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REPORT NO. TRC-92-N07

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

GENERAL MOTORS CORPORATION

1993 CHEVROLET SUBURBAN

SPECIAL PURPOSE VEHICLE

NHTSA NO. MP0103

TRC TEST NO. 930203

PREPARED BY:

TRANSPORTATION RESEARCH CENTER INC.

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EAST LIBERTY, OHIO 43319



FEBRUARY 26, 1993

FINAL REPORT

PREPARED FOR:

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16. Abstract A 56 kph (35 mph) frontal load cell barrier impact test was conducted on a 1993 Chevrolet Suburban special purpose vehicle, NHTSA No. MP0103, at Transportation Research Center Inc. on February 3, 1993. This test was conducted to obtain new car assessment and research data indicant of FMVSS 208 performance. The barrier impact velocity was 56.3 kph. The vehicle's maximum static crush was 745 millimeters. The ambient temperature was 21° C. The driver's head injury criteria (HIC) was 673. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 42.8 g. The driver's chest maximum deflection was 38 millimeters. The driver's left and right femur maximum axial forces were 5003 N and 4986 N, respectively. The passenger's head injury criteria (HIC) was 468. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 44.0 g. The passenger's chest maximum deflection was 38 millimeters. The passenger's left and right femur maximum axial forces were 2980 N and 4731 N, respectively.			
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	tonnes	t
	(2000 lb)			
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

* 1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SO Catalog No. C7316-286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	ac
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	st
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

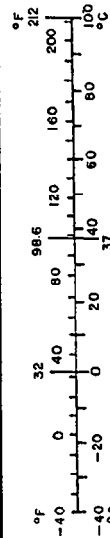


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*The contact indicated on the dummy's left forehead occurred after the test.

SECTION 1.0

PURPOSE AND TEST PROCEDURE

PURPOSE

This 56 kph (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 Transportation Research Center Inc. (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 1993 Chevrolet Suburban special purpose vehicle, NHTSA No. MP0103, at an impact speed in excess of the current 48 kph (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 nine (9) accelerometers to measure longitudinal 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 55.5 to 57.1 kph.

The test vehicle contained two (2) Part 572E 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 Procedure.

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. Each Part 572E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection and a six-axis neck load cell 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 occupant, camera, and vehicle 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 February 3, 1993.

The test vehicle, a 1993 Chevrolet Suburban special purpose vehicle, NHTSA No. MP0103, was equipped with a 5.7 liter inline engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 2849 KG. The vehicle's impact speed was 56.3 kph. The vehicle sustained 745 mm of static crush during the impact.

The driver's head injury criteria (HIC) was 673. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 42.8 g. The driver's chest maximum deflection was 38 mm. The driver's left and right femur maximum axial forces were 5003 N and 4986 N, respectively.

The passenger's HIC was 468. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 44.0 g. The passenger's chest maximum deflection was 38 mm. The passenger's left and right femur maximum axial forces were 2980 N and 4731 N, respectively.

DATA ACQUISITION EXPLANATIONS

The engine top X-axis accelerometer, ENGXG1, lost data from 109 to 178 milliseconds and from 240 to 252 milliseconds as a result of the accelerometer cable being pinched by the vehicle's crush on impact.

The right brake caliper accelerometer, BCRXG1, lost data at 88 milliseconds and after as a result of the accelerometer cable being cut by the vehicle's crush on impact.

The right front passenger's shoulder belt displacement string potentiometer, SHBD2, recorded questionable data as a result of the string jamming in the potentiometer during the impact event.

The load cell at position B3, BB3F, on the load cell barrier exceeded the transducer's full scale rating at 38 milliseconds. Also, the load cell did not return to zero following the impact event. The load cell barrier group number one force total and total load cell barrier force calculation were affected by the data not returning to zero.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: MP0103 TEST TYPE: Frontal Load Cell Barrier

TEST DATE: 02/03/93 TEST TIME: 1208 AMBIENT TEMP.: 21° C

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Chevrolet/Suburban/
special purpose vehicle

VEHICLE TEST WEIGHT (KG): 2849

IMPACT ANGLE (DEG)*: 0

IMPACT VELOCITY (KPH)**: PRIMARY = 56.3 SECONDARY = 56.3

MAXIMUM STATIC CRUSH (MM): 745

AVERAGE REBOUND (MM): 481

DUMMIES: Driver #192 Passenger #142

TYPE: Part 572 E Part 572 E

LOCATION: Left front Right front

RESTRAINT: 3-point unbelt 3-point unbelt

NUMBER OF DATA CHANNELS: 83

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

*With respect to tow track centerline.

**Speed trap measurement ($\pm$.08 kph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: General Motors Corporation

MAKE/MODEL: Chevrolet/Suburban VIN: 1GNFK16KXPJ324989

BODY STYLE: special purpose vehicle MODEL YEAR: 1993

NHTSA NO.: MP0103 COLOR: Black

ENGINE DATA: TYPE: inline CYLINDERS: 8 DISPLACEMENT: 5.7 liter

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

DATE VEHICLE RECEIVED: 12/22/92 ODOMETER READING: 98.0

DEALER'S NAME AND ADDRESS: Kehl Chevy-Olds, Inc.
P. O. 191
Mount Sterling, OH 43143

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	Yes
POWER SEATS	Driver only	TILTING STEERING WHEEL	Yes
POWER WINDOWS	Yes	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	Yes
RADIO	Yes	ANTI-SKID BRAKE	Yes
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
OTHER	None		

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 Corporation

DATE OF MANUFACTURE: 10/92 VIN: 1GNFK16KXPJ324989

GVWR: 3266 KG

GAWR: FRONT: 1780 KG, REAR: 1814 KG

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Uniroyal, Laredo LTL, LT245/75R16 M+S

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 350 kPa
REAR: 350 kPa

SPARE TIRE (MFR., LINE, SIZE): Uniroyal, Laredo LTL, LT245/75R16 M+S

TYPE OF SEATS: FRONT: Bucket
ROW 2: Split Bench
ROW 3: Bench

TYPE OF FRONT SEAT BACKS: Electronically-adjustable

MAXIMUM WIDTH: 2010 MM

WHEELBASE: 3340 MM

LOCATION OF LABEL STATING TIRE DATA:

The label was located on the driver's door.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: LT245/75R16C

RECOMMENDED COLD TIRE PRESSURE: FRONT: 310 kPa; REAR: 310 kPa

DESIGNATED SEATING CAPACITY: NA FRONT NA ROW 2 NA ROW 3
NA TOTAL

VEHICLE CAPACITY WEIGHT: NA KG

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN MILLIMETERS):

DELIVERED ATTITUDE: LF 911; RF 920; LR 883; RR 891

PRE-TEST ATTITUDE: LF 902; RF 905; LR 860; RR 864

POST-TEST ATTITUDE: LF 830; RF 753; LR 791; RR 741

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	635 KG	RIGHT REAR	668 KG
LEFT FRONT	600 KG	LEFT REAR	667 KG
TOTAL FRONT WEIGHT	1235 KG	(48.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1335 KG	(52.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	2570 KG		

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (2570 KG)

VCW = VEHICLE CAPACITY WEIGHT (NA KG)

DSC = DESIGNATED SEATING CAPACITY (NA)

$RCLW* = VCW - 150 (DSC) = 136 \text{ KG}$

$TARGET \text{ TEST WEIGHT} = UDW + RCLW* + (NO. \text{ OF HYBRID III DUMMIES} \times 76 \text{ KG/DUMMY})$

$TARGET \text{ TEST WEIGHT} = 2570 + 136 + 152$

$TARGET \text{ TEST WEIGHT} = 2858 \text{ KG}$

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 127 KG OF CARGO WEIGHT:

RIGHT FRONT	649 KG	RIGHT REAR	783 KG
LEFT FRONT	674 KG	LEFT REAR	743 KG
TOTAL FRONT WEIGHT	1323 KG	(46.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1526 KG	(53.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	2849 KG	(0.3 KG UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE: 159 KG

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 1789 MM 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 136 KG, whichever is less.

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 930203 NHTSA NO.: MP0103
TEST DATE: 02/03/93 TEST TIME: 1208
TEST TYPE: Frontal load cell barrier IMPACT ANGLE: 0°
AMBIENT TEMPERATURE AT IMPACT AREA: 21° C
TEMPERATURE IN OCCUPANT COMPARTMENT: 21° C
IMPACT VELOCITY: PRIMARY = 56.3 KPH SECONDARY = 56.3 KPH

(SPECIFIED RANGE = 55.5 TO 57.1 KPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 356 MM

EXITING VELOCITY TRAP = 51 MM

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

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 5419; C 5595; R 5418

POST-TEST: L 4835; C 4850; R 4840

TOTAL CRUSH: L 584; C 745; R 578

AVERAGE CRUSH: 636

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

DISTANCE FROM TEST VEHICLE TO BARRIER: L 450; C 464; R 530; AVG. 481

TABLE 4 FUEL SYSTEM DATA

MAKE/MODEL: Chevrolet/Suburban

NHTSA NO.: MP0103

FUEL SYSTEM CAPACITY: 159.0 LITERS (FROM OWNER'S MANUAL)

USABLE CAPACITY: 161.0 LITERS (FURNISHED BY COTR)

TEST VOLUME RANGE: 148.1 LITERS TO 151.3 LITERS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 149.7 LITERS (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 was located behind the rear axle.

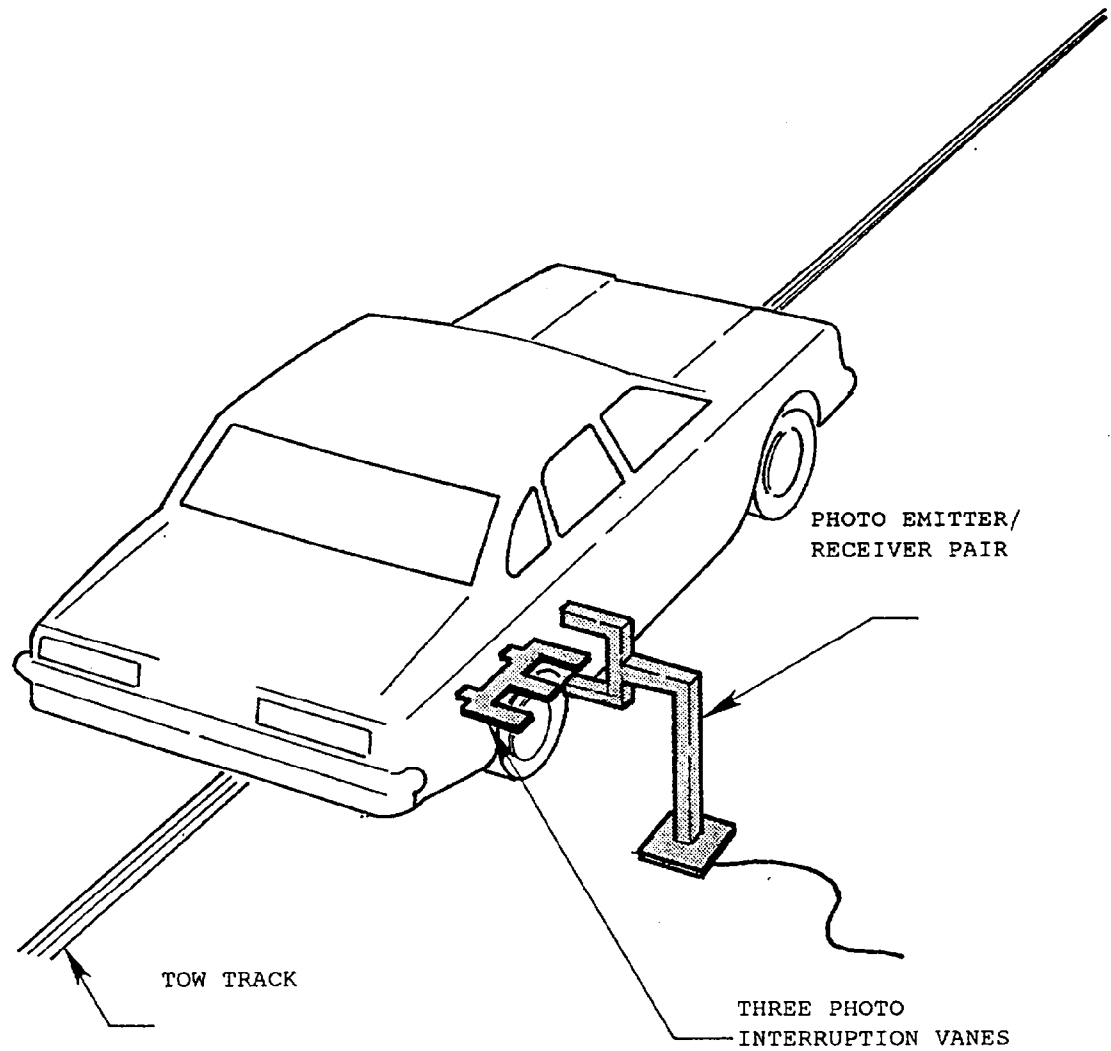
The fuel filler neck was located on the left side. The fuel lines
ran along the left frame rail to the front.

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 51 millimeters before impact.

The vanes have 305-millimeter spacing.

FIGURE 2 ACCIDENT INVESTIGATION DIVISION DATA
FOR 56 KPH (35 MPH) FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Chevrolet/Suburban/special purpose veh.

VEHICLE NHTSA NO.: MP0103; VIN: 1GNFK16KXPJ324989

MODEL YEAR: 1993; BUILD DATE: 10/92; TEST DATE: 02/03/93

VEHICLE SIZE CATEGORY: Special purpose veh.; TEST WEIGHT: 2849 KG

VEHICLE WHEELBASE: 3340 MM

MAXIMUM WIDTH: 2010 MM

FRONT OVERHANG: 910 MM

COLLISION DEFORMATION

CLASSIFICATION (CDC) CODE: 12FDEW3

CRUSH DEPTH

MEASUREMENTS: C1 = 584 MM
 C2 = 685 MM
 C3 = 706 MM
 C4 = 729 MM
 C5 = 706 MM
 C6 = 578 MM

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE
(LONGITUDINAL)

LENGTH OF DAMAGED
 REGION: L = 1706 MM

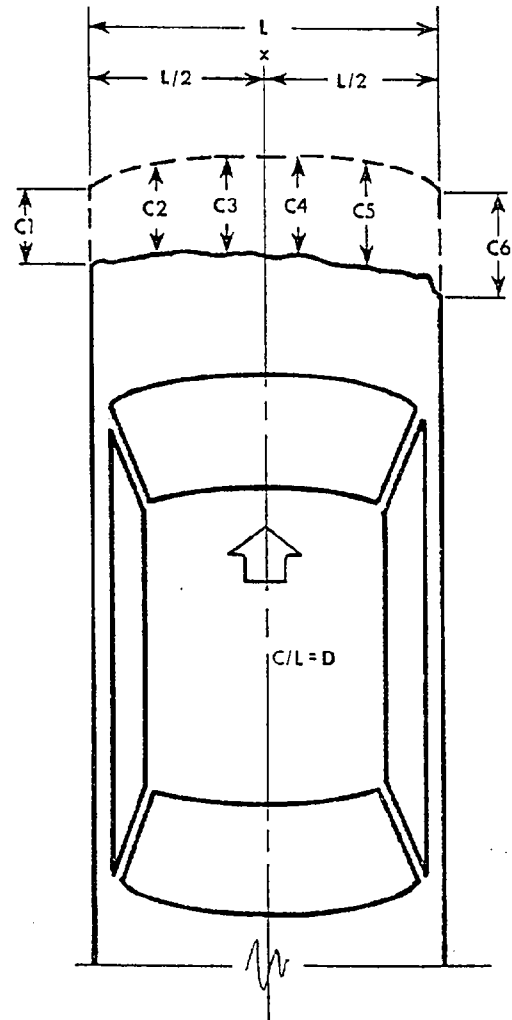
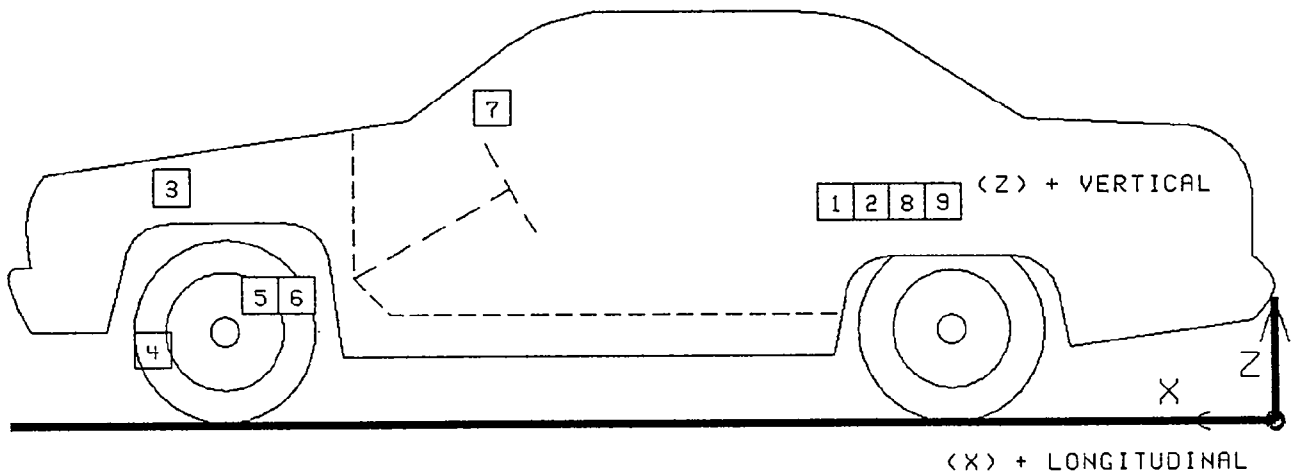
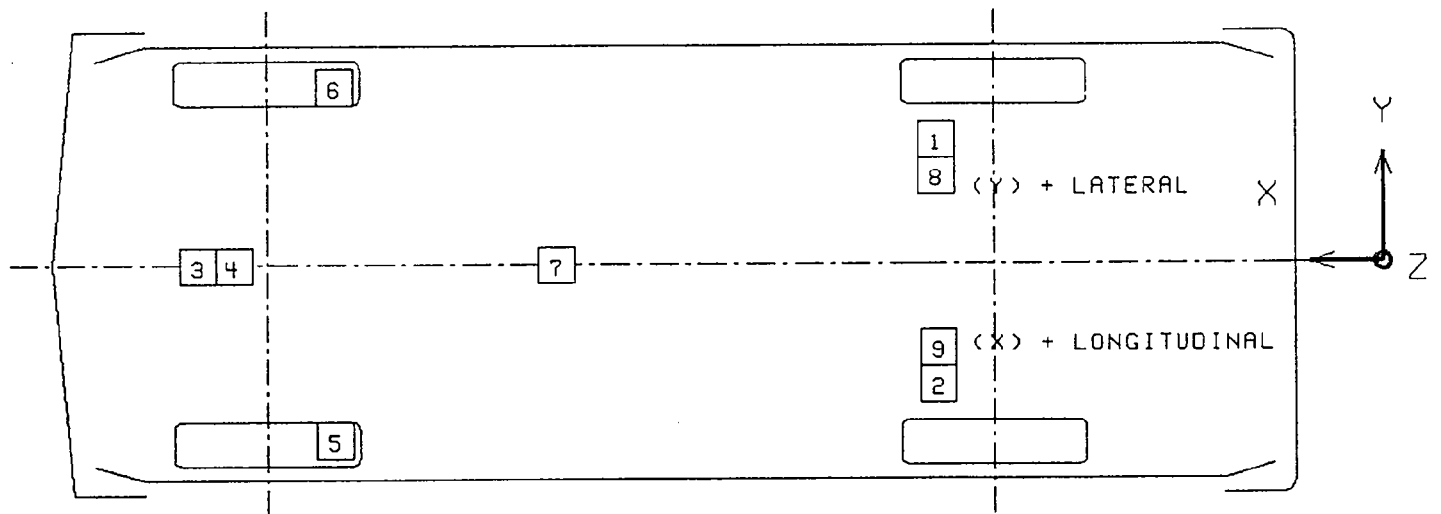


FIGURE 3

VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 5

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930203

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G MSEC		MAX G MSEC	
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	3845	310	755	2.9	180.6	25.2	70.3
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	3845	-315	753	2.6	180.3	24.6	56.5
3	ENGINE TOP LONGITUDINAL	995	169	945	21.3	60.6 Y	91.3	39.0 Y
4	ENGINE BOTTOM LONGITUDINAL	715	70	459	15.4	59.5	82.9	38.9
5	RIGHT BRAKE CALIPER LONGITUDINAL	1540	-700	386	42.2	59.8 Y	110.8	40.6 Y
6	LEFT BRAKE CALIPER LONGITUDINAL	1520	700	386	56.6	58.8	79.6	36.6
7	INSTRUMENT PANEL CENTER LONGITUDINAL	1145	55	1305	28.2	57.6	53.8	69.9
8	LEFT REAR SEAT CROSSMEMBER REDUNDANT VERTICAL	3845	350	755	2.2	240.3	28.3	57.1
9	RIGHT REAR SEAT CROSSMEMBER REDUNDANT VERTICAL	3845	-350	753	2.4	180.9	24.7	56.5

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

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

Y See DATA ACQUISITION EXPLANATIONS

TABLE 6 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

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

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	<u>None</u>	<u>None</u>
REAR	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE:

The entire windshield was cracked upon impact.

OTHER NOTABLE IMPACT EFFECTS:

The right rear tire and axle assembly came

partially out of the axle housing upon impact.

f

TABLE 7 FMVSS 208 DATA SUMMARY

VEH. YR./MAKE/MODEL/BODY STYLE: 1993/Chevrolet/Suburban/spec. purp.

VEH. NHTSA NO.: MP0103; TEST DATE: 02/03/93

	DRIVER DUMMY #192	PASSENGER DUMMY #142
<u>MAXIMUM ACCELERATIONS (G):</u>		
HEAD X-AXIS	-146.7	-39.9
HEAD Y-AXIS	12.4	9.8
HEAD Z-AXIS	-40.6	-48.8
HEAD RESULTANT	152.2	55.2
CHEST X-AXIS	-49.4	-42.8
CHEST Y-AXIS	-4.4	7.5
CHEST Z-AXIS	-18.8	16.8
CHEST RESULTANT*	42.8	44.0
CHEST RESULTANT TIME INTERVAL (SEC.)*	.003	.003

HEAD INJURY CRITERIA (HIC) VALUES:

HIC**	673	468
HIC STARTING TIME (SEC.)	.070	.072
HIC ENDING TIME (SEC.)	.106	.108
AVG. HEAD RESULTANT ACCEL. DURING HIC TIME INTERVAL (G)	51.1	44.2

MAXIMUM CHEST DEFLECTIONS (MM):

CHEST X-AXIS	38	38
MAXIMUM CHEST DEFLECTION TIME (SEC)	.085	.091

MAXIMUM COMPRESSIVE FEMUR FORCES (N):

LEFT FEMUR	5003	2980
RIGHT FEMUR	4986	4731

MAXIMUM SEAT BELT FORCES (N):

LAP BELT	5317	5655
SHOULDER BELT	7297	7666

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: 1993/Chevrolet/Suburban/spec. purp.

VEHICLE NHTSA NO.: MP0103; TEST DATE: 02/03/93

<u>MAXIMUM VALUES:</u>	<u>DRIVER</u> <u>DUMMY #192</u>	<u>PASSENGER</u> <u>DUMMY #142</u>
NECK X-AXIS FORCE (N)	-1004	1353
NECK Y-AXIS FORCE (N)	264	-247
NECK Z-AXIS FORCE (N)	2613	210
NECK MOMENT ABOUT X AXIS (N-M)	16	-10
NECK MOMENT ABOUT Y AXIS (N-M)	-76	69
NECK MOMENT ABOUT Z AXIS (N-M)	-15	-6

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 abdomen impacted the lower steering wheel rim. The dummy's chest impacted the steering wheel hub as the dummy's head rotated slightly downward impacting the upper steering wheel rim. The driver dummy was restrained by the three-point unbelt. The dummy rebounded rearward into the seat back. The dummy's head contacted the seat back. The driver dummy came to rest in the driver's seat restrained by the three-point unbelt.

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 downward contacting the dummy's chest and the instrument panel. The right front passenger dummy was restrained by the three-point unbelt. The dummy rebounded rearward into the seat back leaning slightly to the right as the dummy's head rotated rearward into the seat back. The right front passenger dummy came to rest in the right front passenger's seat, leaning slightly to the right, restrained by the three-point unbelt.

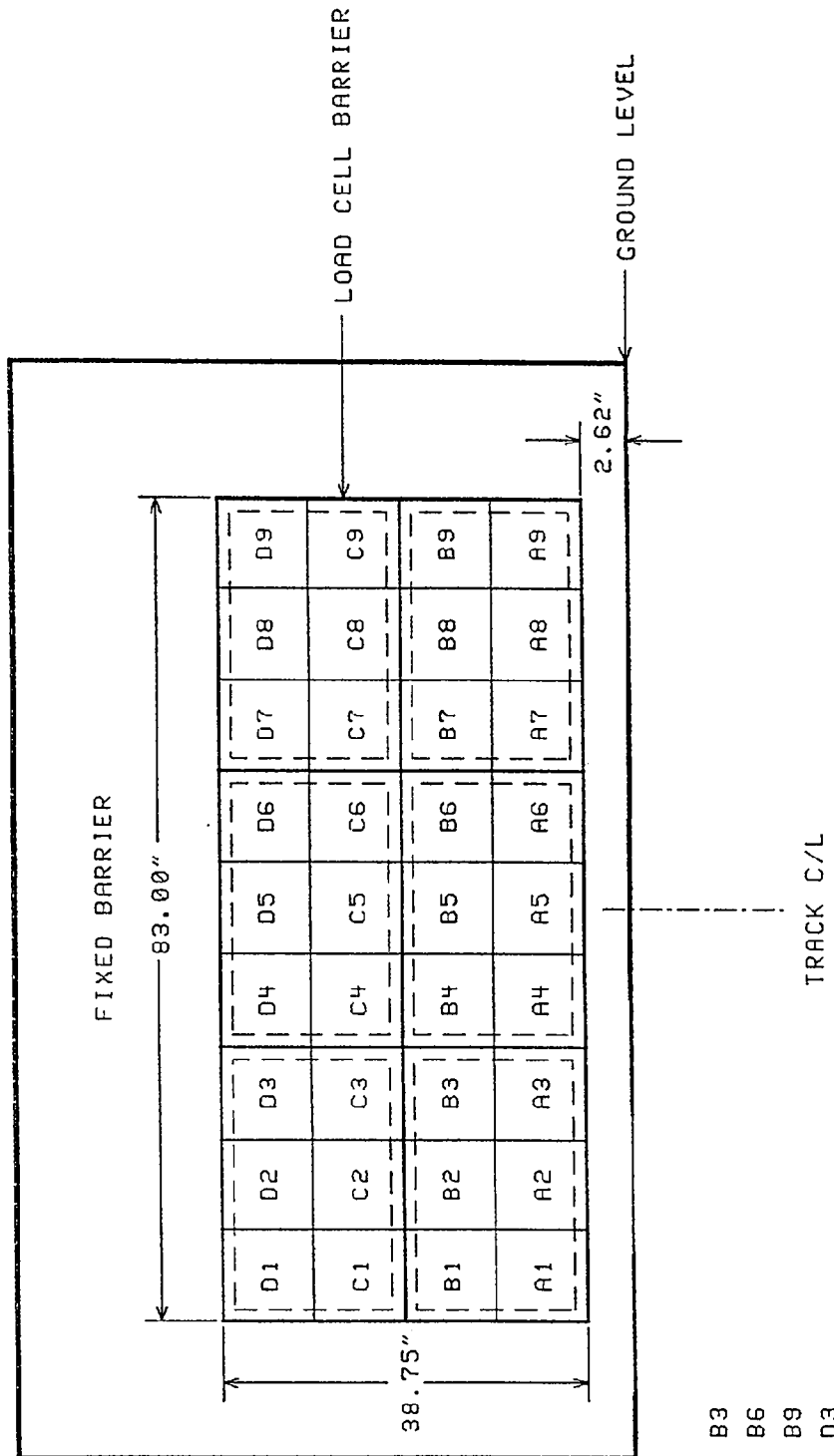
TABLE 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

	DRIVER	PASSENGER
<u>BELT LENGTH DATA:</u>		
BELT LENGTH FROM TRIM PANEL EXIT TO BOLT HOLE ANCHOR POINT FOR CONTINUOUS WEBBING SYSTEMS.	3004	3004
SHOULDER BELT LENGTH AS MEASURED ON PART 572 DUMMY.	876	876
LAP BELT LENGTH AS MEASURED ON PART 572 DUMMY.	757	762
<u>SHOULDER BELT SPOOL-OFF LENGTH:</u>		
AS DETERMINED BY FILM ANALYSIS	46	38
AS DETERMINED MECHANICALLY	50	45
AS DETERMINED ELECTRONICALLY	69	52 Y
<u>BELT STRETCH LENGTH (MM/M):</u>		
AS MEASURED MECHANICALLY	0	0
AS MEASURED ELECTRONICALLY	0	0
<u>RETRACTOR LOCK-UP TIME (MS):</u>		
AS DETERMINED BY SHOULDER BELT SPOOL-OFF	64	62

ALL MEASUREMENTS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
Y See DATA ACQUISITION EXPLANATIONS.

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 930203

LOCATION	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	KN	MSEC	KN	MSEC
TOTAL GROUP 1	1.9	2.5 Y	237.0	38.1 Y
TOTAL GROUP 2	0.8	182.8	218.6	40.1
TOTAL GROUP 3	0.4	182.3	125.0	37.3
TOTAL GROUP 4	0.2	196.8	174.7	18.6
TOTAL GROUP 5	0.3	277.9	249.8	48.4
TOTAL GROUP 6	1.0	196.0	137.7	17.9
TOTAL LOAD CELL FORCE	---	--- T	890.0	39.4 Y
TENSION IS POSITIVE				
COMPRESSION IS NEGATIVE				

Y See DATA ACQUISITION EXPLANATIONS

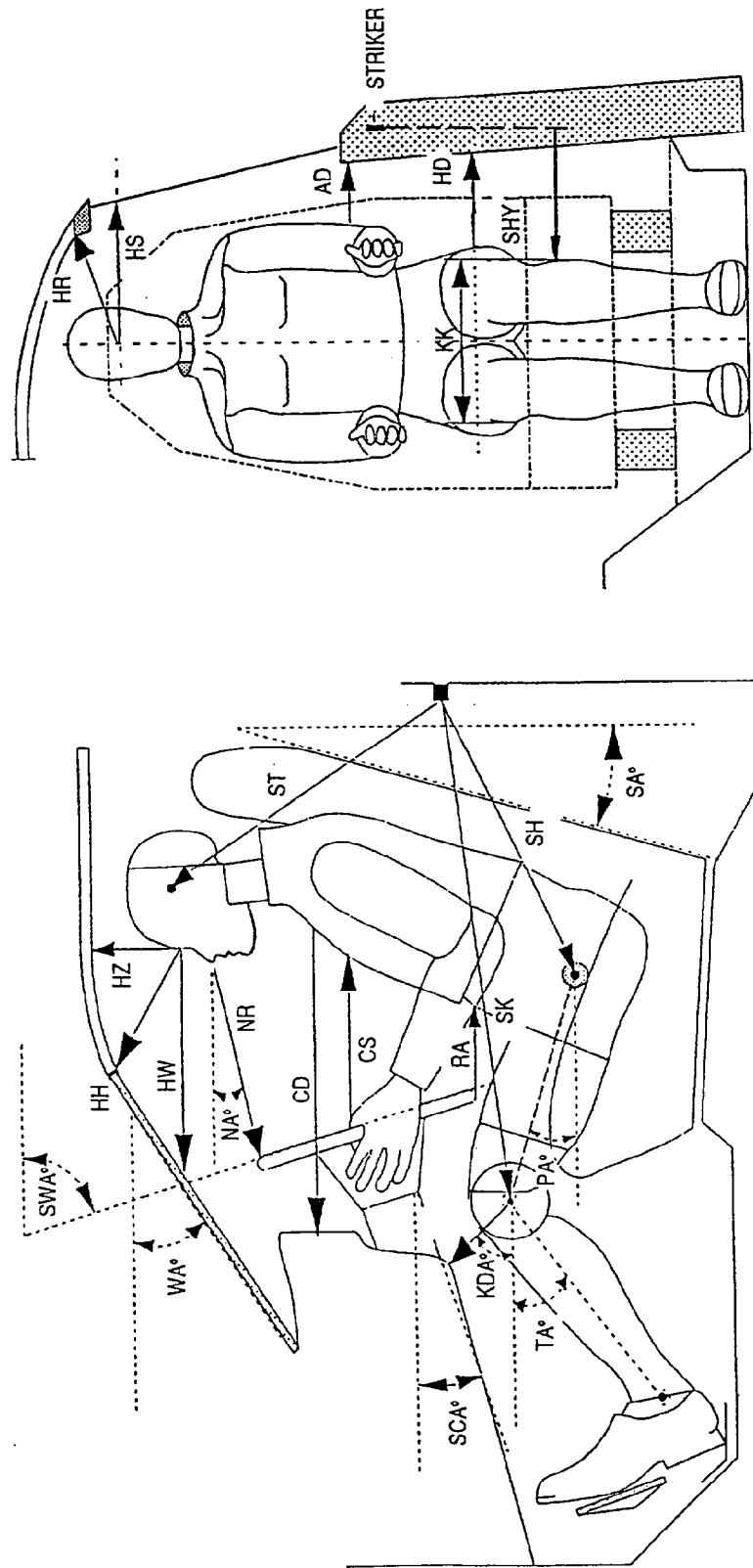
T No positive value in time frame of interest.

SECTION 3.0

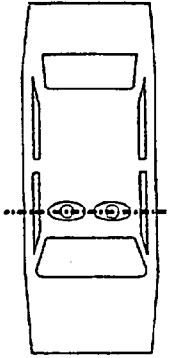
OCCUPANT, CAMERA, & VEHICLE MEASUREMENTS

FIGURE 5

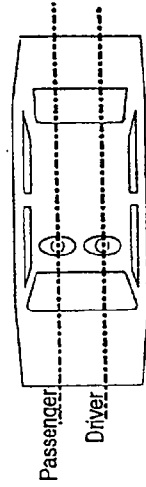
DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS



VERTICAL TRANSVERSE PLANE



VERTICAL LONGITUDINAL PLANE



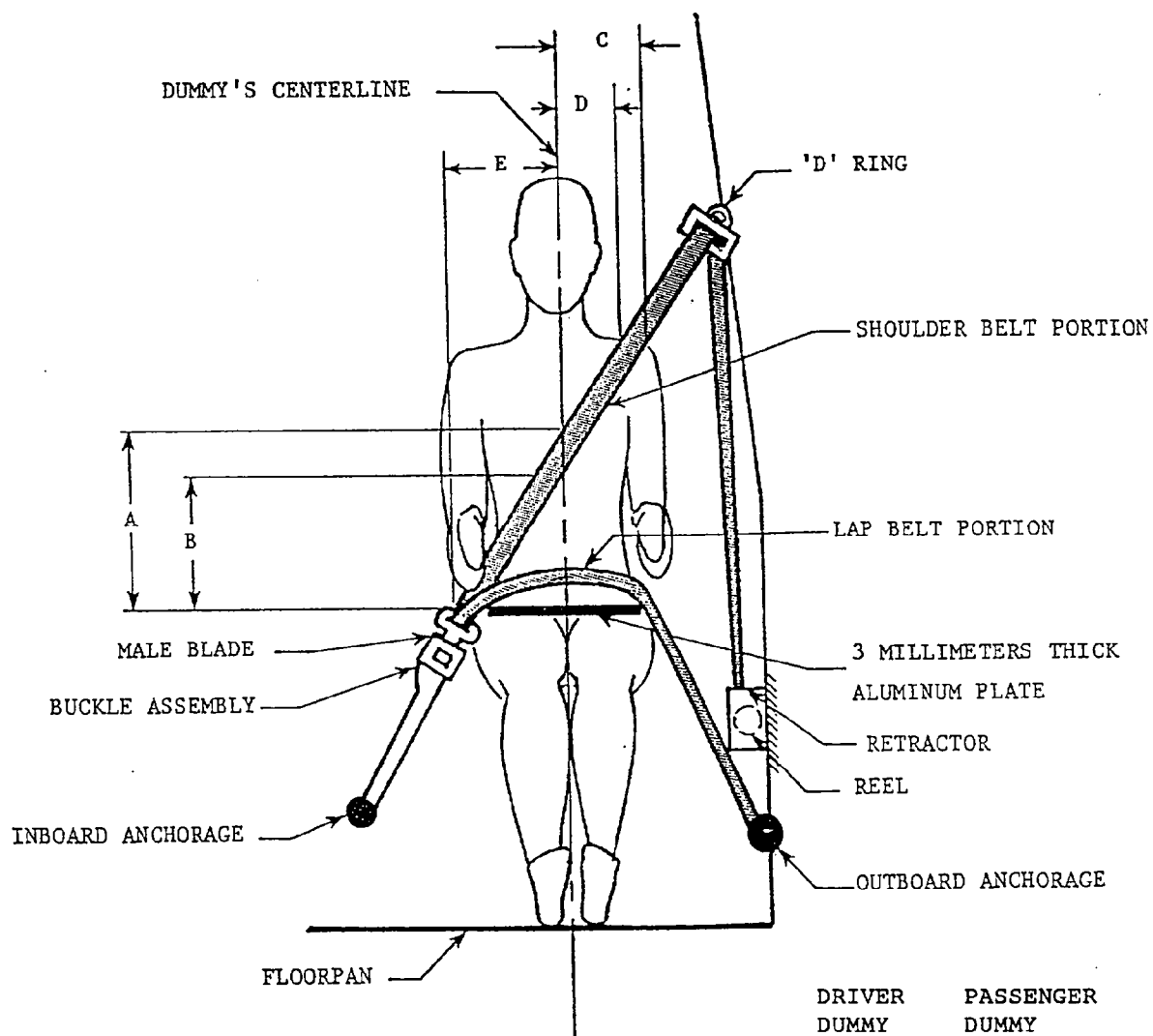
Passenger
Driver

TABLE 11 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

DESIGNATION	TYPE OF MEASUREMENT	DRIVER (SERIAL #192)	PASSENGER (SERIAL #142)
WA°	WINDSHIELD ANGLE	40°	NA
SWA°	STEERING WHEEL ANGLE	66°	NA
SCA°	STEERING COLUMN ANGLE	27°	NA
SA°	SEAT BACK ANGLE	21°	21°
HZ	HEAD TO ROOF	235	210
HH	HEAD TO HEADER	475	472
HW	HEAD TO WINDSHIELD	645	606
HR	HEAD TO SIDE HEADER	257	230
NR	NOSE TO RIM	352	NA
NA	NOSE TO RIM ANGLE	18°	NA
CD	CHEST TO DASH	556	610
CS	STEERING WHEEL TO CHEST	294	NA
RA	RIM TO ABDOMEN	160	NA
KDL	LEFT KNEE TO DASH	150	151
KDR	RIGHT KNEE TO DASH	157	142
KDA	OUTBOARD KNEE TO DASH ANGLE	24°	30°
PA°	PELVIC ANGLE	25°	20°
TA°	TIBIAL ANGLE	50°	45°
KK	KNEE TO KNEE	300	300
ST	STRIKER TO HEAD	648	665
	STRIKER TO HEAD ANGLE	-75°	-72°
SK	STRIKER TO KNEE	751	754
	STRIKER TO KNEE ANGLE	-7°	-4°
SH	STRIKER TO H-POINT	346	353
	STRIKER TO H-POINT ANGLE	5°	5°
SHY	STRIKER TO H-POINT (Y DIR.)	240	230
HS	HEAD TO SIDE WINDOW	340	310
HD	H-POINT TO DOOR	128	127
AD	ARM TO DOOR	131	137

THE SEAT BACK ANGLE (SA°) IS MEASURED RELATIVE TO VERTICAL, ALL OTHER ANGLES ARE MEASURED RELATIVE TO HORIZONTAL.
ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 6 SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	336	365
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	260	285
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT		
AT CHEST FLESH TOP	110	110
D - DUMMY CENTERLINE TO INNER EDGE OF BELT		
AT CHEST FLESH TOP	50	55
LAPBELT TENSION (N)	13	13
SHOULDER BELT TENSION (N)	18	18

ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 7 CAMERA POSITIONS

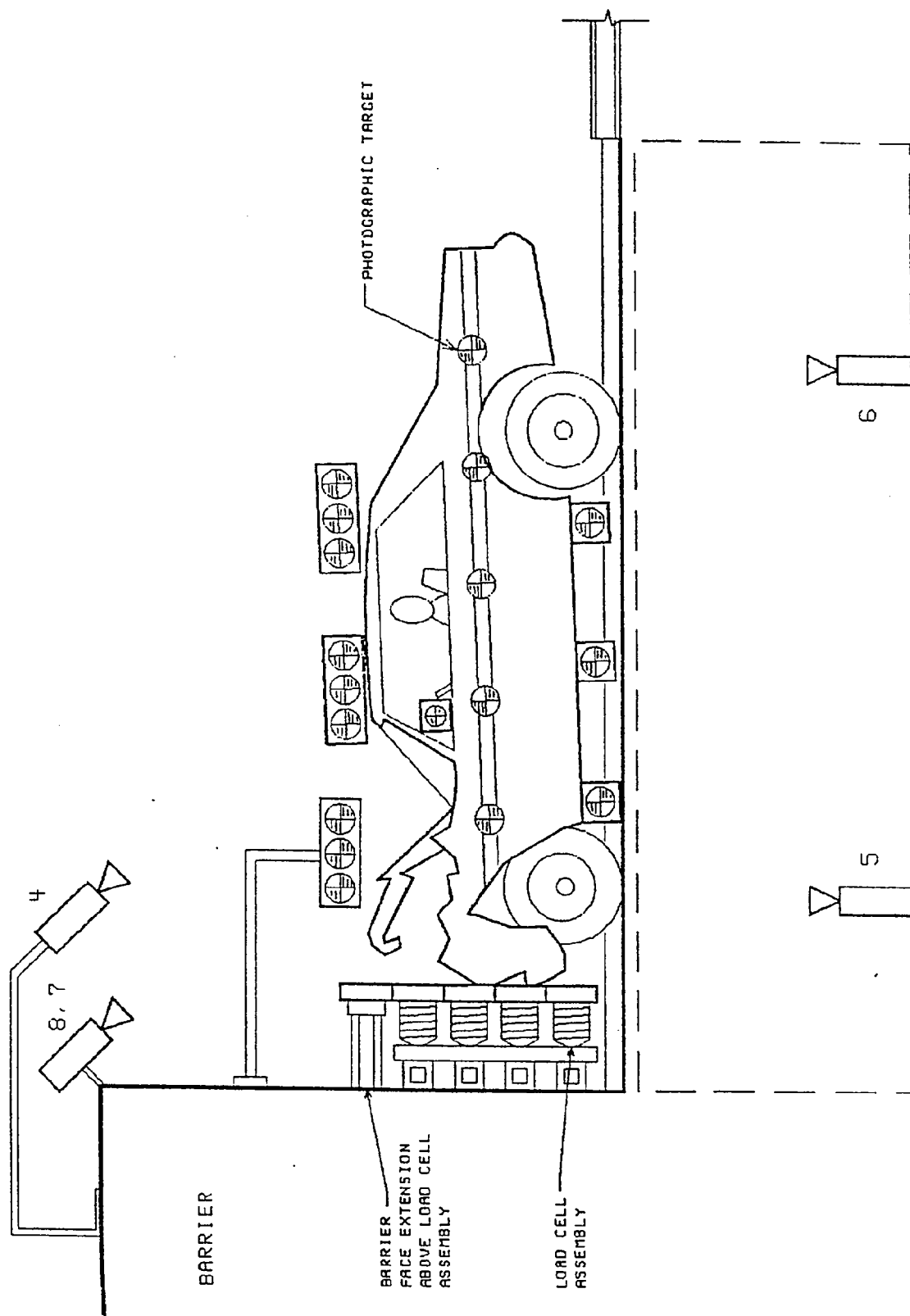


FIGURE 7 CAMERA POSITIONS, CONT'D.

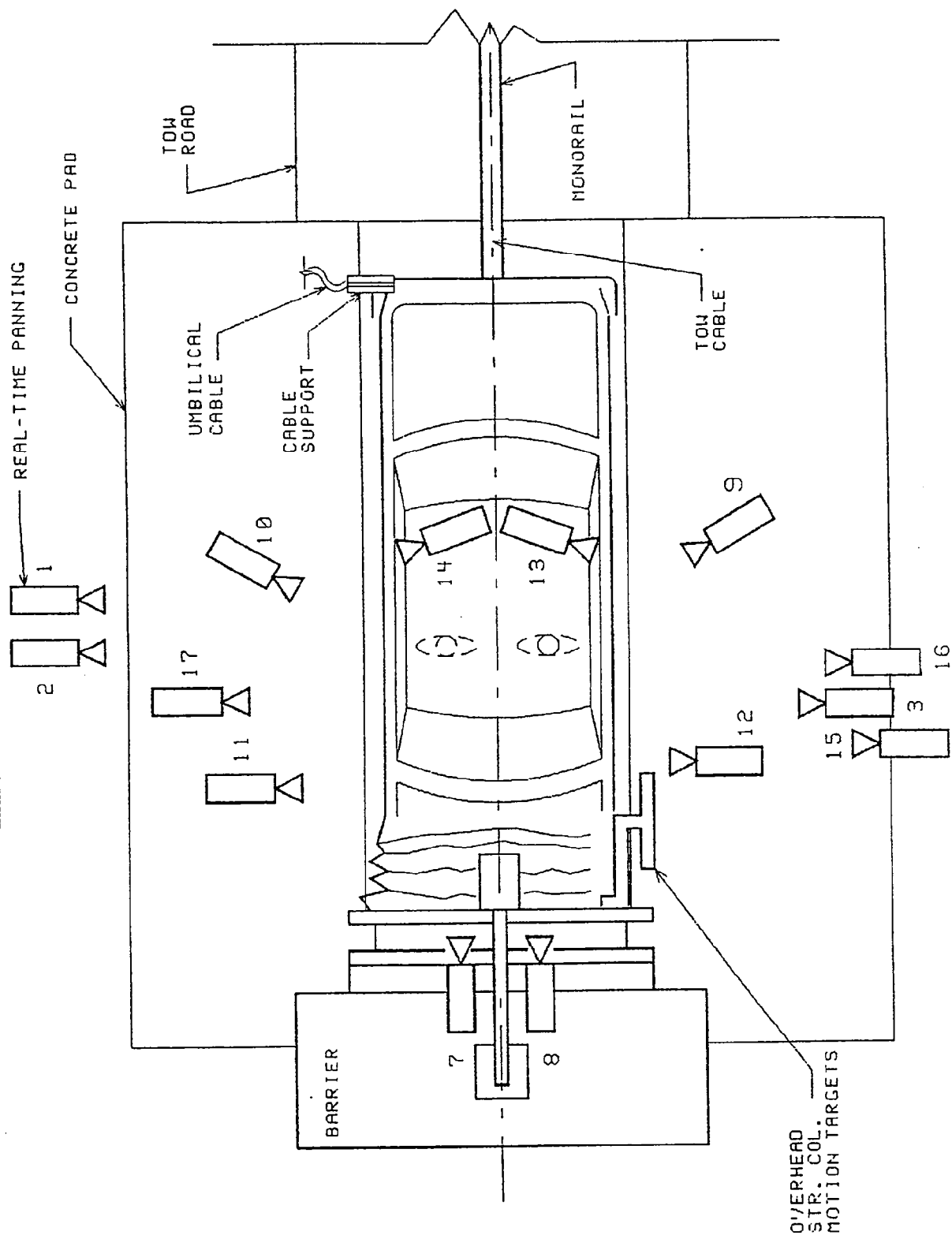


TABLE 12 MOTION PICTURE CAMERA LOCATIONS

TEST NO.:		930203		VEHICLE: 1993 Chevrolet Suburban special purpose vehicle						
CAMERA NO.		VIEW	CAMERA POSITIONS (MM)*			ANGLE** (DEG)	FILM PLANE		FILM SPEED (FPS)	
			X	Y	Z		TO HEAD TARGET (MM)	LENS (MM)		
1	Real-time panning	-3607	-12802	1549	NA	NA	16	24		
2	Vehicle crush	-2065	-6767	942	-2	NA	13	490		
3	Dummy kinematics	-1054	7493	1118	-12	5207	25	1020		
4	Windshield damage	-925	0	2489	-40	NA	13	490		
5	Crush & fluid spillage	-1283	0	-2347	90	NA	13	998		
6	Fluid spillage	-2522	0	-2515	90	NA	13	1000		
7	Passenger kinematics	-114	-351	2159	-40	NA	17	500		
8	Driver kinematics	-173	368	2159	-41	NA	17	500		
9	Driver kinematics	-4572	1854	2591	-27	2413	25	498		
10	Passenger kinematics	-4674	-1880	2540	-26	2210	25	495		
11	Windshield intrusion	-968	-7775	1118	0	NA	50	502		
12	Windshield intrusion	-1346	7859	1074	0	NA	50	500		
13	Driver seatbelt movement	NA	NA	NA	NA	NA	13	500		
14	Passenger seatbelt movement	NA	NA	NA	NA	NA	13	500		
15	Column movement	-2896	7264	2616	-14	NA	25	500		
16	Column movement	-2896	7264	1908	-9	NA	25	505		
17	Passenger kinematics	-986	-5354	1151	7	5359	25	1000		

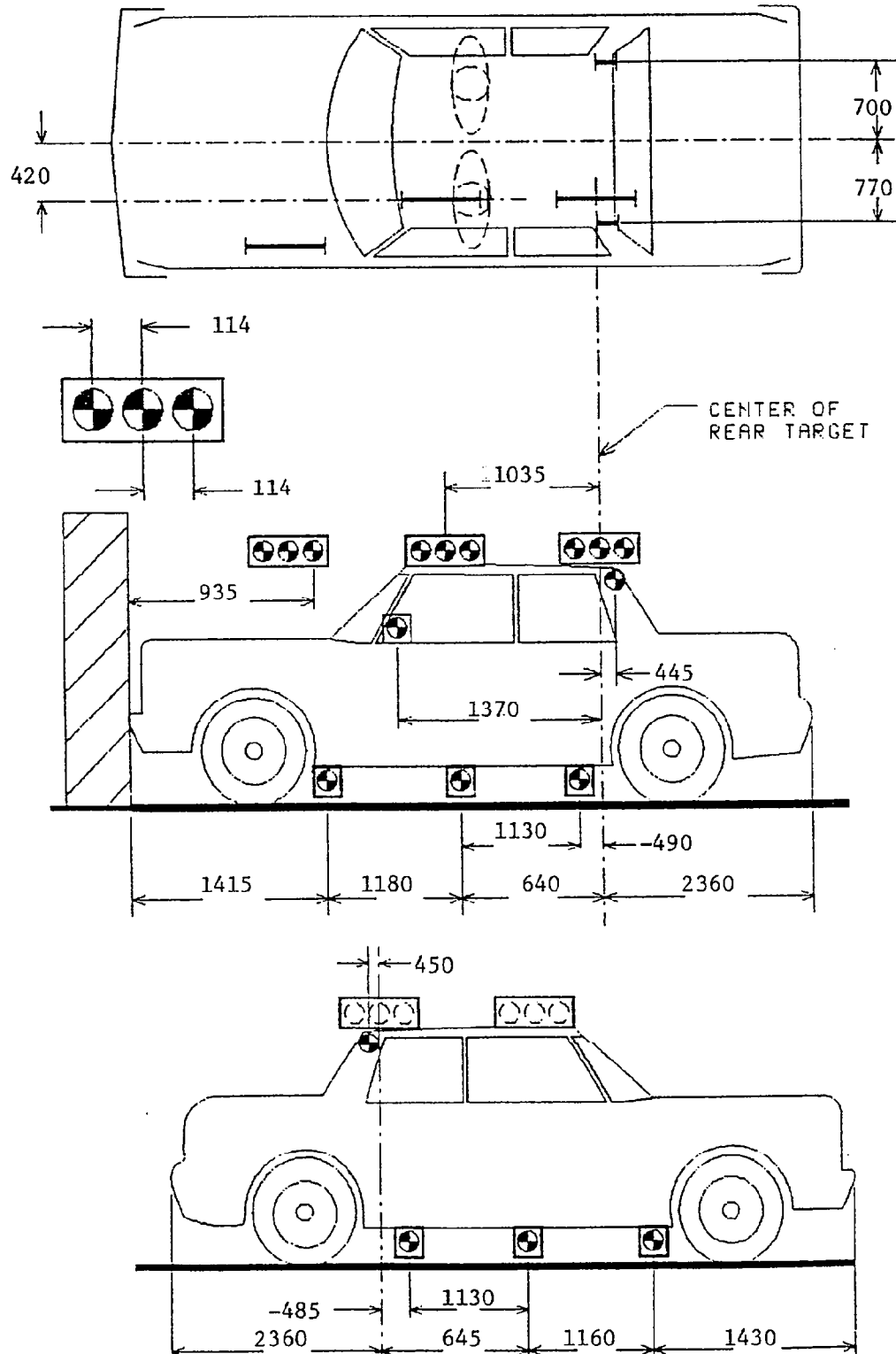
**X = Film plane forward of barrier face

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

***Angle = Film plane angled upward from horizontal plane

FIGURE 8
VEHICLE TARGET LOCATIONS



ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 9

PRE-TEST AND POST-TEST MEASUREMENT POINTS

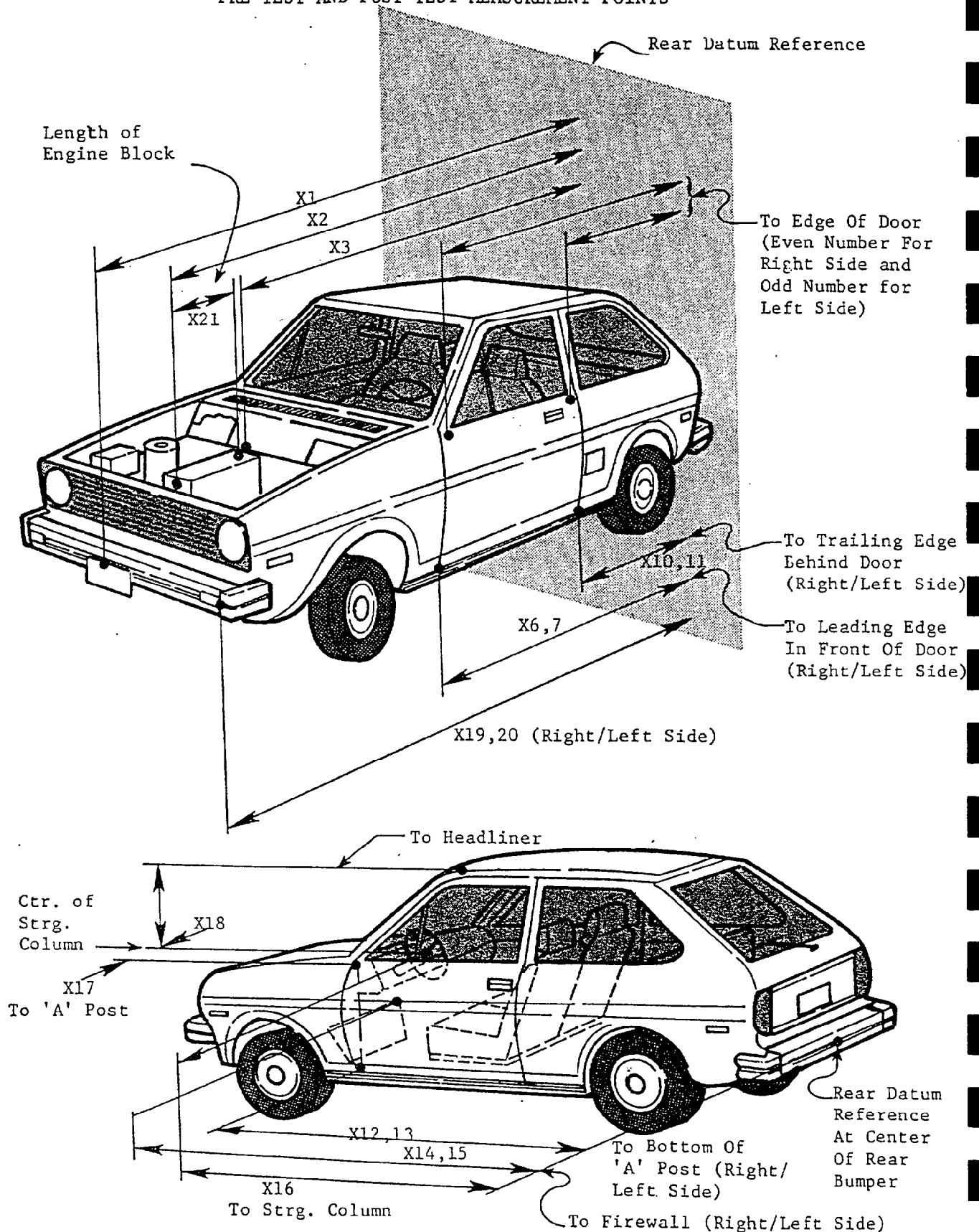


TABLE 13 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Chevrolet/Suburban		TEST NUMBER: 930203		ALL MEASUREMENTS ARE IN MM		
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.		
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	5595	4850	745		
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	4825	4620	205		
X3	REAR SURFACE OF VEHICLE TO FIREWALL	4200	4070	130		
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	4120	4115	5		
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	4118	4060	58		
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	4040	4020	20		
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	4040	3980	60		
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	2890	2925	-35		
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	2888	2928	-40		
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	2922	2905	17		
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	2925	2860	65		
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	4082	4000	82		
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	4082	4000	82		
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	4340	4270	70		
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	4340	4270	70		
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	3590	3480	110		
X17	CENTER OF STEERING COLUMN TO "A" POST	260	225	35		
X18	CENTER OF STEERING COLUMN TO HEADLINER	474	640	-166		
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	5418	4840	578		
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	5419	4835	584		
X21	LENGTH OF ENGINE BLOCK	500	500	0		

APPENDIX A

PHOTOGRAPHS

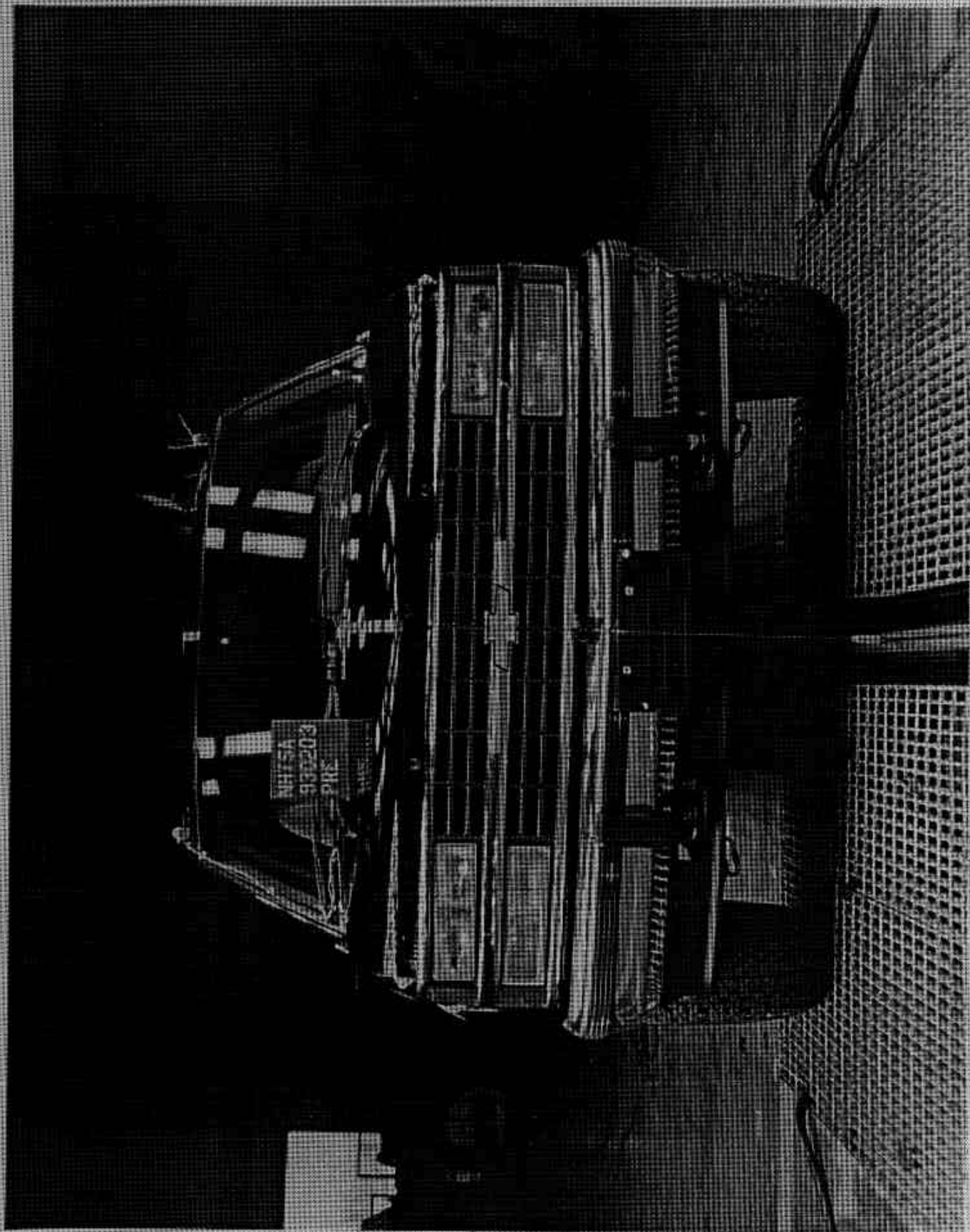


Figure A-1. PRE-TEST FRONT VIEW

A-2

930203

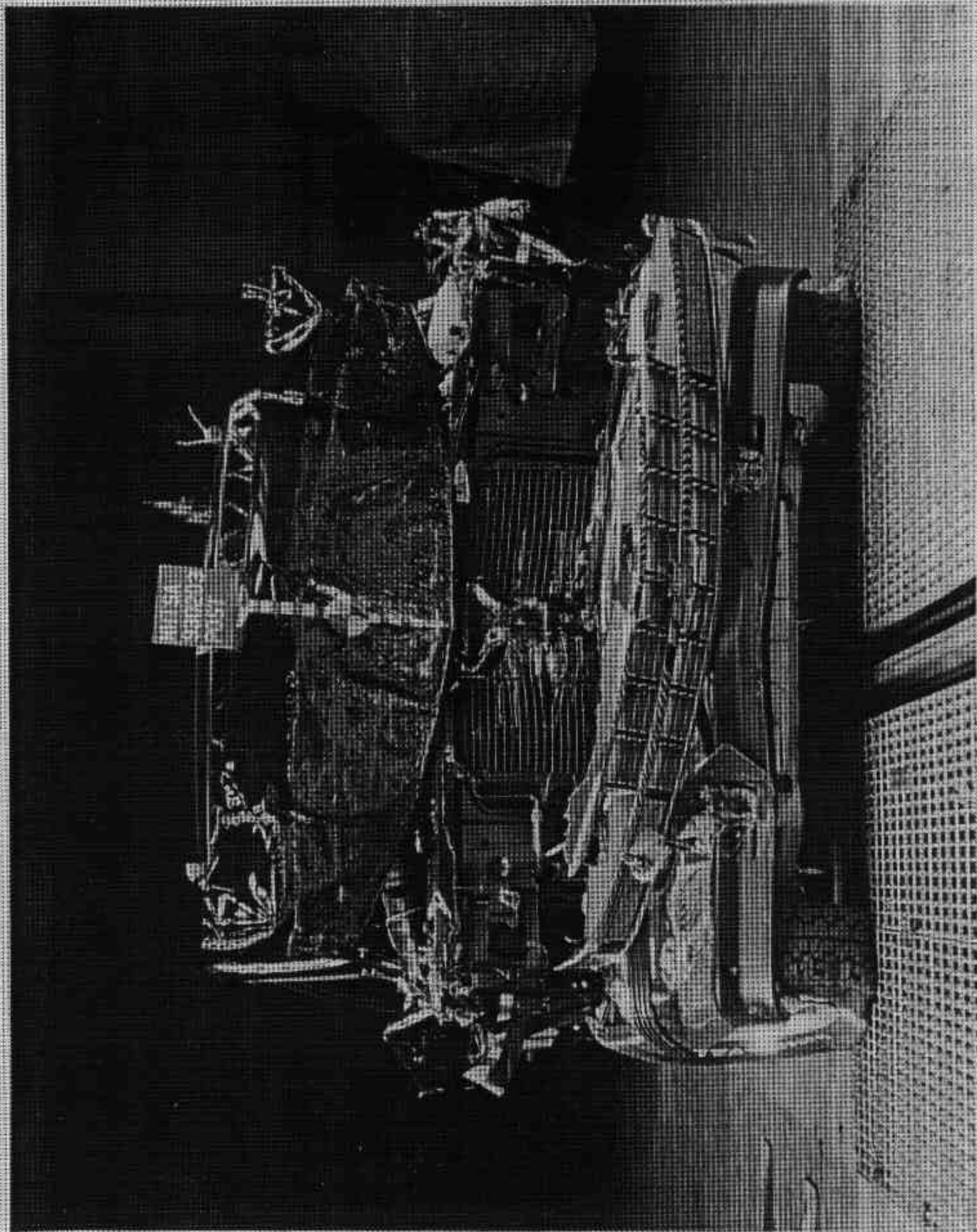


Figure A-2. POST-TEST FRONT VIEW
A-3

930203

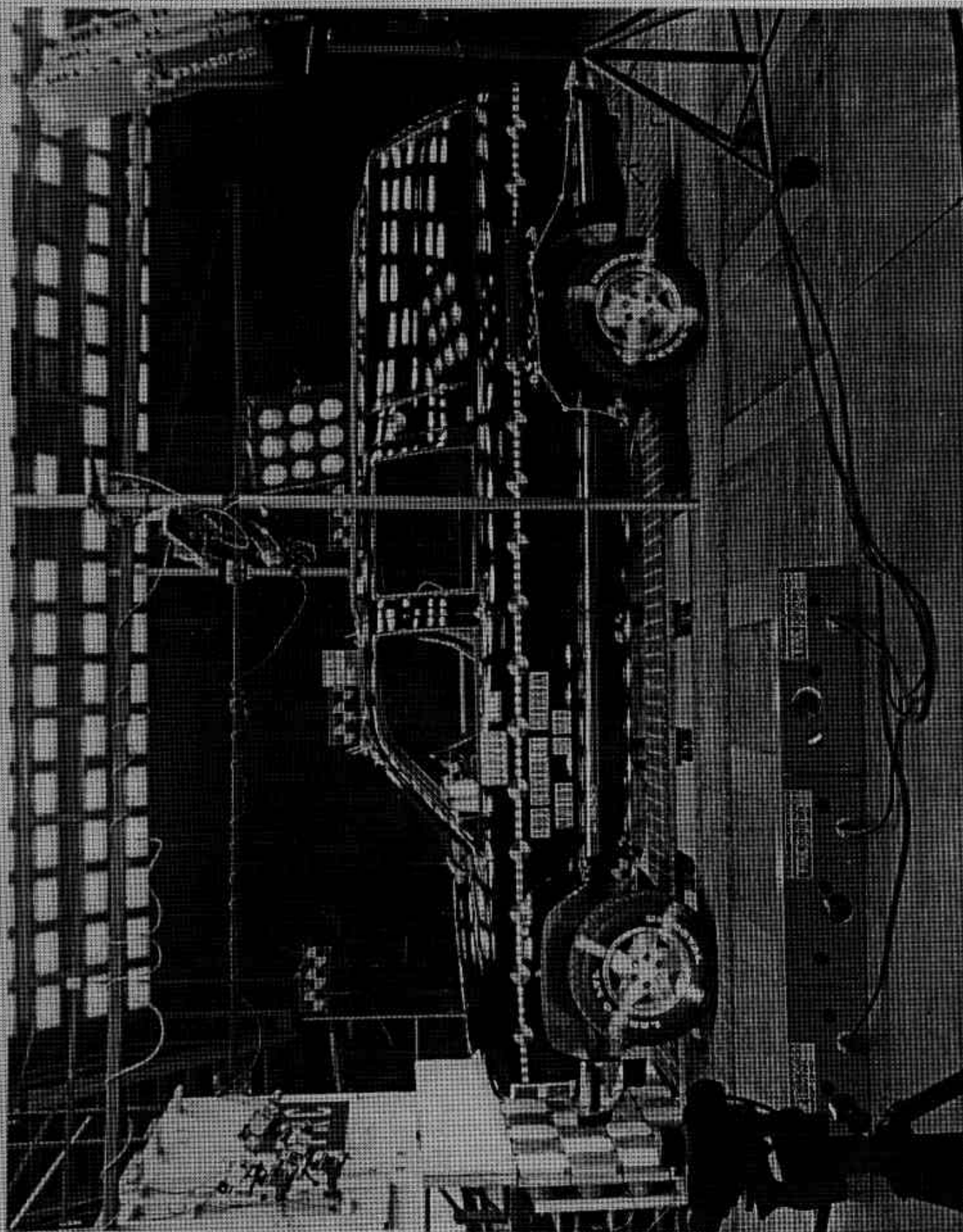


Figure A-3. PRE-TEST LEFT SIDE VIEW

A-4

930203

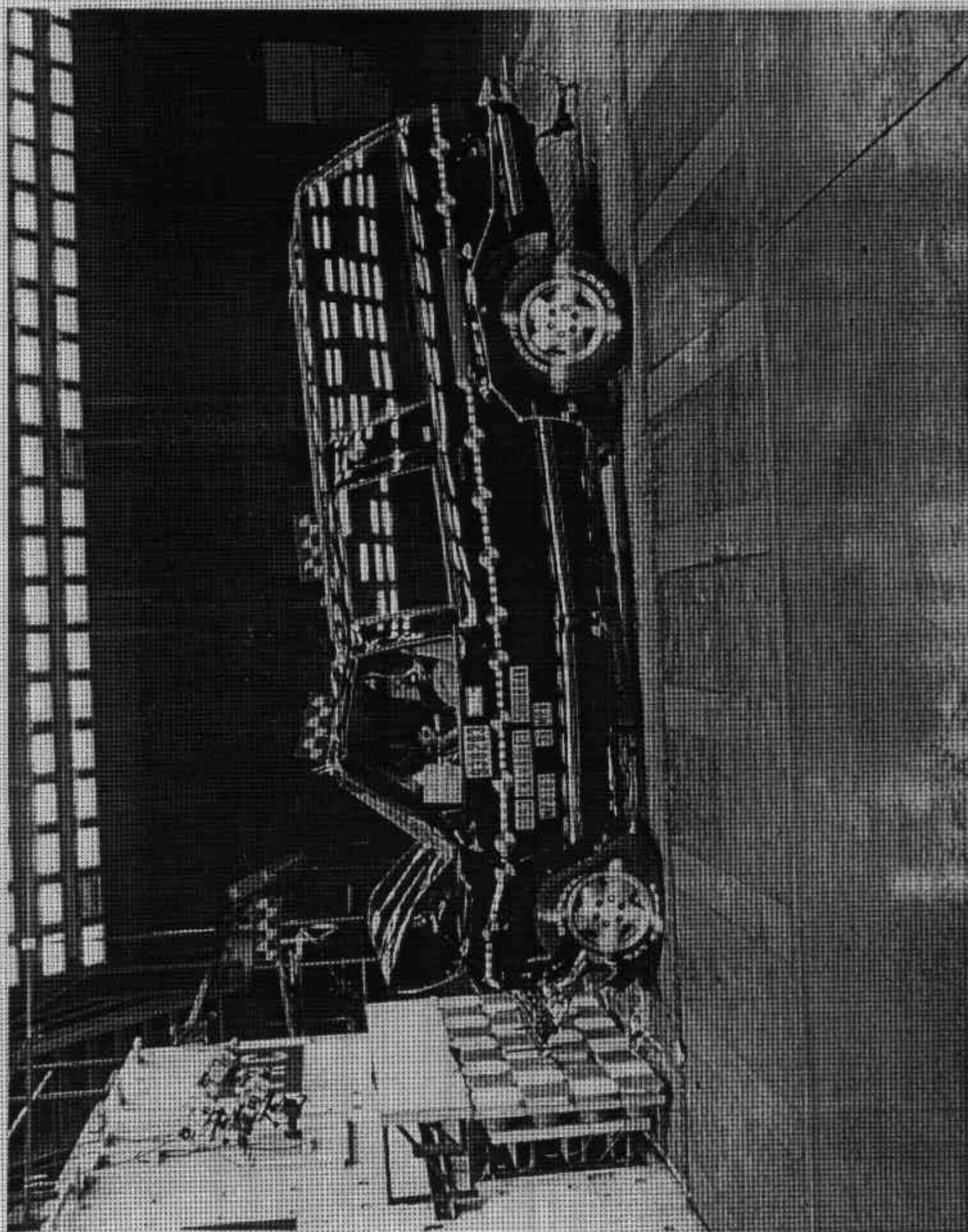


Figure A-4. POST-TEST LEFT SIDE VIEW
A-5

930203

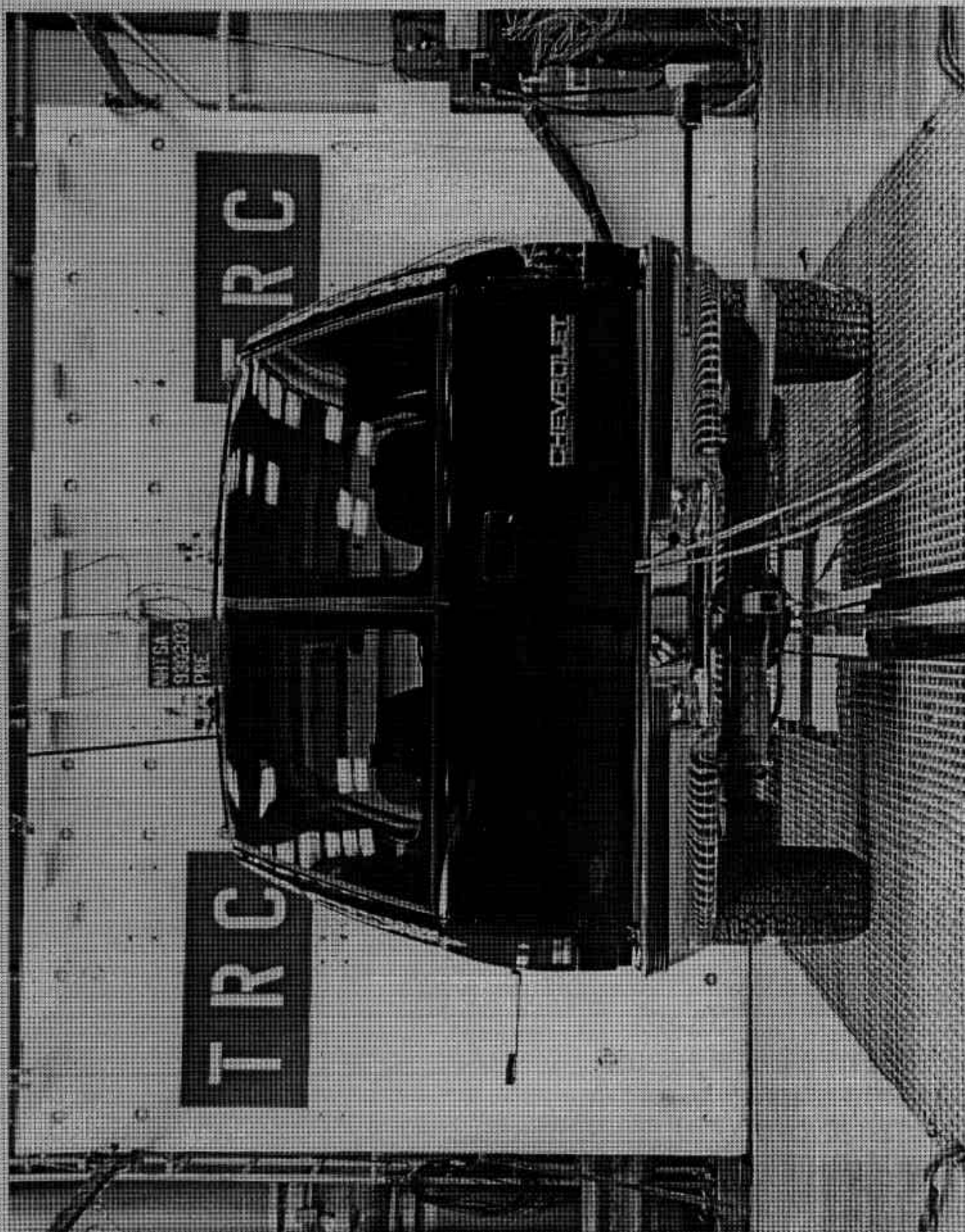


Figure A-5. PRE-TEST REAR VIEW

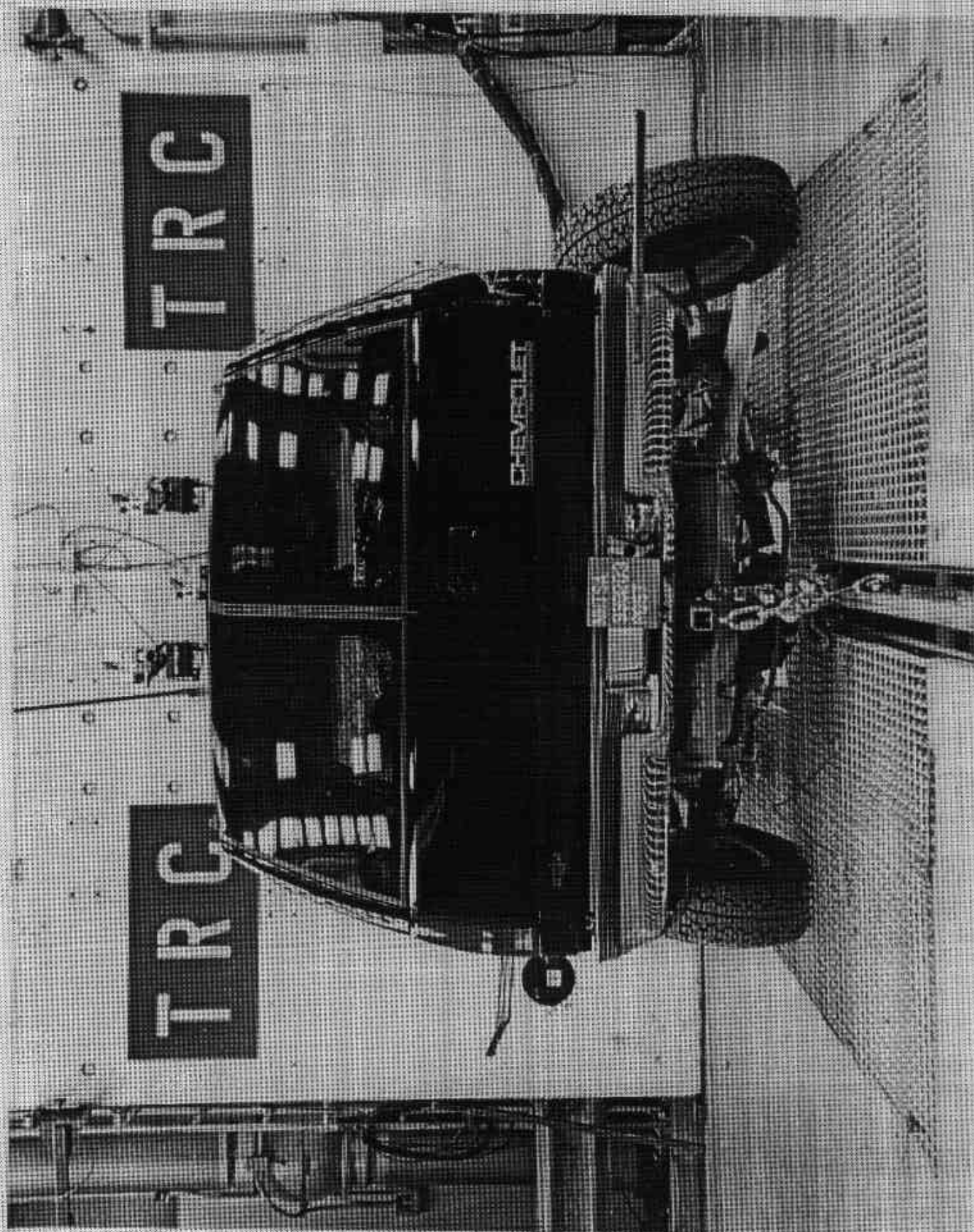


Figure A-6. POST-TEST REAR VIEW

A-7

930203

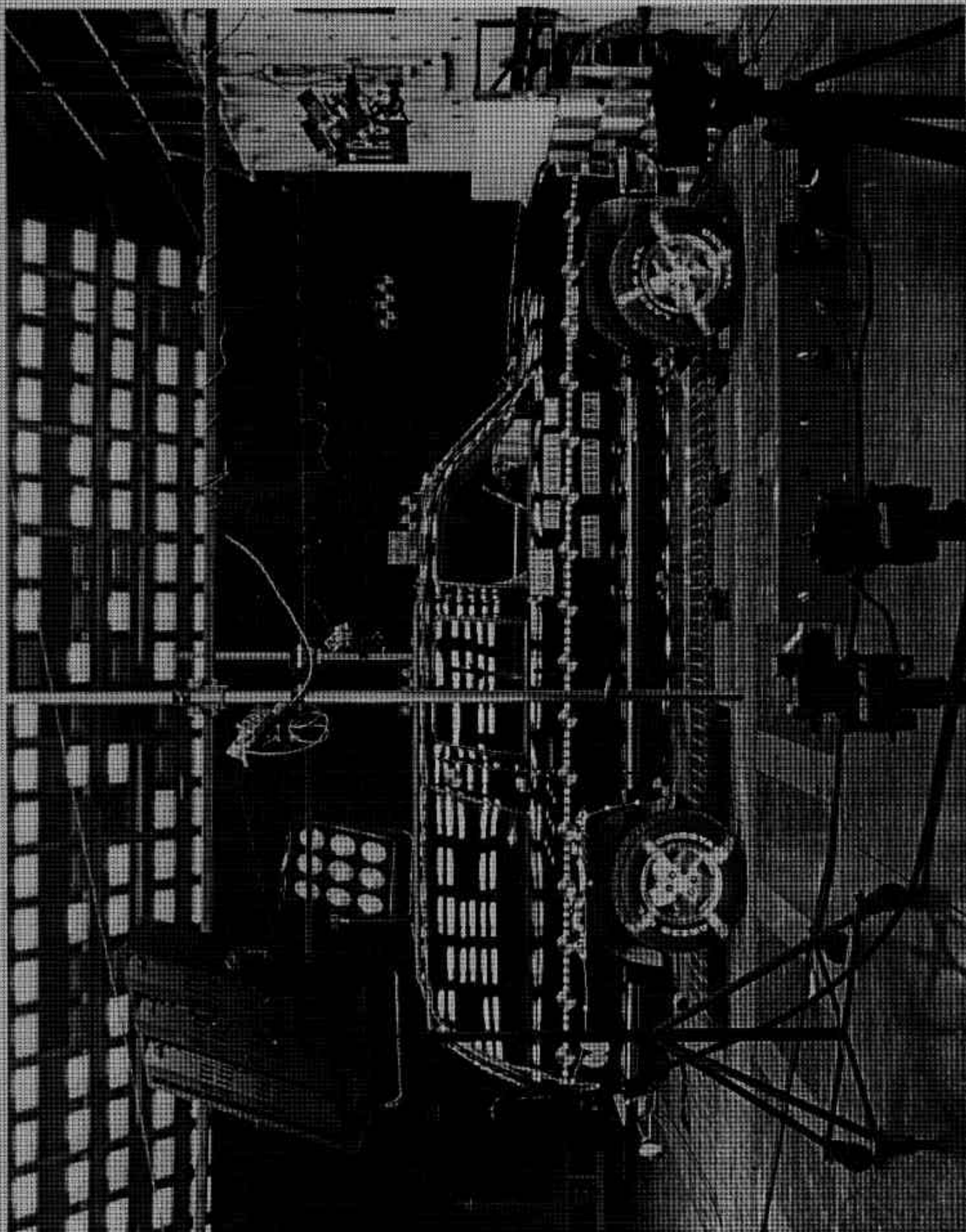


Figure A-7. PRE-TEST RIGHT SIDE VIEW

A-8

930203

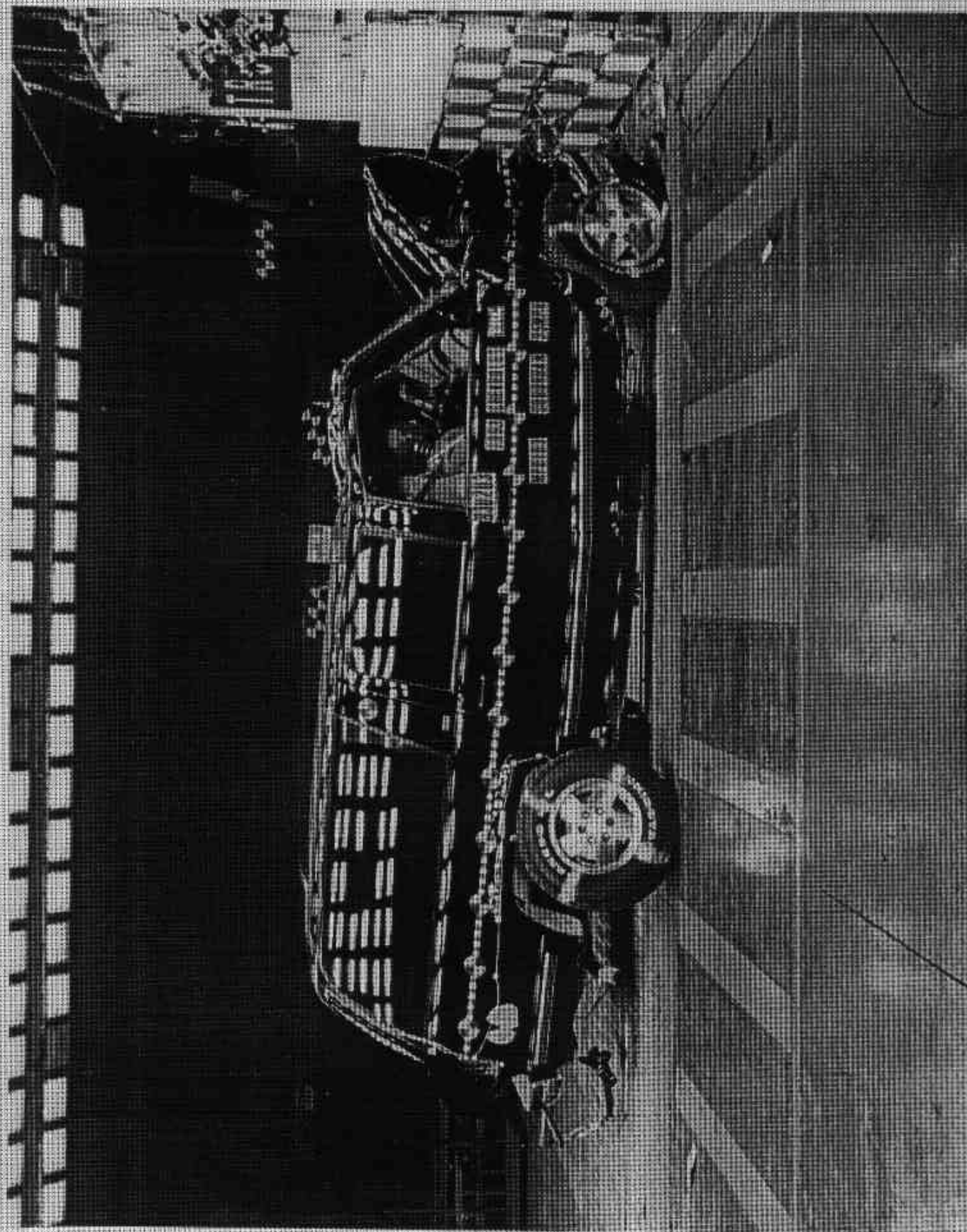


Figure A-8. POST-TEST RIGHT SIDE VIEW

A-9

930203

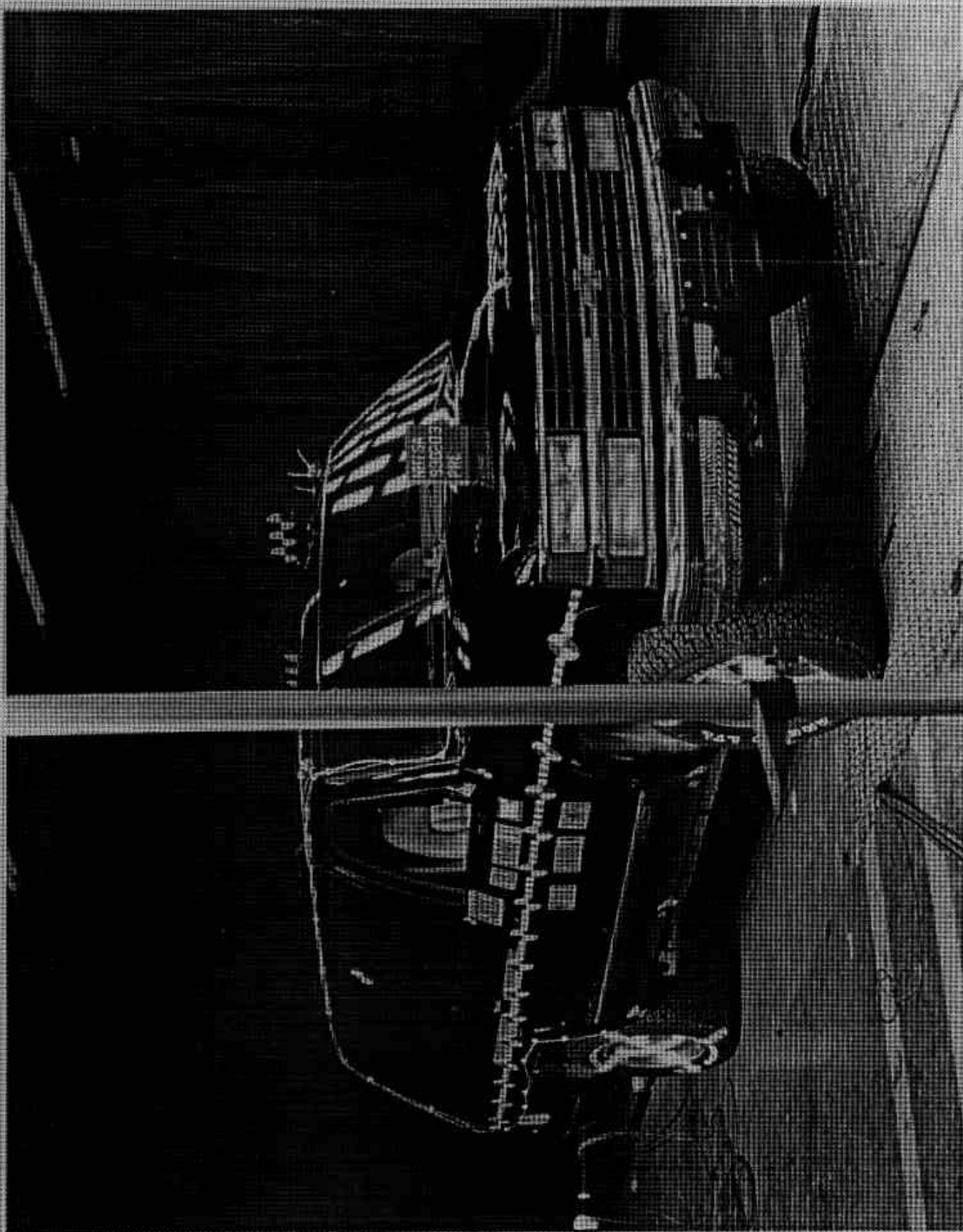


Figure A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

930203

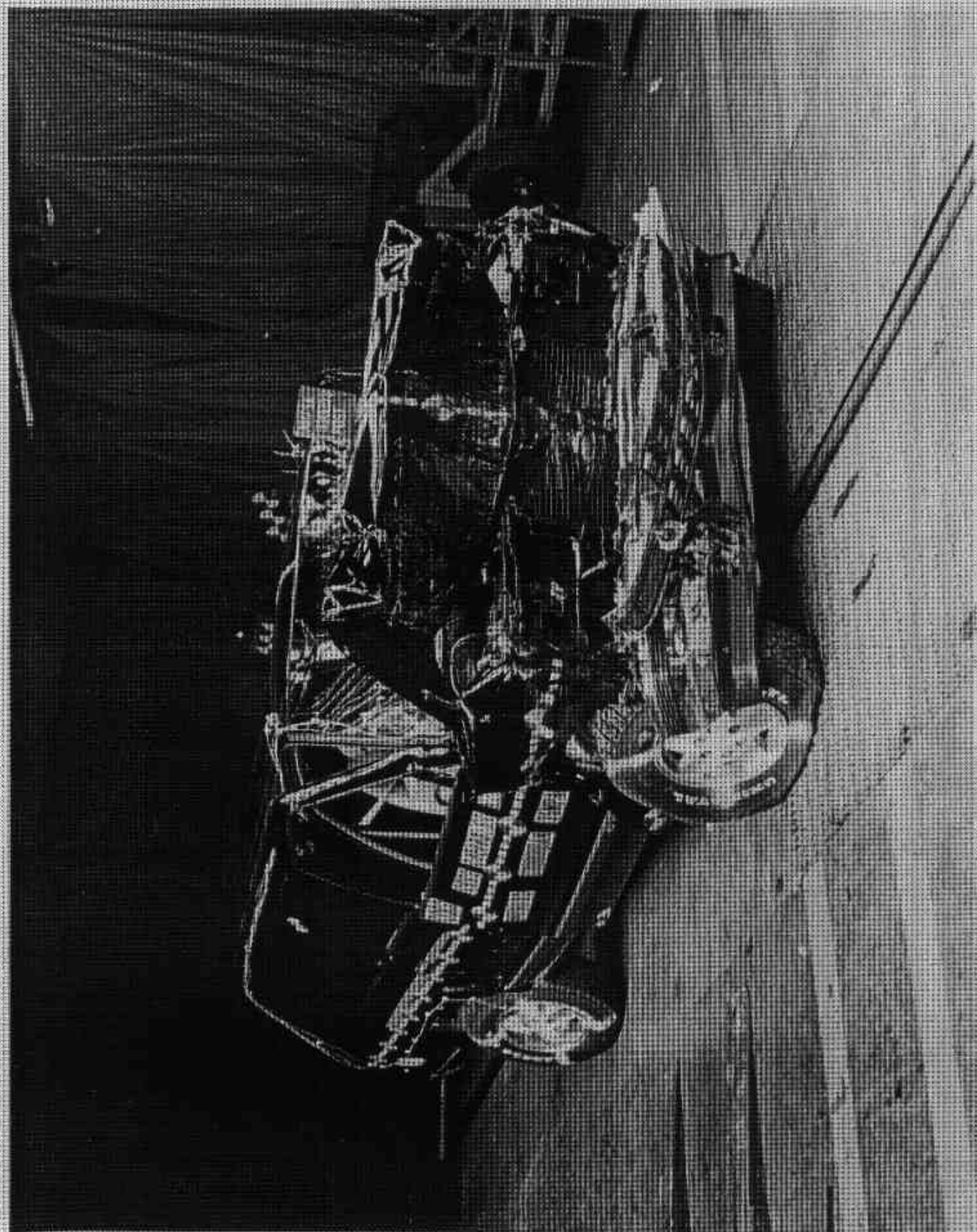


Figure A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-11

930203

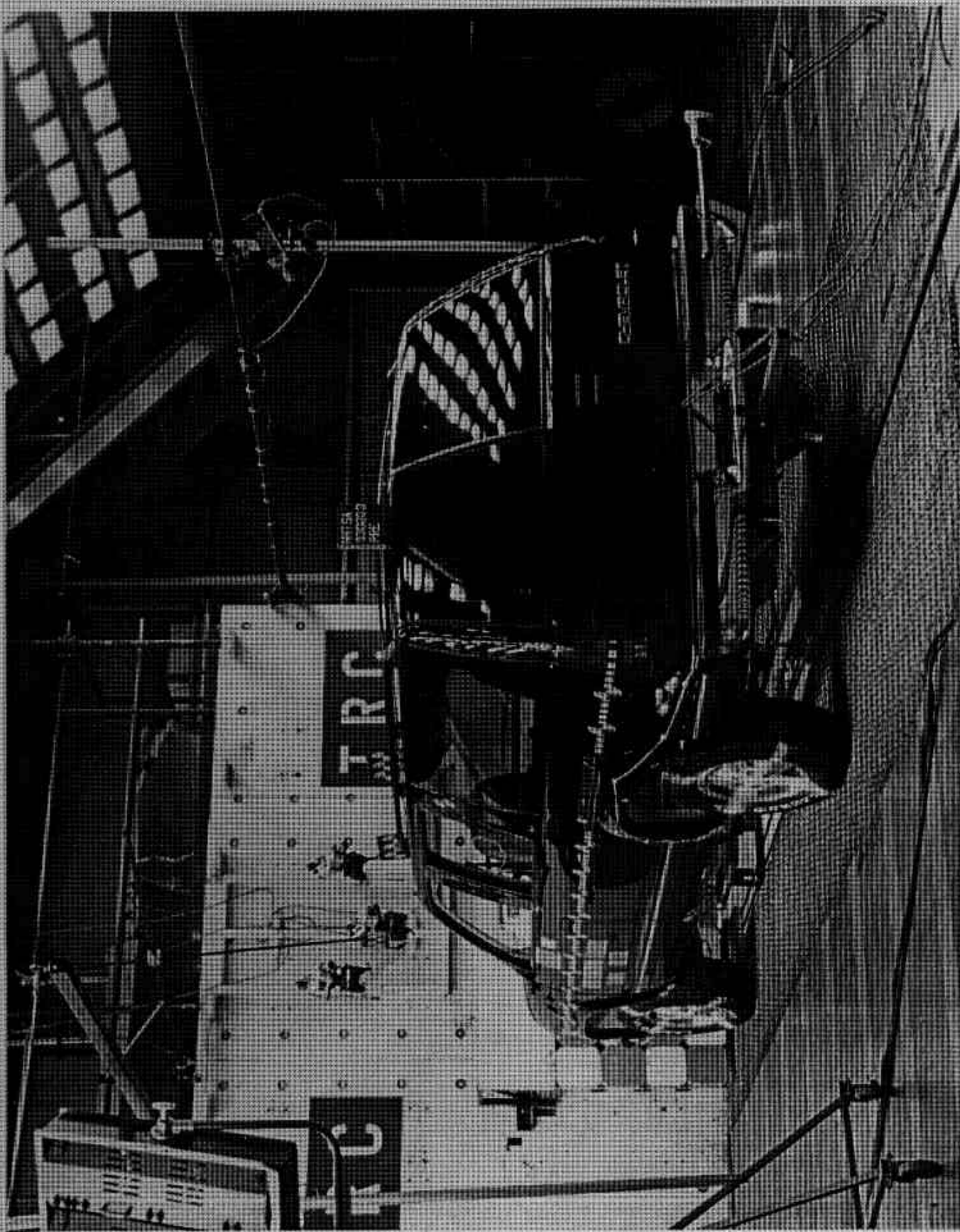


Figure A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW

A-12

930203

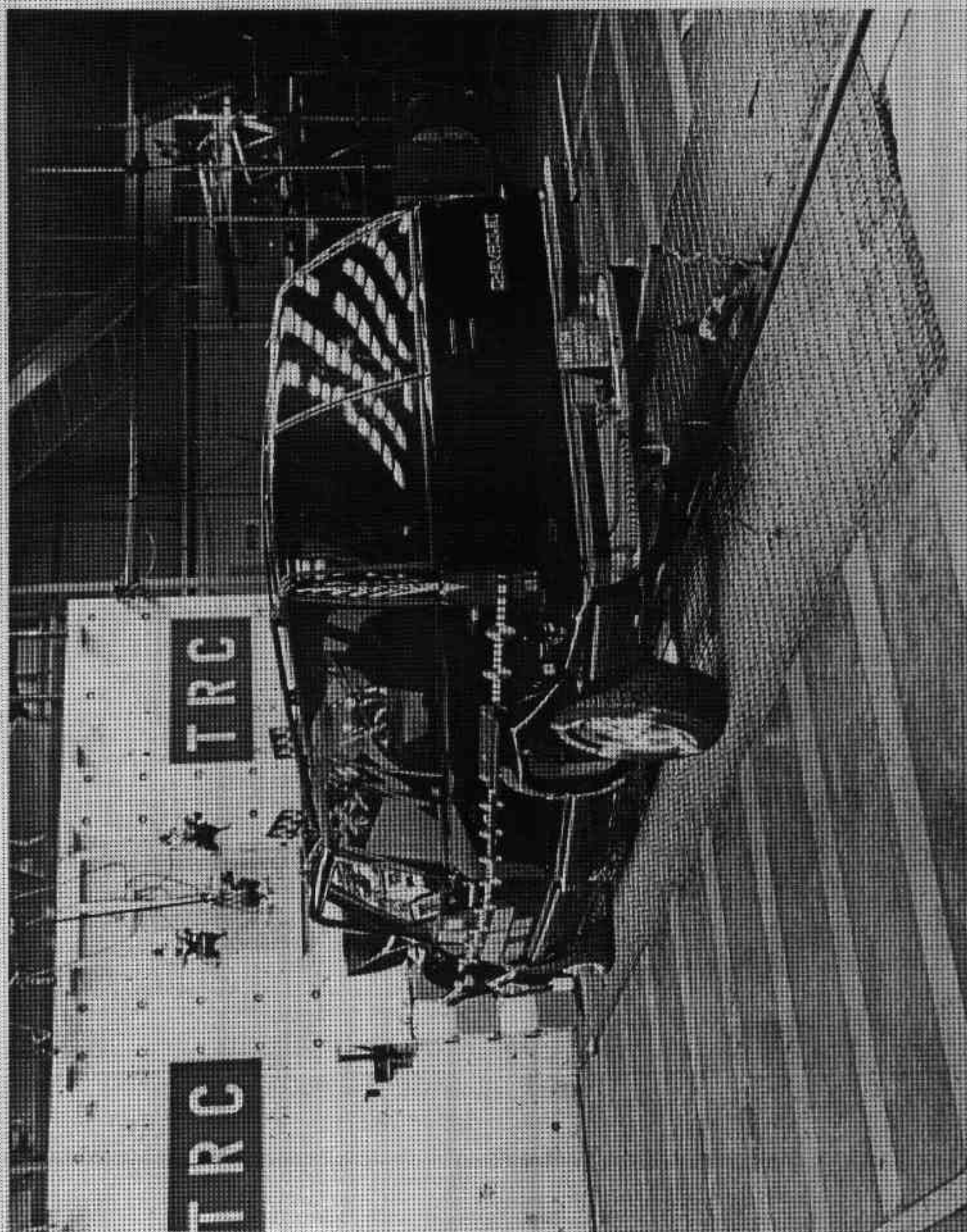


Figure A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW

A-13

930203

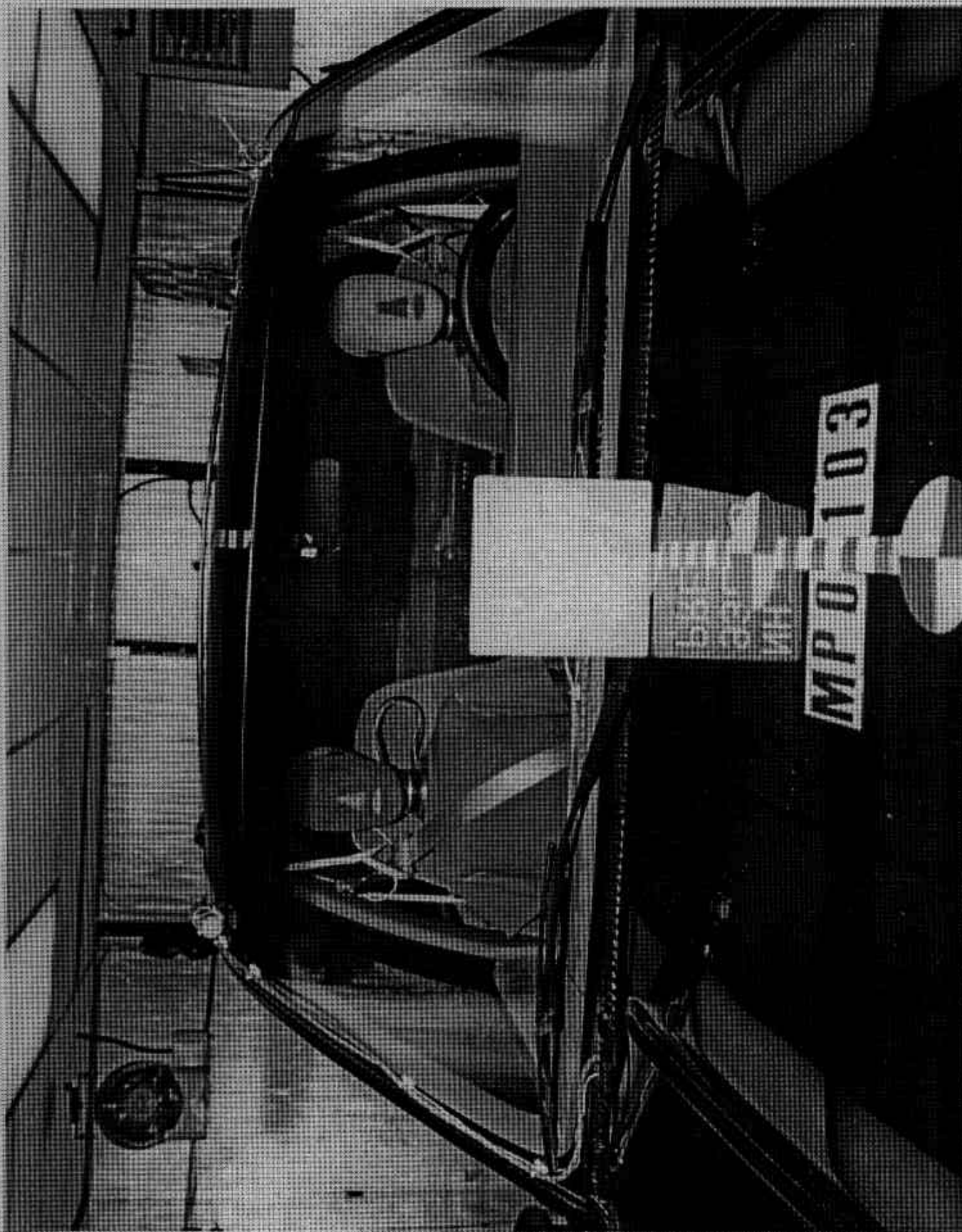


Figure A-13. PRE-TEST WINDSHIELD VIEW

A-14

930203



Figure A-14. POST-TEST WINDSHIELD VIEW
A-15

930203

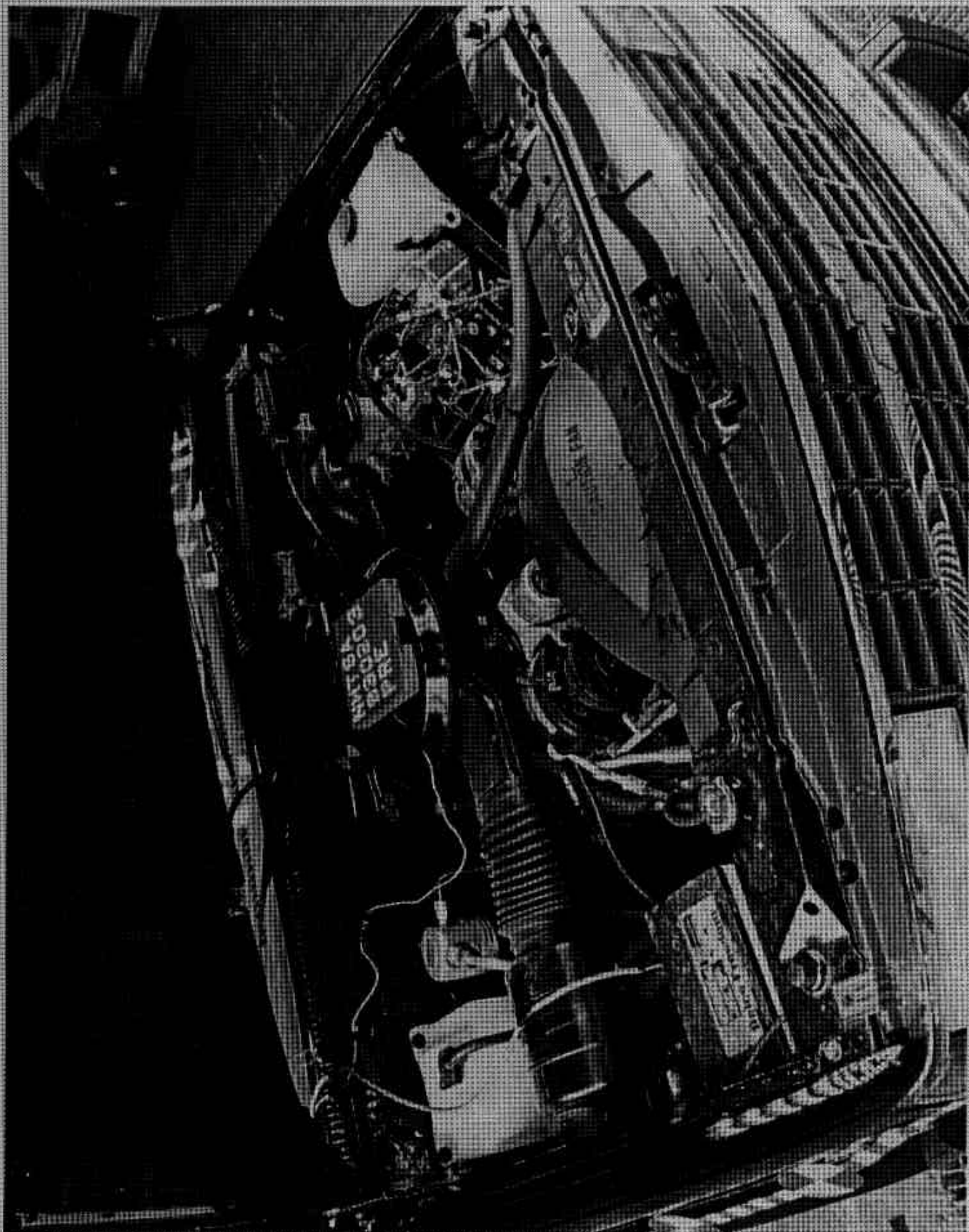


Figure A-15. PRE-TEST ENGINE COMPARTMENT VIEW

A-16

930203

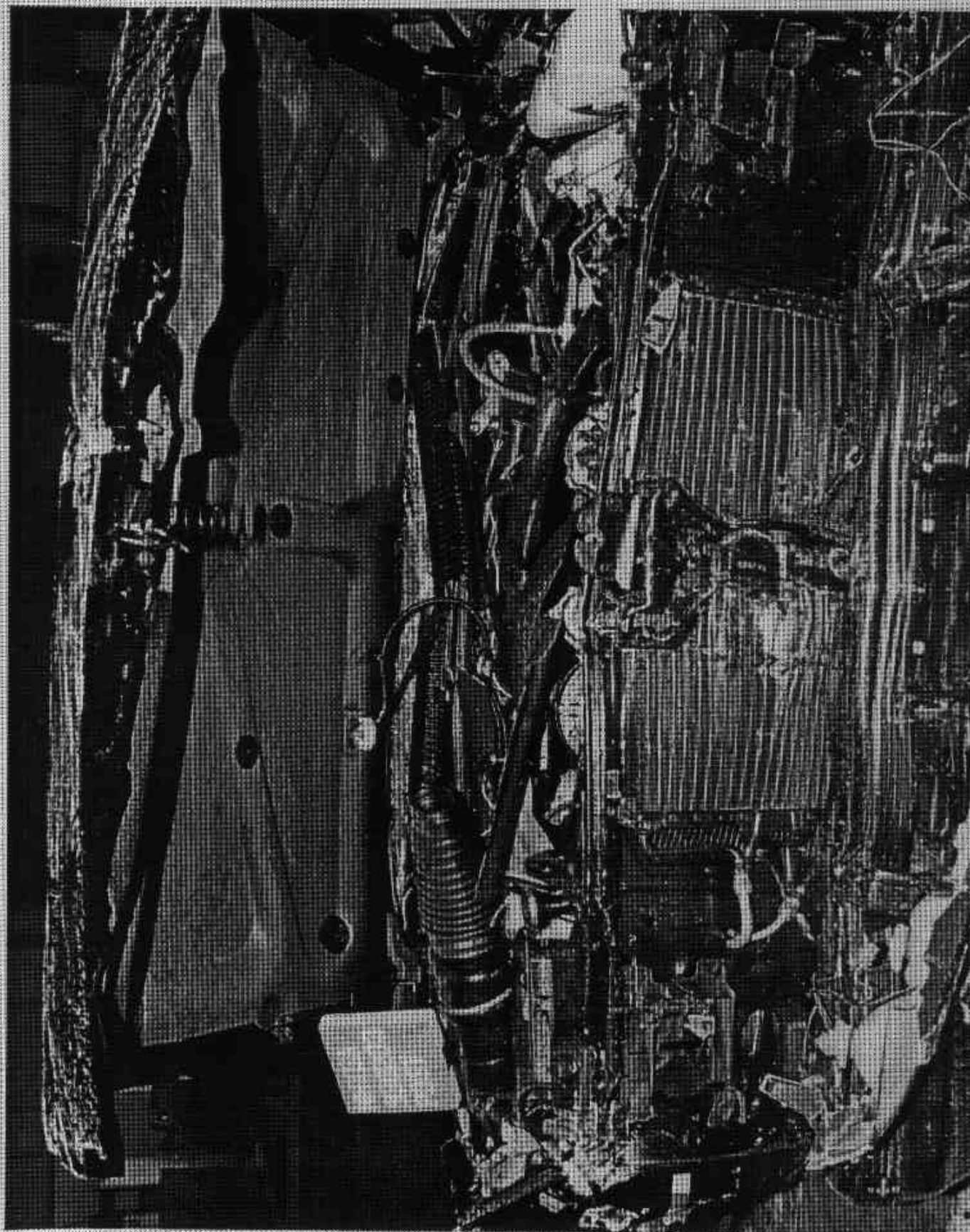


Figure A-16. POST-TEST ENGINE COMPARTMENT VIEW

A-17

930203

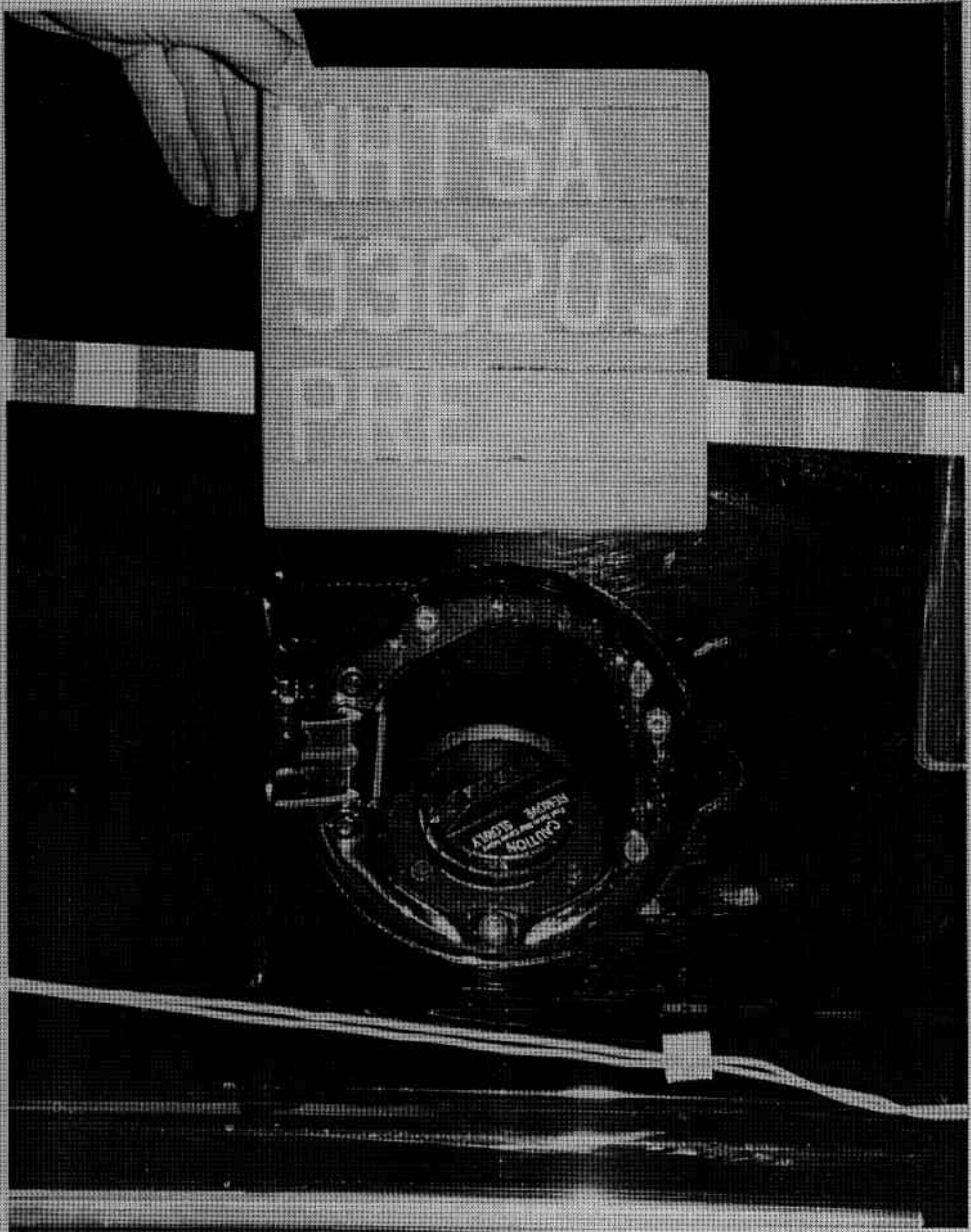


Figure A-17. PRE-TEST FUEL FILLER CAP VIEW

A-18

930203

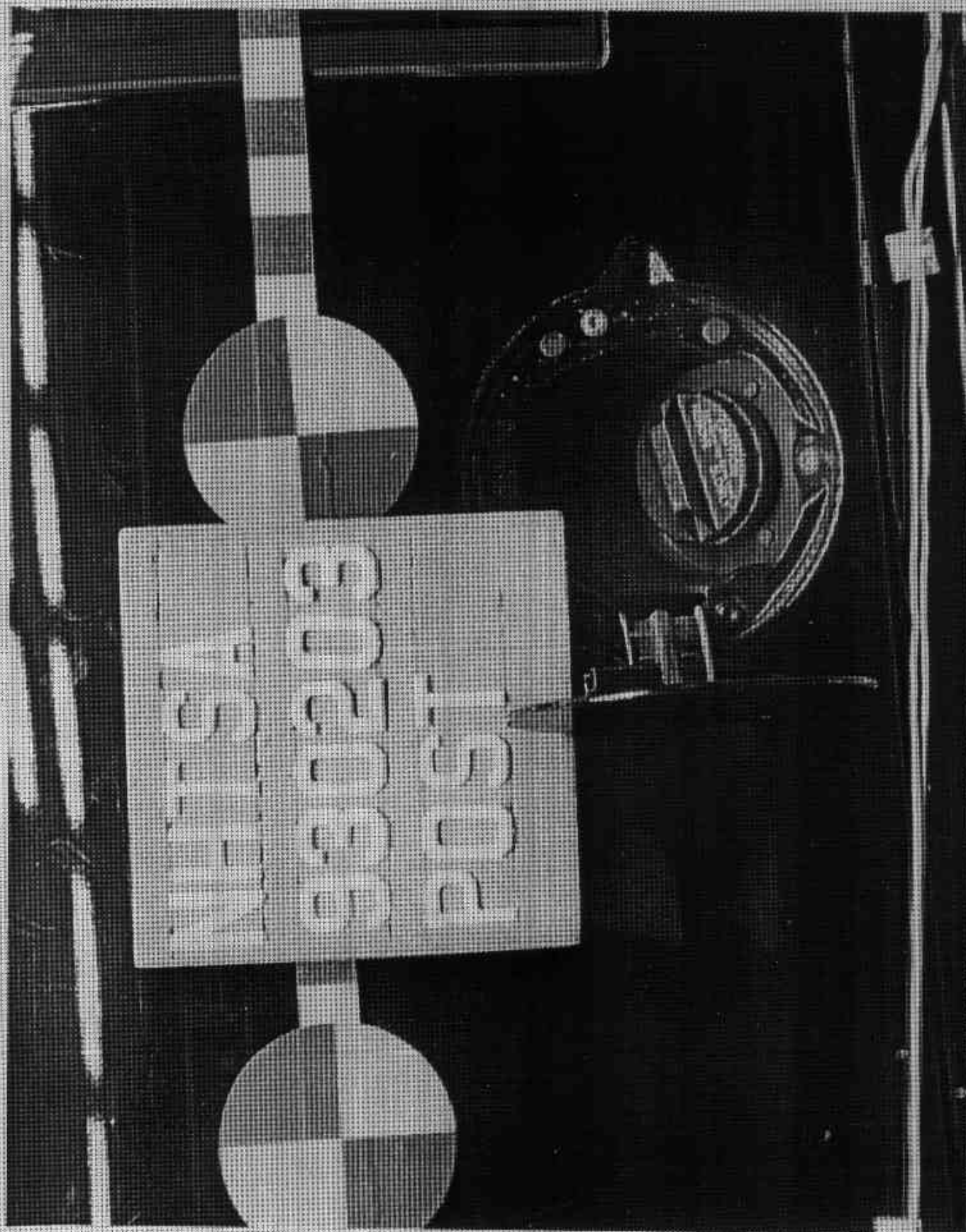


Figure A-18. POST-TEST FUEL FILLER CAP VIEW

A-19

930203

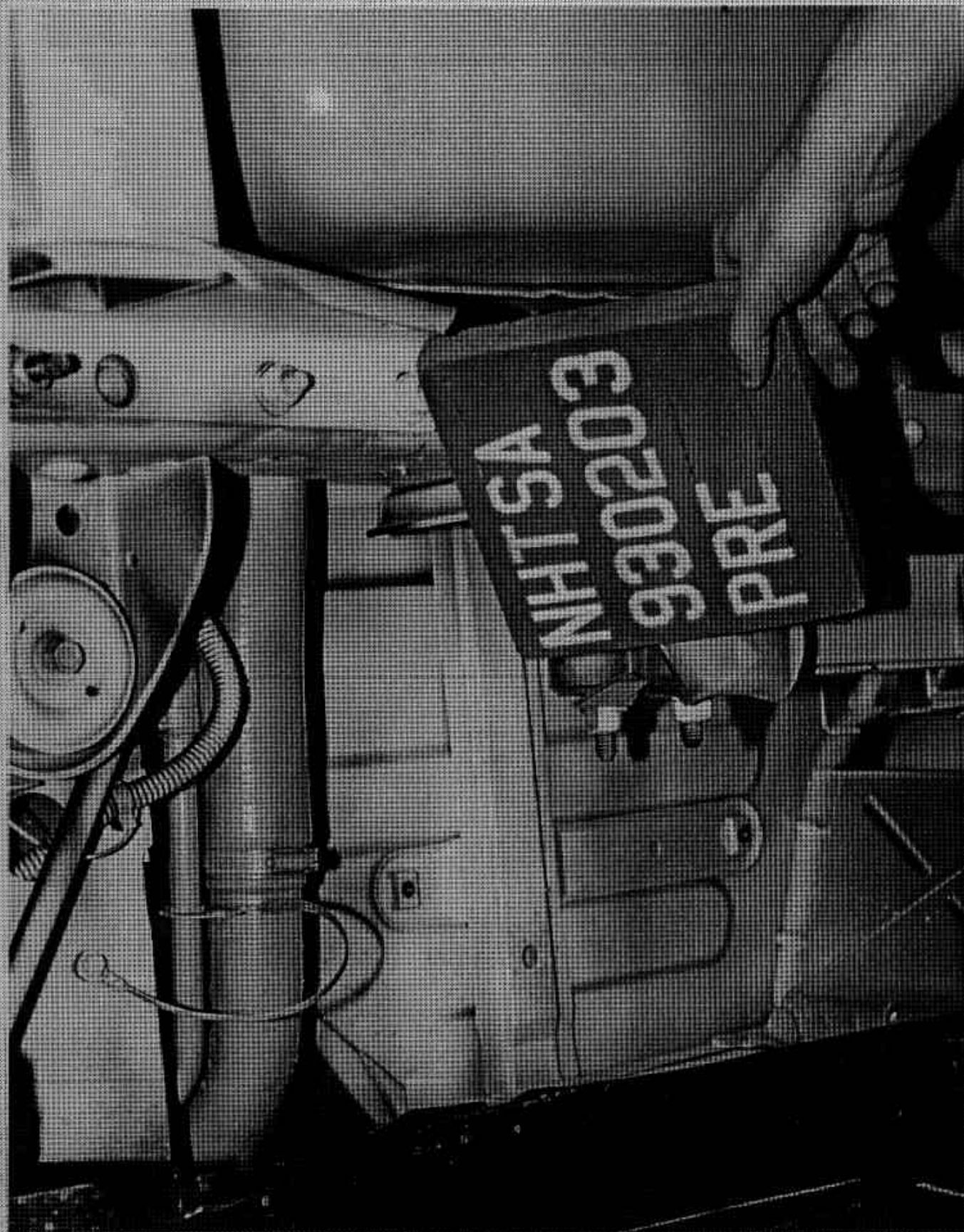


Figure A-19. PRE-TEST FUEL FILLER NECK VIEW



Figure A-20. POST-TEST FUEL FILLER NECK VIEW
A-21

930203

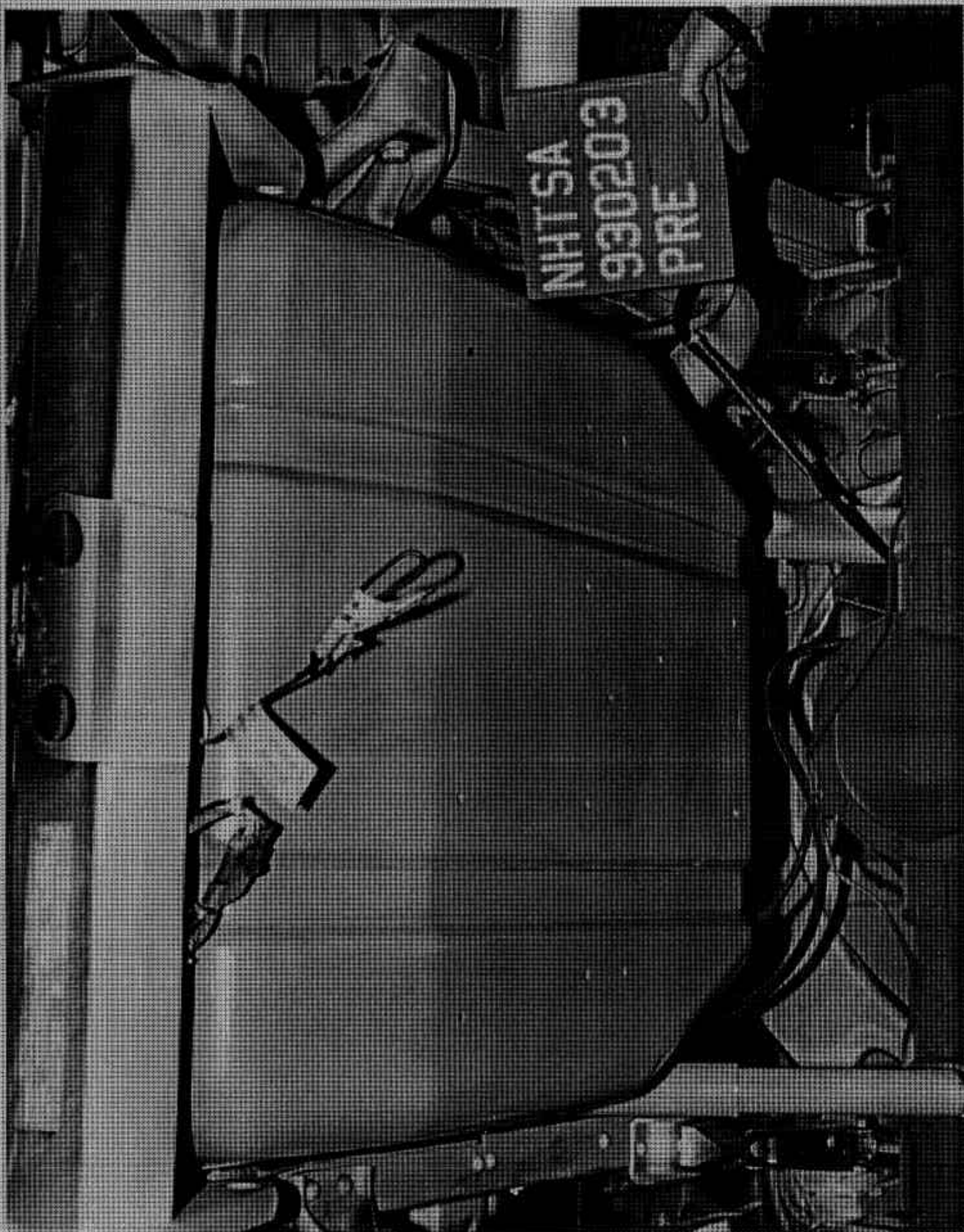


Figure A-21. PRE-TEST FUEL TANK VIEW

A-22

930203

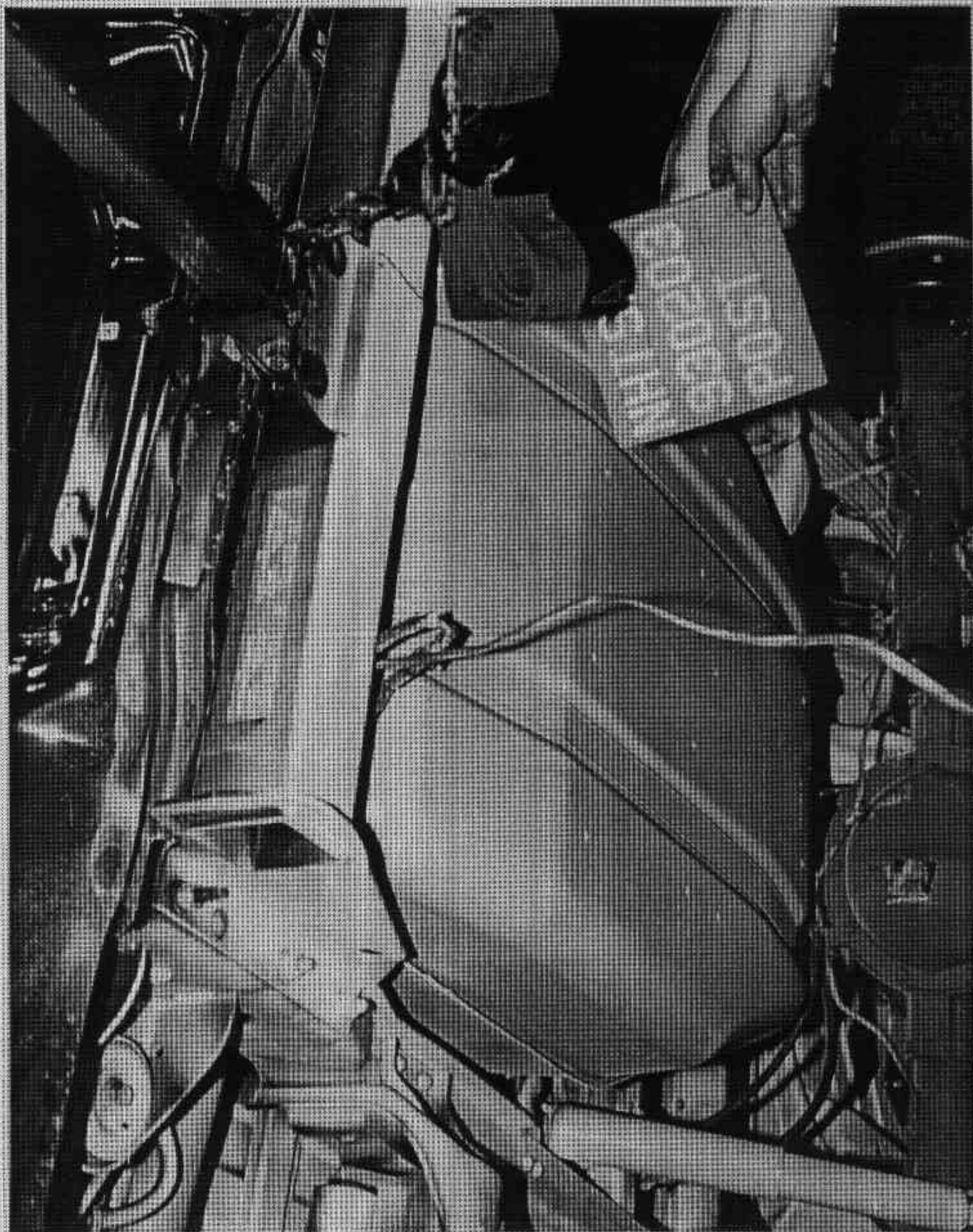


Figure A-22. POST-TEST FUEL TANK VIEW
A-23

930203

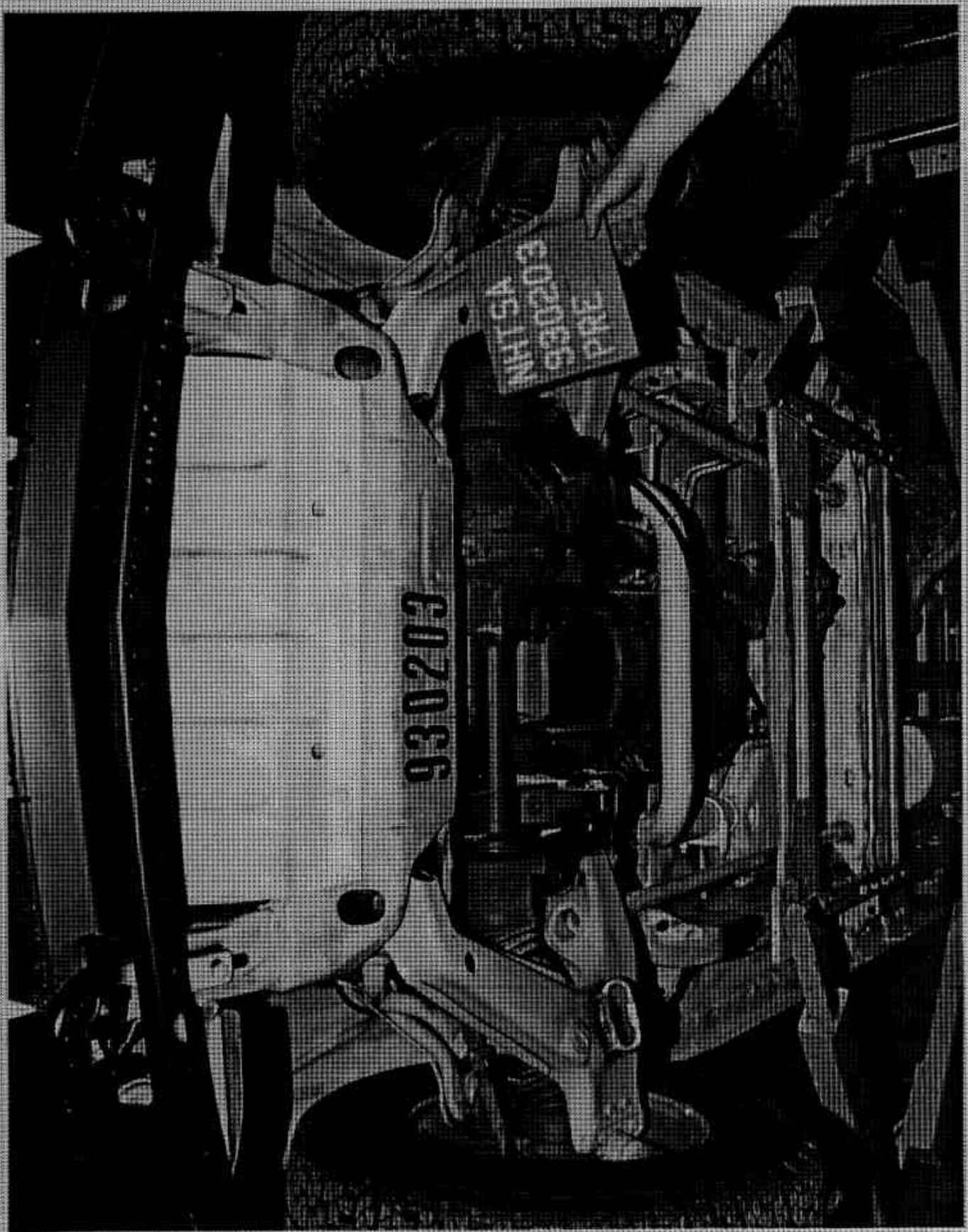


Figure A-23. PRE-TEST FRONT UNDERBODY VIEW



Figure A-24. POST-TEST FRONT UNDERBODY VIEW
A-25

930203

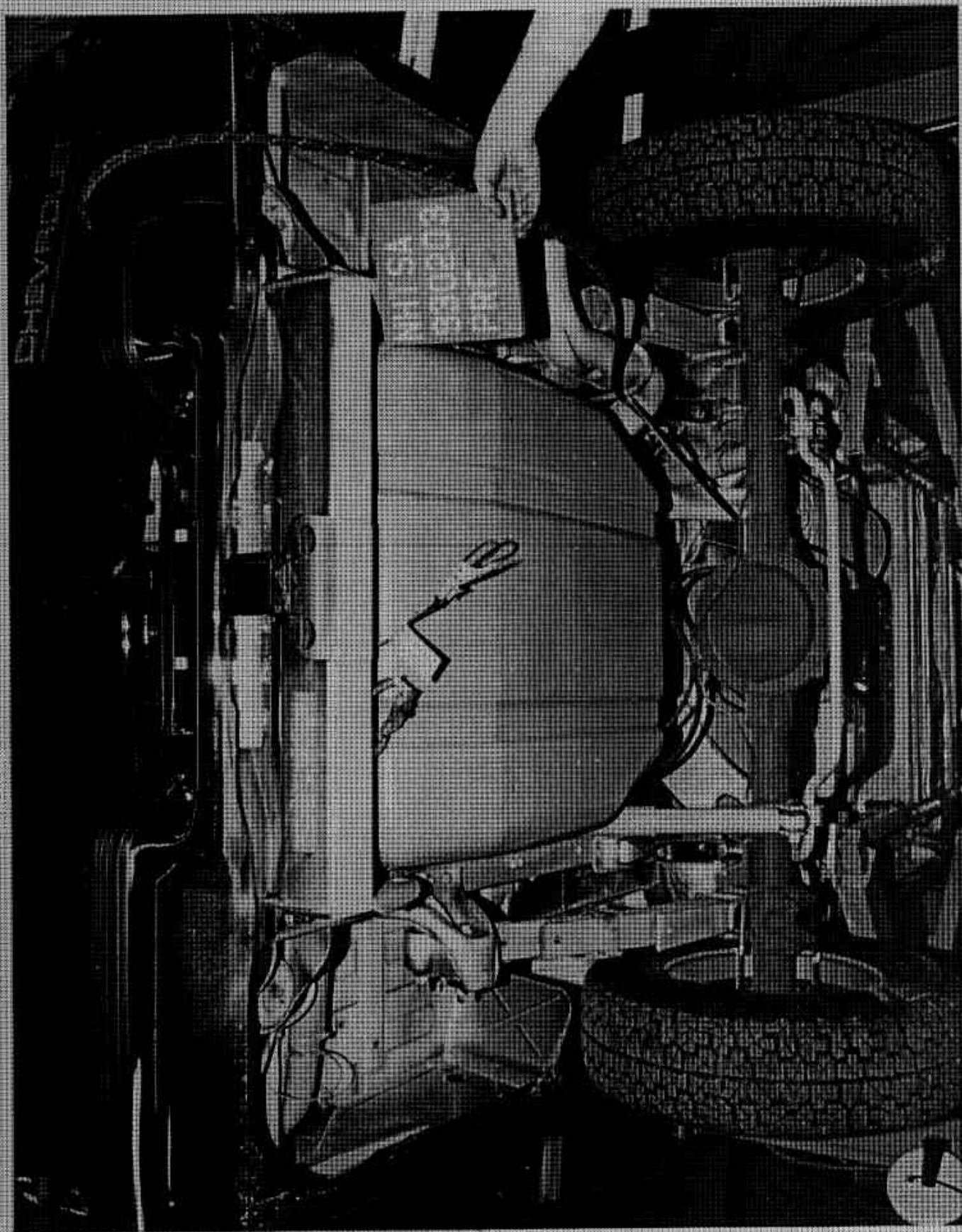


Figure A-25. PRE-TEST REAR UNDERBODY VIEW

A-26

930203

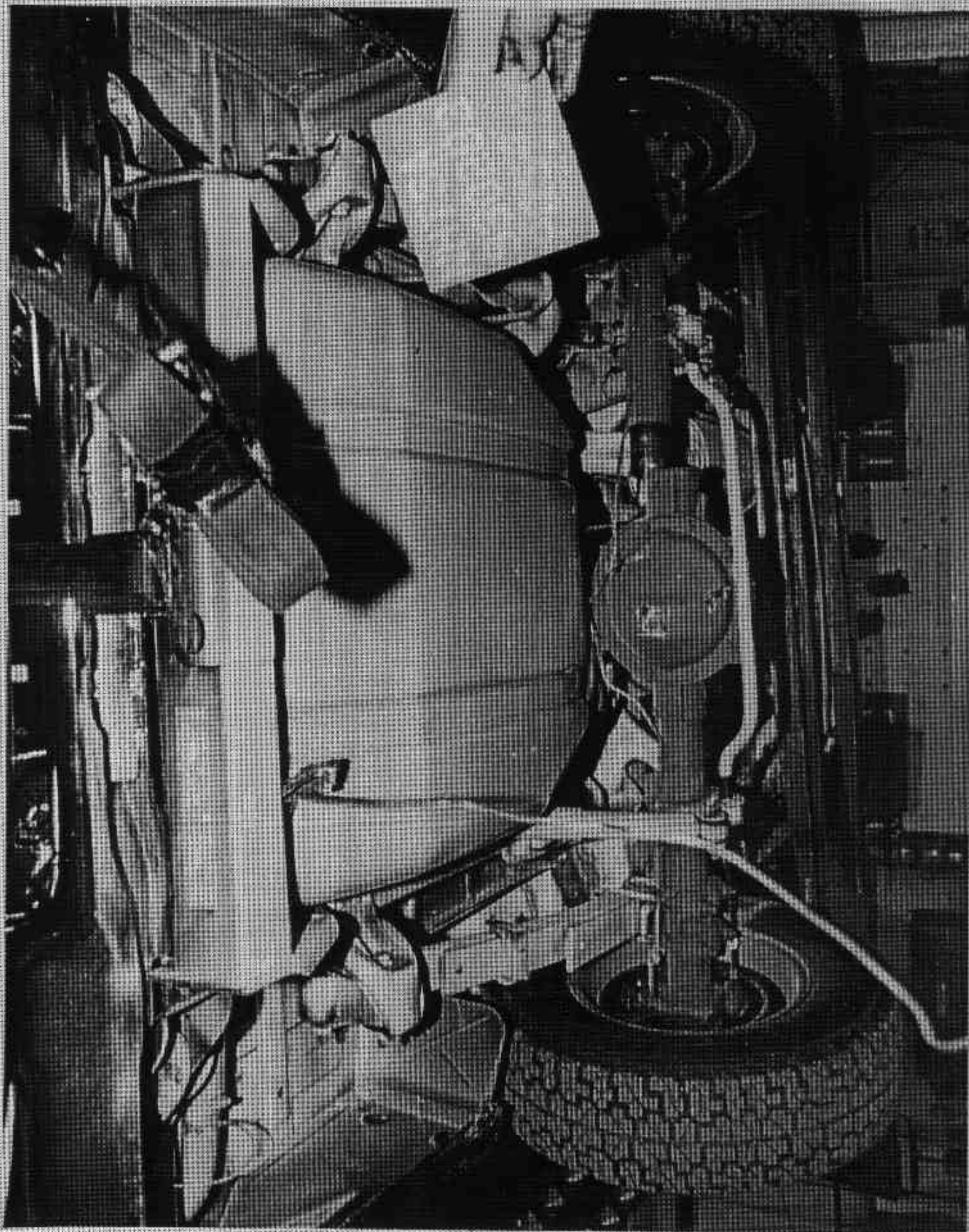


Figure A-26. POST-TEST REAR UNDERBODY VIEW

A-27

930203

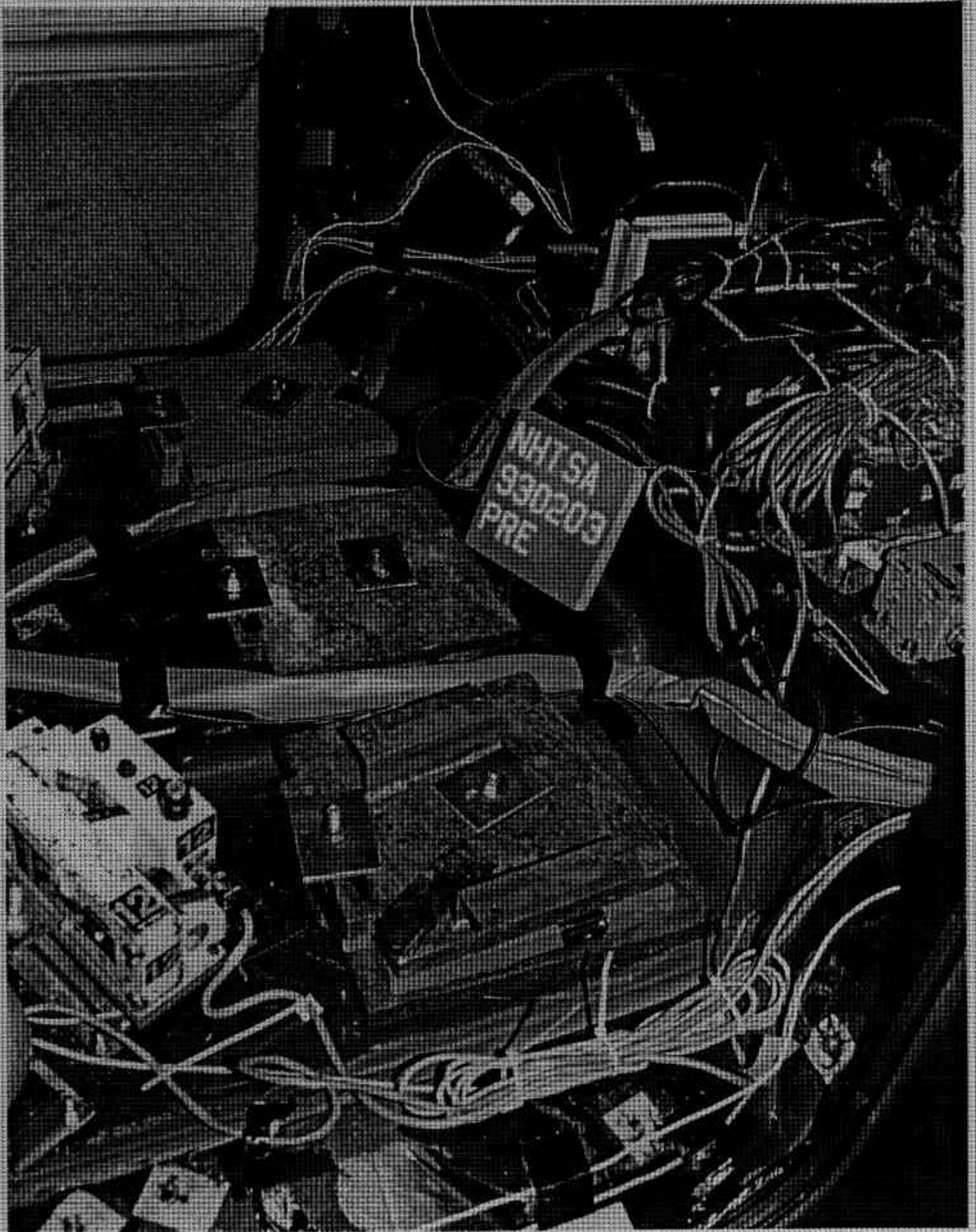


Figure A-27. PRE-TEST BALLAST LOCATION VIEW
A-28

930203

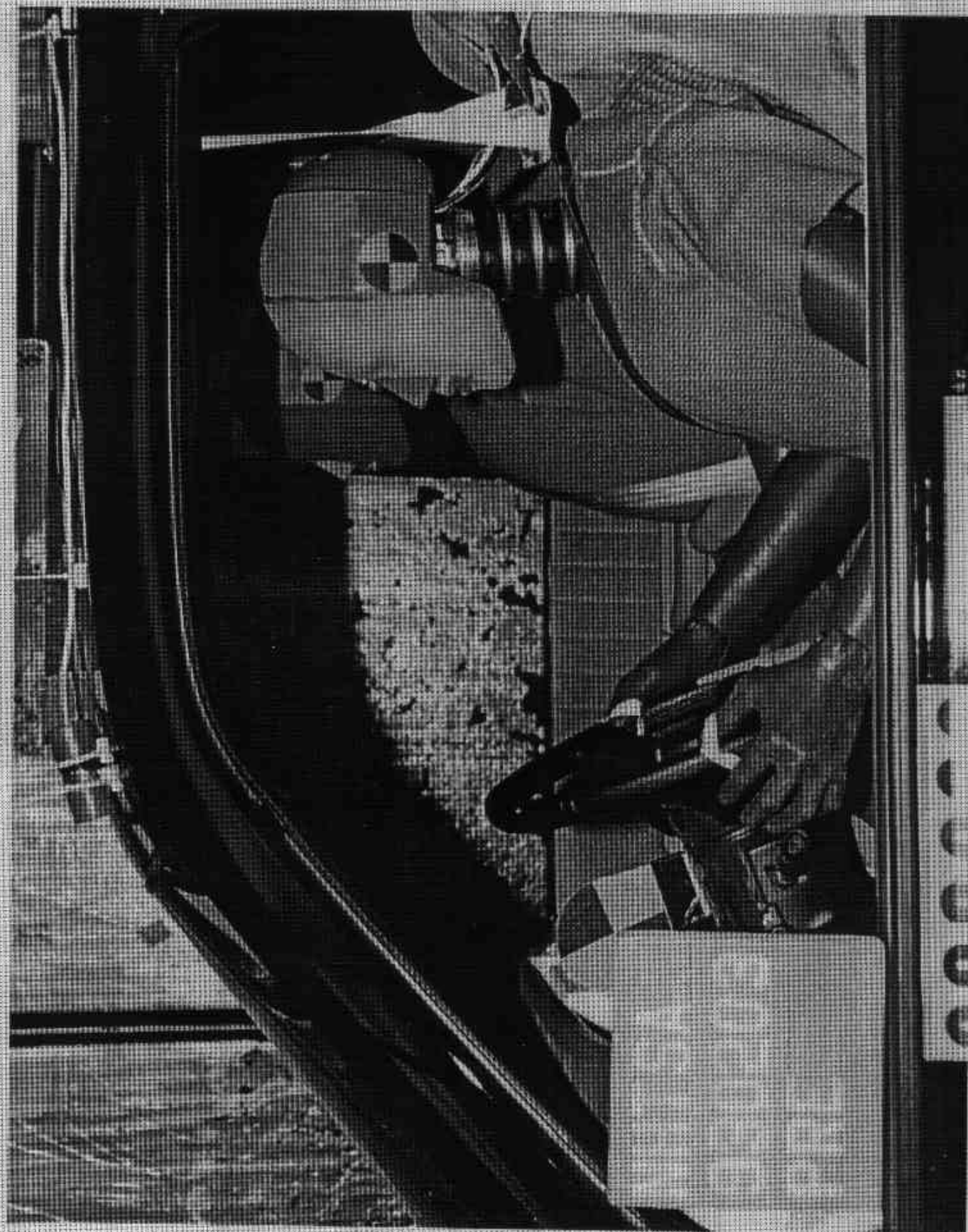


Figure A-28. PRE-TEST DRIVER DUMMY POSITION VIEW

A-29

930203

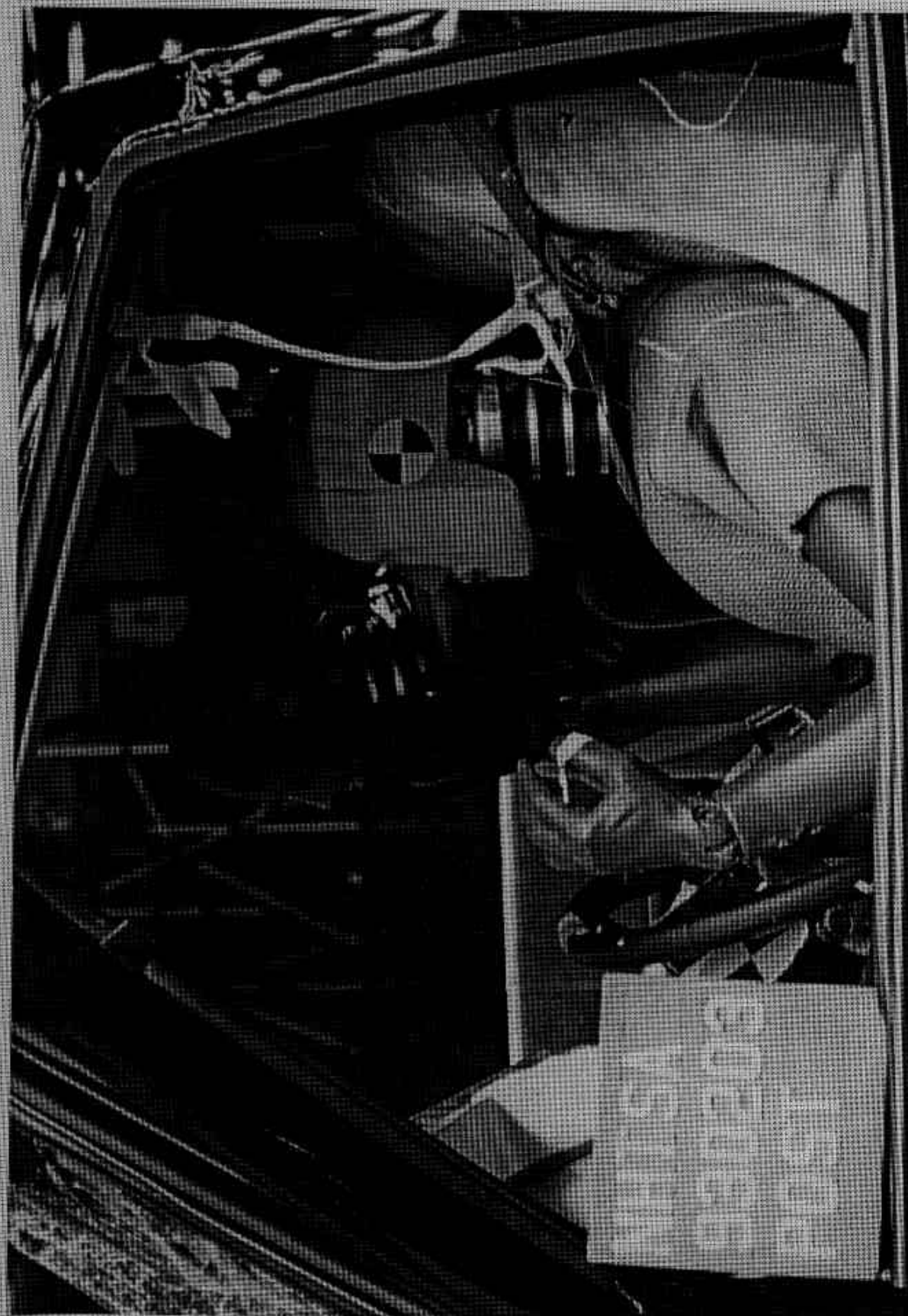


Figure A-29. POST-TEST DRIVER DUMMY POSITION VIEW

A-30

930203

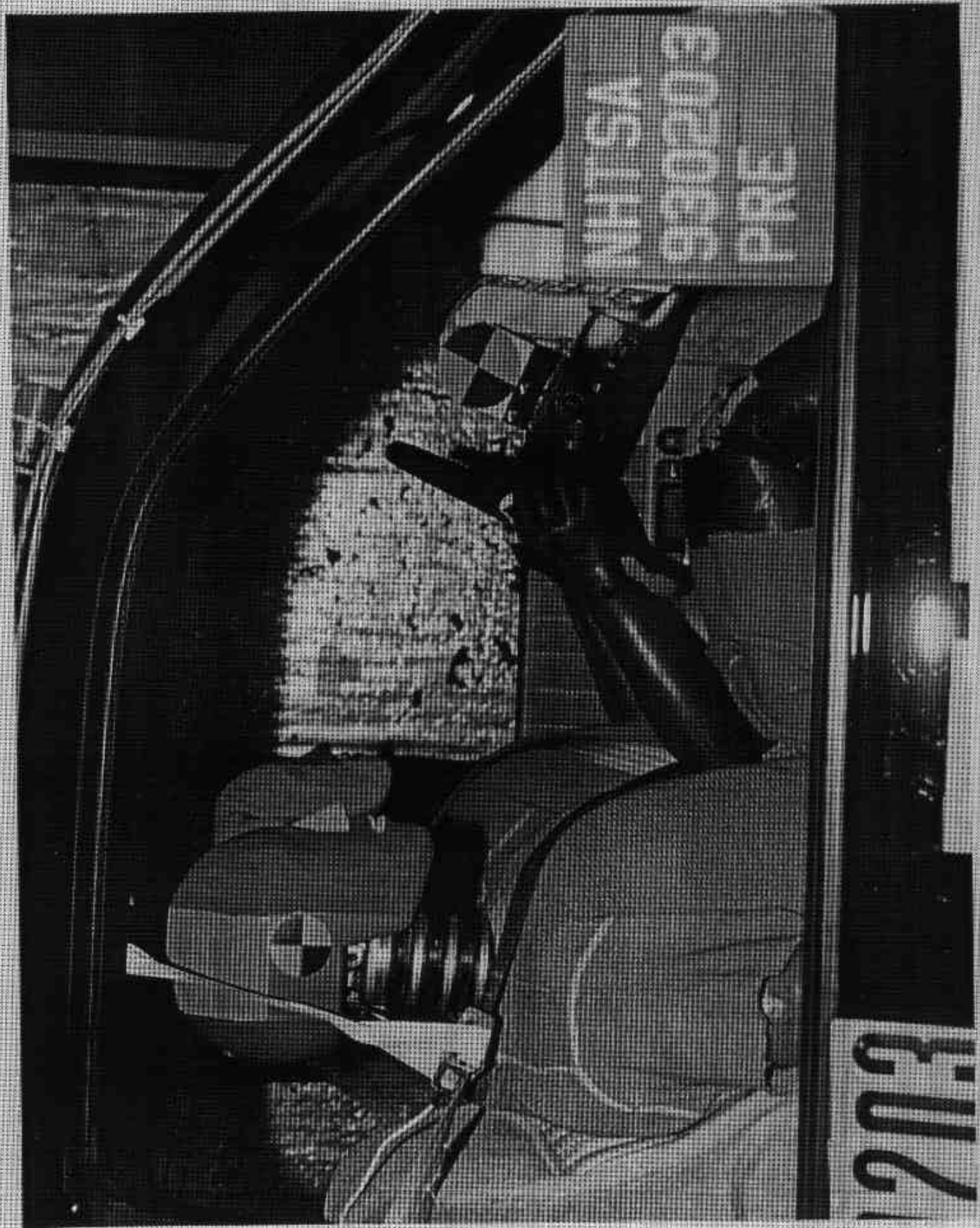


Figure A-30. PRE-TEST PASSENGER DUMMY POSITION VIEW
A-31

930203



Figure A-31. POST-TEST PASSENGER DUMMY POSITION VIEW



Figure A-32. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
A-33 930203



Figure A-33. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

A-34

930203

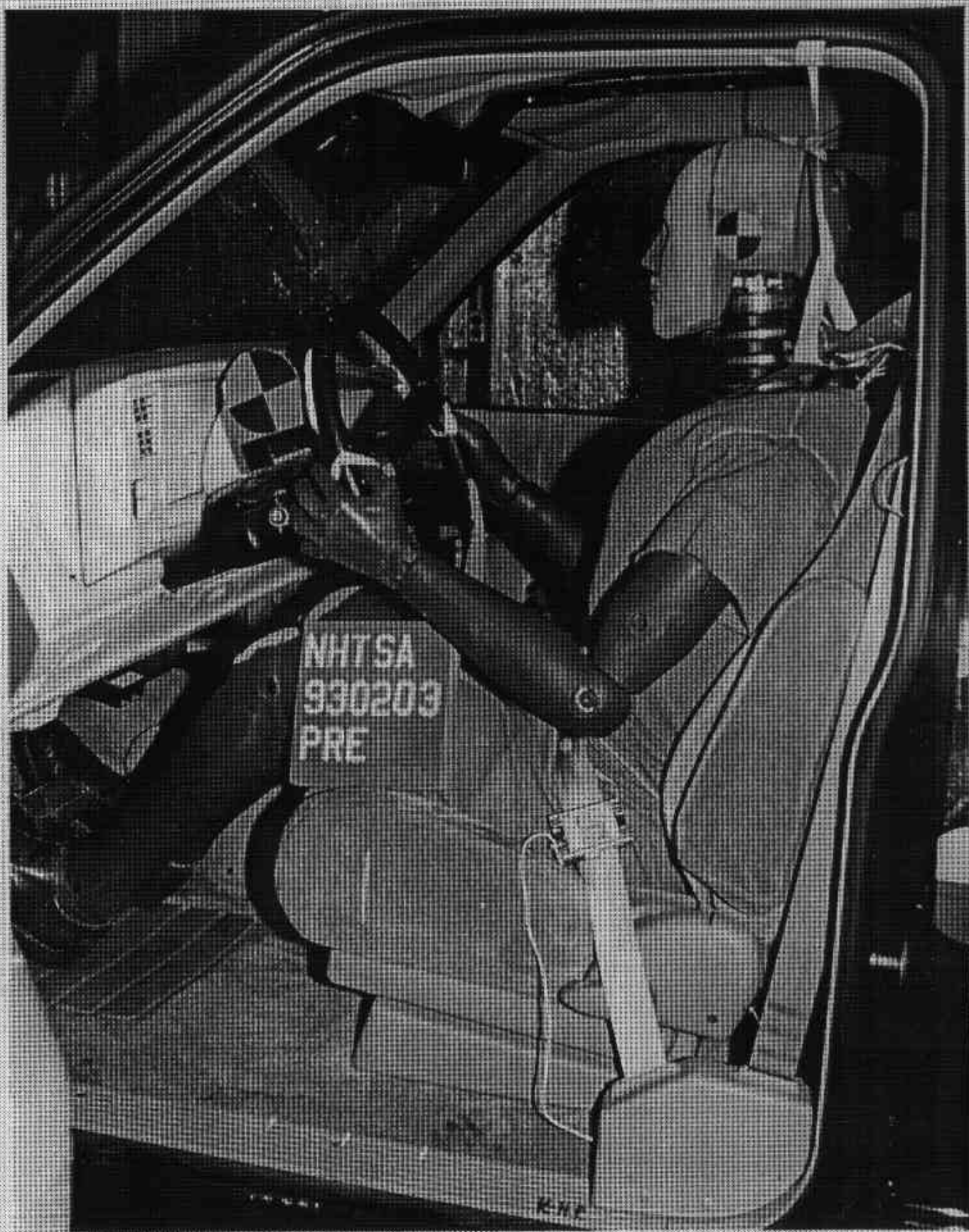


Figure A-34. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2
A-35 930203

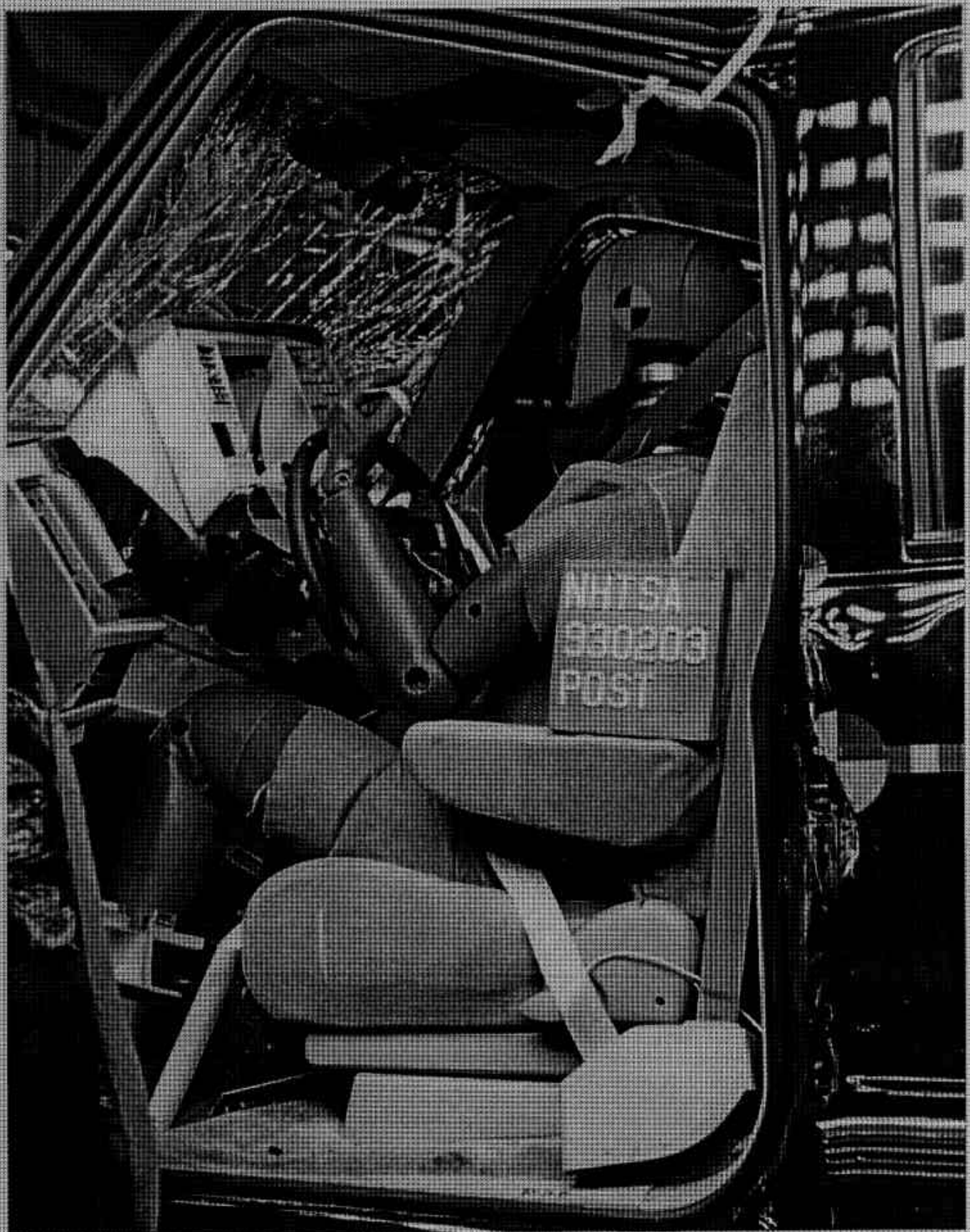


Figure A-35. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

A-36

930203

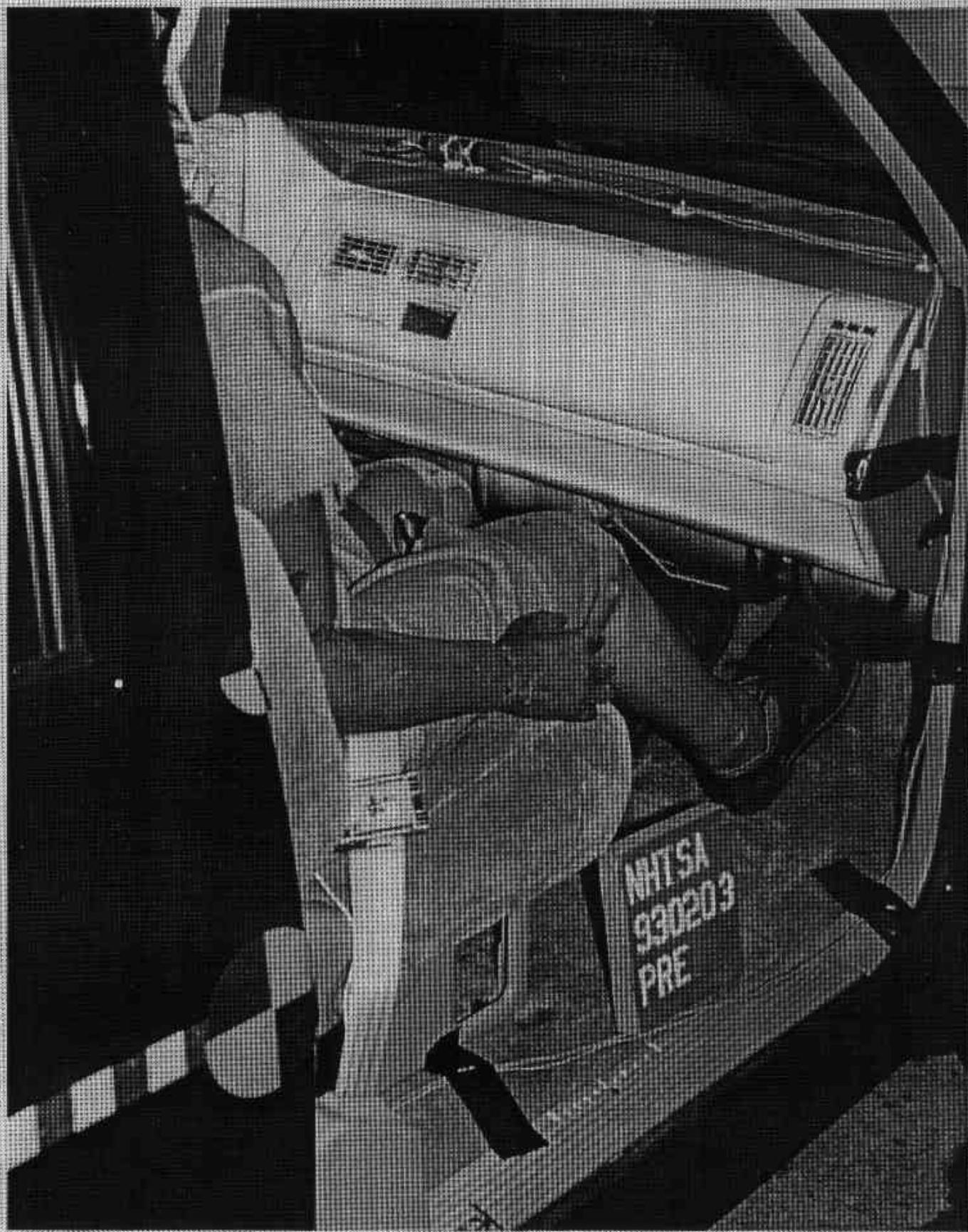


Figure A-36. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1
A-37 930203



Figure A-37. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

A-38

930203



Figure A-38. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

A-39

930203

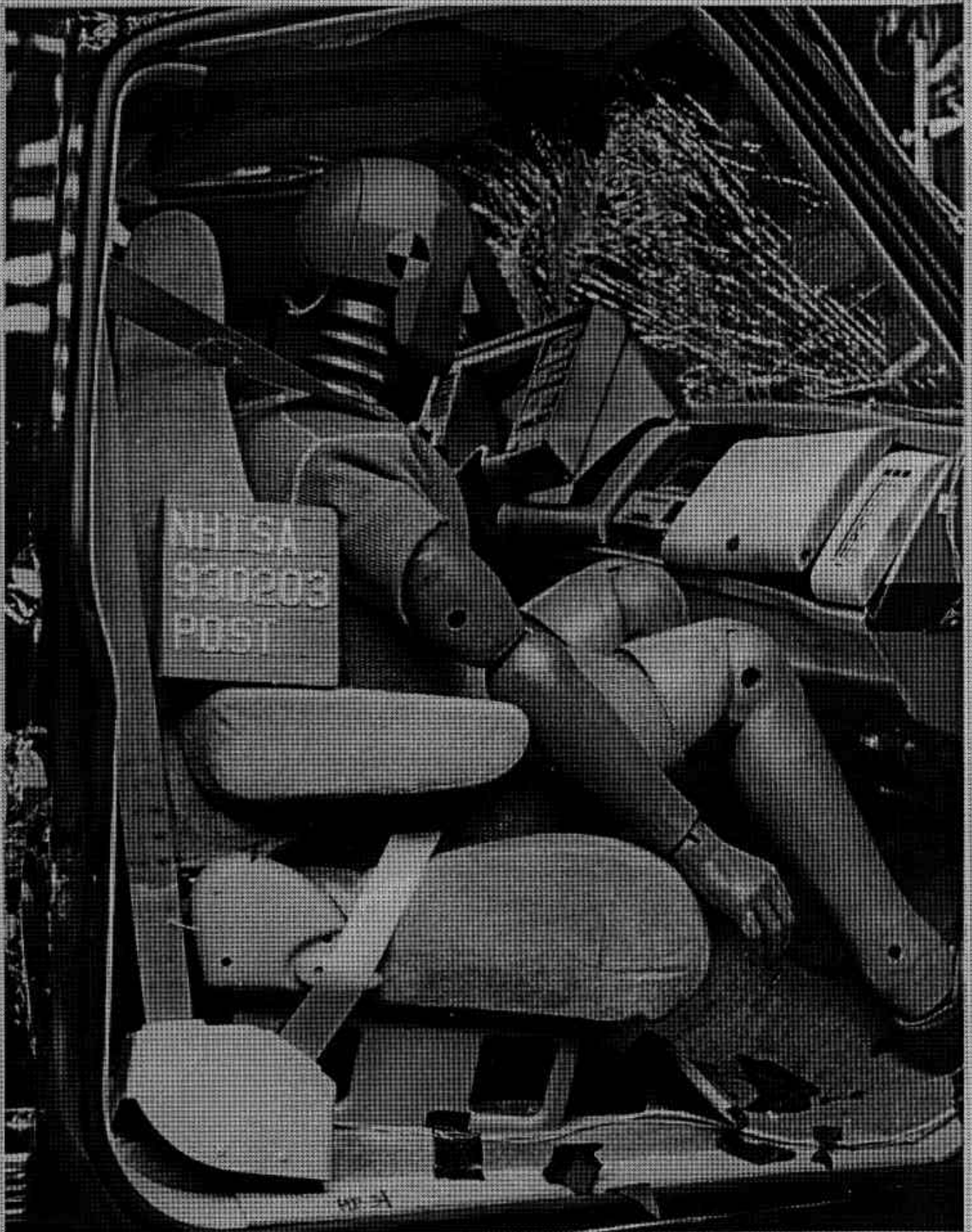


Figure A-39. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

A-40

930203

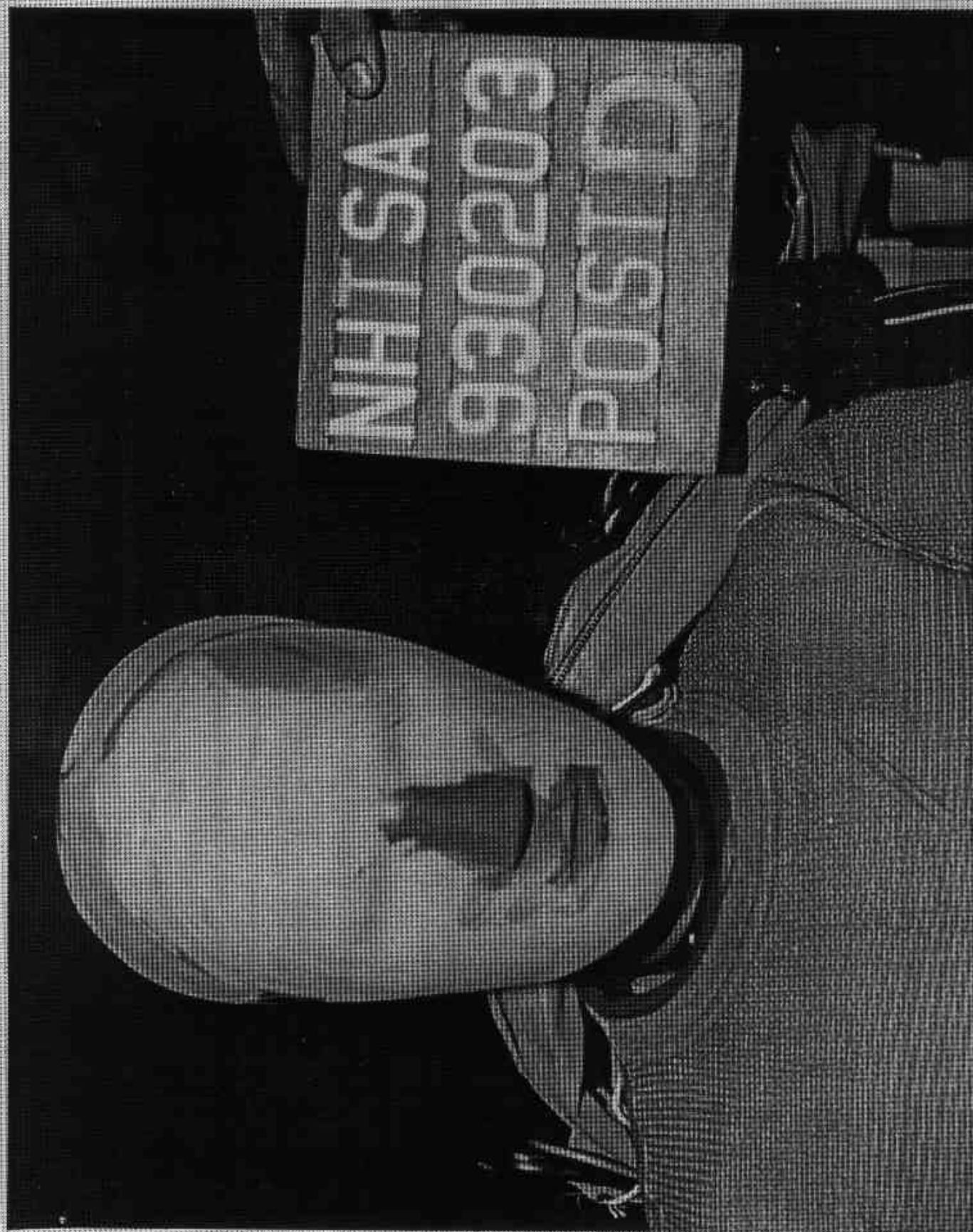


Figure A-40. POST-TEST DRIVER DUMMY HEAD CONTACT VIEW

A-41

930203



Figure A-41. POST-TEST DRIVER DUMMY HEAD & CHEST CONTACT VIEW



Figure A-42. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1

A-43

930203



Figure A-43. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2

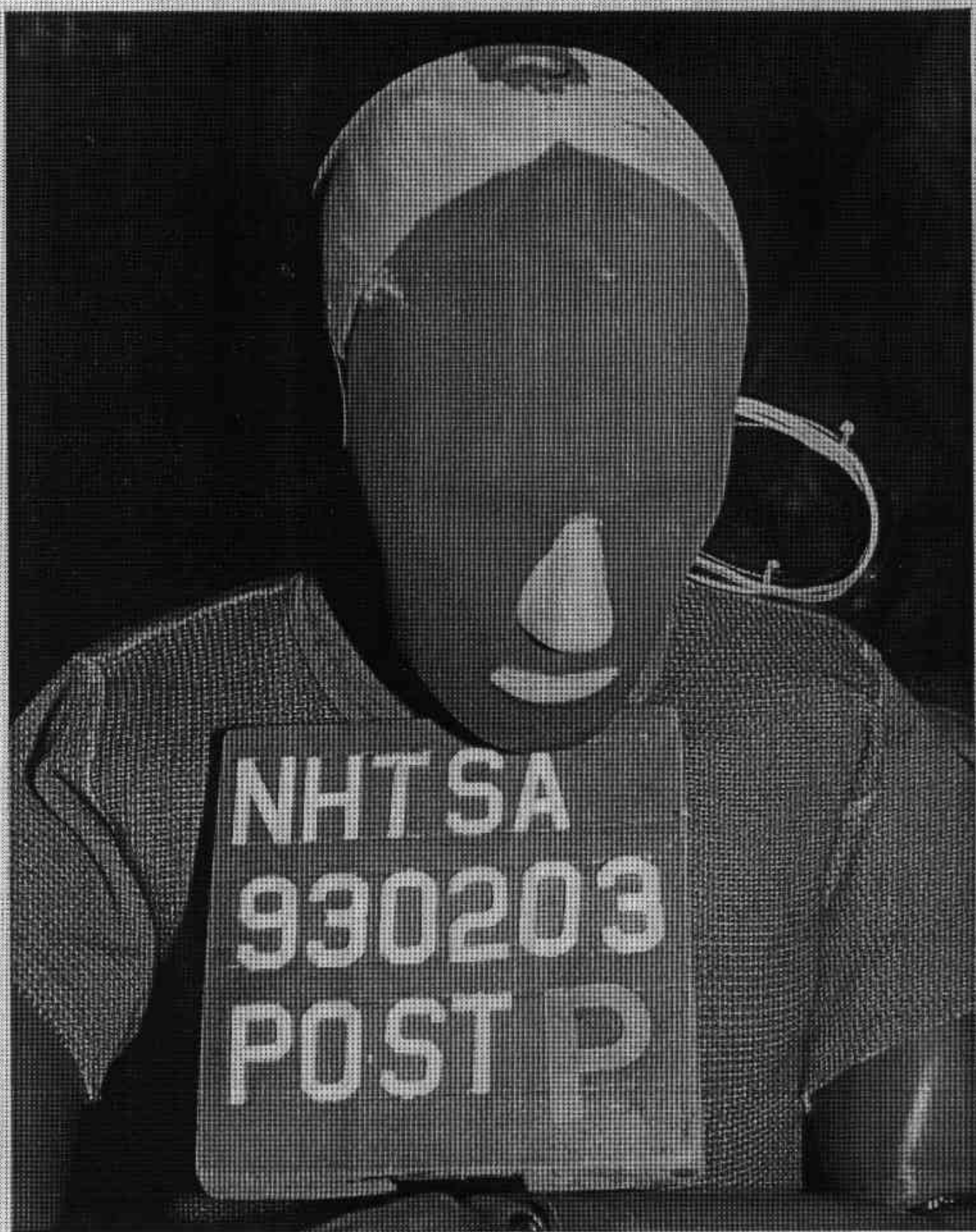


Figure A-44. POST-TEST PASSENGER DUMMY HEAD CONTACT VIEW

A-45

930203



Figure A-45. POST-TEST PASSENGER DUMMY KNEE CONTACT VIEW



Fig. A-46. POST-TEST PASSENGER DUMMY HEAD & KNEE CONTACT VIEW
A-47 930203


GM

MADE BY GENERAL MOTORS CORP. 10/92
 COUNTRY CANADA PART CANADA PART
 T100 1286 2925/1780 4000/1814 15/80
 THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S.
 FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT
 ON THE DATE OF MANUFACTURE SHOWN ABOVE.
 1GNEK19XKP35E4559 N.Y.V.
 MODEL 1986
 RPOB 17243/75R16C
 RPT 17243/75R16C
 RR 17243/75R16C

RIM 15X7/6.5K 15X7/6.5K
 15X7/6.5K 15X7/6.5K
 15X7/6.5K 15X7/6.5K

P91/KPA (COLD)
 45/310 45/310

92180201

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

Fig. A-47. PRE-TEST VEHICLE CERT. & RECOMMENDED TIRE PRES. LABEL

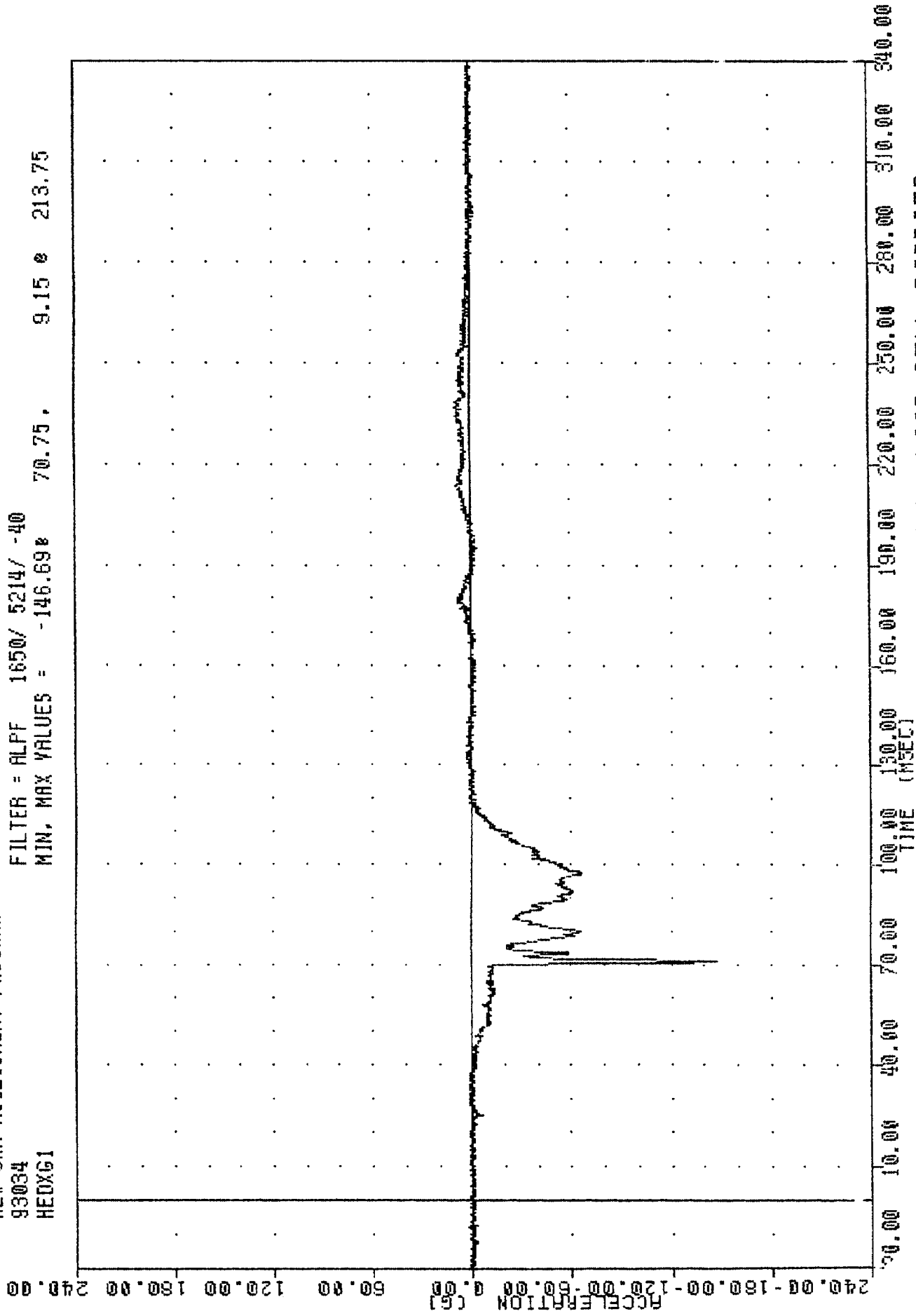
Intentionally Left Blank

APPENDIX B

DATA PLOTS

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 HEDXG1

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -146.698 70.75. 9.15 e 213.75

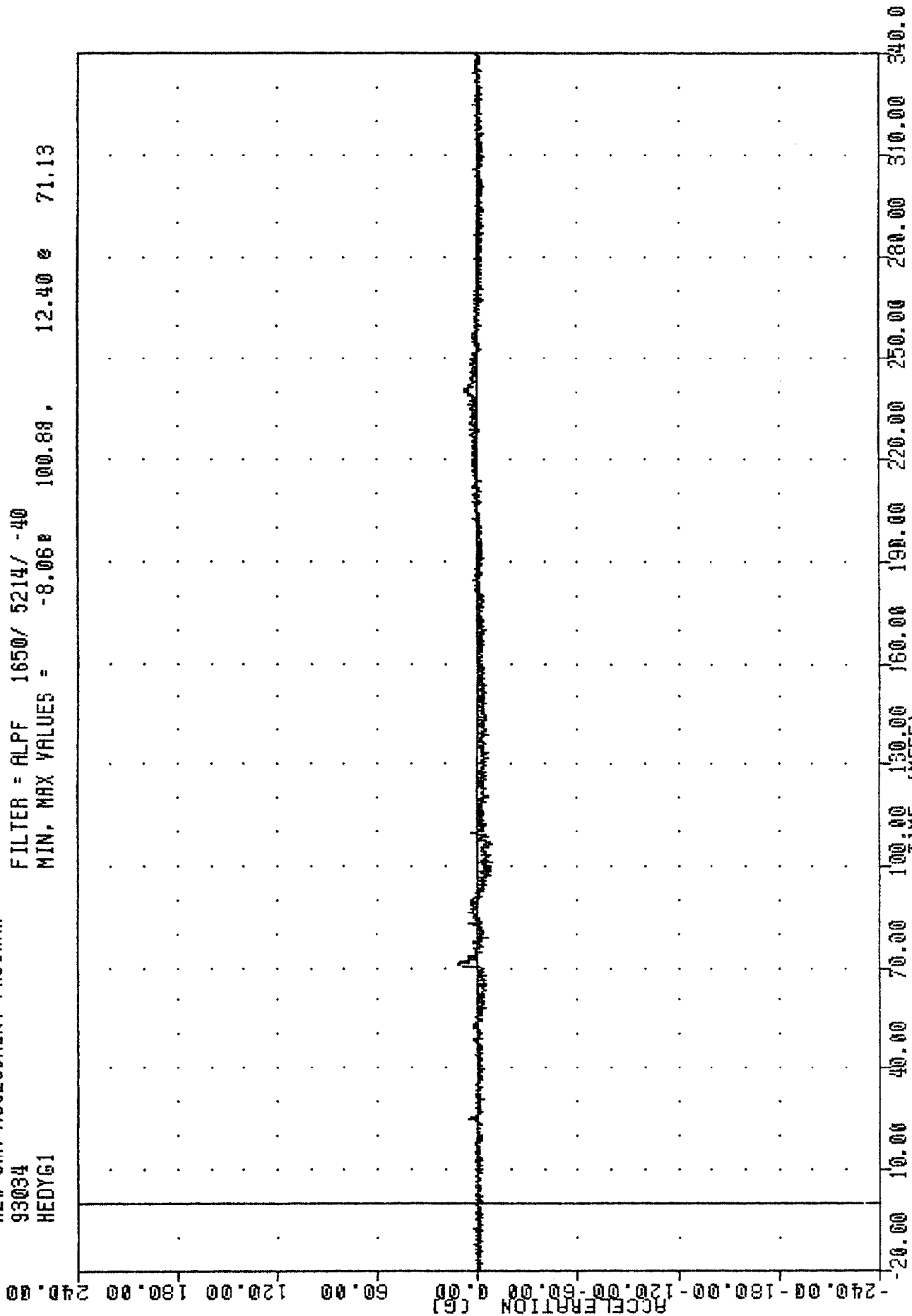


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

DRIVER HEAD AXIAL ACCELERATION

TRC
NEW CAR ASSESSMENT PROGRAM
93034
HEDYG1

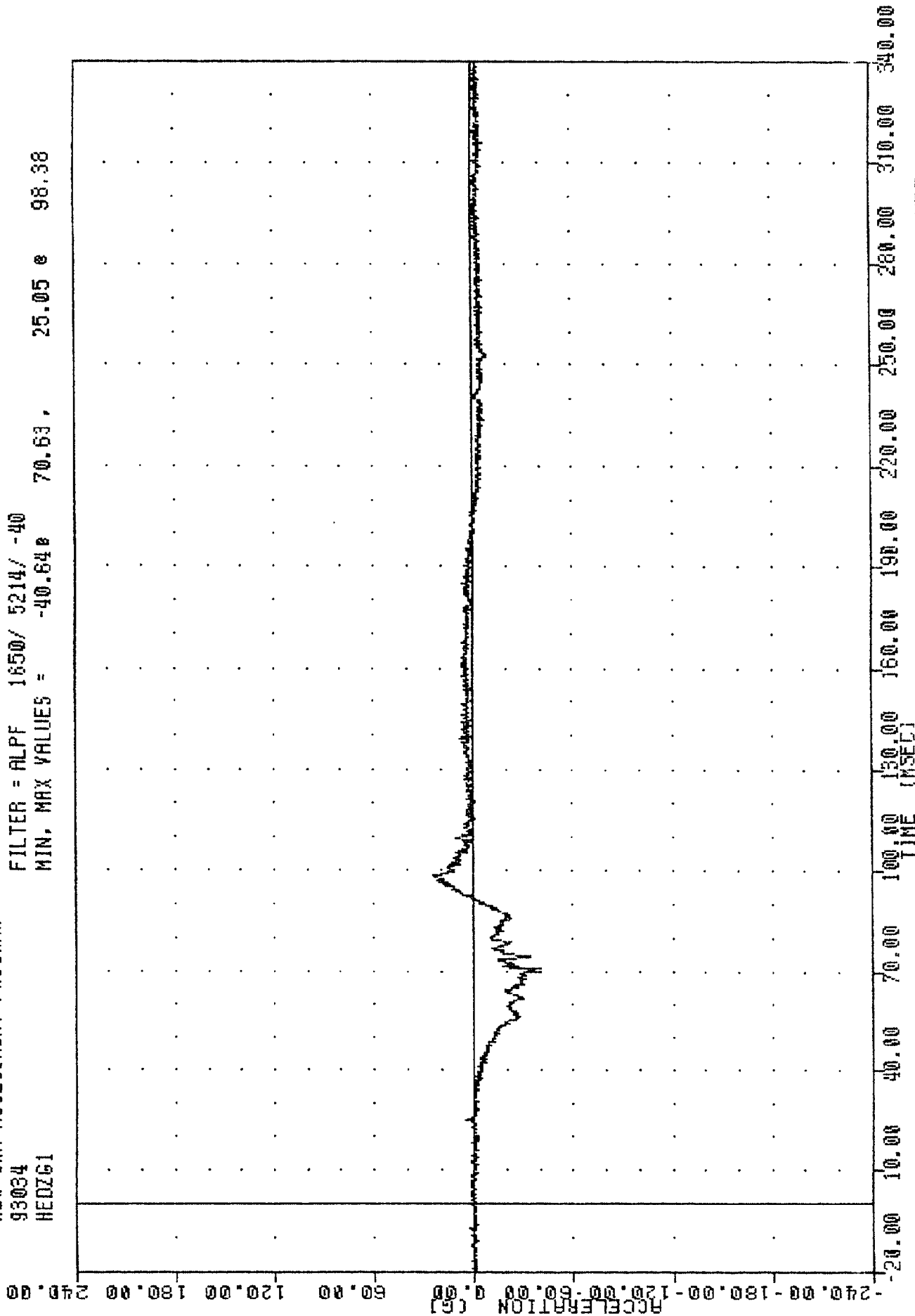
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -8.06 100.88, 12.40 71.13



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION

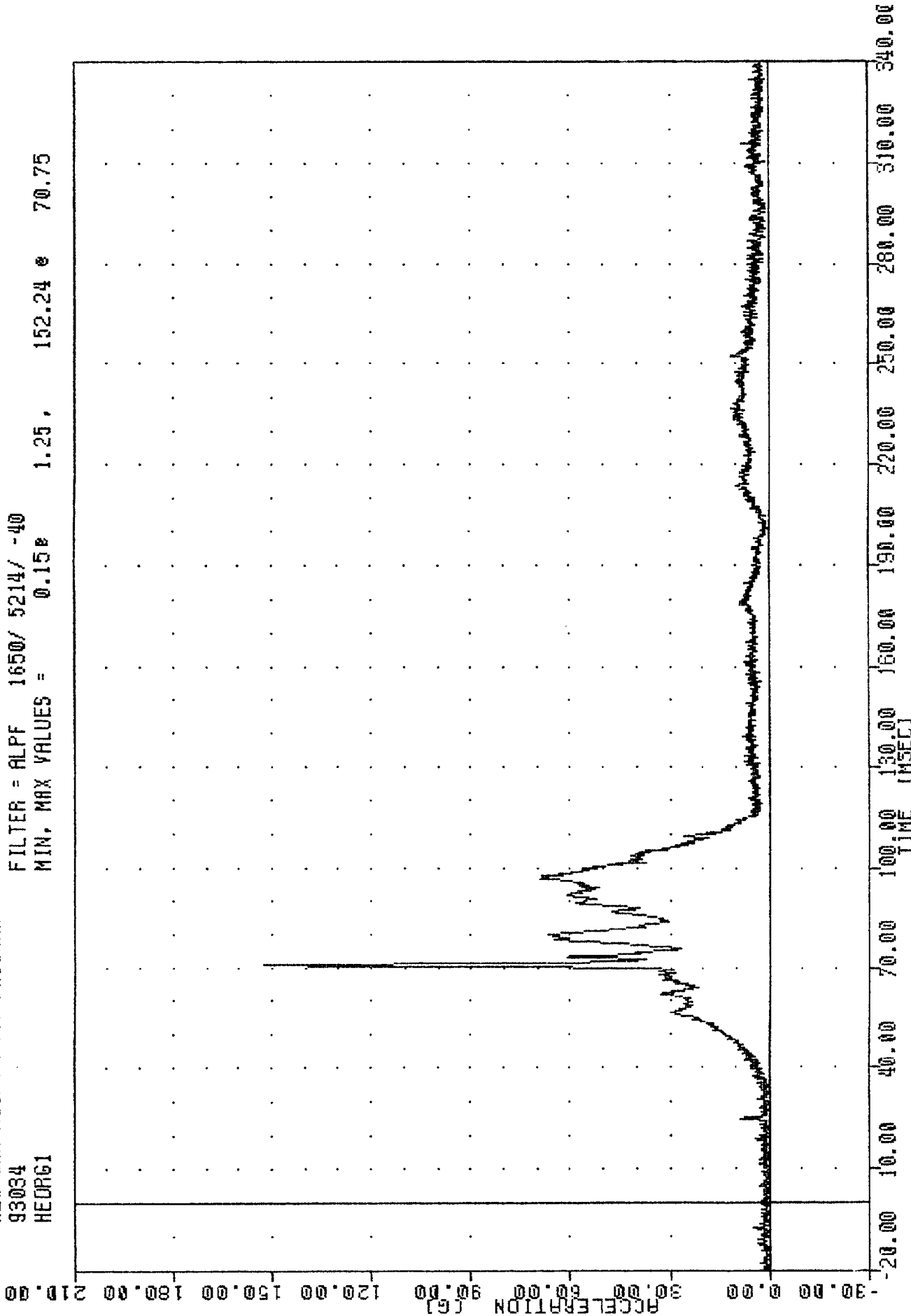
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 HEDZG1

FILTER = ALPF 1850/ 5214/ -40
 MIN. MAX VALUES = -40.64 70.63 , 25.05 e 98.38



TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 HEAD61

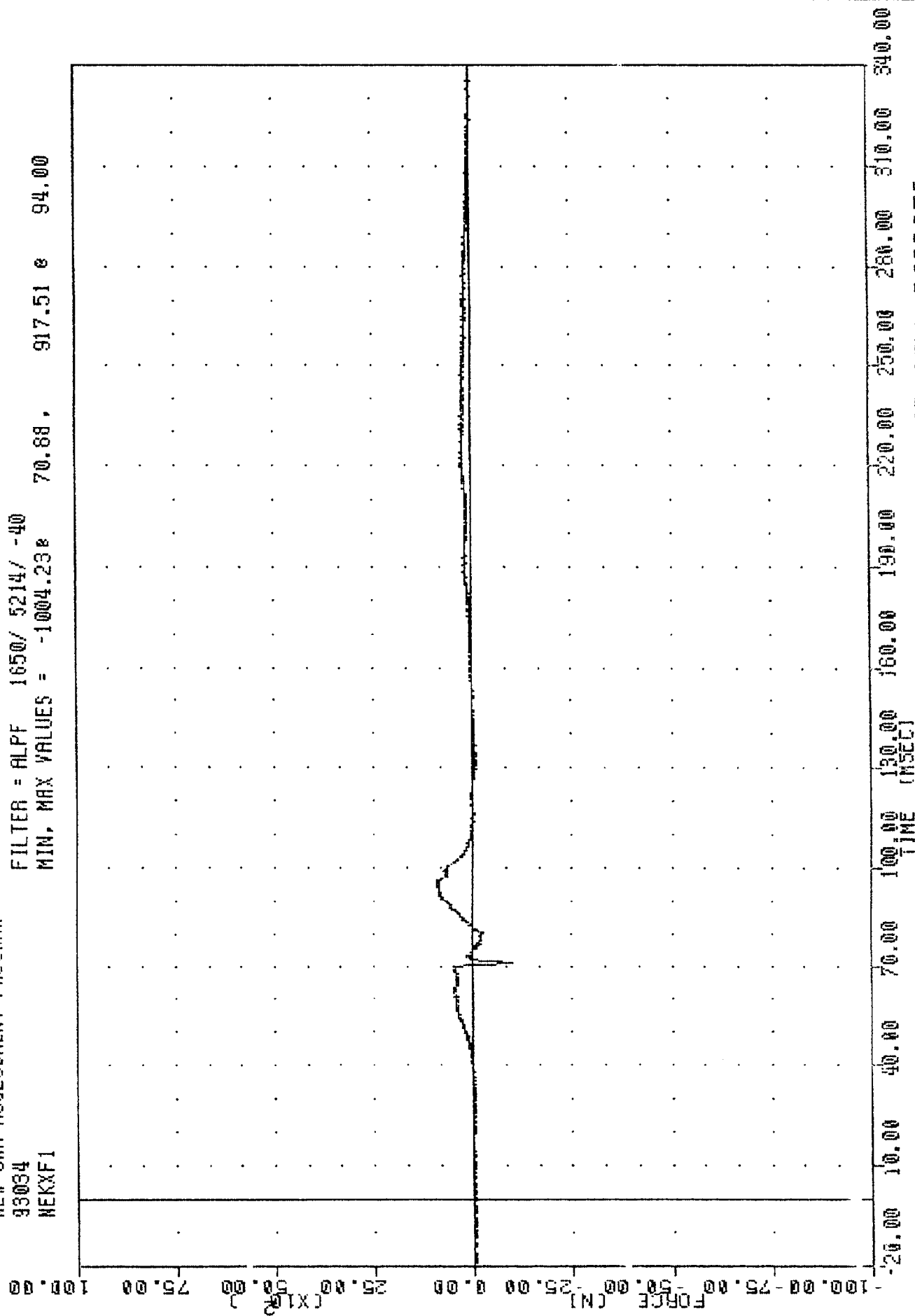
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.15e 1.25, 152.24 e 70.75



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER HEAD RESULTANT ACCELERATION

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 WEKXF1

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -1004.23e 70.88, 917.51 e 94.00



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

OTHER TESTS - AVE 6 SURFACE

TRC
 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 NEKYF1

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -159.84 81.13, 264.47 71.13

100.00

75.00

50.00

25.00

0.00

-25.00

-50.00

-75.00

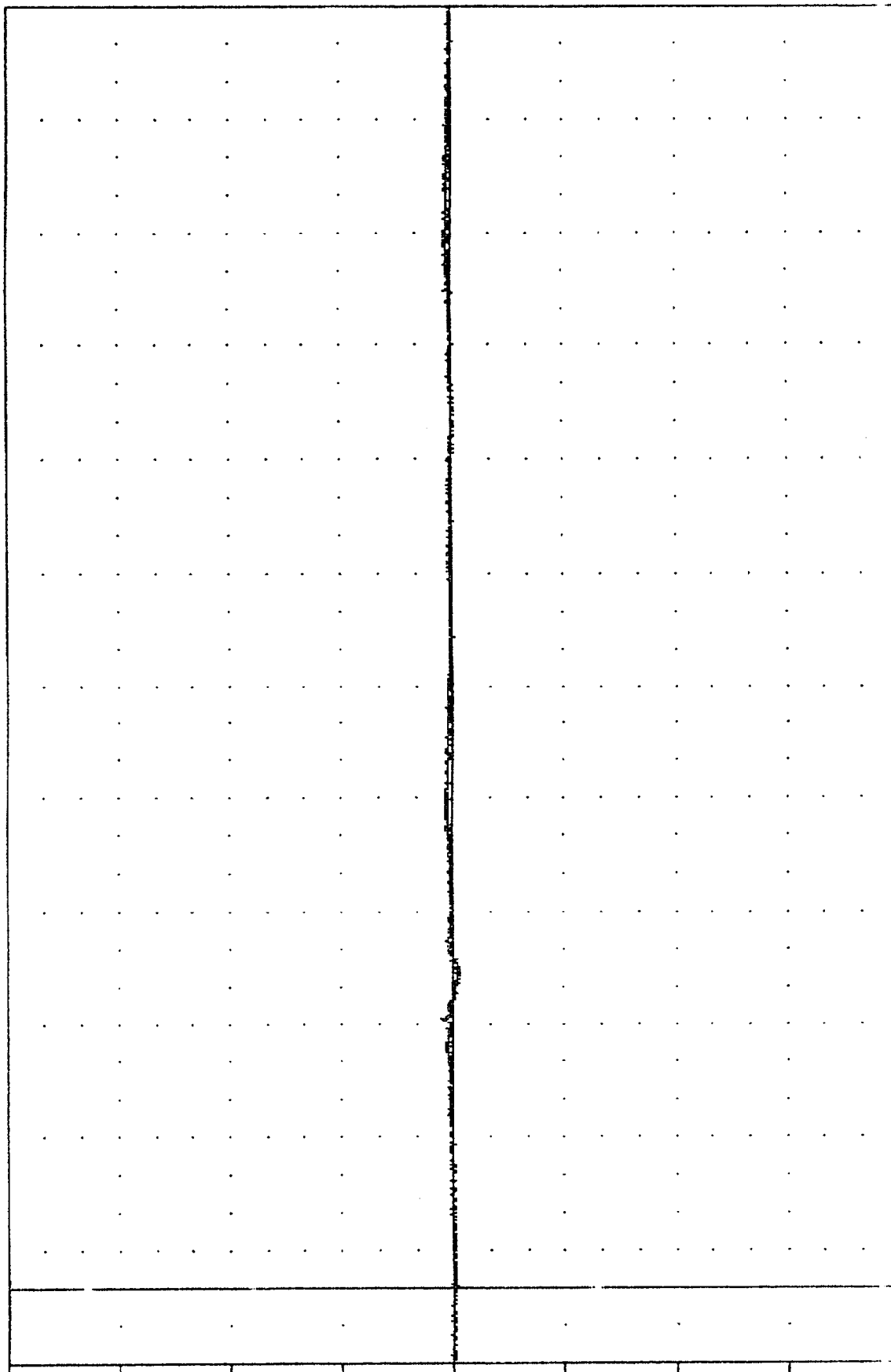
-100.00

(X10³)

FORCE (N)

B-7

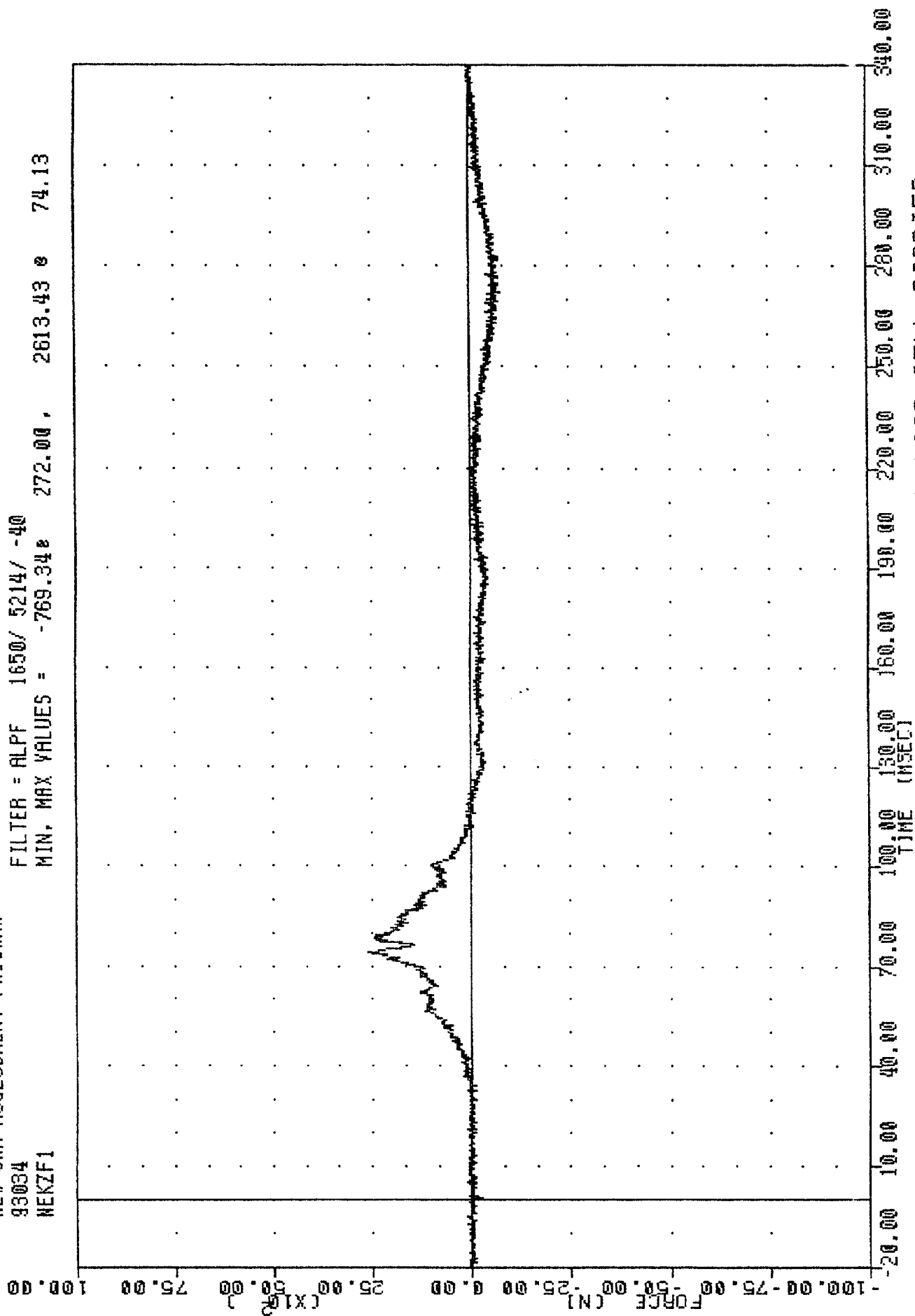
930203



-20.00 10.00 40.00 70.00 100.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 TIME (msec)
 1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK Y-AXIS SHEAR FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 NEKZF1

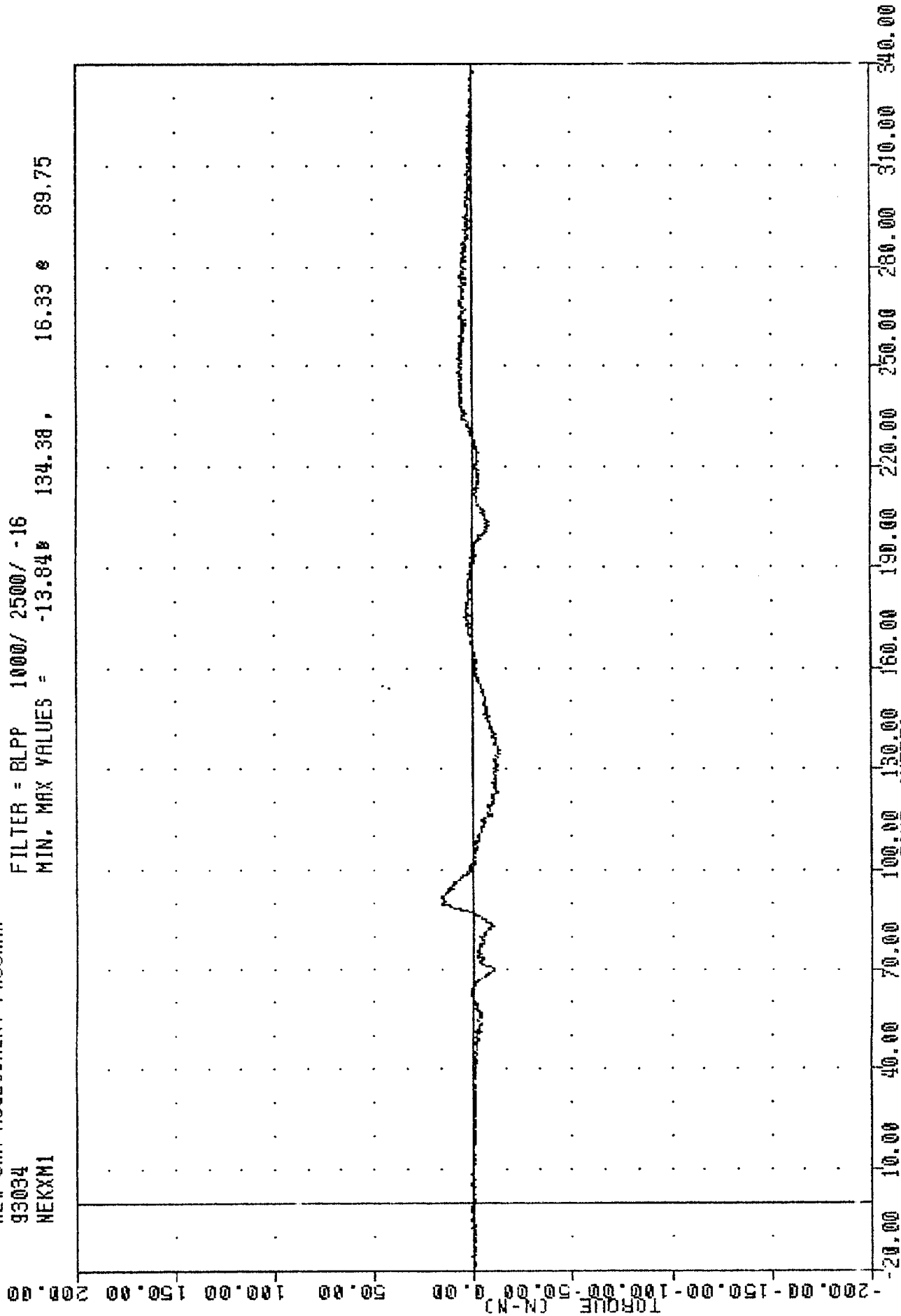
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -769.34e 272.00 , 2613.43 e 74.13



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 OTHER NECK 7-Axis

TRC
 NEW CAR ASSESSMENT PROGRAM
 93034
 NEKXMI

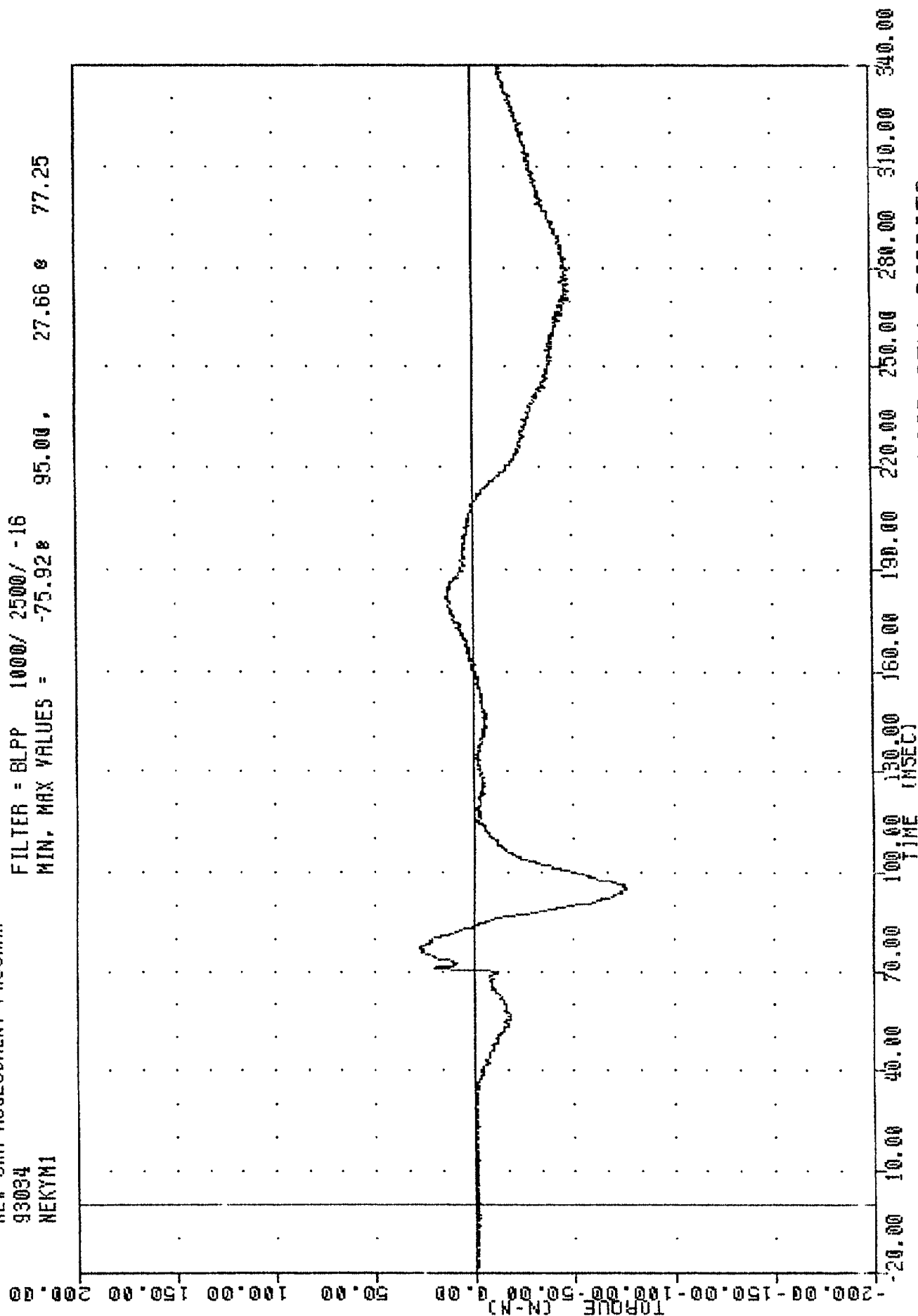
FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -13.84 134.38, 16.33 89.75



1993 CHEVROLET SUBURBAN INTO FRONTAL LRD CELL BARRIER
 DRIVER NECK MOMENT ABOUT X AXIS

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 NEKYM1

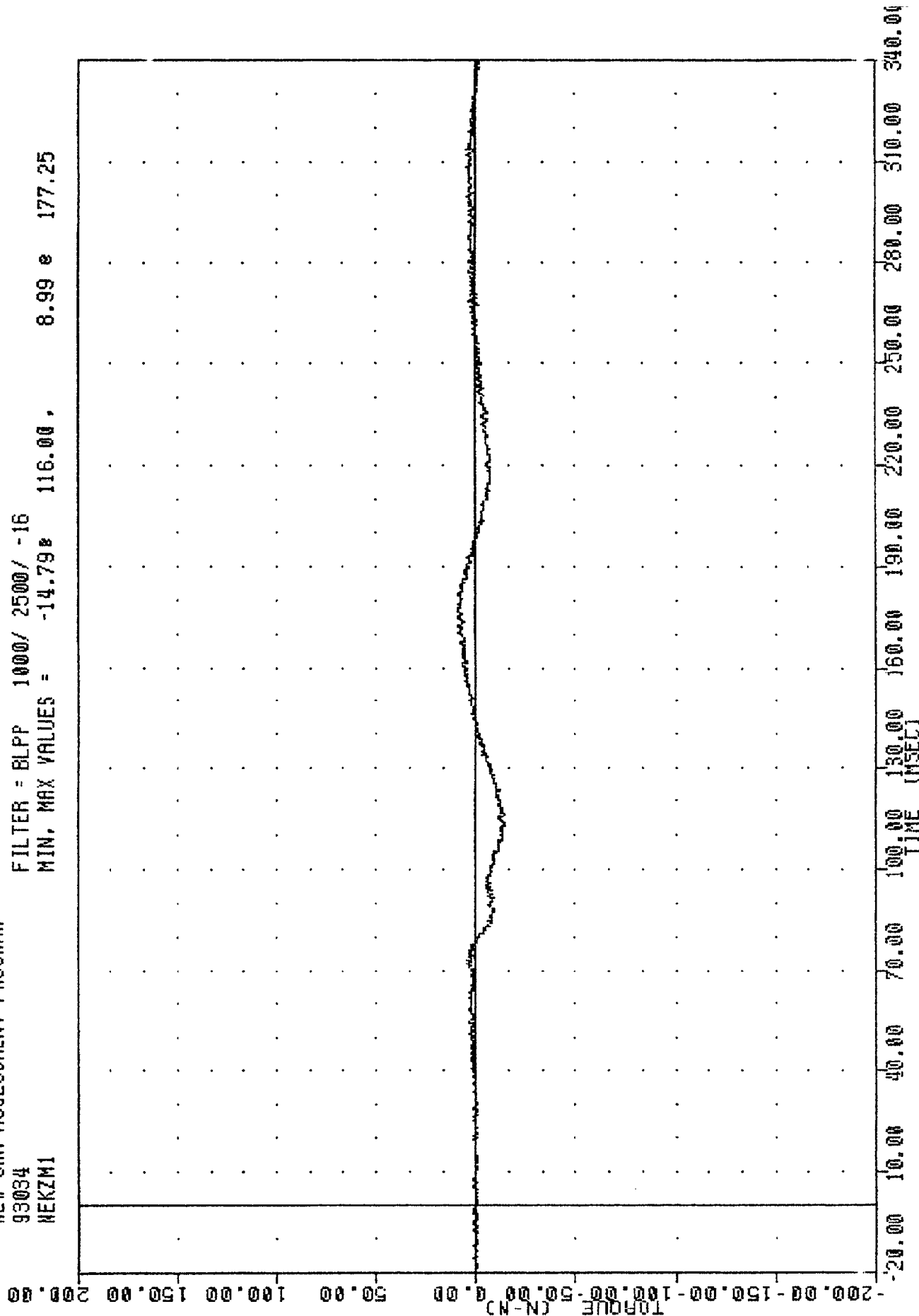
FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -75.92 95.00 27.66 77.25



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER SIDE MOMENT ABOUT Y-AXIS

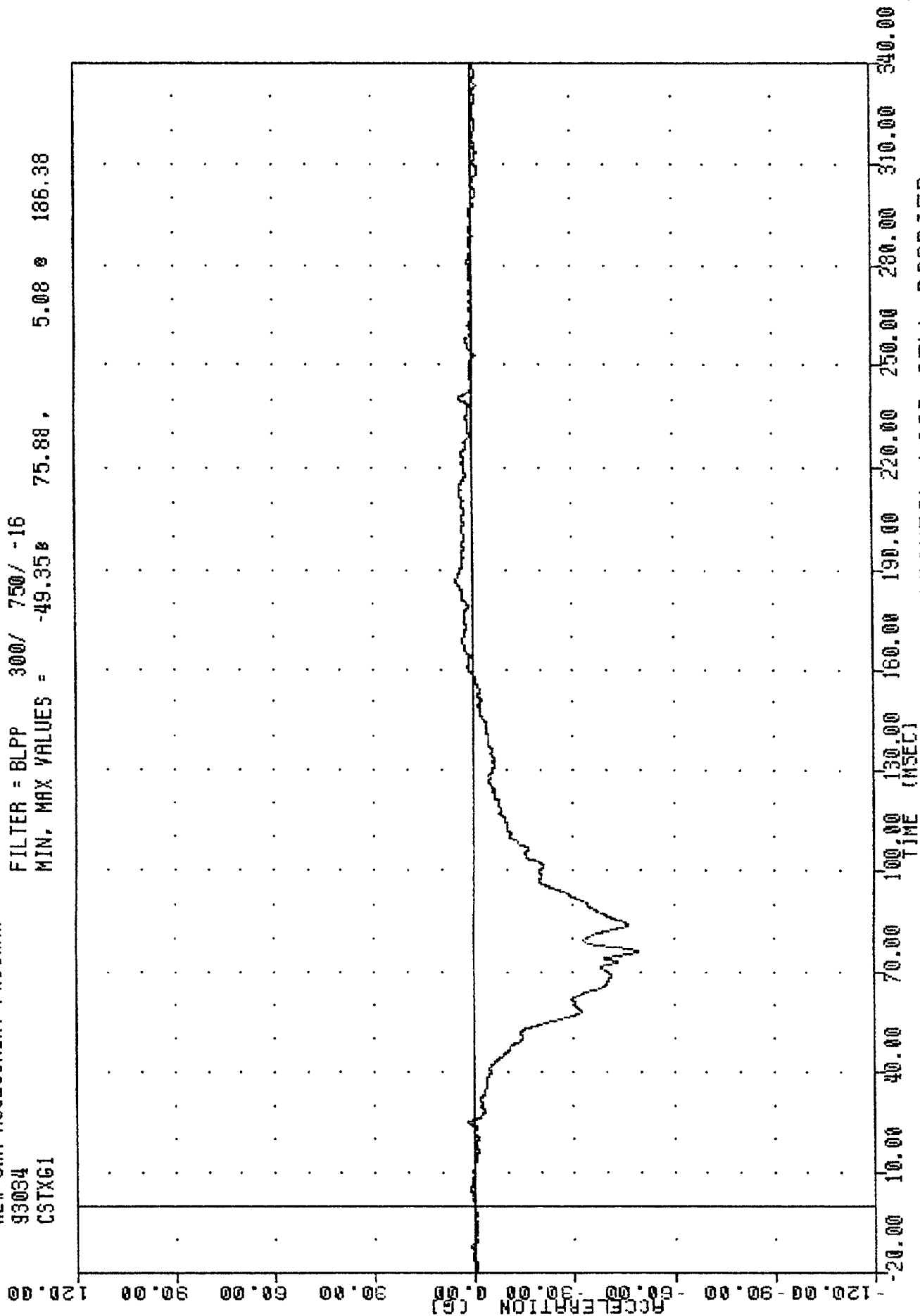
TRC
NEW CAR ASSESSMENT PROGRAM
93034
WEKZM1

FILTER = BLPP 1000/ 2500/ -16
MIN, MAX VALUES = -14.79 116.00, 8.99 e 177.25



TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 CSTXG1

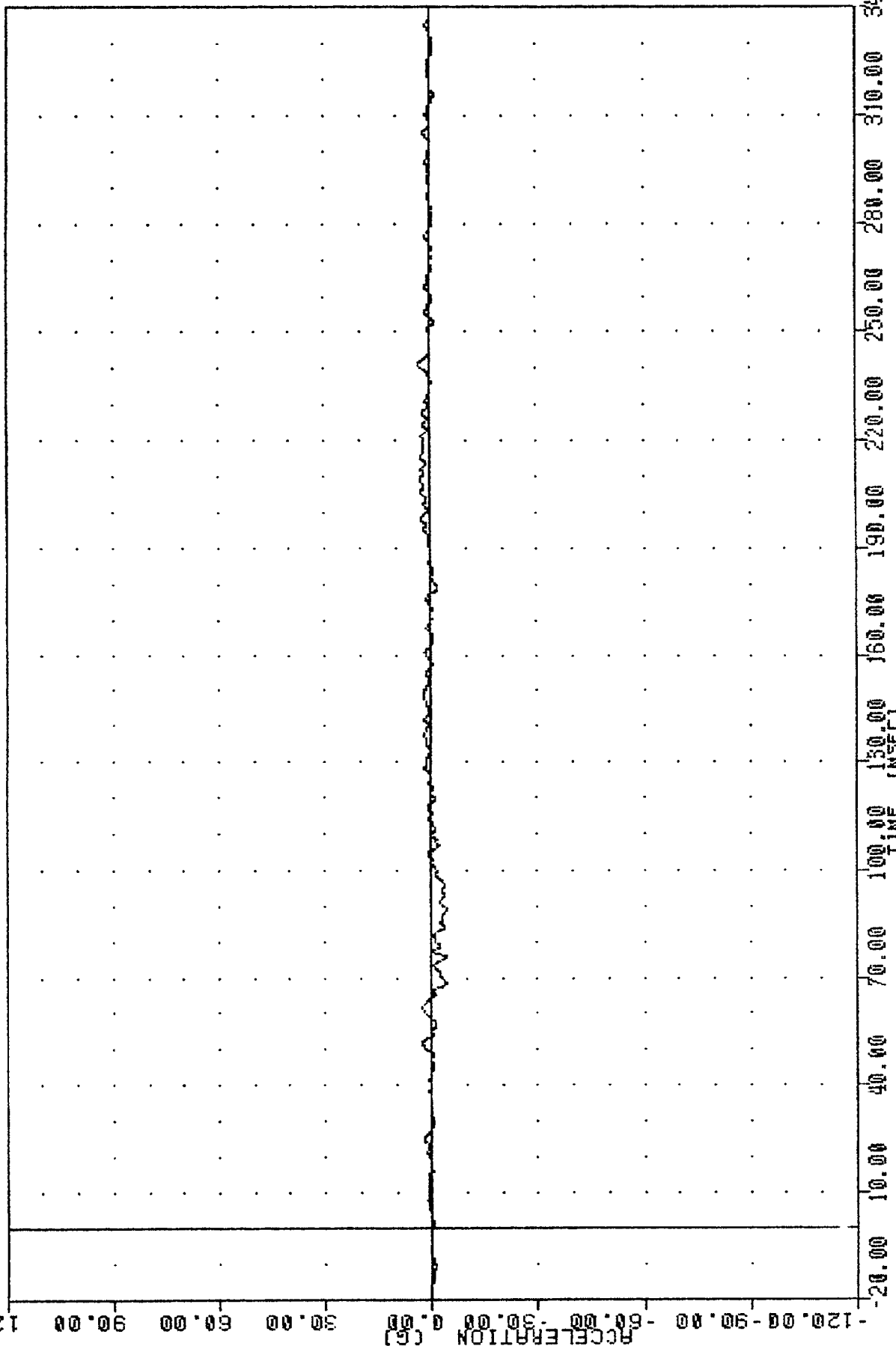
FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -49.35 75.88 5.08 186.38



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 DRAWER SHEET - AXIS ACCELERATION

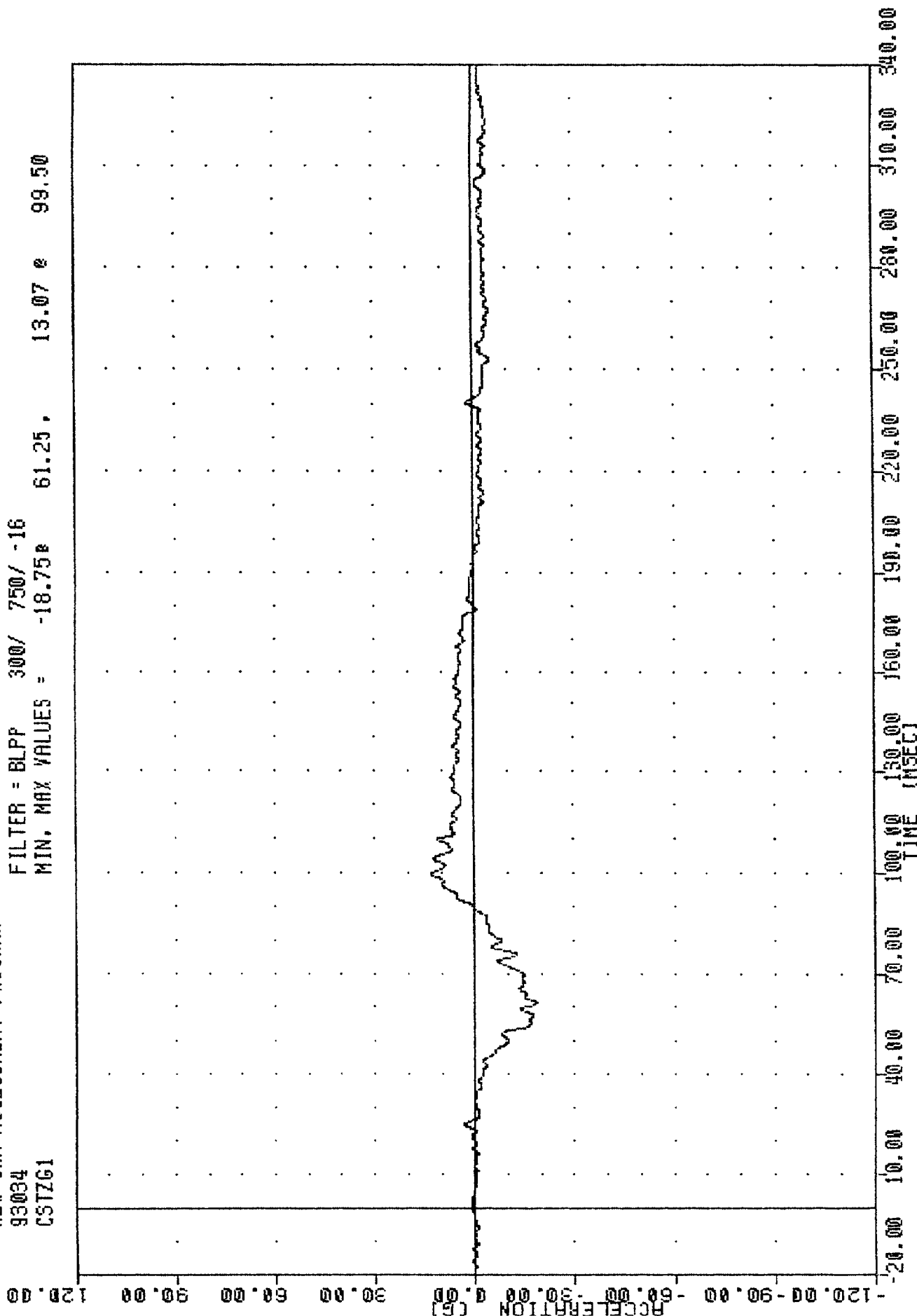
TRC
 NEW CAR ASSESSMENT PROGRAM
 93034
 CSTYG1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -4.36 89.13, 3.32 241.00



TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 CSTZ61

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -18.75 61.25 , 13.07 99.50

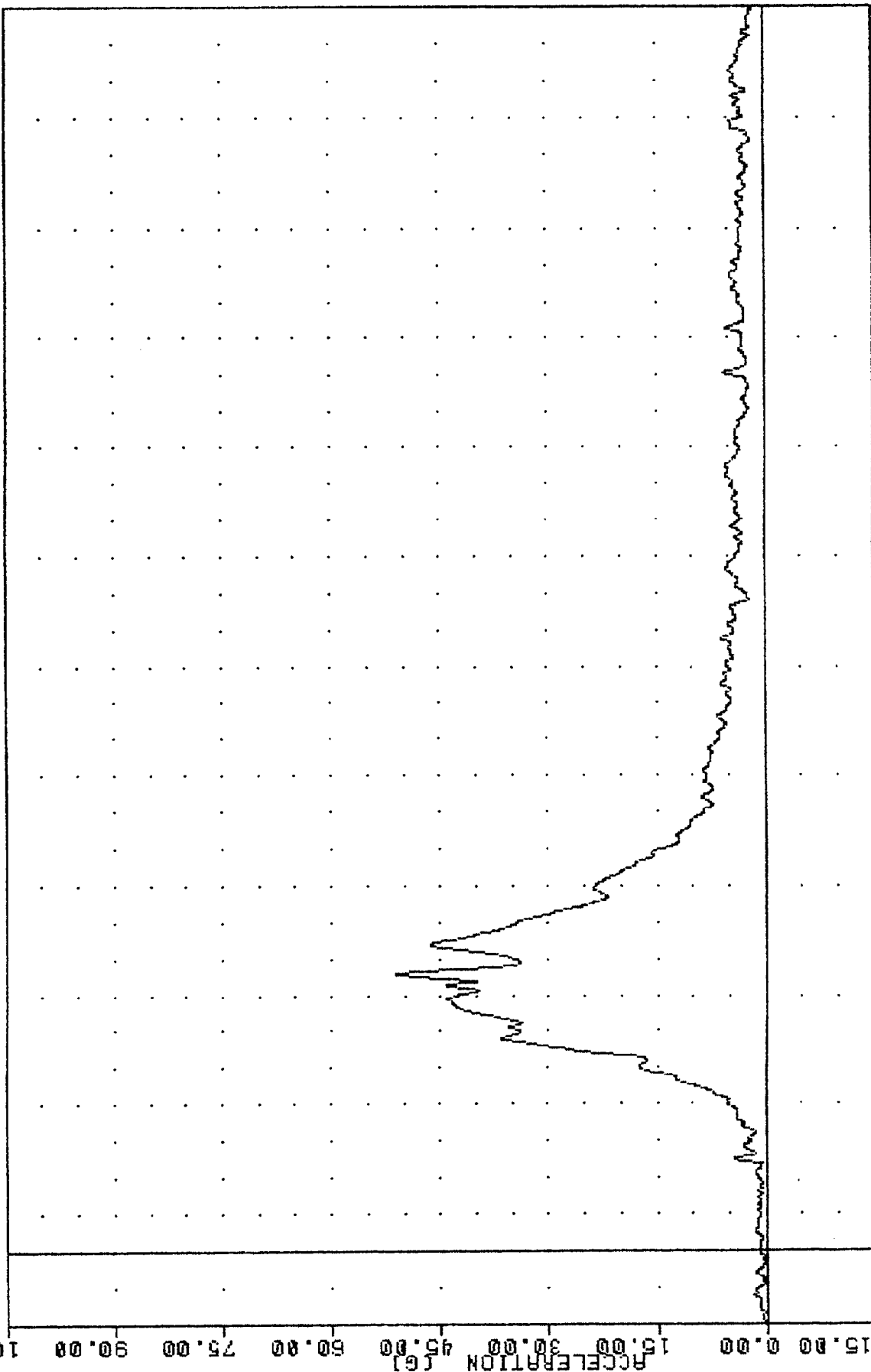


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER SEAT 7-AXIS ACCELERATION

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 CSTRG1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.06 51.08 75.88

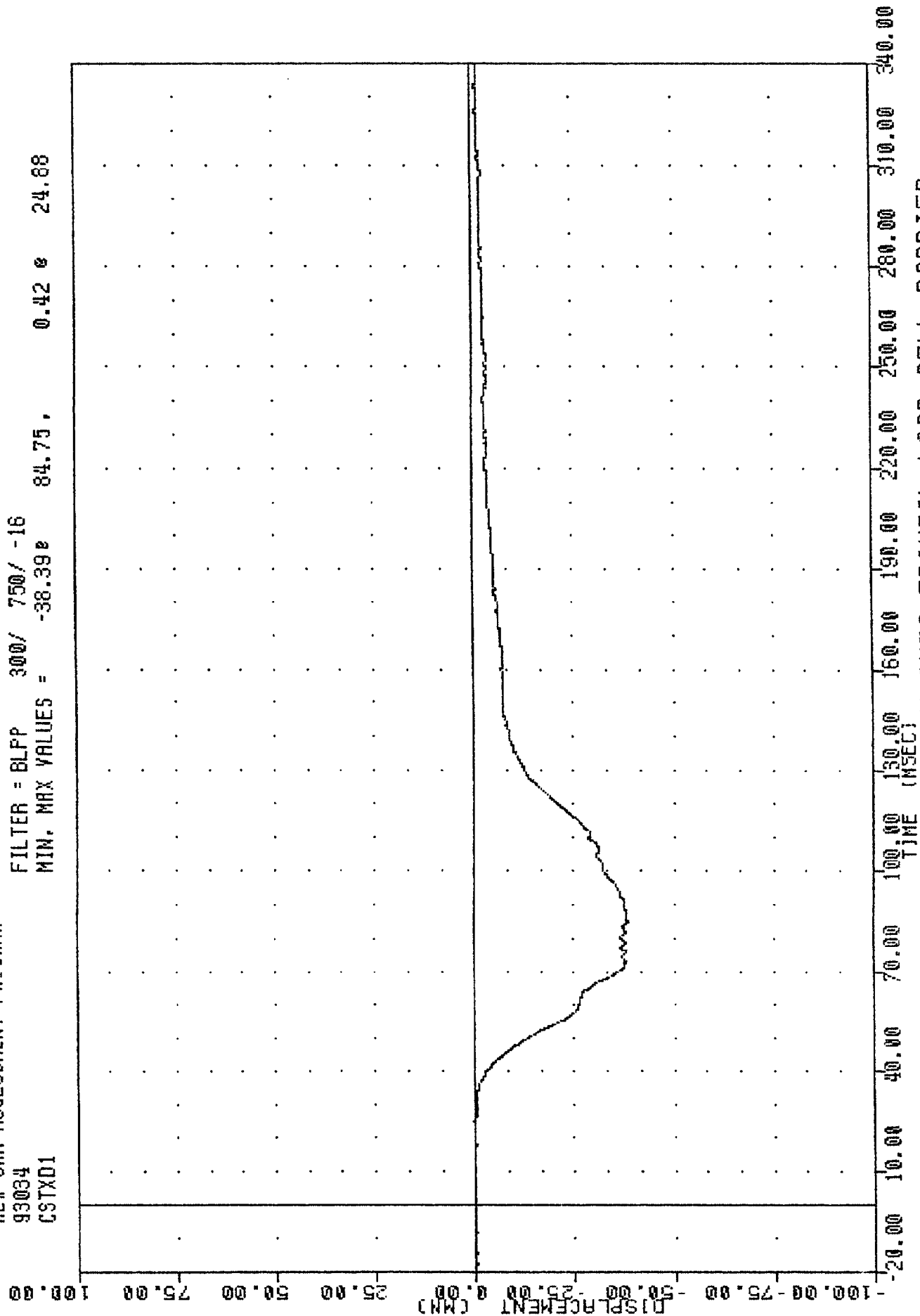
105.00



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION

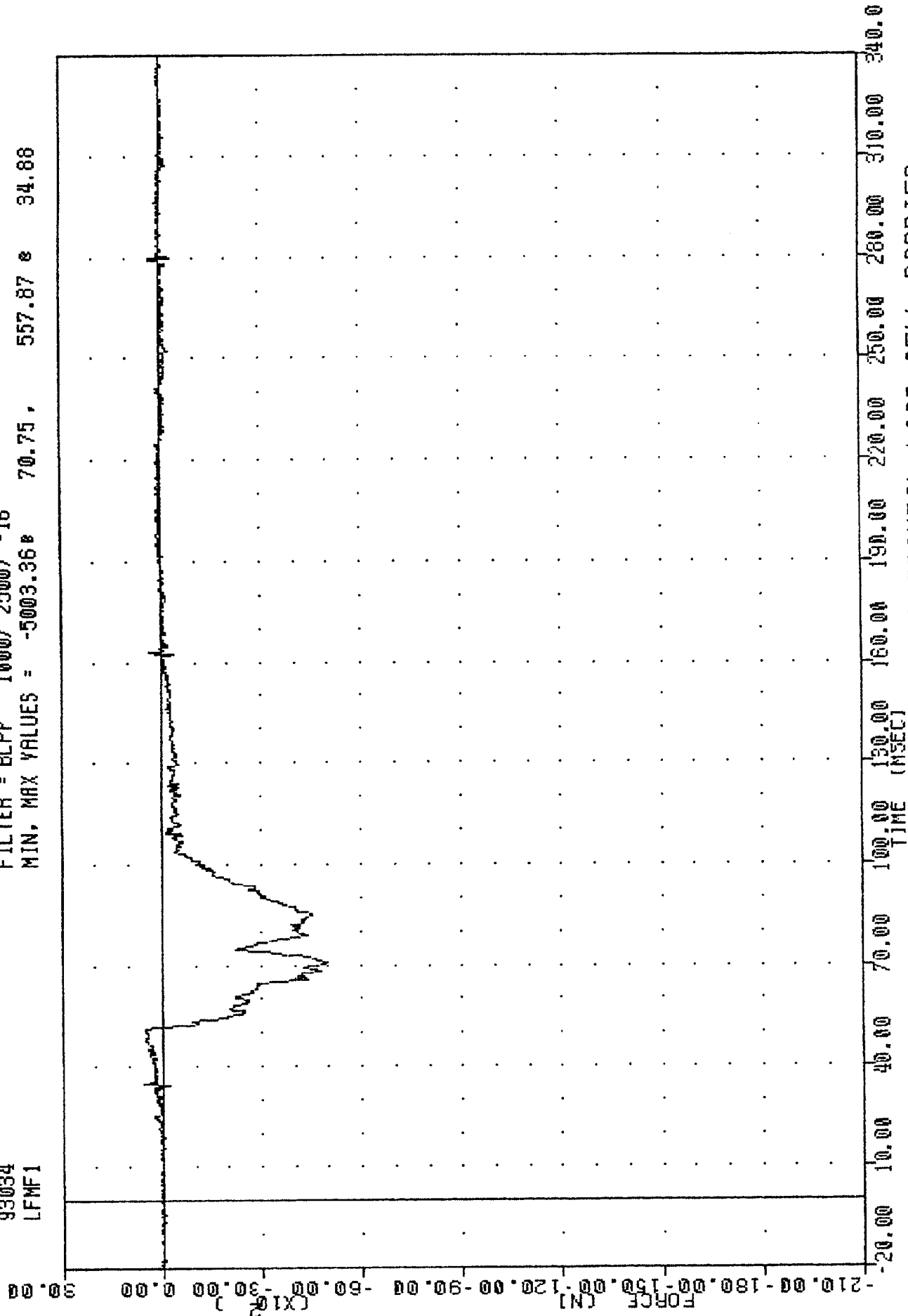
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 CSTXD1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -38.39e 84.75, 0.42 e 24.88



TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 LFMF1

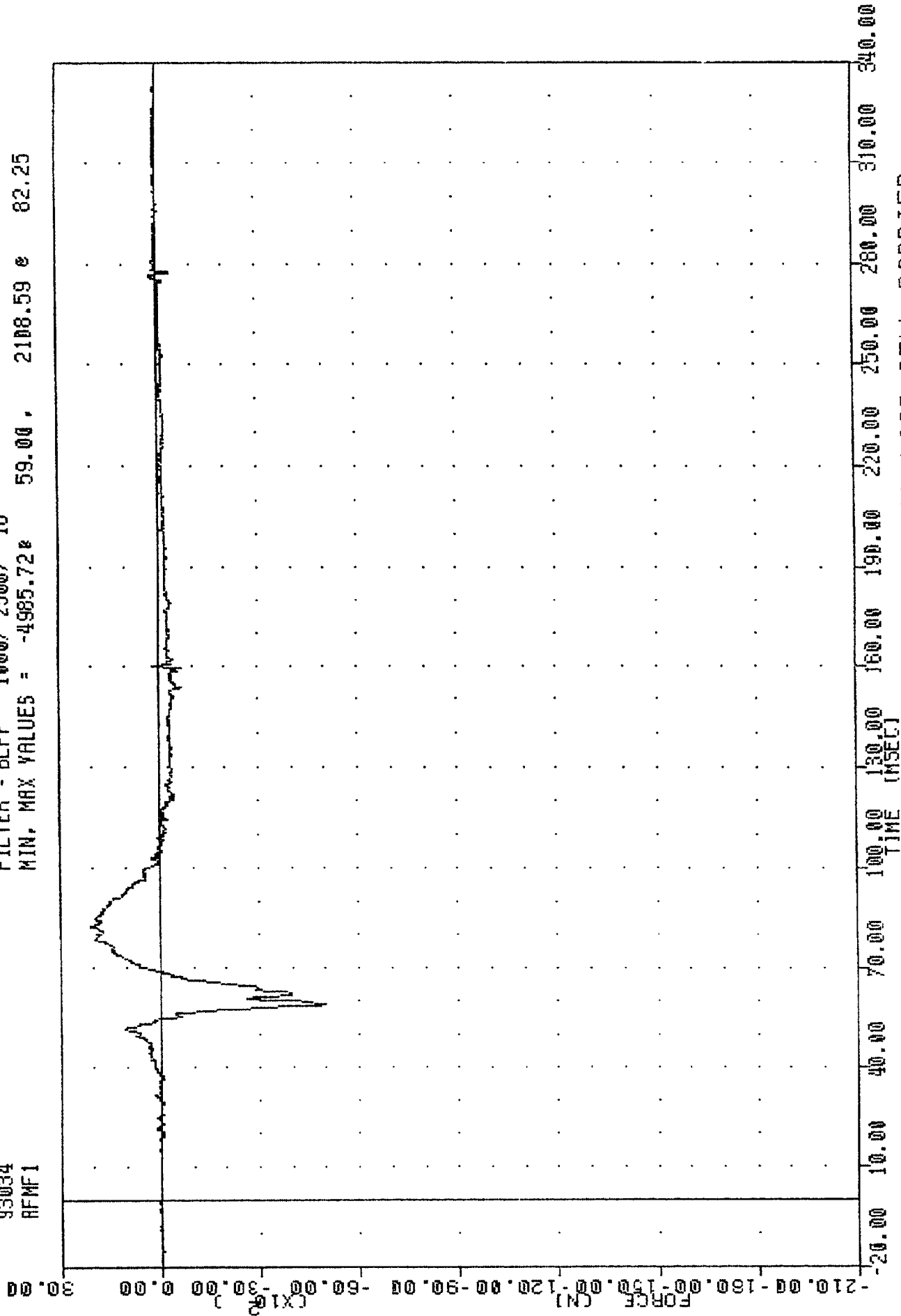
FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -5003.36 70.75, 557.87 34.88



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER LEFT FEMUR FORCE

TRC . 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 AFMF1

FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -4985.72e 59.00, 2108.59 e 82.25



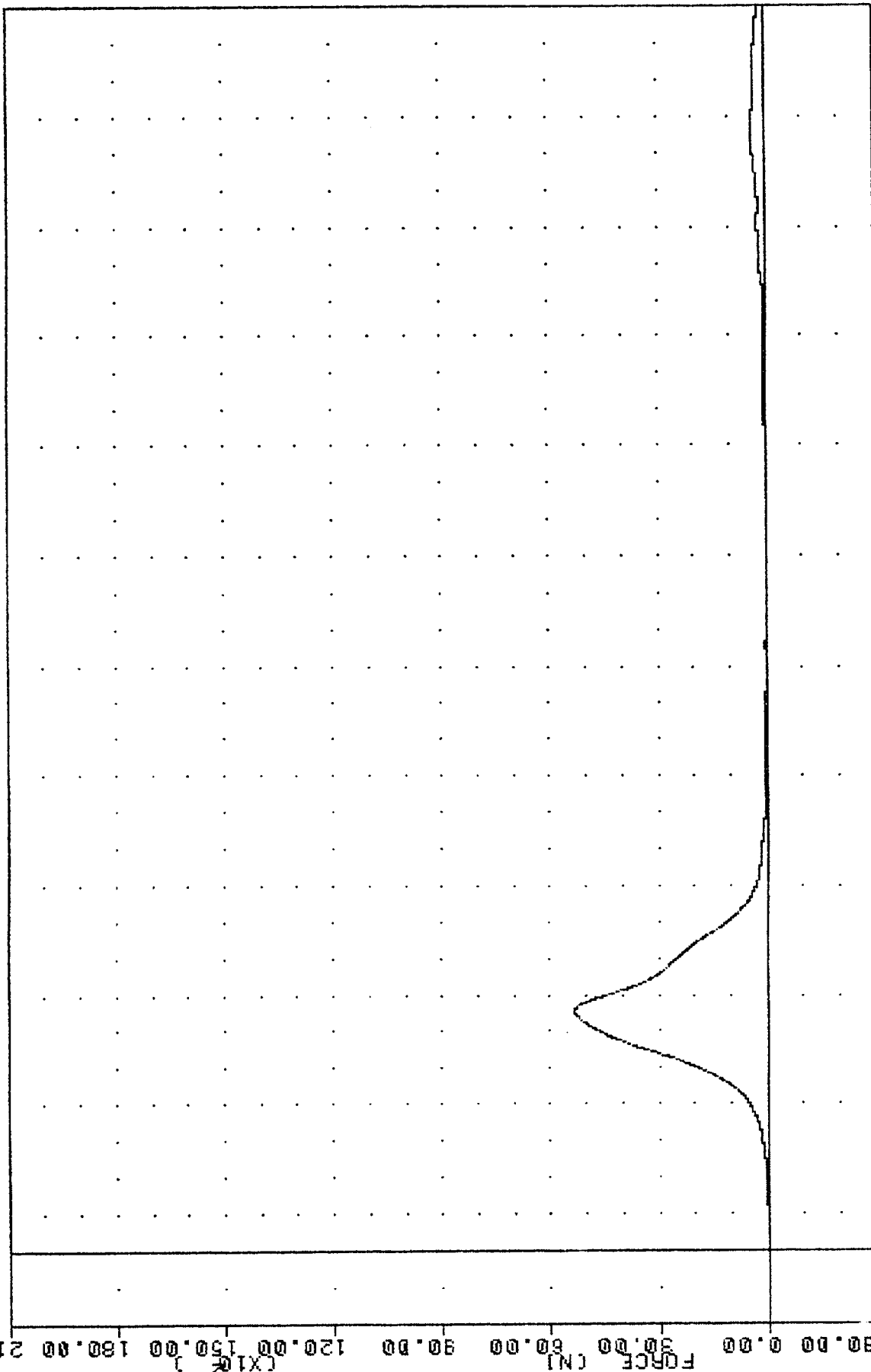
1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER R1CHT FEMUR FORCE

TRC
 93034
 LBOFI
 NEW CAR ASSESSMENT PROGRAM

, 930203

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -23.28 213.13 5316.95 65.38

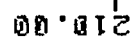
(X10²)



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 DRIVER LAP BELT OUTBOARD FORCE

TPC , 930203

FILTER = BLPP 100/ 250/ -16



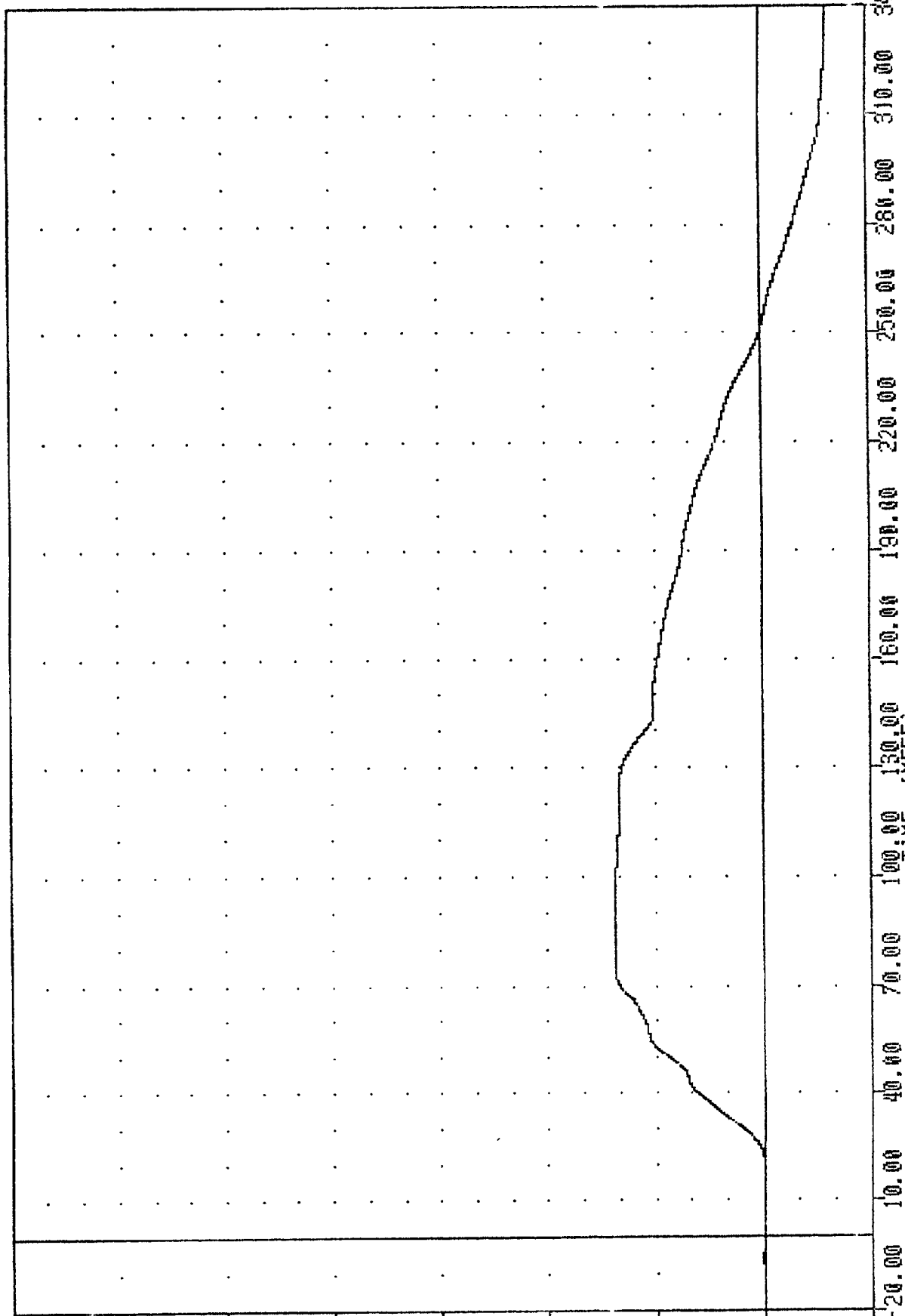
3003 1-88-06-0000

TRC
NEW CAR ASSESSMENT PROGRAM
93034
SHBD1

, 930203

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -31.08 333.00 59.13 92.38

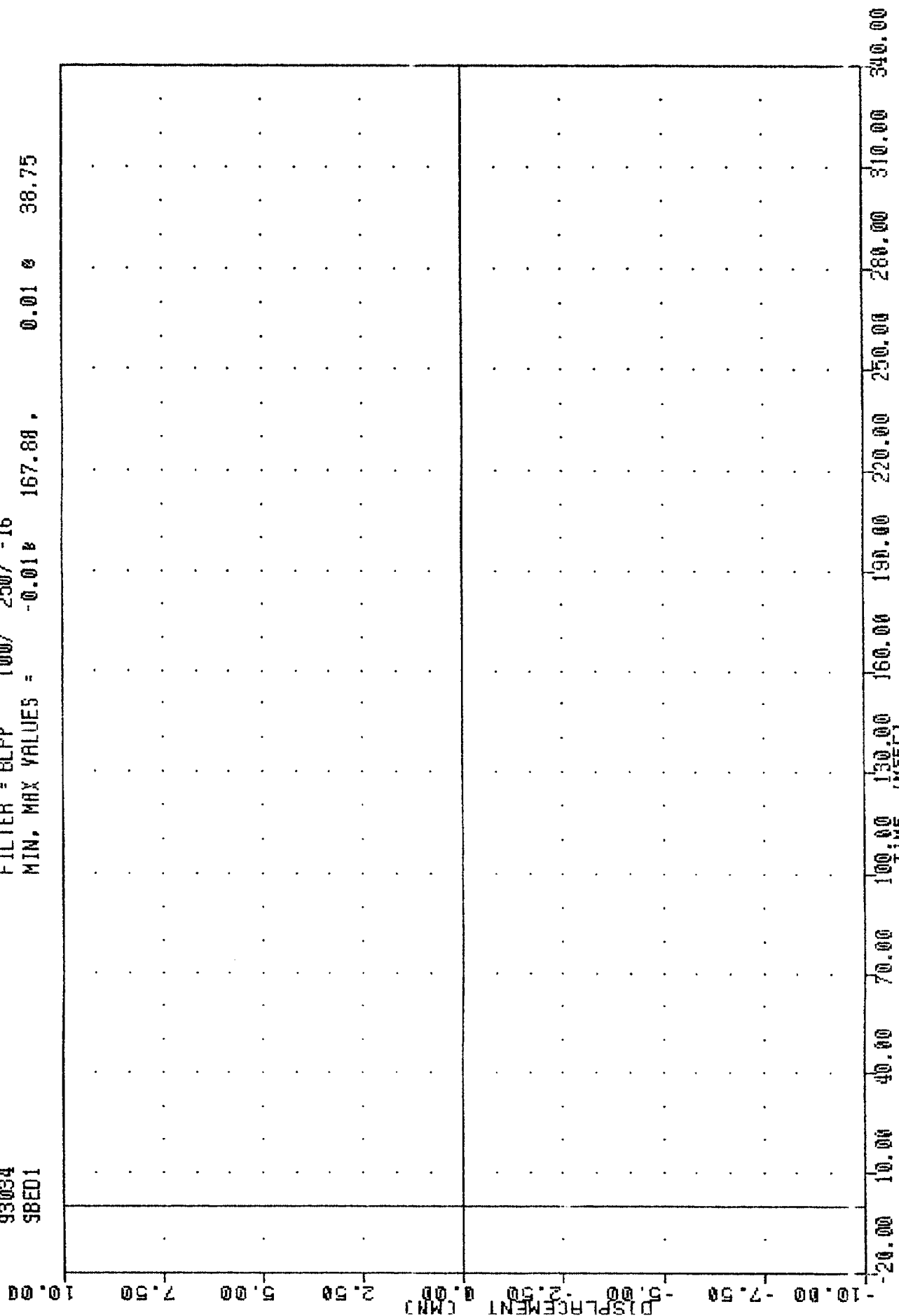
DISPLACEMENT (MM)



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
DRIVER SHOULDER BELT DISPLACEMENT

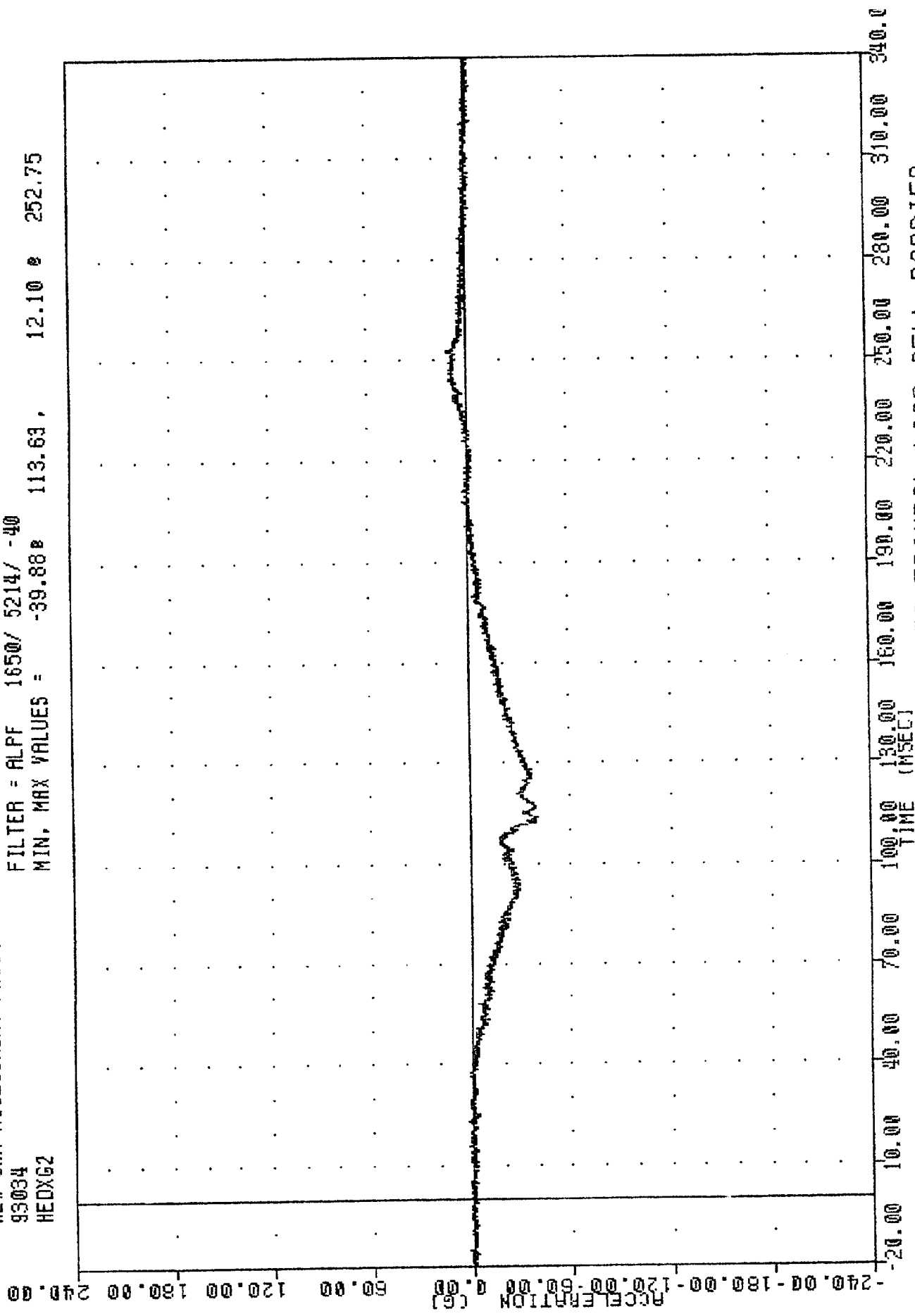
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 SBED1

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -0.018 167.88 0.018 38.75



TRC
 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 HEDXG2

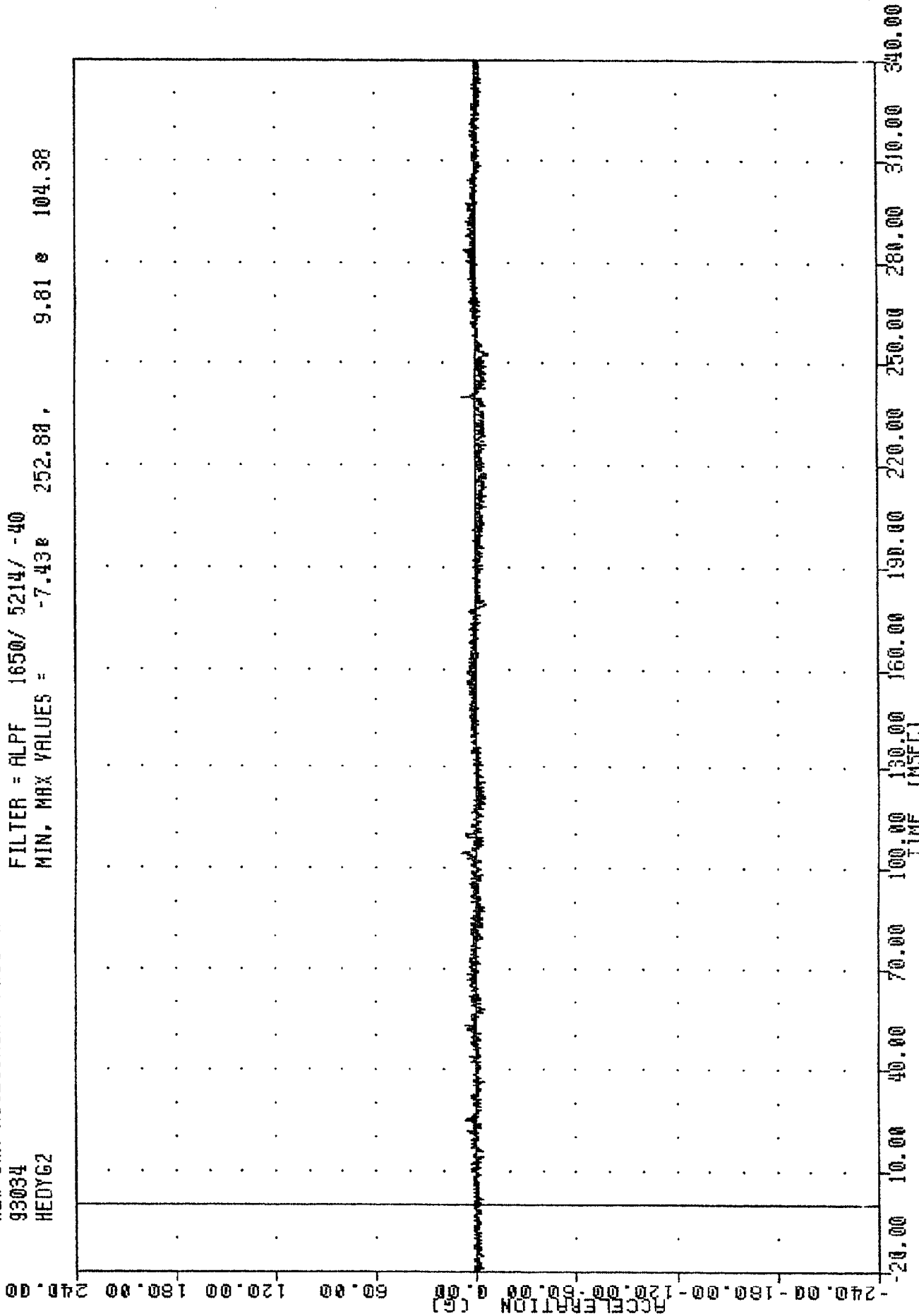
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -39.88 113.63, 12.10 252.75



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER HEAD X-AXIS ACCELERATION

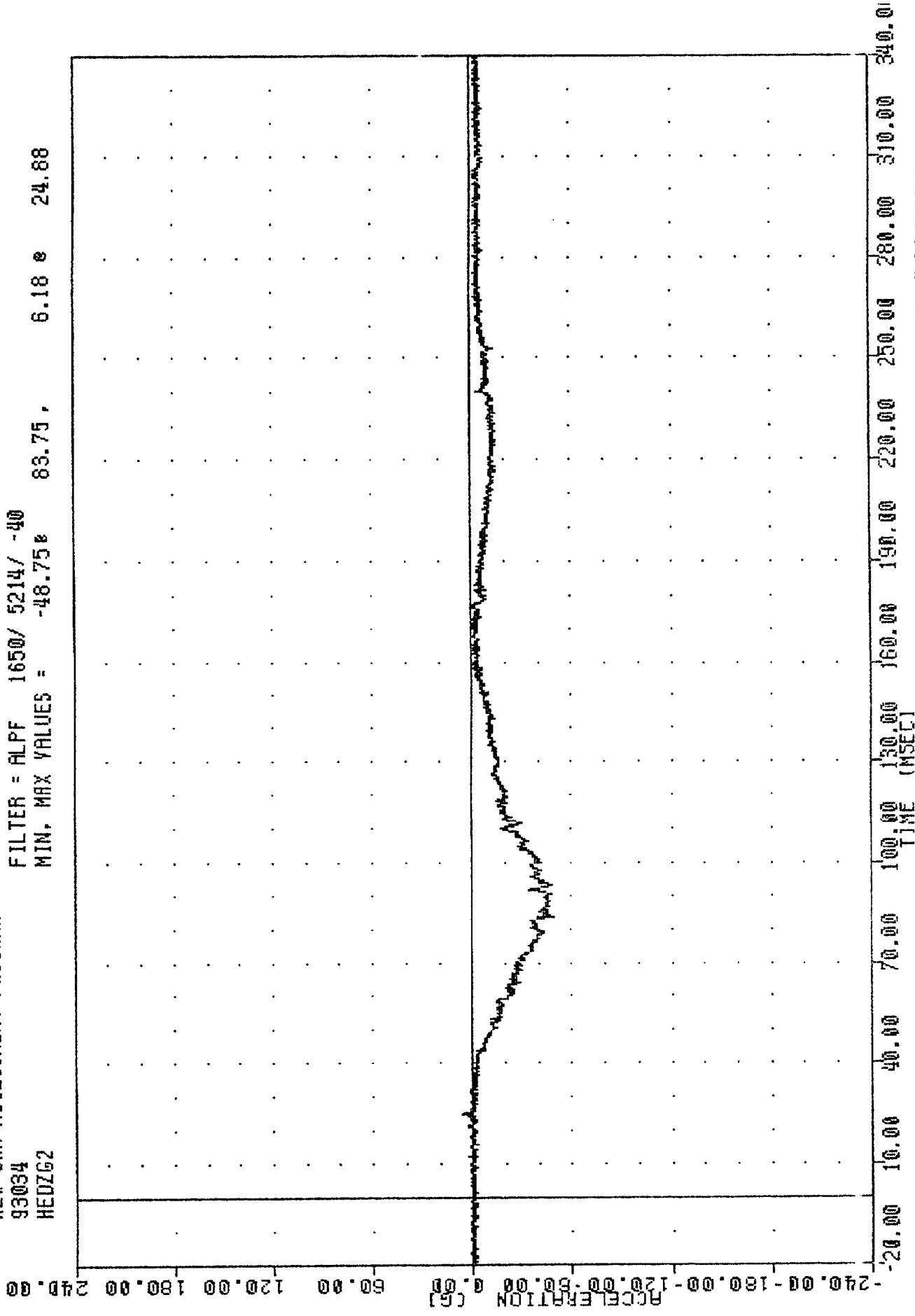
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 HEDYG2

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -7.43E 252.80, 9.81 E 104.38



TRC
 93034
 HEDZG2
 NEW CAR ASSESSMENT PROGRAM

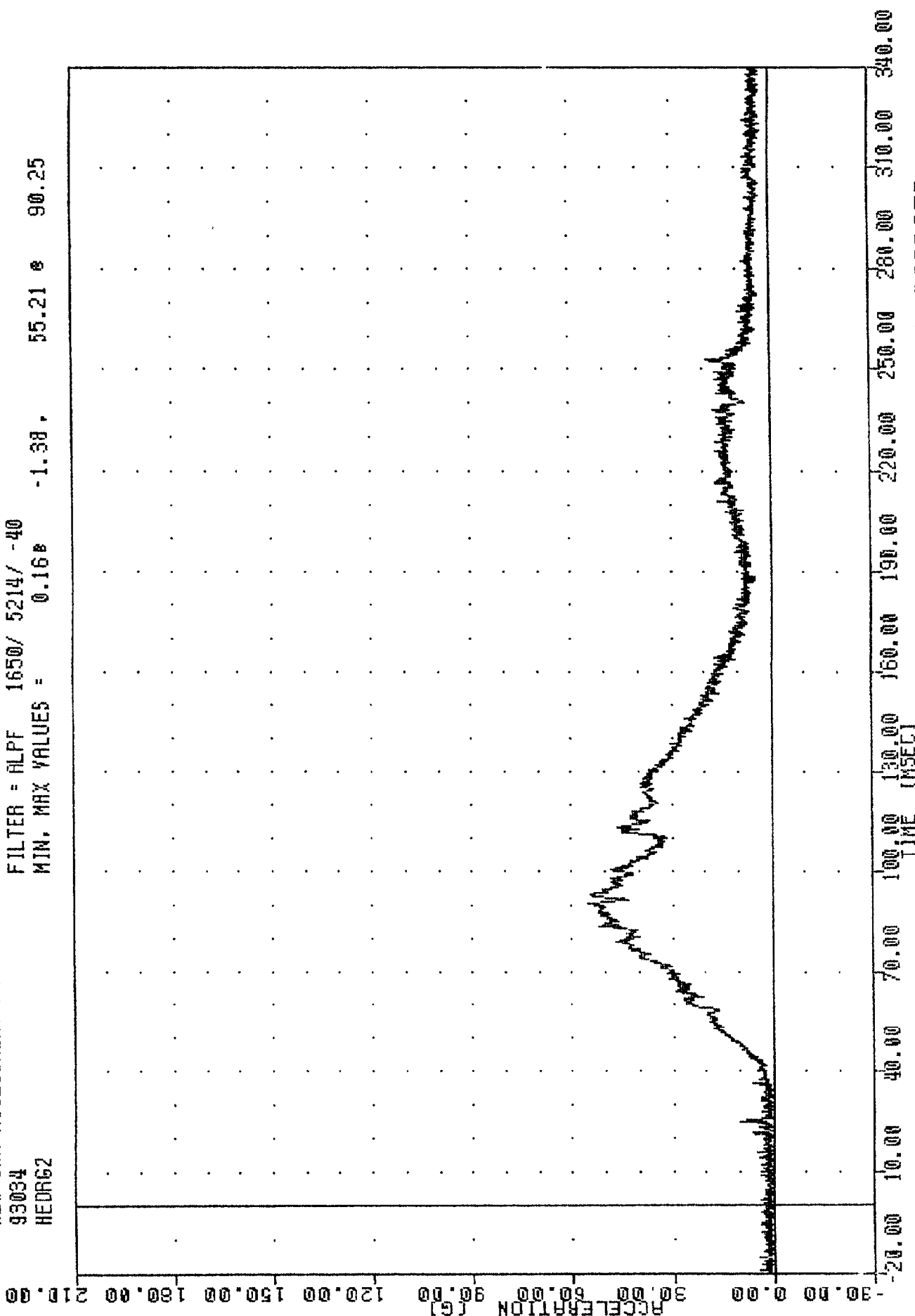
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -48.75% 83.75, 6.18% 24.88



1983 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER HEAD Z-AXIS ACCELERATION

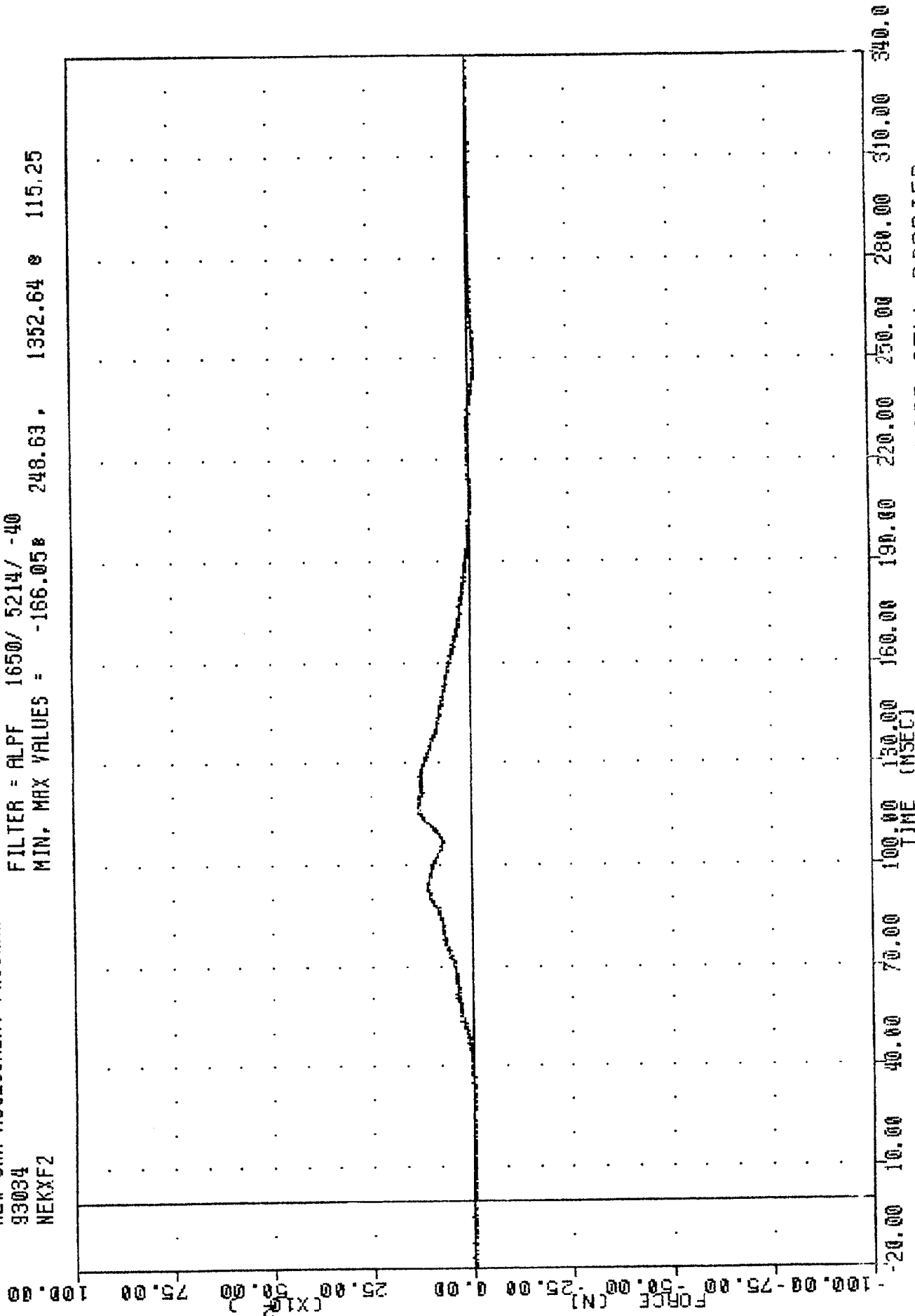
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 HEDR62

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.168 -1.38 , 55.21 8 90.25



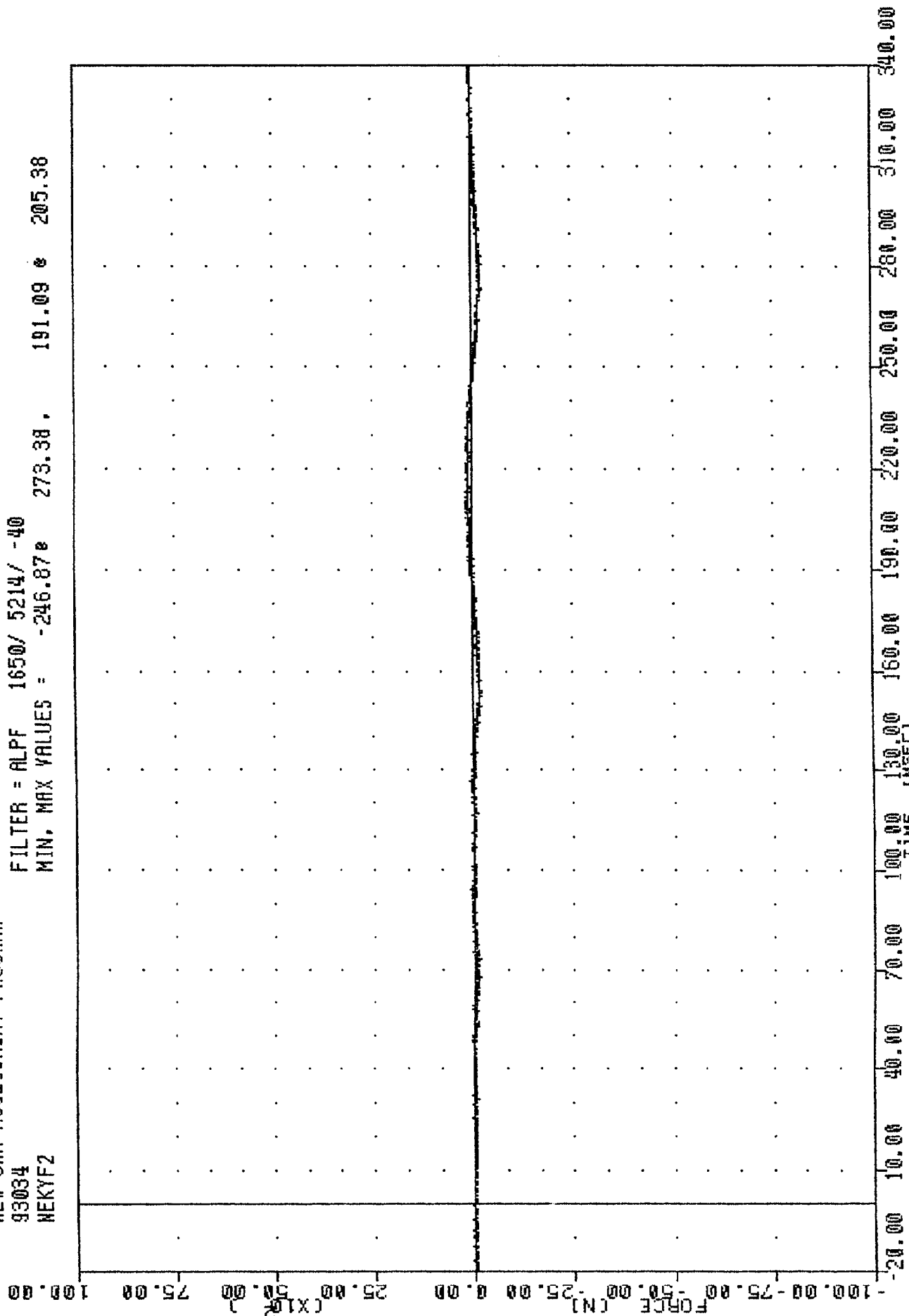
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 NEKXF2

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -166.058 248.63 1352.64 115.25



TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 NEKYF2

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -246.87e 273.38 , 191.09 e 205.38

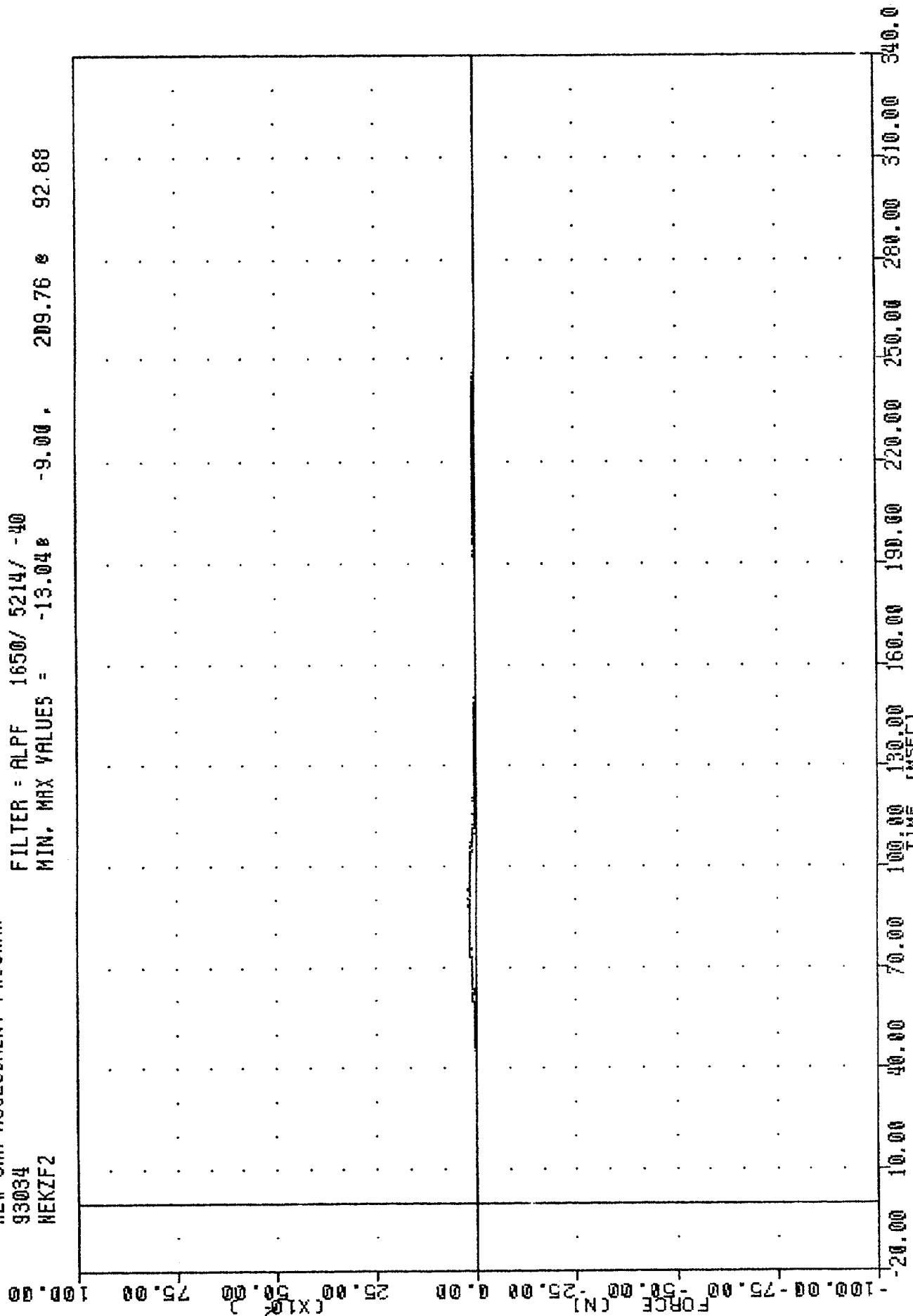


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

Y-AXIS SHEAR FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 NEKIF2

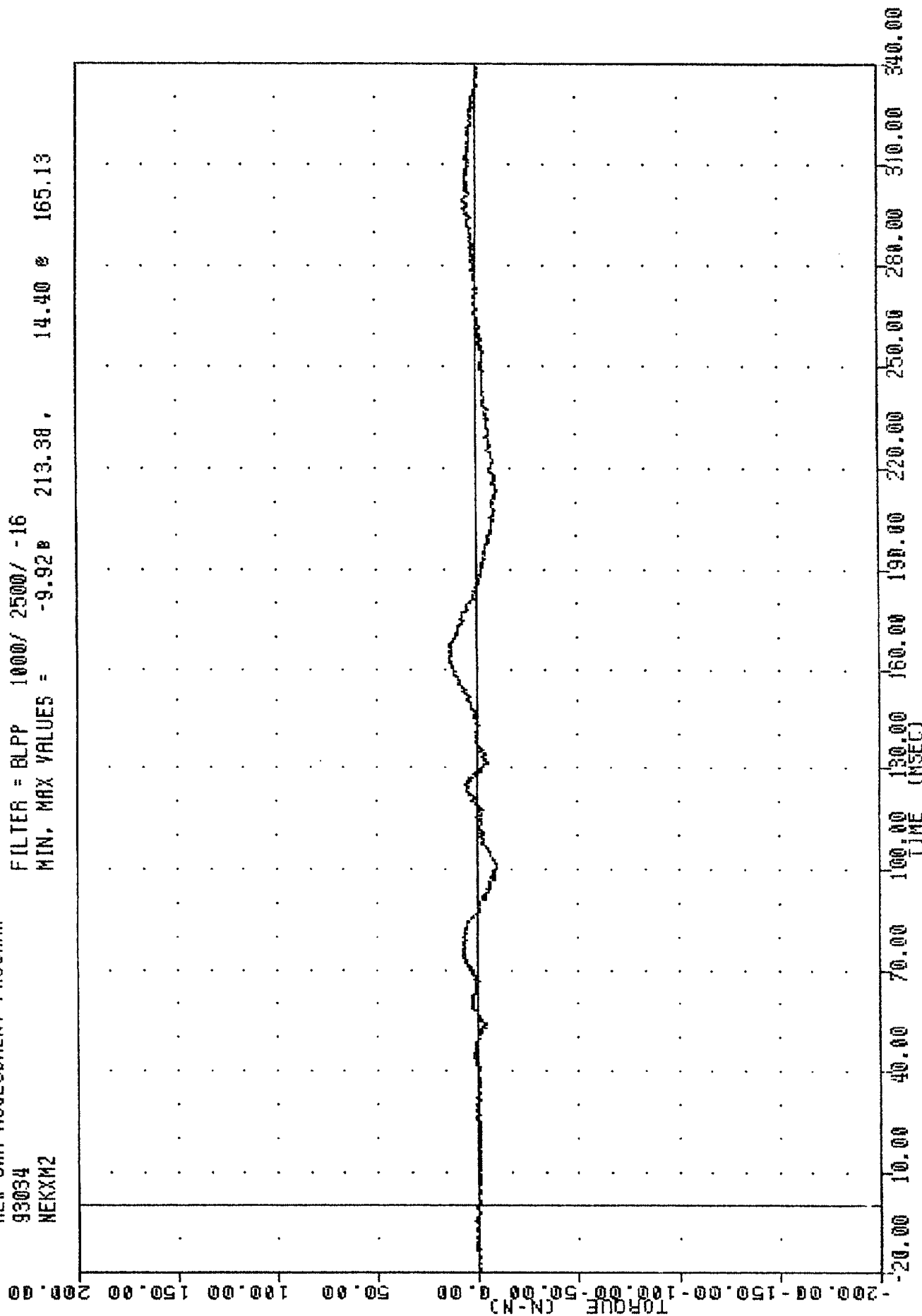
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -13.048 -9.00 209.76 e 92.88



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER NECK Z-AXIS AXIAL FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 MEKX12

FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -9.92 213.38 , 14.40 165.13



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

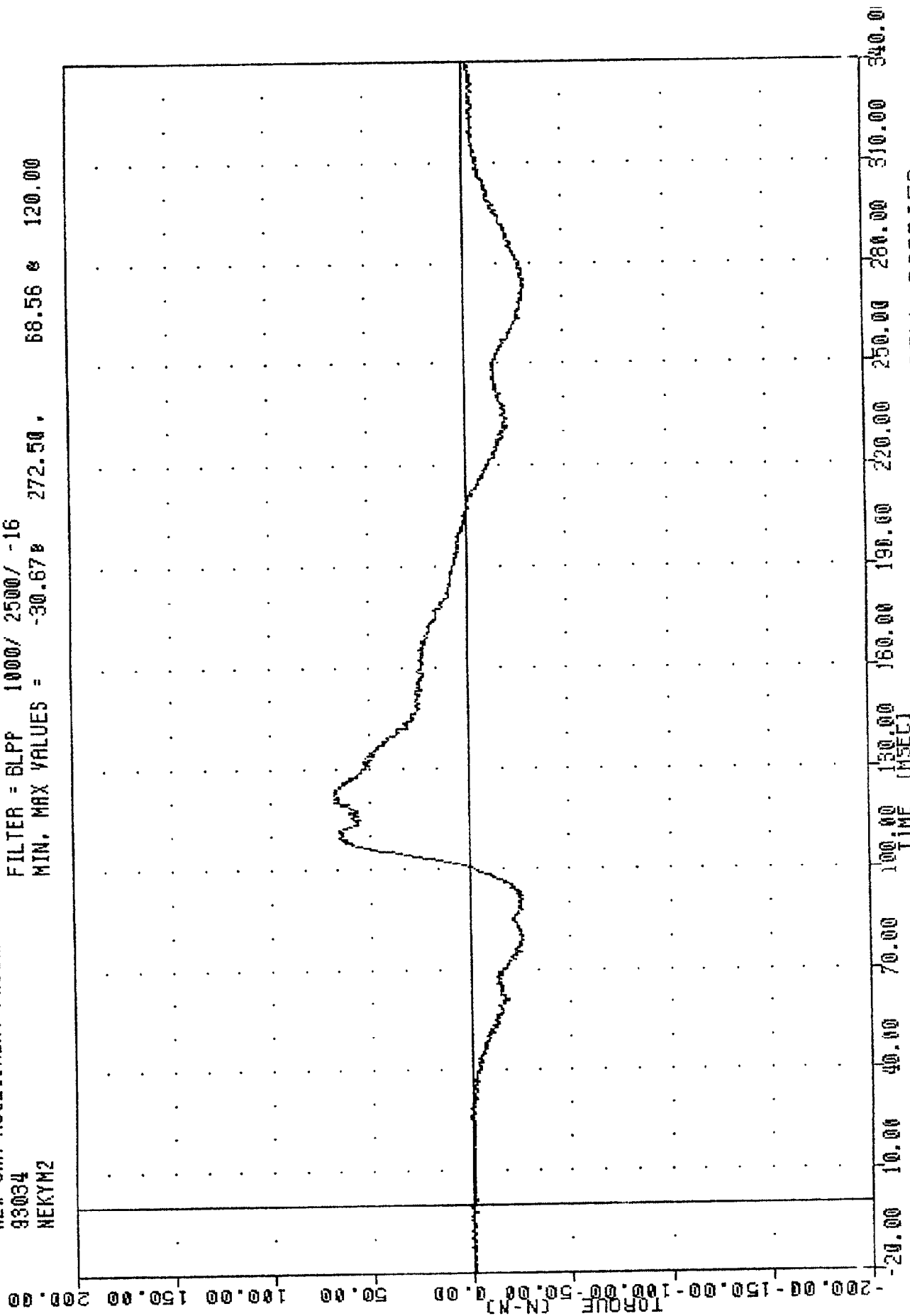
ASSESSMENT REPORT PAGE 6

TRC
NEW CAR ASSESSMENT PROGRAM
93034
NEKYM2

930203

FILTER = BLPP 1000/ 2500/ -16

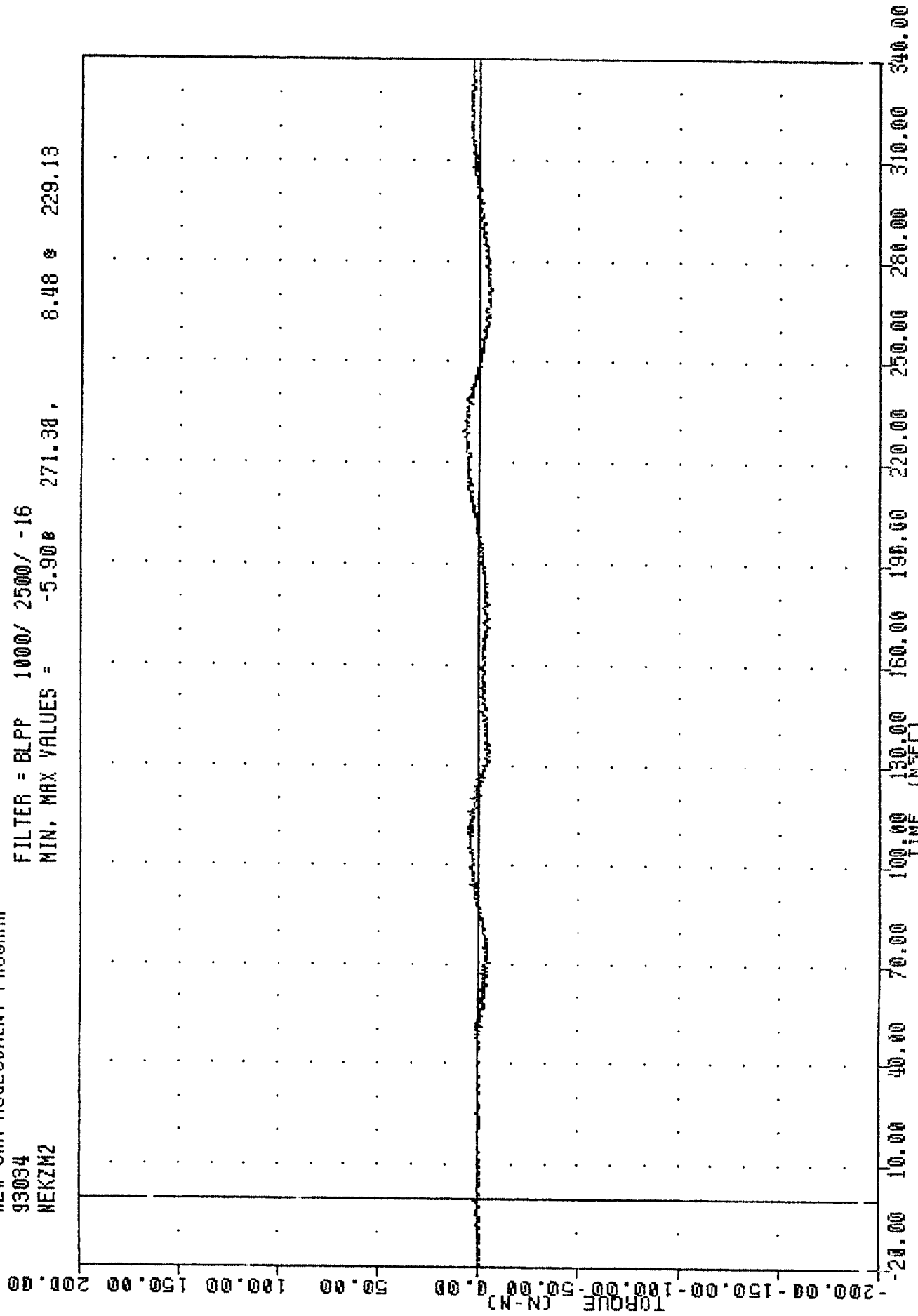
MIN. MAX VALUES = -30.67 272.50 68.56 120.00



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Y AXIS

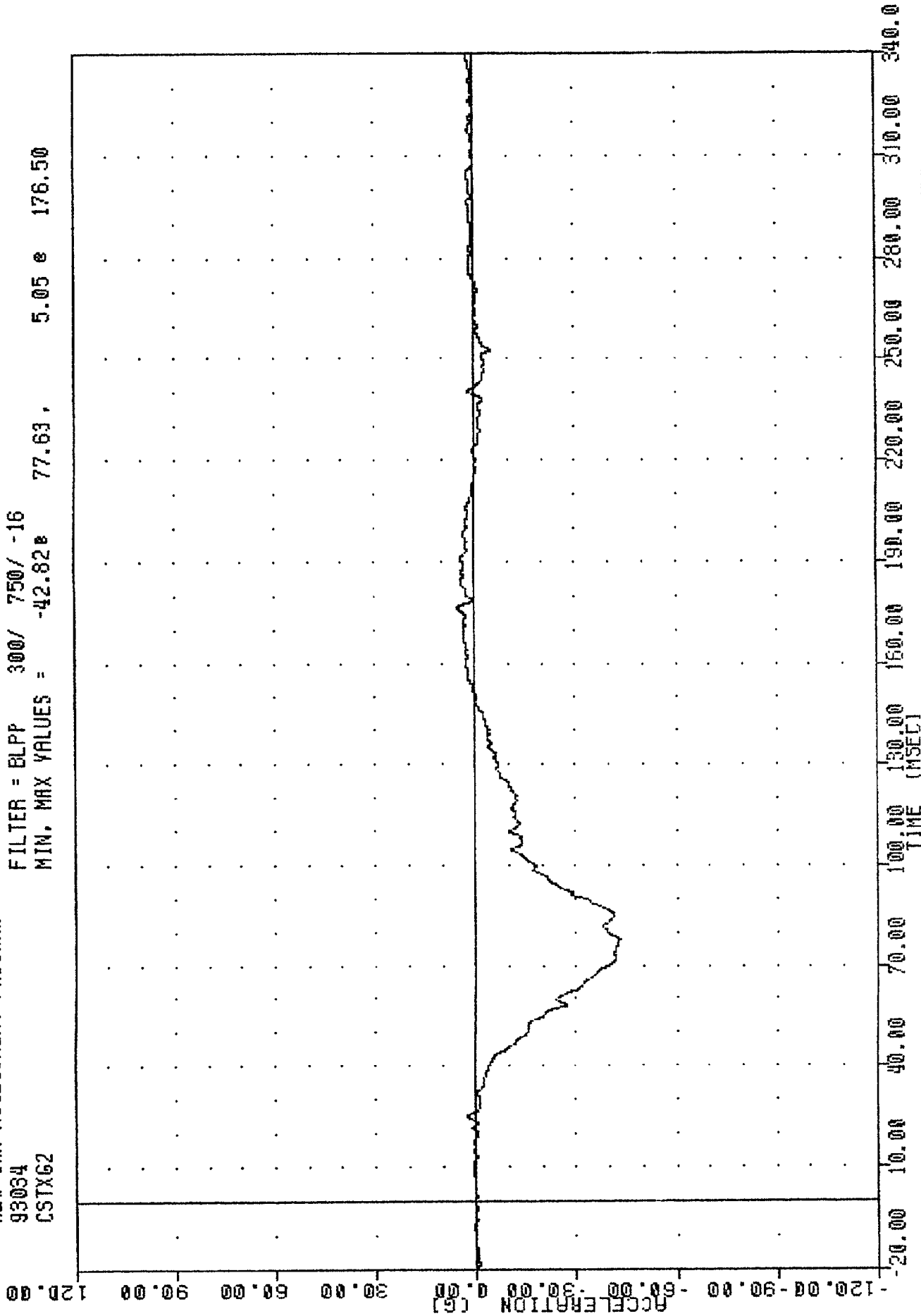
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 NEKZM2

FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -5.908 271.38, 8.48 & 229.13



TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 CSTX62

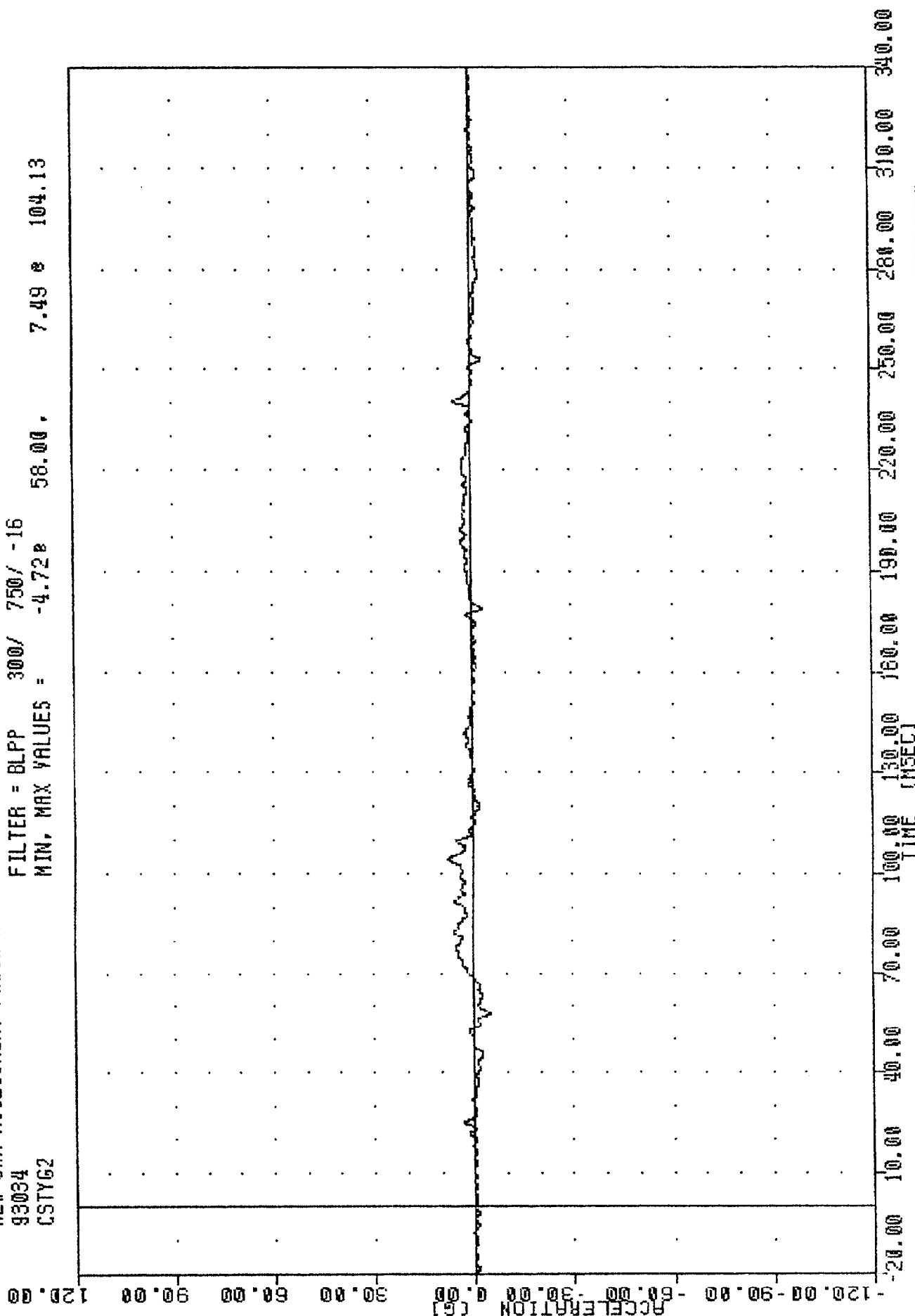
FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -42.82 77.63 , 5.05 176.50



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST X-AXIS ACCELERATION

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 CSTYG2

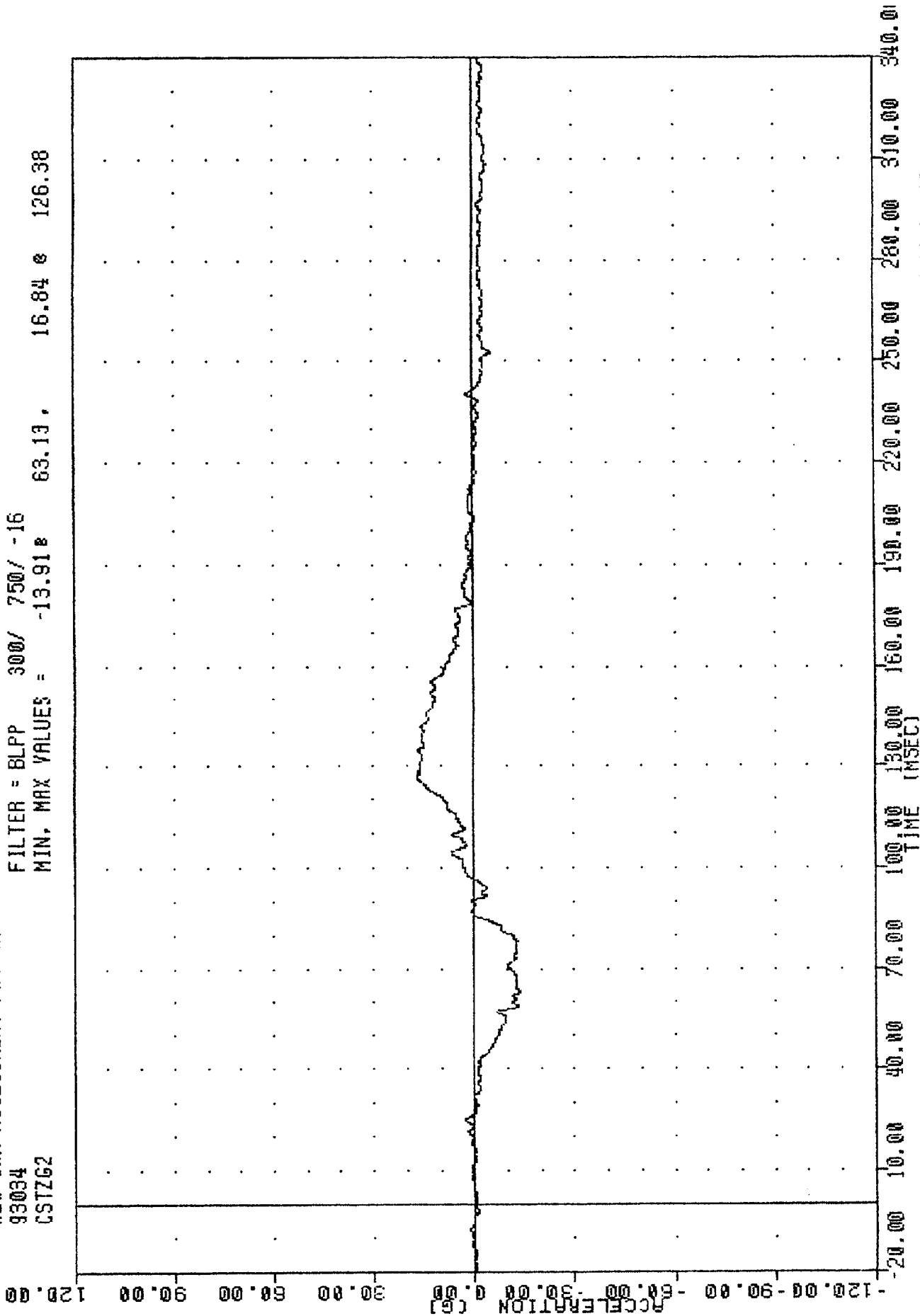
FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -4.728 58.00, 7.49 104.13



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST Y-AXIS ACCELERATION

TRC
NEW CAR ASSESSMENT PROGRAM
93034
CSTZG2

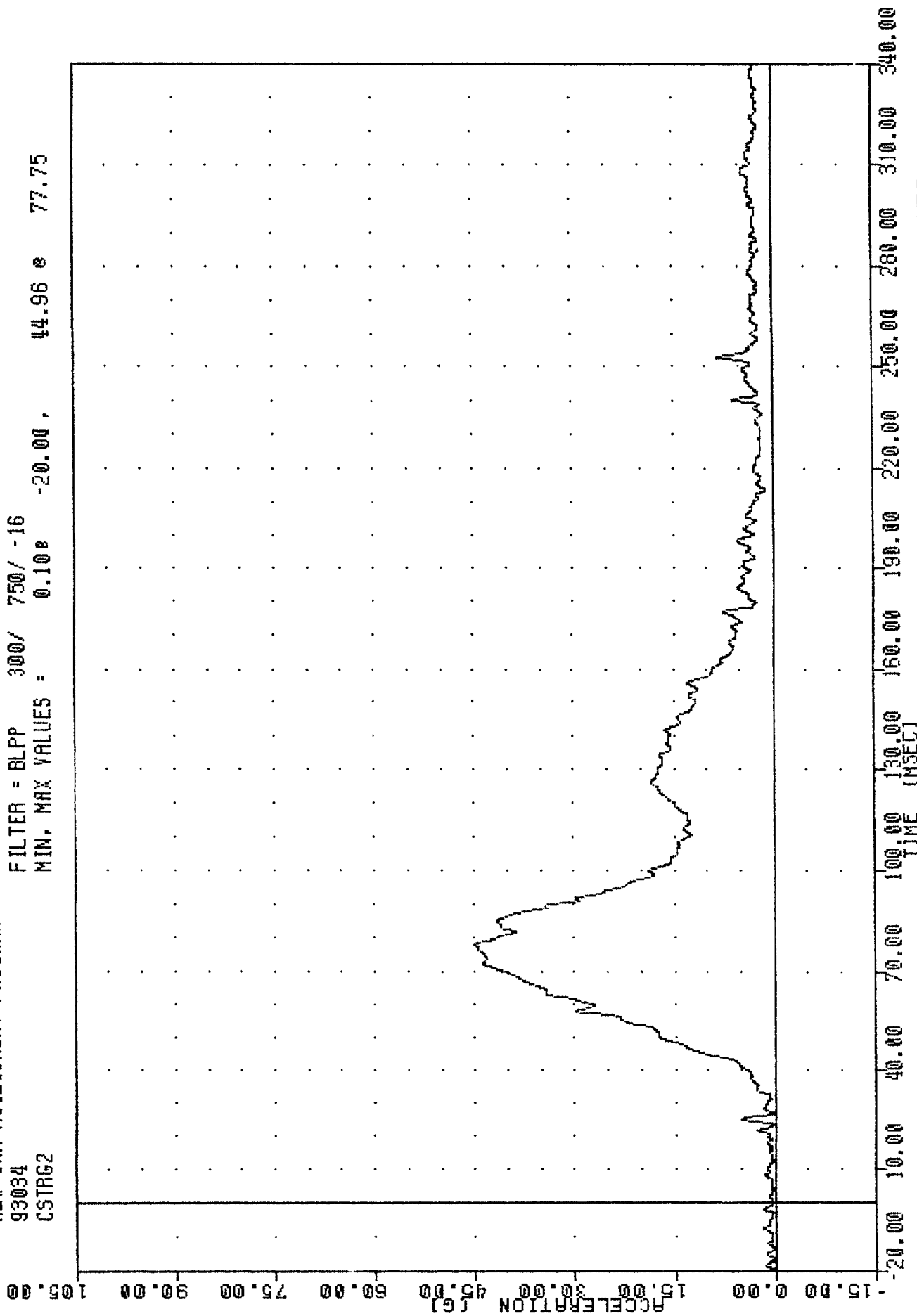
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -13.91 63.13, 16.84 126.38



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 CSTR62

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.108 -20.00, 44.96 8 77.75

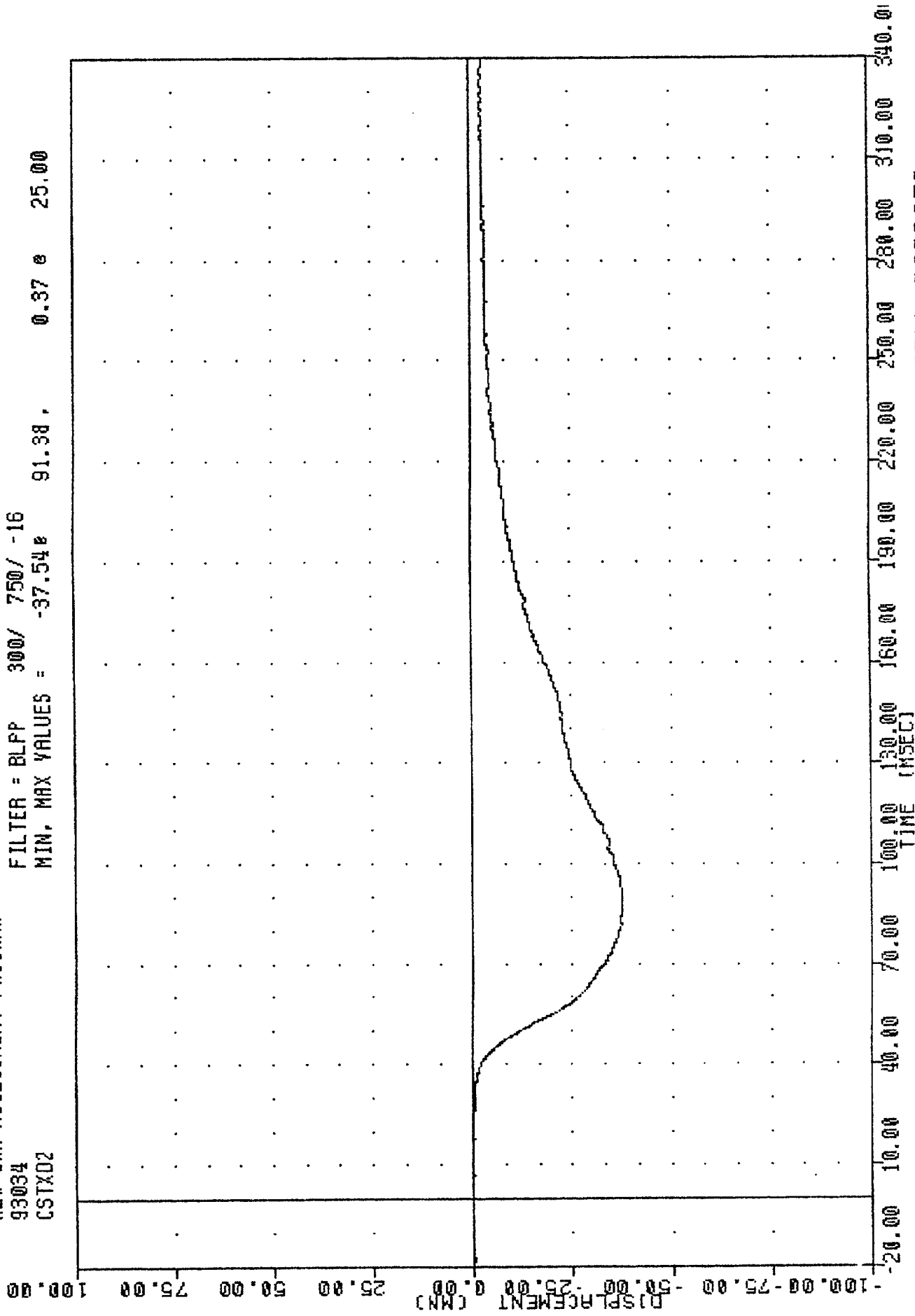


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER RESULTANT ACCELERATION

TRC
 93034
 NEW CAR ASSESSMENT PROGRAM
 CSTXD2

, 930203

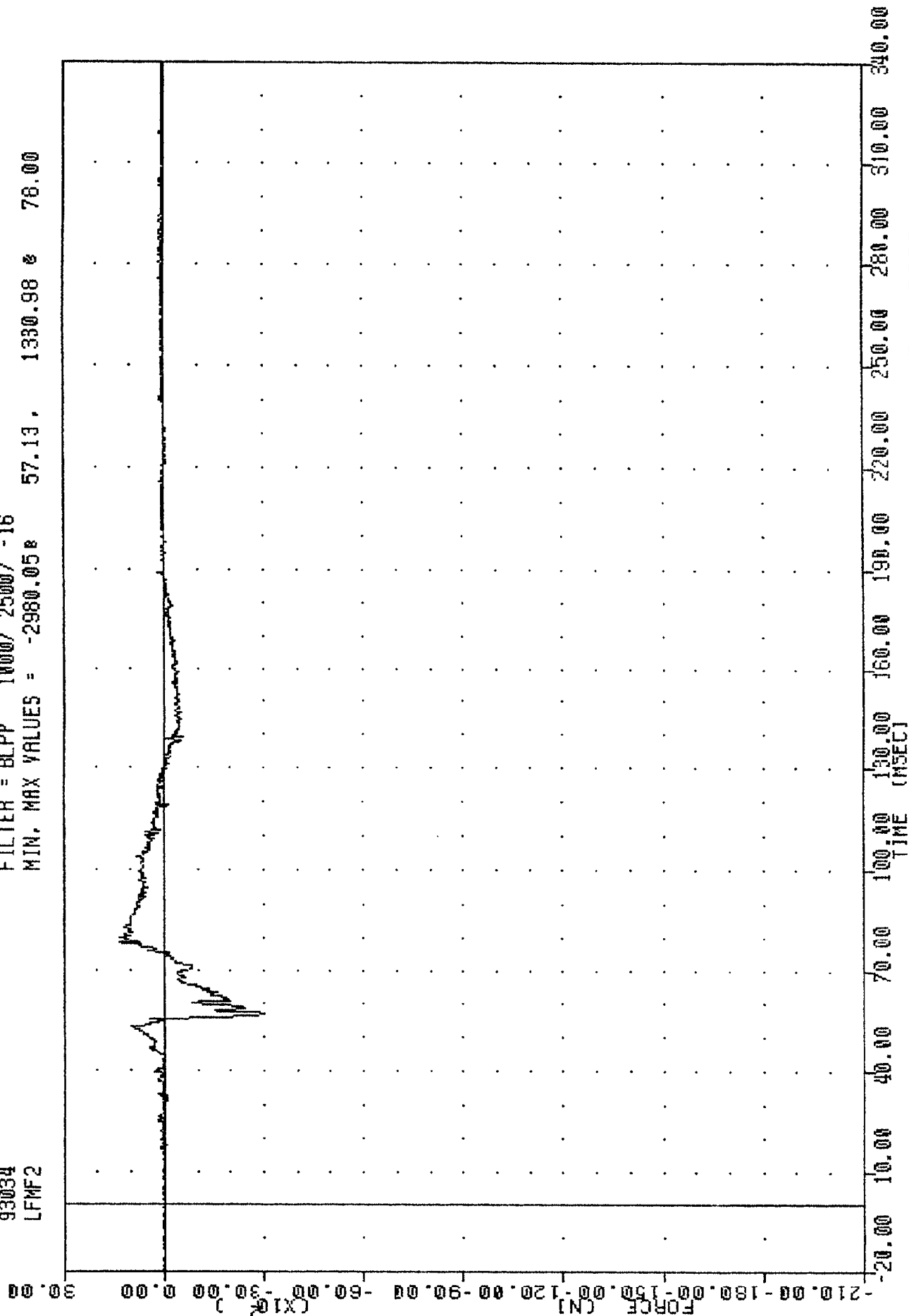
FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -37.54 91.38, 0.37 25.00



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST DEFLECTION

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 LFMF2

FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -2980.058 57.13, 1330.98 76.00

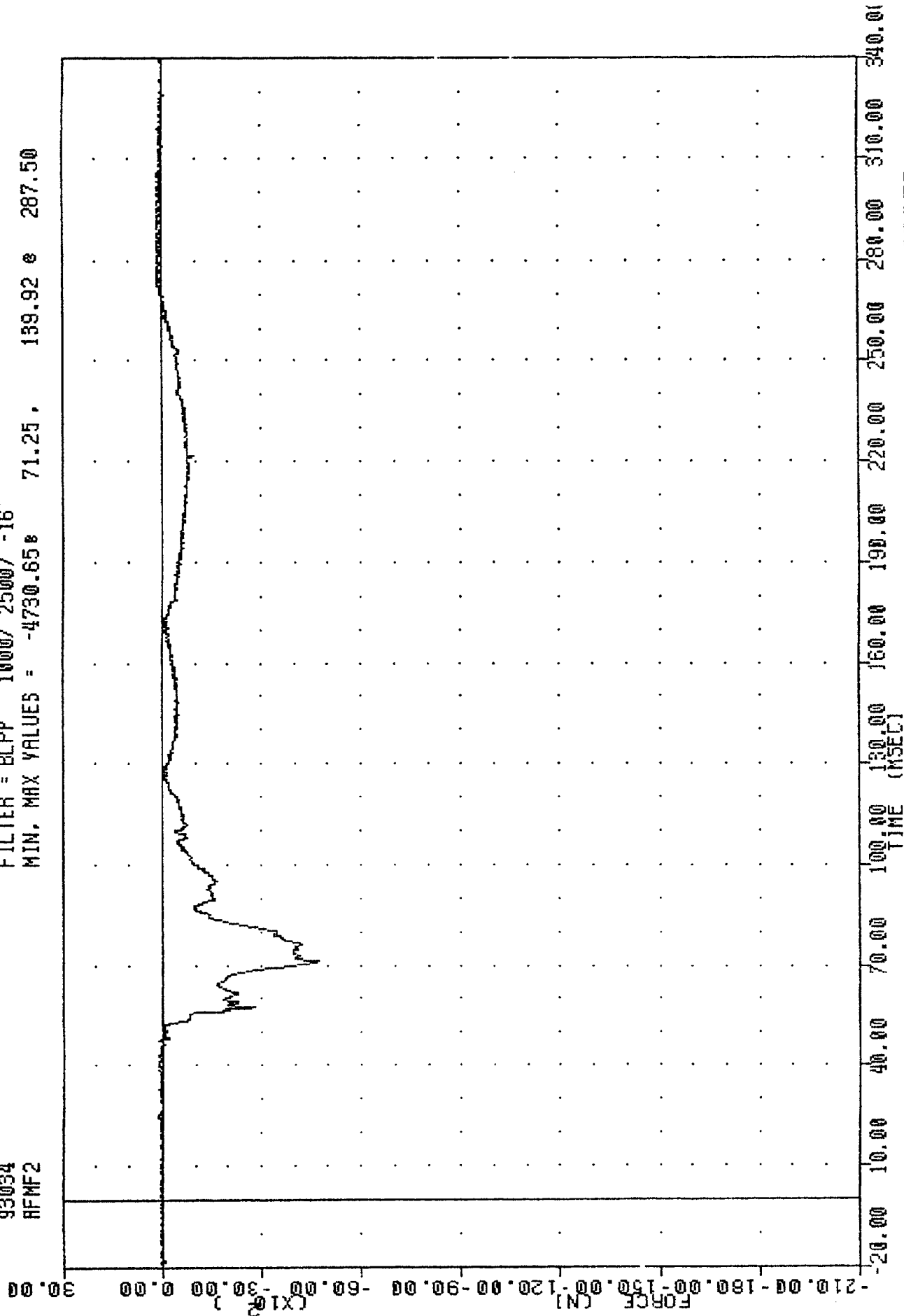


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER LEFT FEMUR FORCE

TRC
 93034
 NEW CAR ASSESSMENT PROGRAM
 AFMF2

, 930203

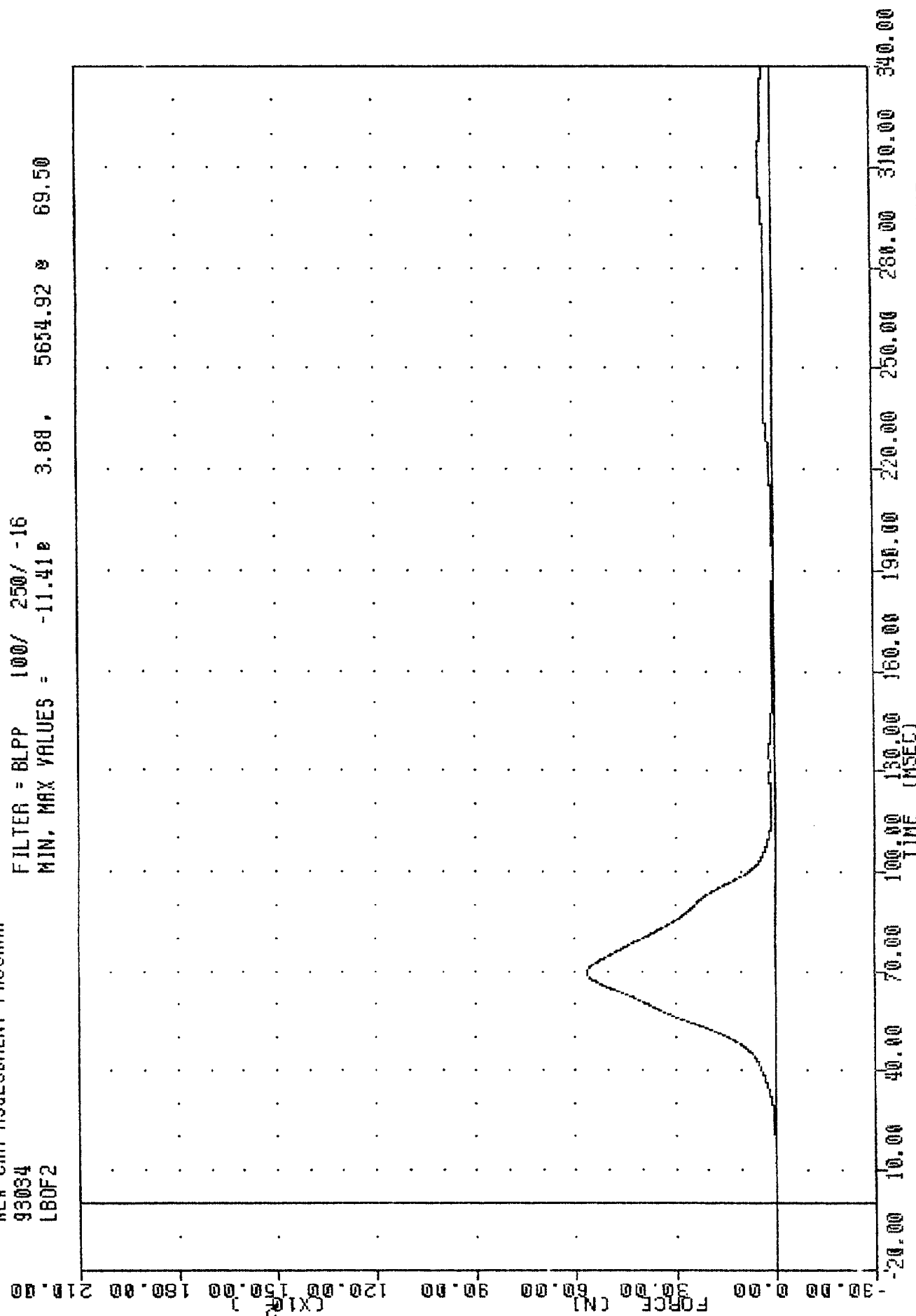
FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -4730.65% 71.25, 139.92 & 287.50



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 PASSENGER RIGHT FEMUR FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 LBOF2

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -11.41e 3.88, 5654.92 e 69.50

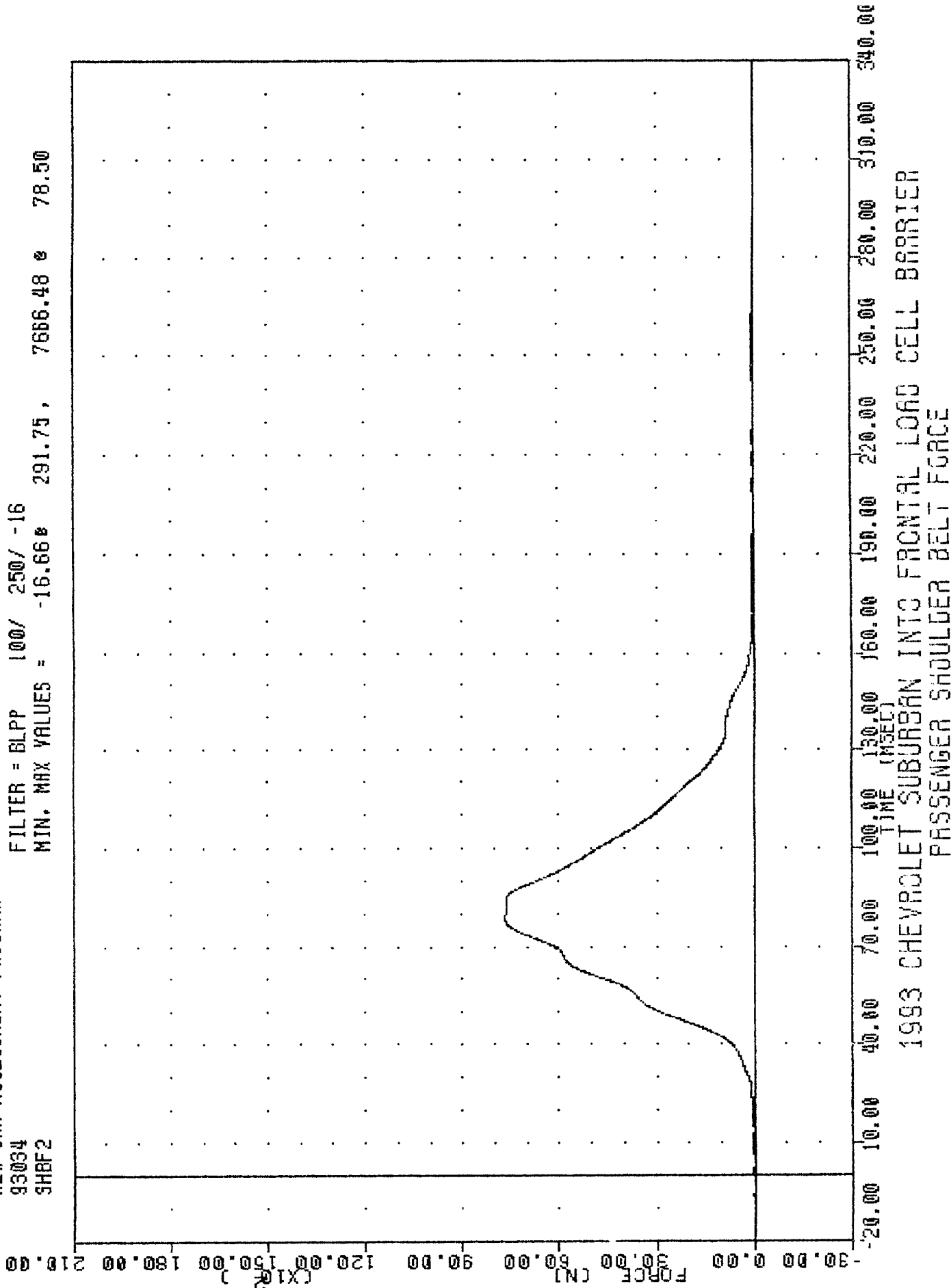


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

ASSESSMENT LAB REPORT

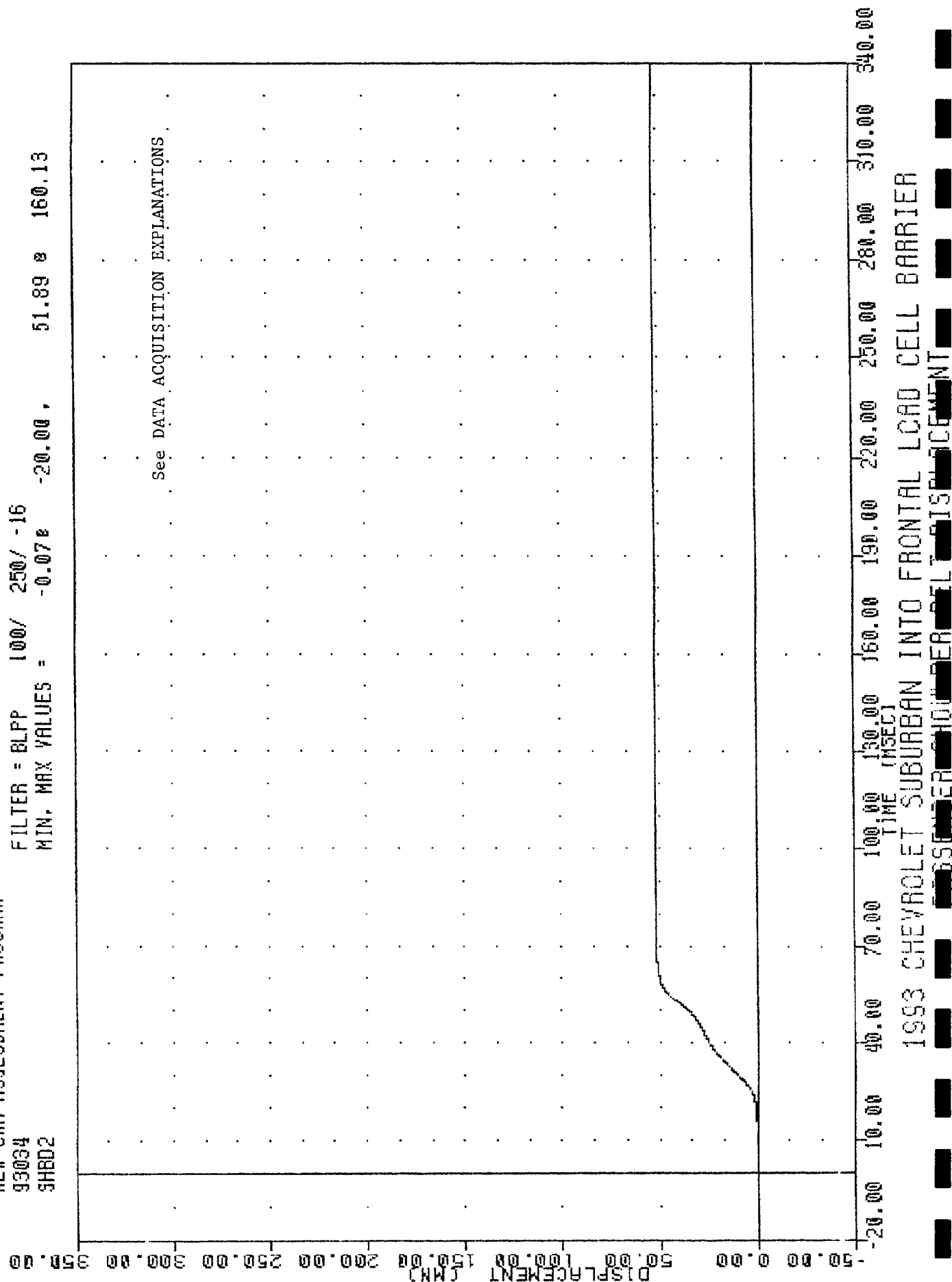
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 SHBF2

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -16.66 291.75, 7666.48 78.50



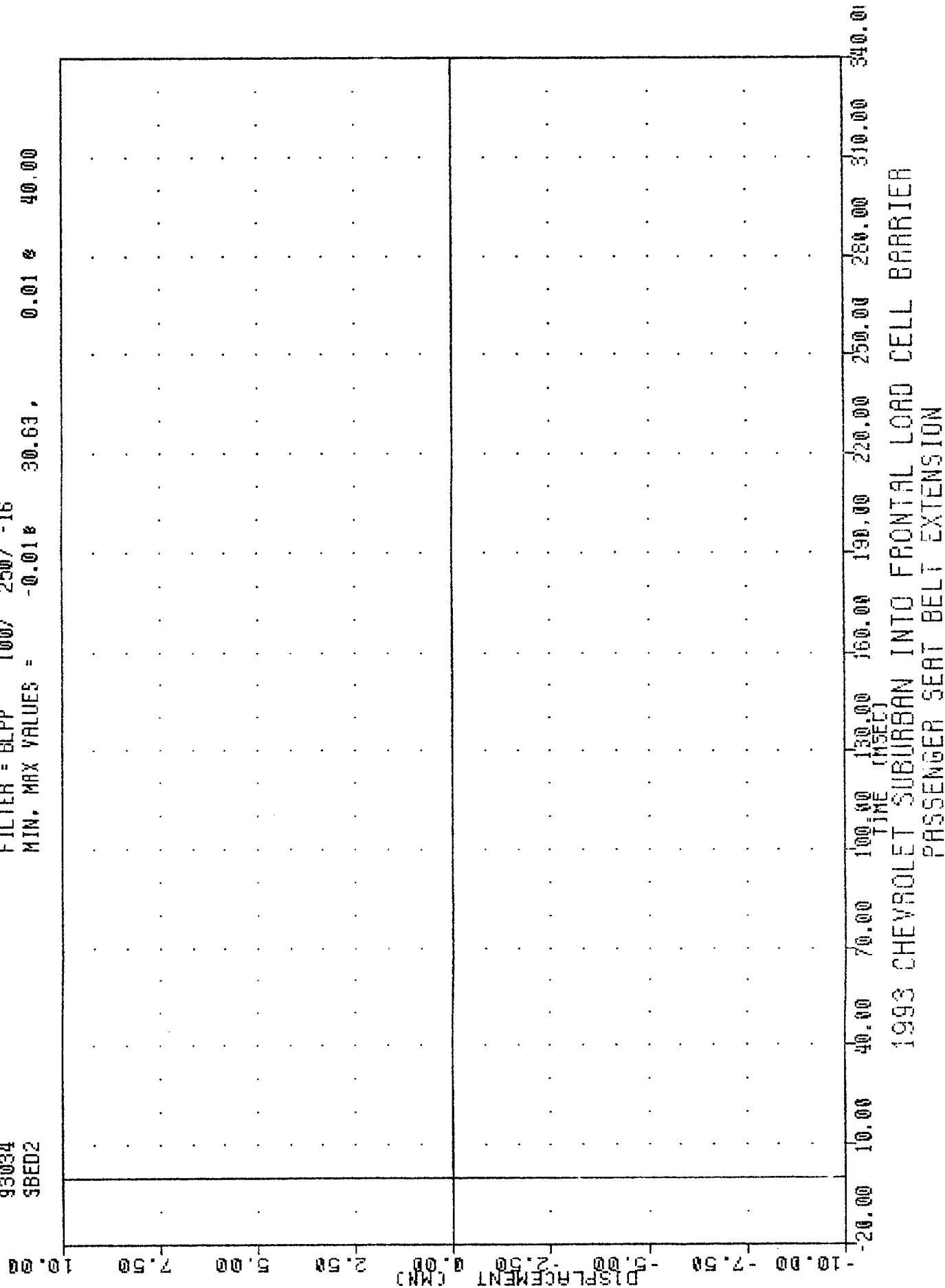
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 SHBD2

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -0.072 -20.00 , 51.89 3 160.13



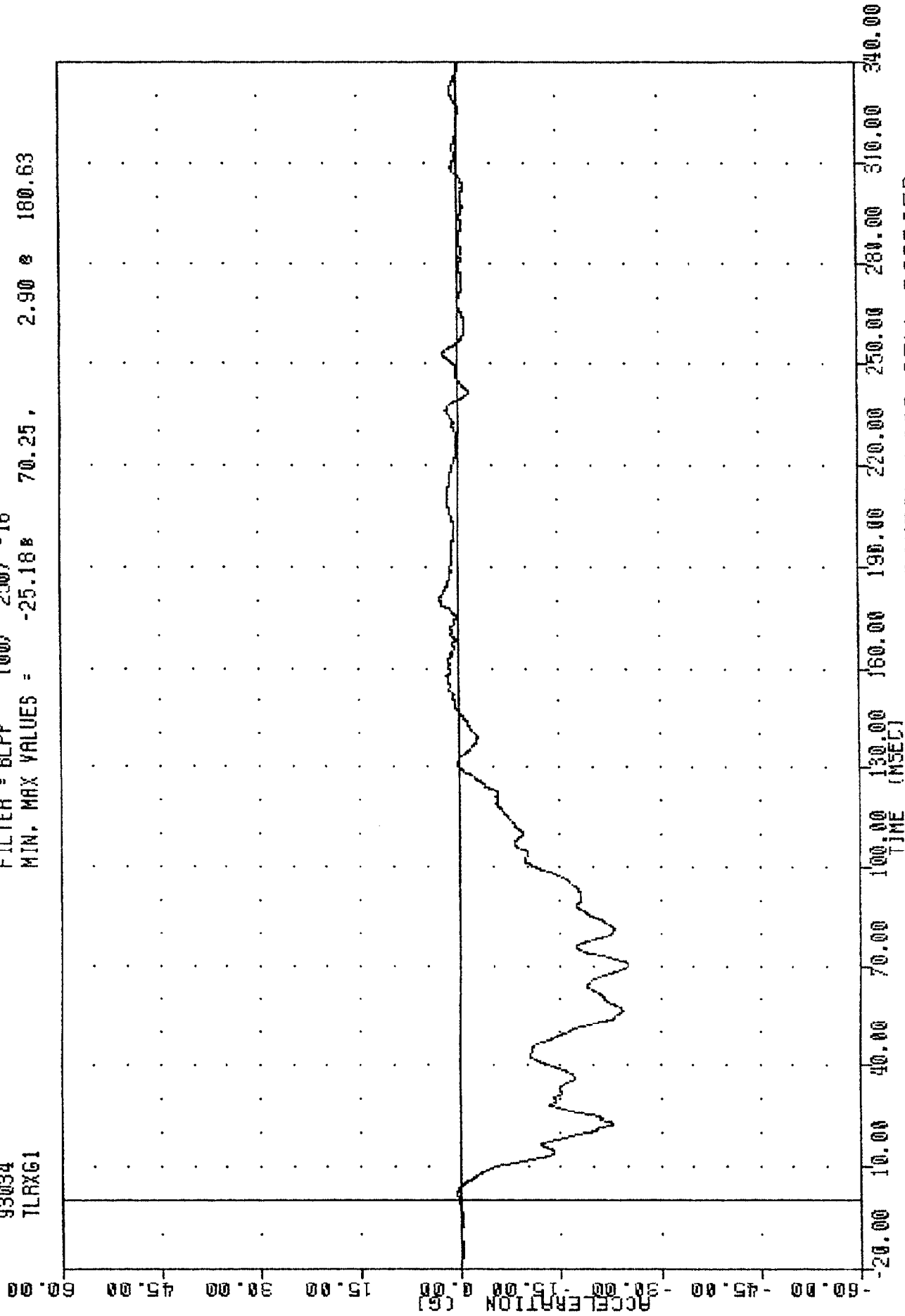
TRC
 93034
 5BED2
 NEW CAR ASSESSMENT PROGRAM

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -0.018 30.63, 0.018 40.00



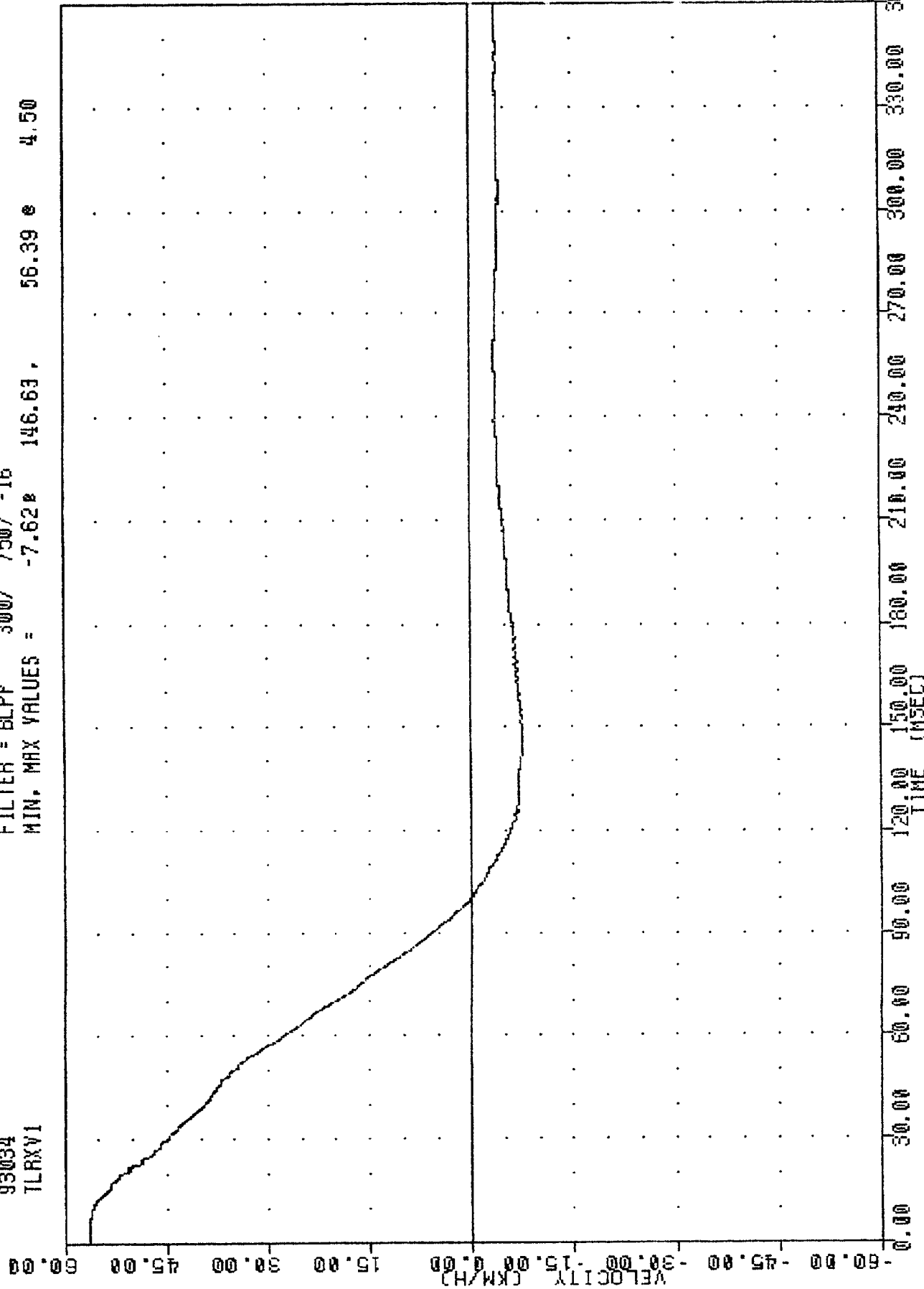
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 TLRXG1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -25.18 70.25, 2.90 180.63



TRC
 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 TLRXV1

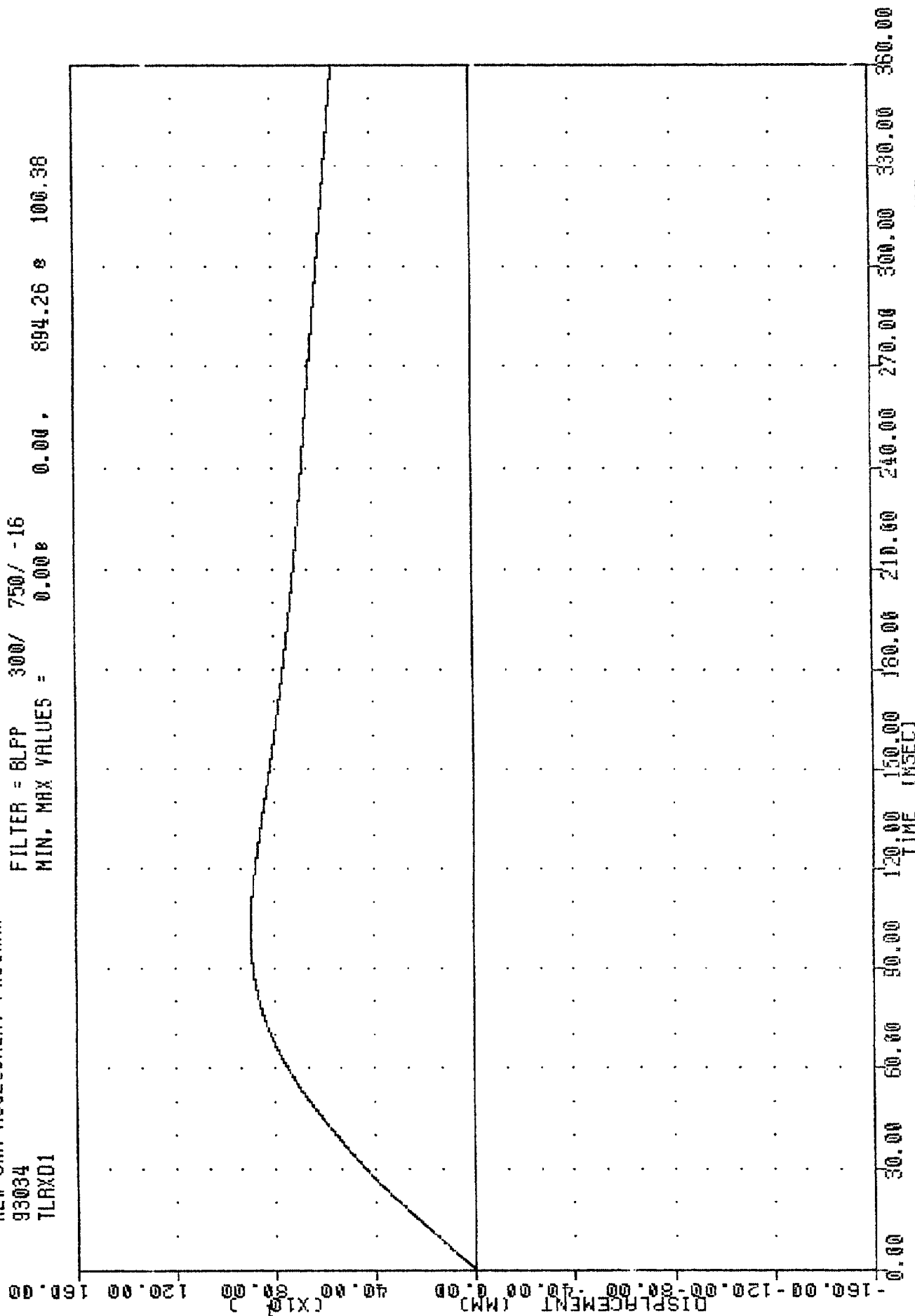
FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -7.62 146.63, 56.39 e 4.50



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS VELOCITY

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 TLRXD1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.00e 0.00, 894.26 e 100.38

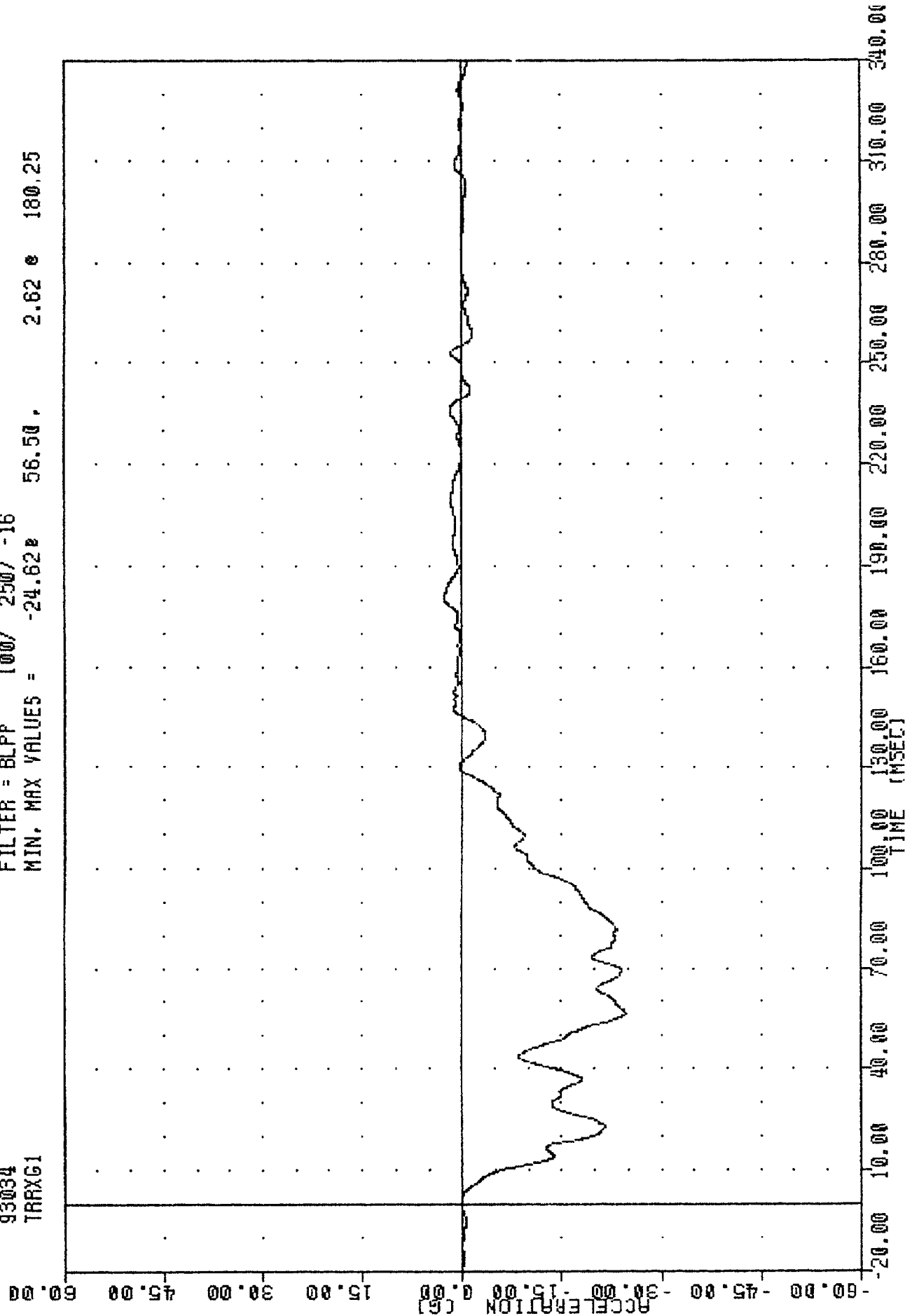


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LEFT TERTIARY X-AXIS DISPLACEMENT

TRC
NEW CAR ASSESSMENT PROGRAM
93034
TRRXG1

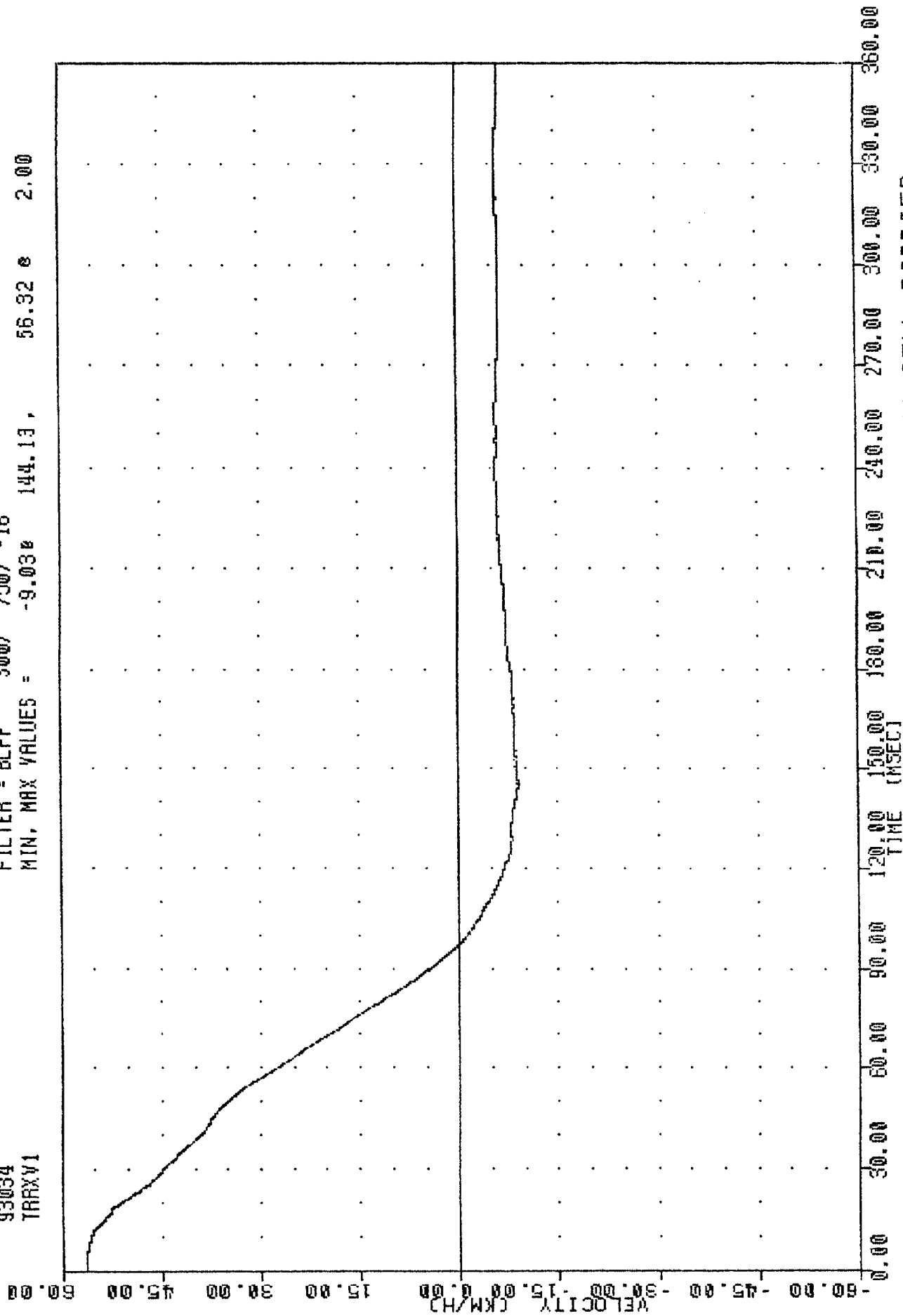
, 930203

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -24.62 56.50, 2.62 180.25



TRC 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 TRAXV1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -9.036 144.13, 56.32 2.00



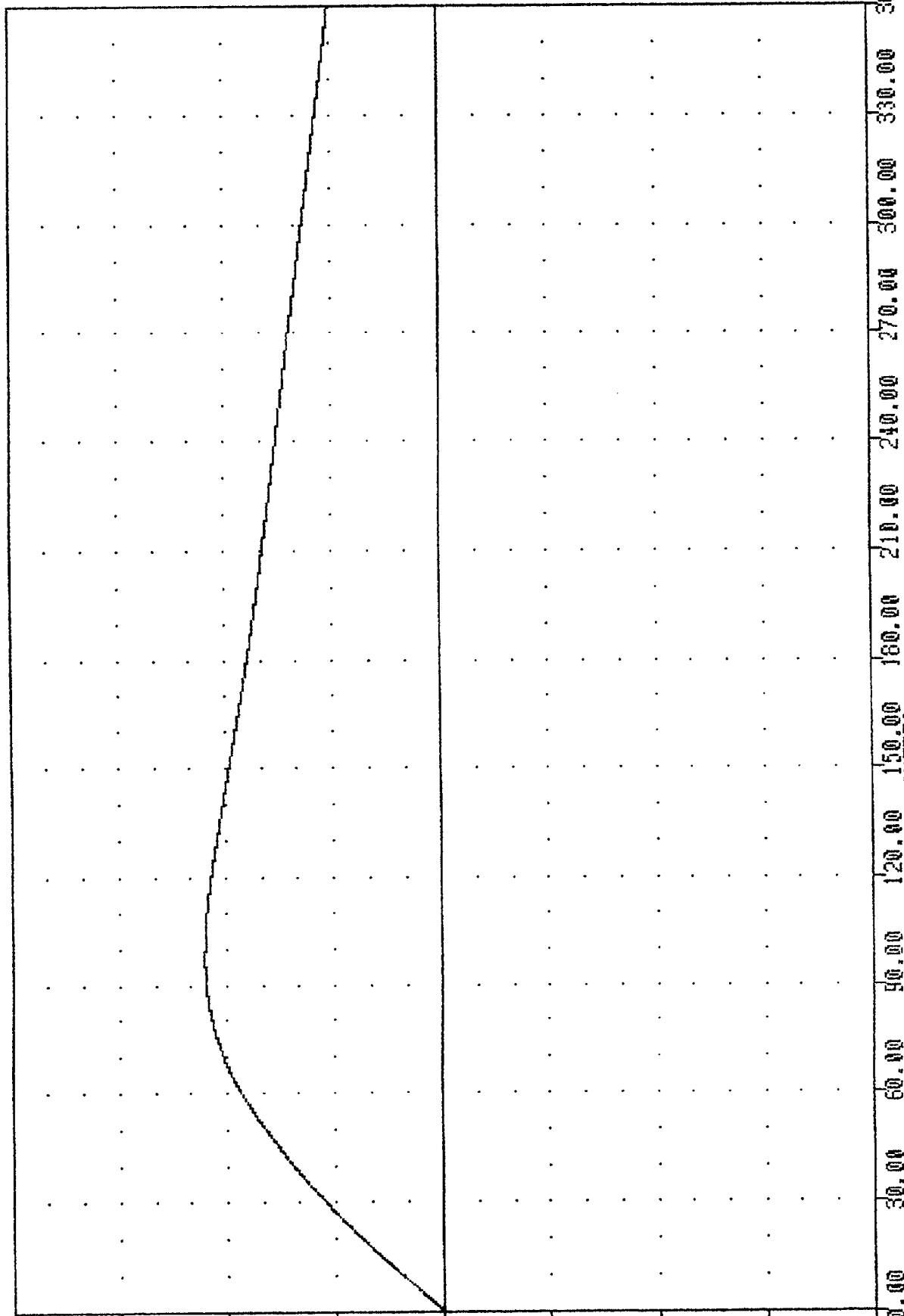
1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

RIGHT REAR SEAT MAX VELOCITY

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 TRXD1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.00 0.00 , 880.50 97.13

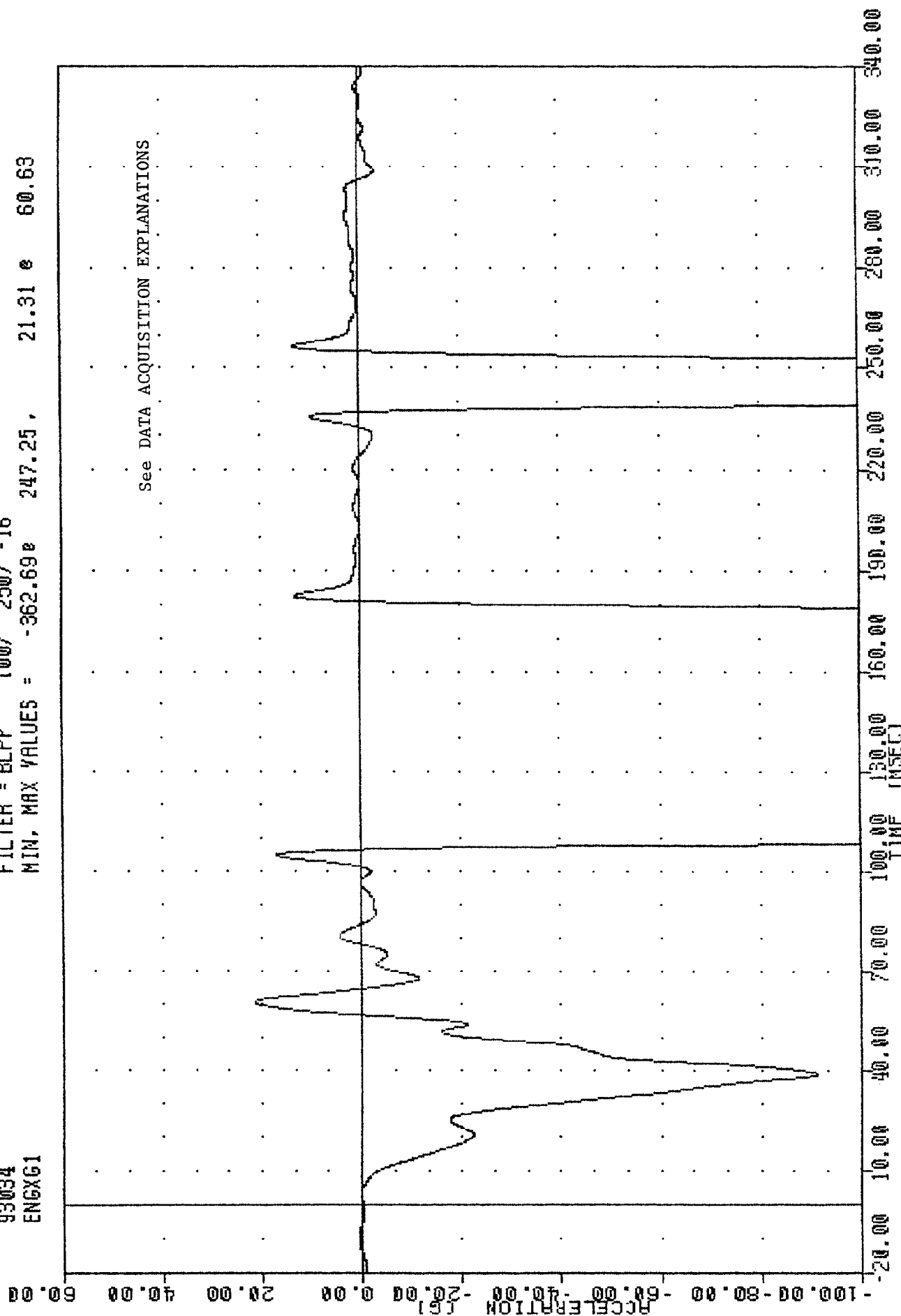
DISPLACEMENT (MM)
 (X10⁴)



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS DISPLACEMENT

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 ENGCG1

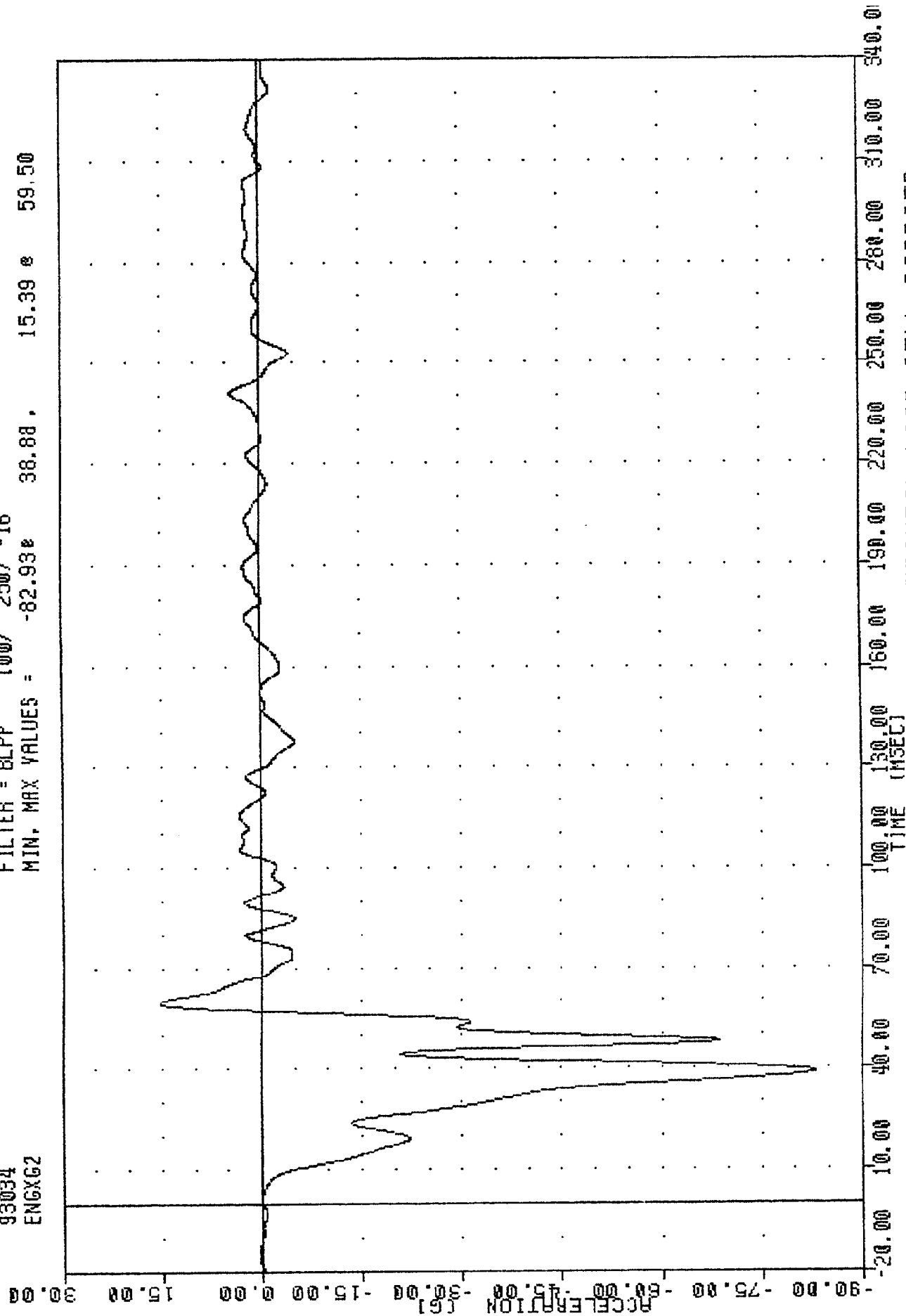
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -362.69e 247.25, 21.31 e 60.63



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 ENGINE TOP MAX ACCELERATION

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 ENGCG2

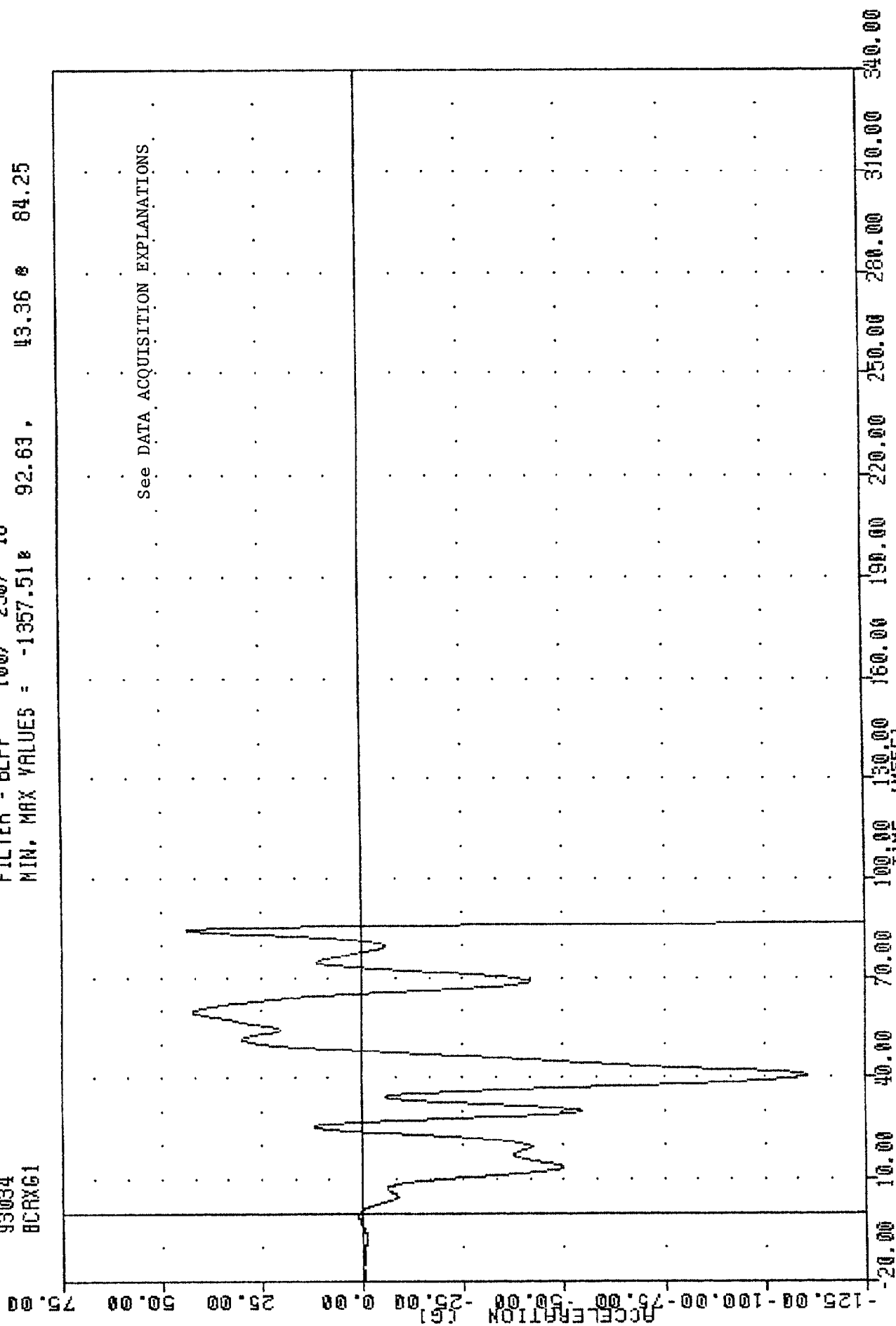
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -82.93e 15.39 e 59.50
 38.88 .



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 ENGINE BOTTOM X-AXIS ACCELERATION

TRC 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BCRXG1

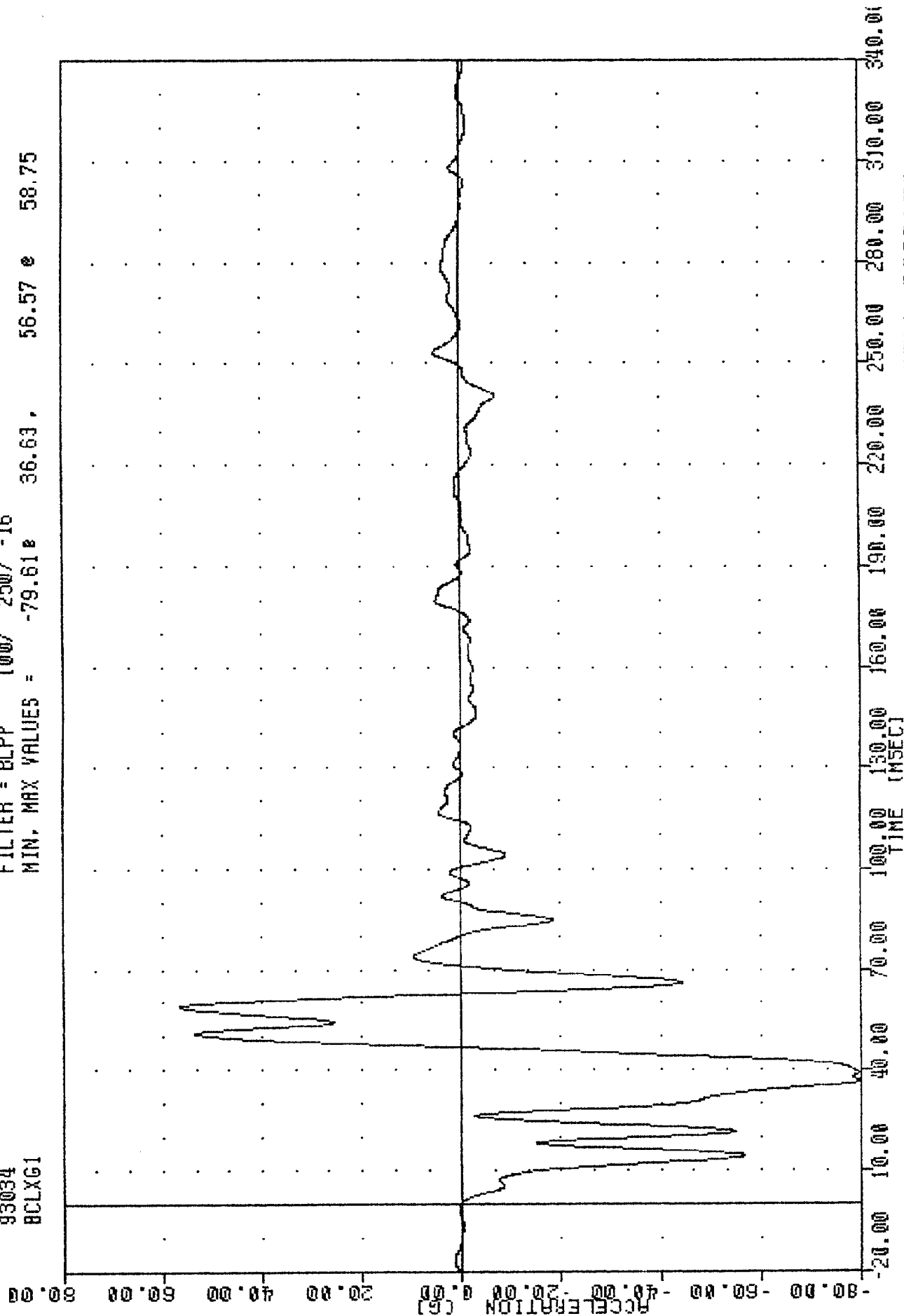
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1357.51 92.63 43.36 84.25



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 RIGHT BRAKE CALIPER AXIAL ACCELERATION

TRC , 930203
NEW CAR ASSESSMENT PROGRAM
93034
BCLXG1

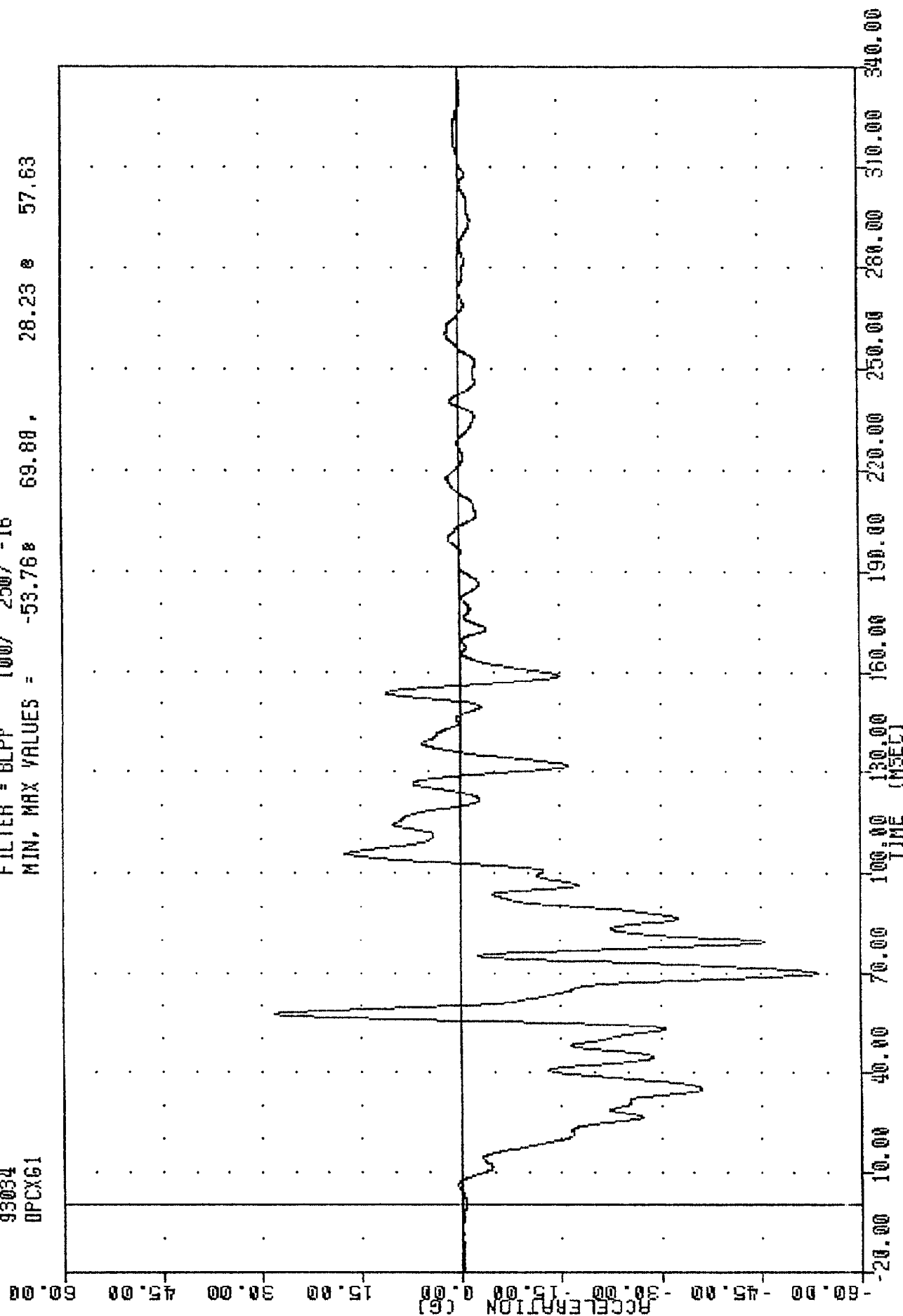
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -79.61e 36.63, 56.57 e 58.75



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

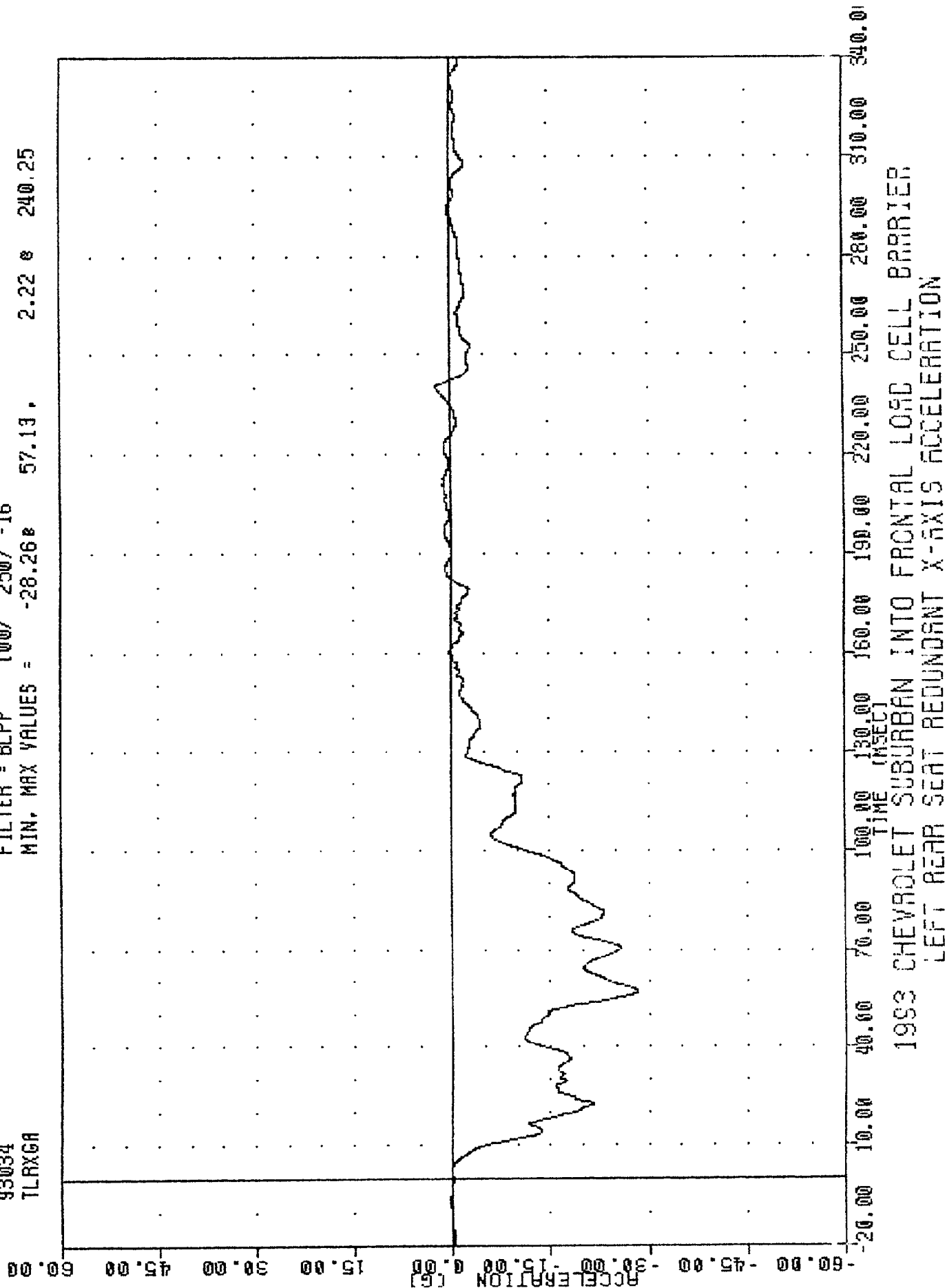
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 0PCXG1

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -53.76 69.88 28.23 57.63



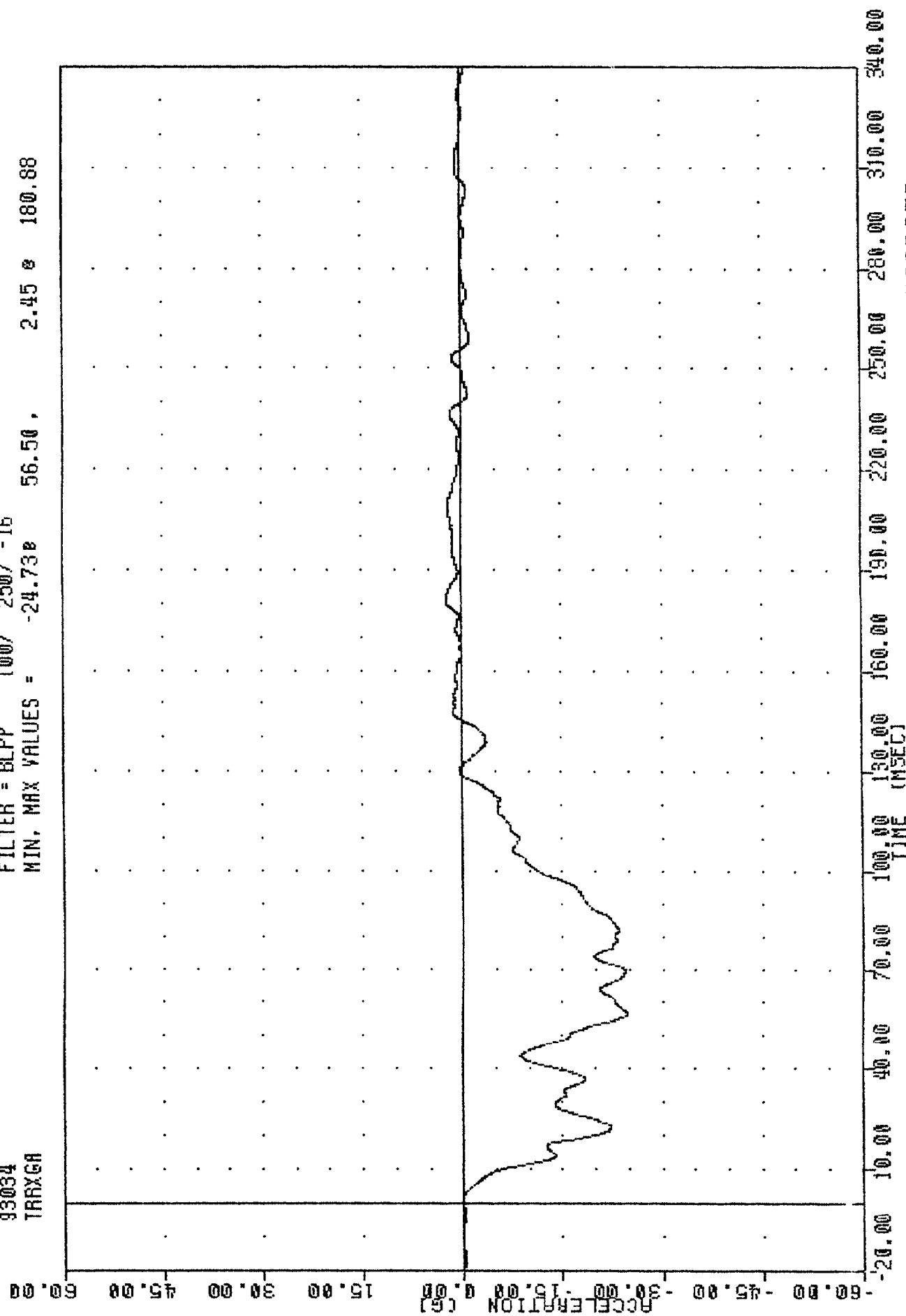
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 TLRXGA

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -28.26e 57.13. 2.22 e 240.25



TRC , 930203

FILTER = BLPP 100/ 250/ -16



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
TIME (MSEC)

TRC
NEW CAR ASSESSMENT PROGRAM
93034
BR3F

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -1.12e 13.88, 0.72 e 23.88

25.00

0.00

-25.00

-50.00

-75.00

-100.00

-125.00

-150.00

-175.00

FORCE (KN)

-20.00

10.00

40.00

70.00

100.00

130.00

160.00

190.00

220.00

250.00

280.00

310.00

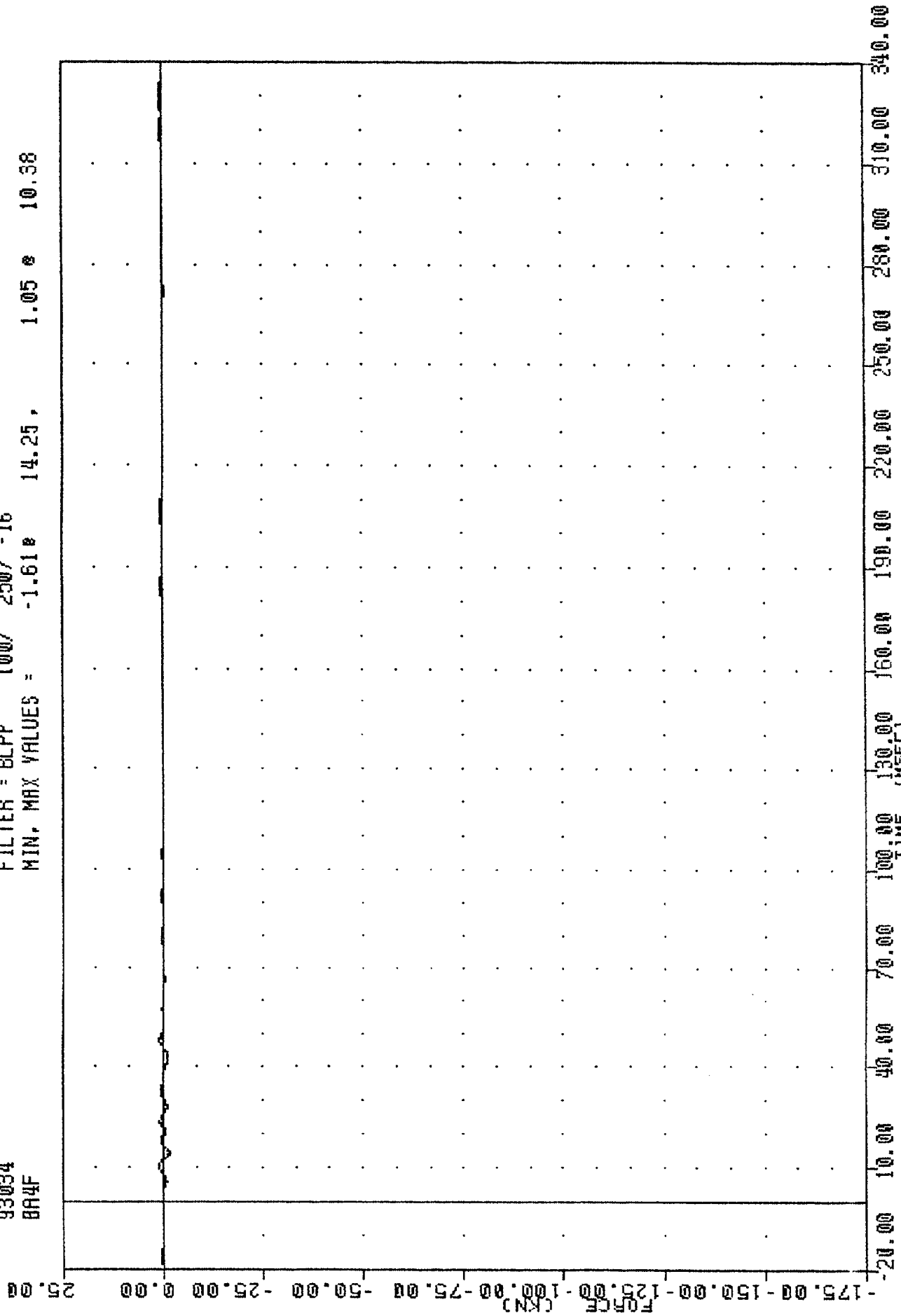
340.00

TIME (MSEC)

1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION #3 FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BR4F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1.61e 14.25, 1.05 e 10.58



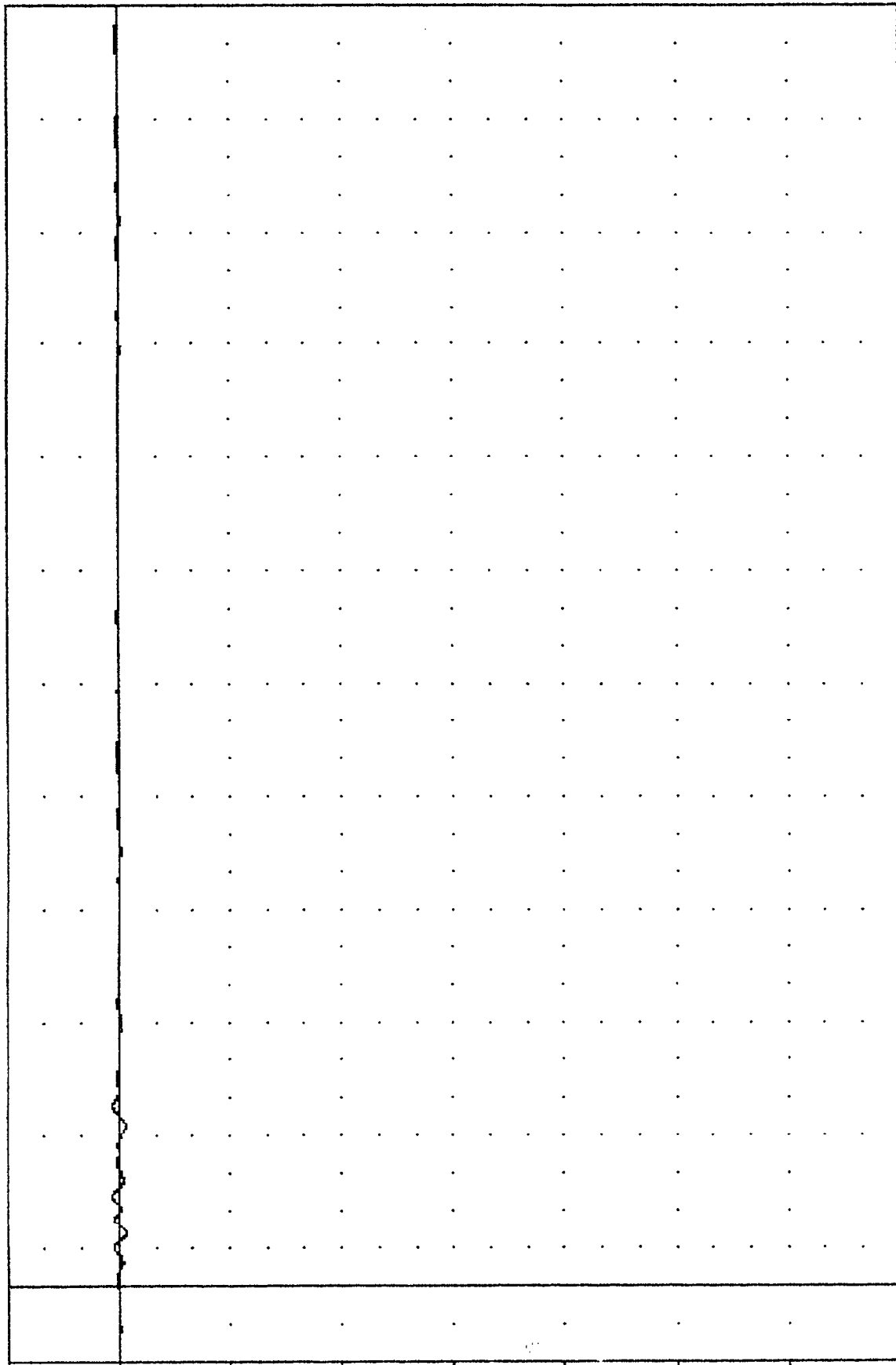
1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION ON FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BR5F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1.87 14.13, 1.44 23.75

25.00



FORCE (KN)

-20.00

-175.00

-150.00

-125.00

-100.00

-75.00

-50.00

-25.00

0.00

25.00

340.00

310.00

280.00

250.00

220.00

190.00

160.00

130.00

100.00

70.00

40.00

10.00

0.00

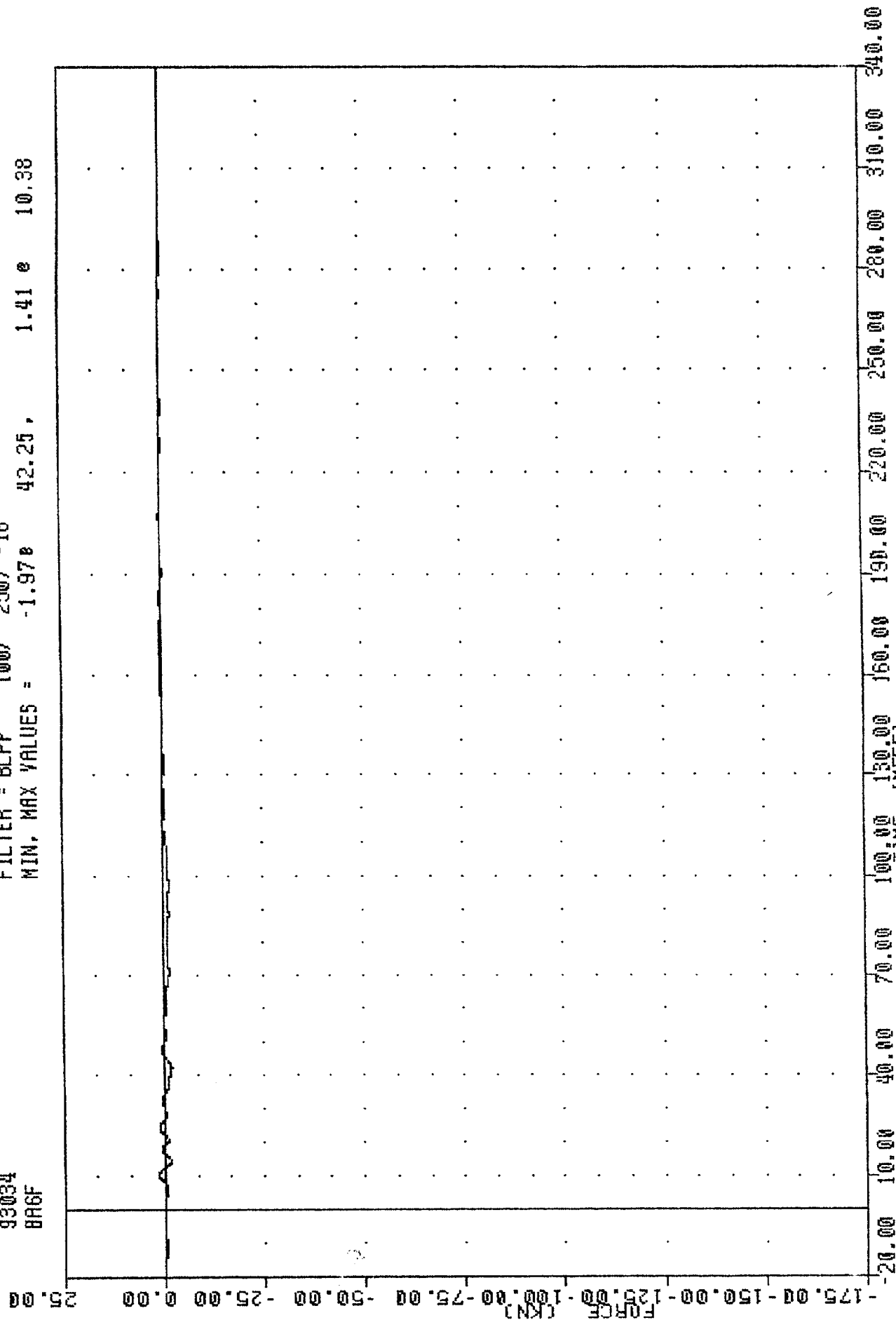
TIME (msec)

1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION A5 FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BR6F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1.97e 42.25, 1.41 e 10.38

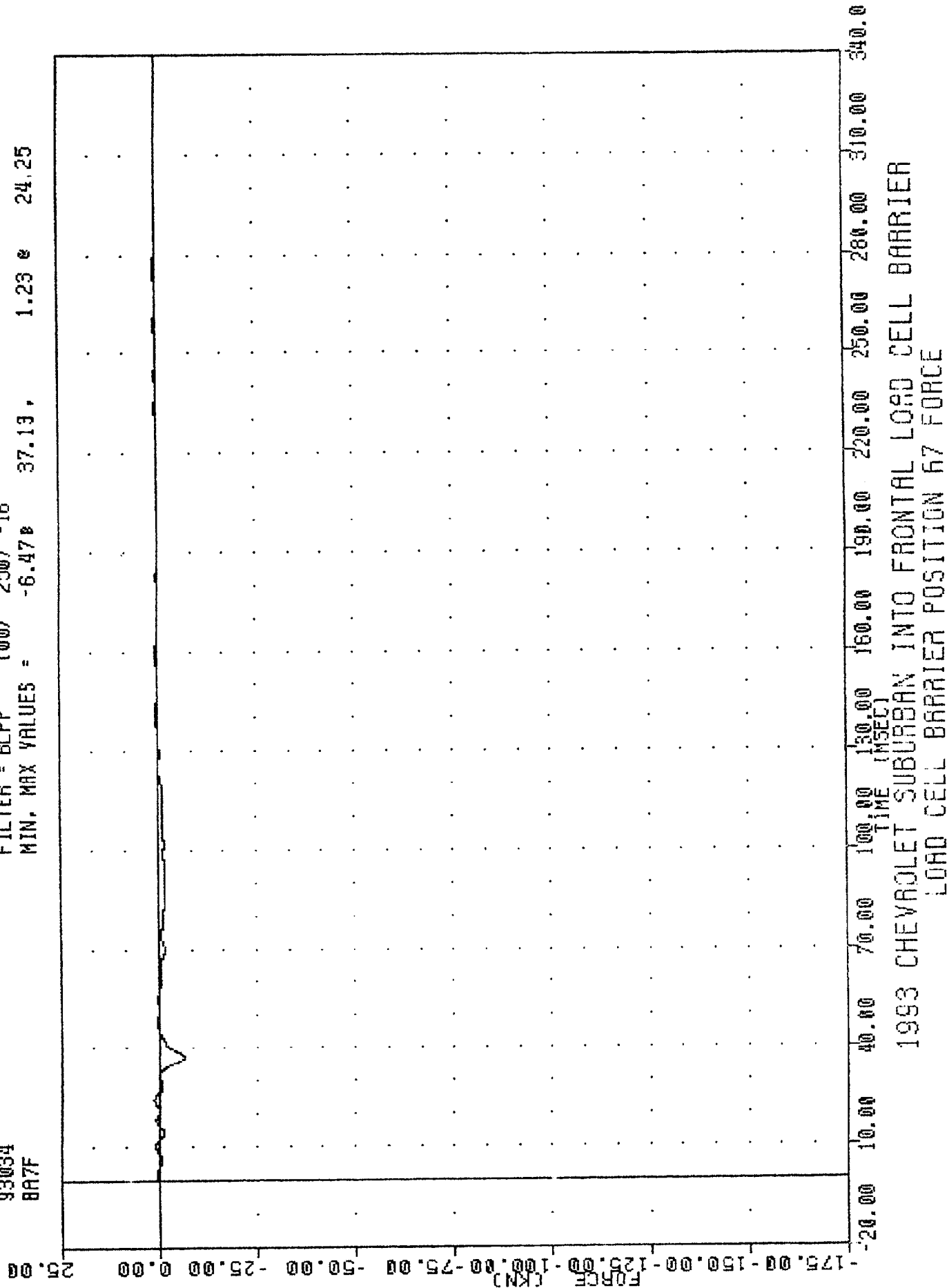


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION FORCE

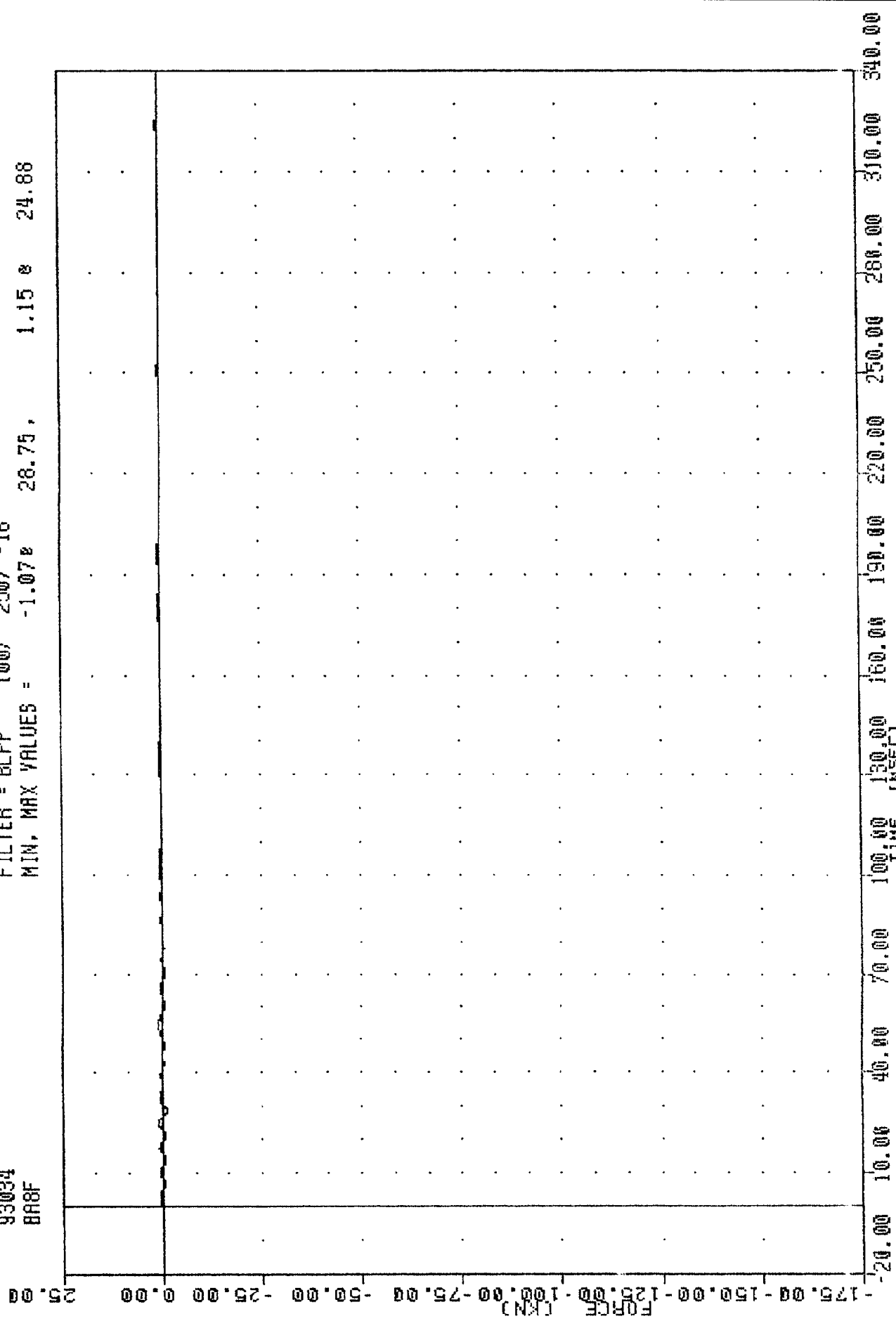
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BA7F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -6.47 37.13 1.23 24.25



TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 888F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -1.07e 28.75, 1.15 e 24.88

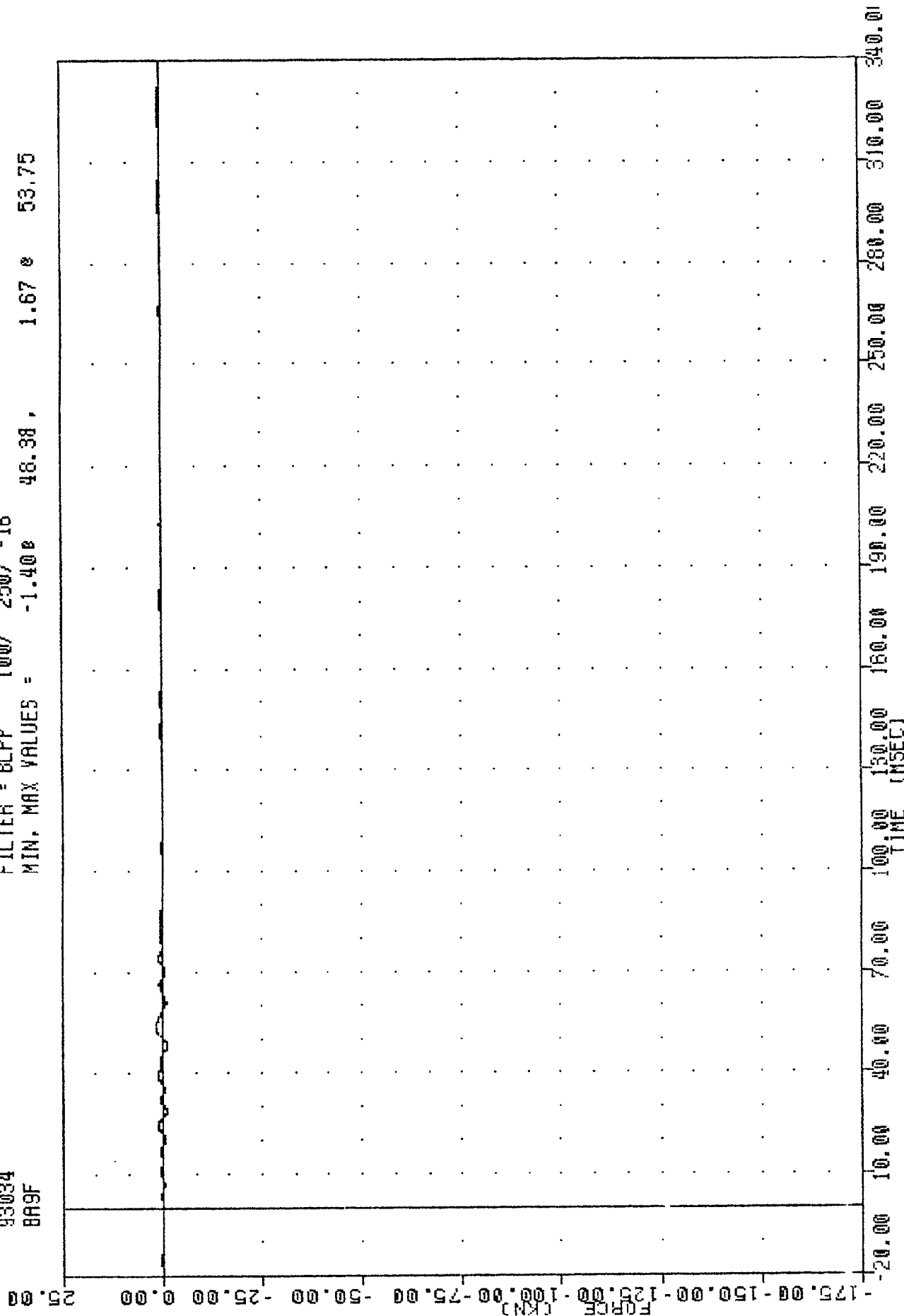


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

FRONTAL BARRIER POSITION 20 FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BAGF

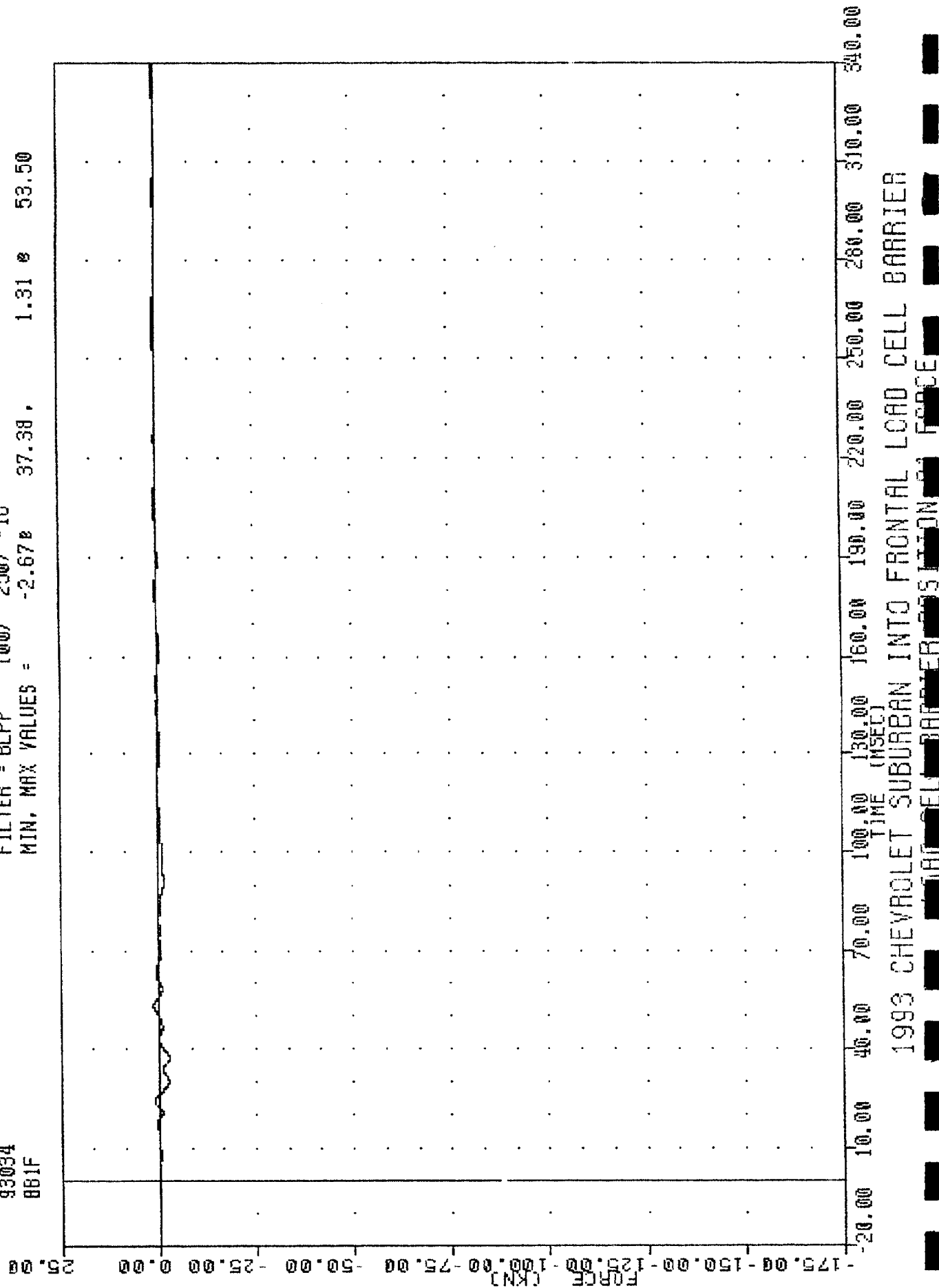
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1.40e 48.38 , 1.67 e 53.75



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A9 FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 881F

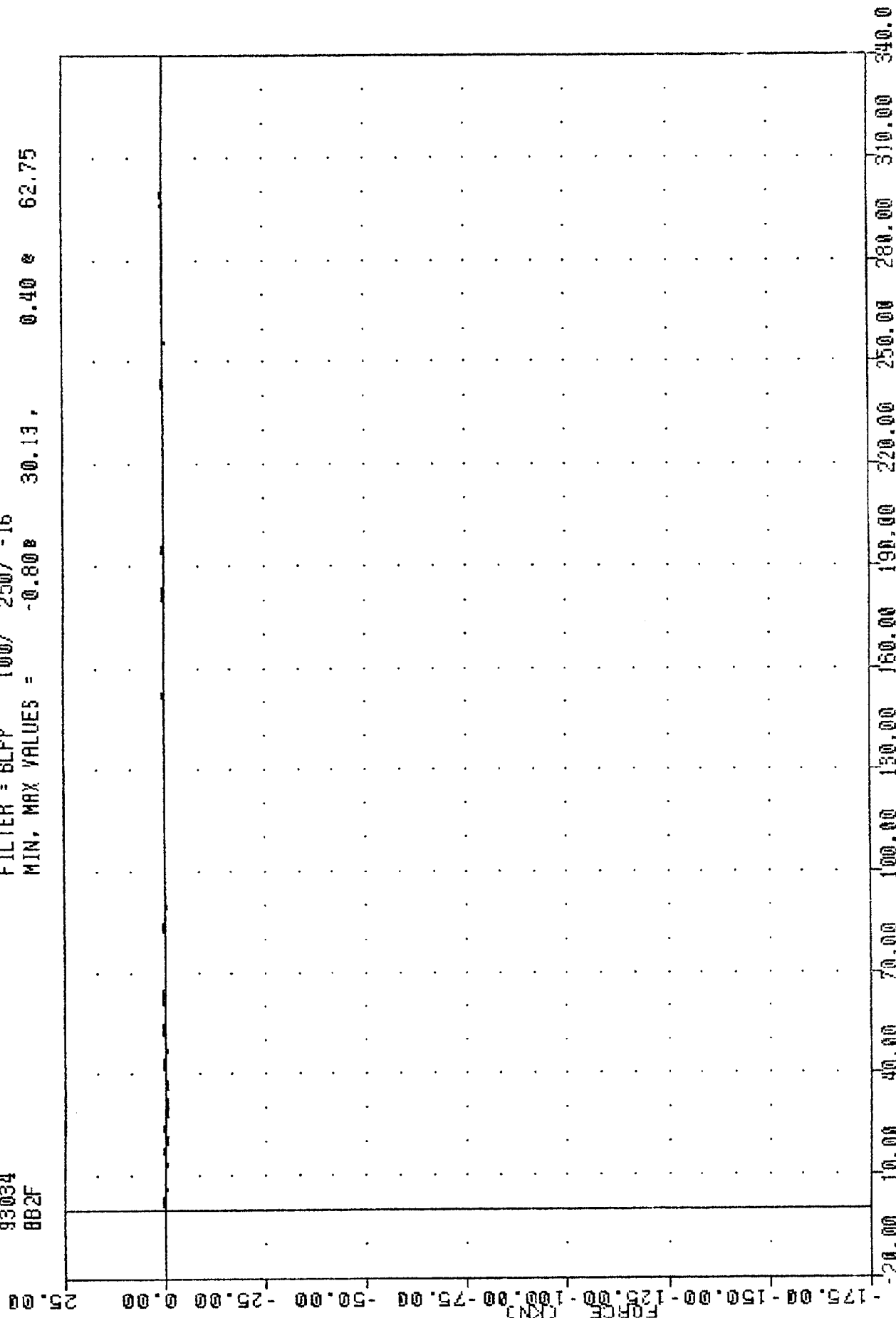
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -2.67 37.38 , 1.31 53.50



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 930203

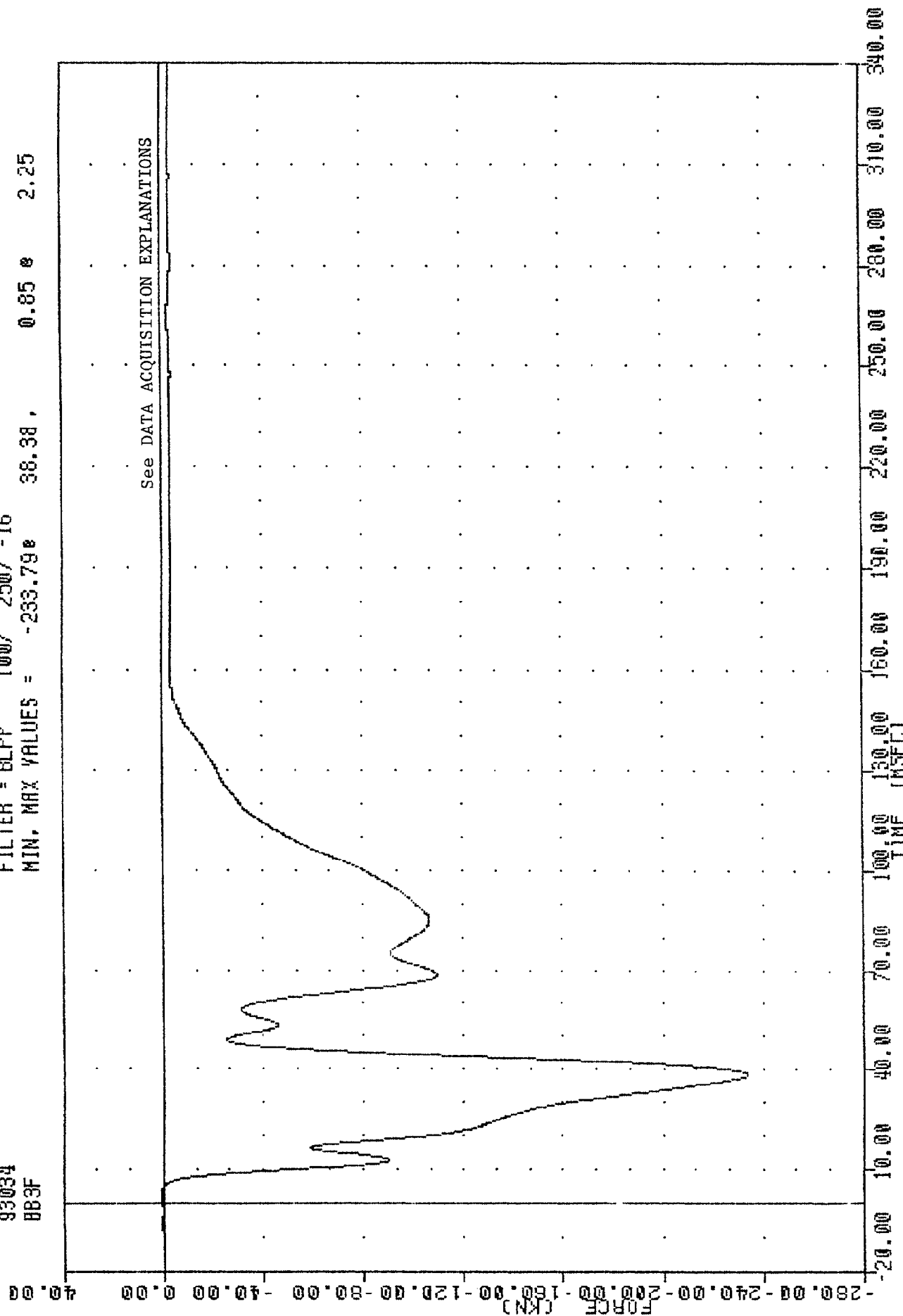
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BB2F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -0.80 30.13, 0.40 62.75



TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BB3F

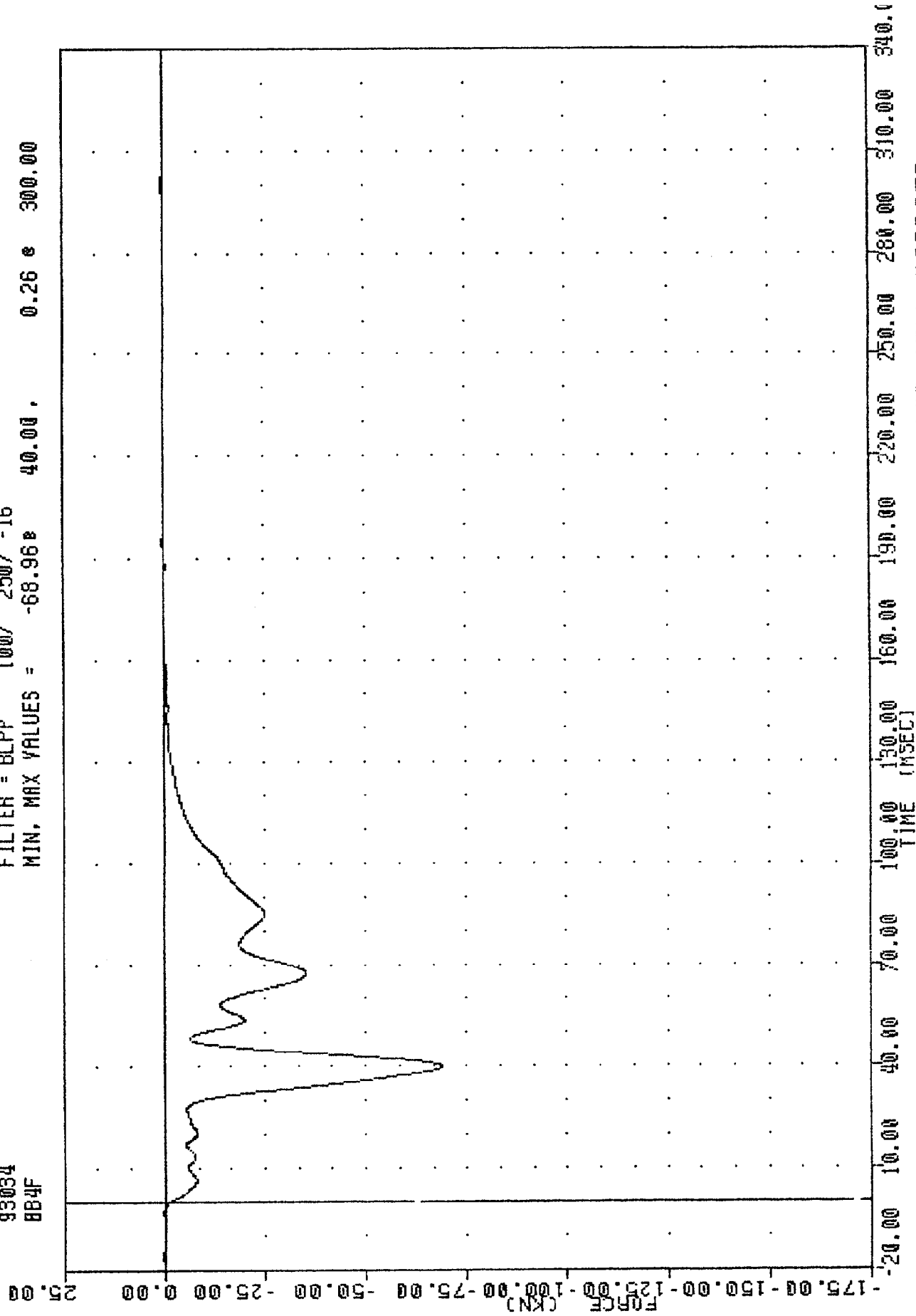
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -233.79 38.38 , 0.85 2.25



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 FORCE

TRC
 93034
 BB4F
 NEW CAR ASSESSMENT PROGRAM
 , 930203

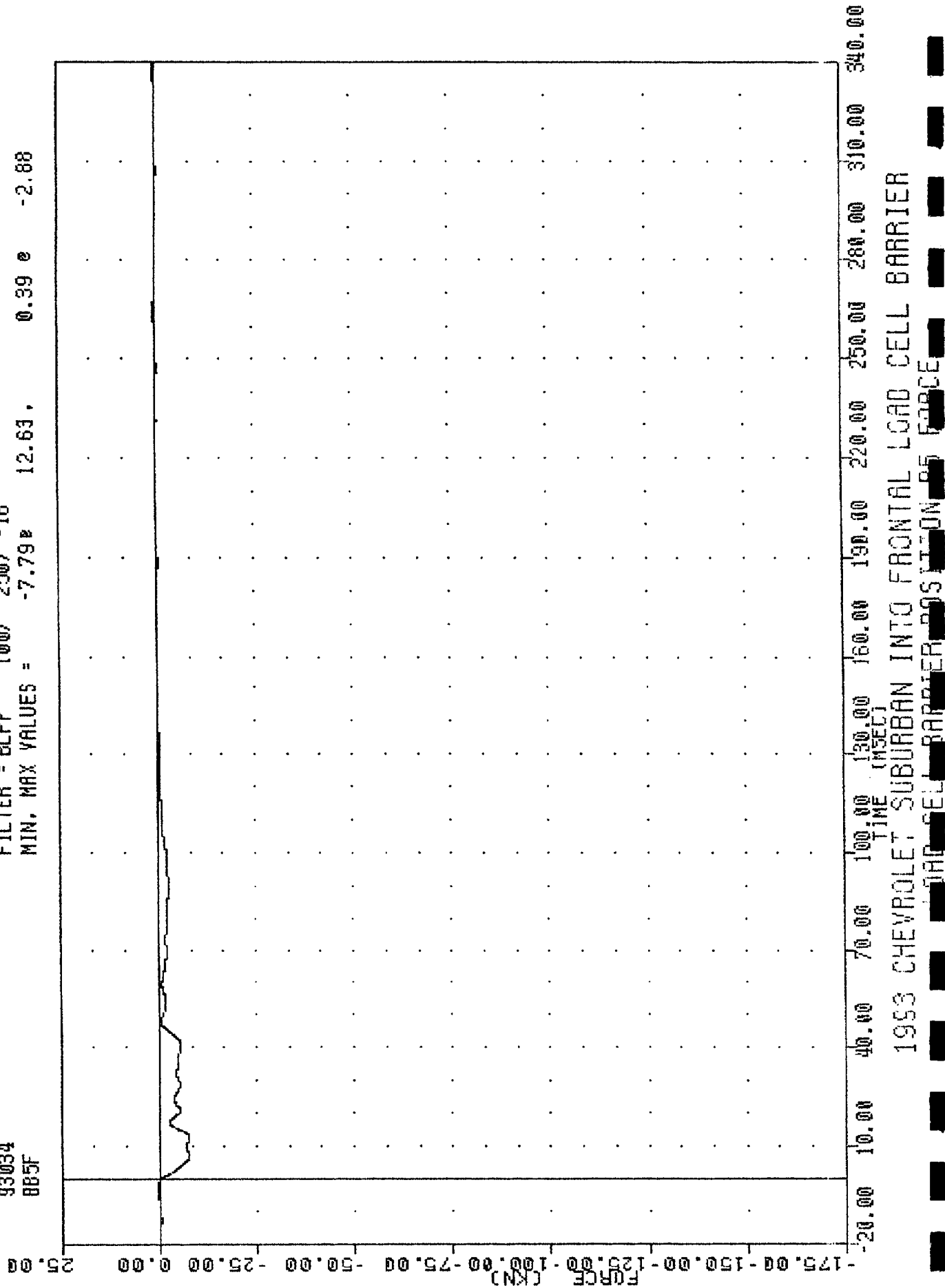
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -68.96 40.00, 0.26 300.00



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B4 FORCE

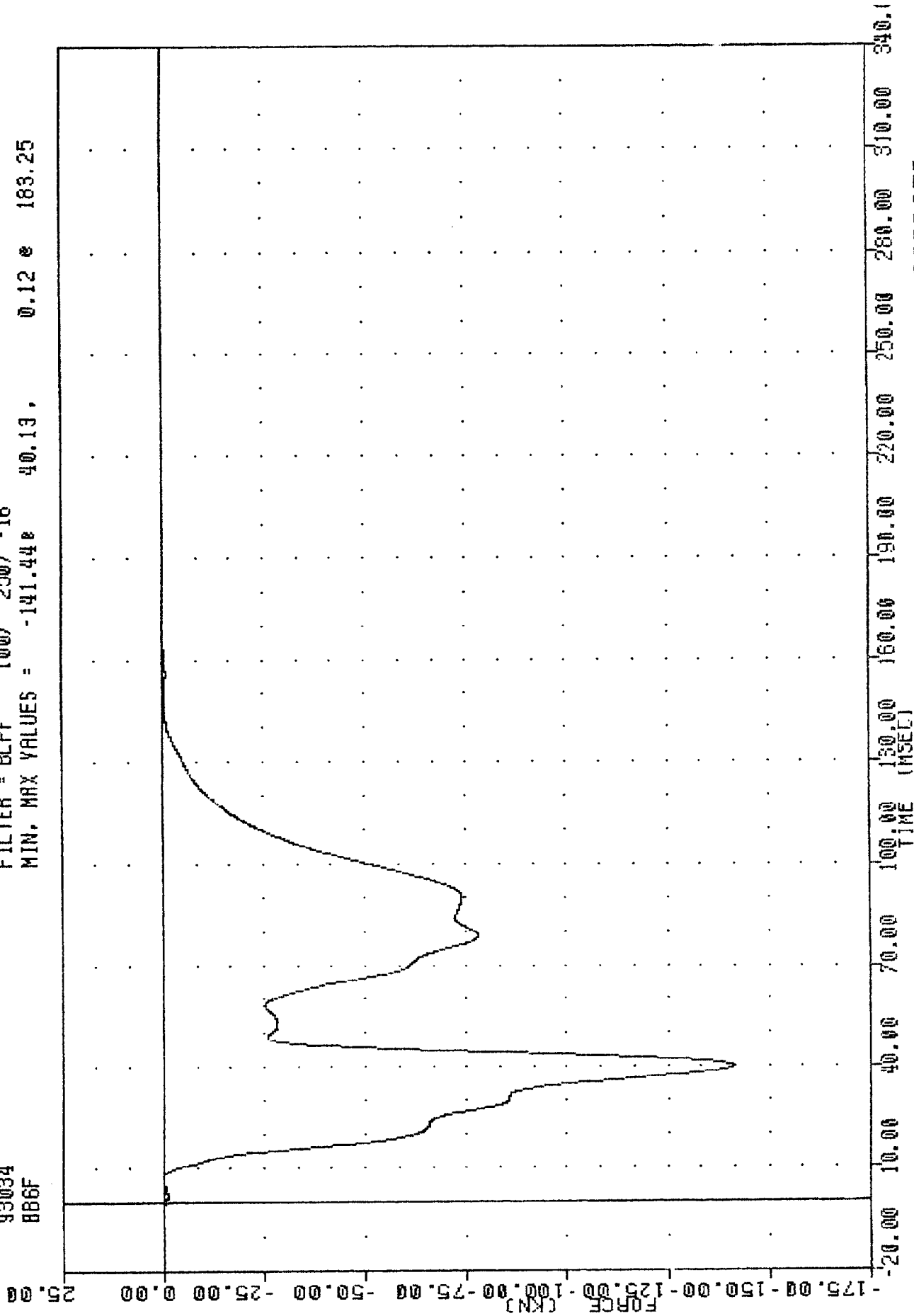
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BB5F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -7.79 12.63, 0.39 0 -2.88



TRC
 NEW CAR ASSESSMENT PROGRAM
 93034
 886F

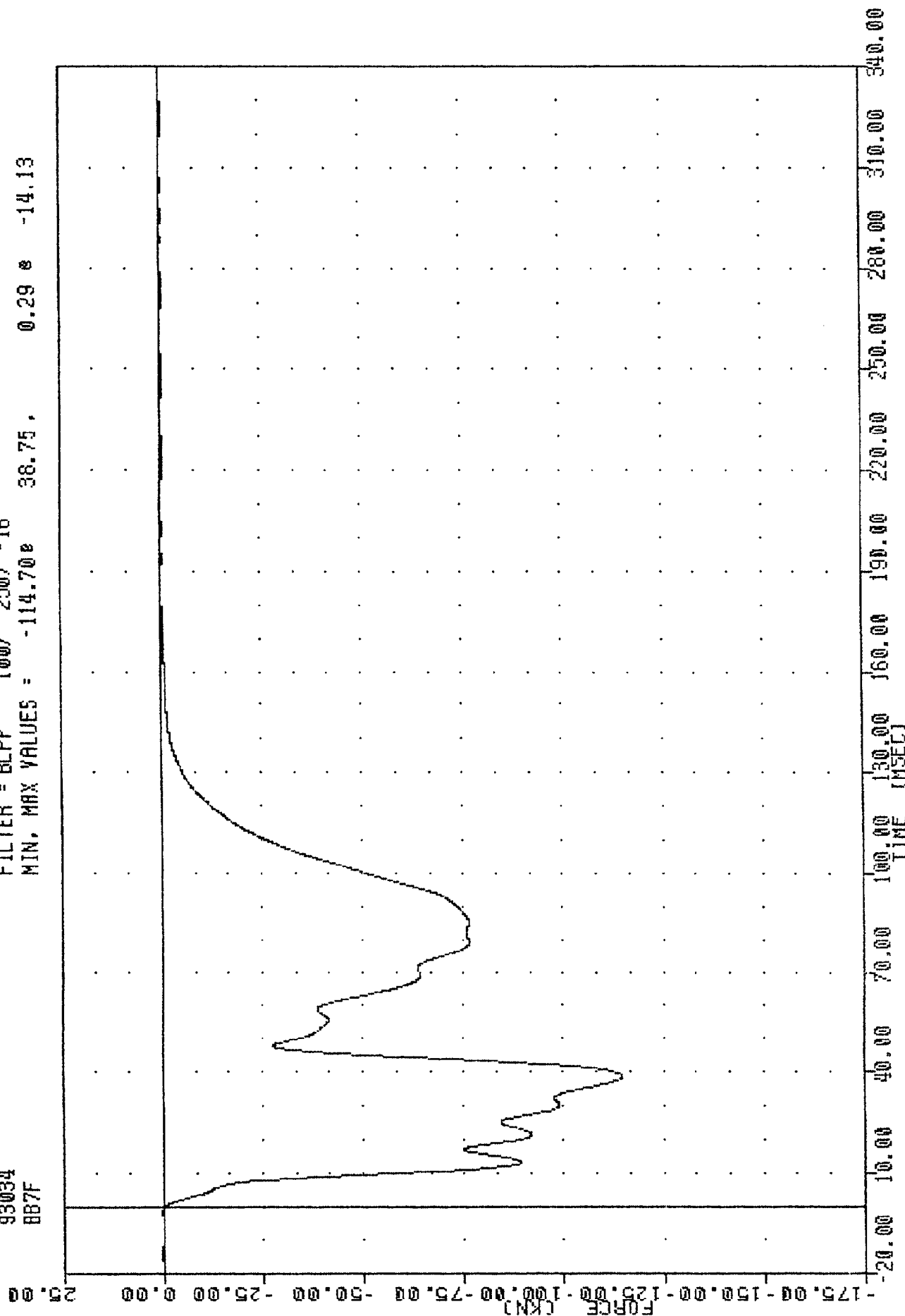
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -141.44e 40.13, 0.12 e 183.25



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 26 FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BB7F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -114.70e 38.75, 0.29 e -14.13

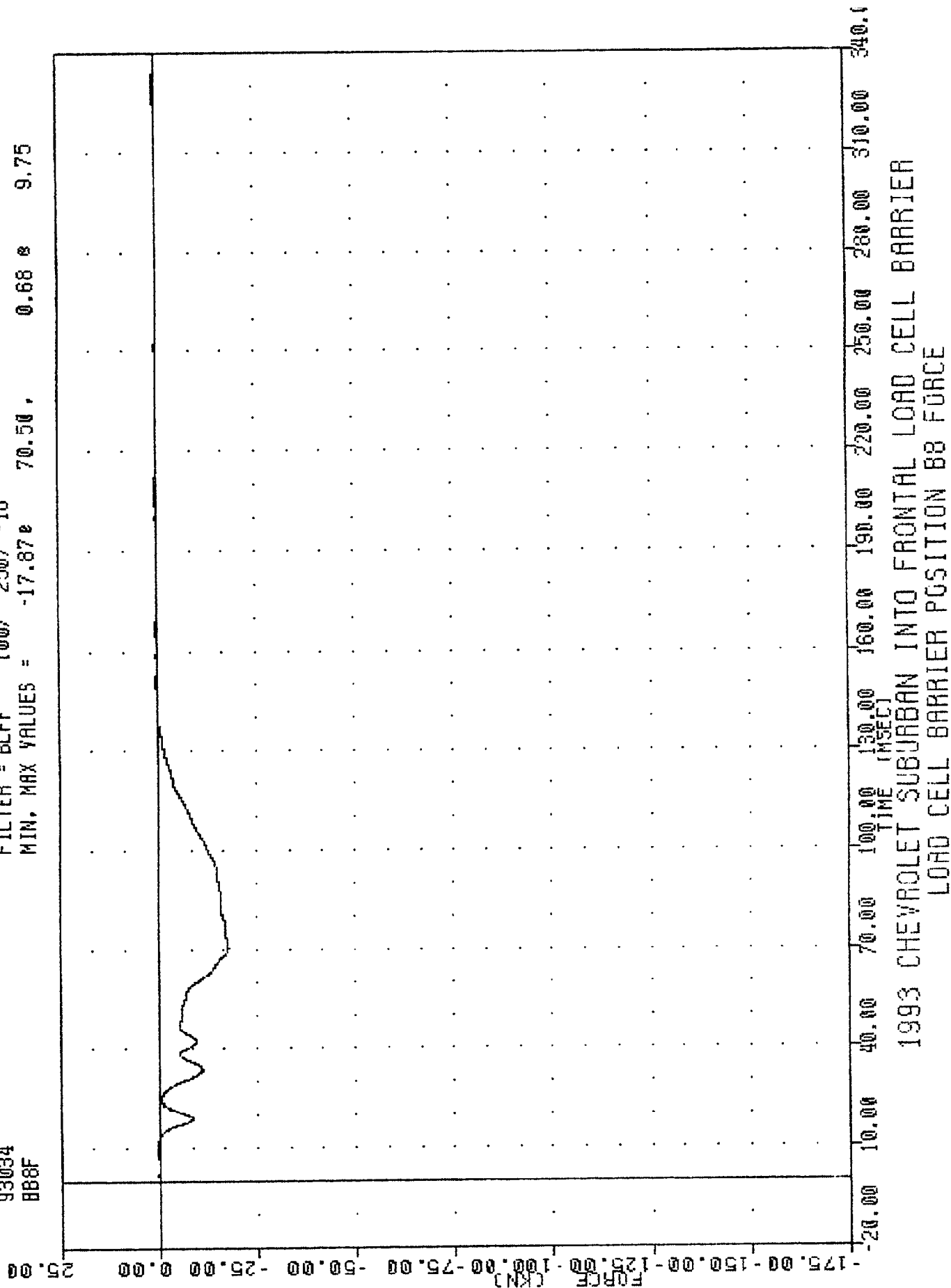


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 27 FORCE

TRC
NEW CAR ASSESSMENT PROGRAM
93034
BB8F

, 930203

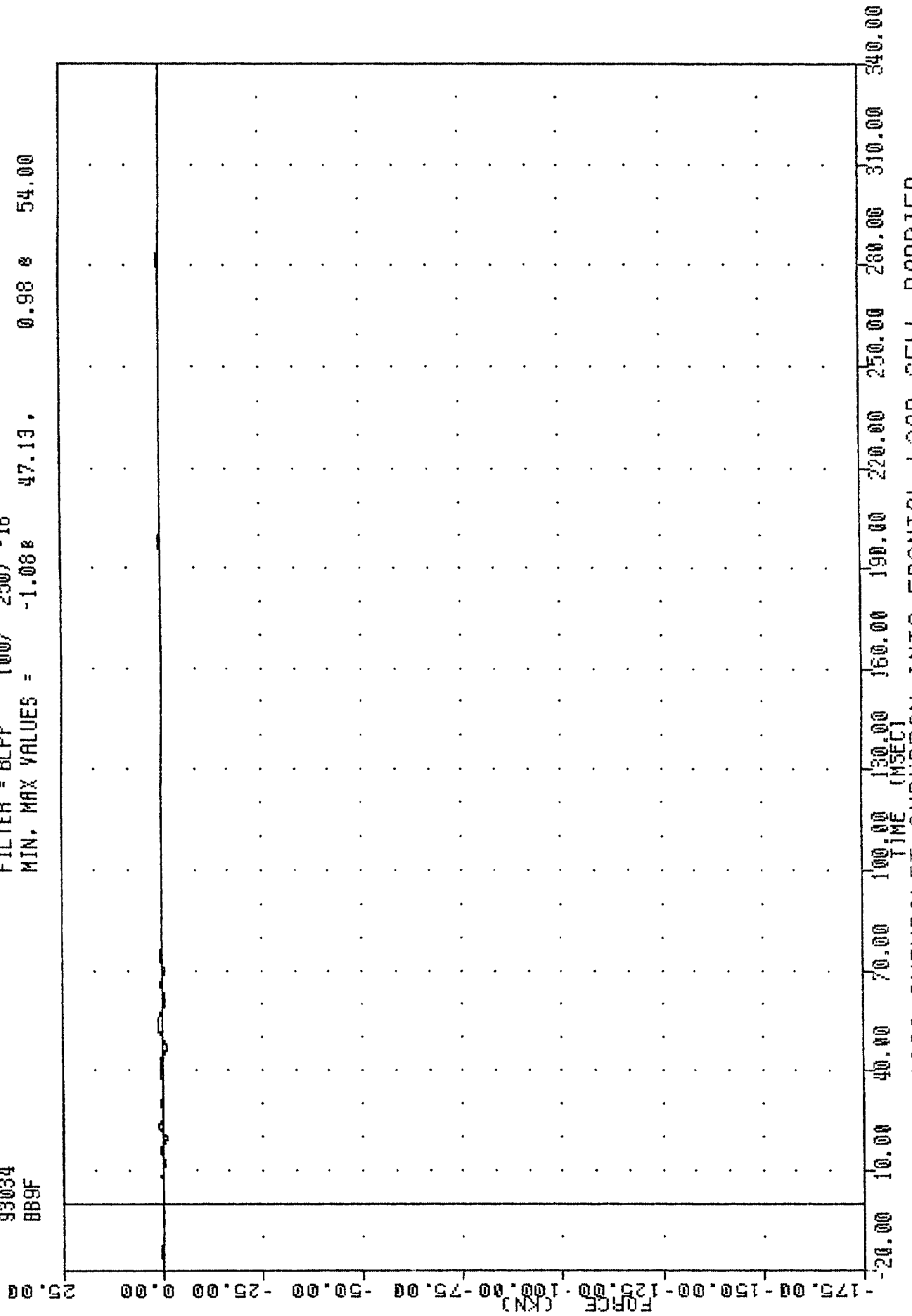
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -17.87e 70.50, 0.68 e 9.75



TRC
NEW CAR ASSESSMENT PROGRAM
93034
BB9F

930203

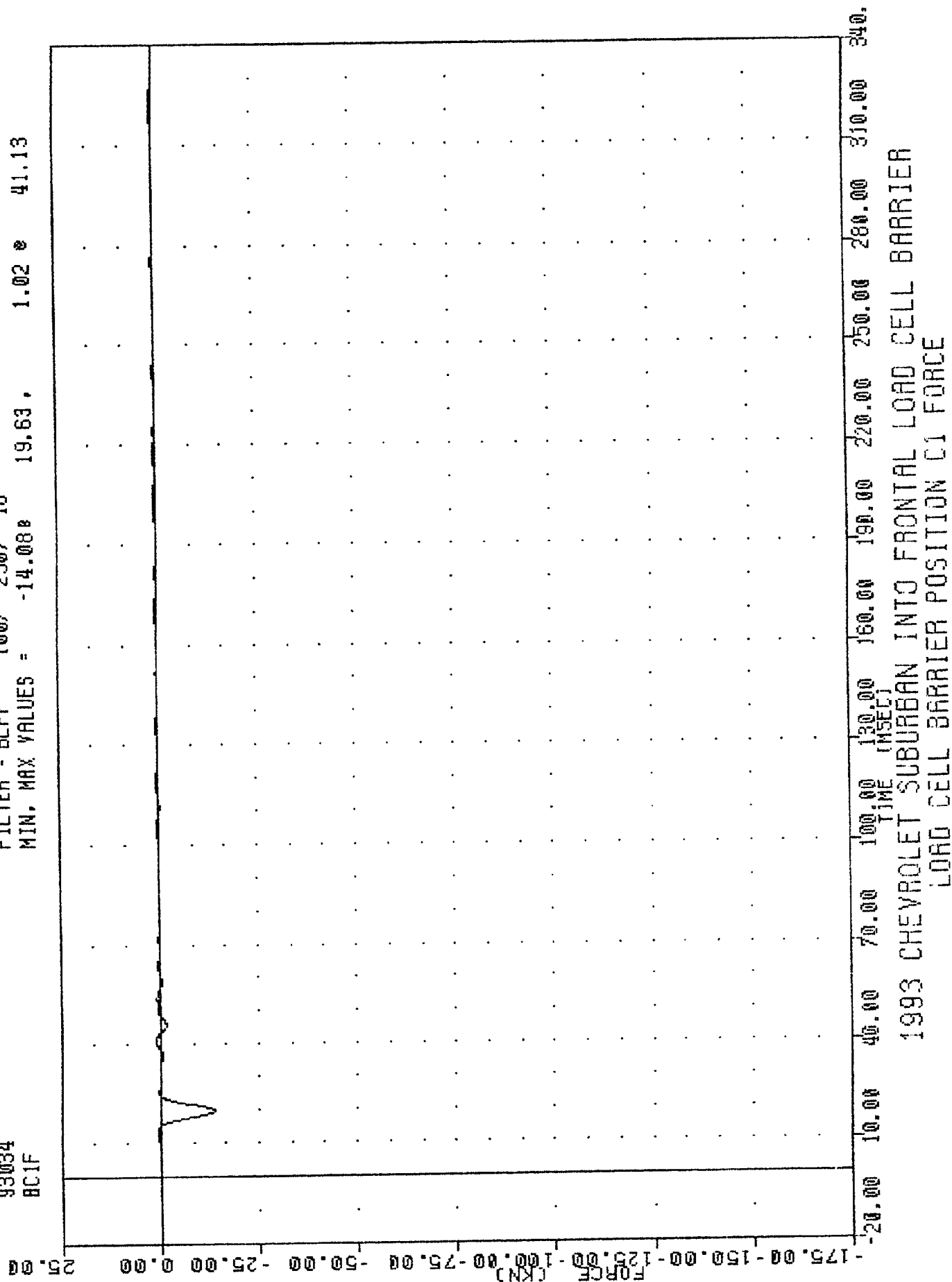
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -1.08 47.13 0.98 54.00



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION FORCE

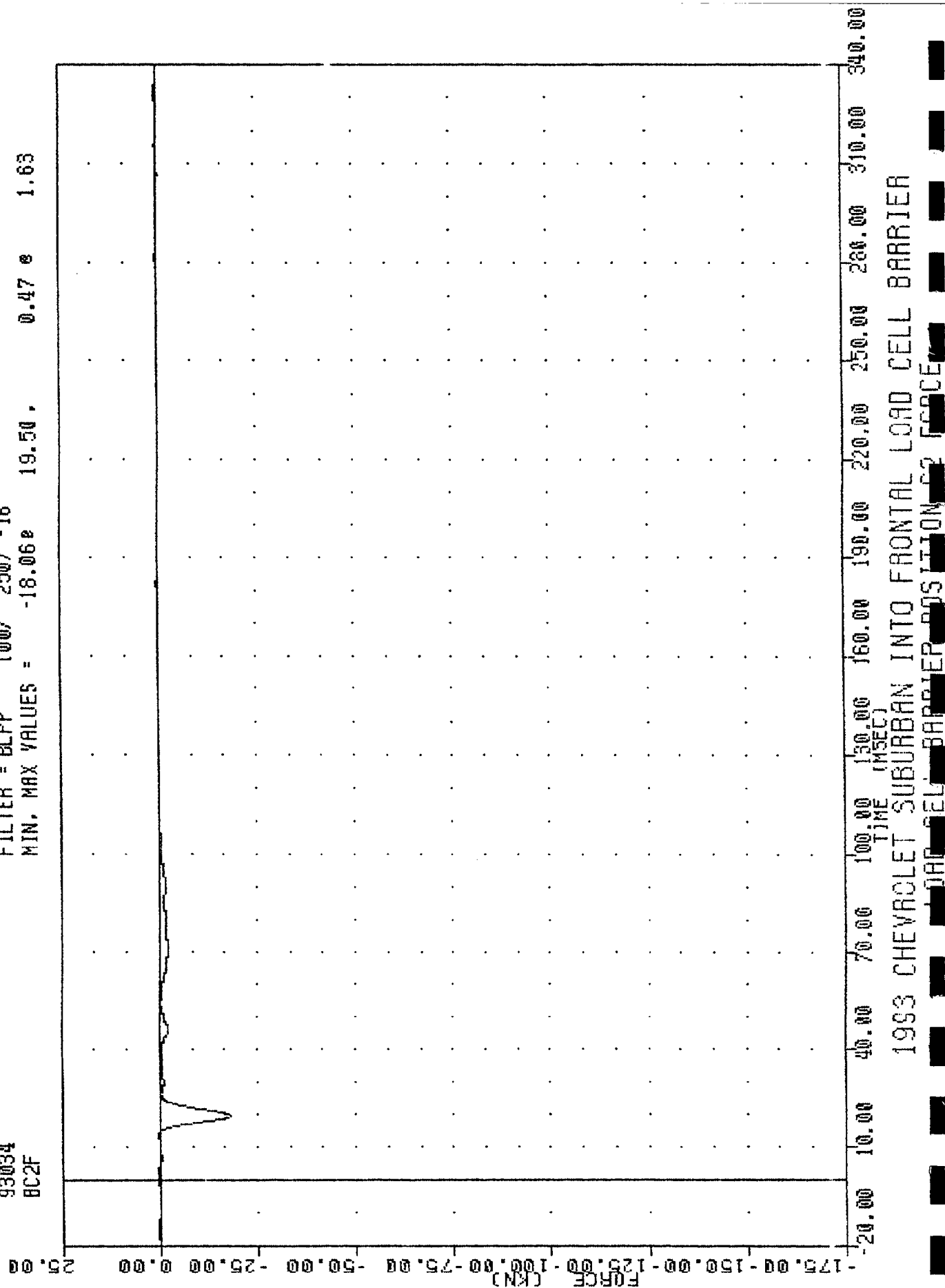
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BCIF

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -14.08 19.63, 1.02 41.13



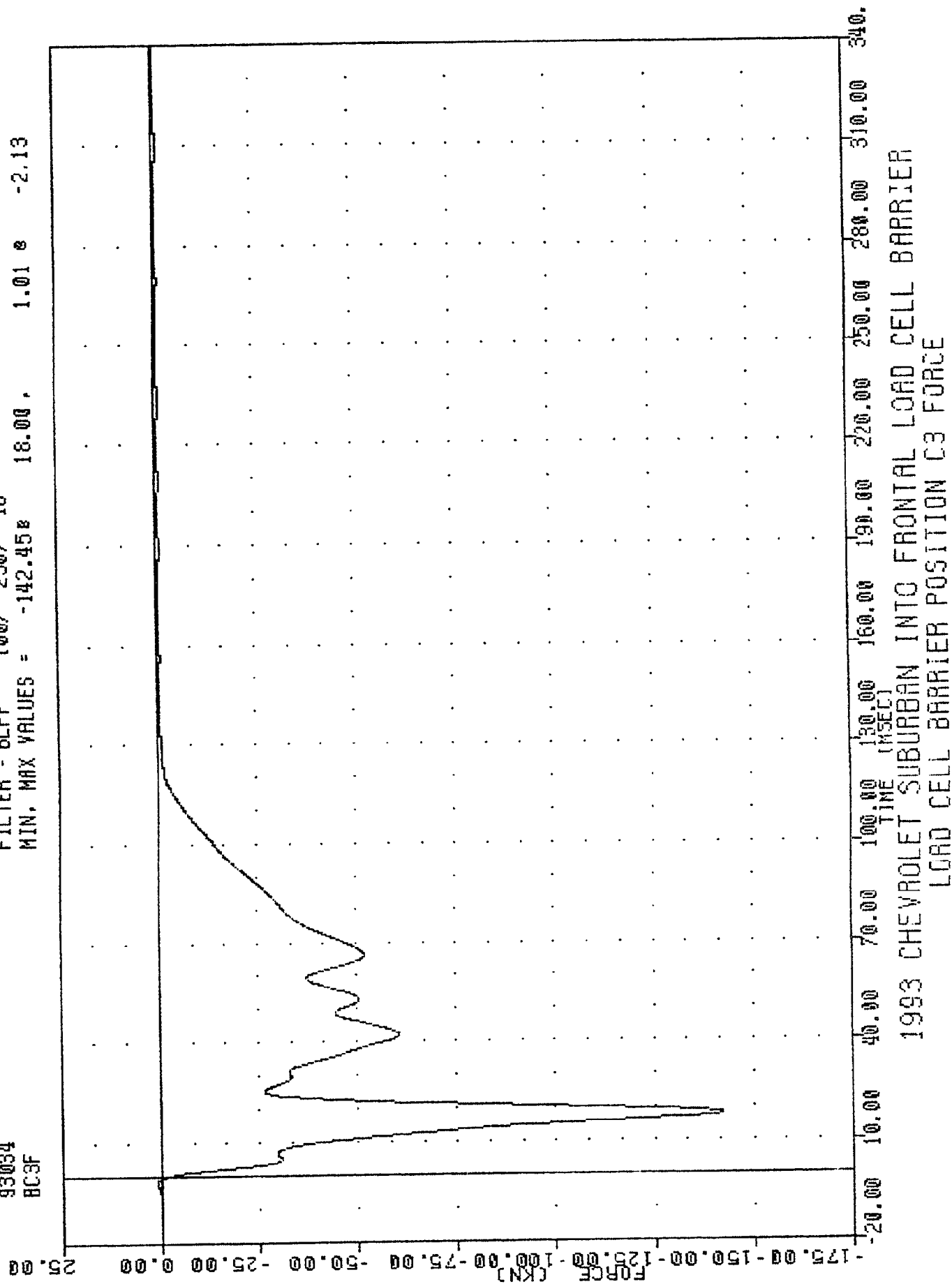
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BC2F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -18.06e 19.50 , 0.47 e 1.63



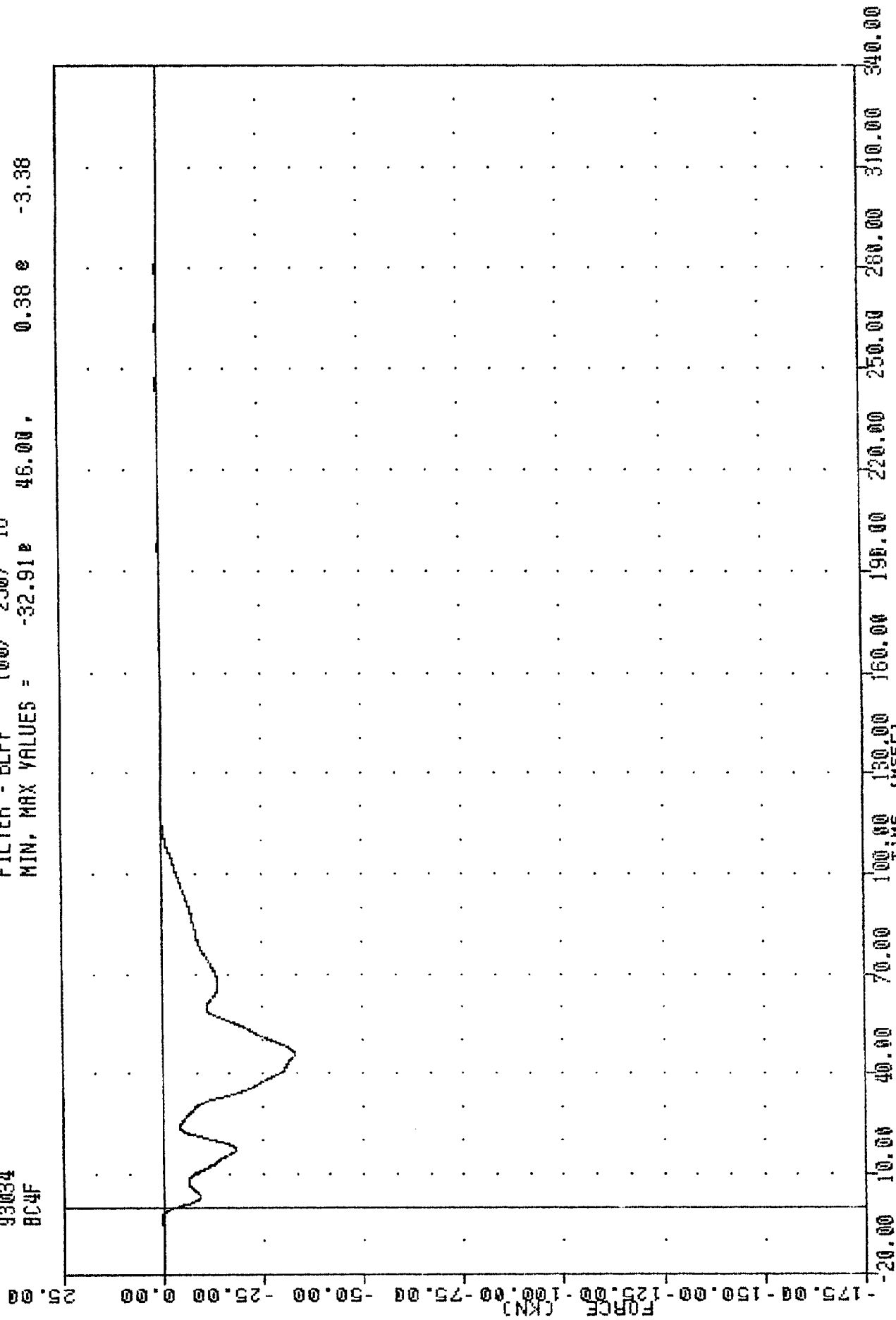
TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BC3F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -142.45 18.00 , 1.01 2 -2.13



TRC 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BC4F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -32.91e 0.38 e -3.38

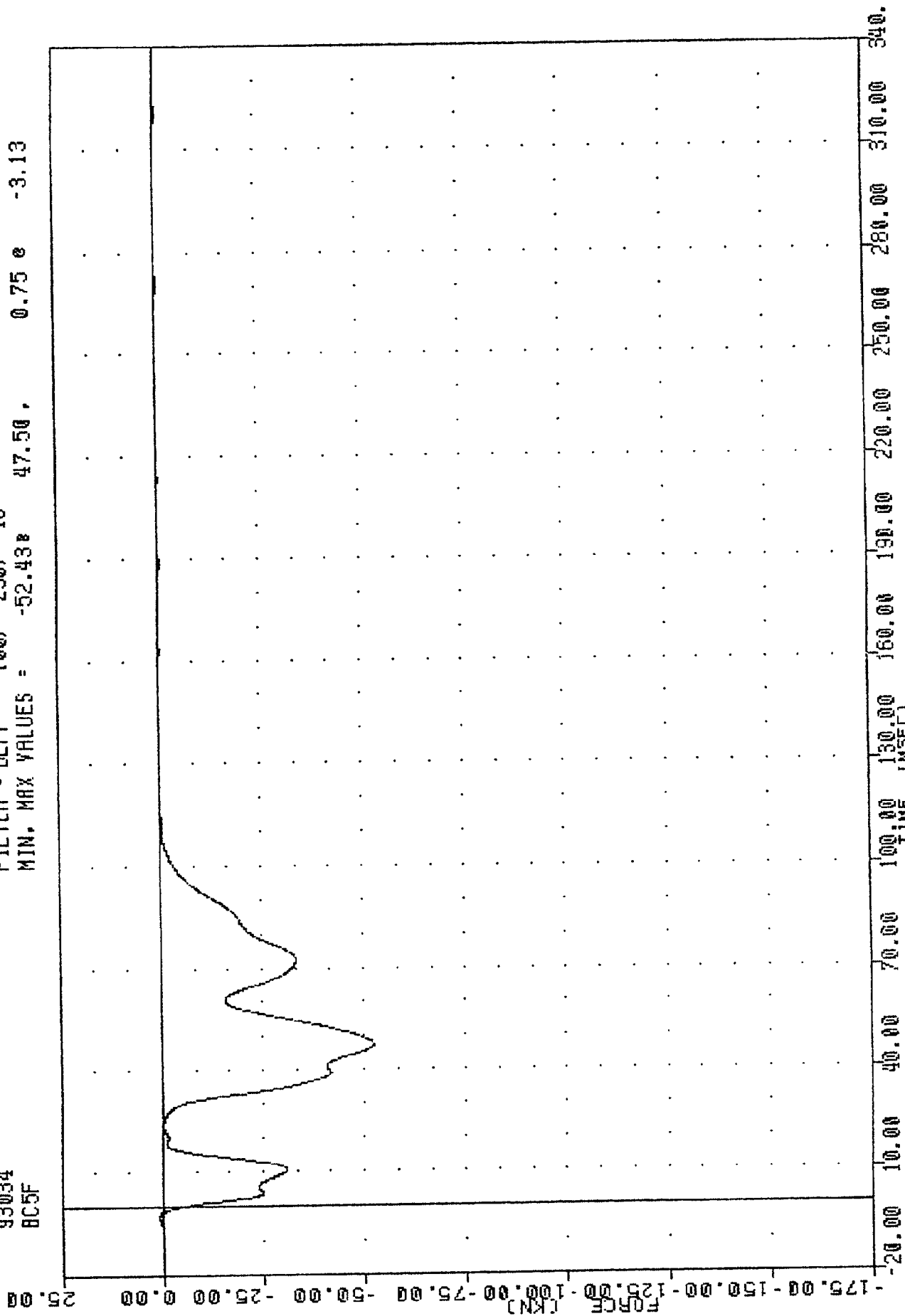


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER SITUATION

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BC5F

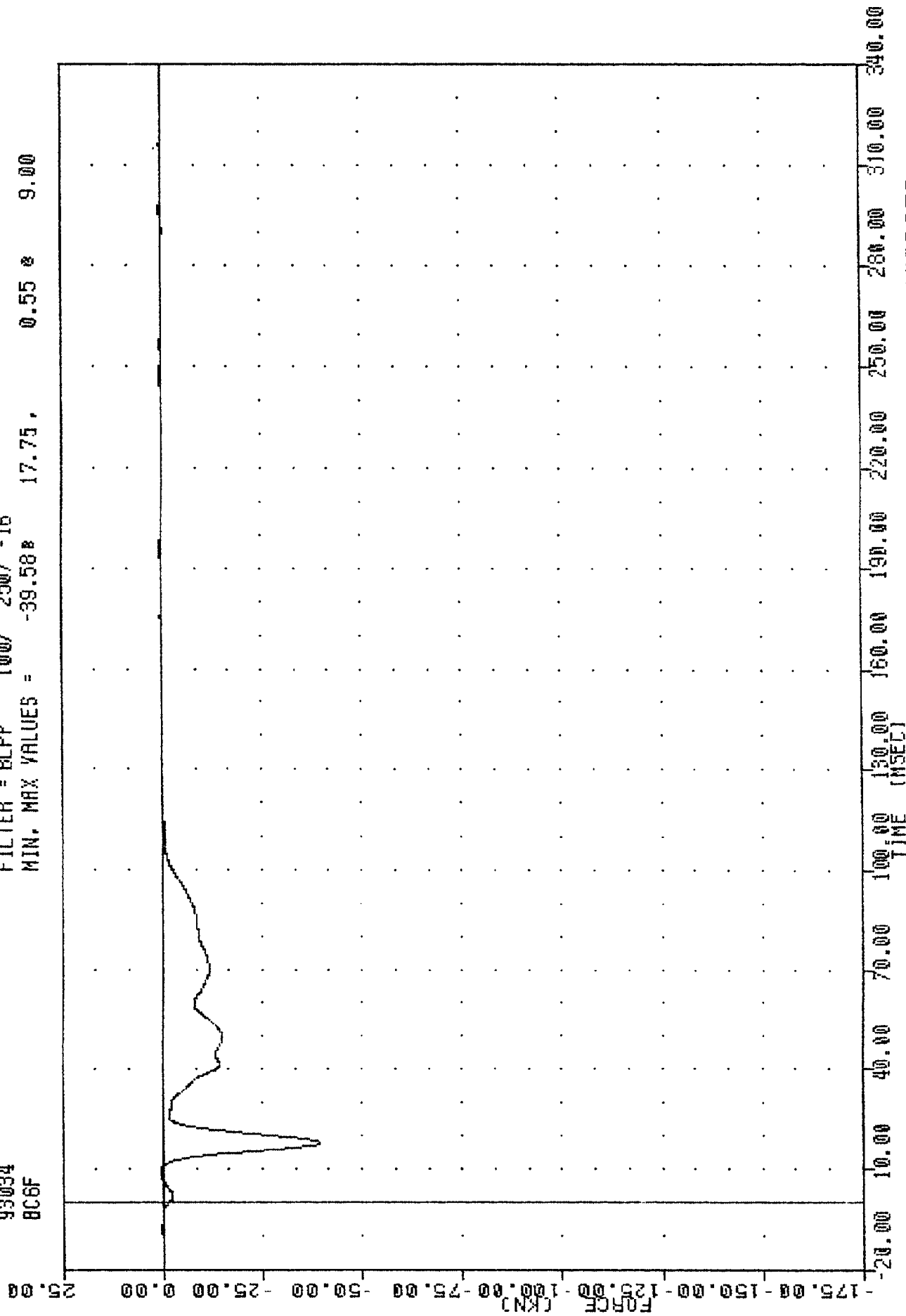
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -52.43 47.50 0.75 -3.13



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C5 FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BC6F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -39.58 17.75 , 0.55 9.00

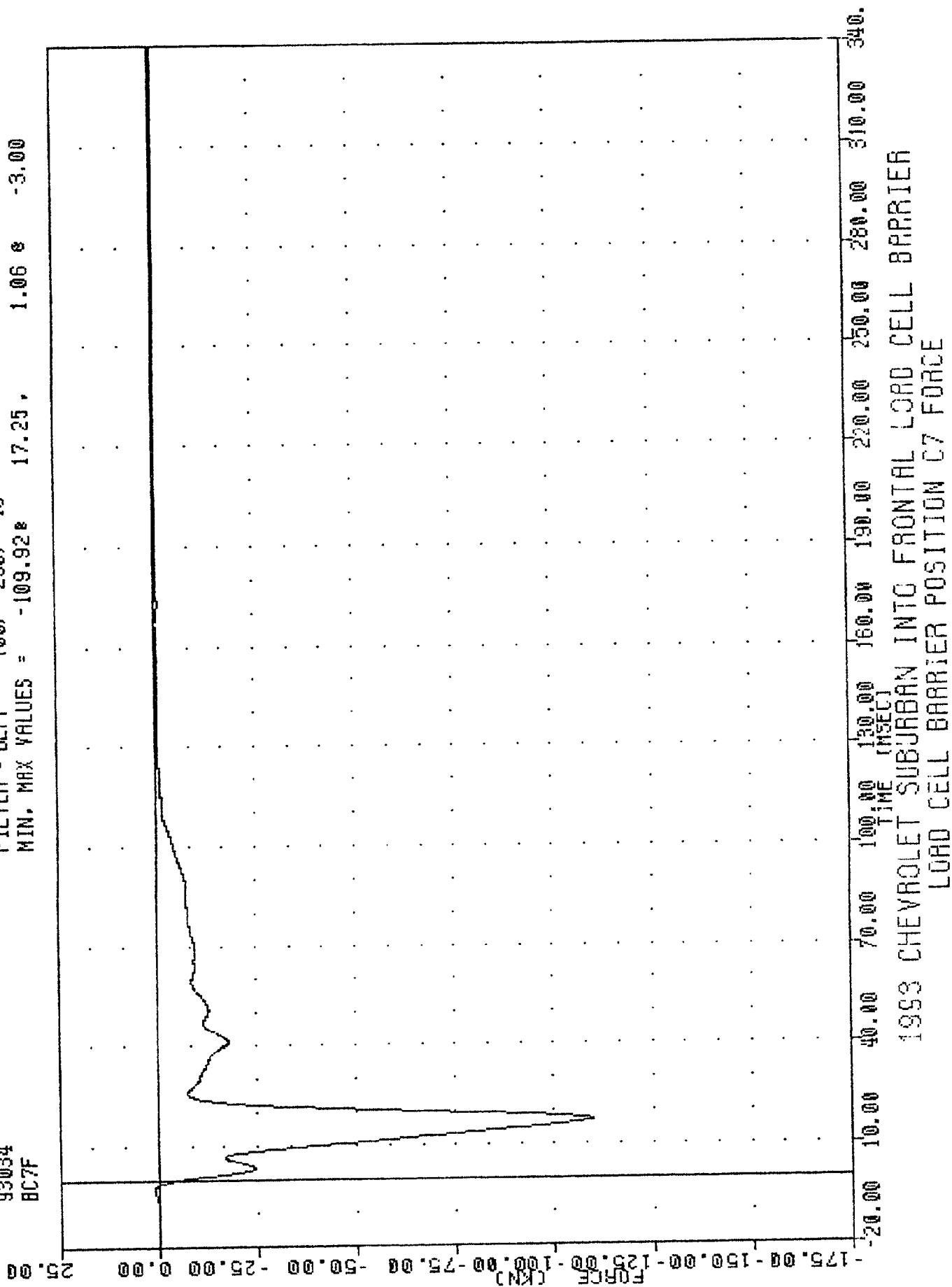


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

LEAD-CELL BARRIER STATION FORCE

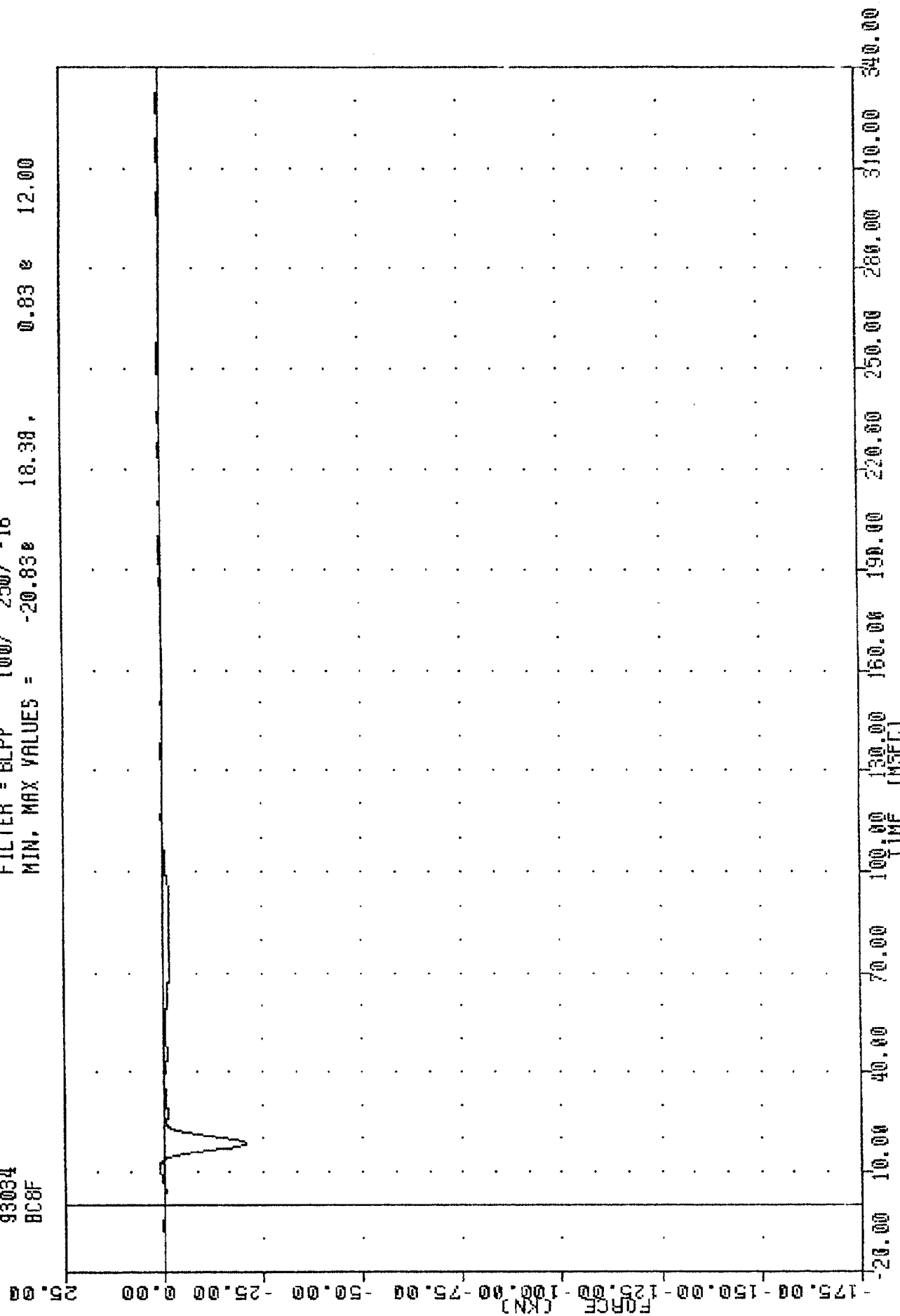
TRC . 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BC7F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -109.92 17.25 1.06 8 -3.00



TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BC8F

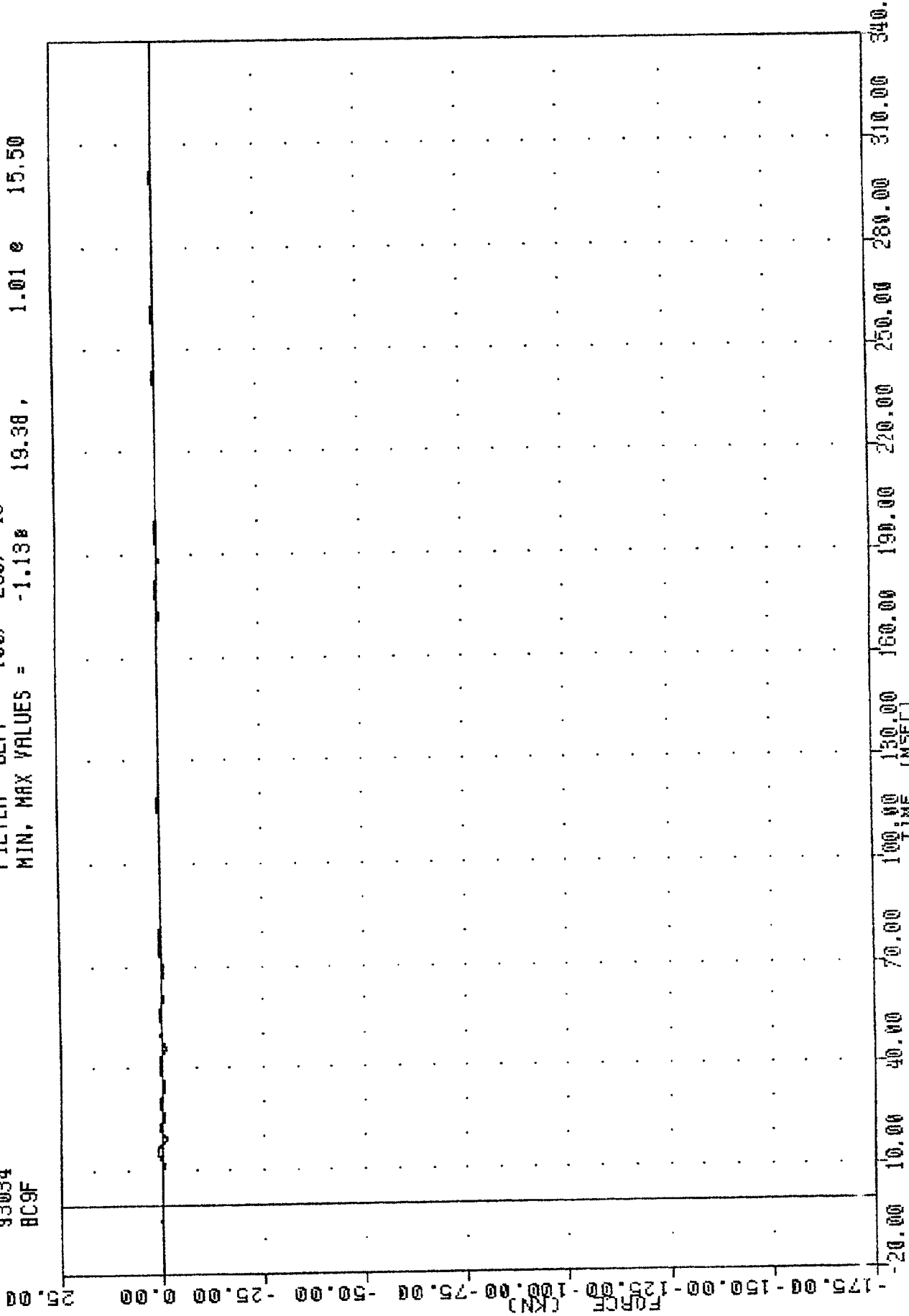
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -20.83e 18.38, 0.83 e 12.00



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 BARRIER POSITION FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BC9F

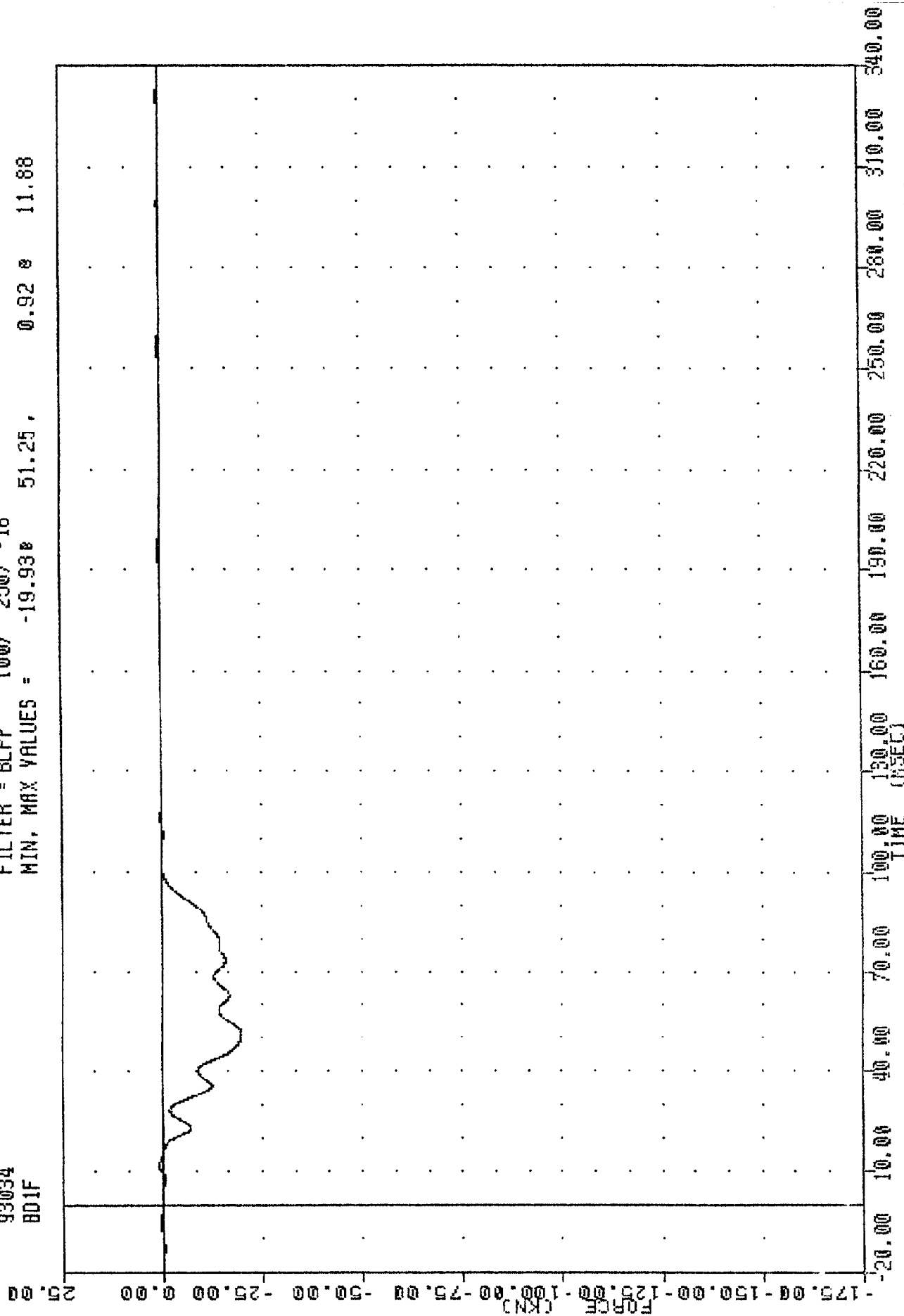
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -1.13 19.38 1.01 e 15.50



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION CG FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BD1F

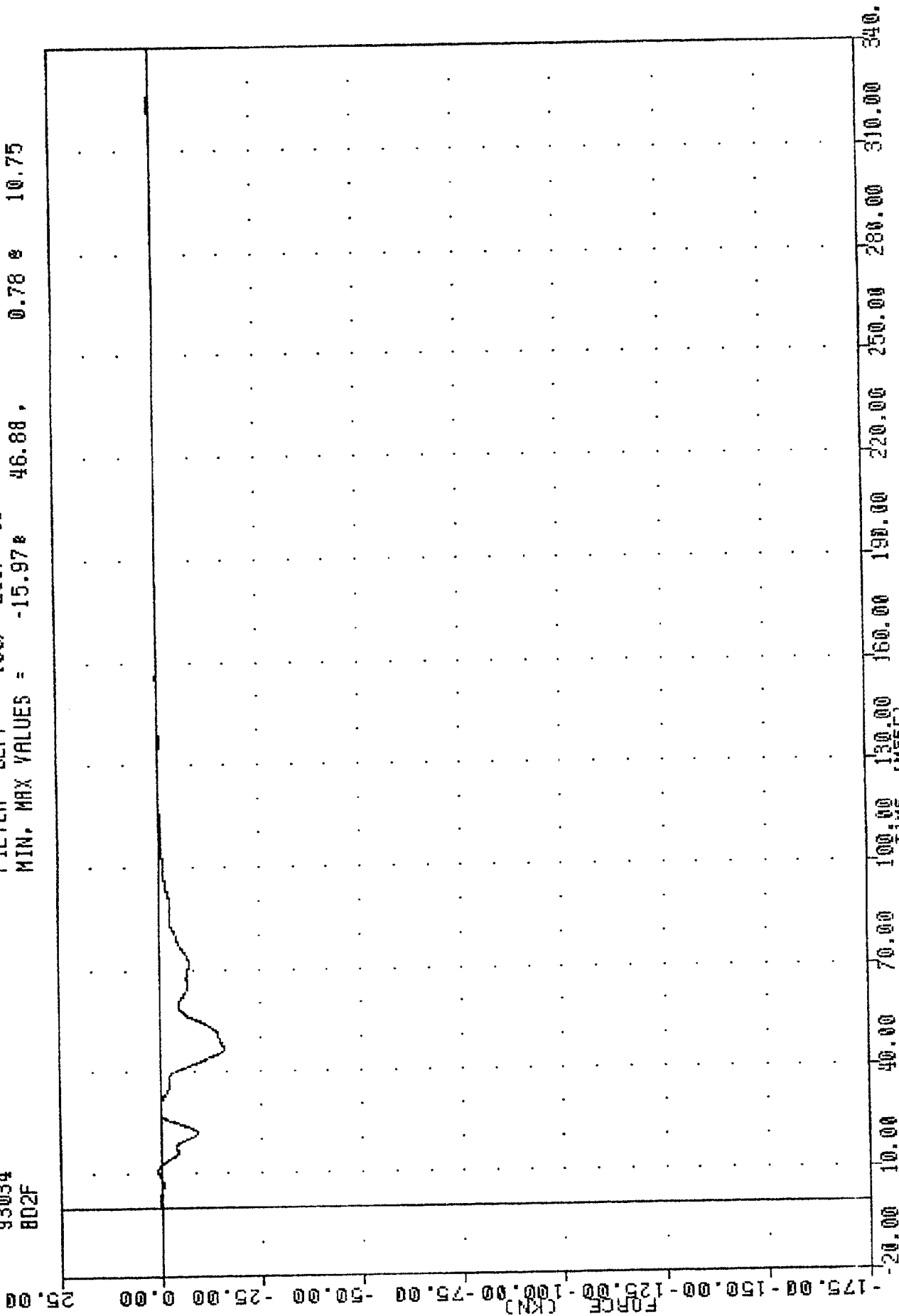
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -19.93 51.25, 0.92 11.88



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 SQUARE BARrier POSITION FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 802F

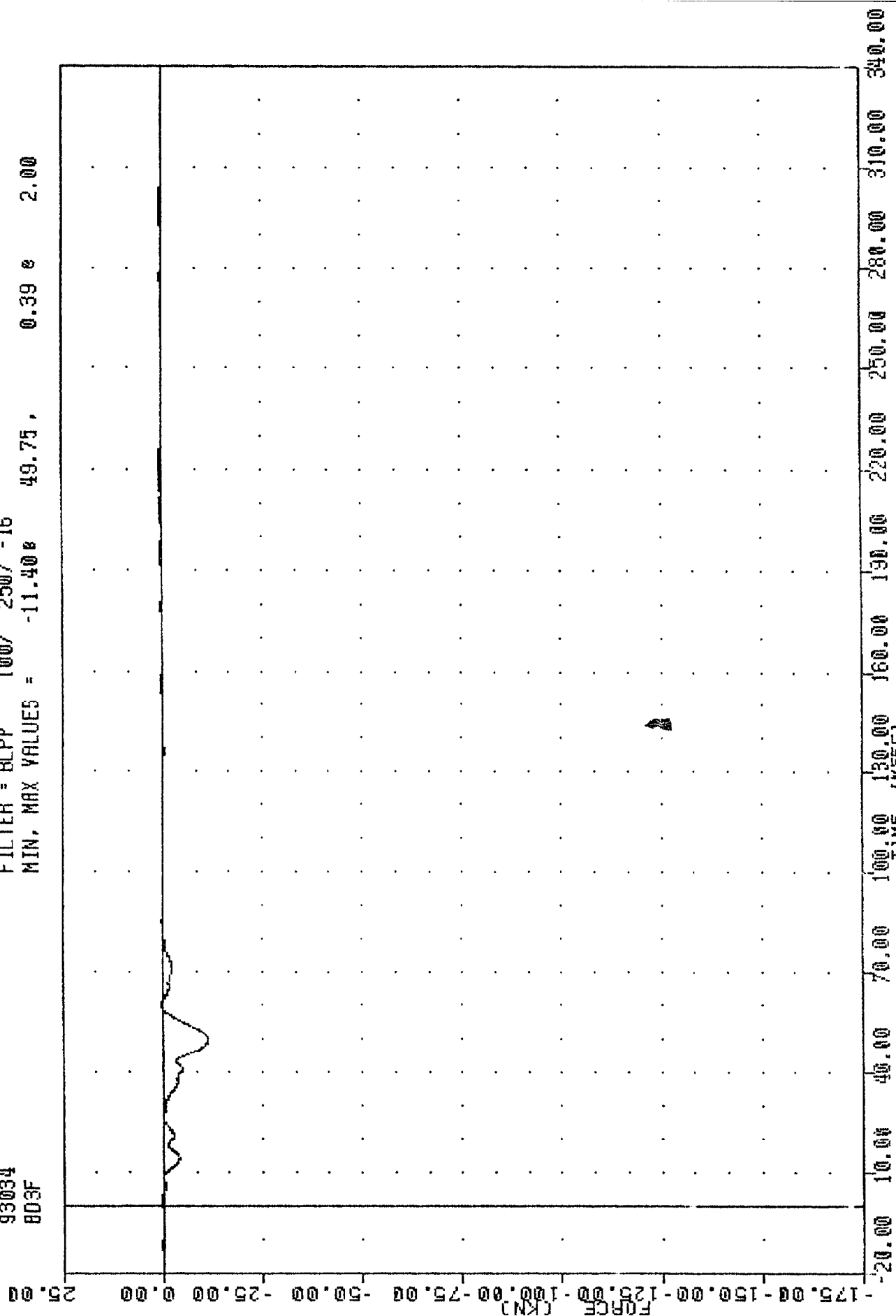
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -15.97 46.88 0.78 10.75



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D2 FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BD3F

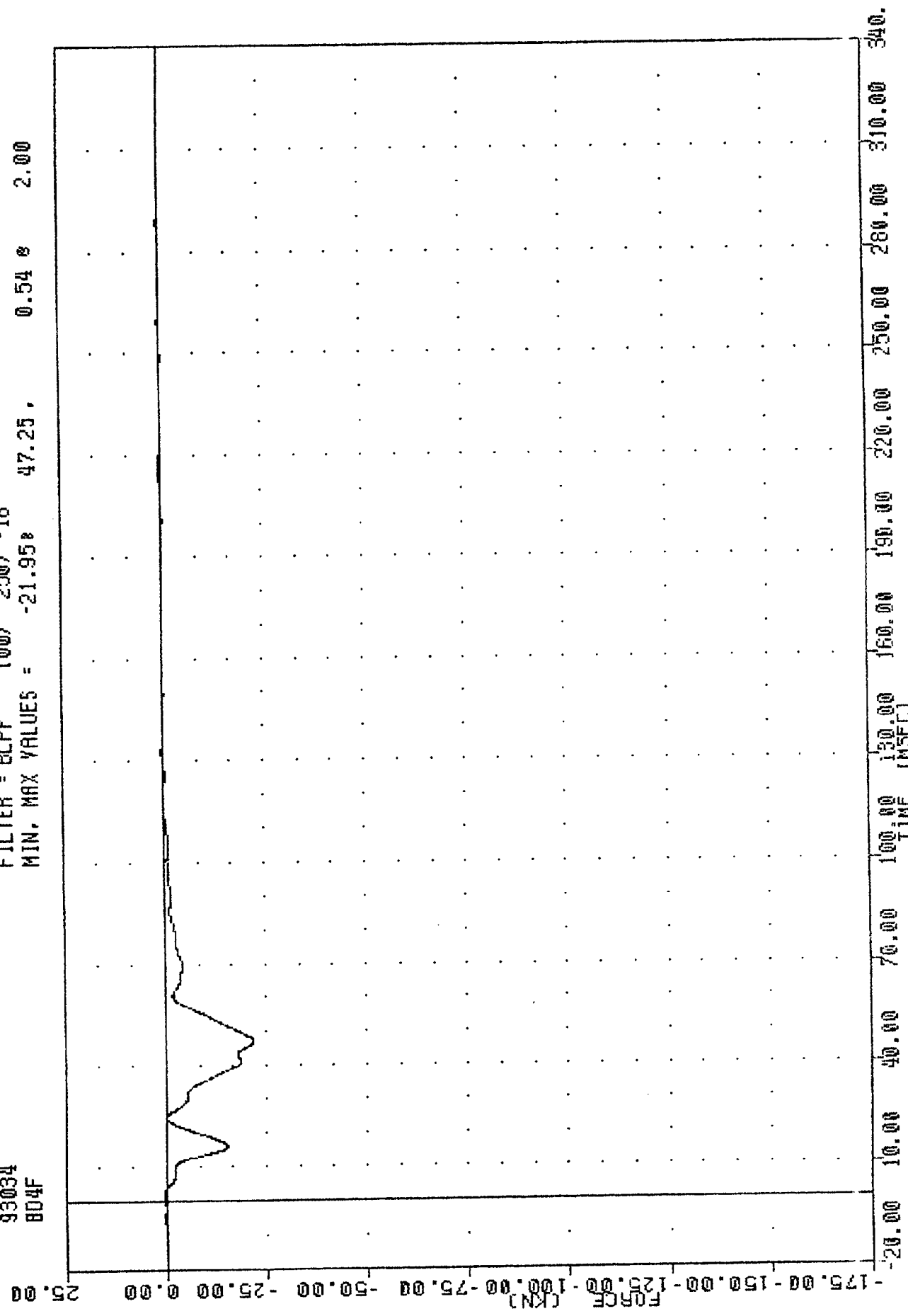
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -11.40 49.75, 0.39 e 2.00



TRC
 NEW CAR ASSESSMENT PROGRAM
 93034
 804F

, 930203

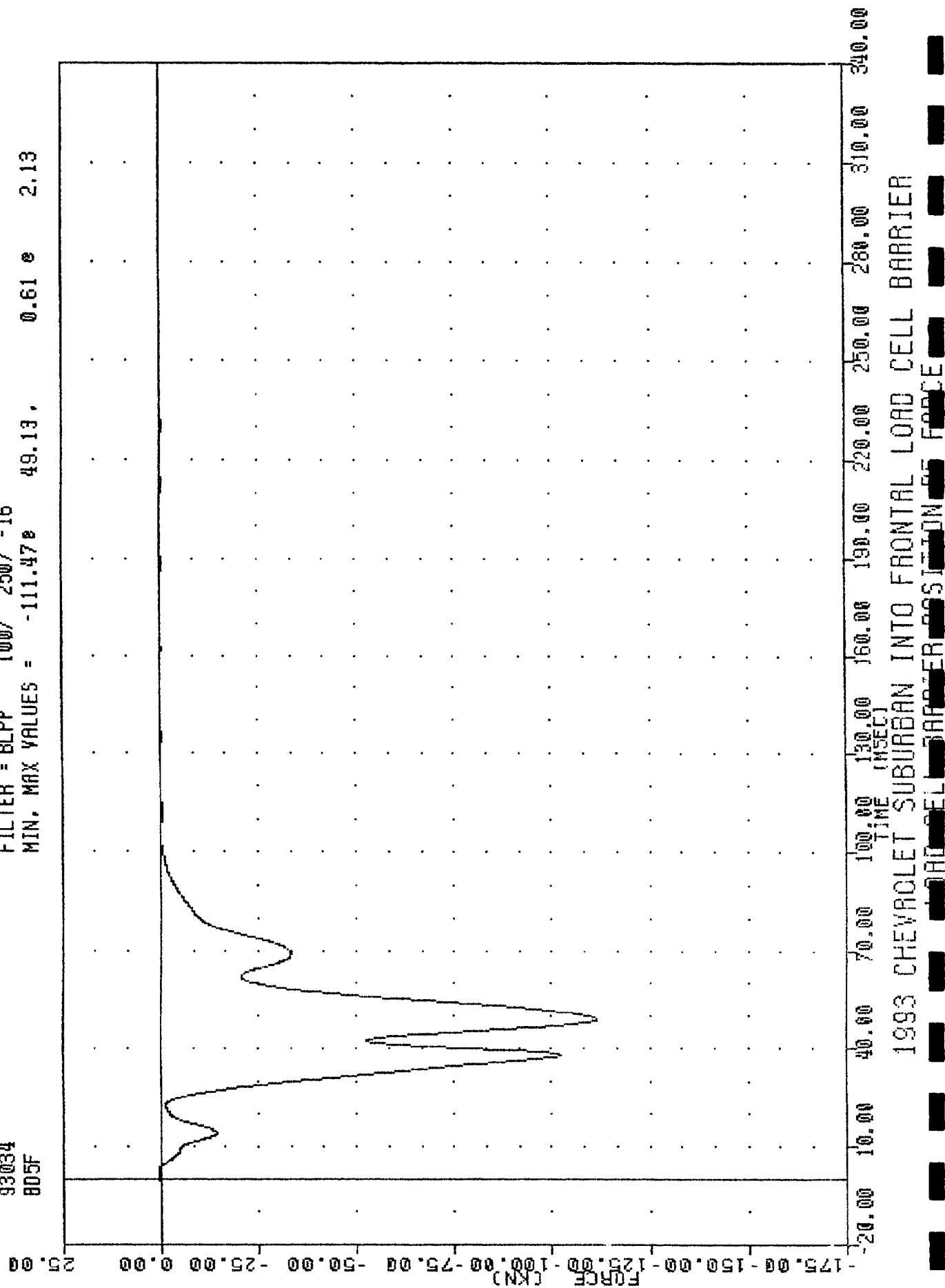
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -21.95 47.25 0.54 2.00



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D4 FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 805F

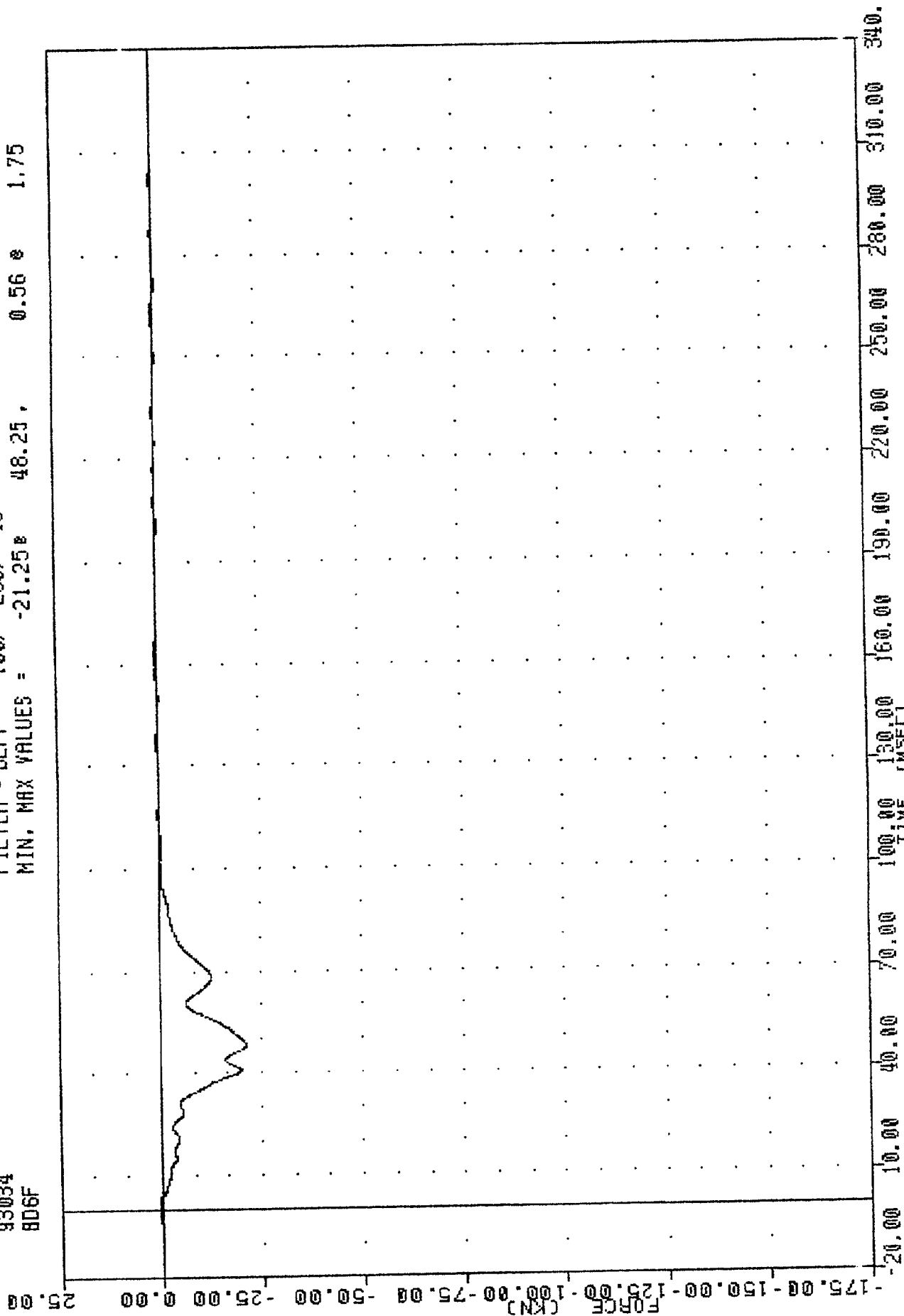
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -111.47e 49.13, 0.61 e 2.13



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION VS FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BD6F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -21.25% 48.25 , 0.56 % 1.75



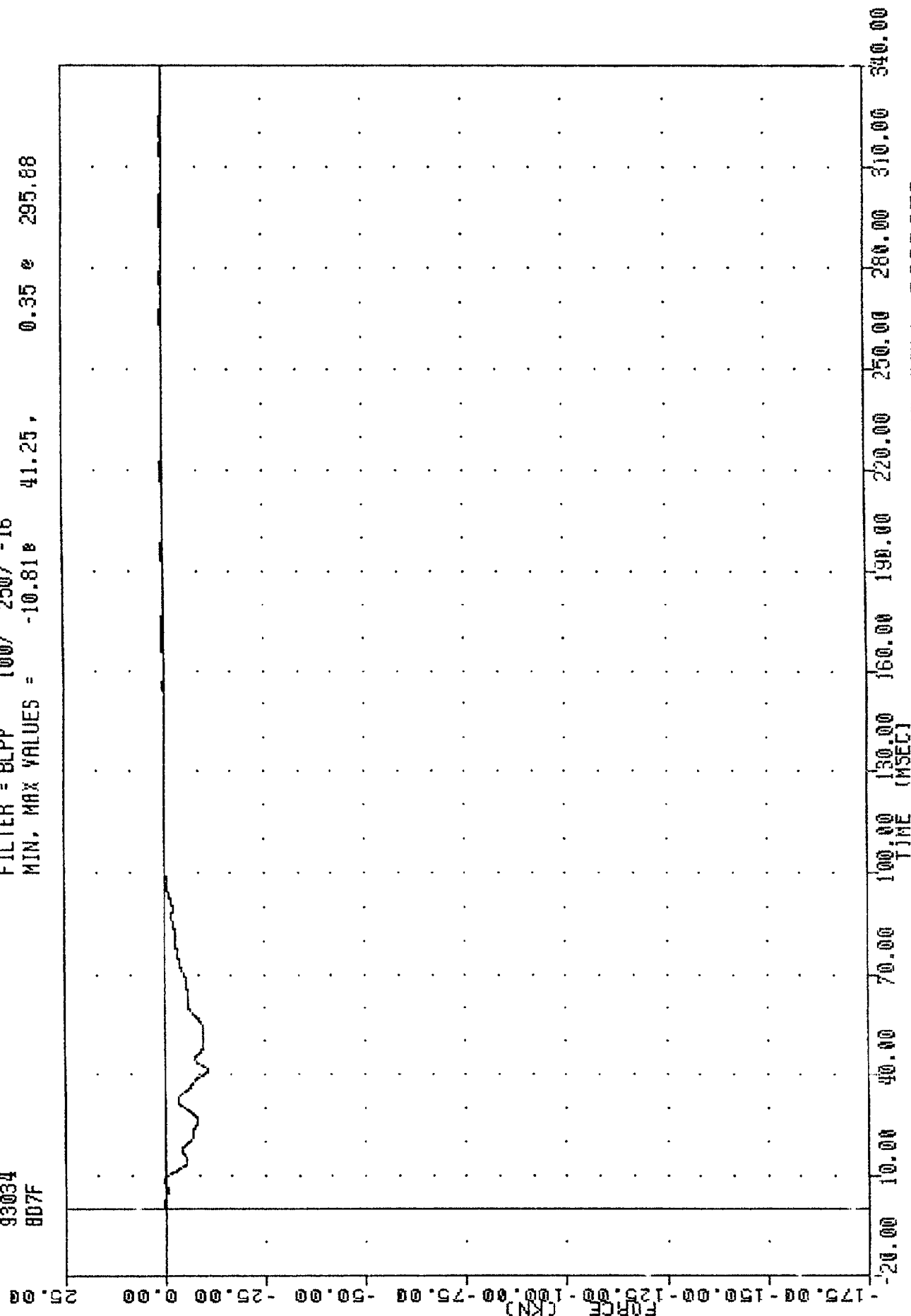
1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 06 FORCE

TRC
NEW CAR ASSESSMENT PROGRAM
93034
BD7F

, 930203

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -10.81e 41.25, 0.35 e 295.88

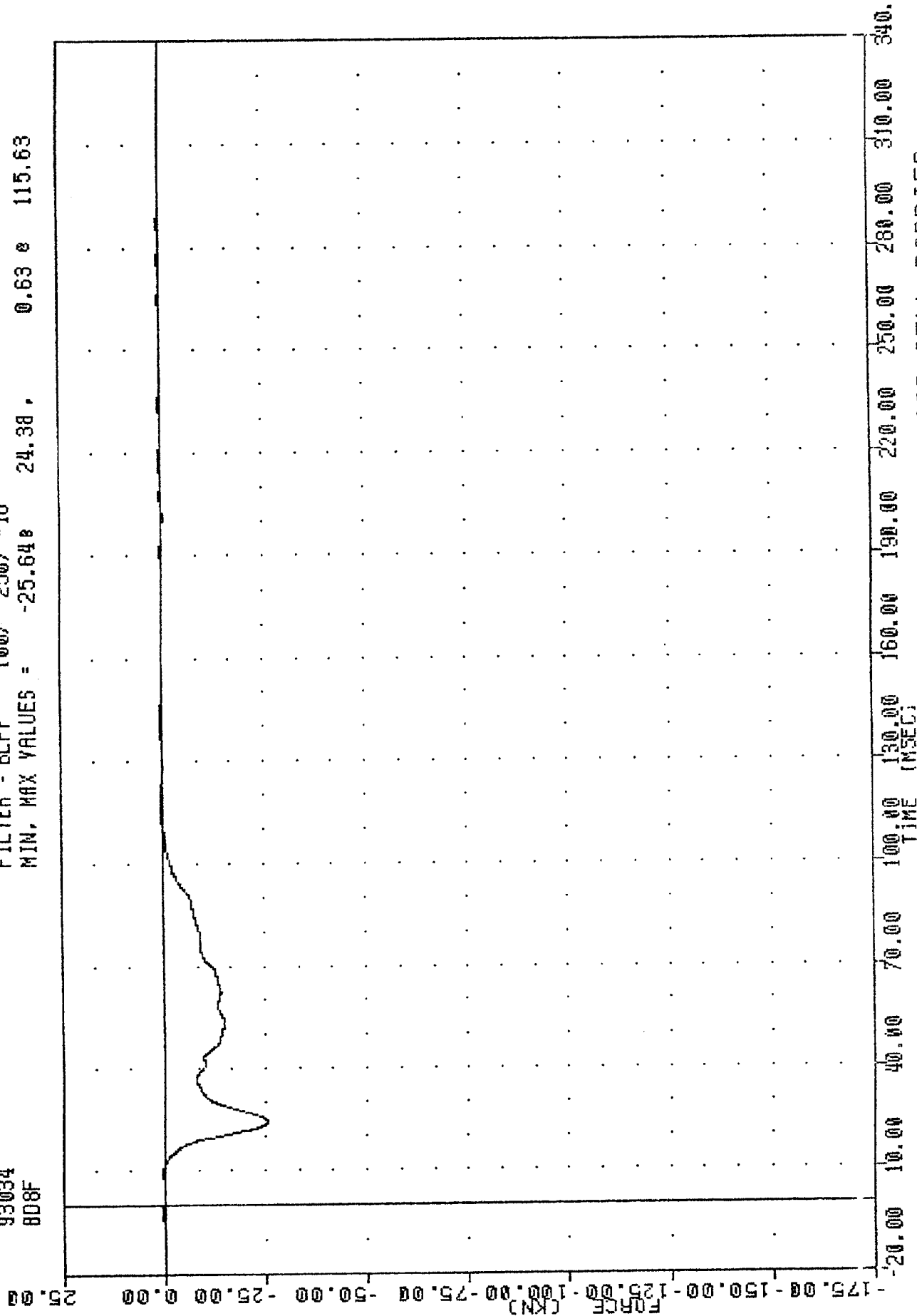


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

LOAD CELL BARRIER POSITION 07 FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 808F

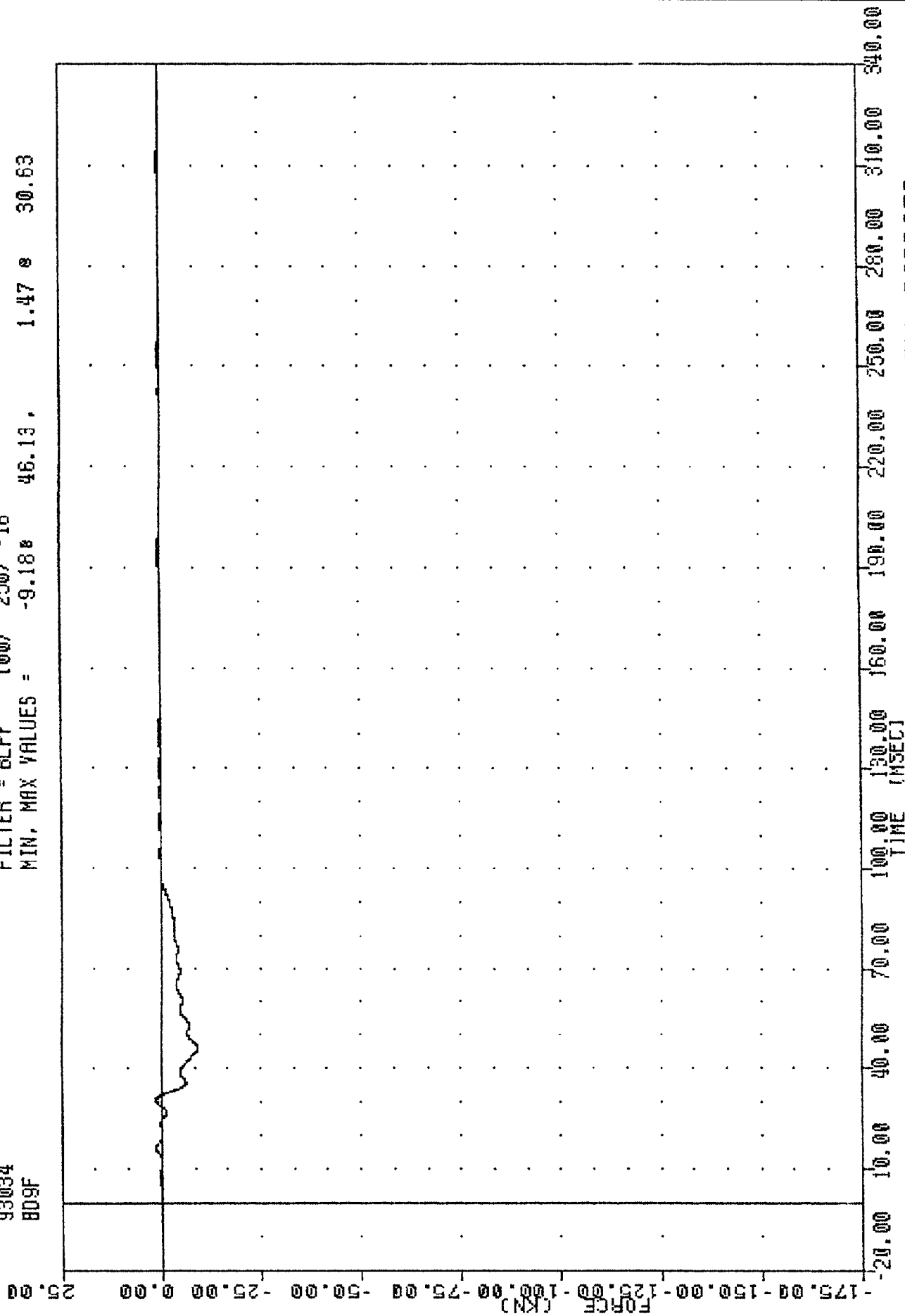
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -25.64 24.38 0.63 115.63



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D8 FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 BD9F

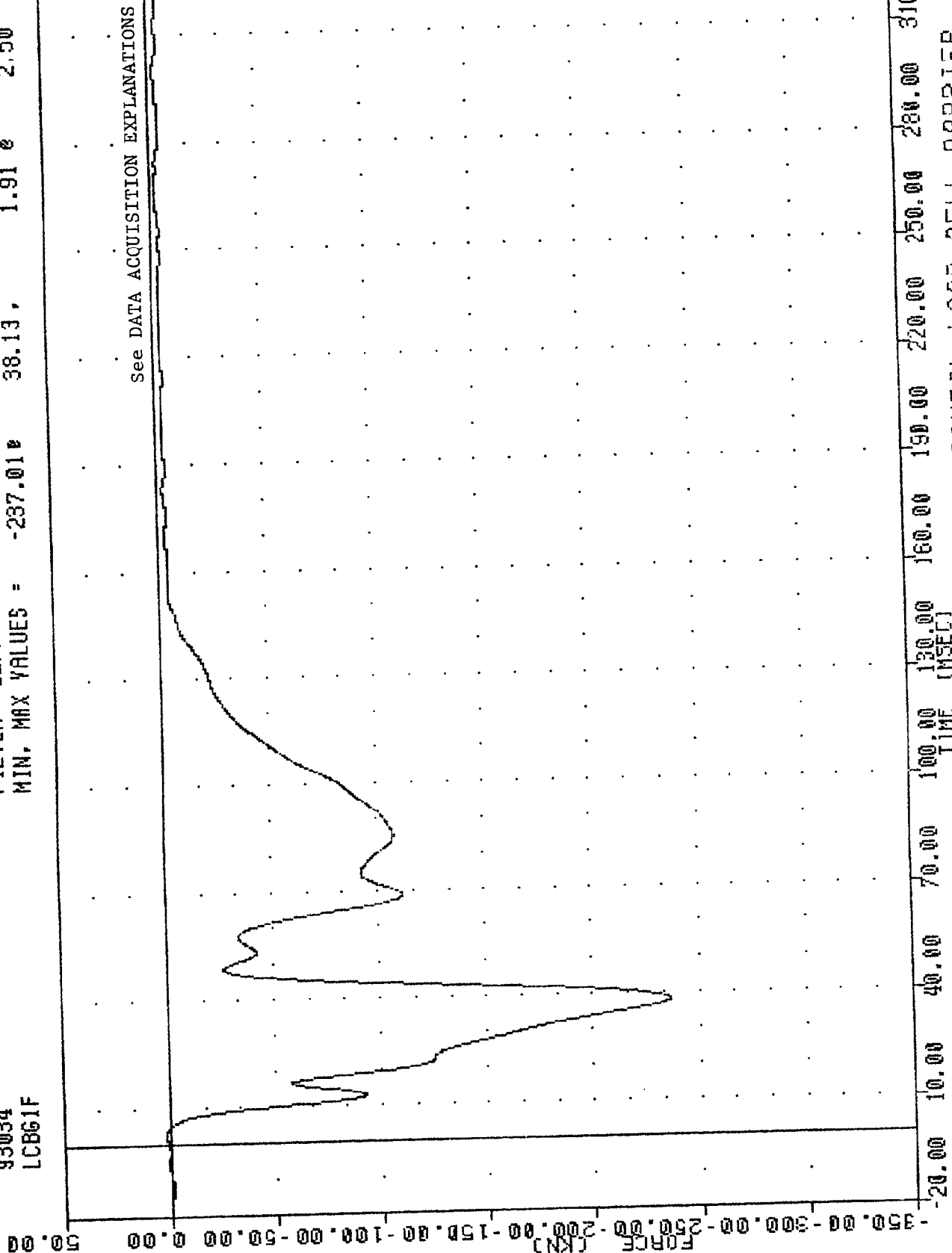
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -9.18 46.13 1.47 30.63



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION FORCE

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 LCBG1F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -237.01e 38.13, 1.91 e 2.50

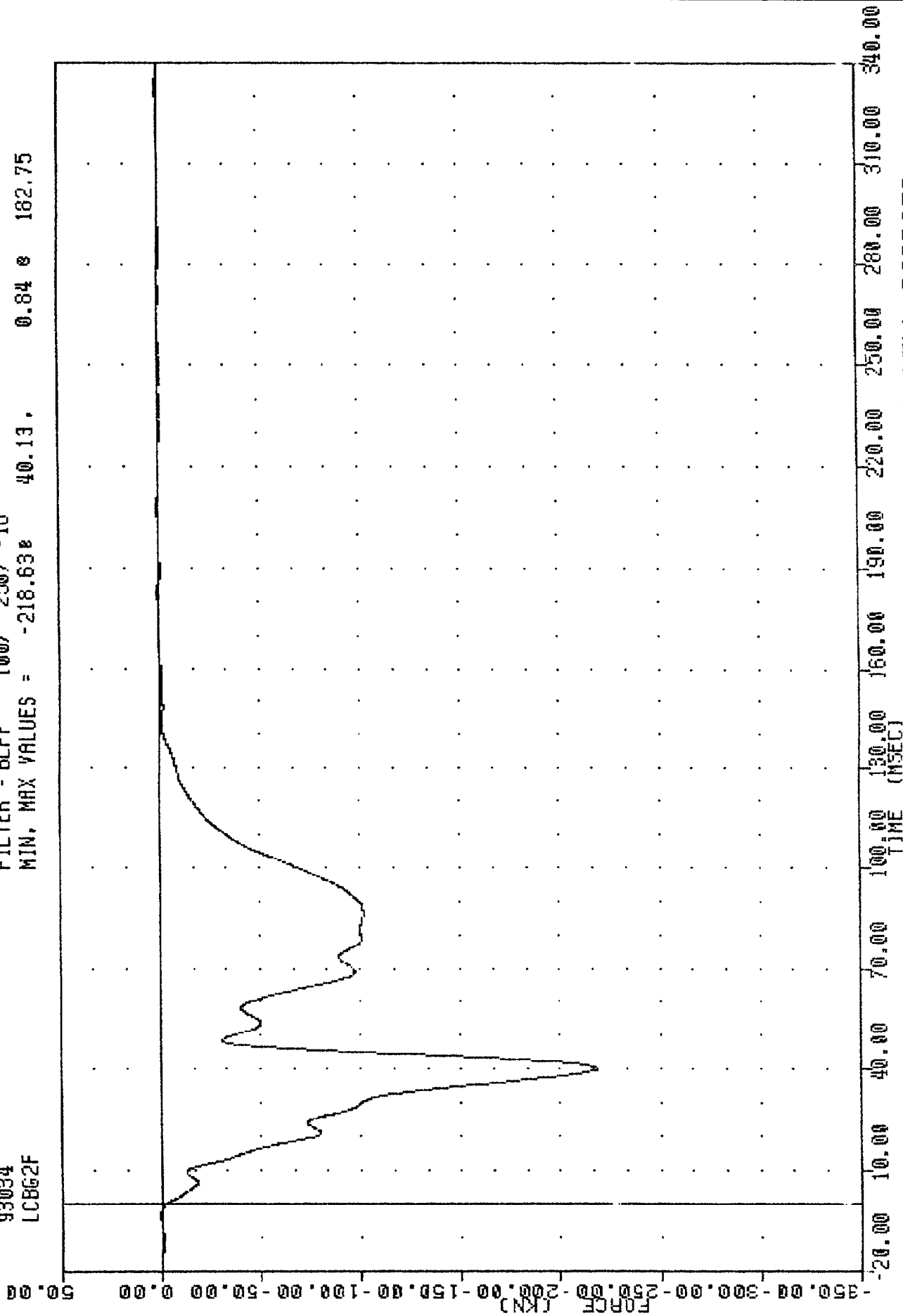


1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 1 MAN CELL BARRIER GROUP - 1 FORCE TOTAL

TRC
 NEW CAR ASSESSMENT PROGRAM
 93034
 LCBG2F

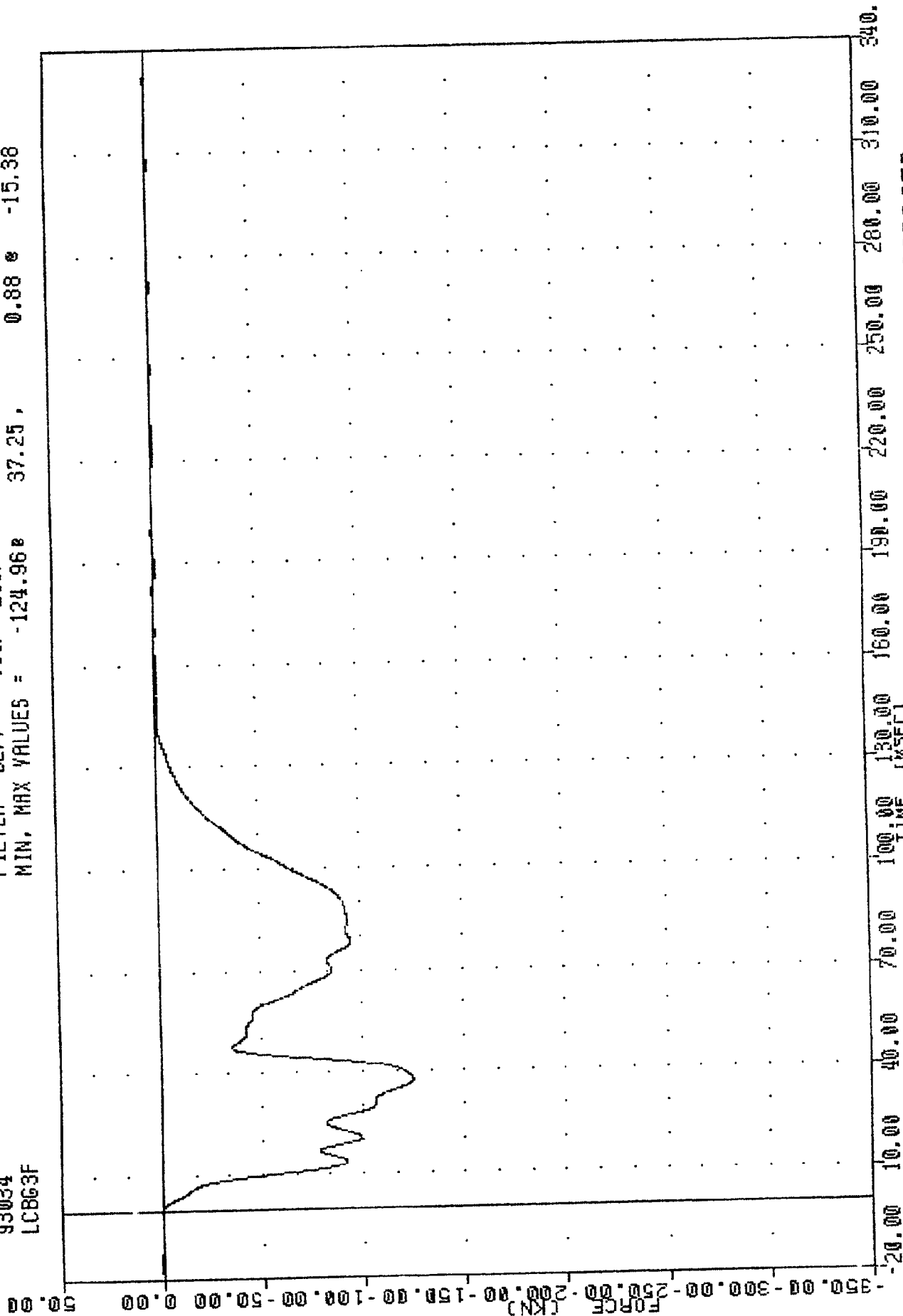
930203

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -218.63% 40.13. 0.84 % 182.75



TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 LCBG3F

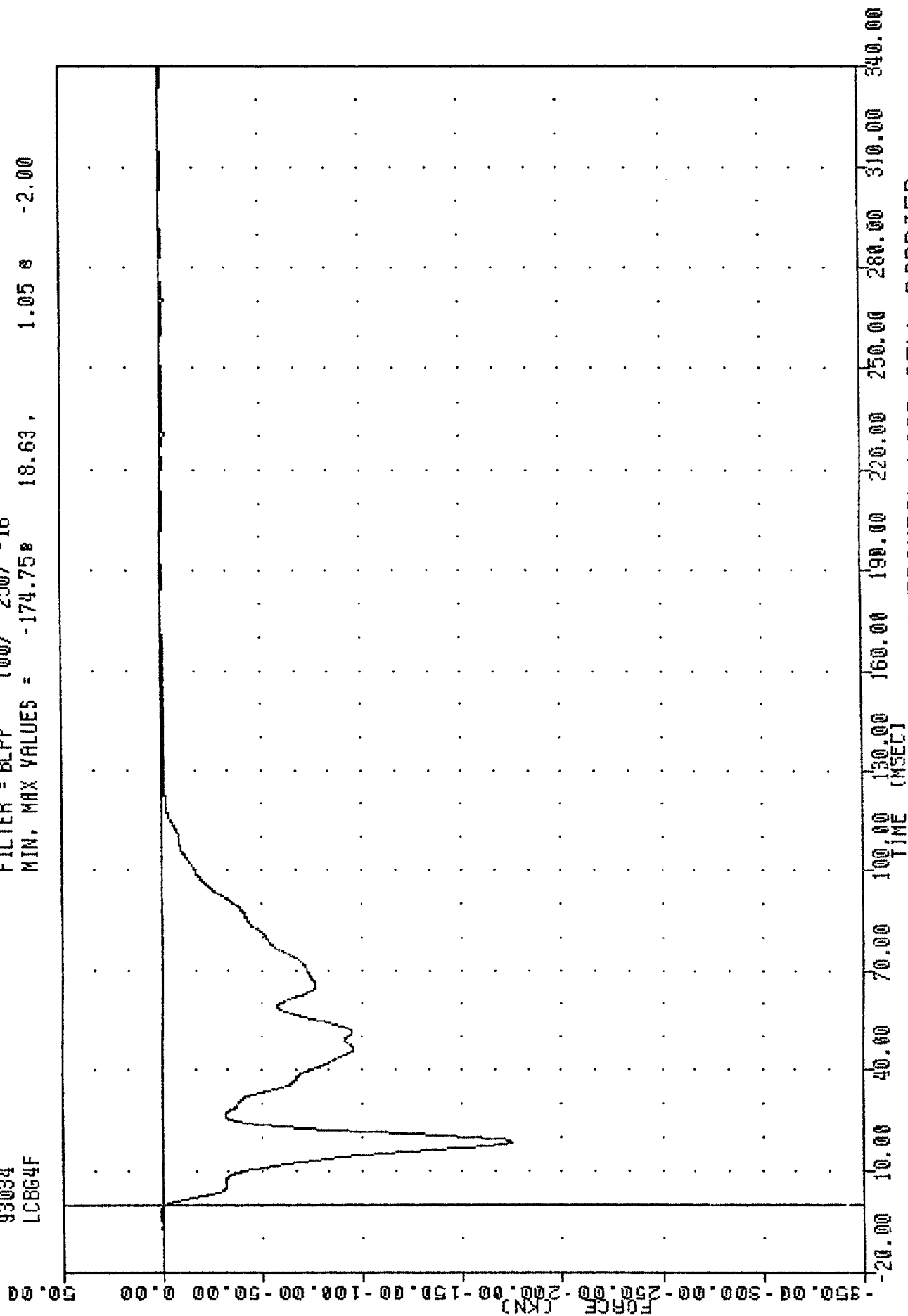
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -124.96e 37.25, 0.88 e -15.38



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP - 3 FORCE TOTAL

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 LCB64F

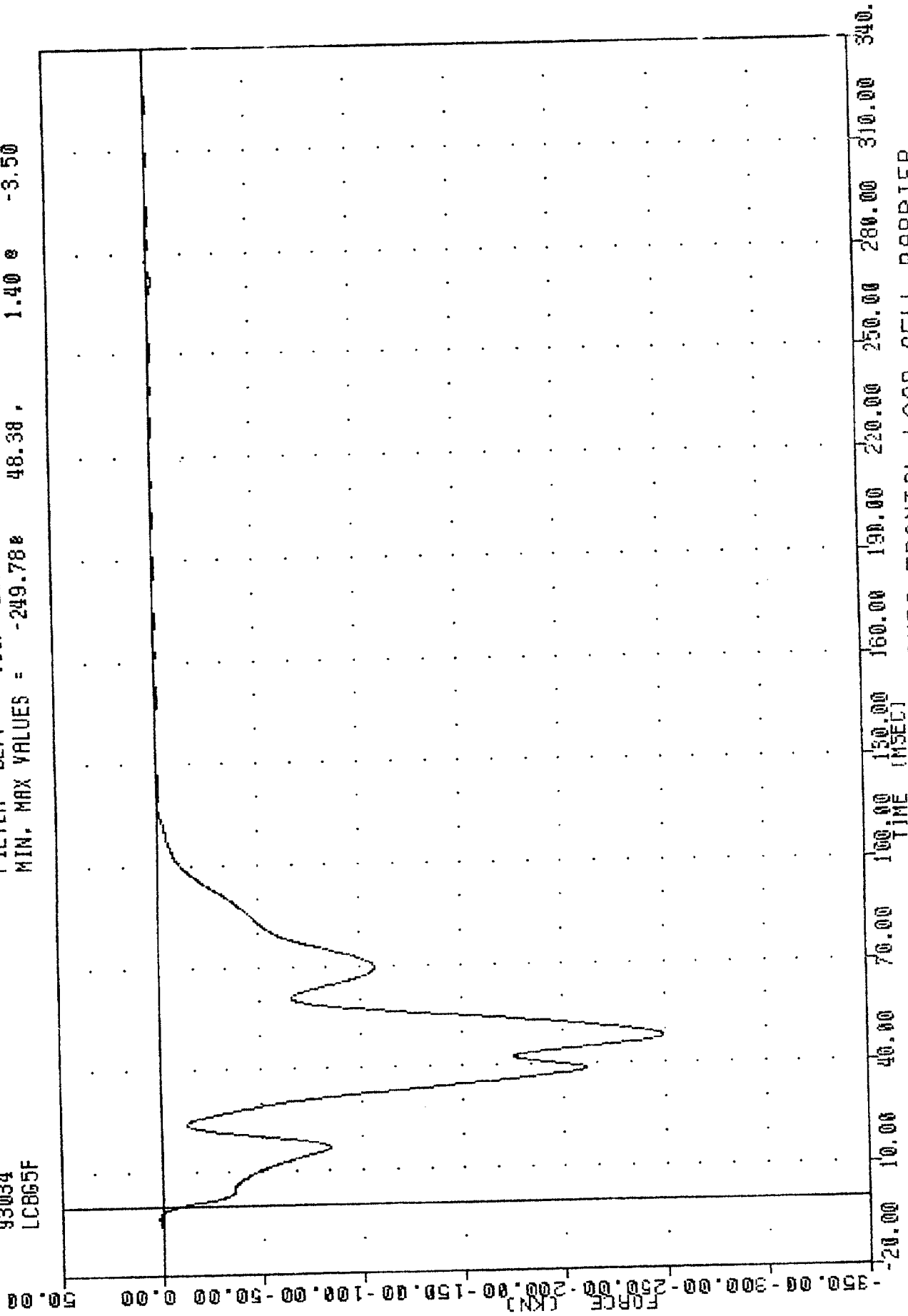
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -174.75 18.63, 1.05 8 -2.00



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LCB64F CELL BARRIER GROUP 4 FORCE TOTAL

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 LCBG5F

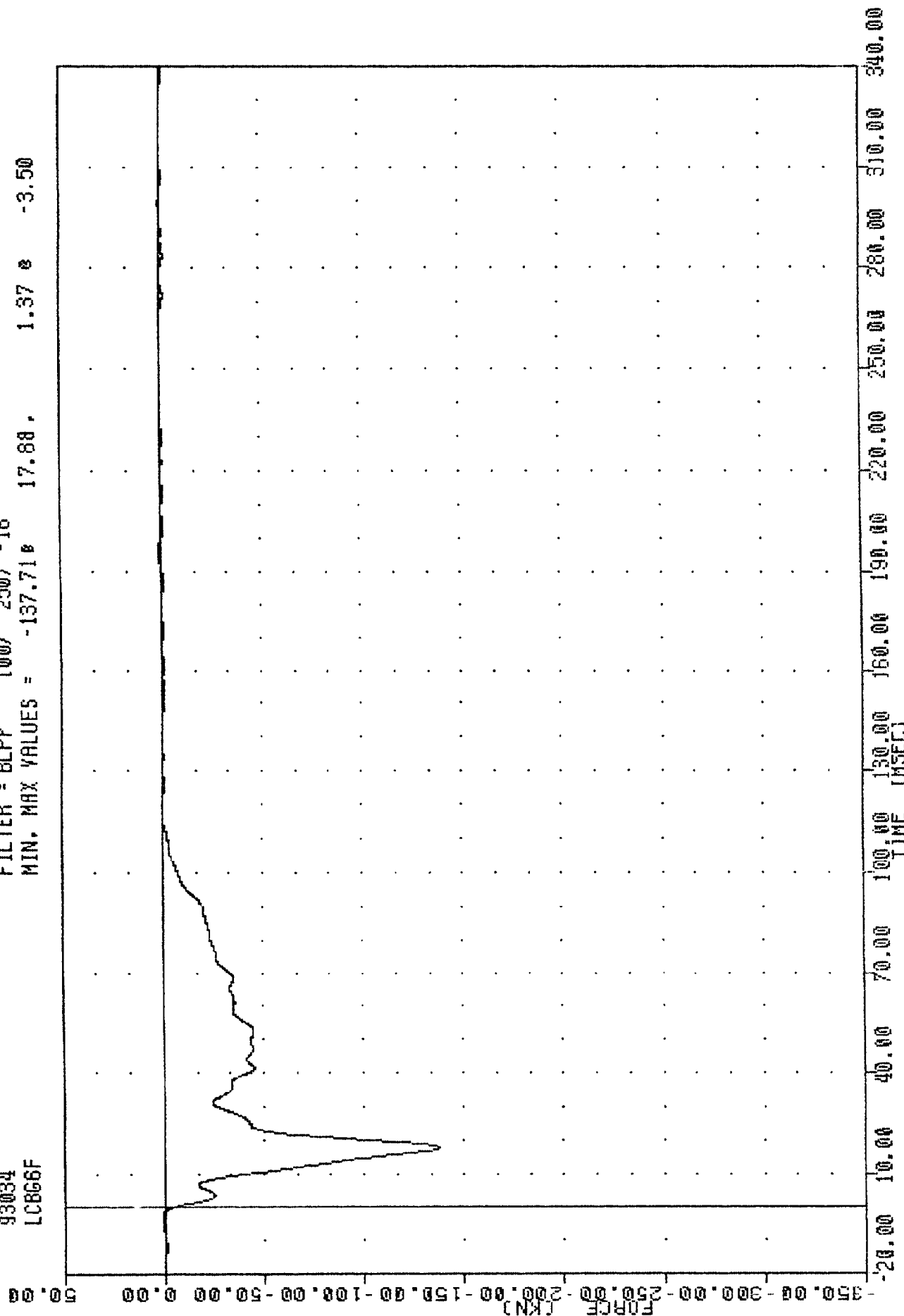
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -249.78e 48.38 , 1.40 e -3.50



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP # 5 FORCE TOTAL

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 LCB66F

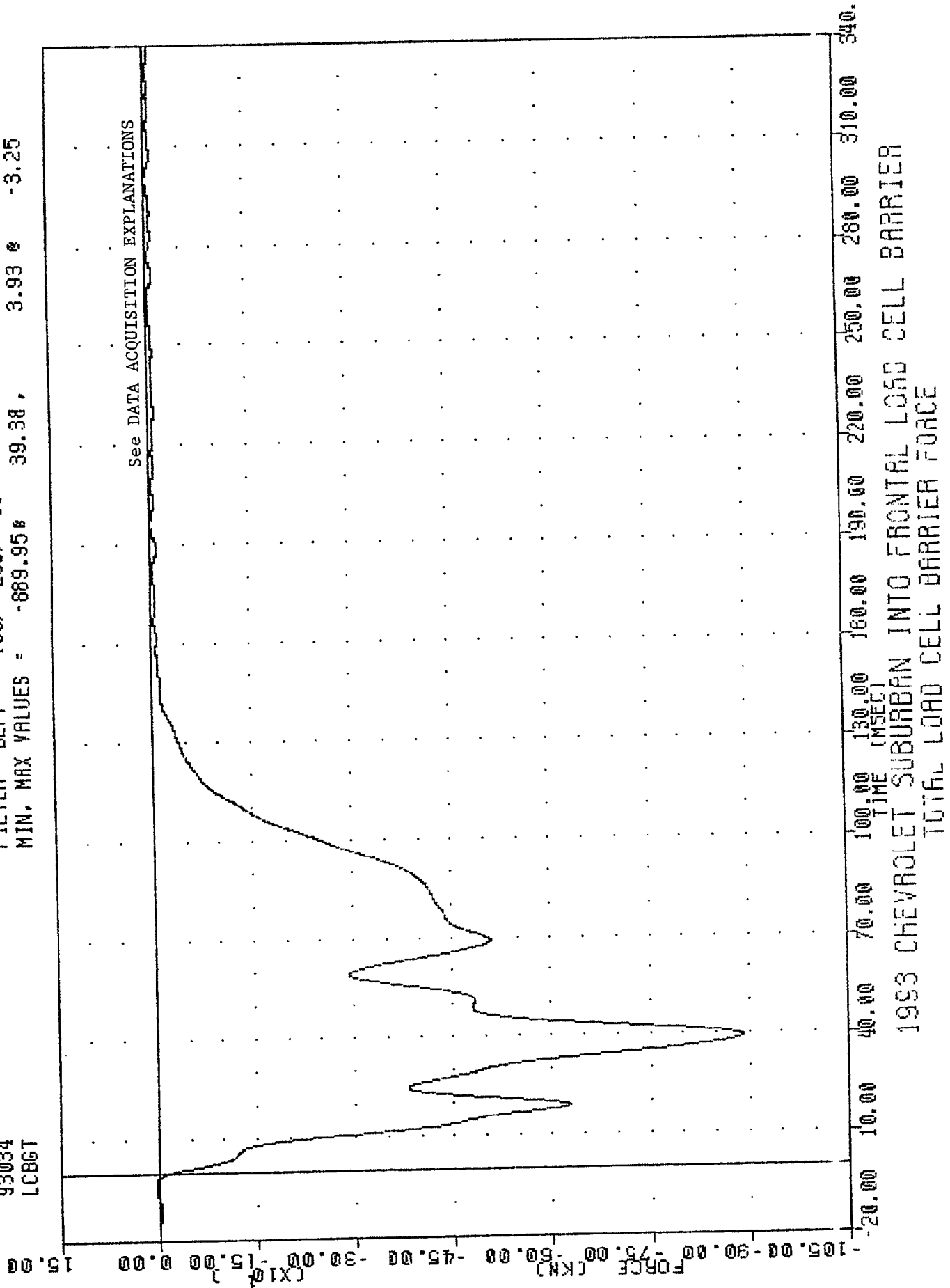
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -137.71 17.88 1.37 3.50



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER
 LCB66F GROUP 6 FORCE TOTAL

TRC , 930203
 NEW CAR ASSESSMENT PROGRAM
 93034
 LCBGT

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -889.95 39.38 , 3.93 3.25



TRC
 OTHXD
 LC8GT

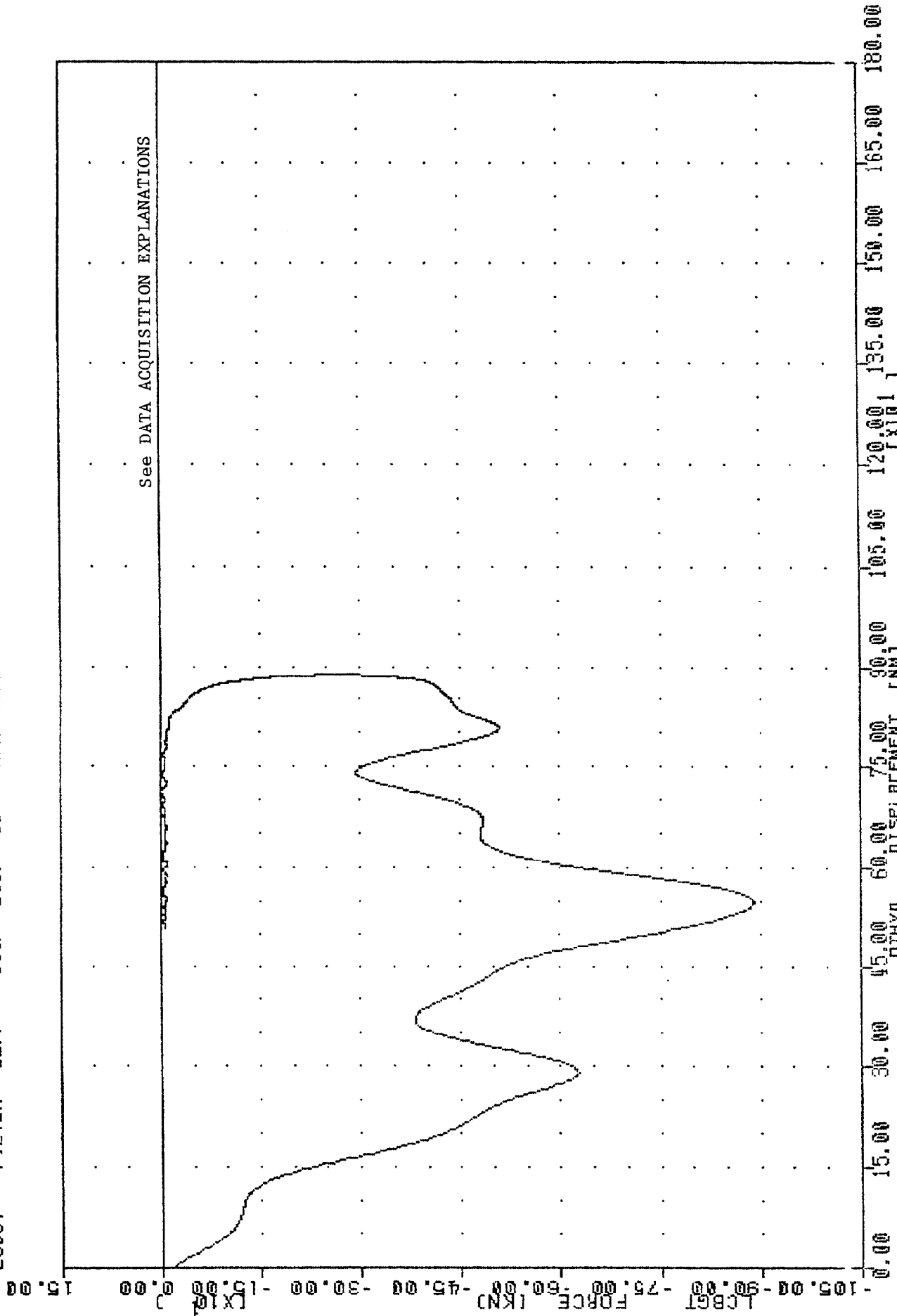
1990203
 FILTER = BLPP
 FILTER = BLPP

NEW CAR ASSESSMENT PROGRAM
 300/ 750/ -16 MIN. MAX =
 100/ 250/ -16 MIN. MAX =

93024
 0.00
 -889.95

887.22
 -1.43

98.63
 196.13



1993 CHEVROLET SUBURBAN INTO FRONTAL LOAD CELL BARRIER

TOTAL BARRIER FORCE VS. OVERPASS W/ICLS X-AXIS DISPLACEMENT

APPENDIX C

DUMMY CERTIFICATION DATA

PRE-TEST CERTIFICATION DATA

DRIVER DUMMY S/N: 192

TRANSPORTATION RESEARCH CENTER OF OHIO
HYBRID III EXTERNAL DIMENSIONS
ALDERSON 192

2-DEC-92

TRC 192C11ED1 572E SN192 EXT. DIMENSION CAL11

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
TEMPERATURE			21.1 DEG. C
RELATIVE HUMIDITY			51.0 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429- 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226- 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970-1001 MM	983. MM
WAIST CIRCUMFERENCE (Z)		836- 866 MM	848. MM
CHEST DEPTH (Q)		213- 229 MM	218. MM
H-POINT HEIGHT (C)		84- 89 MM	86. MM
H-POINT FROM SEATBACK (D)		135- 140 MM	137. MM
SKULL CAP TO BACKLINE (H)		41- 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879- 889 MM	884. MM
THIGH CLEARANCE (F)		140- 155 MM	147. MM
BUTTOCK KNEE LENGTH (K)		579- 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH (N)		452- 478 MM	472. MM
POPLITEAL HEIGHT (L)		429- 455 MM	450. MM
KNEE PIVOT HEIGHT (M)		485- 500 MM	493. MM
FOOT LENGTH (P)		252- 267 MM	259. MM
FOOT BREADTH (W)		91- 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE (E)		84- 94 MM	91. MM
SHOULDER BREADTH (V)		422- 437 MM	427. MM
SHOULDER PIVOT HEIGHT (B)		506- 521 MM	513. MM
ELBOW REST HEIGHT (J)		191- 211 MM	206. MM
SHOULDER-ELBOW LENGTH (I)		330- 345 MM	340. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290- 305 MM	295. MM

TEST MEETS SPECIFICATIONS

TECHNICIAN

Chris Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

27-JAN-92

TRC

192C11HD3

572E SN192 HEAD DROP CAL 11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10% - 70%	41.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	259.57 G
PEAK LATERAL ACCELERATION	15 G MAX	-2.68 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

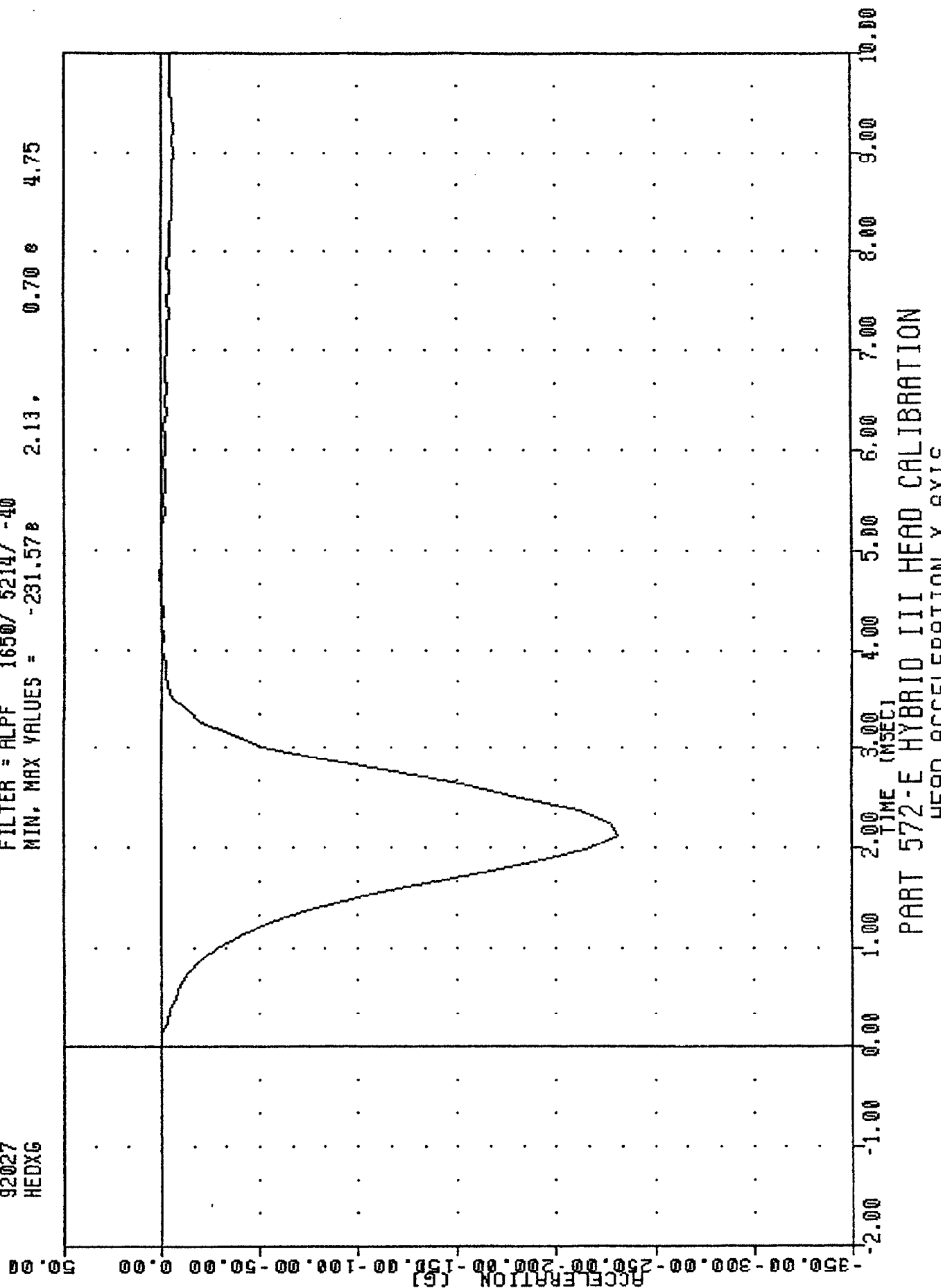
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

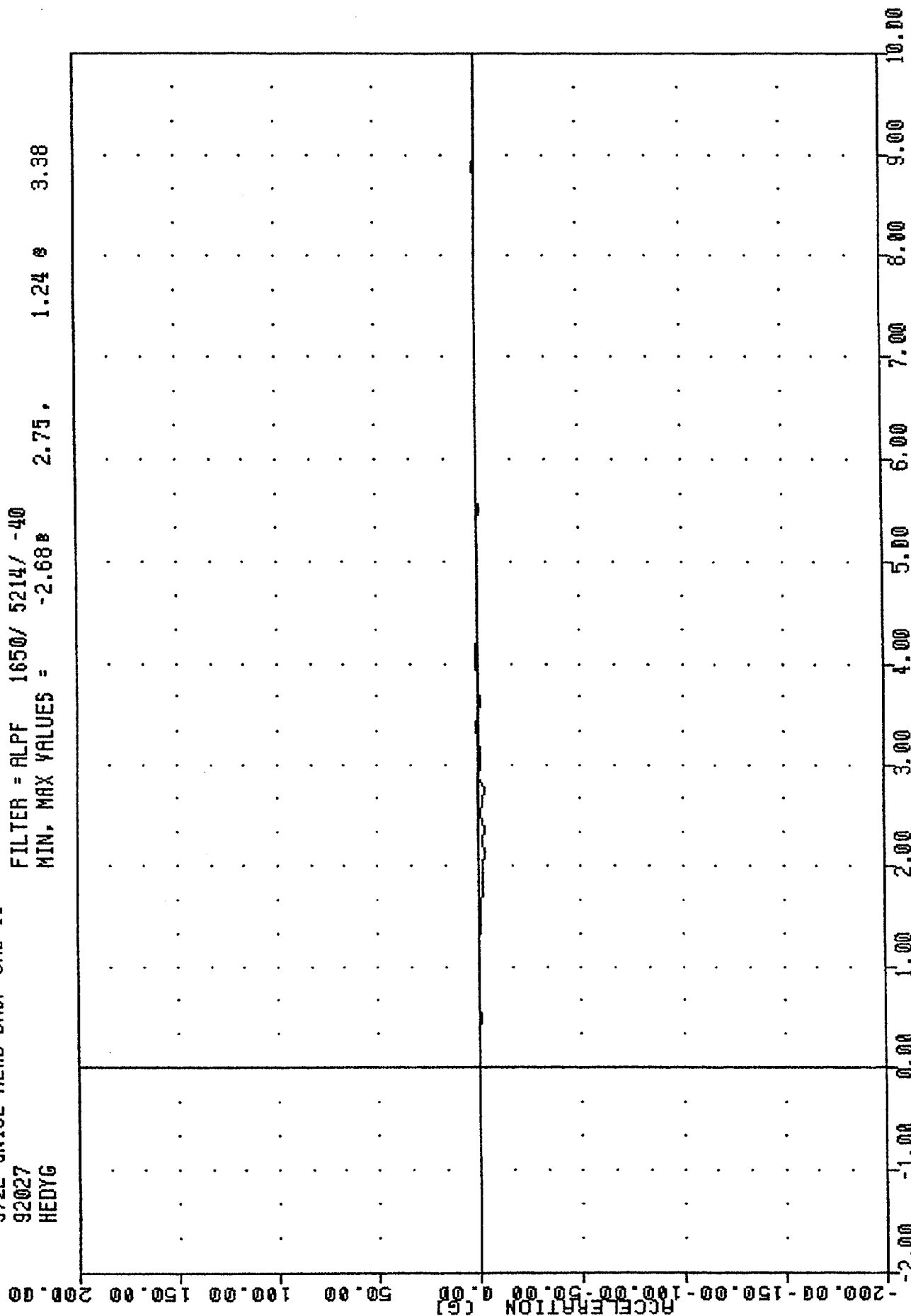
TRC , 192C11HD3
 572E SN192 HEAD DROP CAL 11
 92027
 HEDXG

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -231.57 2.13, 0.70 4.75



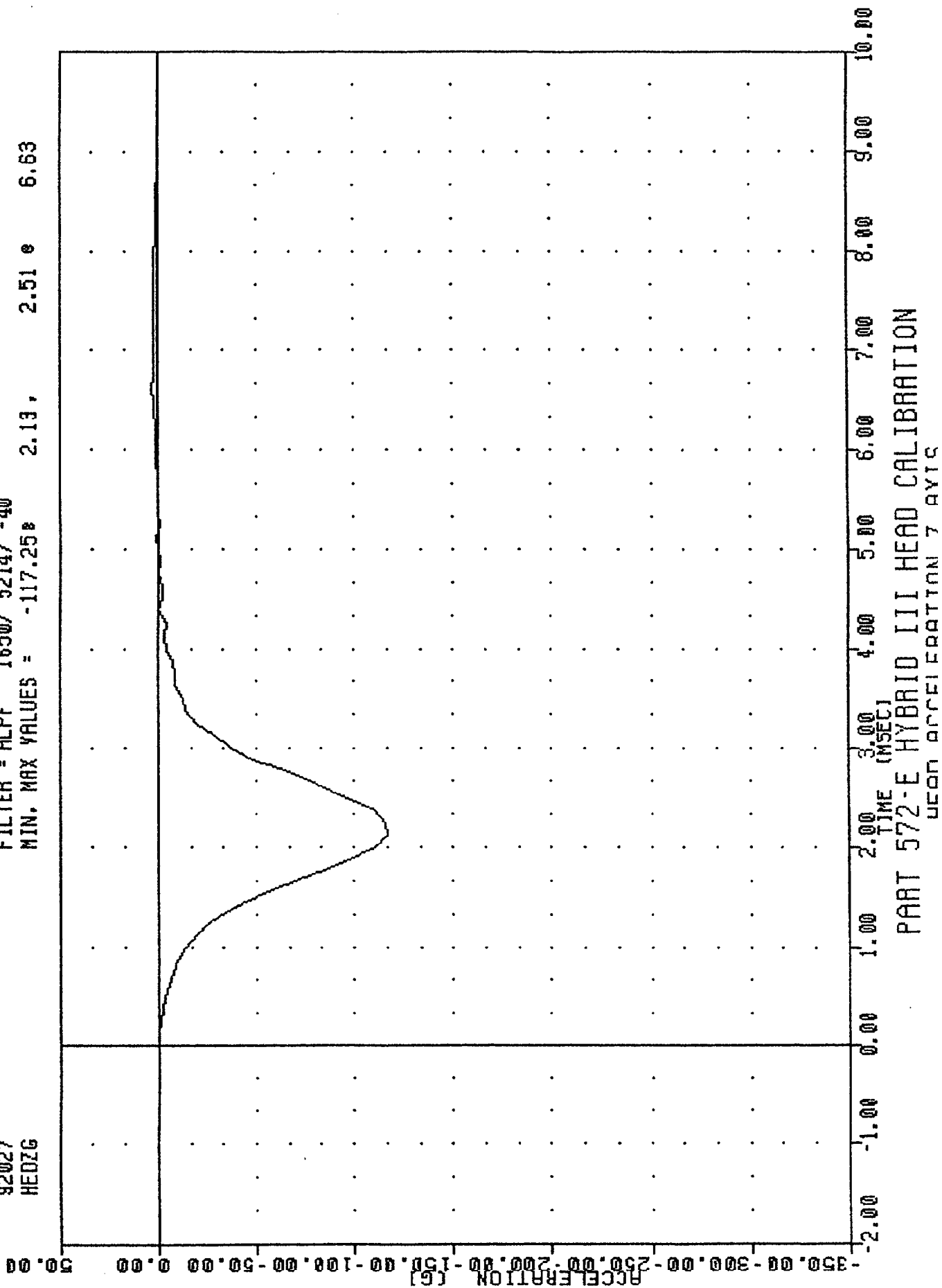
TRC
572E SN192 HEAD DRDP CAL 11
92027
HEDYG

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -2.68 2.75 1.24 3.38



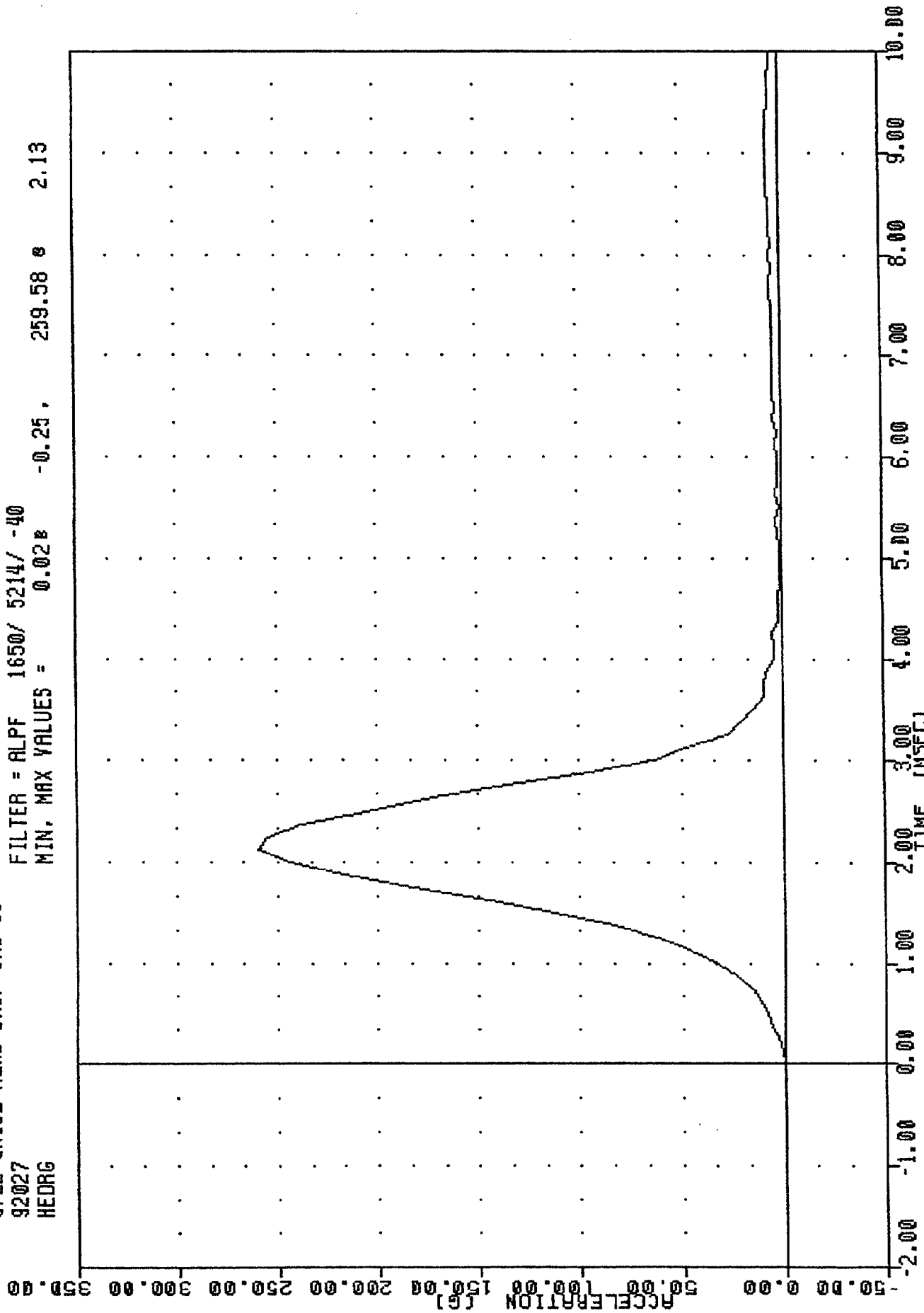
TRC , 192C11HD3
 572E SN192 HEAD DROP CAL 11
 92027
 HEDZG

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -117.25 2.13, 2.51 6.63



TRC , 192C11HD3
 572E SN192 HEAD DROP CAL 11
 92027
 HEDRG

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.02 259.58 2.13
 -0.25



572E HYBRID LI HEAD CALIBRATION

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

02-DEC-92

6 AXIS NECK TRANSDUCER

TRC 192C11NF1

572E SN192 NECK FLEXION CAL11

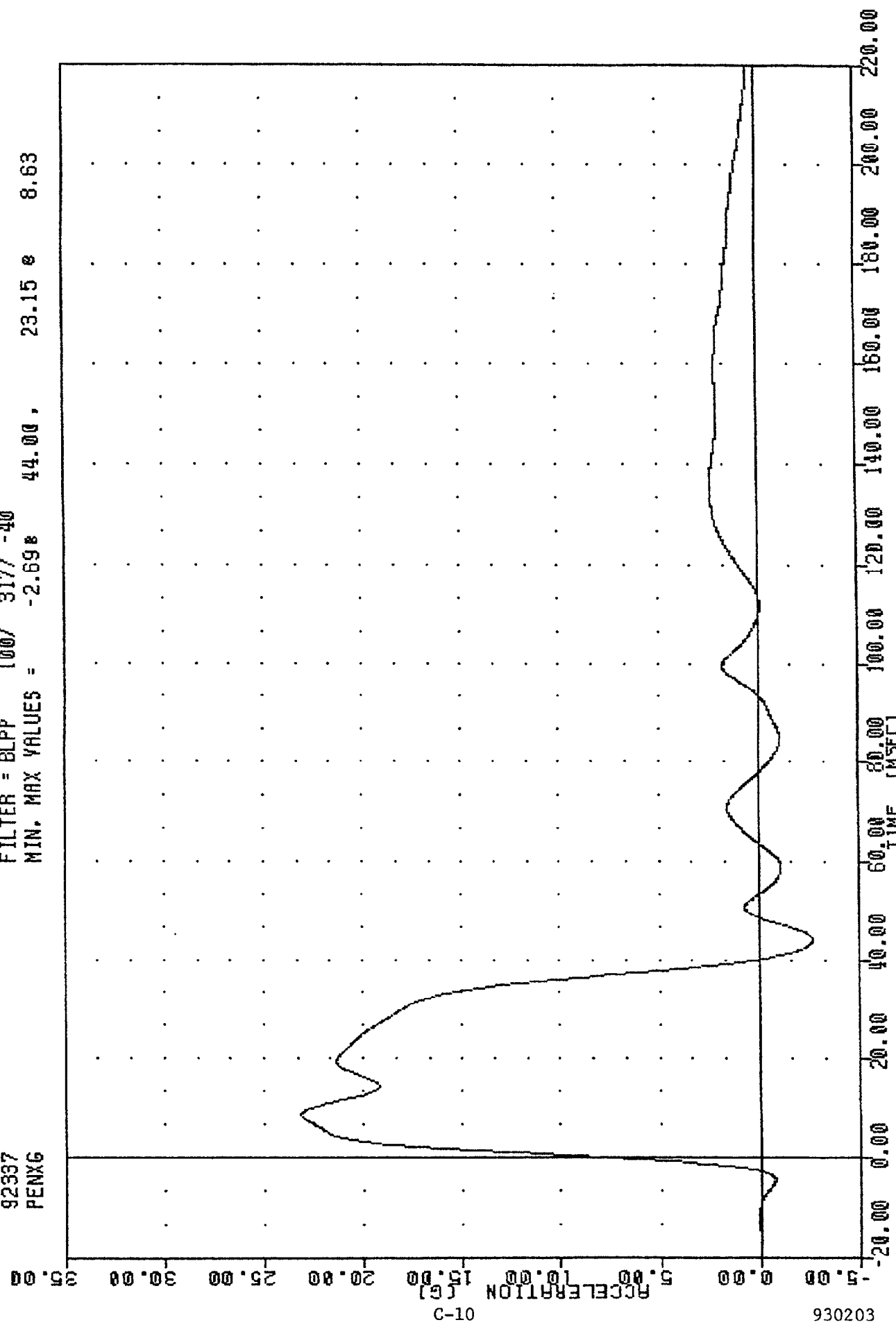
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10% - 70%	51.0 %
IMPACT VELOCITY		6.89 - 7.13 M/SEC	7.03 M/SEC
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.59 G
	20 MS	17.60 - 22.60 G	21.30 G
	30 MS	12.50 - 18.50 G	17.96 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.91 G
DECELERATION-TIME CURVE			
DECAY TIME TO 5 G		34 - 42 MS	37.75 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	67.96 DEG.
	TIME	57 - 64 MS	58.25 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	93.21 NM
	TIME	47 - 58 MS	49.75 MS
ROTATION ANGLE-TIME CURVE			
DECAY TIME TO ZERO		113 - 128 MS	114.50 MS
POSITIVE MOMENT-TIME CURVE			
DECAY TIME TO ZERO		97 - 107 MS	101.25 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN_____

TRC , 192C11NF1
 572E SN192 NECK FLEXION CAL11
 92337
 PENXG

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -2.698 44.00 23.15 8 8.63



C-10

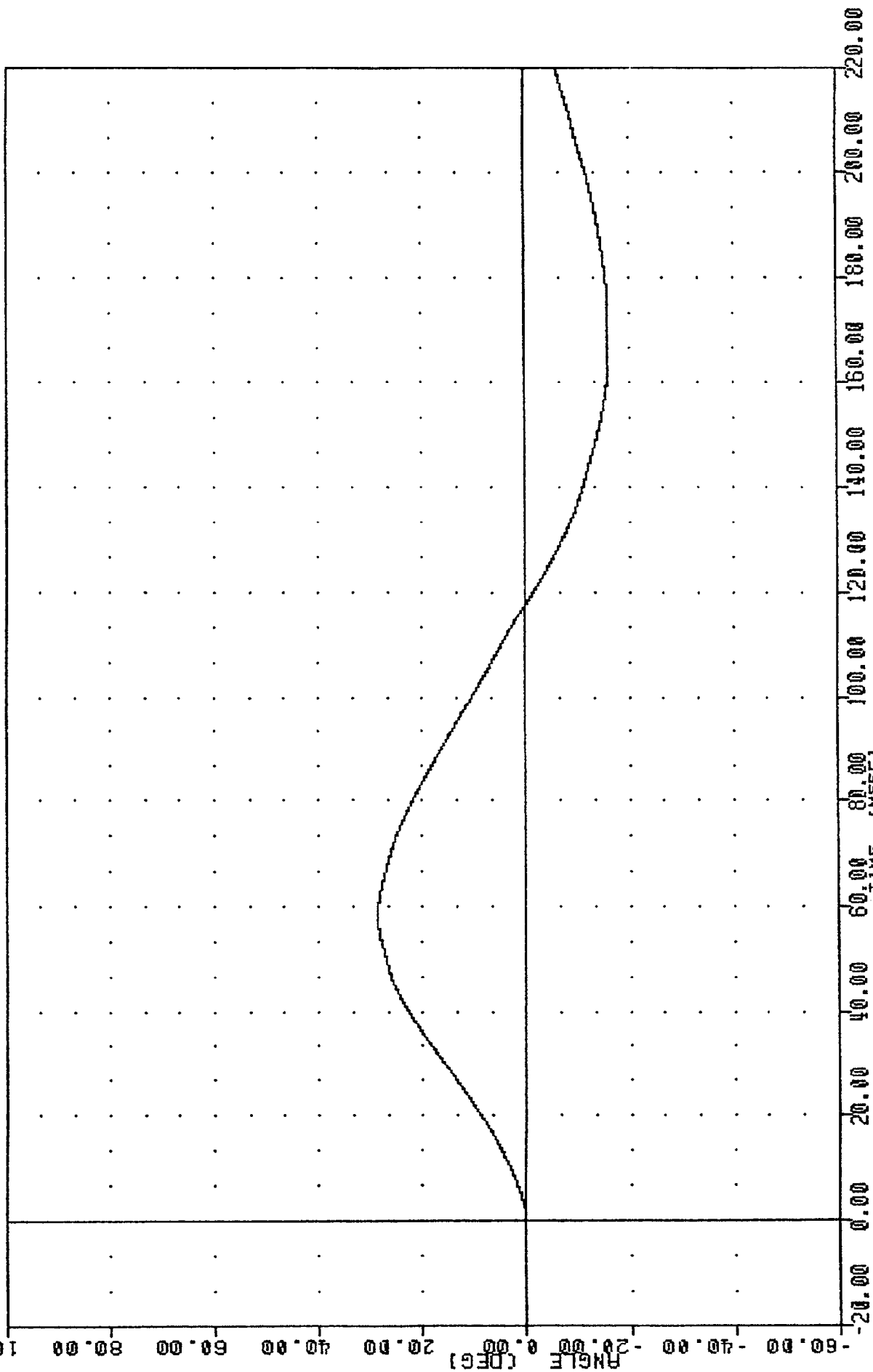
930203

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ENGINEERING DEPARTMENT

TRC
572E SN192 NECK FLEXION CAL11
92337
BETR

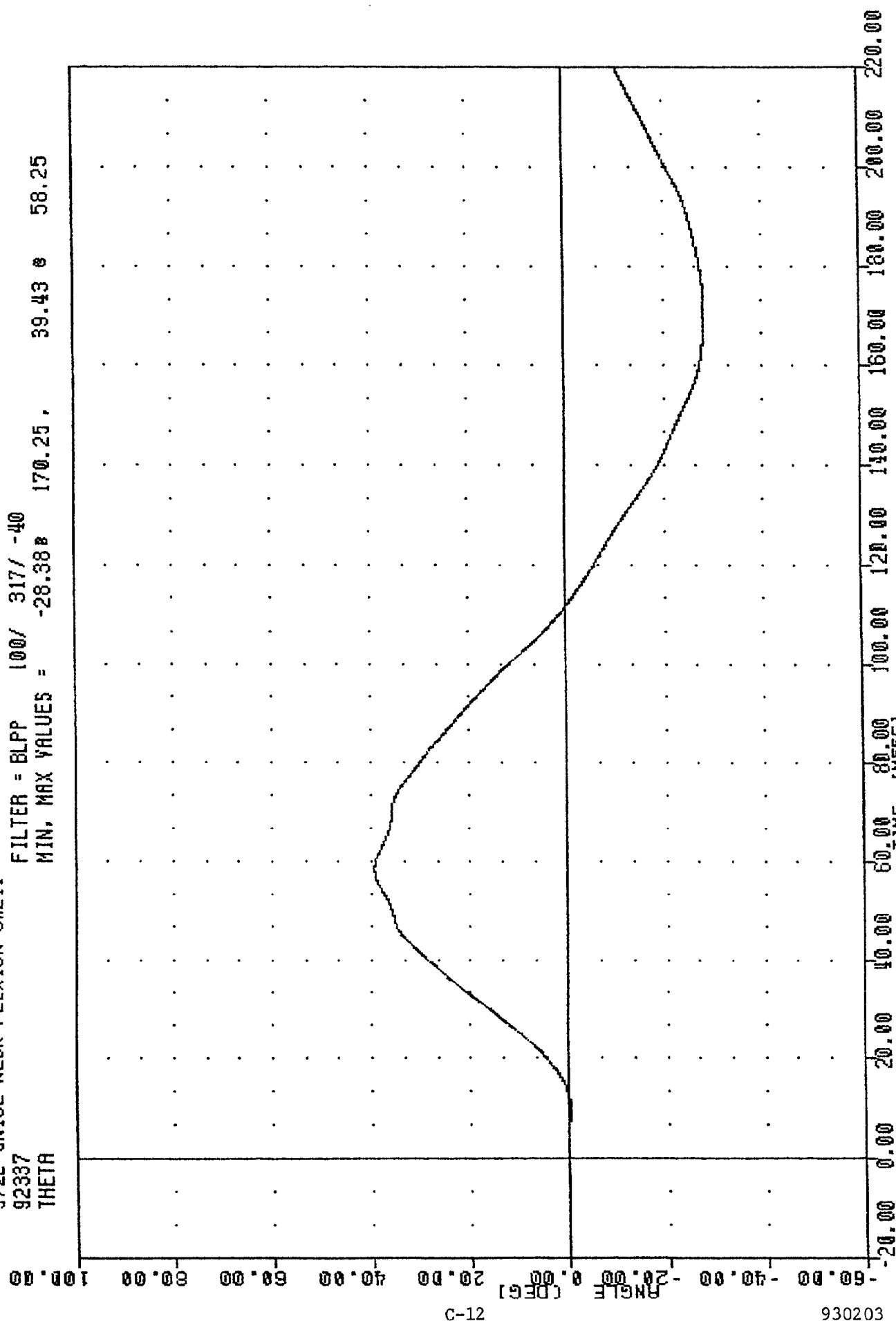
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -16.058 167.75, 28.53 58.13



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

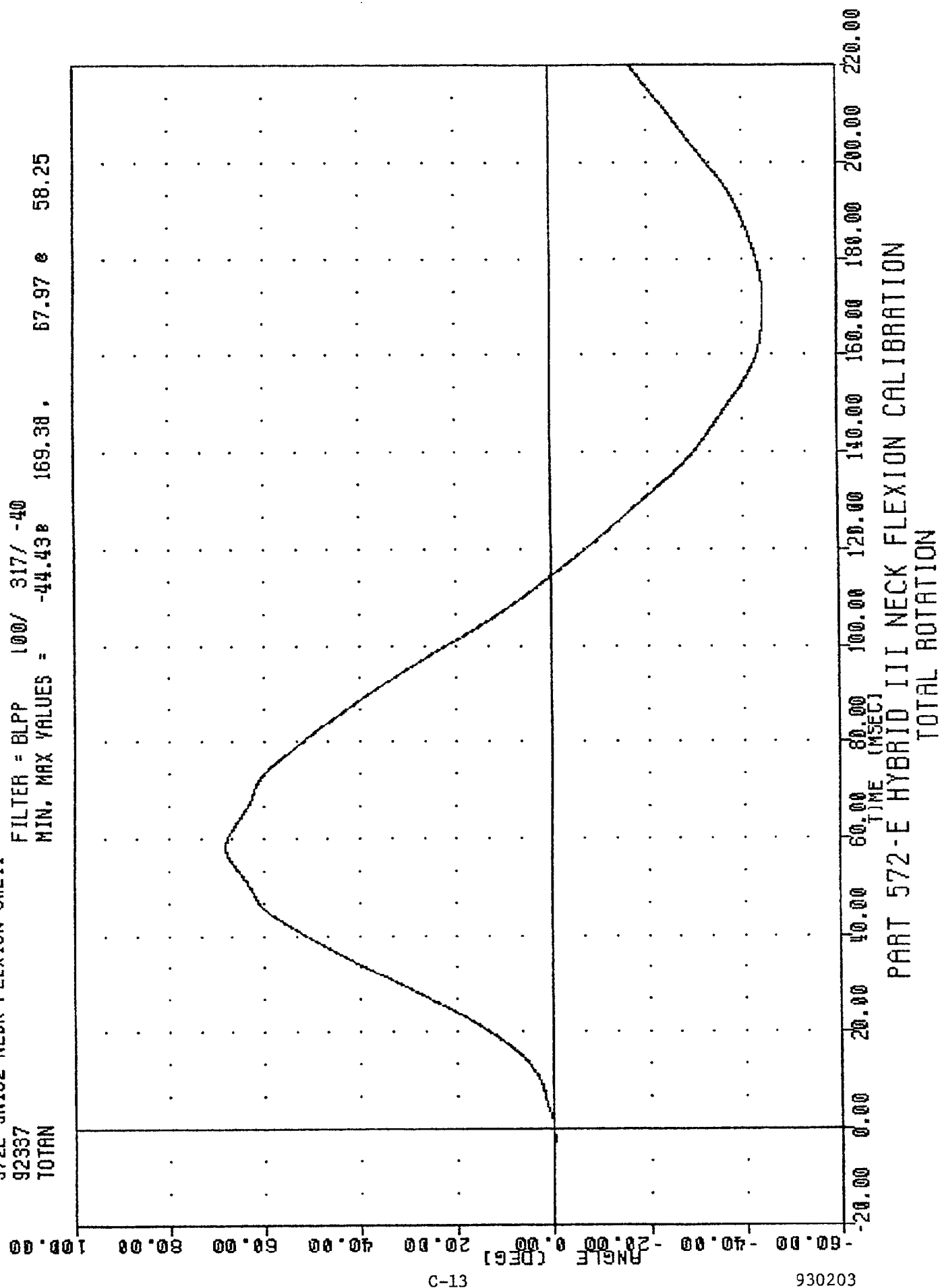
TRC
572E SN192 NECK FLEXION CAL11
92337
THETA

FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -28.38 170.25, 39.43 58.25



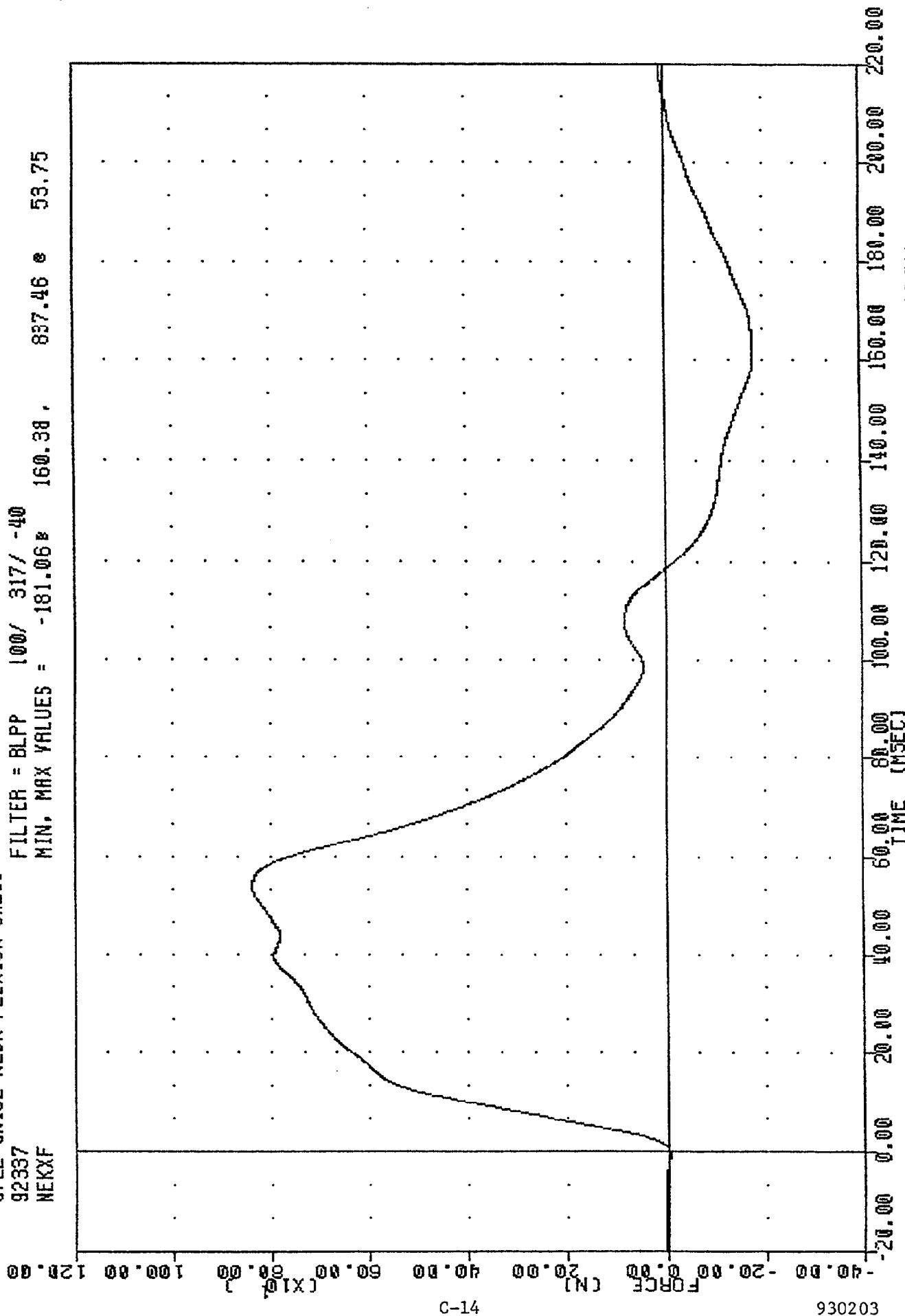
TRC
572E SN192 NECK FLEXION CAL11
92337
TOTAL

FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -44.43e 169.38 . 67.97 e 58.25



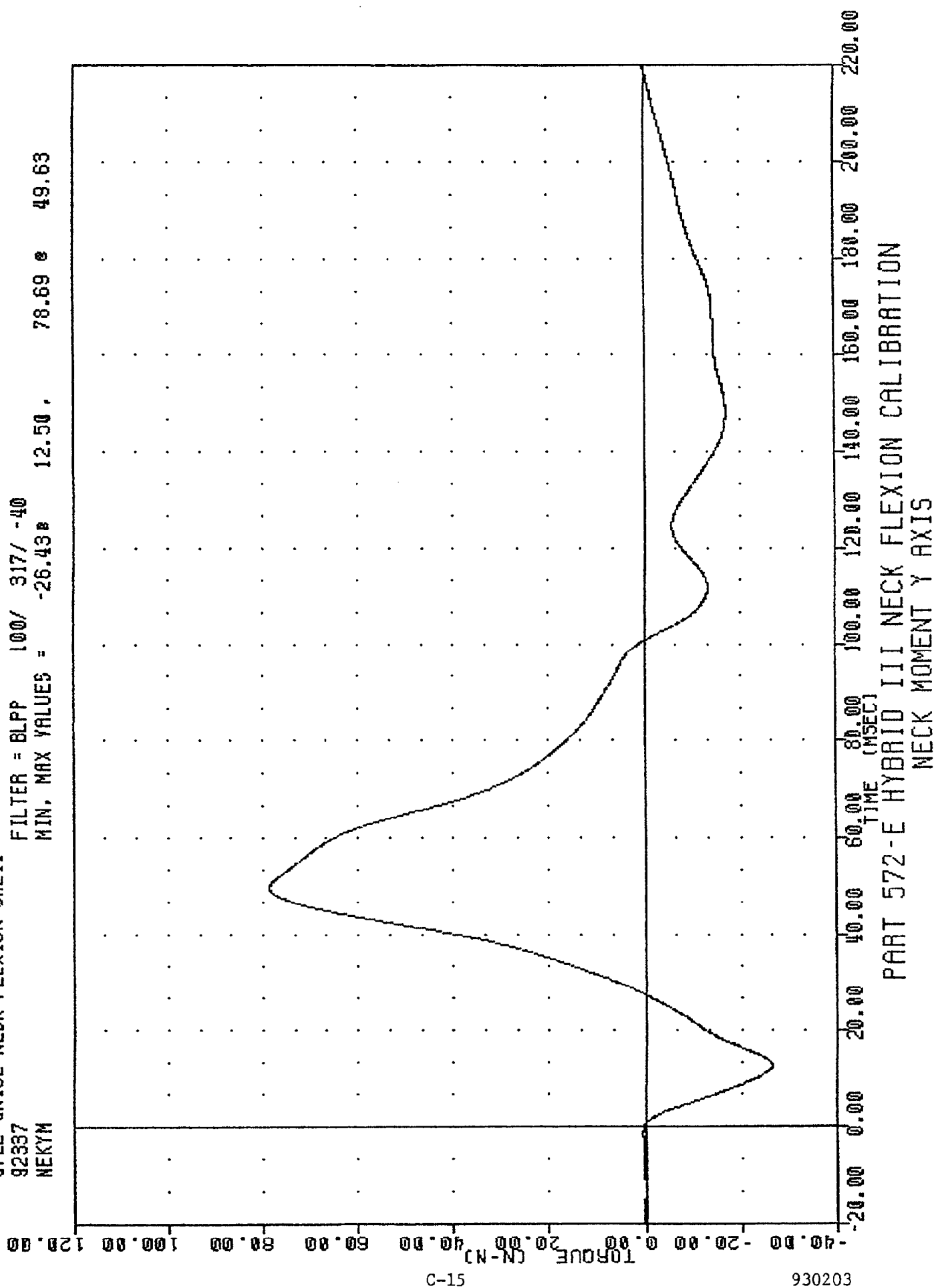
TRC , 192C11HF1
 572E SN192 NECK FLEXION CAL11
 92337
 NEKXF

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -181.06% 160.38 , 837.46 % 53.75



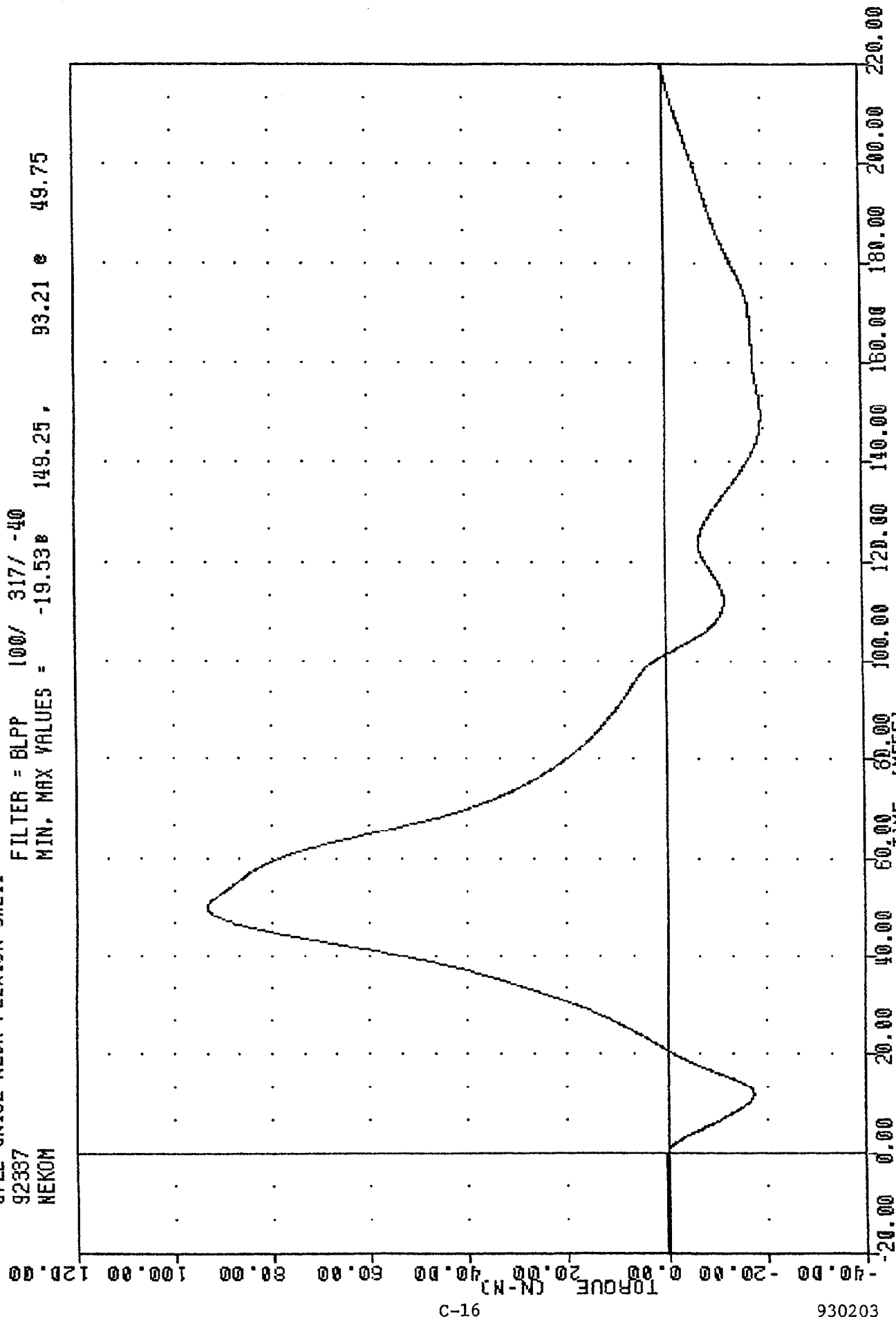
TRC
572E SN192 NECK FLEXION CAL11
92337
NEKYM

FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -26.43 12.50 78.69 49.63



TRC , 192C11NF1
 572E SN192 NECK FLEXION CAL11
 92337
 NEKOM

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -19.53 149.25, 93.21 49.75



C-16

930203

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

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

02-DEC-92

6 AXIS NECK TRANSDUCER
TRC 192C11NE1

572E SN192 NECK EXT. CAL11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
IMPACT VELOCITY	5.95 - 6.19 M/SEC	6.05 M/SEC
PENDULUM	10 MS 17.20 - 21.20 G	18.39 G
DECELERATION	20 MS 14.00 - 19.00 G	17.58 G
	30 MS 11.00 - 16.00 G	14.94 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	14.91 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	39.13 MS
D PLANE	MAX 81 - 106 DEG.	93.25 DEG.
ROTATION	TIME 72 - 82 MS	76.13 MS
MOMENT ABOUT OCCIPITAL	MIN -80.0/-52.9 NM	-57.79 NM
CONDYLE	TIME 65 - 79 MS	70.25 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	158.38 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	136.63 MS

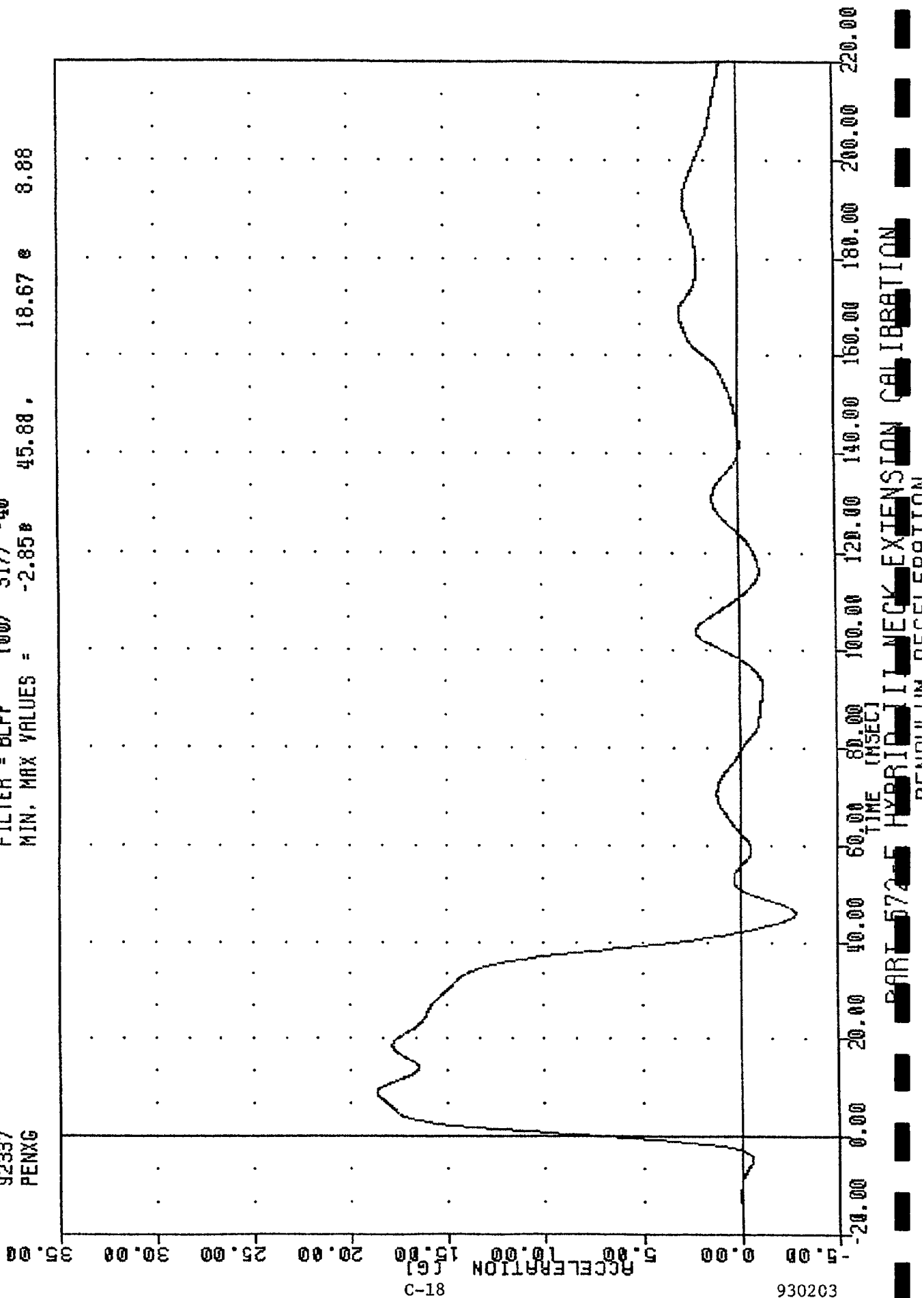
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chris Middleton

TRC , 192C11NE1
 572E SN192 NECK EXT. CAL11
 92337
 PENXG

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -2.85 45.88 , 18.67 8.88



930203

PART 572-E HYBRID II NECK EXTENSION CALIBRATION

TRC , 192C11NE1
 572E SN192 NECK EXT. CAL11
 92337
 BETA

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -9.35 196.25, 35.76 73.50

120.00

100.00

80.00

60.00

40.00

20.00

0.00

-20.00

-40.00

-60.00

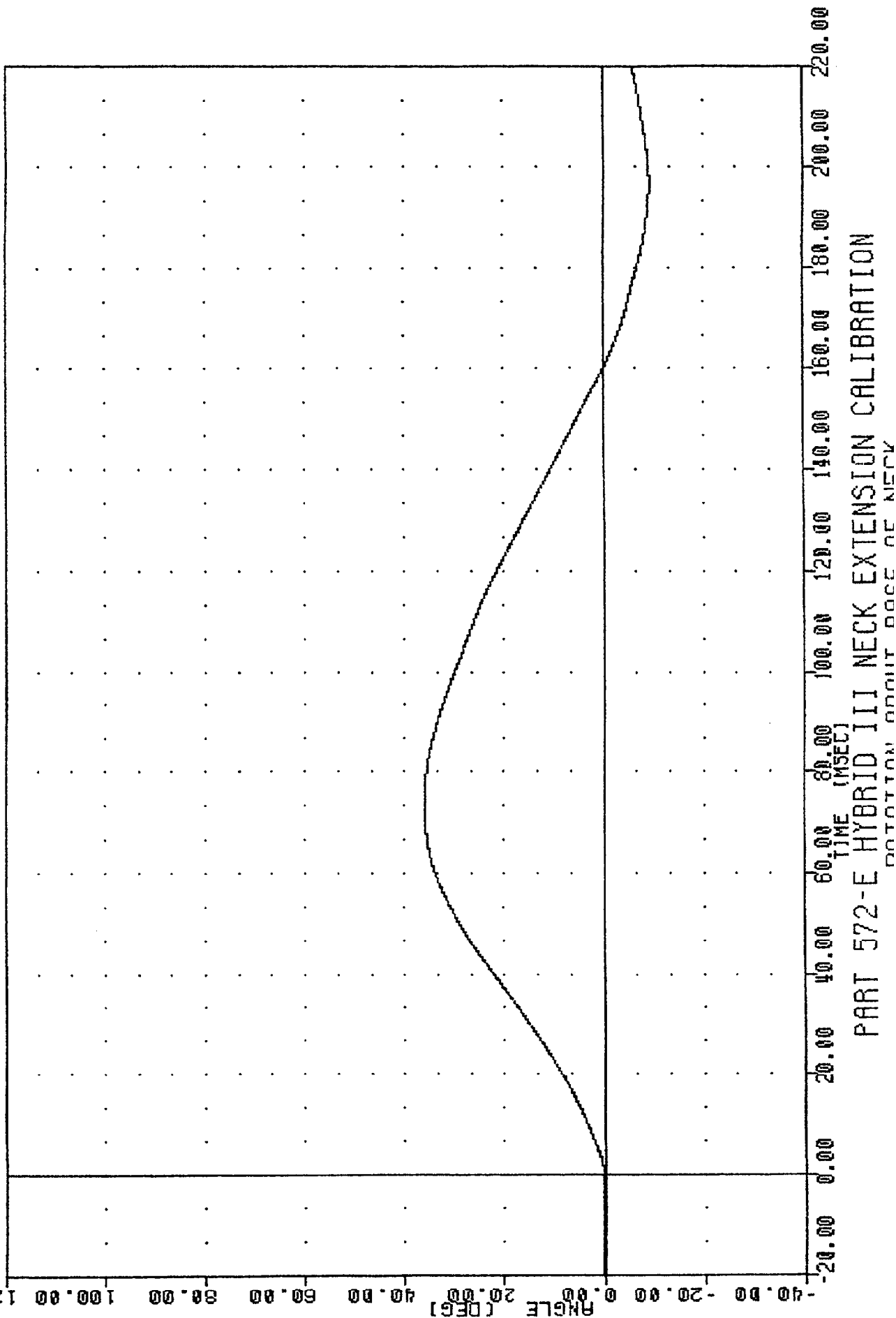
-80.00

-100.00

-120.00

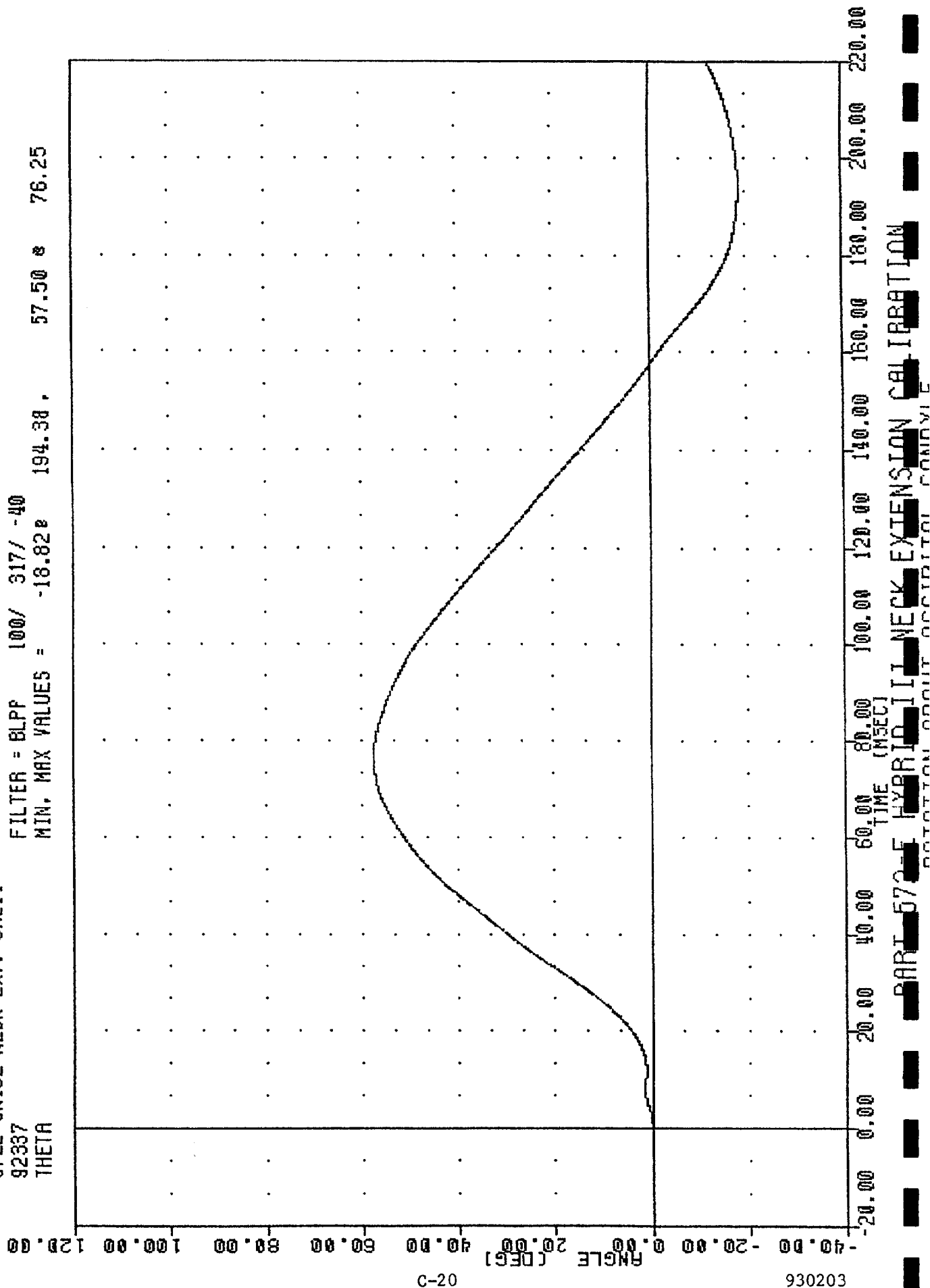
C-19

930203



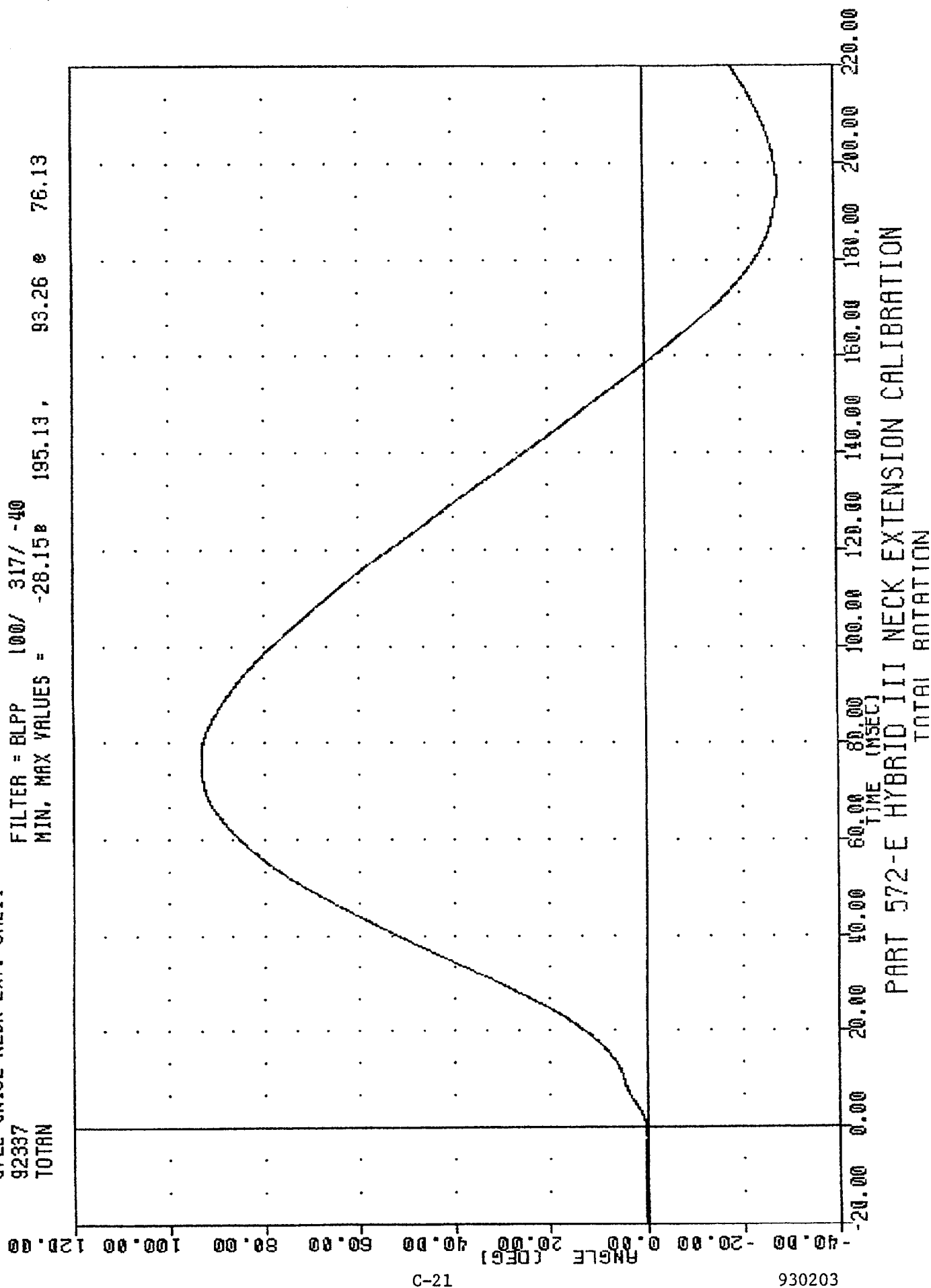
TRC , 192C11NE1
 572E SN192 NECK EXT. CAL11
 92337
 THETA

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -18.82e 194.38 , 57.50 e 76.25



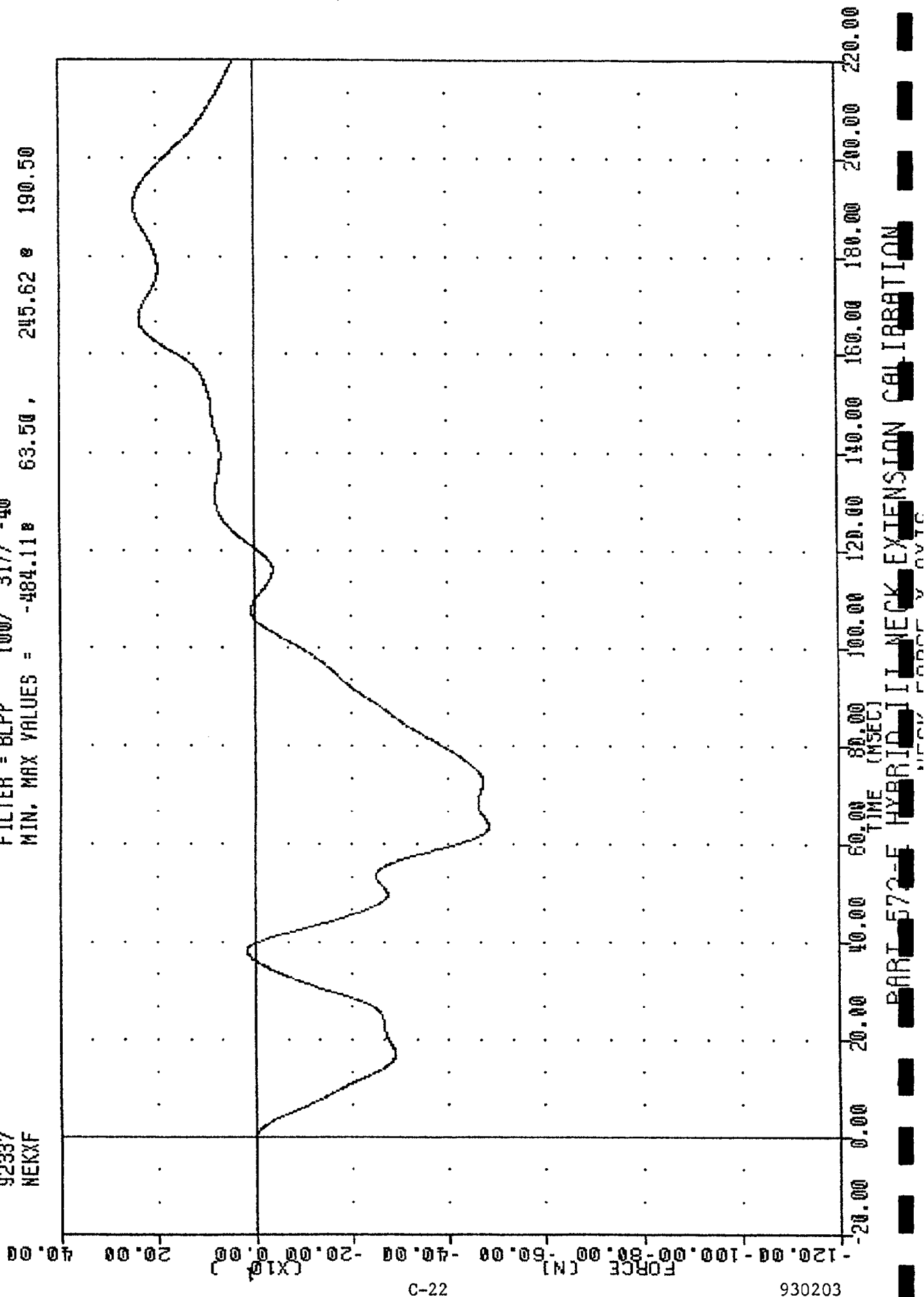
TRC , 192C11WE1
 572E SN192 NECK EXT. CAL11
 92337
 TOTAN

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -28.15 195.13 , 93.26 e 76.13



TRC , 192C11WE1
 572E SN192 NECK EXT. CAL11
 92337
 NEKXF

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -484.118 63.50 , 245.62 e 190.50

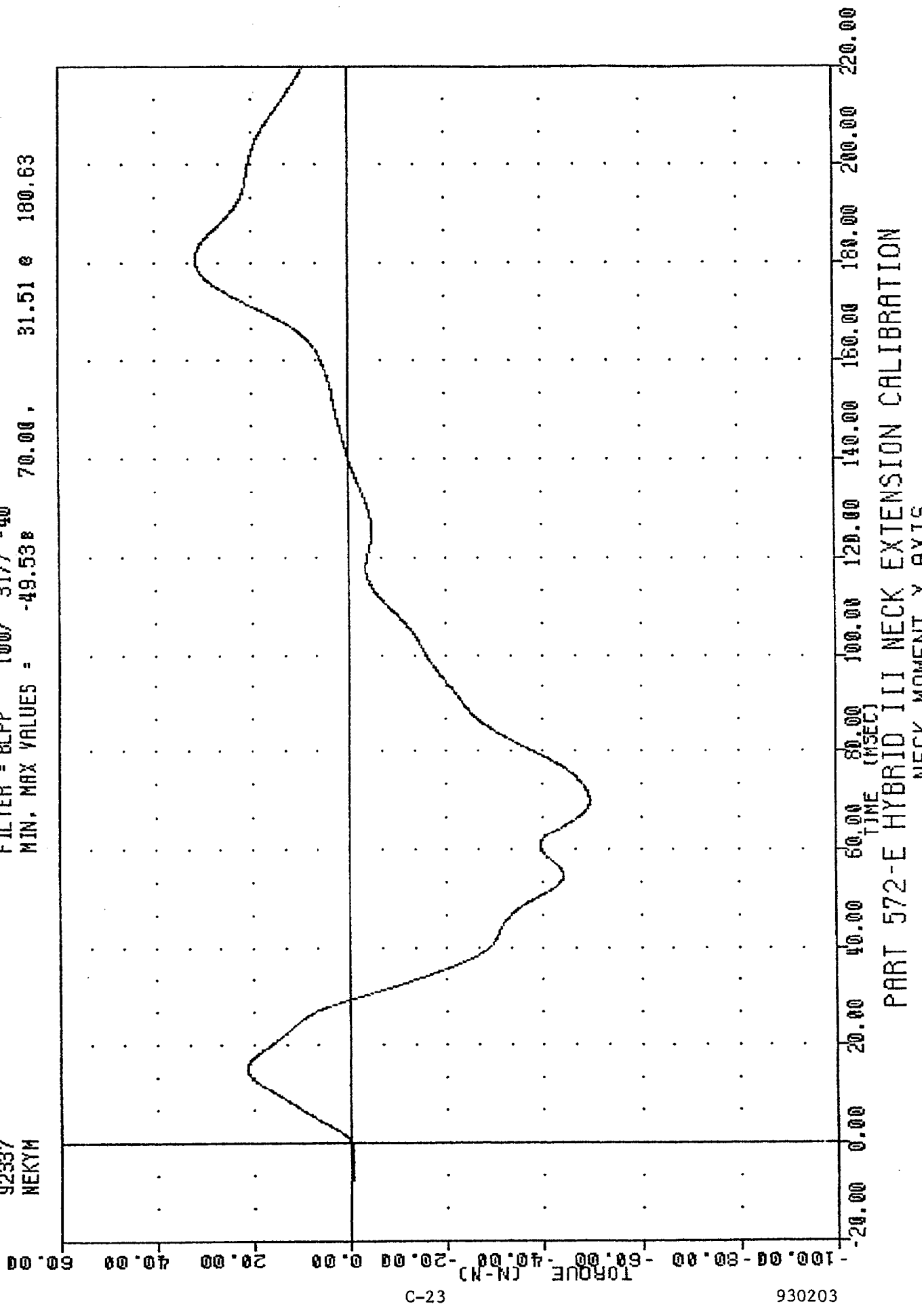


930203

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TRC , 192C11NE1
 572E SN192 NECK EXT. CAL11
 92337
 NEKYM

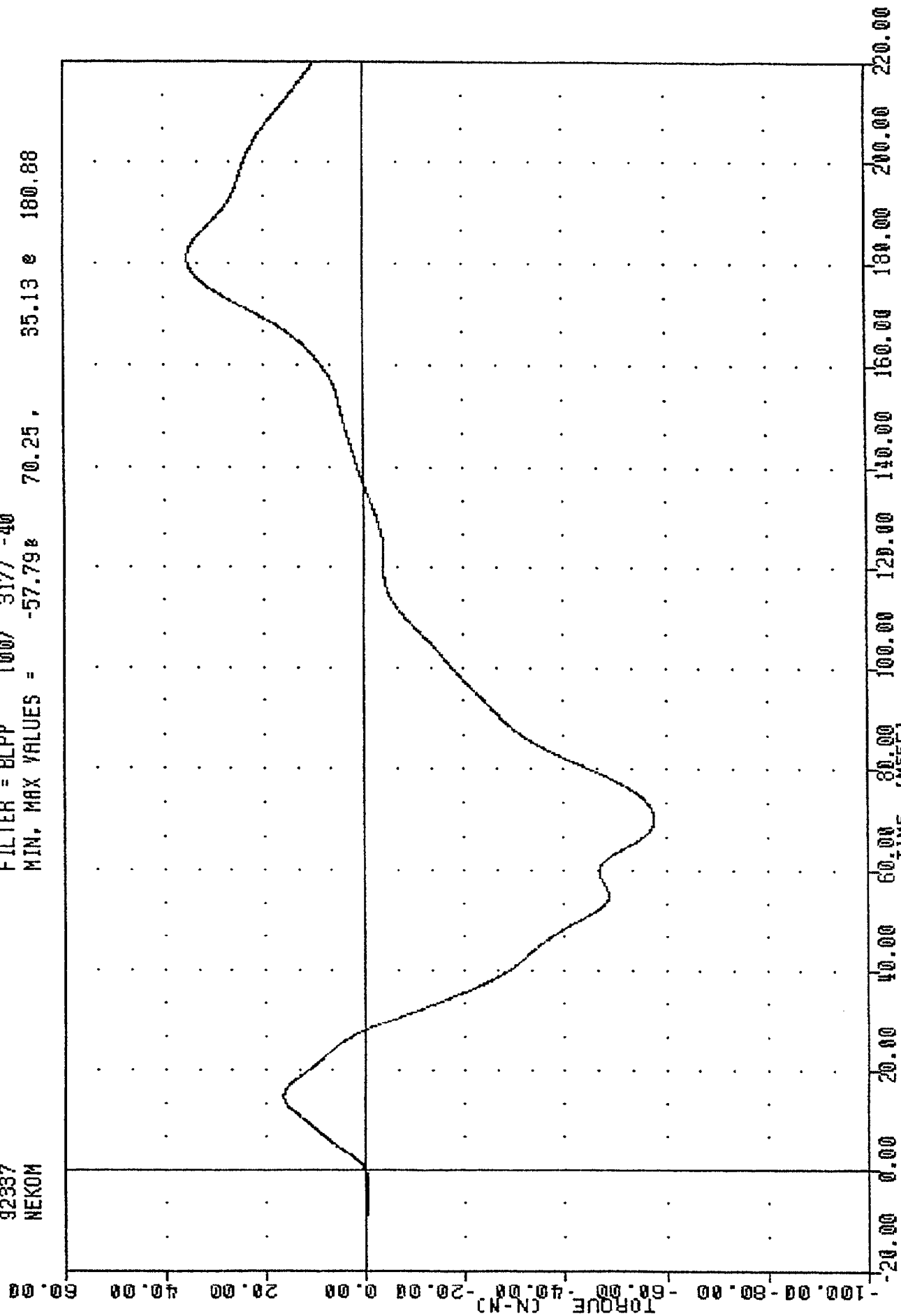
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -49.538 70.00 , 31.51 180.63



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 NECK MOMENT V DYTE

TRC , 192C11NE1
572E SN192 NECK EXT. CAL11
92337
NEKOM

FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -57.79 70.25, 55.13 e 180.88



TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

28-JAN-93

TRC

192C11TH2

572E SN192 H.S.THORAX CAL11

	HIGH SPEED TEST	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
=====		
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C

RELATIVE HUMIDITY	10% - 70%	41.0 %

PENDULUM VELOCITY	6.59 - 6.83 M/SEC	6.63 M/SEC

MAXIMUM DEFLECTION	63.5 - 72.6 MM	72.4 MM

MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5411. N

INTERNAL HYSTERESIS	69% - 85%	71.8%

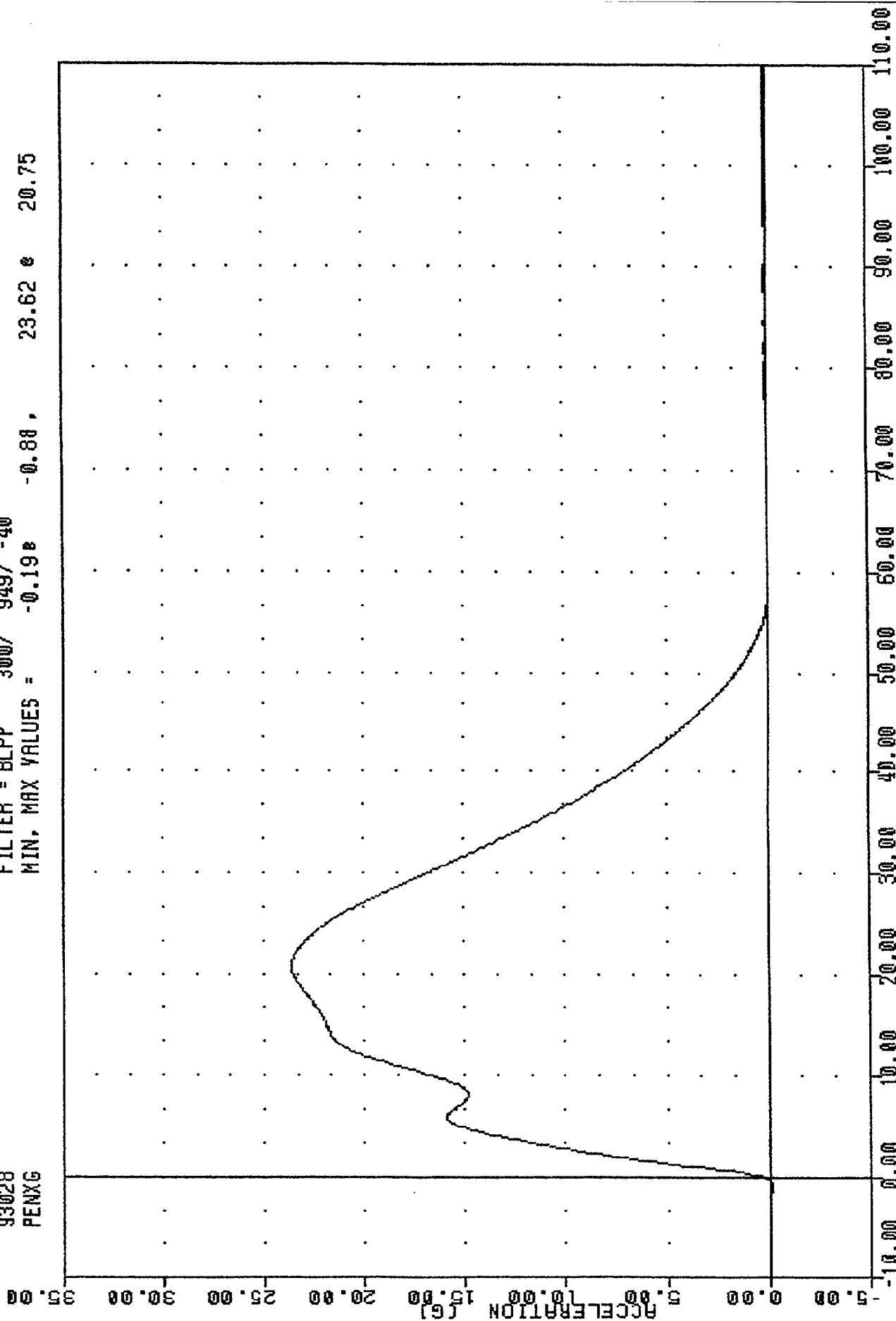
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRC , 192C11TH2
 572E SN192 H.S. THORAX CAL11
 93028
 PENXG

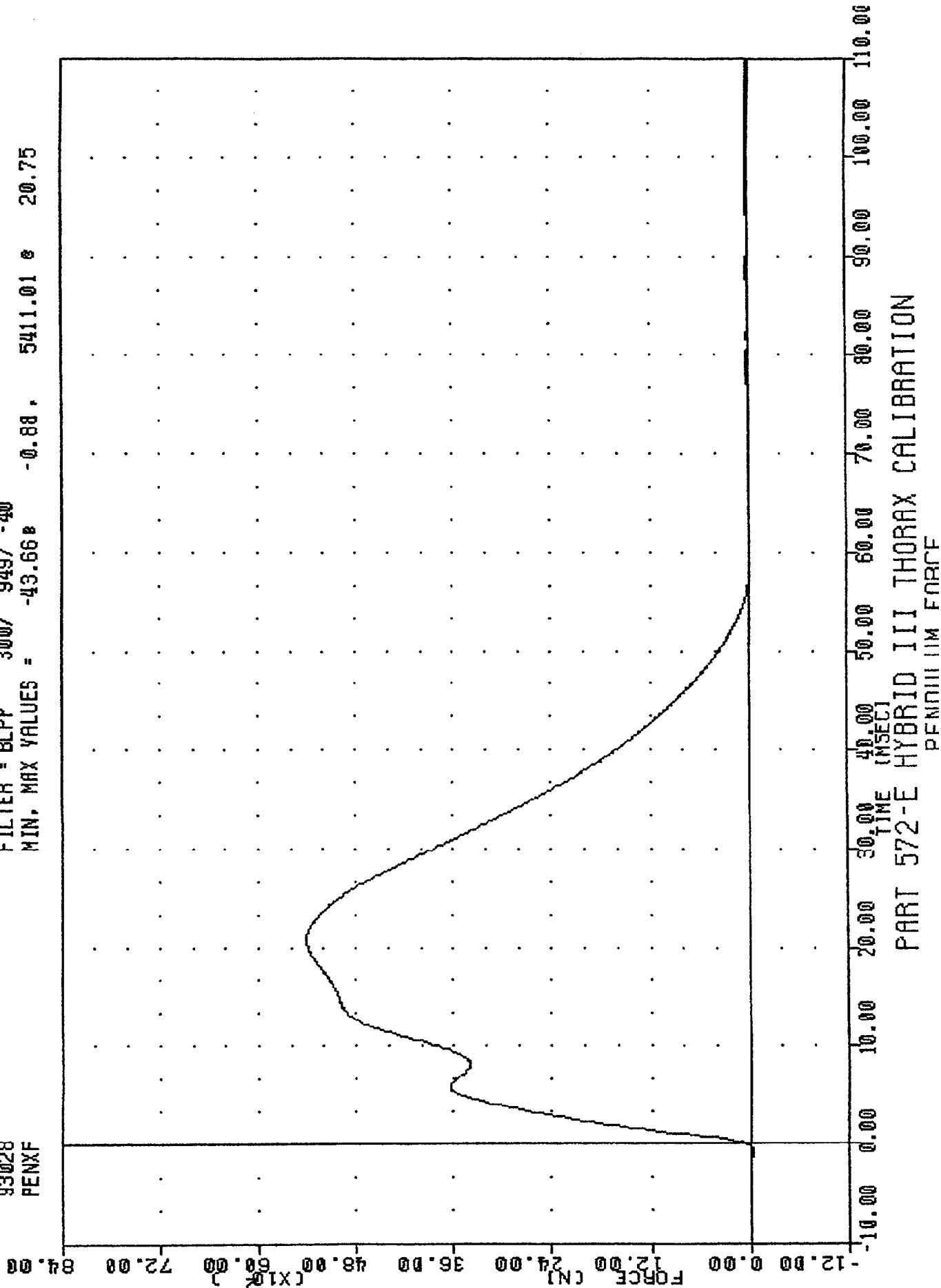
FILTER = BLPP 300/ 949/ -40
 MIN. MAX VALUES = -0.198 -0.88 , 23.62 e 20.75



PAR 572E JYBRIS IL THORAX CALIBRATION

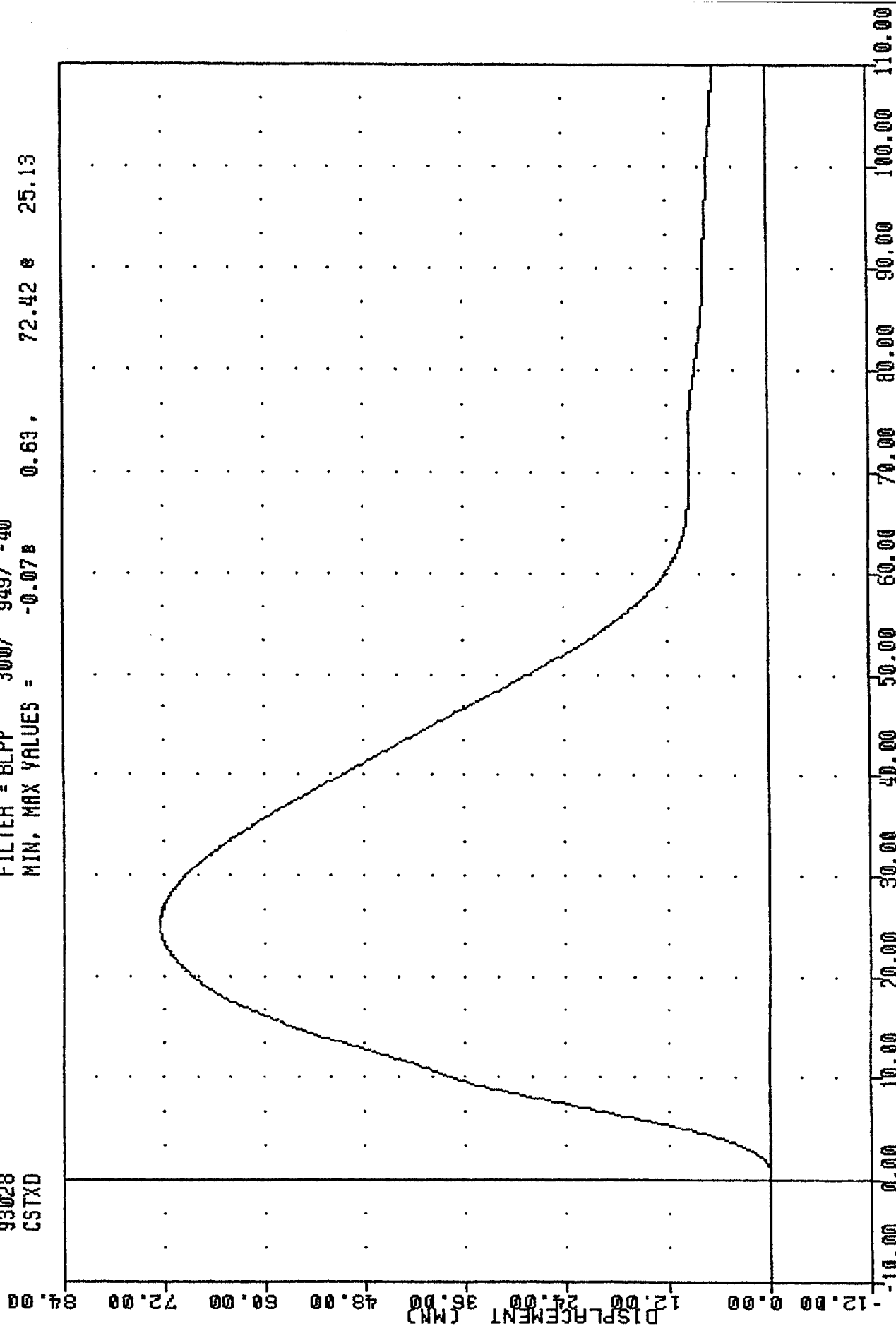
TRC , 192C117H2
 572E SN192 H.S. THORAX CAL11
 93028
 PENXF

FILTER = BLPP 300/ 949/ -40
 MIN. MAX VALUES = -43.66 5411.01 20.75



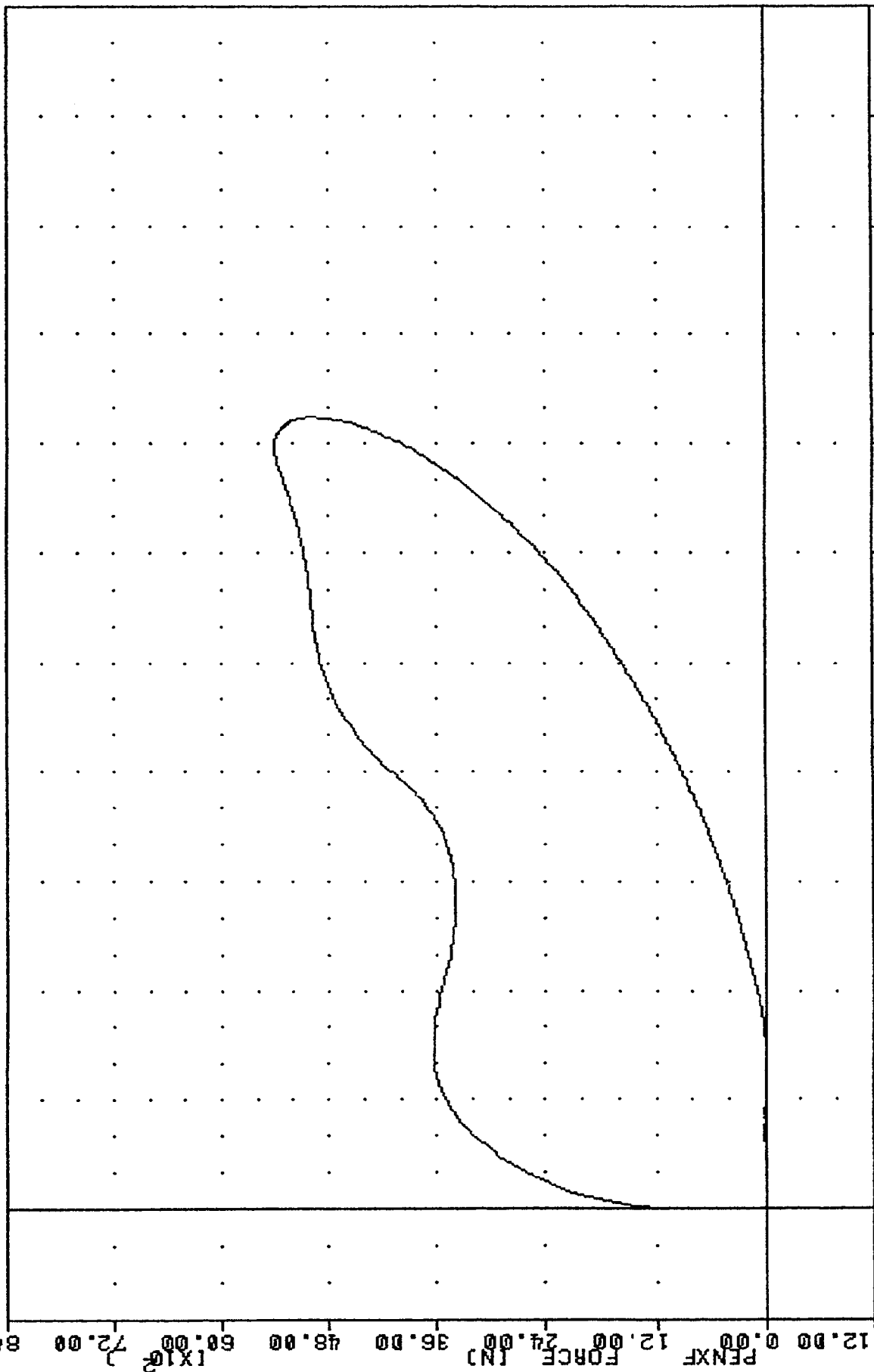
TRC , 192C11TH2
 572E SN192 H.S.THORAX CRL11
 93028
 CSTXD

FILTER = BLPP 300/ 949/ -40
 MIN, MAX VALUES = -0.078 0.63, 72.42 25.13



TRC 572E SN192 H.S. THORAX CAL11 93028 72.42 25.13
 CSTXD 300/ 949/ -40 MIN. MAX = -0.07 0.63
 PENXF 300/ 949/ -40 MIN. MAX = -43.66 -0.88

84.00



C-29

930203

PART 572-E HYBRID III THORAX CALIBRATION
 SUBJECT: RECALIBRATION OF PENNAXIUM FORCE

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

02-DEC-92

RIGHT KNEE

TRC

192C11RK1

572E SN192 RIGHT KNEE CAL 11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.11 M/SEC
PEAK KNEE IMPACT FORCE	4714-5783 N	5664.1 N
PROBE WEIGHT	5.0 KG	

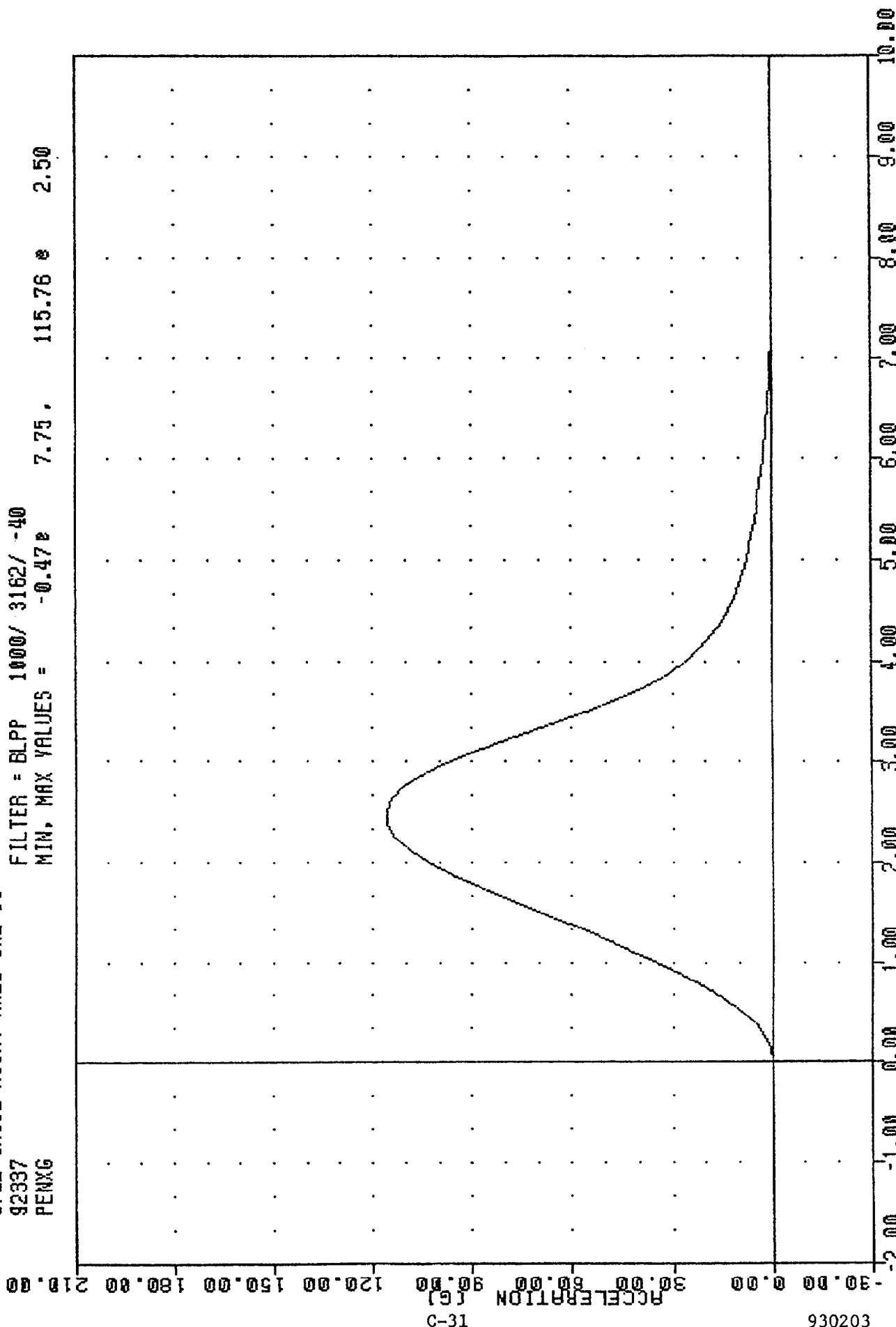
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC
572E SN192 RIGHT KNEE CAL 11
92337
PENXG

FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -0.47e

7.75, 115.76 e 2.50



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
DENNINUM RECEPTION (5 KC PENN)

TRC , 192C11RK1
 572E SN192 RIGHT KNEE CRL 11
 92337
 PENXF

FILTER = BLPP 1000/ 3162/ -40
 MIN. MAX VALUES = -22.98 7.75, 5684.06 2.50

84.00

72.00

(X10²)

60.00

48.00

36.00

24.00

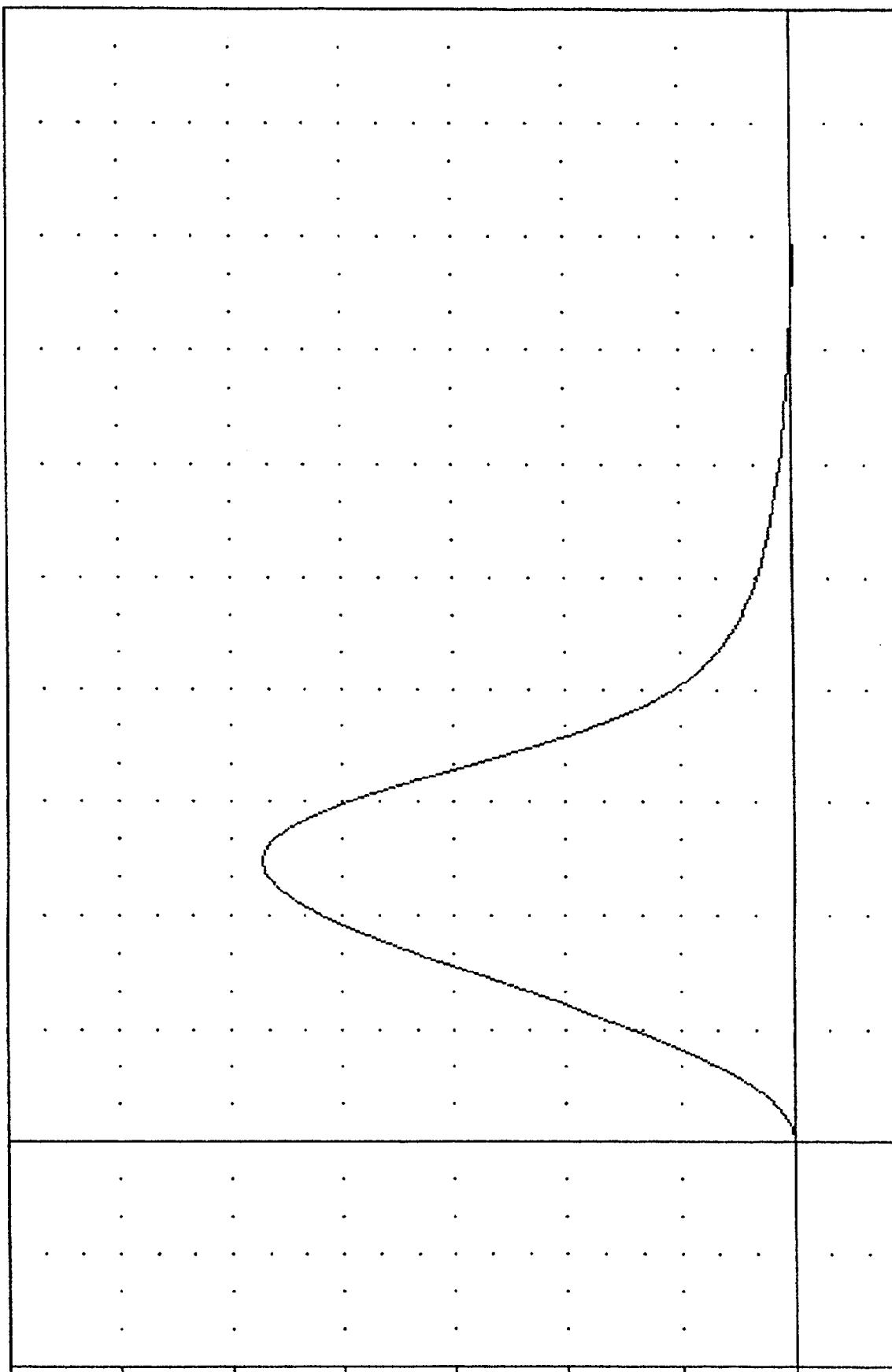
12.00

0.00

-12.00

C-32

930203



PART 572-E HYBRID III RIGHT KNEE CALIBRATION

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

02-DEC-92

LEFT KNEE

TRC

192C11LK1

572E SN192 LEFT KNEE CAL 11

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.09 M/SEC
PEAK KNEE IMPACT FORCE	4714-5783 N	5748.9 N
PROBE WEIGHT	5.0 KG	

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC
572E SN192 LEFT KNEE CAL 11
92337
PENXG

FILTER = BLPP 1000/ 3162/ -40
MIN. MAX VALUES = -0.58 8

7.13, 117.50 8 2.38

ACCELERATION (G)

210.00

180.00

150.00

120.00

90.00

60.00

30.00

0.00

-30.00

-60.00

-90.00

-120.00

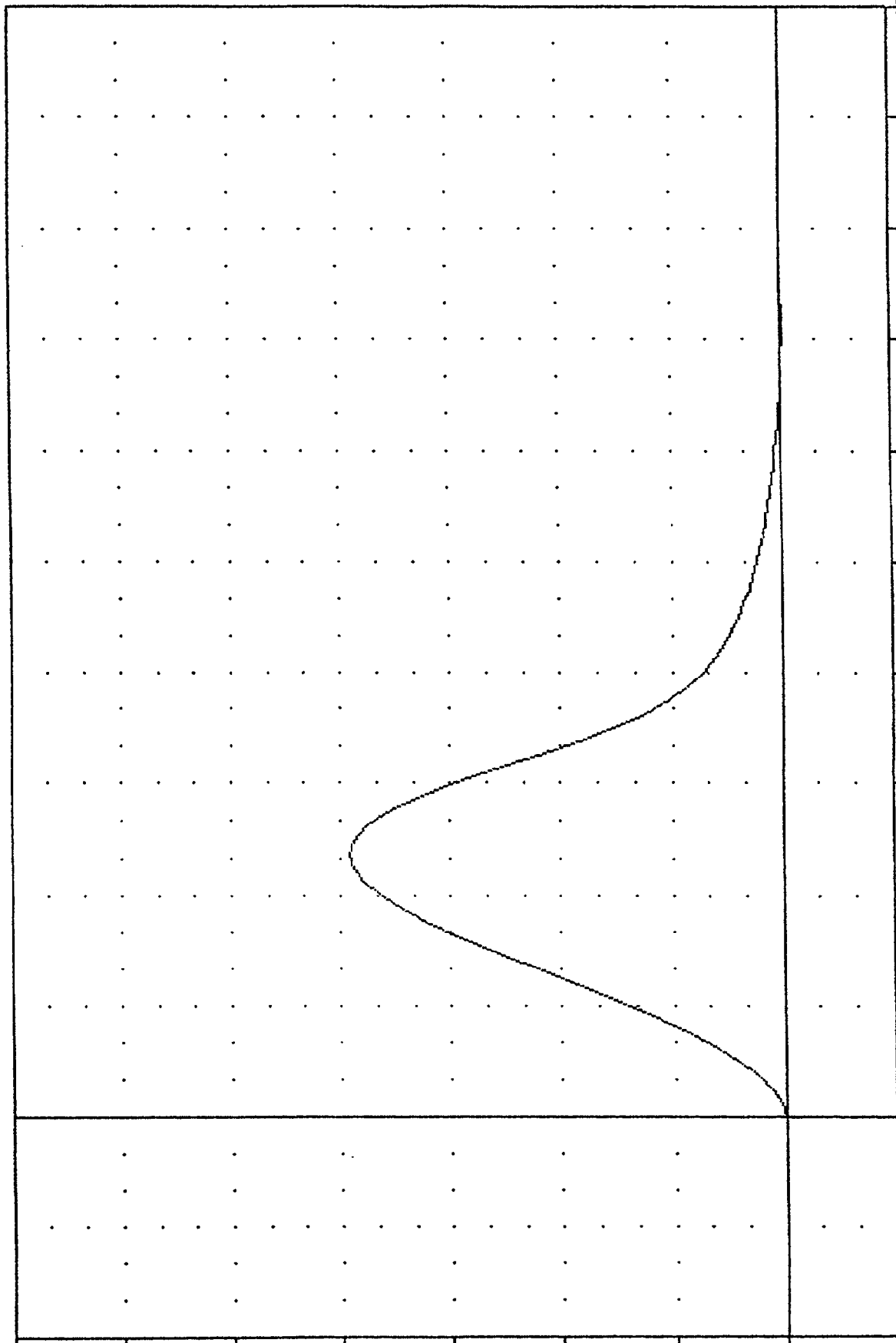
-150.00

-180.00

-210.00

C-34

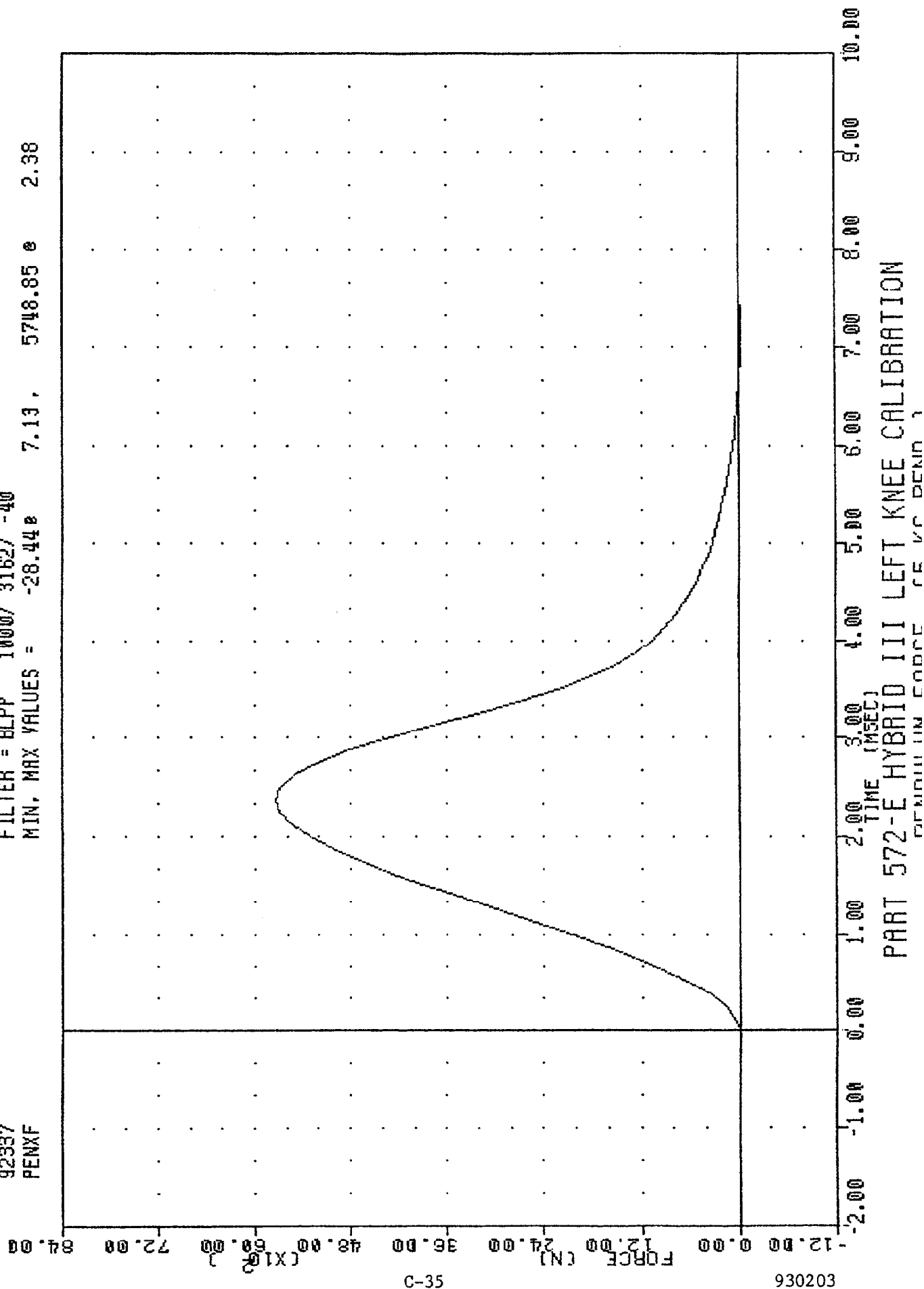
930203



PART 572-5 HYPOD III LEFT KNEE CALIBRATION

TRC
572E SN192 LEFT KNEE CAL 11
92337
PENXF

FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -28.44e 7.13, 5748.85 e 2.38



PRE-TEST CERTIFICATION DATA

PASSENGER DUMMY S/N: 142

TRANSPORTATION RESEARCH CENTER OF OHIO
HYBRID III EXTERNAL DIMENSIONS
HUMANOID 142

2-DEC-92

TRC	142C13ED1	572E SN142 EXT. DIMENSION CAL13	
=====			
TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
=====			
TEMPERATURE			21.1 DEG. C
=====			
RELATIVE HUMIDITY			51.0 %
=====			
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429- 434 MM	432. MM
=====			
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226- 231 MM	229. MM
=====			
CHEST CIRCUMFERENCE	(Y)	970-1001 MM	983. MM
=====			
WAIST CIRCUMFERENCE	(Z)	836- 866 MM	846. MM
=====			
CHEST DEPTH	(O)	213- 229 MM	218. MM
=====			
H-POINT HEIGHT	(C)	84- 89 MM	86. MM
=====			
H-POINT FROM SEATBACK	(D)	135- 140 MM	137. MM
=====			
SKULL CAP TO BACKLINE	(H)	41- 46 MM	43. MM
=====			
TOTAL SITTING HEIGHT	(A)	879- 889 MM	886. MM
=====			
THIGH CLEARANCE	(F)	140- 155 MM	145. MM
=====			
BUTTOCK KNEE LENGTH	(K)	579- 605 MM	597. MM
=====			
BUTTOCK POPLITEAL LENGTH	(N)	452- 478 MM	475. MM
=====			
POPLITEAL HEIGHT	(L)	429- 455 MM	452. MM
=====			
KNEE PIVOT HEIGHT	(M)	485- 500 MM	490. MM
=====			
FOOT LENGTH	(P)	252- 267 MM	257. MM
=====			
FOOT BREADTH	(W)	91- 107 MM	97. MM
=====			
SHOULDER PIVOT FROM BACKLINE	(E)	84- 94 MM	86. MM
=====			
SHOULDER BREADTH	(V)	422- 437 MM	427. MM
=====			
SHOULDER PIVOT HEIGHT	(B)	506- 521 MM	511. MM
=====			
ELBOW REST HEIGHT	(J)	191- 211 MM	211. MM
=====			
SHOULDER-ELBOW LENGTH	(I)	330- 345 MM	345. MM
=====			
BACK OF ELBOW TO WRIST PIVOT	(G)	290- 305 MM	292. MM
=====			

TEST MEETS SPECIFICATIONS

TECHNICIAN Chae Middle

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

28-JAN-92

TRC

142C13HD2

572E SN142 HEAD DROP CAL 13

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.7 DEG. C
RELATIVE HUMIDITY	10% - 70%	42.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	249.44 G
PEAK LATERAL ACCELERATION	15 G MAX	6.44 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

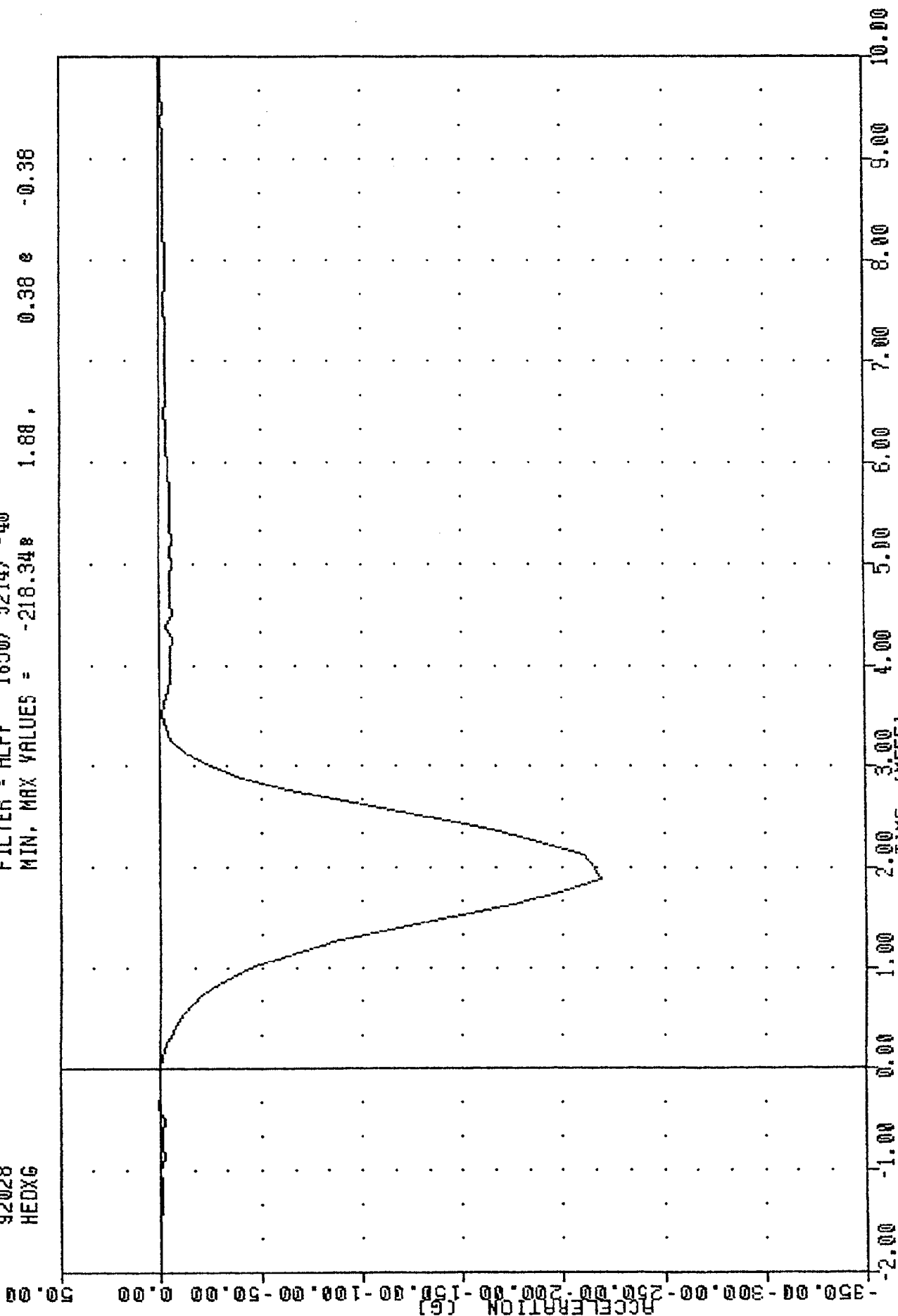
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRC
572E 9N142 HEAD DROP CAL 13
92028
HEDXG

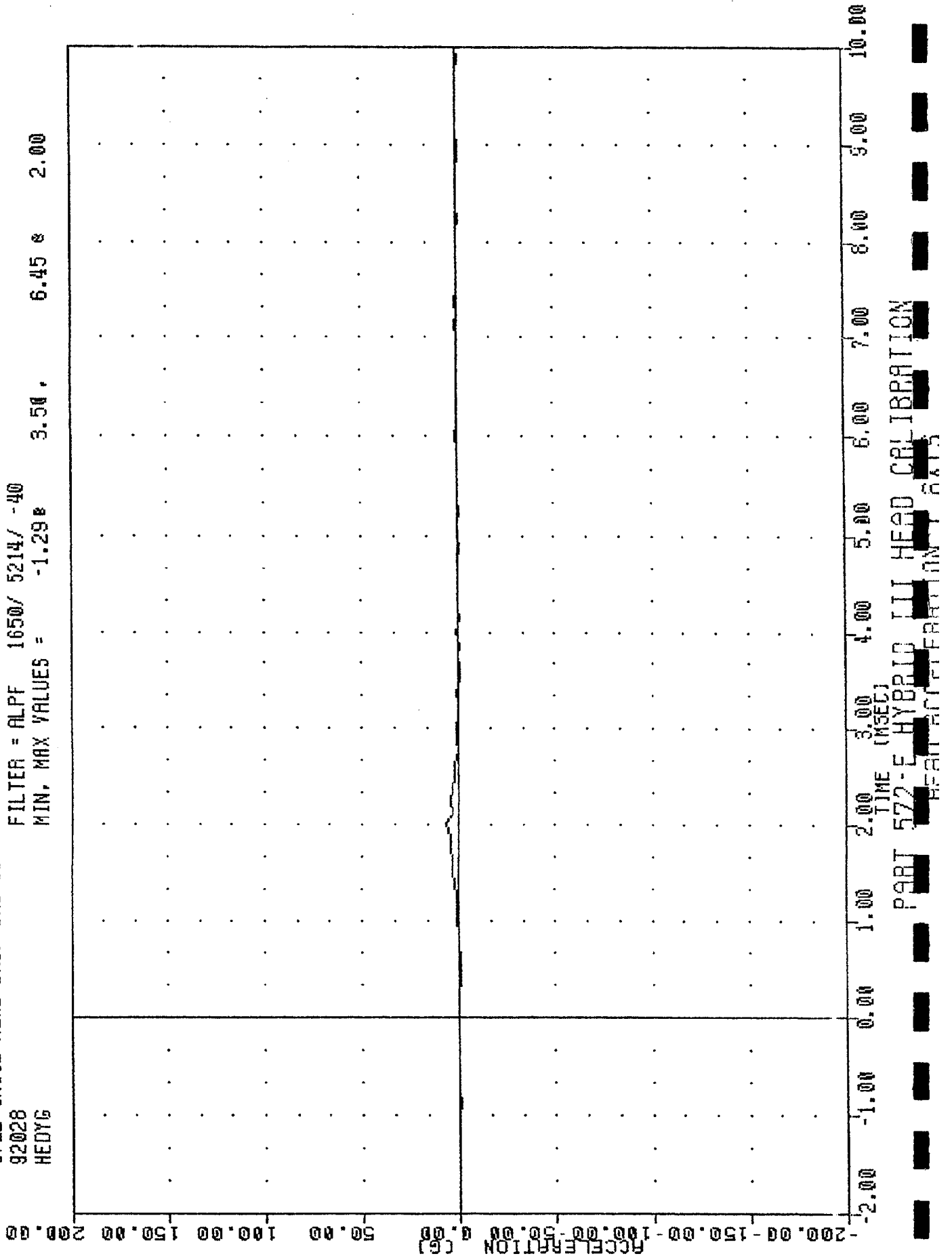
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -218.348 1.88, 0.38 e -0.38



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

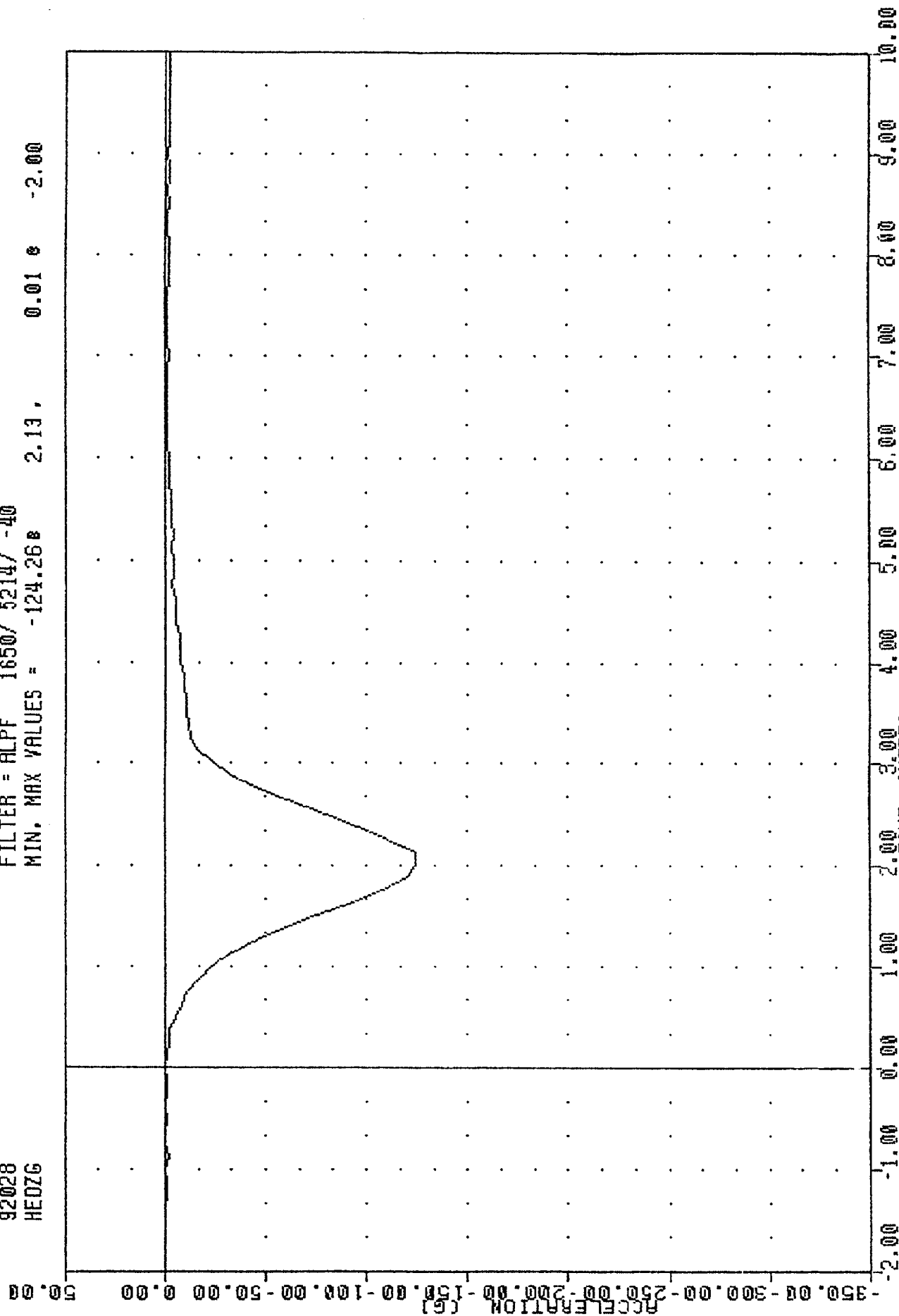
TRC
572E SN142 HEAD DROP CAL 13
92028
HEDYG

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -1.29e 3.50, 6.45 e 2.00



TRC
 572E SN142 HEAD DROP CAL 13
 92028
 HEDZG

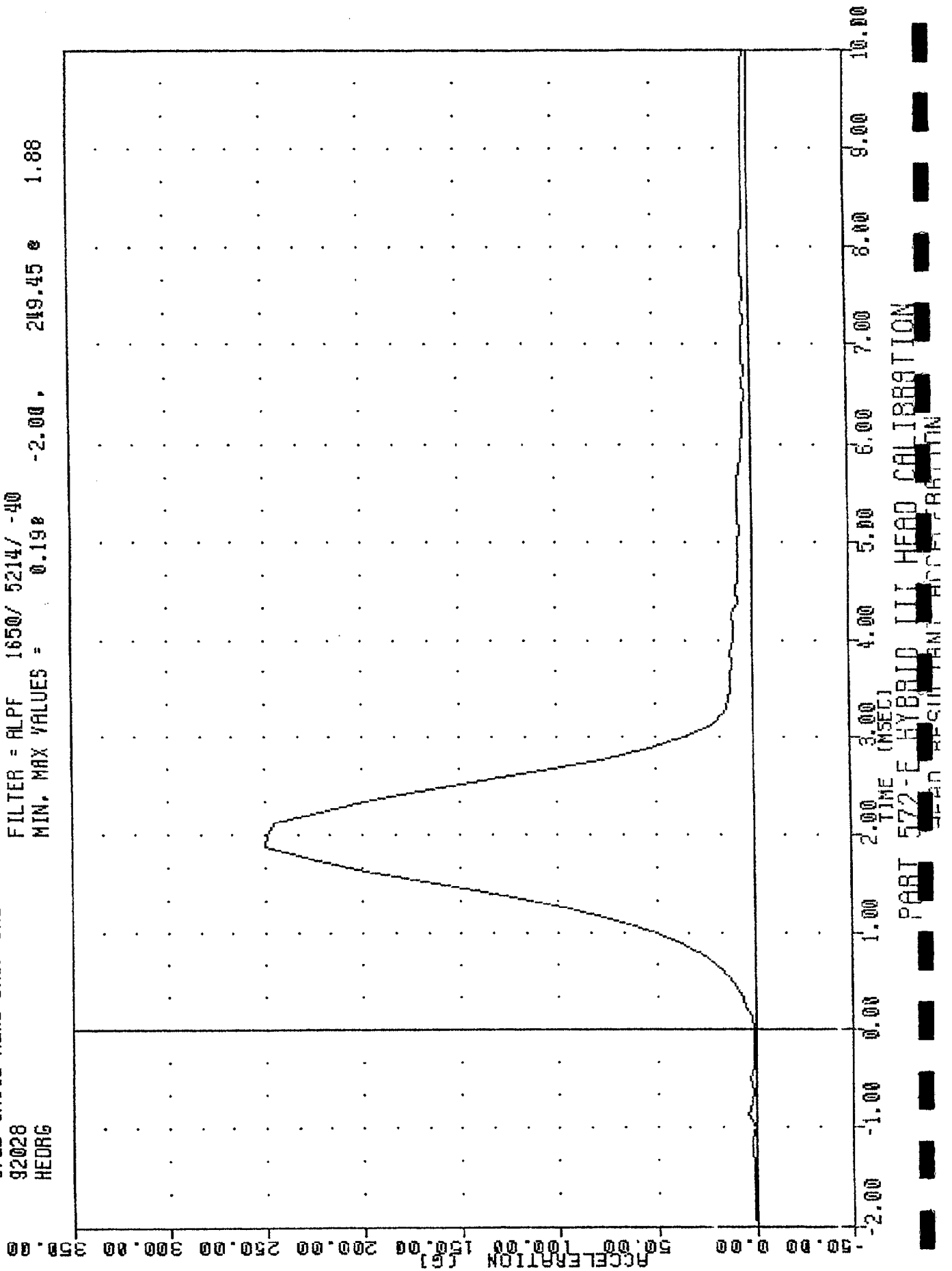
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -124.268 2.13, 0.01 0 -2.00



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

TRC
572E SN142 HEAD DROP CAL 13
92028
HEADG

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 0.198 -2.00 249.45 e 1.88



TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

02-DEC-92

6 AXIS NECK TRANSDUCER
TRC 142C13NF1

572E SN142 NECK FLEXION CAL13

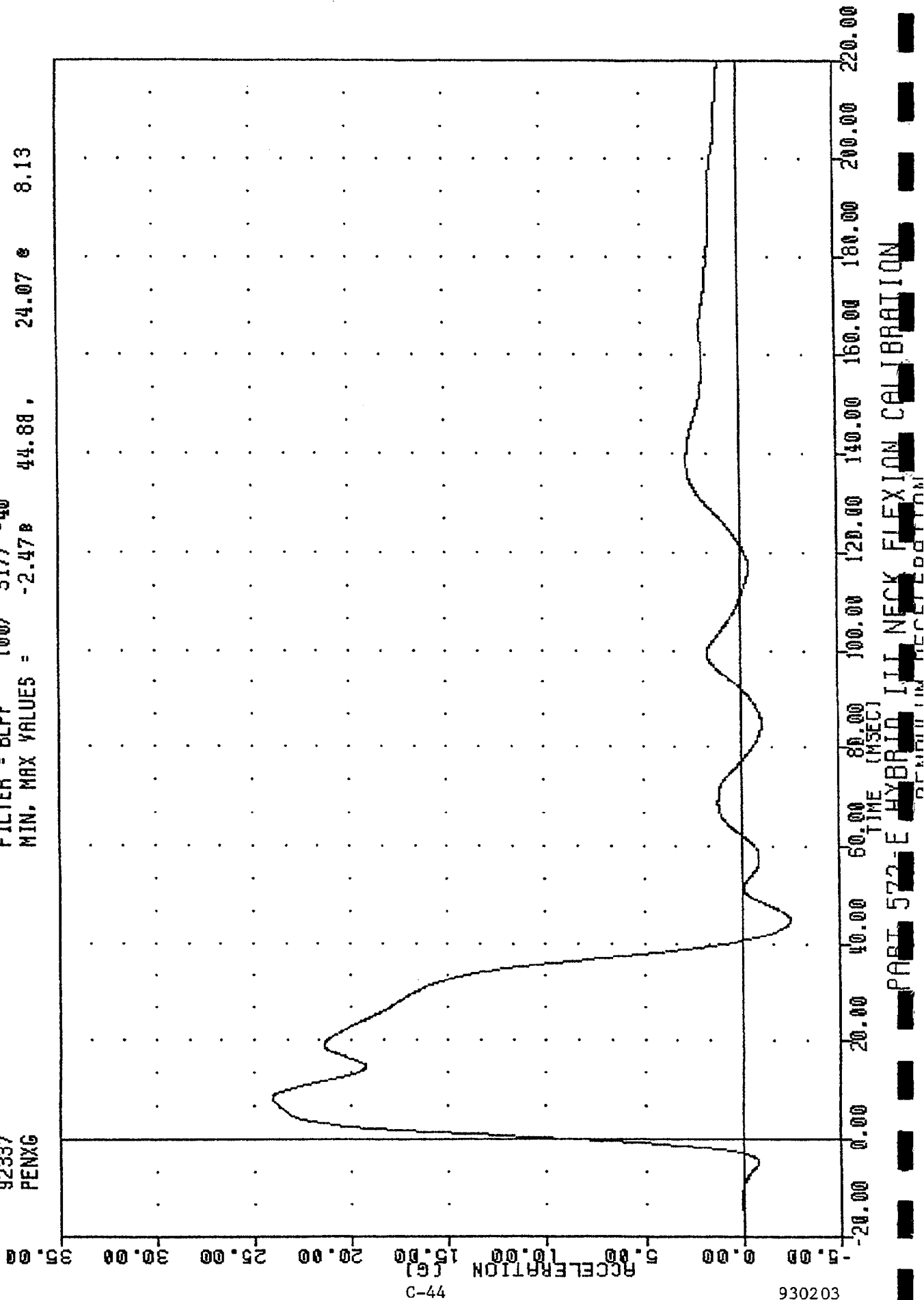
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
IMPACT VELOCITY	6.89 - 7.13 M/SEC	7.03 M/SEC
PENDULUM	10 MS 22.50 - 27.50 G	23.23 G
DECELERATION	20 MS 17.60 - 22.60 G	21.26 G
	30 MS 12.50 - 18.50 G	16.61 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	16.55 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	37.75 MS
D PLANE	MAX 64 - 78 DEG.	74.83 DEG.
ROTATION	TIME 57 - 64 MS	59.13 MS
MOMENT ABOUT OCCIPITAL	MAX 88.2 - 108.5 NM	93.13 NM
CONDYLE	TIME 47 - 58 MS	50.88 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	115.88 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	106.25 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC
572E SN142 NECK FLEXION CAL13
92337
PENXG

FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -2.478 44.88, 24.07 e 8.13



TRC , 142C13NF1
 572E SN142 NECK FLEXION CAL13
 92337
 BETA

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -21.13 175.25, 32.70 60.75

100.00

80.00

60.00

40.00

20.00

0.00

-20.00

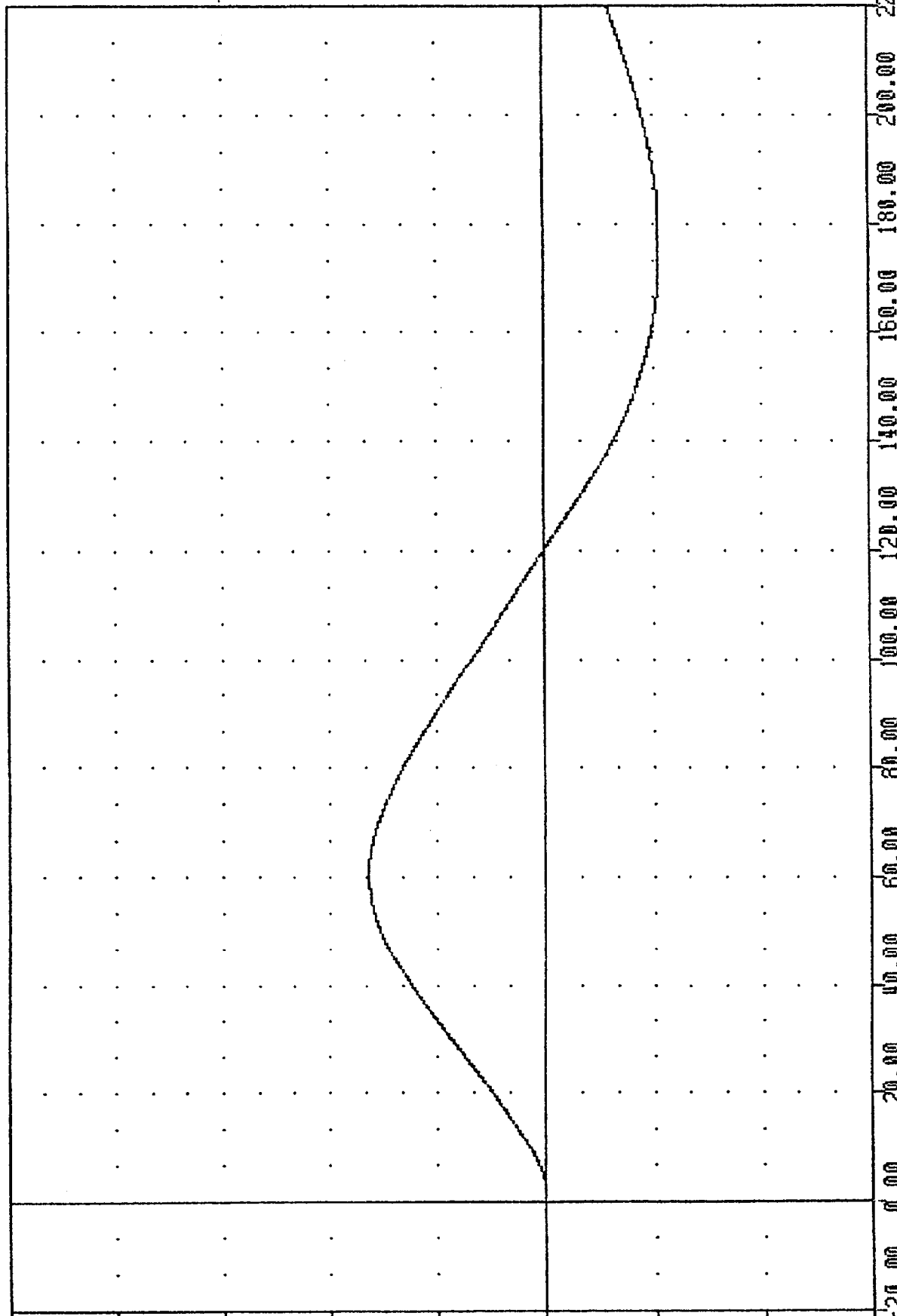
-40.00

-60.00

ANGLE (DEG)

C-45

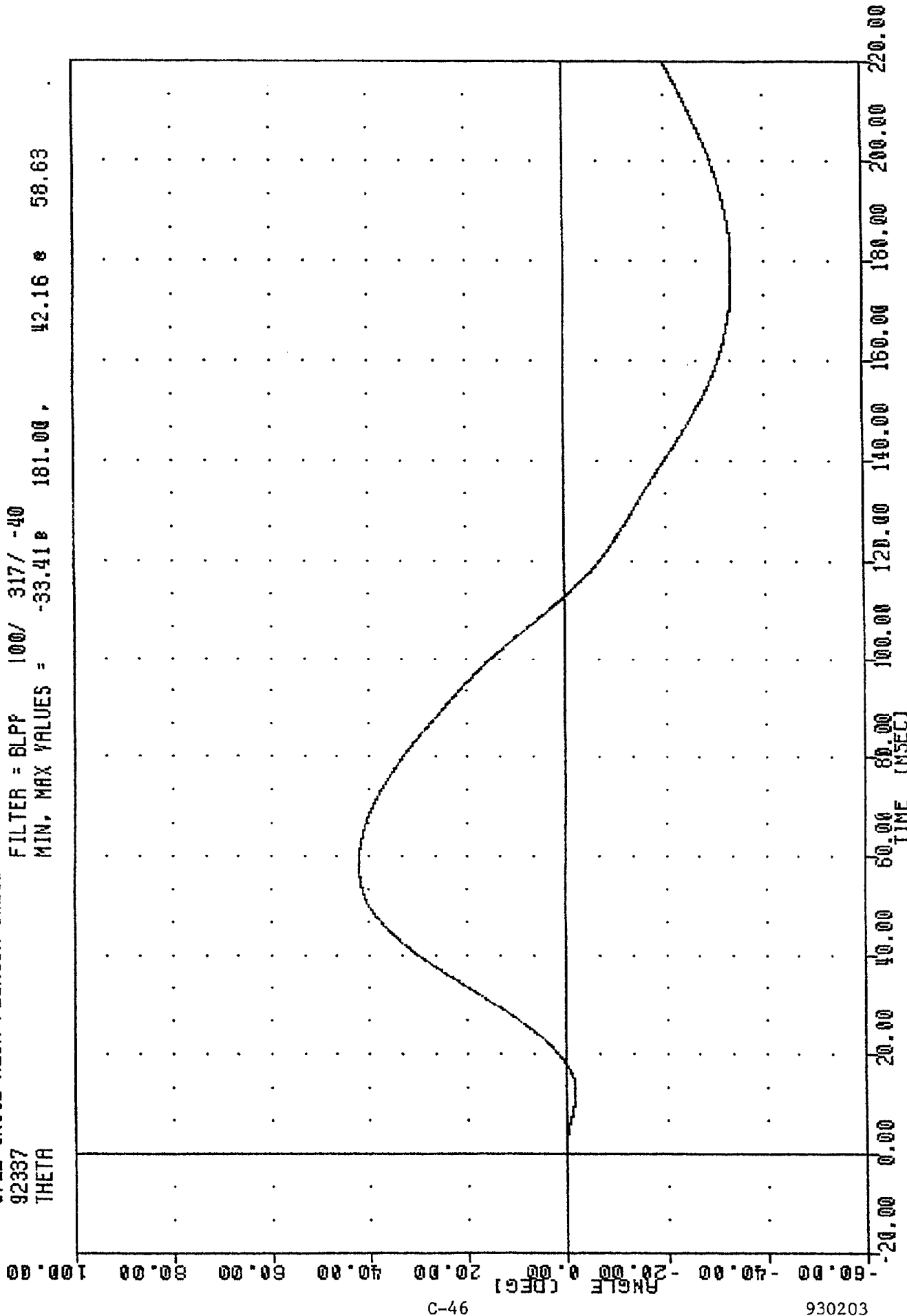
930203



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 DATATION ADMIT DOCE DE NECK

TRC , 142C13NF1
 572E SN142 NECK FLEXION CRL13
 92337
 THETA

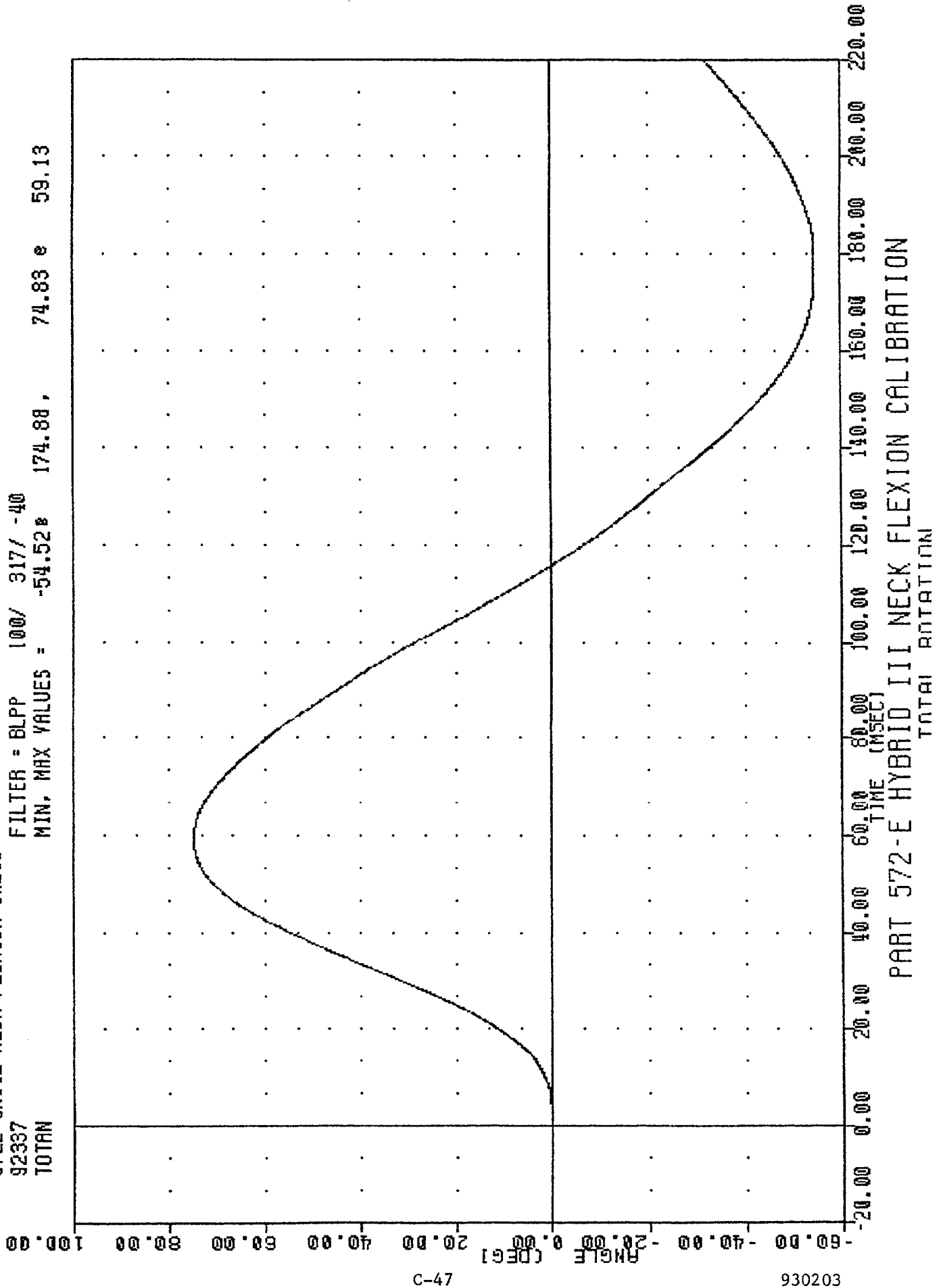
FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -33.41° 181.00°, 42.16° 58.63



TRC
 572E SN142 NECK FLEXION CAL19
 92337
 TOTAL

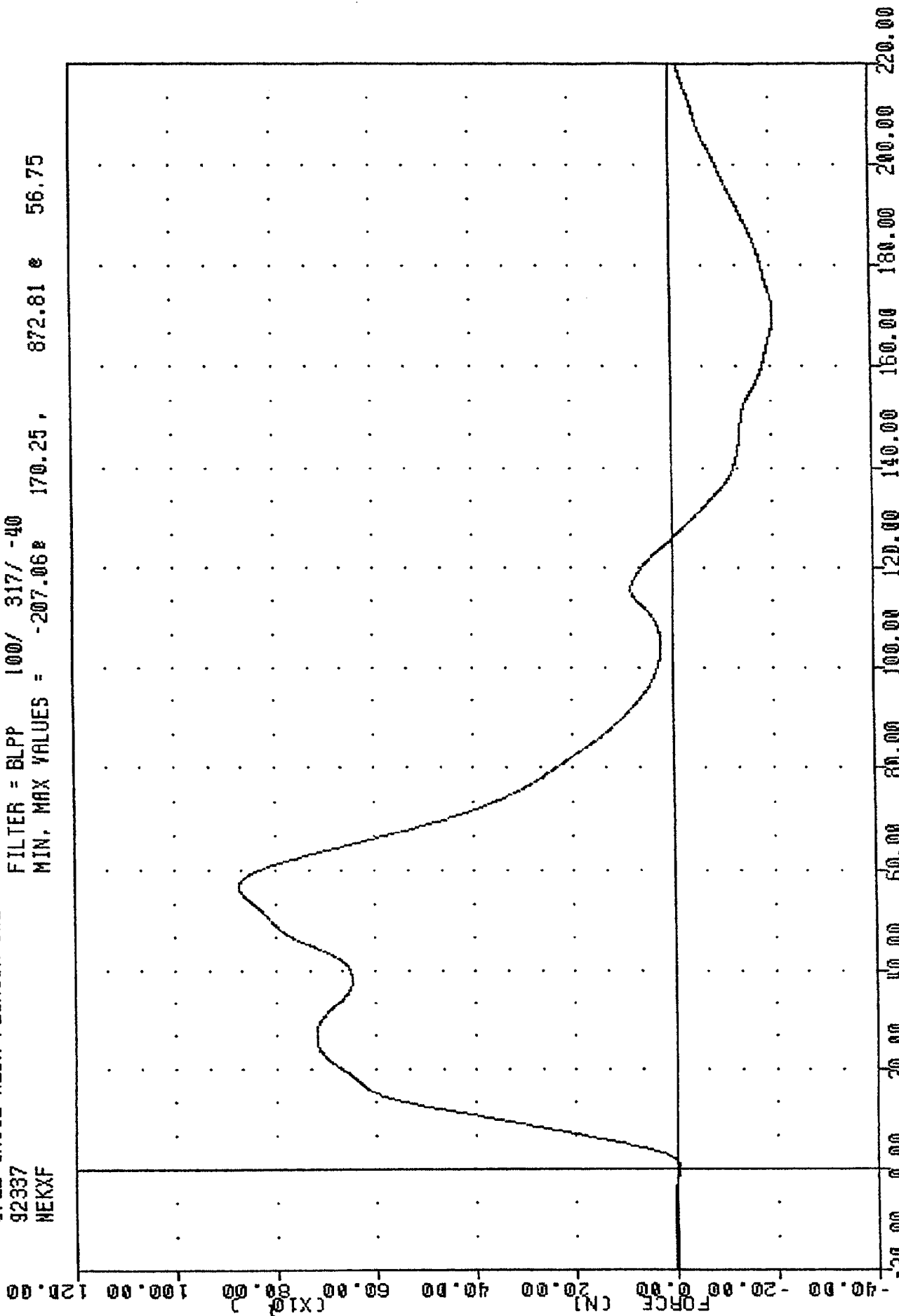
, 142C13NF1

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -54.528 174.88, 74.83 e 59.13



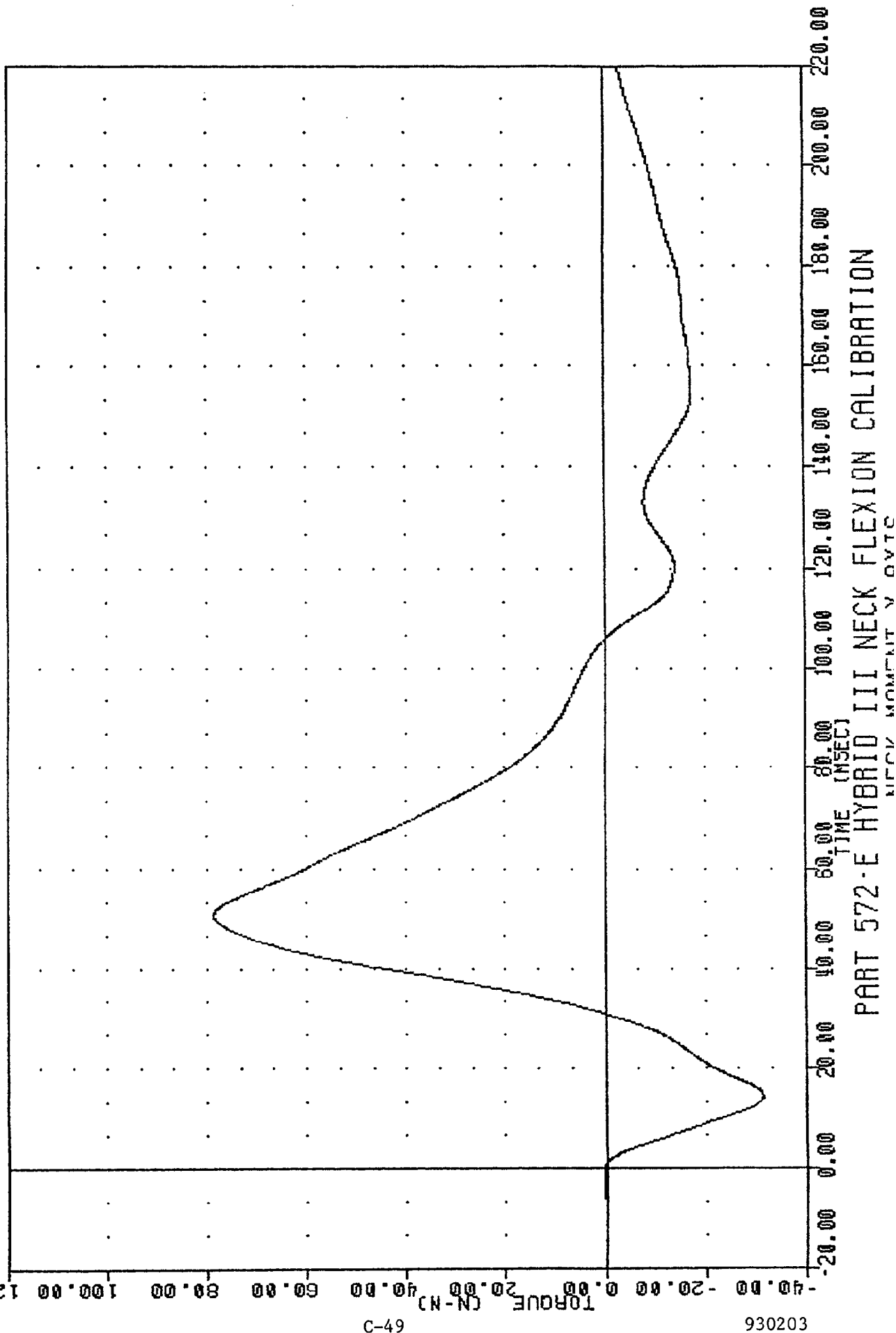
TRC , 142C13HF1
 572E SN142 NECK FLEXION CAL13
 92337
 NEKXF

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -207.06 170.25, 872.81 e 56.75



TRC
572E SN142 NECK FLEXION CAL13
92337
NEKYM

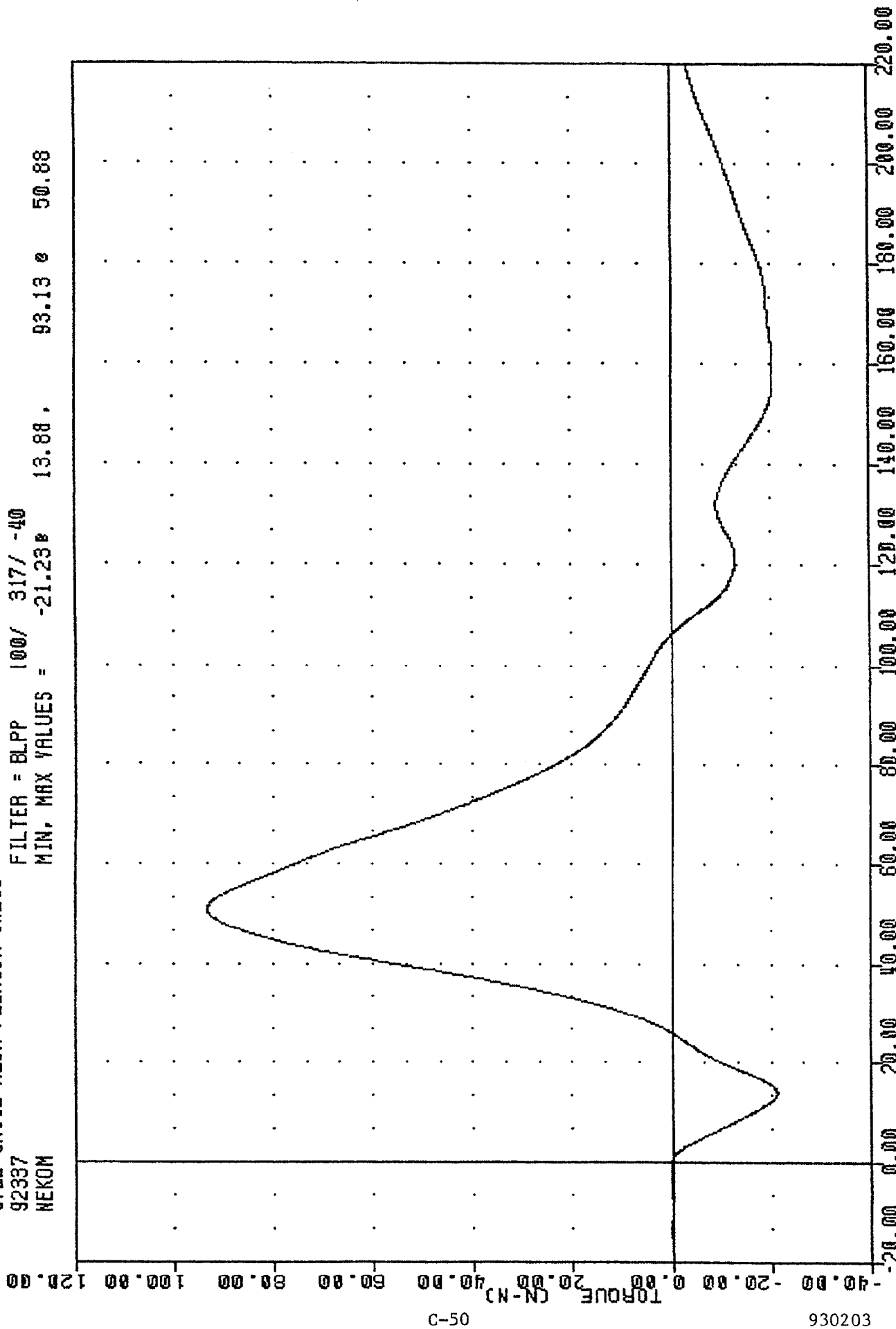
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -31.418 14.50 78.59 50.63



PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT V OVC

TRC , 142C13HF1
 572E SN142 NECK FLEXION CAL13
 92337
 NEKOM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -21.23 13.88 , 93.13 50.88



TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

02-DEC-92

6 AXIS NECK TRANSDUCER
TRC 142C13NE1

572E SN142 NECK EXT. CAL13

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
IMPACT VELOCITY	5.95 - 6.19 M/SEC	6.05 M/SEC
PENDULUM	10 MS 17.20 - 21.20 G	19.15 G
DECELERATION	20 MS 14.00 - 19.00 G	16.94 G
	30 MS 11.00 - 16.00 G	13.42 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	13.37 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	40.50 MS
D PLANE	MAX 81 - 106 DEG.	98.87 DEG.
ROTATION	TIME 72 - 82 MS	74.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN -80.0/-52.9 NM	-70.95 NM
	TIME 65 - 79 MS	71.13 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	154.88 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	139.63 MS

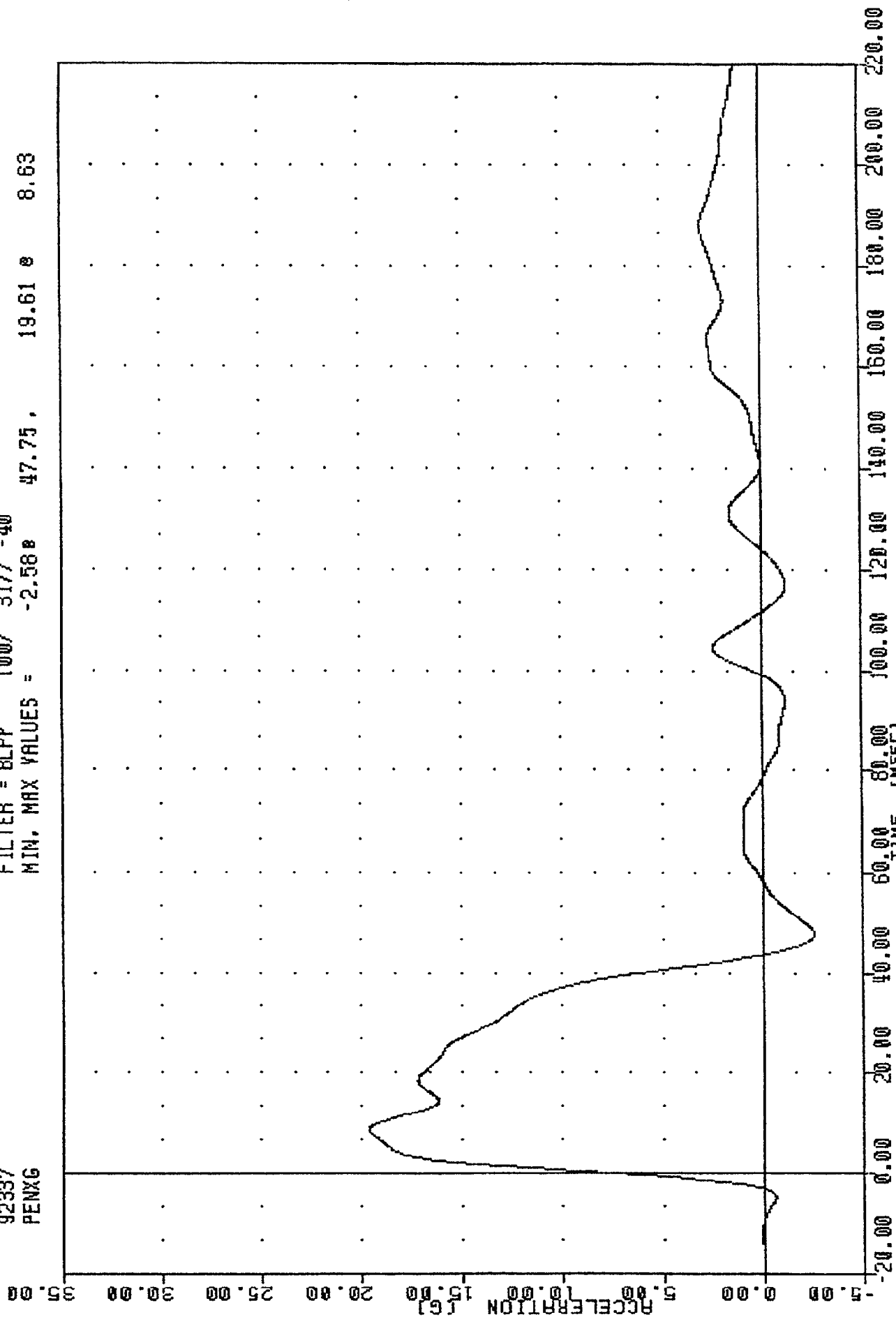
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chris Middleton

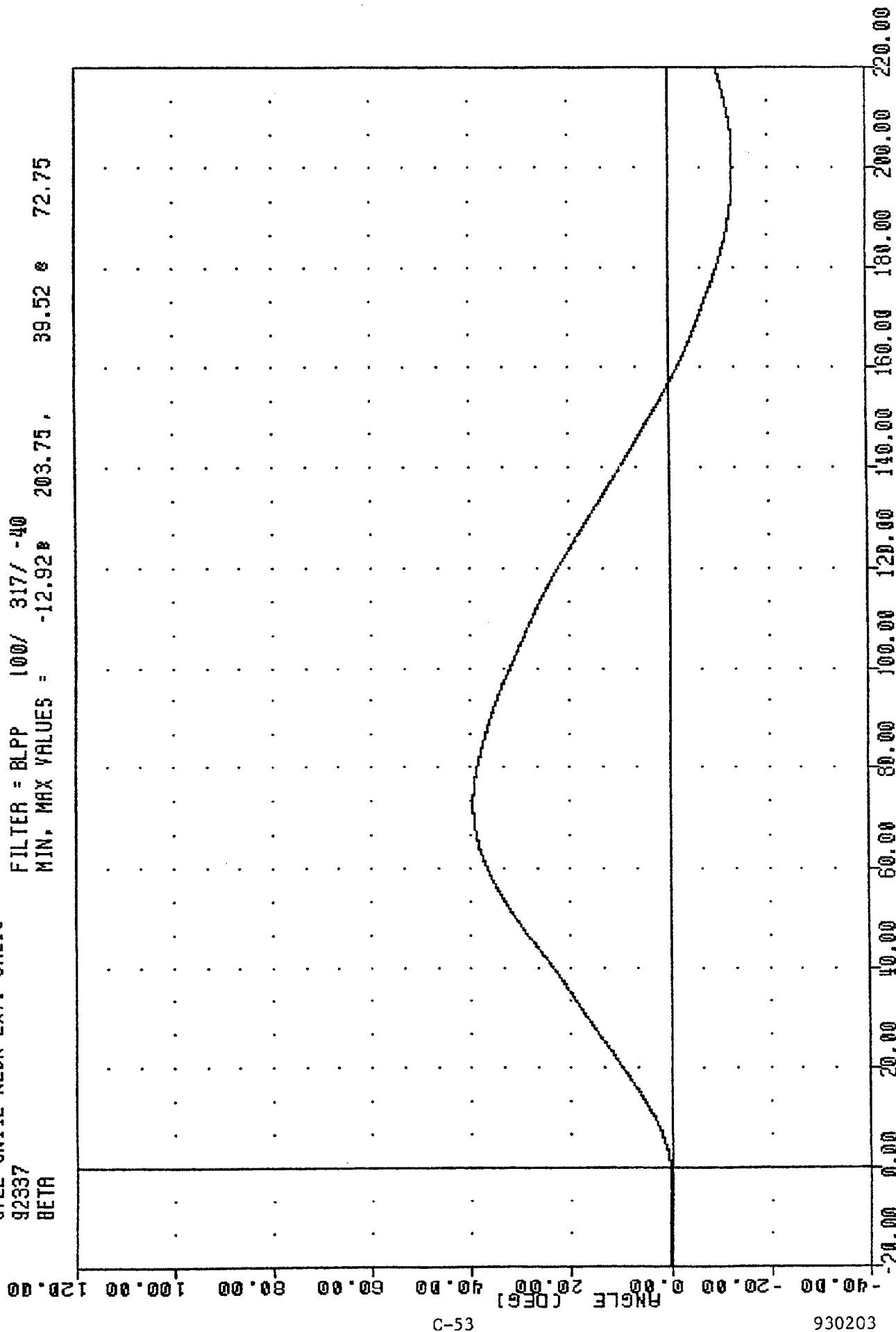
TRC , 142C13NE1
 572E SN142 NECK EXT. CAL13
 92337
 PENXG

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -2.58 47.75, 19.61 8.63



TRC , 142C13NE1
 572E SN142 NECK EXT. CAL13
 92337
 BETA

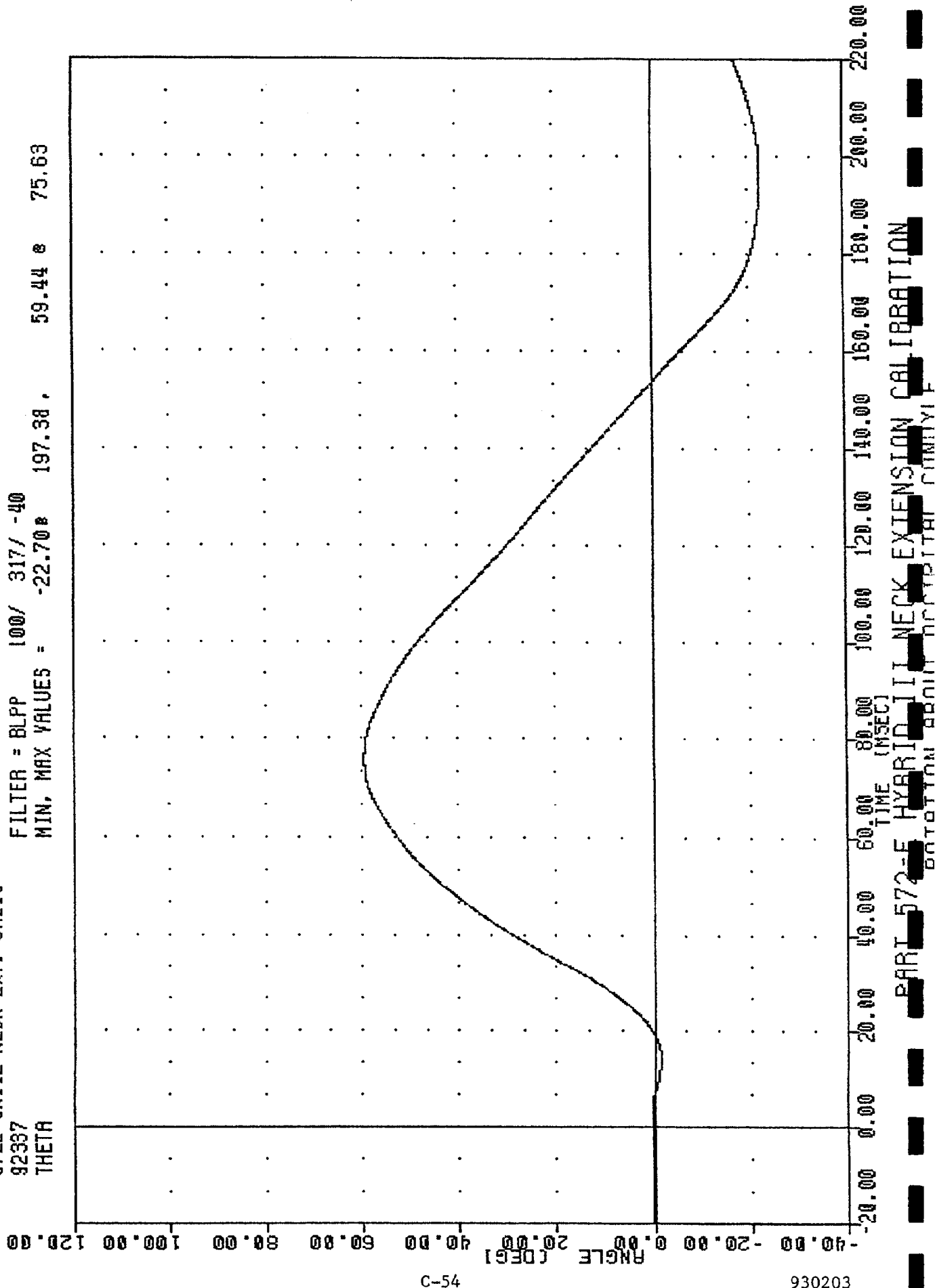
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -12.92 203.75 39.52 72.75



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT BASE OF NECK

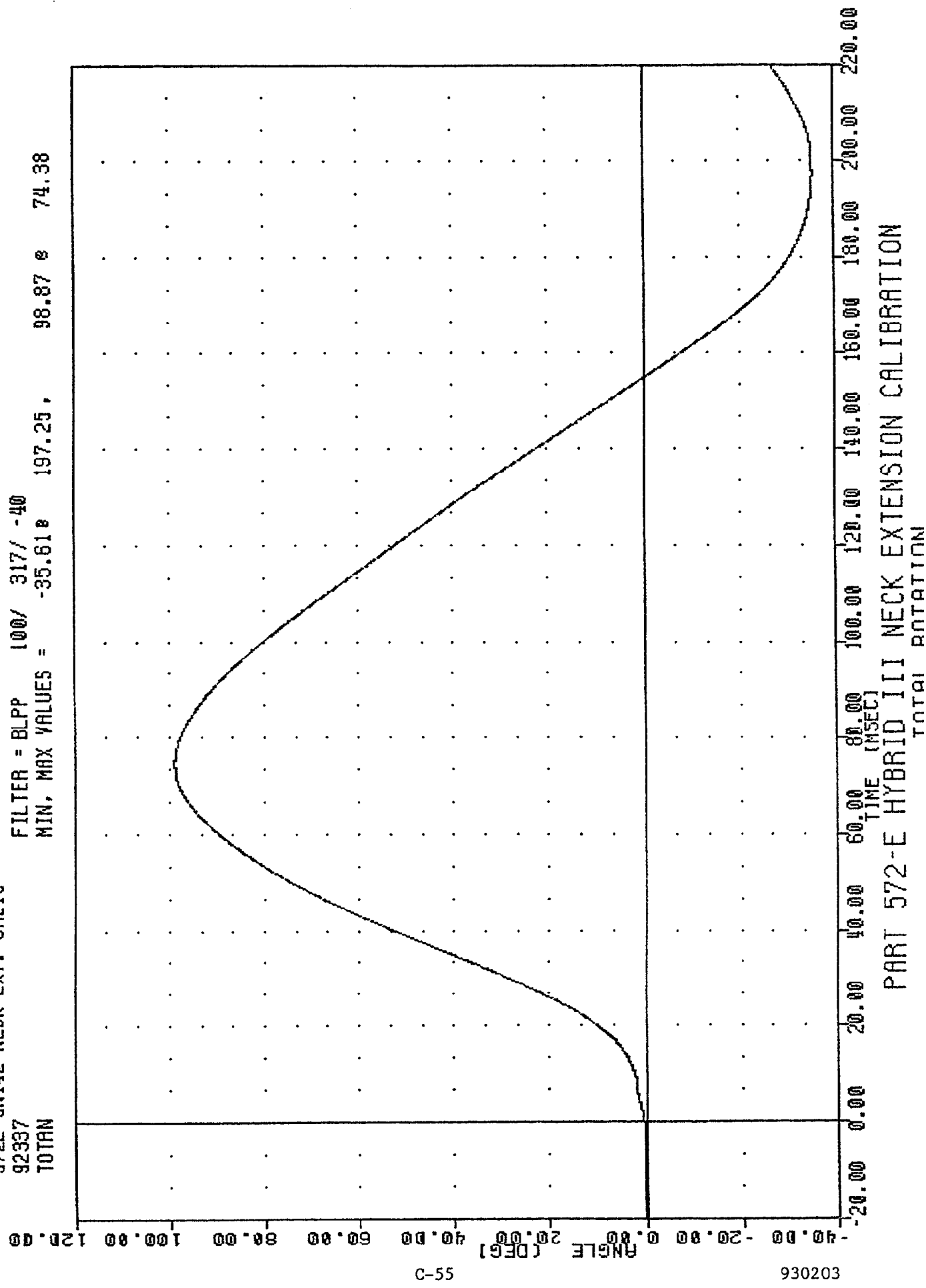
TRC , 142C13NE1
 572E SN142 NECK EXT. CAL13
 92337
 THETA

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -22.70 197.38, 59.44 75.63



TRC , 142C13HE1
 572E SN142 NECK EXT. CAL13
 92337
 TOTAN

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -35.61e 197.25, 98.87 e 74.38



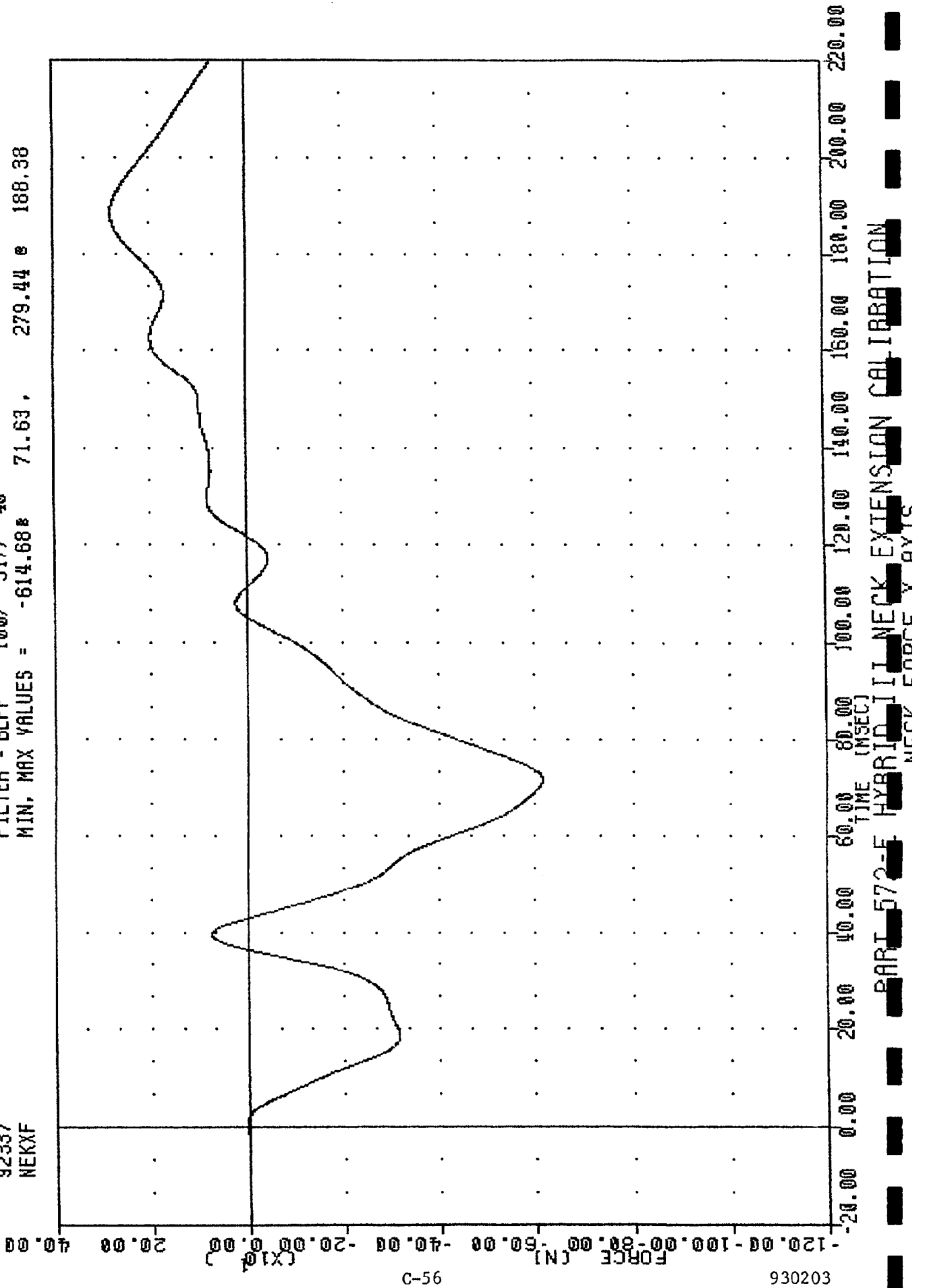
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 TOTAL ROTATION

TRC
572E SN142 NECK EXT. CAL13
92337
NEKXF

, 142C13WE1

FILTER = BLPP 100/ 317/ -40

MIN, MAX VALUES = -614.68 71.63, 279.44 188.38



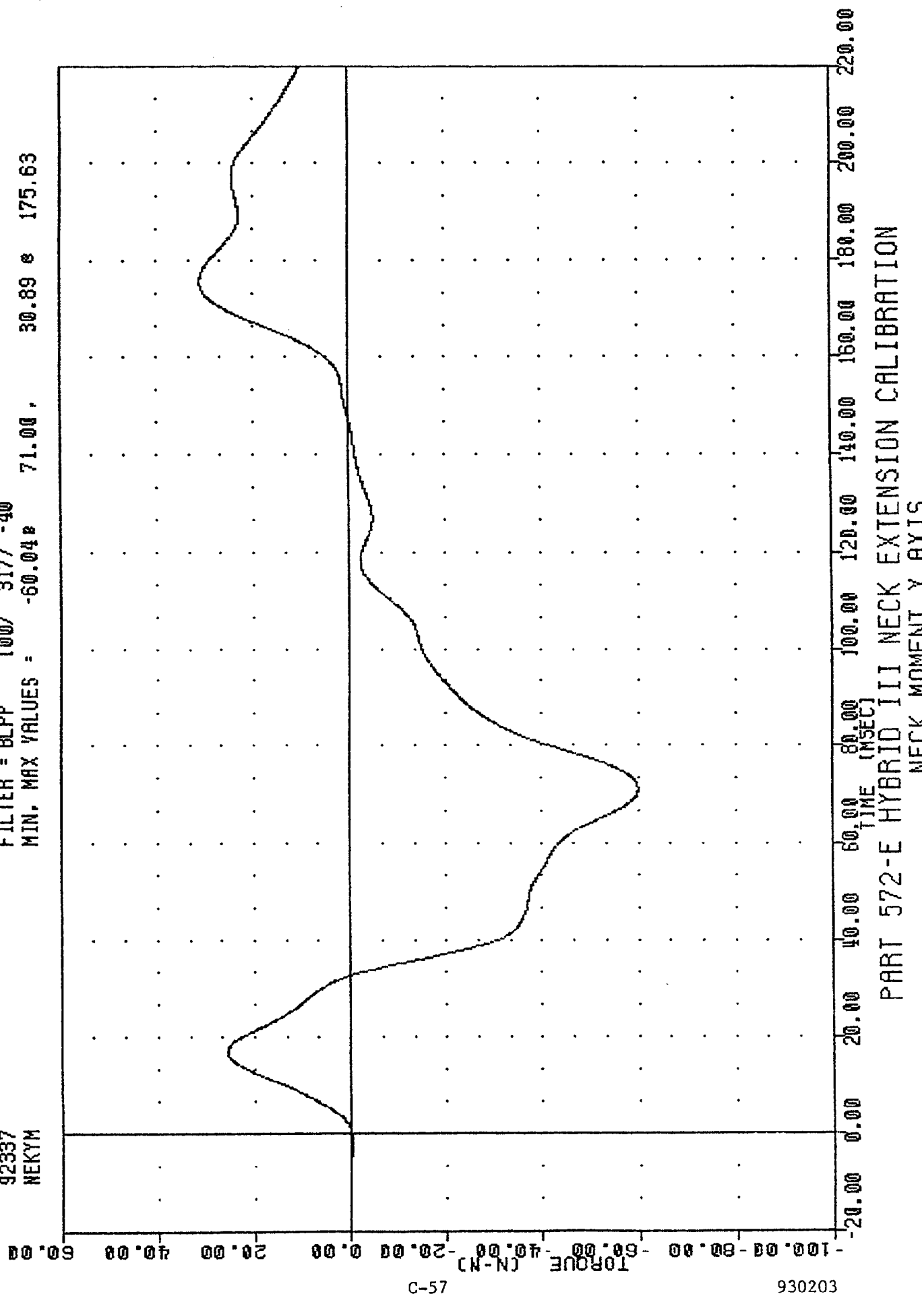
C-56

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PART 572-E HYBRID II NECK EXTENSION CALIBRATION

TRC
572E SN142 NECK EXT. CAL13
92337
NEKYM

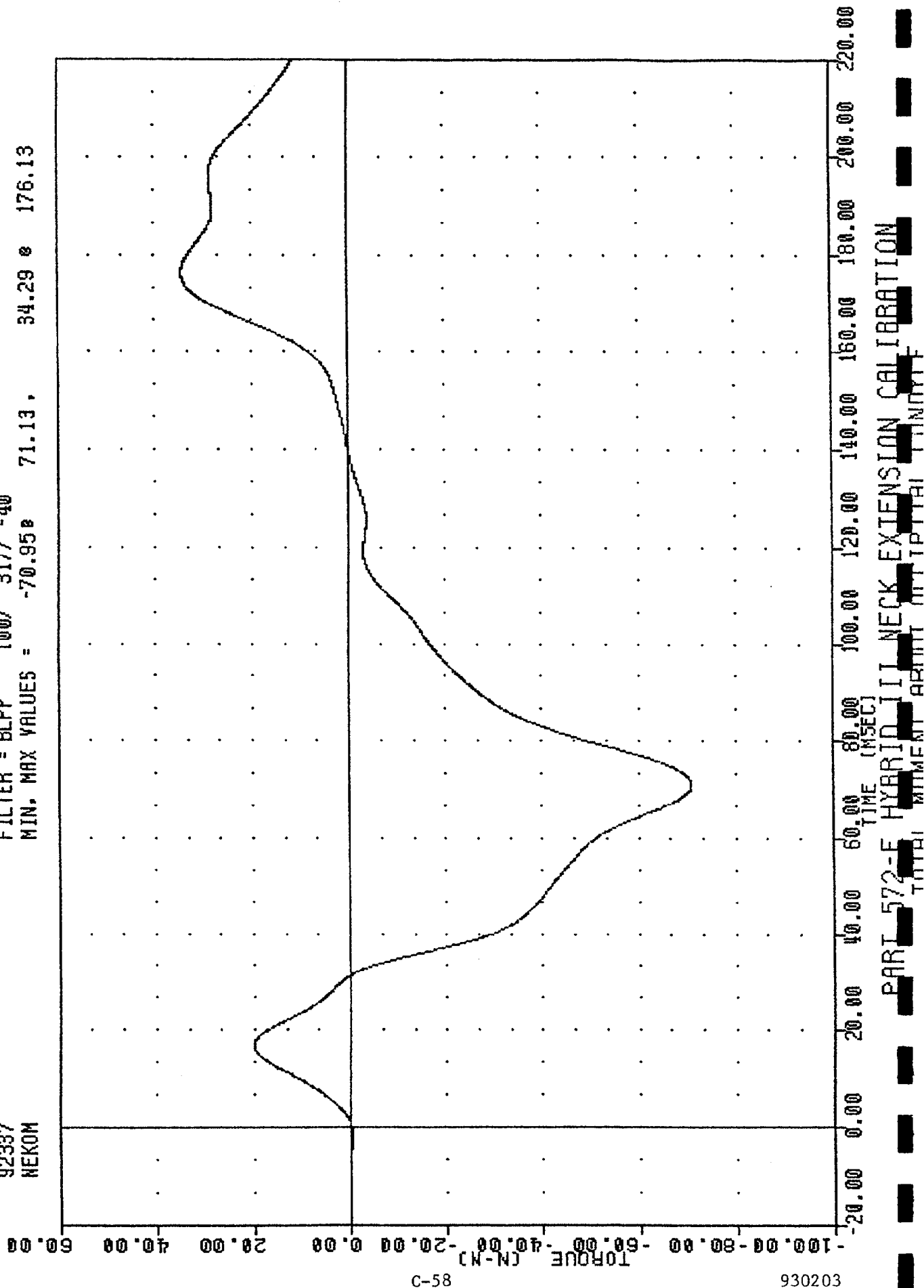
FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -60.04 71.00 30.89 e 175.63



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

TRC , 142C13NE1
 572E SN142 NECK EXT. CAL13
 92337
 NEKOM

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -70.95e 71.13, 34.29 e 176.13



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PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 TOTAL MOMENT ABOUT INITIAL POINT

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

28-JAN-93

TRC

142C13TH2

572E SN142 H.S.THORAX CAL13

	HIGH SPEED TEST	
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	42.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/SEC	6.63 M/SEC
MAXIMUM DEFLECTION	63.5 - 72.6 MM	71.0 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5423. N
INTERNAL HYSTERESIS	69% - 85%	70.8%

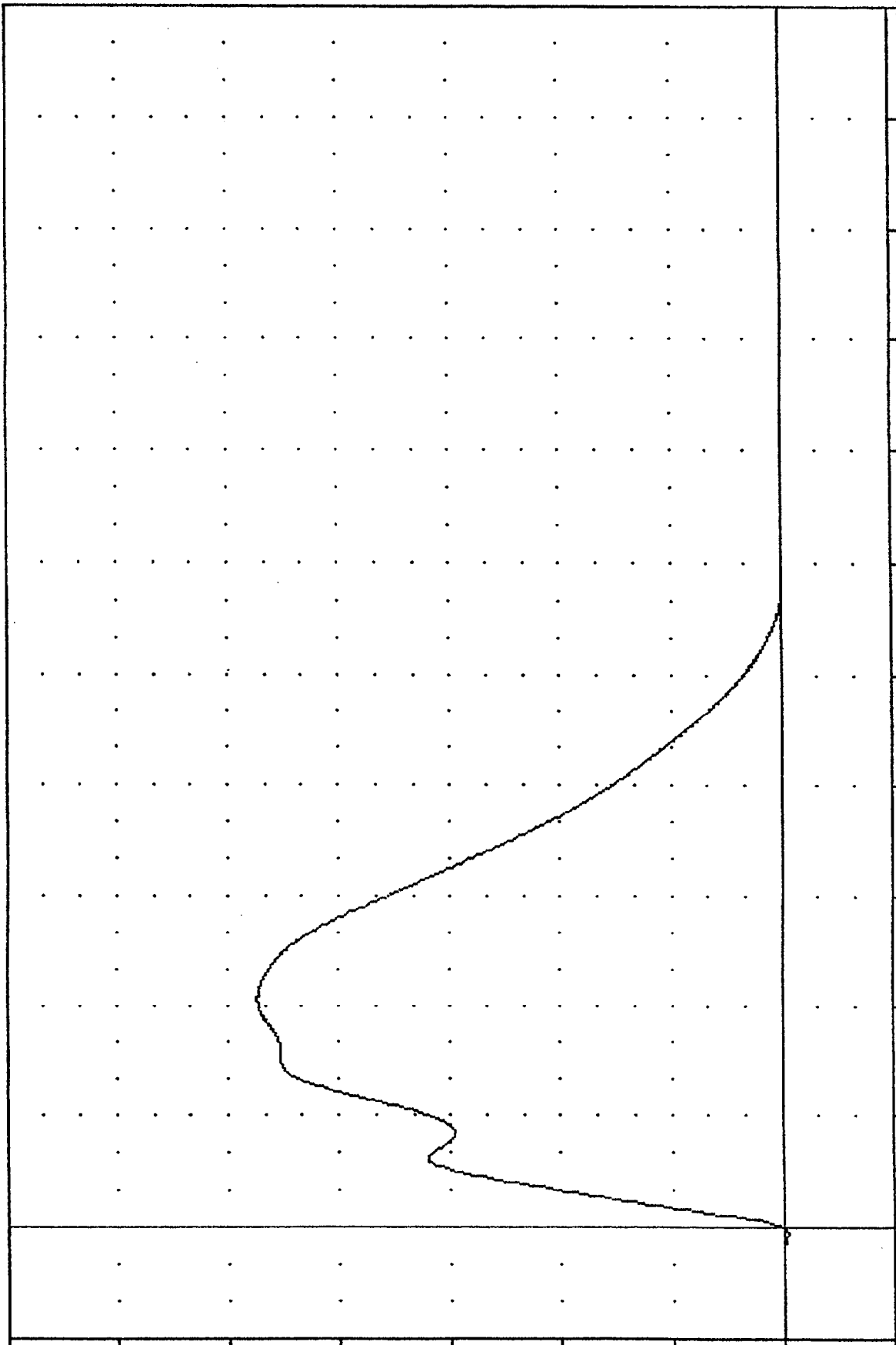
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC , 142C13TH2
 572E SN142 H.S. THORAX CRL13
 93028
 PENXG

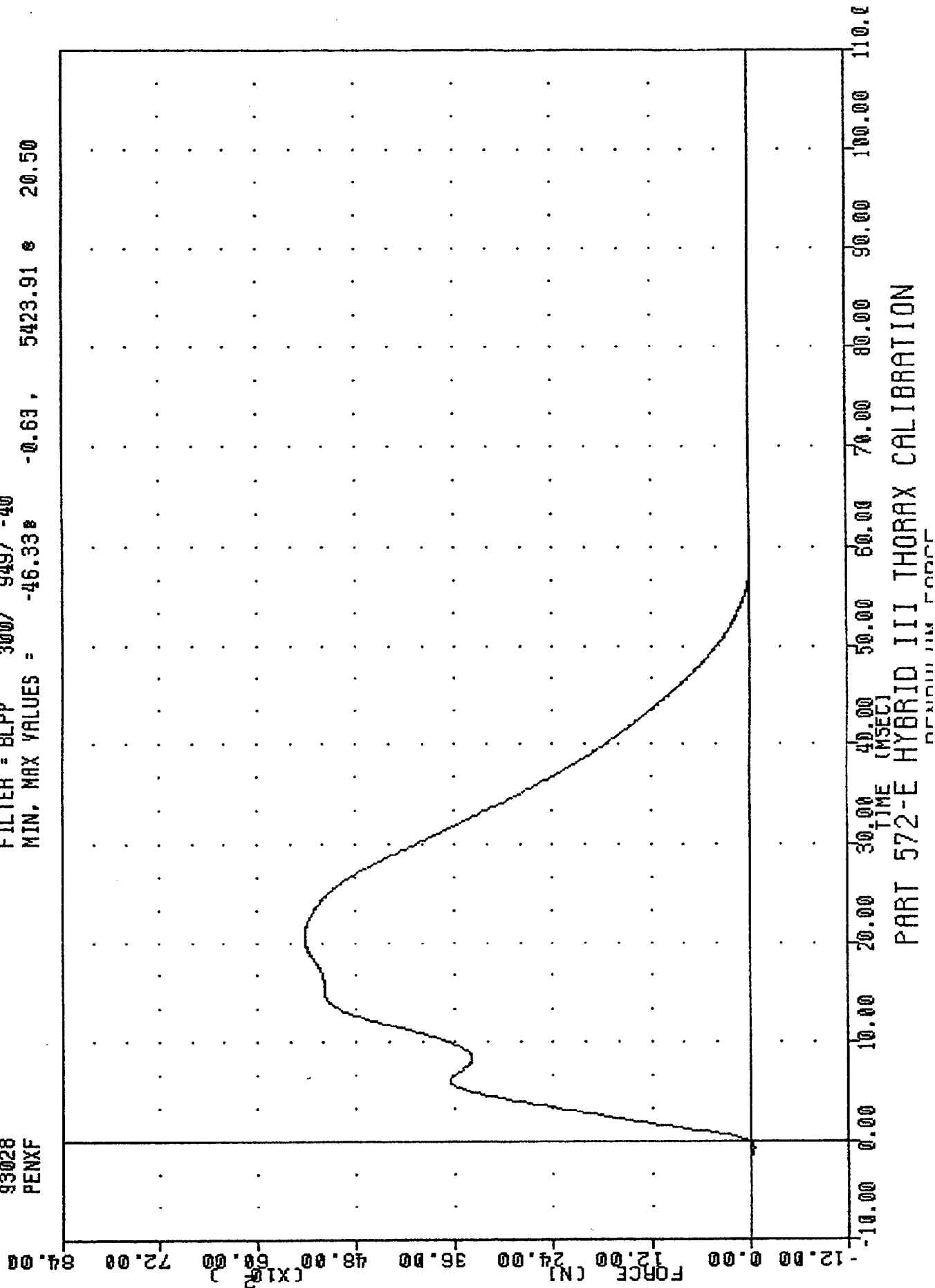
FILTER = BLPP 300/ 949/ -40
 MIN, MAX VALUES = -0.208 -0.63 , 23.68 @ 20.50

ACCELERATION (G)



TRC , 142C13TH2
 572E SN142 H.S.THORAX CAL13
 93028
 PENXF

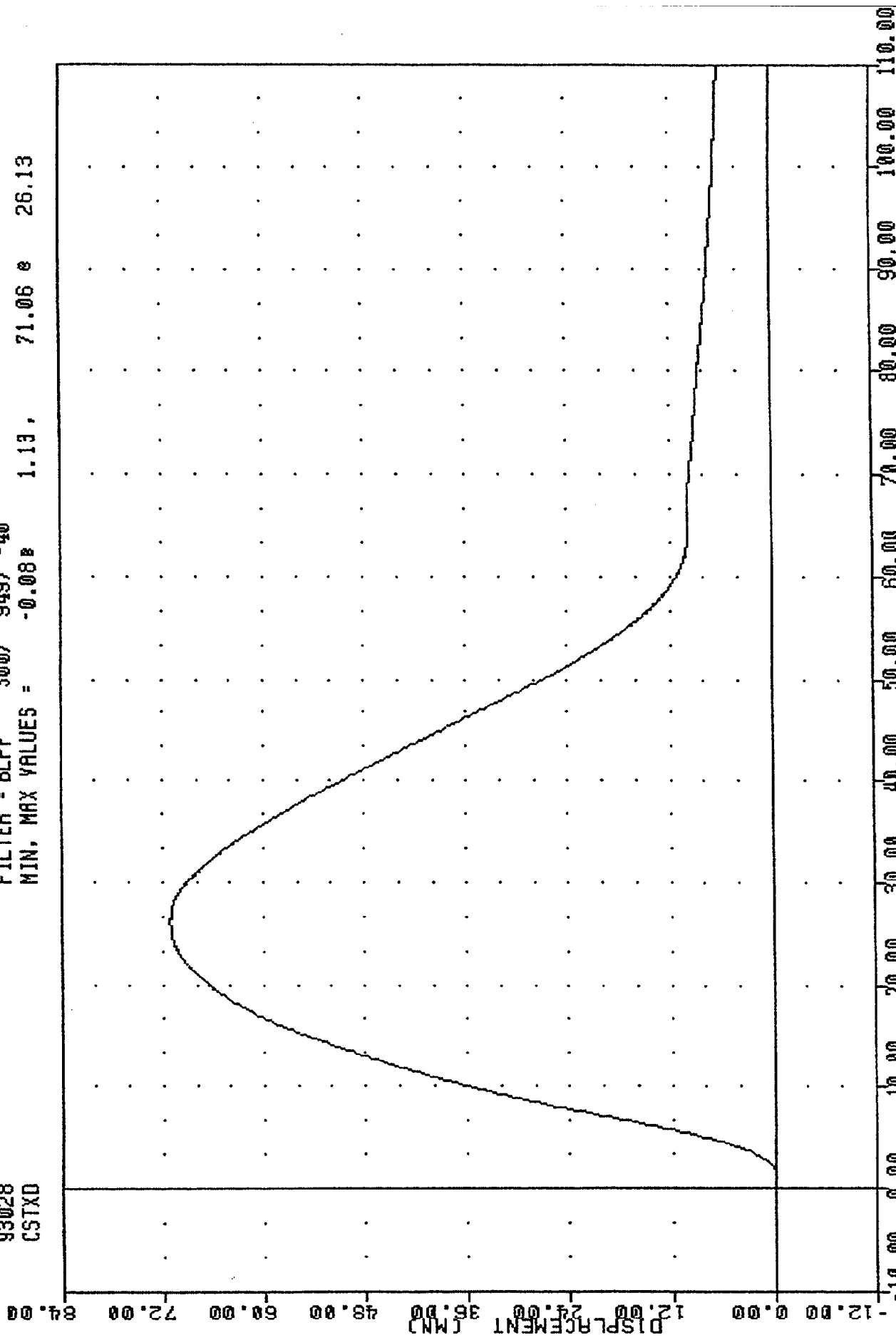
FILTER = BLPP 300/ 949/ -40
 MIN, MAX VALUES = -46.33 5423.91 20.50



PART 572-E HYBRID III THORAX CALIBRATION

TRC , 142C13TH2
 572E SN142 H.S. THORAX CAL13
 93028
 CSTXD

FILTER = BLPP 300/ 949/ -40
 MIN, MAX VALUES = -0.088 1.13, 71.06 e 26.13



PAGE 50 E HYBRID IS THORAX CALIBRATION

TRC
CSTXD
PENXF

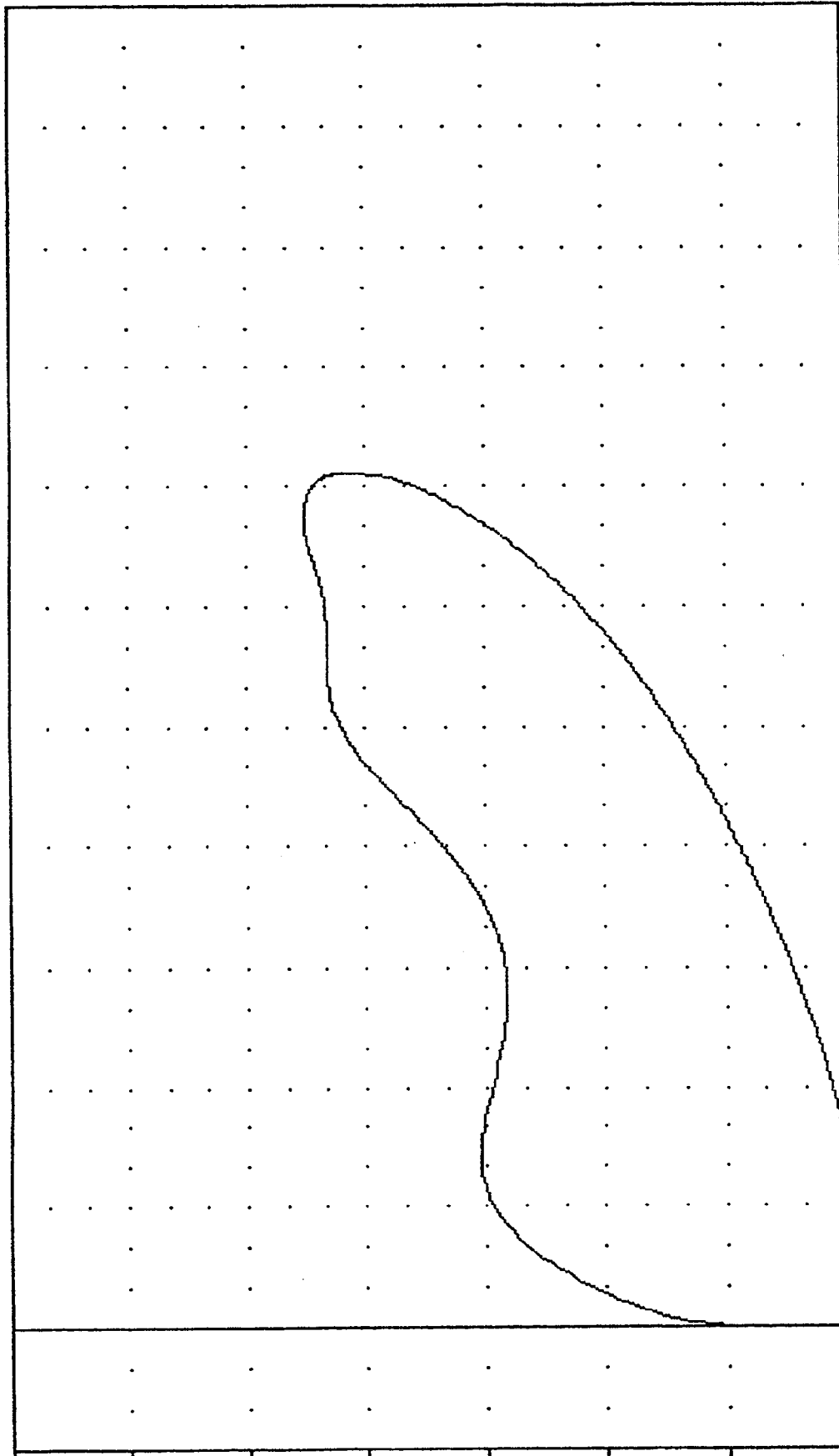
572E SN142 H.S. THORAX CAL13
300/ 949/ -40 MIN, MAX =
300/ 949/ -40 MIN, MAX =

93028
-0.08
-46.33

1.13,
-0.63,
71.06
5423.91

26.13
20.50

84.00
72.00
60.00
48.00
36.00
24.00
12.00
0.00
PENXF



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PART 572-E HYBRID III THORAX CALIBRATION

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

02-DEC-92

RIGHT KNEE

TRC

142C13RK1

572E SN142 RIGHT KNEE CAL 13

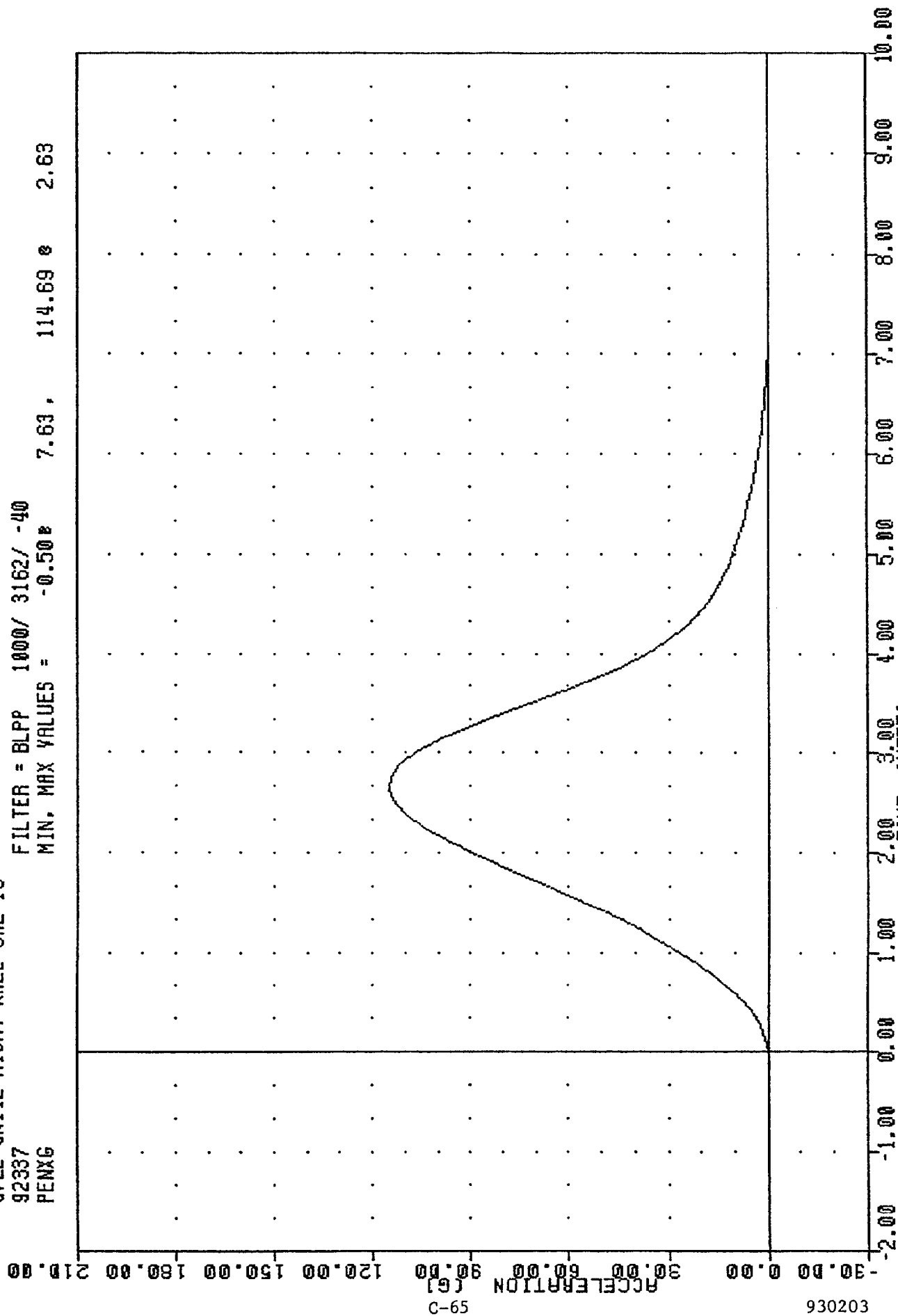
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.10 M/SEC
PEAK KNEE IMPACT FORCE	4714-5783 N	5611.4 N
PROBE WEIGHT	5.0 KG	

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC
572E SN142 RIGHT KNEE CAL 13
92337
PENXG

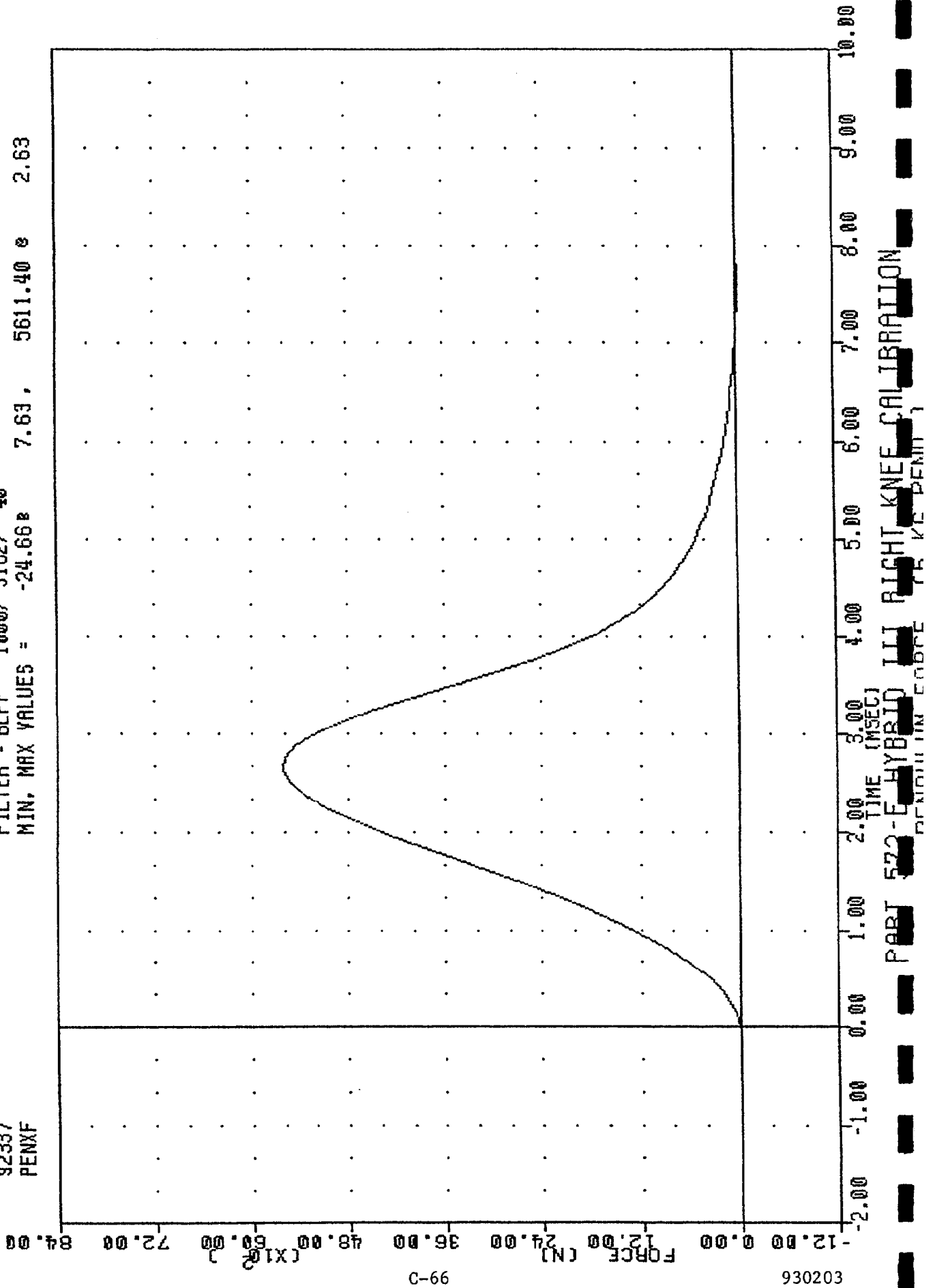
FILTER = BLPP 1000/ 3162/ -40
MIN. MAX VALUES = -0.50 7.63, 114.69 2.63



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENXG MIN PENXG MAX (5 KG PEND.)

TRC , 142C13RK1
 572E SN142 RIGHT KNEE CAL 13
 92337
 PENXF

FILTER = BLPP 1000/ 3162/ -40
 MIN, MAX VALUES = -24.66 7.63, 5611.40 2.63



TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

02-DEC-92

LEFT KNEE

TRC

142C13LK1

572E SN142 LEFT KNEE CAL 13

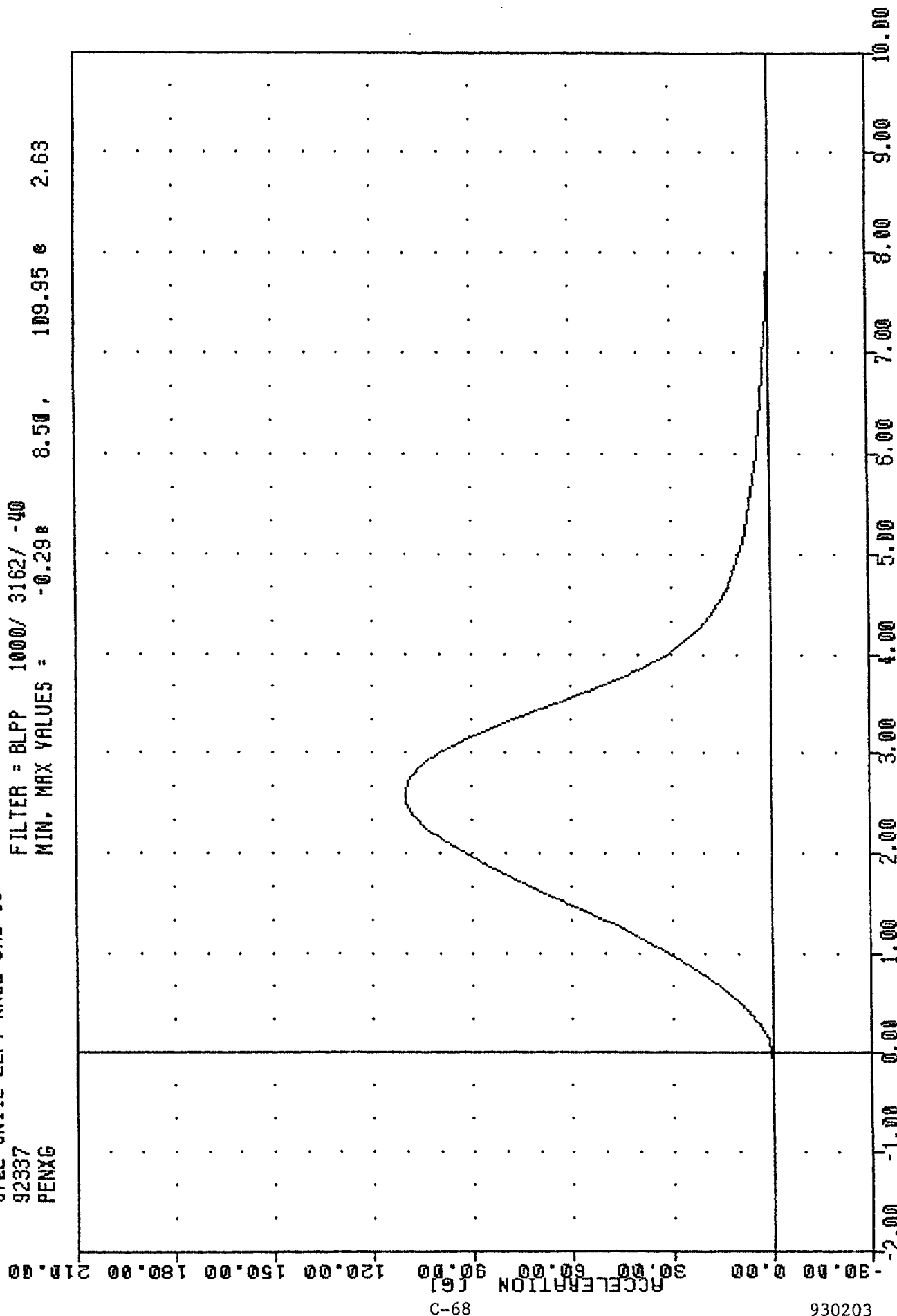
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.09 M/SEC
PEAK KNEE IMPACT FORCE	4714-5783 N	5379.8 N
PROBE WEIGHT	5.0 KG	

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC , 142C13LK1
 572E SN142 LEFT KNEE CAL 13
 92337
 PENXG

FILTER = BLPP 1000/ 3162/ -40
 MIN. MAX VALUES = -0.29 8.50 , 109.95 2.63



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PART 572-E HYBRID III LEFT KNEE CALIBRATION

TRC
572E SN142 LEFT KNEE CAL 13
92337
PENXF

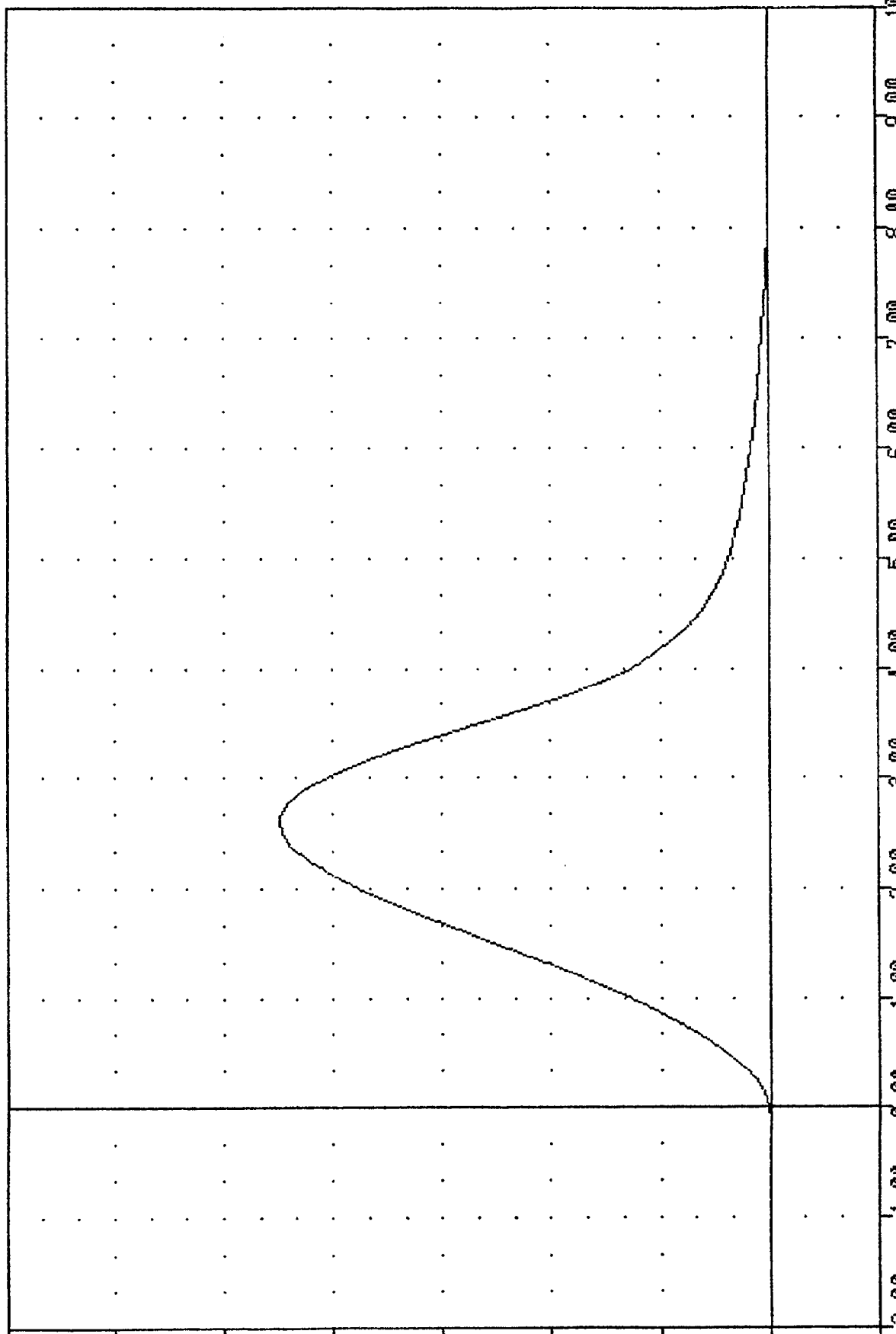
FILTER = BLPP 1000/ 3162/ -40
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84.00
72.00
60.00
48.00
36.00
24.00
12.00
0.00
-12.00

(X10²)

C-69

930203



PART 572-E HYBRID III LEFT KNEE CALIBRATION
DEFINITION: FORCE (N) VS TIME (MSEC)

APPENDIX D

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENT CALIBRATIONS

DRIVER DUMMY #192

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	CY19H	7264	ENDEVCO	01/22/93	07/22/93
Y-AXIS ACCEL.	DH74J	7264	ENDEVCO	01/22/93	07/22/93
Z-AXIS ACCEL.	CW16H	7264	ENDEVCO	01/22/93	07/22/93
CHEST X-AXIS ACCEL.	DW04J	7264	ENDEVCO	01/22/93	07/22/93
Y-AXIS ACCEL.	DA15H	7264	ENDEVCO	01/22/93	07/22/93
Z-AXIS ACCEL.	DK56J	7264	ENDEVCO	01/22/93	07/22/93
LEFT FEMUR FORCE LOAD CELL	889	2430	GSE	01/25/93	07/26/93
RIGHT FEMUR FORCE LOAD CELL	827	2430	GSE	01/25/93	07/26/93
*NECK X-AXIS FORCE LOAD CELL	085	1716	DENTON	01/25/93	07/26/93
Y-AXIS FORCE LOAD CELL	085	1716	DENTON	01/25/93	07/26/93
X-AXIS FORCE LOAD CELL	085	1716	DENTON	01/25/93	07/26/93
*NECK MOMENT ABOUT X-AXIS LOAD CELL	085	1716	DENTON	01/25/93	07/26/93
MOMENT ABOUT Y-AXIS LOAD CELL	085	1716	DENTON	01/25/93	07/26/93
MOMENT ABOUT Z-AXIS LOAD CELL	085	1716	DENTON	01/25/93	07/26/93
*CHEST DEFLECTION POTENTIOMETER	87313-96	81422A	VERNITECH	01/27/93	07/27/93
LAP BELT FORCE LOAD CELL	616	3419	LEBOW	10/05/92	04/06/93
SHOULDER BELT FORCE LOAD CELL	615	3419	LEBOW	10/05/92	04/06/93
SHOULDER BELT SPOOL-OUT POTENTIOMETER	A12889	PT-101-40A	CELESCO	10/28/92	04/28/93
SHOULDER BELT STRETCH POTENTIOMETER	2690	2051414101	BOURNES	10/28/92	04/28/93

*HYBRID III USE ONLY.

DUMMY INSTRUMENT CALIBRATIONS

PASSENGER DUMMY #142

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	CR59H	7264	ENDEVCO	01/25/93	07/25/93
Y-AXIS ACCEL.	CR99H	7264	ENDEVCO	01/25/93	07/25/93
Z-AXIS ACCEL.	CH44H	7264	ENDEVCO	01/25/93	07/25/93
CHEST X-AXIS ACCEL.	DA88H	7264	ENDEVCO	01/25/93	07/25/93
Y-AXIS ACCEL.	DT02JT	7264	ENDEVCO	01/25/93	07/25/93
Z-AXIS ACCEL.	CH74H	7264	ENDEVCO	01/25/93	07/25/93
LEFT FEMUR FORCE LOAD CELL	829	2430	GSE	01/26/93	07/26/93
RIGHT FEMUR FORCE LOAD CELL	610	2430	GSE	01/26/93	07/26/93
*NECK X-AXIS FORCE LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
Y-AXIS FORCE LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
Z-AXIS FORCE LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
*NECK MOMENT ABOUT X-AXIS LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
MOMENT ABOUT Y-AXIS LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
MOMENT ABOUT Z-AXIS LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
*CHEST DEFLECTION POTENTIOMETER	90320B	81422A	VERNI TECH	01/27/93	07/27/93
LAP BELT FORCE LOAD CELL	127	3419	LEBOW	10/26/92	04/26/93
SHOULDER BELT FORCE LOAD CELL	571	3419	LEBOW	10/26/92	04/26/93
SHOULDER BELT SPOOL-OUT POTENTIOMETER	A02465	PT-101-50A	CELESCO	10/28/92	04/28/93
SHOULDER BELT STRETCH POTENTIOMETER	1291	2051414101	BOURNES	10/28/92	04/28/93

*HYBRID III USE ONLY.

VEHICLE AND CALIBRATION LABORATORY INSTRUMENT CALIBRATIONS

VEHICLE ACCELEROMETERS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
LEFT REAR SEAT CROSSMEMBER X-AXIS	BY03J	7264	ENDEVCO	11/20/92	05/20/93
LEFT REAR SEAT CROSSMEMBER X-AXIS REDUN	BK96J	7264	ENDEVCO	10/09/92	04/09/93
RIGHT REAR SEAT CROSSMEMBER X-AXIS	BY97H	7264	ENDEVCO	08/11/92	02/11/93
RIGHT REAR SEAT CROSSMEMBER X-AXIS REDUN	CK16H	7264	ENDEVCO	08/21/92	02/21/93
ENGINE TOP X-AXIS	BW77J	7264	ENDEVCO	11/23/92	05/23/93
ENGINE BOTTOM X-AXIS	CW63H	7264	ENDEVCO	10/13/92	04/13/93
RIGHT BRAKE CALIPER X-AXIS	CJ72H	7264	ENDEVCO	11/20/92	05/20/93
LEFT BRAKE CALIPER X-AXIS	BN83J	7264	ENDEVCO	11/20/92	05/22/93
INSTRUMENT PANEL CENTER X-AXIS	CL83H	7264	ENDEVCO	08/21/92	02/21/93

CALIBRATION LABORATORY INSTRUMENTS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
NECK BENDING PENDULUM ACCEL.	CC44	7232	ENDEVCO	10/06/92	04/06/93
NECK BENDING ROTARY POTENTIOMETER	NA	35435-1-102	BOURNES	MFR. SPECIFICATION	
NECK BENDING LINEAR POTENTIOMETER	NA	5184-2051846003	BOURNES	10/06/92	04/06/93
THORAX/HYBRID II FEMUR PEND. ACCEL.	CC64	7232	ENDEVCO	10/06/92	04/06/93
LUMBAR FLEXION FORCE GAUGE	NA	DPPH-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	10/06/92	04/06/93
ABDOMEN COMPRESSION FORCE GAUGE	1261	3167	LEBOW	10/06/92	04/06/93
HYBRID III FEMUR PEND. ACCEL.	CG83	7232	ENDEVCO	10/06/92	04/06/93

SIGN CONVENTION
NHTSA DATA TAPE REFERENCE GUIDE

ACCELEROMETERS:

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

POTENTIOMETERS:

+CHEST LONGITUDINAL DEFLECTION: OUTWARD
+CHEST LATERAL DEFLECTION: LEFTWARD
+SEAT BELT DISPLACEMENT: OUTWARD
+SEAT BELT EXTENSION: ELONGATION
+KNEE SLIDER DISPLACEMENT: DISTANCE BETWEEN FEMUR
AND TIBIA INCREASED
(IN RELATION TO A
SEATED DUMMY)

LOAD CELLS:

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

NECK LOAD CELLS:

+X FORCE: HEAD PUSHED FORWARD
+Y FORCE: HEAD PUSHED LEFTWARD
+Z FORCE: HEAD PULLED UPWARD (TENSION ON NECK)
+X MOMENT: RIGHT EAR ROTATING TOWARD RIGHT SHOULDER
+Y MOMENT: CHIN ROTATING TOWARD CHEST
+Z MOMENT: CHIN ROTATING TOWARD LEFT SHOULDER

TIBIA LOAD CELLS:

+X FORCE: TENSION
+Y FORCE: TENSION
+Z FORCE: TENSION
+X MOMENT: BOTTOM OF TIBIA MOVING LEFTWARD
+Y MOMENT: BOTTOM OF TIBIA MOVING REARWARD

FREQUENCY RESPONSE CLASSES

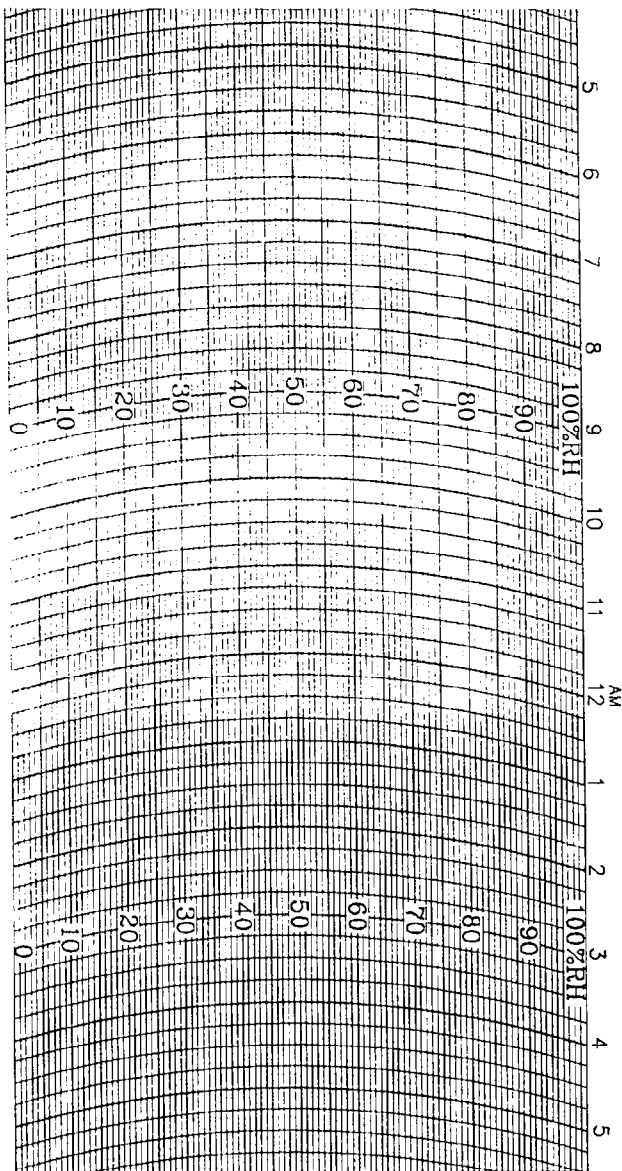
SAE J211 OCT88

TYPICAL TEST MEASUREMENTS

CHANNEL CLASS

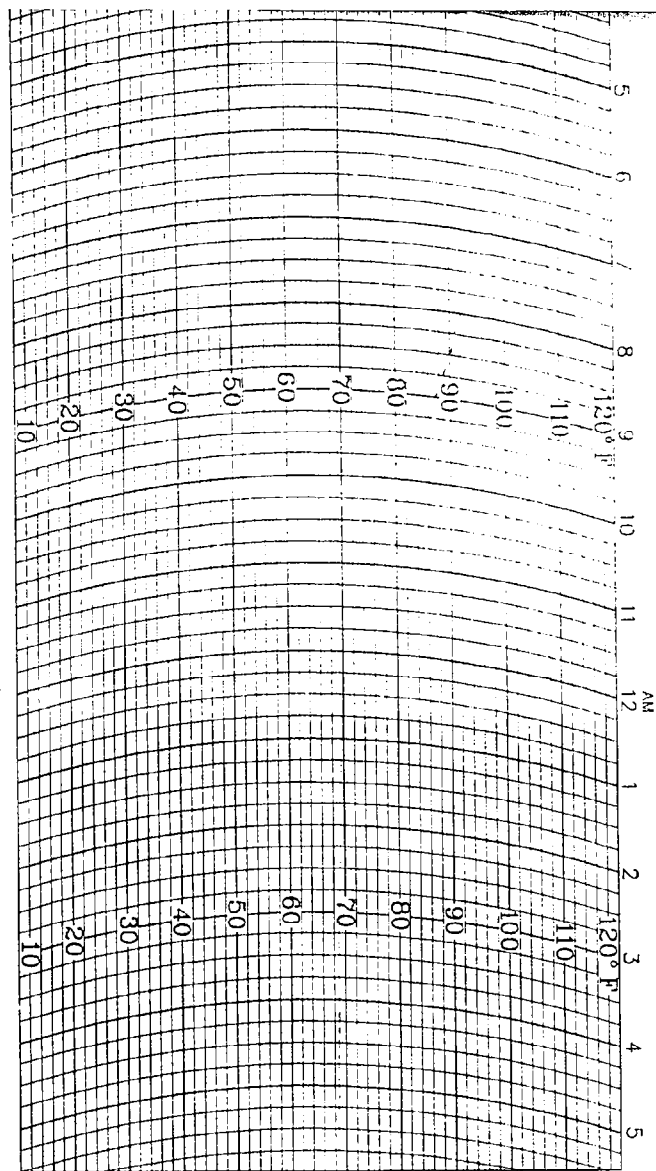
Vehicle Structural Accelerations for use in:

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



WeatherMeasure
WEATHERtronics
 Division of QUALIMETRICS, Inc.

P.O. BOX 41039
 SACRAMENTO, CA 95841
 PHONE: (916) 923-0055



HYGROTHERMOGRAPH
 1 DAY

CHART NO. M699123
 C311-D-HF
 ECN 2717
 6-9-87

STATION _____ DATE ON _____ DATE OFF _____

D-7

930203

APPENDIX E

RESTRAINT SYSTEM INSTRUCTIONS FROM OWNER'S MANUAL

Seats & Safety Belts



Section

1

Here you'll find information about the seats in your vehicle and how to use your safety belts properly. You can also learn about some things you should **not** do with safety belts.

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Seats & Safety Belts

Seats and Seat Controls

This section tells you about the seats—how to adjust them, take them out, and put them back in, and fold them up and down. It also tells you about reclining seats and head restraints.

Front Seats

Manual Front Seat

CAUTION

 You can lose control of the vehicle if you try to adjust a manual driver's seat while the vehicle is moving. The sudden movement could startle and confuse you, or make you push a pedal when you don't want to. Adjust the driver's seat only when the vehicle is not moving.



K2102

Slide the lever at the front of the seat toward your door to unlock it. Slide the seat to where you want it. Then release the lever and try to move the seat with your body, to make sure the seat is locked into place.

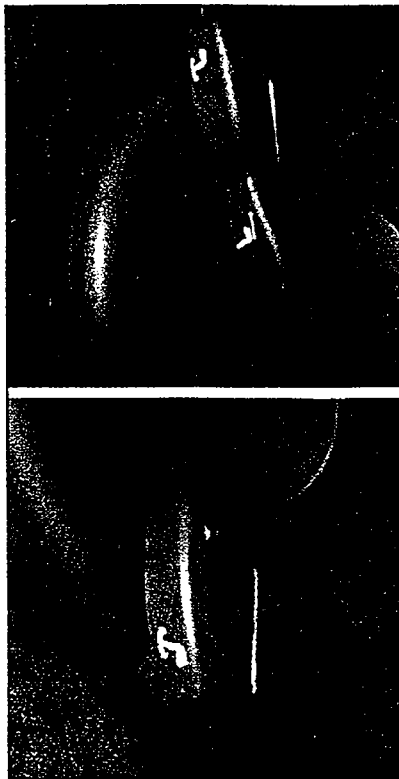
Power Seat



K2365

If your vehicle has a power seat on the driver's side, you can adjust it with this switch at the front of the seat.

Reclining Front Seatback (Bucket or Split Bench Seat)



P0191

To adjust the seatback, lift the front of this lever. If your vehicle has a passenger side easy entry seat, your seatback lever will be slightly larger, but will work the same way. Release the lever to lock the seatback where you want it. Pull up on the lever and the seatback will go to an upright position.

Seats & Safety Belts

Don't have a seatback reclined if your vehicle is moving.



AN101020

CAUTION

 Sitting in a reclined position when your vehicle is in motion can be dangerous. Even if you buckle up, your safety belts can't do their job when you're reclined like this.

The shoulder belt can't do its job because it won't be against your body. Instead, it will be in front of you. In a crash you could go into it, receiving neck or other injuries.

The lap belt can't do its job either. In a crash the belt could go up over your abdomen. The belt forces would be there, not at your pelvic bones. This could cause serious internal injuries.

For proper protection when the vehicle is in motion, have the seatback upright. Then sit well back in the seat and wear your safety belt properly.

Head Restraints

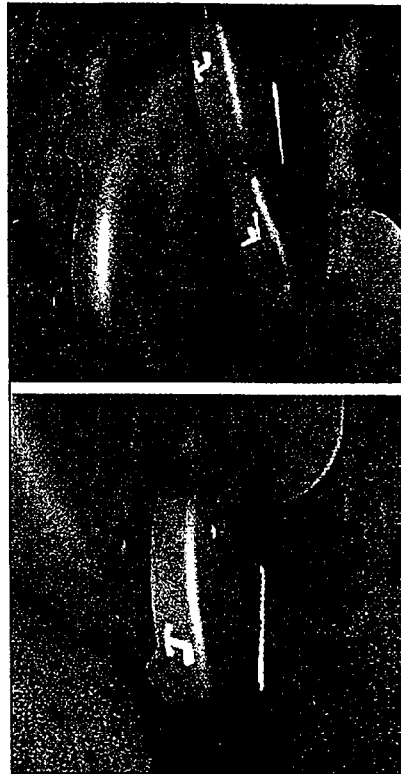


AN102016

Slide the head restraint up or down so that the top of the restraint is closest to the top of your ears.

This position reduces the chance of a neck injury in a crash.

Seatback Latches (40/60 Reclining Split Bench Seat and Reclining Bucket Seat)



P0191

To fold a seatback forward, pull up on the front of this lever and fold the seatback forward.

Seats & Safety Belts

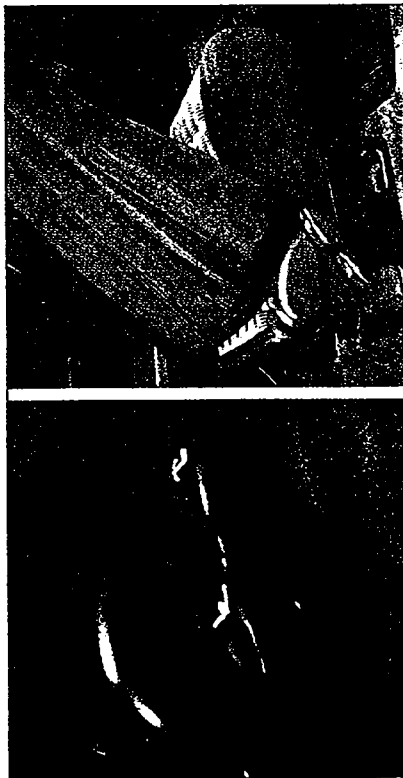
To return the seatback to the upright position, just push the seatback rearward.

When you return the seatback to its original position, pull it forward to make sure the seatback is locked.

CAUTION

 If the seatback isn't locked, it could move forward in a sudden stop or crash. That could cause injury to the person sitting there. Always press rearward on the seatback to be sure it is locked.

Easy Entry Seat (Utility Model Front and Wagon Model Second Seat)



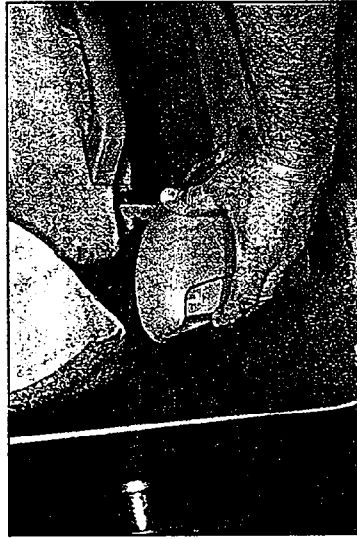
K2405

The right front bucket seat or the right side of the 40/60 split bench seat, available on the Utility model, has an easy entry feature. This makes it easy to get in and out of the rear seat.

To operate the seat, push down on the rear of the lever at the rear edge of the seat. When you do, the seatback will move fully forward and the seat bottom will release. Just pull or push the seat forward until it stops.

To return the seat to its regular position, return the seatback to its upright position, then push the whole seat rearward until it latches.

After returning the seat to its regular position, try to move the seat with your body, to make sure the seat is locked into place.



K2475

The right side of the rear 60/40 split folding bench seat, available on the Wagon model, has an easy entry feature. This makes it easy to get in and out of the third seat, if you have one.

To operate the seat, move the top lever at the rear edge of the seat forward, and tilt the seatback toward the front of the vehicle. When you do, the seat bottom will release. Just pull or push the seat forward until it stops.

To return the seat to its regular position, return the seatback to its upright position, then push the whole seat rearward until latches.

After returning the seat to its regular position, try to move the seat with your body, to make sure the seat is locked into place.

CAUTION

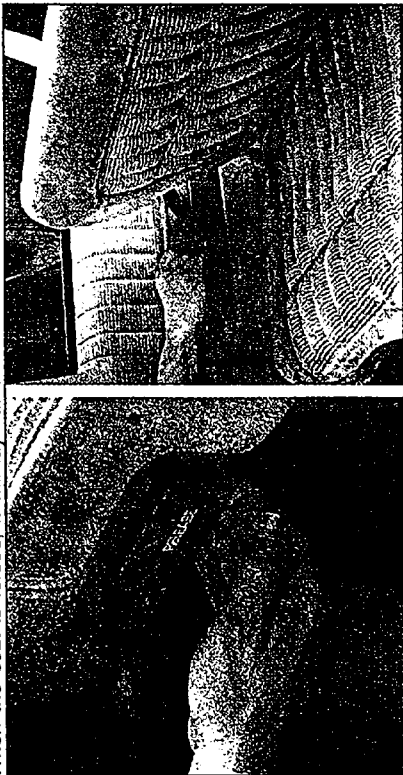
 If an easy entry right front seat isn't locked, it can move. In a sudden stop or crash, the person sitting there could be injured. After you've used it, be sure to push rearward on an easy entry seat to be sure it is locked.

Seats & Safety Belts

Rear Seats

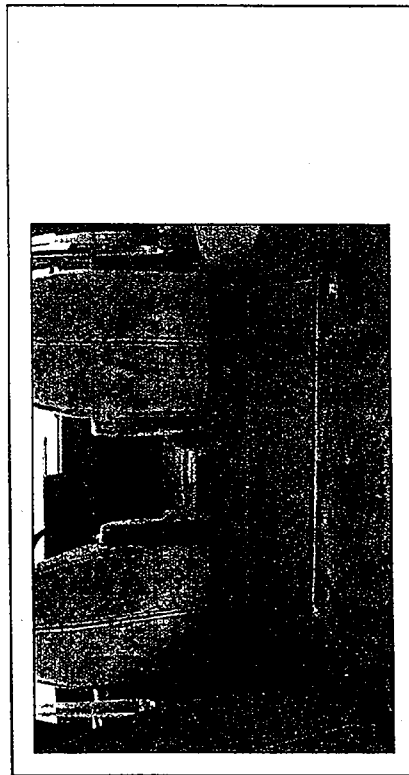
Folding Rear Seat (Utility Models)

If your vehicle has a rear seat, the seat can be folded flat for more cargo space. Before folding, make sure that nothing is under or in front of the seat. When the seat is folded, it will lay flat on the floor.



P0273

To fold the seat, pull on the lever at the front of the seat cushion marked **RELEASE**. Then, using the handle at the side of the seatback, pull the seatback forward and fold it into the seat cushion.



P0272

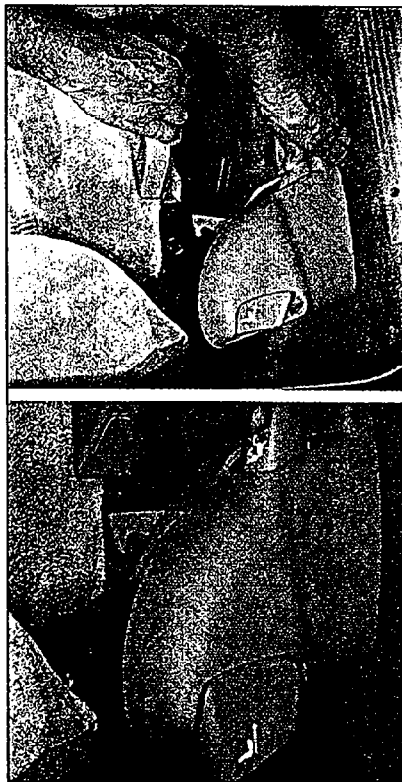
While the seat is in the folded position, hang the latch plate end of the outer passenger position safety belts on the hooks at the top of each retractor cover, out of the way.

To return the seat to the passenger position, just lift up on the seatback and push it rearward until it latches.

After returning the seat to the passenger position, pull forward on the seatback to make sure it is locked in place.

Folding Second Seat (Wagon Models)

If your vehicle has a 60/40 second seat, either side may be folded down to give you more cargo space. Before folding, make sure that nothing is under or in front of the seat. When the seat is folded, it will lay flat on the floor.



K2477

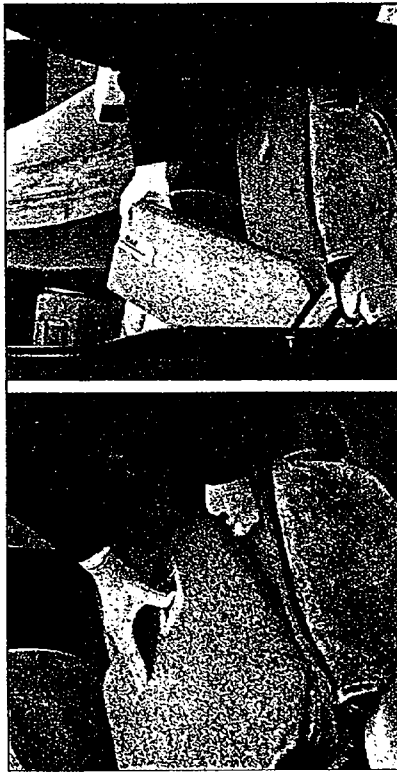
To fold the seat, push down on the lever at the outer side of the seat cushion and, using the handle mounted on the side of the seat, pull the seat cushion up and fold it forward.

Seats & Safety Belts



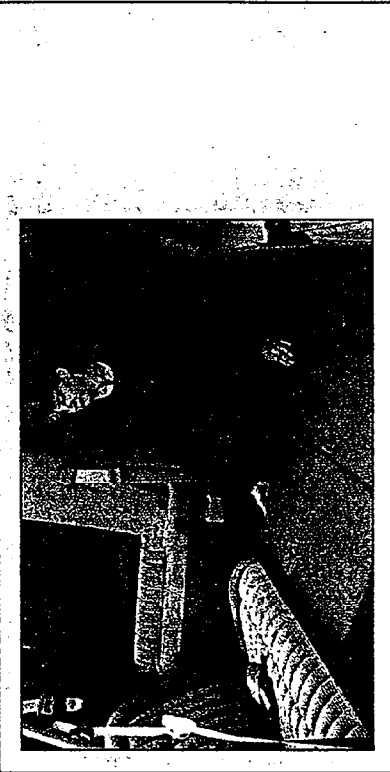
P0507

After folding the seatback fully forward, push down on the lever again and fold the seatback forward until it is flat.



P0508

To create a load floor, release the panels from the seatbacks by pushing rearward on the latch, and fold them out to cover the rear seat footwell.



P0509

To return the seat to the passenger position, lift the load floor panels and latch them into the seatback. Then, lift the seatback up and push rearward until it latches. Lower the seat cushion until it latches in position.

After returning the seat to the passenger position, pull forward on the seatback and up on the seat cushion handle to make sure the seat is locked in place.

Removable Rear Seat (Wagon Models)

If your vehicle has a rear seat, it can be taken out for more cargo space.

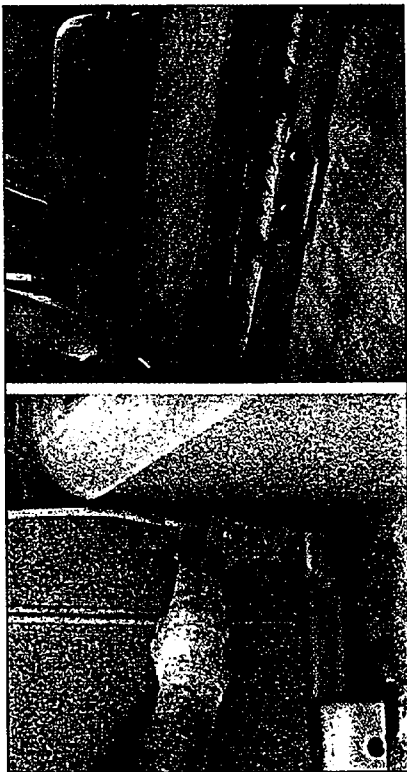


P0274

Before removing the seat, unatch the outside passenger position safety belts from the seat frame. To do this, press in on the inside of the buckle cover

Seats & Safety Belts

sleeve and pull the latch plate out of buckle. Then hang the latch plate end of the belt on the hook at the top of the retractor cover, out of the way.



P0510

To remove the seat, fully open the rear load doors and enter the back of the vehicle. Move the seatback release lever at the right rear of the seat toward the center of the vehicle, and fold the seatback forward into the seat cushion.



K2356

To unlatch the seat from the floor, pull up on the center release handle at the rear of the seat and lift the rear of the seat up, out of the floor. Turn the seat sideways and take it out of the vehicle.

To put the seat back in, hold it sideways and put it into the vehicle. Turn the seat to the forward position and set it down, with the latches at the bottom of the seat over the hooks in the floor. Pull up on the center release handle and let the seat drop into place. Release the handle to let the seat latch close and make sure it locks into place. Then, move the seatback release lever at the right rear of the seat toward the center of the vehicle and raise the seatback.

After returning the seat back to the upright position, push the seatback forward to make sure it is locked in place.

Then, return the outside passenger position safety belts to the seat frame buckles.

CAUTION

 A safety belt that is twisted or not properly attached won't provide the protection needed in a crash. The person wearing the belt could be seriously injured. After installing the seat, always check to be sure that the safety belts are not twisted and are properly attached.

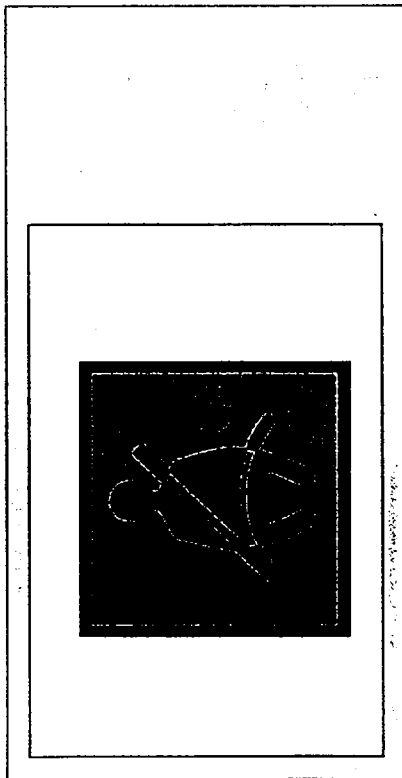
Safety Belts: They're For Everyone

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

 Don't let anyone ride where they can't wear a safety belt properly. 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. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.

Seats & Safety Belts



AM110001

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 buzzer or 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.

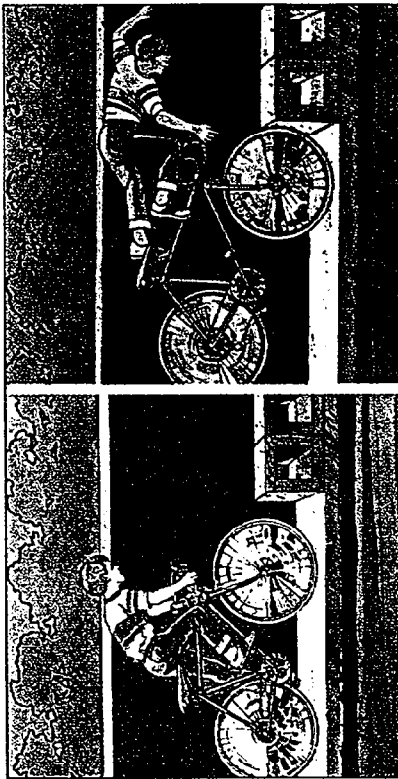
A few crashes are very mild. In them, you won't get hurt even if you're not buckled up. And some crashes can be so serious, like being hit by a train, that even buckled up a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk 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!



AM110021R1

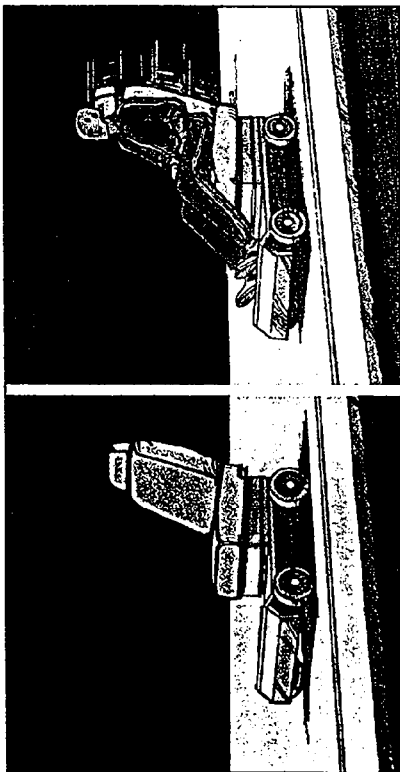
Why Safety Belts Work



AM115002

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!

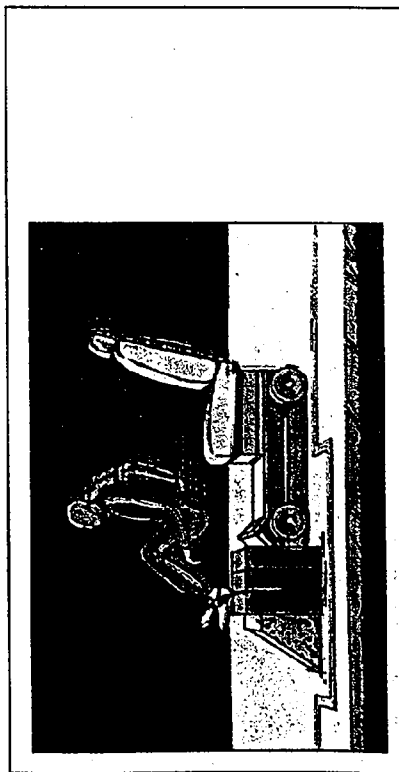
Seats & Safety Belts



AM115003

AM115004

Take the simplest "vehicle." Suppose it's just a seat on wheels. Put someone on it.



AM115005

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



AM115006

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



AM115007

or the instrument panel . . .

Seats & Safety Belts



AM115008

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.

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.

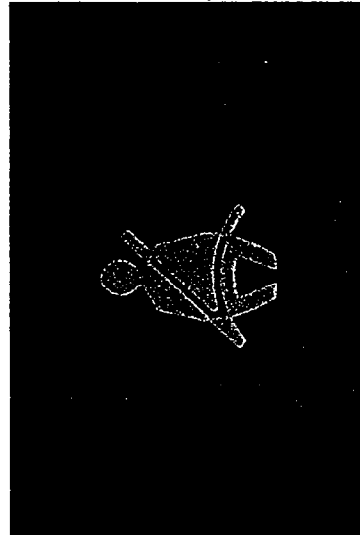
Q: If I'm a good driver, and I never drive far from home, why should I wear safety belts?

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.

Safety Belt Reminder Light



K2443

When the key is turned to **RUN** or **START**, a light will come on for about eight seconds to remind people to fasten their safety belts. Unless the driver's safety belt is buckled, a buzzer or tone will also sound.

Seats & Safety Belts

How To Wear Safety Belts Properly

Adults

This part is only for people of adult size.

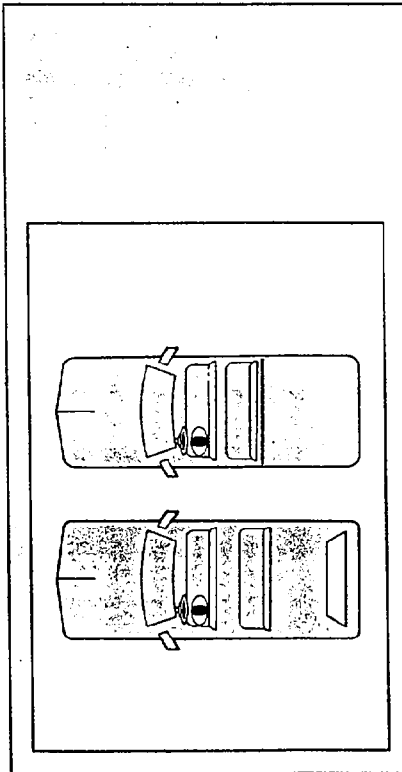
CAUTION

⚠ There are special things to know about safety belts and children. And there are different rules for babies and smaller children. If a child will be riding in your vehicle, see the part after this one, called "Children." Follow those rules for everyone's protection.

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

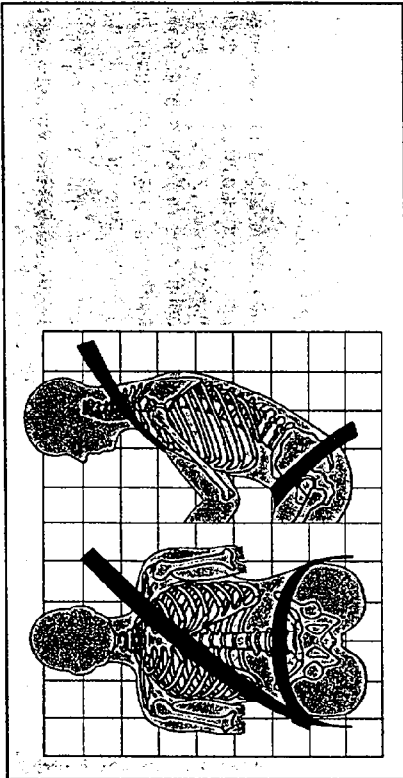
Driver Position

This part describes the driver's restraint system.



K2425

Lap-Shoulder Belt



AM12007

The driver has a lap-shoulder belt. Here's how to wear it properly.

1. Close and lock the door.
2. Adjust the seat (to see how, see "Seats" in the index) so you can sit up straight.



AM120120

3. Pick up the latch plate and pull the belt across you. On some models you may hear a clicking sound as the belt is pulled out. This is a shoulder belt tension reducing feature. Don't let the belt get twisted.
4. Push the latch plate into the buckle until it clicks.

Seats & Safety Belts

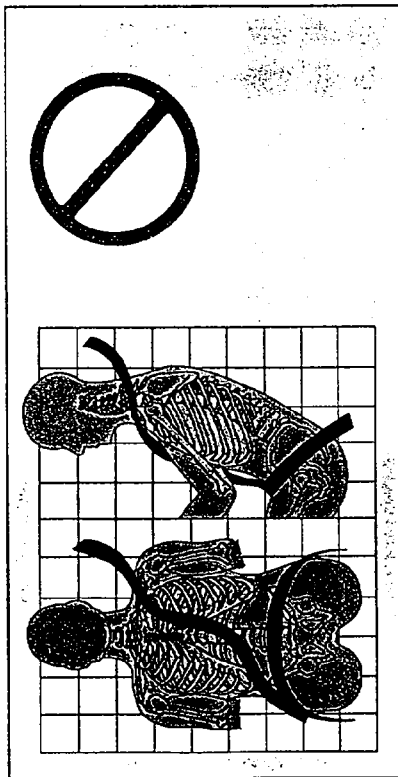
If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

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.

The lap part of the belt should be low and snug on 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 if there's a sudden stop or a crash.

Q: What's wrong with this?



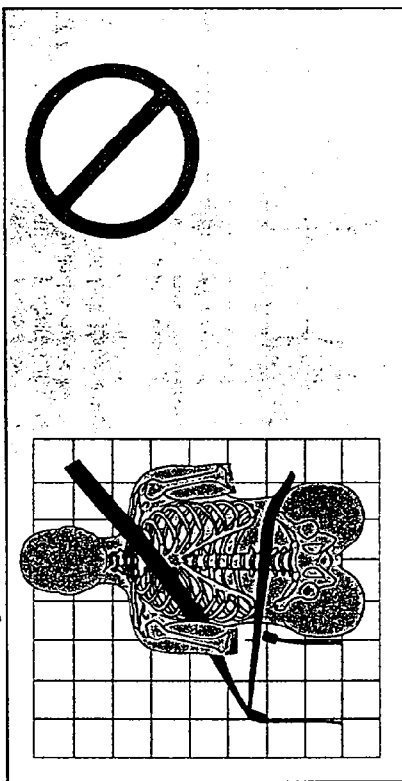
AM120015

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 increase injury. The shoulder belt should fit against your body.

Q: What's wrong with this?



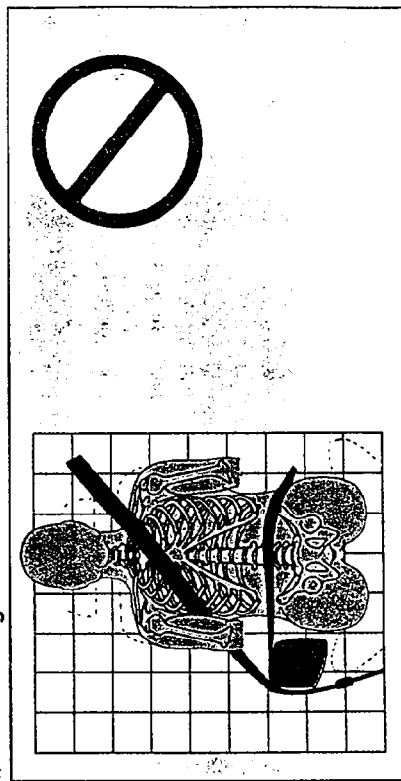
AM120016

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.

Q: What's wrong with this?



AM120058

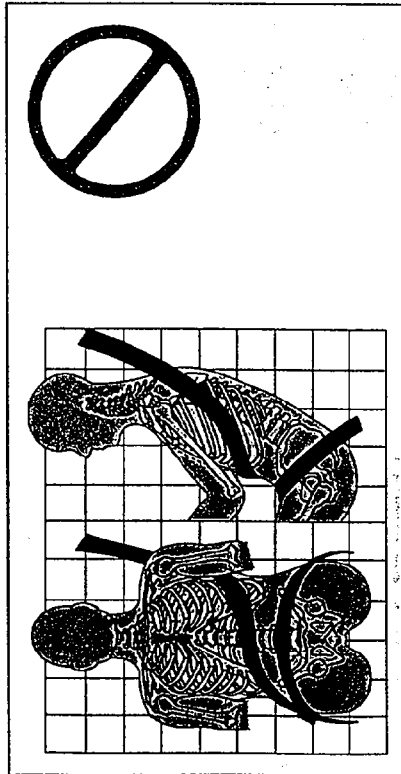
A: The belt is over an armrest.

Seats & Safety Belts

CAUTION

 You can be seriously injured if your belt goes over an armrest like this. The belt would be much too high. In a crash, you can slide under the belt. The belt force would then be applied at the abdomen, not at the pelvic bones, and that could cause serious or fatal injuries. Be sure the belt goes under the armrests.

Q: What's wrong with this?



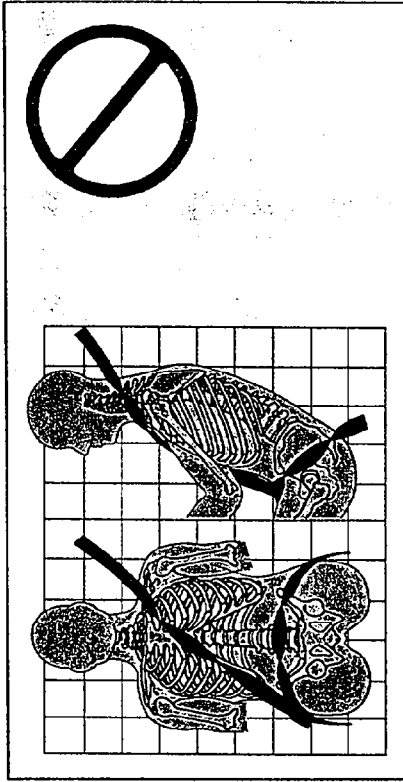
AM125001

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?



AM125002

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 spread impact forces. If a belt is twisted, make it straight so it can work properly, or ask your dealer to fix it.



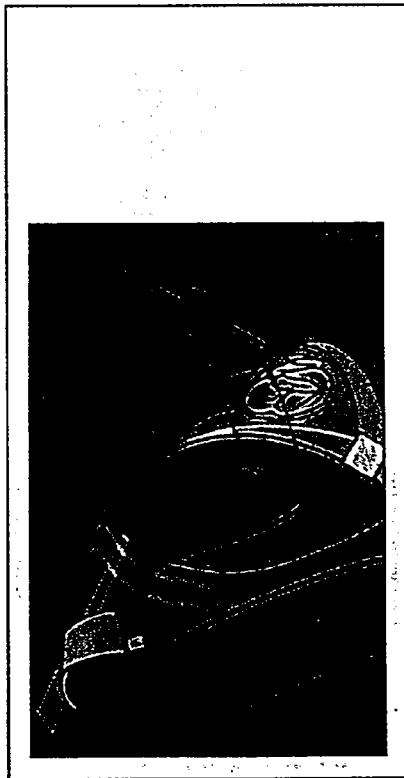
AM120123

To unlatch the belt, just push the button on the buckle. The belt should go back out of the way.

Seats & Safety Belts

Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

Safety Belt Use During Pregnancy



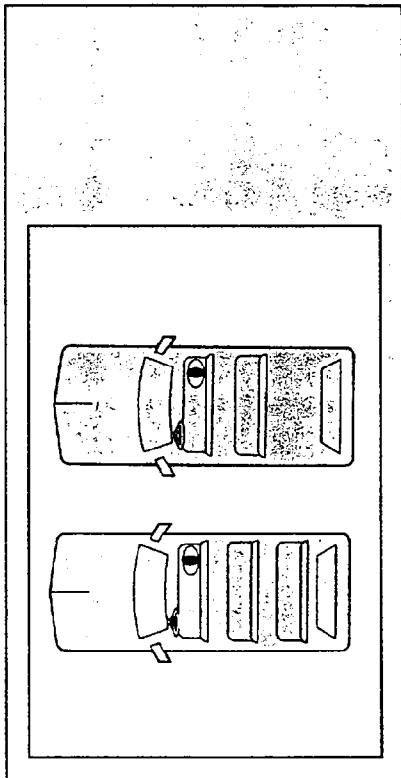
AM135001

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, and 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

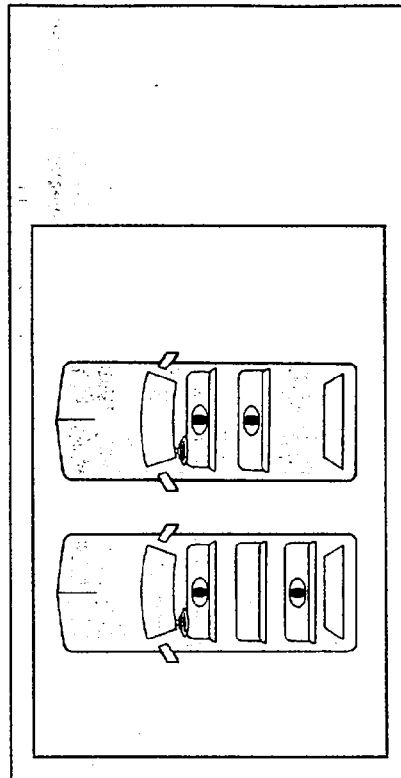


K2426

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

When the lap portion of the belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again.

Center Passenger Position (Except Wagon Models Second Seat)

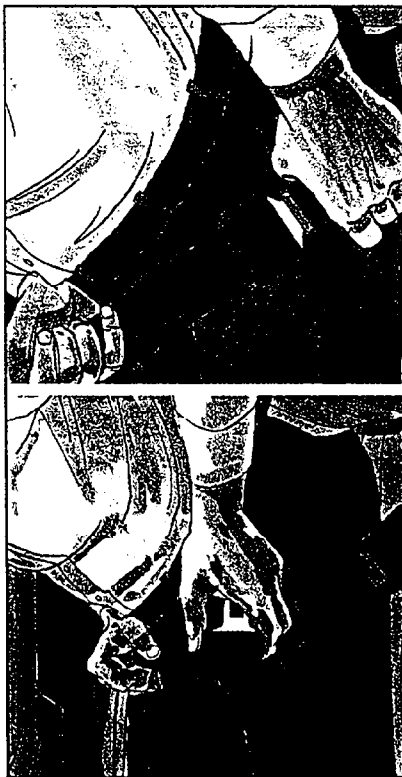


K2436

If your vehicle has front and rear bench seats, someone can sit in the center positions.

Seats & Safety Belts

When you sit in the center seating position, (except in the second seat of the Wagon Models) 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.



AM145041

AM145043

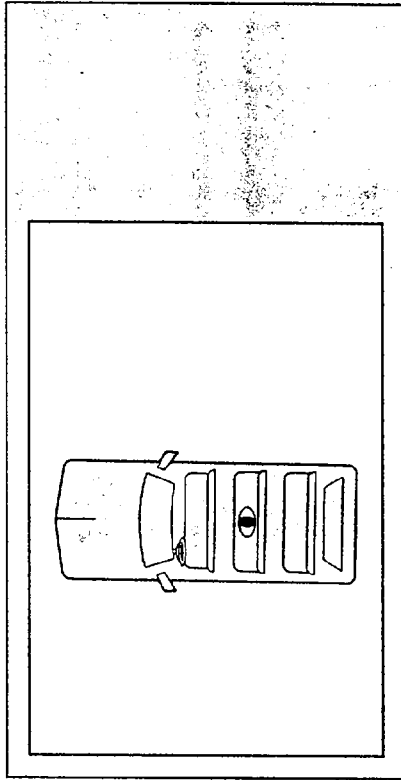
To make the belt shorter, pull its free end as shown until the belt is snug.

Buckle, position and release it the same way as the lap part of a lap-shoulder belt.

If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

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.

Center Passenger Position (Wagon Models Second Seat)



K2337

When you sit in the center of the wagon model second seat, you have a lap safety belt which has a retractor.



AM145053

1. Pick up the latch plate and, in a single motion, pull the belt across you. Don't let it get twisted.
2. Push the latch plate into the buckle until it clicks. If the belt stops before it reaches the buckle, let it go back all the way and start again.

Seats & Safety Belts

3. Feed the lap belt into the retractor to tighten it.
4. Position and release it the same way as the lap part of a lap-shoulder belt.

If the belt isn't long enough, see "Safety Belt Extender" at the end of this section. 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.



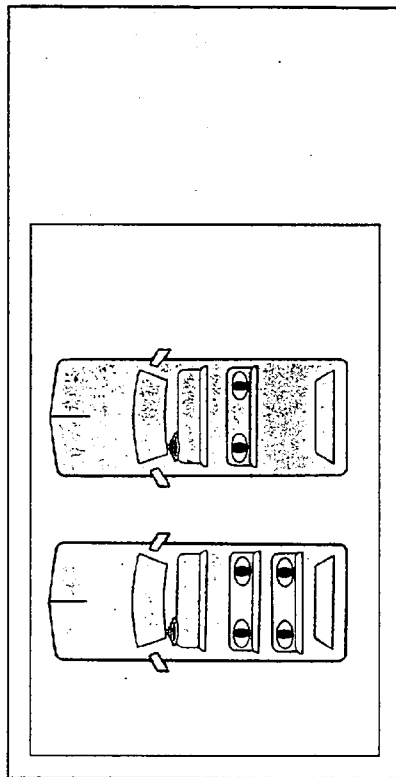
AN145054

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.

Rear Seat Outside Positions



K2428

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 the belt across you. Don't let it get twisted.



AN147025

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

If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle it.

Seats & Safety Belts

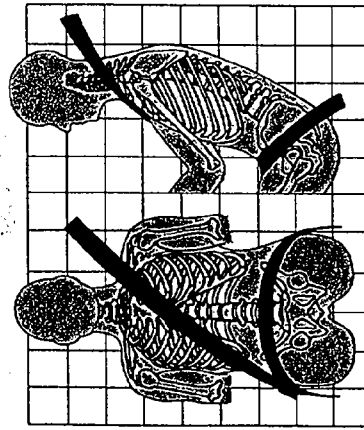
If the belt is not long enough, see "Safety Belt Extender" at the end of this section.

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.



AN147096

- To make the lap part tight, pull down on the buckle end of the belt as you pull up the shoulder part.



AM120007

The lap part of the belt should be low and snug on 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 if there is 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.



AN147030

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

Seats & Safety Belts

Children



AM150036

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 might not 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.



AM150035

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.

Secure the baby in an infant restraint.



AM150037

Seats & Safety Belts

Child Restraints

Be sure to follow the instructions for the restraint. You may find these instructions on the restraint itself or in a booklet. 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

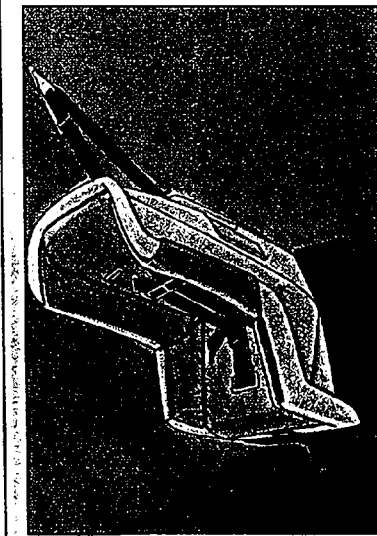
Accident statistics show that children are safer if they are restrained in the rear rather than the front seat. We at General Motors therefore recommend that you put your child restraint in the rear seat unless the child is an infant and you're the only adult in the vehicle. In that case, you might want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

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

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.

Top Strap

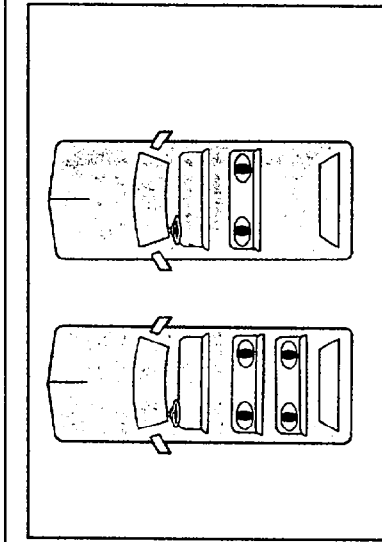


AN155001

If your child restraint has a top strap, it should be anchored. If you need to have an anchor installed, you can ask your GM dealer to put it in for you. If you want to install an anchor yourself, your dealer can tell you how to do it.

1-36

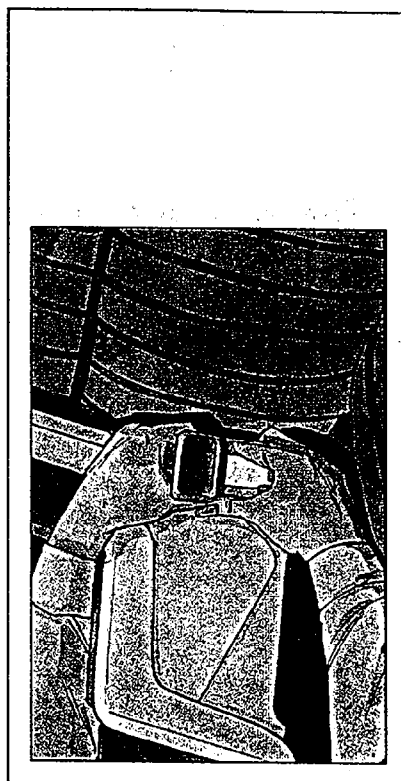
Securing a Child Restraint in a Rear Outside Position



K2432

You'll be using the lap-shoulder 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.



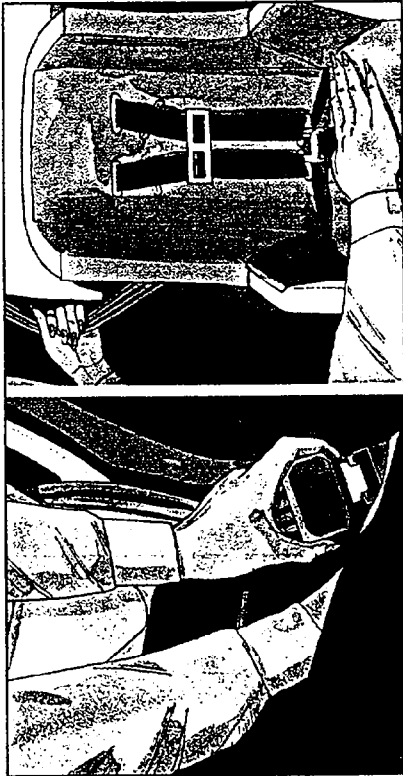
AN160147

3. Pull out the vehicle's safety belt. Make the belt as long as possible by tilting the latch plate and pulling it along the belt.

1-37

Seats & Safety Belts

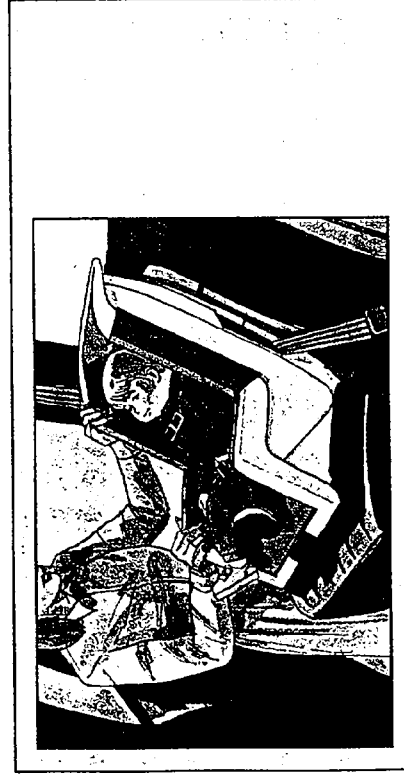
4. Run the lap part through or around the restraint. The child restraint instructions will show you how. See if the shoulder belt would go in front of the child's face or neck. If so, put it behind the child restraint.



AN160052

AN160135

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 up on the shoulder belt while you push down on the child restraint.

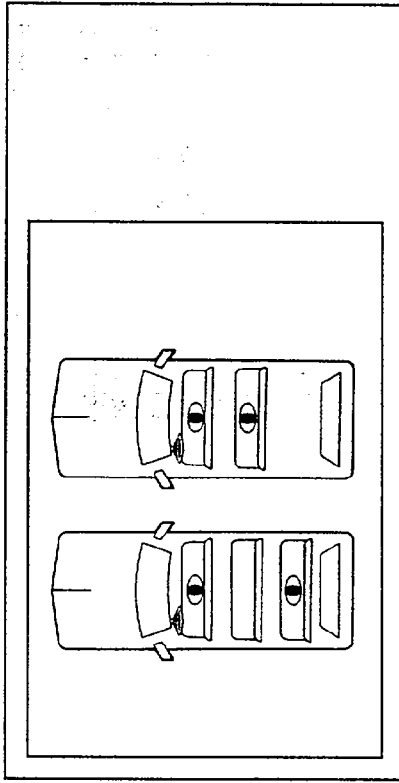


AN160057

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

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

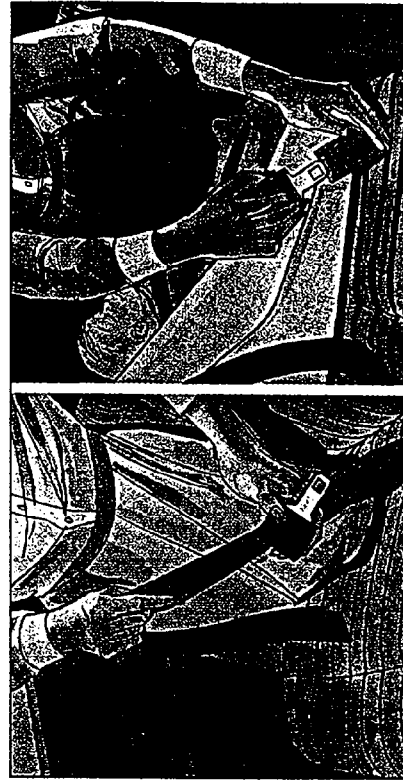
Securing a Child Restraint in the Center Seat Position (Except Wagon Models Second Seat)



K2436

When you secure a child restraint in a center seating position, except in the second seat of a Wagon model, you'll be using the lap belt. See the earlier part about the top strap if the child restraint has one.

1. Make the belt as long as possible by tilting the latch plate and pulling it along the belt.



AN163023

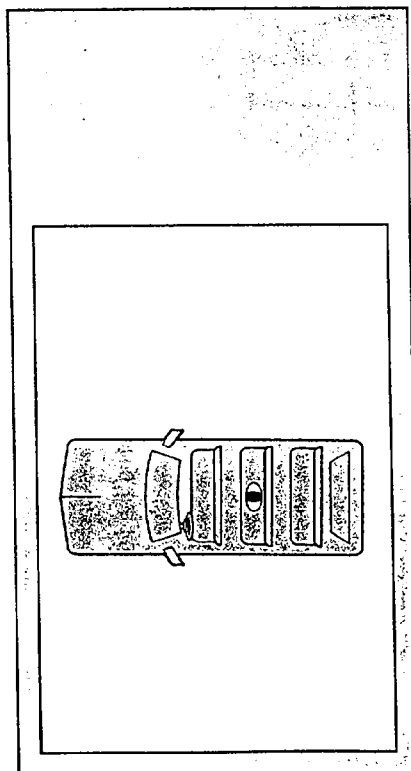
AN163030

Seats & Safety Belts

2. Put the restraint on the seat. Follow the instructions for the child restraint.
3. Secure the child in the child restraint as the instructions say.
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.

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.

Securing a Child Restraint in the Center Seat Position (Wagon Models Second Seat)



You'll be using the lap belt. See the earlier part 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. Pull the lap belt all the way out without stopping.
4. While holding it out, run the belt through or around the child restraint. The child restraint instructions will show you how.



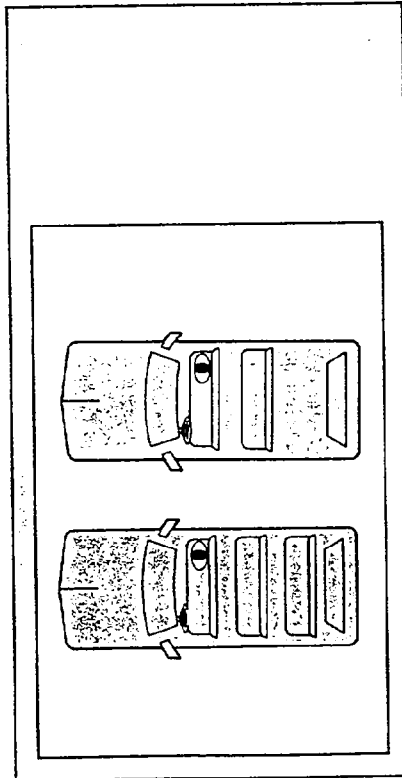
5. Buckle the belt. Make sure the release button faces upward or outward, so you'll be able to unbuckle it quickly if you ever need to.

Seats & Safety Belts

6. Pull the rest of the belt all the way out of the retractor to set the lock.
7. To tighten the belt, feed it back into the retractor while you push down on the child restraint.
8. Push and pull the child restraint in different directions to be sure it is secure.

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

Securing a Child Restraint in the Right Front Seat



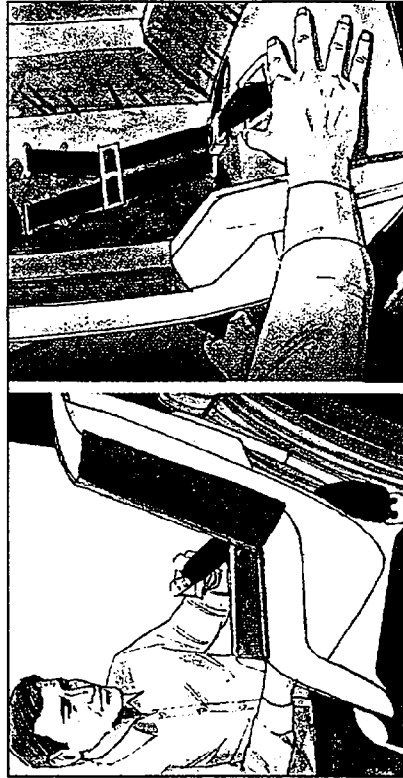
You'll be using the lap-shoulder belt. See the earlier part about the top strap if the child restraint has one.

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. 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.



AN165013

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. Pull the rest of the belt all the way out of the lap retractor to set the lock.



AN165015

6. To tighten the belt, feed the lap belt back into the retractor while you push down on the child restraint.

Seats & Safety Belts

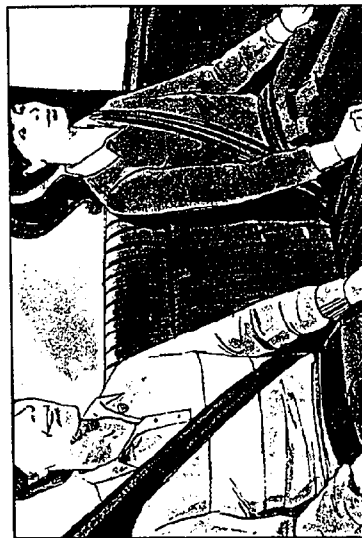


AM165016

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

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

Larger Children



AM170057

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.



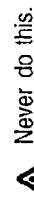
AM170060

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



AM170058

CAUTION



Never do this.

Here two children are wearing the same belt. The belt can't properly spread the impact forces. In a crash, the two children can be crushed together and seriously injured. A belt must be used by only one person at a time.

Seats & Safety Belts

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 a seat that has a lap belt, if your vehicle has one.



AM170054

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 and on the hips, just touching the child's thighs. This applies belt force to the child's pelvic bones in a crash.

Safety Belt Extender

If the vehicle's safety belt will fasten around you, you should use it. 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

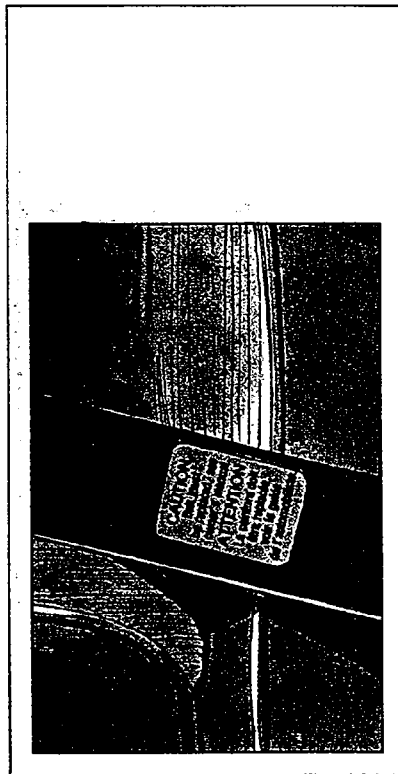
Now and then, make sure all your belts, buckles, latch plates, retractors, anchorages and reminder systems are working properly. Look for any loose parts or damage. If you see anything that might keep a restraint system from doing its job, have it repaired.

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 you ever see a label on a right front safety belt that says to replace the belt, be sure to do so. Then it will be there to help protect you in an accident. You would see this label on the belt near the door opening.

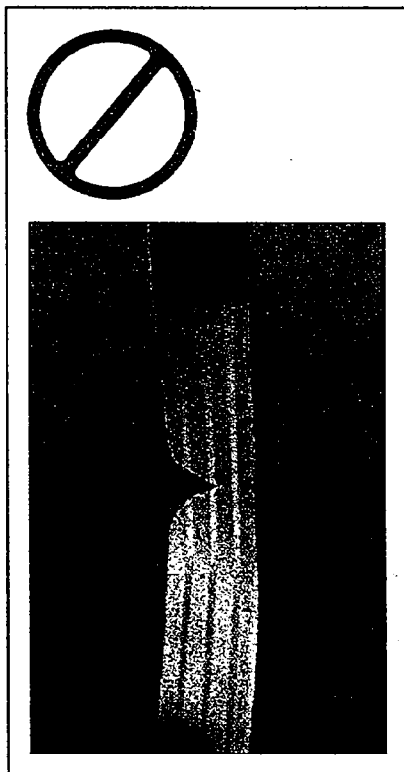


AM177601

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.

Seats & Safety Belts

Q: What's wrong with this?



AP125004

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.

Before replacing any safety belt, see your dealer for the correct part number. You'll need the model year and model number for your vehicle. The model year is on your title and registration. And you can find the model number on the certification/fire label of your vehicle.



K2447

The model number on the replacement belt must be listed on the safety belt you want to replace.