REPORT NO. TRC-91-N03

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

CHRYSLER CORPORATION

1992 DODGE DAKOTA

NHTSA NO. MN0302

TRC TEST NO. 911211

PREPARED BY:

THE TRANSPORTATION RESEARCH CENTER OF OHIO

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JANUARY 3, 1992

FINAL REPORT

PREPARED FOR:

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15. Supplementary Notes

16. Abstract

A 35 mph frontal load cell barrier impact test was conducted on a 1992 Dodge Dakota pickup, NHTSA No. MN0302, at the Transportation Research Center of Ohio on December 11, 1991. This test was conducted to obtain new car assessment and research data indicant of FMVSS No. 208 performance. The barrier impact velocity was 35.0 mph. The vehicle's maximum crush was 29.2 inches. The ambient temperature was 70° F.

The driver's head injury criteria (HIC) was 1005. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.2 g. (See DATA ACQUISITION EXPLANATIONS.) The driver's chest maximum deflection was 1.8 inches. The driver's left and right femur maximum axial forces were 952 pounds and 690 pounds, respectively.

The passenger's head injury criteria (HIC) was 987. The passenger's chest maximum resultant accceleration with three (3) milliseconds minimum duration was 43.0 g. (See DATA ACQUISITION EXPLANATIONS.) The passenger's chest maximum deflection was 1.8 inches. The passenger's left and right femur maximum axial forces were 234 pounds and 575 pounds, respectively.

17. Key Words	18. Distribution Statement
35 mph Frontal Barrier Impact Test: New Car Assessment Program (NCAP) FMVSS 208, "Occupant Crash Protection"	Copies of this report are available from Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 400 Seventh St., S.W., Wash. D.C. 20590

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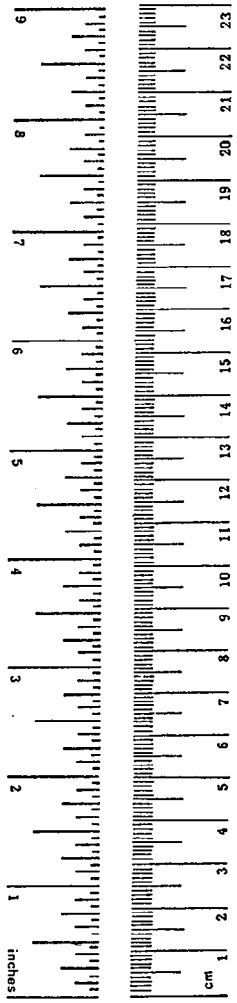
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

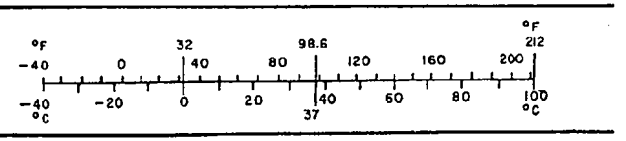
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2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

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		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



9111211

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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 Dodge Dakota Pickup, NHTSA No. MN0302, 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 December 11, 1991.

The test vehicle, a 1992 Dodge Dakota pickup, NHTSA No. MN0302, was equipped with a 2.5 liter longitudinal engine, manual transmission, and power brakes. The vehicle's test weight was 3561 pounds. The vehicle's impact speed was 35.0 mph. The vehicle sustained 29.2 inches of static crush during the impact.

The driver's head injury criteria (HIC) was 1005. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.2 g. (See DATA ACQUISITION EXPLANATIONS.) The driver's chest maximum deflection was 1.8 inches. The driver's left and right femur maximum axial forces were 952 pounds and 690 pounds, respectively.

The passenger's HIC was 987. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 43.0 g. (See DATA ACQUISITION EXPLANATIONS.) The passenger's chest maximum deflection was 1.8 inches. The passenger's left and right femur maximum axial forces were 234 pounds and 575 pounds, respectively.

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

DATA ACQUISITION EXPLANATIONS

The driver's chest X, Y, and Z-axis accelerometers; CSTXG1, CSTYG1, and CSTZG1; recorded questionable data spikes from 148 to 149 milliseconds. The driver's chest resultant acceleration with three (3) milliseconds minimum duration calculation was not affected by the these spikes.

The right front passenger's X, Y, and Z-axis accelerometers, CSTXG2, CSTYG2, and CSTZG2; recorded questionable data spikes from 96 to 97 milliseconds. The right front passenger's chest resultant acceleration with three (3) milliseconds minimum duration calculation was not affected by these spikes.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: MN0302 TEST TYPE: Frontal Load Cell Barrier

TEST DATE: 12/11/91 TEST TIME: 1359 AMBIENT TEMP. (°F): 70

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1992/Dodge/Dakota/Pickup

VEHICLE TEST WEIGHT (LBS): 3561

IMPACT ANGLE (DEG)*: 0

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

MAXIMUM STATIC CRUSH (IN): 29.2

AVERAGE REBOUND (IN): 24.7

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

NUMBER OF DATA CHANNELS: 83

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

*With respect to tow track centerline.
**Speed trap measurement (± .05 mph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Chrysler Corporation

MAKE/MODEL: Dodge/Dakota VIN: 1B7FL16G4NS533993

BODY STYLE: Pickup MODEL YEAR: 1992

NHTSA NO.: MN0302 COLOR: White

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

TRANSMISSION DATA: _5_ SPEED, _X_ MANUAL, ___ AUTOMATIC, ___ FWD, _X_ RWD, ___ 4WD

DATE VEHICLE RECEIVED: 11/27/91 ODOMETER READING: 146.0

DEALER'S NAME AND ADDRESS: Greg Nelson
Chrysler-Plymouth-Dodge
Marysville, OH 43040

ACCESSORIES:

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

REMARKS:

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

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Chrysler Corporation

DATE OF MANUFACTURE: 10/91 VIN: 1B7FL16G4NS533993

GVWR: 4300 LBS

GAWR: FRONT: 2684 LBS., REAR: 2684 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Goodyear Invicta GL 195/75R15

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

SPARE TIRE (MFR., LINE, SIZE): Goodyear Invicta 195/75R15

TYPE OF SEATS: FRONT: Bench
REAR: NA

TYPE OF FRONT SEAT BACKS: Non-adjustable

MAXIMUM WIDTH: 71.2 INCHES

WHEELBASE: 112.2 INCHES

LOCATION OF LABEL STATING TIRE DATA:

The label was located on the driver's B-pillar.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P195/75R15

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	30.4;	RF	30.0;	LR	33.1;	RR 32.9
PRE-TEST ATTITUDE:	LF	30.1;	RF	29.8;	LR	31.2;	RR 30.9
POST-TEST ATTITUDE:	LF	33.2;	RF	29.6;	LR	33.2;	RR 30.1

*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	799 LBS.	RIGHT REAR	642 LBS.
LEFT FRONT	858 LBS.	LEFT REAR	636 LBS.
TOTAL FRONT WEIGHT	1657 LBS.	(56.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1278 LBS.	(43.6% OF TOTAL VEHICLE WEIGHT)	

TOTAL DELIVERED WEIGHT 2935 LBS.

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (2935 LBS)

VCW = VEHICLE CAPACITY WEIGHT (NA LBS) *

DSC = DESIGNATED SEATING CAPACITY (NA) *

RCLW*= VCW - 150 (DSC) = 300 LBS *

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

TARGET TEST WEIGHT = 2935 + 300 + 334

TARGET TEST WEIGHT = 3569 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 292 LBS. OF CARGO WEIGHT:

RIGHT FRONT	875 LBS.	RIGHT REAR	909 LBS.
LEFT FRONT	909 LBS.	LEFT REAR	868 LBS.
TOTAL FRONT WEIGHT	1784 LBS.	(50.1% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1777 LBS.	(49.9% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	3561 LBS.	(0.2% UNDER TARGET TEST WEIGHT)	

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

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 56.0 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: 911211 NHTSA NO.: MN0302

TEST DATE: 12/11/91 TEST TIME: 1359

TEST TYPE: Frontal load cell barrier IMPACT ANGLE: 0°

AMBIENT TEMPERATURE AT IMPACT AREA: 70° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 69° F

IMPACT VELOCITY: PRIMARY = 35.0 MPH SECONDARY = 35.0 MPH

(SPECIFIED RANGE = 34.5 TO 35.5 MPH)

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

EXITING VELOCITY TRAP = 2.0 IN.

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

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 183.4; C 189.1; R 183.2

POST-TEST: L 160.2; C 159.9; R 159.6

TOTAL CRUSH: L 23.2; C 29.2; R 23.6

AVERAGE CRUSH: 25.3

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

DISTANCE FROM TEST VEHICLE TO BARRIER: L 24.2; C 25.2; R 24.8; AVG. 24.7

TABLE 4 FUEL SYSTEM DATA

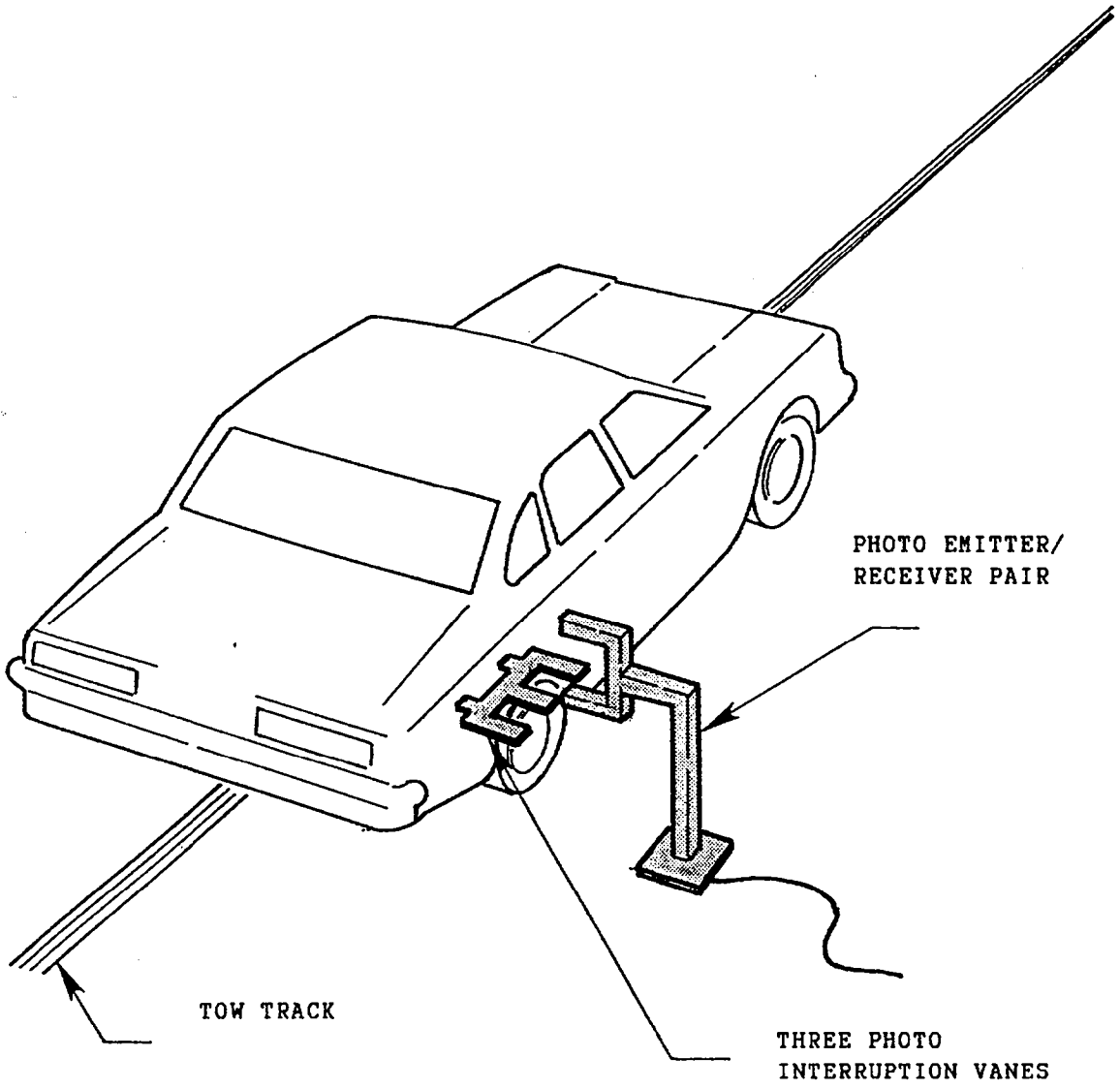
MAKE/MODEL:	Dodge/Dakota
NHTSA NO.:	MN0302
FUEL SYSTEM CAPACITY:	15.0 GALLONS (FROM OWNER'S MANUAL)
USABLE CAPACITY:	15.0 GALLONS (FURNISHED BY COTR)
TEST VOLUME RANGE:	13.8 GALLONS TO 14.1 GALLONS (92-94% OF USABLE)
ACTUAL TEST VOLUME:	13.9 GALLONS (WITH ENTIRE FUEL SYSTEM FILLED)
TEST FLUID TYPE:	STODDARD 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: Dodge/Dakota/Pickup

VEHICLE NHTSA NO.: MN0302 ; VIN: 1B7FL16G4NS533993

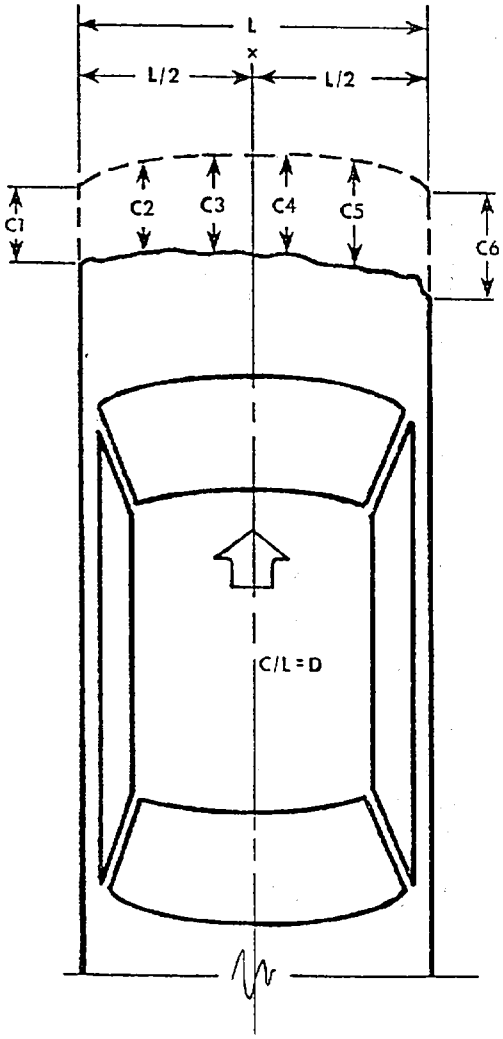
MODEL YEAR: 1992 ; BUILD DATE: 10/91 ; TEST DATE: 12/11/91

VEHICLE SIZE CATEGORY: Standard pickup ; TEST WEIGHT: 3561 LBS.

VEHICLE WHEELBASE: 112.2 INCHES

MAXIMUM WIDTH: 71.2 INCHES

FRONT OVERHANG: 34.1 INCHES



COLLISION DEFORMATION
CLASSIFICATION (CDC) CODE: 12FDEW3

CRUSH DEPTH
MEASUREMENTS:

C1 = 23.2 INCHES

C2 = 27.0 INCHES

C3 = 29.1 INCHES

C4 = 29.1 INCHES

C5 = 27.3 INCHES

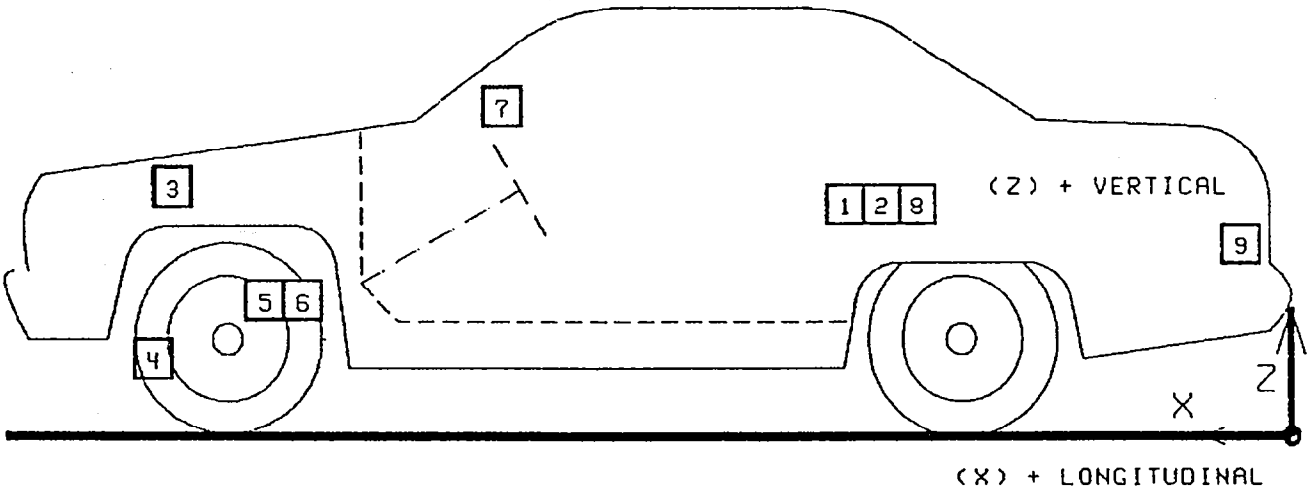
C6 = 23.6 INCHES

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE (LONGITUDINAL)

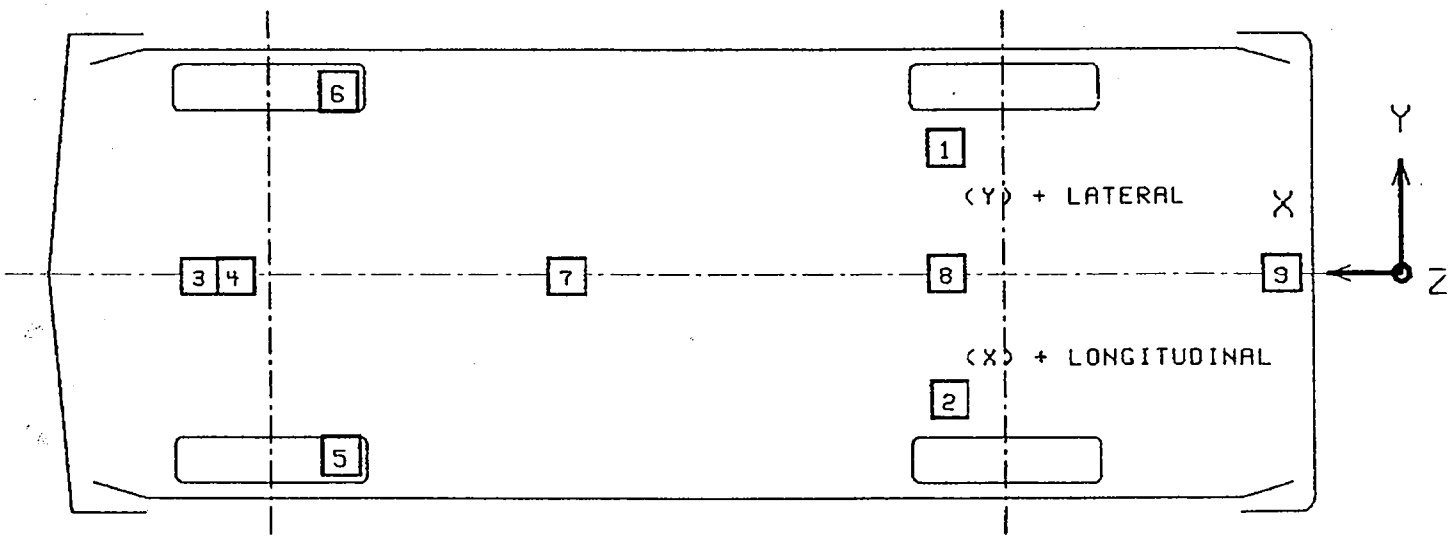
LENGTH OF DAMAGED
REGION: L = 60.0 INCHES

FIGURE 3

VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 5

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 911211

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX G	POSITIVE DIRECTION MSEC	NEGATIVE DIRECTION MAX G	NEGATIVE DIRECTION MSEC
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	99.8	23.0	20.9	6.2	115.6	46.4	58.1
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	100.7	-18.0	20.8	6.6	34.0	53.0	58.5
3	ENGINE TOP LONGITUDINAL	34.4	-0.8	35.8	53.4	56.5	142.1	46.8
4	ENGINE BOTTOM LONGITUDINAL	39.5	1.0	8.8	52.3	56.1	140.8	47.8
5	RIGHT BRAKE CALIPER LONGITUDINAL	38.2	-25.0	10.8	17.3	67.1	100.8	42.9
6	LEFT BRAKE CALIPER LONGITUDINAL	38.1	25.4	11.4	31.9	66.4	105.9	42.0
7	INSTRUMENT PANEL CENTER LONGITUDINAL	60.1	-2.0	44.4	28.0	41.6	90.3	74.1
8	REAR SEAT CROSSMEMBER CENTER VERTICAL	96.9	0.0	19.8	27.0	38.9	35.9	65.9
9	VEHICLE REAR CENTER VERTICAL	186.1	0.0	22.5	23.9	59.9	40.6	55.5

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

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

TABLE 6 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #192	PASSENGER #142
HEAD	Steering wheel	Chest
CHEST	Steering wheel	None
ABDOMEN	None	None
LEFT KNEE	Instrument panel	Instrument panel
RIGHT KNEE	Instrument panel	Instrument panel

DOOR OPENING:

	LEFT	RIGHT
FRONT	Tools required	Tools required
REAR	NA	NA

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	None	None
REAR	NA	NA

GLAZING DAMAGE:

The entire windshield was cracked upon impact.

OTHER NOTABLE IMPACT EFFECTS:

The driver's seat belt unlatched during the impact.

The right front tire was flattened upon impact.

TABLE 7 FMVSS 208 DATA SUMMARY

VEH. YR./MAKE/MODEL/BODY STYLE: 1992/Dodge/Dakota/pickup

VEH. NHTSA NO.: MN0302 ; TEST DATE: 12/11/91

MAXIMUM ACCELERATIONS (G):	DRIVER DUMMY #192	PASSENGER DUMMY #142
HEAD X-AXIS	-110.8	-52.0
HEAD Y-AXIS	-9.9	-15.7
HEAD Z-AXIS	-44.6	-70.9
HEAD RESULTANT	119.8	80.5
CHEST X-AXIS	-48.0 Y	-41.0 Y
CHEST Y-AXIS	-8.0 Y	-7.1 Y
CHEST Z-AXIS	-16.6 Y	24.5 Y
CHEST RESULTANT*	48.2	43.0
CHEST RESULTANT TIME INTERVAL (SEC.)*	.003	.003
HEAD INJURY CRITERIA (HIC) VALUES:		
HIC**	1005	987
HIC STARTING TIME (SEC.)	72.6	81.6
HIC ENDING TIME (SEC.)	104.4	117.6
AVG. HEAD RESULTANT ACCEL. DURING HIC TIME INTERVAL (G)	63.0	59.5
MAXIMUM CHEST DEFLECTIONS (IN):		
CHEST X-AXIS	1.8	1.8
MAXIMUM CHEST DEFLECTION TIME (SEC.)	.086	.101
MAXIMUM COMPRESSIVE FEMUR FORCES (LBS):		
LEFT FEMUR	952	234
RIGHT FEMUR	690	575
MAXIMUM SEAT BELT FORCES (LBS):		
LAP BELT	1339	1705
SHOULDER BELT	1320	1593

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/Dodge/Dakota/pickup

VEHICLE NHTSA NO.: MN0302 ; TEST DATE: 12/11/91

MAXIMUM VALUES:	DRIVER DUMMY #192	PASSENGER DUMMY #142
NECK X-AXIS FORCE (LBS.)	157	388
NECK Y-AXIS FORCE (LBS.)	87	169
NECK Z-AXIS FORCE (LBS.)	718	670
NECK MOMENT ABOUT X AXIS (IN.-LBS.)	214	-199
NECK MOMENT ABOUT Y AXIS (IN.-LBS.)	-286	1091
NECK MOMENT ABOUT Z AXIS (IN.-LBS.)	-90	111

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

DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

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

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 dummy's chest as the dummy's upper torso was restrained by the three-point unibelt. The dummy's head rotated rearward and contacted the shoulder belt and right side of the head restraint as the dummy rebounded into the seat back. The dummy came to rest seated in the right front passenger's seat, leaning to the right, restrained by the three-point unibelt.

TABLE 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

	DRIVER	PASSENGER
BELT LENGTH DATA:		
BELT LENGTH FROM TRIM PANEL EXIT TO BOLT HOLE ANCHOR POINT FOR CONTINUOUS WEBBING SYSTEMS.	31.0	31.8
SHOULDER BELT LENGTH AS MEASURED ON PART 572 DUMMY.	33.0	34.9
LAP BELT LENGTH AS MEASURED ON PART 572 DUMMY.	125.0	123.6
SHOULDER BELT SPOOL-OFF LENGTH:		
AS DETERMINED BY FILM ANALYSIS	4.2	4.2
AS DETERMINED MECHANICALLY	4.0	4.3
AS DETERMINED ELECTRONICALLY	4.8	4.4
BELT STRETCH LENGTH (IN/FT):		
AS MEASURED MECHANICALLY	.03	.03
AS MEASURED ELECTRONICALLY	.01	.34
RETRACTOR LOCK-UP TIME (MS):		
AS DETERMINED BY SHOULDER BELT SPOOL-OFF	96	90

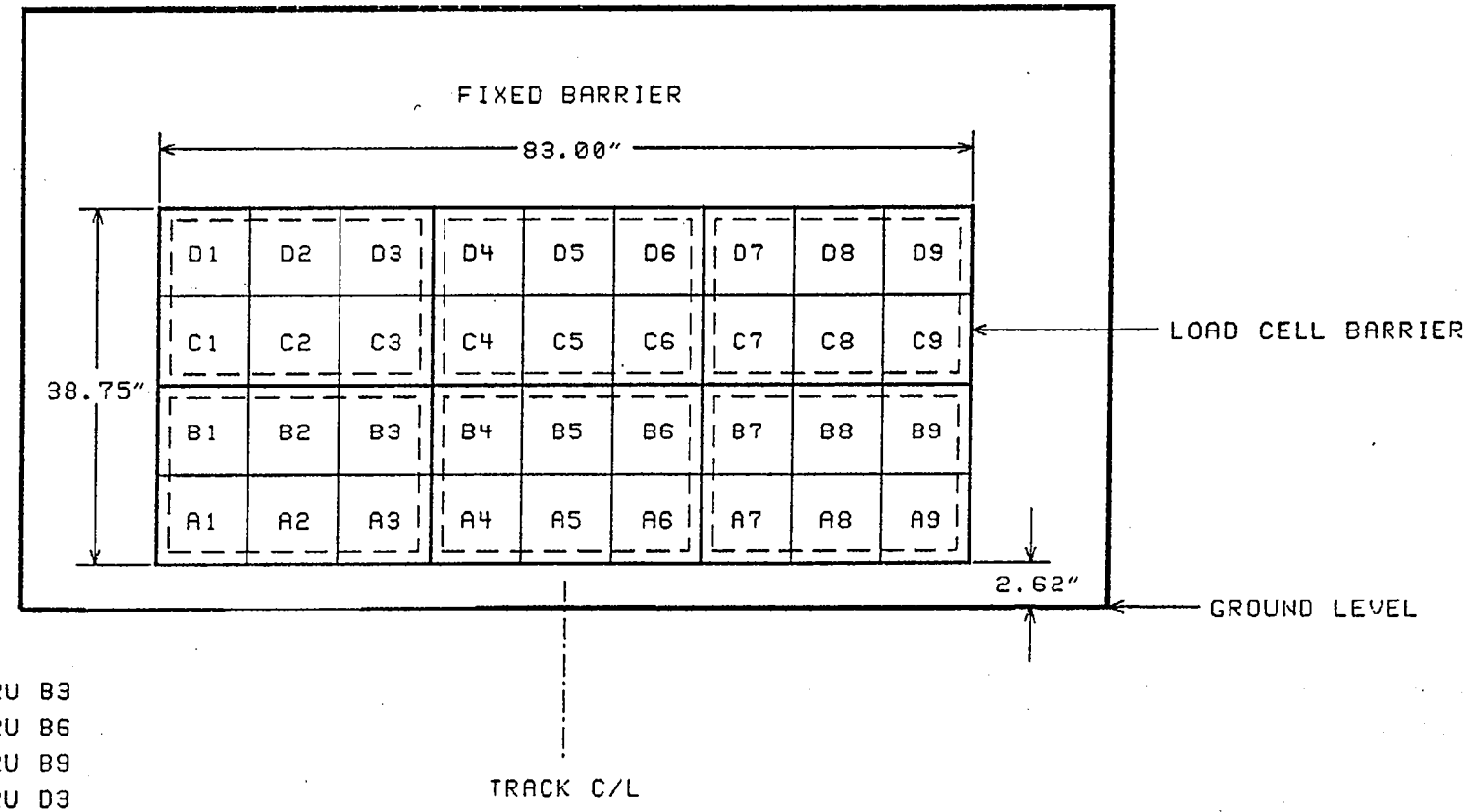
ALL MEASUREMENTS ARE IN INCHES UNLESS OTHERWISE NOTED.

FIGURE 4

LOAD CELL BARRIER CONFIGURATION

FRONT VIEW

36 LOAD CELLS
4 ROWS
9 COLUMNS



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

TABLE 10

LOAD CELL BARRIER DATA SUMMARY

TEST NUMBER 911211

LOCATION	POSITIVE DIRECTION LB	POSITIVE DIRECTION MSEC	NEGATIVE DIRECTION LB	NEGATIVE DIRECTION MSEC
TOTAL GROUP 1	396	1.1	35945	51.6
TOTAL GROUP 2	1673	19.6	41262	48.6
TOTAL GROUP 3	277	1.3	39920	50.6
TOTAL GROUP 4	339	0.8	30752	14.0
TOTAL GROUP 5	324	281.6	28785	47.3
TOTAL GROUP 6	443	116.0	24828	14.3
TOTAL LOAD CELL FORCE	1359	232.1	163928	49.6

TENSION IS POSITIVE
COMPRESSION IS NEGATIVE

SECTION 3.0

OCCUPANT, CAMERA, & VEHICLE MEASUREMENTS

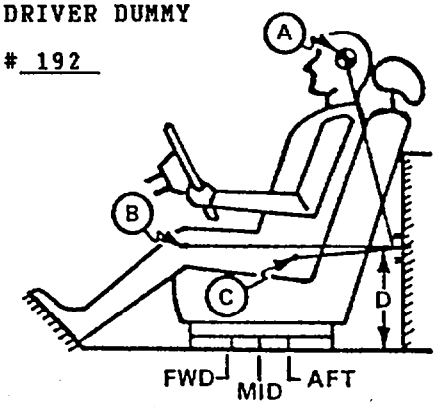
FIGURE 5 DUMMY AND SEAT POSITIONING DATA

TEST NO.: 911211 ; VEHICLE: Dodge Dakota

SEAT TYPE:	ADJUSTER TYPE:	FRONT SEAT BACK TYPE:
X BENCH	X MANUAL	X NON-ADJUSTABLE
_____ BUCKET	_____ POWER	_____ ADJUSTABLE RECLINING
_____ SPLIT BENCH		

DRIVER DUMMY

192

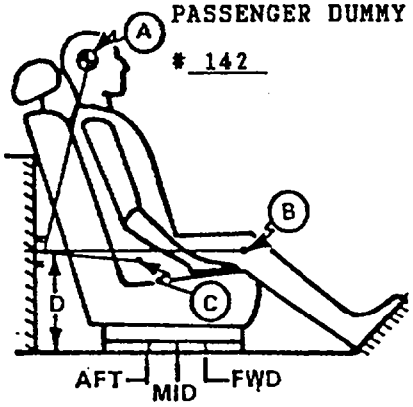


MEASUREMENT LOCATION

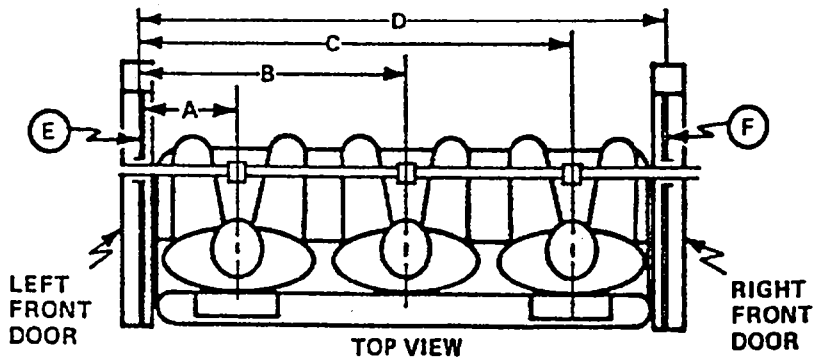
A - HEAD TARGET
B - KNEE JOINT
C - APPROXIMATE 'H' POINT
D - SILL TO DOOR STRIKER REFERENCE POINT

PASSENGER DUMMY

142



A =	19.9 IN.	21 DEGREES	A =	20.8 IN.	23 DEGREES
B =	30.5 IN.	99 DEGREES	B =	31.1 IN.	97 DEGREES
C =	17.2 IN.	115 DEGREES	C =	17.1 IN.	112 DEGREES
D =	17.8 IN.		D =	18.0 IN.	
SEAT TRACK REARWARD:	5 NOTCHES		SEAT TRACK REARWARD:	5 NOTCHES	



A = LEFT DOOR TO DRIVER CENTERLINE	13.5 IN.
B = LEFT DOOR TO CENTER PASSENGER CENTERLINE	NA IN.
C = LEFT DOOR TO RIGHT PASSENGER CENTERLINE	42.5 IN.
D = LEFT DOOR TO RIGHT DOOR	57.1 IN.
E,F = WINDOW GLASS HEIGHT (RIGHT AND LEFT MUST BE EQUAL)	8.1 IN.

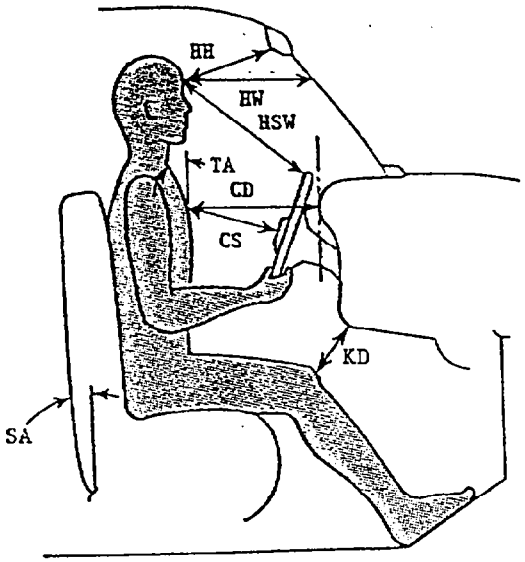
ALL ANGLES ARE RELATIVE TO VERTICAL PLANE THROUGH DOOR STRIKER.

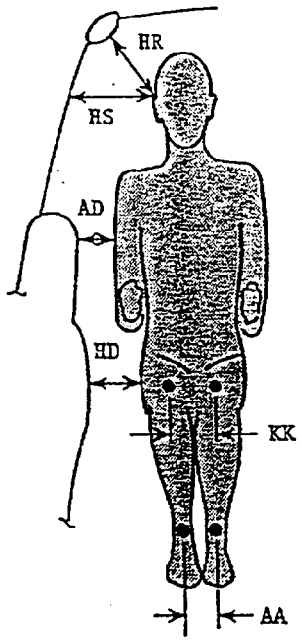
FIGURE 6 DUMMY IN-VEHICLE POSITIONING DATA

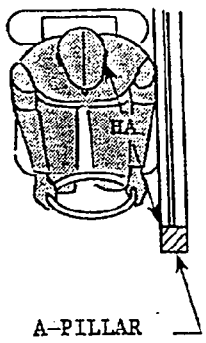
	DRIVER	PASSENGER
HH	16.1	15.4
HW	21.4	21.0
CD	18.9	20.2
CS	11.2	NA
KDL	5.8	3.9
KDR	5.4	3.9
TA	15°	18°
SA	19°	19°
HSW	15.9	NA

	DRIVER	PASSENGER
HR	8.4	8.5
HS	10.2	10.8
AD	5.0	5.6
HD	6.8	7.1
KK	7.9	8.0
AA	7.5	6.5
HA	22.0	21.5

KNEE OUTER CLEVIS TO OUTER CLEVIS SPACING:
DRIVER = 10.6
PASSENGER = 10.6
PELVIS ANGLE:
DRIVER = 25°
PASSENGER = 25°





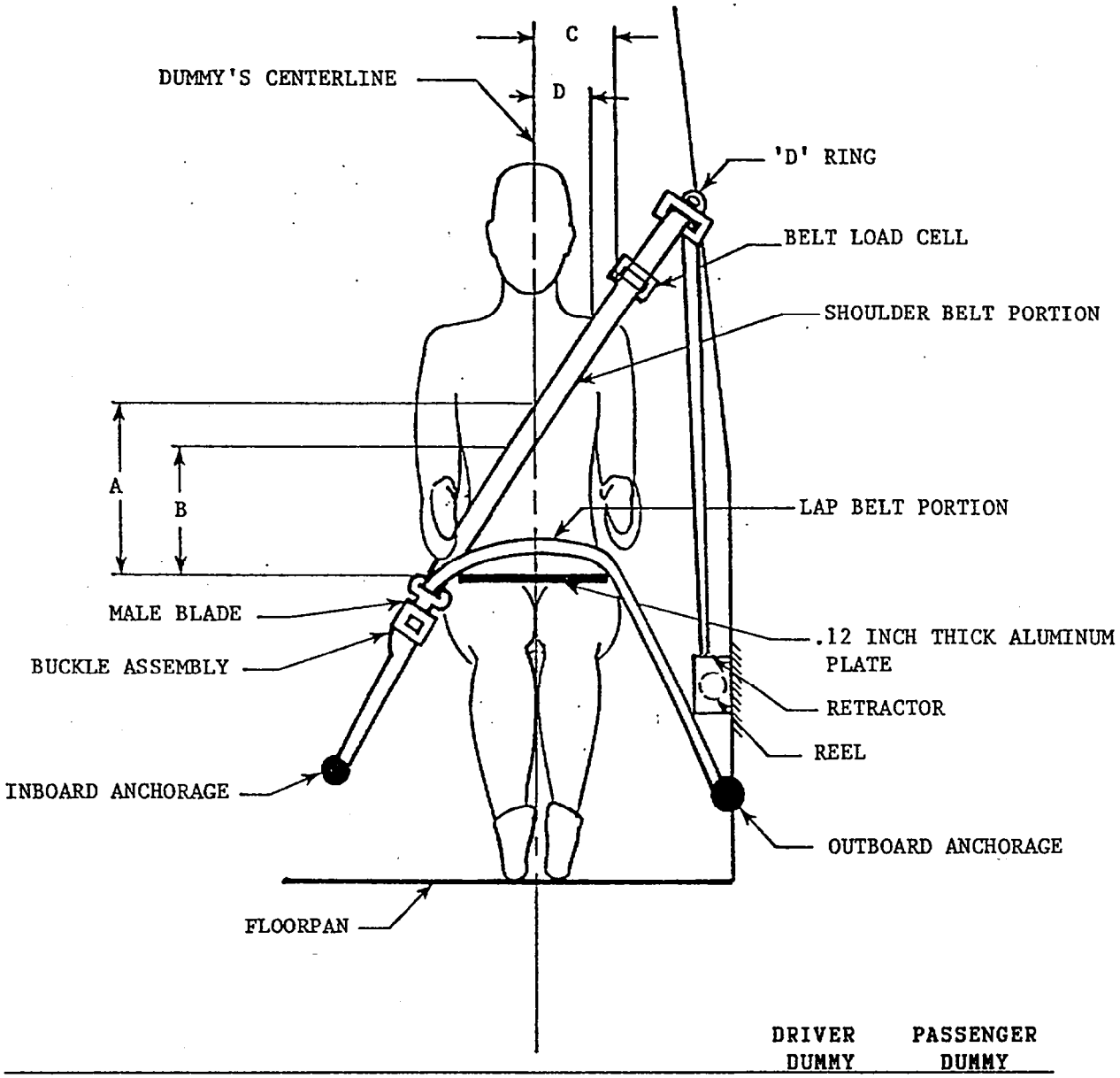


HH = HEAD TO WINDSHIELD HEADER
HW = HEAD TO WINDSHIELD
CD = CHEST TO DASH
CS = CHEST TO STEERING WHEEL
KD = KNEE TO DASH
TA = TORSO ANGLE
SA = SEAT BACK ANGLE
HSW= HEAD TO STEERING WHEEL

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

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

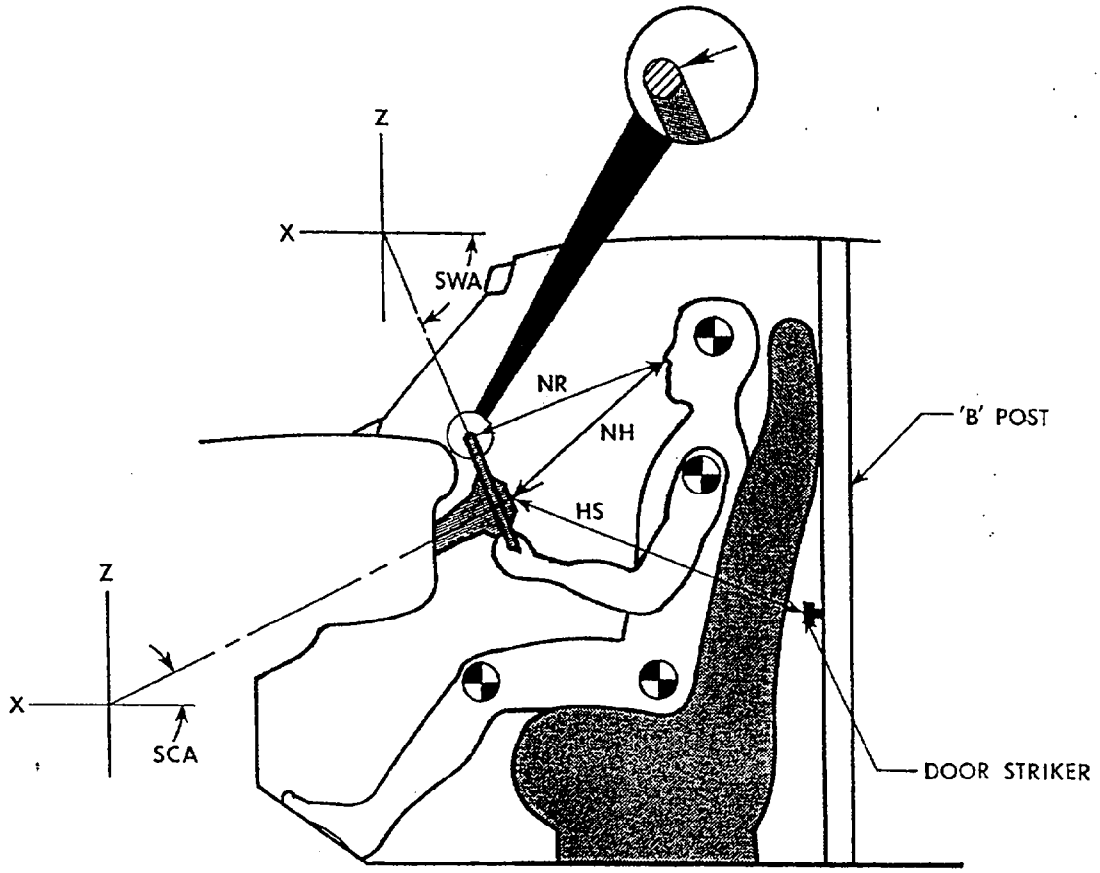
FIGURE 7 SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	13.6	13.1
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	10.5	10.0
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	3.5	3.5
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	1.5	1.5
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 not adjustable.

	MEASUREMENTS
NR - DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	13.9
NH - DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	15.4
HS - DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	28.0
SCA - ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	25°
SWA - ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	65°

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 9

CAMERA POSITIONS

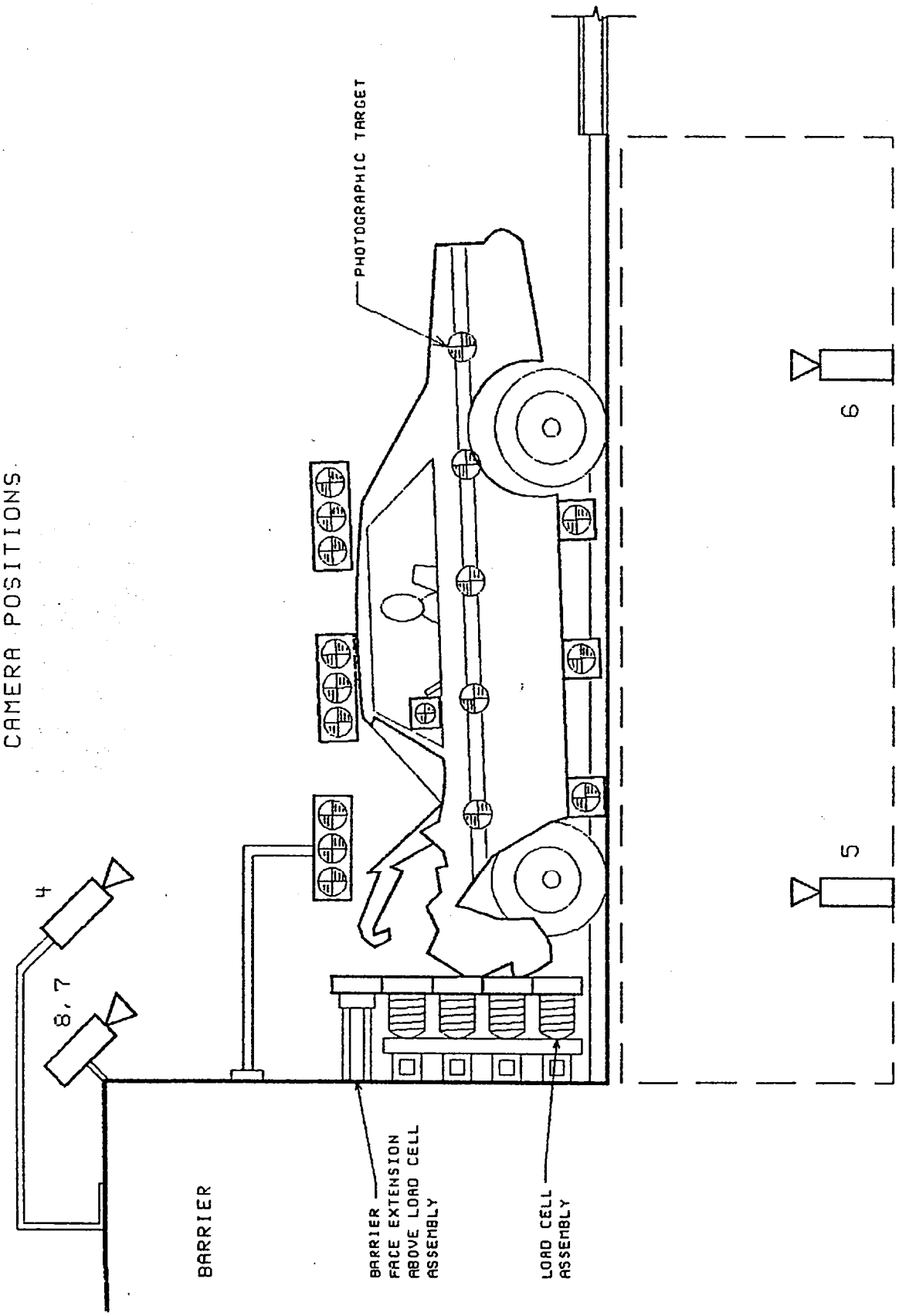


FIGURE 9

CAMERA POSITIONS, CONTINUED

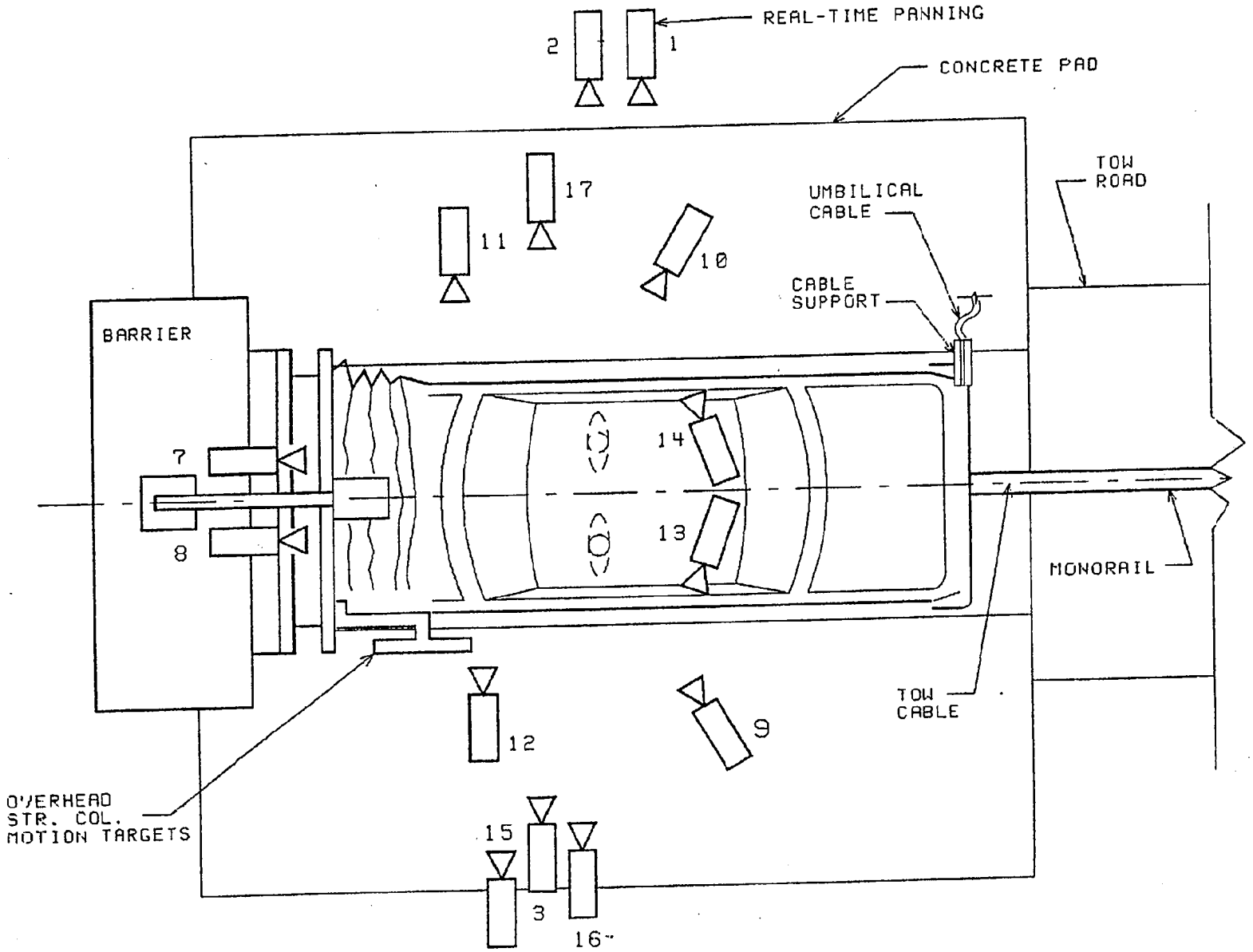


TABLE 11 MOTION PICTURE CAMERA LOCATIONS

TEST NO.: 911211 VEHICLE: Dodge Dakota pickup

CAMERA NO.	VIEW	CAMERA POSITIONS (IN)* X	Y	Z	ANGLE** (DEG)	FILM PLANE TO HEAD TARGET (IN)	LENS (MM)	FILM SPEED (FPS)
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	222.0	25	498
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	500
8	Front - driver	-6.8	14.5	85.0	-41	NA	17	500
9	Left side - driver	-180.0	73.0	102.0	-27	106.0	25	498
10	Right side - passenger	-184.0	-74.0	100.0	-26	114.0	25	500
11	Right side - A-pillar	-38.1	-306.1	44.0	0	NA	50	505
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	495
15	Left side - steering column	-144.0	286.0	103.0	-14	NA	25	495
16	Left side - steering column	-144.0	286.0	75.1	-9	NA	25	500
17	Right side - passenger	-38.8	-210.8	45.3	7	229.0	25	520

*+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

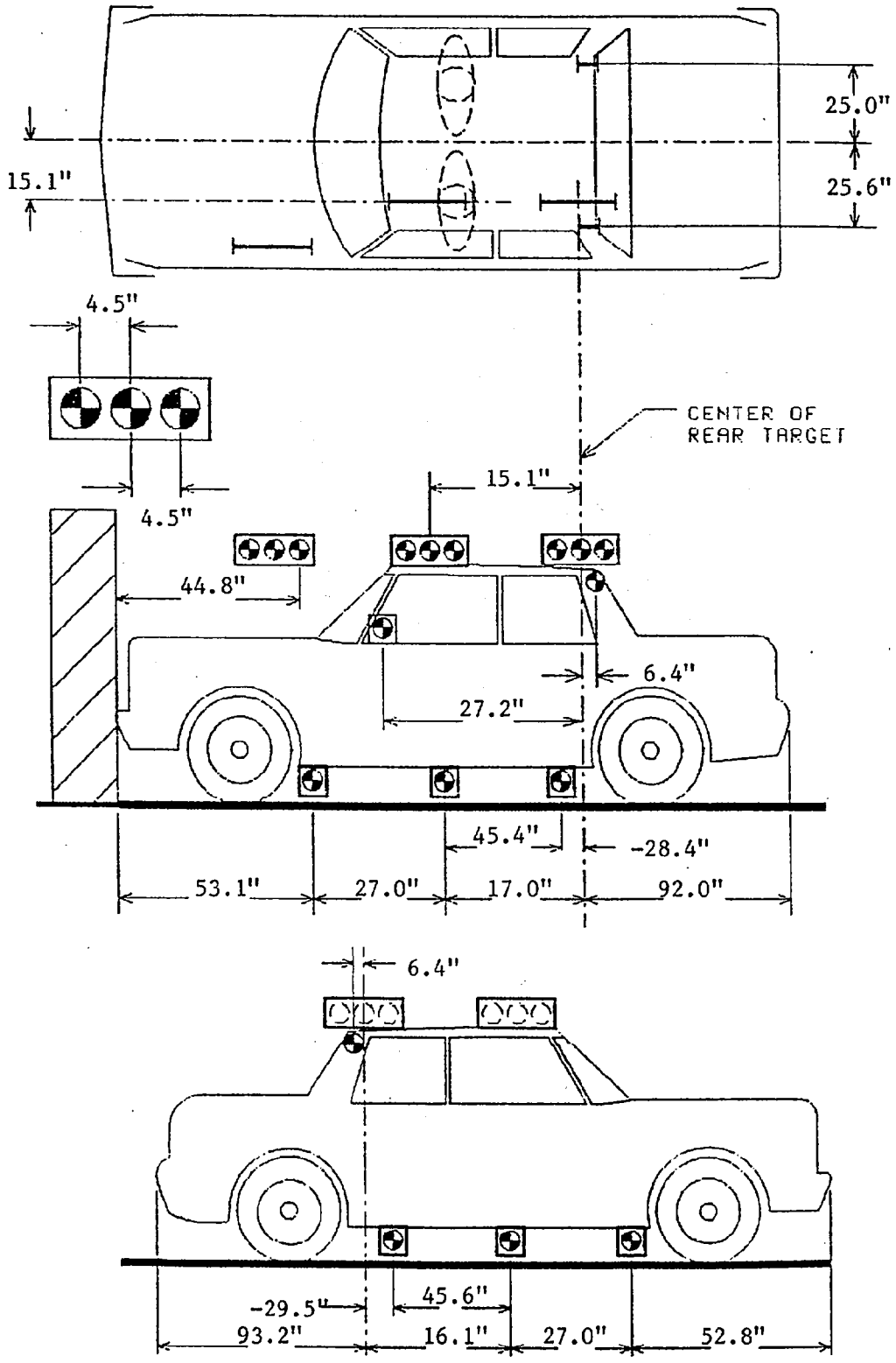


FIGURE 11

PRE-TEST AND POST-TEST MEASUREMENT POINTS

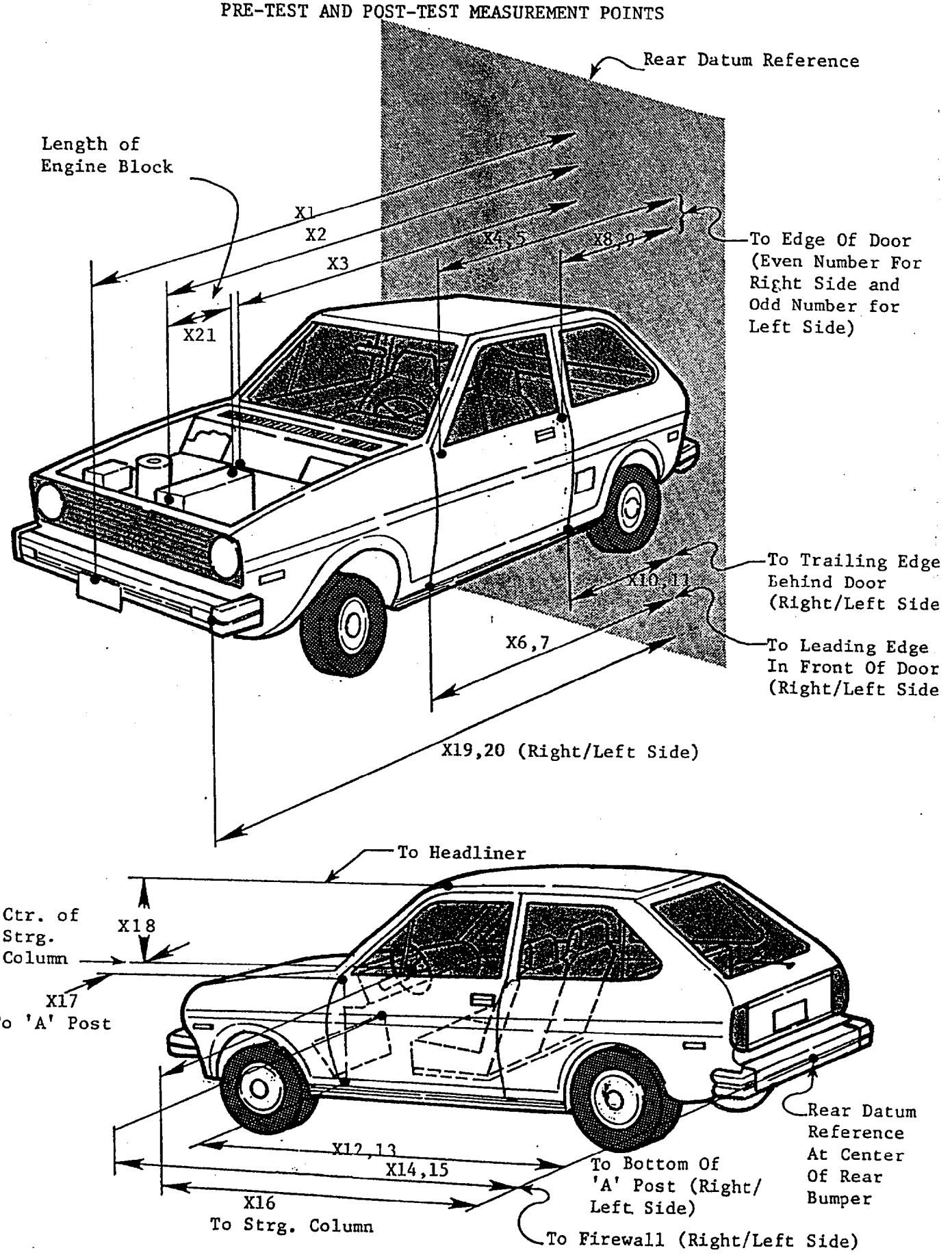


TABLE 12 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Dodge Dakota TEST NUMBER: 911211

ALL MEASUREMENTS ARE IN INCHES

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	189.1	159.9	29.2
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	163.0	151.4	11.6
X3	REAR SURFACE OF VEHICLE TO FIREWALL	143.1	141.4	1.7
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	131.5	131.0	0.5
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	137.4	130.5	6.9
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	130.2	128.8	1.4
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	130.5	128.6	1.9
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	87.2	86.5	0.7
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	87.8	86.2	1.6
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	87.0	85.4	1.6
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	87.2	85.2	2.0
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	130.2	129.0	1.2
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	130.2	128.6	1.6
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	143.2	142.3	0.9
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	142.4	141.5	0.9
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	114.0	110.5	3.5
X17	CENTER OF STEERING COLUMN TO "A" POST	11.2	12.0	-0.8
X18	CENTER OF STEERING COLUMN TO HEADLINER	18.1	29.0	-10.9
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	183.2	159.6	23.6
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	183.4	160.2	23.2
X21	LENGTH OF ENGINE BLOCK	19.0	19.0	0.0

APPENDIX A

PHOTOGRAPHS

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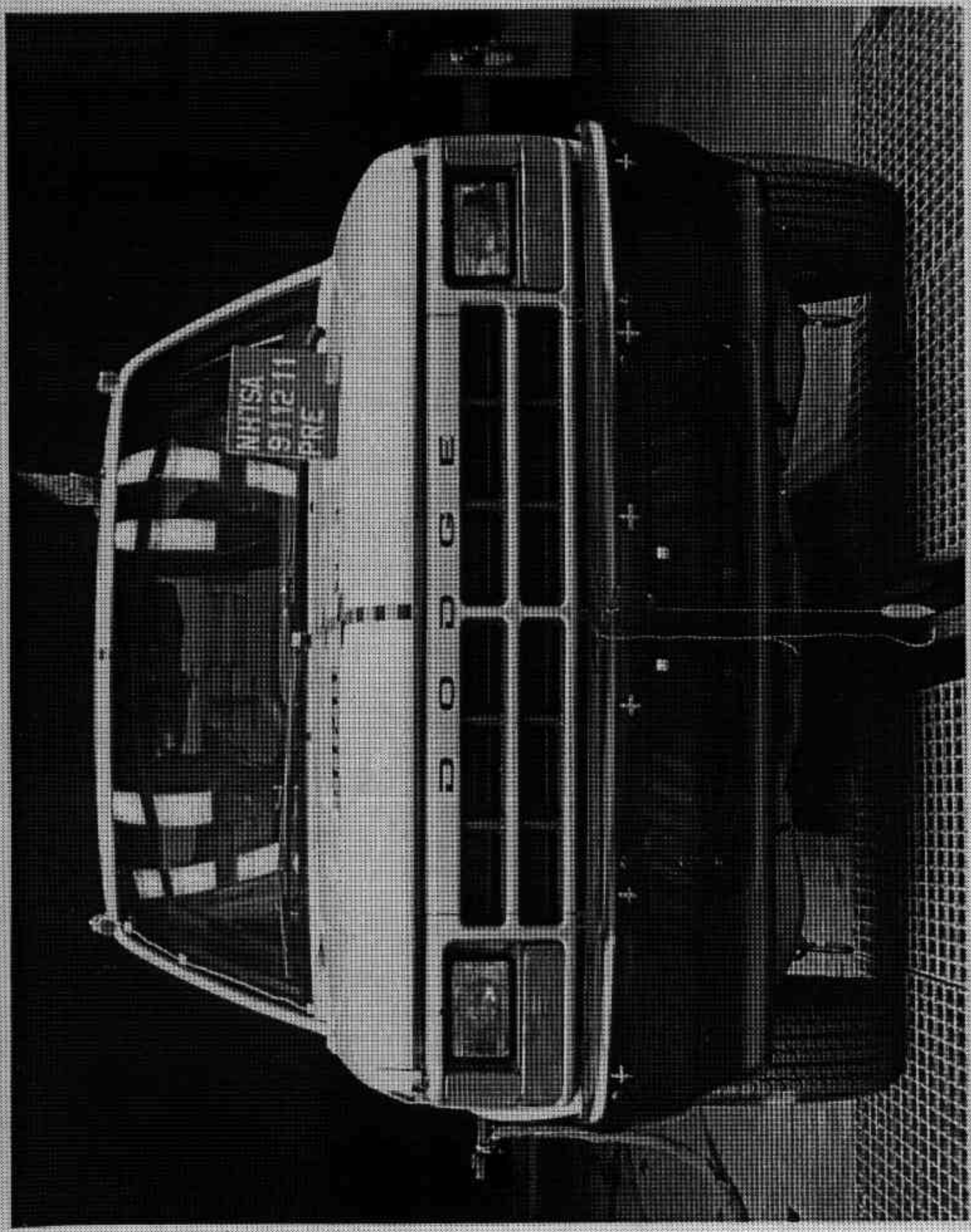


FIGURE A-1. PRE-TEST FRONT VIEW

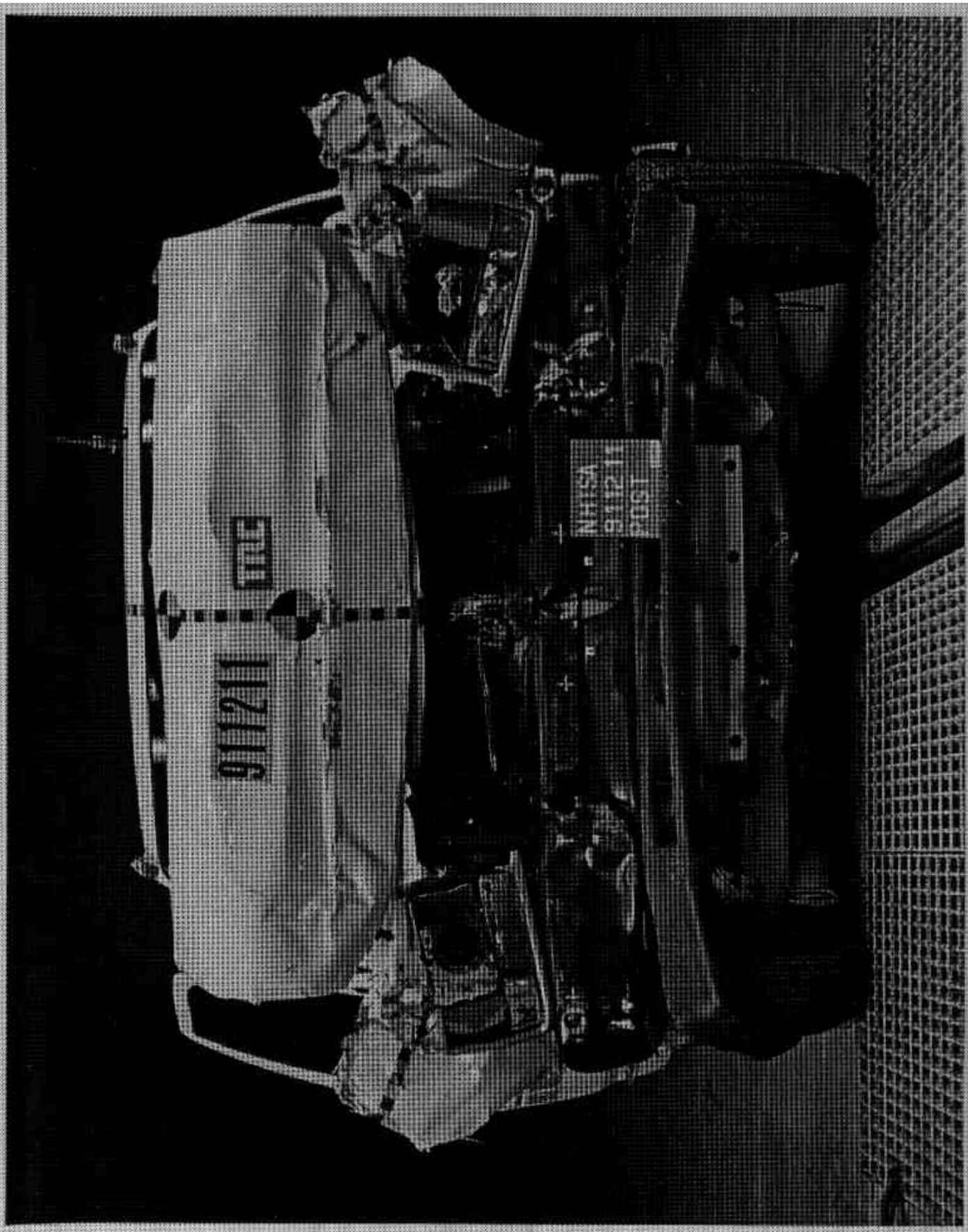


FIGURE A-2. POST-TEST FRONT VIEW

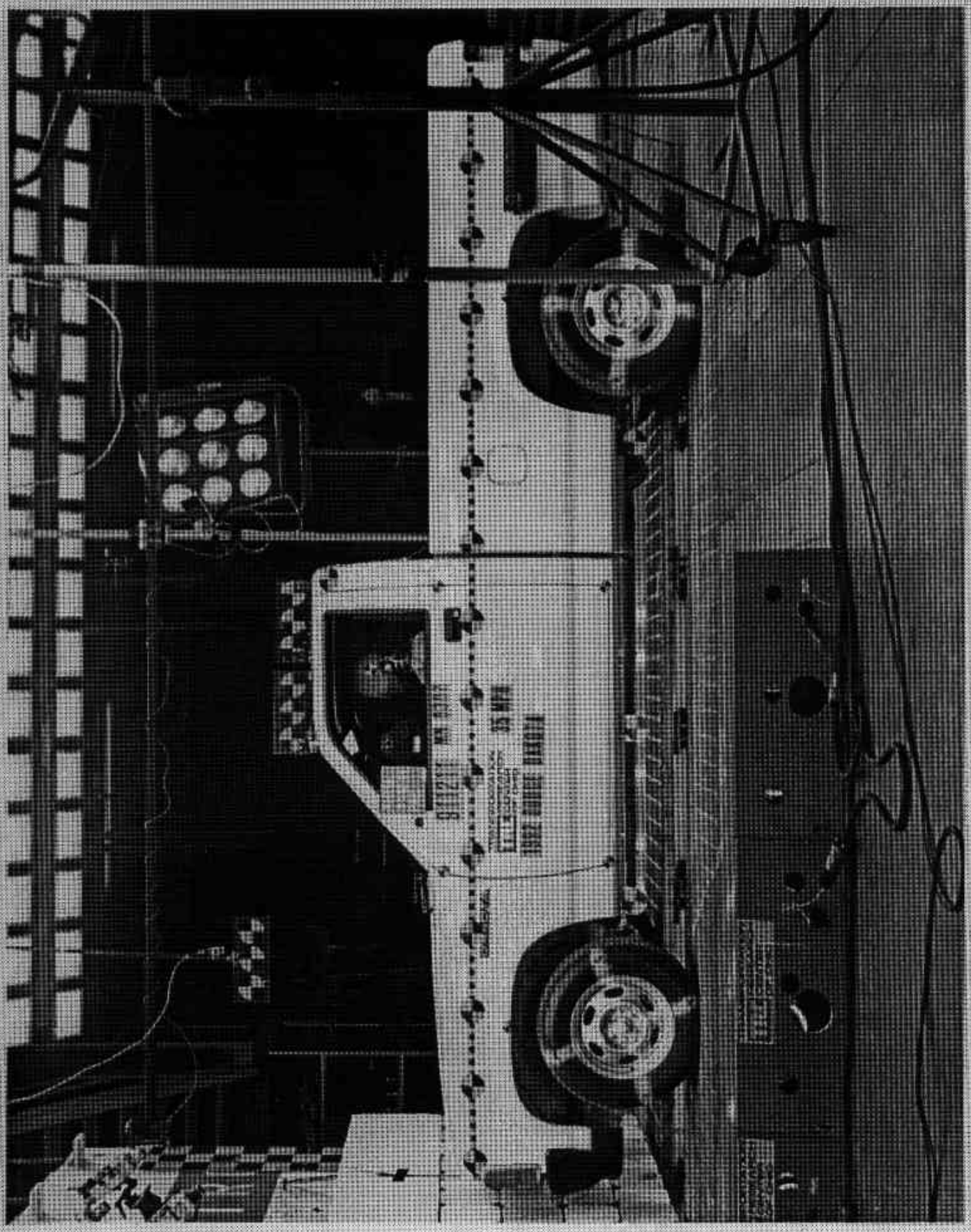


FIGURE A-3. PRE-TEST LEFT SIDE VIEW

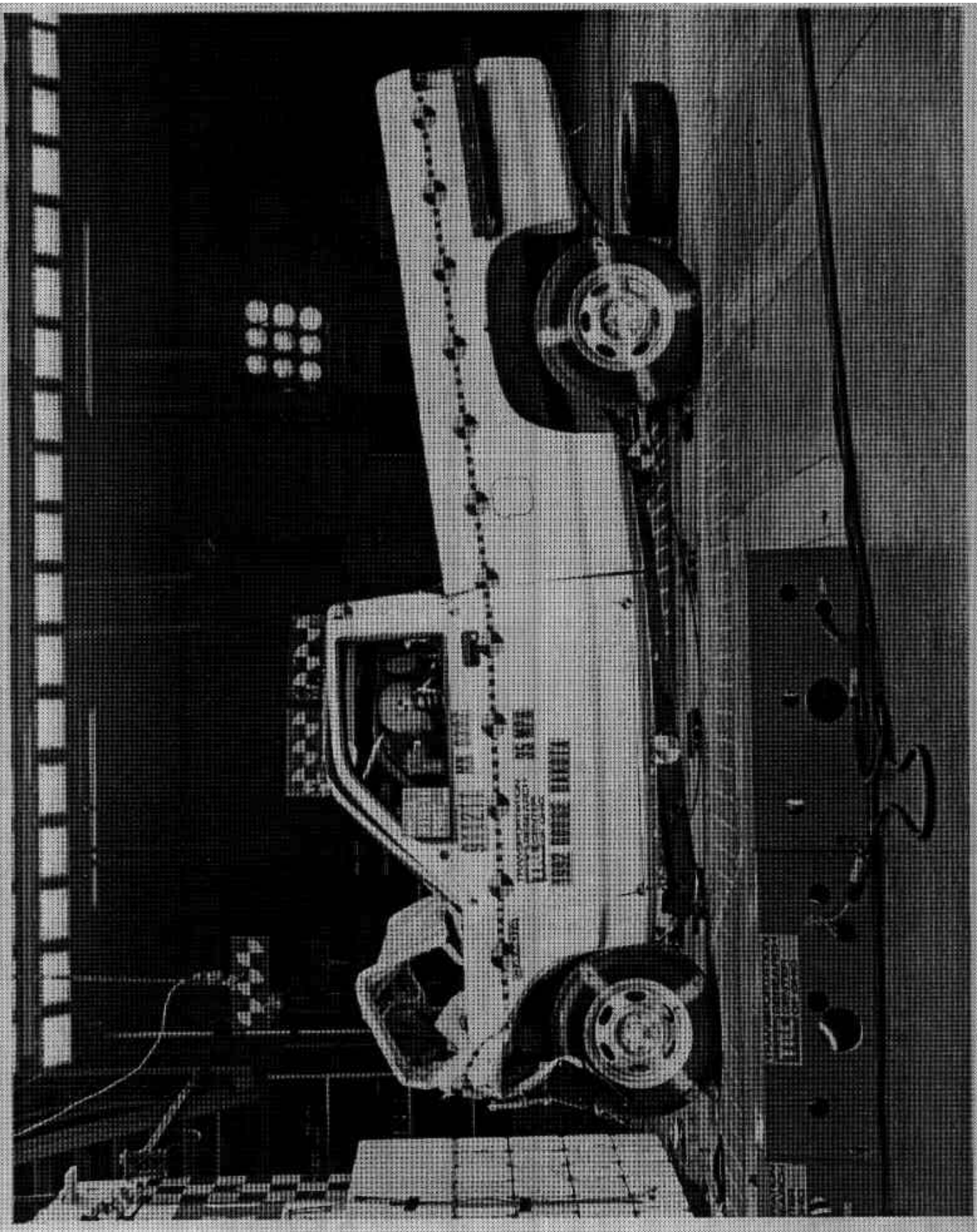


FIGURE A-4. POST-TEST LEFT SIDE VIEW

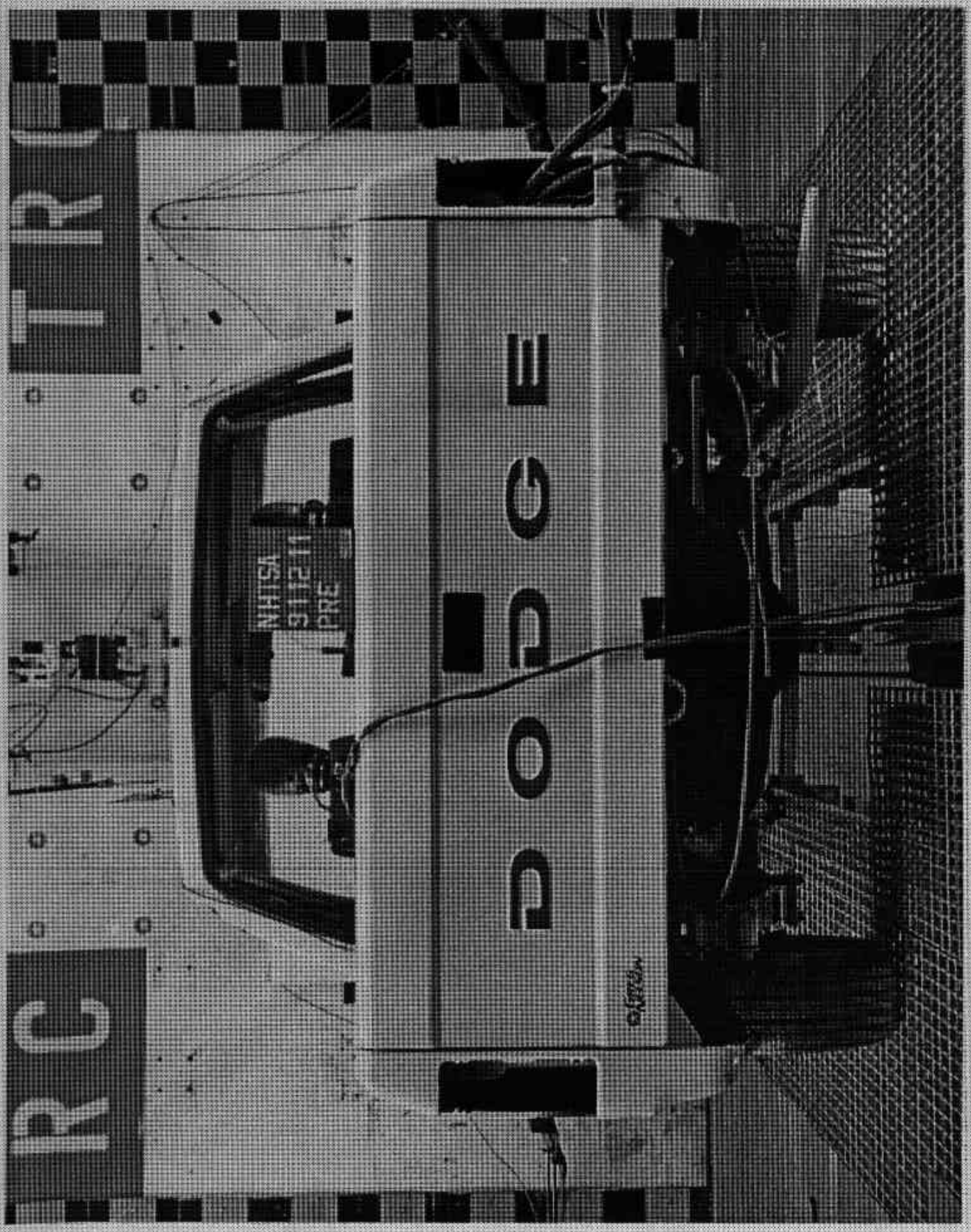


FIGURE A-5. PRE-TEST REAR VIEW

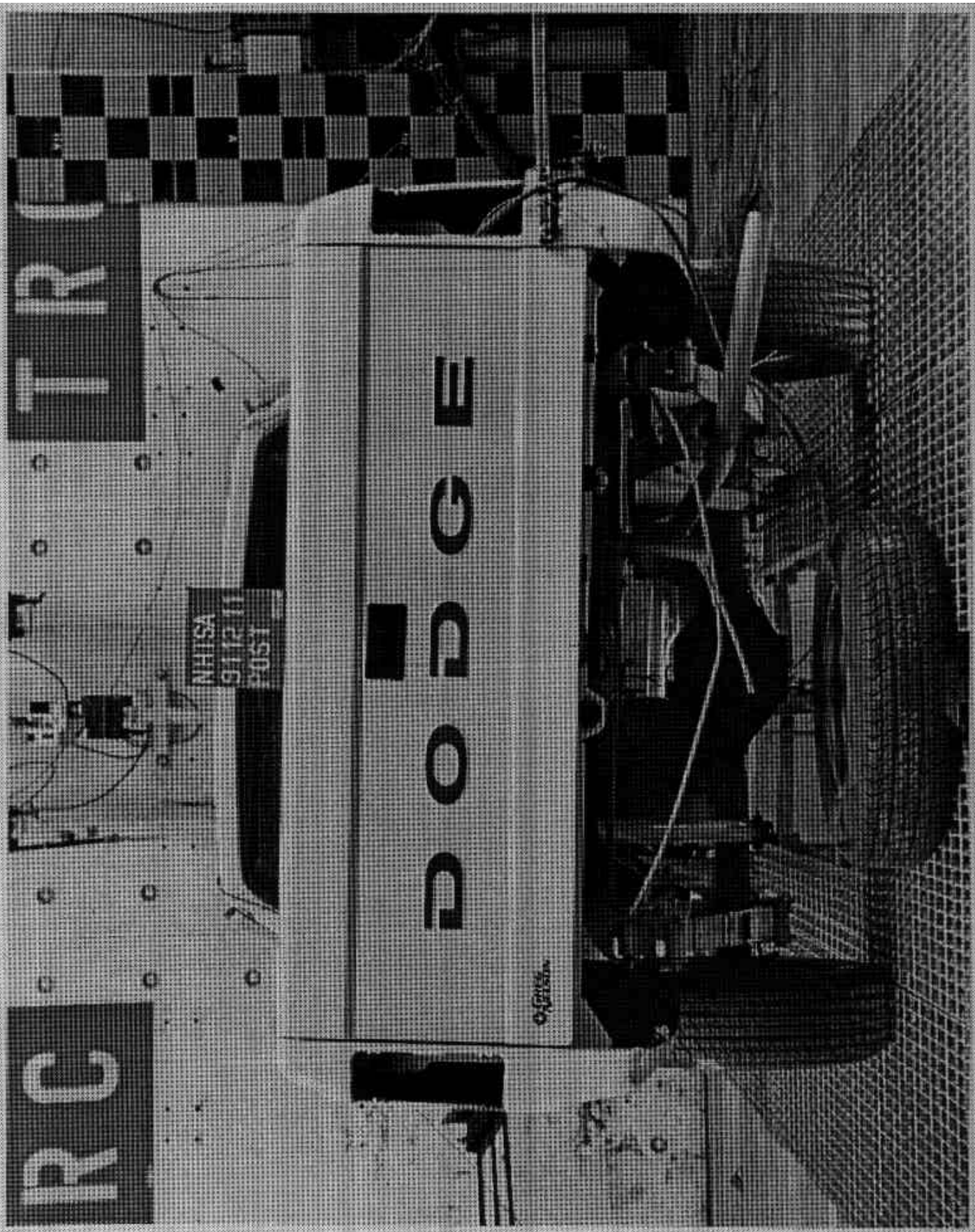


FIGURE A-6. POST-TEST REAR VIEW

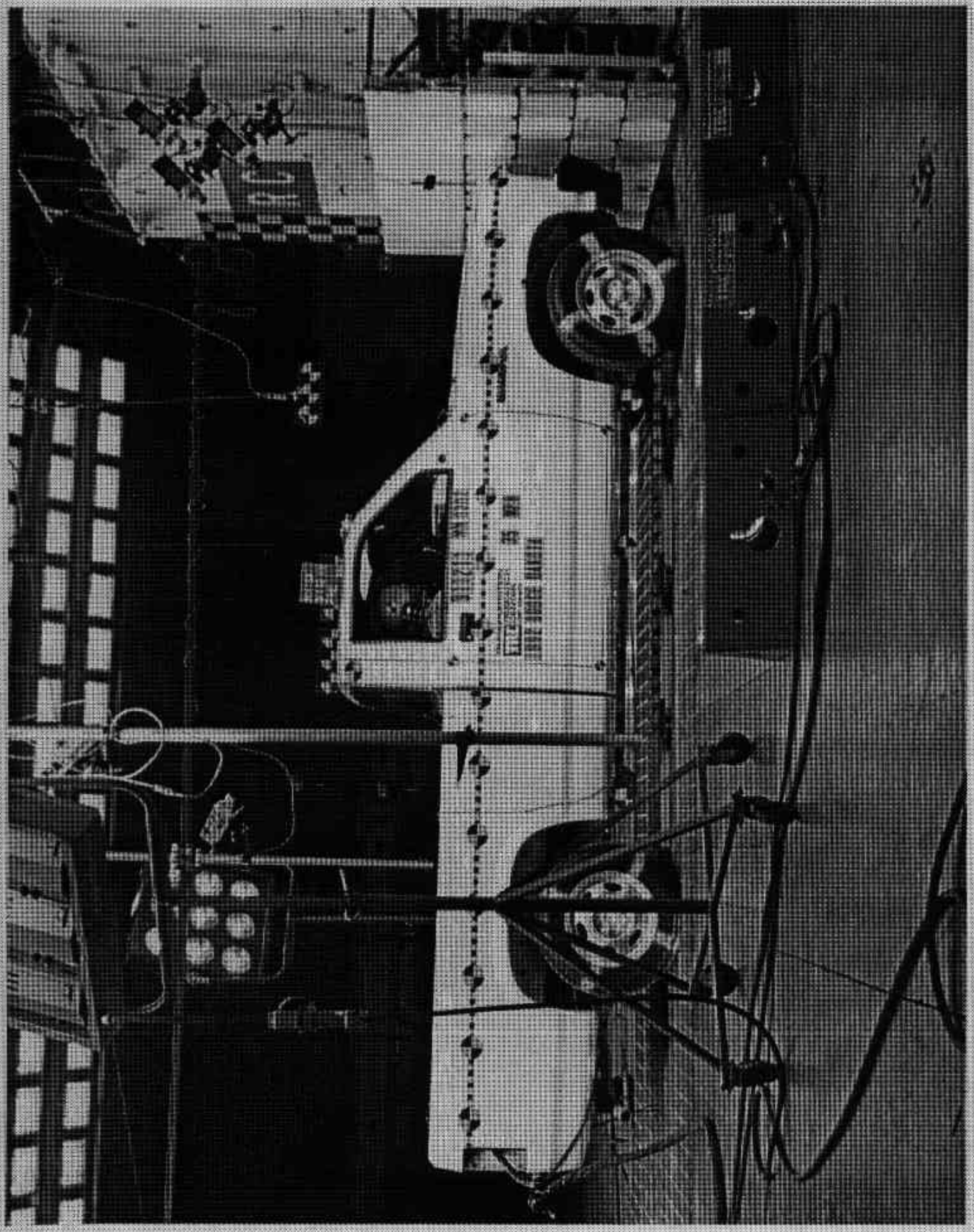


FIGURE A-7. PRE-TEST RIGHT SIDE VIEW

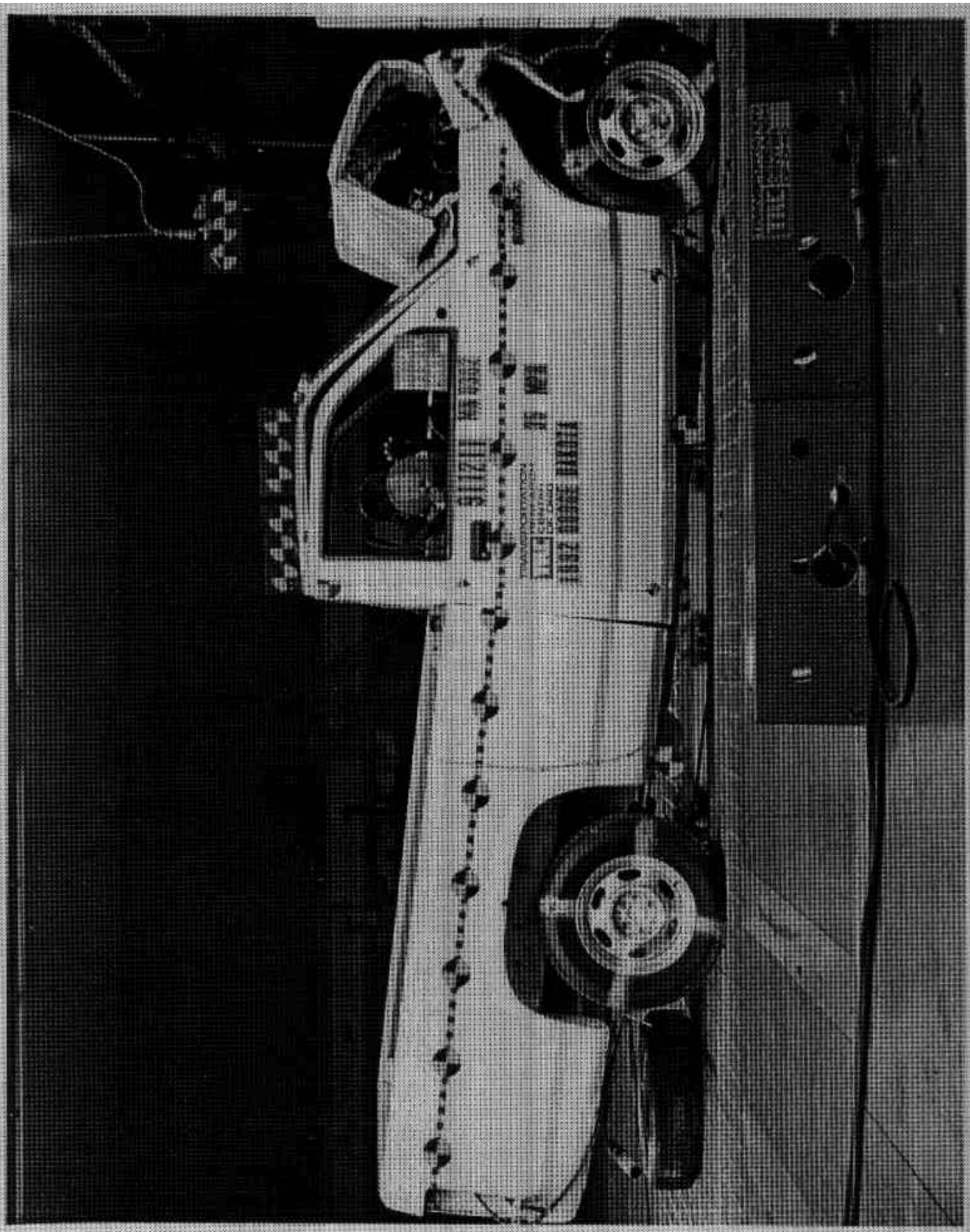


FIGURE A-8. POST-TEST RIGHT SIDE VIEW

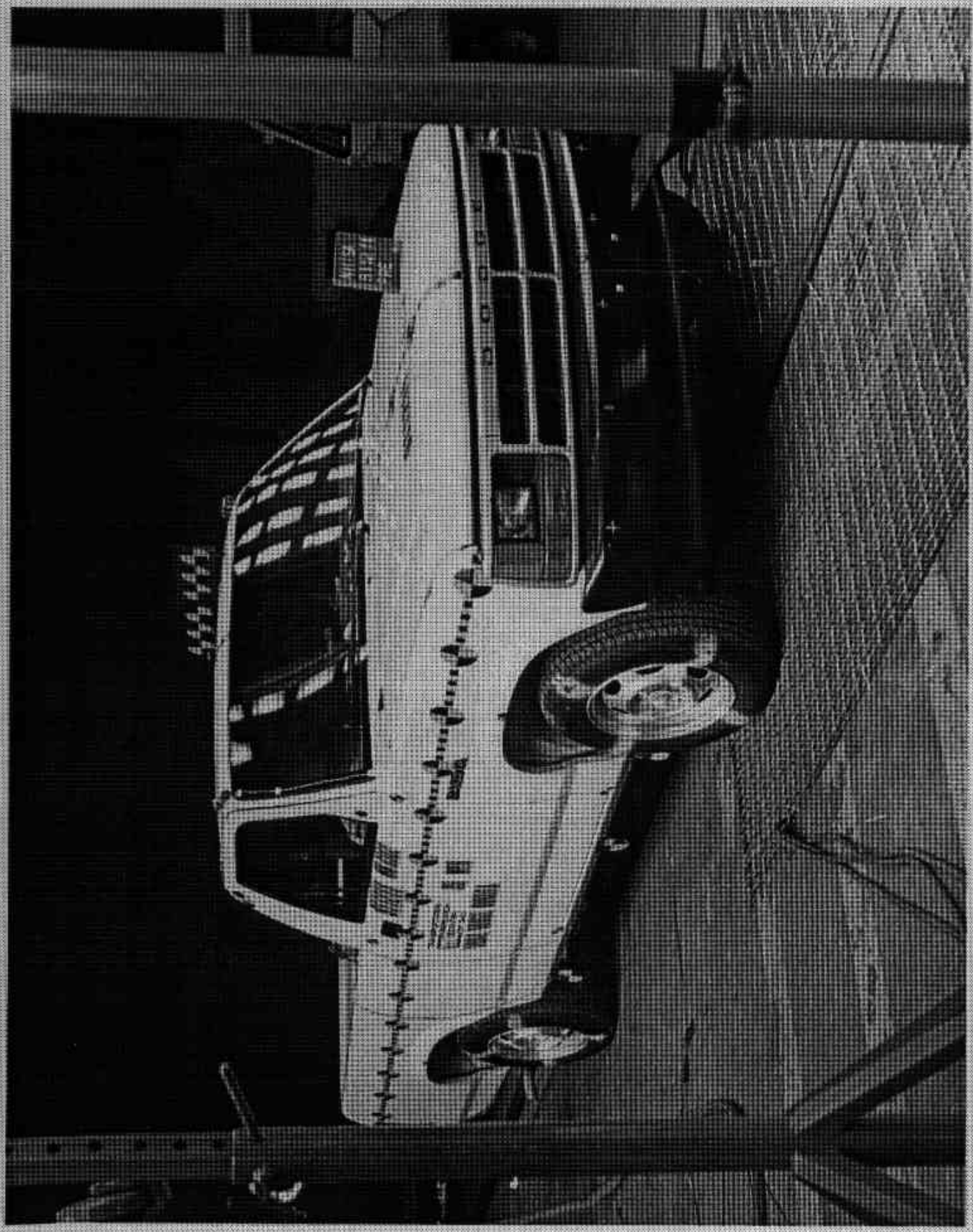


FIGURE A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

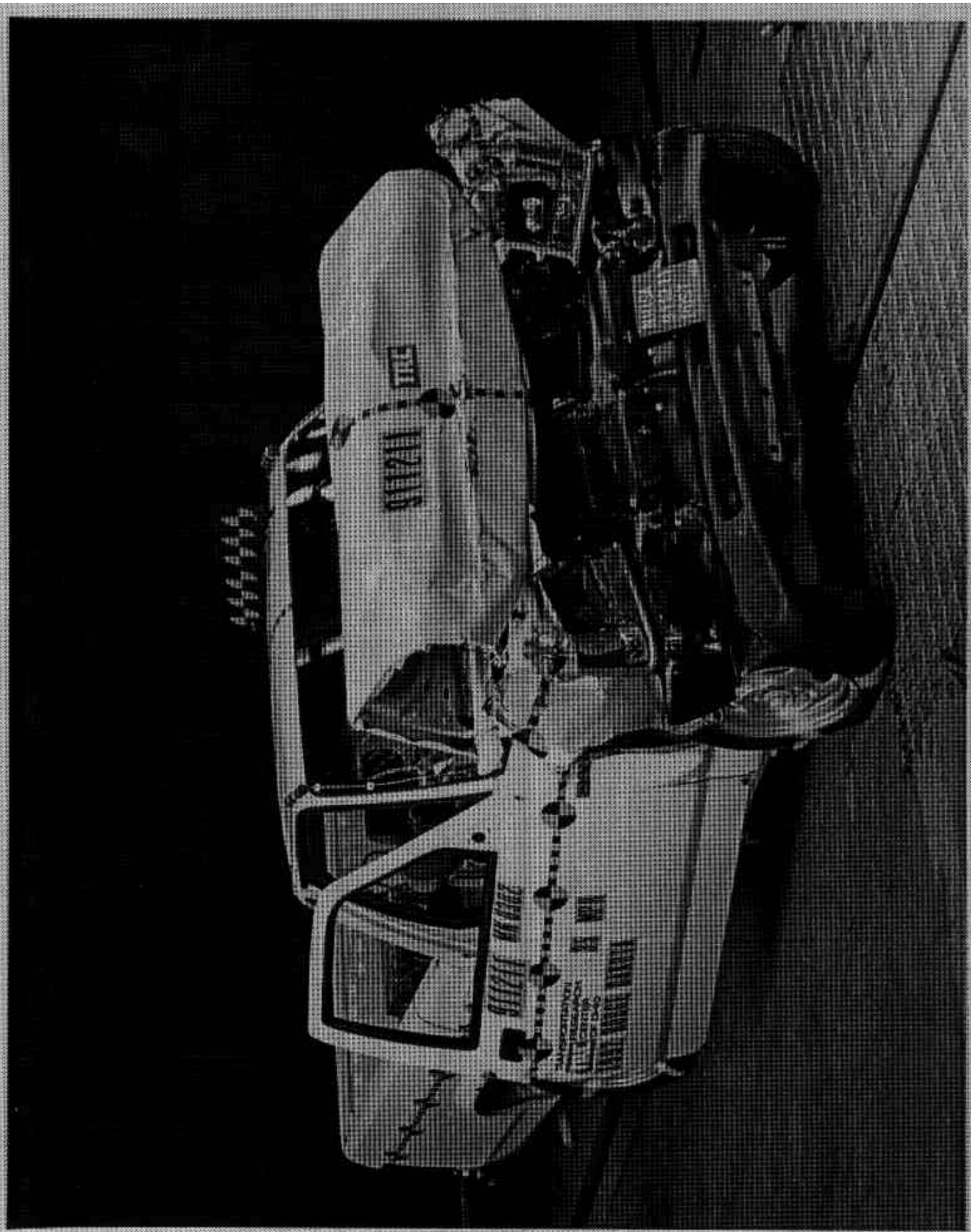


FIGURE A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

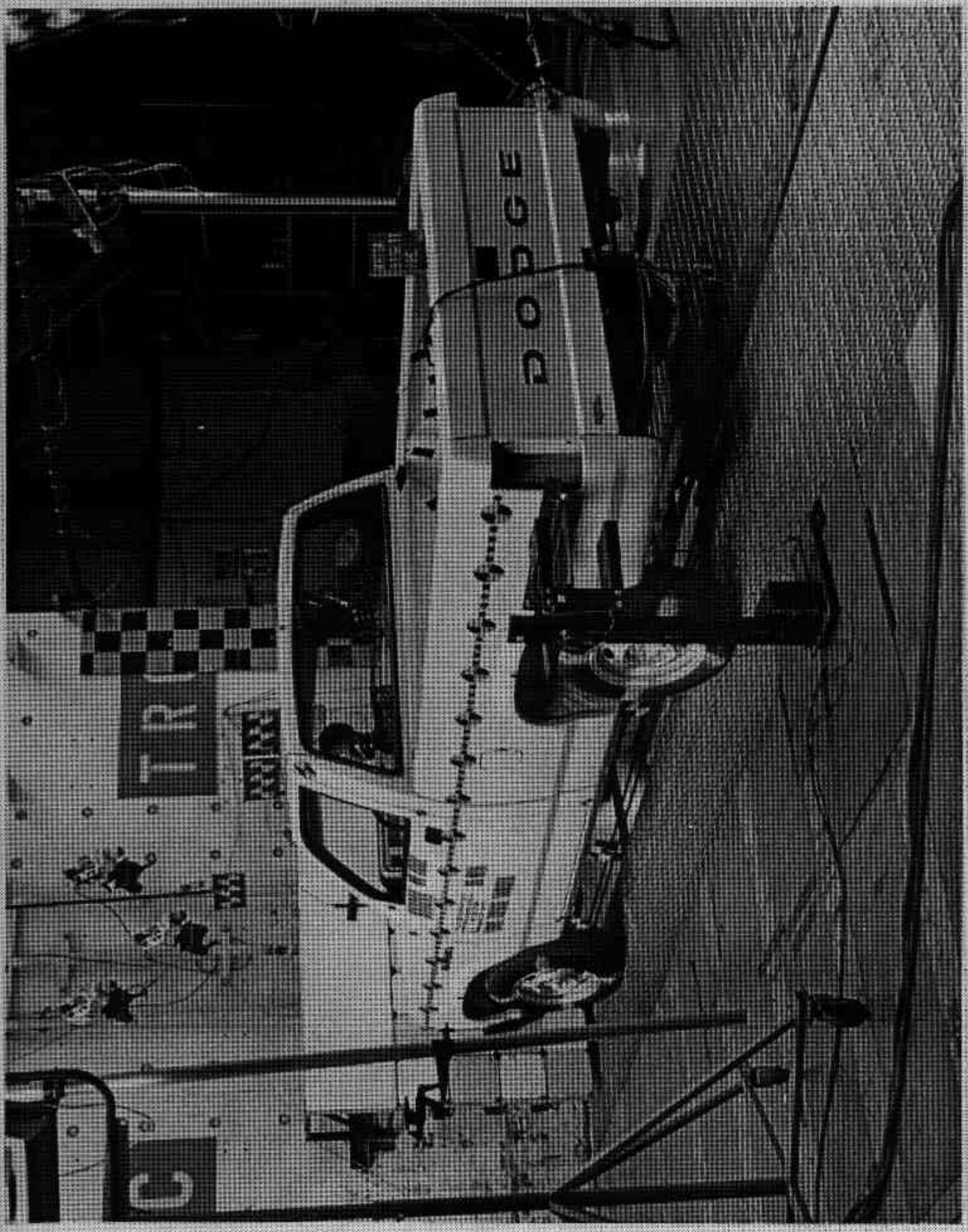


FIGURE A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW

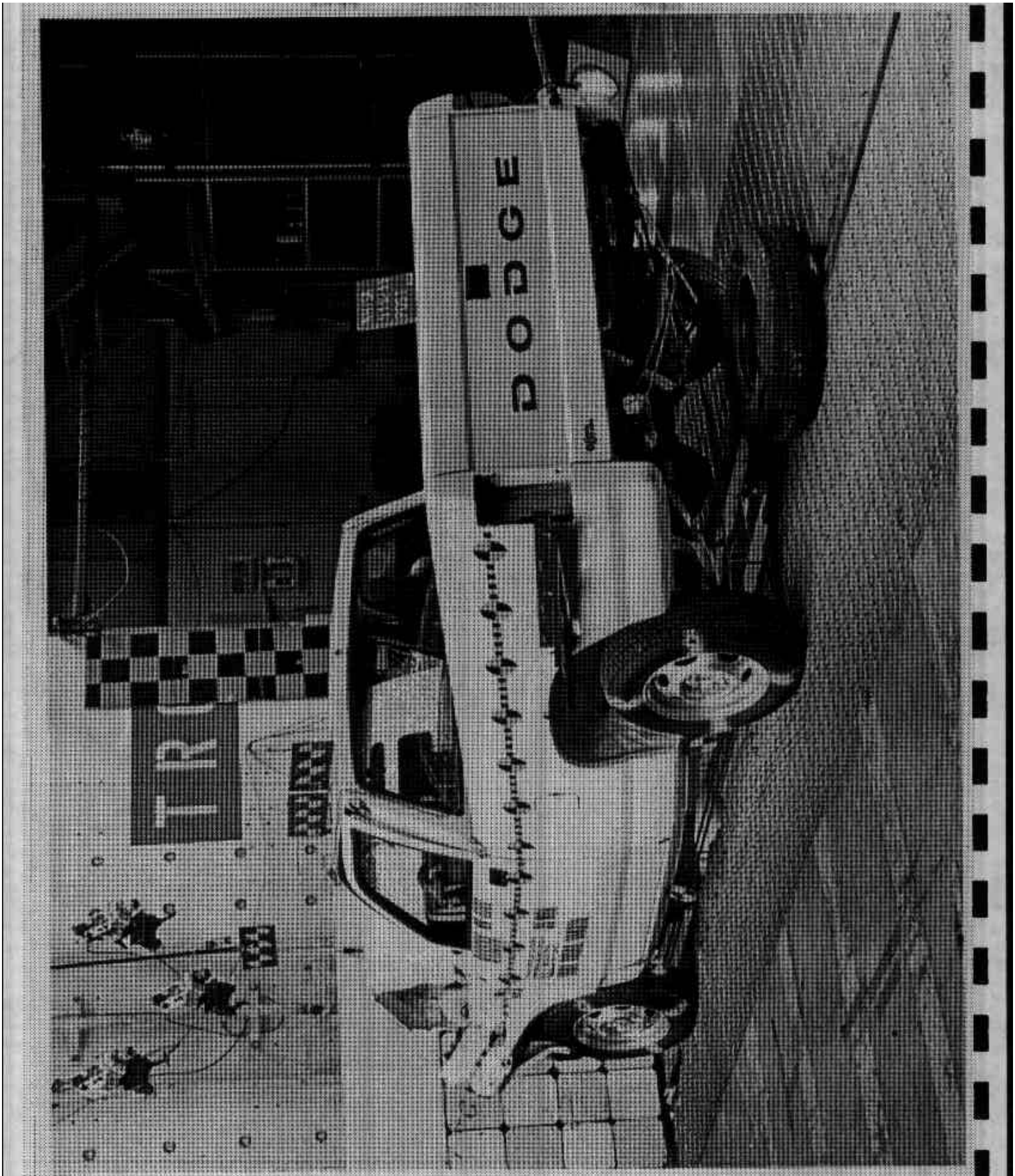


FIGURE A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW

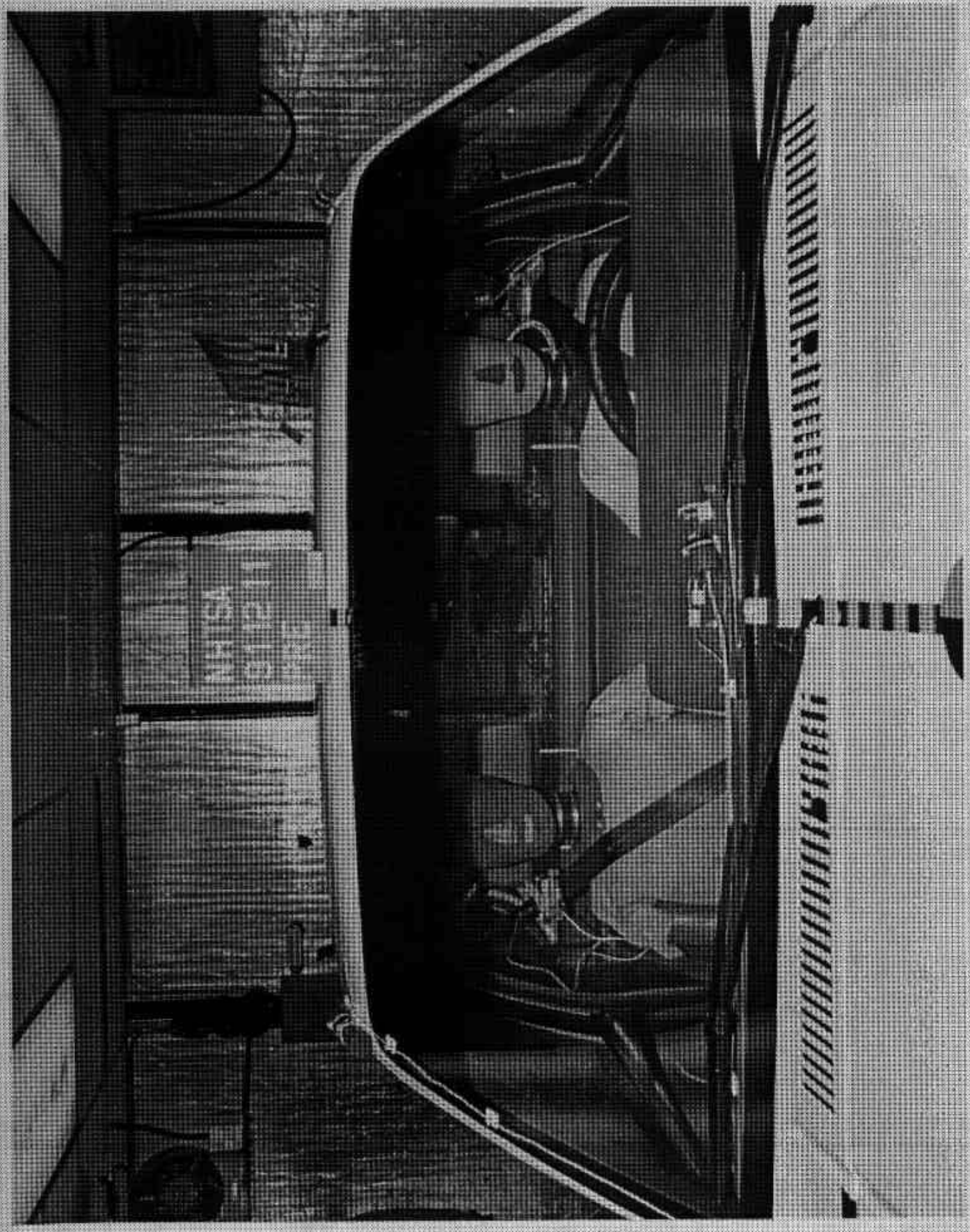


FIGURE A-13. PRE-TEST WINDSHIELD VIEW

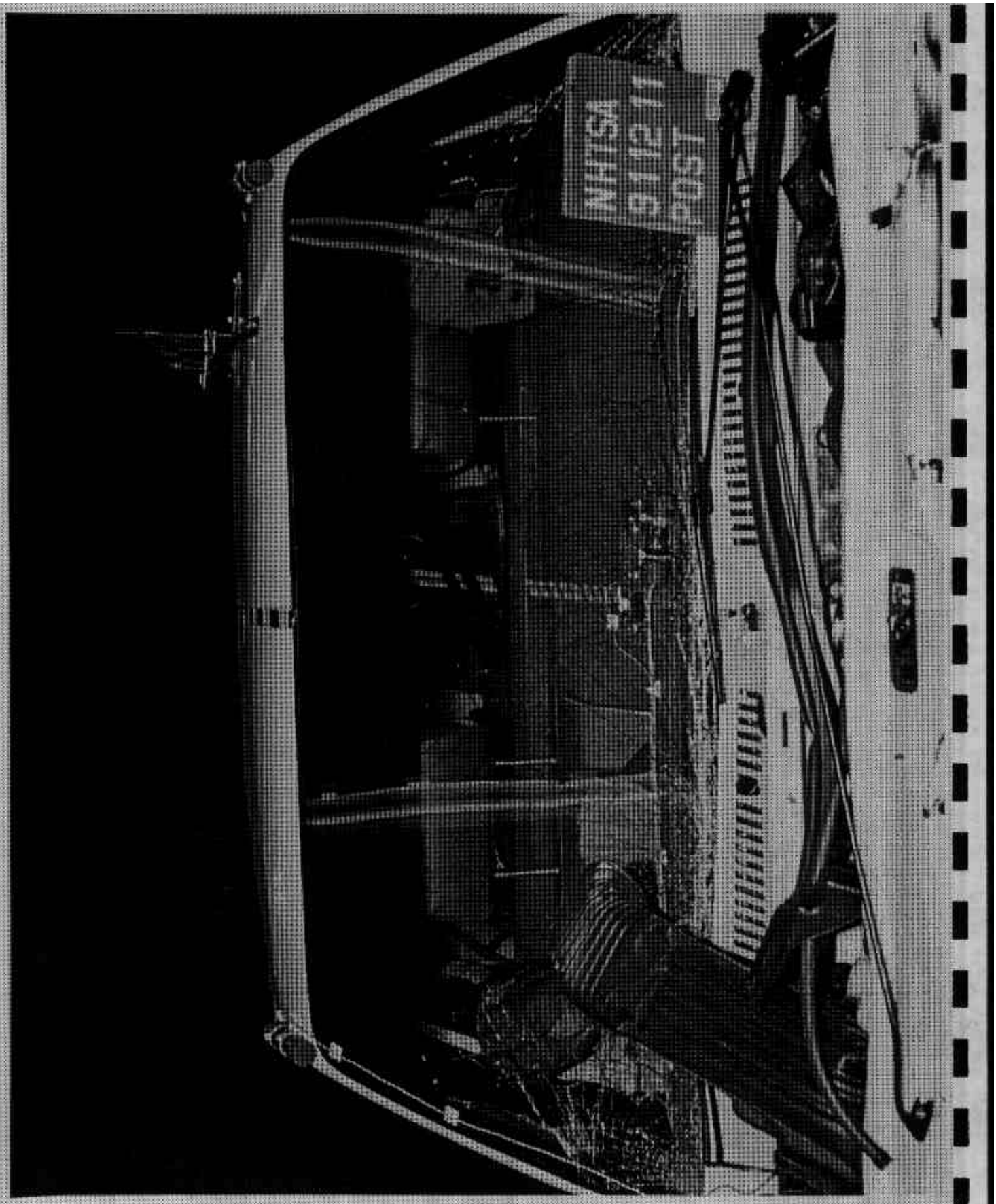


FIGURE A-14. POST-TEST WINDSHIELD VIEW

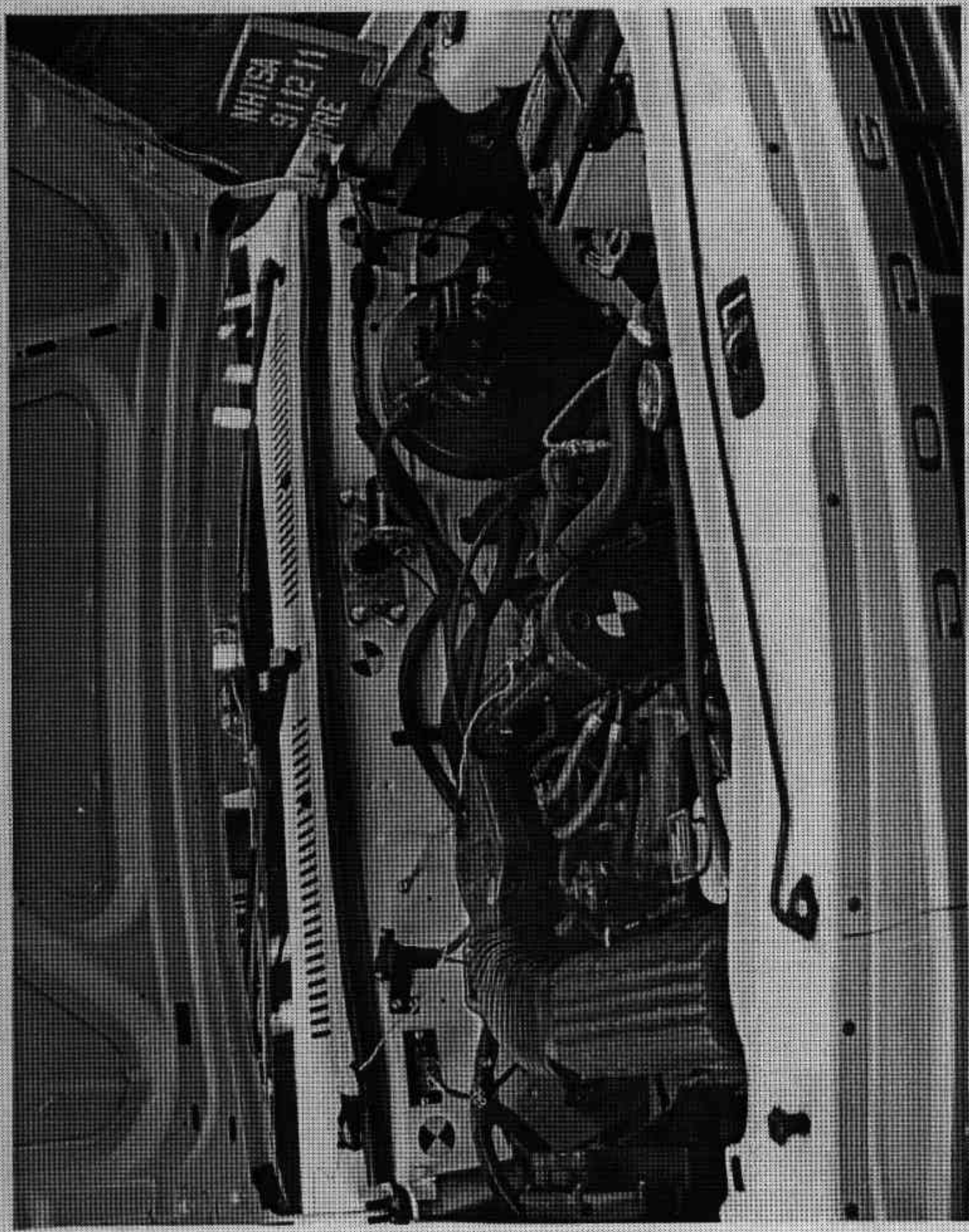


FIGURE A-15. PRE-TEST ENGINE COMPARTMENT VIEW

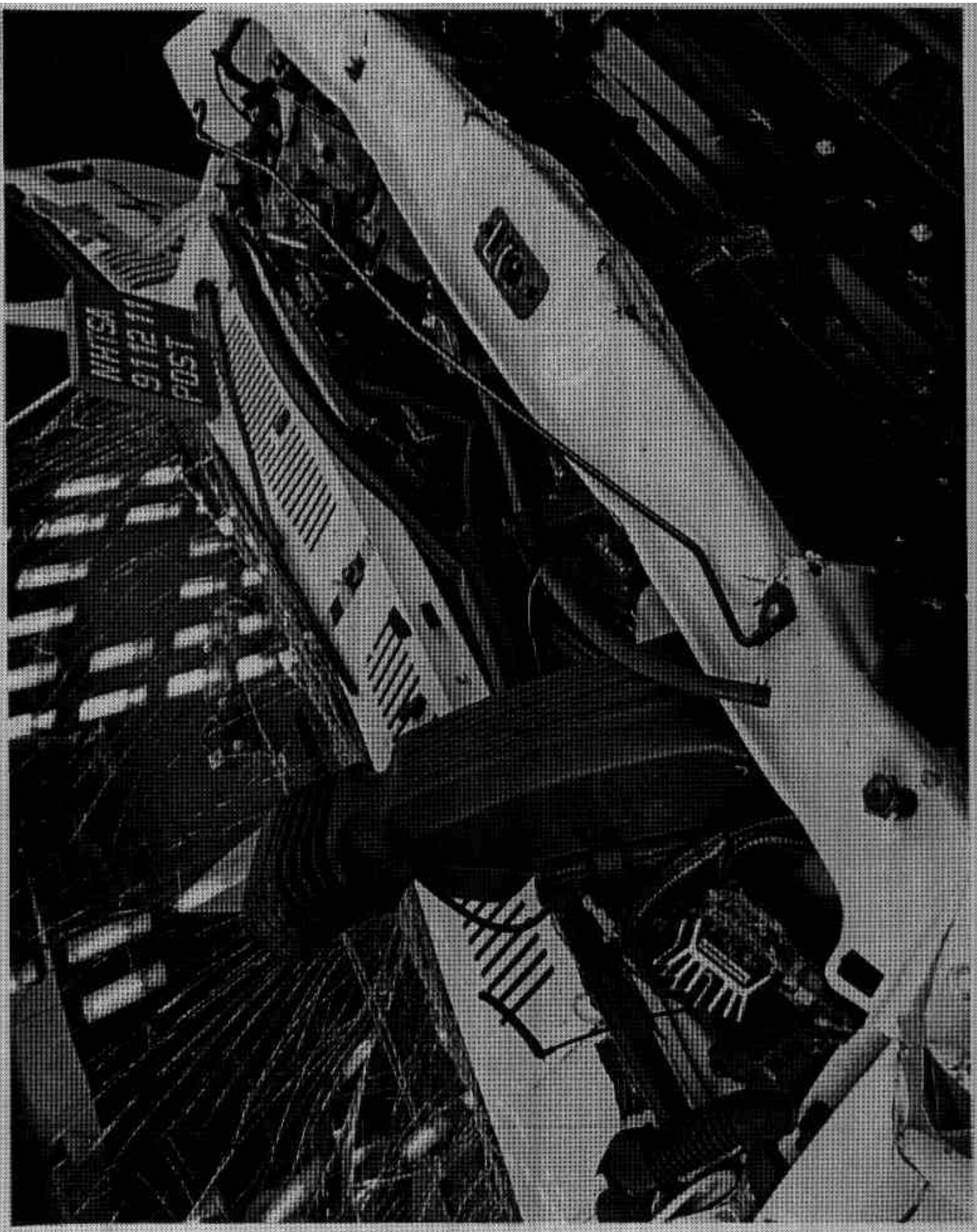


FIGURE A-16. POST-TEST ENGINE COMPARTMENT VIEW

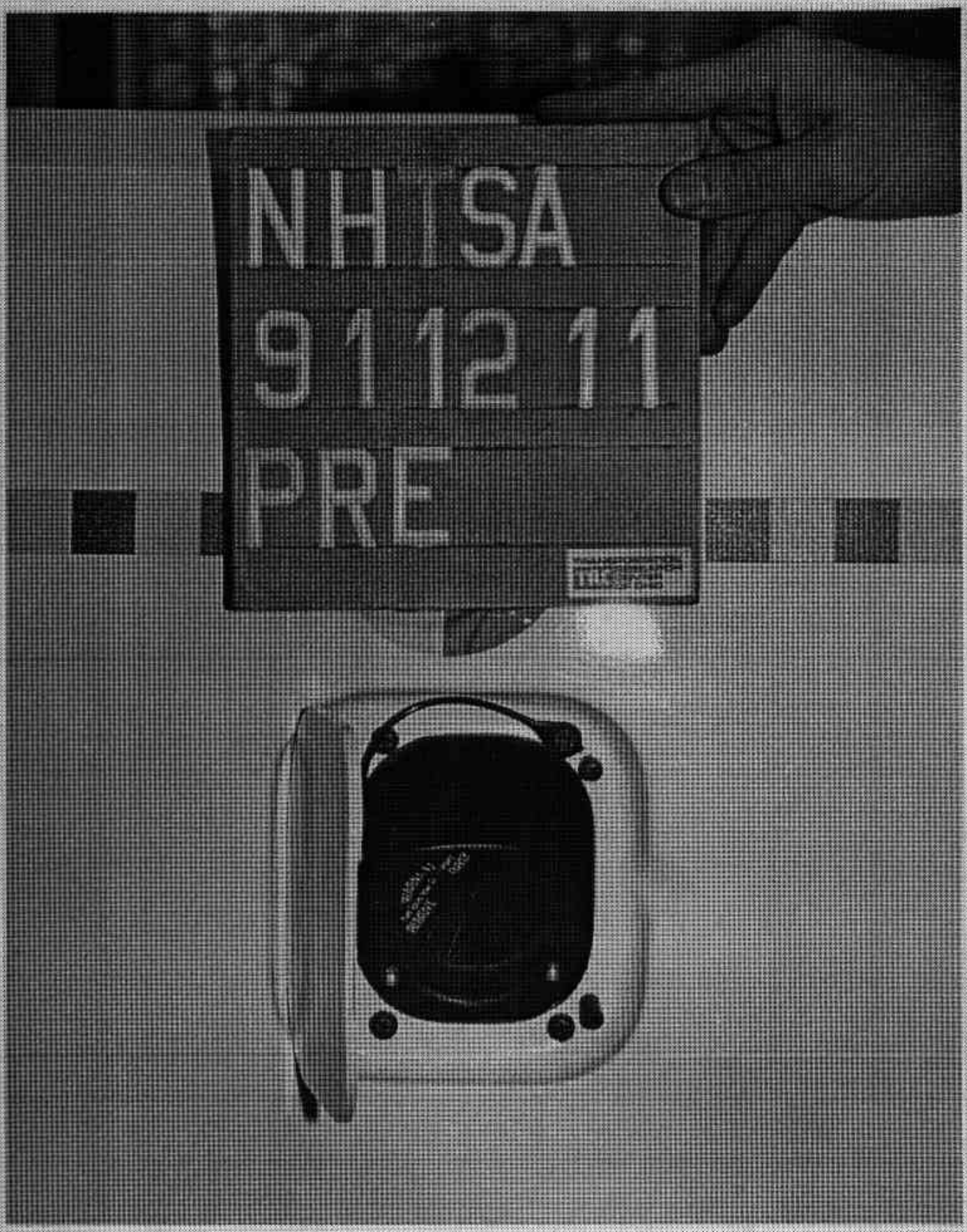


FIGURE A-17. PRE-TEST FUEL FILLER CAP VIEW

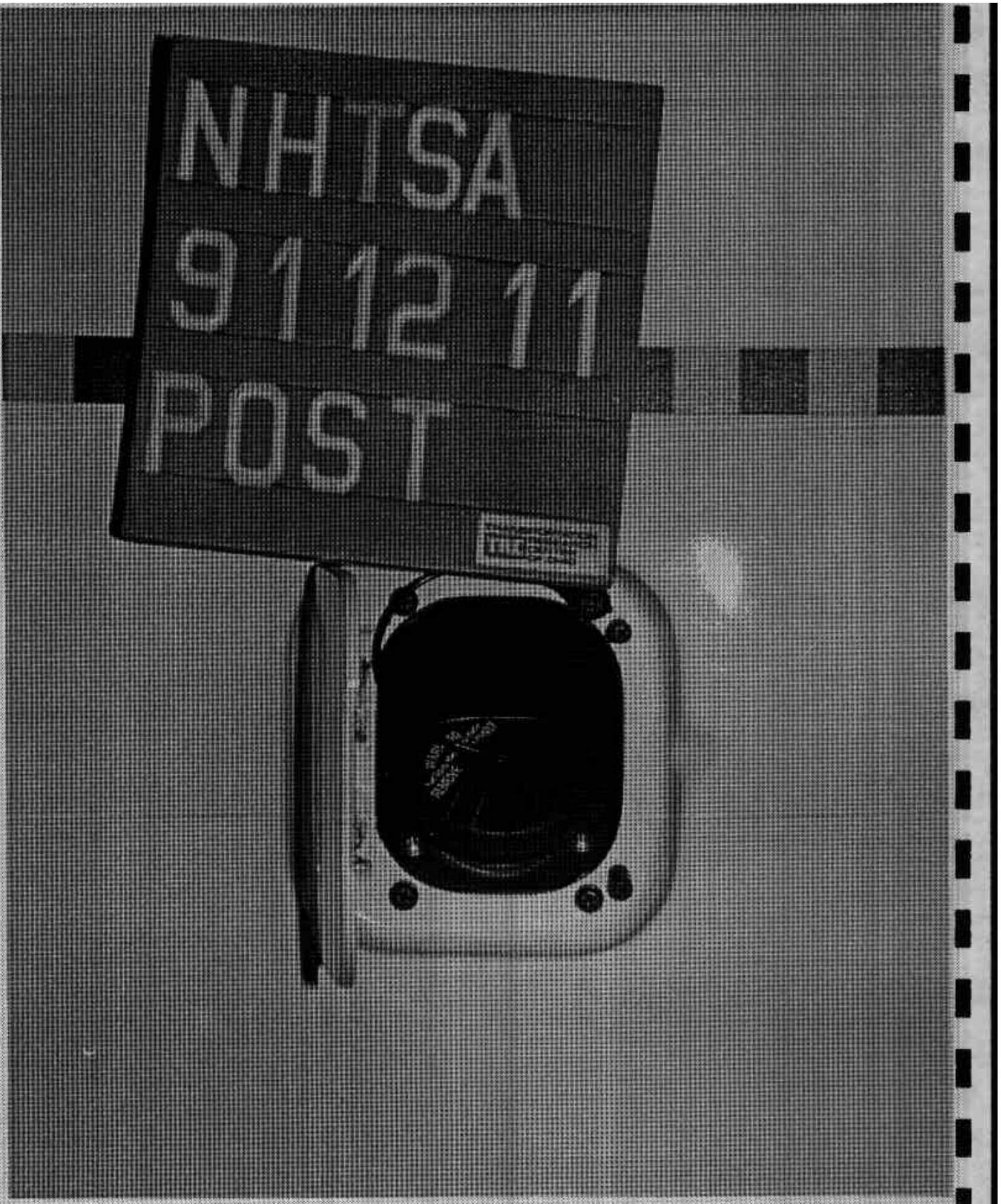


FIGURE A-18. POST-TEST FUEL FILLER CAP VIEW

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

FIGURE A-20. POST-TEST FUEL FILLER NECK VIEW

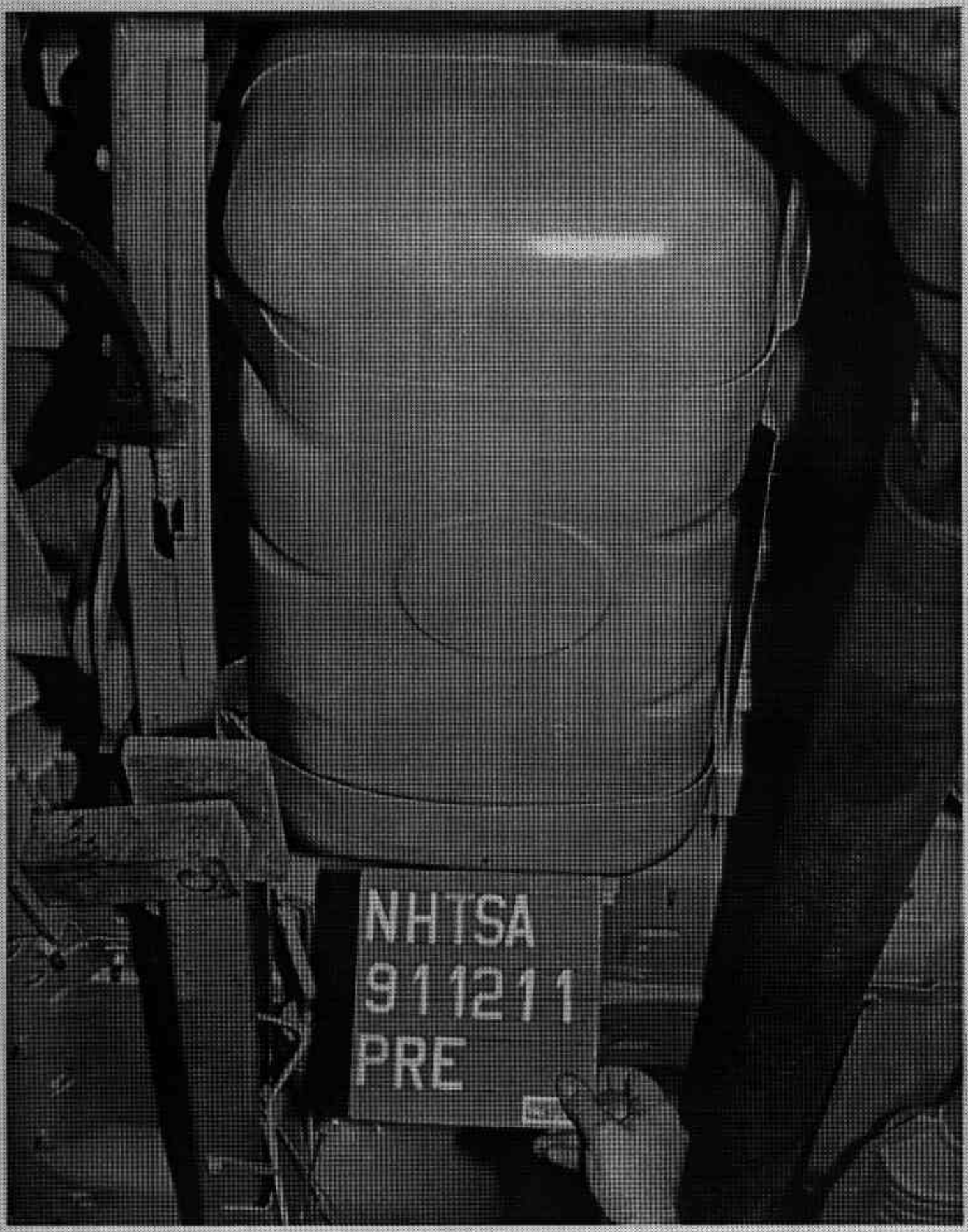


FIGURE A-21. PRE-TEST FUEL TANK VIEW

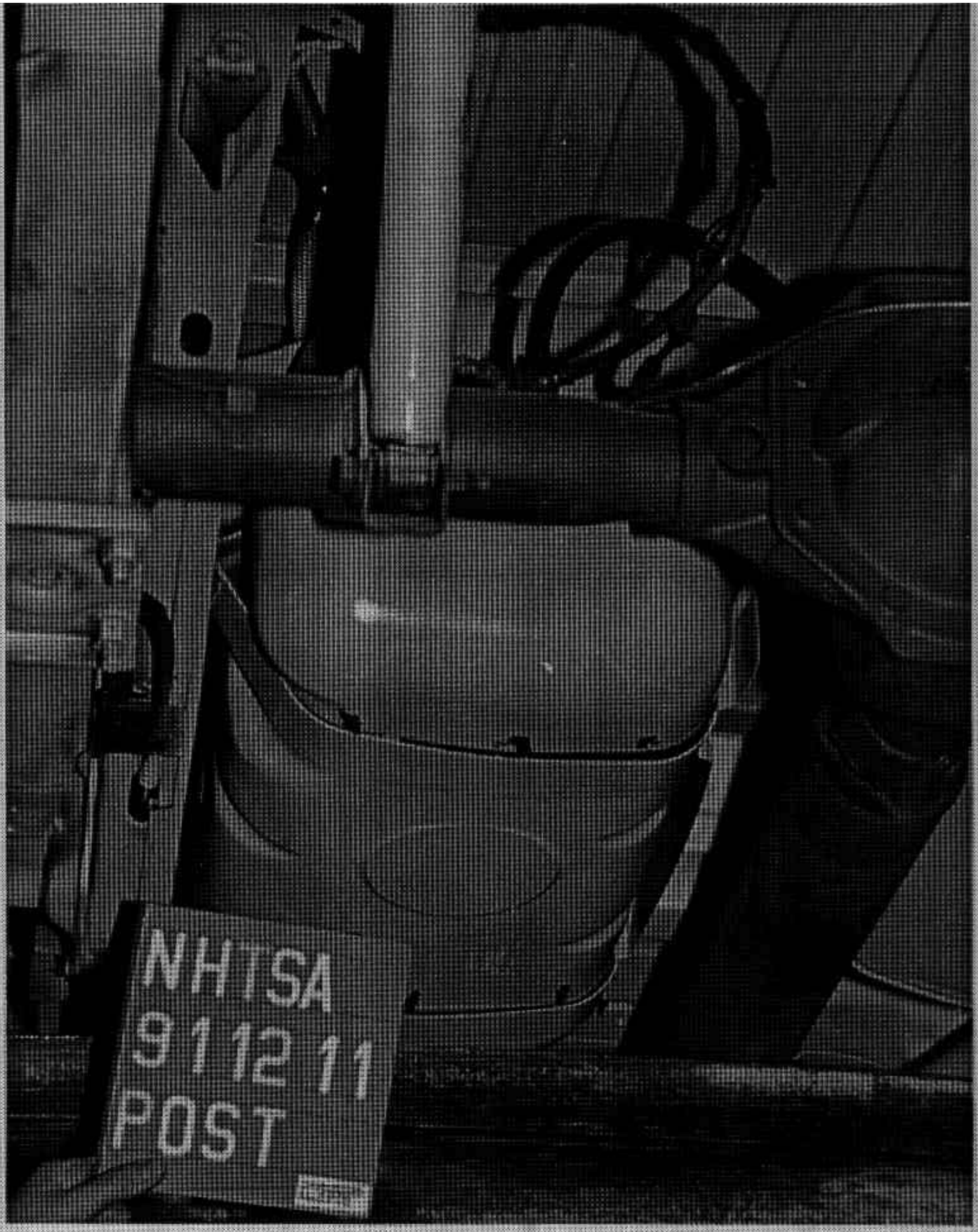


FIGURE A-22. POST-TEST FUEL TANK VIEW

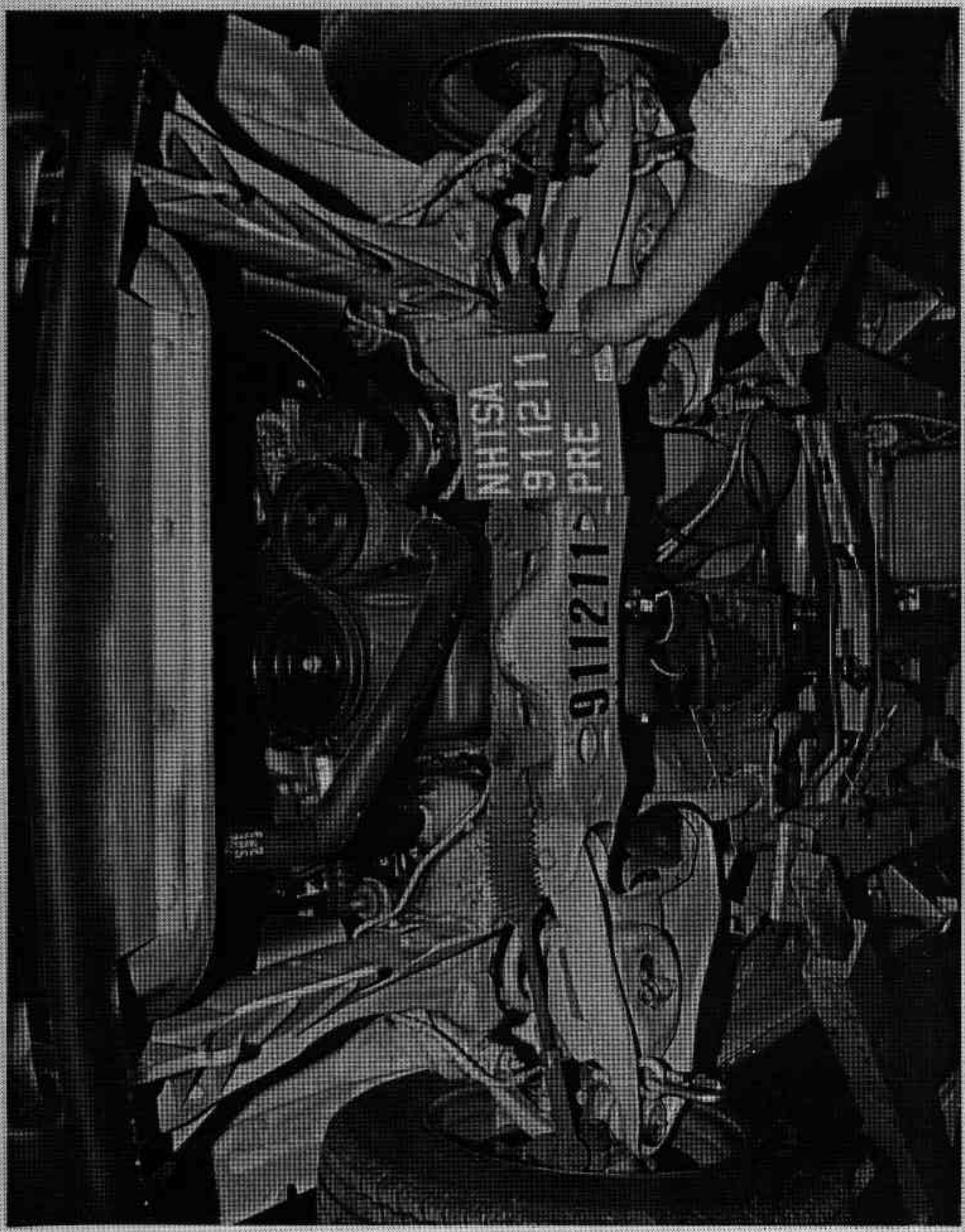


FIGURE A-23. PRE-TEST FRONT UNDERBODY VIEW

FIGURE A-24. POST-TEST FRONT UNDERBODY VIEW

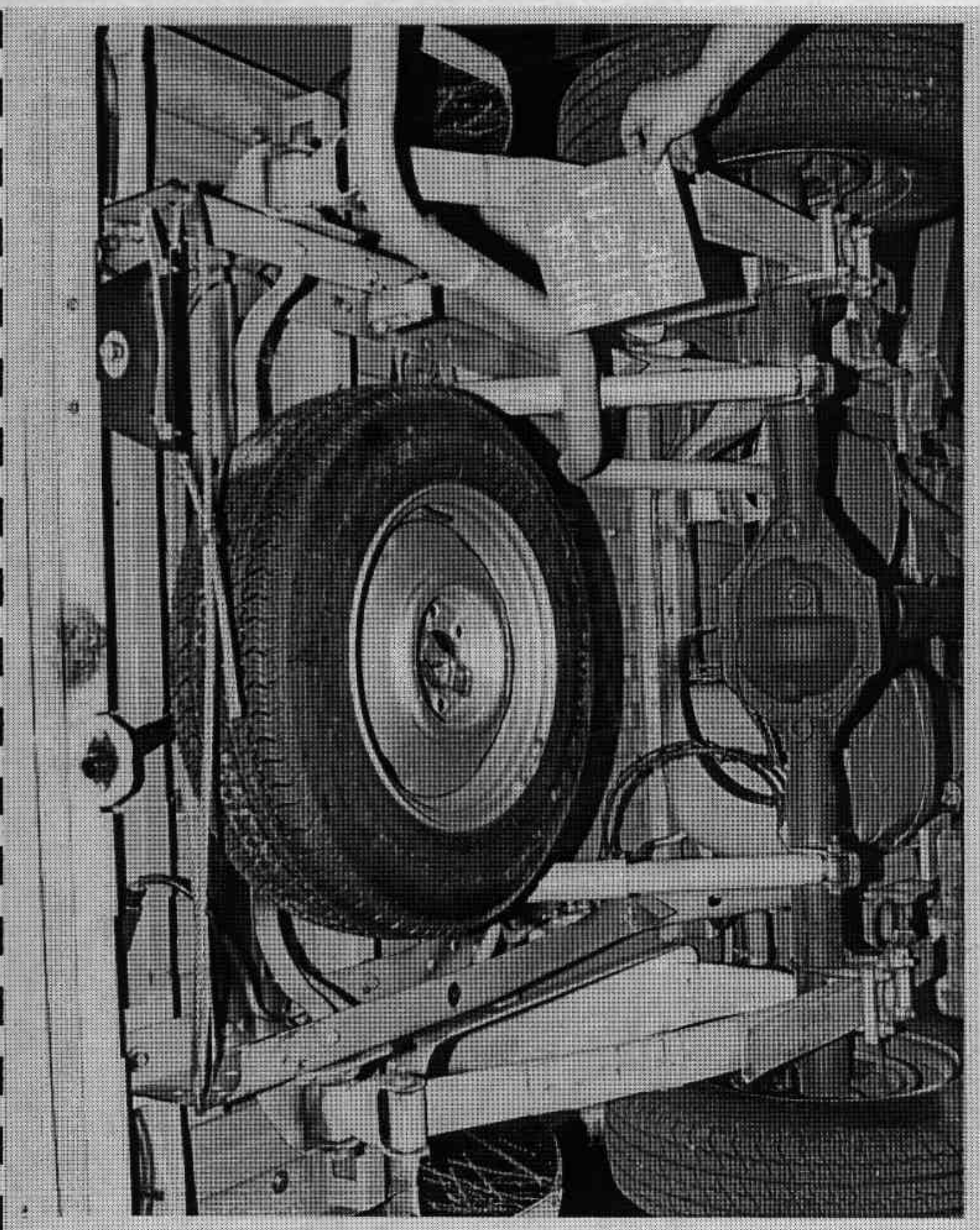


FIGURE A-25. PRE-TEST REAR UNDERBODY VIEW

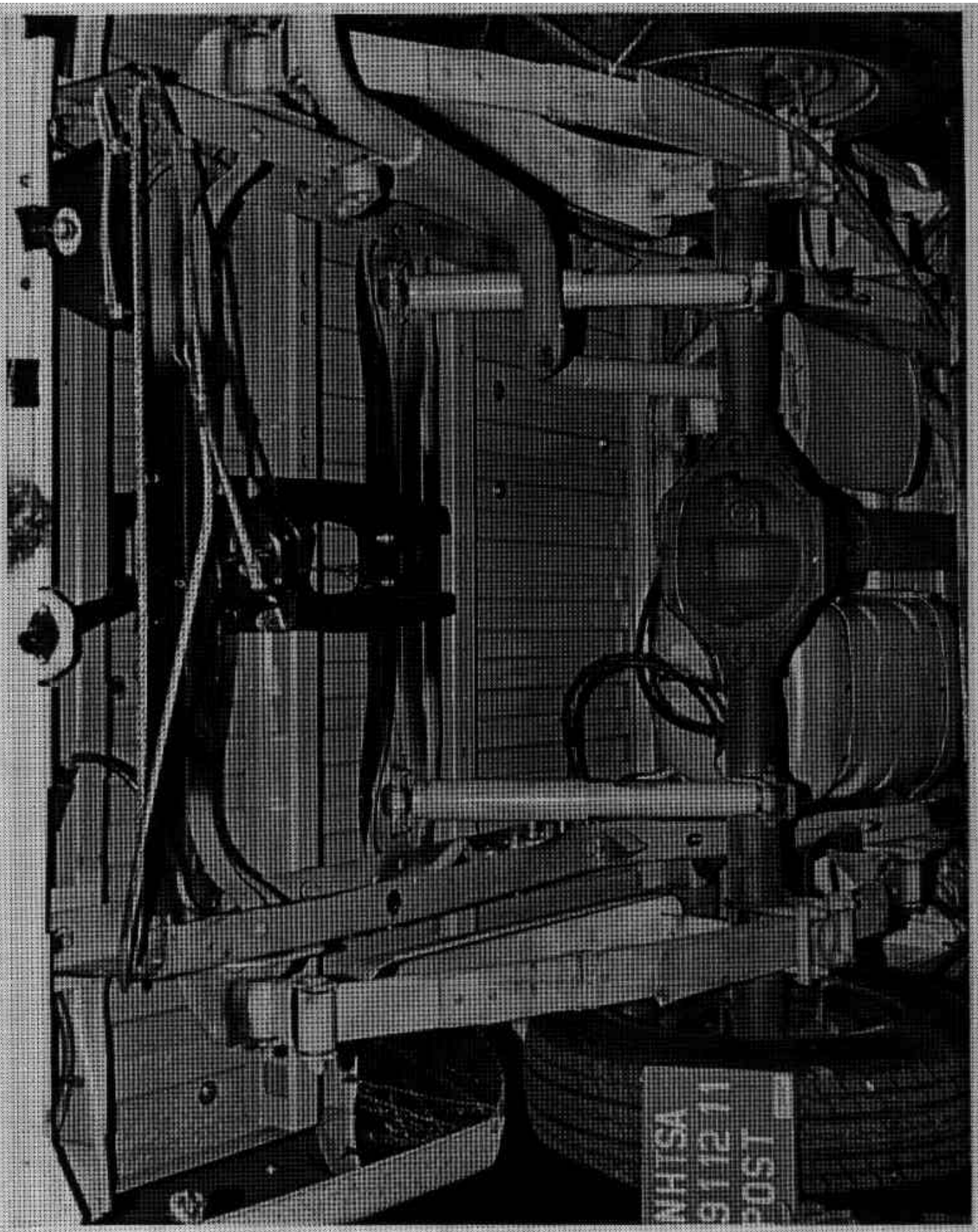


FIGURE A-26. POST-TEST REAR UNDERBODY VIEW

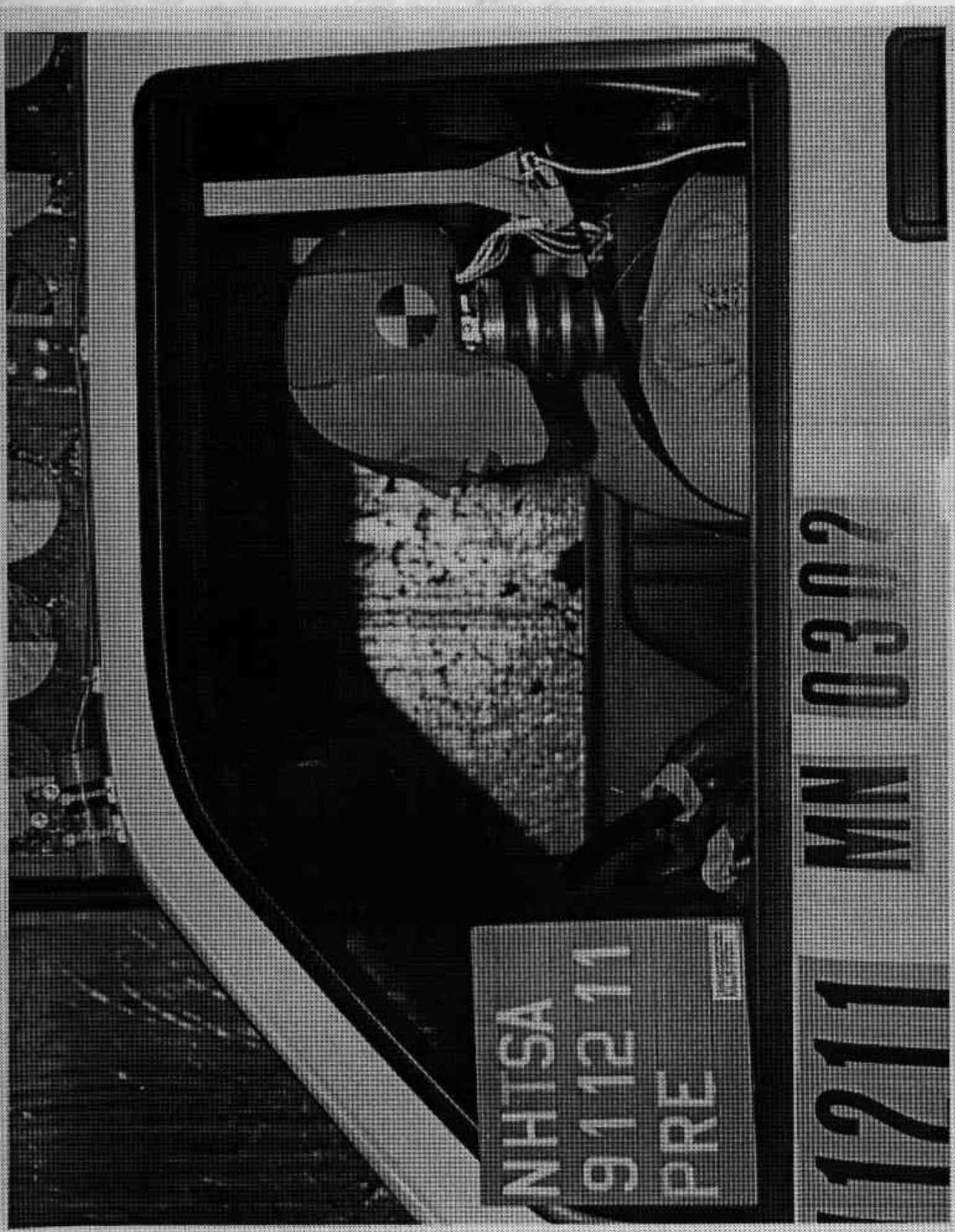


FIGURE A-27. PRE-TEST DRIVER DUMMY POSITION VIEW

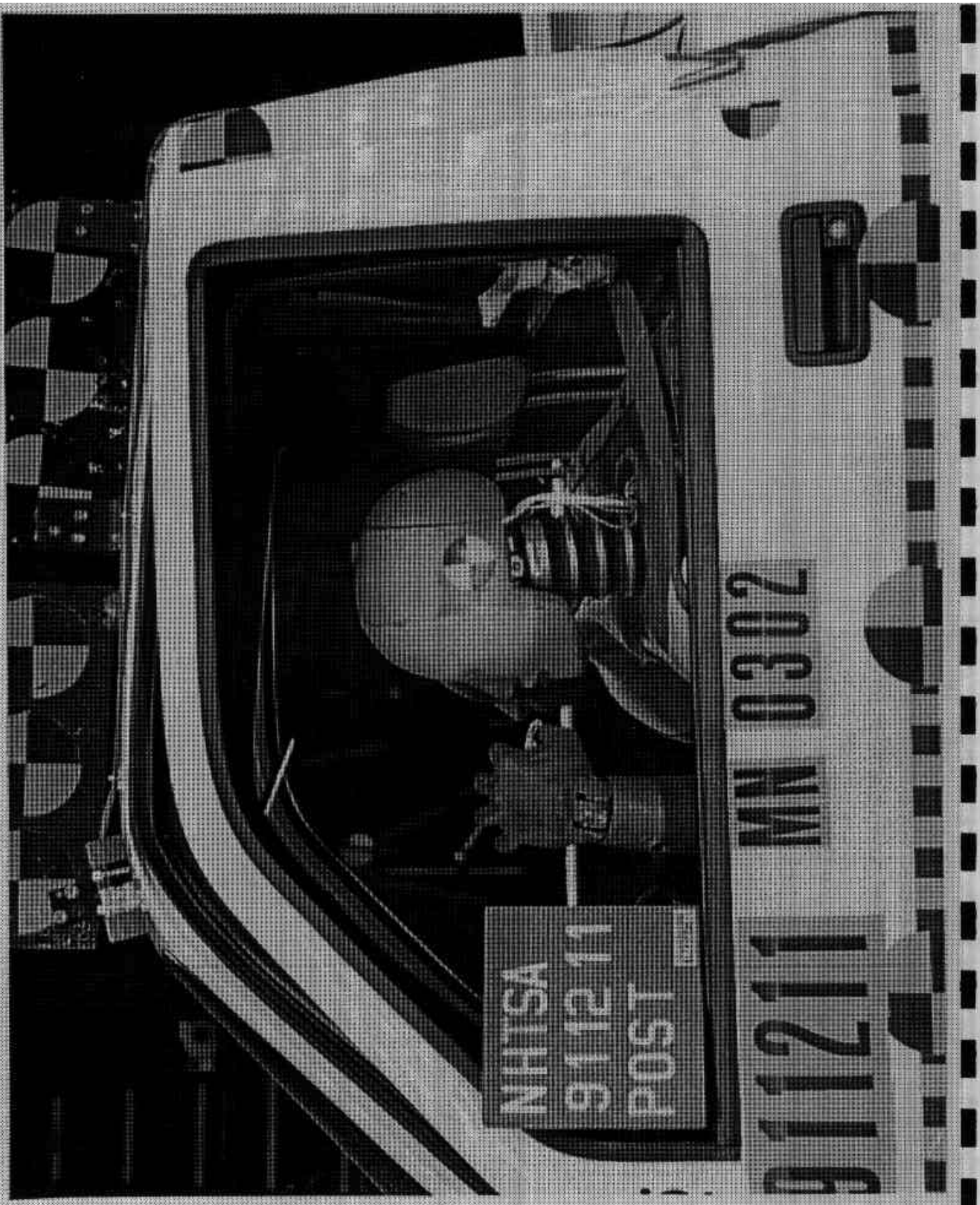


FIGURE A-28. POST-TEST DRIVER DUMMY POSITION VIEW

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

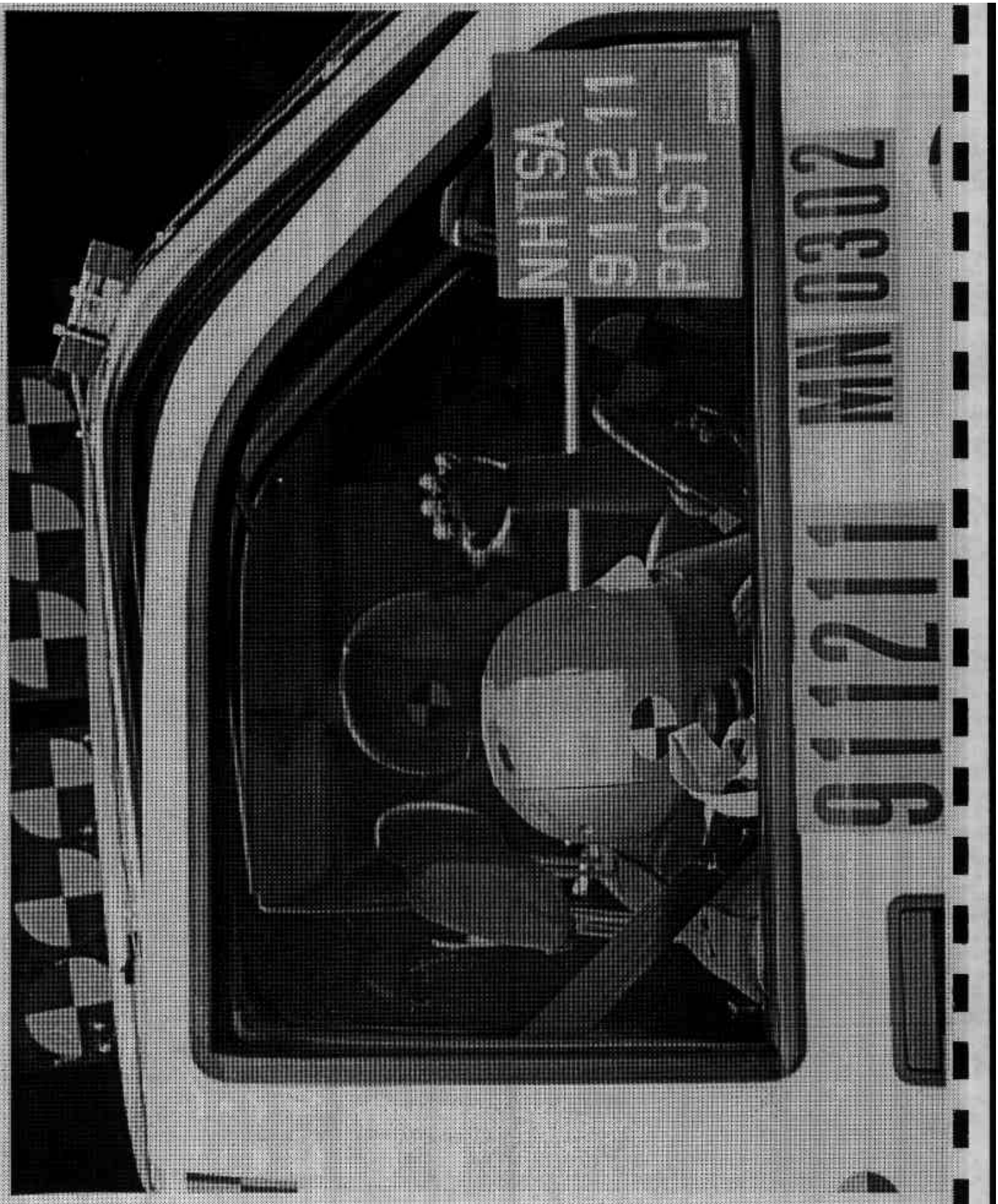


FIGURE A-30. POST-TEST PASSENGER DUMMY POSITION VIEW

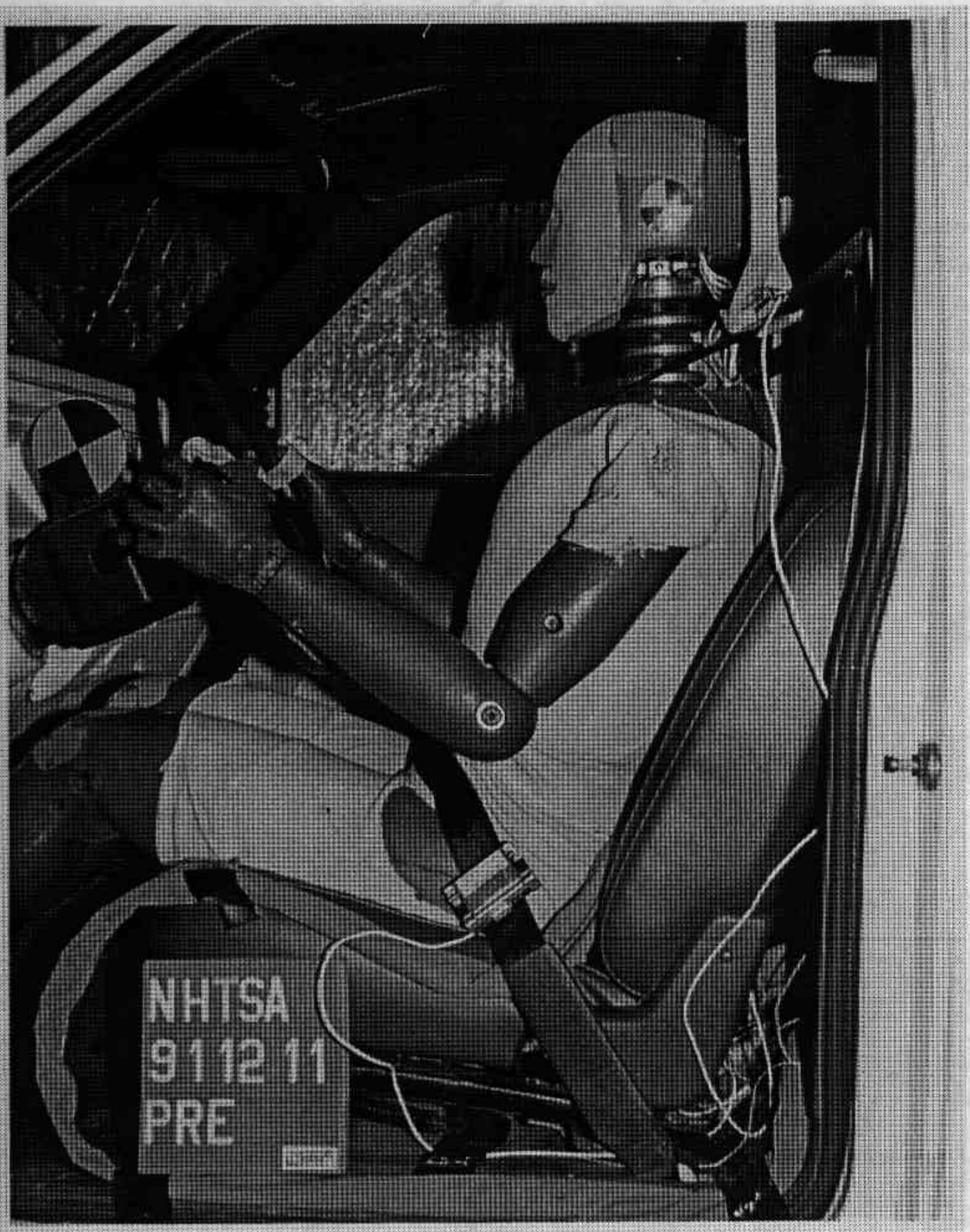


FIGURE A-31. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

FIGURE A-32. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

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

FIGURE A-34. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

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

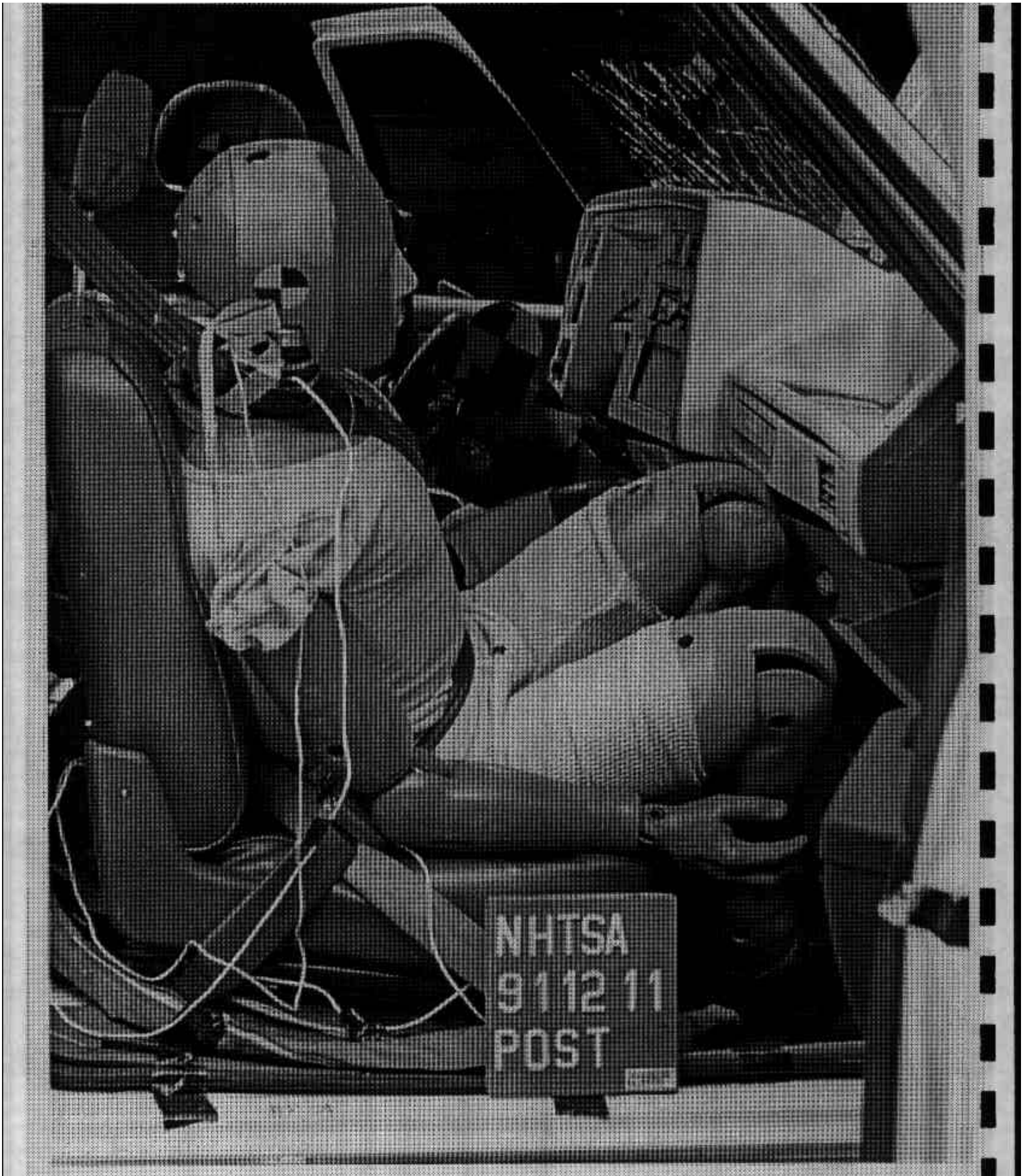


FIGURE A-36. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

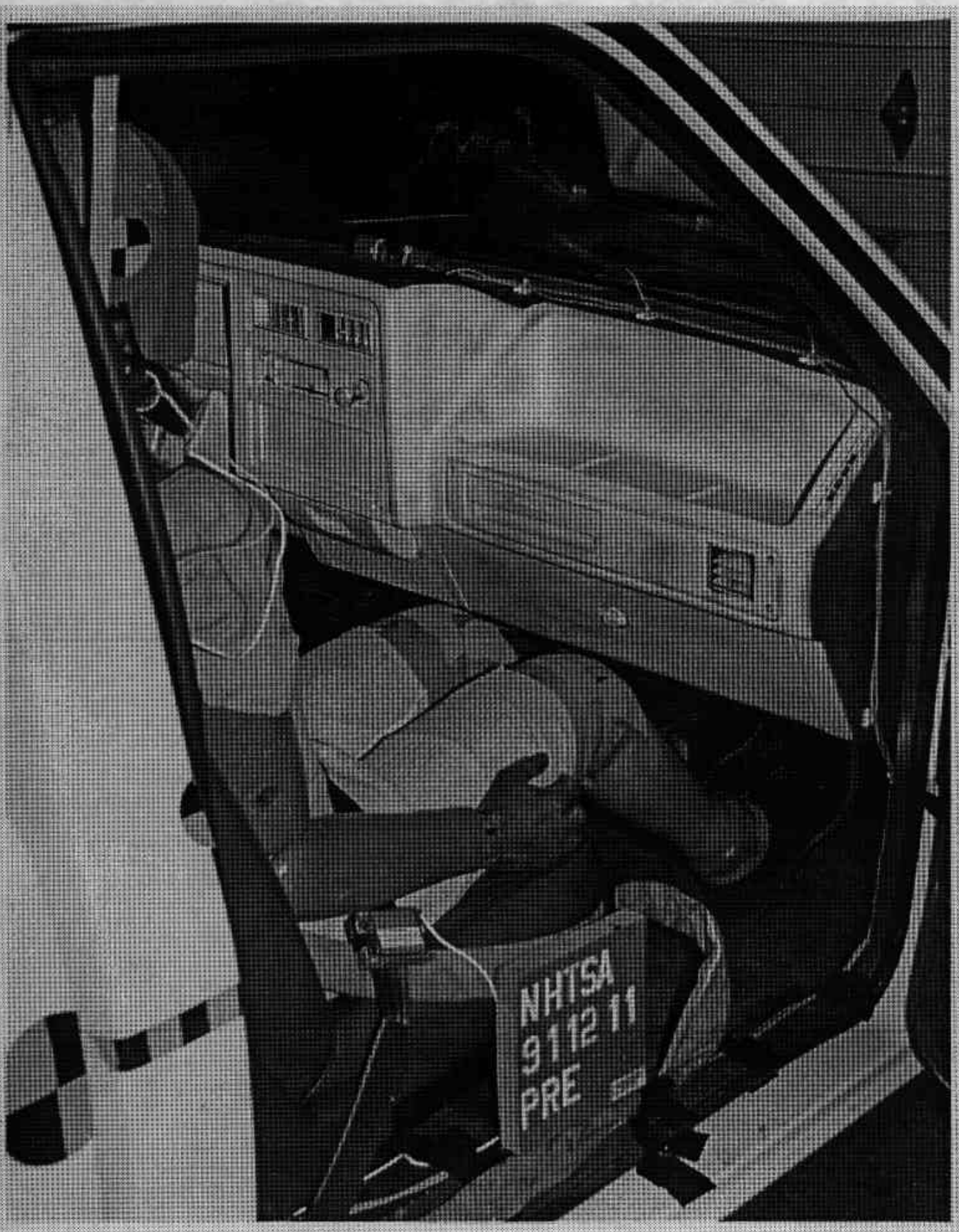


FIGURE A-37. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

FIGURE A-38. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

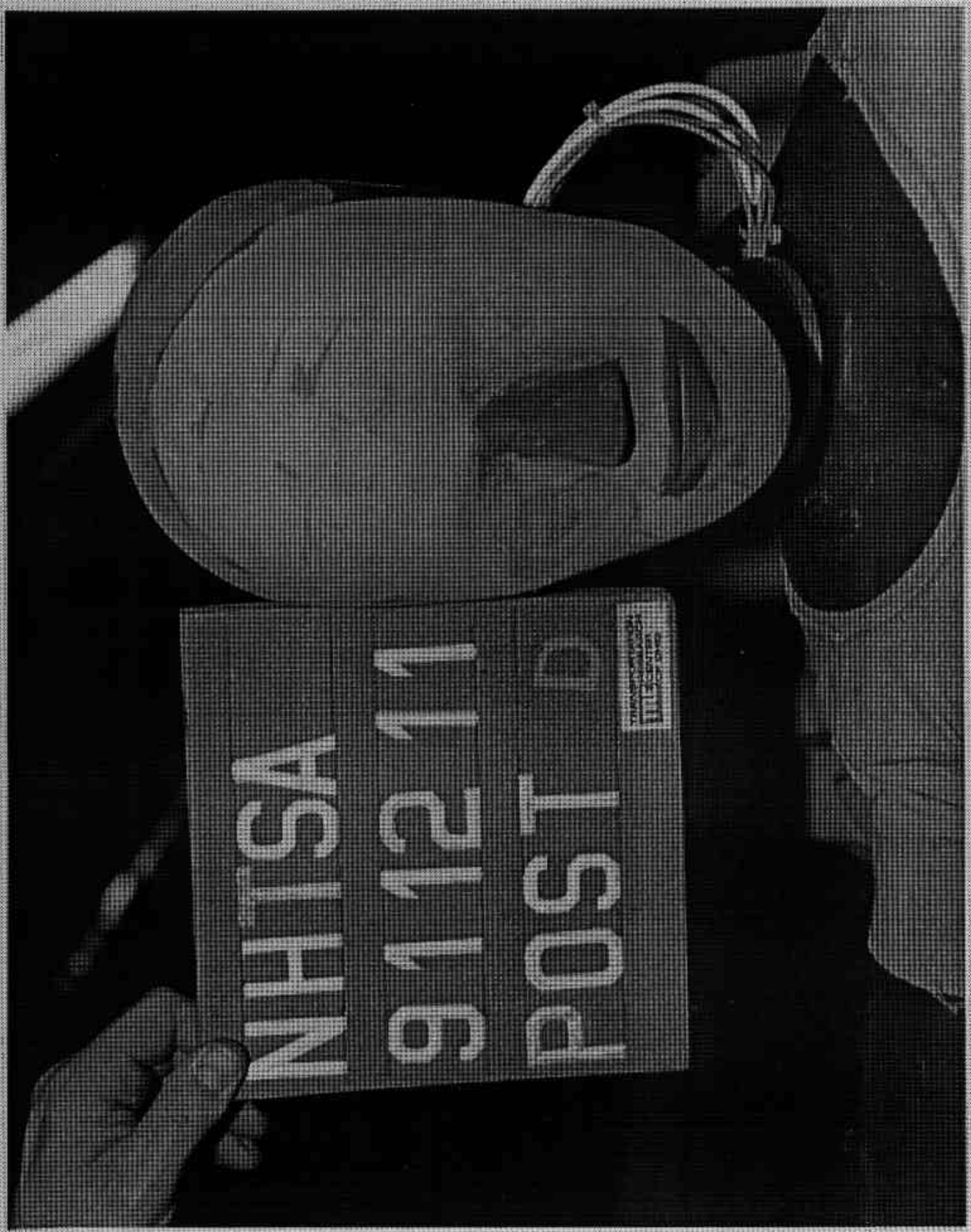


FIGURE A-39. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1

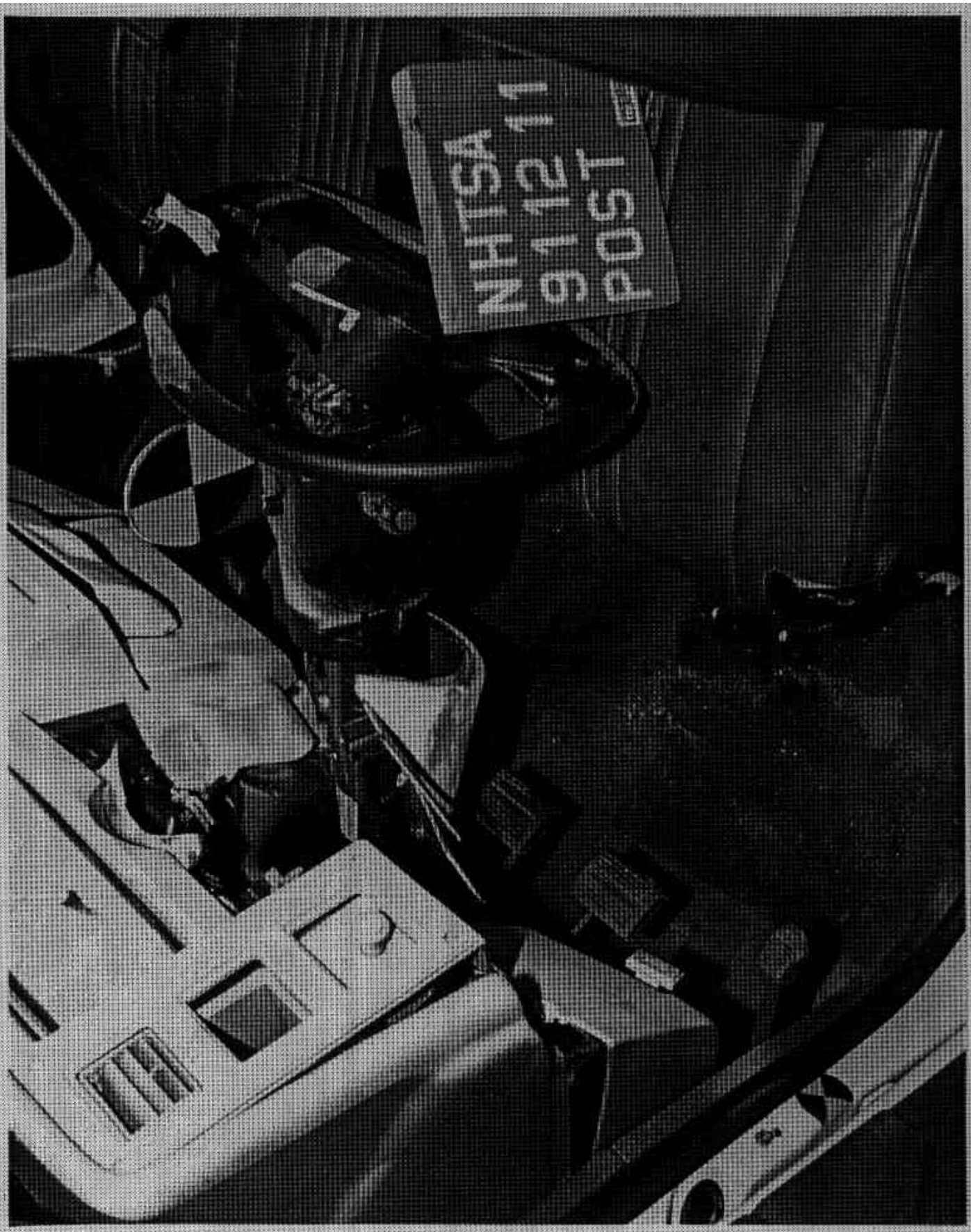


FIGURE A-40. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2

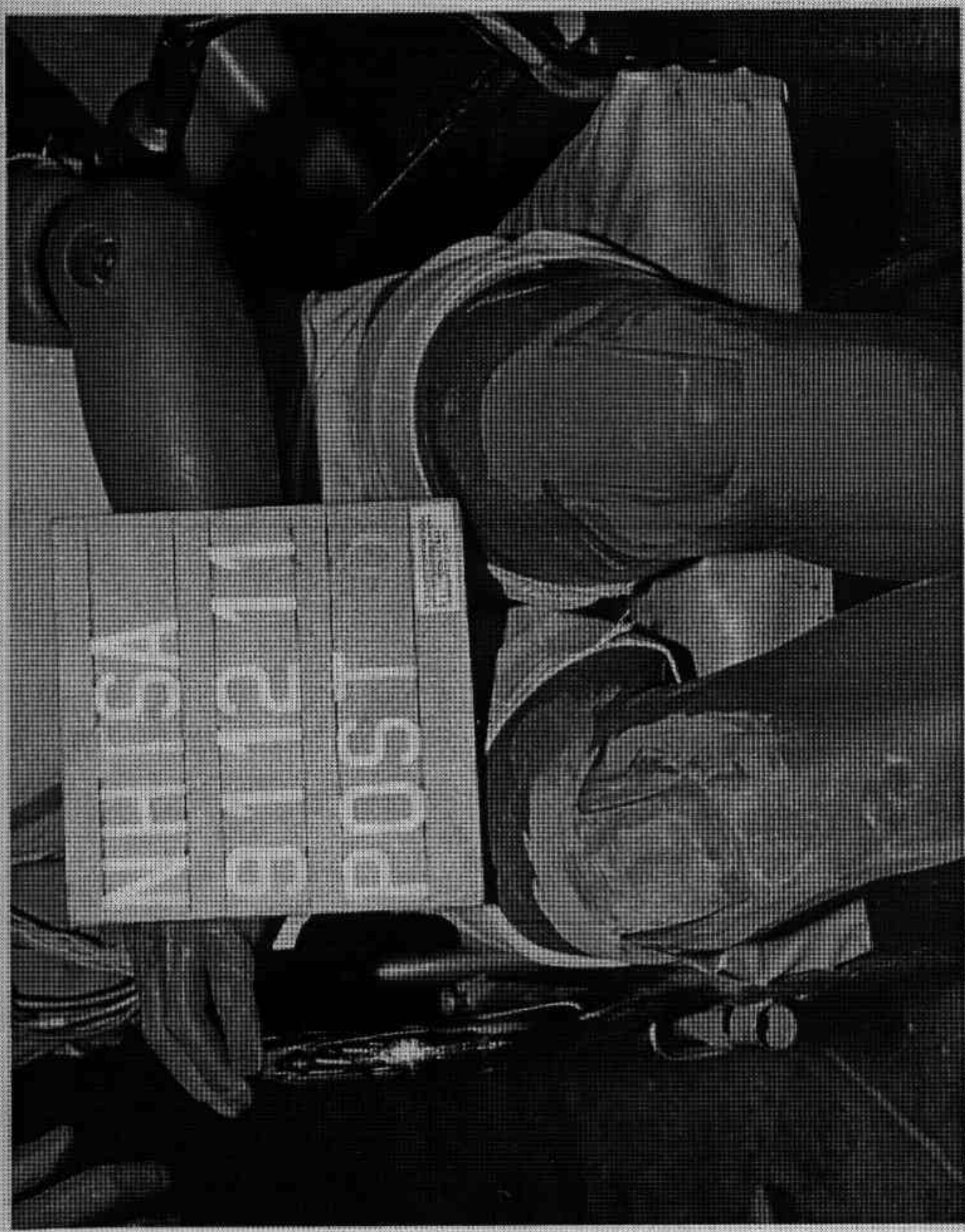


FIGURE A-41. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1

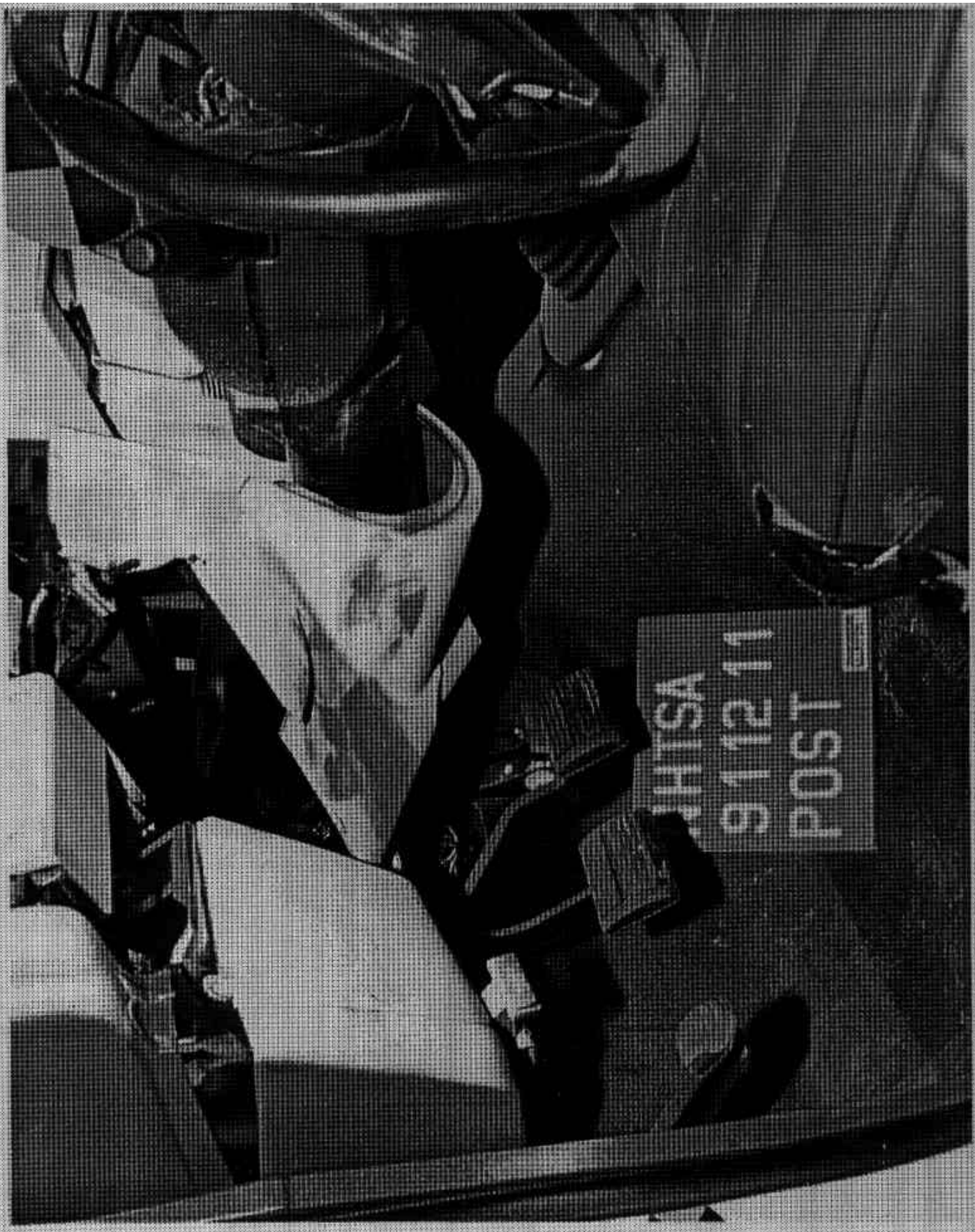


FIGURE A-42. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2

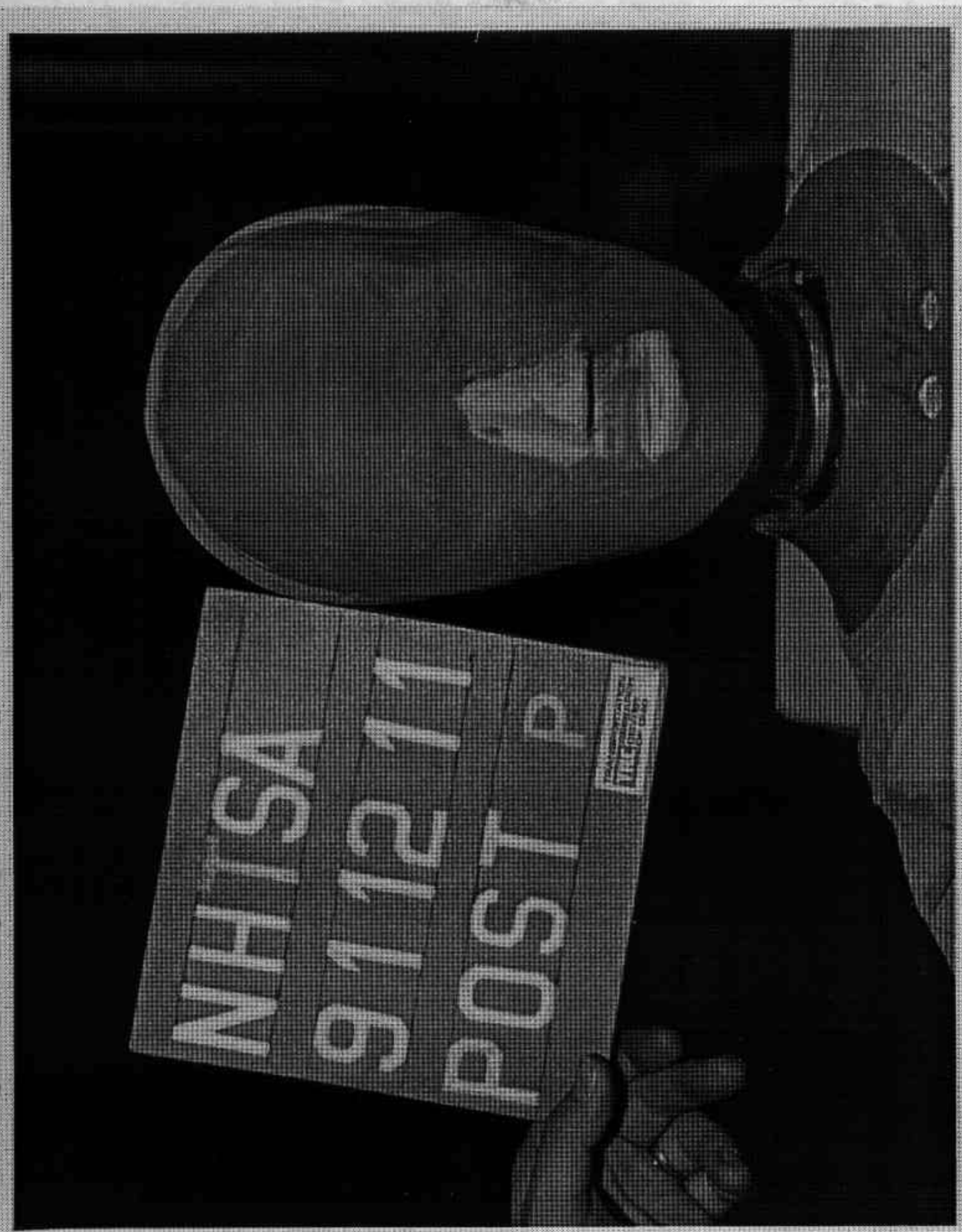


FIGURE A-43. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 1

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

FIGURE A-45. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 3

FIGURE A-46. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1

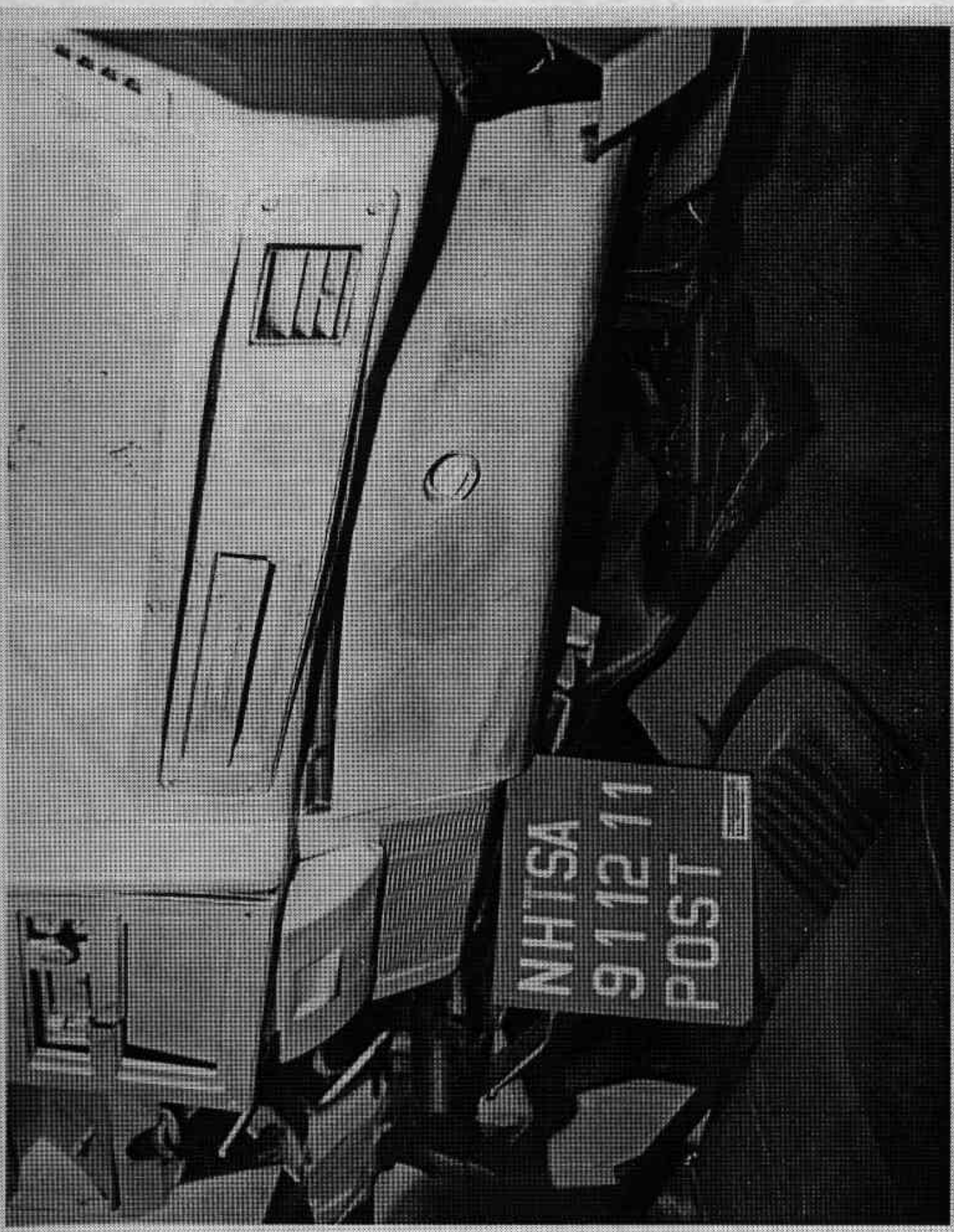
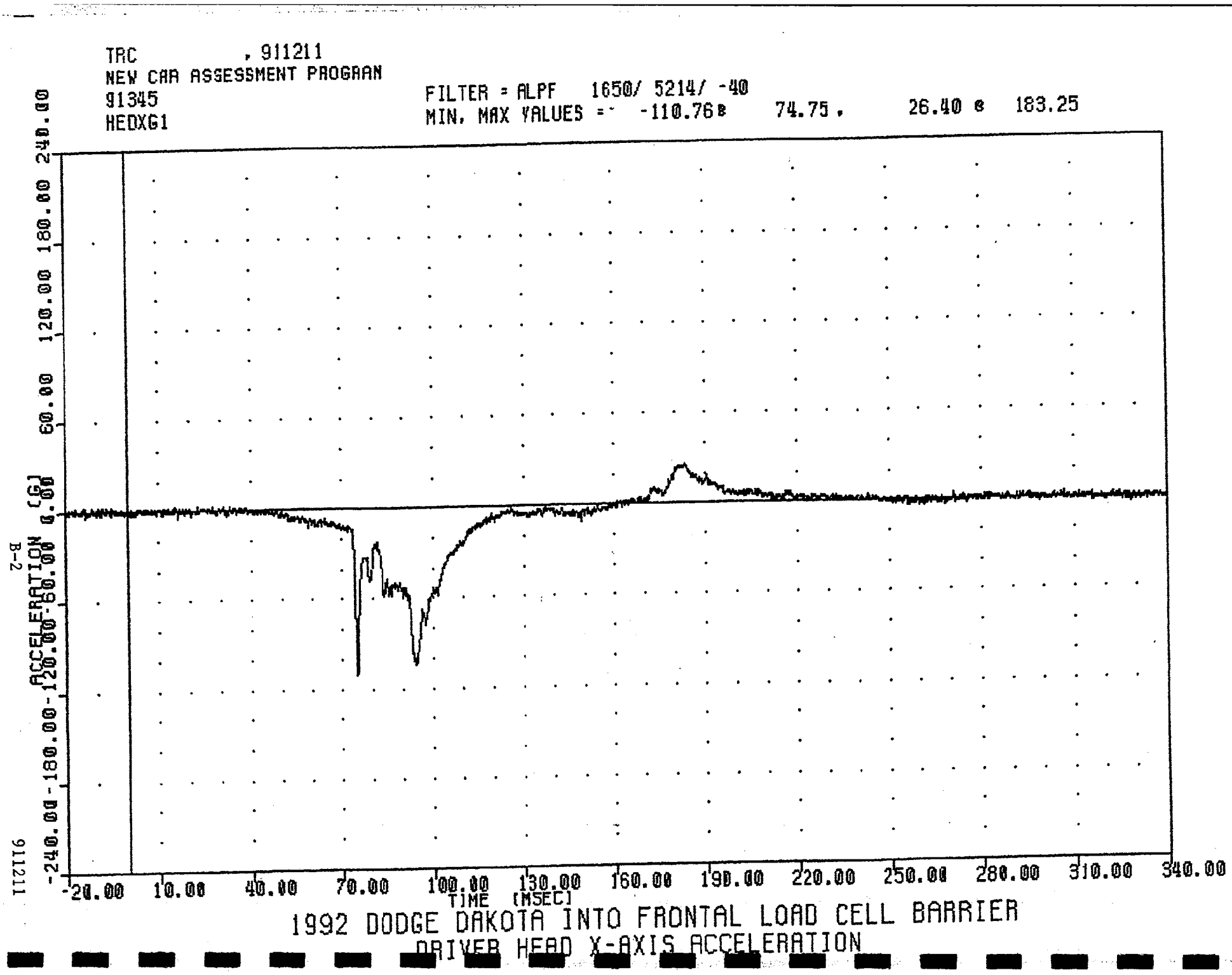


FIGURE A-47. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

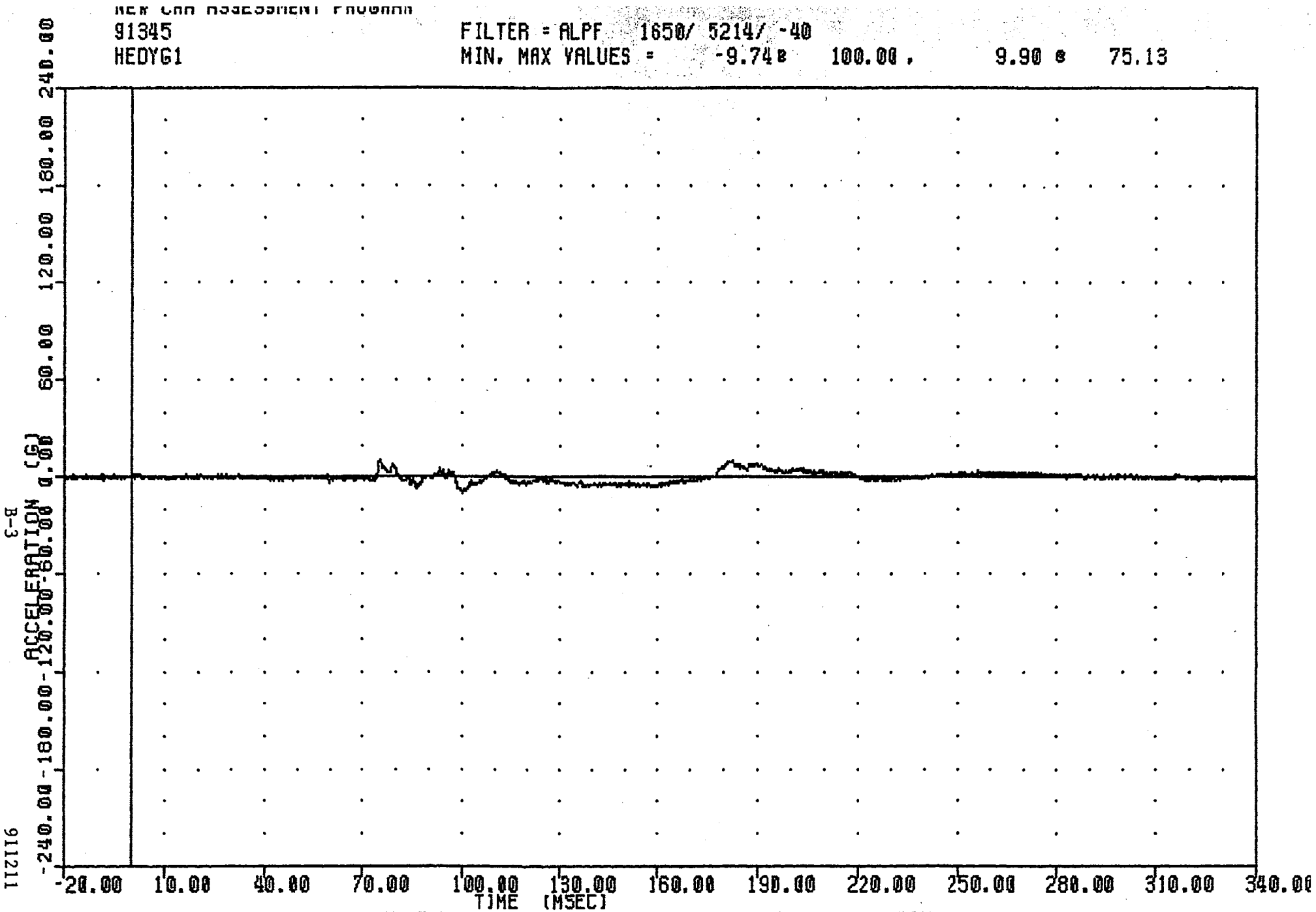
FIG. A-48. PRE-TEST VEHICLE CERT. & RECOMMENDED TIRE PRES. LABEL

APPENDIX B

DATA PLOTS

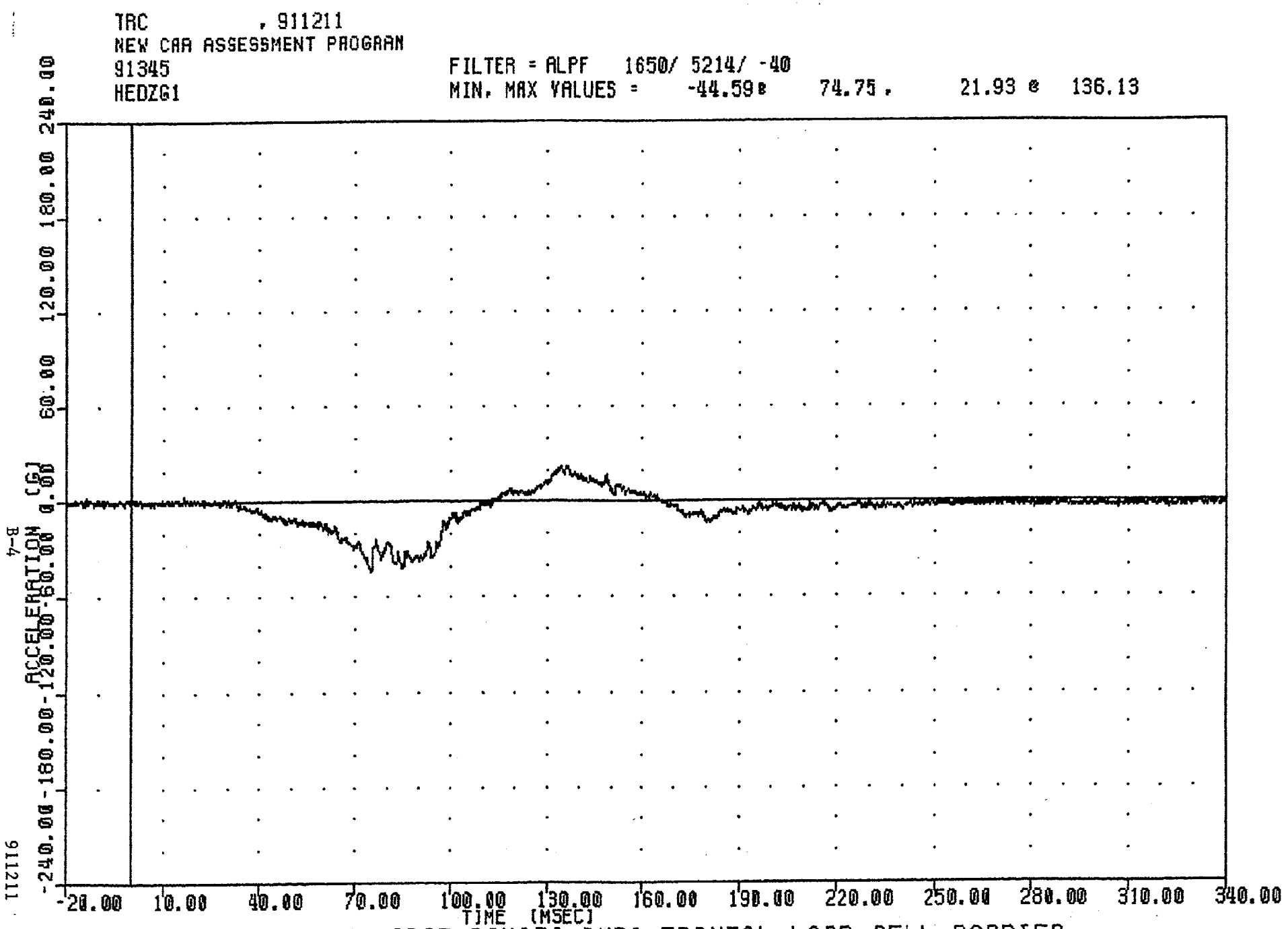


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD X-AXIS ACCELERATION



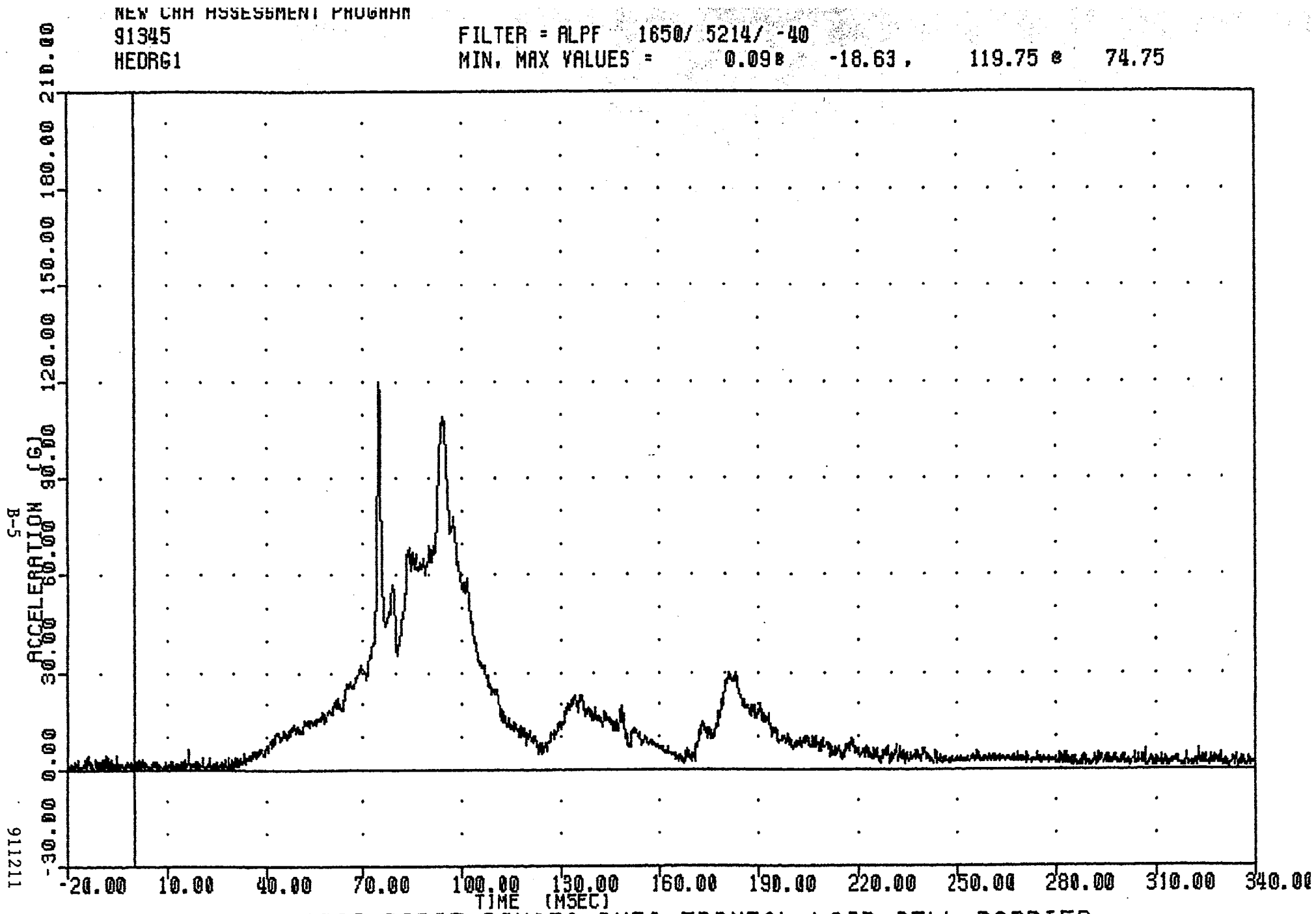
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION

91121



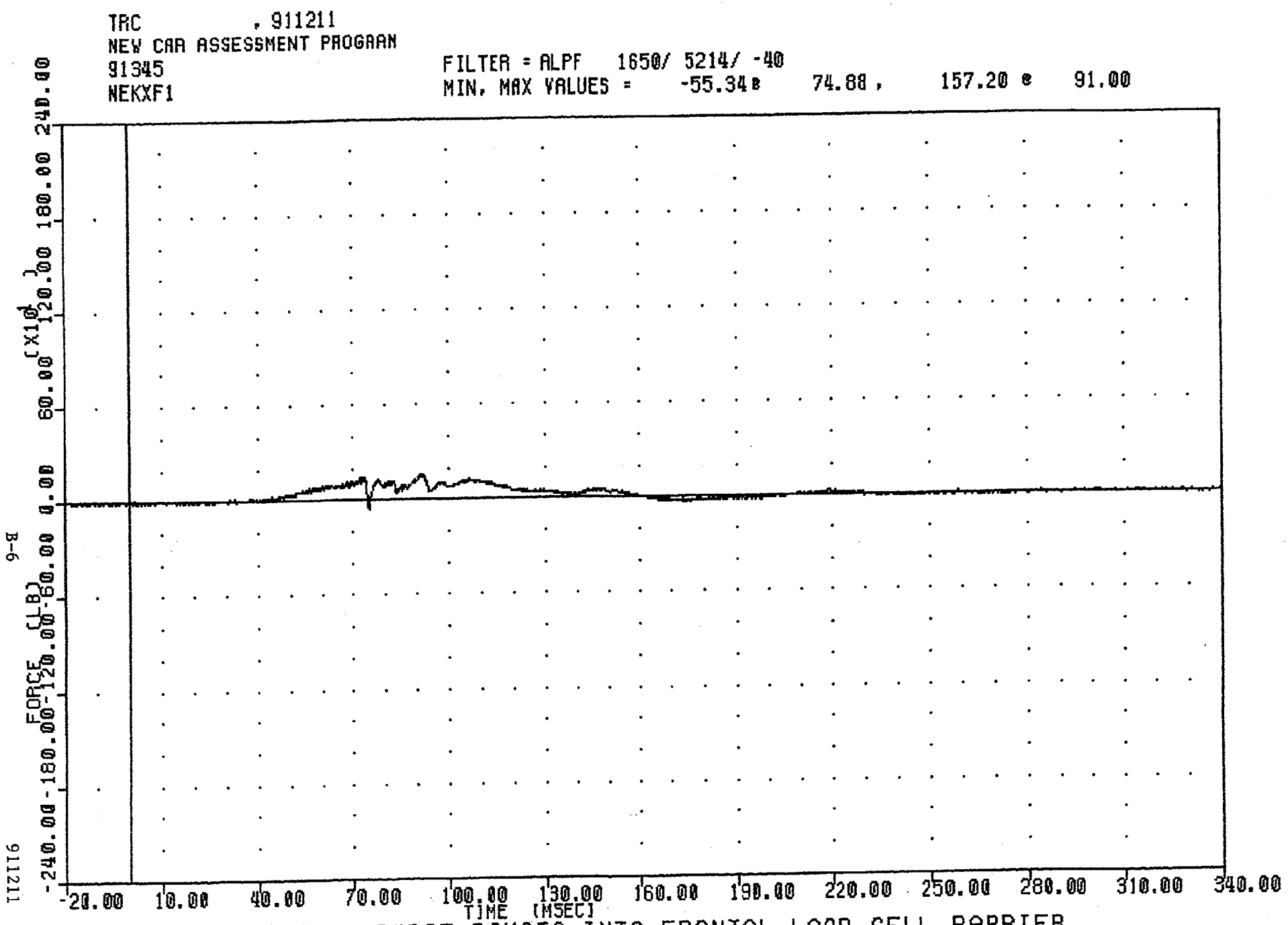
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION

911211

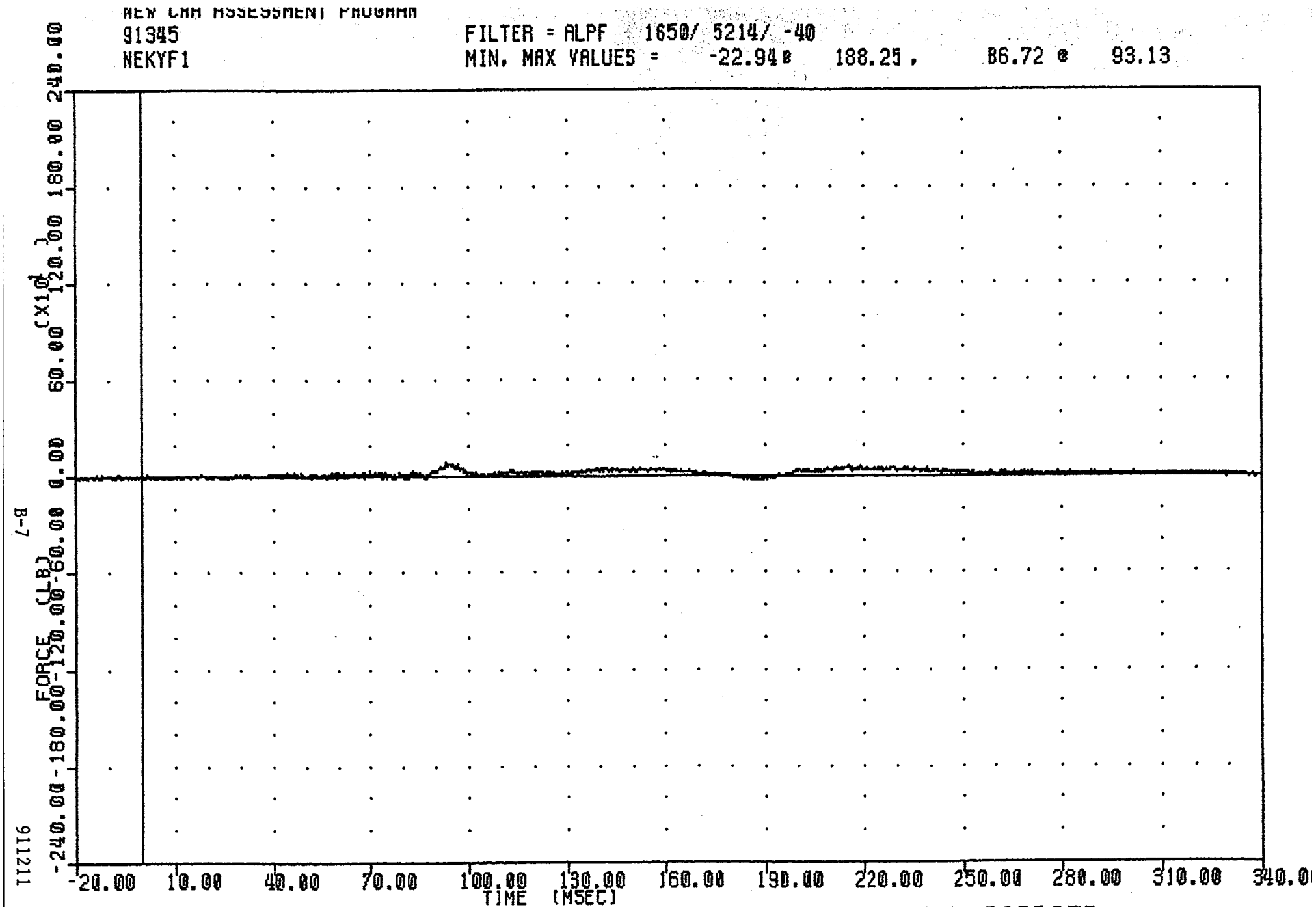


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD RESULTANT ACCELERATION

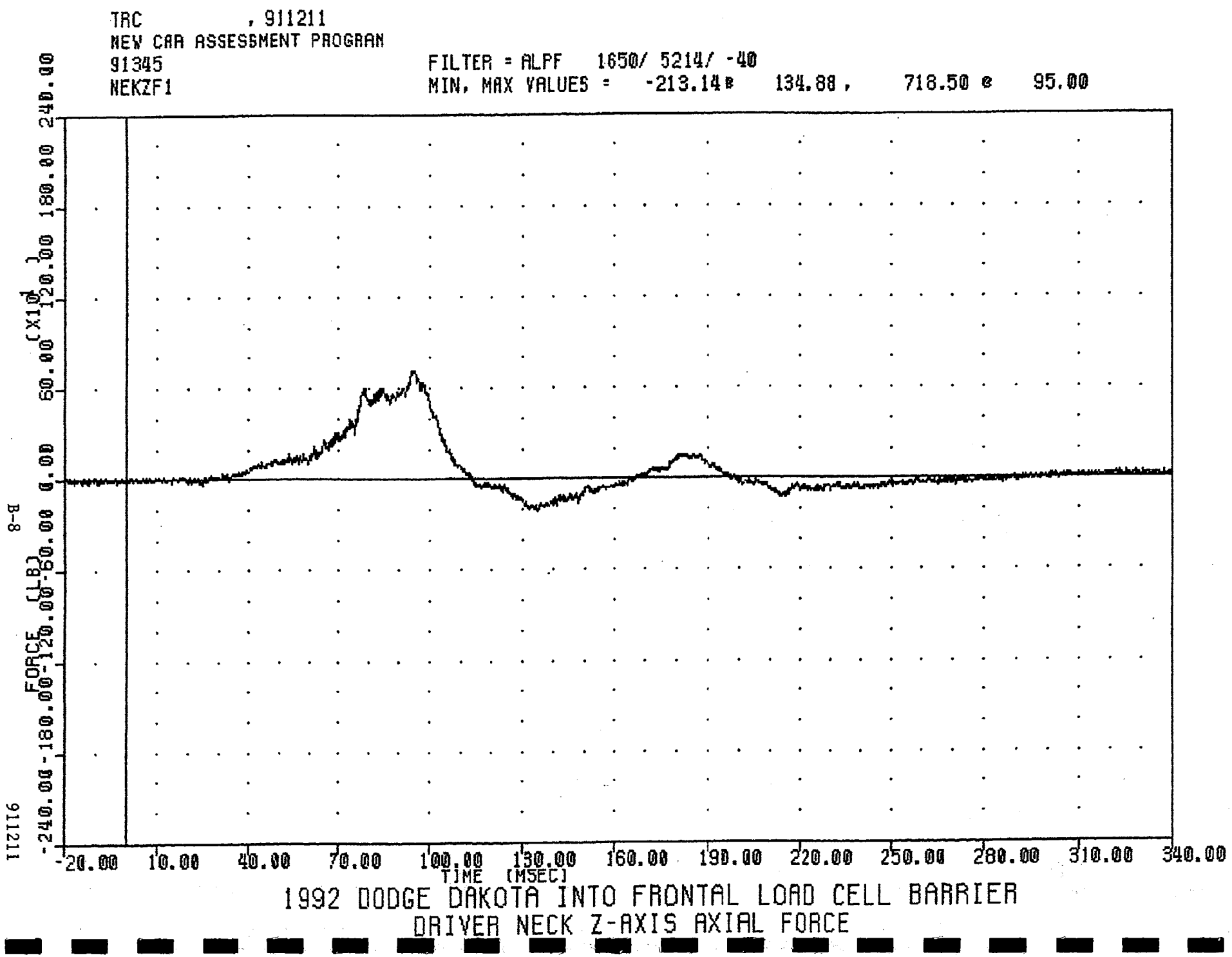
911211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK X-AXIS SHEAR FORCE

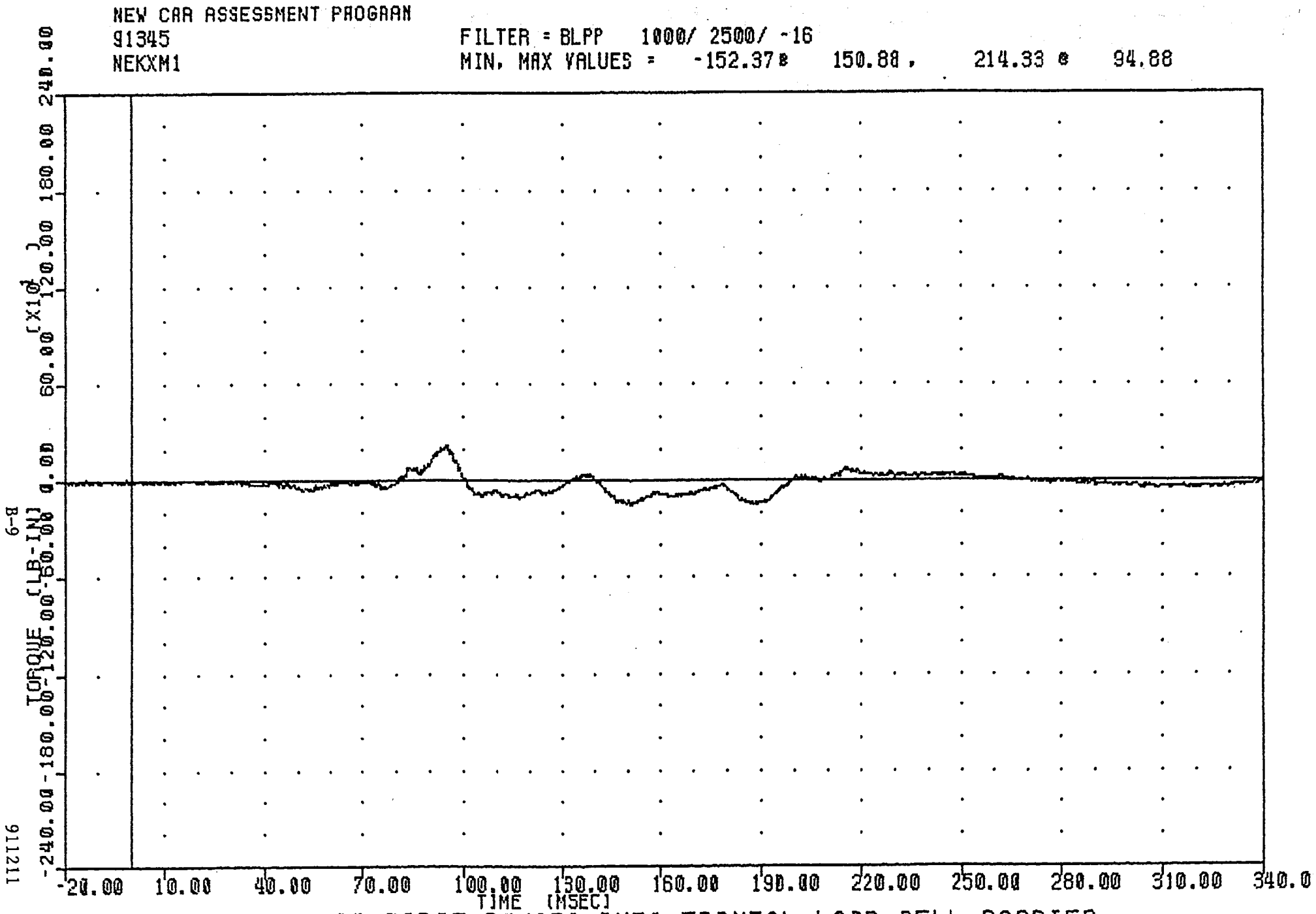


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK Y-AXIS SHEAR FORCE



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK Z-AXIS AXIAL FORCE

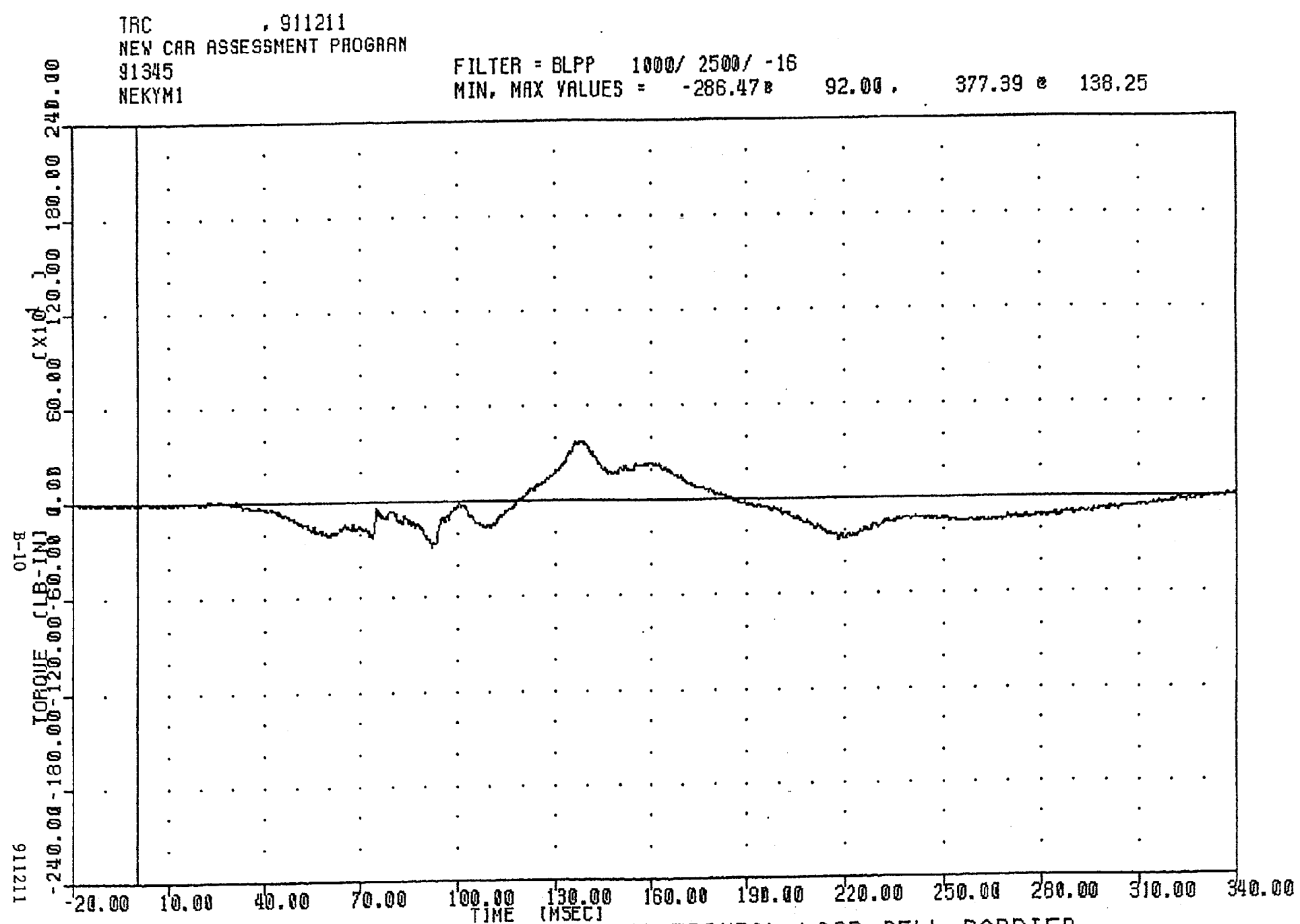
911211



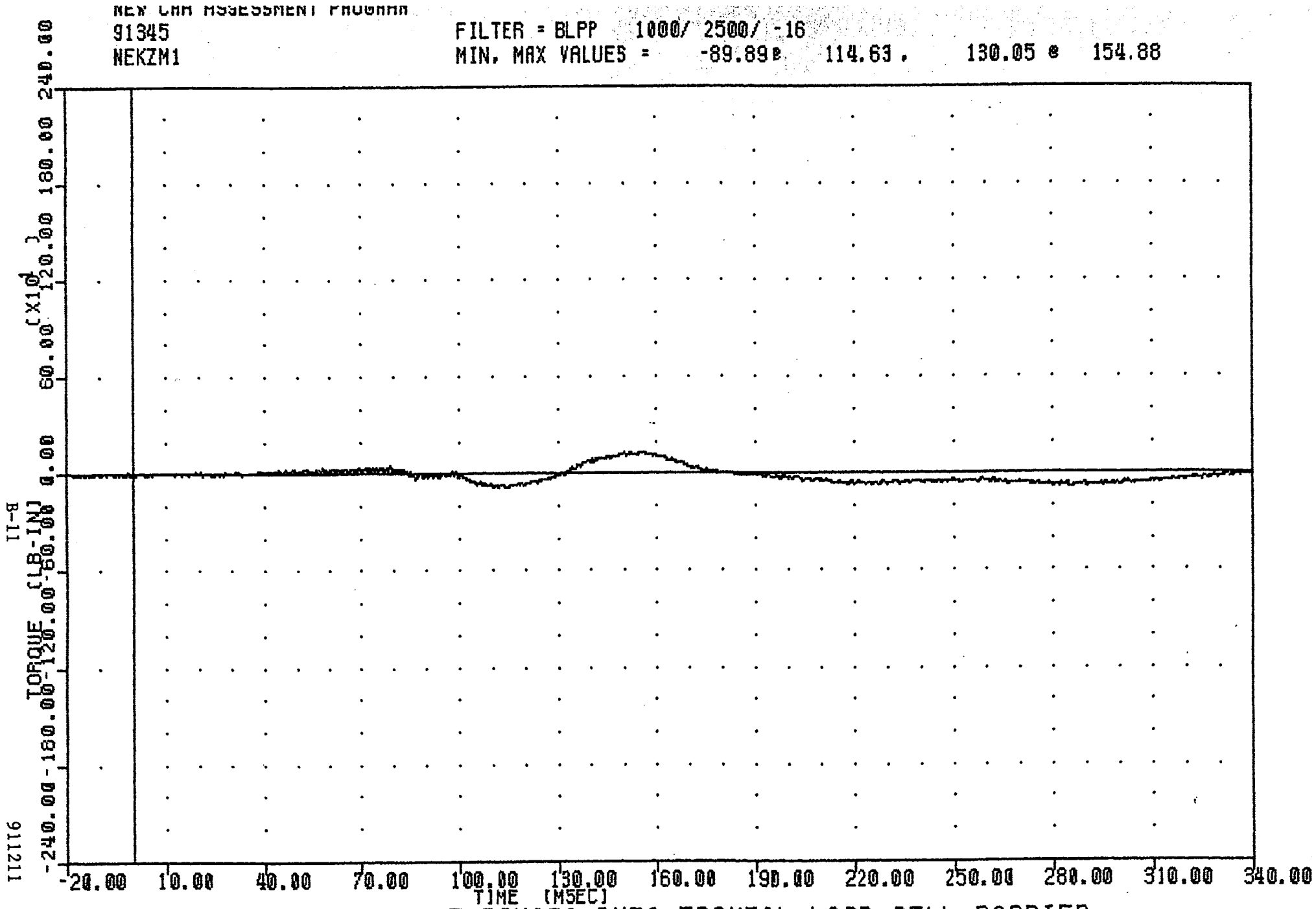
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT X AXIS

B-9

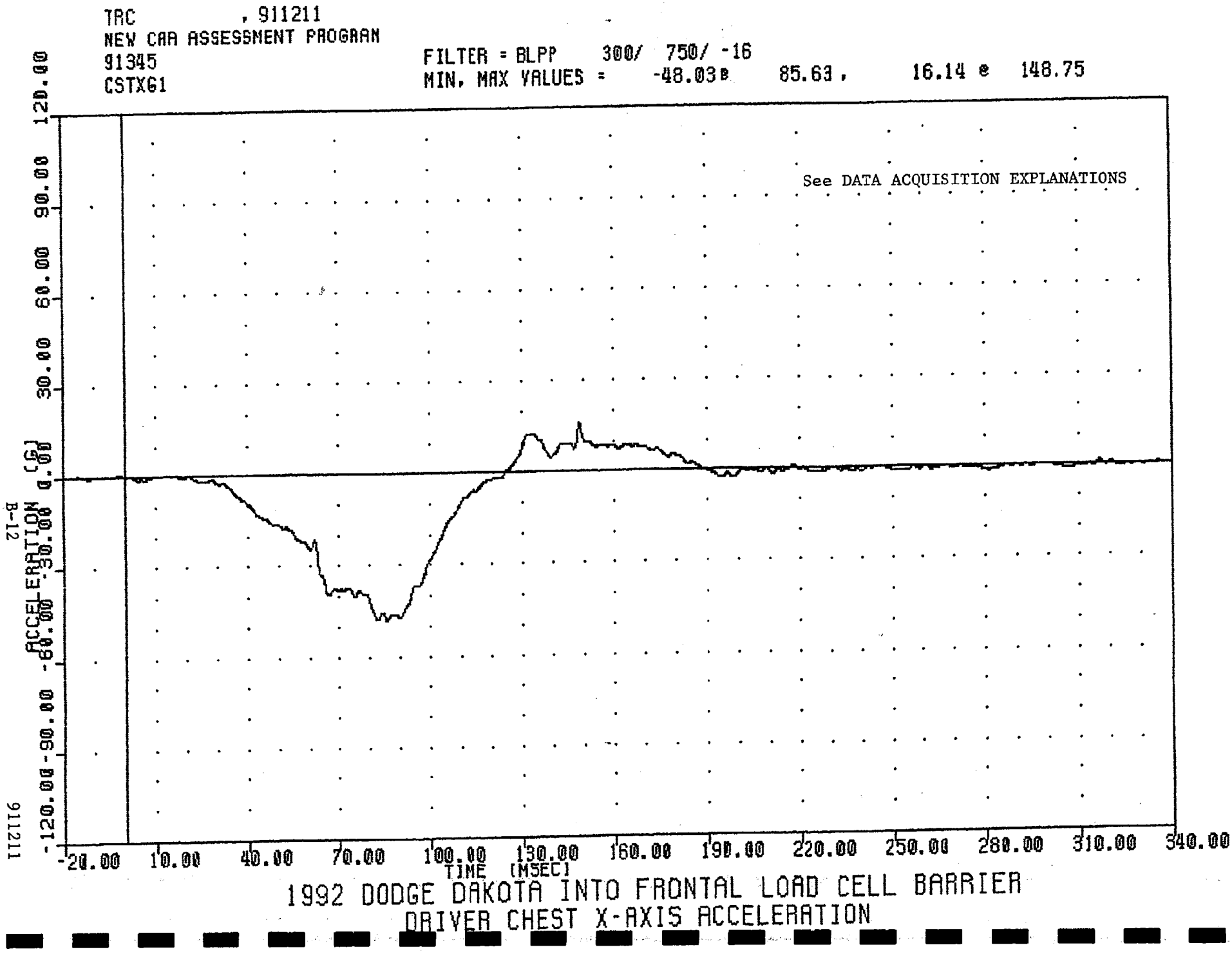
91121



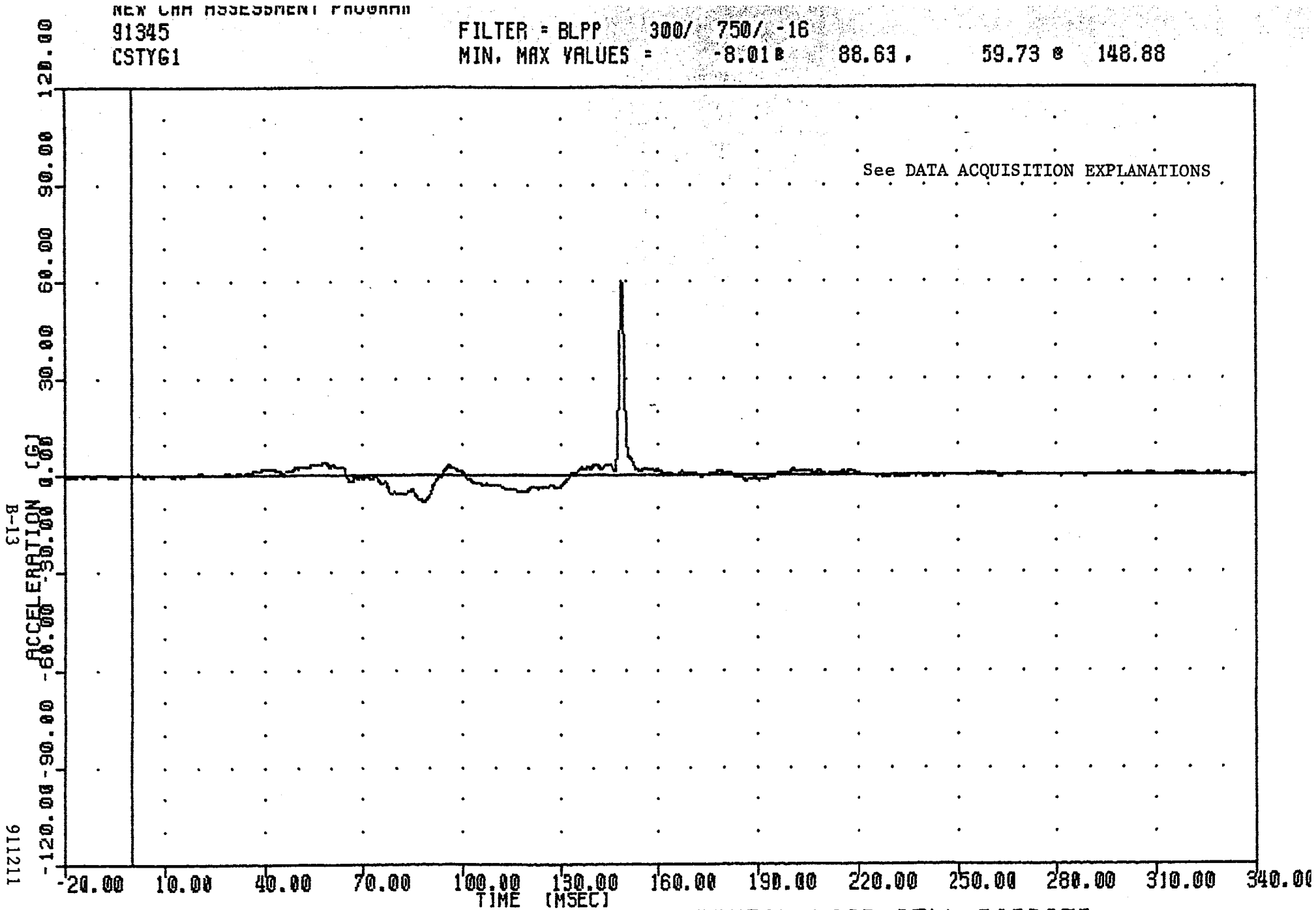
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT Z AXIS

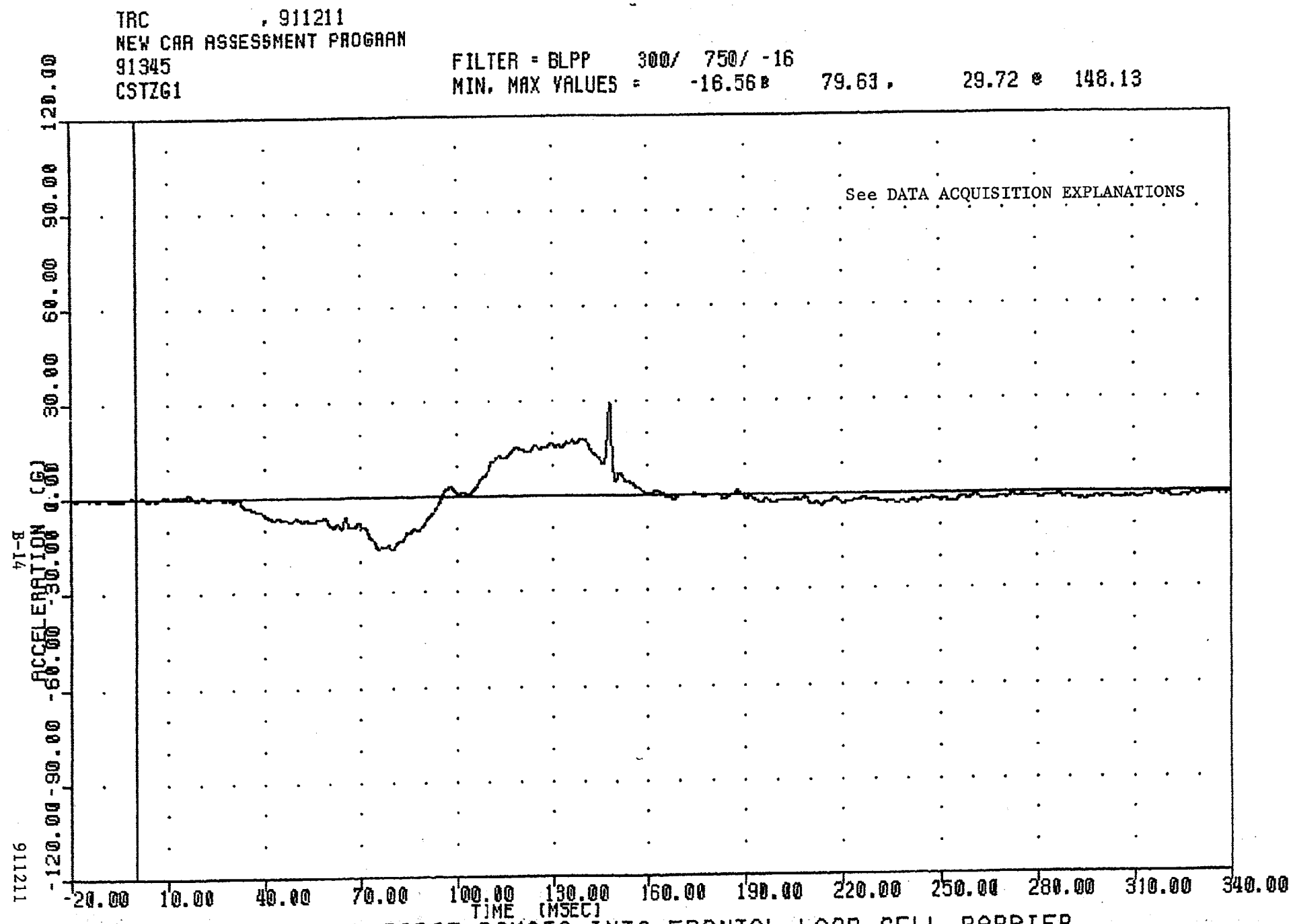


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST X-AXIS ACCELERATION

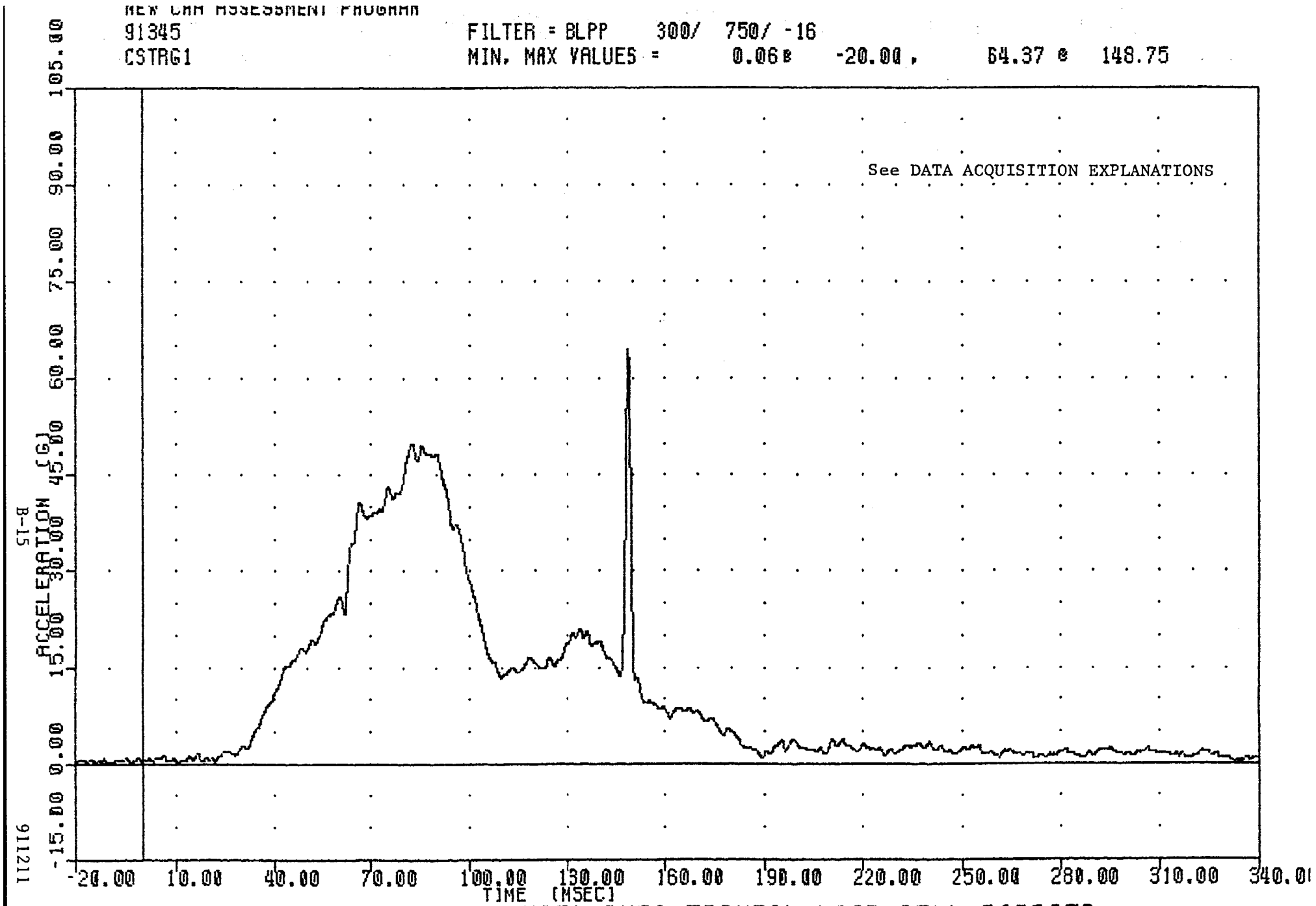


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION

911211

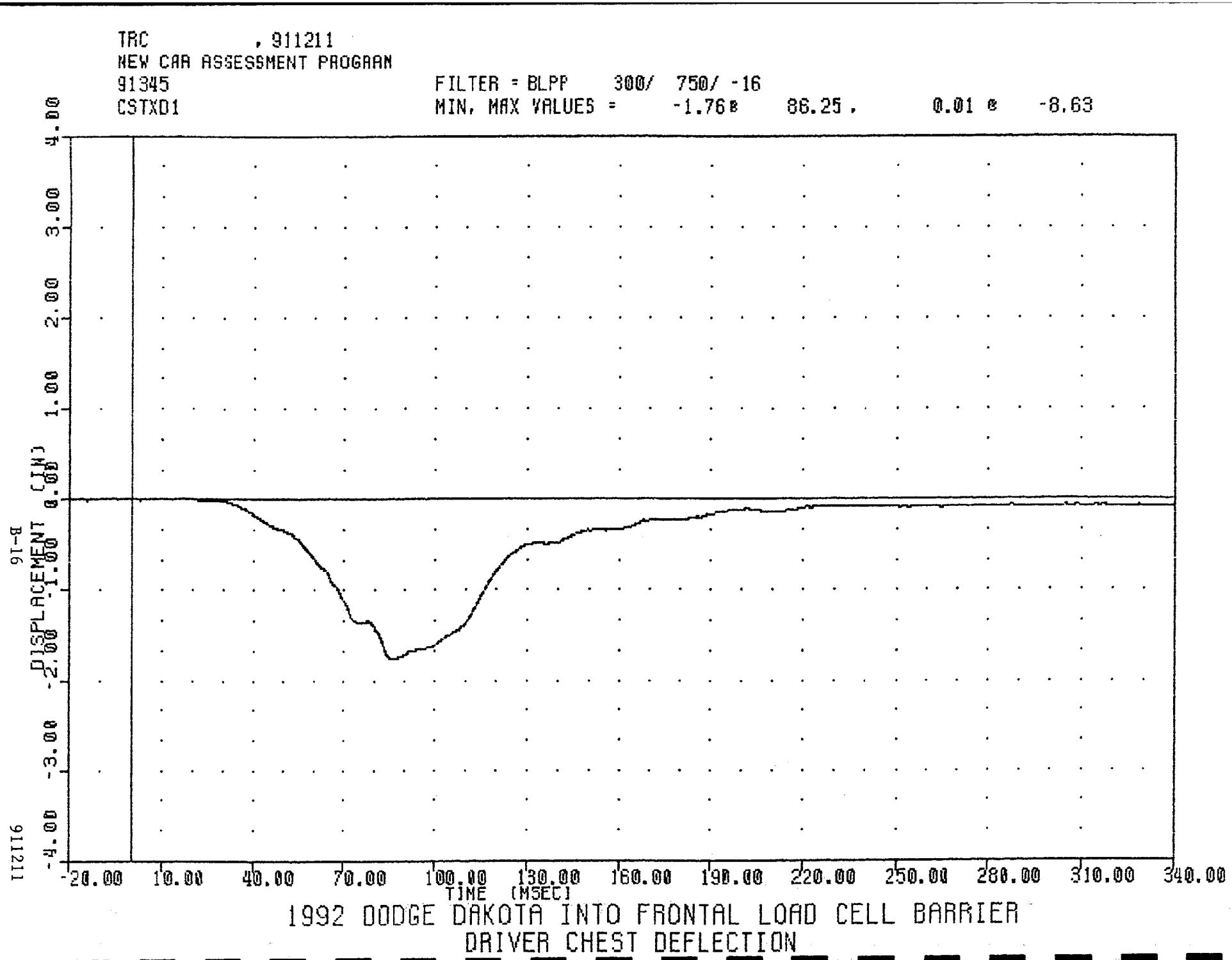


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST RESULTANT ACCELERATION

911211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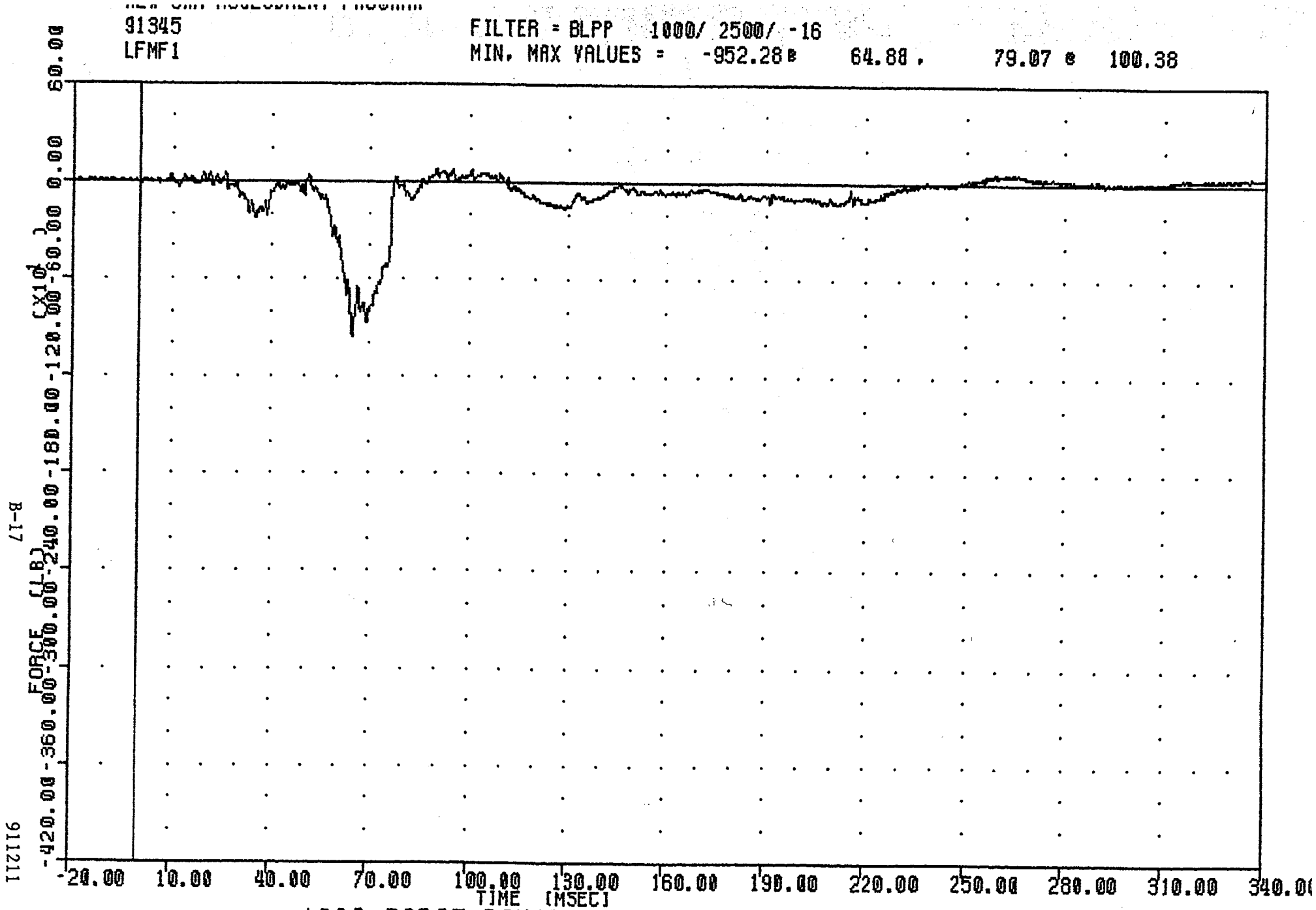
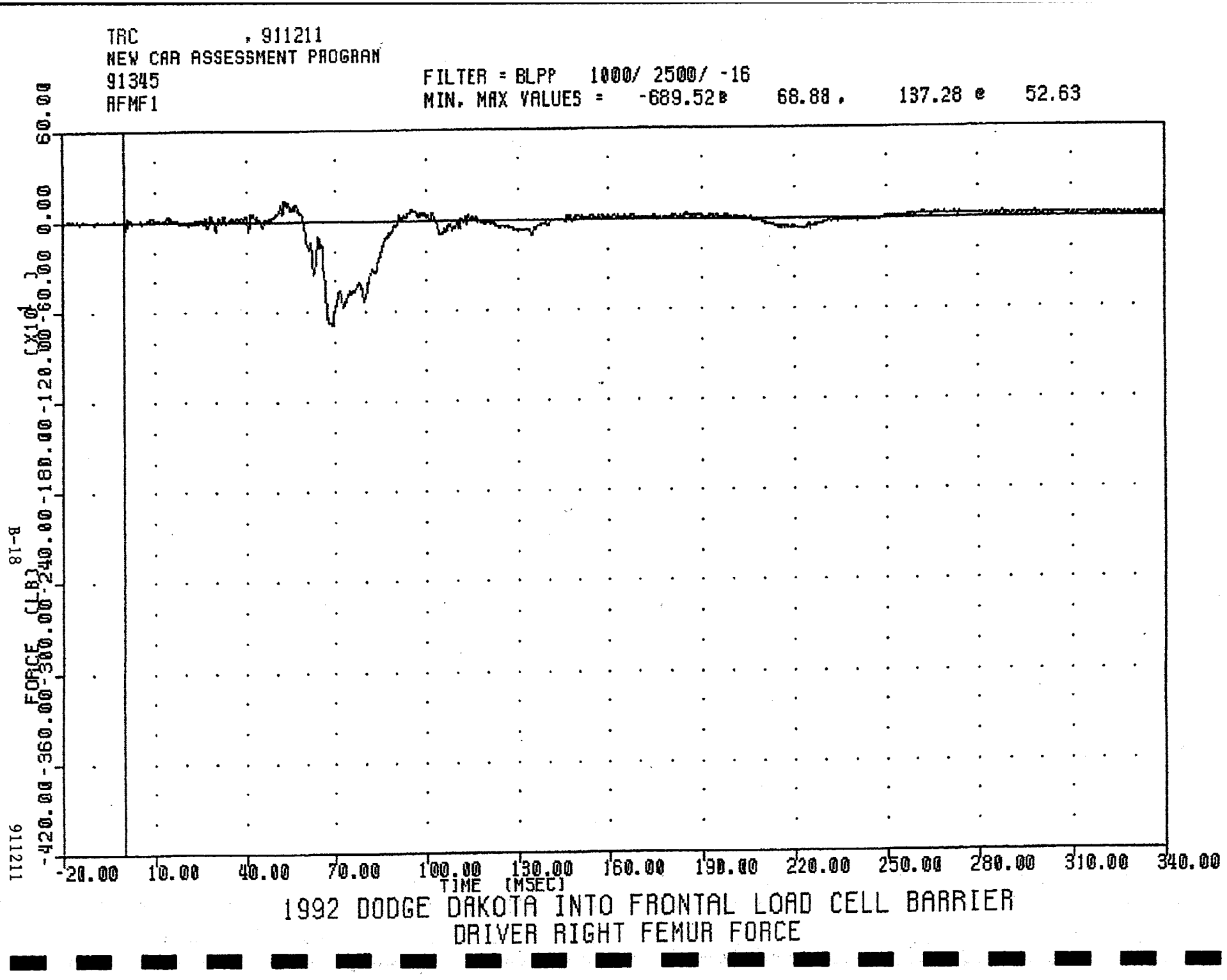
NEW CAR ASSESSMENT PROGRAM
91345
CSTXD1
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -1.76 @ 86.25 , 0.01 @ -8.63
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
DISPLACEMENT (IN)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST DEFLECTION

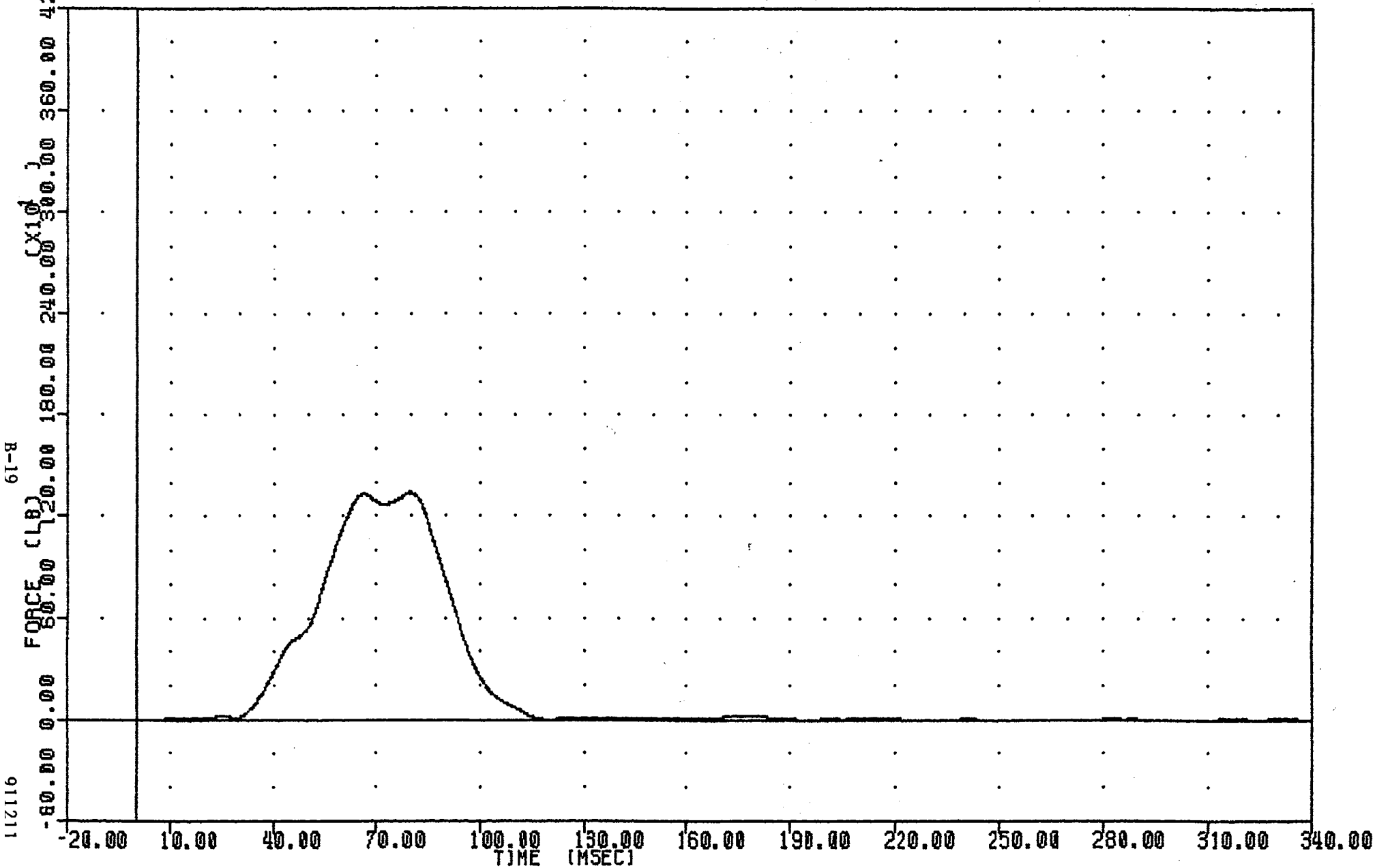


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT FEMUR FORCE

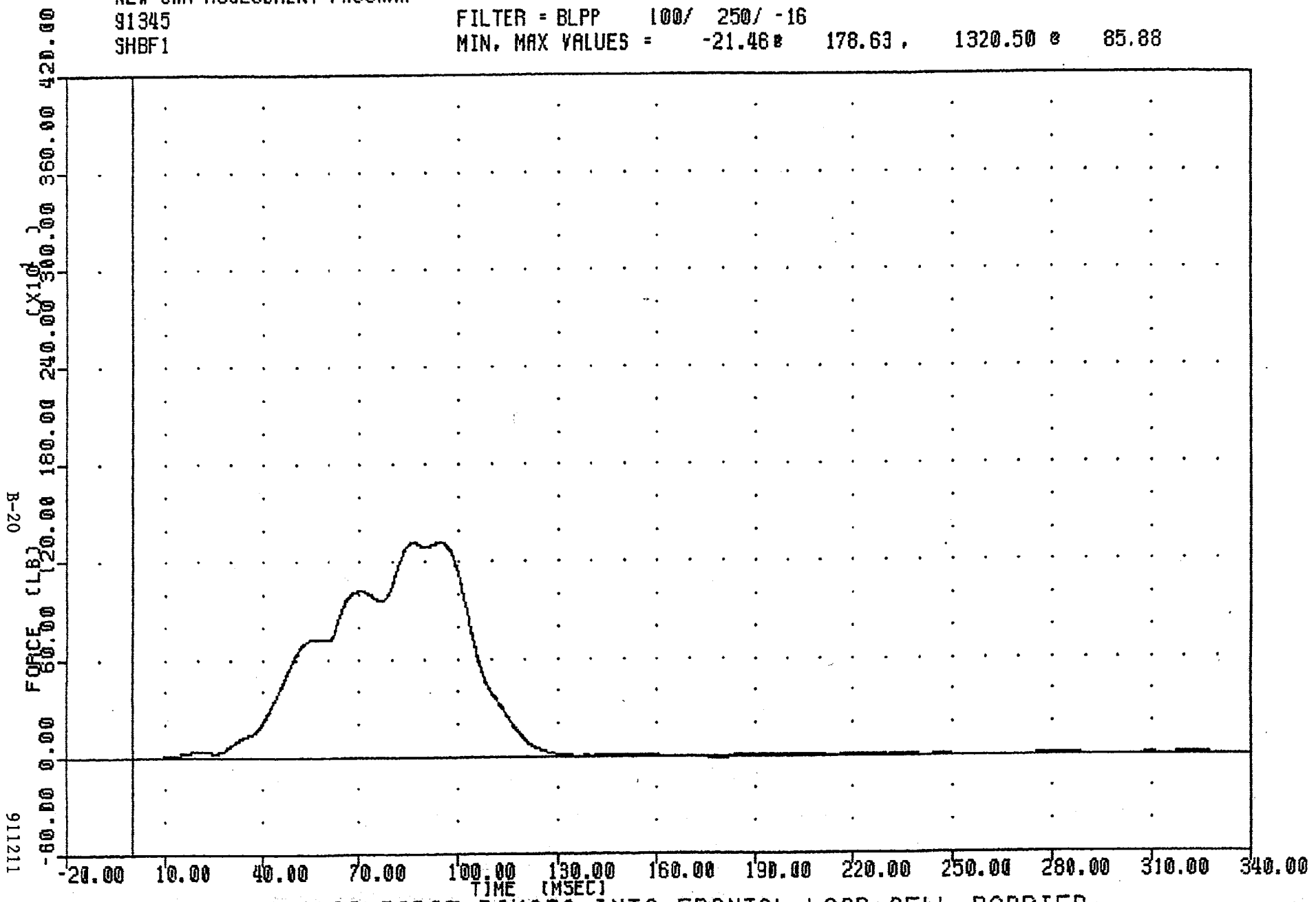

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
RFMF1
FILTER = BLPP 1000/ 2500/ -16
MIN. MAX VALUES = -689.52 @ 68.88 , 137.28 @ 52.63
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
FORCE (LB) (X10)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FEMUR FORCE

911211

NCAP CAR ASSESSMENT PROGRAM
91345
LBOF1
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -3.50 @ -9.75 , 1338.91 @ 79.75



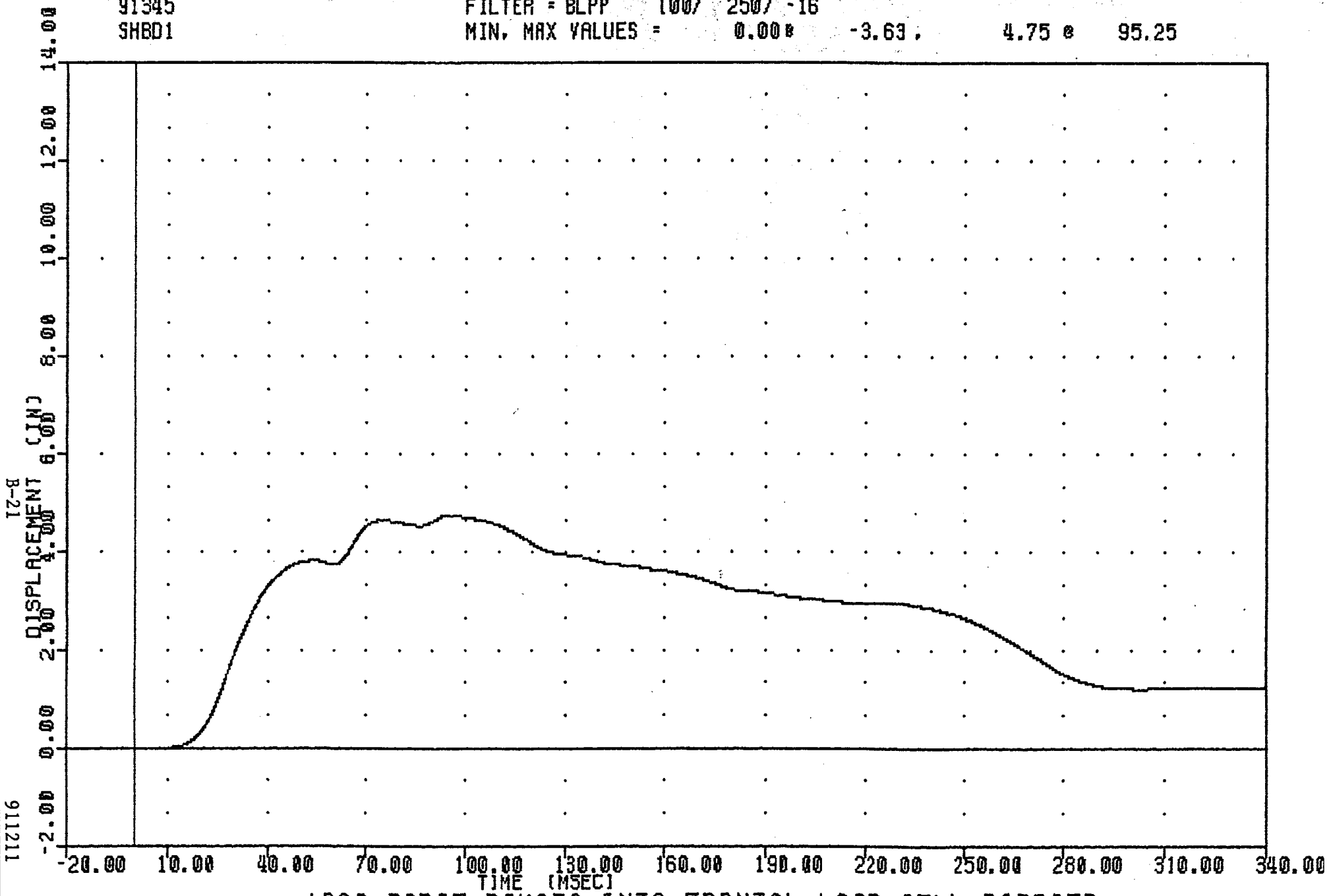
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER LAP BELT OUTBOARD FORCE



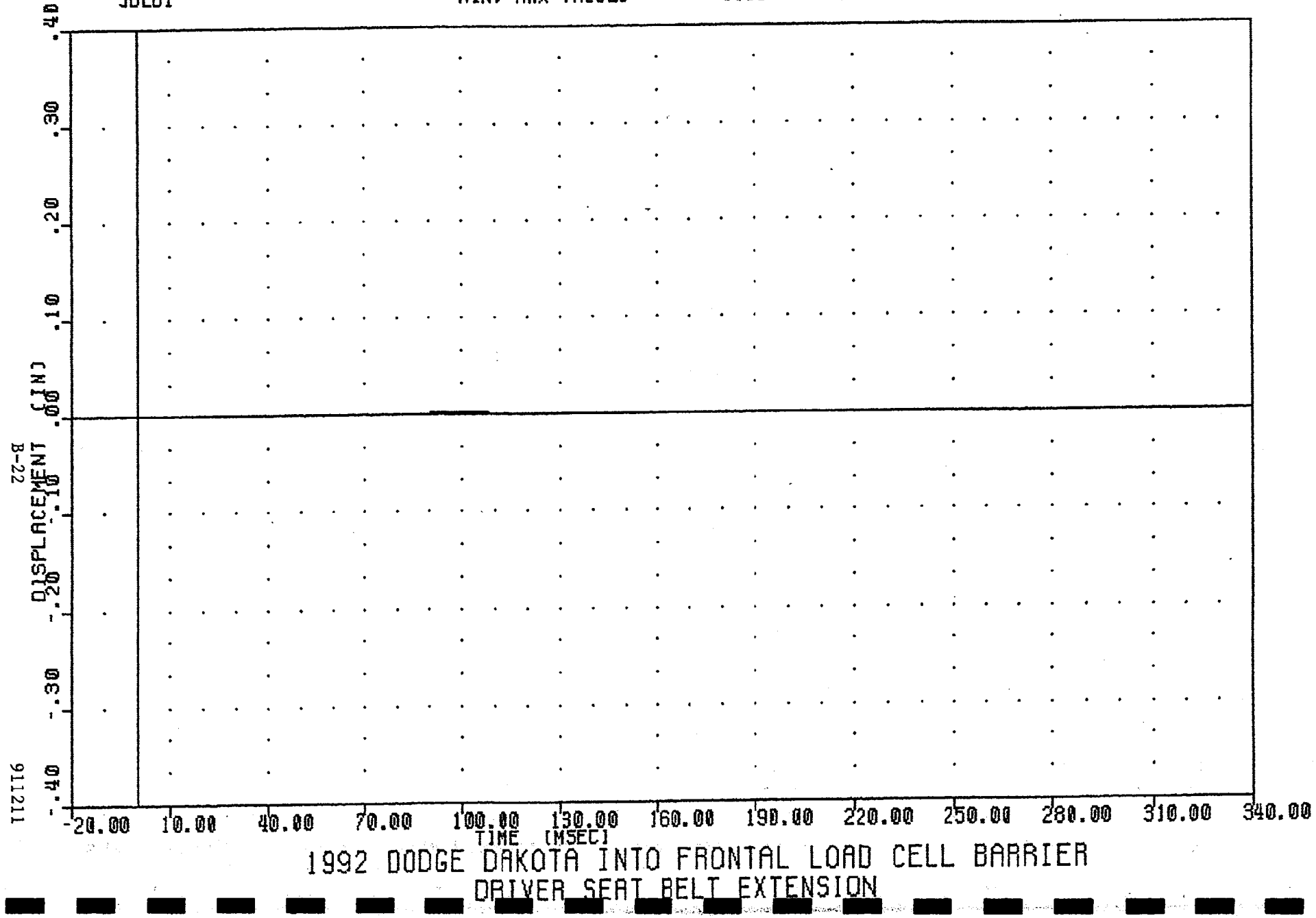
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER SHOULDER BELT FORCE

911211

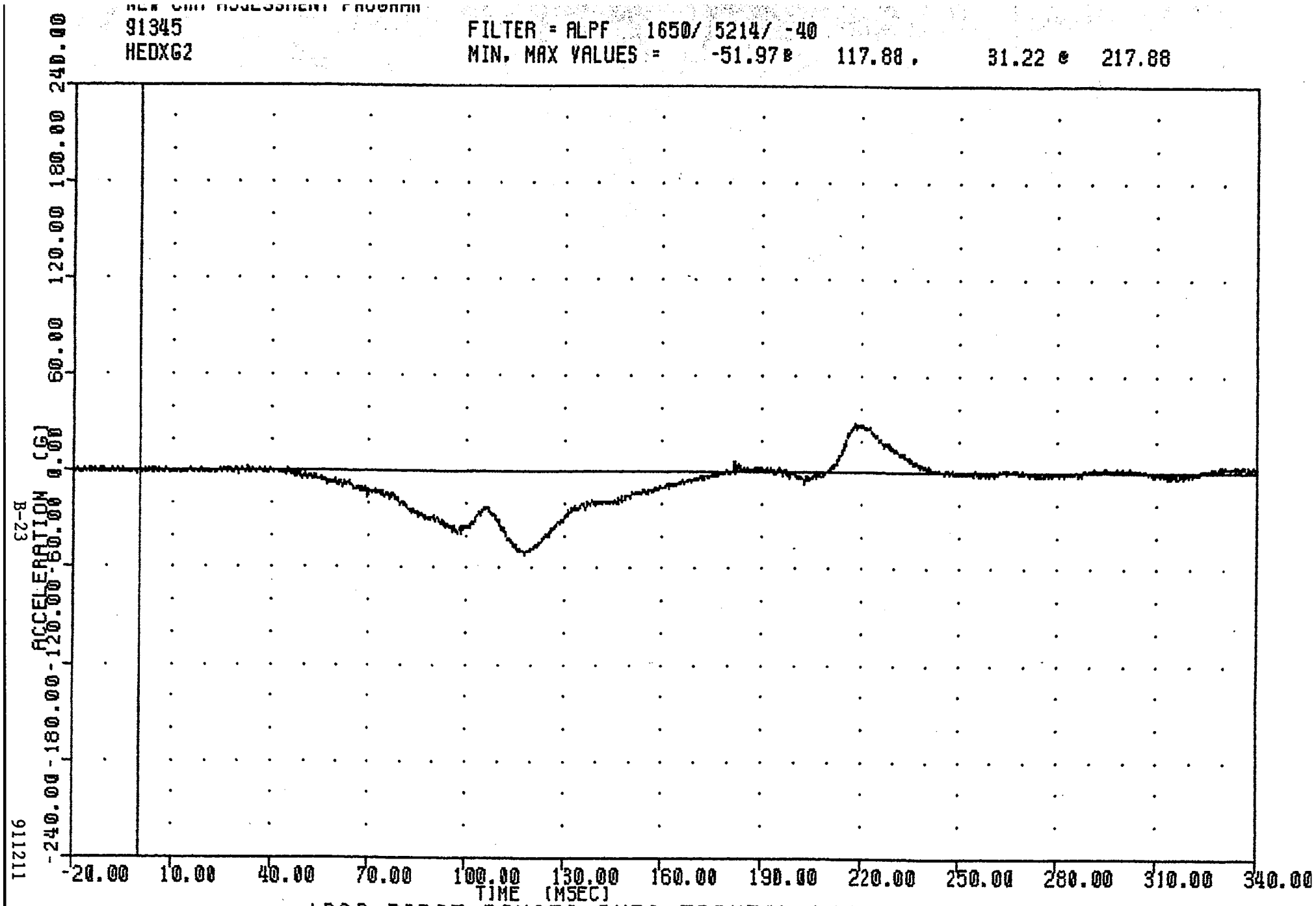
NEW CRH ASSESSMENT PROGRAM
91345
SHBD1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = 0.00 @ -3.63 , 4.75 @ 95.25



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER SHOULDER BELT DISPLACEMENT

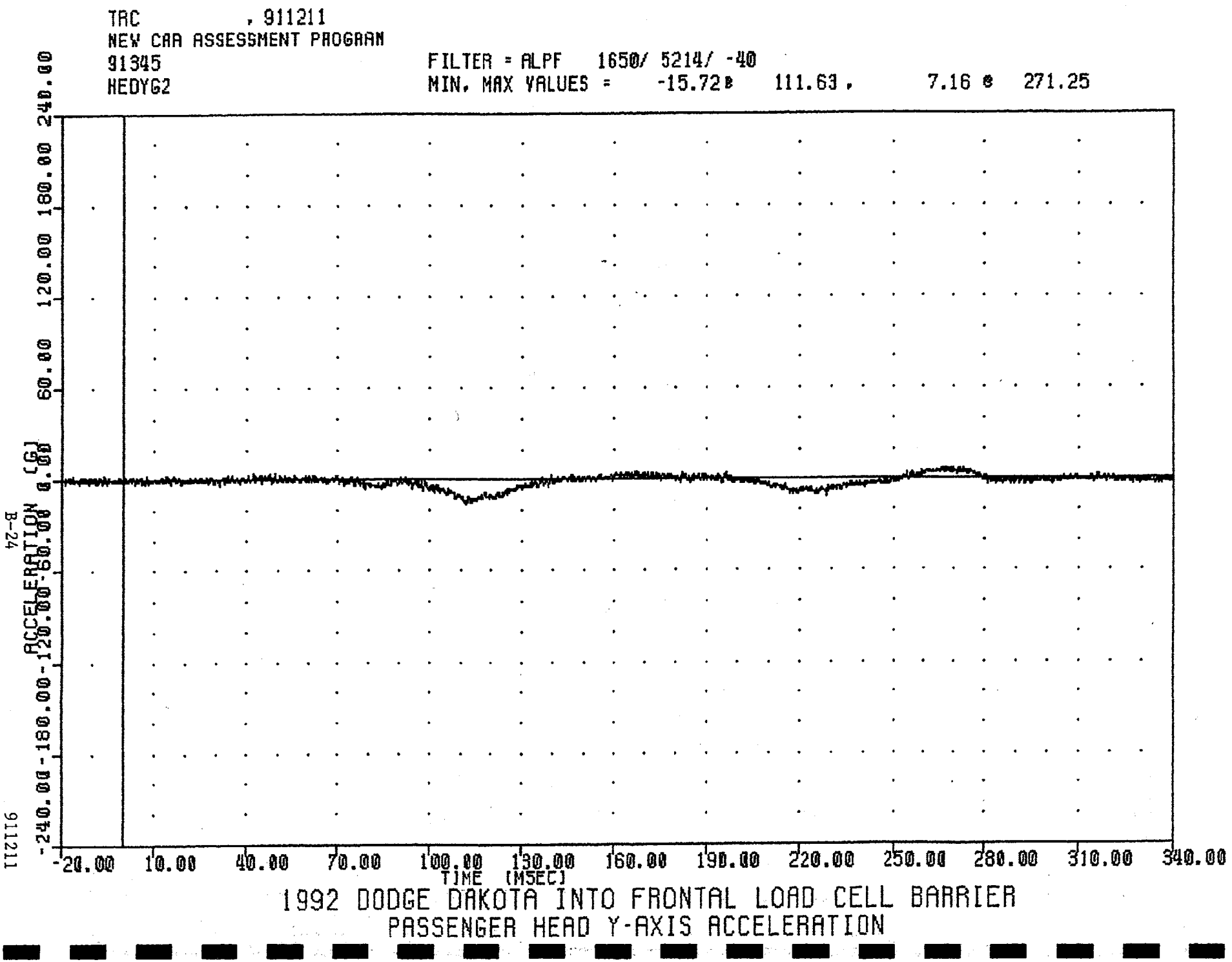

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
SBED1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = 0.00 @ 65.63 , 0.00 @ 94.75
.40
.30
.20
.10
.00
-.10
-.20
-.30
-.40
DISPLACEMENT (IN)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
DRIVER SEAT BELT EXTENSION

911211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION

911211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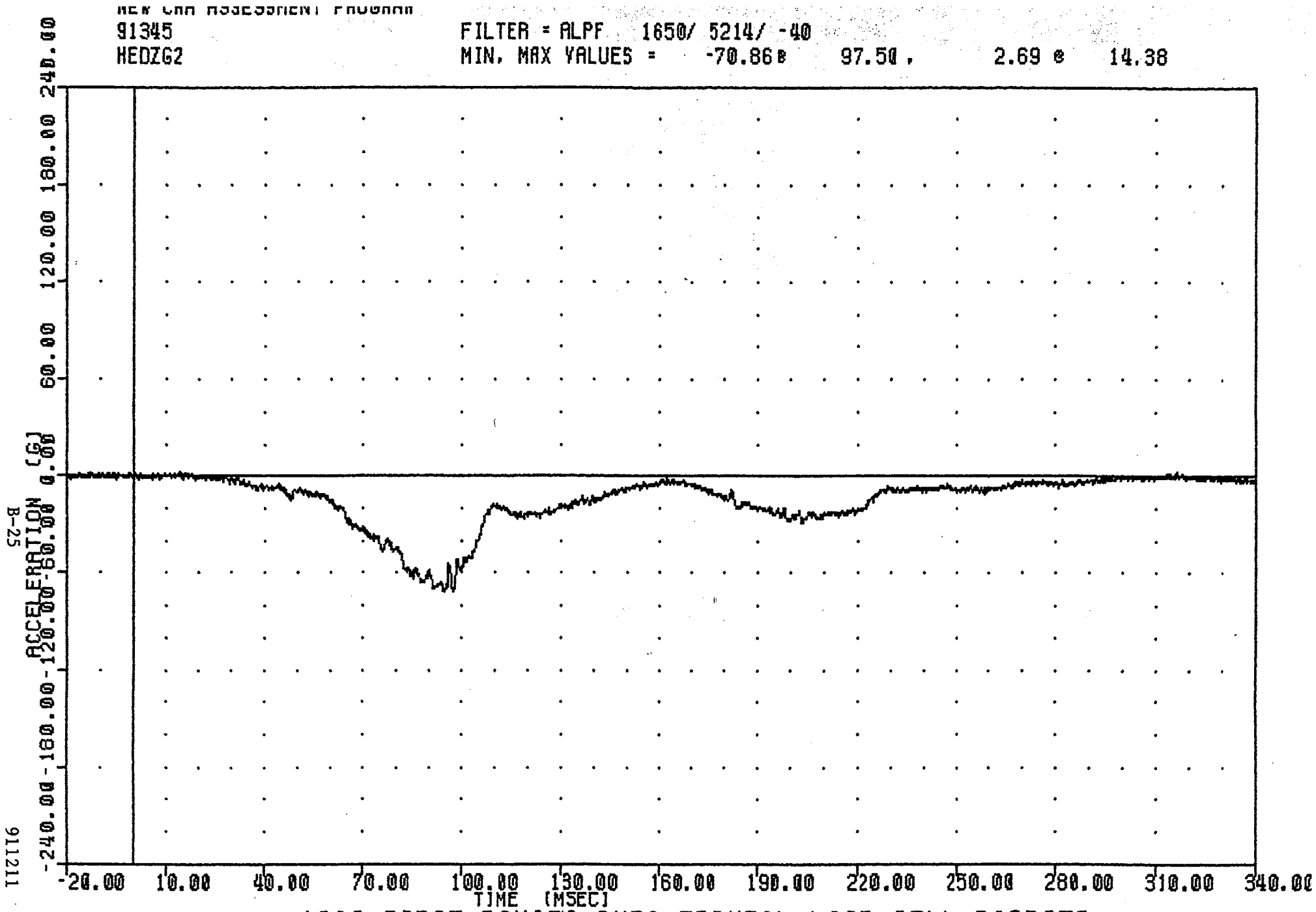
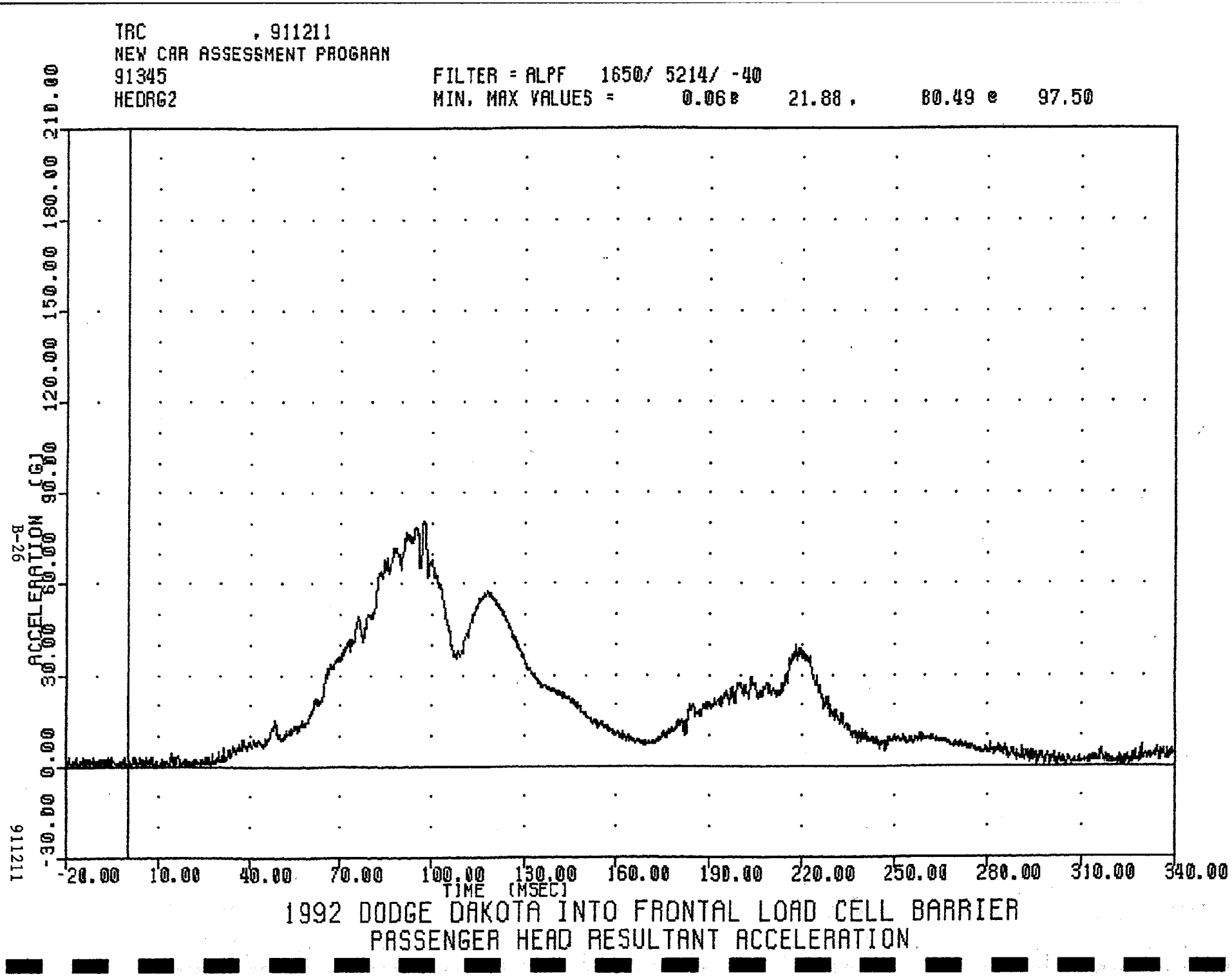
NEW CAR ASSESSMENT PROGRAM
91345
HEDYG2
FILTER = CFC 1650/ 5214/ -40
MIN, MAX VALUES = -15.72 @ 111.63 , 7.16 @ 271.25
240.00
180.00
120.00
60.00
0.00
-60.00
-120.00
-180.00
-240.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION

911211

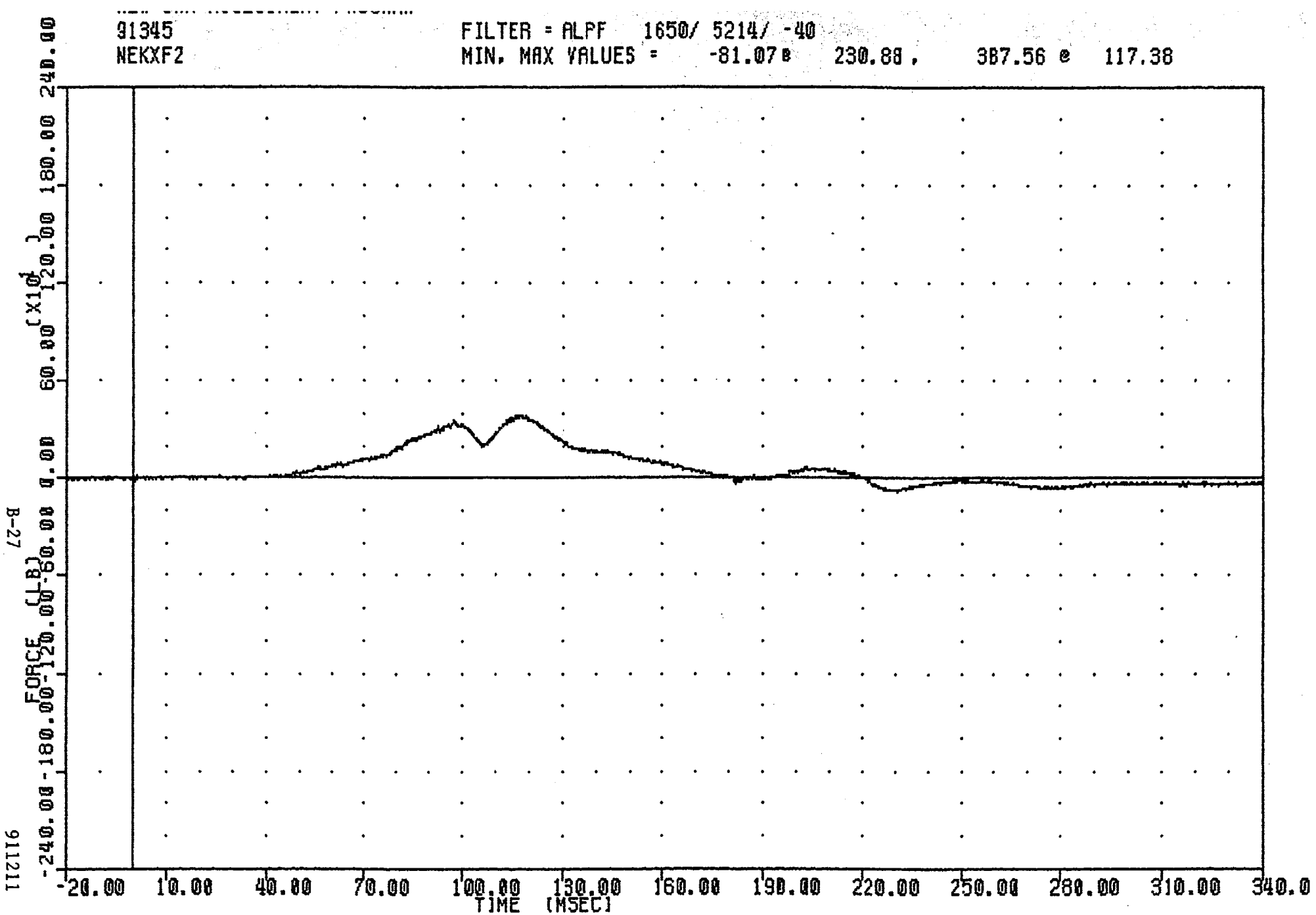


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION

911211

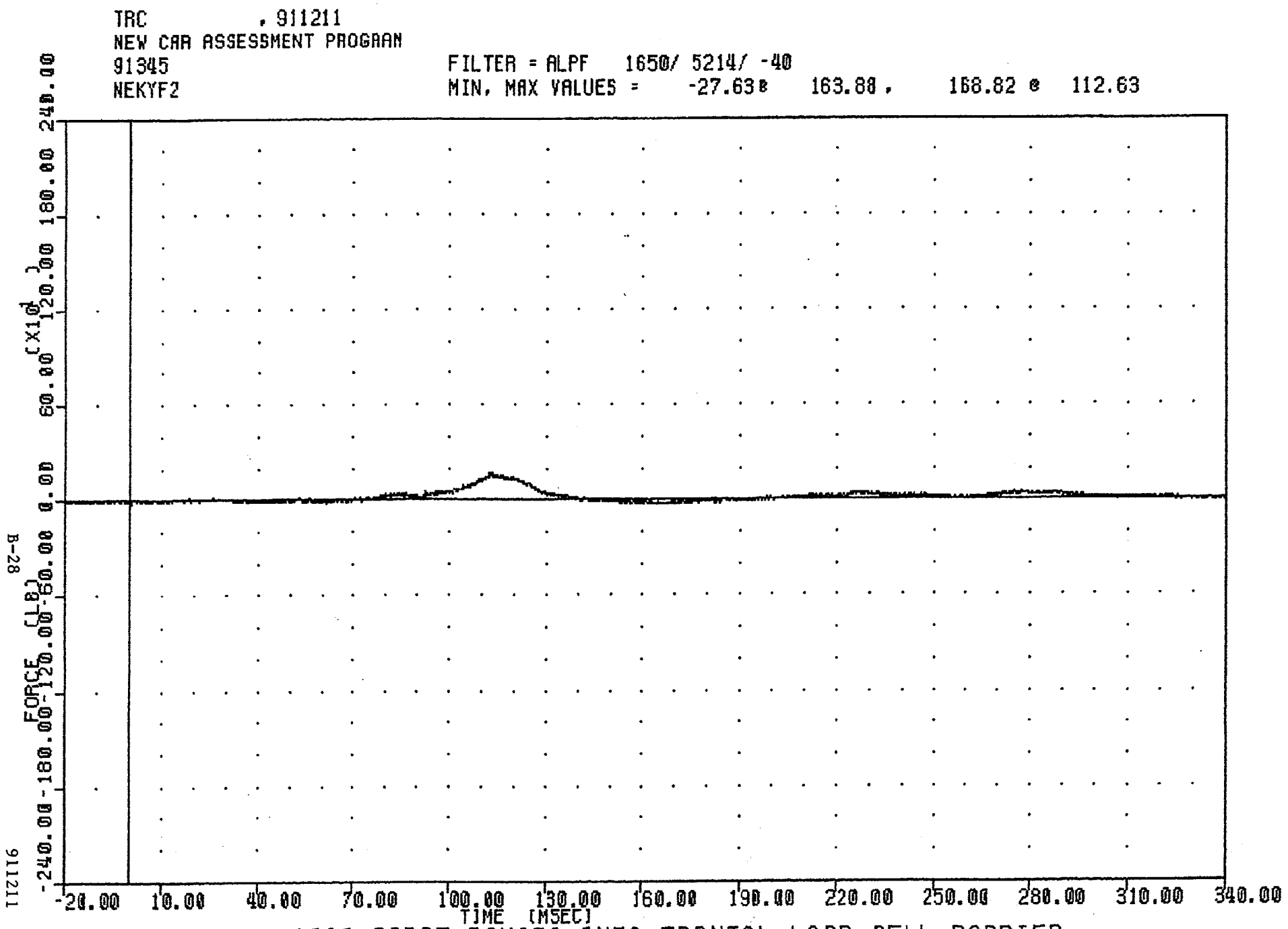


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION



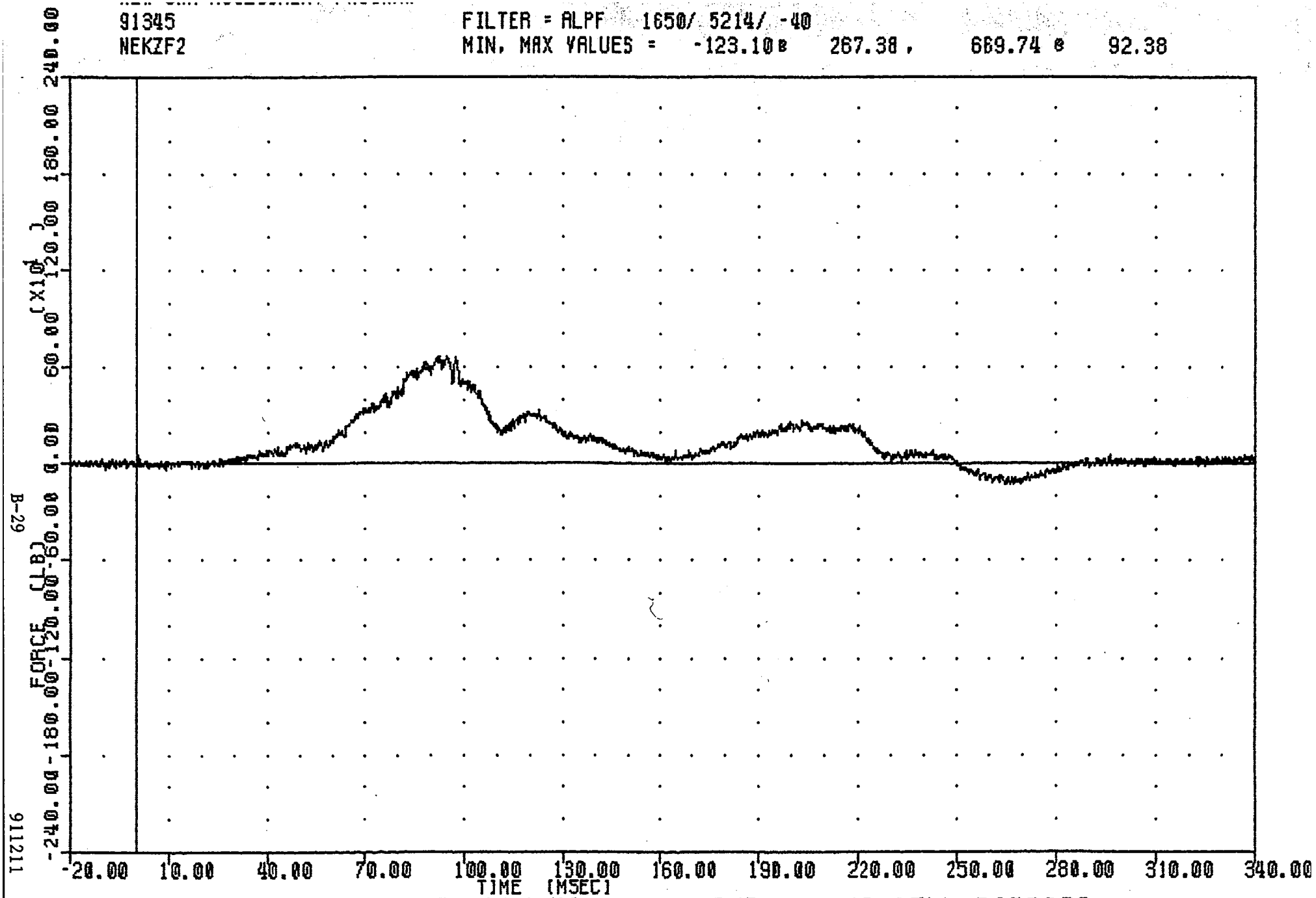
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK X-AXIS SHEAR FORCE

911211



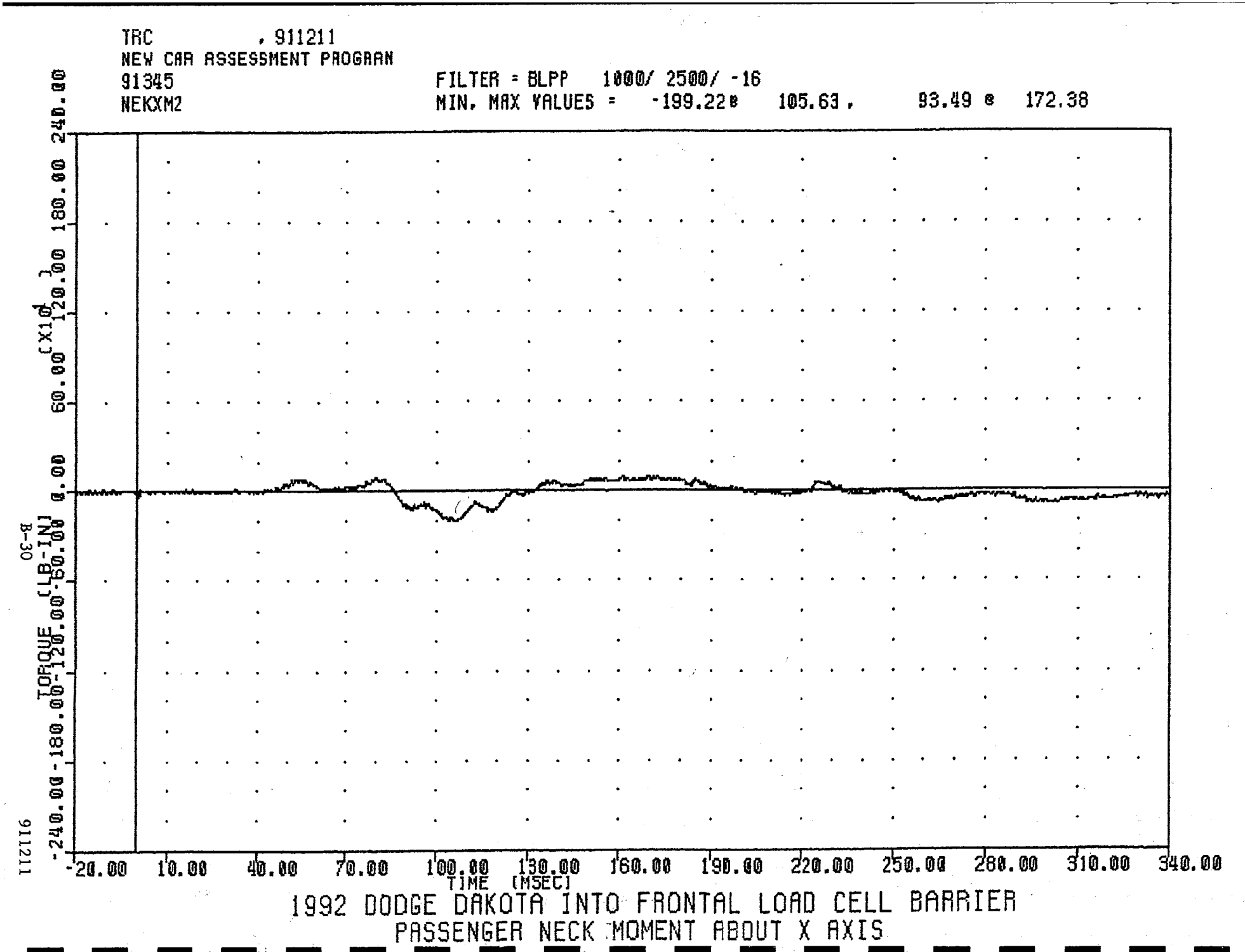
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Y-AXIS SHEAR FORCE

911211

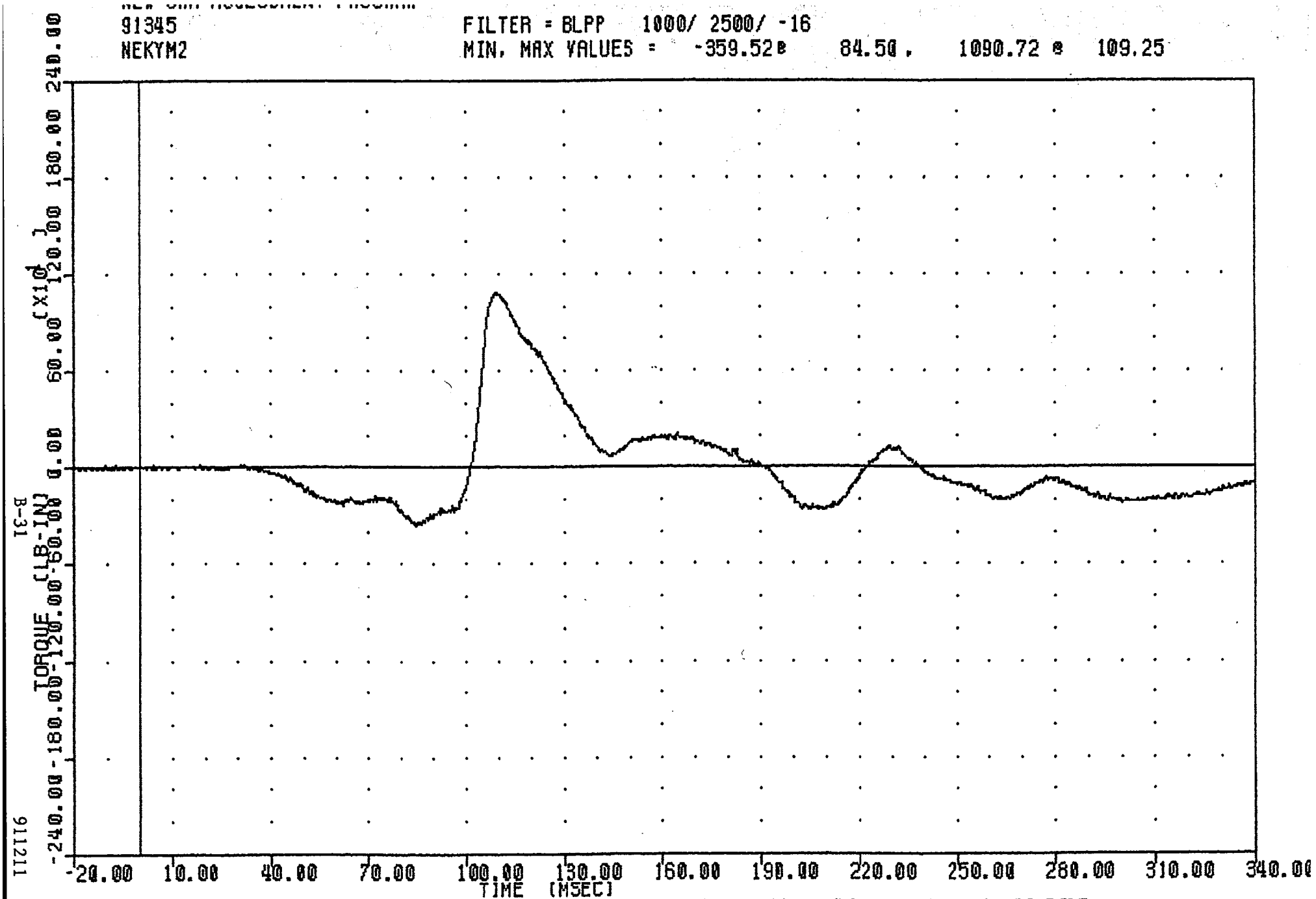


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Z-AXIS AXIAL FORCE

911211

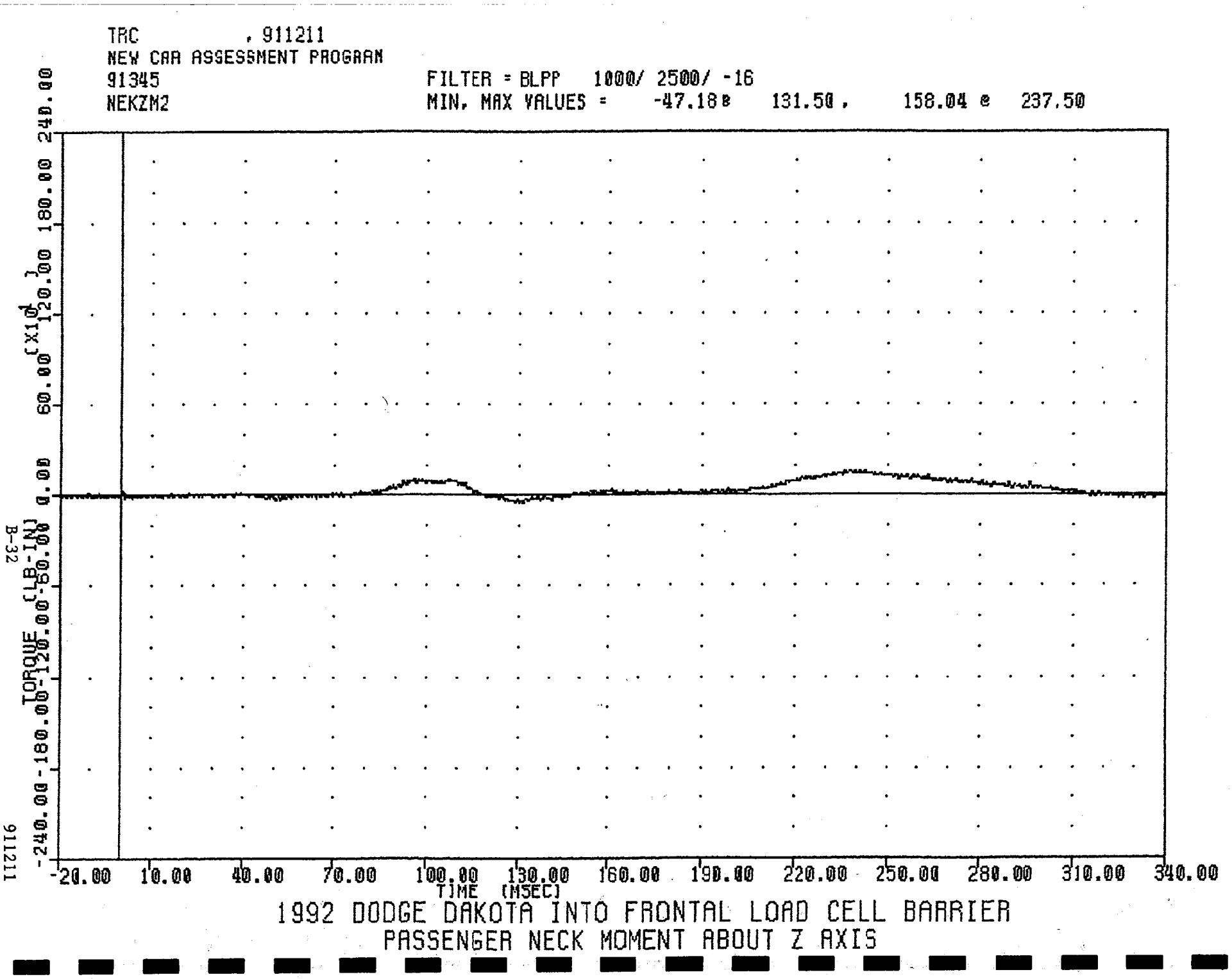


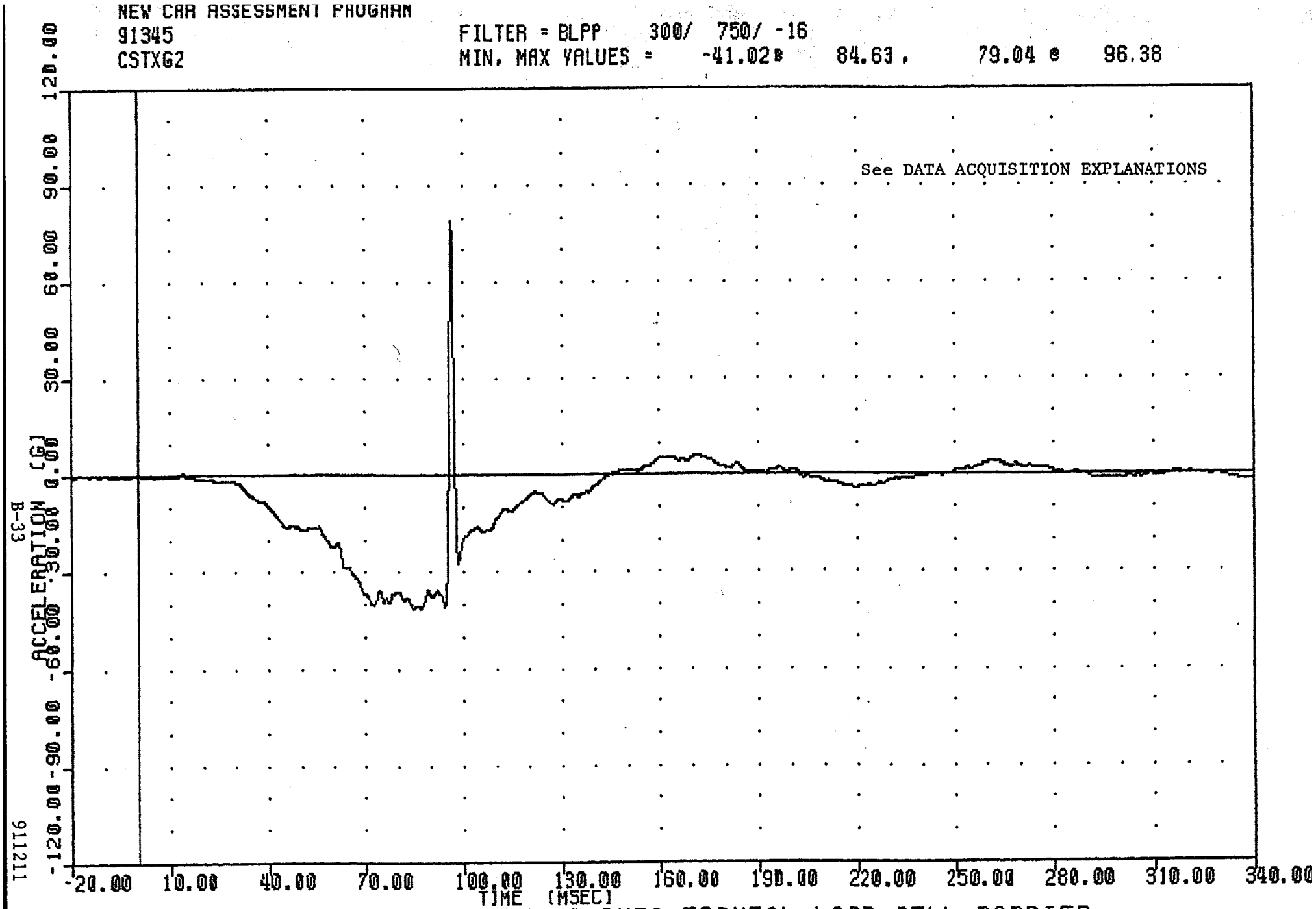
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT X AXIS



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Y AXIS

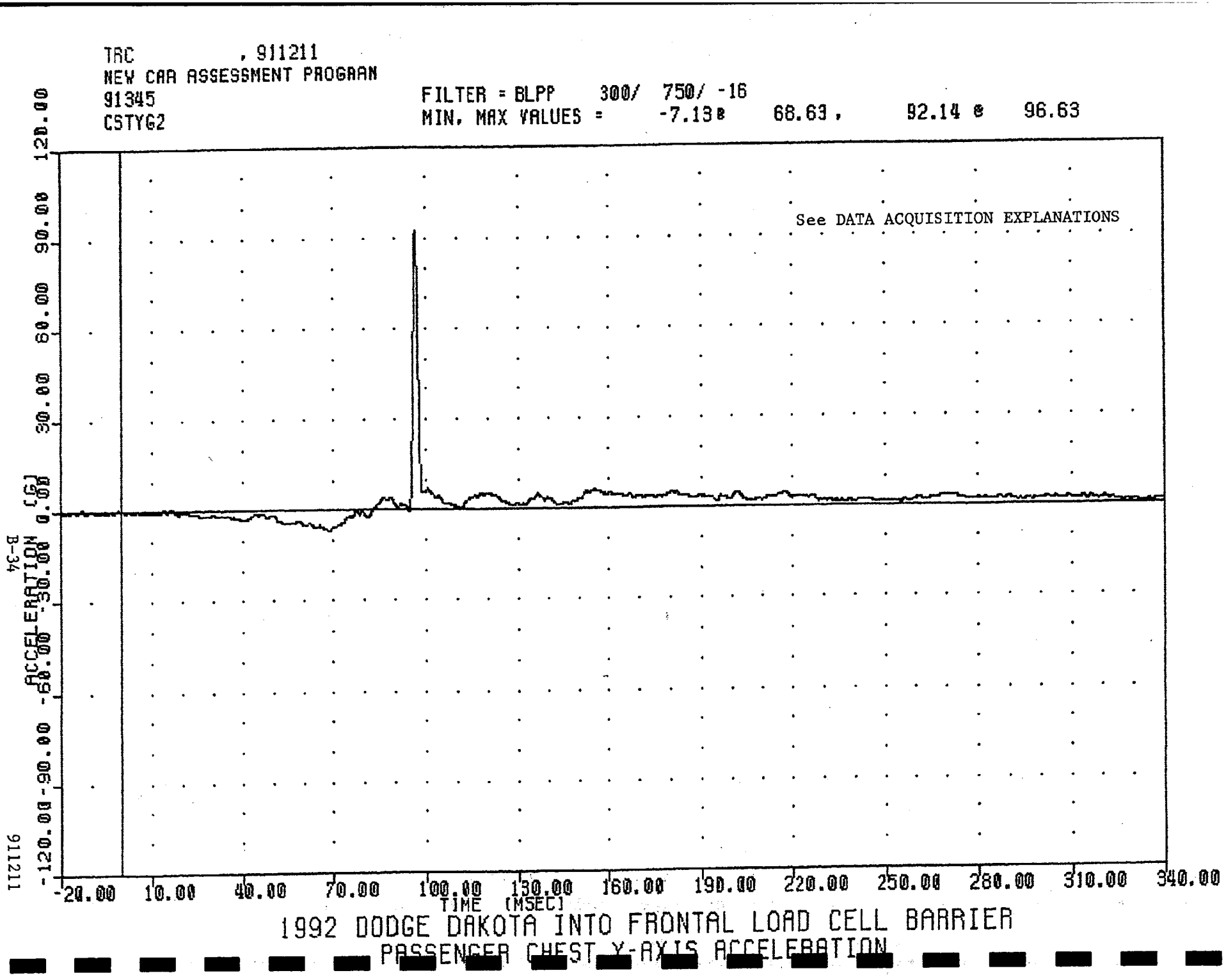
911211

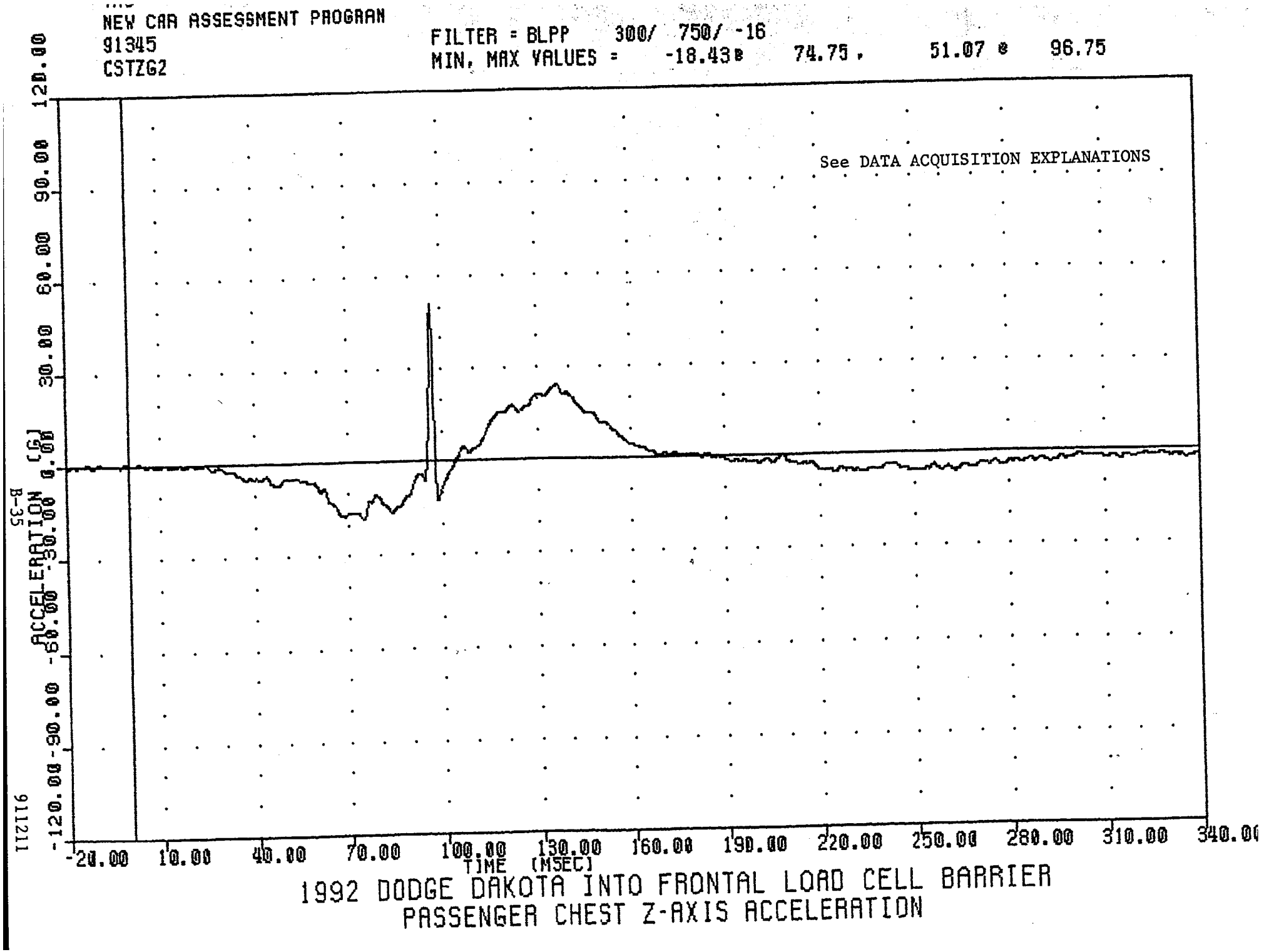

TRC . 911211
NEW CAR ASSESSMENT PROGRAM
91345
NEKZM2
FILTER = BLPP 1000/ 2500/ -16
MIN, MAX VALUES = -47.18 @ 131.50 , 158.04 @ 237.50
240.00
180.00
120.00
60.00
0.00
-60.00
-120.00
-180.00
-240.00
TORQUE (LB-IN) (X10)
B-32
911211
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Z AXIS

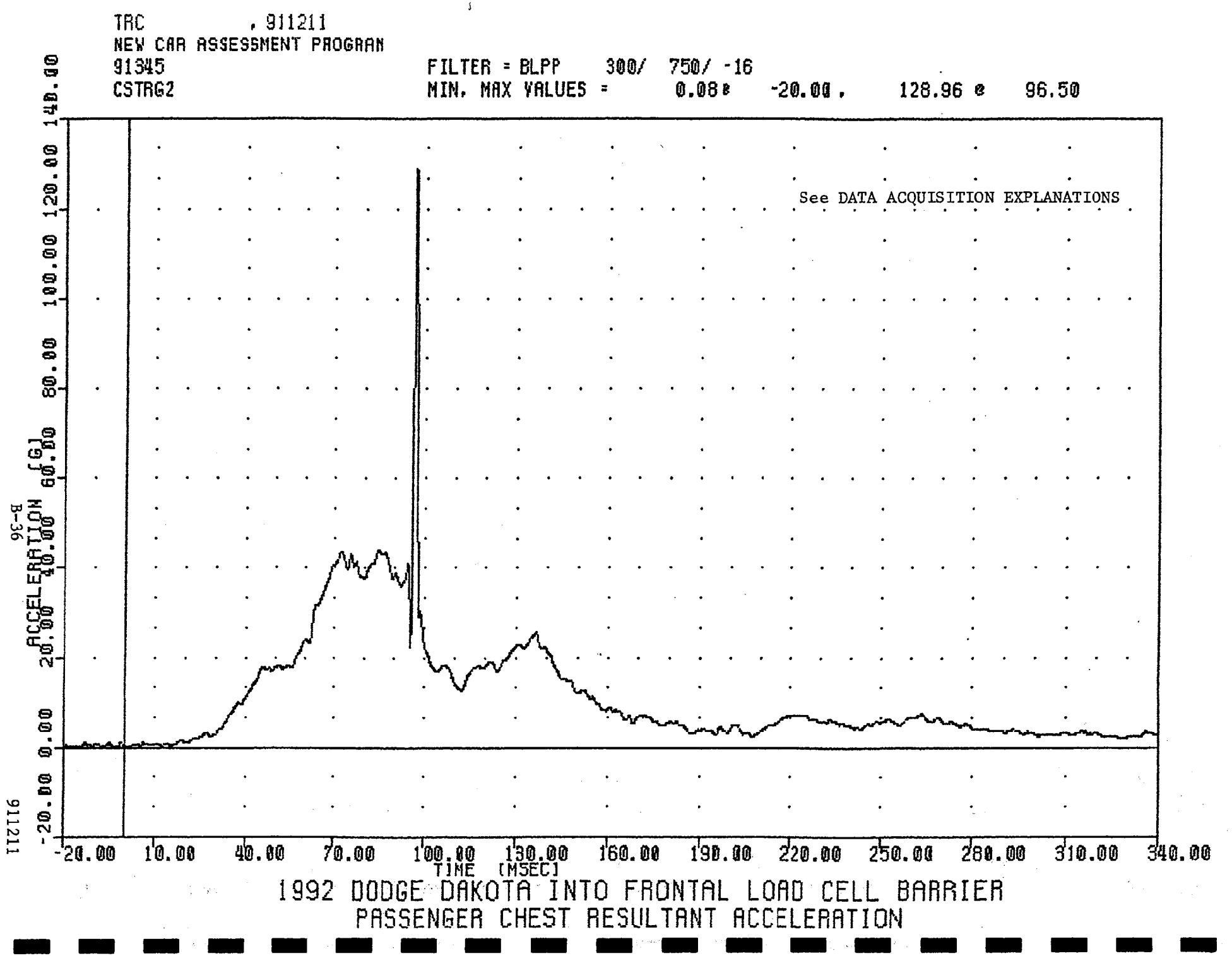


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION

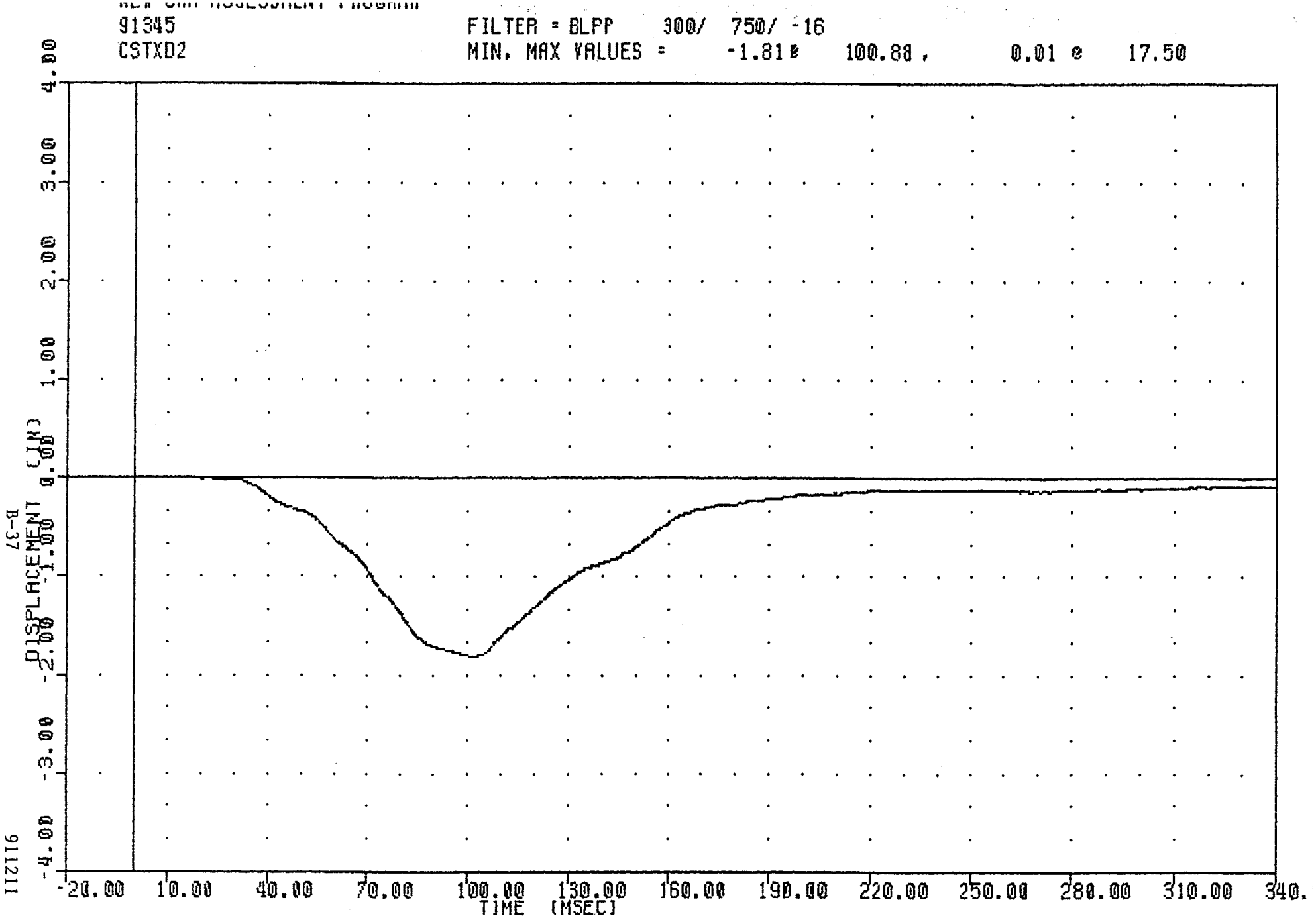
911211


TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
CSTYG2
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -7.13 @ 68.63 , 92.14 @ 96.63
See DATA ACQUISITION EXPLANATIONS
120.00
90.00
60.00
30.00
0.00
-30.00
-60.00
-90.00
-120.00
ACCELERATION [G]
-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 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION
911211


NEW CAR ASSESSMENT PROGRAM
91345
CSTZG2
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -18.43 @ 74.75 , 51.07 @ 96.75
See DATA ACQUISITION EXPLANATIONS
ACCELERATION (G)
120.00
90.00
60.00
30.00
0.00
-30.00
-60.00
-90.00
-120.00
-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 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION
B-35
911211

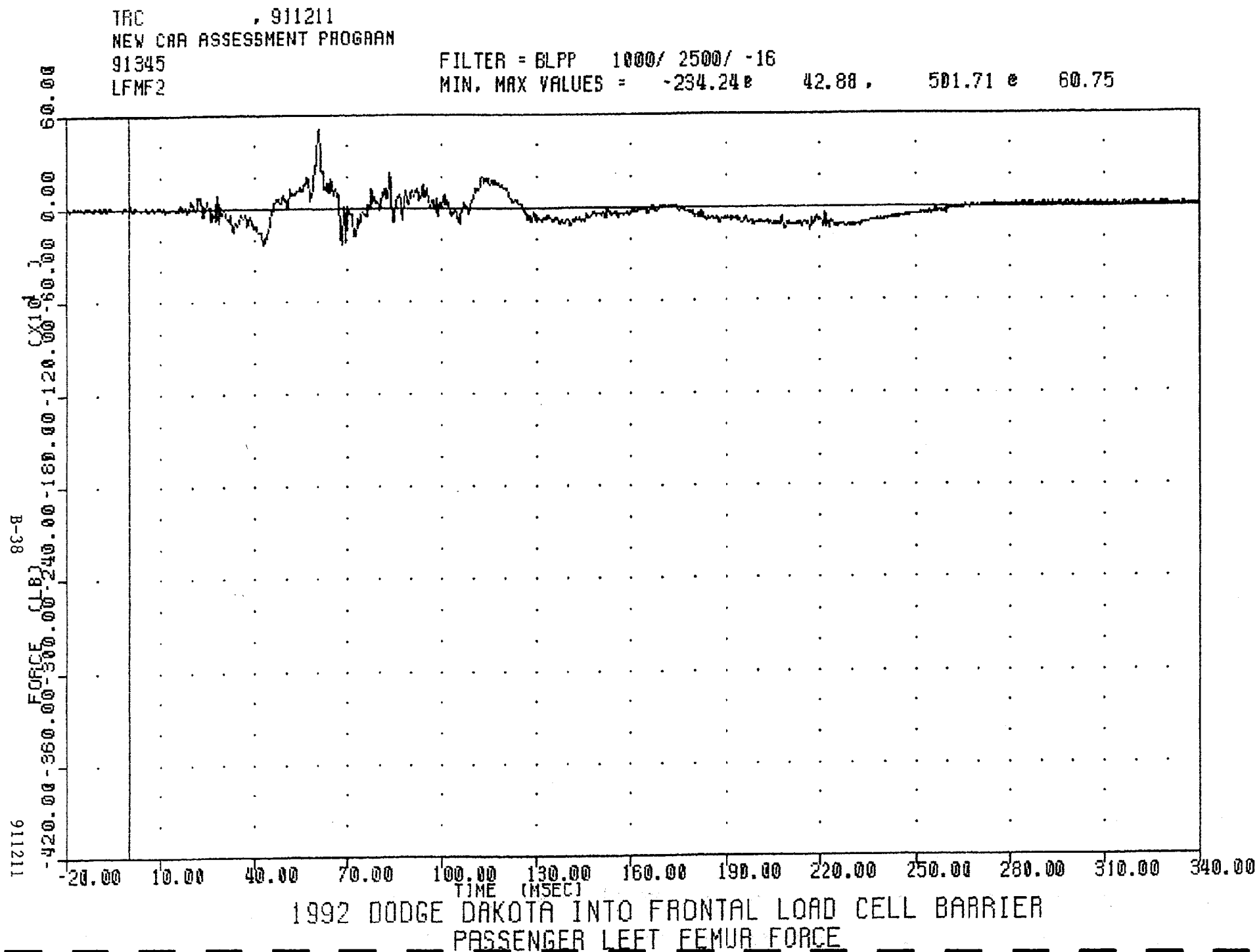


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION



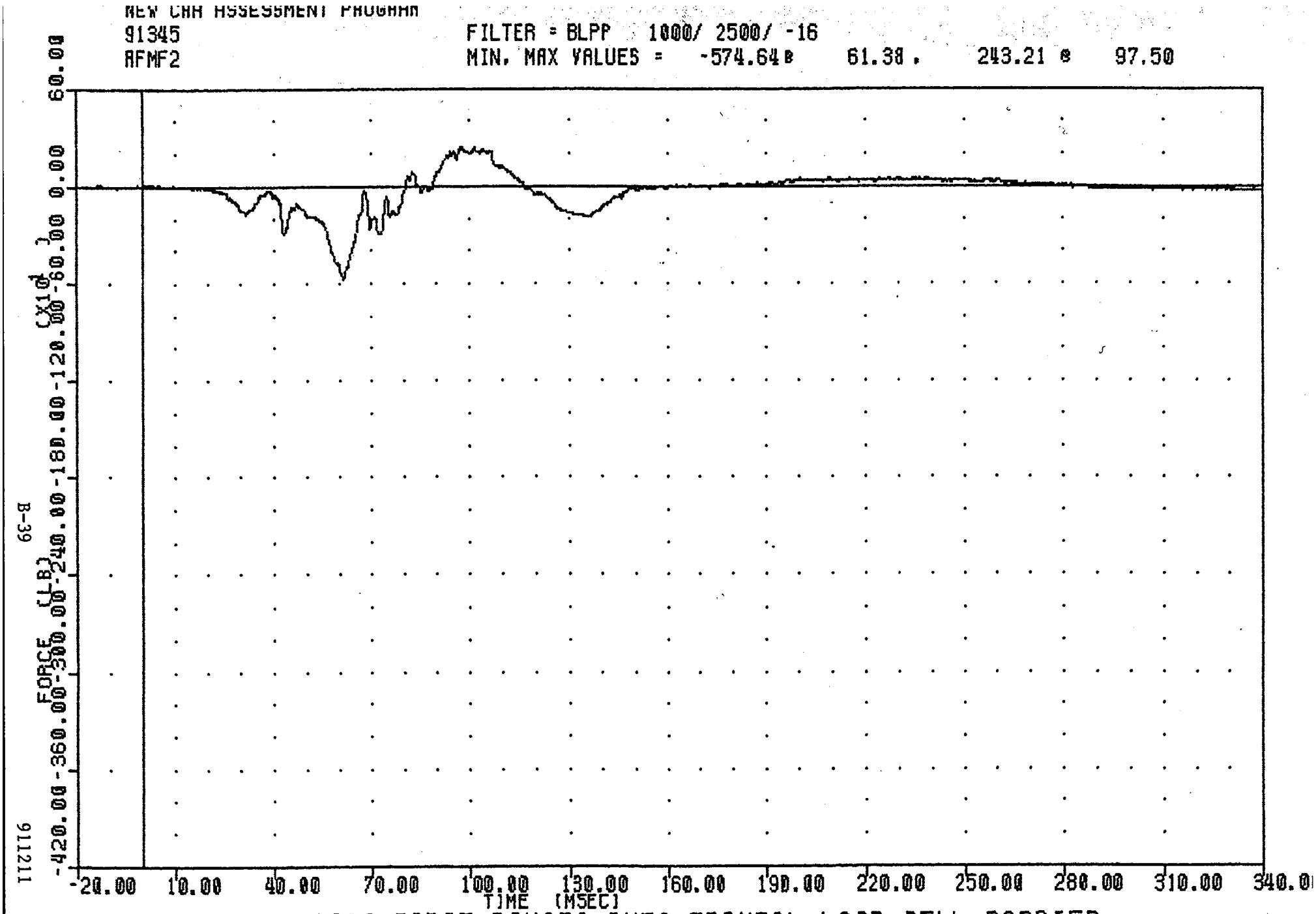
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST DEFLECTION

911211

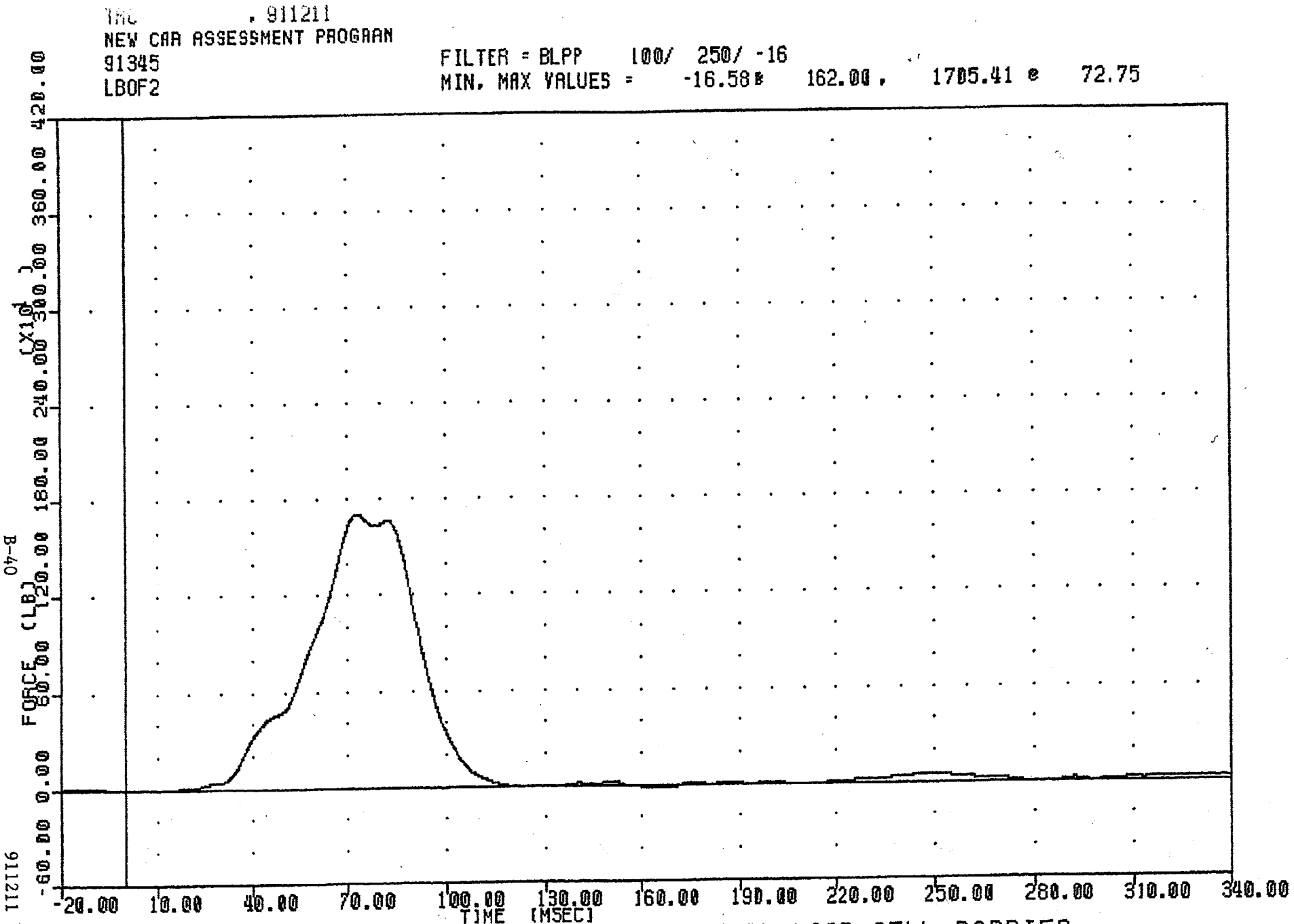


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FEMUR FORCE

911211



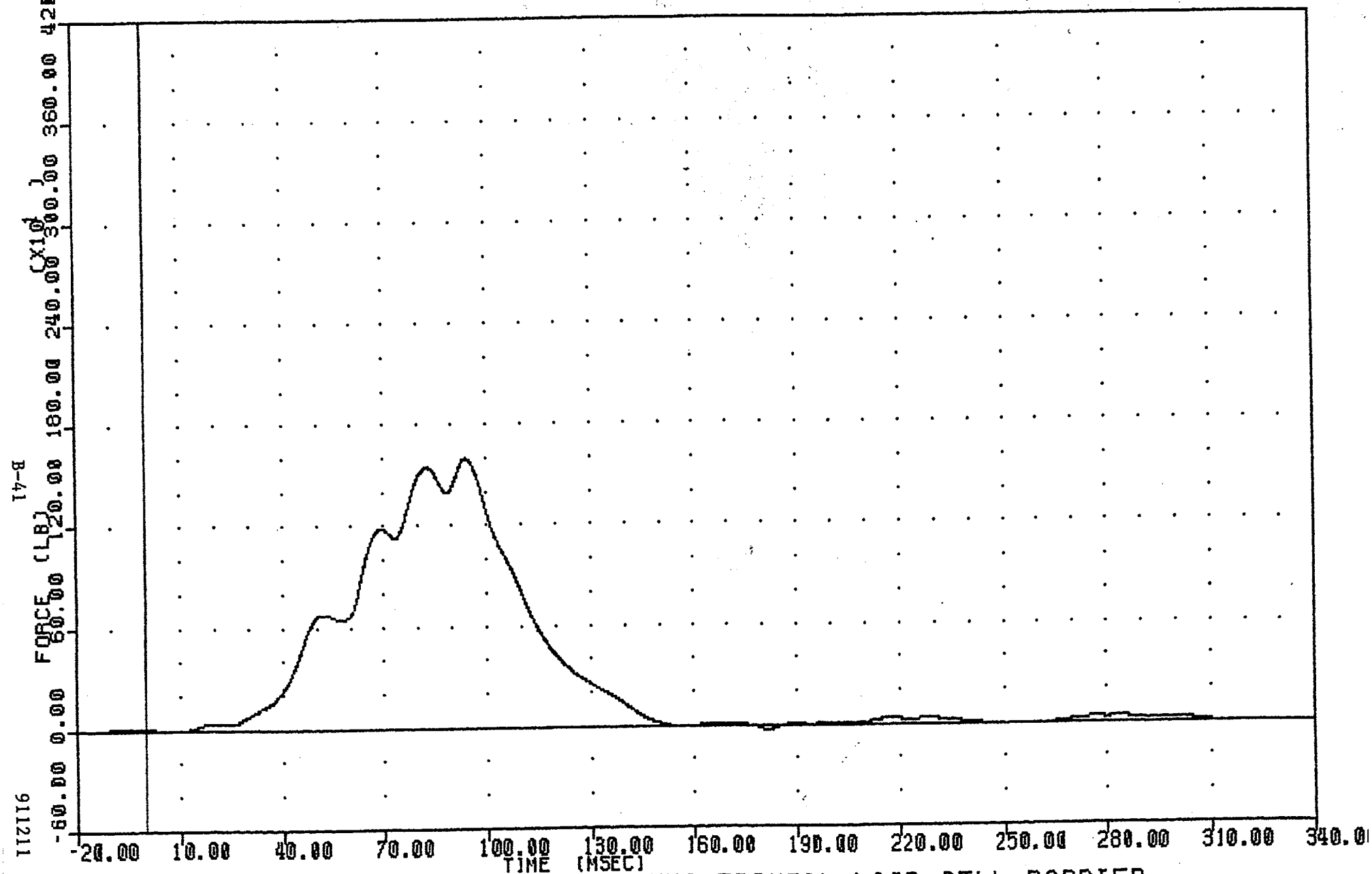
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FEMUR FORCE



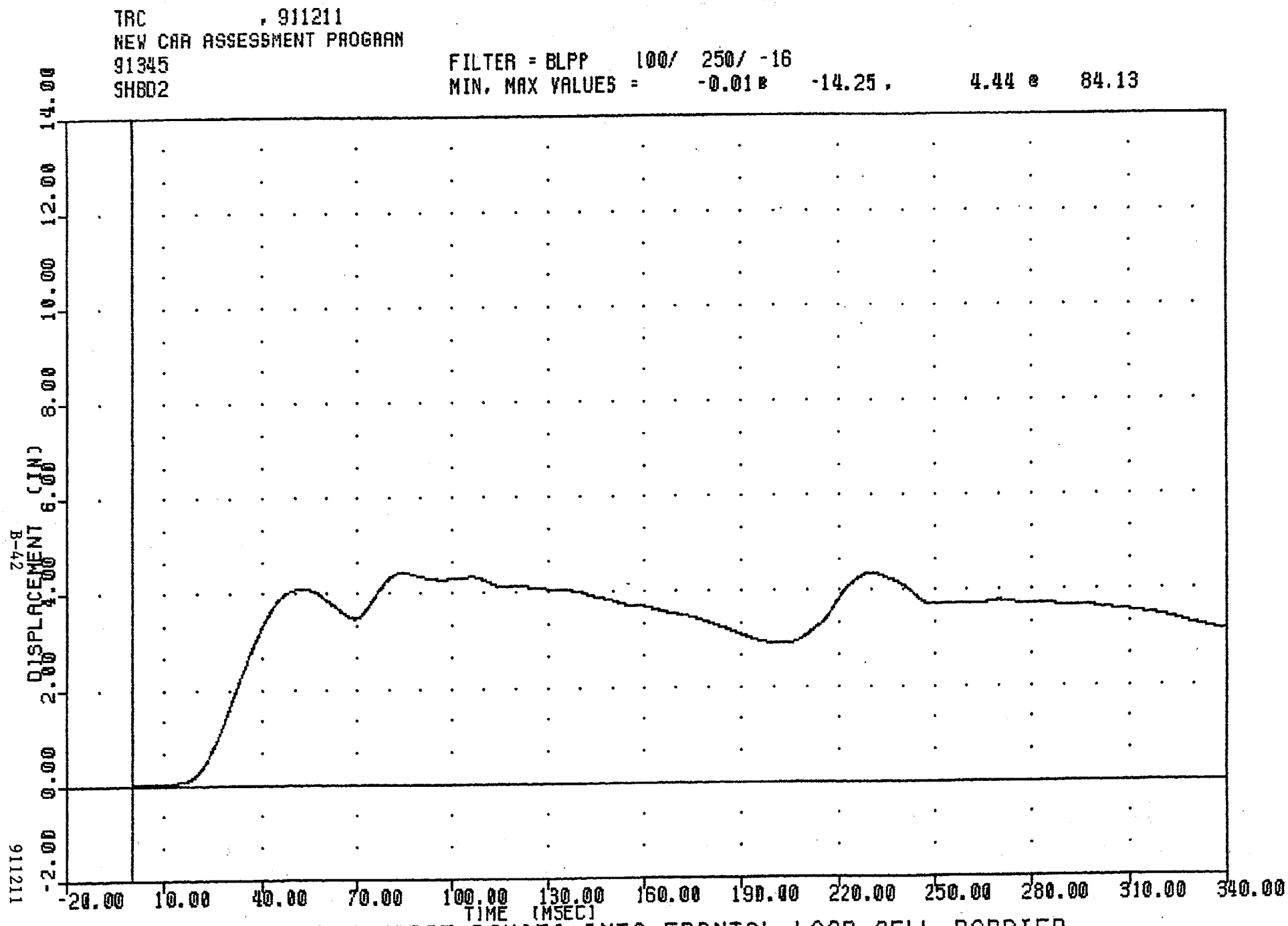
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER LAP BELT OUTBOARD FORCE

NEW CAR ASSESSMENT PROGRAM
91345
SHBF2

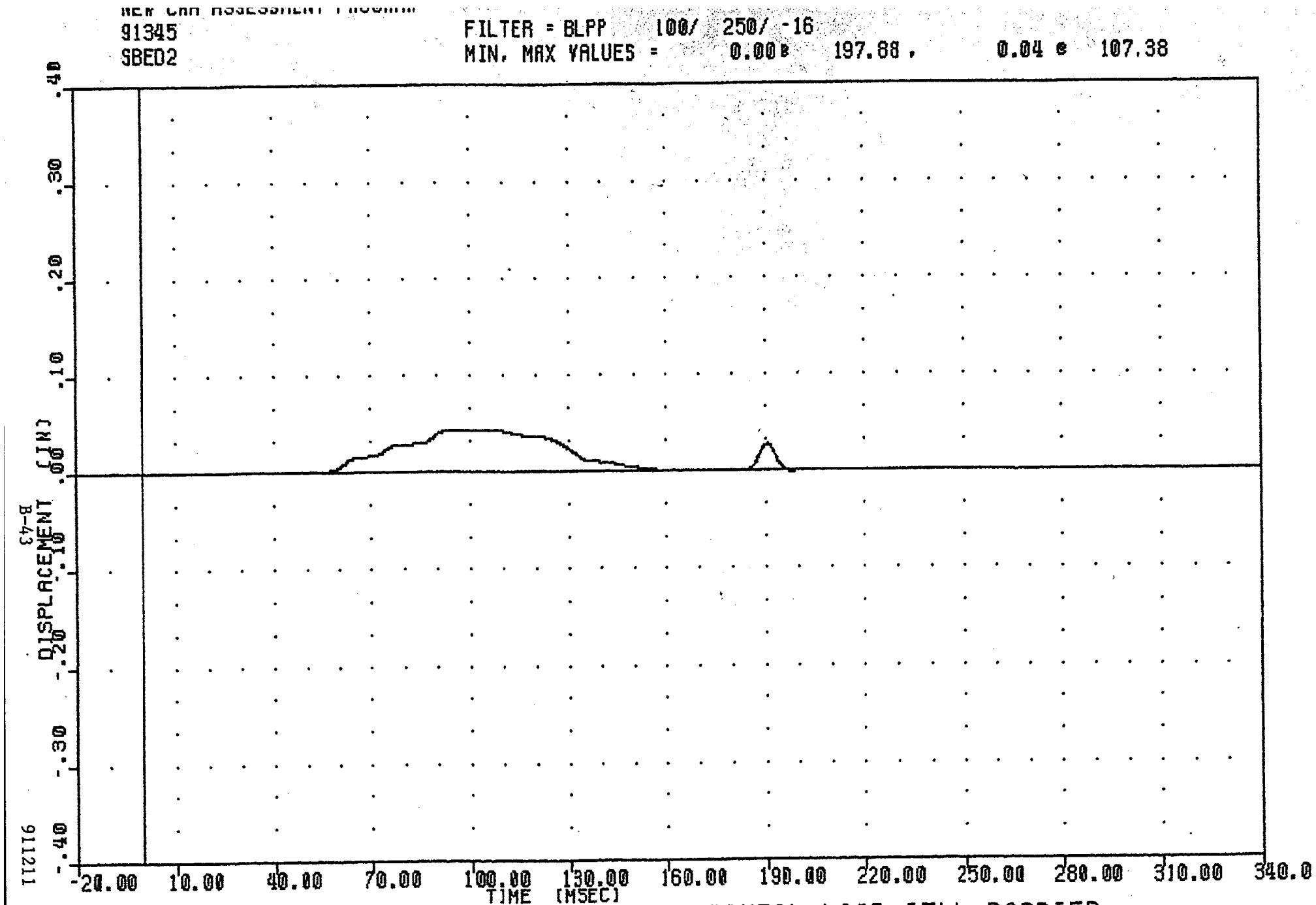
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -34.66 @ 181.50 , 1593.33 @ 94.13



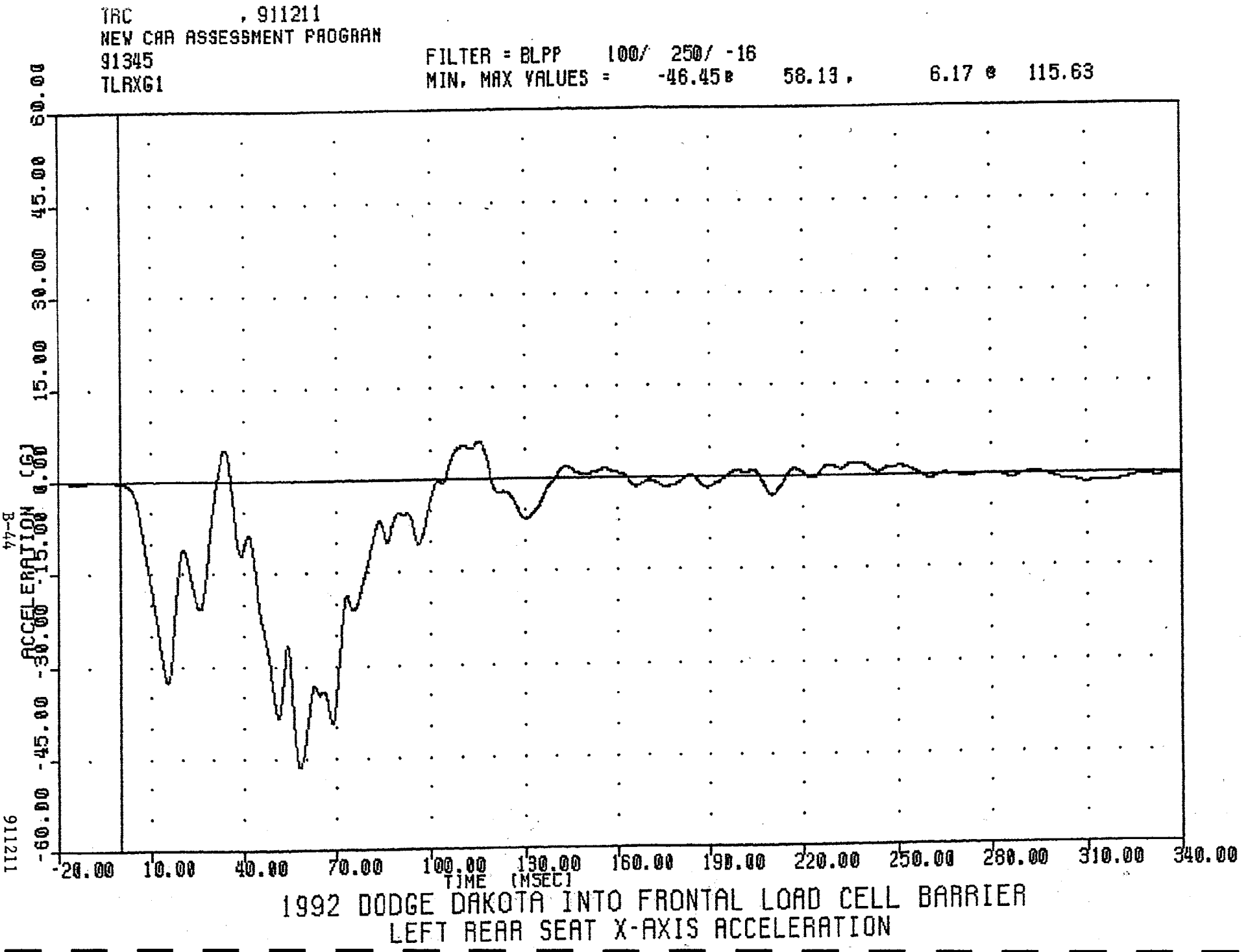
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT FORCE

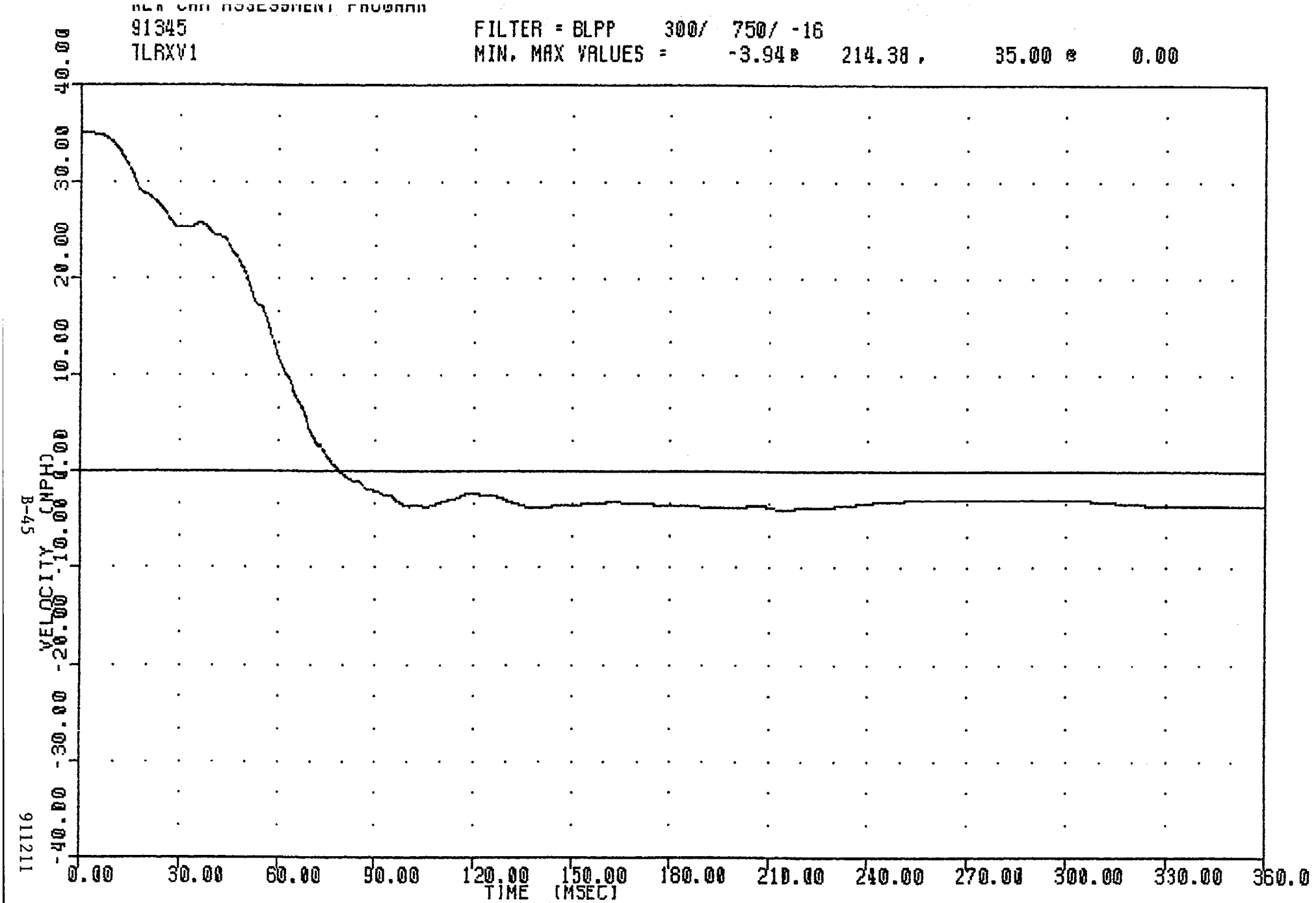


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER SHOULDER BELT DISPLACEMENT



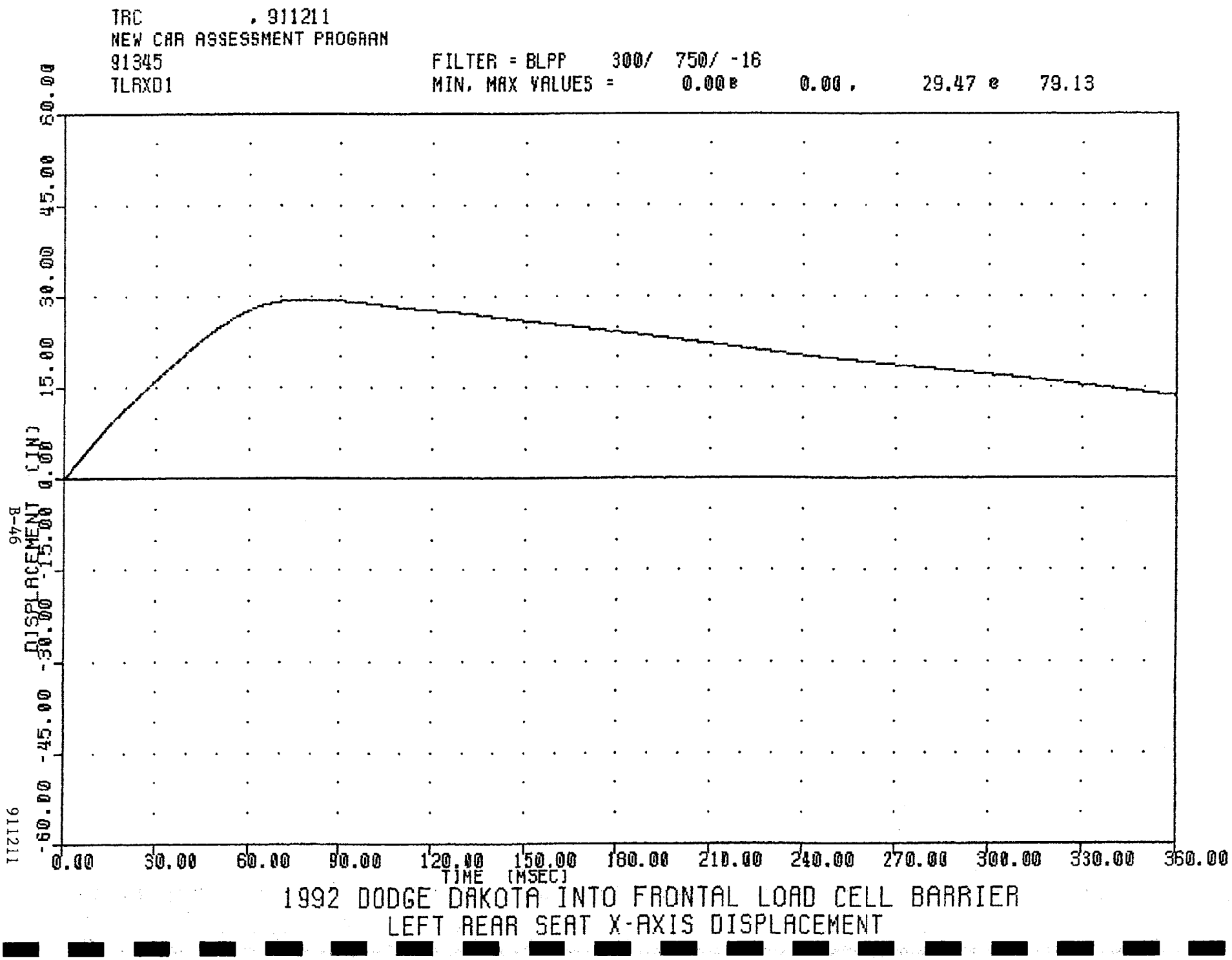
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
PASSENGER SEAT BELT EXTENSION

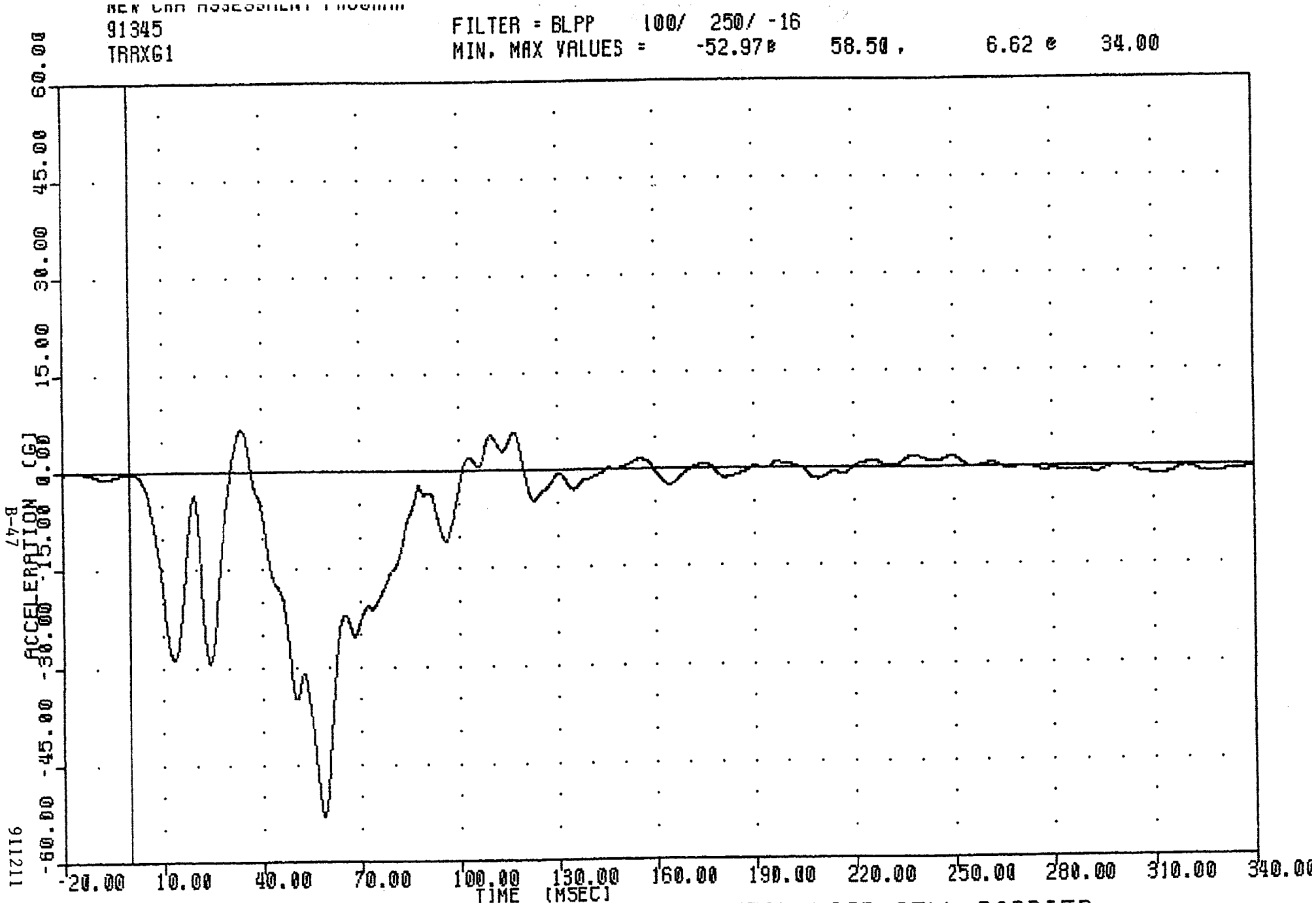

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
TLRXG1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -46.45 @ 58.13 , 6.17 @ 115.63
60.00
45.00
30.00
15.00
0.00
-15.00
-30.00
-45.00
-60.00
ACCELERATION [G]
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION
911211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS VELOCITY

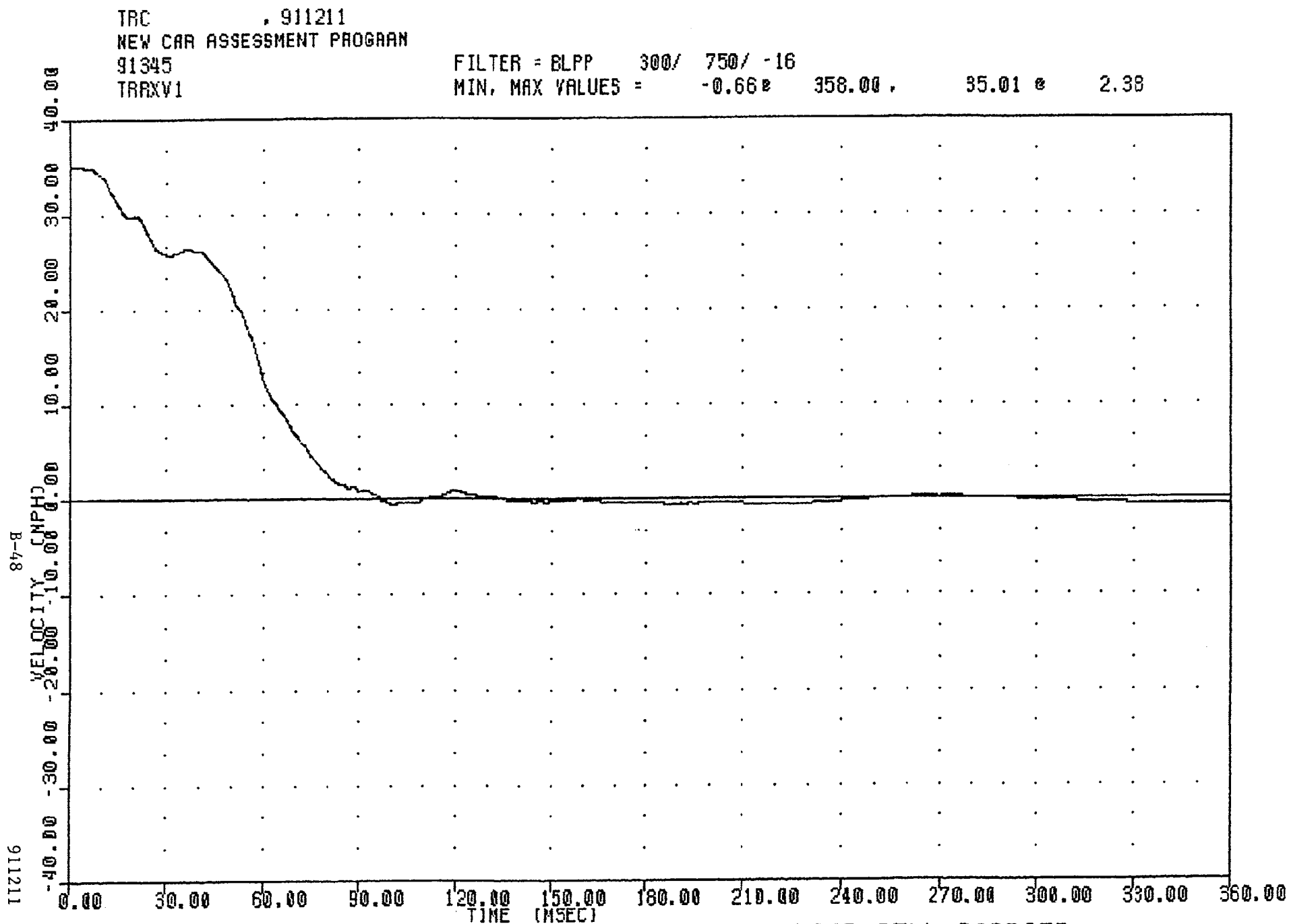
911211


TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
TLRXD1
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = 0.00 @ 0.00 , 29.47 @ 79.13
60.00
45.00
30.00
15.00
0.00
-15.00
-30.00
-45.00
-60.00
DISPLACEMENT (IN)
0.00
30.00
60.00
90.00
120.00
150.00
180.00
210.00
240.00
270.00
300.00
330.00
360.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS DISPLACEMENT

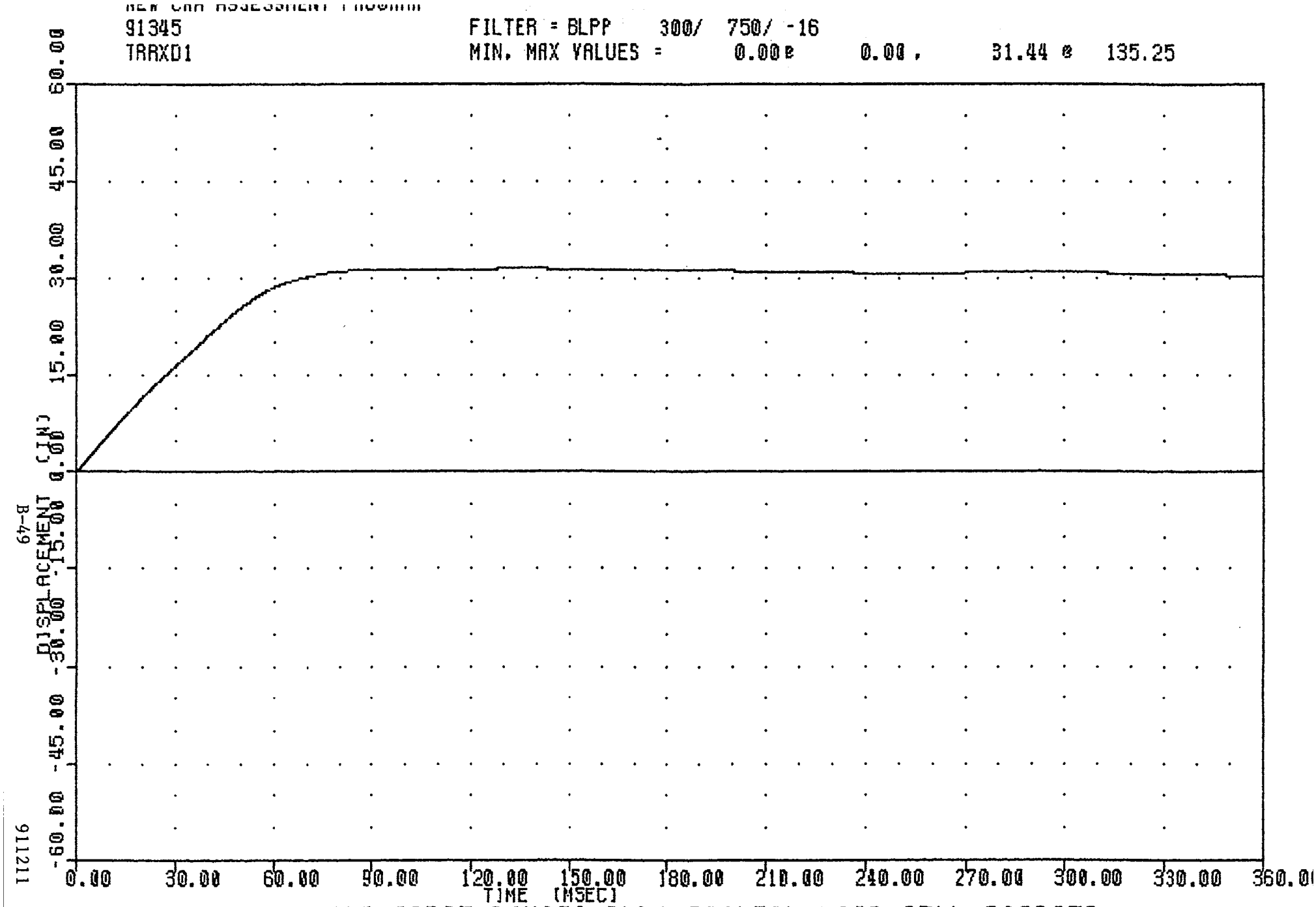


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION

91211

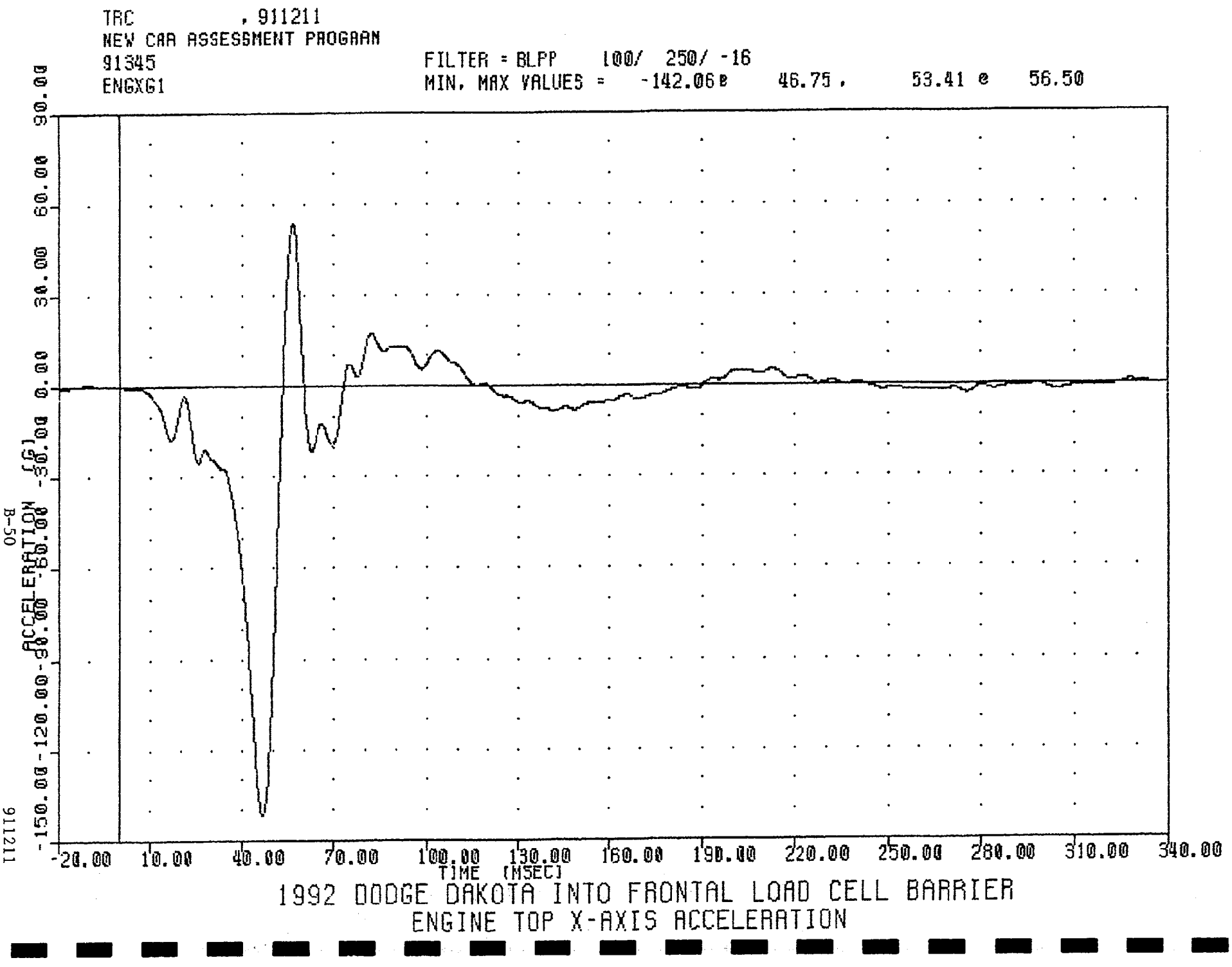


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS VELOCITY

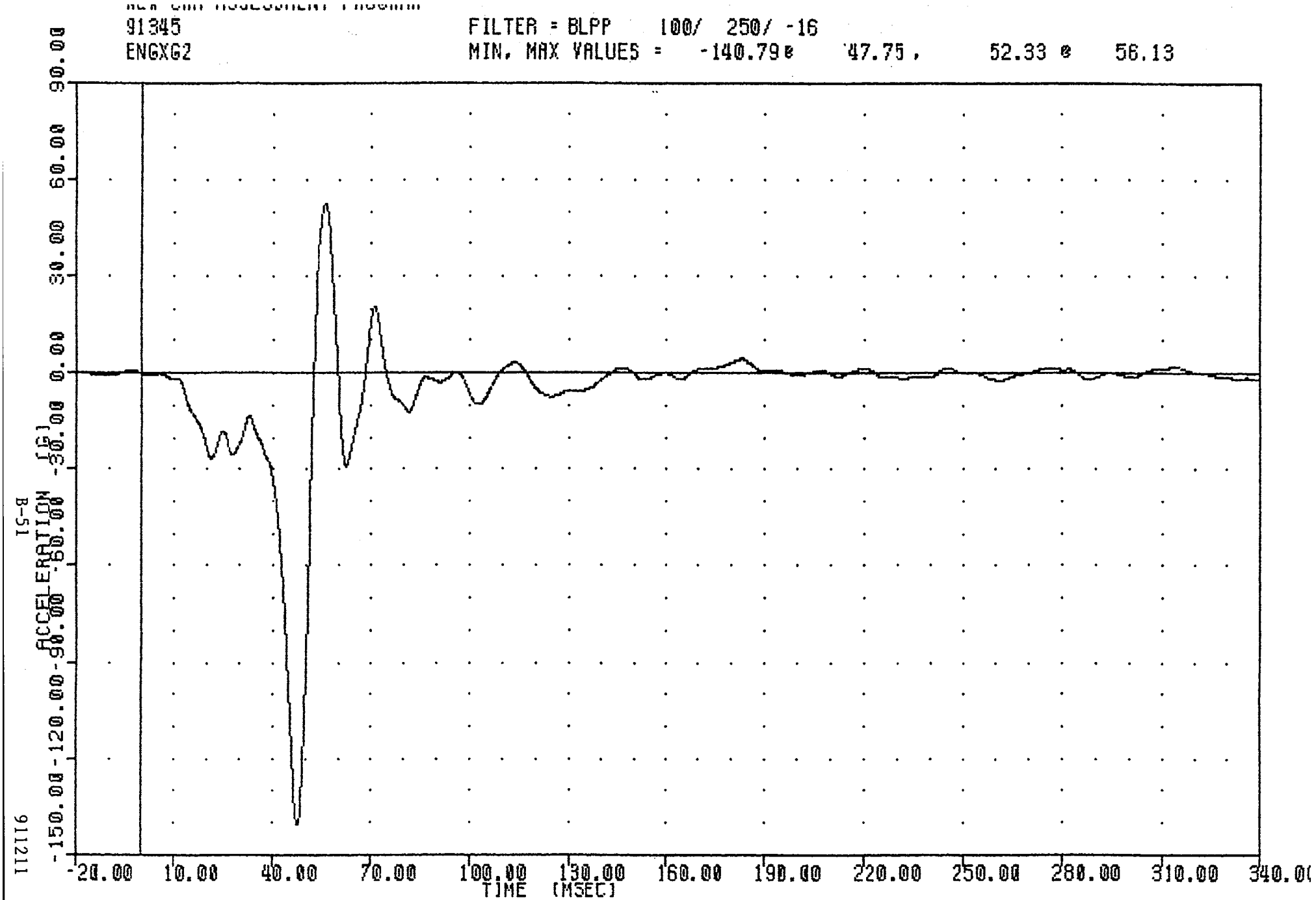


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS DISPLACEMENT

911211

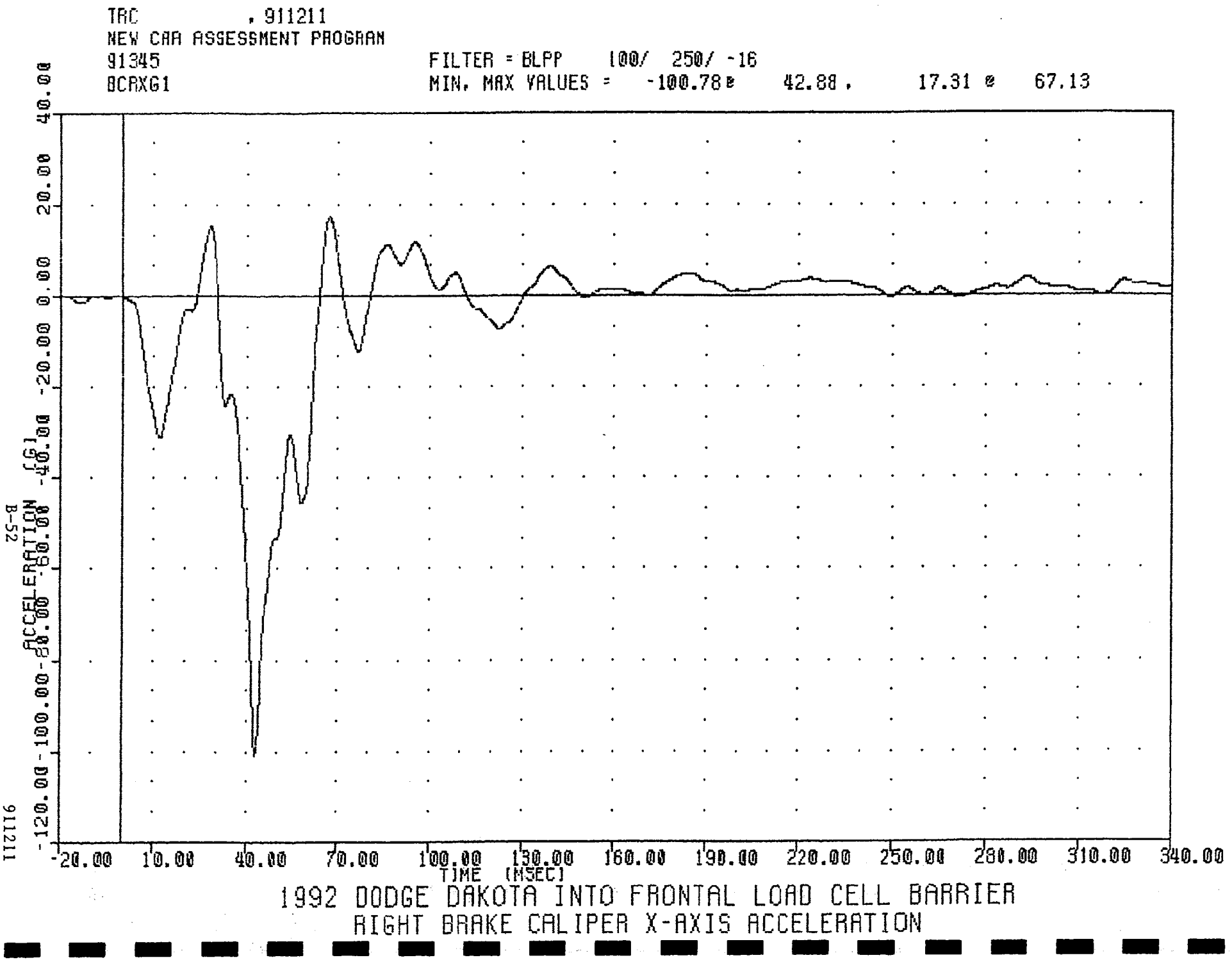


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
ENGINE TOP X-AXIS ACCELERATION

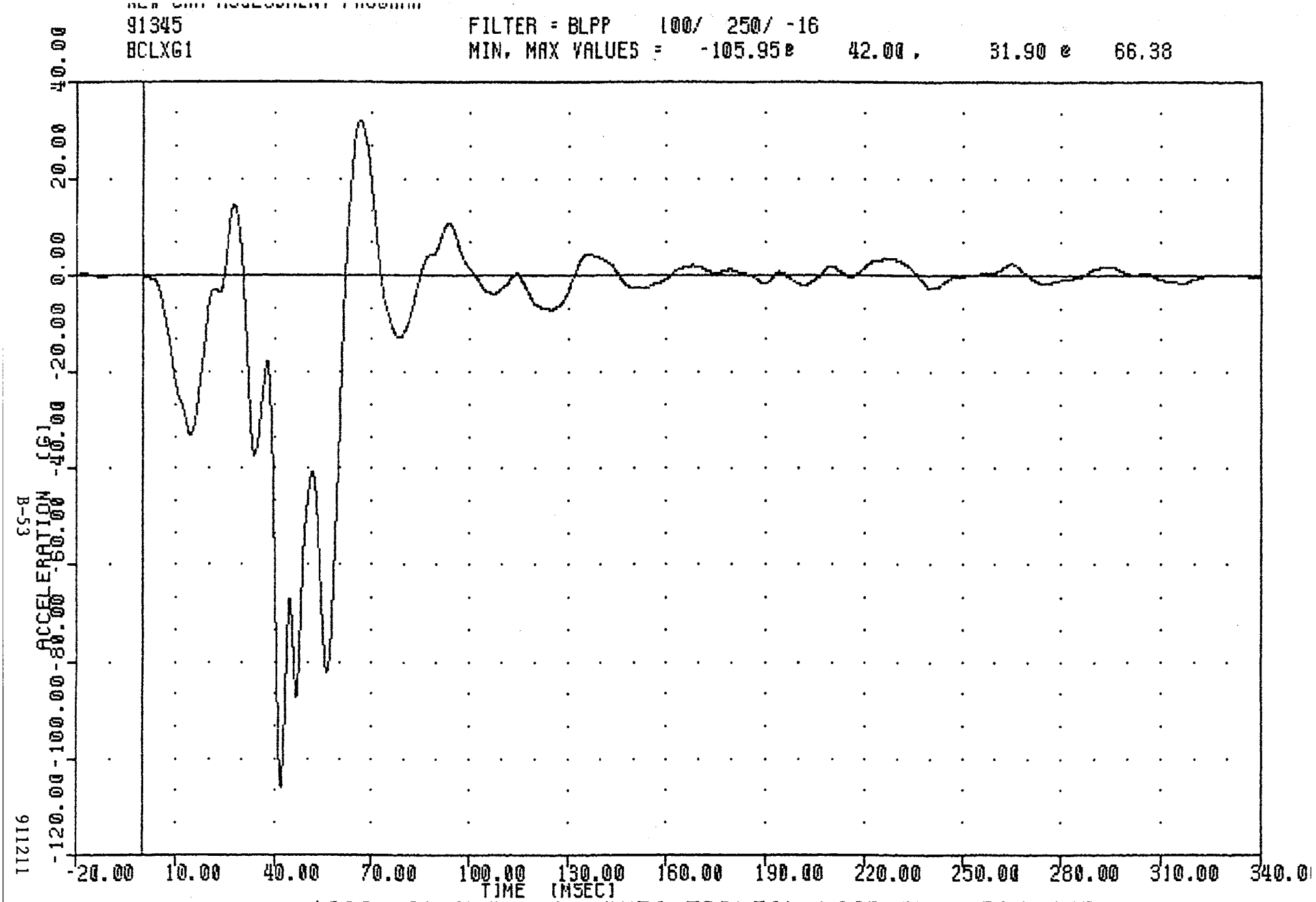


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION

911211

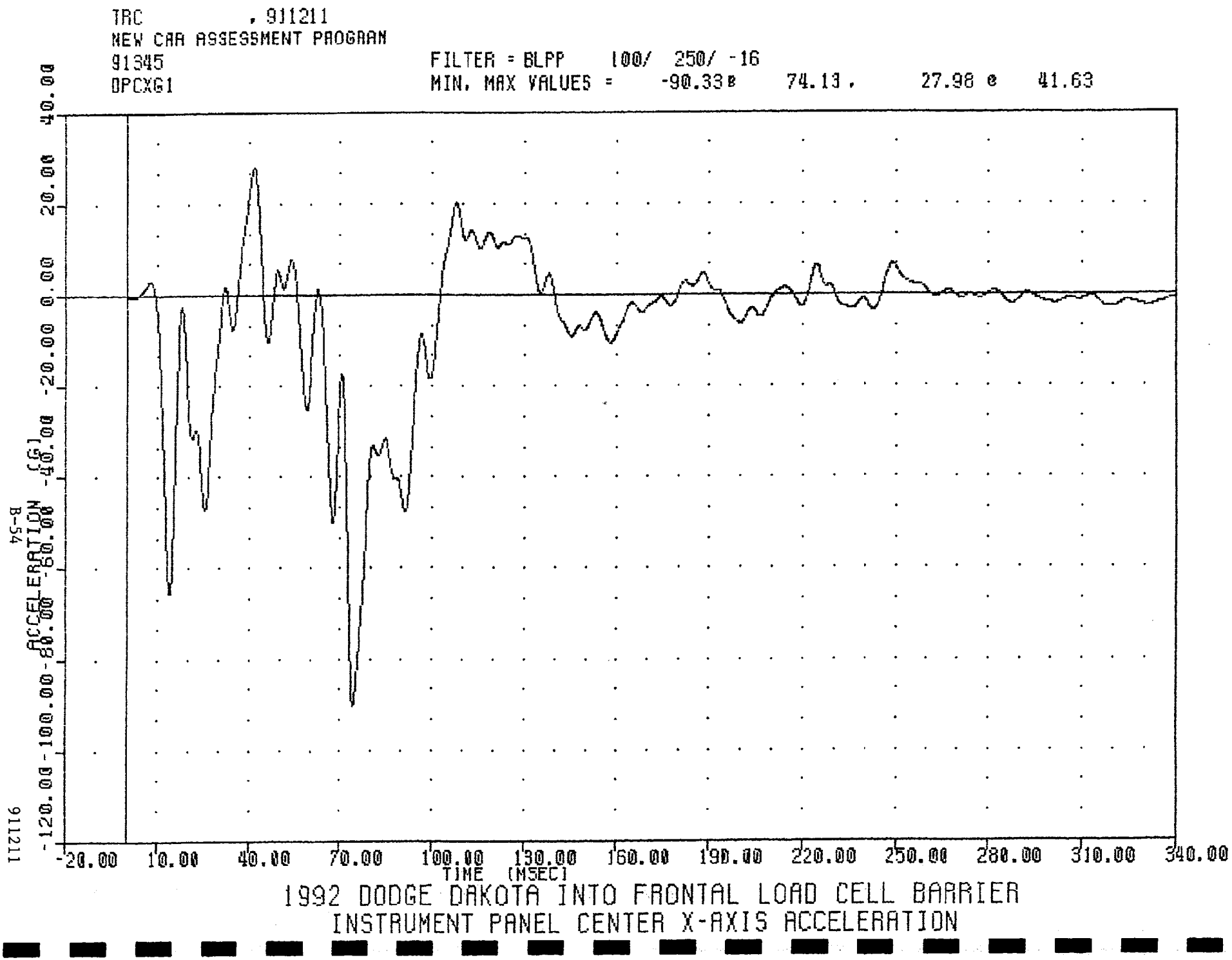


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

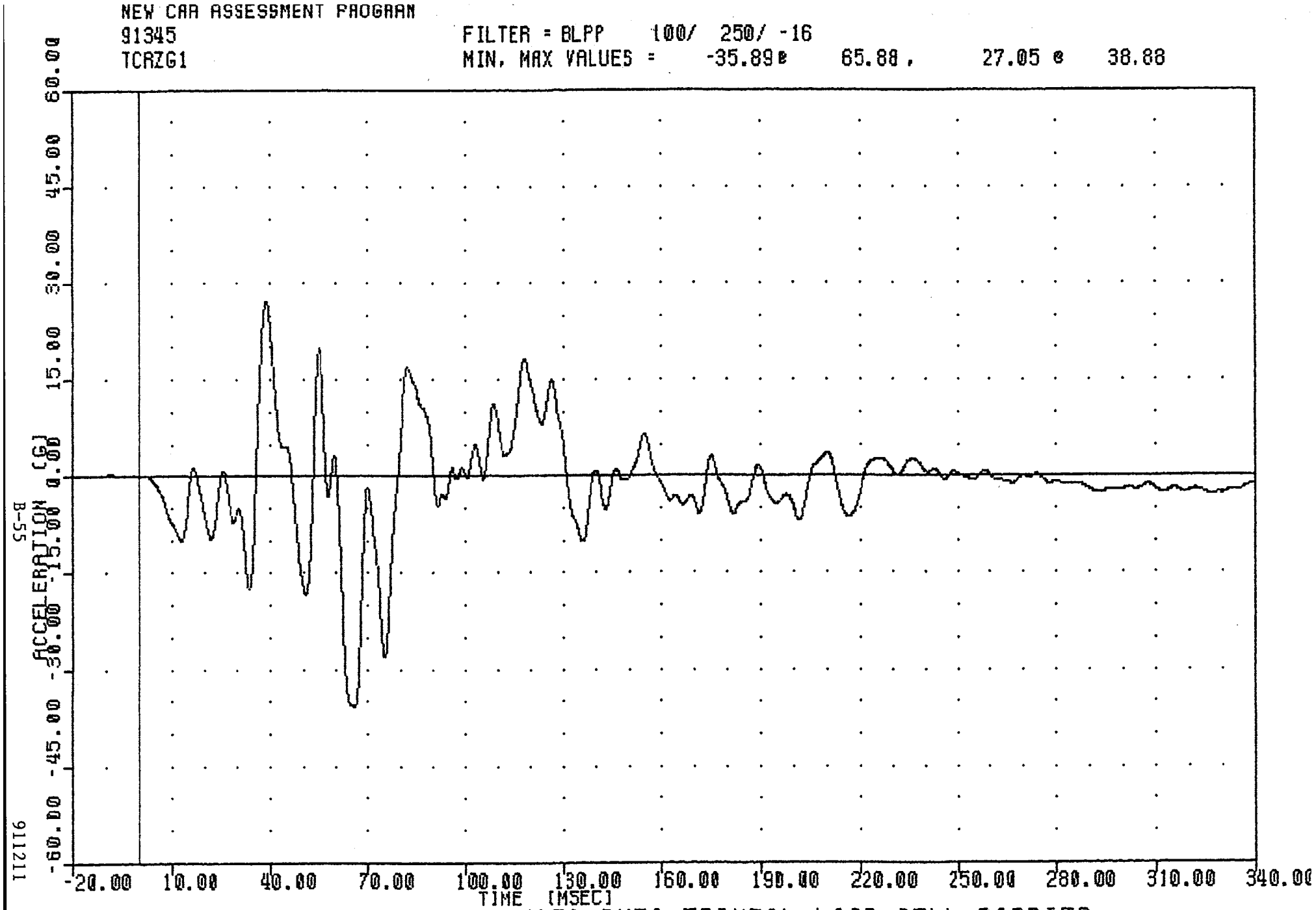


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

911211

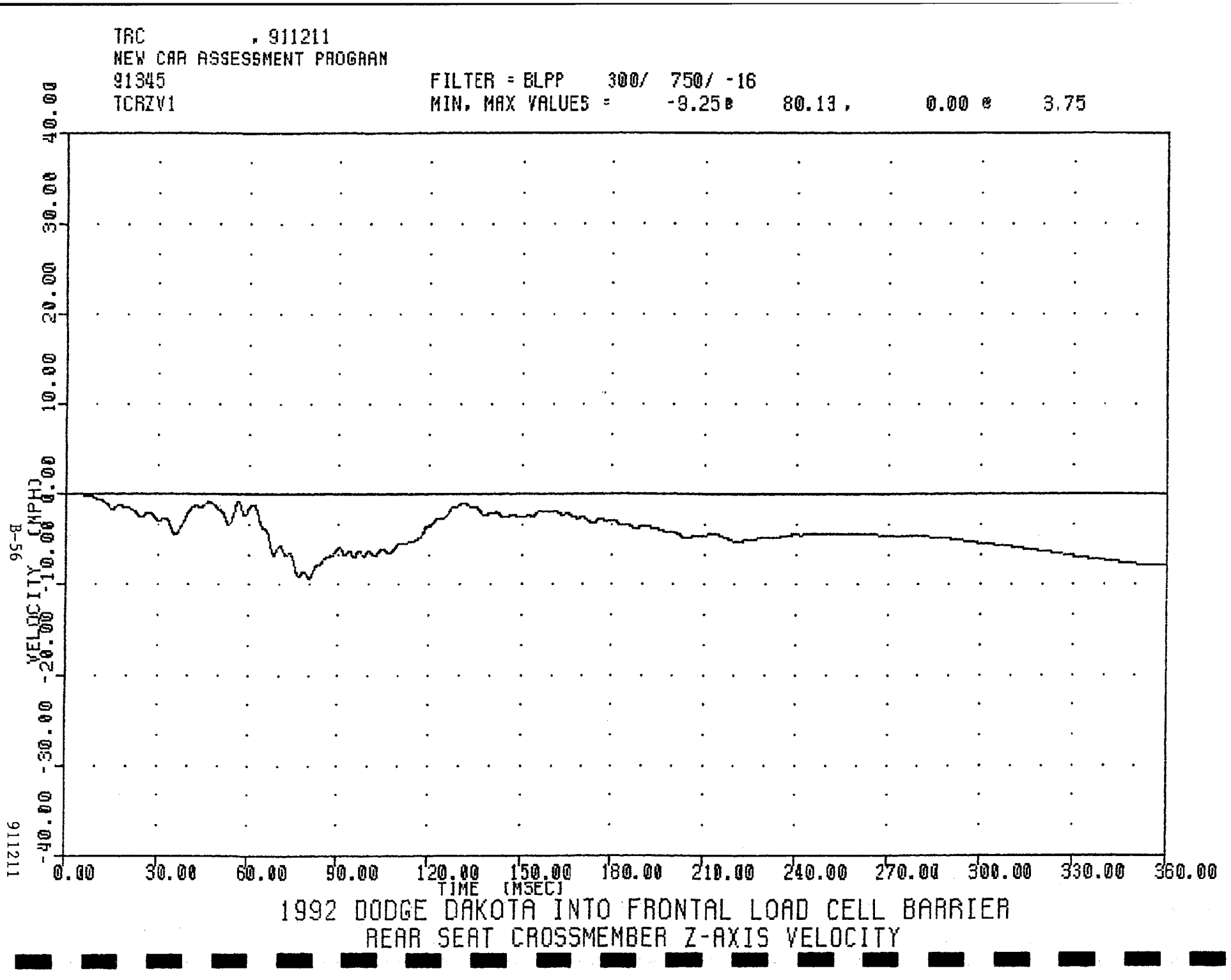


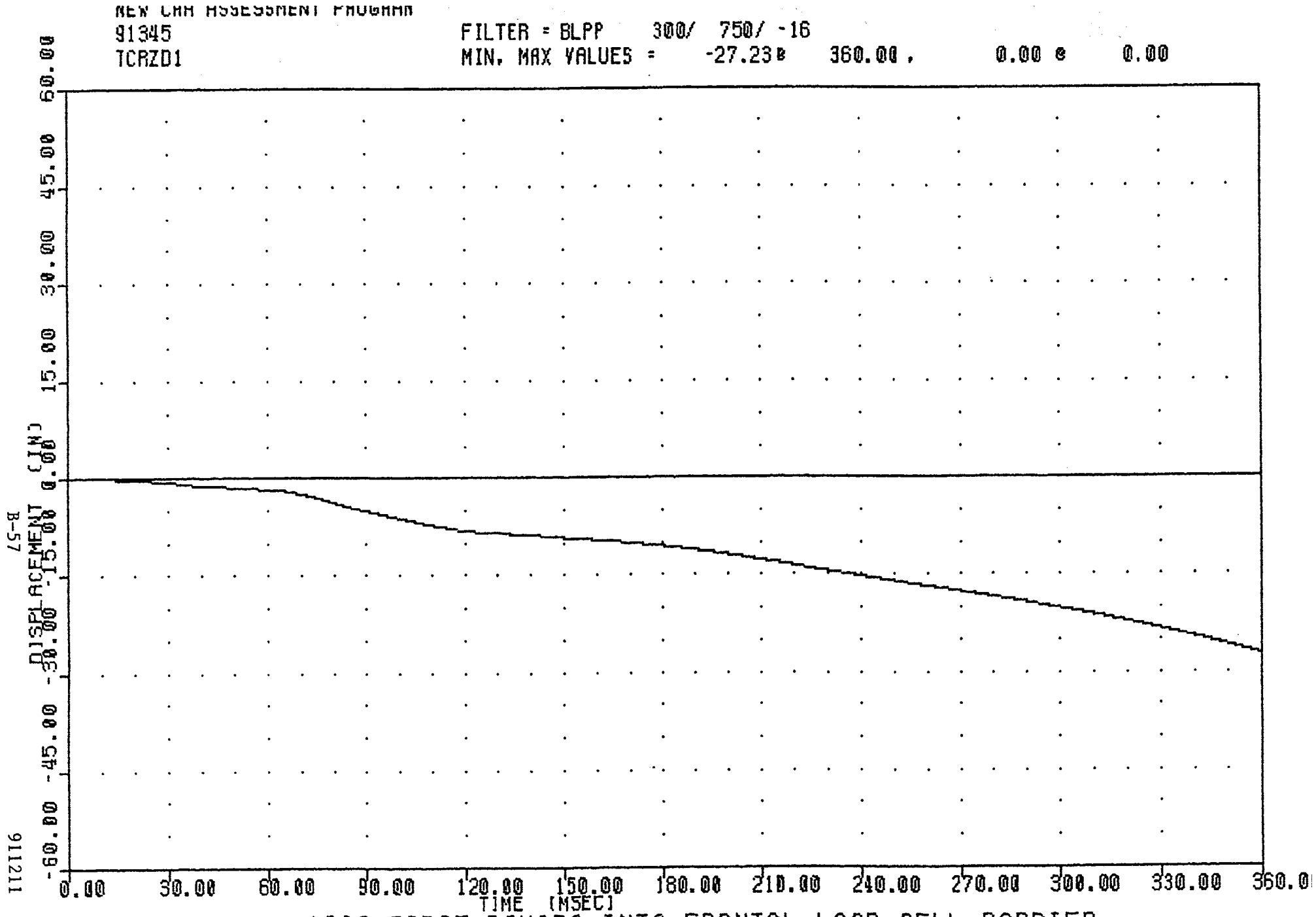
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
REAR SEAT CROSSMEMBER Z-AXIS ACCELERATION

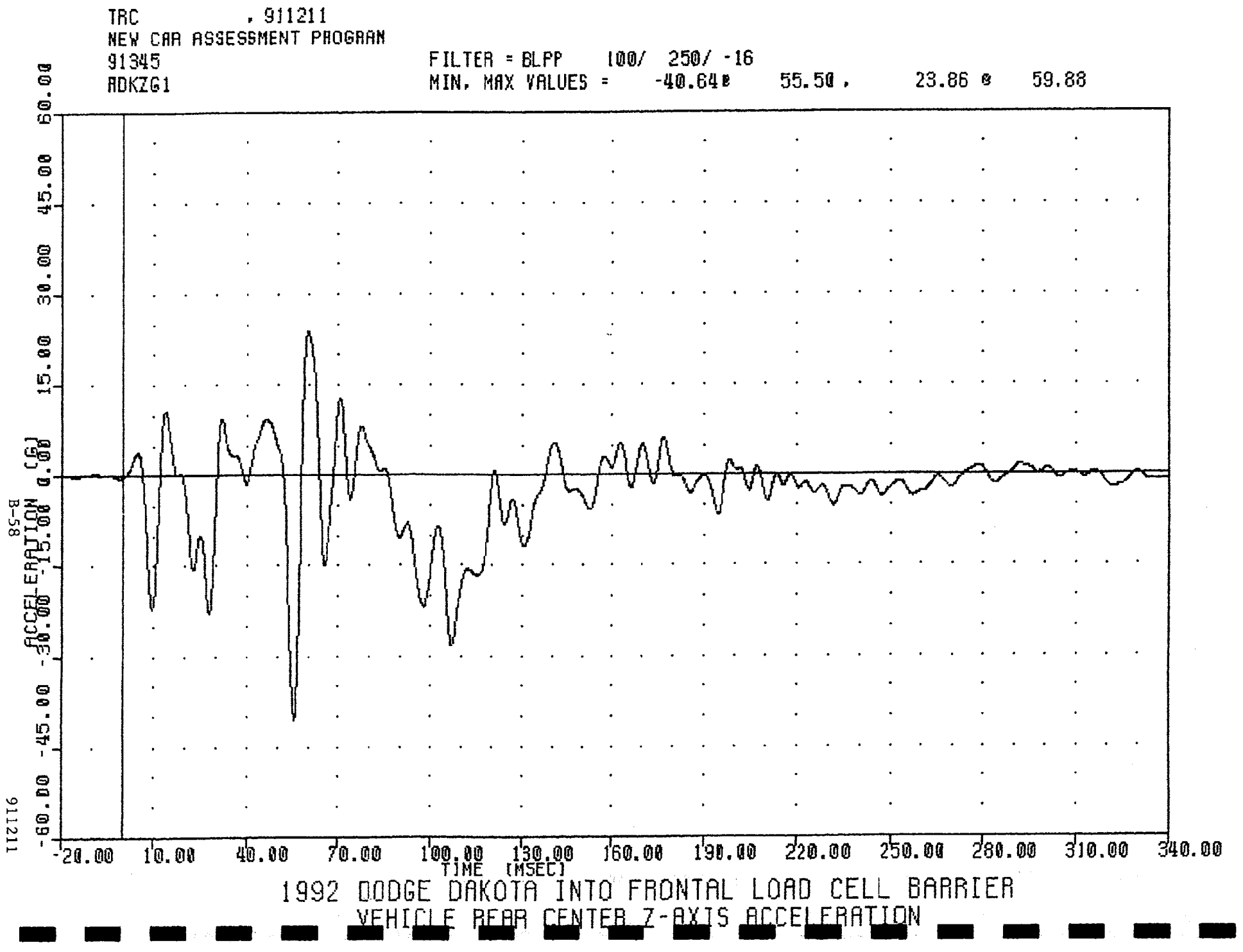
91121

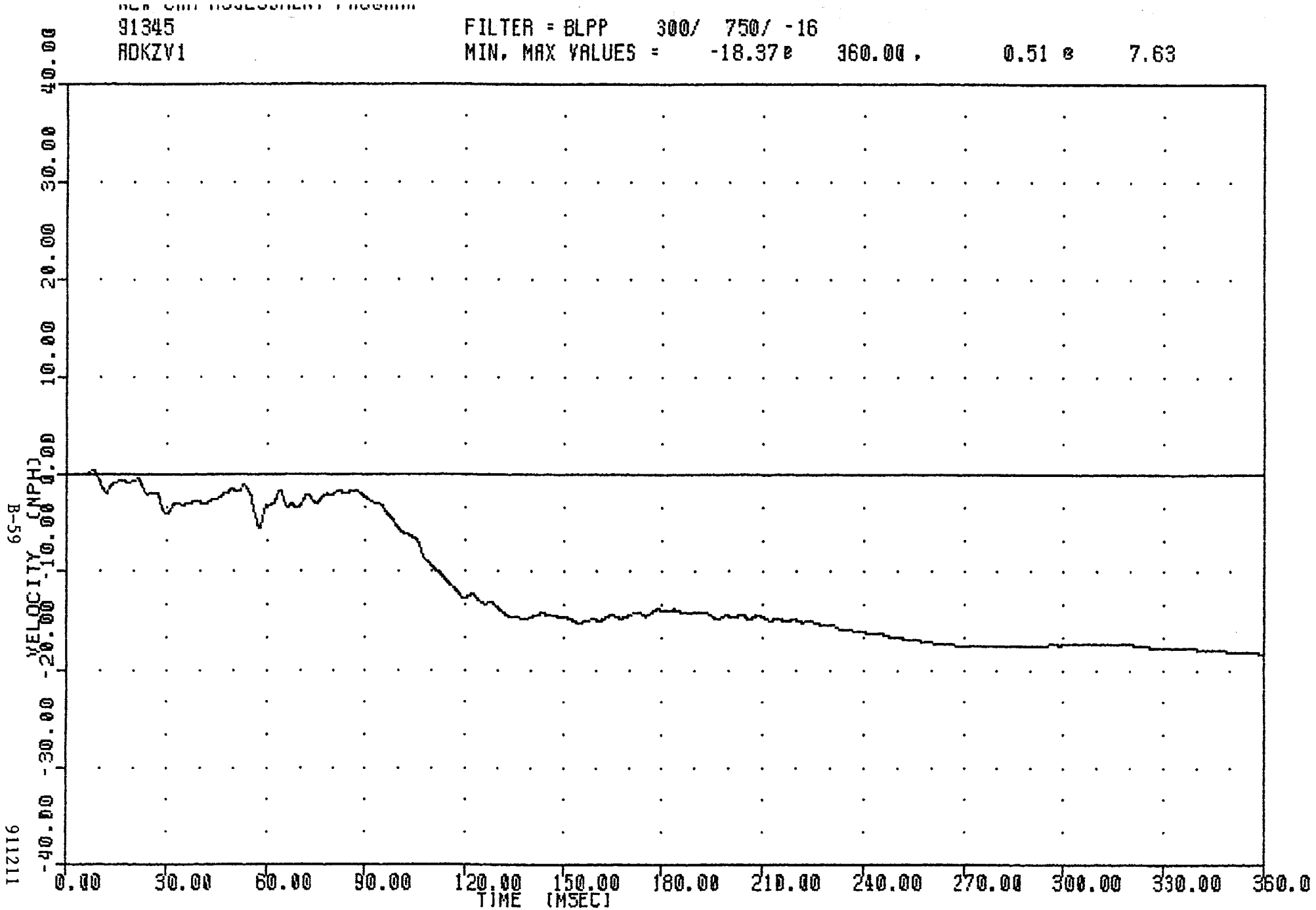

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
TCRZV1
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -9.25 @ 80.13 , 0.00 @ 3.75
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
VELOCITY (MPH)
0.00
30.00
60.00
90.00
120.00
150.00
180.00
210.00
240.00
270.00
300.00
330.00
360.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
REAR SEAT CROSSMEMBER Z-AXIS VELOCITY
B-56
911211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
REAR SEAT CROSSMEMBER Z-AXIS DISPLACEMENT

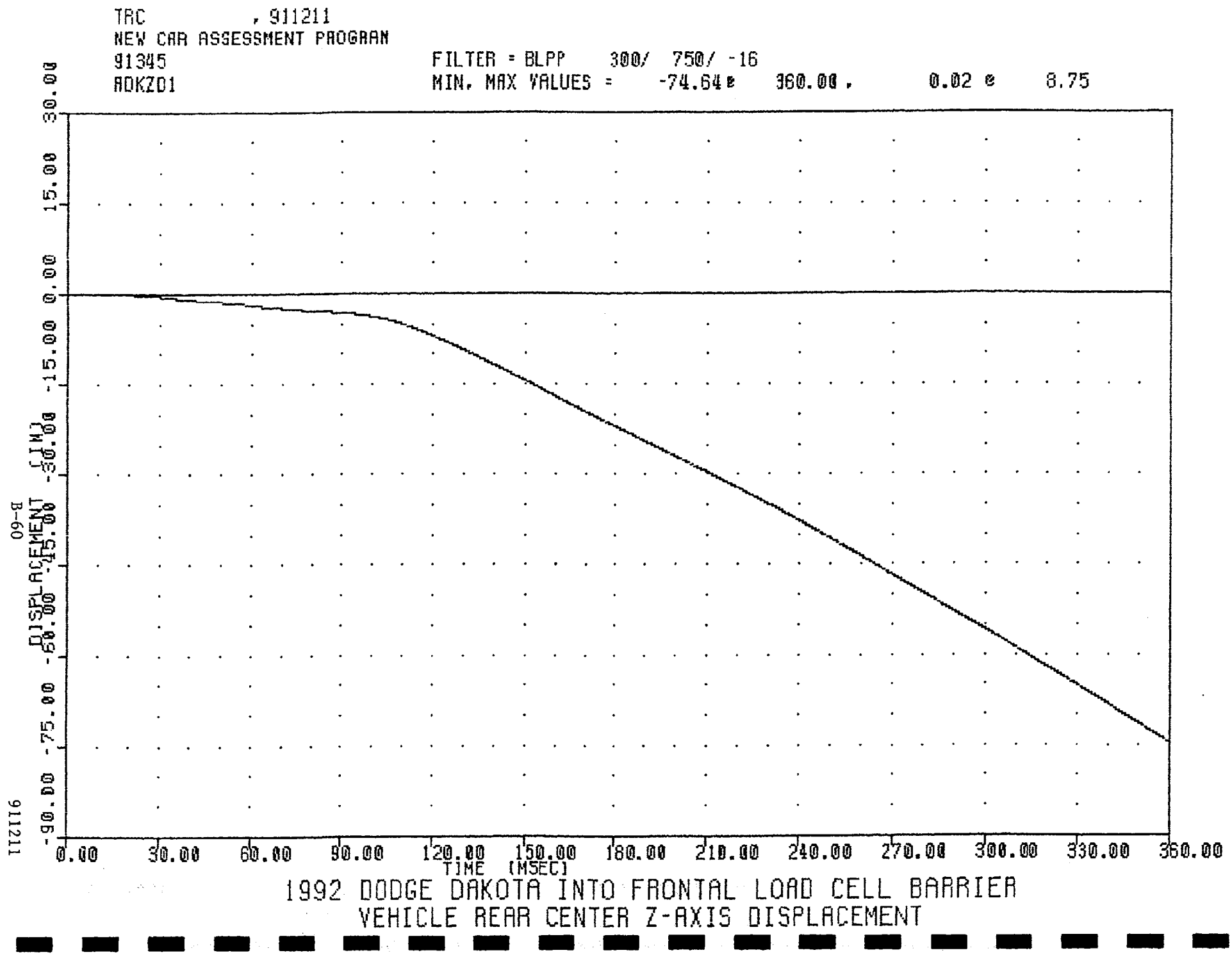
911211


TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
RDKZG1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -40.64 @ 55.50 , 23.86 @ 59.88
60.00
45.00
30.00
15.00
0.00
-15.00
-30.00
-45.00
-60.00
ACCELERATION (G)
-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 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
VEHICLE REAR CENTER Z-AXIS ACCELERATION
B-58
911211

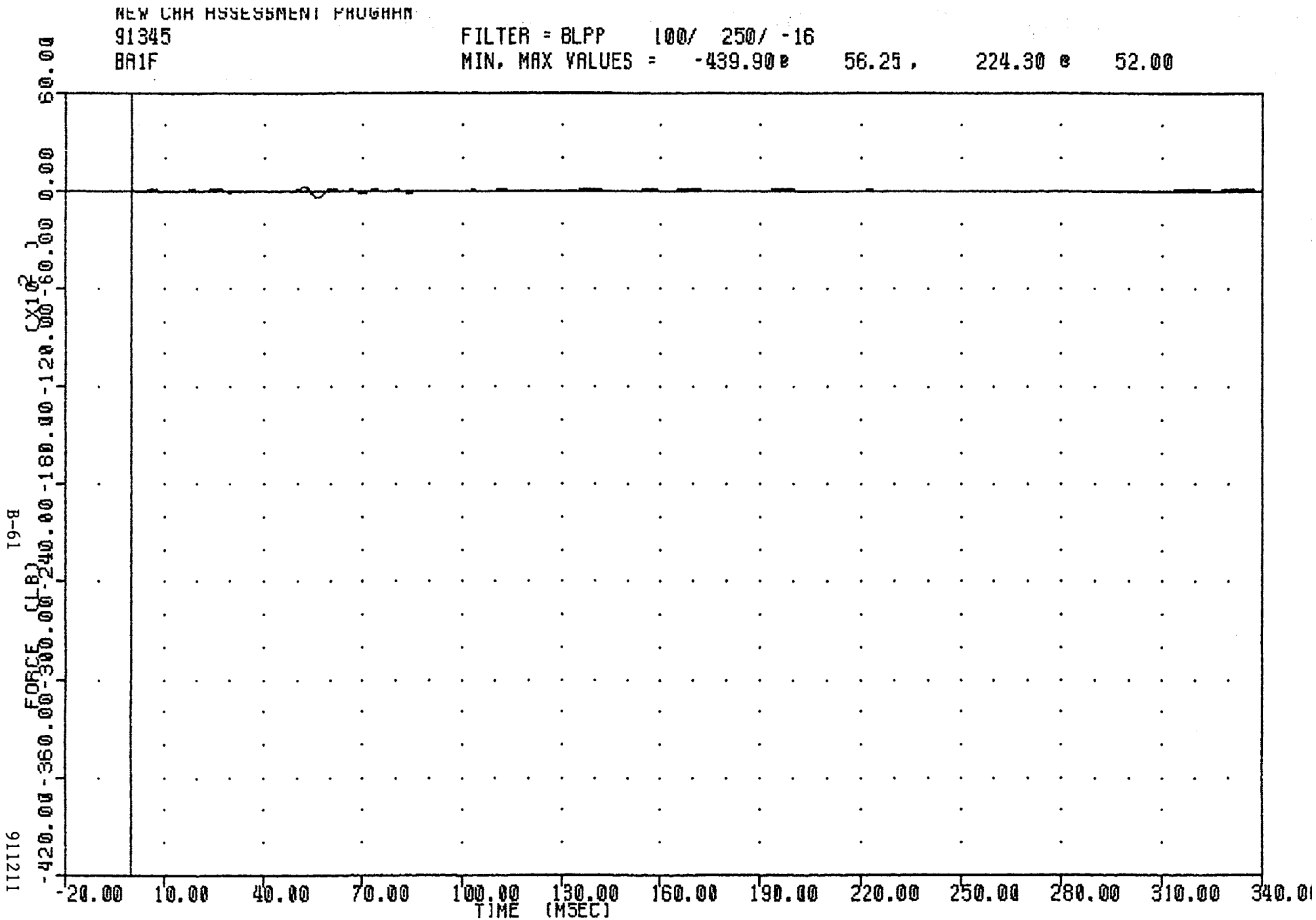


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
VEHICLE REAR CENTER Z-AXIS VELOCITY

911211

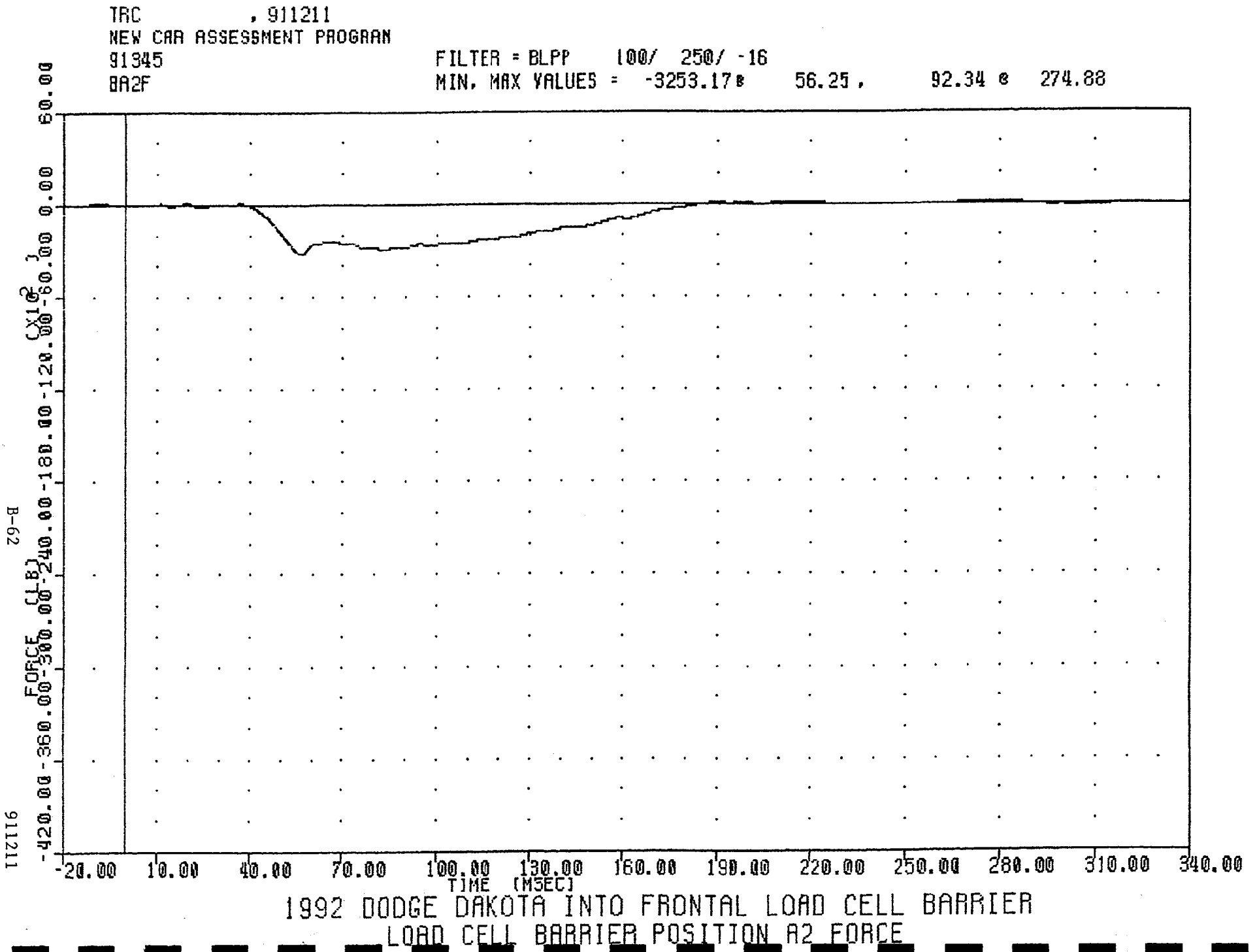


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
VEHICLE REAR CENTER Z-AXIS DISPLACEMENT

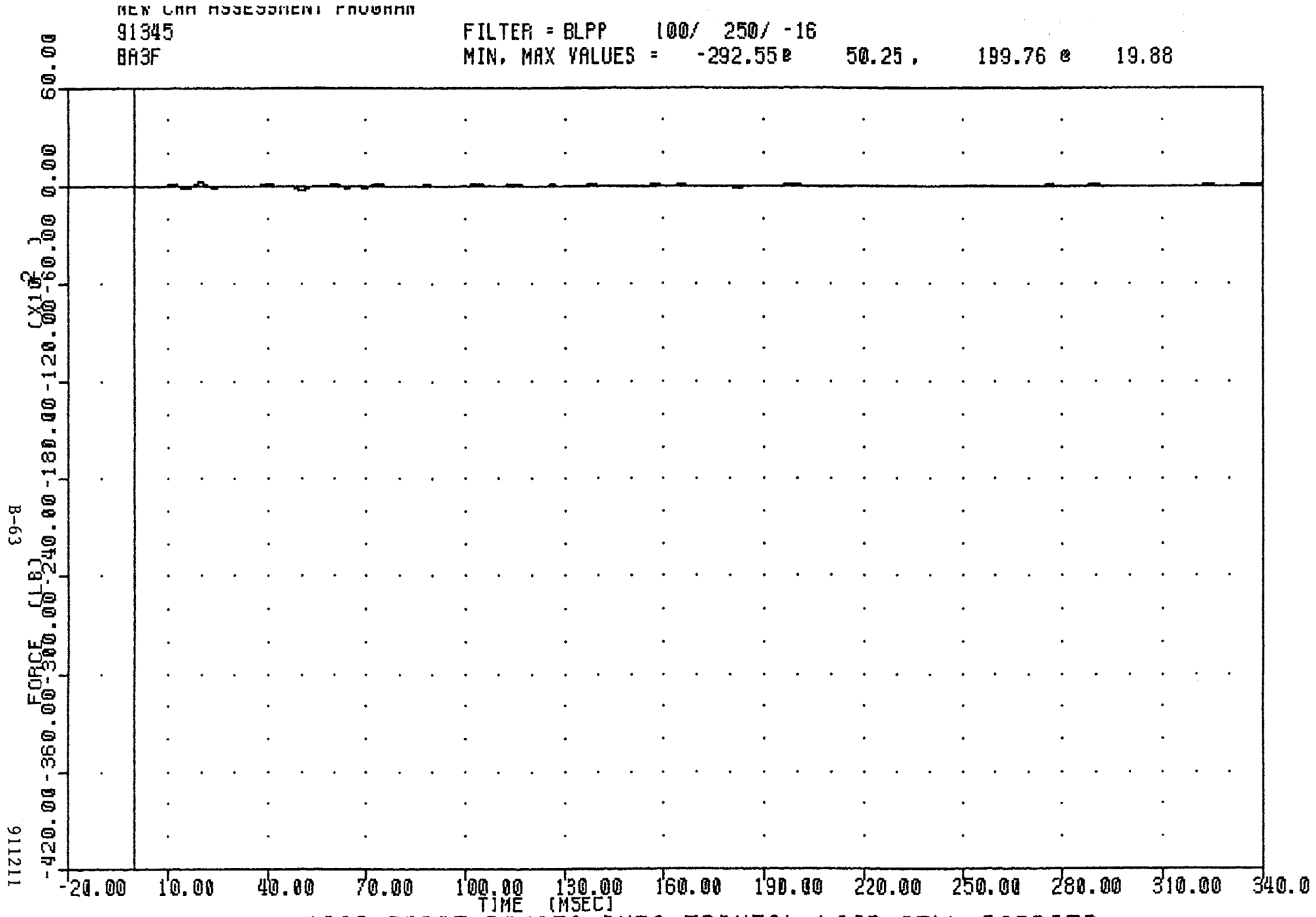


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A1 FORCE

911211

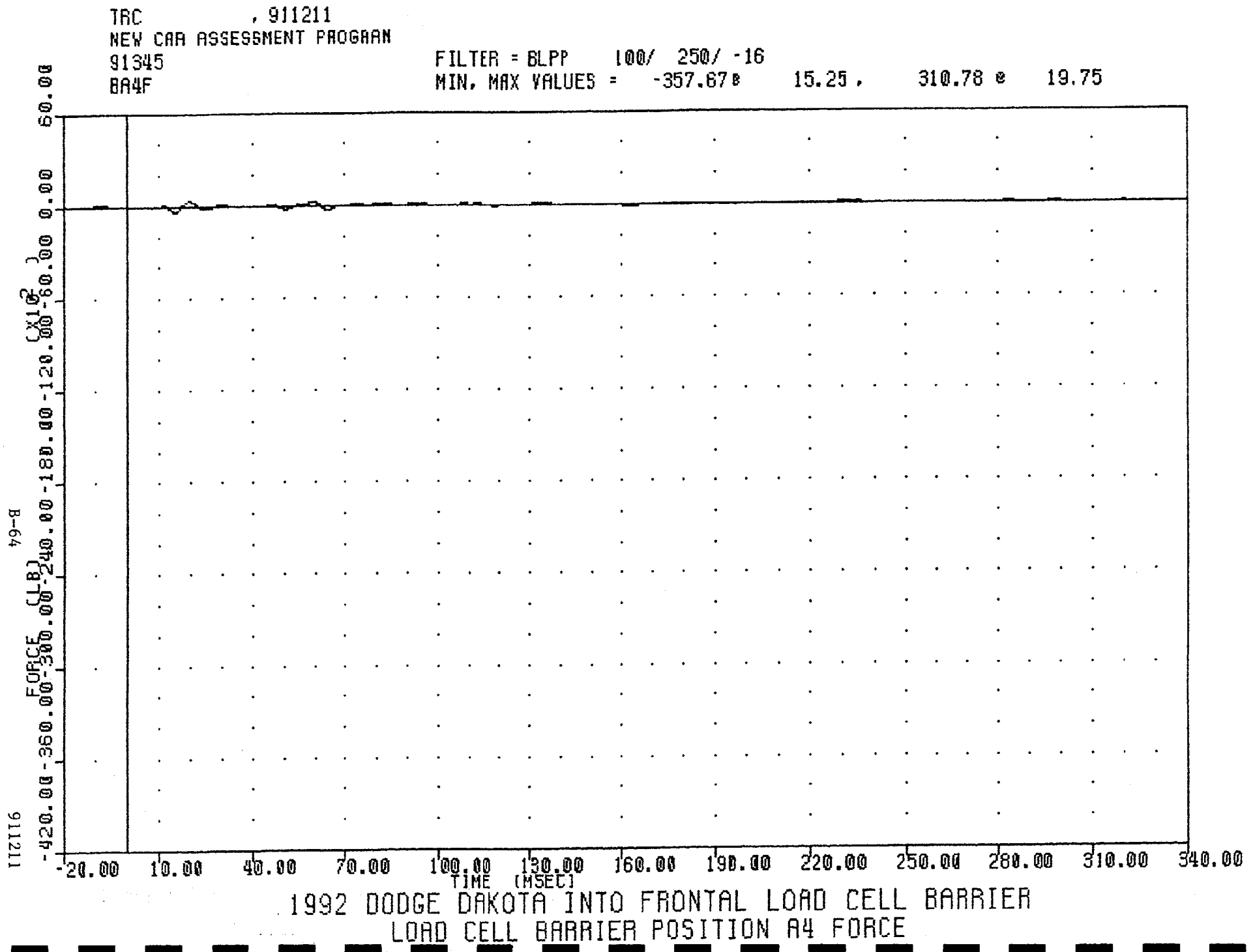

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
BA2F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -3253.17 @ 56.25 , 92.34 @ 274.88
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
(X10^2)
FORCE (LB)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A2 FORCE

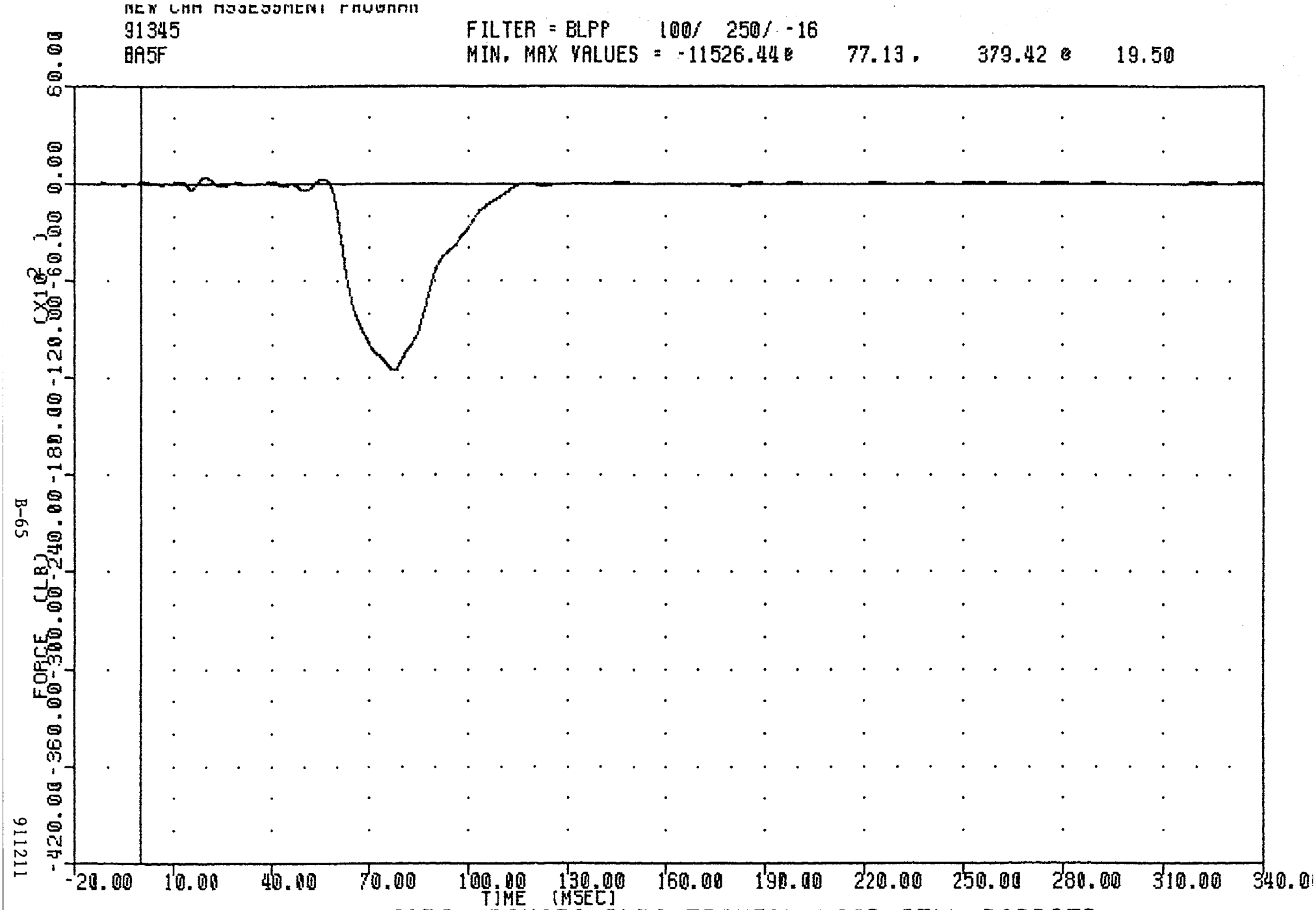
911211



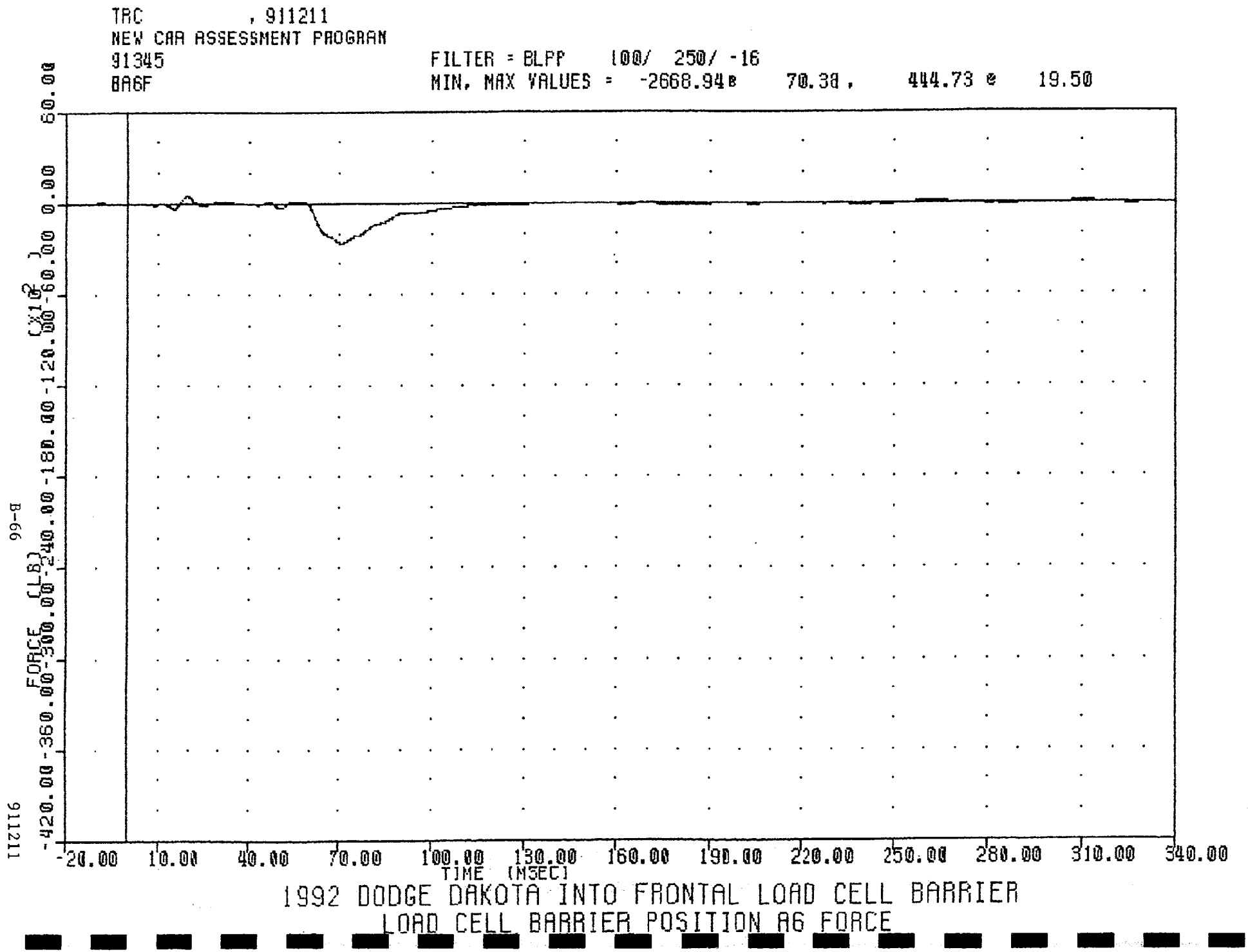
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A3 FORCE

91121


TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
BA4F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -357.67 @ 15.25 , 310.78 @ 19.75
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
FORCE (LB) (X10^2)
-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 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A4 FORCE

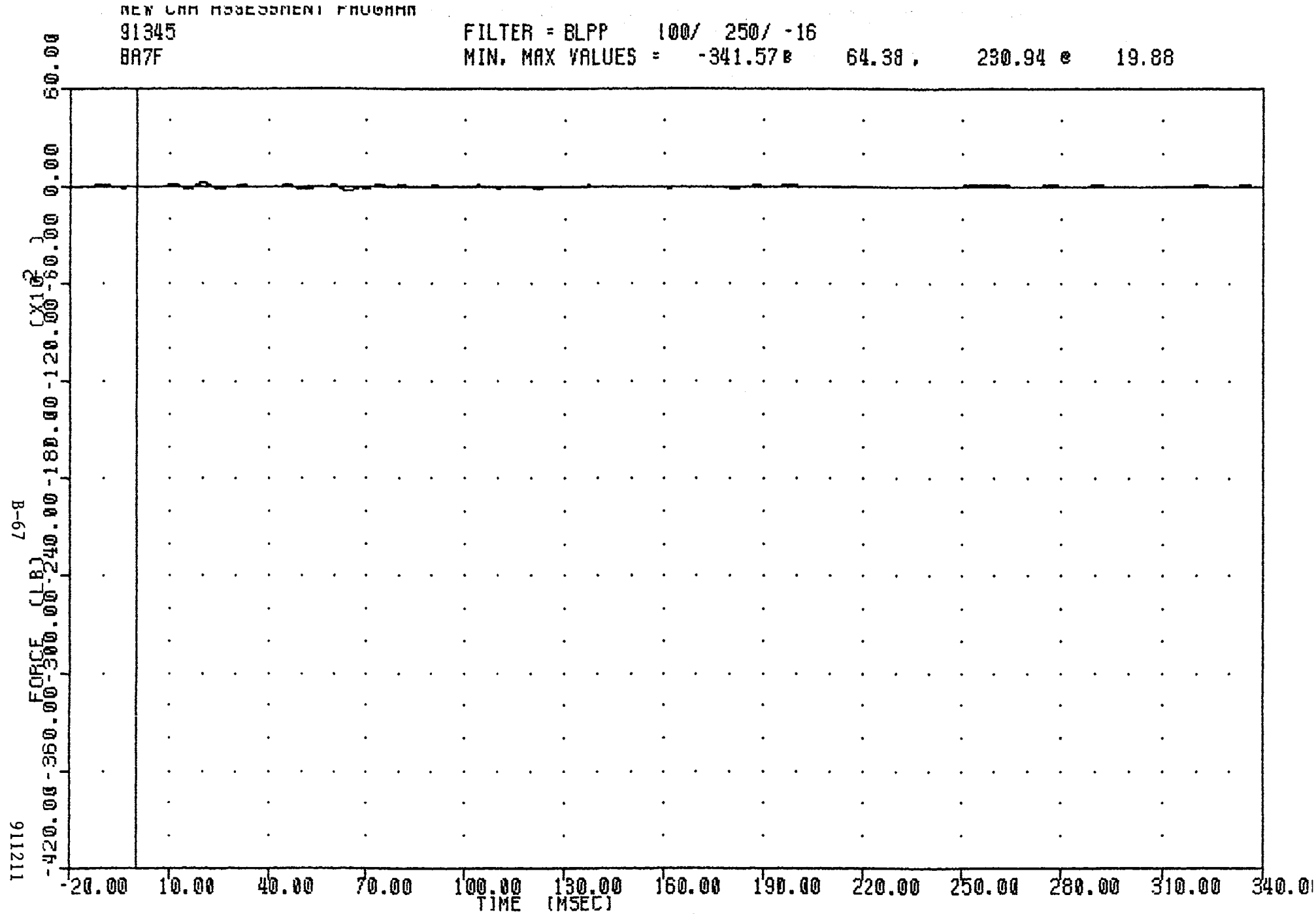


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A5 FORCE

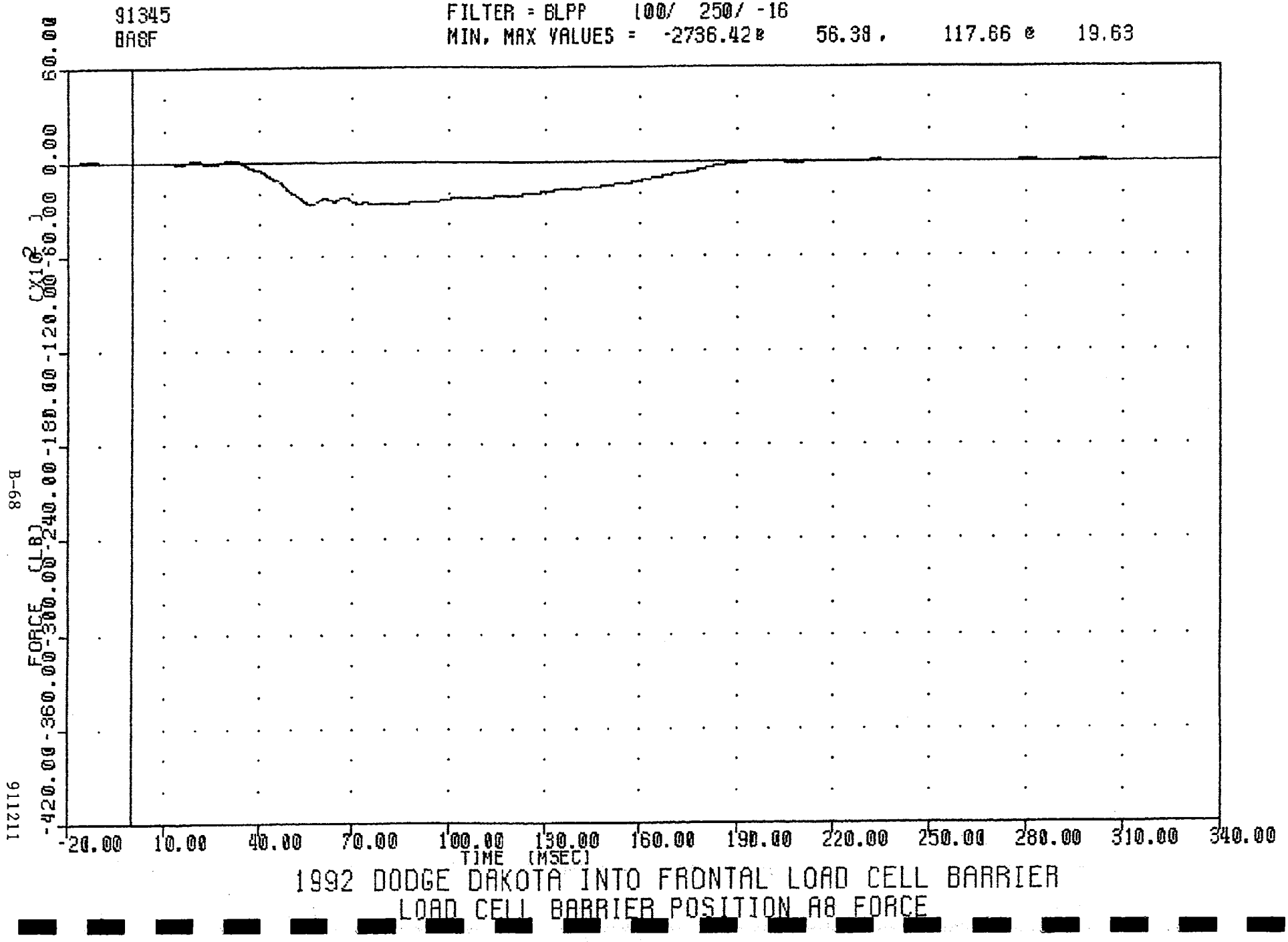


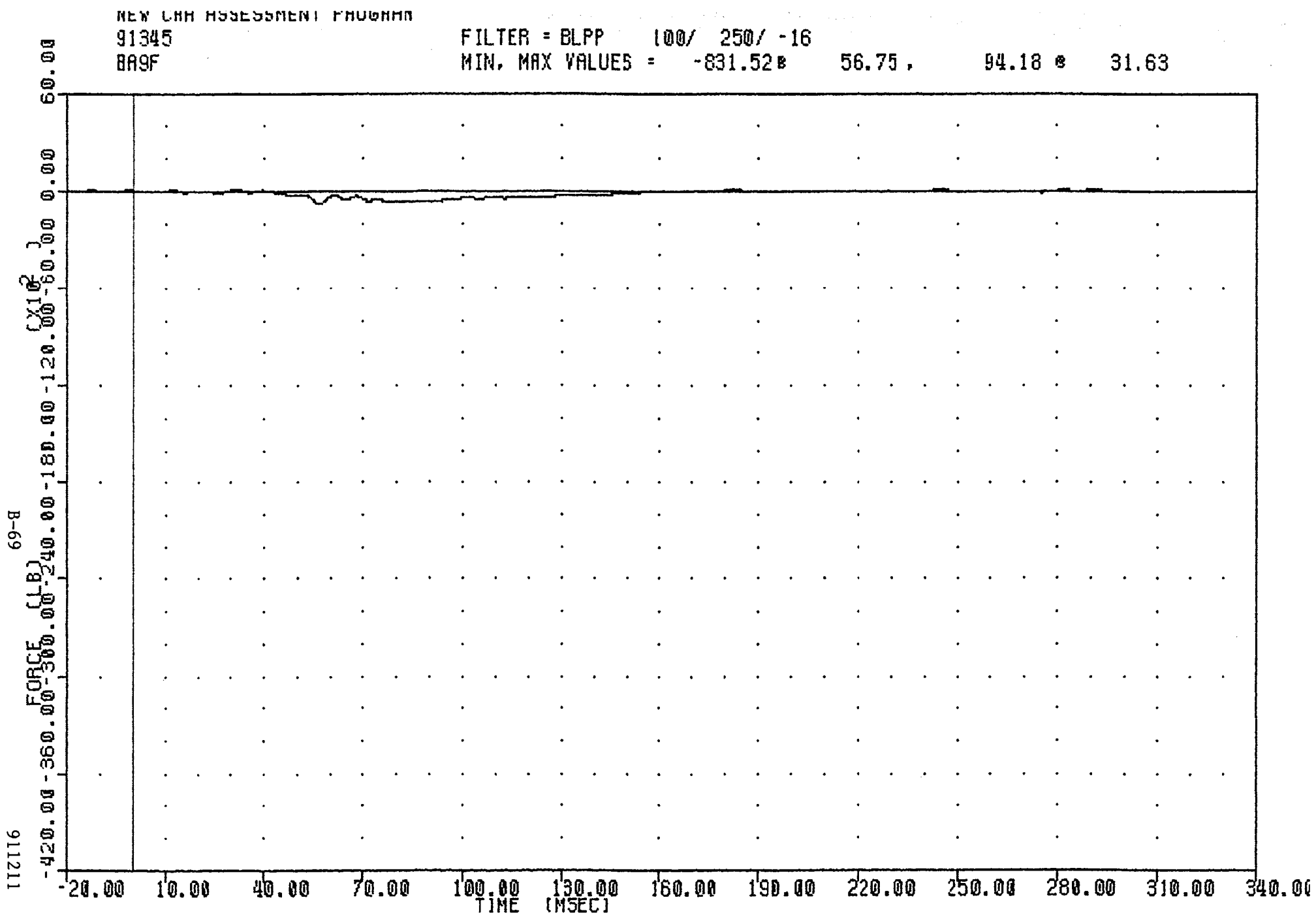
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A6 FORCE

911211



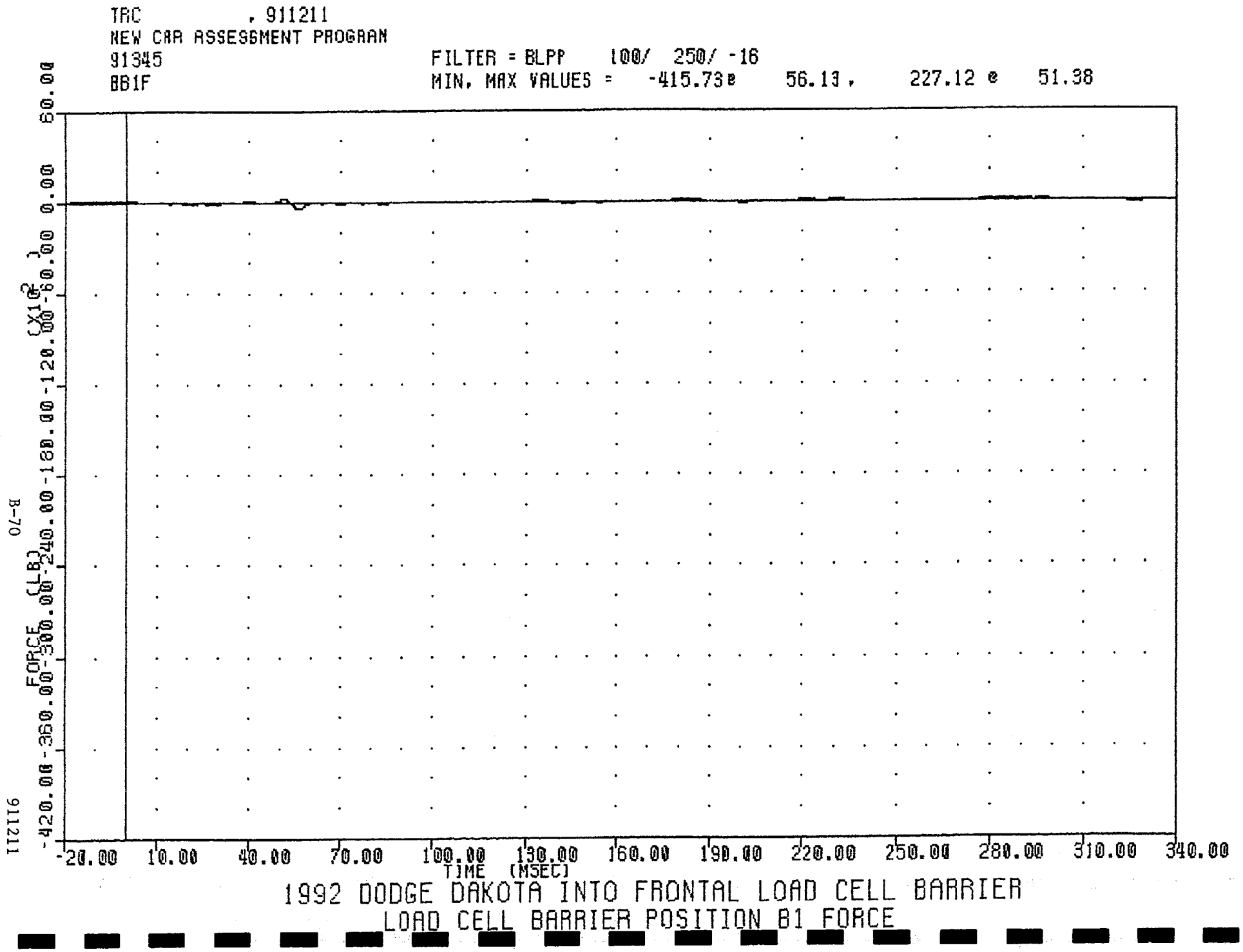
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A7 FORCE


TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
BASF
FILTER = BLPP [00/ 250/ -16
MIN, MAX VALUES = -2736.42 @ 56.38 , 117.66 @ 19.63
FORCE (LB) (X10^2)
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
-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 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A8 FORCE



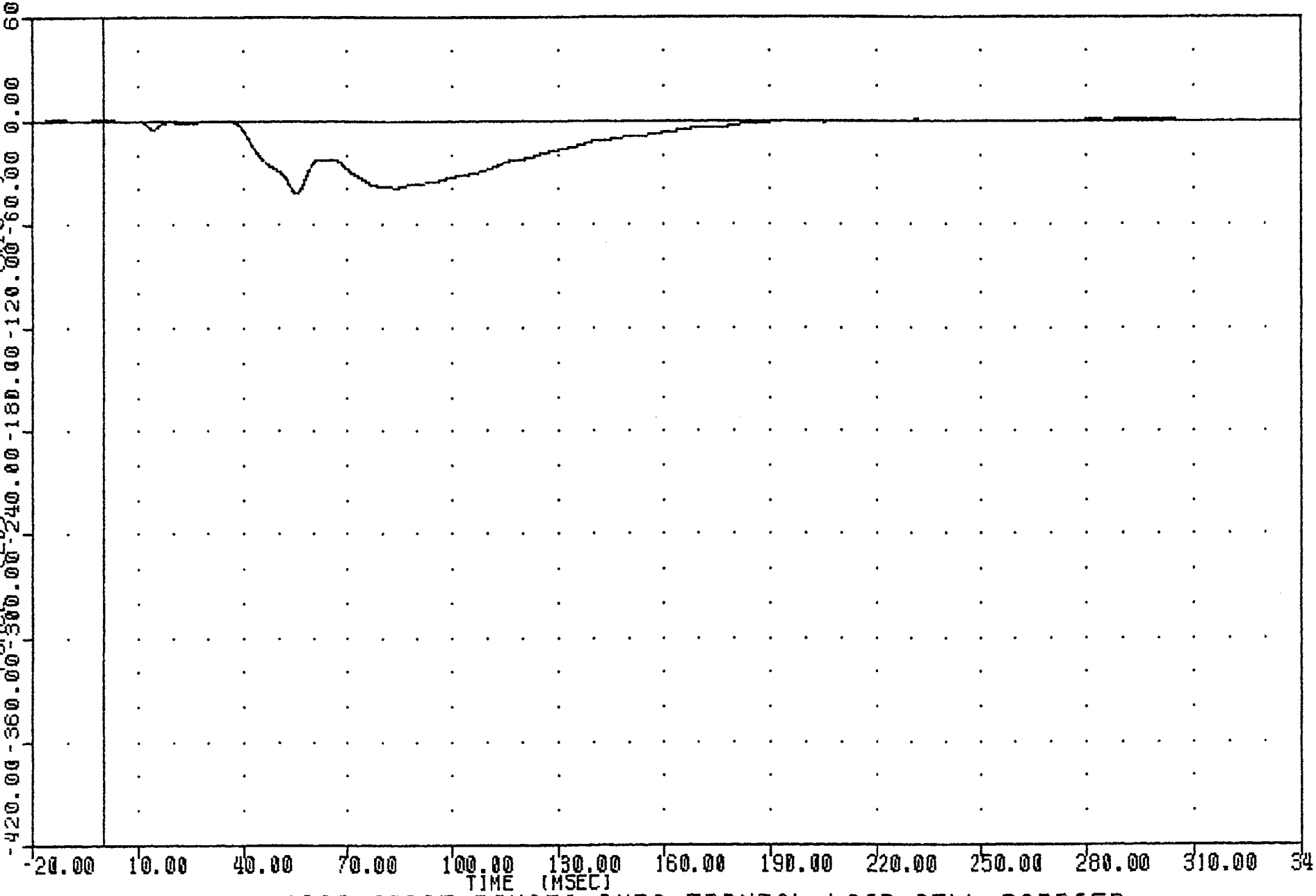
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A9 FORCE

911211

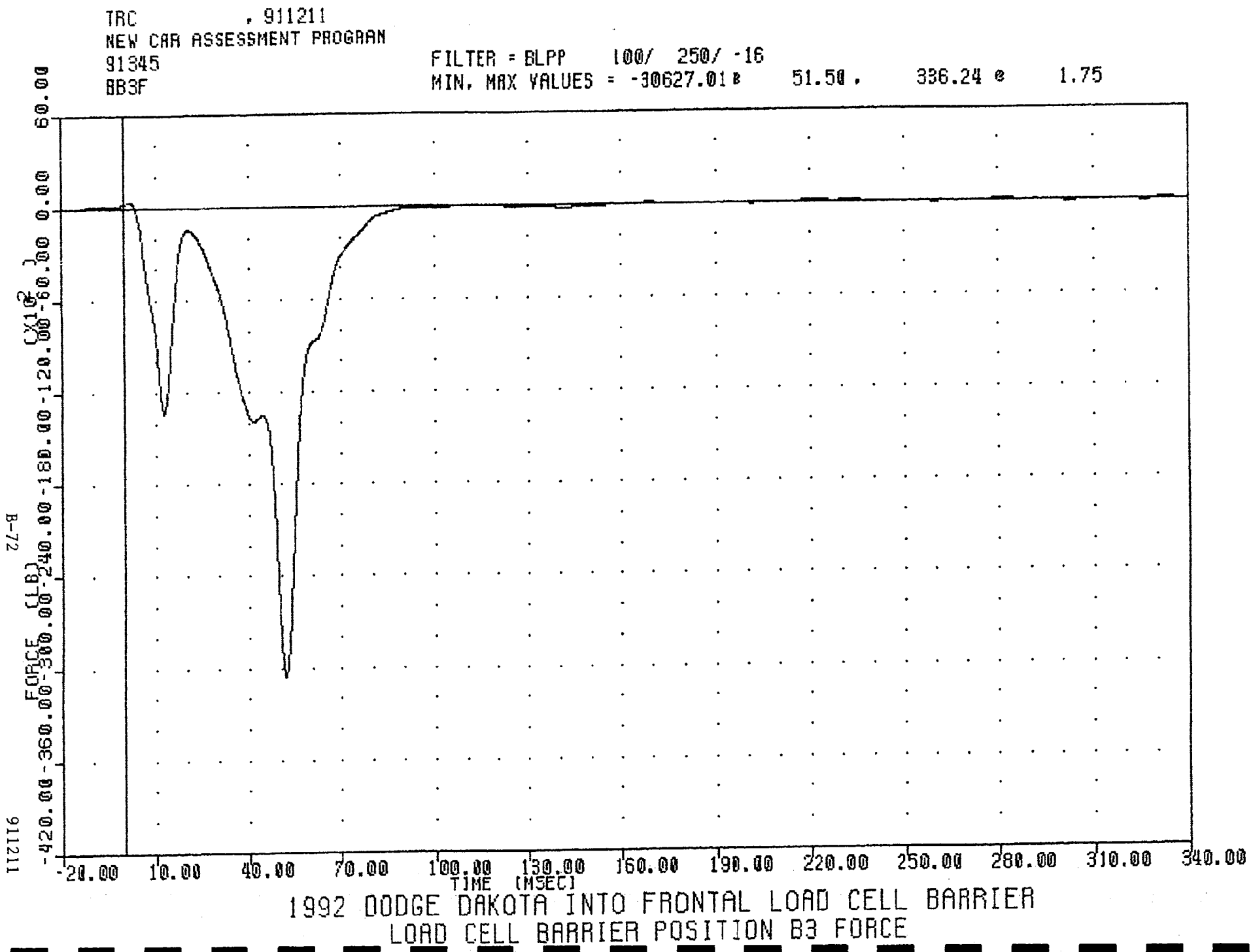

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
BB1F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -415.73 @ 56.13 , 227.12 @ 51.38
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
FORCE (LB) (X10^2)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B1 FORCE

NEW CAR ASSESSMENT PROGRAM
91345
BB2F

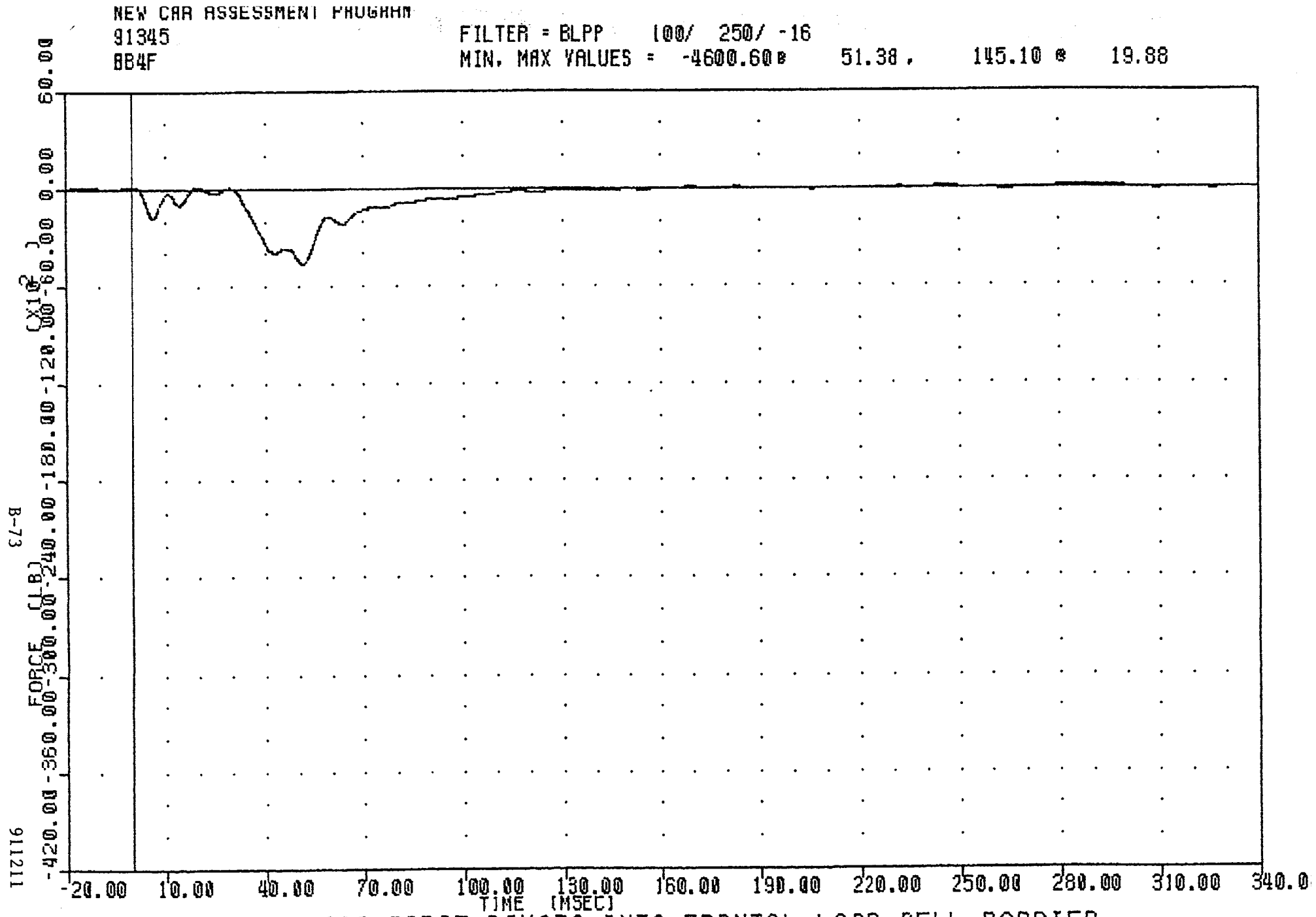
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -4260.02 @ 55.38 , 83.53 @ -1.00



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B2 FORCE

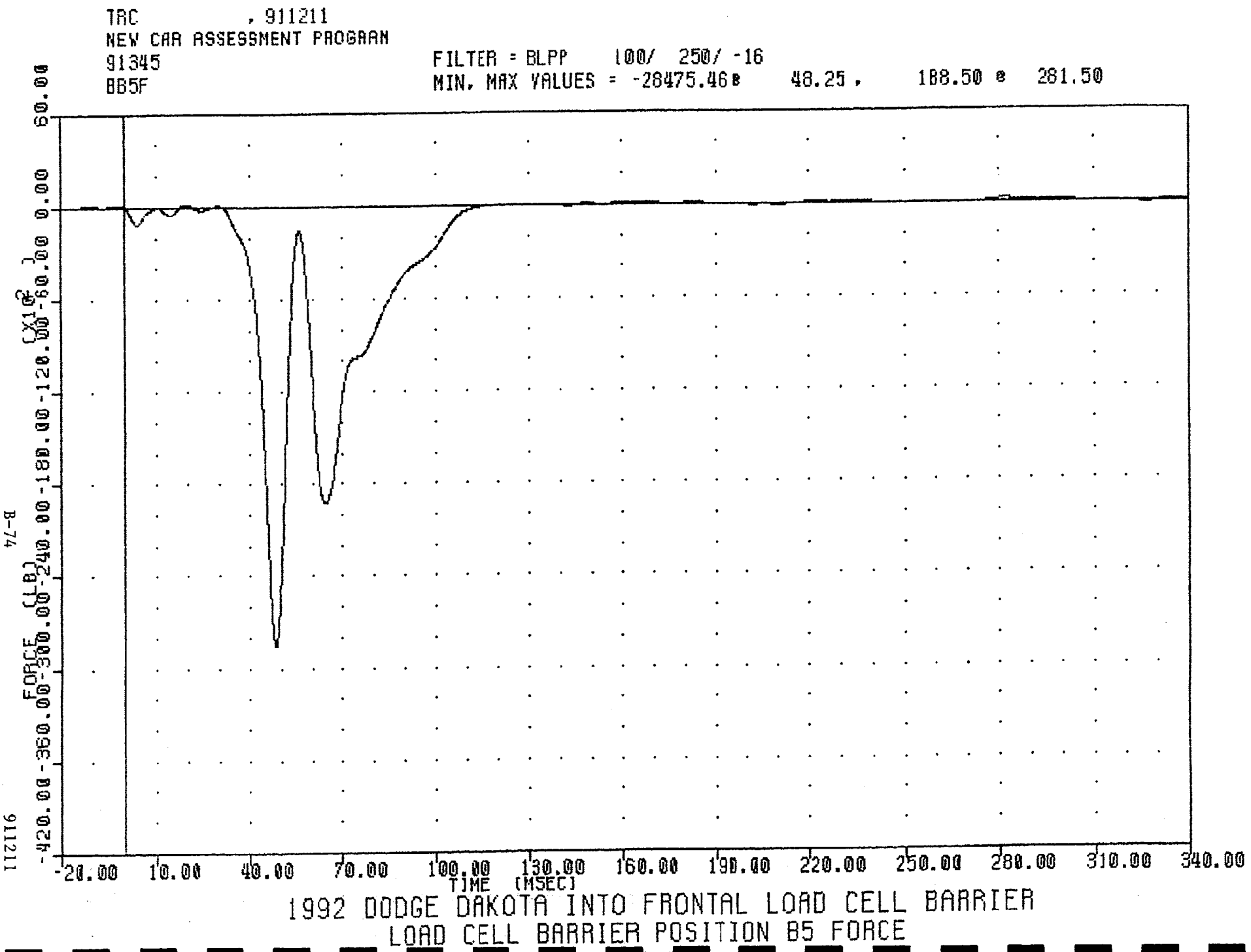

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
BB3F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -30627.01 @ 51.50 , 336.24 @ 1.75
FORCE (LB) (X10^2)
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B3 FORCE

911211

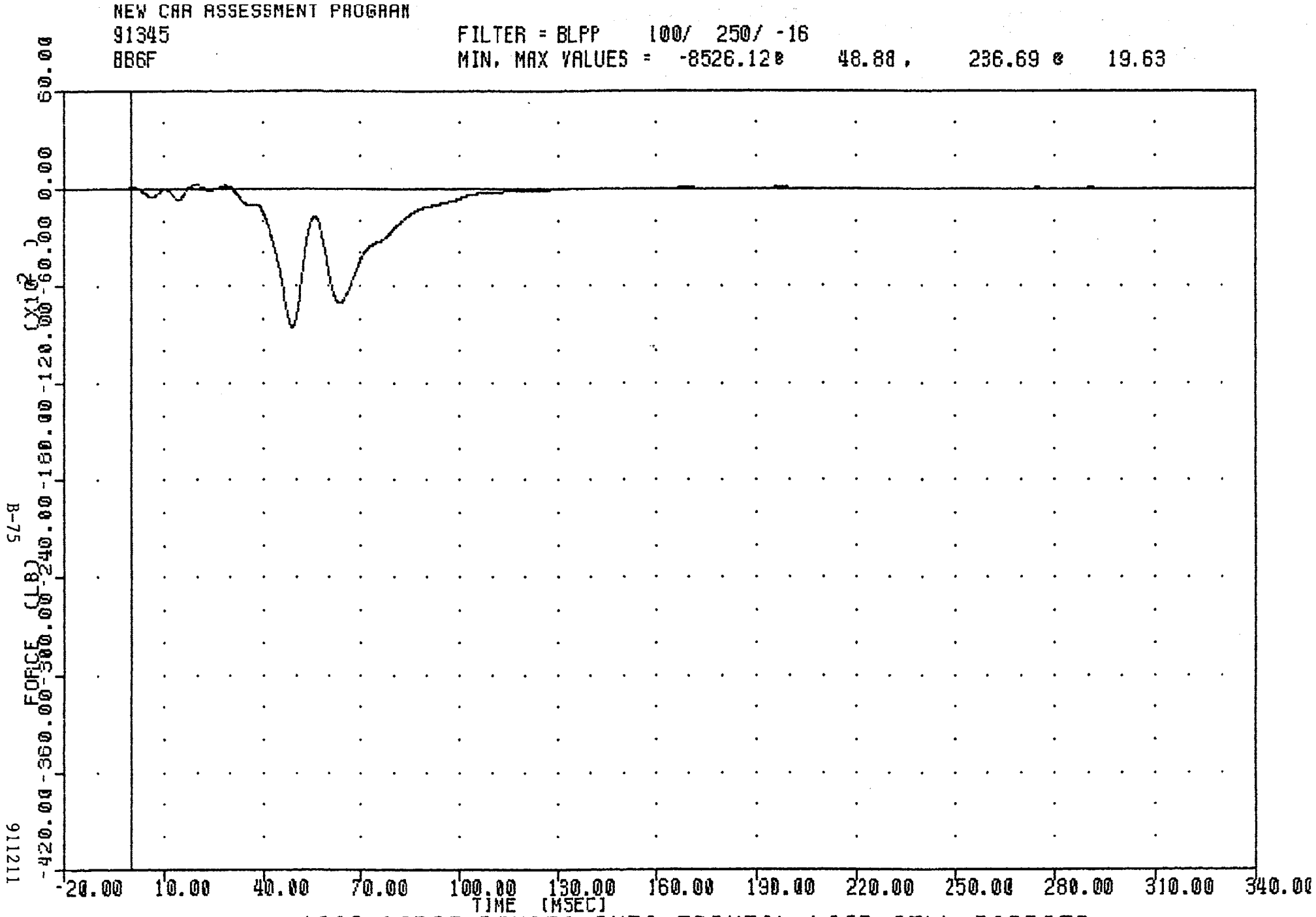


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B4 FORCE

911211

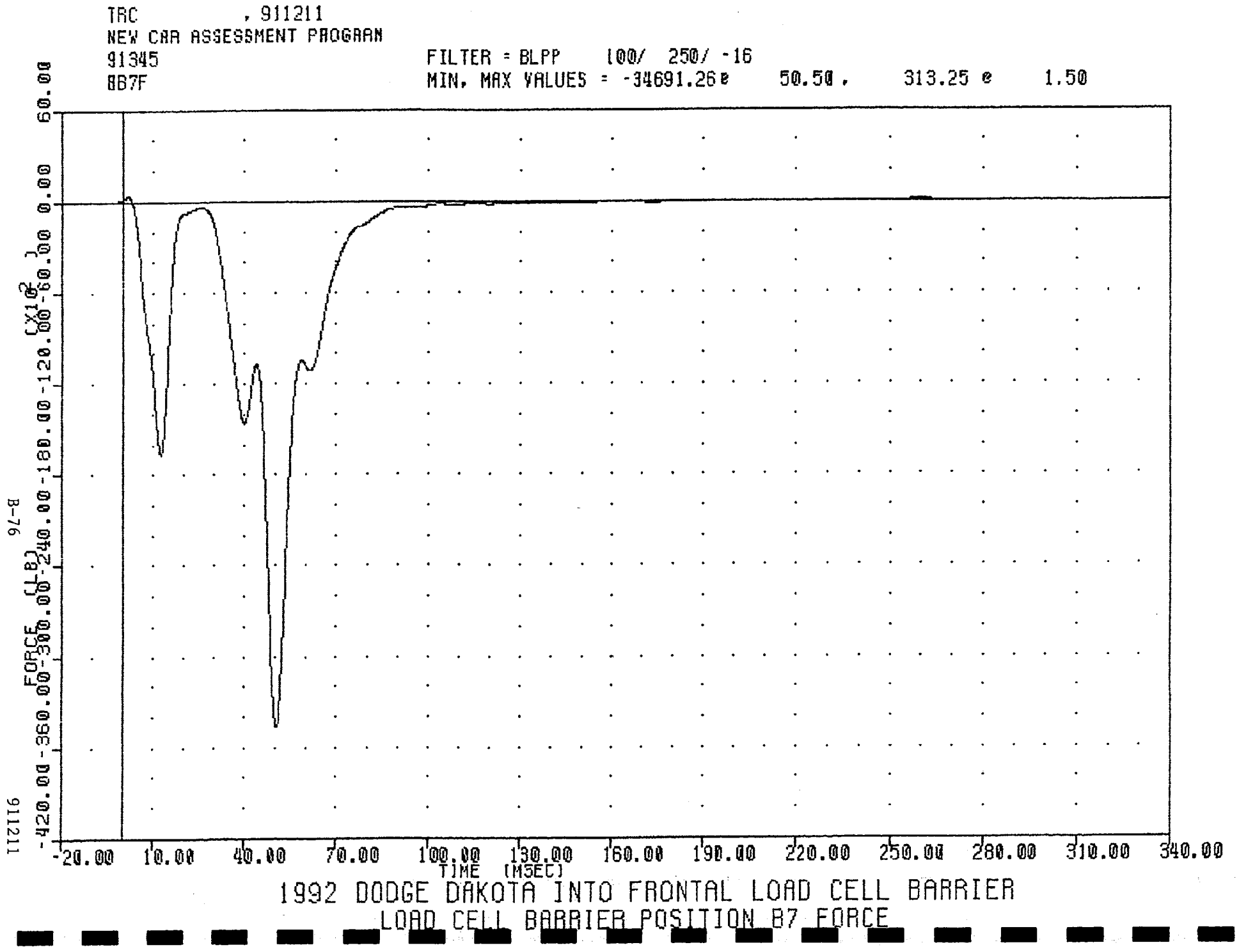

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
BB5F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -28475.46 @ 48.25 , 188.50 @ 281.50
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
FORCE (LB) (X1E2)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B5 FORCE

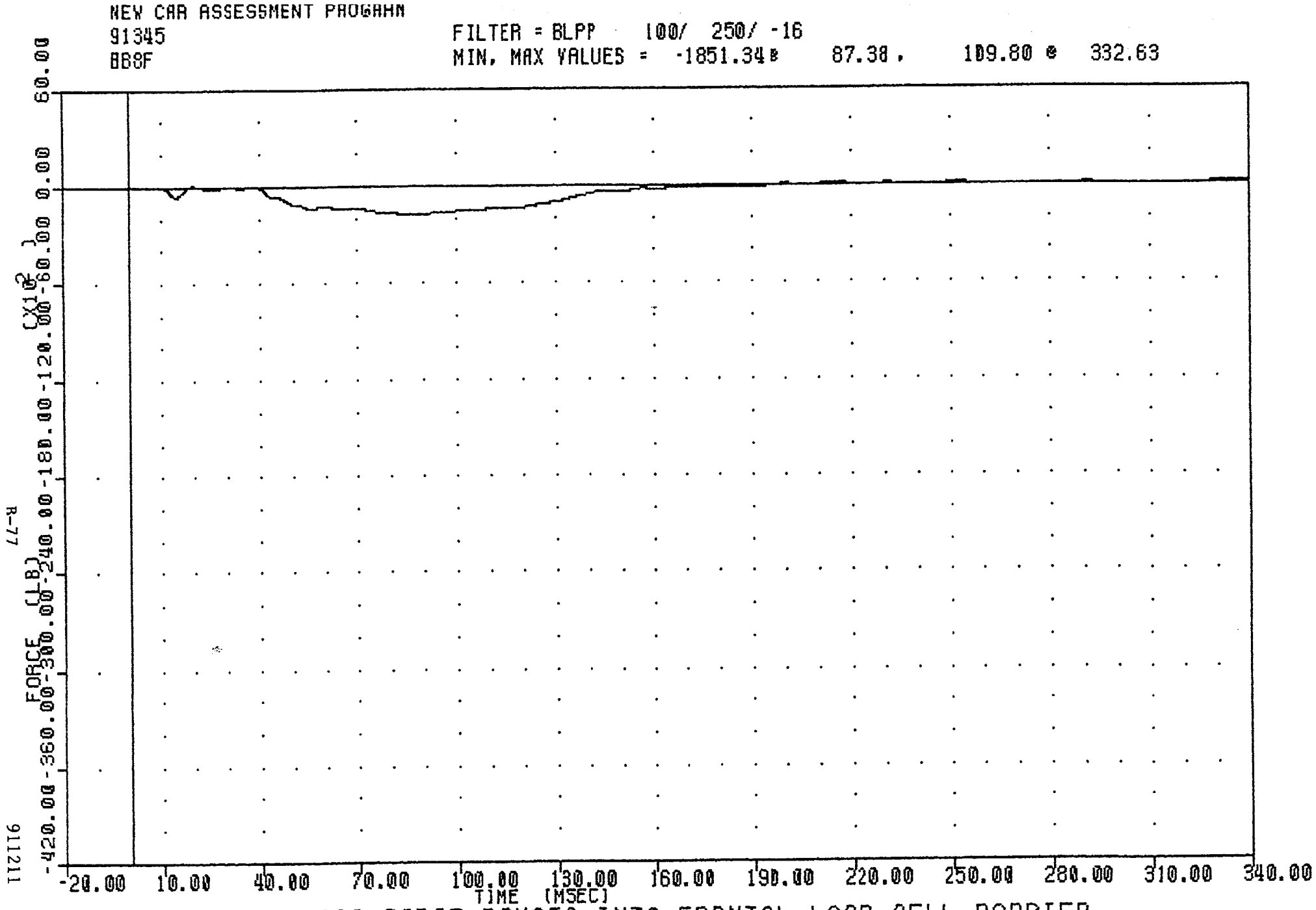
911211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B6 FORCE

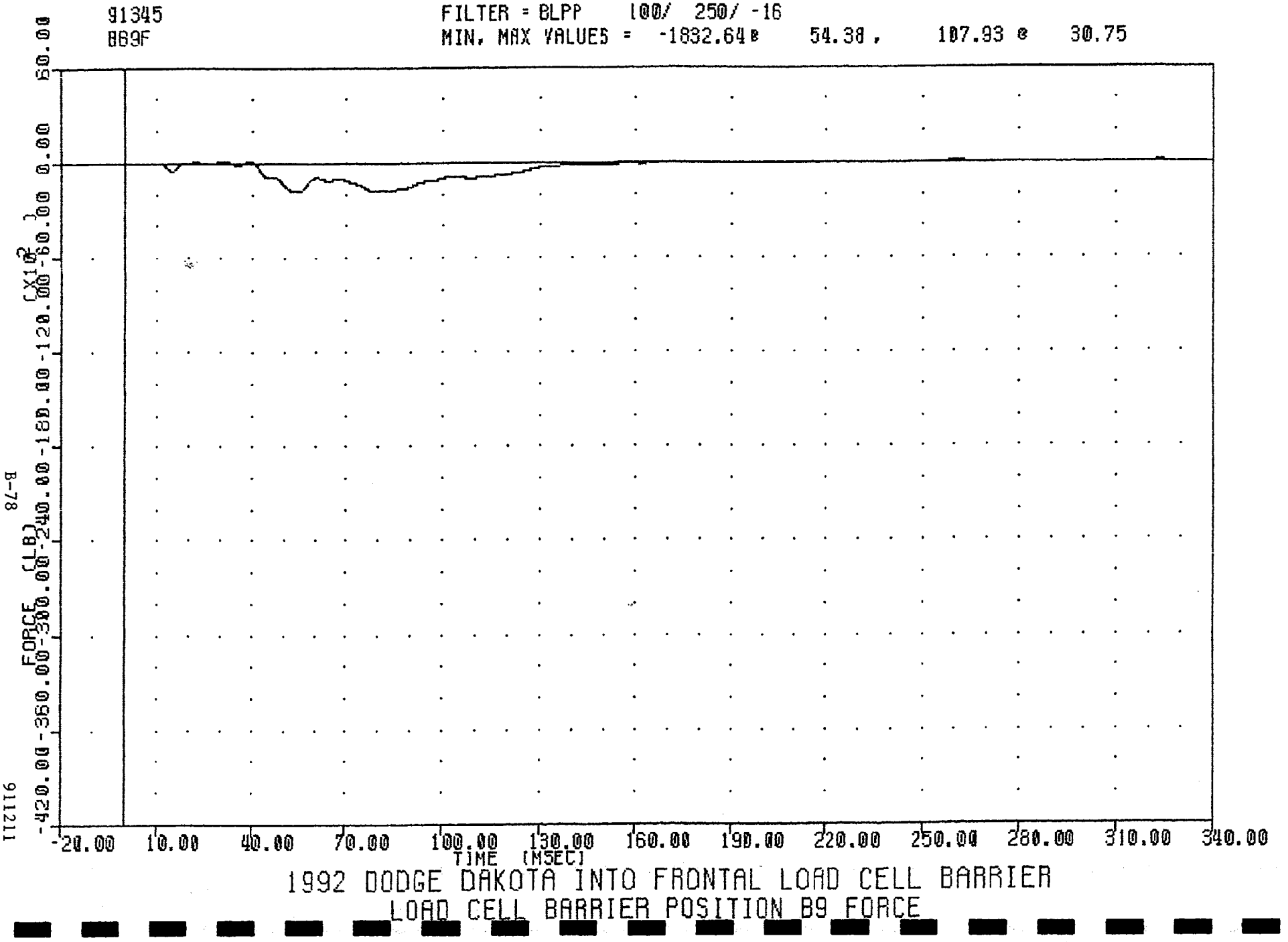
911211


TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
8B7F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -34691.26 @ 50.50 , 313.25 @ 1.50
FORCE (LB) (X10^2)
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
-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 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B7 FORCE
B-76
91211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B8 FORCE

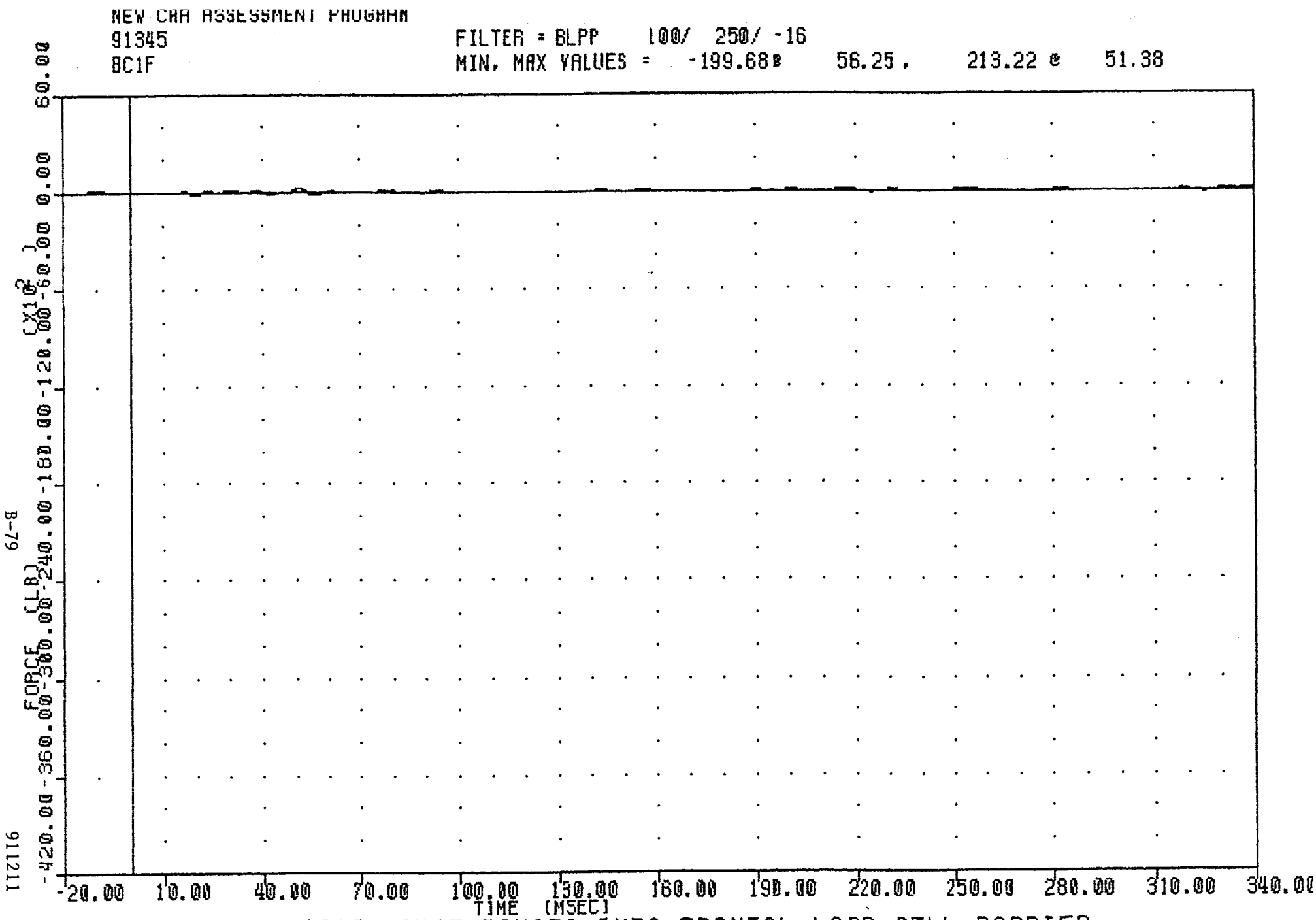
911211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER

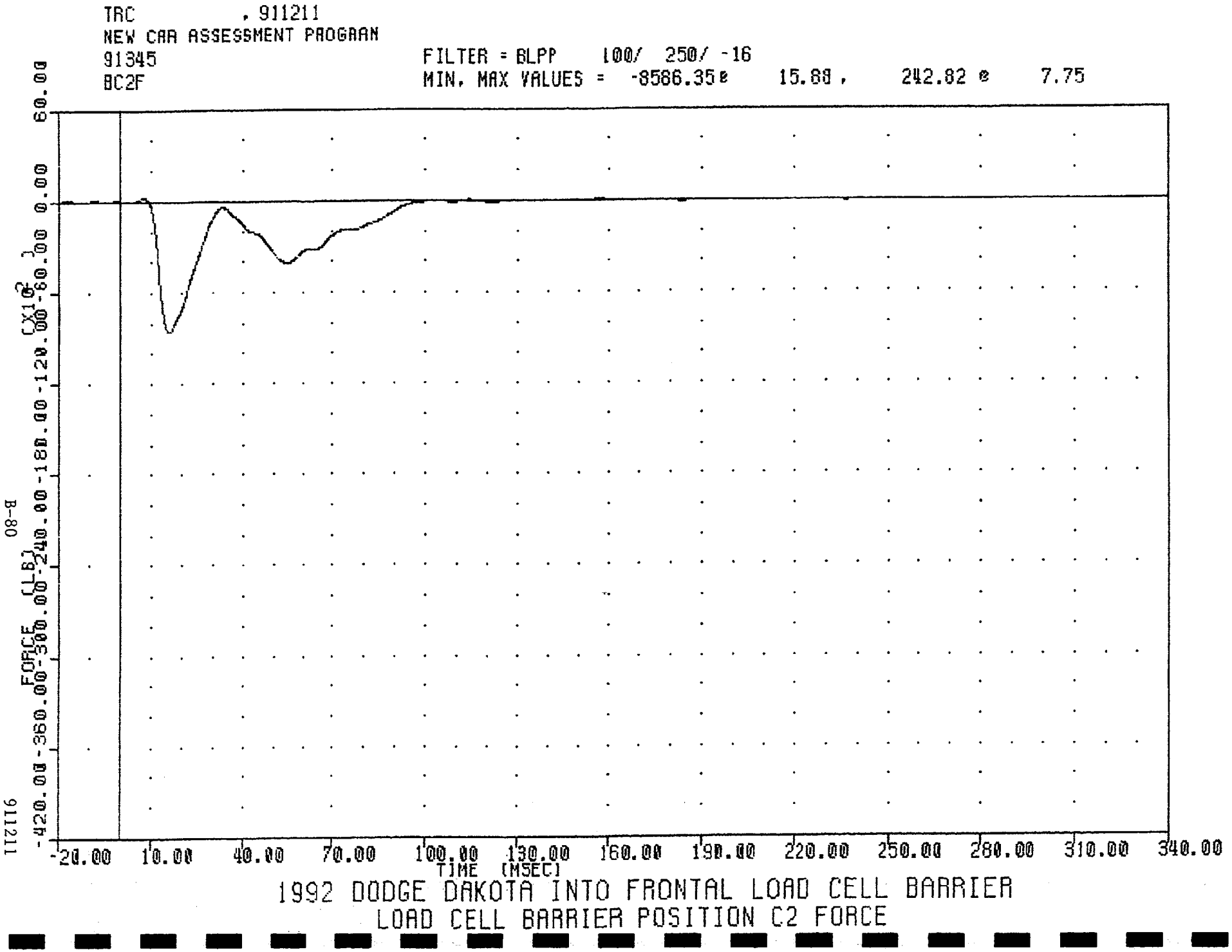
LOAD CELL BARRIER POSITION B9 FORCE

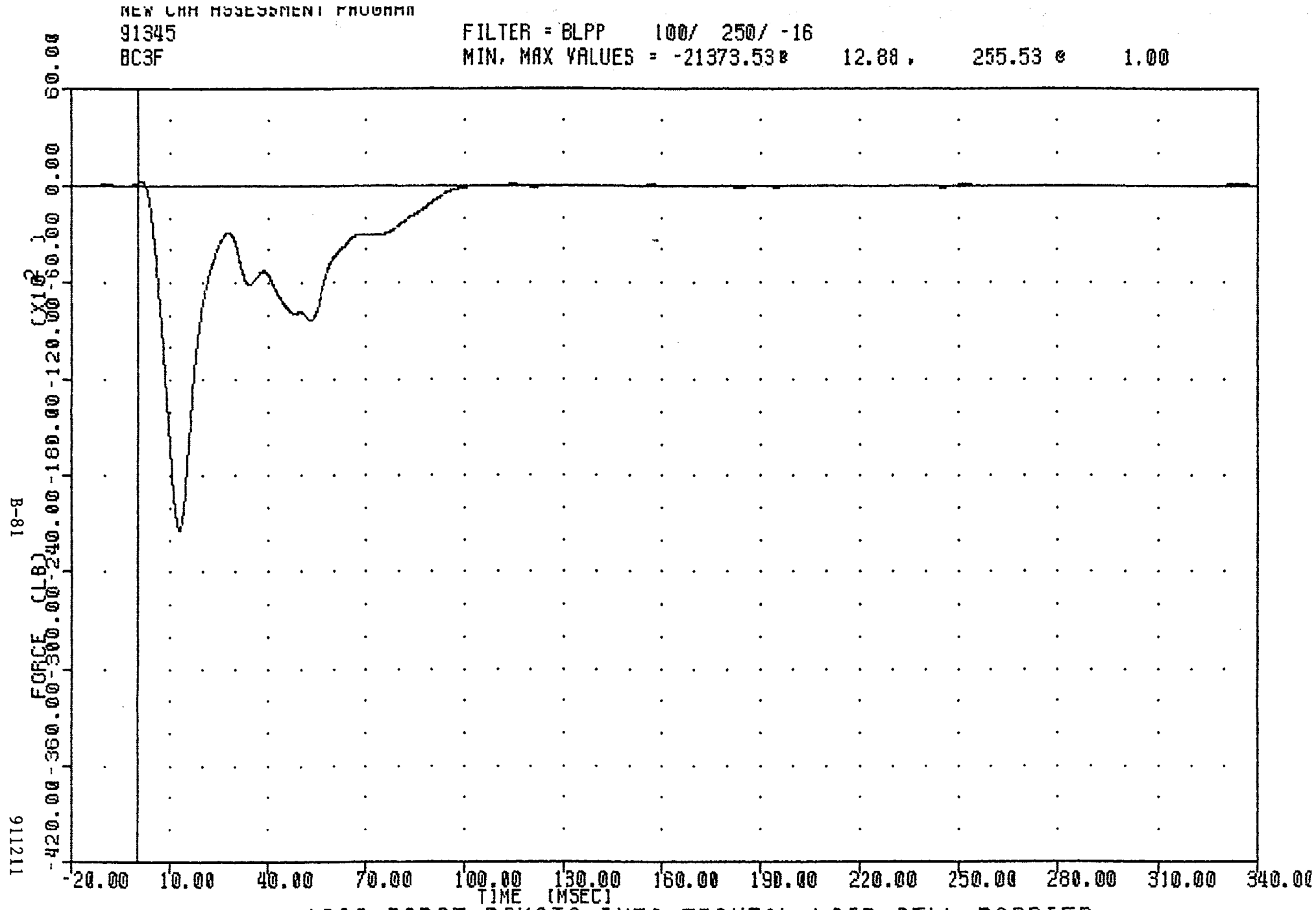
911211



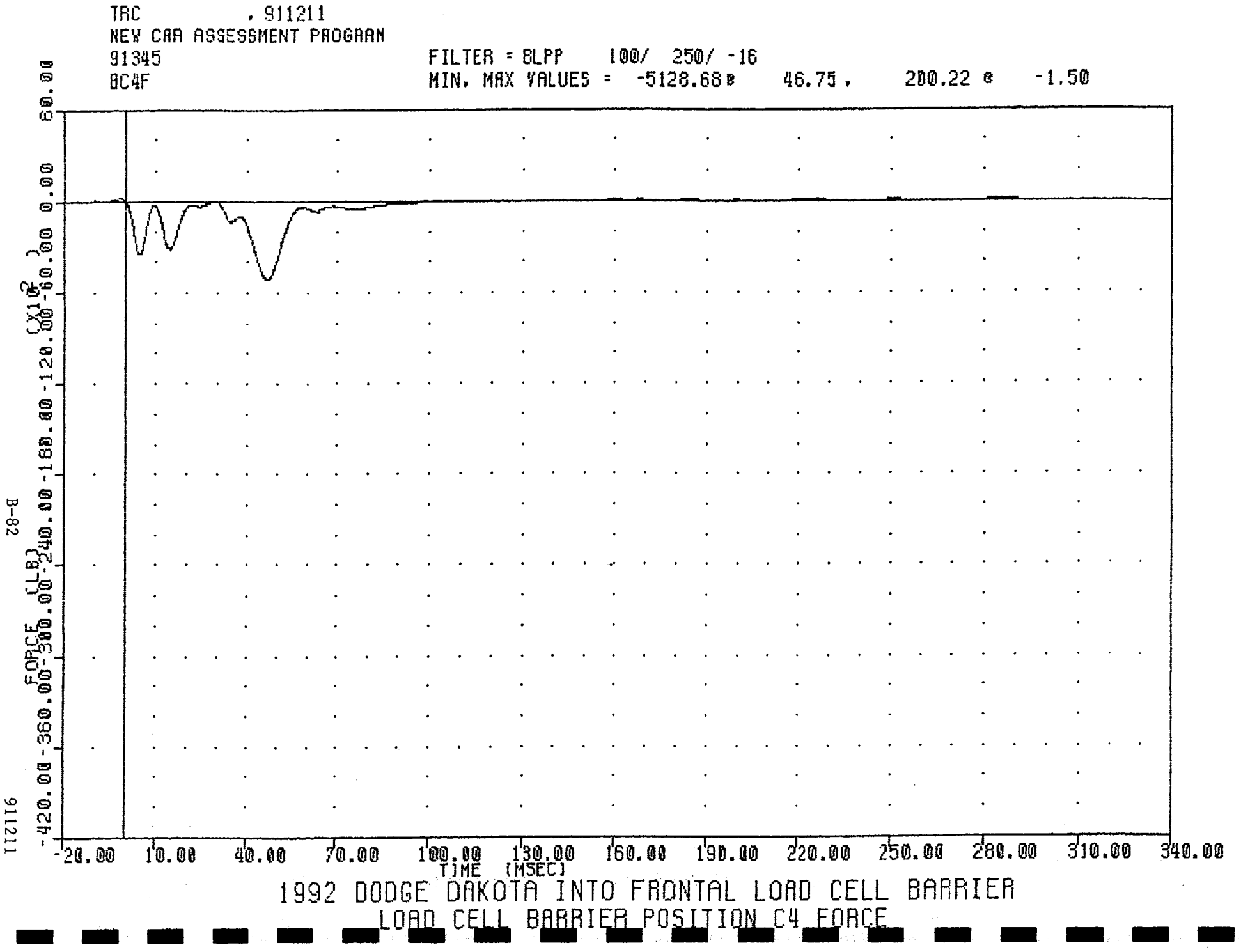
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C1 FORCE

911211

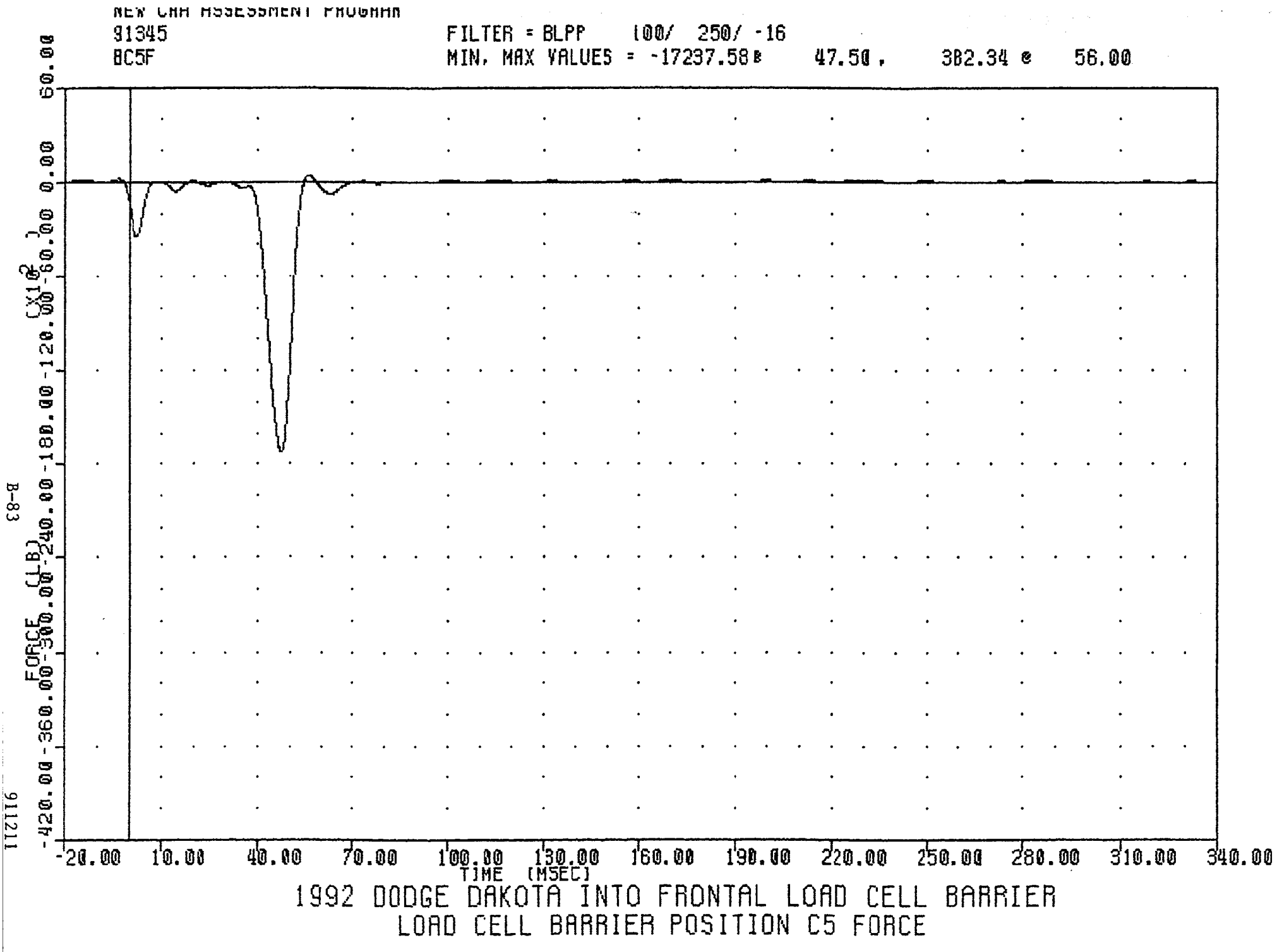

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
BC2F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -8586.35 @ 15.88 , 242.82 @ 7.75
FORCE (LB) (X10^2)
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
B-80
91121
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C2 FORCE



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C3 FORCE

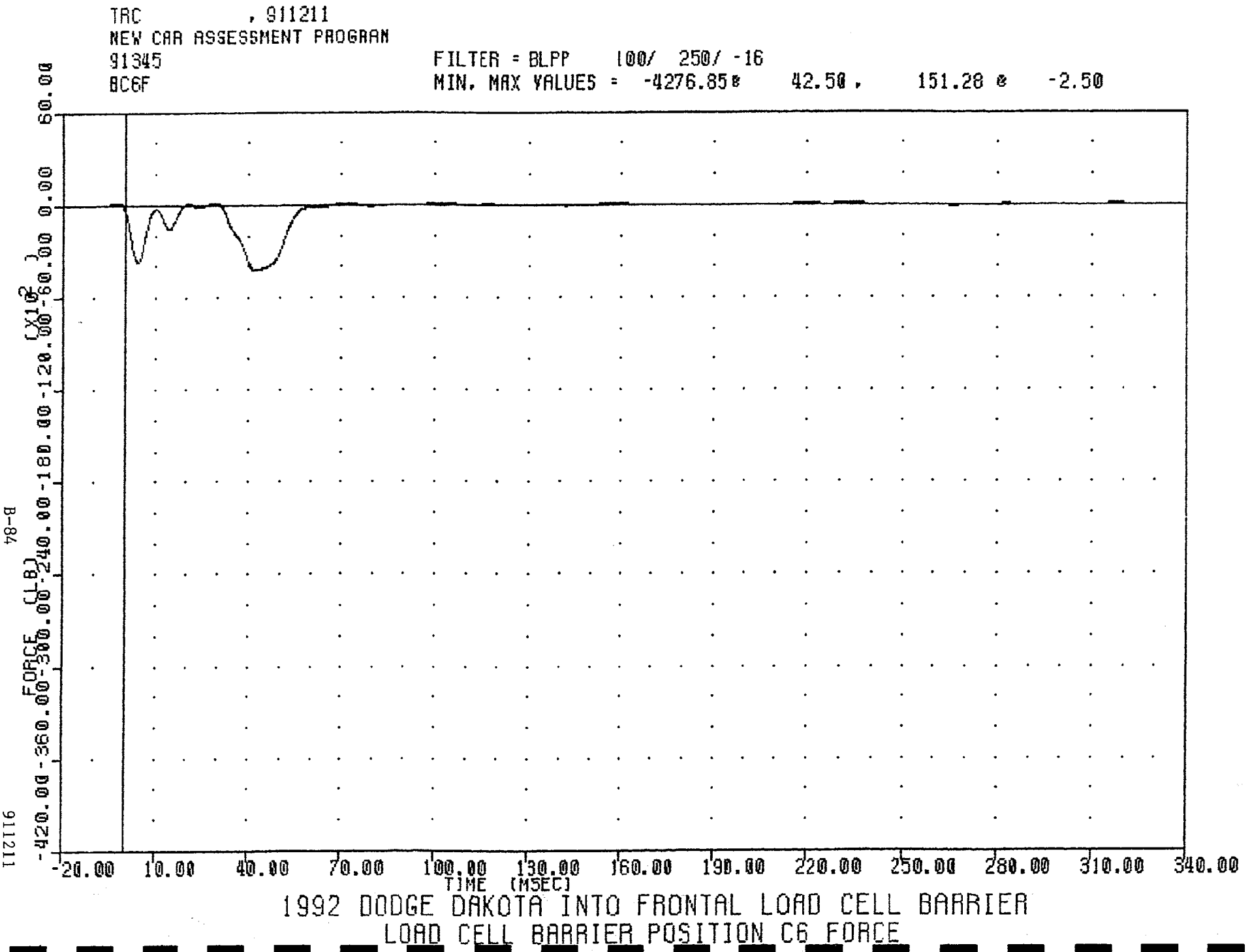

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
8C4F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -5128.68 @ 46.75 , 200.22 @ -1.50
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
FORCE (LB) (X10^2)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C4 FORCE

911211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C5 FORCE

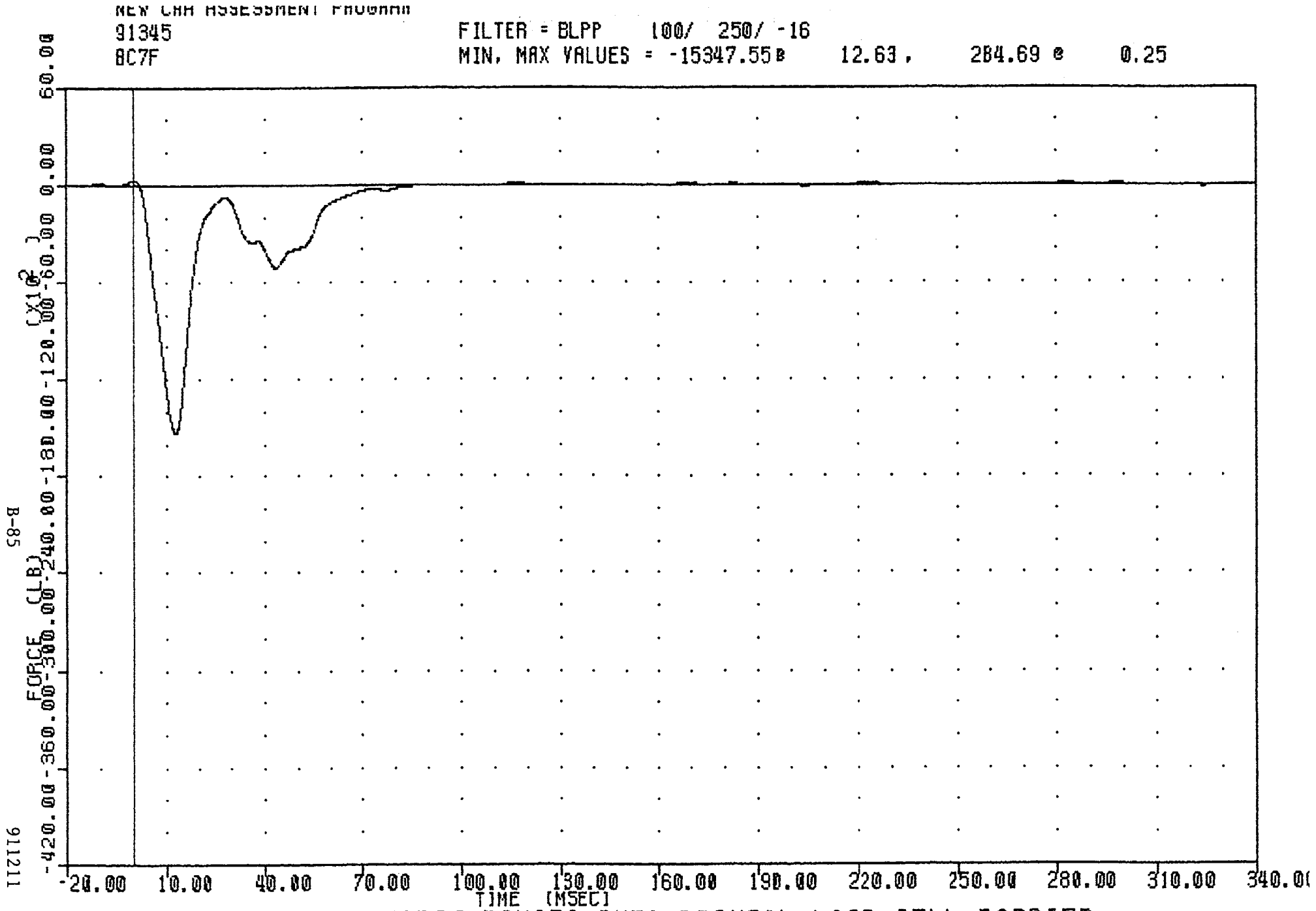
911211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER

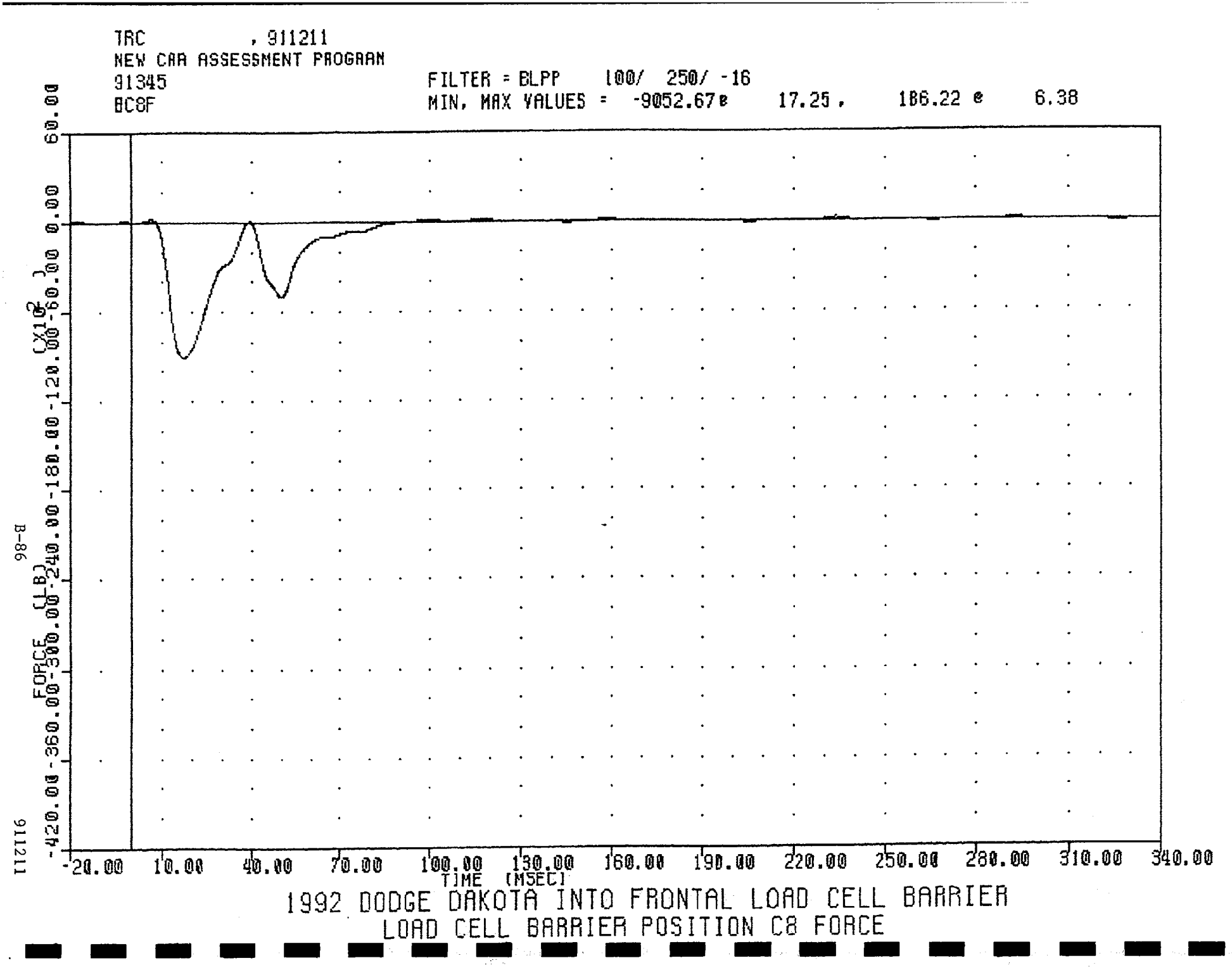
LOAD CELL BARRIER POSITION C6 FORCE

911211

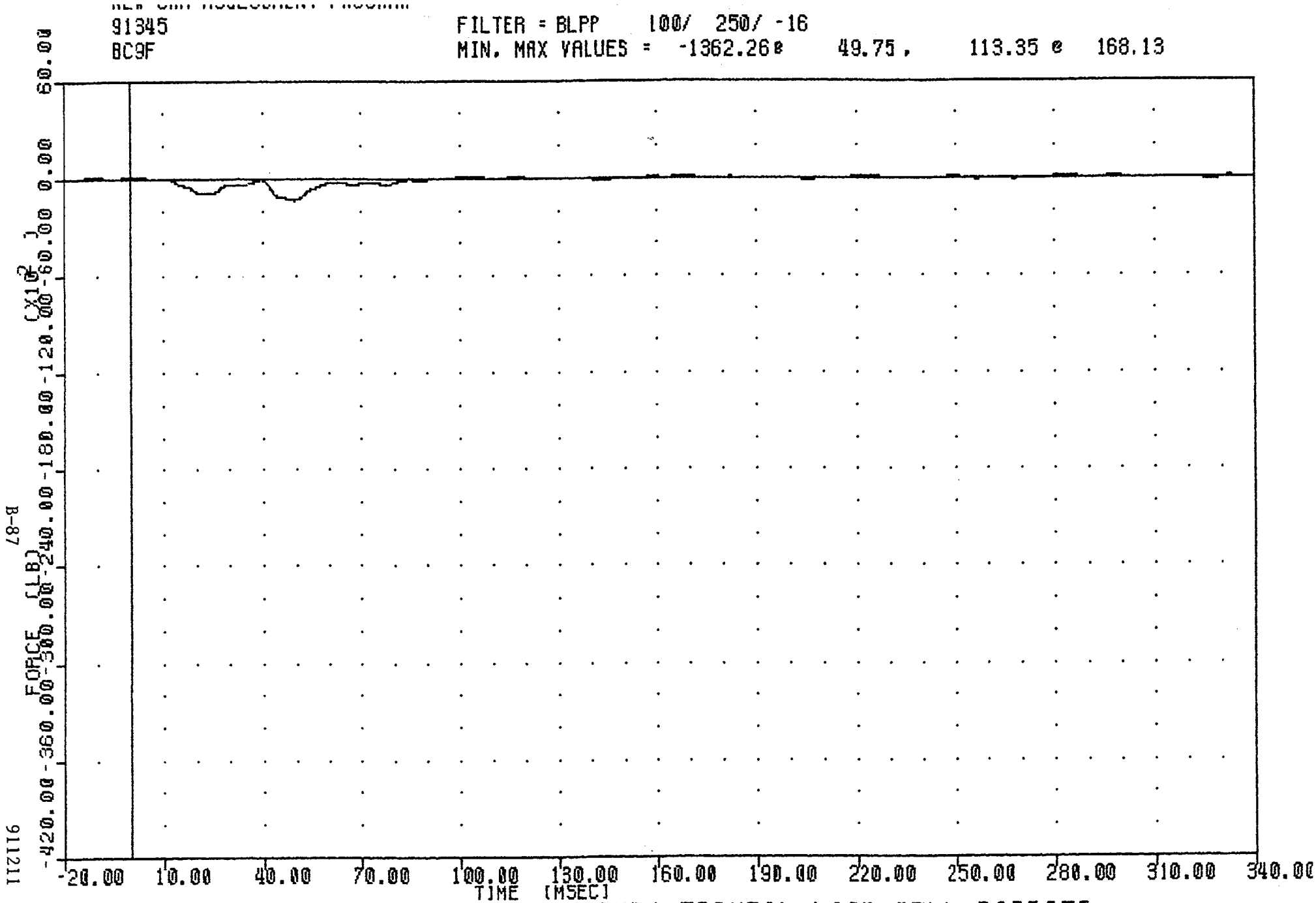


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C7 FORCE

911211

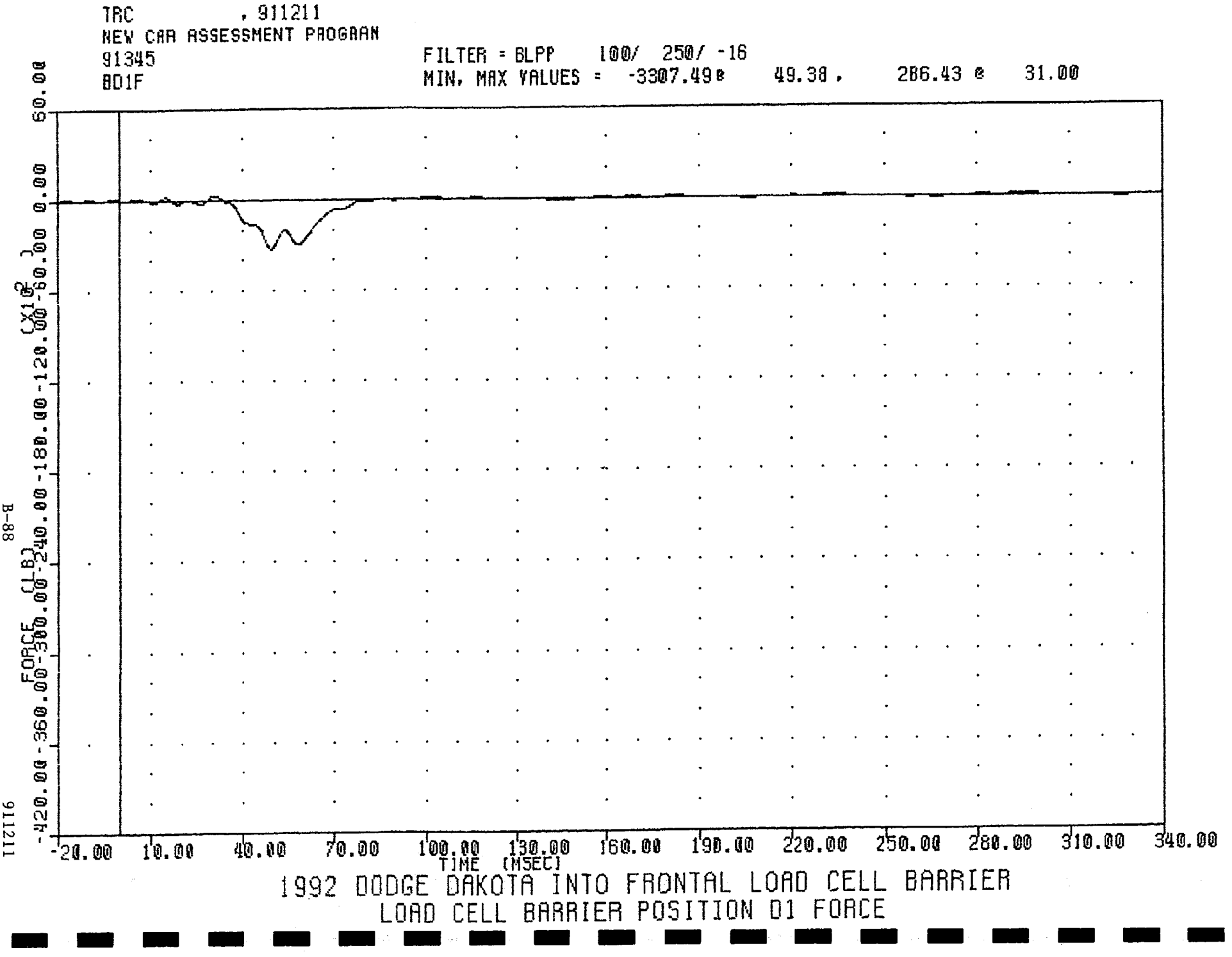

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
BC8F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -9052.67@ 17.25 , 186.22 @ 6.38
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
FORCE (LB) (X10^2)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C8 FORCE

911211

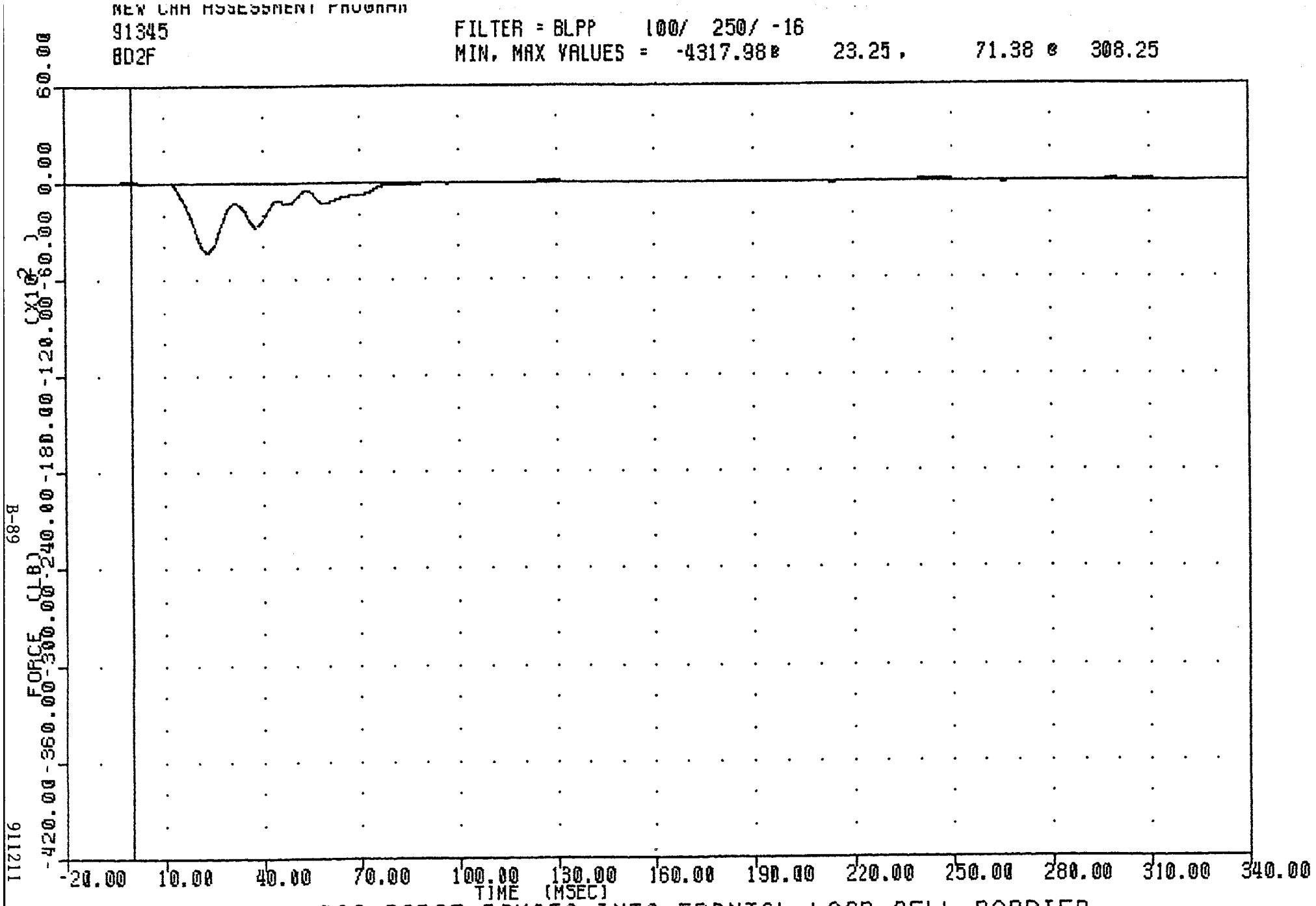


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C9 FORCE

91211

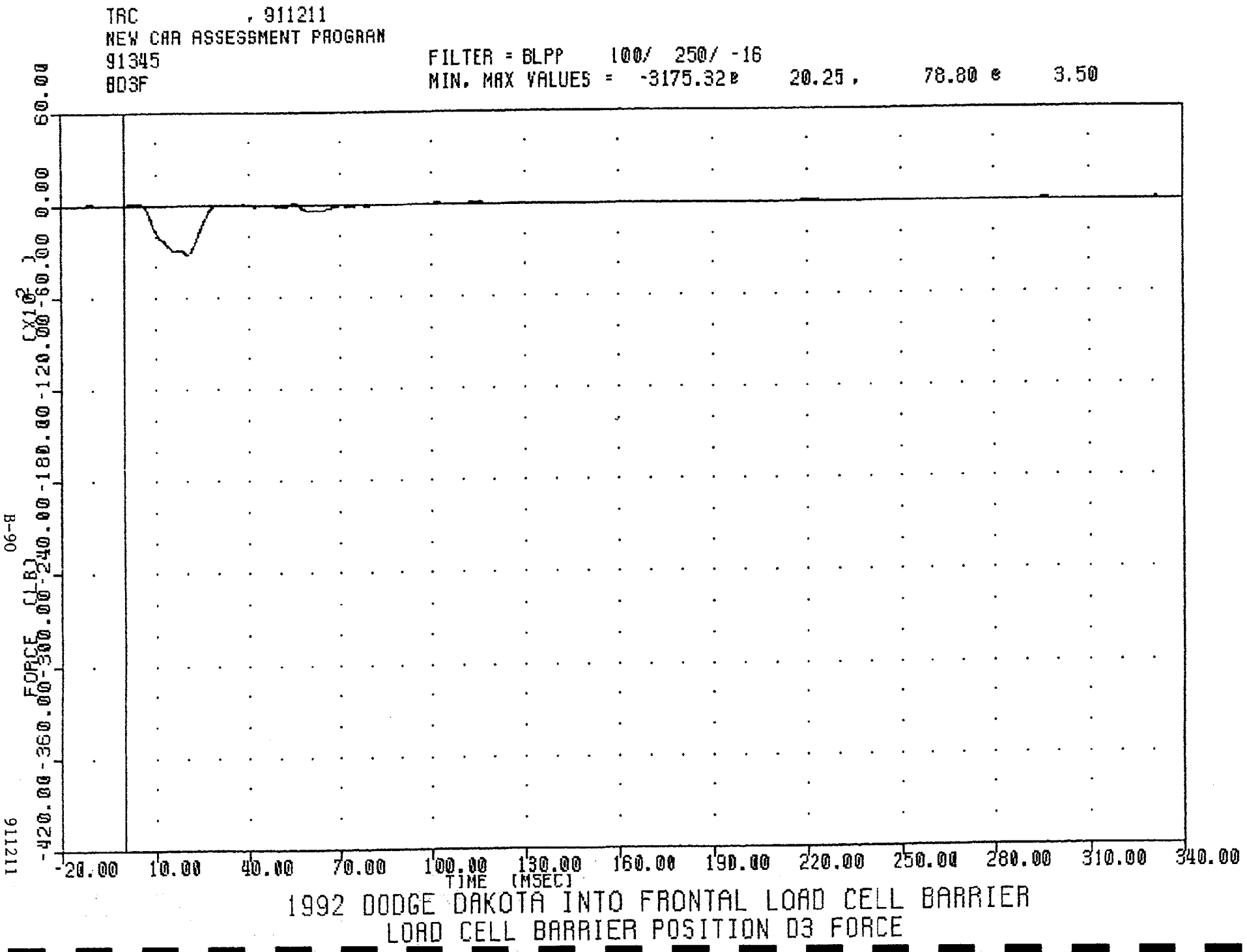

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
BD1F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -3307.49 @ 49.38 , 286.43 @ 31.00
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
FORCE (LB) (X10^2)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D1 FORCE

911211

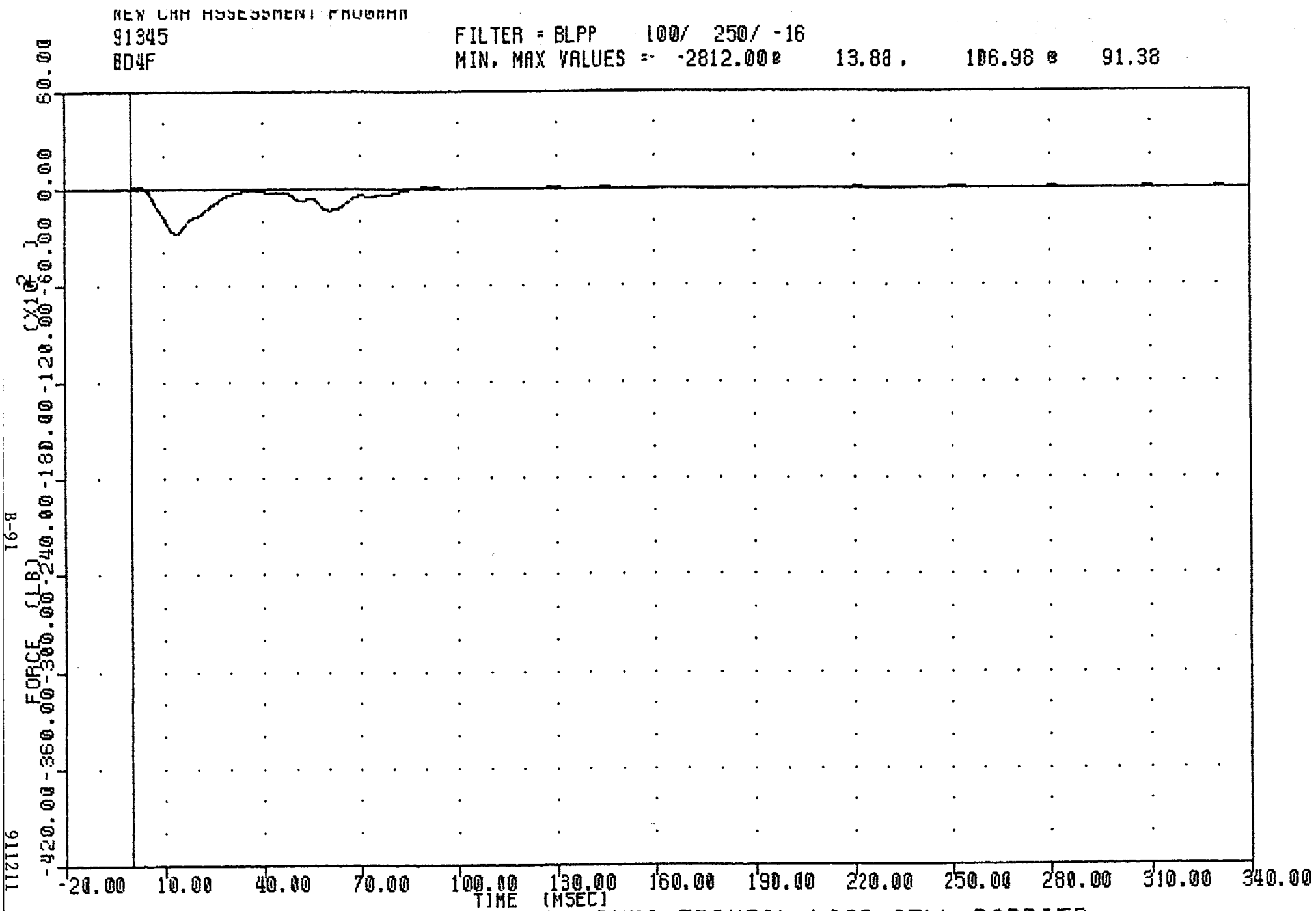


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D2 FORCE

911211

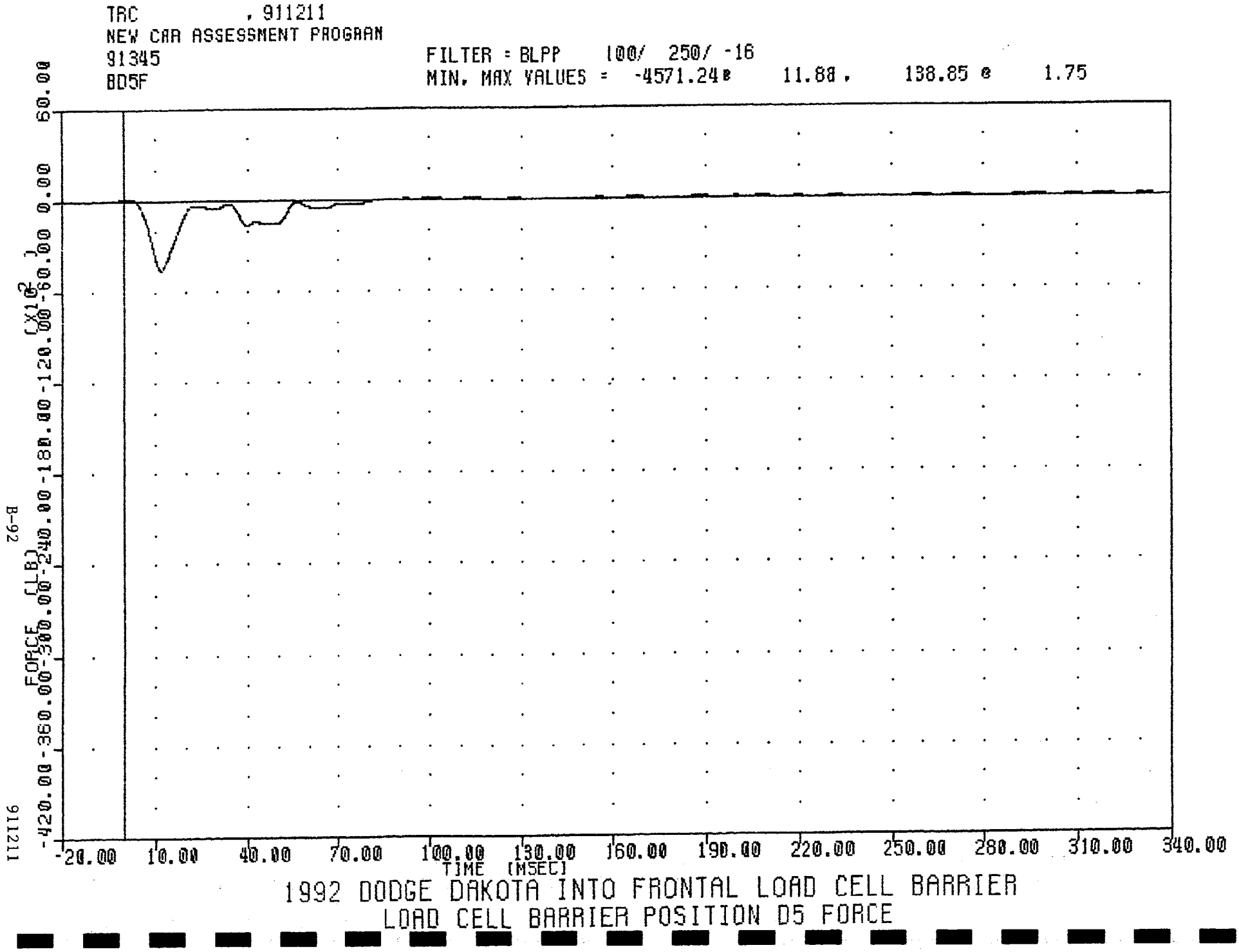

TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
8D3F
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -3175.32 @ 20.25 , 78.80 @ 3.50
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-300.00
-360.00
-420.00
FORCE (LB) (X10^2)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D3 FORCE

911211



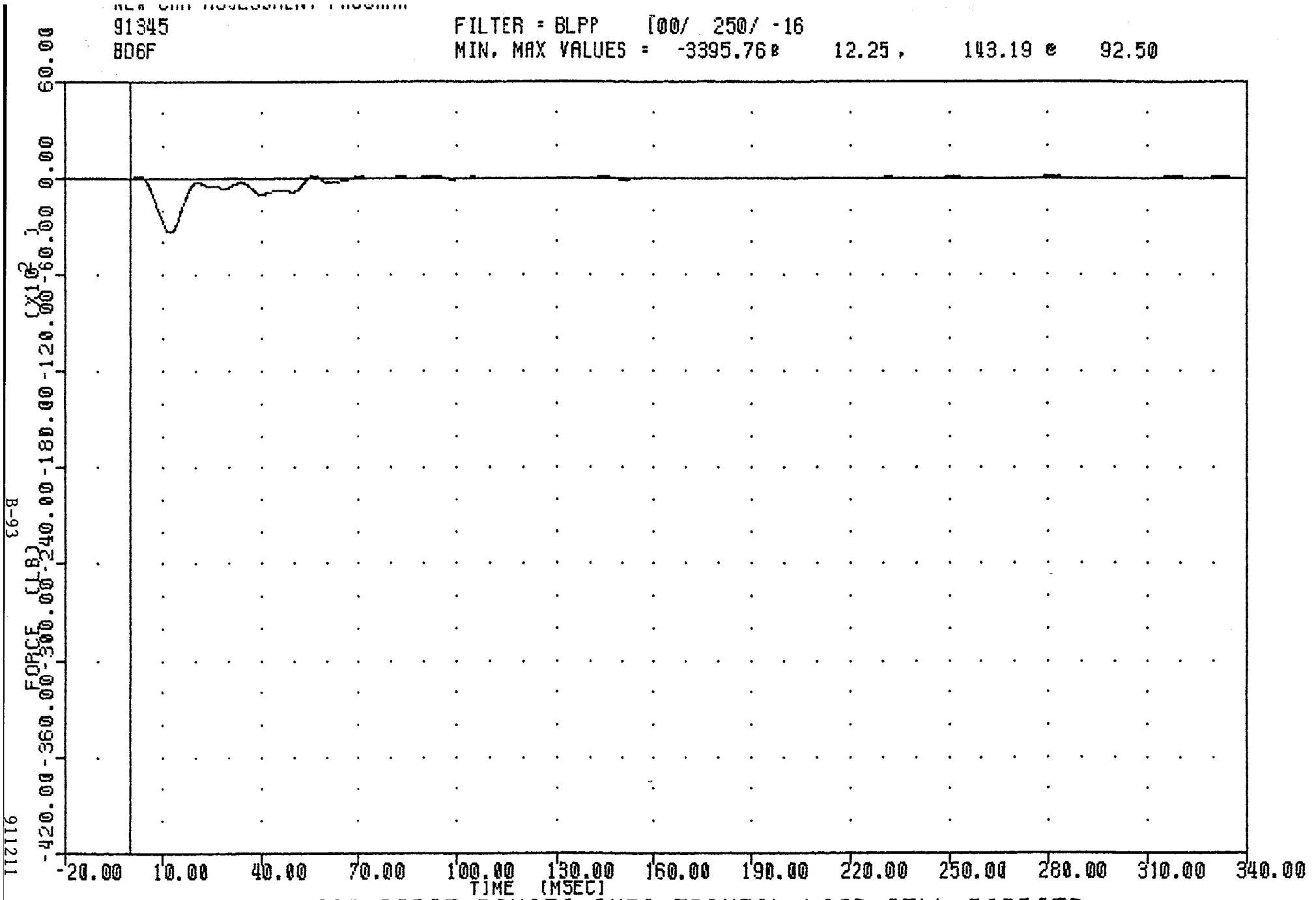
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D4 FORCE

911211



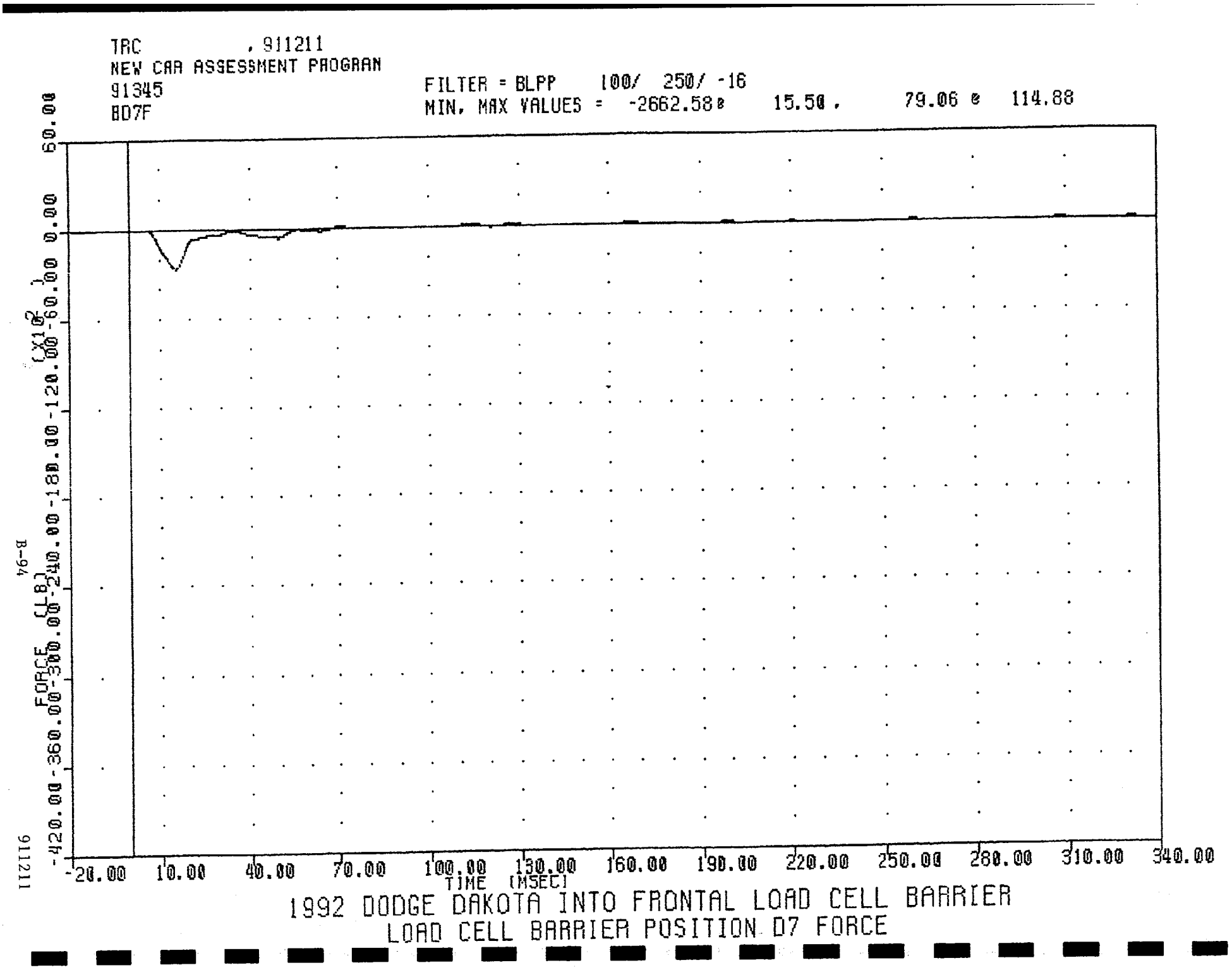
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D5 FORCE

911211

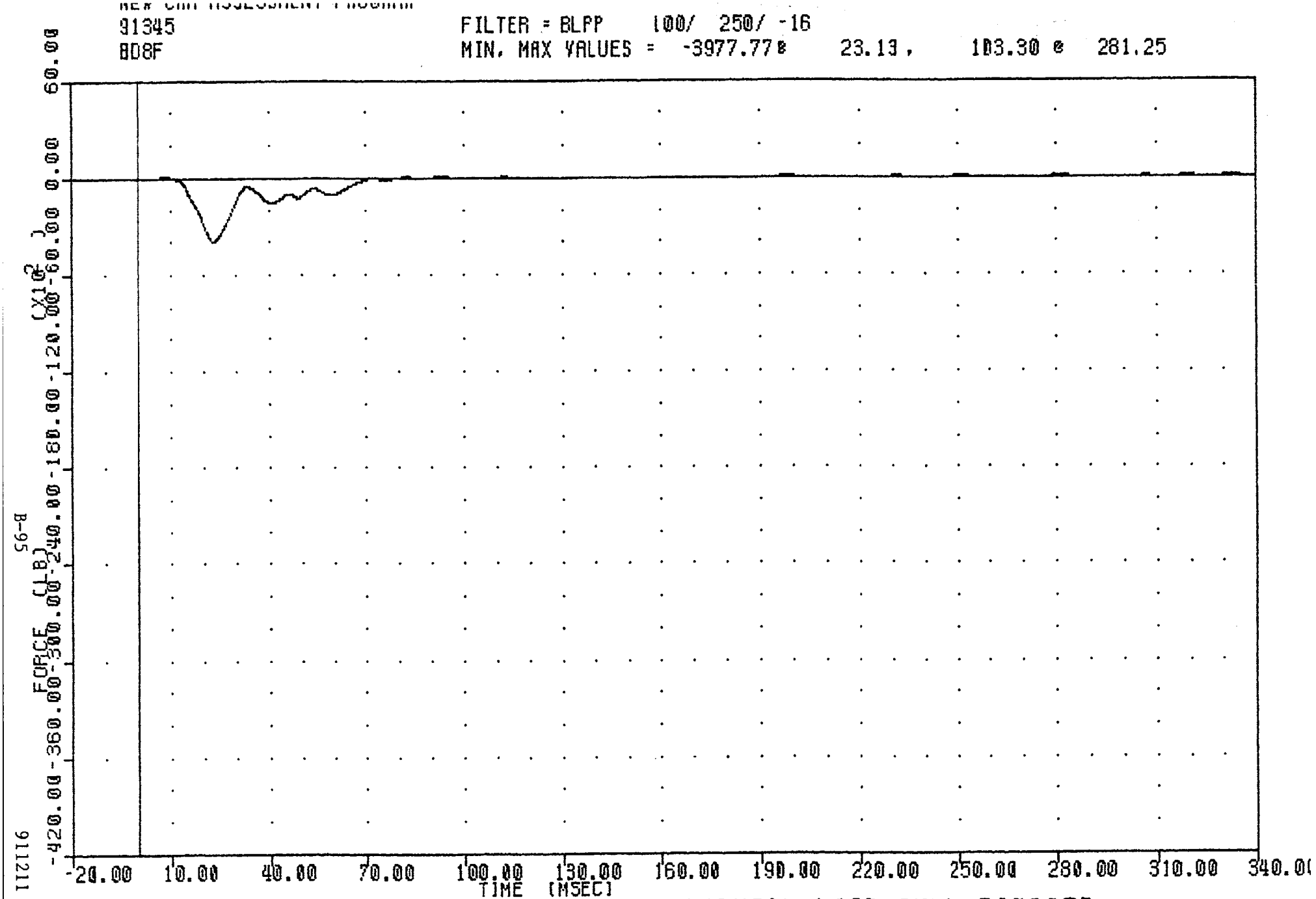


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D6 FORCE

911211

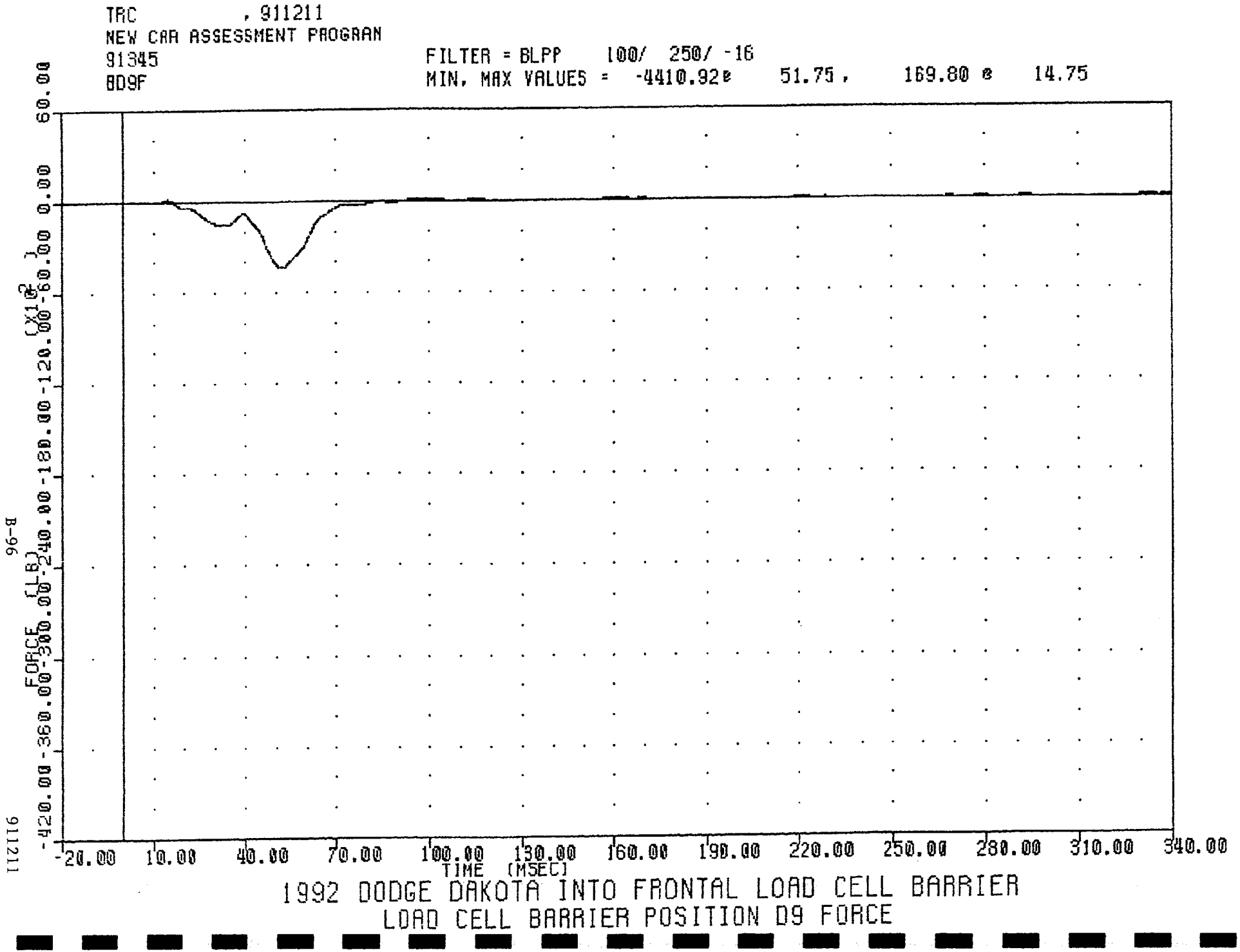


1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D7 FORCE



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D8 FORCE

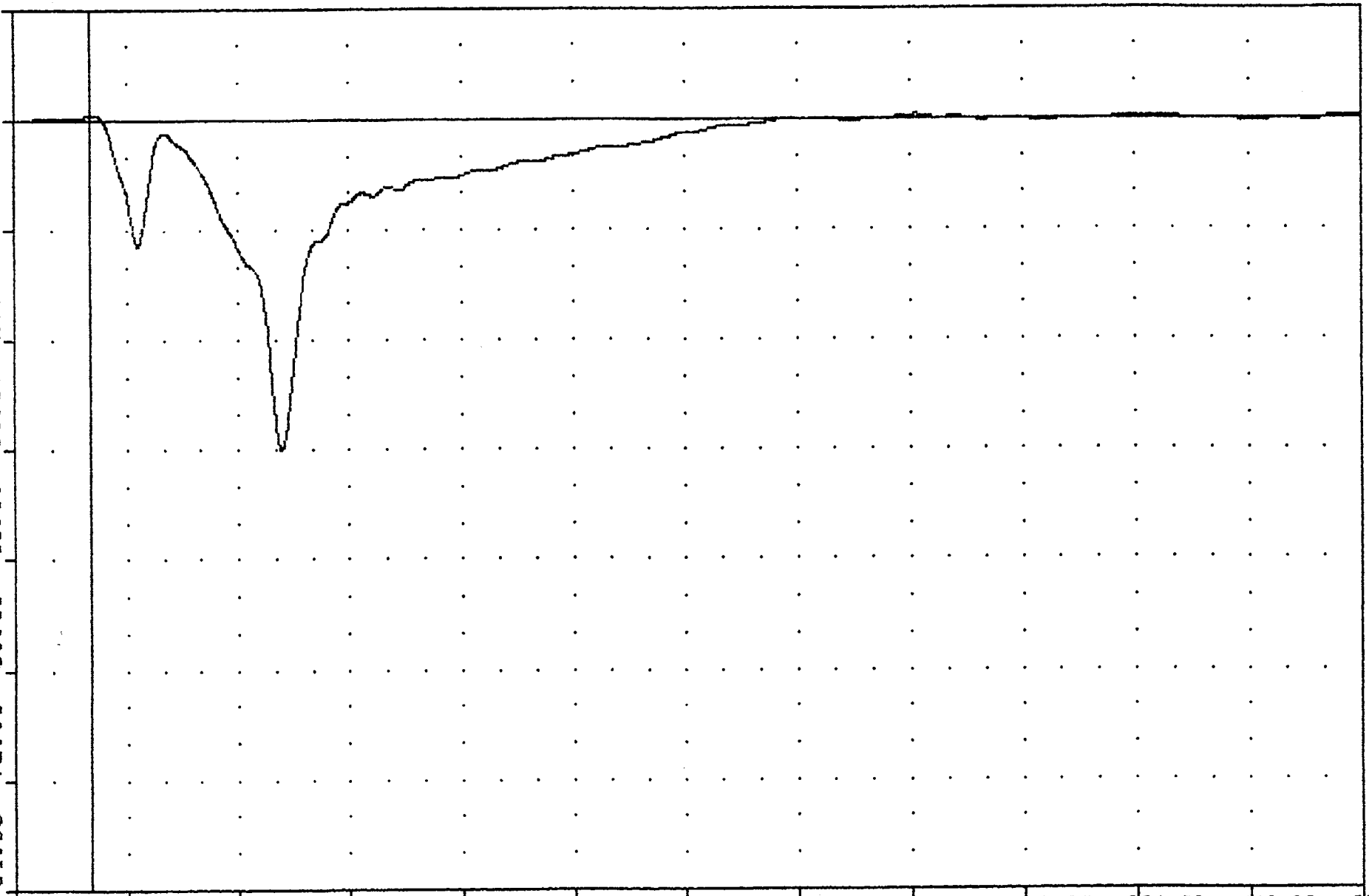
911211



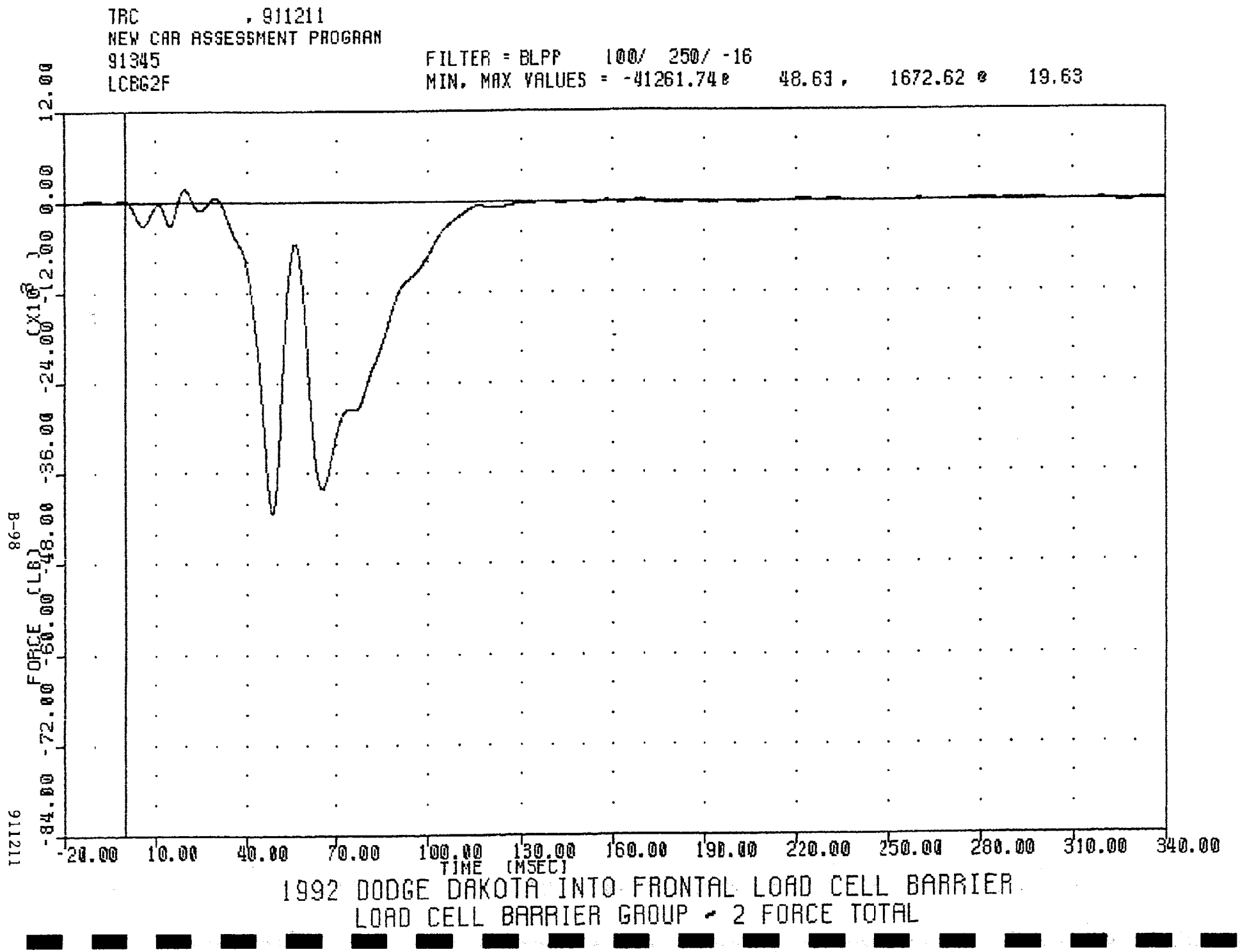
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D9 FORCE

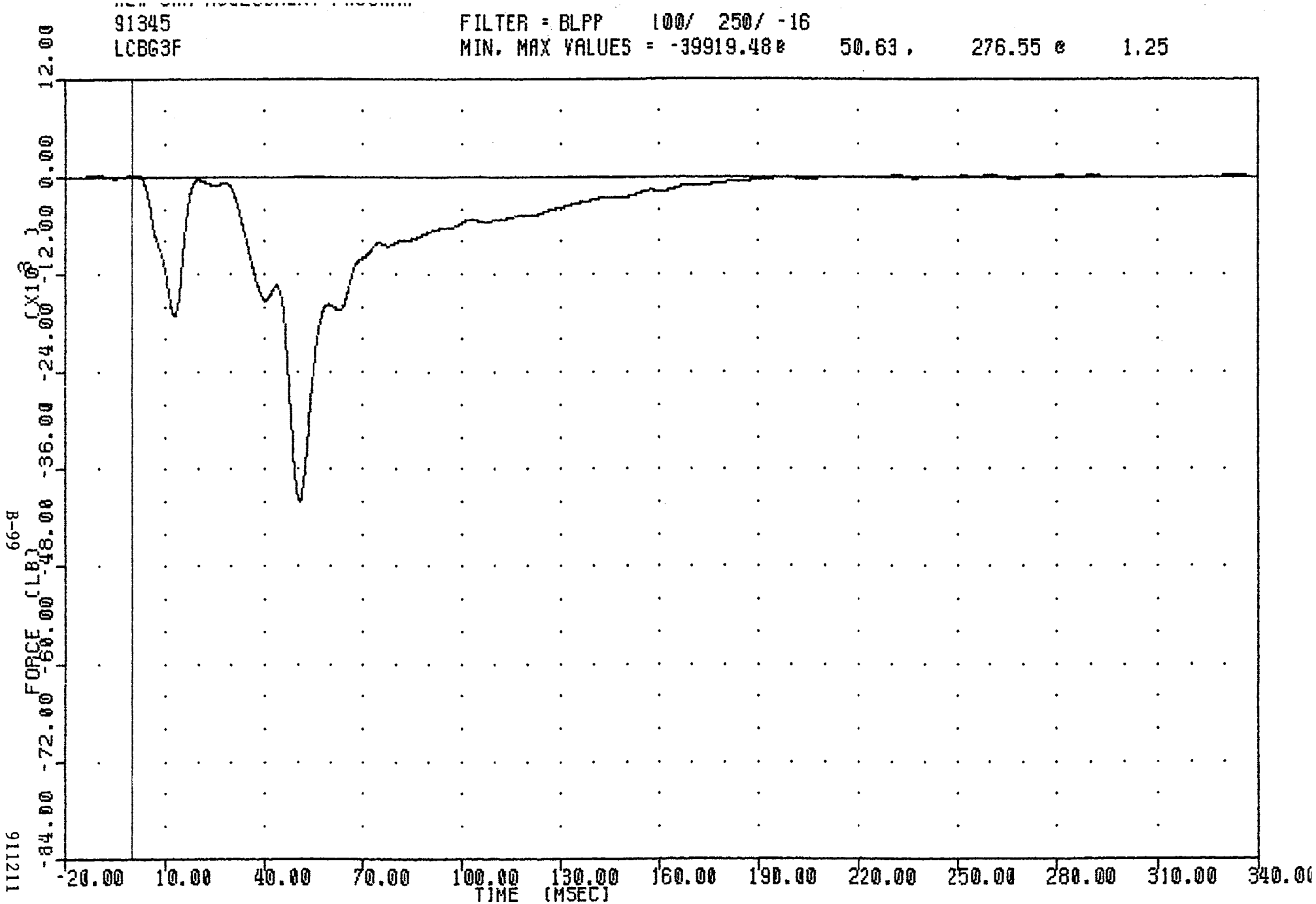
911211

NCAP CAR ASSESSMENT PROGRAM
91345
LCBG1F
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -35945.21 @ 51.63 , 395.49 @ 1.13



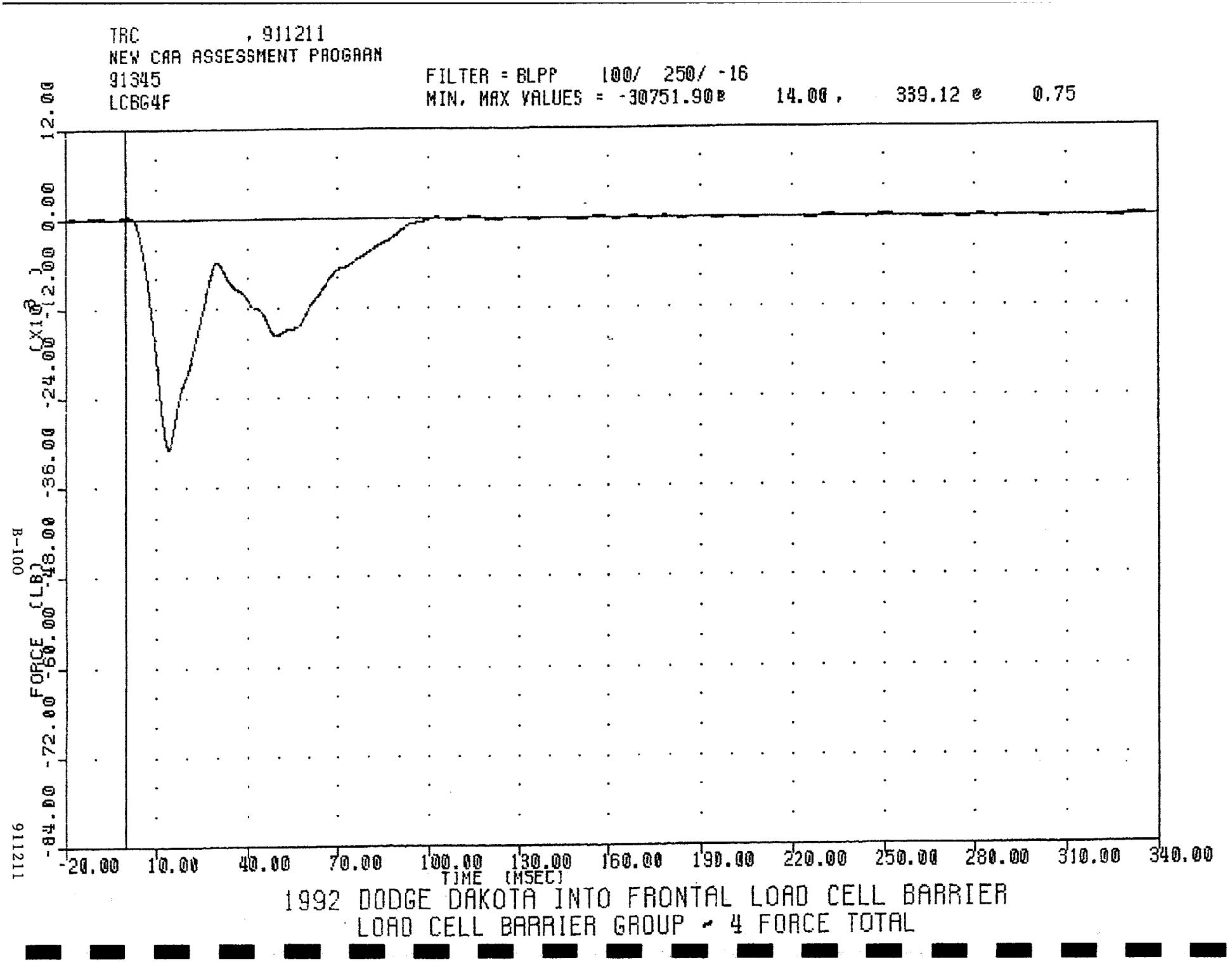
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 1 FORCE TOTAL


TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
LCBG2F
FILTER = BLPF 100/ 250/ -16
MIN, MAX VALUES = -41261.74 @ 48.63 , 1672.62 @ 19.63
12.00
0.00
-12.00
-24.00
-36.00
-48.00
-60.00
-72.00
-84.00
FORCE (LB) (X10^3)
-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 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 2 FORCE TOTAL
B-98
911211



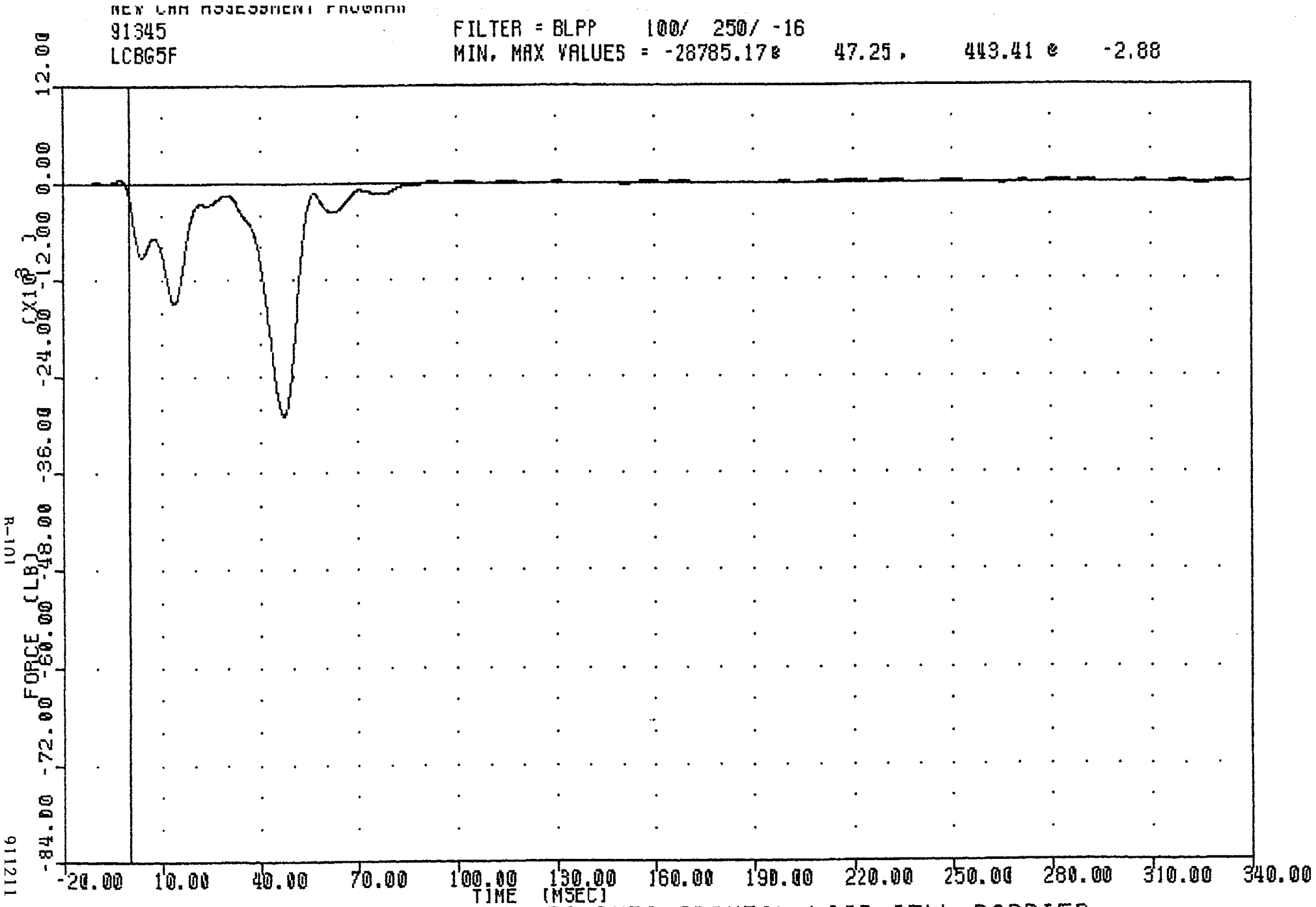
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 3 FORCE TOTAL

911211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER

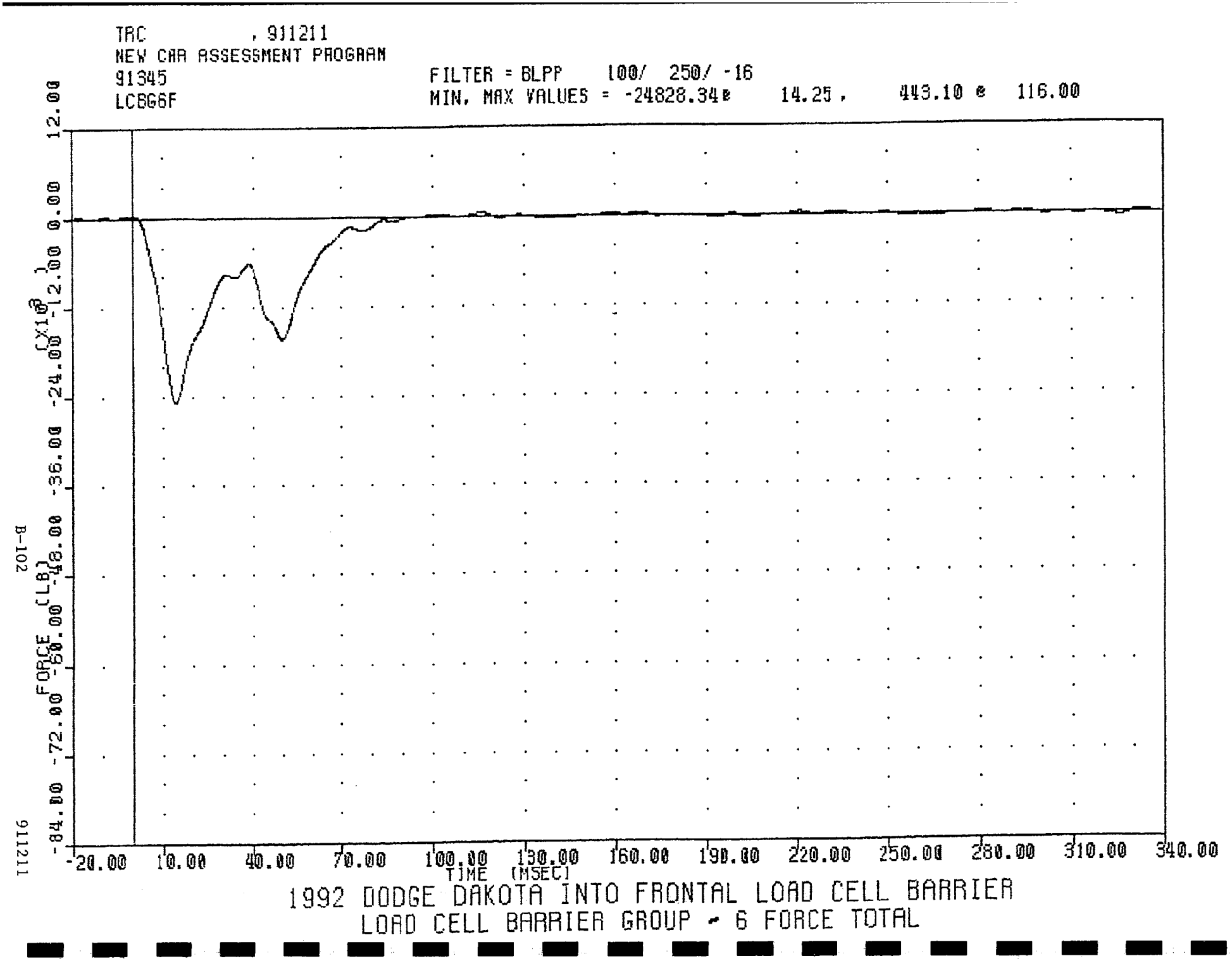
LOAD CELL BARRIER GROUP - 4 FORCE TOTAL



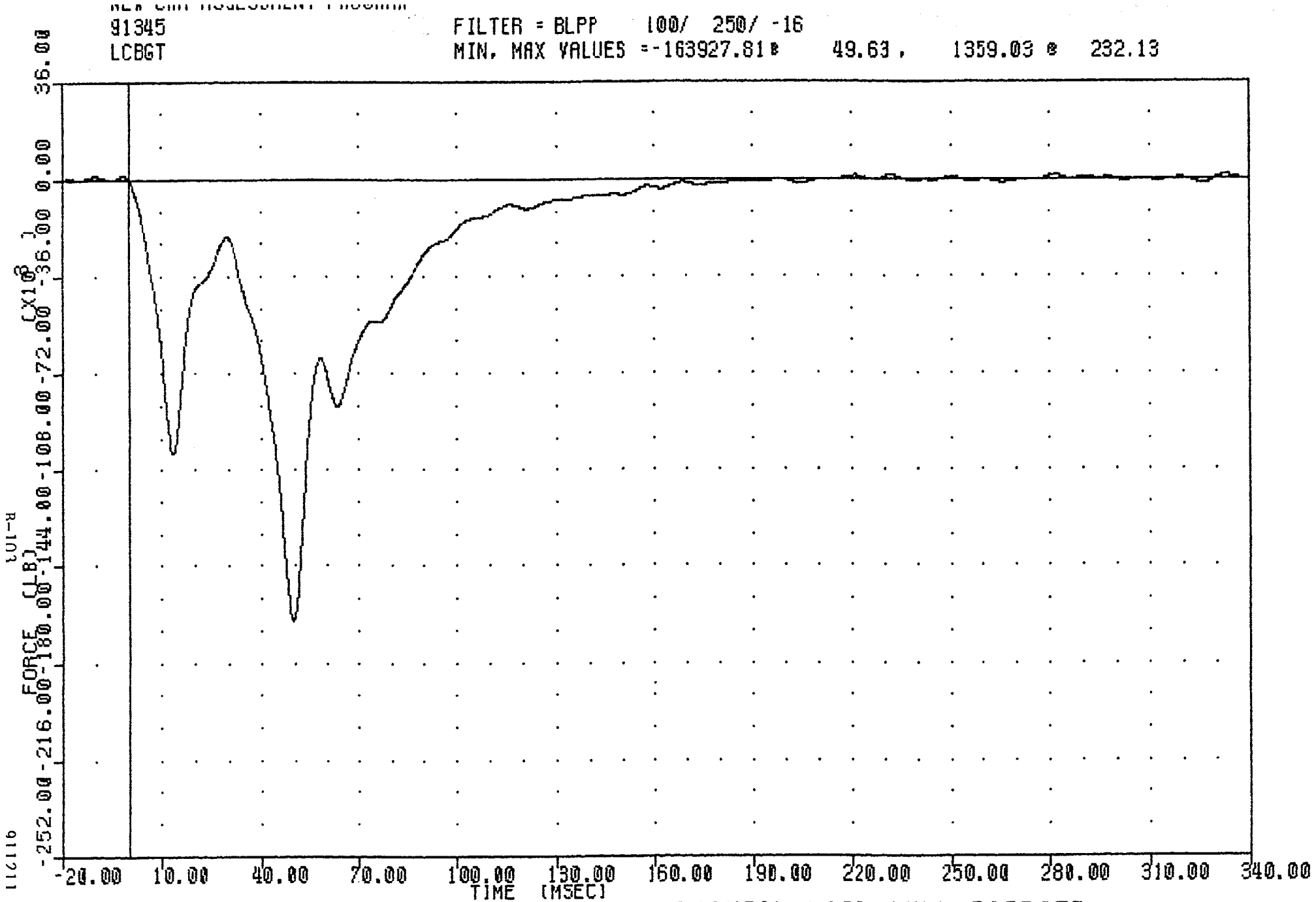
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 5 FORCE TOTAL

R-101

911211


TRC , 911211
NEW CAR ASSESSMENT PROGRAM
91345
LCBG6F
FILTER = BLPF 100/ 250/ -16
MIN, MAX VALUES = -24828.34@ 14.25 , 443.10 @ 116.00
12.00
0.00
-12.00
-24.00
-36.00
-48.00
-60.00
-72.00
-84.00
FORCE (LB) (X10³)
-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 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP - 6 FORCE TOTAL

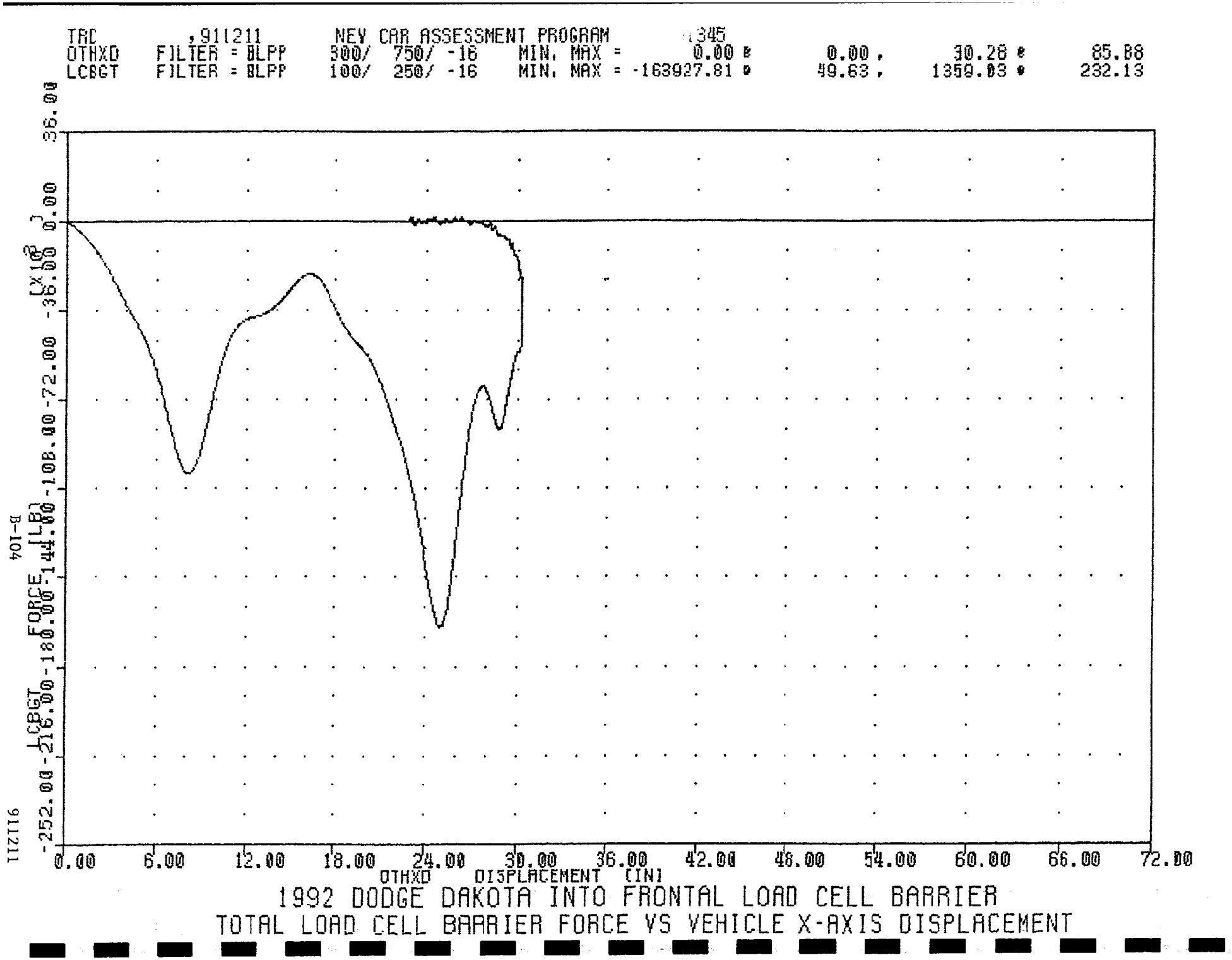
911211



1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
TOTAL LOAD CELL BARRIER FORCE

R-103

911211


TRC ,911211 NEV CAR ASSESSMENT PROGRAM 1345
OTHXD FILTER = BLPP 300/ 750/ -16 MIN, MAX = 0.00 @ 0.00 , 30.28 @ 85.88
LCBGT FILTER = BLPP 100/ 250/ -16 MIN, MAX = -163927.81 @ 49.63 , 1359.03 @ 232.13
36.00
0.00
-36.00
-72.00
-108.00
-144.00
-180.00
-216.00
-252.00
FORCE (LB) (X10^3)
LCBGT
0.00
6.00
12.00
18.00
24.00
30.00
36.00
42.00
48.00
54.00
60.00
66.00
72.00
OTHXD DISPLACEMENT (IN)
1992 DODGE DAKOTA INTO FRONTAL LOAD CELL BARRIER
TOTAL LOAD CELL BARRIER FORCE VS VEHICLE X-AXIS DISPLACEMENT
B-104
911211

APPENDIX C

DUMMY CERTIFICATION DATA

PRE-TEST CERTIFICATION DATA

DRIVER DUMMY S/N: 192

TRANSPORTATION RESEARCH CENTER OF OHIO
HYBRID III EXTERNAL DIMENSIONS
192 ALDERSON 08-NOV-91

TRC 192C5ED1 572E SN192 EXT. DIMENSION CALOS

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
TEMPERATURE			71.0 DEG. F
RELATIVE HUMIDITY			58.0 %
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 16-NOV-91

TRC 192C5HD1 572E SN192 HEAD DROP CAL 05

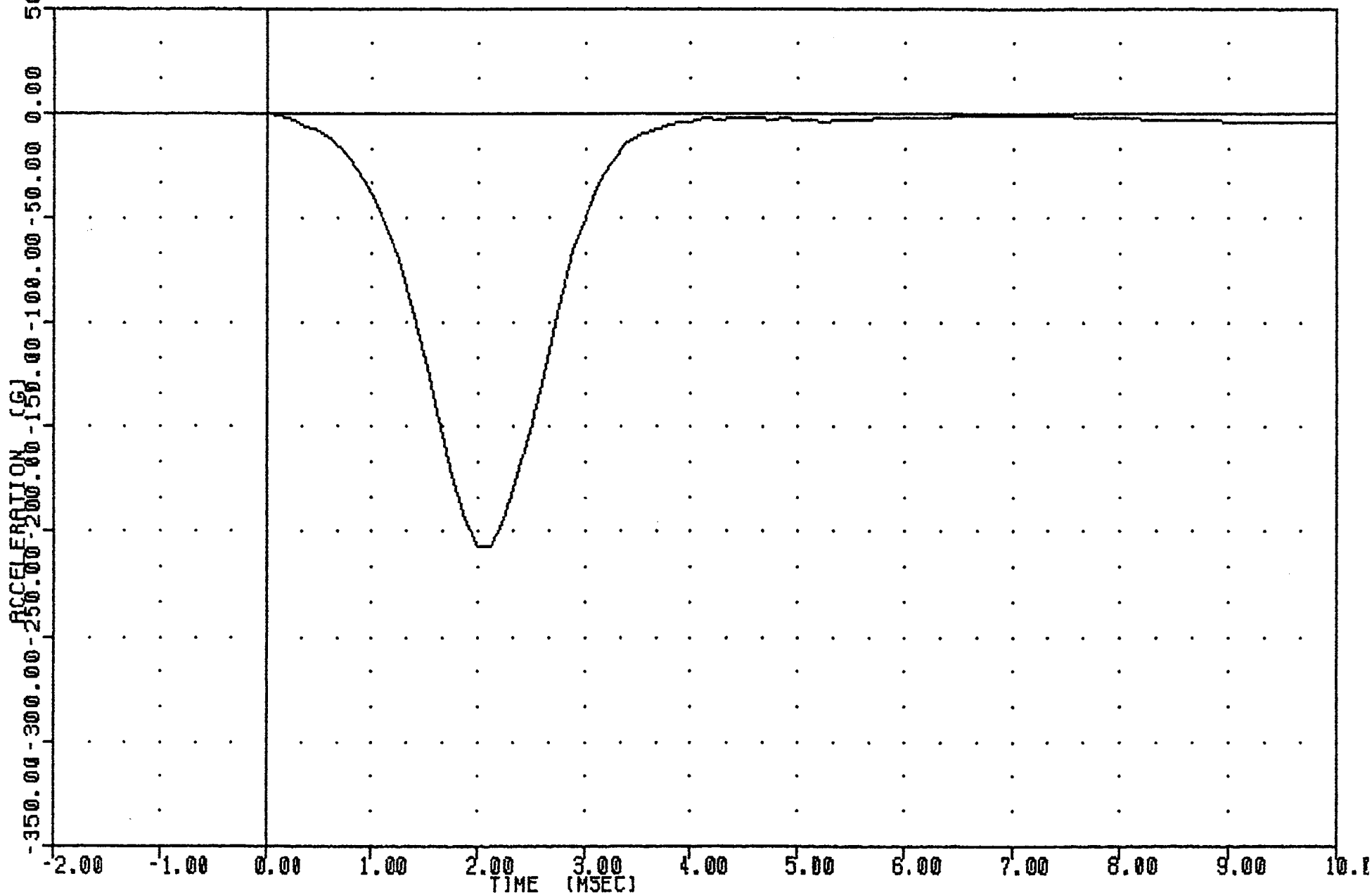
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	58.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	239.56 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.17 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

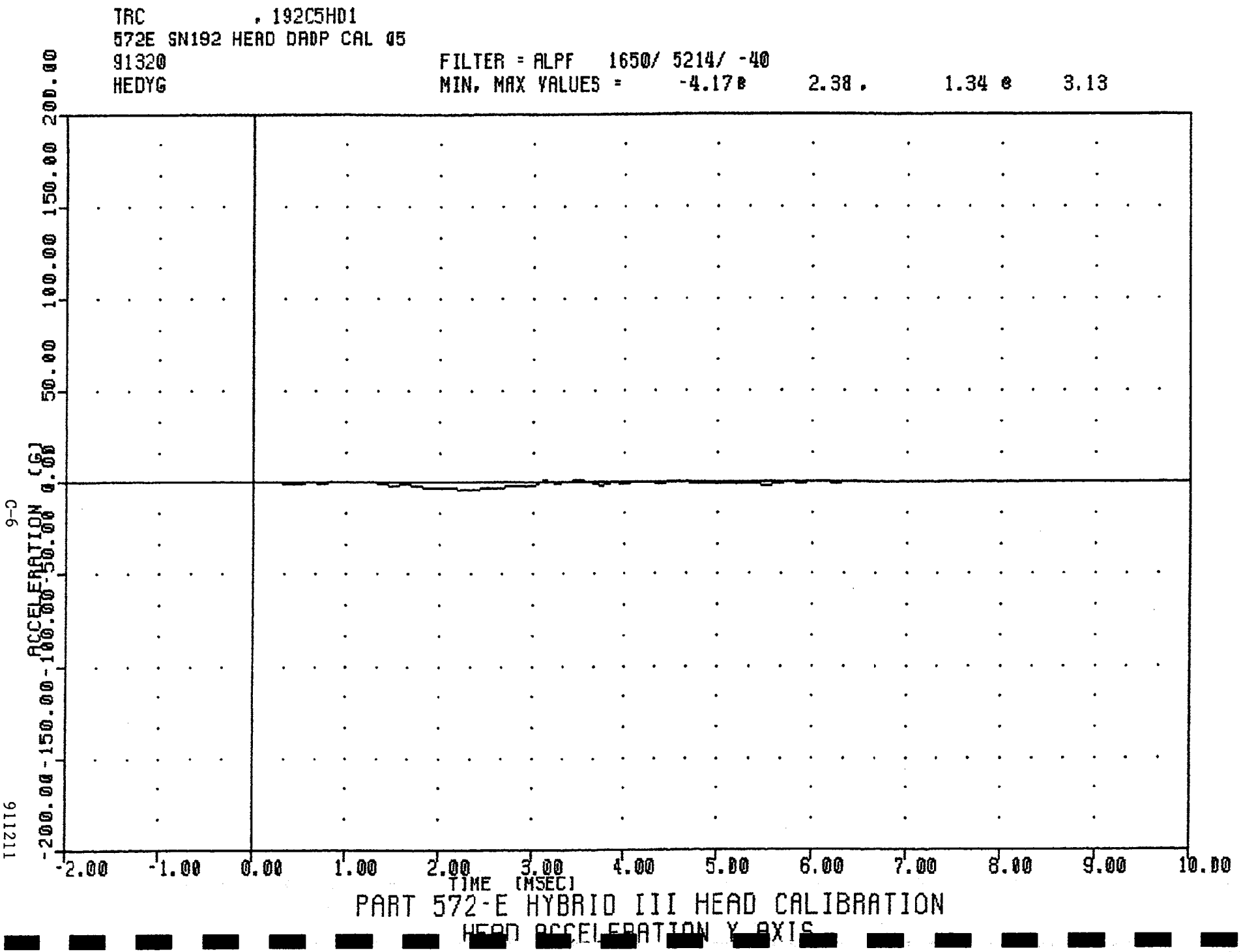
TECHNICIAN Chas Middleton

572E SN192 HEAD DROP CAL @5
91320
HEDXG

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -207.09 @ 2.13 , 0.03 @ -1.00



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



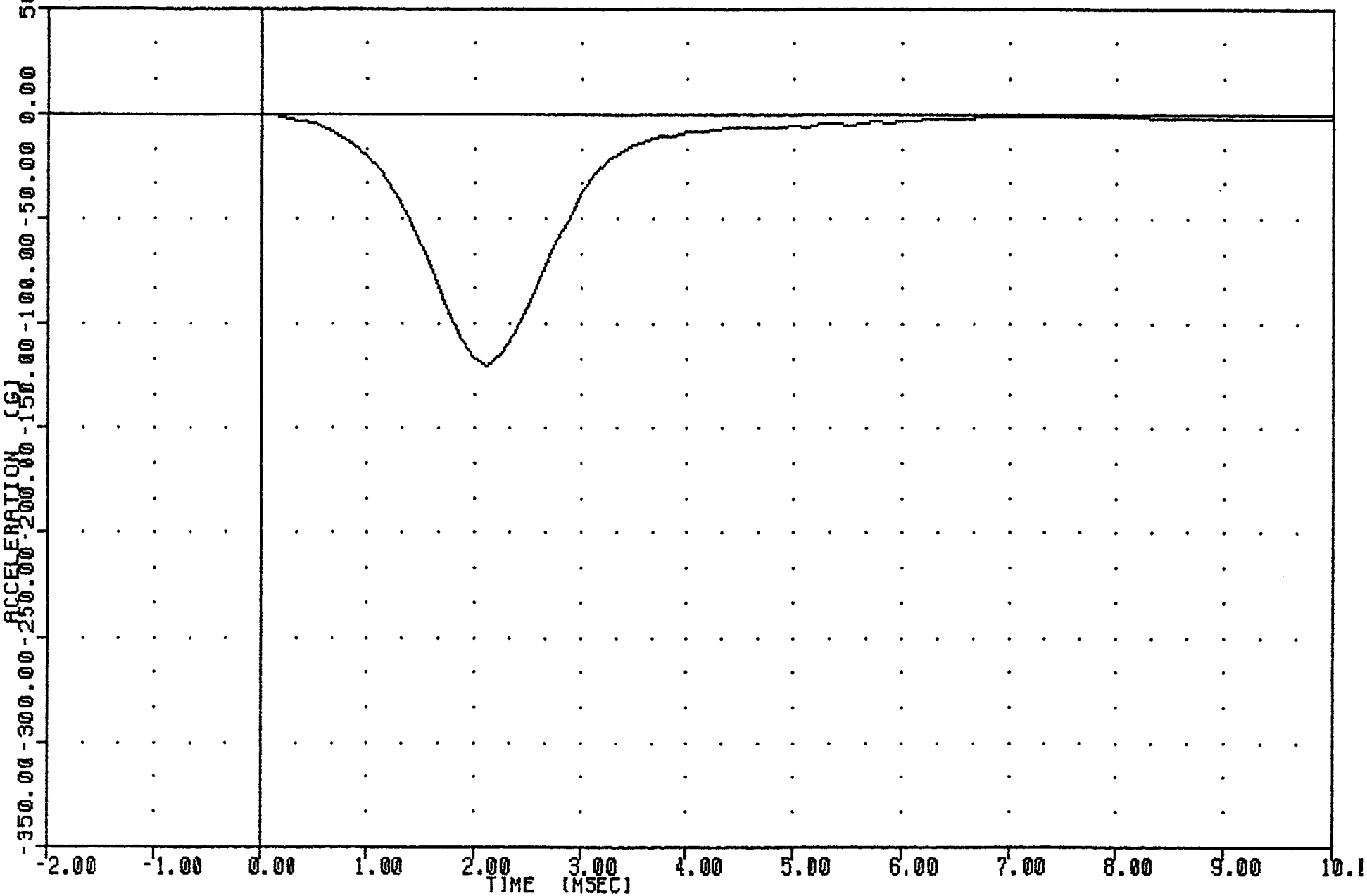
PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

911211

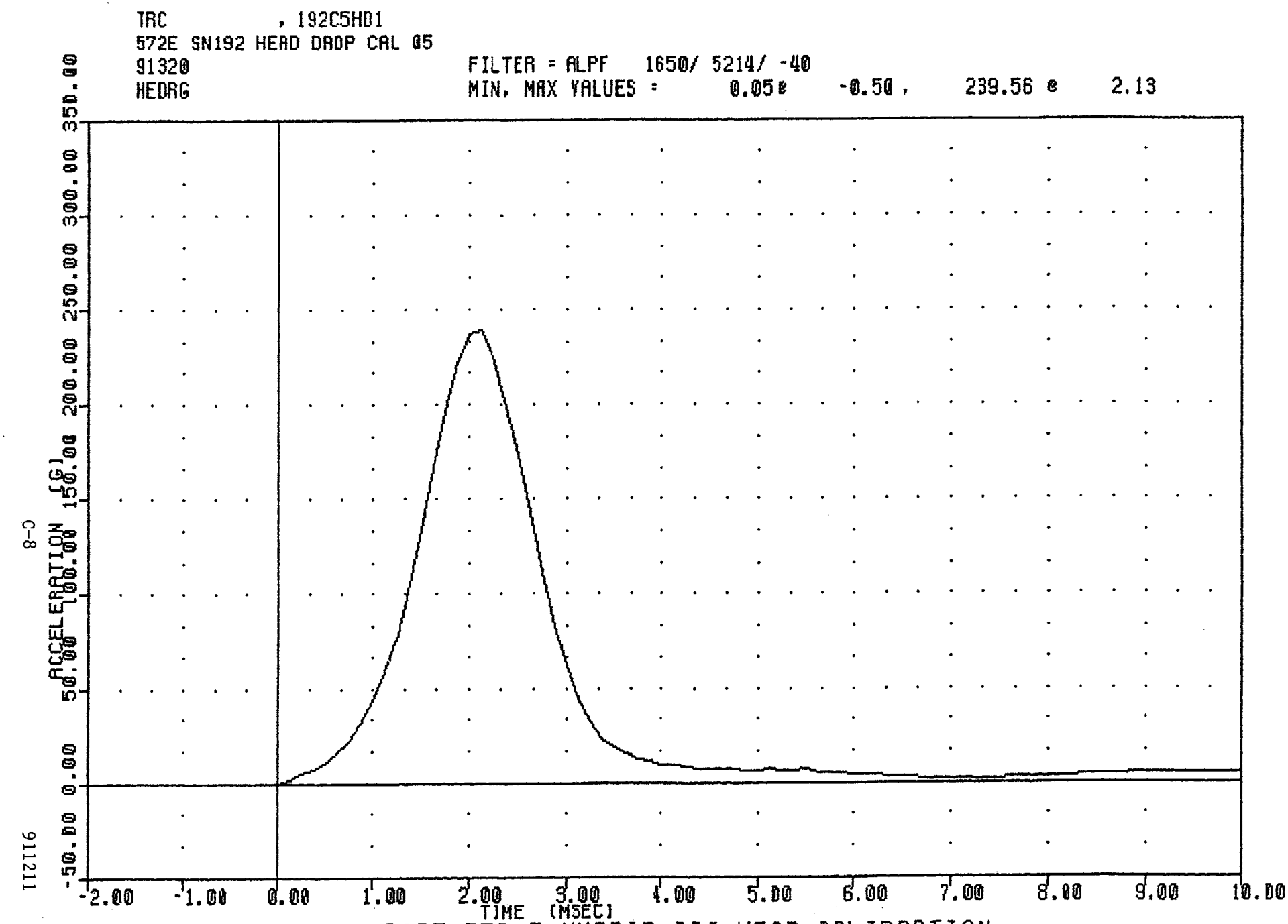
572E SN192 HEAD DROP CAL 05
91320
HEDZG

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -120.38 @ 2.13 , 0.03 @ -2.00



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

911211



PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

911211

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

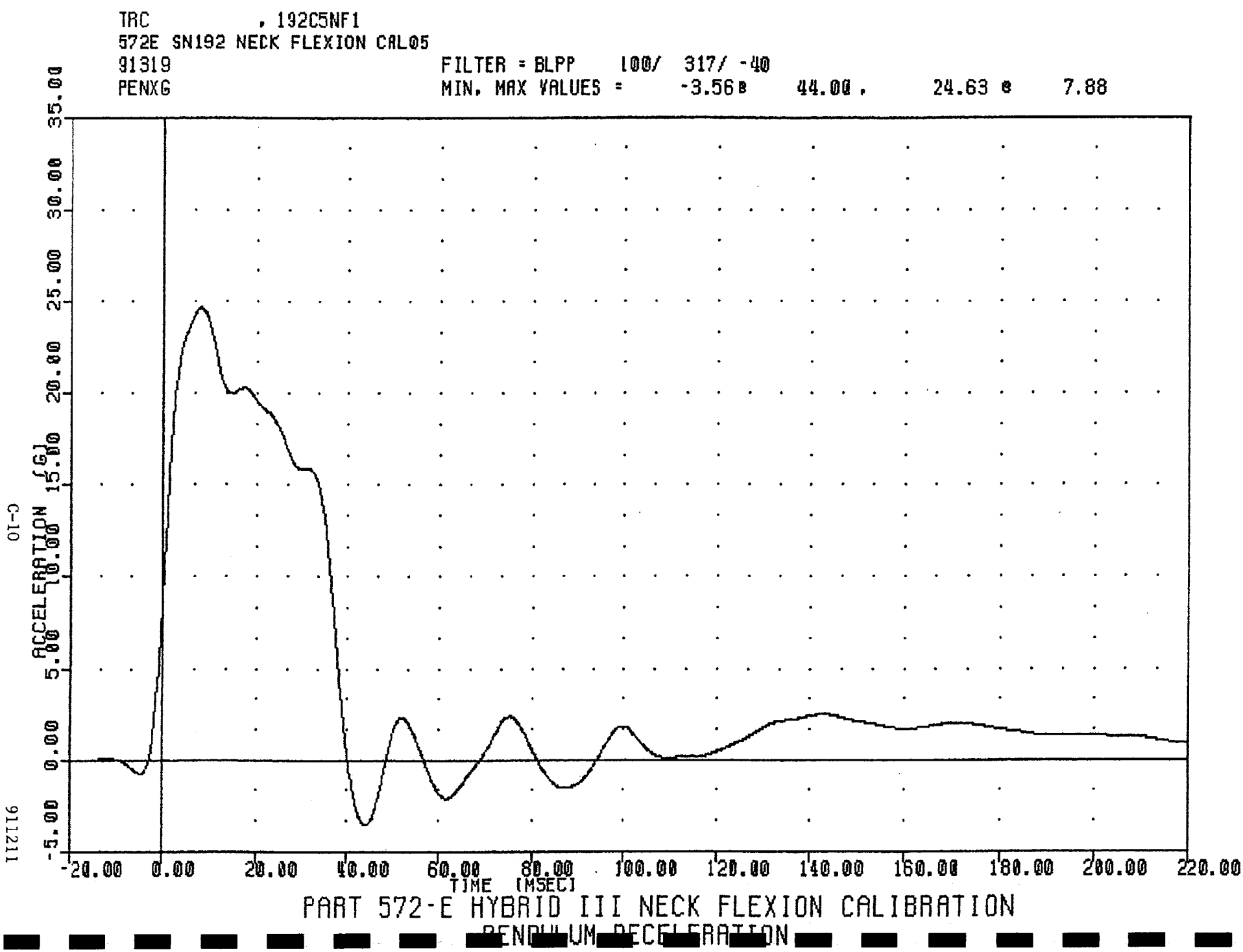
HYBRID III 15-NOV-91

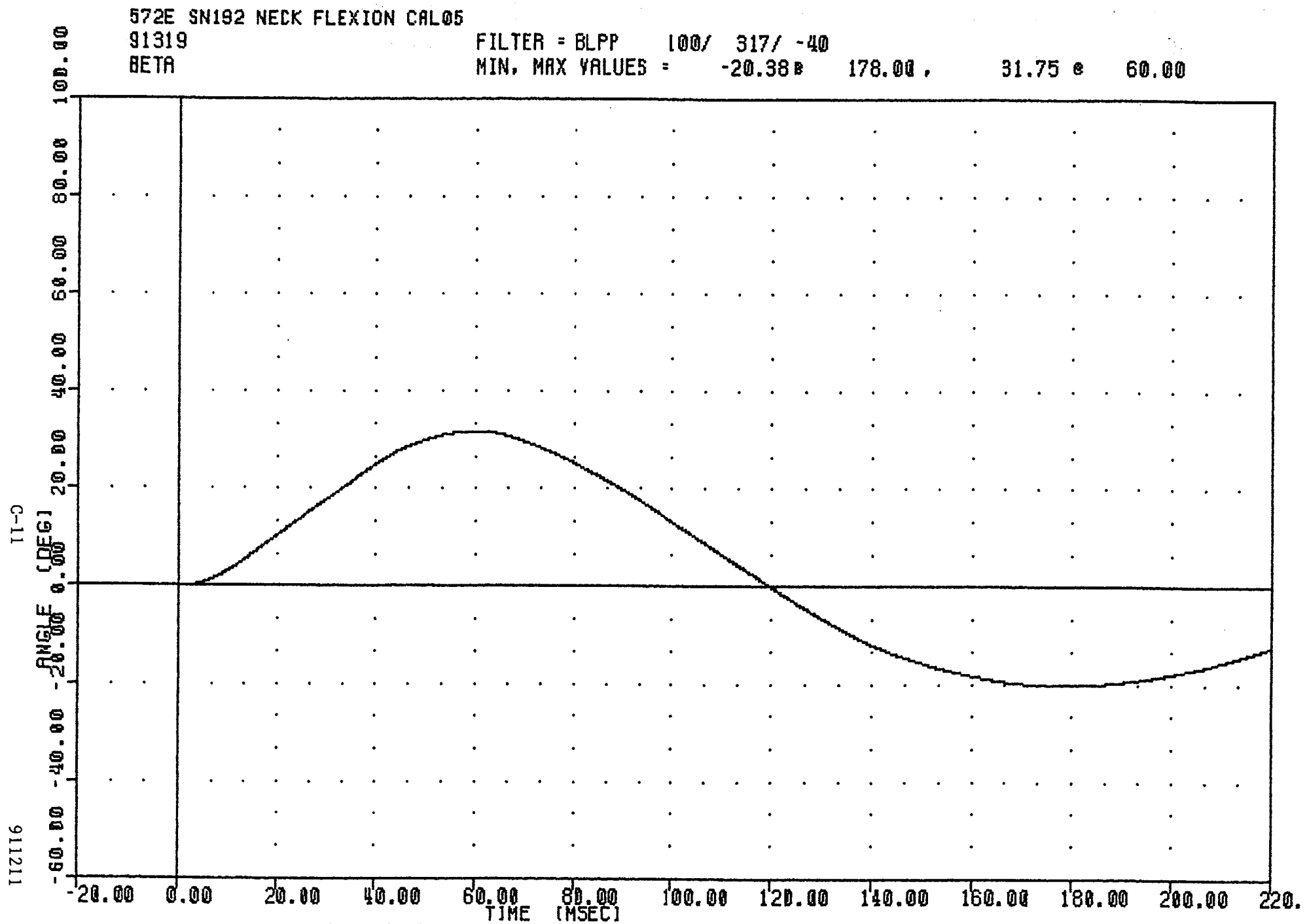
6 AXIS NECK TRANSDUCER
TRC 192C5NF1 572E SN192 NECK FLEXION CAL05

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY		10% - 70%	58.0 %
IMPACT VELOCITY		22.6-23.4 FT/SEC	23.30 FT/SEC
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.58 G
	20 MS	17.60 - 22.60 G	19.61 G
	30 MS	12.50 - 18.50 G	15.85 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.86 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	37.88 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	73.96 DEG.
	TIME	57 - 64 MS	60.25 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.LBS	69.91 FT.LBS
	TIME	47 - 58 MS	51.50 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	117.50 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	103.13 MS

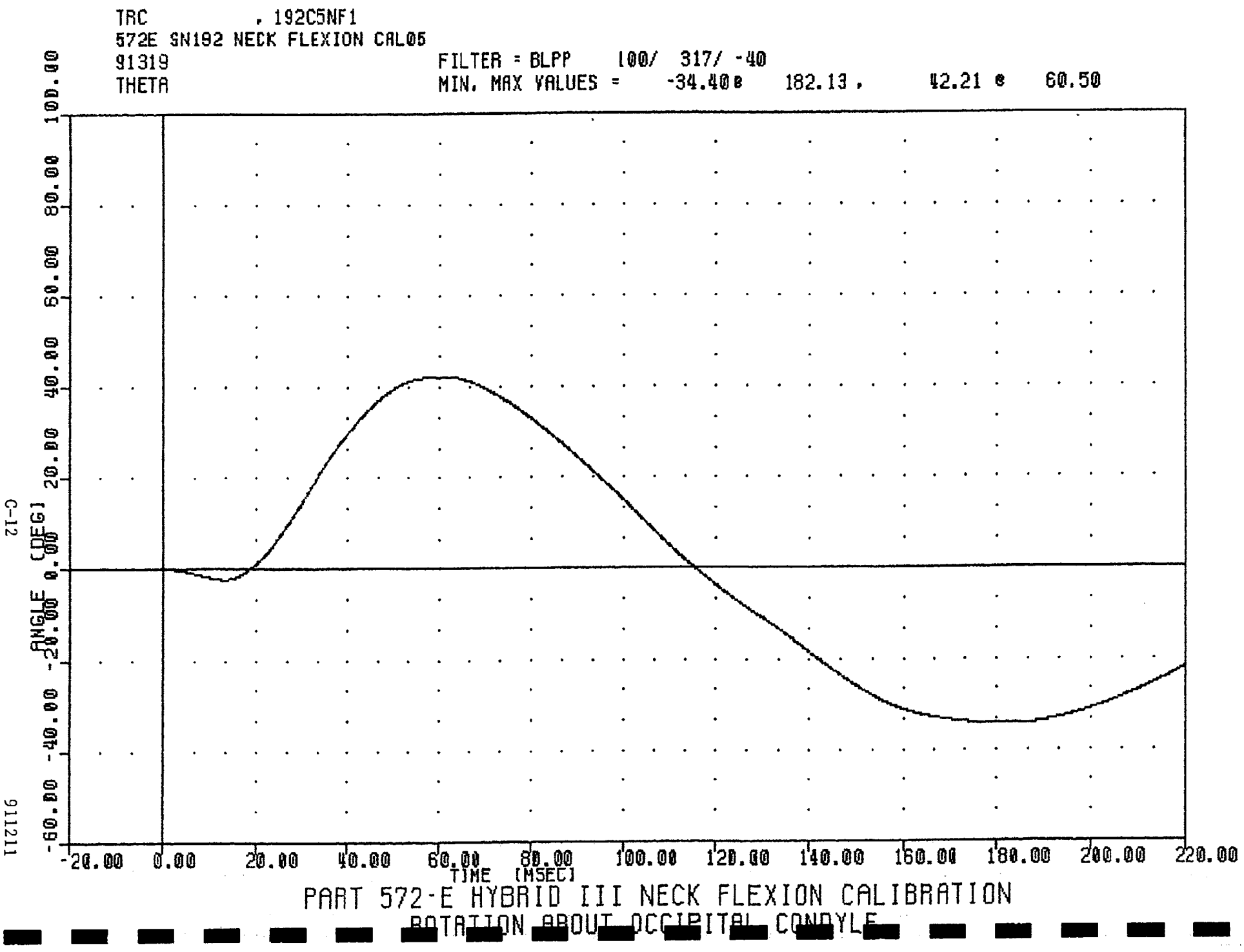
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas Middleton


TRC , 192C5NF1
572E SN192 NECK FLEXION CAL05
91319
PENXG
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -3.56 @ 44.00 , 24.63 @ 7.88
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
ACCELERATION (G)
-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
TIME (MSEC)
PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

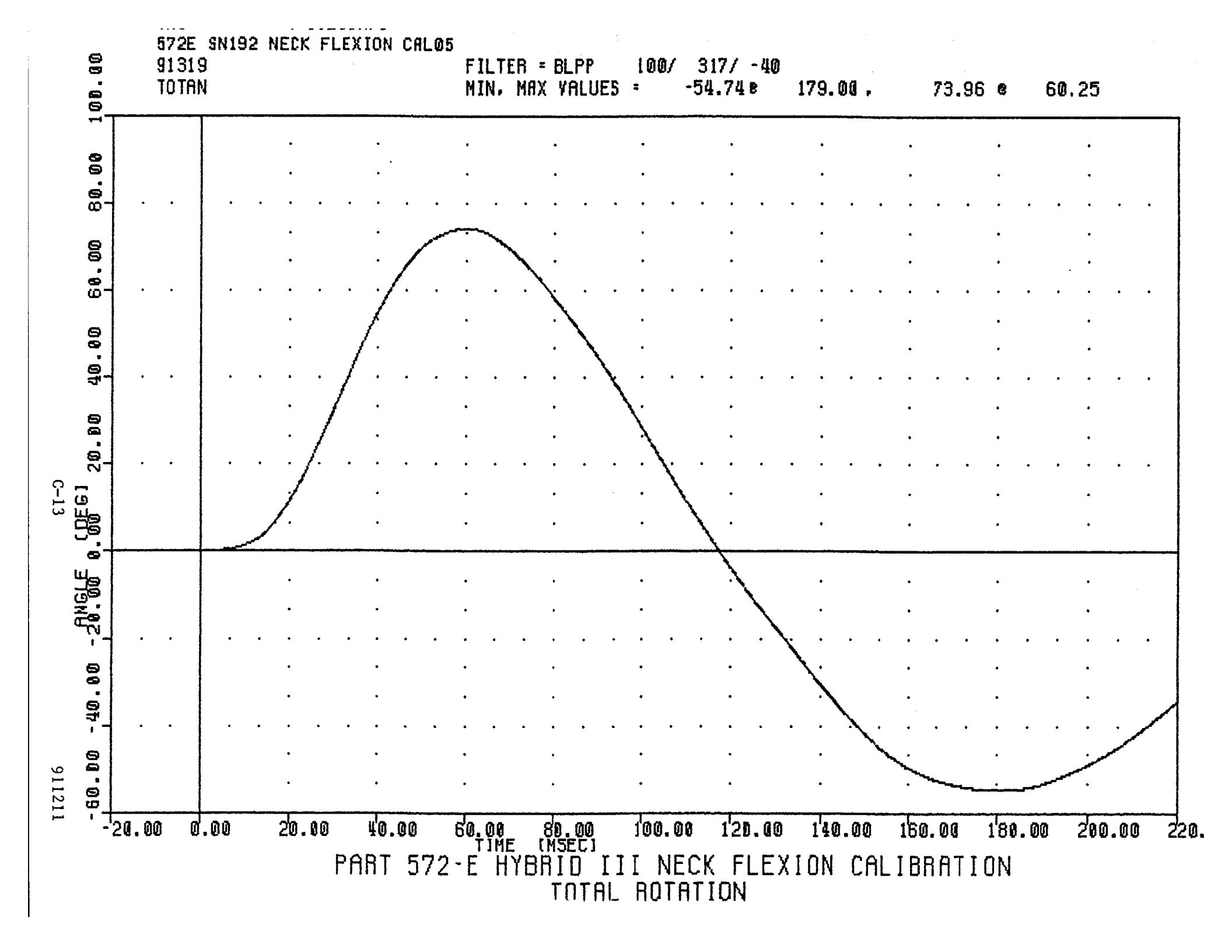


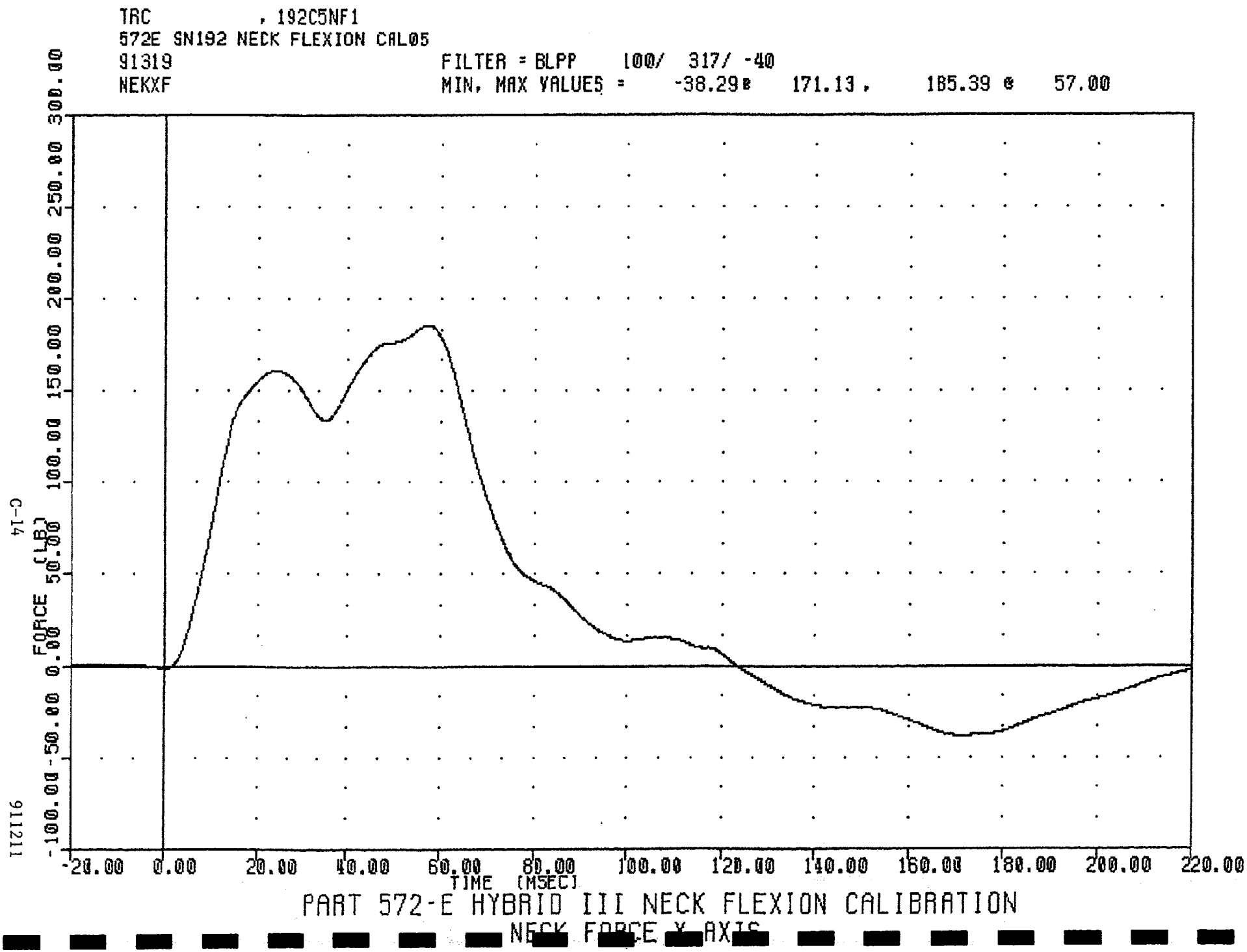
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK

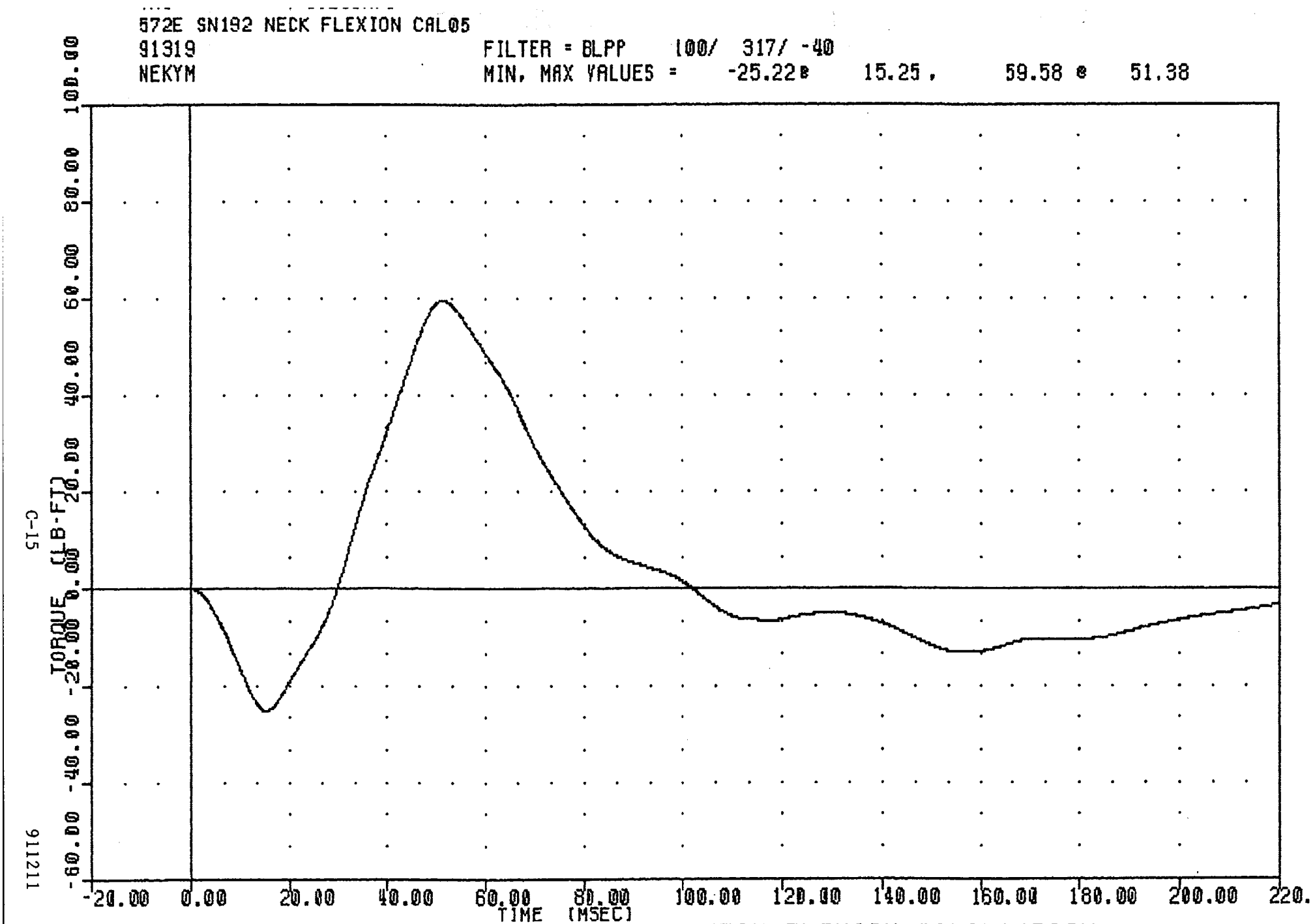


PART 572-E HYBRID III NECK FLEXION CALIBRATION

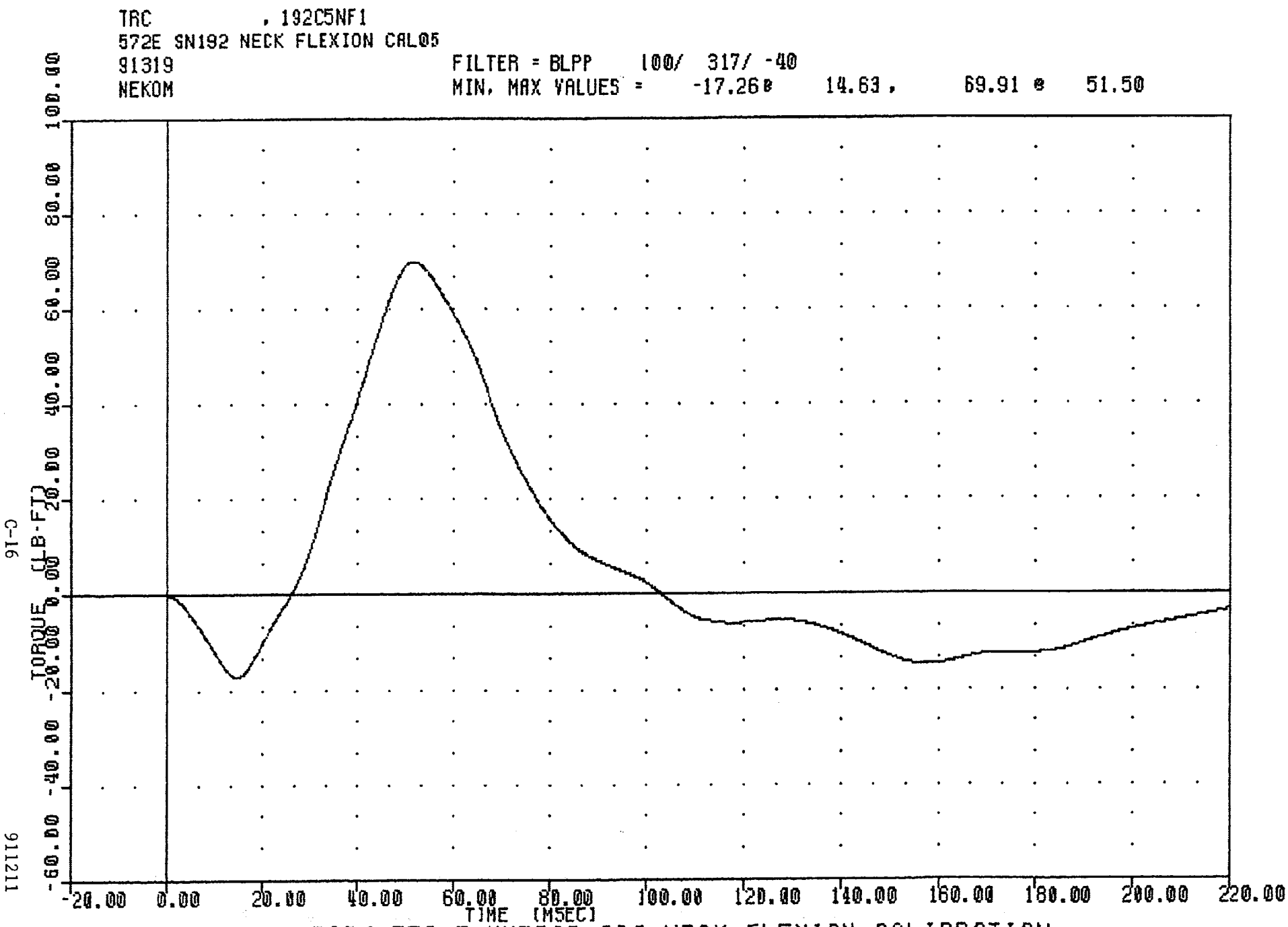
ROTATION ABOUT OCCIPITAL CONDYLE


572E SN192 NECK FLEXION CAL05
91319
TOTAN
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -54.74 @ 179.00 , 73.96 @ 60.25
100.00
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
ANGLE [DEG]
-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.
TIME [MSEC]
PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION


TRC , 192C5NF1
572E SN192 NECK FLEXION CAL05
91319
NEKXF
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -38.29 @ 171.13 , 185.39 @ 57.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
FORCE (LB)
-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
TIME (MSEC)
PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS



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



PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

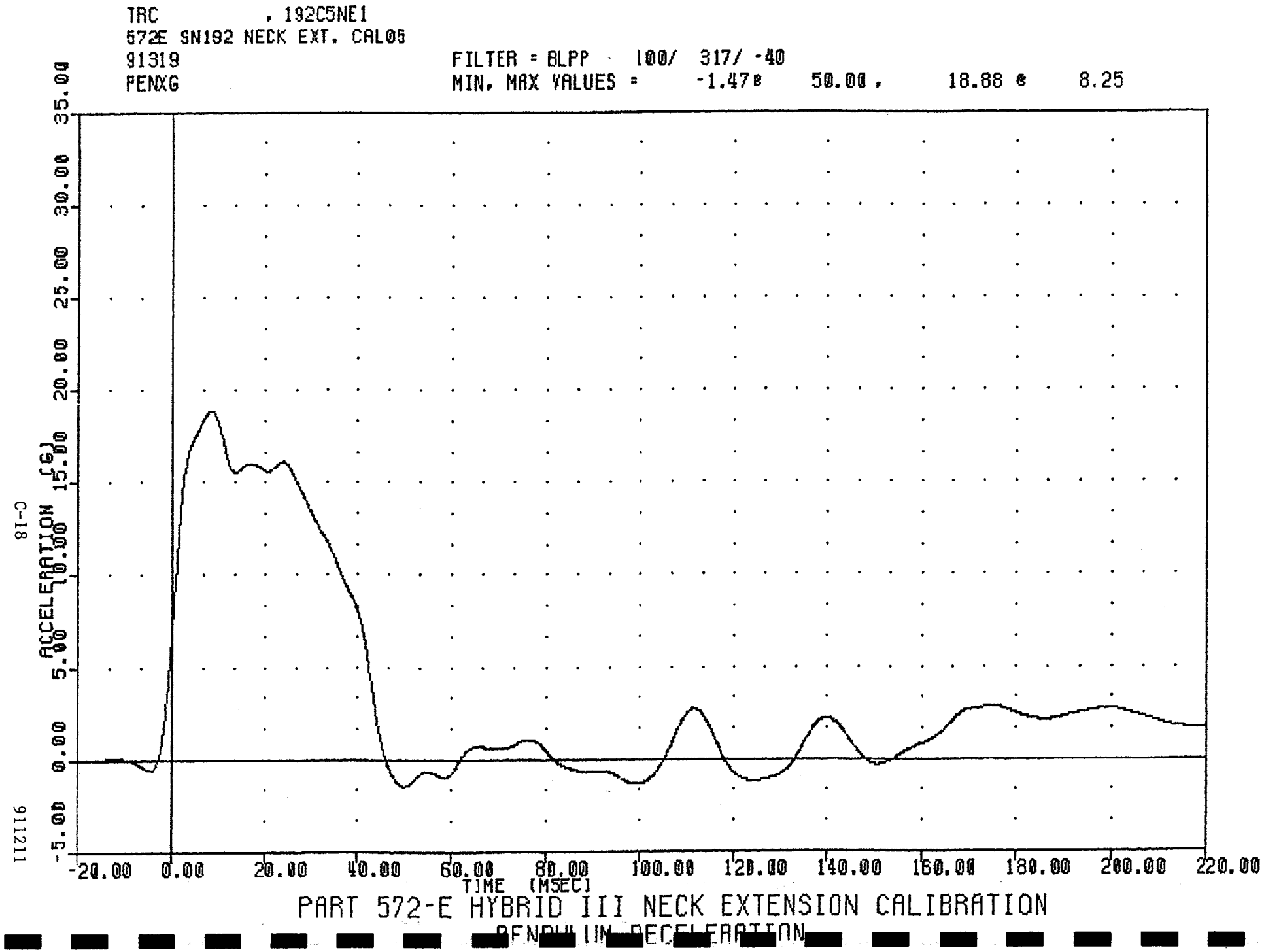
HYBRID III 15-NOV-91

6 AXIS NECK TRANSDUCER
TRC 192C5NE1 572E SN192 NECK EXT. CAL05

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY		10% - 70%	58.0 %
IMPACT VELOCITY		19.50-20.30 FT/SEC	19.67 FT/SEC
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.08 G
	20 MS	14.00 - 19.00 G	15.64 G
	30 MS	11.00 - 16.00 G	13.32 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	13.25 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	42.25 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	103.62 DEG.
	TIME	72 - 82 MS	78.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-59.0/-39.0 FT.LBS	-52.29 FT.LBS
	TIME	65 - 79 MS	74.50 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	162.25 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	144.25 MS

TEST MEETS SPECIFICATIONS

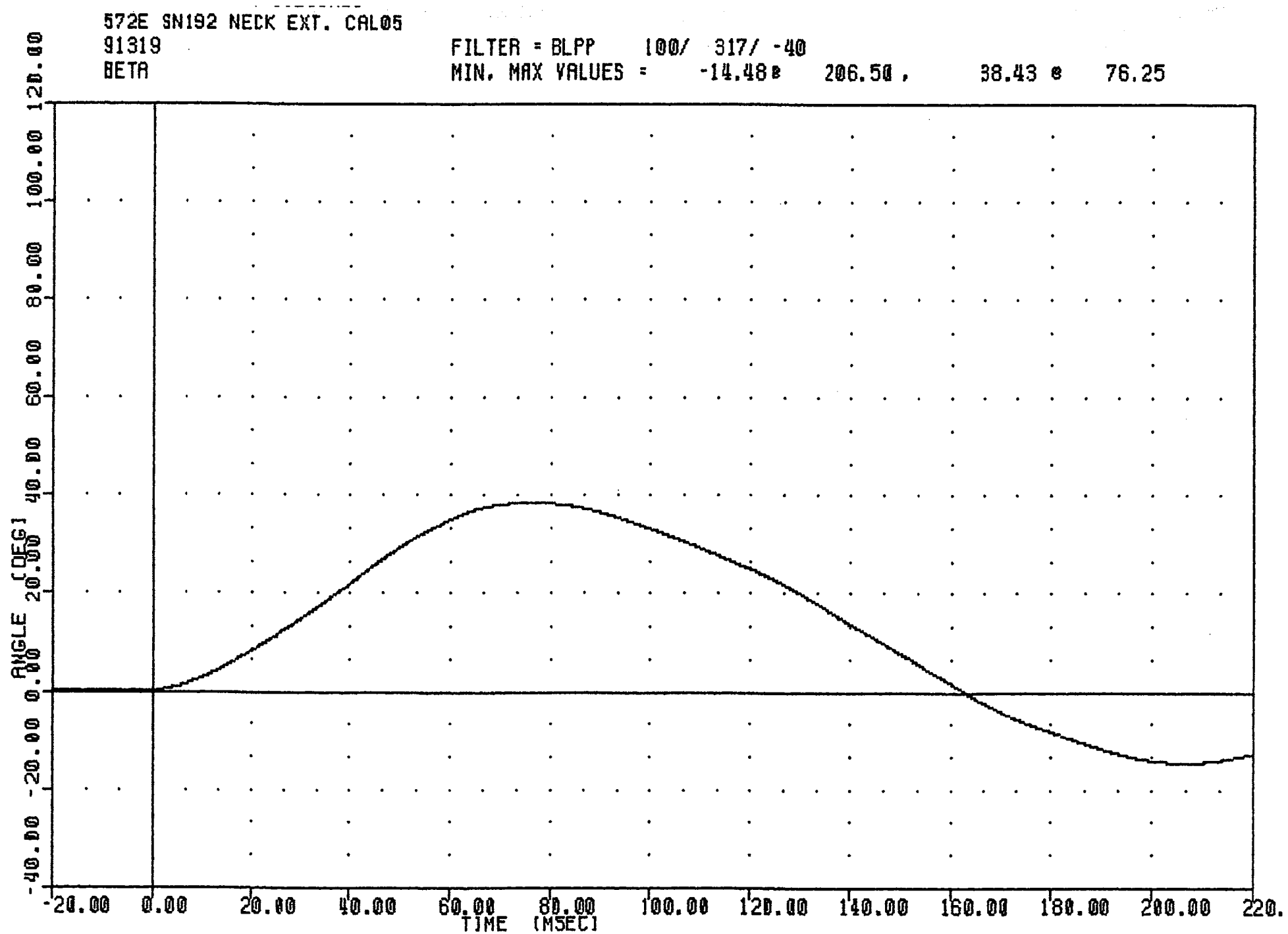
TECHNICIAN Chas Middleton



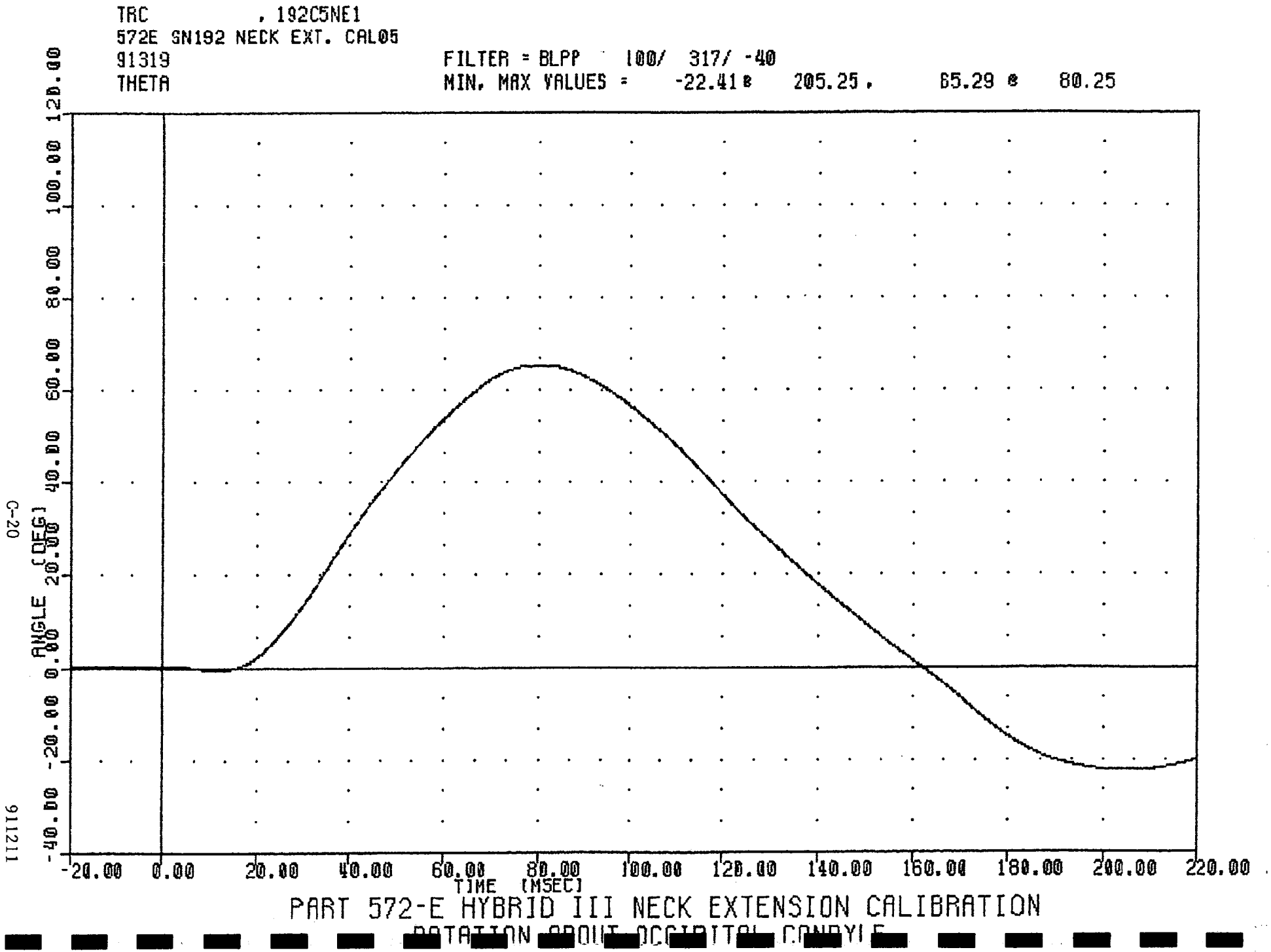
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION

911211



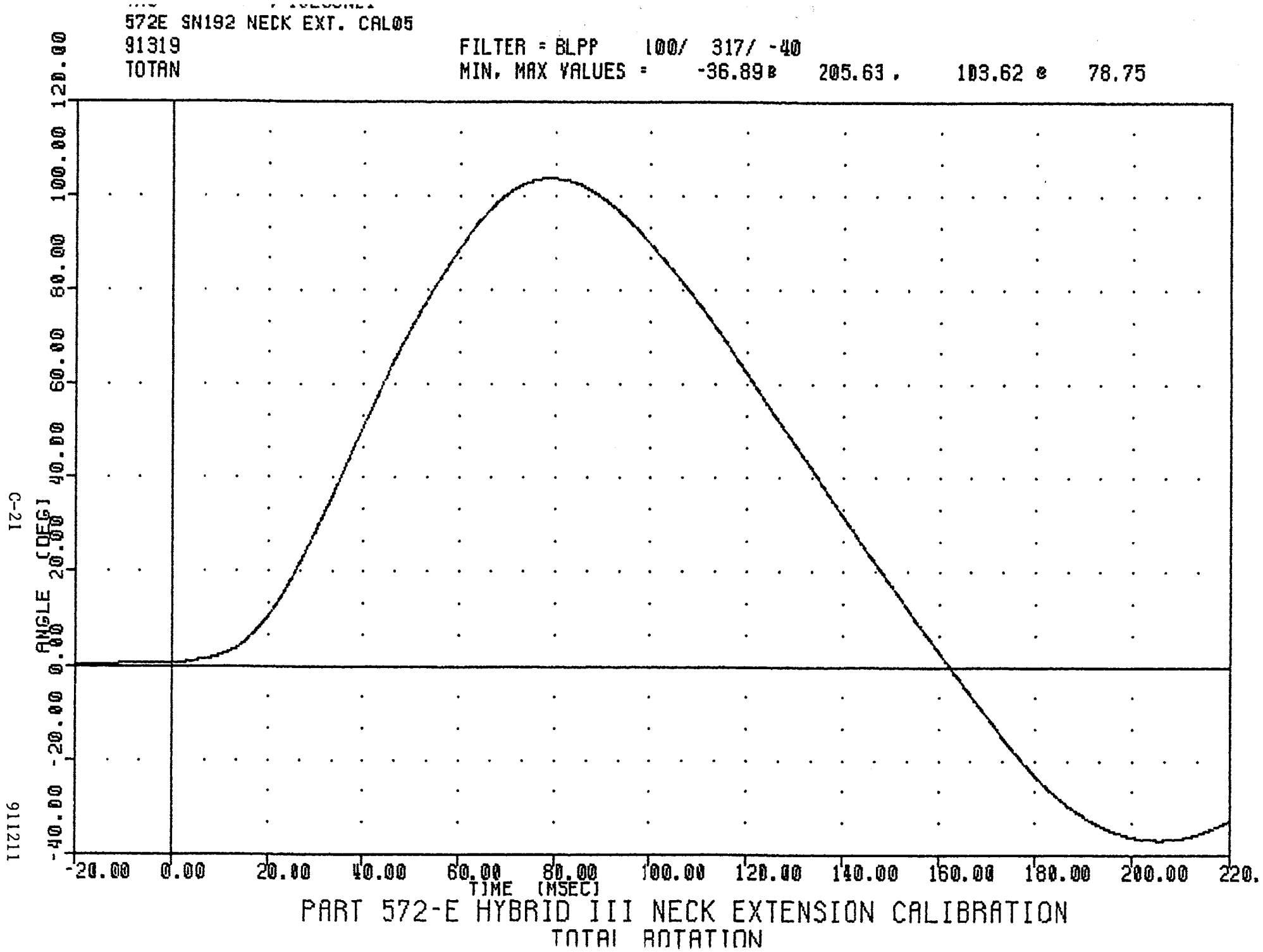
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

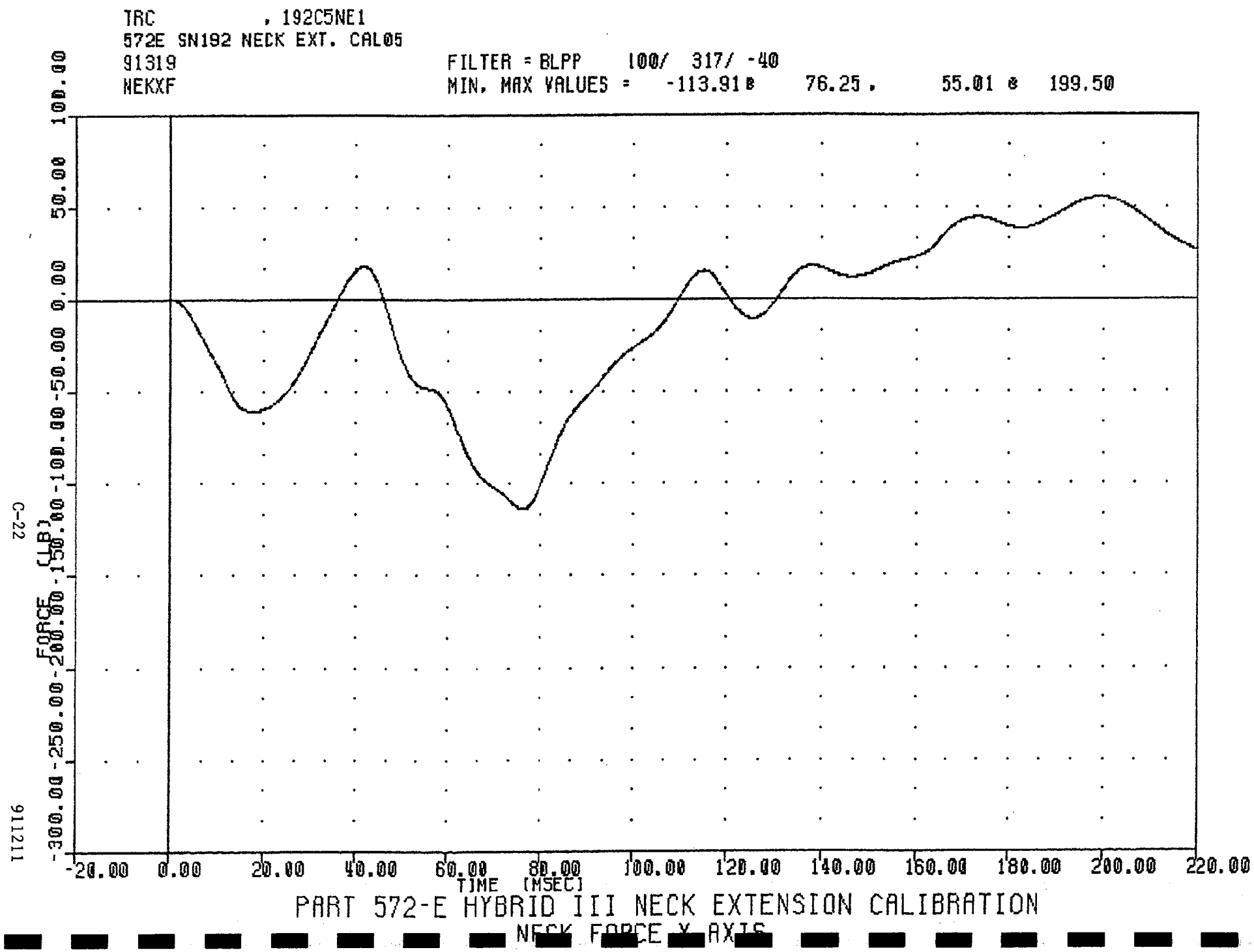
ROTATION ABOUT OCCIPITAL CONDYLE

911211



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

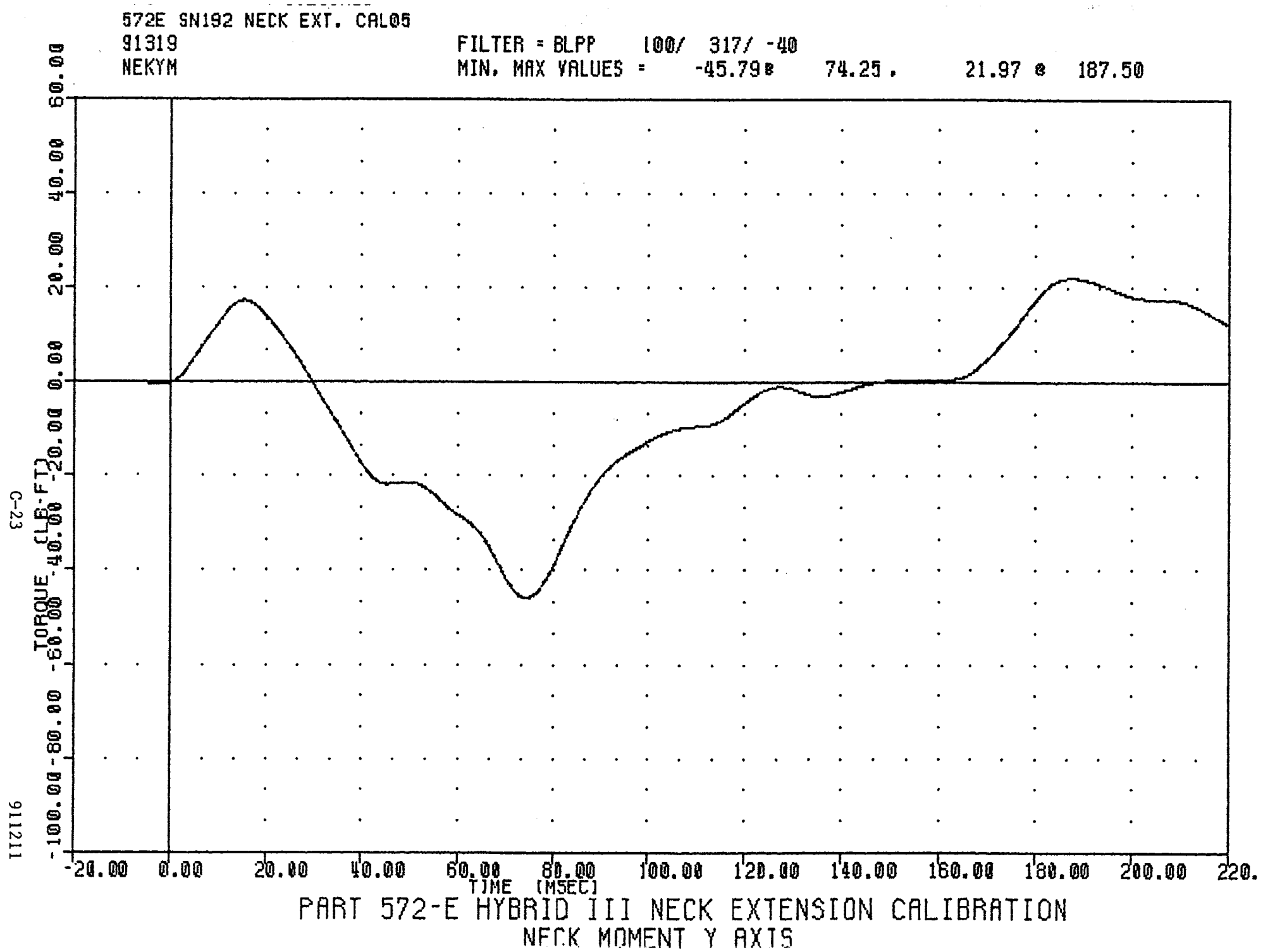
TOTAL ROTATION



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

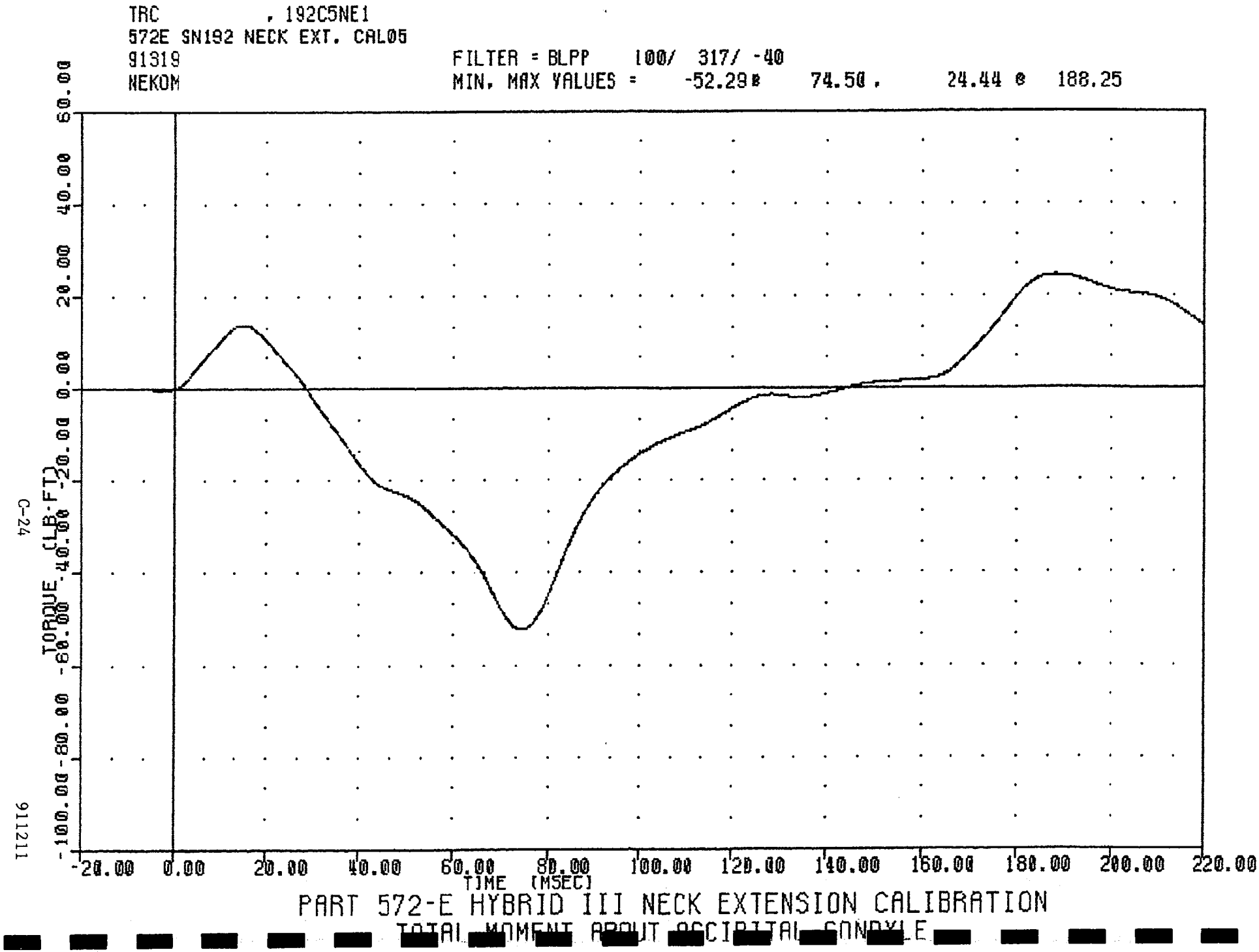
NECK FORCE X AXIS

911211



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

911211


TRC , 192C5NE1
572E SN192 NECK EXT. CAL05
91319
NEKOM
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -52.29 @ 74.50 , 24.44 @ 188.25
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
-100.00
TORQUE (LB-FT)
-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
TIME (MSEC)
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

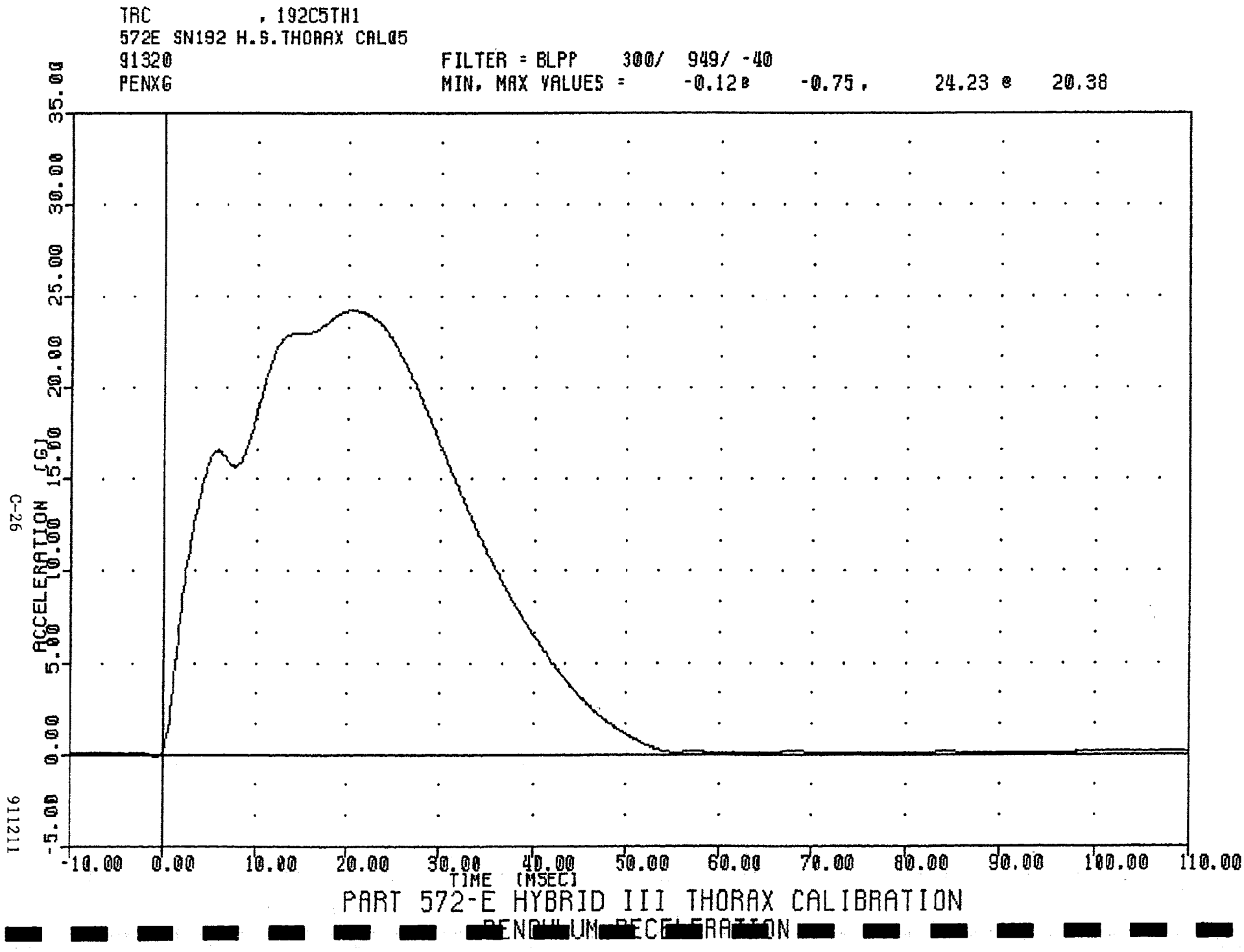
HYBRID III 16-NOV-91

TRC 192C5TH1 572E SN192 H.S. THORAX CAL05

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	59.0 %
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 IN	2.67 IN
MAXIMUM RESISTIVE FORCE	1160 - 1325 LBS	1248.0 LBS
INTERNAL HYSTERESIS	69% - 85%	73.9%

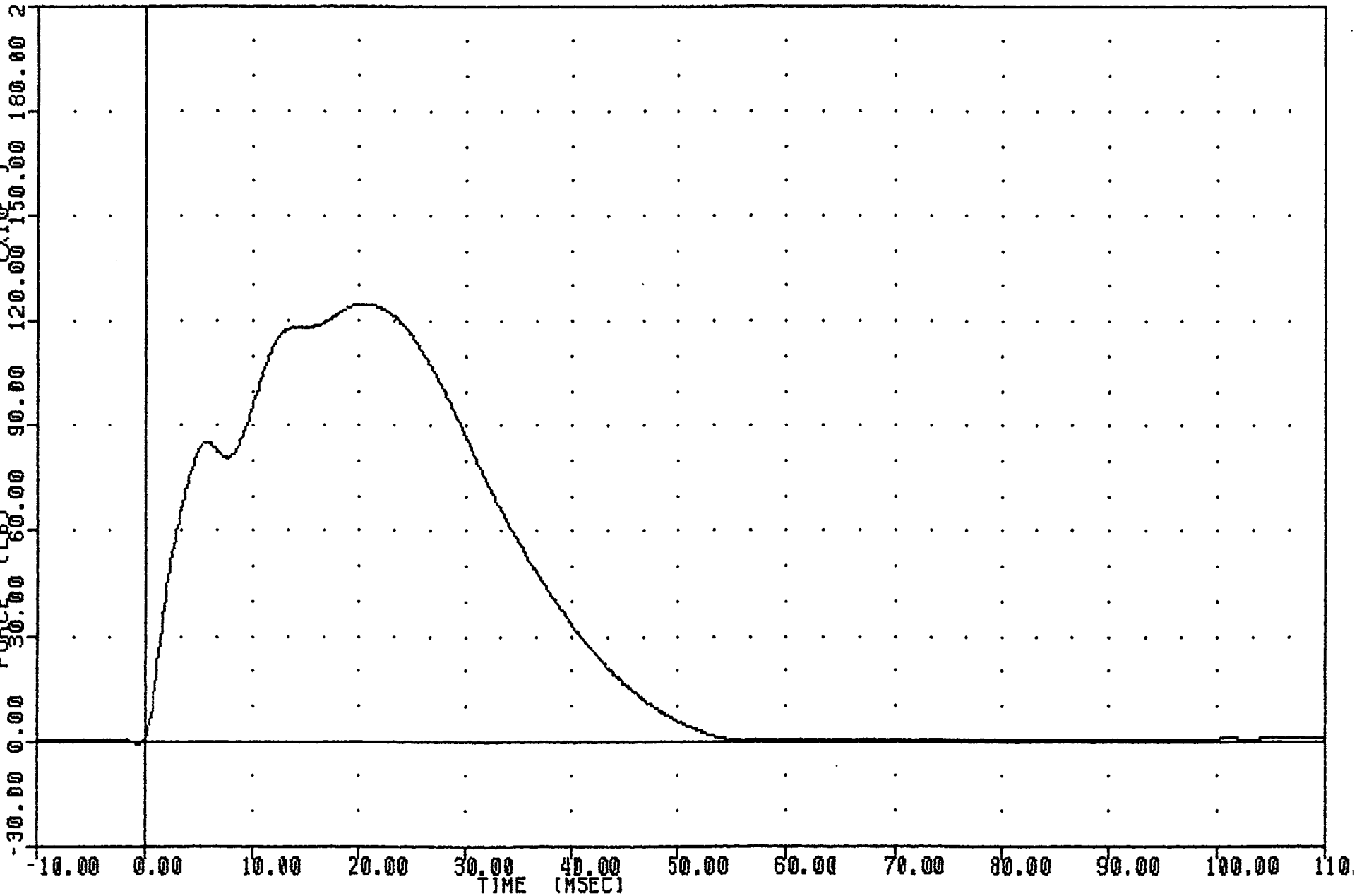
TEST MEETS SPECIFICATIONS

TECHNICIAN Clar Middleton

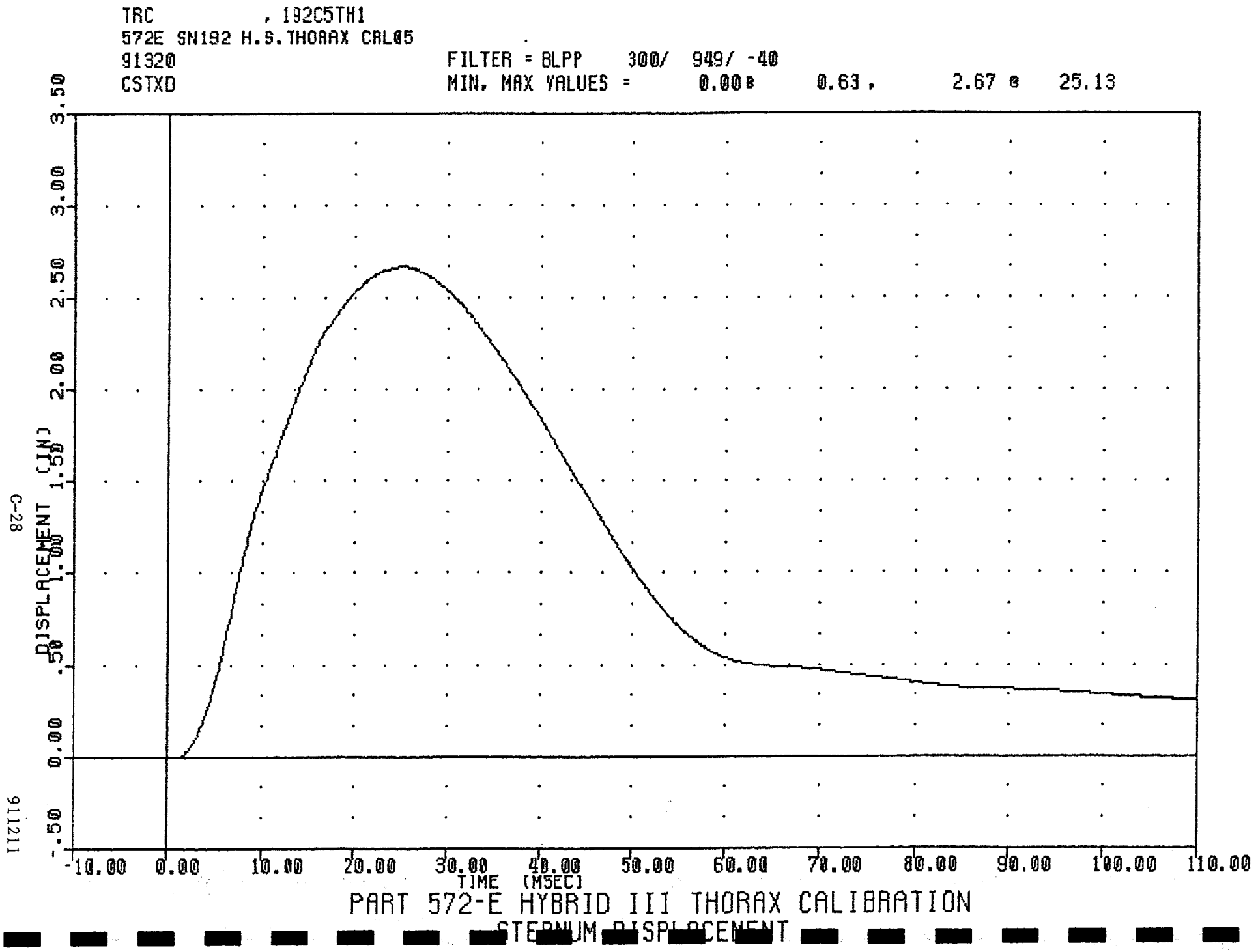

TRC , 192C5TH1
572E SN192 H.S.THORAX CAL05
91320
PENXG
FILTER = BLPP 300/ 949/ -40
MIN, MAX VALUES = -0.12 @ -0.75 , 24.23 @ 20.38
ACCELERATION [G]
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
TIME (MSEC)
PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

911211

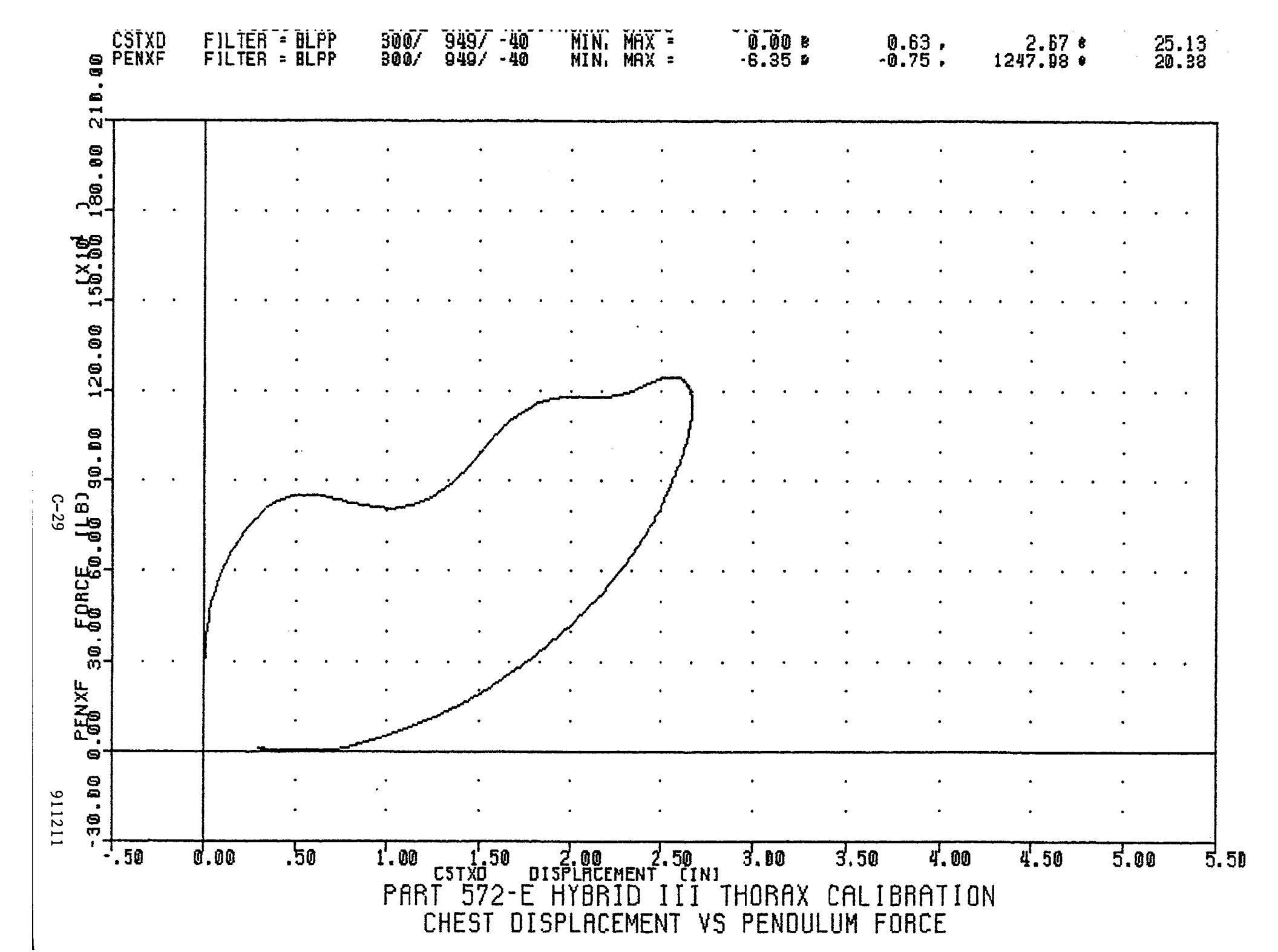
572E SN192 H.S.THORAX CAL05
91320
PENXF
FILTER = BLPP 300/ 949/ -40
MIN, MAX VALUES = -6.35 @ -0.75 , 1247.98 @ 20.38



PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE


TRC , 192C5TH1
572E SN192 H.S.THORAX CAL05
91320
CSTXD
FILTER = BLPP 300/ 949/ -40
MIN, MAX VALUES = 0.00@ 0.63, 2.67@ 25.13
DISPLACEMENT (IN)
3.50
3.00
2.50
2.00
1.50
1.00
.50
0.00
-.50
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
TIME (MSEC)
PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT

911211



PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III 11-Nov-91

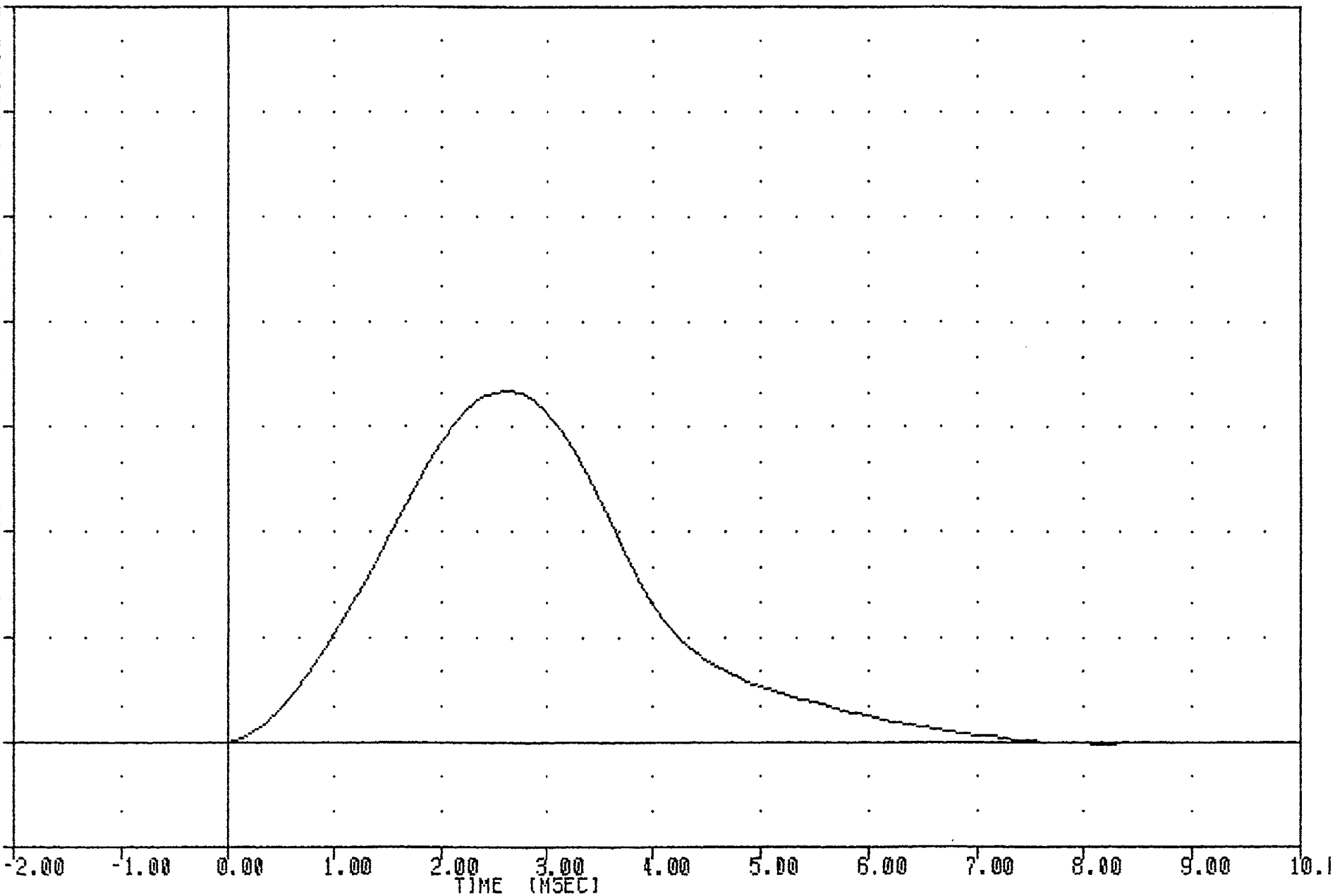
LEFT KNEE
TRC 192C5LK1 572E SN192 L.KNEE 11LB CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	57.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.87 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1106.01 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

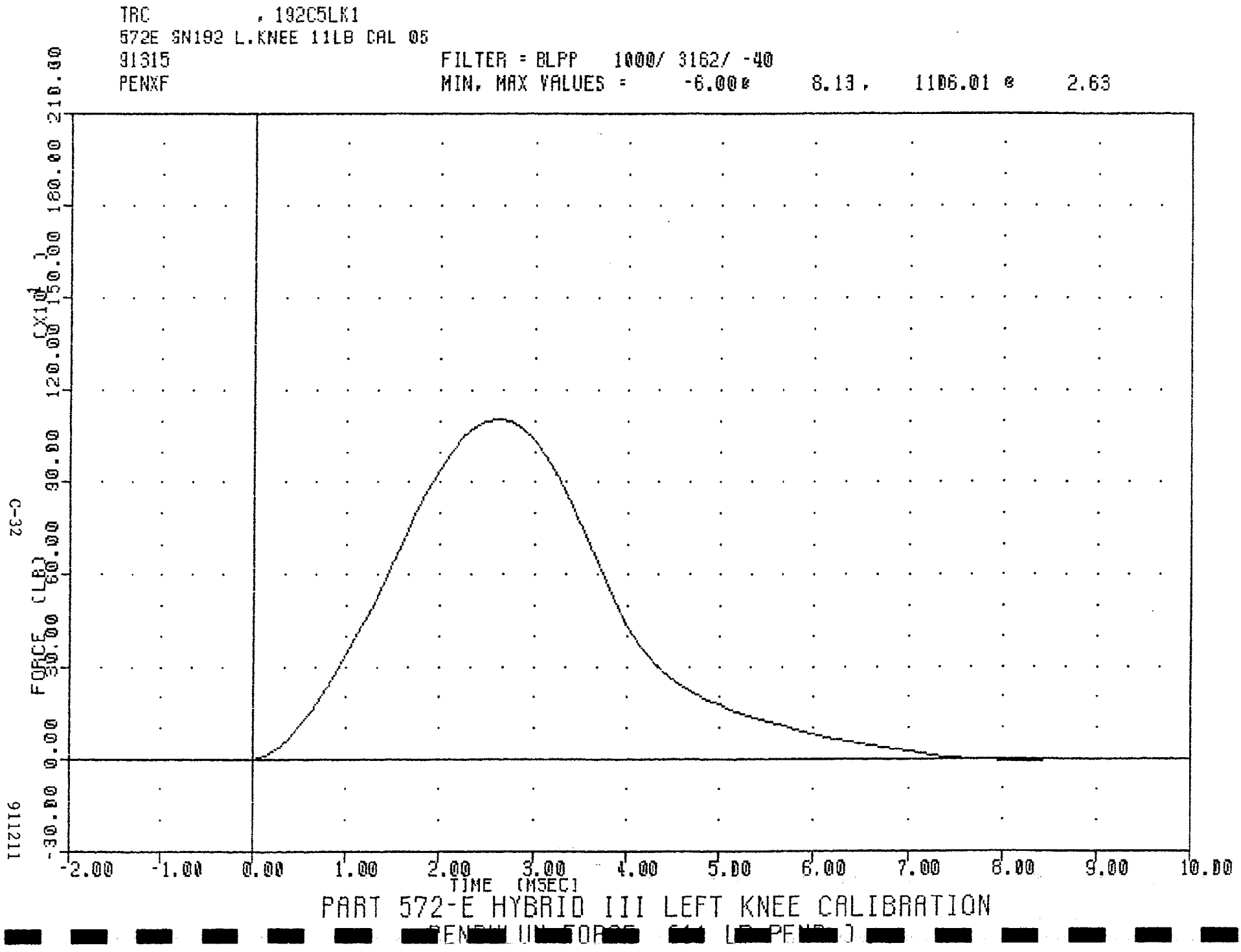
TECHNICIAN Chas. Middlet

572E SN192 L.KNEE 11LB CAL 05
91315
PENXG
FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -0.55 @ 8.13 , 100.55 @ 2.63



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

91121


TRC , 192C5LK1
572E SN192 L.KNEE 11LB CAL 05
91315
PENXF
FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -6.00@ 8.13, 1106.01 @ 2.63
FORCE (LB) (X10)
210.00
180.00
150.00
120.00
90.00
60.00
30.00
0.00
-30.00
-2.00
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
TIME (MSEC)
PART 572-E HYBRID III LEFT KNEE CALIBRATION

911211

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III 11-Nov-91

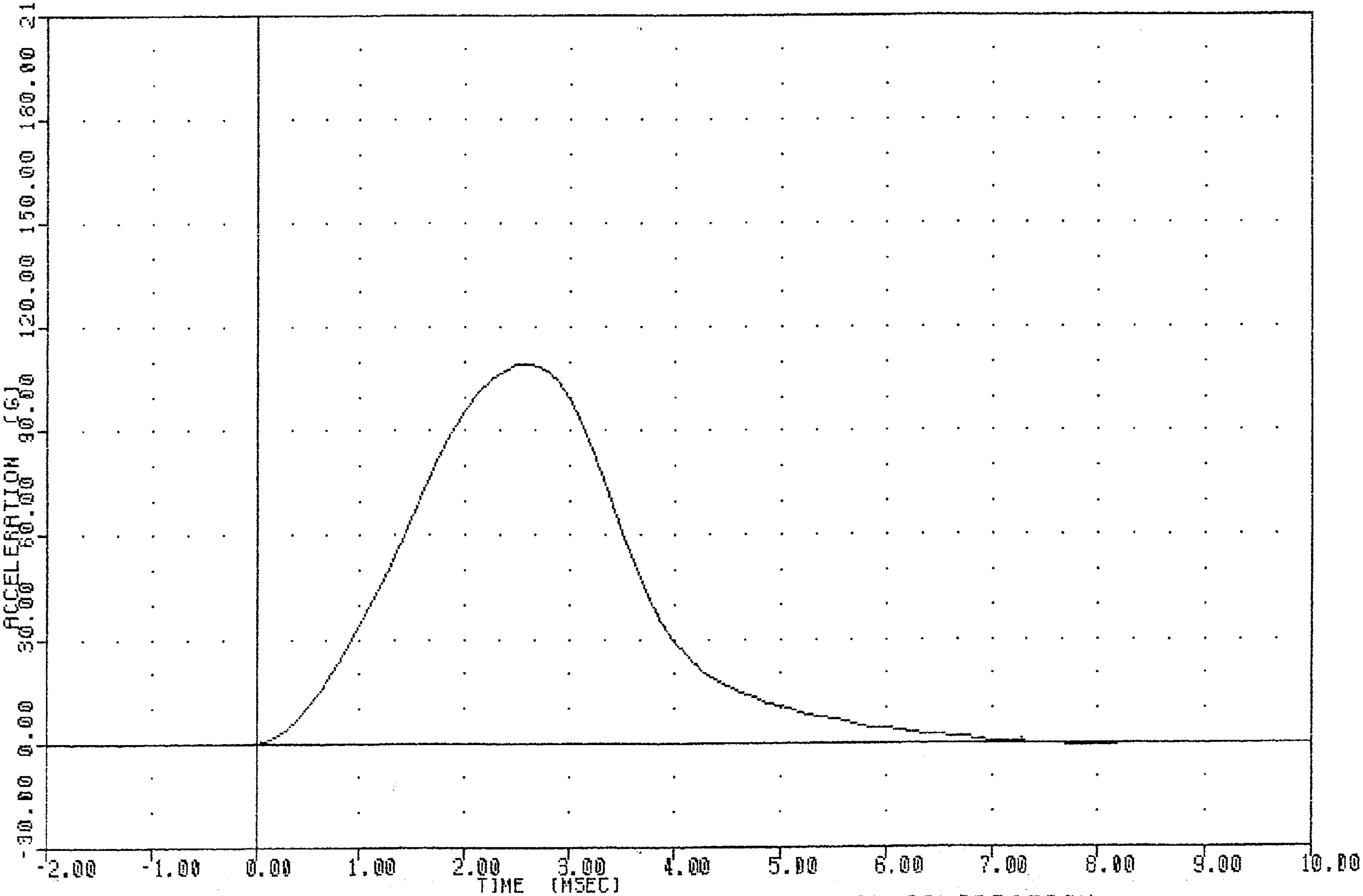
RIGHT KNEE
TRC 192C5RK1 572E SN192 R.KNEE 11LB CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	57.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.84 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1203.47 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

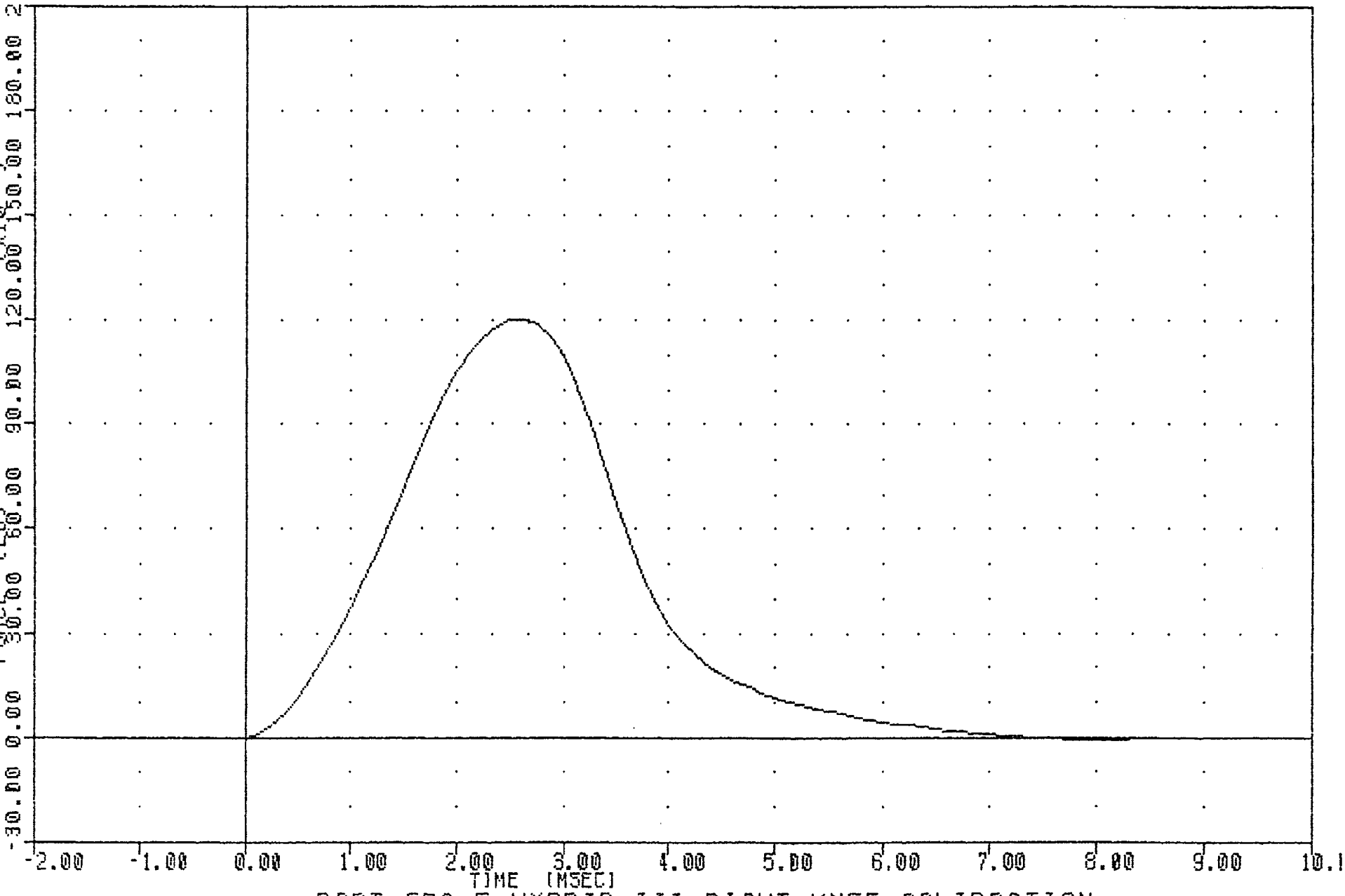
TECHNICIAN Clara Middlet

TRC , 192C5RK1
572E SN192 R.KNEE 11LB CAL 05
91315 FILTER = BLPP 1000/ 3162/ -40
PENXG MIN, MAX VALUES = -0.70 @ 7.88 , 109.41 @ 2.63



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

572E SN192 R.KNEE 11LB CAL 05
91315
PENXF
FILTER = BLPF 1000/ 3162/ -40
MIN, MAX VALUES = -7.66 @ 7.68 , 1203.47 @ 2.63



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

91121I

PRE-TEST CERTIFICATION DATA

PASSENGER DUMMY S/N: 142

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. Middlet

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III 09-DEC-91

TRC 142C8HD1 572E SN142 HEAD DROP CAL 08

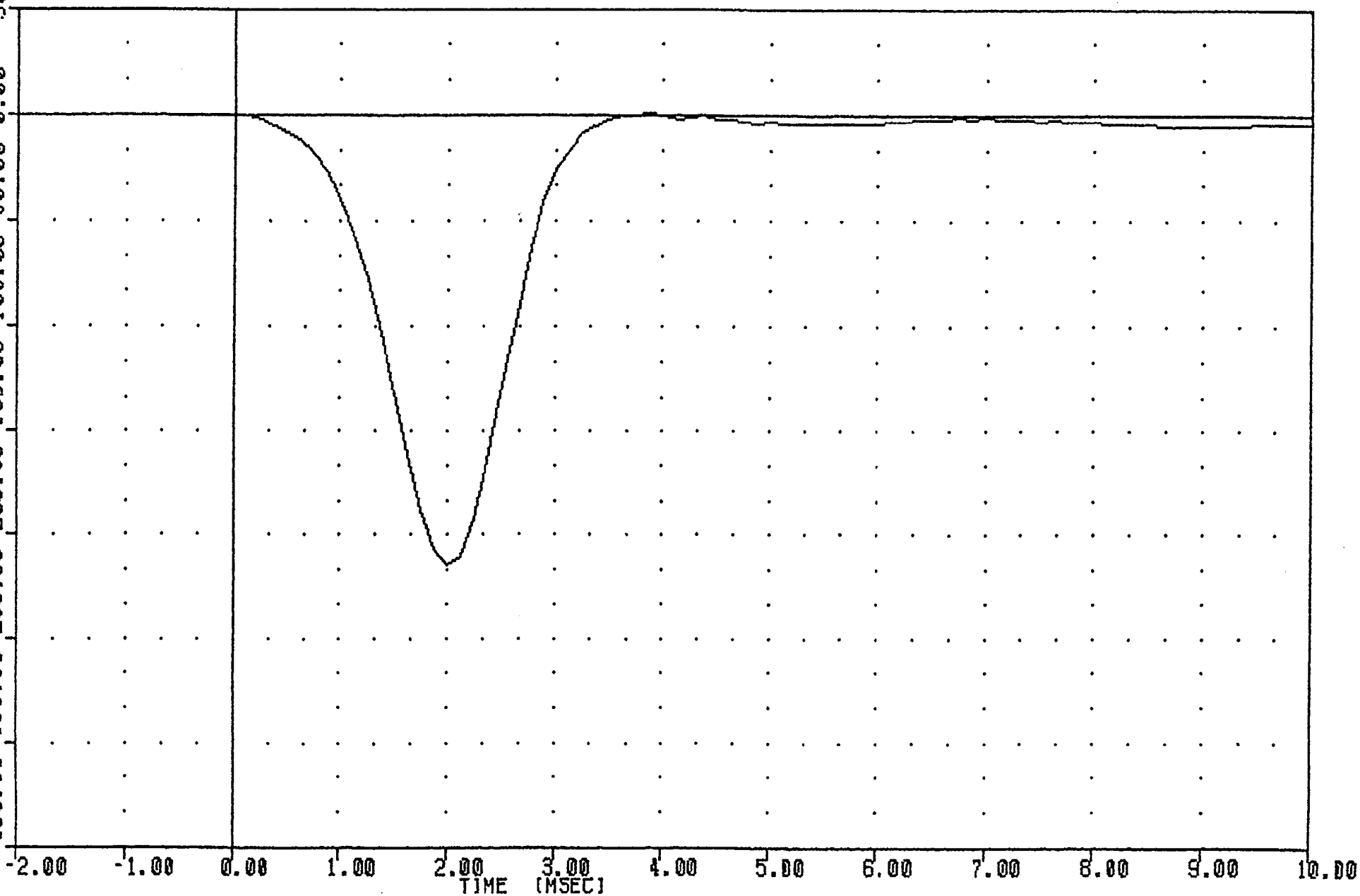
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	50.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.01 G
PEAK LATERAL ACCELERATION	15 G MAX	-1.59 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas Middleton

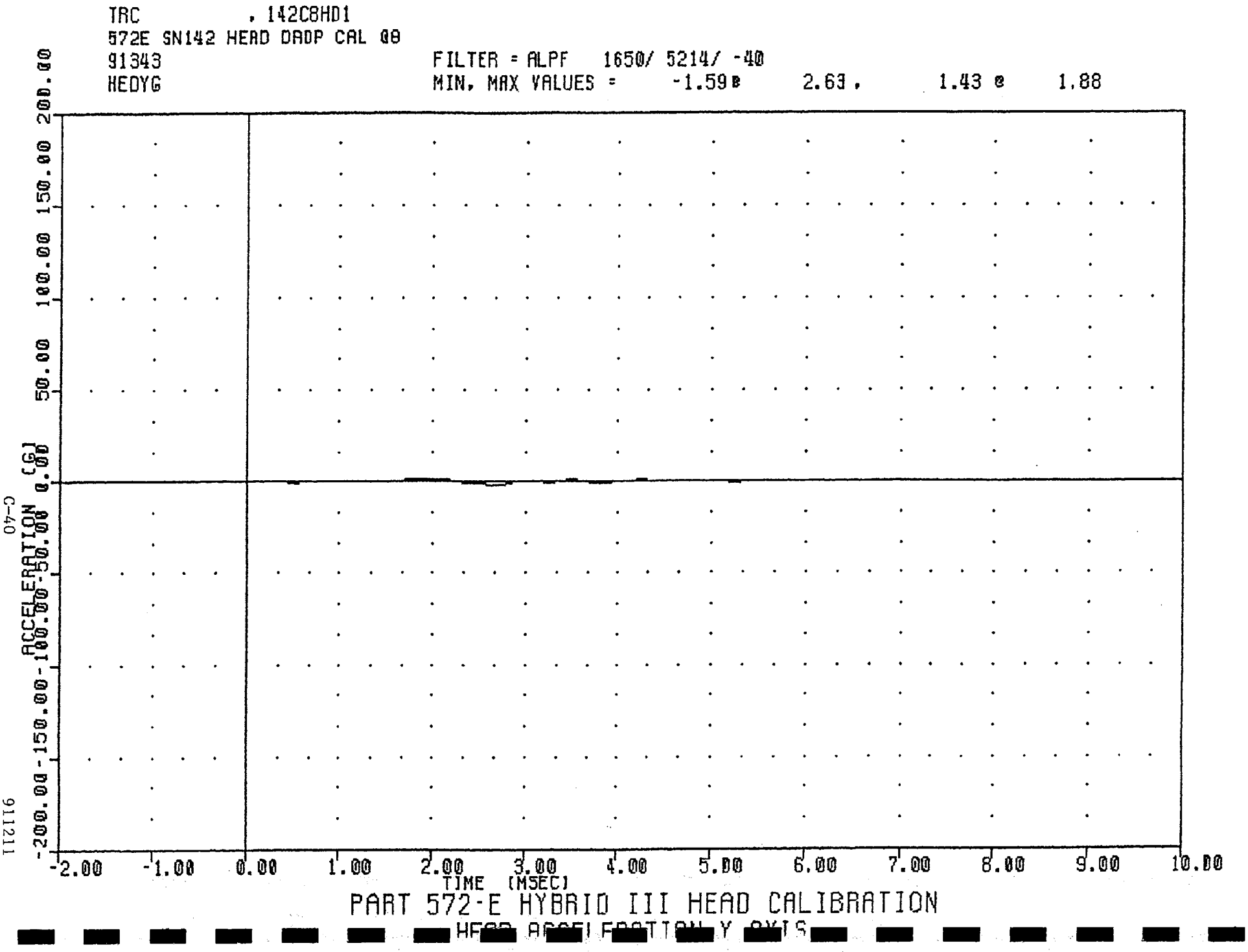
572E SN142 HEAD DROP CAL 08
91343
HEDXG

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



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

911211

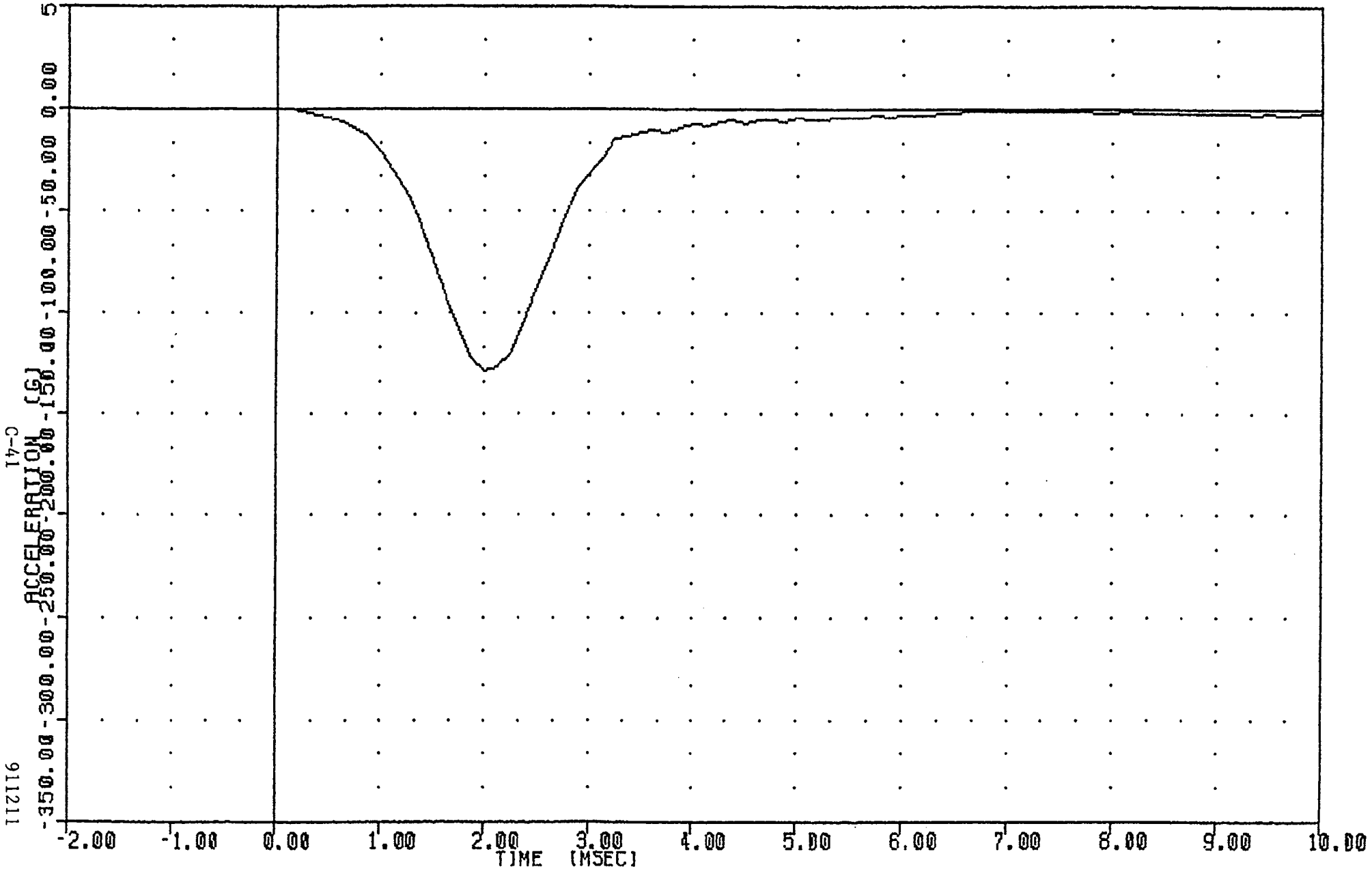


PART 572-E HYBRID III HEAD CALIBRATION

HEAD ACCELERATION Y AXIS

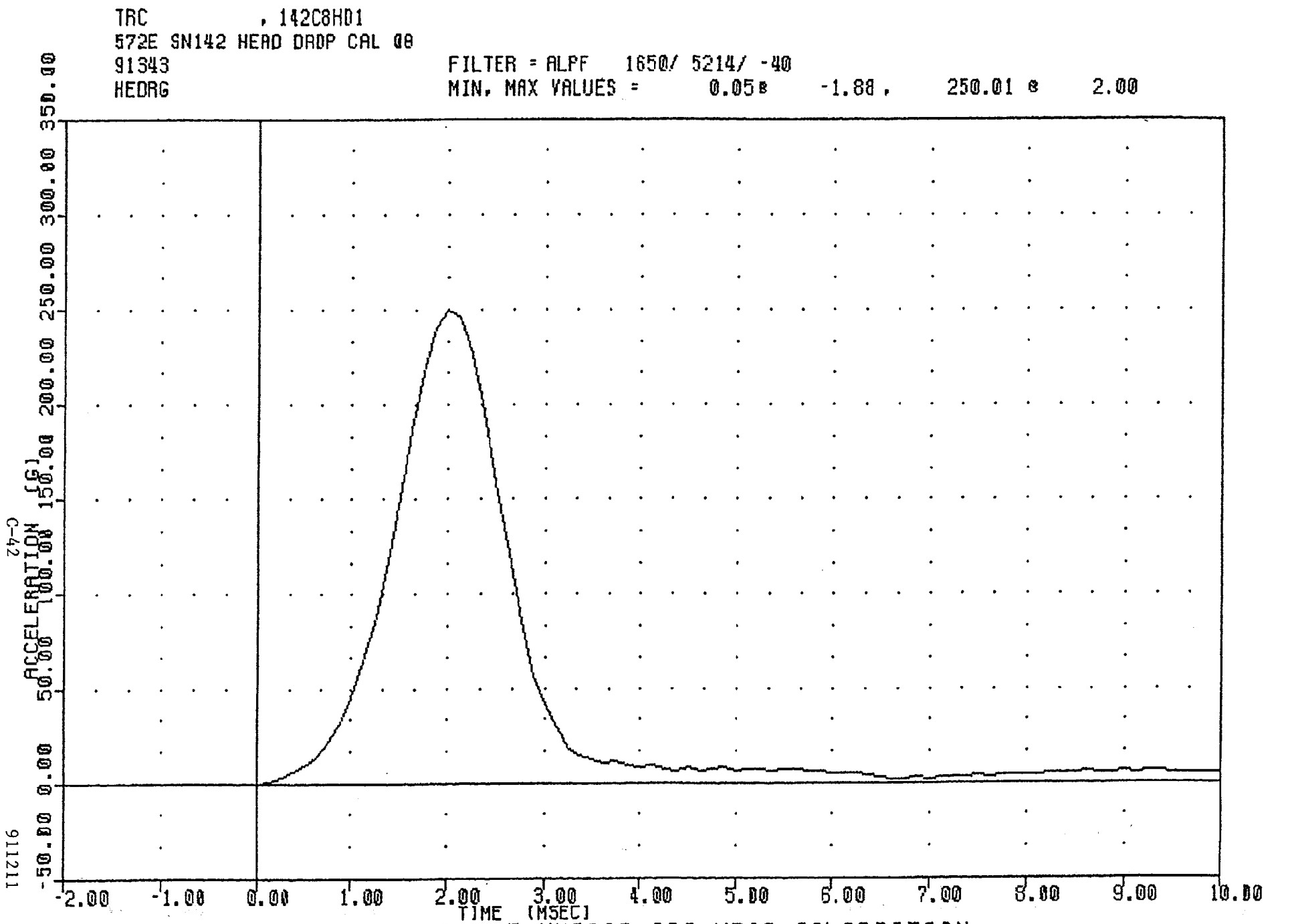
572E SN142 HEAD DROP CAL 00
91343
HEDZG

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -128.25 @ 2.00 , 0.10 @ -2.00



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

911211



PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULTANT ACCELERATION

911211

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

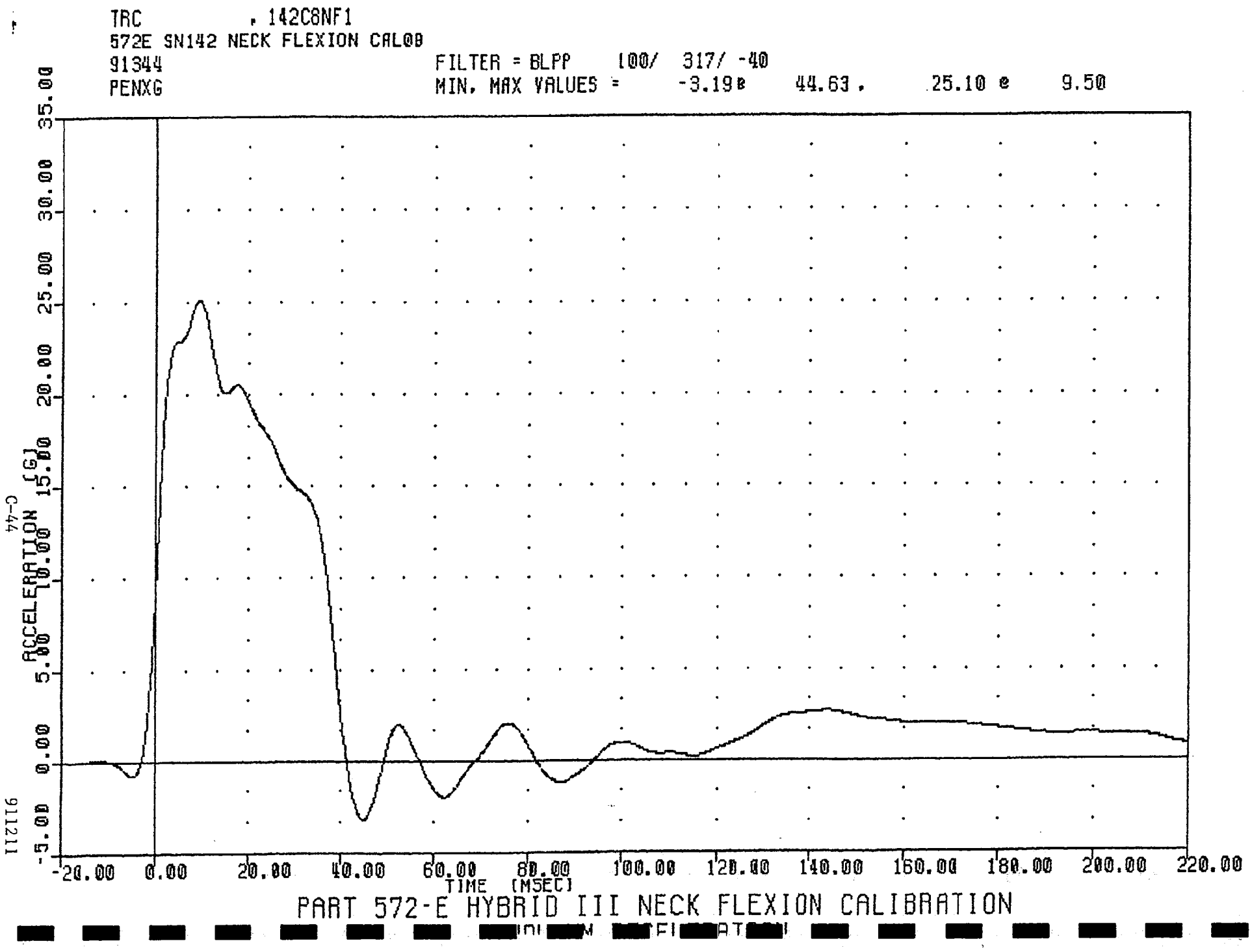
HYBRID III 10-DEC-91

6 AXIS NECK TRANSDUCER
TRC 142C8NF1 572E SN142 NECK FLEXION CAL08

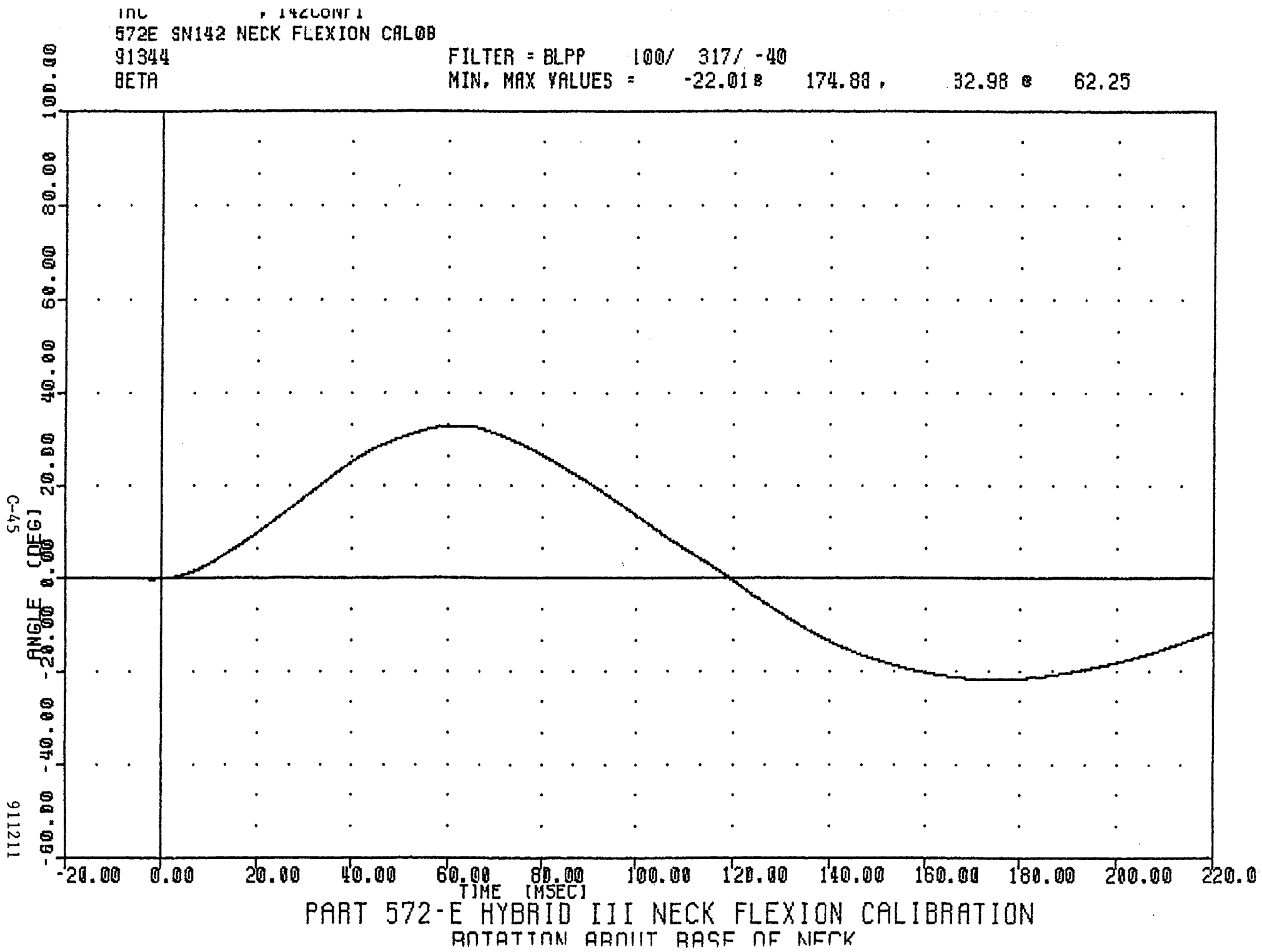
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY		10% - 70%	42.0 %
IMPACT VELOCITY		22.6-23.4 FT/SEC	23.08 FT/SEC
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	24.98 G
	20 MS	17.60 - 22.60 G	19.71 G
	30 MS	12.50 - 18.50 G	14.96 G
MAX PENDULUM G ABOVE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

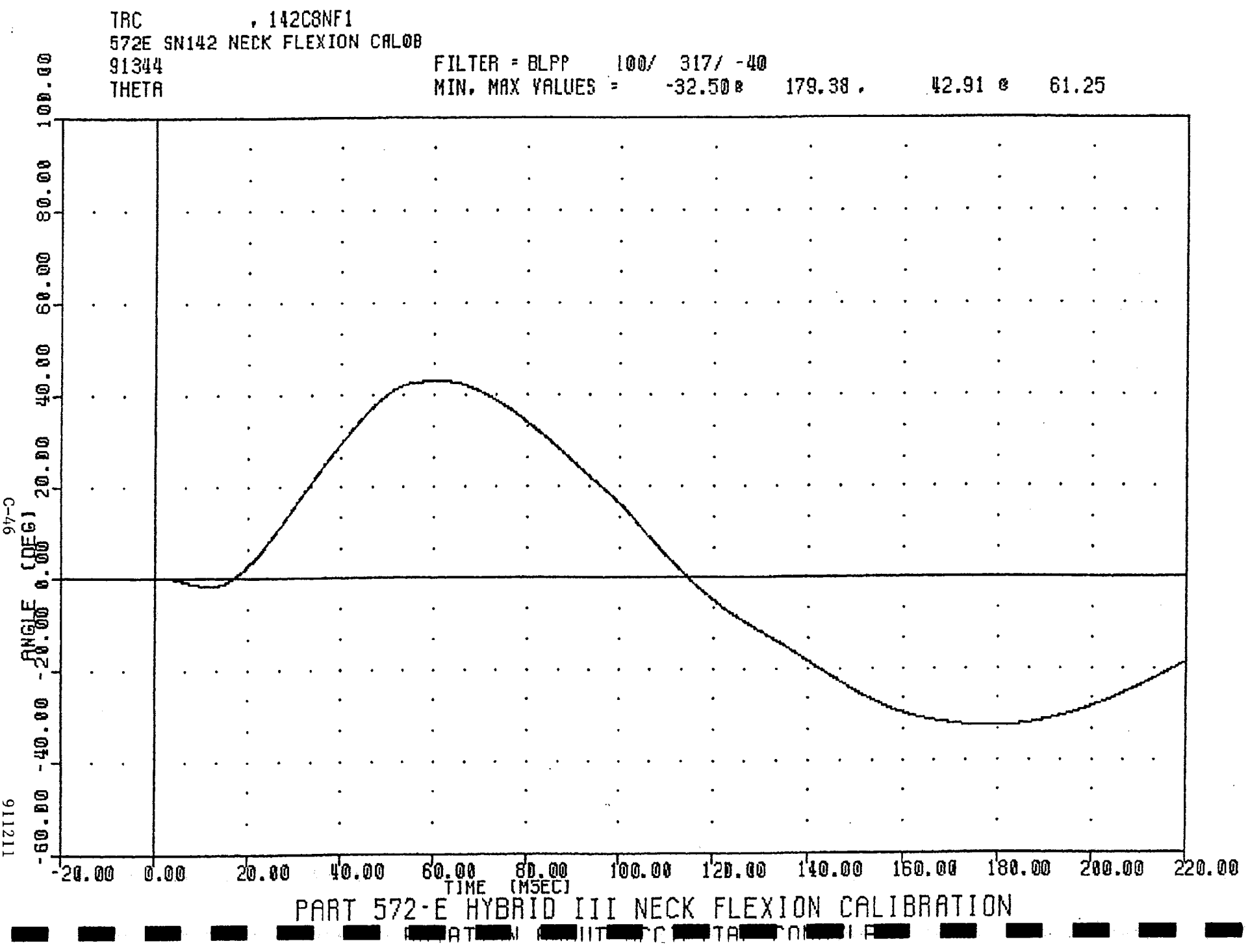


PART 572-E HYBRID III NECK FLEXION CALIBRATION

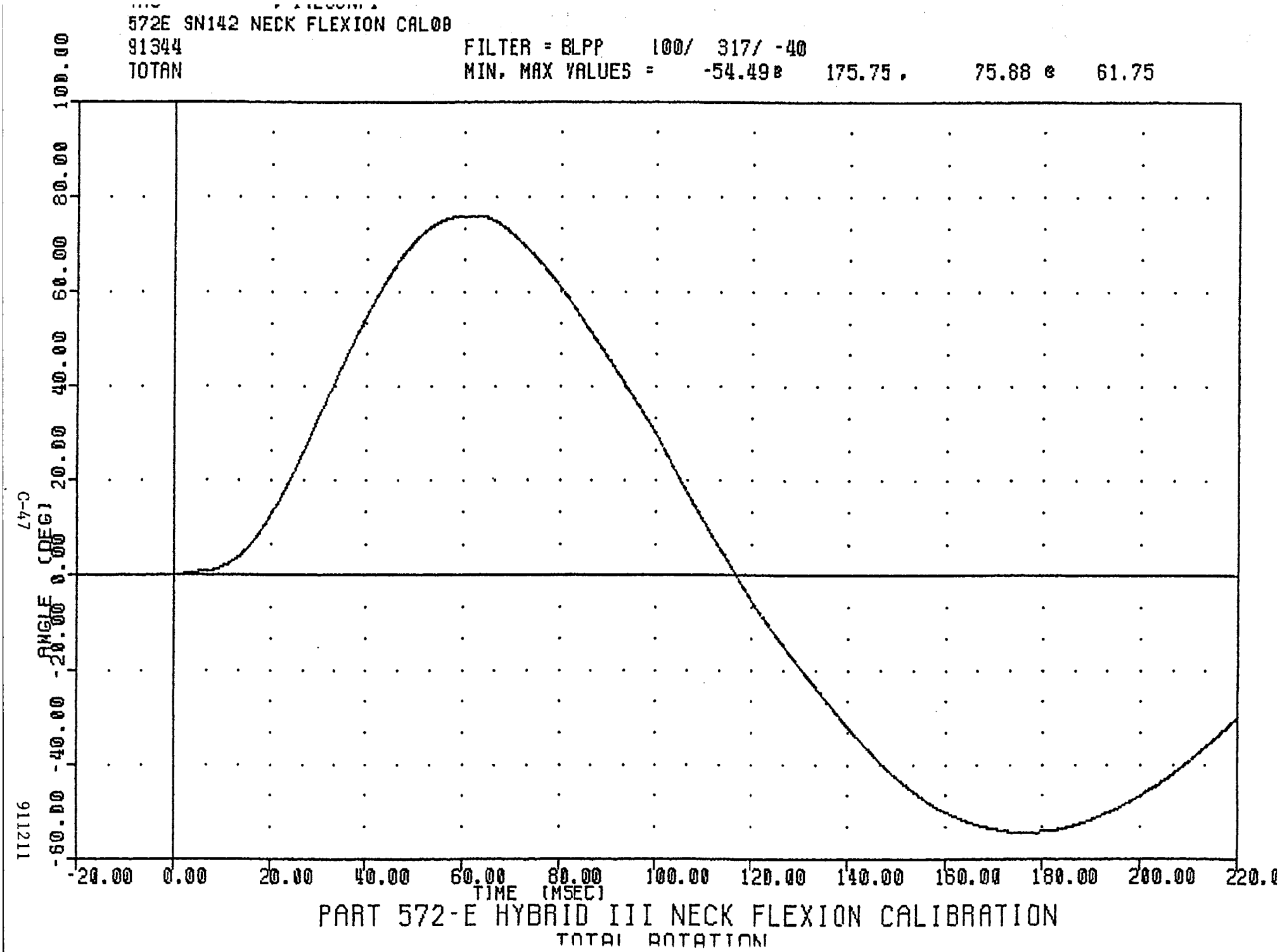


PART 572-E HYBRID III NECK FLEXION CALIBRATION

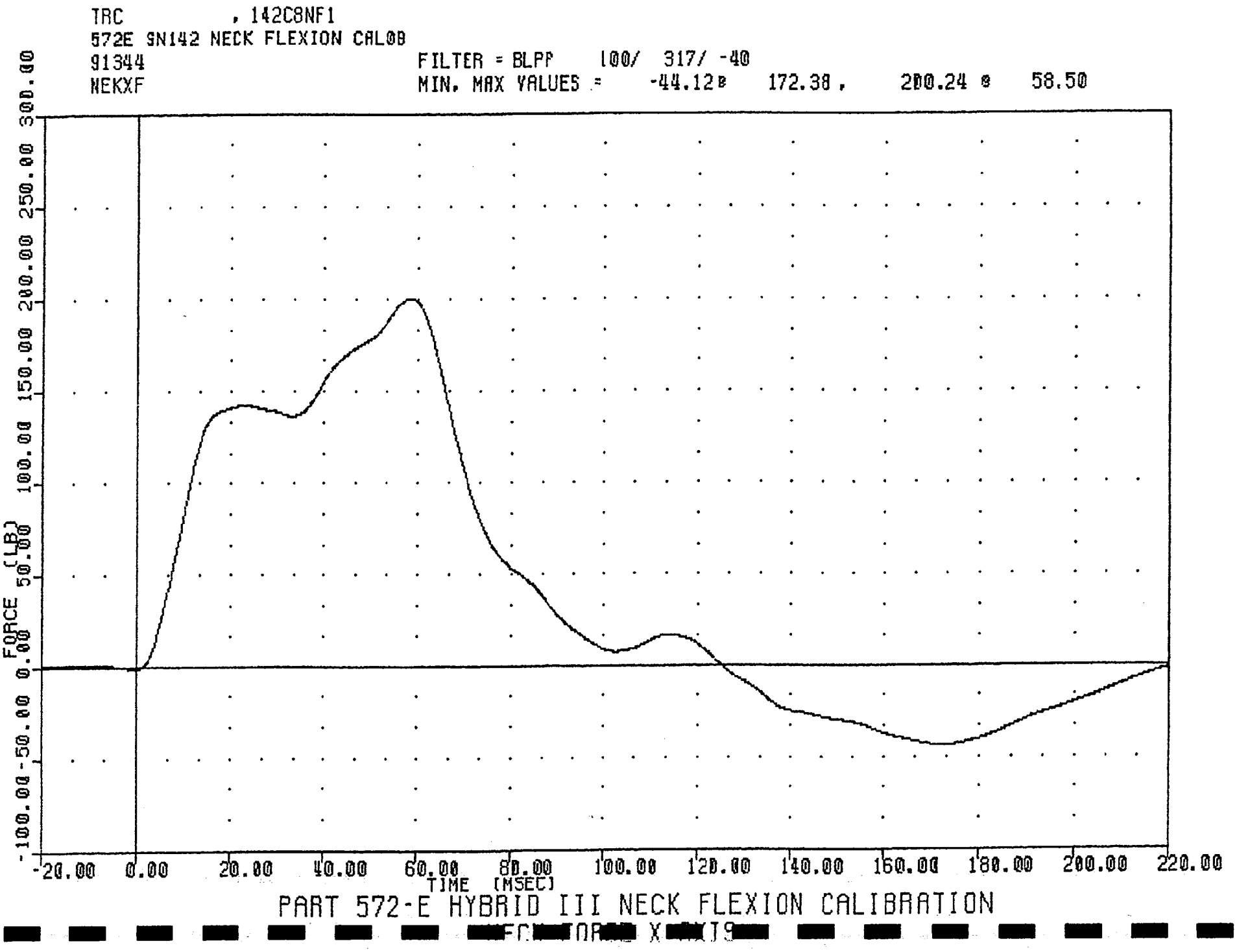
ROTATION ABOUT BASE OF NECK

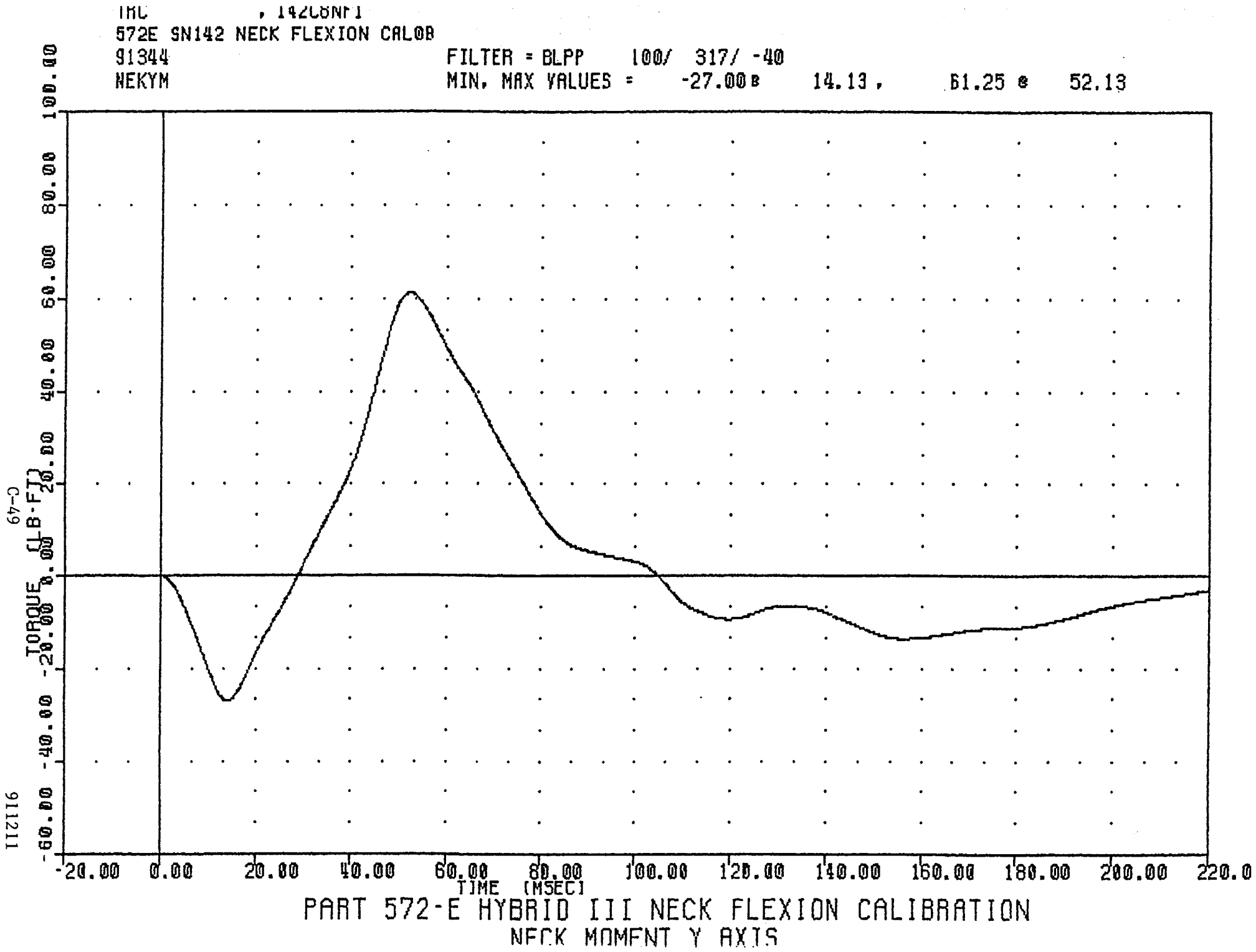


PART 572-E HYBRID III NECK FLEXION CALIBRATION


572E SN142 NECK FLEXION CAL08
91344
TOTAN
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -54.49 @ 175.75 , 75.88 @ 61.75
100.00
80.00
60.00
40.00
20.00
0.000
-20.00
-40.00
-60.00
ANGLE (DEG)
-20.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
200.00
220.0
TIME (MSEC)
PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION

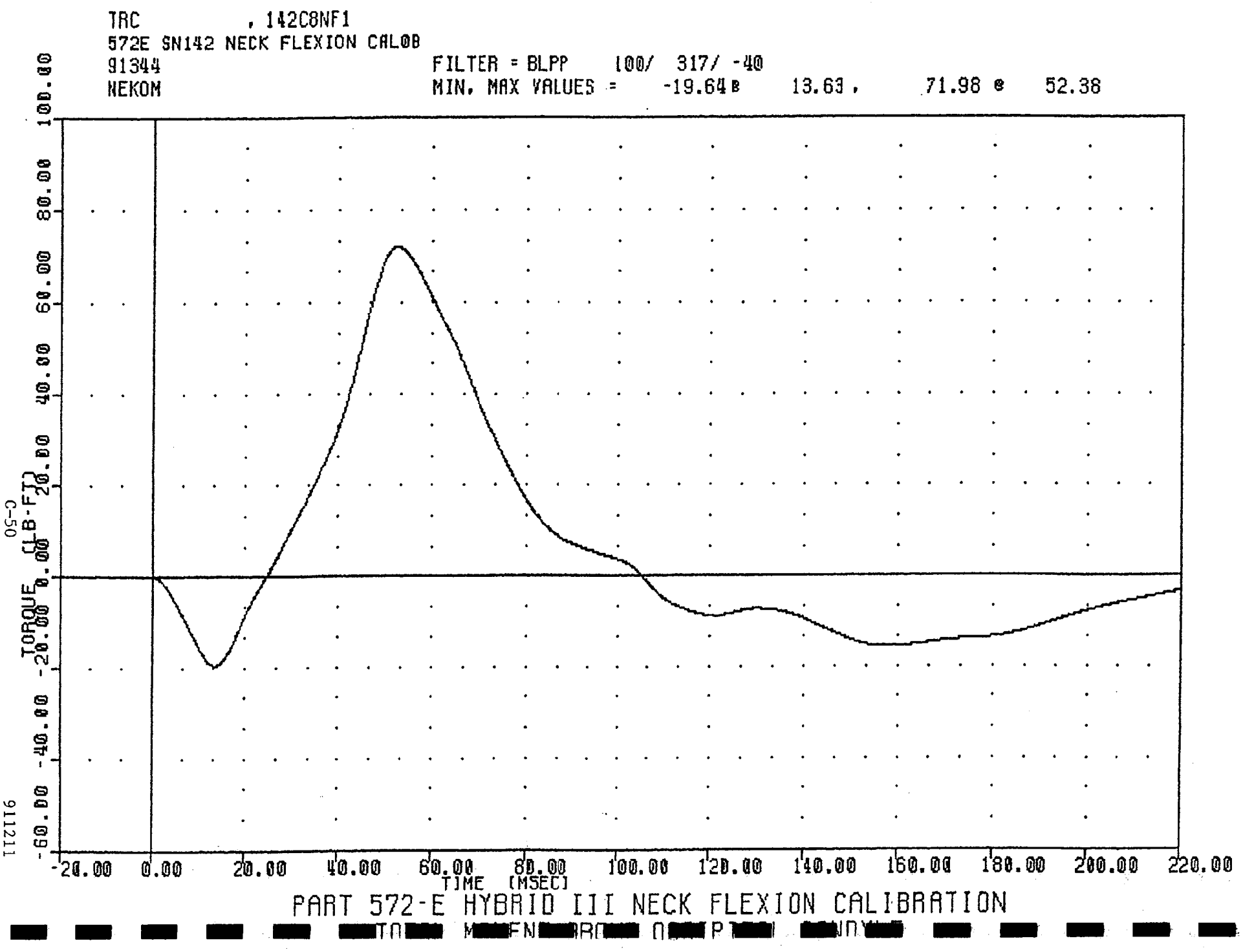
911211


TRC , 142C8NF1
572E SN142 NECK FLEXION CAL08
91344
NEKXF
FILTER = BLPF 100/ 317/ -40
MIN. MAX VALUES = -44.12@ 172.38 , 200.24 @ 58.50
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
FORCE (LB)
-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
TIME (MSEC)
PART 572-E HYBRID III NECK FLEXION CALIBRATION



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

911211


TRC , 142C8NF1
572E SN142 NECK FLEXION CAL0B
91344
NEKOM
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -19.64 B 13.63 , 71.98 @ 52.38
100.00
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
TORQUE (LB-FT)
C-50
911211
-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
TIME (MSEC)
PART 572-E HYBRID III NECK FLEXION CALIBRATION

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

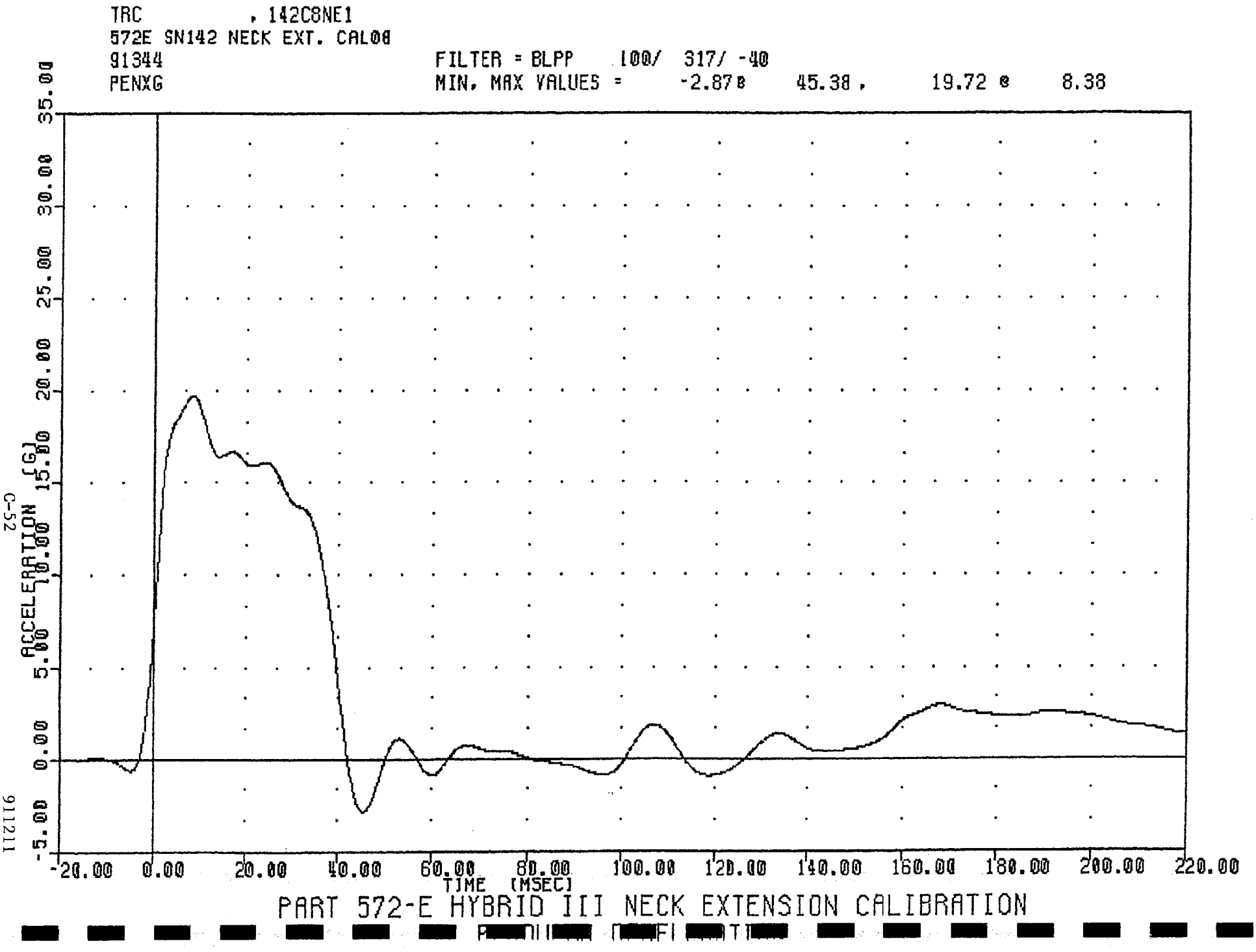
HYBRID III 10-DEC-91

6 AXIS NECK TRANSDUCER
TRC 142C8NE1 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 DECELERATION	10 MS	17.20 - 21.20 G	19.05 G
	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 ROTATION	MAX	81 - 106 DEG.	100.78 DEG.
	TIME	72 - 82 MS	74.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-59.0/-39.0 FT.LBS	-55.79 FT.LBS
	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

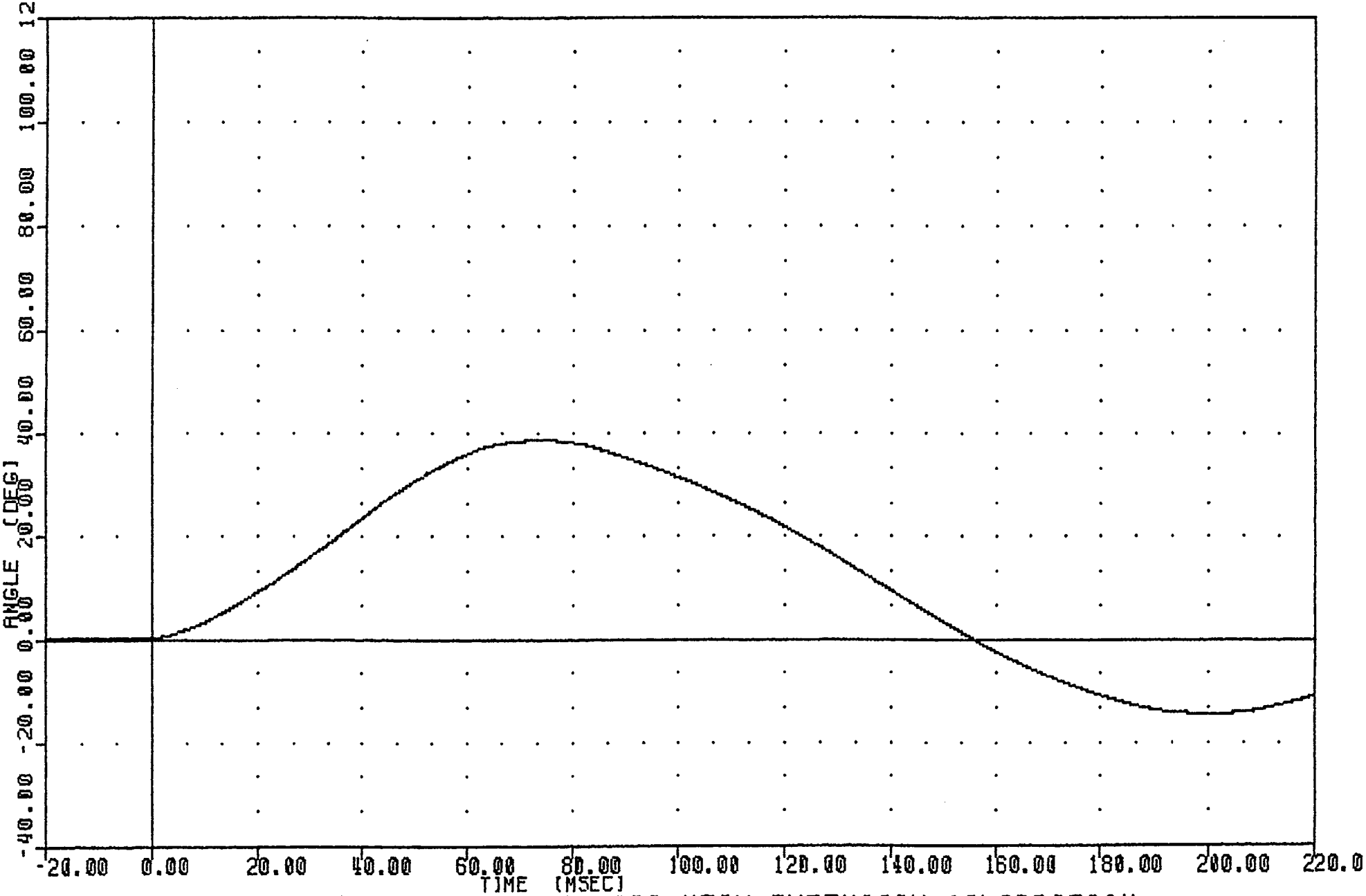
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet


TRC , 142C8NE1
572E SN142 NECK EXT. CAL08
91344
PENXG
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -2.87@ 45.38 , 19.72 @ 8.38
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
ACCELERATION [G]
-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
TIME (MSEC)
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

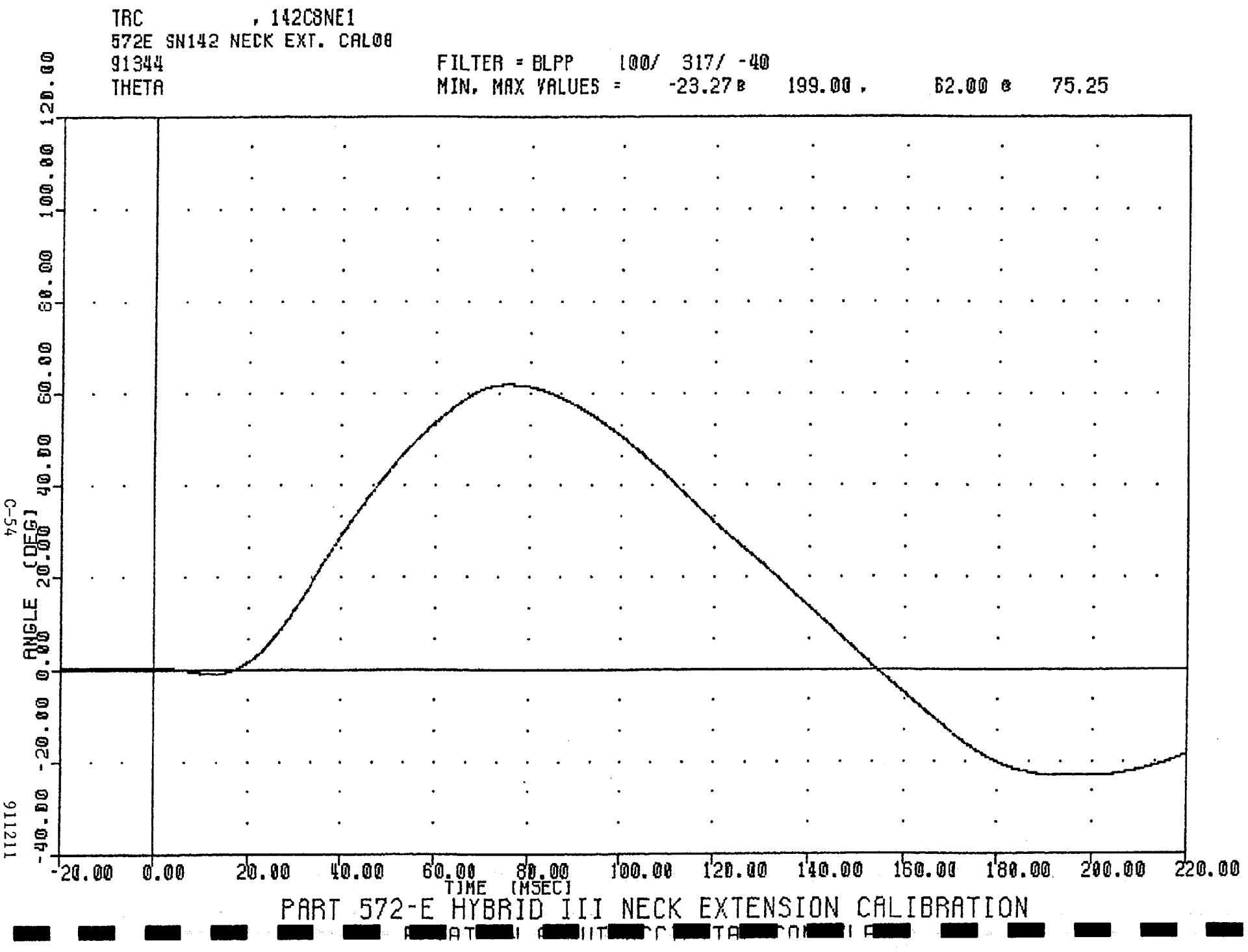
572E SN142 NECK EXT. CAL08
91344
BETA

FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -14.54 @ 200.13 , 38.80 @ 74.00

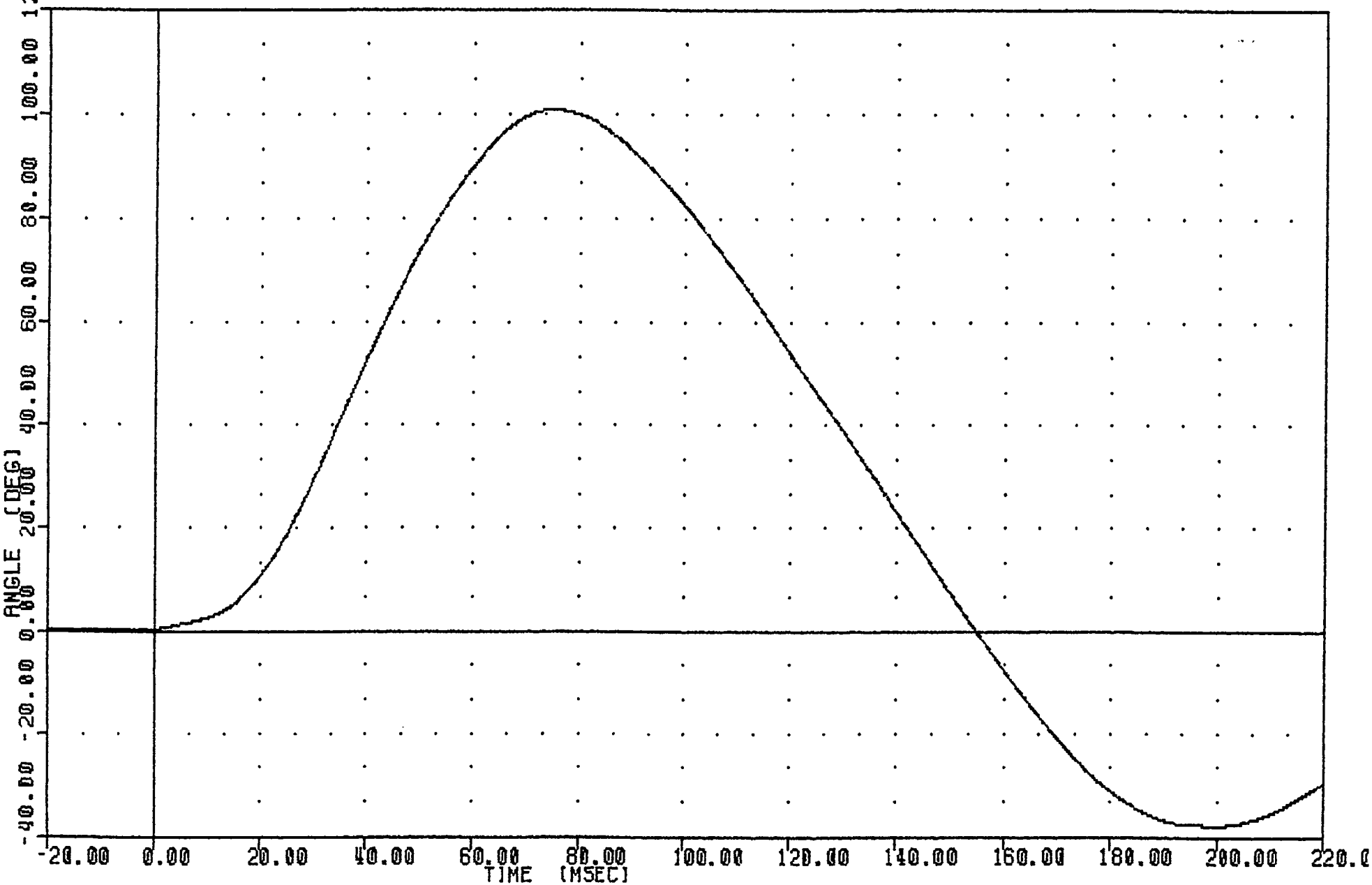


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK

911211

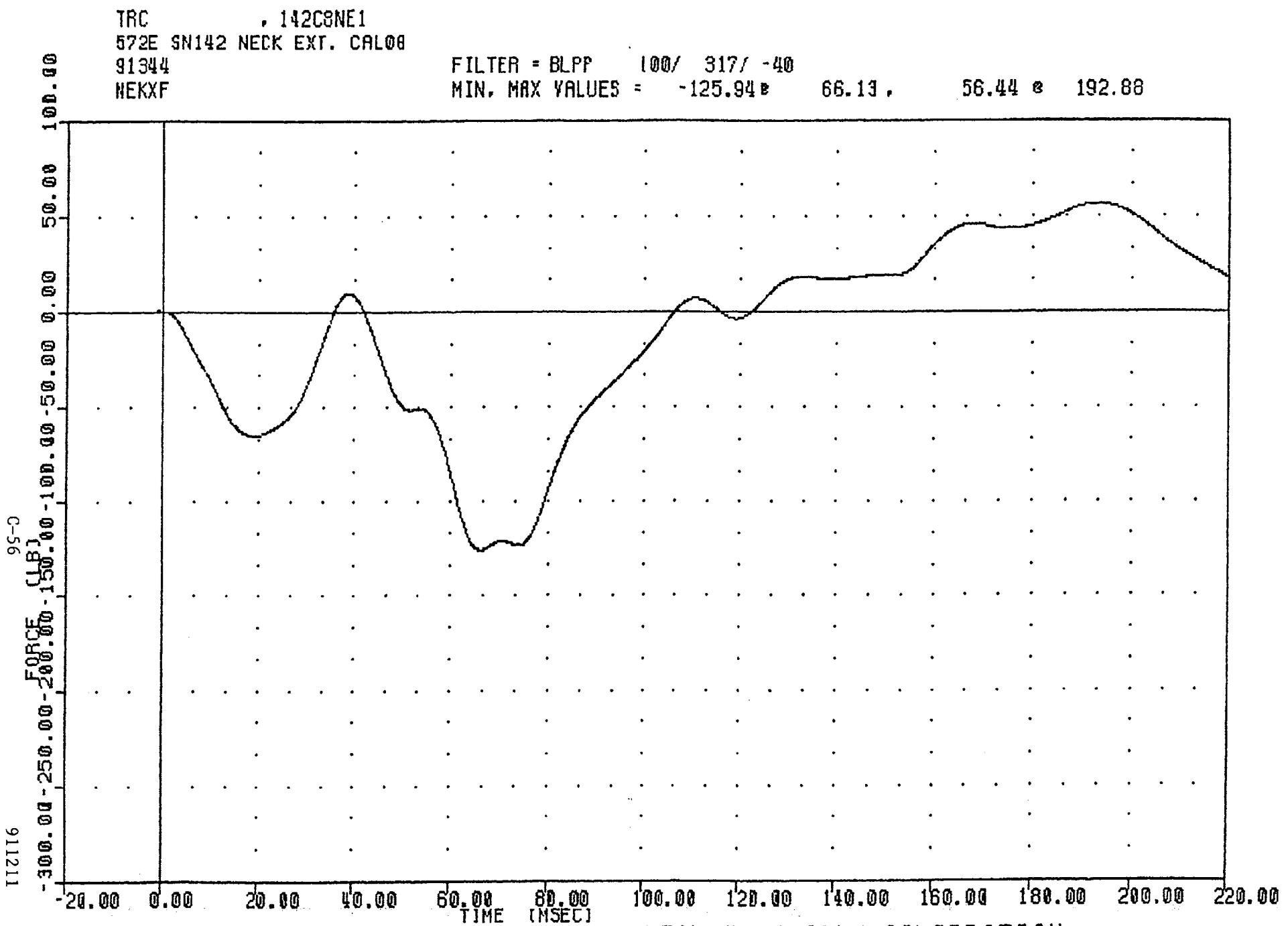

TRC , 142C8NE1
572E SN142 NECK EXT. CAL08
91344
THETA
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -23.27 @ 199.00 , 62.00 @ 75.25
ANGLE (DEG)
120.00
100.00
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-20.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
200.00
220.00
TIME (MSEC)
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
C-54
91121I

572E SN142 NECK EXT. CAL08
91344
TOTAN
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -37.81 @ 199.63 , 100.78 @ 74.75



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION

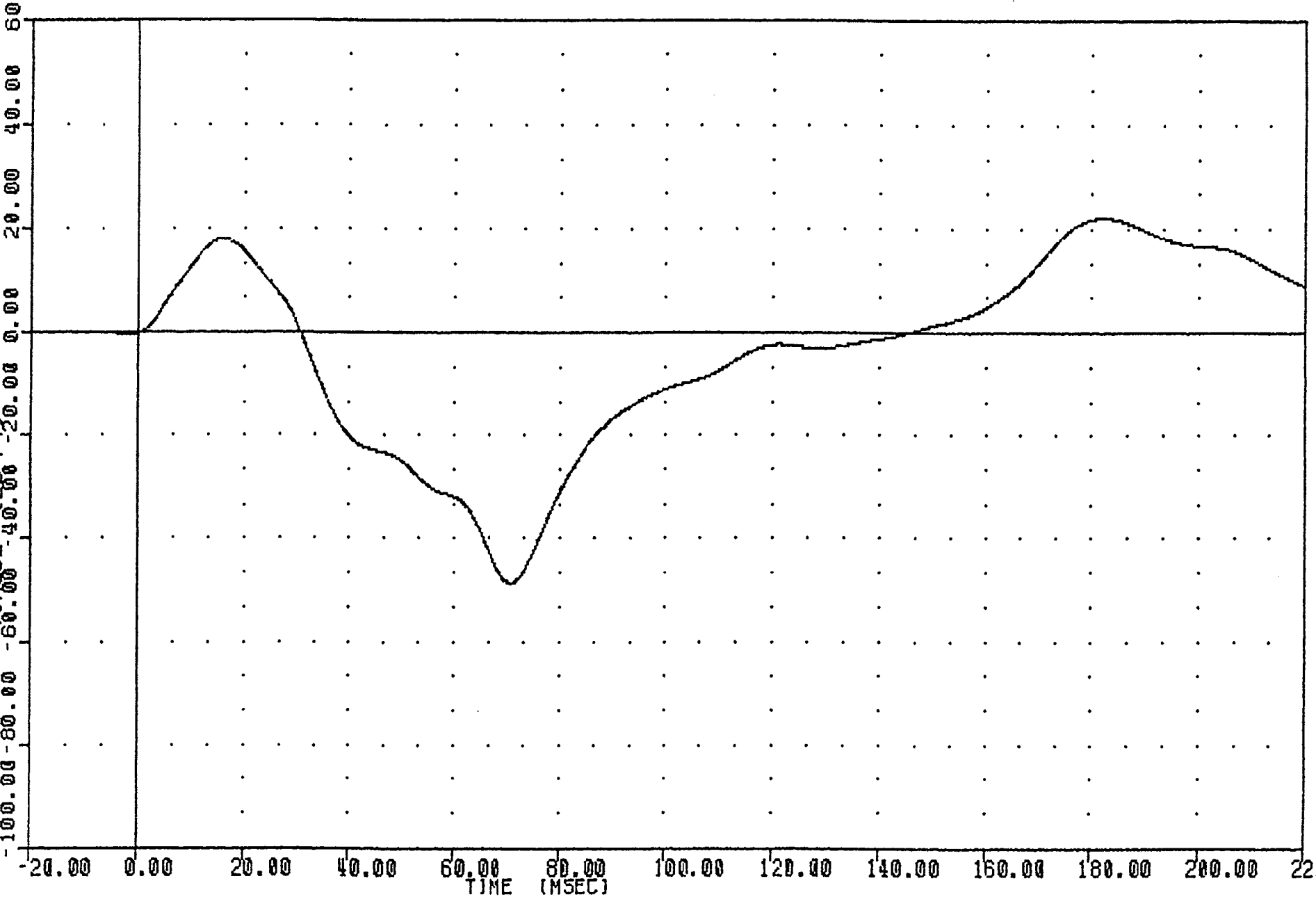
911211



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

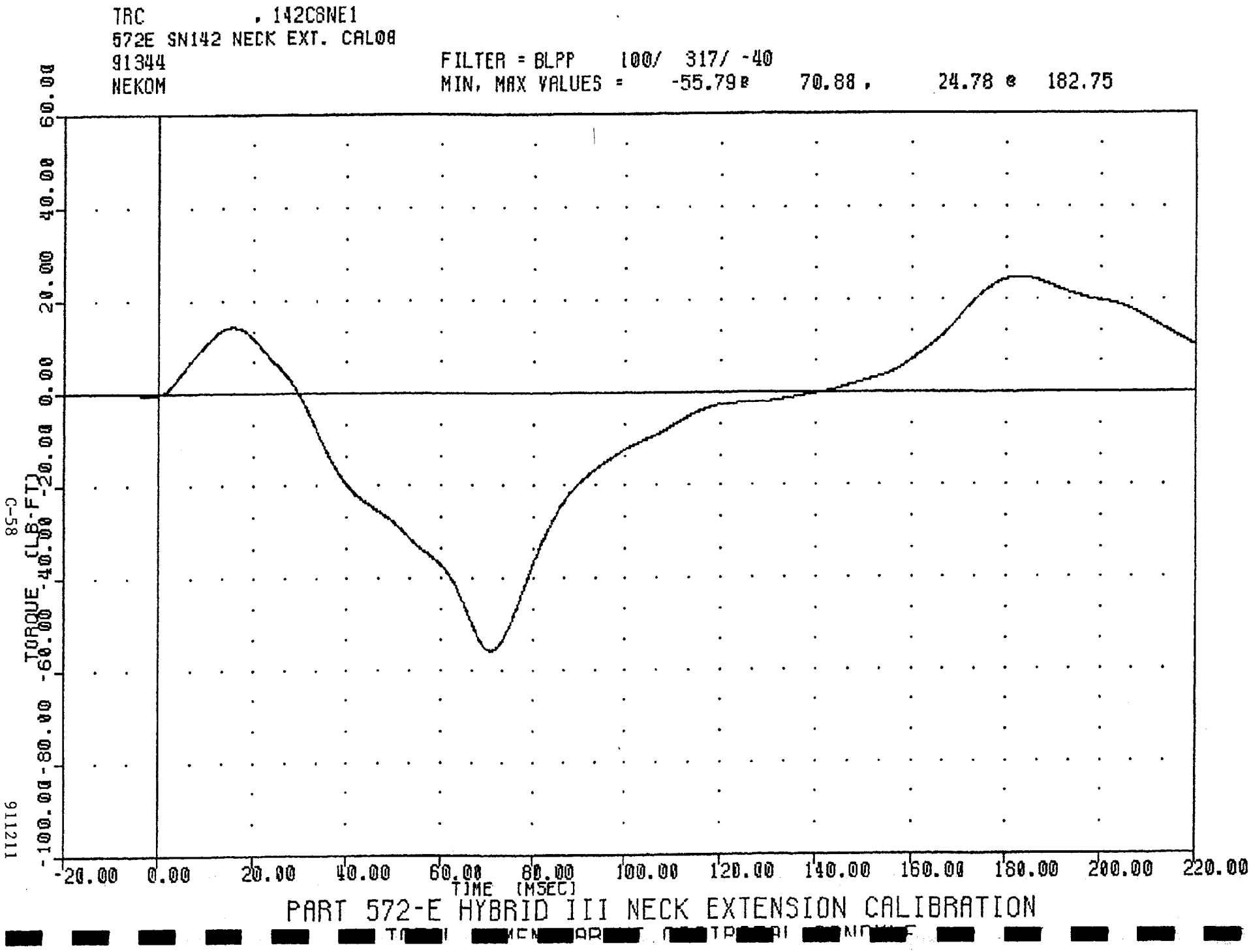
NECK FORCE X EXT9

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

911211



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

911211

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

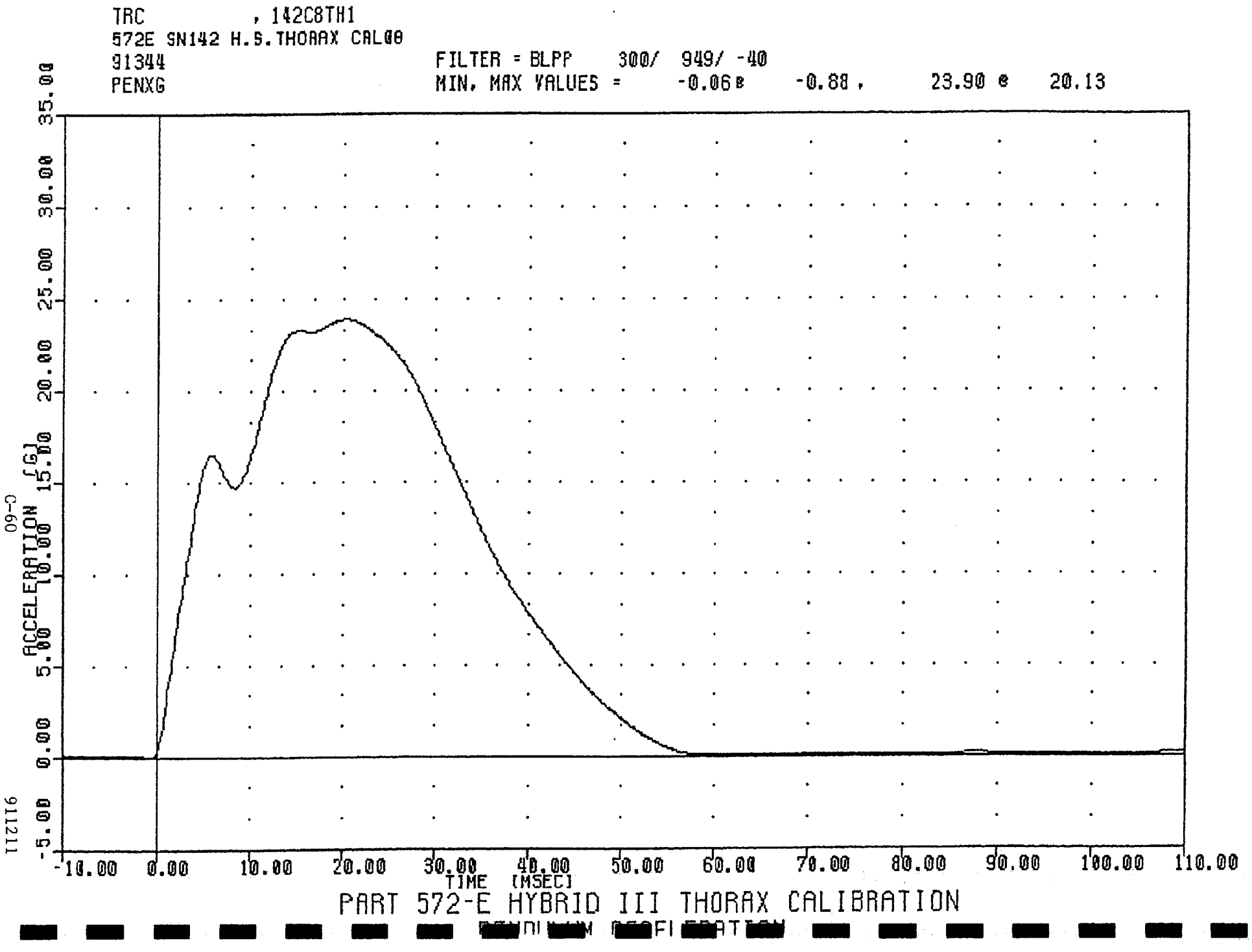
HYBRID III 10-DEC-91

TRC 142C8TH1 572E SN142 H.S.THORAX CAL08

TEST PARAMETER	HIGH SPEED TEST 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%

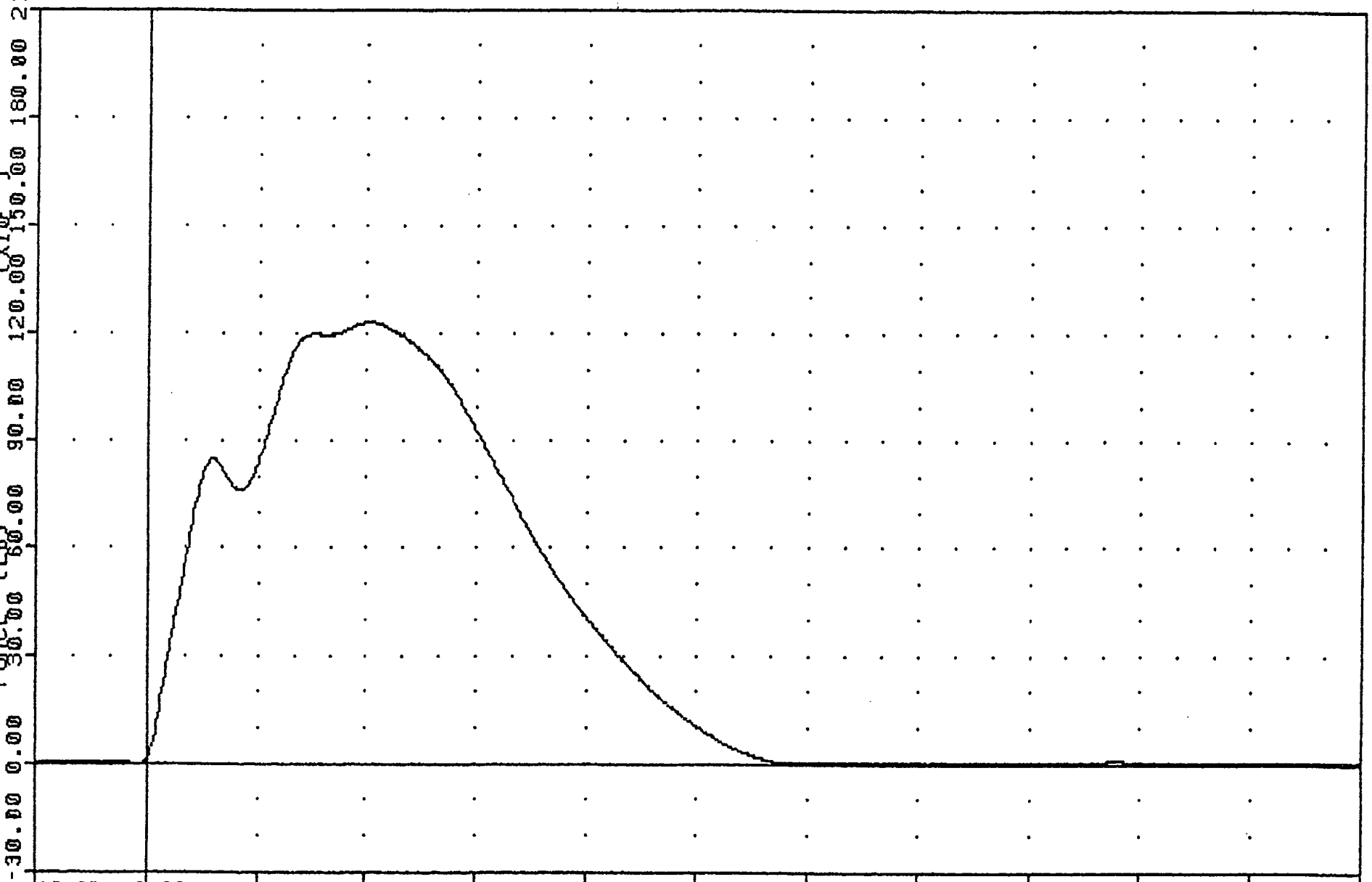
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet



PART 572-E HYBRID III THORAX CALIBRATION

572E SN142 H.S.THORAX CAL08
91344
PENXF
FILTER = BLPP 300/ 949/ -40
MIN, MAX VALUES = -2.86 @ -0.88 , 1230.88 @ 20.13



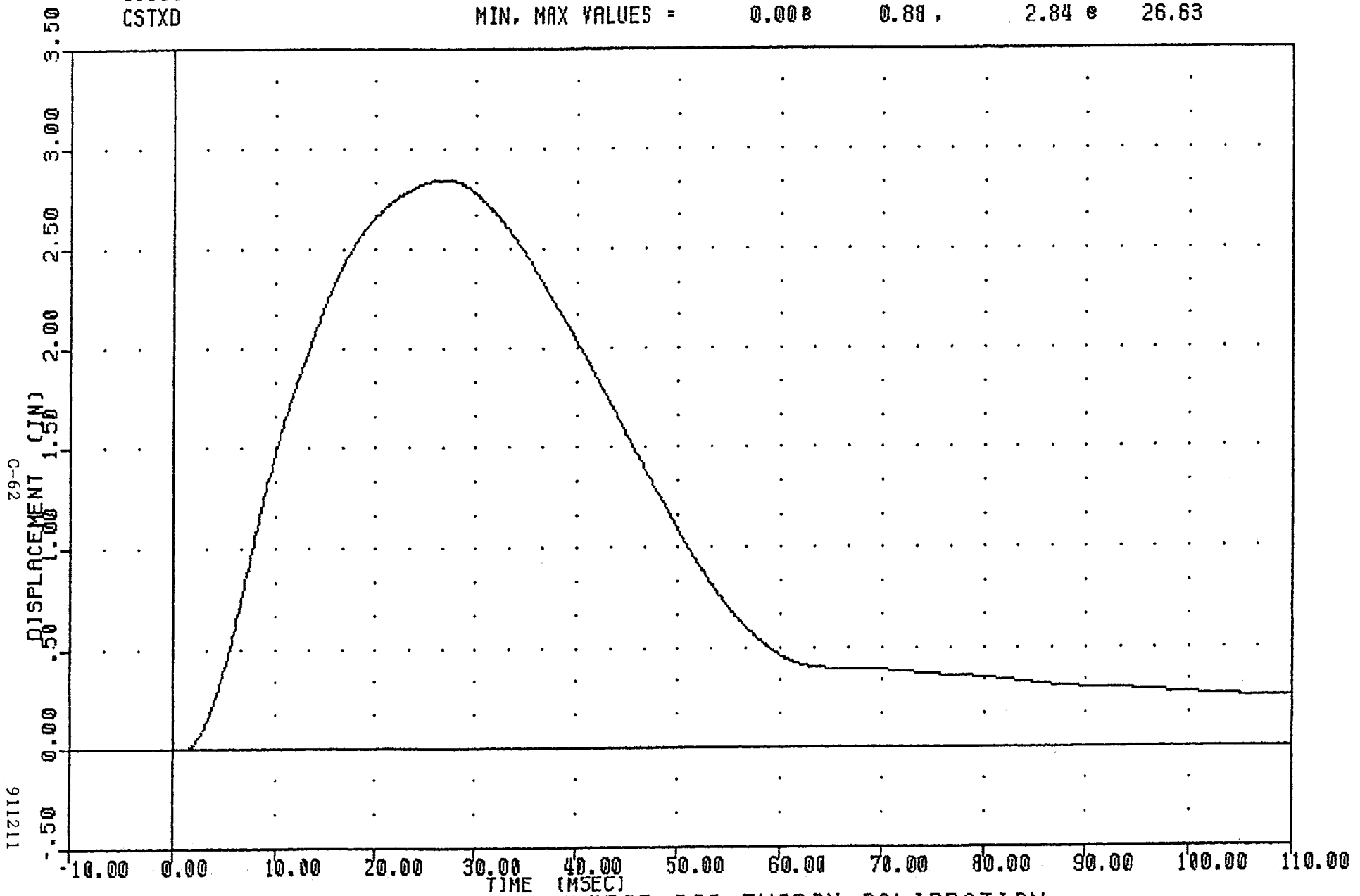
PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

C-61

91121

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

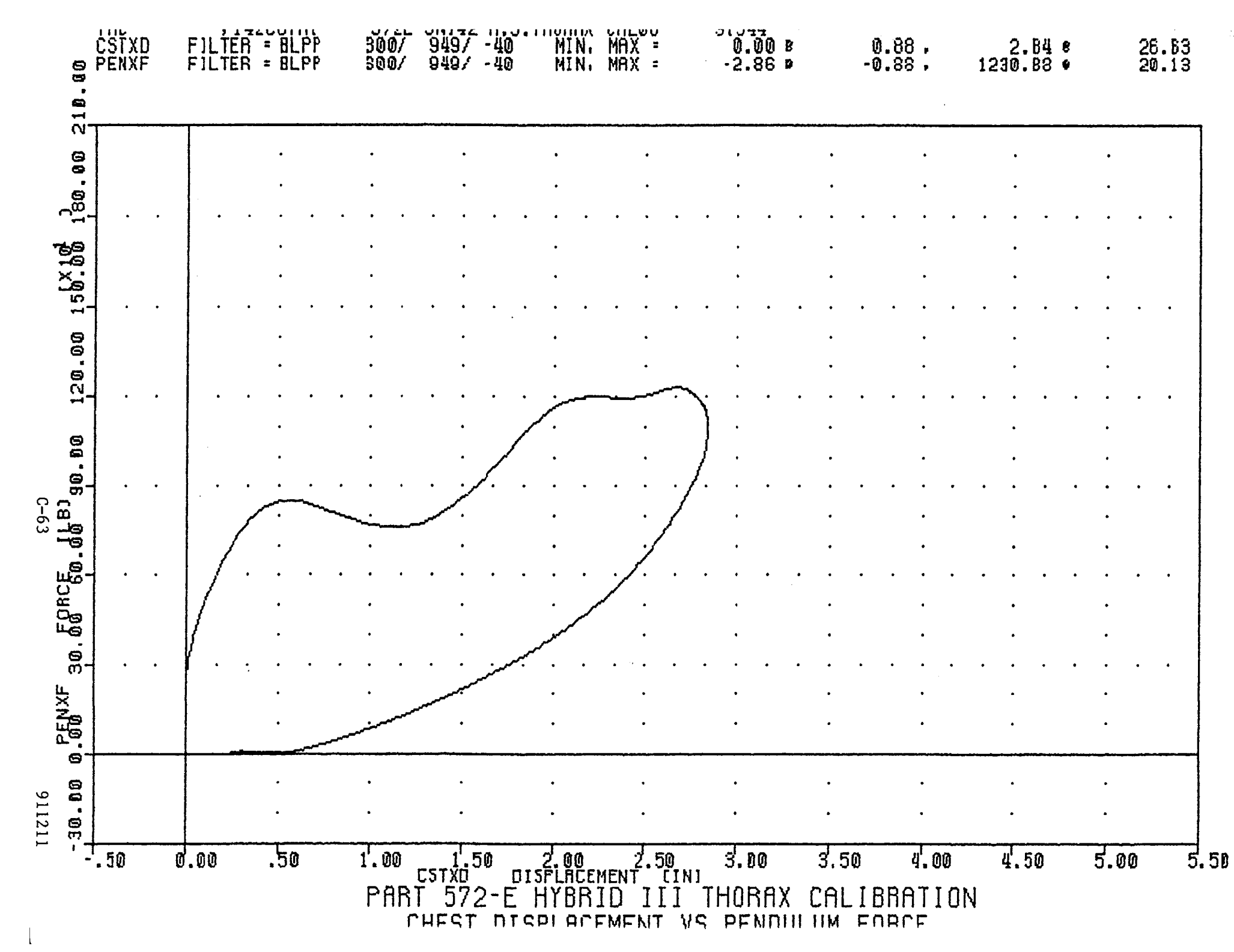
FILTER = BLPP 300/ 949/ -40
MIN, MAX VALUES = 0.00 @ 0.88 , 2.84 @ 26.63



PART 572-E HYBRID III THORAX CALIBRATION

C-62

911211


CSTXD FILTER = BLPP 300/ 949/ -40 MIN, MAX = 0.00 @ 0.88 , 2.84 @ 26.63
PENXF FILTER = BLPP 300/ 949/ -40 MIN, MAX = -2.86 @ -0.88 , 1230.88 @ 20.13
PENXF FORCE [LB] [X10]
210.00
180.00
150.00
120.00
90.00
60.00
30.00
0.000
-30.00
-.50
0.00
.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
CSTXD DISPLACEMENT [IN]
PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM 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

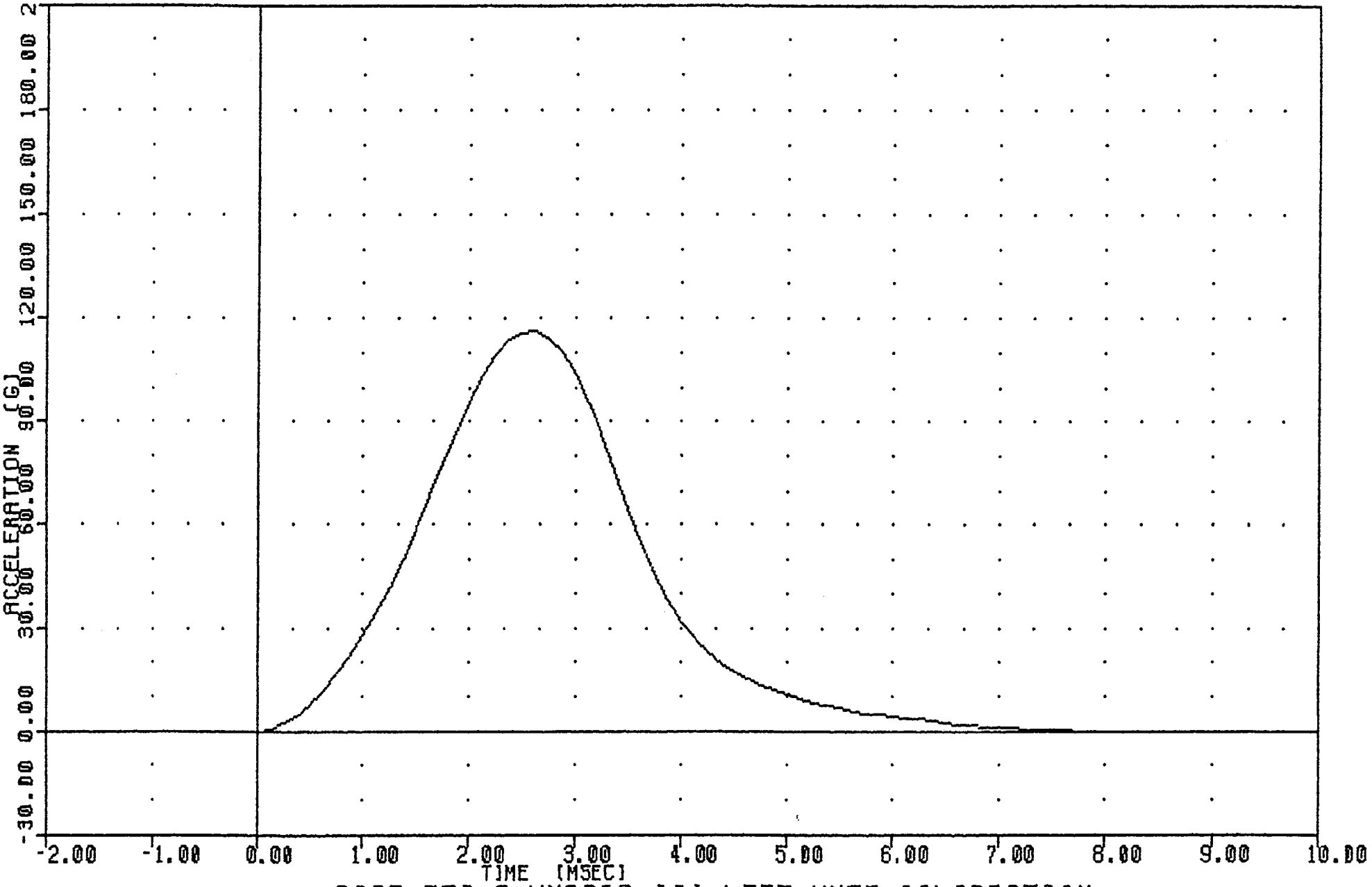
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	43.0 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.91 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1275.77 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet

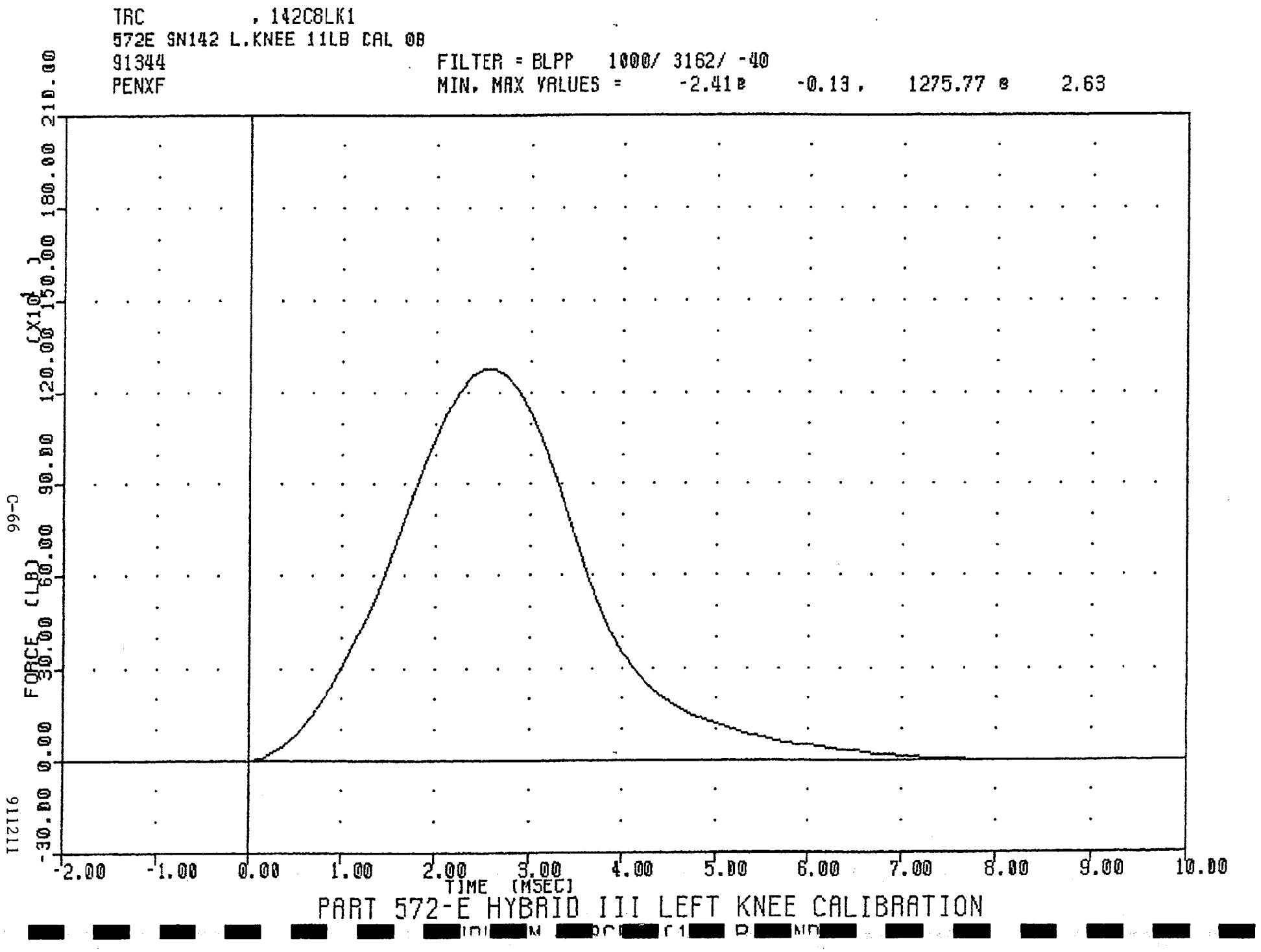
572E SN142 L.KNEE 11LB CAL 08
91344
PENXG

FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -0.22 @ -0.13 , 115.98 @ 2.63



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

911211


TRC , 142C8LK1
572E SN142 L.KNEE 11LB CAL 0B
91344
PENXF
FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -2.41 @ -0.13 , 1275.77 @ 2.63
FORCE (LB) (X10^1)
210.00
180.00
150.00
120.00
90.00
60.00
30.00
0.00
-30.00
-2.00
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
TIME (MSEC)
PART 572-E HYBRID III LEFT KNEE CALIBRATION
C-66
91211

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

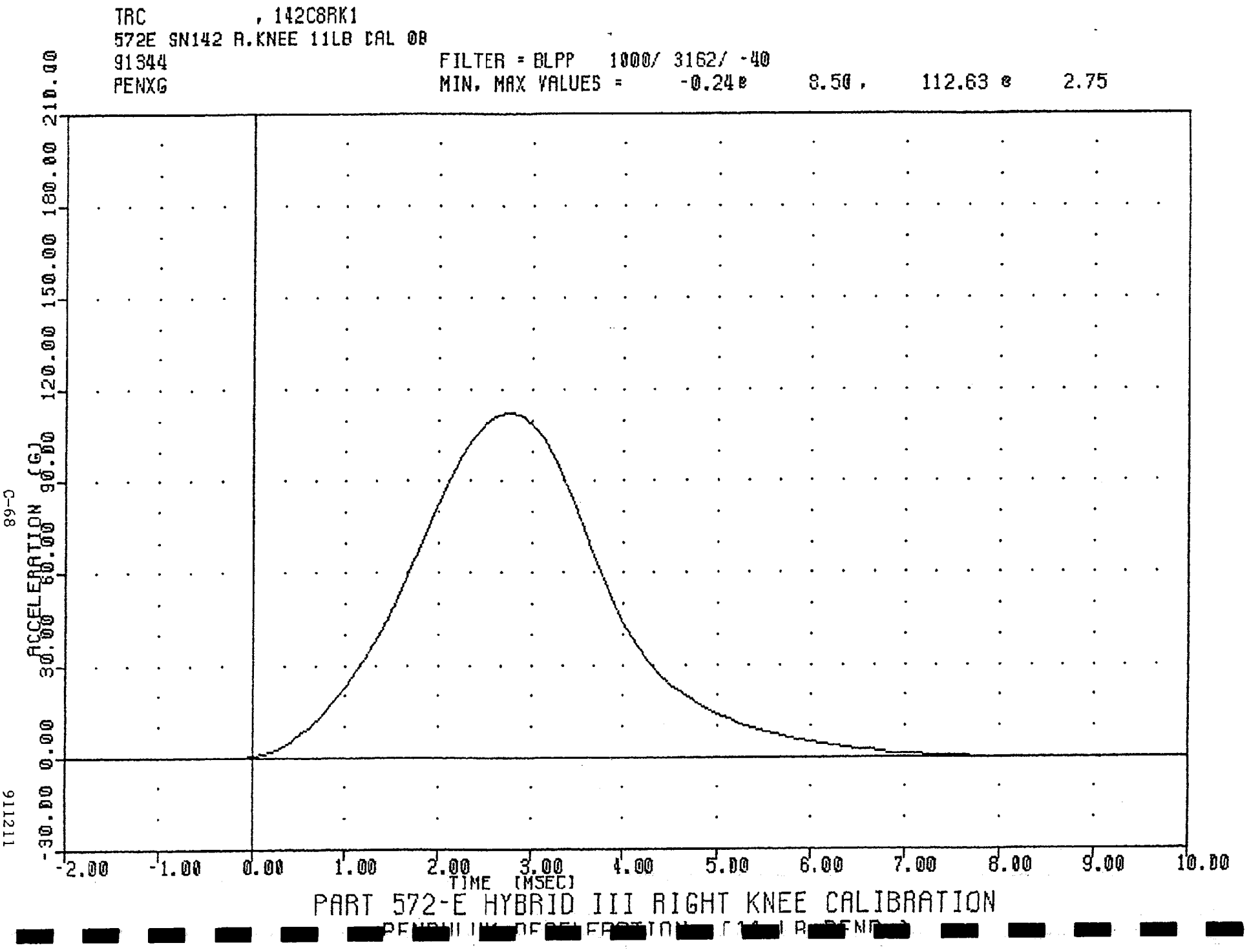
HYBRID III 10-DEC-91

RIGHT KNEE
TRC 142C8RK1 572E SN142 R.KNEE 11LB CAL 08

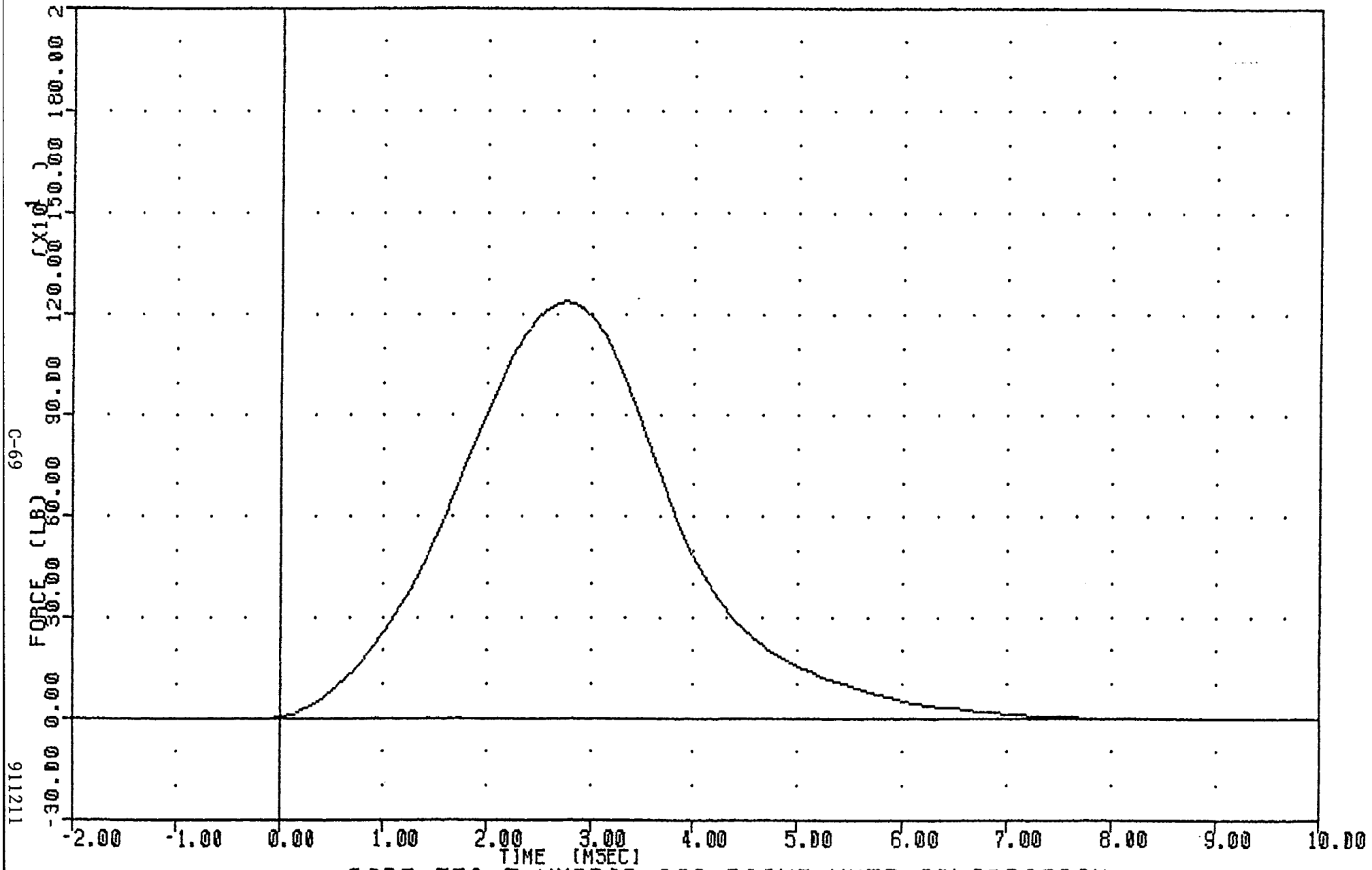
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	43.0 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1238.92 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet


TRC , 142C8RK1
572E SN142 R.KNEE 11LB CAL 08
91344
PENXG
FILTER = BLPP 1000/ 3162/ -40
MIN. MAX VALUES = -0.24 @ 8.50 , 112.63 @ 2.75
ACCELERATION (G)
210.00
180.00
150.00
120.00
90.00
60.00
30.00
0.00
-30.00
-2.00
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
TIME (MSEC)
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

572E SN142 A.KNEE 11LB CAL 08
91344
PENXF
FILTER = BLPP 1000/ 3162/ -40
MIN. MAX VALUES = -2.62 @ 6.50 , 1238.92 @ 2.75



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

91211

APPENDIX D

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENT CALIBRATIONS

DRIVER DUMMY #192

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE LAST	DUE
HEAD X-AXIS ACCEL.	CY19H	7264	ENDEVCO	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.	CL99H	7264	ENDEVCO	11/07/91	05/07/92
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	571	3419	LEBOW	09/12/91	03/12/92
SHOULDER BELT FORCE LOAD CELL	616	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.

DUMMY INSTRUMENT CALIBRATIONS

PASSENGER 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	236	3419	LEBOW	10/19/91	04/19/92
SHOULDER BELT FORCE LOAD CELL	615	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.

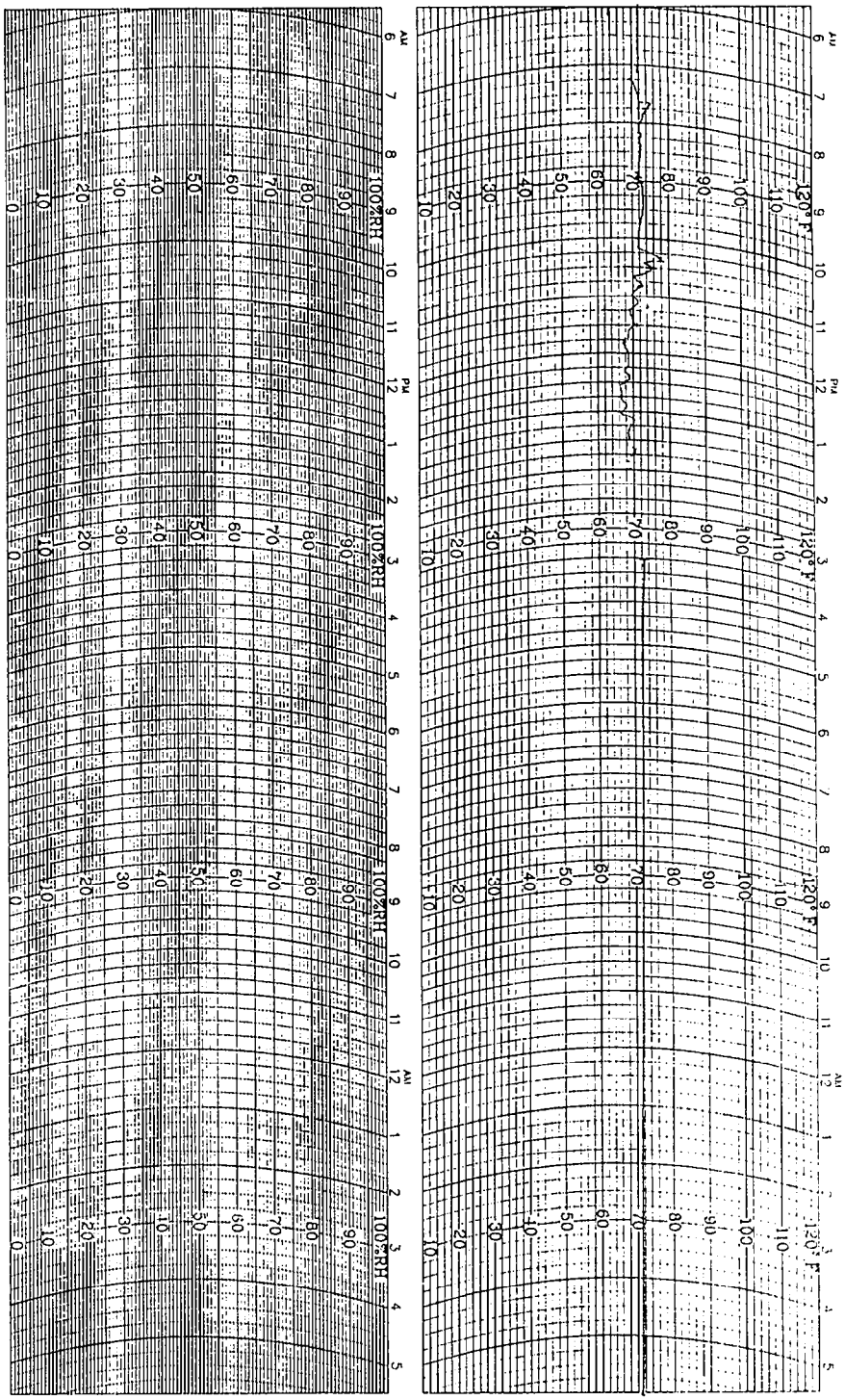
VEHICLE AND CALIBRATION LABORATORY INSTRUMENT CALIBRATIONS

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	CH35H	7264	ENDEVCO	08/12/91	02/18/92
ENGINE BOTTOM X-AXIS	DG40J	7264	ENDEVCO	08/17/91	02/17/92
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	CHATILLON	05/03/89	REPAIRED
LUMBAR FLEXION ROTATION GAUGE	CP17-0601-1	7020	HUMPHREY	MFR. SPECIFICATION	
ABDOMEN COMPRESSION DISPL. GAUGE	4075-172	80294-2051941504	BOURNES	10/08/91	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

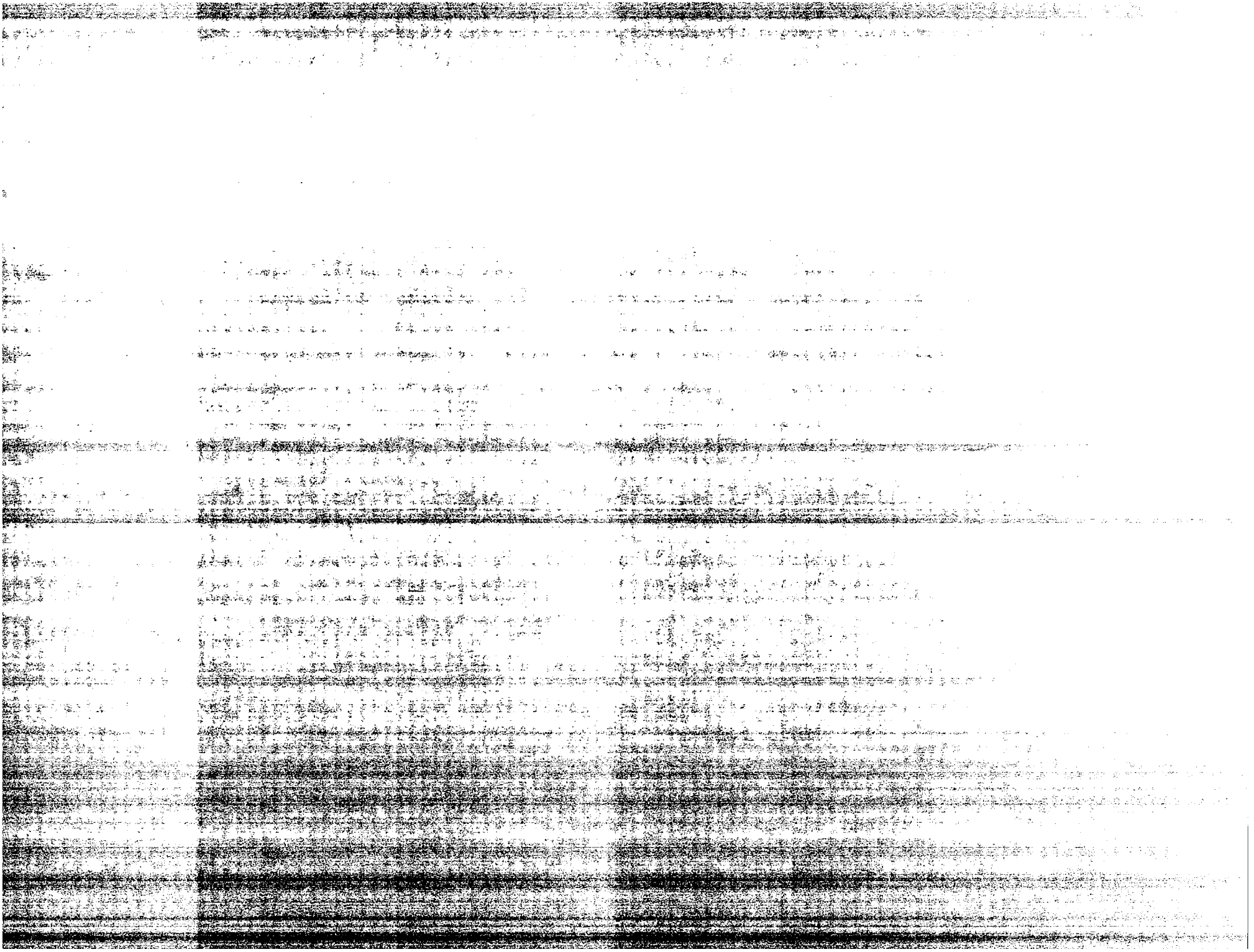


WeatherMeasure
WEATHERtronics
Division of QUALIMETRICS, Inc.

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

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

STATION [illegible] DATE ON 12/10/91 DATE OFF 12/11/91



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

APPENDIX E

RESTRAINT SYSTEM INSTRUCTIONS FROM OWNER'S MANUAL

ing the plunger. Doors locked before closing will remain locked when closed.

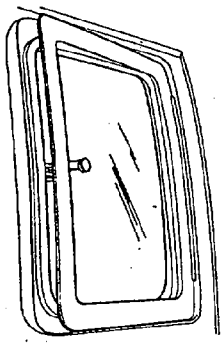
The ignition key will unlock all the locks on your vehicle.

Power Door Locks (optional)
Front doors equipped with power door locks can be locked or unlocked from inside by the lock switches on either of the front doors.

Power Windows (optional)
The control on the left front door has up-down switches that give you finger tip control of both front door windows. There is a single opening and closing switch on the passenger door for passenger window control. The windows will operate only when the ignition switch is turned to the ON position.

Sliding Rear Window (optional)
A locking device in the center of the windows helps to prevent entry from the rear of the vehicle. Squeeze the lock to release the window.

Club Cab Vented Quarter Window
The Club Cab is equipped with rear quarter windows that open out. Pull the window latch toward you to unlock, push out on the window. Press the latch straight to secure the window in an open position.



Occupant Restraints
One of the most important safety features in your vehicle is the restraint system. This system includes the front and rear seat belts. Your seat belts can also be used to hold infant and child restraint systems if you will be carrying children too small for adult-size belts.

Please pay close attention to the information in this section. It tells you how to use your restraint system properly to keep you and your passengers as safe as possible.

> **WARNING:** *In a collision you and your passengers can suffer much greater injuries if your are not properly buckled up. You can strike parts of the inside of the vehicle or other passengers, or you can be thrown out of the vehicle. Always be sure you and others in your vehicle are buckled up properly.*

Buckle up even though you are an excellent driver. Even on short trips. Someone else on the road may be a poor driver and cause a collision which involves you. And this can happen far from home or on your own street.

Research has shown that seat belts save lives. And they can reduce the seriousness of injuries in a collision. Some of the worst injuries happen when people are thrown from the vehicle. Seat belts provide protection against that, and they reduce the risk of injury caused by striking the inside of the vehicle. Everyone in a motor vehicle needs to be buckled up all the time.

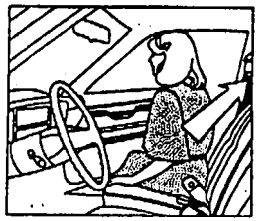
Unibelts

The outboard front and rear seats of your vehicle have combination lap/shoulder belts, or unibelts. The retractor is designed to lock during very sudden stops or impacts. This feature allows the shoulder part of the belt to move freely with you under normal conditions. But in a collision, the belt will lock and reduce the risk of your striking the inside of the vehicle or being thrown out.

> **WARNING:** *Wearing a seat belt incorrectly is dangerous. Seat belts are designed to go around the large bones of your body. These are the strongest parts of your body and can take the forces of a collision the best. Wearing your belt in the wrong place could make your injuries in a collision much worse. You might suffer internal injuries, or you could even slide out of part of the belt. Follow these instructions to wear your seat belt safely and to keep your passengers safe, too.*

Seat Belt Operating Instructions

1. Enter the vehicle and close the door. Sit back and adjust the seat.

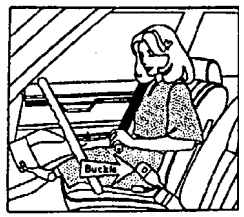


1

2. The latch plate of the belt is above the back of your seat. Grasp the latch plate and pull out the belt. Slide the latch plate up the webbing as far as necessary to make the belt go around your lap.

2

3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a "click."



3

WARNING: *A belt buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.*

WARNING:

- *A belt that is too loose will not protect you as well. In a sudden stop you could move too far forward, increasing the possibility of injury. Wear your safety belt snugly.*

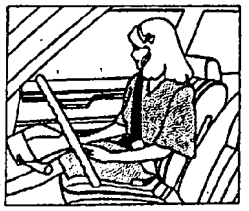
- *A shoulder belt worn under your arm is very dangerous. Your body could fall into the inside surfaces of the vehicle in a crash, increasing head and neck injury. And a belt worn under the arm is very likely to break your ribs. Ribs aren't as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will take the force in a collision.*

4. Position the lap belt across your thigh, below your abdomen. If you need the lap portion tighter, pull up a bit on the shoulder part, as shown. A snug belt reduces the risk of sliding under the belt in a collision.

4

WARNING: *A lap belt worn too high can increase the risk of internal injury in a collision. The belt forces won't be at the strong hip and pelvic bones, but across your abdomen. Always wear the lap part of your safety belt as low as possible, and keep it snug.*

5. Position the shoulder belt on your chest so that it is comfortable and not resting on your neck. The retractor will withdraw any slack in the belt.



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WARNING: *A twisted belt can't do its job as well. In a collision it could even cut into you. Be sure your belt is not twisted. If your belt can't be untwisted, take it to your dealer and have it fixed.*

6. To release the belt, push the red button marked "Press" on the buckle. The belt will automatically retract to its stowed position.

If necessary, slide the latch plate down the webbing to allow the belt to retract fully.

WARNING: *A frayed or torn belt could*

rip apart in a collision. It could leave you with no protection. Inspect your belts periodically, checking for cuts, frays, and loose parts. If you have been in a collision, have the belts checked, even though they may not show signs of damage. Have any damaged belt replaced.

Front Center Lap Belts

Front center seating positions have a lap belt only.

To fasten the lap belt, slip the latch plate into the buckle.

To lengthen the lap belt, tilt the latch plate and pull. To shorten the belt, pull the loose end of the webbing.

Wear the lap belt snug against the hips. Sit back and erect in the seat, then adjust the belt as tightly as is comfortable.

> **WARNING:** *A lap belt worn too loose or too high is dangerous.*

- A belt worn too loose can allow you to slip down and under the belt in a collision.
- A belt that is too high will apply crash forces to the abdomen, not to the stronger hip bones.

In either case, the risk of internal injuries is greater. Wear a lap belt low and snug.

> **WARNING:** *Belting two people into one seat belt can lead to greater injury. People belted together can crash into one another in an accident, hurting one another badly. Never use a belt for more than one person, no matter what their size.*

Seat Belts and Pregnant Women

We recommend that pregnant women use seat belts throughout their pregnancies. Keeping the mother safe is the best way to keep the baby safe.

Pregnant women should wear the lap part of the belt across the thighs and as snug against the hips as possible. Keep the belt low so that it does not come across the abdomen. That way the strong bones of the hips will take the force if there is a collision.

Seat Belt Extender

If a seat belt is too short, even when fully extended, your dealer can provide you with a seat belt extender. This extender should be used only if the existing belt is not long enough.

When it is not required, remove the extender and stow it. Use of the extender when it is not needed may defeat the seat belt locking mechanism.

Child Restraint

When we say that everyone in your vehicle needs to be buckled up all the time, we mean babies and children, too.

> **WARNING:** *In a collision, an unrestrained child, even a tiny baby, can become a missile inside the vehicle. The force required to hold even an infant on your lap can become so great that you could not hold the child, no matter how strong you are. The child and others could be badly injured. Any child riding in your vehicle should be in the proper restraint for his or her size.*

Every state in the United States and all Canadian provinces require small children to ride in proper restraint systems. This is the law, and you can be prosecuted for ignoring it.

Infants and Small Children

There are different sizes and types of restraints for children from newborn size to the bigger child almost large enough for an adult safety belt. Use the restraint that is correct for your child.

Two different child restraint systems are generally available.

- The infant carrier for babies weighing up to 20 lbs. (9 kg.)
- The child seat for small children over 20 lbs.

In addition, some manufacturers make systems that can be used first as an infant carrier, and then converted to a child seat as the child grows.

Here are some tips on getting the most out of your child restraint:

- Before buying any restraint system, make sure that it has a label certifying that it meets Motor Vehicle Safety Standard 213. We also recommend that before you buy a child restraint, you try it in the vehicle in the seats where you will use it.
- The restraint must be appropriate for your child's weight and height. Check the label on the restraint for this, too.
- If possible, install the restraint in the rear seat. According to accident statistics, children are safer when properly restrained in the rear seats rather than in the front.
- Carefully follow the instructions that come with the restraint. If you install the restraint improperly it may not work when you need it.

  WARNING: *Improper installation can lead to failure of an infant or child restraint. It could come loose in a collision. The child could be badly injured or killed. Follow the manufacturer's directions exactly when installing an infant or child restraint.*

- Infant and child restraints are secured in vehicle seats by the lap belt or the lap part of the lap/shoulder belt.

In the rear seat, you may have trouble tightening the belt on the child restraint because the buckle or latch plate interferes with the belt path opening on the restraint. Disconnect the latch plate from the buckle end and twist the short buckle-end belt several turns to shorten it. Reassemble the latch plate to the buckle with the release button turned so that it is facing out.

In the front seat, move the seat forward to re-position the buckle against the side of the child restraint.

In the front center seat, if the belt still can't be tightened or if pulling and pushing on the restraint loosens that belt, you may need to do someting more. Disconnect the latch plate from the buckle, turn it over, and reconnect it to the buckle. If you still can't make the child restraint secure, try a different seating position.

- A seat belt locking clip must be used with your child seat when used in the right front and right and left rear seating positions. If a locking clip has not been supplied with your child seat, you can buy one where child seats are sold.

  WARNING: *Failure to use the seat belt locking clip as directed may result in severe or fatal injury to your child in a collision. Follow the directions below.*

To use the locking clip:

1. Install the child seat according to the instructions supplied with the child seat.
2. Grasp the webbing and the latch plate as you unbuckle the seat belt. Do not allow the latch plate to slide along the webbing.
3. Install the locking clip as shown in the illustration. Keep the locking clip as close to the latch plate as possible.

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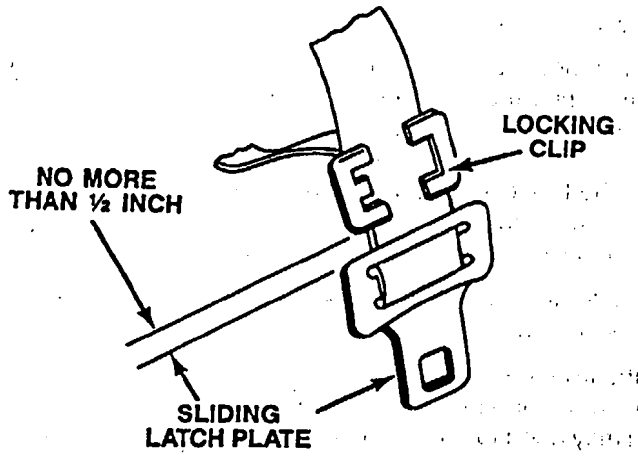

4. Buckle the seat belt and check that it is snug around the child seat.

> **WARNING:** *Leaving the locking clip in place when you remove the child restraint can lead to increased injury in an accident. With the clip in place, the belt can't adjust to its wearer. When an adult or a larger child will use the seat belt, remove the locking clip from the belt webbing.*

- Buckle the child into the seat exactly as the seat manufacturer's directions tell you.
- When your infant carrier or child seat is not in use, secure it with the seat belt or remove it from the vehicle. Don't leave it loose in the vehicle. In a sudden stop or collision it could strike occupants and injure them.

Children Too Large for Child Seats

Children who are too large for child seats and who can sit upright by themselves should use the available lap/shoulder belts for best protection.

- Make sure that the child is seated upright in the seat.
- The lap belt should be fastened low on the hips and as snug as possible.
- Check belt fit periodically. A child's squirming or slouching can move the belt out of position.

If the shoulder belt contacts the face or neck, move the child closer to the middle of the vehicle. If this doesn't solve the problem, move the child to the front center seat and use the lap belt.

Booster seats that may help overcome this problem are also available for use with lap/shoulder belts. Before buying a booster seat, make sure it has a label certifying that it meets applicable Motor Vehicle Safety Standards. Make sure it is satisfactory for use in this vehicle.

SEATS

Seat Adjustment

The adjusting lever is at the front of the seat, near the floor. Rotate the lever with a lifting action and move the seat to the desired position.

Using body pressure, move forward and rearward on the seat to be sure the seat adjusters have latched.

> **WARNING:** *Adjusting a seat while the vehicle is moving is dangerous. If you are driving, the sudden movement of the seat could cause you to lose control. If you are a passenger, the loose seat could move in a sudden stop and your seat belt might not be adjusted properly to help you. You could be injured. Adjust any seat only while the vehicle is parked.*

Reclining Seats

Both the bucket seats and the split-bench seats are equipped with recliners. The reclining mechanism is operated by a control located on the outside of the seat.