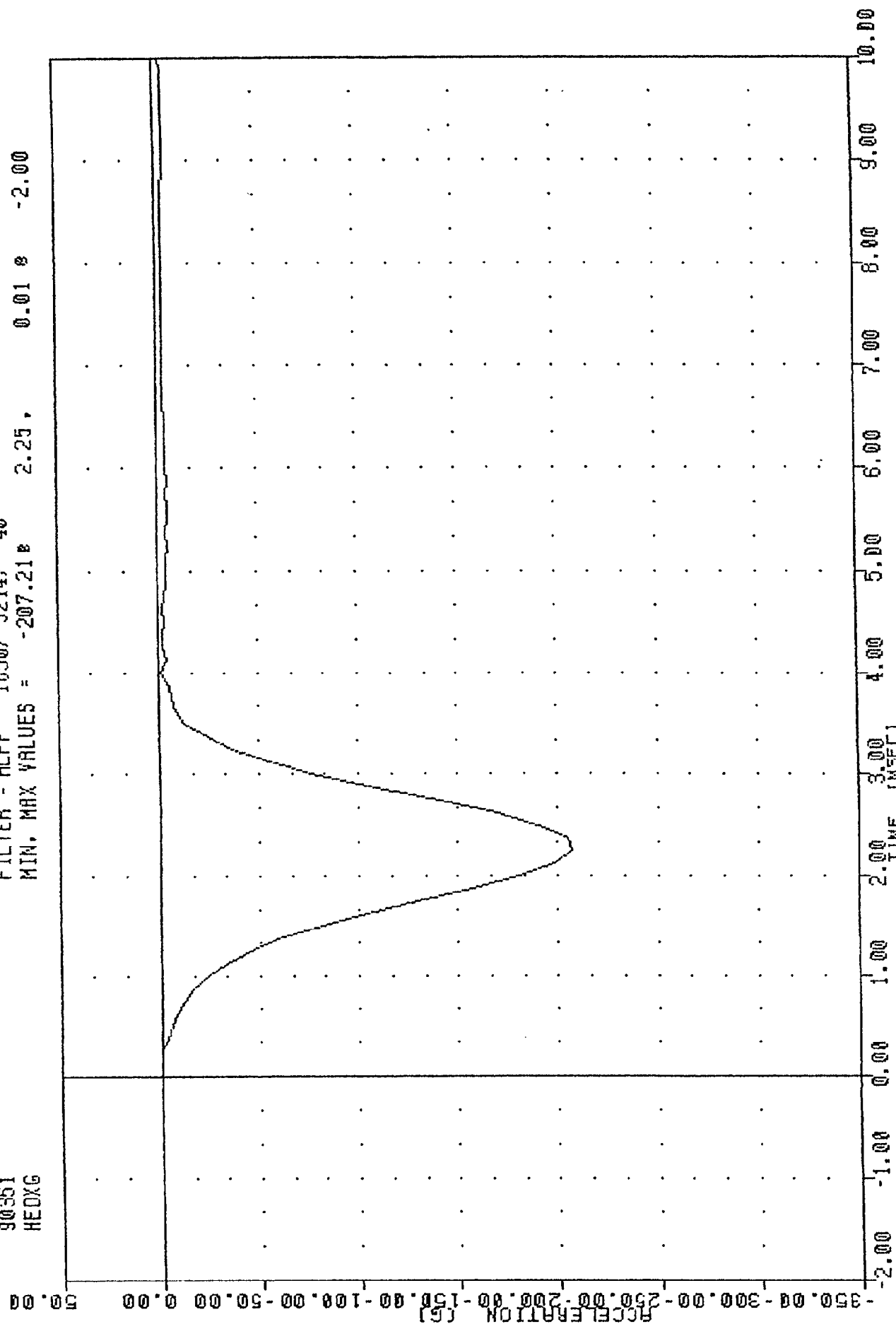
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	72.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	38.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	239.31 G
PEAK LATERAL ACCELERATION	15 G MAX	2.11 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

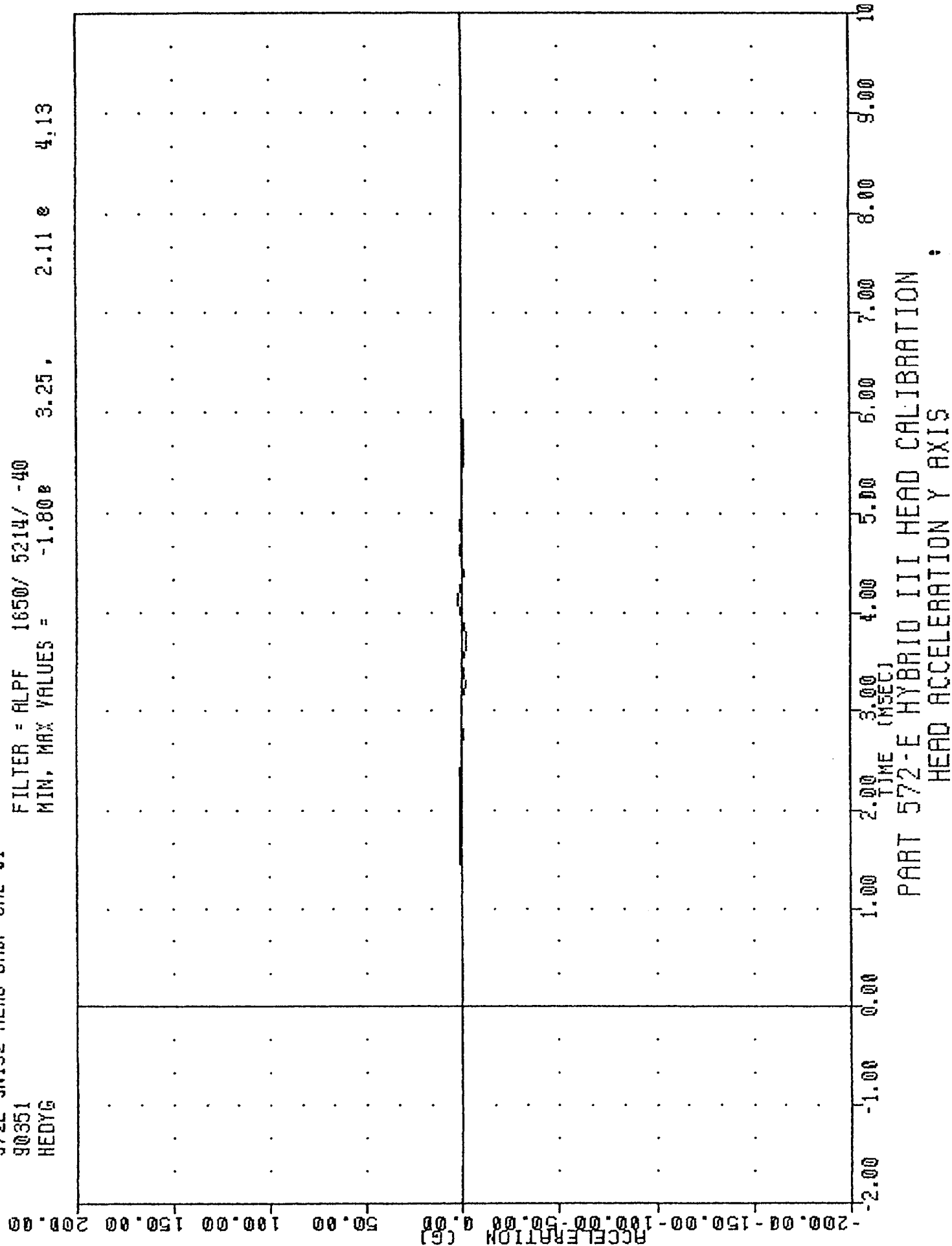
NHTSA , 192C1HD1
 572E SN192 HEAD DROP CAL 01
 90351
 HEDXG

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -207.21 2.25, 0.01 0 -2.00



KHTSA , 192C1HD1
 572E SN192 HEAD DROP CAL 01
 90351
 HEDYG

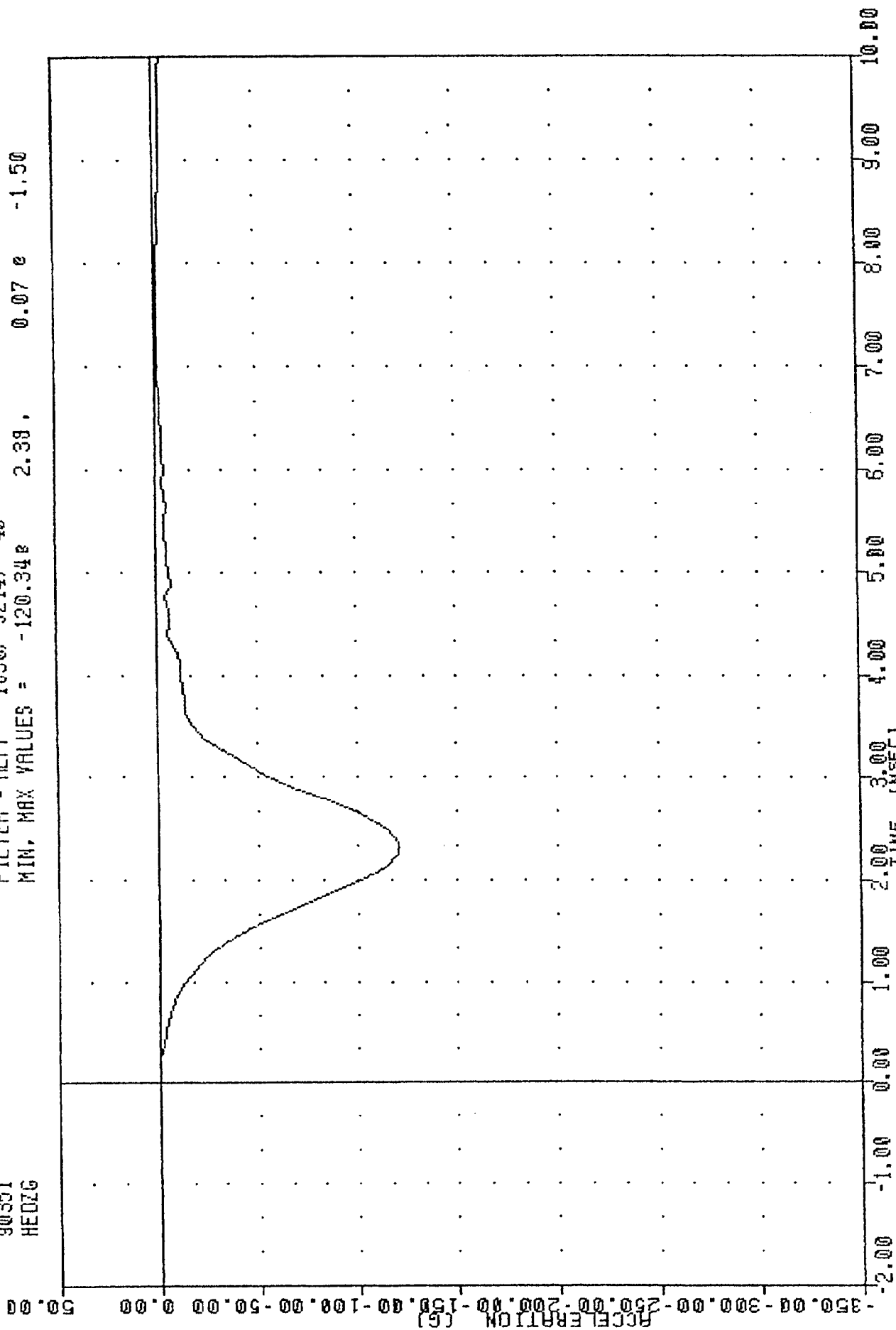
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -1.800 3.25 , 2.11 4.13



PART 572-E HYBRID III HEAD CALIBRATION
 HEAD ACCELERATION Y AXIS

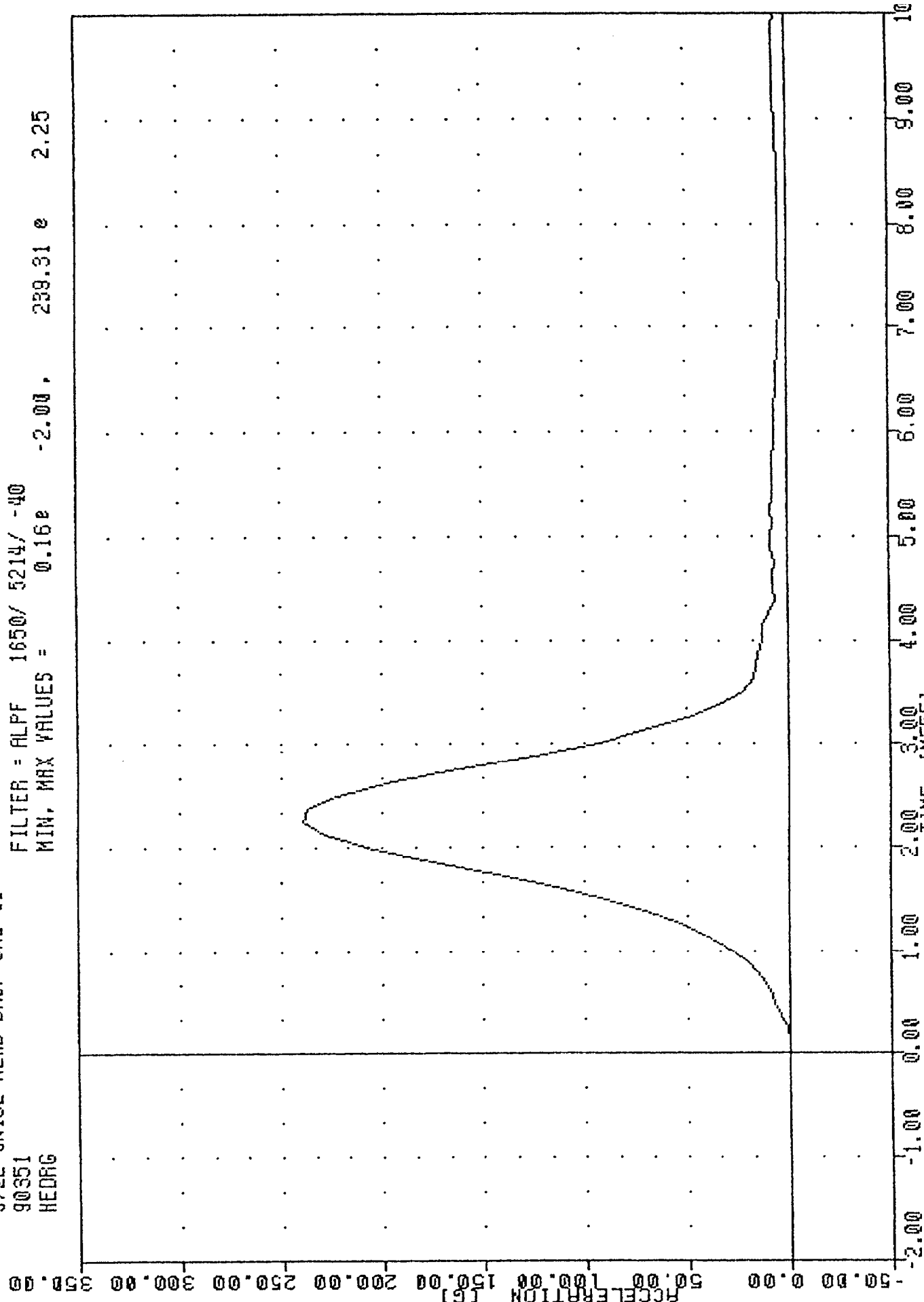
NHTSA , 192CIHD1
 572E SN192 HEAD DROP CAL 01
 90351
 HEDZG

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -120.348 2.39 , 0.07 e -1.50



KHTSH , 182ULHUI
 572E SN192 HEAD DRDP CAL 01
 90351
 HEDRG

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.16e -2.00, 239.31 e 2.25



PART 572-E HYBRID III HEAD CALIBRATION
 HEAD RESULTANT ACCELERATION

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

18-Dec-90

6 AXIS NECK TRANSDUCER
NHTSA 192C1NF1

572E SN192 NECK FLEXION CAL01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	72.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	54.00 %
IMPACT VELOCITY	22.6-23.4 FT/SEC	22.64 FT/SEC
PENDULUM	10 MS 22.50 - 27.50 G	24.57 G
DECELERATION	20 MS 17.60 - 22.60 G	19.15 G
	30 MS 12.50 - 18.50 G	15.64 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	15.57 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	36.63 MS
D PLANE	MAX 64 - 78 DEG.	74.85 DEG.
ROTATION	TIME 57 - 64 MS	58.38 MS
MOMENT ABOUT OCCIPITAL	MAX 65 - 80 FT.LBS	70.01 FT.LBS
CONDYLE	TIME 47 - 58 MS	48.63 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	116.13 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	103.00 MS

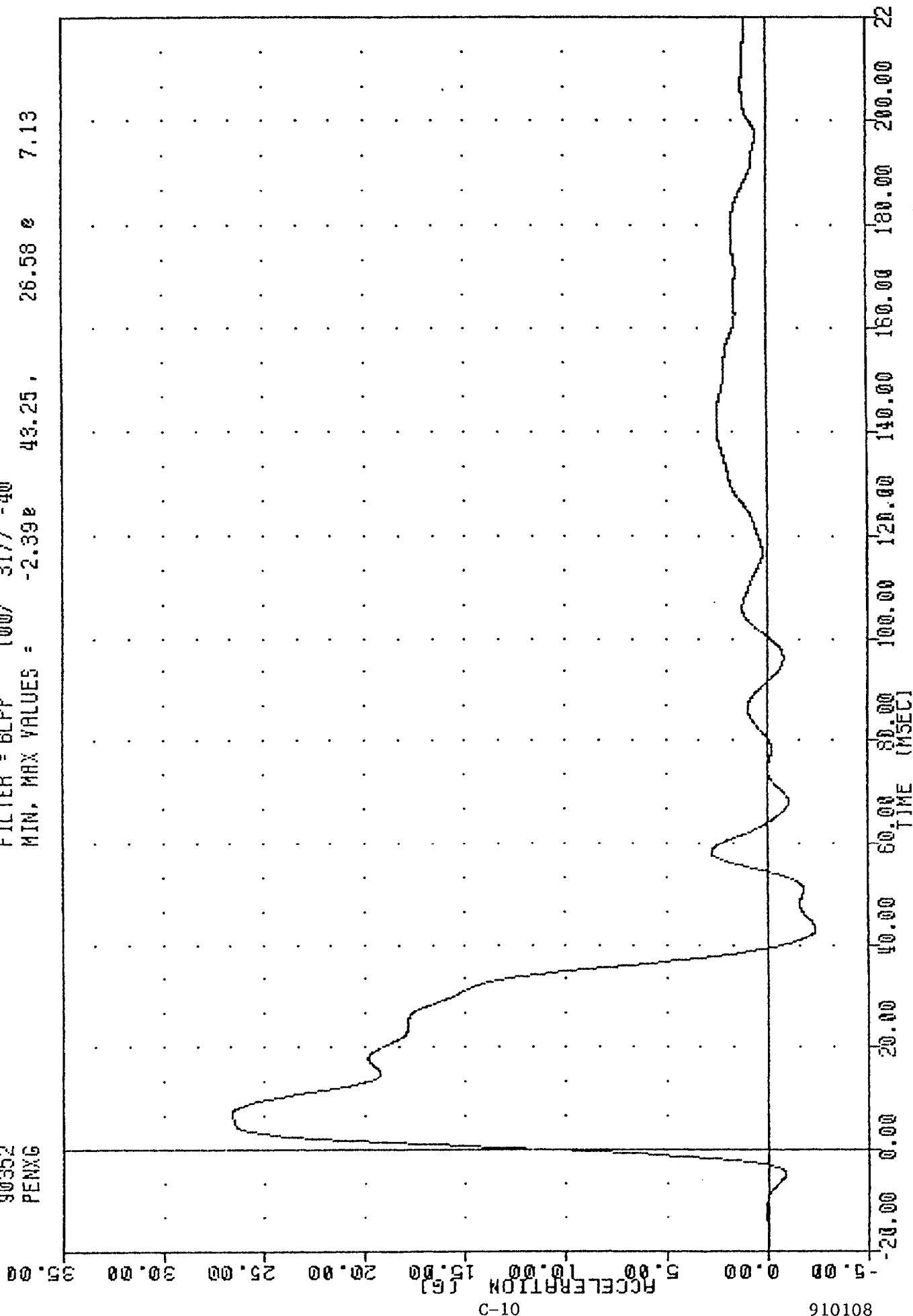
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

MH13H , 132CLINF1
 572E SN192 NECK FLEXION CAL01
 90352
 PENXG

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -2.39e 43.25, 26.58 e 7.13



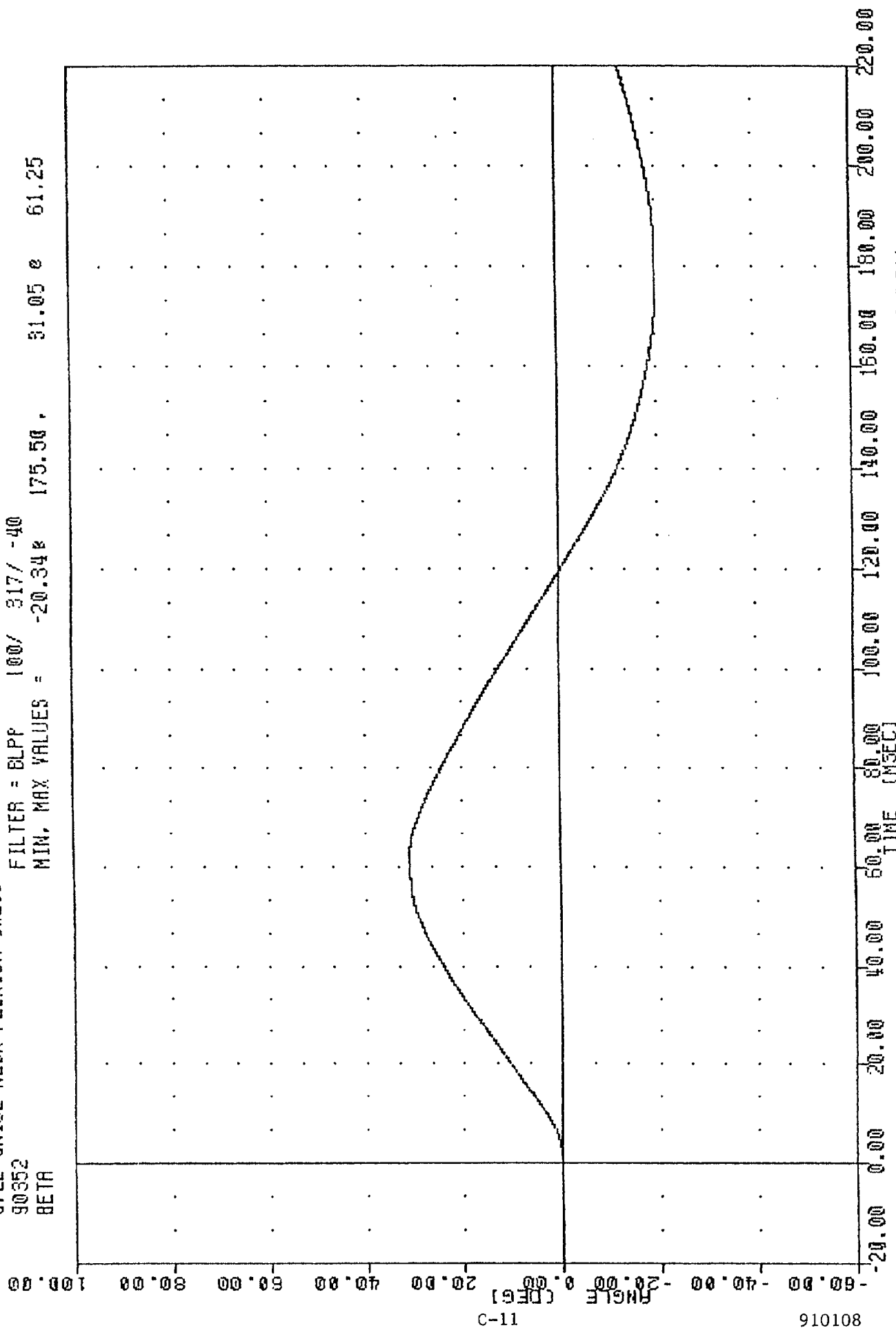
C-10

910108

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 PENDULUM DECELERATION

KHT3A , 192C1NF1
 572E SN192 NECK FLEXION CAL01
 90352
 BETA

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -20.34% 175.50 , 31.05 % 61.25



C-11

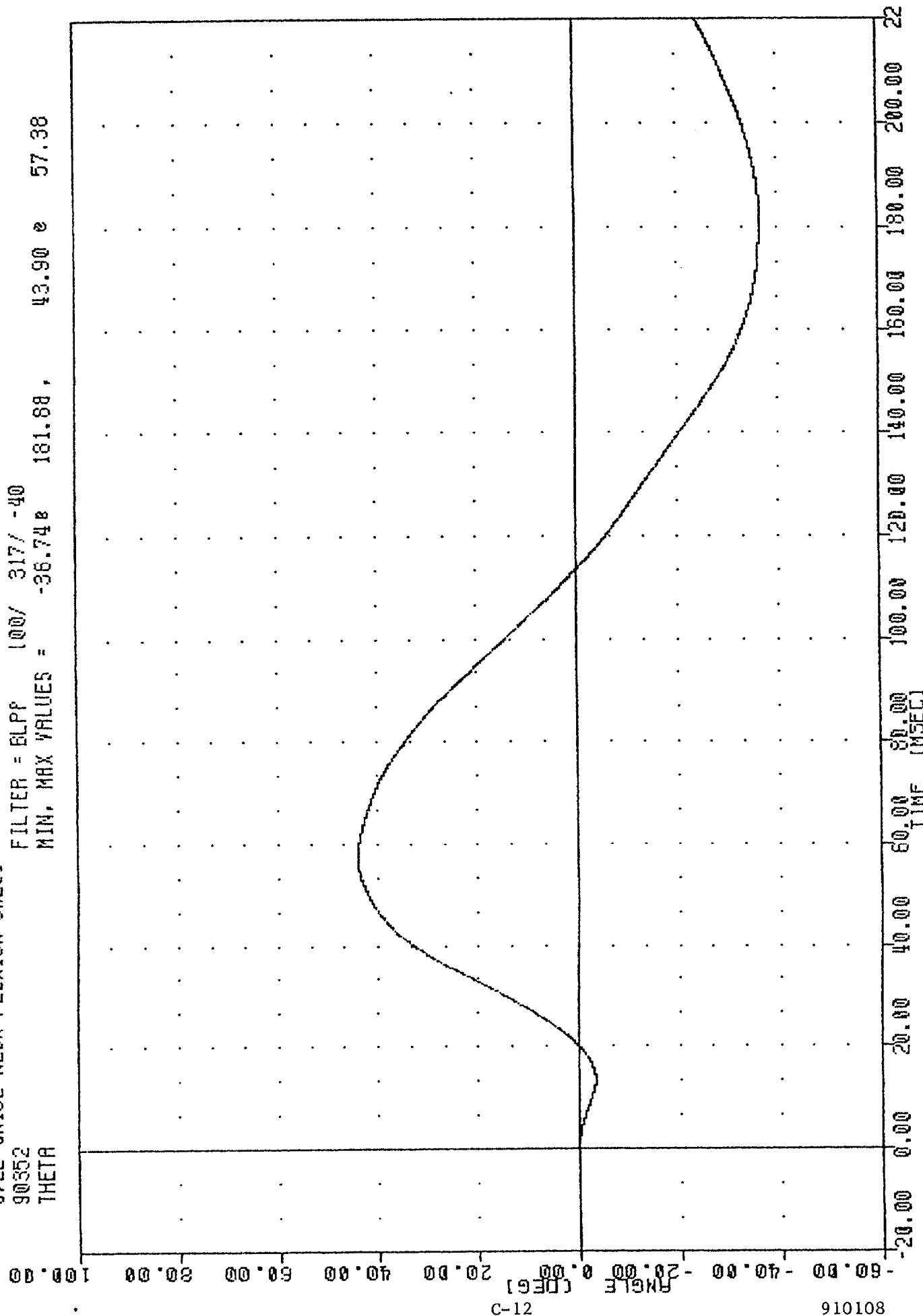
910108

PART 572-E HYBRID III NECK FLEXION CALIBRATION

POLYMERIZATION ABOUT 20 SECS OF NECK

NHISH , 192C1NF1
 572E SN192 NECK FLEXION CAL01
 90352
 THETA

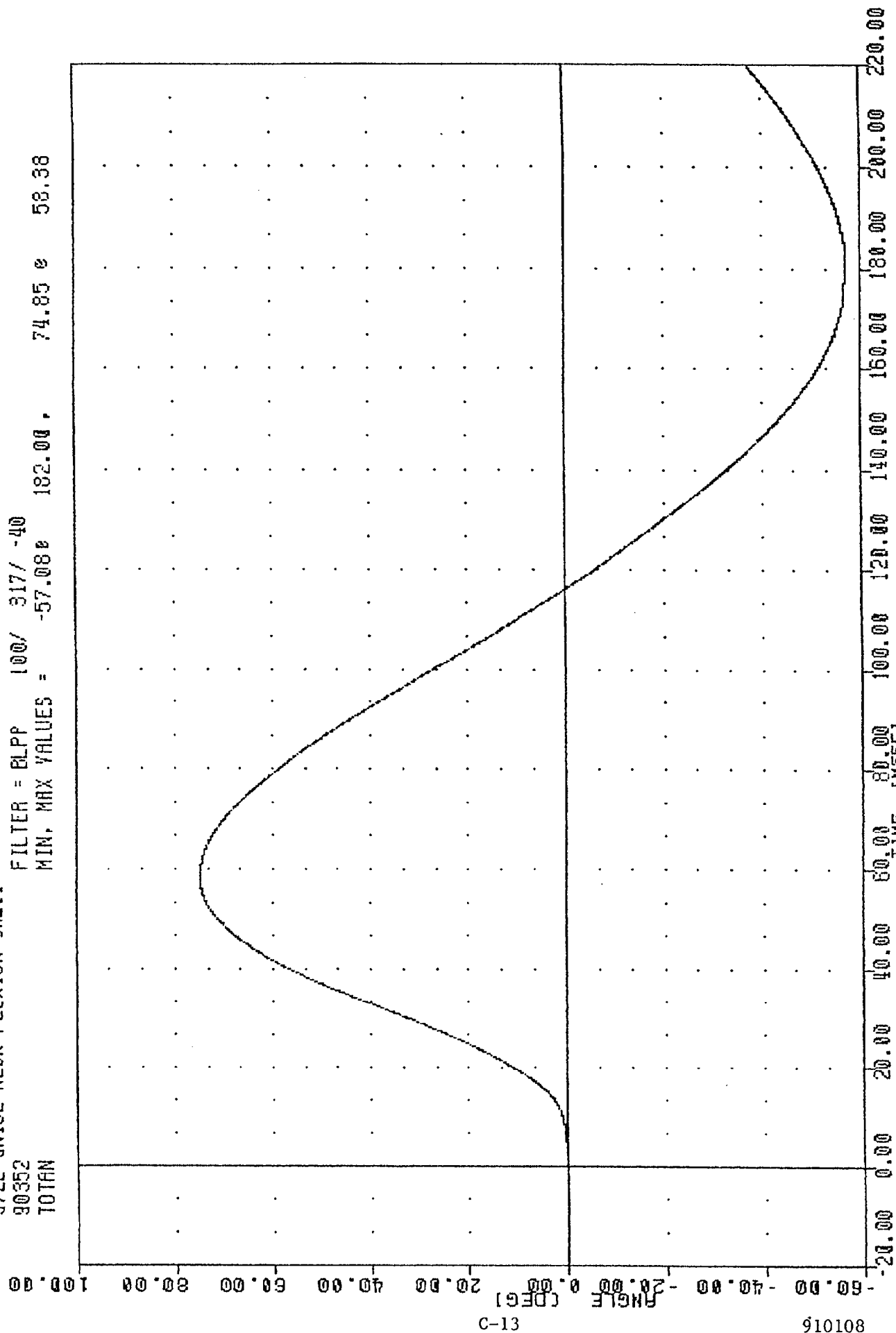
FILTER = BLPF 100/ 317/ -40
 MIN, MAX VALUES = -36.748 181.88, 43.90 57.38



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

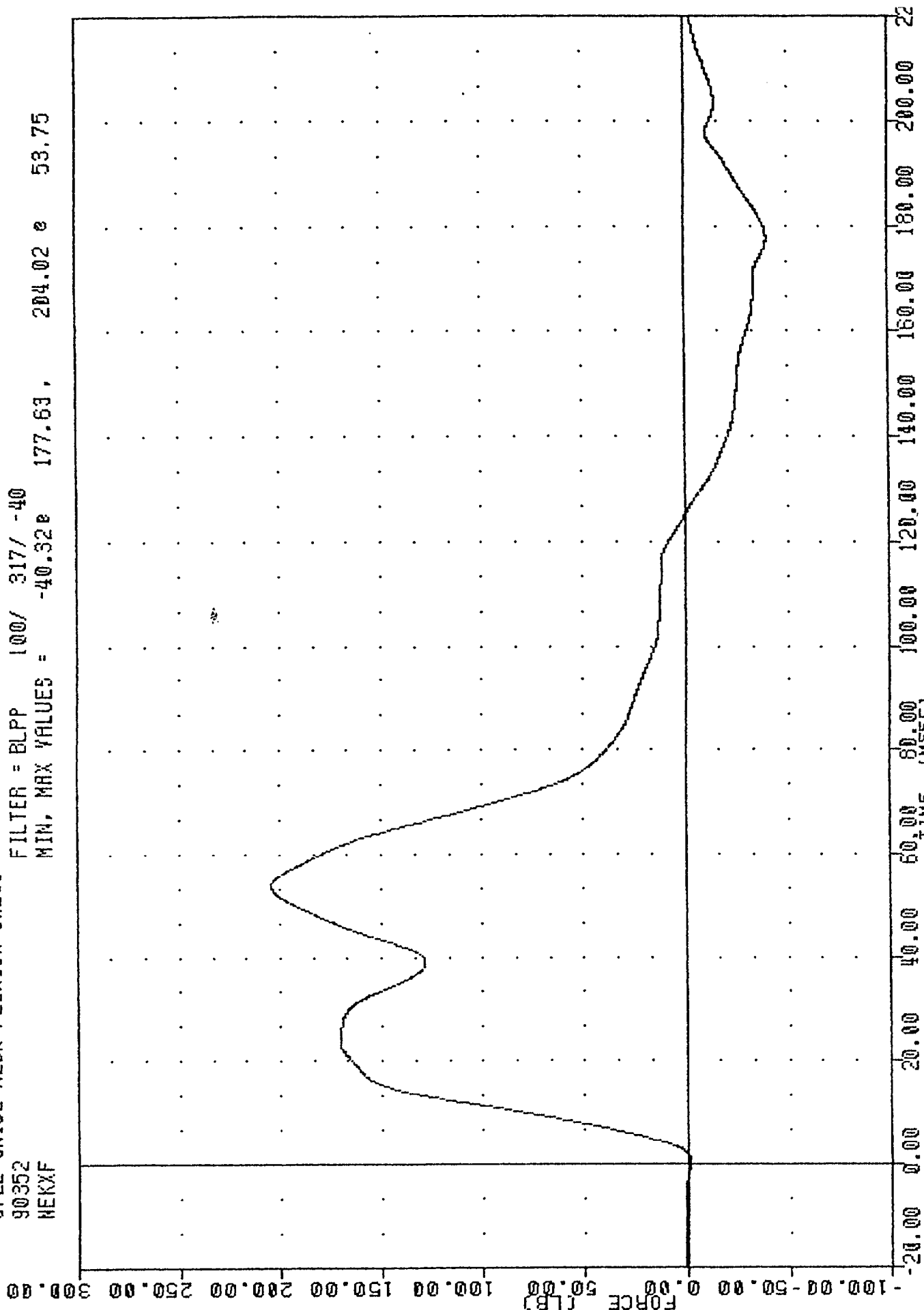
KHTSH , 192C1NF1
 572E SN192 NECK FLEXION CAL01
 90352
 TOTAL

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -57.080 182.00 , 74.85 58.38



MMISH , 132LJMF1
 572E SN192 NECK FLEXION CAL01
 90352
 HEKXF

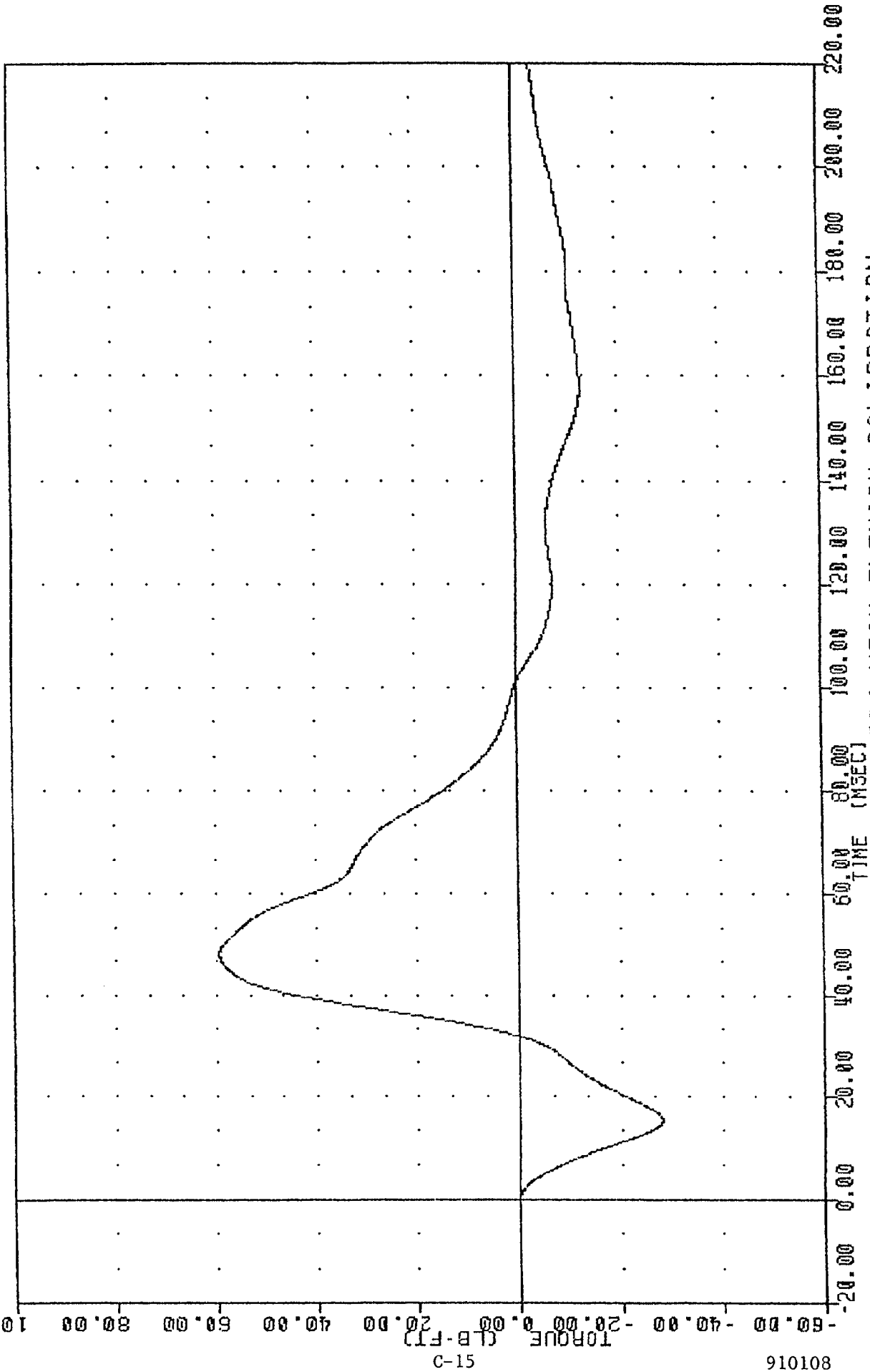
FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -40.32e 177.63, 204.02 e 53.75



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 NECK FORCE X AXIS

NHTSA , 192C1NF1
 572E SN192 NECK FLEXION CAL01
 90352
 NEKYM

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -28.12e 15.38 , 59.39 e 47.75



910108

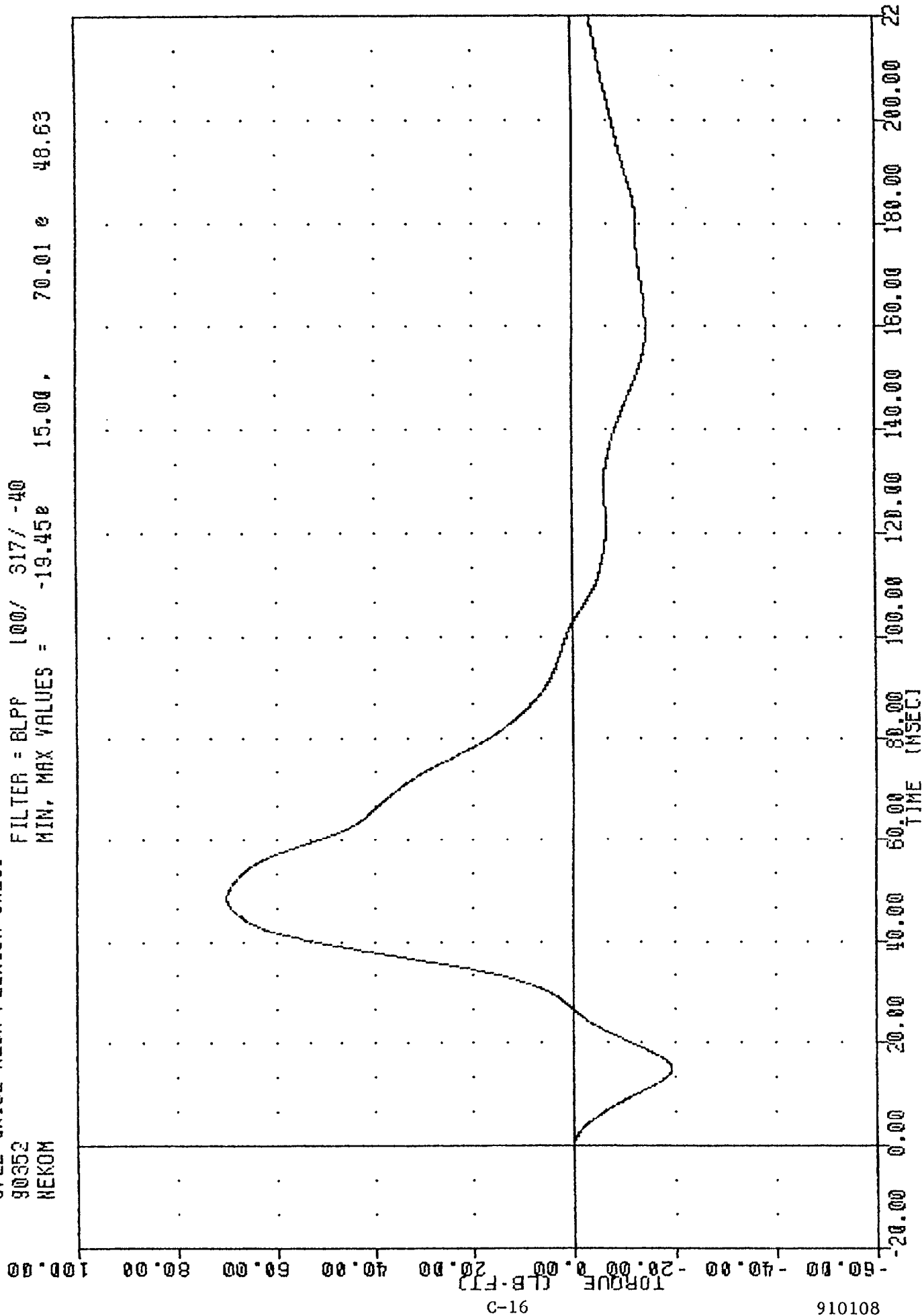
C-15

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT AXIS

NHTSA , 182C1NF1
 572E SN182 NECK FLEXION CAL01
 90352
 NEKOM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -19.45e 15.00 , 70.01 e 48.63



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 TOTAL MOMENT ABOUT OCCIPITAL CONDYLE :

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

18-Dec-90

6 AXIS NECK TRANSDUCER
NHTSA 192C1NE1

572E SN192 NECK EXT. CAL01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	47.00 %
IMPACT VELOCITY	19.50-20.30 FT/SEC	19.67 FT/SEC
PENDULUM	10 MS 17.20 - 21.20 G	18.73 G
DECELERATION	20 MS 14.00 - 19.00 G	14.76 G
	30 MS 11.00 - 16.00 G	12.70 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	12.63 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	42.63 MS
D PLANE	MAX 81 - 106 DEG.	101.41 DEG.
ROTATION	TIME 72 - 82 MS	79.00 MS
MOMENT ABOUT OCCIPITAL	MIN -59.0/-39.0 FT.LBS	-49.24 FT.LBS
CONDYLE	TIME 65 - 79 MS	75.75 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	164.38 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	147.38 MS

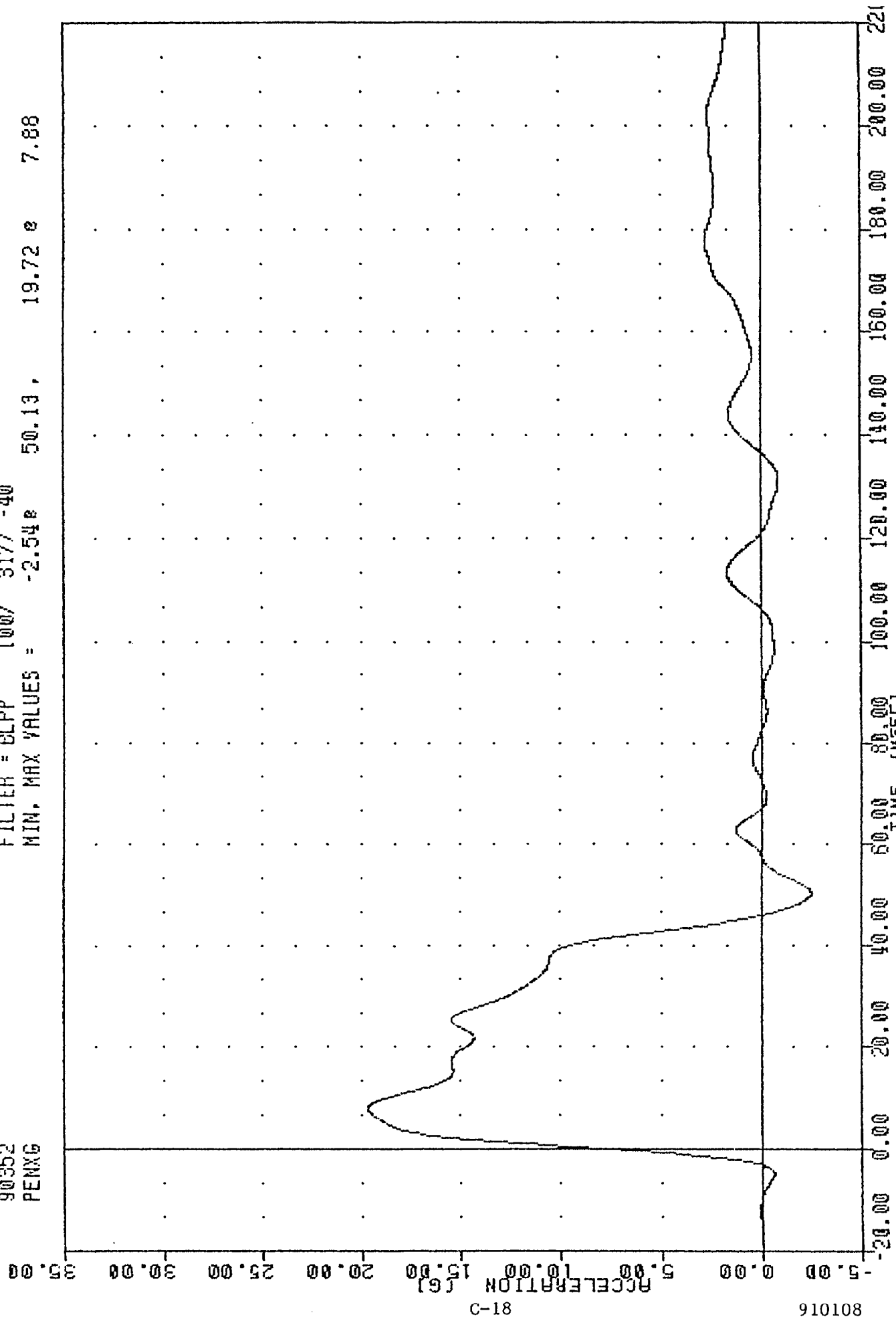
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

NHTSA , 192C1ME1
 572E 9M192 NECK EXT. CAL01
 90352
 PENXG

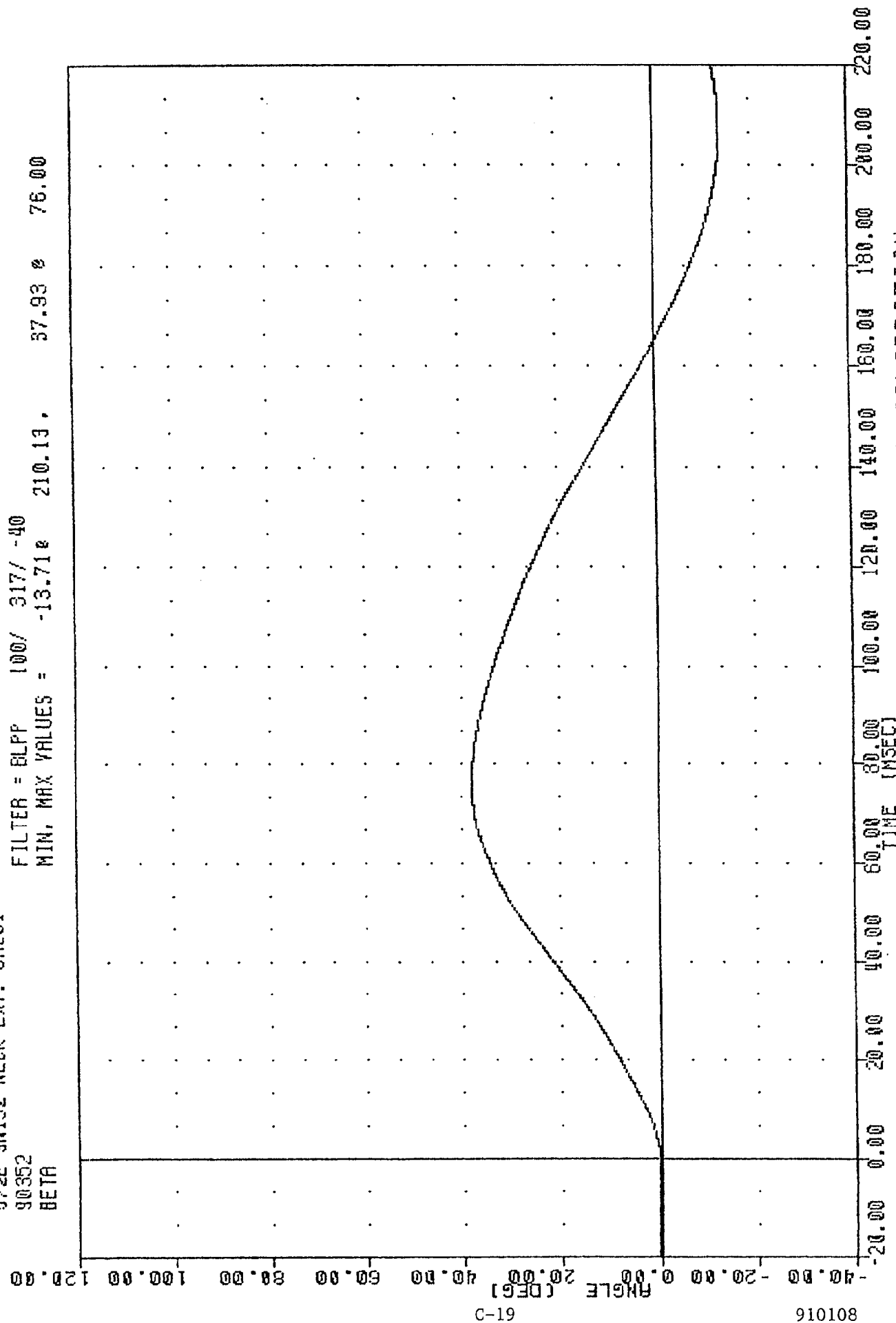
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -2.54e 50.13 , 19.72 e 7.88



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 PENDULUM DECELERATION

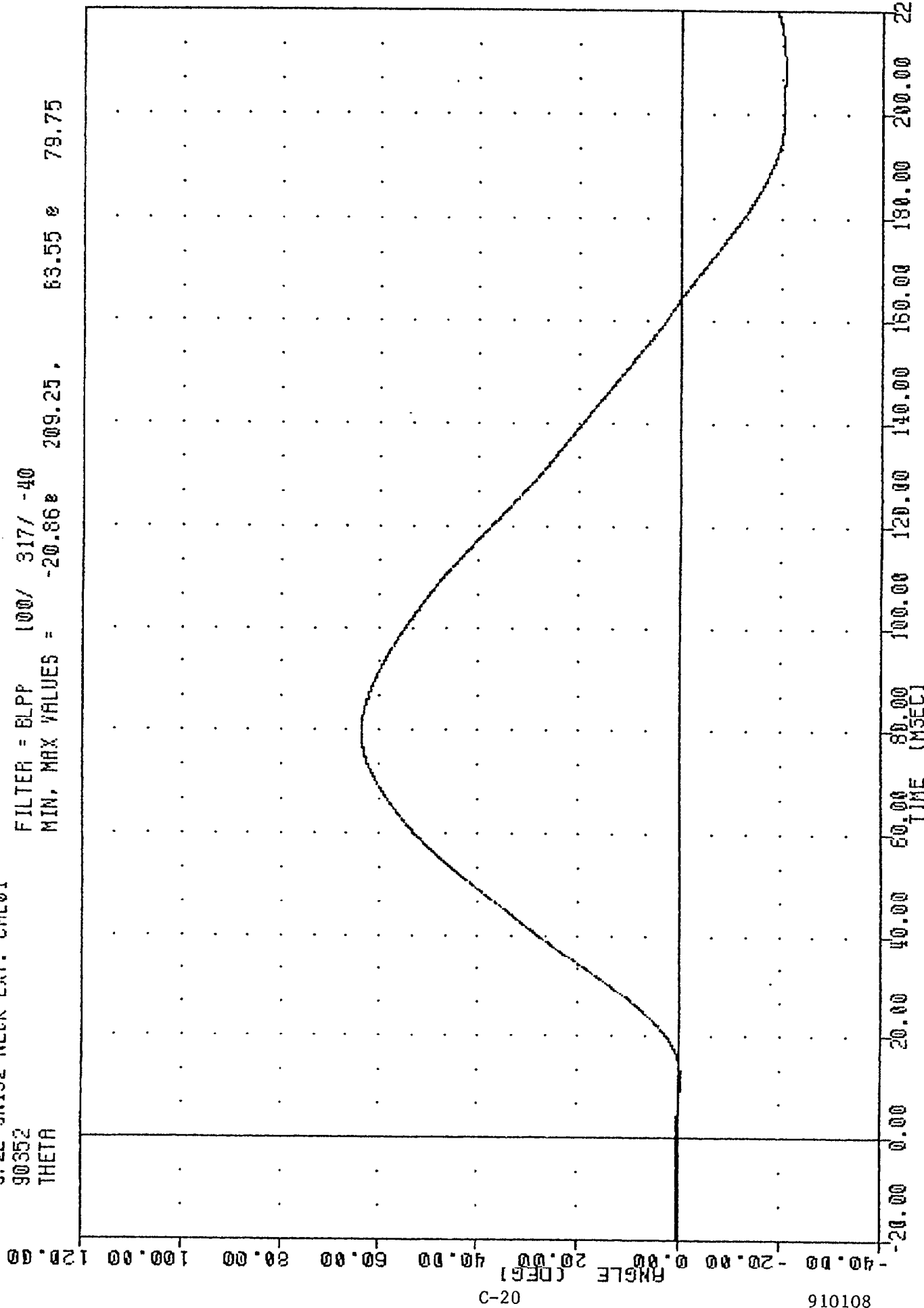
KHTSA , 192CINE1
 572E 3N192 NECK EXT. CAL01
 90352
 BETA

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -13.71e 210.13, 57.93 e 76.00



NM13M
 572E SN192 NECK EXT. CAL01
 90352
 THETA

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -20.86 209.25, 63.55 79.75



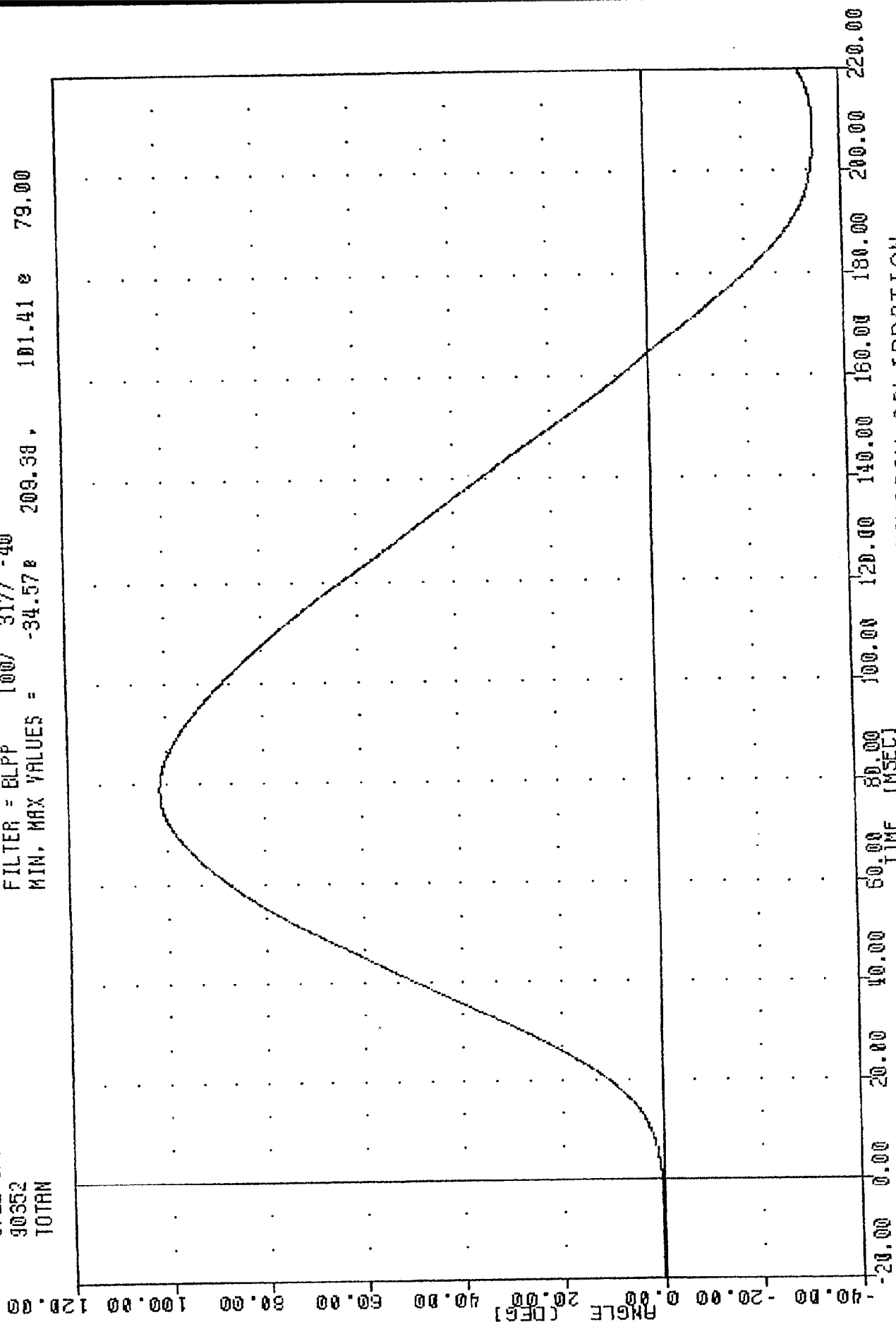
C-20

910108

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

NHTSA , 192C1NE1
 572E SN192 NECK EXT. CAL01
 90352
 TOTRN

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -34.57 209.39 101.41 e 79.00



C-21

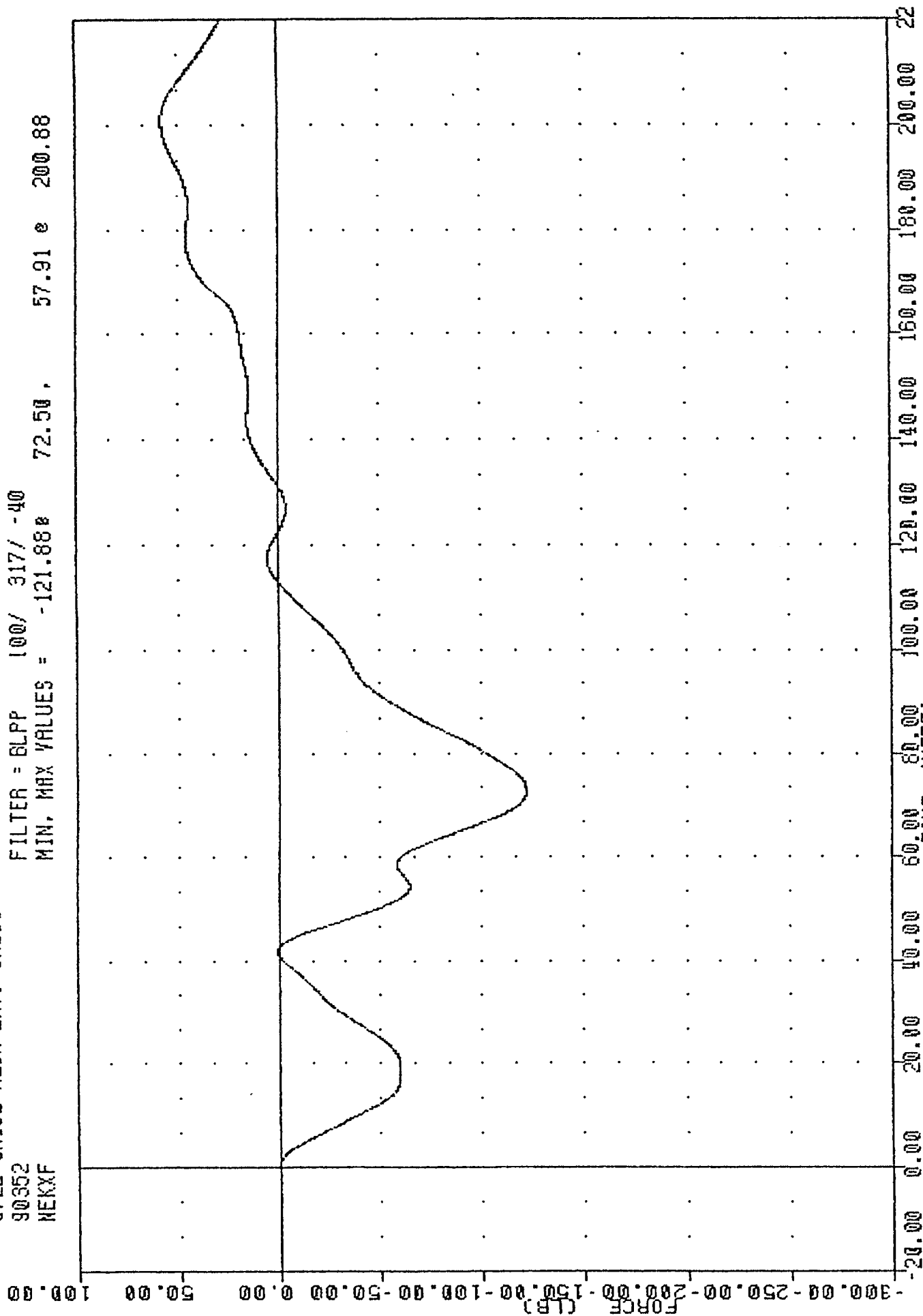
910108

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ADJUSTION

NHTSA
572E SN192 NECK EXT. CAL01
90352
NEKXF

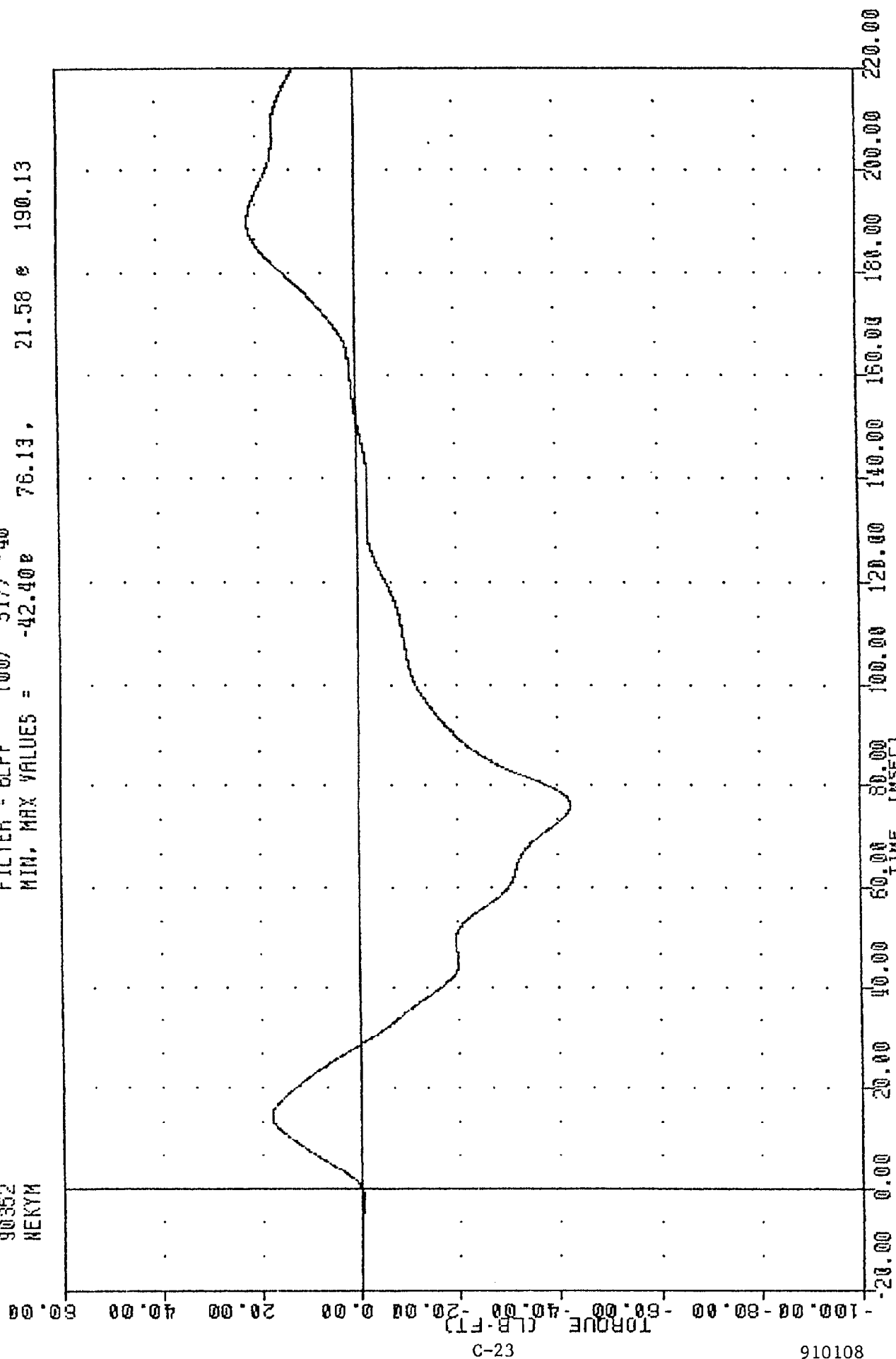
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -121.88 72.50, 57.91 @ 200.88



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS

NHTSA , 192C1ME1
 572E 3N192 NECK EXT. CAL01
 90352
 MEKYM

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -42.40e 76.13, 21.58 e 190.13



801016

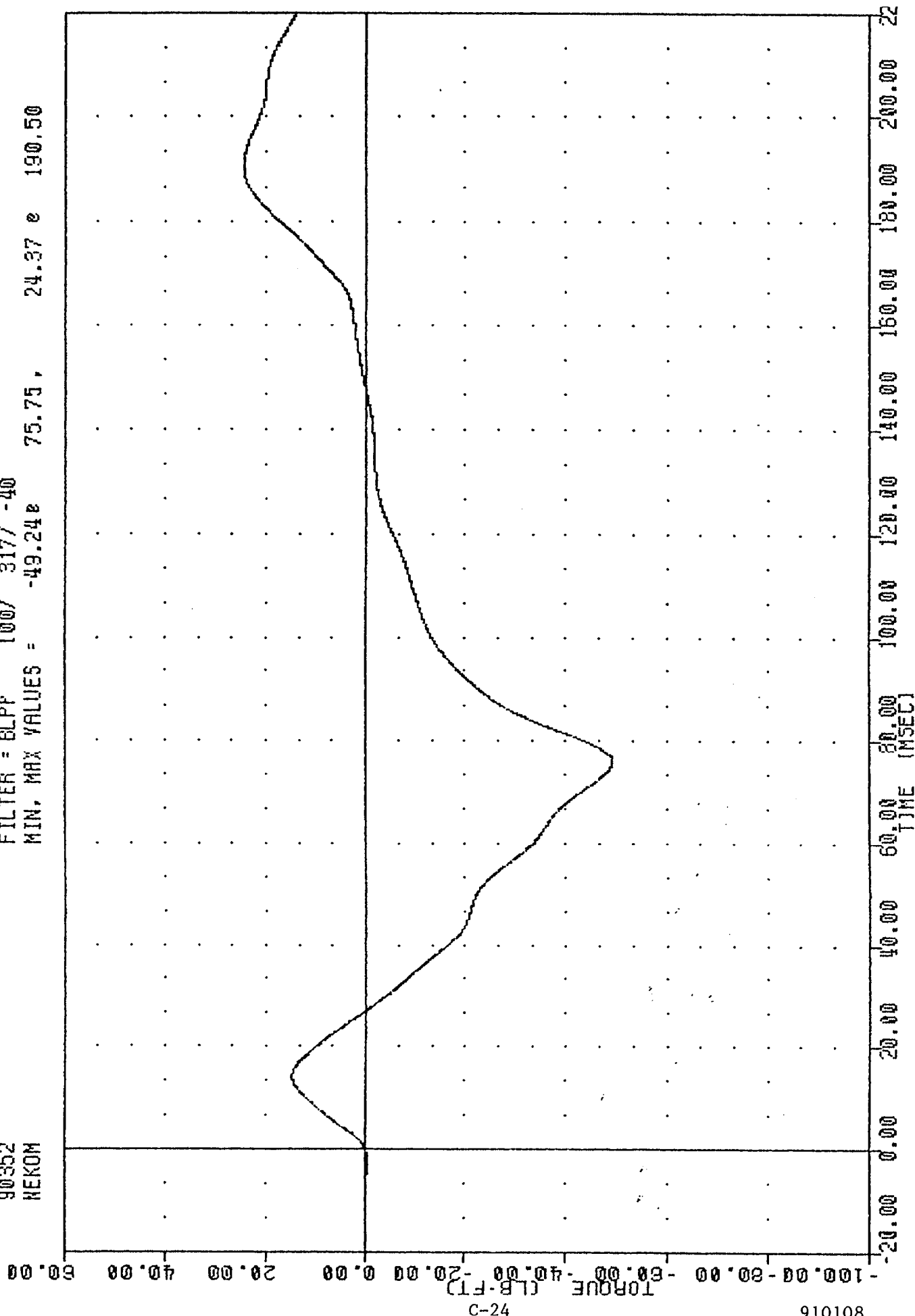
C-23

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT AXIS

NHTSR , 192CINE1
 572E SN192 NECK EXT. CAL01
 90352
 REKOM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -49.24e 75.75, 24.37 e 190.50



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

17-Dec-90

NHTSA

192C1TH1

572E SN192 H.S.THORAX CAL01

	HIGH SPEED TEST	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
=====		
TEMPERATURE	69 - 72 DEG. F	72.00 DEG. F

RELATIVE HUMIDITY	10% - 70%	38.00 %

PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.77 FT/SEC

MAXIMUM DEFLECTION	2.50 - 2.86 IN	2.62 IN

MAXIMUM RESISTIVE FORCE	1160 - 1325 LBS	1212.5 LBS

INTERNAL HYSTERESIS	69% - 85%	74.5%

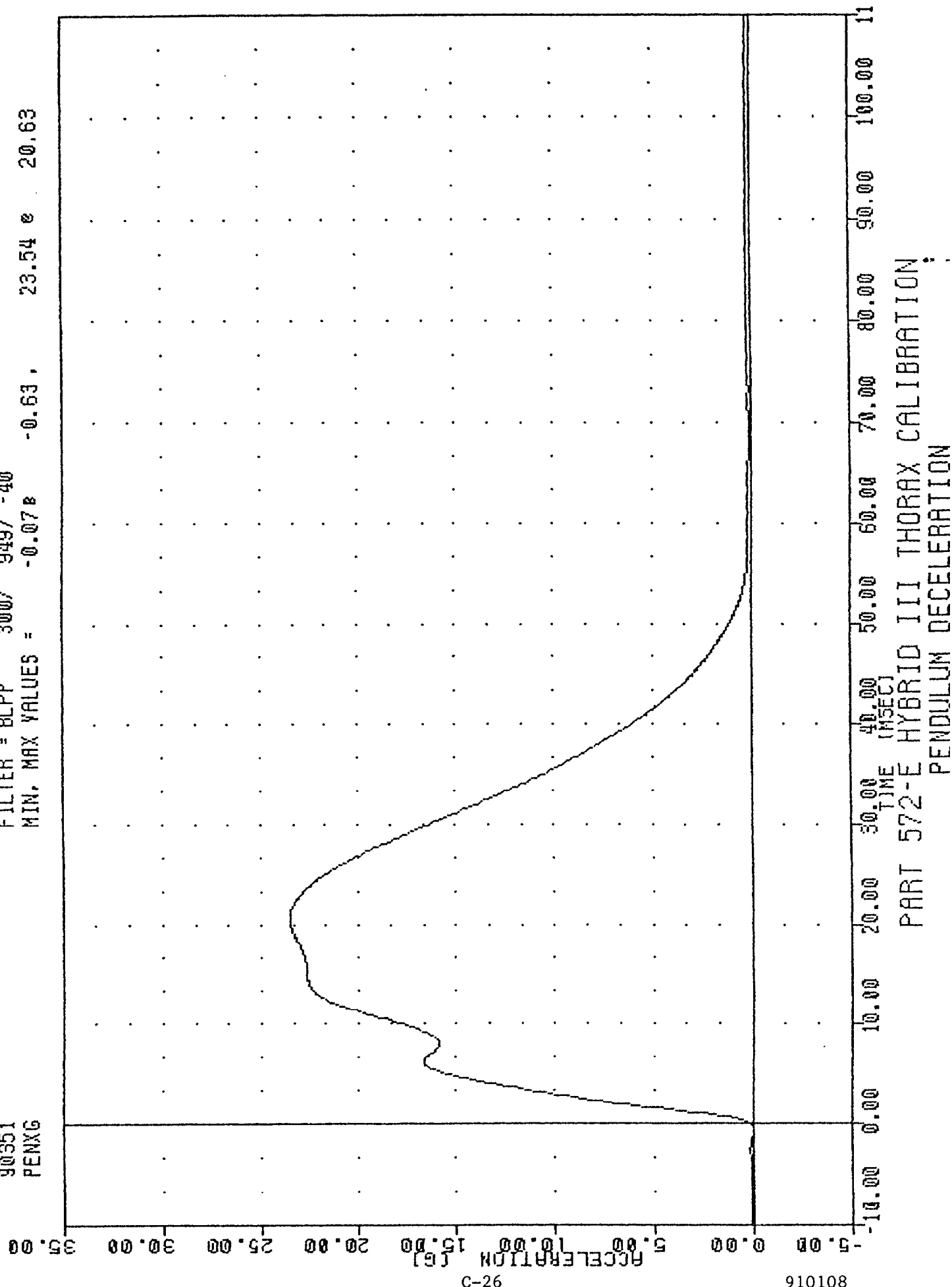
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

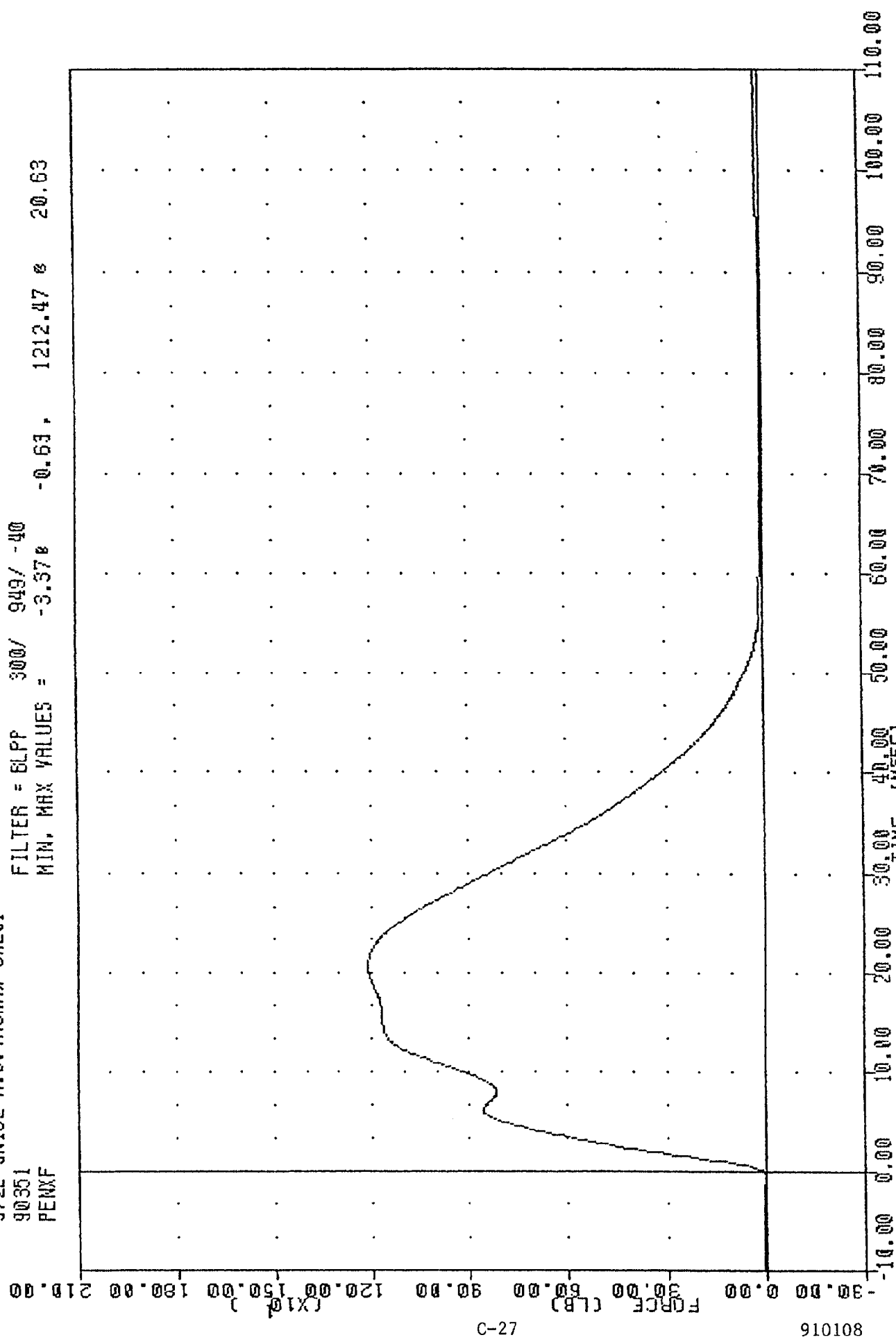
NHTSA , 192C1TH1
 572E SN192 H.S.THORAX CAL01
 90351
 PENXG

FILTER = BLPP 300/ 949/ -40
 MIN, MAX VALUES = -0.078 -0.63 , 23.54 @ 20.63



NHTSA , 192C1TH1
 572E SN192 H.S. THORAX CAL01
 90351
 PENXF

FILTER = 6LPP 300/ 949/ -40
 MIN. MAX VALUES = -3.37% -0.63 , 1212.47 % 20.63



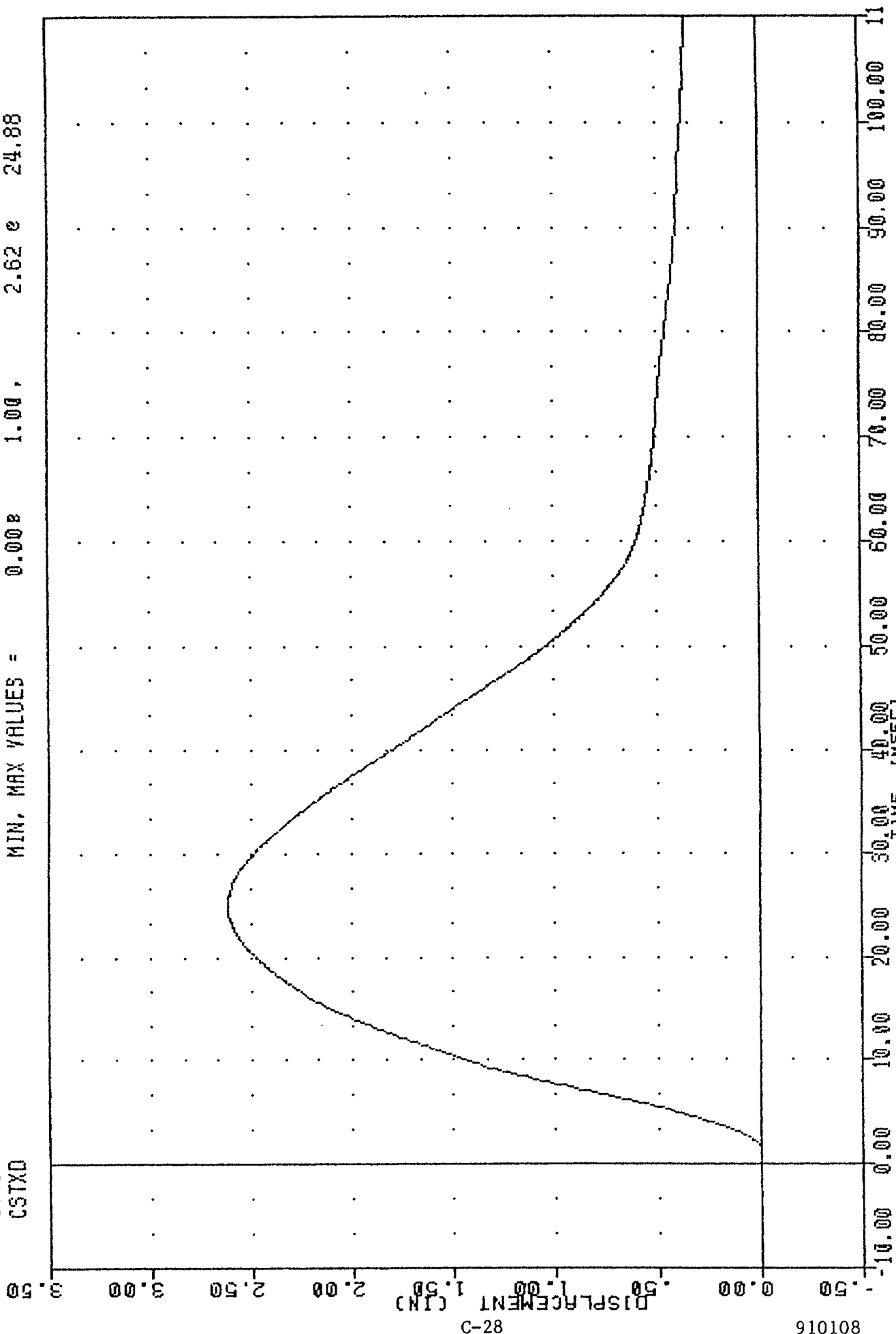
C-27

910108

PART 572-E HYBRID III THORAX CALIBRATION
 MINIMUM FORCE

NHTSR , 192C1TH1
 572E 3N192 H.S.THORAX CAL01
 90351
 CSTXD

FILTER = BLPP 300/ 349/ -40
 MIN, MAX VALUES = 0.002 1.00, 2.62 24.88



C-28

910108

PART 572-E HYBRID III THORAX CALIBRATION
 STERNUM DISPLACEMENT

24.88
20.63

2.62 %
1212.47 %

1.00 %
-0.63 %

0.00 %
-3.37 %

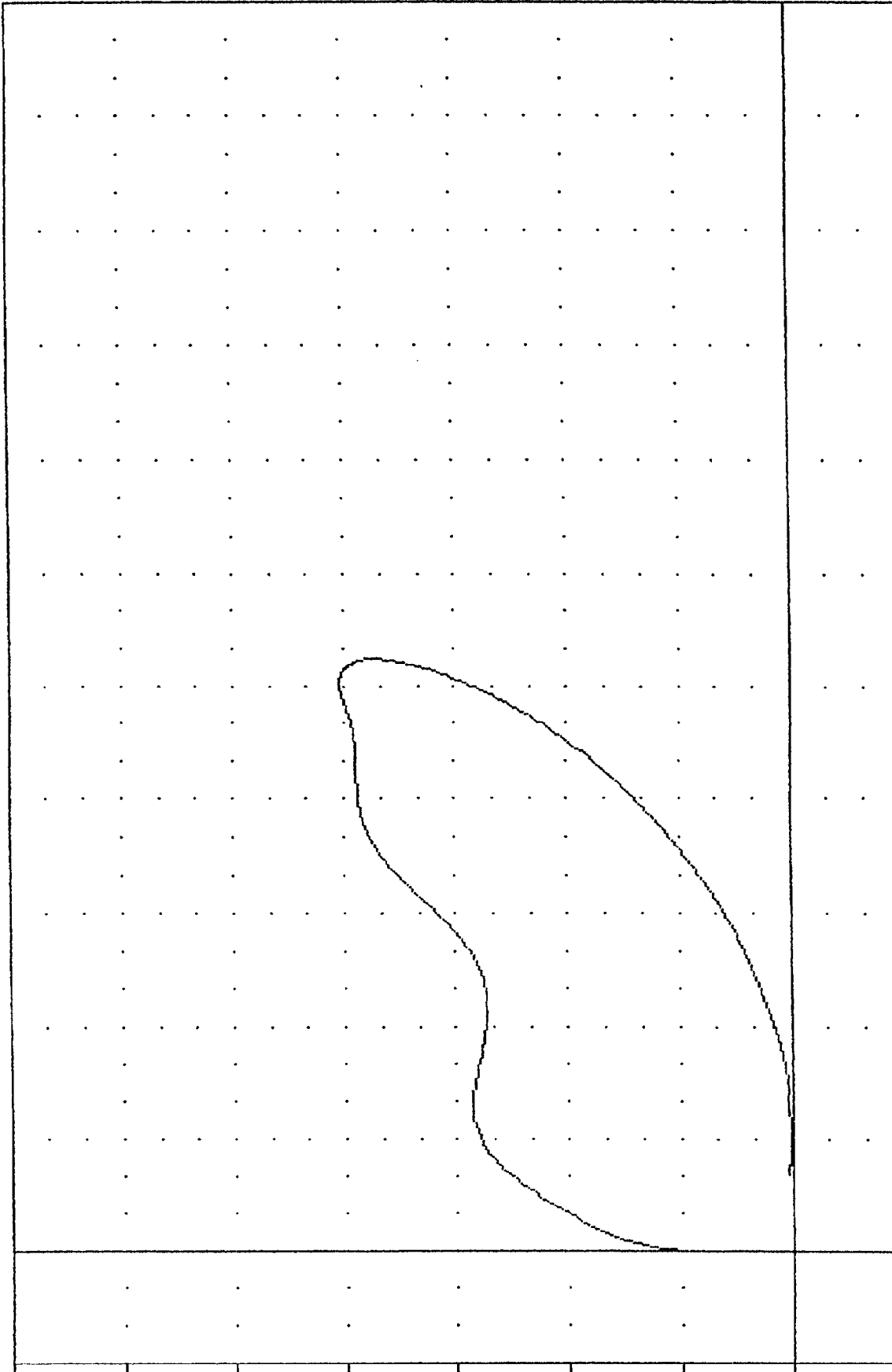
MIN. MAX =
MIN. MAX =

572E SNJ92 H.S. THORAX CAL01
300/ 849/ -40
300/ 849/ -40

192C1THL
FILTER = BLPP
FILTER = BLPP

NHISA
CSTXD
PENXF

801016
C-29
-30.00 0.00 30.00 60.00 90.00 120.00 150.00 180.00 210.00
[X10³]
FORCE (LBS)
PENXF



5.50 5.00 4.50 4.00 3.50 3.00 2.50 2.00 1.50 1.00 .50 0.00 -0.50
DISPLACEMENT (IN)
PART 572-E HYBRID III THORAX CALIBRATION
CSTXD
PENXF
CSTXD
PENXF

KNEE IMPACT TEST

HYBRID III

04-Dec-90

RIGHT
NHTSAKNEE
192C1RK1

572E SN192 R.KNEE 11LB CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	34.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.93 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1144.15 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

NHTSA , 192C1R1
 572E SN192 R.KNEE 11LB CAL 01
 90338
 PENXG

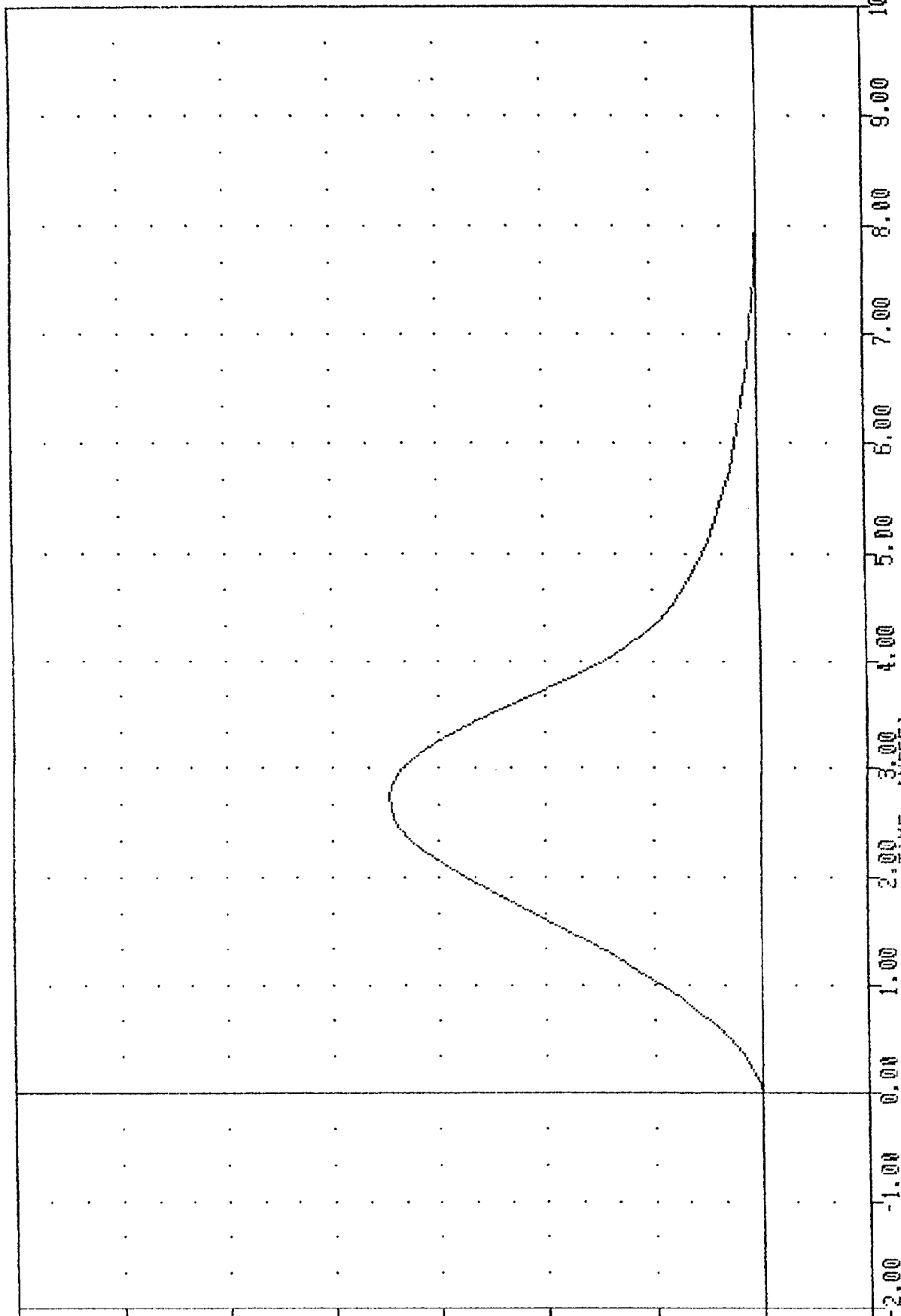
FILTER = BLPP 1000/ 3162/ -40
 MIN, MAX VALUES = -0.290 -0.13, 104.01 2.75

210.00

ACCELERATION (G)

13-C

801016

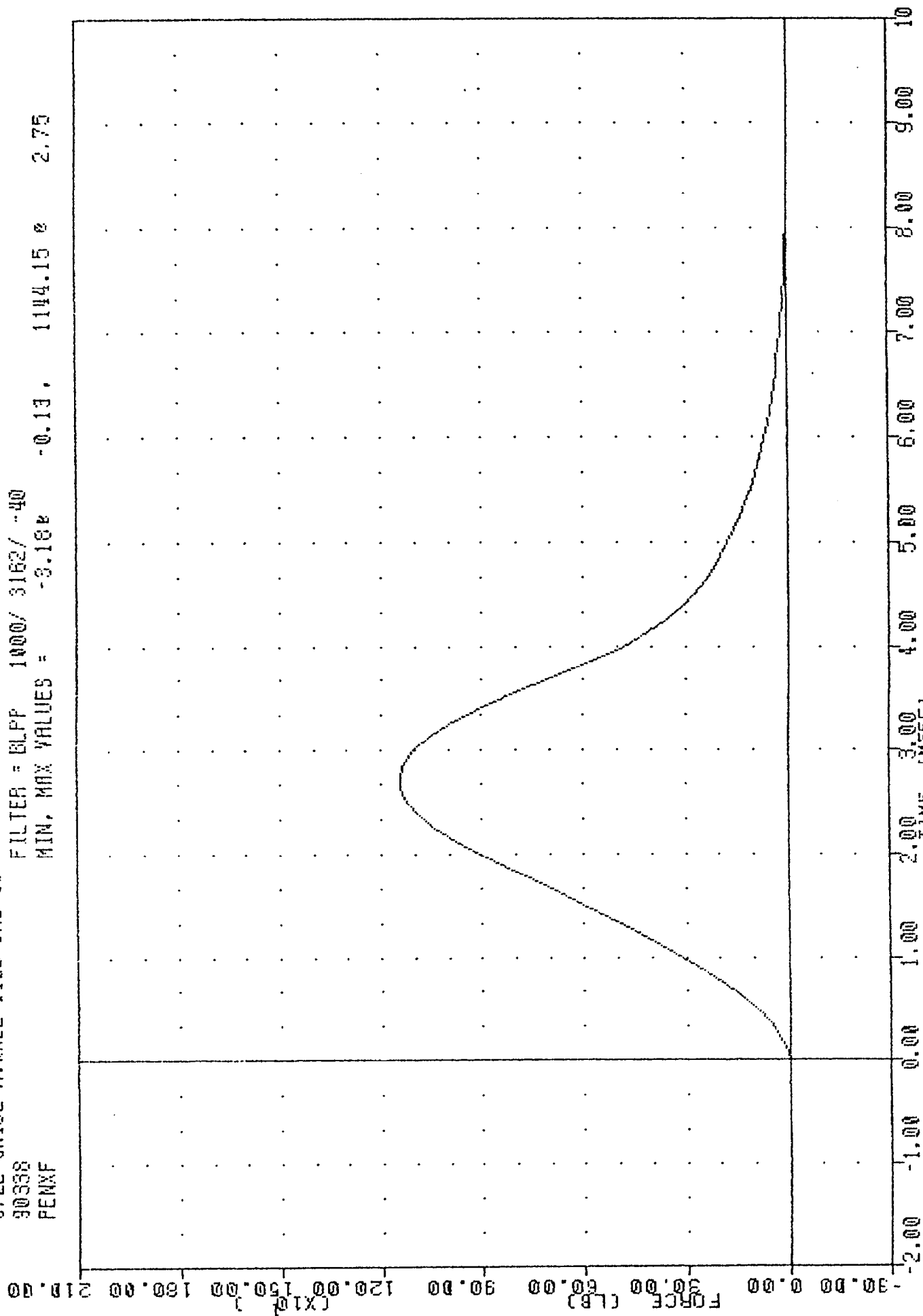


PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM DECELERATION (11 LB PEND)

572E SN192 R.KNEE 11LB DAL Q1
 90338
 PENXF

FILTER = BLPP 1000/ 3162/ -40
 MIN, MAX VALUES = -3.18e -0.13, 1144.15 e 2.75



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
 PENDULUM FORCE (11 LB PEND.)

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

04-Dec-90

LEFT KNEE

NHTSA

192C1LK1

572E SN192 L.KNEE 11LB CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	34.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.93 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1197.11 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middle

PRE-TEST CERTIFICATION DATA

PASSENGER DUMMY S/N: 142

TRANSPORTATION RESEARCH CENTER OF OHIO
HYBRID III EXTERNAL DIMENSIONS
142 HUMANOID

03-DEC-90

NHTSA 142C1ED1 572E SN142 EXT. DIMENSION CAL01

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
TEMPERATURE			72.0 DEG. F
RELATIVE HUMIDITY			55.0 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)		16.9-17.1 IN	17.0 IN
LOCATION FOR WAIST CIRCUMFERENCE (BB)		8.9- 9.1 IN	9.0 IN
CHEST CIRCUMFERENCE (Y)		38.2-39.4 IN	38.8 IN
WAIST CIRCUMFERENCE (Z)		32.9-34.1 IN	33.2 IN
CHEST DEPTH (D)		8.4- 9.0 IN	8.7 IN
H-POINT HEIGHT (C)		3.3- 3.5 IN	3.4 IN
H-POINT FROM SEATBACK (D)		5.3- 5.5 IN	5.4 IN
SKULL CAP TO BACKLINE (H)		1.6- 1.8 IN	1.7 IN
TOTAL SITTING HEIGHT (A)		34.6-35.0 IN	34.8 IN
THIGH CLEARANCE (F)		5.5- 6.1 IN	5.7 IN
BUTTOCK KNEE LENGTH (K)		22.8-23.8 IN	23.5 IN
BUTTOCK POPLITEAL LENGTH (N)		17.8-18.8 IN	18.7 IN
POPLITEAL HEIGHT (L)		16.9-17.9 IN	17.8 IN
KNEE PIVOT HEIGHT (M)		19.1-19.7 IN	19.3 IN
FOOT LENGTH (P)		9.9-10.5 IN	10.1 IN
FOOT BREADTH (W)		3.6- 4.2 IN	3.8 IN
SHOULDER PIVOT FROM BACKLINE (E)		3.3- 3.7 IN	3.5 IN
SHOULDER BREADTH (V)		16.6-17.2 IN	16.8 IN
SHOULDER PIVOT HEIGHT (B)		19.9-20.5 IN	20.1 IN
ELBOW REST HEIGHT (J)		7.5- 8.3 IN	8.2 IN
SHOULDER-ELBOW LENGTH (I)		13.0-13.6 IN	13.6 IN
BACK OF ELBOW TO WRIST PIVOT (G)		11.4-12.0 IN	11.5 IN

TEST MEETS SPECIFICATIONS

TECHNICIAN *Chas. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

04-Dec-90

NHTSA

142C1HD1

572E SN142 HEAD DROP CAL 01

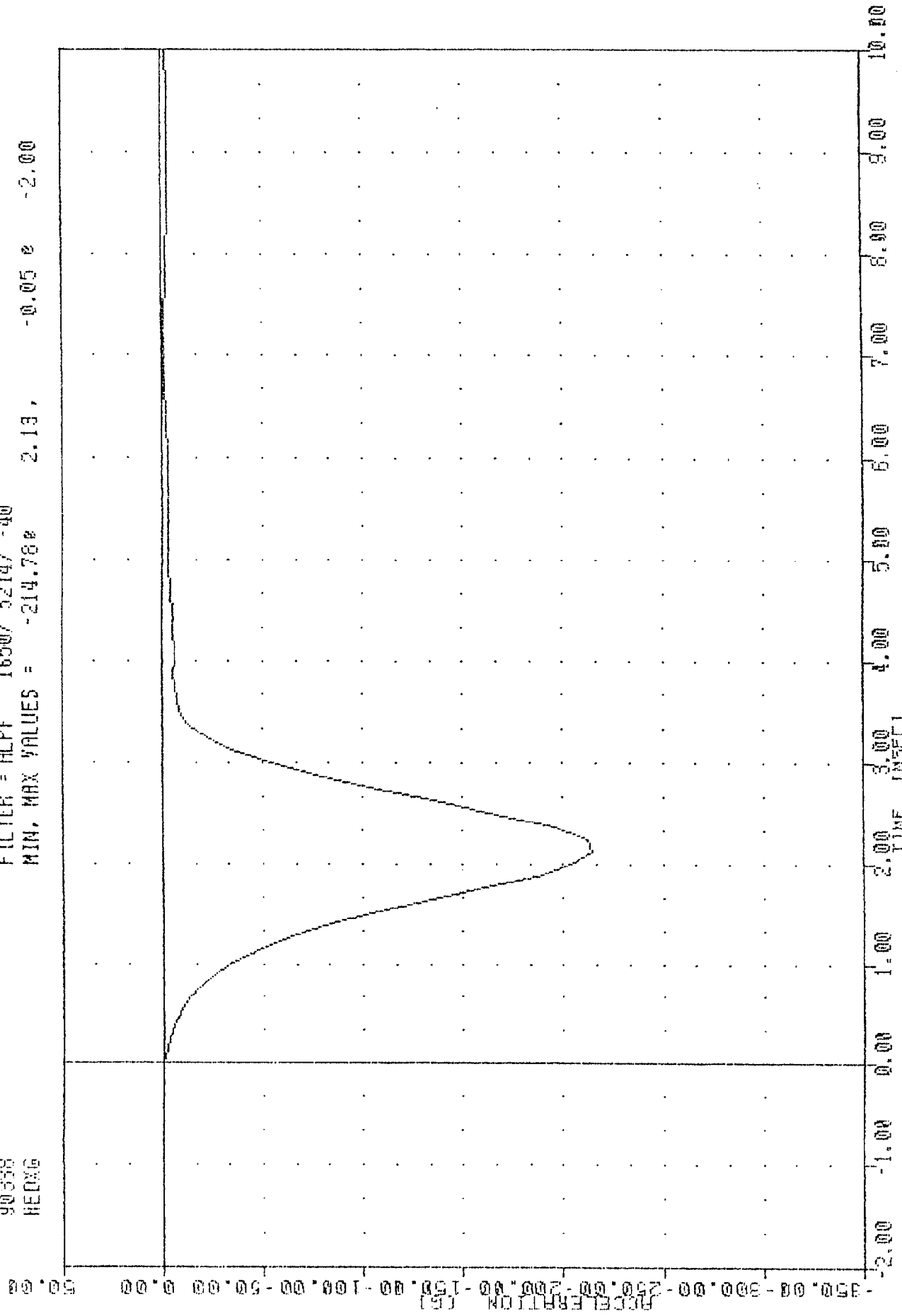
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	34.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	252.43 G
PEAK LATERAL ACCELERATION	15 G MAX	-7.27 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

WNTSA 142C1HD1
 572E 5N142 HEAD DROP CAL 01
 90338
 HEADG

FILTER = HLPF 1650/ 5214/ -40
 MIN, MAX VALUES = -214.78 2.13, -0.05 -2.00

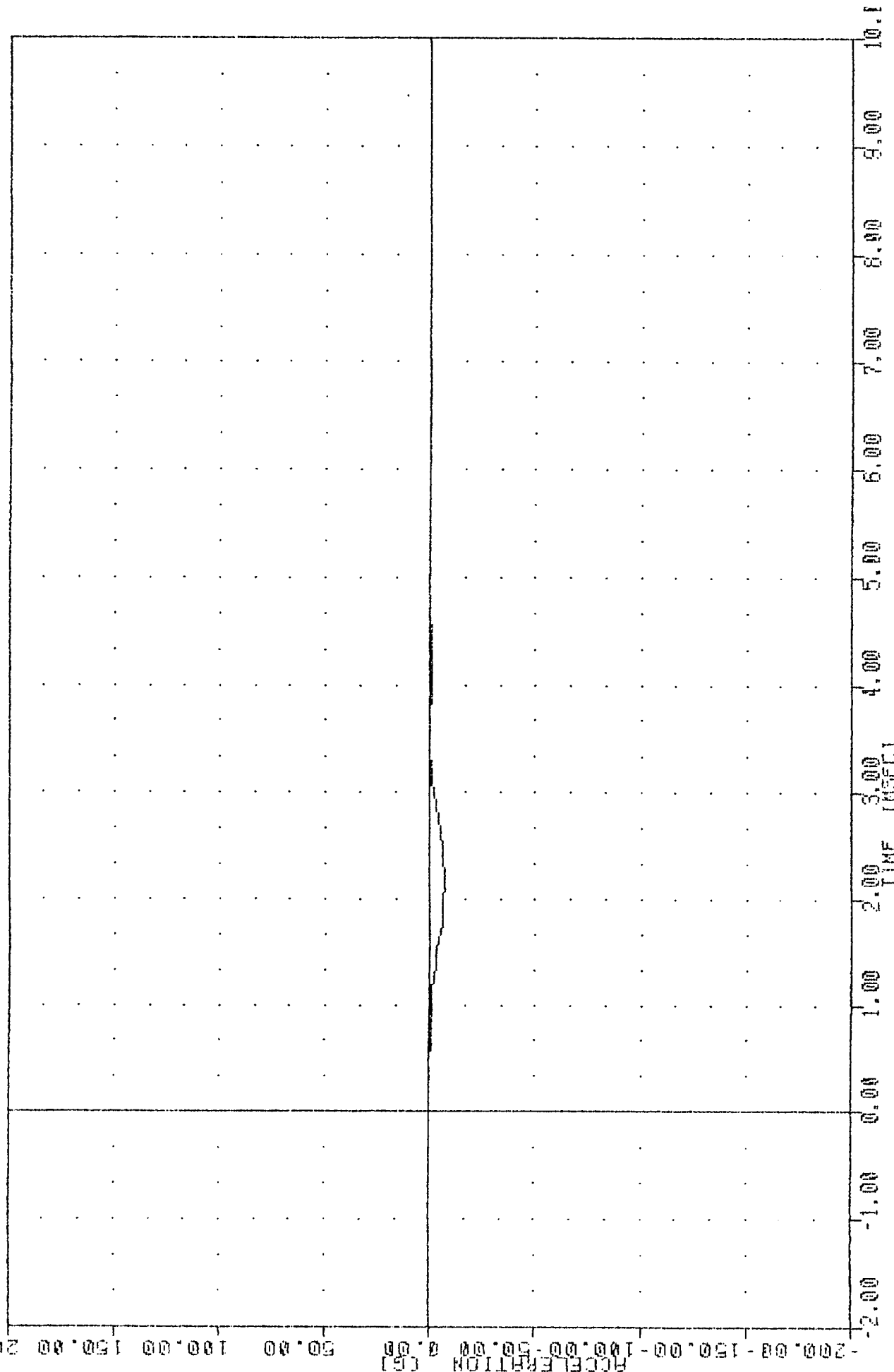


PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION X 10¹⁰

572E SN142 HEAD DRDP CAL 01
 90339
 HEDYG

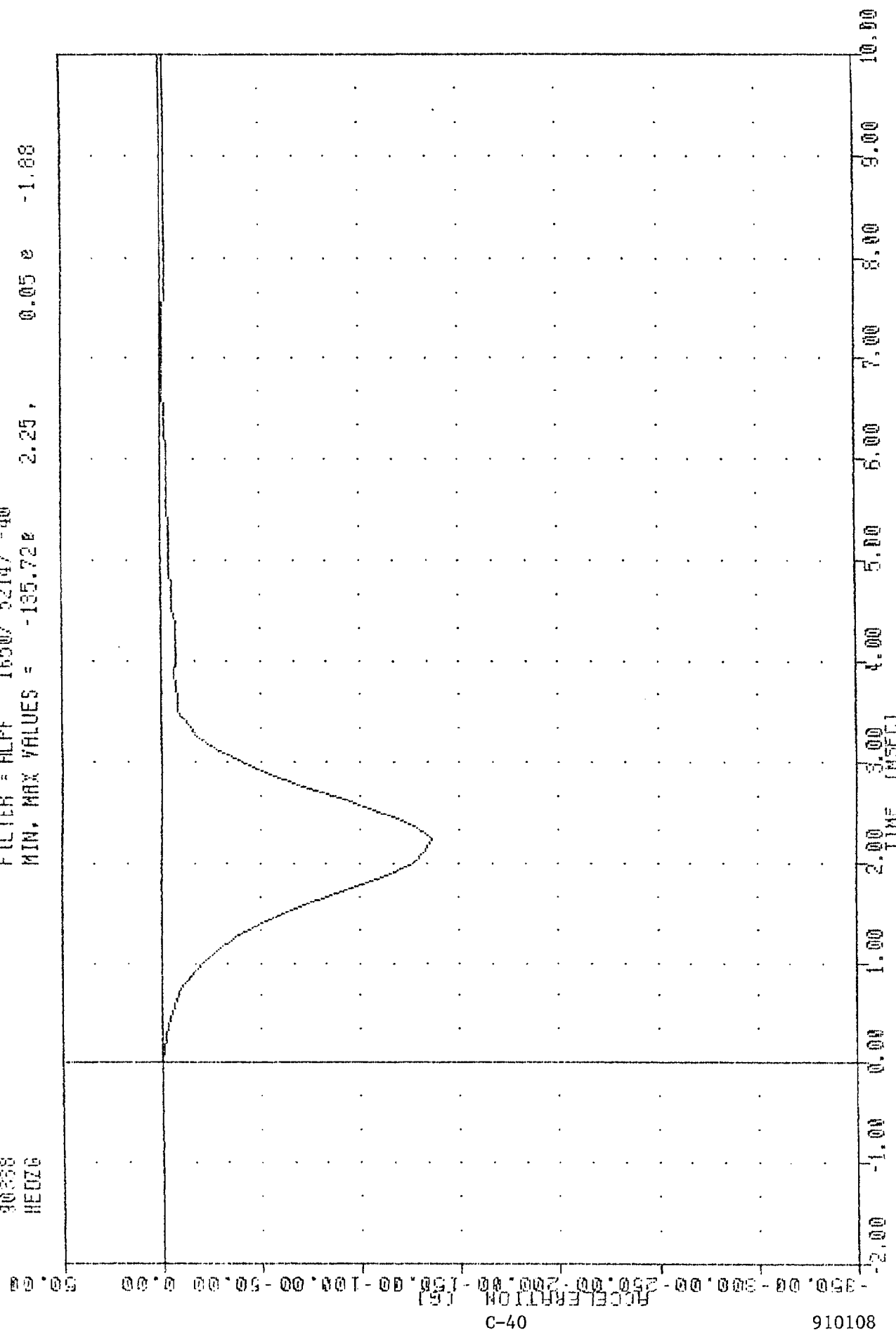
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -7.27 2.13 0.55 5.13



PART 572-E HYBRID III HEAD CALIBRATION
 HEAD ACCELERATION Y AXIS

WHTSH
 572E 3N142 HEAD DROP CAL 01
 30338
 HEADZG

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -135.72# 2.25 , 0.05 e -1.88

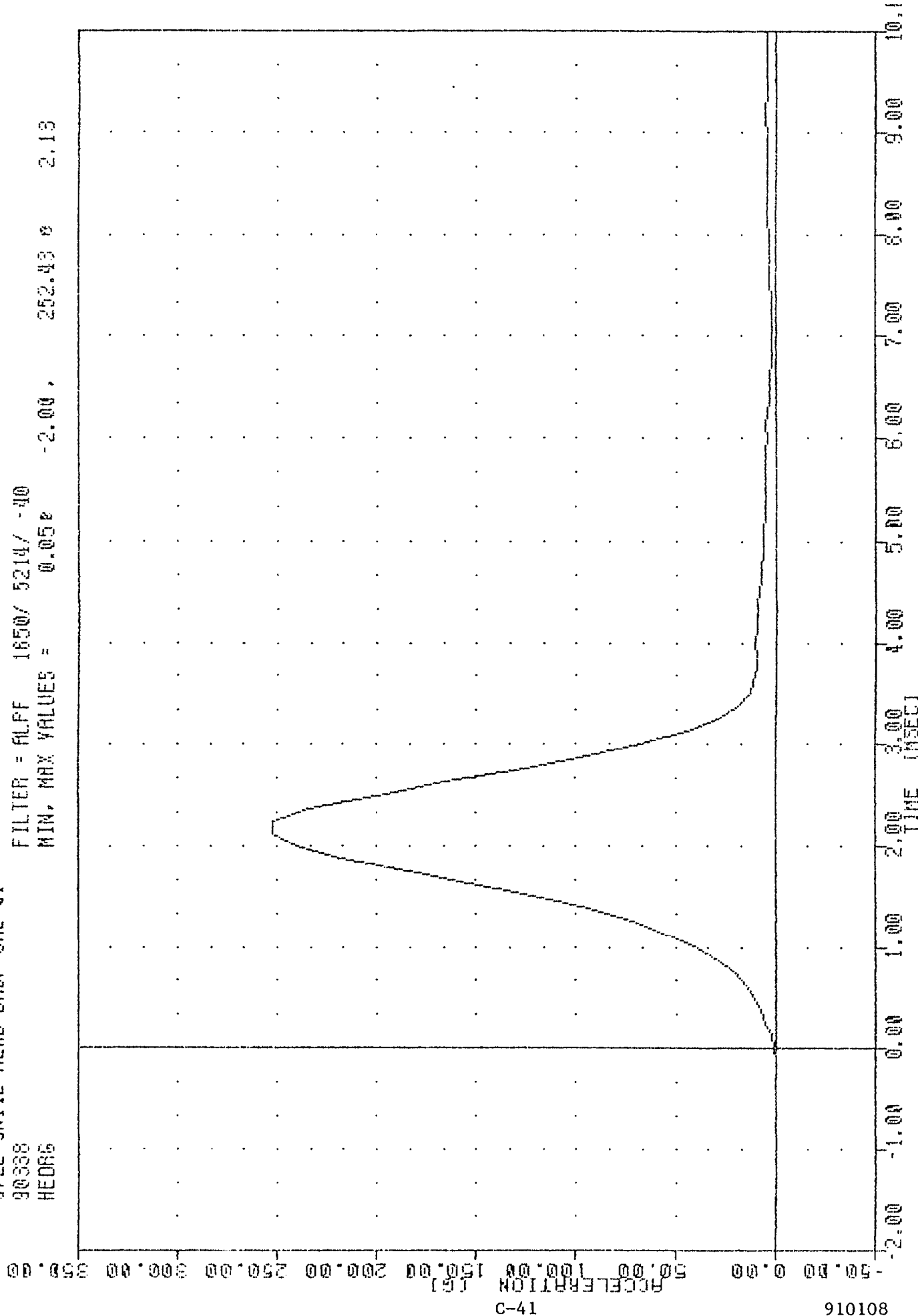


PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Z AXIS

572E SN142 HEAD DROP CAL 01
 90338
 HEADS

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.05e -2.00, 252.43 e 2.13



C-41

910108

PART 572-E HYBRID III HEAD CALIBRATION
 HEAD RESULTANT ACCELERATION

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

04-Dec-90

6 AXIS NECK TRANSDUCER
NHTSA 142C1NF1

572E SN142 NECK FLEXION CAL01

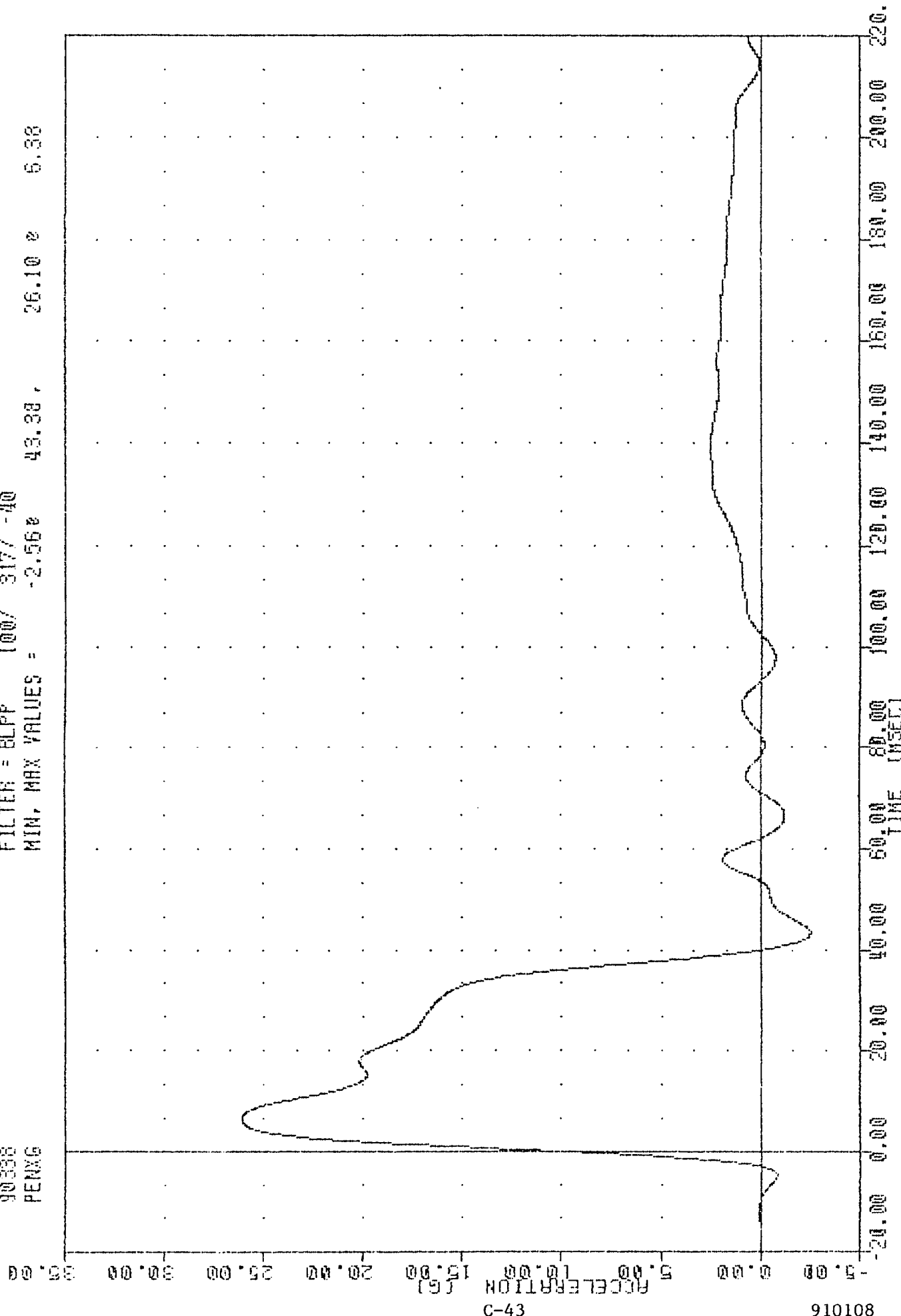
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	69.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	35.00 %
IMPACT VELOCITY	22.6-23.4 FT/SEC	23.30 FT/SEC
PENDULUM	10 MS 22.50 - 27.50 G	24.09 G
DECELERATION	20 MS 17.60 - 22.60 G	19.59 G
	30 MS 12.50 - 18.50 G	16.25 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	16.22 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	37.75 MS
D PLANE	MAX 64 - 78 DEG.	74.52 DEG.
ROTATION	TIME 57 - 64 MS	58.50 MS
MOMENT ABOUT OCCIPITAL	MAX 65 - 80 FT.LBS	77.95 FT.LBS
CONDYLE	TIME 47 - 58 MS	51.63 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	114.75 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	99.00 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Chris. Middleton

MICH
 572E SN142 NECK FLEXION CAL01
 90338
 PERMG

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -2.56e 43.33, 26.10 e 6.38



C-43

910108

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 PENDULUM DECELERATION

RHYSR , 14201NF1
 572E SN142 NECK FLEXION CAL01
 90868
 BETH

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -19.89 172.38 31.34 60.25

100.00

80.00

60.00

40.00

20.00

0.00

-20.00

-40.00

-60.00

-80.00

-100.00

-120.00

-140.00

-160.00

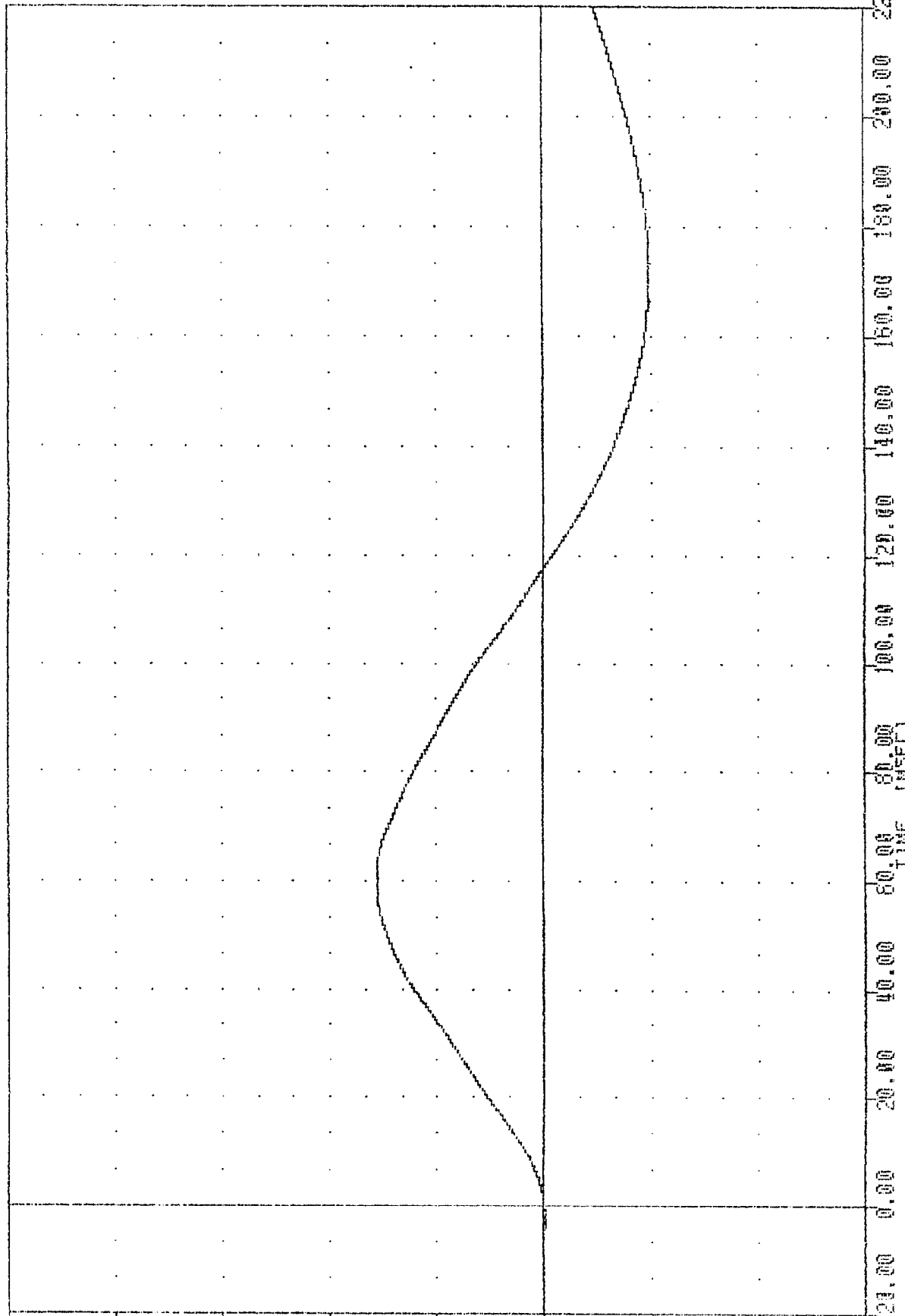
-180.00

-200.00

-220.00

C-44

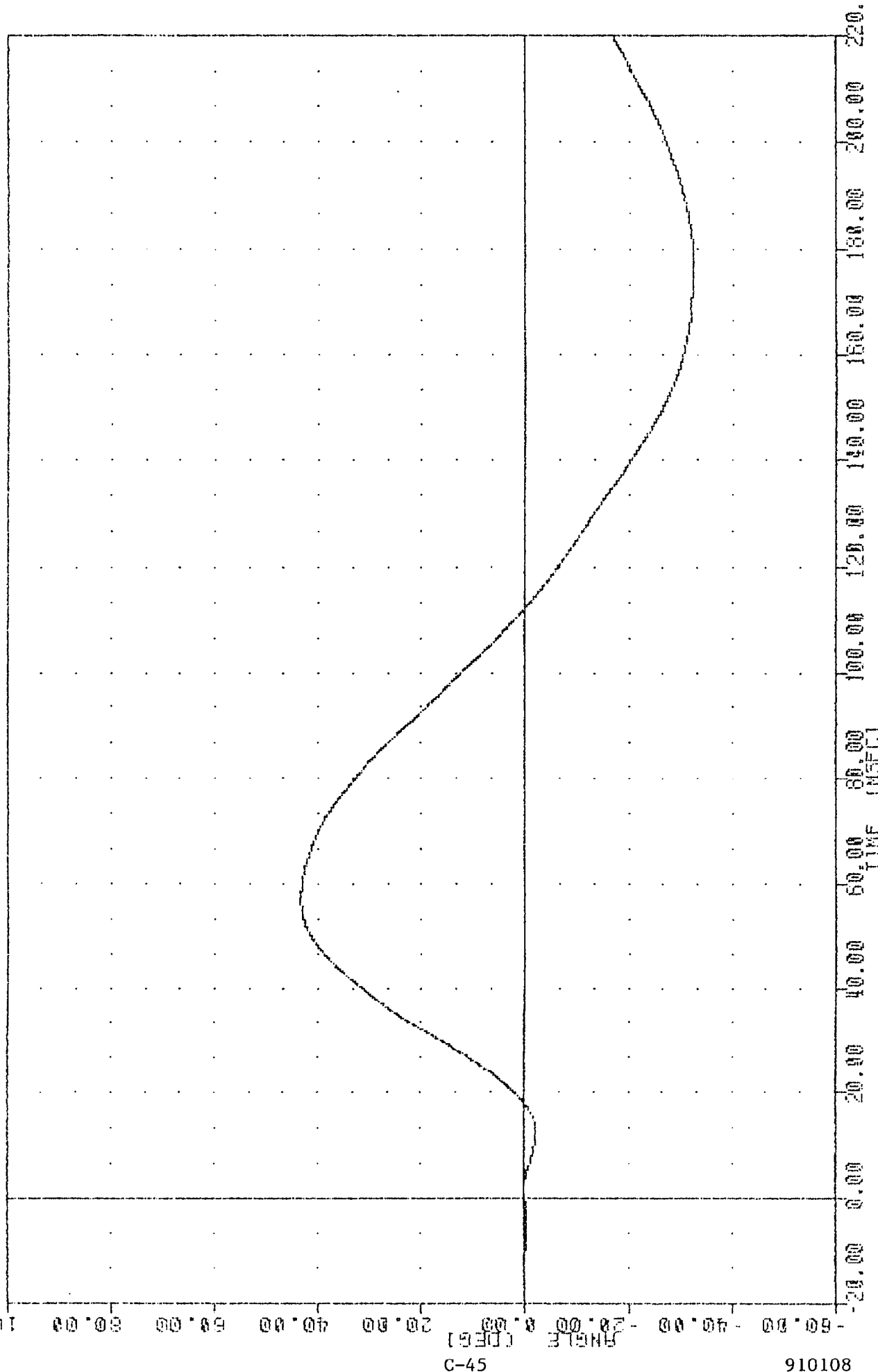
910108



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 ROTATION ABOUT ROSE OF NECK

NM13H
 572E SN142 NECK FLEXION CAL01
 90358
 THETA

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -32.69 177.63, 43.27 57.25



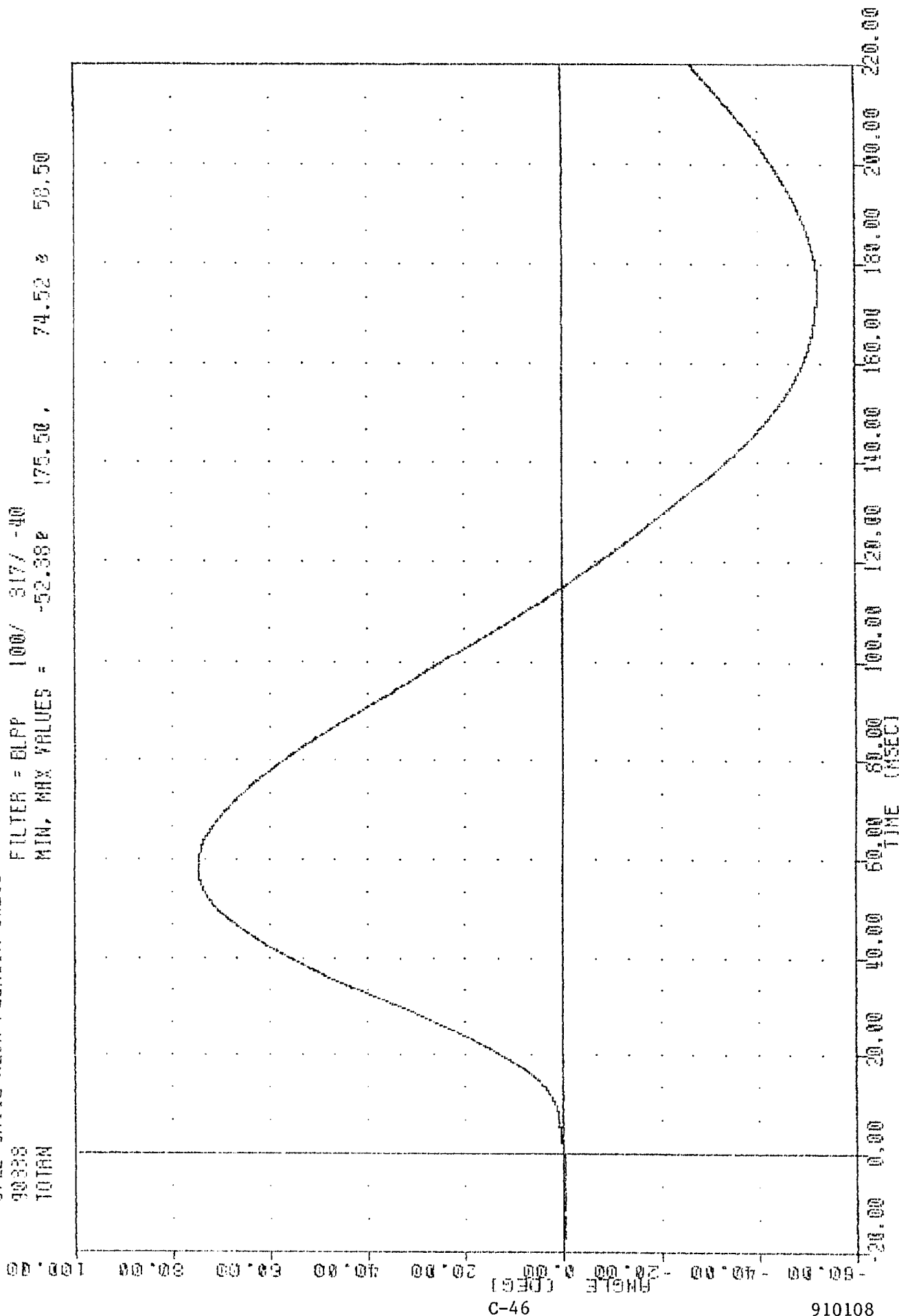
C-45

910108

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

NH13R , 142CINF1
 572E SN142 NECK FLEXION CAL01
 90338
 TOTAL

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -52.38 175.50 , 74.52 58.50



C-46

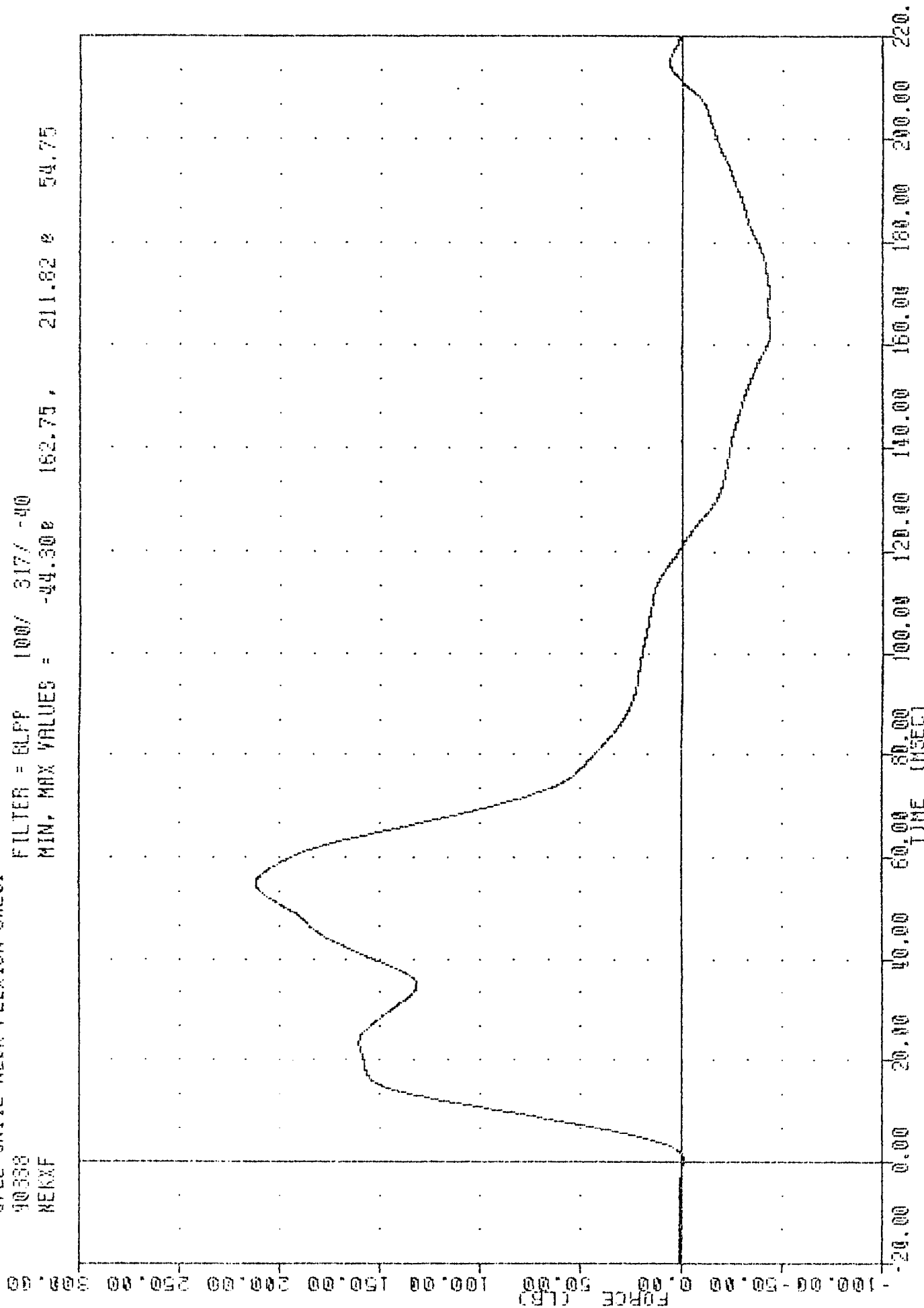
910108

PART 572-E HYBRID III NECK FLEXION CALIBRATION
 TOTAL ROTATION

572E SN142 NECK FLEXION CAL01
 90338
 NEKXF

1420111

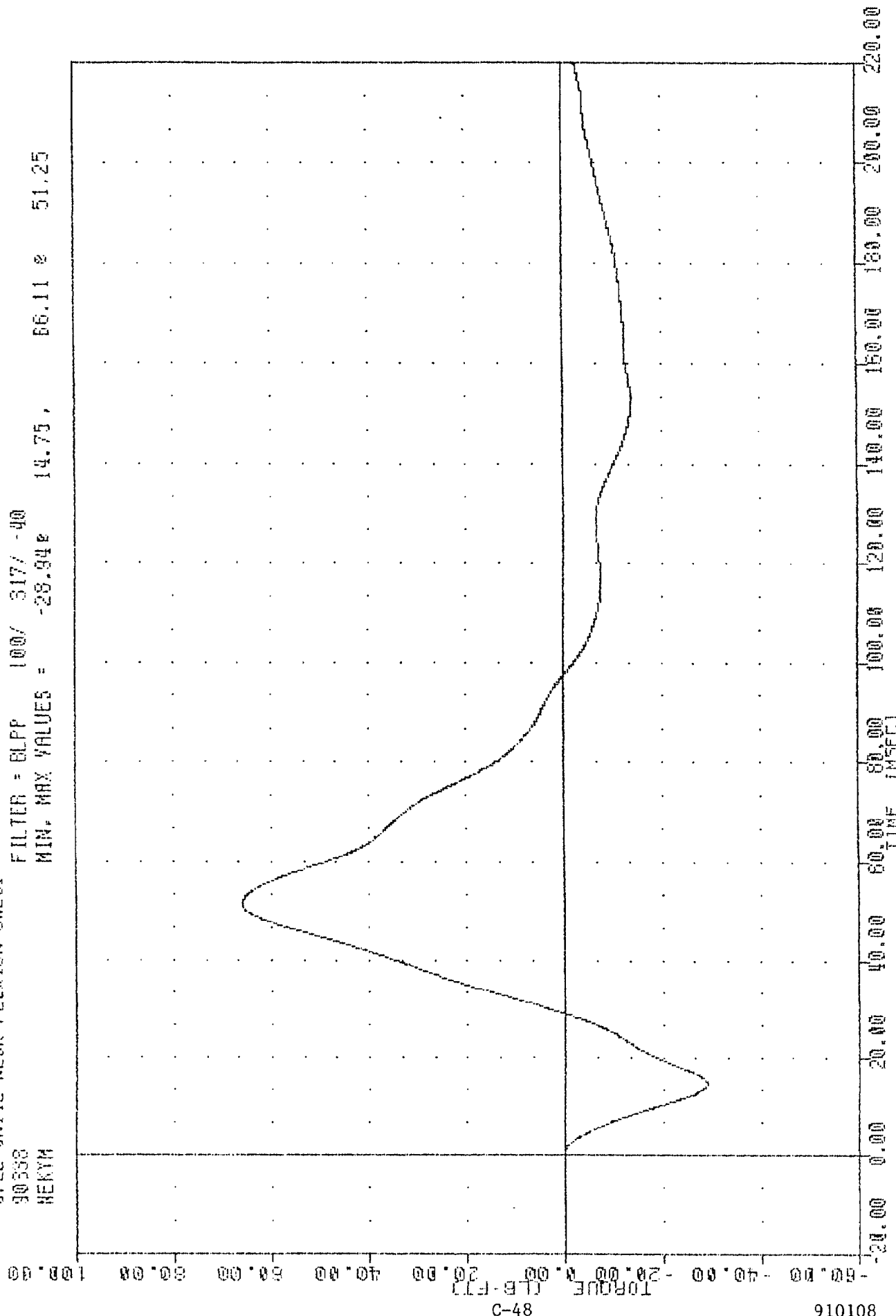
FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -44.30e 162.75, 211.82 e 54.75



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 NECK FORCE X AXIS

NHTSR .142CINF1
 572E SM142 NECK FLEXION CAL01
 90338
 HEKYM

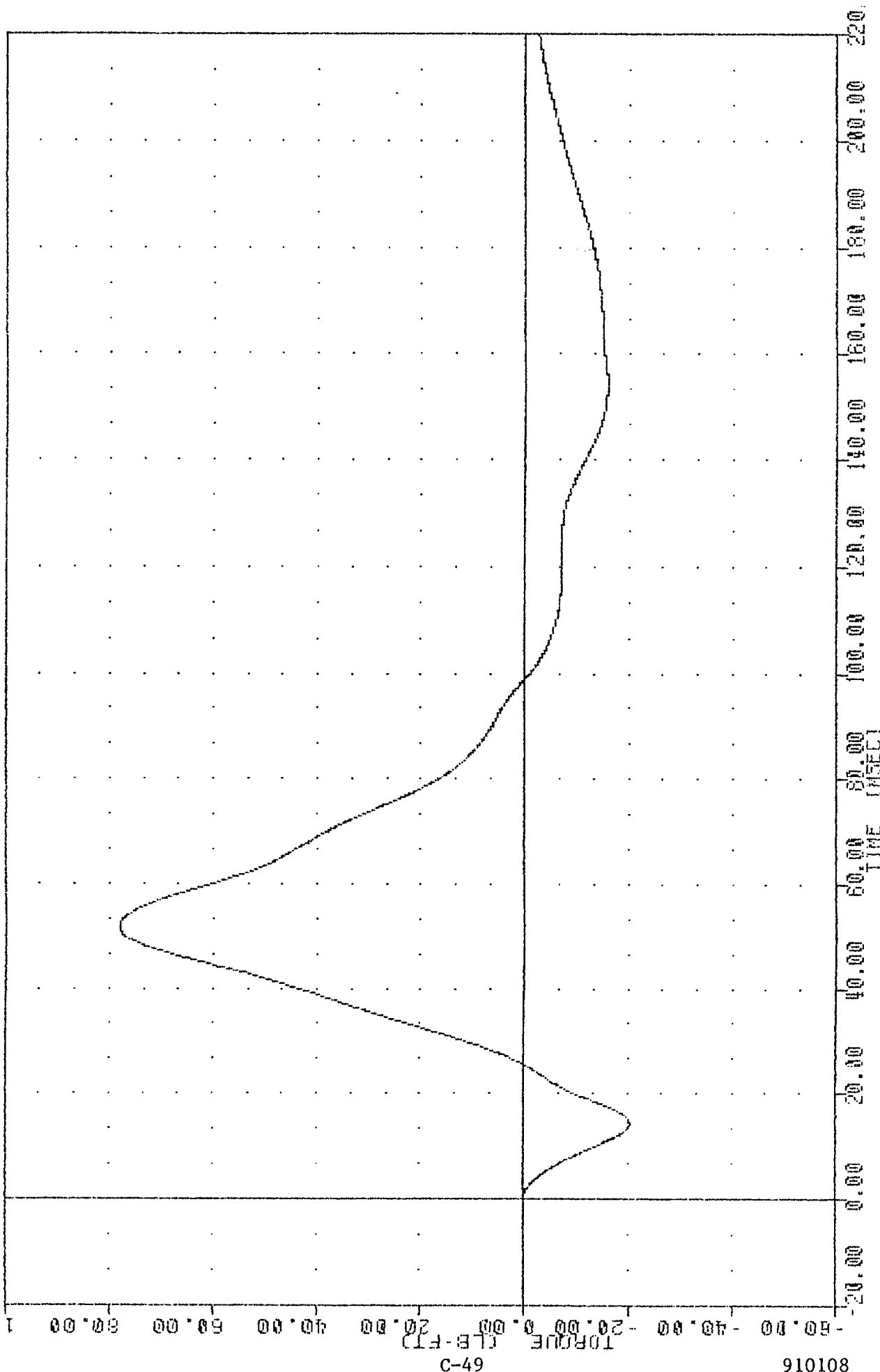
FILTER = BLPP 100/ 317/ -90
 MIN. MAX VALUES = -28.94e 14.75, 86.11 e 51.25



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 NECK MOMENT Y AXIS

00120
 572E 3N142 NECK FLEXION CAL01
 90338
 REKOM

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -20.44 14.25 77.95 51.63



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 TOTAL MOMENT ABOUT OCCIPITAL CONDYLE :

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

04-Dec-90

6 AXIS NECK TRANSDUCER
NHTSA 142C1NE1

572E SN142 NECK EXT. CAL01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	35.00 %
IMPACT VELOCITY	19.50-20.30 FT/SEC	19.93 FT/SEC
PENDULUM	10 MS 17.20 - 21.20 G	19.59 G
DECELERATION	20 MS 14.00 - 19.00 G	15.85 G
	30 MS 11.00 - 16.00 G	12.62 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	12.57 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	41.25 MS
D PLANE	MAX 81 - 106 DEG.	97.85 DEG.
ROTATION	TIME 72 - 82 MS	76.88 MS
MOMENT ABOUT OCCIPITAL	MIN -59.0/-39.0 FT.LBS	-51.45 FT.LBS
CONDYLE	TIME 65 - 79 MS	73.88 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	159.00 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	145.75 MS

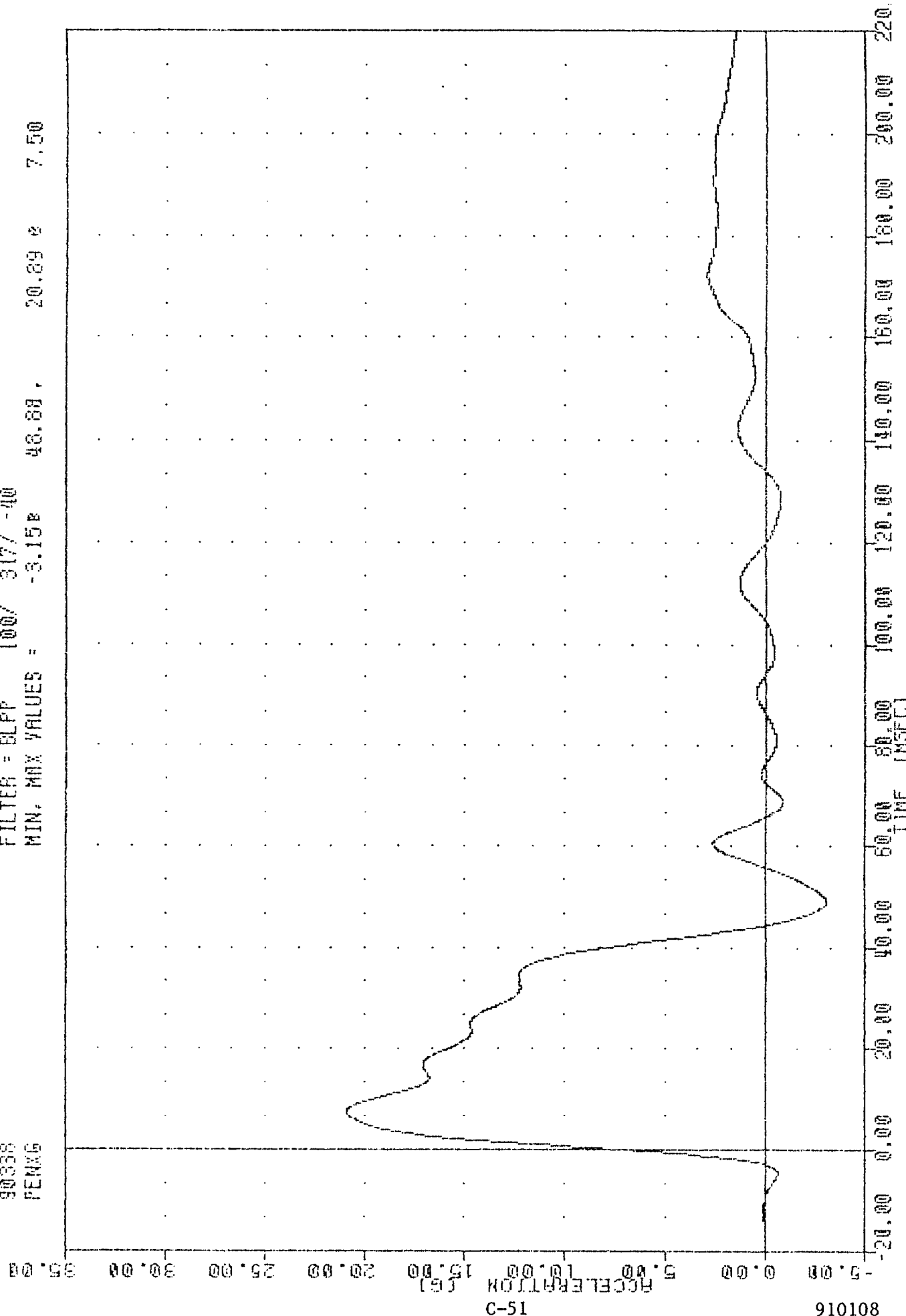
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

BRIGH
 572E 3N142 NECK EXT. CAL01
 90338
 PENXG

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -3.15E 48.88, 20.89 E 7.50



15-C

910108

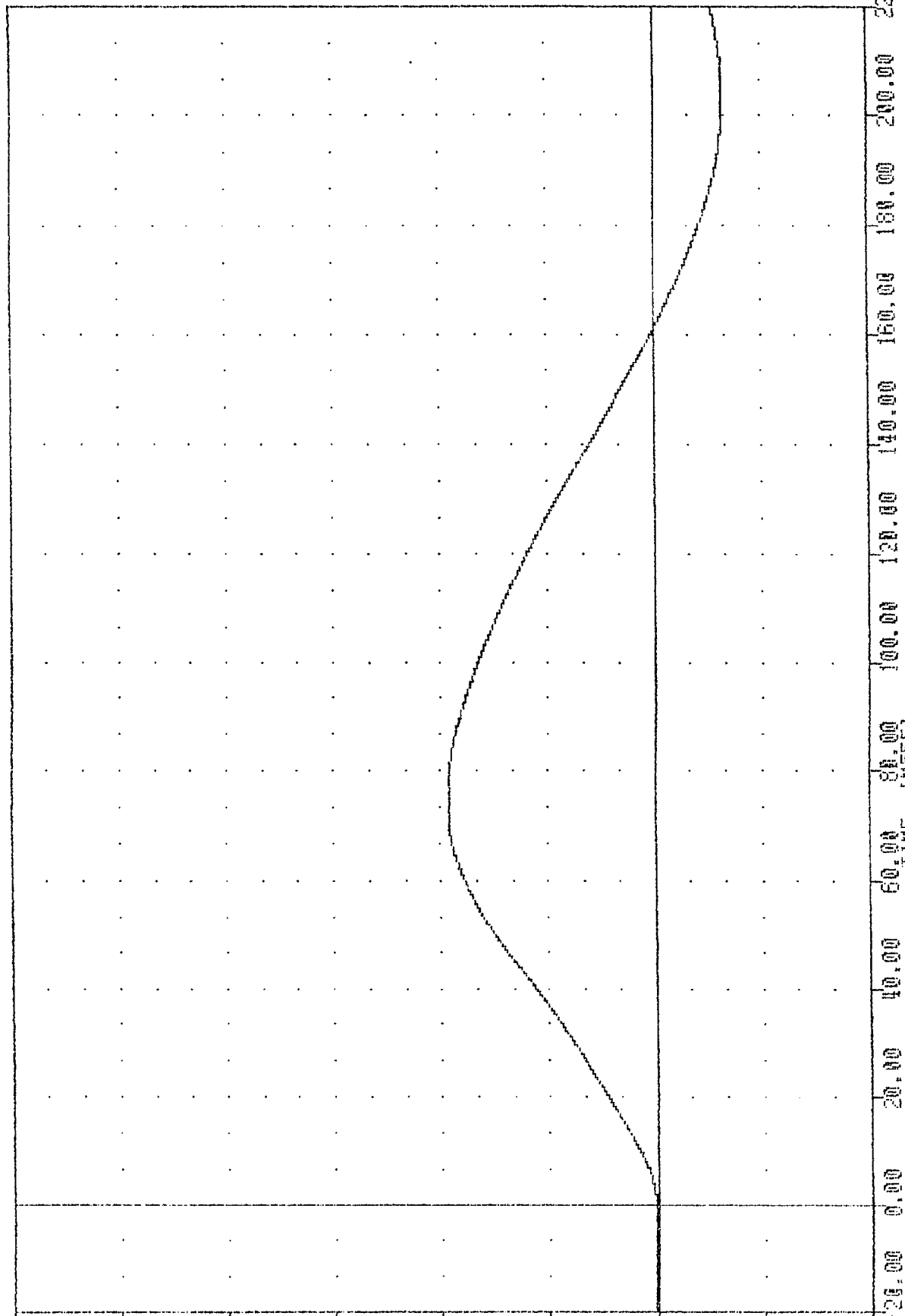
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 PENDULUM DECELERATION

WHICH : 142CINE1
572E 3N142 NECK EXT. CAL01

90336
BETA

FILTER = BLFF 100/ 317/ -40
MIN, MAX VALUES = -13.10% 203.63, 39.57 & 74.83

55-2
PHILE (DEG)



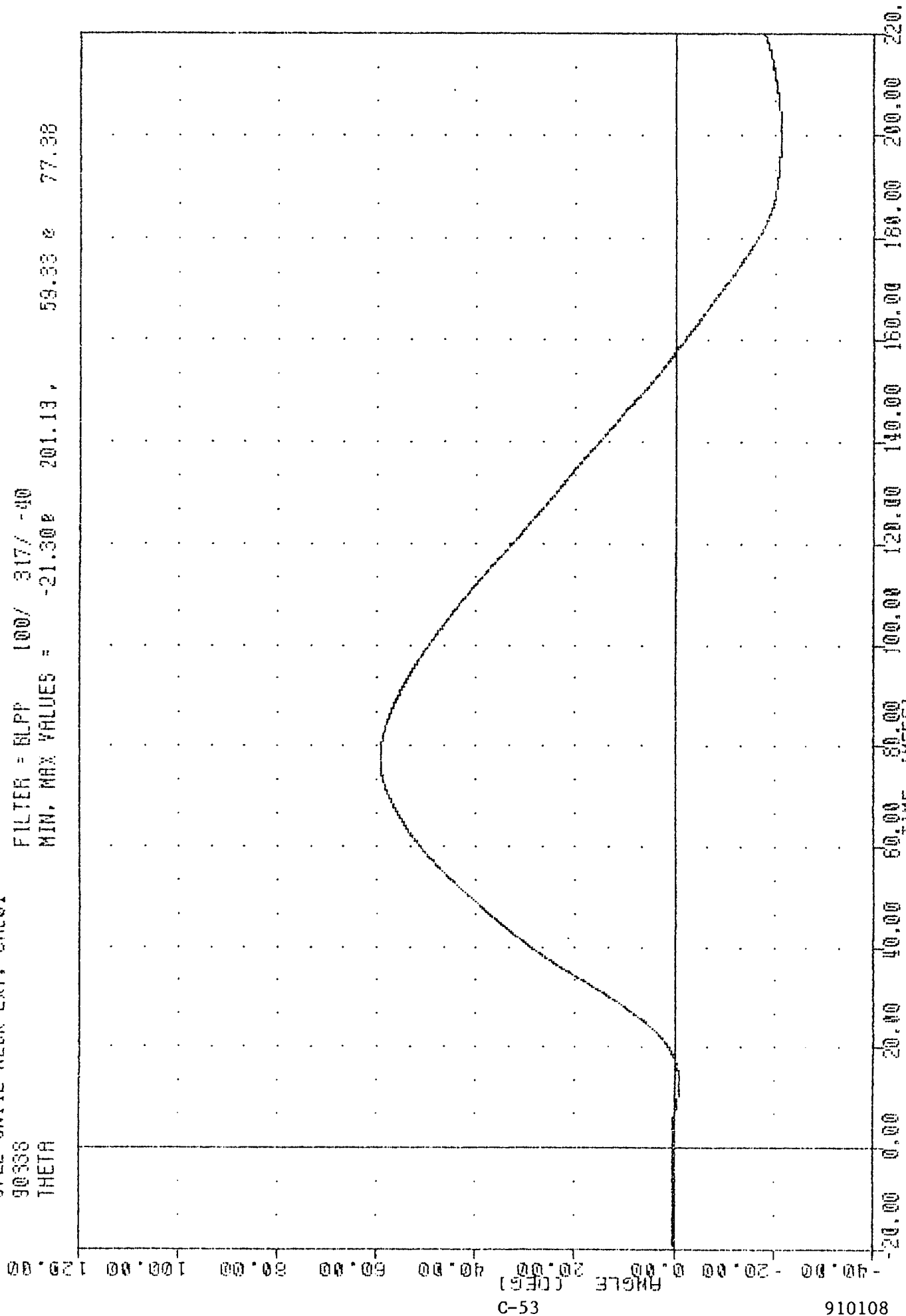
910108

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

POTENTIAL ABOUT BASE OF NECK

572E SN142 NECK EXT. CAL01
 90338
 THETA

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -21.300 201.13, 59.33 0 77.38



C-53

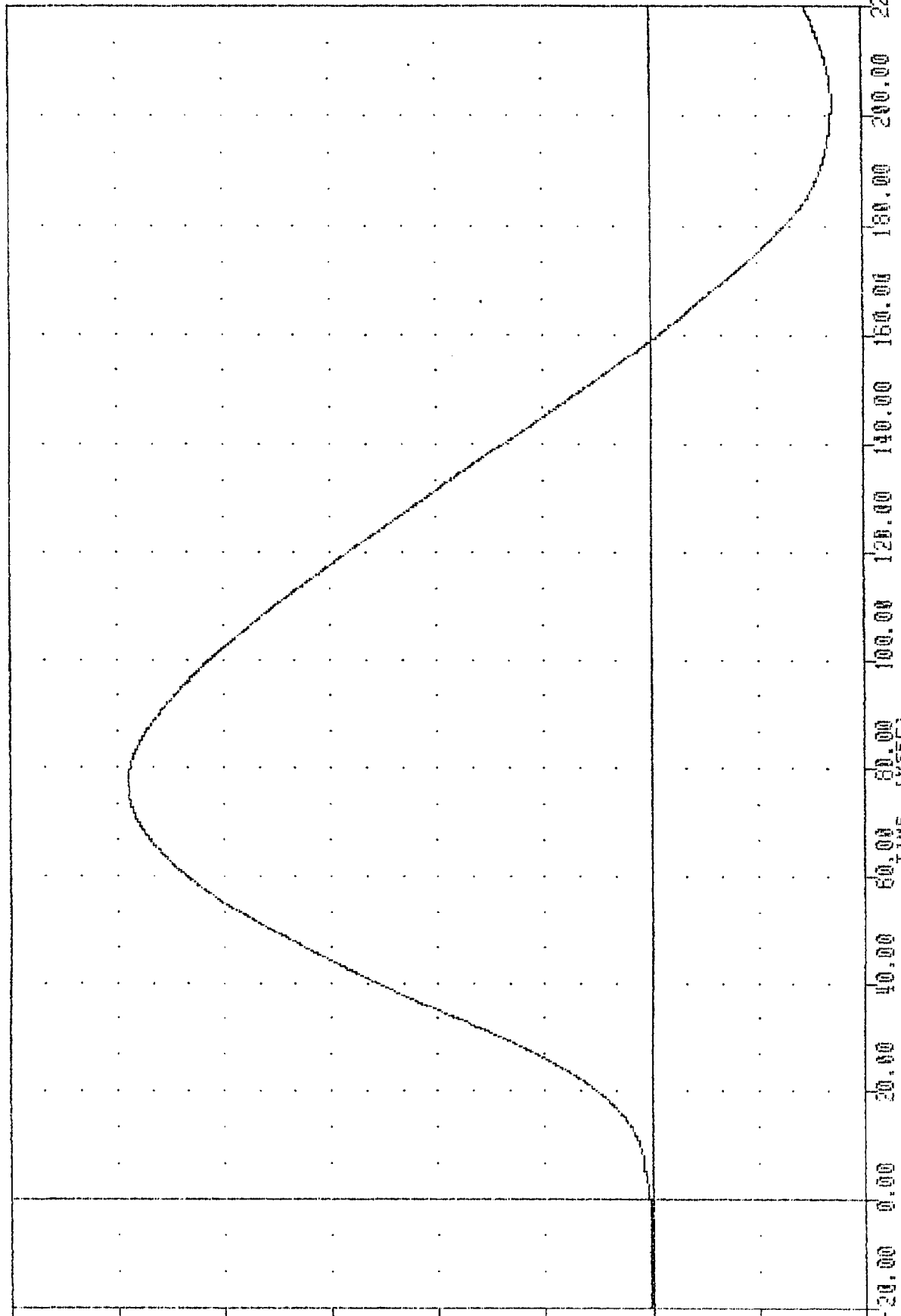
910108

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

80150
 572E 3M142 NECK EXT. CAL01
 80306
 TOTAL

FILTER = 6LPP 100/ 317/ -40
 MIN, MAX VALUES = -34.38 202.38 , 97.35 75.88

120.00
 100.00
 80.00
 60.00
 40.00
 20.00
 0.00
 -20.00
 -40.00
 ANGLE [DEG]



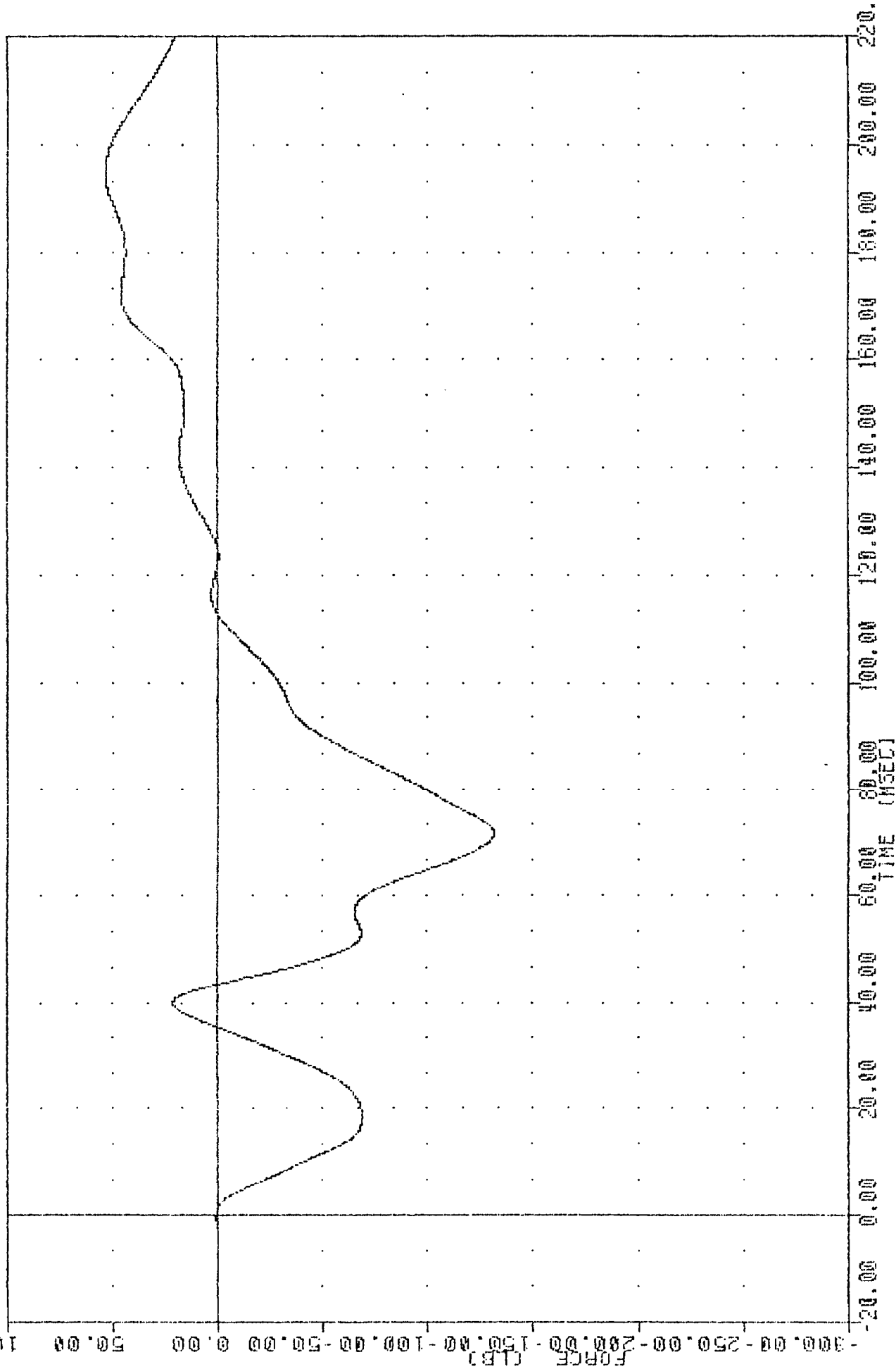
910108

C-54

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 TOTAL EXTENSION

RATION 142L19E1
 572E 3N142 NECK EXT. CAL01
 90338
 NEKXF

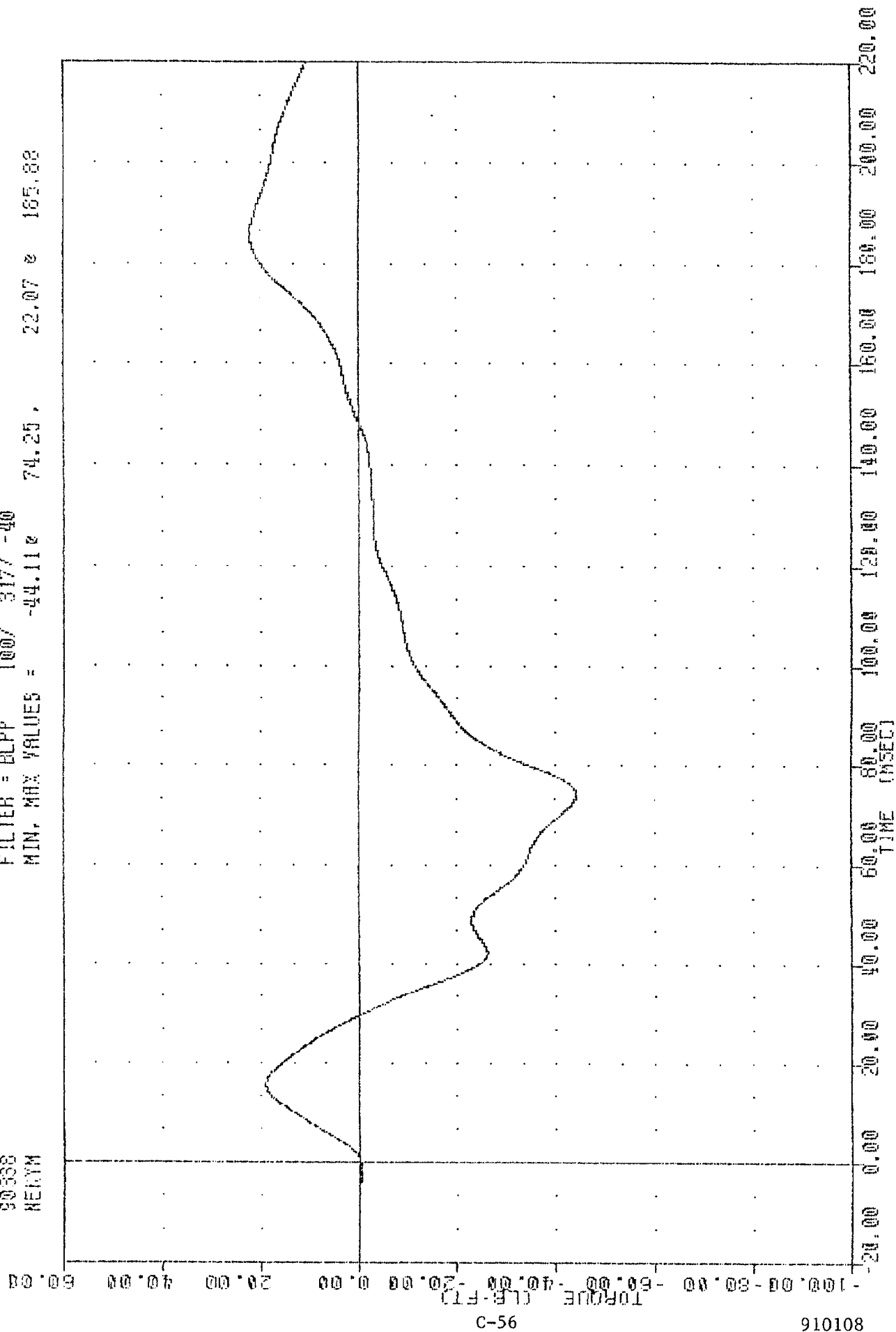
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -131.56 71.63 53.21 2 195.13



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 NECK FORCE X AXIS

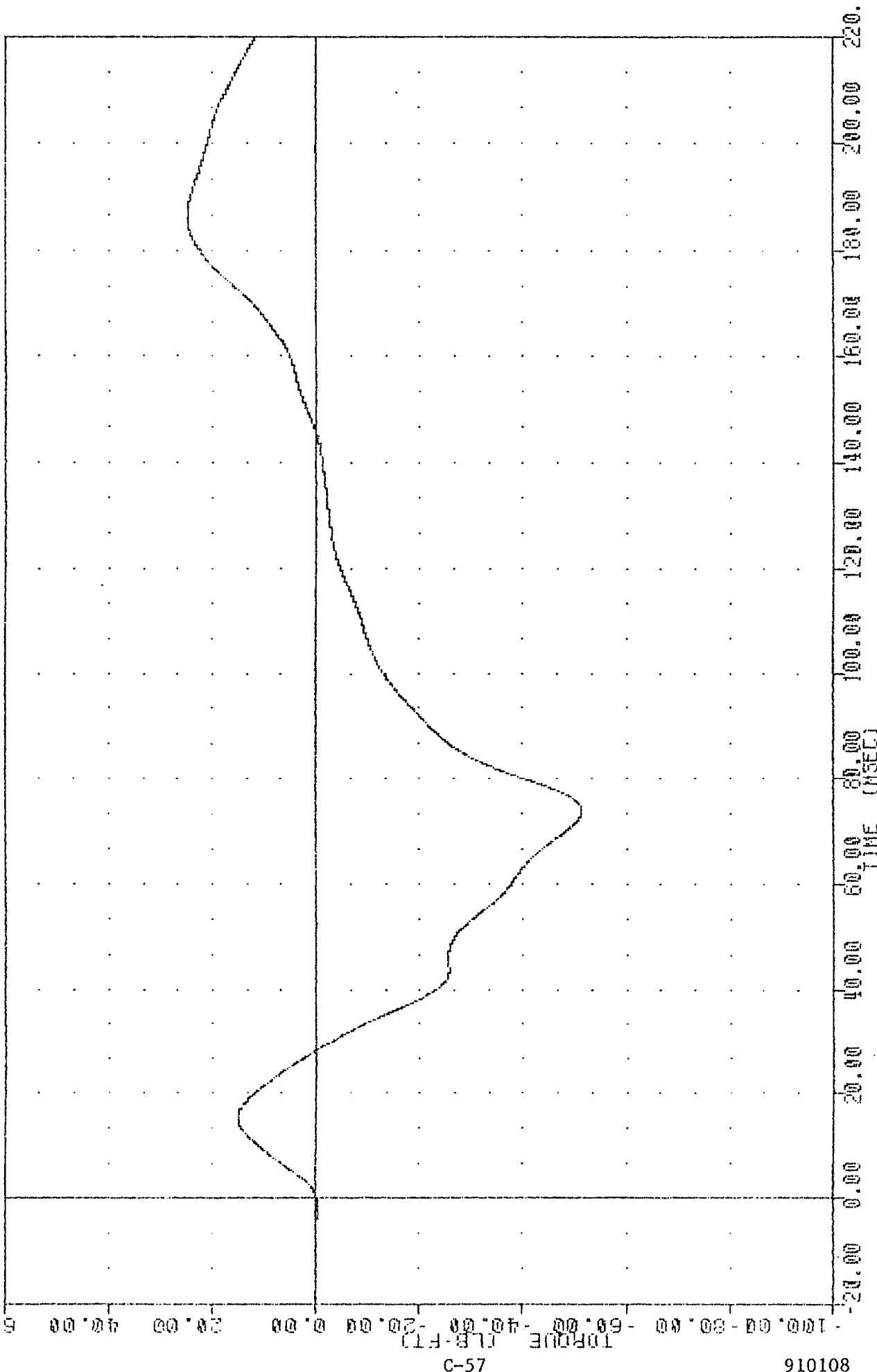
WHTSR , 142CINR1
 572E 5N142 NECK EXT. CAL01
 90338
 NEMYM

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -44.11e 74.25, 22.07 e 185.88



572E SN142 NECK EXT. CAL01
 90330
 NEKOM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -51.45 73.88, 24.79 2 186.38



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 TOTAL MDMENT ABOUT OCCIPITAL CONDYLE ;

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

12-Dec-90

NHTSA

142C1TH1

572E SN142 H.S.THORAX CAL01

	HIGH SPEED TEST	
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	72.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	39.00 %
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 IN	2.55 IN
MAXIMUM RESISTIVE FORCE	1160 - 1325 LBS	1225.8 LBS
INTERNAL HYSTERESIS	69% - 85%	73.6%

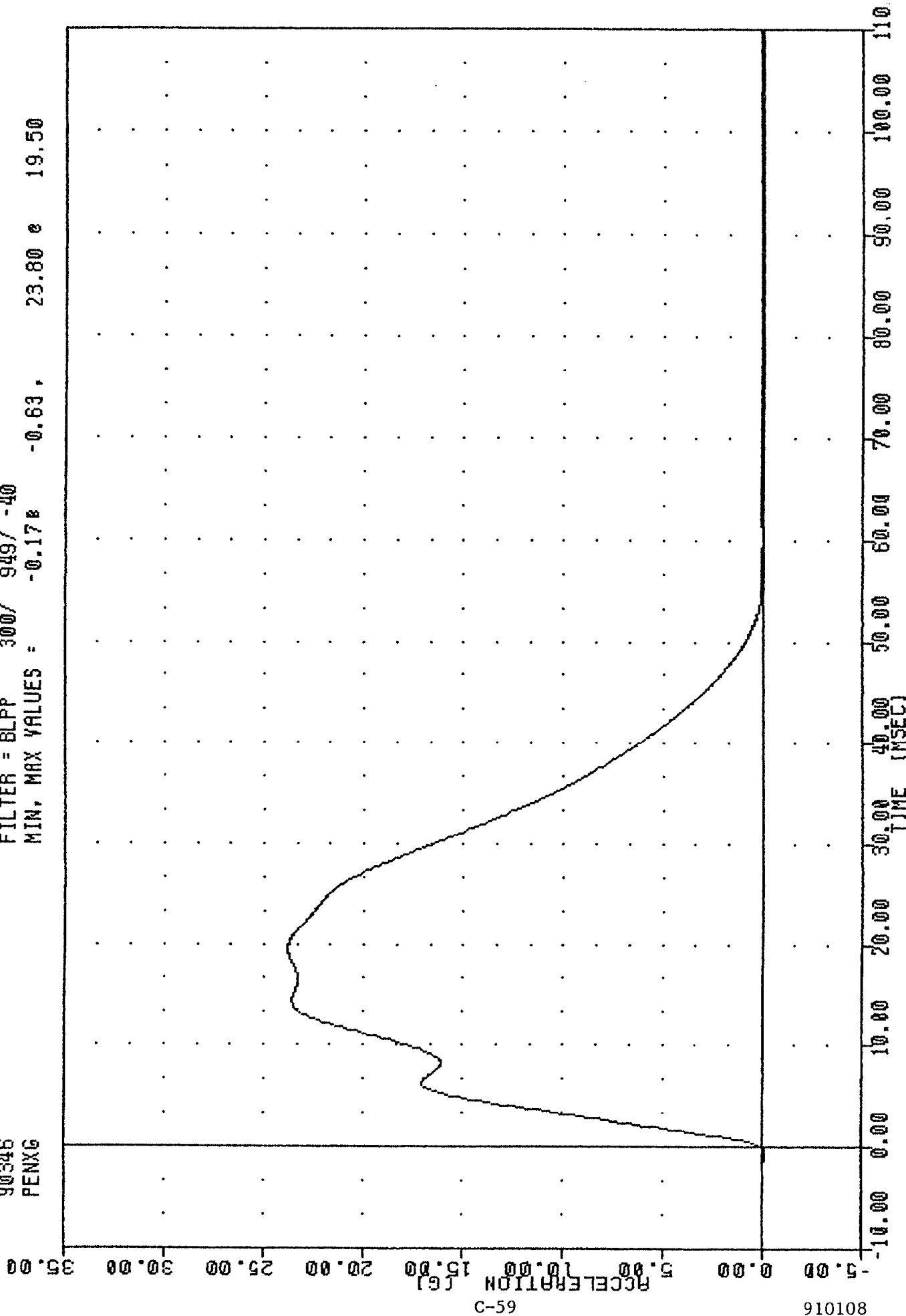
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

WH13M , 142011H1
 572E SN142 H.S. THORAX CAL01
 90346
 PENXG

FILTER = BLPP 300/ 949/ -40
 MIN, MAX VALUES = -0.178 -0.63, 23.80 0 19.50



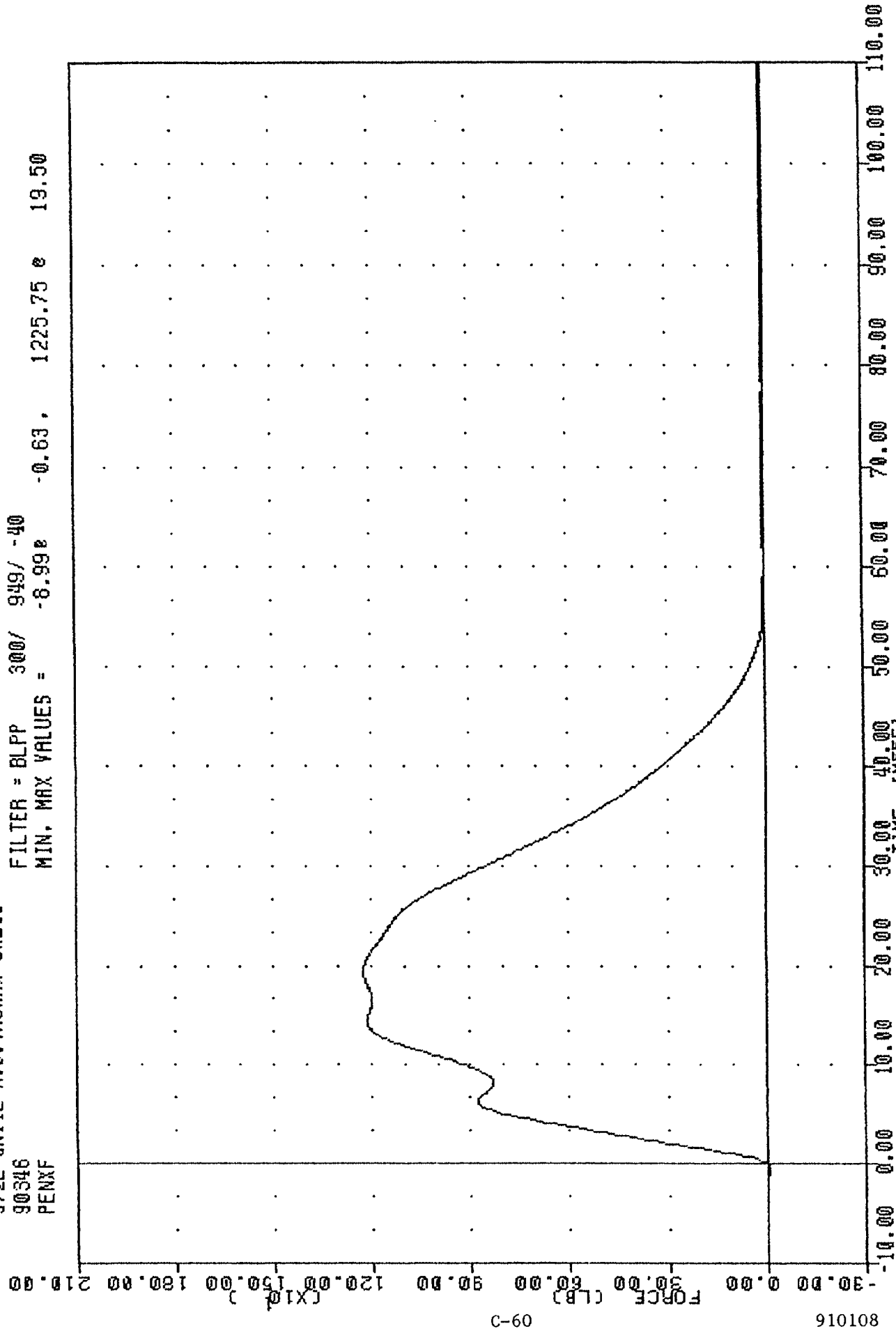
C-59

910108

PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

KHTSA , 142C1TH1
 572E SN142 H.S.THORAX CAL01
 90346
 PENXF

FILTER = BLPP 300/ 949/ -40
 MIN. MAX VALUES = -8.99e -0.63, 1225.75 e 19.50



C-60

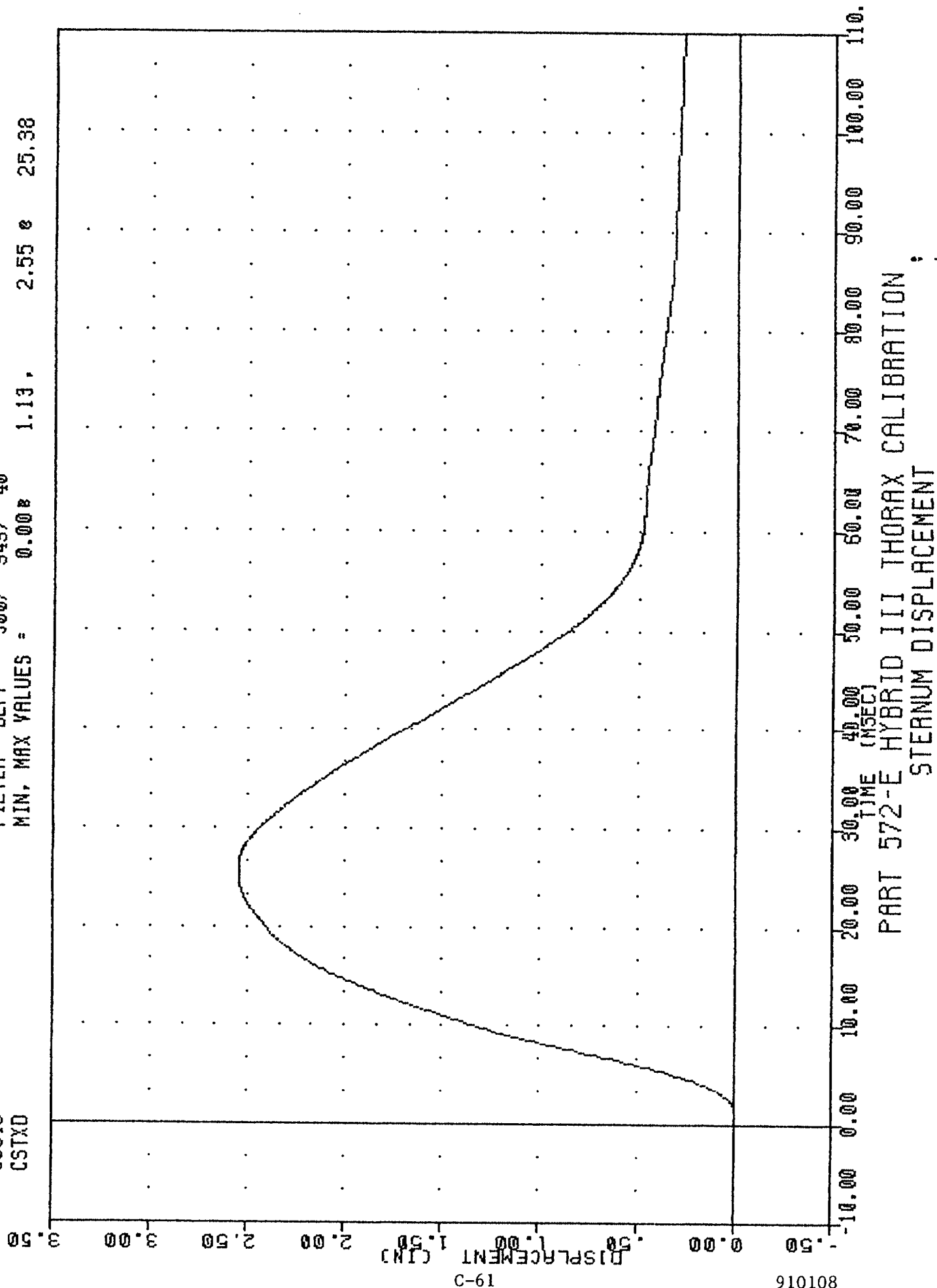
910108

PART 572-E HYBRID III THORAX CALIBRATION

REPRODUCED FROM

NR13H
 572E SN142 H.S. THORAX CAL01
 90346
 CSTXD

FILTER = BLPP 300/ 949/ -40
 MIN, MAX VALUES = 0.008 1.13, 2.55 25.38



NHISA
CSTXD
PENXF

, 142CITHI
FILTER = BLPP
FILTER = BLPP

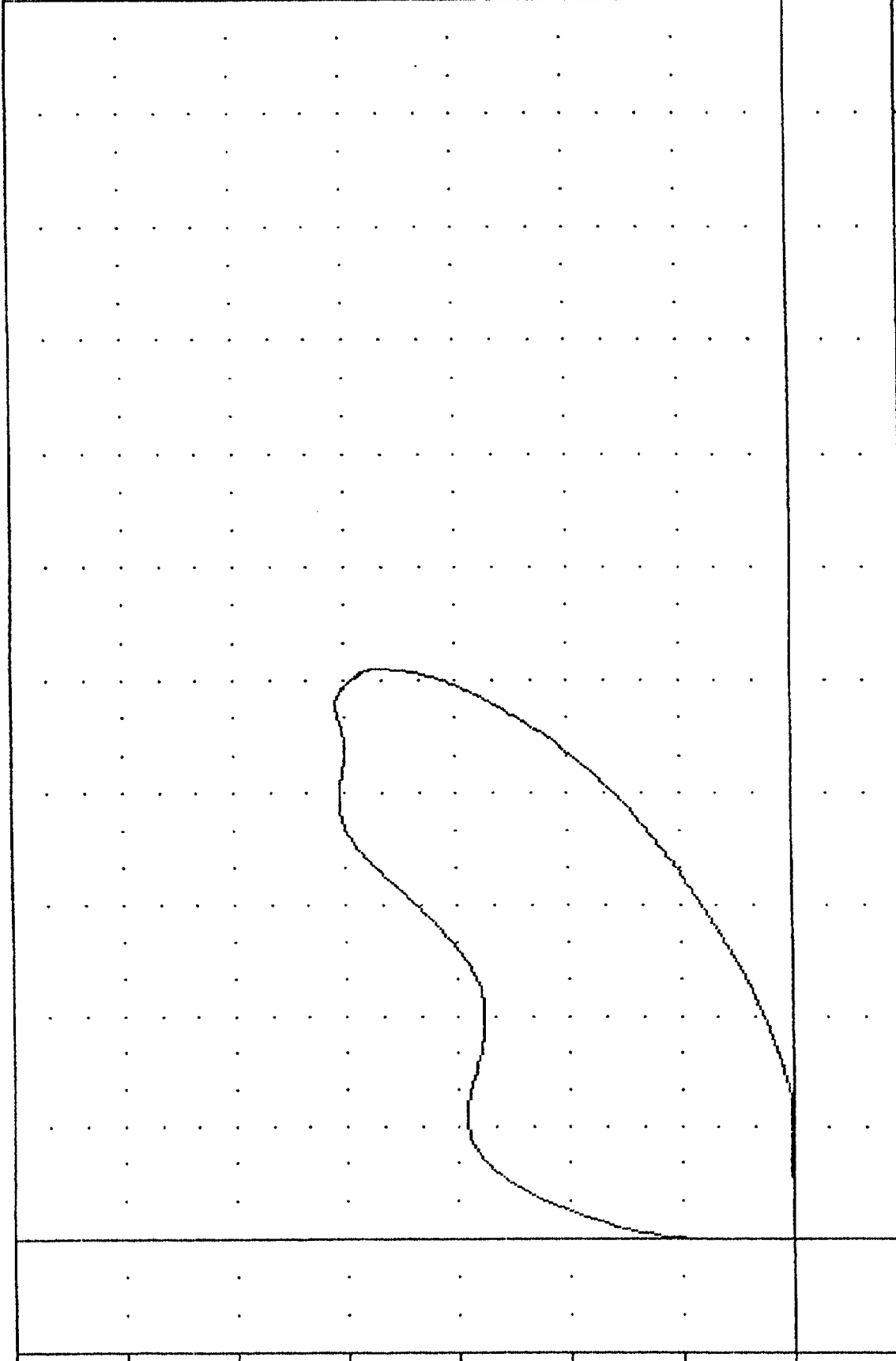
572E SN142 H.S. THORAX CAL01
300/ 949/ -40 MIN, MAX =
300/ 949/ -40 MIN, MAX =

90346
0.00 #
-8.99 #

1.13 ,
-0.63 ,
2.55 #
1225.75 #

25.38
19.50

910108
C-62
X10⁴
J
210.00
180.00
150.00
120.00
90.00
60.00
30.00
0.00
-30.00



PART 572-E HYBRID III THORAX CALIBRATION

DISPLACEMENT PENX
FORCE

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

05-Dec-90

RIGHT
NHTSAKNEE
142C1RK1

572E SN142 R.KNEE 11LB CAL 01

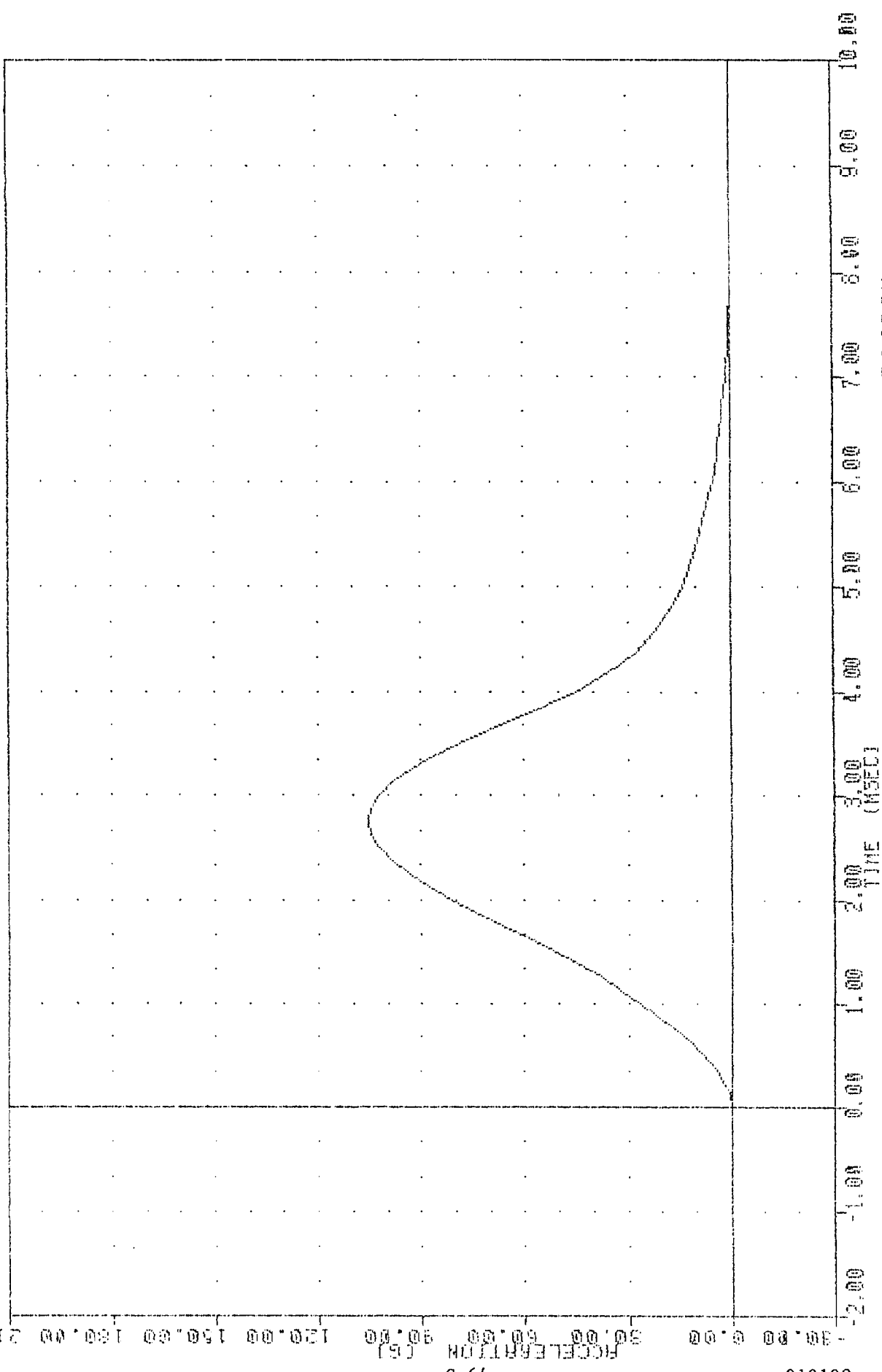
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	33.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.93 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1158.71 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Muddlet

PART 572-E HYBRID III RIGHT KNEE CALIBRATION
 142CIRK1
 572E 0N142 R.KNEE 11LB CAL 01
 40359
 PENNG

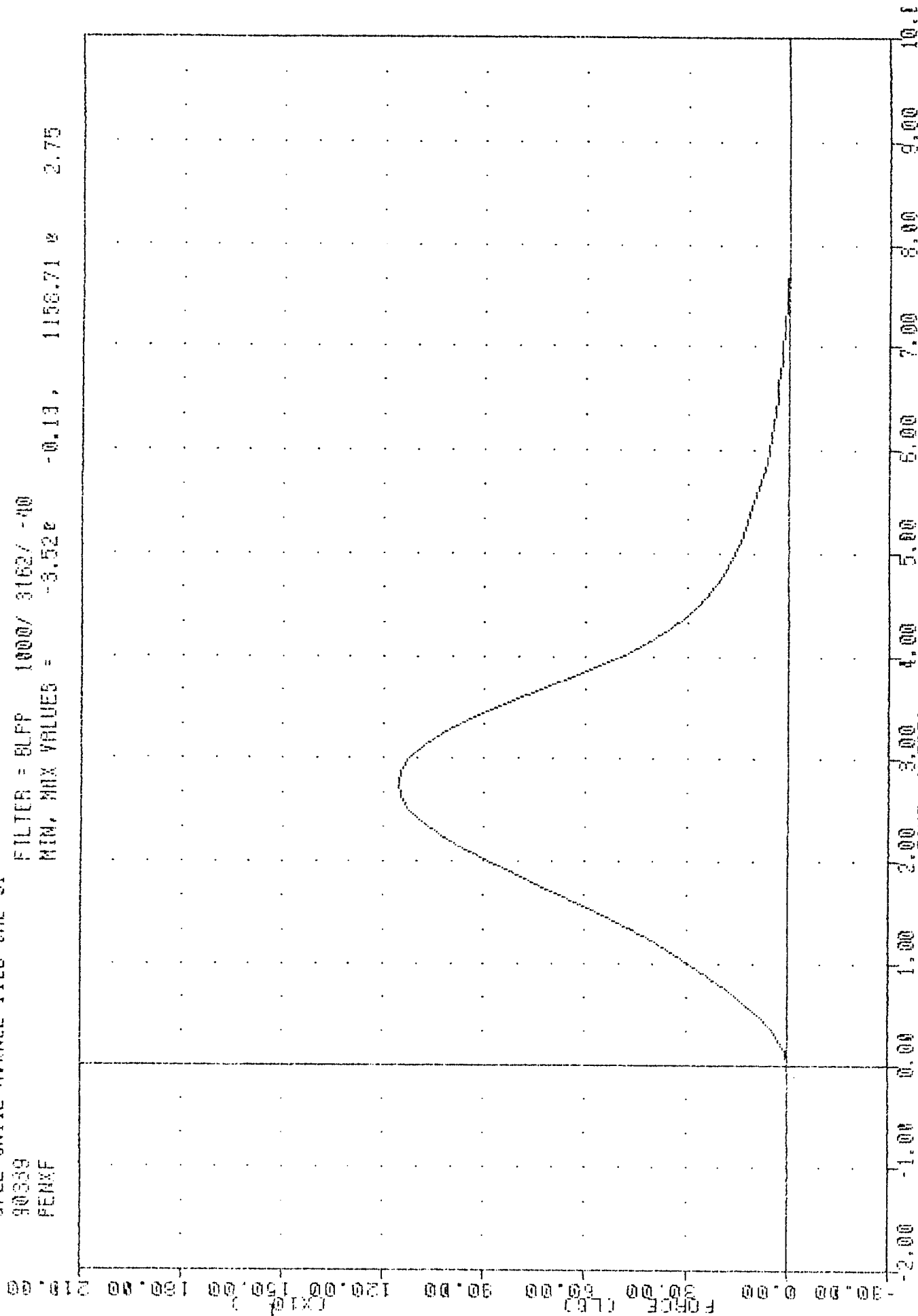
FILTER = 6LPP 1000/ 3162/ -40
 MIN, MAX VALUES = -0.32e -0.13, 105.34 e 2.75



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
 PENNG

572E SH142 R.KNEE 11LB CAL 01
 90339
 FENXF

FILTER = BLPP 1000/ 3162/ -40
 MIN, MAX VALUES = -0.13, 1150.71 2.75



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
 PENDULUM FORCE (11 LB PEND.)

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

05-Dec-90

LEFT KNEE

NHTSA

142C1LK1

572E SN142 L.KNEE 11LB CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	33.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.93 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1146.45 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas Middleton

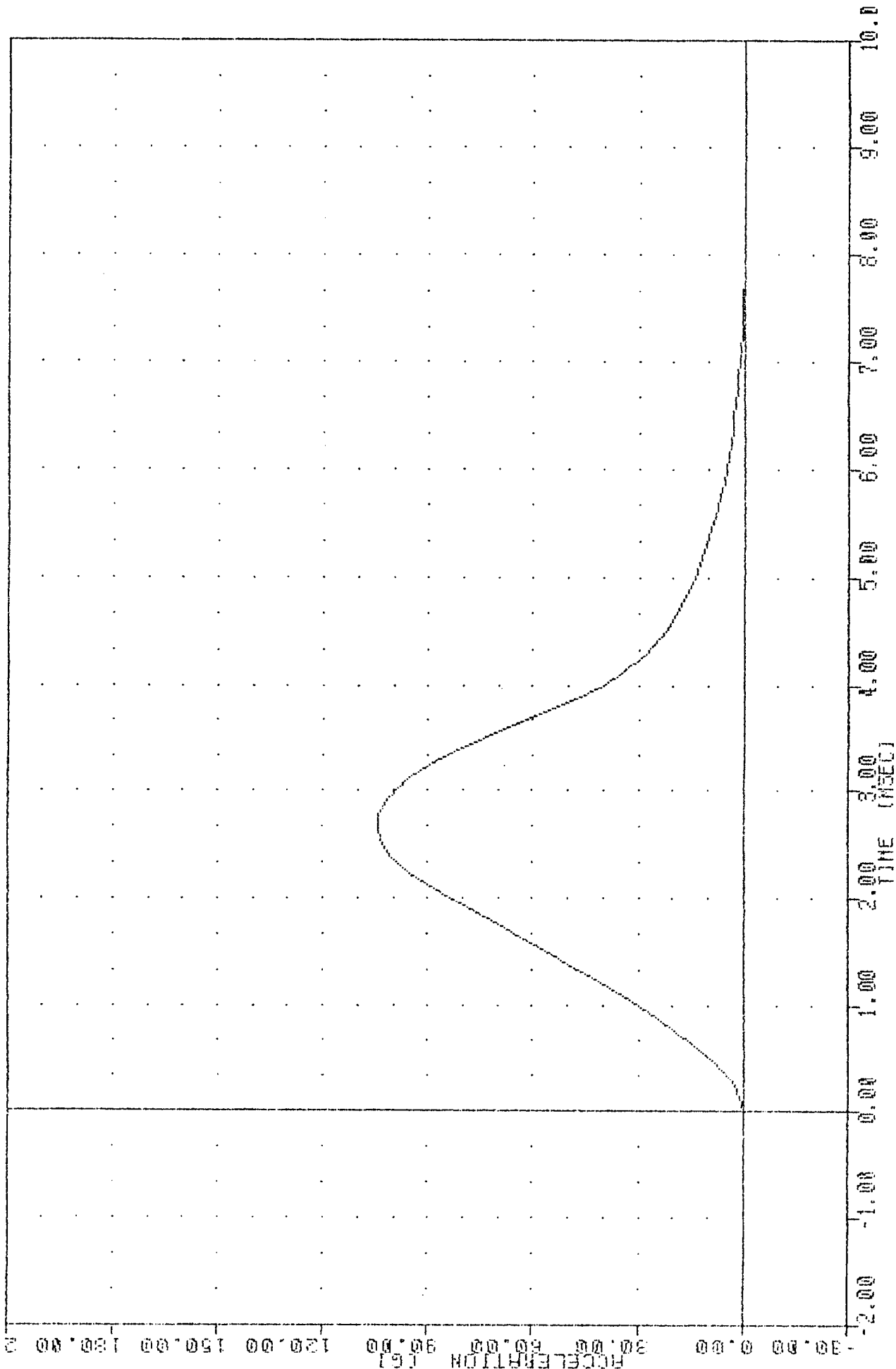
572E 3N142 L.KNEE 11LB CAL 01

90339

PENX6

FILTER = BLPP 1000/ 3162/ -40

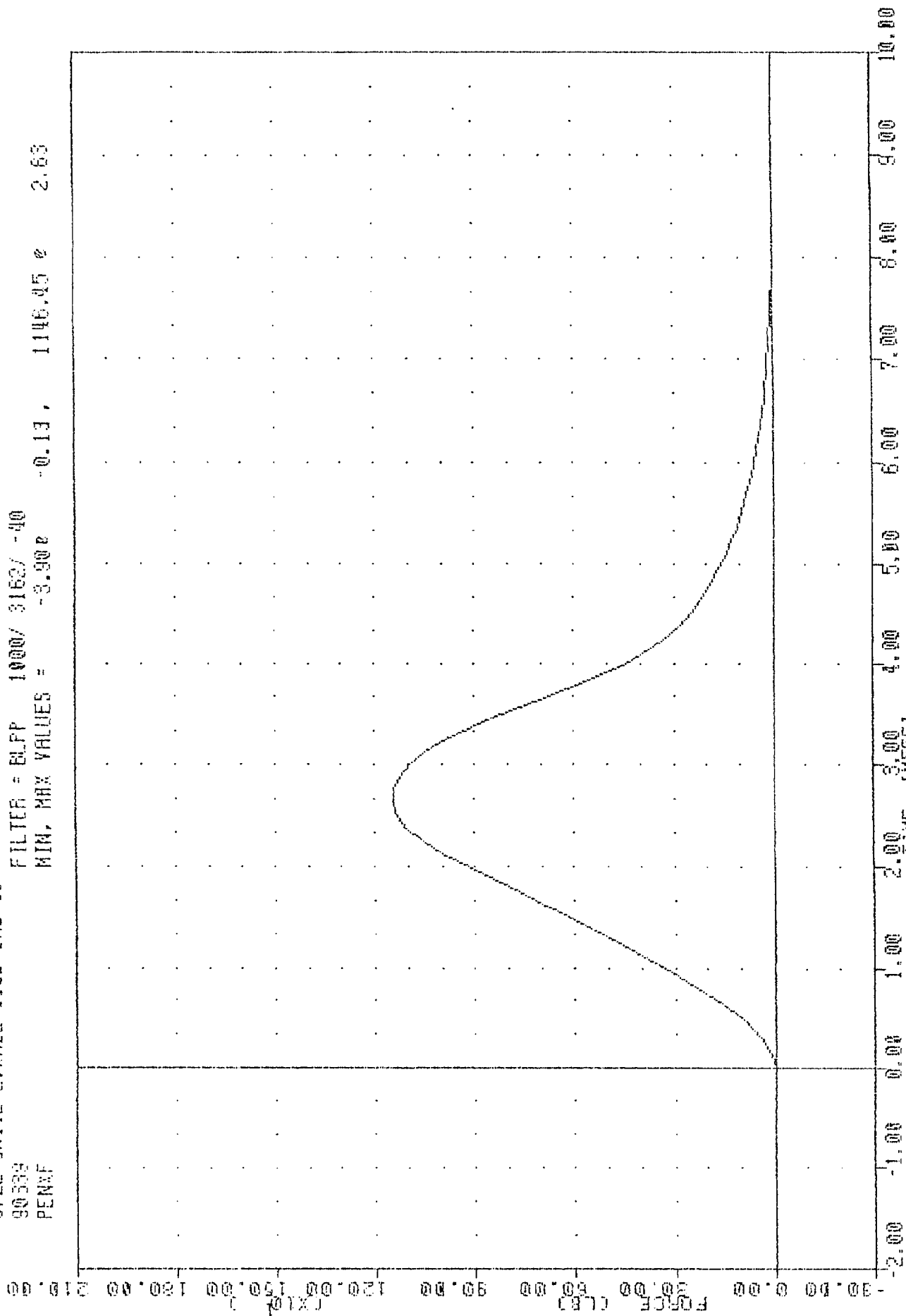
MIN. MAX VALUES = -0.350 -0.13 104.22 2 2.53



PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (11 LB PEND.)

HHTSH , 142CJLKI
 572E SN142 L.KNEE 111B CAL 01
 90339
 PENXF

FILTER = BLPP 1000/ 3162/ -40
 MIN. MAX VALUES = -3.90e -0.13, 1146.45 e 2.63



PART 572-E HYBRID III LEFT KNEE CALIBRATION
 PENXF UN FORCE (11 LB PEND)

APPENDIX D

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENT CALIBRATIONS

DRIVER DUMMY #192

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	CC71H	7264	ENDEVCO	11/07/90	05/07/91
Y-AXIS ACCEL.	DA84H	7264	ENDEVCO	11/07/90	05/07/91
Z-AXIS ACCEL.	CL98H	7264	ENDEVCO	11/07/90	05/07/91
CHEST X-AXIS ACCEL.	CW96H	7264	ENDEVCO	11/05/90	05/05/91
Y-AXIS ACCEL.	CM28H	7264	ENDEVCO	11/05/90	05/05/91
Z-AXIS ACCEL.	CG13H	7264	ENDEVCO	11/07/90	05/07/91
LEFT FEMUR FORCE LOAD CELL	903	2430	GSE	11/06/90	05/06/91
RIGHT FEMUR FORCE LOAD CELL	923	2430	GSE	11/06/90	05/06/91
*NECK X-AXIS FORCE LOAD CELL	0280	1716	DENTON	11/27/90	05/27/91
Y-AXIS FORCE LOAD CELL	0280	1716	DENTON	11/27/90	05/27/91
Z-AXIS FORCE LOAD CELL	0280	1716	DENTON	11/27/90	05/27/91
*NECK MOMENT ABOUT X-AXIS LOAD CELL	0280	1716	DENTON	11/27/90	05/27/91
MOMENT ABOUT Y-AXIS LOAD CELL	0280	1716	DENTON	11/27/90	05/27/91
MOMENT ABOUT Z-AXIS LOAD CELL	0280	1716	DENTON	11/27/90	05/27/91
*CHEST DEFLECTION POTENTIOMETER	87313-96	81422A	VERITECH	12/03/90	06/03/91
LAP BELT FORCE LOAD CELL	236	3419	LEBOW	07/09/90	01/09/91
SHOULDER BELT FORCE LOAD CELL	130	3419	LEBOW	11/28/90	05/28/91
SHOULDER BELT SPOOL-OUT POTENTIOMETER	A12899	PT-101-40A	CELESCO	01/08/91	07/08/91
SHOULDER BELT STRETCH POTENTIOMETER	2087	2051414101	BOURNES	01/08/91	07/08/91

DUMMY INSTRUMENT CALIBRATIONS

PASSENGER DUMMY #142

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	DC59J	7264	ENDEVCO	11/05/90	05/05/91
Y-AXIS ACCEL.	CW42H	7264	ENDEVCO	11/05/90	05/05/91
Z-AXIS ACCEL.	CT44H	7264	ENDEVCO	11/05/90	05/05/91
CHEST X-AXIS ACCEL.	CR63H	7264	ENDEVCO	11/07/90	05/07/91
Y-AXIS ACCEL.	CR65H	7264	ENDEVCO	11/07/90	05/07/91
Z-AXIS ACCEL.	CK16H	7264	ENDEVCO	11/07/90	05/07/91
LEFT FEMUR FORCE LOAD CELL	1007	2430	GSE	07/24/90	01/24/91
RIGHT FEMUR FORCE LOAD CELL	1006	2430	GSE	07/24/90	01/24/91
*NECK X-AXIS FORCE LOAD CELL	0106	1716	DENTON	11/28/90	05/28/91
Y-AXIS FORCE LOAD CELL	0106	1716	DENTON	11/28/90	05/28/91
X-AXIS FORCE LOAD CELL	0106	1716	DENTON	11/28/90	05/28/91
*NECK MOMENT ABOUT X-AXIS LOAD CELL	0106	1716	DENTON	11/28/90	05/28/91
MOMENT ABOUT Y-AXIS LOAD CELL	0106	1716	DENTON	11/28/90	05/28/91
MOMENT ABOUT Z-AXIS LOAD CELL	0106	1716	DENTON	11/28/90	05/28/91
*CHEST DEFLECTION POTENTIOMETER	903208	81422A	VERNITECH	12/03/90	06/03/91
LAP BELT FORCE LOAD CELL	571	3419	LEBOW	07/09/90	01/09/91
SHOULDER BELT FORCE LOAD CELL	606	3419	LEBOW	11/28/90	05/28/91
SHOULDER BELT SPOOL-OUT POTENTIOMETER	0586135	PT-101-40A	CELESCO	01/08/91	07/08/91
SHOULDER BELT STRETCH POTENTIOMETER	5089	2051414101	BOURNES	01/08/91	07/08/91

VEHICLE AND CALIBRATION LABORATORY INSTRUMENT CALIBRATIONS

VEHICLE ACCELEROMETERS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
LEFT SEAT REAR CROSSMEMBER X-AXIS	CW37H	7264	ENDEVCO	12/21/90	06/21/91
RIGHT REAR SEAT CROSSMEMBER X-AXIS	CH13H	7264	ENDEVCO	10/12/90	04/12/91
ENGINE TOP X-AXIS	CK39H	7264	ENDEVCO	10/23/90	04/23/91
ENGINE BOTTOM X-AXIS	EY03J	7264	ENDEVCO	12/11/90	06/11/91
RIGHT BRAKE CALIPER X-AXIS	CJ04H	7264	ENDEVCO	08/23/90	02/23/91
LEFT BRAKE CALIPER X-AXIS	CG16H	7264	ENDEVCO	10/19/90	04/19/91
INSTRUMENT PANEL CENTER X-AXIS	CY23H	7264	ENDEVCO	10/24/90	04/24/91
REAR SEAT CROSSMEMBER CENTER Z-AXIS	CK09H	7264	ENDEVCO	12/21/90	06/21/91
VEHICLE REAR CENTER Z-AXIS	CR66H	7264	ENDEVCO	11/13/90	05/13/91

CALIBRATION LABORATORY INSTRUMENTS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
NECK BENDING PENDULUM ACCEL.	CC59	7232	ENDEVCO	10/09/90	04/09/91
NECK BENDING ROTARY POTENTIOMETER	NA	35435-1-102	BOURNES	MFR. SPECIFICATION	
NECK BENDING LINEAR POTENTIOMETER	NA	5184-2051846003	BOURNES	10/10/90	04/10/91
FEMUR/CHEST/THORAX PENDULUM ACCEL.	CC64	7232	ENDEVCO	10/16/90	04/16/91
LUMBAR FLEXION FORCE GAUGE	NA	DPFH-50	CHATILLON	05/03/89	REPAIRED
LUMBAR FLEXION ROTATION GAUGE	CP17-0601-1	7020	HUMPHREY	MFR. SPECIFICATION	
ABDOMEN COMPRESSION DISPL. GAUGE	4075-172	80294-2051941504	BOURNES	10/01/90	04/01/91
ABDOMEN COMPRESSION FORCE GAUGE	1261	3167	LEBOW	10/17/90	04/17/91

SIGN CONVENTION

ACCELEROMETERS:

+X: FORWARD
+Y: LEFTWARD
+Z: UPWARD

POTENTIOMETERS:

+CHEST DISPLACEMENT: OUTWARD
+SEAT BELT DISPLACEMENT: OUTWARD
+SEAT BELT EXTENSION: ENLONGATION

LOAD CELLS:

+FEMUR FORCE: TENSION
+SEAT BELT FORCE: TENSION
+BARRIER FORCE: TENSION

NECK LOAD CELLS:

+X FORCE: HEAD FORWARD
+Y FORCE: HEAD RIGHTWARD
+Z FORCE: HEAD UPWARD (TENSION ON NECK)
+X MOMENT: RIGHT EAR TO RIGHT SHOULDER
+Y MOMENT: HEAD ROTATING FORWARD
+Z MOMENT: HEAD ROTATING LEFTWARD

FREQUENCY RESPONSE CLASSES

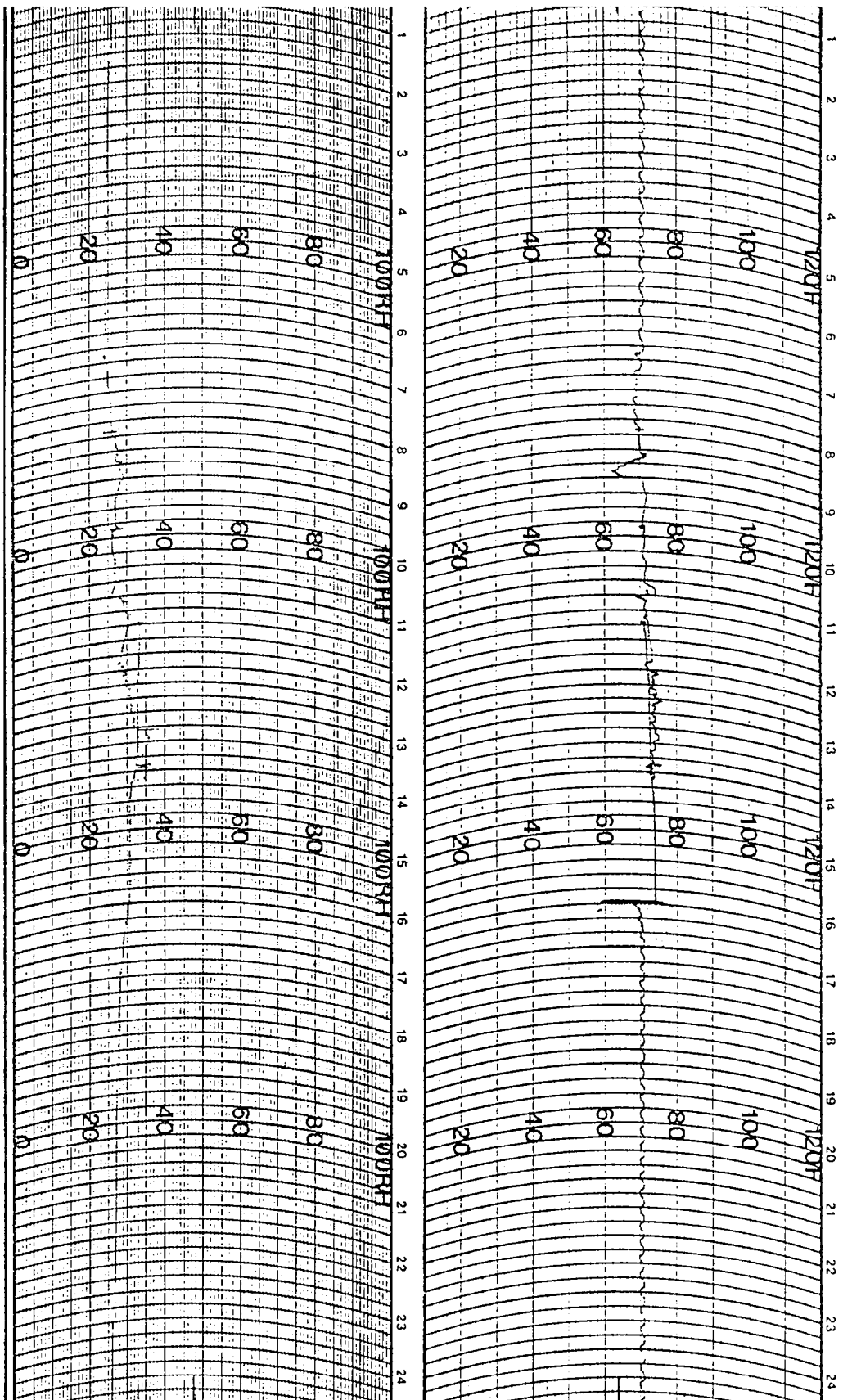
SAE J211 OCT88

TYPICAL TEST MEASUREMENTS

CHANNEL CLASS

Vehicle Structural Accelerations for use in:

Total vehicle comparison	60
Collision simulation input	60
Component analysis	600
Integration for velocity or displacement	180
Barrier Face Forces	60
Belt Restraint System Loads	60
Anthropomorphic Test Device	
Head accelerations (linear and angular)	1000
Neck	
Forces	1000
Moments	600
Thorax	
Spine accelerations	180
Rib accelerations	1000
Sternum accelerations	1000
Deflections	180
Lumbar	
Forces	1000
Moments	1000
Pelvis	
Accelerations	1000
Forces	1000
Moments	1000
Femur/Knee/Tibia/Ankle	
Forces	600
Moments	600
Displacements	180
Sled Accelerations	60
Steering Column Loads	600
Headform Accelerations	1000



WEATHER MEASURE
PO BOX 41257
SACRAMENTO, CA. 95841
PHONE (916) 481-7565

HYGROTHERMOGRAPH
1 DAY

CHART # C311 D HF
PART # 699123

STATION *112074* DATE ON *1/2/01* DATE OFF *1/5/01*

APPENDIX E

RESTRAINT SYSTEM INSTRUCTIONS FROM OWNER'S MANUAL

Safety Belts: They're For Everyone

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.



CAUTION:

If you are in a crash and you're not wearing a safety belt, your injuries can be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be if you are buckled up.



This figure lights up when you turn the key to "Run" or "Start" when your safety belt isn't buckled, and you'll hear a tone too.

It's the reminder to buckle up. In many states and Canadian provinces, the law says to wear safety belts. Here's why: They work.

You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

A few crashes are very mild. In them, you won't get hurt even if you're not buckled up. And some crashes can be so serious, like being hit by a train, that even buckled up a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could be badly hurt or killed.

After 25 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter ... a lot!

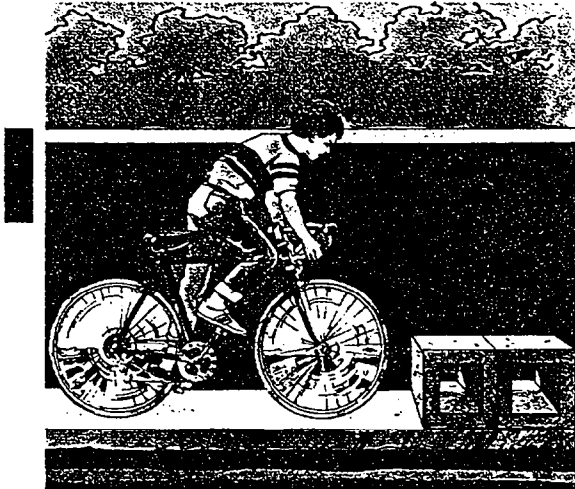


Safety Belt Reminder Light

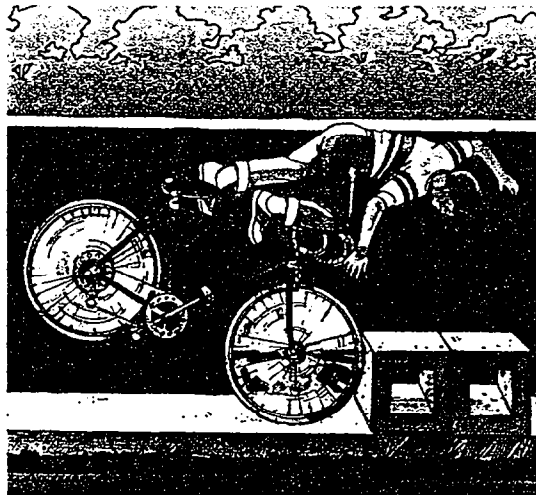
When the key is turned to "Run" or "Start," a tone will come on for about eight seconds to remind people to fasten their safety belts, unless the driver's safety belt is buckled. The safety belt reminder light will also come on and stay on until the driver's belt is buckled.

Why Safety Belts Work

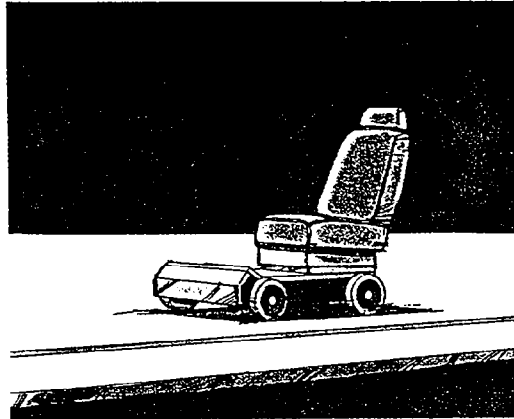
When you ride in or on anything, you go as fast as it goes.



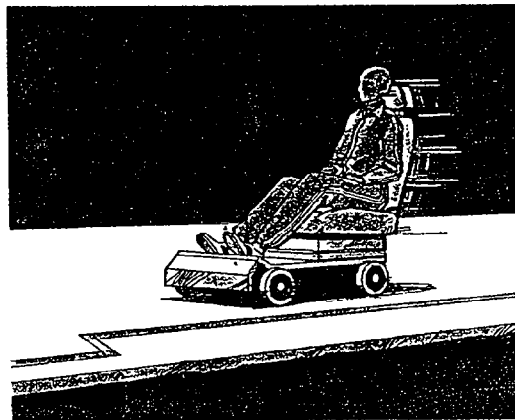
For example, if the bike is going 10 mph (16 km/h), so is the child.



When the bike hits the block, it stops. But the child keeps going!

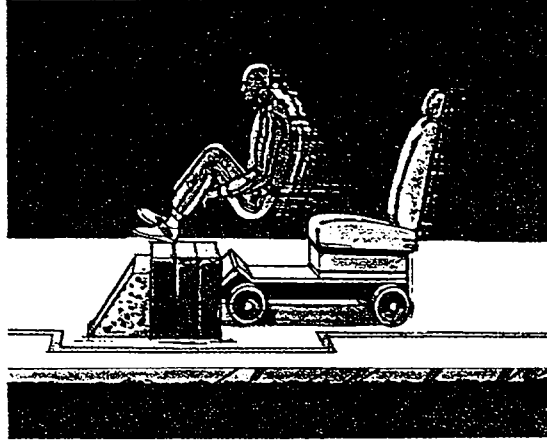


Take the simplest "car."
Suppose it's just a seat on
wheels.



Put someone on it.

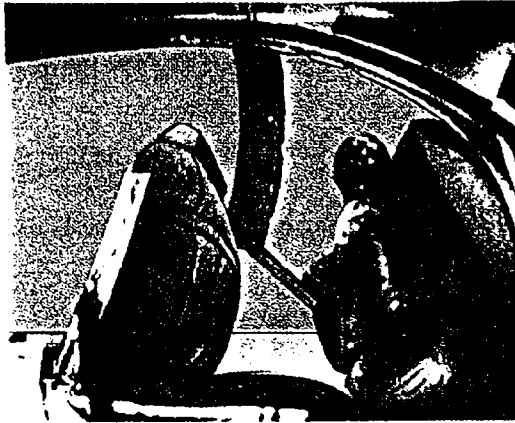
Why Safety Belts Work (Continued)



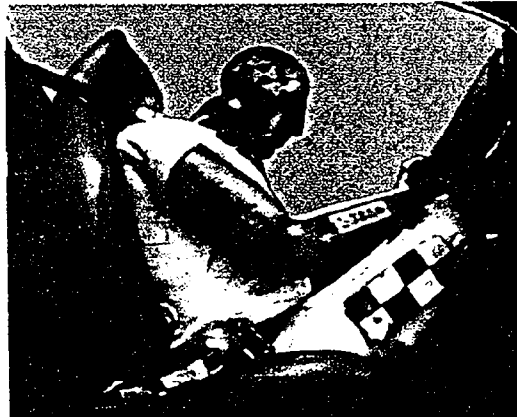
Get it up to speed. Then stop the "car." The rider doesn't stop.



The person keeps going until stopped by something.
In a real vehicle, it could be the windshield ...



or the instrument panel ...



or the safety belts!

With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

Why Safety Belts Work (Continued)

Here Are Questions Many People Ask About Safety Belts -- and the Answers

Q: Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?

A: You could be -- whether you're wearing a safety belt or not. But you can easily unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you can unbuckle and get out, is much greater if you are belted.

Q: Why don't they just put in air bags so people won't have to wear safety belts?

A: "Air bags," or Supplemental Inflatable Restraint systems, are in some vehicles today and will be in more of them in the future. But they are supplemental systems only -- so they work with safety belts, not instead of them. Every "air bag" system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has "air bags," you still have to buckle up to get the most protection. That's true not only in frontal collisions, but especially in side and other collisions.

Q: If I'm a good driver, and I never drive far from home, why should I wear safety belts?

A: You may be an excellent driver, but if you're in an accident -- even one that isn't your fault -- you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

How To Wear Safety Belts Properly

Adults

This section is for people of adult size only. If a child will be riding in your Buick, see the section after this one, called "Children."



CAUTION:

There are special things to know about safety belts and children. And there are different rules for babies, toddlers, and older children. Follow these rules for everyone's protection.

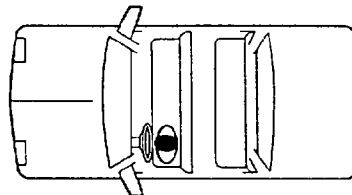
First, you'll want to know which restraint systems your vehicle has. We'll start with the driver position.

Cars First Sold In Canada

Was your Buick first sold, when new, in Canada? (If it was, a sticker on the driver's door will say "conforms to all applicable Canada motor vehicle..." etc.) If so, then the rest of Part 1 does not apply to your vehicle.

To learn how to use your safety belts, please read the Owner's Manual Safety Belt Supplement. It comes with every new Buick first sold in Canada.

Driver Position



How To Wear Safety Belts Properly *(Continued)*

Automatic Lap-Shoulder Belt



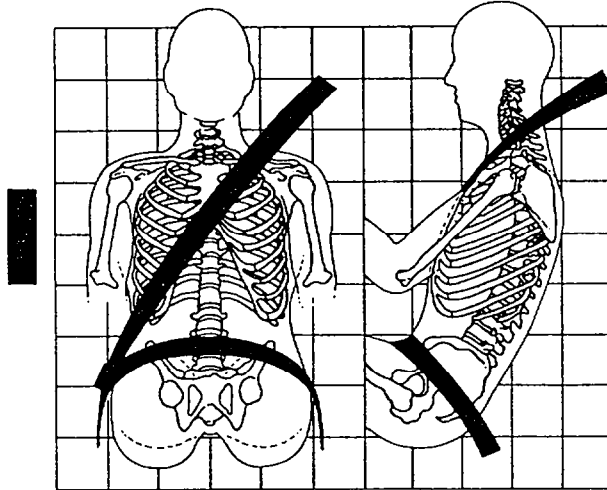
This safety belt is called "automatic" because you don't have to buckle up when you get into your car.



And you don't have to unbuckle when you get out.

Just get into your car. Then close and lock the door. Adjust the seat (to see how, see Index under "Seats") so you can sit up straight.

How To Wear Safety Belts Properly (Continued)



The lap belt should be as low on the hips as possible. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

The safety belt locks only if there's a sudden stop or a crash.

It's possible that an automatic belt could keep you from fully opening a door. That can happen if the door was slammed shut very hard. Just close the door all the way, then slowly open it. If that doesn't fix it, then your Buick needs service.

We hope you'll always keep your automatic belt buckled. However, you may need to unbuckle it in an emergency. And you would need to unbuckle it to let someone get into the center front seat position, if your vehicle has one.

To unbuckle the automatic belt, just push the button on the buckle.



To reattach the automatic belt:

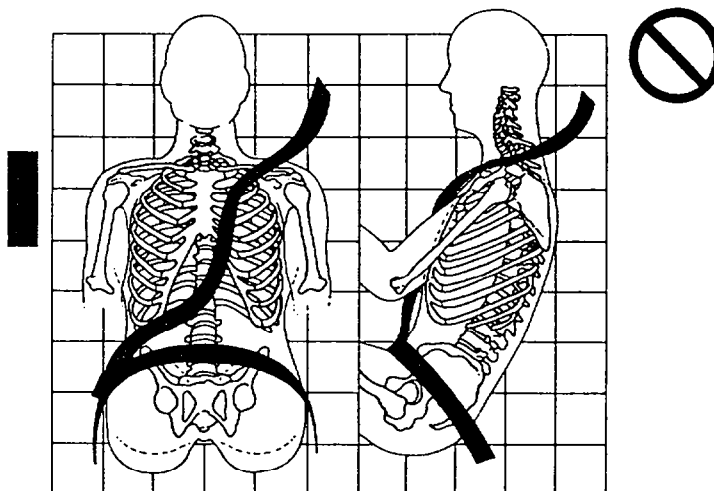
1. Close and lock the door.
2. Adjust the seat (to see how, see Index under "Seats") so you can sit up straight.
3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.



4. Push the latch plate into the buckle until it clicks.

How To Wear Safety Belts Properly (Continued)

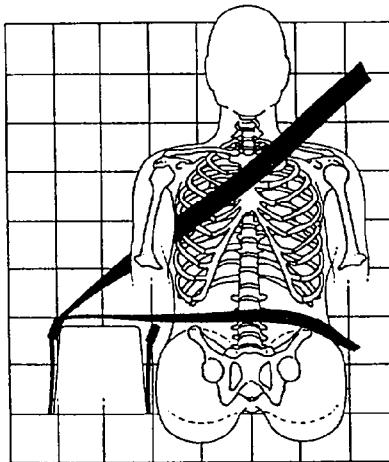
Q: What's wrong with this?



A: The shoulder belt is too loose. It won't give nearly as much protection this way.

⚠ CAUTION:
You can be seriously hurt if your shoulder belt is too loose. In a crash you would move forward too much, which could significantly increase injury. The shoulder belt should fit against your body.

Q: What's wrong with this?



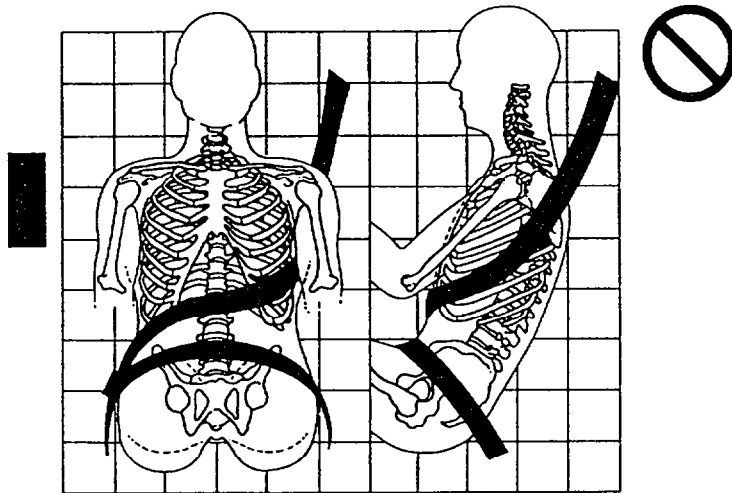
A: The belt is buckled in the wrong place.

⚠ CAUTION:

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

How To Wear Safety Belts Properly (Continued)

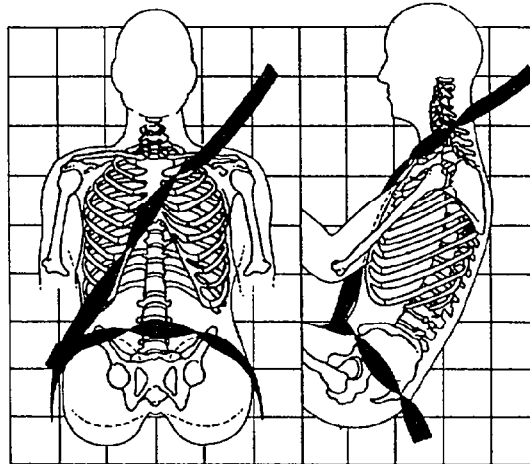
Q: What's wrong with this?



A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

CAUTION: You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

Q: What's wrong with this?

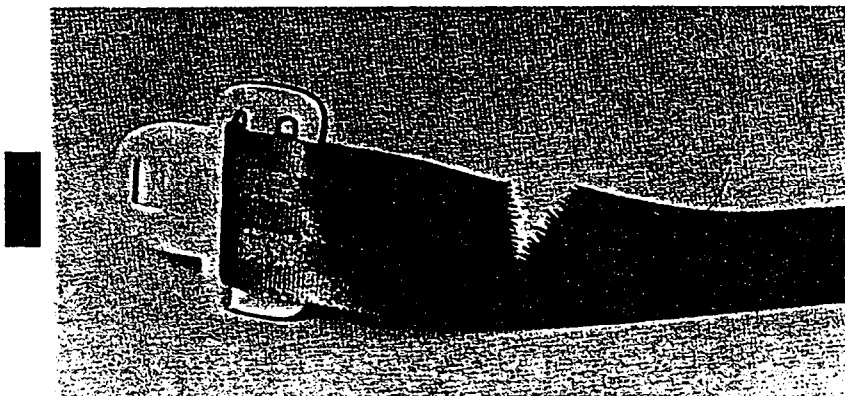


A: The belt is twisted across the body.

CAUTION: You can be seriously injured by a twisted belt. In a crash, you wouldn't have the full width of the belt to take impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer to fix it.

How To Wear Safety Belts Properly (Continued)

Q: What's wrong with this?

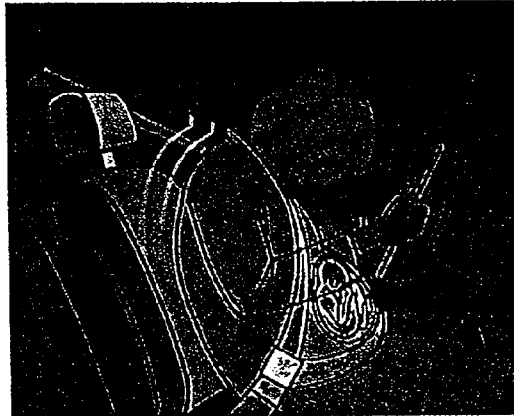


A: The belt is torn.

CAUTION:
Torn or frayed belts may not protect you in a crash. They can rip apart under impact forces. If a belt is torn or frayed, get a new one right away.

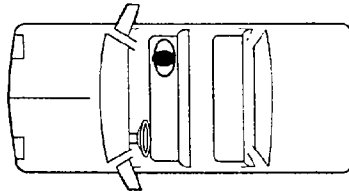
Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts. A pregnant woman should wear a lap-shoulder belt if at all possible. The lap portion should be worn as low as possible throughout the pregnancy.



The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

Right Front Passenger Position



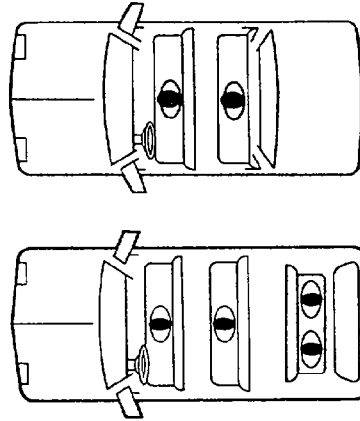
The right front passenger's safety belt works the same way as the driver's safety belt. See "Driver Position," earlier in this section.

How To Wear Safety Belts Properly *(Continued)*

- Adjust the seat (to see how, see Index under "Seats") so you can sit up straight. Move your seat far enough forward that your feet touch the part of the car that is called the "toeboard" (A). That way you'd be less likely to slide under the lap belt in a crash.



Center Passenger Position And Any Station Wagon Third Seat Passenger Position



Lap Belt



When you sit in a center seating position, or in a station wagon third seat, you have a lap safety belt, which has no retractor. To make the belt longer, tilt the latch plate and pull it along the belt.

How To Wear Safety Belts Properly *(Continued)*

To make the belt shorter, pull its free end as shown until the belt is snug.



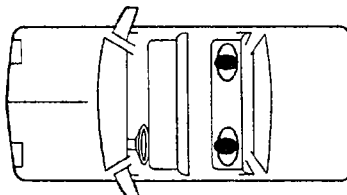
Buckle, position and release it the same way as a lap-shoulder belt. Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Rear Seat Passengers

It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

Rear passengers who aren't safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

Outside Positions



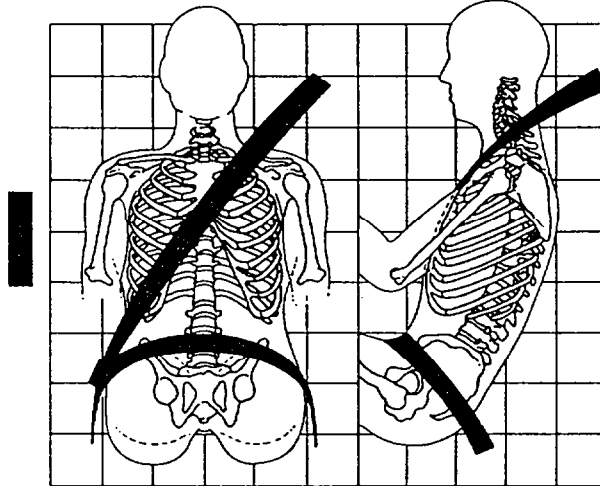
The positions next to the windows have lap-shoulder belts. Here's how to wear one properly.



1. Pick up the latch plate and pull it across you. Don't let it get twisted.

2. Push the latch plate into the buckle until it clicks. Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to.
3. Pull up on the shoulder belt to tighten the lap belt. If the belt is not long enough, see "Safety Belt Extender" at the end of this section.

How To Wear Safety Belts Properly (Continued)



The lap part of the belt should be low and snug below the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces. The safety belt locks only if there's a sudden stop or a crash.

**CAUTION:**
You can be seriously hurt if your shoulder belt is too loose.
In a crash you would move forward too much, which could increase injury. The shoulder belt should fit against your body.



- To unlatch the belt, just push the button on the buckle.

Children



How To Wear Safety Belts Properly *(Continued)*

Everyone in a vehicle needs protection! That includes infants and all children smaller than adult size. In fact, the law in every state and Canadian province says children up to some age must be restrained while in a vehicle.

Smaller Children and Babies

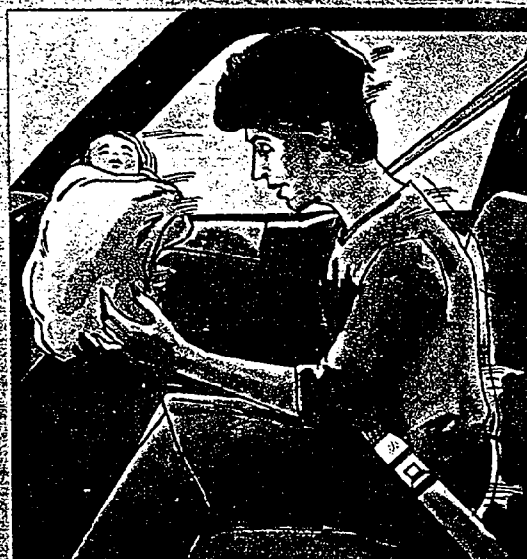


CAUTION:

Smaller children and babies should always be restrained in a child or infant restraint. The instructions for the restraint will say whether it is the right type and size for your child. A very young child's hip bones are so small that a regular belt can't stay low on the hips, as it should. Instead, the belt will likely be over the child's abdomen. In a crash the belt would apply force right on the child's abdomen, which could cause serious or fatal injuries. So, be sure that any child small enough for one is always properly restrained in a child or infant restraint.

⚠ CAUTION:

Never hold a baby in your arms while riding in a vehicle. A baby doesn't weigh much — until a crash. During a crash a baby will become so heavy you can't hold it. For example, in a crash at only 25 mph (40 km/h), a 12-pound (5.5 kg) baby will suddenly become a 240-pound (110 kg) force on your arms. The baby would be almost impossible to hold.



How To Wear Safety Belts Properly (Continued)



Child Restraints

Be sure to follow the instructions for the restraint. These restraints use the belt system in your vehicle, but the child also has to be secured within the restraint to help reduce the chance of personal injury. The instructions that come with the infant or child restraint will show you how to do that.

Where to Put the Restraint

Accident statistics show that children are safer if they are restrained in the rear rather than the front seat. We at General Motors therefore recommend that you put your child restraint in the rear seat unless the child is an infant and you're the only adult in the vehicle. In that case, you might want to secure the restraint in the front seat where you can keep an eye on the baby.

But wherever you install it, be sure to secure the child restraint properly.

Top Strap

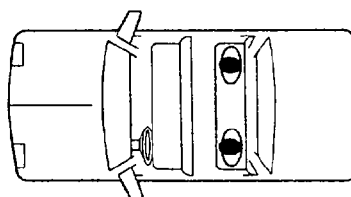


If your child restraint has a top strap, it must be anchored.

If you need to have an anchor installed, you can ask your Buick dealer to put it in for you. If you want to install an anchor yourself, your dealer can tell you how to do it.

If you want to use a child restraint with a top strap in the second seat of a station wagon, have your dealer install a combination anchor-tether belt to which the top strap can be hooked.

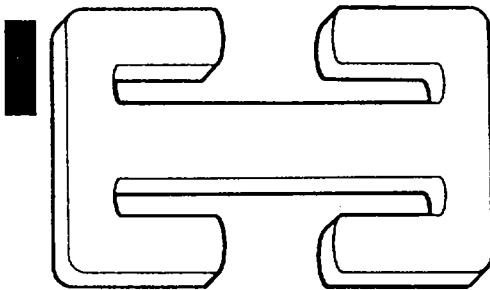
Securing a Child Restraint in a Rear Outside Position



How To Wear Safety Belts Properly *(Continued)*

You'll be using the lap-shoulder belt. See the earlier section about the top strap if the child restraint has one.

You'll need a safety locking clip to secure a child restraint in this position. You can get a locking clip where child restraints are sold, or from your GM dealer (Part No. 94844571). The locking clip must be the same as the one shown here.



LOCKING CLIP - TOP VIEW

Until you have this clip, secure a child restraint only in a seat that has a separate lap belt. Once you have the clip, follow these instructions:

1. Put the restraint on the seat. Follow the instructions for the child restraint.



2. Secure the child in the child restraint as the instructions say.

3. Pull out the vehicle's safety belt and run the lap part through or around the restraint. The child restraint instructions will show you how.

See if the shoulder belt would go in front of the child's face or neck. If so, put it behind the child restraint.

4. Buckle the belt. Make sure the release button faces upward or outward, so you'll be able to unbuckle it quickly if you ever need to.



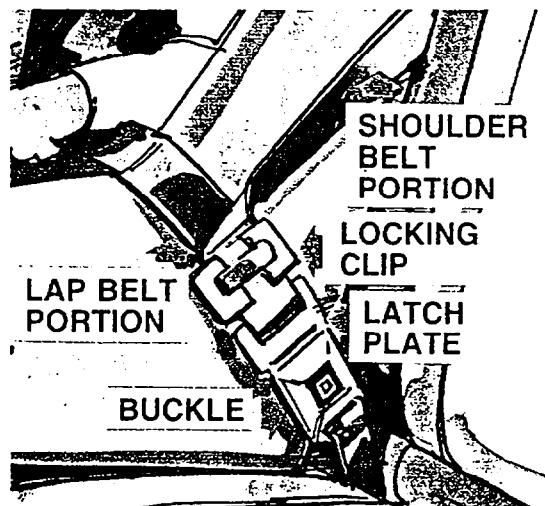
5. Then thread both the lap and shoulder belt portions through the locking clip.

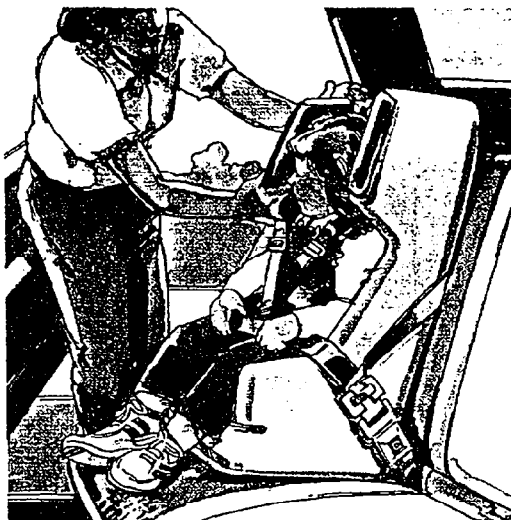
How To Wear Safety Belts Properly (Continued)



CAUTION:

If a locking clip is not used or is not installed properly, the child restraint may move or tip over when your vehicle turns or stops quickly. The child or others could be injured. When you secure a child restraint with a lap-shoulder belt, always thread both the lap and shoulder belt portions through a locking clip.





6. Push and pull the child restraint in different directions to be sure it is secure.



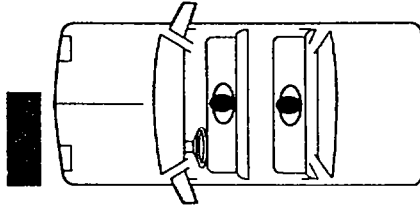
CAUTION:

An unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle – even when no child is in it.

To remove the child restraint, just unbuckle the vehicle's safety belt and remove the locking clip. Let the safety belt go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

How To Wear Safety Belts Properly *(Continued)*

Securing a Child Restraint in a Center Seating Position



When you secure a child restraint in a center seating position, you'll be using the lap belt. See the earlier section about the top strap if the child restraint has one.

1. Put the restraint on the seat. Follow the instructions for the child restraint.
2. Secure the child in the child restraint as the instructions say.
3. Make the belt as long as possible by tilting the latch plate and pulling it along the belt.



4. Run the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.



5. Buckle the belt. Make sure the release button faces upward or outward, so you'll be able to unbuckle it quickly if you ever need to.
6. To tighten the belt, pull its free end while you push down on the child restraint.
7. Push and pull the child restraint in different directions to be sure it is secure. If the child restraint isn't secure, turn the latch plate over and buckle it again. Then see if it is secure. If it isn't, secure the restraint in a different place in the vehicle and contact the child restraint maker for their advice.

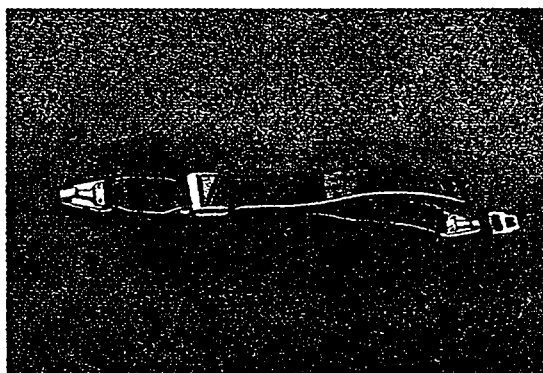
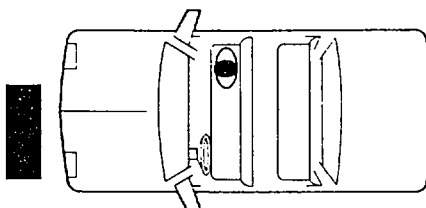
⚠ CAUTION:

An unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle – even when no child is in it.

To remove the child restraint, just unbuckle the vehicle's safety belt. It will be ready to work for an adult or larger child passenger.

How To Wear Safety Belts Properly *(Continued)*

Securing a Child Restraint in the Right Front Seat



- An Infant/Child Seat Restraint Belt, and
- The special hardware for it.

Your dealer can get these and put them in for you. It's free. Instructions with this special hardware show how to put it in and use it.



CAUTION:

Don't use the special hardware in another vehicle. If you do, it may not work well and the child may not be protected properly in a crash. The special hardware is for your vehicle only.

Also, don't use the special belt for anything but securing a child restraint in the right front seat. If an adult or older child uses it, the belt won't provide protection and may even increase injury in a crash.

Once the special hardware is installed, please follow the instructions with it and these steps:

1. Unbuckle the automatic lap-shoulder belt by pushing the button on the buckle.



It will stay on the door, ready to be rebuckled for use by adults or older children.

How To Wear Safety Belts Properly *(Continued)*

2. Snap one hook of the Infant/Child Seat Restraint Belt near the floor at the door side of the seat.



3. Put the belt's special latch plate into the vehicle's safety belt buckle.

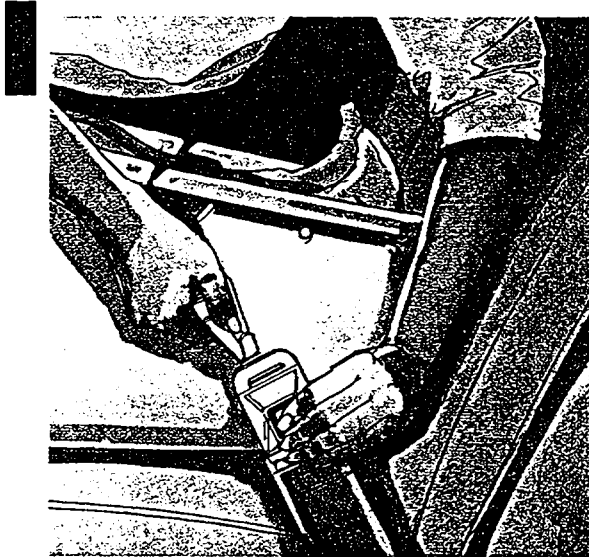


4. You can make the belt longer by tilting the buckle and pulling it along the belt.

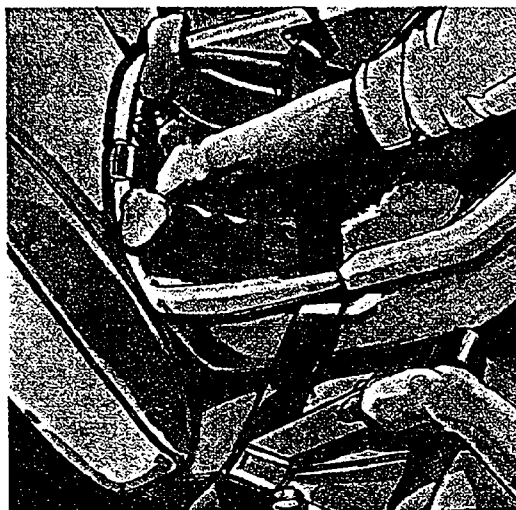


How To Wear Safety Belts Properly *(Continued)*

5. Put the restraint on the seat. Follow the instructions for the child restraint.
6. Secure the child in the child restraint as the instructions say.
7. Run the belt through or around the child restraint. The child restraint instructions will show you how.
8. Put the hook on the free end through the slot in the latch plate.



9. To make it tight, pull the belt while you push down on the child restraint. If the belt won't stay tight, switch it end for end.



10. Push and pull the child restraint in different directions to be sure it is secure.



CAUTION:

An unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle – even when no child is in it.

To remove the Infant/Child Seat Restraint:

1. Push the button on the safety belt buckle and remove the special latch plate. Leave the latch plate on the special belt.

How To Wear Safety Belts Properly *(Continued)*



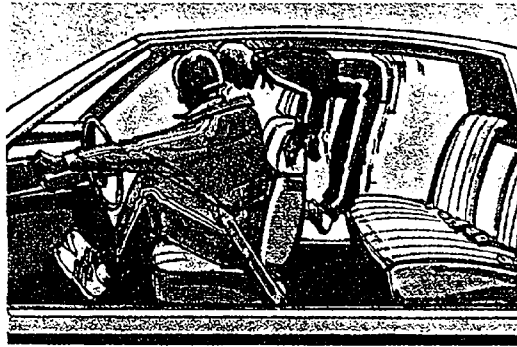
2. Push the spring on the hook near the door and remove the special belt.
3. Put the belt away in a safe place in your vehicle, so it won't fly around in a crash and injure someone.
4. Remember to reattach the automatic belt again, once the child restraint is removed. Be sure it isn't twisted.

Larger Children



Children who have outgrown child restraints should wear the vehicle's safety belts. If you have the choice, a child should sit next to a window so the child can wear a lap-shoulder belt and get the additional restraint a shoulder belt can provide. Accident statistics show that children are safer if they are restrained in the rear seat. But they need to use the safety belts properly.

- Children who aren't buckled up can be thrown out in a crash.



- Children who aren't buckled up can strike other people who are.

How To Wear Safety Belts Properly (Continued)



- Q:** What if a child is wearing a lap-shoulder belt, but the child is so small that the shoulder belt is very close to the child's face or neck?
- A:** Move the child toward the center of the vehicle, but be sure that the shoulder belt still is on the child's shoulder, so that in a crash the child's upper body would have the restraint that belts provide. If the child is so small that the shoulder belt still is very close to the child's face or neck, you might want to place the child in the center seat position, the one that has only a lap belt.

⚠ CAUTION:

Never do this.



Here a child is sitting in a seat that has a lap-shoulder belt, but the shoulder part is behind the child. If the child wears the belt in this way, in a crash the child might slide under the belt. The belt's force would then be applied right on the child's abdomen. That could cause serious or fatal injuries.

Wherever the child sits, the lap portion of the belt should be worn low, snug below the hips, and just touching the child's thighs. This applies belt force to the child's pelvic bones in a crash.

How To Wear Safety Belts Properly *(Continued)*

Safety Belt Extender

If the vehicle's safety belt will fasten around you, you should use it. The automatic lap-shoulder belt has plenty of extra length built in, so it will fasten around almost all people.

But if a safety belt isn't long enough to fasten, your dealer will order you an extender. It's free. When you go in to order it, take the heaviest coat you will wear, so the extender will be long enough for you. The extender will be just for you, and just for the seat in your vehicle that you choose. Don't let someone else use it, and use it only for the seat it is made to fit. To wear it, just attach it to the regular safety belt.

Checking Your Restraint Systems

Now and then, make sure all your belts, buckles, latch plates, retractors, anchorages and reminder systems are working properly. Look for any loose parts or damage. If you see anything that might keep a restraint system from doing its job, have it repaired.

Replacing Safety Belts After a Crash

If you've had a crash, do you need new belts?

After a very minor collision, nothing may be necessary. But if the belts were stretched, as they would be if worn during a more severe crash, then you need new belts.

If belts are cut or damaged, replace them. Collision damage also may mean you will have to have safety belt parts, like the retractor, replaced or anchorage locations repaired – even if the belt wasn't being used at the time of the collision.