

REPORT NO. TRC-91-N04

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

GENERAL MOTORS CORPORATION
1992 CHEVROLET ASTRO VAN
NHTSA NO. MN0107
TRC TEST NO. 920102

PREPARED BY:
THE TRANSPORTATION RESEARCH CENTER OF OHIO
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EAST LIBERTY, OHIO 43319



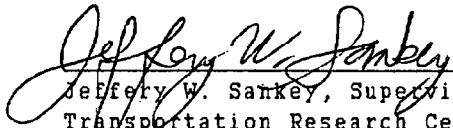
JANUARY 27, 1992

FINAL REPORT

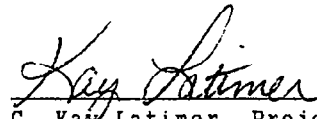
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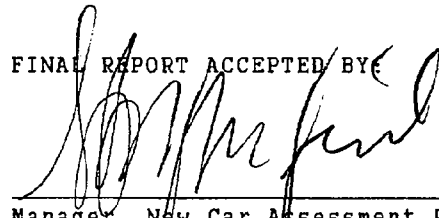
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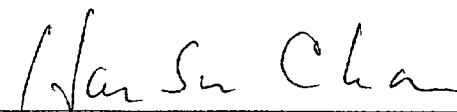
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16. Abstract A 35 mph frontal load cell barrier impact test was conducted on a 1992 Chevrolet Astro Van, NHTSA No. MN0107, at the Transportation Research Center of Ohio on January 2, 1992. This test was conducted to obtain new car assessment and research data indicant of FMVSS No. 208 performance. The barrier impact velocity was 35.0 mph. The vehicle's maximum crush was 21.9 inches. The ambient temperature was 68° F. The driver's head injury criteria (HIC) was 2065. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 61.0 g. The driver's chest maximum deflection was 2.1 inches. The driver's left and right femur maximum axial forces were 1752 pounds and 1046 pounds, respectively. The passenger's head injury criteria (HIC) was 1815. The passenger's chest maximum resultant accceleration with three (3) milliseconds minimum duration was 68.4 g. The passenger's chest maximum deflection was 1.8 inches. The passenger's left and right femur maximum axial forces were 3750 pounds and 698 pounds, respectively. (See DATA ACQUISITION EXPLANATIONS.)					
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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	0.96	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)

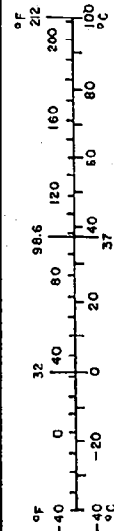
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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Approximate Conversions from Metric Measures

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	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
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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*1 in. = 2.54 (exact). For other exact conversions and more detailed tables, see NBS Misc. Publ. 200, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10-286.

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SECTION 1.0

PURPOSE AND TEST PROCEDURE

PURPOSE

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

The purpose of this test was to obtain new car assessment and research data for vehicle crashworthiness and occupant restraint system performance for the subject vehicle, a 1992 Chevrolet Astro van, NHTSA No. MN0107, at an impact speed in excess of the current 30 mph FMVSS 208 requirements.

TEST PROCEDURE

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

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

The test vehicle contained two (2) Part 572 E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedures specified in Appendices VII and VIII of the Laboratory Indicant Test 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 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 January 2, 1992.

The test vehicle, a 1992 Chevrolet Astro van, NHTSA No. MN0107, was equipped with a 4.3 liter longitudinal engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 4595 pounds. The vehicle's impact speed was 35.0 mph. The vehicle sustained 21.9 inches of static crush during the impact.

The driver's head injury criteria (HIC) was 2065. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 61.0 g. The driver's chest maximum deflection was 2.1 inches. The driver's left and right femur maximum axial forces were 1752 pounds and 1046 pounds, respectively.

The passenger's HIC was 1815. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 68.4 g. The passenger's chest maximum deflection was 1.8 inches. The passenger's left and right femur maximum axial forces were 3750 pounds and 698 pounds, respectively. (See DATA ACQUISITION EXPLANATIONS.)

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

DATA ACQUISITION EXPLANATIONS

The right front passenger's chest X, Y, and Z-axis accelerometers, CSTXG2, CSTYG2, and CSTZG2; recorded spikes at 93 milliseconds. The right front passenger's chest resultant acceleration calculation, CSTRG2, was affected by these spikes only after the primary impact event. The right front passenger's chest resultant acceleration with three (3) milliseconds minimum duration calculation was not affected by these spikes.

The right front passenger's left femur force load cell, LFMF2, data exceeded the full scale of the transducer from 63 to 71 milliseconds.

The right front passenger's seat belt extension potentiometer, SBED2, recorded questionable data after 220 milliseconds.

The left brake caliper X-axis accelerometer, BCLXG, lost data after 48 milliseconds due to the vehicle's crush destroying the accelerometer.

The load cell barrier position B7 force load cell, BB7F, did not return to zero following the crash test event. The load cell barrier group #3 total and total force calculations, LCBG3F, and LCBGT, were affected by this data.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: MN0107 TEST TYPE: Frontal Load Cell Barrier

TEST DATE: 01/02/92 TEST TIME: 1526 AMBIENT TEMP. (°F): 68

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1992/Chevrolet/Astro/Van

VEHICLE TEST WEIGHT (LBS): 4595

IMPACT ANGLE (DEG)*: 0

IMPACT VELOCITY (MPH)**: PRIMARY = 35.0 SECONDARY = 35.2

MAXIMUM STATIC CRUSH (IN): 21.9

AVERAGE REBOUND (IN): 18.5

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

NUMBER OF DATA CHANNELS: 47

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

*With respect to tow track centerline.

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

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: General Motors Corporation

MAKE/MODEL: Chevrolet/Astro

VIN: 1GNDM15Z0NB115557

BODY STYLE: Van

MODEL YEAR: 1992

NHTSA NO.: MN0107

COLOR: Red

ENGINE DATA: TYPE: Longitudinal CYLINDERS: 6 DISPLACEMENT: 4.3 liter

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

DATE VEHICLE RECEIVED: 12/23/91

ODOMETER READING: 331.0

DEALER'S NAME AND ADDRESS: Monty Zinn Chevrolet/Hyundai
Springfield, OH

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	Yes
POWER SEATS	No	TILTING STEERING WHEEL	Yes
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	Yes
RADIO	Yes	ANTI-SKID BRAKE	Yes
CLOCK	Yes	REAR WINDOW DEFROSTER	No
OTHER	Two-tone paint		
	Chromed bumpers		
	3.42 ratio rear axle		
	Preferred equipment group ASA2		

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: 10/91 VIN: 1GNDM15Z0NB115557

GVWR: 5700 LBS

GAWR: FRONT: 2800 LBS., REAR: 2900 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Uniroyal Tiger Paw XTM P205/75R15

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 35 PSI
REAR: 35 PSI

SPARE TIRE (MFR., LINE, SIZE): T145/80D16

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Non-adjustable

MAXIMUM WIDTH: 77.4 INCHES

WHEELBASE: 111.0 INCHES

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: P205/75R15

RECOMMENDED COLD TIRE PRESSURE: FRONT: 35 PSI; REAR: 35 PSI

DESIGNATED SEATING CAPACITY: NA FRONT NA REAR NA TOTAL *

VEHICLE CAPACITY WEIGHT: NA LBS. *

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 29.4; RF 29.2; LR 31.4; RR 31.4

PRE-TEST ATTITUDE: LF 28.8; RF 28.8; LR 30.3; RR 31.2

POST-TEST ATTITUDE: LF 28.4; RF 34.5; LR 27.6; RR 32.1

*The vehicle did not contain a label stating capacity data.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	1137 LBS.	RIGHT REAR	830 LBS.
LEFT FRONT	1154 LBS.	LEFT REAR	850 LBS.
TOTAL FRONT WEIGHT	2291 LBS.	(57.7% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1680 LBS.	(42.3% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 3971 LBS.			

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (3971 LBS)

VCW = VEHICLE CAPACITY WEIGHT (NA LBS) *

DSC = DESIGNATED SEATING CAPACITY (NA) *

$RCLW* = VCW - 150 (DSC) = 300 \text{ LBS} *$

TARGET TEST WEIGHT = $UDW + RCLW* + (\text{NO. OF HYBRID III DUMMIES} \times 167 \text{ LBS/DUMMY})$

TARGET TEST WEIGHT = $3971 + 300 + 334$

TARGET TEST WEIGHT = 4605 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 290 LBS. OF CARGO WEIGHT:

RIGHT FRONT	1214 LBS.	RIGHT REAR	1060 LBS.
LEFT FRONT	1240 LBS.	LEFT REAR	1081 LBS.
TOTAL FRONT WEIGHT	2454 LBS.	(53.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	2141 LBS.	(46.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	4595 LBS.	(0.2% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 25 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 51.7 INCHES REARWARD OF FRONT WHEEL CENTERLINE

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

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 920102 NHTSA NO.: MN0107
TEST DATE: 01/02/92 TEST TIME: 1526
TEST TYPE: Frontal load cell barrier IMPACT ANGLE: 0°
AMBIENT TEMPERATURE AT IMPACT AREA: 68° F
TEMPERATURE IN OCCUPANT COMPARTMENT: 70° F
IMPACT VELOCITY: PRIMARY = 35.0 MPH SECONDARY = 35.2 MPH

(SPECIFIED RANGE = 34.5 TO 35.5 MPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 26.0 IN.

EXITING VELOCITY TRAP = 2.0 IN.

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

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 173.1; C 178.1; R 173.1

POST-TEST: L 154.9; C 156.2; R 156.0

TOTAL CRUSH: L 18.2; C 21.9; R 17.1

AVERAGE CRUSH: 19.1

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

DISTANCE FROM TEST VEHICLE TO BARRIER: L 21.8; C 17.8; R 15.8; AVG. 18.5

TABLE 4 FUEL SYSTEM DATA

MAKE/MODEL: Chevrolet/Astro

NHTSA NO.: MNO107

FUEL SYSTEM CAPACITY: 27.0 GALLONS (FROM OWNER'S MANUAL)

USABLE CAPACITY: 26.7 GALLONS (FURNISHED BY COTR)

TEST VOLUME RANGE: 24.6 GALLONS TO 25.1 GALLONS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 24.8 GALLONS (WITH ENTIRE FUEL SYSTEM FILLED)

TEST FLUID TYPE: STODDARD SOLVENT

SPECIFIC GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

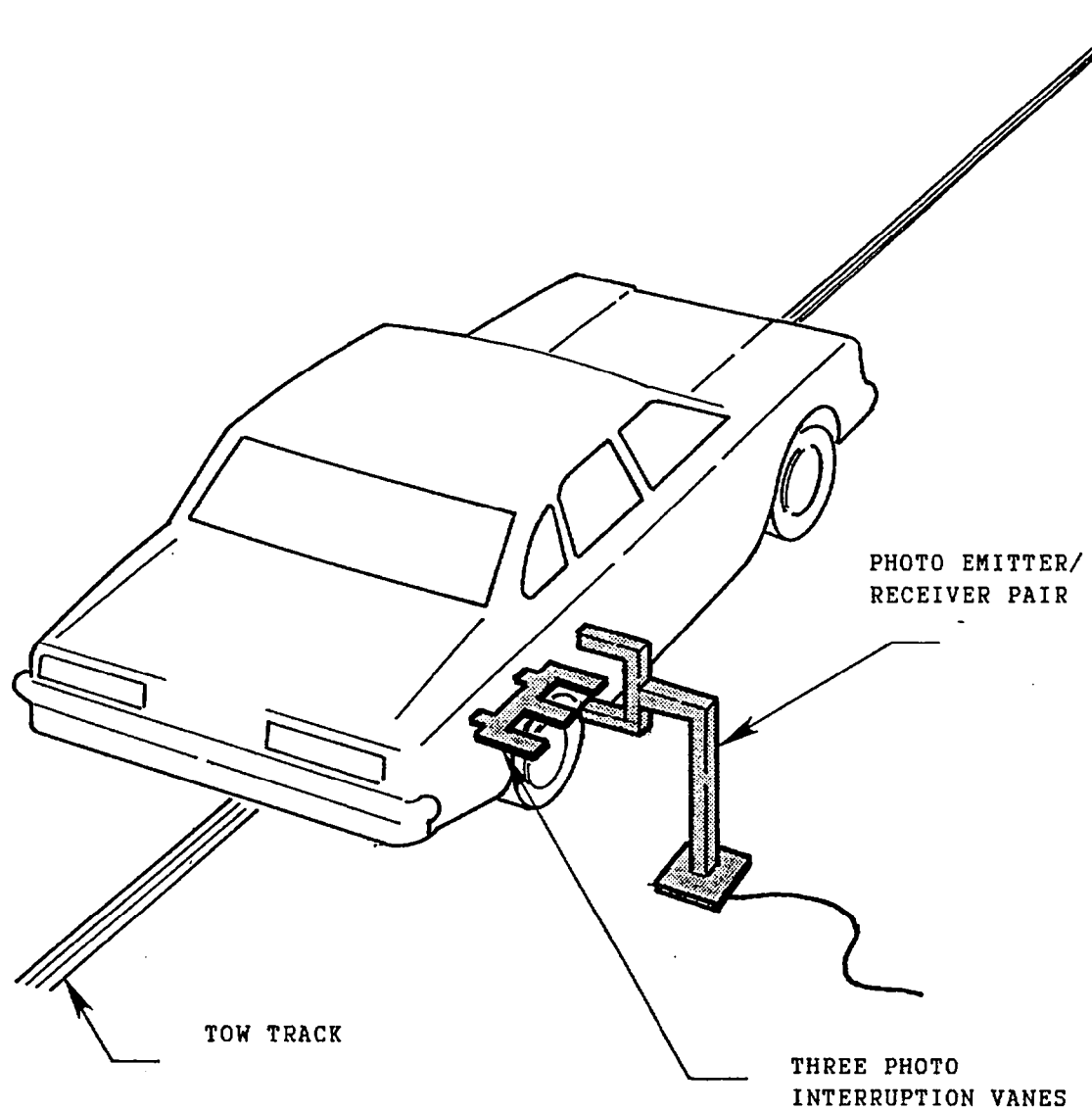
TEST FLUID COLOR: PURPLE

DETAILS OF FUEL SYSTEM: The fuel tank was located on the left side in front of 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 two inches before impact.

The vanes have one foot spacing.

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

VEHICLE MAKE/MODEL/BODY STYLE: Chevrolet/Astro/Van

VEHICLE NHTSA NO.: MN0107; VIN: 1GNDM15Z0NB115557

MODEL YEAR: 1992; BUILD DATE: 10/91; TEST DATE: 01/02/92

VEHICLE SIZE CATEGORY: Van; TEST WEIGHT: 4595 LBS.

VEHICLE WHEELBASE: 111.0 INCHES

MAXIMUM WIDTH: 77.4 INCHES

FRONT OVERHANG: 43.3 INCHES

COLLISION DEFORMATION
CLASSIFICATION (CDC) CODE: 12FDEW4

CRUSH DEPTH
MEASUREMENTS:

C1 = 18.2 INCHES

C2 = 21.1 INCHES

C3 = 21.6 INCHES

C4 = 21.4 INCHES

C5 = 20.0 INCHES

C6 = 17.1 INCHES

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE
(LONGITUDINAL)

LENGTH OF DAMAGED
REGION: L = 65.8 INCHES

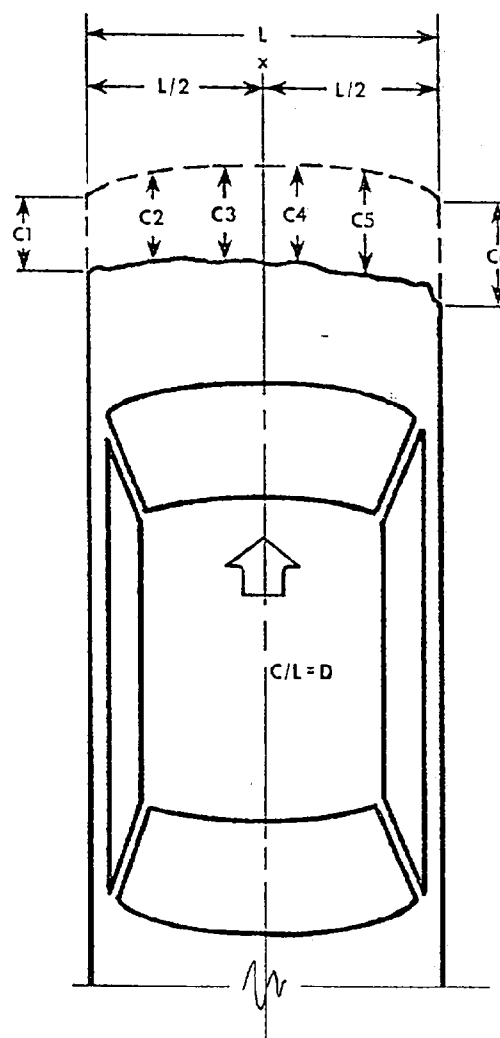


FIGURE 3
VEHICLE ACCELEROMETER PLACEMENT

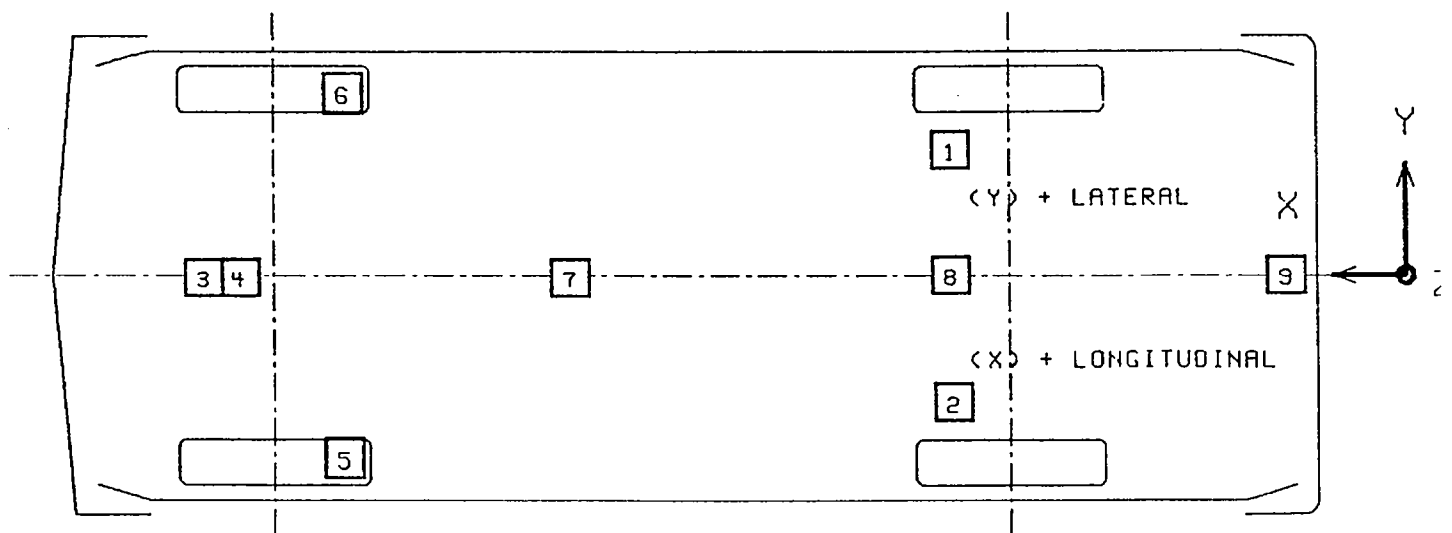
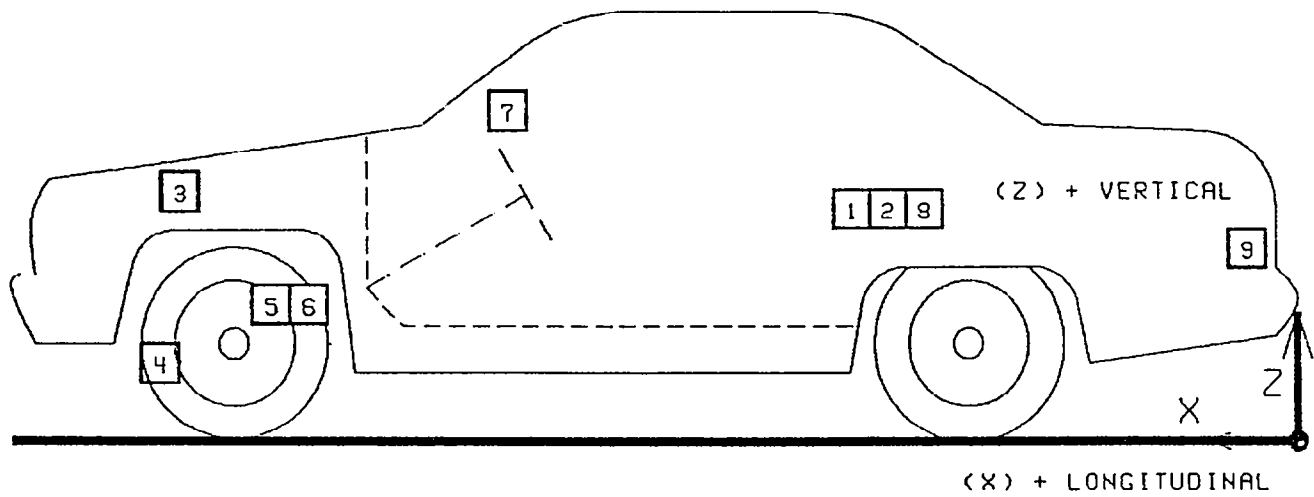


TABLE 5

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920102

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G	MSEC	MAX G	MSEC
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	111.5	21.8	22.3	5.8	103.8	49.5	40.5
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	110.6	-25.4	23.2	4.9	104.8	47.5	54.9
3	ENGINE TOP LONGITUDINAL	47.8	5.2	32.0	13.3	56.1	111.5	40.3
4	ENGINE BOTTOM LONGITUDINAL	41.6	5.8	12.8	6.7	55.3	93.1	39.4
5	RIGHT BRAKE CALIPER LONGITUDINAL	36.8	-25.4	14.3	37.3	114.5	77.3	8.4
6	LEFT BRAKE CALIPER LONGITUDINAL	36.8	25.4	14.3	---	---Y	---	---Y
7	INSTRUMENT PANEL CENTER LONGITUDINAL	39.6	3.2	52.0	17.7	53.3	64.9	33.1
8	REAR SEAT CROSSMEMBER CENTER VERTICAL	109.1	-2.5	22.8	12.4	66.4	16.8	75.8
9	VEHICLE REAR CENTER VERTICAL	171.3	0.0	22.0	20.7	56.1	9.8	75.4

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

REFERENCE: X: + REARWARD FROM FRONT BUMPER
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 #142	PASSENGER #192
HEAD	<u>Steering wheel hub</u>	<u>Instrument panel</u>
	<u>Lower</u>	
CHEST	<u>Steering wheel rim</u>	<u>None</u>
ABDOMEN	<u>None</u>	<u>None</u>
LEFT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>
RIGHT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>Torch and</u> <u>tools required</u>	<u>Easy</u>
REAR	<u>NA</u>	<u>Easy</u>

SEAT MOVEMENT:

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

GLAZING DAMAGE:

The entire windshield was cracked upon impact.

OTHER NOTABLE IMPACT EFFECTS:

The left front tire was flattened upon impact.

The right doors unlatched upon impact.

TABLE 7 FMVSS 208 DATA SUMMARY

VEH. YR./MAKE/MODEL/BODY STYLE: 1992/Chevrolet/Astro/Van

VEH. NHTSA NO.: MN0107; TEST DATE: 01/02/92

	DRIVER DUMMY #142	PASSENGER DUMMY #192
<u>MAXIMUM ACCELERATIONS (G):</u>		
HEAD X-AXIS	-174.4	-70.2
HEAD Y-AXIS	-12.1	15.3
HEAD Z-AXIS	-41.1	-90.3
HEAD RESULTANT	174.6	96.4
CHEST X-AXIS	-66.3	-68.4 Y
CHEST Y-AXIS	8.6	-9.4 Y
CHEST Z-AXIS	-16.0	-12.3 Y
CHEST RESULTANT*	61.0	68.4
CHEST RESULTANT TIME INTERVAL (SEC.)*	.003	.003

HEAD INJURY CRITERIA (HIC) VALUES:

HIC**	2065	1815
HIC STARTING TIME (SEC.)	70.2	70.5
HIC ENDING TIME (SEC.)	79.1	106.5
AVG. HEAD RESULTANT ACCEL. DURING HIC TIME INTERVAL (G)	139.4	76.0

MAXIMUM CHEST DEFLECTIONS (IN):

CHEST X-AXIS	2.1	1.8
MAXIMUM CHEST DEFLECTION TIME (SEC.)	.085	.084

MAXIMUM COMPRESSIVE FEMUR FORCES (LBS):

LEFT FEMUR	1752	3750 Y
RIGHT FEMUR	1046	698

MAXIMUM SEAT BELT FORCES (LBS):

LAP BELT	1119	2151
SHOULDER BELT	2014	2363

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.

Y See DATA ACQUISITION EXPLANATIONS

TABLE 8 HYBRID III NECK DATA SUMMARY

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1992/Chevrolet/Astro/Van

VEHICLE NHTSA NO.: MN0107; TEST DATE: 01/02/92

<u>MAXIMUM VALUES:</u>	<u>DRIVER DUMMY #142</u>	<u>PASSENGER DUMMY #192</u>
NECK X-AXIS FORCE (LBS.)	-423	442
NECK Y-AXIS FORCE (LBS.)	-111	45
NECK Z-AXIS FORCE (LBS.)	1125	849
NECK MOMENT ABOUT X AXIS (IN.-LBS.)	-178	-120
NECK MOMENT ABOUT Y AXIS (IN.-LBS.)	1200	1016
NECK MOMENT ABOUT Z AXIS (IN.-LBS.)	-125	81

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

DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head impacted the steering wheel's hub and the dummy's chest impacted the steering wheel's lower rim as the dummy was restrained by the three-point unbelt. The dummy's head rotated forward and then rearward as the dummy rebounded into the seat back. The dummy came to rest seated in the driver's seat, restrained by the three-point 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 forward and impacted the instrument panel as the dummy's torso was restrained by the three-point unbelt. The dummy's head rotated rearward as the dummy rebounded into the seat back. The dummy came to rest in the right front passenger's seat, restrained by the three-point unbelt.

TABLE 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

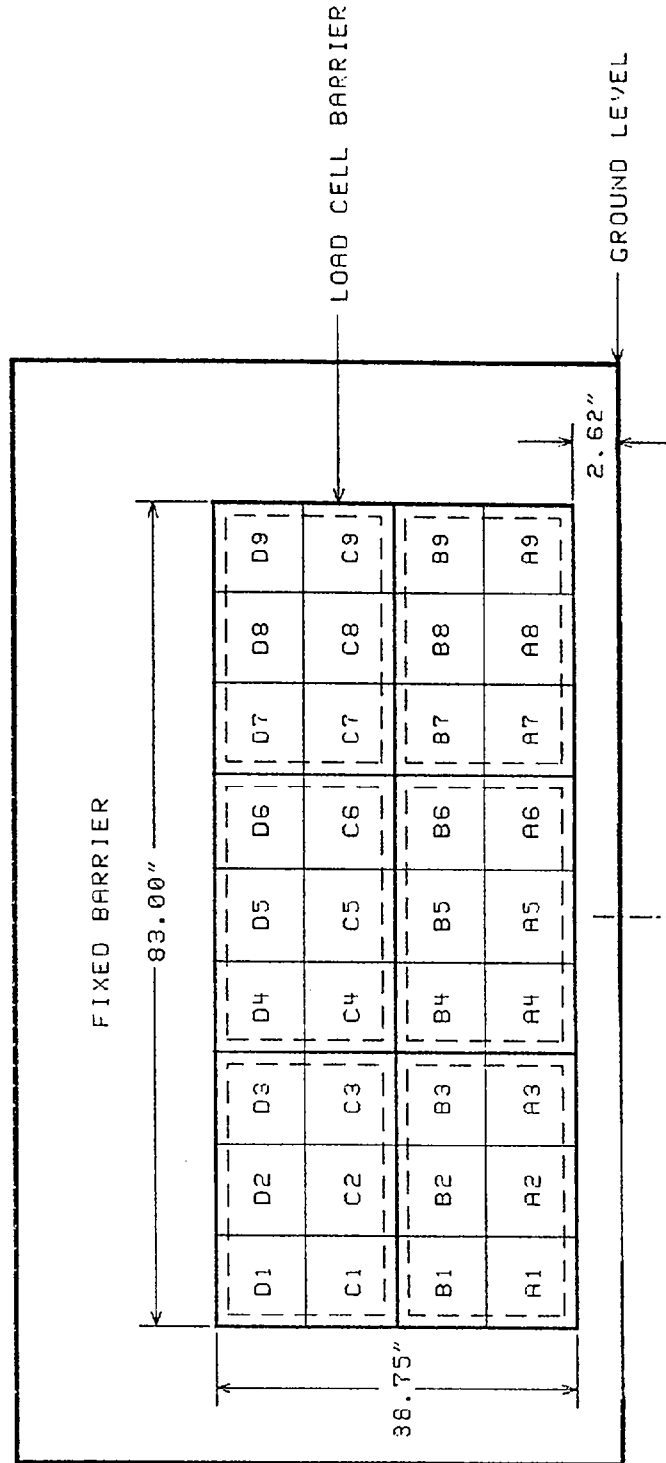
	DRIVER	PASSENGER
<u>BELT LENGTH DATA:</u>		
BELT LENGTH FROM TRIM PANEL EXIT TO BOLT HOLE ANCHOR POINT FOR CONTINUOUS WEBBING SYSTEMS.	111.0	110.5
SHOULDER BELT LENGTH AS MEASURED ON PART 572 DUMMY.	39.2	36.0
LAP BELT LENGTH AS MEASURED ON PART 572 DUMMY.	38.9	36.8
<u>SHOULDER BELT SPOOL-OFF LENGTH:</u>		
AS DETERMINED BY FILM ANALYSIS	2.4	2.3
AS DETERMINED MECHANICALLY	1.7	2.2
AS DETERMINED ELECTRONICALLY	6.5	3.6
<u>BELT STRETCH LENGTH (IN/FT):</u>		
AS MEASURED MECHANICALLY	0.0	0.0
AS MEASURED ELECTRONICALLY	0.4	0.4Y
<u>RETRACTOR LOCK-UP TIME (MS):</u>		
AS DETERMINED BY SHOULDER BELT SPOOL-OFF	84	76

ALL MEASUREMENTS ARE IN INCHES UNLESS OTHERWISE NOTED.
YSee 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 920102

LOCATION	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	LB	MSEC	LB	MSEC
TOTAL GROUP 1	528	255.8	31877	15.6
TOTAL GROUP 2	474	191.6	54894	42.8
TOTAL GROUP 3	832	328.8 Y	35821	13.4Y
TOTAL GROUP 4	287	202.5	21616	30.1
TOTAL GROUP 5	275	150.9	52836	40.5
TOTAL GROUP 6	404	318.5	15675	57.5
TOTAL LOAD CELL FORCE	2243	256.1 Y	172905	40.9Y

TENSION IS POSITIVE
COMPRESSION IS NEGATIVE

Y See DATA ACQUISITION EXPLANATIONS

SECTION 3.0

OCCUPANT, CAMERA, & VEHICLE MEASUREMENTS

FIGURE 5 DUMMY AND SEAT POSITIONING DATA

TEST NO.: 920102; VEHICLE: Chevrolet Astro

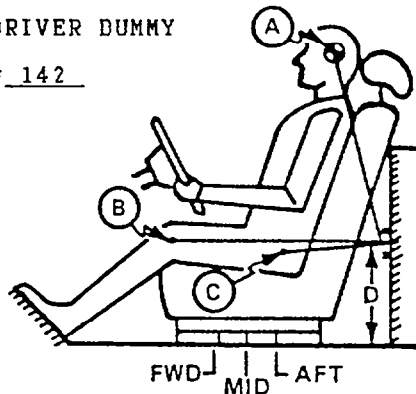
SEAT TYPE: BENCH ADJUSTER TYPE: X MANUAL X NON-ADJUSTABLE

 X BUCKET POWER ADJUSTABLE RECLINING

 SPLIT BENCH

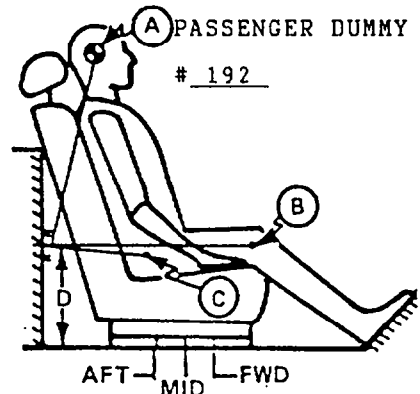
DRIVER DUMMY

142



MEASUREMENT
LOCATION

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



PASSENGER DUMMY

192

A = 23.6 IN. 20 DEGREES

B = 29.5 IN. 90 DEGREES

C = 14.0 IN. 105 DEGREES

D = 24.0 IN.

A = 22.6 IN. 13 DEGREES

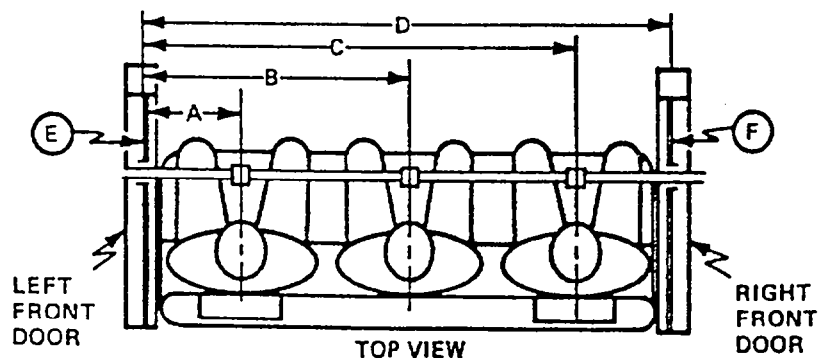
B = 26.6 IN. 83 DEGREES

C = 12.6 IN. 104 DEGREES

D = 24.0 IN.

SEAT TRACK REARWARD: 6 NOTCHES

SEAT TRACK REARWARD: 4 NOTCHES



A = LEFT DOOR TO DRIVER CENTERLINE 13.8 IN.

B = LEFT DOOR TO CENTER PASSENGER CENTERLINE NA IN.

C = LEFT DOOR TO RIGHT PASSENGER CENTERLINE 49.5 IN.

D = LEFT DOOR TO RIGHT DOOR 63.2 IN.

E, F = WINDOW GLASS HEIGHT (RIGHT AND LEFT MUST BE EQUAL) 13.9 IN.

ALL ANGLES ARE RELATIVE TO VERTICAL PLANE THROUGH DOOR STRIKER.

FIGURE 6 DUMMY IN-VEHICLE POSITIONING DATA

	DRIVER	PASSENGER
HH	17.3	20.0
HW	22.9	24.5
CD	20.2	20.1
CS	10.3	NA
KDL	4.0	4.3
KDR	4.1	4.4
TA	14°	17°
SA	23°	23°
HSW	15.2	NA

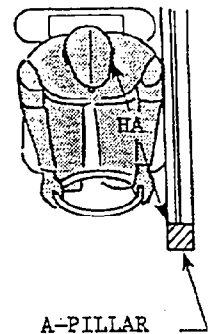
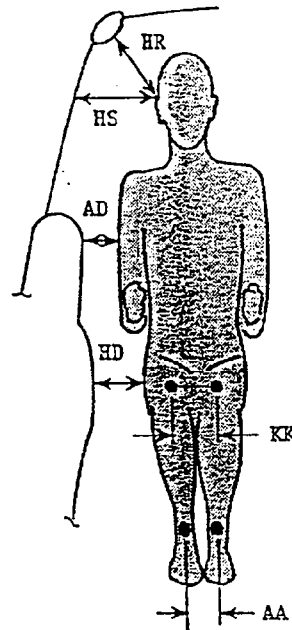
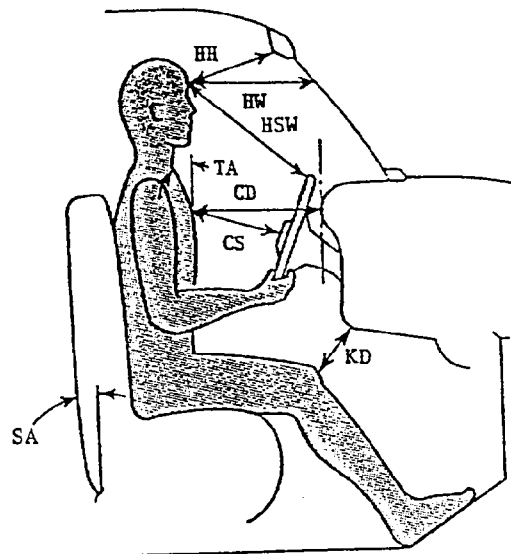
	DRIVER	PASSENGER
HR	8.4	9.0
HS	10.8	11.1
AD	4.8	5.2
HD	6.2	6.2
KK	8.0	7.8
AA	7.0	4.0
HA	21.2	22.7

KNEE OUTER CLEVIS TO OUTER CLEVIS SPACING:

DRIVER = 10.6
PASSENGER = 10.6

PELVIS ANGLE:

DRIVER = 20°
PASSENGER = 24°

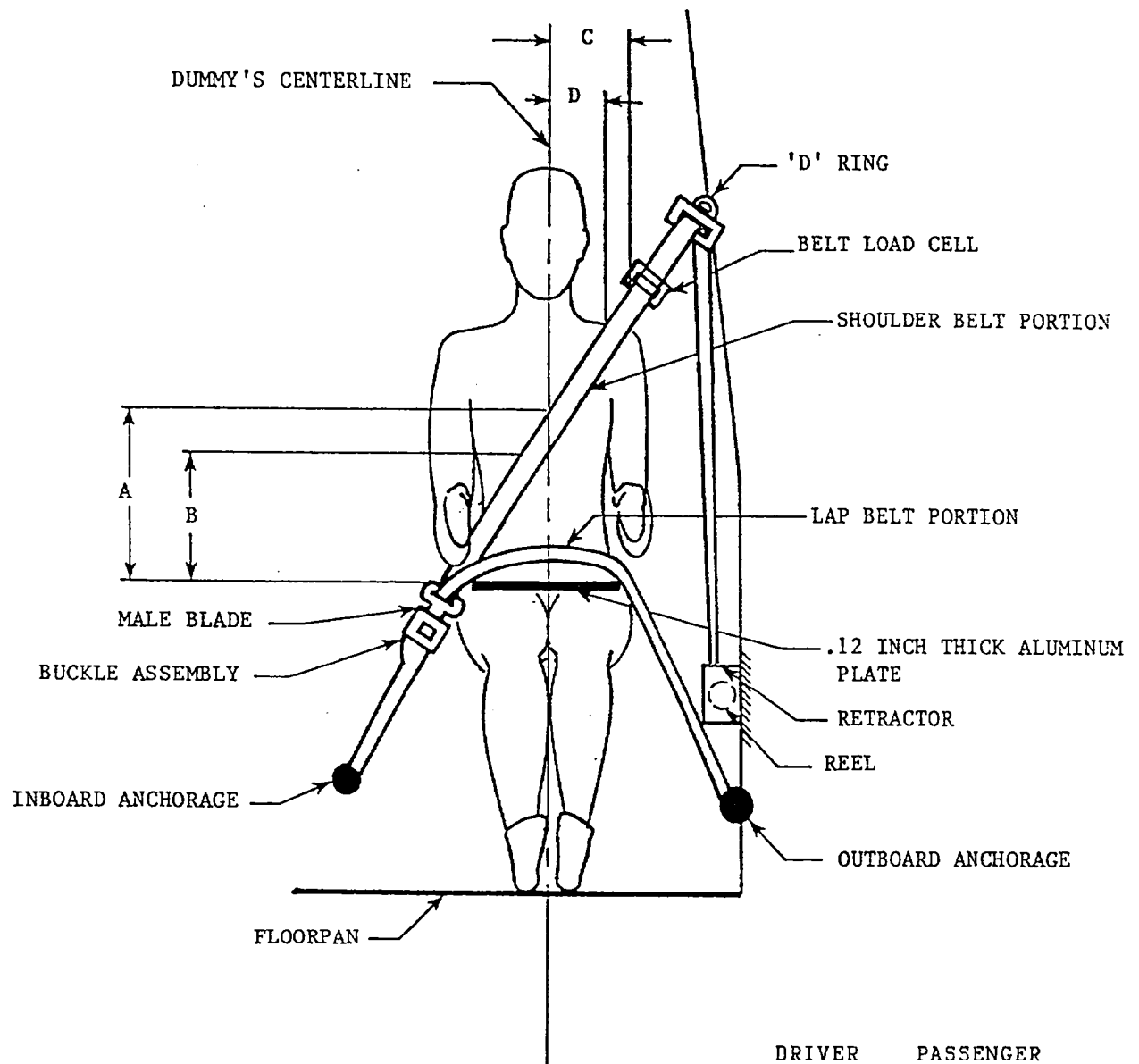


HH = HEAD TO WINDSHIELD HEADER
HW = HEAD TO WINDSHIELD
CD = CHEST TO DASH
CS = CHEST TO STEERING WHEEL
KD = KNEE TO DASH
TA = TORSO ANGLE
SA = SEAT BACK ANGLE
HSW = HEAD TO STEERING WHEEL

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

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

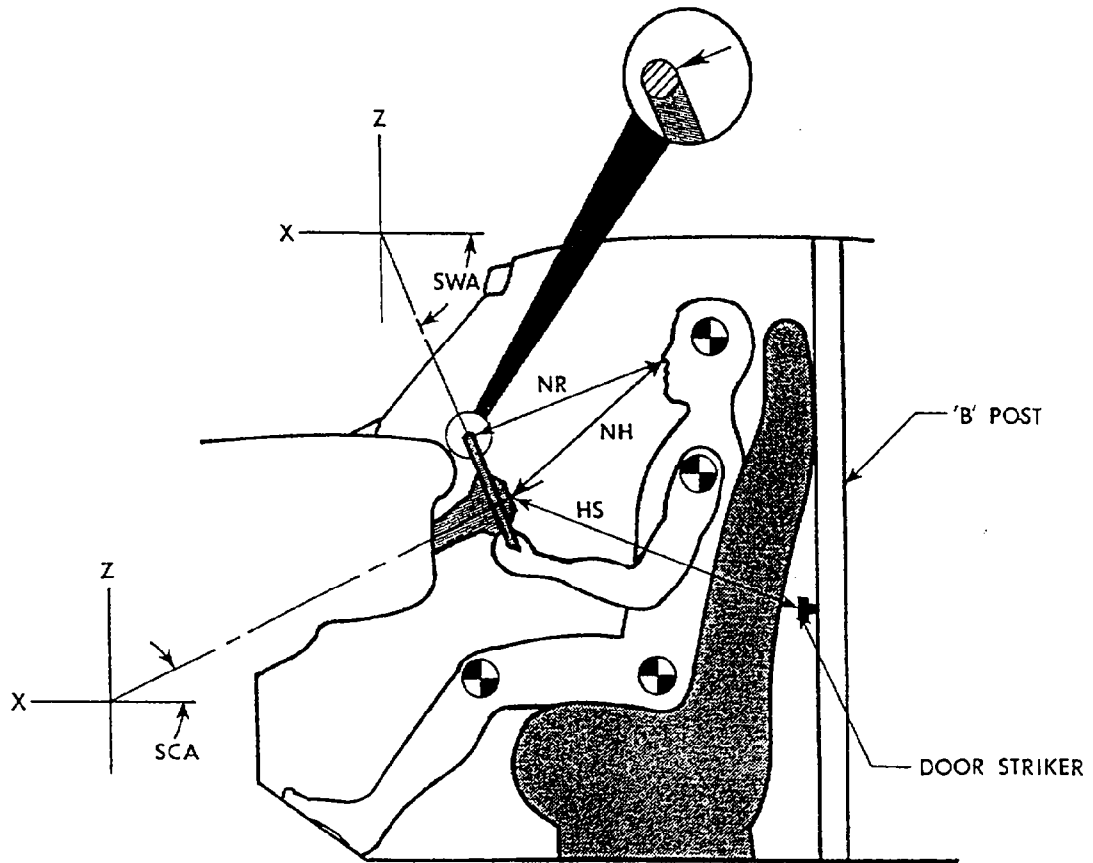
FIGURE 7 SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	15.2	13.4
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	11.9	11.5
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	4.4	4.6
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	2.0	2.2
LAP BELT TENSION (LBS)	4	4
SHOULDER BELT TENSION (LBS)	4	4

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 8 DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY DATA



POSITION OF STEERING COLUMN TILTING AND TELESCOPING ADJUSTMENTS, IF ANY:
The steering column was latched in the third latch position from the top.

MEASUREMENTS

NR	- DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	13.8
NH	- DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	15.2
HS	- DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	26.5
SCA	- ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	22°
SWA	- ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	67°

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 9
CAMERA POSITIONS

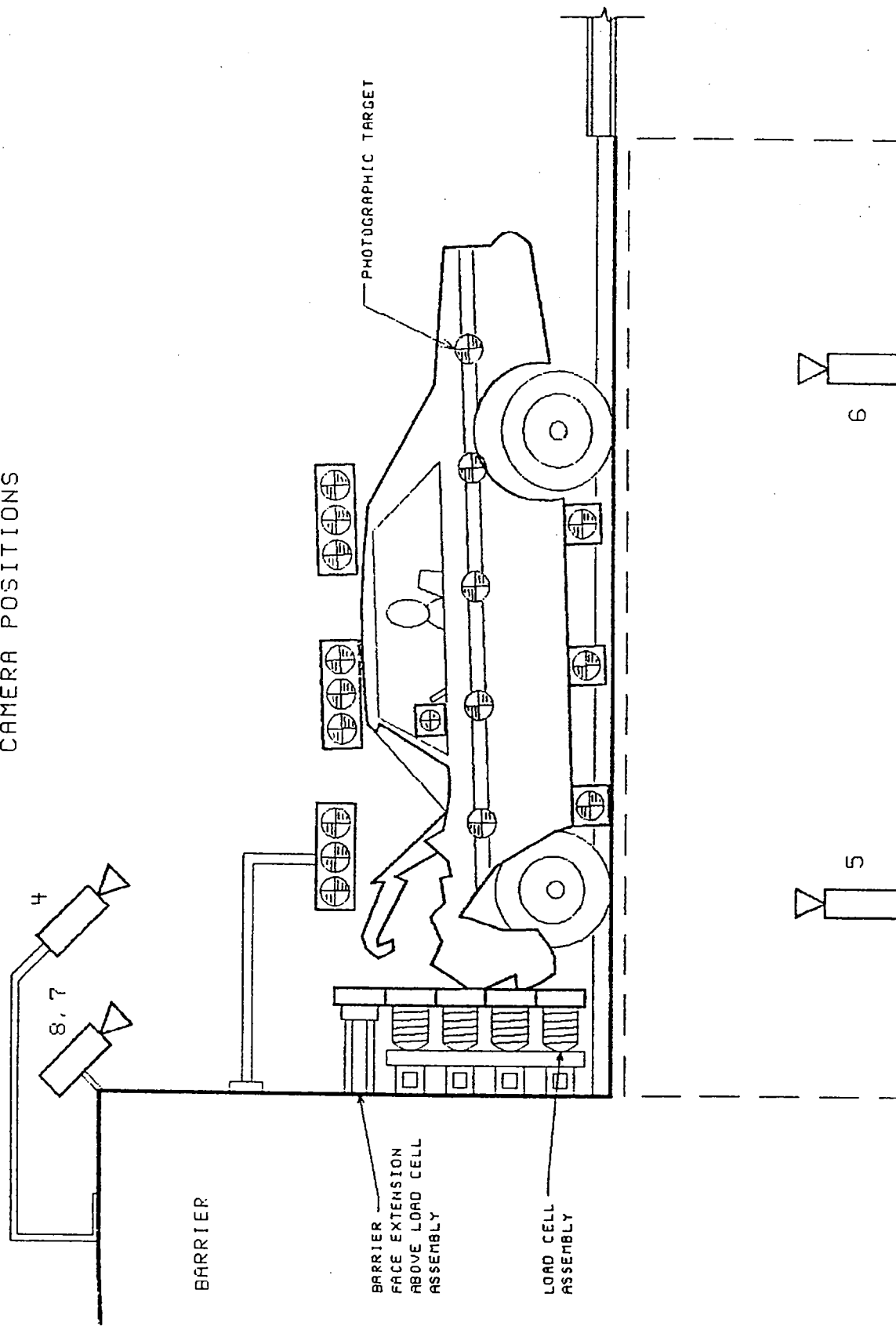


FIGURE 9
CAMERA POSITIONS, CONTINUED

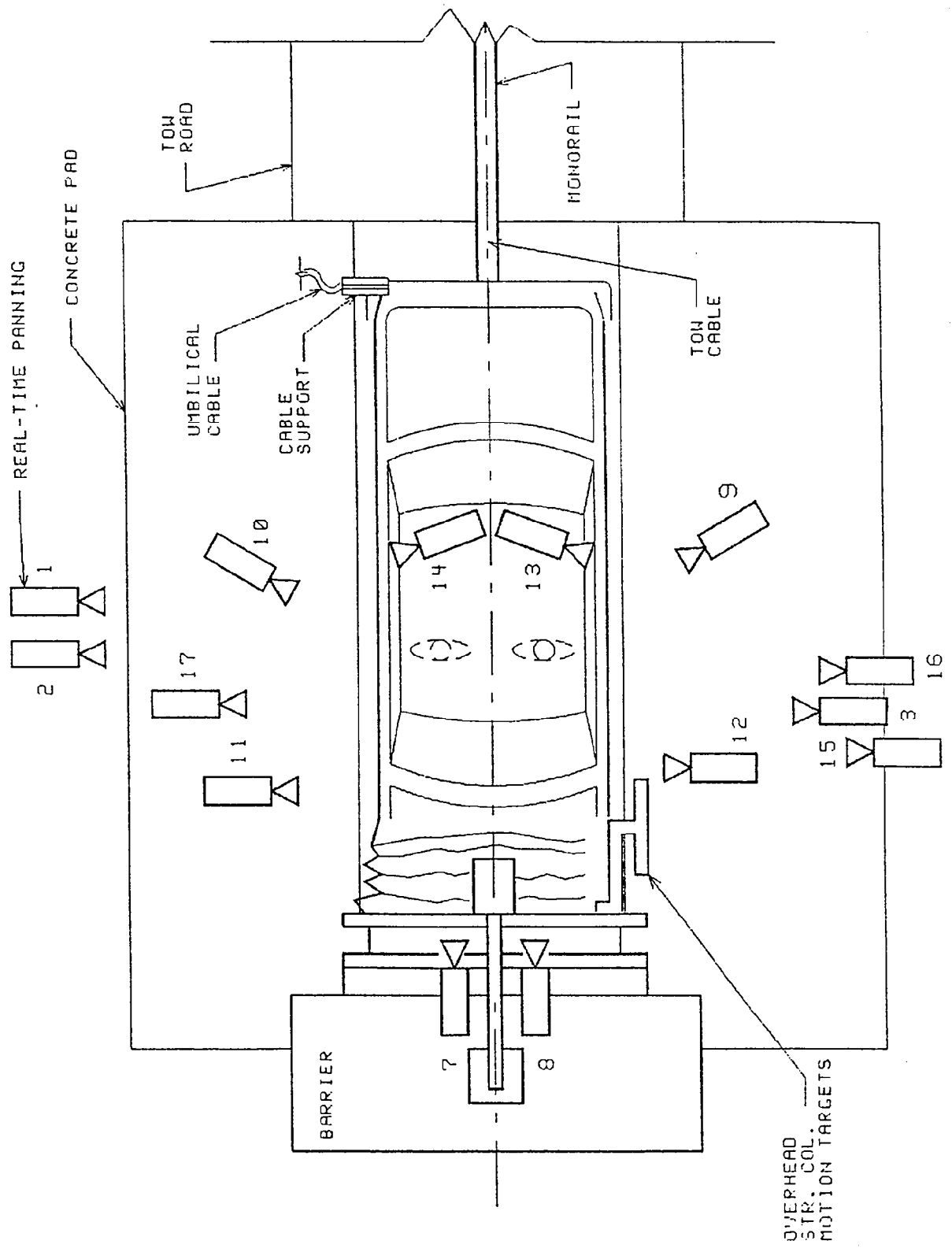


TABLE 11 MOTION PICTURE CAMERA LOCATIONS

TEST NO.: 920102		VEHICLE: Chevrolet Astro Van					FILM PLANE		FILM
CAMERA NO.	VIEW	CAMERA POSITIONS (IN)*			ANGLE** (DEG)	TO HEAD TARGET (IN)	LENS (MM)	SPEED (FPS)	
		X	Y	Z					
1	Real-time panning	-142.0	-504.0	61.0	NA	NA	16	24	
2	Right side	-81.3	-266.4	37.1	-2	NA	13	500	
3	Left side	-41.5	295.0	44.0	-12	237.0	25	500	
4	Overhead	-36.4	0.0	98.0	-40	NA	13	498	
5	Pit - engine	-50.5	0.0	-92.4	90	NA	13	1000	
6	Pit - fuel tank	-99.3	0.0	-99.0	90	NA	13	1000	
7	Front - passenger	-4.5	-13.8	85.0	-40	NA	17	508	
8	Front - driver	-6.8	14.5	85.0	-41	NA	17	498	
9	Left side - driver	-180.0	73.0	102.0	-27	98.0	25	500	
10	Right side - passenger	-184.0	-74.0	100.0	-26	94.0	25	508	
11	Right side - A-pillar	-38.1	-306.1	44.0	0	NA	50	493	
12	Left side - A-pillar	-53.0	309.4	42.3	0	NA	50	500	
13	Onboard - left side	NA	NA	NA	NA	NA	13	498	
14	Onboard - right side	NA	NA	NA	NA	NA	13	498	
15	Left side - steering column	-110.0	286.0	103.0	-14	NA	25	500	
16	Left side - steering column	-132.0	286.0	75.1	-9	NA	25	498	
17	Right side - passenger	-38.8	-210.8	45.3	7	241.0	25	505	

*+X = Film plane forward of barrier face

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

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

FIGURE 10
VEHICLE TARGET LOCATIONS

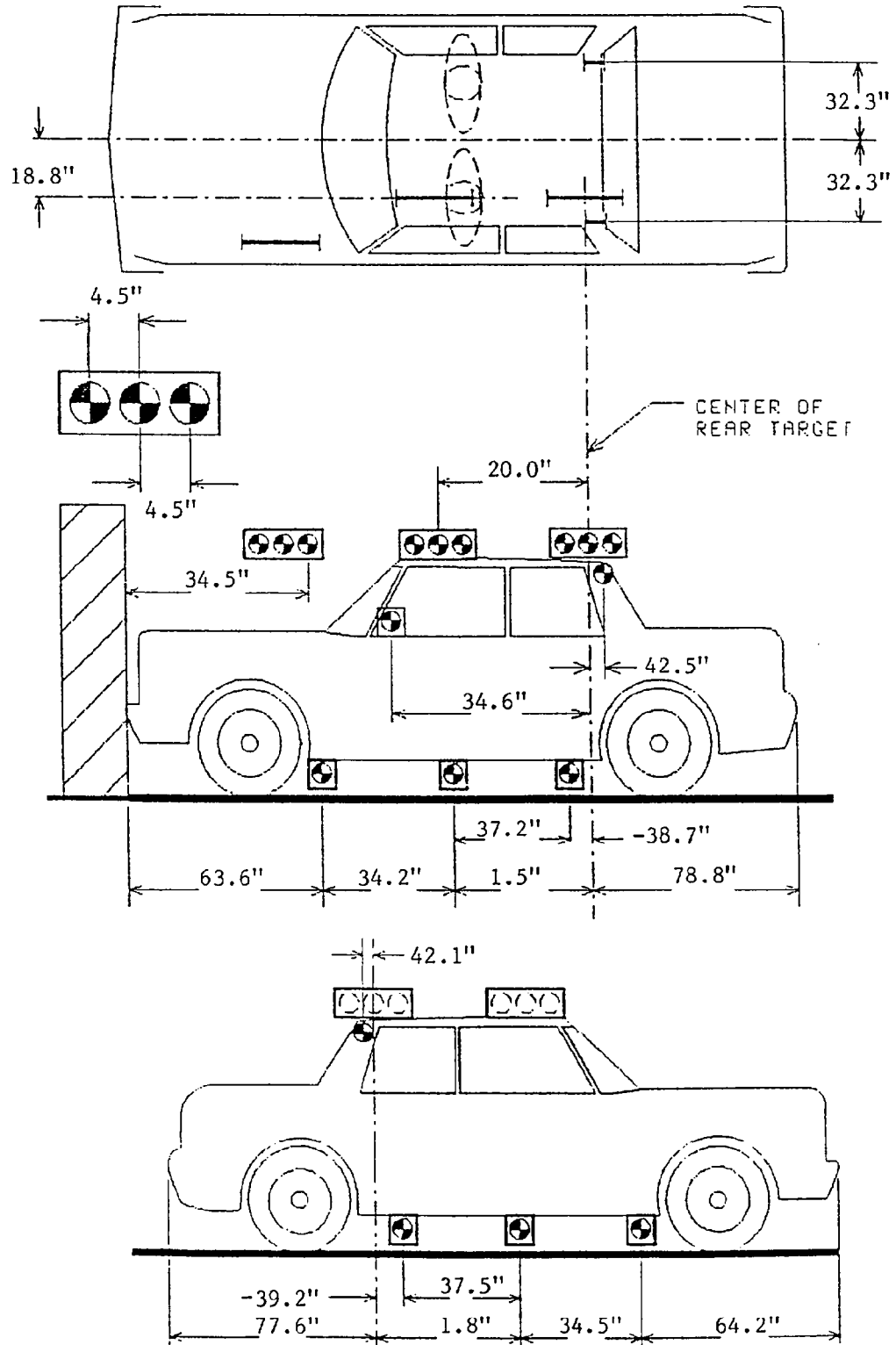


FIGURE 11

PRE-TEST AND POST-TEST MEASUREMENT POINTS

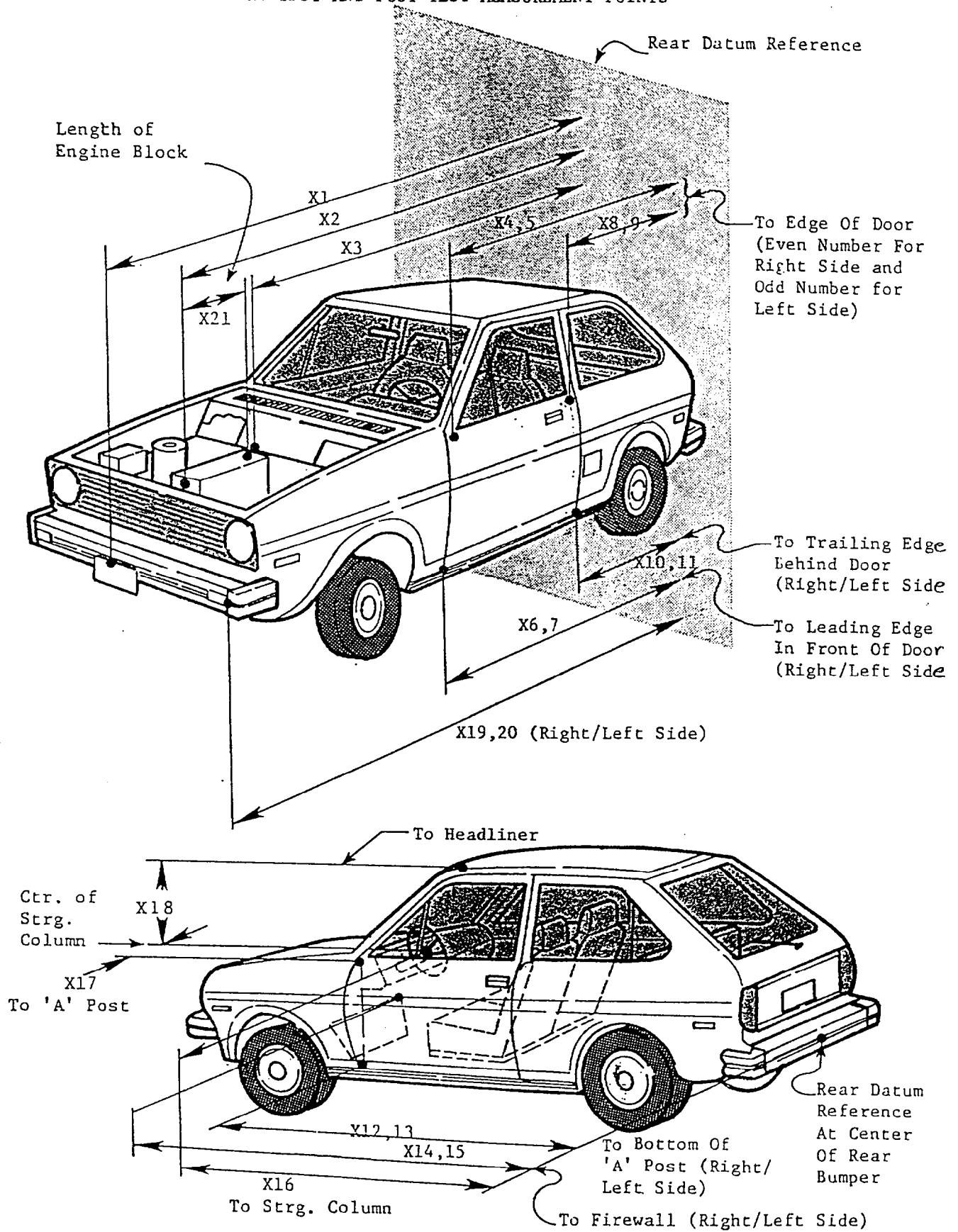


TABLE 12 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Chevrolet Astro		TEST NUMBER: 920102		ALL MEASUREMENTS ARE IN INCHES		
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.		
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	178.1	156.2	21.9		
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	147.0	145.7	1.3		
X3	REAR SURFACE OF VEHICLE TO FIREWALL	150.8	147.1	3.7		
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	134.6	134.8	-0.2		
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	134.6	133.9	0.7		
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	127.4	127.4	0.0		
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	127.8	127.0	0.8		
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	94.5	94.4	0.1		
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	94.5	94.9	-0.4		
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	94.0	93.9	0.1		
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	94.1	94.1	0.0		
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	132.1	132.0	0.1		
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	132.1	130.6	1.5		
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	150.1	148.9	1.2		
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	148.8	143.5	5.3		
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	120.8	121.3	-0.5		
X17	CENTER OF STEERING COLUMN TO "A" POST	11.4	11.0	0.4		
X18	CENTER OF STEERING COLUMN TO HEADLINER	17.4	14.3	3.1		
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	173.1	156.0	17.1		
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	173.1	154.9	18.2		
X21	LENGTH OF ENGINE BLOCK	16.0	16.0	0.0		

APPENDIX A

PHOTOGRAPHS



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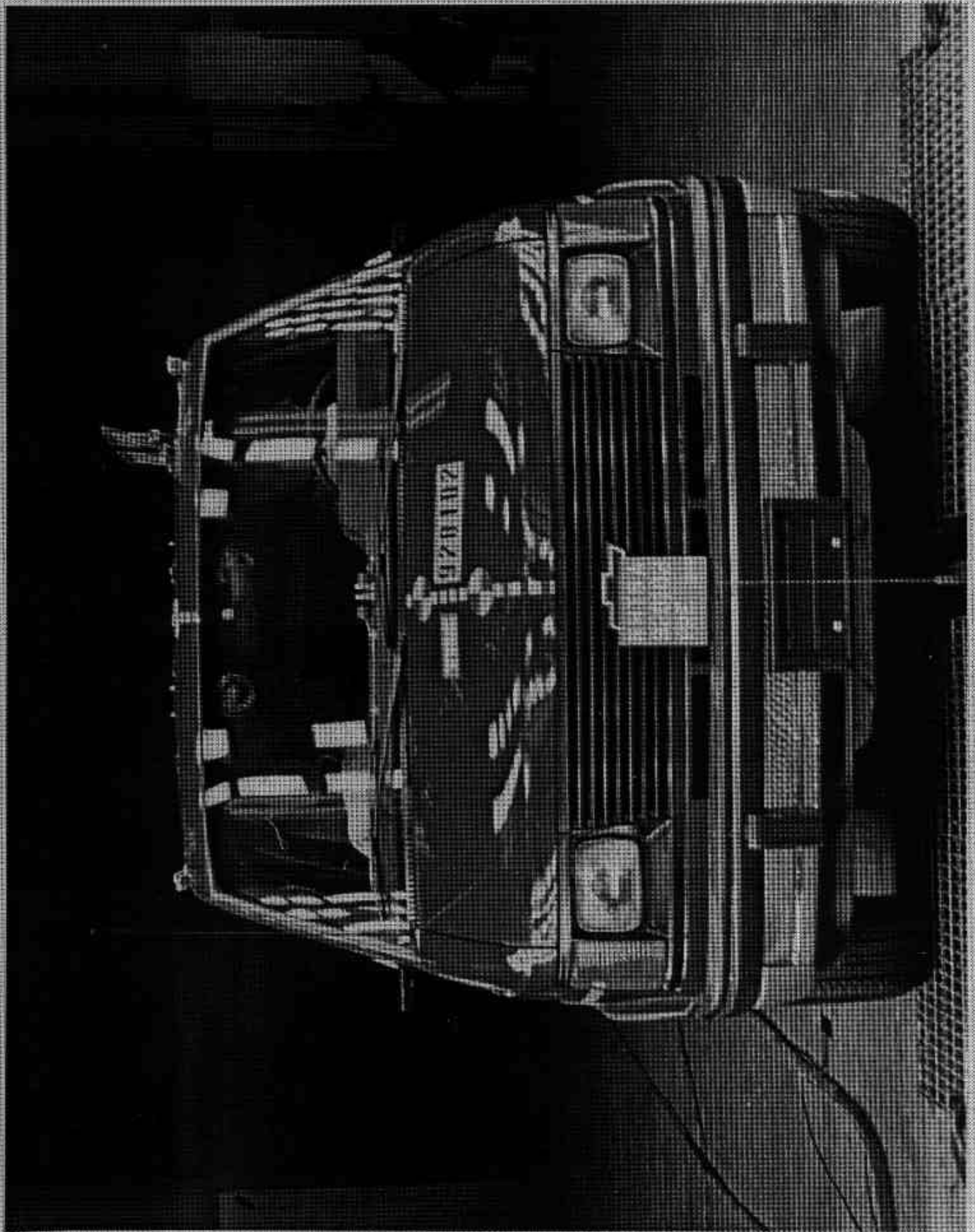


FIGURE A-1. PRE-TEST FRONT VIEW

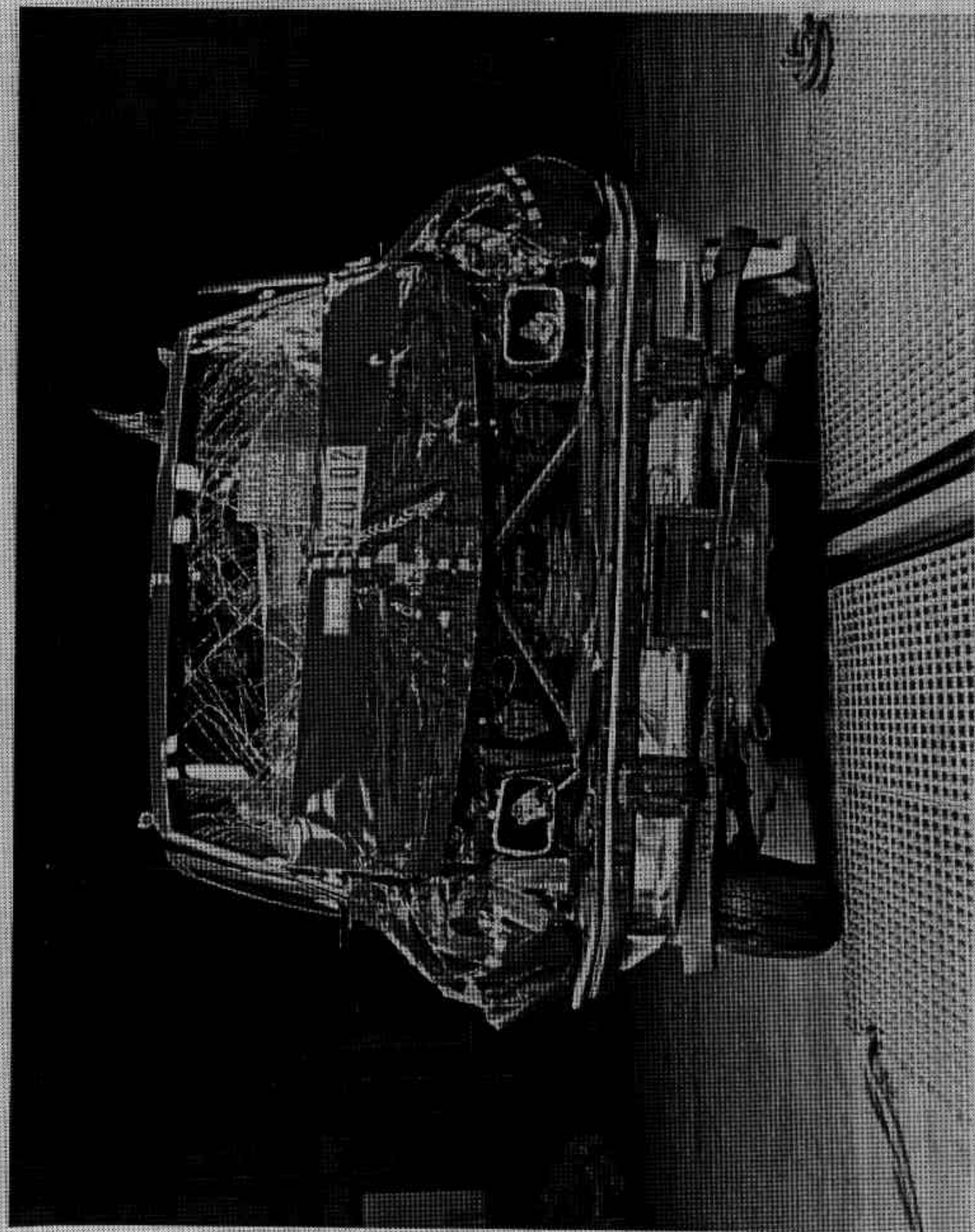


FIGURE A-2. POST-TEST FRONT VIEW



FIGURE A-3. PRE-TEST LEFT SIDE VIEW

A-4

920102

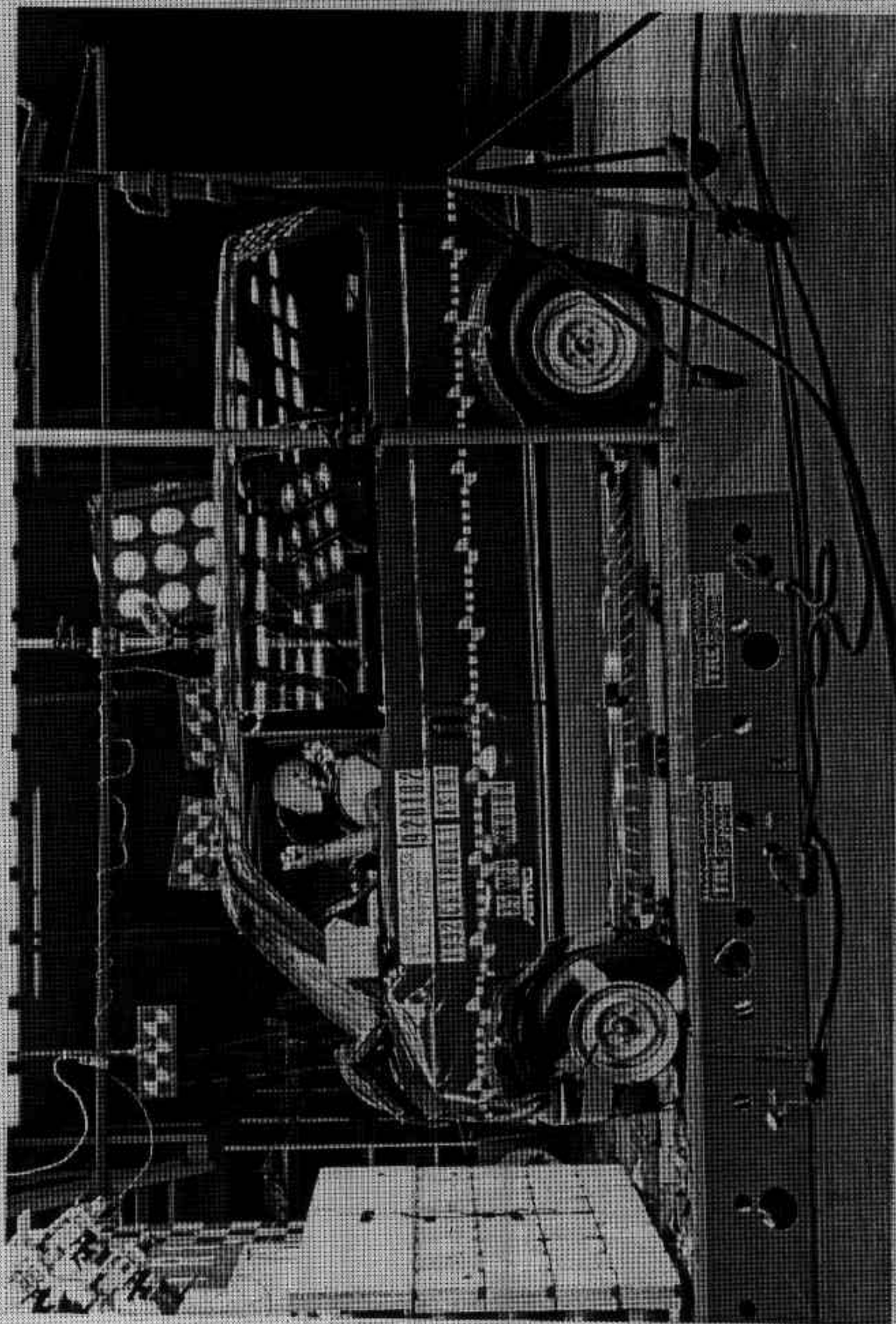


FIGURE A-4. POST-TEST LEFT SIDE VIEW
A-5

920102

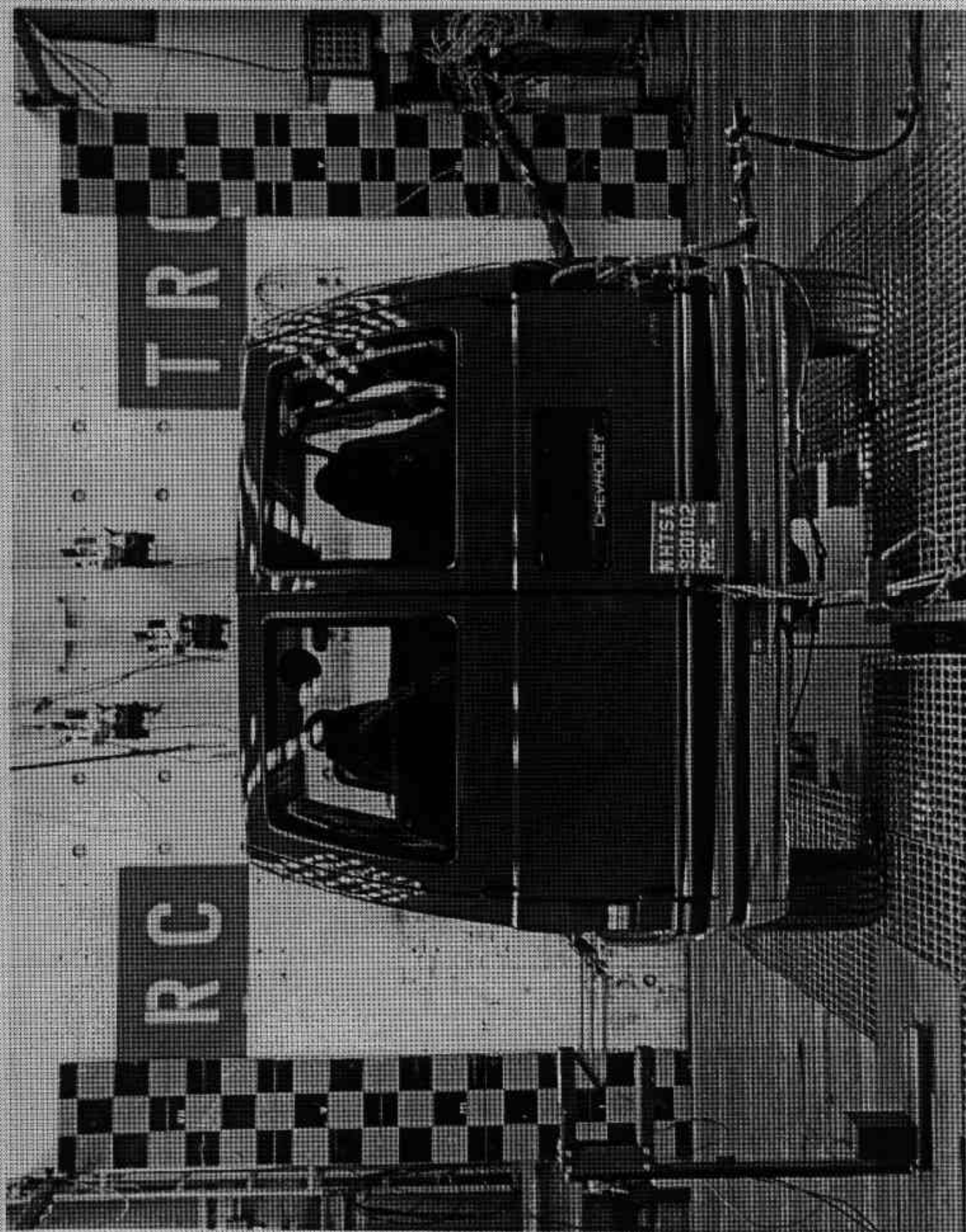


FIGURE A-5. PRE-TEST REAR VIEW

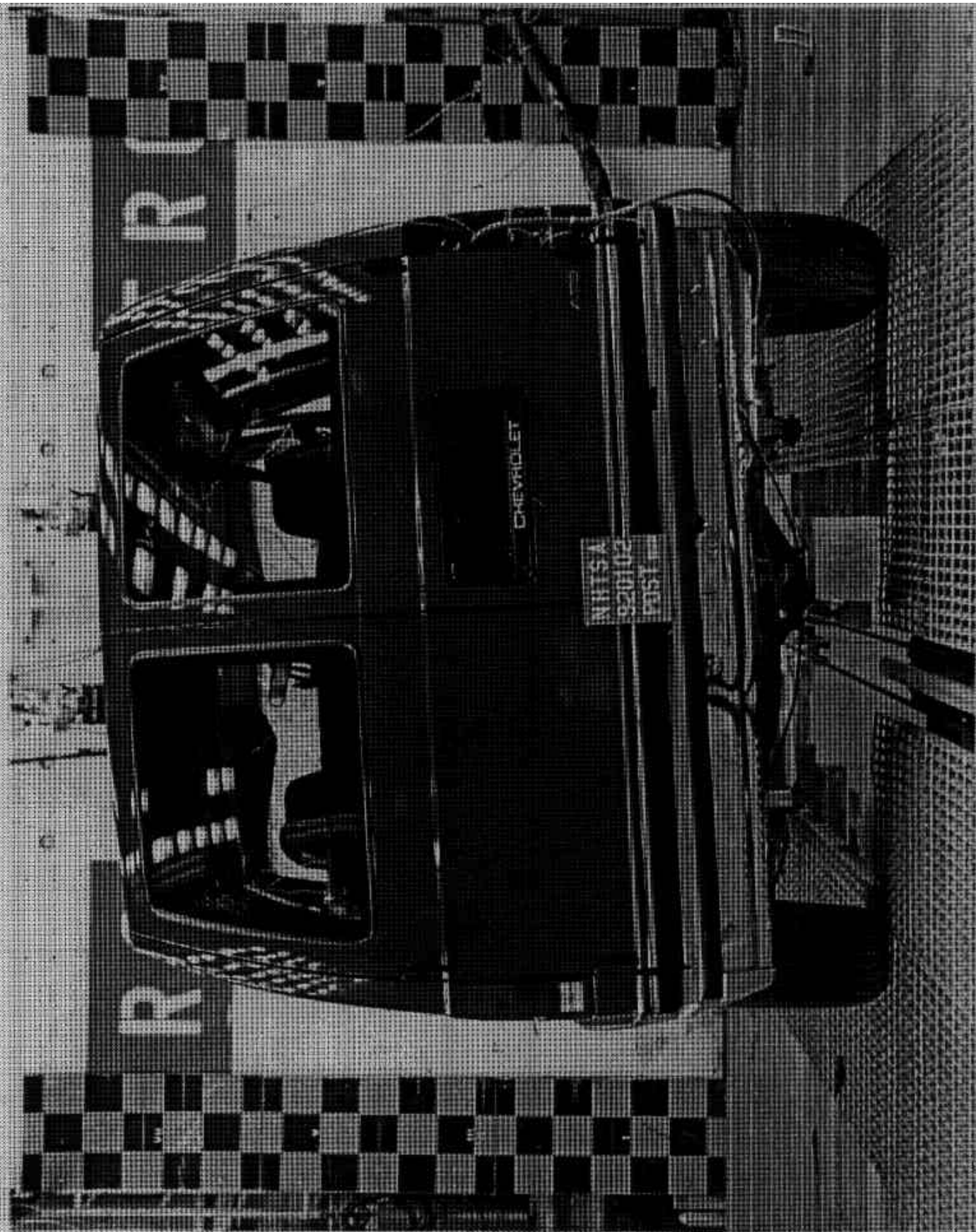


FIGURE A-6. POST-TEST REAR VIEW

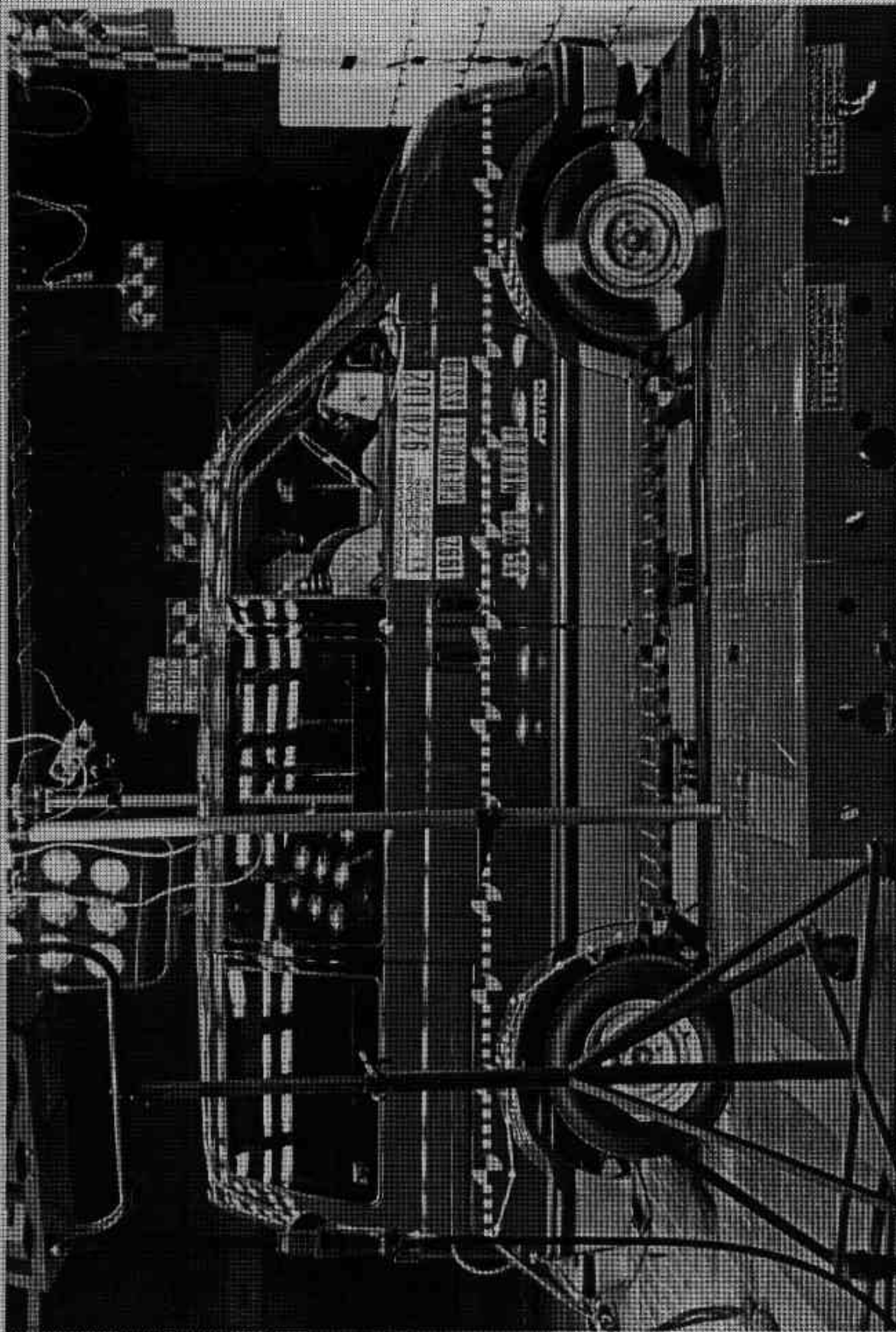


FIGURE A-7. PRE-TEST RIGHT SIDE VIEW

A-8

920102

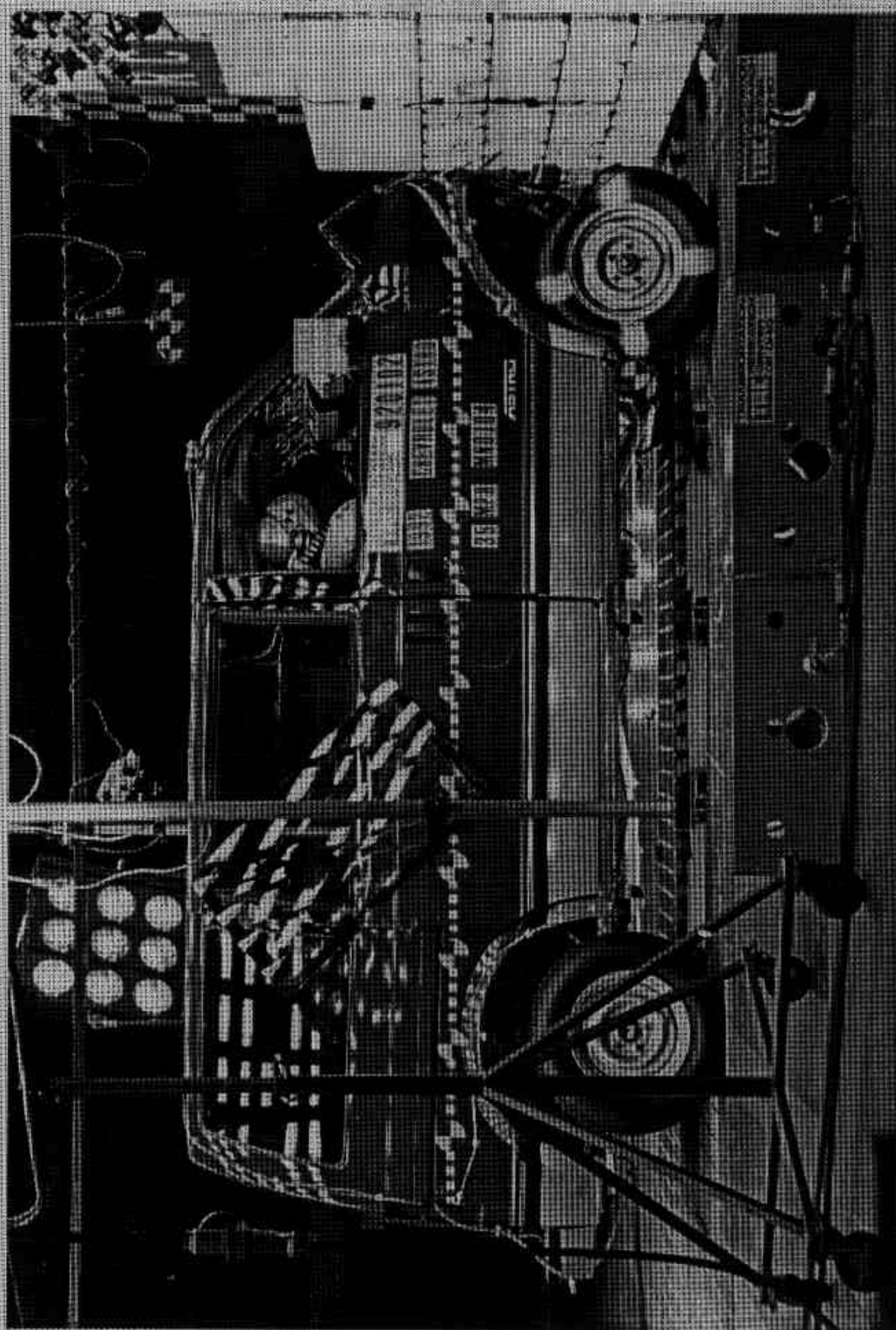


FIGURE A-8. POST-TEST RIGHT SIDE VIEW

A-9

920102

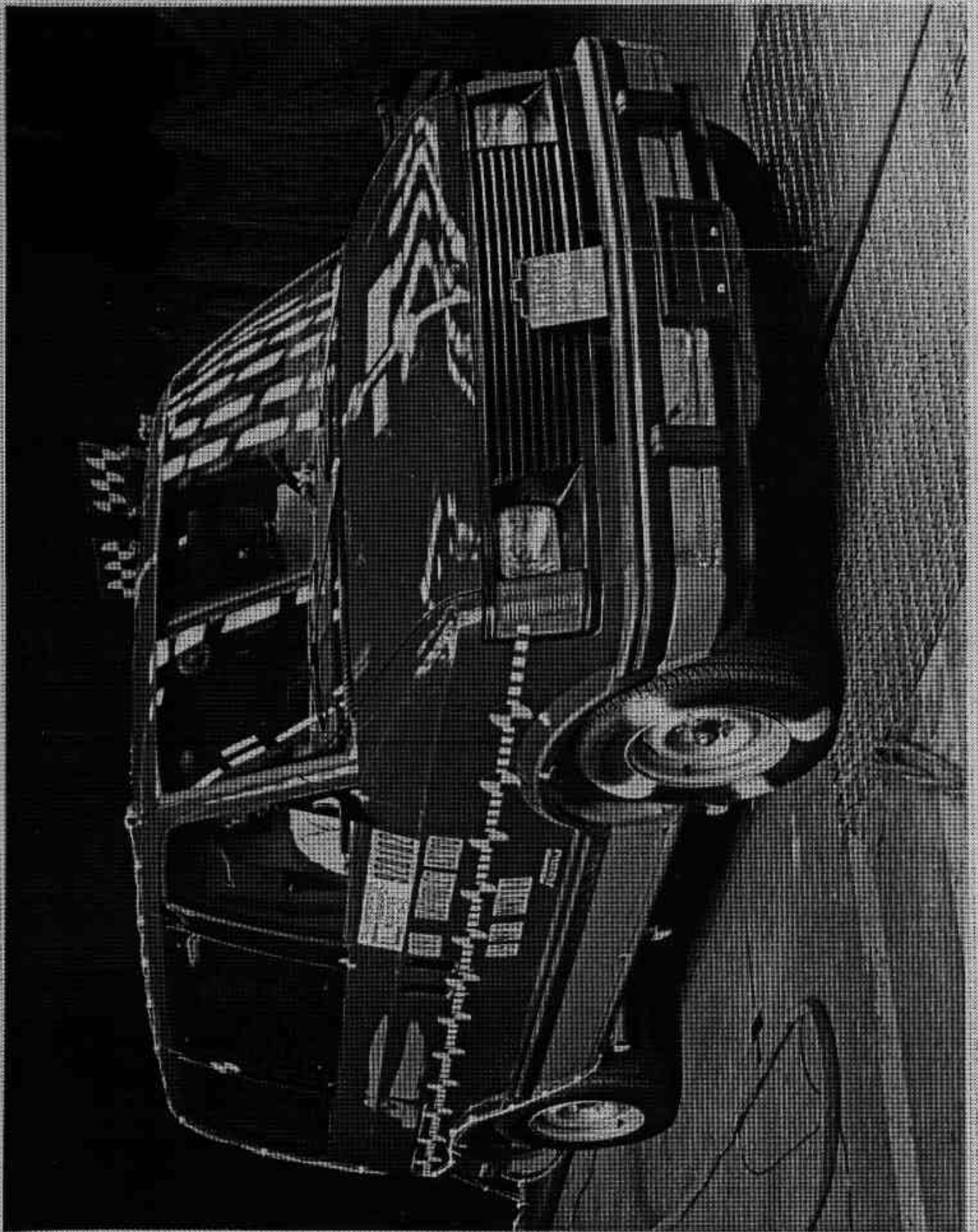


FIGURE A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

920102

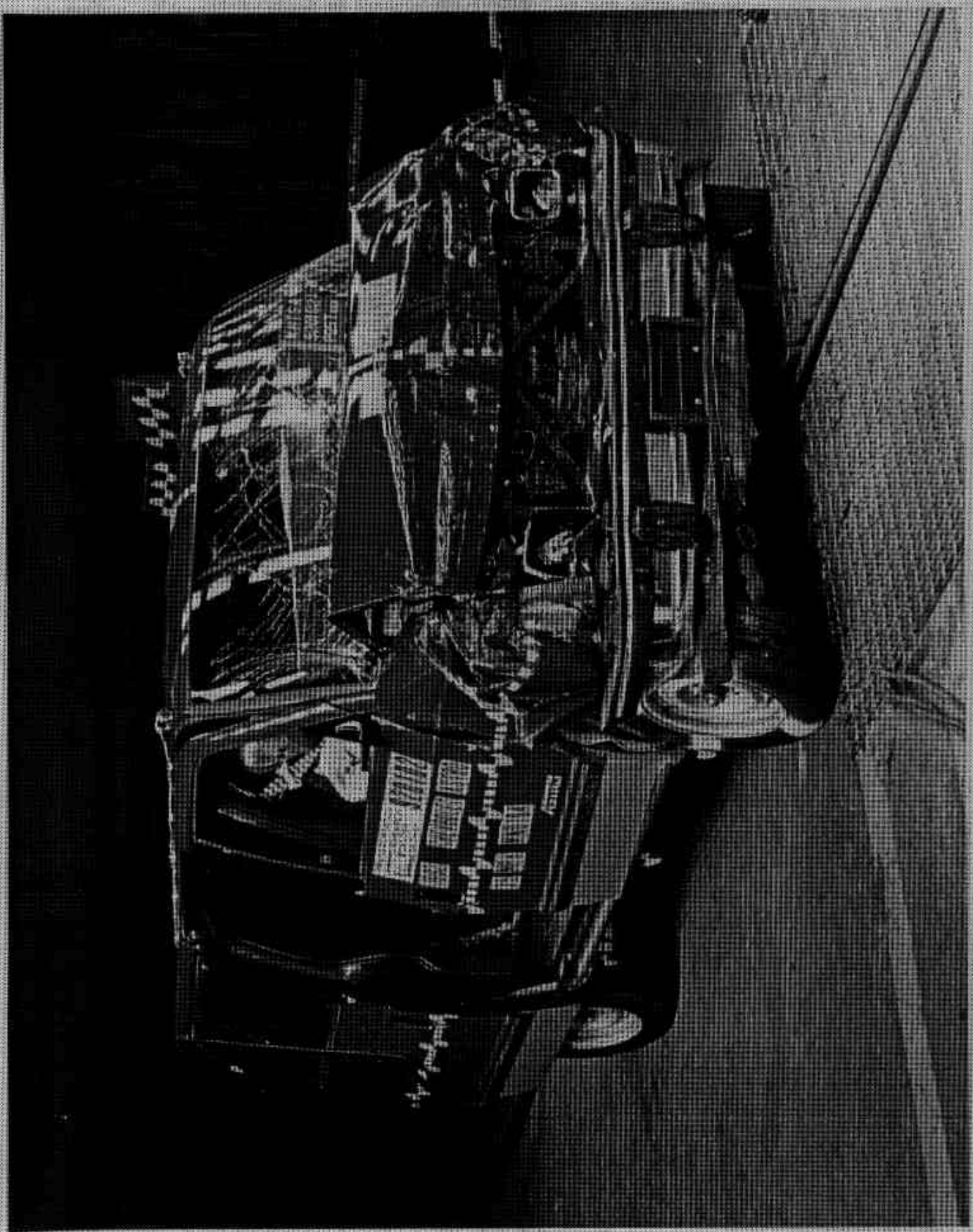


FIGURE A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
A-11

920102

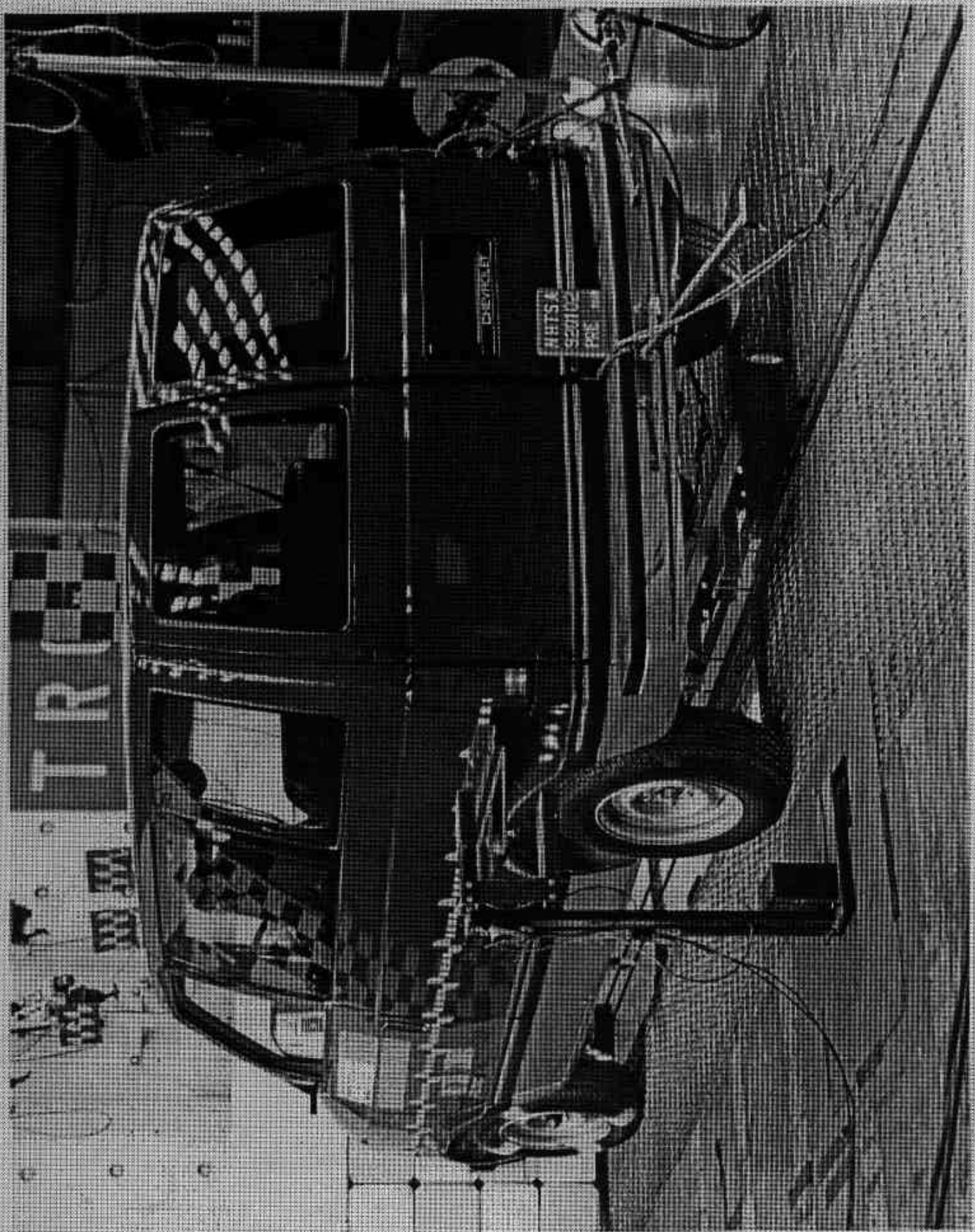


FIGURE A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW

A-12

920102



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

A-13

920102



FIGURE A-13. PRE-TEST WINDSHIELD VIEW

A-14

920102

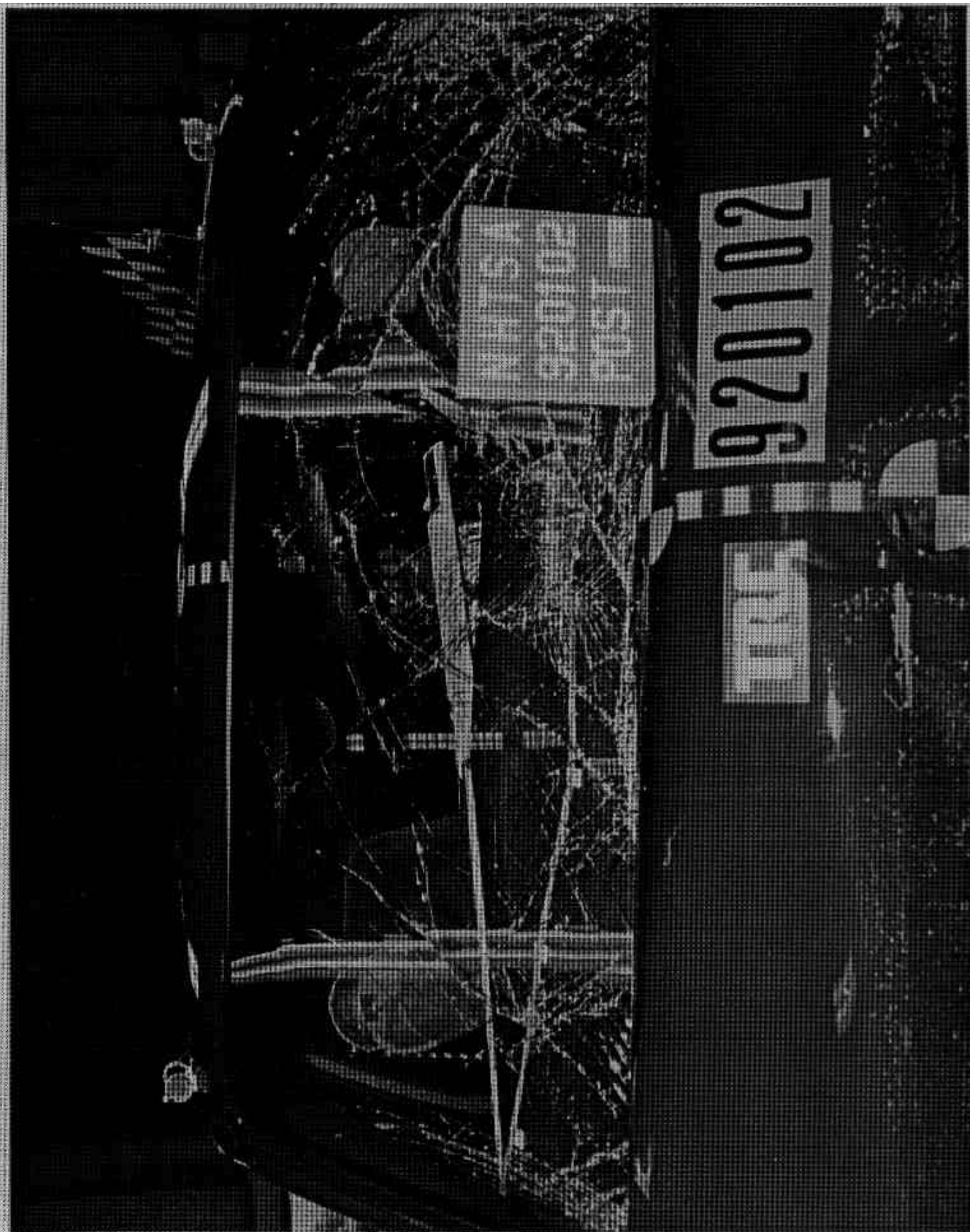


FIGURE A-14. POST-TEST WINDSHIELD VIEW
A-15

920102



FIGURE A-15. PRE-TEST ENGINE COMPARTMENT VIEW

A-16

920102



FIGURE A-16. POST-TEST ENGINE COMPARTMENT VIEW
A-17

920102

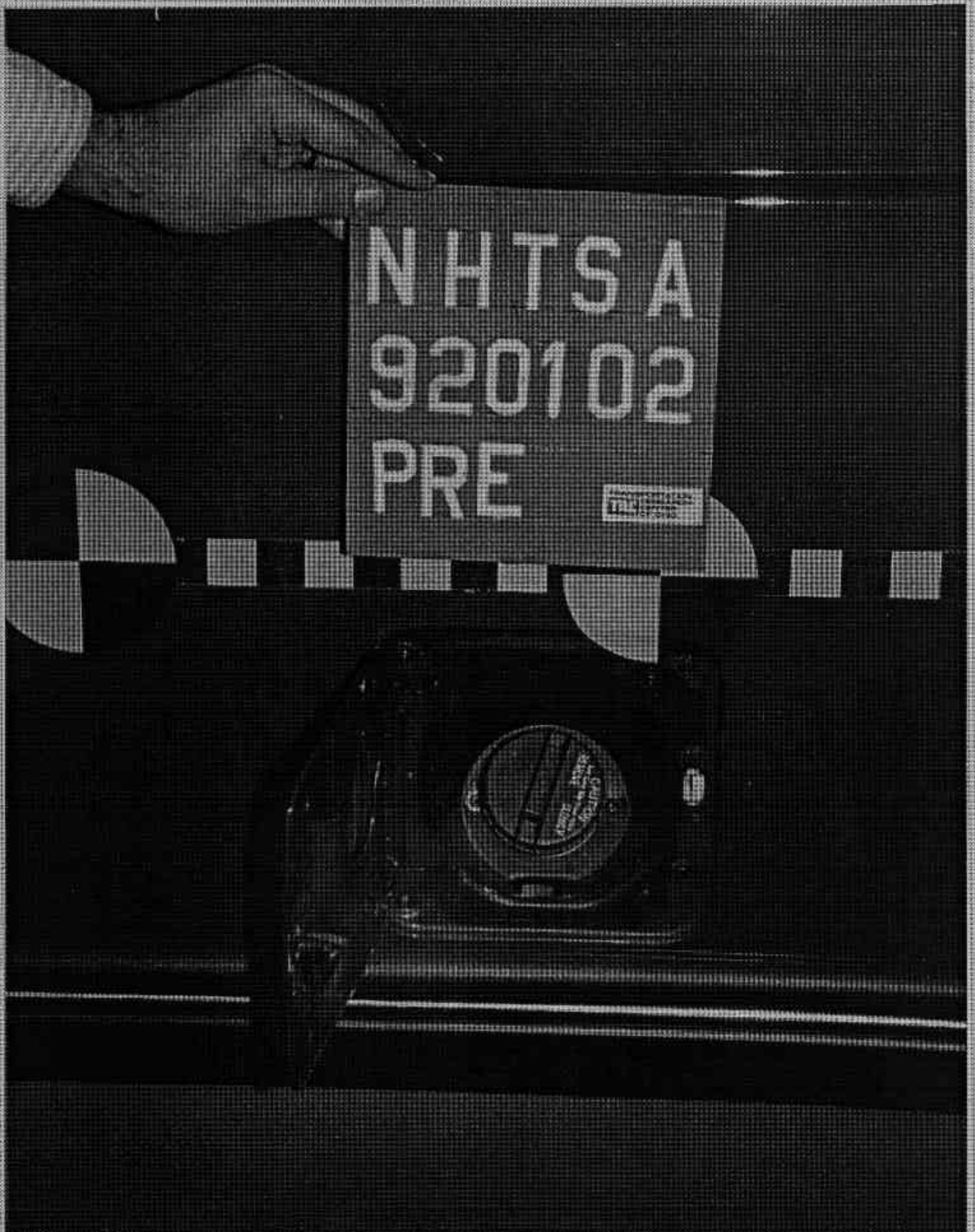


FIGURE A-17. PRE-TEST FUEL FILLER CAP VIEW

A-18

920102

NHTS A
920102
POST

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RESEARCH
CENTER
FBI LABORATORY

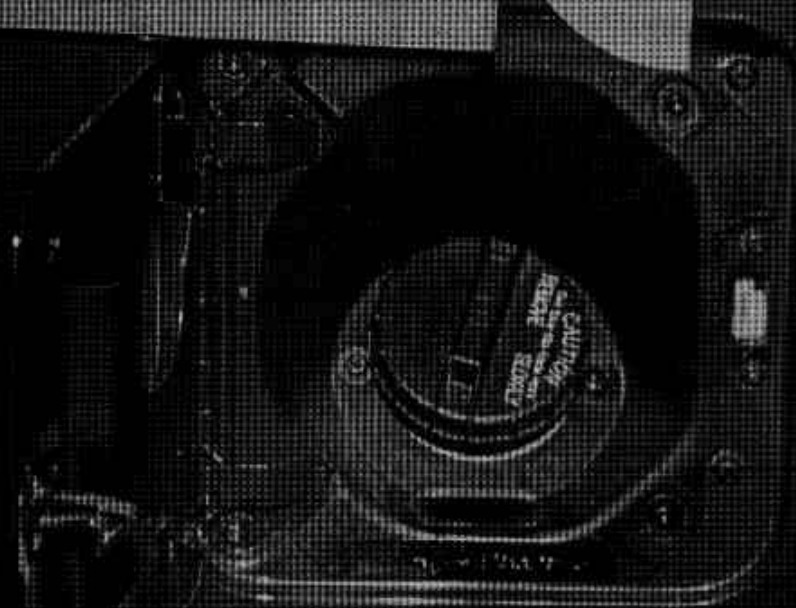


FIGURE A-18. POST-TEST FUEL FILLER CAP VIEW

A-19

920102



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

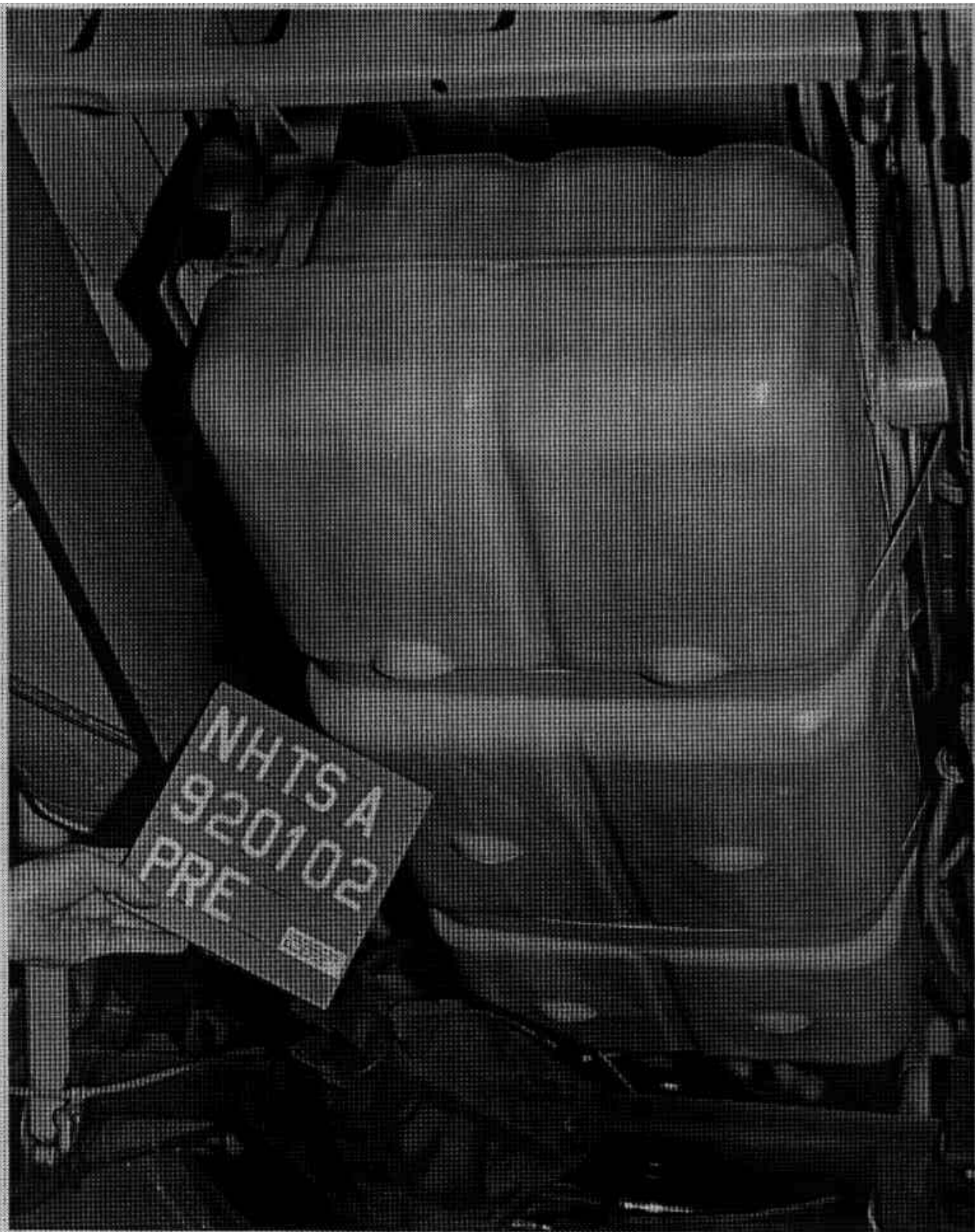


FIGURE A-20. PRE-TEST FUEL TANK VIEW
A-21

920102

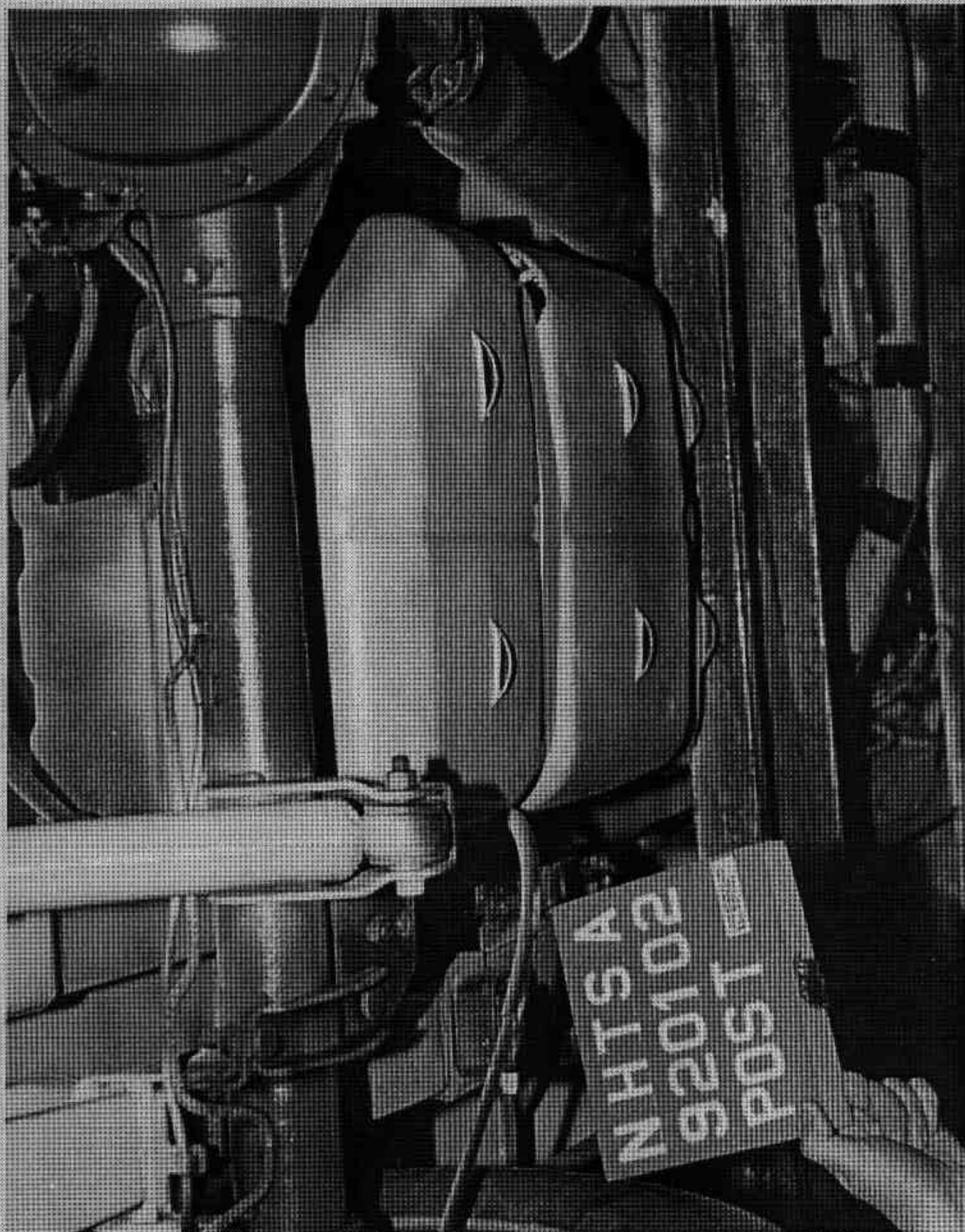


FIGURE A-21. POST-TEST FUEL TANK VIEW

A-22

920102



FIGURE A-22. PRE-TEST FRONT UNDERBODY VIEW

A-23

920102

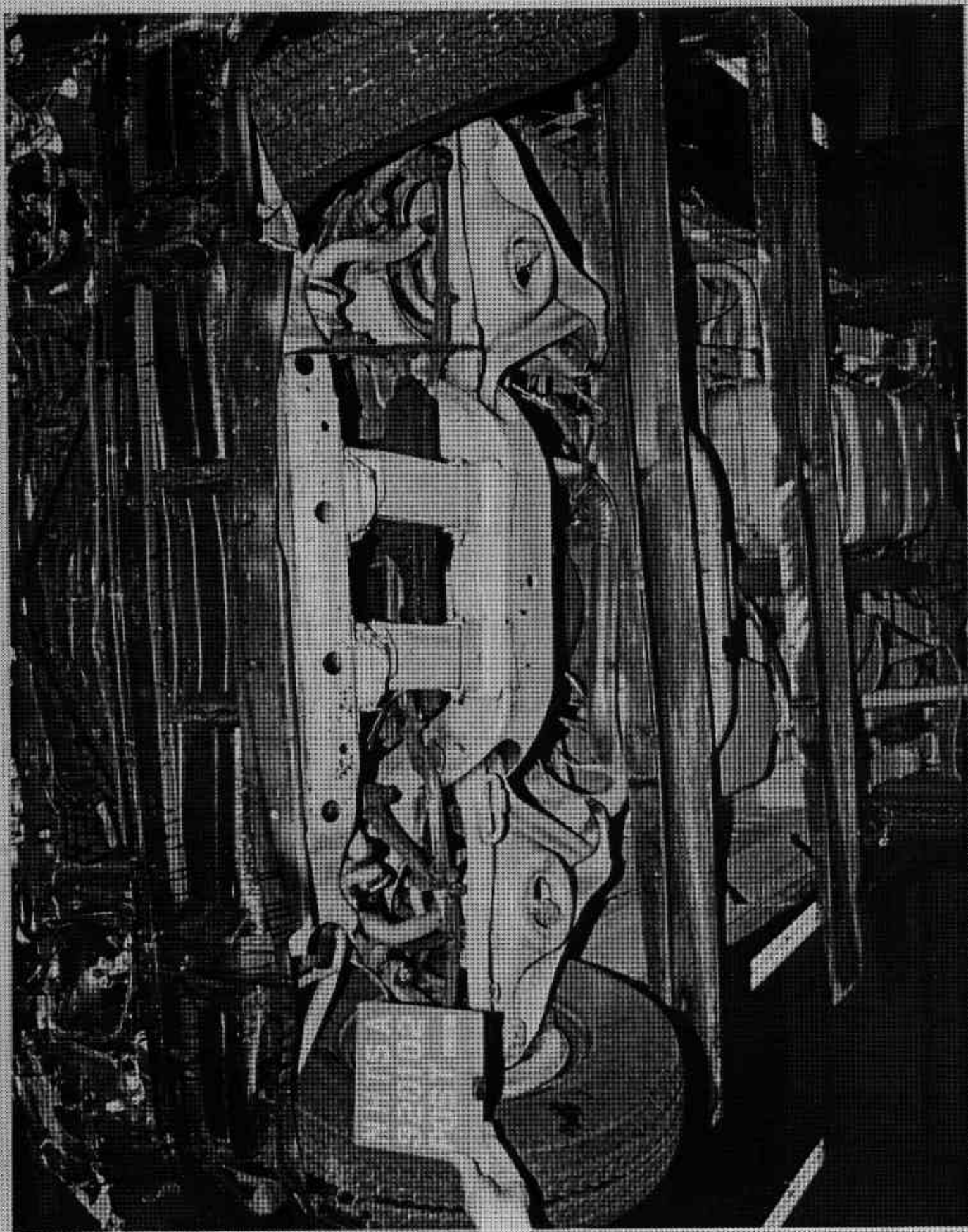


FIGURE A-23. POST-TEST FRONT UNDERBODY VIEW

A-24

920102

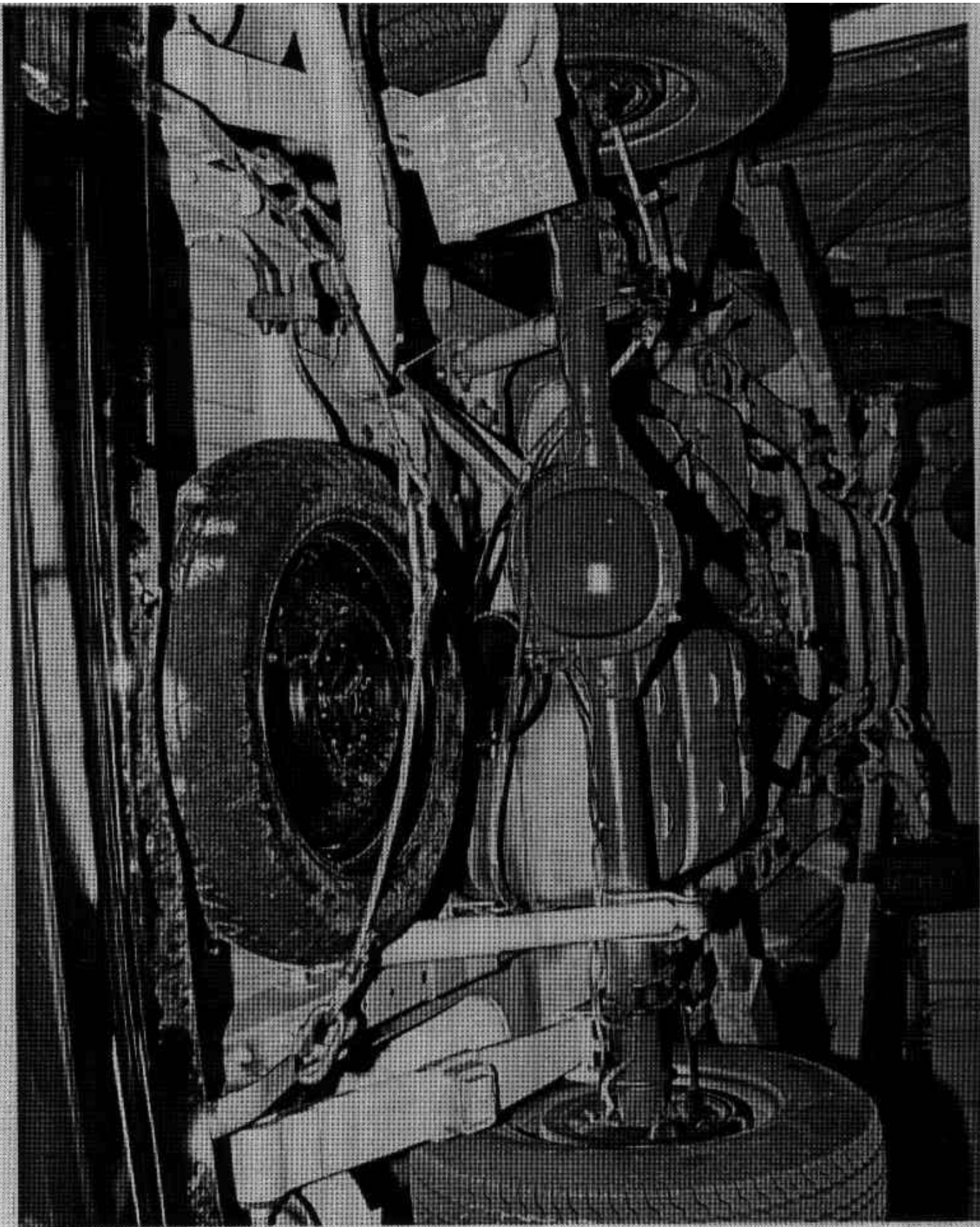


FIGURE A-24. PRE-TEST REAR UNDERBODY VIEW

A-25

920102

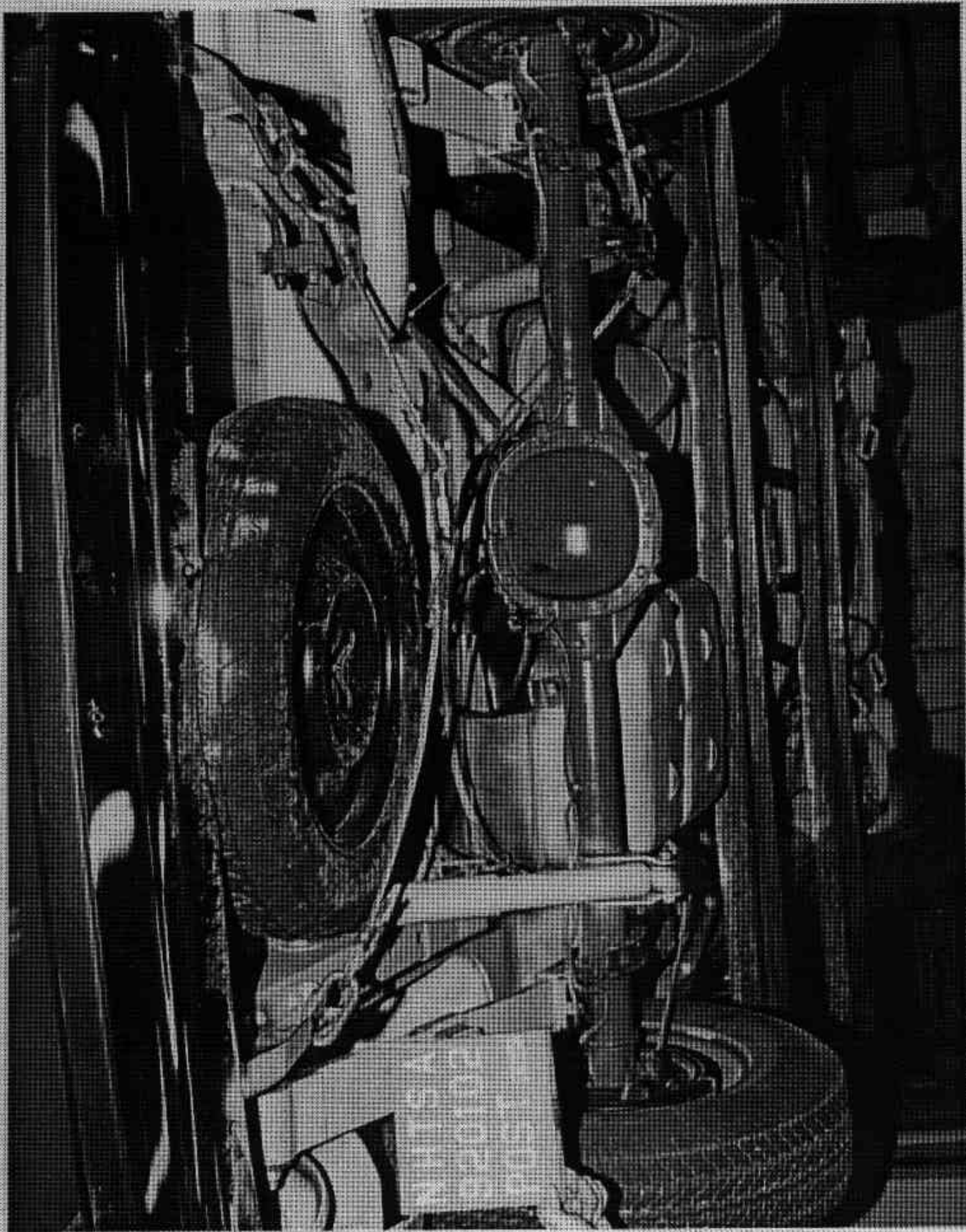


FIGURE A-25. POST-TEST REAR UNDERBODY VIEW

A-26

920102

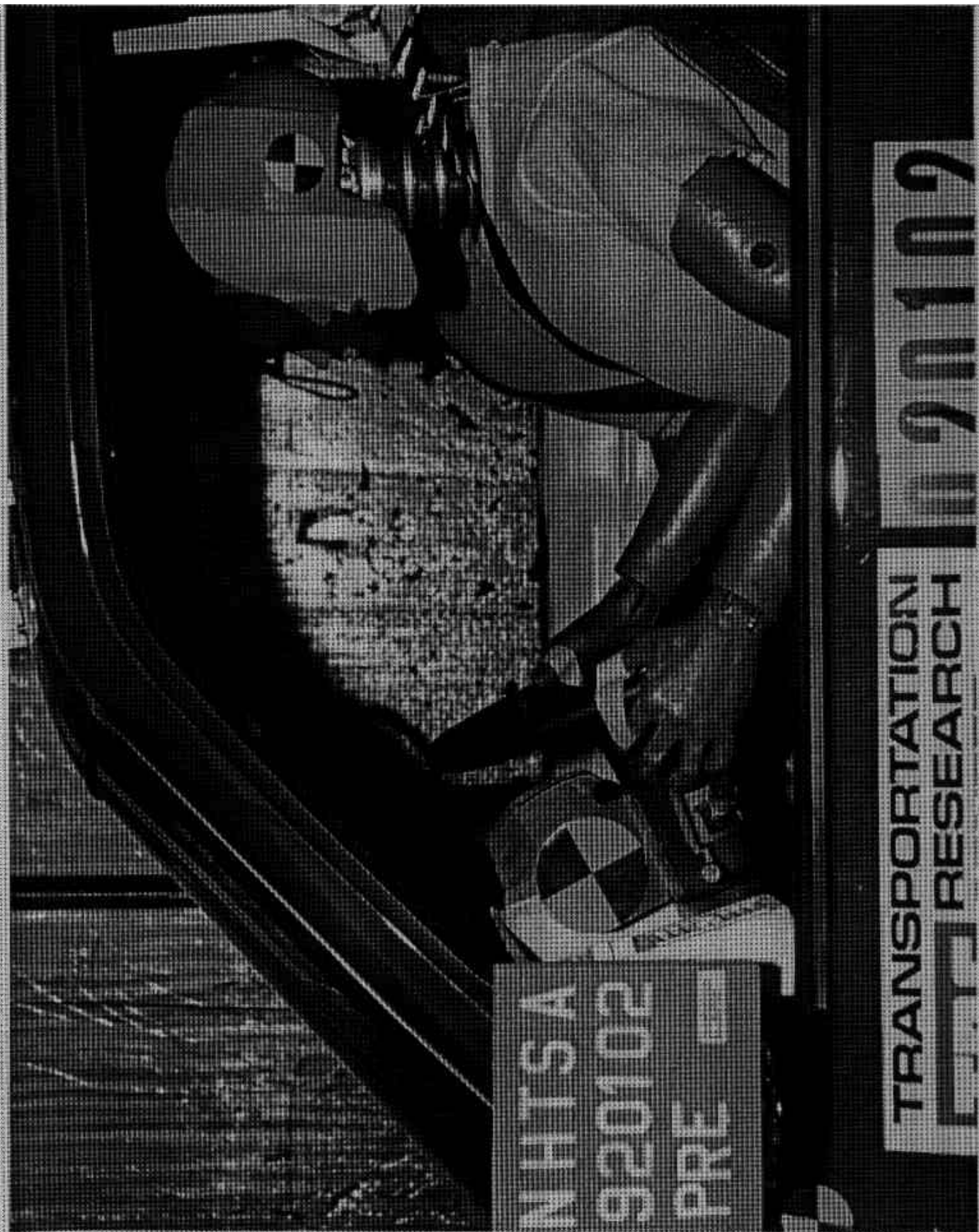


FIGURE A-26. PRE-TEST DRIVER DUMMY POSITION VIEW



FIGURE A-27. POST-TEST DRIVER DUMMY POSITION VIEW

A-28

920102

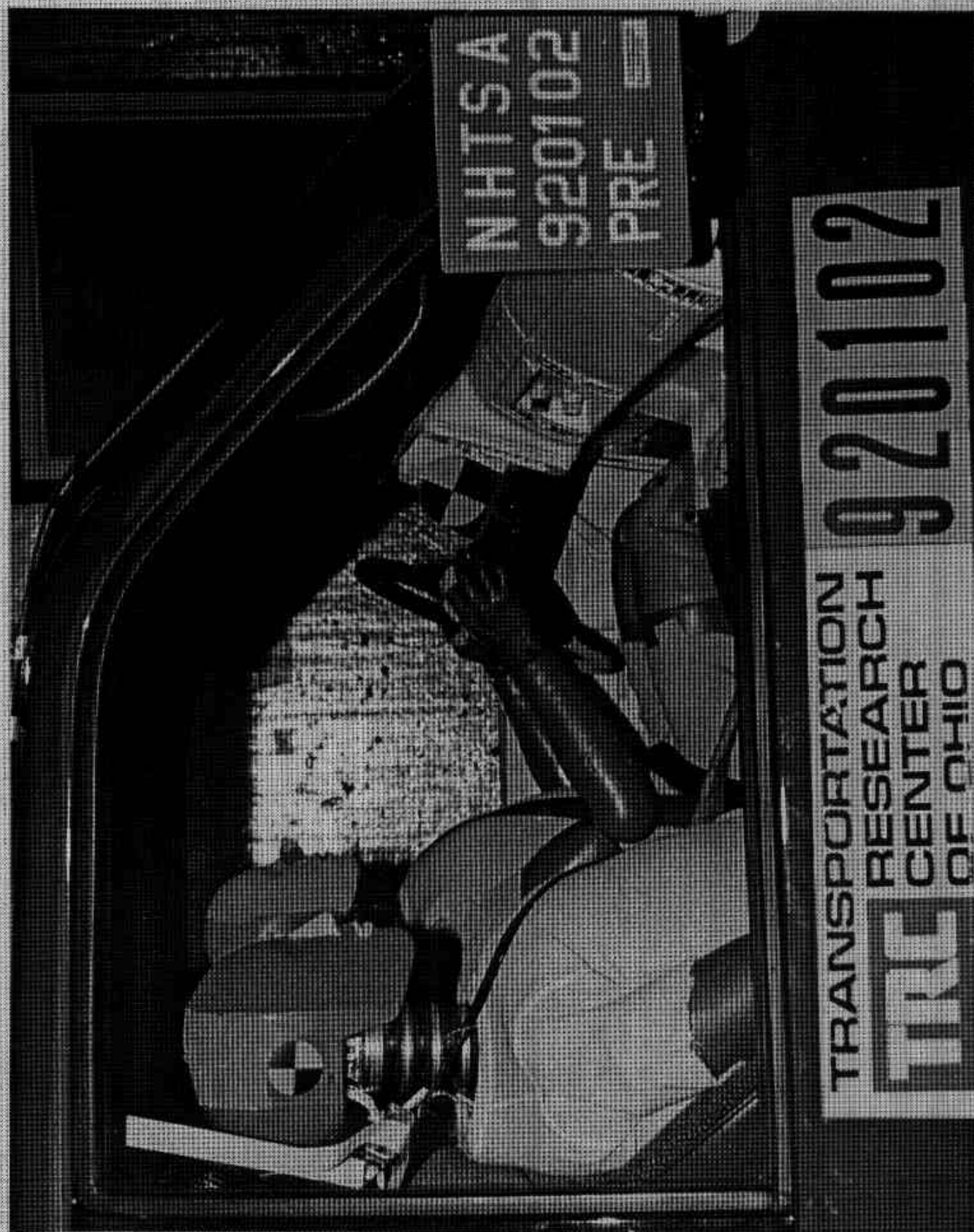
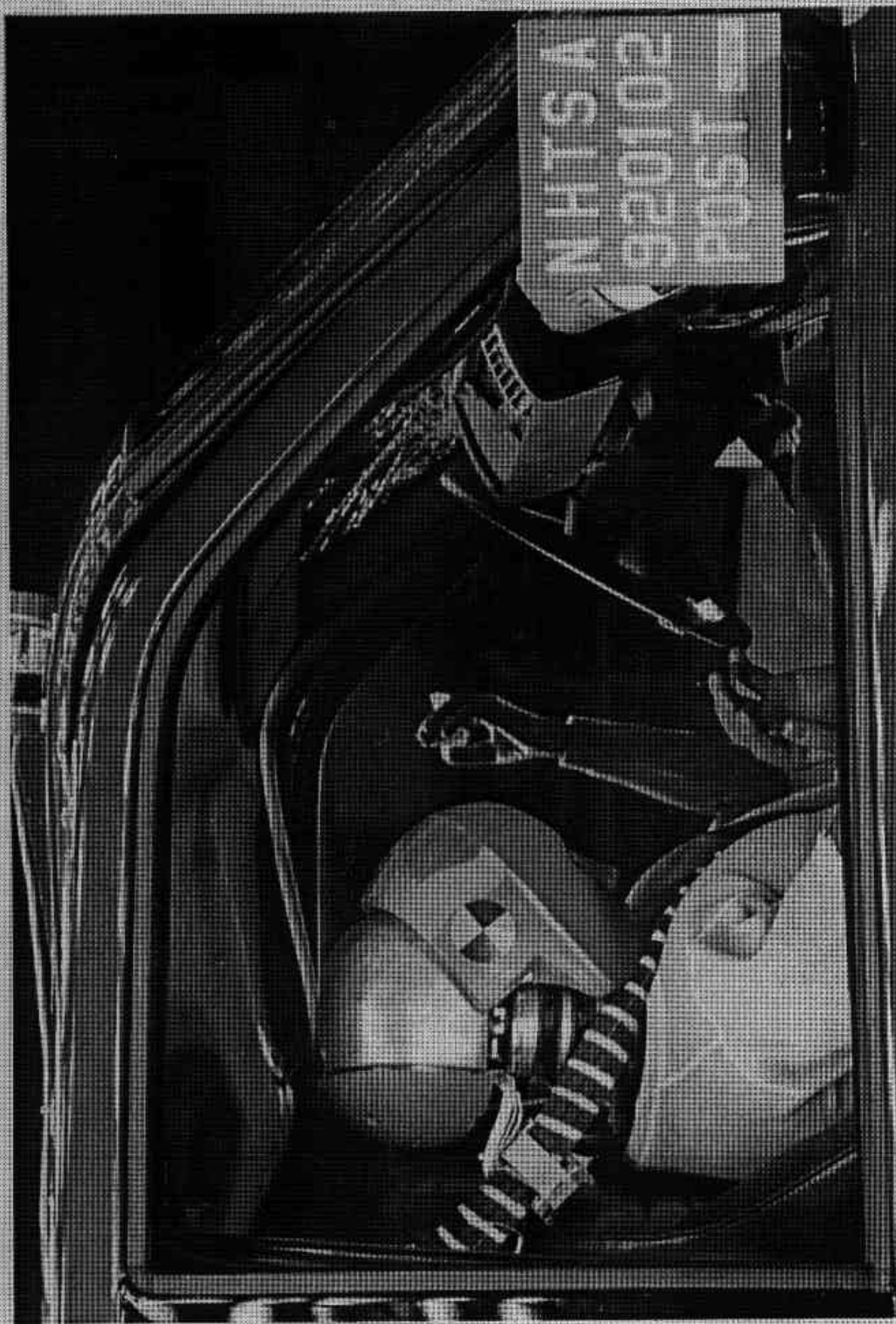


FIGURE A-28. PRE-TEST PASSENGER DUMMY POSITION VIEW



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FIGURE A-29. POST-TEST PASSENGER DUMMY POSITION VIEW

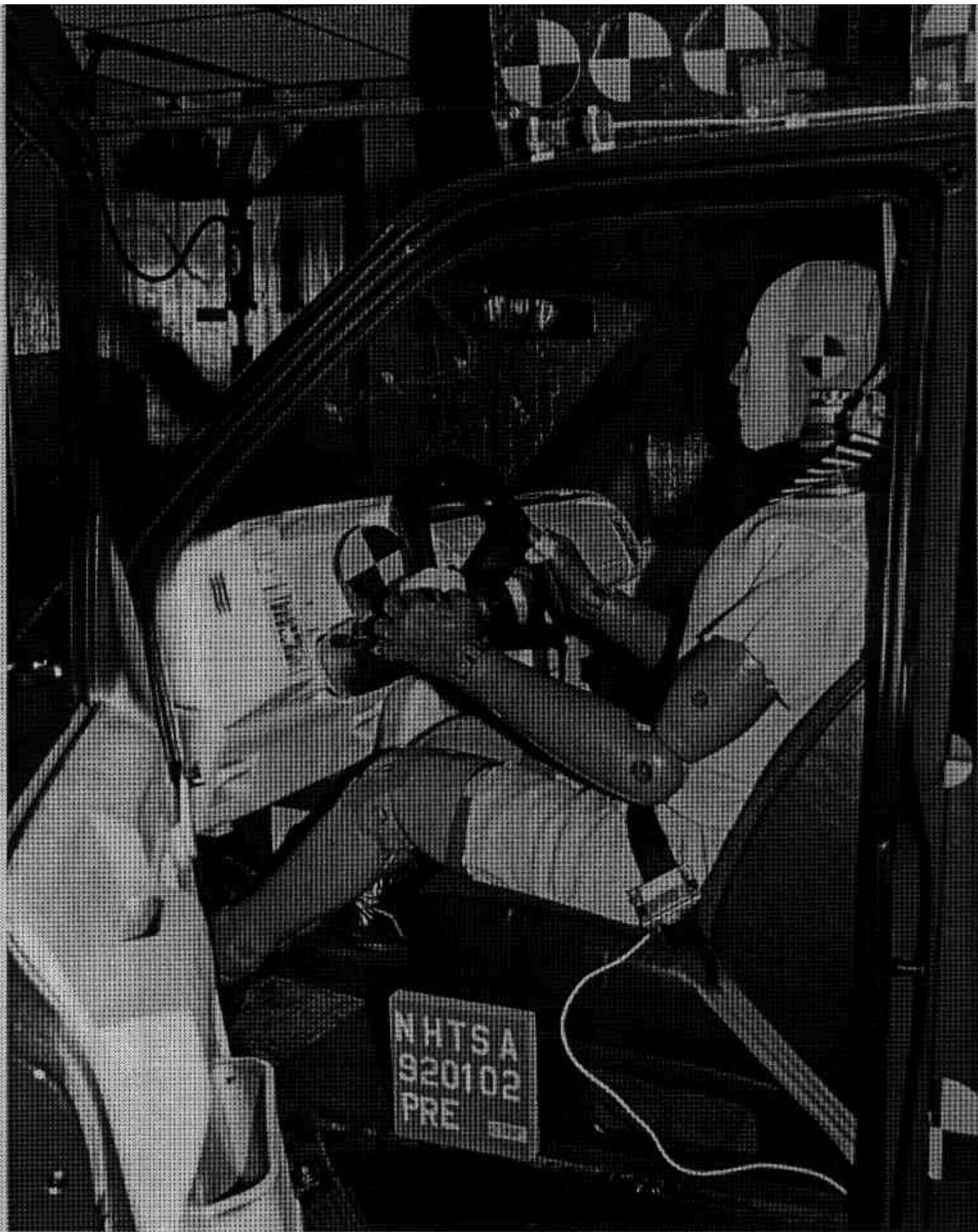


FIGURE A-30, PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

A-31

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FIGURE A-31. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

A-32

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FIGURE A-32. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

A-33

920102



FIGURE A-33. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

A-34

920102

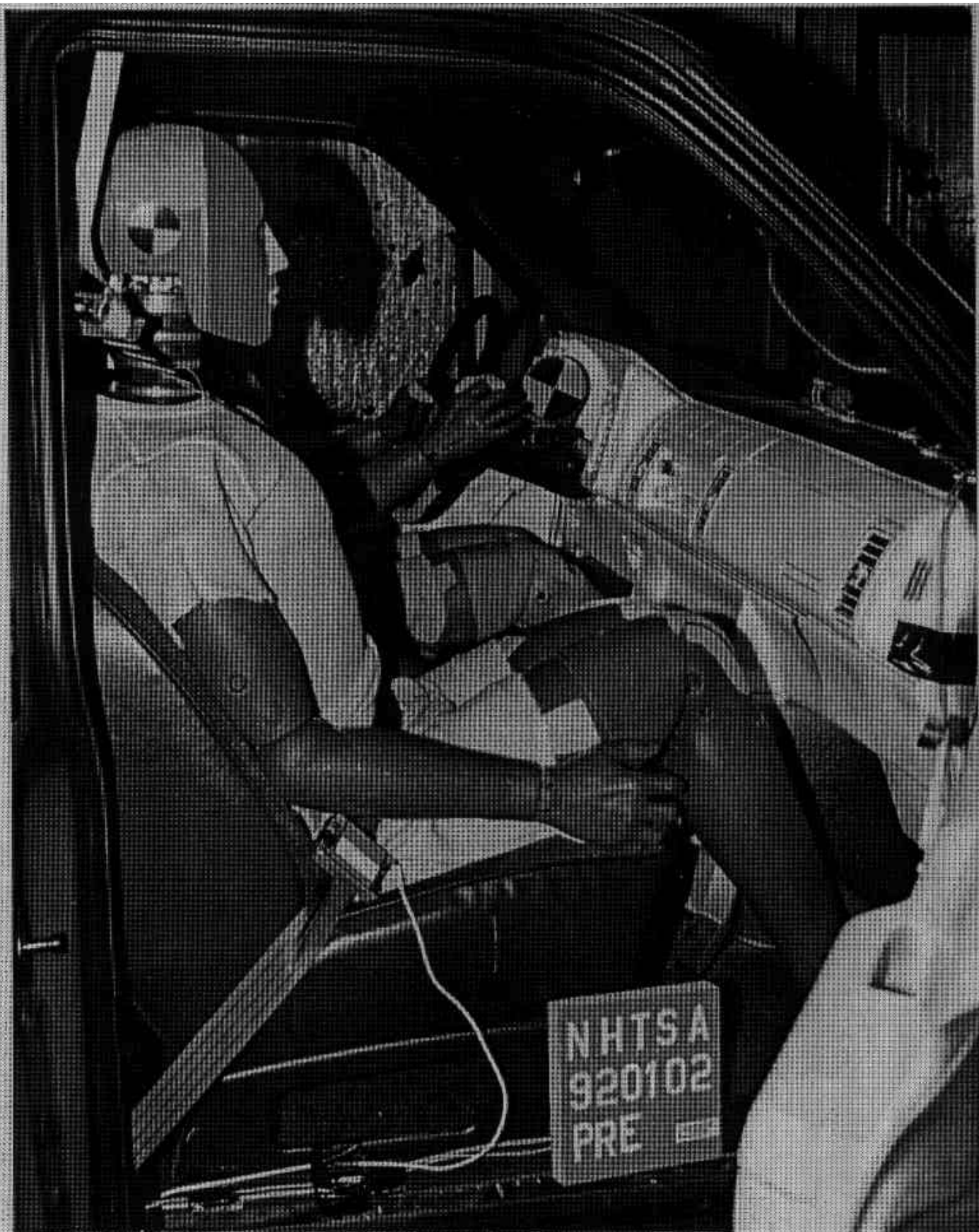


FIGURE A-34. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

A-35

920102



FIGURE A-35. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

A-36

920102

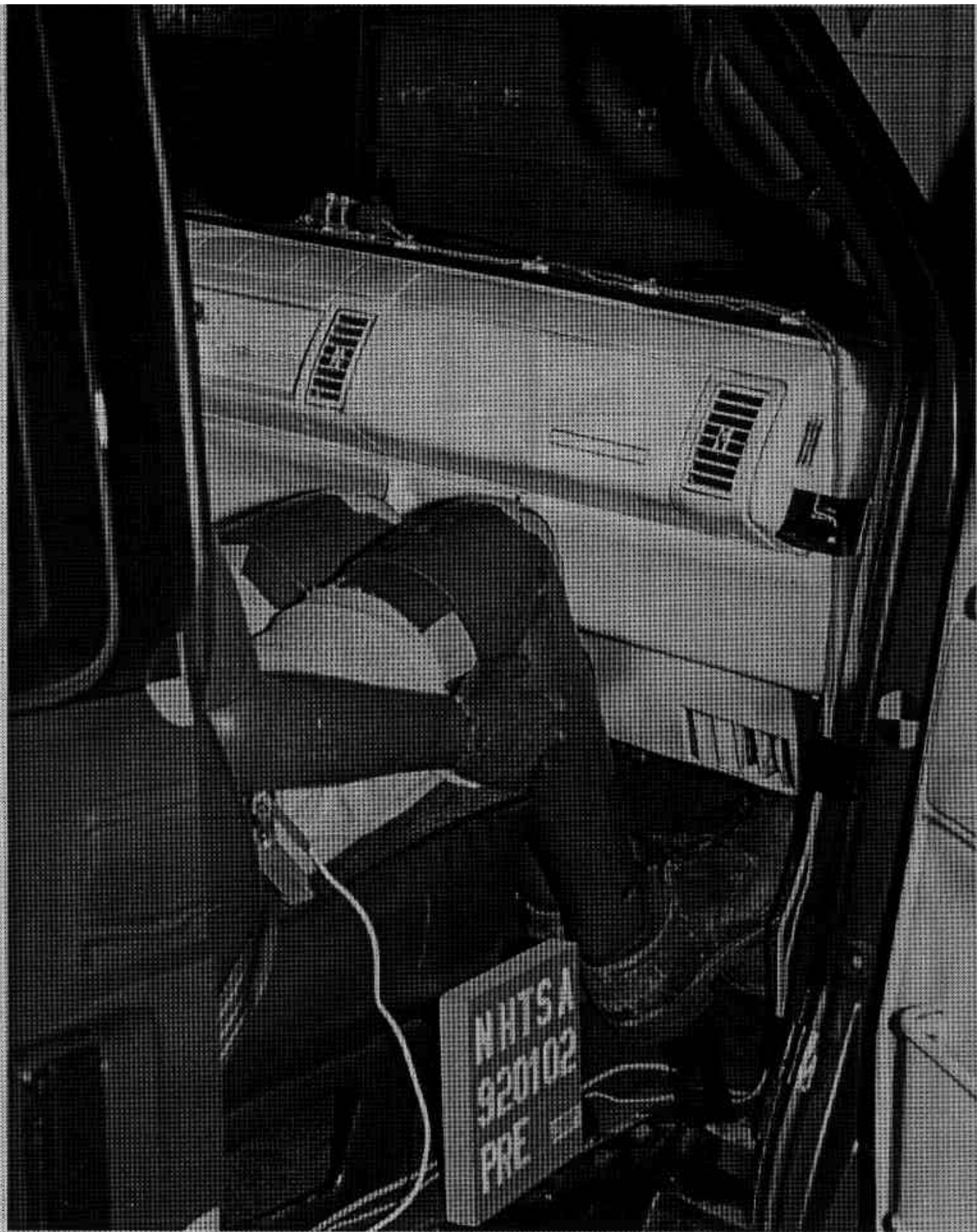


FIGURE A-36. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2
A-37 920102



FIGURE A-37. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

A-38

920102

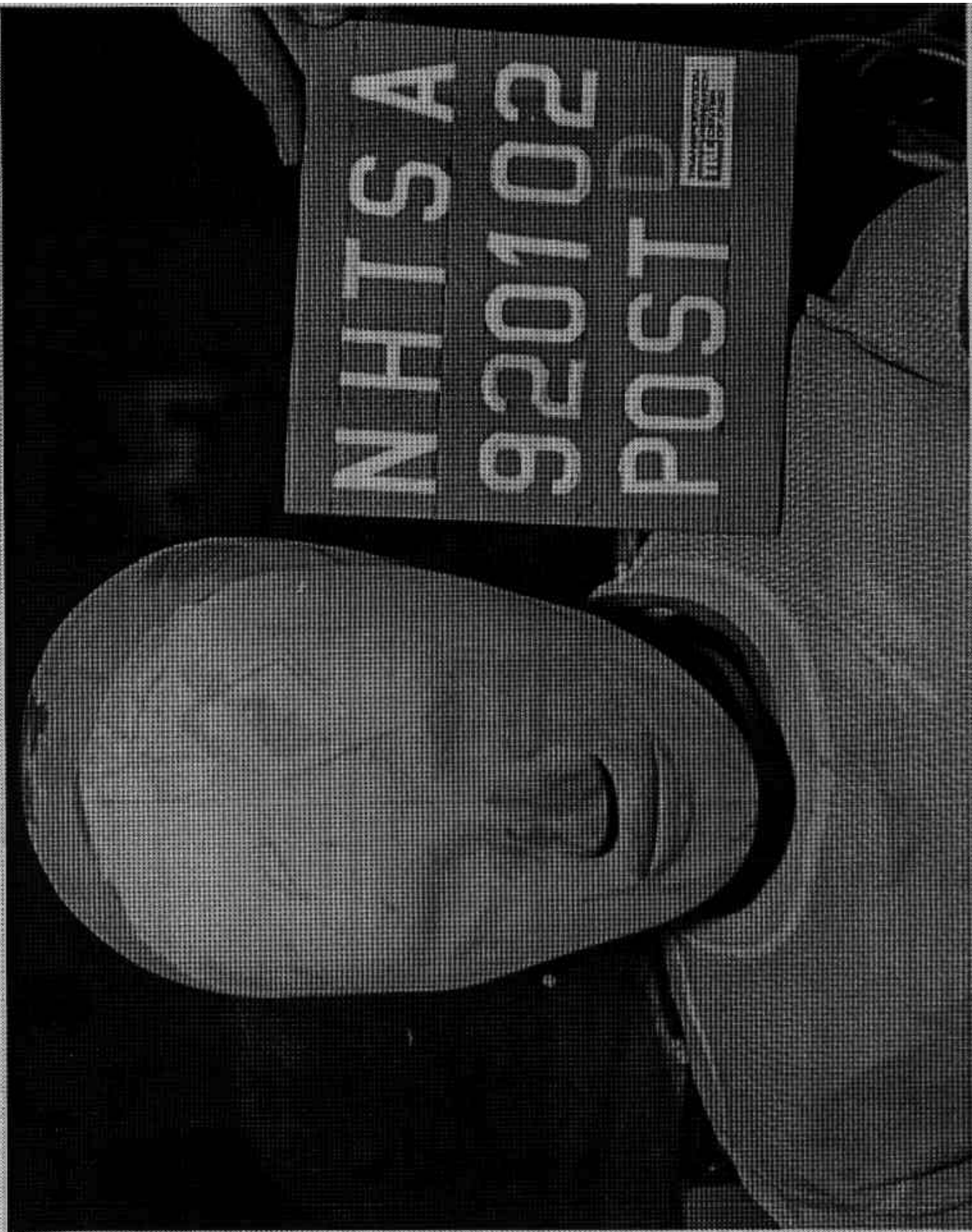


FIGURE A-38. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1

A-39

920102

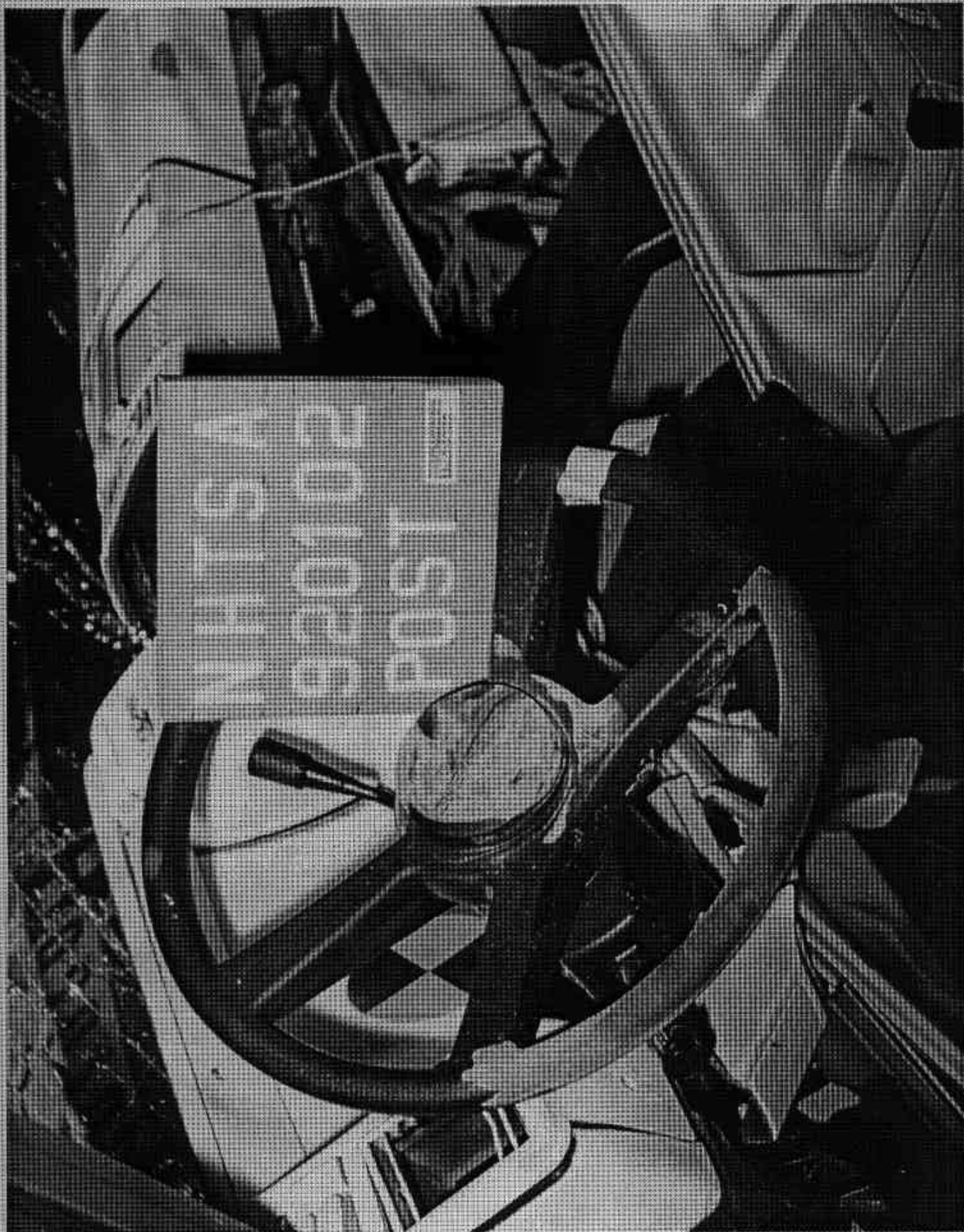


FIGURE A-39. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2

A-40

920102

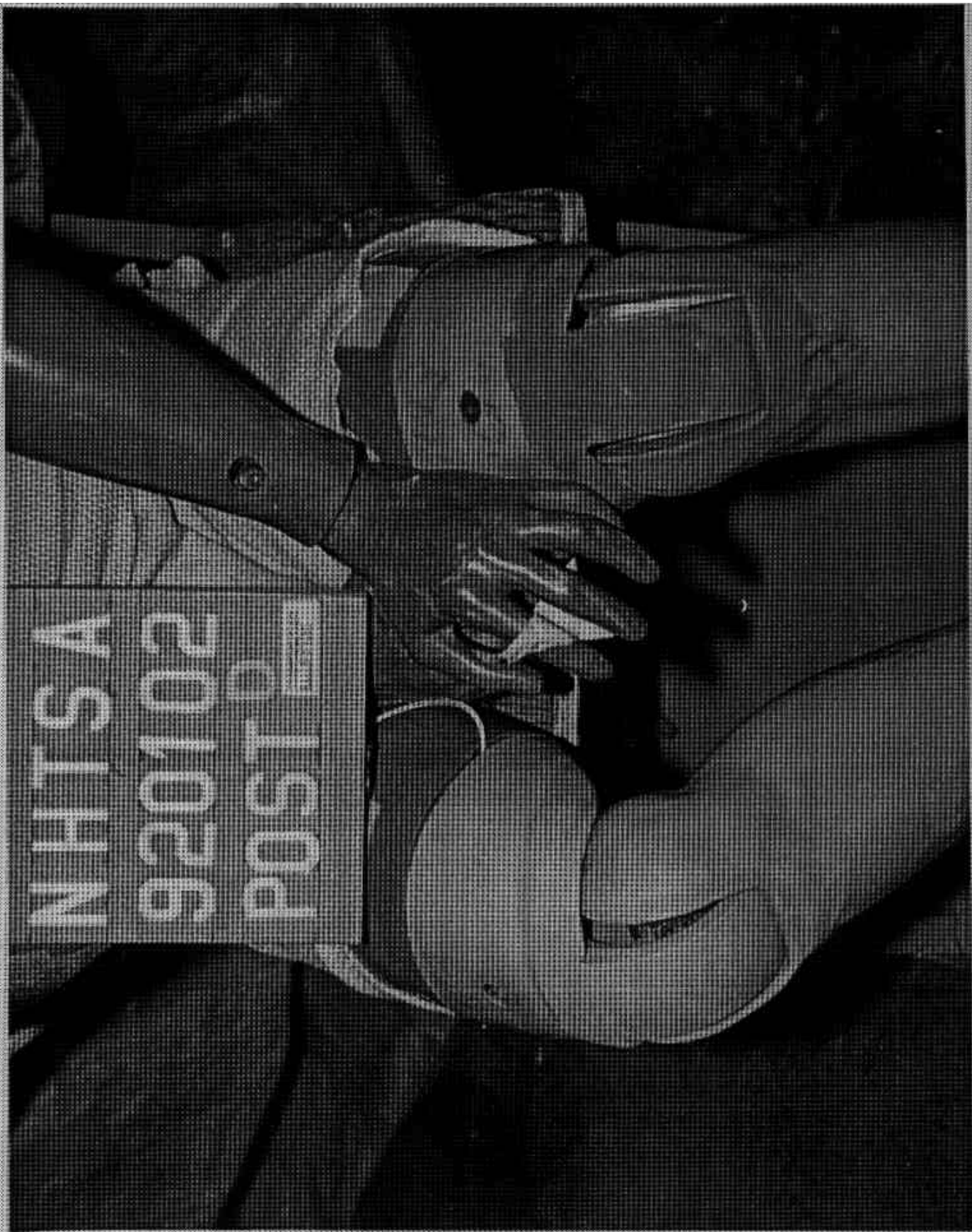


FIGURE A-40. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1

A-41

920102

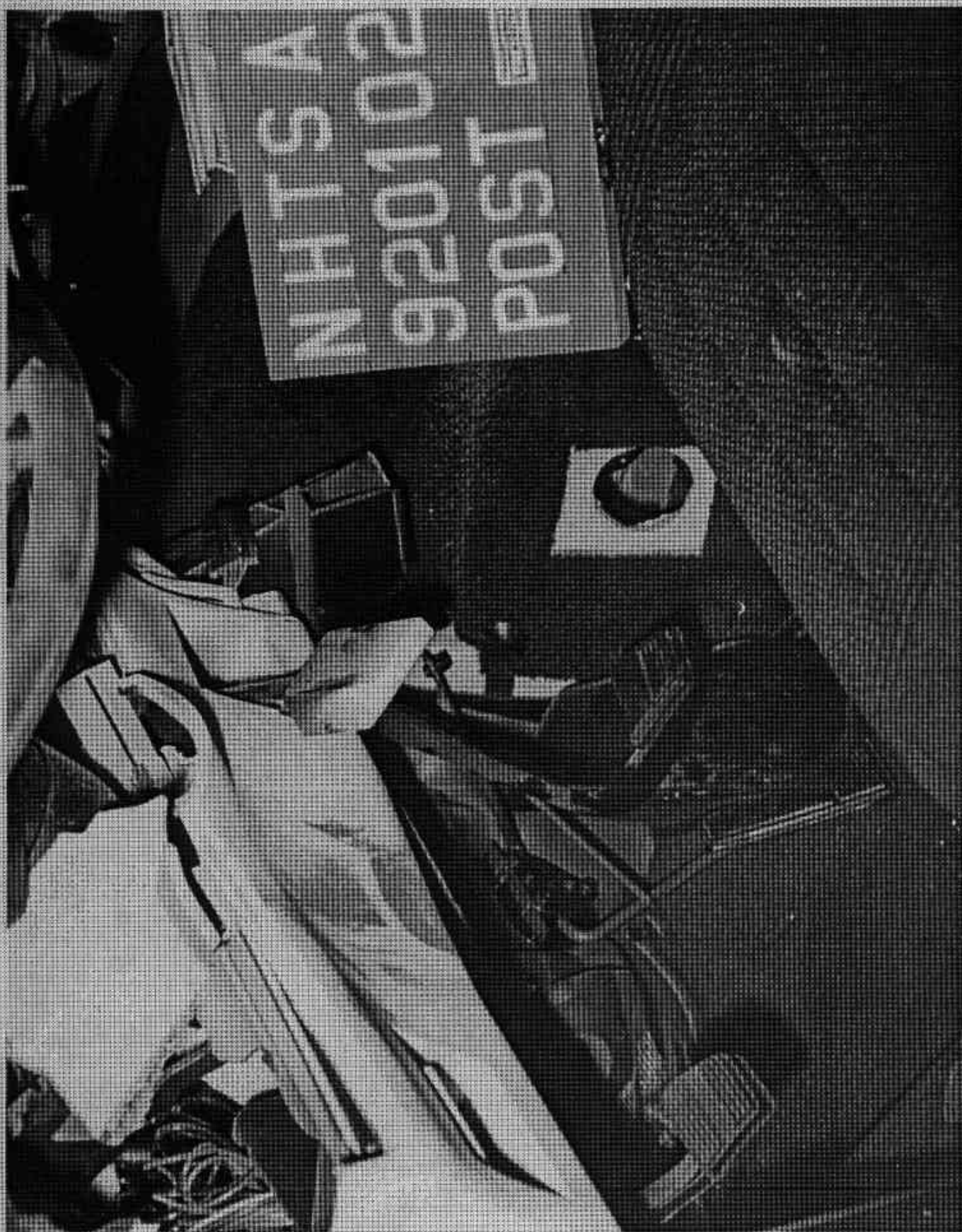


FIGURE A-41. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2

A-42

920102

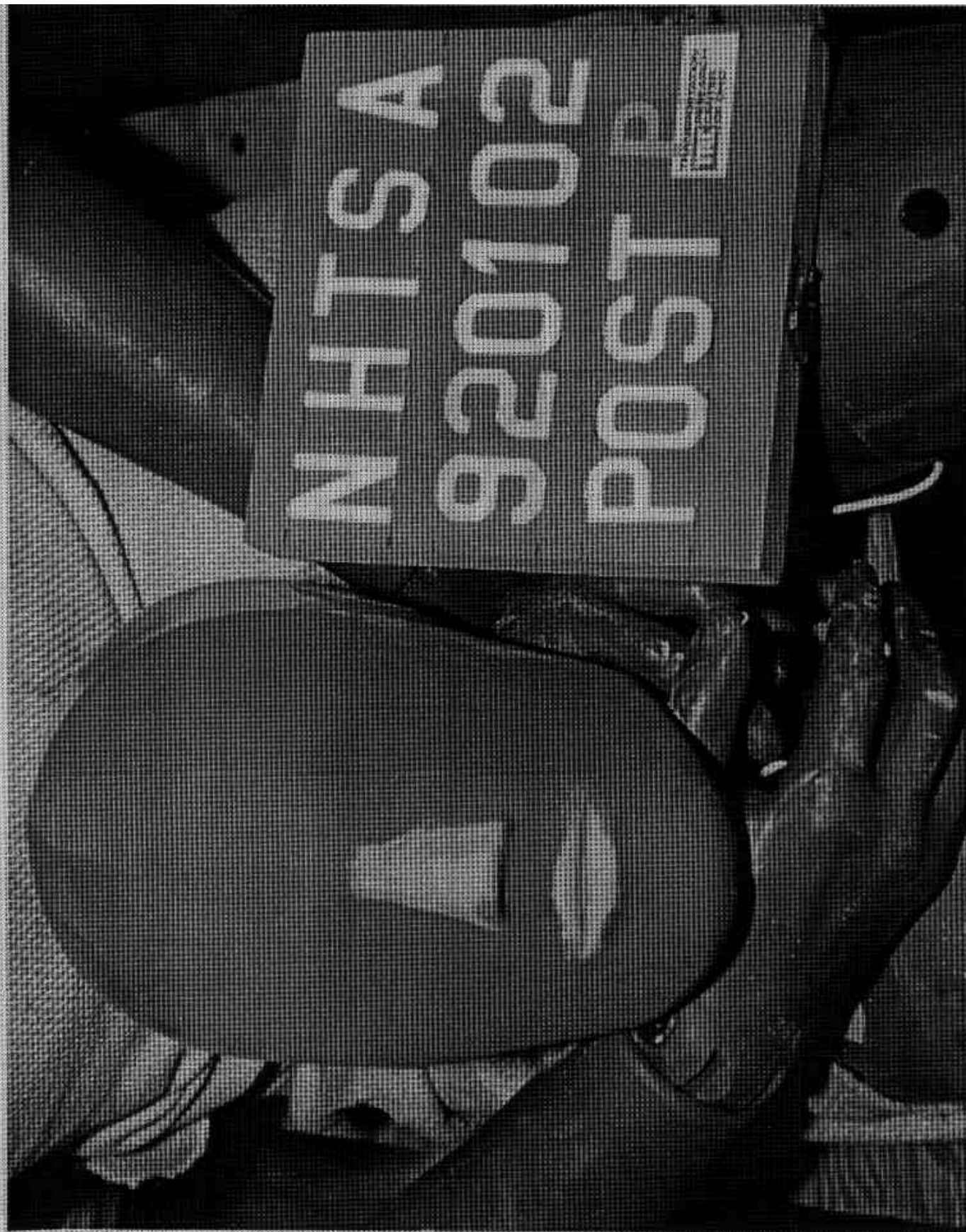


FIGURE A-42. POST-TEST PASSENGER DUMMY HEAD CONTACT VIEW

A-43

920102

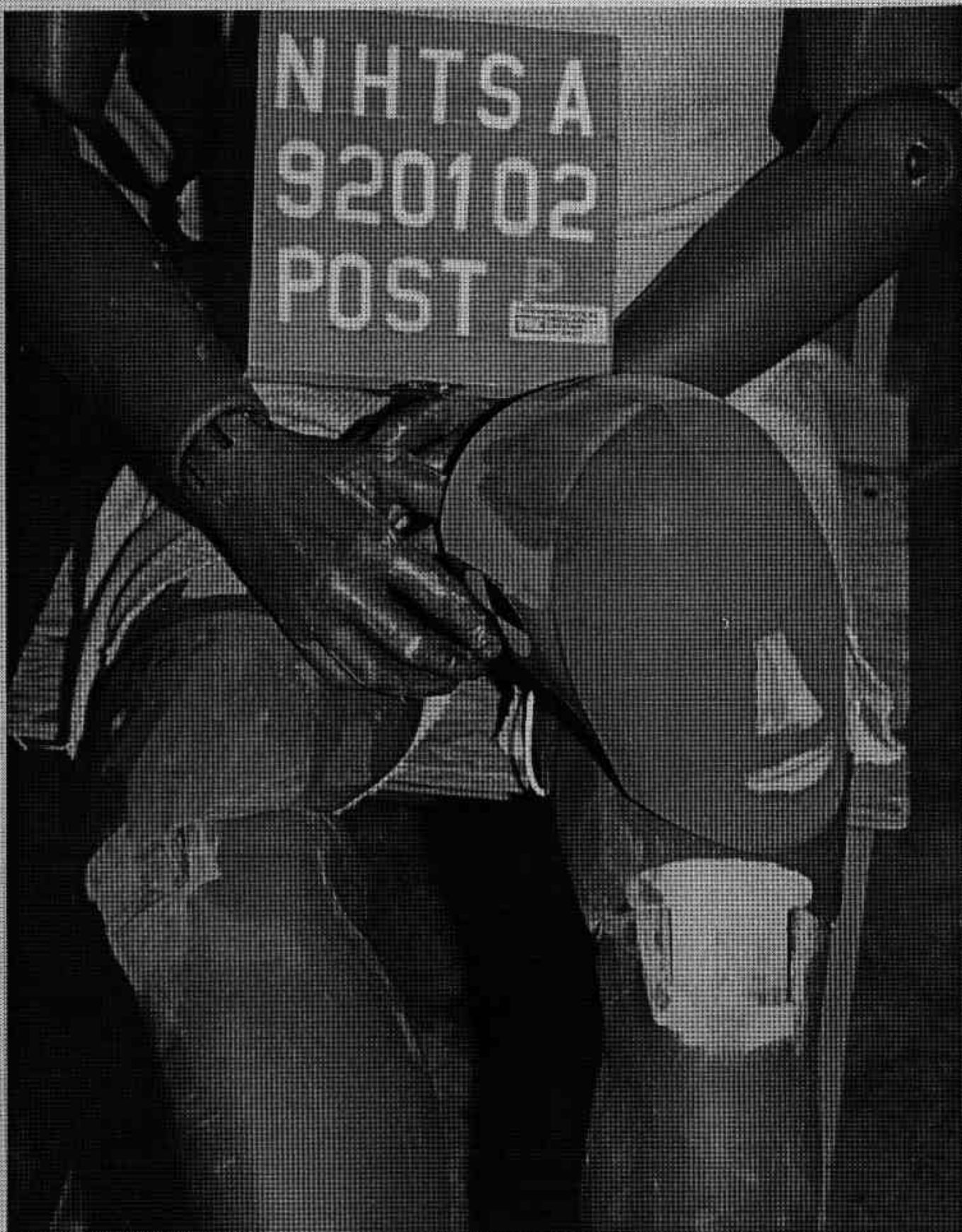


FIGURE A-43. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1

A-44

920102



FIGURE A-44. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

A-45

920102

10-100-001

MADE BY GENERAL MOTORS CORP 10/91
 VINR GAMA FRI GAMP RR
 2700/01270 2900/01315 LB/KG
 THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S.
 FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT
 ON THE DATE OF MANUFACTURE SHOWN ABOVE.
 10-100-001-001
 M.P.V.
 PAYLOAD = 1658/757
 PSI/KPA (COLD)
 35/240
 35/240
 60/420
 MANUAL FOR ADDITIONAL INFORMATION

Fig A-45. PRE-TEST VEHICLE CERT. & RECOMMENDED TIRE PRES. LABEL

APPENDIX B

DATA PLOTS

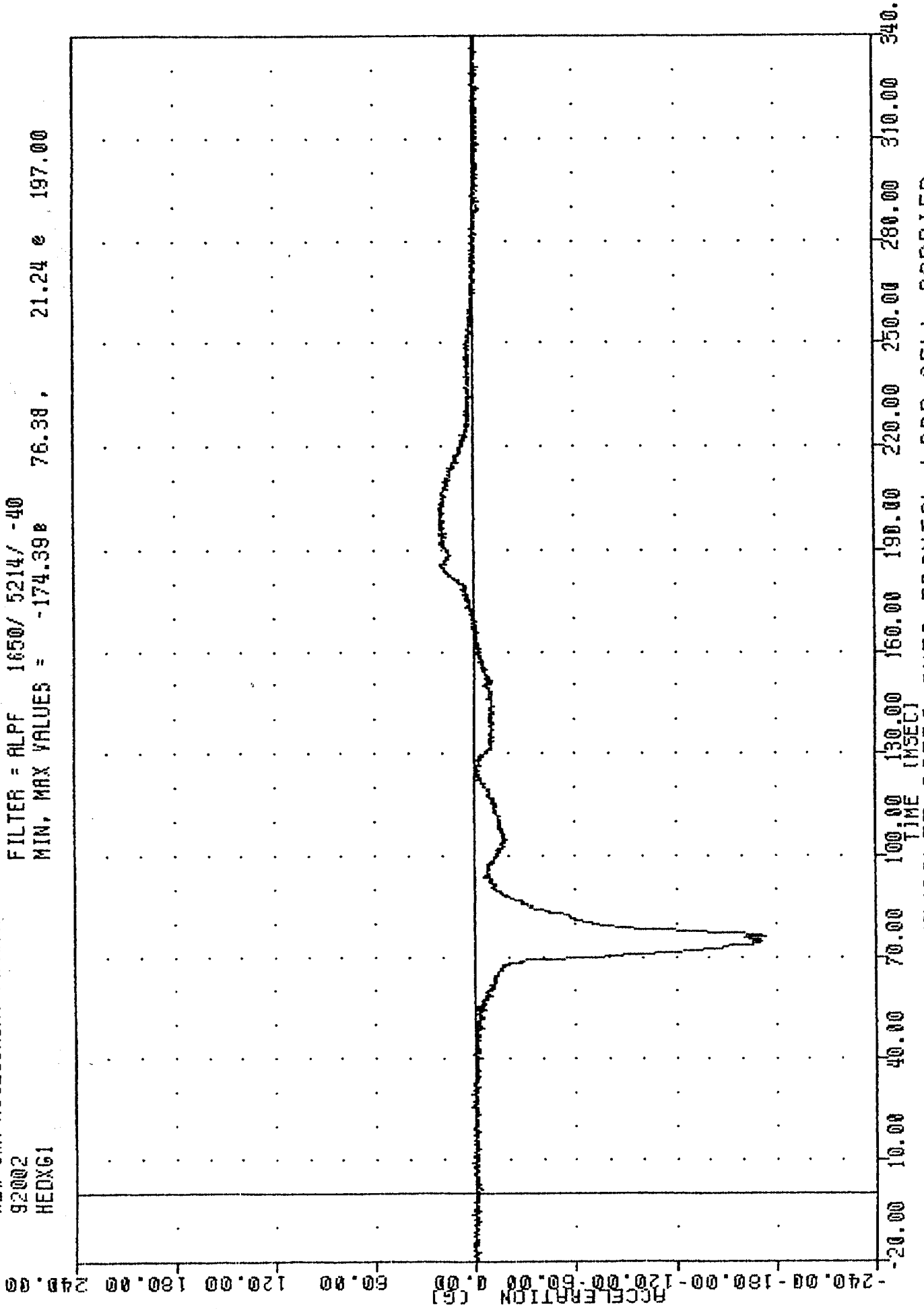
Intentionally Left Blank

NEW CAR ASSESSMENT PROGRAM

92002
HEDXG1

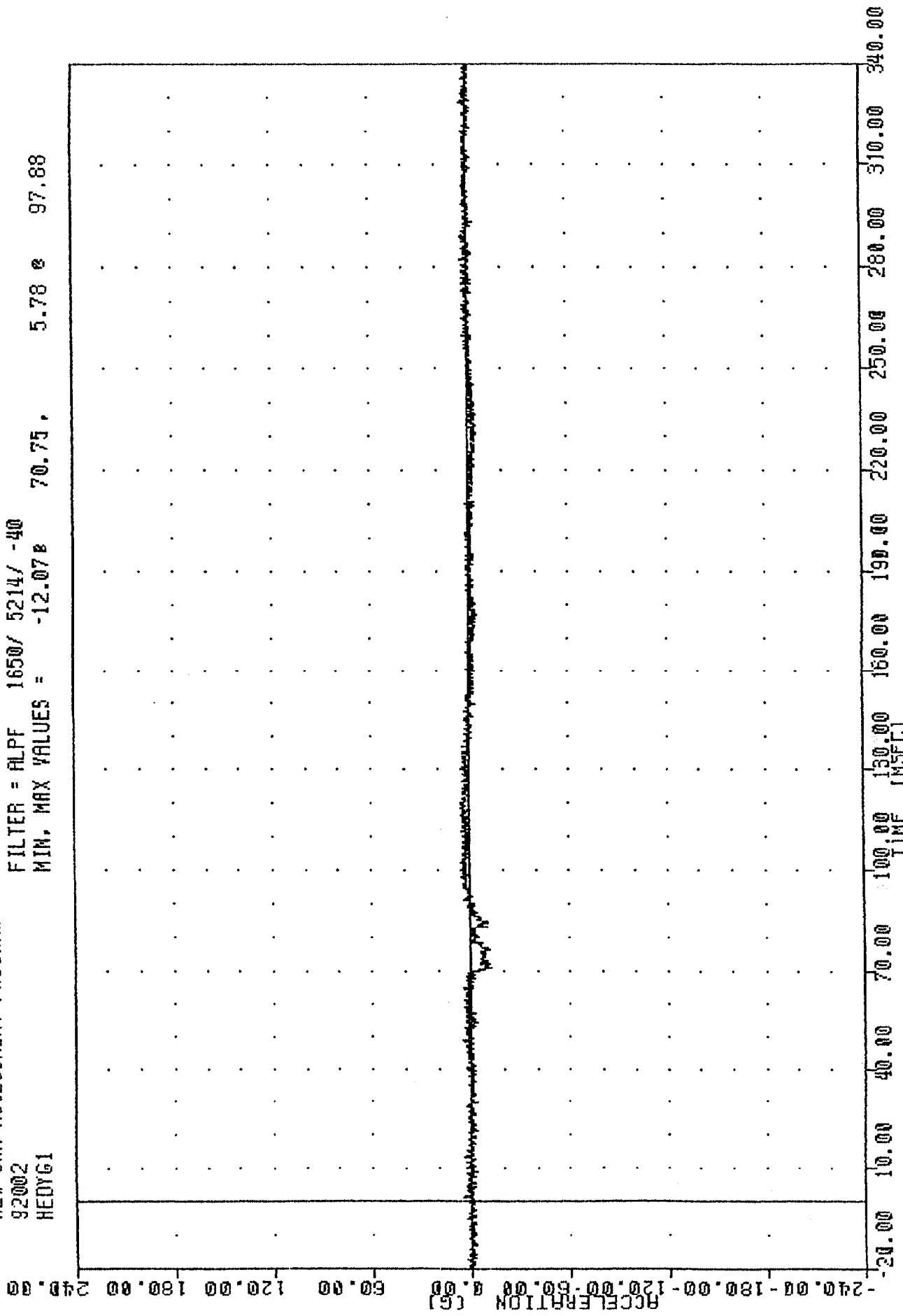
FILTER = ALPF 1650/ 5214/ -40

MIN, MAX VALUES = -174.398 76.38, 21.24 e 197.00



TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 920002
 HEDY61

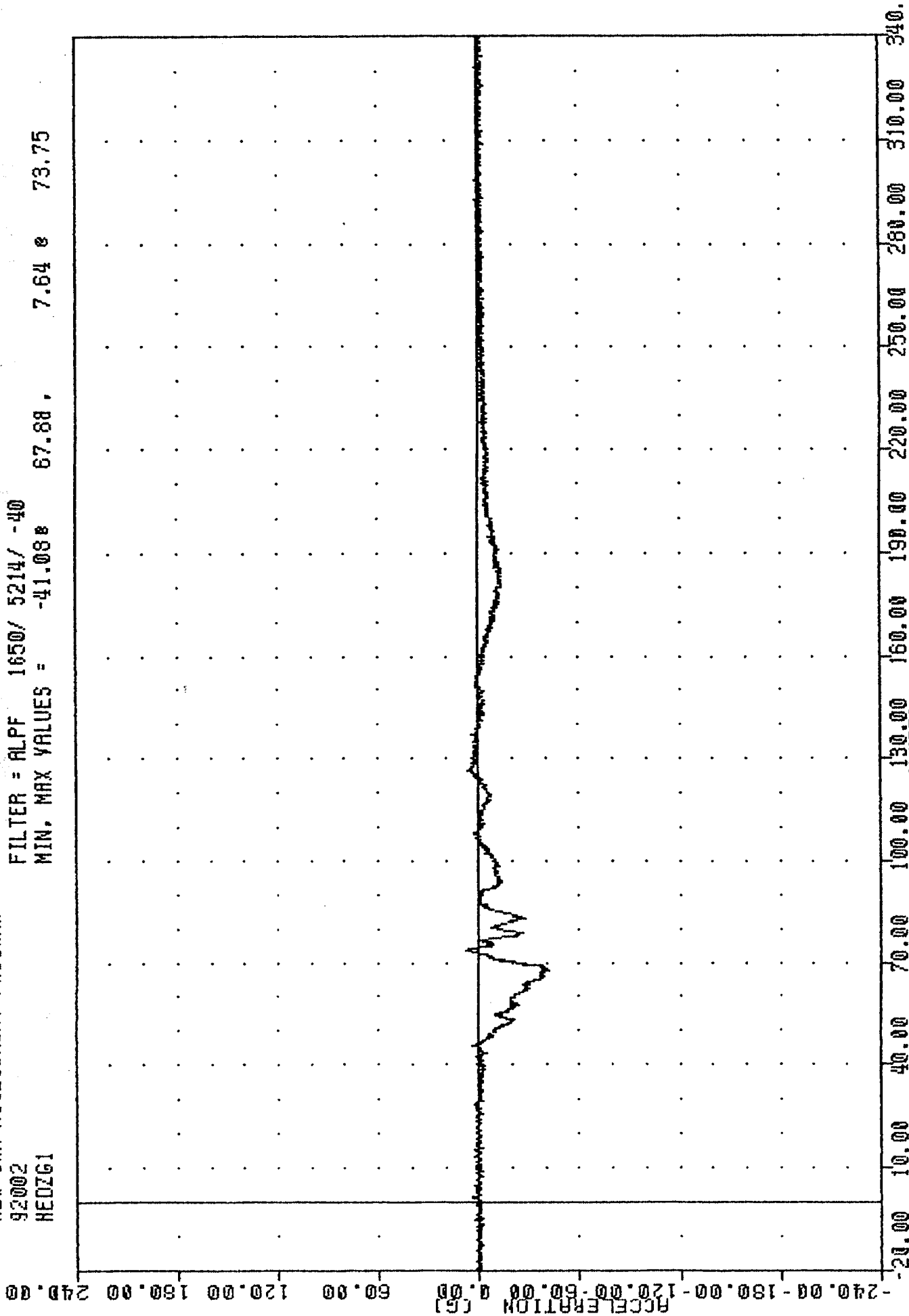
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -12.078 70.75, 5.78 97.88



NEW CAR ASSESSMENT PROGRAM

92002
HEDZG1

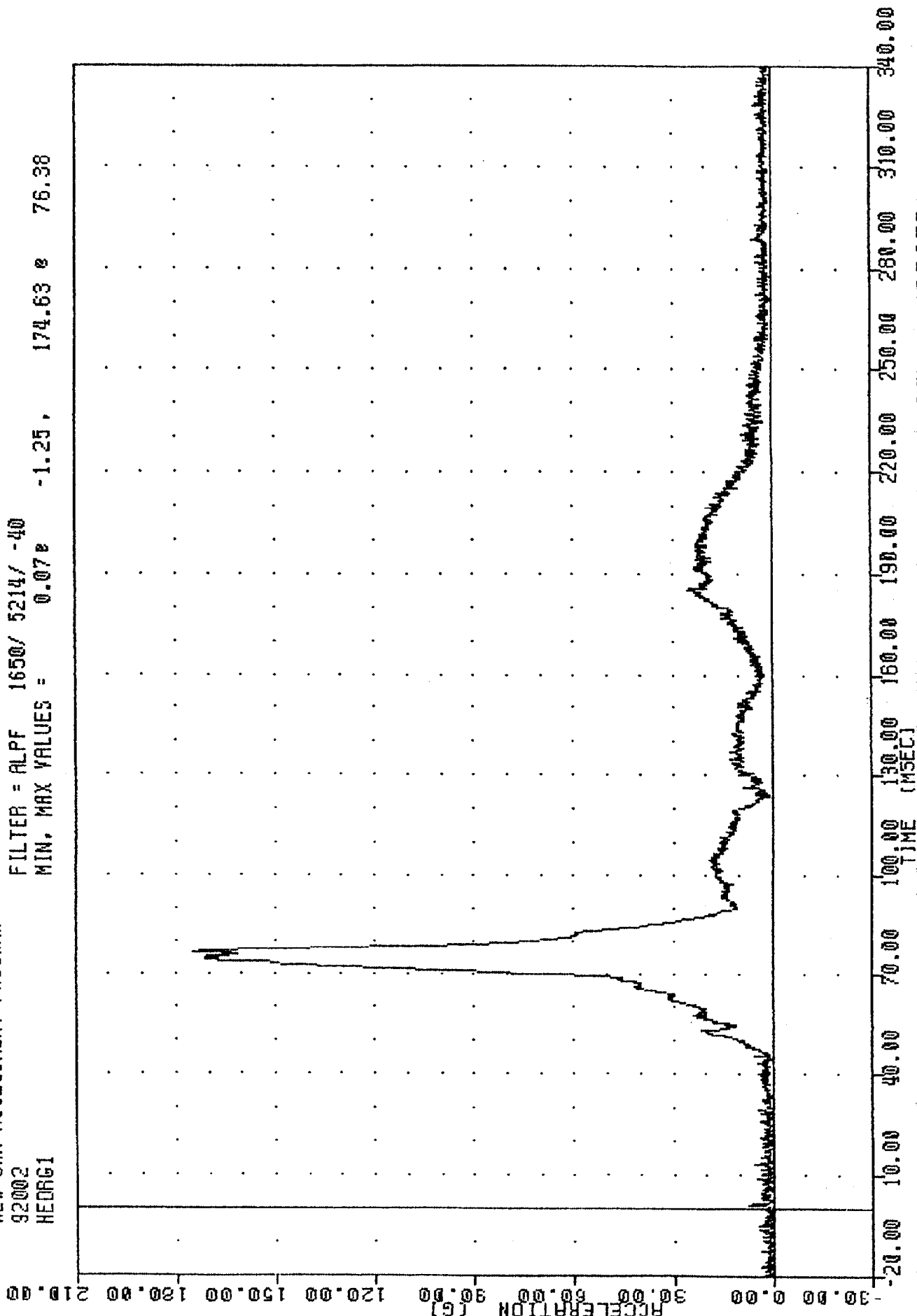
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -41.08 67.88 , 7.64 73.75



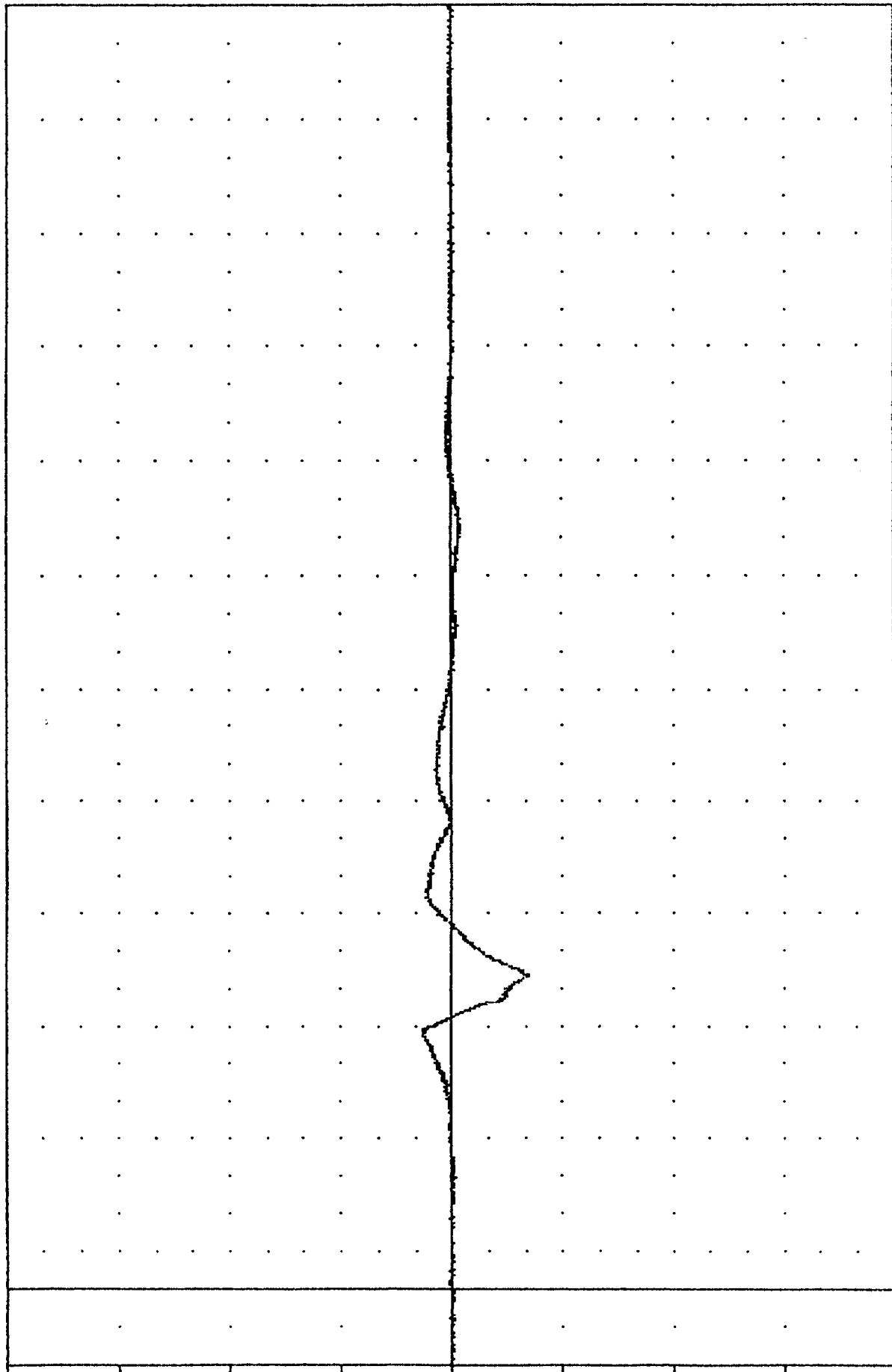
1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 HEDRG1

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.07e -1.25, 174.63 e 76.38



FORCE (LBS) (X10⁴)



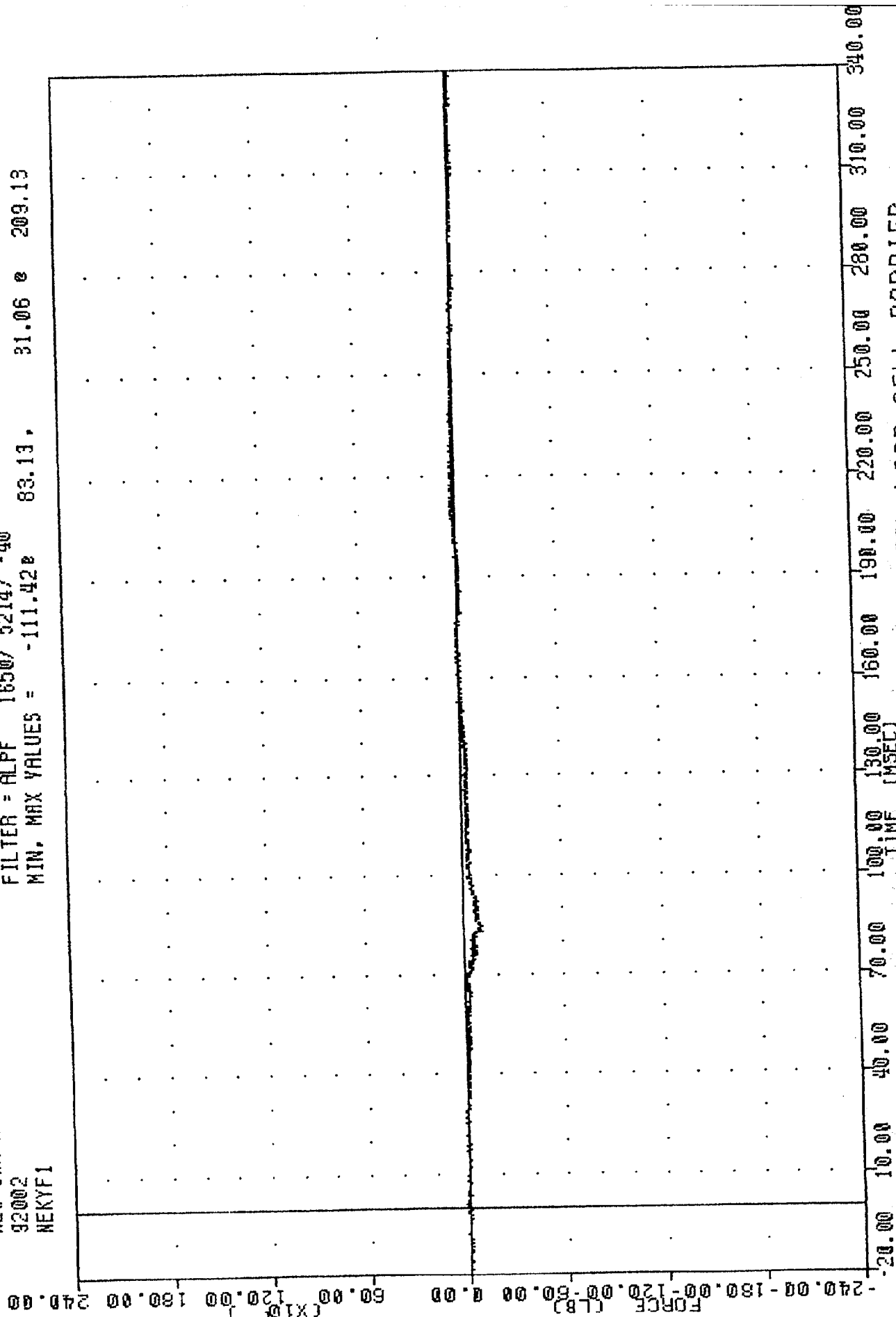
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

TIME (MSEC)

1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK X-AXIS SHEAR FORCE

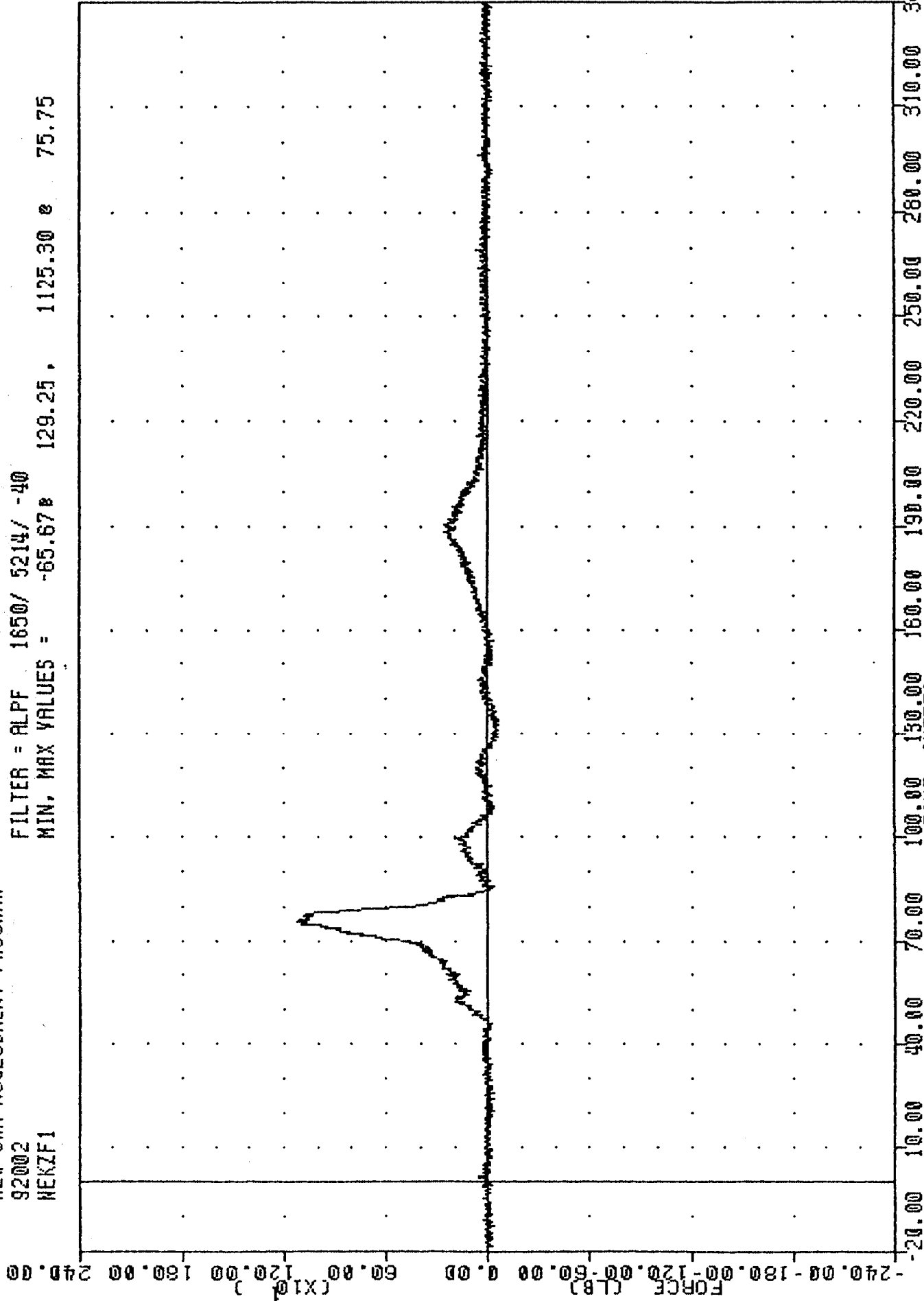
TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 920002
 NEKYF1

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -111.42 83.13 31.06 209.13



920102

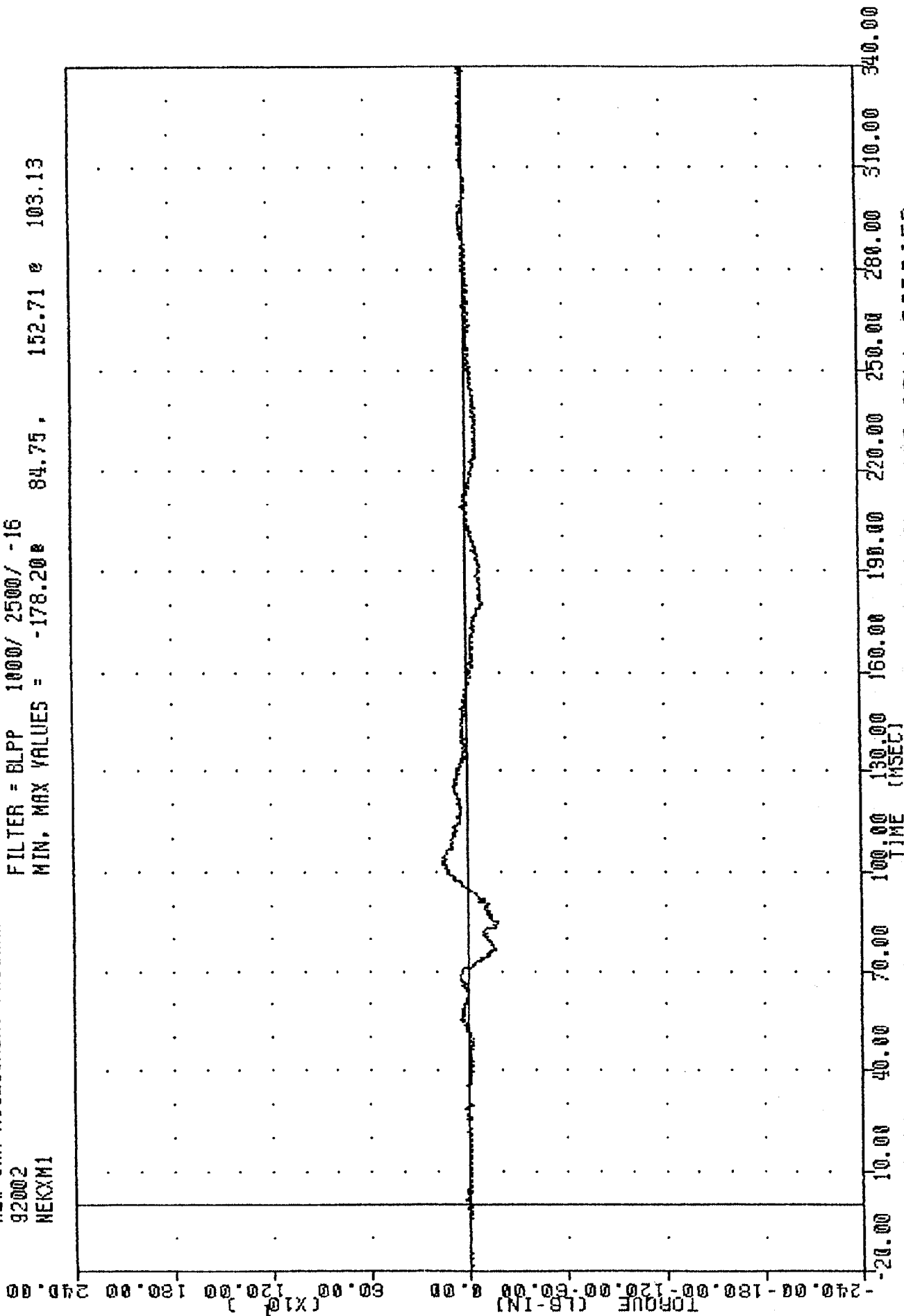
1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK Y-AXIS SHEAR FORCE



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK Z-AXIS AXIAL FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 NEKXM1

FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -178.20e 84.75 , 152.71 e 103.13



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT X AXIS

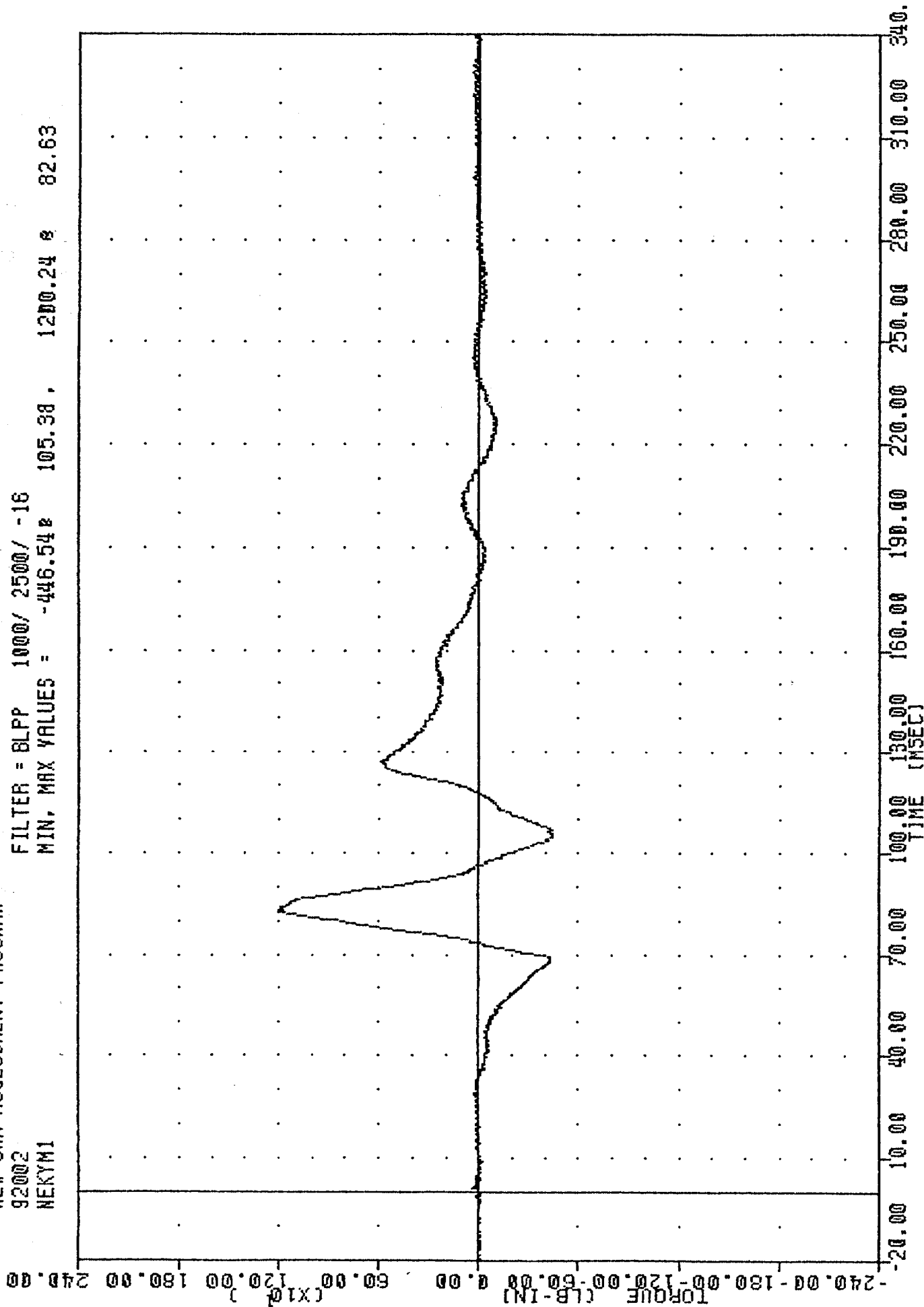
NEW LHM ASSESSMENT PTHGHHH

92002

NEKYM1

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -446.54 105.38 1200.24 82.63



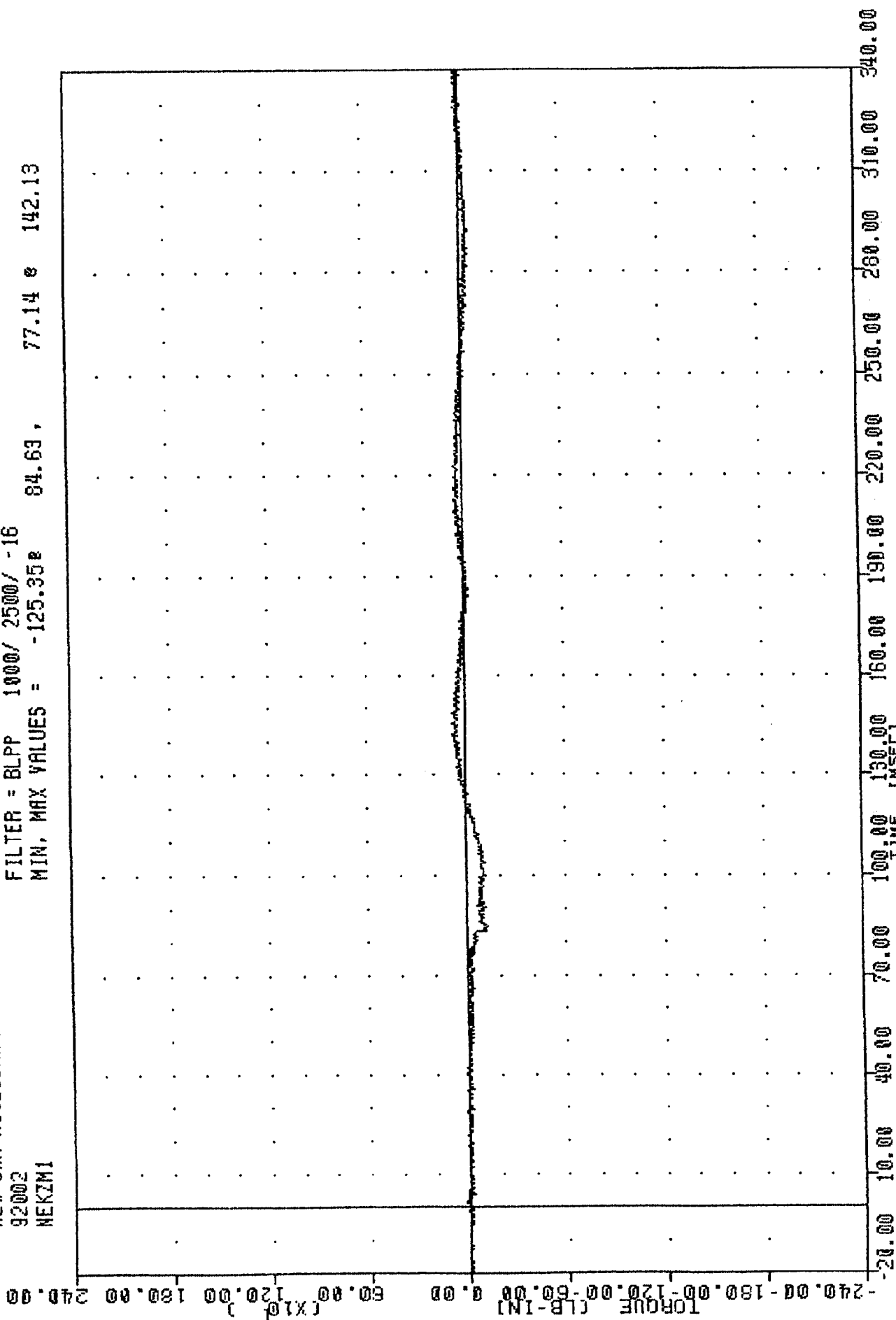
B-10

920102

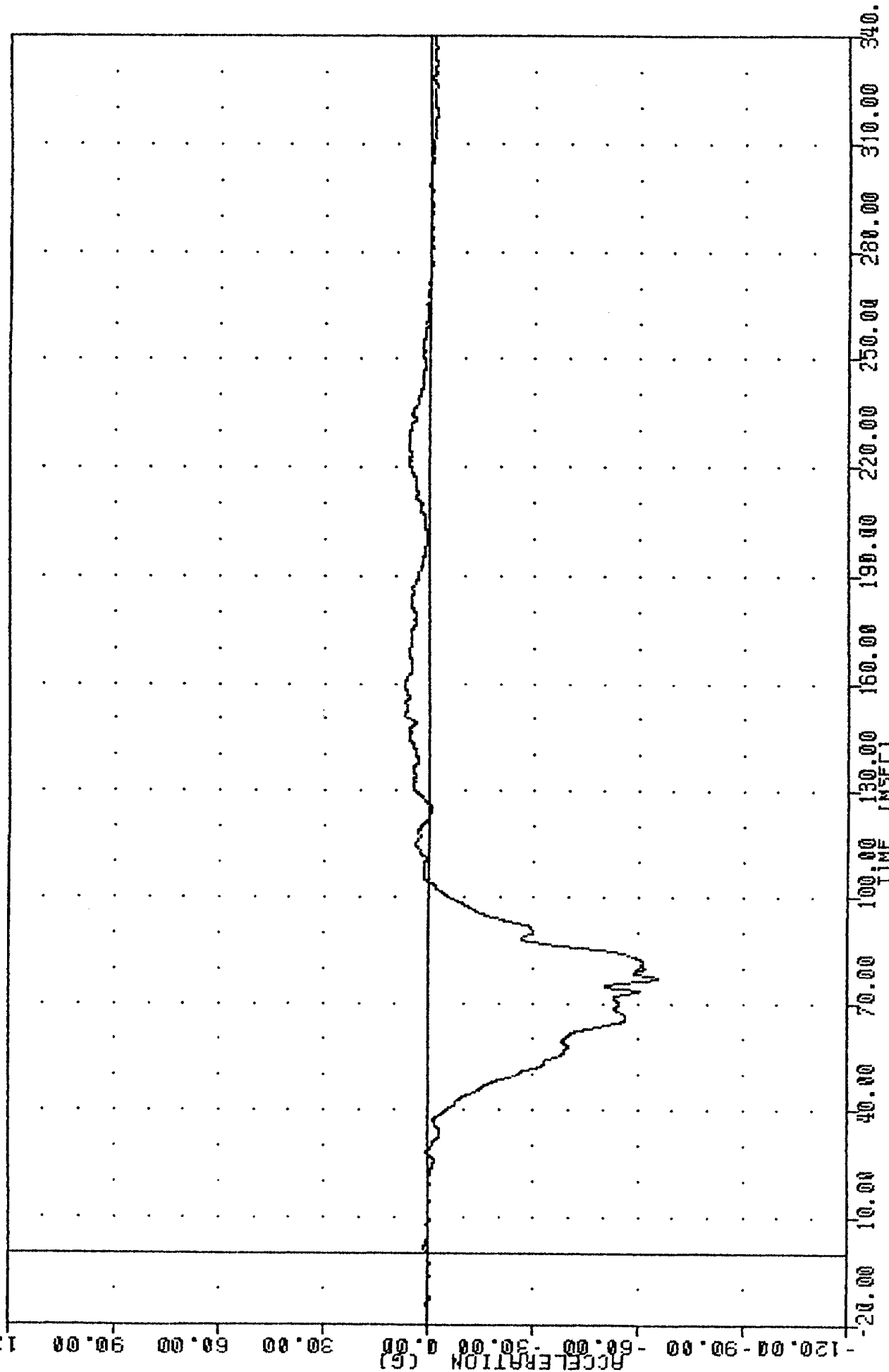
1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 NEKZM1

FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -125.35e 84.63 , 77.14 e 142.13



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 DRIVER NECK MOMENT ABOUT Z AXIS

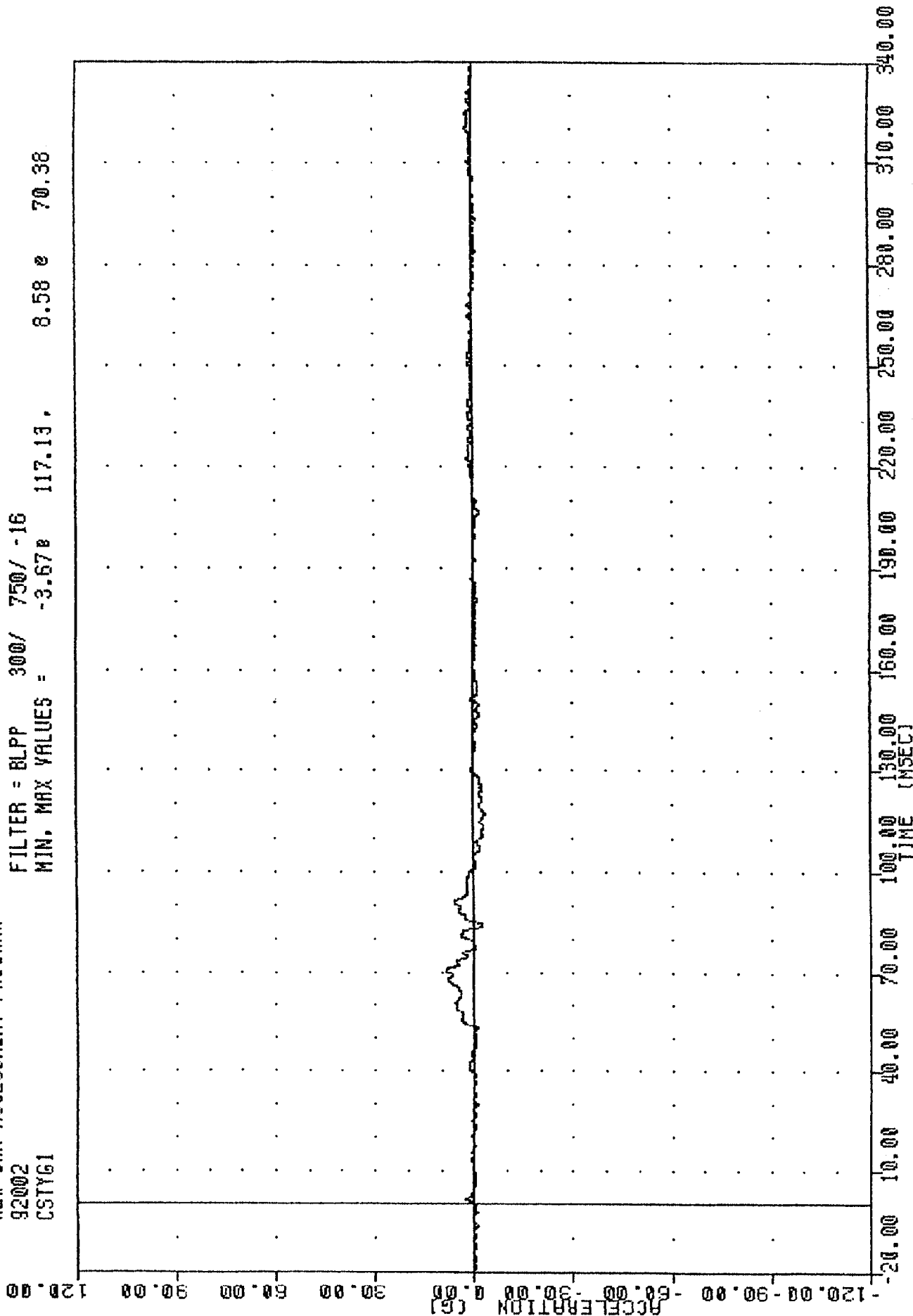


1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER

DRIVER CHEST X-AXIS ACCELERATION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 CSTYG1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -3.67e 117.13, 8.58 e 70.38



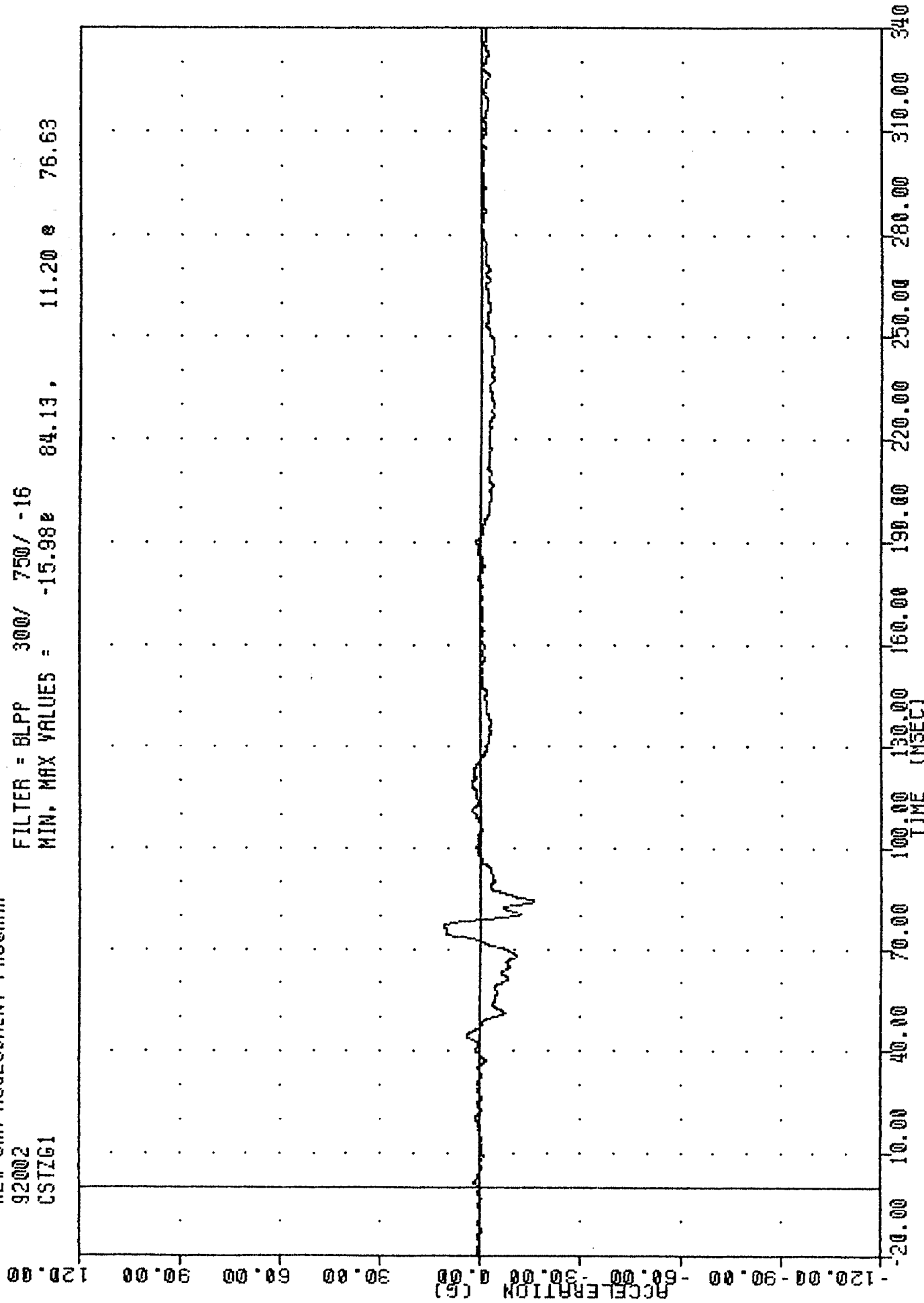
NEW LHM ASSESSMENT PROGRAM

92002

CSTZG1

FILTER = BLPP 300/ 750/ -16

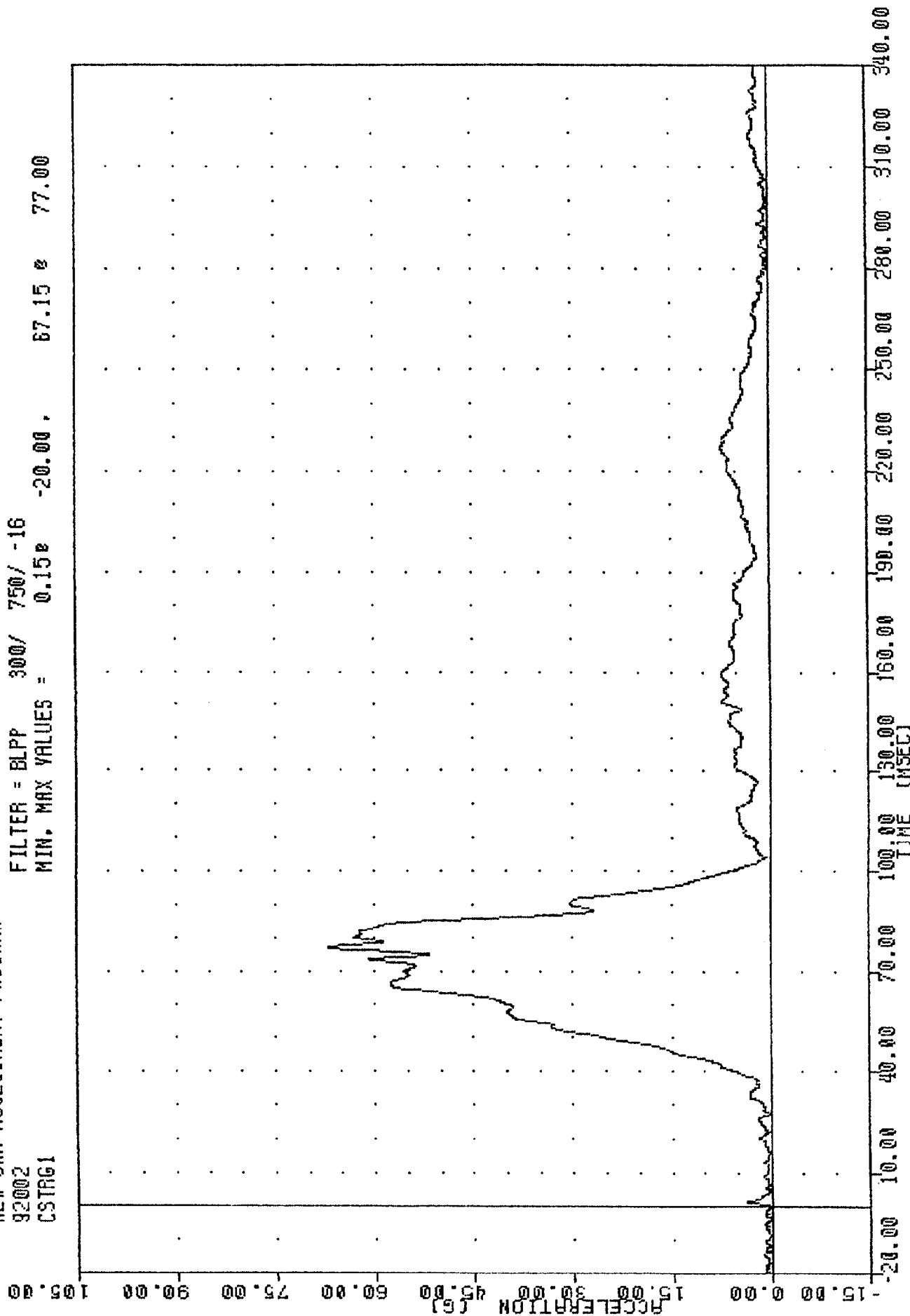
MIN. MAX VALUES = -15.98e 84.13, 11.20 e 76.63



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION

TRC 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 CSTRG1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.15e -20.00, 67.15 e 77.00



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION

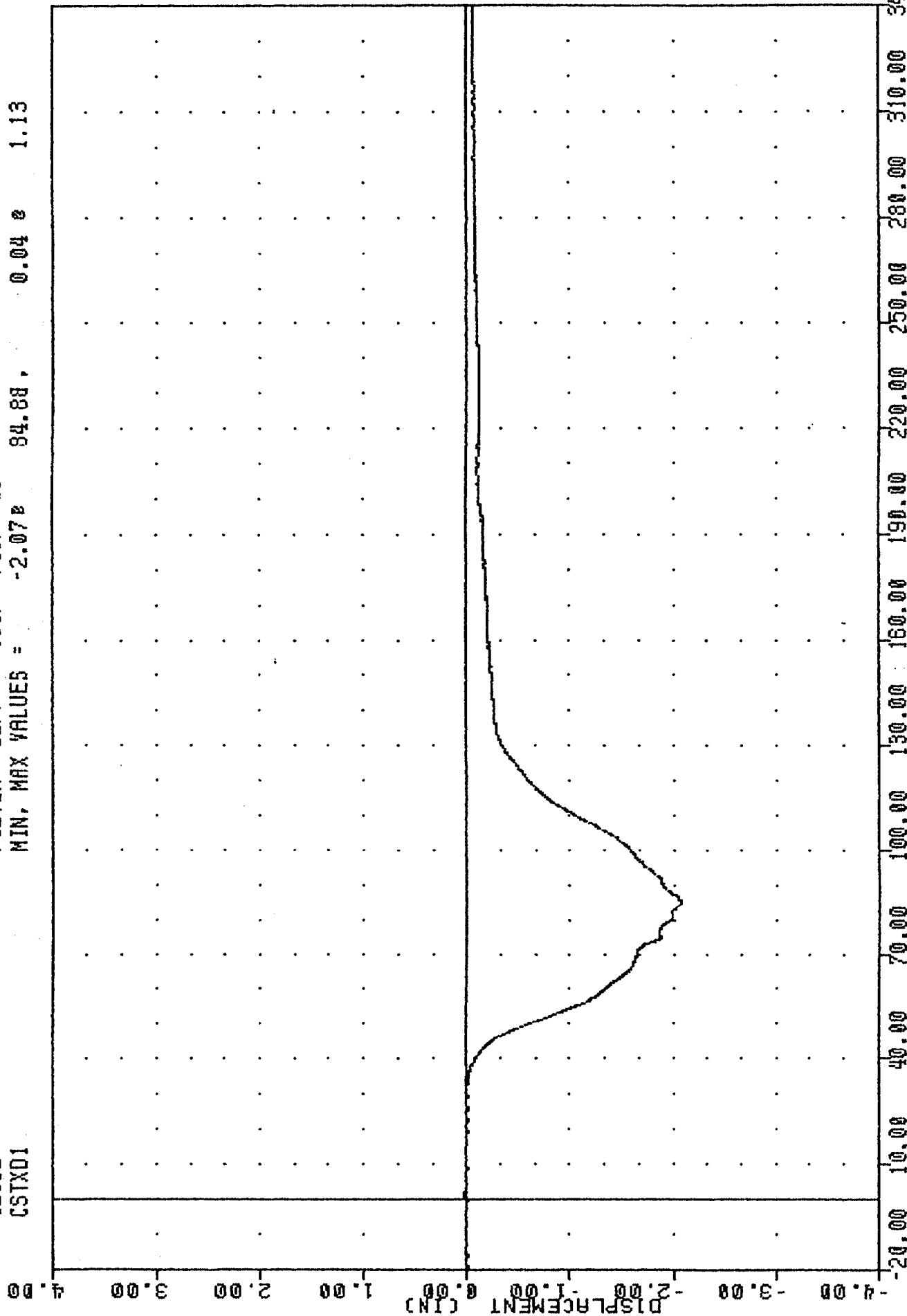
FILE: C:\DATA\1992CHEV\1992CHEV.DAT

92002

FILTER = BLPP 300/ 750/ -16

CSTD01

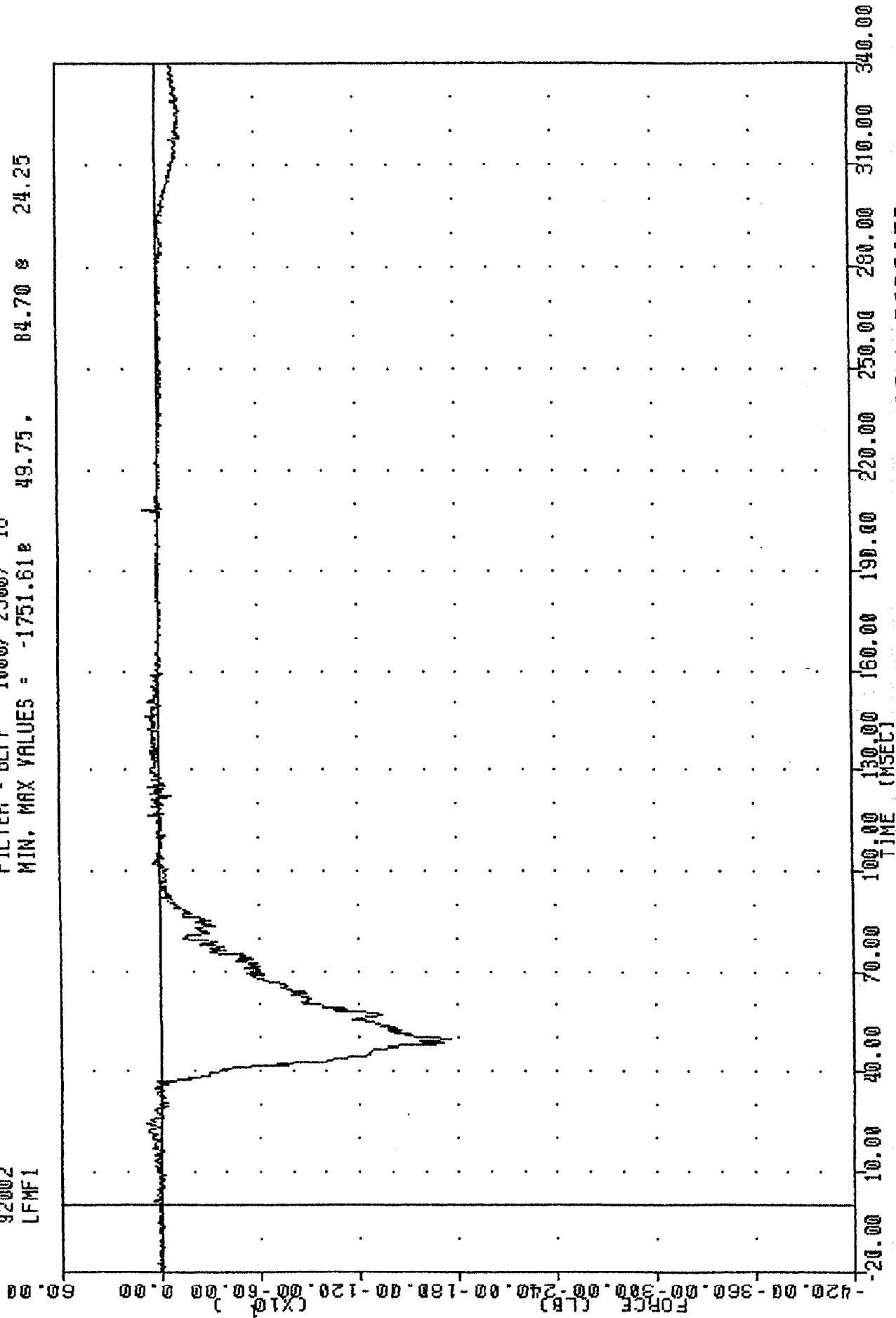
MIN, MAX VALUES = -2.07 84.88 0.04 1.13



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST DEFLECTION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 LFMF1

FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -1751.61e 49.75, 84.70 s 24.25



NEW CAR ASSESSMENT PROGRAM

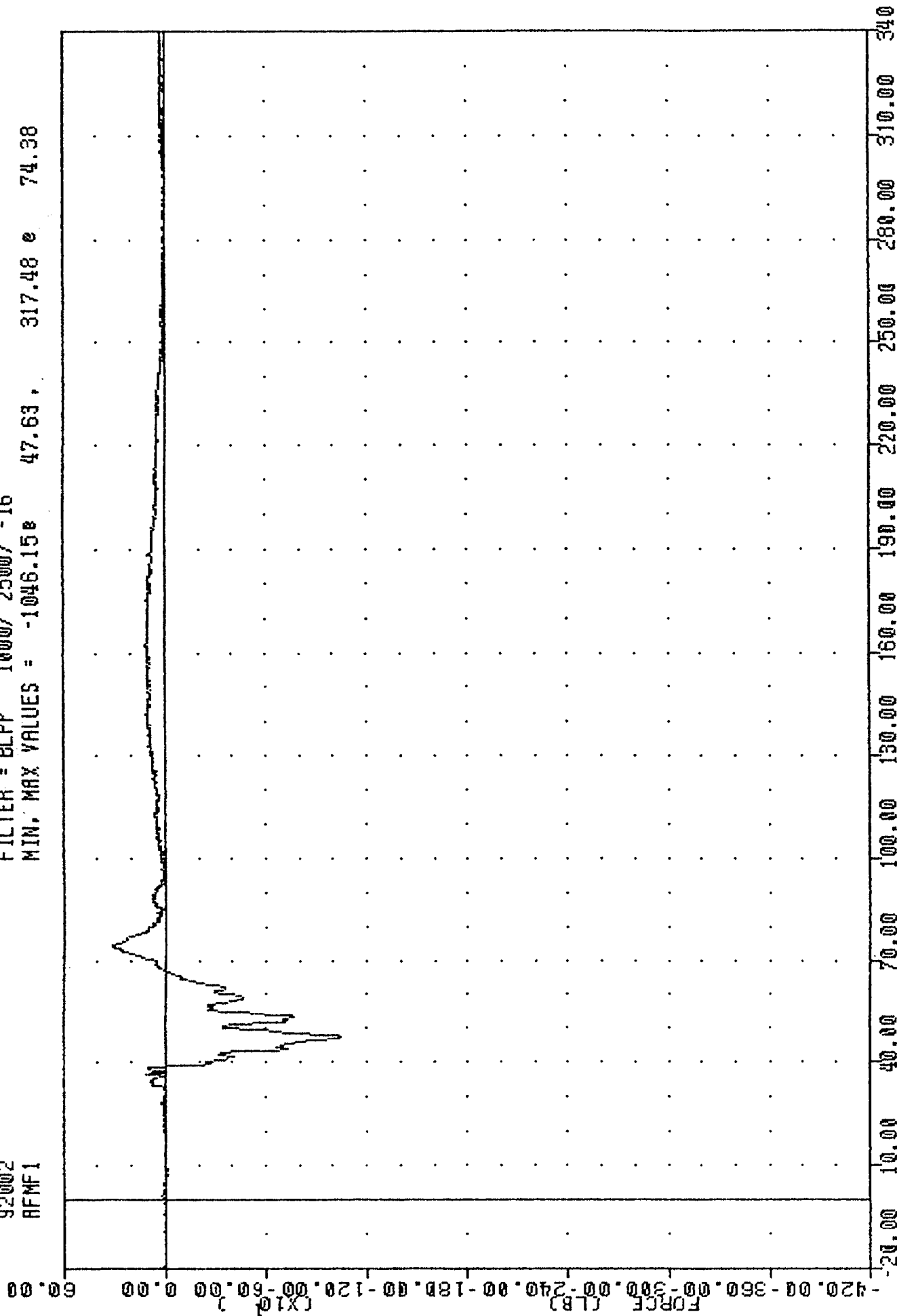
920002

AFMF1

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -1046.15e 47.63,

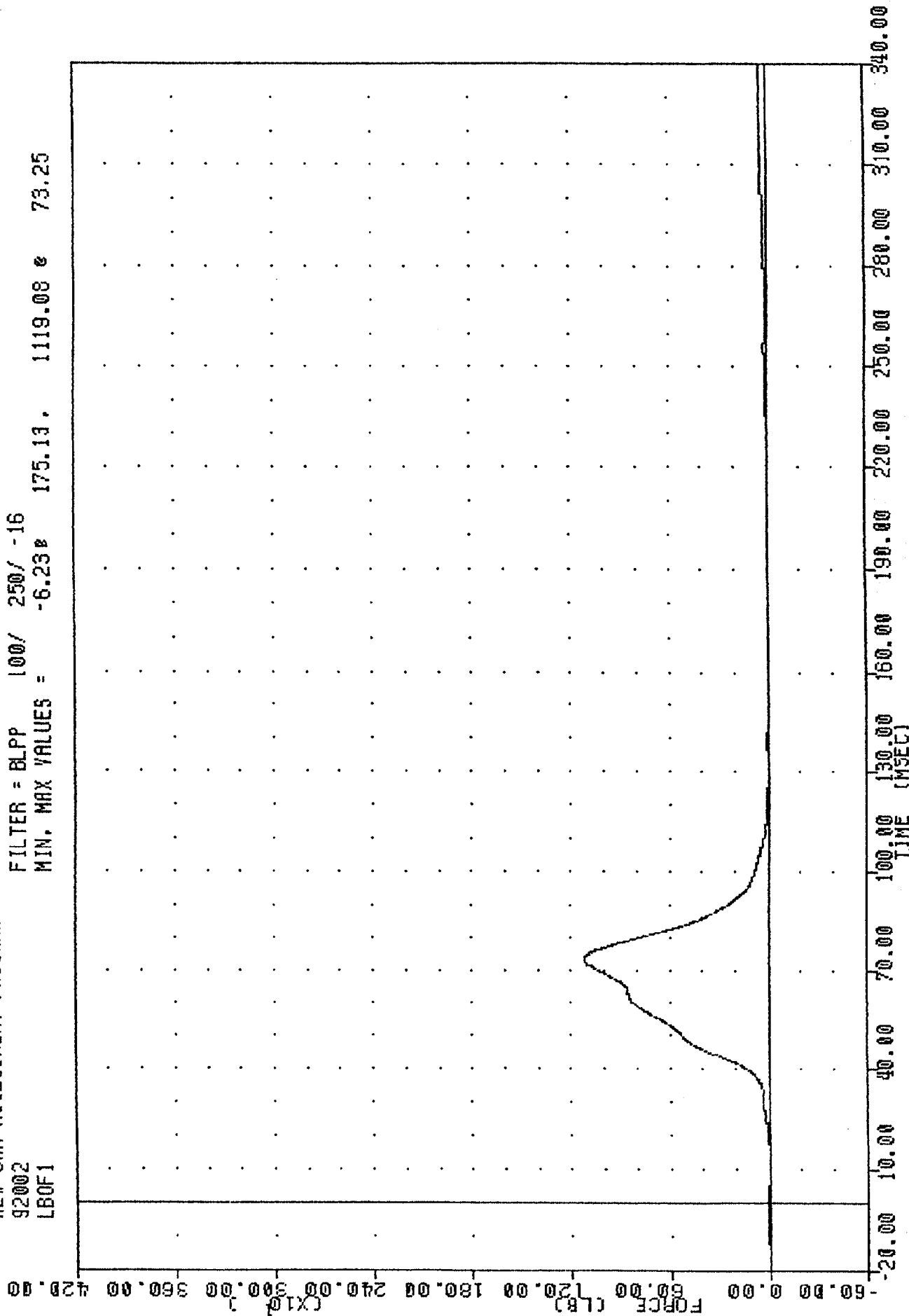
317.48 e 74.38



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FEMUR FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 LB0F1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -6.23 175.13 1119.08 e 73.25

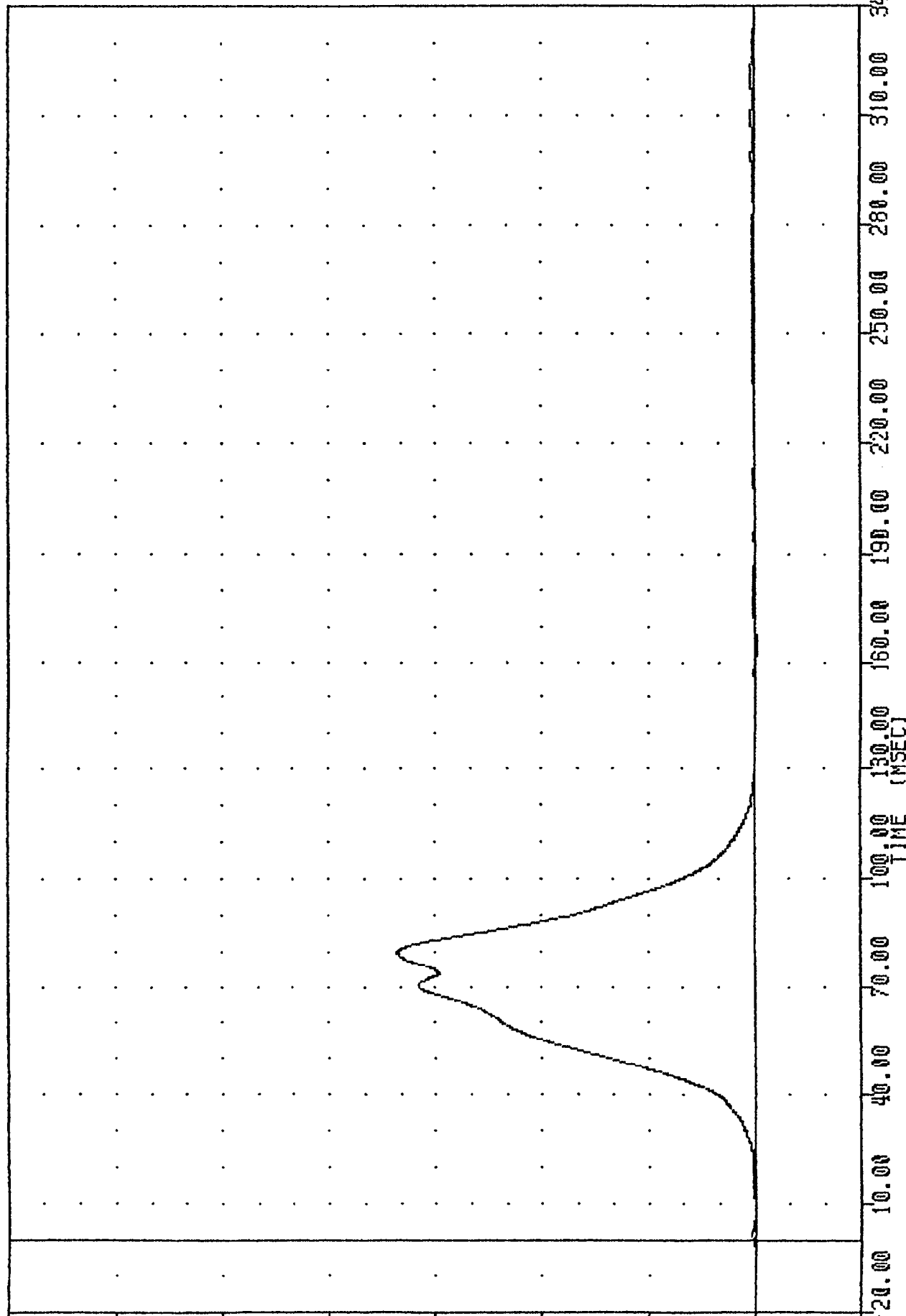


1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 DRIVER LAP BELT OUTBOARD FORCE

FORCE (LB)
(x10³)

B-20

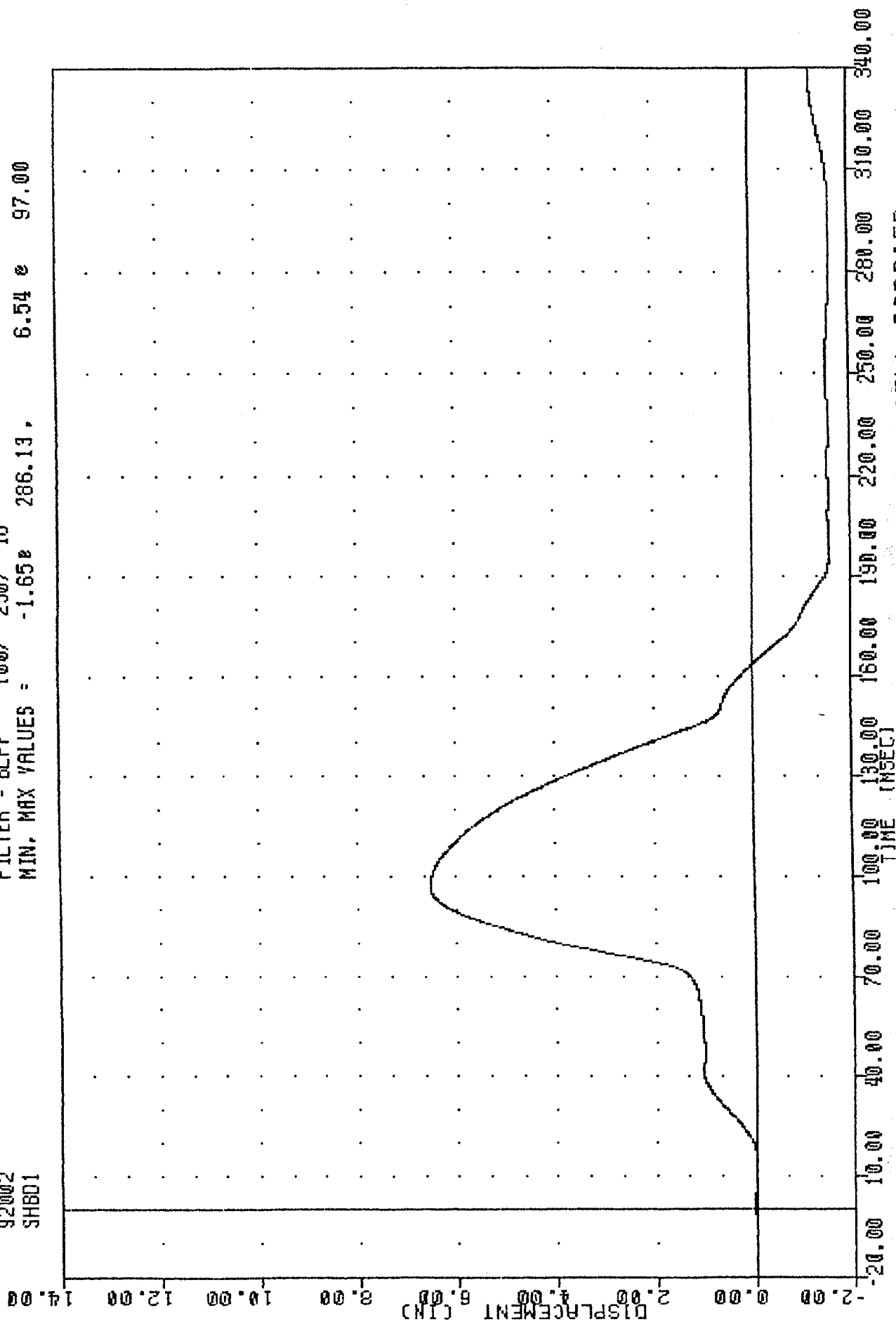
920102



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
DRIVER SHOULDER BELT FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 SH601

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1.65% 286.13 , 6.54 % 97.00



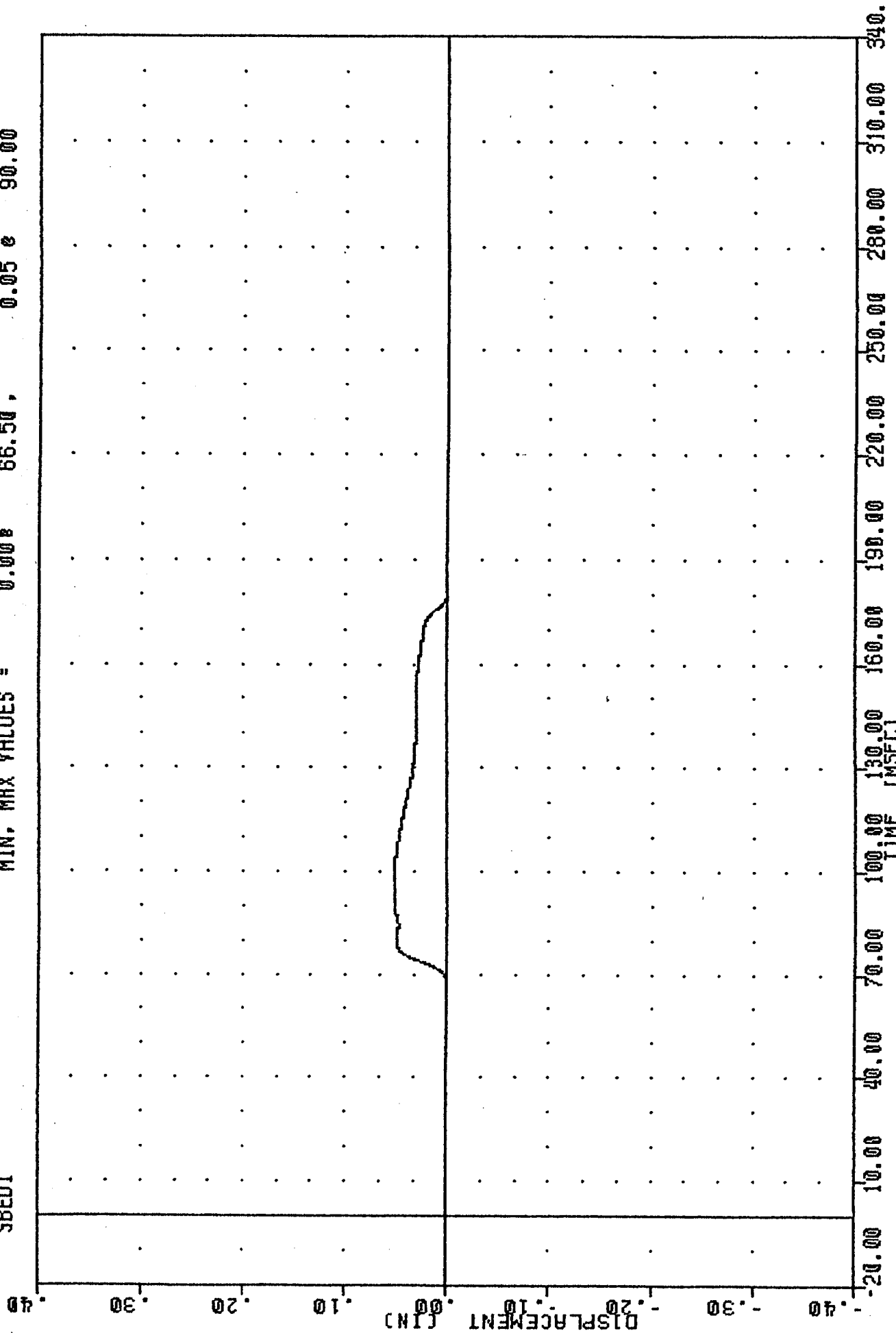
1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 DRIVER SHOULDER BELT DISPLACEMENT

92002

SBED1

FILTER = BLPP 100/ 250/ -16

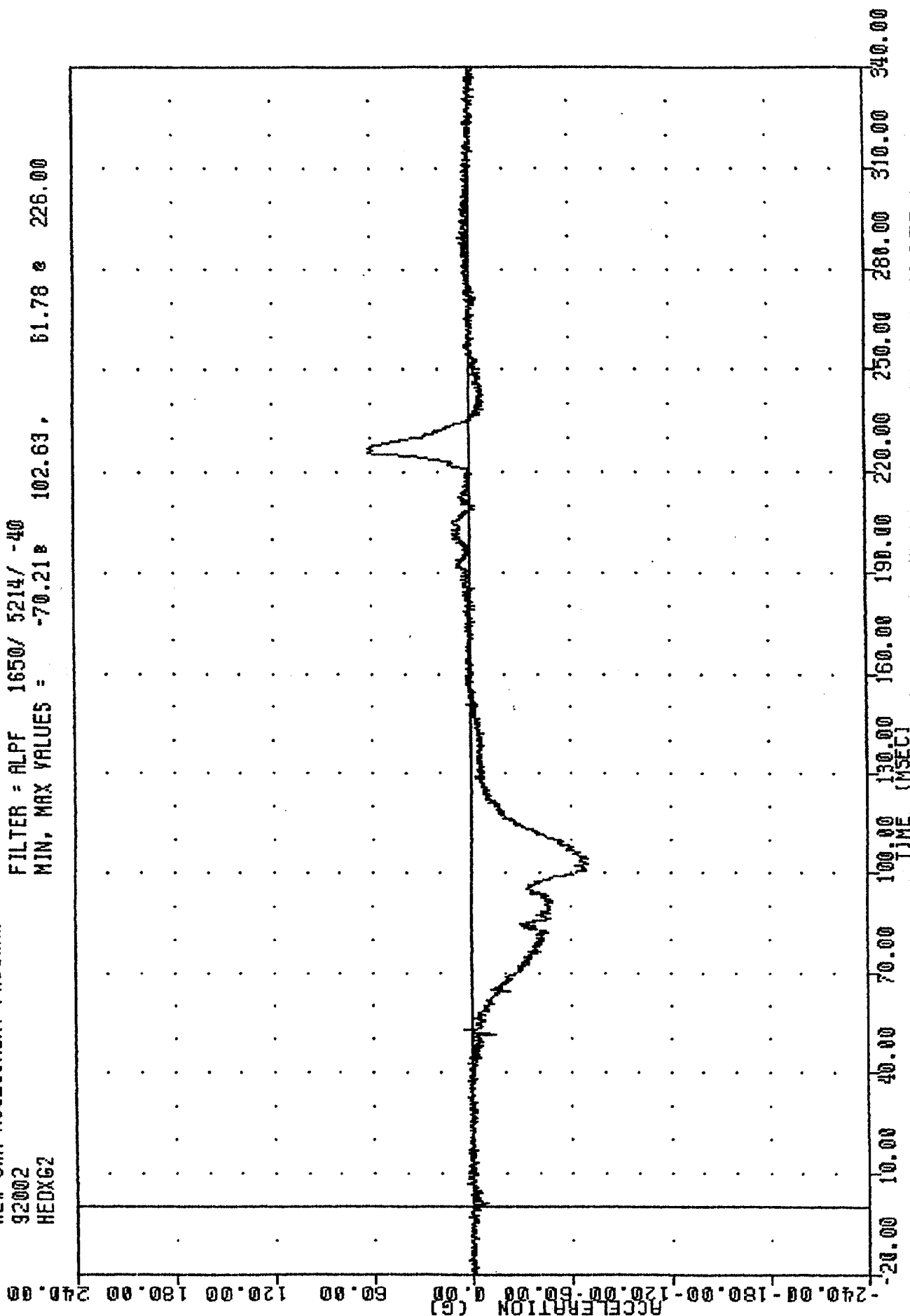
MIN, MAX VALUES = 0.008 66.50, 0.05 @ 90.00



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
DRIVER SEAT BELT EXTENSION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 HEDX62

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -70.218 102.63, 61.78 @ 226.00



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER HEAD X-AXIS ACCELERATION

NEW CAR ASSESSMENT PROGRAM

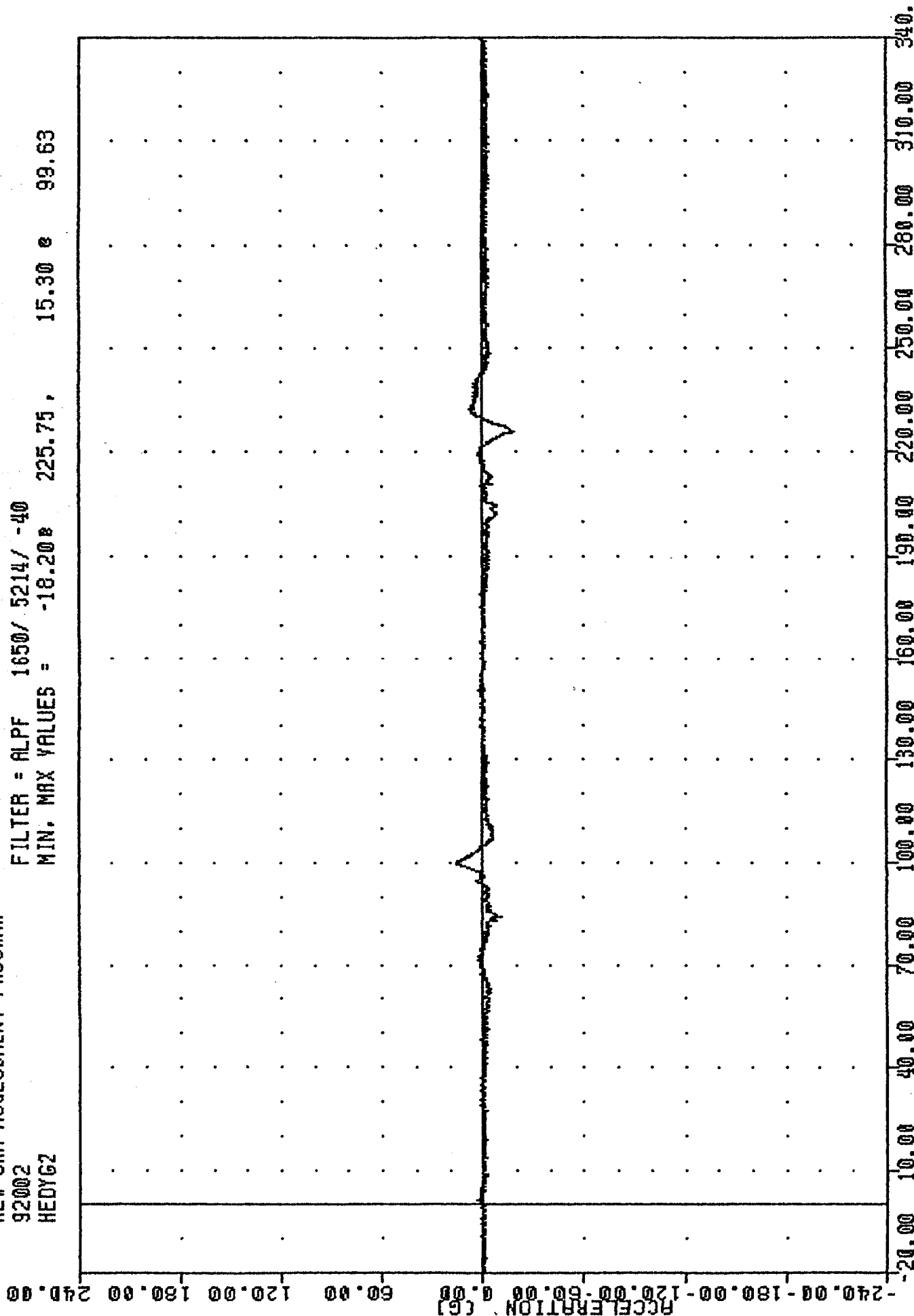
92002

HEDYG2

FILTER = ALPF 1650/ 5214/ -40

MIN. MAX VALUES = -18.20 225.75,

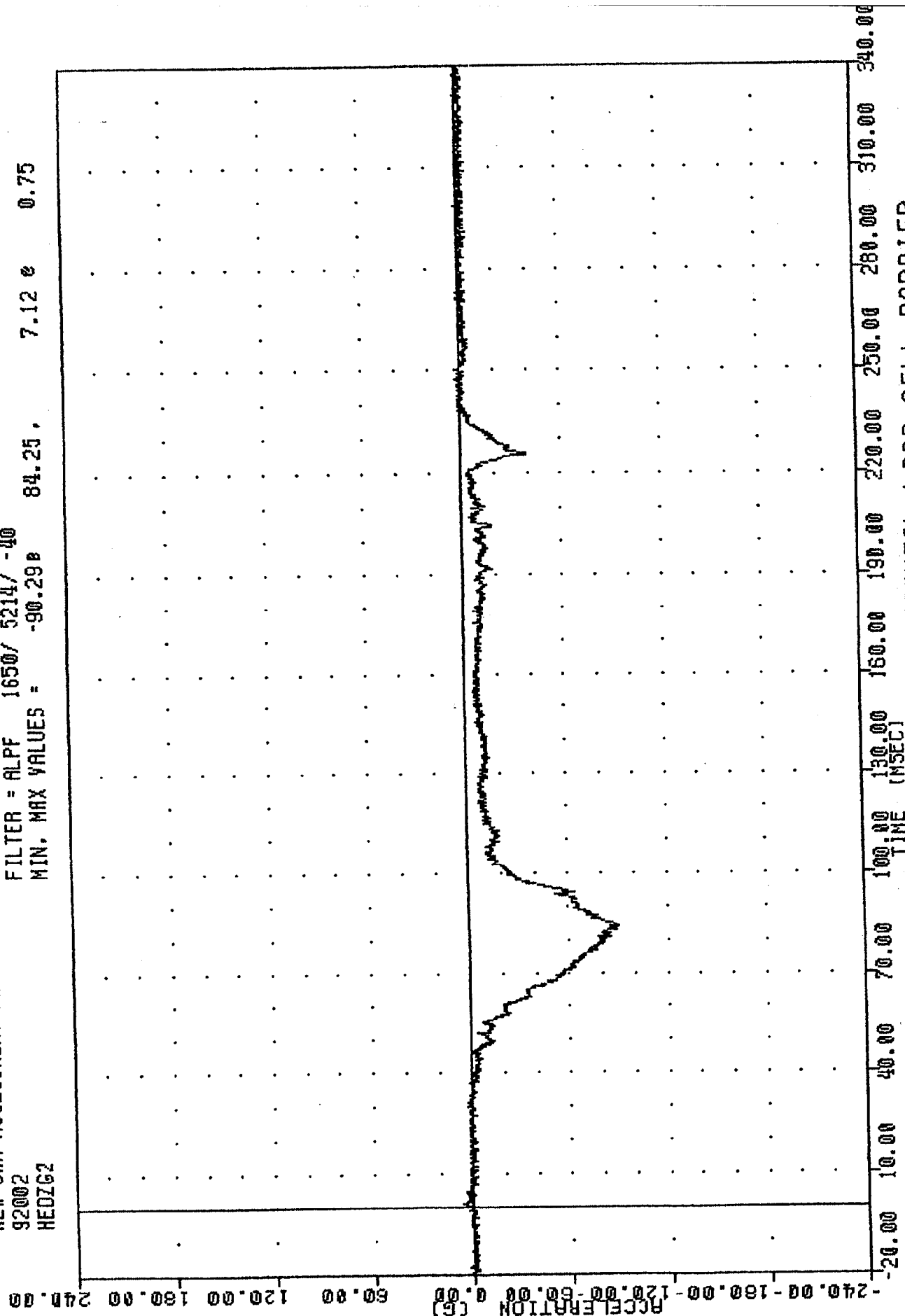
15.30 e 99.63



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 HEDIG2

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -90.298 84.25, 7.12 e 0.75



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1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER HEAD Z-AXIS ACCELERATION

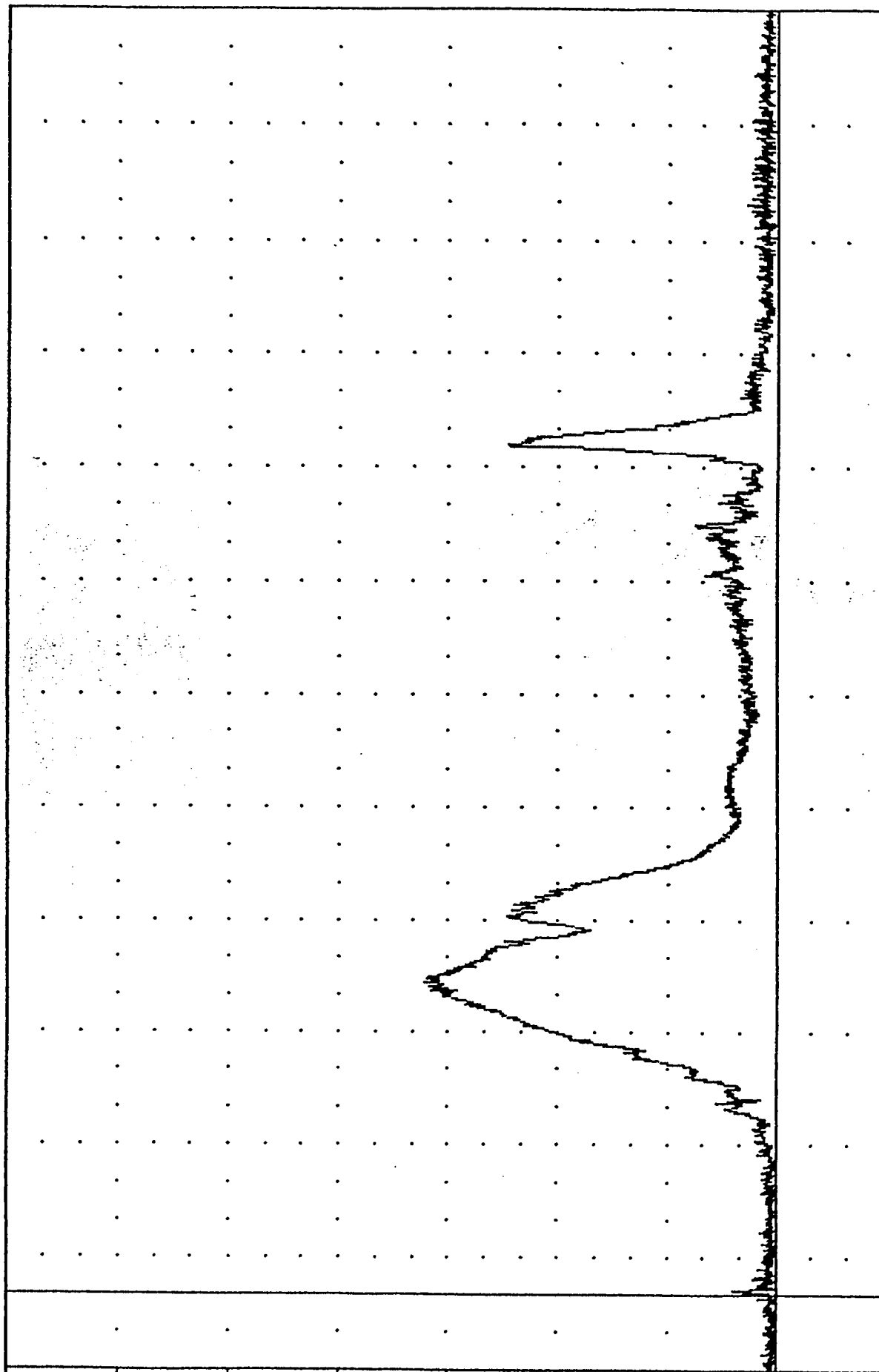
NEW CAR ASSESSMENT PROGRAM

92002
HEDRG2

FILTER = ALPF 1650/ 5214/ -40

MIN, MAX VALUES = 0.13e 12.38, 96.35 & 83.00

ACCELERATION (G)

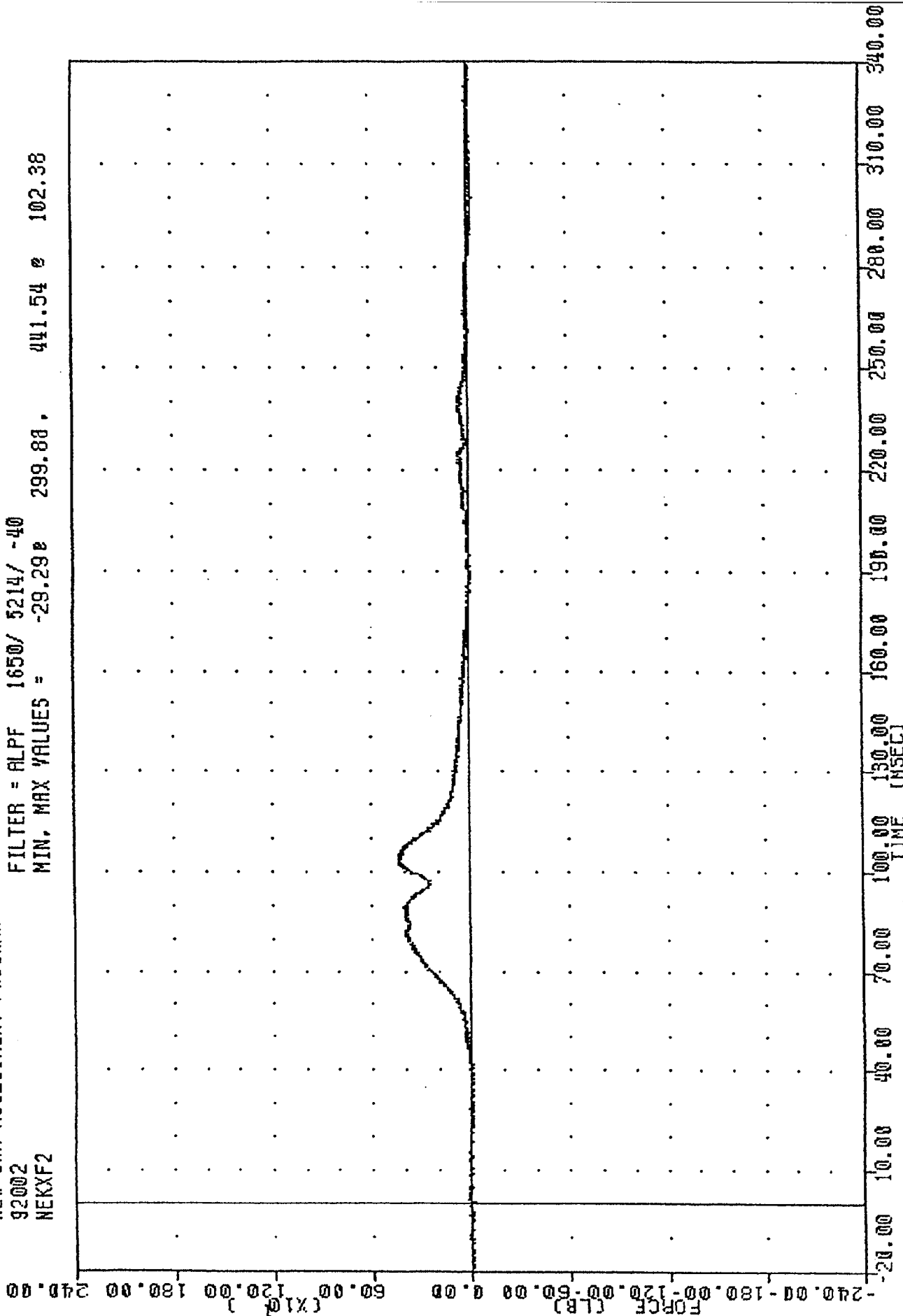


TIME (msec)

1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 NEKXF2

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -29.290 299.88 , 441.54 102.38

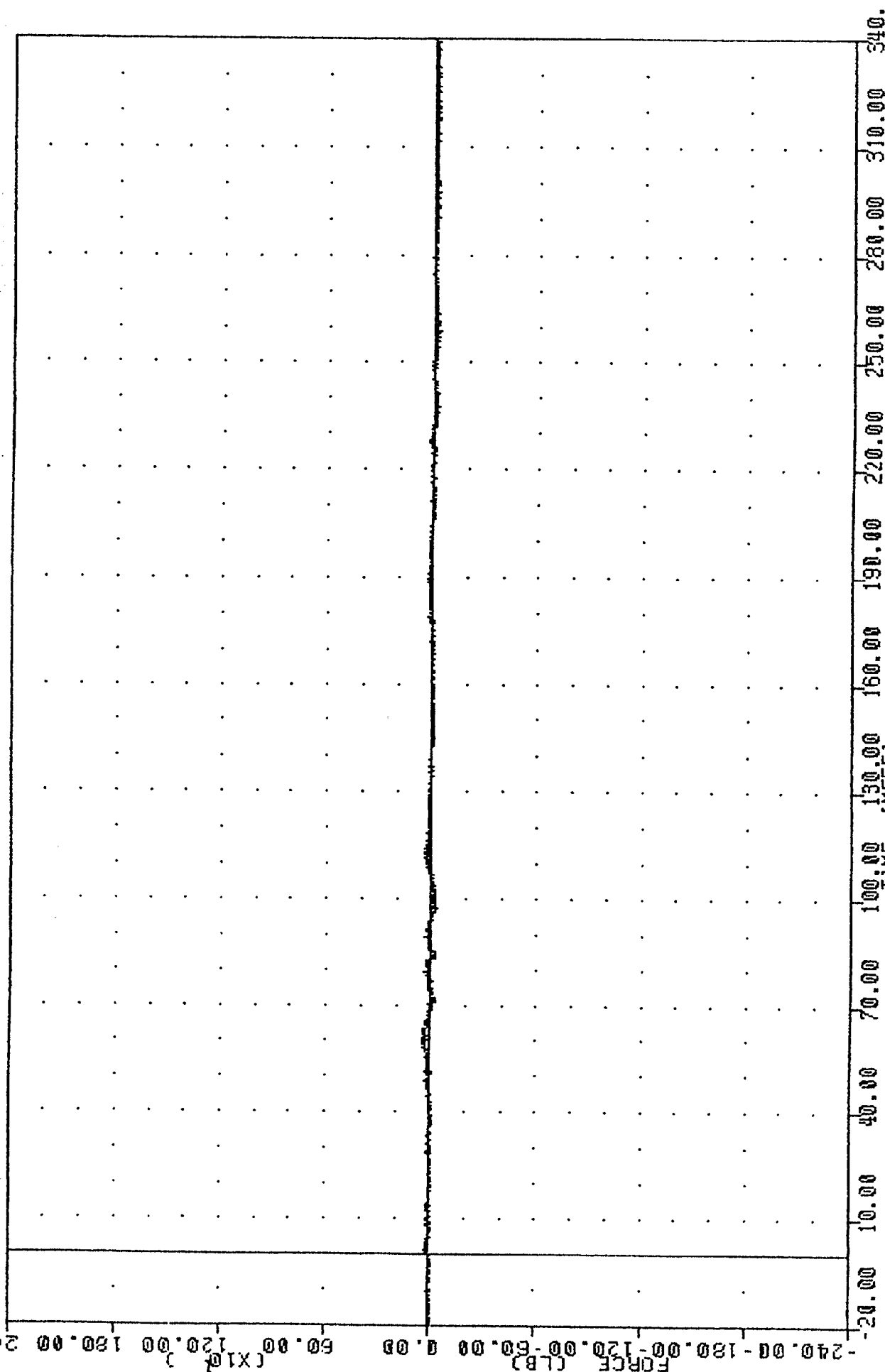


1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER NECK X-AXIS SHEAR FORCE

92002
HEKYZ

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -31.458

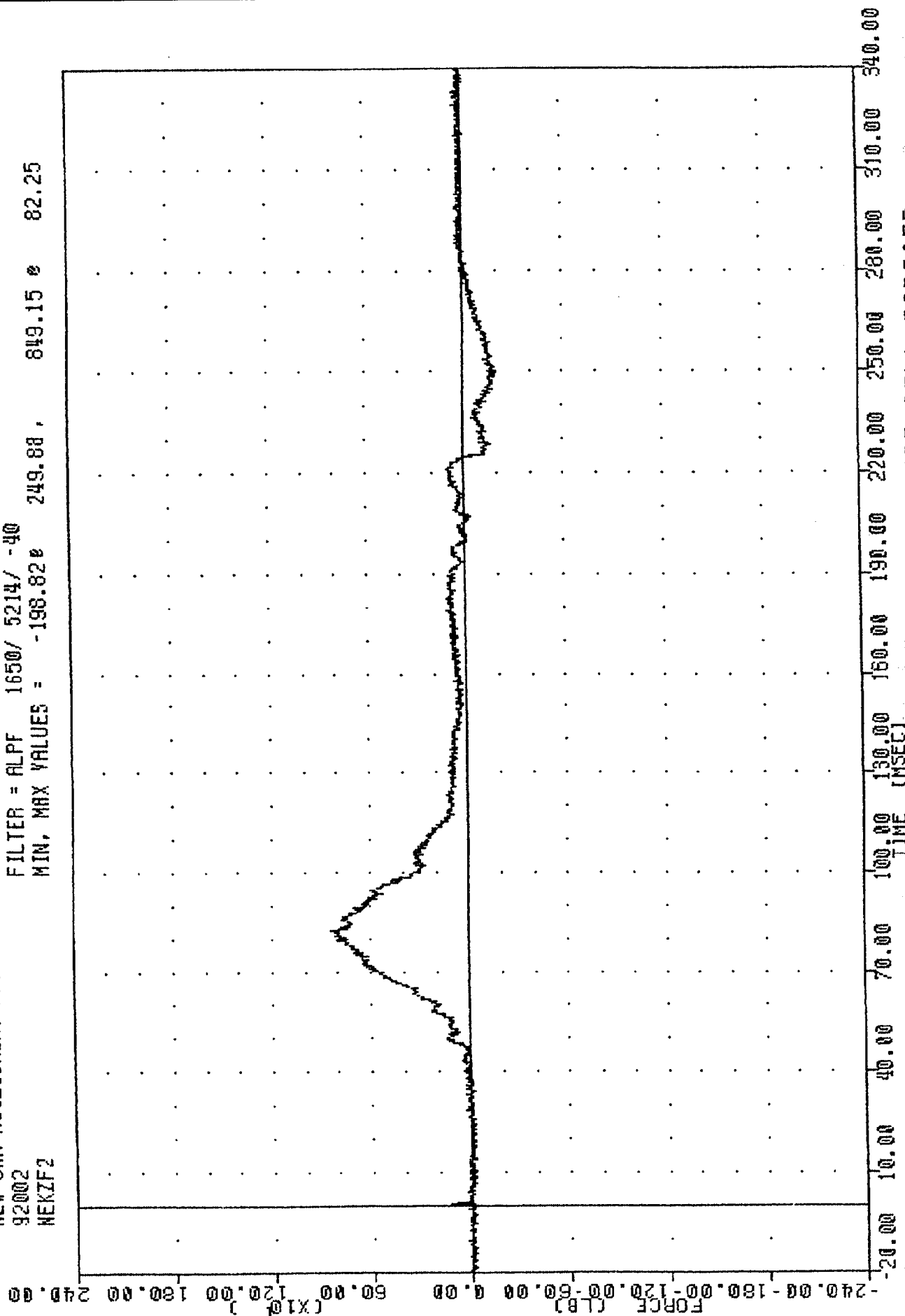
88.09 2 56.77



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Y-AXIS SHEAR FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 NEKZF2

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -198.820 249.88 , 849.15 82.25

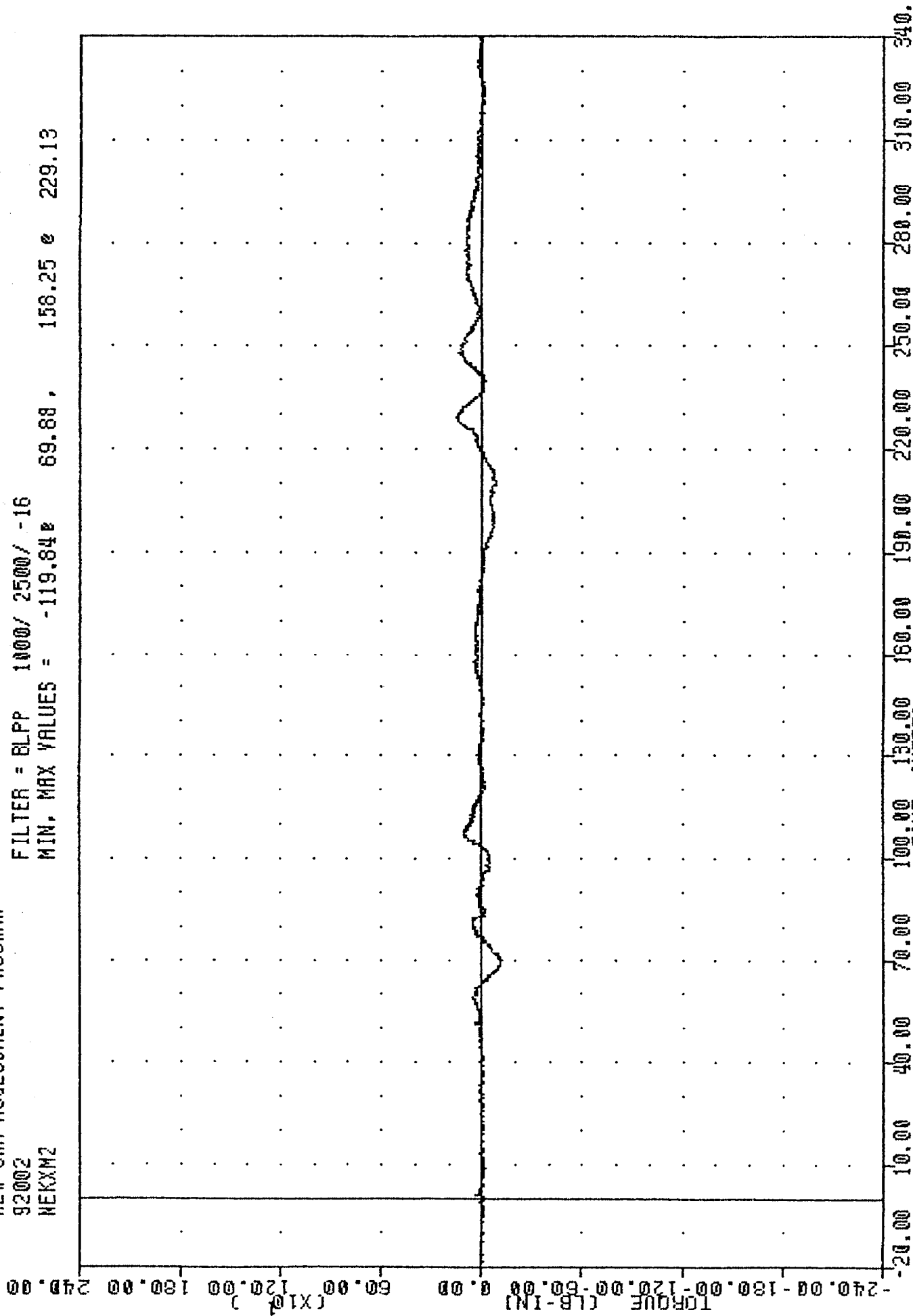


1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER NECK Z-AXIS AXIAL FORCE

NEW CAR ASSESSMENT PROGRAM

92002
NEKXM2

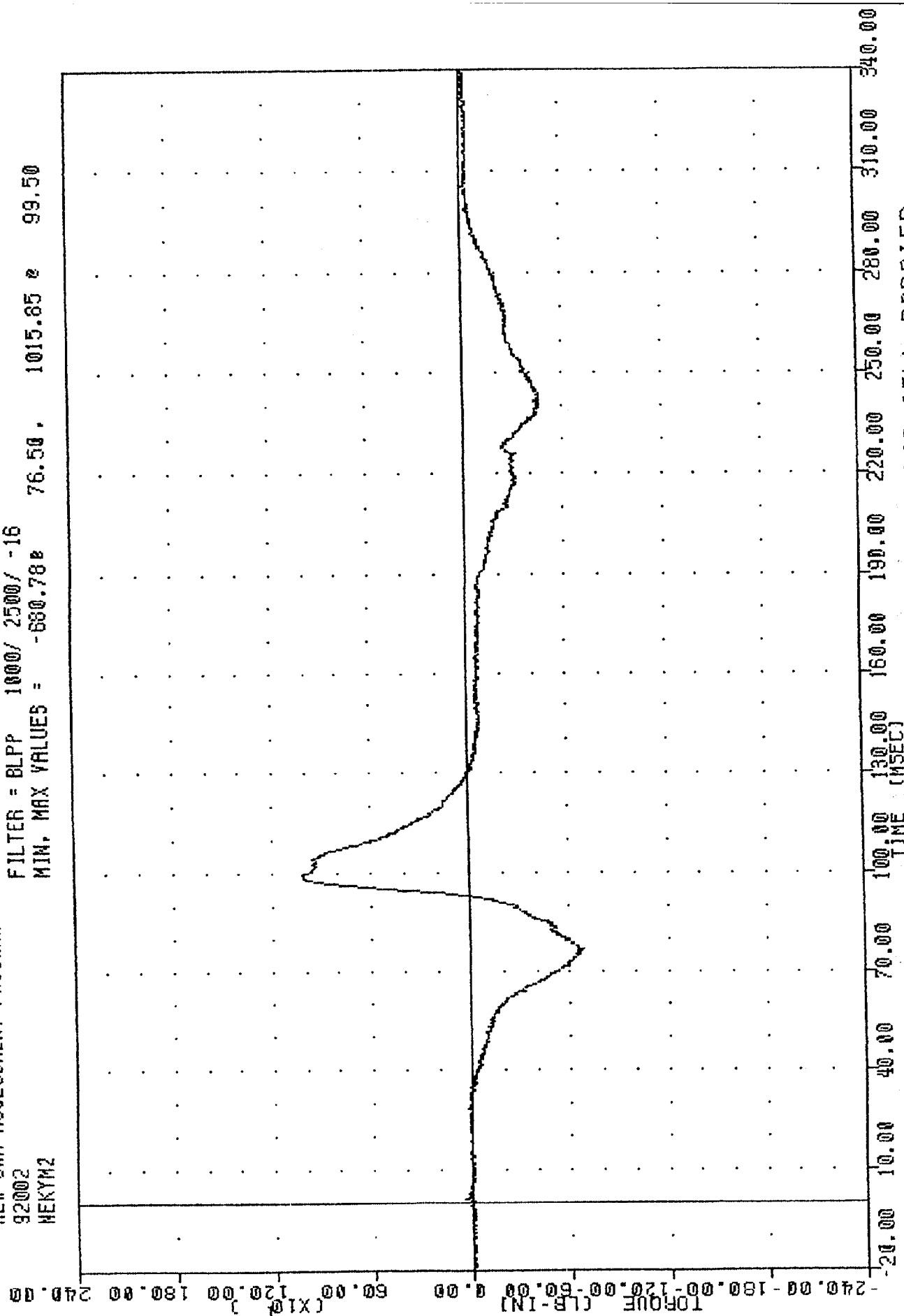
FILTER = BLPP 1000/ 2500/ -16
MIN. MAX VALUES = -119.84e 69.88 , 158.25 e 229.13



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT X AXIS

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 HEKYM2

FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -680.78 76.50 . 1015.85 99.50



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920102

1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER NECK MOMENT ABOUT Y AXIS

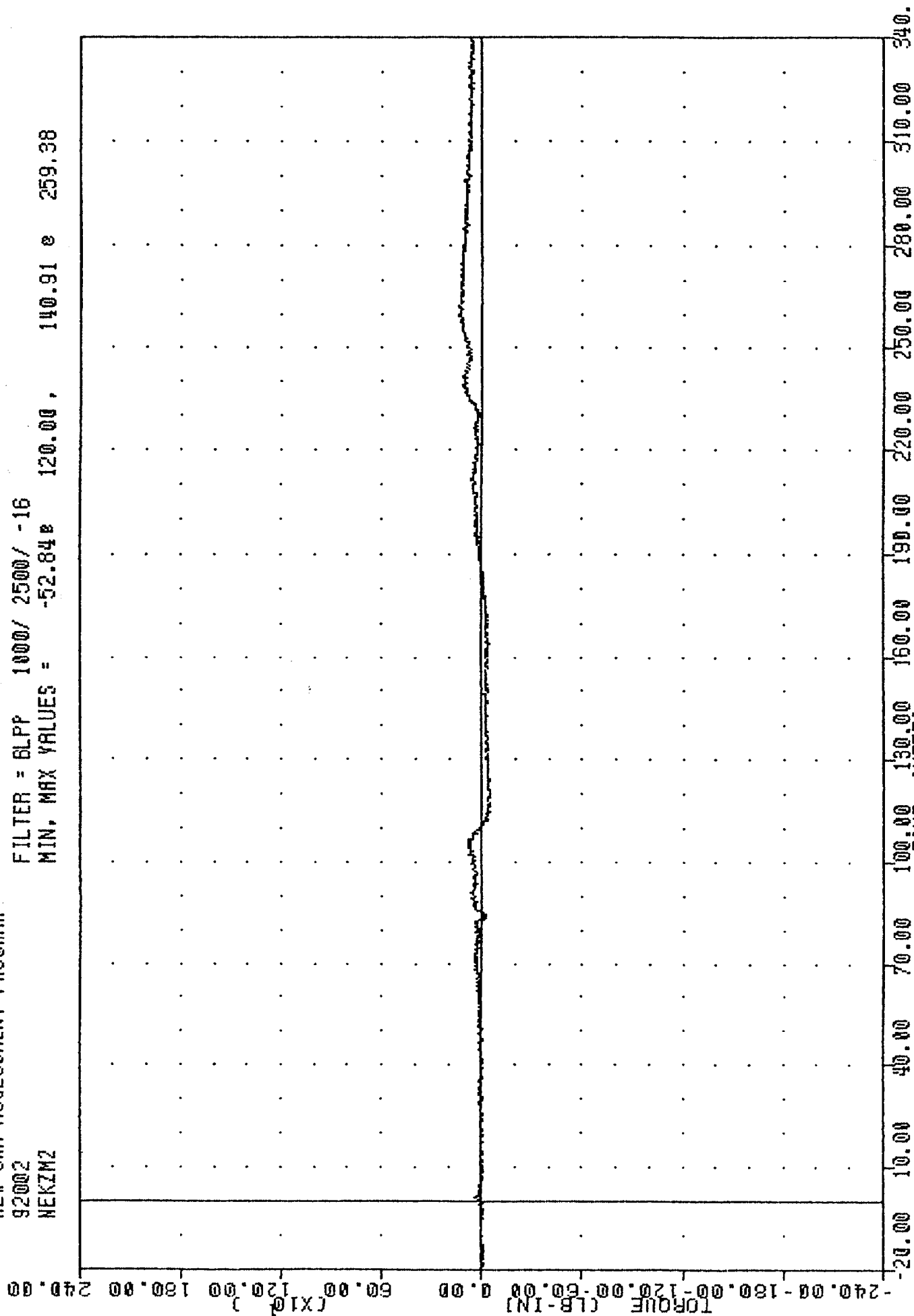
NEW CAR ASSESSMENT PROGRAM

92002

NEK2M2

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -52.84e 120.00, 140.91 e 259.38

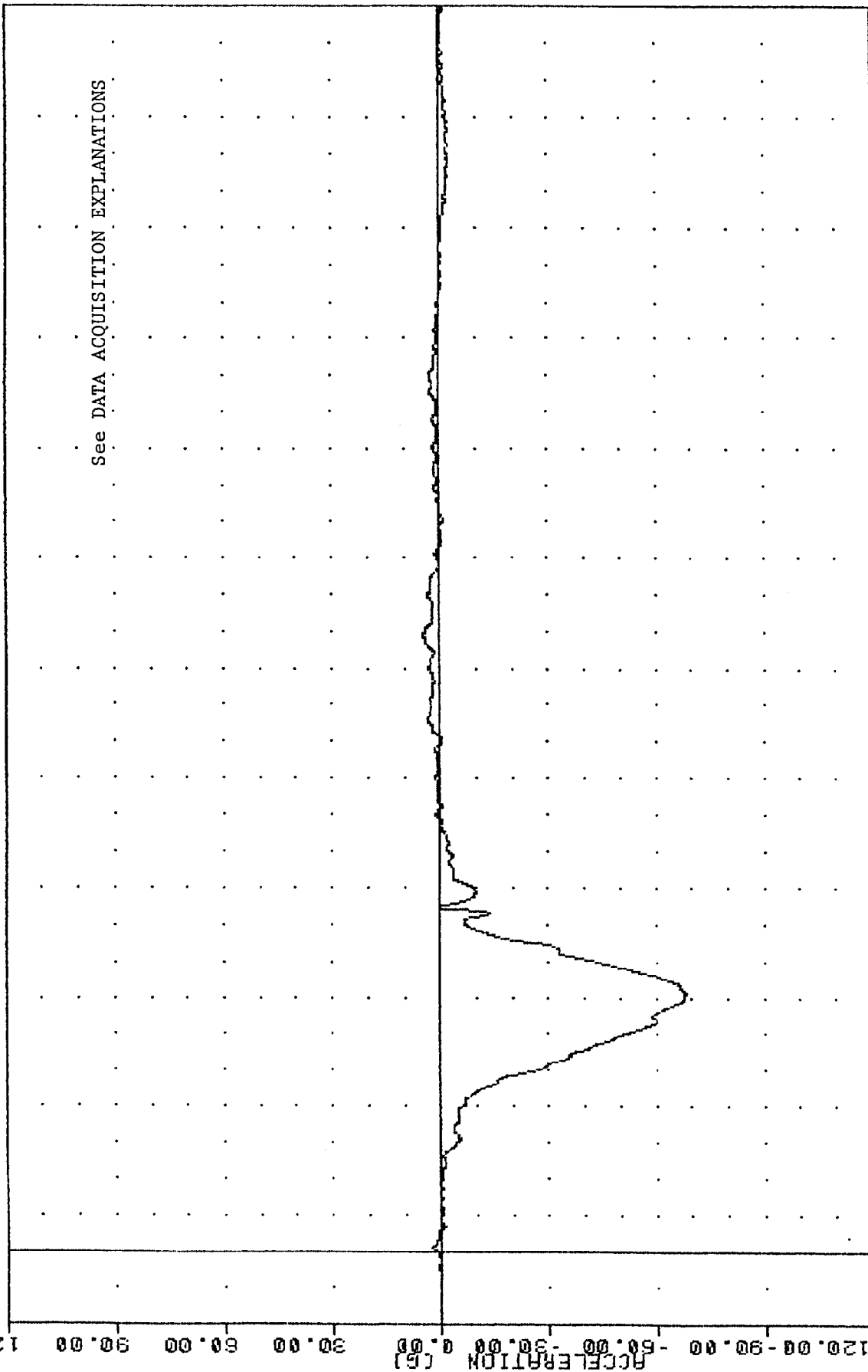


1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Z AXIS

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 CSTXG2

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -68.37% 71.00 , 4.35 % 168.88

120.00



B-33

920102

-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)

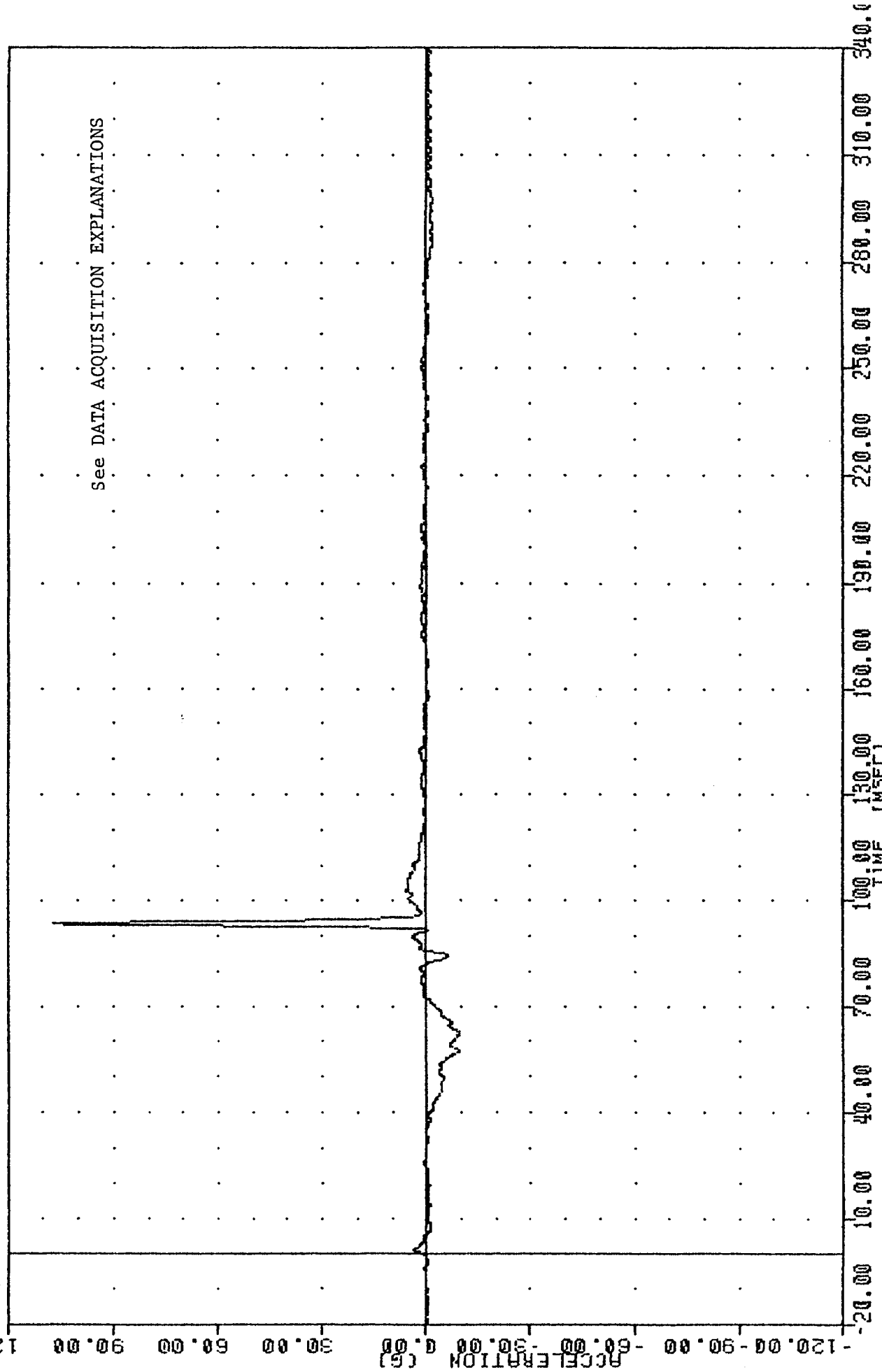
1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST X-AXIS ACCELERATION

NEW CAR ASSESSMENT PROGRAM

92002
CSTY62

FILTER = BLPP 300/ 750/ -16

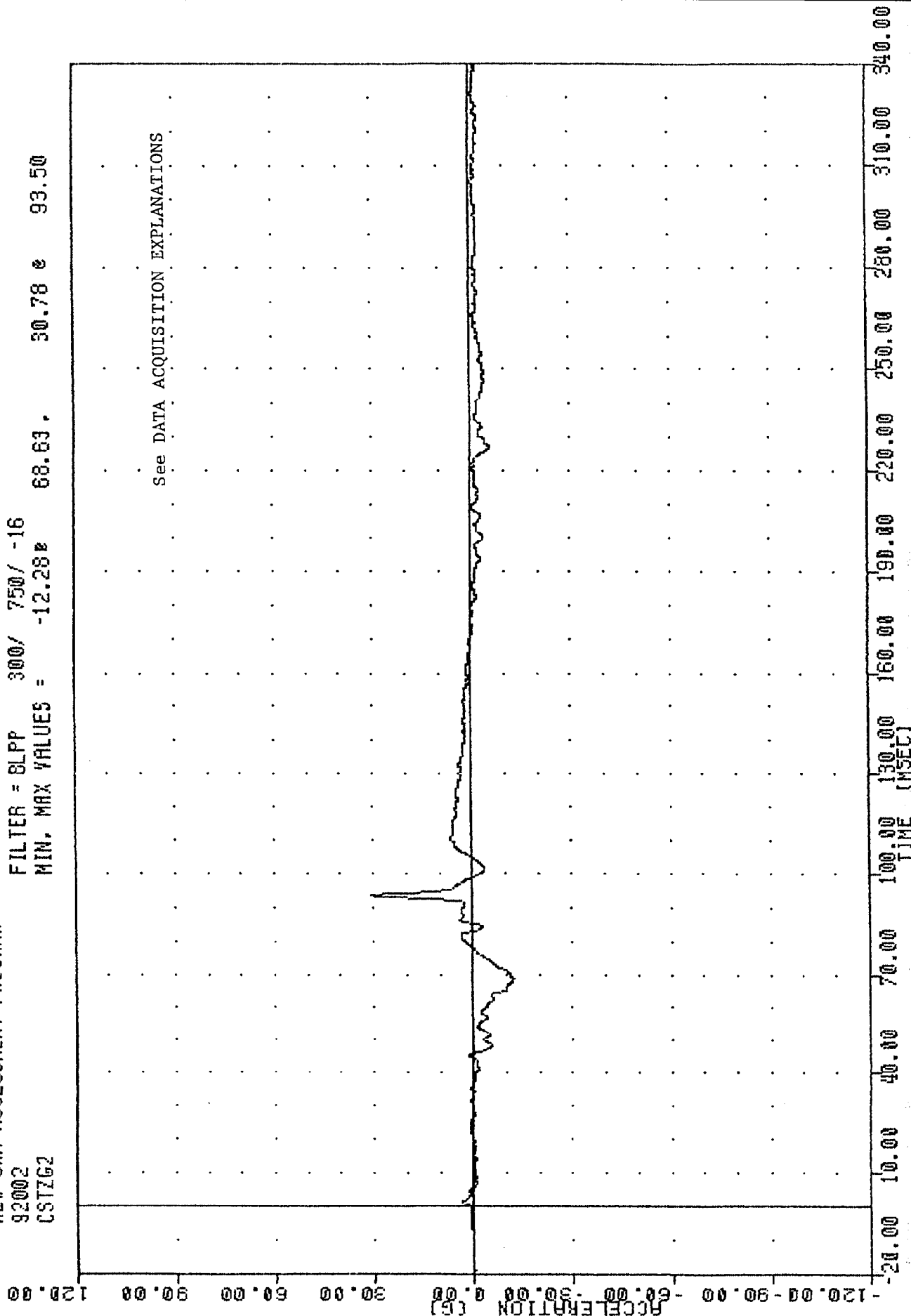
MIN. MAX VALUES = -9.42e 57.50, 106.86 e 93.38



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 CSTZG2

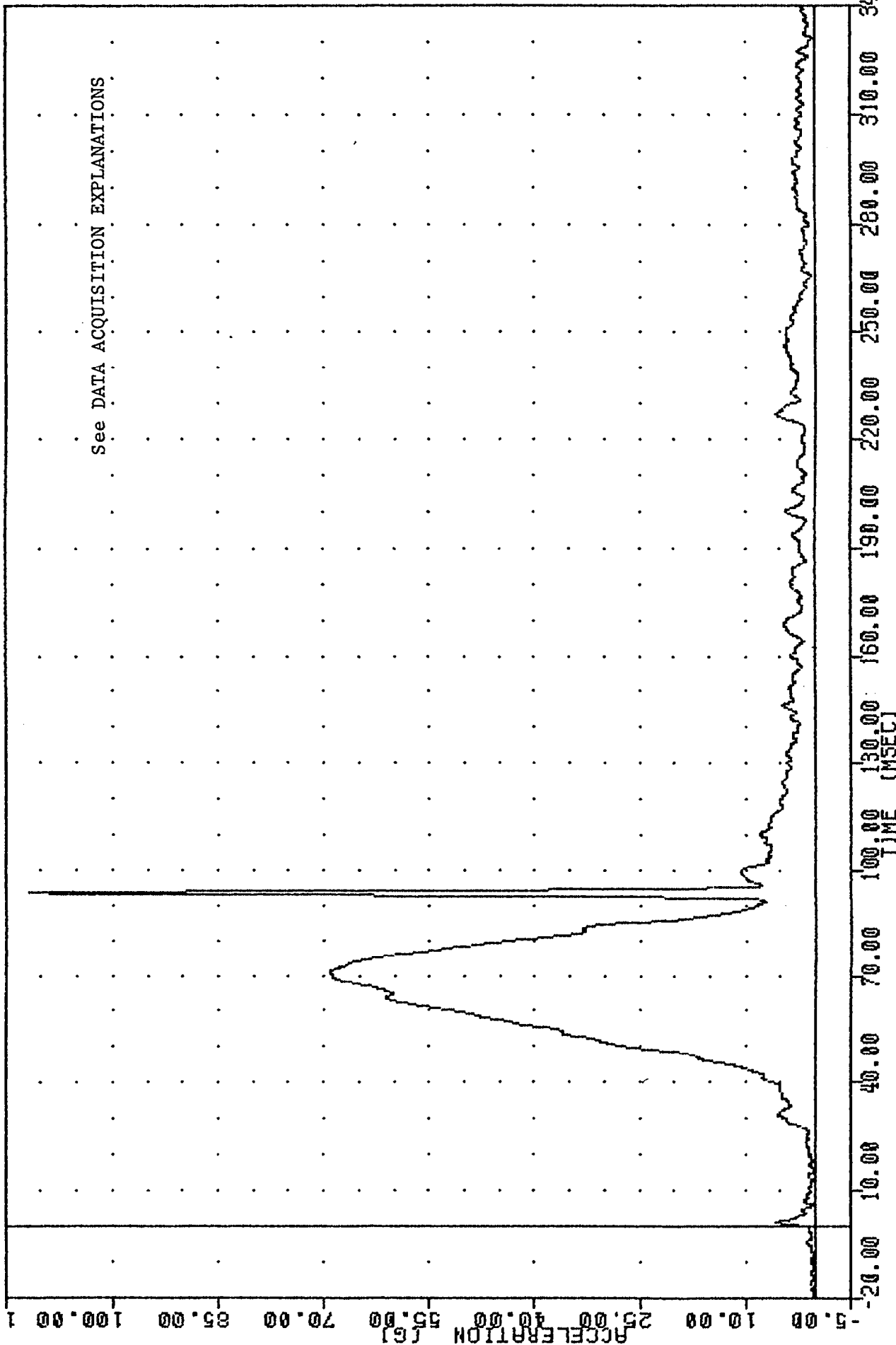
FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -12.28 68.63, 30.78 93.50



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST Z-AXIS ACCELERATION

NLR UNIT IDENTIFICATION NUMBER
 92002
 CSTRG2

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.058 -20.00 111.85 93.38



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST RESULTANT ACCELERATION

TRC . 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 CSTX02

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -1.848 83.63, 0.04 1.13

4.00

3.00

2.00

1.00

0.00

-1.00

-2.00

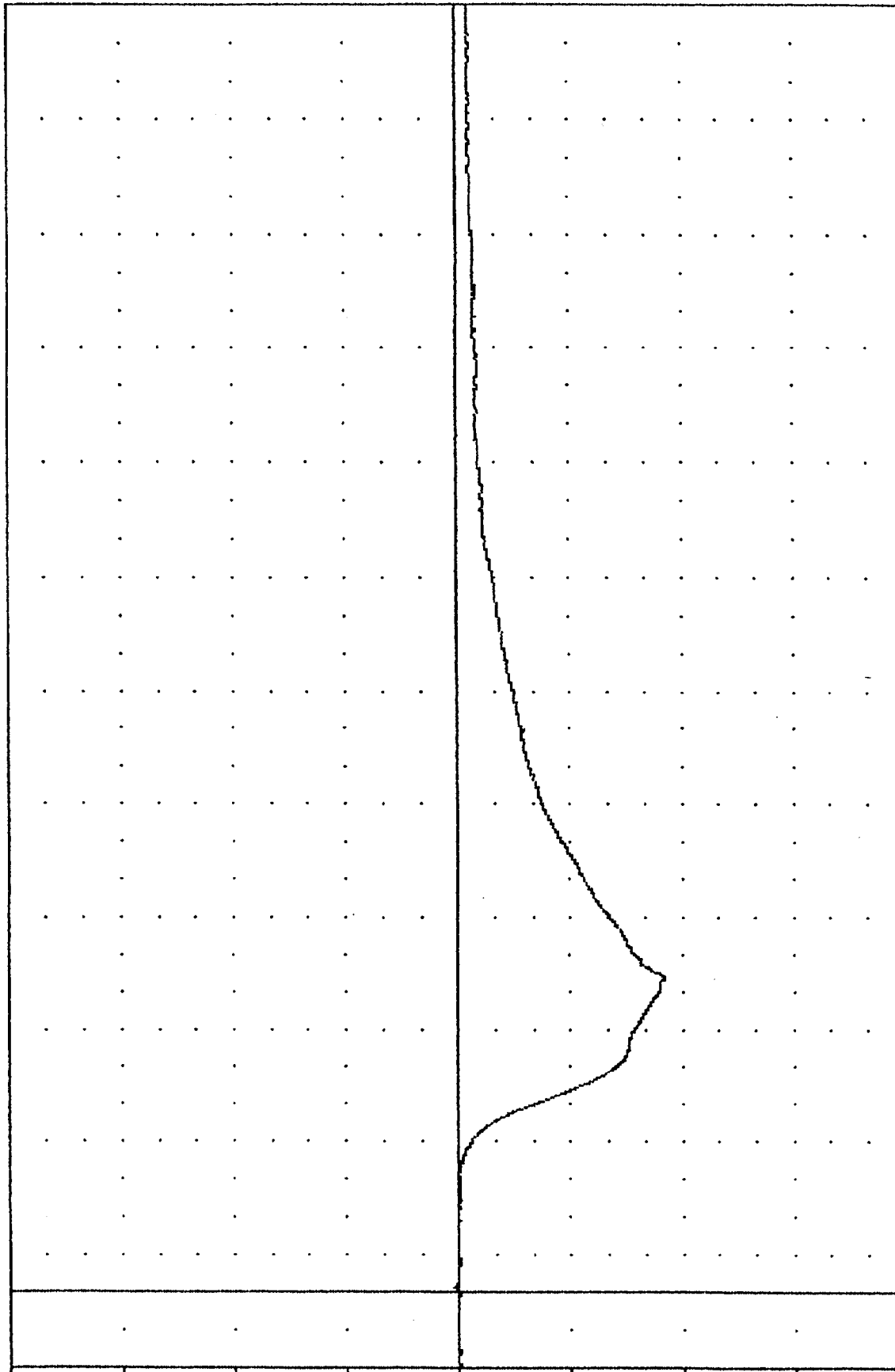
-3.00

-4.00

DISPLACEMENT (IN)

B-37

920102



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

1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER CHEST DEFLECTION

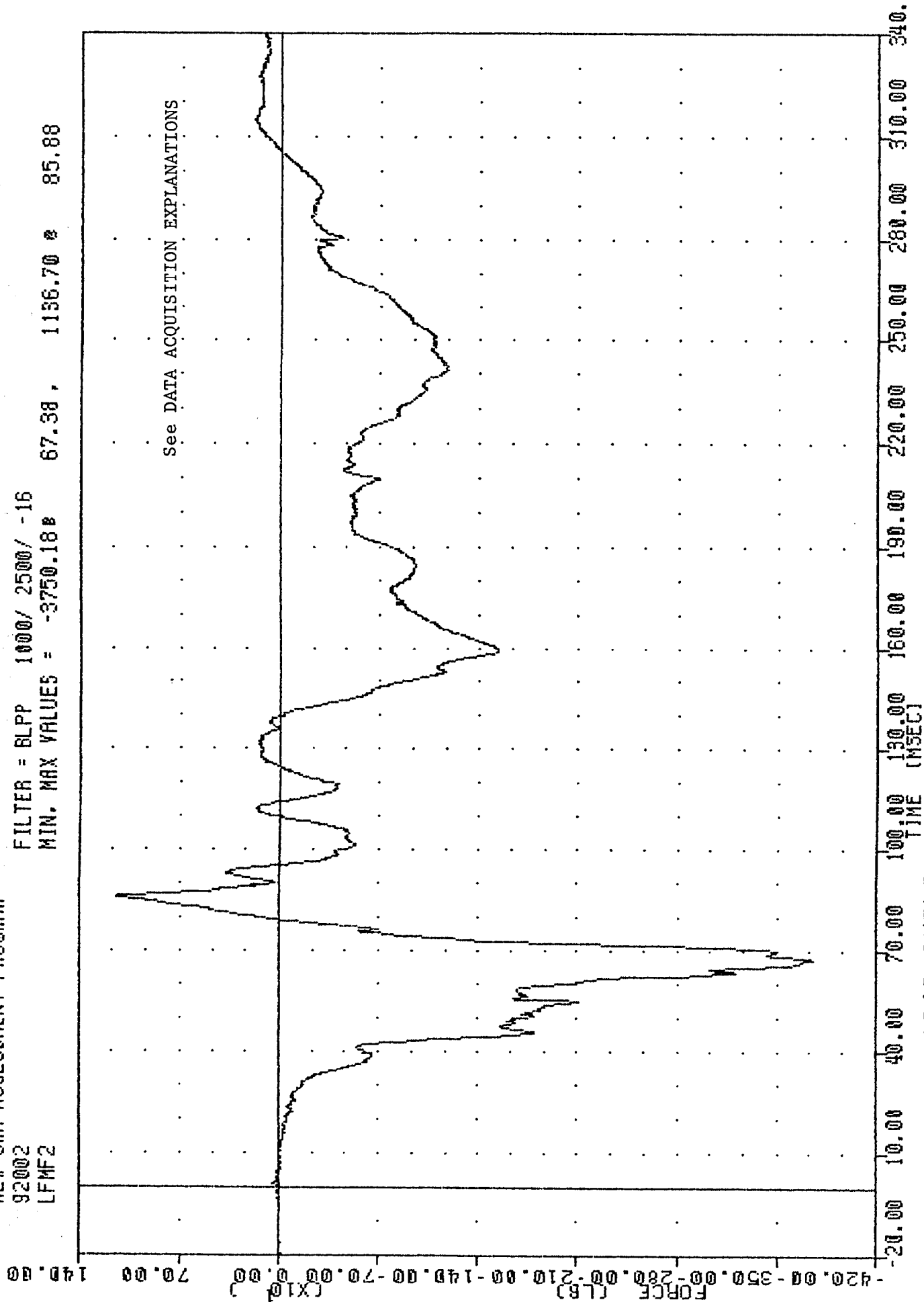
92002

LFMF2

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -3750.18 87.38 , 1136.70 85.88

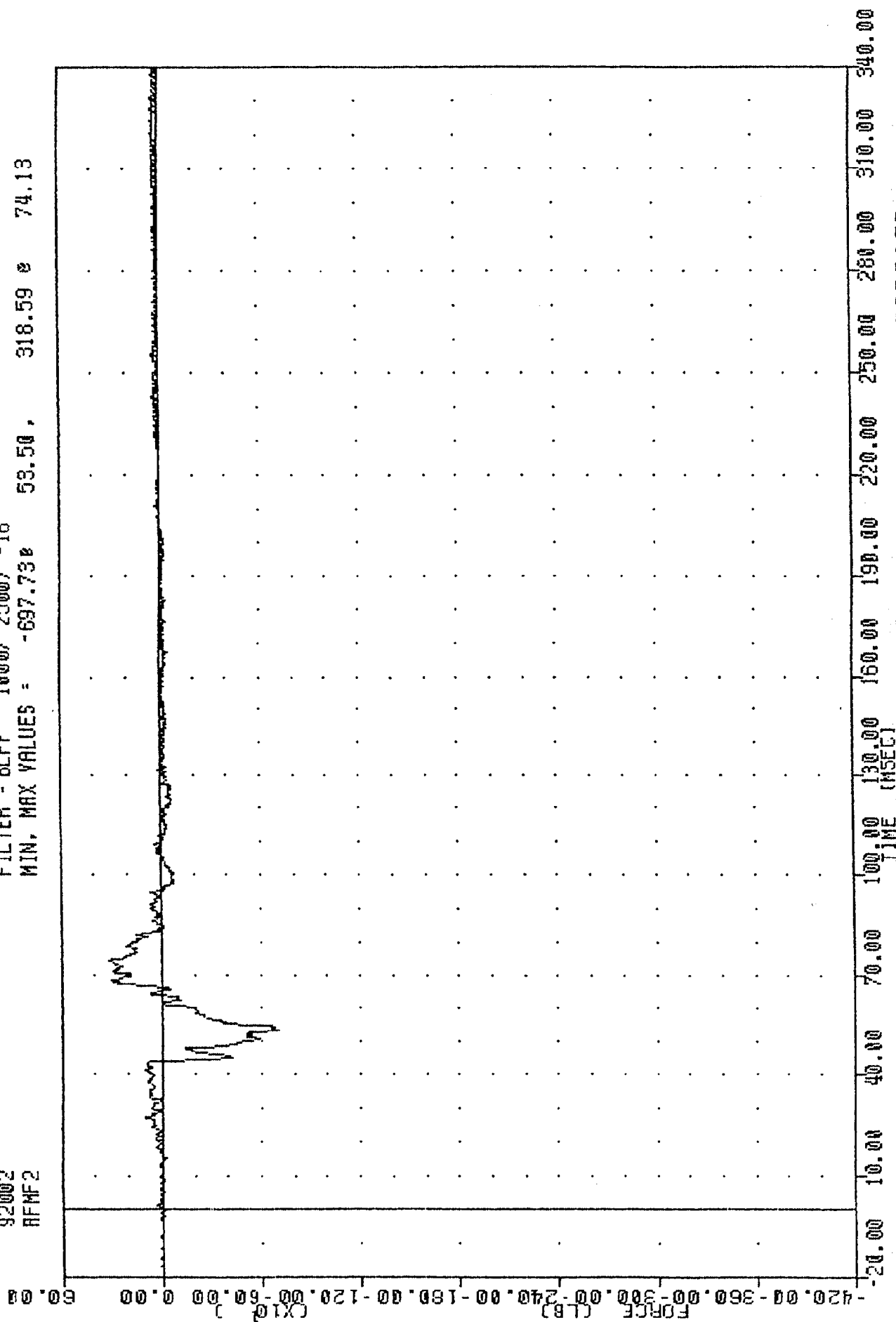
See DATA ACQUISITION EXPLANATIONS



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FEMUR FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 AFMF2

FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -697.730 53.50 , 318.59 74.13

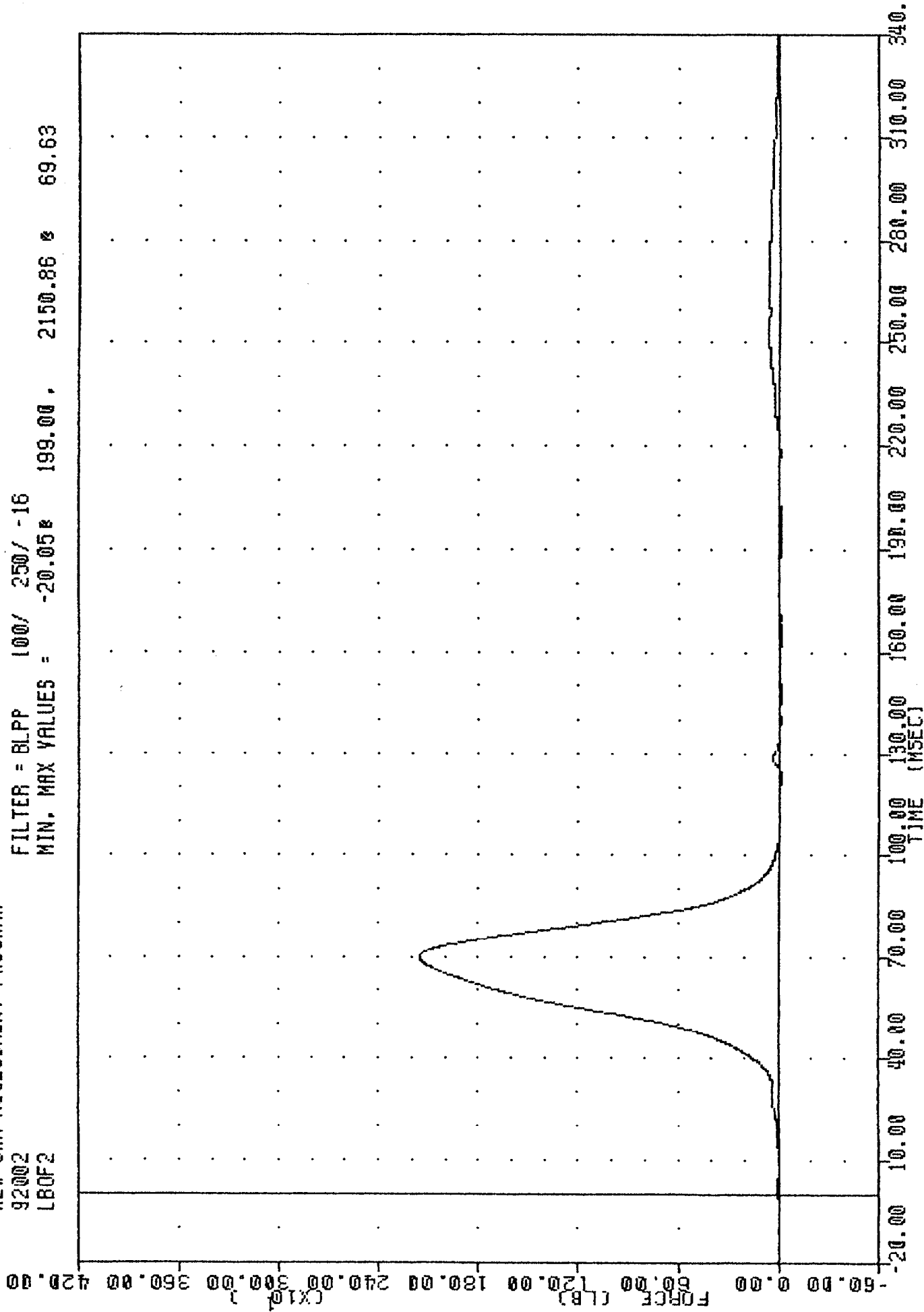


1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER RIGHT FEMUR FORCE

NEW CAR ASSESSMENT PROGRAM

92002
LBOF2

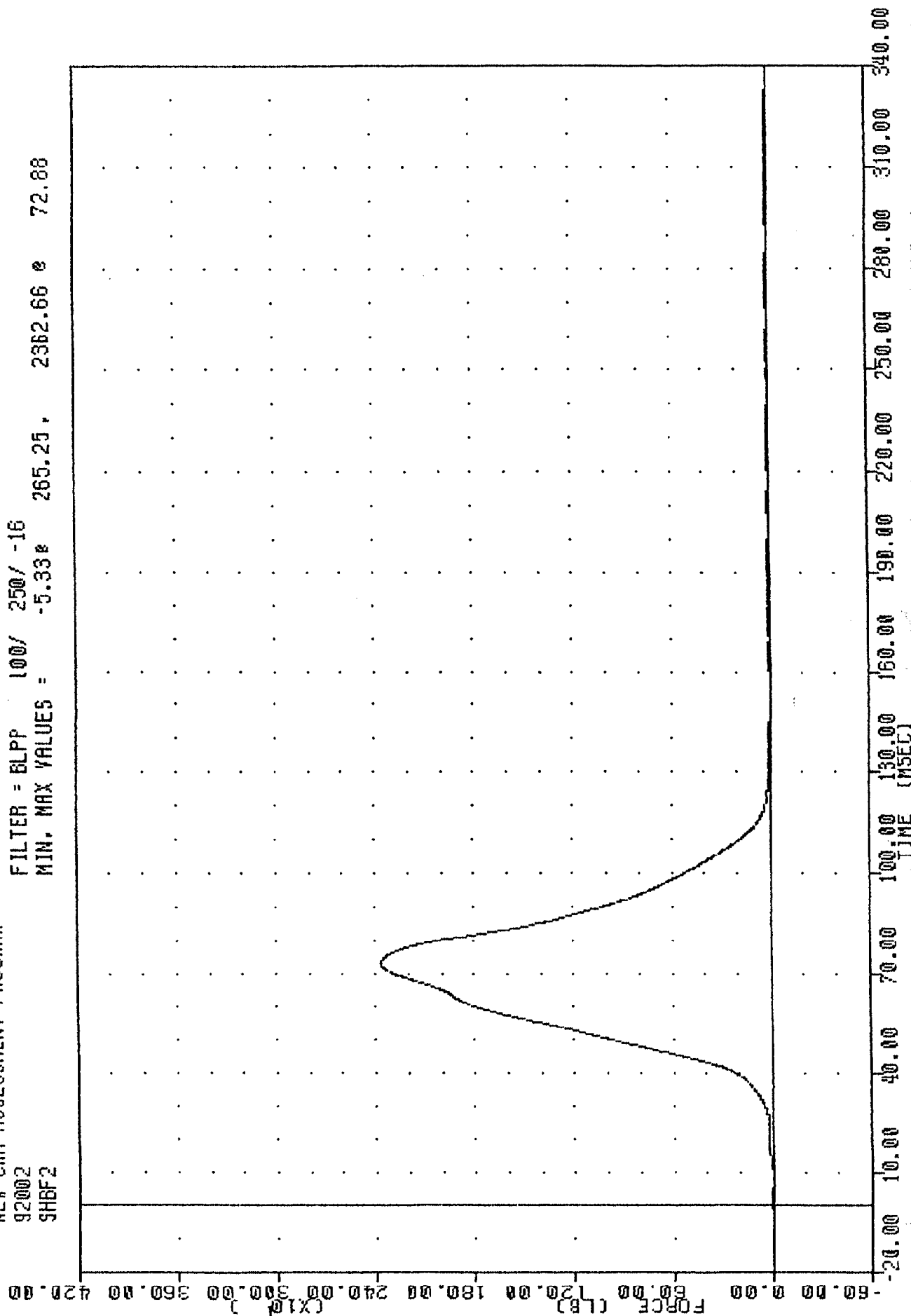
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -20.05 199.00 2150.86 69.63



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
PASSENGER LAP BELT OUTBOARD FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 SHBF2

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -5.33% 2362.66 @ 72.68



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER SHOULDER BELT FORCE

NEW CAR ASSESSMENT PROGRAM

92002
SH802

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = 0.00e -16.38, 3.61 e 76.25

3.61 e 76.25

-16.38,

0.00e

100/

BLPP

250/

-16

92002
SH802

14.00

12.00

10.00

8.00

6.00

4.00

2.00

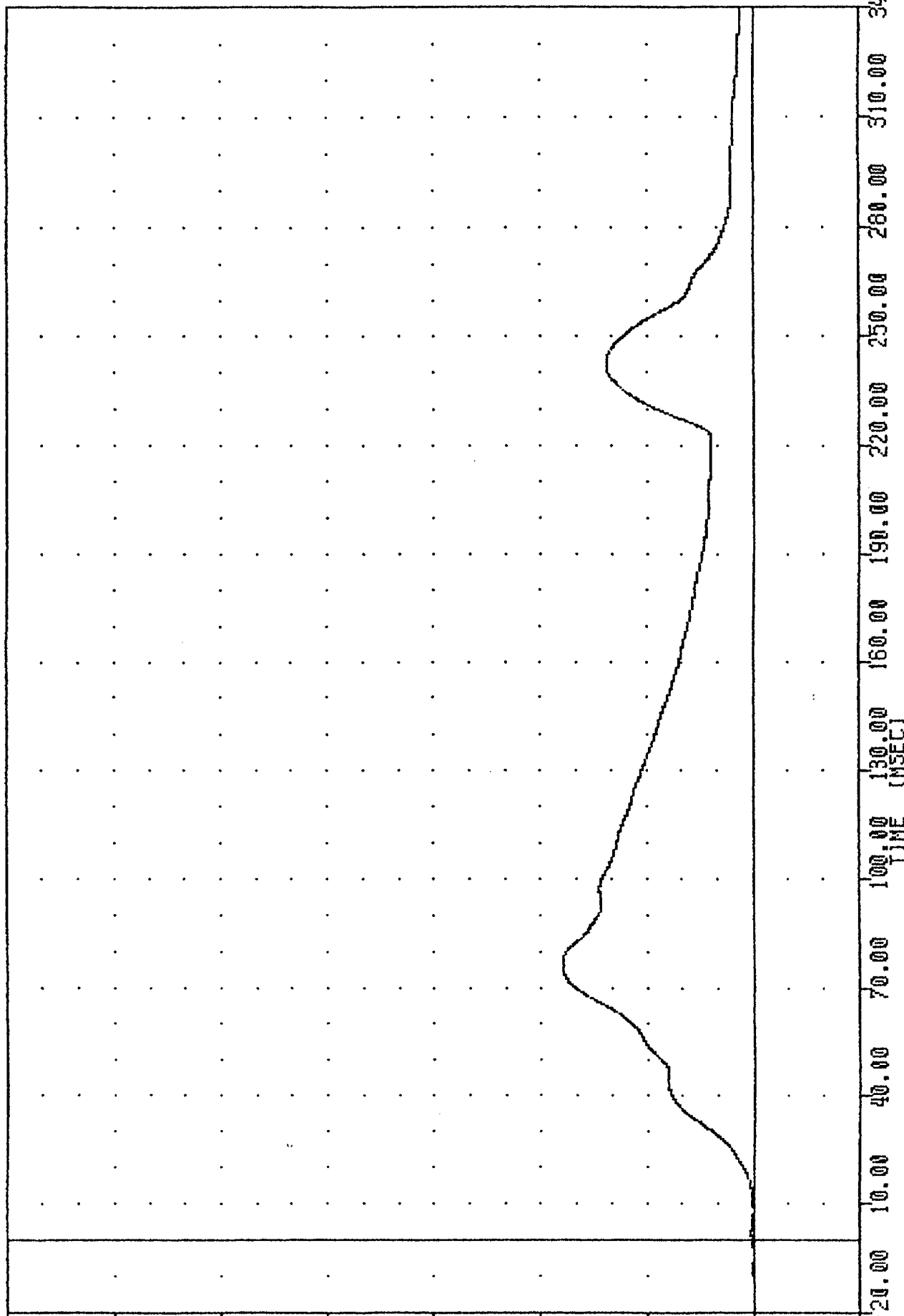
0.00

-2.00

DISPLACEMENT (IN)

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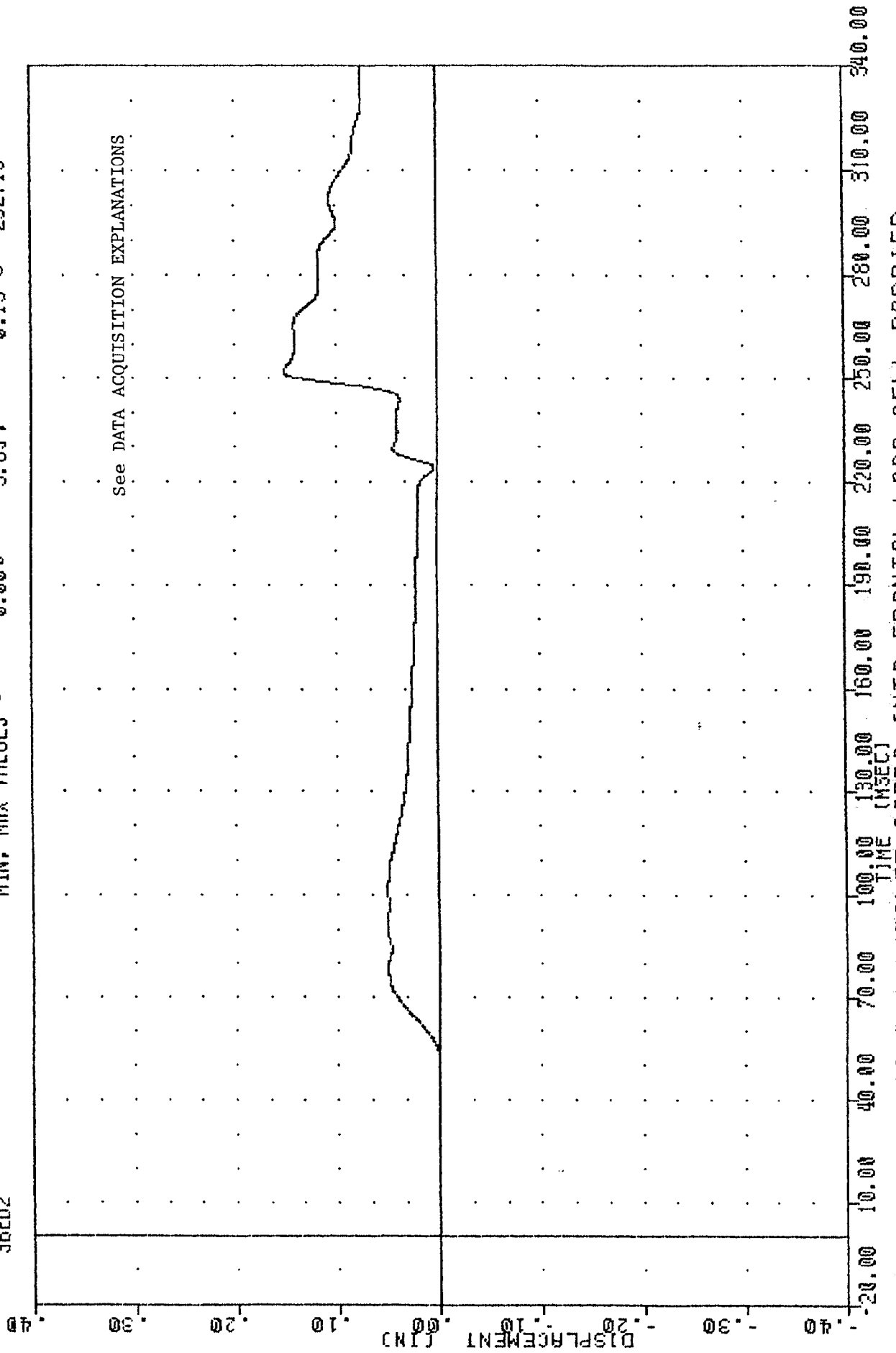
920102



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT DISPLACEMENT

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 SRED2

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = 0.00e -3.63. 0.15 e 252.13



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 PASSENGER SEAT BELT EXTENSION

NEW CAR ASSESSMENT PROGRAM

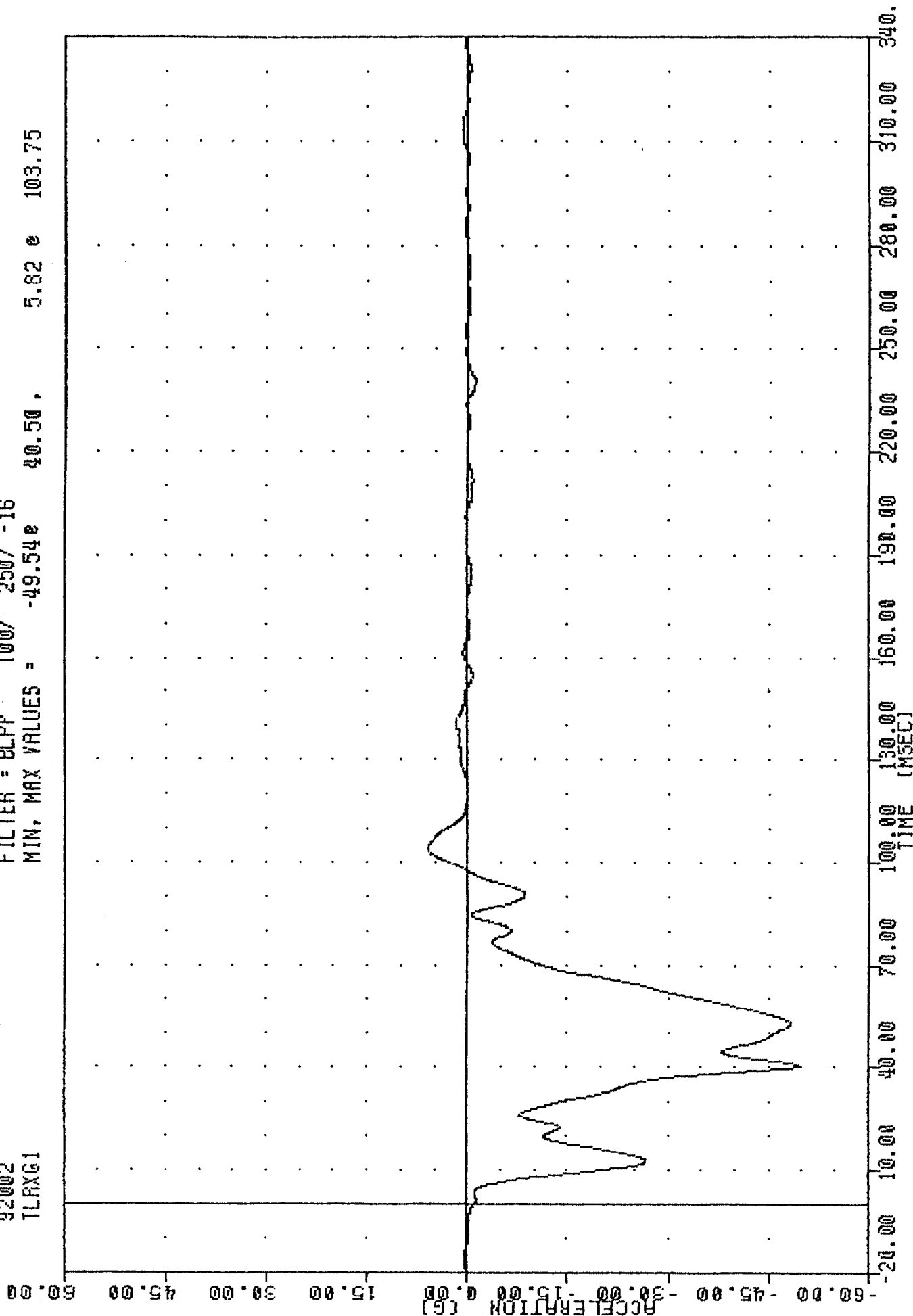
92002

TLRXG1

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -49.54e 40.50 ,

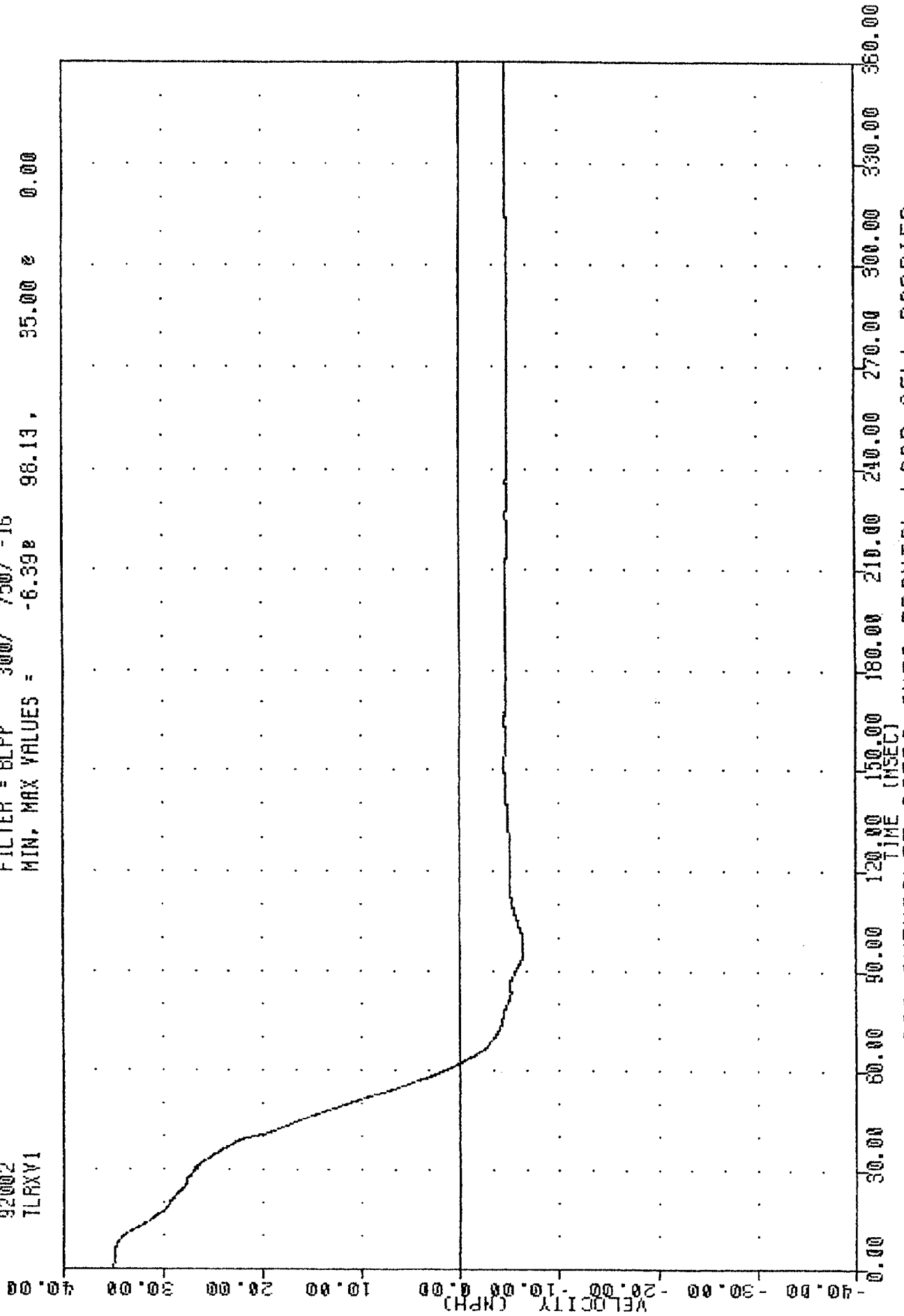
5.82 e 103.75



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 TLRXY1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -6.39e 96.13, 35.00 e 0.00



B-45

920102

1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LEFT REAR SEAT X-AXIS VELOCITY

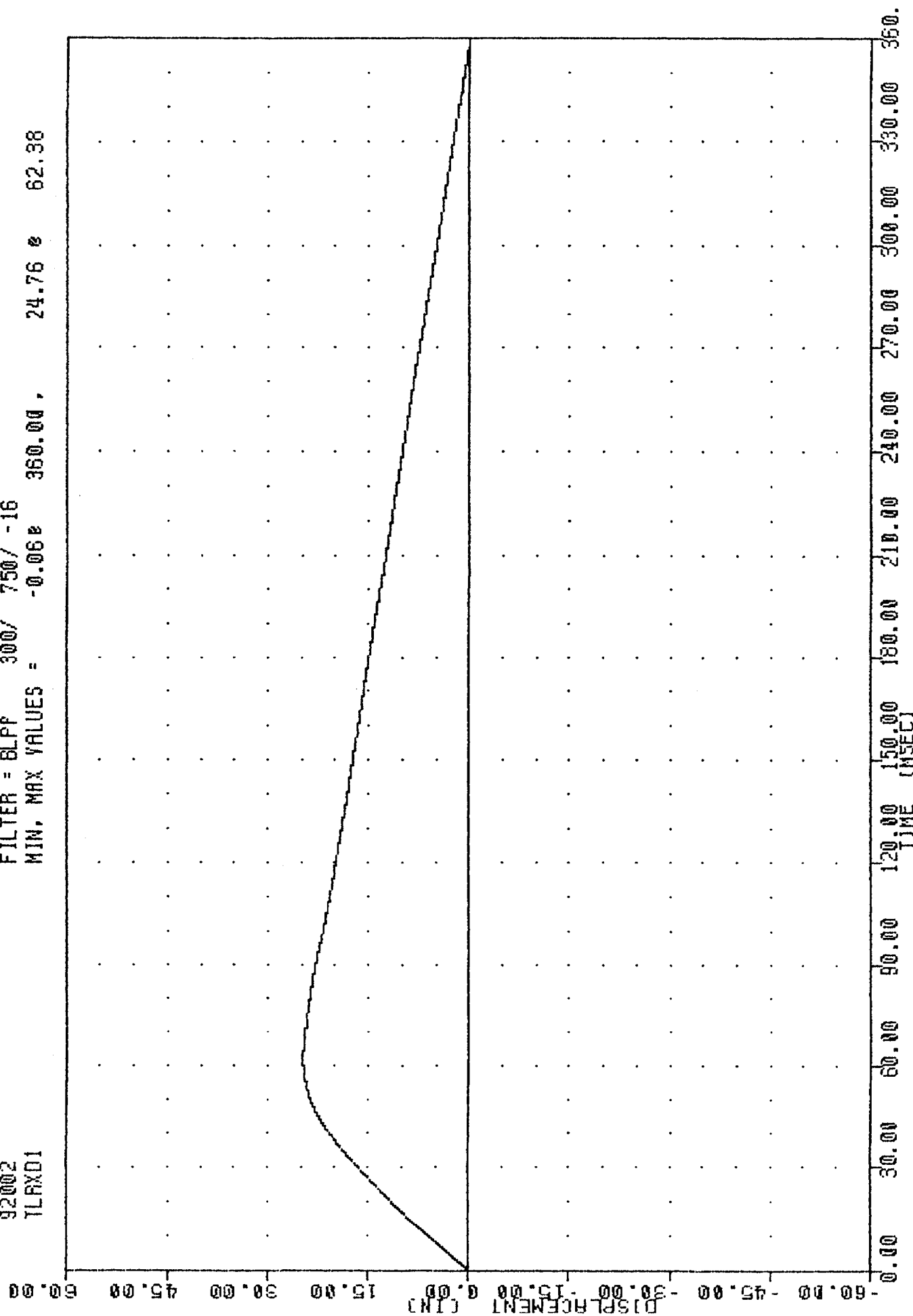
NEW LHM ASSESSMENT PROGRAM

92002

TLRXD1

FILTER = BLPF 300/ 750/ -16

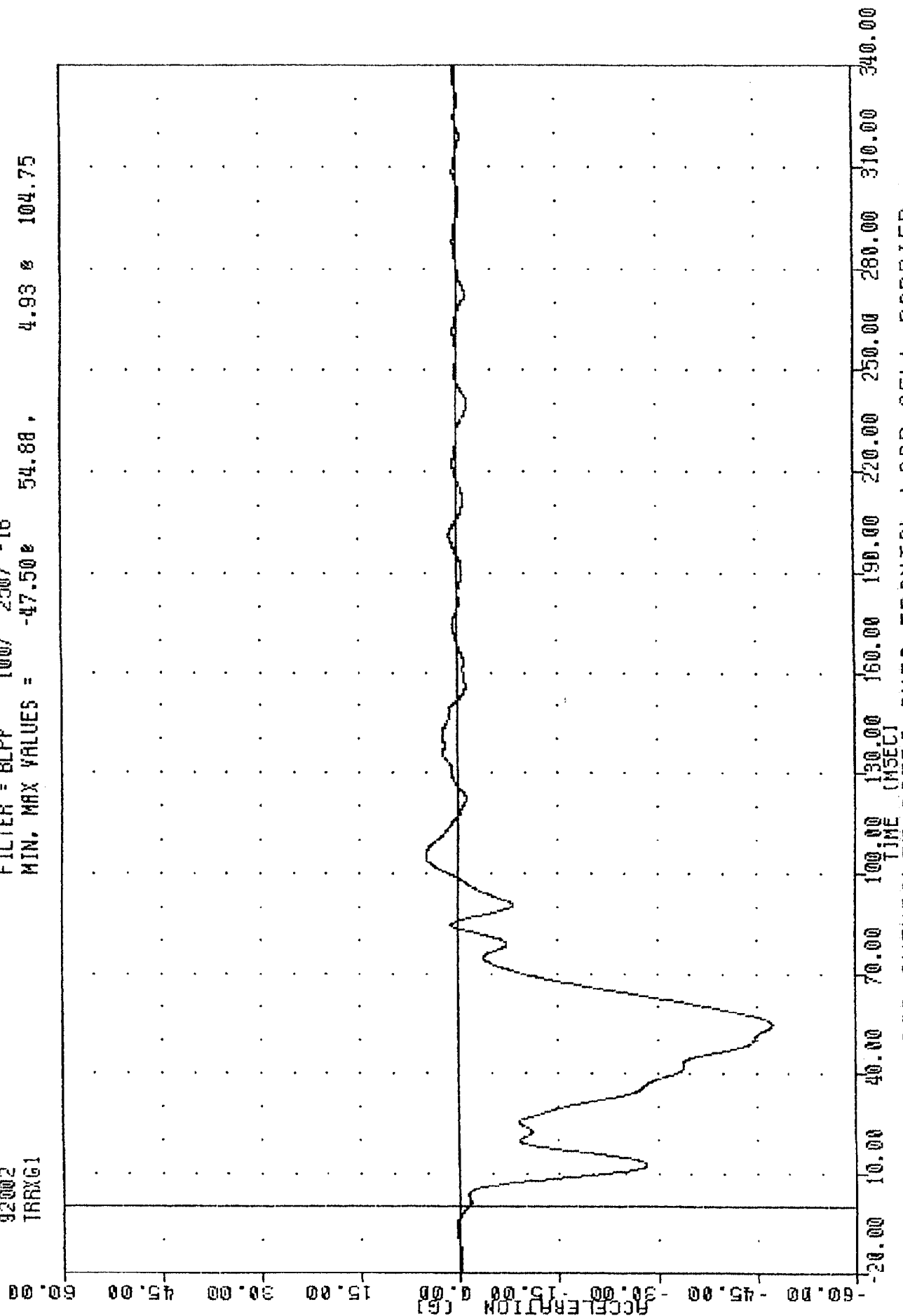
MIN, MAX VALUES = -0.06e 360.00, 24.76 e 62.38



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS DISPLACEMENT

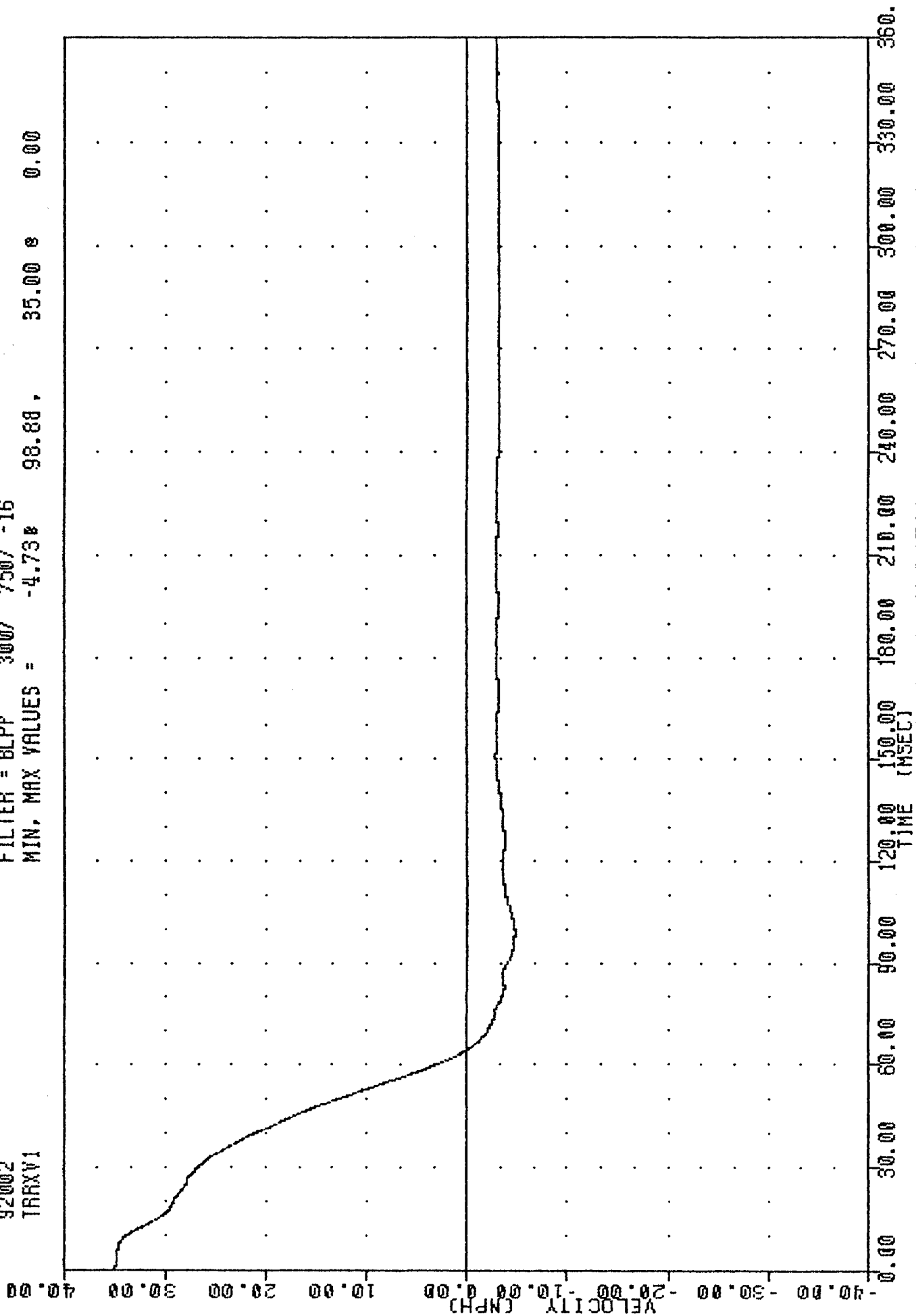
TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 TRRXG1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -47.50e 54.88 , 4.93 e 104.75



92002 TRRXV1

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -4.73 98.88 35.00 0.00

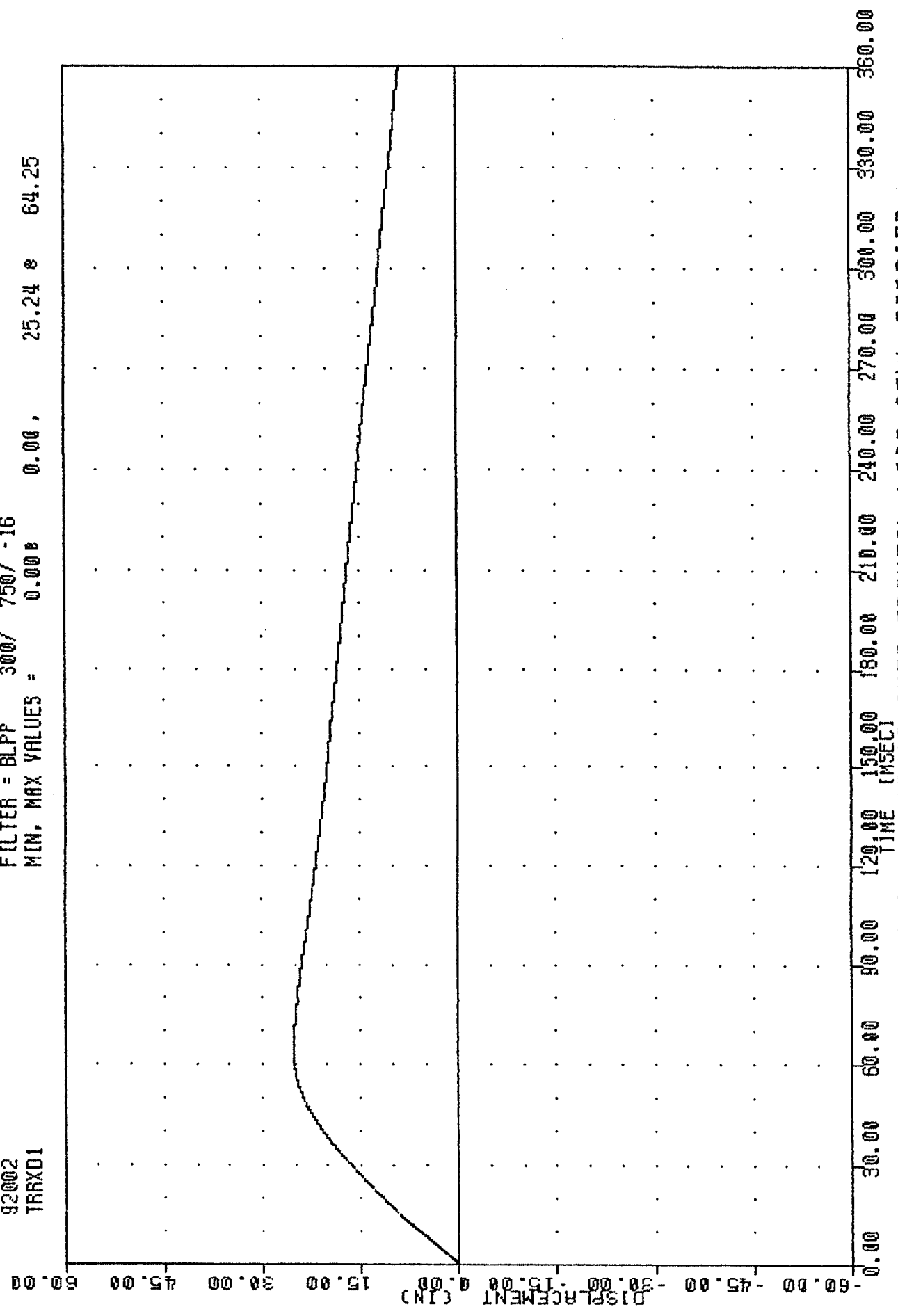


1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS VELOCITY

TPC
 NEW CAR ASSESSMENT PROGRAM
 92002
 TRXD1

920102

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.00 0.00, 25.24 64.25



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 RIGHT REAR SEAT X-AXIS DISPLACEMENT

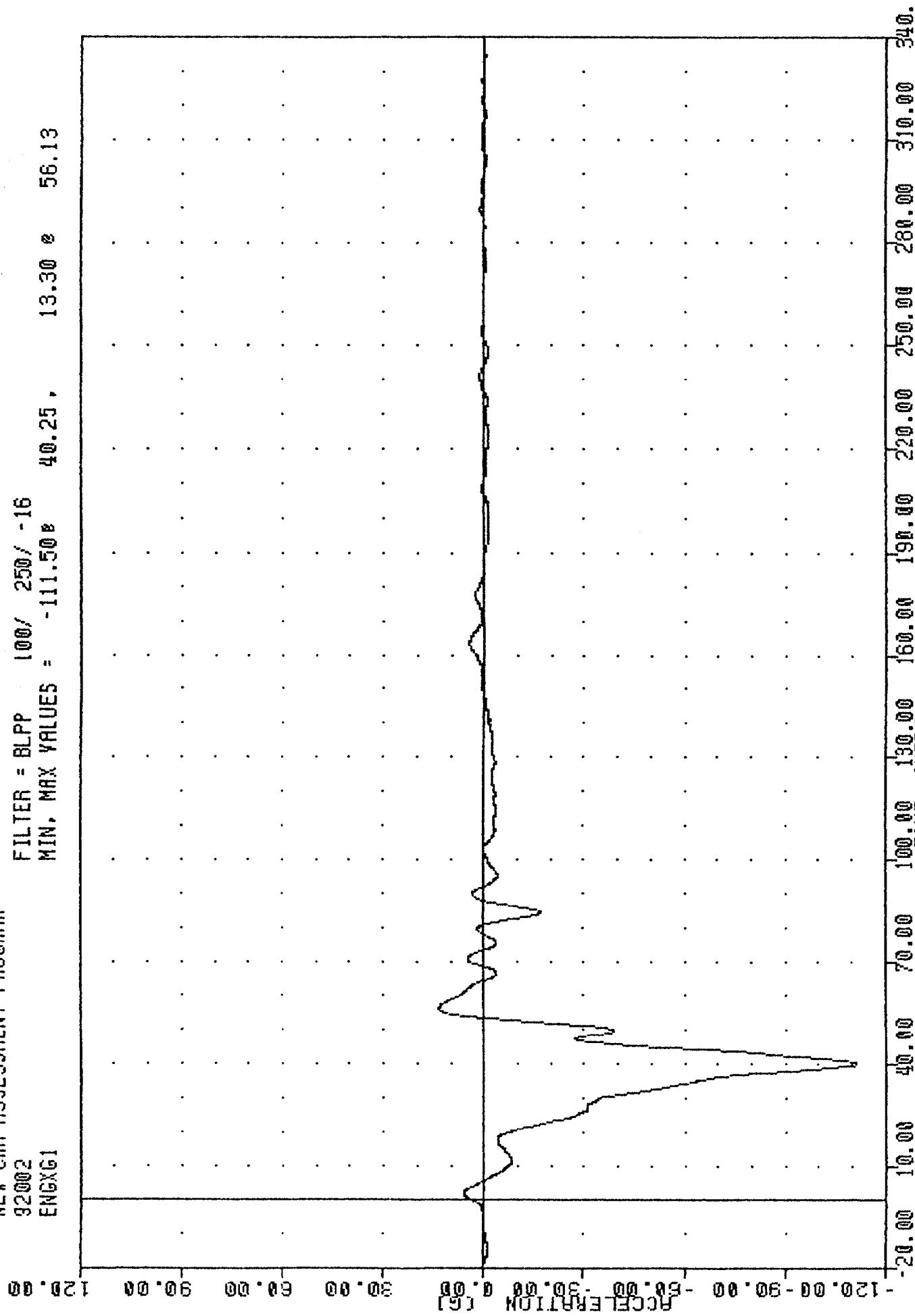
NEW LHM ASSESSMENT PROGRAM

92002

ENGXG1

FILTER = BLPP 100/ 250/ -16

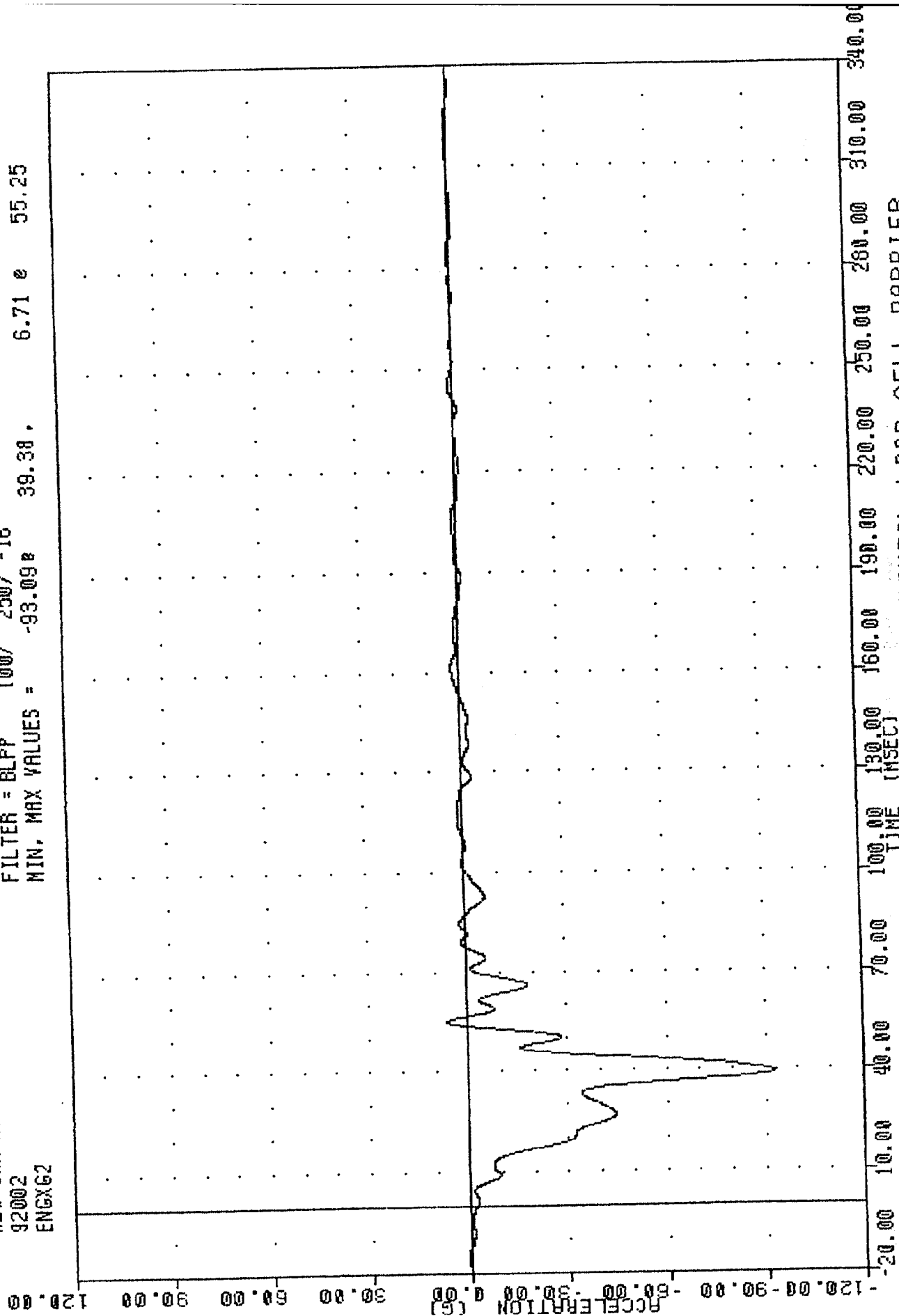
MIN, MAX VALUES = -111.50% 40.25, 13.30 @ 56.13



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
ENGINE TOP X-AXIS ACCELERATION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 ENGCG2

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -93.09 39.38 6.71 55.25



B-51

920102

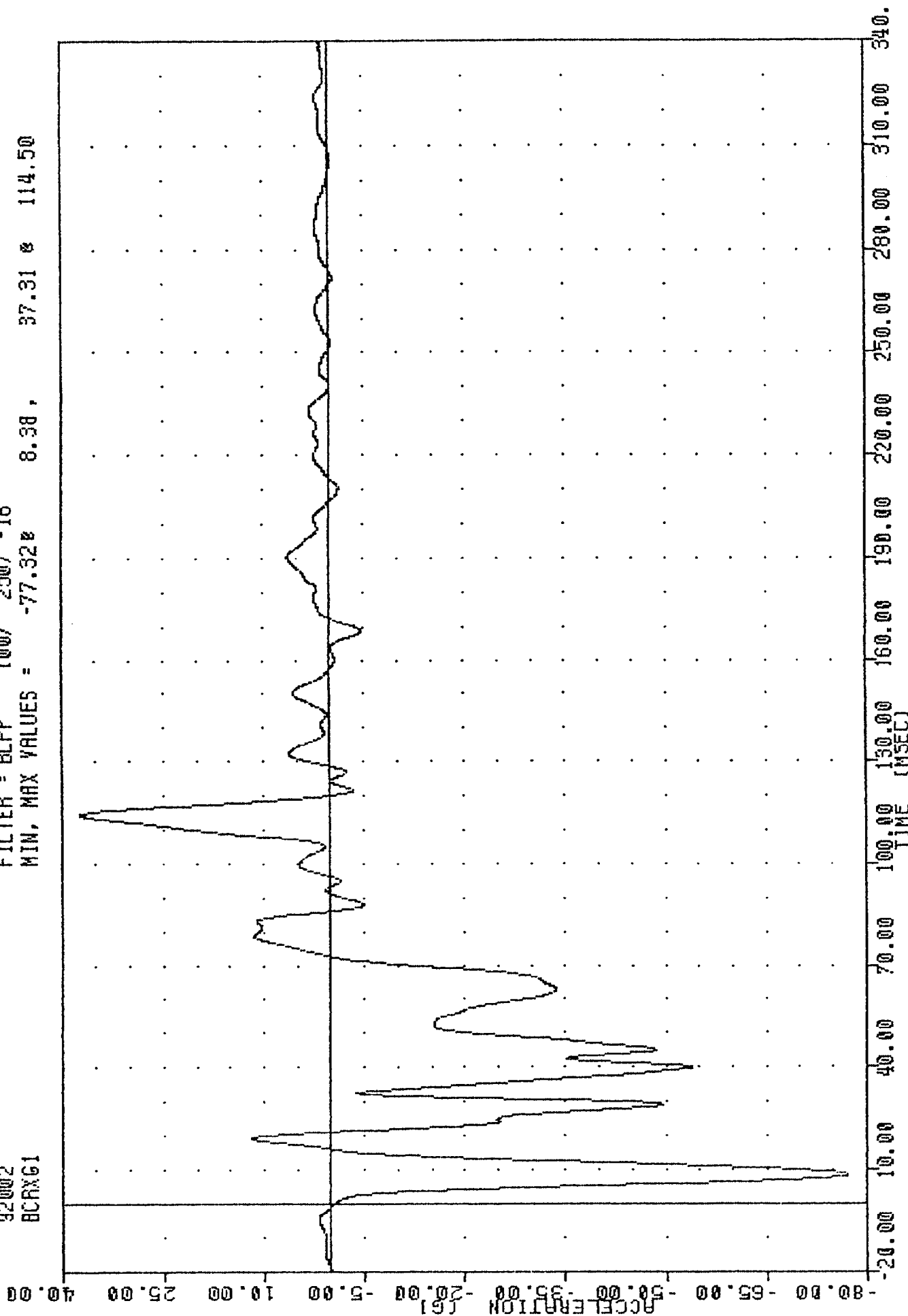
1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 ENGINE BOTTOM X-AXIS ACCELERATION

92002

BCRXG1

FILTER = BLPP 100/ 250/ -16

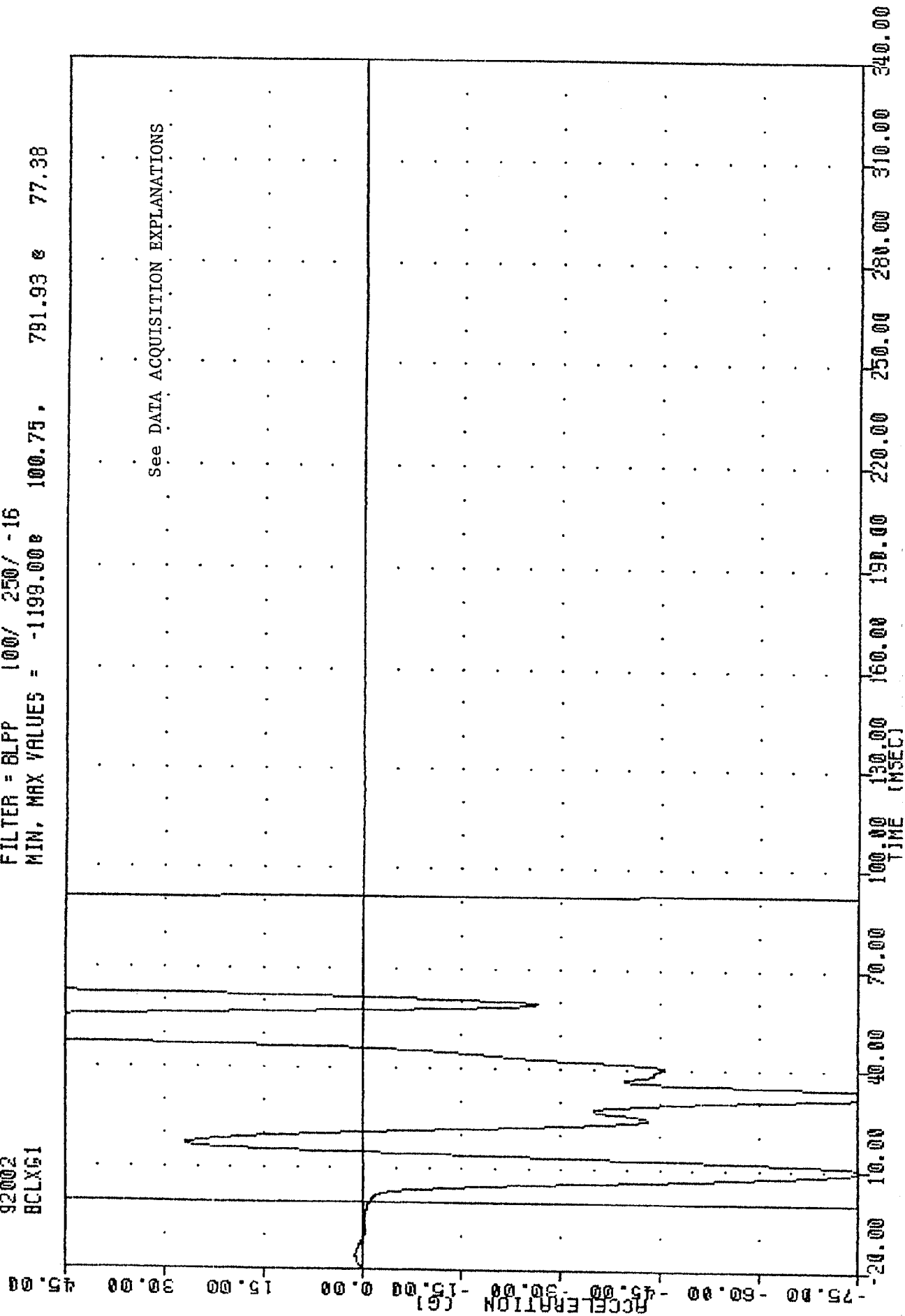
MIN, MAX VALUES = -77.32 8.38 , 37.31 114.50



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BCLXG1

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -1199.00e 100.75, 791.93 e 77.38



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LEFT BRAKE CALIPER X-AXIS ACCELERATION

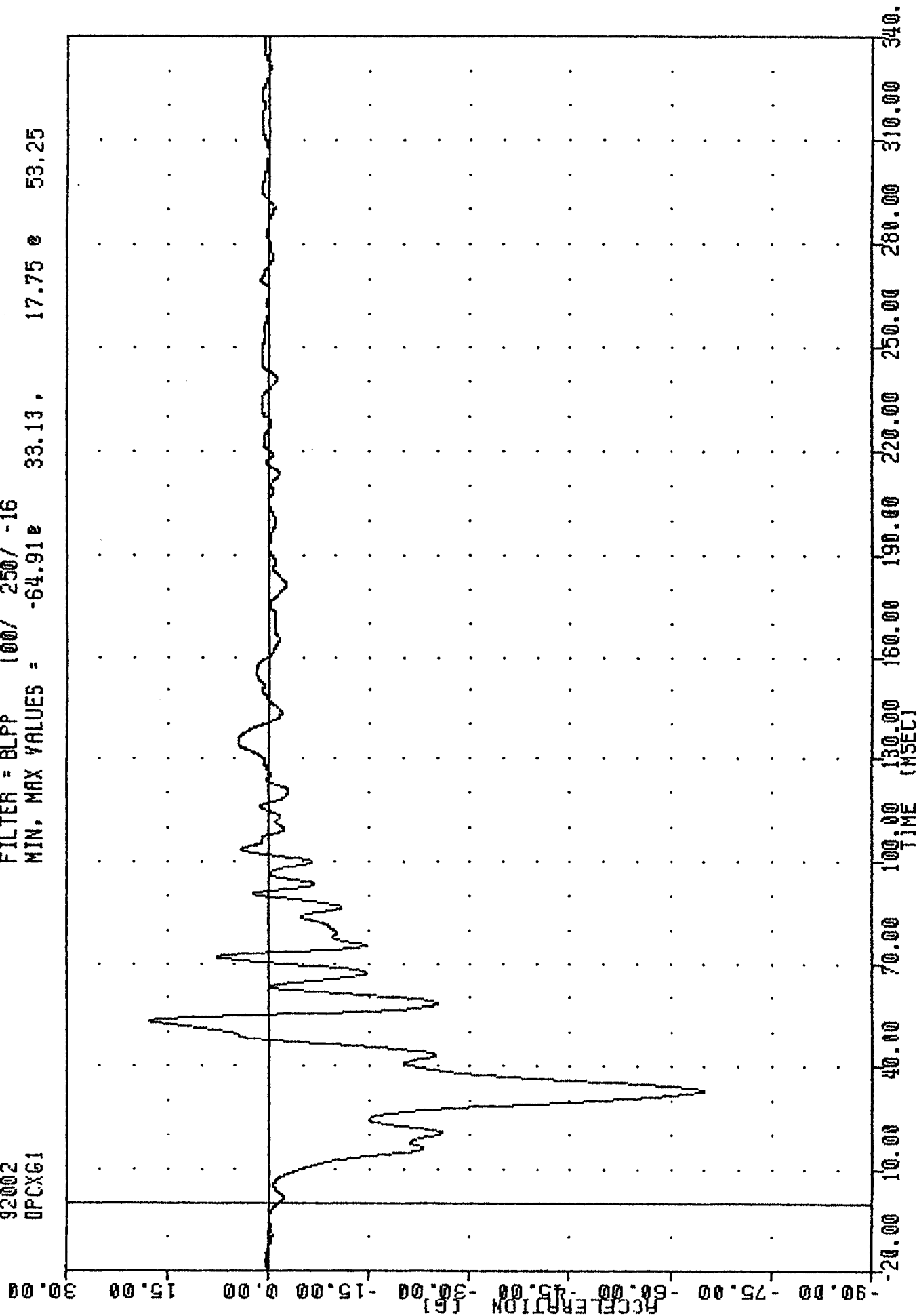
NEW LINE ADDRESSMENT PROGRAM

92002

OPCXG1

FILTER = BLPP 100/ 250/ -16

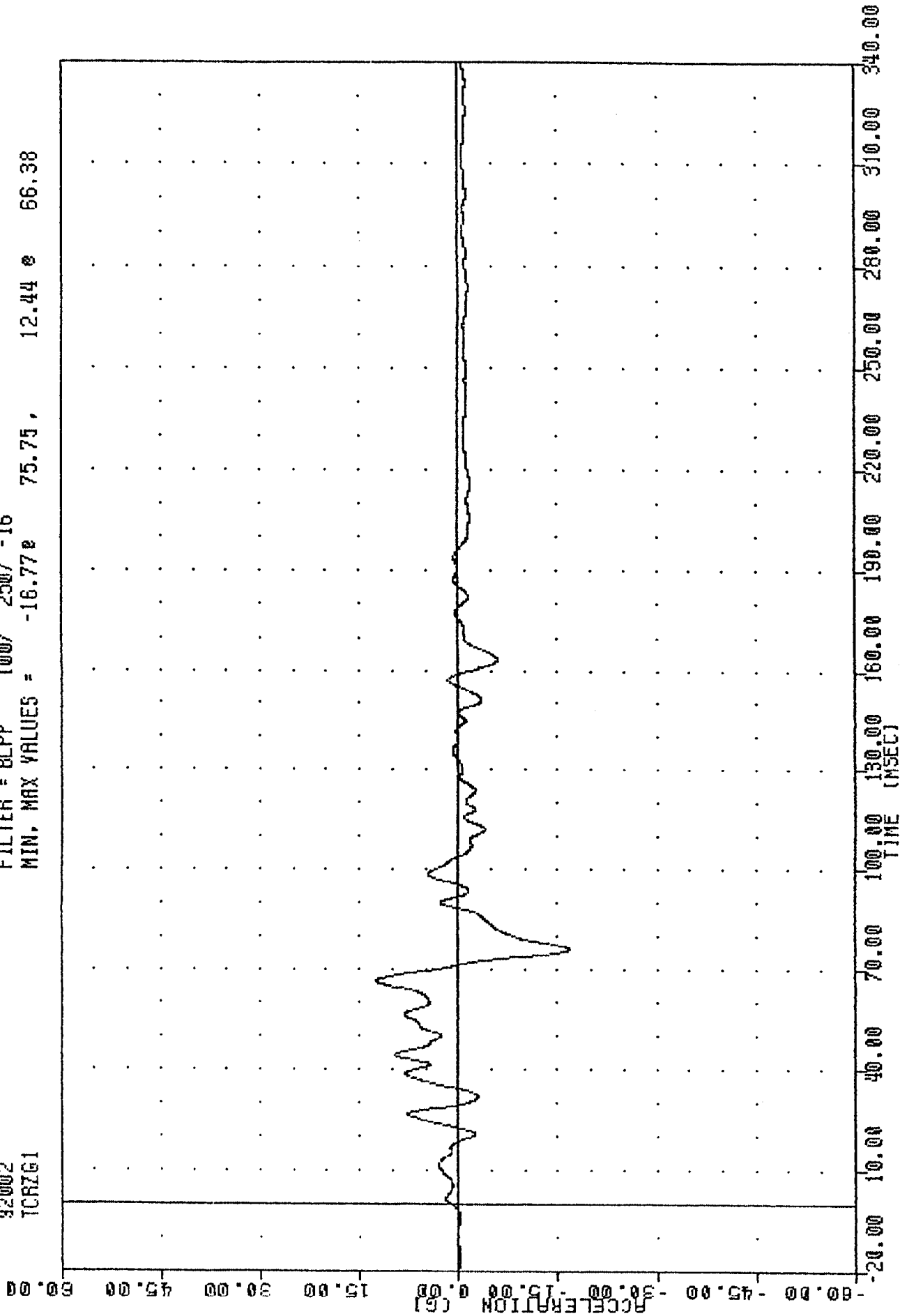
MIN, MAX VALUES = -64.91e 33.13, 17.75 e 53.25



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

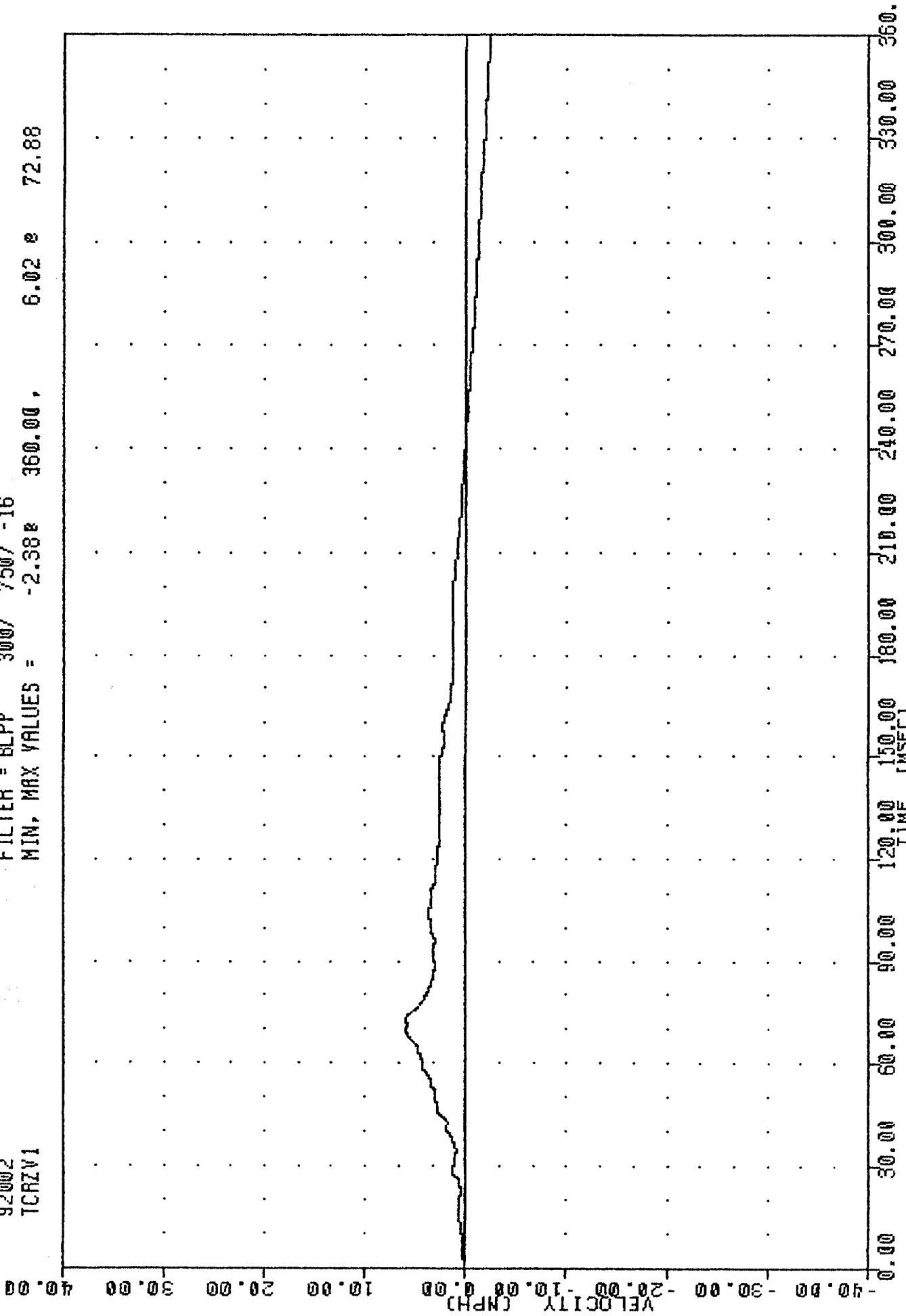
TRC , 920102
NEW CAR ASSESSMENT PROGRAM
92002
TCR161

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -16.77 75.75, 12.44 66.38



92002
TCRZV1

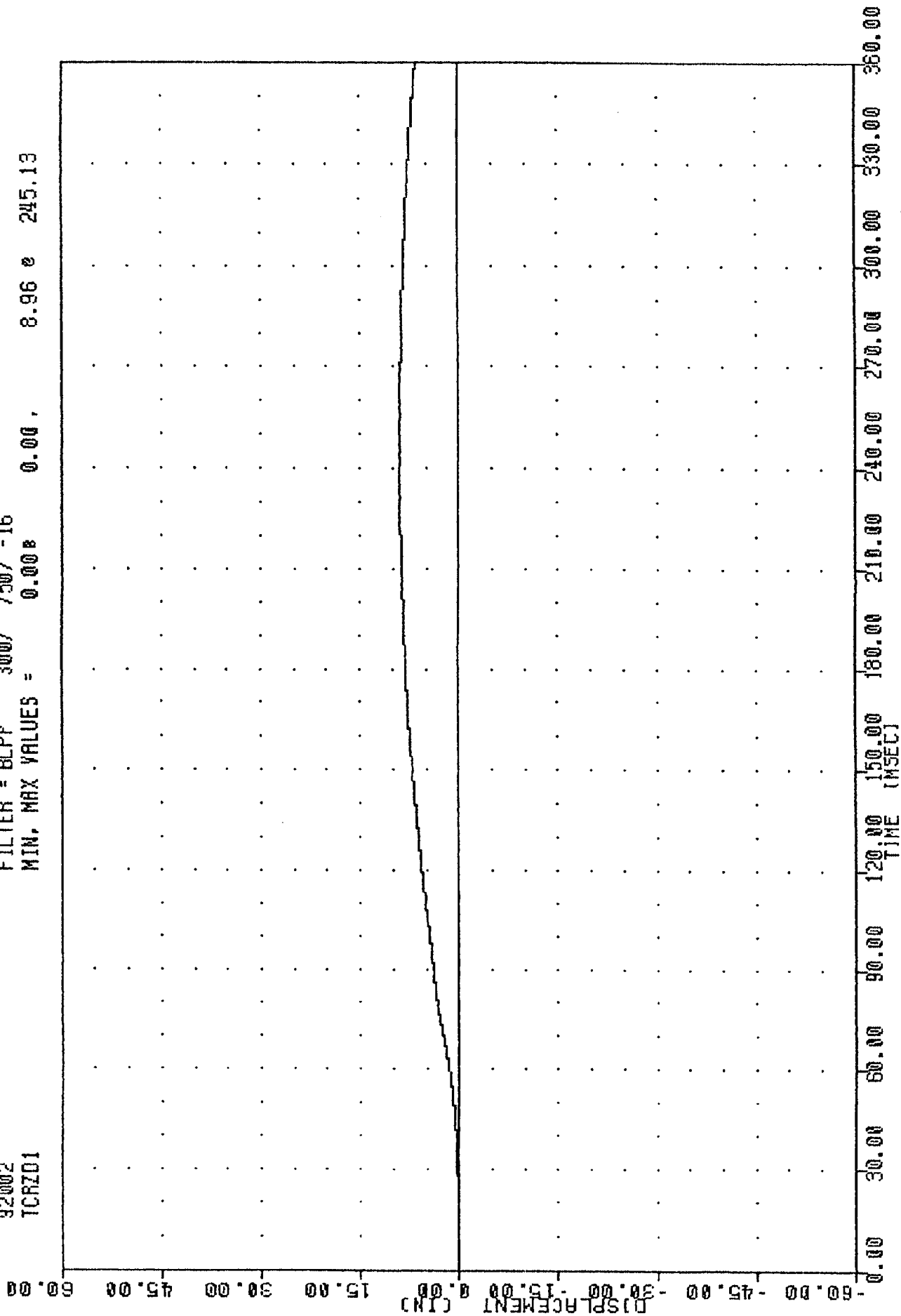
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -2.38 360.00, 6.02 72.88



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
REAR SEAT CROSSMEMBER Z-AXIS VELOCITY

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 TCRZ01

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.00 8.96 e 245.13



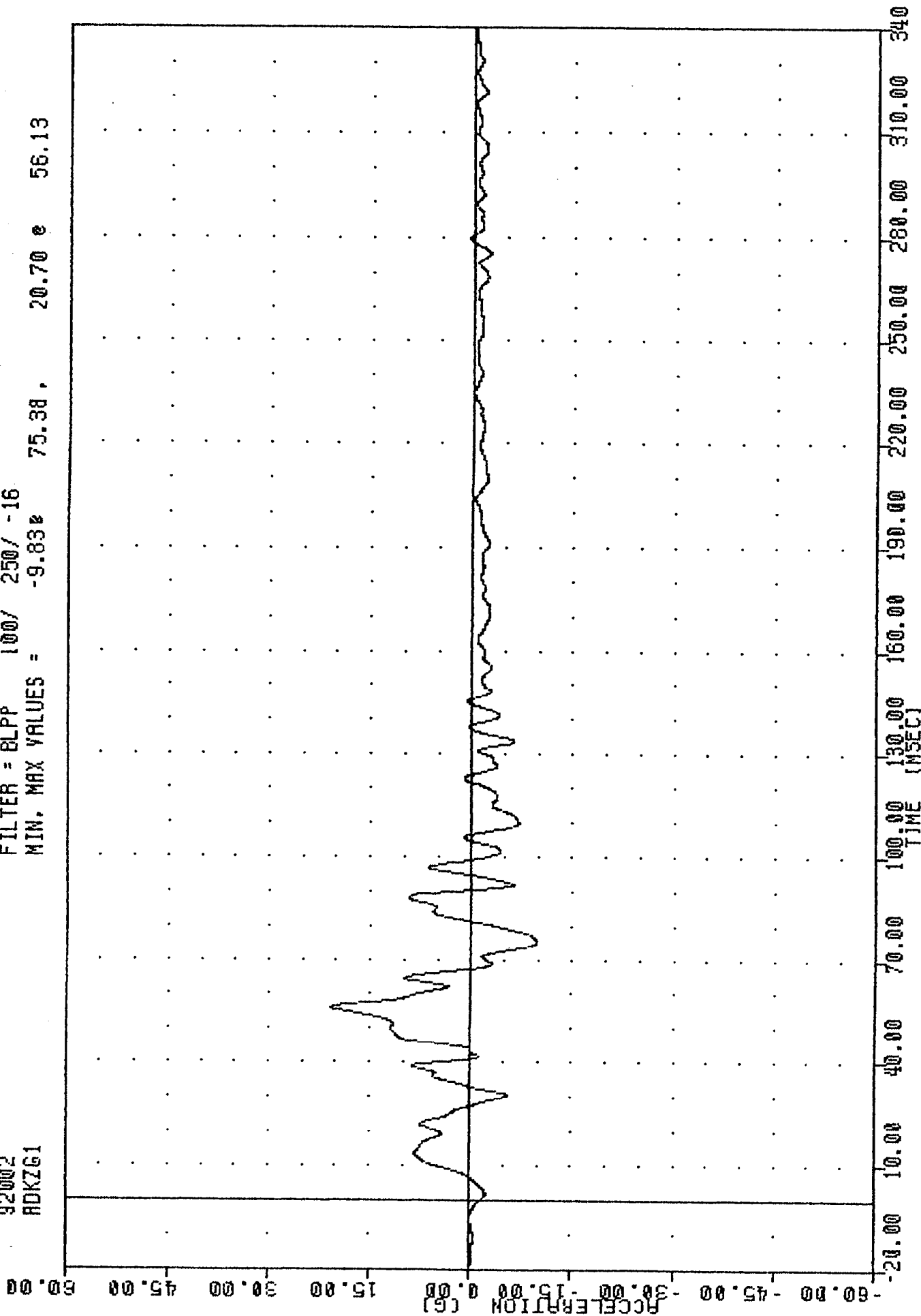
1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 REAR SEAT CROSSMEMBER Z-AXIS DISPLACEMENT

NEW YORK TECHNOLOGICAL PROGRAM

92002
ADKZG1

FILTER = BLPP 100/ 250/ -16

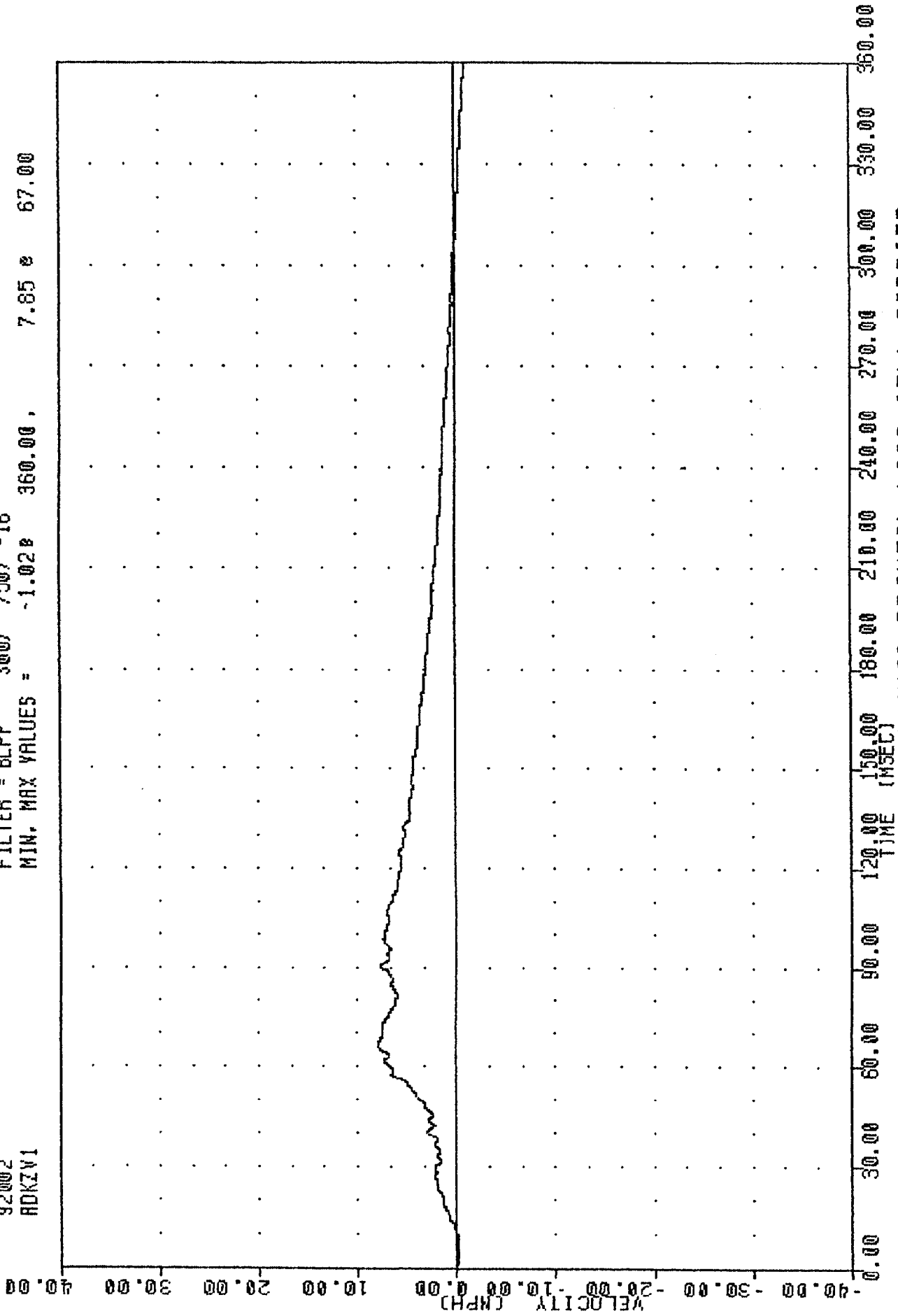
MIN. MAX VALUES = -9.83e 20.70 e 56.13



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
VEHICLE REAR CENTER Z-AXIS ACCELERATION

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 ADKZV1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -1.028 360.00, 7.85 e 67.00

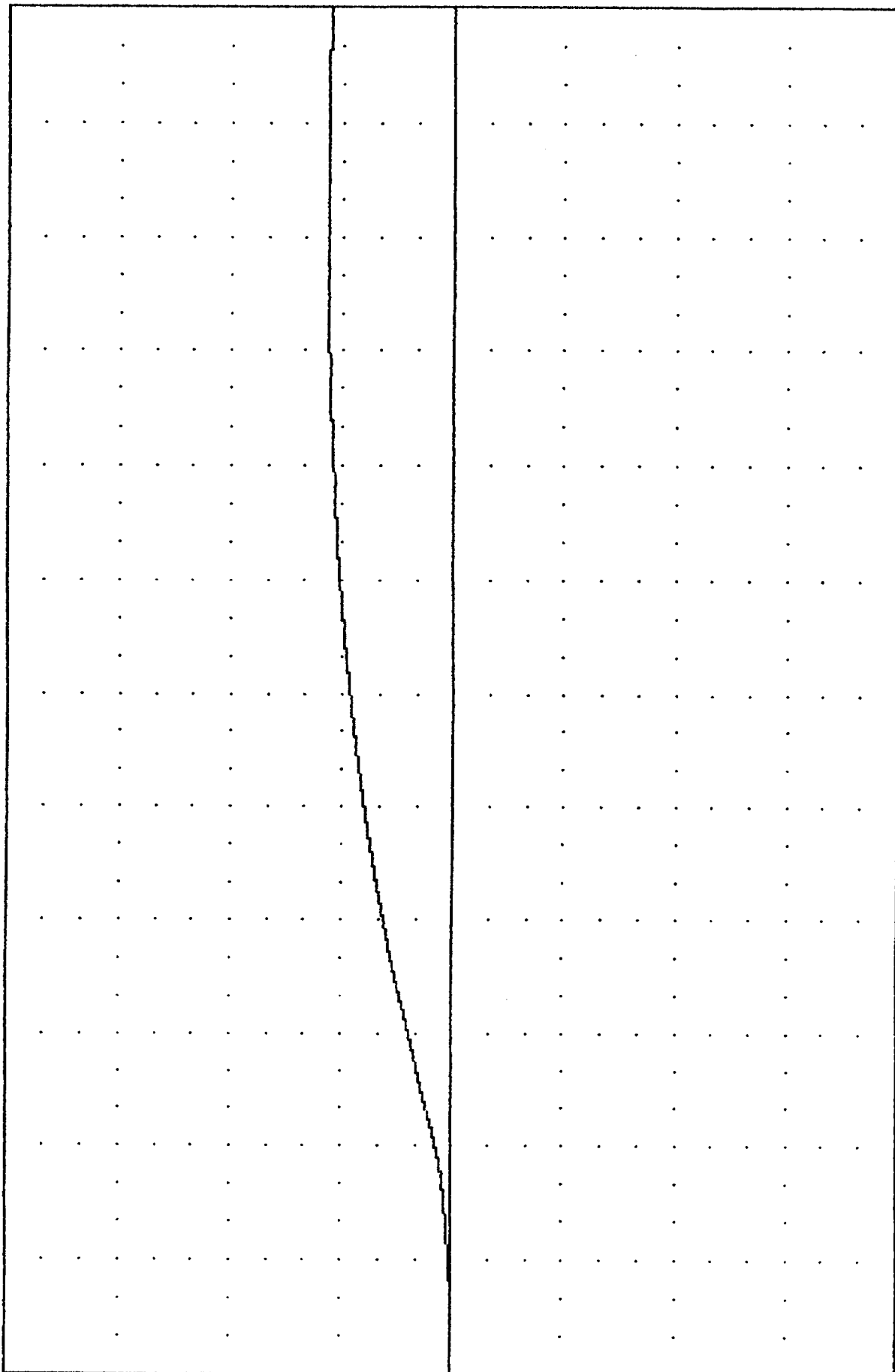


1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 VEHICLE REAR CENTER Z-AXIS VELOCITY

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = -0.038 10.38, 17.05 & 307.00

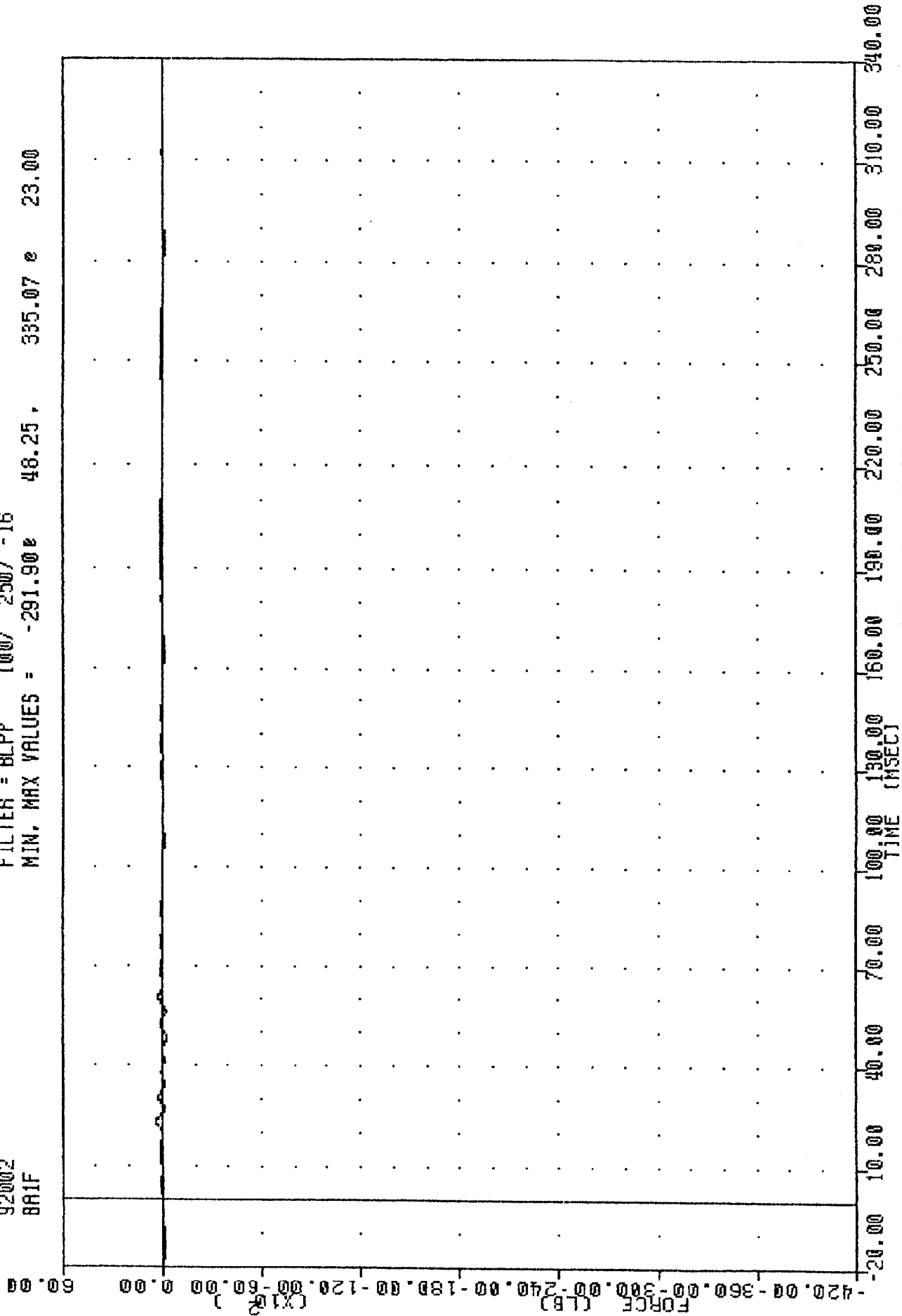
DISPLACEMENT (IN)



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
VEHICLE REAR CENTER Z-AXIS DISPLACEMENT

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BAIF

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -291.90e 48.25, 335.07 e 23.00

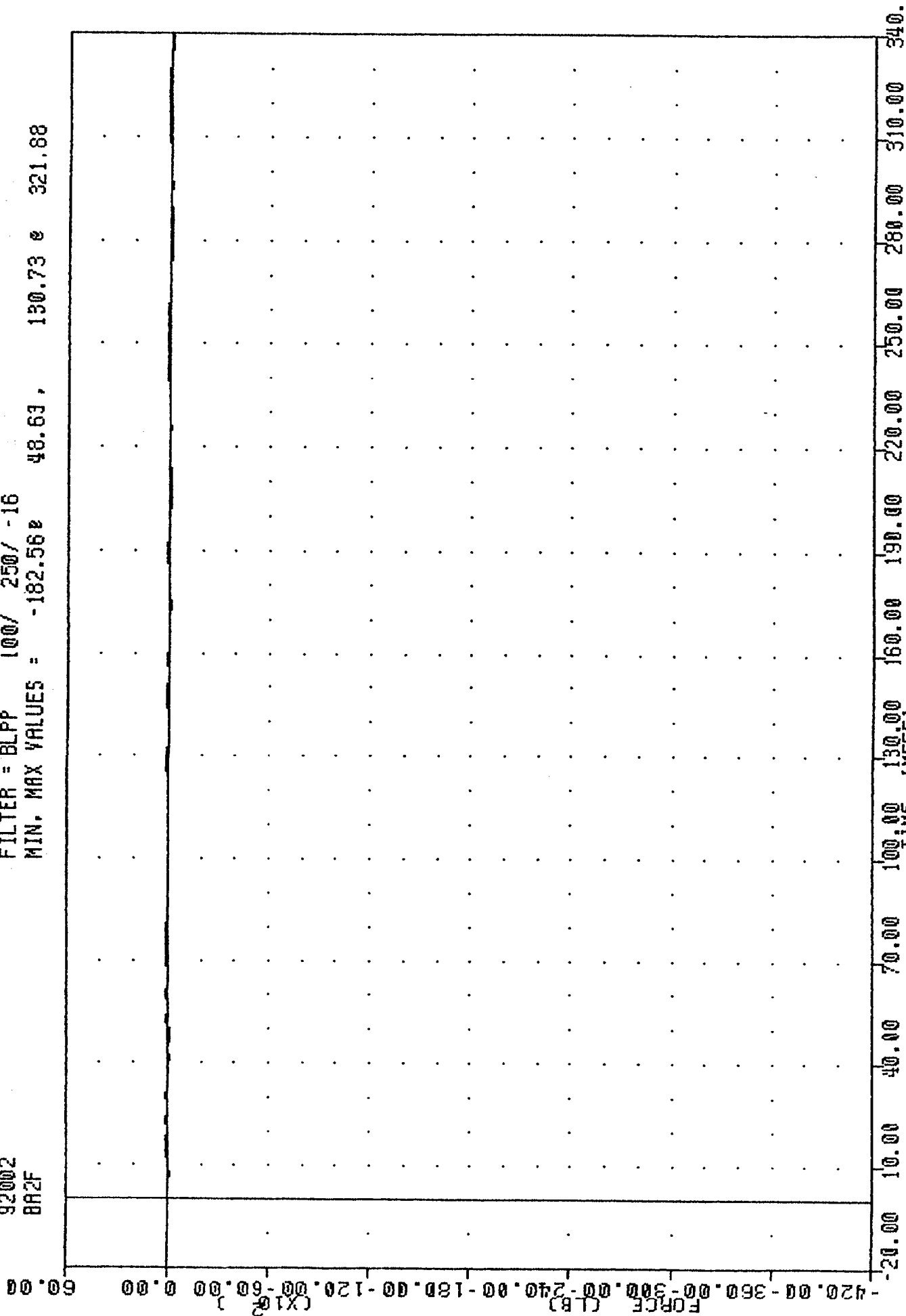


92002

BR2F

FILTER = BLPP 100/ 250/ -16

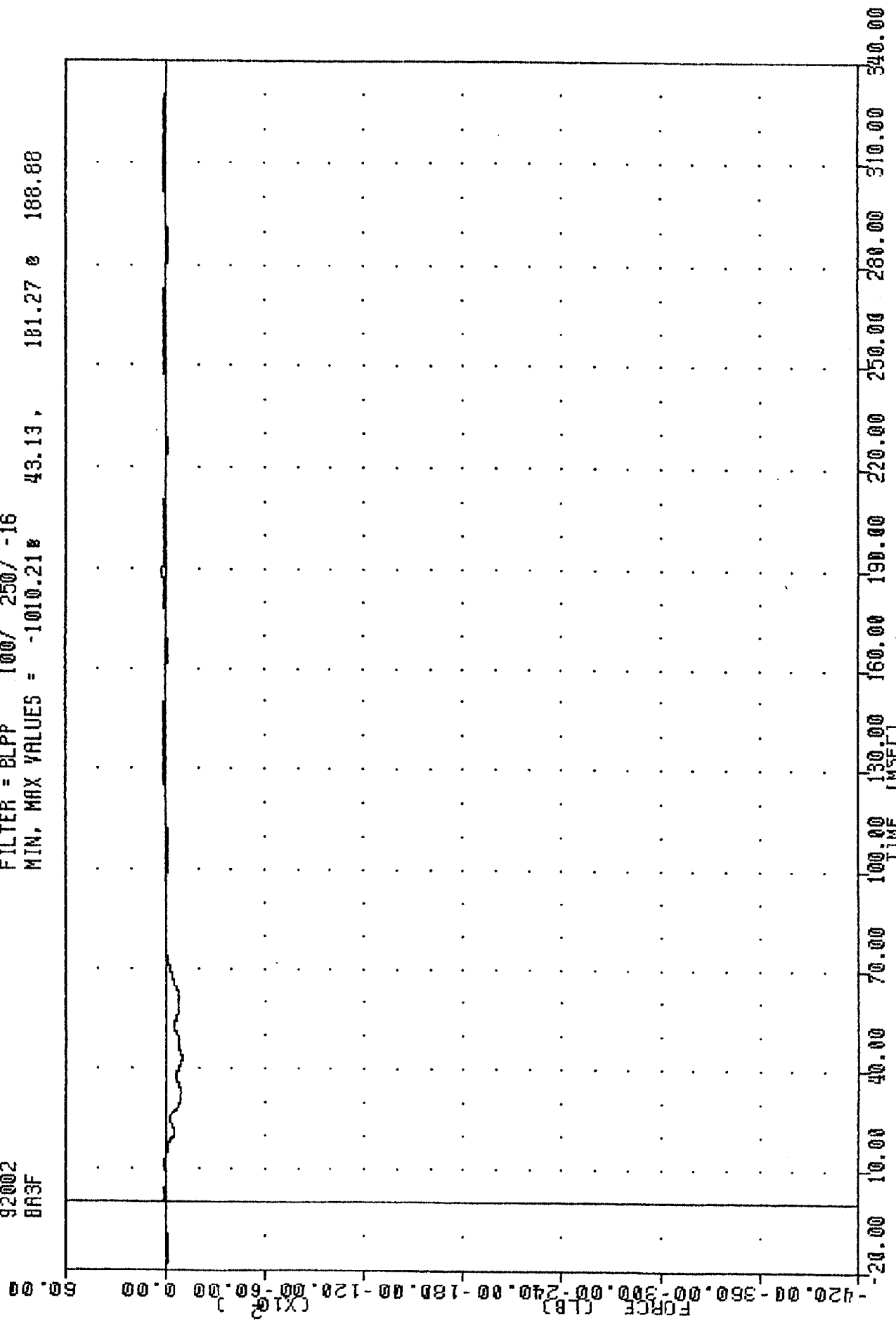
MIN. MAX VALUES = -182.56 48.63, 130.73 321.88



TRC
 NEW CAR ASSESSMENT PROGRAM
 92002
 BR3F

, 920102

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -1010.218 43.13, 181.27 @ 188.88



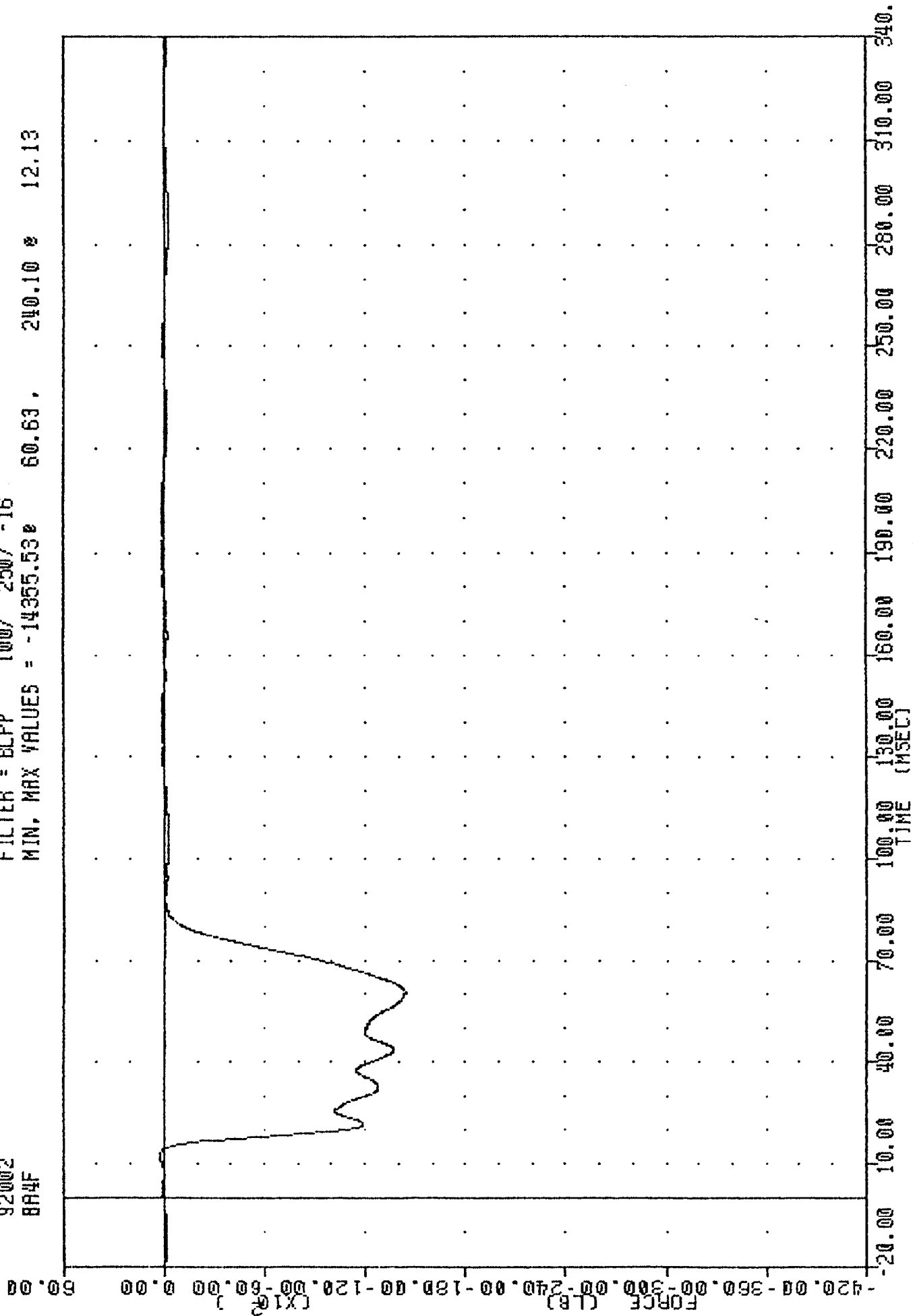
1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A3 FORCE

92002

BA4F

FILTER = BLPP 100/ 250/ -16

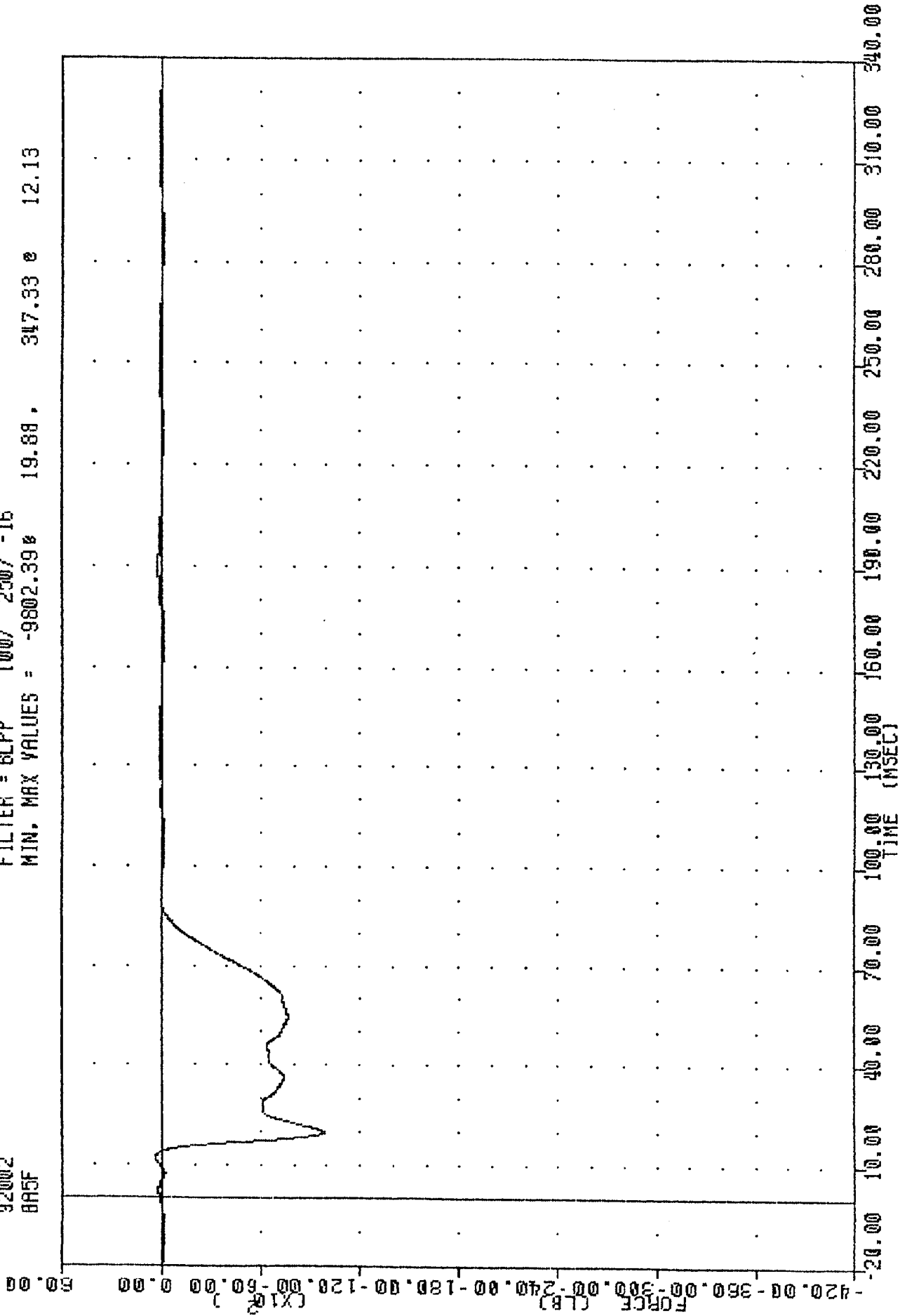
MIN. MAX VALUES = -14355.53# 60.63, 240.10 # 12.13



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A4 FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 095F

FILTER = 6LPP 100/ 250/ -16
 MIN. MAX VALUES = -9802.39% 19.88, 347.33 @ 12.13



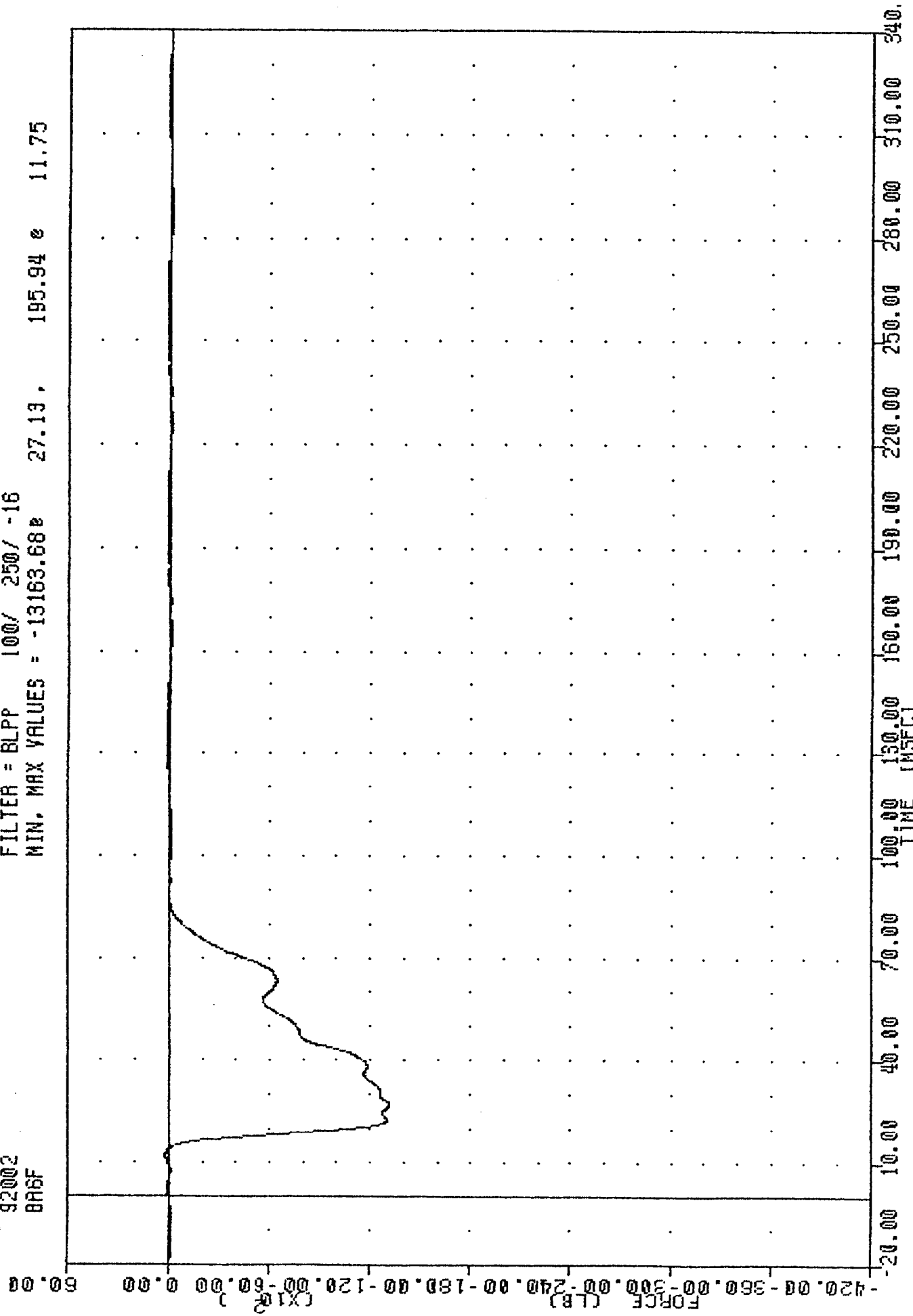
NEW CHH ASSESSMENT PROGRAM

92002

BASE

FILTER = BLPP 100/ 250/ -16

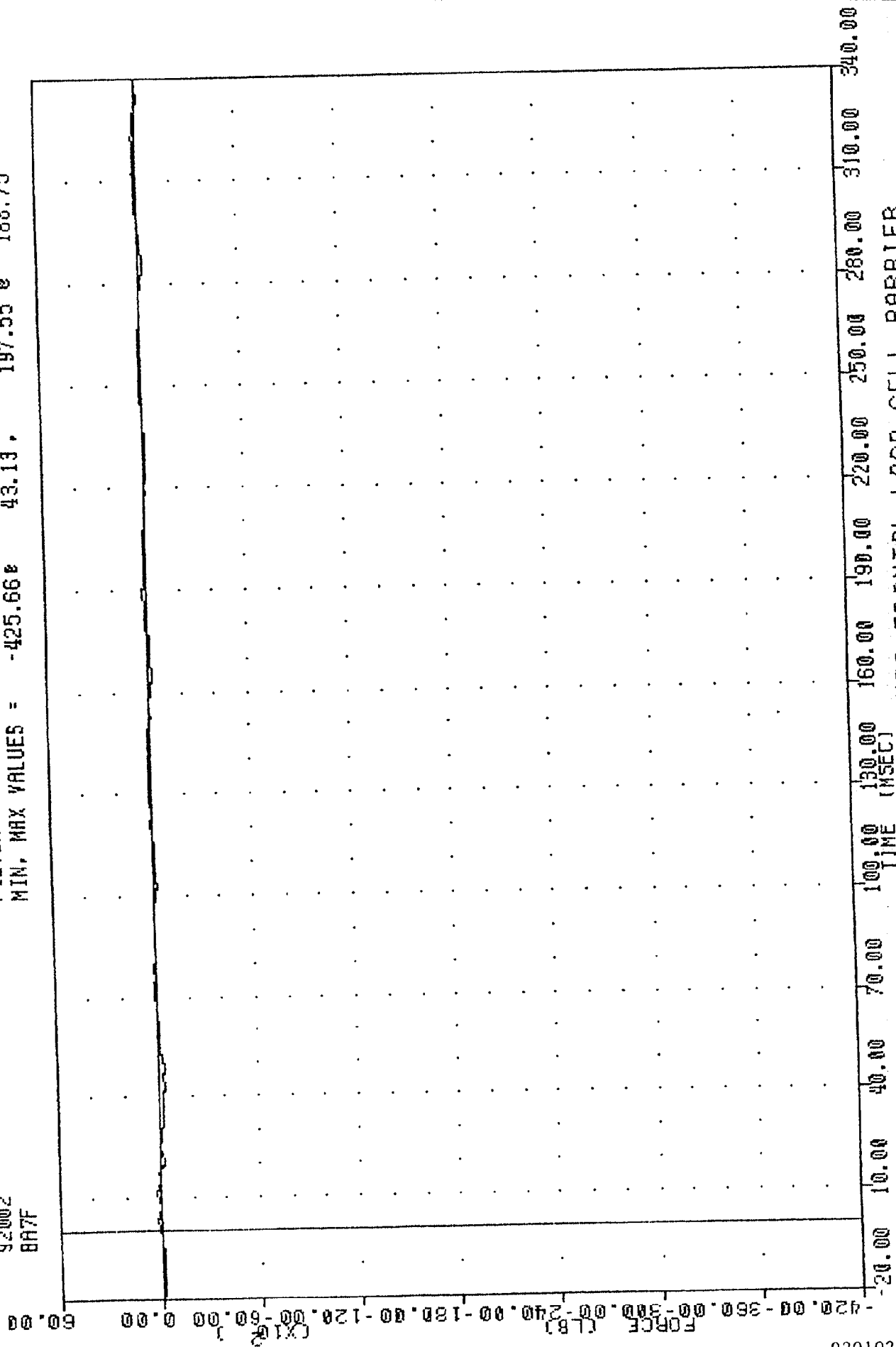
MIN. MAX VALUES = -13163.68e 27.13 , 195.94 e 11.75



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A6 FORCE

TRC 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BA7F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -425.66 43.13 197.55 188.75



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION A7 FORCE

NEW CAR POSSESSION PROGRAM

92002

BA8F

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -715.13 62.00 ,

116.75 2.88

50.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

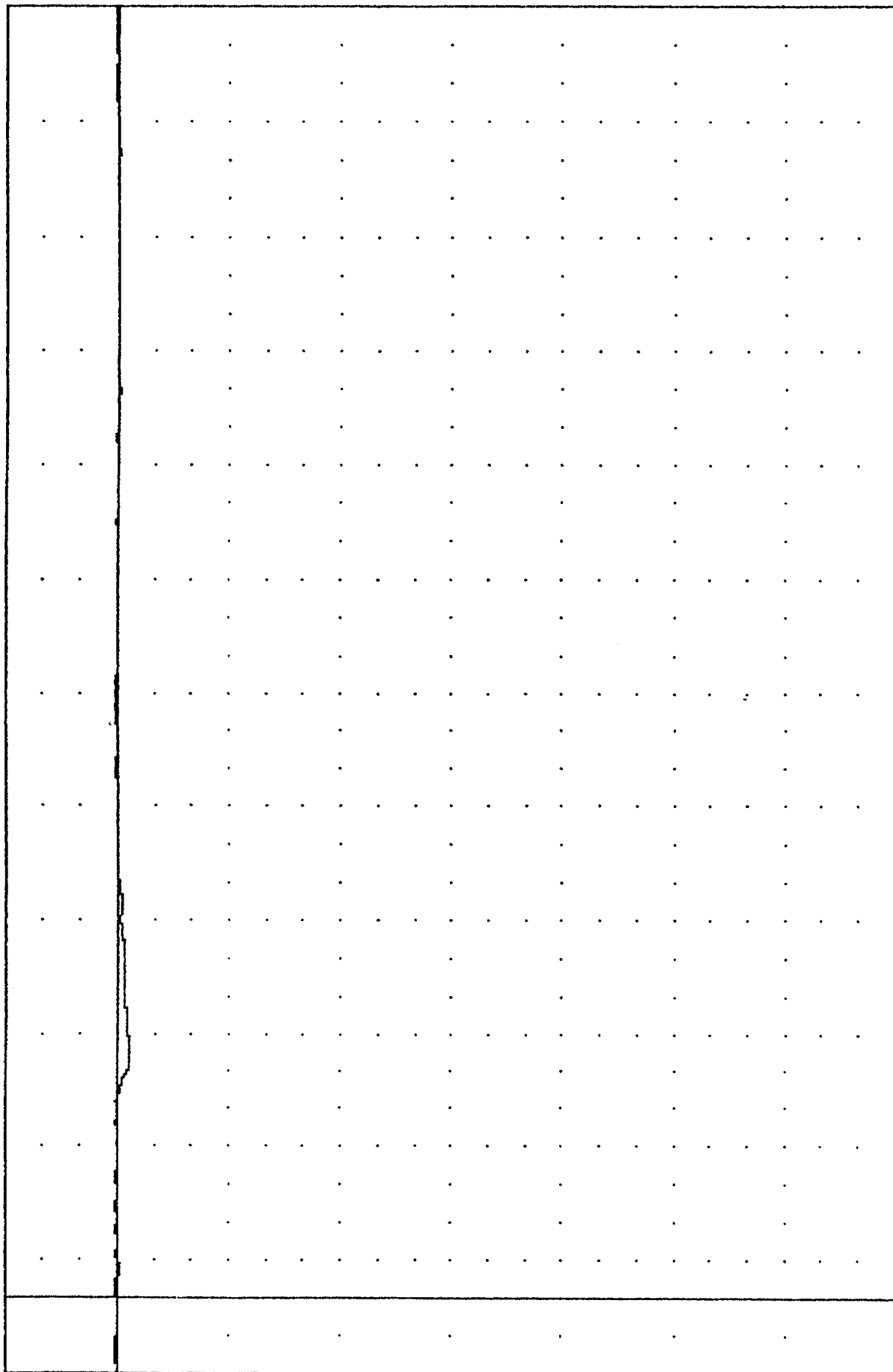
0.00

0.00

0.00

0.00

0.00

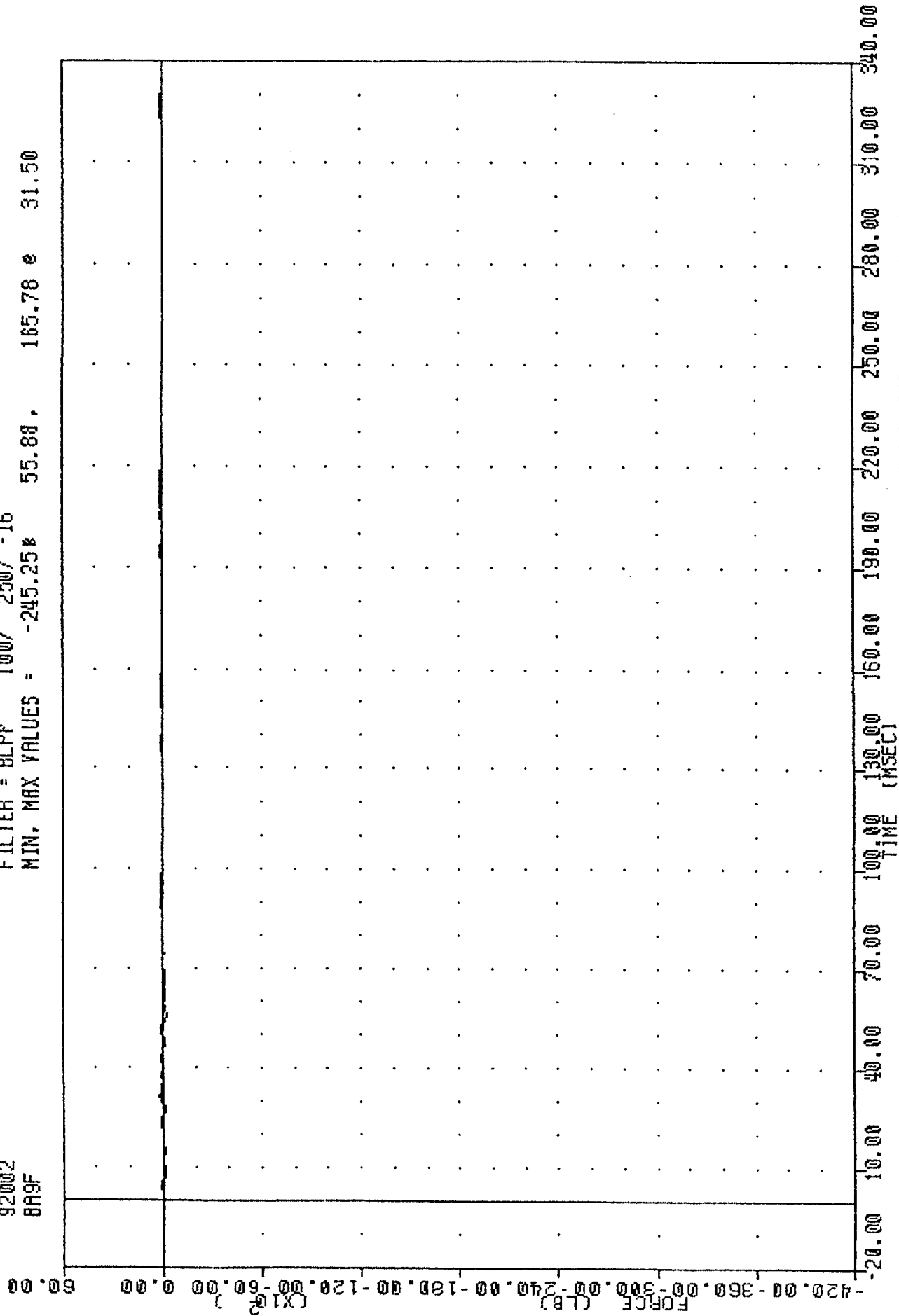


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A8 FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BR9F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -245.25% 55.88 , 165.78 e 31.50

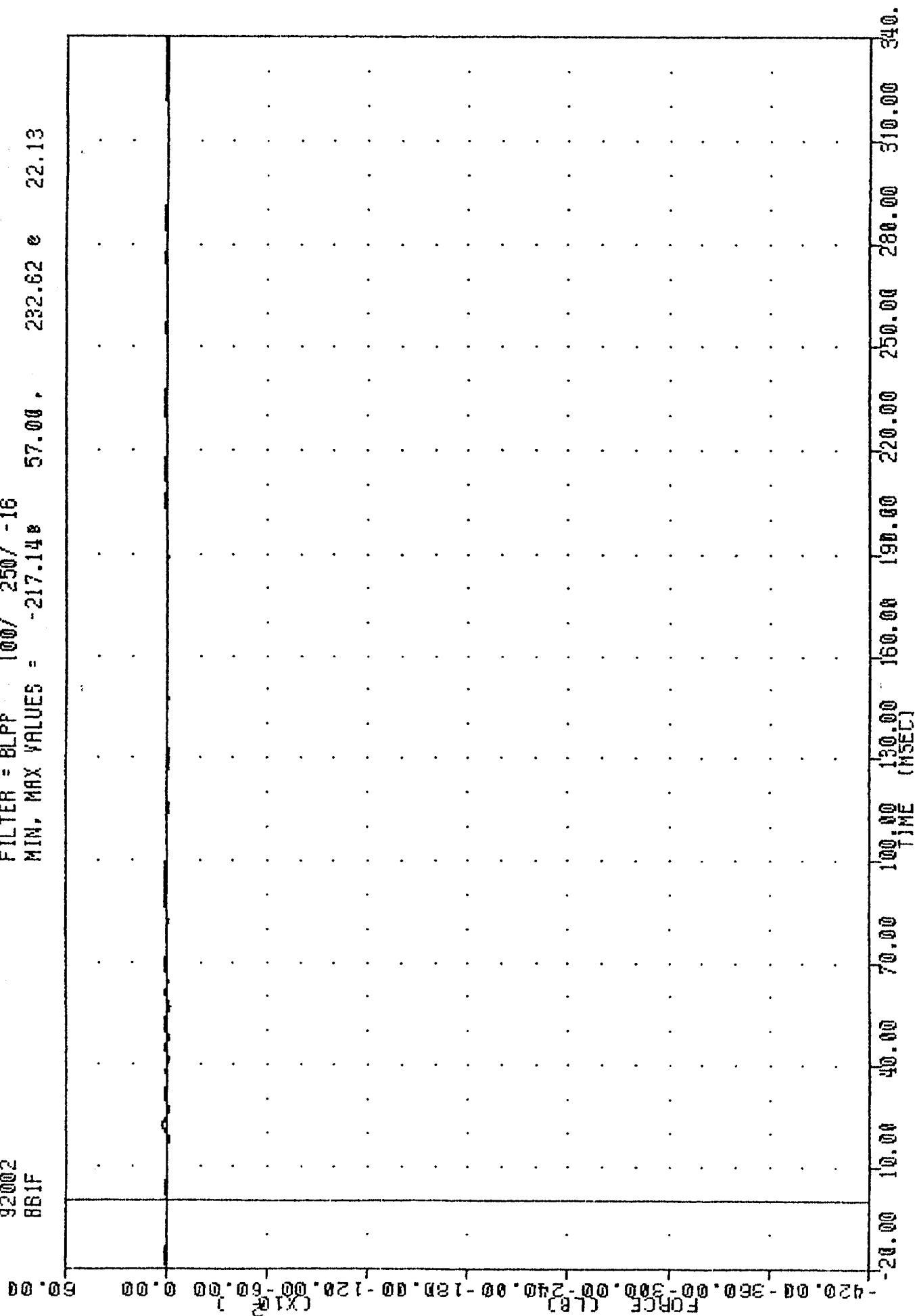


7138

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -217.148

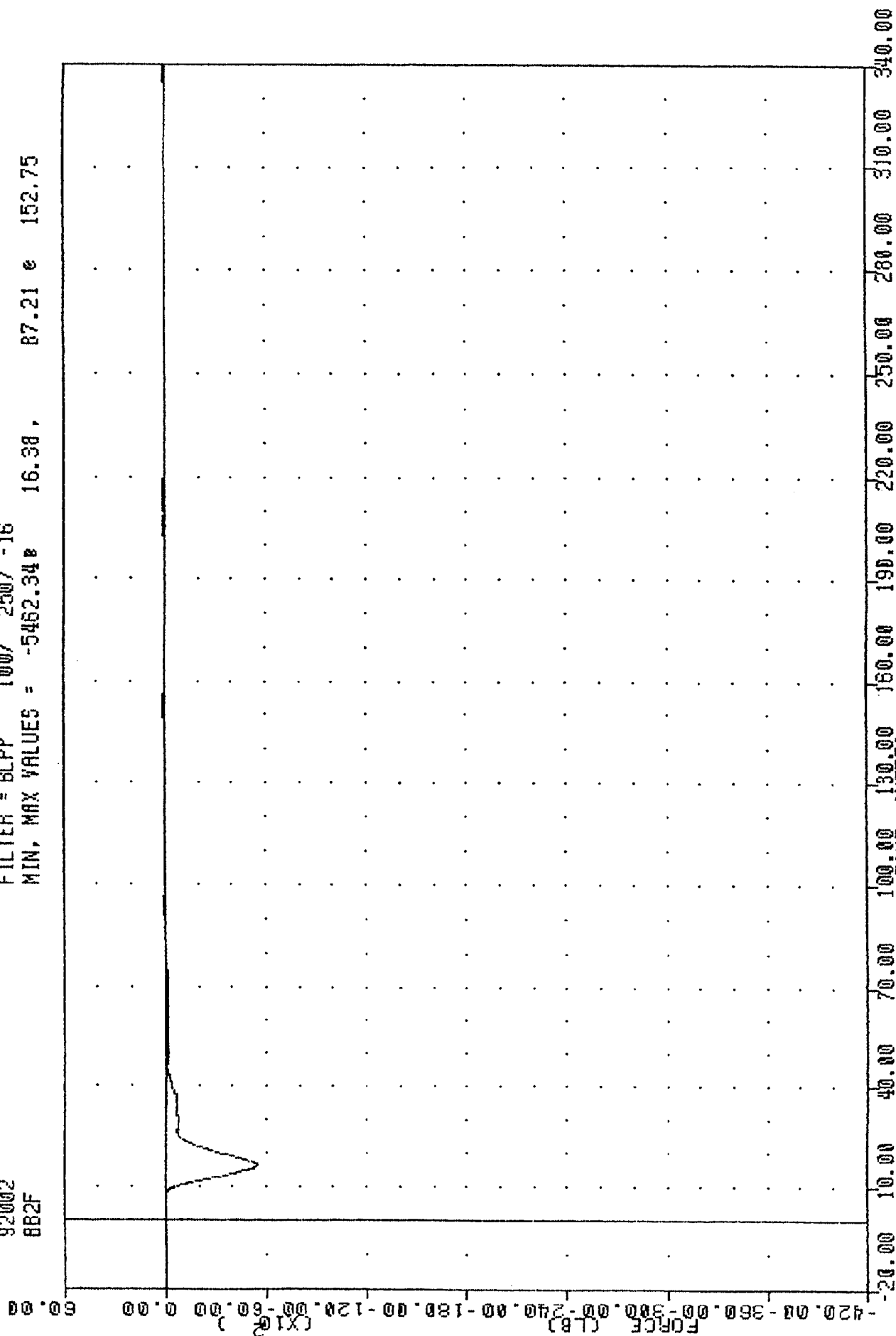
202.62 22.13



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B1 FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 882F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -5462.348 16.38 , 87.21 e 152.75

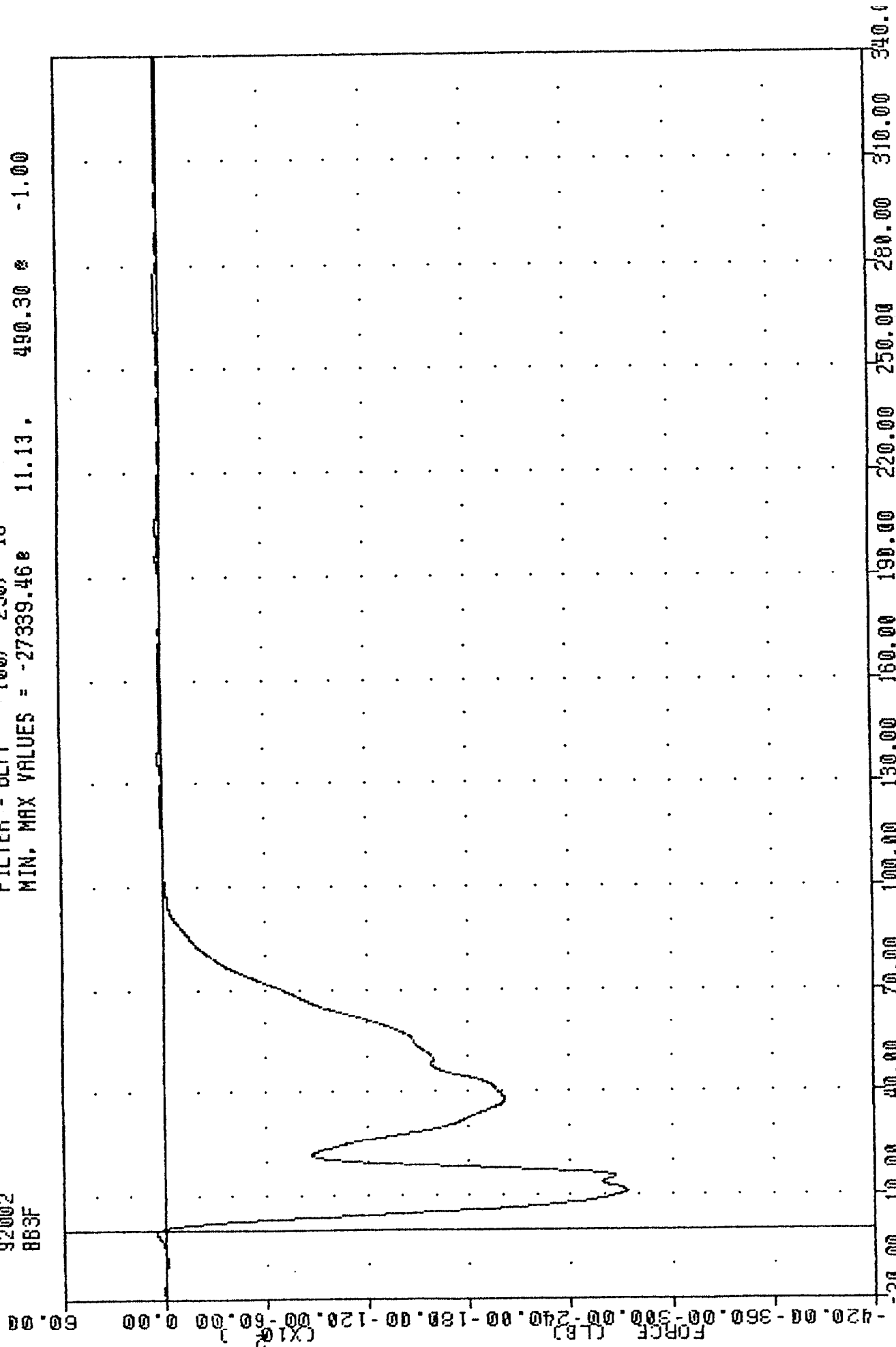


NEW CAR ASSESSMENT PROGRAM

FILTER = BLPP 100/ 250/ -16

92002
883F

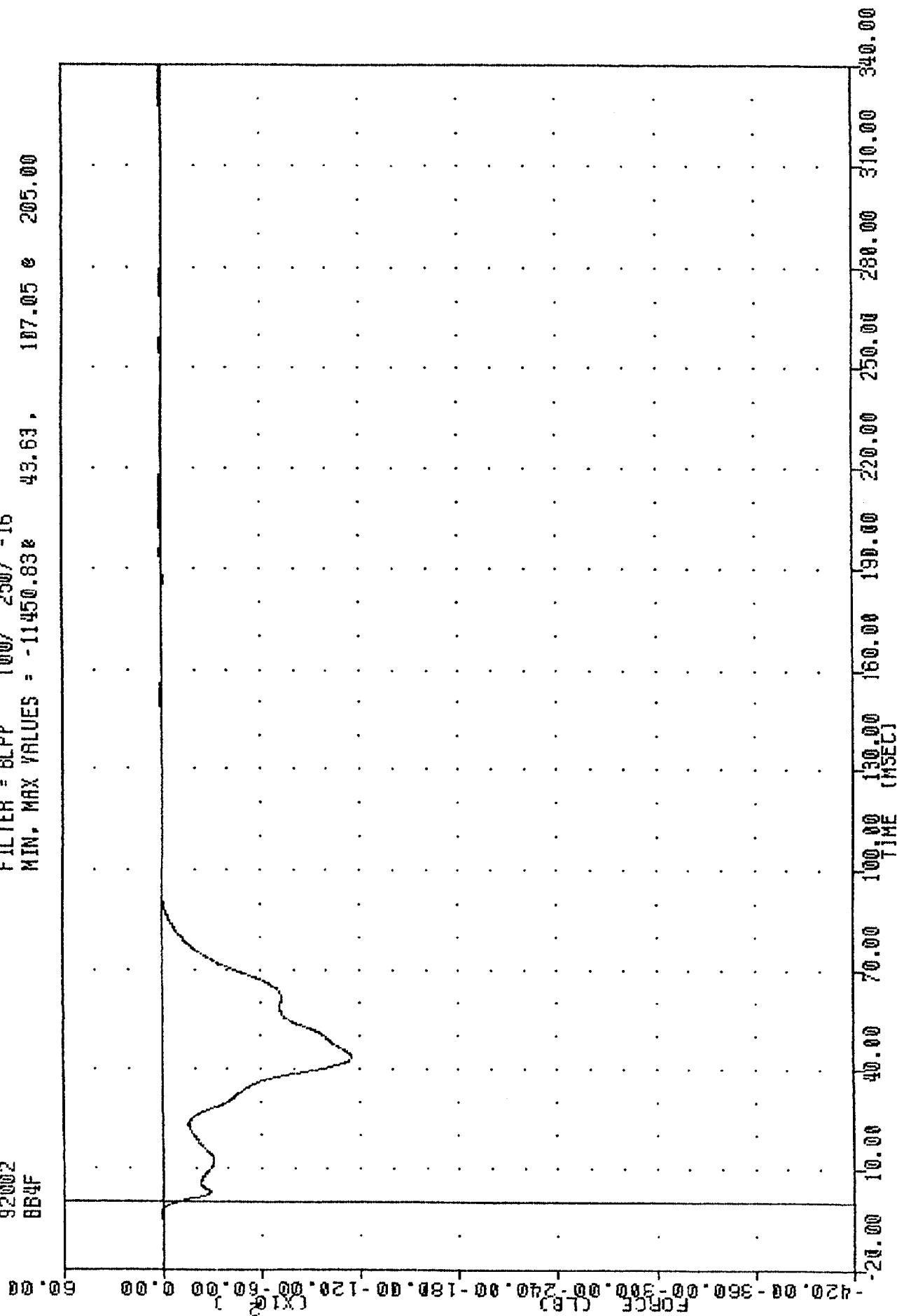
MIN. MAX VALUES = -27339.46e 11.13. 490.30 e -1.00



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B3 FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BB4F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -11450.83% 43.63, 107.05 @ 205.00

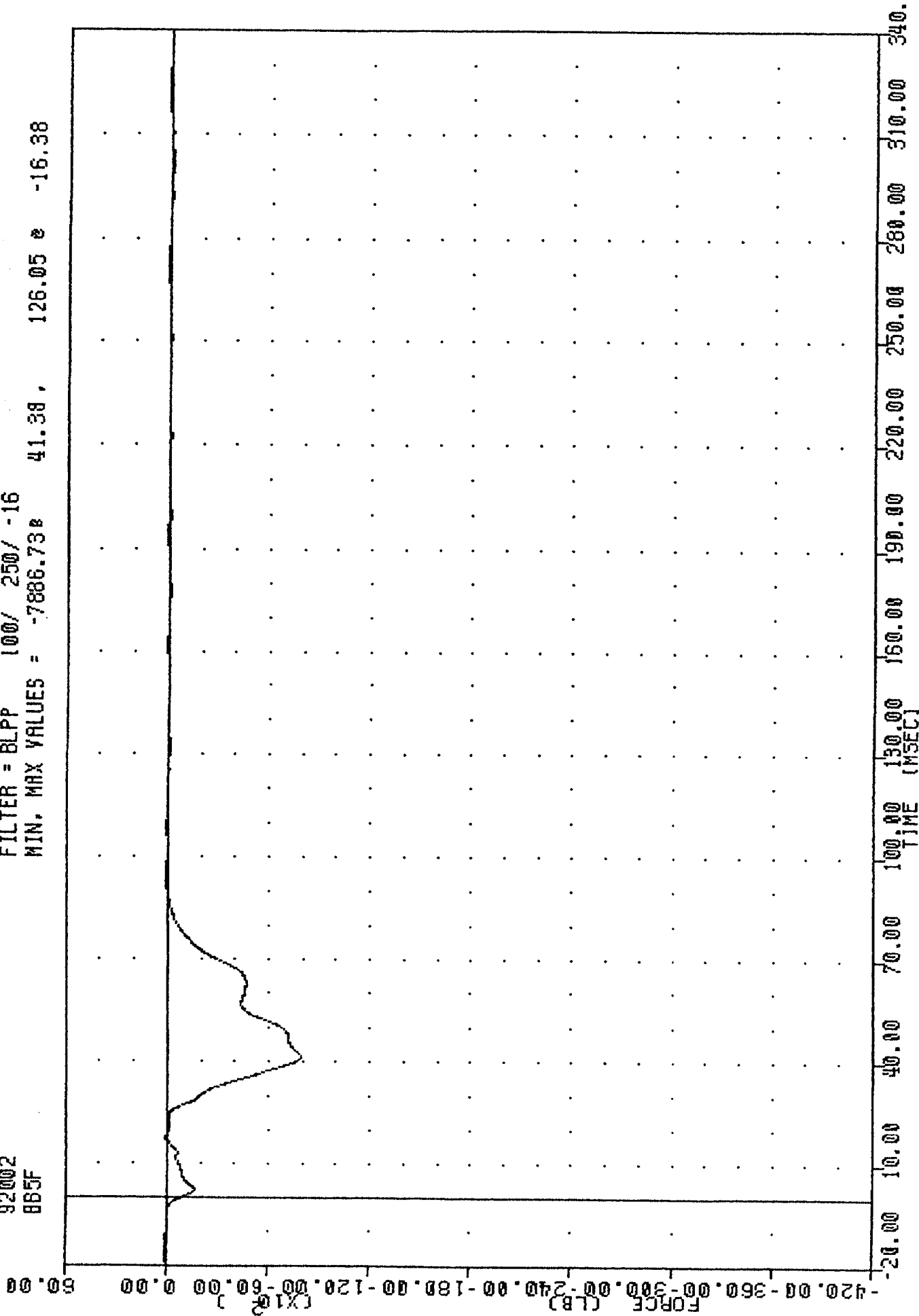


92002

885F

FILTER = BLPP 100/ 250/ -16

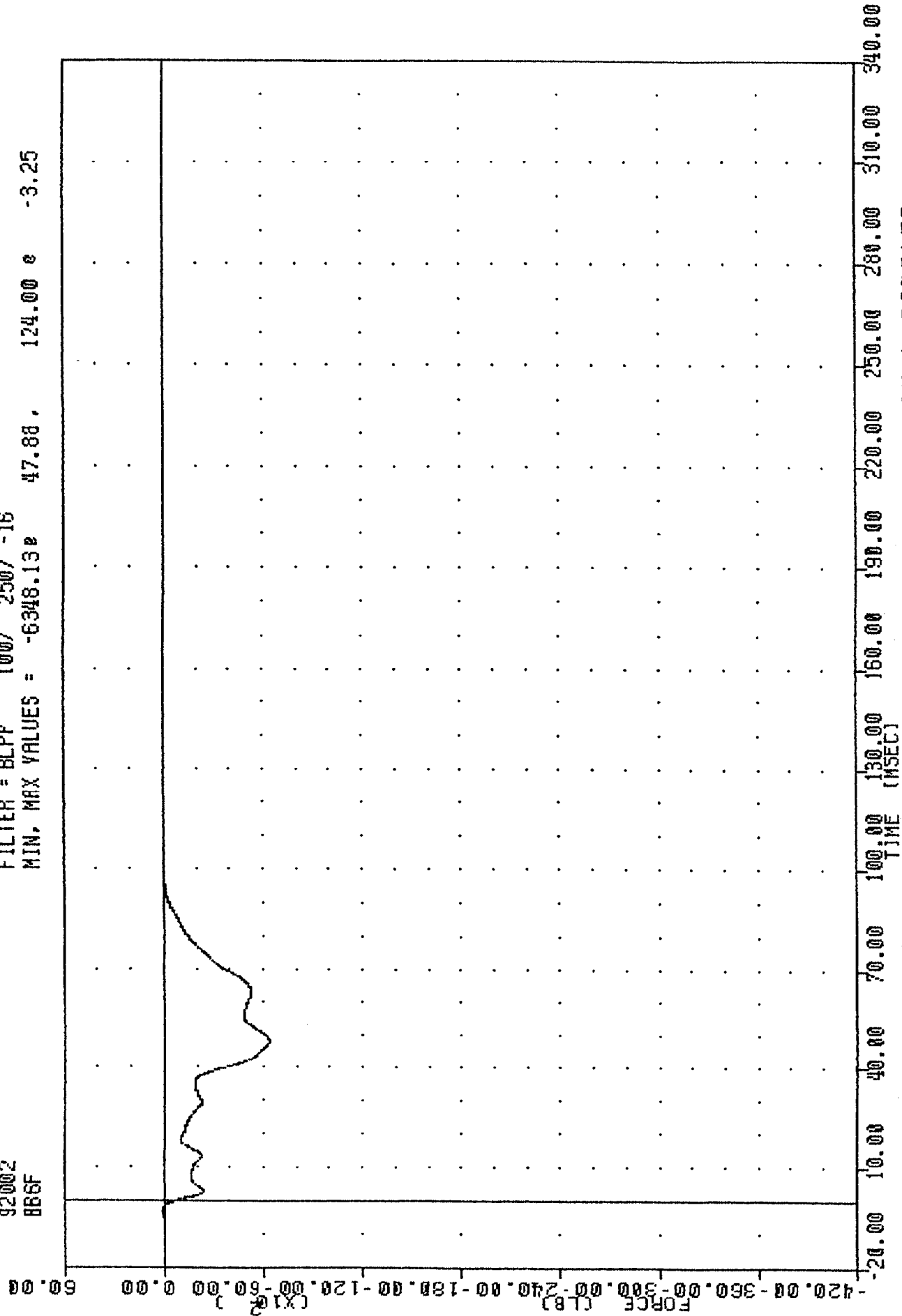
MIN, MAX VALUES = -7886.738 41.38, 126.05 e -16.38



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B5 FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BB6F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -6348.13e 47.88 , 124.00 e -3.25



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION B6 FORCE

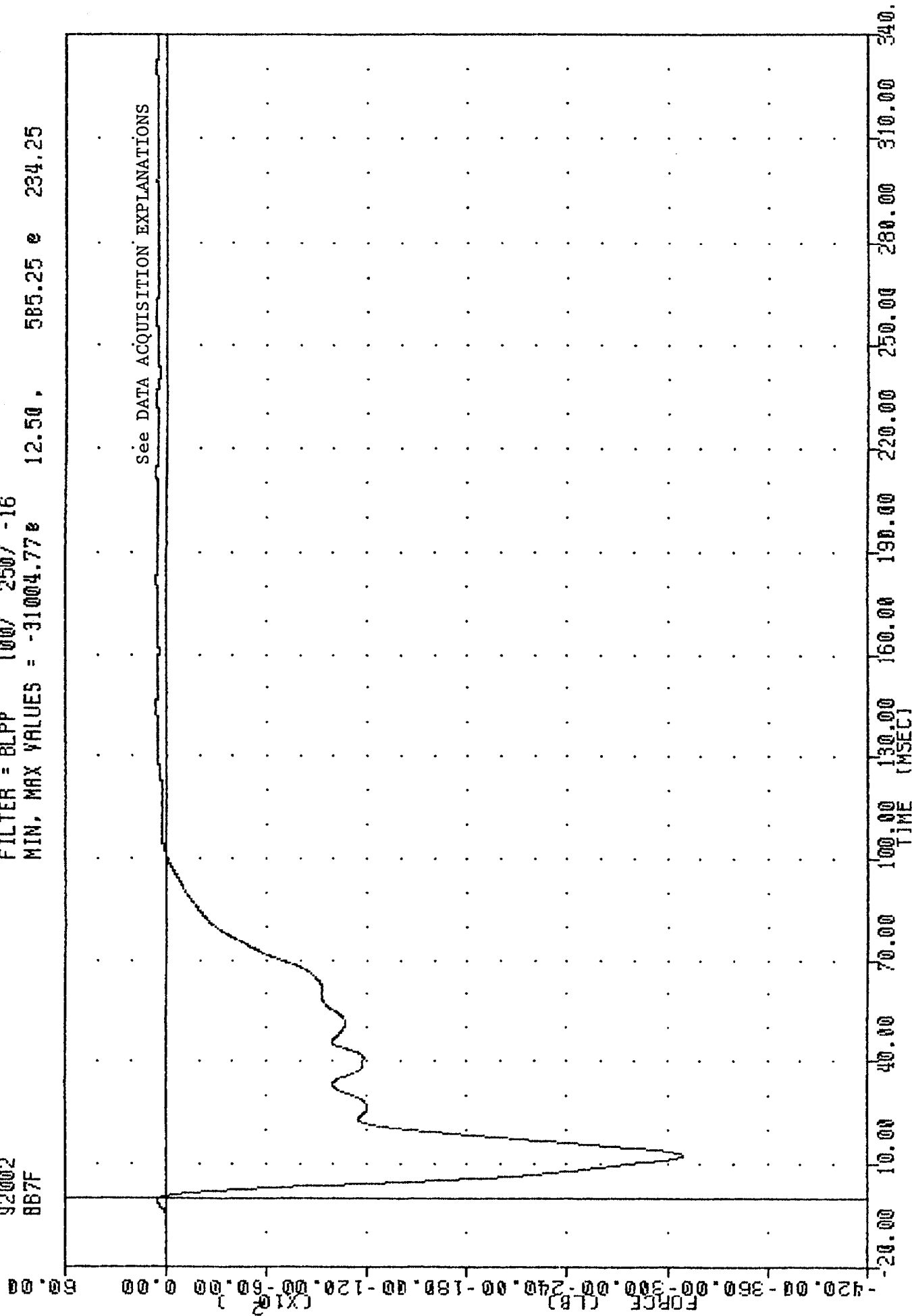
NEW CAR ASSESSMENT PROGRAM

92002

887F

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -31004.77e 12.50 . 585.25 e 234.25

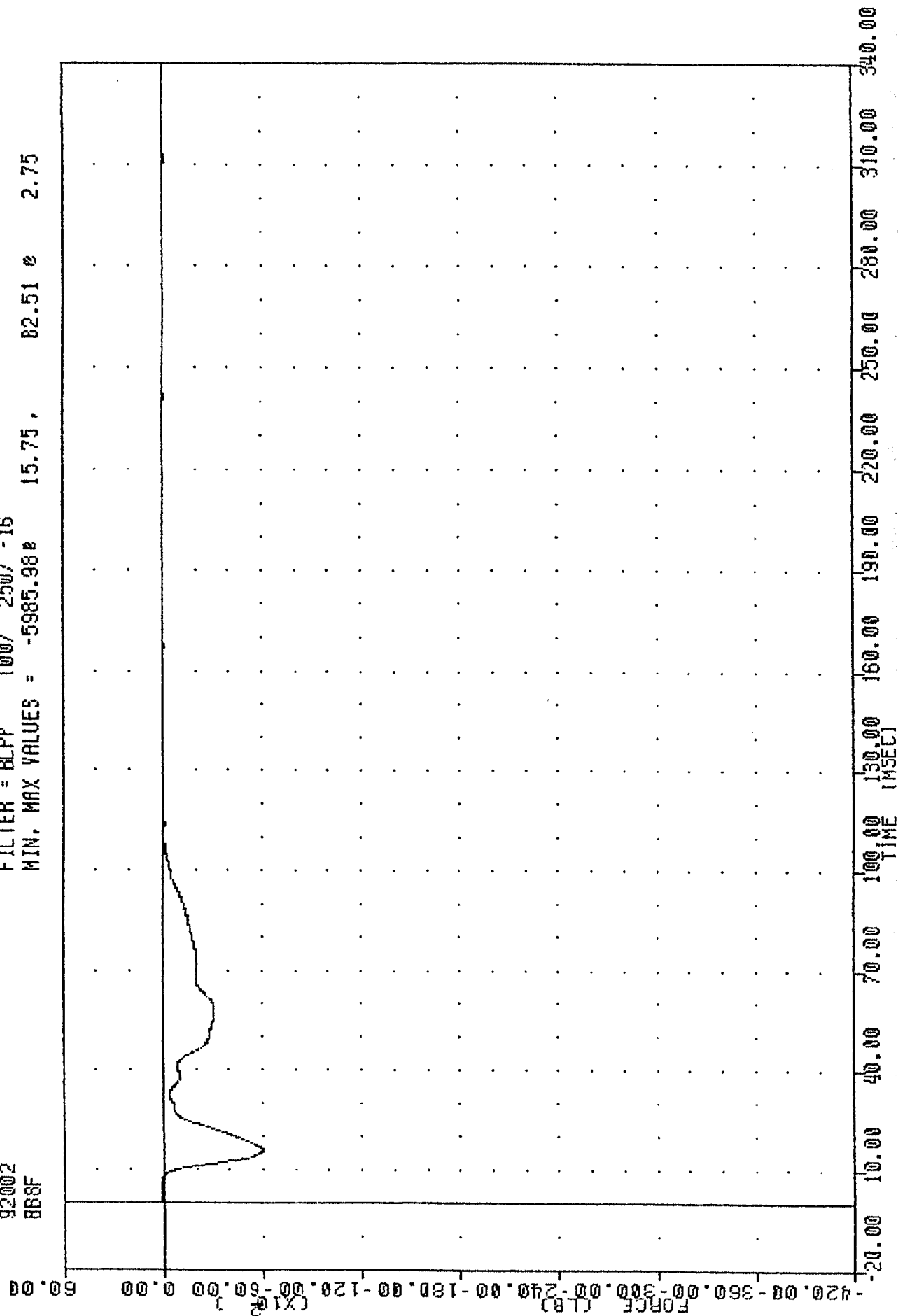


See DATA ACQUISITION EXPLANATIONS

1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION 87 FORCE

TRC , 920102
 REV CAR ASSESSMENT PROGRAM
 92002
 888F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -5985.98 15.75 , 82.51 2.75



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 88 FORCE

NEW CAR ASSESSMENT PROGRAM

92002

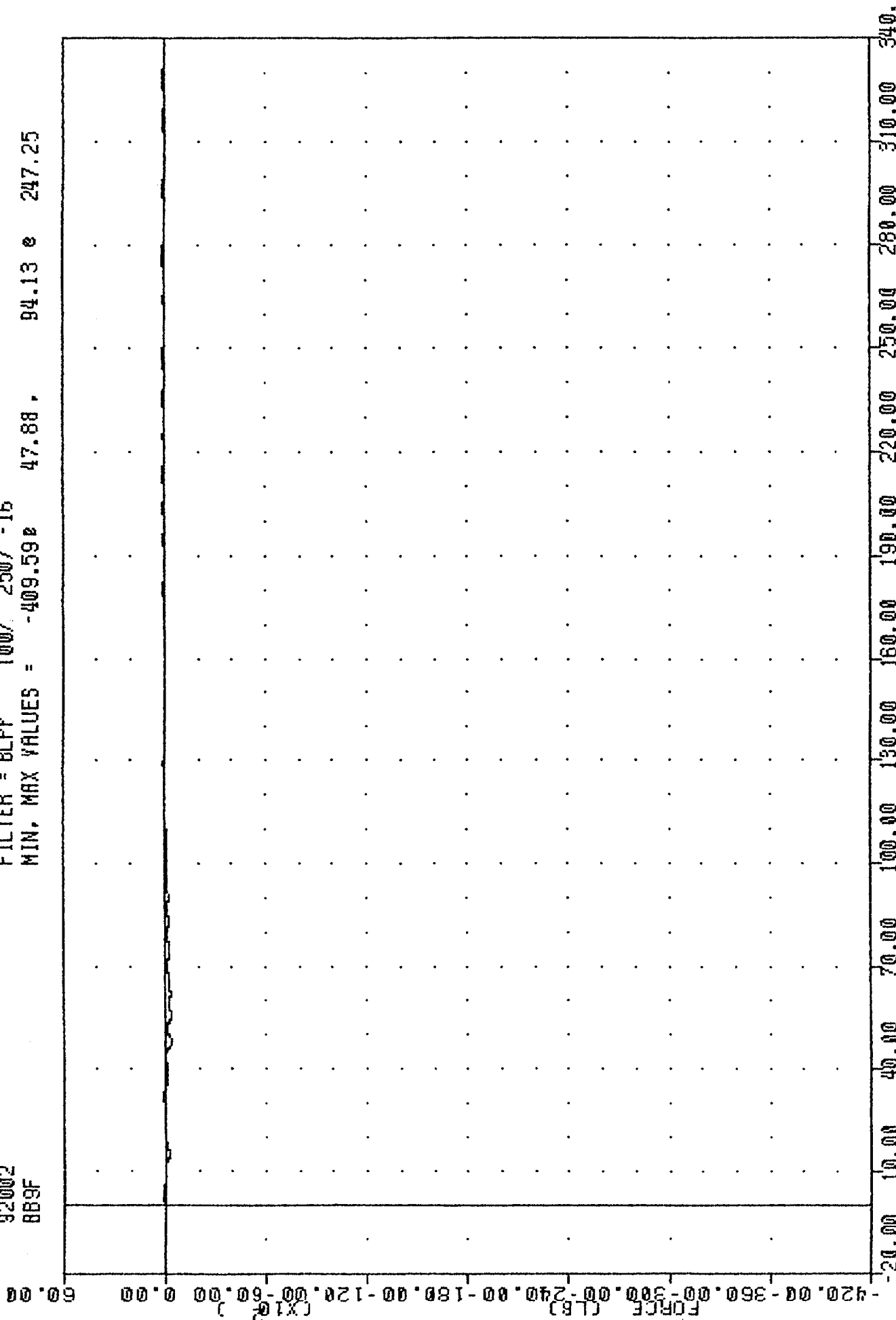
BB9F

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -409.592

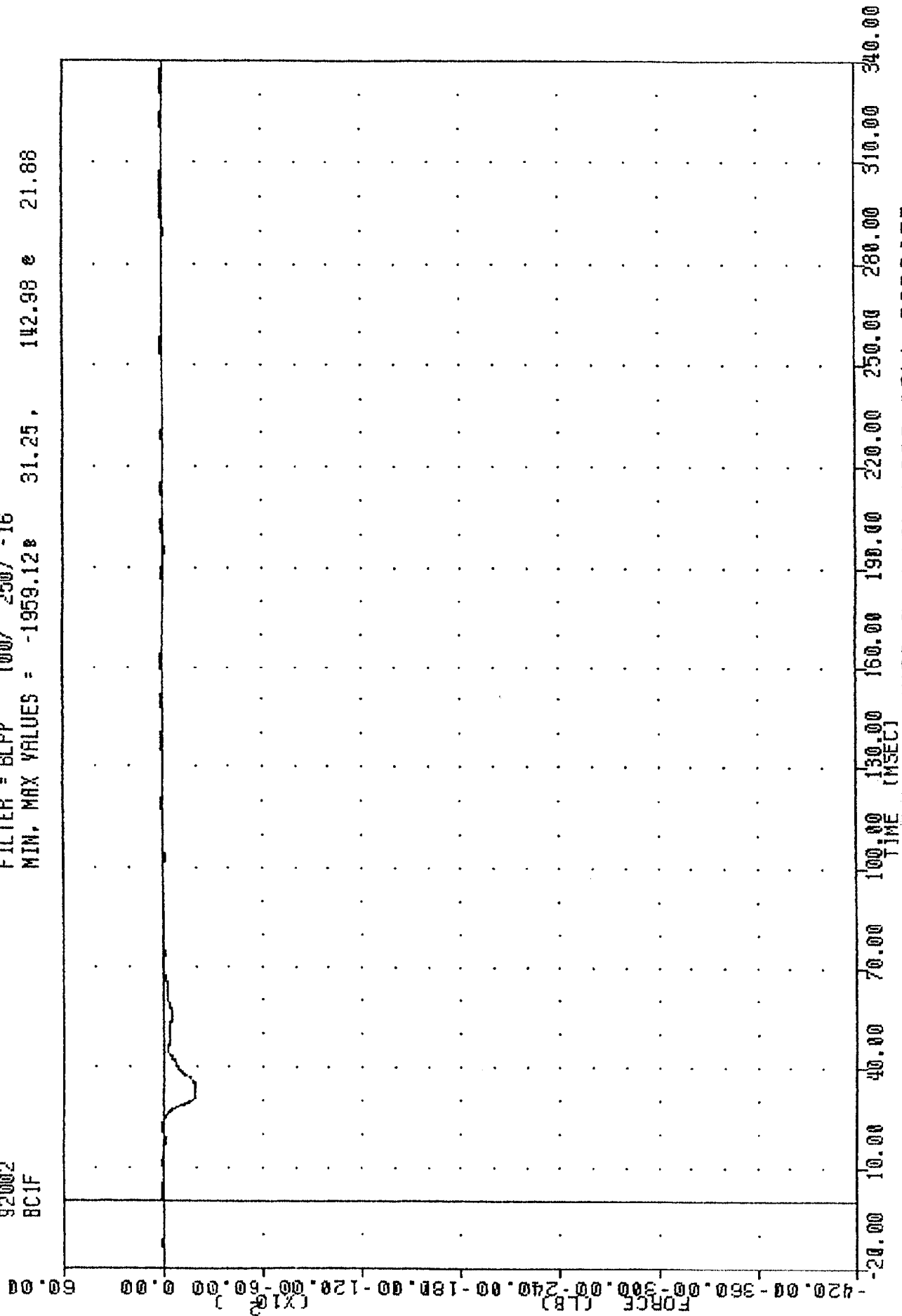
47.88

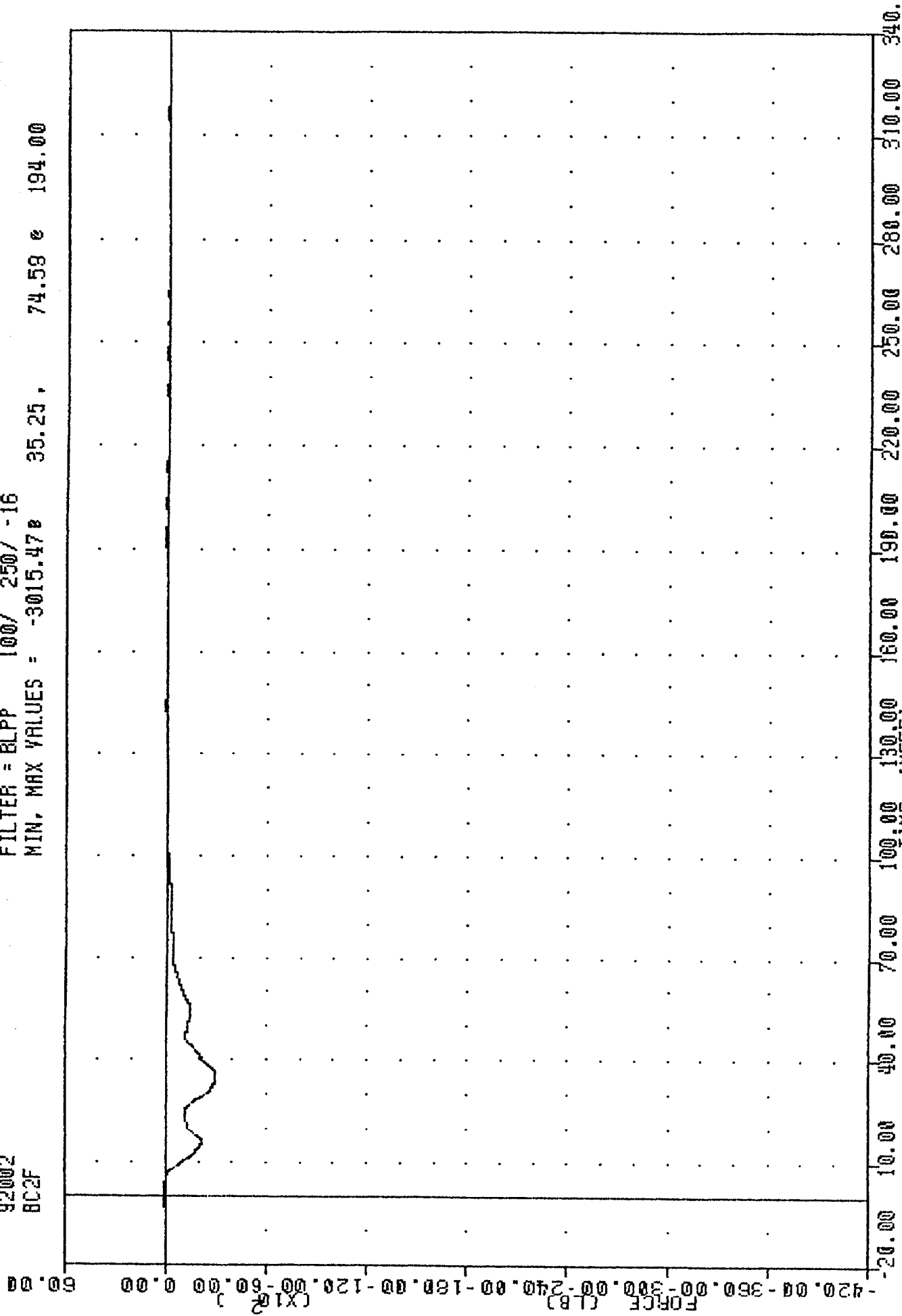
94.13 e 247.25



TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BCIF

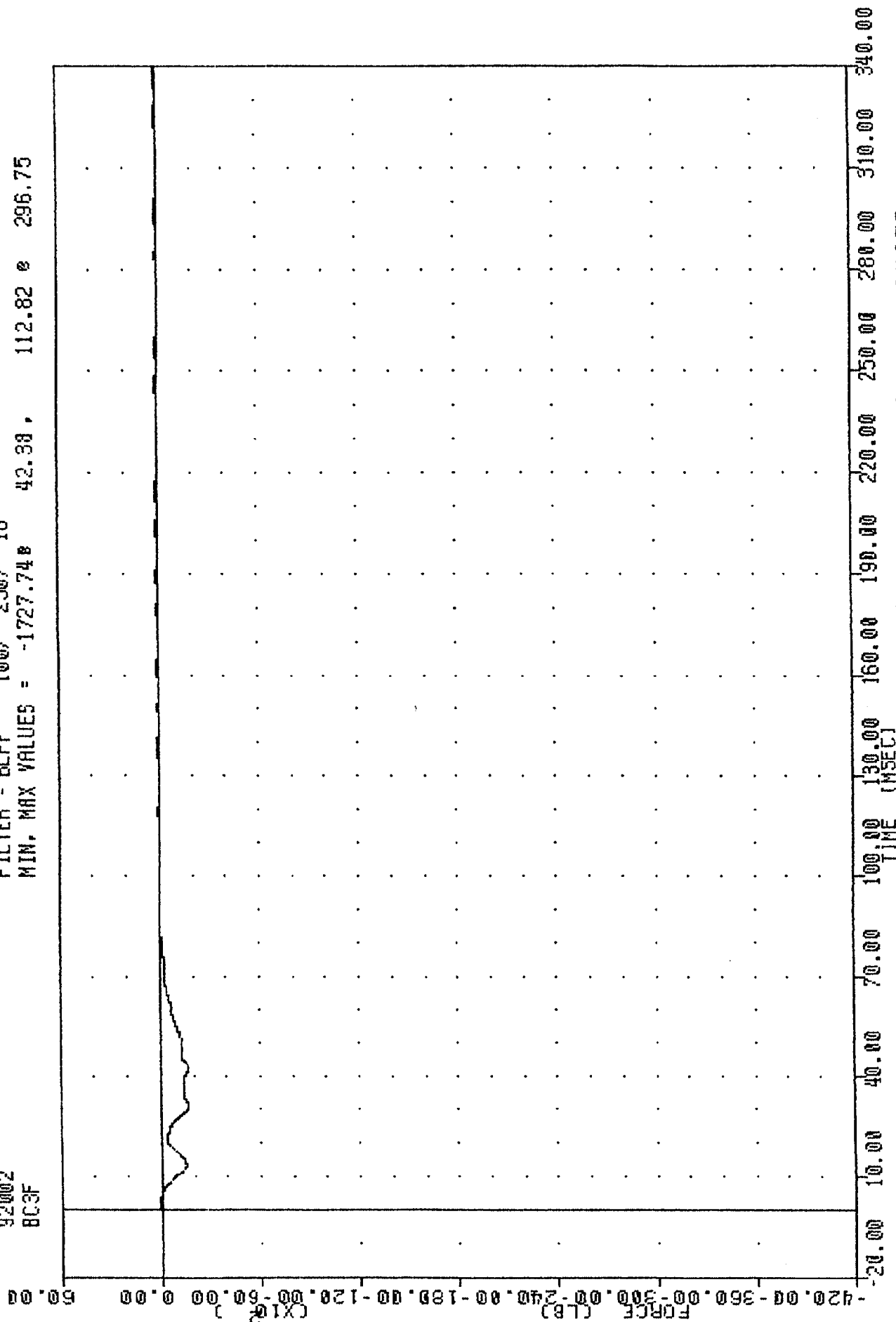
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1959.128 31.25, 142.98 e 21.88





TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BC3F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -1727.748 42.38, 112.82 296.75



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C3 FORCE

92002

BC4F

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -5675.75# 44.25, 89.22 @ 151.00

60.00

0.00

(X10²)

FORCE (LB)

-20.00

-420.00

-360.00

-300.00

-240.00

-180.00

-120.00

-60.00

0.00

60.00

120.00

180.00

240.00

300.00

360.00

420.00

480.00

540.00

600.00

660.00

720.00

780.00

840.00

900.00

960.00

1020.00

1080.00

1140.00

1200.00

1260.00

1320.00

1380.00

1440.00

1500.00

1560.00

1620.00

1680.00

1740.00

1800.00

1860.00

1920.00

1980.00

2040.00

2100.00

2160.00

2220.00

2280.00

2340.00

2400.00

2460.00

2520.00

2580.00

2640.00

2700.00

2760.00

2820.00

2880.00

2940.00

3000.00

3060.00

3120.00

3180.00

3240.00

3300.00

3360.00

3420.00

3480.00

3540.00

3600.00

3660.00

3720.00

3780.00

3840.00

3900.00

3960.00

4020.00

4080.00

4140.00

4200.00

4260.00

4320.00

4380.00

4440.00

4500.00

4560.00

4620.00

4680.00

4740.00

4800.00

4860.00

4920.00

4980.00

5040.00

5100.00

5160.00

5220.00

5280.00

5340.00

5400.00

5460.00

5520.00

5580.00

5640.00

5700.00

5760.00

5820.00

5880.00

5940.00

6000.00

6060.00

6120.00

6180.00

6240.00

6300.00

6360.00

6420.00

6480.00

6540.00

6600.00

6660.00

6720.00

6780.00

6840.00

6900.00

6960.00

7020.00

7080.00

7140.00

7200.00

7260.00

7320.00

7380.00

7440.00

7500.00

7560.00

7620.00

7680.00

7740.00

7800.00

7860.00

7920.00

7980.00

8040.00

8100.00

8160.00

8220.00

8280.00

8340.00

8400.00

8460.00

8520.00

8580.00

8640.00

8700.00

8760.00

8820.00

8880.00

8940.00

9000.00

9060.00

9120.00

9180.00

9240.00

9300.00

9360.00

9420.00

9480.00

9540.00

9600.00

9660.00

9720.00

9780.00

9840.00

9900.00

9960.00

10020.00

10080.00

10140.00

10200.00

10260.00

10320.00

10380.00

10440.00

10500.00

10560.00

10620.00

10680.00

10740.00

10800.00

10860.00

10920.00

10980.00

11040.00

11100.00

11160.00

11220.00

11280.00

11340.00

11400.00

11460.00

11520.00

11580.00

11640.00

11700.00

11760.00

11820.00

11880.00

11940.00

12000.00

12060.00

12120.00

12180.00

12240.00

12300.00

12360.00

12420.00

12480.00

12540.00

12600.00

12660.00

12720.00

12780.00

12840.00

12900.00

12960.00

13020.00

13080.00

13140.00

13200.00

13260.00

13320.00

13380.00

13440.00

13500.00

13560.00

13620.00

13680.00

13740.00

13800.00

13860.00

13920.00

13980.00

14040.00

14100.00

14160.00

14220.00

14280.00

14340.00

14400.00

14460.00

14520.00

14580.00

14640.00

14700.00

14760.00

14820.00

14880.00

14940.00

15000.00

15060.00

15120.00

15180.00

15240.00

15300.00

15360.00

15420.00

15480.00

15540.00

15600.00

15660.00

15720.00

15780.00

15840.00

15900.00

15960.00

16020.00

16080.00

16140.00

16200.00

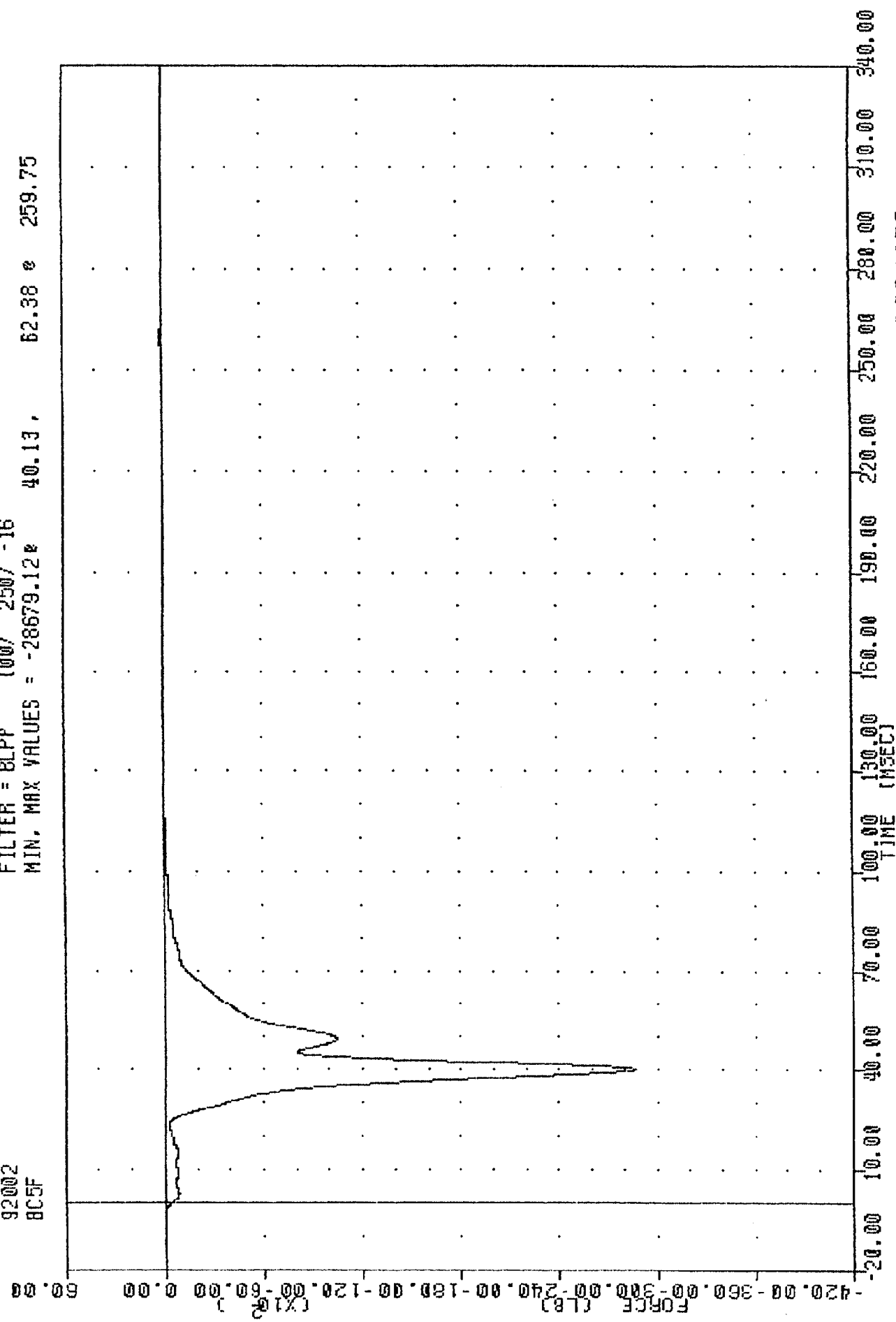
16260.00

16320.00

16380.00

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BC5F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -28679.12 40.13 , 62.38 259.75



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C5 FORCE

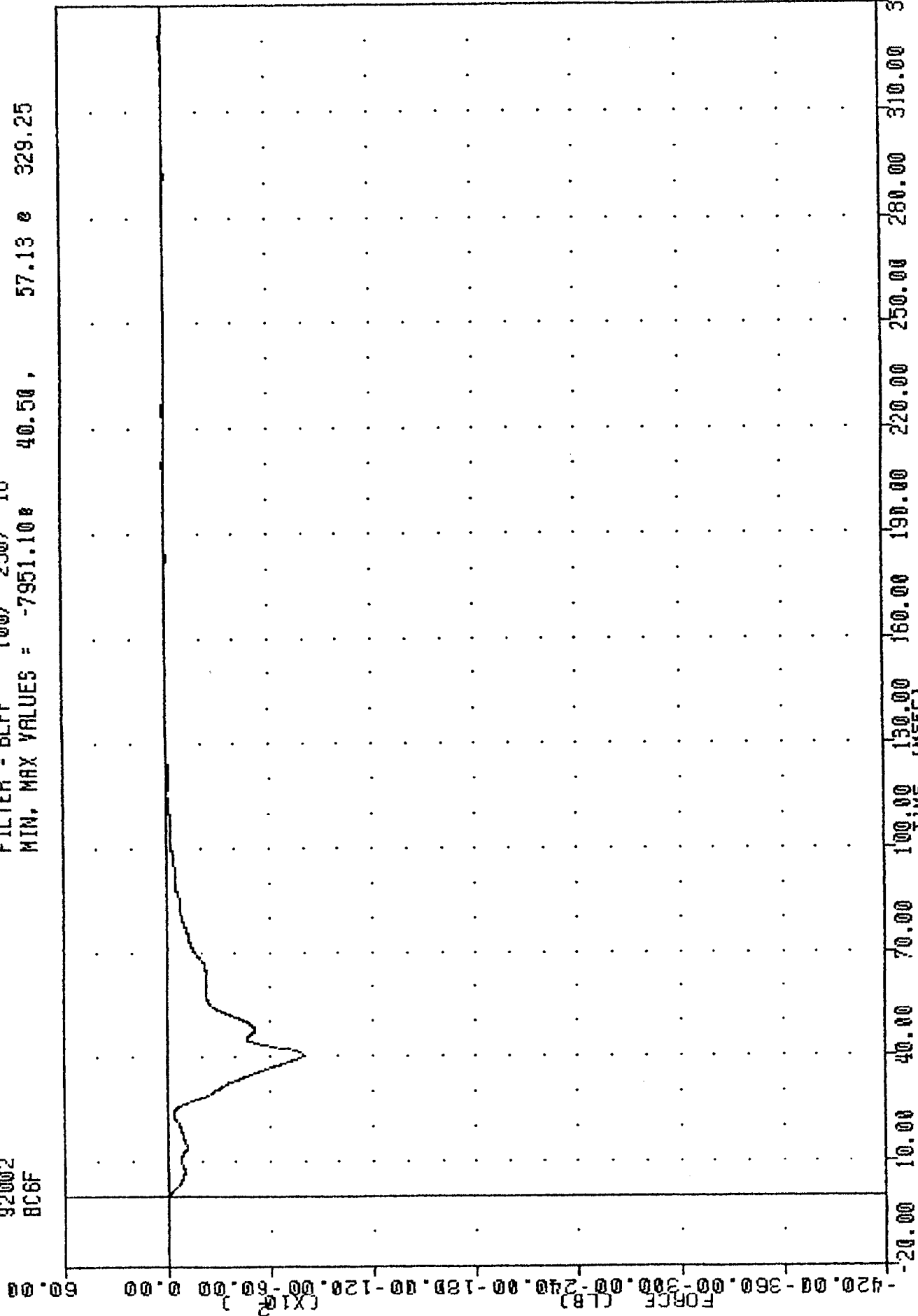
92002

BC6F

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -7951.10 40.50 ,

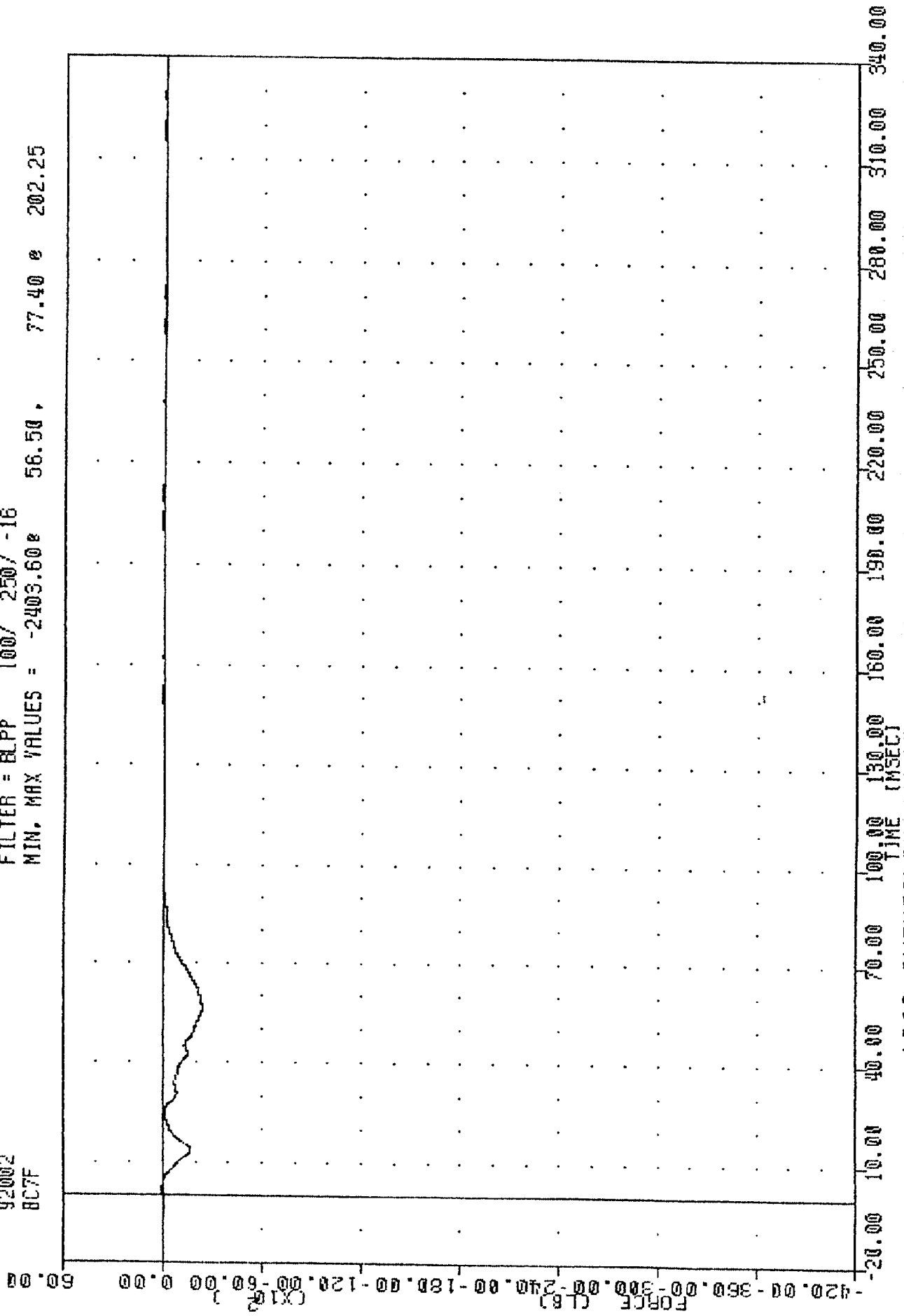
57.13 e 329.25



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C6 FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BC7F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -2403.60 56.50 , 77.40 202.25



MAX LOAD MEASUREMENT PROGRAM

92002

BC8F

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -2224.59 36.50

93.67 278.25

50.00

0.00

(X10²)

FORCE (LB)

-20.00

10.00

40.00

70.00

100.00

130.00

160.00

190.00

220.00

250.00

280.00

310.00

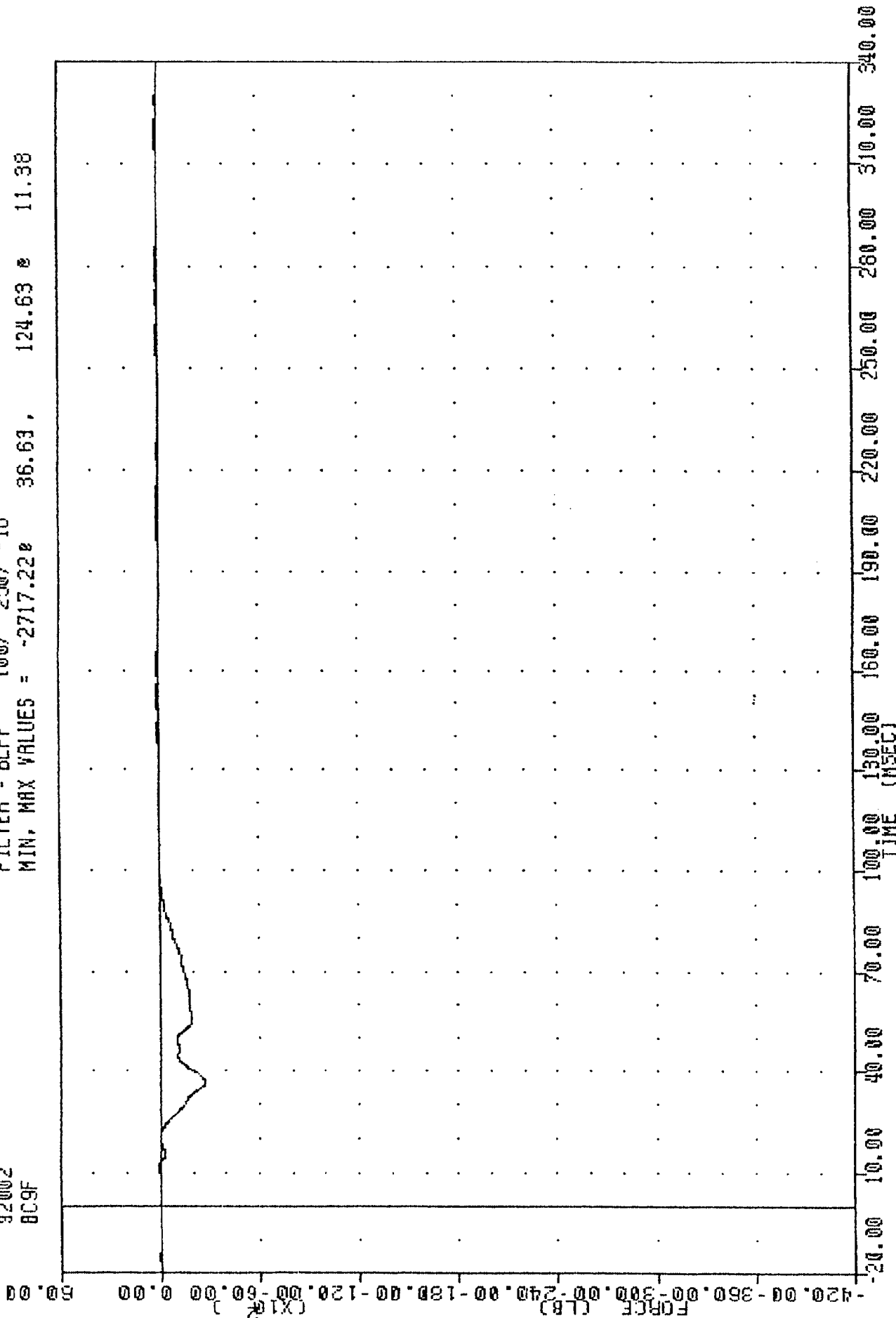
340.00

TIME (MSEC)

1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C8 FORCE

TRC
 NEW CAR ASSESSMENT PROGRAM
 92002
 BC9F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -2717.220 36.63, 124.63 11.38



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION C9 FORCE

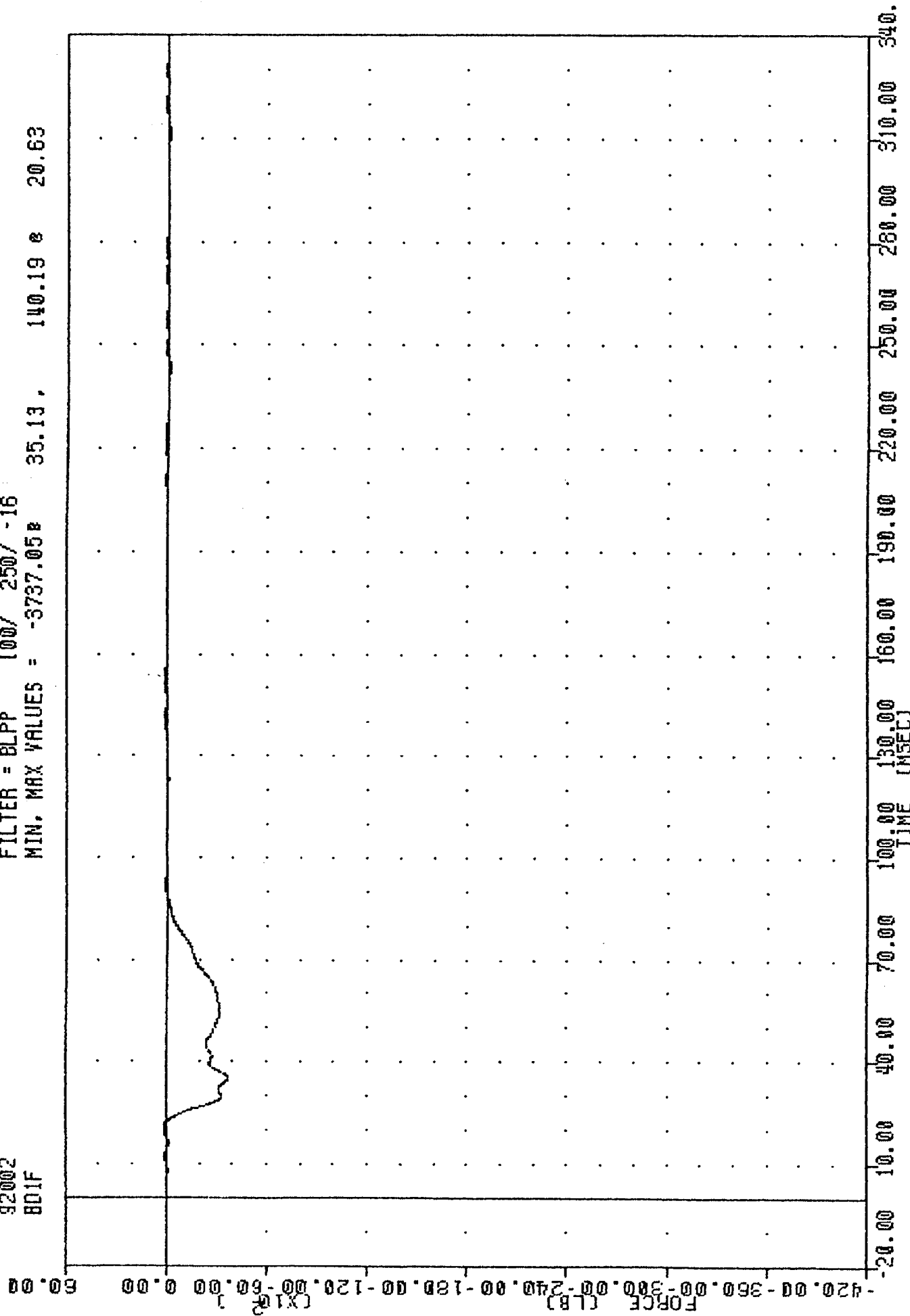
NEW CHR ASSESSMENT PROGRAM

92002

BD1F

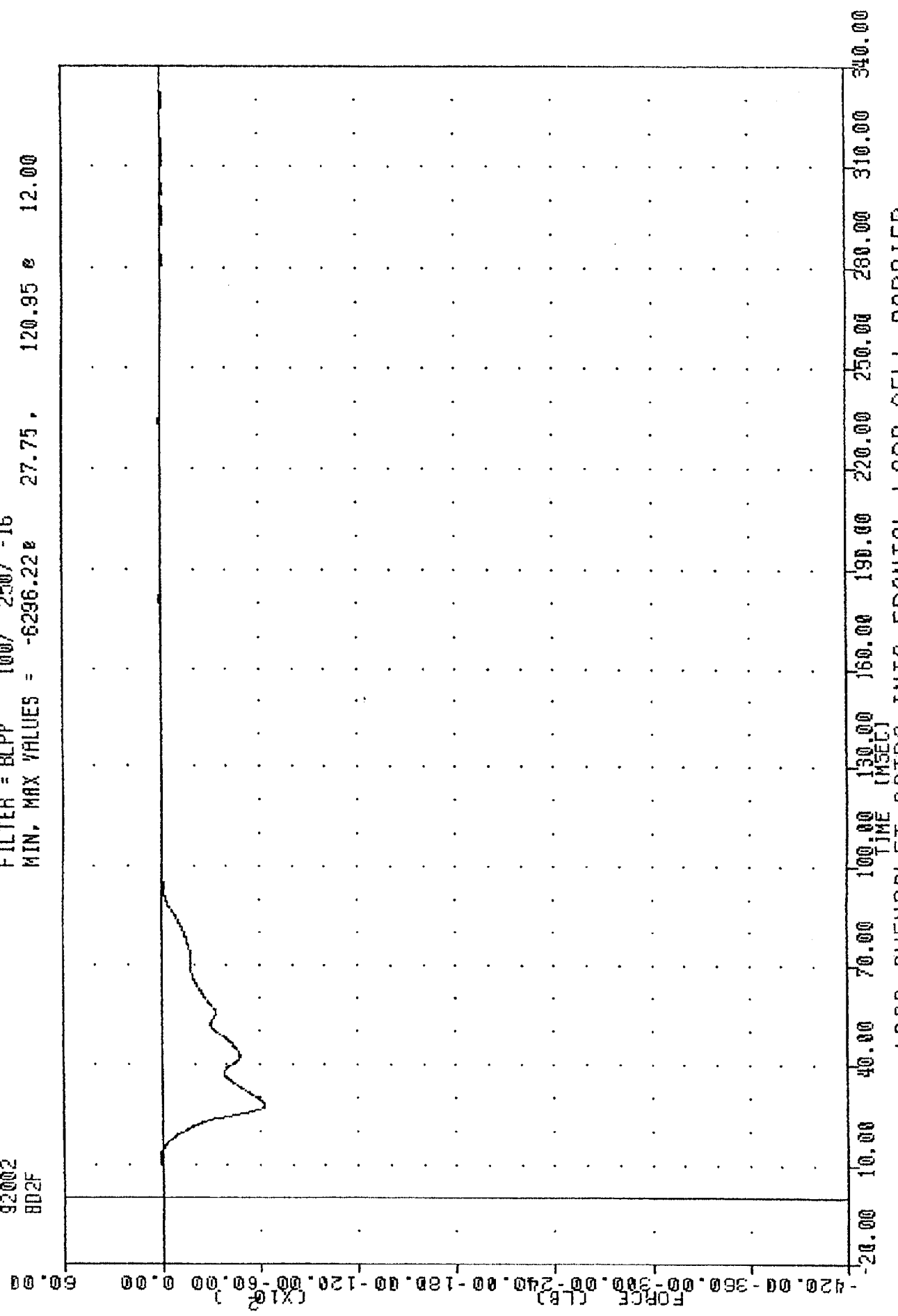
FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -3737.05 35.13 140.19 20.63



TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BD2F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -6296.22 e 27.75 , 120.95 e 12.00



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D2 FORCE

NEW CAR ASSESSMENT PROGRAM

92002

8D3F

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -7142.12 42.88 , 49.76 e 287.88

50.00

(X10²)

0.00

-20.00

-40.00

-60.00

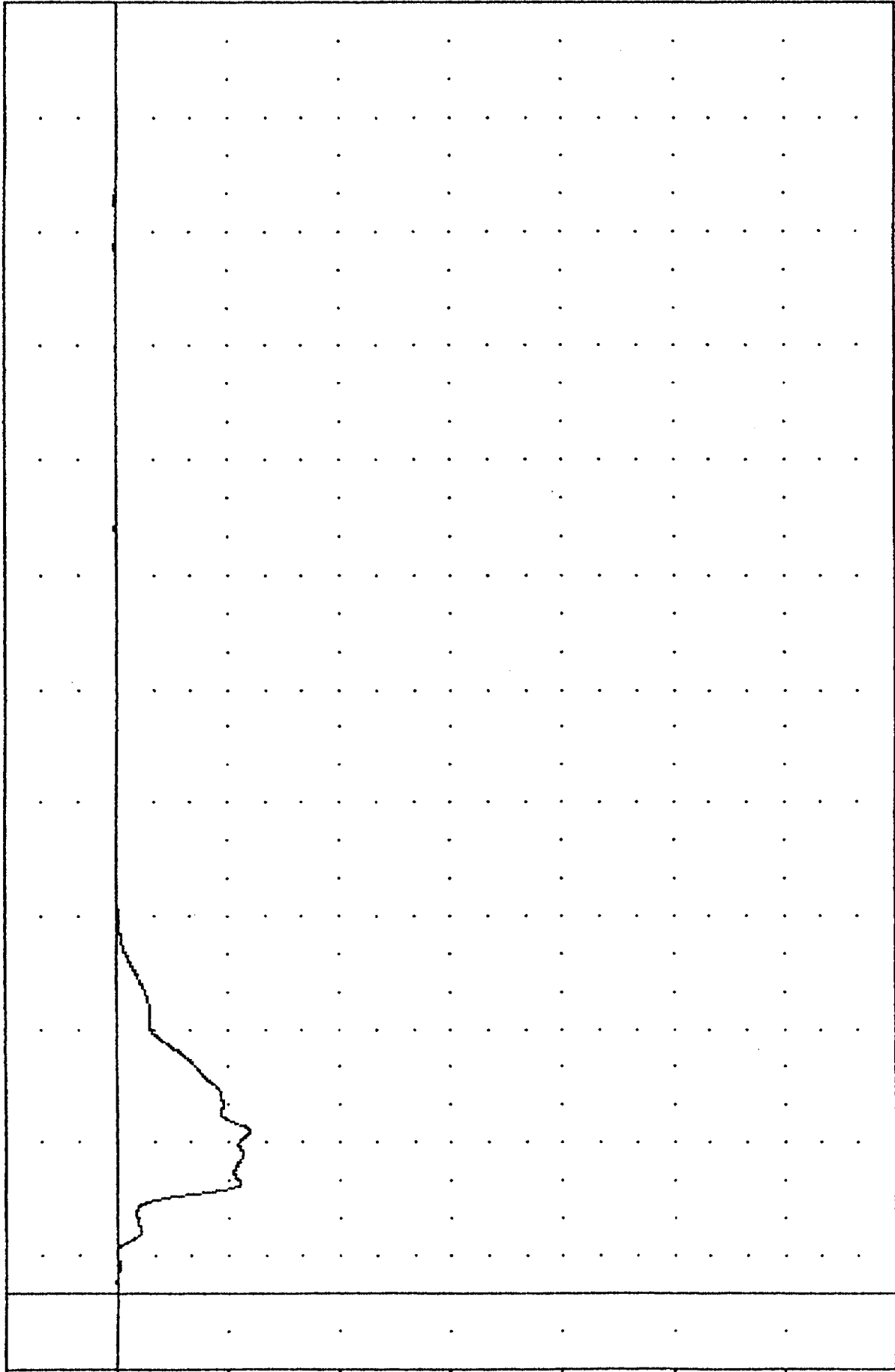
-80.00

-100.00

-120.00

-140.00

-160.00



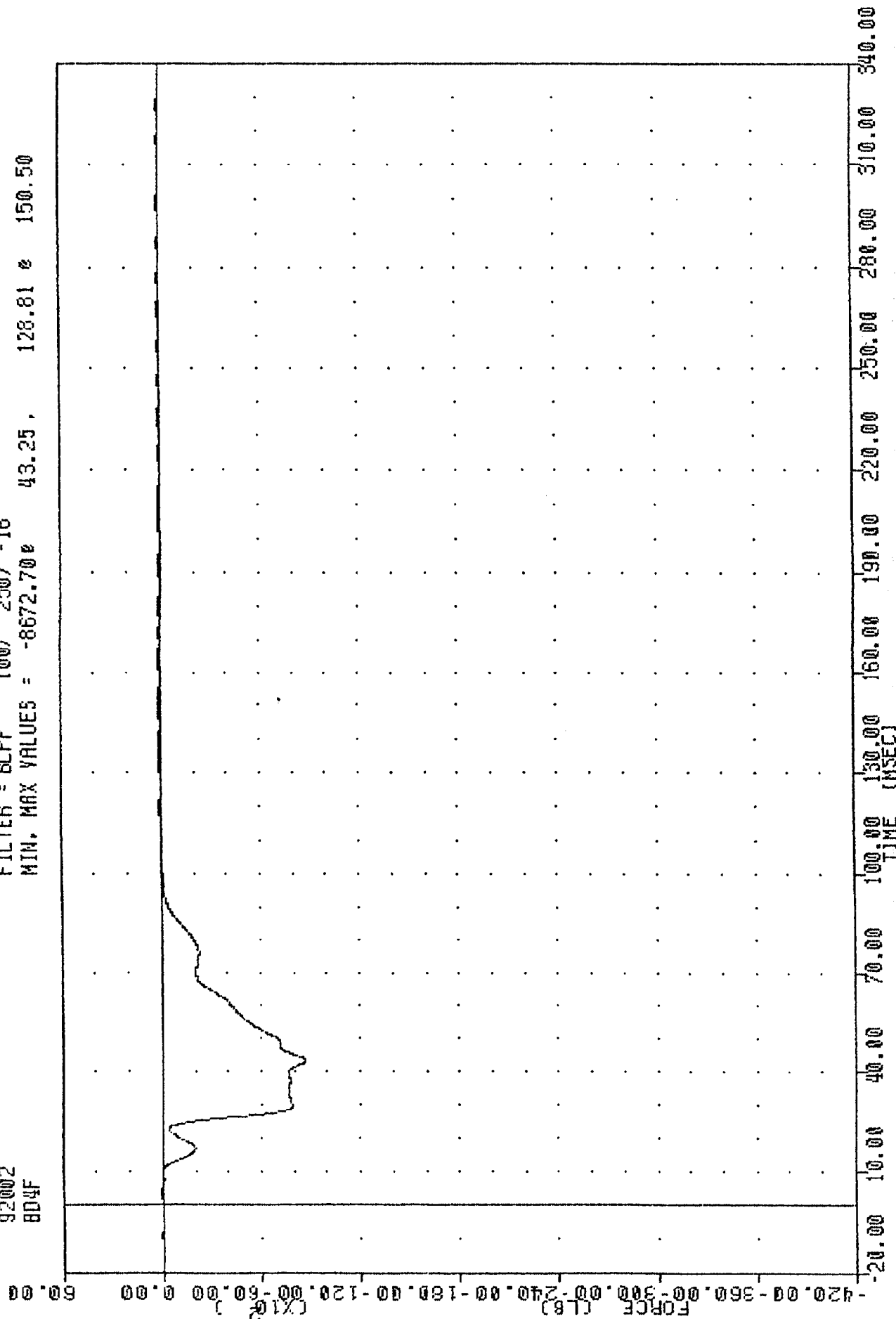
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

TIME (MSEC)

1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION 03 FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BD4F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -8672.70e 43.25, 128.81 e 150.50



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION 04 FORCE

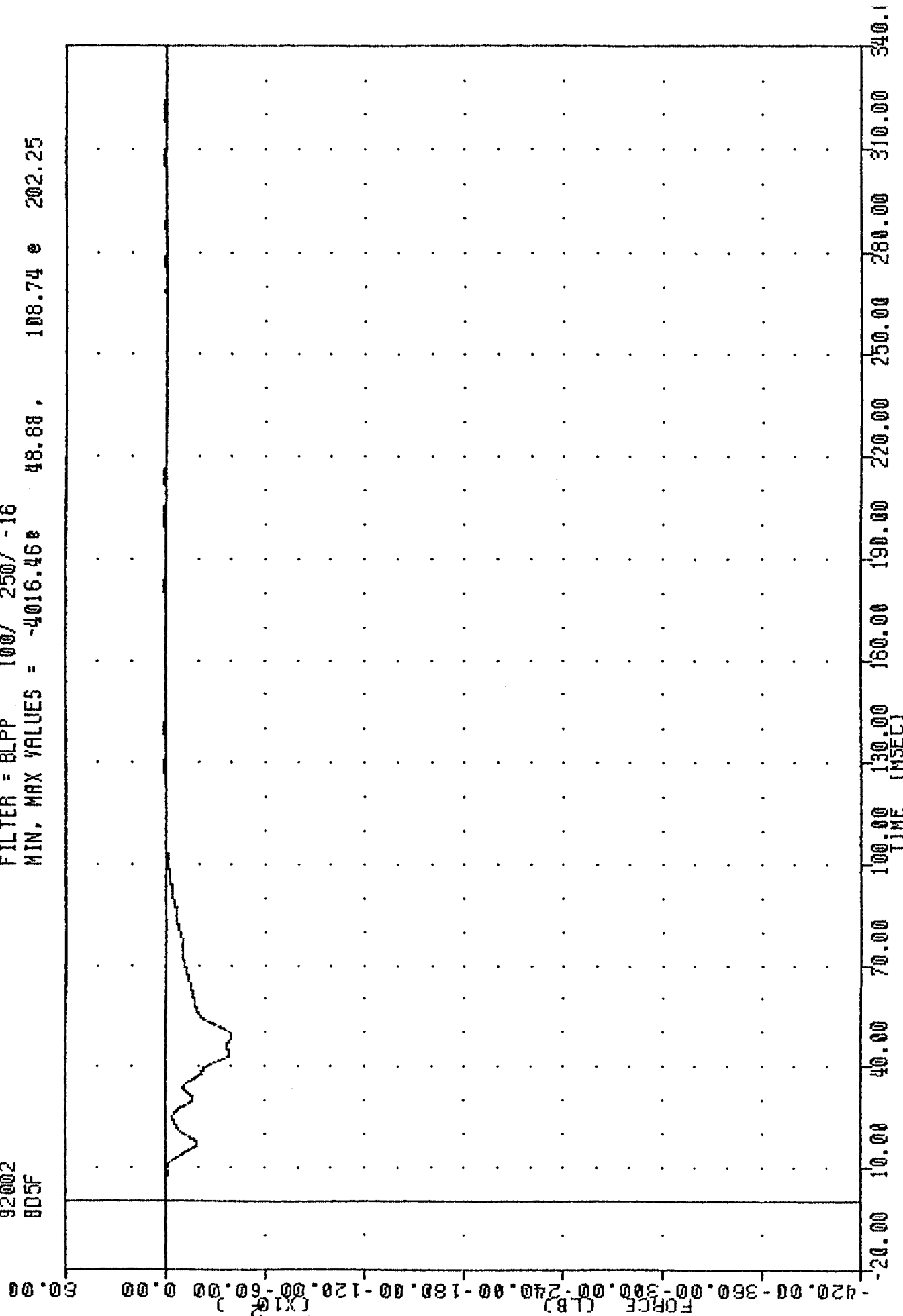
NEW CAR ASSESSMENT PROGRAM

92002

BD5F

FILTER = BLPP 100/ 250/ -16

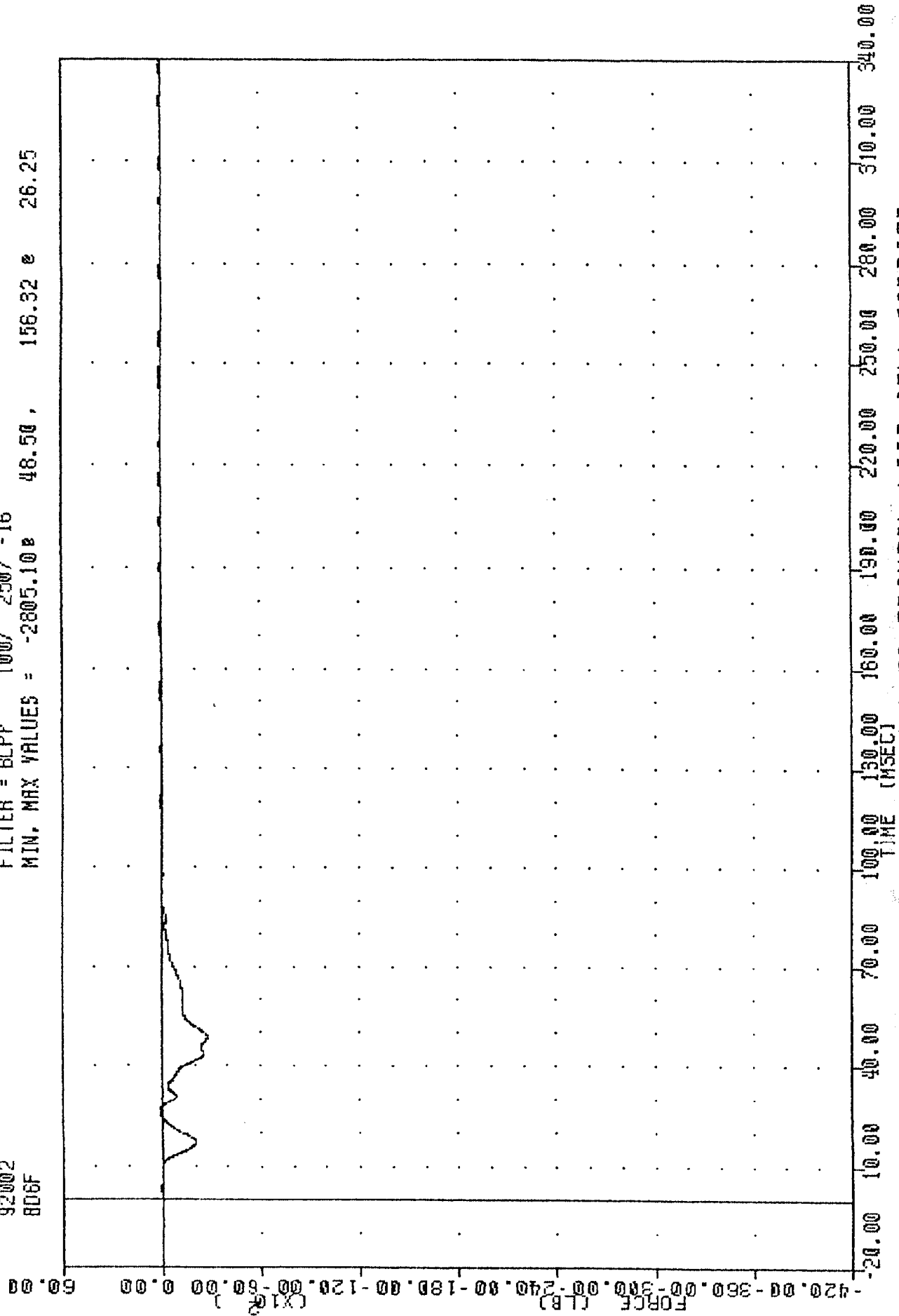
MIN, MAX VALUES = -4016.46 48.88 , 108.74 @ 202.25



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION 05 FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 806F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -2805.10 48.50 , 158.32 26.25



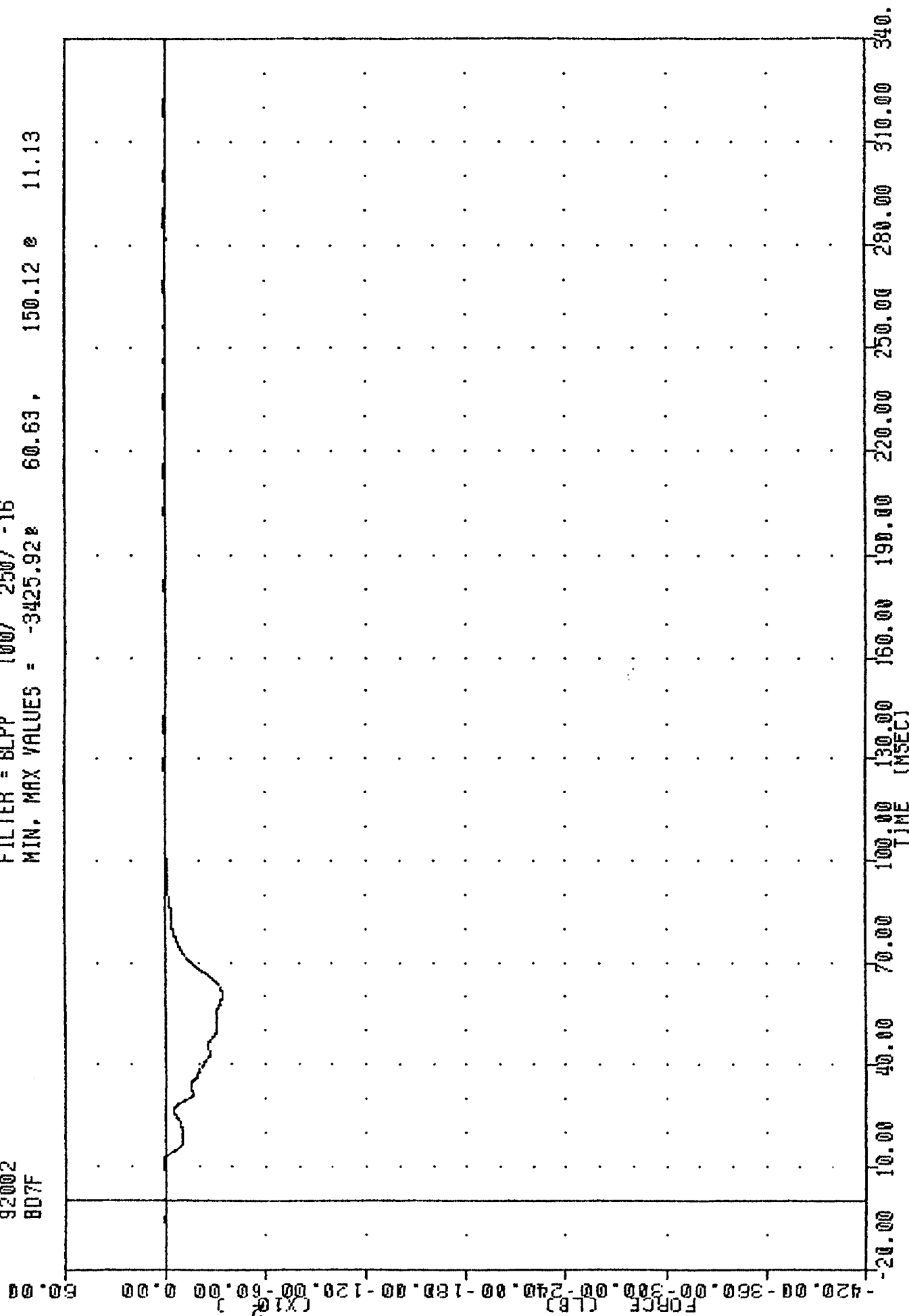
NEW CAR ASSESSMENT PROGRAM

92002

BD7F

FILTER = BLPP 100/ 250/ -16

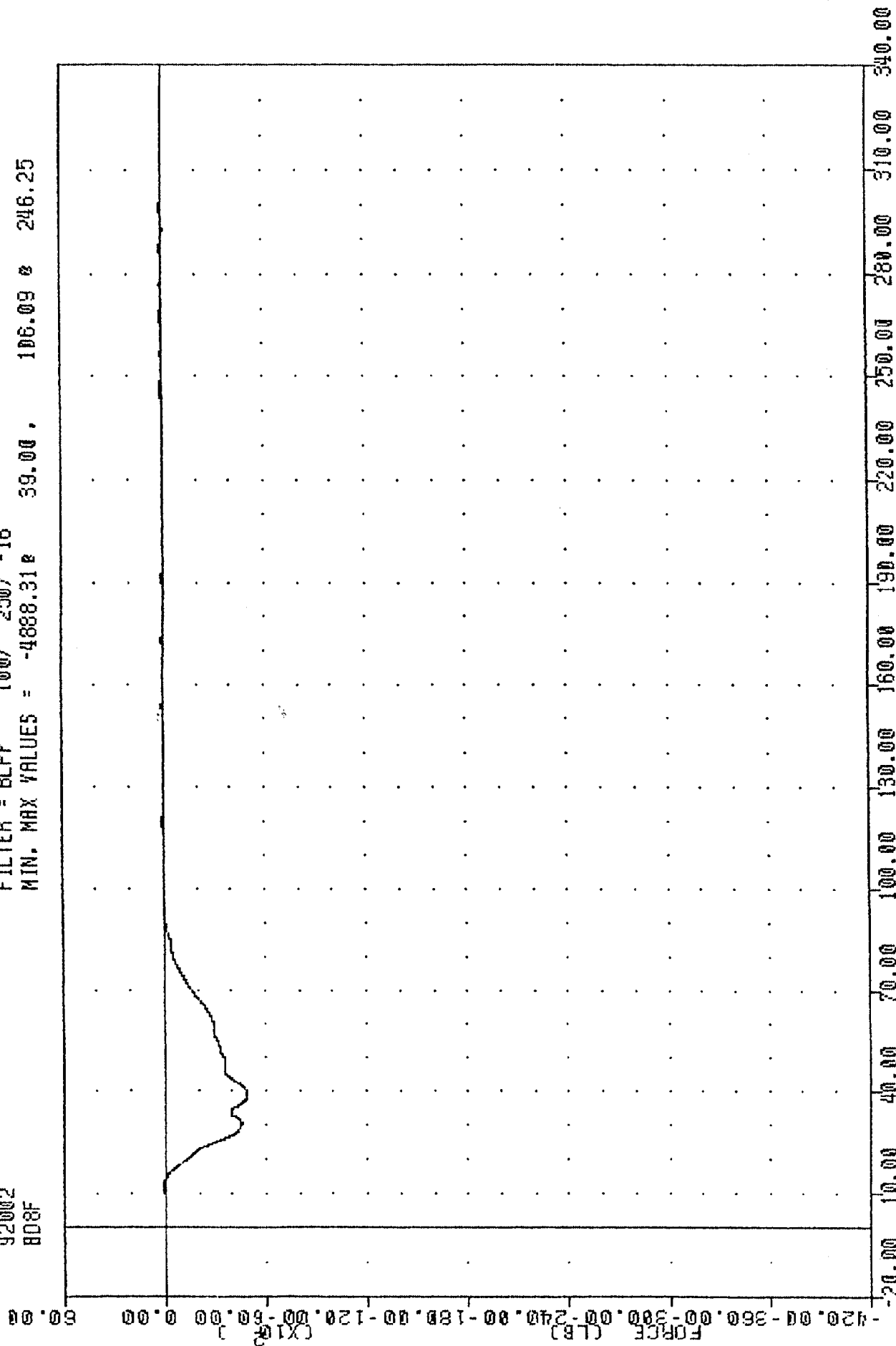
MIN, MAX VALUES = -3425.92 60.63, 150.12 11.13



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION 07 FORCE

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 BD8F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -4888.318 39.00 , 106.09 2 246.25



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER POSITION D8 FORCE

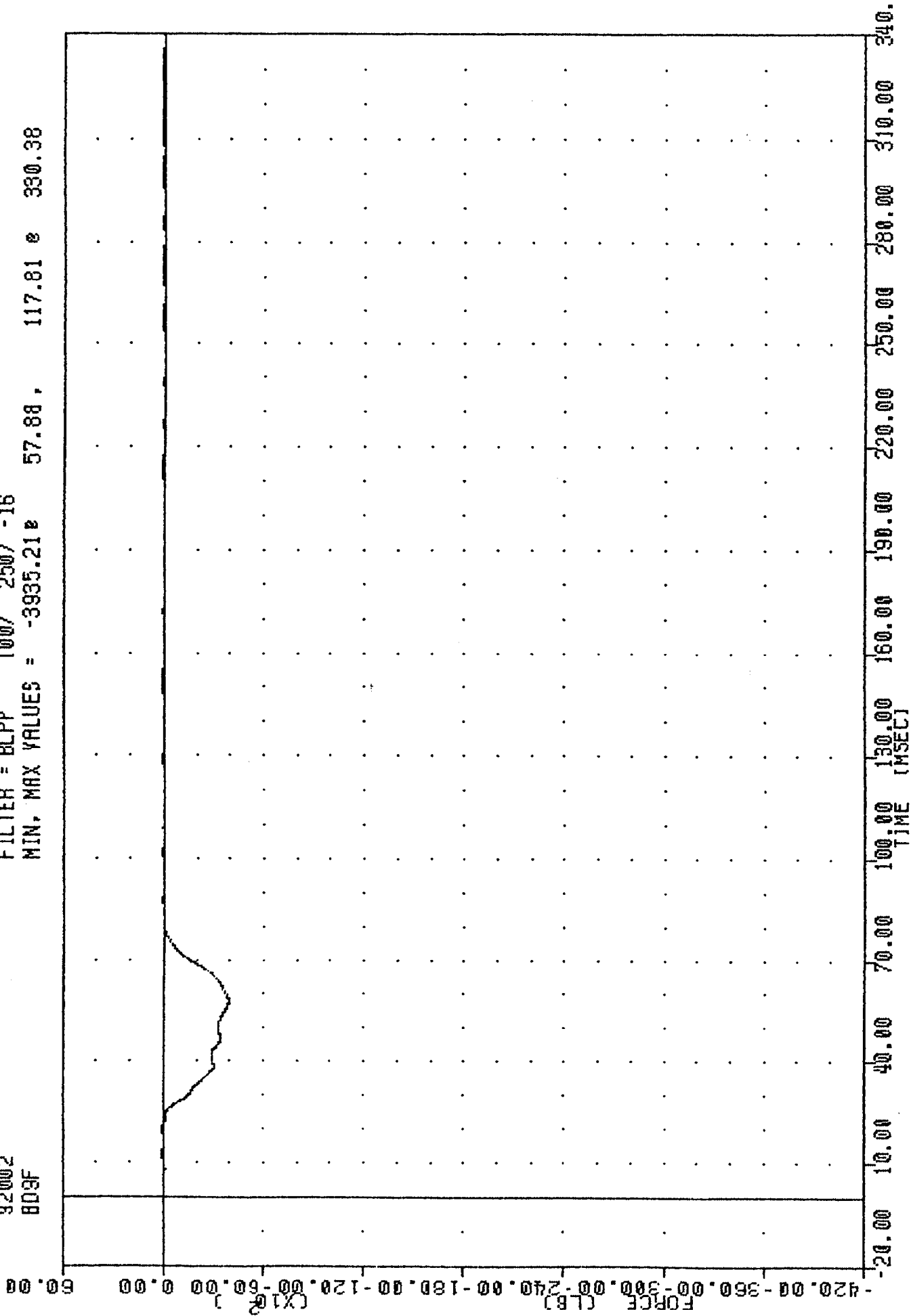
NEW CAR ASSESSMENT PROGRAM

920002

BD3F

FILTER = BLPP 100/ 250/ -16

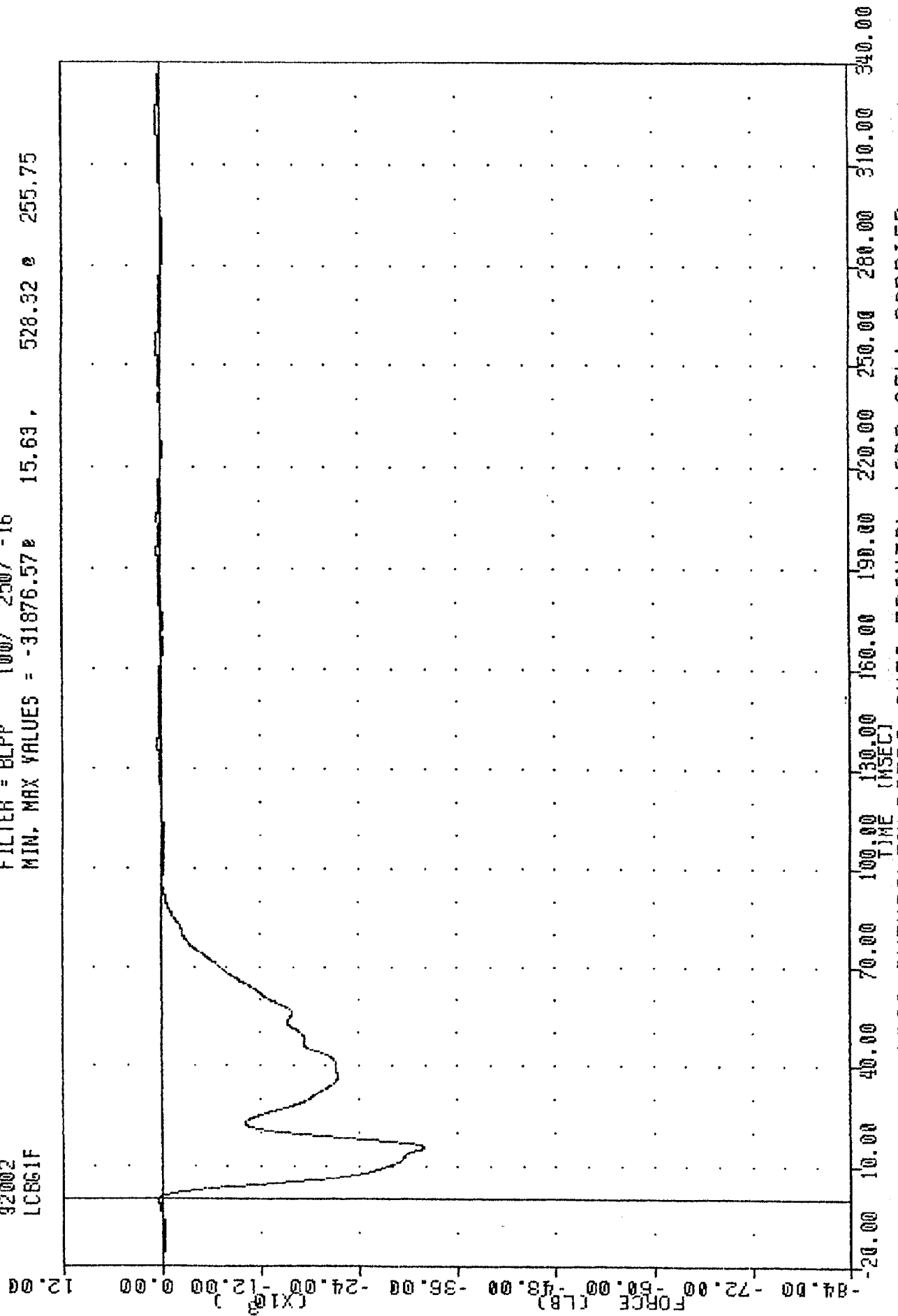
MIN, MAX VALUES = -3935.21e 57.88, 117.81 e 330.38



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION 09 FORCE

TRC 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 LC8G1F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -31876.57 15.63 528.32 255.75



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP 1 FORCE TOTAL

NEW CAR ASSESSMENT PROGRAM

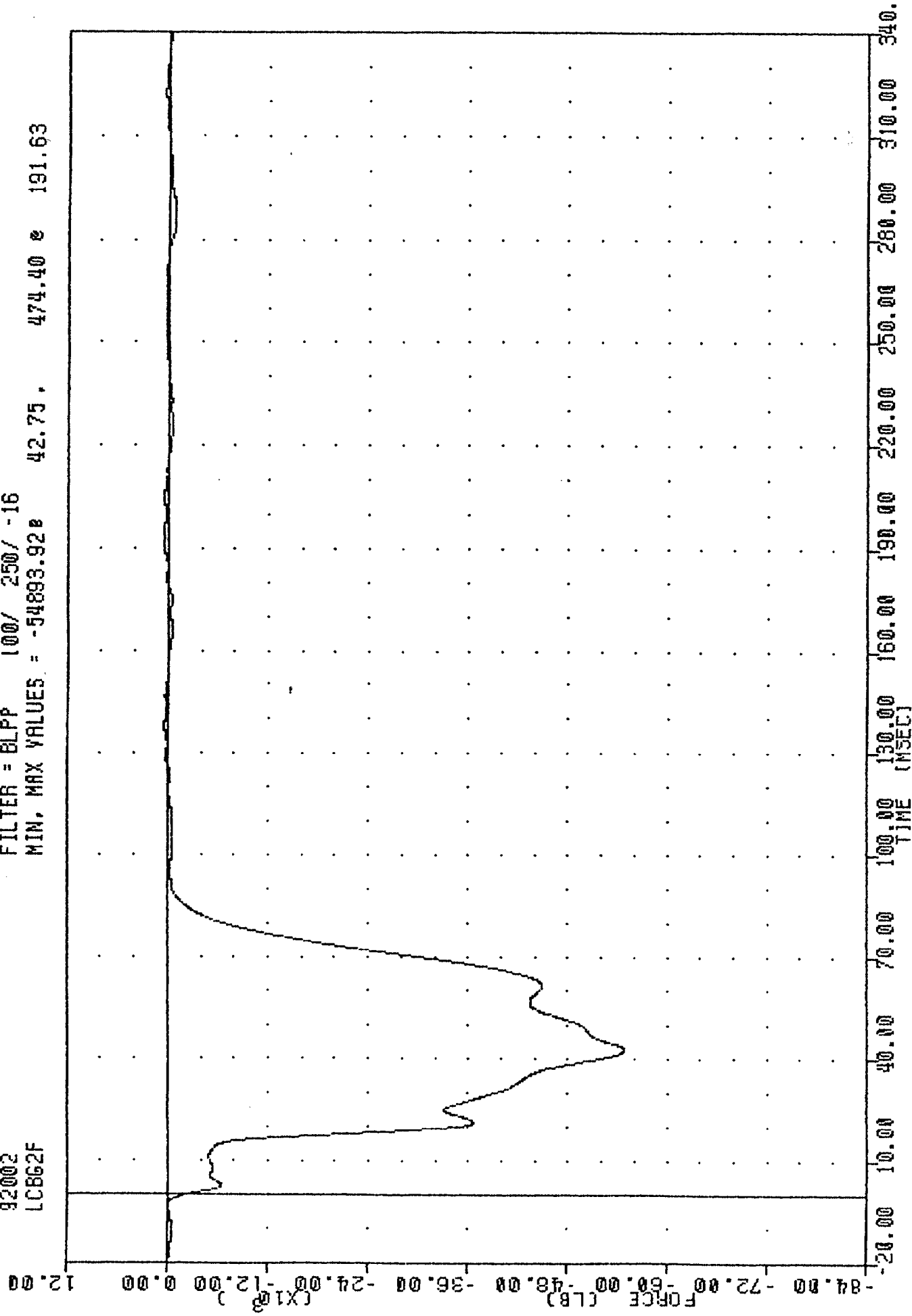
92002

LCB62F

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -54893.92#

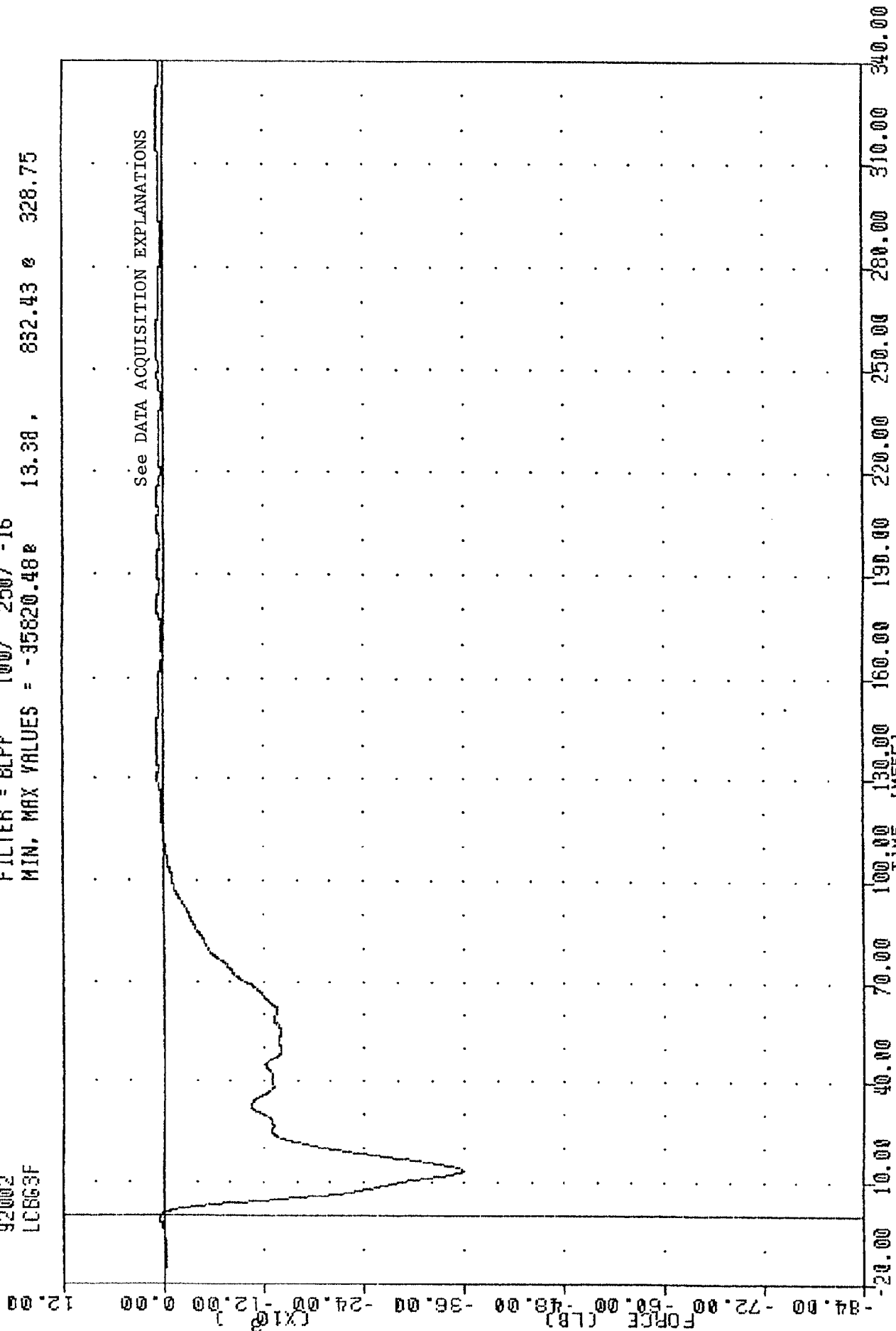
42.75, 474.40 @ 191.63



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 2 FORCE TOTAL

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 LC863F

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -35820.48 832.43 328.75



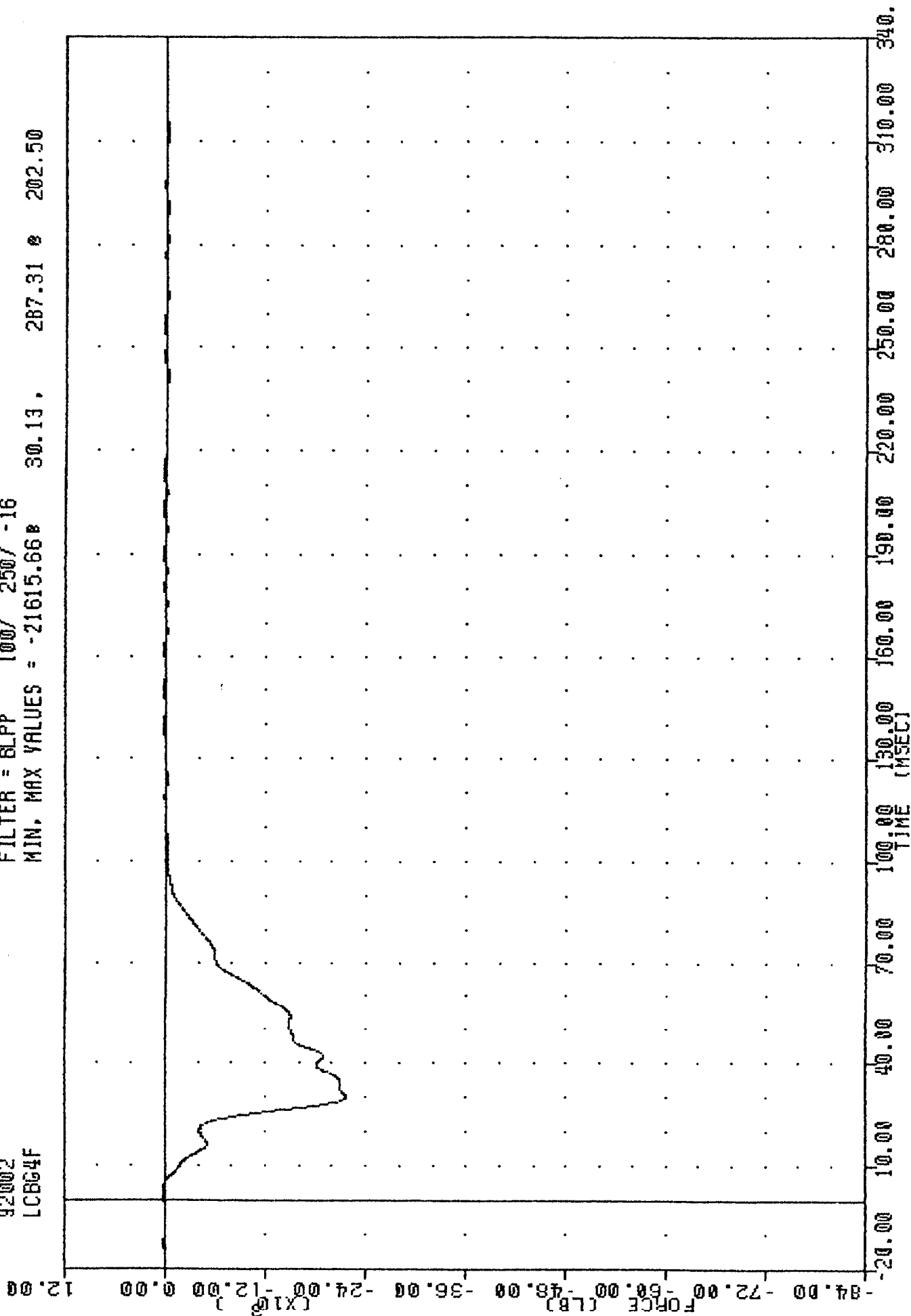
See DATA ACQUISITION EXPLANATIONS

NEW CAR ASSESSMENT PROGRAM

92002
LCBG4F

FILTER = BLPP 100/ 250/ -16

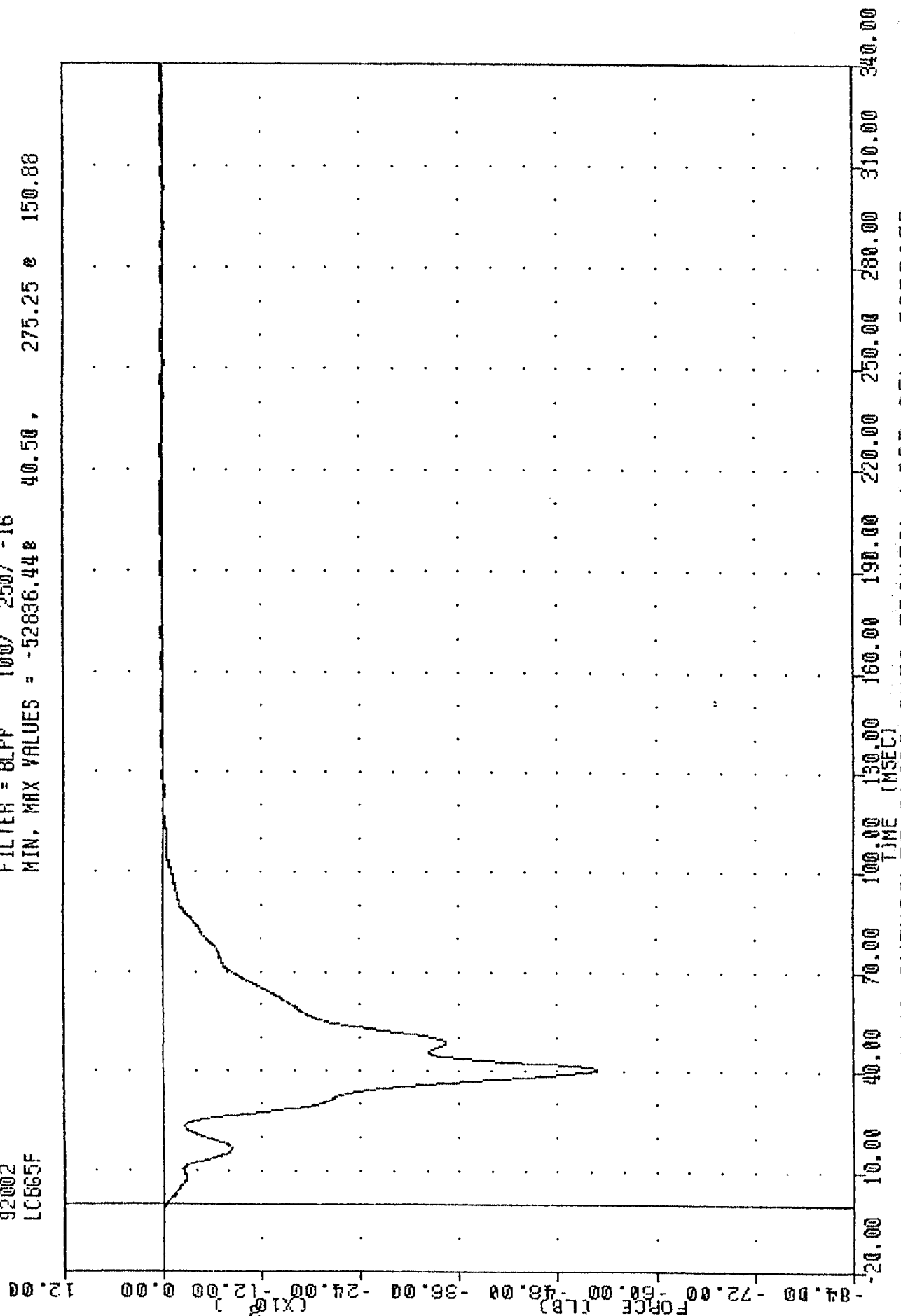
MIN. MAX VALUES = -21615.668 30.13, 287.31 @ 202.50



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 4 FORCE TOTAL

TRC 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 LCEG5F

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -52836.448 40.50, 275.25 e 150.88



B-101

920102

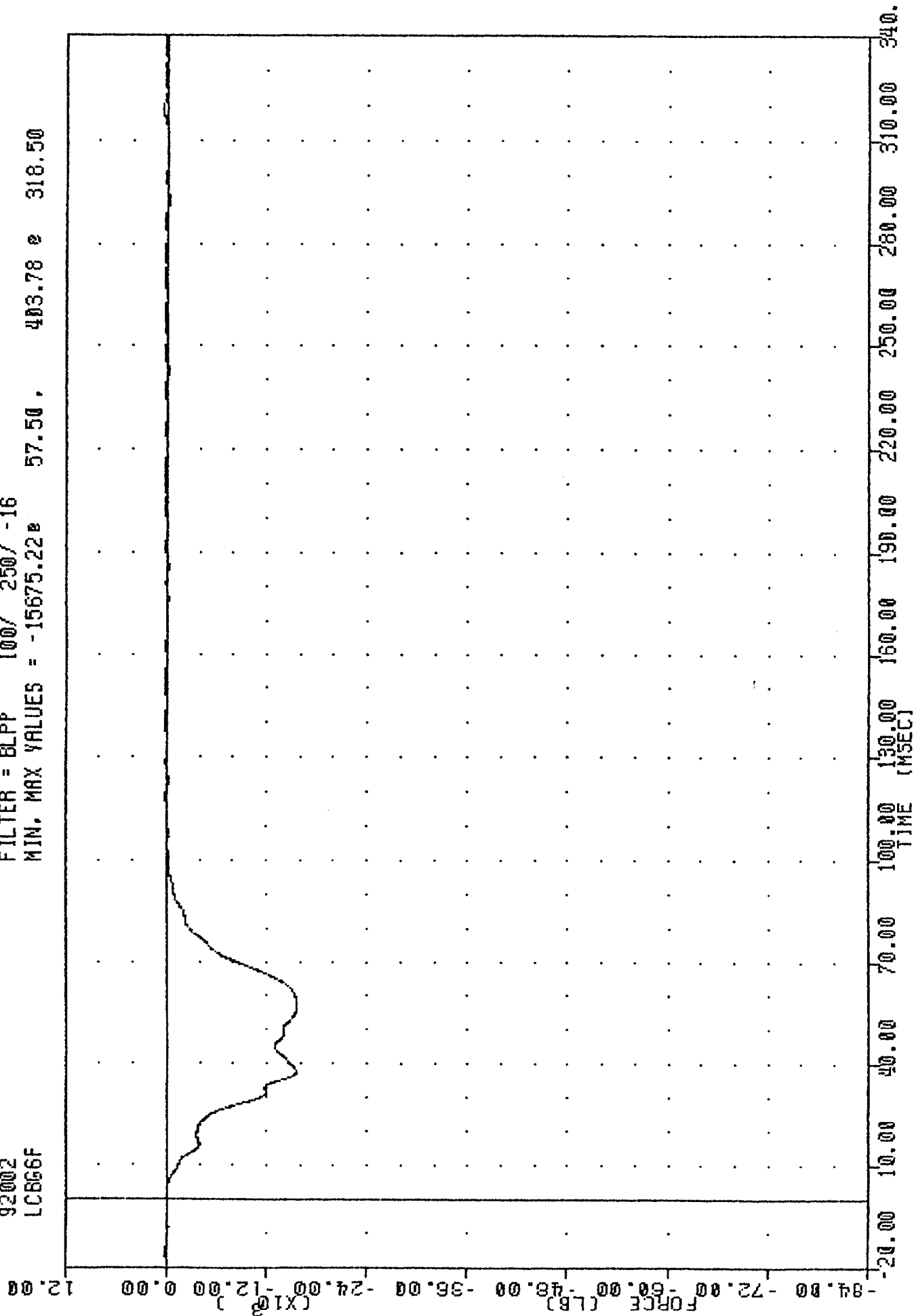
1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 LOAD CELL BARRIER GROUP 5 FORCE TOTAL

NEW CAR ASSESSMENT PROGRAM

92002
LCB66F

FILTER = BLPP 100/ 250/ -16

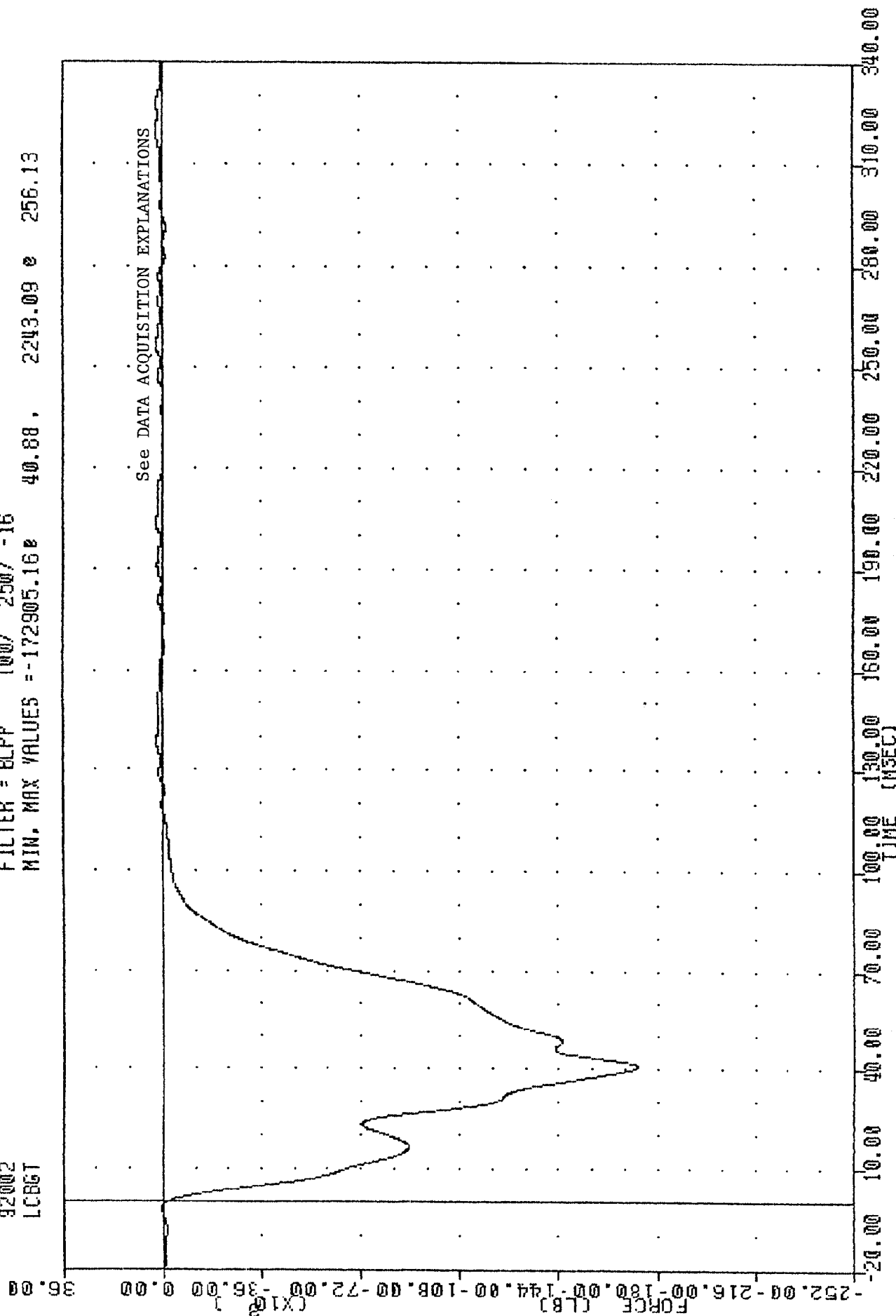
MIN. MAX VALUES = -15675.22 57.50, 403.78 318.50



1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 6 FORCE TOTAL

TRC , 920102
 NEW CAR ASSESSMENT PROGRAM
 92002
 LCBGT

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -172905.16 40.88 , 2243.09 256.13



B-103

920102

1992 CHEVROLET ASTRO INTO FRONTAL LOAD CELL BARRIER
 TOTAL LOAD CELL BARRIER FORCE

APPENDIX C

DUMMY CERTIFICATION DATA

PRE-TEST CERTIFICATION DATA

DRIVER DUMMY S/N: 142

TRANSPORTATION RESEARCH CENTER OF OHIO
HYBRID III EXTERNAL DIMENSIONS
142 HUMANOID

09-DEC-91

TRC 142C8ED1 572E SN142 EXT. DIMENSION CAL08

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
TEMPERATURE			71.0 DEG. F
RELATIVE HUMIDITY			50.0 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)		16.9-17.1 IN	17.0 IN
LOCATION FOR WAIST CIRCUMFERENCE (BB)		8.9- 9.1 IN	9.0 IN
CHEST CIRCUMFERENCE (Y)		38.2-39.4 IN	38.7 IN
WAIST CIRCUMFERENCE (Z)		32.9-34.1 IN	33.3 IN
CHEST DEPTH (O)		8.4- 9.0 IN	8.6 IN
H-POINT HEIGHT (C)		3.3- 3.5 IN	3.4 IN
H-POINT FROM SEATBACK (D)		5.3- 5.5 IN	5.4 IN
SKULL CAP TO BACKLINE (H)		1.6- 1.8 IN	1.7 IN
TOTAL SITTING HEIGHT (A)		34.6-35.0 IN	34.9 IN
THIGH CLEARANCE (F)		5.5- 6.1 IN	5.7 IN
BUTTOCK KNEE LENGTH (K)		22.8-23.8 IN	23.5 IN
BUTTOCK POPLITEAL LENGTH (N)		17.8-18.8 IN	18.7 IN
POPLITEAL HEIGHT (L)		16.9-17.9 IN	17.8 IN
KNEE PIVOT HEIGHT (M)		19.1-19.7 IN	19.3 IN
FOOT LENGTH (P)		9.9-10.5 IN	10.1 IN
FOOT BREADTH (W)		3.6- 4.2 IN	3.8 IN
SHOULDER PIVOT FROM BACKLINE (E)		3.3- 3.7 IN	3.4 IN
SHOULDER BREADTH (V)		16.6-17.2 IN	16.8 IN
SHOULDER PIVOT HEIGHT (B)		19.9-20.5 IN	20.1 IN
ELBOW REST HEIGHT (J)		7.5- 8.3 IN	8.3 IN
SHOULDER-ELBOW LENGTH (I)		13.0-13.6 IN	13.6 IN
BACK OF ELBOW TO WRIST PIVOT (G)		11.4-12.0 IN	11.5 IN

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

09-DEC-91

TRC

142C8HD1

572E SN142 HEAD DROP CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	50.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.01 G
PEAK LATERAL ACCELERATION	15 G MAX	-1.59 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

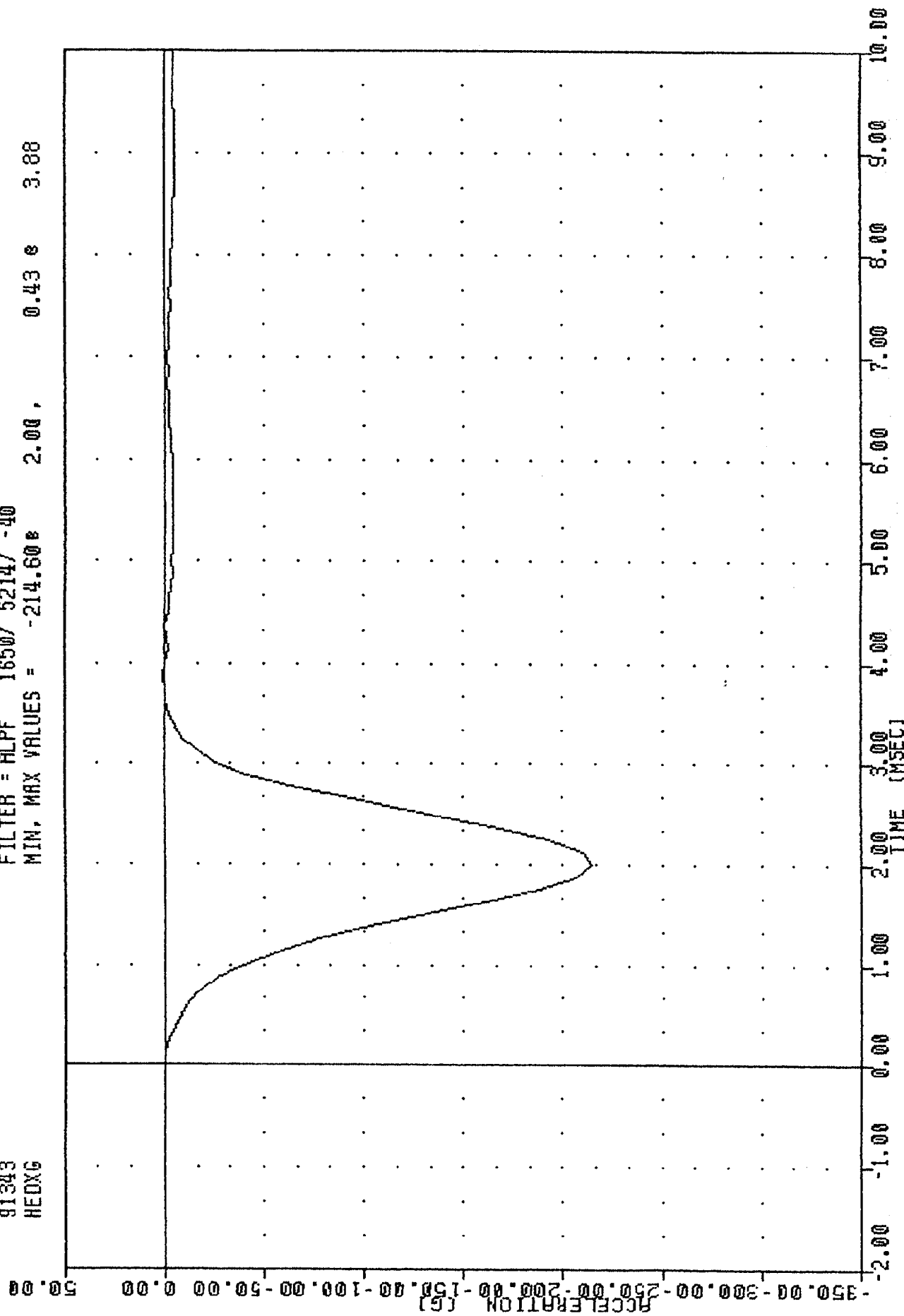
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas Middleton

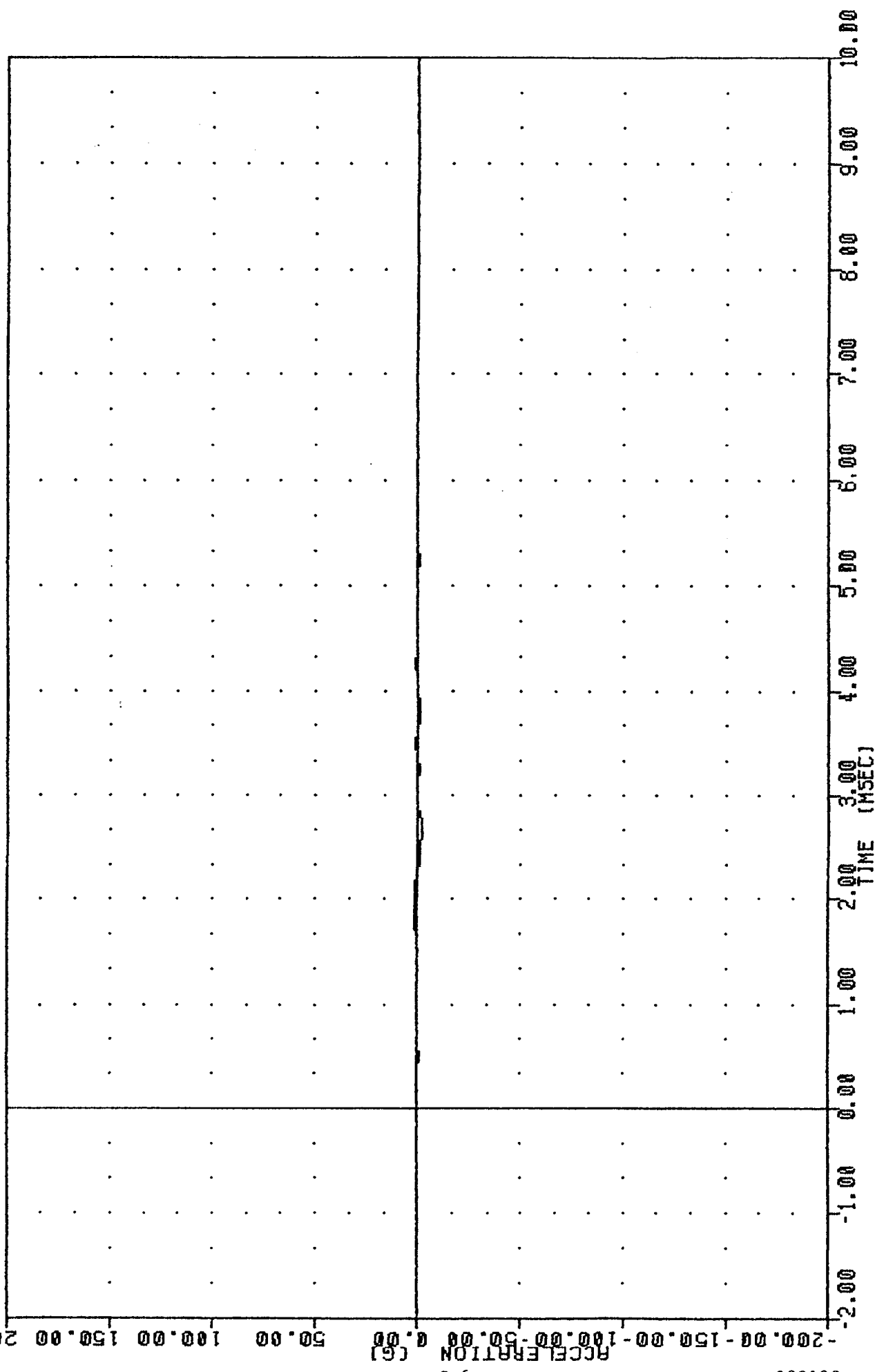
TRC
572E 3N142 HEAD DROP CAL 00
91343
HEDXG

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -214.60e 2.00, 0.43 e 3.88



572E SN142 HEAD DRDP CAL 00
 91343
 HEDYG

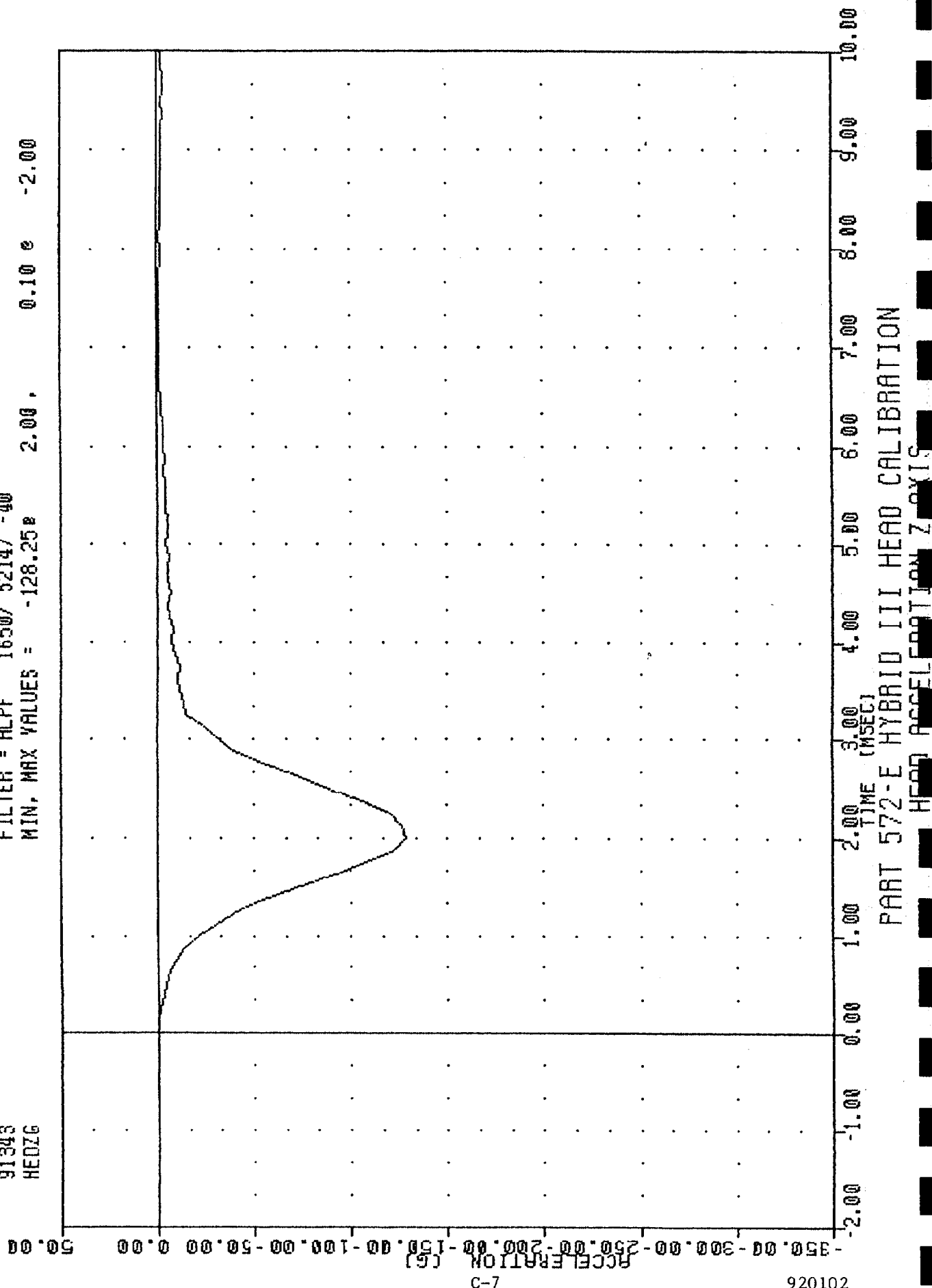
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -1.59 2.63 1.43 1.88



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

TRC
 572E SN142 HEAD DRDP CAL 00
 91343
 HEADZG

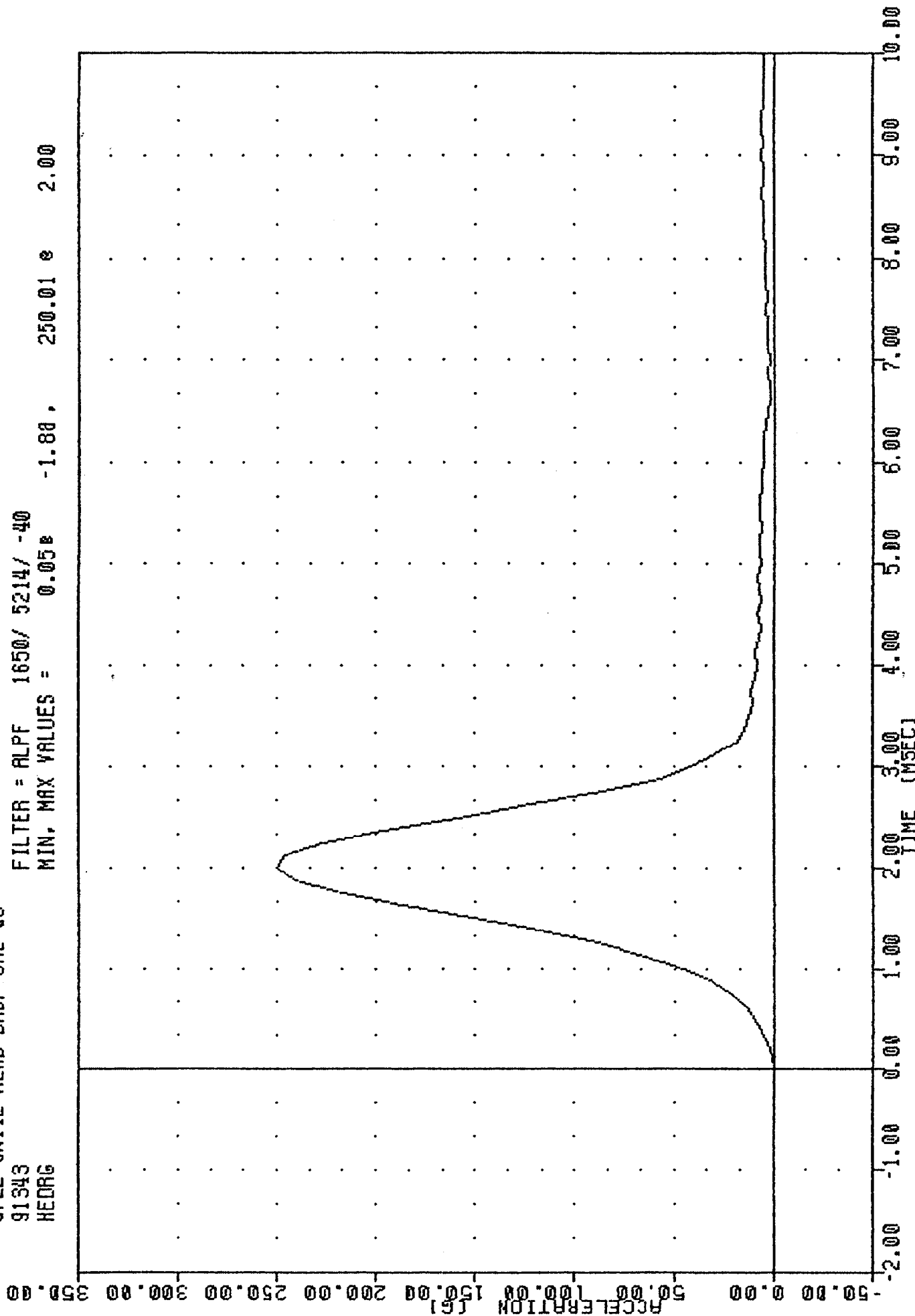
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -128.250 2.00 0.10 e -2.00



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

INL , 142LONDI
 572E SN142 HEAD DRDP CAL 08
 91343
 HEADRG

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.05e -1.8e 250.01 e 2.00



PART 572-E HYBRID III HEAD CALIBRATION
 HEAD RESULTANT ACCELERATION

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

10-DEC-91

6 AXIS NECK TRANSDUCER
TRC 142C8NF1

572E SN142 NECK FLEXION CAL08

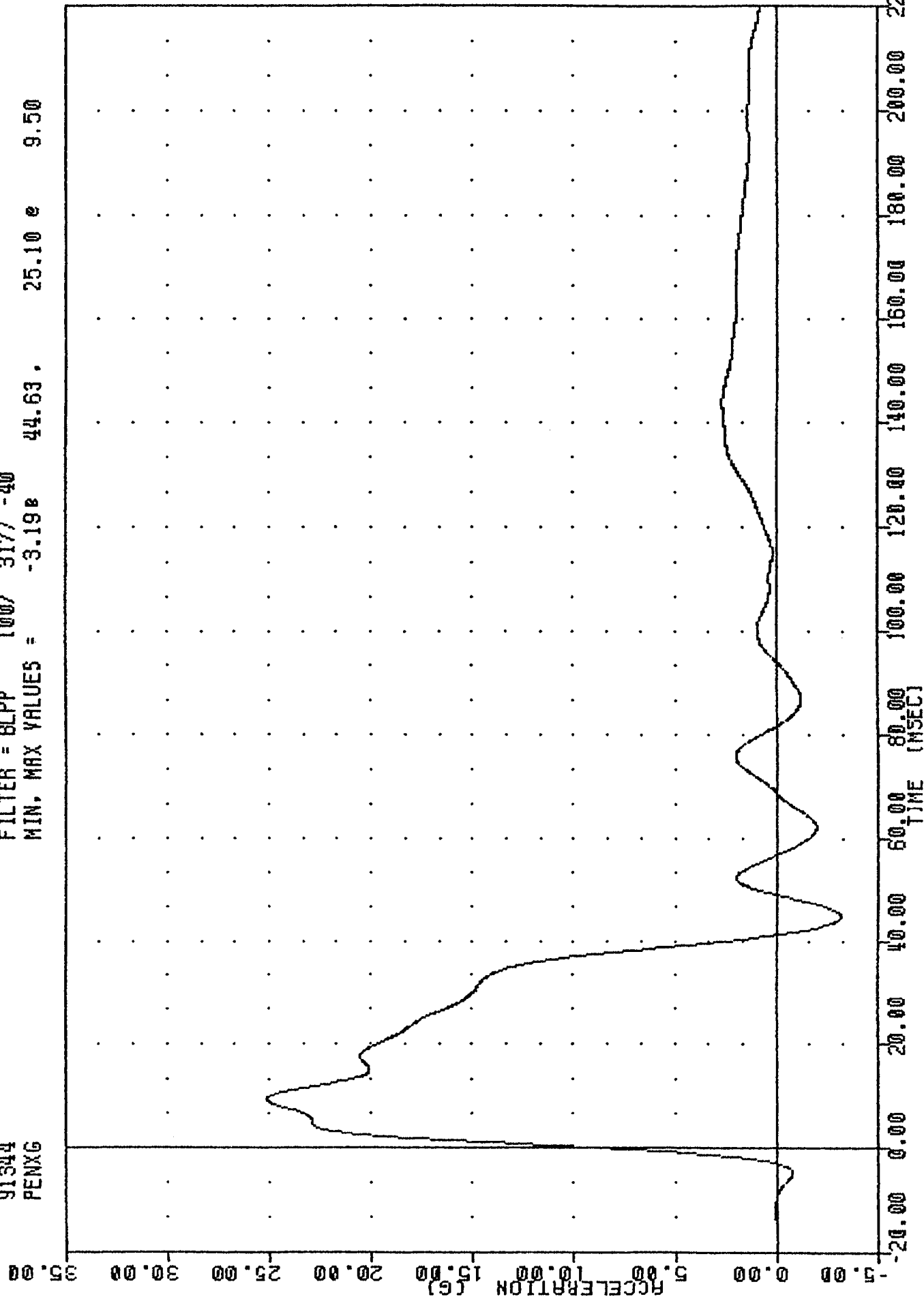
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	42.0 %
IMPACT VELOCITY	22.6-23.4 FT/SEC	23.08 FT/SEC
PENDULUM	10 MS 22.50 - 27.50 G	24.98 G
DECELERATION	20 MS 17.60 - 22.60 G	19.71 G
	30 MS 12.50 - 18.50 G	14.96 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	14.93 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	38.88 MS
D PLANE	MAX 64 - 78 DEG.	75.88 DEG.
ROTATION	TIME 57 - 64 MS	61.75 MS
MOMENT ABOUT OCCIPITAL	MAX 65 - 80 FT.LBS	71.98 FT.LBS
CONDYLE	TIME 47 - 58 MS	52.38 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	116.63 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	105.38 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN *Chas. Middle*

IHC
 572E SN142 NECK FLEXION CAL00B
 91344
 PENXG

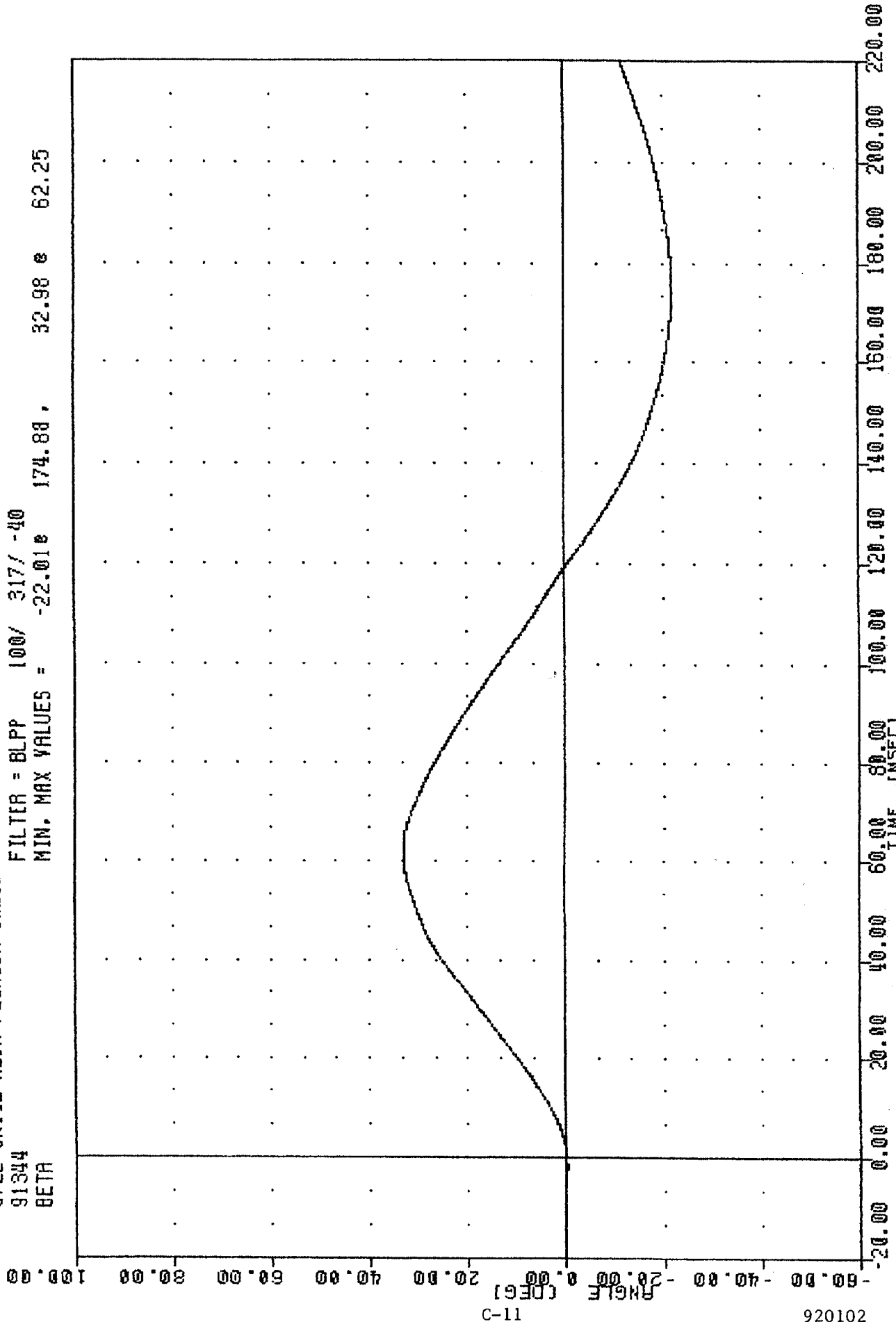
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -3.19 44.63 25.10 9.50



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 PENNIUM DECELERATION

TRC , 142C8NF1
 572E SN142 NECK FLEXION CAL08
 91344
 BETA

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -22.018 174.88, 32.98 62.25



C-11

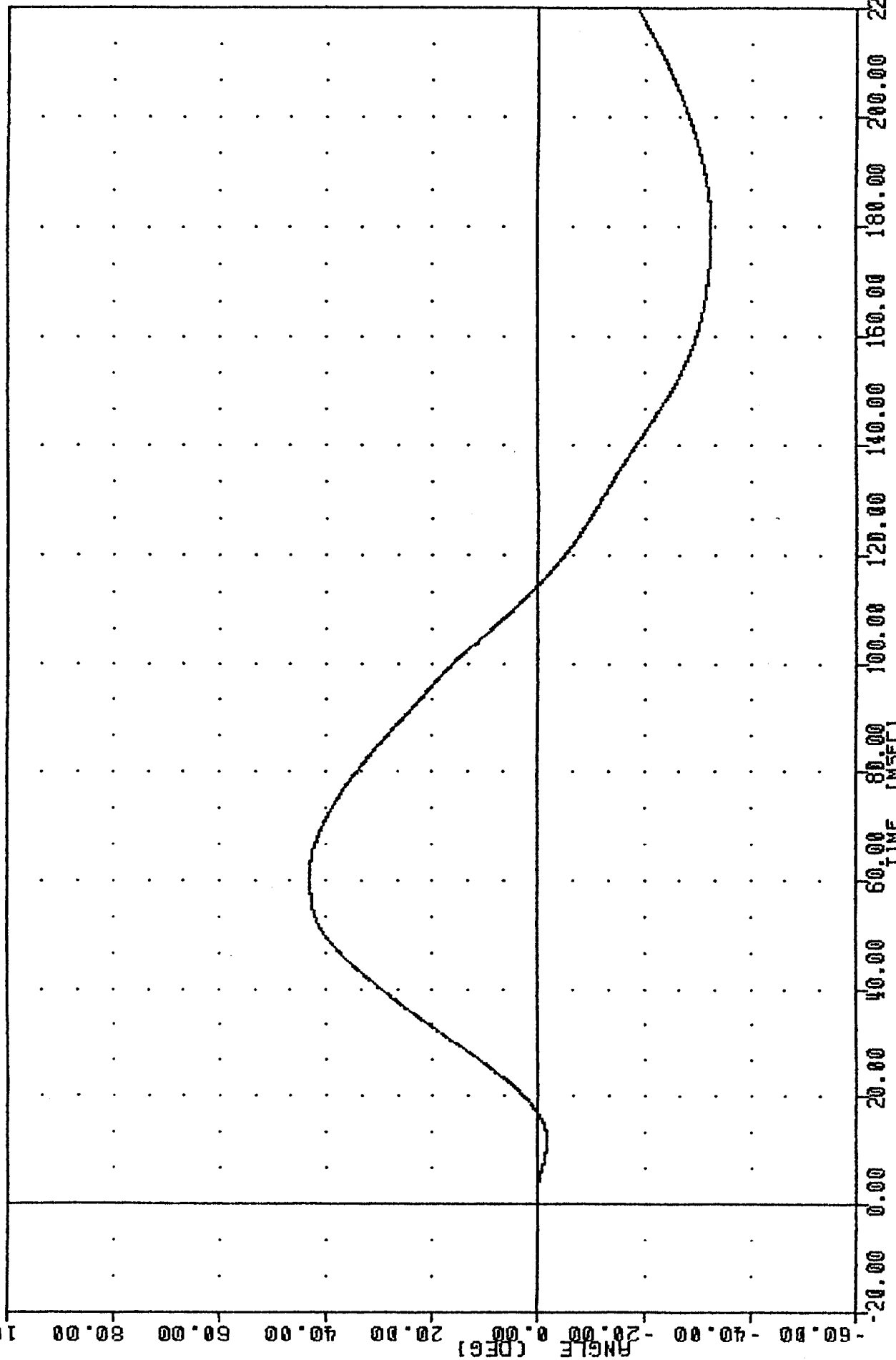
920102

PART 572-E HYBRID III NECK FLEXION CALIBRATION

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IHC
 572E SN142 NECK FLEXION CALIB
 91344
 THETA

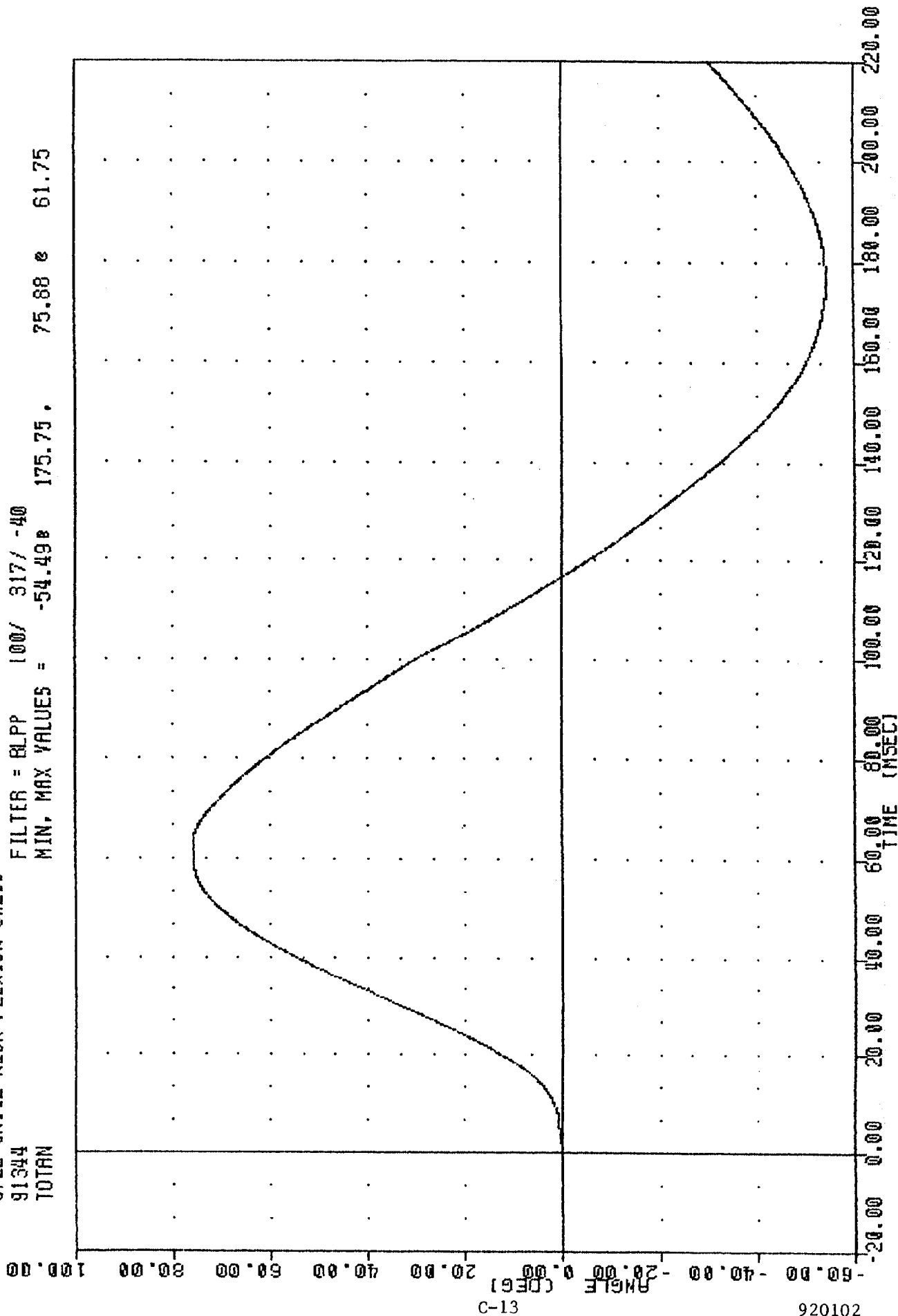
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -32.50 179.38
 42.91 61.25



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

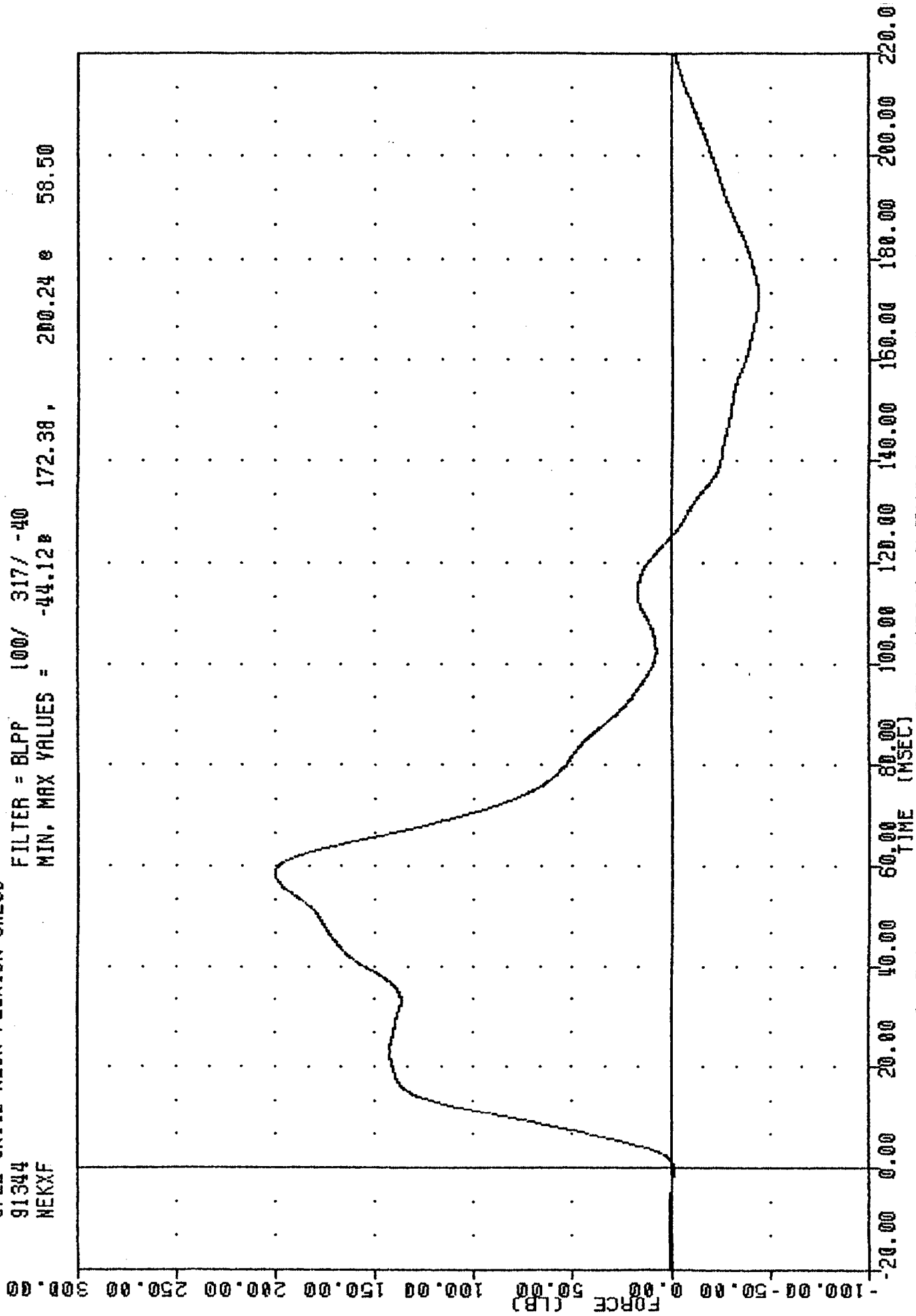
TRC , 142C8WF1
 572E SN142 NECK FLEXION CAL08
 91344
 TOTAL

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -54.498 175.75, 75.88 e 61.75



III
 572E 9N142 NECK FLEXION CAL08
 91344
 NEKXF

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -44.128 172.38, 200.24 @ 58.50



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

TRC , 14208NF1
572E SN142 NECK FLEXION CAL08

91344
NEKYM

FILTER = BLPP 100/ 317/ -40

MIN. MAX VALUES = -27.00 14.13, 51.25 52.13

100.00

80.00

60.00

40.00

20.00

0.00

C-15

TOPQUE (LB-FT)

-20.00

-40.00

-60.00

920102



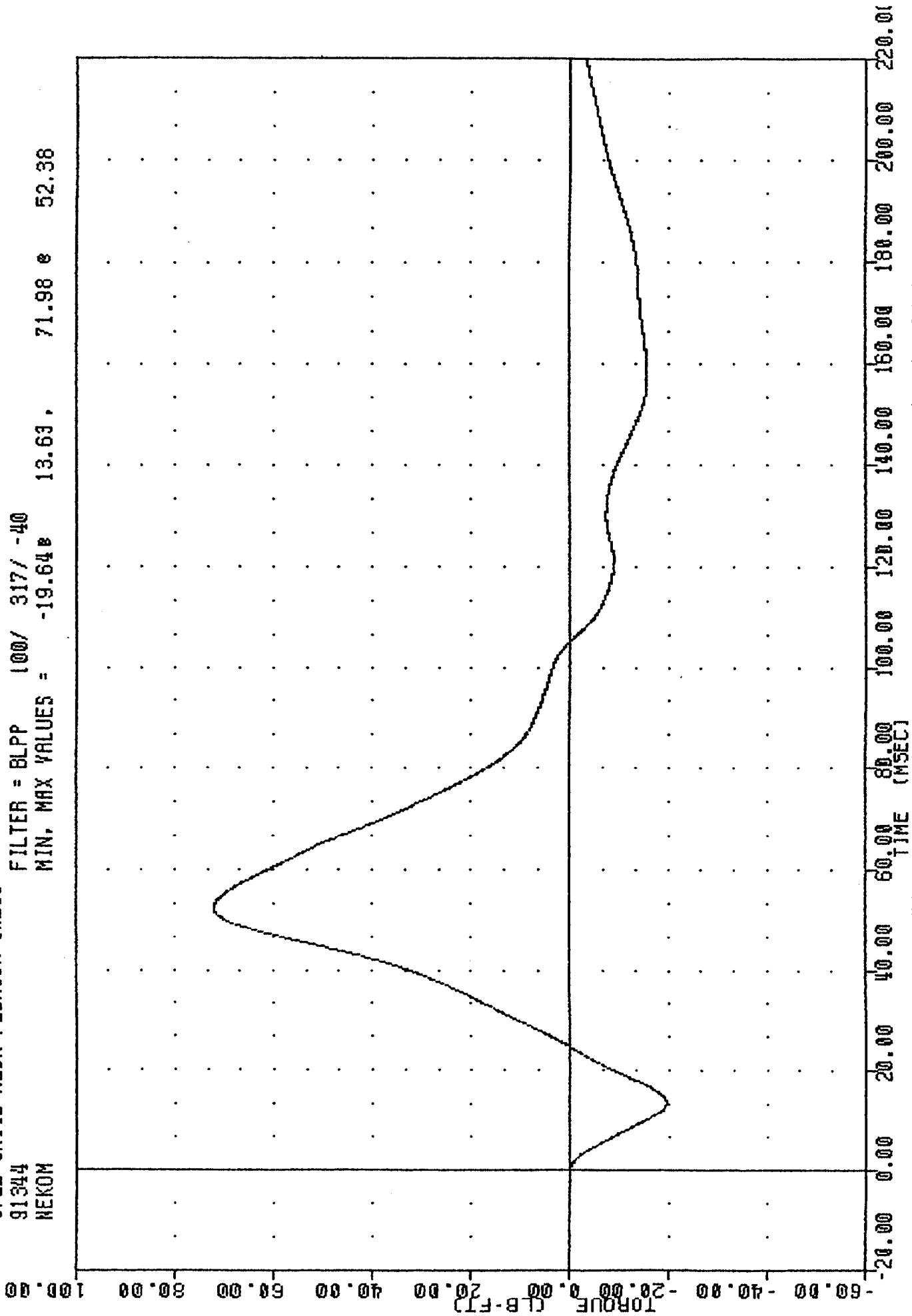
-20.00 0.00 20.00 40.00 60.00 80.00 100.00 120.00 140.00 160.00 180.00 200.00 220.00

PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

572E SN142 NECK FLEXION CAL00
 91344
 NEKOM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -19.64 13.63, 71.98 52.38



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

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

10-DEC-91

6 AXIS NECK TRANSDUCER
TRC 142CSNE1

572E SN142 NECK EXT. CAL08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	42.0 %
IMPACT VELOCITY	19.50-20.30 FT/SEC	19.67 FT/SEC
PENDULUM	10 MS 17.20 - 21.20 G	19.05 G
DECELERATION	20 MS 14.00 - 19.00 G	16.07 G
	30 MS 11.00 - 16.00 G	13.93 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	13.90 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	39.50 MS
D PLANE	MAX 81 - 106 DEG.	100.78 DEG.
ROTATION	TIME 72 - 82 MS	74.75 MS
MOMENT ABOUT OCCIPITAL	MIN -59.0/-39.0 FT.LBS	-55.79 FT.LBS
CONDYLE	TIME 65 - 79 MS	70.88 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	154.75 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	141.13 MS

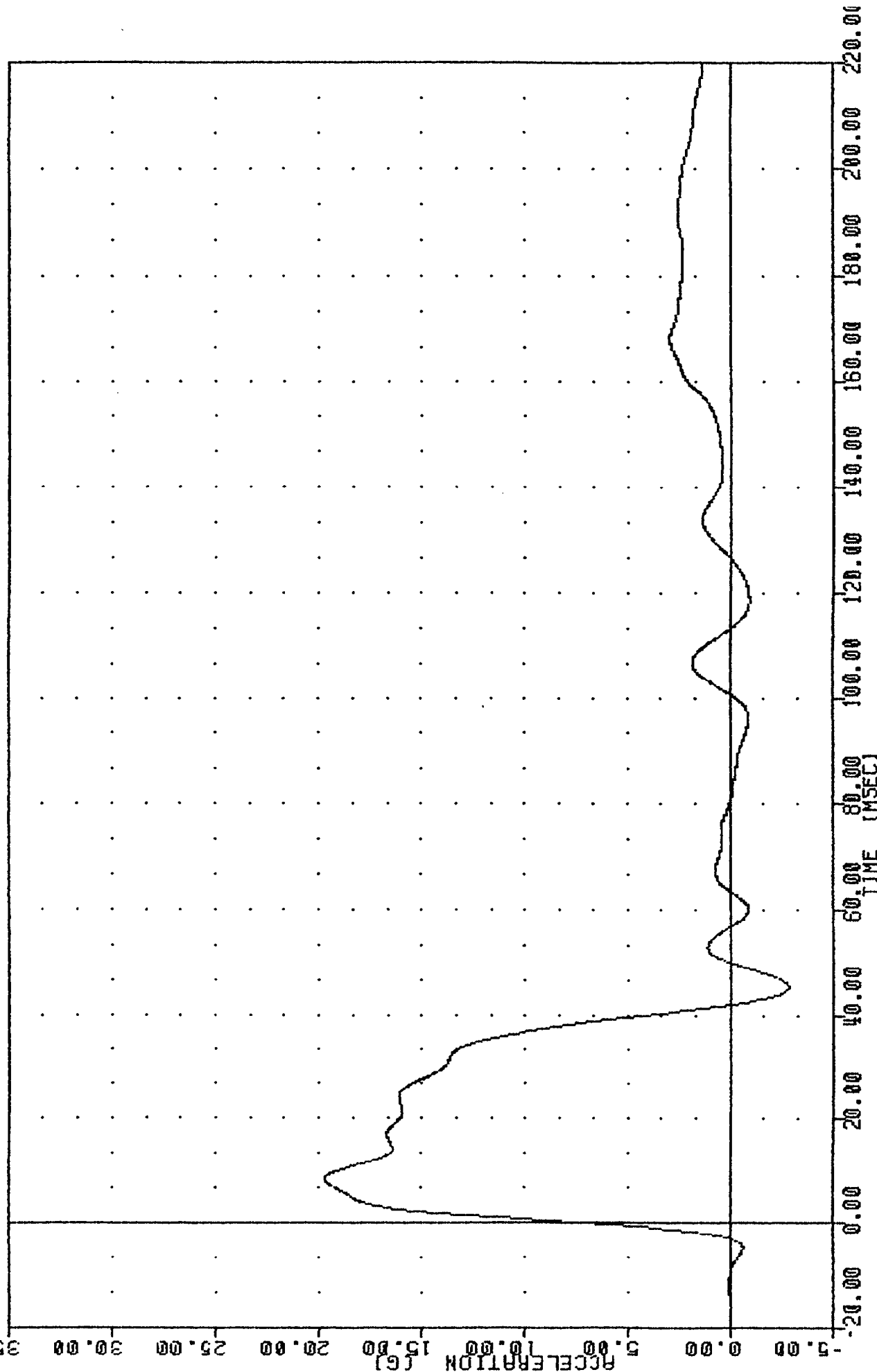
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

572E SN142 NECK EXT. CAL00
 91344
 PENXG

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -2.87 45.38 19.72 8.38



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 PENDULUM DECELERATION

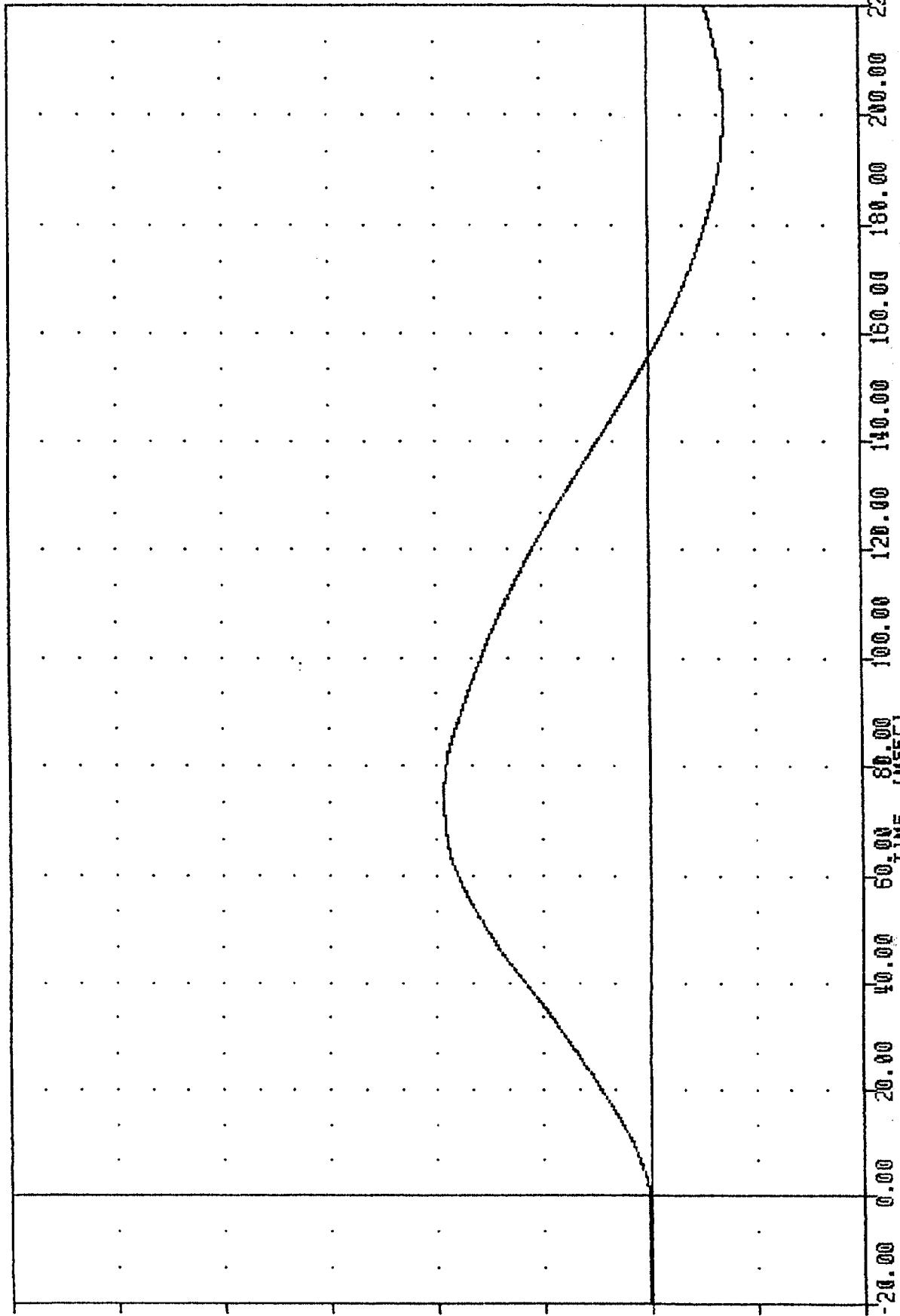
TRC , 142C8NE1
 572E SN142 NECK EXT. CAL08
 91344
 BETA

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -14.548 200.13, 38.80 74.00

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

C-19

920102

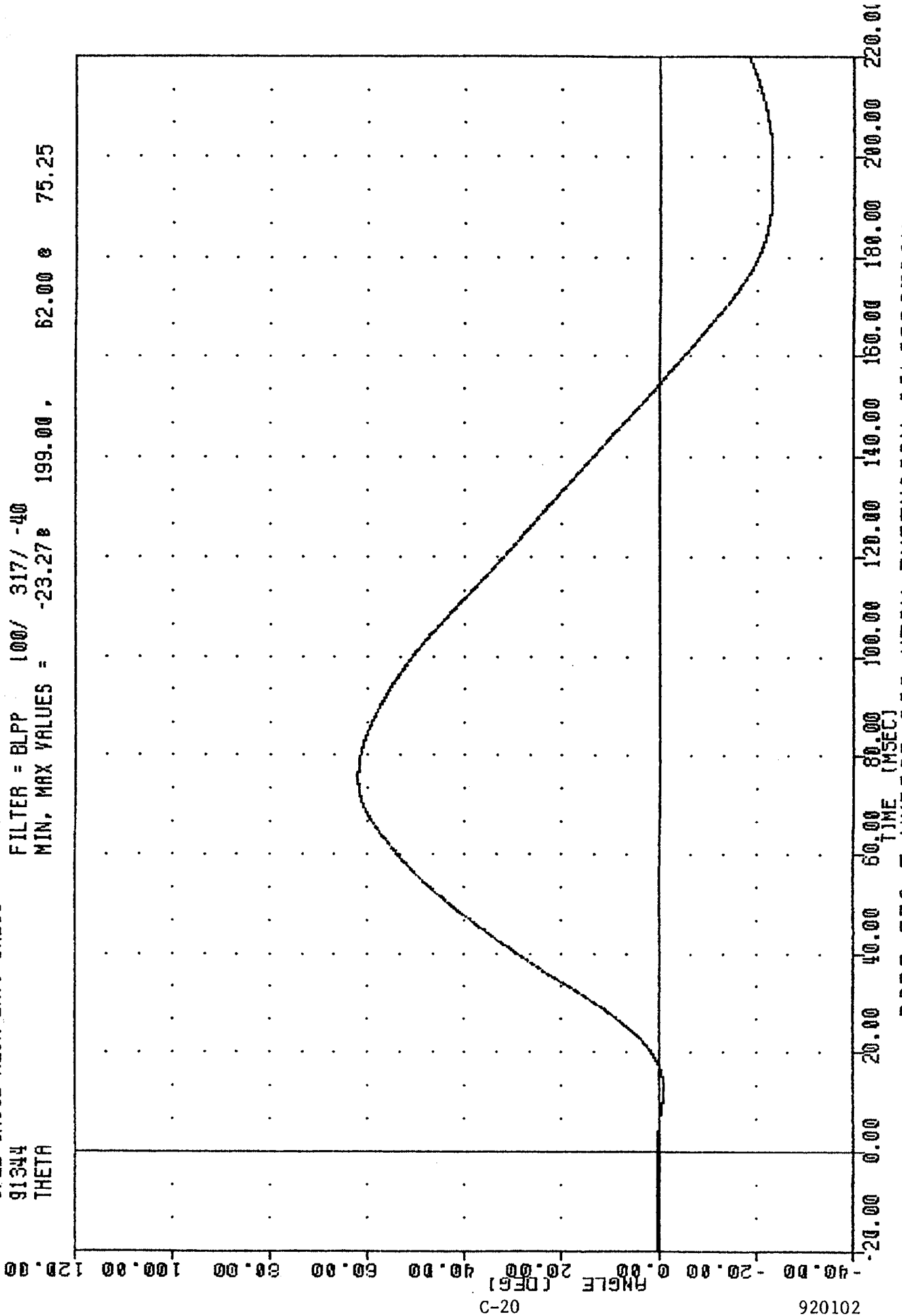


PART 572-E HYBRID III NECK EXTENSION CALIBRATION

ROTATION ON ABOUT BASE OF NECK

572E SN142 NECK EXT. CAL08
 91344
 THETA

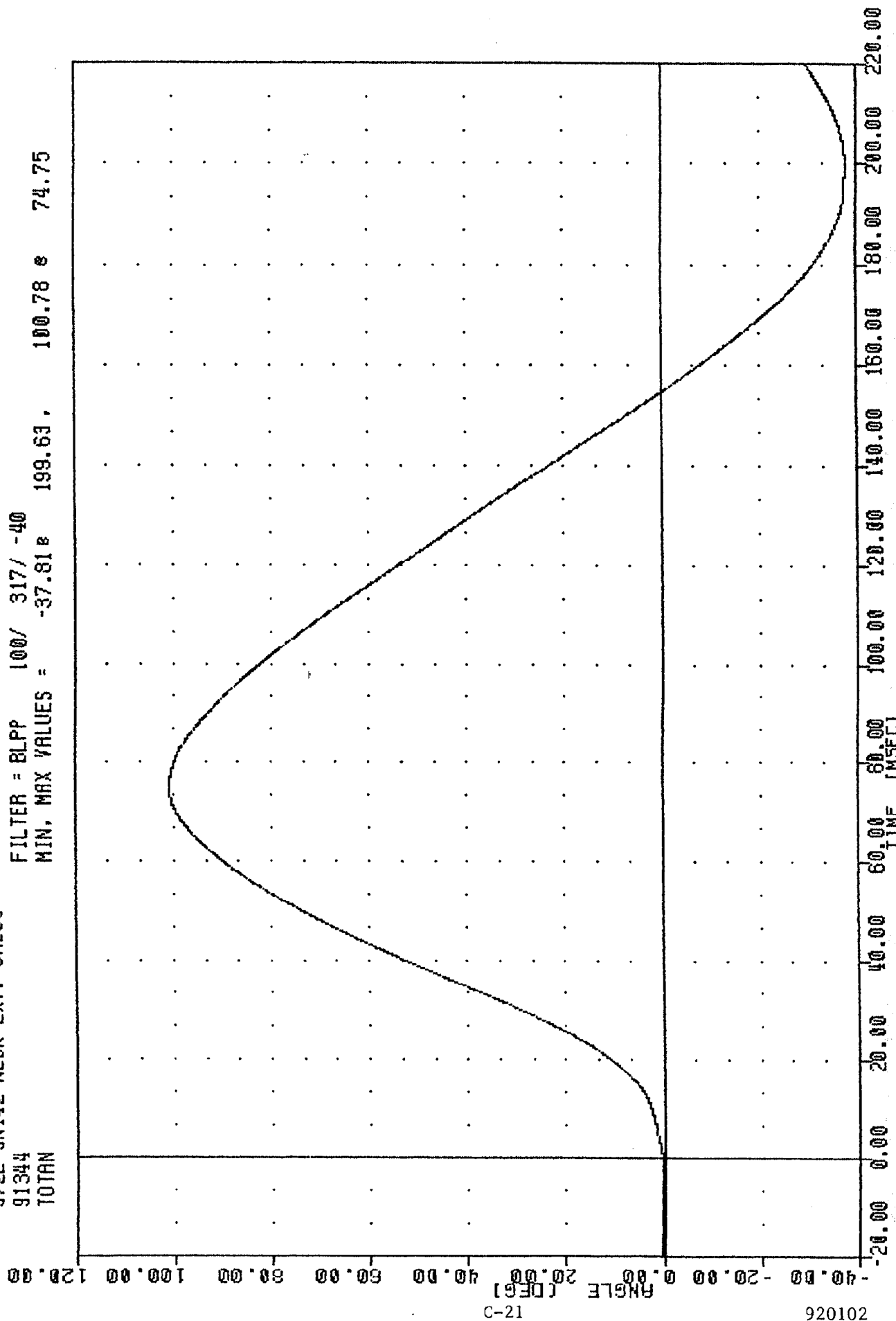
FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -23.27 199.00 62.00 75.25



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

TRC , 142C8NE1
 572E SN142 NECK EXT. CAL08
 91344
 TOTAL

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -37.81 e 199.63 , 100.78 e 74.75



920102

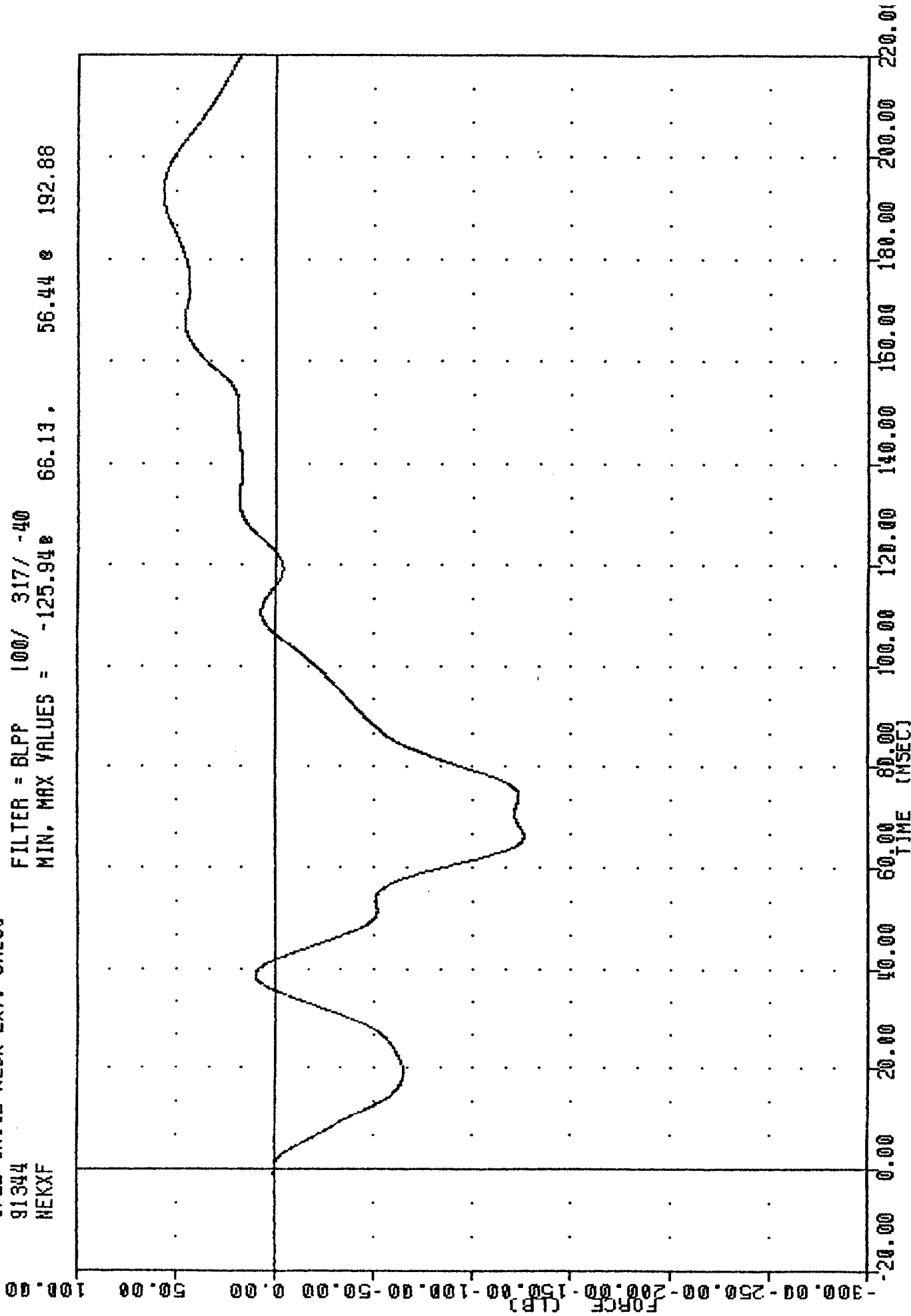
C-21

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

572E SN142 NECK EXT. CAL08
 91344
 NEKXF

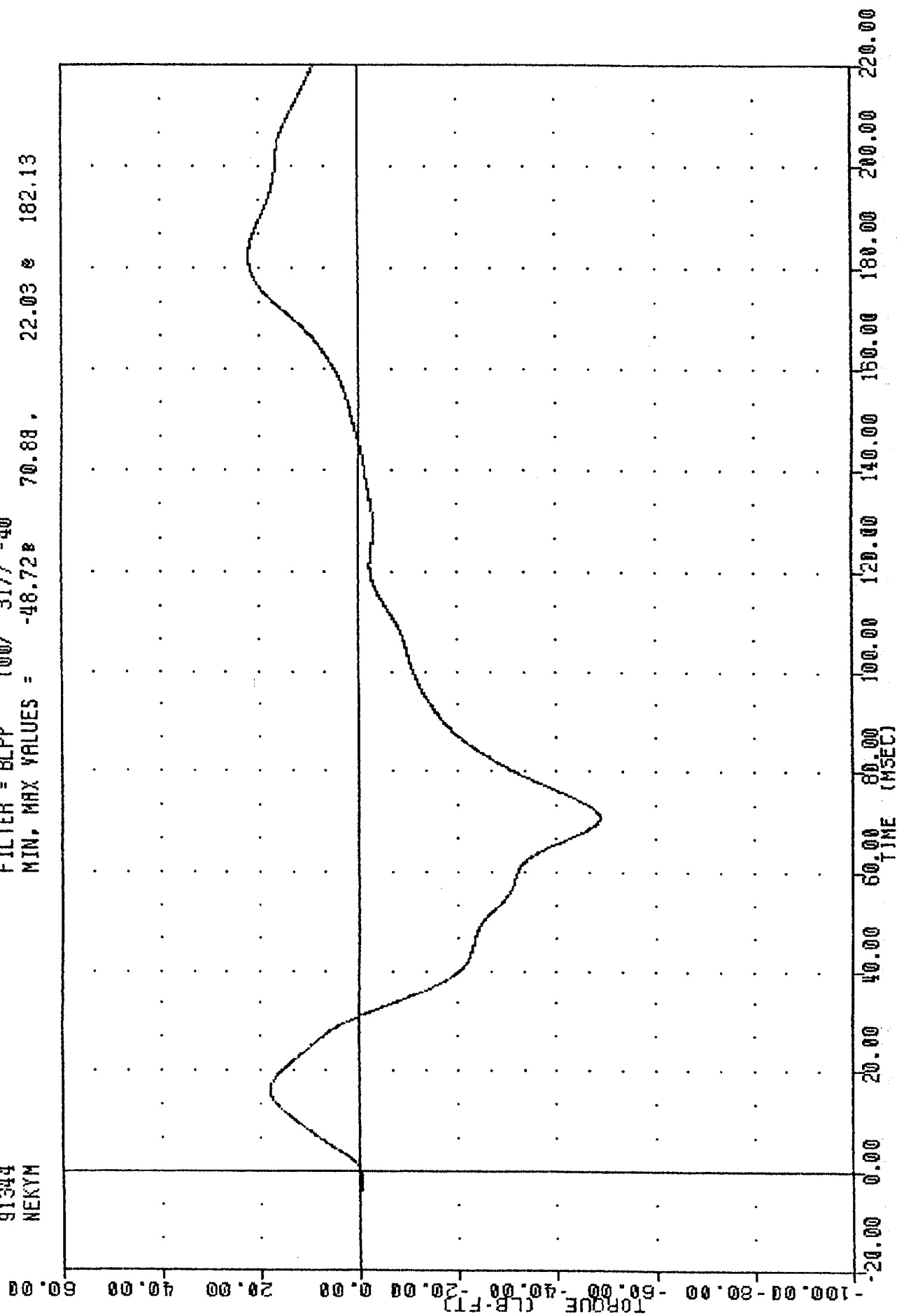
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -125.94 66.13 56.44 192.86



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

TRC
572E SN142 NECK EXT. CAL08
91344
NEKYM

FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -48.72 70.88 22.03 182.13

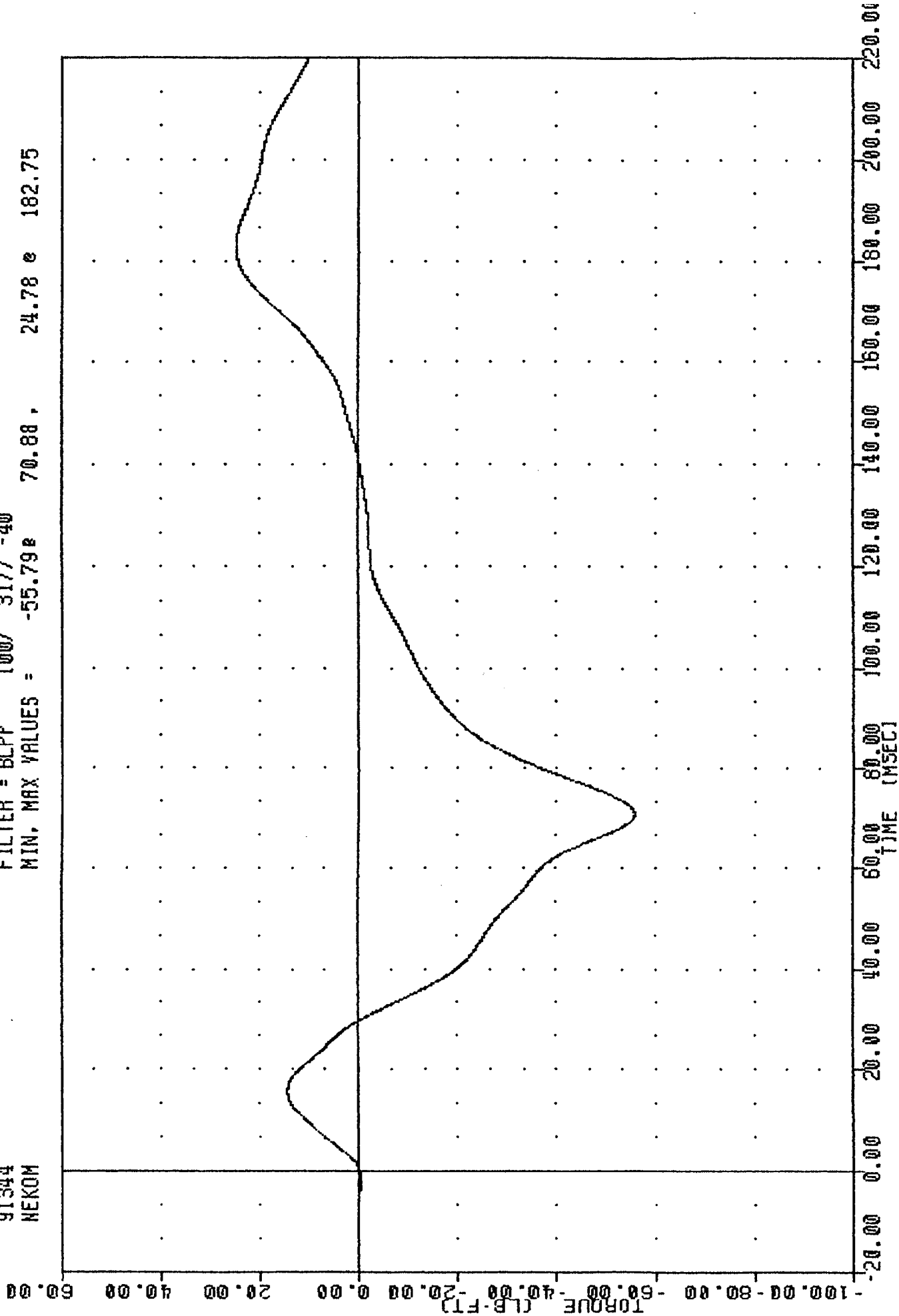


PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT Y-Axis

572E SN142 NECK EXT. CAL08
 91344
 NEKOM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -55.79 70.88 , 24.78 182.75



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

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

10-DEC-91

TRC

142C8TH1

572E SN142 H.S. THORAX CAL08

	HIGH SPEED TEST	
TEST PARAMETER	SPECIFICATION	TEST RESULTS
=====		
TEMPERATURE	69 - 72 DEG. F	71.0 DEG. F

RELATIVE HUMIDITY	10% - 70%	43.0 %

PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC

MAXIMUM DEFLECTION	2.50 - 2.86 IN	2.84 IN

MAXIMUM RESISTIVE FORCE	1160 - 1325 LBS	1230.9 LBS

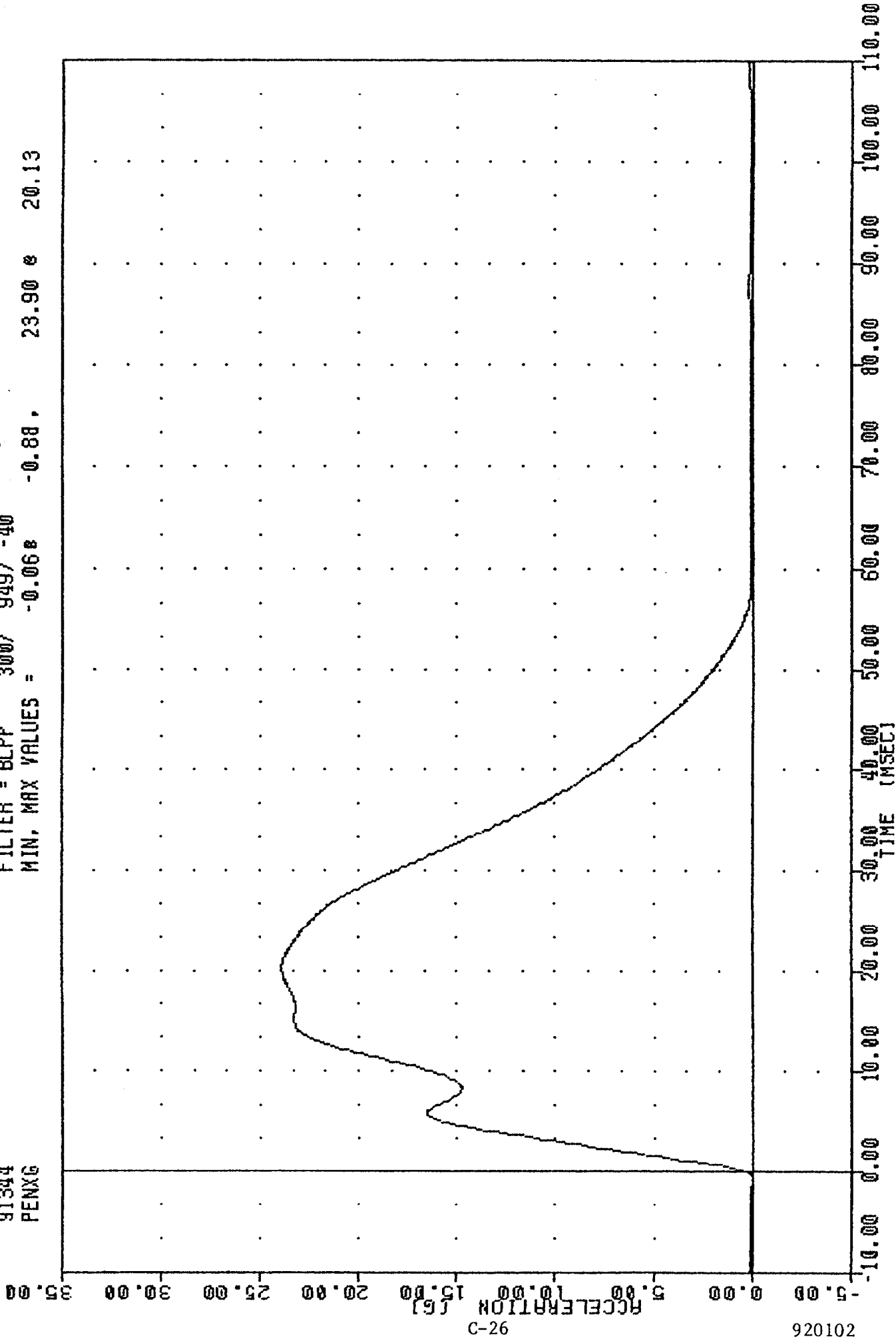
INTERNAL HYSTERESIS	69% - 85%	70.7%

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

INC 14200111
 572E SN142 H.S. THORAX CAL00
 91344
 PENXG

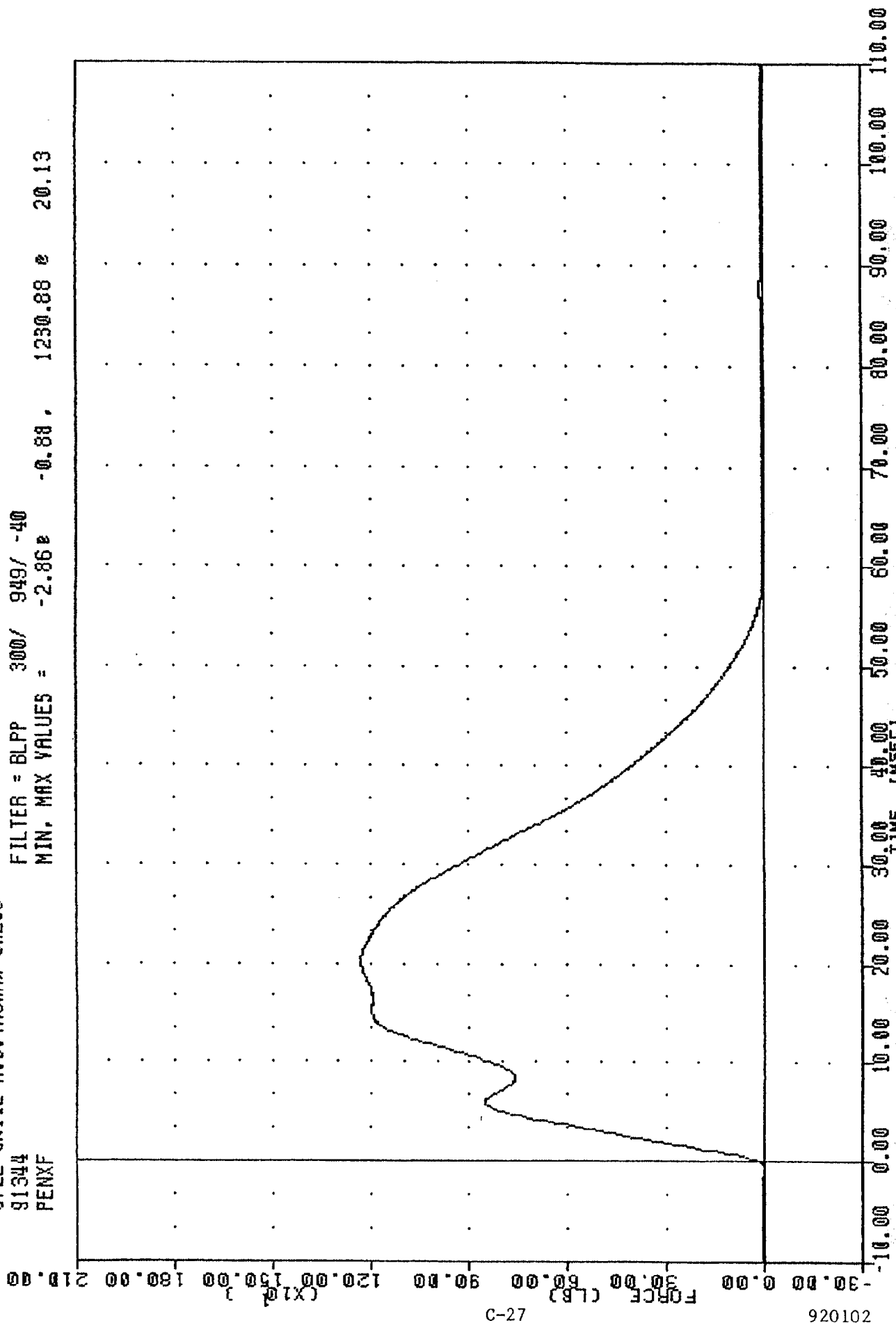
FILTER = BLPP 300/ 949/ -40
 MIN, MAX VALUES = -0.068 -0.88, 23.90 & 20.13



PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

TRC , 142C8TH1
 572E SN142 H.S. THORAX CAL08
 91344
 PENXF

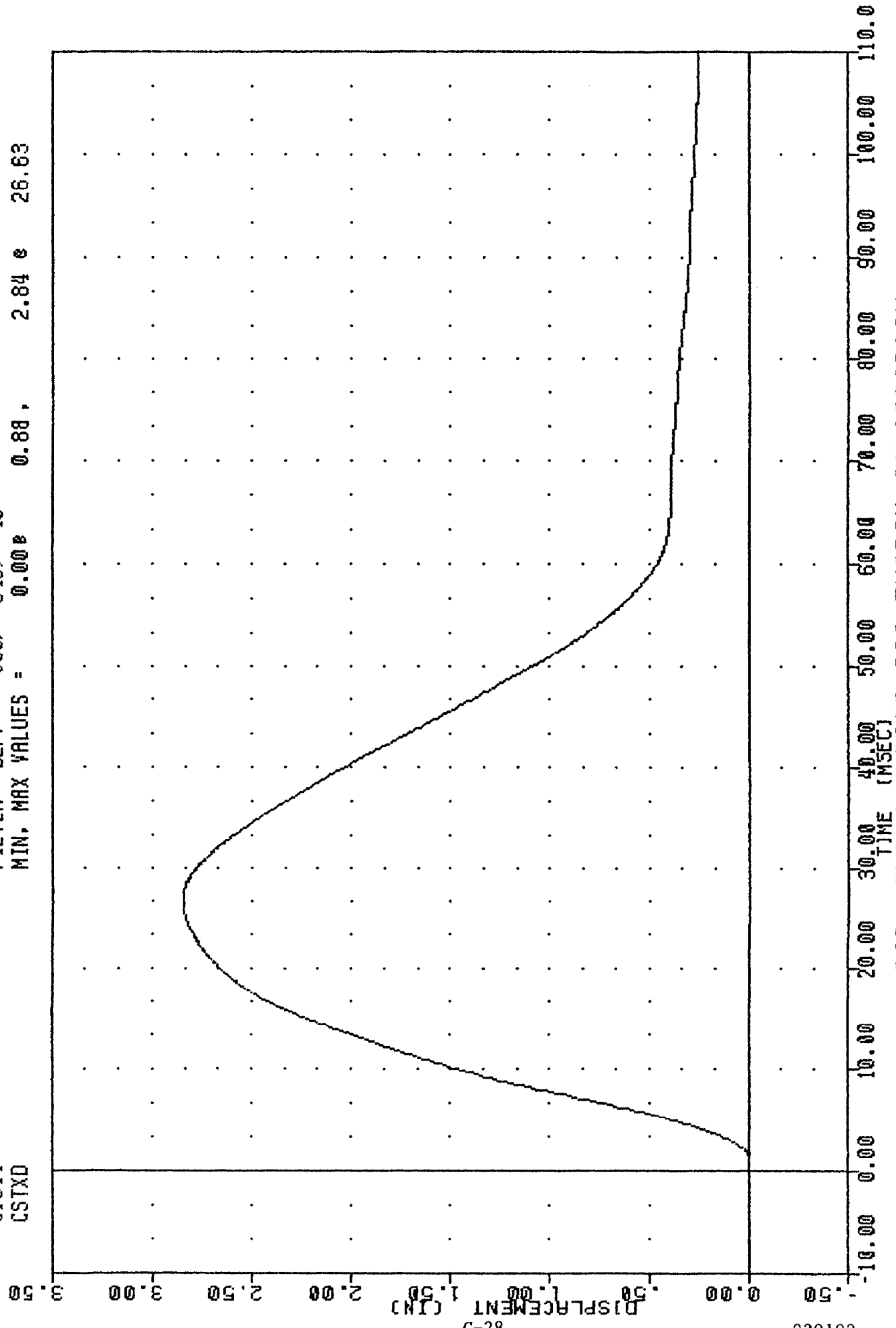
FILTER = BLPP 300/ 949/ -40
 MIN. MAX VALUES = -2.86e -0.88, 1230.88 e 20.13



PART 572-E HYBRID III THORAX CALIBRATION

572E SN142 H.S. THORAX CAL08
 91344
 CSTXD

FILTER = BLPP 300/ 949/ -40
 MIN. MAX VALUES = 0.00 0.88 2.84 26.63



PART 572-E HYBRID III THORAX CALIBRATION
 STERNIM DISPLACEMENT

TAC
 CSTXD
 PENXF

572E SN142 H.S. THORAX CAL08
 500/ 949/ -40 MIN. MAX =
 500/ 949/ -40 MIN. MAX =

91344
 0.000
 -2.86

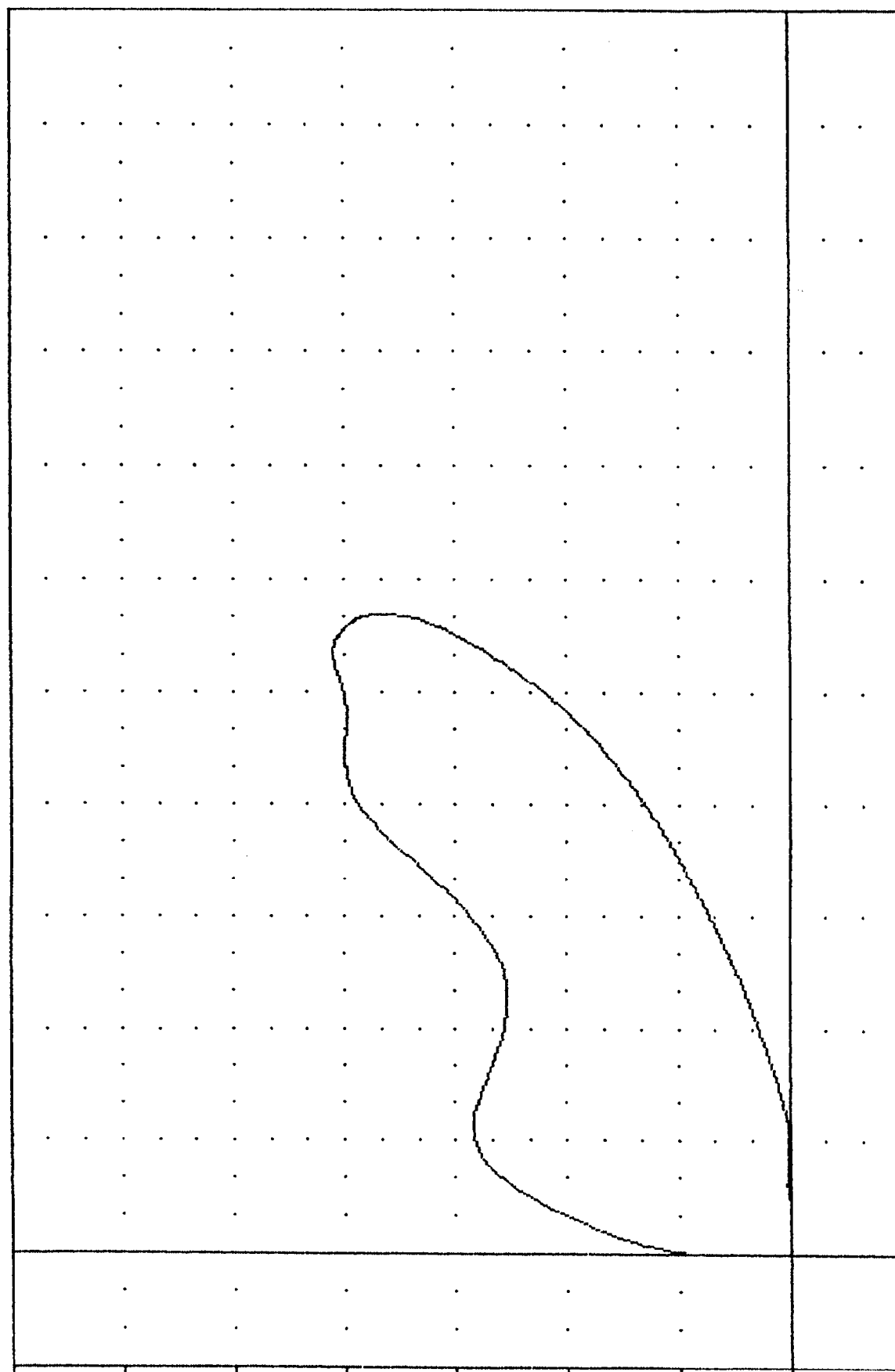
0.88
 -0.88
 2.84
 1230.88

26.63
 20.13

210.00
 180.00
 150.00
 120.00
 90.00
 60.00
 30.00
 0.00
 -30.00

C-29

920102



-0.50 0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50

PART 572-E HYBRID III THORAX CALIBRATION

CHEST RECPI COMPONENT VS PENALTY FORCE

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

10-DEC-91

LEFT KNEE
TRC

142C8LK1

572E SN142 L.KNEE 11LB CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	43.0 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.91 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1275.77 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

TECHNICIAN

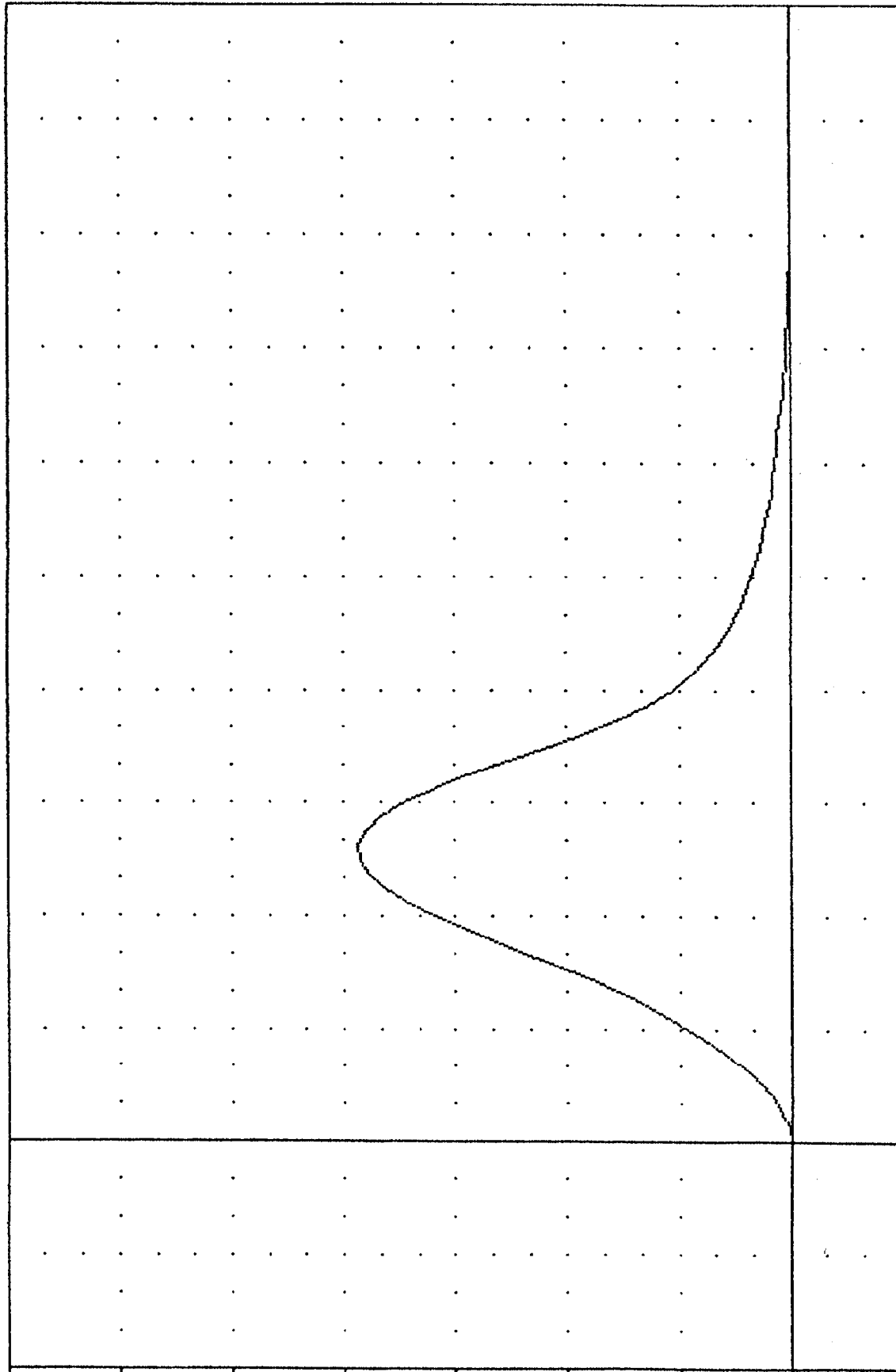
Chas. Middleton

TRC
572E SN142 L.KNEE 11LB CAL 00
91344
PENXG

FILTER = BLPP 1000/ 3162/ -40

MIN, MAX VALUES = -0.228 -0.13, 115.98 2.63

ACCELERATION (G)

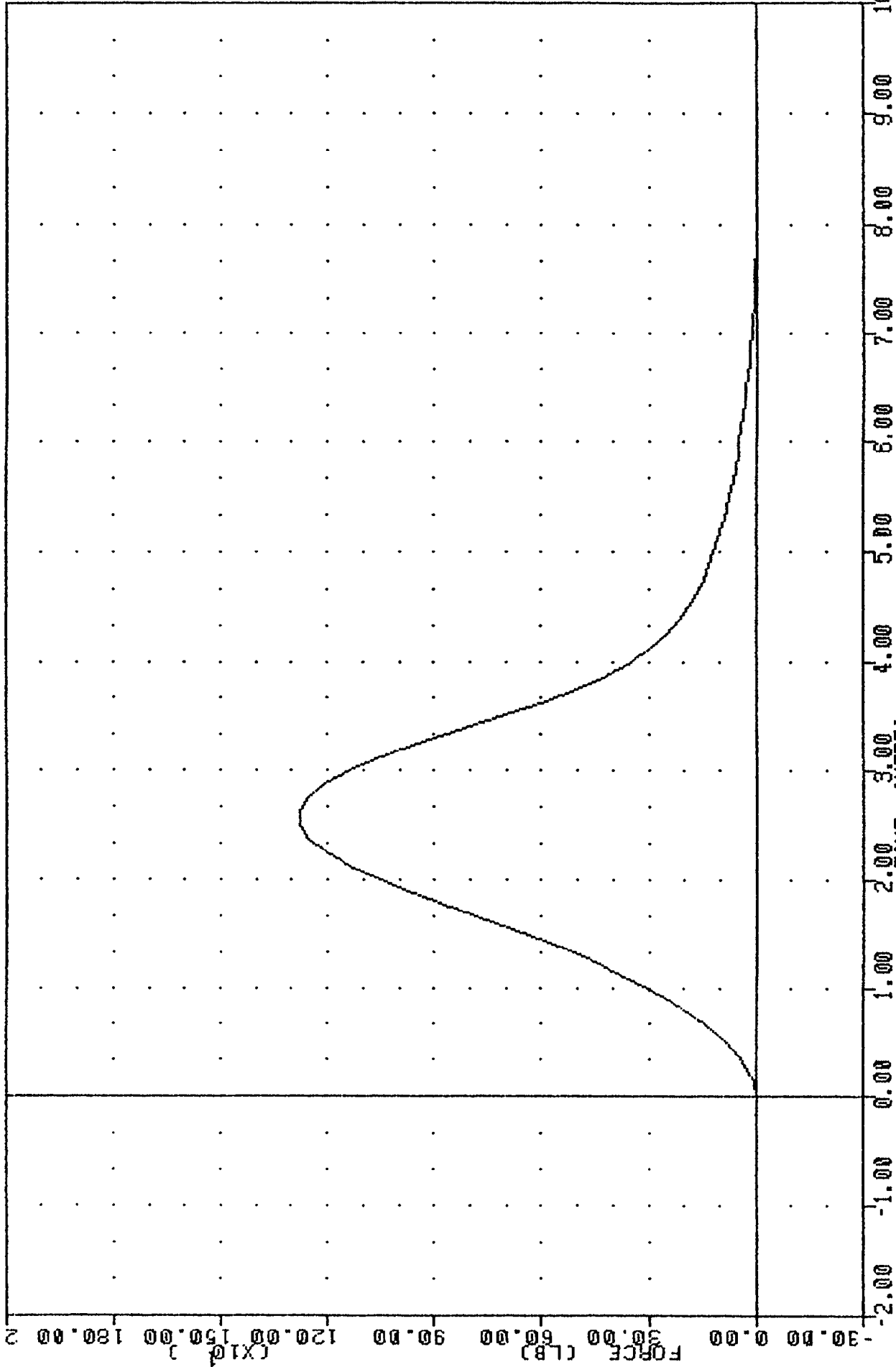


PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENULTIMATE DECELERATION (G) LB-ENCL

572E SN142 L.KNEE 11LB CAL 08
 91344
 PENXF

FILTER = BLPP 1000/ 3162/ -40
 MIN. MAX VALUES = -0.13, 1275.77 @ 2.63



PART 572-E HYBRID III LEFT KNEE CALIBRATION
 PENNIIIM FORCE (11 1B PENN)

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

10-DEC-91

RIGHT KNEE

TRC

142C8RK1

572E SN142 R.KNEE 11LB CAL 08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	43.0 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1238.92 LBS
PROBE WEIGHT	11.0 LBS	

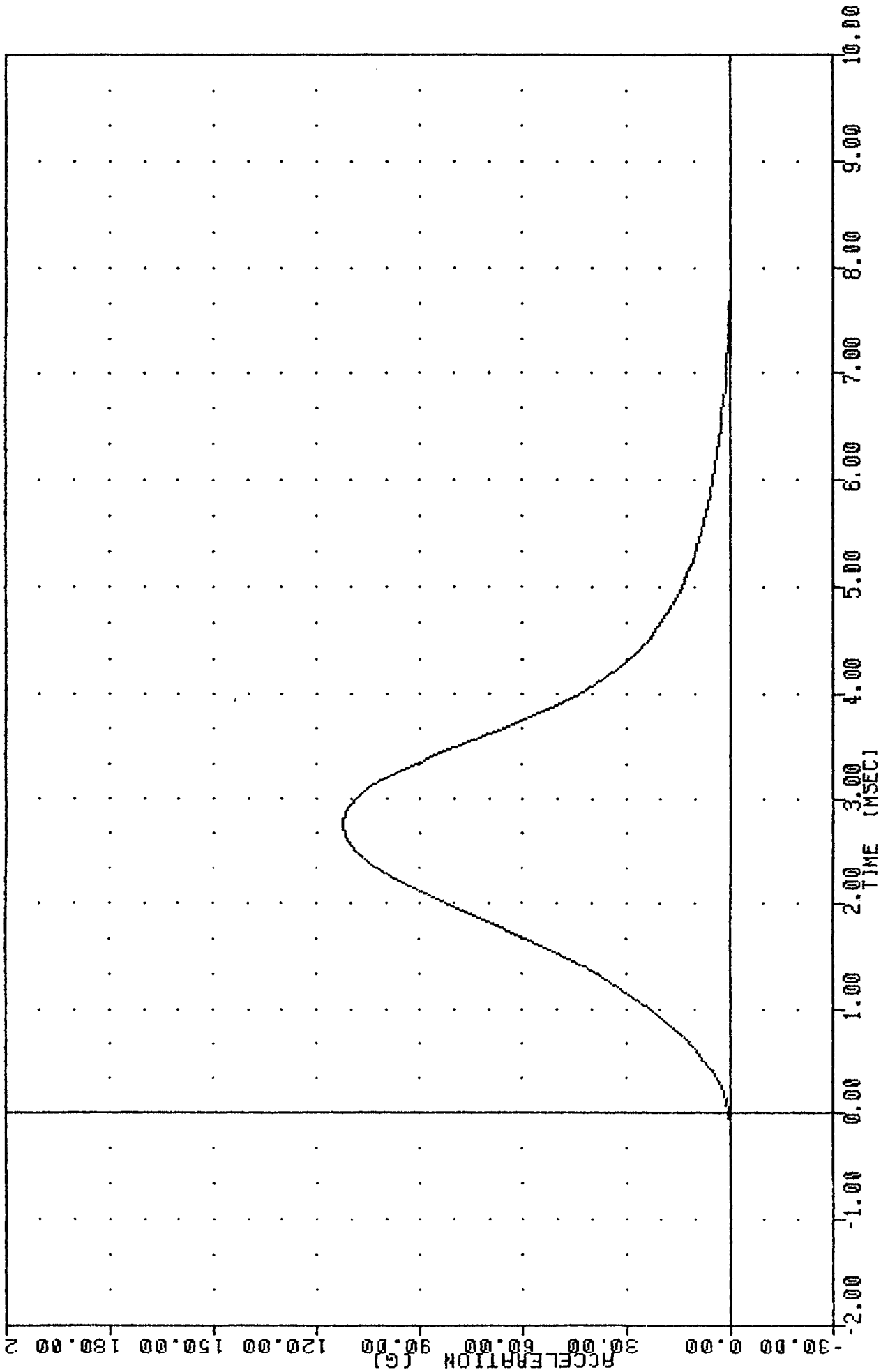
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

572E SN142 R.KNEE 111B CAL 00
 91344
 PENXG

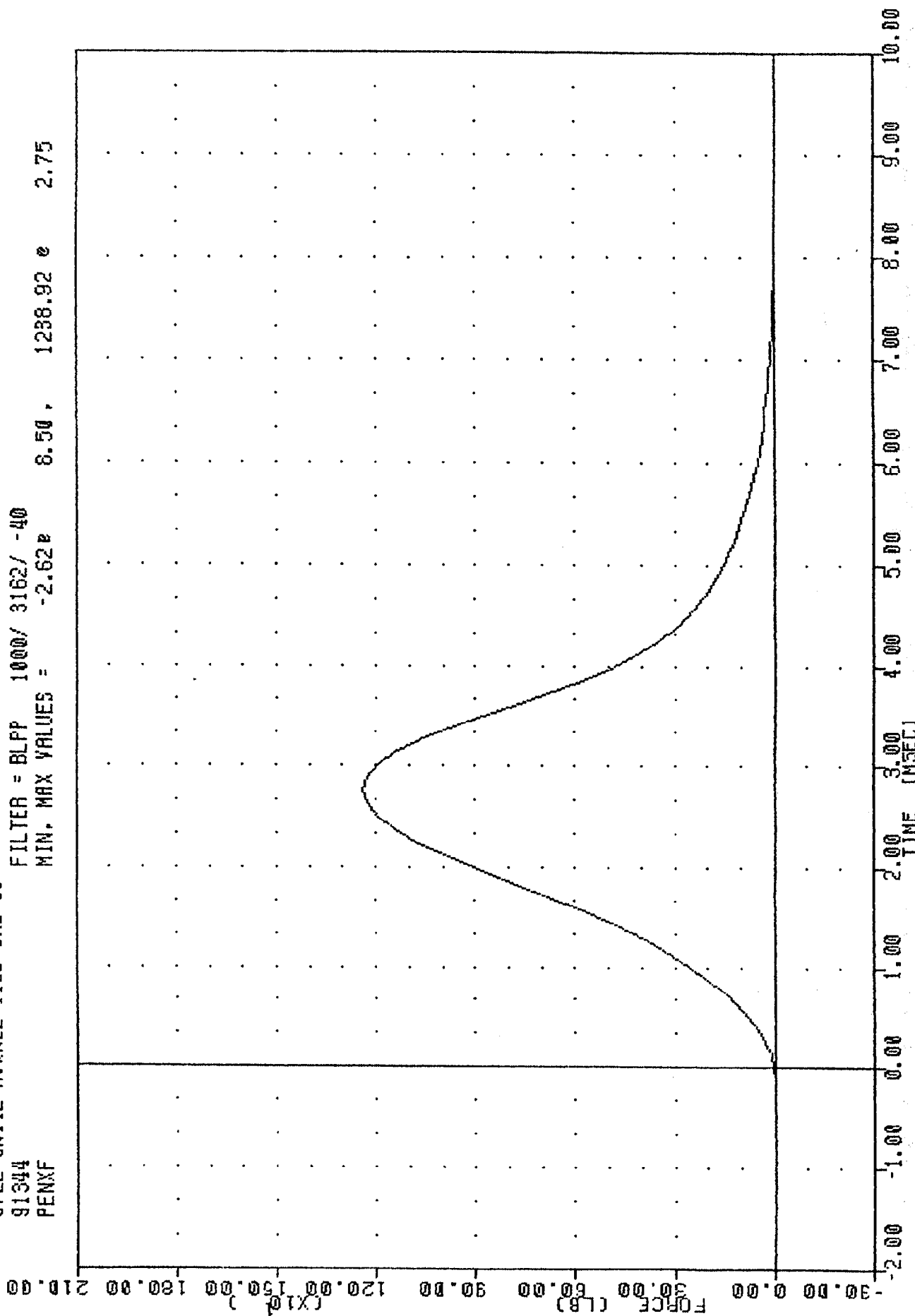
FILTER = BLPP 1000/ 3162/ -40
 MIN, MAX VALUES = -0.248 8.50, 112.63 2.75



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
 PENNIIIM RECALIBRATION (11 IR PENN.)

TRC
572E SN142 R.KNEE 11LB CAL 00
91344
PENXF

FILTER = BLPP 1000/ 3162/ -40
MIN. MAX VALUES = -2.62 8.50 1238.92 2.75



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENX UN-FOUR (11 LP-PEN)

PRE-TEST CERTIFICATION DATA

PASSENGER DUMMY S/N: 192

TRANSPORTATION RESEARCH CENTER OF OHIO
HYBRID III EXTERNAL DIMENSIONS
192 HUMANOID

12-DEC-91

TRC 192C6ED1 572E SN192 EXT. DIMENSION CAL06

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
TEMPERATURE			71.0 DEG. F
RELATIVE HUMIDITY			44.0 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)		16.9-17.1 IN	17.0 IN
LOCATION FOR WAIST CIRCUMFERENCE (BB)		8.9- 9.1 IN	9.0 IN
CHEST CIRCUMFERENCE (Y)		38.2-39.4 IN	38.7 IN
WAIST CIRCUMFERENCE (Z)		32.9-34.1 IN	33.4 IN
CHEST DEPTH (O)		8.4- 9.0 IN	8.6 IN
H-POINT HEIGHT (C)		3.3- 3.5 IN	3.4 IN
H-POINT FROM SEATBACK (D)		5.3- 5.5 IN	5.4 IN
SKULL CAP TO BACKLINE (H)		1.6- 1.8 IN	1.7 IN
TOTAL SITTING HEIGHT (A)		34.6-35.0 IN	34.8 IN
THIGH CLEARANCE (F)		5.5- 6.1 IN	5.8 IN
BUTTOCK KNEE LENGTH (K)		22.8-23.8 IN	23.7 IN
BUTTOCK POPLITEAL LENGTH (N)		17.8-18.8 IN	18.6 IN
POPLITEAL HEIGHT (L)		16.9-17.9 IN	17.7 IN
KNEE PIVOT HEIGHT (M)		19.1-19.7 IN	19.4 IN
FOOT LENGTH (P)		9.9-10.5 IN	10.2 IN
FOOT BREADTH (W)		3.6- 4.2 IN	4.0 IN
SHOULDER PIVOT FROM BACKLINE (E)		3.3- 3.7 IN	3.6 IN
SHOULDER BREADTH (V)		16.6-17.2 IN	16.8 IN
SHOULDER PIVOT HEIGHT (B)		19.9-20.5 IN	20.2 IN
ELBOW REST HEIGHT (J)		7.5- 8.3 IN	8.1 IN
SHOULDER-ELBOW LENGTH (I)		13.0-13.6 IN	13.4 IN
BACK OF ELBOW TO WRIST PIVOT (G)		11.4-12.0 IN	11.6 IN

TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

12-DEC-91

TRC

192C6HD1

572E SN192 HEAD DROP CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	46.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	226.48 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.60 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

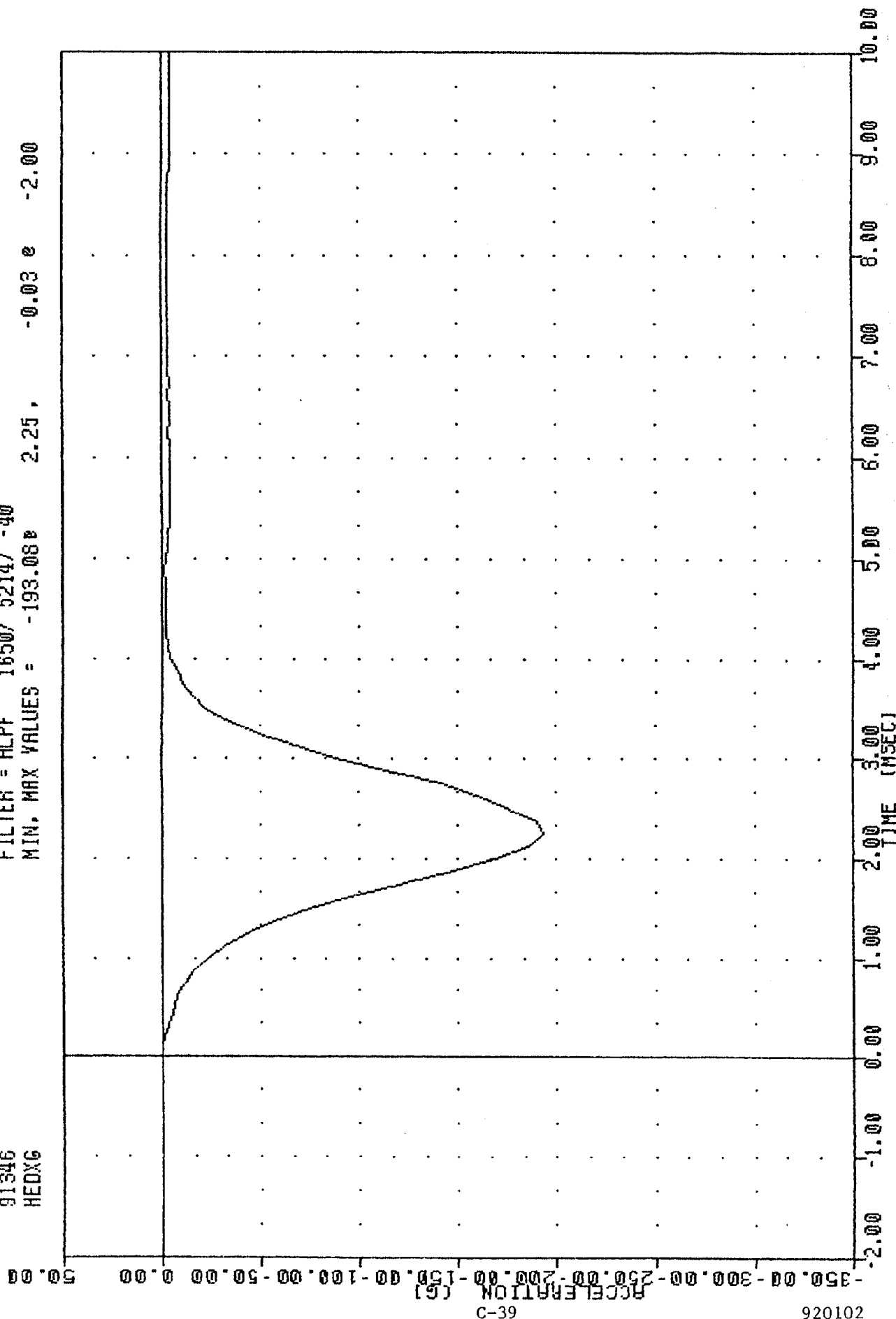
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRC , 192C6H01
 572E SN192 HEAD DROP CAL 06
 91346
 HEDXG

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -193.08e 2.25, -0.03 e -2.00



572E SN192 HEAD DROP CAL 06

91346

HEDYG

FILTER = ALPF 1650/ 5214/ -40

MIN. MAX VALUES = -3.60e

2.63.

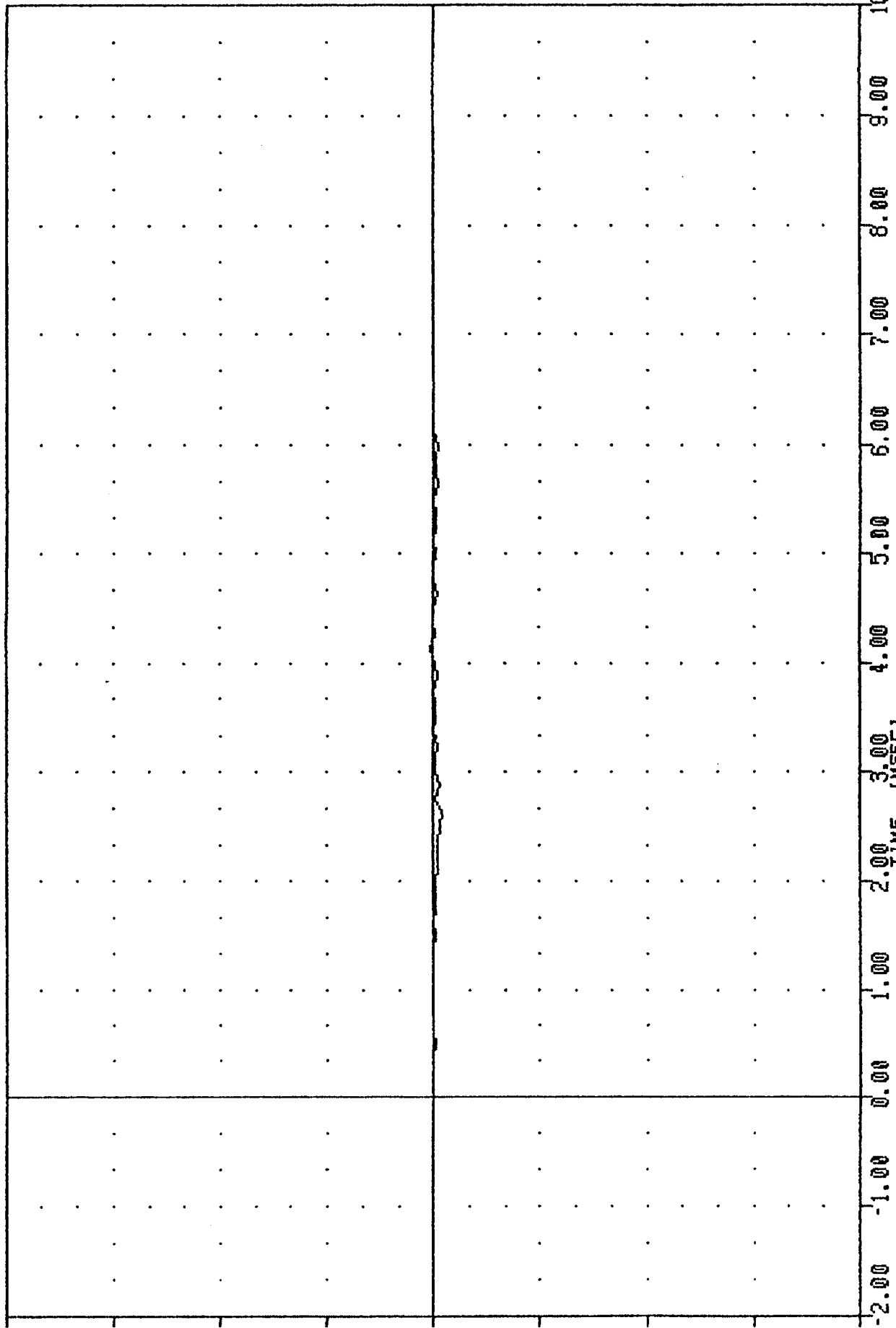
0.90 e

4.13

ACCELERATION (G)

C-40

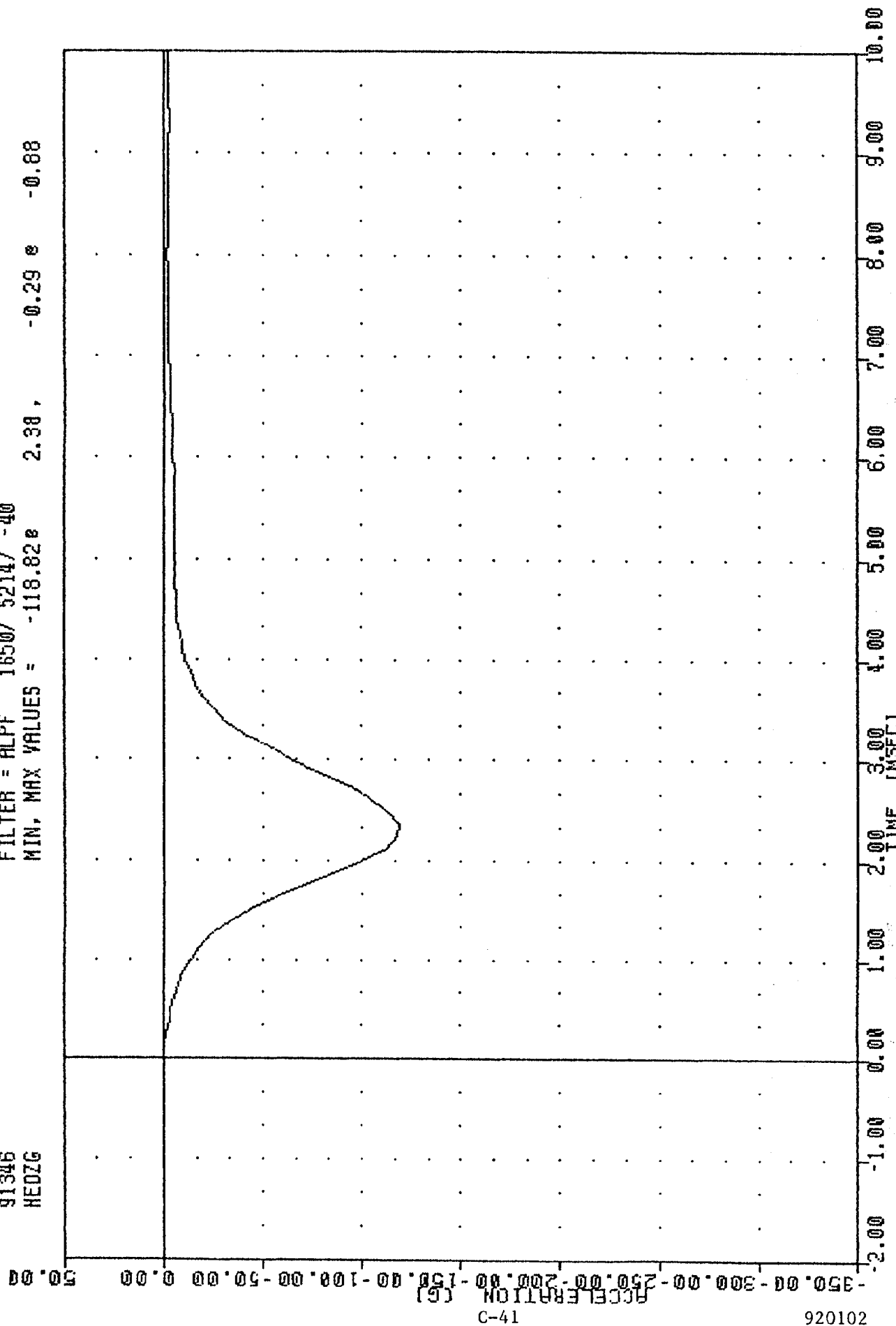
920102



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

TRC , 19206H01
 572E 3N192 HEAD DADP CAL 06
 91346
 HEDZG

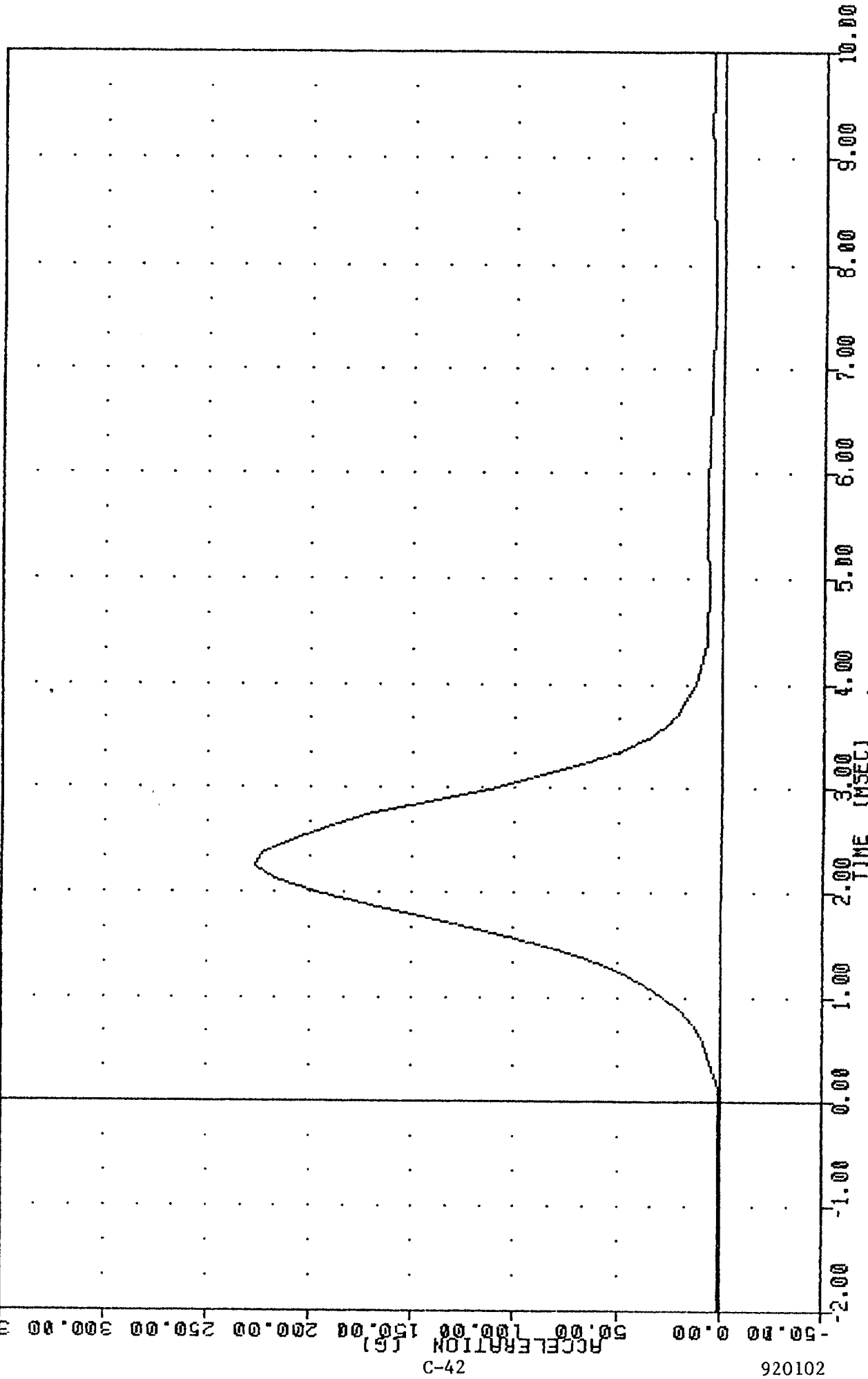
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -118.82e 2.38 , -0.29 e -0.88



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

572E SN192 HEAD DRDP CAL 06
 91346
 HEDRG

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.298 -0.88, 226.48 2.25



PART 572-E HYBRID III HEAD CALIBRATION
 HEAD RESONANT ACCELERATION

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

13-DEC-91

6 AXIS NECK TRANSDUCER
TRC 192C6NF1

572E SN192 NECK FLEXION CAL06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	56.0 %
IMPACT VELOCITY	22.6-23.4 FT/SEC	23.08 FT/SEC
PENDULUM	10 MS 22.50 - 27.50 G	24.73 G
DECELERATION	20 MS 17.60 - 22.60 G	18.66 G
	30 MS 12.50 - 18.50 G	15.00 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	15.01 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	38.88 MS
D PLANE	MAX 64 - 78 DEG.	76.27 DEG.
ROTATION	TIME 57 - 64 MS	60.88 MS
MOMENT ABOUT OCCIPITAL	MAX 65 - 80 FT. LBS	69.13 FT. LBS
CONDYLE	TIME 47 - 58 MS	52.75 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	119.13 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	103.25 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

572E SN192 NECK FLEXION CAL06

91347

PENXG

FILTER = BLPP 100/ 317/ -40

MIN. MAX VALUES = -3.49 44.75 25.46 8.25

35.00

30.00

25.00

20.00

15.00

10.00

5.00

0.00

-5.00

-10.00

-15.00

-20.00

-25.00

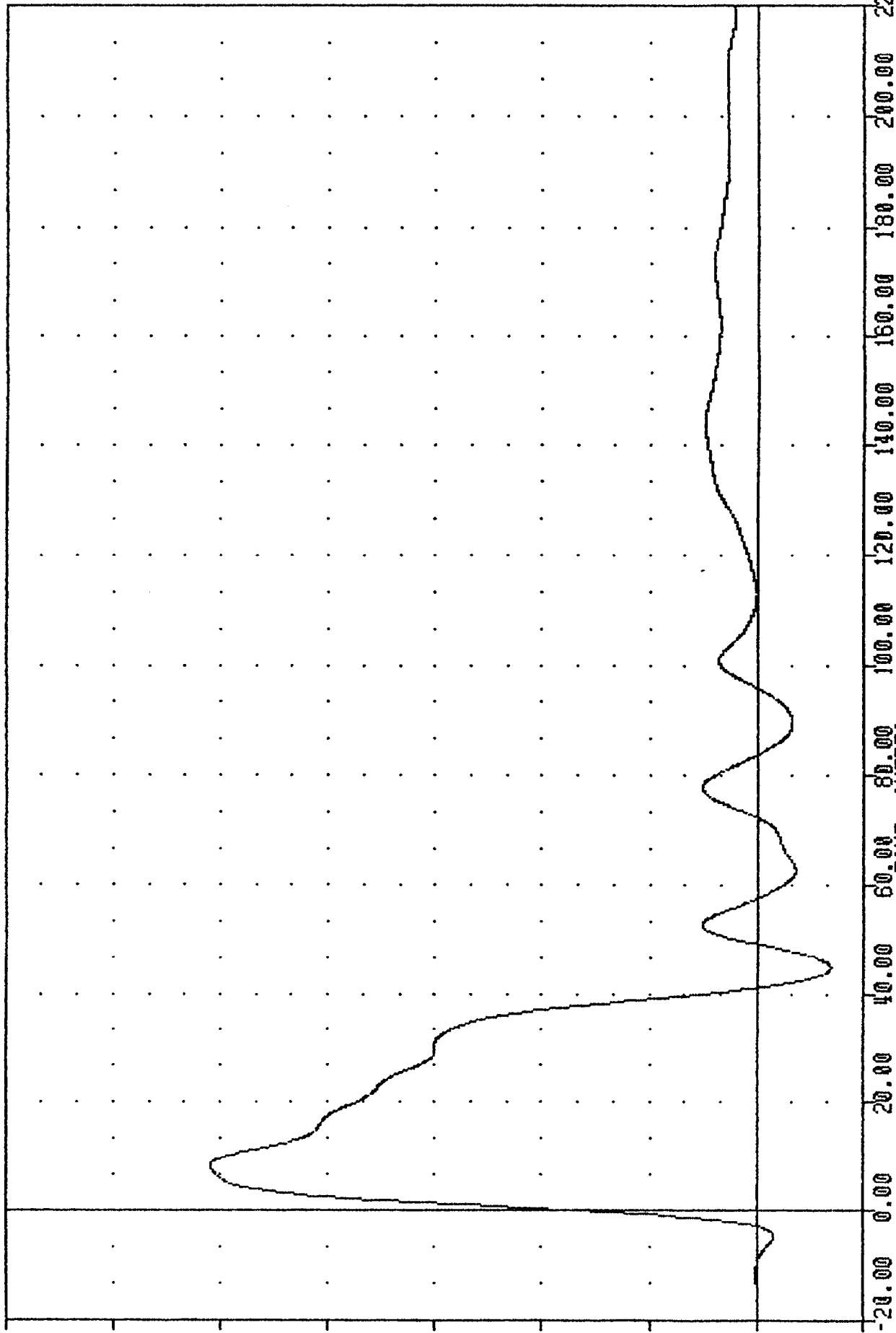
-30.00

-35.00

ACCELERATION (G)

C-44

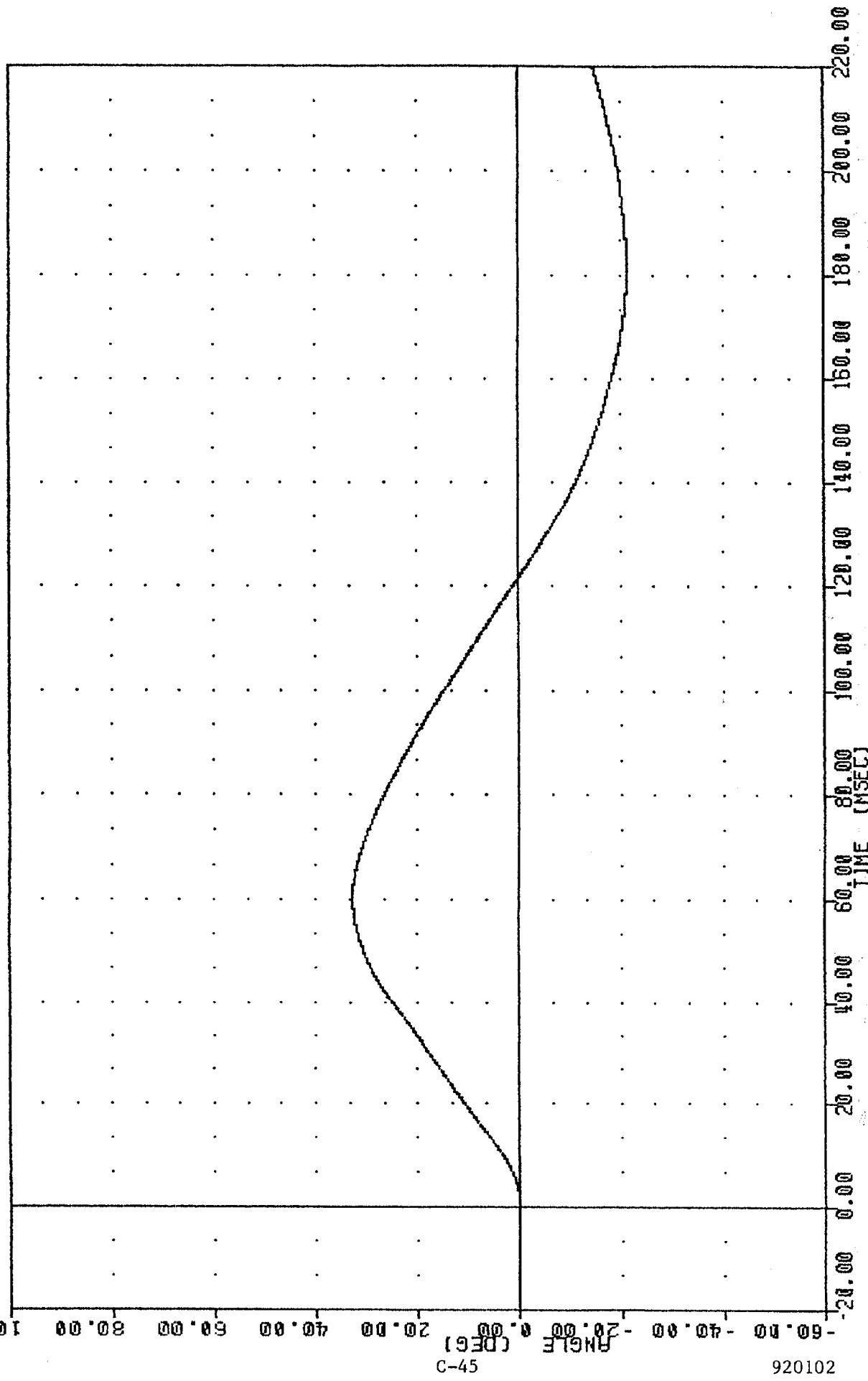
920102



PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

TRC , 19206MF1
 572E SN192 NECK FLEXION CAL06
 91347
 BETA

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -21.36 181.38 32.68 60.50



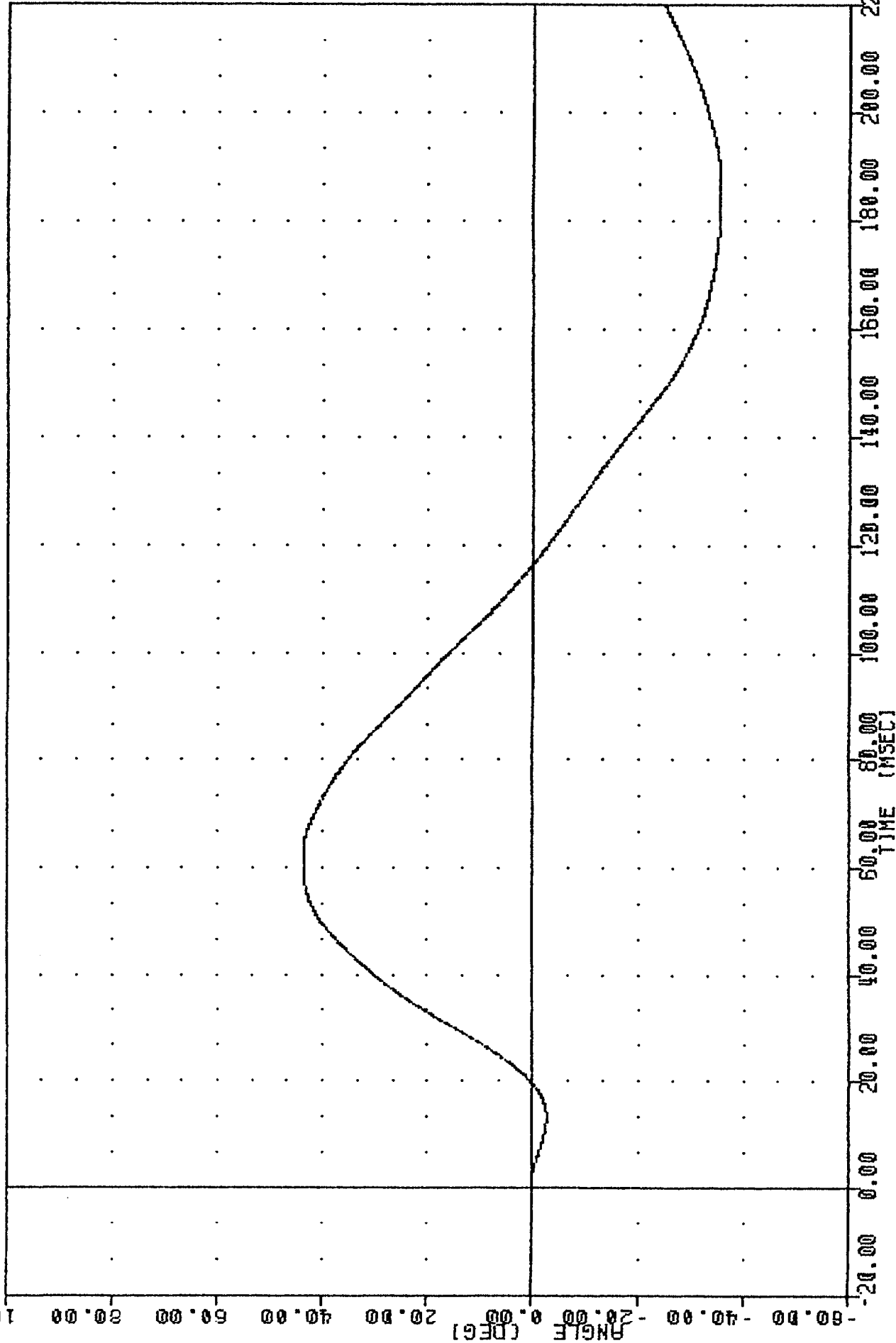
920102

C-45

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

572E SN192 NECK FLEXION CAL08
 91347
 THETA

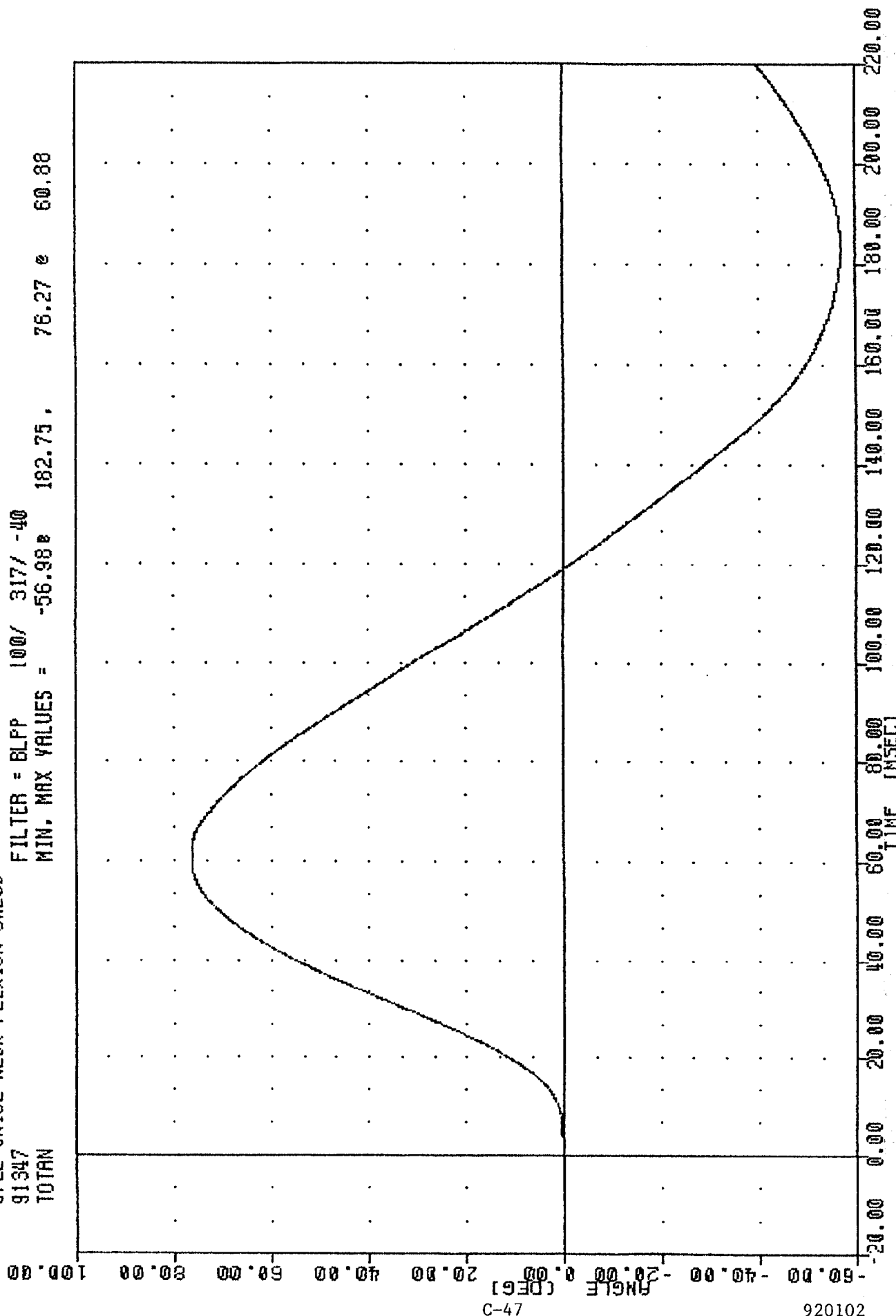
FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -35.628 185.13, 43.59 61.25



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

TRC , 192C6NF1
 572E SN192 NECK FLEXION CAL06
 91347
 TOTAN

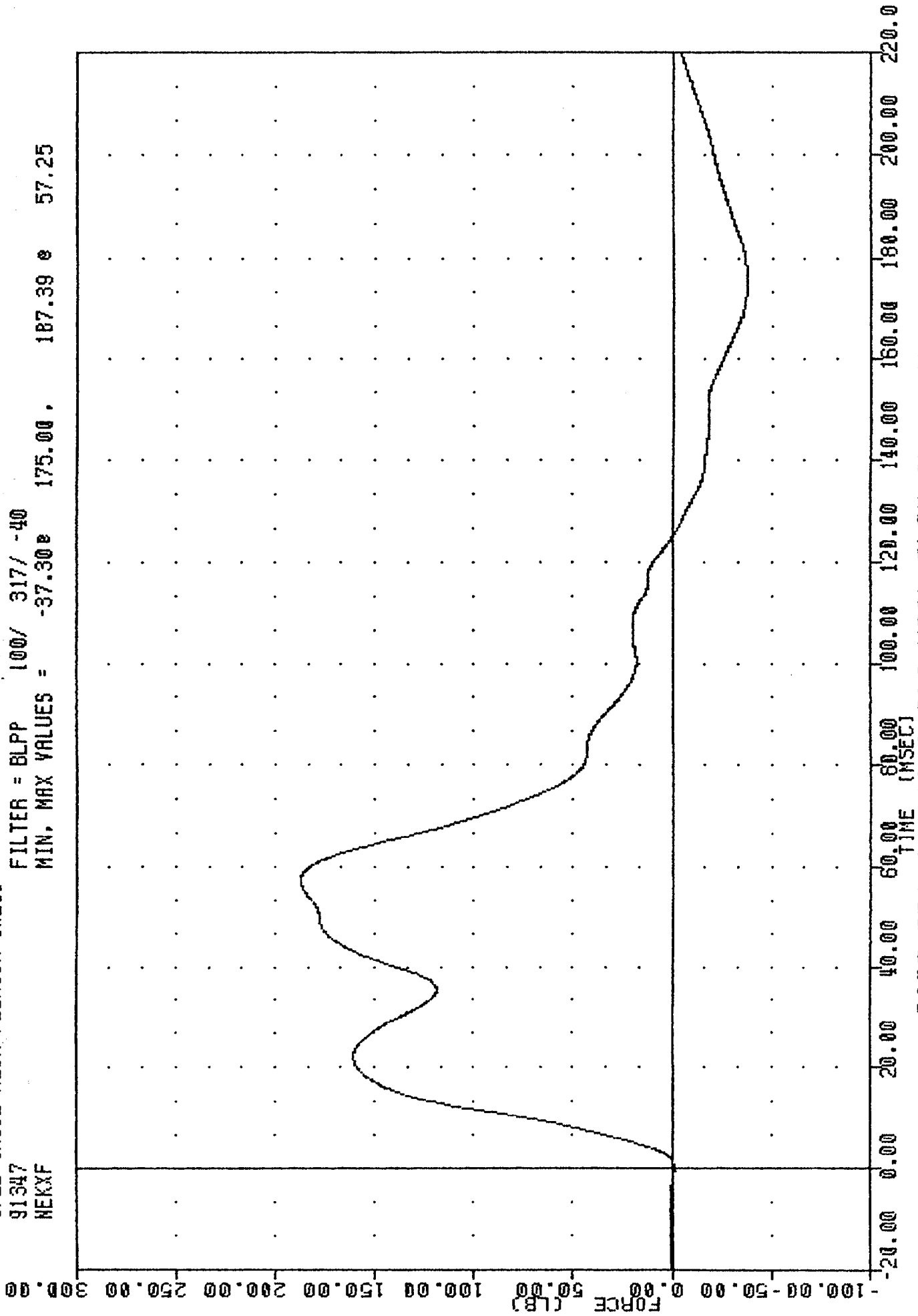
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -56.98 182.75 , 76.27 e 60.88



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 TOTAL ROTATION

572E SN102 NECK FLEXION CAL06
91347
NEKXF

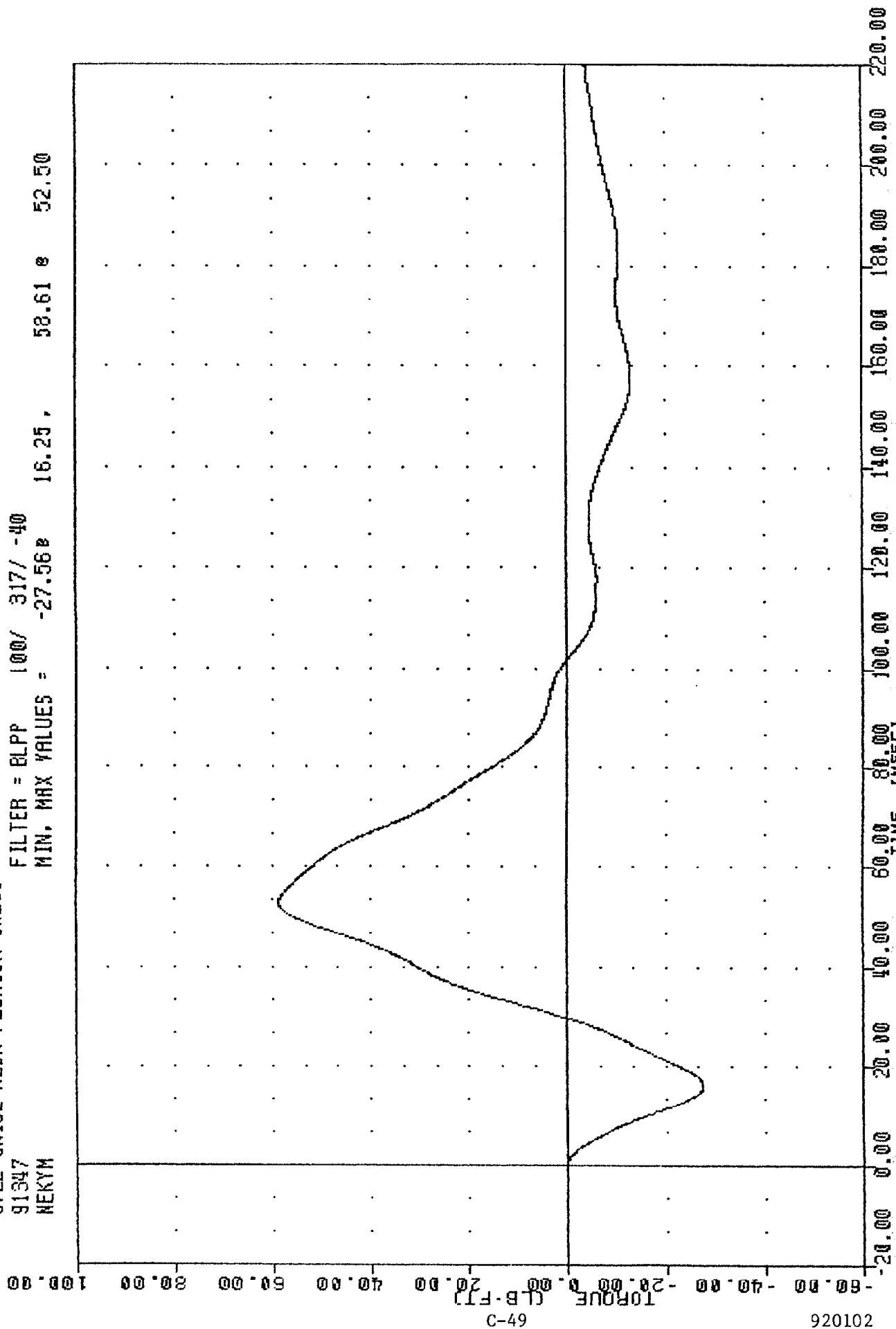
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -37.30e 175.00, 187.39 e 57.25



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

TRC , 192C6NF1
 572E 9N192 NECK FLEXION CAL06
 91347
 NEKYM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -27.56 16.25 , 58.61 52.50

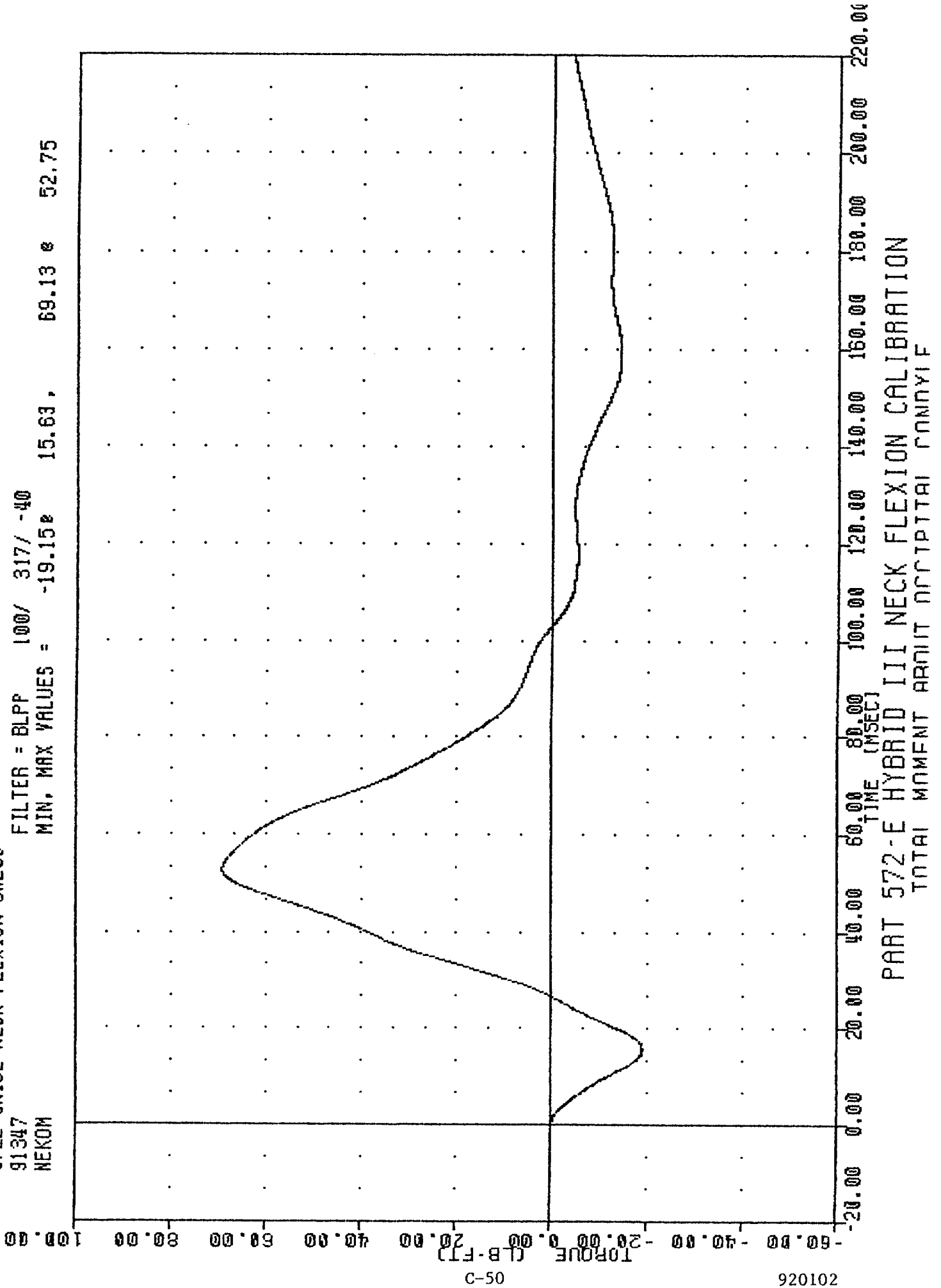


PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT AXIS

572E SN192 NECK FLEXION CAL06
 91347
 NEKOM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -19.15e 69.13 e 52.75



TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

13-DEC-91

6 AXIS NECK TRANSDUCER
TRC 192C6NE1

572E SN192 NECK EXT. CAL06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	56.0 %
IMPACT VELOCITY	19.50-20.30 FT/SEC	19.83 FT/SEC
PENDULUM	10 MS 17.20 - 21.20 G	17.74 G
DECELERATION	20 MS 14.00 - 19.00 G	16.08 G
	30 MS 11.00 - 16.00 G	12.46 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	12.42 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	43.25 MS
D PLANE	MAX 81 - 106 DEG.	105.93 DEG.
ROTATION	TIME 72 - 82 MS	81.00 MS
MOMENT ABOUT OCCIPITAL	MIN -59.0/-39.0 FT. LBS	-51.73 FT. LBS
CONDYLE	TIME 65 - 79 MS	76.13 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	165.88 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	146.88 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

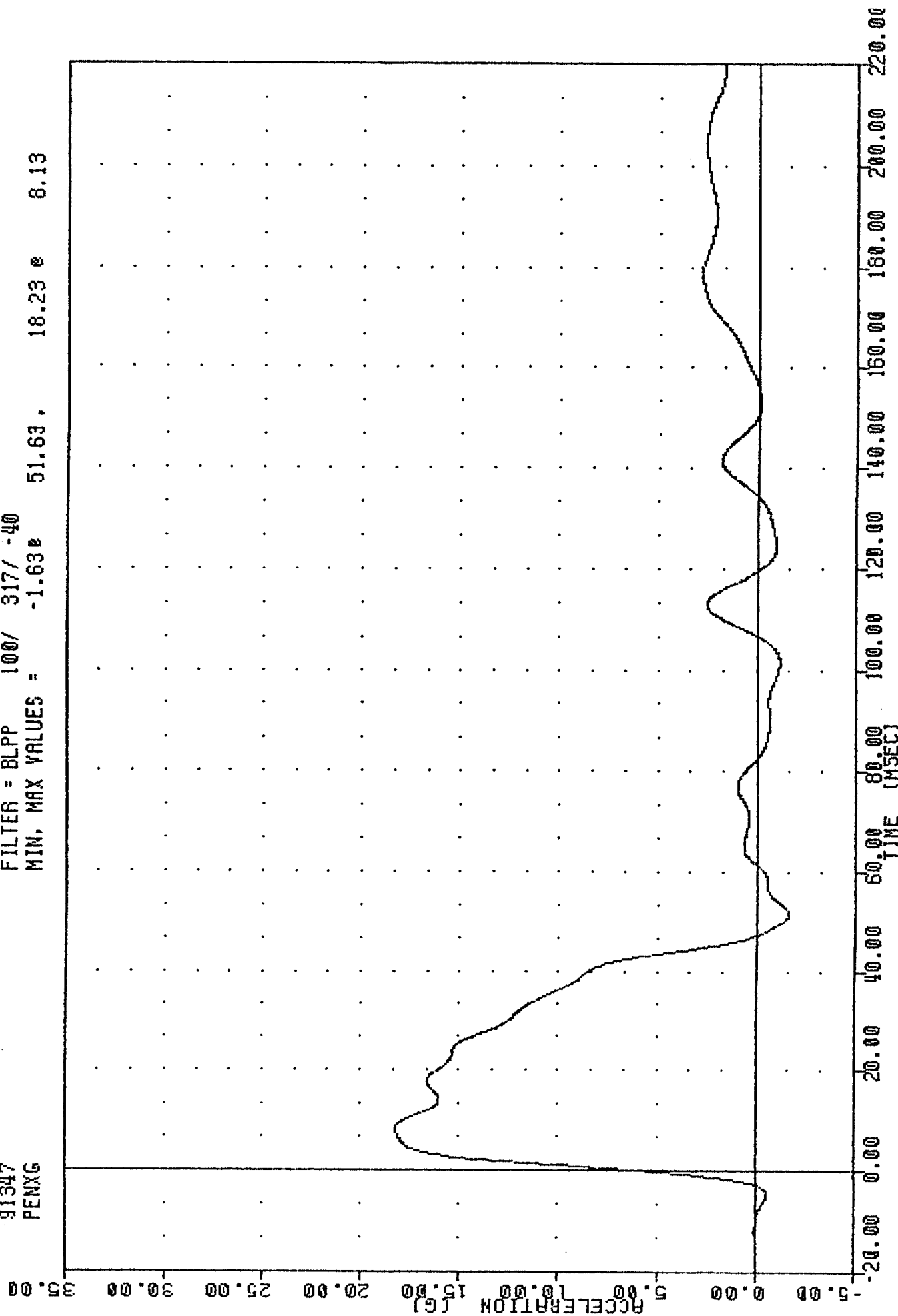
572E SN192 NECK EXT. CAL06

91347

PENXG

FILTER = BLPP 100/ 317/ -40

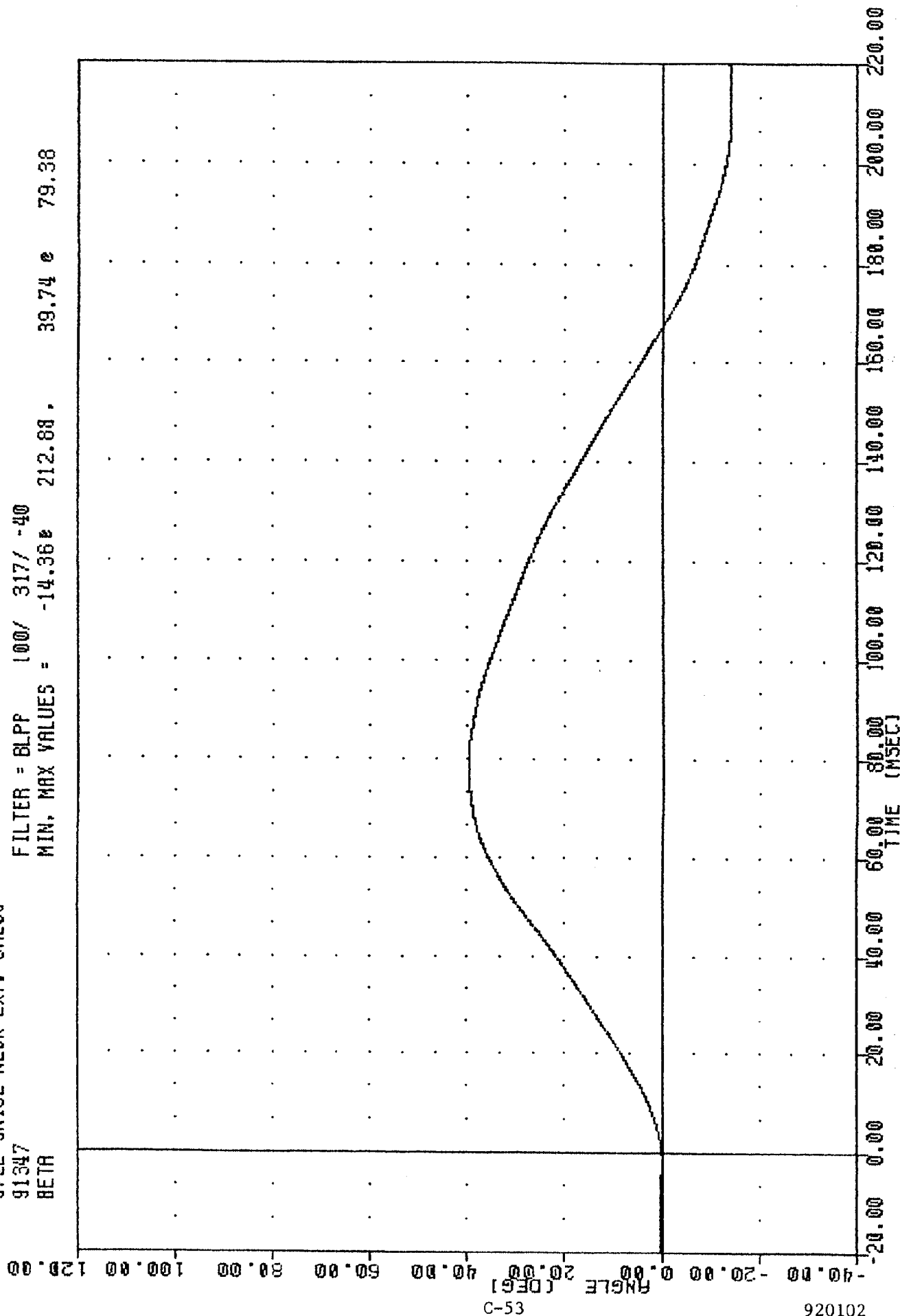
MIN. MAX VALUES = -1.63e 51.63, 18.23 e 8.13



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION

TRC
572E 3N192 NECK EXT. CAL06
91347
BETA

FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -14.36e 212.88. 39.74 e 79.38



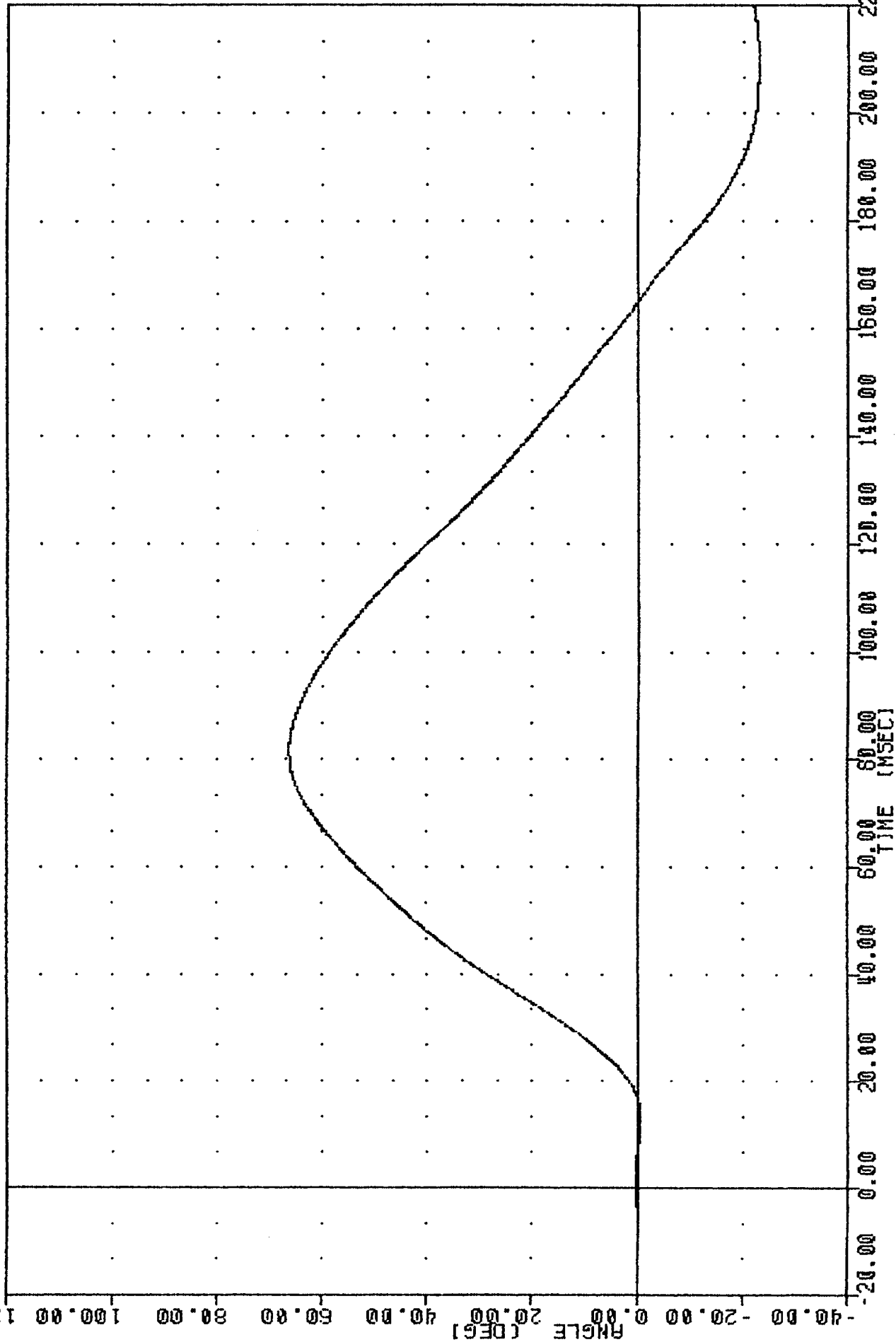
C-53

920102

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

572E SN192 NECK EXT. CAL08
 91347
 THETA

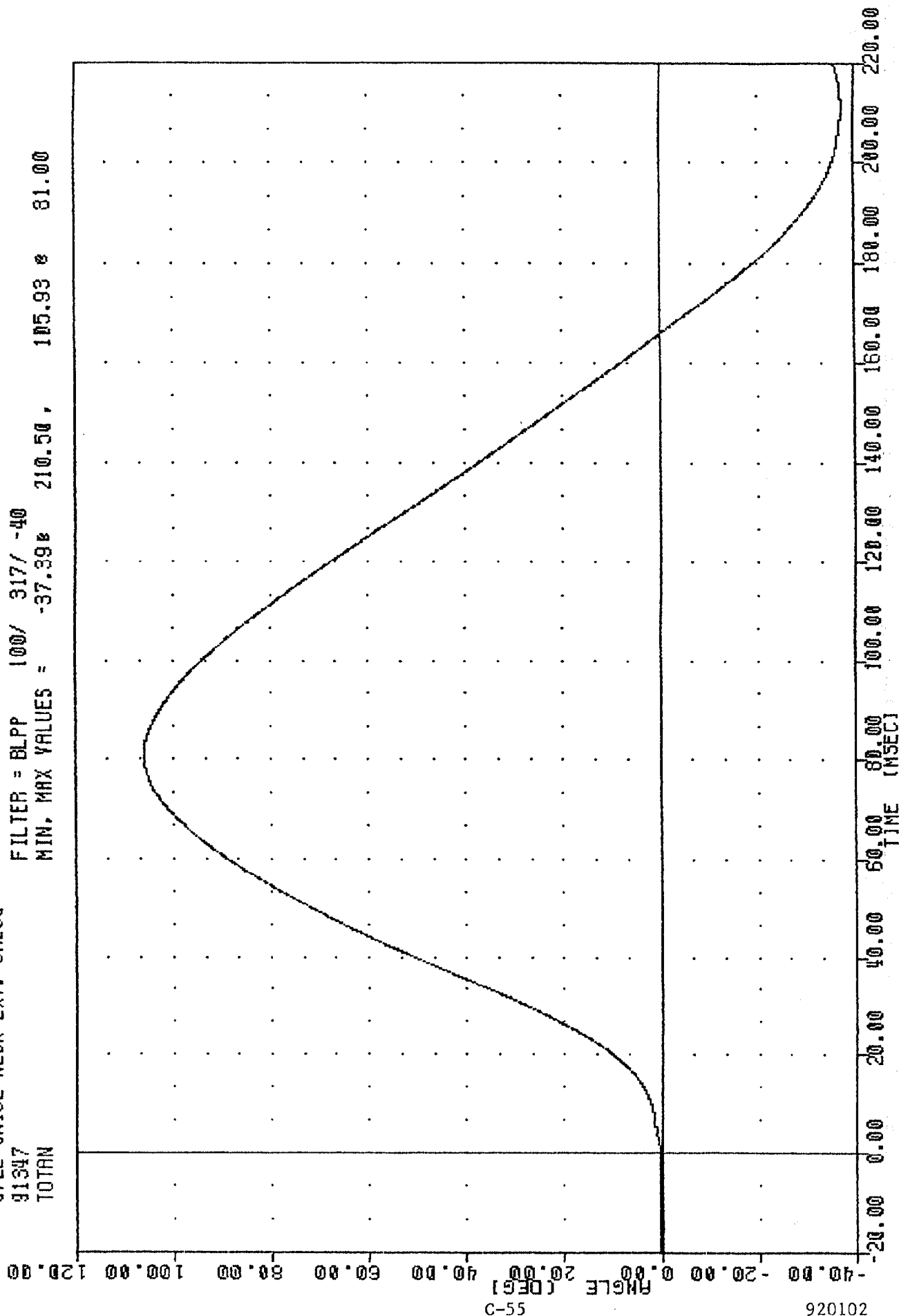
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -23.07° 209.63, 86.23 ° 81.75



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

TRC , 19206NE1
 572E SN192 NECK EXT. CAL06
 91347
 TOTAN

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -37.39% 210.50 , 105.93 % 81.00



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL ROTATION

572E SN192 NECK EXT. CAL06

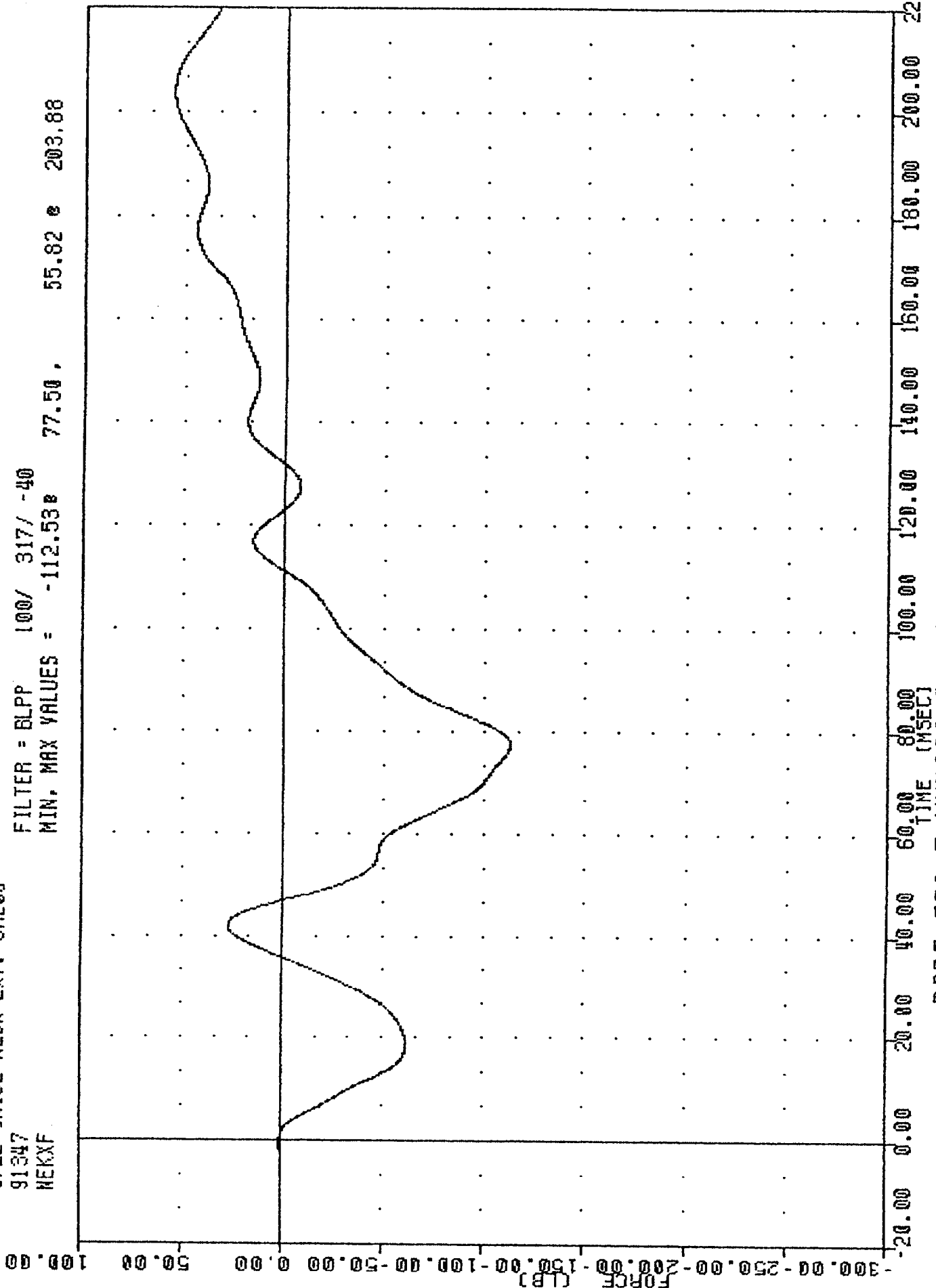
91347

HEKXF

FILTER = BLPP 100/ 317/ -40

MIN. MAX VALUES = -112.53 77.50 ,

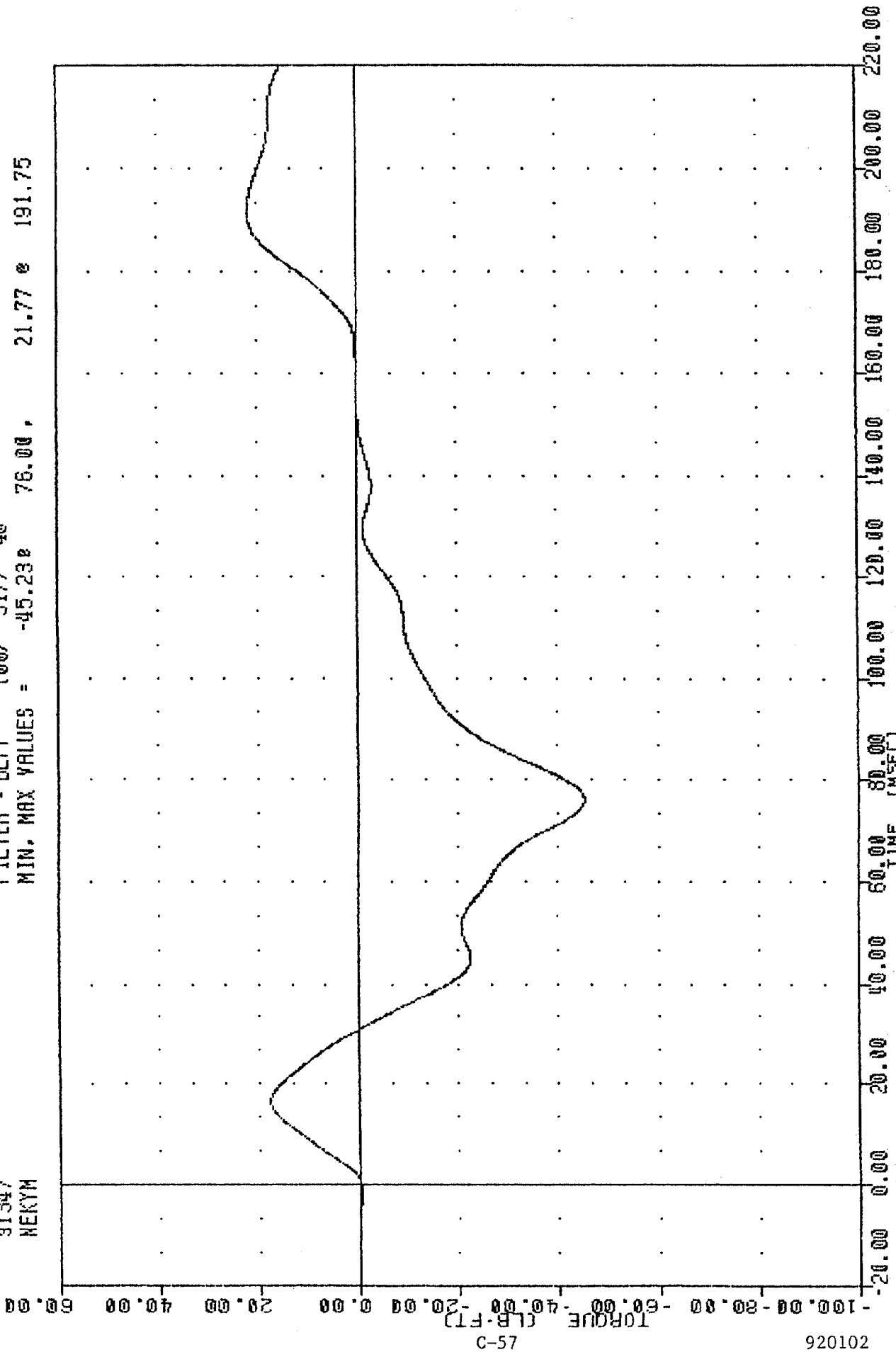
55.82 @ 203.88



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

TRC , 19205NE1
 572E SN192 NECK EXT. CAL06
 91347
 NEKYM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -45.232 76.00, 21.77 191.75



920102

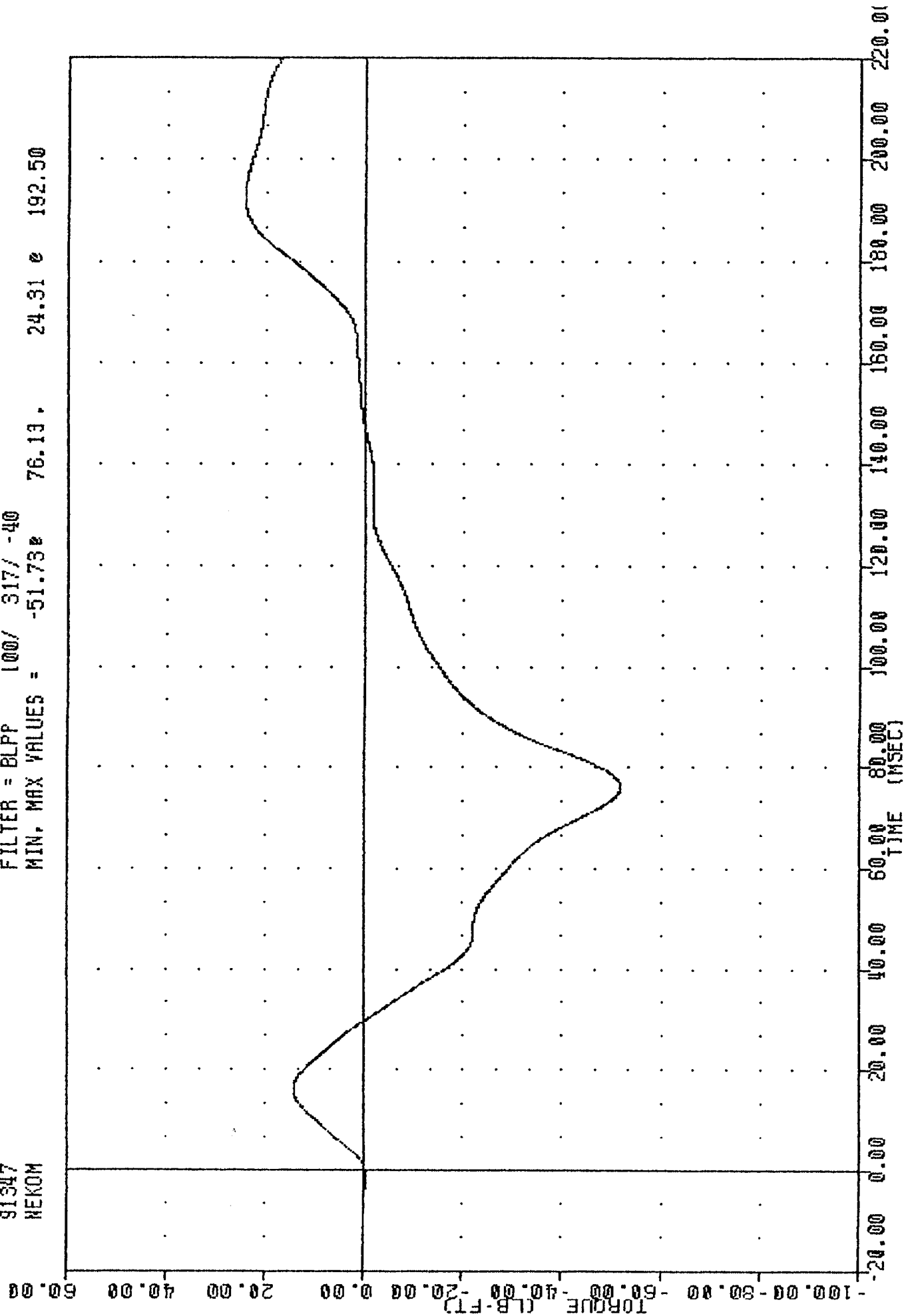
C-57

PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK MOMENT X AXIS

572E SN192 NECK EXT. CAL06
 91347
 HEKOM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -51.73 76.13 24.31 192.50



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

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

12-DEC-91

TRC

192C6TH1

572E SN192 H. S. THORAX CAL06

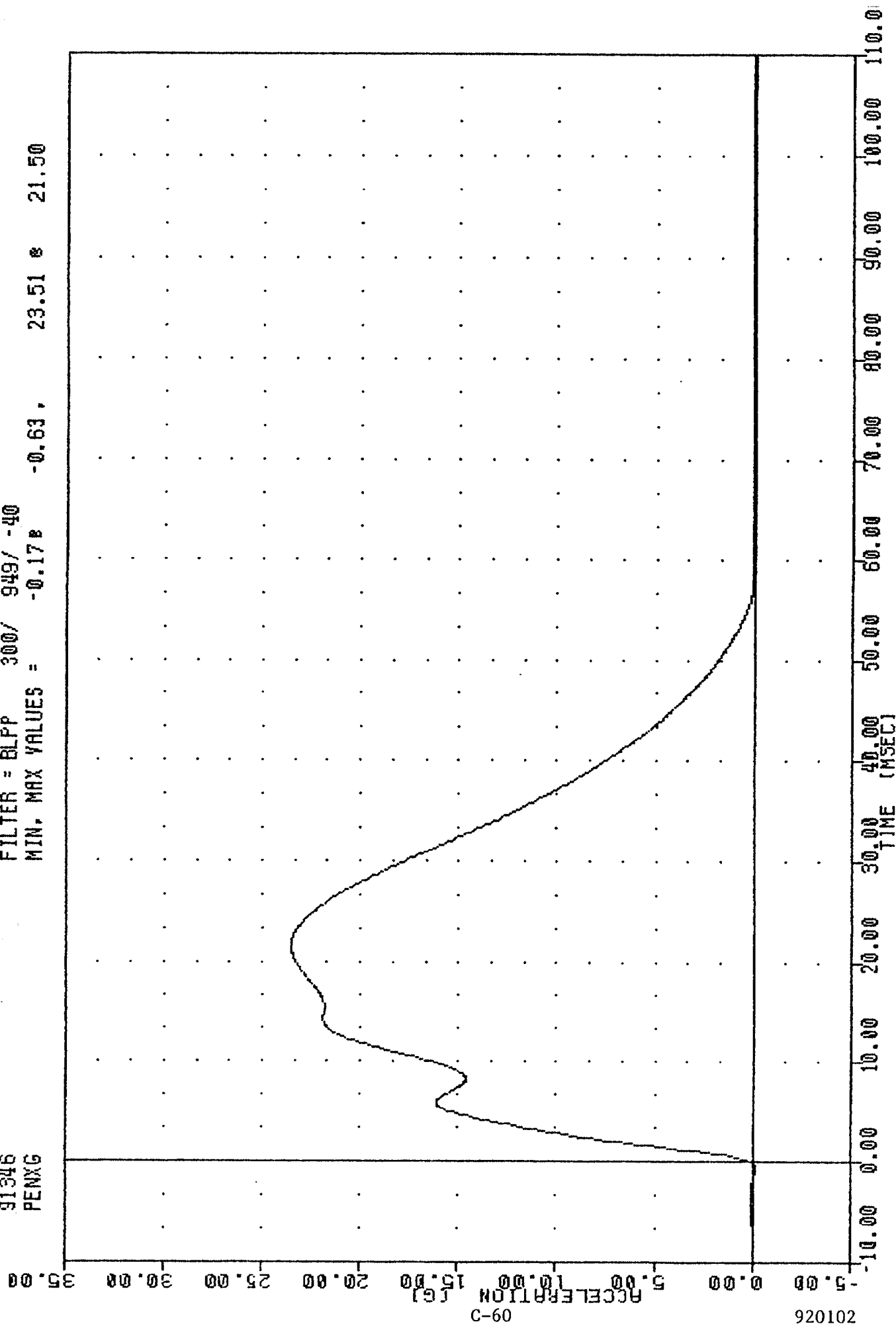
TEST PARAMETER	HIGH SPEED TEST	
	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	44.0 %
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 IN	2.81 IN
MAXIMUM RESISTIVE FORCE	1160 - 1325 LBS	1210.8 LBS
INTERNAL HYSTERESIS	69% - 85%	72.6%

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

572E SN192 H.S. THORAX CAL06
 91346
 PENXG

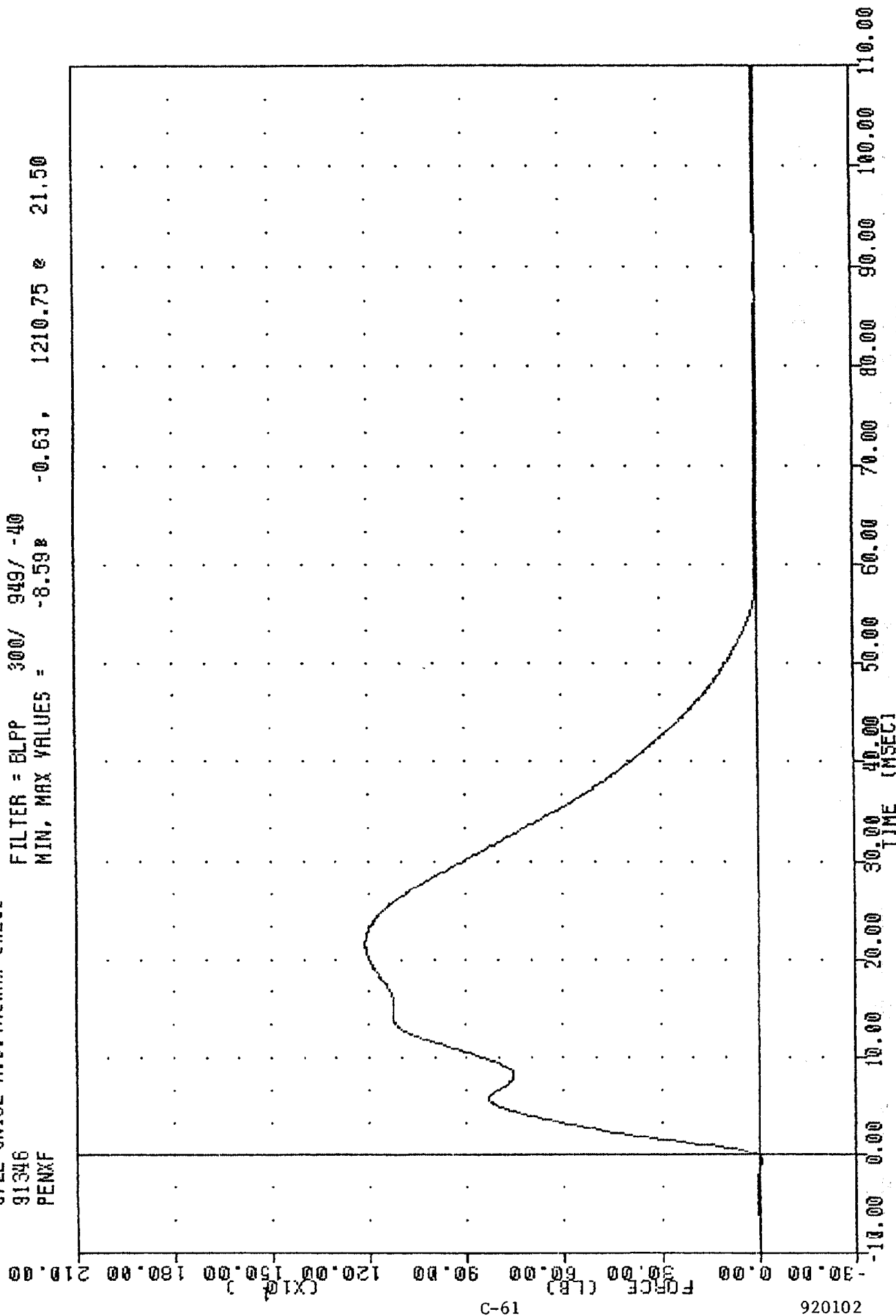
FILTER = BLPP 300/ 949/ -40
 MIN. MAX VALUES = -0.17 23.51 21.50



PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM DECELERATION

TRC , 19206TH1
 572E 3N192 H.S. THORAX CAL06
 91346
 PENXF

FILTER = BLPP 300/ 949/ -40
 MIN, MAX VALUES = -8.59% -0.63, 1210.75 e 21.50

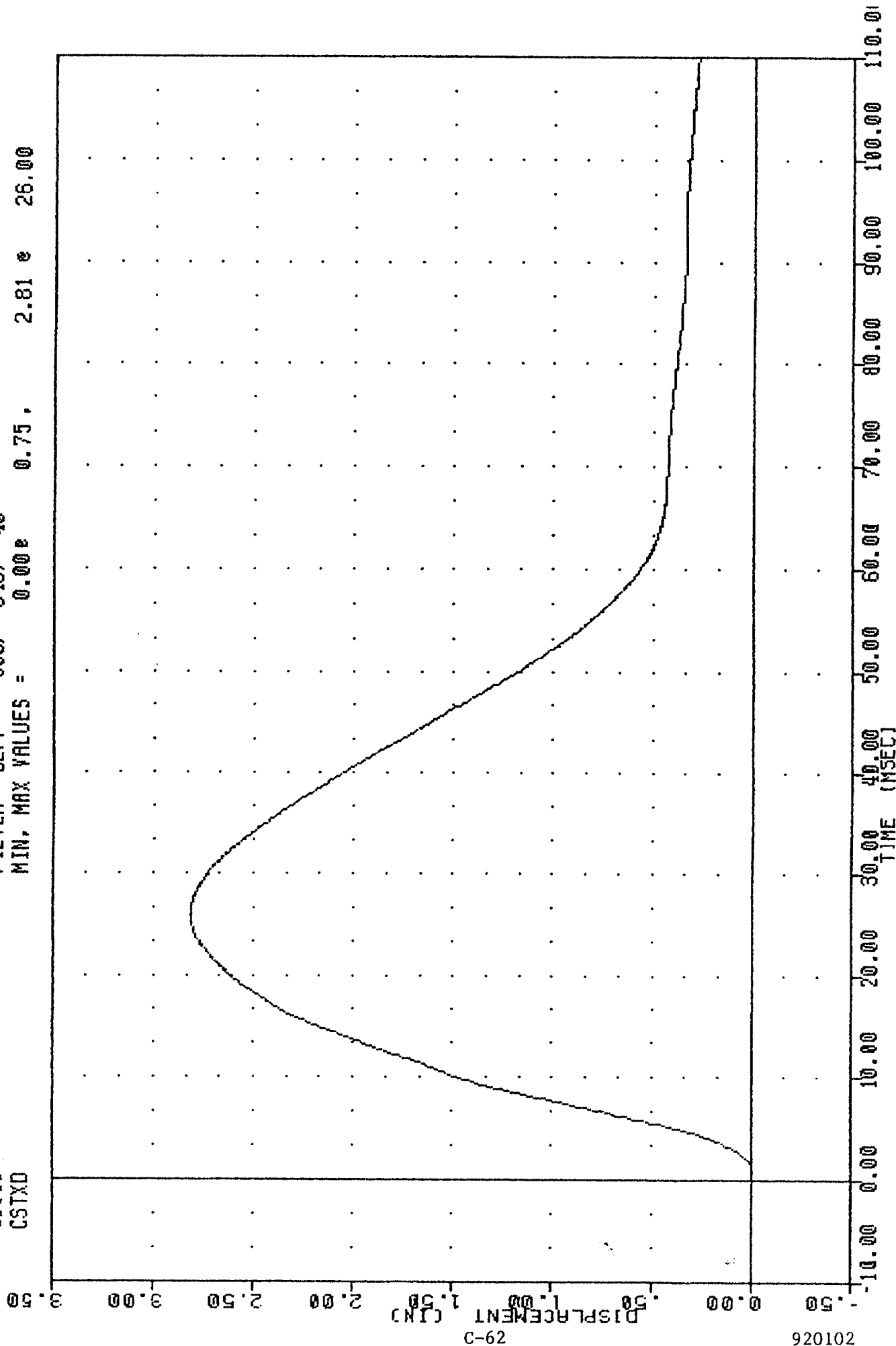


PART 572-E HYBRID III THORAX CALIBRATION

PENULTIMATE FORCE

INC
 572E SN192 H.S. THORAX CAL06
 91346
 CSTXD

FILTER = BLPP 300/ 949/ -40
 MIN. MAX VALUES = 0.00e 0.75. 2.81 e 26.00



PART 572-E HYBRID III THORAX CALIBRATION
 STERNIM NISPI AFMENT

TRC
 CSTXD
 PENXF

572E SN192 H.S. THORAX CAL06
 300/ 949/ -40 MIN. MAX =
 300/ 949/ -40 MIN. MAX =

91346
 0.00
 -8.59

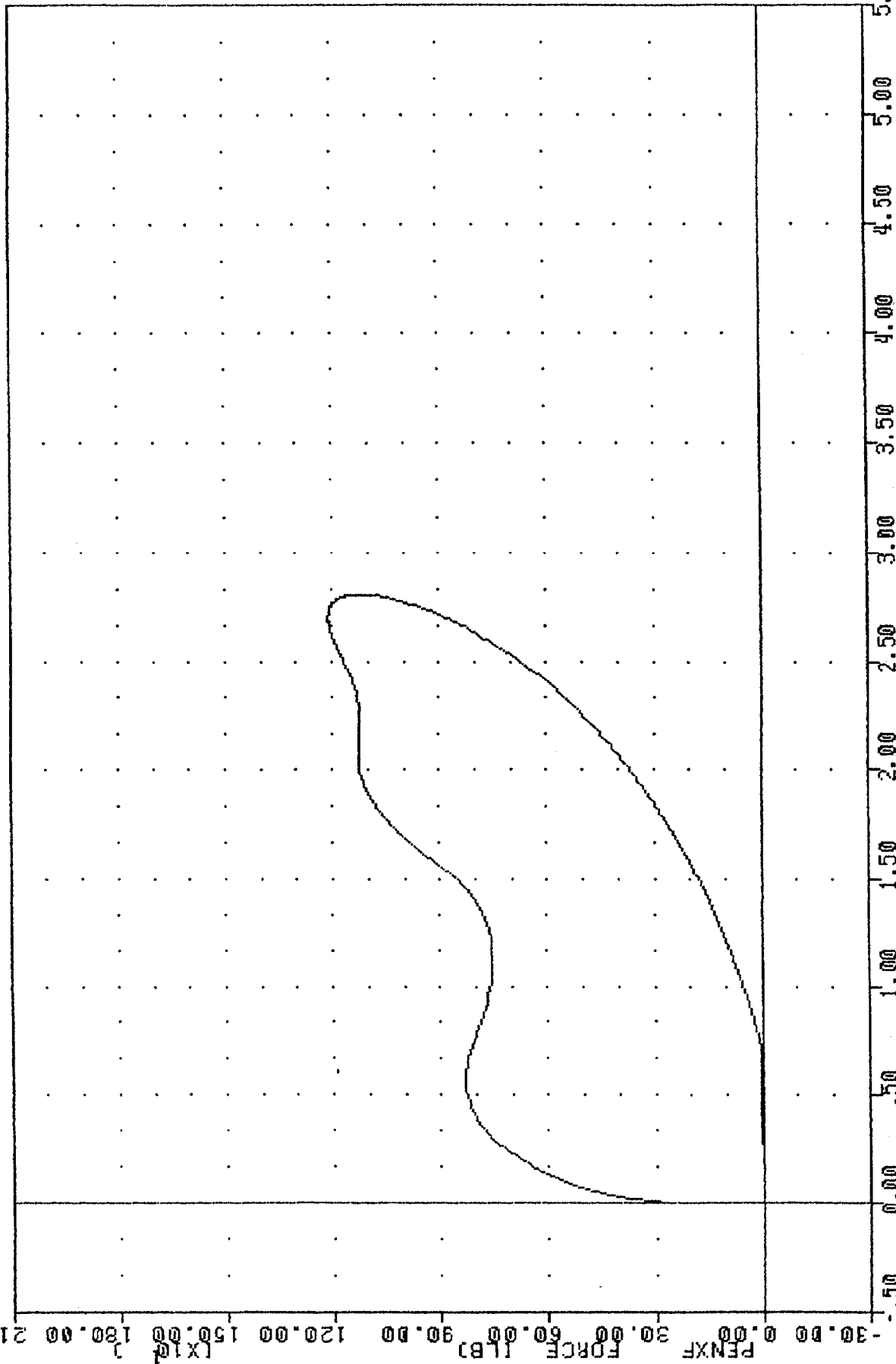
0.75;
 -0.63;

2.81
 1210.75

26.00
 21.50

-30.00
 -15.00
 0.00
 15.00
 30.00
 45.00
 60.00
 75.00
 90.00
 105.00
 120.00
 135.00
 150.00
 165.00
 180.00
 195.00
 210.00

C-63



920102

PART 572-E HYBRID III THORAX CALIBRATION
 C-63
 0.00
 0.50
 1.00
 1.50
 2.00
 2.50
 3.00
 3.50
 4.00
 4.50
 5.00
 5.50

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

13-DEC-91

LEFT KNEE

TRC

192C6LK1

572E SN192 L.KNEE 11LB CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	54.0 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.91 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1241.74 LBS
PROBE WEIGHT	11.0 LBS	

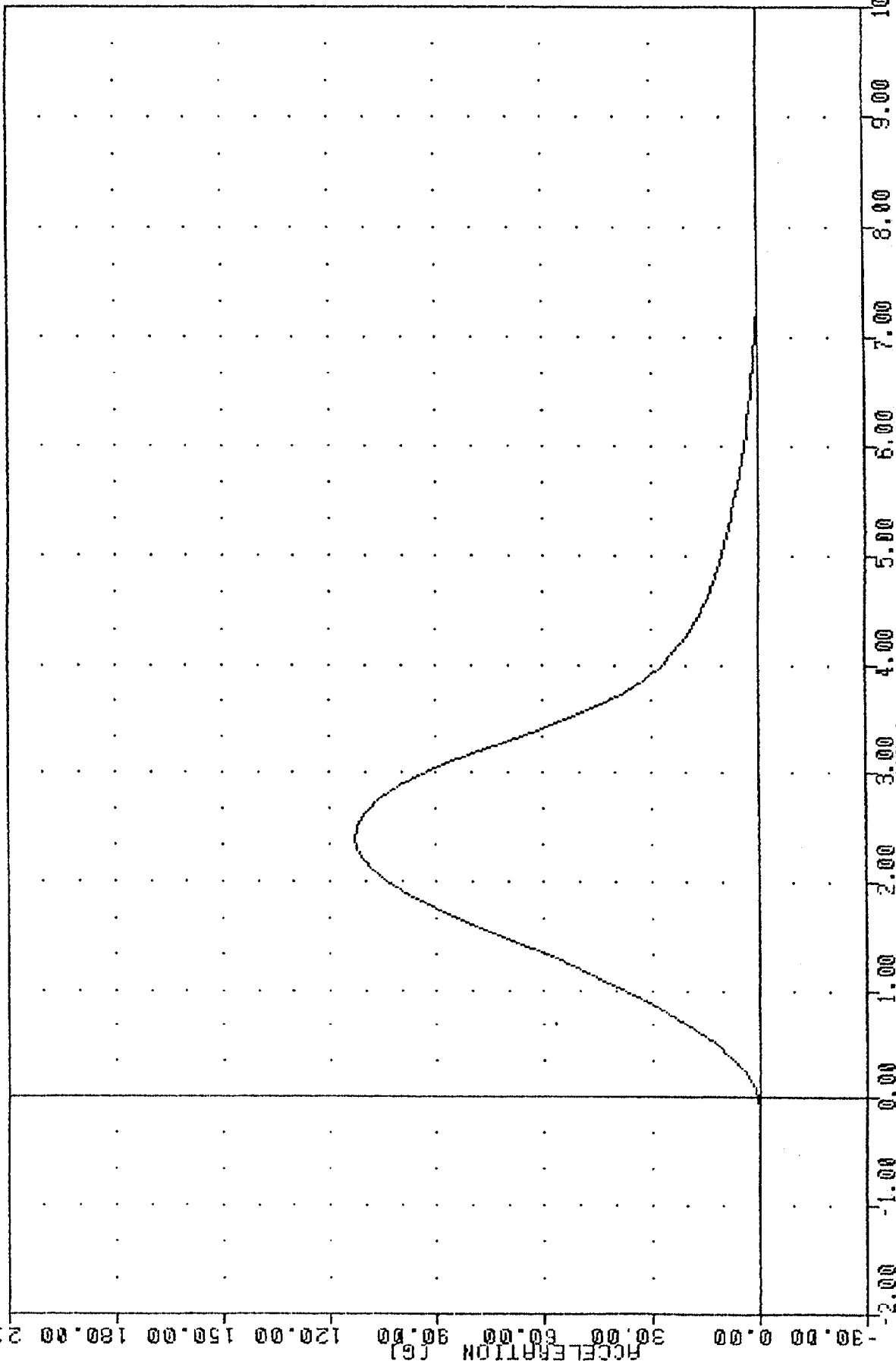
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC , 19206LK1
 572E SN192 L.KNEE 11LB CAL 06
 91347
 PENXG

FILTER = BLPP 1000/ 3162/ -40
 MIN, MAX VALUES = -0.35e -0.25, 112.89 e 2.38

210.00



C-65

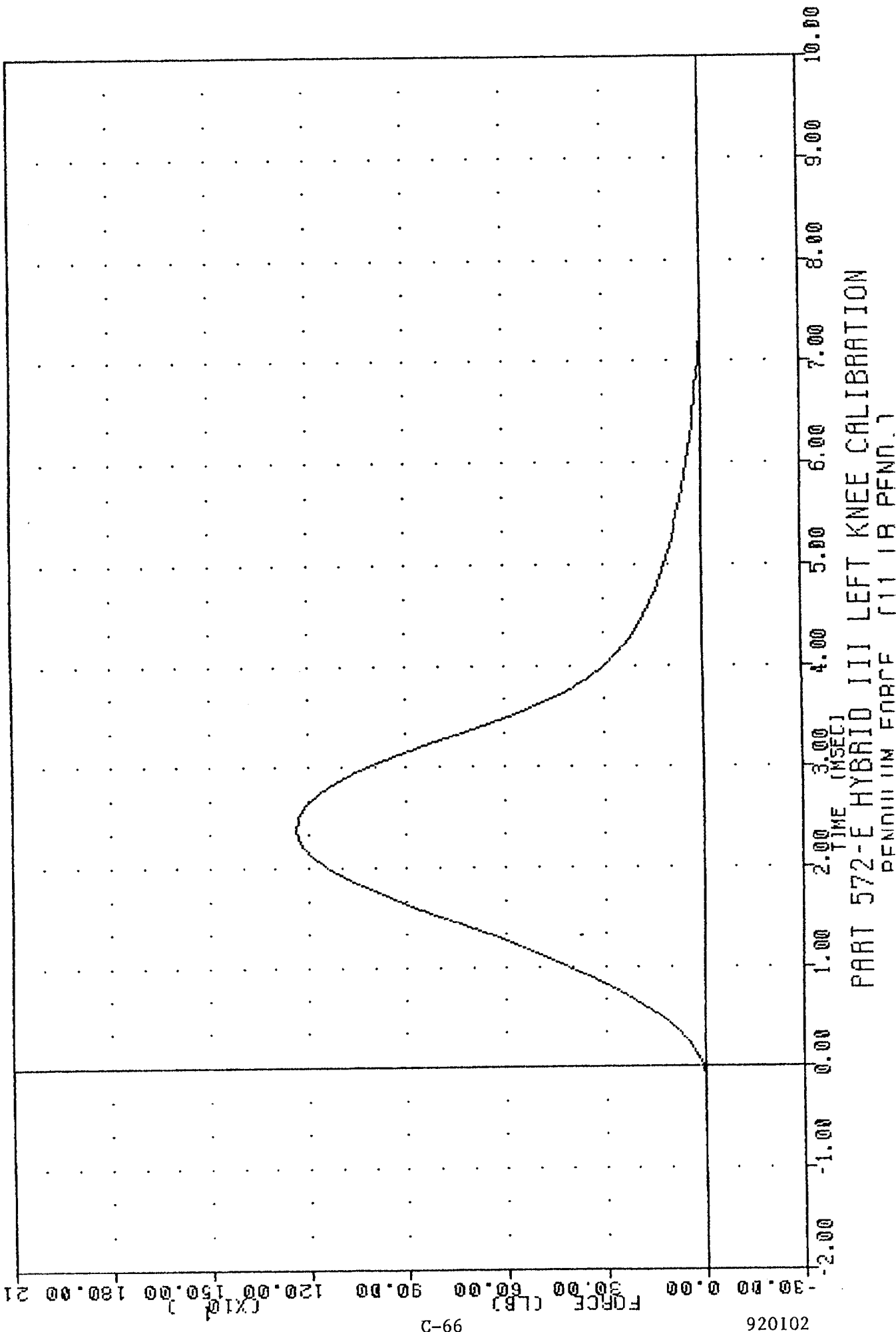
920102

PART 572-E HYBRID III LEFT KNEE CALIBRATION

PHASE III DATA ACQUISITION (LA FIVE)

TRC
572E SN192 L.KNEE 11LB CAL 06
91347
PENXF

FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -3.86 1241.74 2.38



TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

12-DEC-91

RIGHT KNEE

TRC

192C6RK1

572E SN192 R.KNEE 11LB CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	46.0 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.91 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1272.02 LBS
PROBE WEIGHT	11.0 LBS	

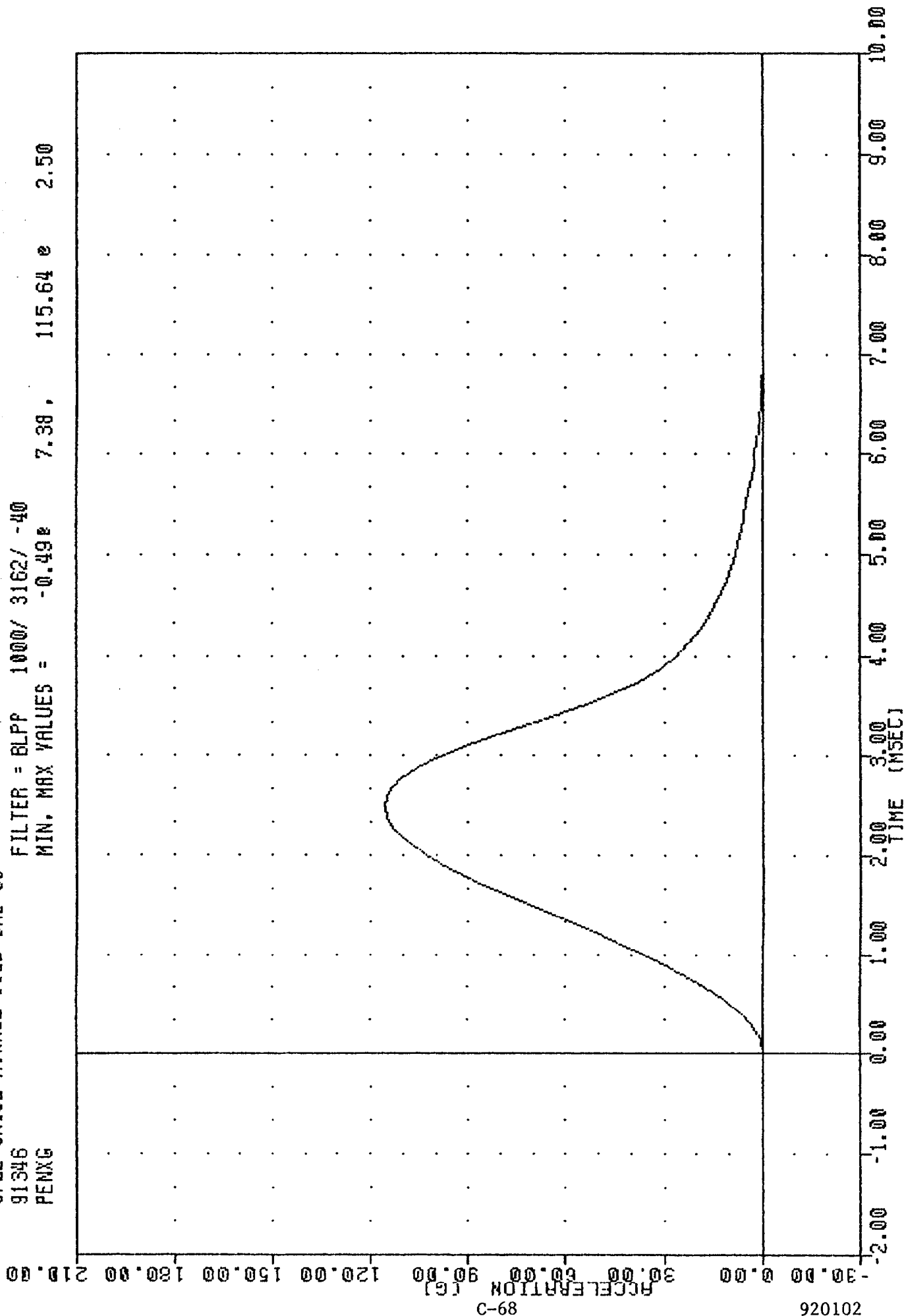
TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

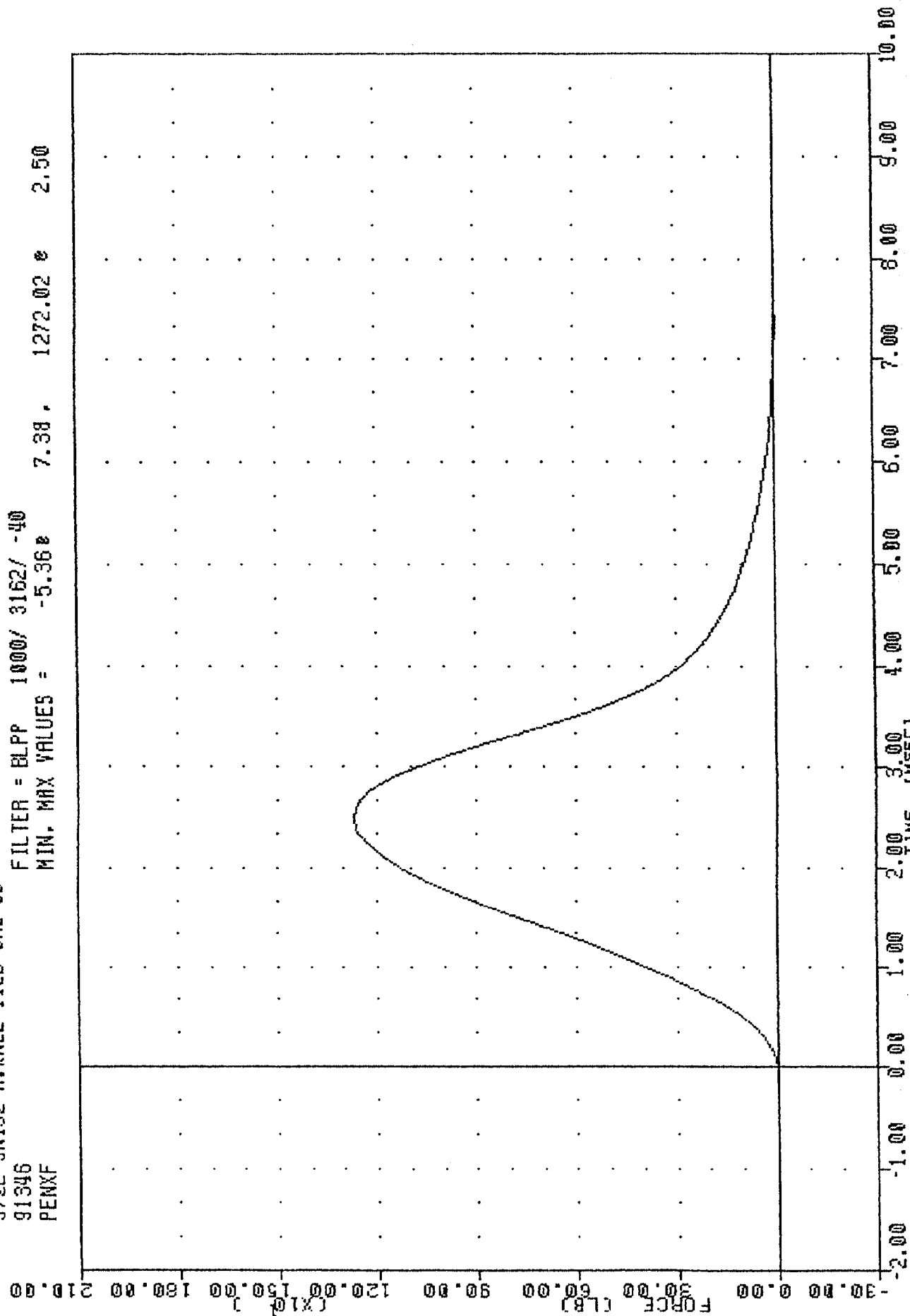
INC 10200001
 572E SN192 A.KNEE 11LB CAL 06
 91346
 PENXG

FILTER = BLPP 1000/ 3162/ -40
 MIN. MAX VALUES = -0.49e 7.38. 115.64 e 2.50



TRC
572E SN192 R.KNEE 11LB CAL 08
91346
PENXF

FILTER = BLPP 1000/ 3162/ -40
MIN. MAX VALUES = -5.36 7.38 1272.02 2.50



APPENDIX D

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENT CALIBRATIONS

DRIVER DUMMY #142

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	CR59H	7264	ENDEVCO	11/07/91	05/07/92
Y-AXIS ACCEL.	CR99H	7264	ENDEVCO	11/07/91	05/07/92
Z-AXIS ACCEL.	CH44H	7264	ENDEVCO	11/07/91	05/07/92
CHEST X-AXIS ACCEL.	DA88H	7264	ENDEVCO	11/07/91	05/07/92
Y-AXIS ACCEL.	CL09H	7264	ENDEVCO	11/07/91	05/07/92
Z-AXIS ACCEL.	CH74H	7264	ENDEVCO	11/07/91	05/07/92
LEFT FEMUR FORCE LOAD CELL	829	2430	GSE	11/06/91	05/06/92
RIGHT FEMUR FORCE LOAD CELL	610	2430	GSE	11/06/91	05/06/92
*NECK X-AXIS FORCE LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
Y-AXIS FORCE LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
Z-AXIS FORCE LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
*NECK MOMENT ABOUT X-AXIS LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
MOMENT ABOUT Y-AXIS LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
MOMENT ABOUT Z-AXIS LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
*CHEST DEFLECTION POTENTIOMETER	90320B	81422A	VERNITECH	11/15/91	05/15/92
LAP BELT FORCE LOAD CELL	571	3419	LEBOW	10/19/91	04/19/92
SHOULDER BELT FORCE LOAD CELL	616	3419	LEBOW	10/19/91	04/19/92
SHOULDER BELT SPOOL-OUT POTENTIOMETER	A12899	PT-101-40A	CELESCO	11/27/91	05/27/92
SHOULDER BELT STRETCH POTENTIOMETER	2087	2051414101	BOURNES	11/27/91	05/27/92

*HYBRID III USE ONLY.

DUMMY INSTRUMENT CALIBRATIONS

PASSENGER DUMMY #192

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	CY19H	7264	ENDEVCO	11/07/91	05/07/92
Y-AXIS ACCEL.	DH74J	7264	ENDEVCO	11/07/91	05/07/92
Z-AXIS ACCEL.	CJ75H	7264	ENDEVCO	11/07/91	05/07/92
CHEST X-AXIS ACCEL.	DW04J	7264	ENDEVCO	11/07/91	05/07/92
Y-AXIS ACCEL.	A97CJ	7264	ENDEVCO	11/22/91	05/22/92
Z-AXIS ACCEL.	DK56J	7264	ENDEVCO	11/07/91	05/07/92
LEFT FEMUR FORCE LOAD CELL	613	2430	GSE	11/06/91	05/06/92
RIGHT FEMUR FORCE LOAD CELL	827	2430	GSE	11/06/91	05/06/92
*NECK X-AXIS FORCE LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
Y-AXIS FORCE LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
X-AXIS FORCE LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
*NECK MOMENT ABOUT X-AXIS LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
MOMENT ABOUT Y-AXIS LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
MOMENT ABOUT Z-AXIS LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
*CHEST DEFLECTION POTENTIOMETER	87313-96	81422A	VERNITECH	11/15/91	05/15/92
LAP BELT FORCE LOAD CELL	236	3419	LEBOW	10/19/91	04/19/92
SHOULDER BELT FORCE LOAD CELL	615	3419	LEBOW	09/12/91	03/12/92
SHOULDER BELT SPOOL-OUT POTENTIOMETER	0586135	PT-101-40A	CELESCO	11/27/91	05/27/92
SHOULDER BELT STRETCH POTENTIOMETER	NA	2051414101	BOURNES	11/27/91	05/27/92

*HYBRID III USE ONLY.

VEHICLE AND CALIBRATION LABORATORY INSTRUMENT CALIBRATIONS

VEHICLE ACCELEROMETERS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
LEFT SEAT REAR CROSSMEMBER X-AXIS	CL80H	7264	ENDEVCO	09/04/91	03/04/92
RIGHT REAR SEAT CROSSMEMBER X-AXIS	CJ04H	7264	ENDEVCO	09/05/91	03/05/92
ENGINE TOP X-AXIS	CJ37H	7264	ENDEVCO	11/27/91	05/27/92
ENGINE BOTTOM X-AXIS	CJ03H	7264	ENDEVCO	11/27/91	05/27/92
RIGHT BRAKE CALIPER X-AXIS	CT68H	7264	ENDEVCO	09/18/91	03/18/92
LEFT BRAKE CALIPER X-AXIS	CA76H	7264	ENDEVCO	09/04/91	03/04/92
INSTRUMENT PANEL CENTER X-AXIS	BW77J	7264	ENDEVCO	11/27/91	05/27/92
REAR SEAT CROSSMEMBER CENTER Z-AXIS	DK59J	7264	ENDEVCO	09/04/91	03/04/92
VEHICLE REAR CENTER Z-AXIS	CK56H	7264	ENDEVCO	09/05/91	03/05/92

CALIBRATION LABORATORY INSTRUMENTS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
NECK BENDING PENDULUM ACCEL.	CC59	7232	ENDEVCO	10/08/91	04/08/92
NECK BENDING ROTARY POTENTIOMETER	NA	35435-1-102	BOURNES	MFR. SPECIFICATION	
NECK BENDING LINEAR POTENTIOMETER	NA	5184-2051846003	BOURNES	10/08/91	04/08/92
THORAX/HYBRID II FEMUR PEND. ACCEL.	CC64	7232	ENDEVCO	10/08/91	04/08/92
LUMBAR FLEXION FORCE GAUGE	NA	DPPH-50	CHATELON	05/03/89	REPAIRED
LUMBAR FLEXION ROTATION GAUGE	CP17-0601-1	7020	HUMPHREY	MFR. SPECIFICATION	
ABDOMEN COMPRESSION DISPL. GAUGE	4075-172	80294-2051941504	BOURNES	10/08/91	04/08/92
ABDOMEN COMPRESSION FORCE GAUGE	1261	3167	LEBOW	10/08/91	04/08/92
HYBRID III FEMUR PEND. ACCEL.	CG83	7232	ENDEVCO	10/08/91	04/08/92

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: ENLONGATION
+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

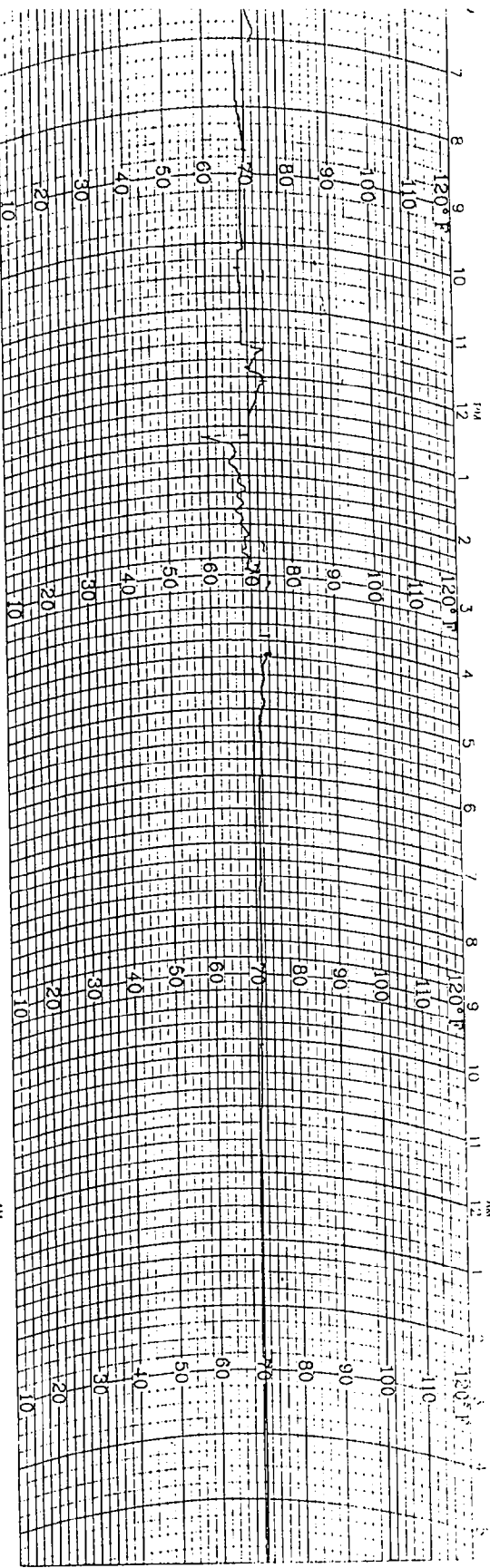
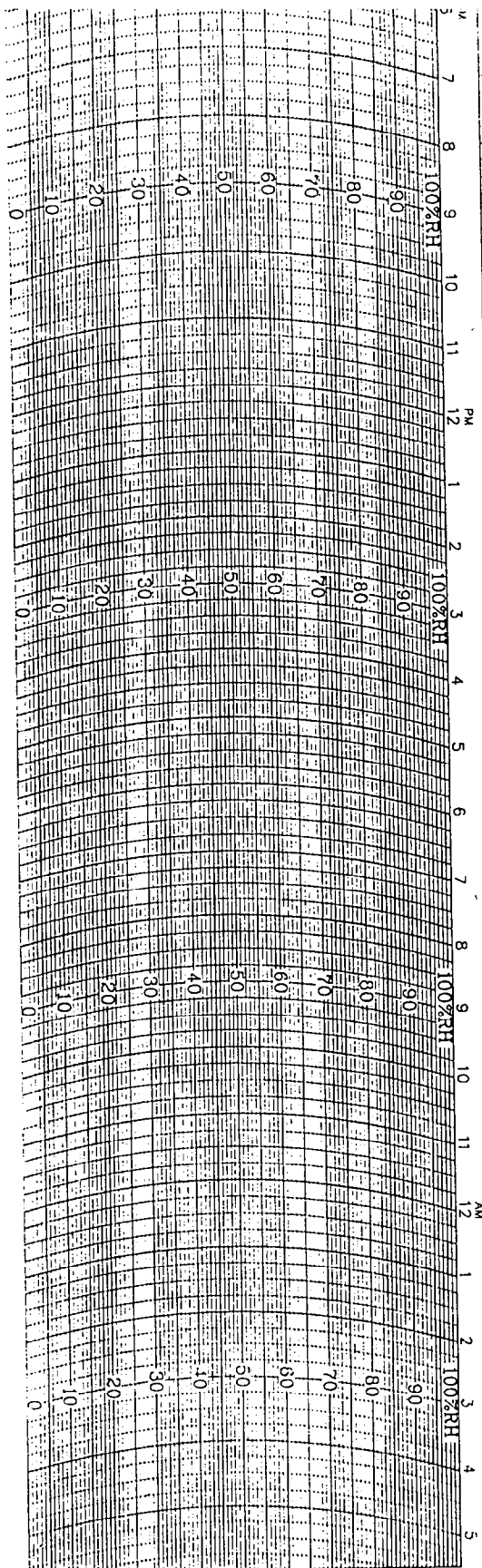
SAE J211 OCT88

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) 923-0955

HYGROTHERMOGRAPH
1 DAY

CHART NO. M699123
C511-D-III
ECH 2717
6-9-87

STATION S10 DUMMIES

DATE ON 11/26/91 DATE OFF 11/27/91

APPENDIX E

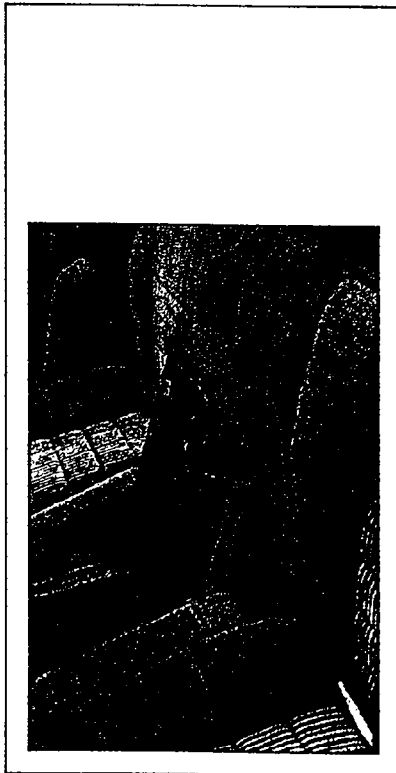
RESTRAINT SYSTEM INSTRUCTIONS FROM OWNER'S MANUAL

Seats and Safety Belts

NOTICE

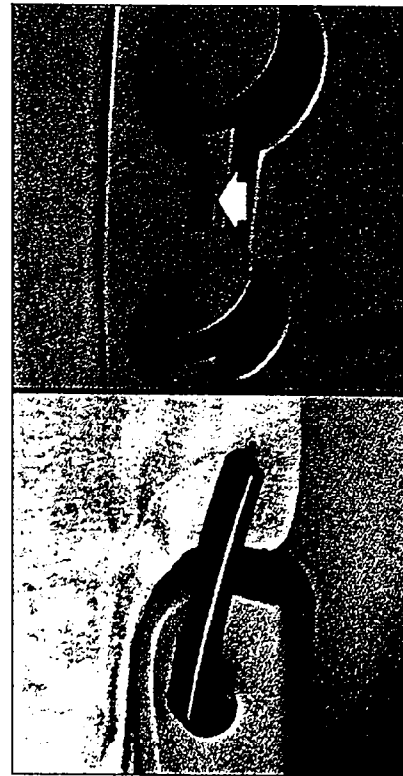
If you have optional touring seats, do not put the center seat in the third seat location. The center seat recliner goes back further than the third seat and it could hit and possibly damage the rear air conditioner unit when the seat is reclined.

Touring Bench Seats



K3111

Your optional touring bench seats come with moveable armrests, individual reclining seatbacks, adjustable headrests and a fold down center console.



K3112

To adjust your seatback, pull up on the lever on the lower outside of the seat.

The center bench seatbacks will recline further back than the rear bench seatbacks.

To raise or lower the center console, press the button between the beverage holders. Only sit in the center seating position when the console is in an upright position.

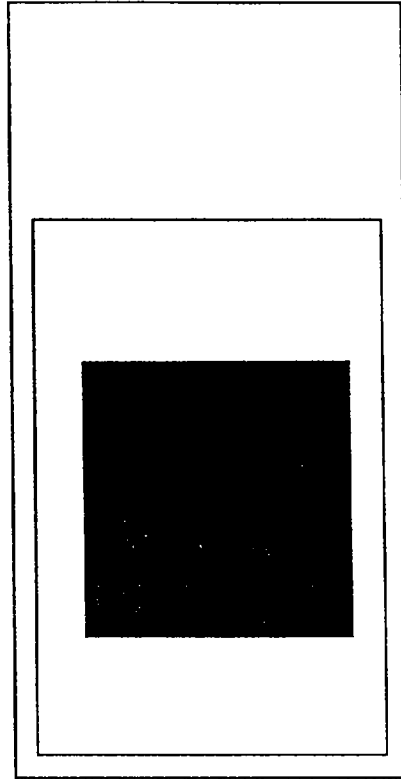
For details about headrests, see "Head Restraints" in this part.

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.



K4163

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 chime, too.

Seats and Safety Belts

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.



K3117

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!

F-13

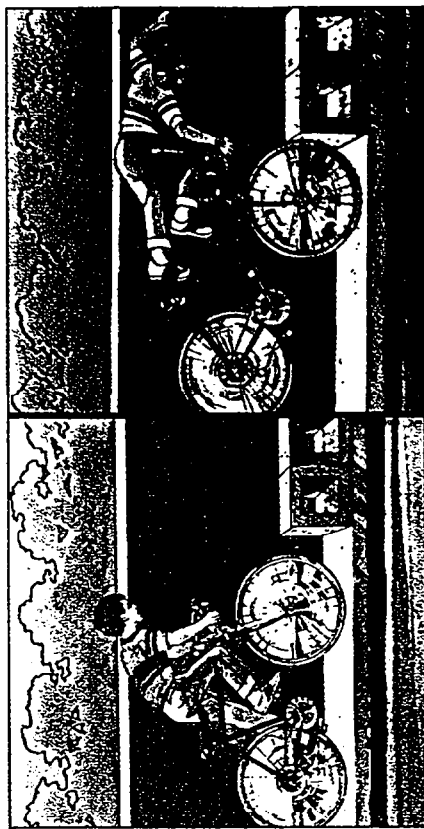
920102

1-12

Why Safety Belts Work

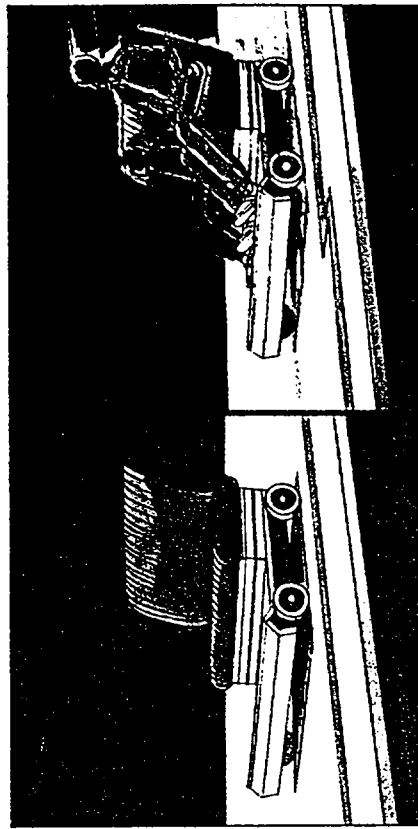
When you ride in or on anything, you go as fast as it goes.

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



K1118

When the bike hits the block, it stops. But the child keeps going! Take the simplest "car." Suppose it's just a seat on wheels.



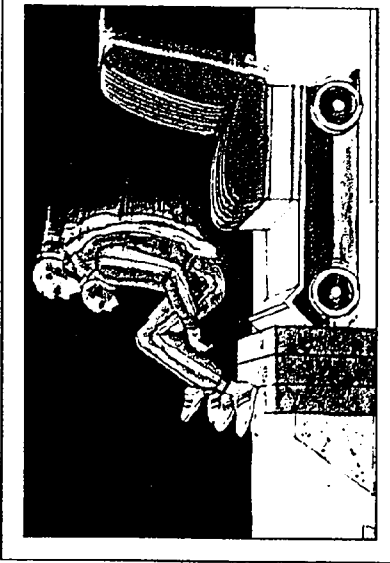
K1120

Put someone on it.

1-13

Seats and Safety Belts

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



K1122

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



K1123

E-4

or the instrument panel . . .



K1125

or the safety belts!



K1126

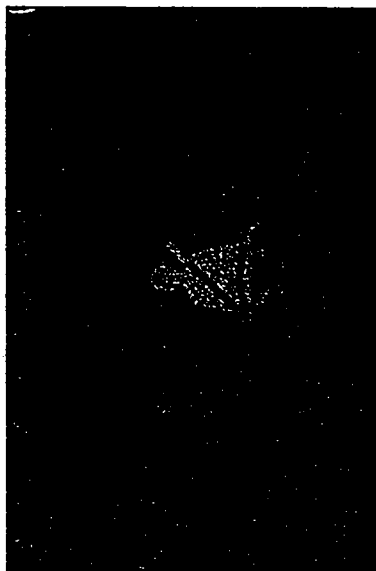
With safety belts, you slow down as the vehicle does. You get more time to stop. You stop over more distance, and your strongest bones take the forces. That's why safety belts make such good sense.

Seats and Safety Belts

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



K3264

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 chime will also sound.

How To Wear Safety Belts Properly

Adults

This section is for people of adult size.

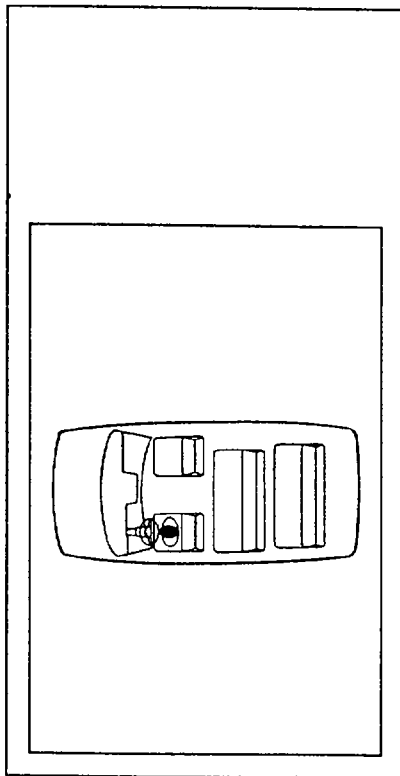
CAUTION

⚠ 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.

Seats and Safety Belts

Driver Position



K3123

This part describes the driver's restraint system.

Lap-Shoulder Belt



K3195

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 the Index under "Seats") so you can sit up straight.

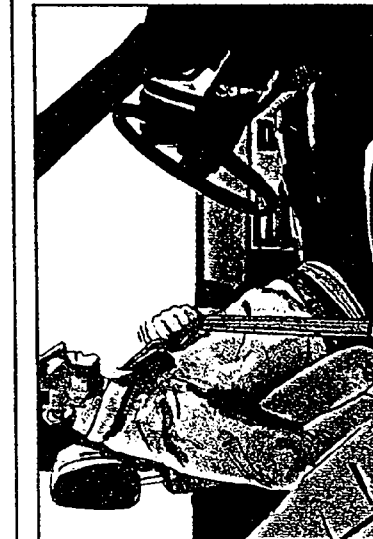
920102



K3125

3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.
4. Push the latch plate into the buckle until it clicks. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

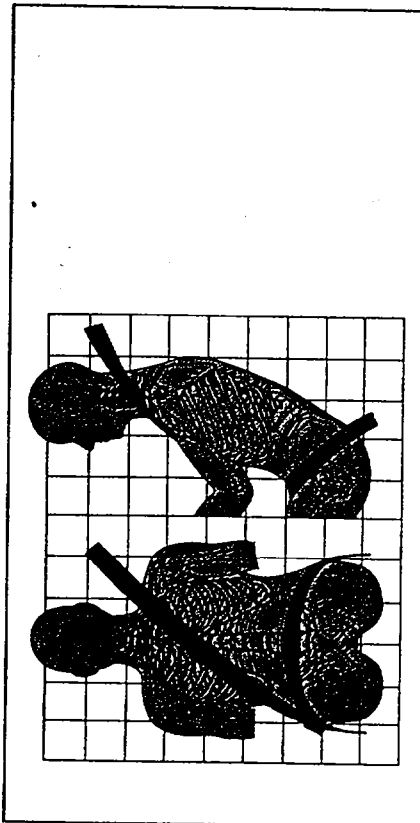
Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to.



K3121

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

Seats and Safety Belts



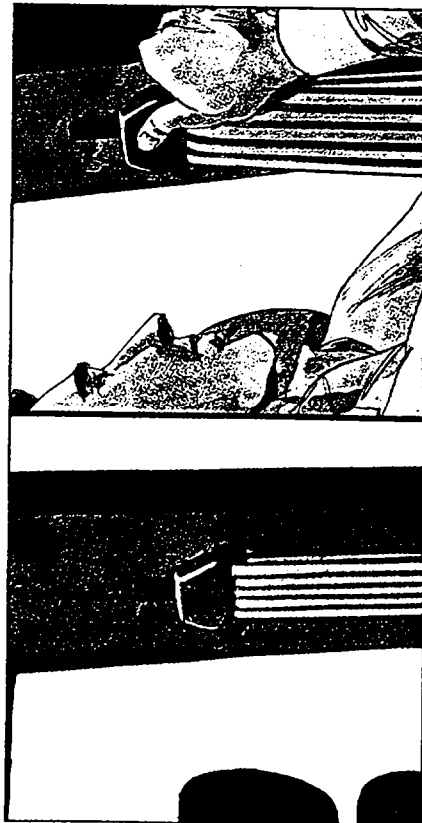
K5303

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

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

Shoulder Belt Height Adjuster

You can move the shoulder belt adjuster to the height that is right for you.



K3195

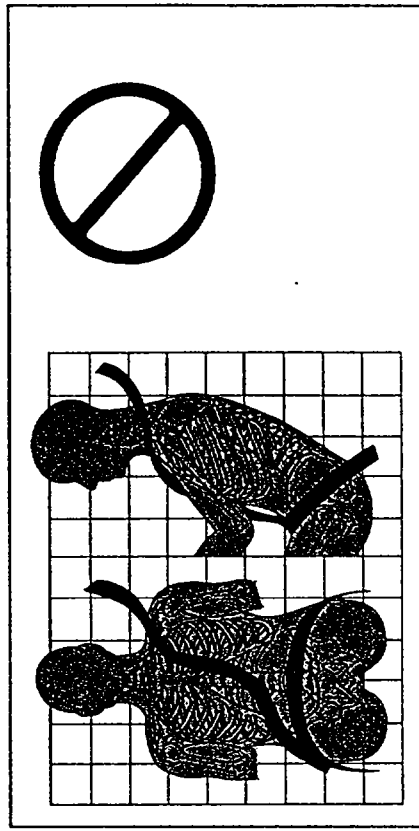
To move it down, push in the adjuster at the arrows and pull down on the adjuster. After you move the adjuster to where you want it, try to move it up and down to make sure it is locked into place. You can move the adjuster up from a lower position just by pushing up on it.



K3194

Adjust the height so that the shoulder portion of the belt is centered on your shoulder. The belt should be away from your face and neck but not falling off your shoulder.

Q: What's wrong with this?



K3141

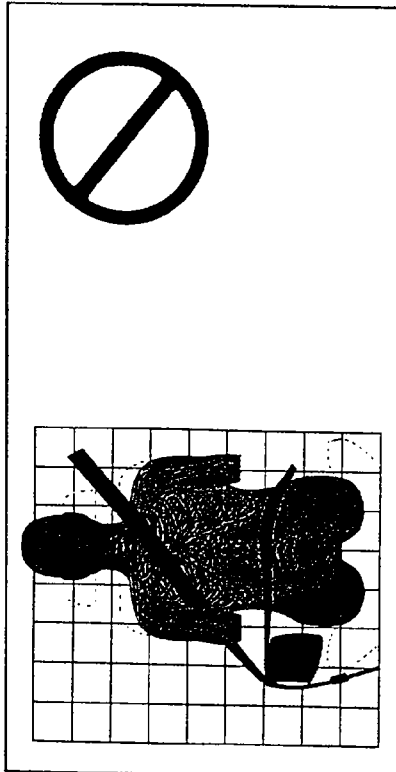
A: The shoulder belt is too loose. It won't give nearly as much protection this way.

Seats and Safety Belts

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?



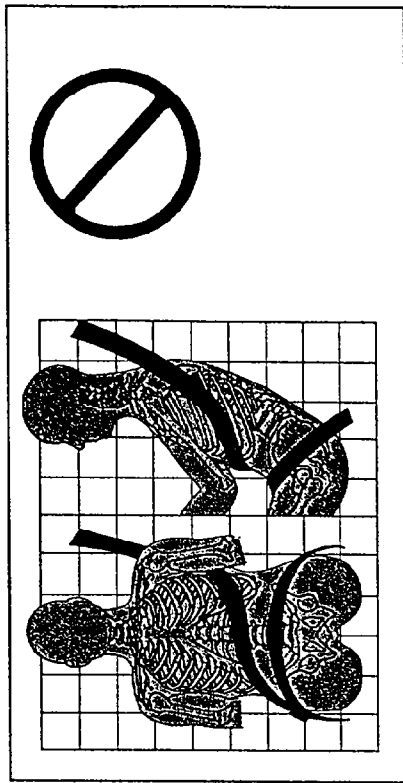
K1131

A: The belt is over an armrest.

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?



K1133

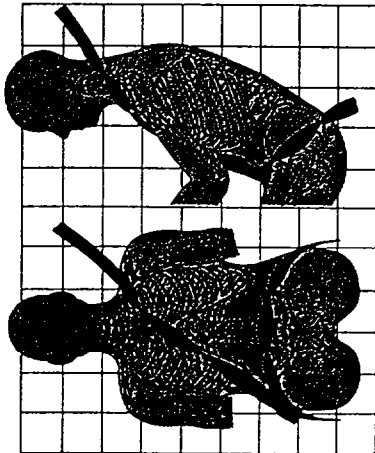
A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

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.

Seats and Safety Belts

Q: What's wrong with this?



K1139

A: The belt is twisted across the body.

CAUTION

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



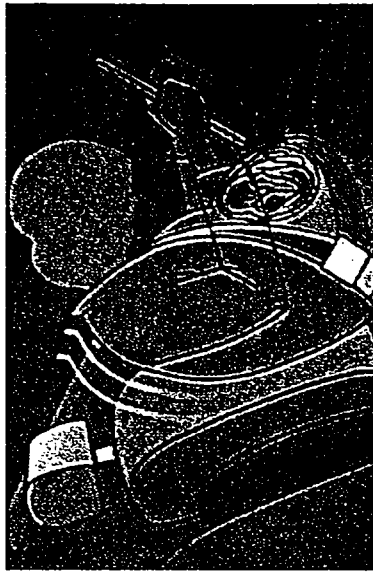
K3129

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

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

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.

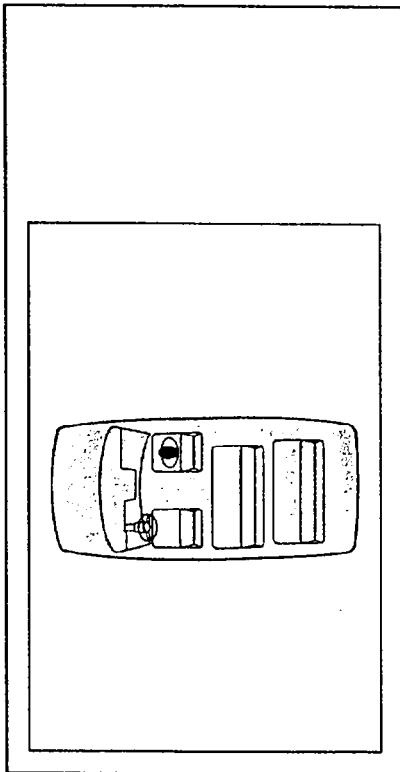


K1142

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.

Seats and Safety Belts

Right Front Passenger Position



K3114

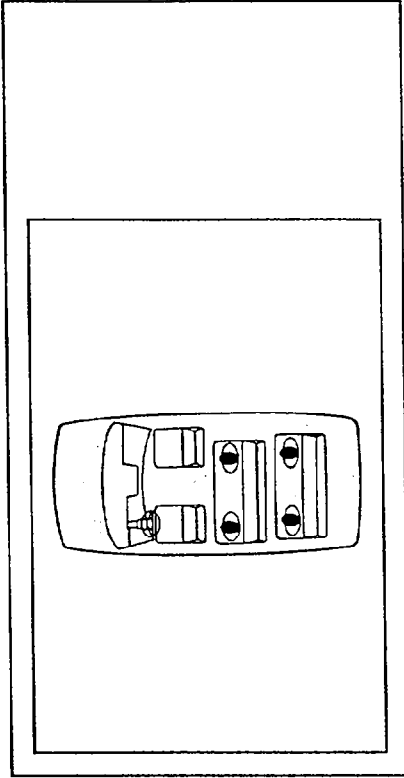
The right front passenger's safety belt works the same way as the driver's safety belt. See "Driver Position," earlier in this section.

Rear Seat Passengers

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

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

Rear Seat Outside Passenger Positions



K3138

These positions have lap-shoulder belts. Here's how to wear one properly.

1. Pick up the latch plate and, in a single motion, pull it across you. Don't let it get twisted.



K3139

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 and Safety Belts

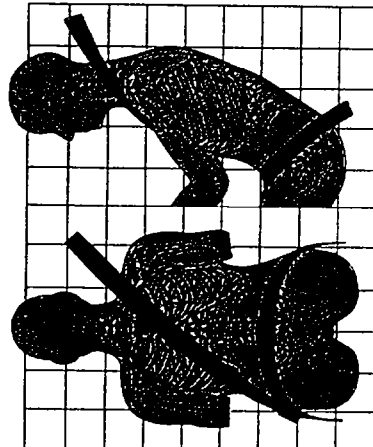
If the belt is not long enough, see "Safety Belt Extender" at the end of this section.

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.



K3183

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



K5303

The lap part of the belt should be low and snug below the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid

under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

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

CAUTION

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

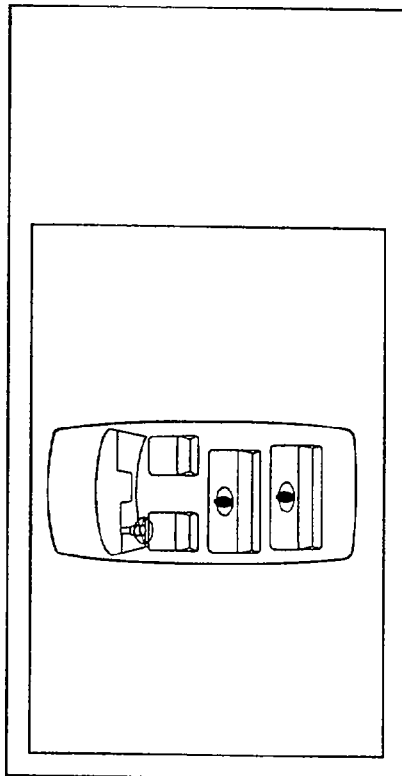


K3141

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

Seats and Safety Belts

Center Passenger Position



K3133

If your vehicle has a rear bench seat, someone can sit in the center position.

When you sit in a center seating position, 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.



K3134

To make the belt shorter, pull its free end as shown until the belt is snug. Buckle, position and release it the same way as a lap-shoulder belt.

Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to.

Children



K3146

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.

Seats and Safety Belts

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.



K1155

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.



K3164

Child Restraints

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

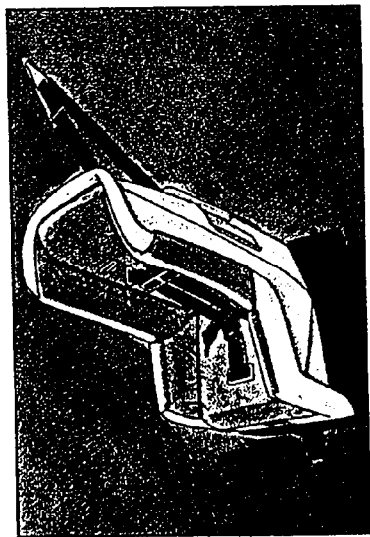
Wherever you install it, be sure to secure the child restraint properly.

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.

Seats and Safety Belts

Top Strap

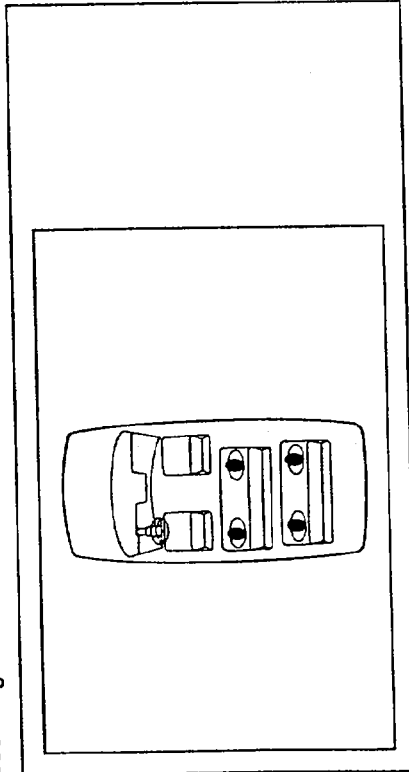


K2372

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

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

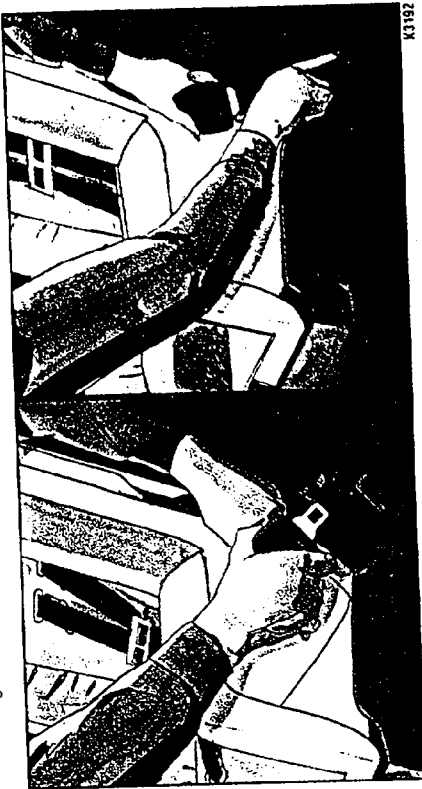
Securing a Child Restraint in a Rear Outside Position



K3138

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

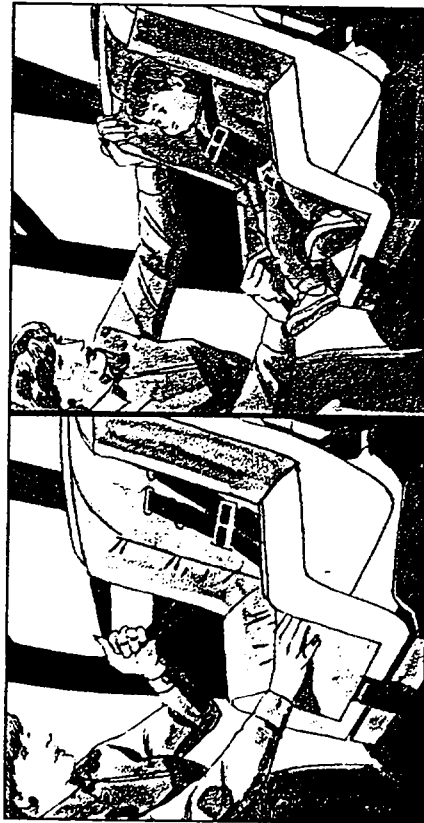
1. Put the restraint on the seat. Follow the instructions for the child restraint.
2. Secure the child in the child restraint as the instructions say.
3. Pull out the vehicle's safety belt. Make the belt as long as possible by tilting the latch plate and pulling it along the belt.



K3192

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.
5. Buckle the belt. Make sure the release button faces upward and 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.

Seats and Safety Belts

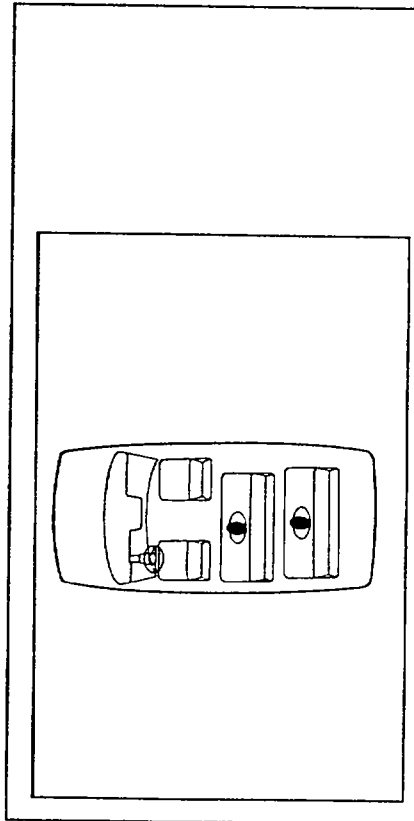


K3191

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.

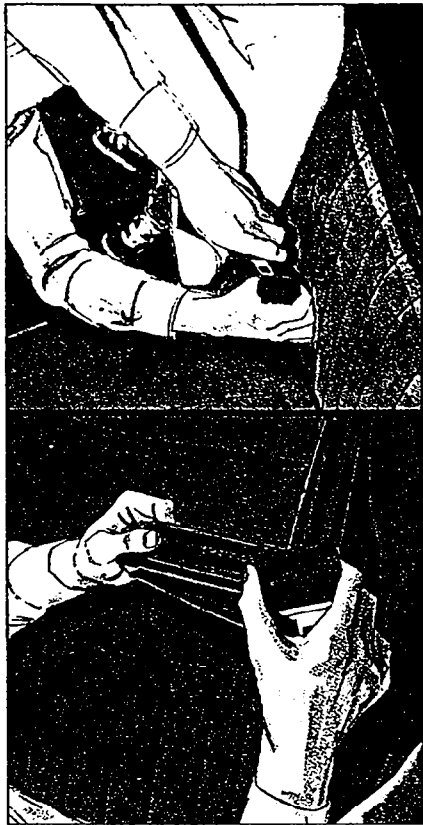
Securing a Child Restraint in the Center Rear Seat Position



K3133

When you secure a child restraint in a center seating position, 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.
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.



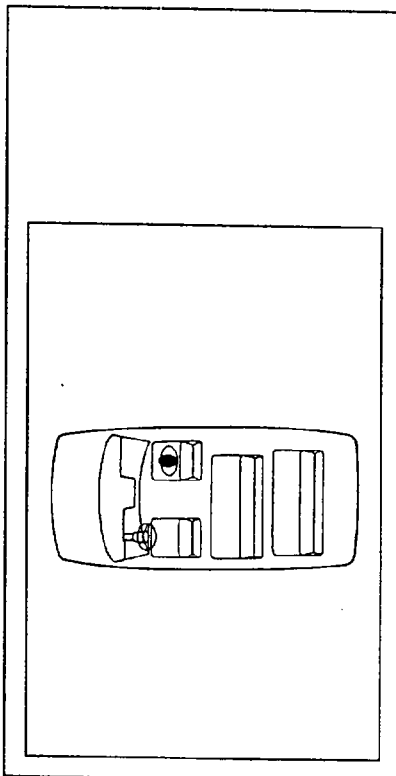
K3152

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.

Seats and Safety Belts

Securing a Child Restraint in the Right Front Seat

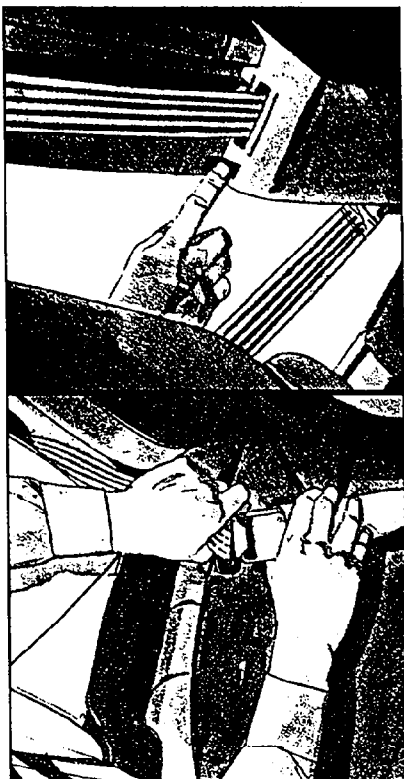


You'll be using the lap-shoulder belt. See the earlier part about the top strap if the child restraint has one.

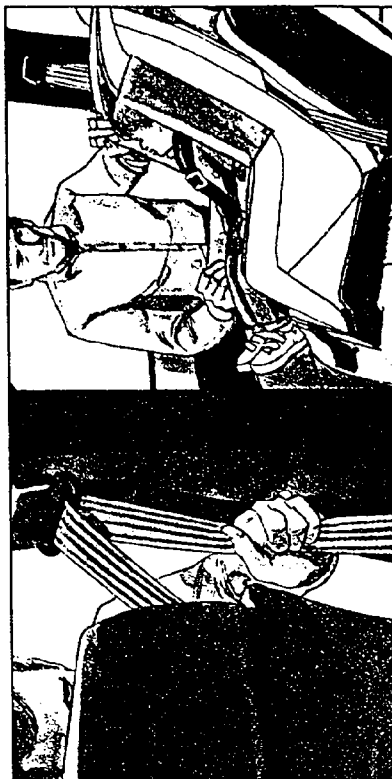
1. Put the restraint on the seat. Follow the instructions for the child restraint.
2. Secure the child in the child restraint as the instructions say.
3. Pull out the vehicle's safety belt and run the lap part through or around the child restraint. The child restraint instructions will show you how. See if the shoulder belt would go in front of the child's face or neck. If so, put it behind the child restraint.
4. Buckle the belt. Make sure the release button faces upward or outward, so you'll be able to unbuckle it quickly if you ever need to.

E-16

920102



5. Press the button on the retractor cover to set the lock.
6. To tighten the belt, feed it back into the retractor while you push down on the child restraint.



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.

Seats and Safety Belts

Larger Children



K3157

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.



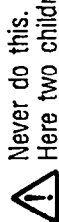
K3158

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



K5124

CAUTION



Never do this.

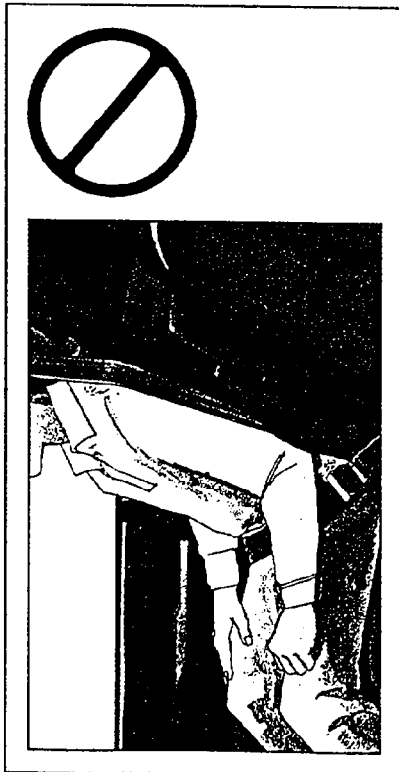
Here two children are wearing the same belt. The belt can't properly spread the impact forces. In a crash, the two children can be crushed together and seriously injured. A belt must be used by only one person at a time.

Q: What if a child is wearing a lap-shoulder, 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.

Seats and Safety Belts



K3160

CAUTION

Never do this.

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

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

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.

1-42

Checking Your Restraint Systems

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

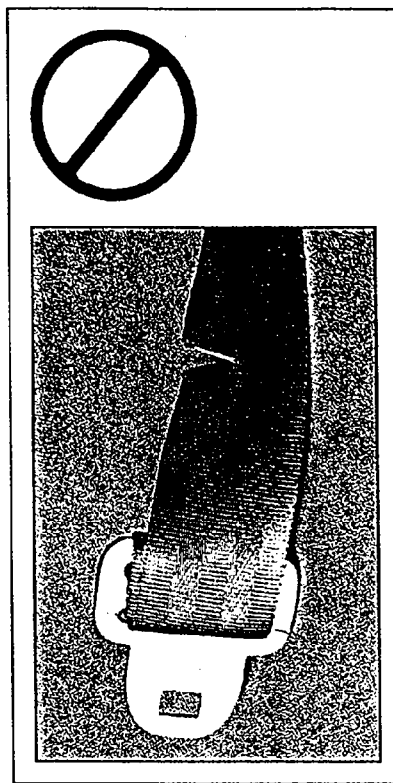
Replacing Safety Belts After a Crash

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

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

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

Q: What's wrong with this?



K3140

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.

1-43

Seats and Safety Belts

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/tire label on the rear edge of the driver's door.



K2447

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