

REPORT NO. CAL-89-N04

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

CHRYSLER CORPORATION
1989 DODGE DAYTONA
2-DOOR HATCHBACK

NHTSA NO. MK0304
CALSPAN TEST NO. 7689-4

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225

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FINAL REPORT

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Prepared: Michael J. Kilgallon
Michael J. Kilgallon, Project Engineer

Approved: Walter E. Levan
Walter E. Levan, Program Manager
Transportation Research/
Physical Sciences Department

FINAL REPORT ACCEPTED BY:

Vincent Quarles

Manager, New Car Assessment Program (NCAP)

MAY 11 1989

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16. Abstract A frontal barrier impact test of a 1989 Dodge Daytona 2-Door Hatchback was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York on January 23, 1989. The impact speed was 34.7 mph and the ambient temperature at the barrier face was 49°F. The maximum post-test crush was 25.9 inches. The test vehicle was equipped with a manual 3-point belt system at each of the front outboard positions. The driver position was equipped with an airbag as a supplemental restraint system. With regard to FMVSS 208, "Occupant Crash Protection," injury criteria, both the driver and passenger dummies appear to satisfy the head, chest and femur requirements.					
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Section 1
PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 89 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-87-D-02012. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph requirements.

The 35 mph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test Procedure.

Section 2
SUMMARY OF TEST NUMBER MK0304

A load cell barrier consisting of 36 load cells was impacted by a 1989 Dodge Daytona 2-Door Hatchback at a velocity of 34.7 mph. The test was performed at the Calspan Corporation Advanced Technology Center on January 23, 1989. Pre- and post-test photographs of the vehicle and the anthropomorphic test devices (ATDs) can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 15 high speed cameras. Camera locations and other pertinent camera data can be found in this report.

Two Part 572 50th percentile ATDs were placed in the driver and right-front passenger seating positions. The ATDs were positioned according to dummy placement instructions as specified in Laboratory Indicant Test Procedure. Both of the ATDs were restrained with a 3-point restraint system. The driver seating position was equipped with an airbag as a supplemental restraint system.

The ATDs were fully instrumented with head and chest triaxial accelerometers and left/right femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 1021) had been used in one previous test (MK5600) and the Injury Criteria values were not exceeded in that test. The passenger ATD (Serial No. 1022) was certified prior to the test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 65 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the airbag, and his HIC was 399. The maximum chest deceleration over 3 milliseconds was 39 g's and femur loads were 729 and 795 pounds.

The right-front passenger HIC was 297 and maximum chest deceleration over 3 milliseconds was 32 g's. Femur loads were 908 and 457 pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1989 Dodge Daytona 2-Door Hatchback

NHTSA NO.: MK0304 VIN.: 1B3XG24K1KG155797

BODY COLOR: White DATE OF MANUFACTURE: 11/88

Engine: 4 cylinders; - C.I.D.; 2.5 Liters; - CC
X Gas; - Diesel; - Turbocharged
- Longitudinal; X Transverse

Transmission: 5 Speed X Manual; - Automatic; - Overdrive
 Final Drive: X Front Wheel; - Rear Wheel; - Four Wheel

Date Received: 12-22-88 Odometer Reading: 21.3
- A/C; - P/S; - P/B; X P/wdo.; - Tilt Wheel
- P/seats; - Cruise Control

Type of Occupant Restraint: Driver airbag, 3-point manual belts

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 35 psi, Rear 35 psi

Recommended Tire Size: P185/70R14

Recommended Cold Tire Pressure: Front 32 psi, Rear 32 psi

Tires on Vehicle: P185/70R14; Manufacturer: Goodyear

Number of Occupants: 2 Front; 2 Rear; - 3rd Seat; 4 TOTAL

Type of Front Seats: X Bucket; - Bench; - Split Bench

Type of Front Seat Back: - Fixed; X Adj. With X Lever - Rot. Knob

Vehicle Capacity Weight (VCW) = 715 lbs. (A)

No. of Occupants x 150 lbs. = 600 lbs. (B)

Rated Cargo and Luggage Weight (RCLW) A-B = 115 lbs.

GVWR 3571 lbs. GAWR: Front 2000 lbs. Rear 1621 lbs.

Table 1
GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 850 lbs. Right Rear = 530 lbs.
 Left Front = 870 lbs. Left Rear = 540 lbs.
 TOTAL FRONT WEIGHT = 1720 lbs. (62 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1070 lbs. (38 % of Total Vehicle Weight)
 TOTAL DELIVERY WEIGHT = 2790 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (2790 lbs.)
 VCW = Vehicle Capacity Weight (715 lbs.)
 DSC = Designated Seating Capacity (4)
 RCLW = VCW - 150 (DSC) = 115 lbs.
 Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)
 Target Test Weight = 3233 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 202 POUNDS CARGO:

Right Front = 920 lbs. Right Rear = 710 lbs.
 Left Front = 980 lbs. Left Rear = 710 lbs.
 TOTAL FRONT WEIGHT = 1900 lbs. (57 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1420 lbs. (43 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 3320 lbs.
 Weight of ballast secured in vehicle trunk area = 0 lbs.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 26.7" LF 26.6" RR 26.9" LR 26.9"
 Test Attitude: RF 27.0" LF 27.0" RR 24.9" LR 25.1"
 Wheel Base: 97.0 in.; C.G. = 41.5 in. rearward of front wheel C/L

Table 1
GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0 °
 Date of Test: 1-23-89 Time of Test: 12:20
 Ambient Temperature: 49 °F at impact area
 Temperature in Occupant Compartment: 68 °F.
 Windshield Molding Temperature: 68 °F.
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 34.7 mph, secondary = 34.8 mph
 Distance From Front Bumper to Barrier Face When Entering Speed Trap: 52
 inches; Exiting Speed Trap: 12 inches

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length:	Pre-test	= R	<u>174.2</u>	C _L	<u>178.2</u>	L	<u>174.7</u>
	Post-test	= R	<u>148.7</u>	C _L	<u>152.3</u>	L	<u>149.6</u>
	Crush	= R	<u>25.5</u>	C _L	<u>25.9</u>	L	<u>25.1</u>

Distance from front of test vehicle to point of impact:

R 15.5" C/L 14.4" L 15.1"

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Airbag</u>	<u>None</u>
Chest	<u>Airbag</u>	<u>None</u>
Abdomen	<u>None</u>	<u>None</u>
Left Knee	<u>Dash</u>	<u>Dash</u>
Right Knee	<u>Dash</u>	<u>Dash</u>

Table 1
GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	<u>Front</u>	
	<u>Left</u>	<u>Right</u>
Door Opening	<u>Operable</u>	<u>Operable</u>

	<u>Front</u>	
	<u>Left</u>	<u>Right</u>
<u>Seat Movement</u>		
Seat Back Failure	<u>None</u>	<u>None</u>
Seat Shift (in.)	<u>None</u>	<u>None</u>

Glazing Damage

Backlight/Windshield Windshield remained intact.

Section 3
OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Driver Dummy to Steering Column Dimensions
6. Camera Locations
7. Vehicle Target Locations

II. OVR DATA

1. Load Cell Barrier Data
2. Vehicle Accelerometer Data
3. Test Vehicle Measurements

Table 2
DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-46	-21	27	53	-39	-12	-10	39
DUMMY (2)	-15	19	47	51	-28	15	24	32
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	LEFT FEMUR	RIGHT FEMUR
DUMMY (1)	729	795
DUMMY (2)	908	457
DUMMY (3)		
DUMMY (4)		

	MAXIMUM FORCE - SEAT BELTS LOADS (LBS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	1451	-	908
DUMMY (2)	1562	890	-
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**			
	HIC	36 millisecond max.		AVE. ACC. (g) t ₁ TO t ₂
		t ₁ (SEC)	t ₂ (SEC)	
DUMMY (1)	399	0.06810	0.10410	41.5
DUMMY (2)	297	0.09405	0.13005	36.9
DUMMY (3)				
DUMMY (4)				

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION

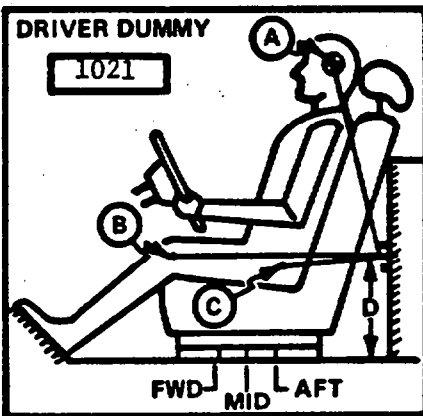
TEST NO.: MK0304

VEHICLE: 1989 Dodge Daytona

SEAT TYPE:
 Bench
 X Bucket
 Split Bench

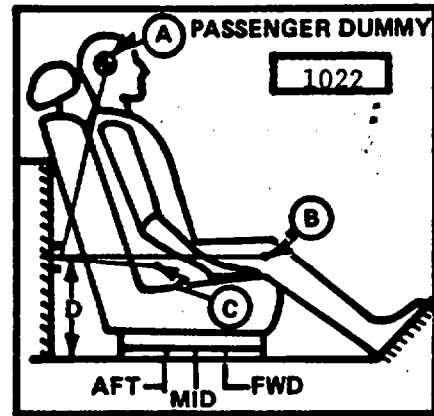
ADJUSTER TYPE:
 X Manual
 Power

BUCKET SEAT BACK TYPE:
 Fixed
 X Adjustable Reclining



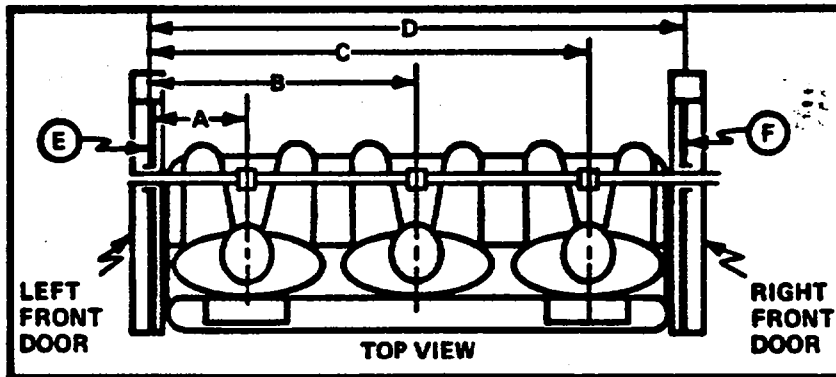
MEASUREMENT LOCATION

- A - Head Target
- B - Knee Joint
- C - Approximate 'H' Point
- D - Sill to Reference Point



A =	<u>25.8</u>	in.	<u>33</u>	Degrees
B =	<u>35.8</u>	in.	<u>92</u>	Degrees
C =	<u>21.0</u>	in.	<u>108</u>	Degrees
D =	<u>14.5</u>	in.		

A =	<u>26.3</u>	in.	<u>34</u>	Degrees
B =	<u>36.0</u>	in.	<u>95</u>	Degrees
C =	<u>20.6</u>	in.	<u>107</u>	Degrees
D =	<u>14.5</u>	in.		



DUMMY ID

1021

1022

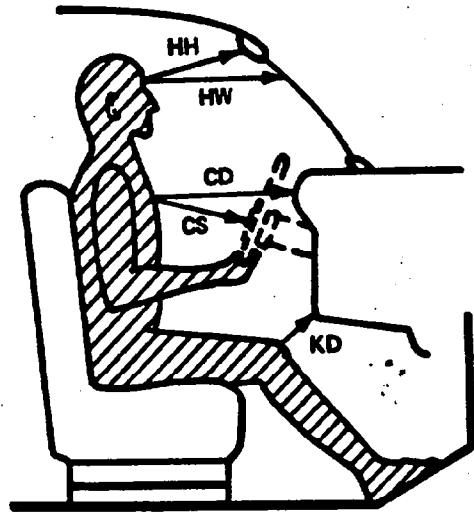
A =	Left Door to Driver Centerline	<u>12.5</u>	in.
B =	Left Door to Center Passenger Centerline	<u>-</u>	in.
C =	Left Door to Right Passenger Centerline	<u>38.9</u>	in.
D =	Left Door to Right Door	<u>51.5</u>	in.
E, F =	Window Glass Height (Right and Left Must Be Equal)	<u>12.0</u>	in.

NOTE: DIMENSIONS PROVIDED BY MANUFACTURER FOR SEAT ANGLES.

Figure 2

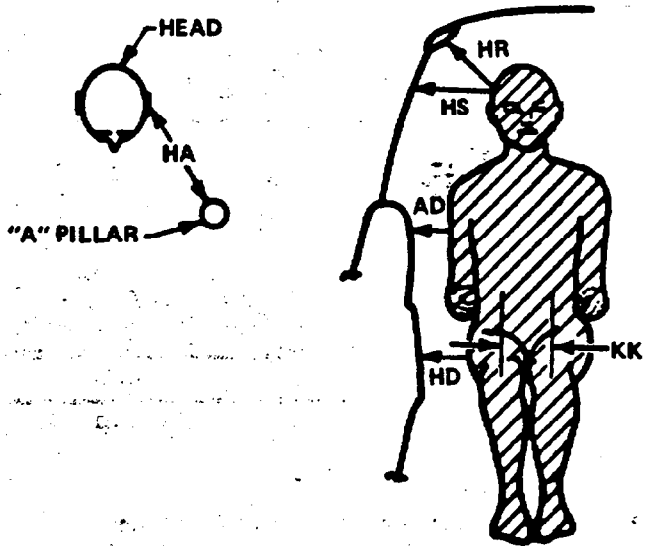
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	13.5	13.4
HW	16.6	16.3
CD	21.0	23.6
CS	13.5	-
KDL	5.9	6.2
KDR	5.9	5.8
SA	26°	26°
TA	24°	24°



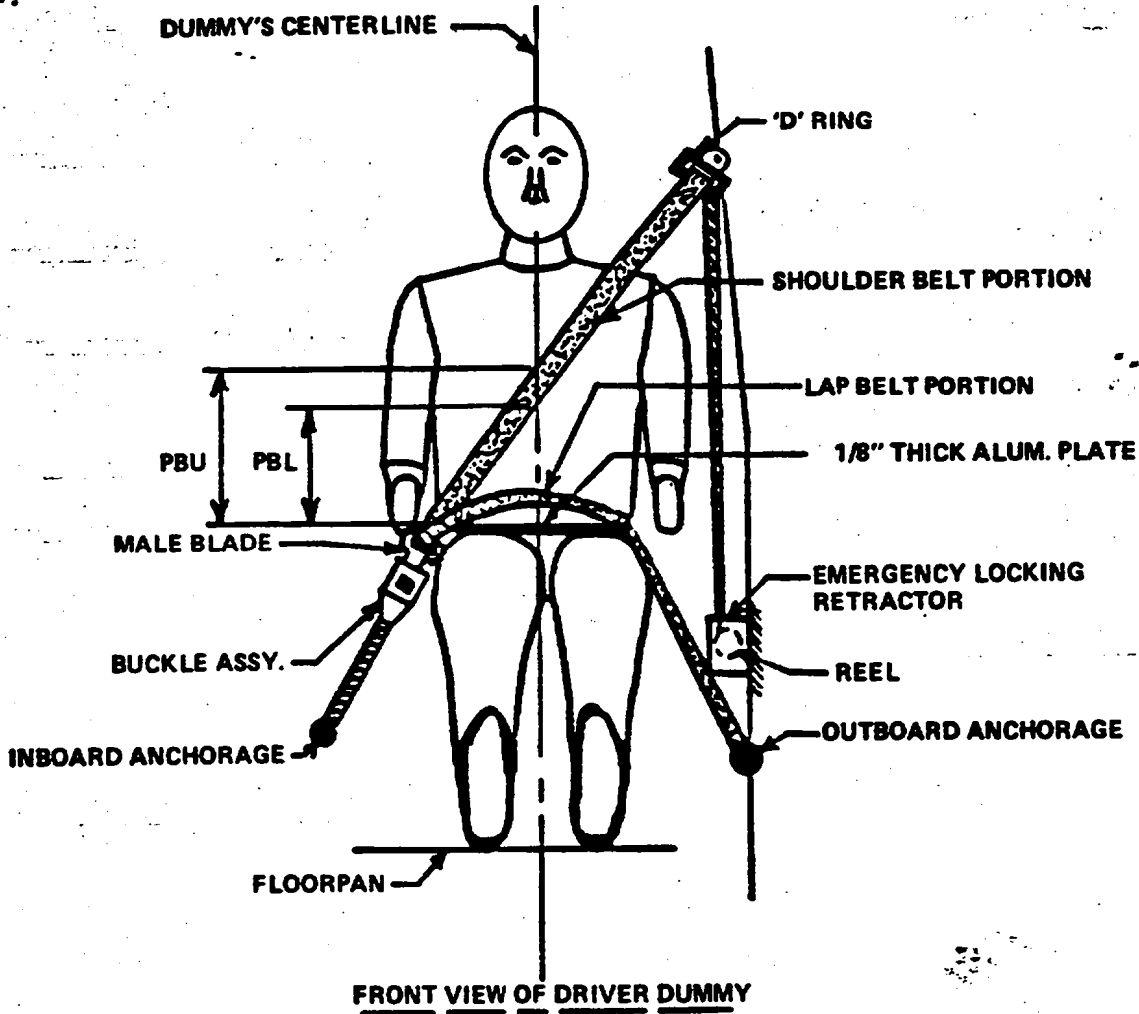
- HH = Head to Windshield Header
- HW = Head to Windshield
- CD = Chest to Dash
- CS = Chest to Steering Wheel
- KD(L/R) = Knee to Dash (Left/Right)
- SA = Seat Back Angle
- TA = Torso Angle

- HA = Head Target to "A" Pillar
- HR = Head to Side Roof
- HS = Head to Side Window
- AD = Arm to Door
- HD = Hip to Door
- KK = Knee to Knee



	DRIVER	PASSENGER
HR	4.5	4.4
HS	9.1	9.5
AD	5.0	5.4
HD	7.1	7.1
KK	10.0	8.1
HA	15.6	15.3

Figure 3
SEAT BELT POSITIONING DATA



	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	13.5	13.5
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	10.2	10.0
<u>LAP BELT TENSION</u>	2 lbs	2 lbs
<u>SHOULDER BELT TENSION</u>	-	-

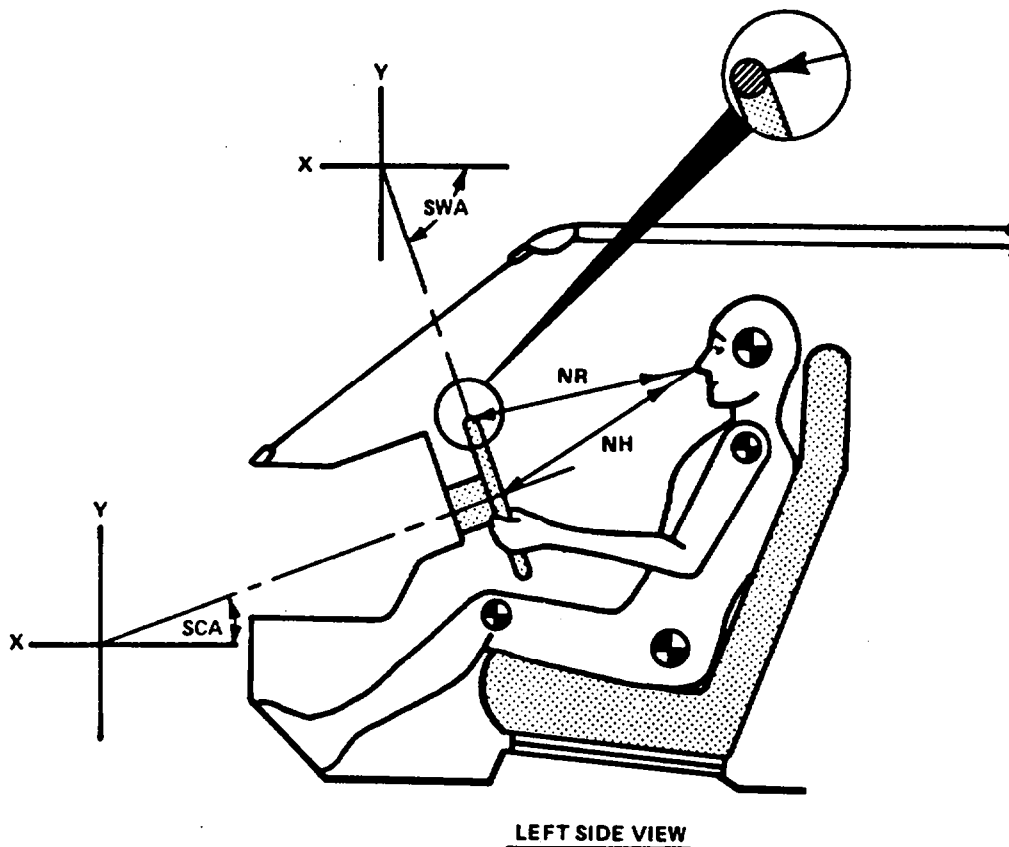
Table 3

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

<u>BELT LENGTH DATA:</u>	<u>Driver</u>	<u>Passenger</u>
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	<u>73.5</u>	<u>73.5</u>
Shoulder belt length as measured on Part 572 Dummy	<u>42.5</u>	<u>42.5</u>
Lap belt length as measured on Part 572 Dummy.	<u>31.0</u>	<u>31.0</u>
<u>BELT SPOOL-OFF DATA:</u>		
As determined by film analysis.	<u>2.5</u>	<u>3.0</u>
As determined mechanically.	<u>2.0</u>	<u>2.8</u>
<u>BELT STRETCH DATA:</u>		
Measured electronically between shoulder belt load cell and the "D" ring.	<u>0.5"/ft</u>	<u>N/A</u>
Measured Mechanically	<u>0.0"/ft</u>	<u>0.0"/ft</u>

Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



	MEASUREMENTS	
<u>NR</u> -- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	18.3	Inches
<u>NH</u> -- Distance from tip of dummy's nose to center of steering column hub	19.4	Inches
<u>SCA</u> -- Angle of steering column relative to the horizontal X axis	22	Degrees
<u>SWA</u> -- Angle of steering wheel relative to the horizontal X axis	-68	Degrees

Figure 5

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

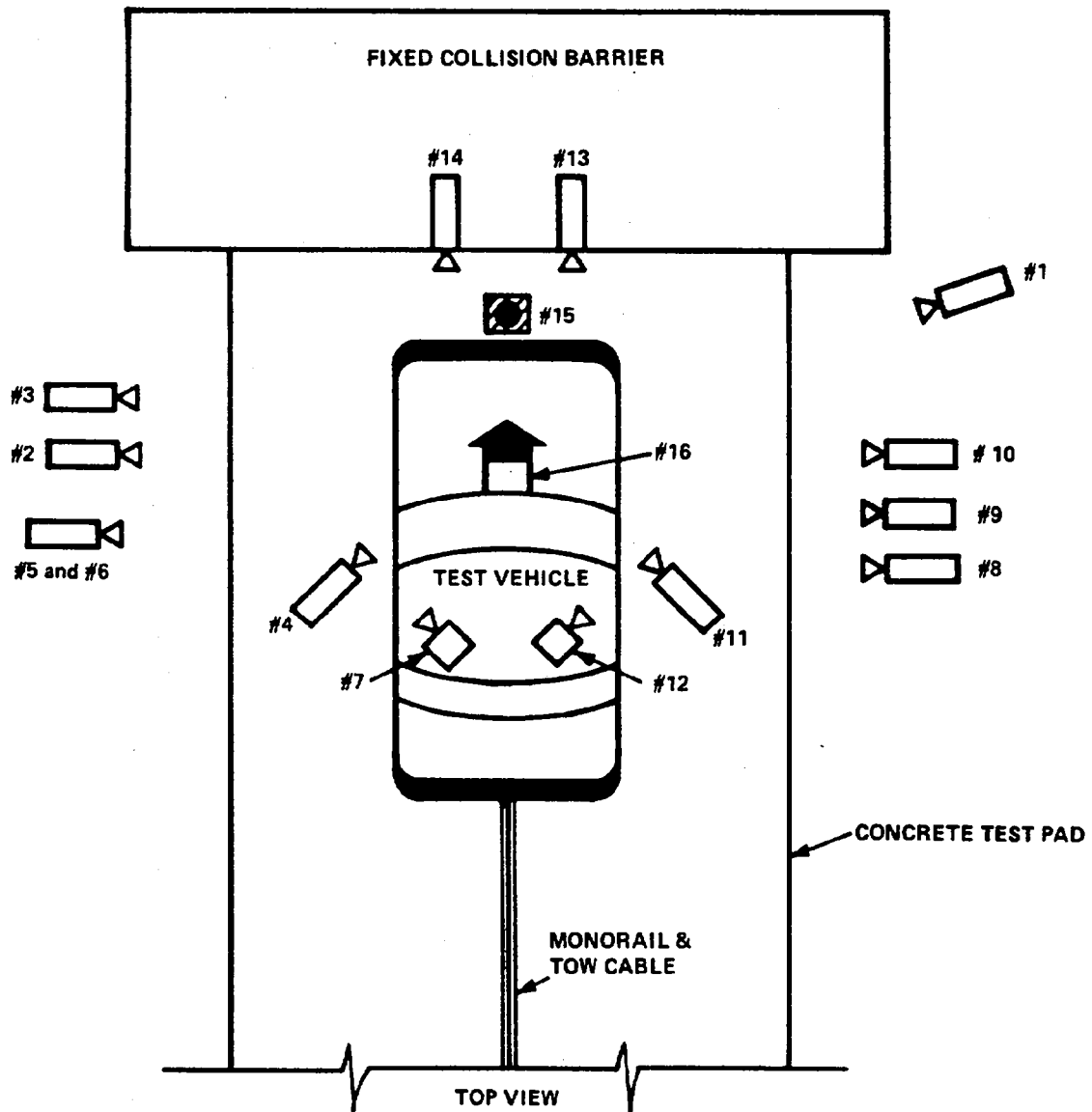


Table 4
HIGH-SPEED CAMERA LOCATIONS

Test No. MK0304

Vehicle 1989 Dodge Daytona

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	24	
2	Overall Left Side	246	59	41	-5	230	540	
3	Left Side View	316	32	41	-4	300	540	
4	Driver and Interior View	106	112	70.5	-17	90	720	
5	Steering Column (Bottom)	284	80	47	-3	268	550	
6	Steering Column (Top)	284	80	71	-9	268	570	
7	Left Belt	-	-	-	-	-	610	
8	Overall Right Side	244	80	42	-4	228	880	
9	Right Side View	298	72	41	-3	282	820	
10	Right Passenger View	318	89	58	-5	302	720	
11	Passenger and Interior View	97	120	70	-19	81	600	
12	Right Belt	-	-	-	-	-	740	
13	Passenger Front View	24	-5	73	-30	-	550	
14	Driver Front View	24	-5	73	-32	-	550	
15	Windshield View	0	0	126	-48	-	540	
16	Pit View of Engine	0	32	-120	90	-	900	

* X = film plane to monorail centerline

Y = film plane to impact location

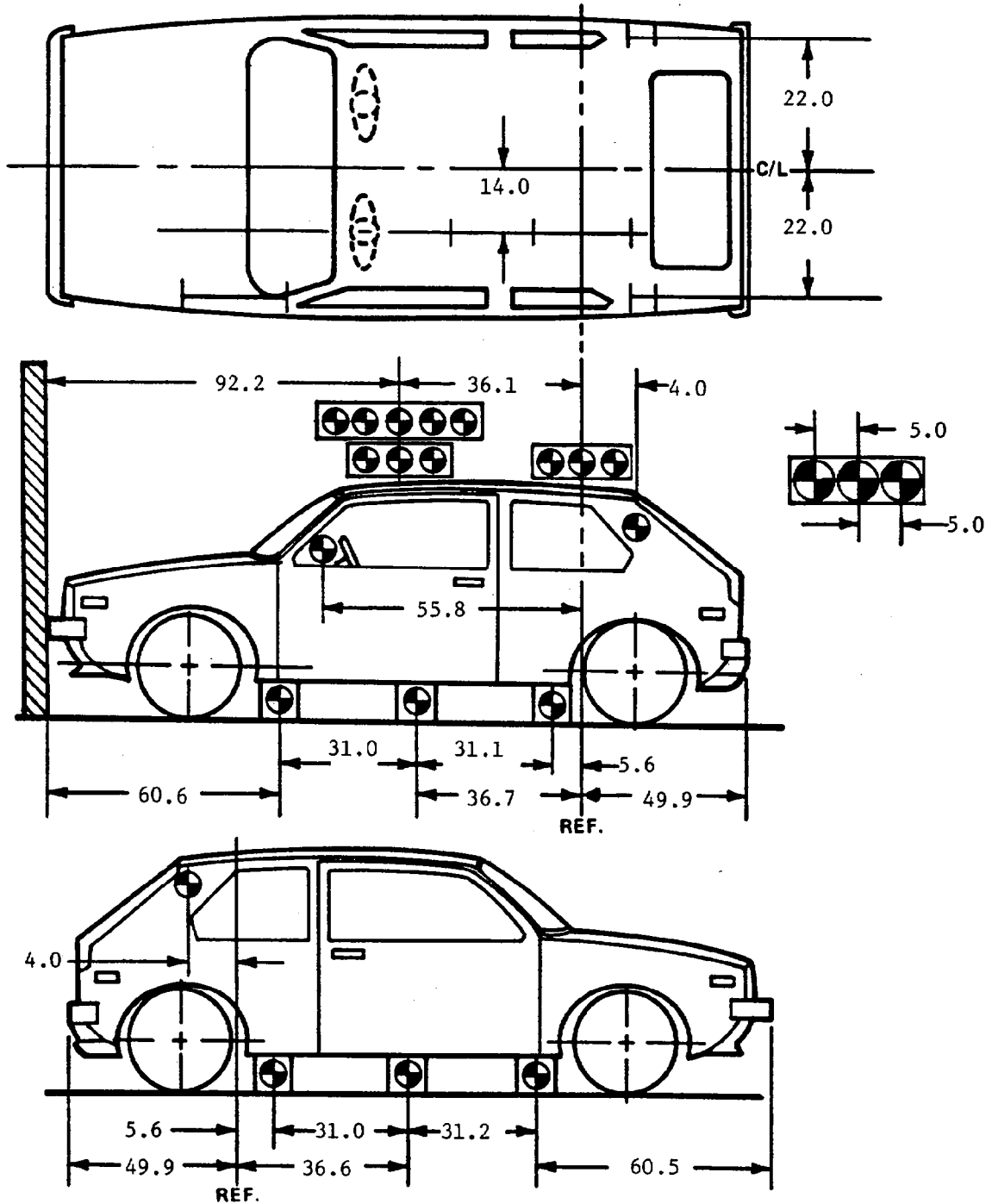
Z = film plan to ground

** = referenced to horizontal plane

Note: Film speed is not available.

Figure 6

VEHICLE TARGET LOCATIONS

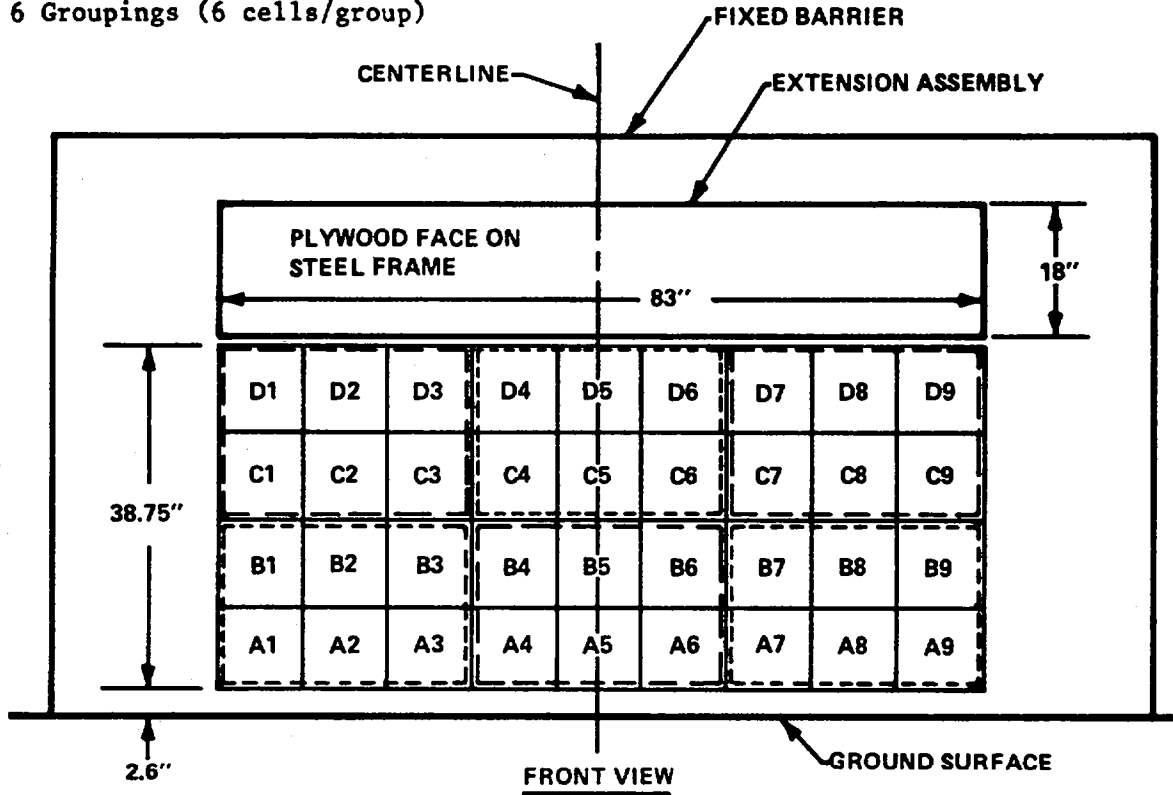


(DIMENSIONS IN INCHES)

Figure 7

LOAD CELL LOCATIONS ON FIXED BARRIER

- 36 Load Cells
- 4 Rows
- 9 Columns
- 6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

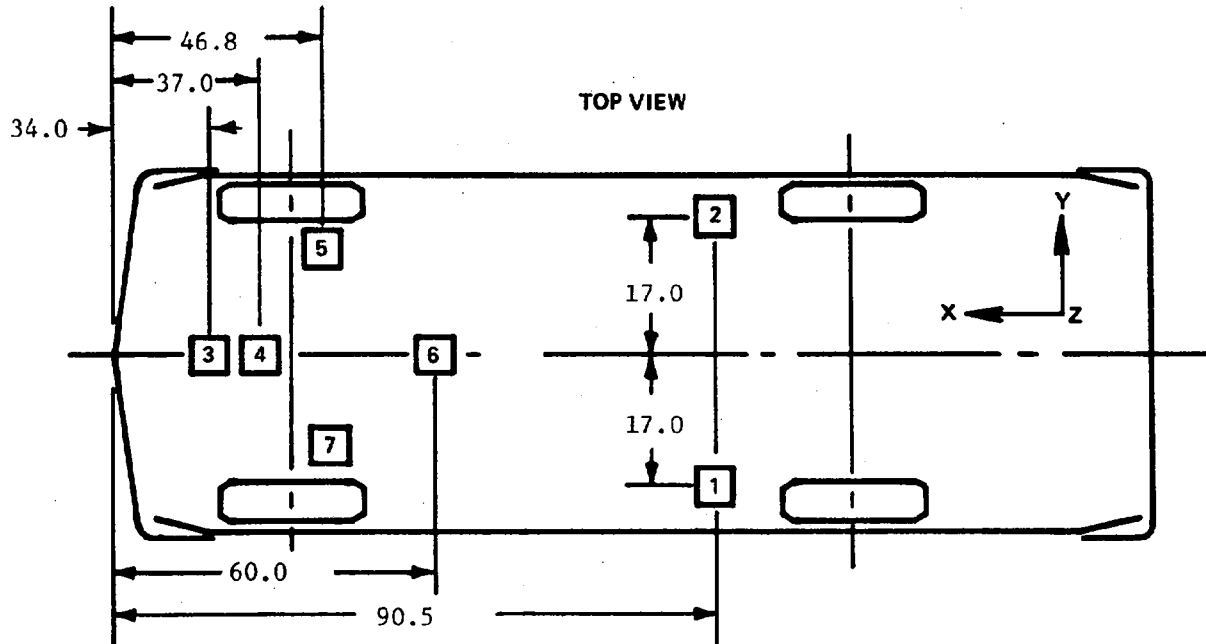
Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

The following data is presented in Appendix B:

- (1) Data from 36 individual load cells
- (2) Total or Sum of 36 individual load cells
- (3) Data from 6 Groupings shown above (6 cells/group)

Figure 8

VEHICLE ACCELEROMETER LOCATIONS



ACCELEROMETER NUMBER*	ACCELEROMETER LOCATION	DIRECTION		
		X	Y	Z
1	Left Rear Seat Crossmember	X		
2	Right Rear Seat Crossmember	X		
3	Top of Engine	X		
4	Bottom of Engine	X		
5	Right Disc Brake Caliper	X		
6	Instrument Panel	X		
7	Left Disc Brake Caliper	X		

*The accelerometer pack number can be correlated with the vehicle response data traces found in Appendix B.

Figure 9

TEST VEHICLE MEASUREMENTS

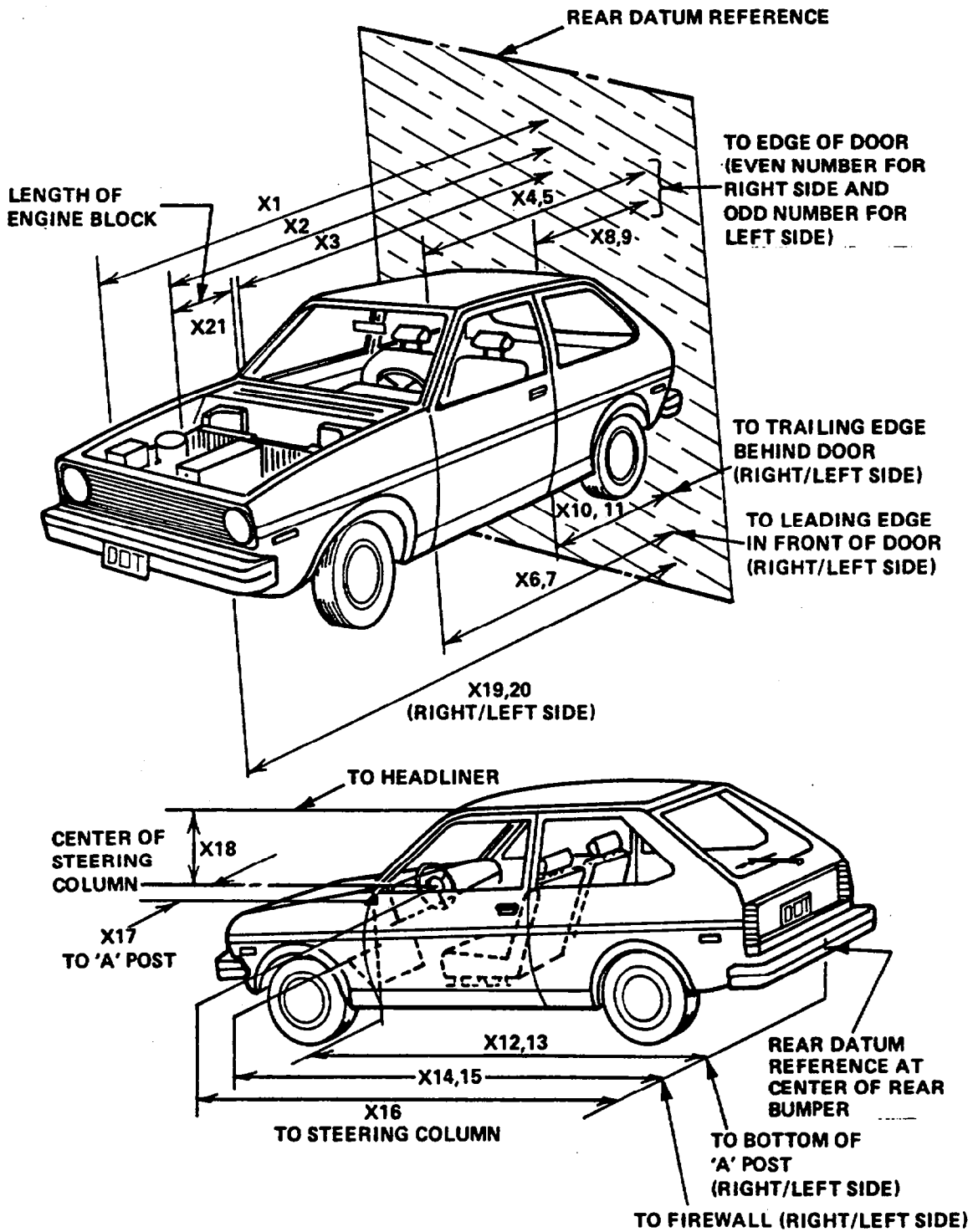


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	178.2	152.3	25.9
X2	Rear Surface of Vehicle to Front of Engine	149.7	140.1	9.6
X3	Rear Surface of Vehicle to Firewall	127.0	123.5	3.5
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	113.7	114.0	-0.3
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	114.5	113.9	0.6
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	112.5	113.3	-0.8
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	113.5	112.9	0.6
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	58.9	59.0	-0.1
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	59.6	59.0	0.6
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	65.8	66.1	-0.3
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	66.6	66.2	0.4
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	112.4	113.0	-0.6
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	113.4	113.0	0.4
X14	Rear Surface of Vehicle to Firewall, Right Side	126.2	122.6	3.6
X15	Rear Surface of Vehicle to Firewall, Left Side	127.4	124.4	3.0
X16	Rear Surface of Vehicle to Steering Column	98.3	96.3	2.0
X17	Center of Steering Column to "A" Post	16.7	15.7	1.0
X18	Center of Steering Column to Headliner	16.8	19.3	-2.5
X19	Rear Surface of Vehicle to Right Side of Front Bumper	174.2	148.7	25.5
X20	Rear Surface of Vehicle to Left Side of Front Bumper	174.7	149.6	25.1
X21	Length of Engine Block	15.0	15.0	0.0

Appendix A

PHOTOGRAPHS

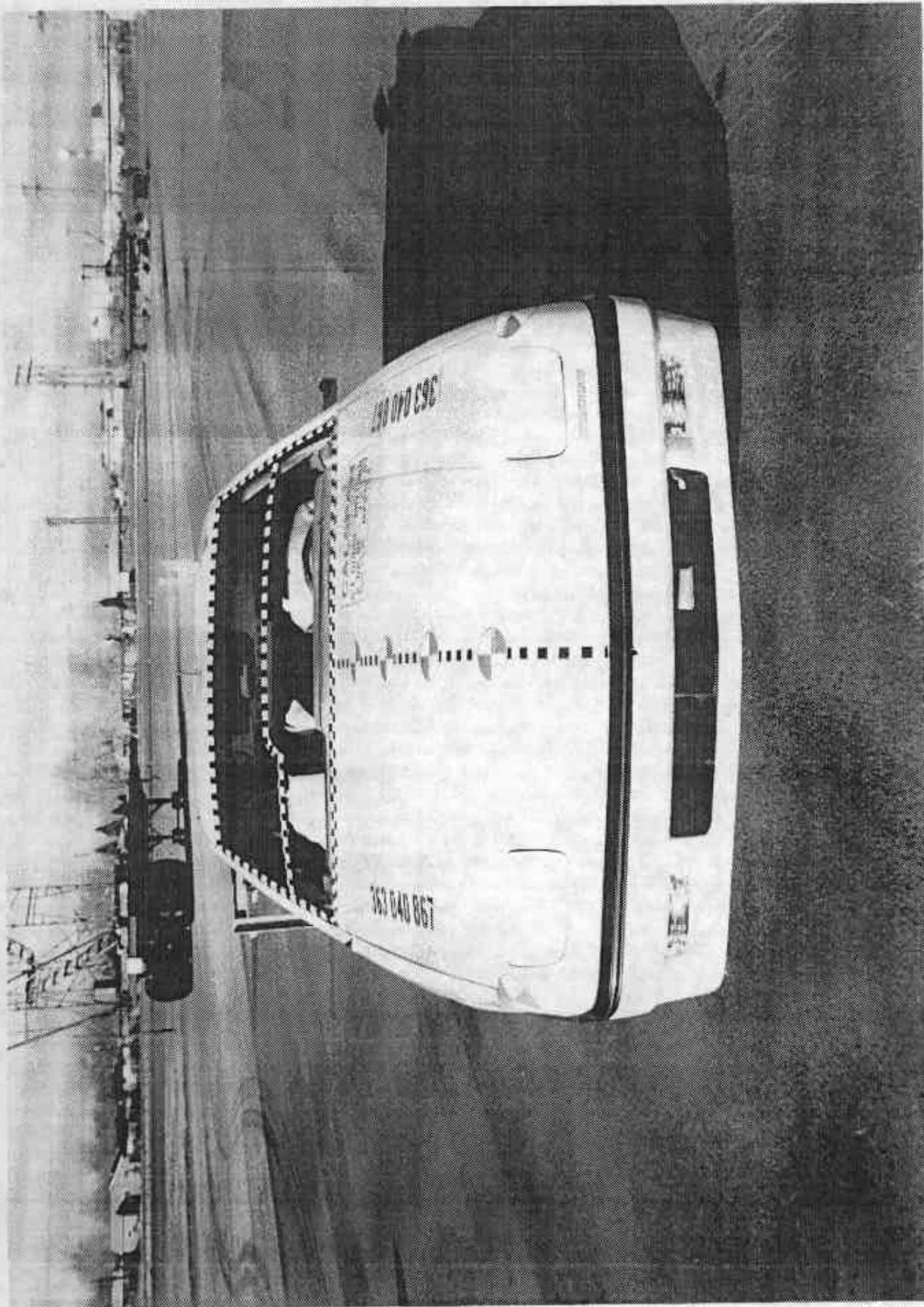


Figure A-1 PRE-TESI FRONT VIEW

A-2

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Figure A-2 POST-TEST FRONT VIEW

A-3

7689-4

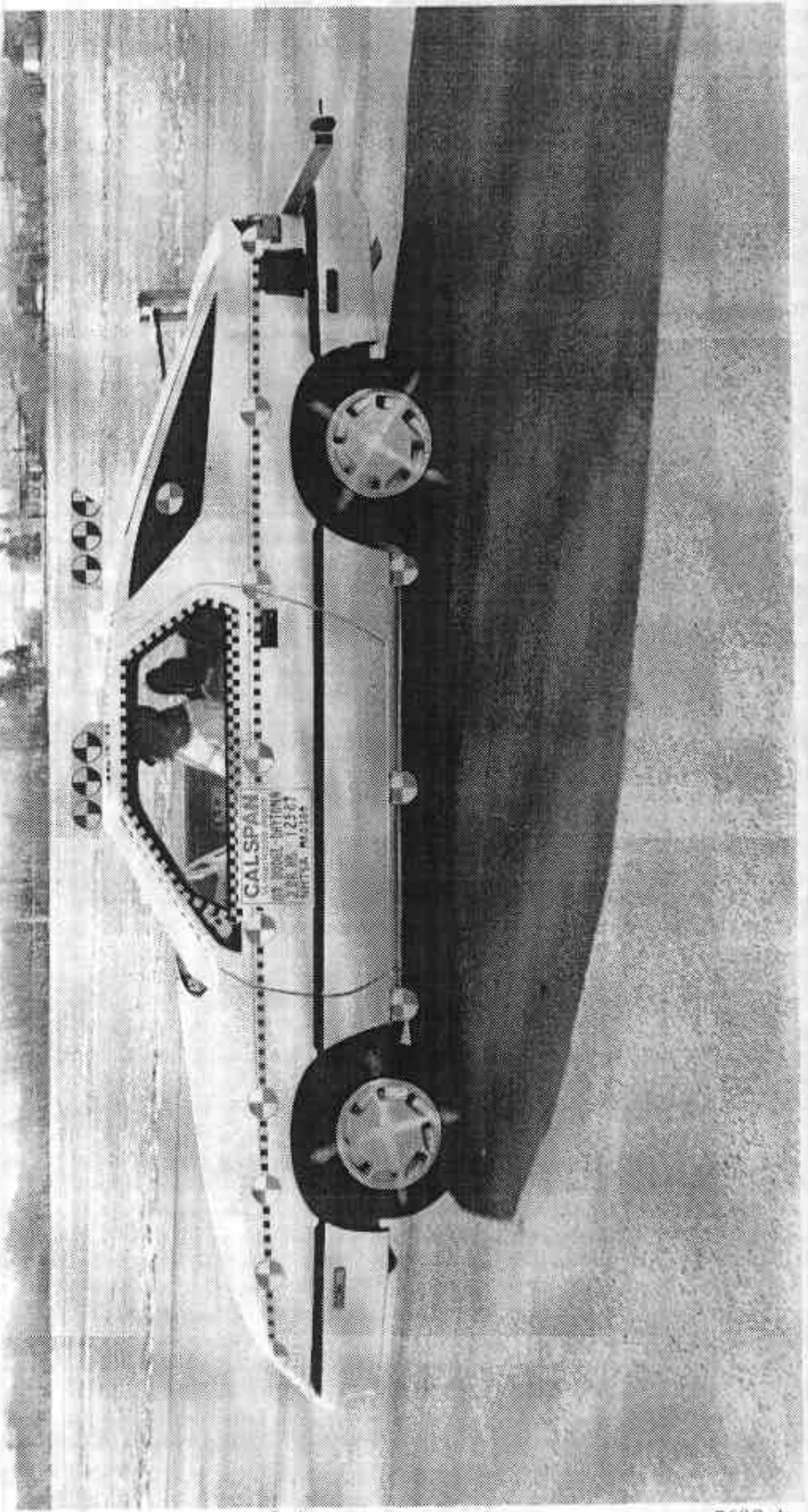


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-4

7689-4

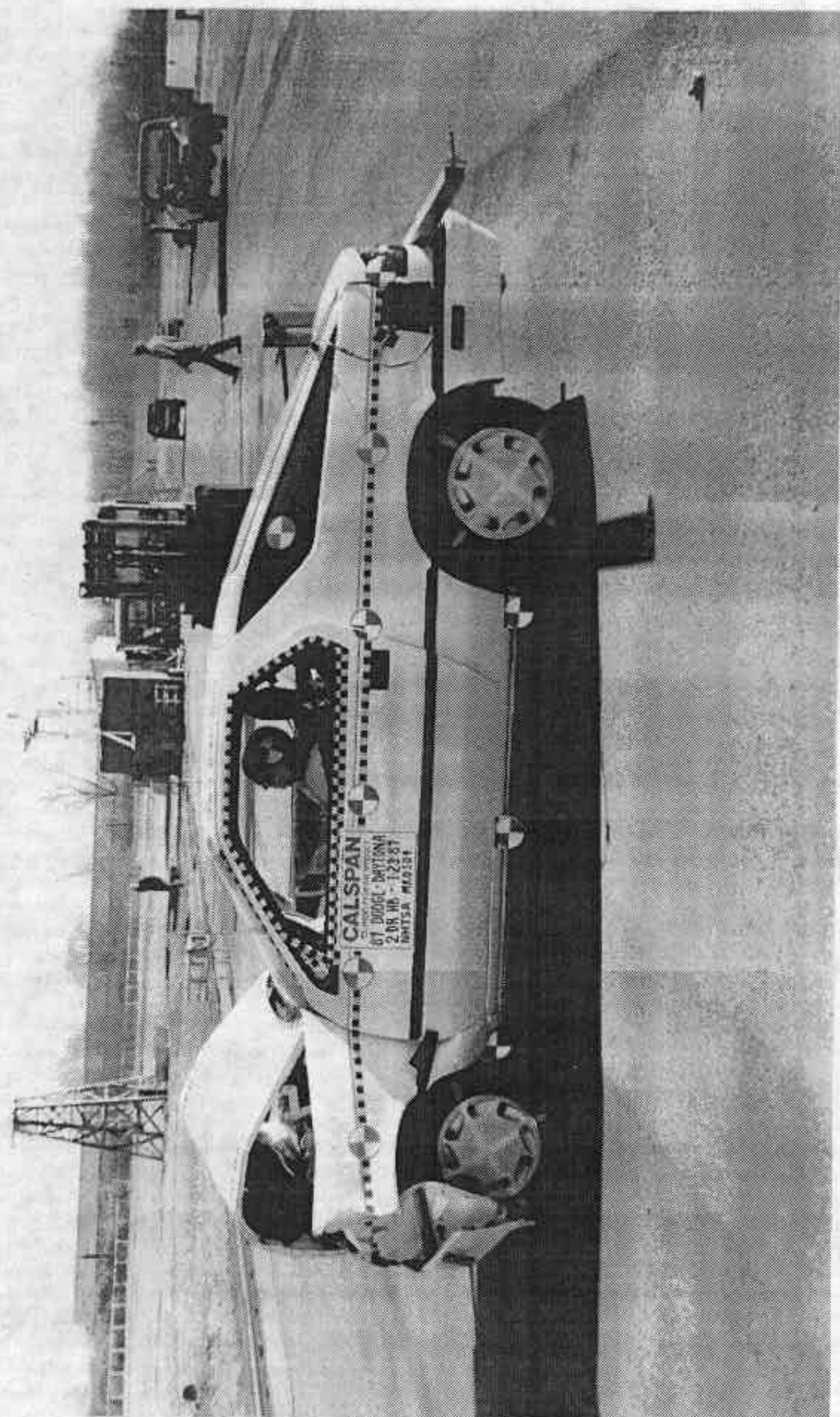


Figure A-4 POST-TEST LEFT SIDE VIEW

A-5

7689-4

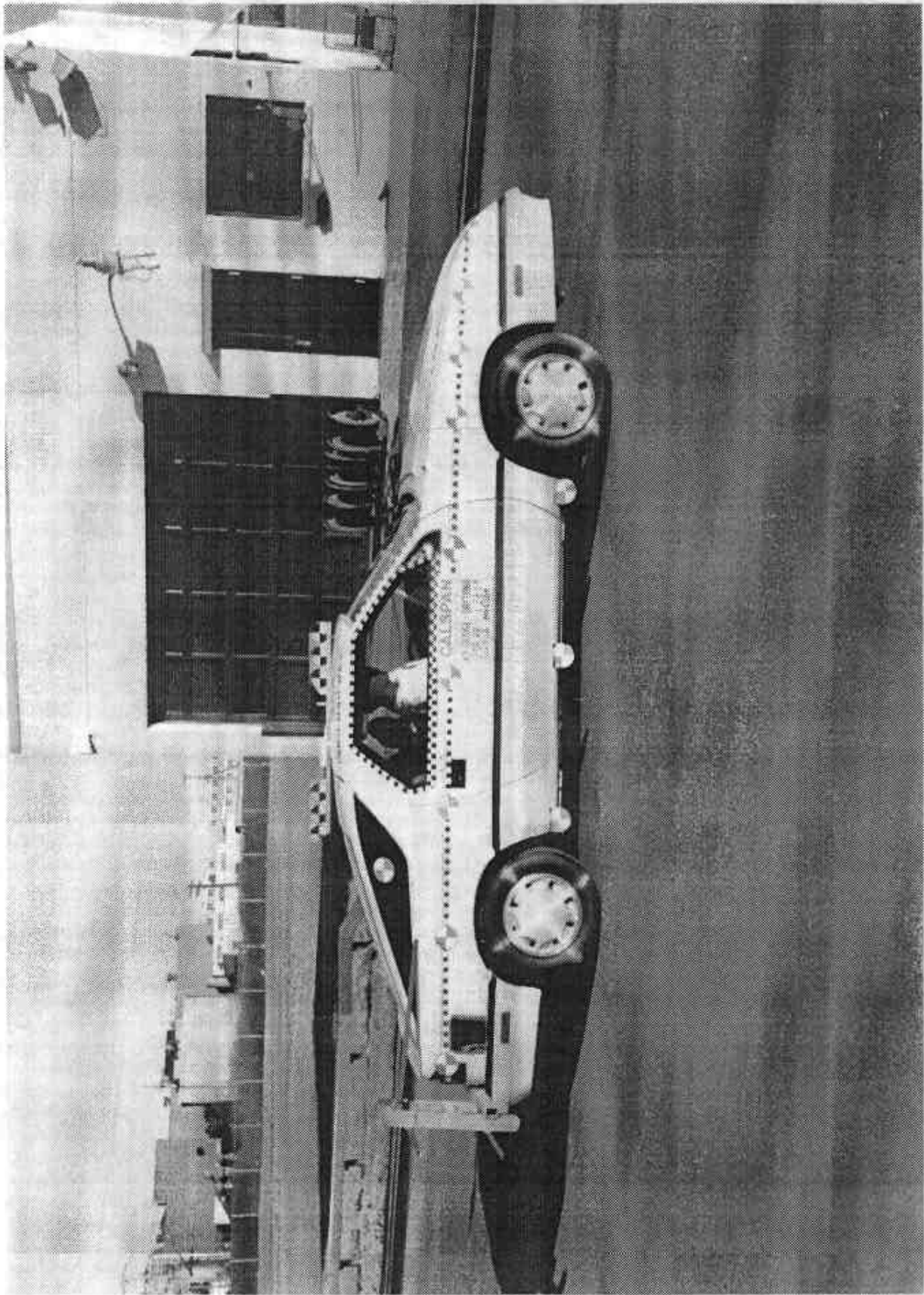


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-6

7689-4

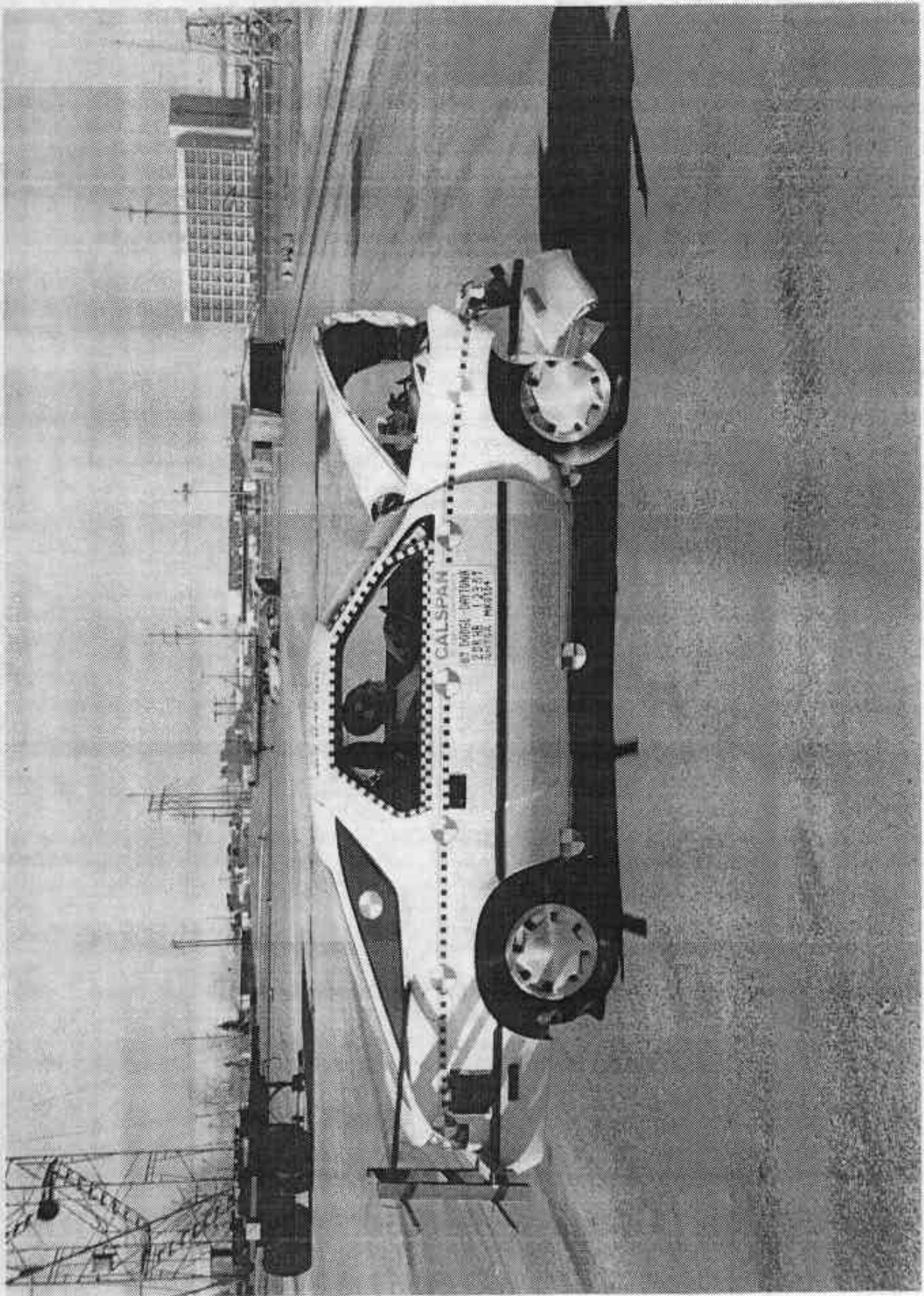


Figure A-6 POST-TEST RIGHT SIDE VIEW

A-7

7689-4

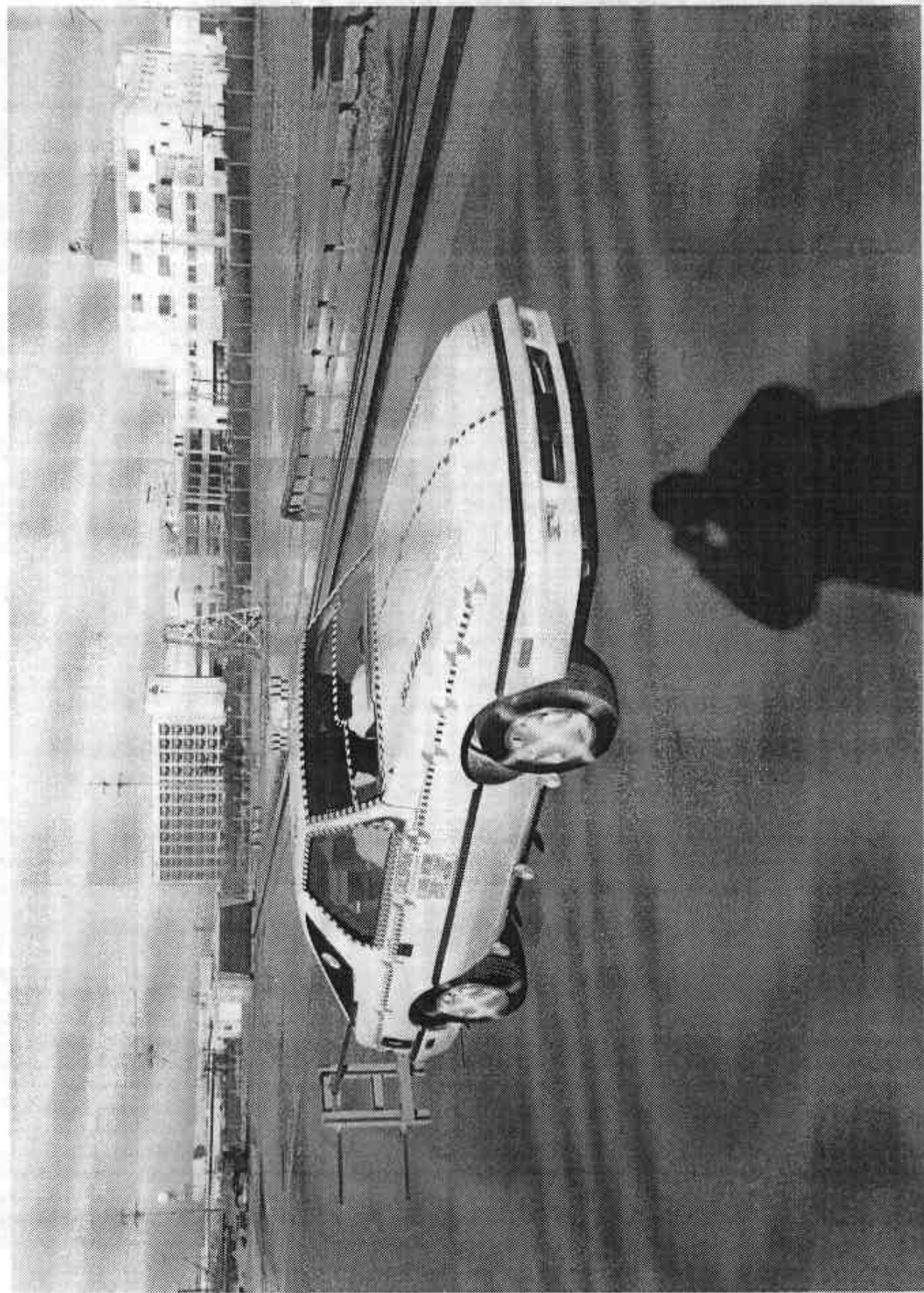


Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-8

7689-4

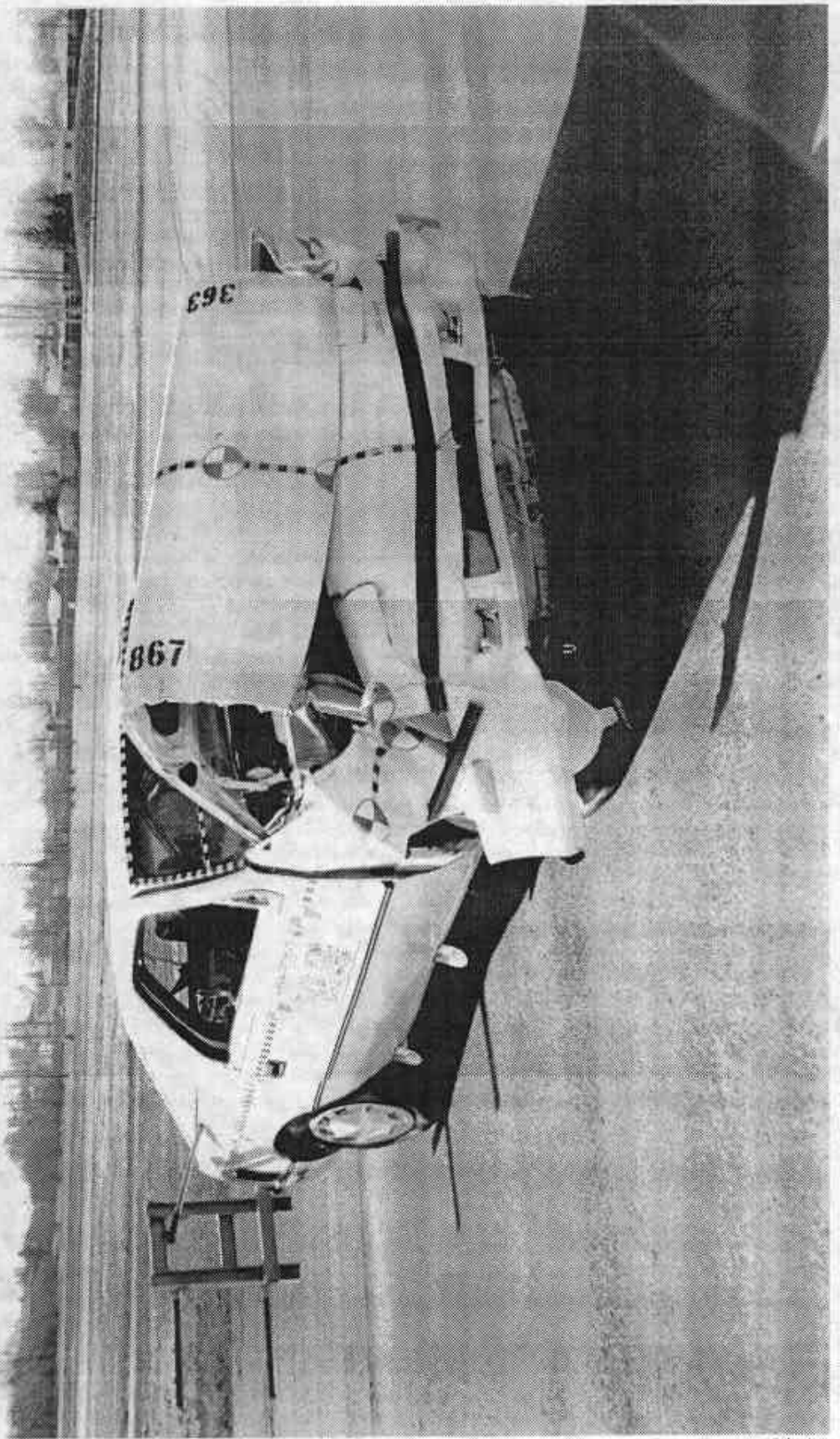


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-9

7689-4



A-10

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

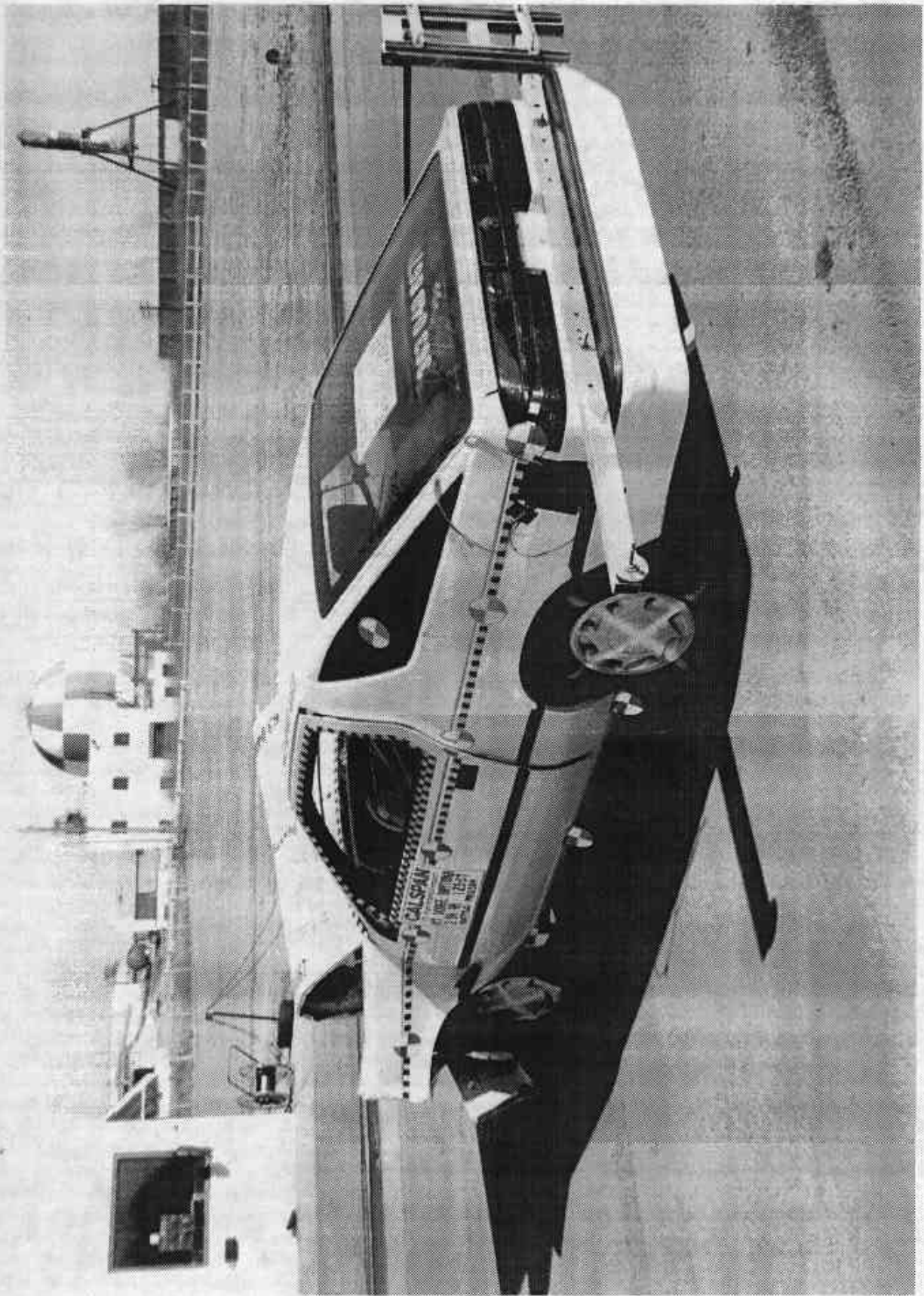
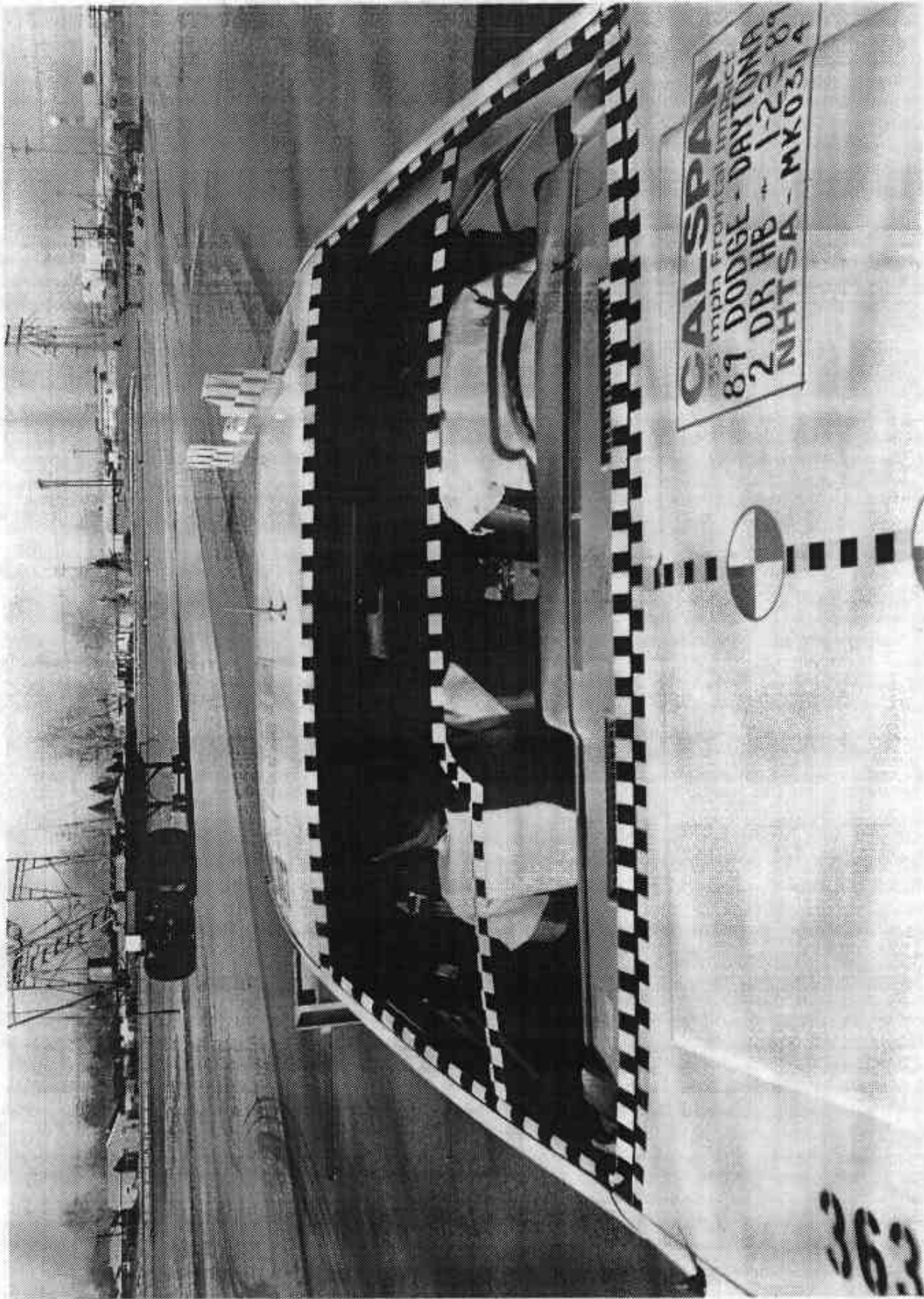


Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

A-11

7689-4



A-12

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Figure A-11 PRE-TEST WINDSHIELD VIEW

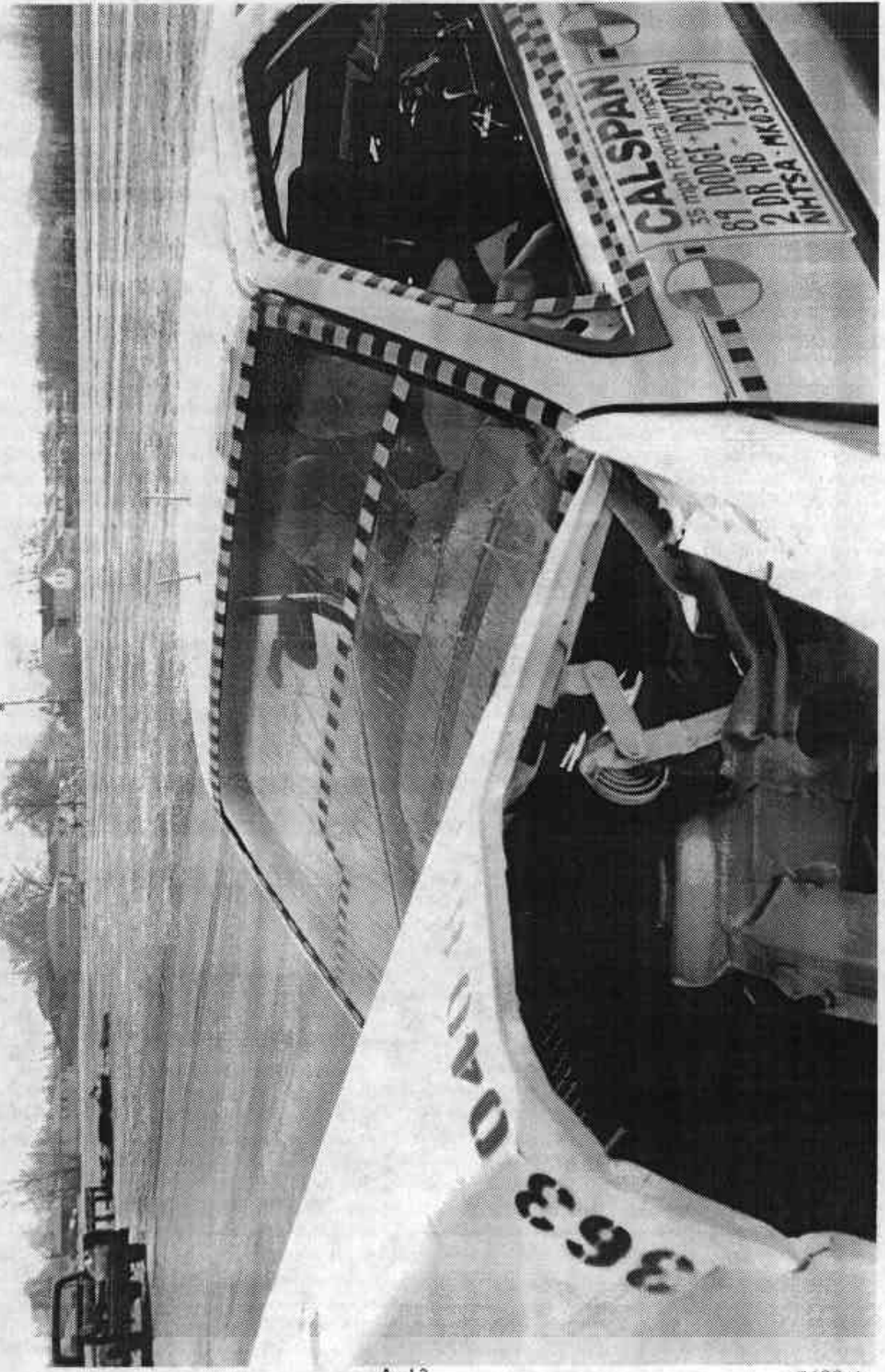
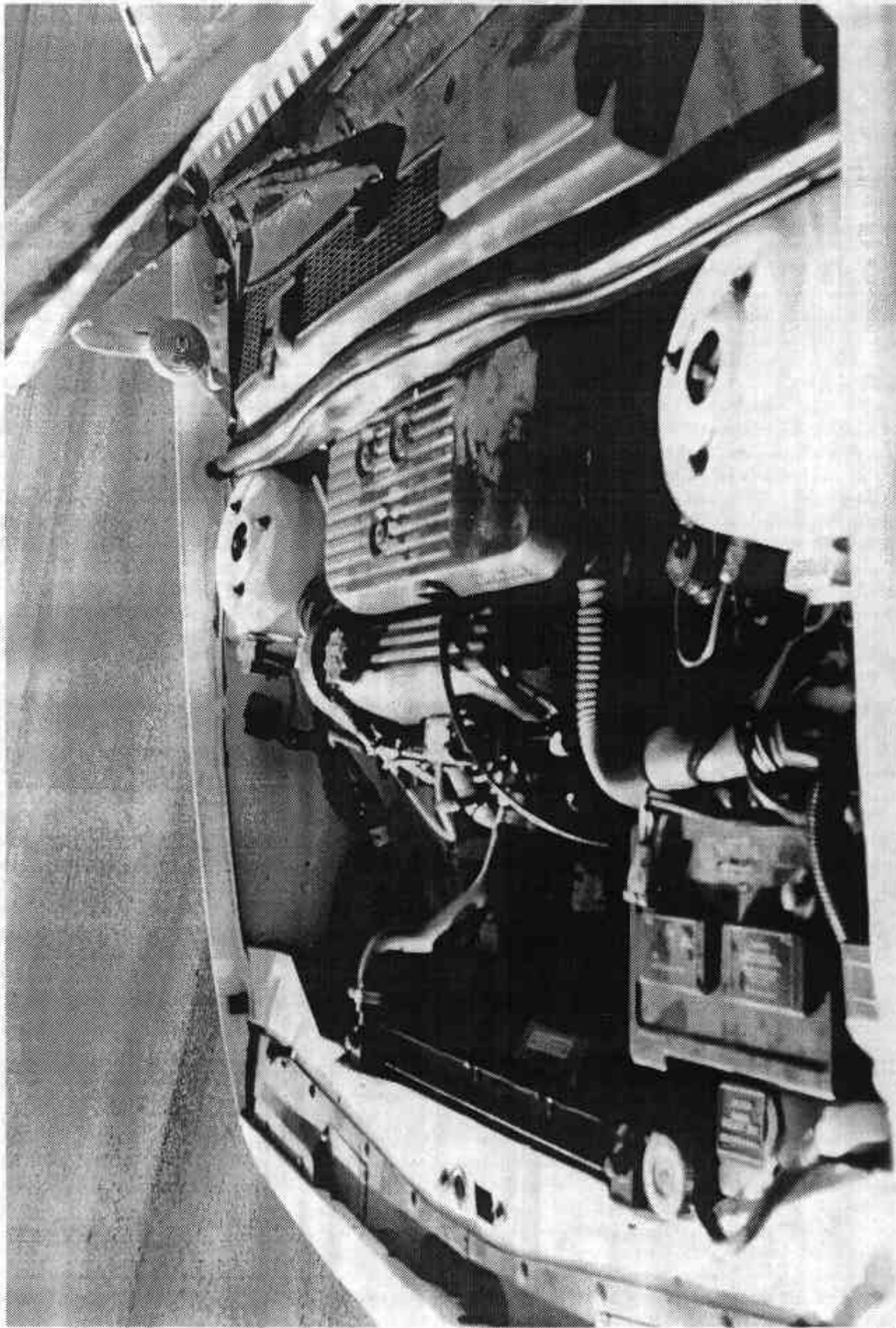


Figure A-12 POST-TEST WINDSHIELD VIEW

A-13

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A-14

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Figure A-13 PRE-TEST ENGINE COMPARTMENT VIEW

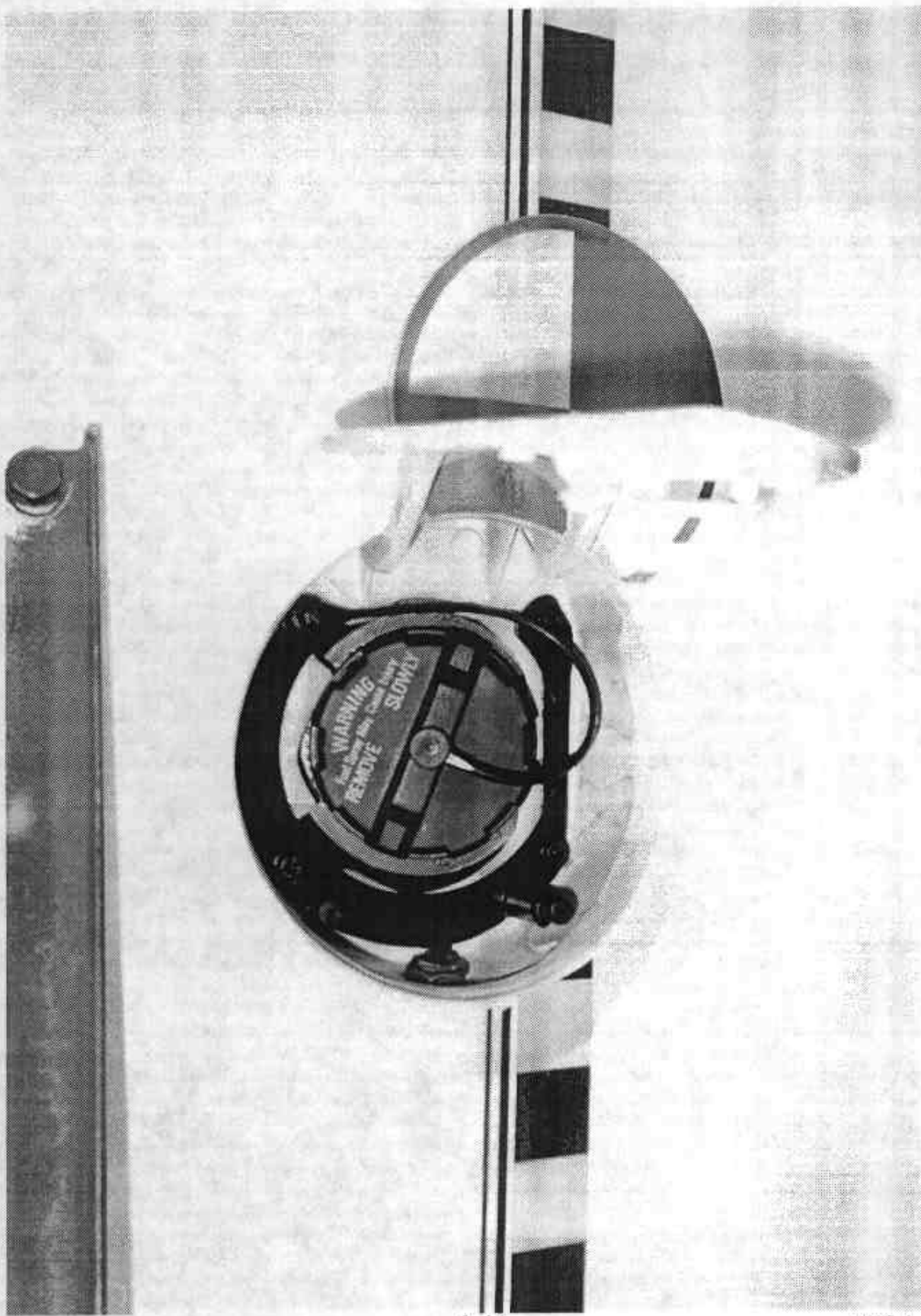


Figure A-14 PRE-TEST FUEL CAP VIEW

A-15

7689-4

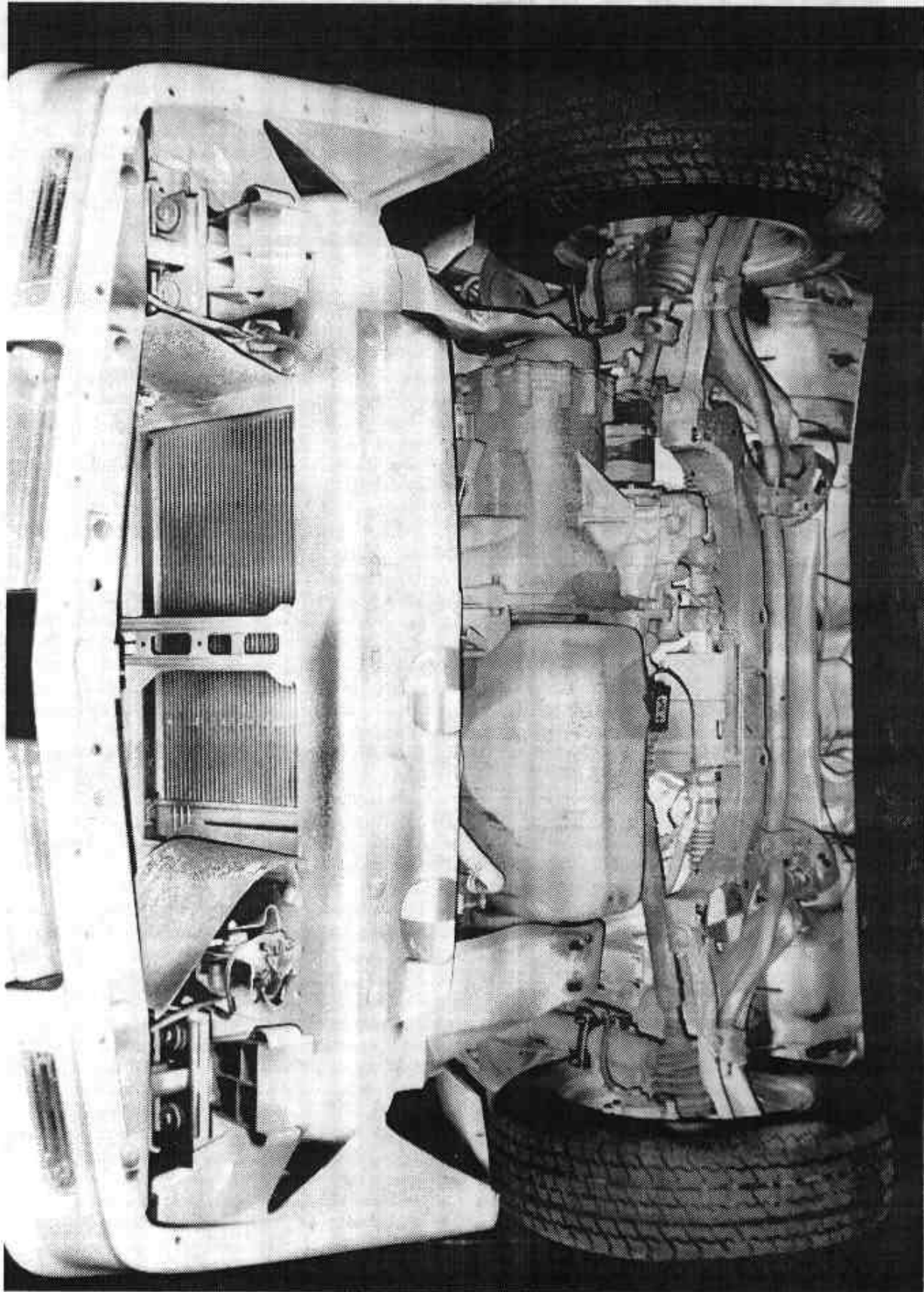


FIGURE A-15 PRE-TEST FRONT UNDERBODY VIEW

A-16

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Figure A-16 POST-TEST FRONT UNDERBODY VIEW

A-17

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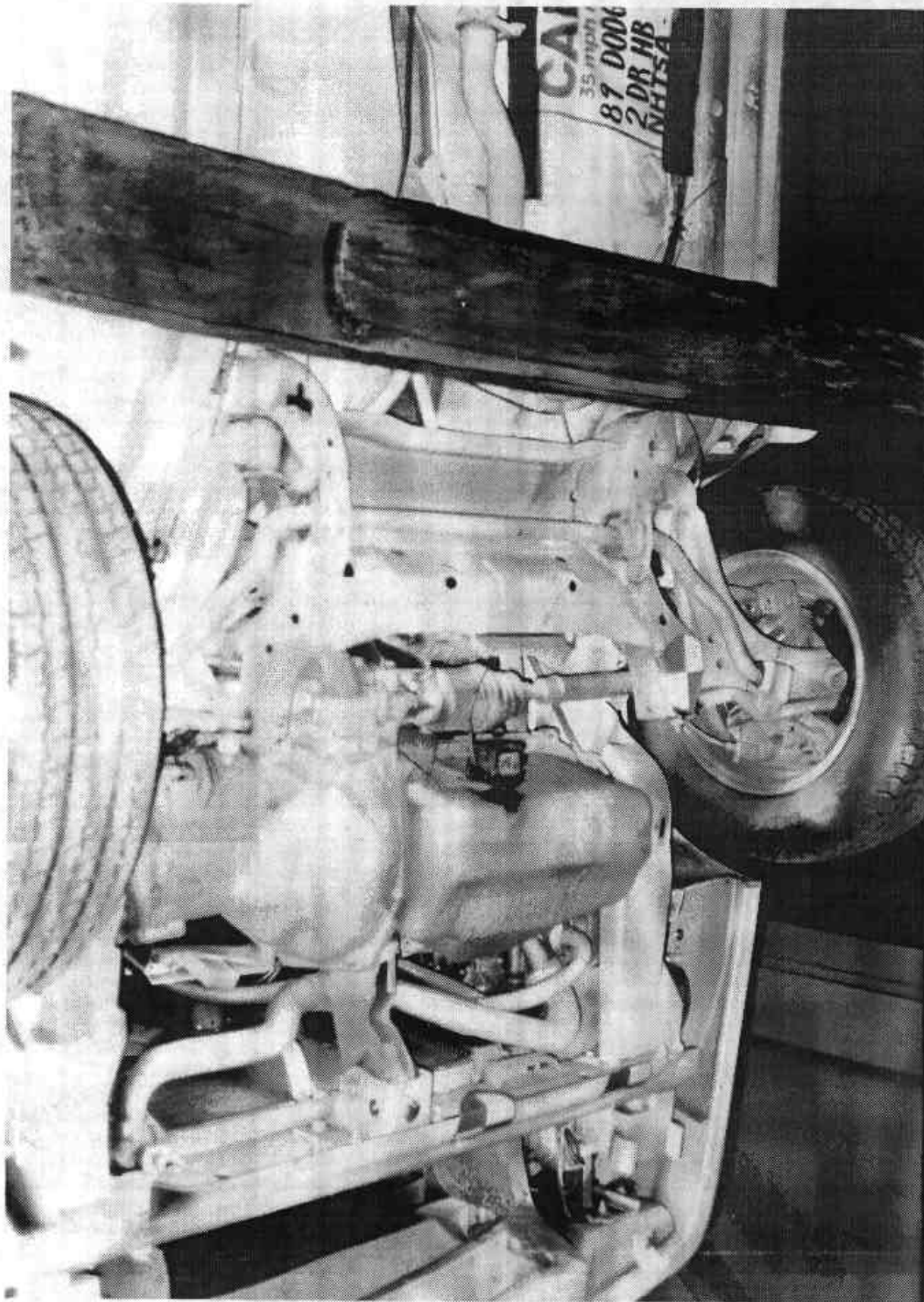


Figure A-17 PRE-TEST FRONT SIDE UNDERBODY VIEW

A-18

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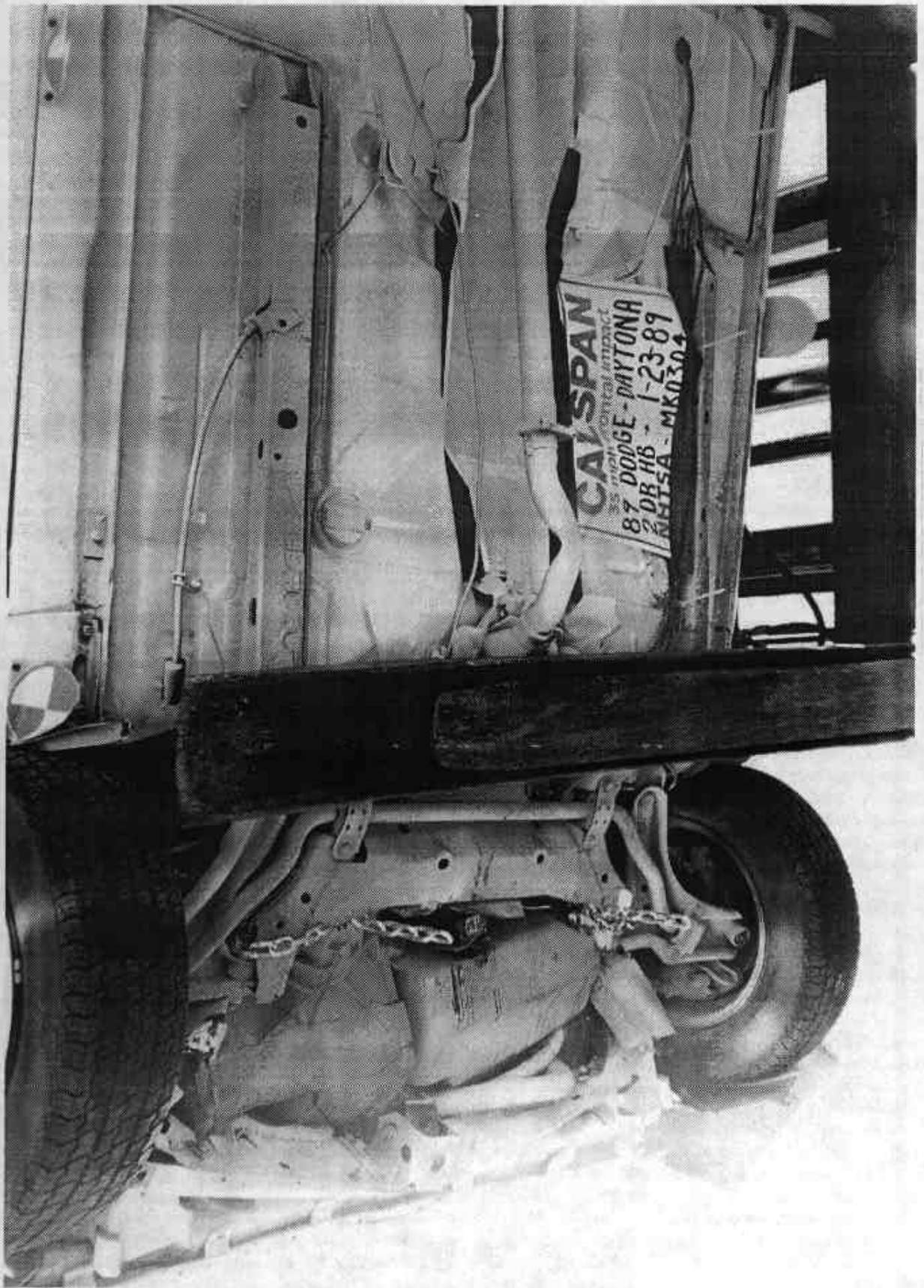


Figure A-18 POST-TEST FRONT SIDE UNDERBODY VIEW



Figure A-19 PRE-TEST REAR UNDERBODY VIEW

A-20

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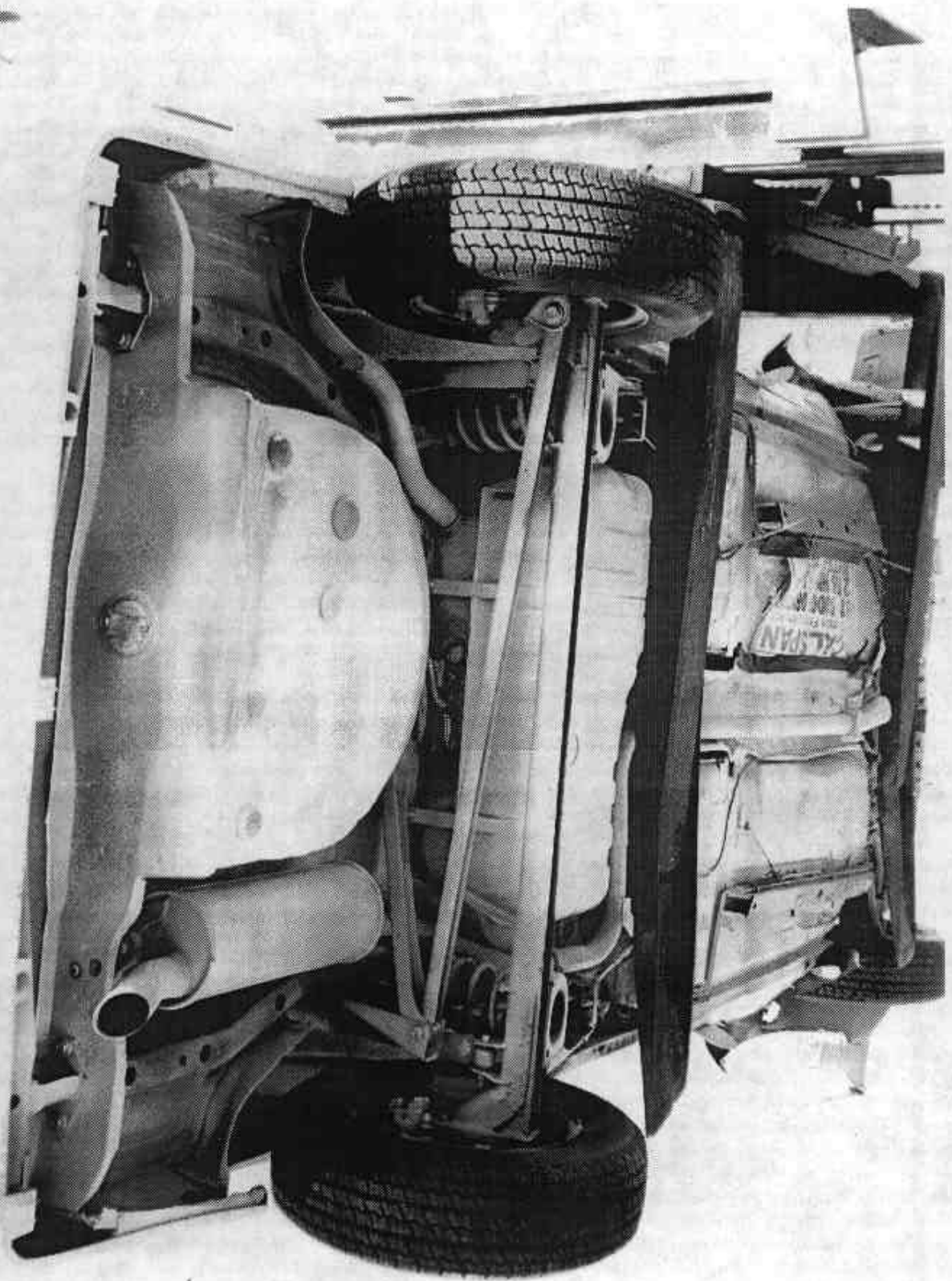


Figure A-20 POST-TEST REAR UNDERBODY VIEW

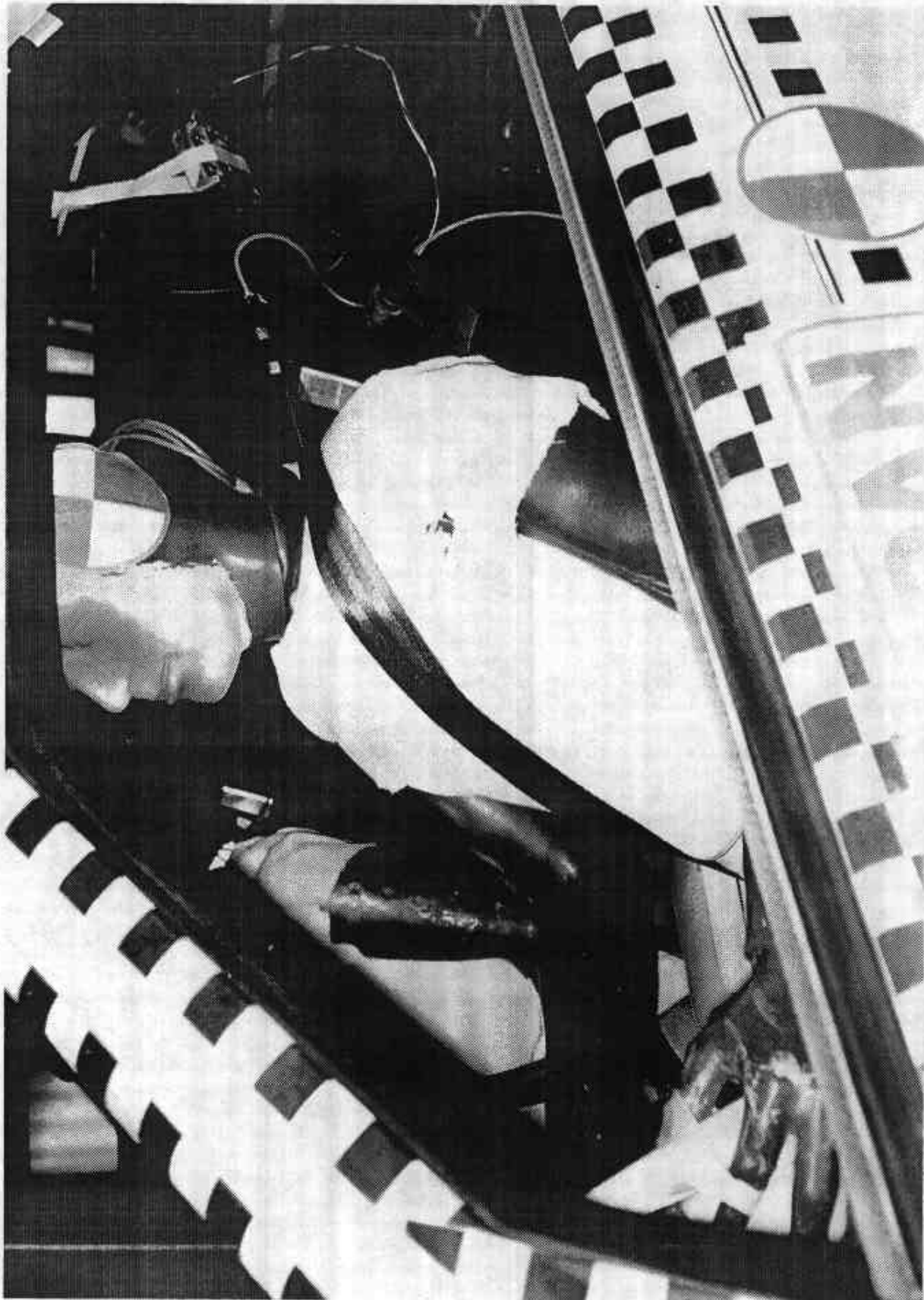


Figure A-21 PRE-TEST DRIVER POSITION VIEW

A-22

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Figure A-22 POST-TEST DRIVER POSITION VIEW

A-23

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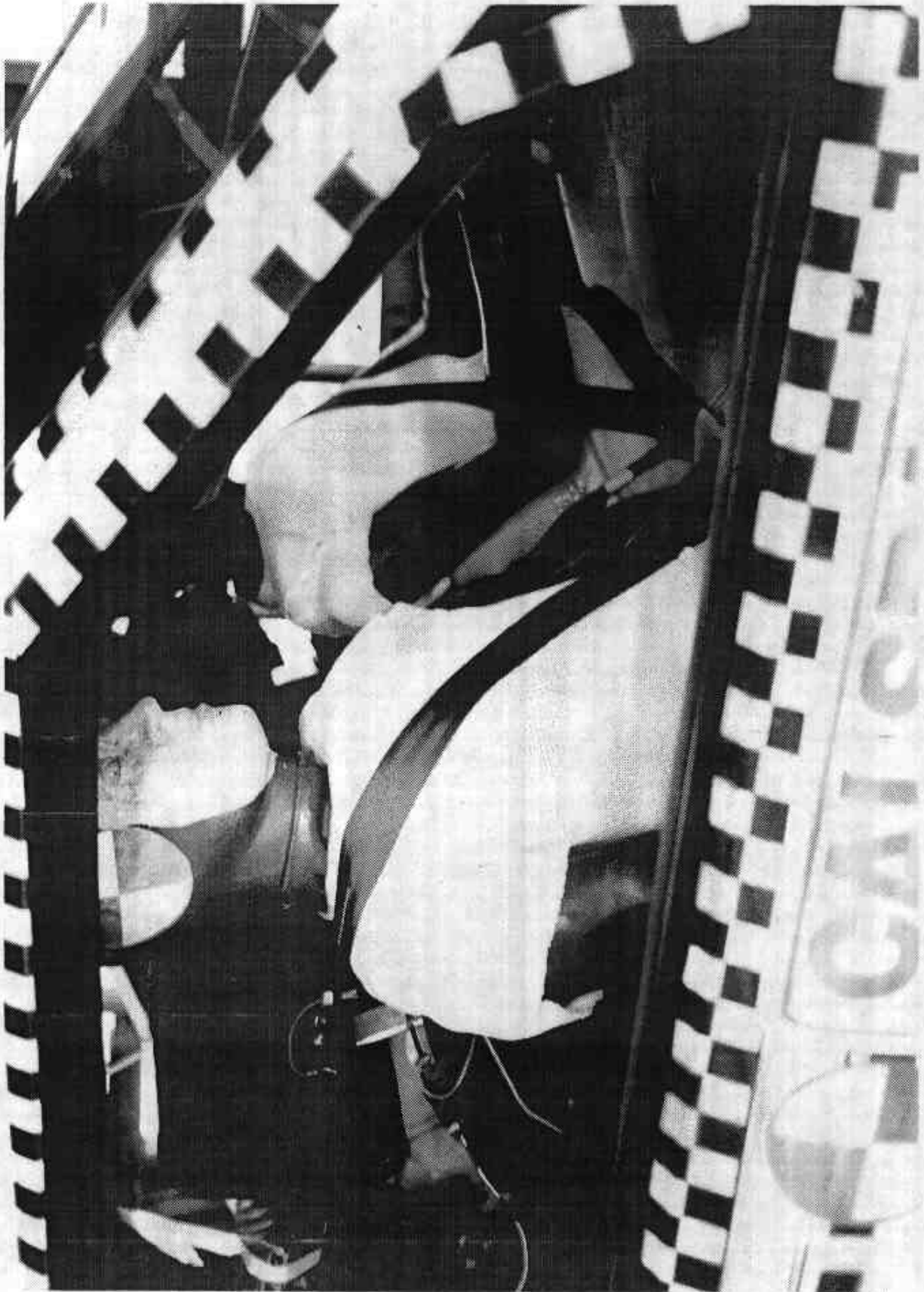


Figure A-23 PRE-TEST PASSENGER POSITION VIEW

A-24

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Figure A-24 POST-TEST PASSENGER POSITION VIEW

A-25

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Figure A-25 PRE-TEST DRIVER AND INTERIOR VIEW

A-26

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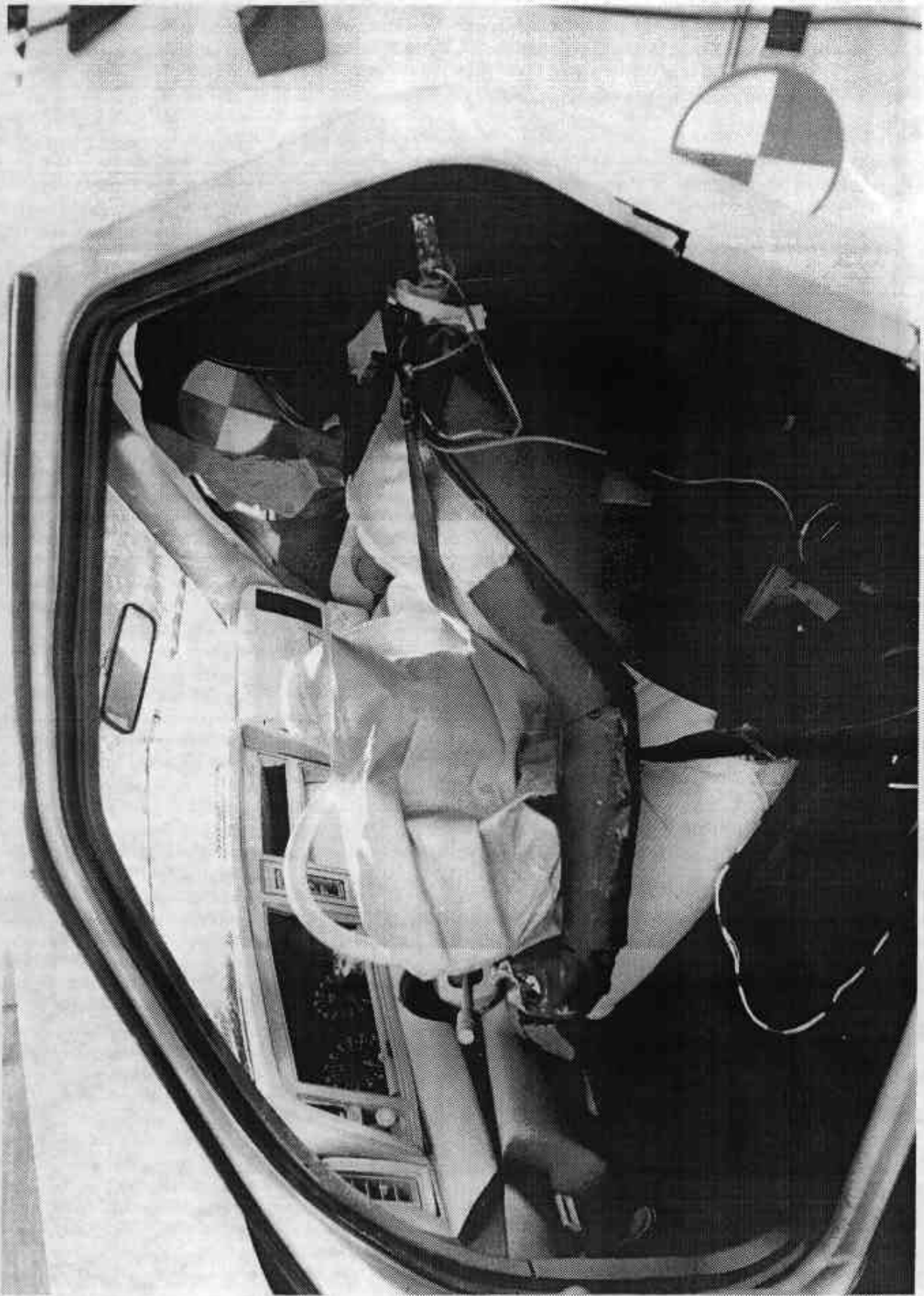


Figure A-26 POST-TEST DRIVER AND INTERIOR VIEW

A-27

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Figure A-27 PRE-TEST PASSENGER AND INTERIOR VIEW

A-28

7689-4



Figure A-28 POST-TEST PASSENGER AND INTERIOR VIEW

A-29

7689-4

Appendix B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

TEST NO. MK0304

VEHICLE DATA

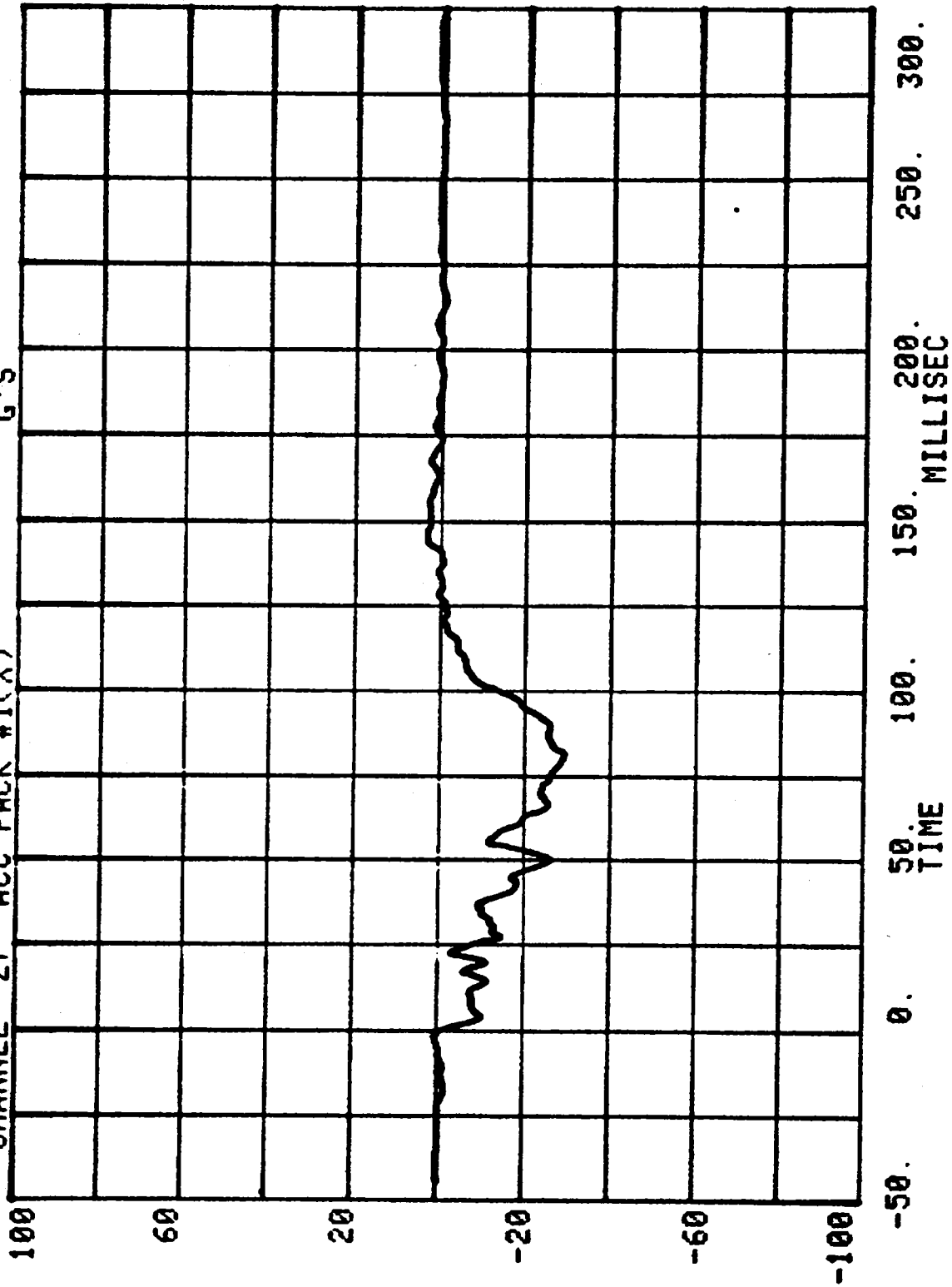
FILTER CHANNEL CLASS

60

B-2

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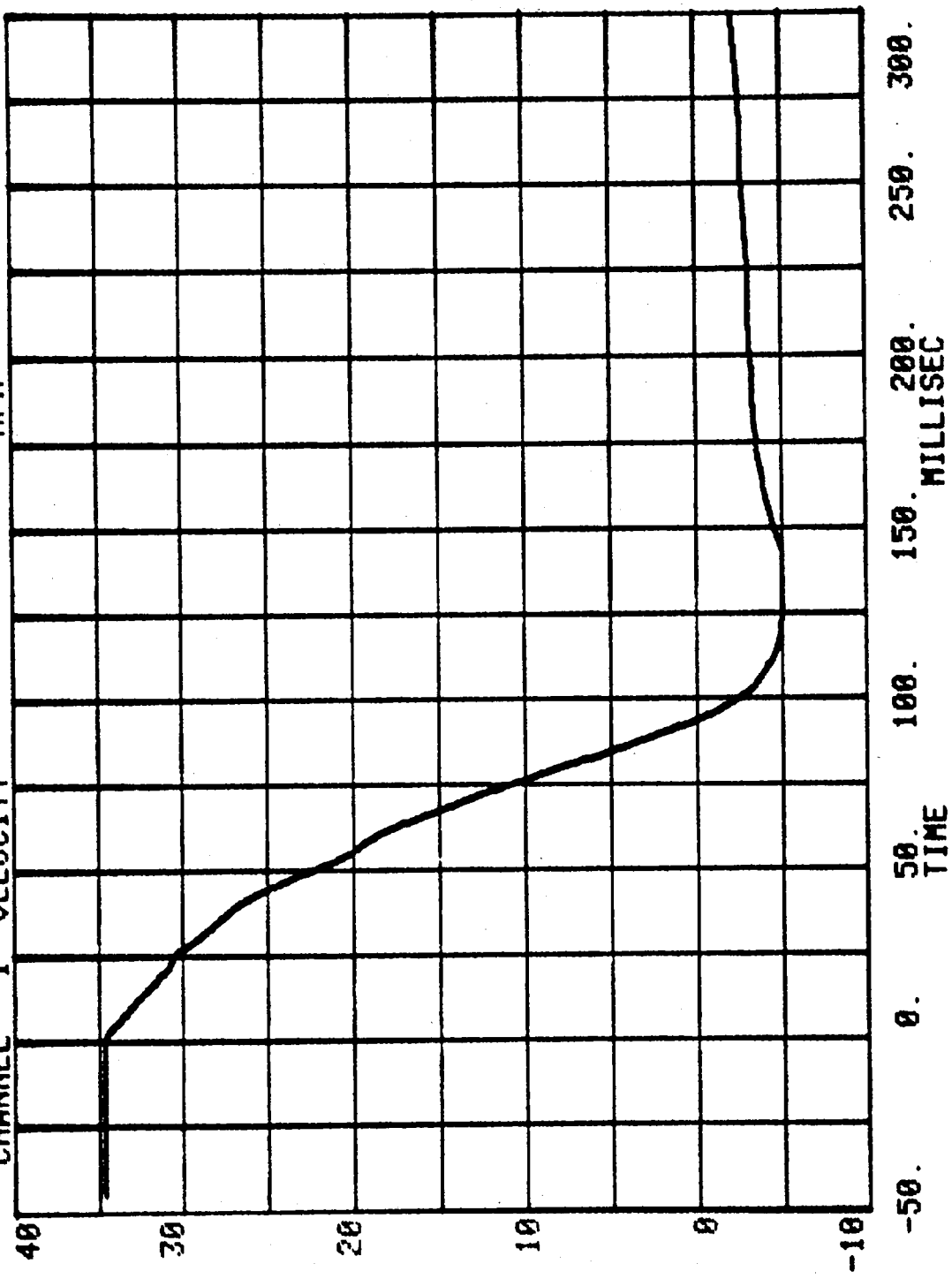
CHANNEL 27 ACC PACK #1(X) RUN= 867 SERIES= 304 G'S



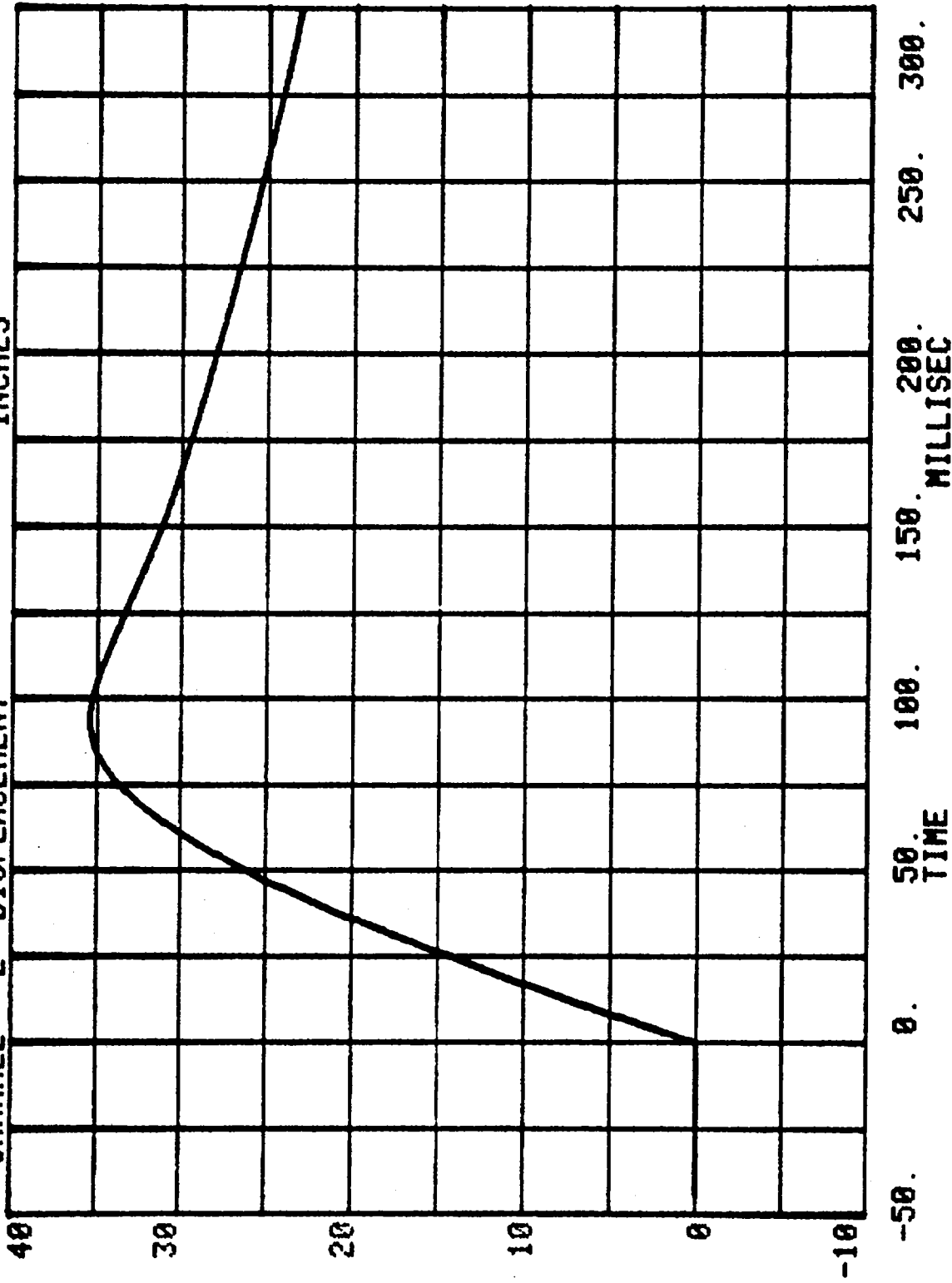
ACCEL #1(X)

RUN= 867 SERIES= 304 MPH

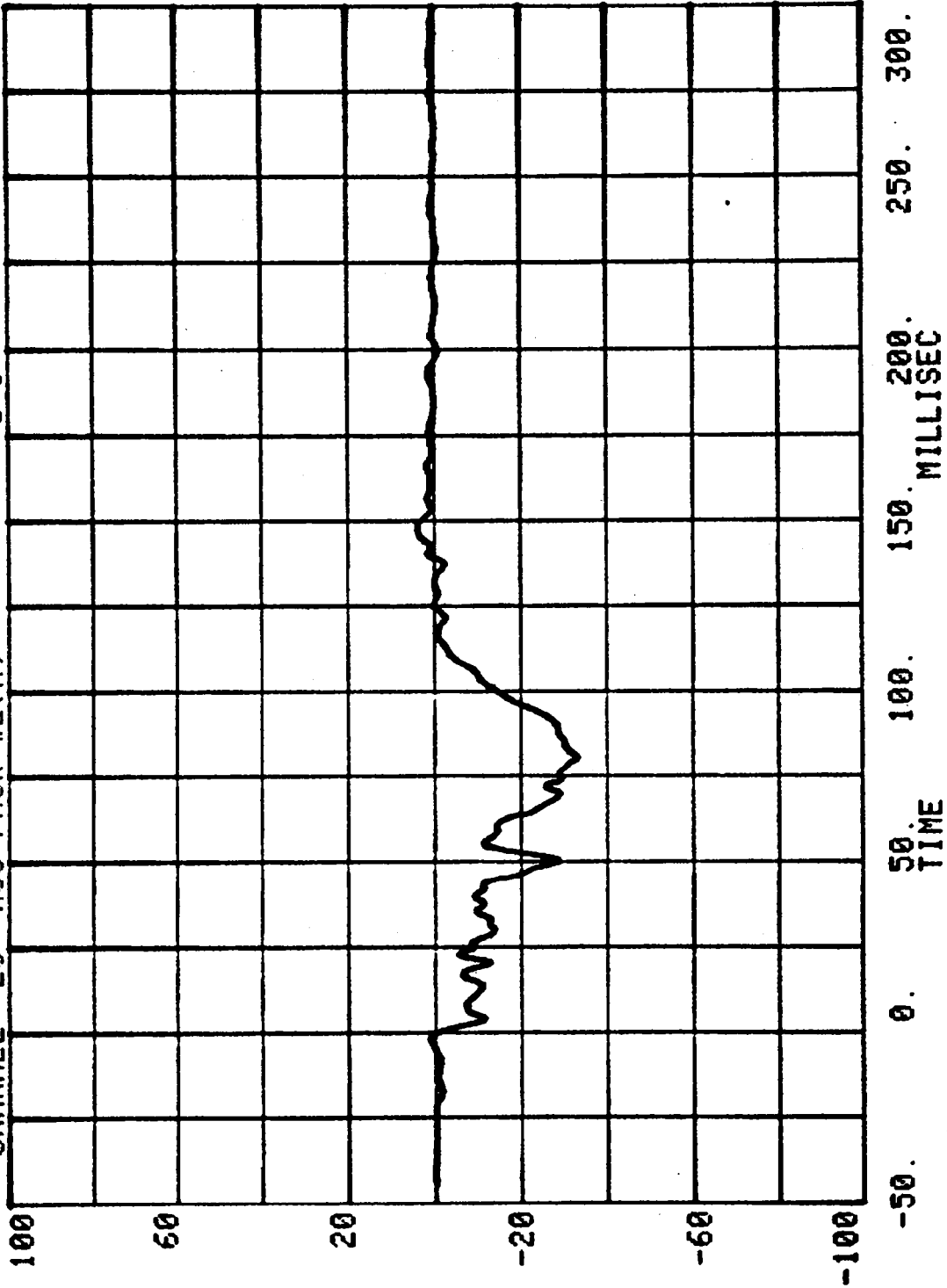
CHANNEL 1 VELOCITY



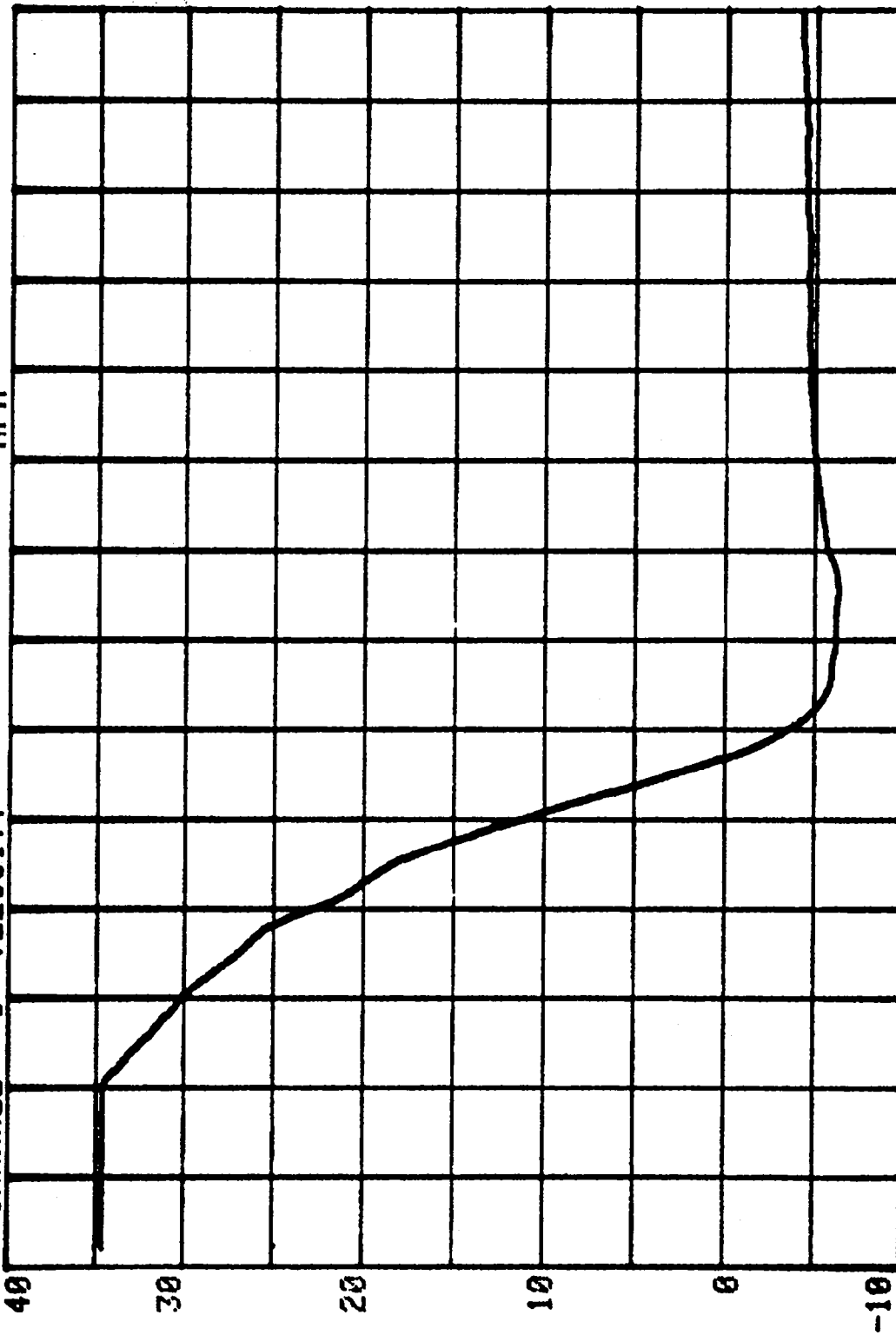
CHANNEL 2 DISPLACEMENT
RUN= 867 SERIES= 304 INCHES
ACCEL #1 (X)



CHANNEL 28 ACC PACK #2(X) SERIES= 304 G'S



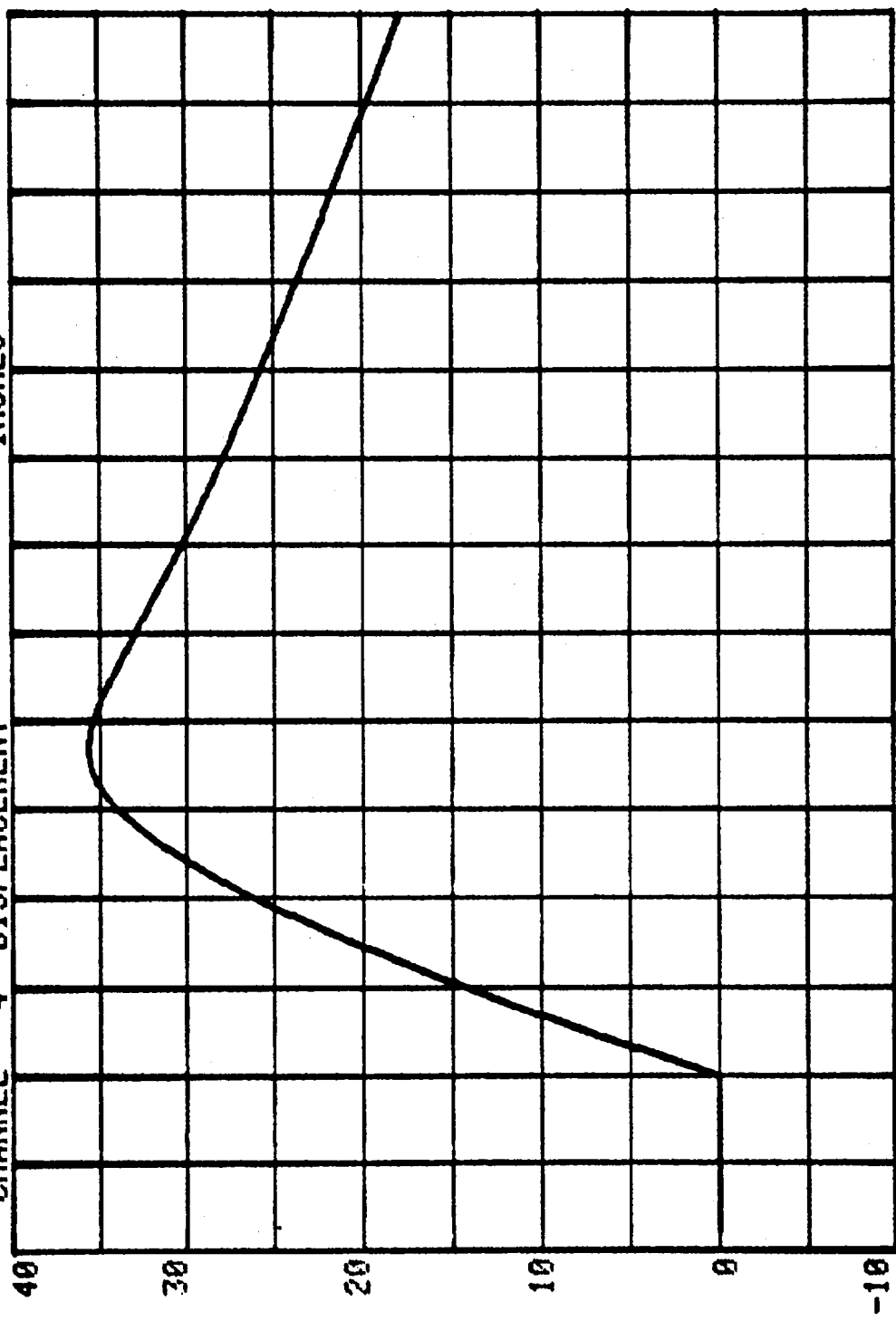
CHANNEL 3 VELOCITY
RUN= 867 SERIES= 304 MPH
ACCEL #2 (X)



ACCEL #2 (X)

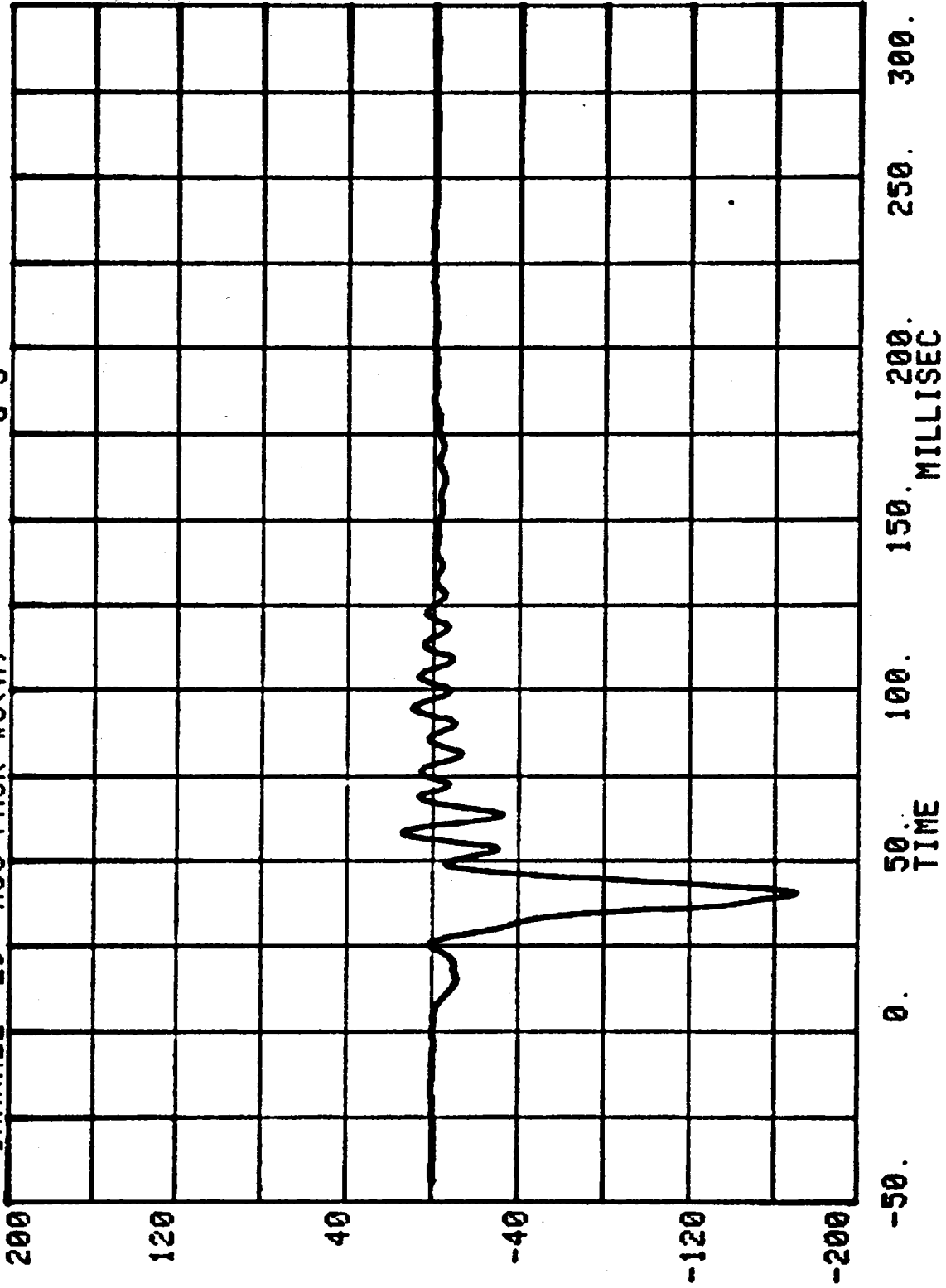
CHANNEL 4 DISPLACEMENT SERIES= 304 INCHES

RUN= 867



-50. 0. 50. 100. 150. 200. 250. 300.

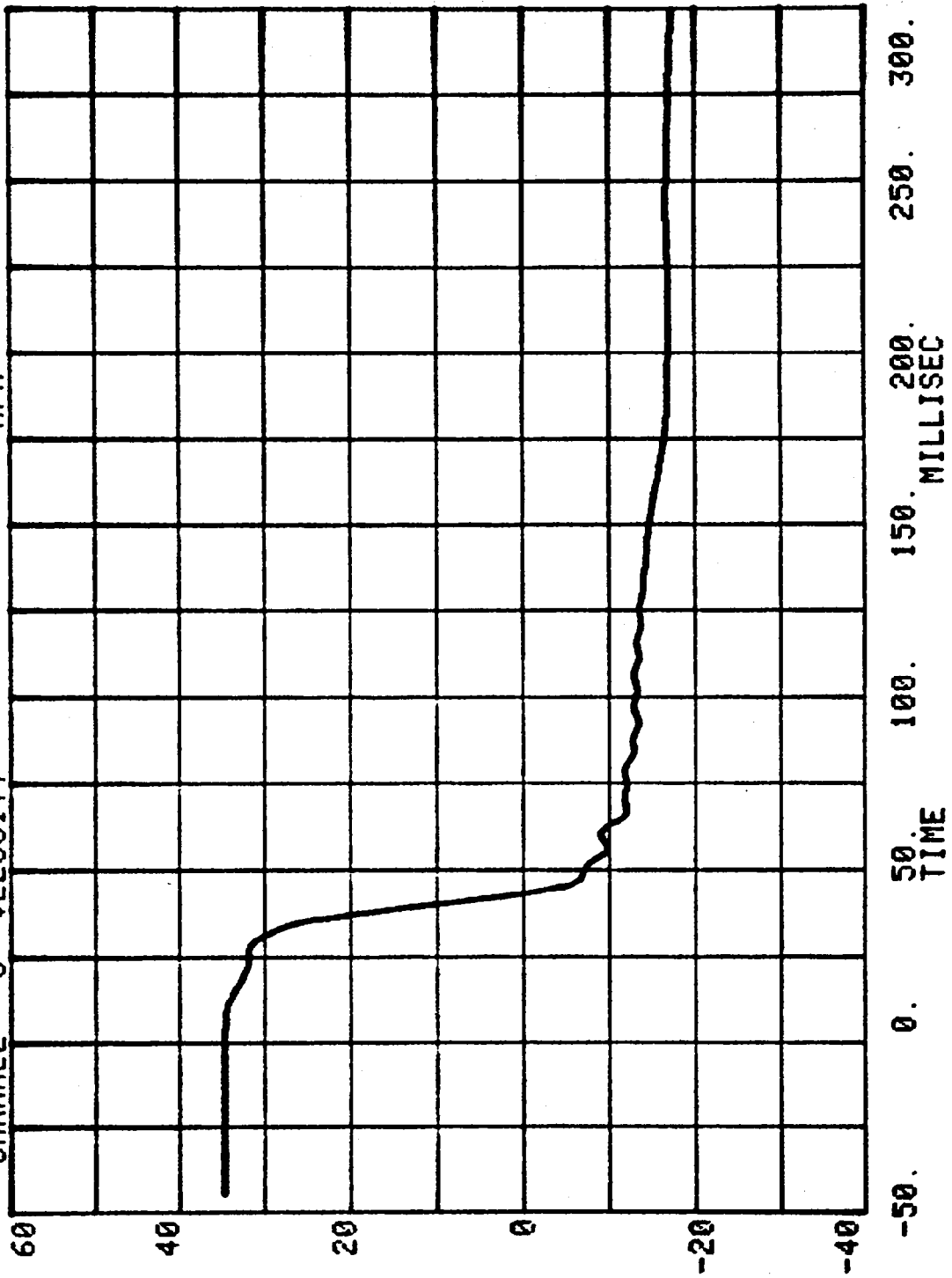
CHANNEL 29 ACC PACK #3(X) RUN= 867 SERIES= 304 G'S



ACCEL #3(X)

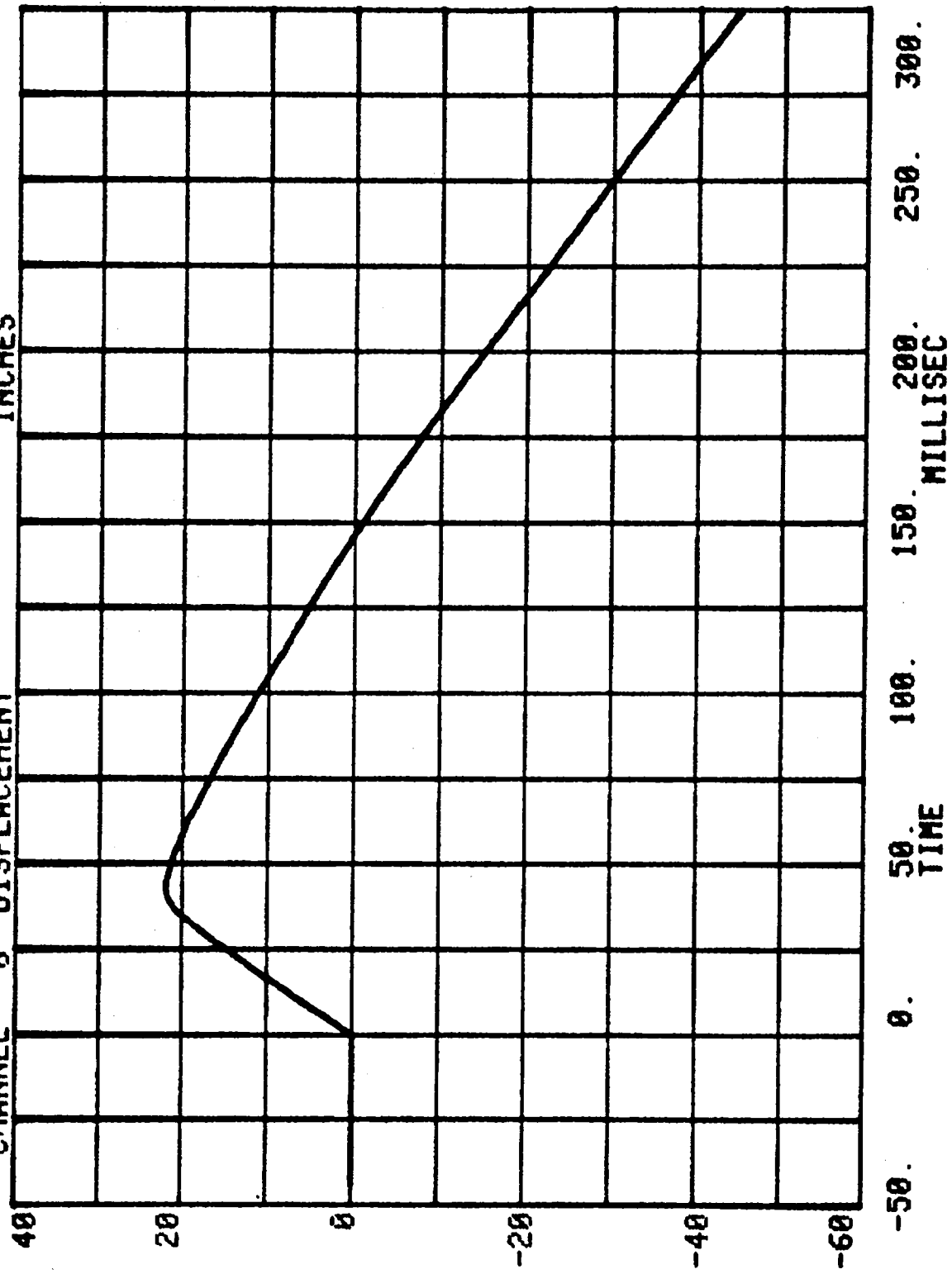
CHANNEL 5 VELOCITY SERIES= 304 MPH

RUN= 867

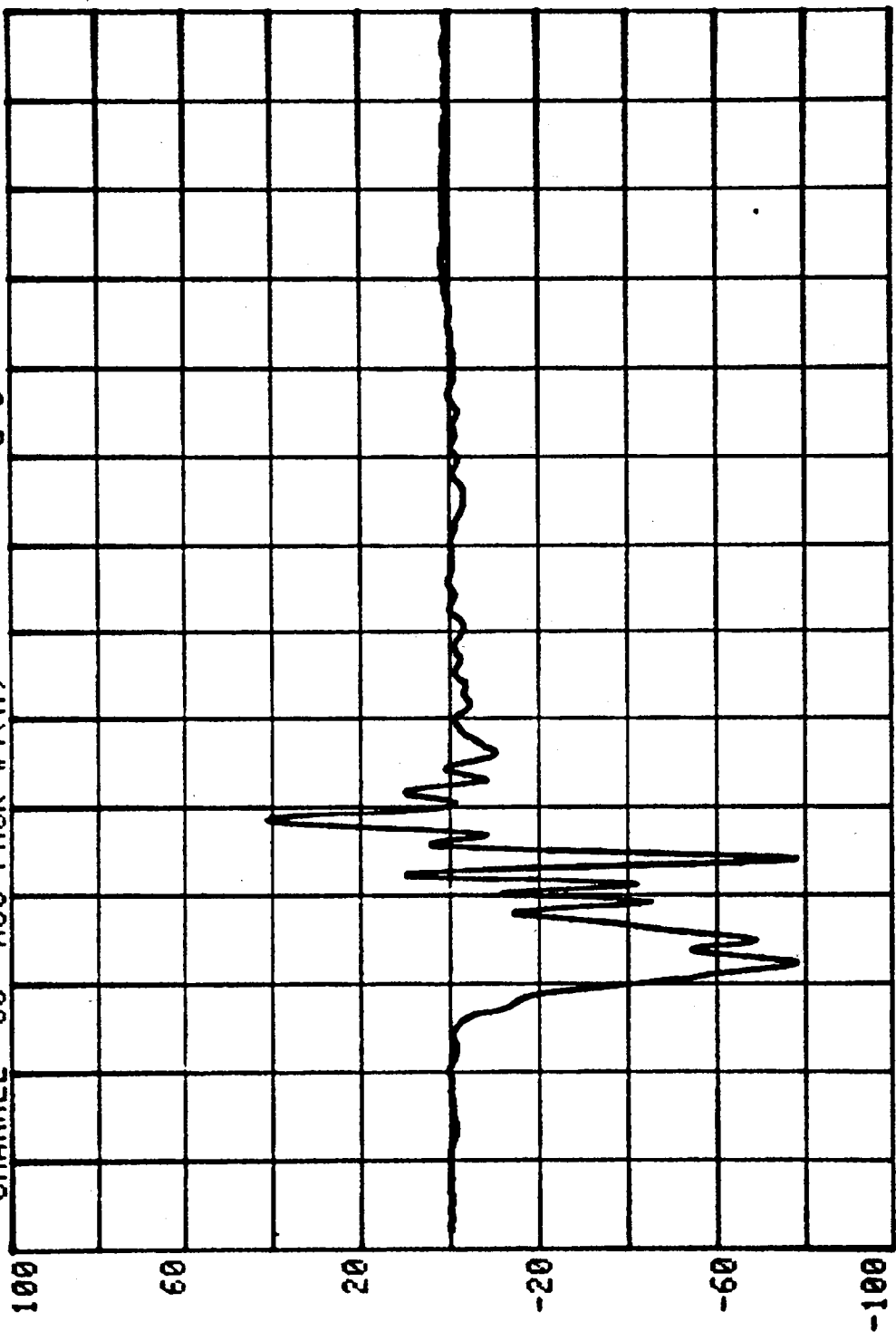


ACCEL #3 (X)

CHANNEL 6 DISPLACEMENT
RUN= 867 SERIES= 304 INCHES

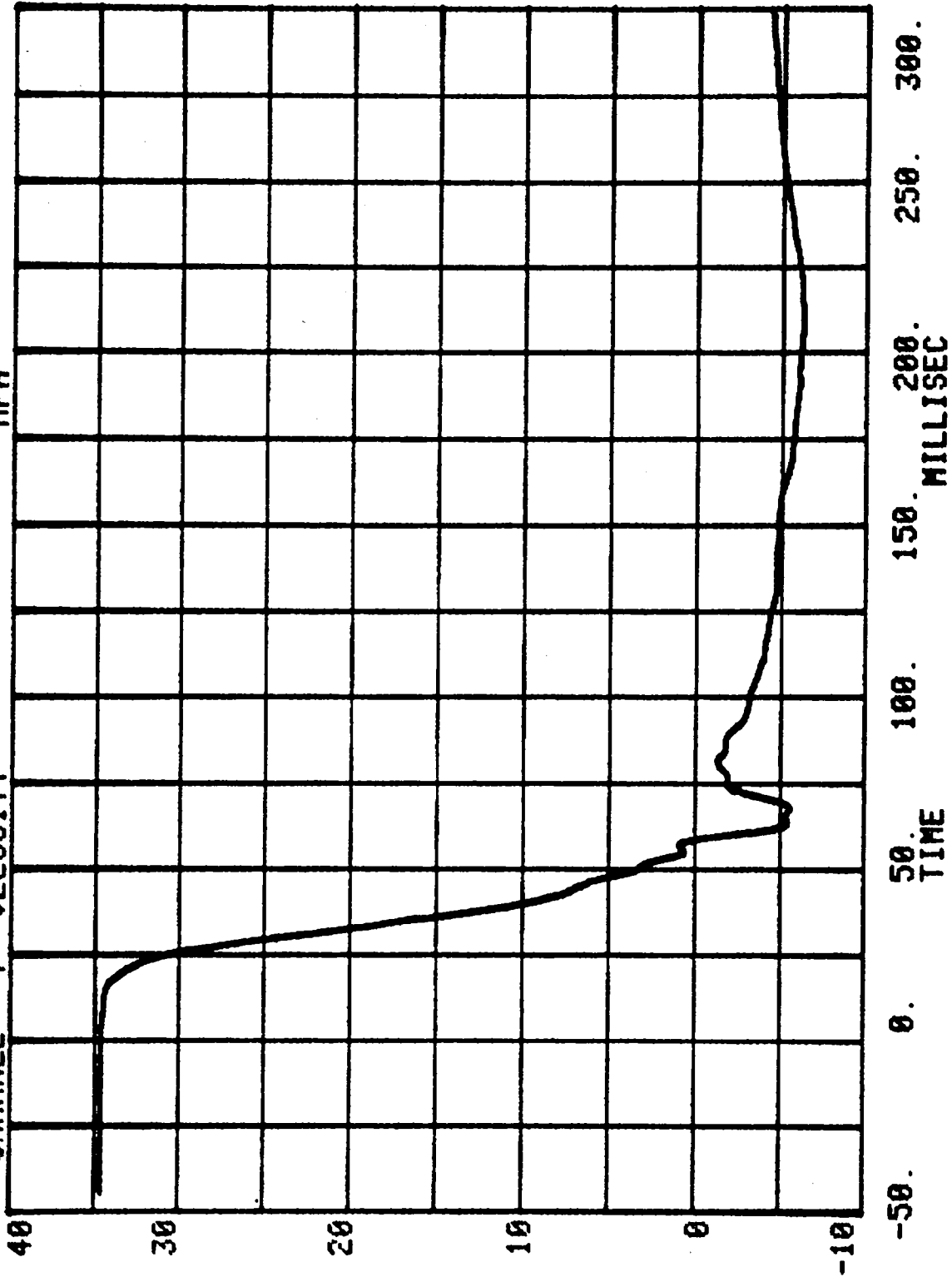


CHANNEL 30 ACC PACK #4(X) RUN= 867 SERIES= 304 G'S



ACCEL #4 (X)

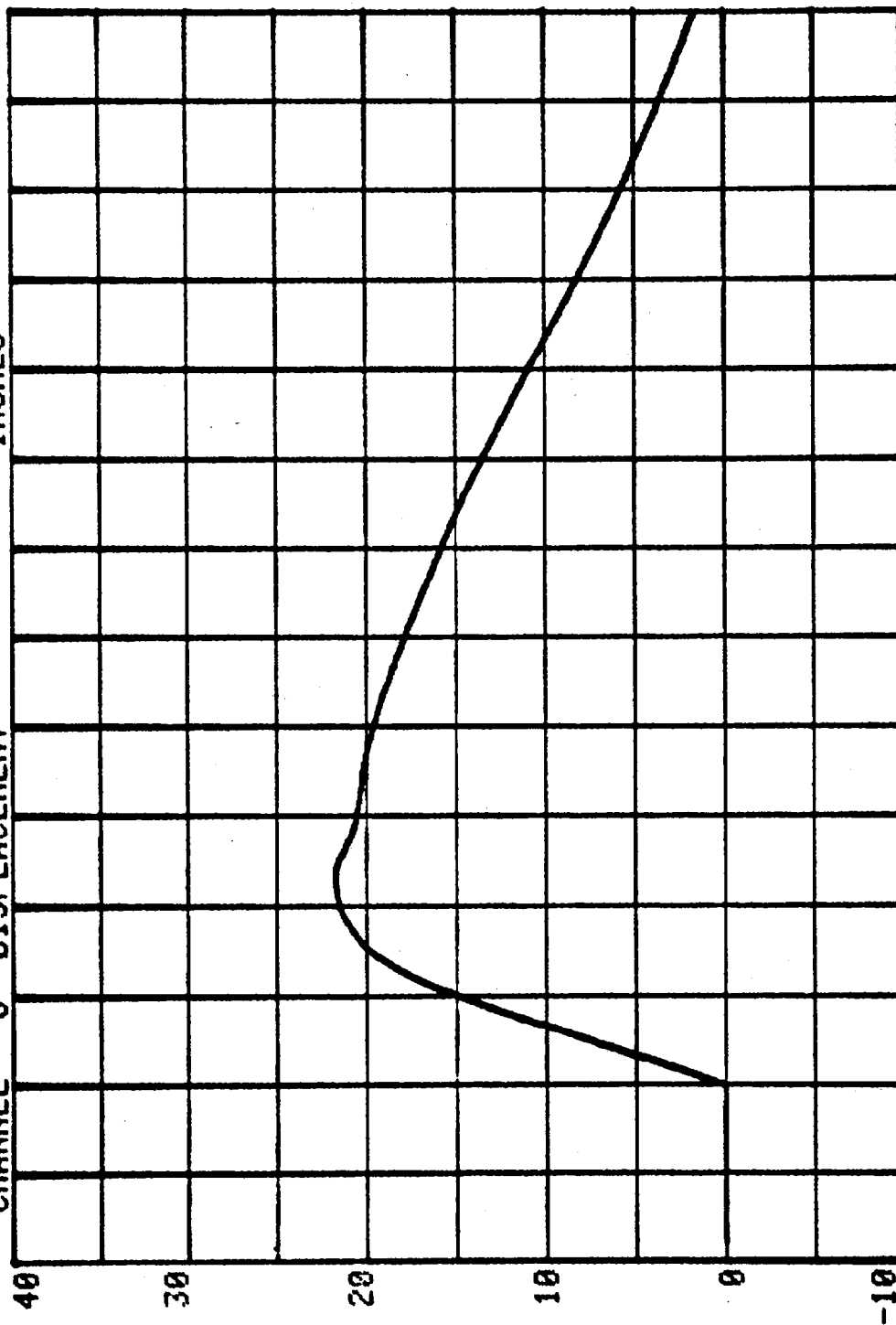
CHANNEL 7 VELOCITY
RUN= 867 SERIES= 304 MPH



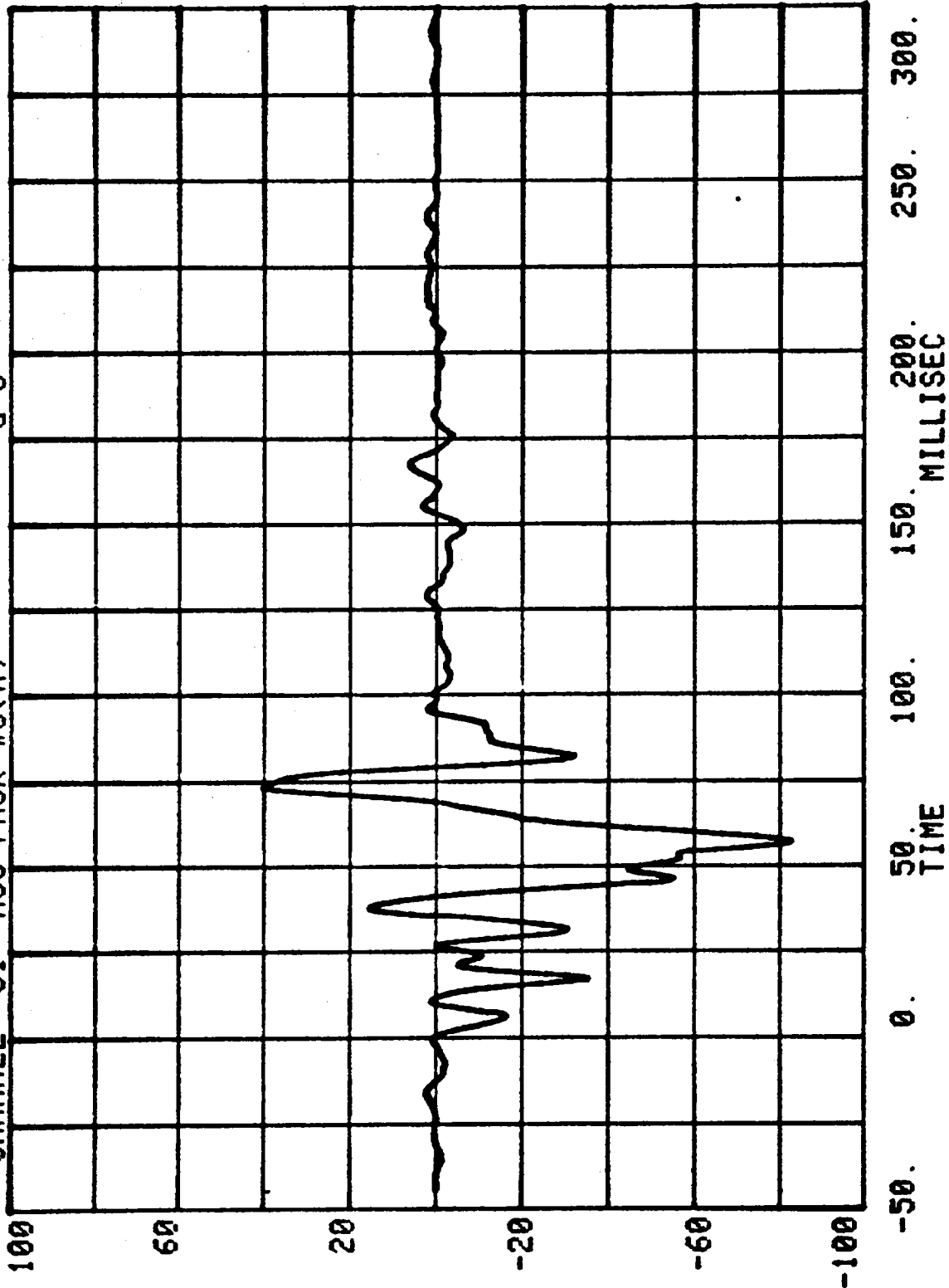
ACCEL #4 (X)

CHANNEL 8 DISPLACEMENT SERIES= 304 INCHES

RUN= 867



RUN= 867 SERIES= 304 G'S
CHANNEL 31 ACC PACK #5(X)

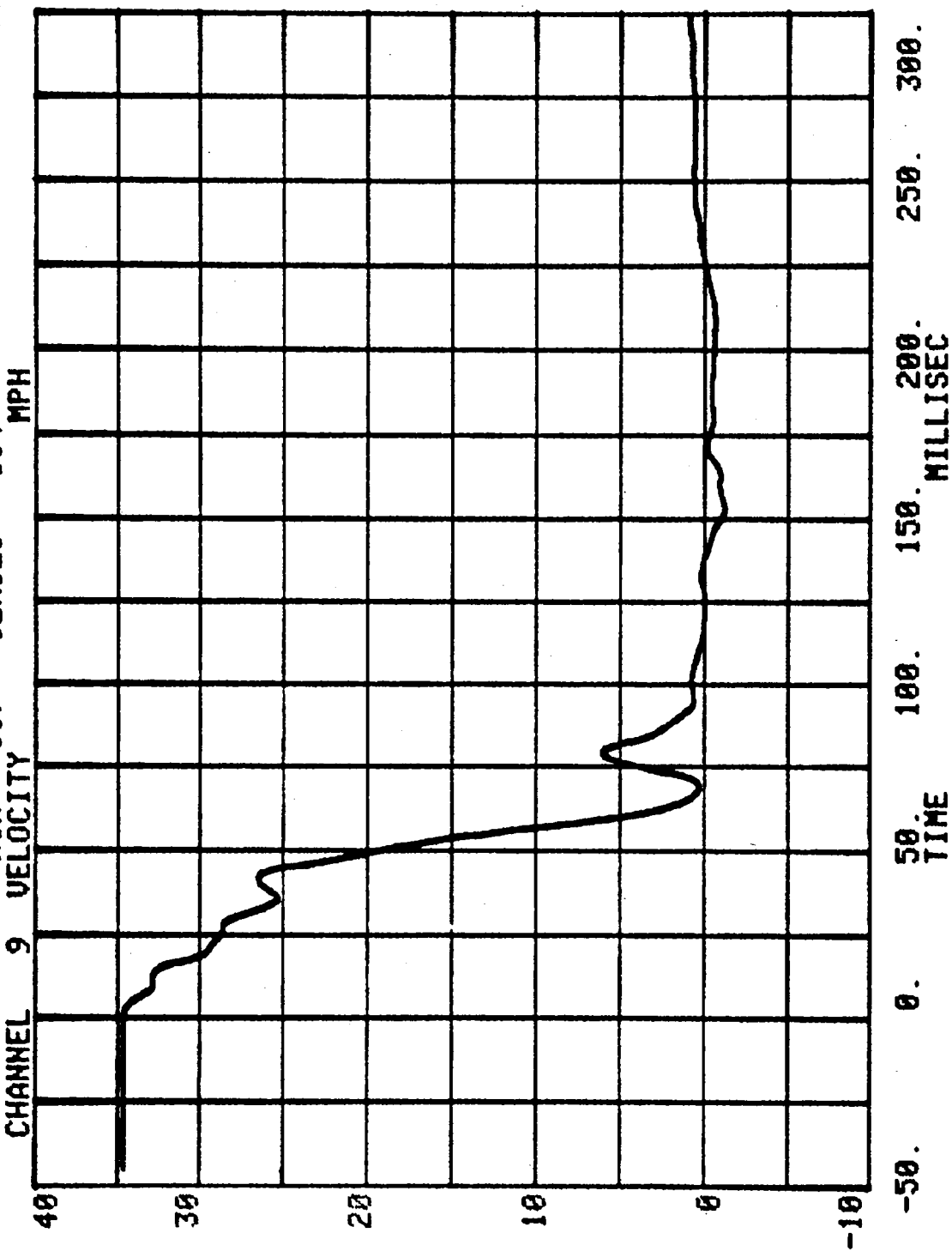


ACCEL #5 (X)

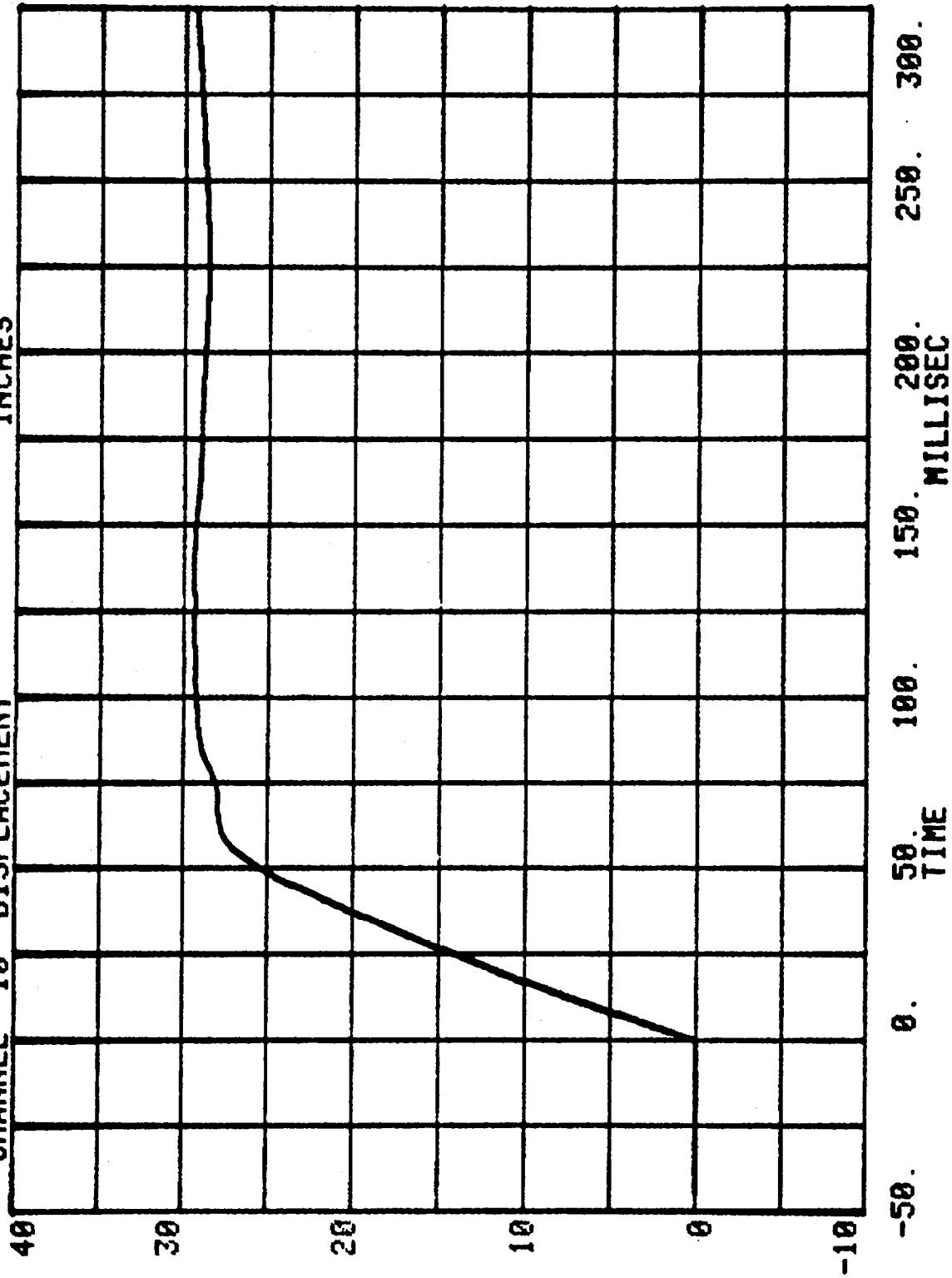
CHANNEL 9 VELOCITY SERIES= 304 MPH

RUN= 867

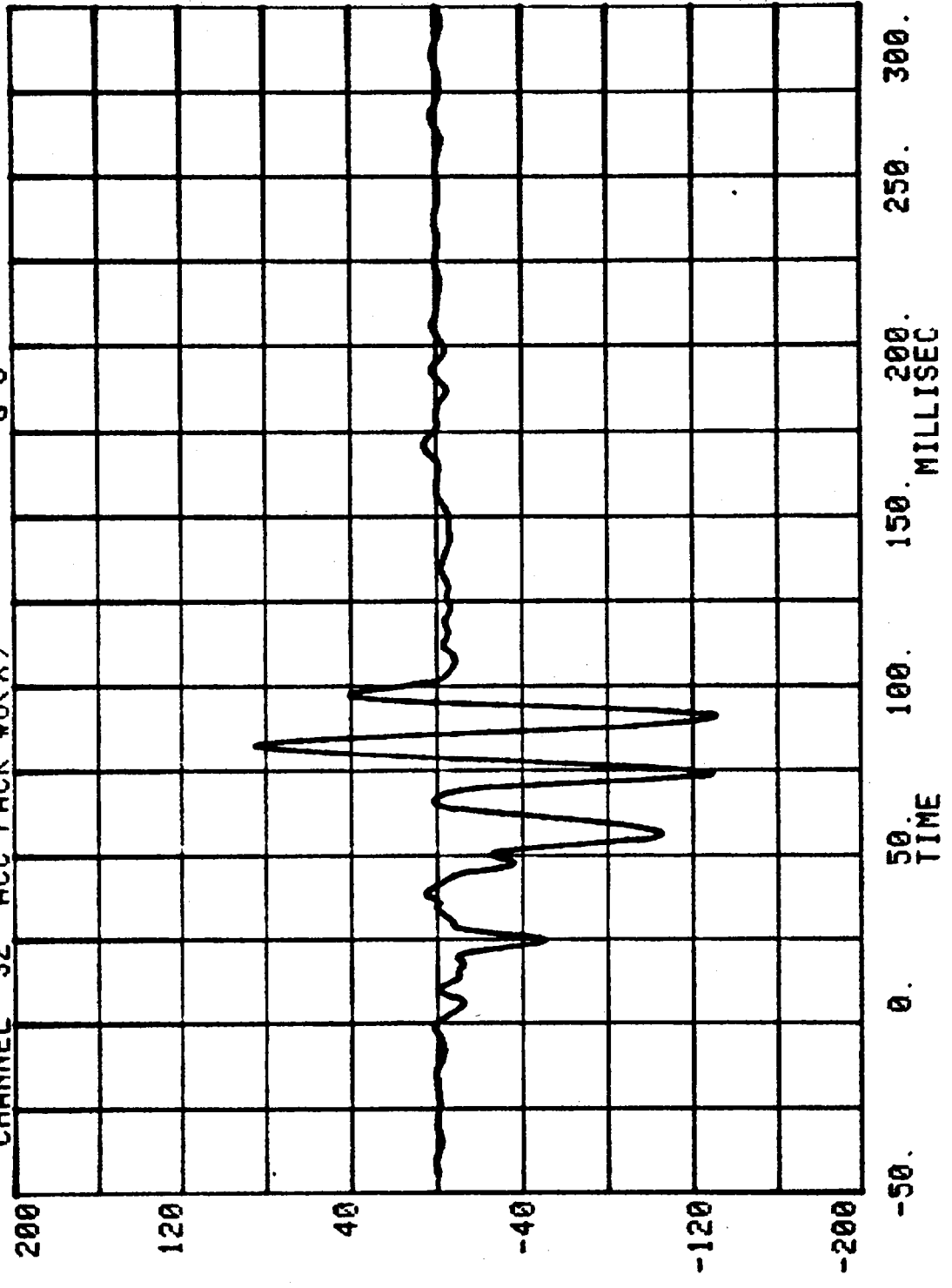
SERIES= 304



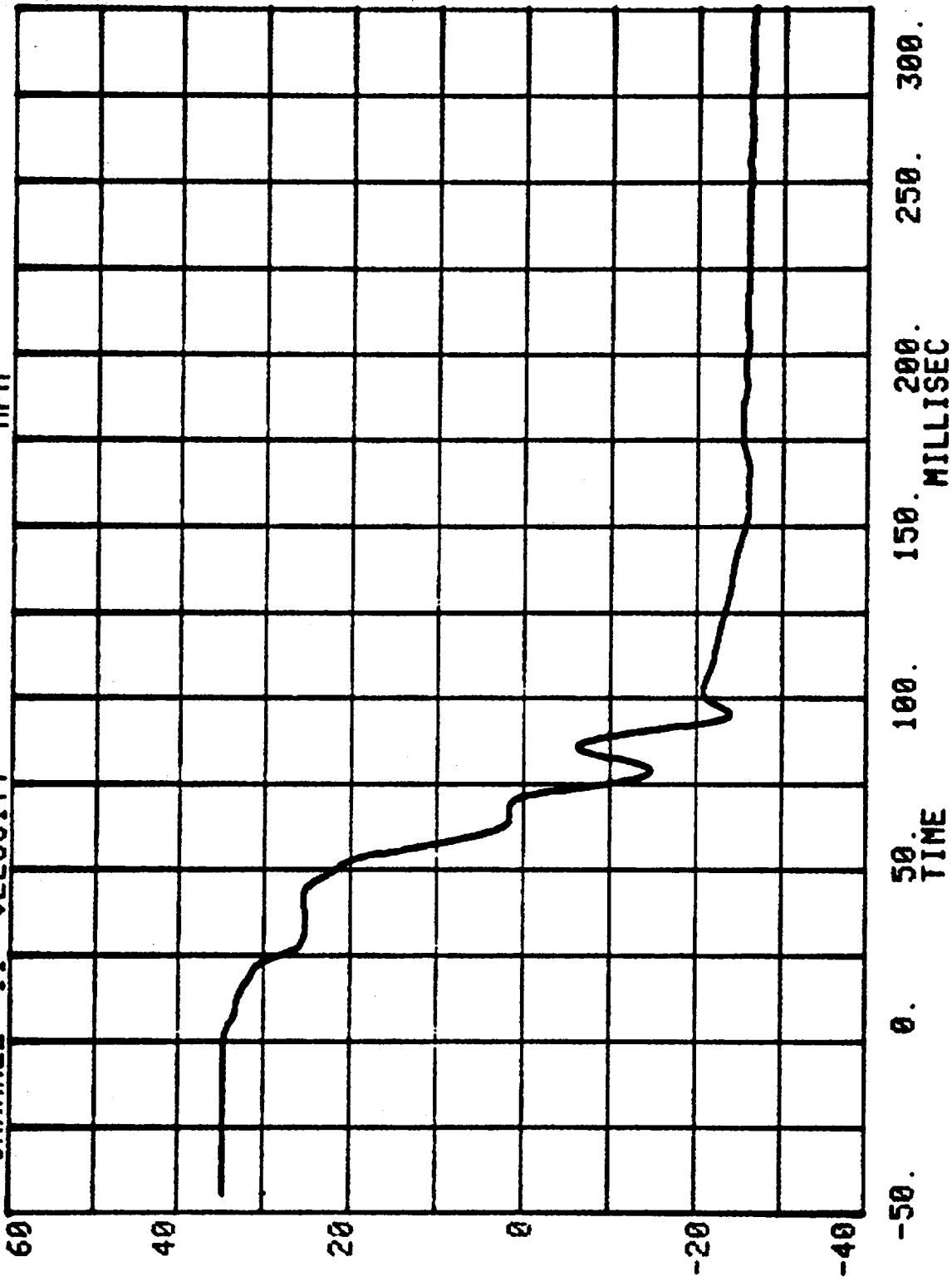
CHANNEL 10 DISPLACEMENT RUN= 867 SERIES= 304 INCHES ACCEL #5(X)



CHANNEL 32 ACC PACK #6(X) RUN= 867 SERIES= 304 G'S

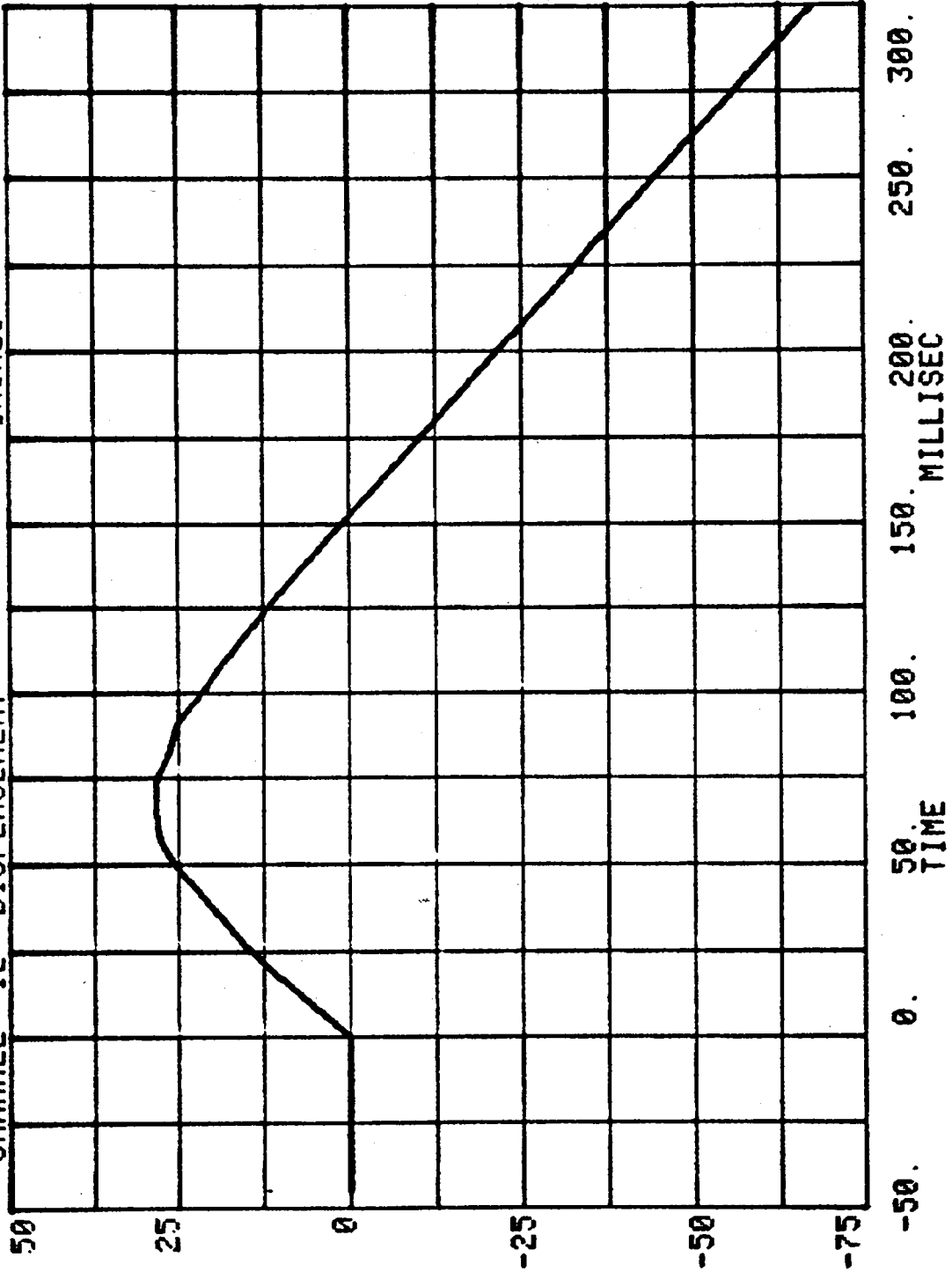


CHANNEL 11 VELOCITY
RUN= 867 SERIES= 304 MPH
ACCEL #6 (X)

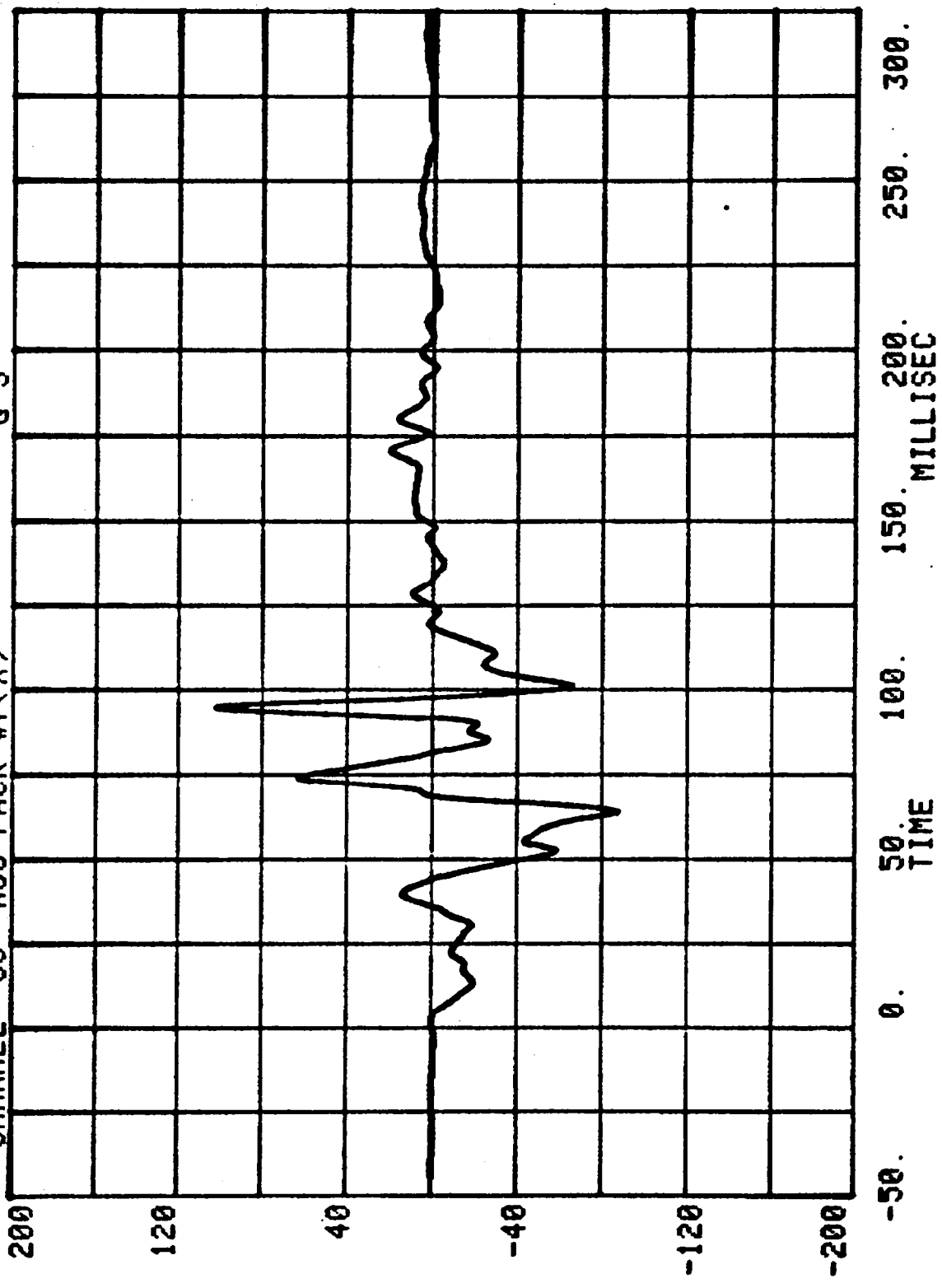


ACCEL #6 (X)

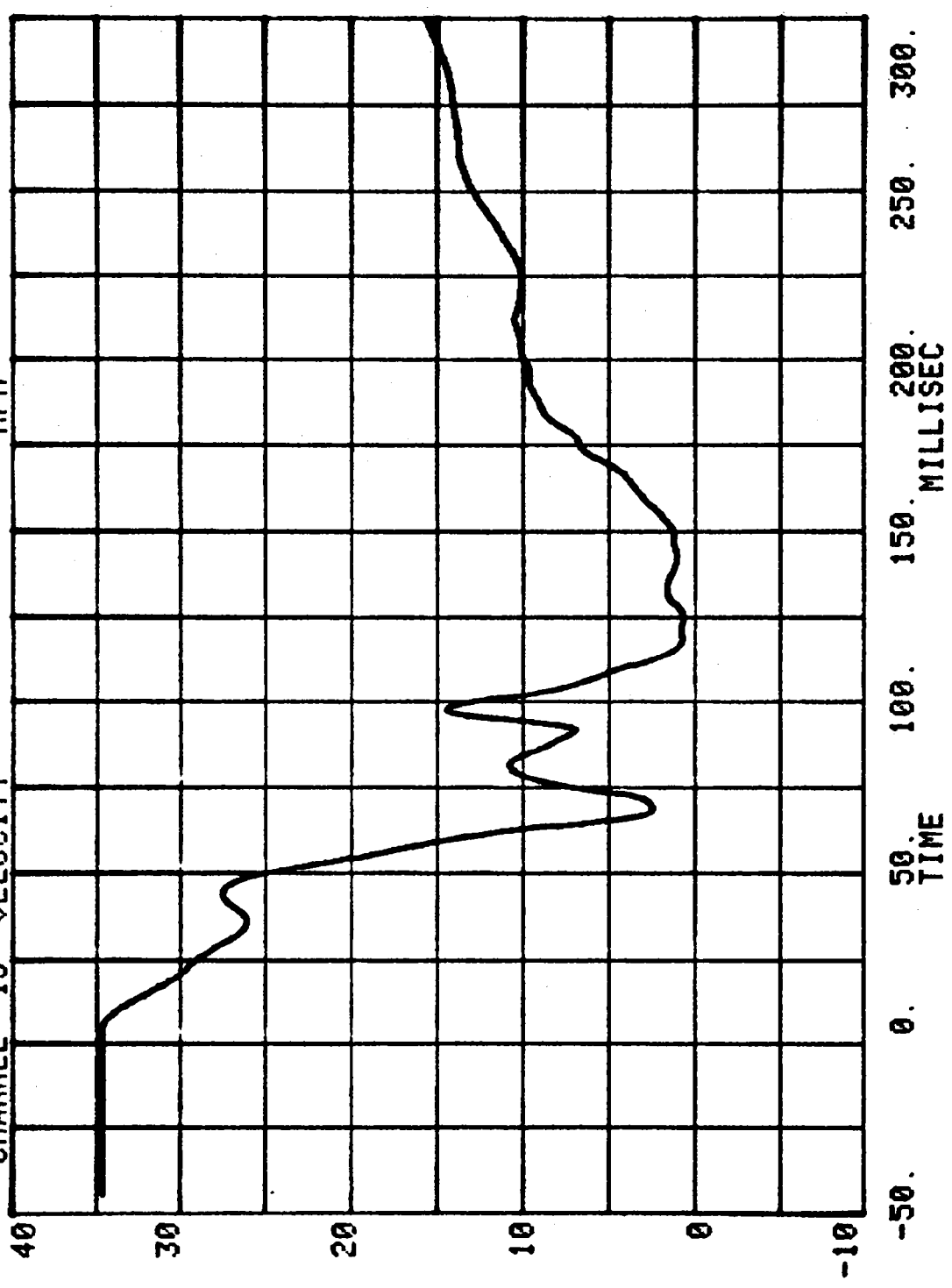
CHANNEL 12 DISPLACEMENT
RUN= 867 SERIES= 304 INCHES



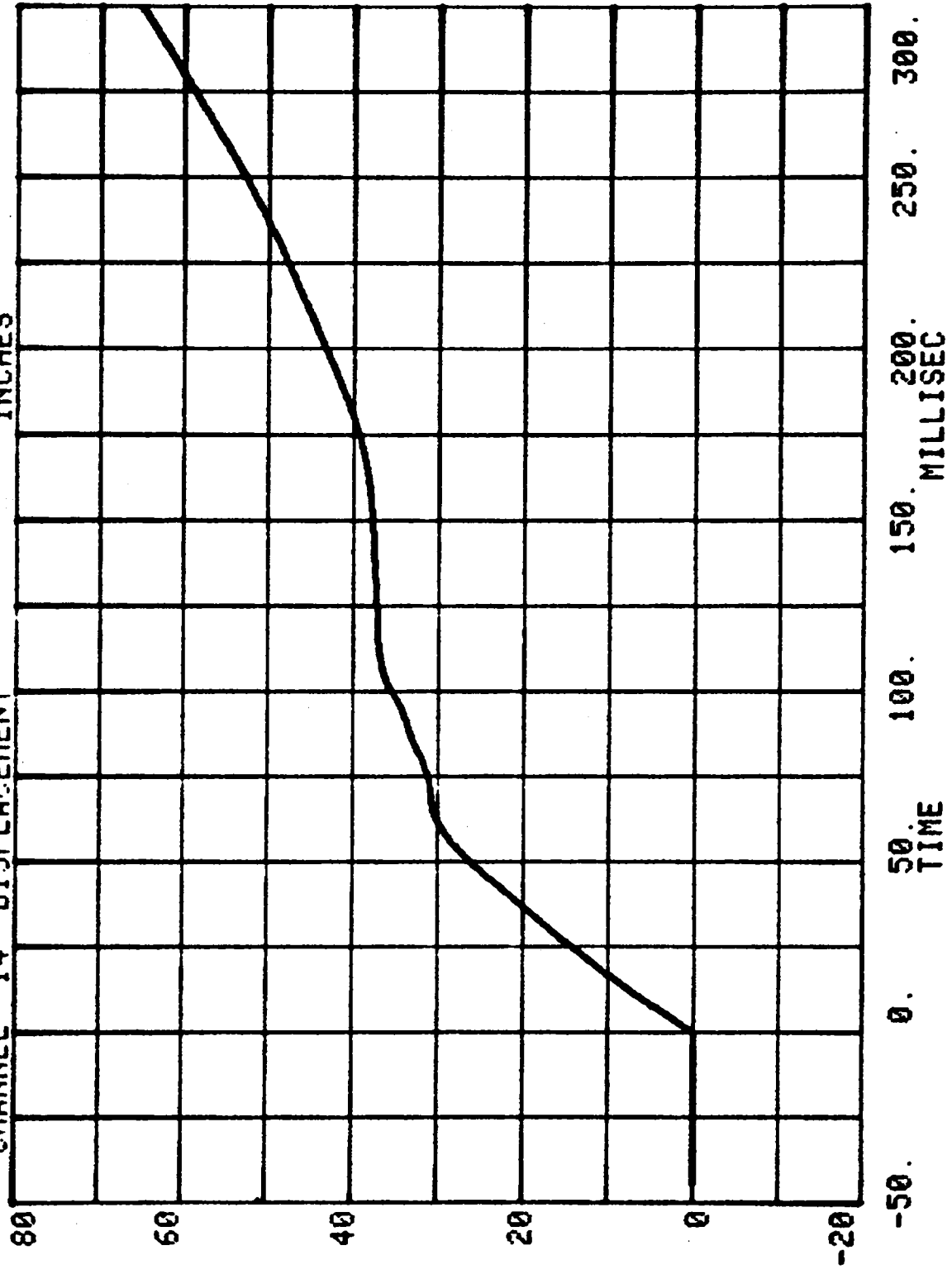
CHANNEL 33 ACC PACK #7(X) RUN= 867 SERIES= 304 G'S



CHANNEL 13 VELOCITY RUN= 867 SERIES= 304 MPH ACCEL #7 (X)



CHANNEL 14 DISPLACEMENT
RUN= 867 SERIES= 304 INCHES
ACCEL #7 (X)



TEST NO. MK0304

LOAD CELL BARRIER DATA

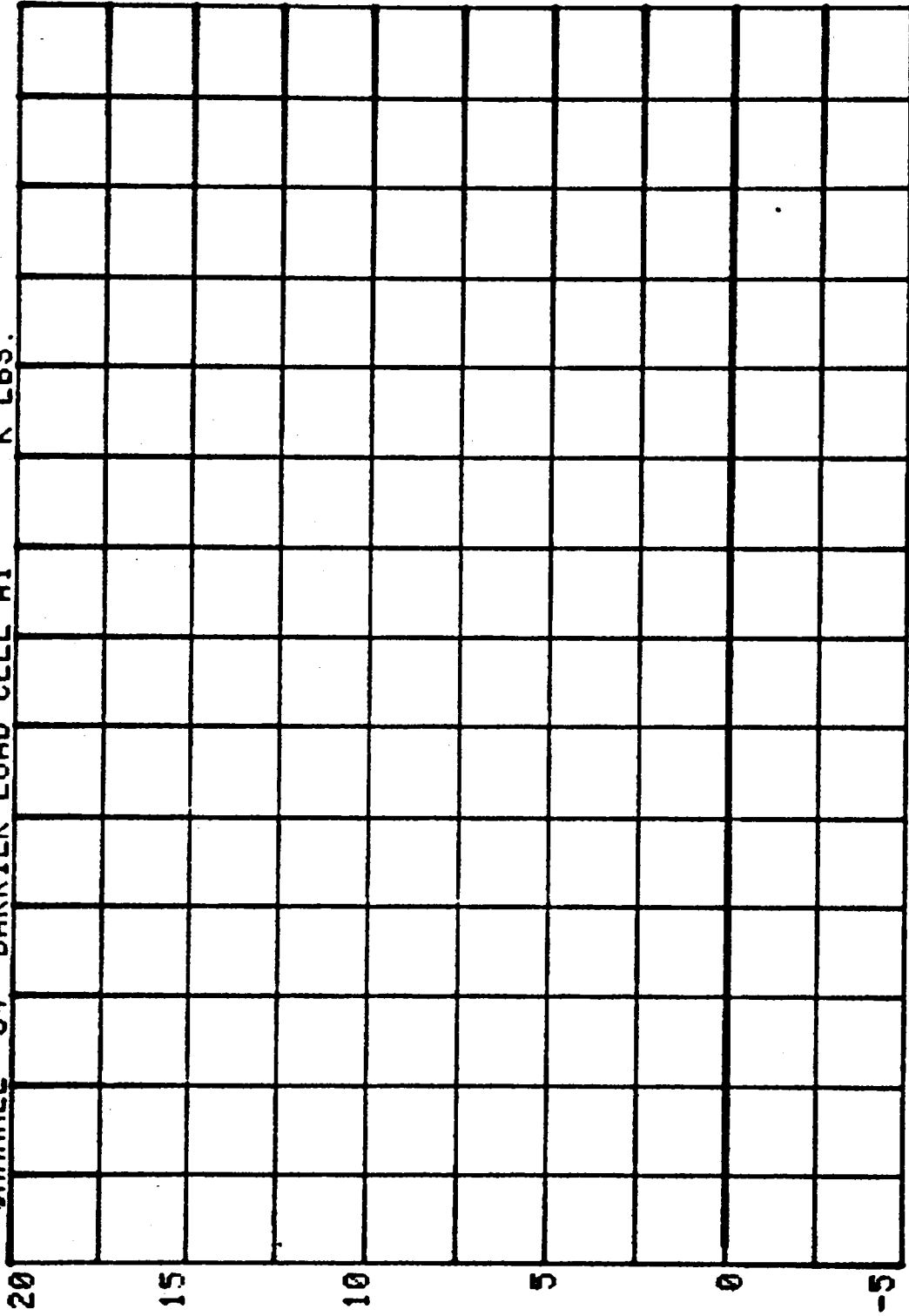
FILTER CHANNEL CLASS

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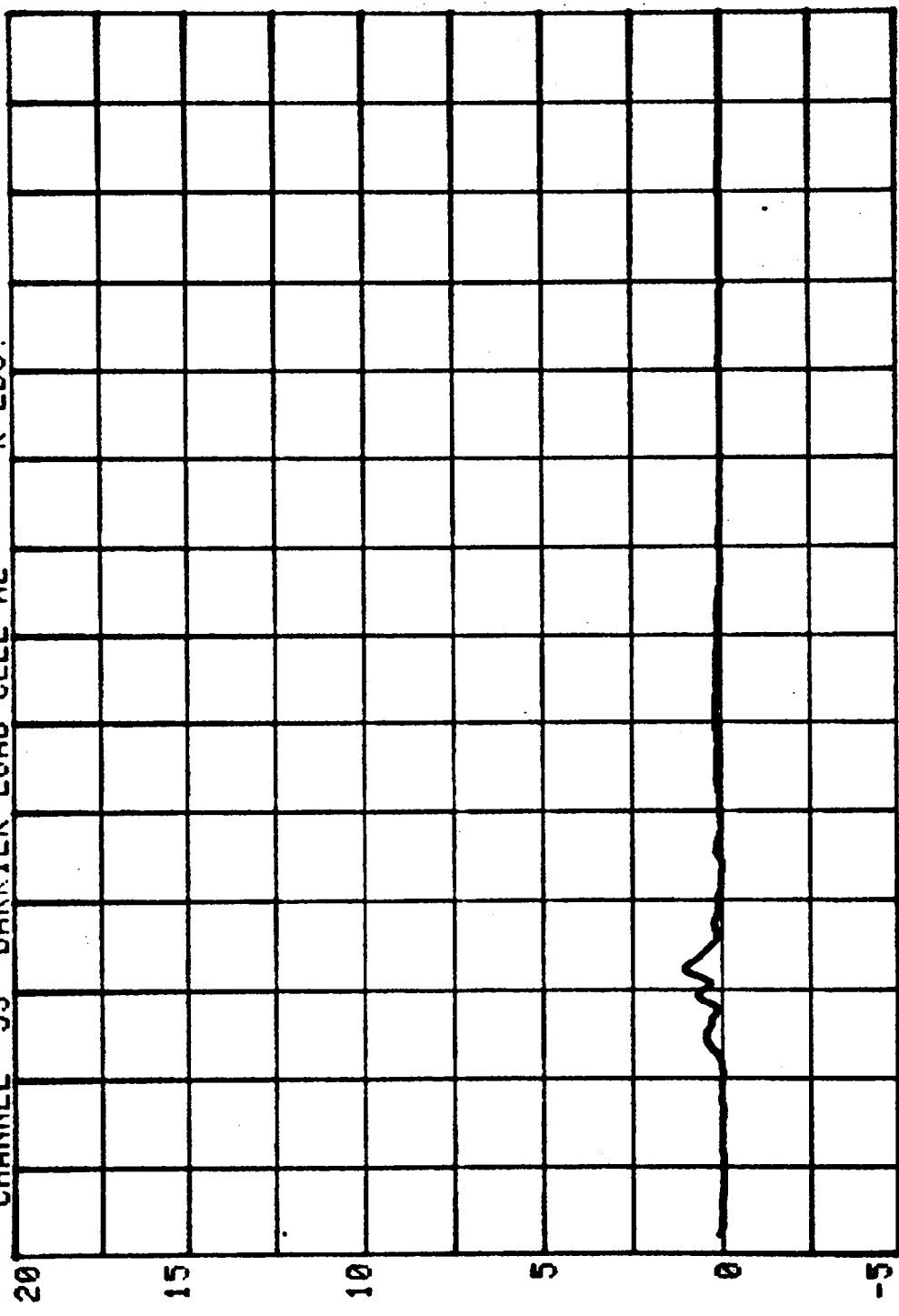
B-24

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CHANNEL 34 BARRIER LOAD CELL A1 RUN= 867 SERIES= 304 K LBS.

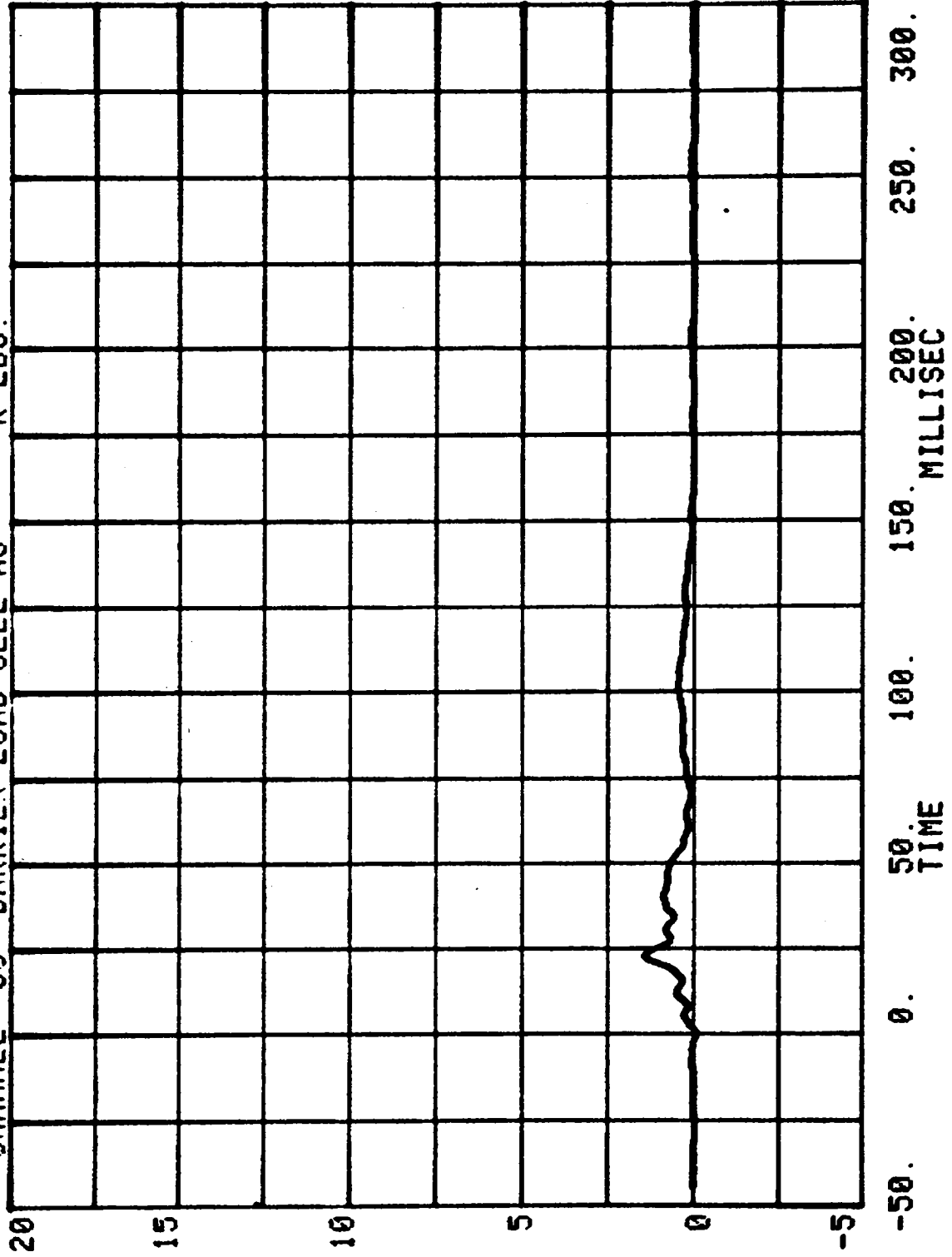


CHANNEL 35 BARRIER LOAD CELL A2 RUN= 867 SERIES= 304 K LBS.



-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 35 BARRIER LOAD CELL A3
RUN= 867 SERIES= 304 K LBS.



CHANNEL 37 BARRIER LOAD CELL A4 RUN= 867 SERIES= 304 K LBS.



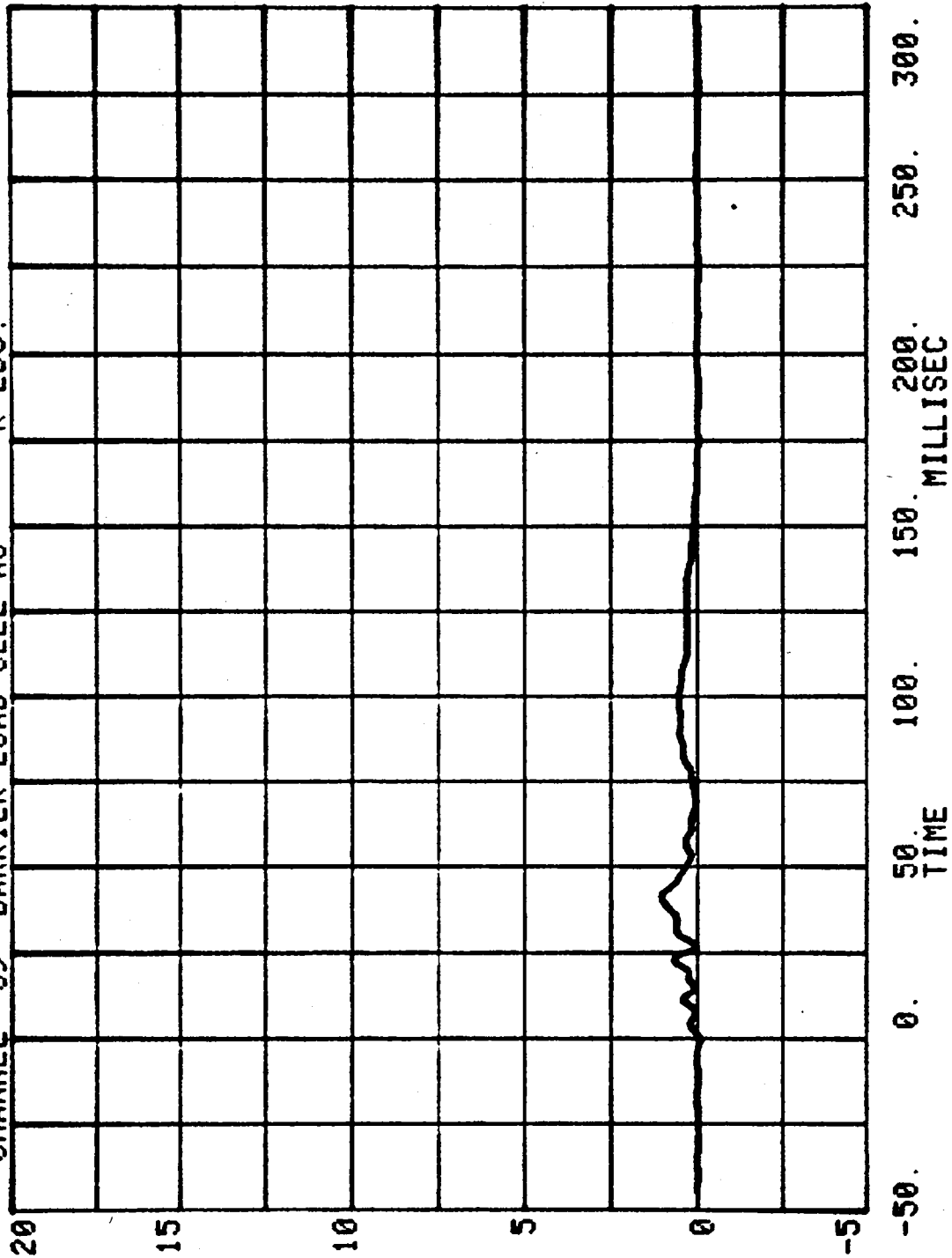
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 38 BARRIER LOAD CELL A5
RUN= 867 SERIES= 304 K LBS.

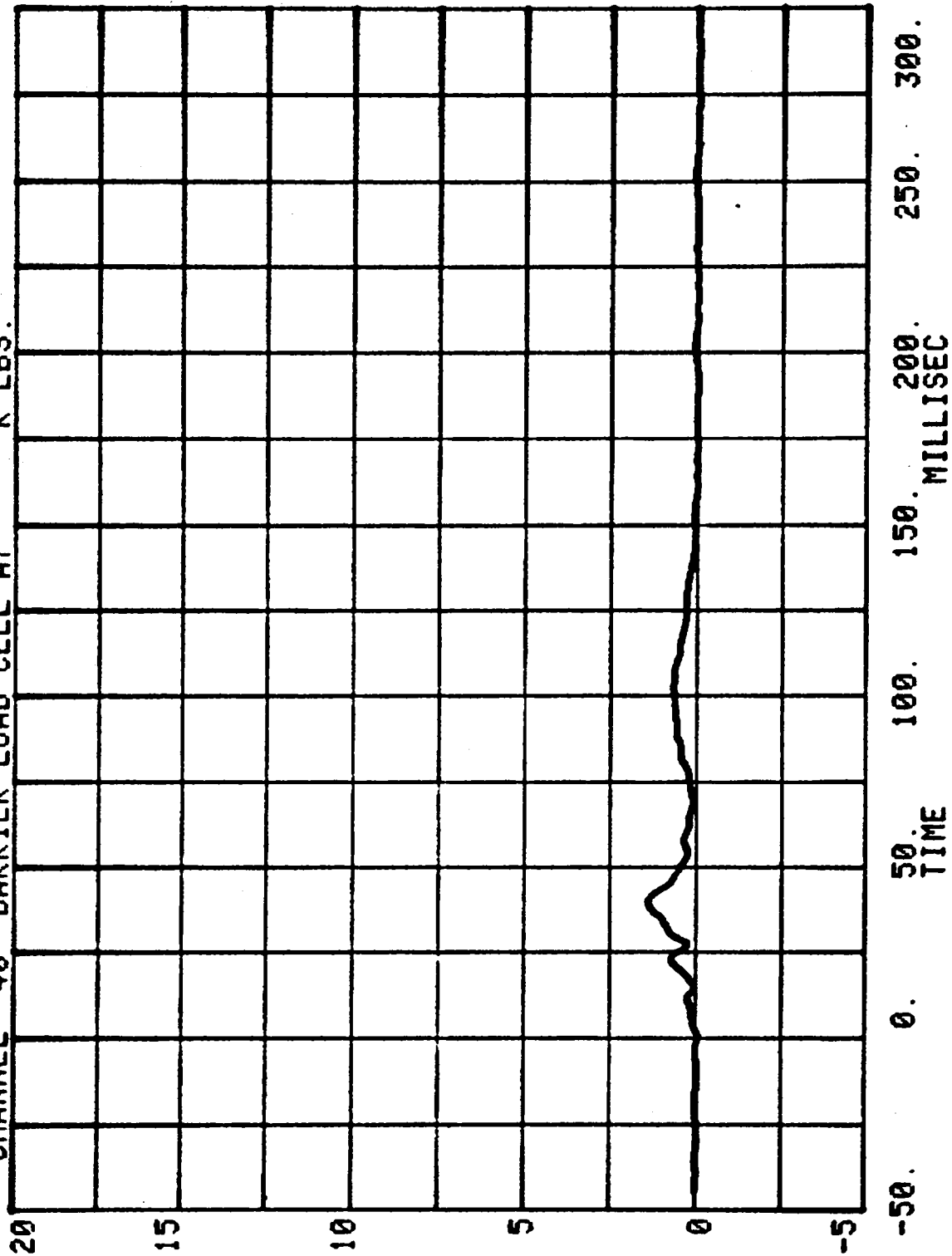


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

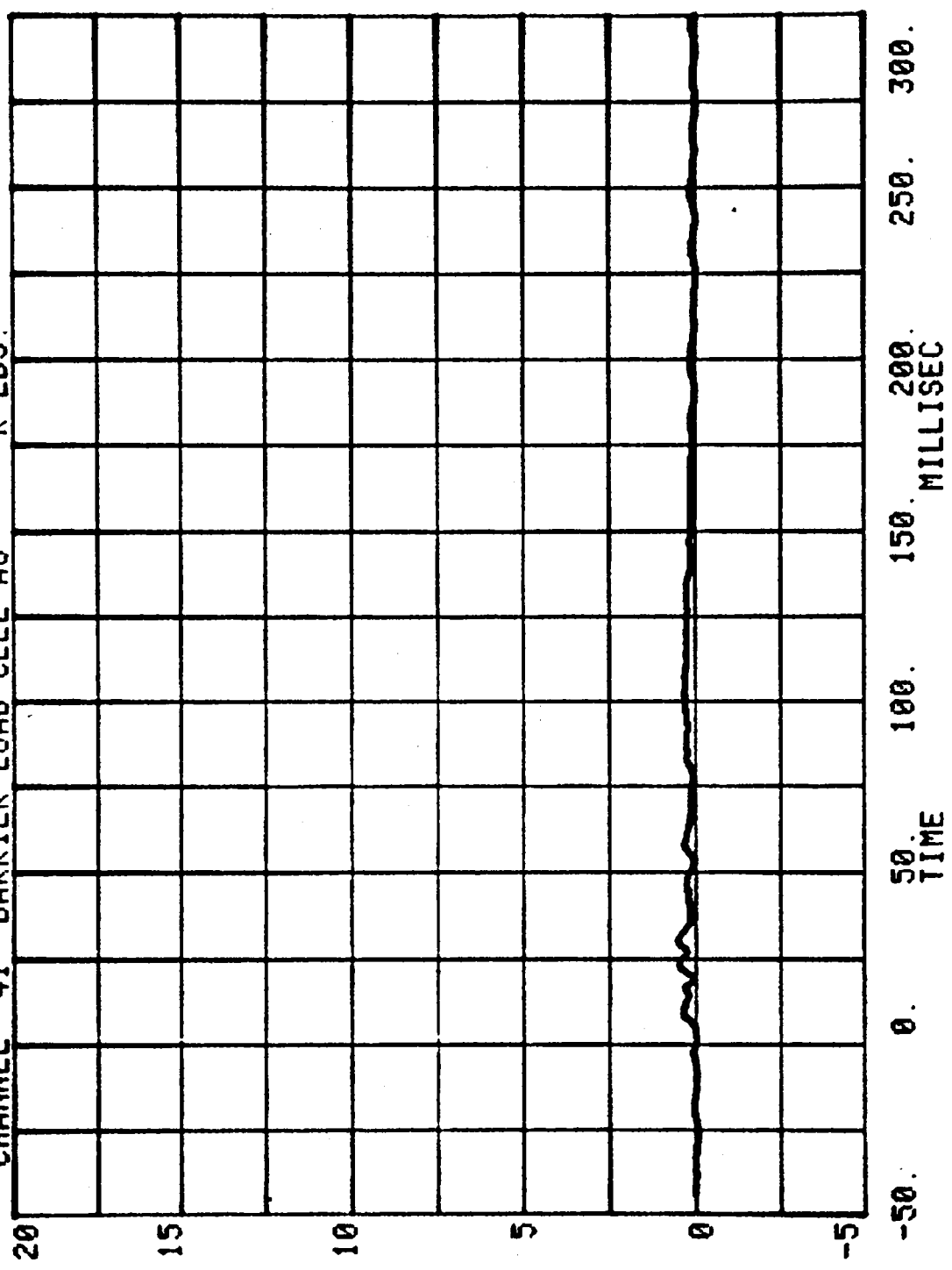
CHANNEL 39 BARRIER LOAD CELL A6
RUN= 867 SERIES= 304 K LBS.



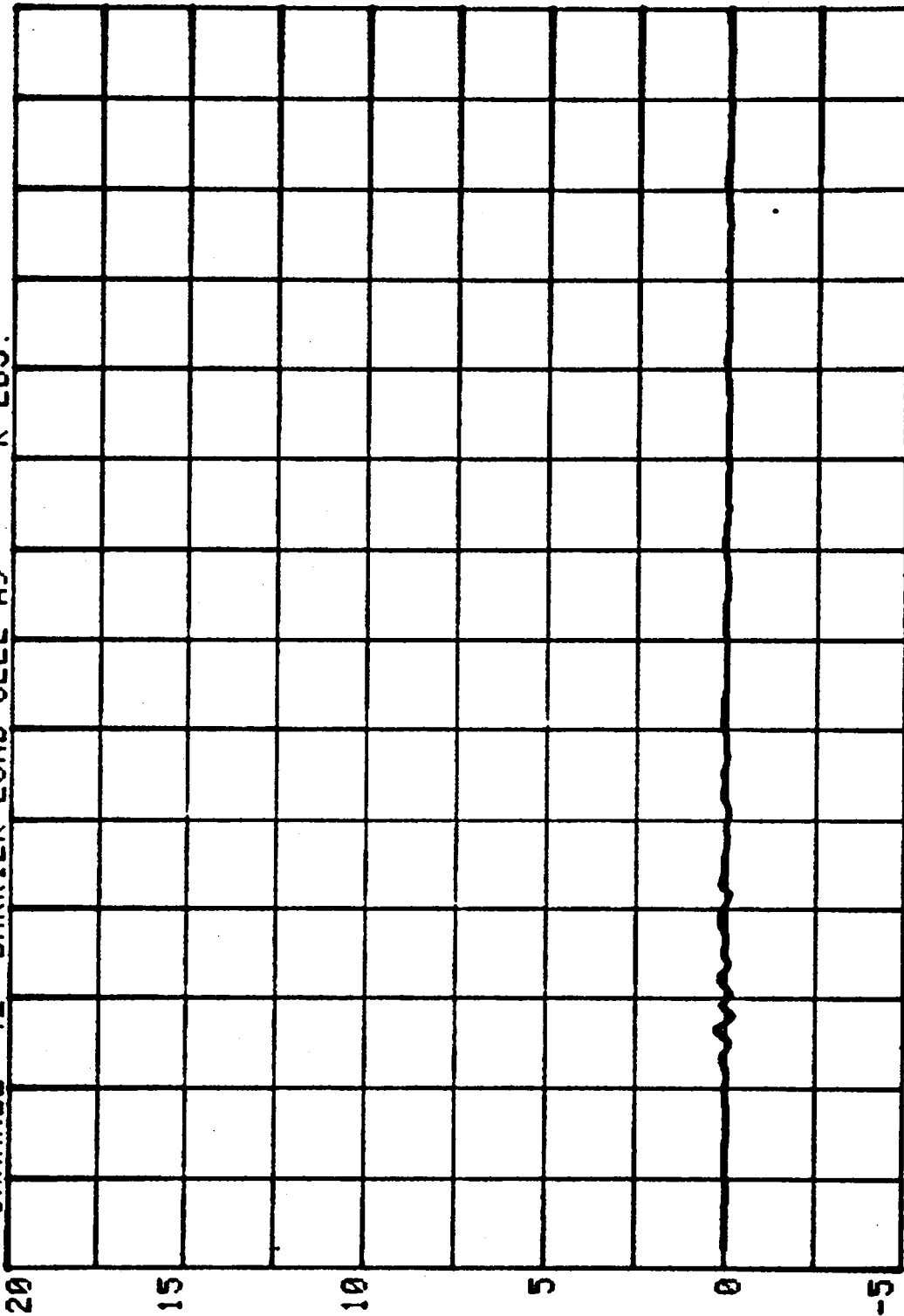
CHANNEL 40 BARRIER LOAD CELL A7
RUN= 867 SERIES= 304 K LBS.



CHANNEL 41 BARRIER LOAD CELL A8 RUN= 867 SERIES= 304 K LBS.

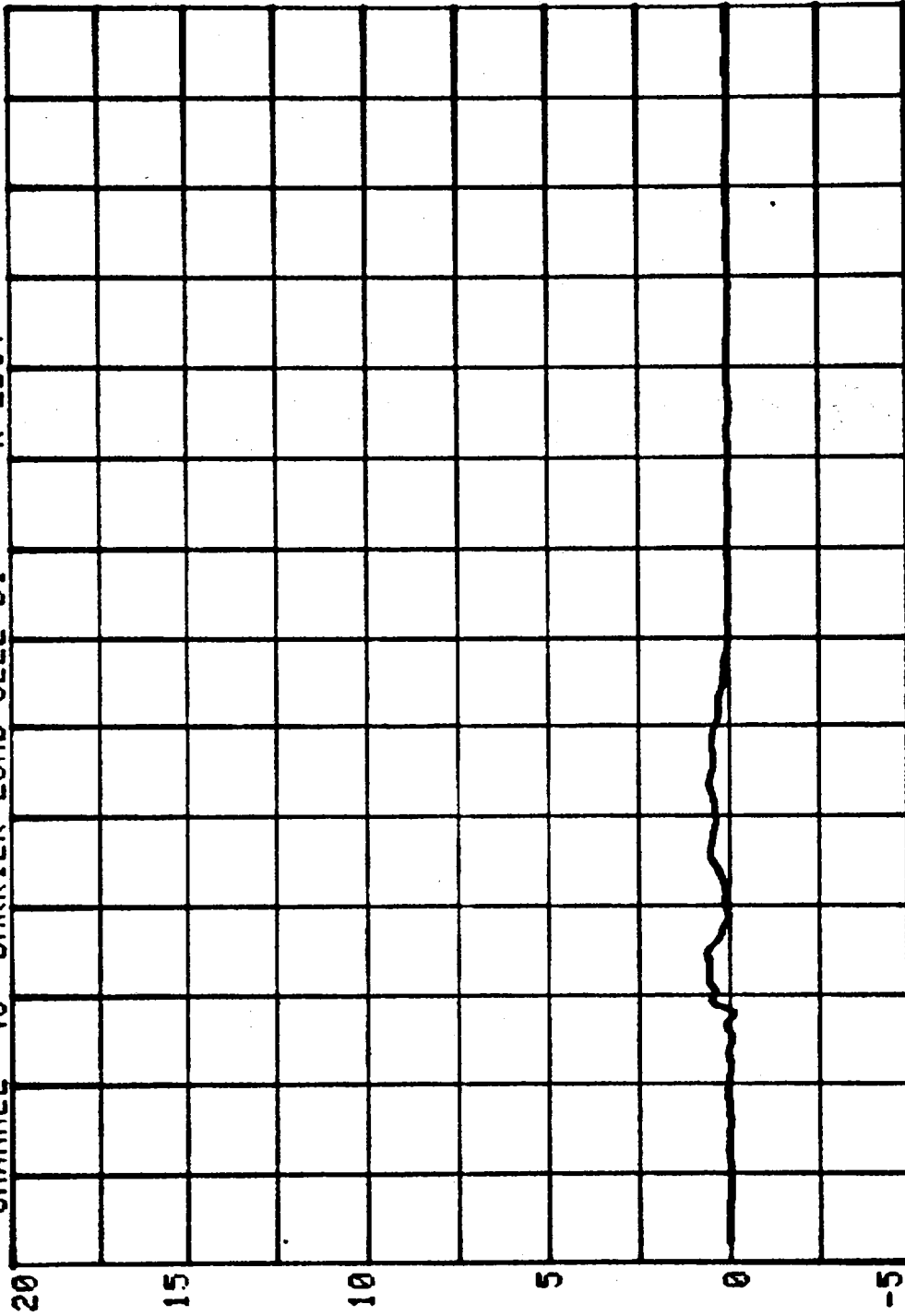


CHANNEL 42 BARRIER LOAD CELL A9
RUN= 867 SERIES= 304 K LBS.



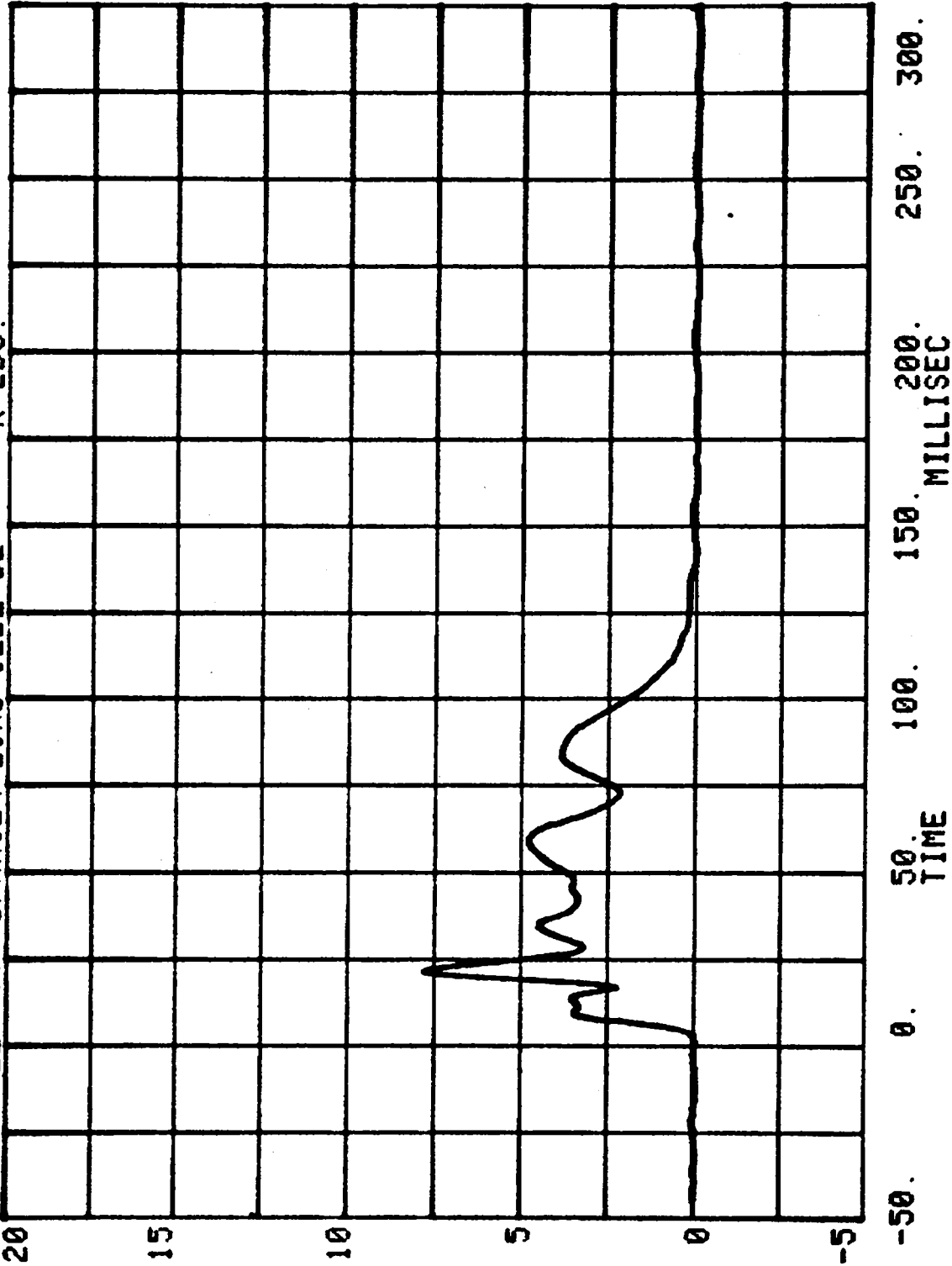
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 43 BARRIER LOAD CELL B1
RUN= 867 SERIES= 304 K LBS.

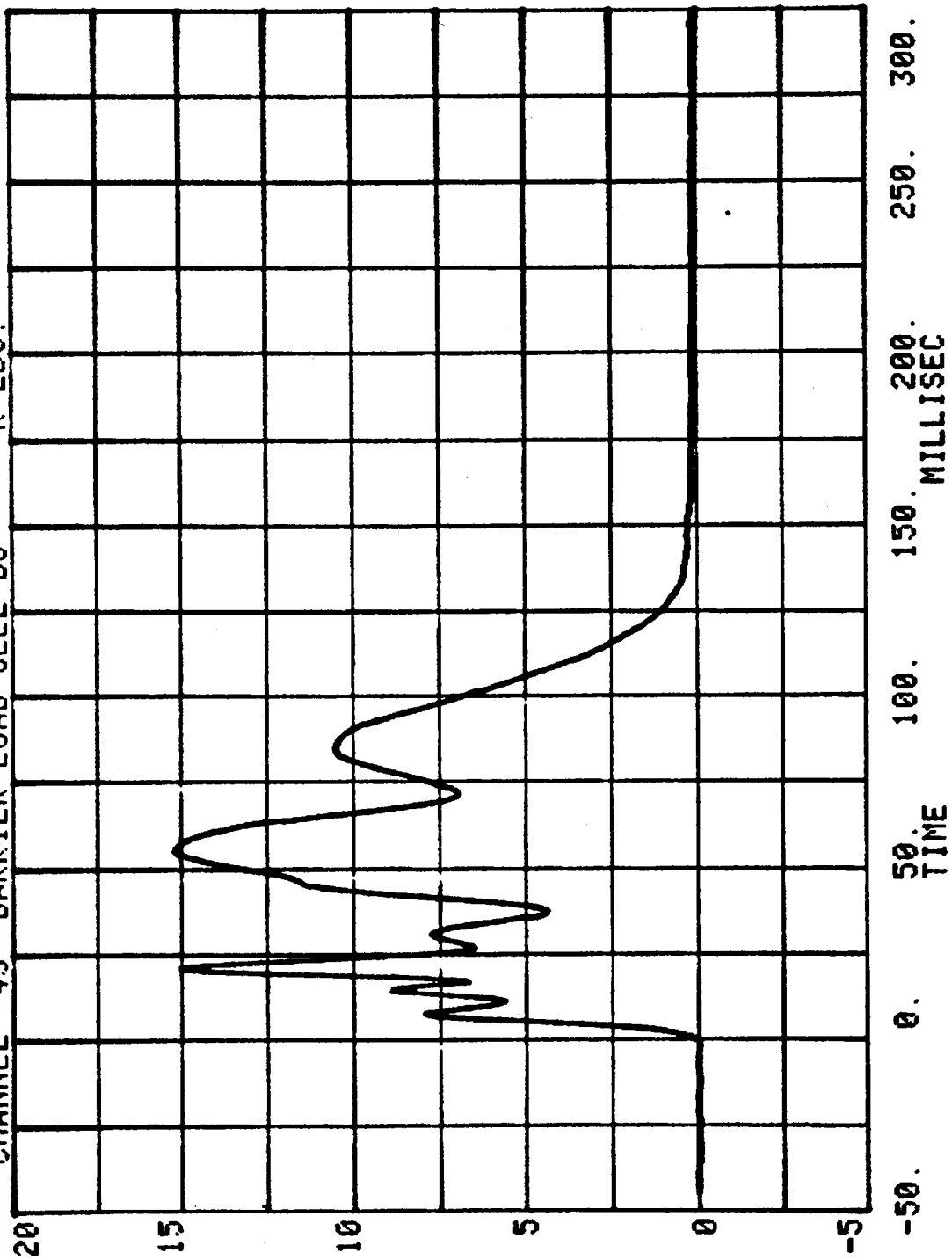


20
15
10
5
0
-5
-50. 0. 50. 100. 150. 200. 250. 300.
TIME
MILLISEC

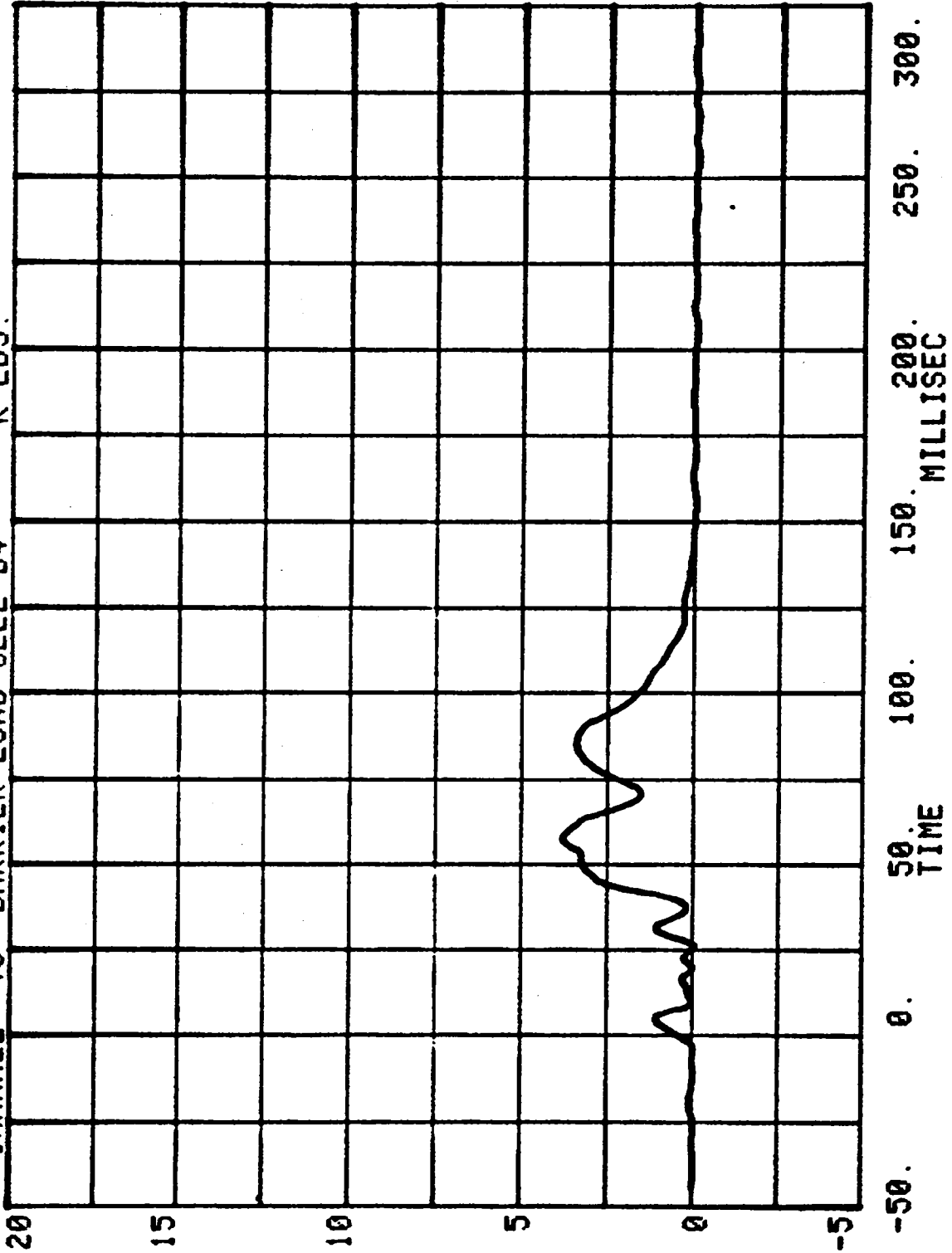
CHANNEL 44 BARRIER LOAD CELL B2
RUN= 867 SERIES= 304 K LBS.



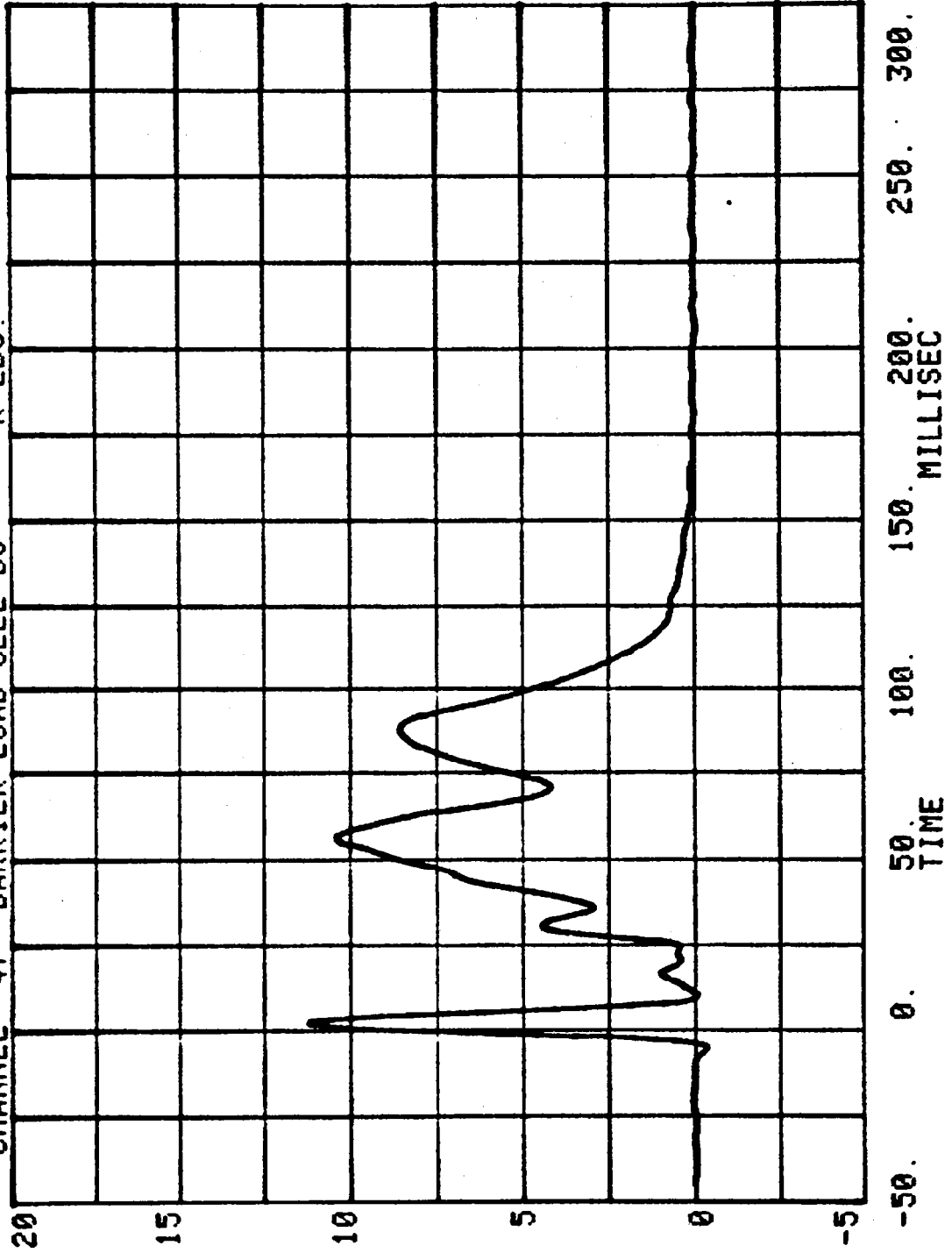
CHANNEL 45 BARRIER LOAD CELL B3 RUN= 867 SERIES= 304 K LBS.



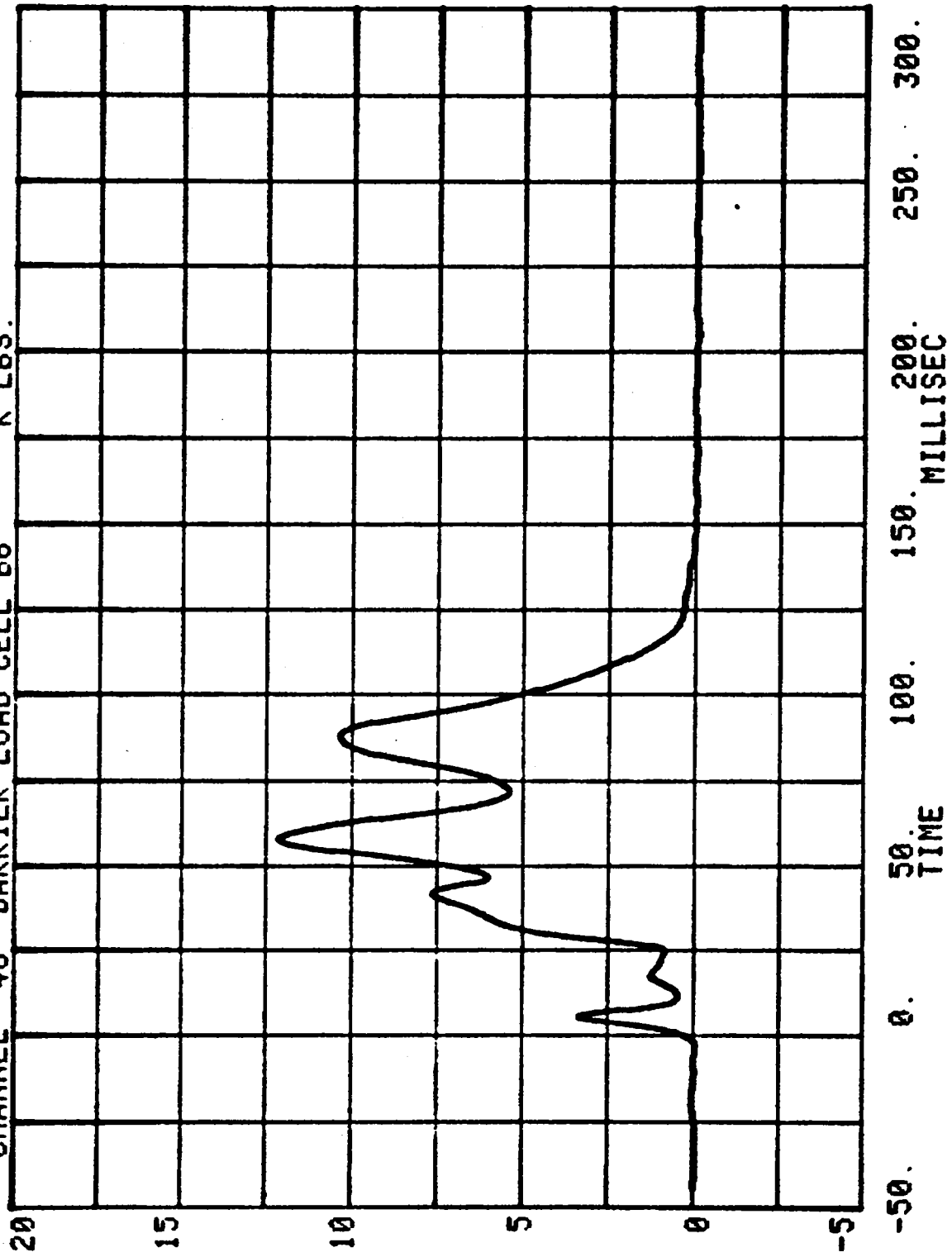
CHANNEL 46 BARRIER LOAD CELL B4
RUN= 867 SERIES= 304 K LBS.



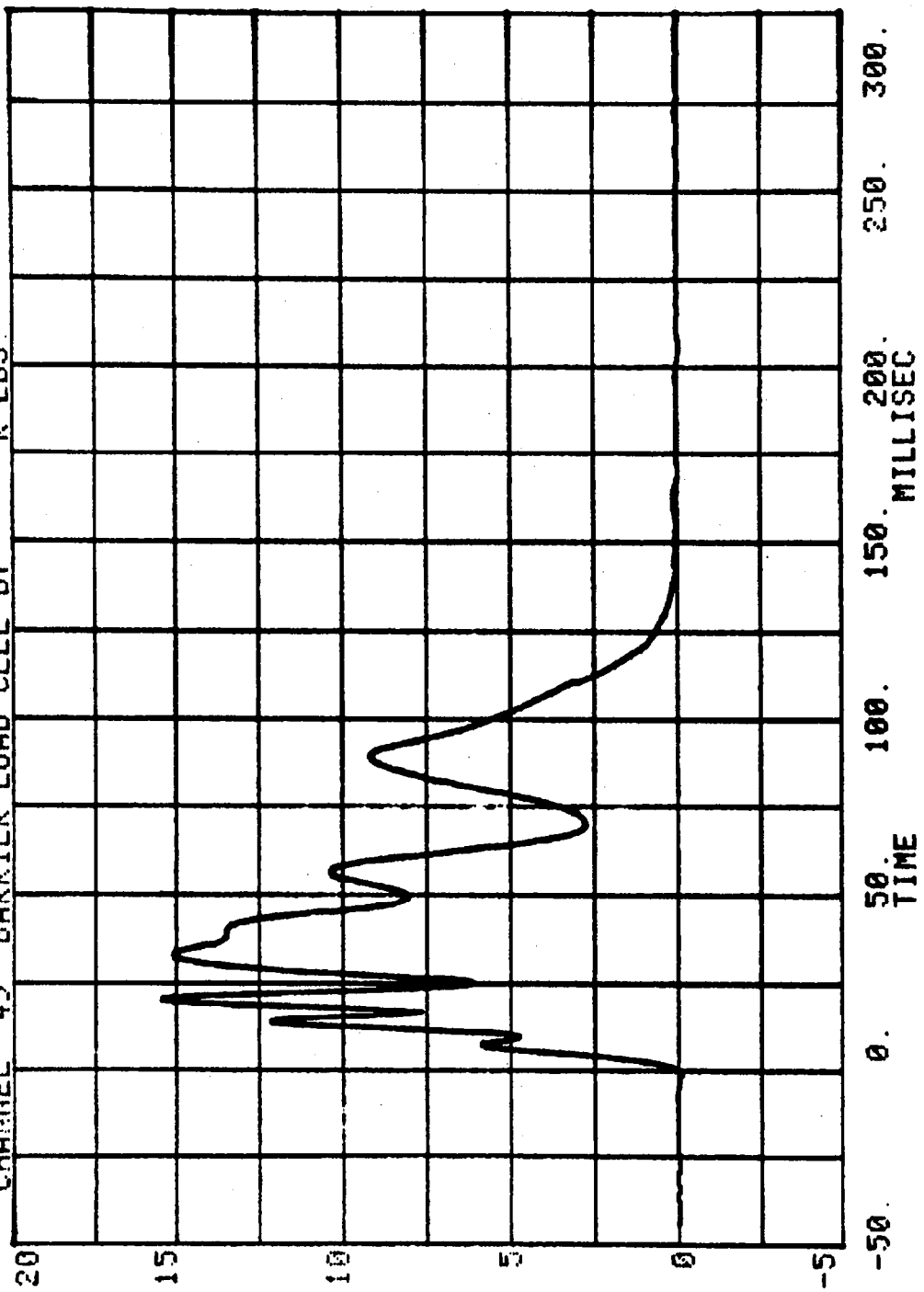
CHANNEL 47 BARRIER LOAD CELL 85
RUN= 867 SERIES= 304 K LBS.



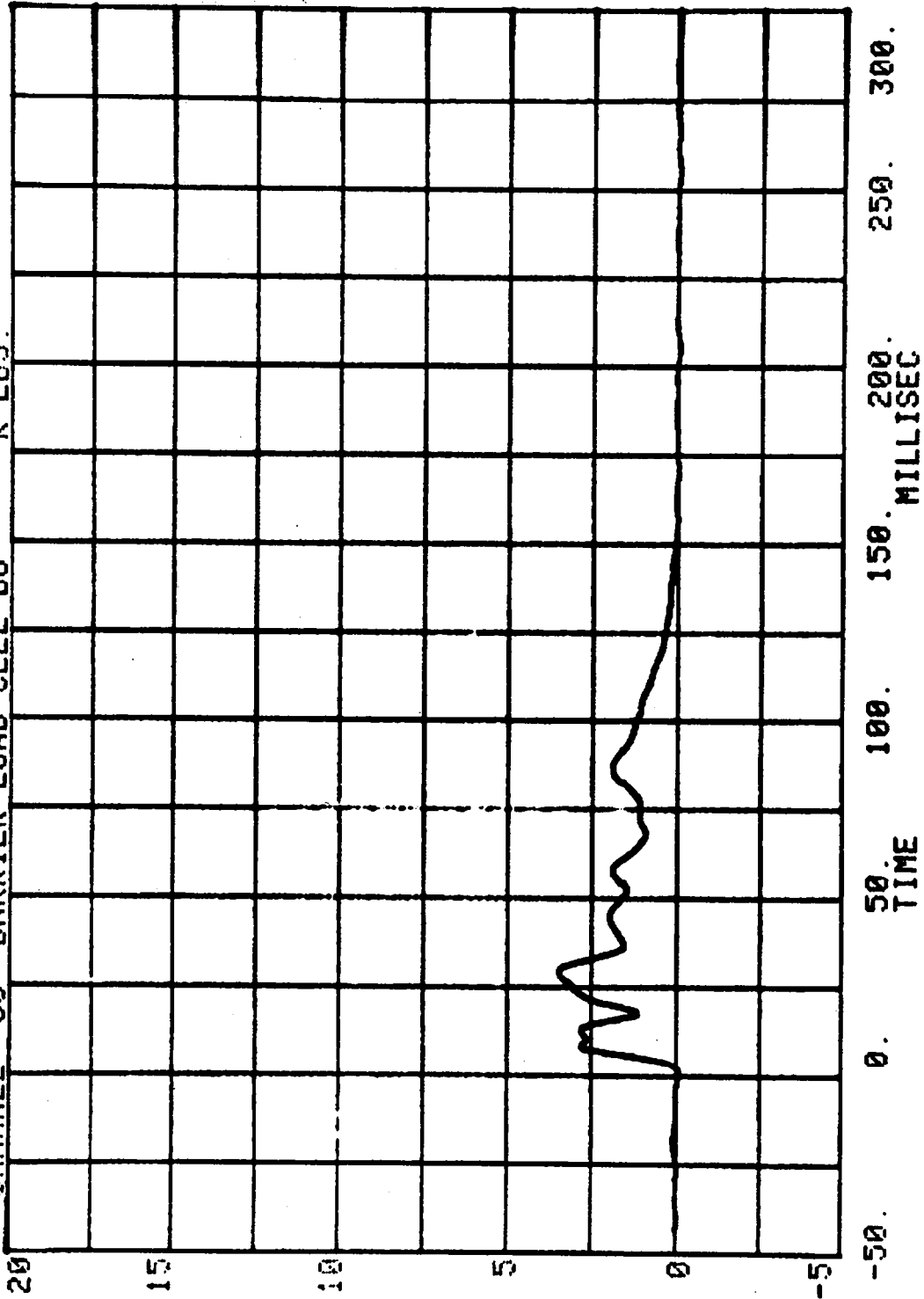
CHANNEL 48 BARRIER LOAD CELL B6 RUN= 867 SERIES= 304 K LBS.



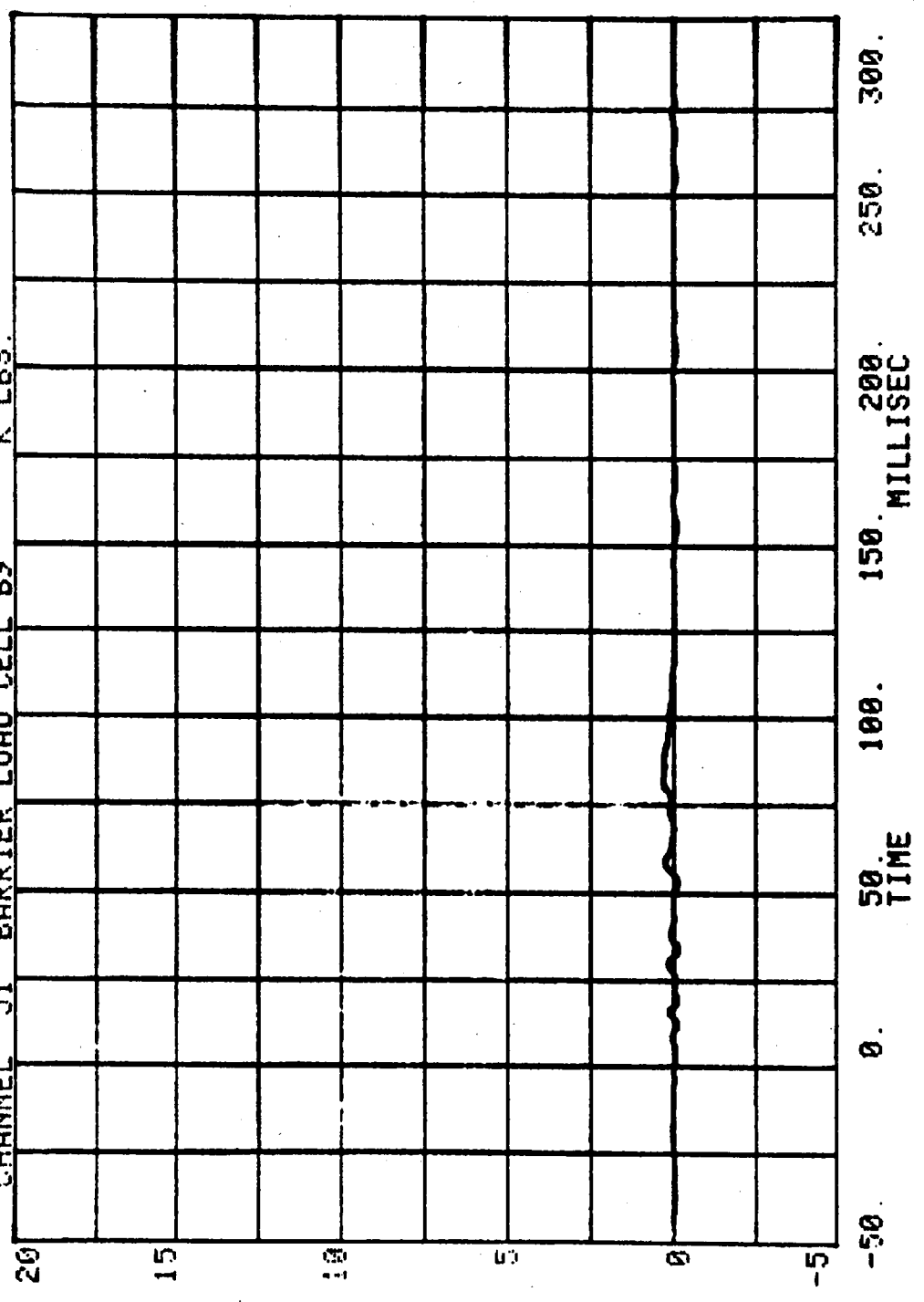
CHANNEL 49 BARRIER LOAD CELL B7 K LBS.
RUN= 867 SERIES= 304



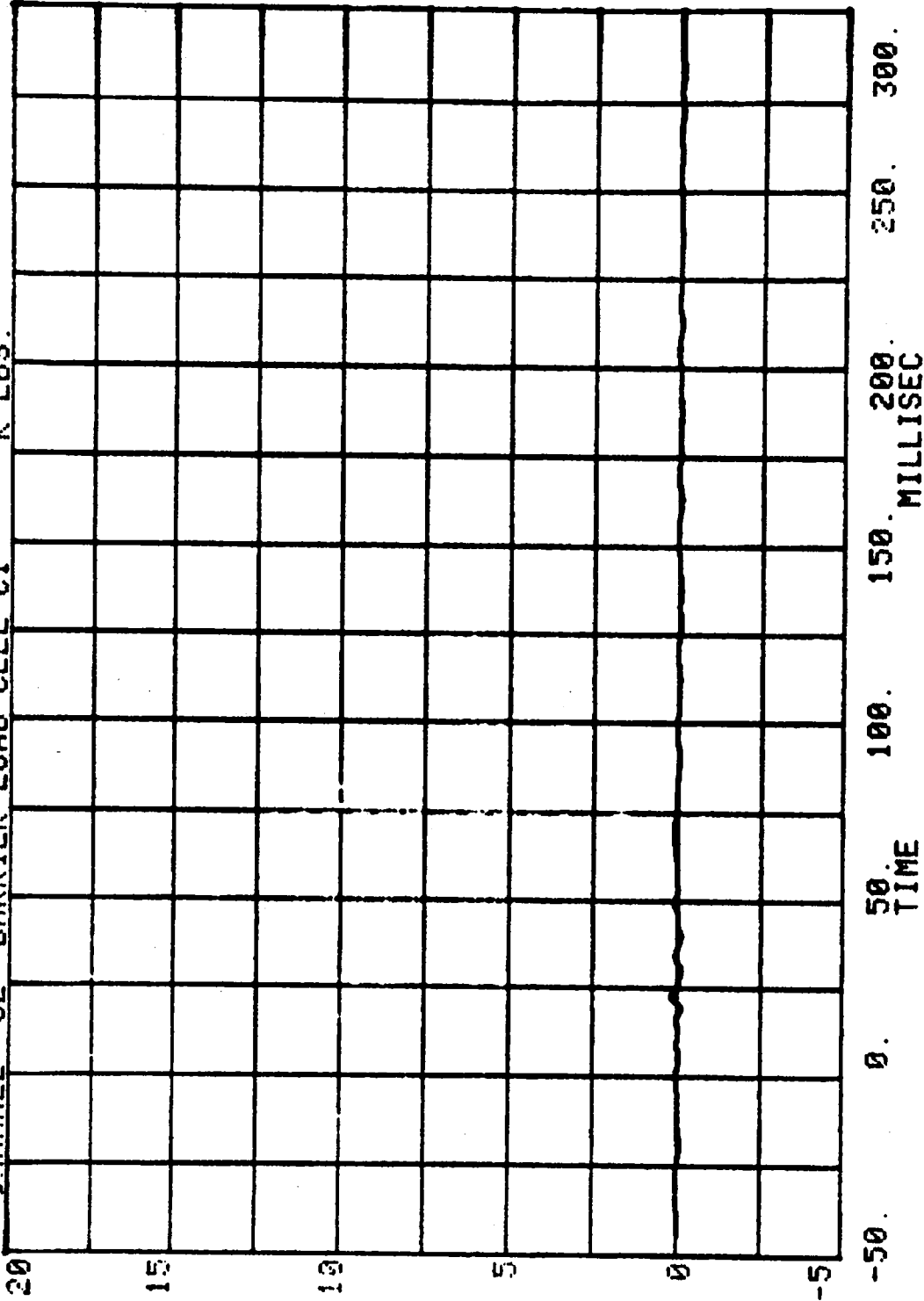
CHANNEL 50 BARRIER LOAD CELL B8 RUN= 867 SERIES= 304 K LBS.



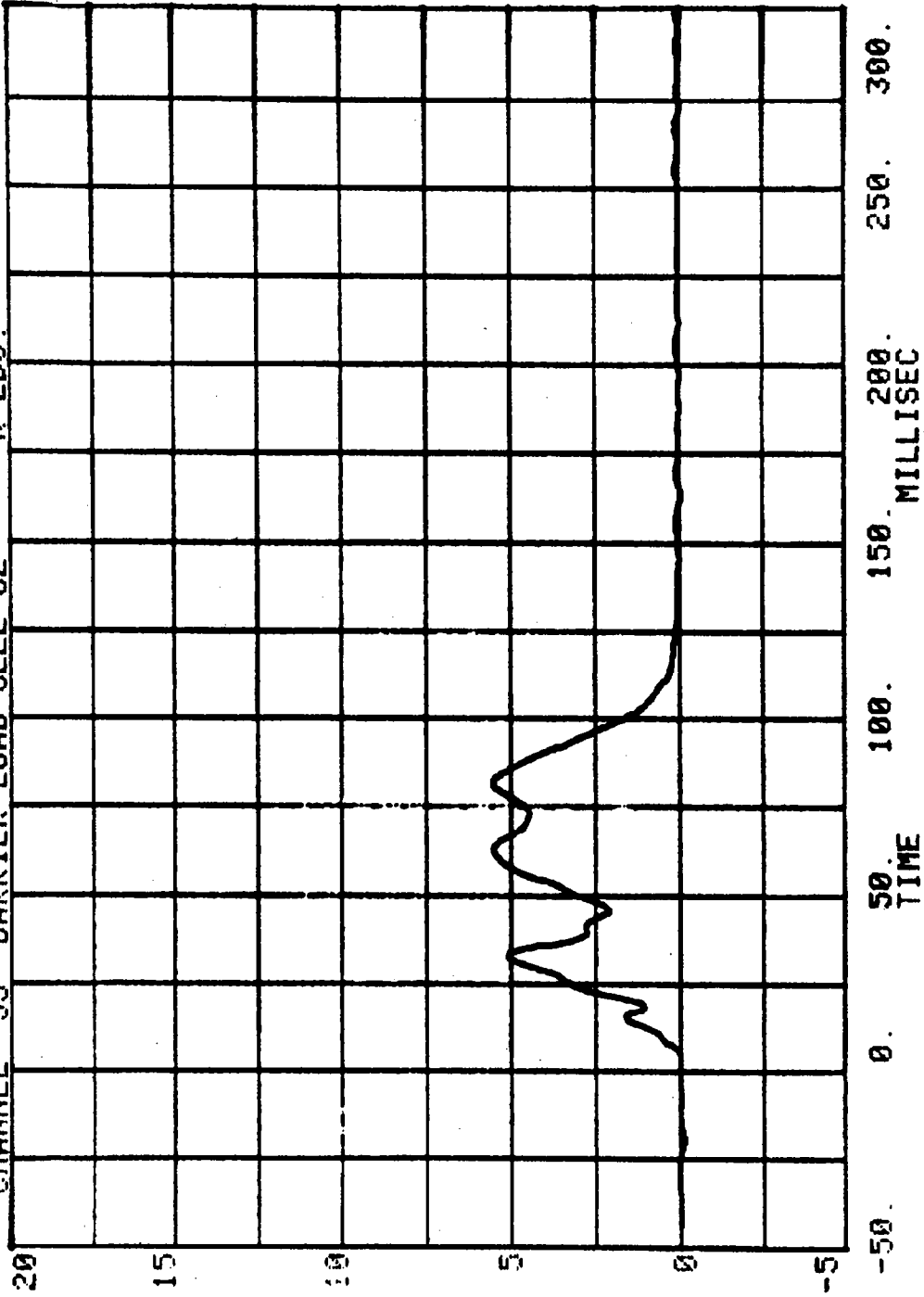
CHANNEL 51 BARRIER LOAD CELL B9 RUN= 867 SERIES= 304 K LBS.



CHANNEL 52 BARRIER LOAD CELL C1 SERIES= 304 K LBS.

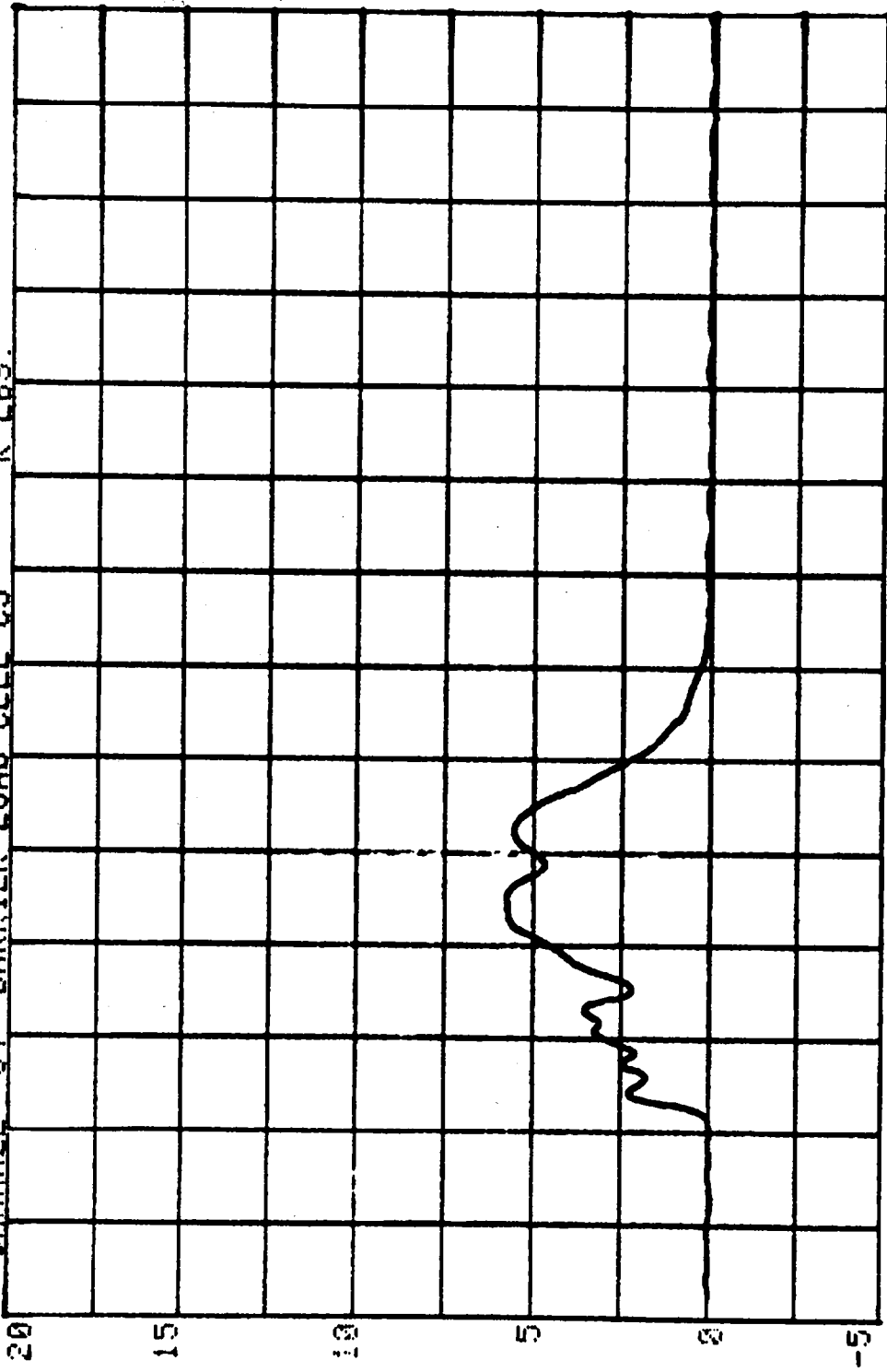


CHANNEL 53 BARRIER LOAD CELL C2
RUN= 867 SERIES= 304 K LBS.



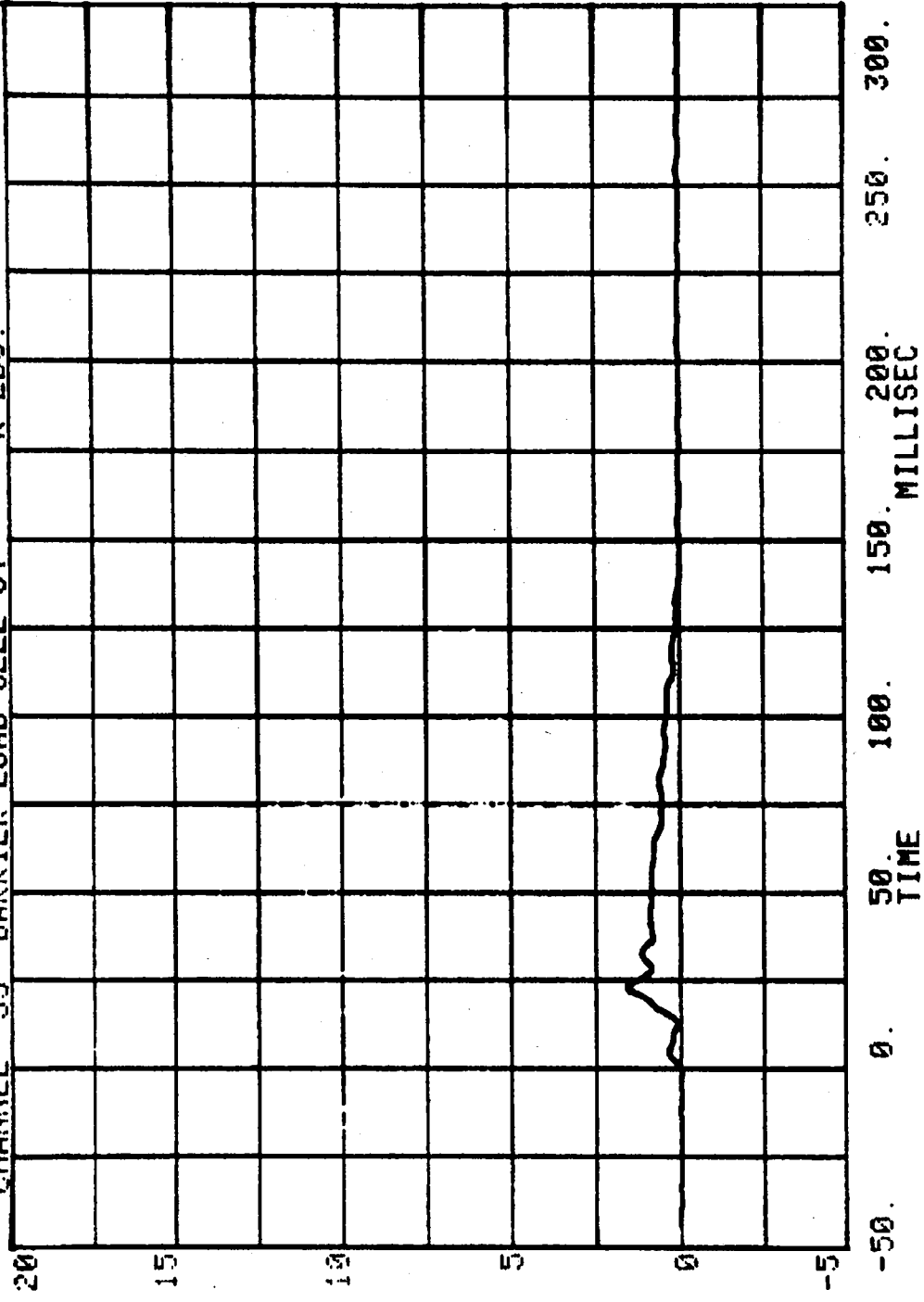
CHANNEL 54 BARRIER LOAD CELL C3 K LBS.

RUN= 867 SERIES= 304

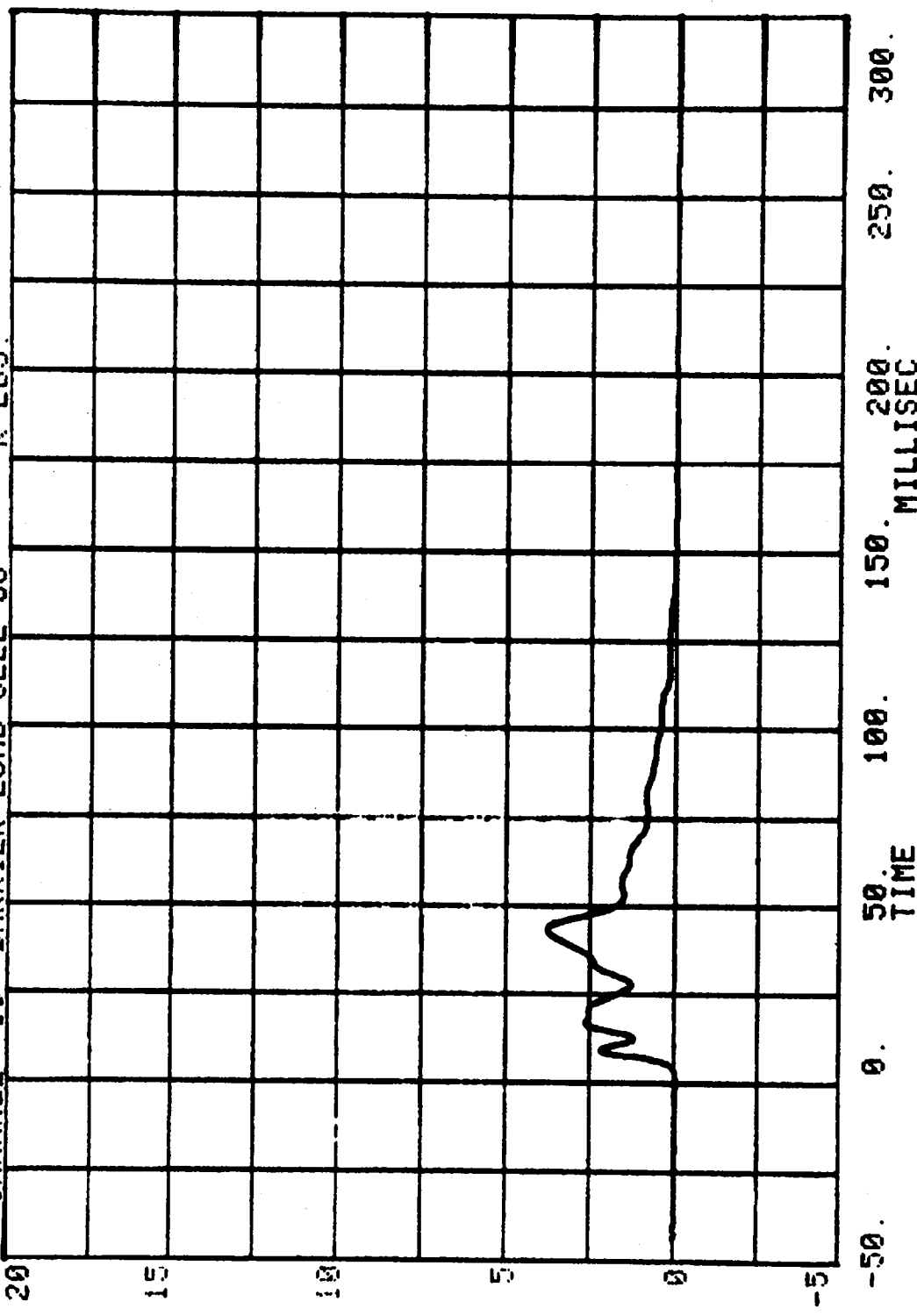


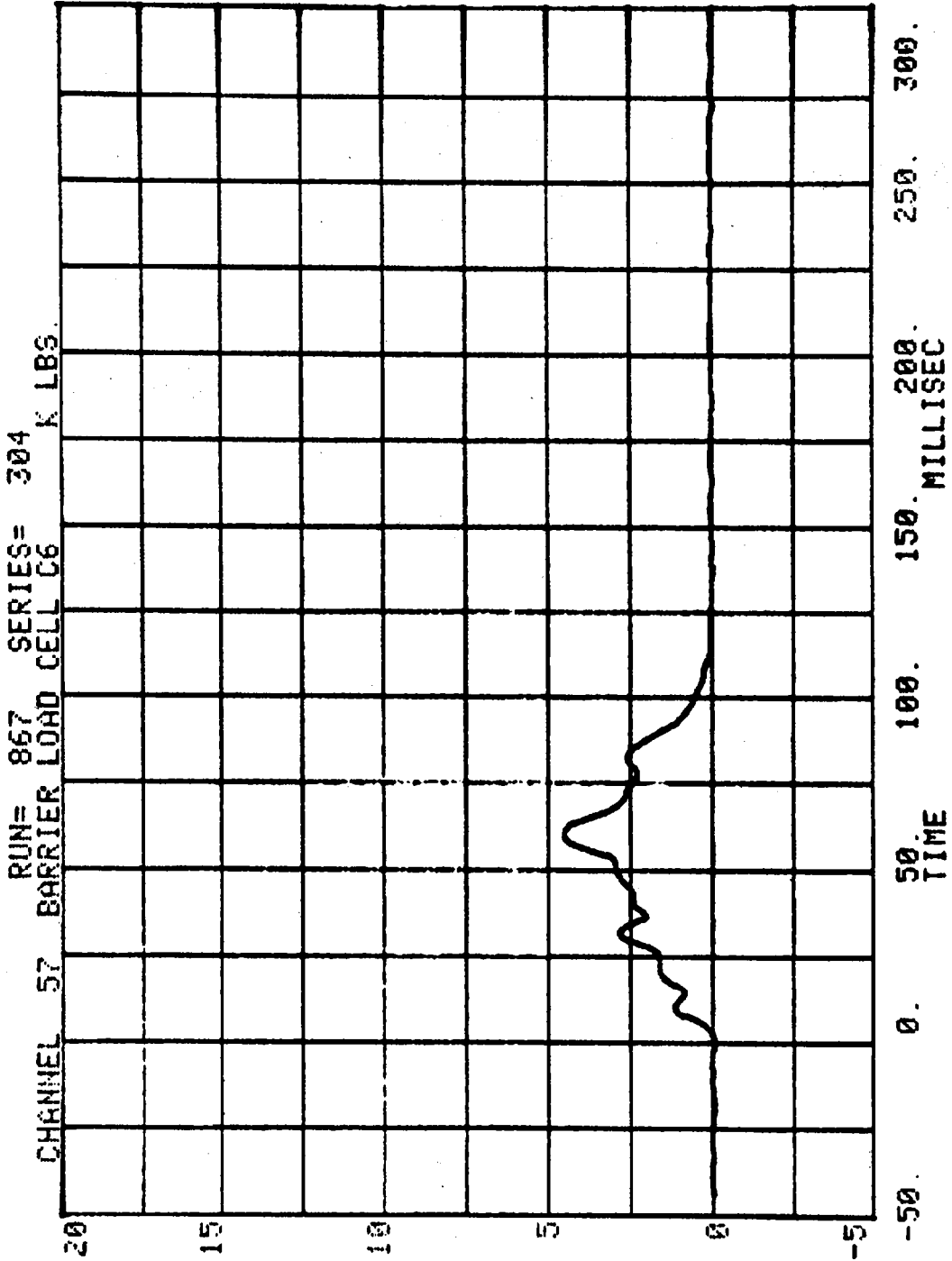
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 55 BARRIER LOAD CELL C4 RUN= 867 SERIES= 304 K LBS.

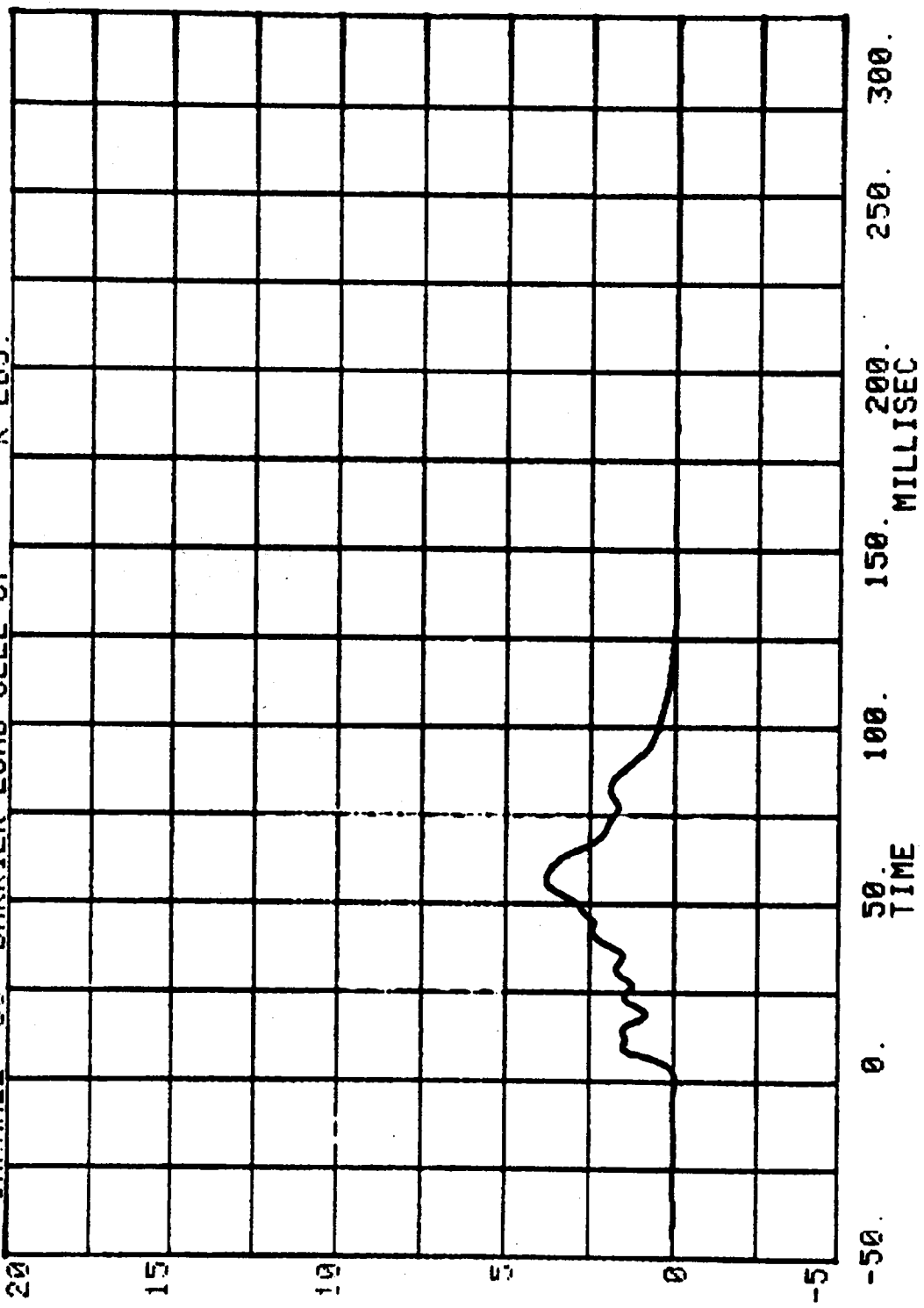


CHANNEL 56 BARRIER LOAD CELL C5 SERIES= 304 K LBS.

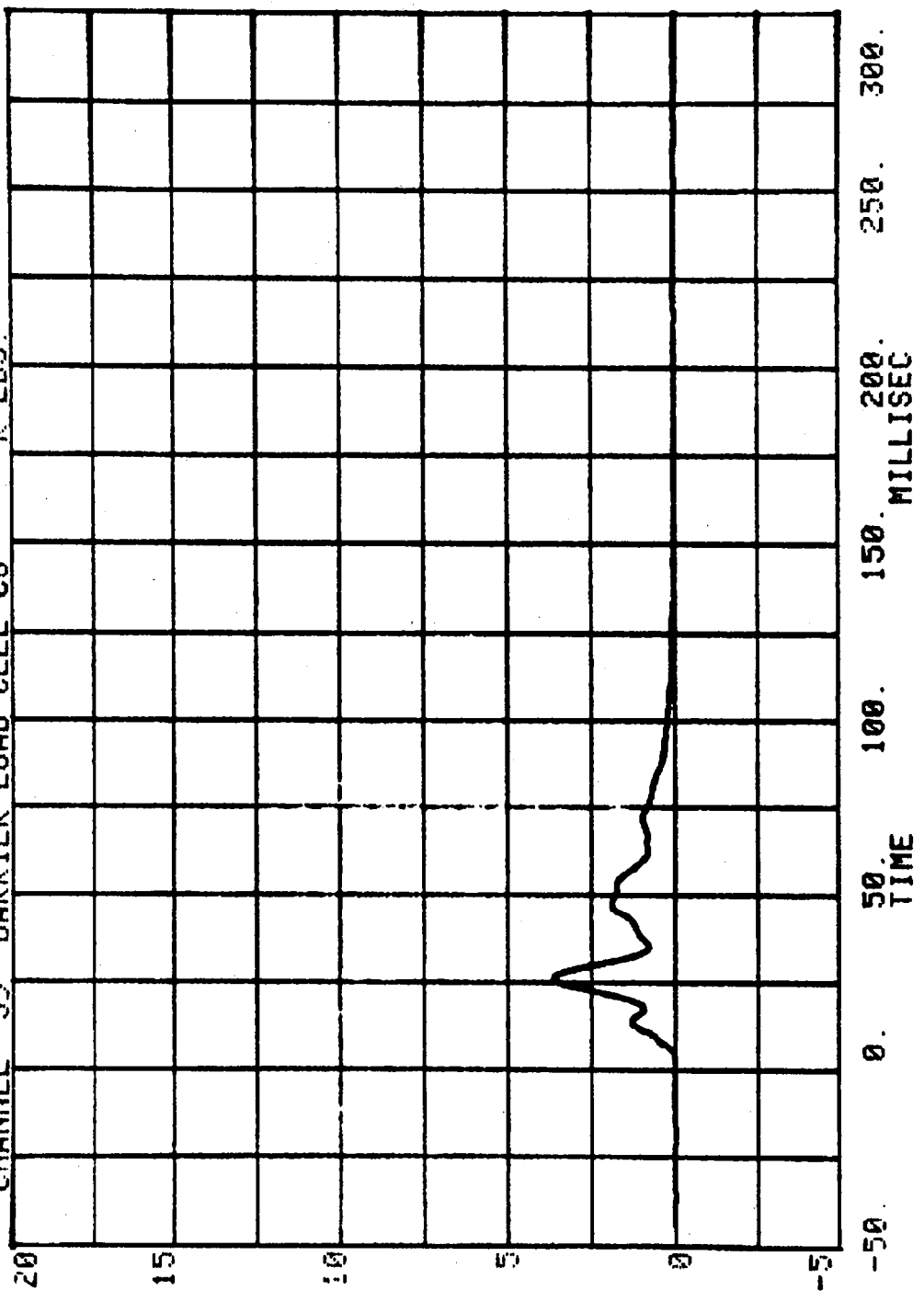




CHANNEL 53 BARRIER LOAD CELL C7 RUN= 867 SERIES= 304 K LBS.



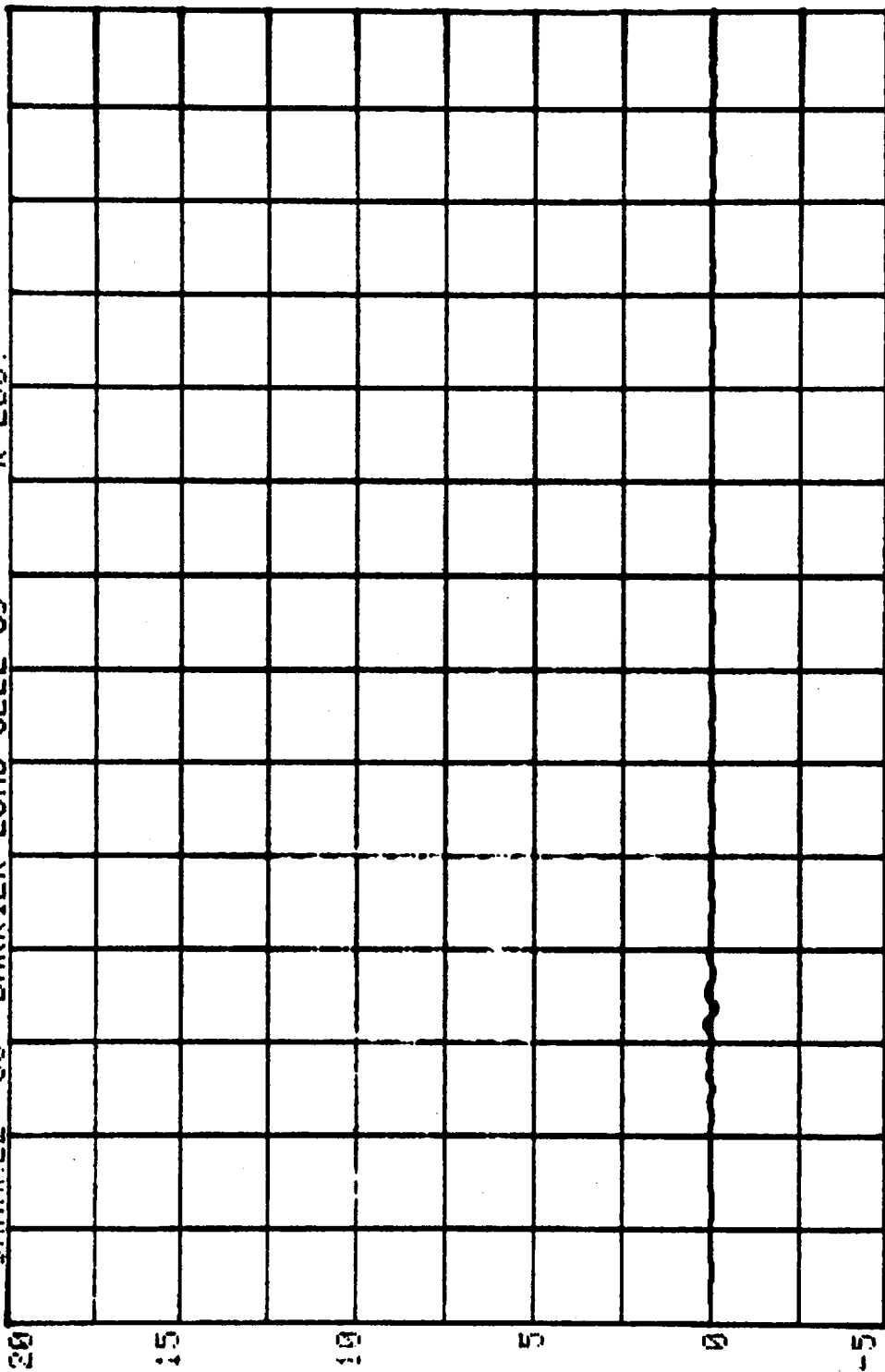
CHANNEL 53 BARRIER LOAD CELL C8
RUN= 867 SERIES= 304 K LBS.



CHANNEL 60 BARRIER LOAD CELL C9

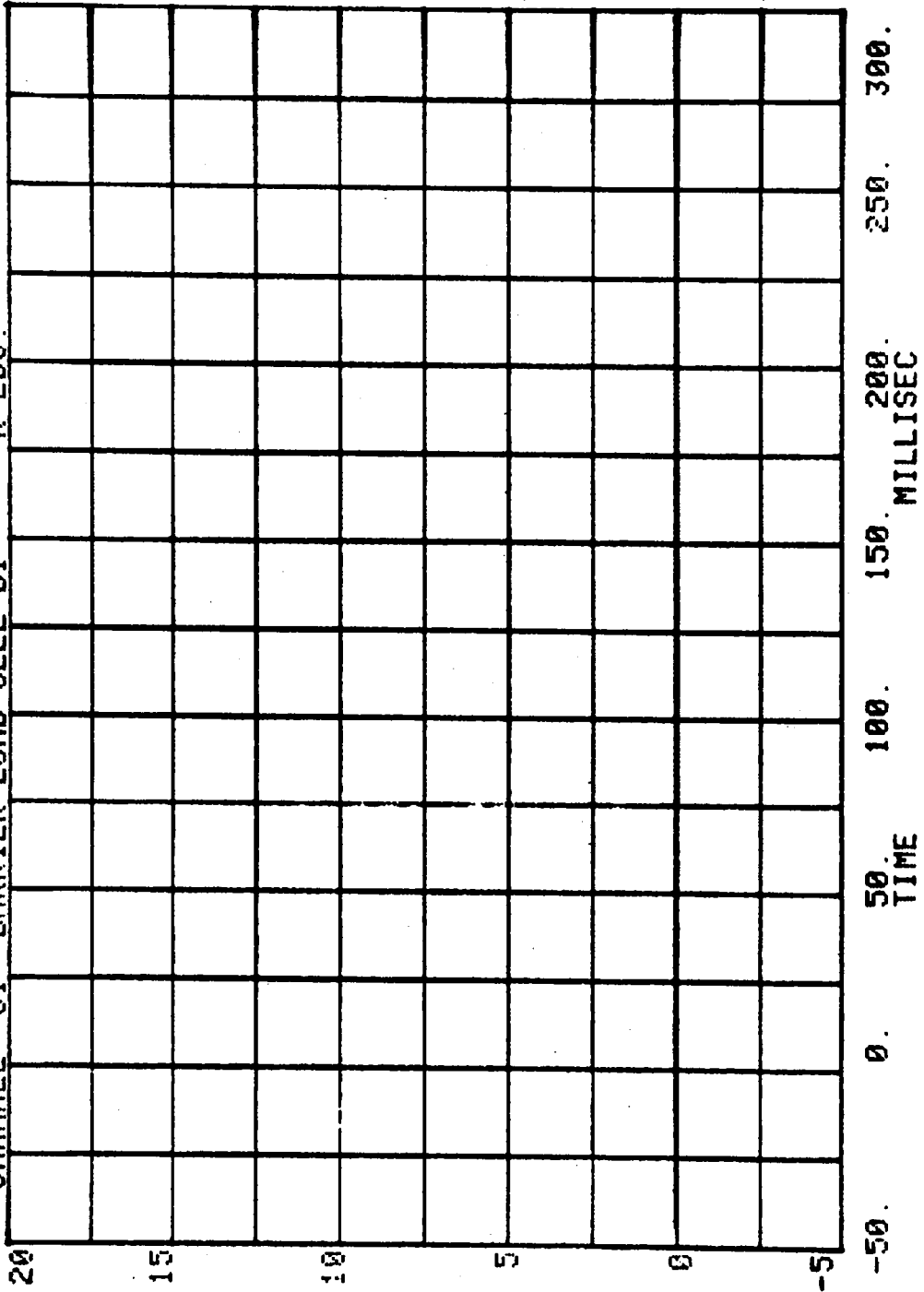
RUN= 867 SERIES= 304

K LBS.

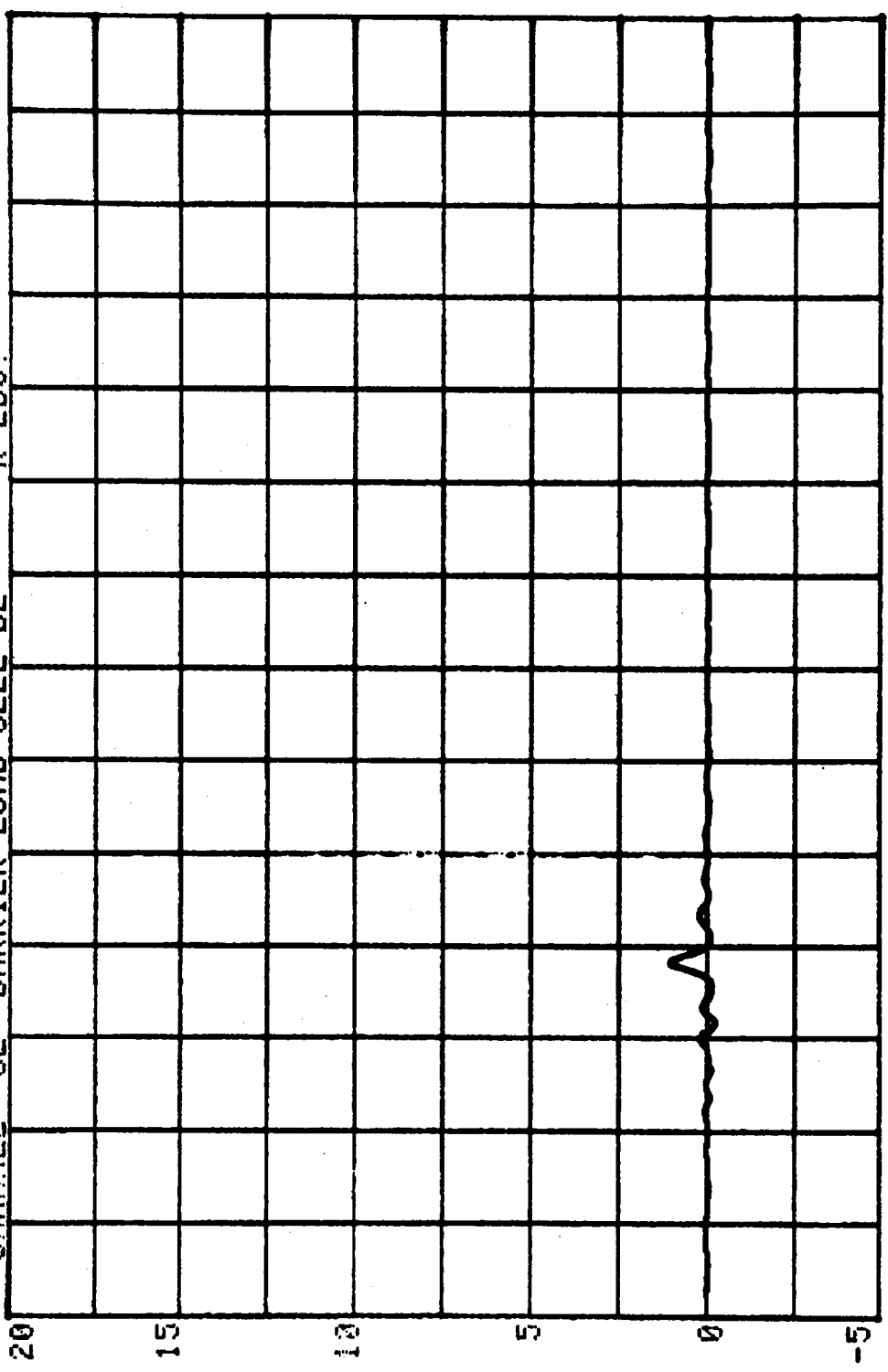


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

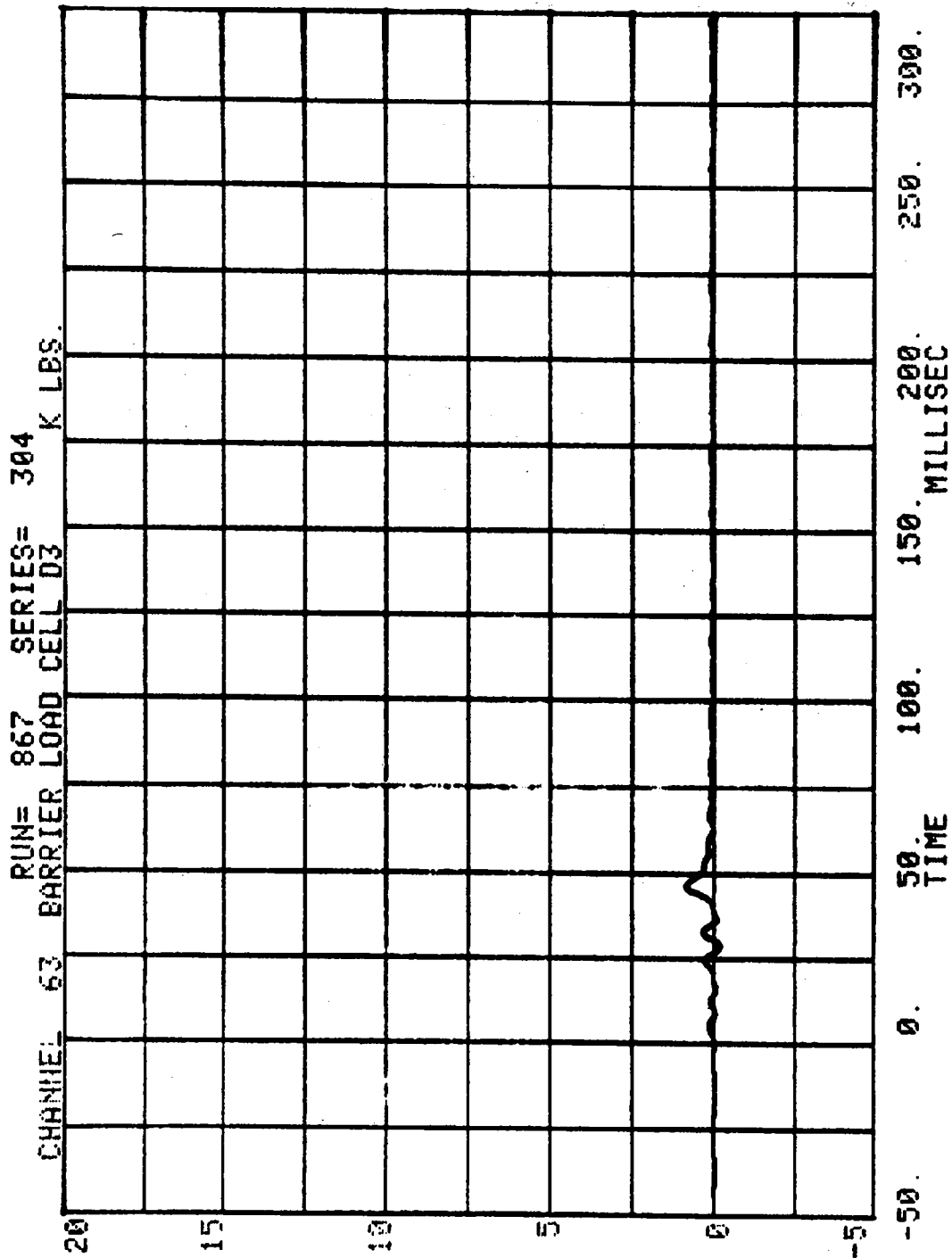
CHANNEL 61 BARRIER LOAD CELL D1 RUN= 867 SERIES= 304 K LBS.



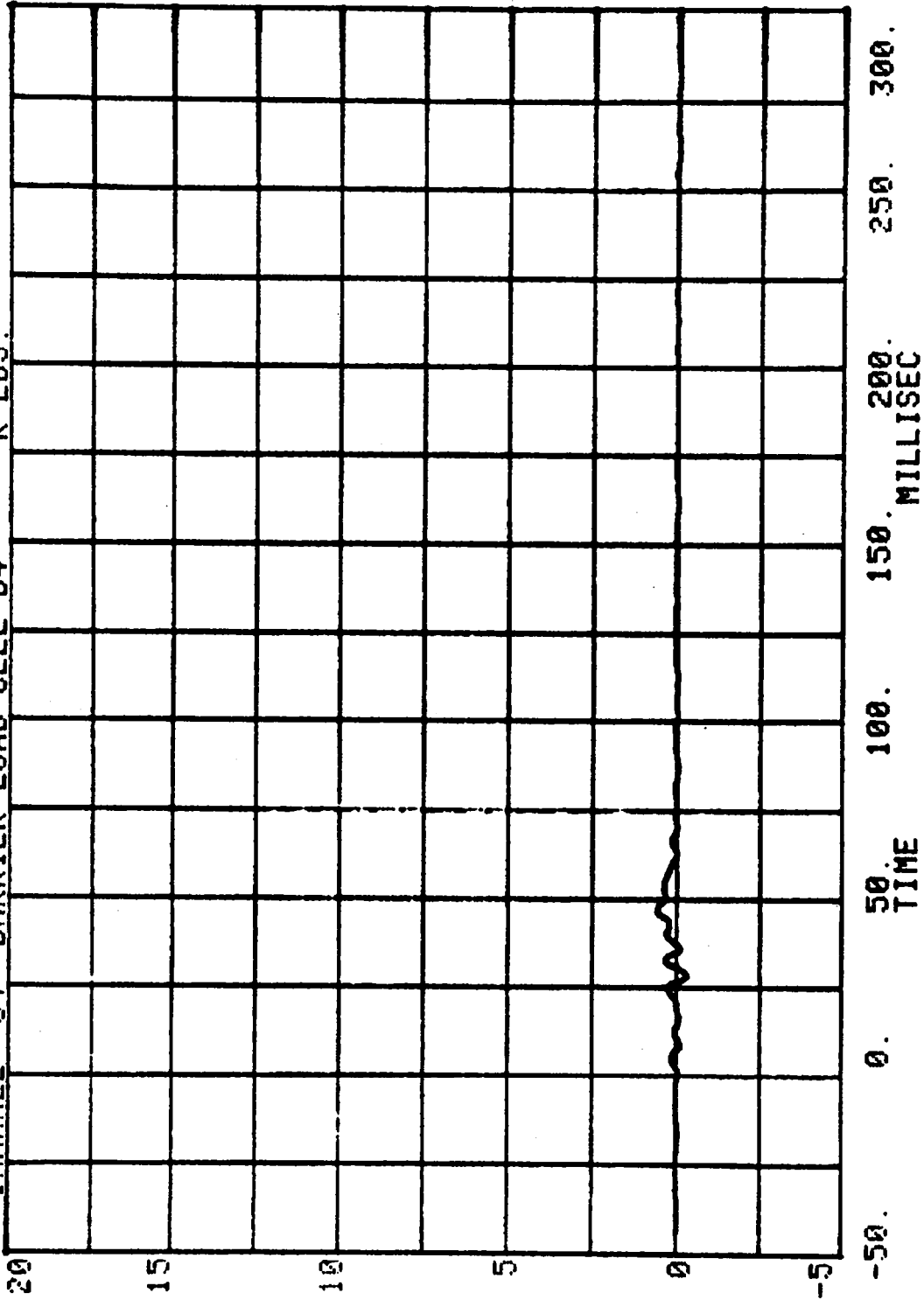
CHANNEL 62 BARRIER LOAD CELL D2 RUN= 867 SERIES= 304 K LBS.



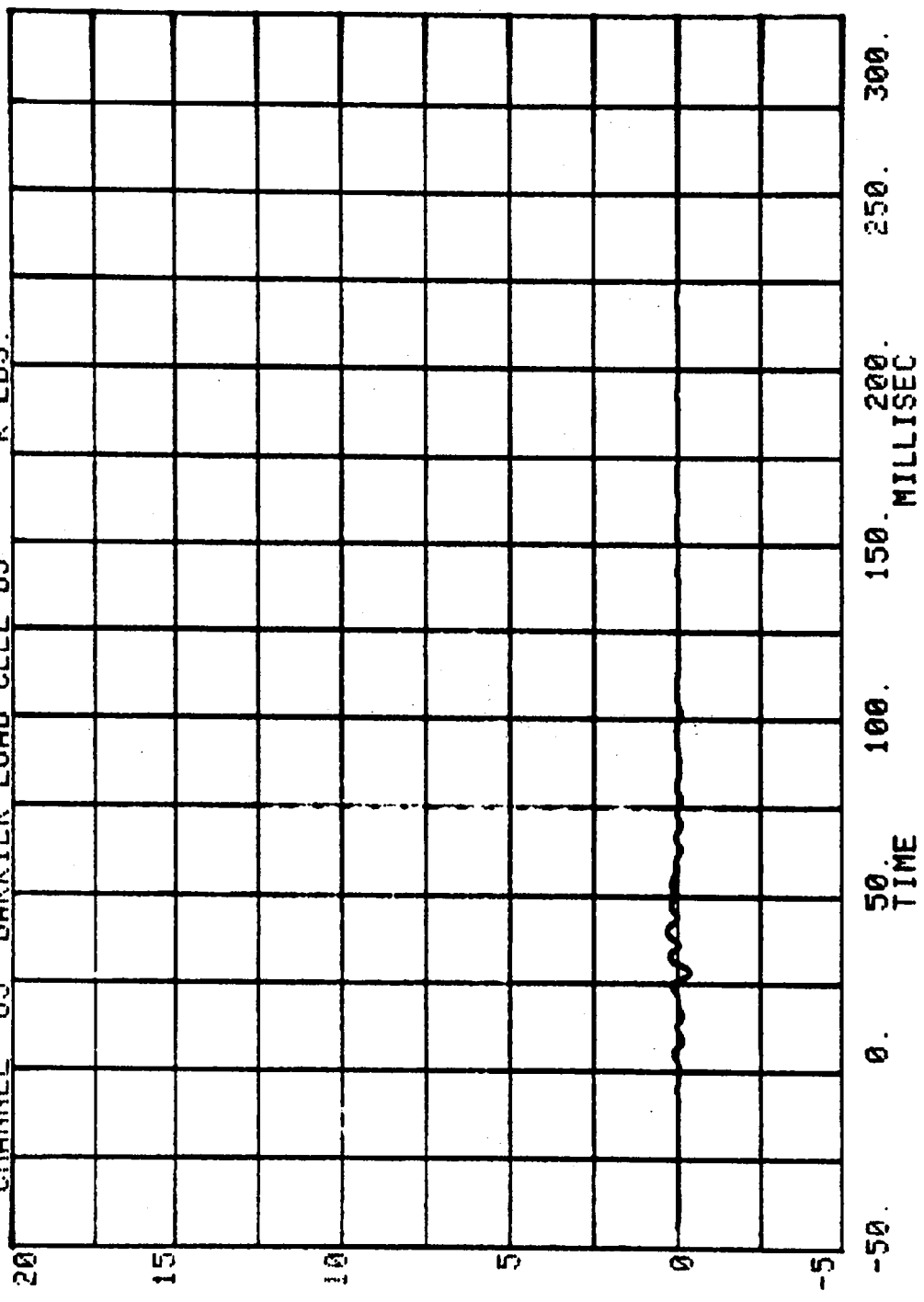
-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC



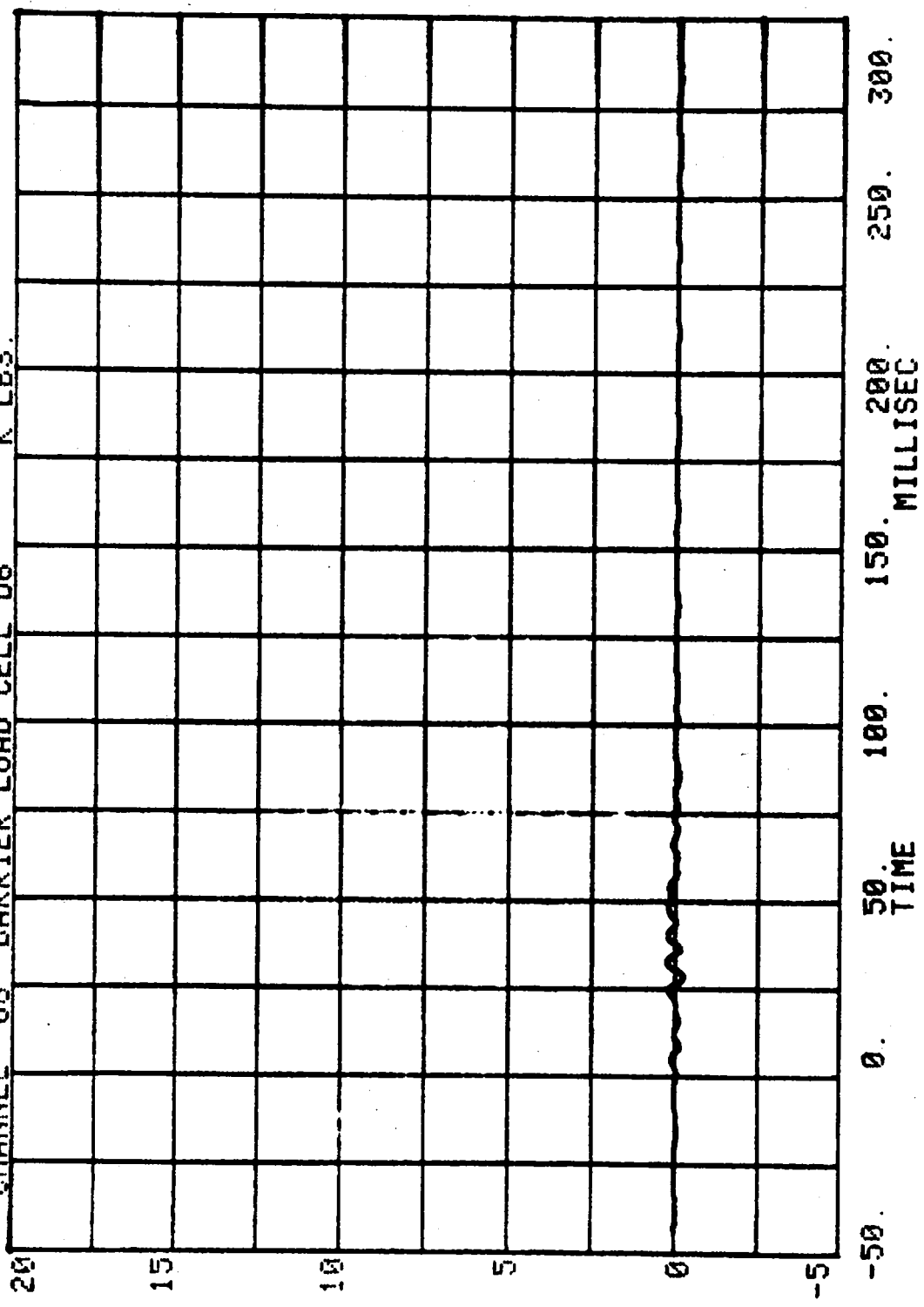
CHANNEL 64 BARRIER LOAD CELL D4
RUN= 867 SERIES= 304 K LBS.



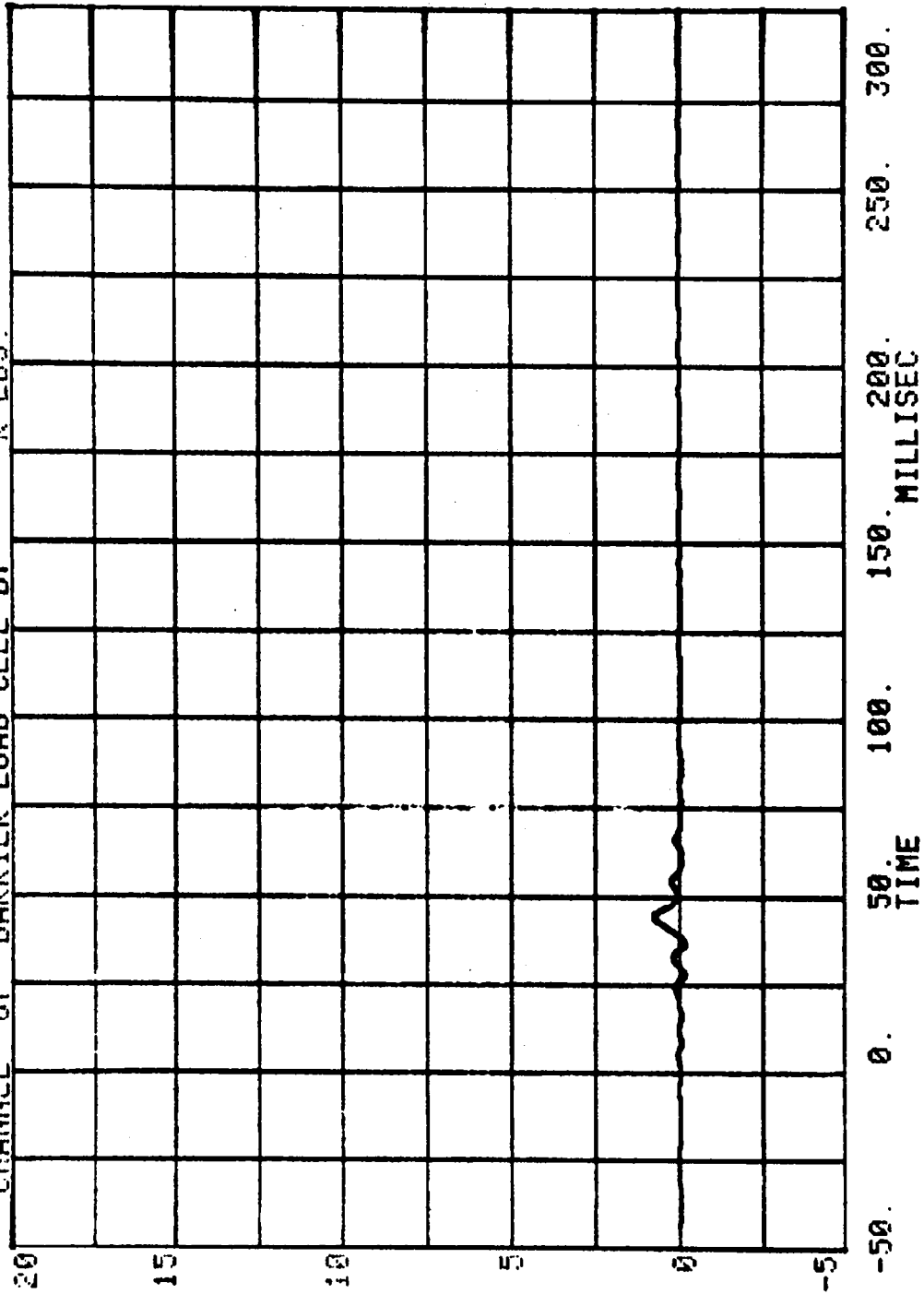
CHANNEL 65 BARRIER LOAD CELL D5 RUN= 867 SERIES= 304 K LBS.



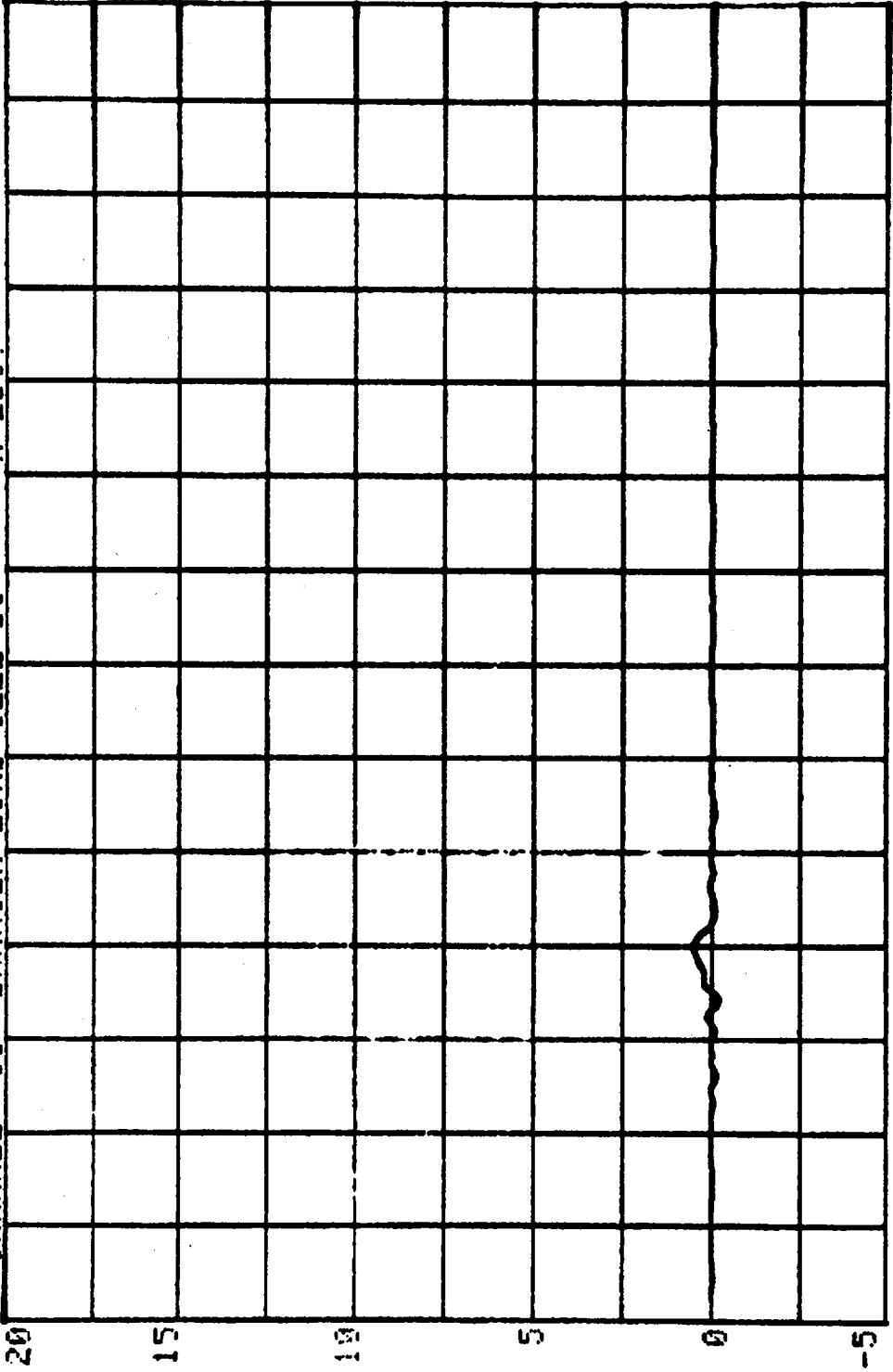
CHANNEL 66 BARRIER LOAD CELL D6
RUN= 867 SERIES= 304 K LBS.



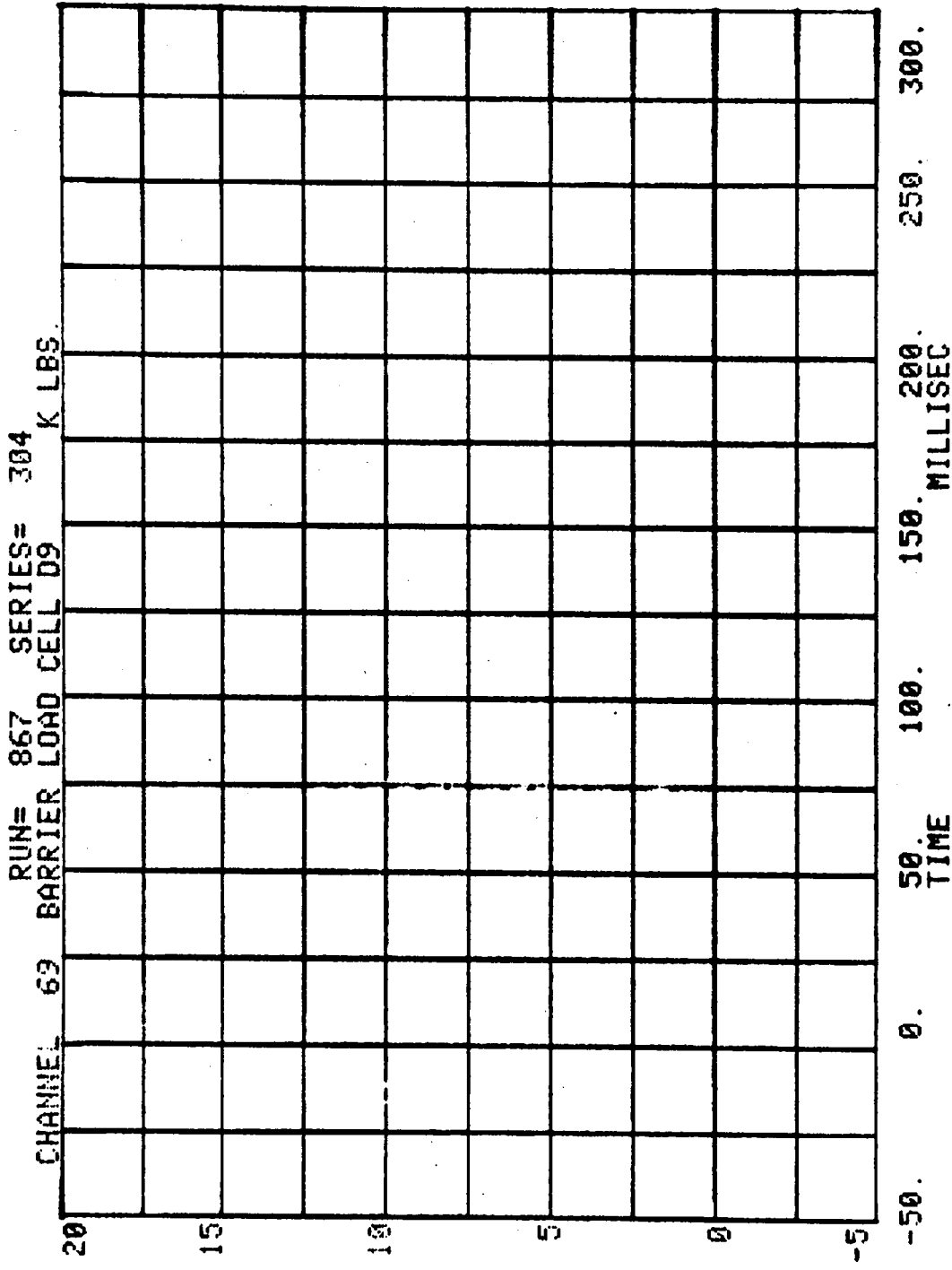
CHANNEL 67 BARRIER LOAD CELL D7
RUN= 867 SERIES= 304
K LBS.



CHANNEL 68 BARRIER LOAD CELL D8 SERIES= 304 K LBS.



-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC



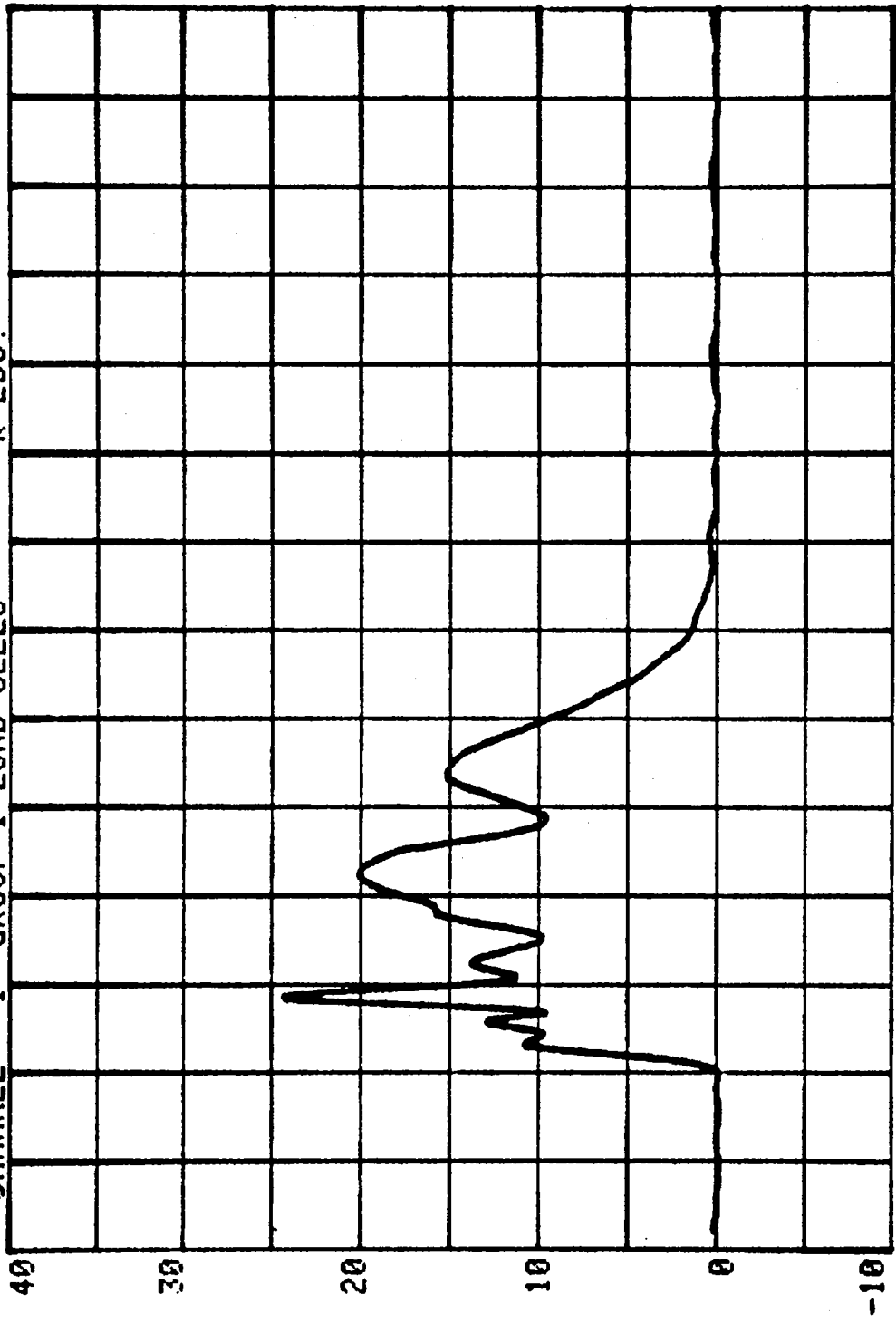
NEW CAR ASSESSMENT CRASH TEST - 1989

RUN # 867

SERIES # 304

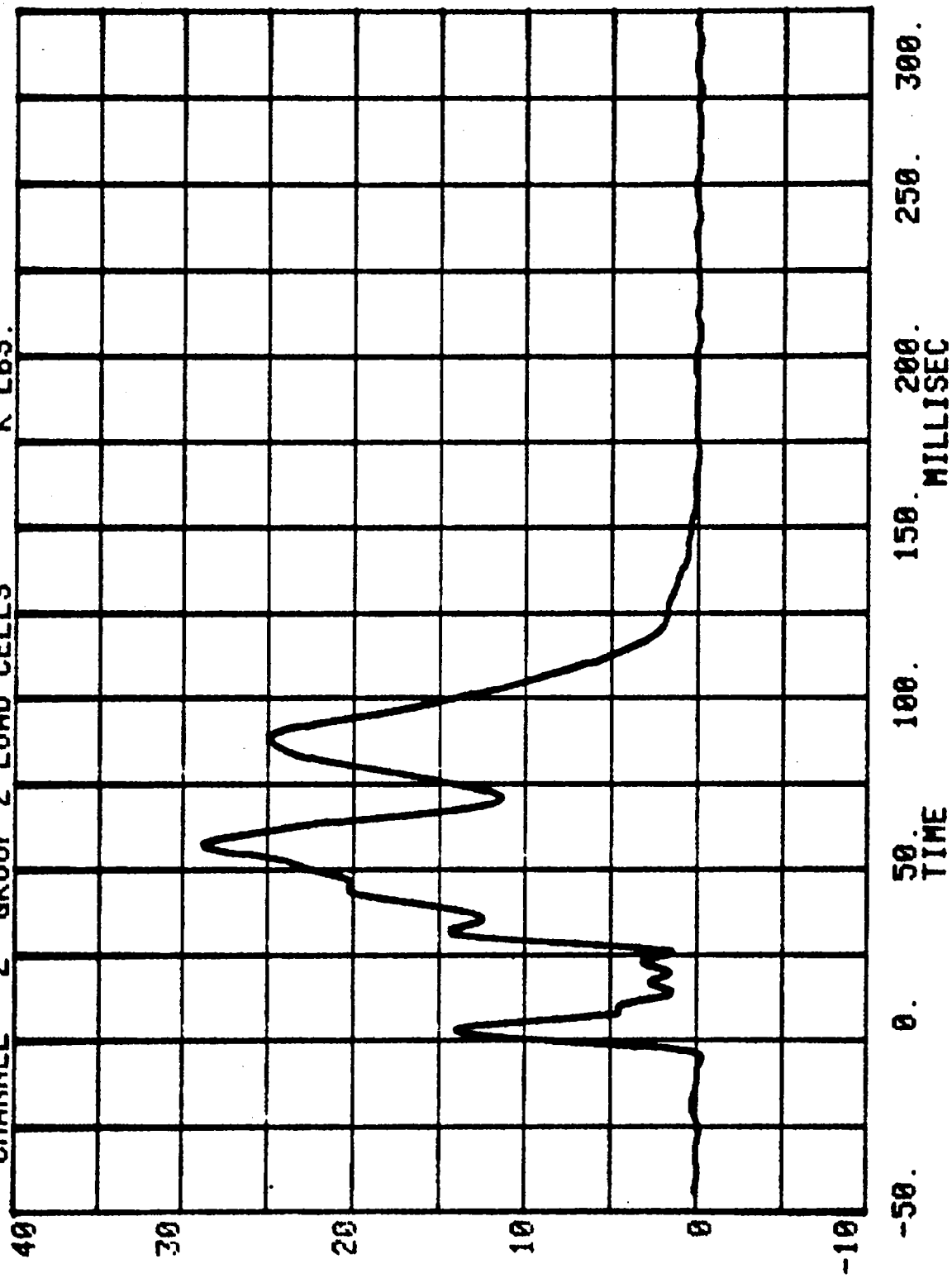
CHAN	TITLE	MINIMUM/MAXIMUM	AT	TIME
1	GROUP 1 LOAD CELLS	- .073 K LBS. 24.489 K LBS.		-28.80 MS. 21.60 MS.
2	GROUP 2 LOAD CELLS	- .333 K LBS. 28.845 K LBS.		-5.10 MS. 57.22 MS.
3	GROUP 3 LOAD CELLS	- .150 K LBS. 19.418 K LBS.		-26.62 MS. 31.50 MS.
4	GROUP 4 LOAD CELLS	- .319 K LBS. 11.369 K LBS.		-18.90 MS. 60.15 MS.
5	GROUP 5 LOAD CELLS	- .312 K LBS. 7.510 K LBS.		.15 MS. 41.10 MS.
6	GROUP 6 LOAD CELLS	- .134 K LBS. 5.767 K LBS.		264.07 MS. 54.30 MS.
7	TOTAL LOAD CELL SUM	- .197 K LBS. 85.144 K LBS.		-38.25 MS. 57.37 MS.

CHANNEL 1 GROUP 1 LOAD CELLS
RUN= 867 SERIES= 304 K LBS.

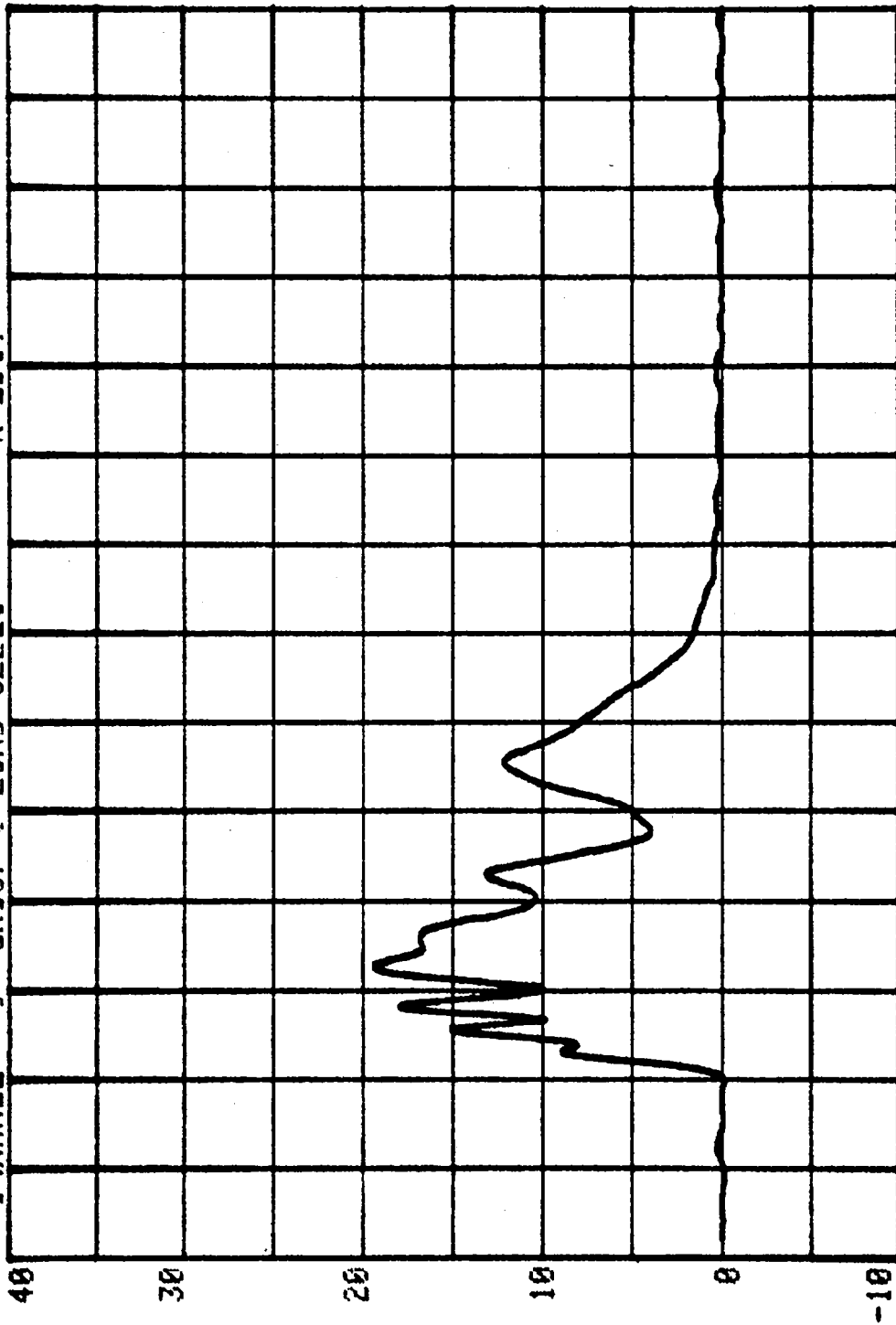


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

RUN= 867 SERIES= 304
CHANNEL 2 GROUP 2 LOAD CELLS K LBS.

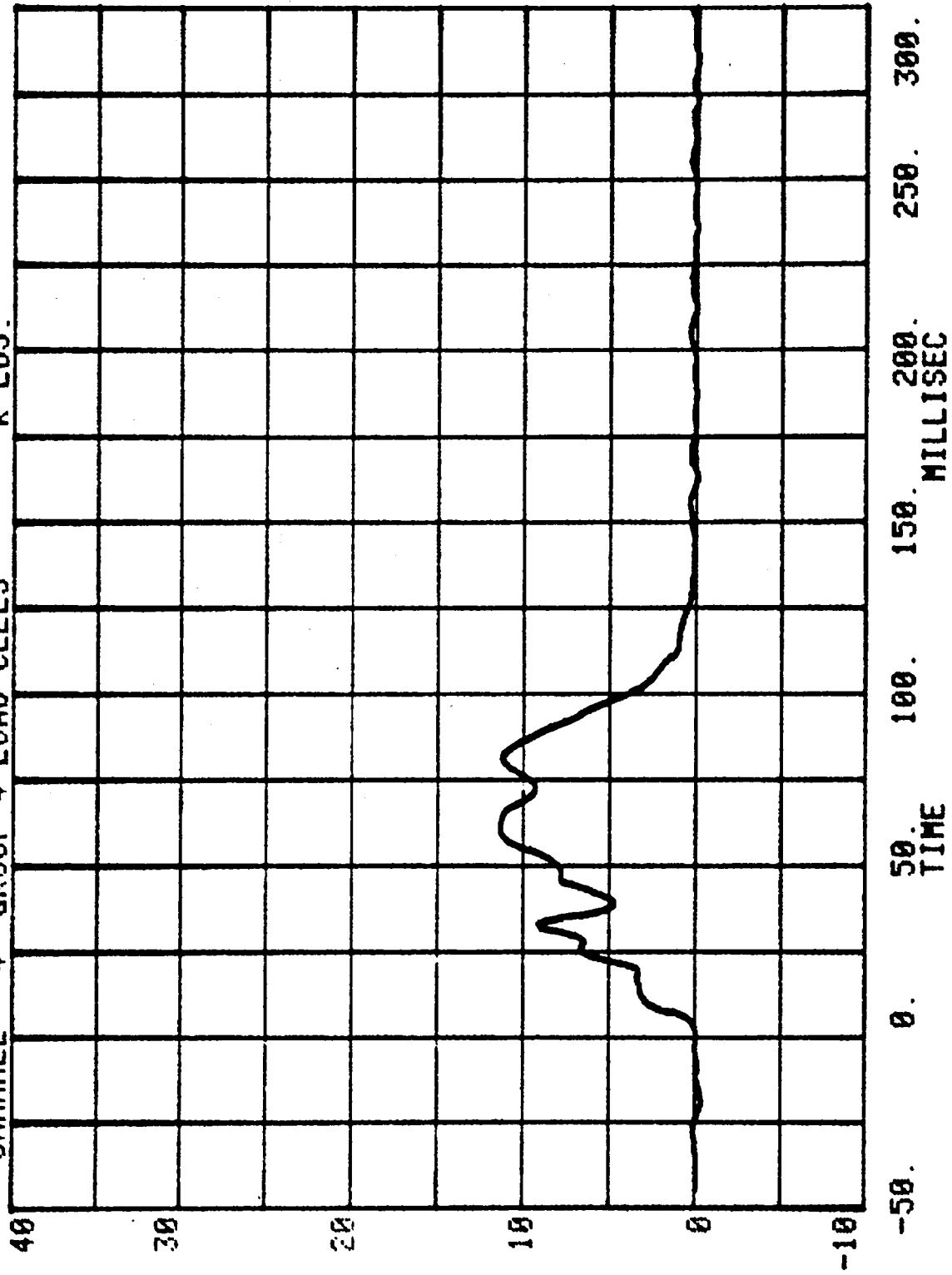


CHANNEL 3 GROUP 3 LOAD CELLS
RUN= 867 SERIES= 304 K LBS.

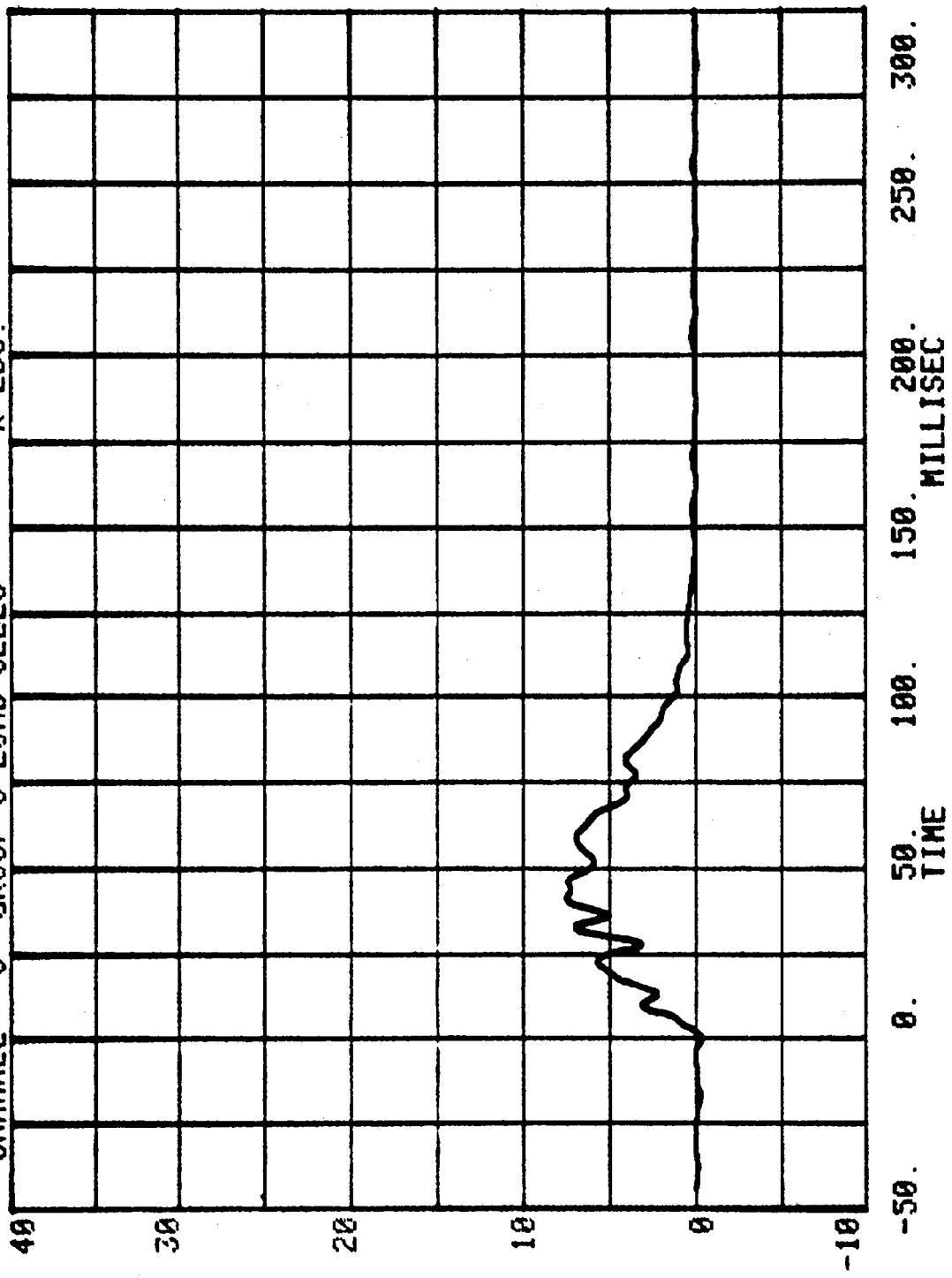


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

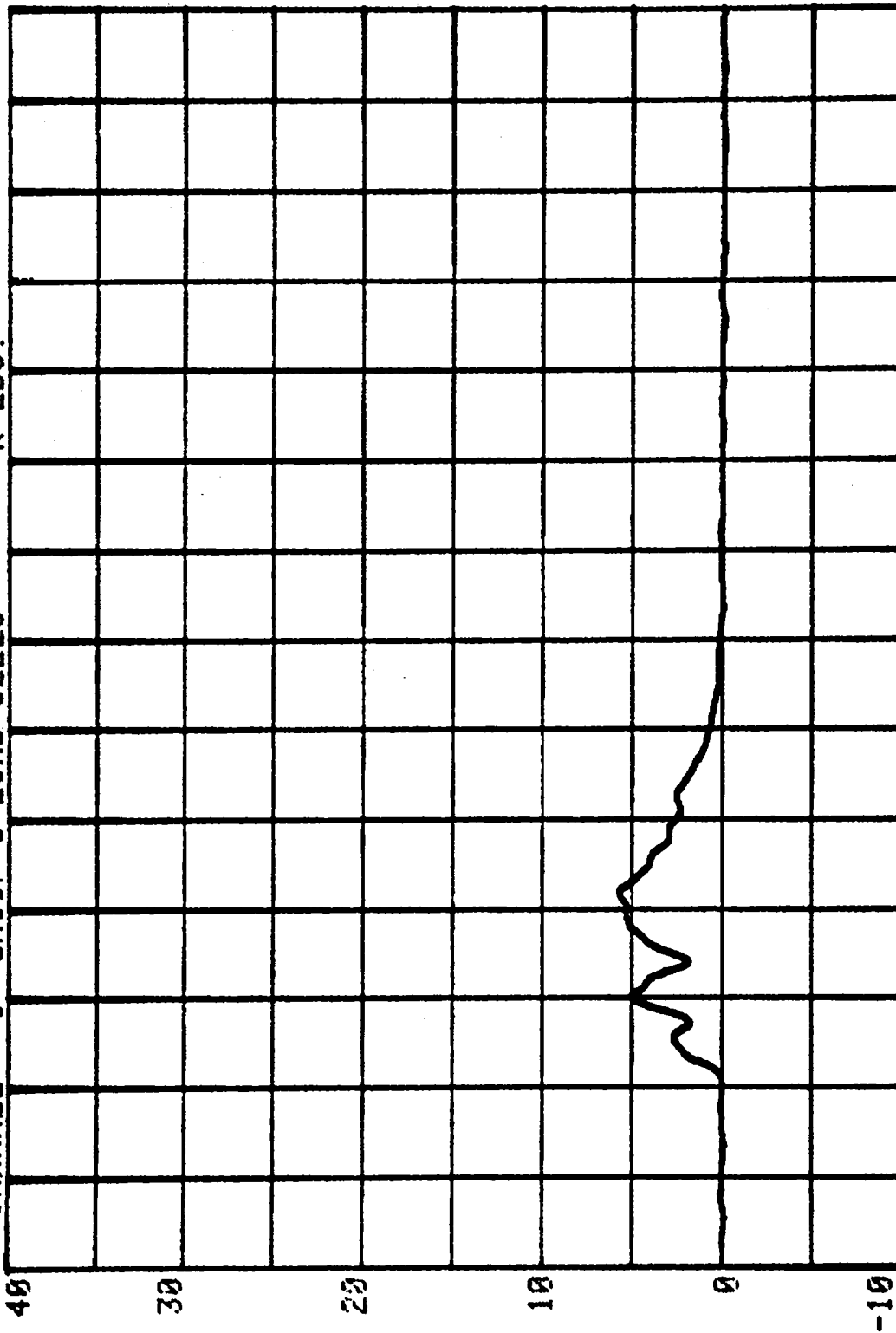
CHANNEL 4 GROUP 4 LOAD CELLS RUN= 867 SERIES= 304 K LBS.



CHANNEL 5 GROUP 5 LOAD CELLS RUN= 867 SERIES= 304 K LBS.

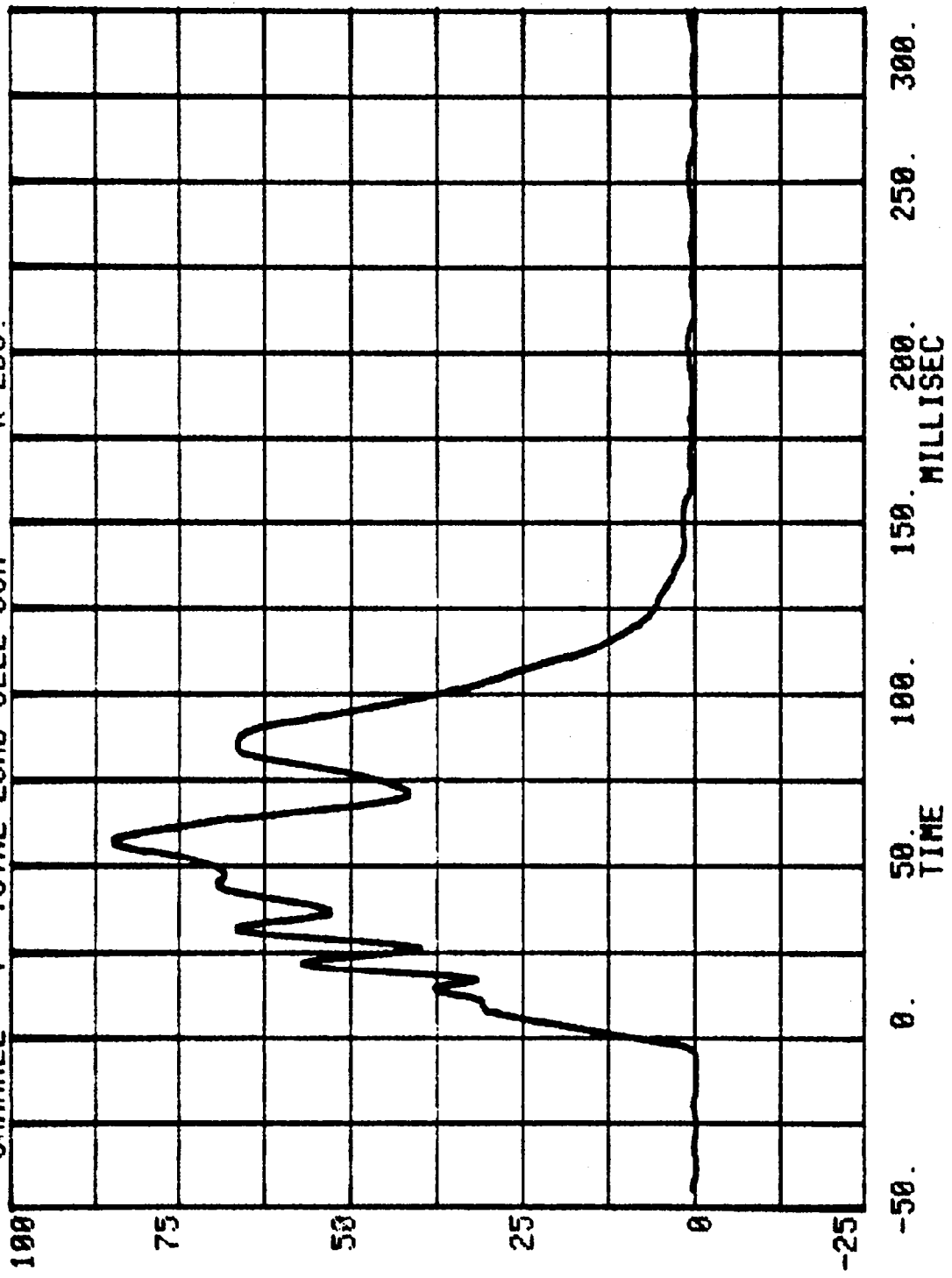


CHANNEL 6 GROUP 6 LOAD CELLS
RUN= 867 SERIES= 304 K LBS.



-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 7 TOTAL LOAD CELL SUM RUN= 867 SERIES= 304 K LBS.

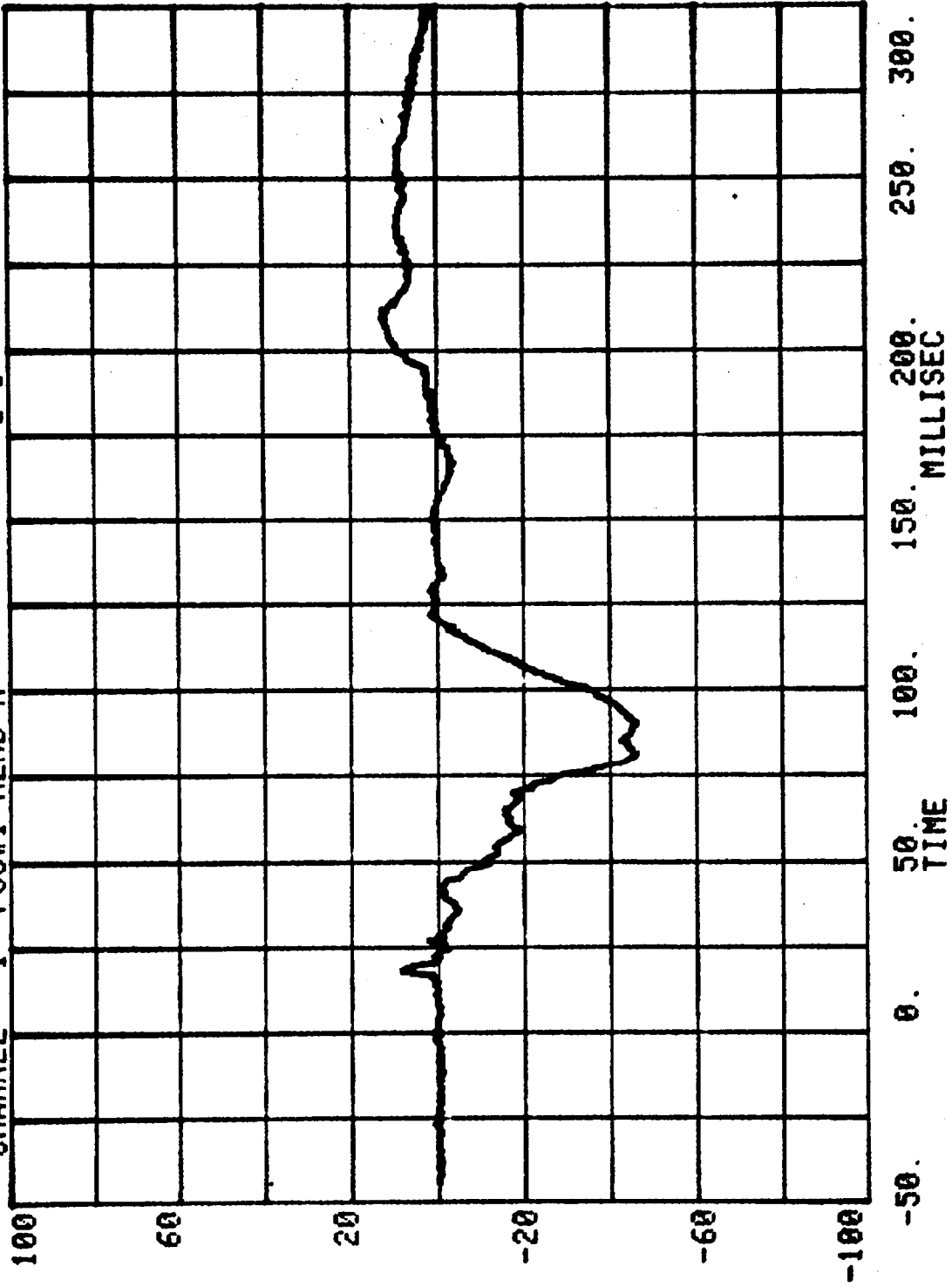


TEST NO. MK0304

DUMMY DATA

	FILTER CHANNEL CLASS
HEAD ACCELERATIONS	1000
CHEST ACCELERATIONS	180
FEMUR FORCES	600
BELT LOADS	60

CHANNEL 1 POS#1 HEAD X
RUN= 867 SERIES= 304 G'S

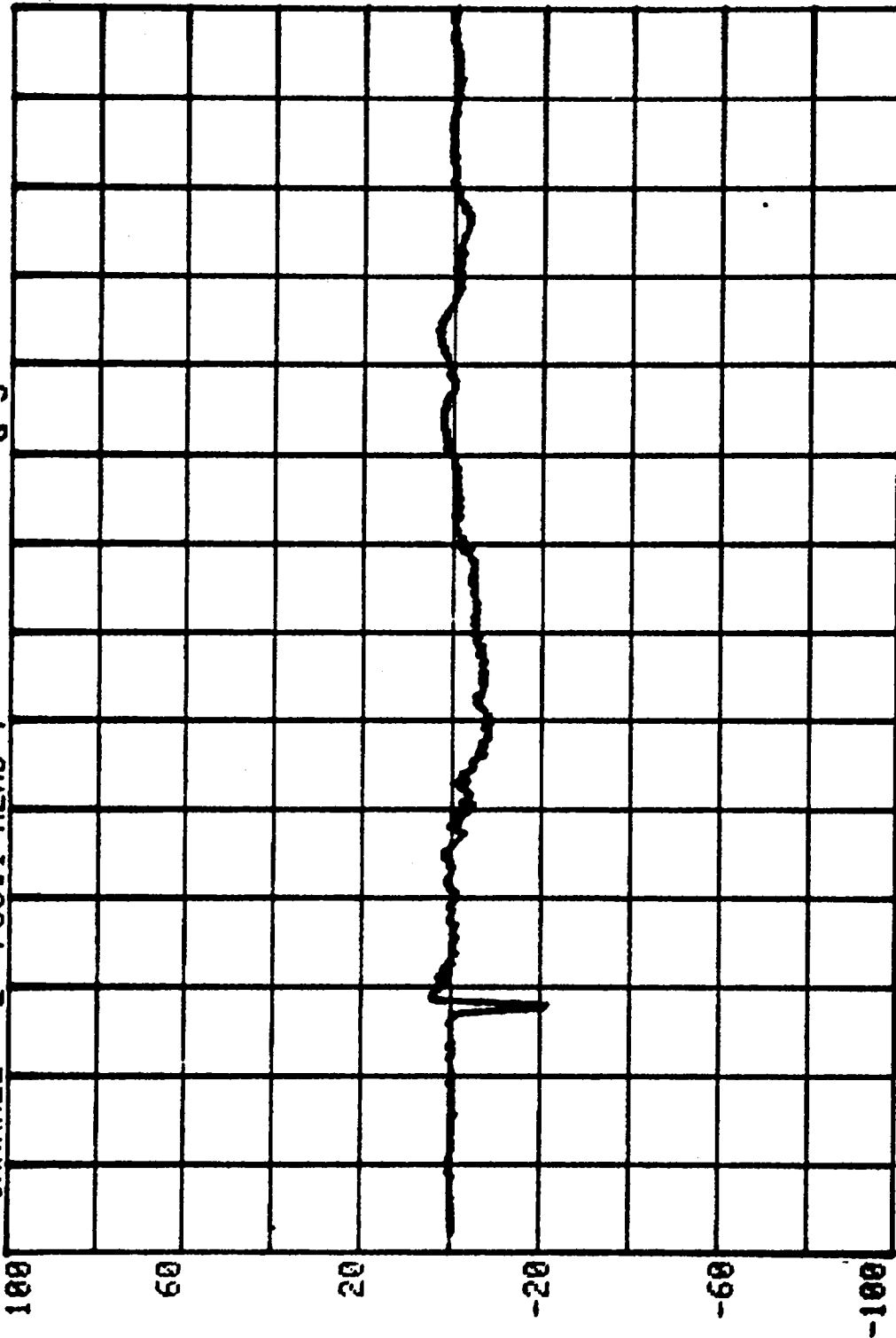


CHANNEL 2 POS#1 HEAD Y

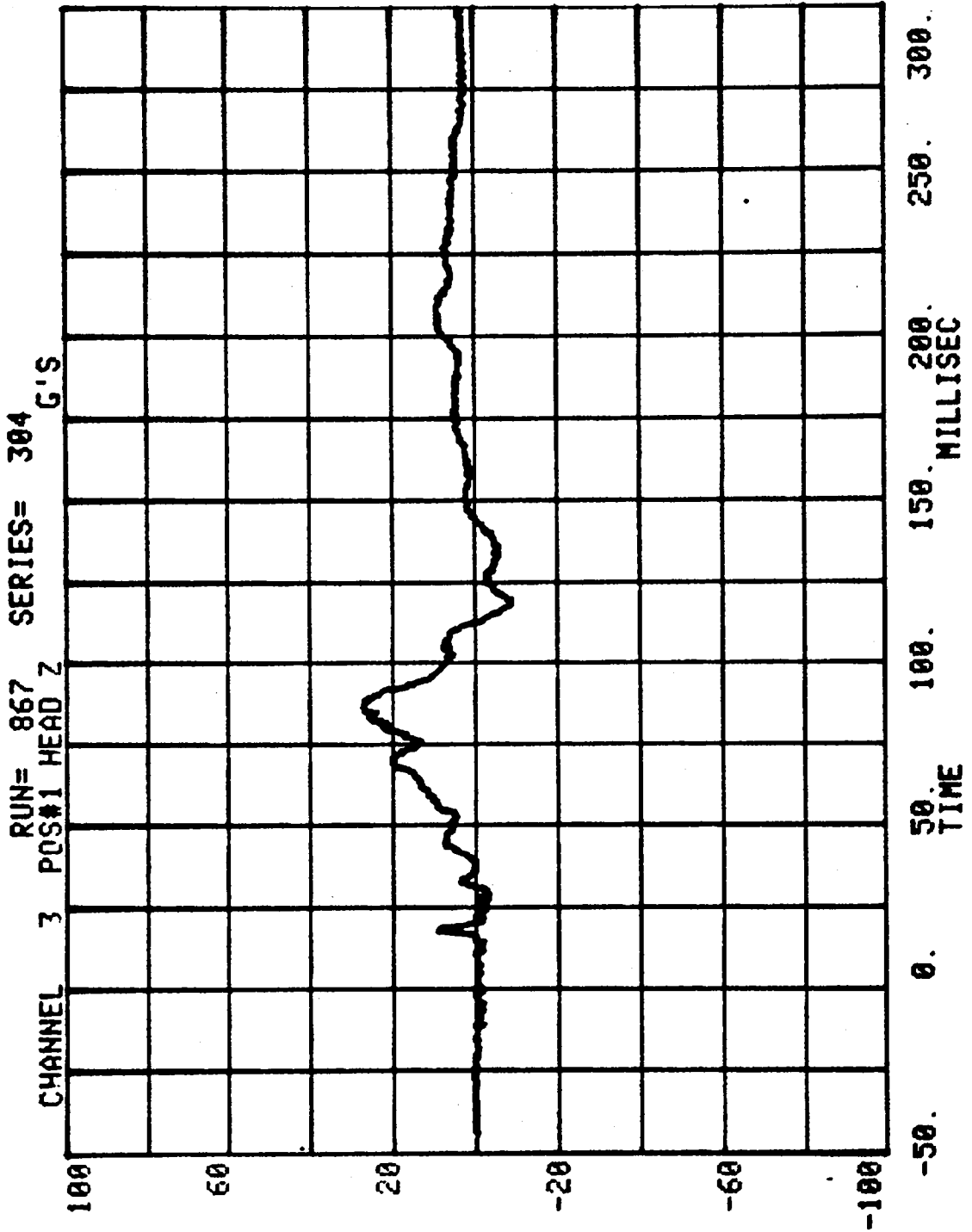
RUN= 867

SERIES= 304

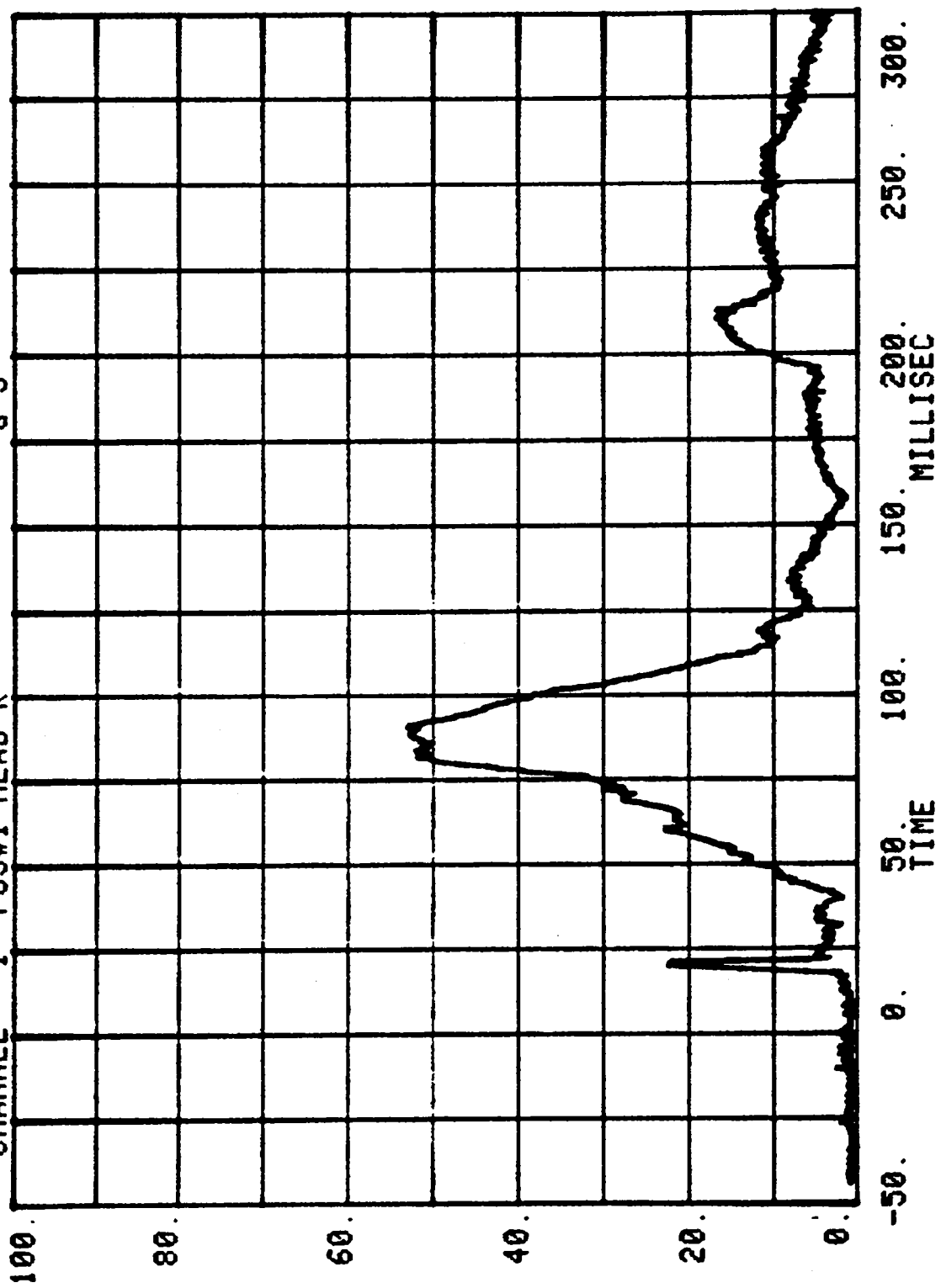
G'S

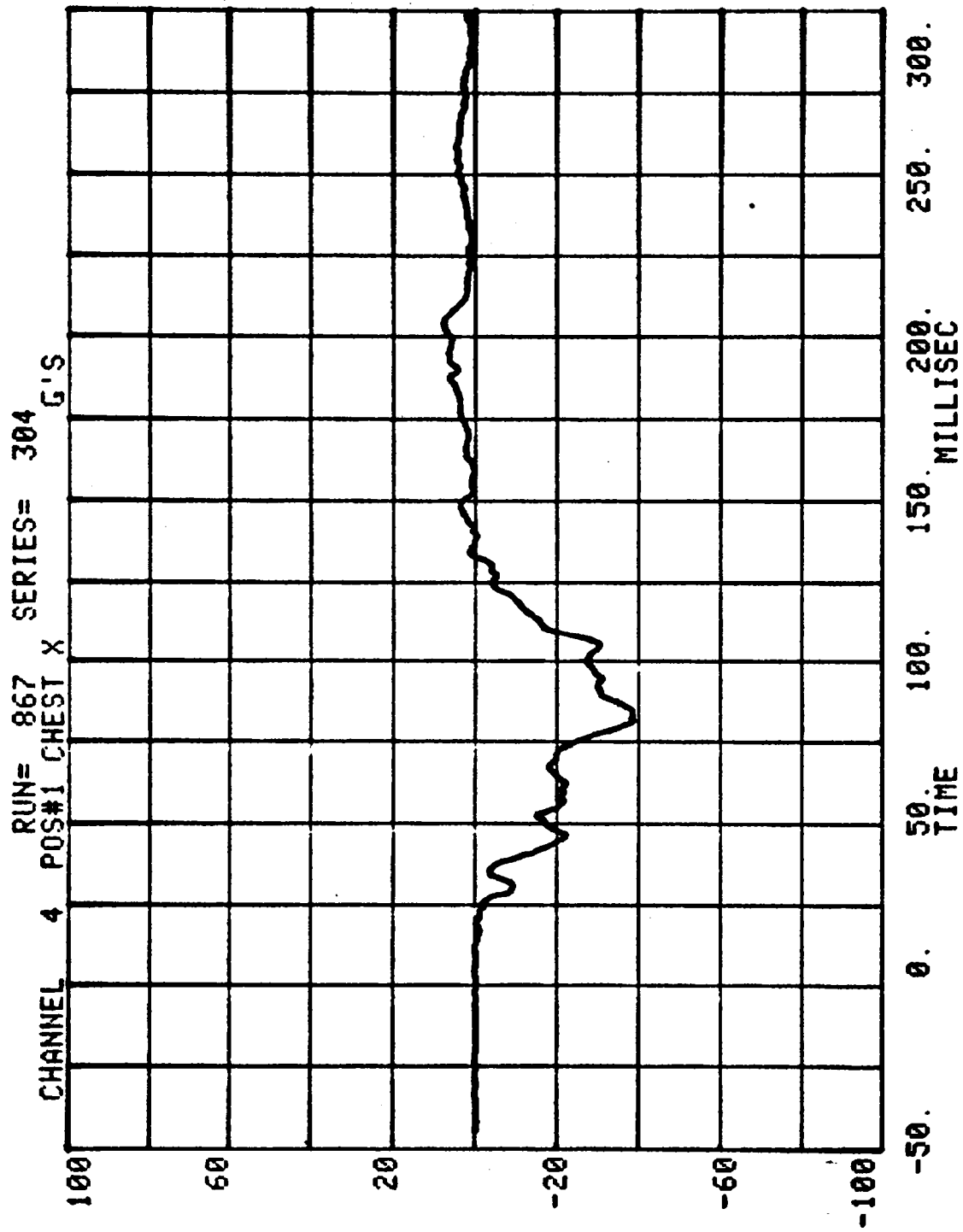


TIME
0. 50. 100. 150. 200. 250. 300.
-50. -60. -20. -100.

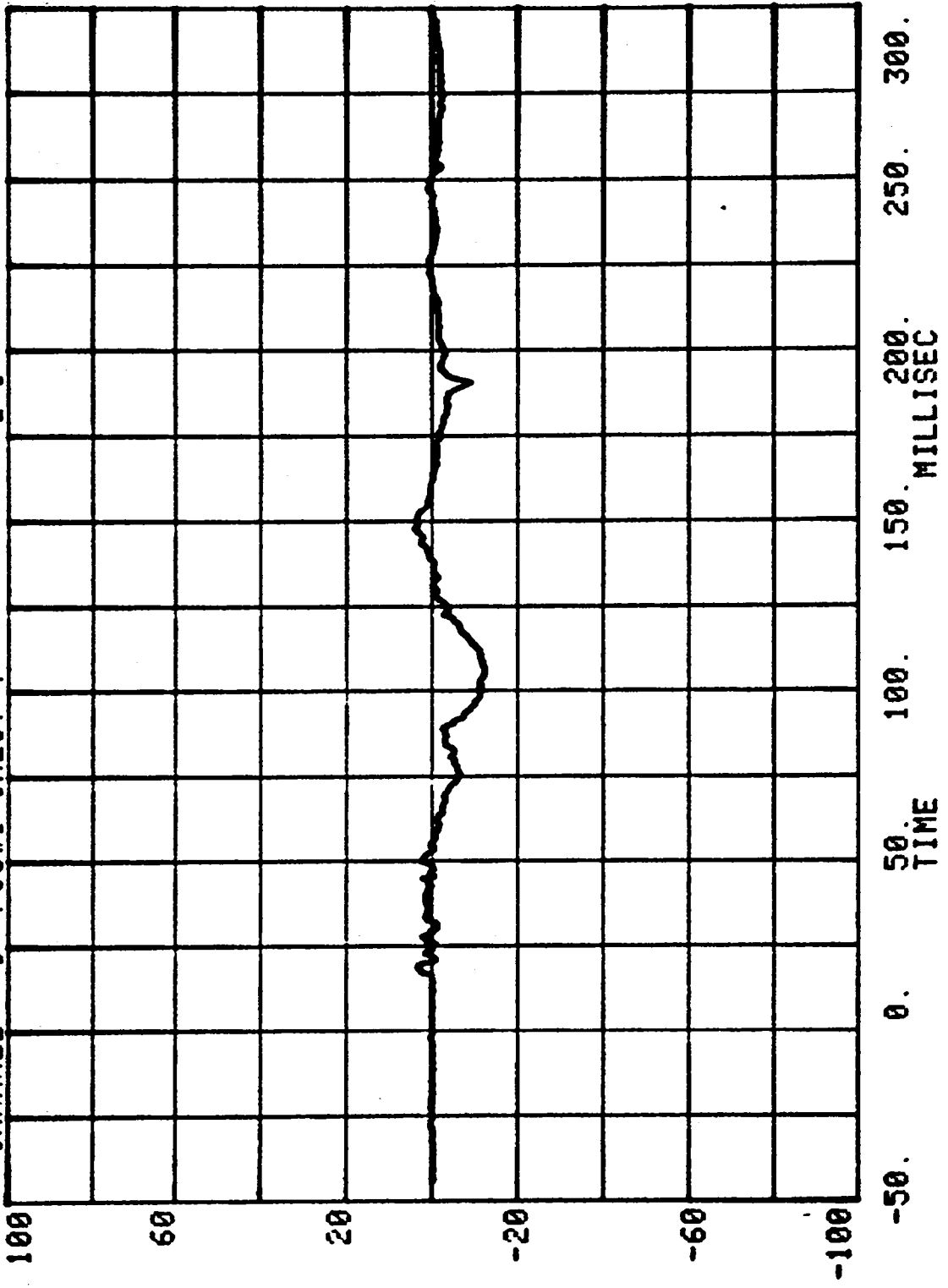


CHANNEL 1 POS#1 HEAD R RUN= 867 SERIES= 304 G'S



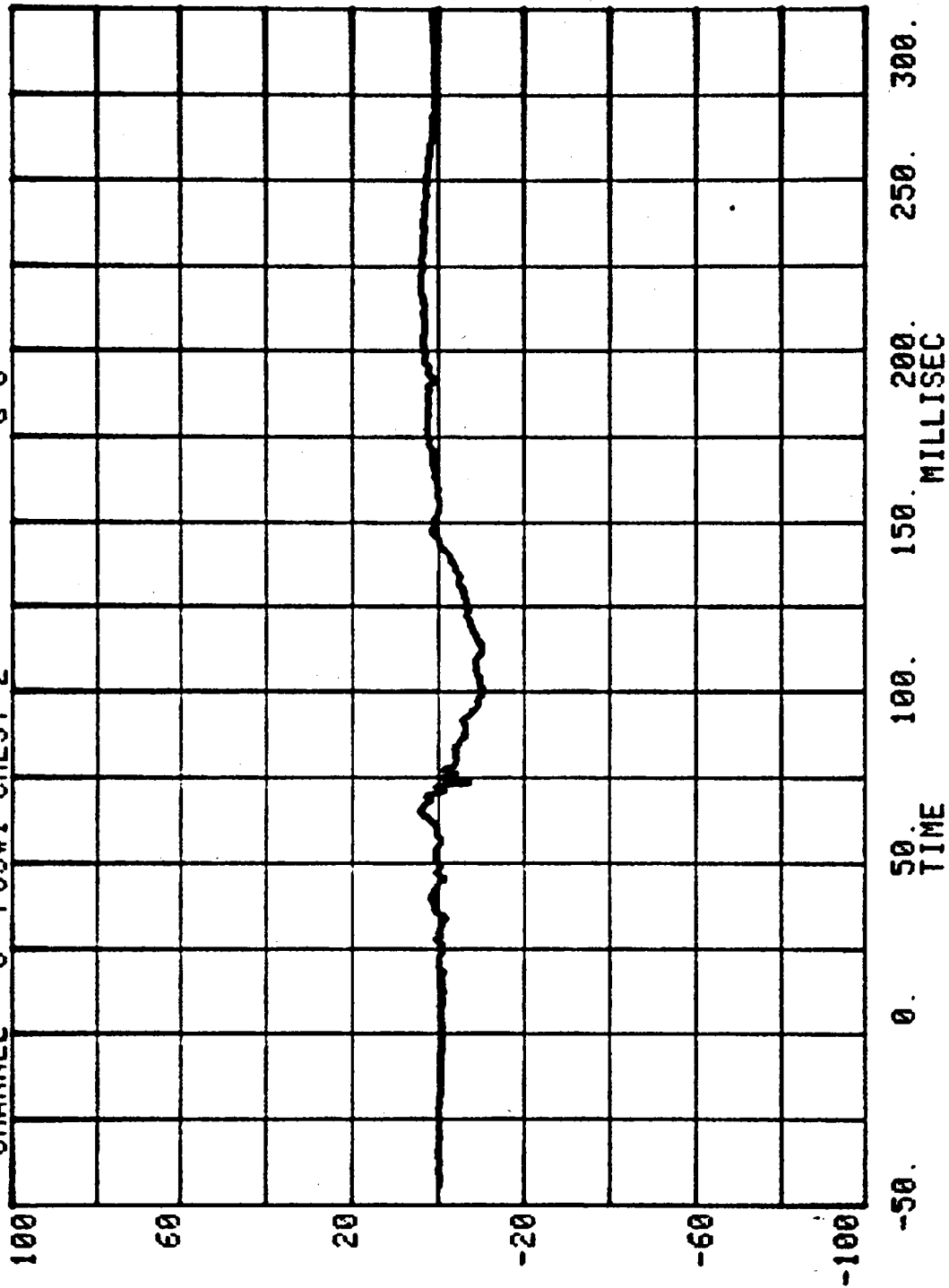


CHANNEL 5 POS#1 CHEST Y
RUN= 867 SERIES= 304 G'S

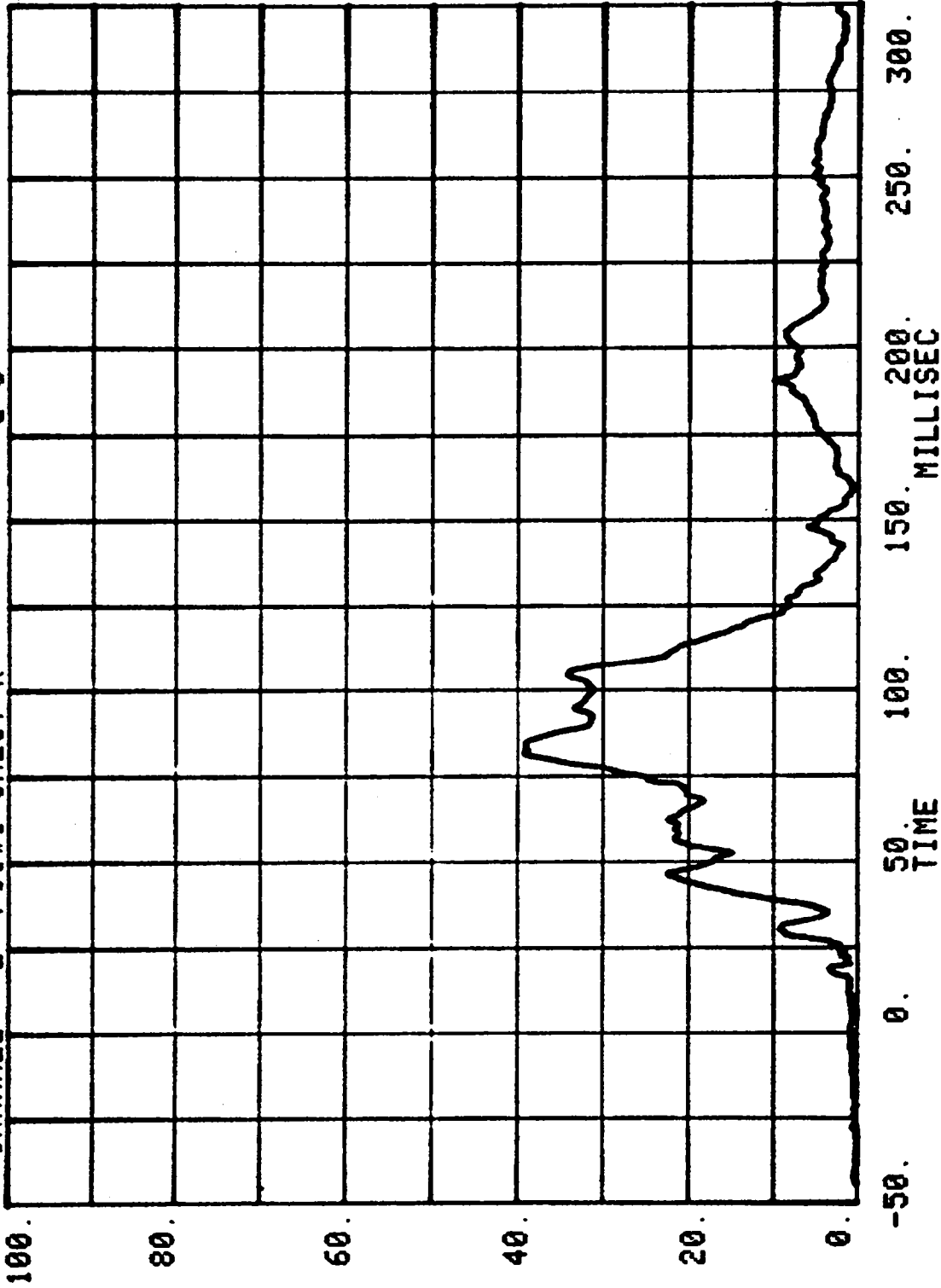


CHANNEL 6 POS#1 CHEST Z

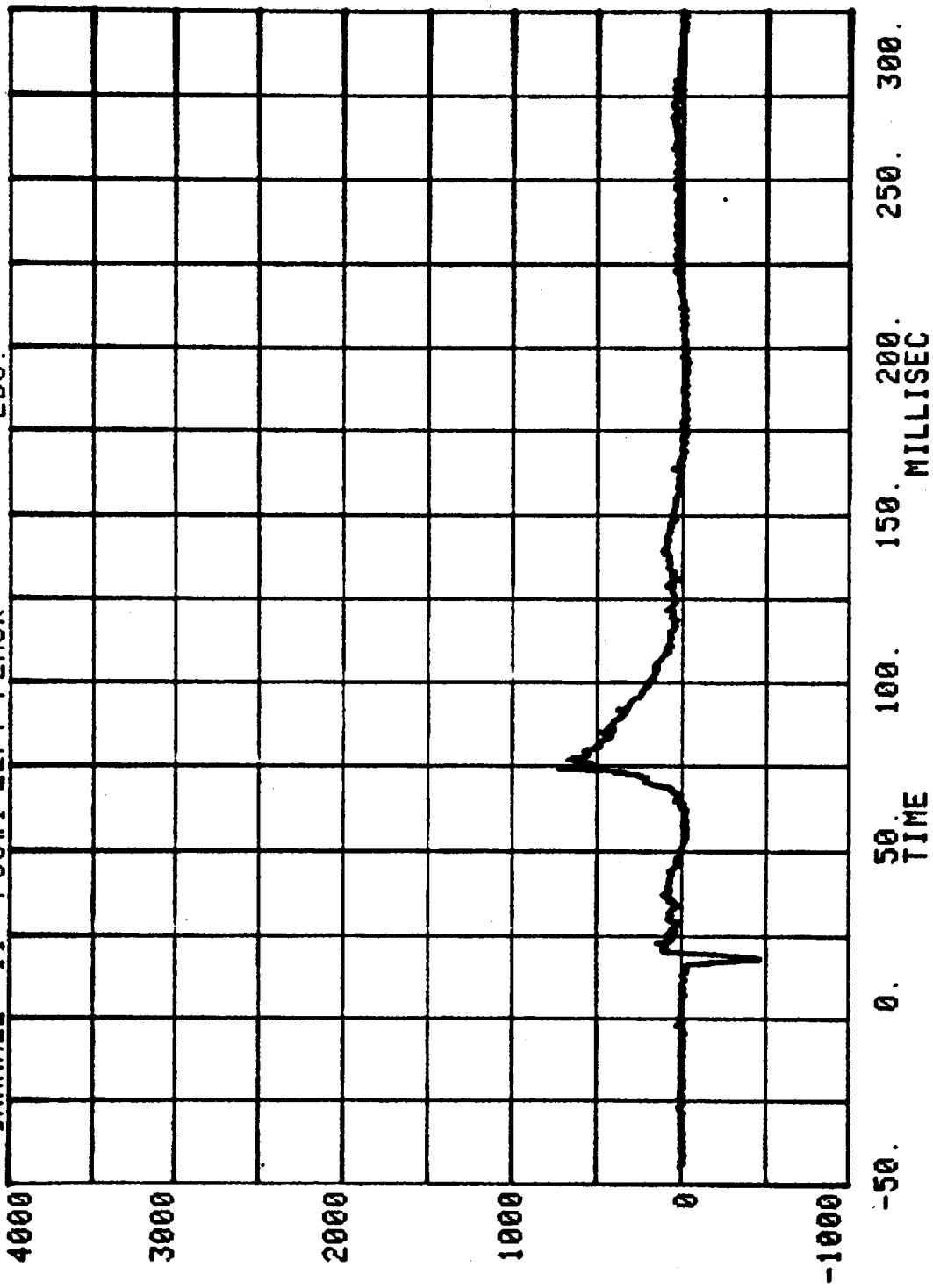
RUN= 867 SERIES= 304 G'S



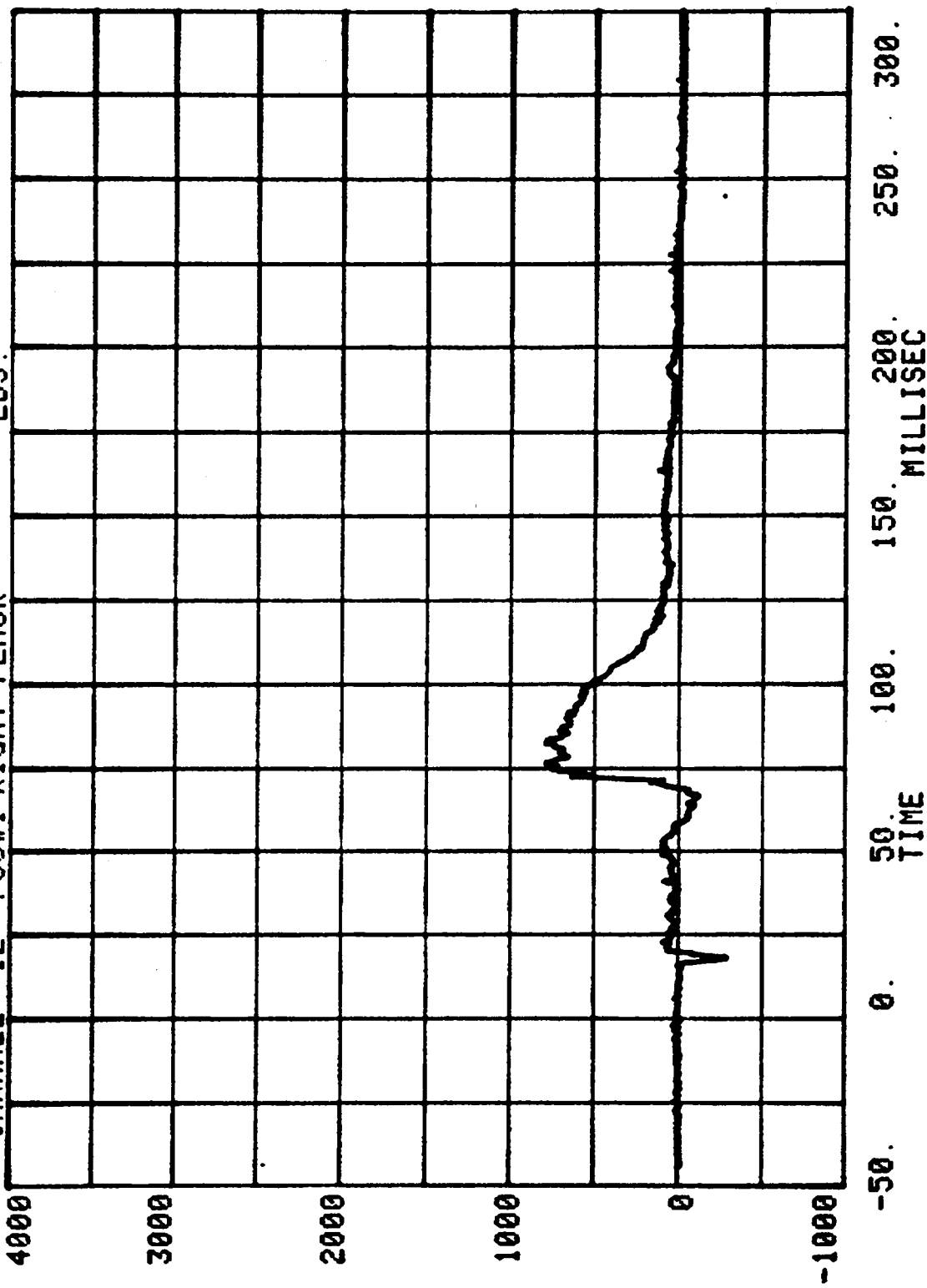
CHANNEL 2 POS#1 CHEST R
RUN= 867 SERIES= 304 G'S



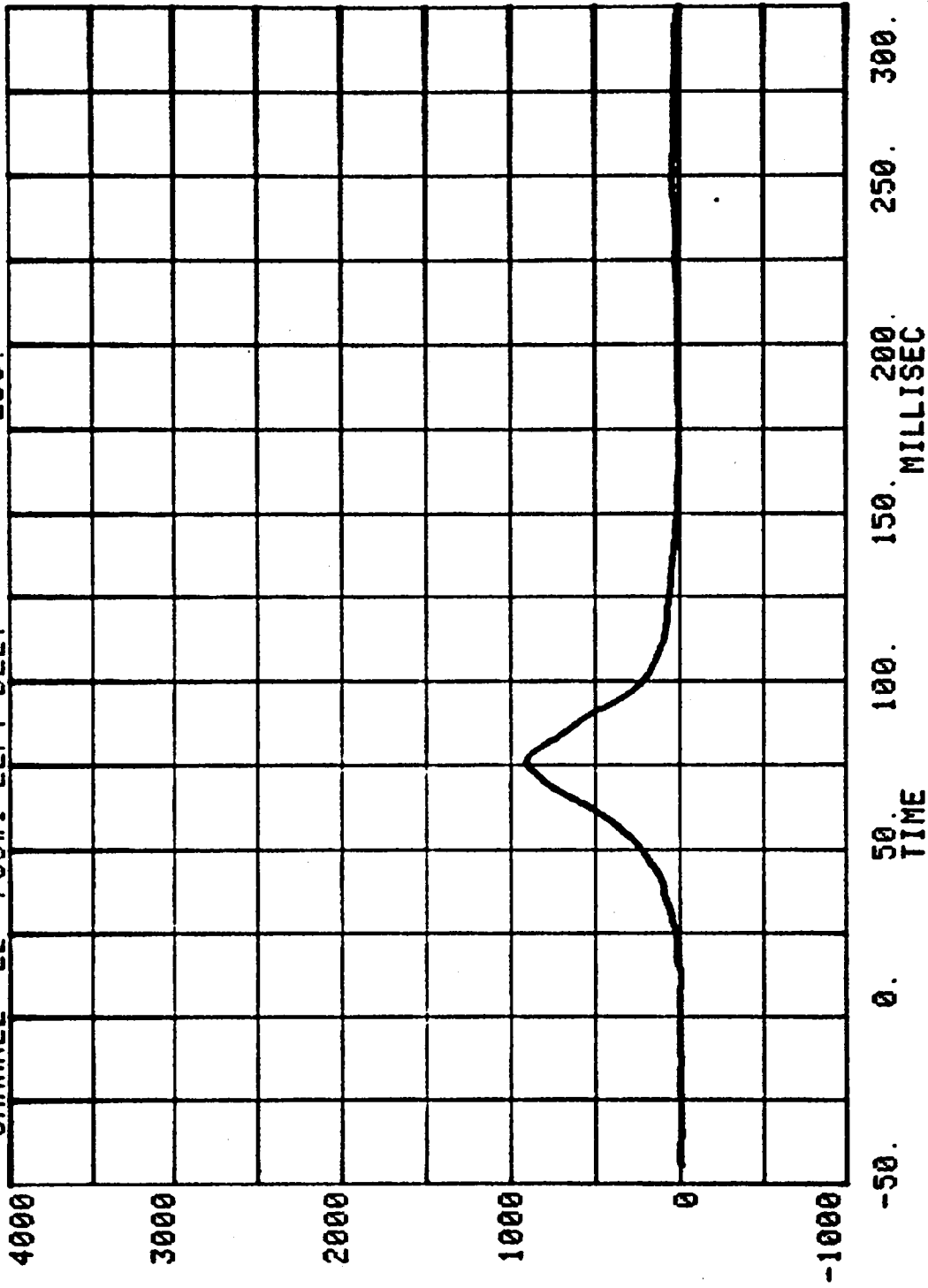
CHANNEL 11 POS#1 LEFT FEMUR SERIES= 304 LBS.



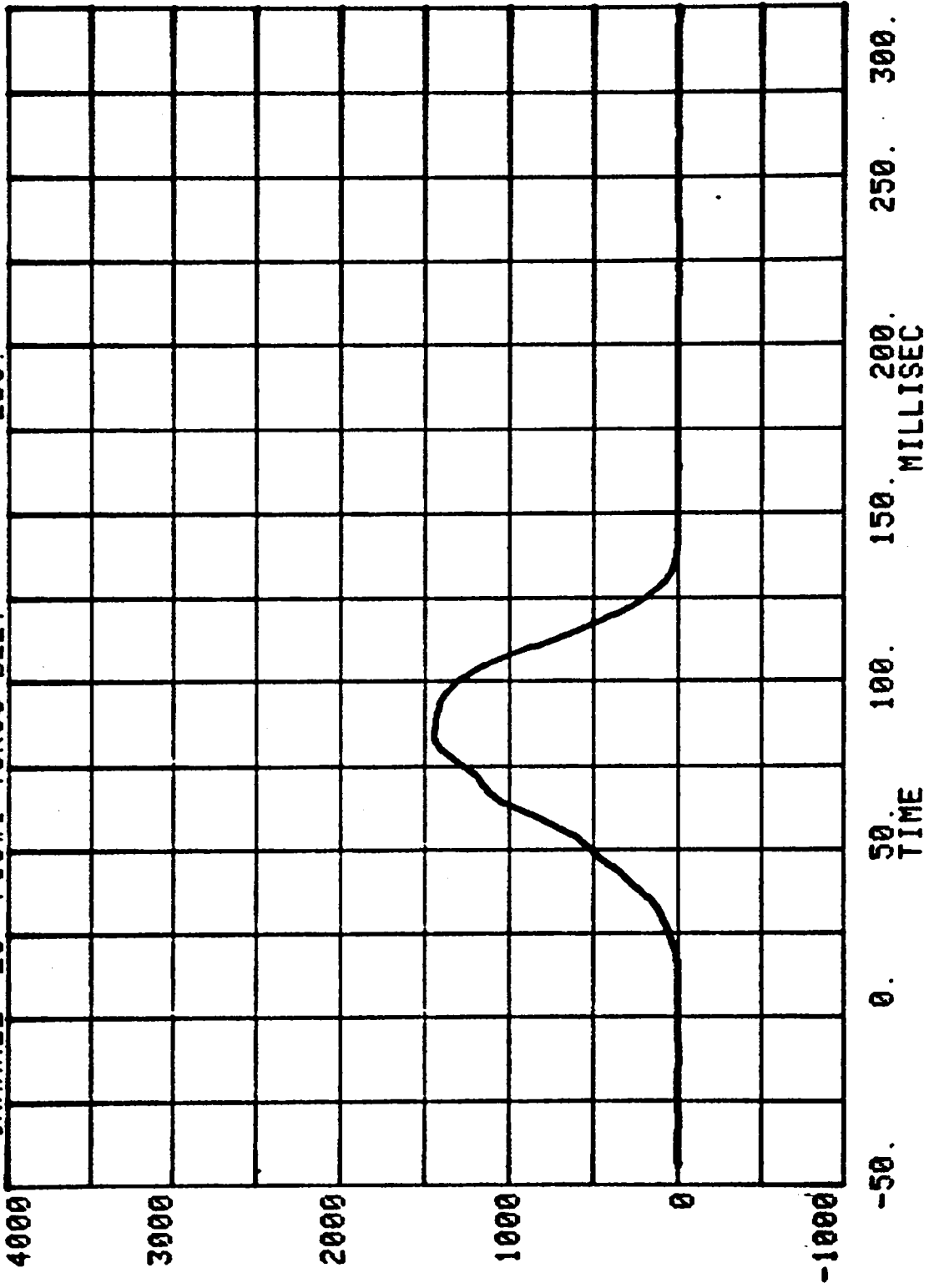
RUN= 867 SERIES= 304 LBS.
CHANNEL 12 POS#1 RIGHT FEMUR



CHANNEL 22 POS#1 LEFT BELT
RUN= 867 SERIES= 304 LBS.

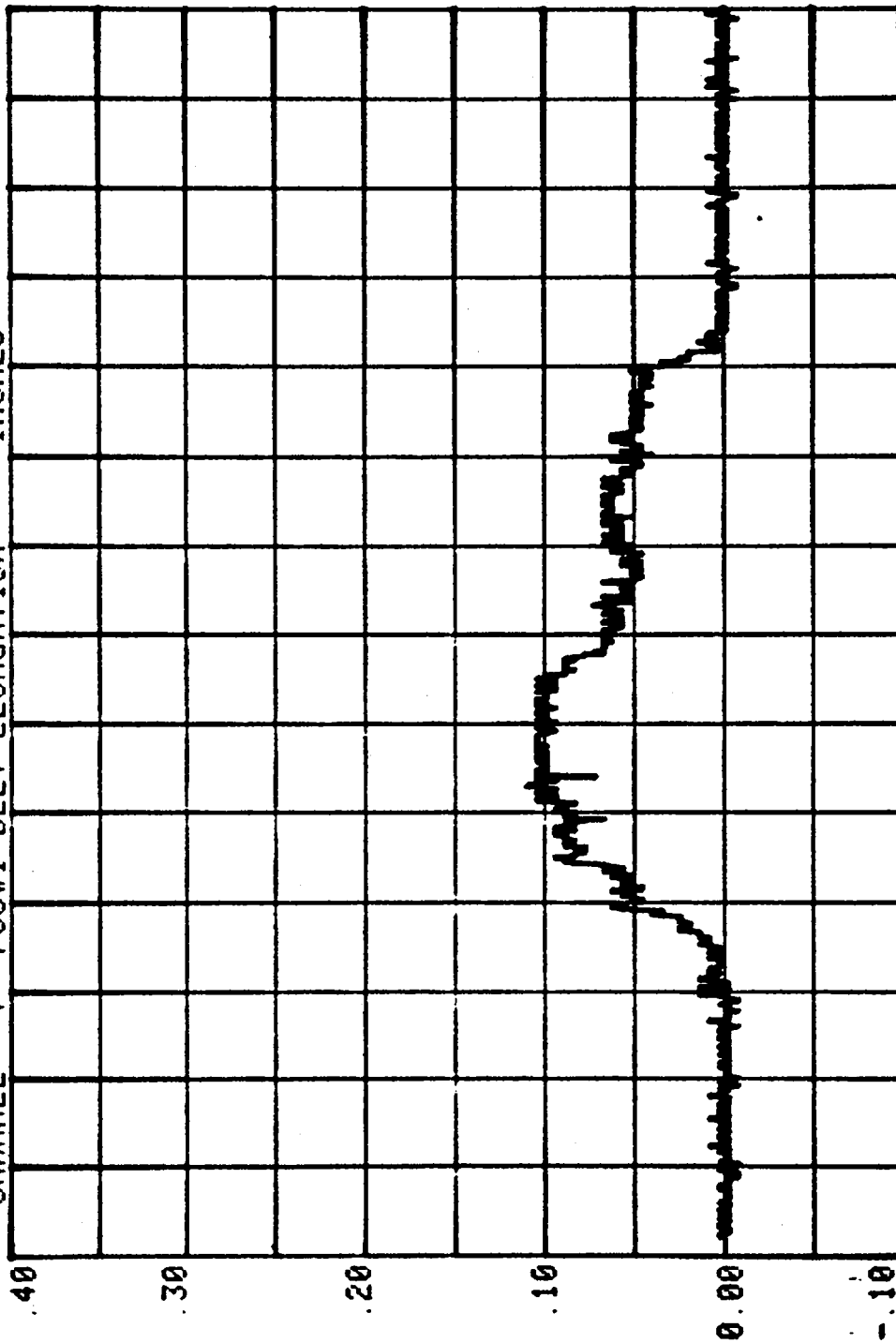


CHANNEL 23 POS#1 TORSO BELT
RUN= 867 SERIES= 304 LBS.

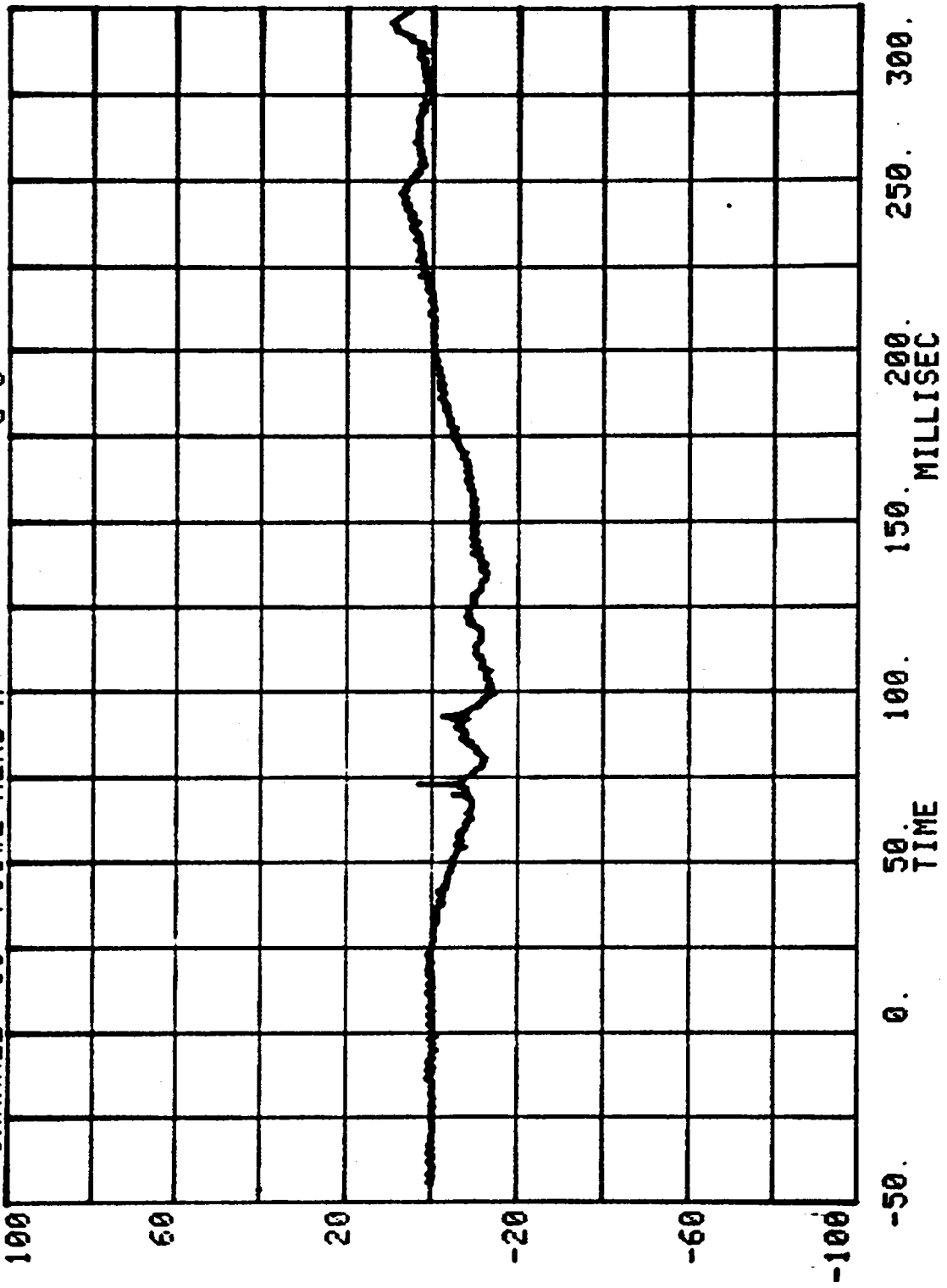


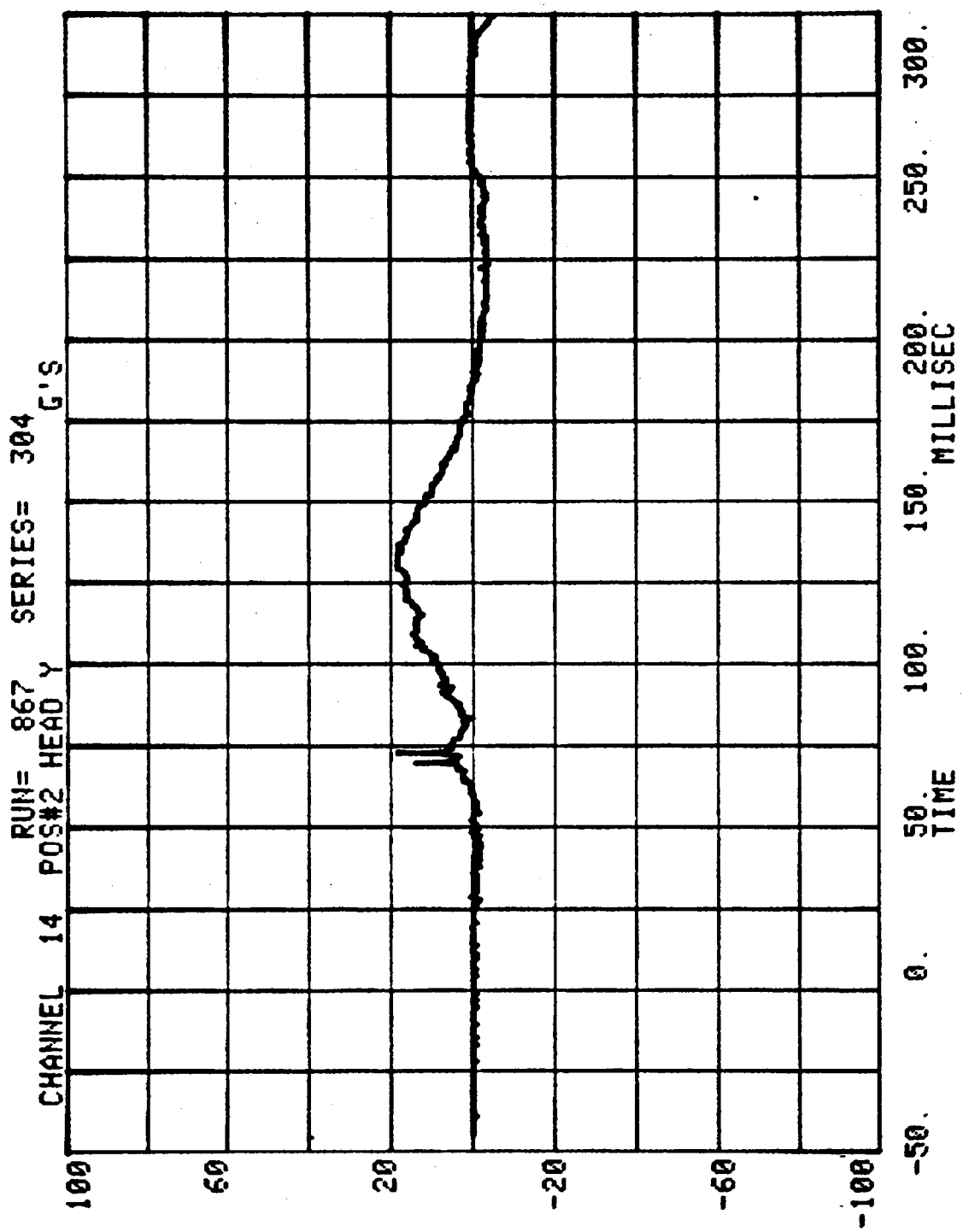
Measured over 2.5 inches

CHANNEL 7 POS#1 BELT ELONGATION SERIES= 304 INCHES

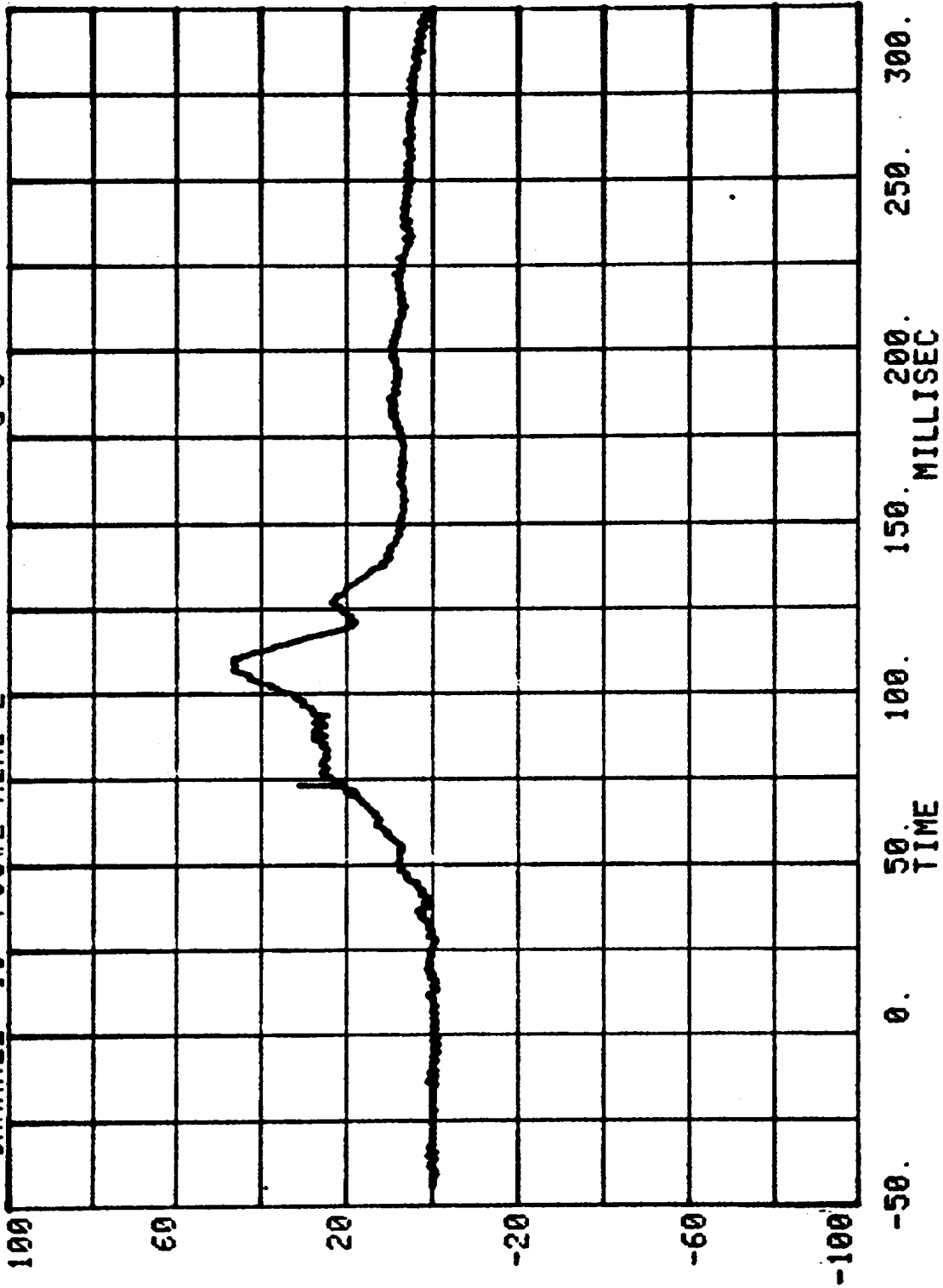


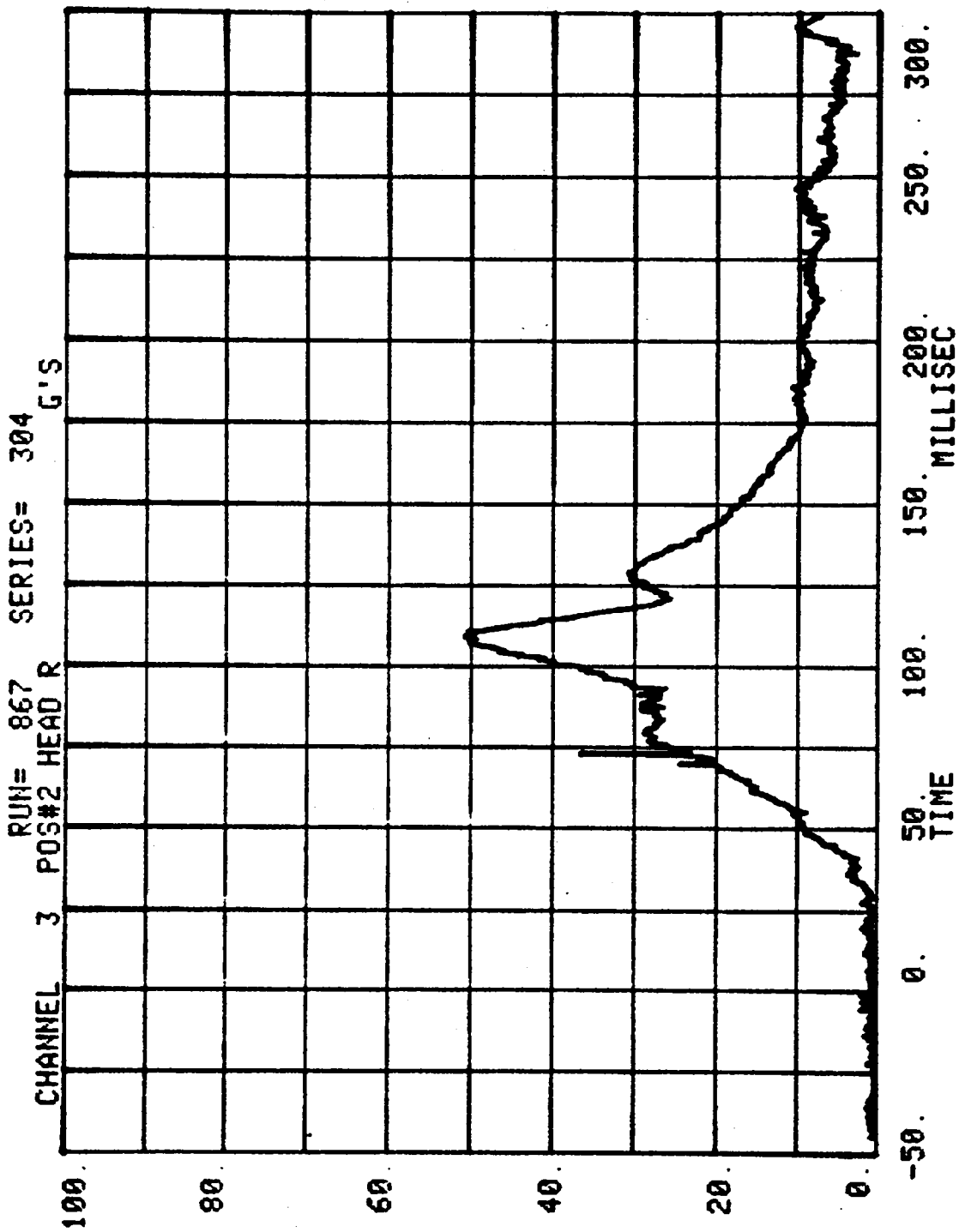
CHANNEL 13 POS#2 HEAD X
RUN= 867 SERIES= 304 G'S



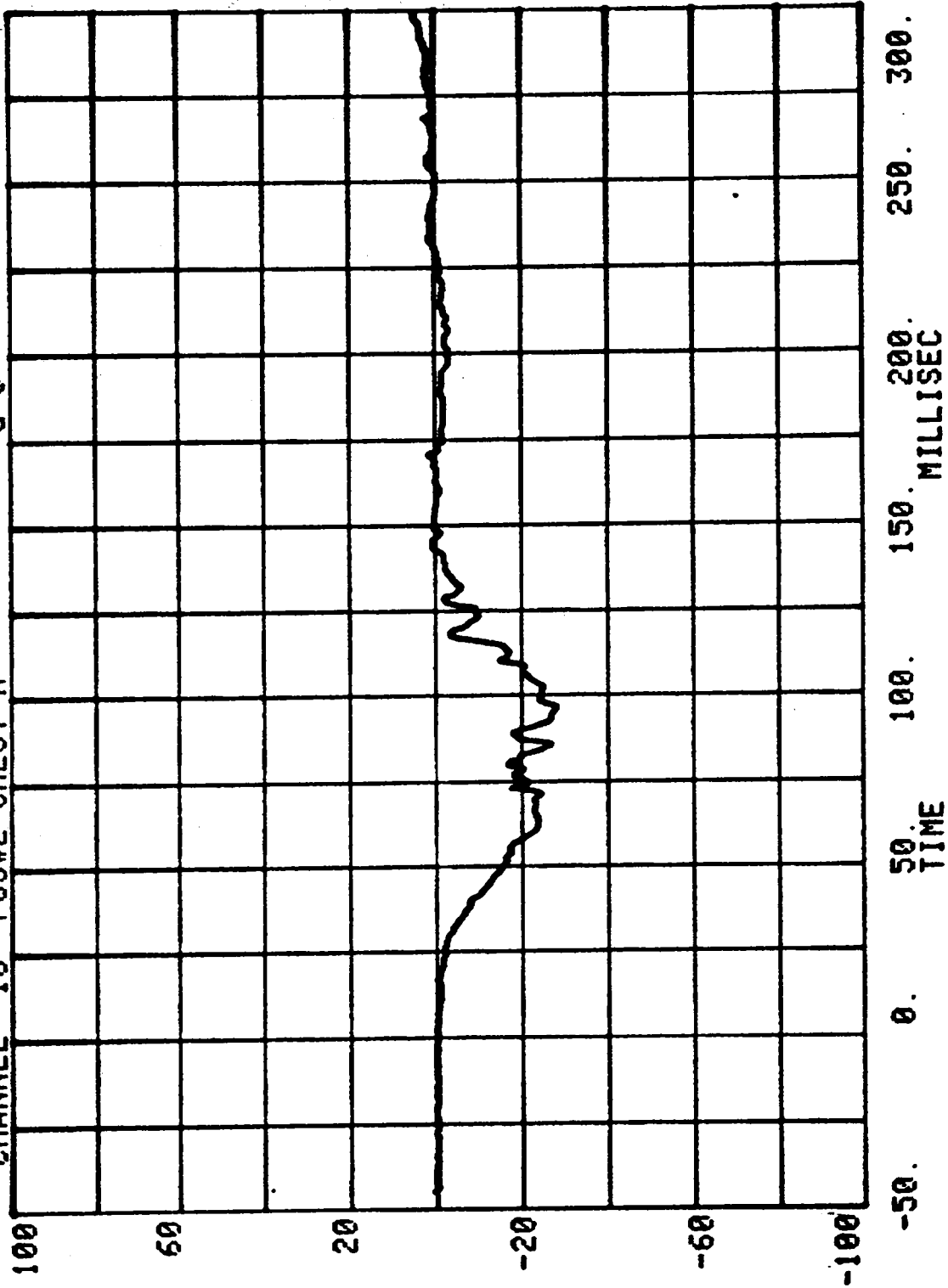


CHANNEL 15 POS#2 HEAD Z
RUN= 867 SERIES= 304 G'S

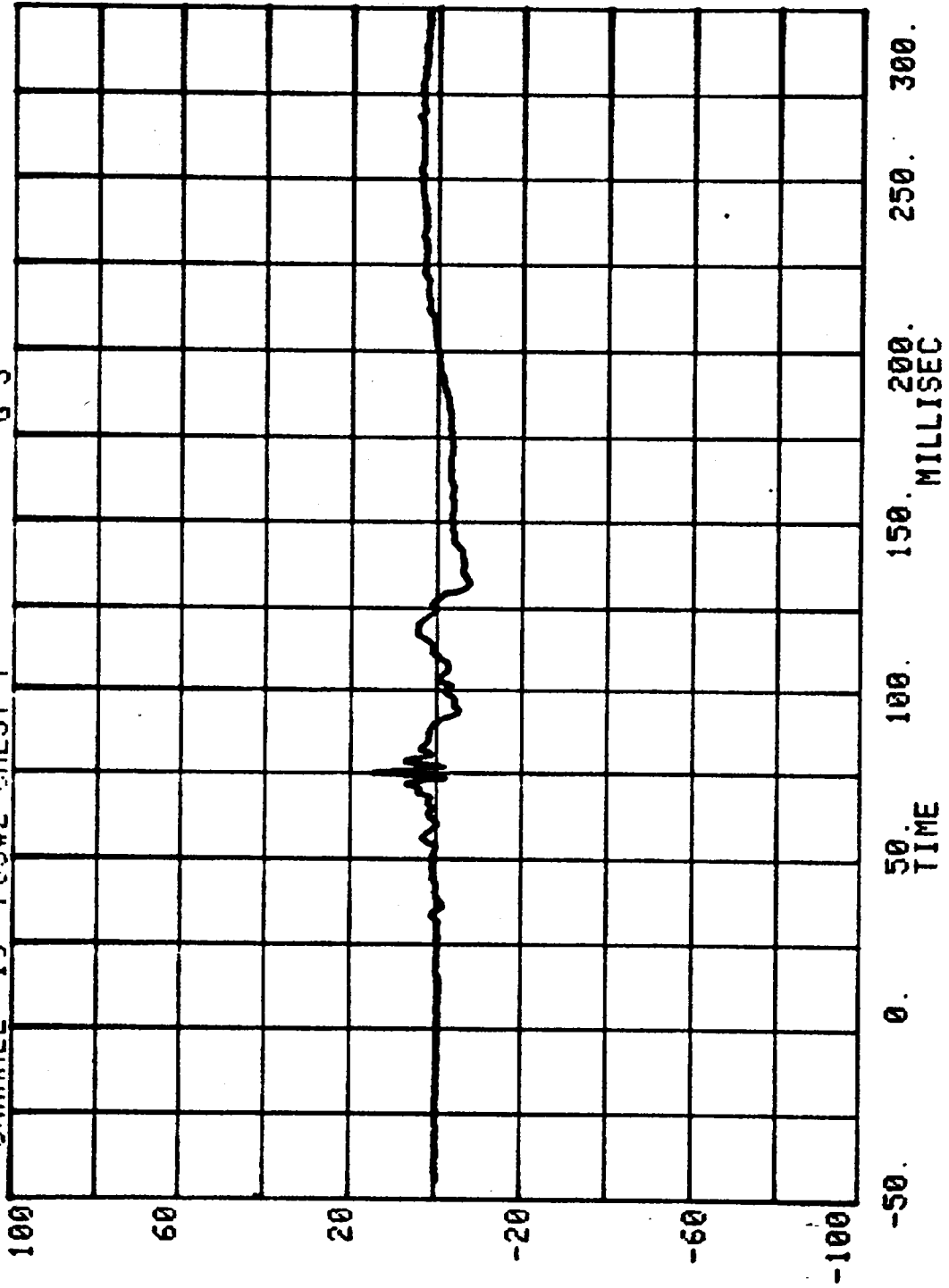




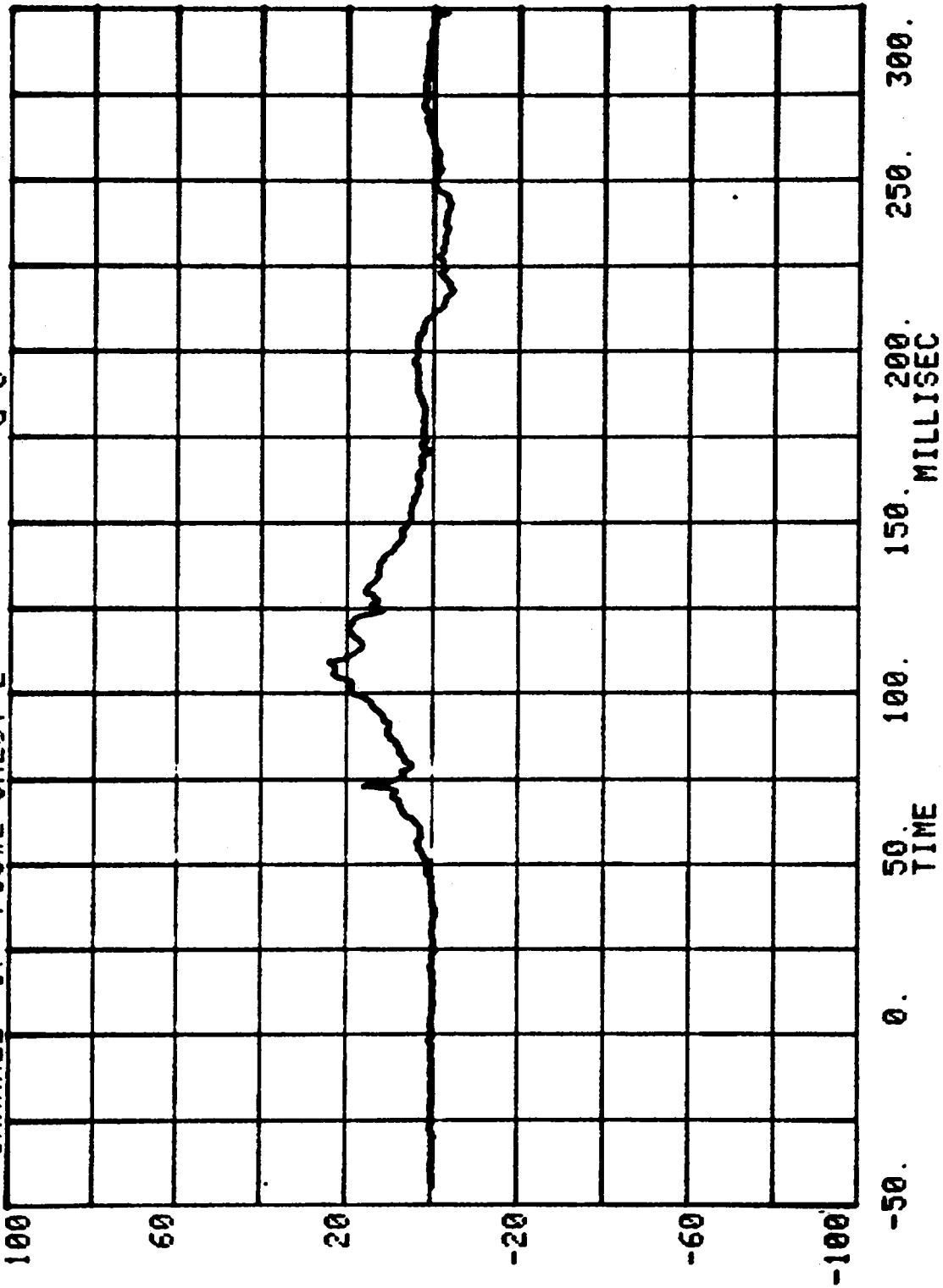
CHANNEL 16 POS#2 CHEST X
RUN= 867 SERIES= 304 G'S



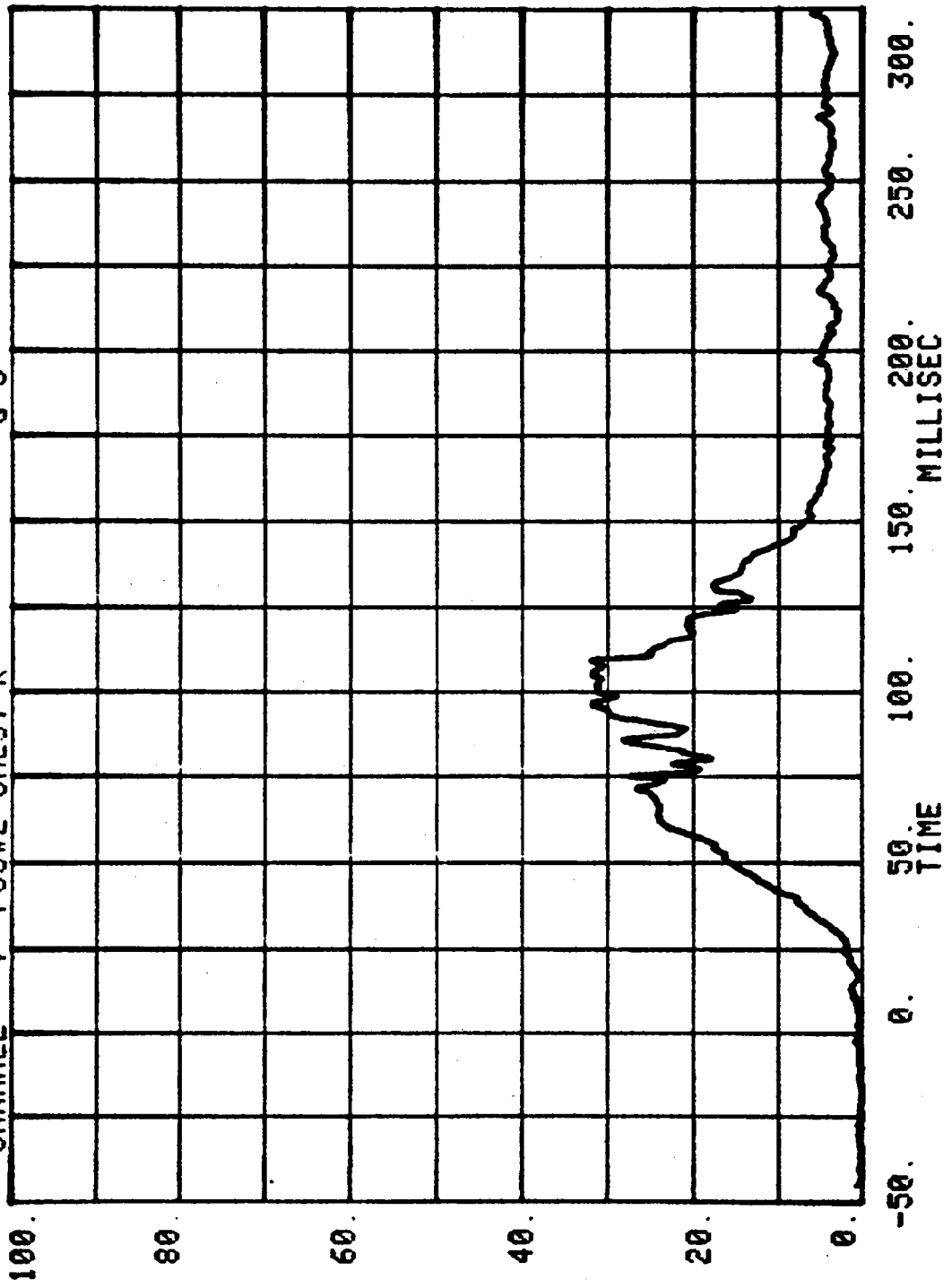
CHANNEL 18 POS#2 CHEST Y
RUN= 867 SERIES= 304 G'S



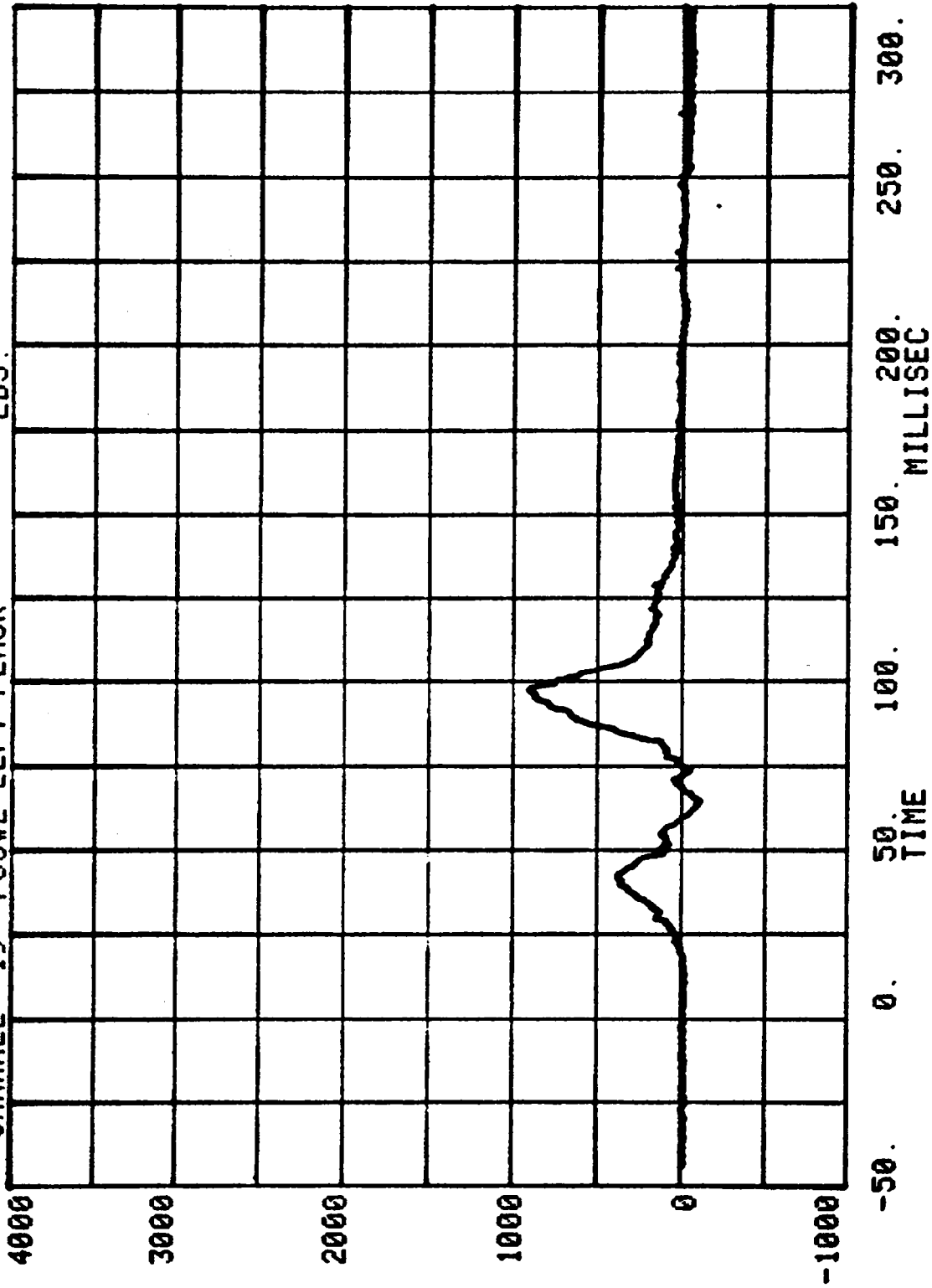
CHANNEL 17 POS#2 CHEST Z
RUN= 867 SERIES= 304 G'S



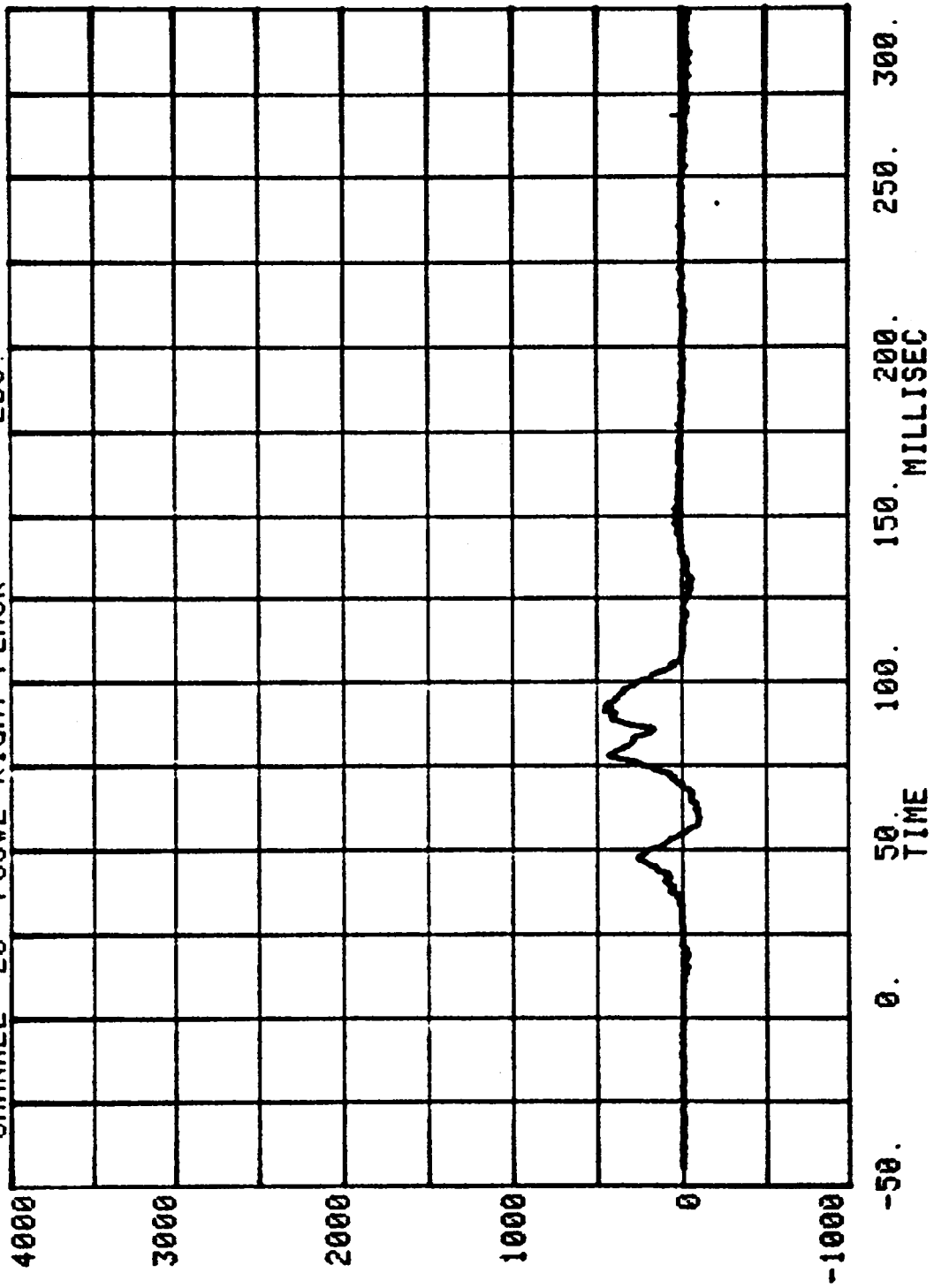
CHANNEL 4 POS#2 CHEST R
RUN= 867 SERIES= 304 G'S



CHANNEL 19 POS#2 LEFT FEMUR
RUN= 867 SERIES= 304 LBS.

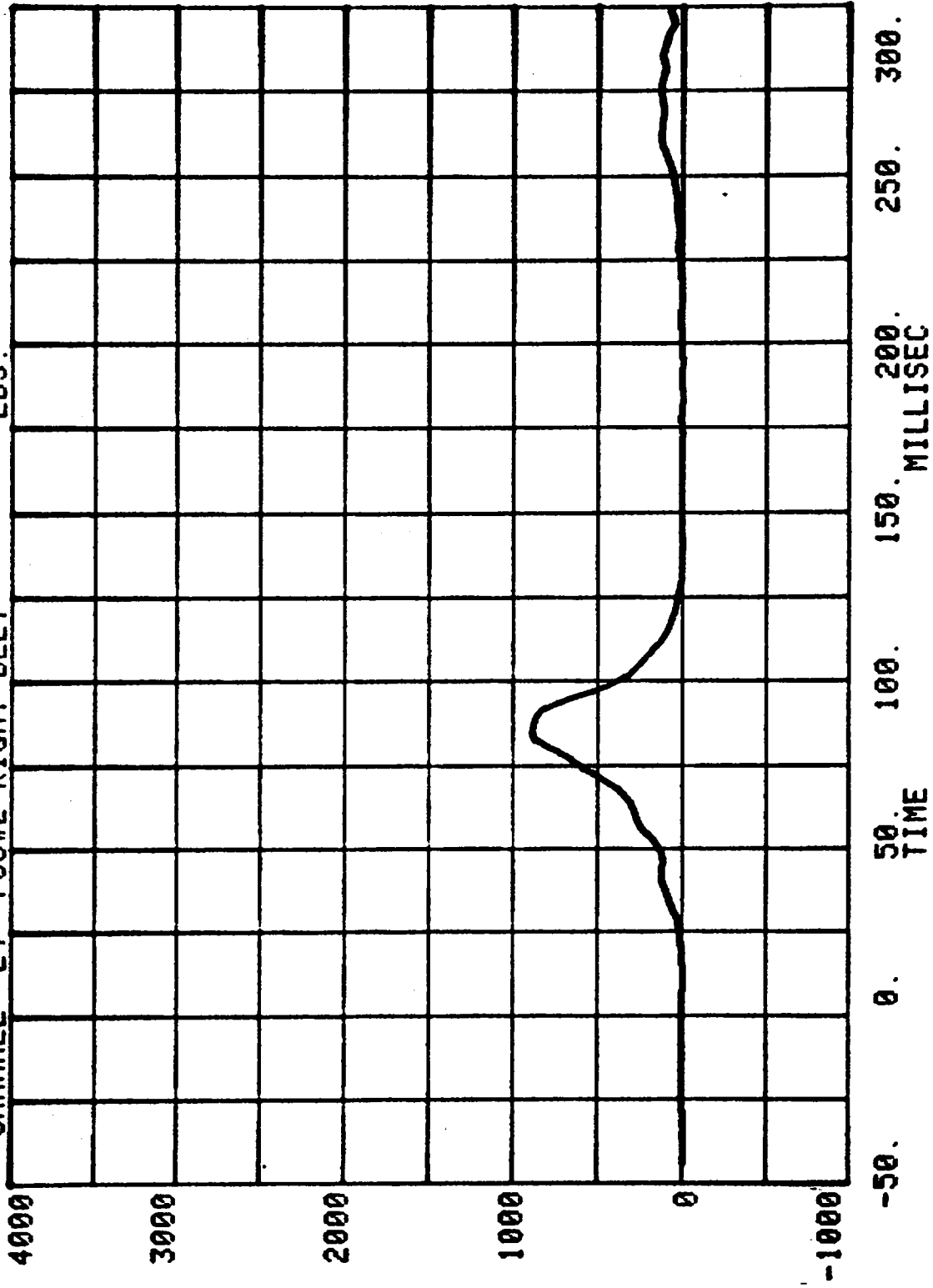


CHANNEL 20 POS#2 RIGHT FEMUR
RUN= 867 SERIES= 304 LBS.

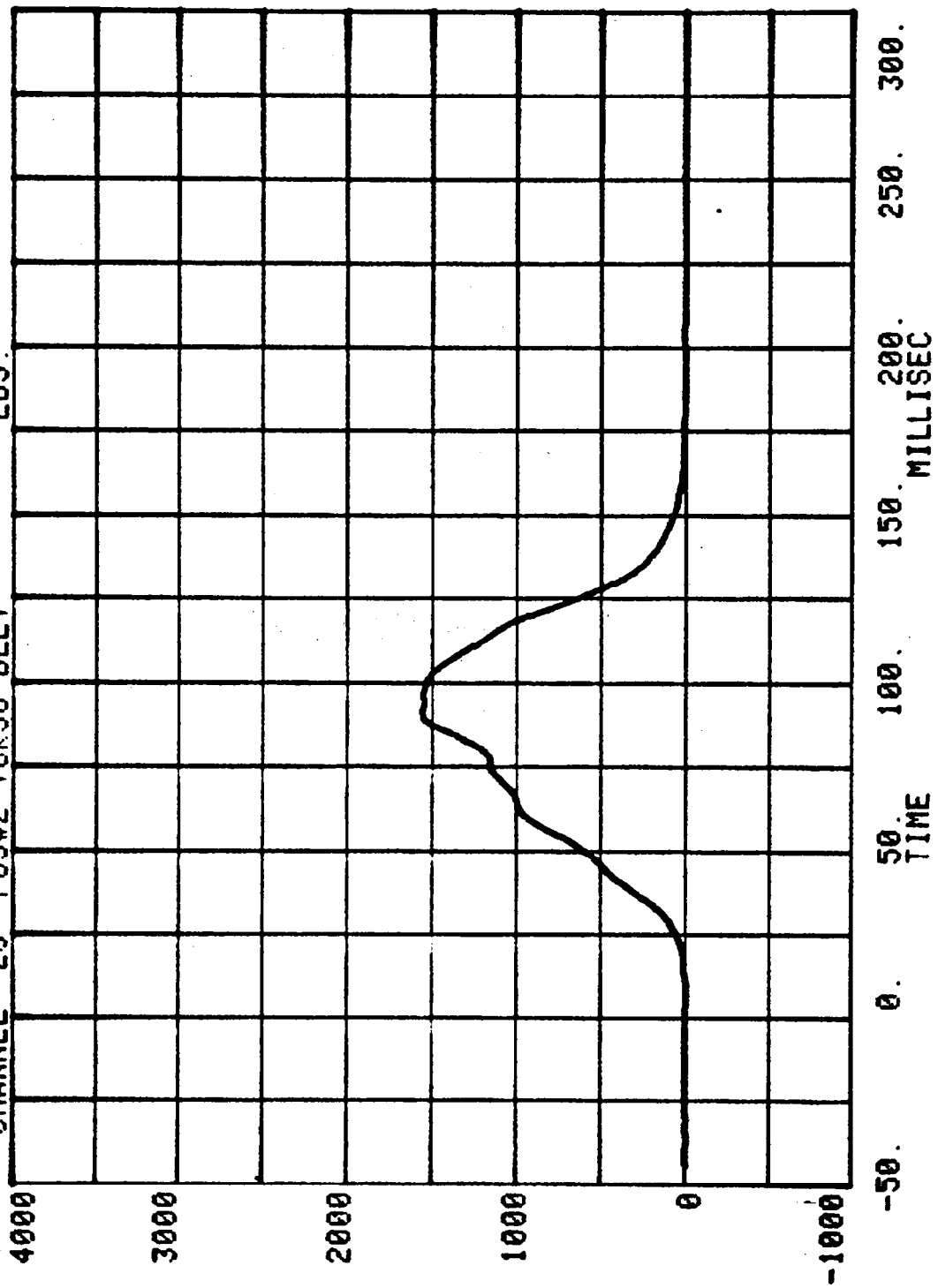


CHANNEL 24 POS#2 RIGHT BELT

RUN= 867 SERIES= 304 LBS.

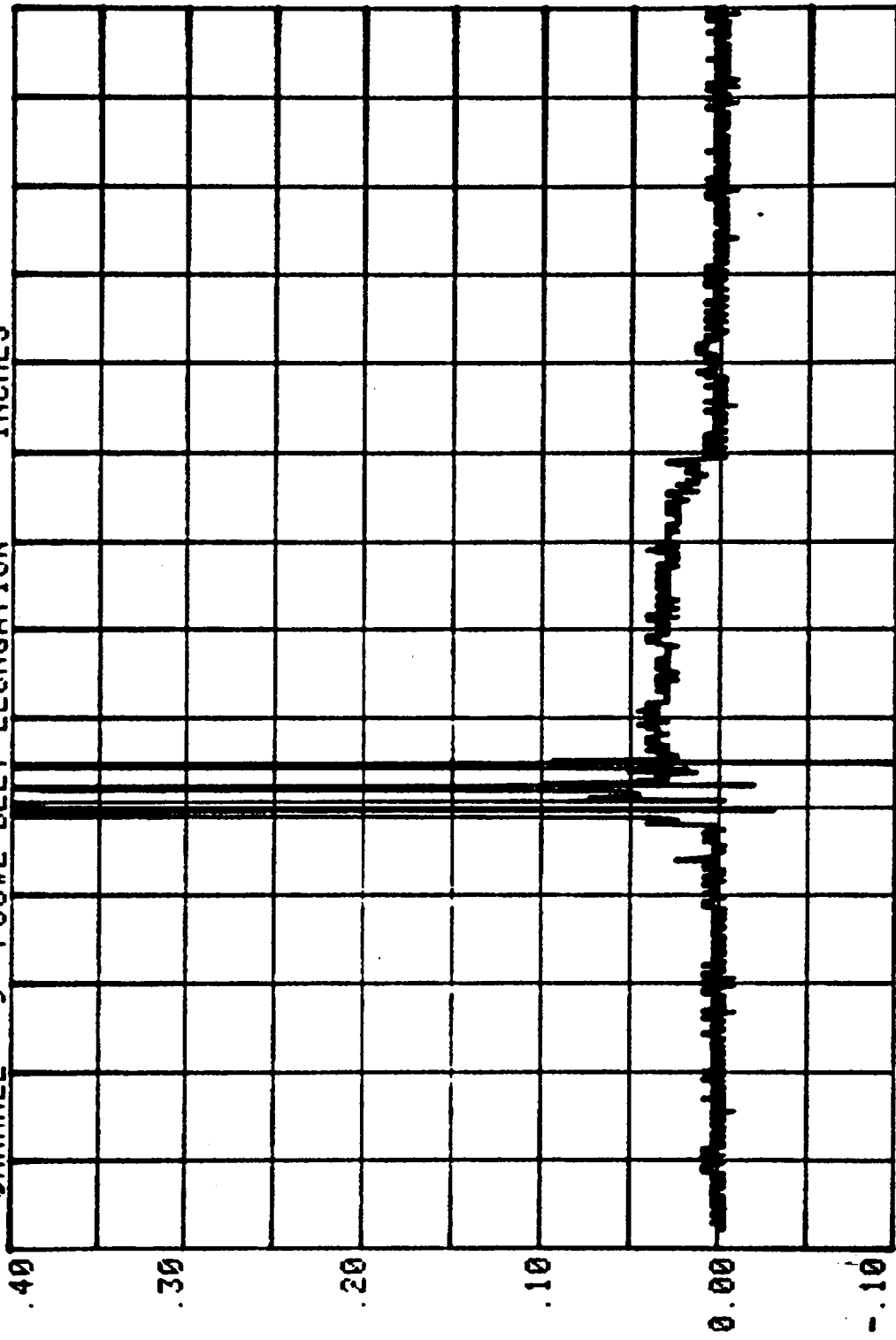


CHANNEL 26 POS#2 TORSO BELT
RUN= 867 SERIES= 304 LBS.



Measured over 2.5 inches

CHANNEL 9 POS#2 BELT ELONGATION SERIES= 304 INCHES



Appendix C

DUMMY CERTIFICATION TESTS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Calspan Corporation, Advanced Technology Center. A summary of the test results, Part 572 specifications and instrument calibration information is included in this Appendix.

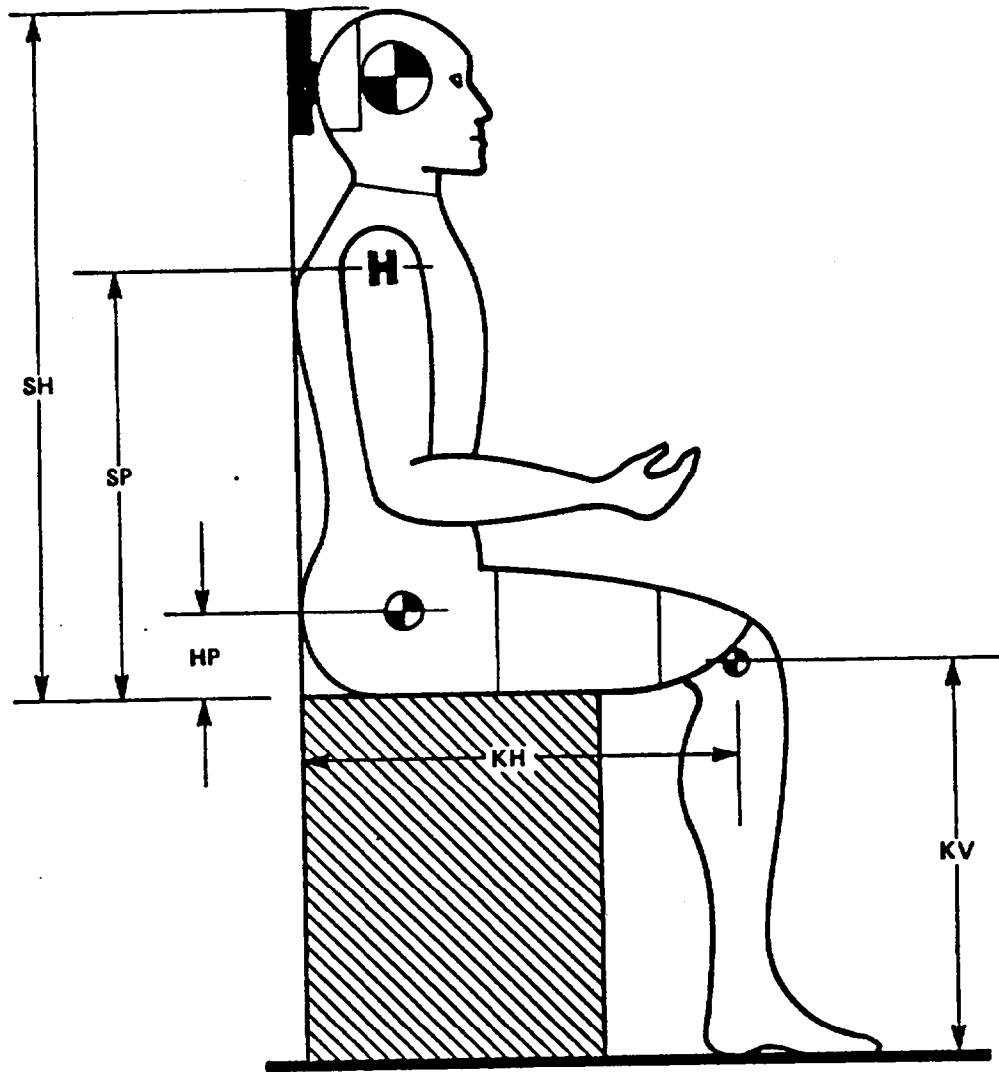
Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Date</u>
1021	10-19-88
1022	10-19-88

Electronic Test Equipment

The complement of signal conditioning recording and display equipment in conjunction with dummy certification testing can be found in New Car Assessment and Standards Indicant Testing Final Report, Report No. 6525-V-1.

Figure 10 DUMMY CONFIGURATION DIMENSIONS



PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 1021

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXXX	10-19-88	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	1	
SH - Seated Height	35.6 to 35.8"	35.7 "	
SP - Shoulder Pivot Height	21.8 to 22.4"	21.9 "	
HP - Hip Pivot Height	3.9" ref.	3.9 "	
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.4 "	
KV - Knee Pivot from floor	19.3 to 19.9"	19.8 "	
SW - Shoulder Width	17.8 to 18.4"	18.3 "	
HW - Hip Width	14.0 to 15.4"	14.9 "	

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		10-19-88	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-72 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		37-44 %	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	210 G's	
b. peak lateral accel.	<= 10 G's	8 G's	
c. Time above 100 G's	0.9 to 1.5 ms.	1.2 ms	

* Sequential number beginning with "1" at the start of each fiscal years' crash test program.

TECHNICIAN'S NAME:

John M. King

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST			
a. Pendulum Speed	21.5 to 25.5 fps.	21.9 fps	
b. Pend. Avg. Decel. over t3 to t2	20 to 24 G's	24 G's	
c. Peak Resultant Head Acceleration	26 G's max.	25.1 G's	
d. Pendulum Decel. (t2-t1)	<= 3 ms.	1.8 ms	
e. Pendulum Decel. (t3-t2)	25 to 30 ms.	26.8 ms	
f. Pendulum Decel. (t4-t3)	<= 10 ms.	2 ms	
g. Max. Head Rotation	63 to 73 deg.	72 deg	
h. Chordal Displacement			
HEAD ROTATION ANGLE			
0 deg.	Time	-2 to 2 ms.	0.0 ms
	Displ.	-.5 to .5"	0.0 "
30 deg.	Time	25.6 to 34.4 ms.	26.9 ms
	Displ.	2.1 to 3.1"	2.6 "
60 deg.	Time	40.3 to 51.7 ms.	41 ms
	Displ.	4.3 to 5.3"	4.6 "
Maximum (72 deg)	Time	53.2 to 66.8 ms.	54.3 ms
	Displ.	5.0 to 6.0"	5.45 "
60 deg.	Time	67.0 to 83.0 ms.	74.4 ms
	Displ.	4.3 to 5.3"	4.6 "
30 deg.	Time	85.4 to 104.6 ms.	90 ms
	Displ.	2.1 to 3.1"	2.35 "
0 deg.	Time	101.0 - 123.0 ms.	104.6 ms
	Displ.	-.5 to 0.5"	0.0 "

TECHNICIANS NAME:



C-5

7689-4

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	27 lbs	
b. Force @ 0.75"	36 to 50 lbs.	42 lbs	
c. Force @ 1.0"	50 to 63 lbs.	59.5 lbs	
d. Force @ 1.3"	73 to 88 lbs.	88 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	26.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	38 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	48 lbs	
d. Return Angle	12 deg. maximum	10 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.8 fps	
(2) Peak Deflection	1.7" maximum	1.6 "	
(3) Peak Resistive Force	2250 lbs maximum	2147 lbs	
(4) Internal Hysteresis	50 to 70%	57 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	13.9 fps	
(2) Peak Deflection	1.1" maximum	1.07 "	
(3) Peak Resistive Force	1450 lbs maximum	1315 lbs	
(4) Internal Hysteresis	50 to 70%	62.9 %	

TECHNICIAN'S NAME:

John W. ...
C-6

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Right Side			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2050 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	2.0 ms	
B. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2200 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.9 ms	

REMARKS:

TECHNICIAN'S NAME:

[Handwritten Signature]

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 1021

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CJ22	11-88	5-89
HY LATERAL--	ENDEVCO	CS41	11-88	5-89
HZ VERTICAL--	ENDEVCO	CH31	11-88	5-89
2. CHEST ACCELEROMETER--				
CX LONGITUDINAL--	CEC	A73	11-88	5-89
CY LATERAL--	ENDEVCO	CE06	11-88	5-89
CZ VERTICAL--	CEC	A44	11-88	5-89
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	552	12-88	5-89
LEFT SIDE	GSE	551	12-88	5-89
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A144	9-88	3-89
2. TEST PROBE ACCELEROMETER--	CEC	A142	11-88	12-88
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	11-88	5-89
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	11-88	5-89
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	11-88	5-89

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 1022

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXXX	10-19-88	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	1	
SH - Seated Height	35.6 to 35.8"	35.6 "	
SP - Shoulder Pivot Height	21.8 to 22.4"	22.1 "	
HP - Hip Pivot Height	3.9" ref.	3.9 "	
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.4 "	
KV - Knee Pivot from floor	19.3 to 19.9"	19.7 "	
SW - Shoulder Width	17.8 to 18.4"	18.3 "	
HW - Hip Width	14.0 to 15.4"	15.0 "	

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		10-19-88	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		70-72 deg	
VERIFICATION LAB HUMIDITY (10 TO 70 %)		37-48 %	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	241 G's	
b. peak lateral accel.	<= 10 G's	1.5 G's	
c. Time above 100 G's	0.9 to 1.5 ms.	1.15 ms	

* Sequential number beginning with "1" at the start of each fiscal years' crash test program.

TECHNICIAN'S NAME:

[Handwritten Signature]

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA...continued

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST			
a. Pendulum Speed	21.5 to 25.5 fps.	21.9 fps	
b. Pend. Avg. Decel. over t3 to t2	20 to 24 G's	23.8 G's	
c. Peak Resultant Head Acceleration	26 G's max.	25.8 G's	
d. Pendulum Decel. (t2-t1)	<= 3 ms.	2.2 ms	
e. Pendulum Decel. (t3-t2)	25 to 30 ms.	26.8 ms	
f. Pendulum Decel. (t4-t3)	<= 10 ms.	3.5 ms	
g. Max. Head Rotation	63 to 73 deg.	72 deg	
h. Chordal Displacement			
HEAD ROTATION ANGLE			
0 deg.	Time	-2 to 2 ms.	0.0 ms
	Displ.	-.5 to .5"	0.0 "
30 deg.	Time	25.6 to 34.4 ms.	29.2 ms
	Displ.	2.1 to 3.1"	2.65 "
60 deg.	Time	40.3 to 51.7 ms.	43.4 ms
	Displ.	4.3 to 5.3"	4.8 "
Maximum (72 deg)	Time	53.2 to 66.8 ms.	57.1 ms
	Displ.	5.0 to 6.0"	5.65 "
60 deg.	Time	67.0 to 83.0 ms.	77.9 ms
	Displ.	4.3 to 5.3"	4.85 "
30 deg.	Time	85.4 to 104.6 ms.	95 ms
	Displ.	2.1 to 3.1"	2.5 "
0 deg.	Time	101.0 - 123.0 ms.	109.8 ms
	Displ.	-.5 to 0.5"	0.0 "

TECHNICIANS NAME:

[Signature]
C-10

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	27.5 lbs	
b. Force @ 0.75"	36 to 50 lbs.	42 lbs	
c. Force @ 1.0"	50 to 63 lbs.	60 lbs	
d. Force @ 1.3"	73 to 88 lbs.	86 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	27 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	40 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	50.5 lbs	
d. Return Angle	12 deg. maximum	11 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.9 fps	
(2) Peak Deflection	1.7" maximum	1.58 "	
(3) Peak Resistive Force	2250 lbs maximum	2074 lbs	
(4) Internal Hysteresis	50 to 70%	56.7 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.0 fps	
(2) Peak Deflection	1.1" maximum	1.05 "	
(3) Peak Resistive Force	1450 lbs maximum	1274 lbs	
(4) Internal Hysteresis	50 to 70%	63.7 %	

TECHNICIAN'S NAME:

[Handwritten Signature]

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
6. KNEE IMPACT TEST			
A. Right Side			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2195 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	1.98 ms	
B. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	1945 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	2.0 ms	

REMARKS:

TECHNICIAN'S NAME:

[Handwritten Signature]

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 1022

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CK54	12-88	6-89
HY LATERAL--	ENDEVCO	CK78	12-88	6-89
HZ VERTICAL--	ENDEVCO	CD75	12-88	6-89
2. CHEST ACCELEROMETER--				
CX LONGITUDINAL--	CEC	A115	12-88	6-89
CY LATERAL--	ENDEVCO	CS09	12-88	6-89
CZ VERTICAL--	CEC	A29	12-88	6-89
3. FEMUR LOAD CELLS				
RIGHT SIDE	GSE	077	12-88	6-89
LEFT SIDE	GSE	076	12-88	6-89
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A144	9-88	3-89
2. TEST PROBE ACCELEROMETER--	CEC	A142	11-88	5-89
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS-DUCER INC	20051	11-88	5-89
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	11-88	5-89
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	11-88	5-89

APPENDIX D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

Safety belts provide protection against being thrown from the vehicle as well as reducing the risk of an injury caused by striking the interior of the vehicle.

Front Seats

Your vehicle is equipped with either the Automatic Belt System or the Unibelt System. Use the instructions for the system installed in your vehicle.

Automatic Belt System (if so equipped)

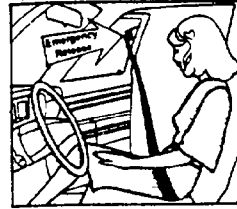
Automatic seat belts move out of the way when the door is opened and eliminated the need to buckle and unbuckle the shoulder belt. An emergency release is located at the upper door frame, should the need arise to manually release the shoulder belt.

A manual lap belt is also provided and must be worn in addition to the automatic shoulder belt in order to obtain the maximum amount of protection afforded by seat belts.

Both the automatic shoulder belt and manual lap belt incorporate an inertia sensitive belt webbing retractor which is designed to lock during very sudden stops or impacts. This feature allows the belt to move freely with the wearer under normal conditions, and locks the retractor only when the whole vehicle is tipped or jolted. These belts will also lock if the webbing is jerked or pulled rapidly from the retractor.

Automatic Belt Operating Instructions

When the vehicle door is opened, the upper portion of the shoulder belt will swing out with the door.



1



2



3



4

1. Enter the vehicle, sit behind the shoulder belt, and close the door. Sit back and erect and adjust the seat. The shoulder belt will be automatically positioned when the door is closed.

2. Adjust the shoulder belt, if necessary, so that it is comfortably and properly positioned across your chest and shoulder, as shown in the illustration. If the belt is too loose, pull it toward the console and the retractor will take up the excess belt webbing.

3. Grasp the metal tip of the lap belt and pull the belt toward the buckle. Insert the metal tip into the buckle until a "click" is heard. Snug the belt against your hips and ensure that it is not twisted. If the belt is too loose, pull it toward the console and the retractor will take up the excess belt webbing.

4. To release the lap belt, press the red button marked "Press" on the buckle. The belt will automatically retract to its stowed position when the button is pressed.

WARNING

The lap belt must be used in addition to the automatic shoulder belt to provide full occupant restraint.

Both belts must be worn properly for maximum effectiveness. The automatic torso belt must be positioned midway on the shoulder and should not touch or cross the neck. The lap belt should be positioned across the hips,

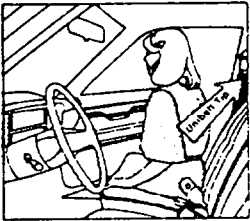
not across the stomach. Never use these belts for more than one person at a time.

Failure to follow these instructions could increase the chance of severe or fatal injury in the event of a collision.

Unibelt System (if so equipped)

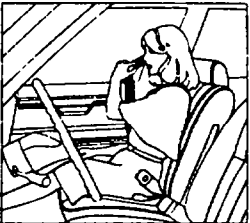
The "UNIBELT", or single continuous belt restraint system, incorporates an inertia sensitive belt webbing retractor which is designed to lock (i.e., prevent belt travel) only during very sudden stops or impacts. This feature allows the shoulder belt to move freely with the wearer under normal conditions. The retractor will not lock by jerking or pulling the webbing rapidly by hand.

Unibelt Operating Instructions



1

1. Enter the vehicle and close the door. Sit back and erect and adjust the seat. Note the metal tip of the unibelt in its stowed position.



2

2. Grasp the metal tip and slide it up the webbing as far as necessary to go around your lap as you pull out the webbing.

3. As you pull the webbing across your lap and over your shoulder, move the metal tip toward the buckle.

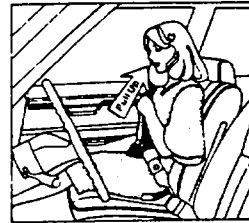
Insert the tip into the buckle until a "click" is heard.



3

Do not wear the shoulder belt under your arm or otherwise out of position. Such use could increase the chance of severe or fatal injury in a collision.

4. Position the lap belt with the upper edge of the belt drawn across the thighs and snug against the hips. Slack will automatically be removed due to tension created by the retractor. If a snug fit in the lap belt portion is desired, pull up on the shoulder belt as shown. A snug belt reduces the risk of sliding under the belt in a collision.



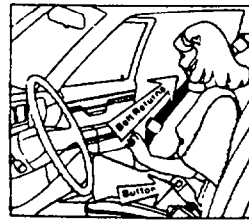
4

5. Position the shoulder belt on your chest so that it is comfortable and not resting on your neck. Any slack in the belt will be withdrawn automatically by the retractor.



5

If the shoulder belt feels too tight, pull about an inch of webbing from the retractor; just enough to allow your closed fist to fit between the belt and your chest. This small amount of slack will be retained by the retractor.



6

The amount of slack in the shoulder belt should be kept to a minimum. Too much slack may prevent the belt from properly restraining you in the event of an accident.

If the slack is not retained, pull out 6 to 8 inches of webbing, let it return to your chest, and repeat the procedure.

The shoulder belt will allow unrestricted movement of the upper body under normal conditions. Extreme movements will probably require resetting the slack. The retractor will lock in the event of an accident.

6. To release the belt, push the button on the buckle. The belt

will automatically retract to its stowed position when the door is opened.

If needed, slide the tip down the webbing to allow the belt to fully retract.

Driver Supplemental Air Bag (If so equipped)

This vehicle is equipped with an air bag for the driver as a supplement to the seat belt restraint system. The seat belt is the primary restraint and should be worn whenever the vehicle is in motion. The seat belt provides protection in collisions for which the air bag is not intended to deploy, either because of low impact speed or non-frontal direction of impact, and positions the driver for those collisions in which the bag does deploy. The steering wheel-mounted air bag deploys in higher-speed frontal impacts, and works with the instrument panel knee bolster and the seat belt to provide improved protection for the driver.

The air bag system consists of the following items:

- crash sensors
- diagnostic unit
- **"AIR BAG"** - readiness lamp
- air bag/inflator unit
- unique steering wheel and column
- interconnecting wiring
- knee impact bolster

Crash sensors in the front of the vehicle determine if a frontal impact is severe enough to require air bag deployment. The sensors are not designed to detect lateral, rollover, or rear impacts. Switches in the sensors are connected to the diagnostic unit.

The diagnostic unit monitors the readiness of the electronic portions of the air bag system components that

deploy the air bag, all of the items listed above except the knee bolster. The unit continuously monitors the components whenever the ignition switch is in the "start" or "run" position. It lights the **"AIR BAG"** lamp in the instrument panel for 6 to 8 seconds when the ignition switch is first turned on, then turns the lamp off. It lights the lamp momentarily or continuously if it detects a malfunction in any part of the system.

The air bag/inflator unit is located in the center of the steering wheel. When the crash sensors detect an impact requiring air bag deployment, their switches close a circuit which ignites materials in the inflator to generate nitrogen gas and inflate the air bag. The air bag begins to expand from its flat, stored position behind the steering wheel hub trim cover. The cover separates and folds out of the way as the bag inflates to its full size.

IMPORTANT MAINTENANCE. To assure that the air bag will be ready to deploy for your protection in an impact, have the system serviced promptly by an authorized dealer if any of the following occurs:

- the **"AIR BAG"** lamp does not light for 6 to 8 seconds when the ignition switch is first turned on;
- the lamp remains lit or flickers after the 6 to 8 second interval, above;
- the lamp flickers or lights and remains lit while driving.
- Aside from the maintenance indicated above in response to the **"AIR BAG"** lamp, an inspection of the mechanical and electrical components of the system is included in the regular maintenance service recommended for every 3 years or 30,000 miles. (See SECTION 4 - MAINTENANCE)

WARNING!

Modification to air bag system components or wiring, including the addition of any kind of badges to the

steering wheel hub trim cover or modifications to the front bumper or body structure, can adversely affect system performance and lead to possible injury.

Rear Seats Lap Belts

Both rear seats are equipped with lap belts. The belts should be worn with the upper edge of the belt drawn across the thighs and snug against the hips. To reduce the risk of sliding under the belt in a collision, it should be adjusted as tight as comfort will allow, **WHILE SITTING WELL BACK AND ERECT IN THE SEAT.**

The rear seat positions are equipped with automatic locking retractors. These retractors will lock if the webbing is pulled or jerked after withdrawal from the retractor. Withdraw the belt from the retractor in a continuous motion, forward and upward away from the seat, until the belt is extended as far as possible. Bring the belt across the body and insert the latch plate in the buckle until a "click" is heard. If the belt has not been pulled out far enough to reach the buckle, return the belt to its stowed position. This will unlock the retractor so that the belt can be pulled out a greater amount. Tighten the belt by pulling the webbing back toward and into the retractor until the belt fits snugly on the hips.

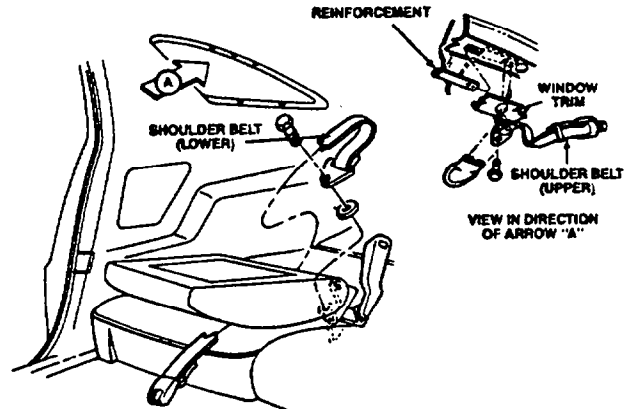
Never use the same lap belt on more than one person at a time.

Optional Rear Shoulder Belts

If you carry rear seat passengers in your vehicle, shoulder belts can be installed in the rear outboard seat positions by your dealer. The use of shoulder belts in addition to lap belts may increase occupant protection in some types of accidents.

The following graphic shows the location of the shoulder belt anchorages for the right and left rear seat positions. Special reinforcing hardware must be added at the

upper anchorages when shoulder belts are installed. Rear seat shoulder belts can be purchased from your dealer.



Chrysler Motors recommends that these belts be installed by your dealer.

Rear Shoulder Belt Use

To use the optional shoulder belt, first buckle the lap seat belt. Sit erect and place the lap belt as low on the hips as practical. Do not wear the lap belt high on the stomach. Next, grasp the metal tip of the shoulder belt and tilt it to lengthen the webbing. Insert the metal tip into the buckle. Pull on the loose end of the webbing to shorten the belt to fit your body.

CAUTION: *The shoulder belt must be worn as snugly as comfort will allow. Slack could reduce the amount of protection in a collision. NEVER WEAR THE SHOULDER BELT WITHOUT ALSO WEARING THE LAP BELT.*

Use Of Seat Belts During Pregnancy

Chrysler Motors recommends that pregnant women use the available safety belts. This will reduce the likelihood of injury to both the woman and the unborn child. The lap