

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

FORD MOTOR COMPANY
1989 FORD THUNDERBIRD
2-DOOR COUPE

NHTSA NO. MK0201
CALSPAN TEST NO. 7731-1

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FINAL REPORT

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16. Abstract A frontal barrier impact test of a 1989 Ford Thunderbird 2-door Coupe was performed at Calspan Advanced Technology Center crash test facility in Buffalo, New York on February 28, 1989. The impact speed was 34.7 mph and the ambient temperature at the barrier face was 33°F. The maximum vehicle crush was 21.1 inches. The test vehicle was equipped with a manual lap belt and an automatic torso belt at each of the front outboard positions. 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 MK0201

A load cell barrier consisting of 36 load cells was impacted by a 1989 Ford Thunderbird 2-Door Coupe at a velocity of 34.7 mph. The test was performed at the Calspan Corporation Advanced Technology Center on February 28, 1989. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 13 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572, 50th percentile male anthropomorphic test devices (ATDs) were placed in the driver and right-front passenger seating positions, according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head and chest triaxial accelerometers and right/left 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 two previous tests (MK0304 and MK5600) and the right-front passenger ATD (Serial No. 1022) was also used in Test MK0304. The Injury Criteria Values were not exceeded in these tests. 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 steering wheel rim and hub; the HIC was 541. The maximum chest deceleration over 3 milliseconds was 44 g's and femur loads were 1224 (left) and 1138 (right) pounds.

The right front passenger's HIC was 496 and maximum chest deceleration over 3 milliseconds was 40 g's. Femur loads were 1264 (left) and 776 (right) pounds.

Table 1

GENERAL TEST AND VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1989 Ford Thunderbird 2-Door Coupe
 NHTSA NO.: MK0201 VIN.: 1FAPP604XKH120933
 BODY COLOR: Silver DATE OF MANUFACTURE: 12/88
 Engine: 6 cylinders; - C.I.D.; 3.8 Liters; - CC
 X Gas; - Diesel; - Turbocharged
 X Longitudinal; - Transverse
 Transmission: 3 Speed - Manual; X Automatic; X Overdrive
 Final Drive: - Front Wheel; X Rear Wheel; - Four Wheel
 Date Received: 1/-24-89 Odometer Reading: 19.0
 X A/C; X P/S; X P/B; X P/wdo.; X Tilt Wheel
 X P/seats; X Cruise Control
 Type of Occupant Restraint: Manual lap belt, automatic torso belt
 DATA RECORDED FROM VEHICLE'S TIRE PLACARD:
 Tire Pressure (at capacity): Front 35 psi, Rear 35 psi
 Recommended Tire Size: P205/70R15
 Recommended Cold Tire Pressure: Front 30 psi, Rear 30 psi
 Tires on Vehicle: P205/70R15; Manufacturer: General
 Number of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 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) = 900 lbs. (A)
 No. of Occupants x 150 lbs. = 750 lbs. (B)
 Rated Cargo and Luggage Weight (RCLW) A-B = 150 lbs.
 GVWR 4885 lbs. GAWR: Front 2563 lbs. Rear 2345 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 = <u>1000</u> lbs.	Right Rear = <u>800</u> lbs.
Left Front = <u>1040</u> lbs.	Left Rear = <u>790</u> lbs.
TOTAL FRONT WEIGHT = <u>2040</u> lbs. (<u>56</u> % of Total Vehicle Weight)	
TOTAL REAR WEIGHT = <u>1590</u> lbs. (<u>44</u> % of Total Vehicle Weight)	
TOTAL DELIVERY WEIGHT = <u>3630</u> lbs.	

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (3630 lbs.)
VCW = Vehicle Capacity Weight (900 lbs.)
DSC = Designated Seating Capacity (5)
RCLW = VCW - 150 (DSC) = 150 lbs.
Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)
Target Test Weight = 4108 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 152 POUNDS CARGO:

Right Front = <u>1130</u> lbs.	Right Rear = <u>930</u> lbs.
Left Front = <u>1120</u> lbs.	Left Rear = <u>930</u> lbs.
TOTAL FRONT WEIGHT = <u>2250</u> lbs. (<u>55</u> % of Total Vehicle Weight)	
TOTAL REAR WEIGHT = <u>1860</u> lbs. (<u>45</u> % of Total Vehicle Weight)	
TOTAL TEST WEIGHT = <u>4110</u> lbs.	
Weight of ballast secured in vehicle trunk area = <u>0</u> lbs.	

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude:	RF	<u>29.5</u>	LF	<u>29.3</u>	RR	<u>29.7</u>	LR	<u>29.4</u>
Test Attitude:	RF	<u>28.8</u>	LF	<u>28.8</u>	RR	<u>28.0</u>	LR	<u>27.9</u>
Wheel Base: <u>113.0</u> in.; C.G. = <u>51.1</u> in. rearward of front wheel C/L								
Remarks: _____								

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

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0 °
 Date of Test: 2-28-89 Time of Test: 12:45
 Ambient Temperature: 33 °F at impact area
 Temperature in Occupant Compartment: 70 °F.
 Windshield Molding Temperature: 72 °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>194.7</u>	C _L	<u>199.0</u>	L	<u>194.7</u>
	Post-test	= R	<u>178.0</u>	C _L	<u>177.9</u>	L	<u>178.5</u>
	Crush	= R	<u>16.7</u>	C _L	<u>21.1</u>	L	<u>16.2</u>

Distance from front of test vehicle to point of impact:

R 15.3 C/L 14.2 L 17.5

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Steering wheel rim and hub</u>	<u>Visor and Dash</u>
Chest	<u>No contact</u>	<u>No contact</u>
Abdomen	<u>Lower steering wheel rim</u>	<u>No contact</u>
Left Knee	<u>Dash</u>	<u>Dash and left shoulder</u>
Right Knee	<u>Dash</u>	<u>Dash and Panel</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>Seat Movement</u>	<u>Left</u>	<u>Right</u>
Seat Back Failure	<u>None</u>	<u>None</u>
Seat Shift (in.)	<u>None</u>	<u>None</u>

Glazing Damage

Backlight/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)	-115	-79	72	152	-38	-28	15	43.7
DUMMY (2)	-54	74	49	92	-29	40	22	39.9
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE - FEMUR LOAD (LBS)	
	LEFT FEMUR	RIGHT FEMUR
DUMMY (1)	1224	1138
DUMMY (2)	1264	776
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)	1726	-	297
DUMMY (2)	1484	379	-
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)	540.9	0.08077	0.11602	47.2
DUMMY (2)	496.3	0.10860	0.13132	54.4
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

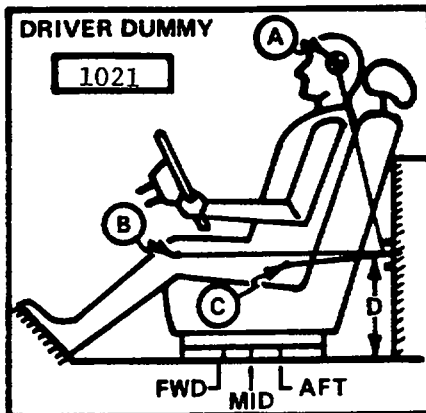
TEST NO.: MK0201

VEHICLE: 1989 Ford Thunderbird

SEAT TYPE:
 Bench
 X Bucket
 Split Bench

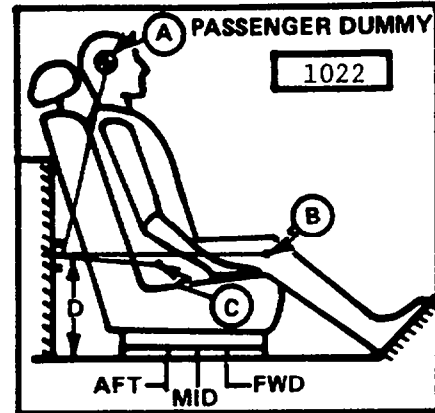
ADJUSTER TYPE:
 Manual
 X Power

BUCKET SEAT BACK TYPE:
 Fixed
 X Adjustable Reclining



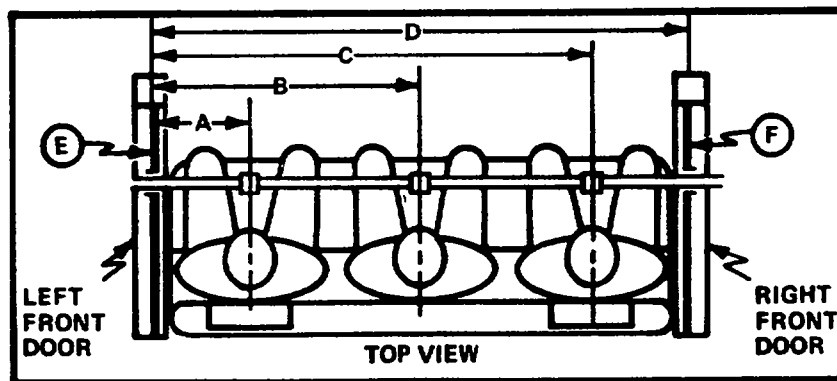
MEASUREMENT
LOCATION

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



A = 24.8 in. 37° Degrees
 B = 35.0 in. 96° Degrees
 C = 20.7 in. 112° Degrees
 D = 15.7 in.

A = 25.5 in. 37° Degrees
 B = 35.3 in. 98° Degrees
 C = 20.6 in. 110° Degrees
 D = 15.7 in.



DUMMY ID

1021

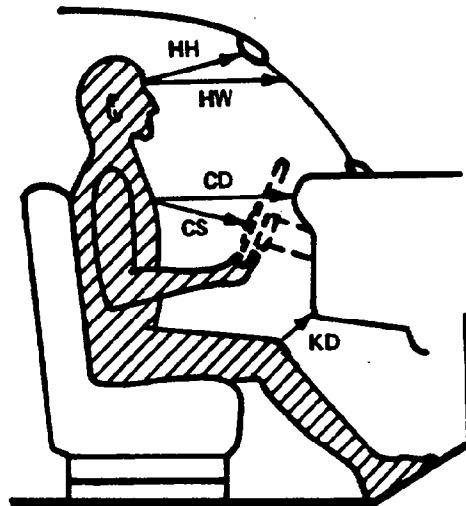
1022

A	=	Left Door to Driver Centerline	<u>13.3</u> in.
B	=	Left Door to Center Passenger Centerline	<u>-</u> in.
C	=	Left Door to Right Passenger Centerline	<u>43.2</u> in.
D	=	Left Door to Right Door	<u>56.3</u> in.
E, F	=	Window Glass Height (Right and Left Must Be Equal)	<u>13.0</u> in.

Figure 2

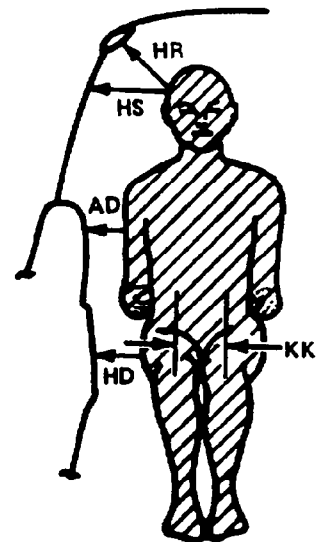
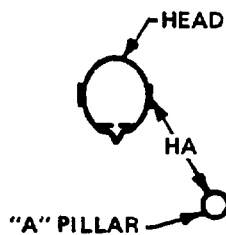
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	12.5	12.0
HW	17.0	16.4
CD	21.0	21.3
CS	12.7	-
KDL	5.8	5.8
KDR	4.8	5.8
SA	22°	22°
TA	22°	20°



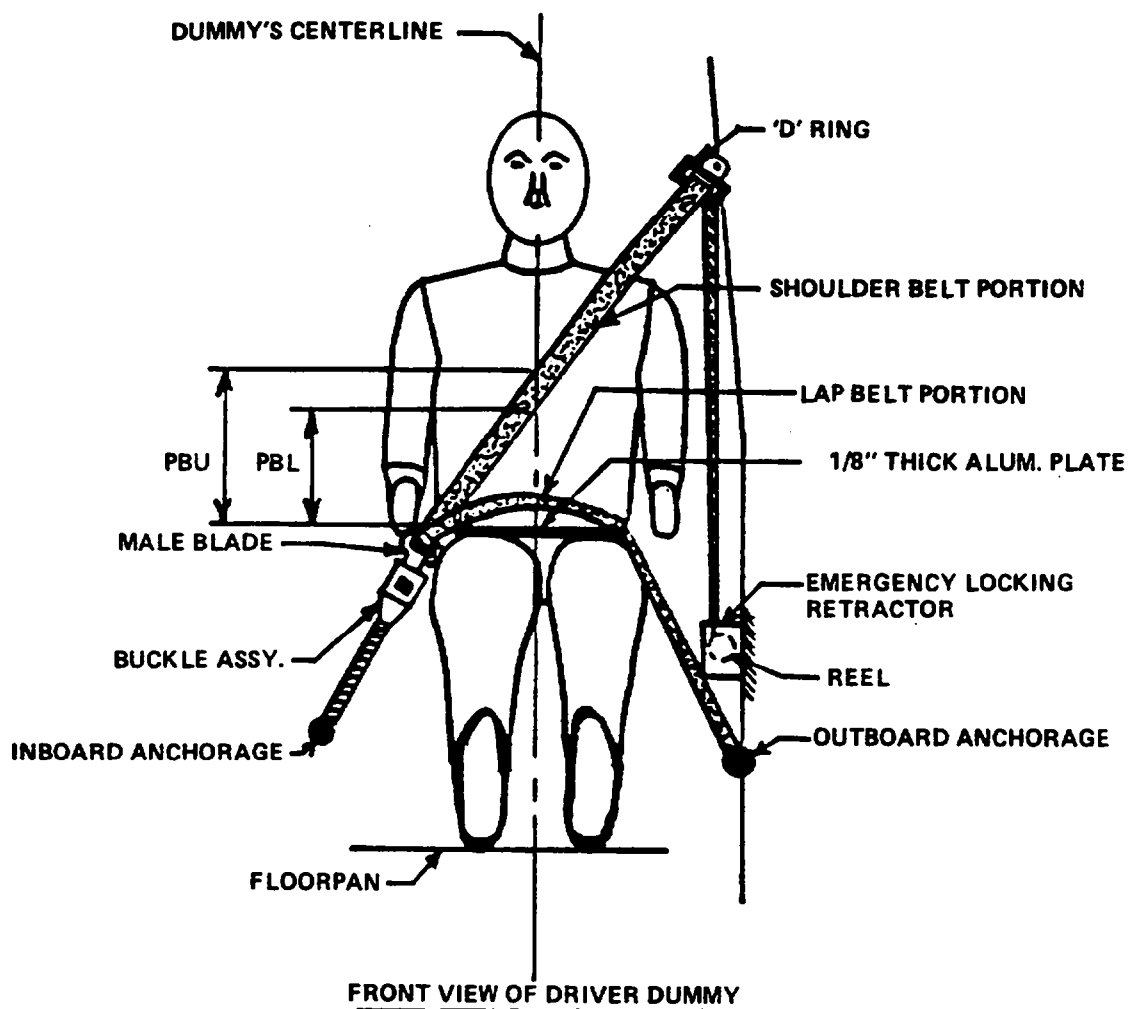
HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD(L/R) = Knee to Dash (Left/Right)
 SA = Seat Back Angle
 TA = Torso Angle

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	4.7
HS	9.7	9.7
AD	4.9	5.2
HD	8.3	8.0
KK	8.8	7.3
HA	14.0	13.3

Figure 3
SEAT BELT POSITIONING DATA



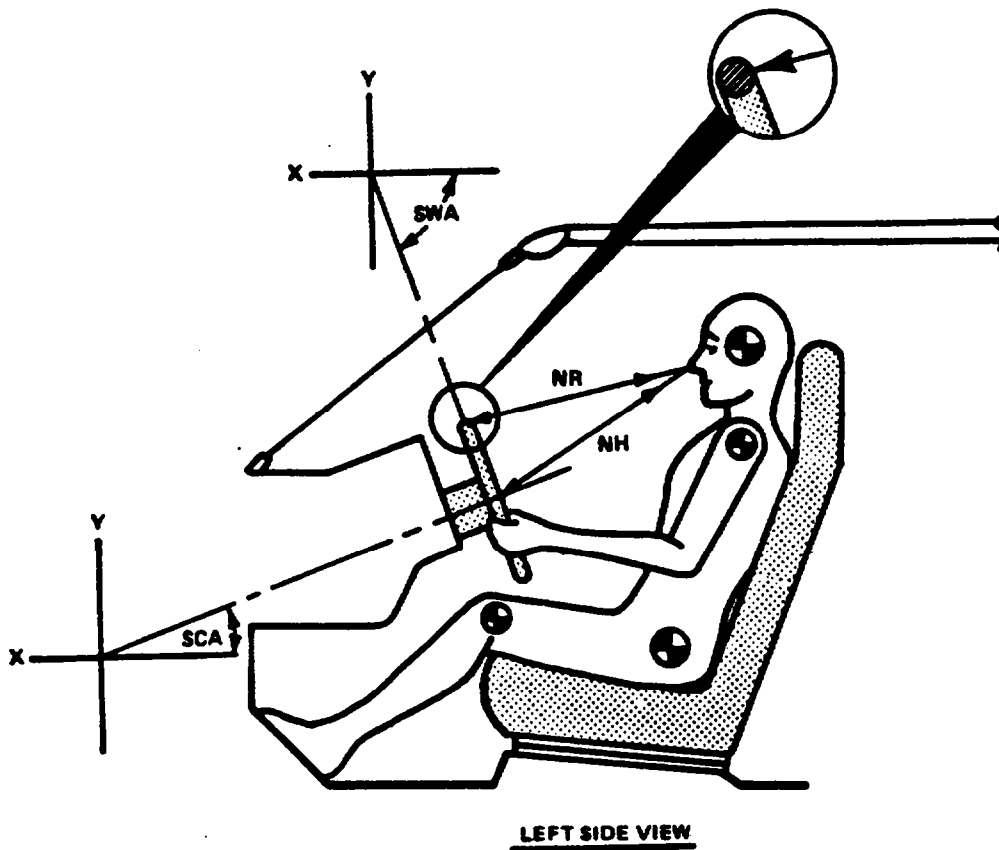
	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	12.5	12.5
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	9.0	9.0
<u>LAP BELT TENSION</u>	-	-
<u>SHOULDER BELT TENSION</u>	-	-

BOTH BELTS HAVE AUTOMATIC RETRACTORS

Table 3
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

<u>BELT LENGTH DATA:</u>	<u>Driver</u>	<u>Passenger</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>45.5"</u>	<u>45.6"</u>
Lap belt length as measured on Part 572 Dummy.	<u>29.0"</u>	<u>28.3"</u>
 <u>SHOULDER BELT SPOOL-OFF DATA:</u>		
As determined mechanically.	<u>1.3"</u>	<u>1.3"</u>
 <u>BELT STRETCH DATA:</u>		
Measured electronically between shoulder belt load cell and the "D" ring.	<u>0.3 in/ft</u>	<u>.9 in/ft</u>
Measured mechanically	<u>0.0</u>	<u>0.0</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	16.5	Inches
<u>NH</u> -- Distance from tip of dummy's nose to center of steering column hub	18.0	Inches
<u>SCA</u> -- Angle of steering column relative to the horizontal X axis	19°	Degrees
<u>SWA</u> -- Angle of steering wheel relative to the horizontal X axis	-71°	Degrees

Figure 5

CAMERA POSITION FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

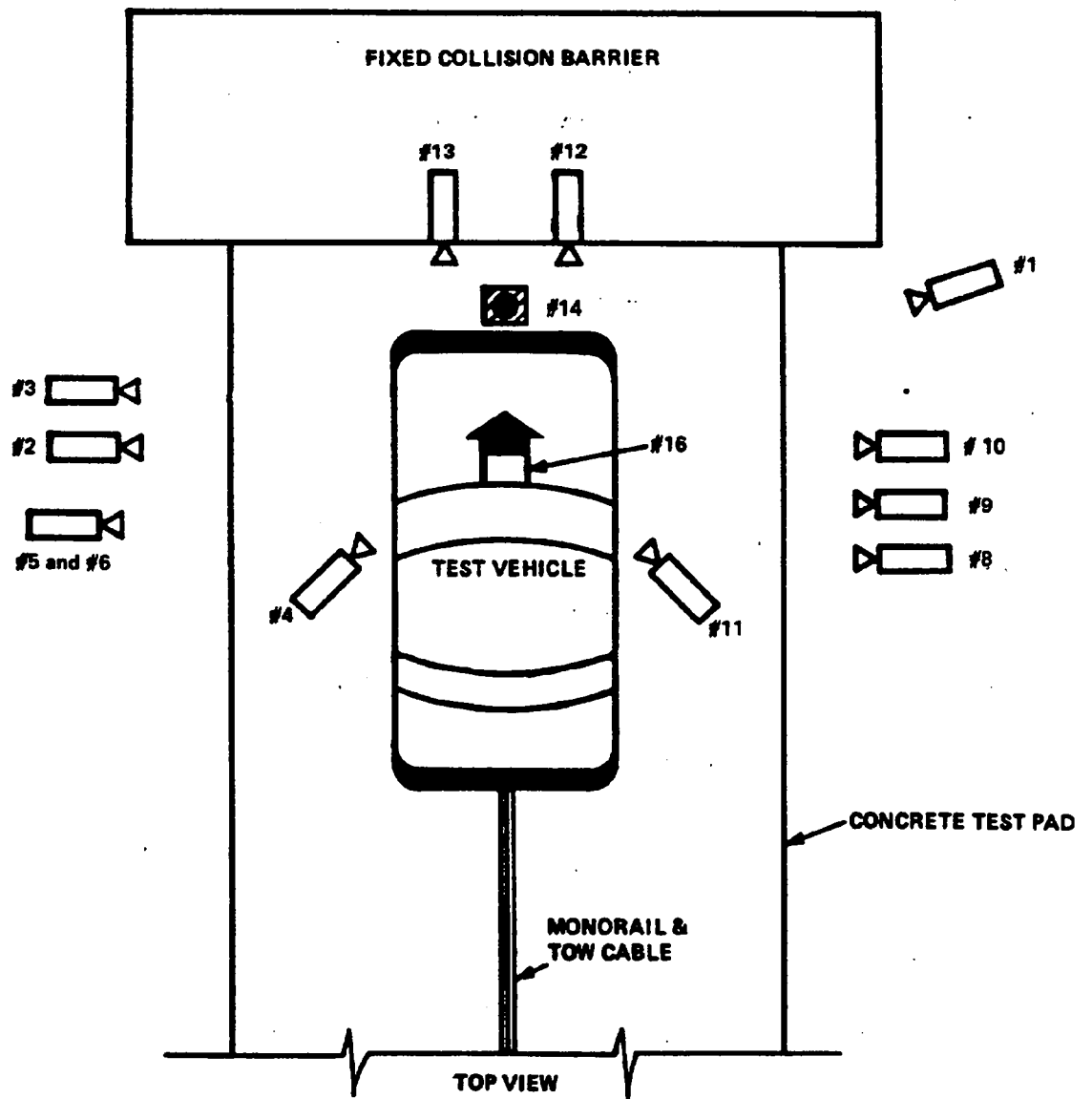


Table 4
HIGH-SPEED CAMERA LOCATIONS

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	237	63	40	-5	219	13	540
3	Left Side View	312	39	41	-4	294	25	540
4	Driver and Interior View	100	128	68.5	-16	82	13	690
5	Steering Column (Bottom)	296	81	46.5	-5	278	25	880
6	Steering Column (Top)	296	81	70	-10	278	25	560
8	Overall Right Side	256	75	42	-3	238	13	See Note
9	Right Side View	320	58	41	-4	302	25	800
10	Right Passenger View	315	80	57	-5	297	35	720
11	Passenger and Interior View	98	128	70	-21	80	25	610
12	Passenger Front View	24	-5	73	-36	-	13	540
13	Driver Front View	24	-5	73	-40	-	13	550
14	Windshield View	0	0	126	-45	-	13	540
16	Pit View of Engine	0	32	-120	90	-	13	920

Test No. MK0201

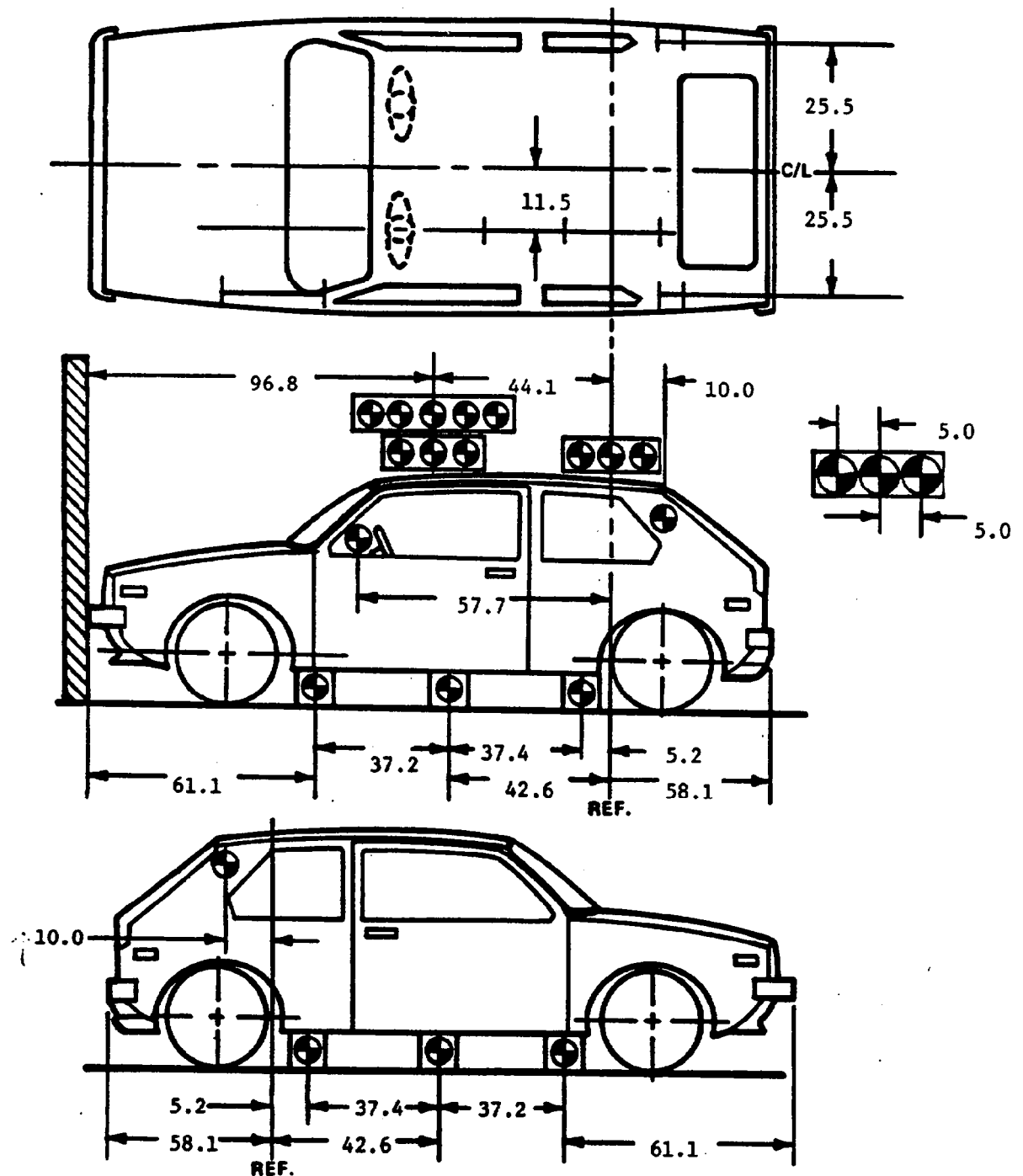
Vehicle 1989 Ford Thunderbird

NOTE: FILM SPEED IS NOT AVAILABLE.

* X = film plane to monorail centerline
 Y = film plane to impact location
 Z = film plan to ground
 ** = referenced to horizontal plane

Figure 6

VEHICLE TARGET LOCATIONS



(DIMENSIONS IN INCHES)

Figure 7

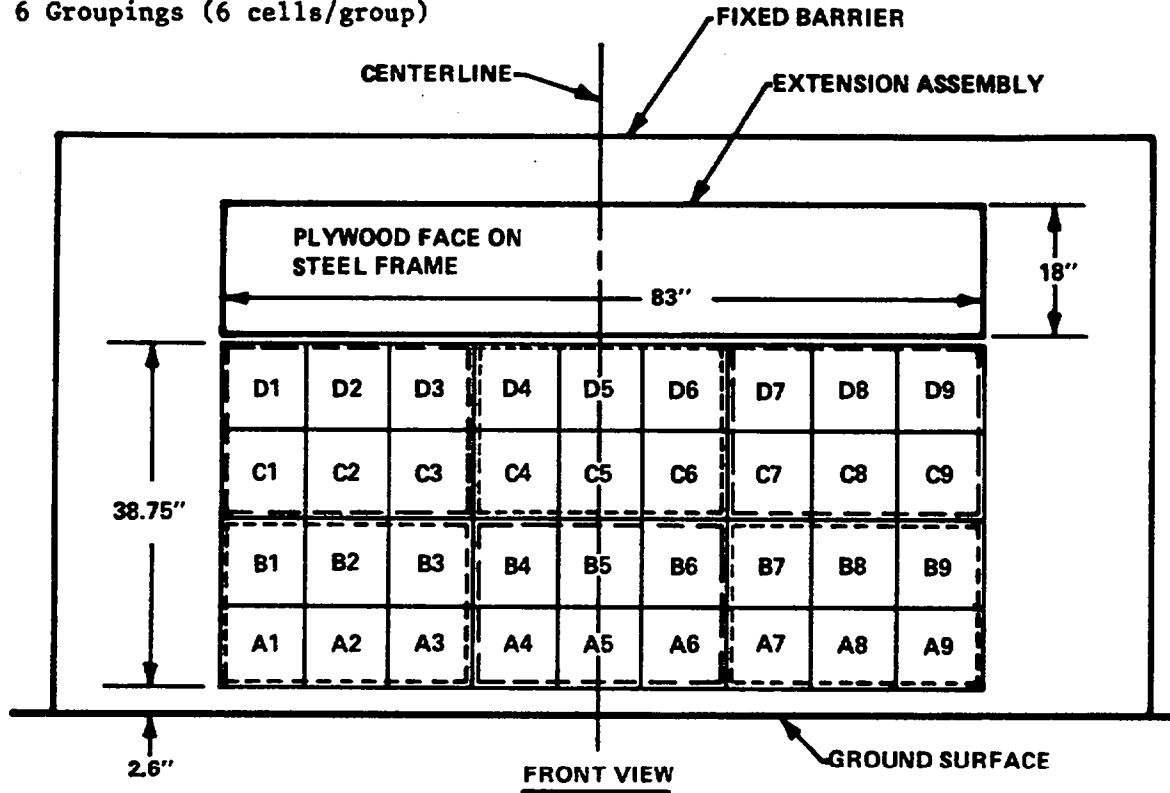
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells

4 Rows

9 Columns

6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

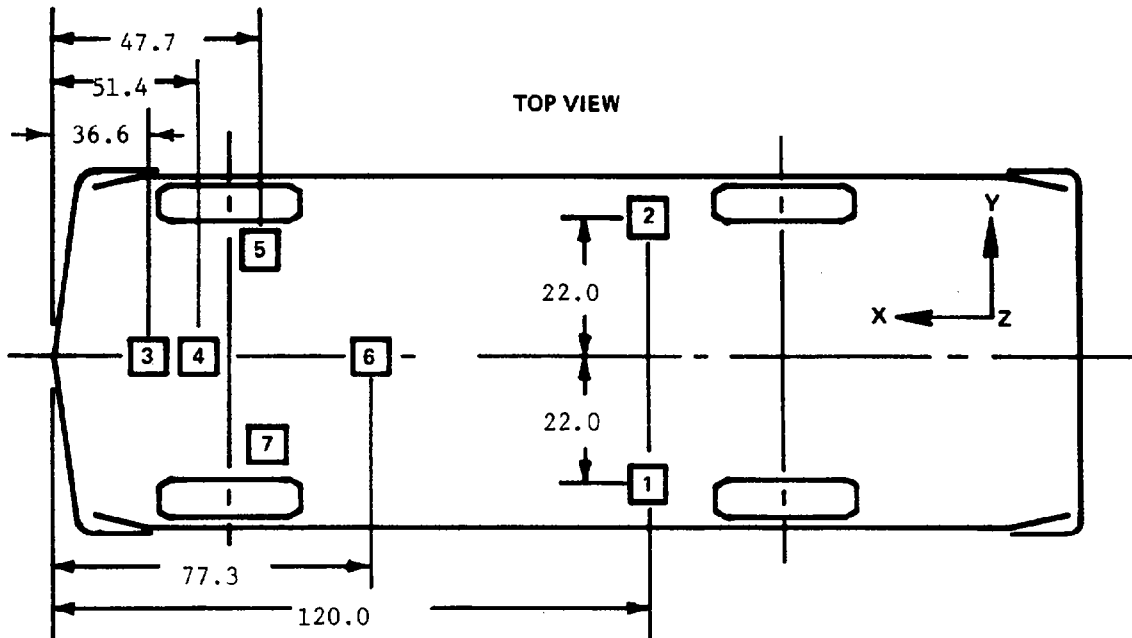
Group 4	Group 5	Group 6
C1 thru D3	C4 thru D6	C7 thru D9
Group 1	Group 2	Group 3
A1 thru B3	A4 thru B6	A7 thru B9

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

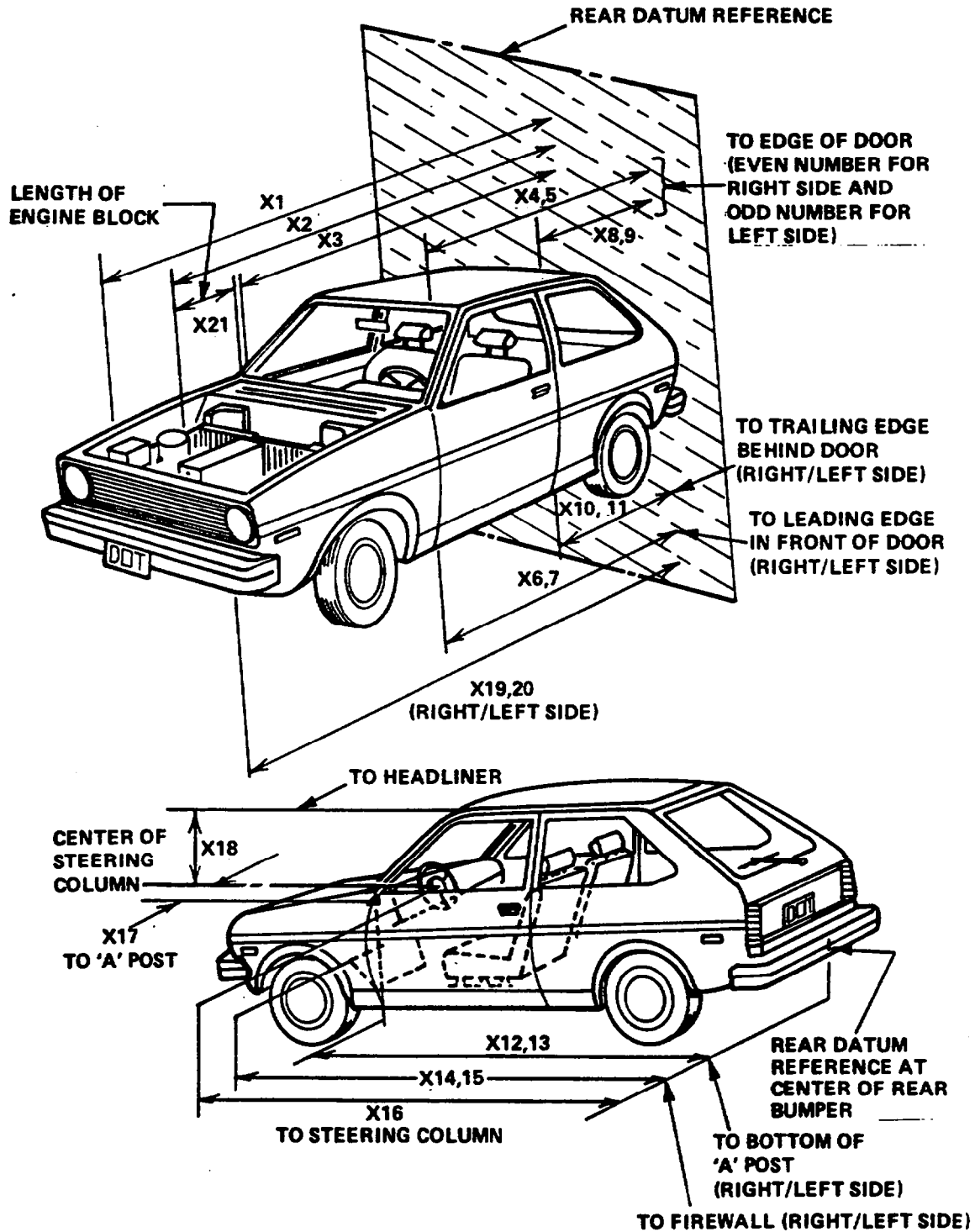


Table 5

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	199.0	177.9	21.1
X2	Rear Surface of Vehicle to Front of Engine	166.2	160.0	6.2
X3	Rear Surface of Vehicle to Firewall	144.7	141.0	3.7
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	136.2	135.3	0.9
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	135.8	135.9	-0.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	134.2	133.3	0.9
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	133.5	133.4	0.1
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	80.0	79.4	0.6
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	80.2	80.0	0.2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	79.9	78.8	1.1
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	79.3	79.0	0.3
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	134.2	132.8	1.4
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	133.3	133.1	0.2
X14	Rear Surface of Vehicle to Firewall, Right Side	144.7	143.2	1.5
X15	Rear Surface of Vehicle to Firewall, Left Side	141.9	142.5	-0.6
X16	Rear Surface of Vehicle to Steering Column	113.6	113.8	-0.2
X17	Center of Steering Column to "A" Post	17.8	16.1	1.7
X18	Center of Steering Column to Headliner	17.0	17.3	-0.3
X19	Rear Surface of Vehicle to Right Side of Front Bumper	194.7	178.0	16.7
X20	Rear Surface of Vehicle to Left Side of Front Bumper	194.7	178.5	16.2
X21	Length of Engine Block	21.0	21.0	0.0

Appendix A
PHOTOGRAPHS

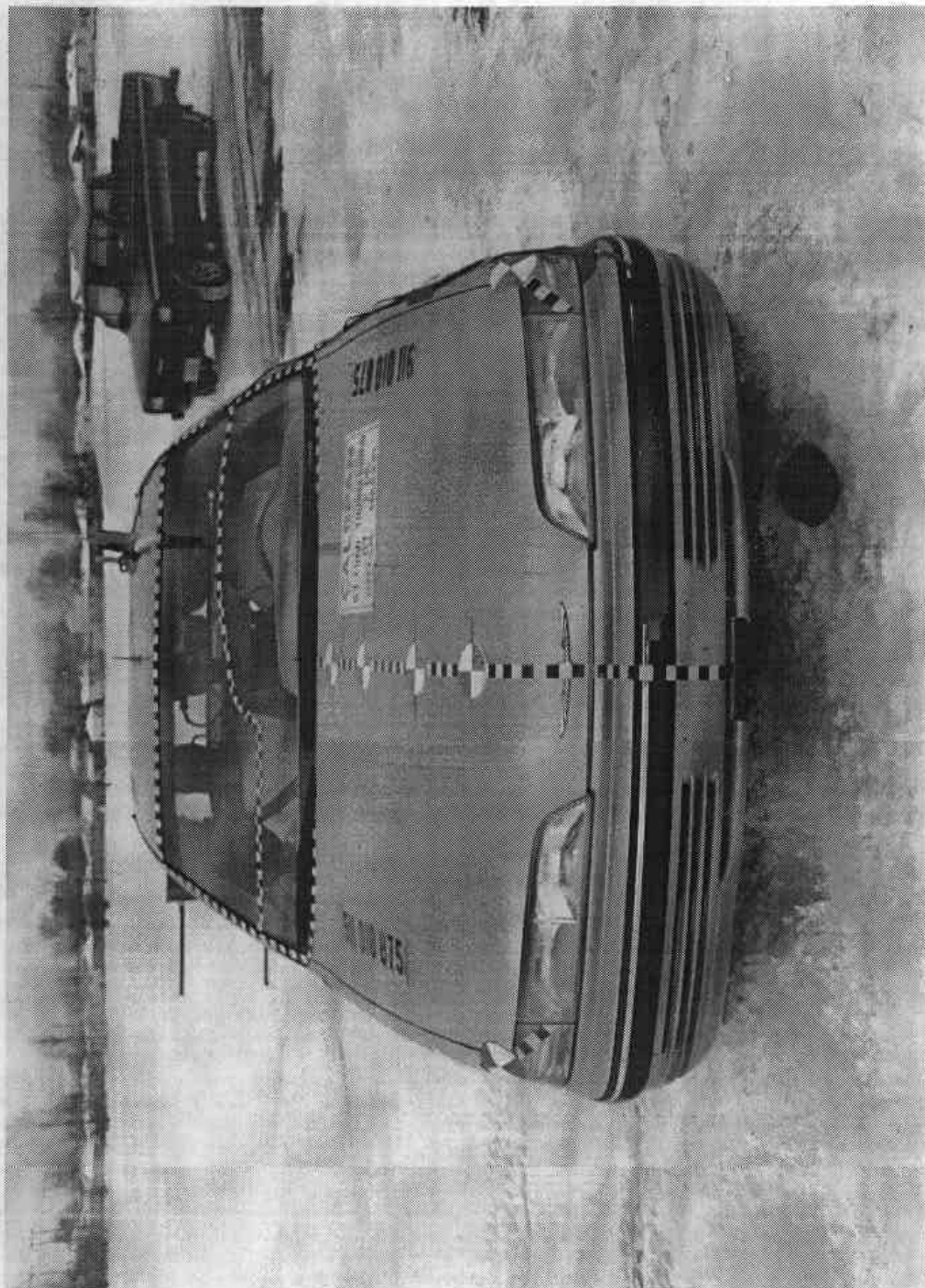


Figure A-1 PRE-TEST FRONT VIEW

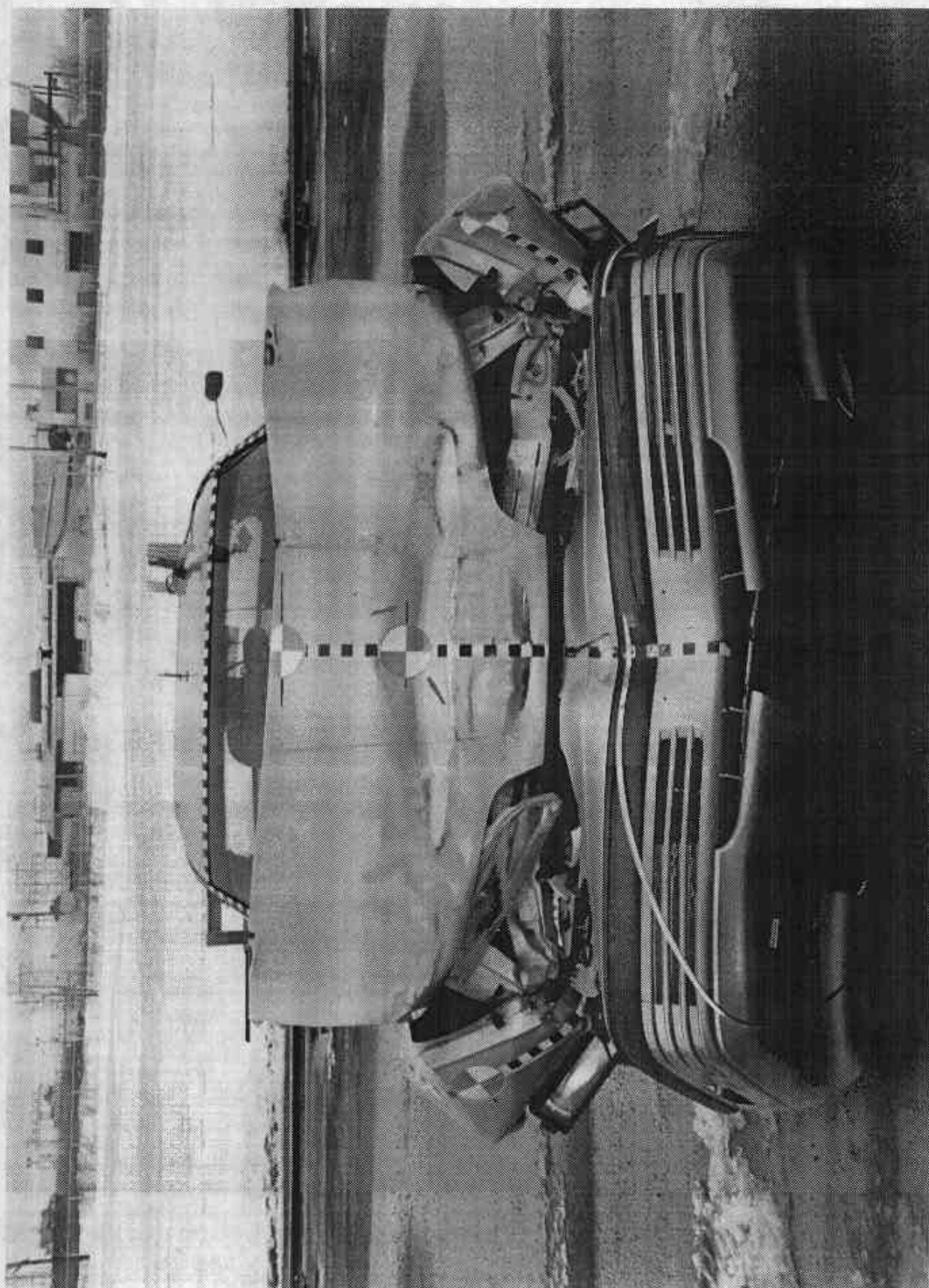


Figure A-2 POST-TEST FRONT VIEW

A-3

7731-1

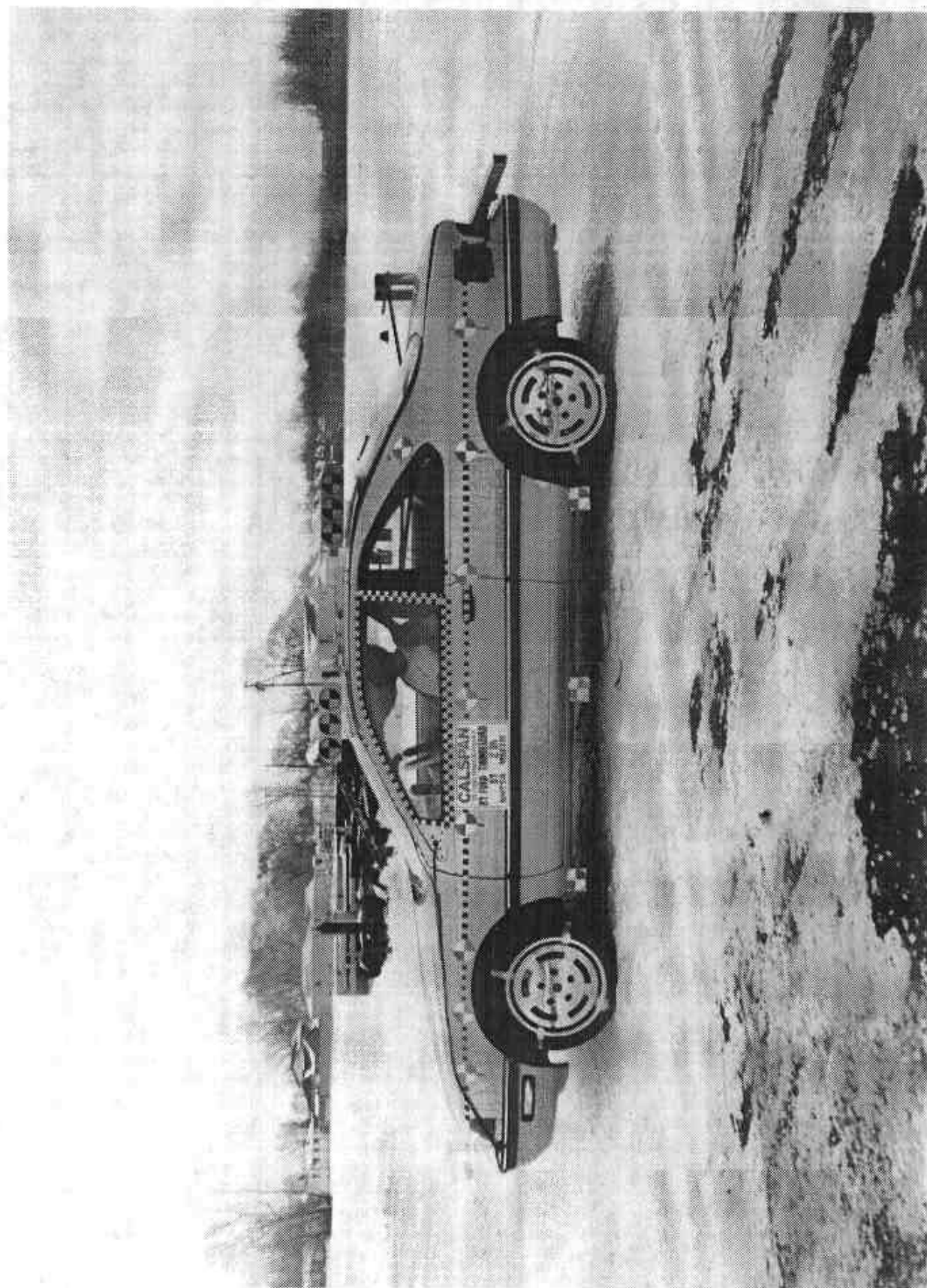


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-4

7731-1

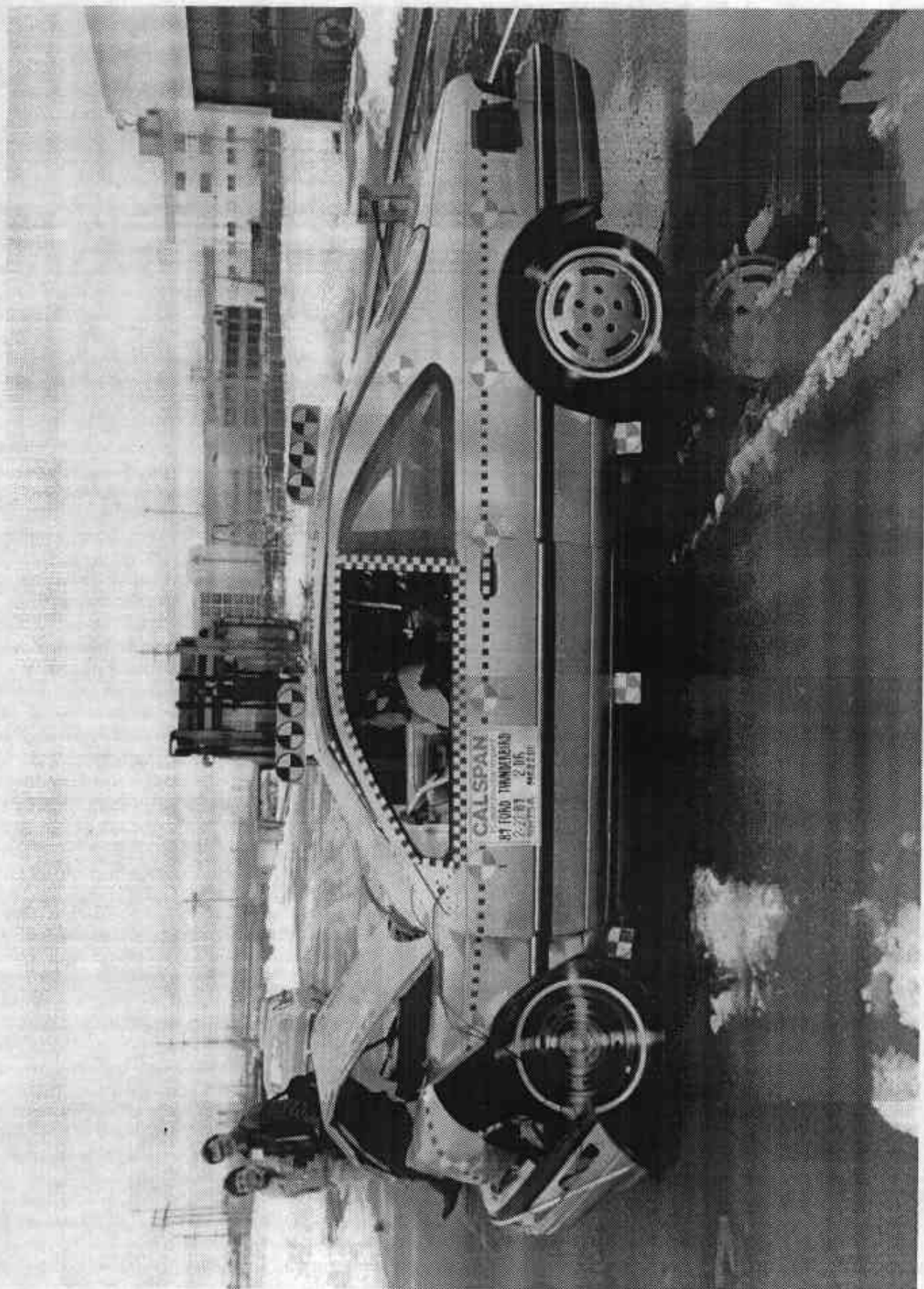


Figure A-4 POST-TEST LEFT SIDE VIEW

A-5

7731-1

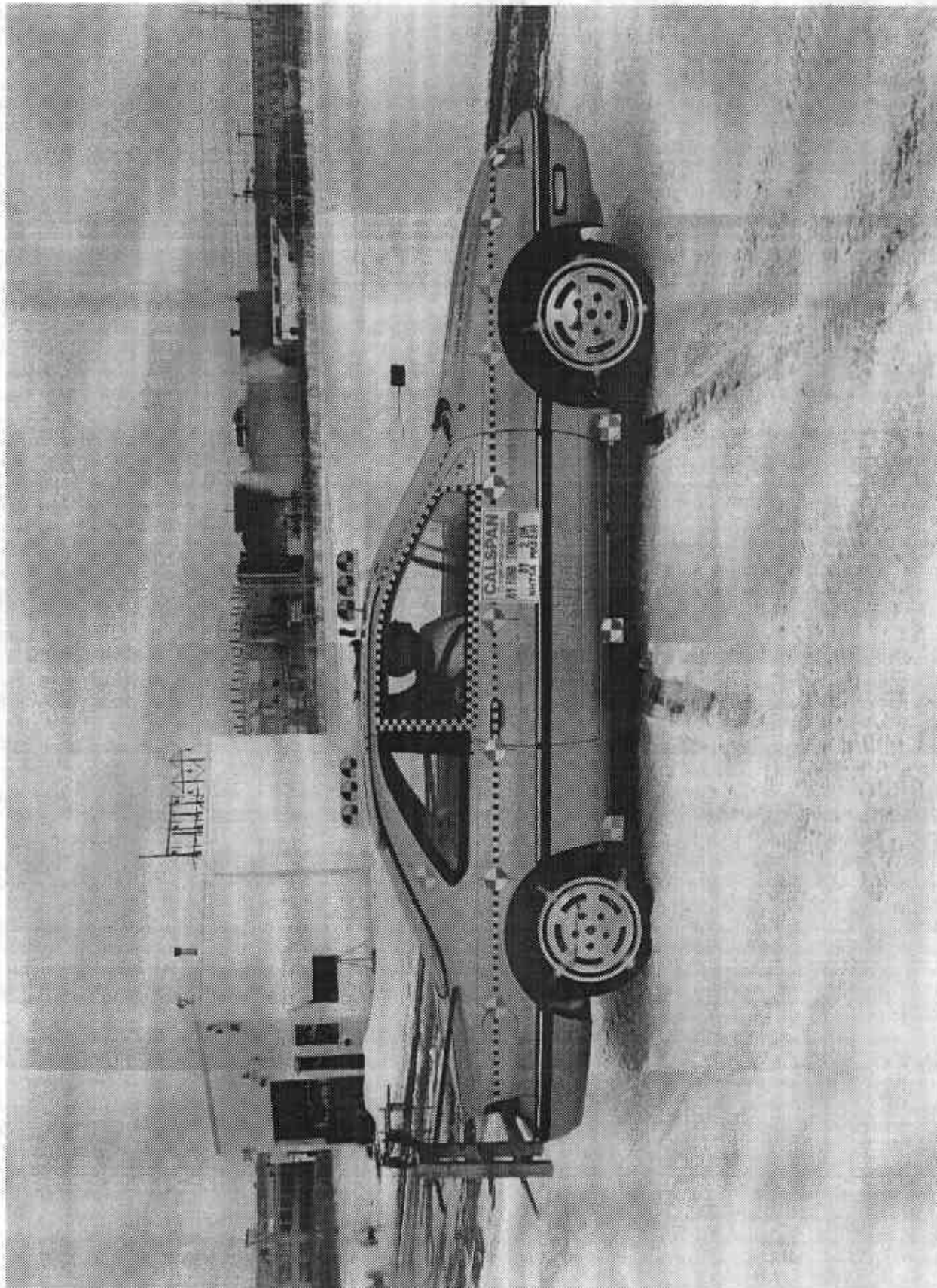


Figure A-5 PRE-TEST RIGHT SIDE VIEW

A-6

7731-1

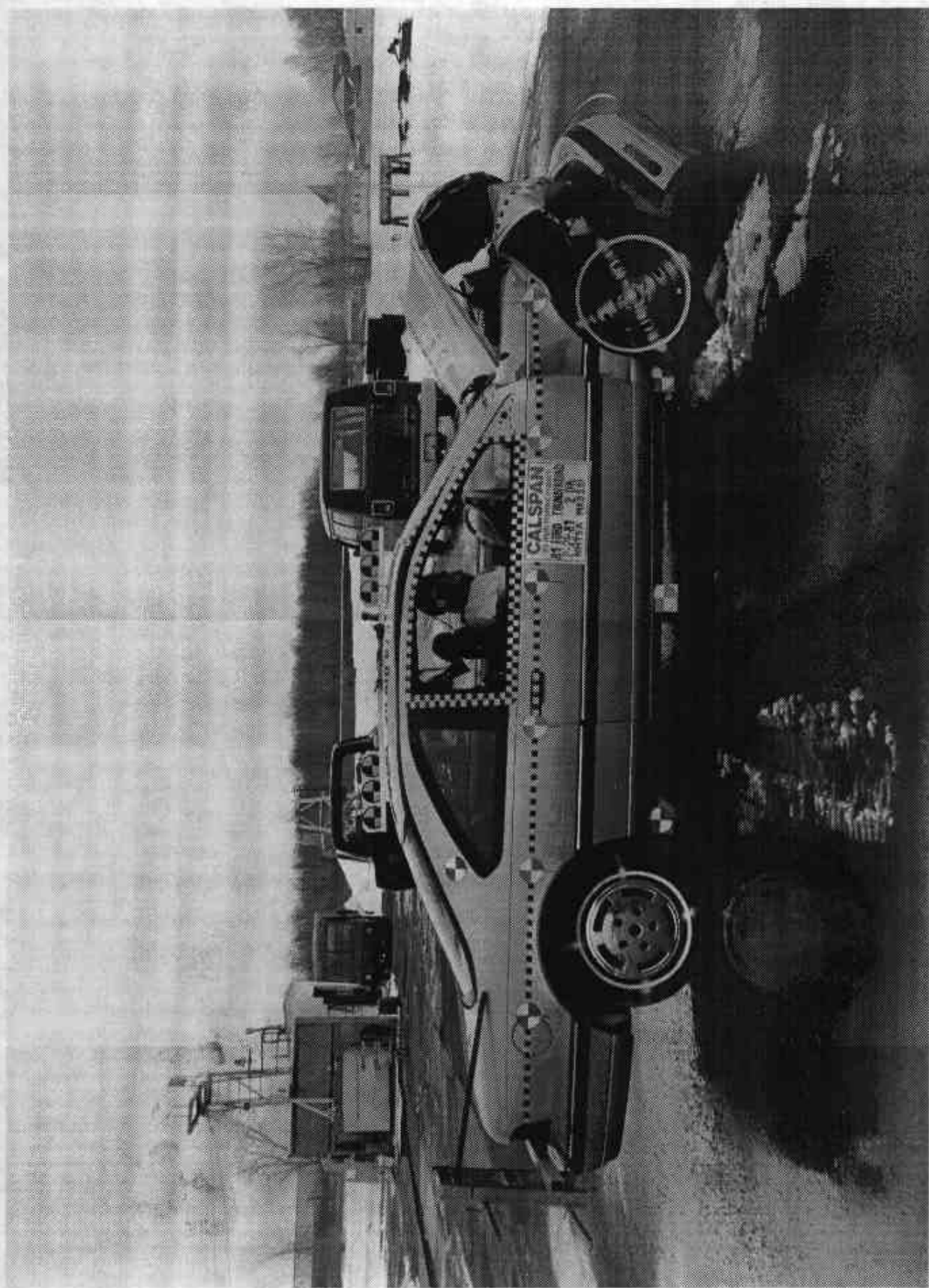


Figure A-6 POST-TEST RIGHT SIDE VIEW

A-7

7731-1



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



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

A-9

7731-1



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

A-10

7731-1



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

A-11

7731-1

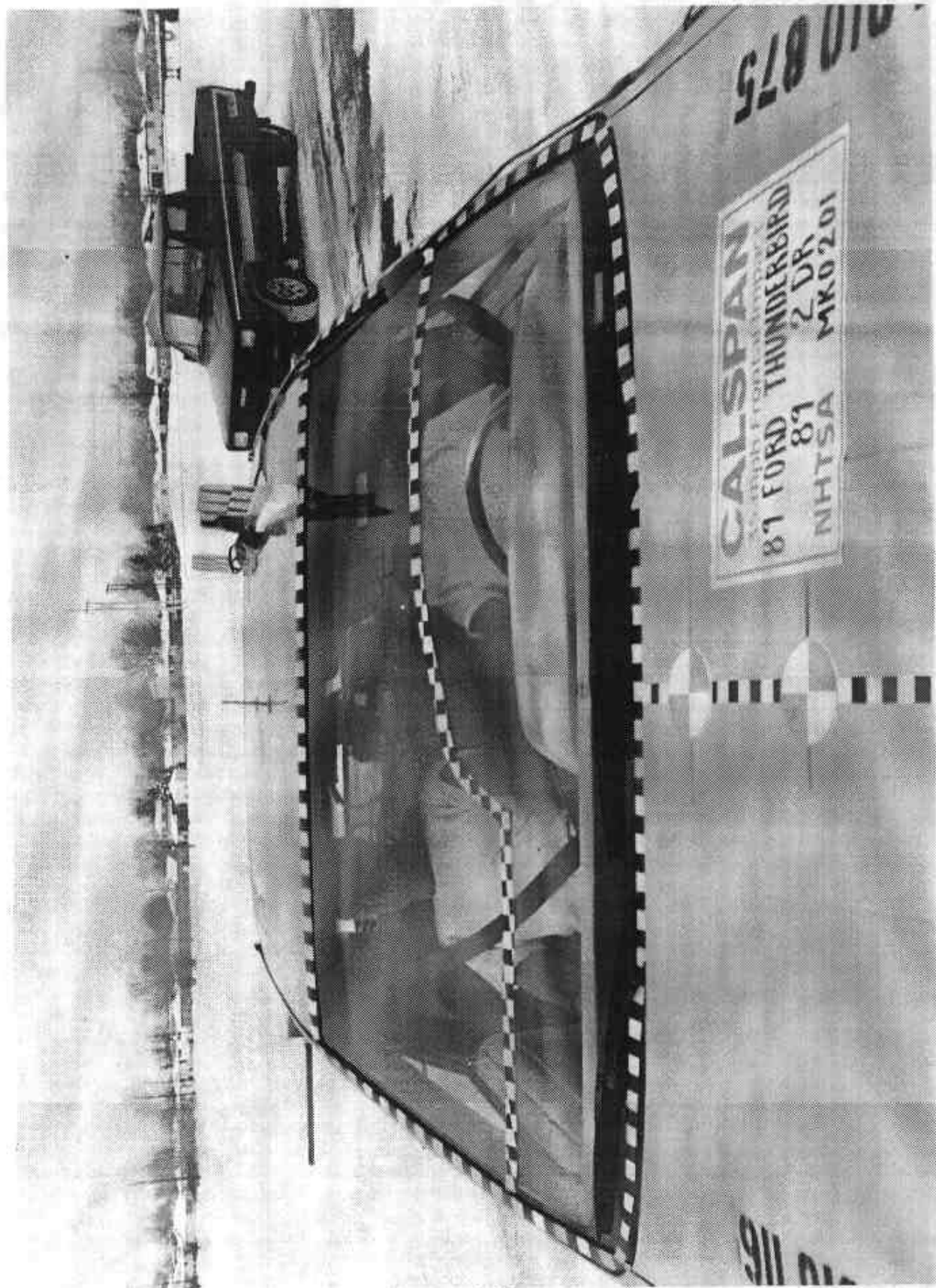


Figure A-11 PRE-TEST WINDSHIELD VIEW

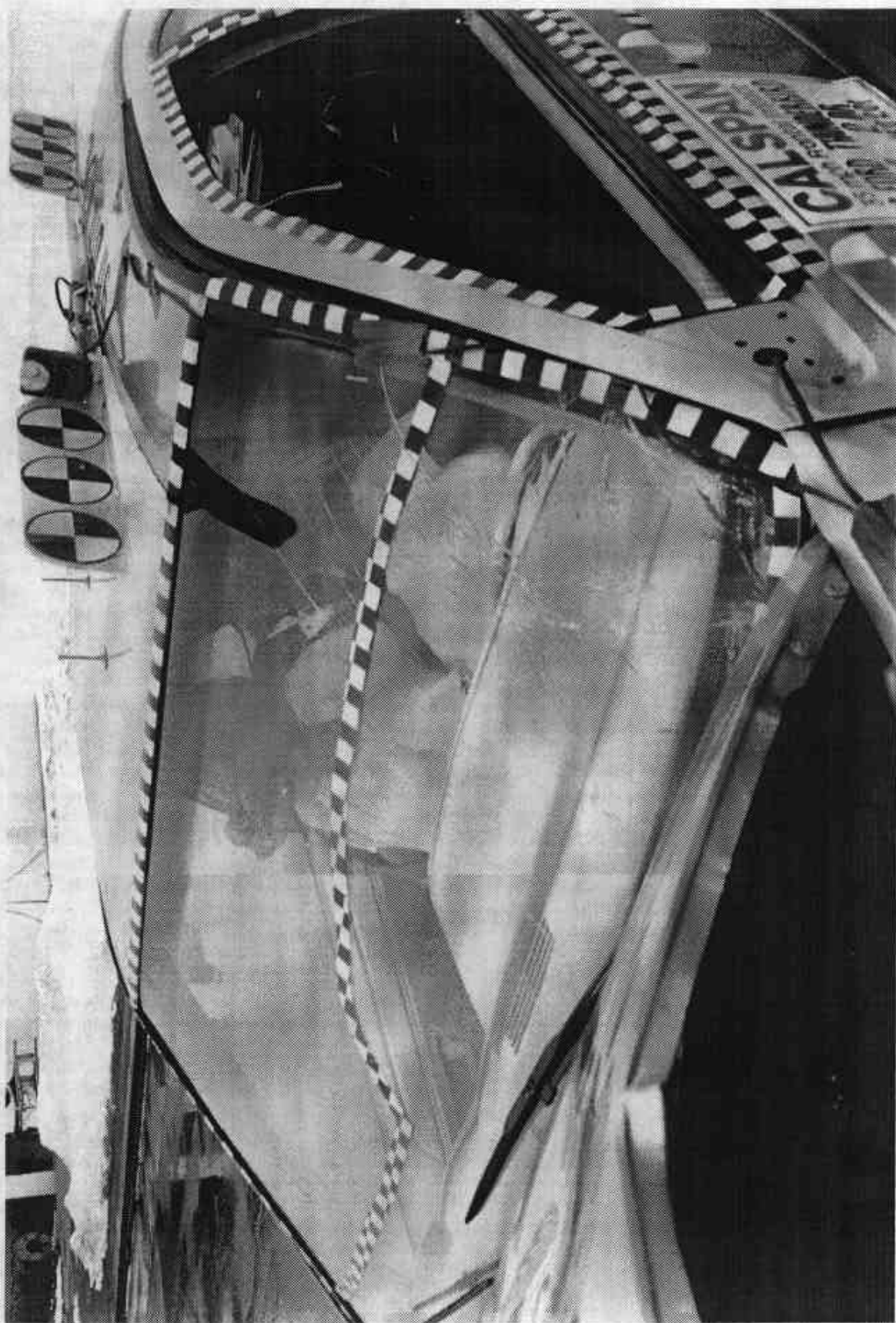


Figure A-12 POST-TEST WINDSHIELD VIEW

A-13

7731-1

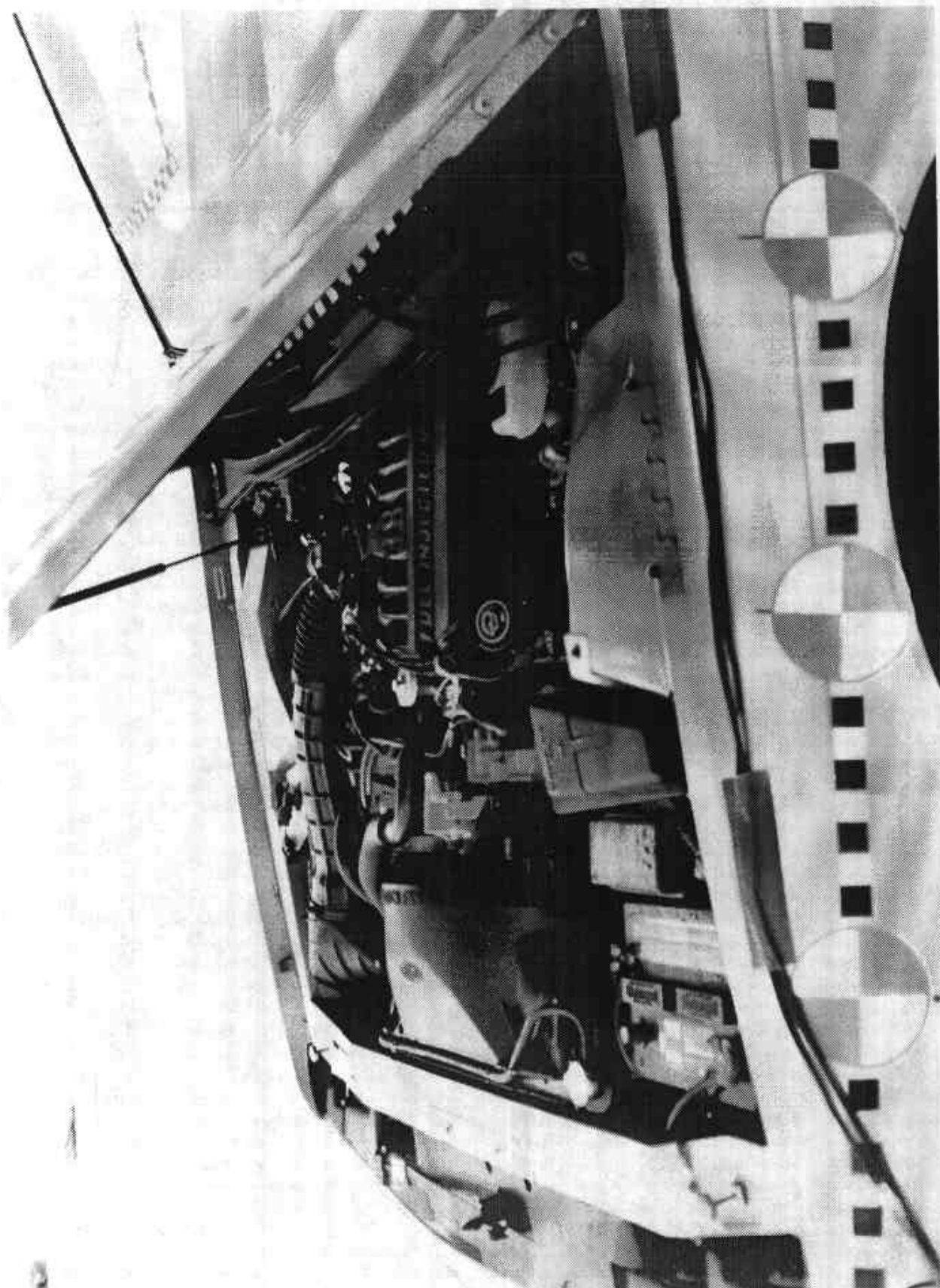


Figure A-13 PRE-TEST ENGINE COMPARTMENT VIEW

A-14

7731-1

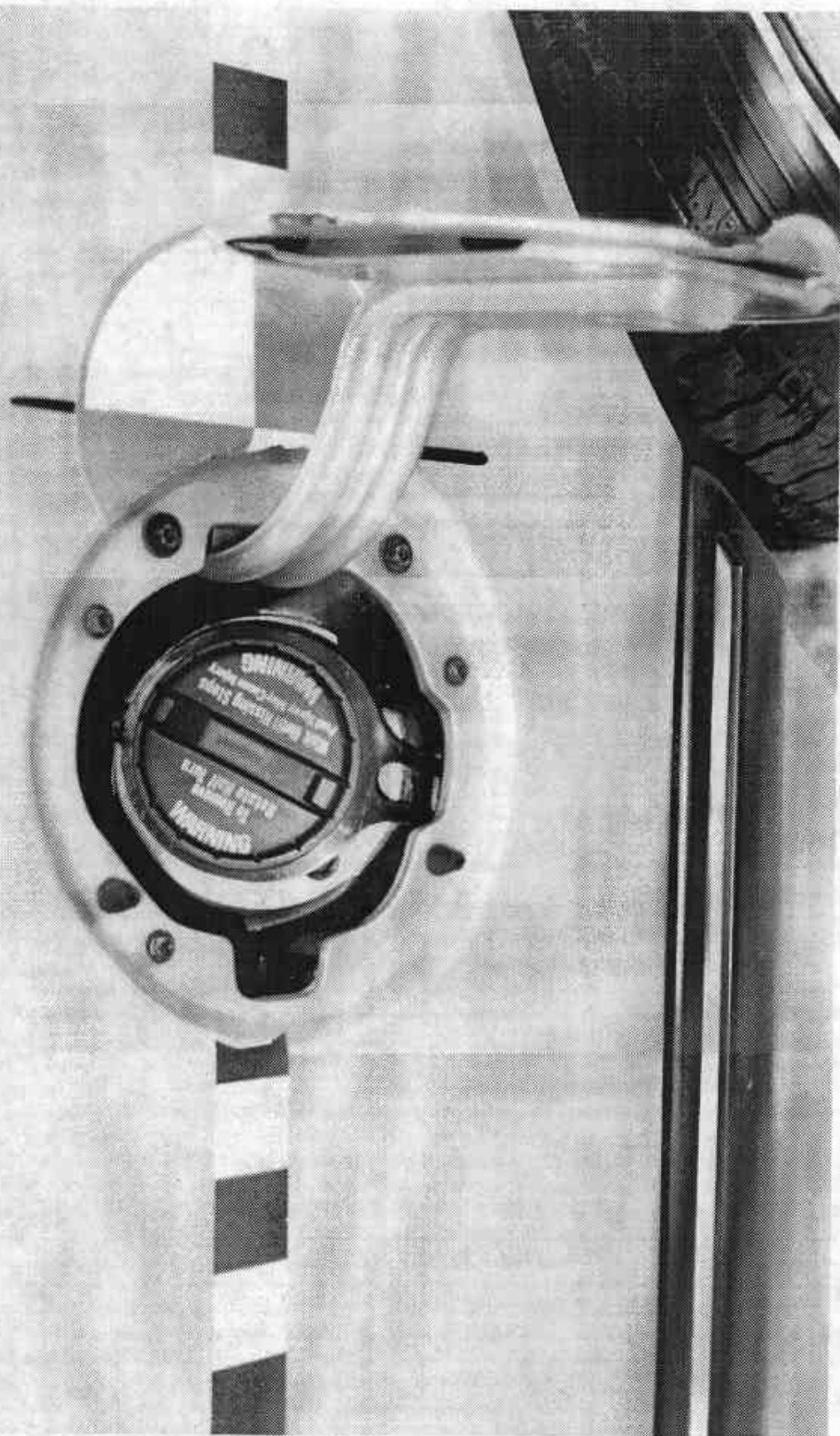


Figure A-14 PRE-TEST FUEL CAP VIEW

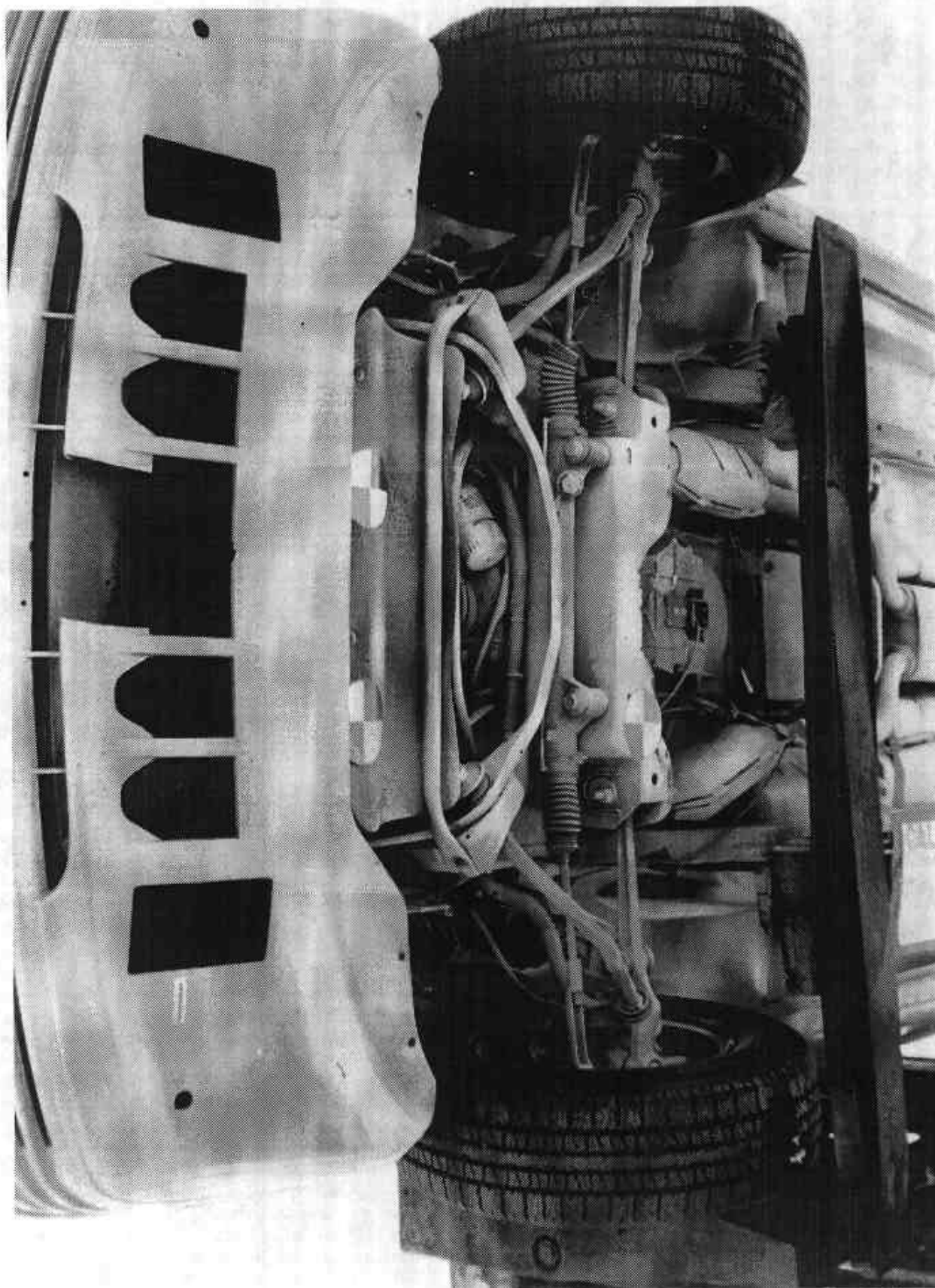


Figure A-15 PRE-TEST FRONT UNDERBODY VIEW

A-16

7731-1

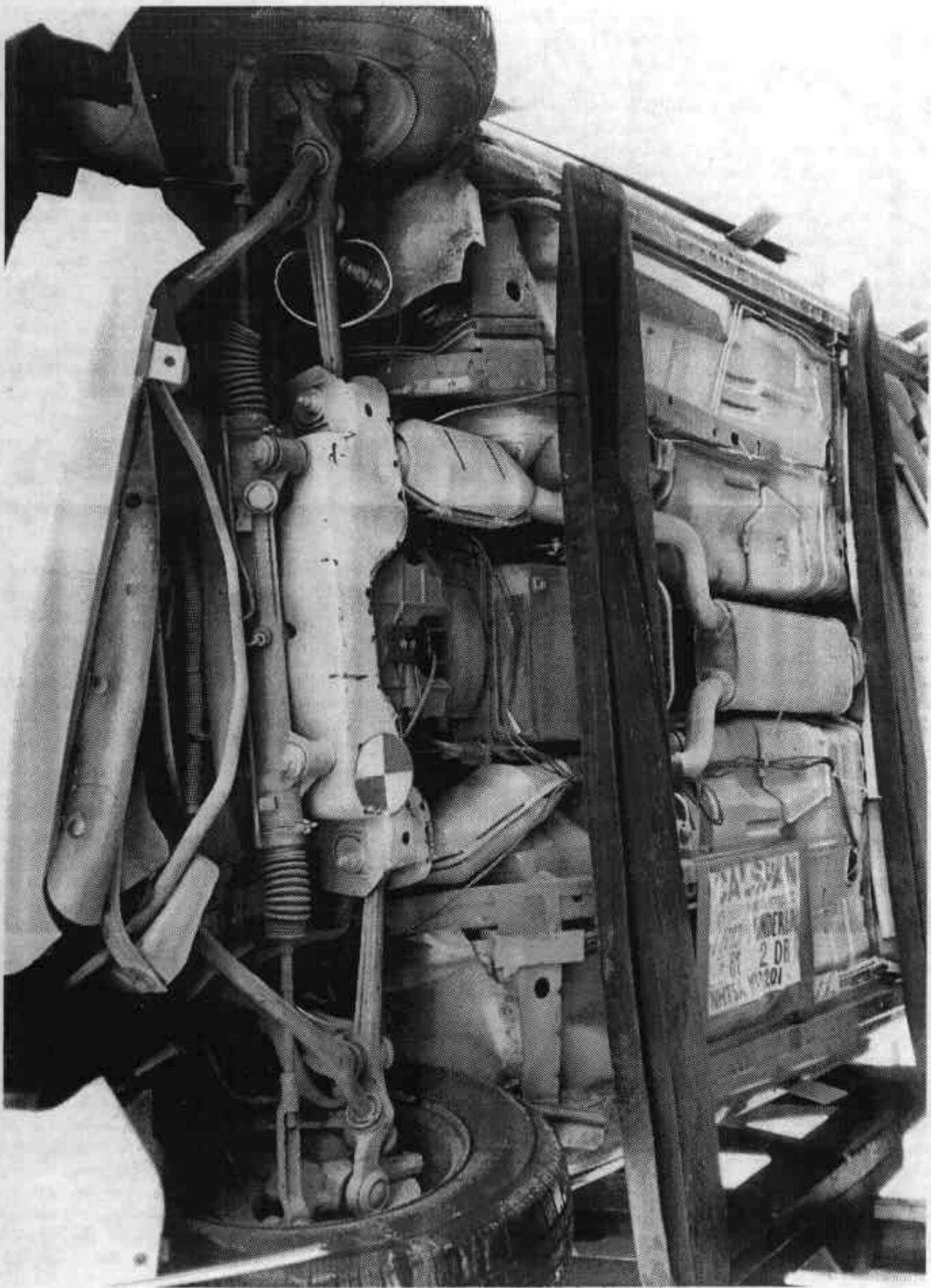


Figure A-16 POST-TEST FRONT UNDERBODY VIEW

A-17

7731-1

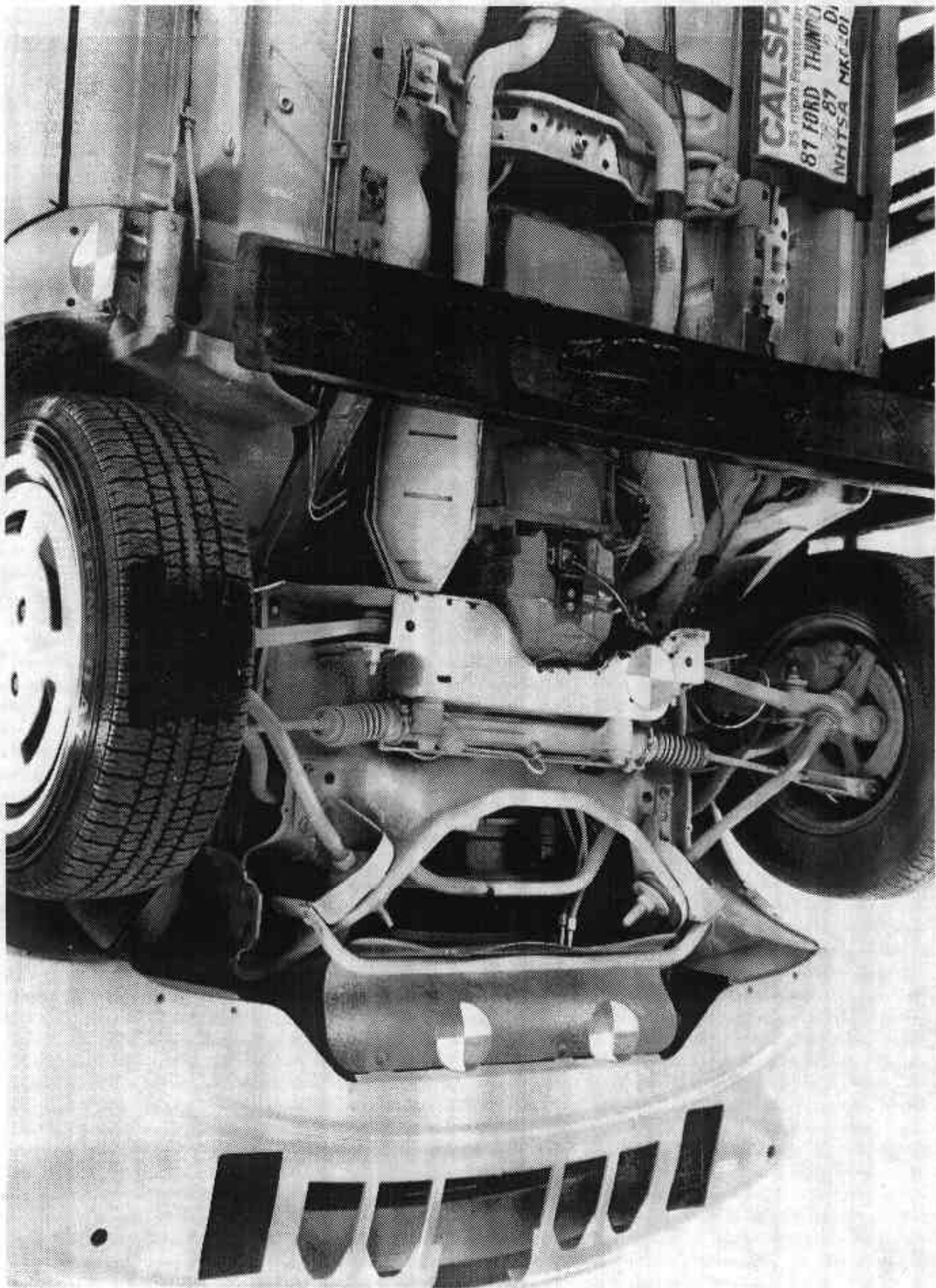
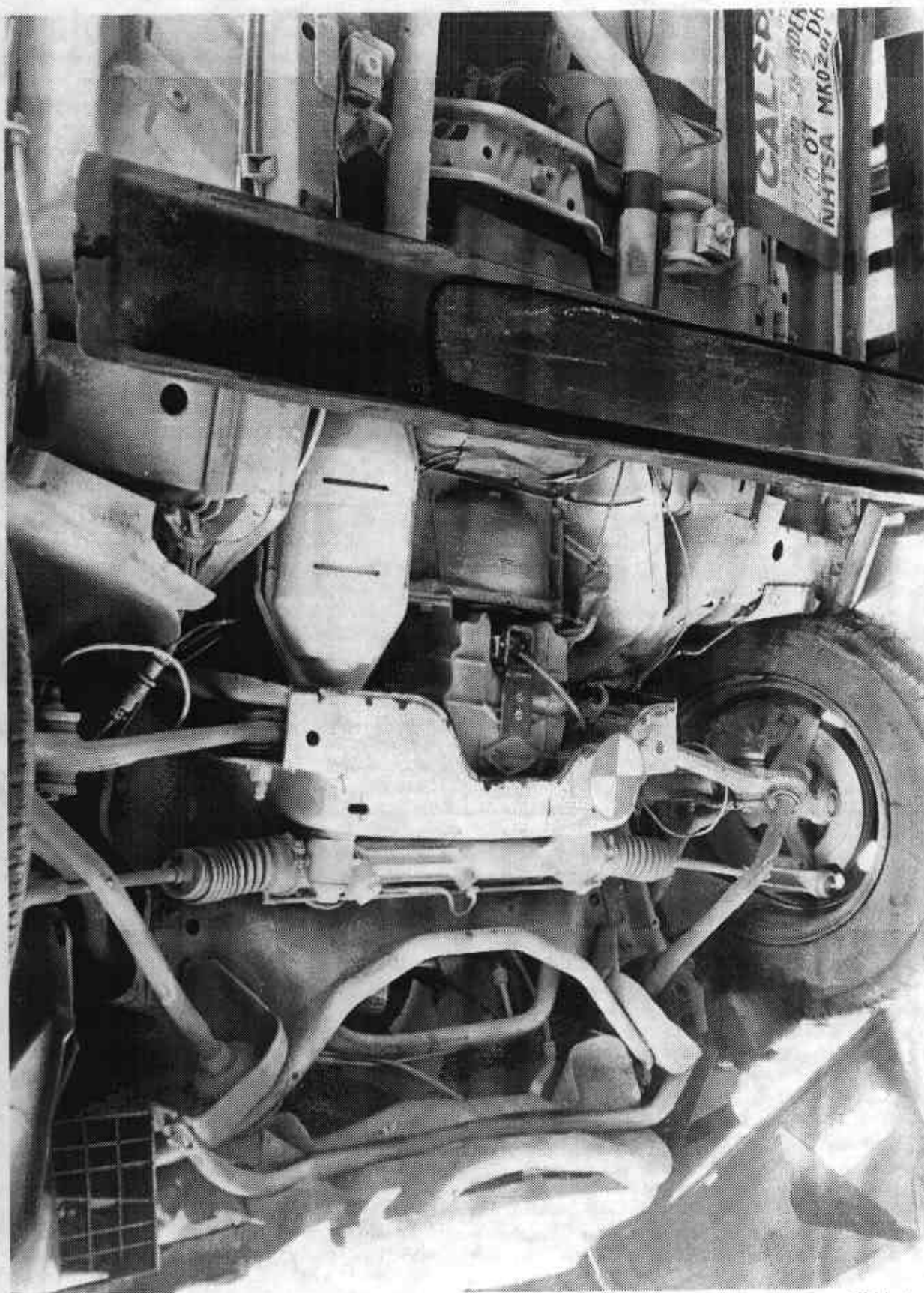


Figure A-17 PRE-TEST FRONT-SIDE UNDERBODY VIEW



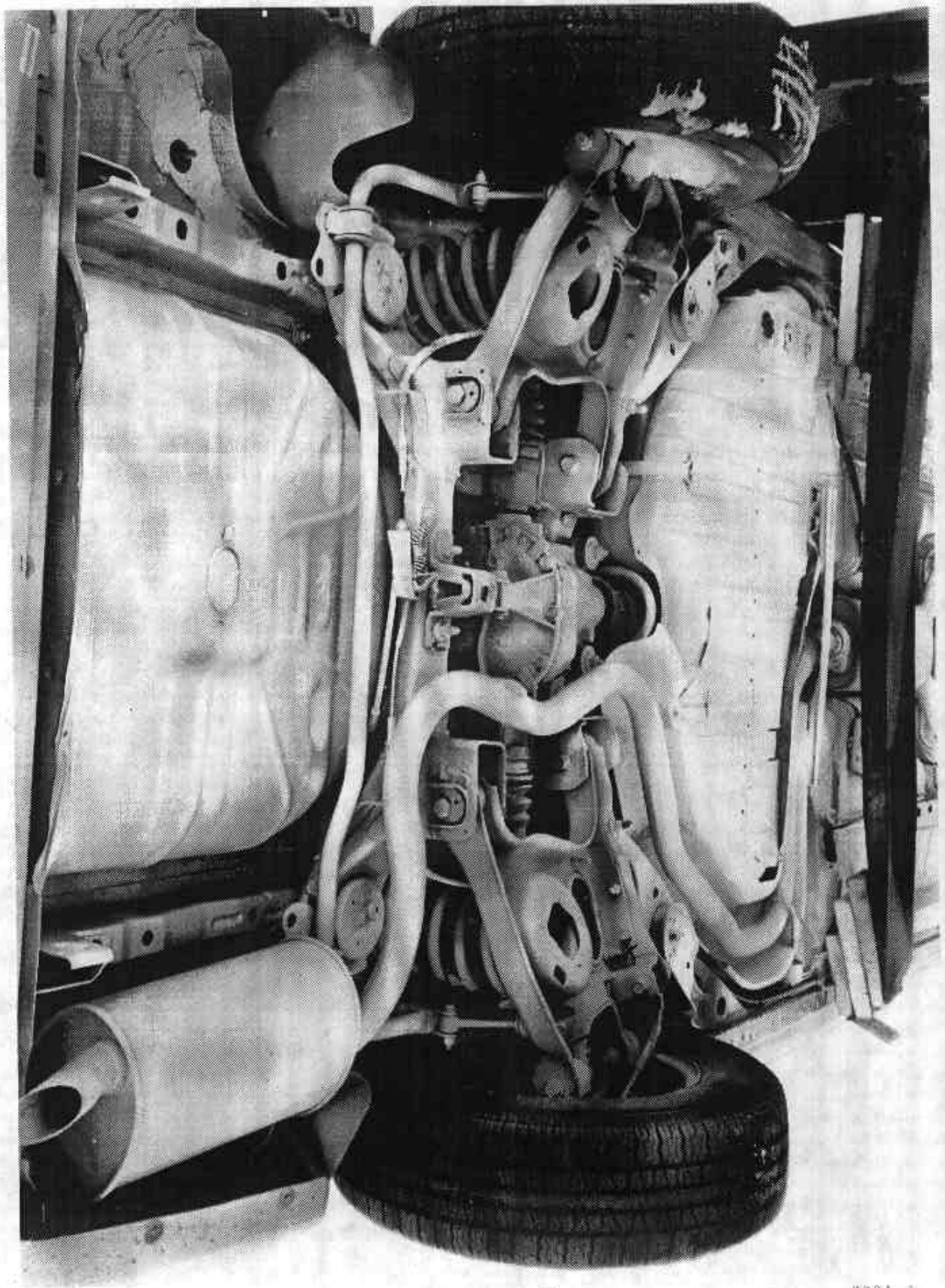


Figure A-19 PRE-TEST REAR UNDERBODY VIEW

A-20

7731-1

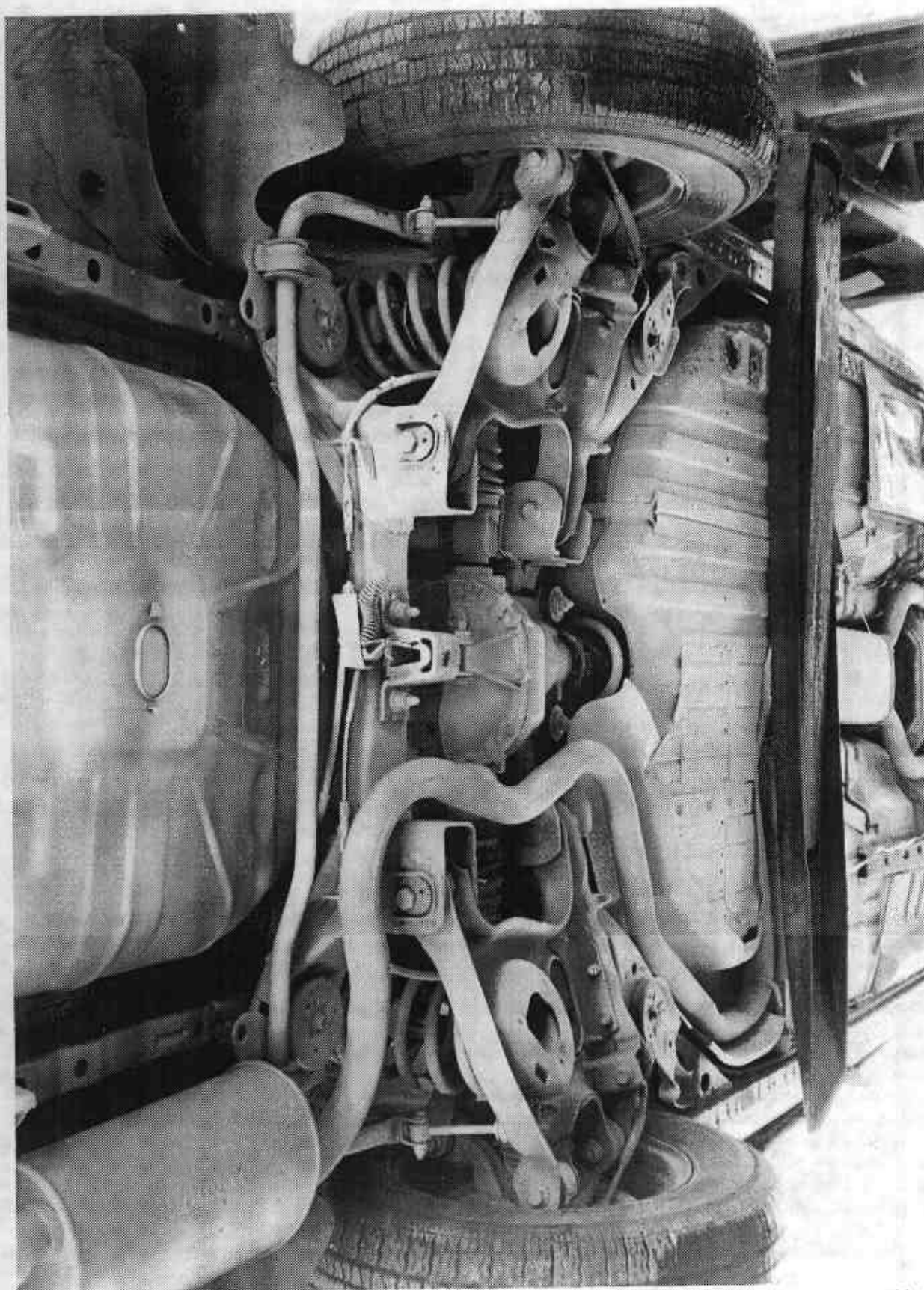


Figure A-20 POST-TEST REAR UNDERBODY VIEW

A-21

7731-1

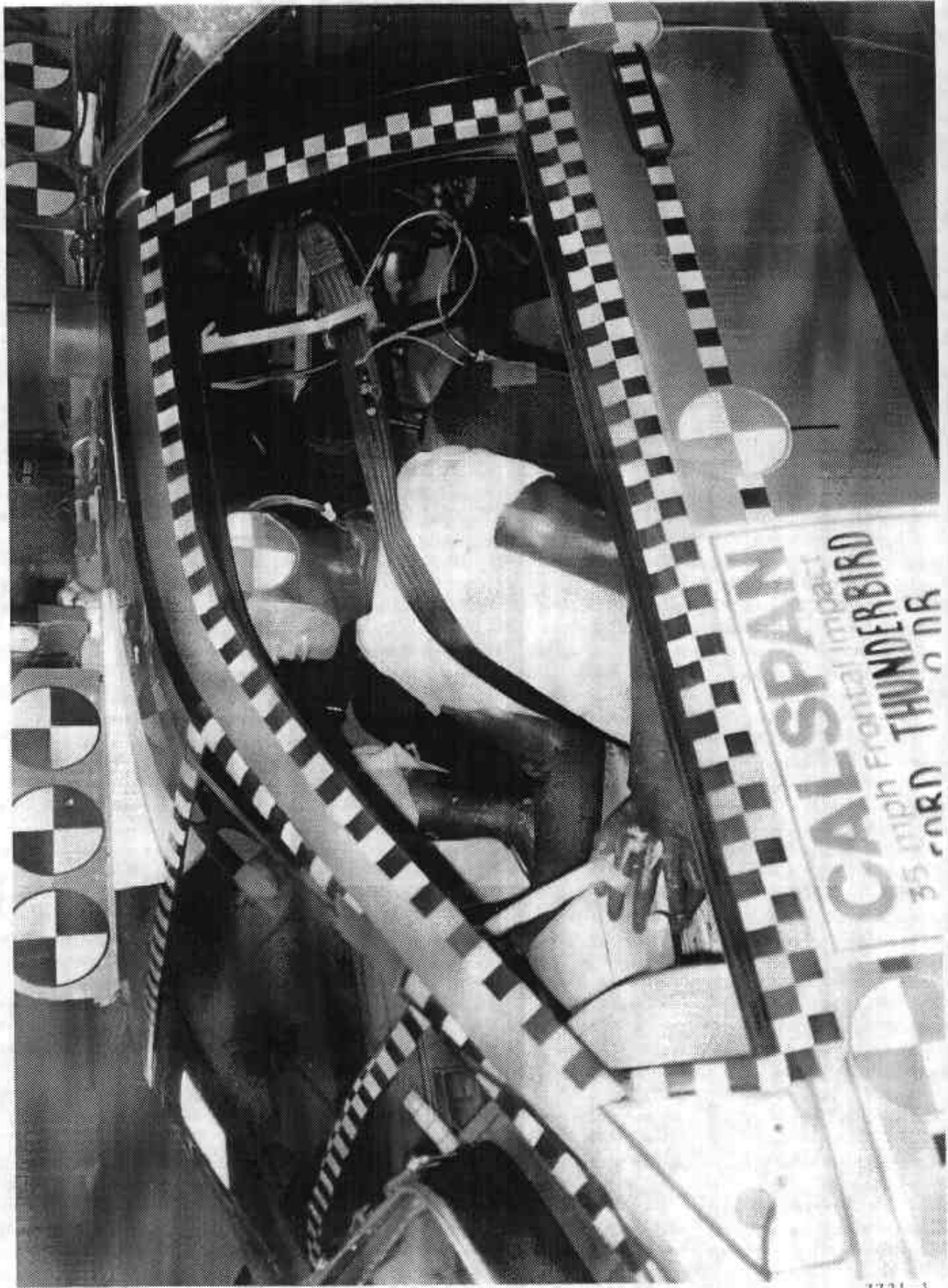


Figure A-21 PRE-TEST DRIVER POSITION VIEW

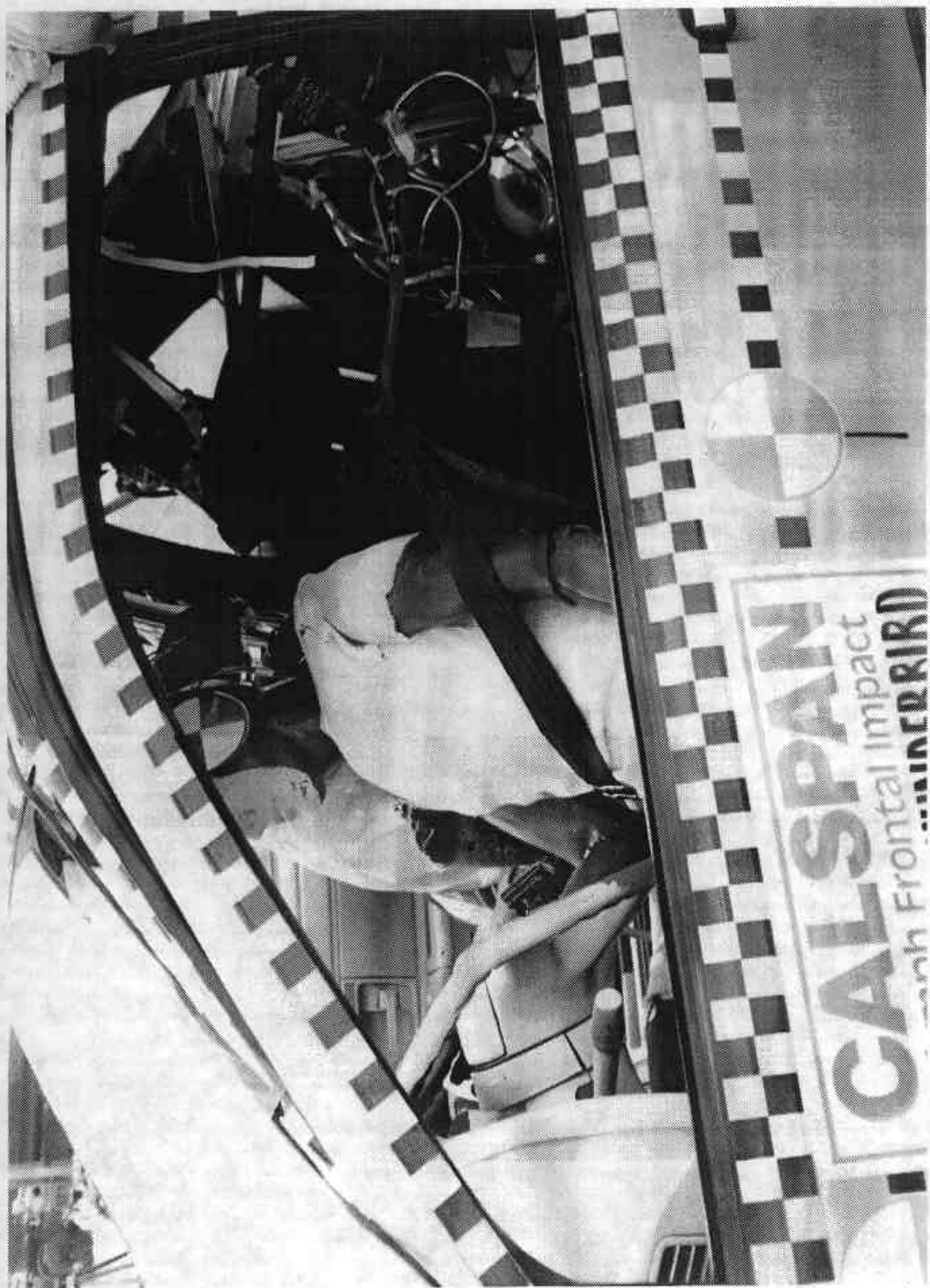


Figure A-22 POST-TEST DRIVER POSITION VIEW



Figure A-23 PRE-TEST PASSENGER POSITION VIEW

A-24

7731-1



Figure A-24 POST-TEST PASSENGER POSITION VIEW

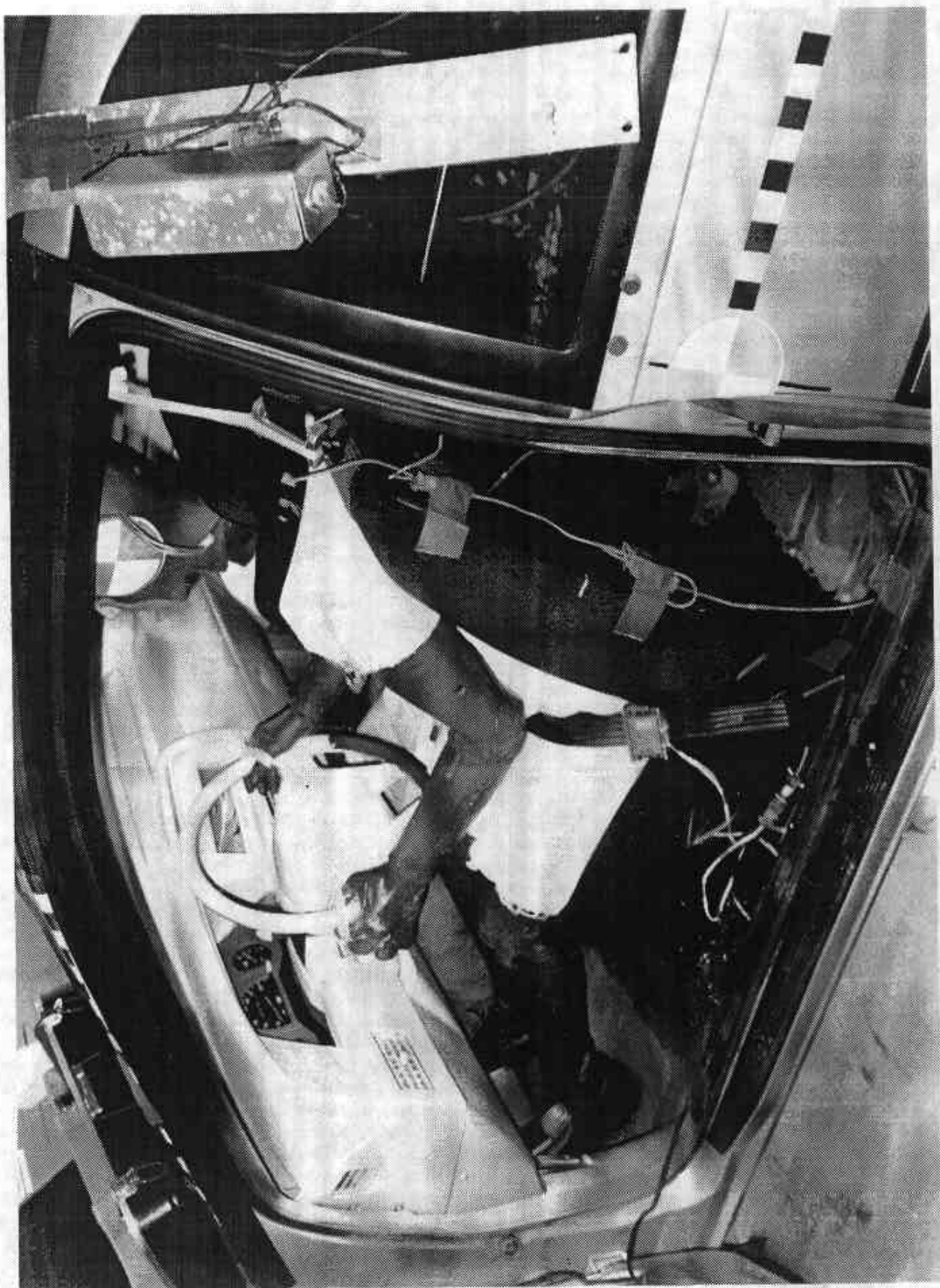


Figure A-25 PRE-TEST DRIVER AND INTERIOR VIEW

A-26

7731-1



Figure A-26 POST-TEST DRIVER AND INTERIOR VIEW



Figure A-27 PRE-TEST PASSENGER AND INTERIOR VIEW



Figure A-28 POST-TEST PASSENGER AND INTERIOR VIEW

Appendix B

VEHICLE, FRONTAL LOAD CELL BARRIER AND DUMMY RESPONSE DATA

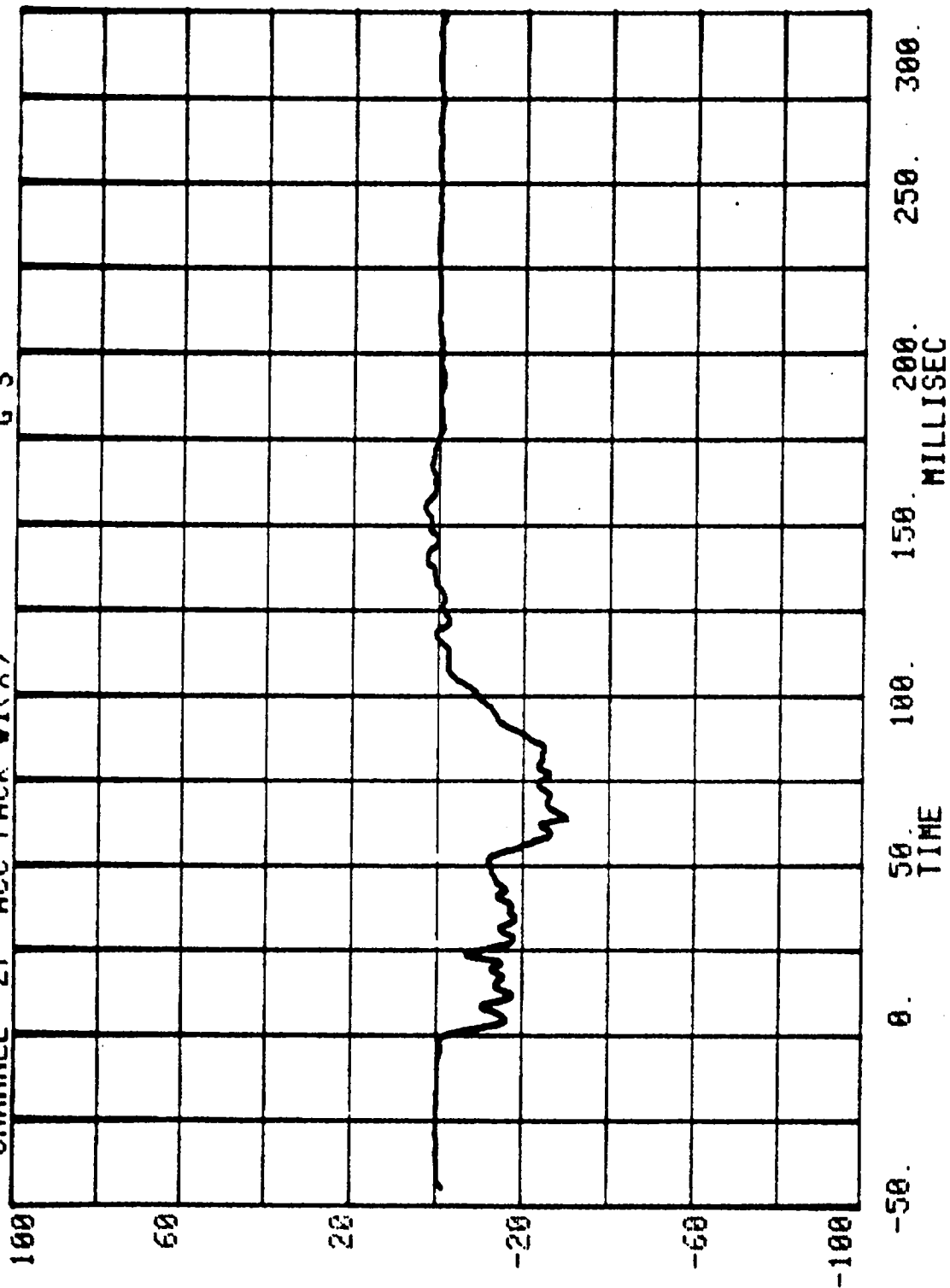
TEST NO. MK0201

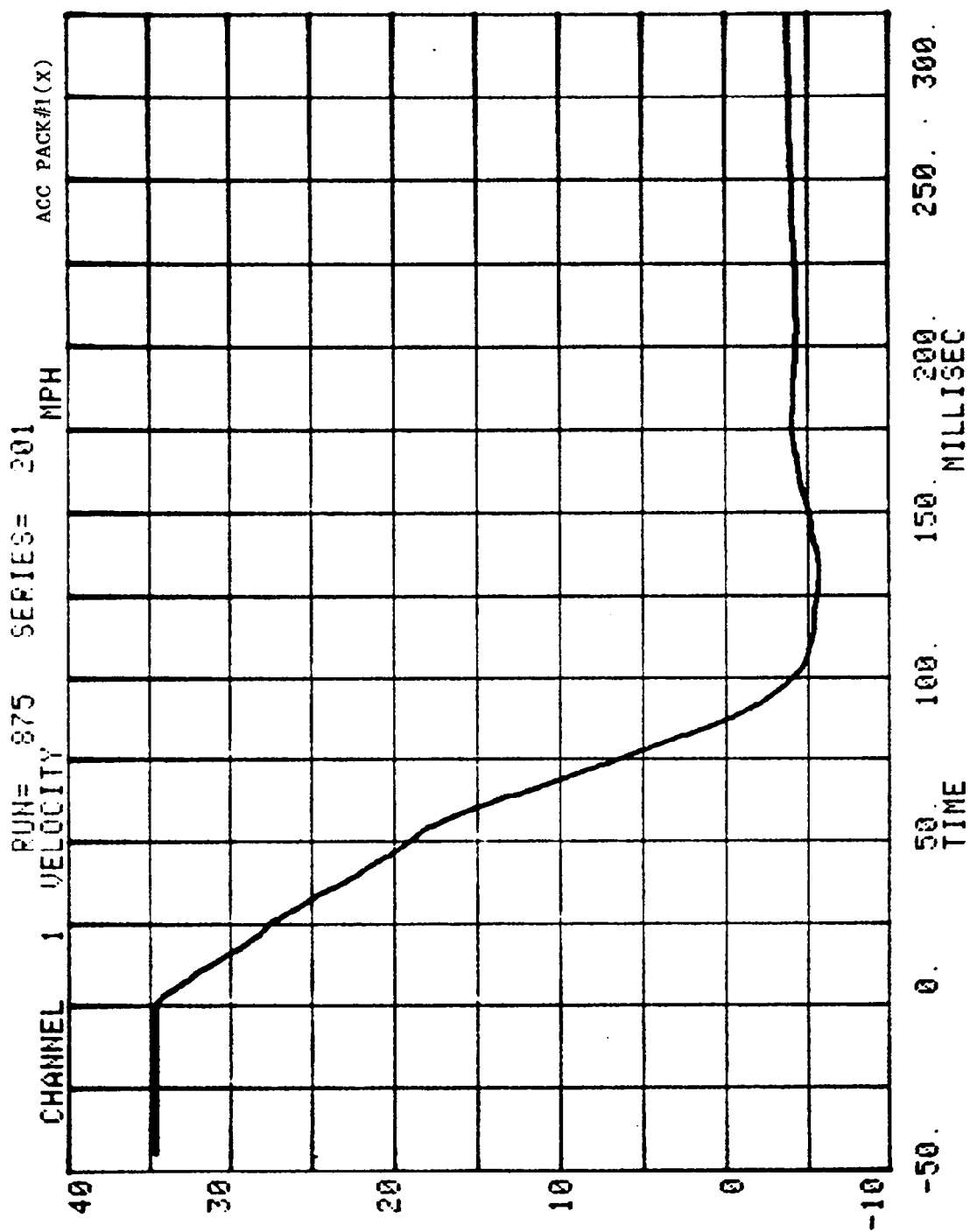
VEHICLE DATA

FILTER CHANNEL CLASS

60

RUN= 875 SERIES= 201
CHANNEL 27 ACC PACK #1(X) G'S





ACC PACK#1 (X)

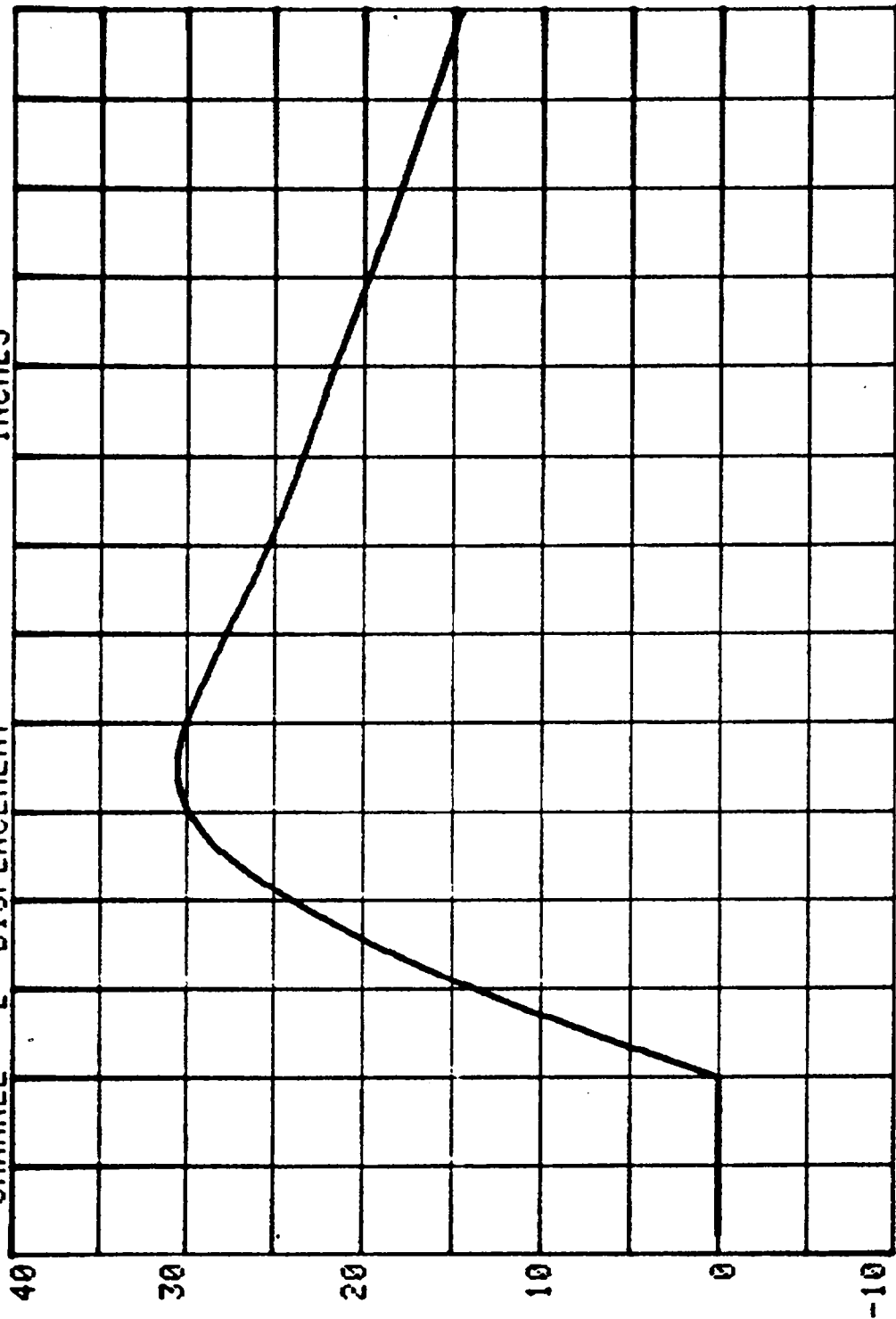
SERIES= 201

RUN= 875

CHANNEL 2

INCHES

DISPLACEMENT



300.

250.

200.

150.

100.

50.

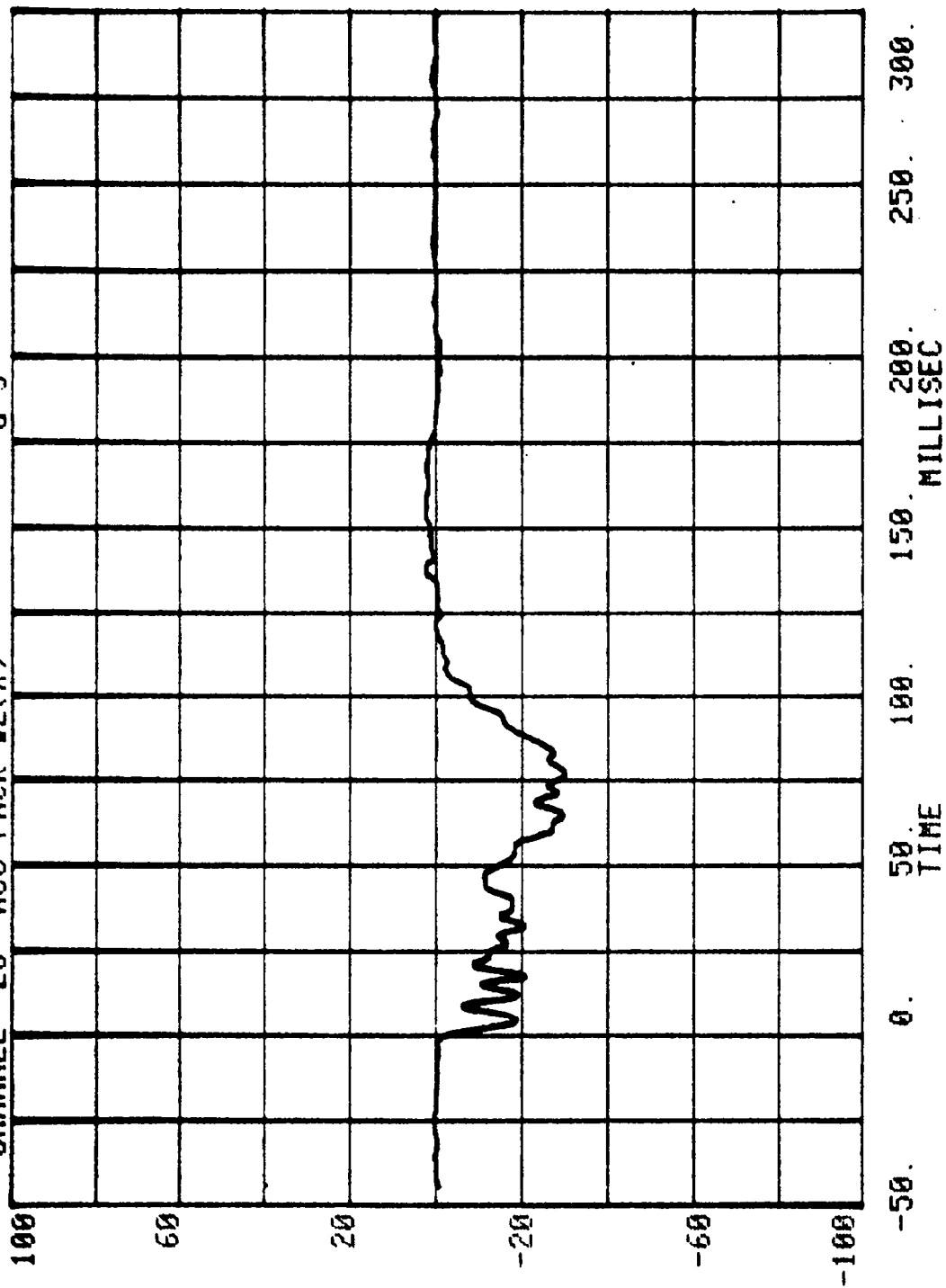
0.

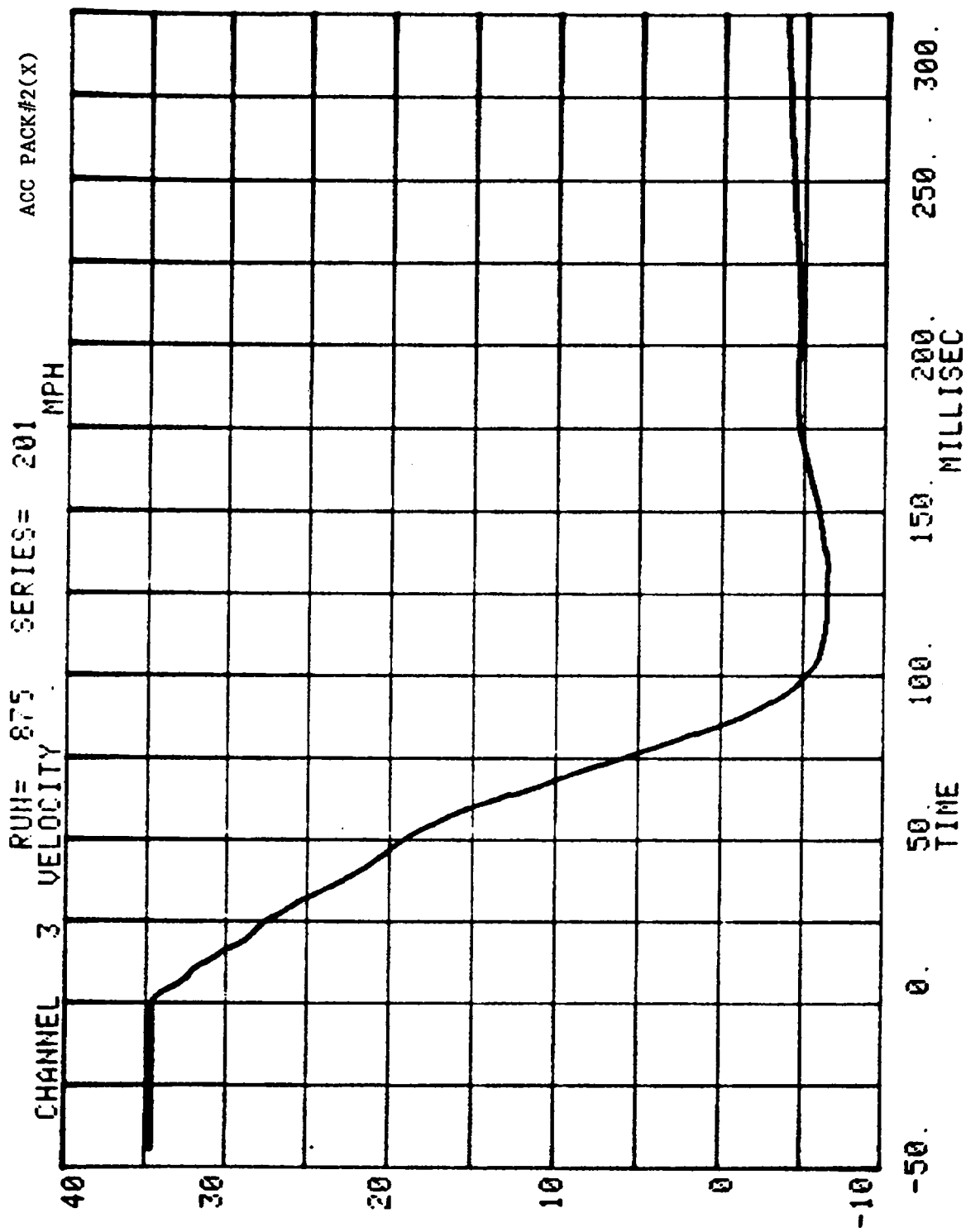
-50.

MILLISEC

TIME

RUN= 875 SERIES= 201
CHANNEL 28 ACC PACK #2(X) G'S



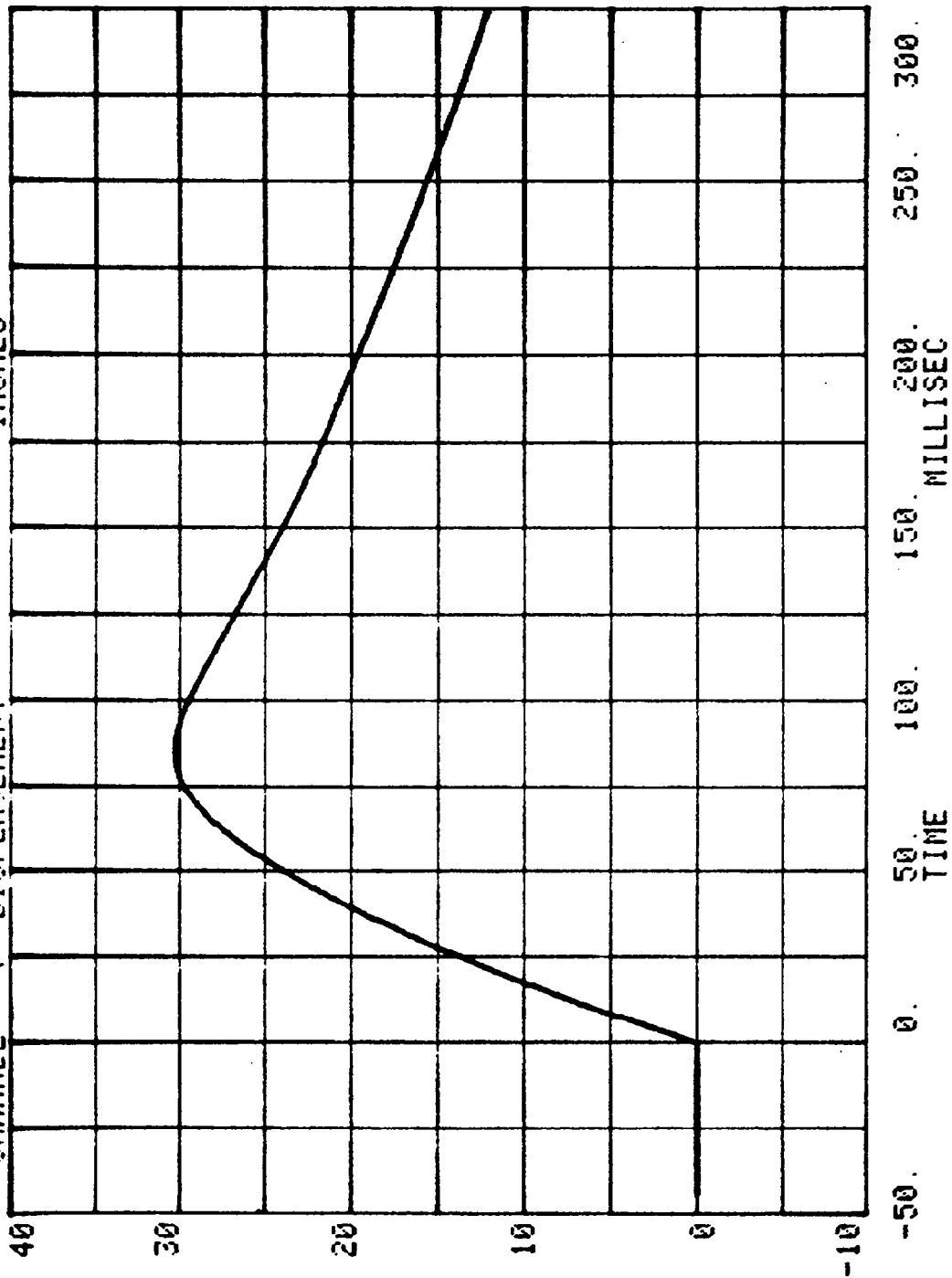


ACC PACK#2(X)

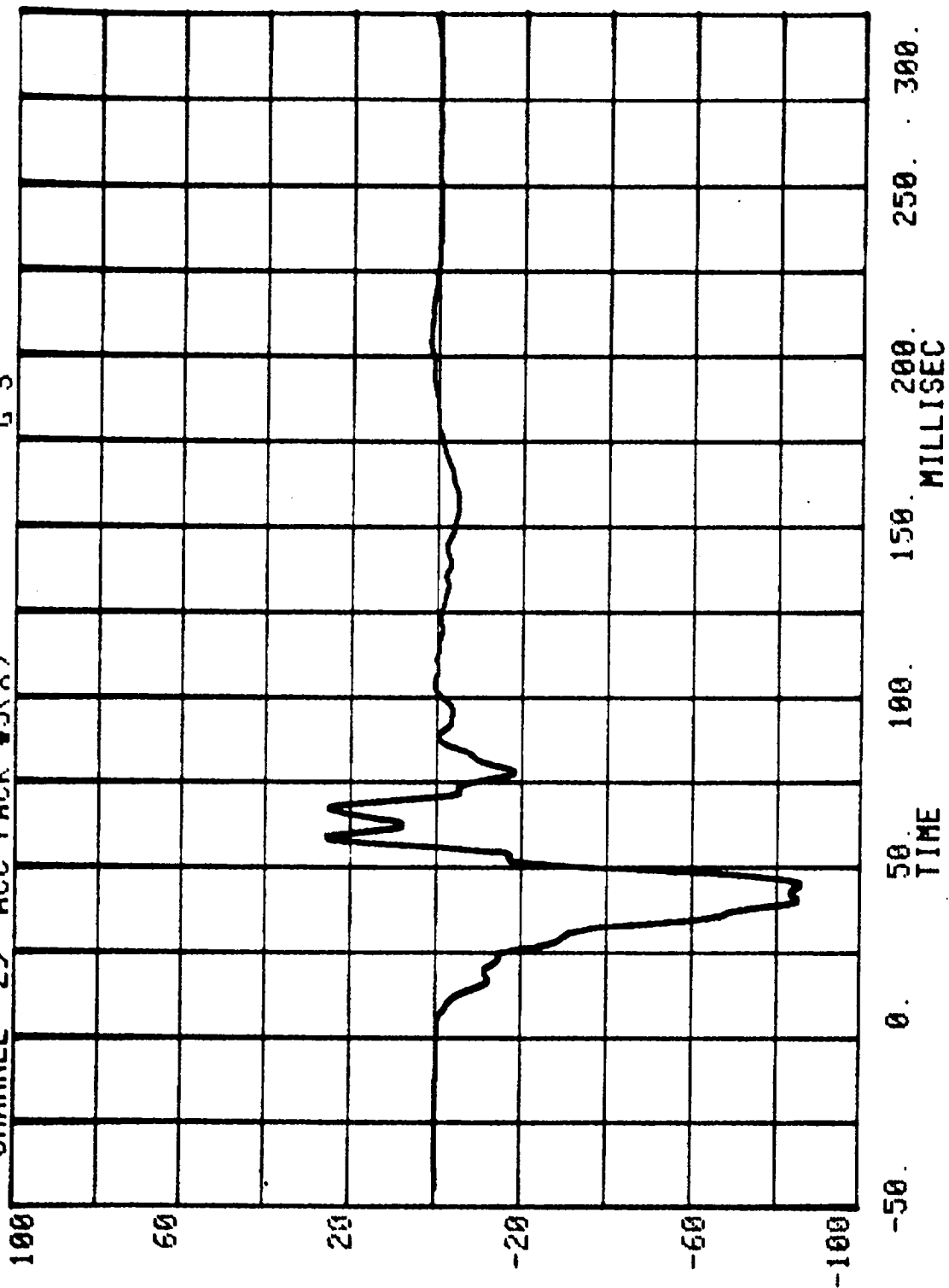
SERIES= 201 INCHES

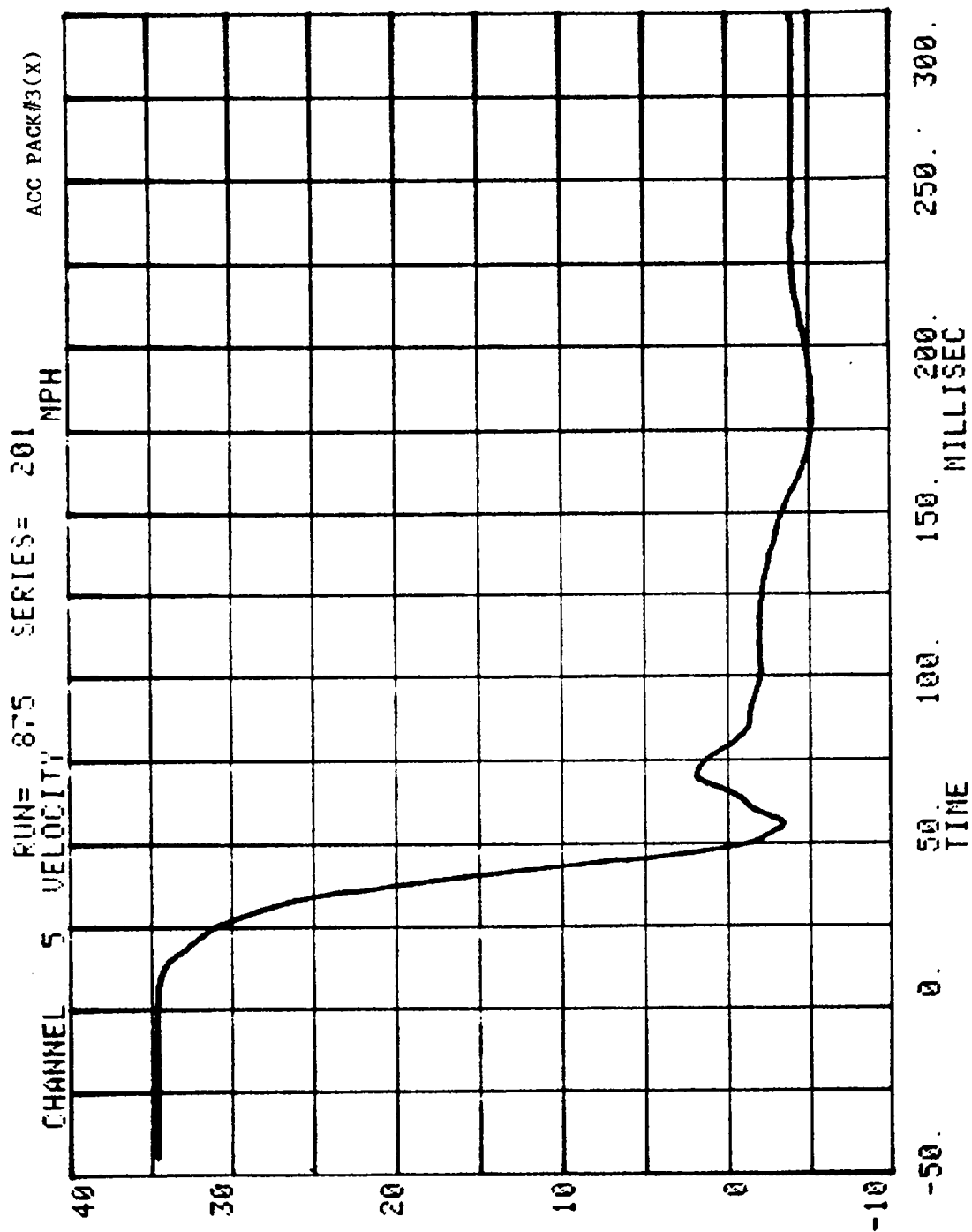
RUN= 875

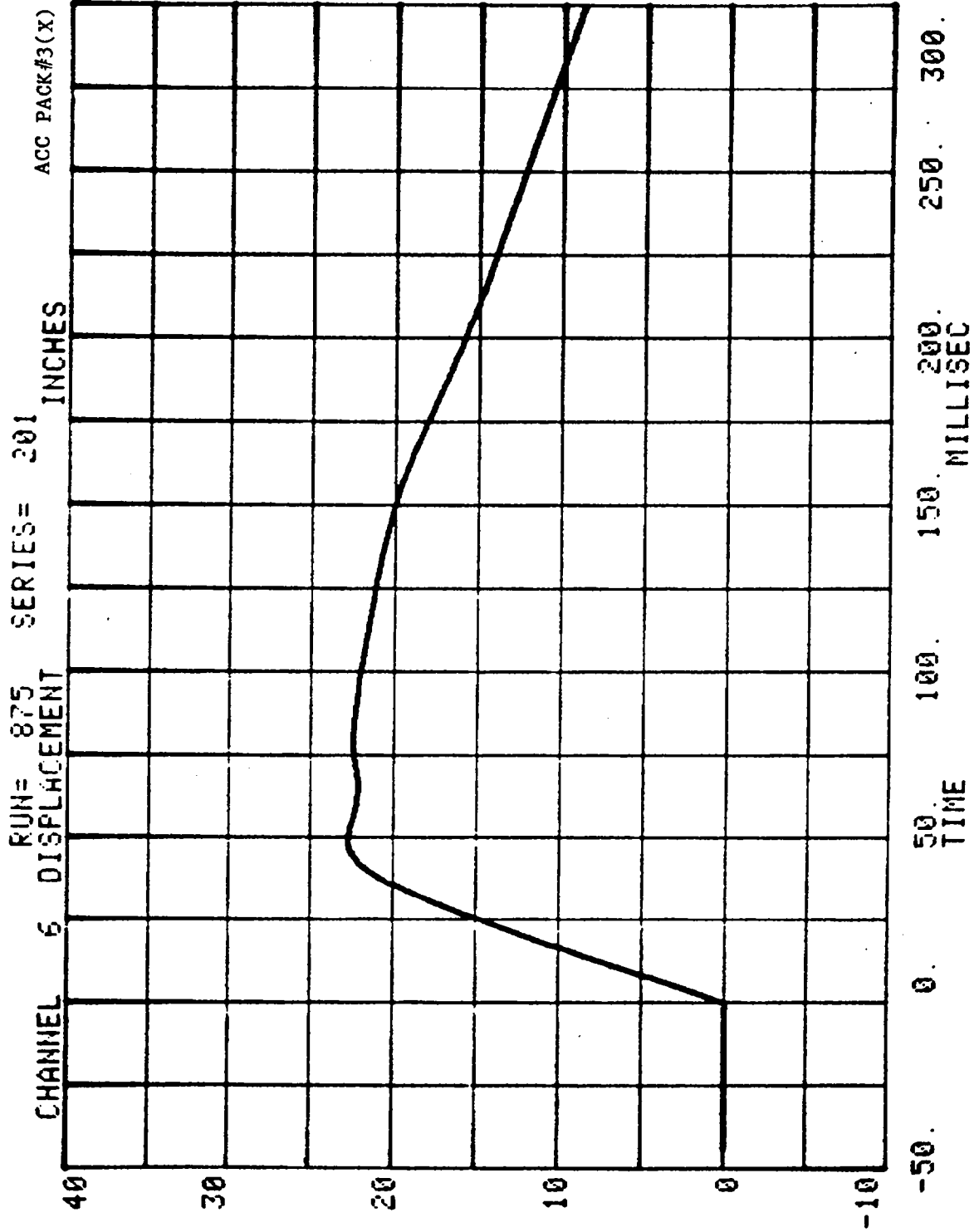
CHANNEL 4 DISPLACEMENT



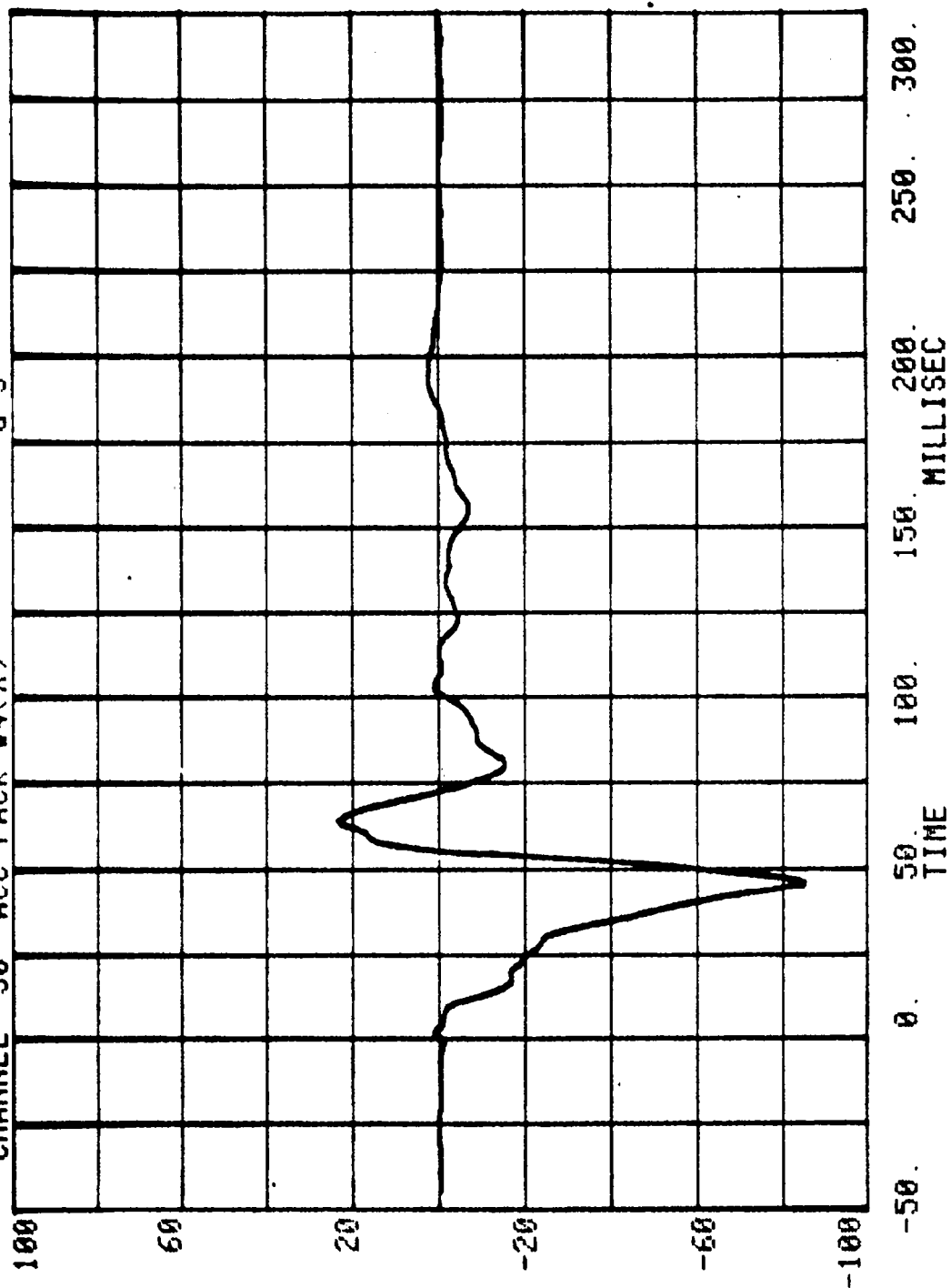
CHANNEL 29 ACC PACK #3(X) RUN= 875 SERIES= 201 G'S

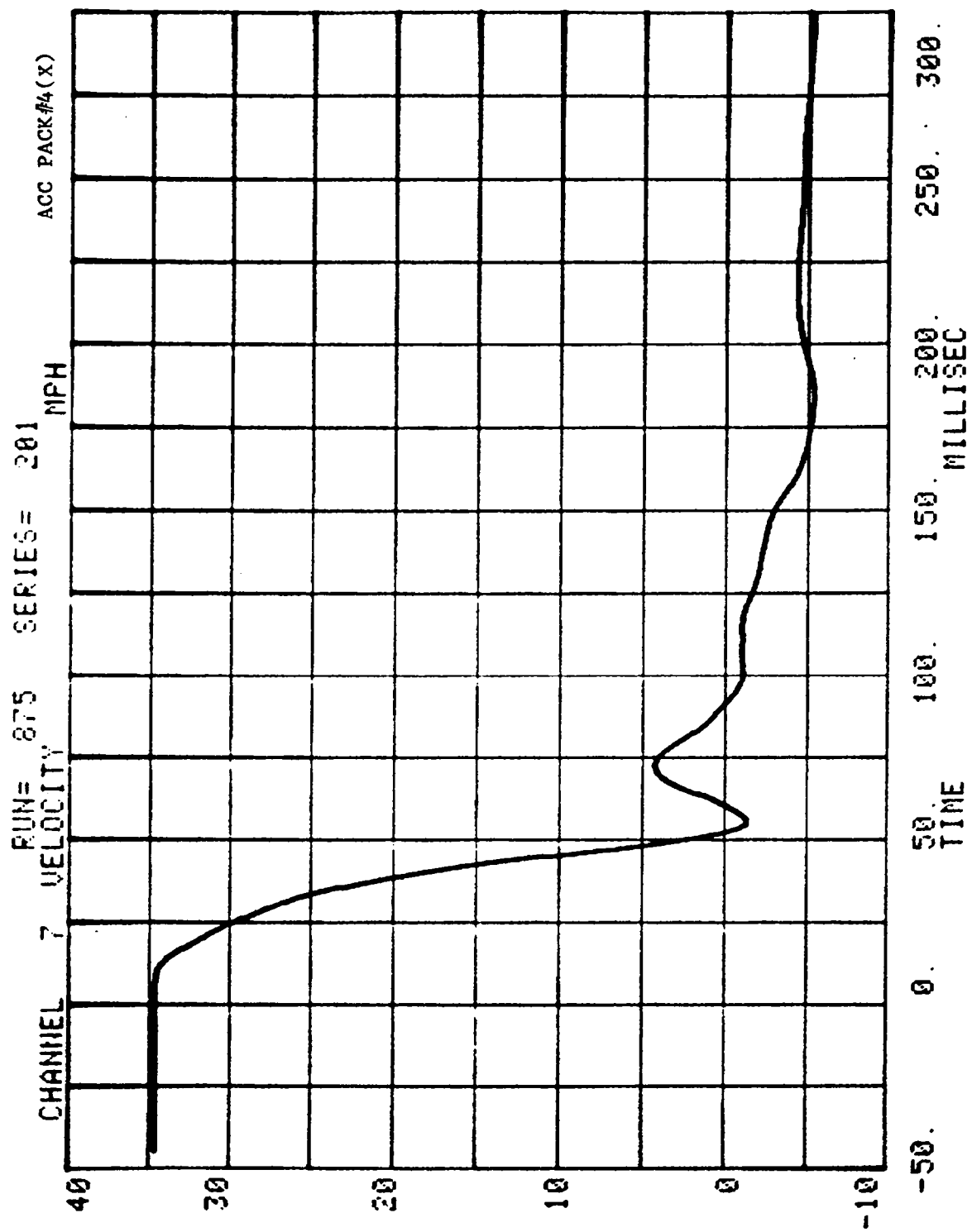


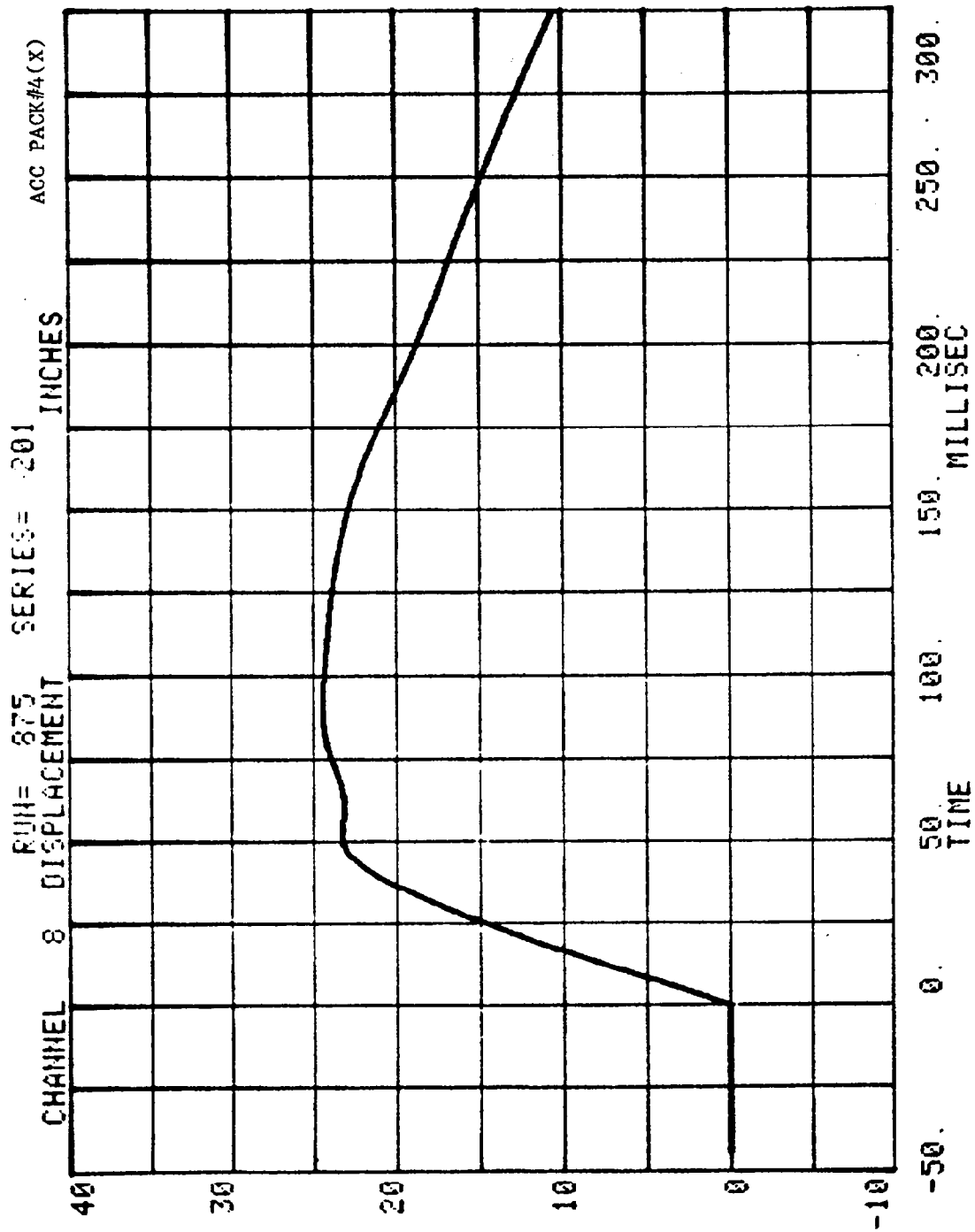




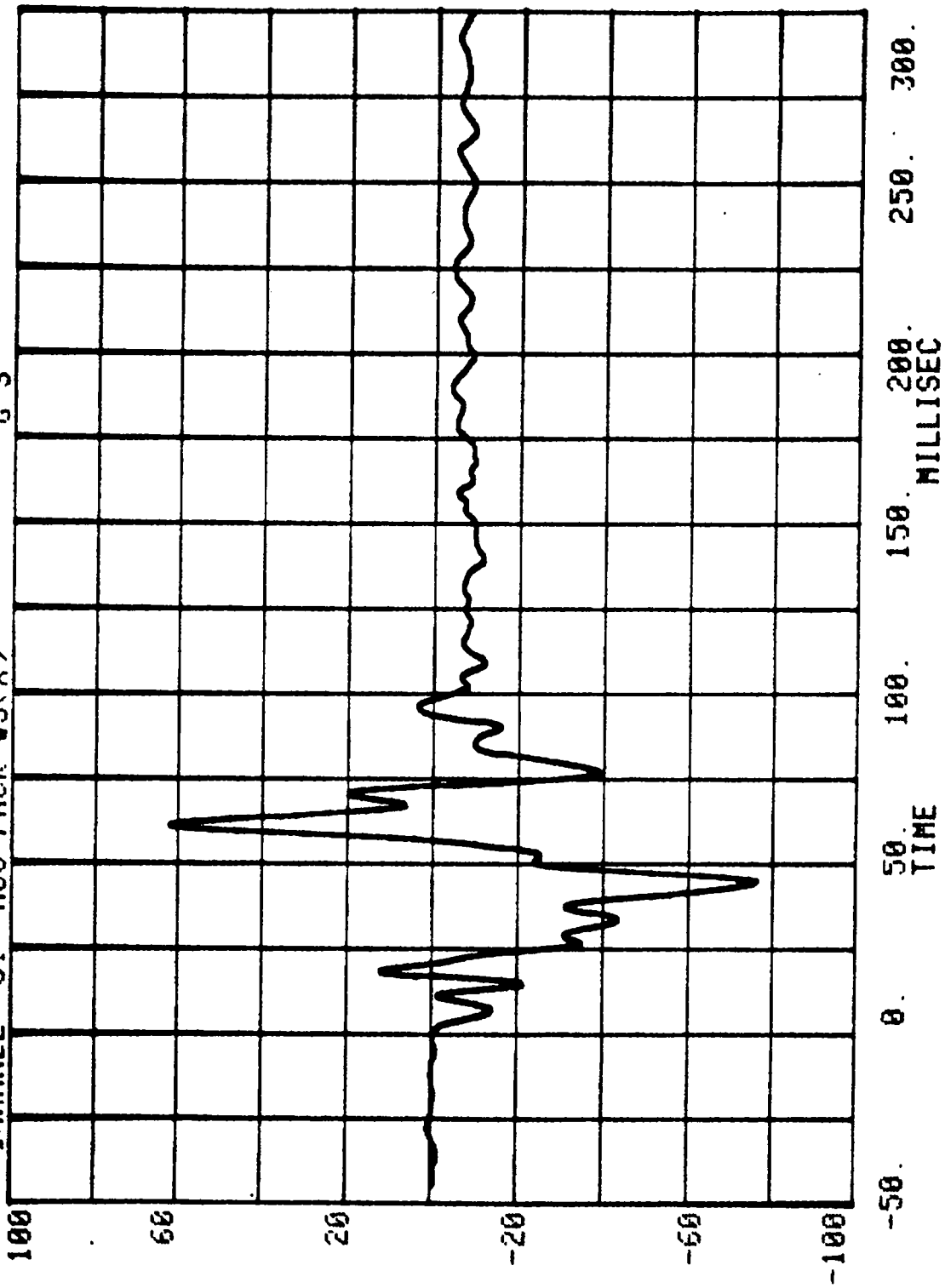
RUN= 875 SERIES= 201
CHANNEL 30 ACC PACK #4(X) G'S

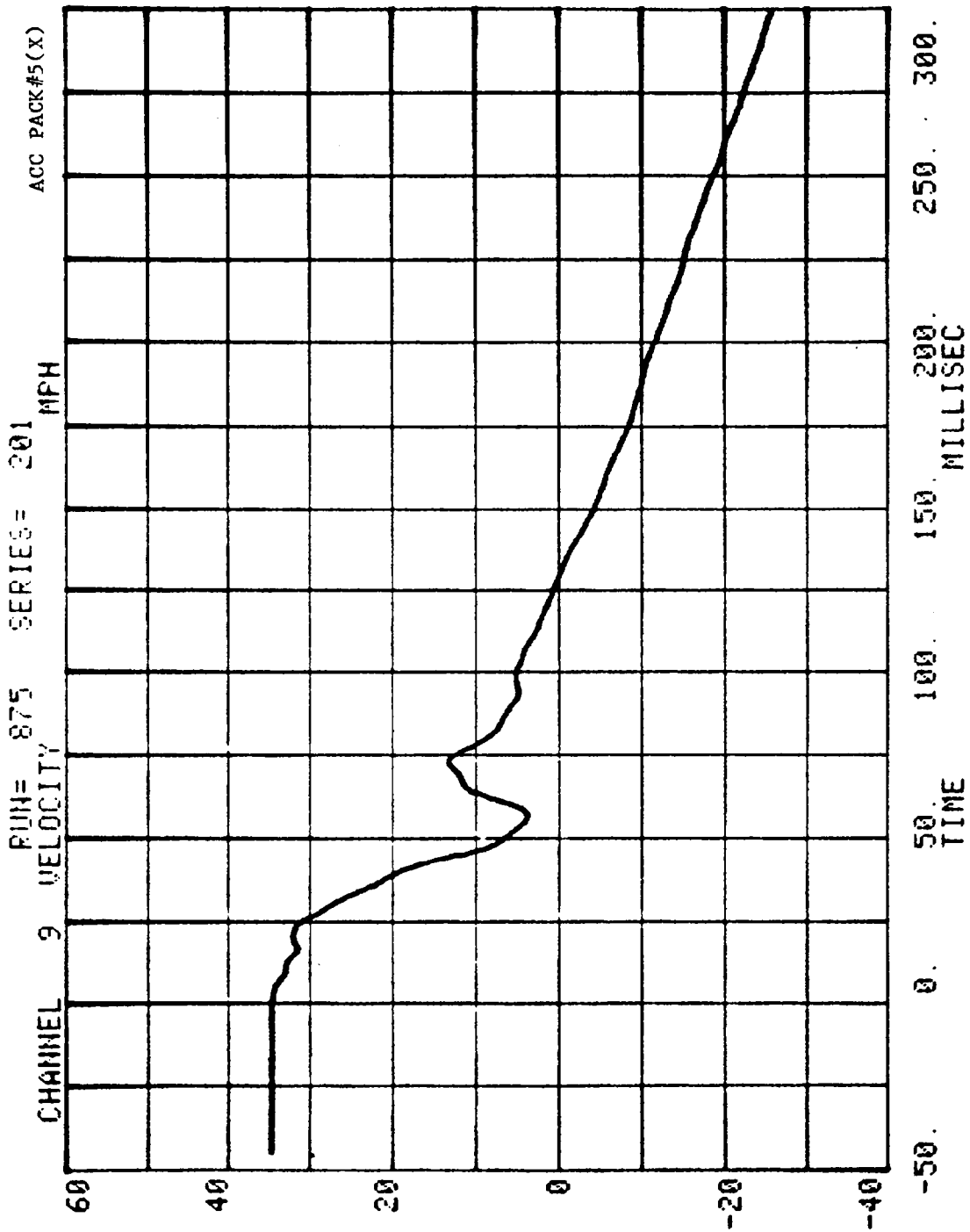


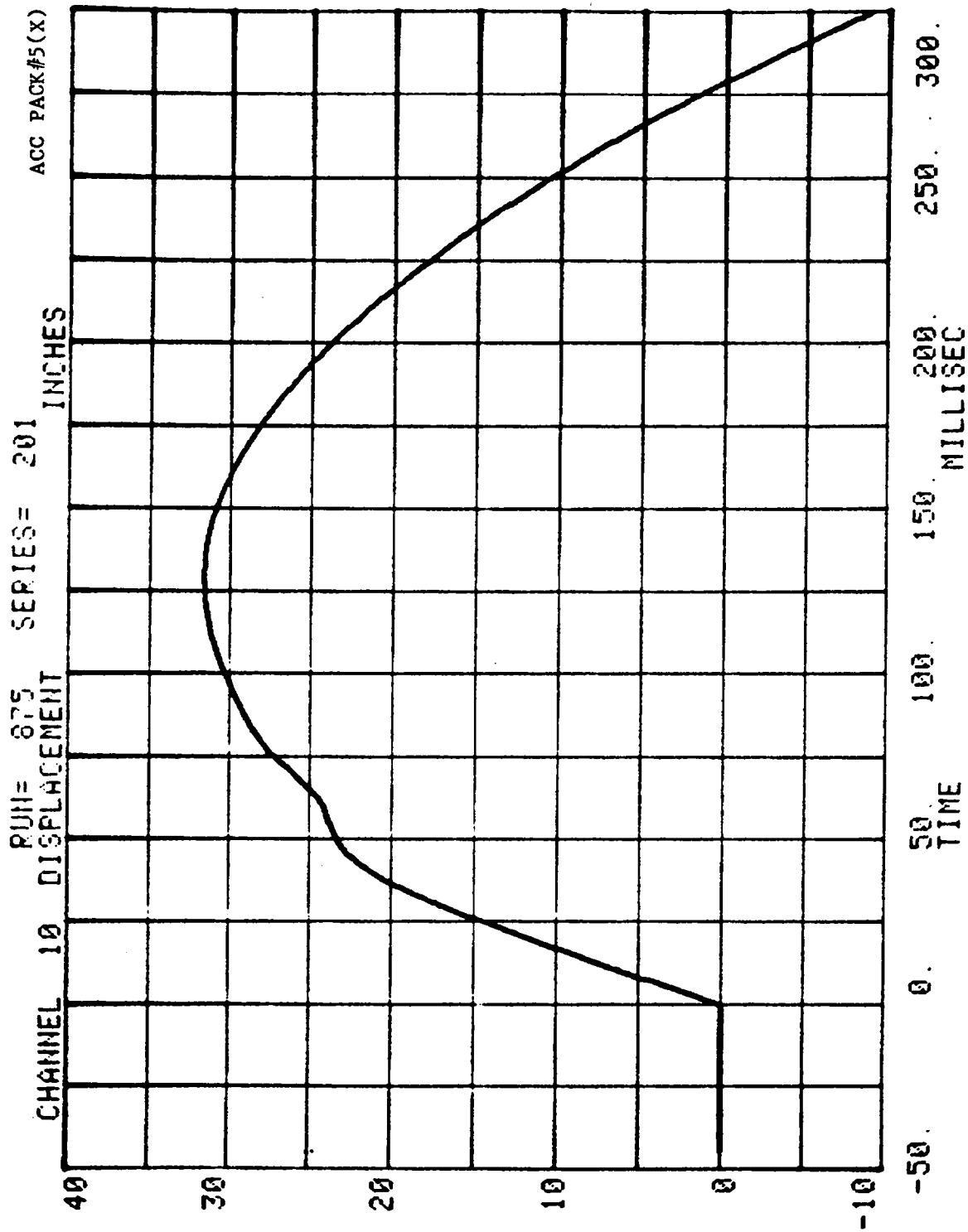




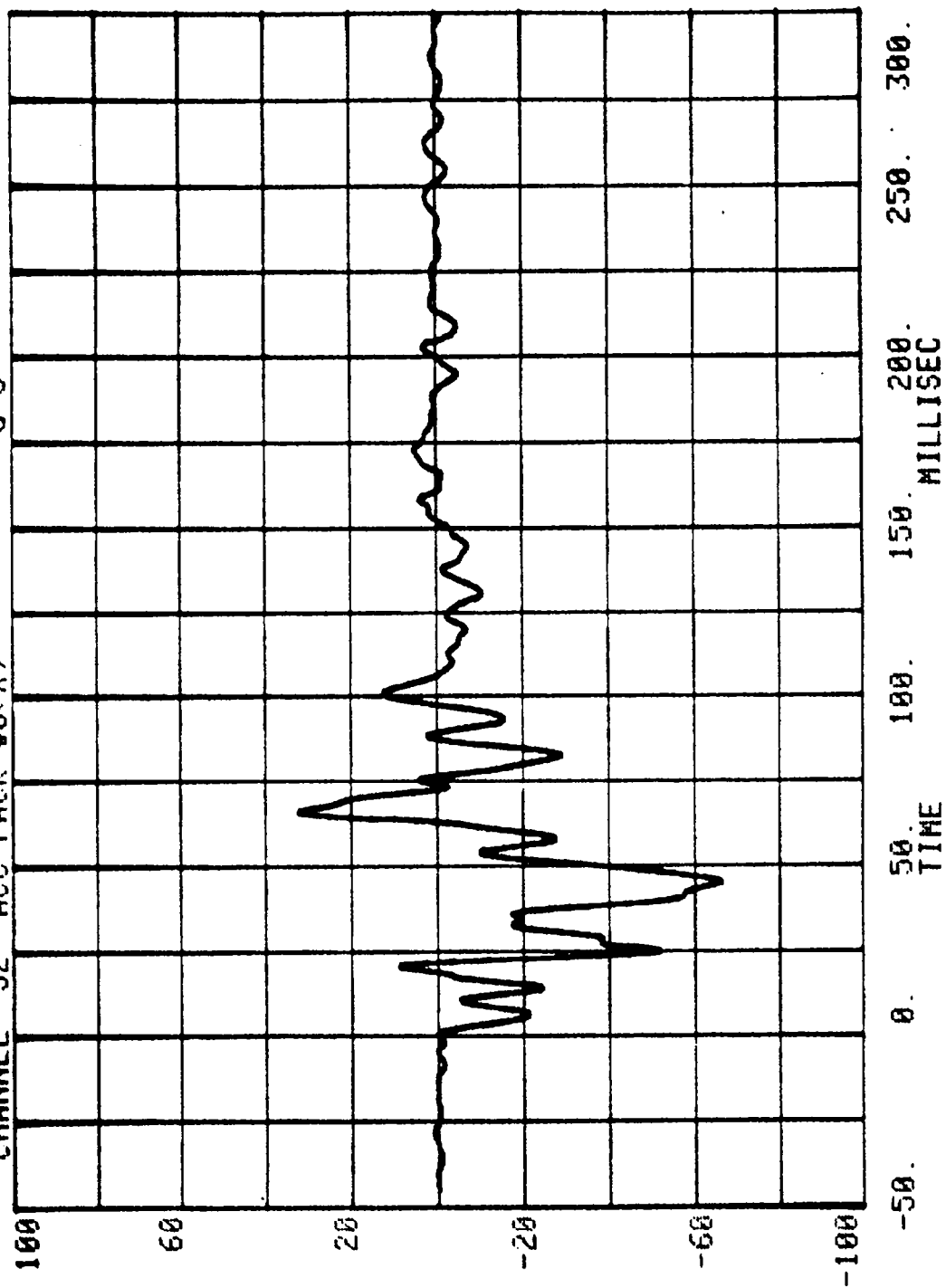
RUN= 875 SERIES= 201
CHANNEL 31 ACC PACK #5(X) G'S

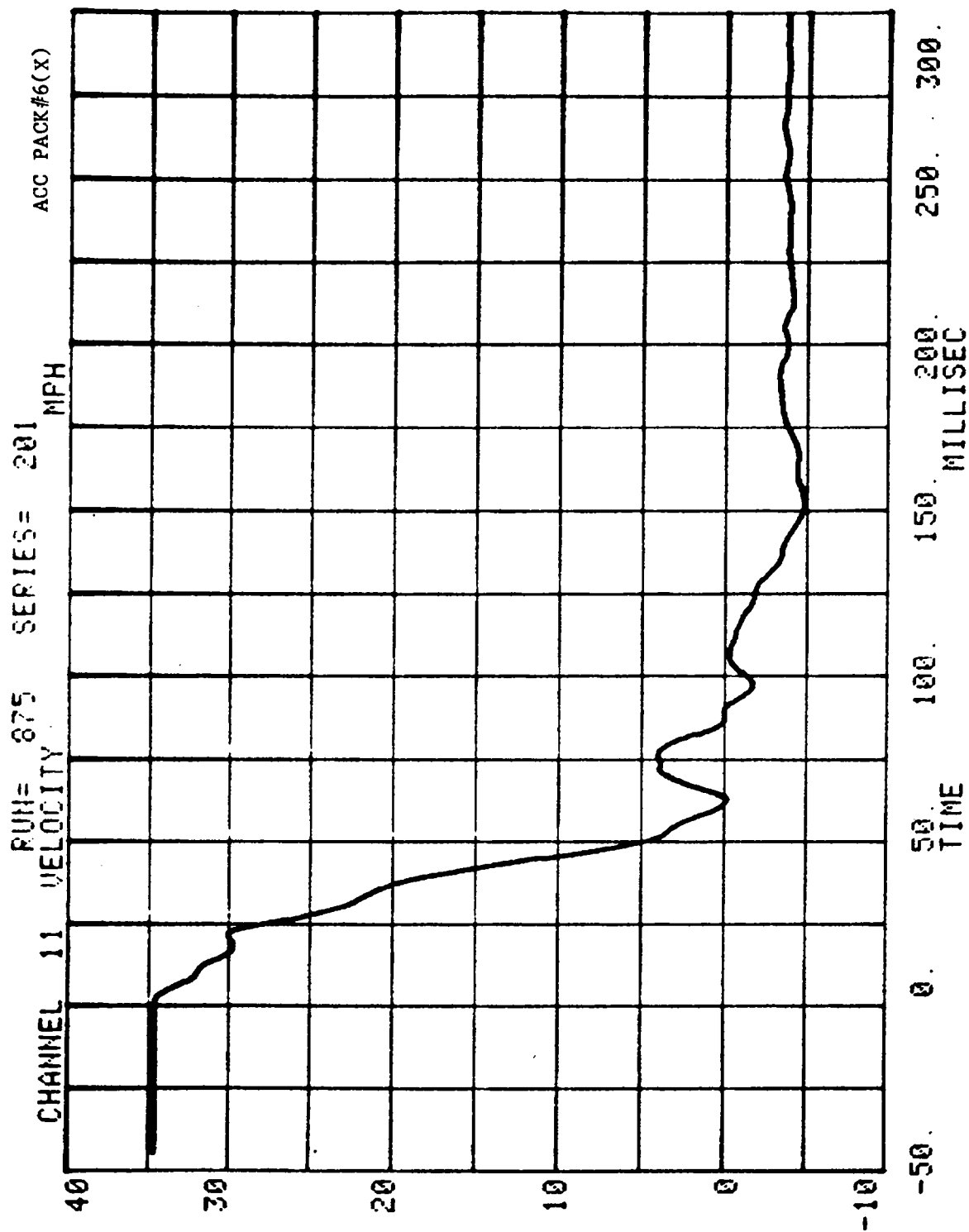


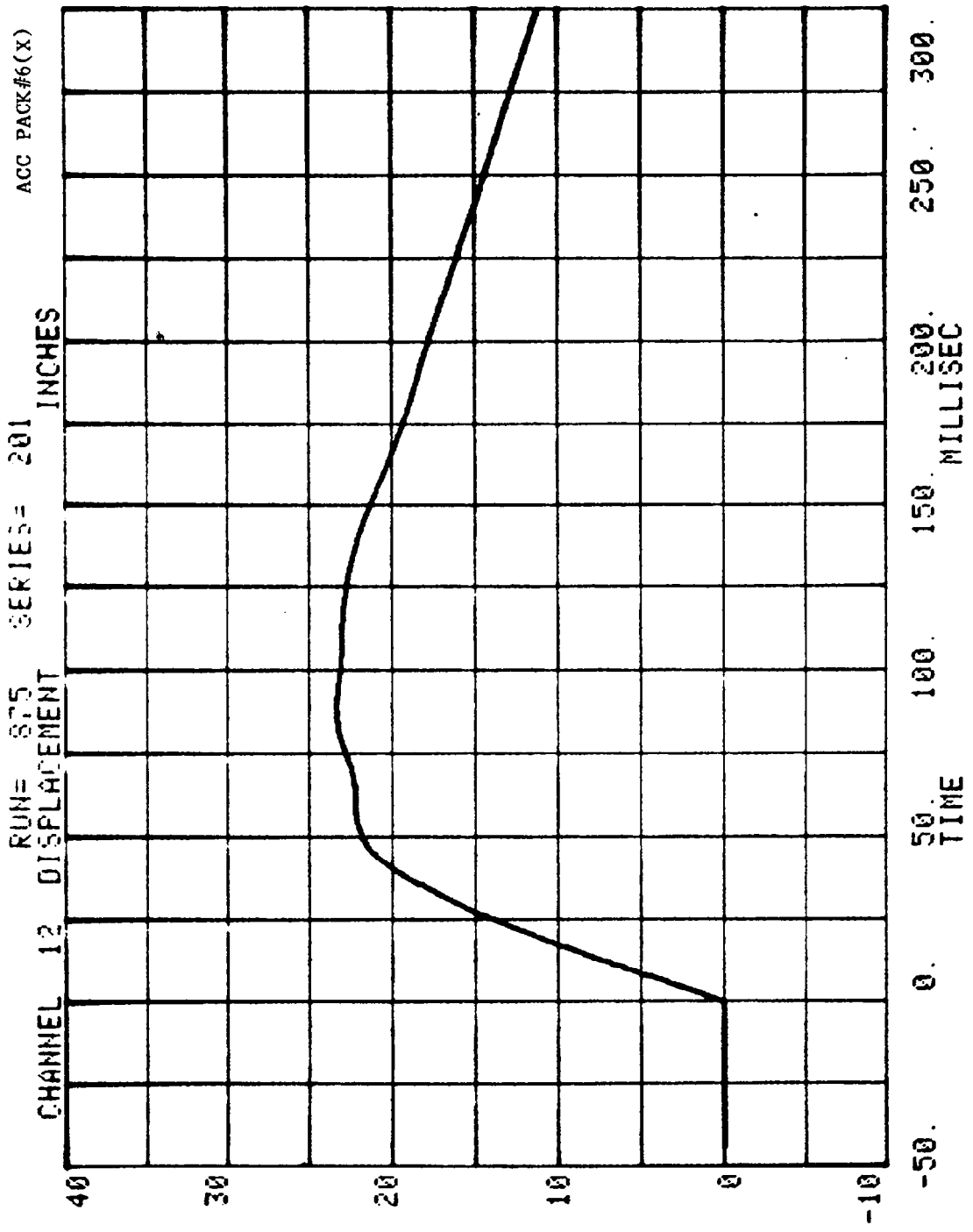




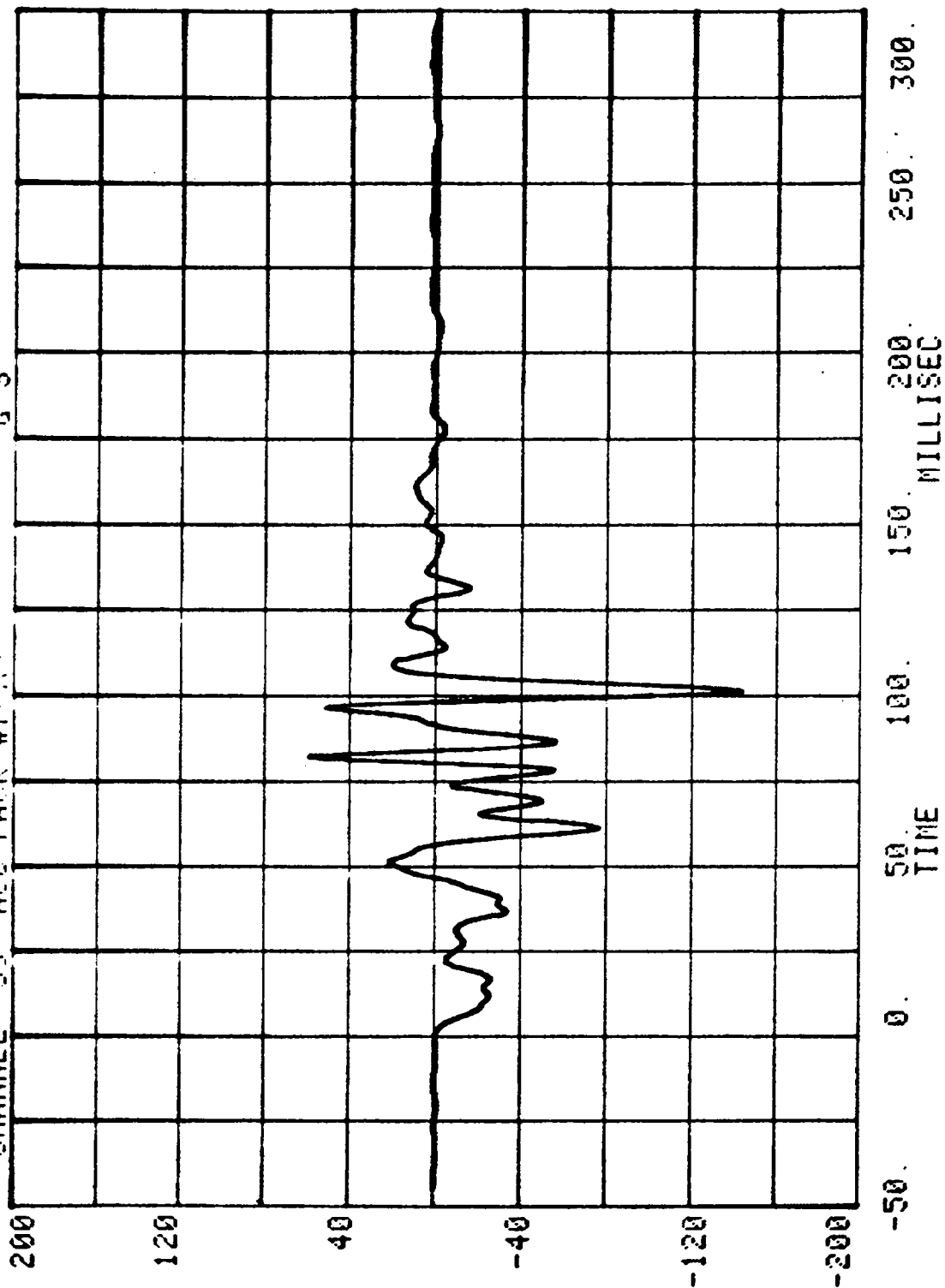
RUN= 875 SERIES= 201
CHANNEL 32 ACC PACK #6(X) G'S

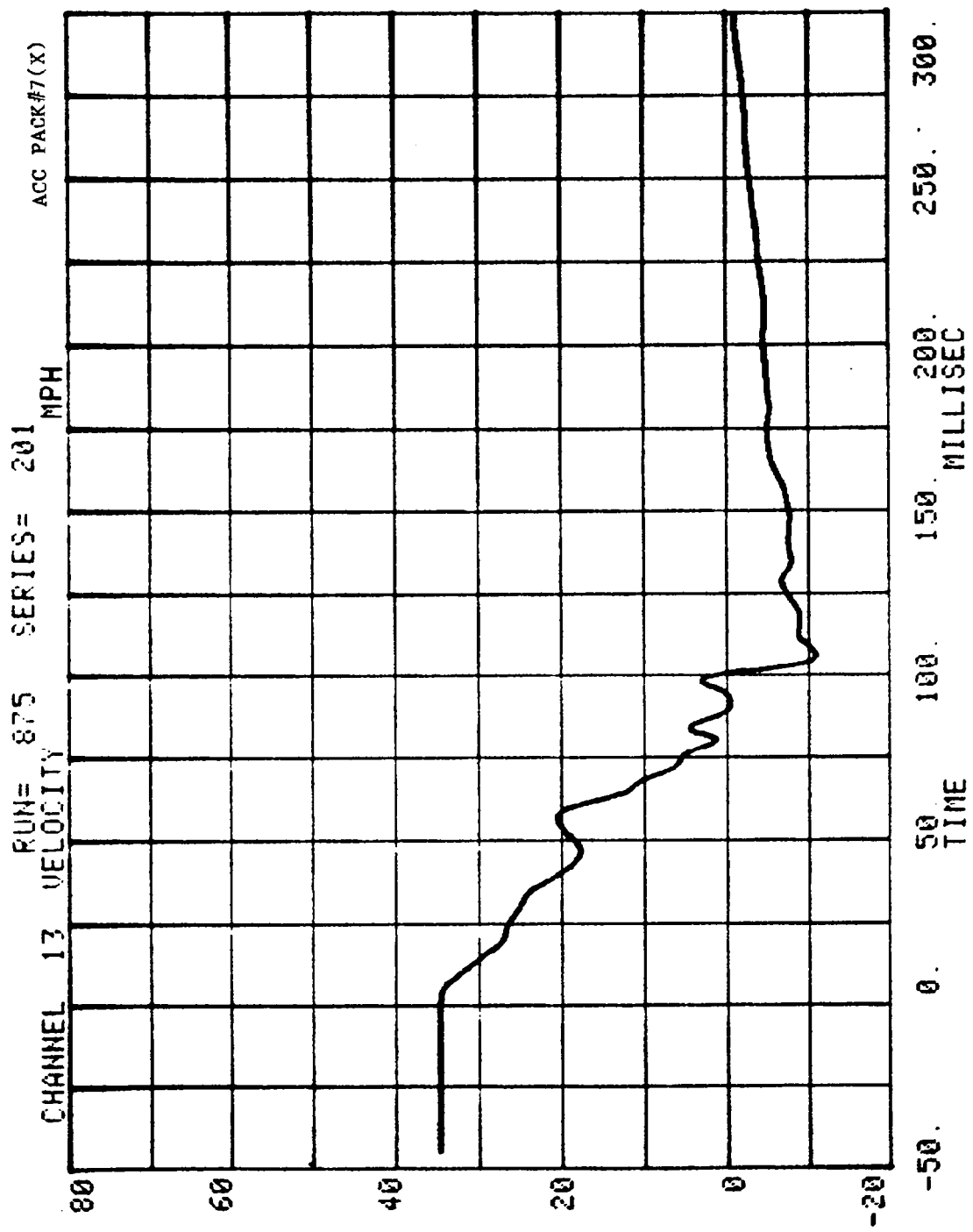


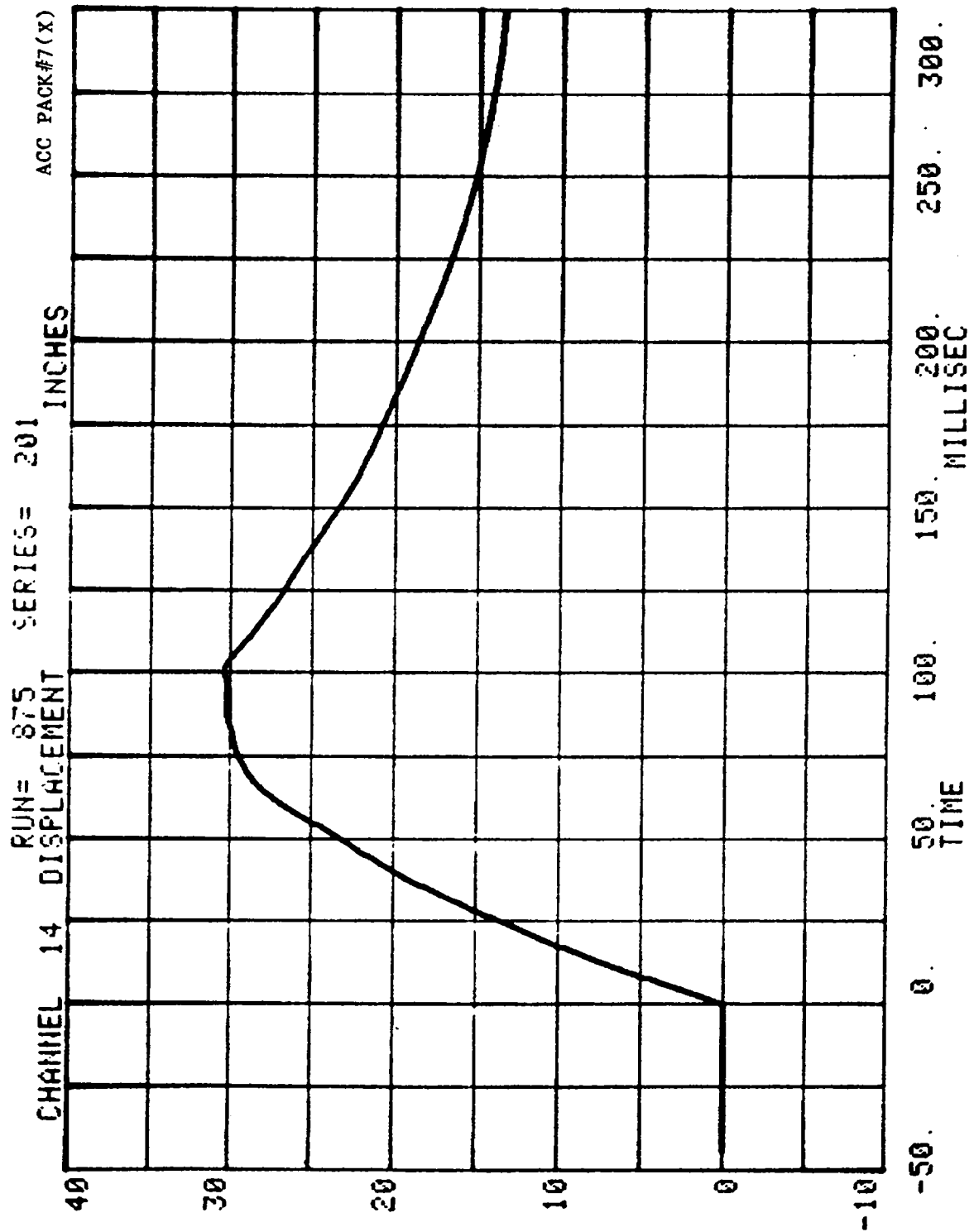




CHANNEL 33 ACC PHASE #7, W. RUN# 875 SERIES# 201 G'S







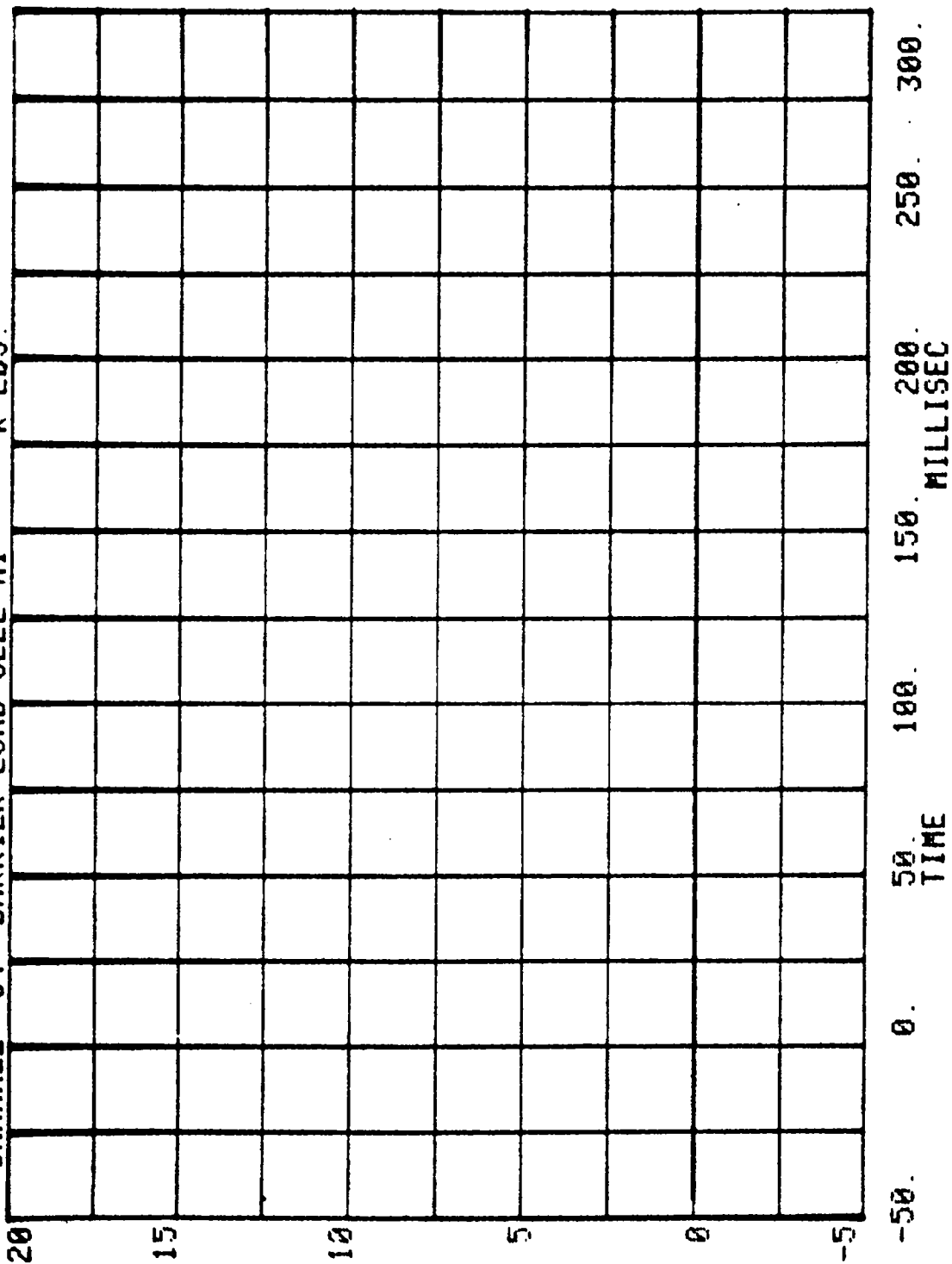
TEST NO. MK0201

LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

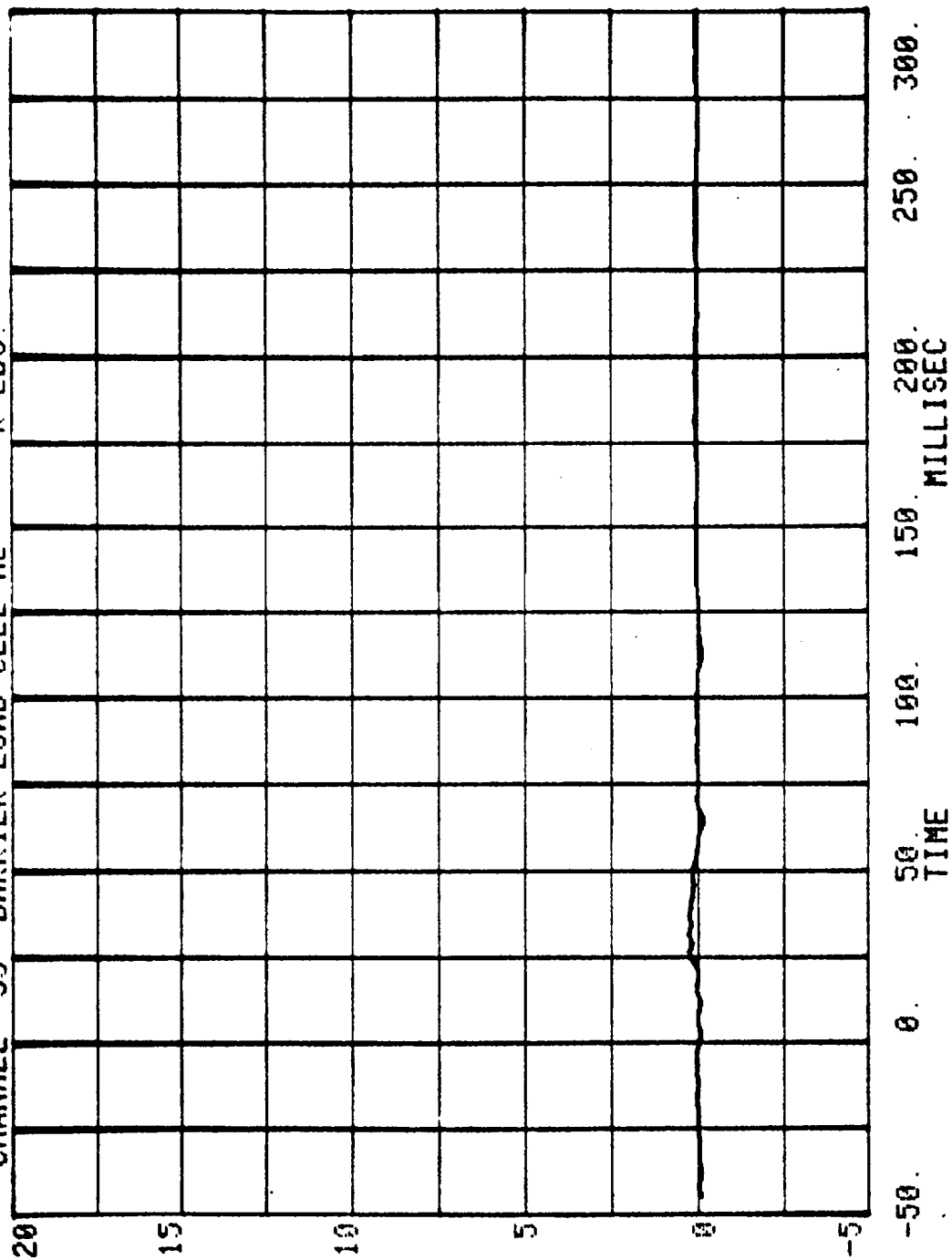
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CHANNEL 34 RUN= 875 SERIES= 201
BARRIER LOAD CELL A1 K LBS.

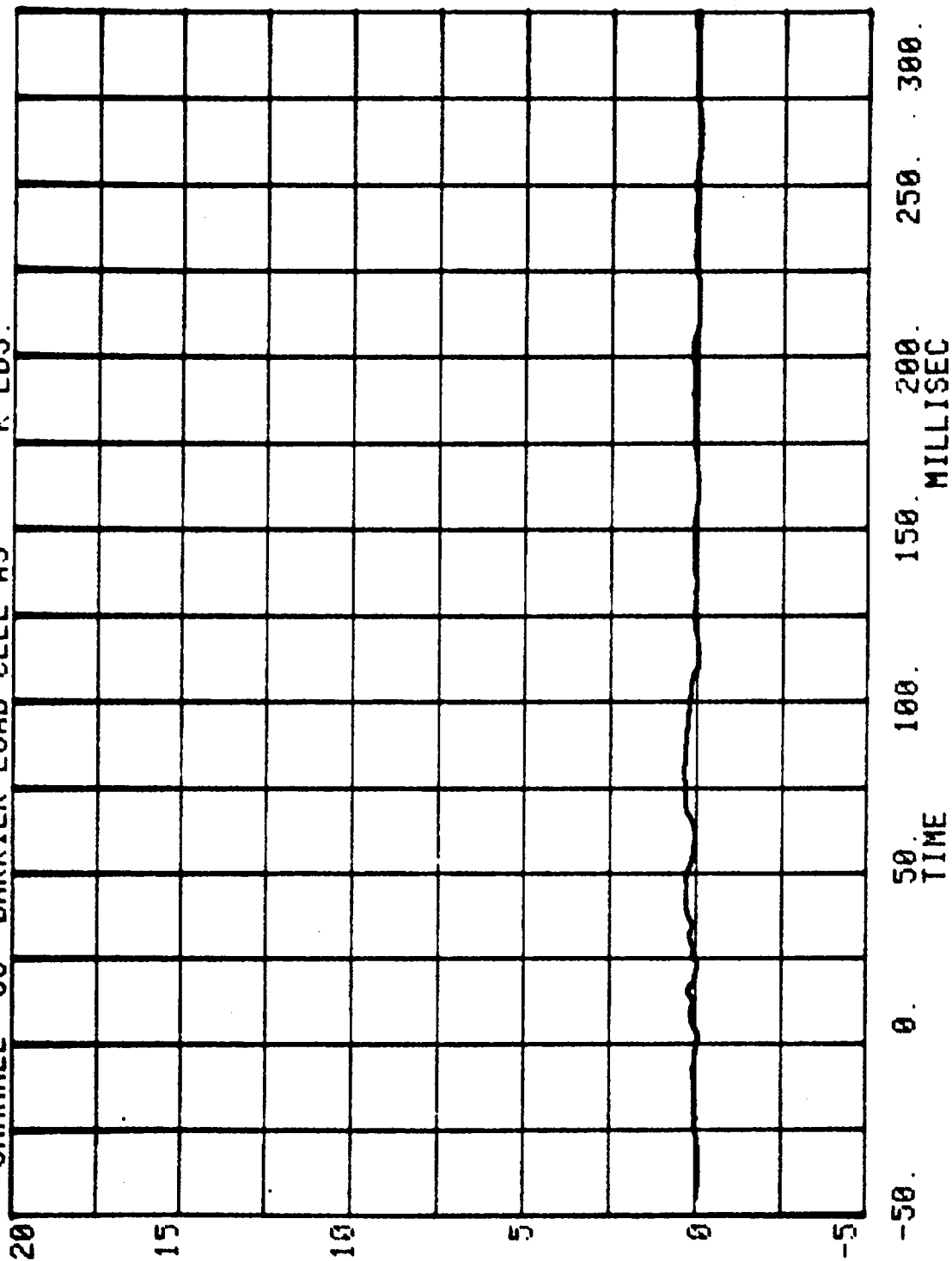


CHANNEL 35 BARRIER LOAD CELL A2 K LBS.

RUN= 875 SERIES= 201

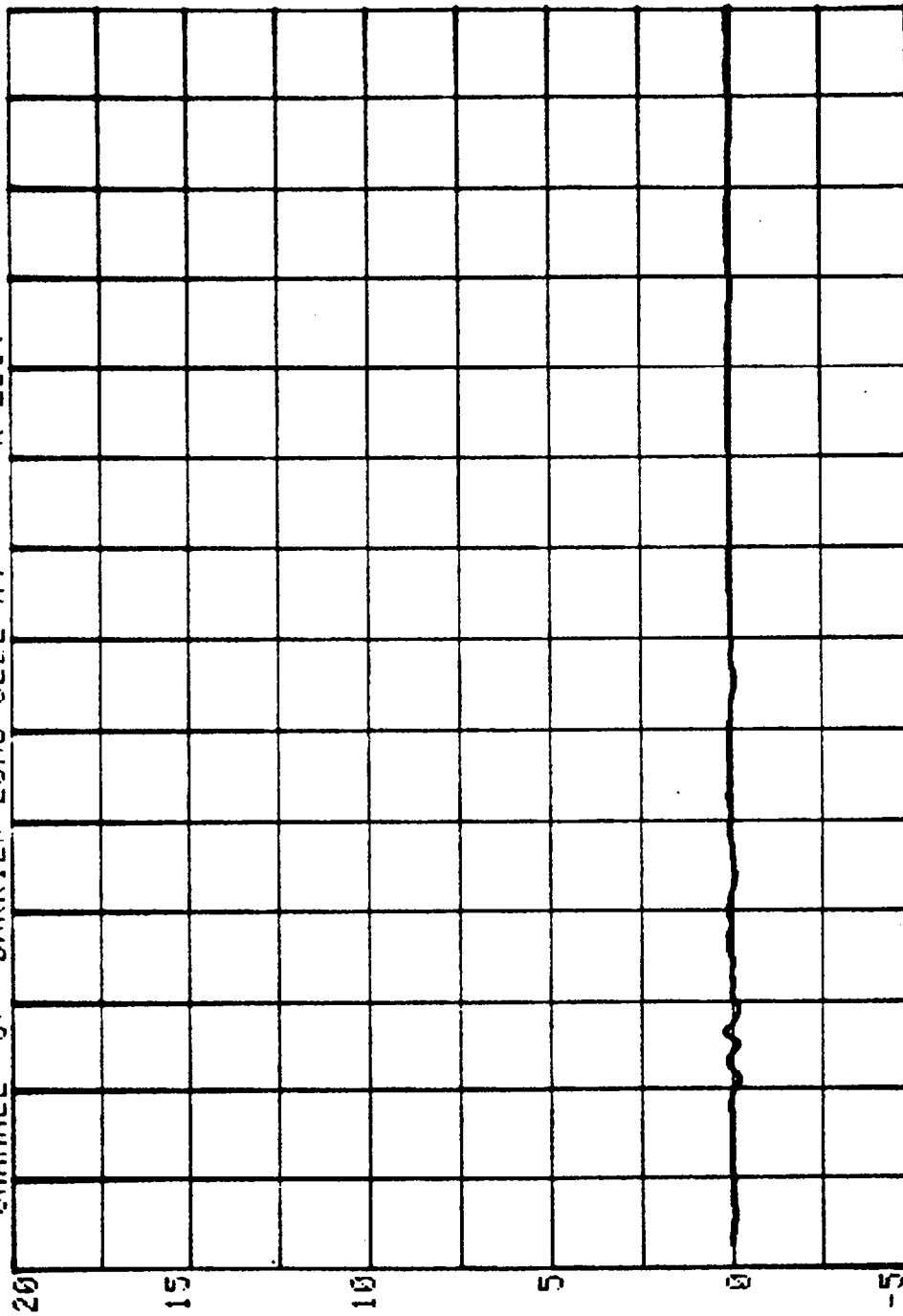


RUN= 875 SERIES= 201
CHANNEL 36 BARRIER LOAD CELL A3 K LBS.



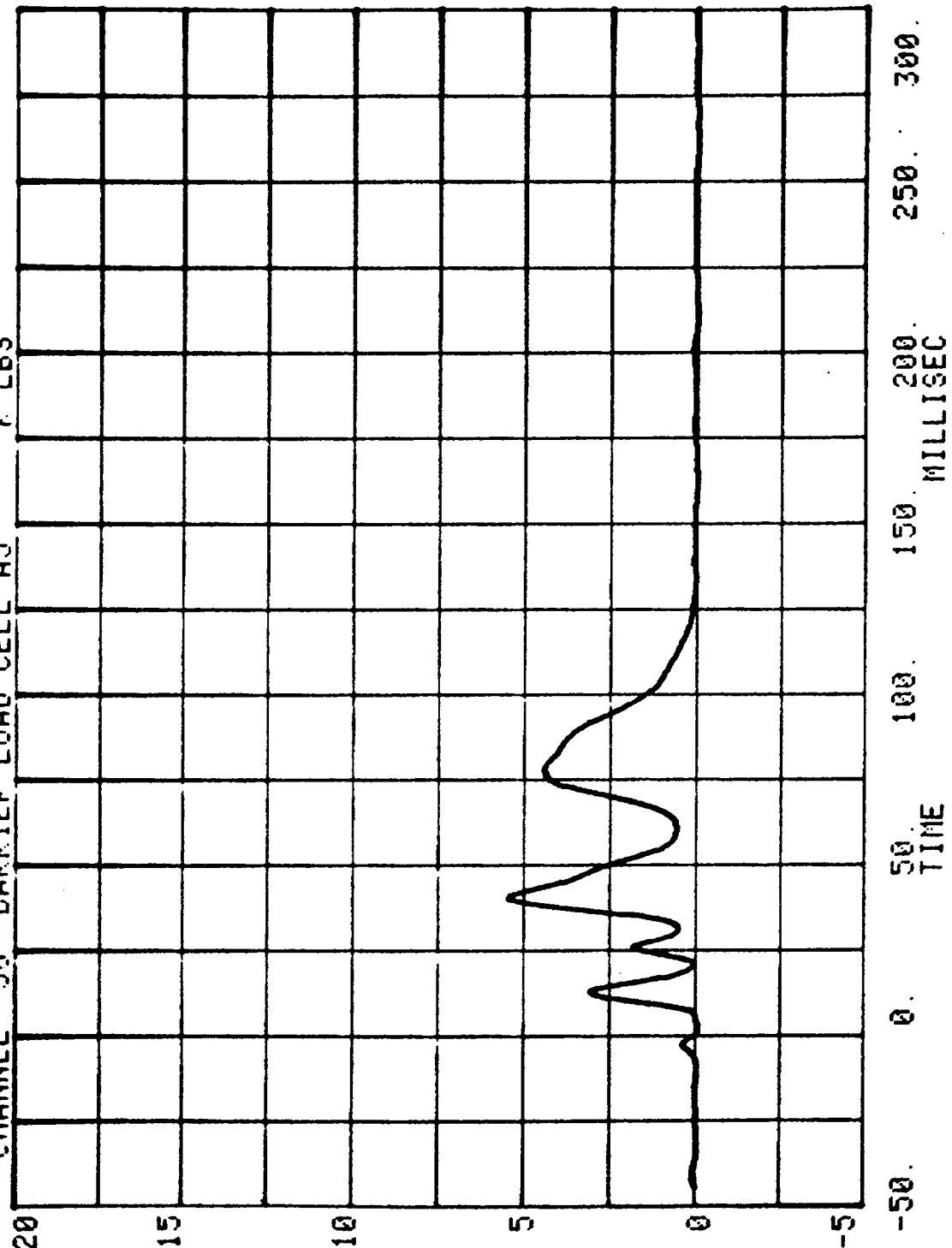
CHANNEL 37 BARRIER LOAD CELL A4 K LBS.

RUN= 875 SERIES= 201

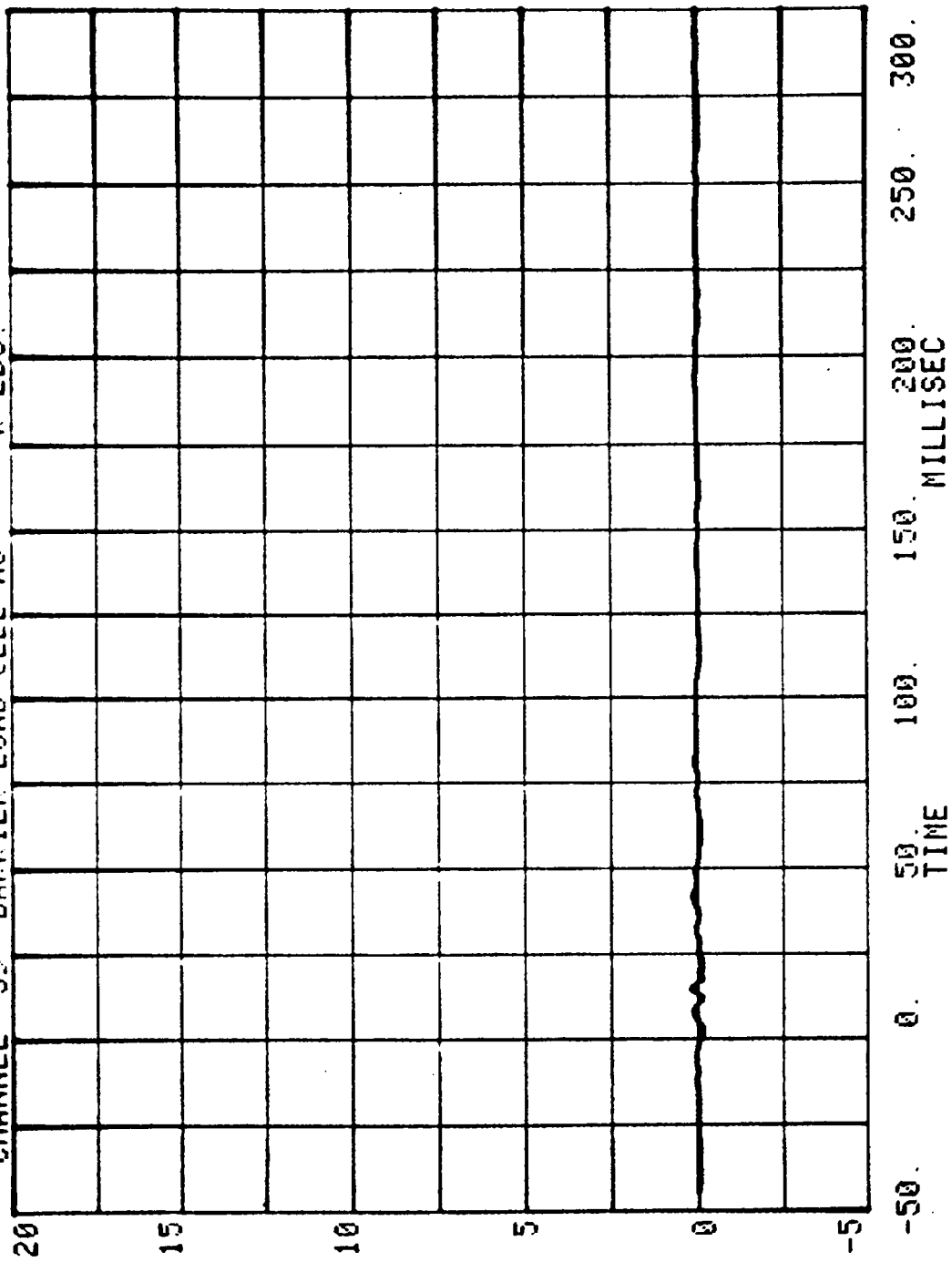


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

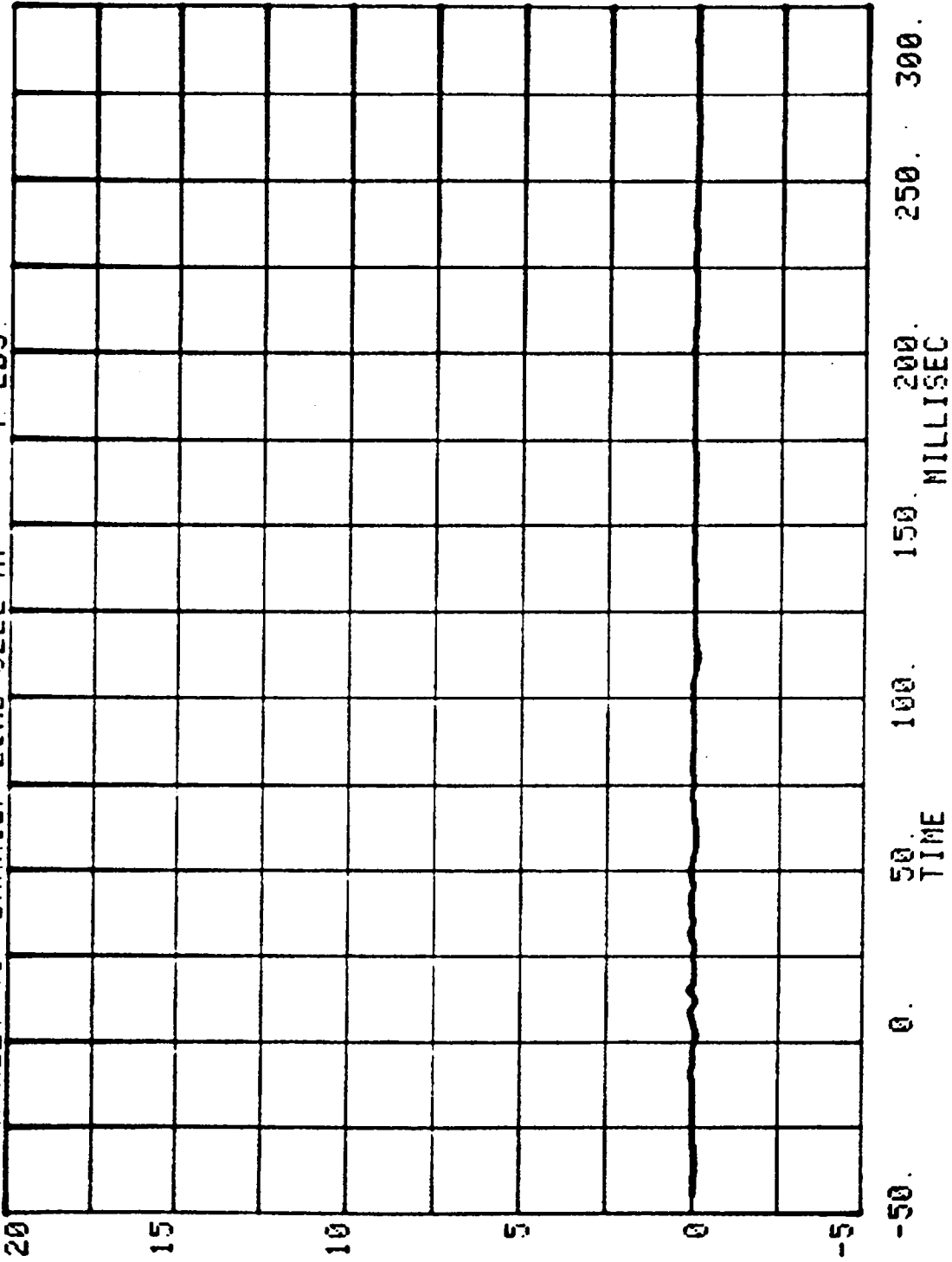
RUN= 875 SERIES= 201
CHANNEL 38 BARRIER LOAD CELL A5 K LBS



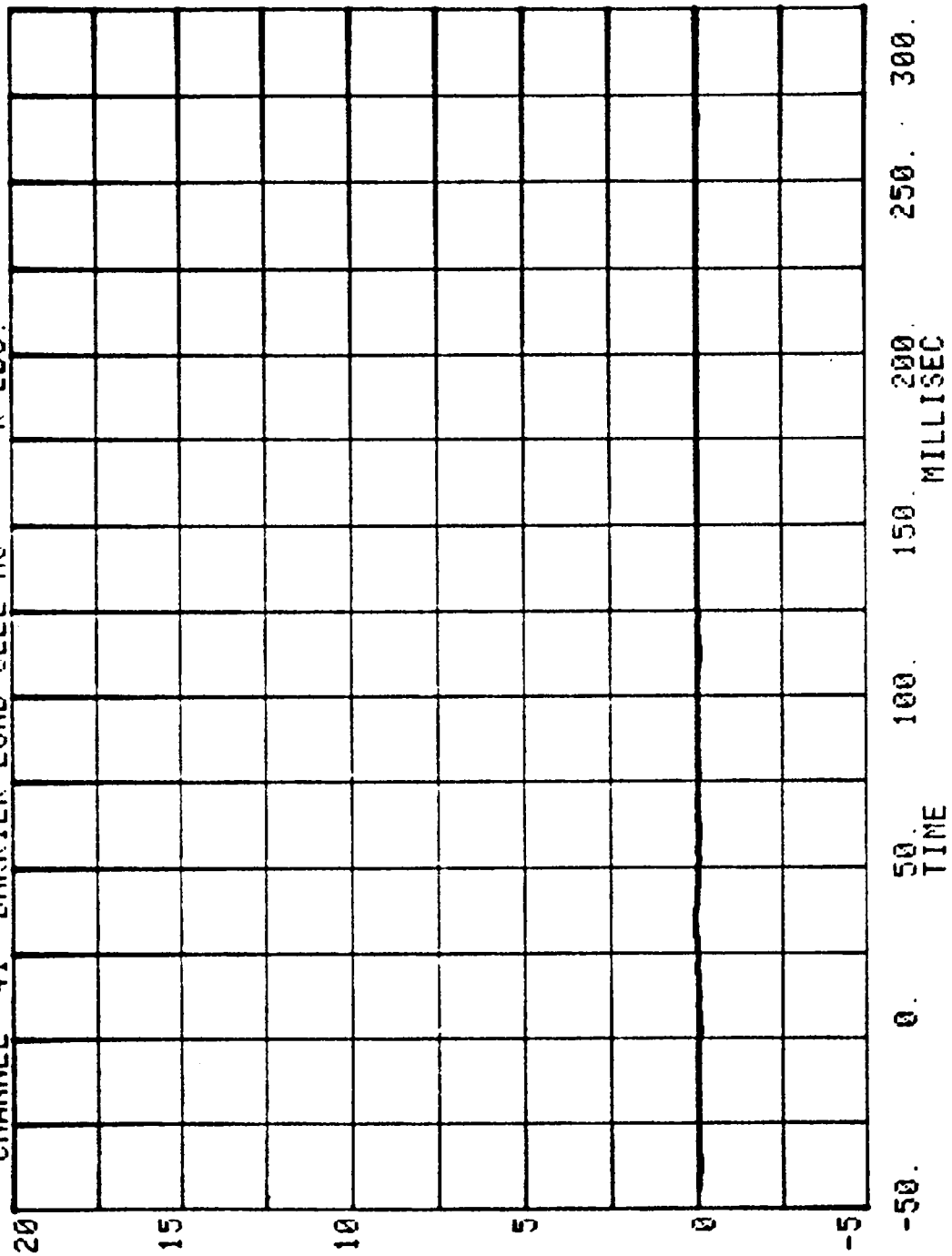
CHANNEL 39 BARRIER LOAD CELL AG 201 K LBS.



CHANNEL 40 BARRIER LOAD CELL A7 FUH= 875 SERIES= 201 LBS.

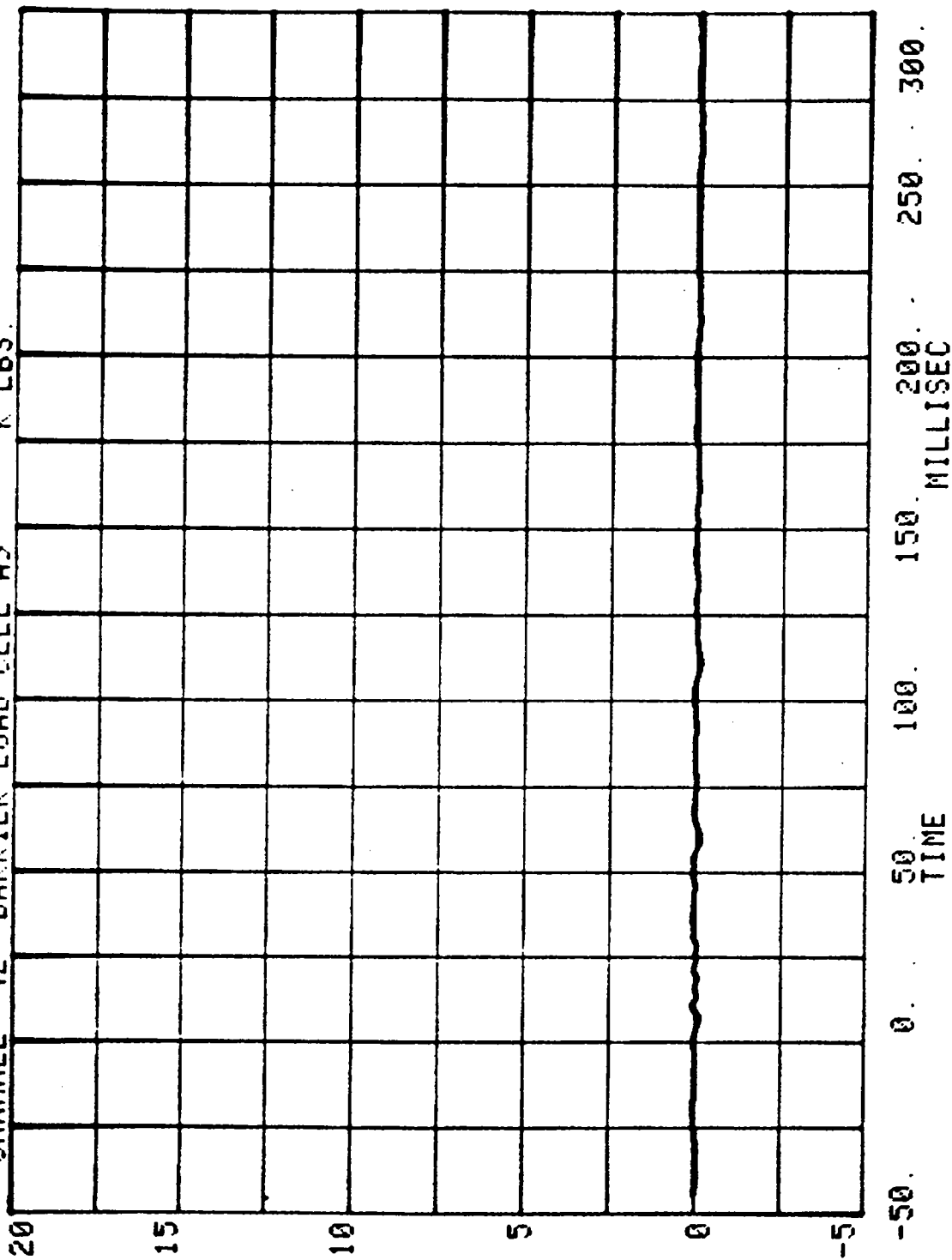


CHANNEL 41 BARRIER LOAD CELL A8
RUN= 875 SERIES= 201 K LBS.



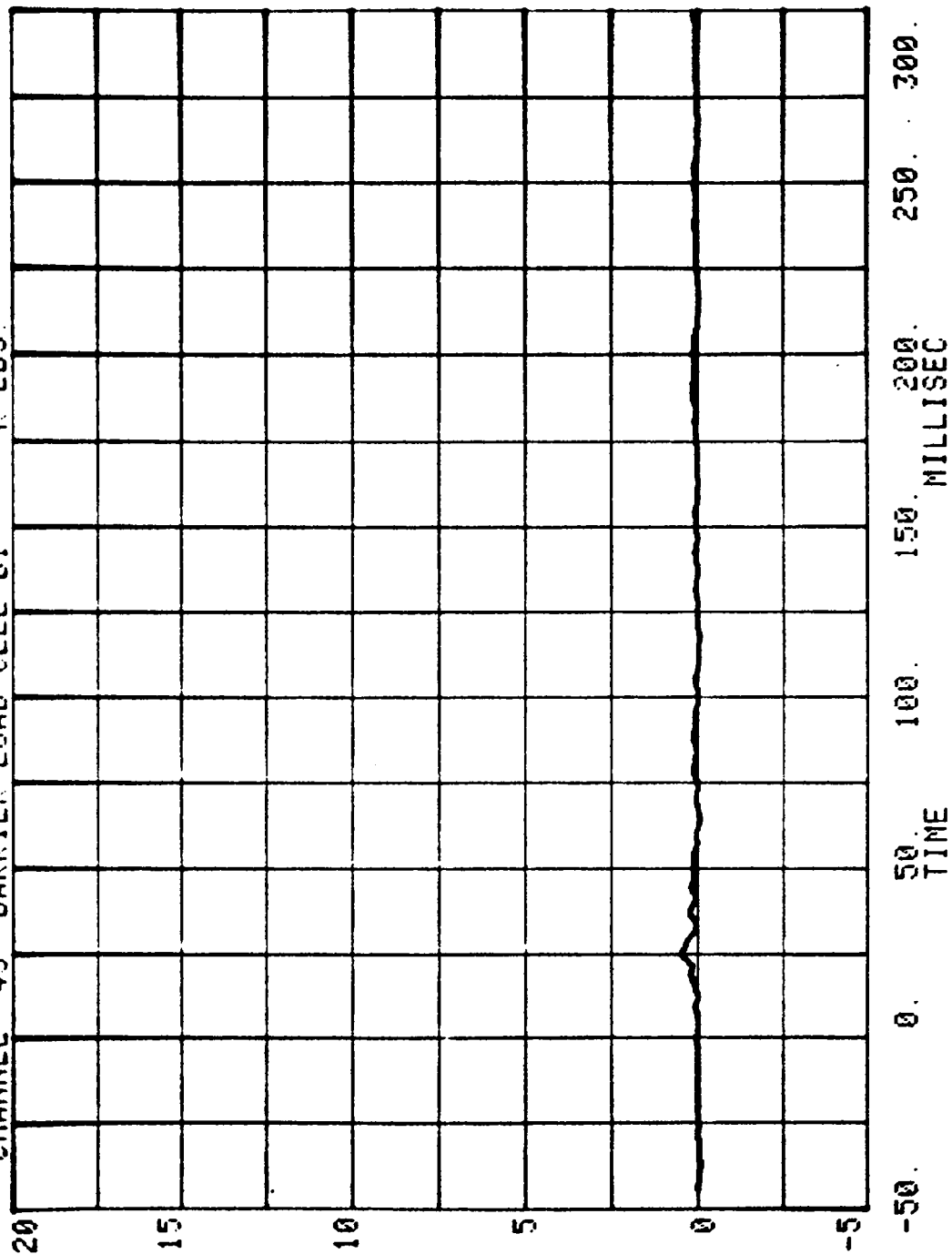
CHANNEL 42 BARRIER LOAD CELL #9 K LBS.

RUN= 875 SERIES= 201

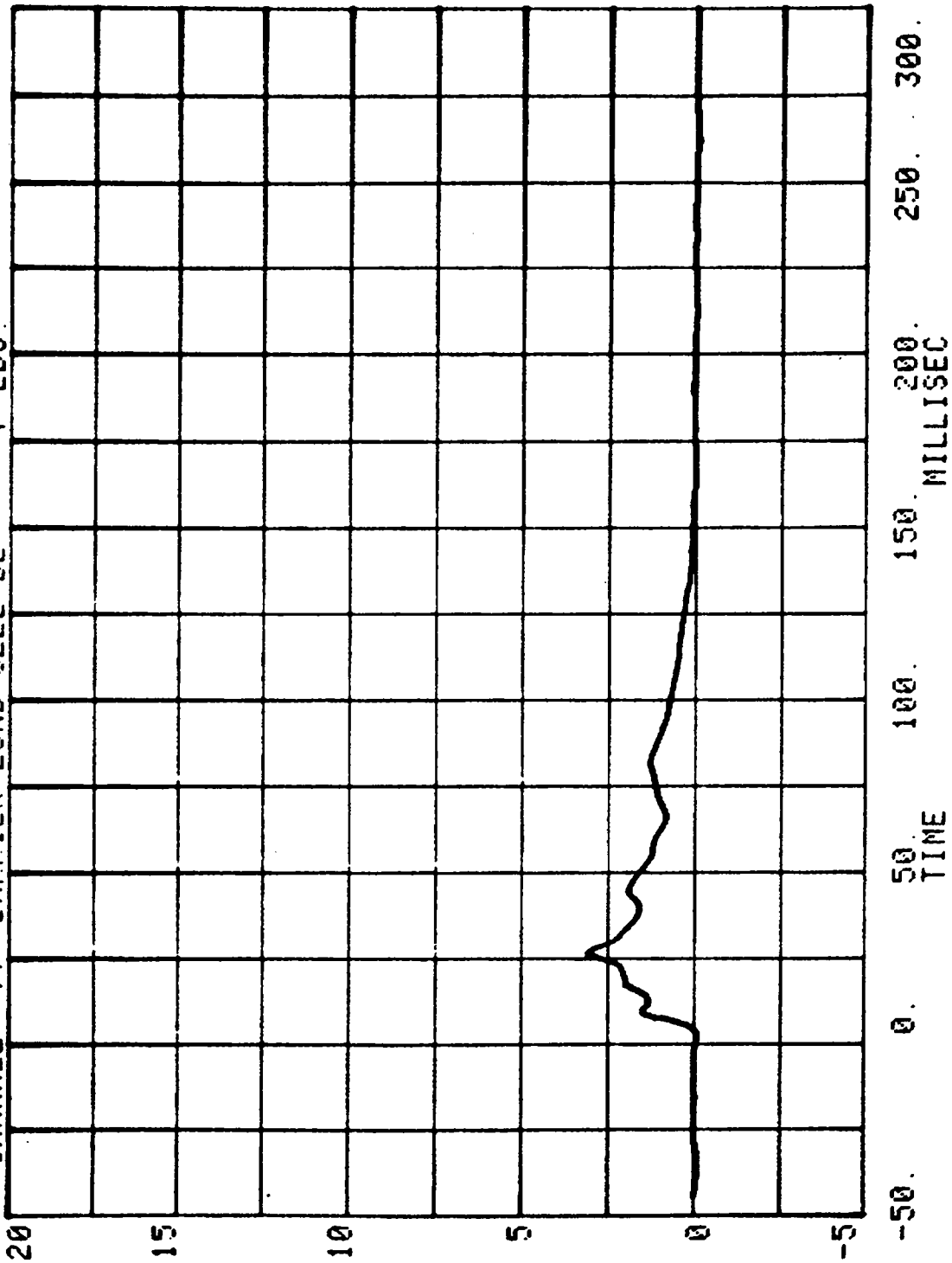


CHANNEL 43 BARRIER LOAD CELL B1 K LBS.

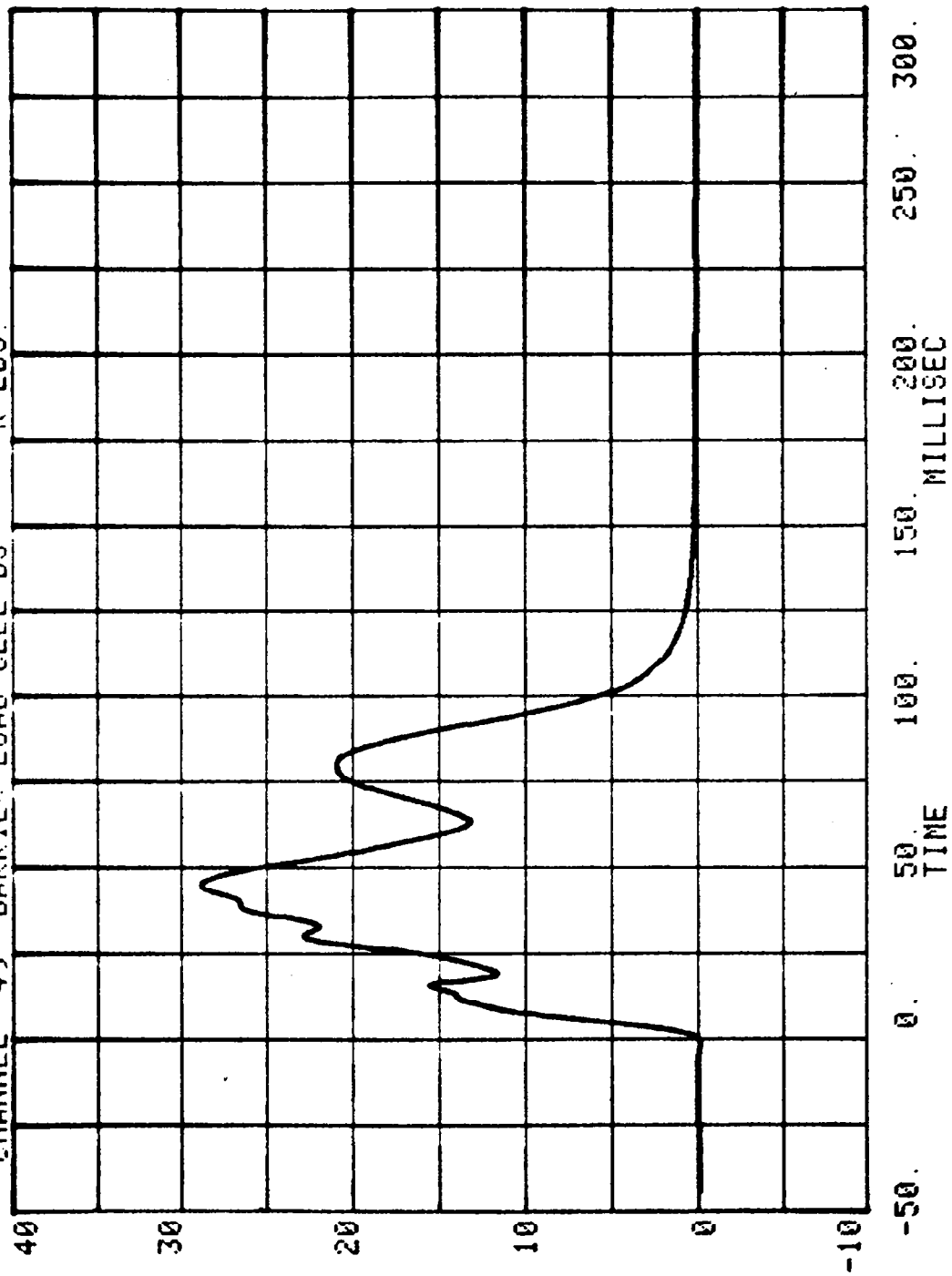
RUN= 875 SERIES= 201



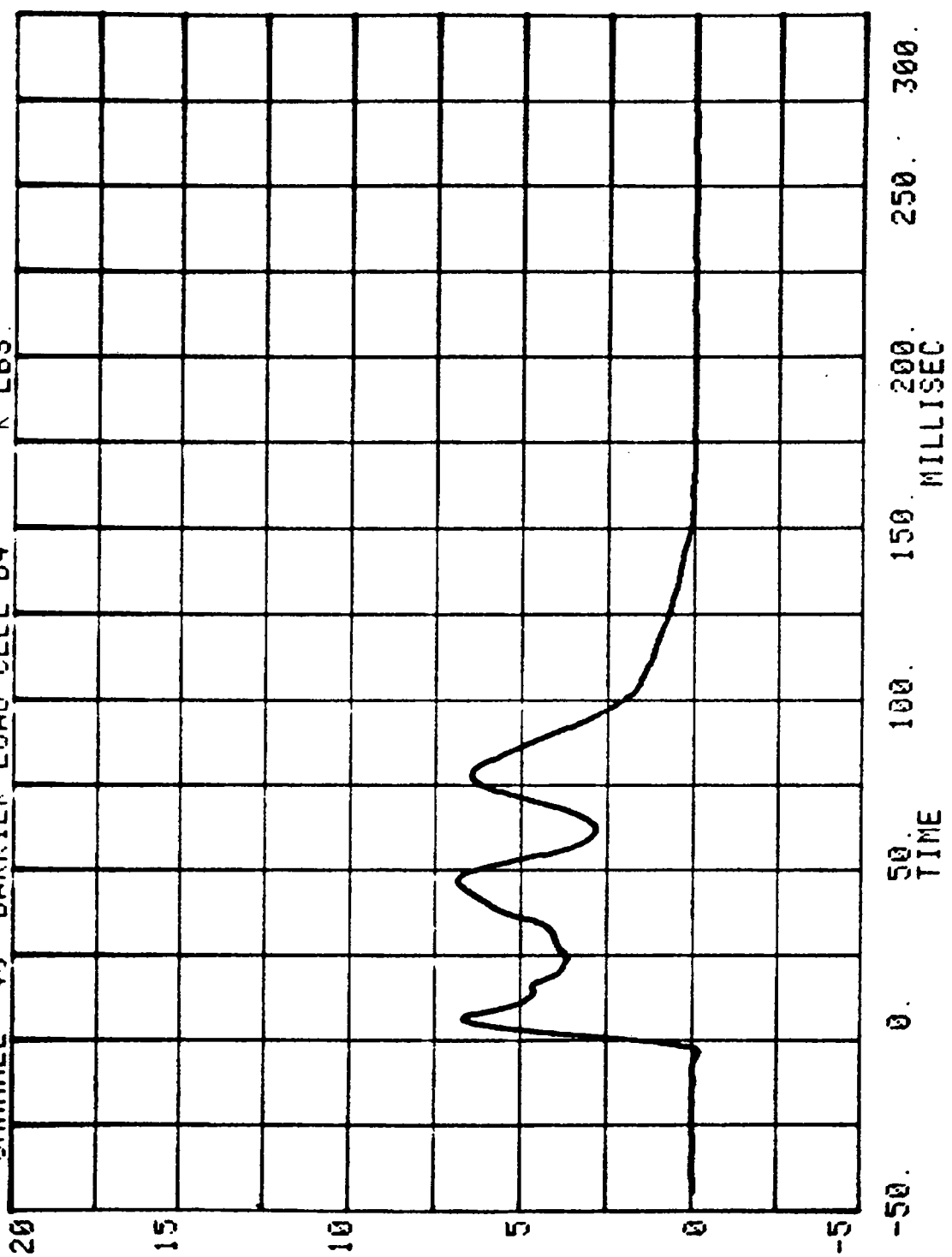
CHANNEL 44 RUH= 875 SERIES= 201 K LBS.
BARRIER LOAD CELL B2



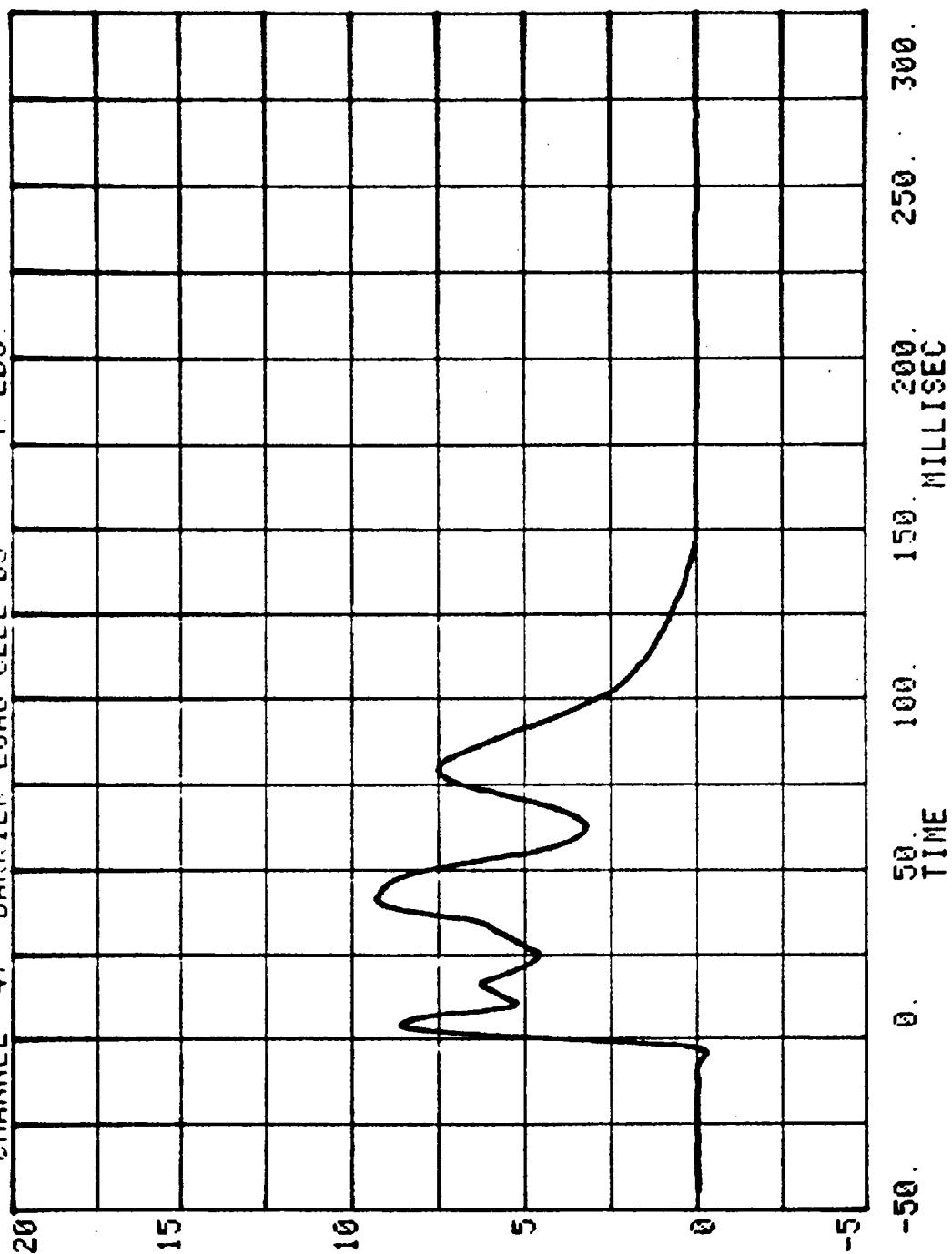
RUN= 875 SERIES= 201
CHANNEL 45 BARRIER LOAD CELL B3 K LBS.



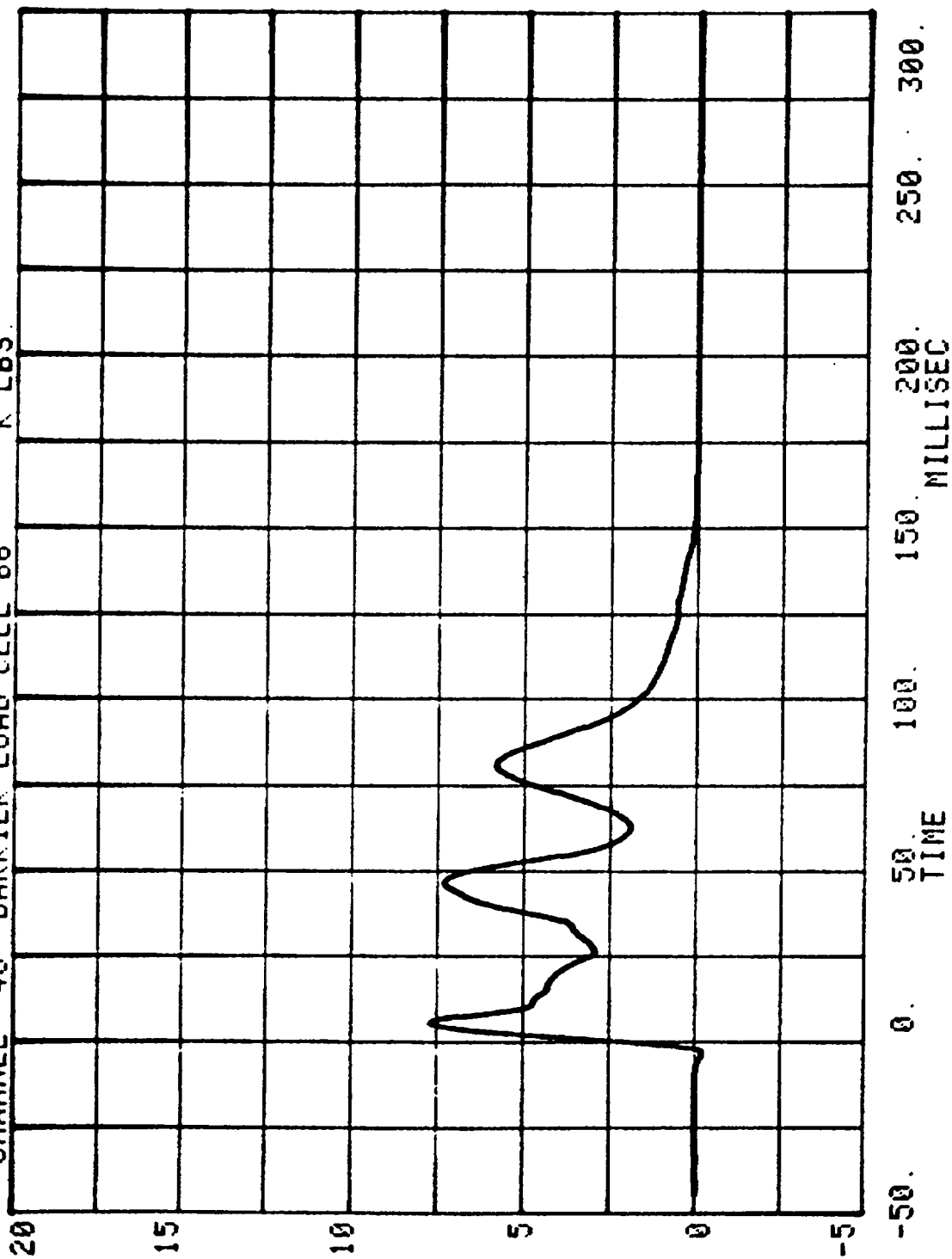
CHANNEL 46 BARRIER LOAD CELL B4 RUN= 375 SERIES= 201 K LBS.



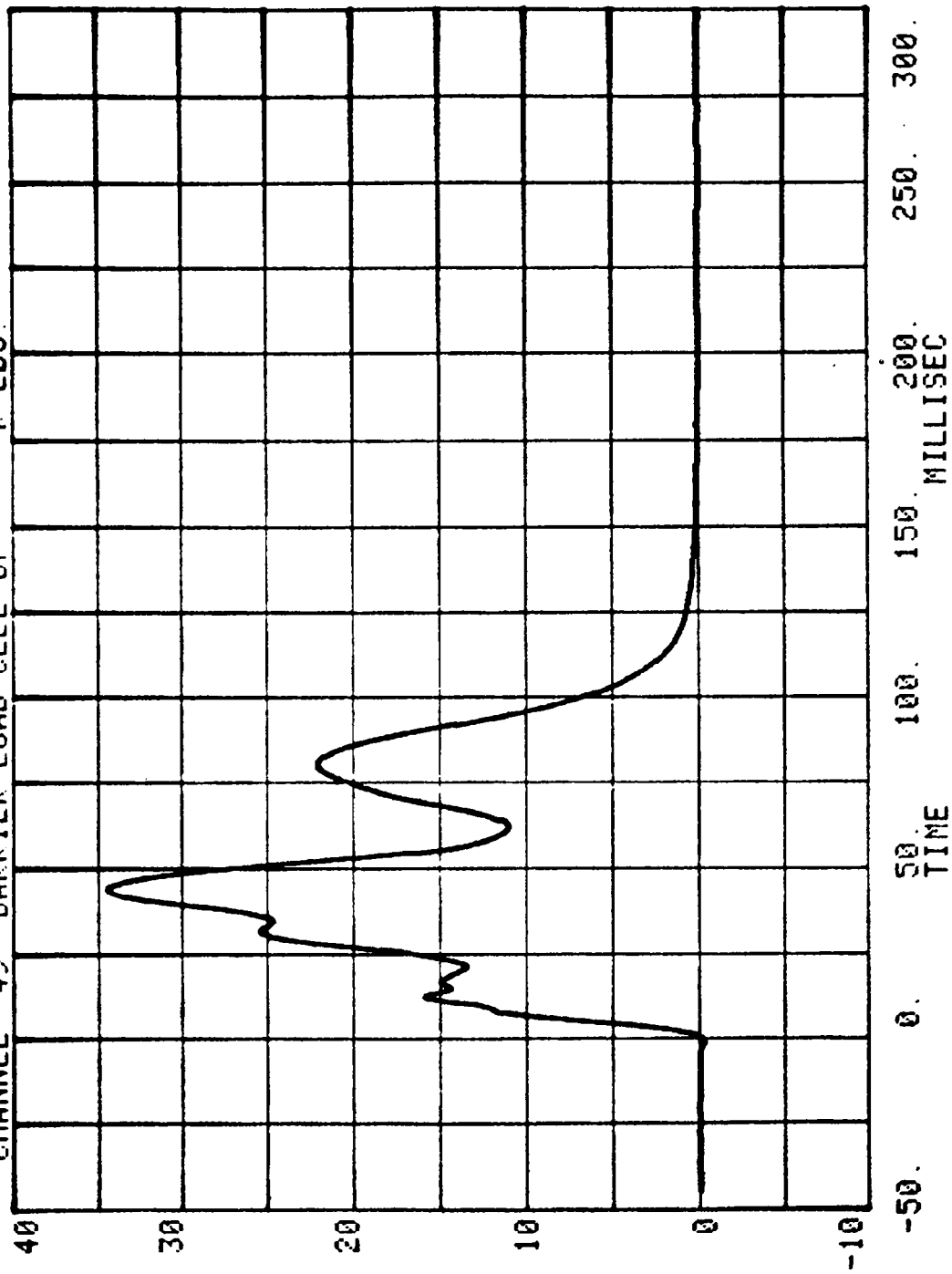
RUN= 875 SERIES= 201
CHANNEL 47 BARRIER LOAD CELL B5 LBS.



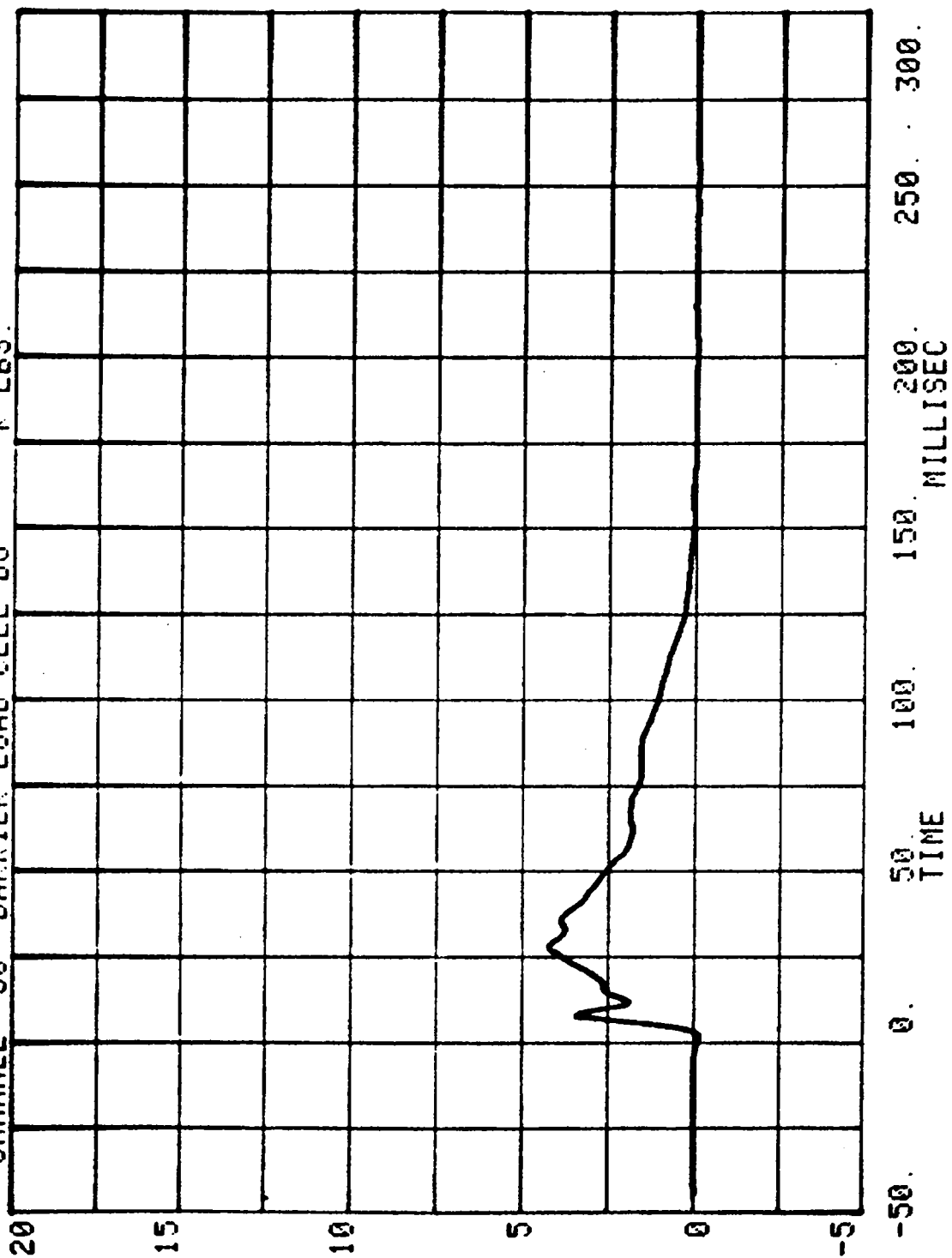
PUN= 875 SERIES= 201
CHANNEL 48 BARRIER LOAD CELL B6 K LBS



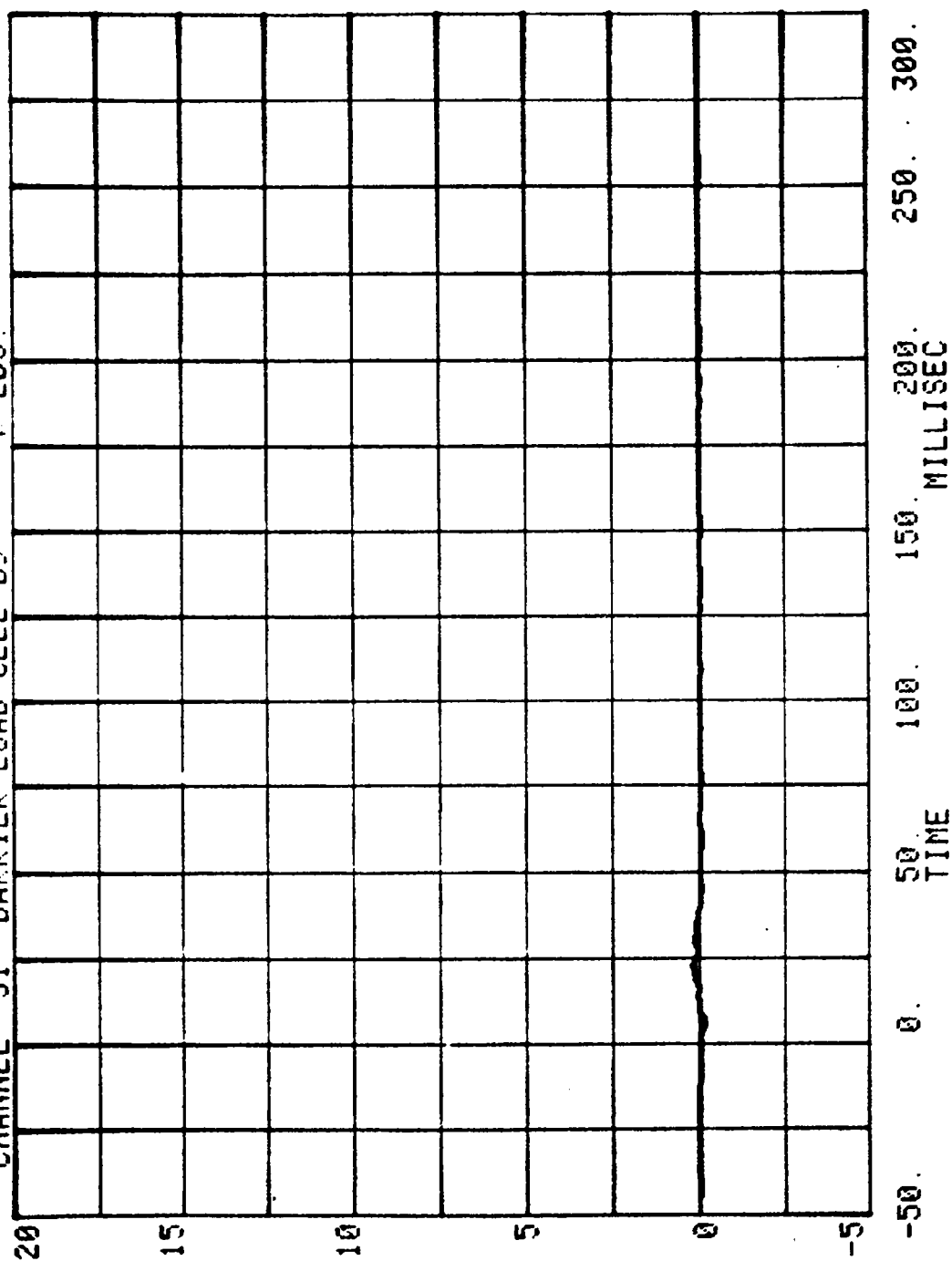
CHANNEL 49 BARRIER LOAD CELL B7
RUI= 875 SERIES= 201 K LBS



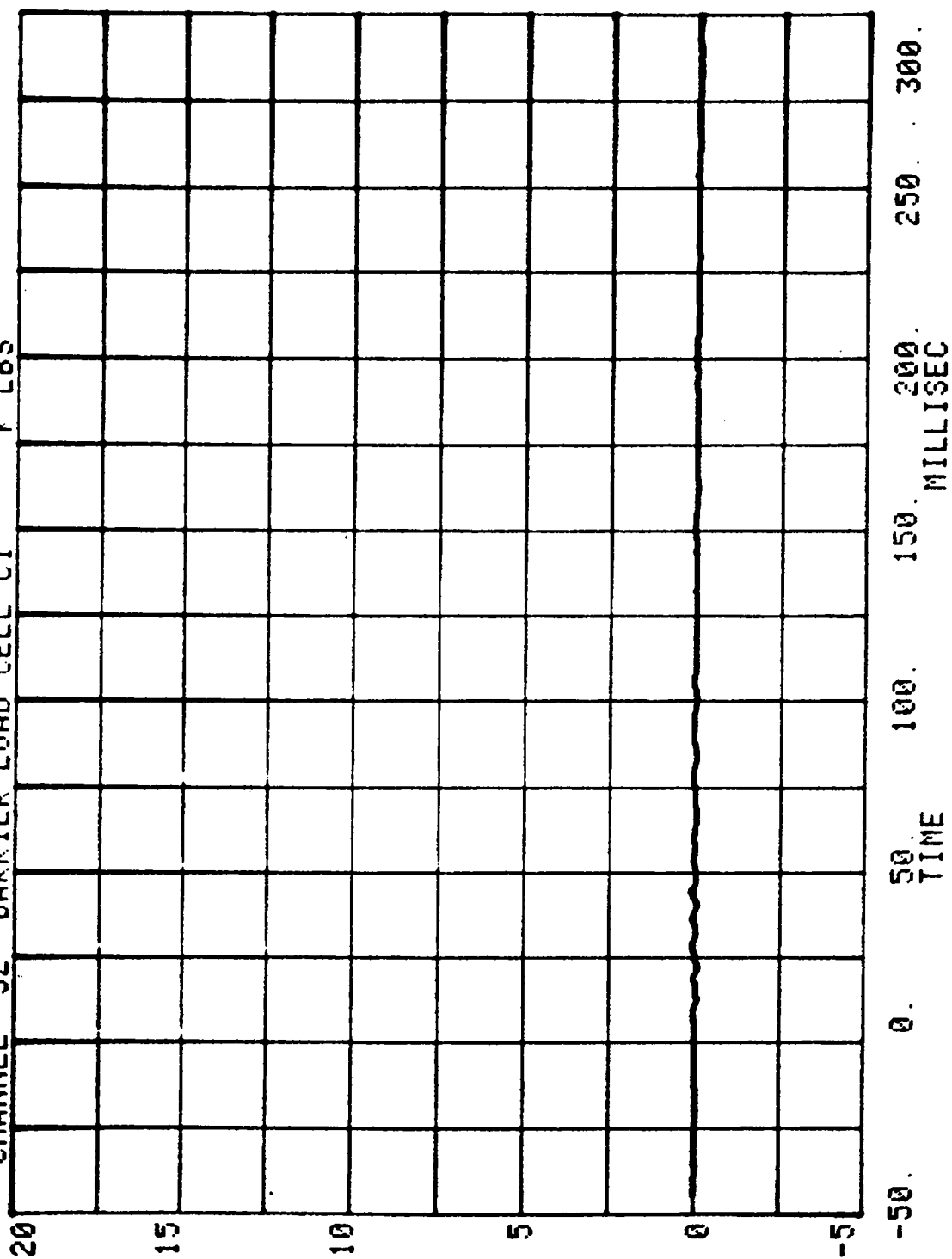
CHANNEL 50 BARRIER LOAD CELL B8 RUN= 875 SERIES= 201 K LBS.



RUN= 875 SERIES= 201
CHANNEL 51 BARRIER LOAD CELL 69 K LBS.

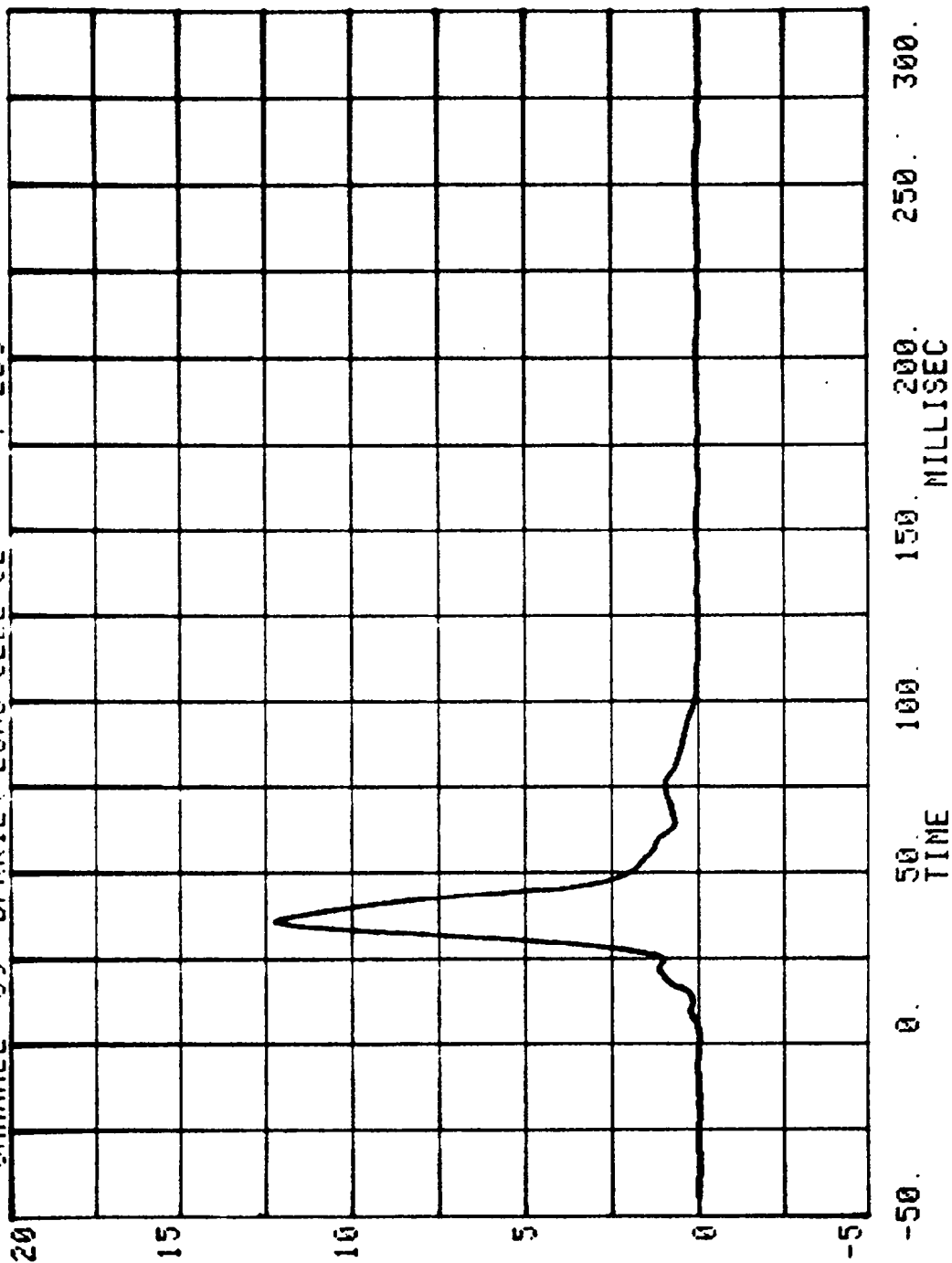


CHANNEL 52 RUH= 875 SERIES= 201
BARRIER LOAD CELL C1 LBS

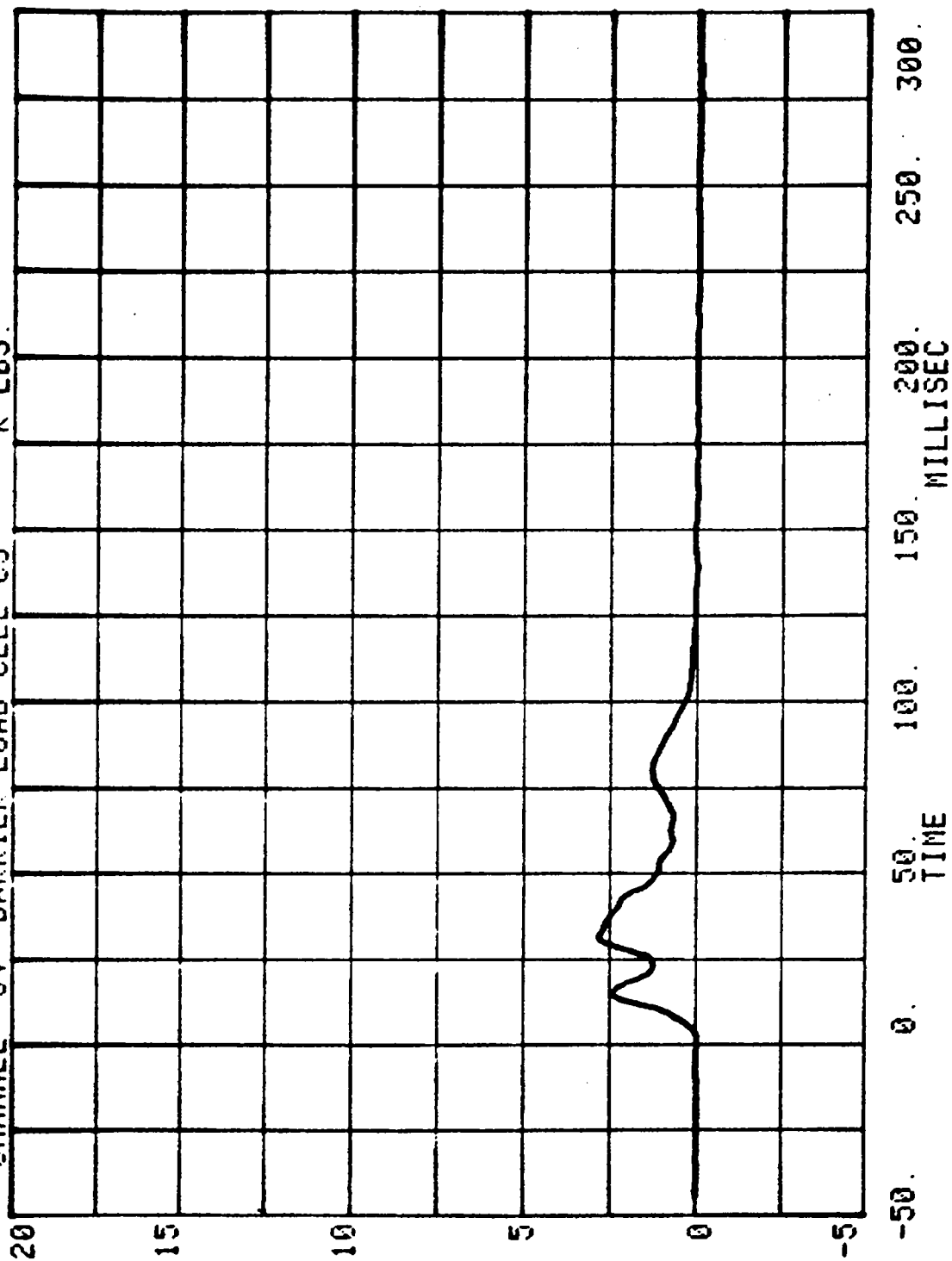


CHANNEL 53 BARRIER LOAD CELL C2 K LBS

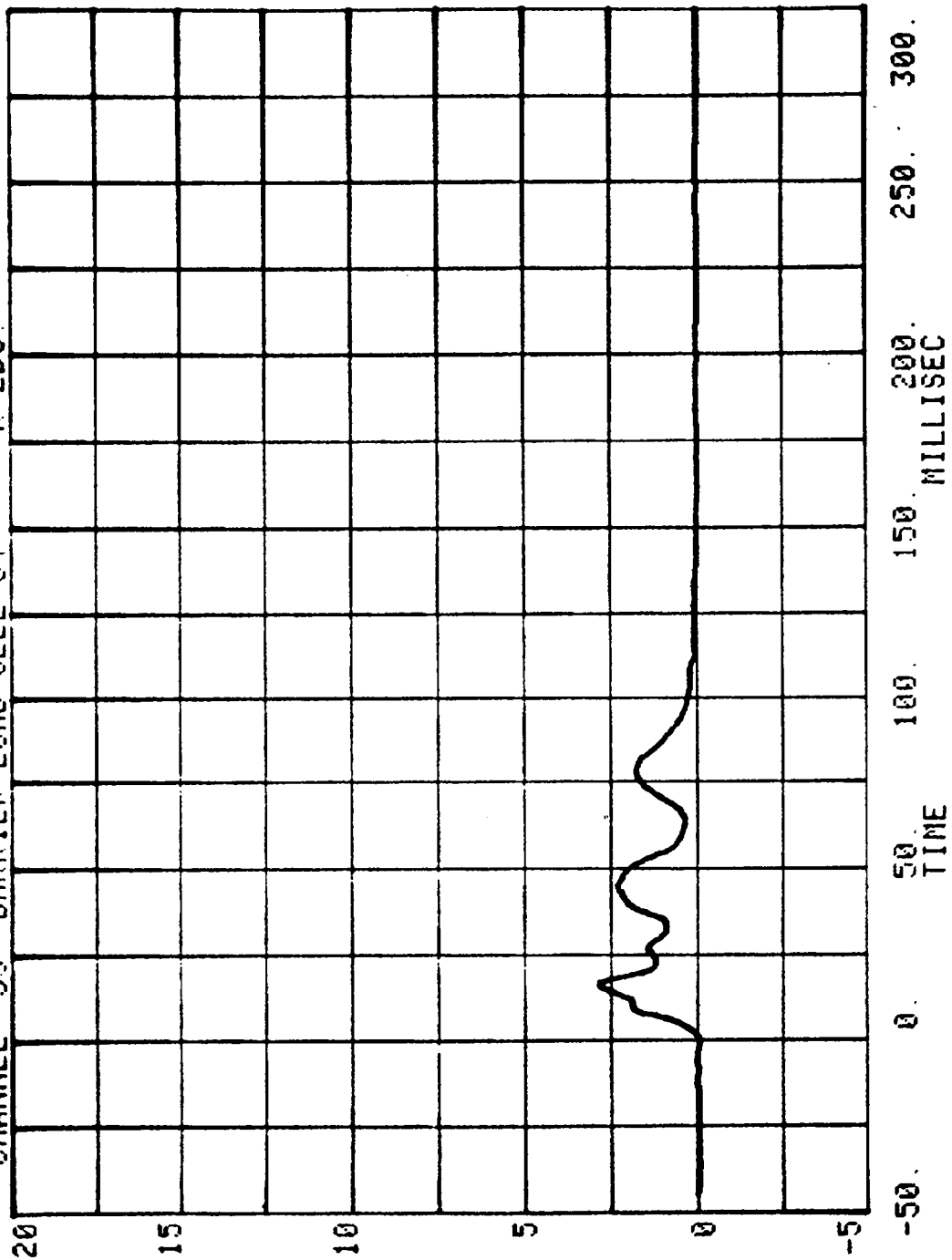
RUN= 875 SERIES= 201



RUN= 875 SERIES= 201
CHANNEL 54 BARRIER LOAD CELL C3 K LBS.

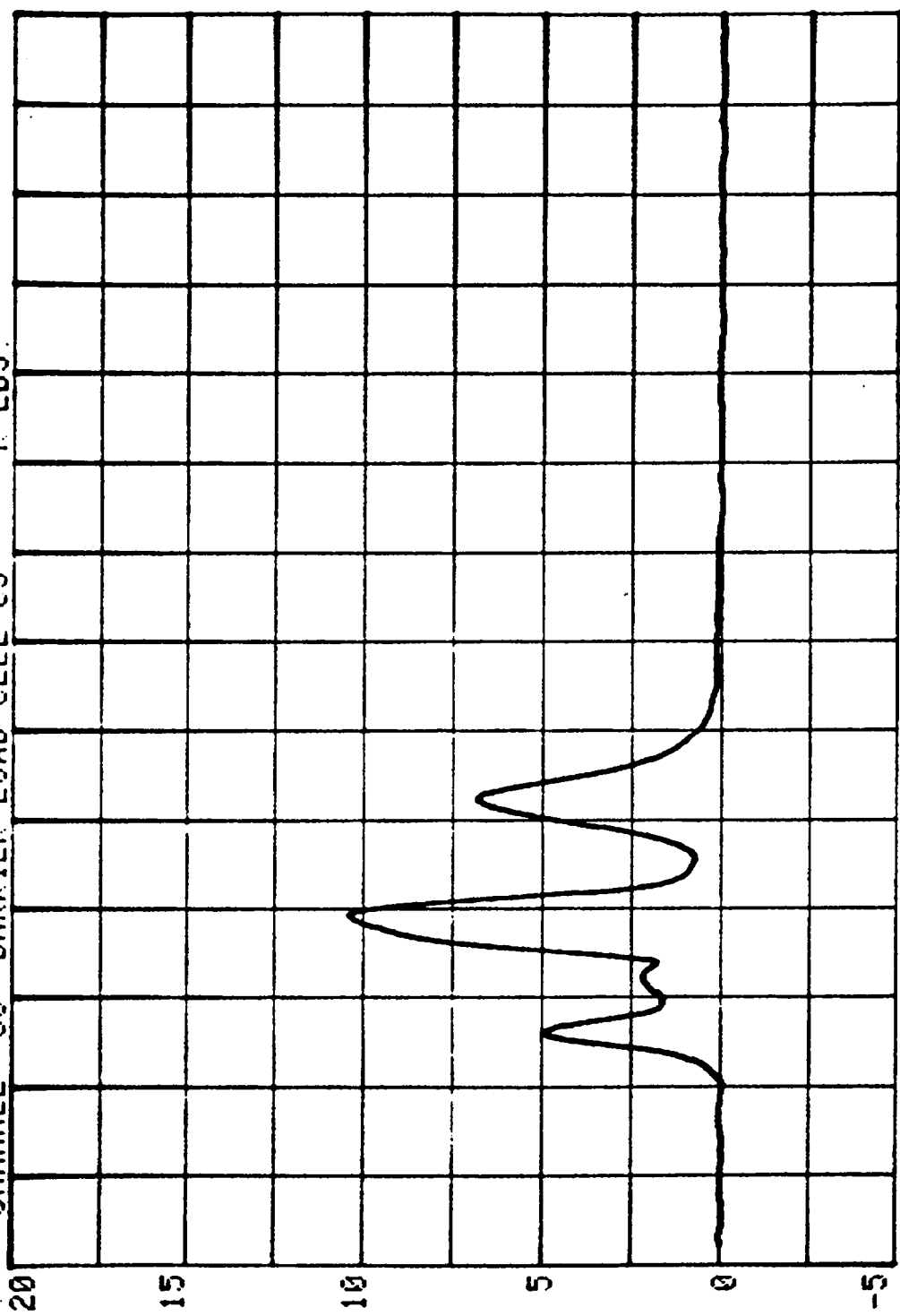


CHANNEL 55 BARRIER LOAD CELL C4 FUN= 375 SERIES= 201 K LBS.



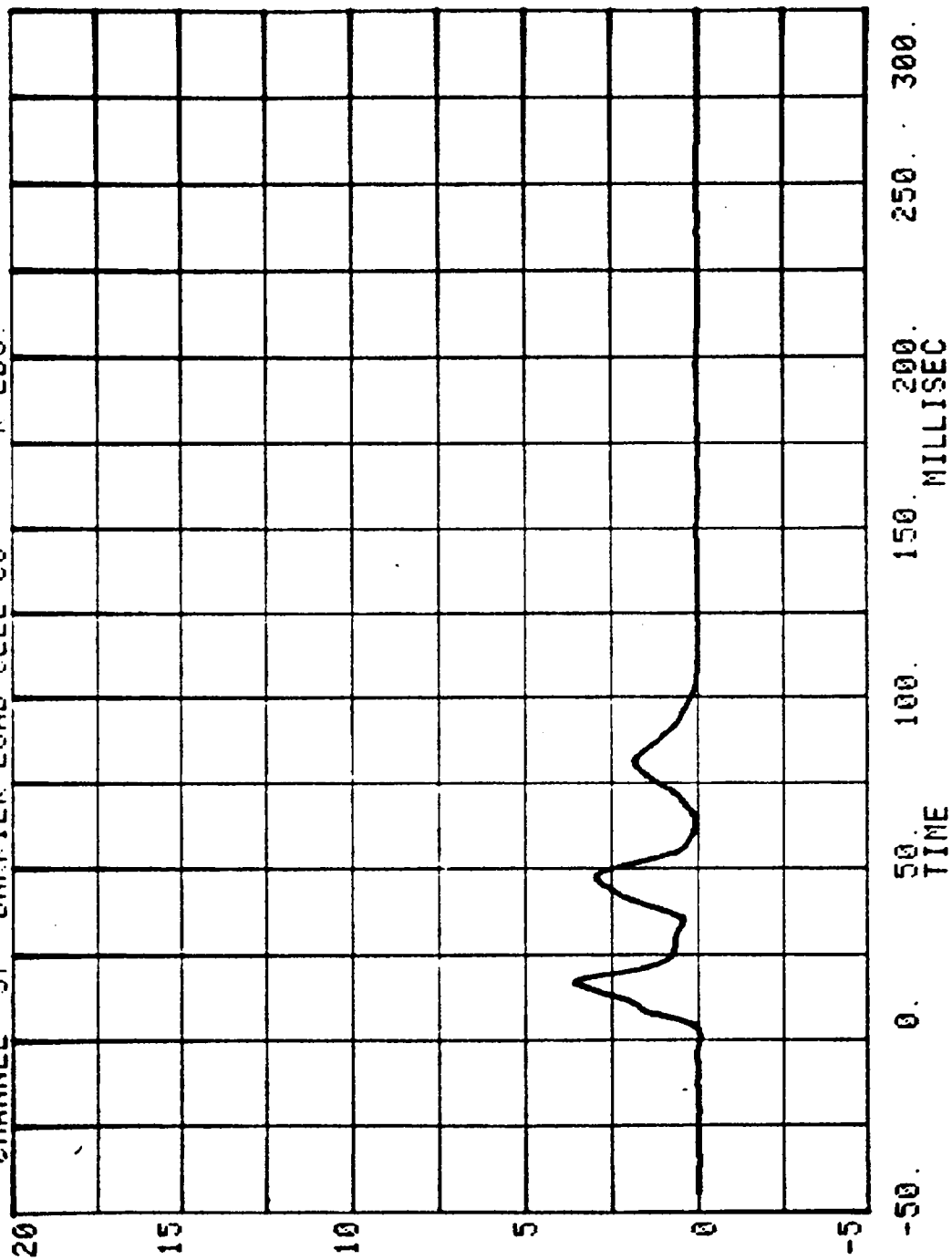
CHANNEL 56 BARRIER LOAD CELL 05 K LBS.

RUN= 875 SERIES= 201

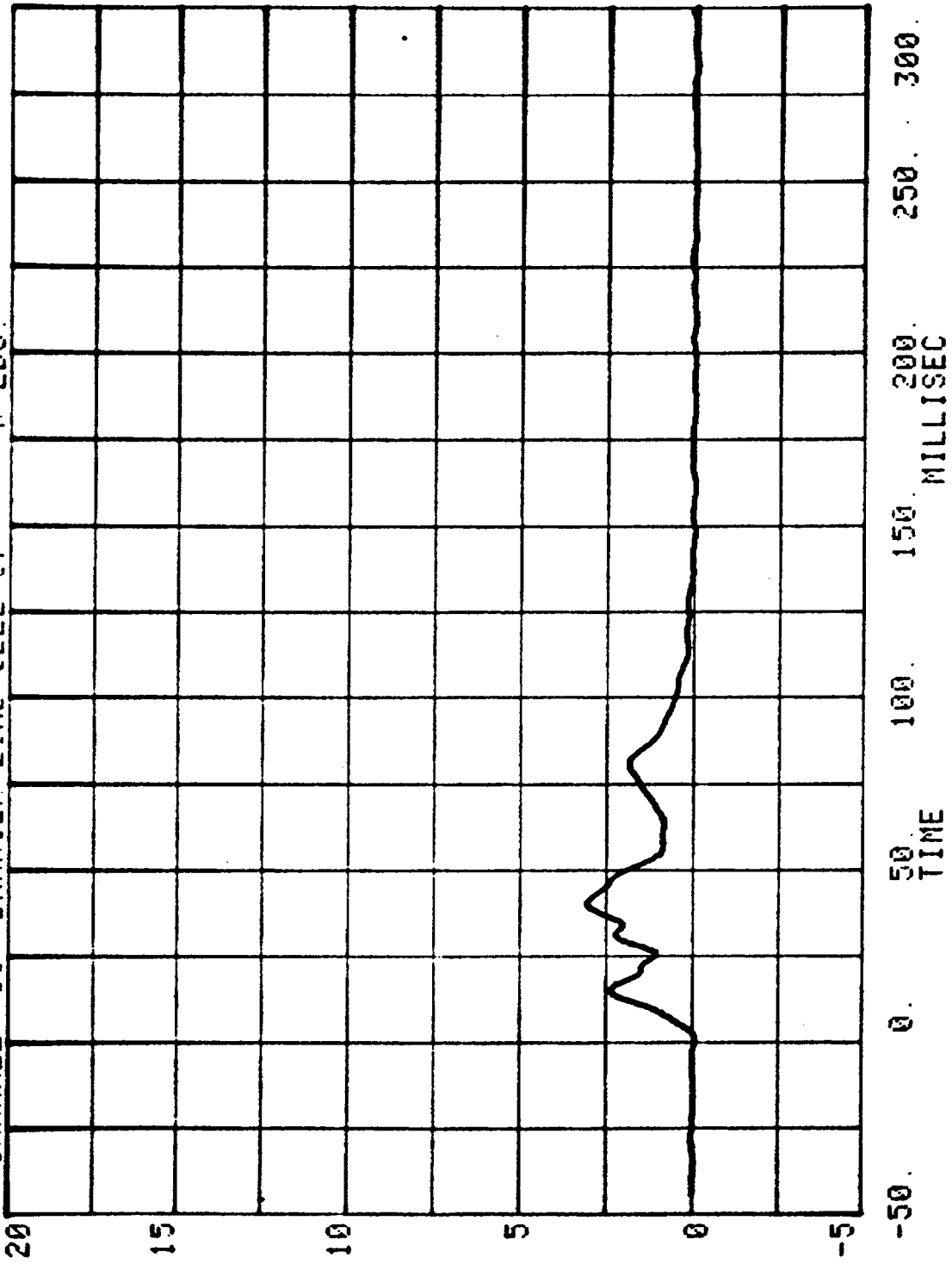


CHANNEL 57 BARRIER LOAD CELL C6 K LBS.

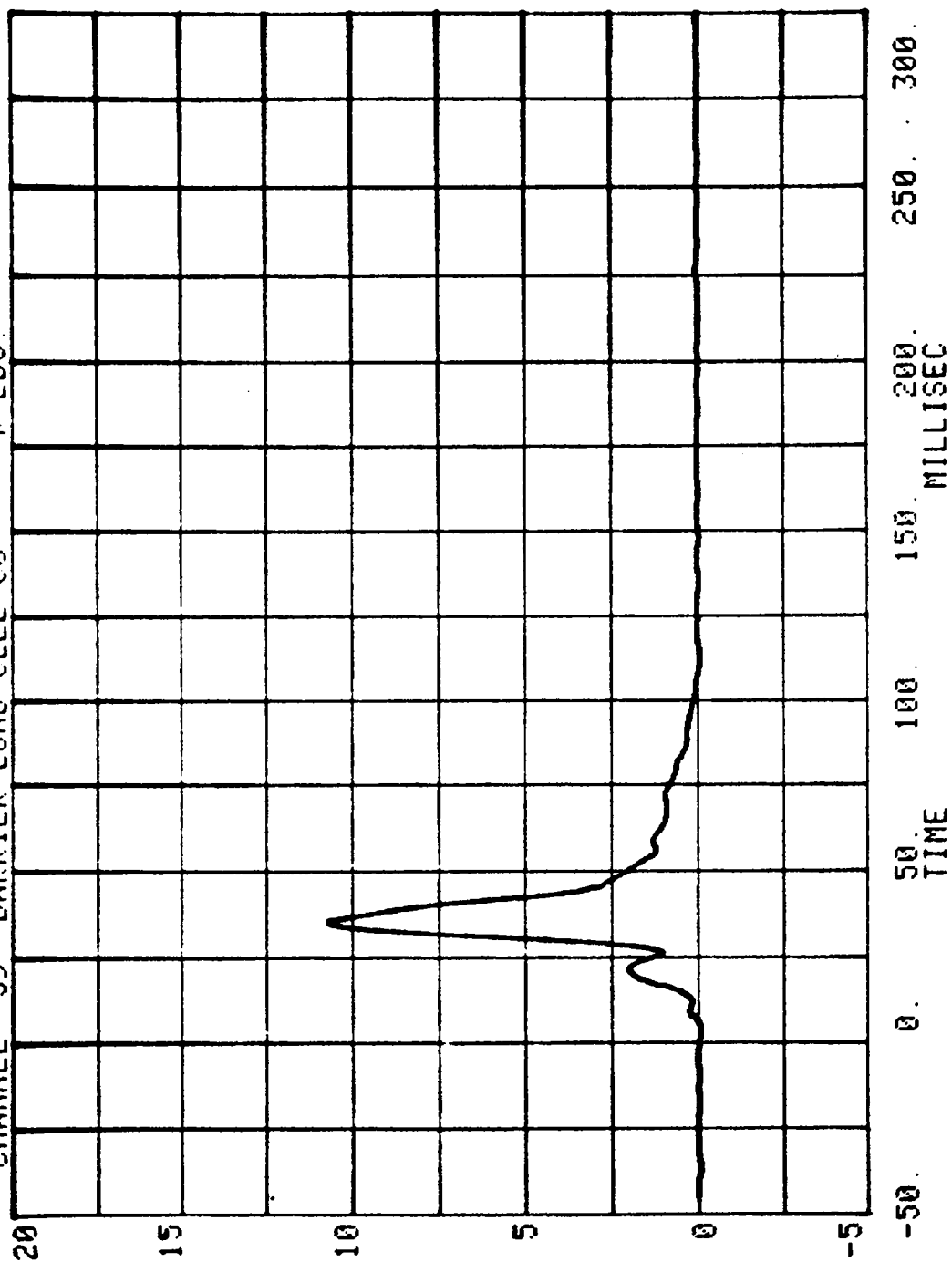
RUN= 875 SERIES= 201



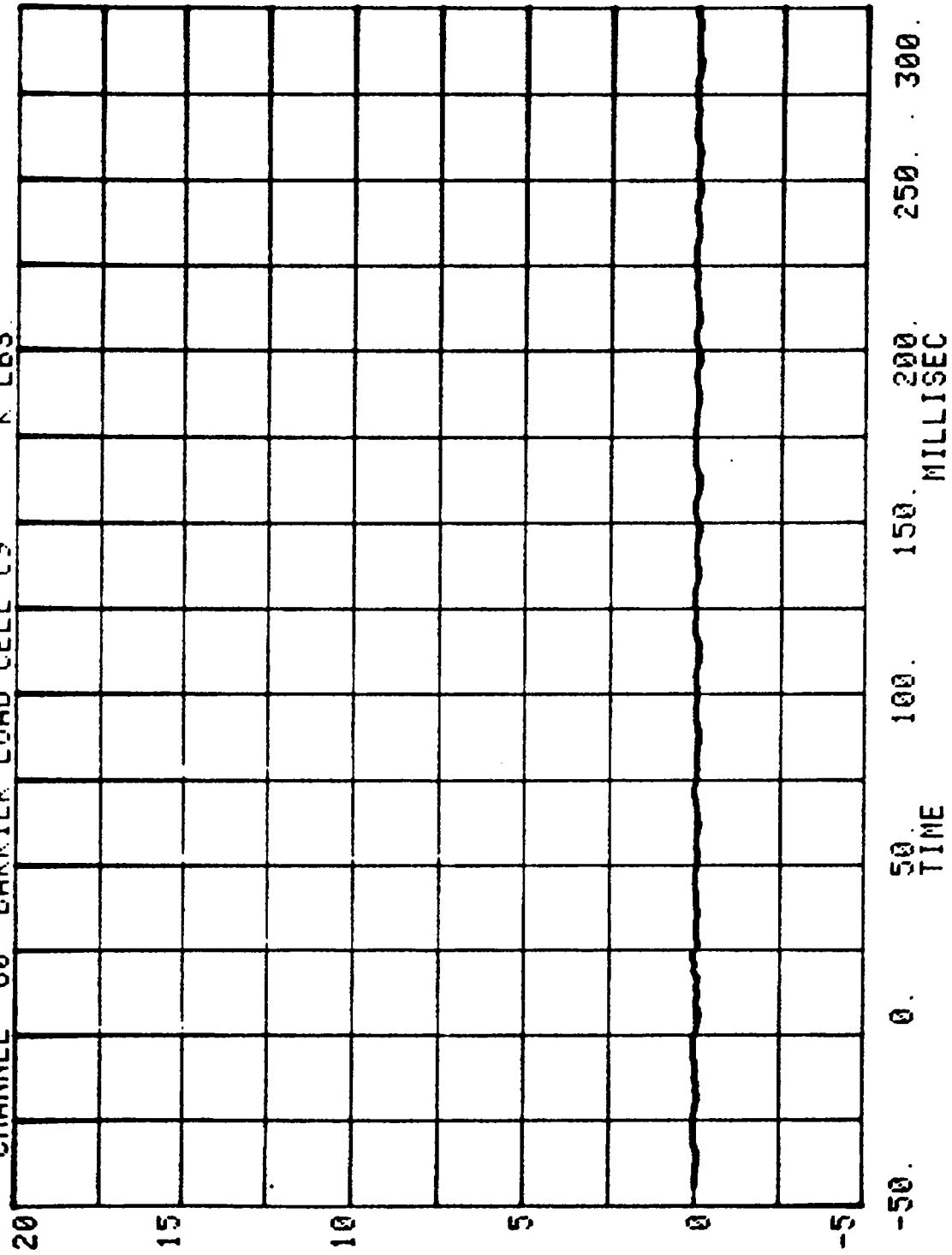
CHANNEL 58 BARRIER LOAD CELL C7
RUN= 875 SERIES= 201 K LBS.



CHANNEL 59 BARRIER LOAD CELL C8
RUN= 875 SERIES= 201 K LBS.

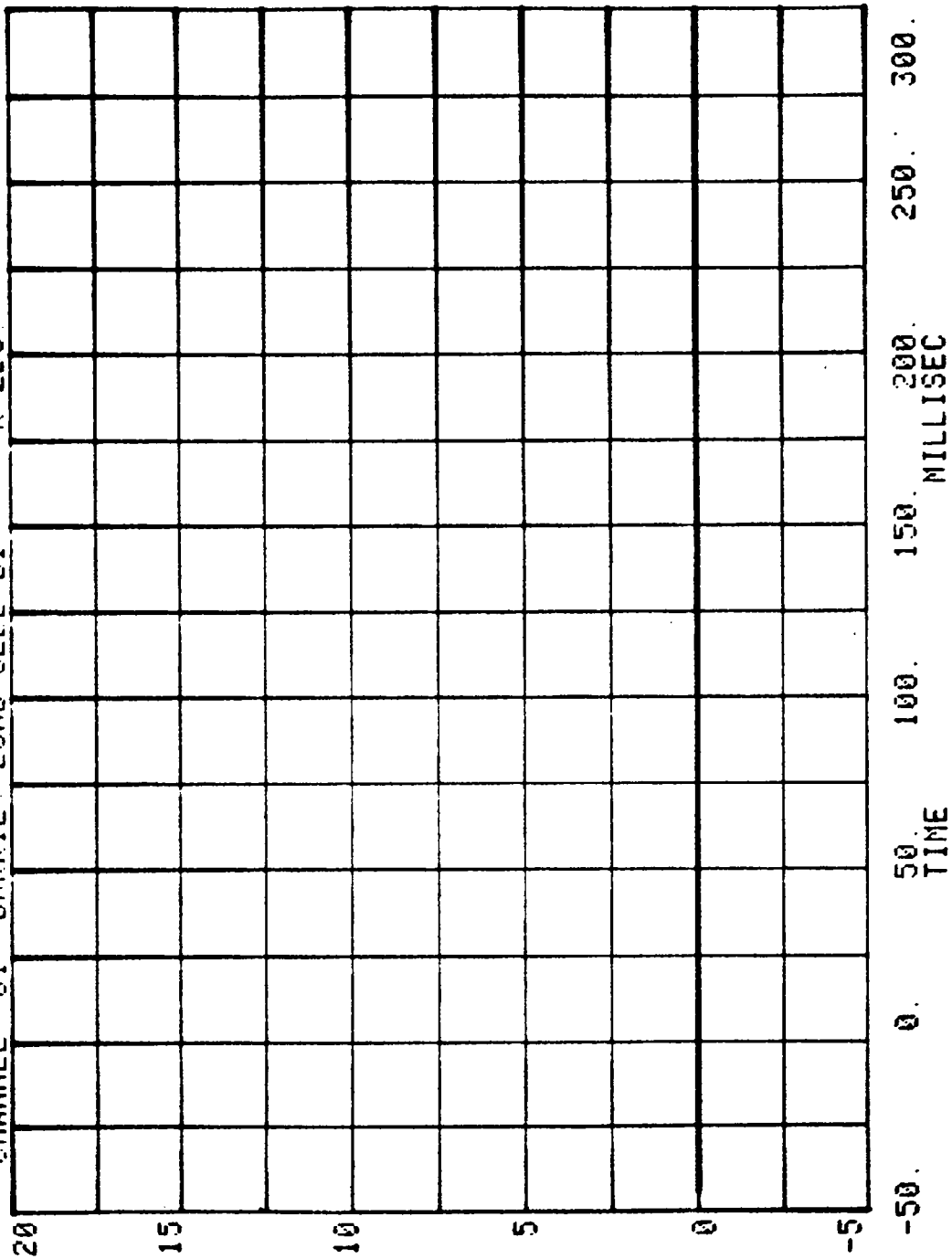


CHANNEL 60 BARRIER LOAD CELL C9 RUH= 875 SERIES= 201 K LBS



CHANNEL 61 BARRIER LOAD CELL 01 K LBS

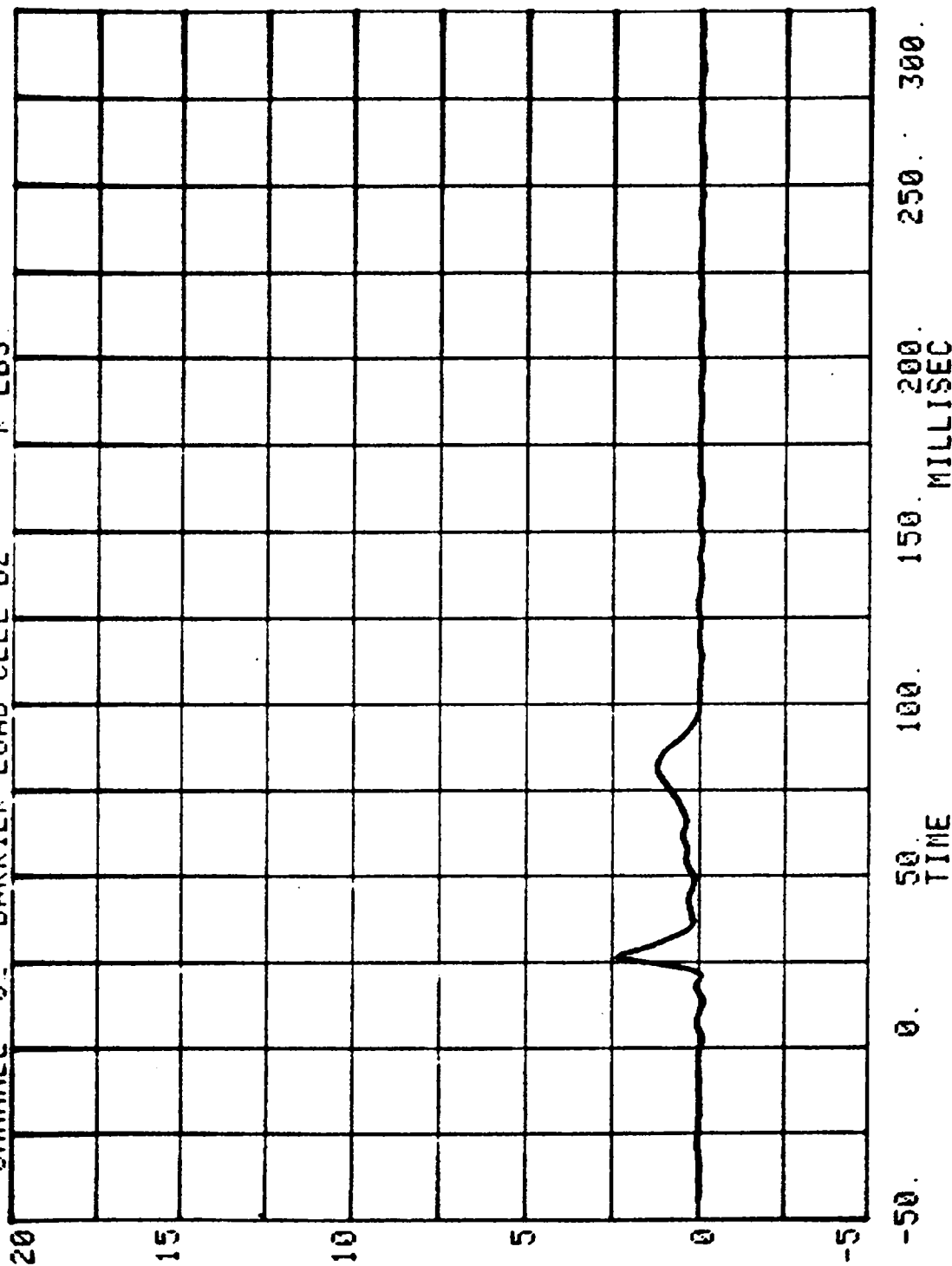
RUN= 875 SERIES= 201



CHANNEL 62 BARRIER LOAD CELL D2

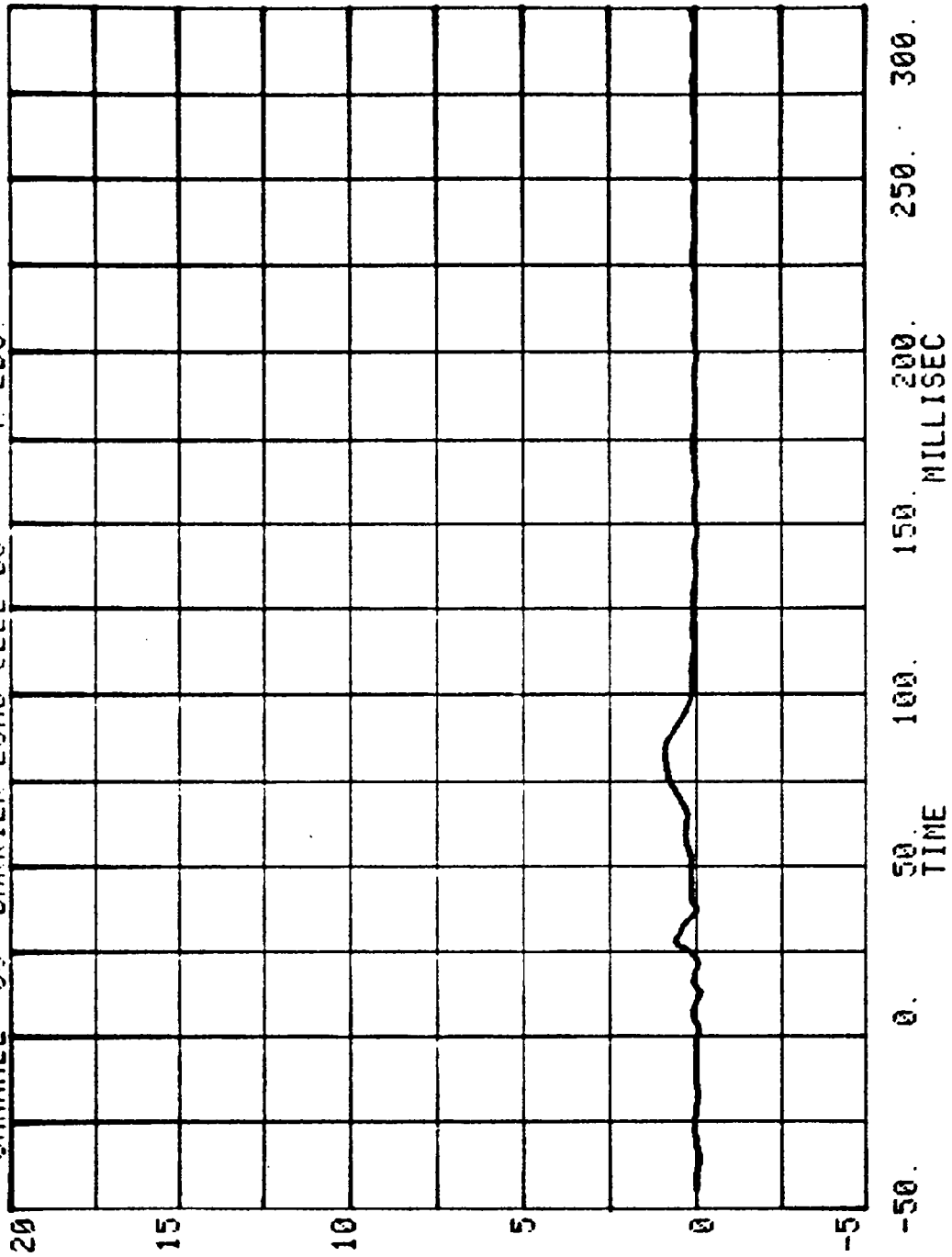
PUN= 875 SERIES= 201

LBS



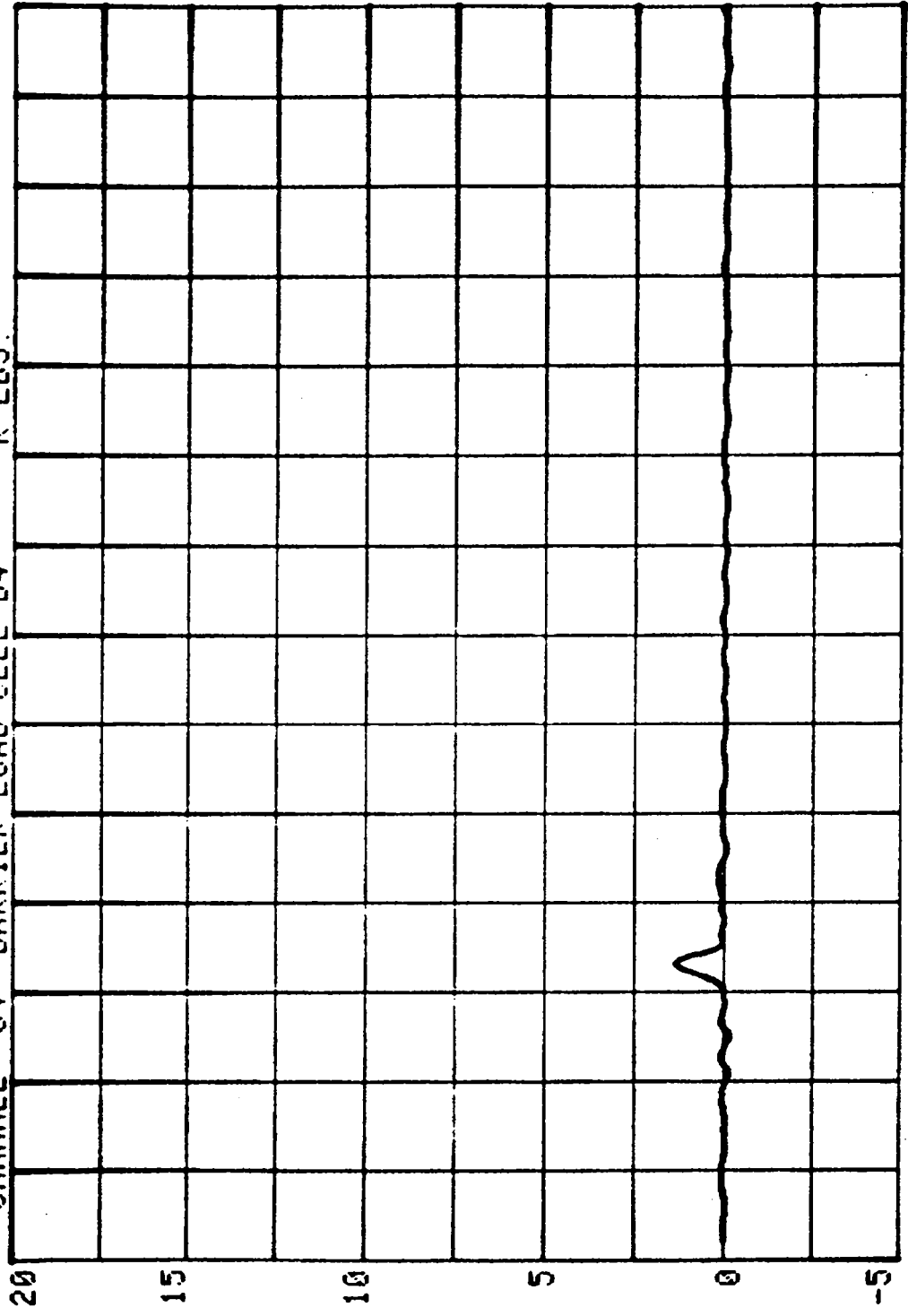
CHANNEL 63 BARRIER LOAD CELL 03 K LBS.

RUN= 875 SERIES= 201



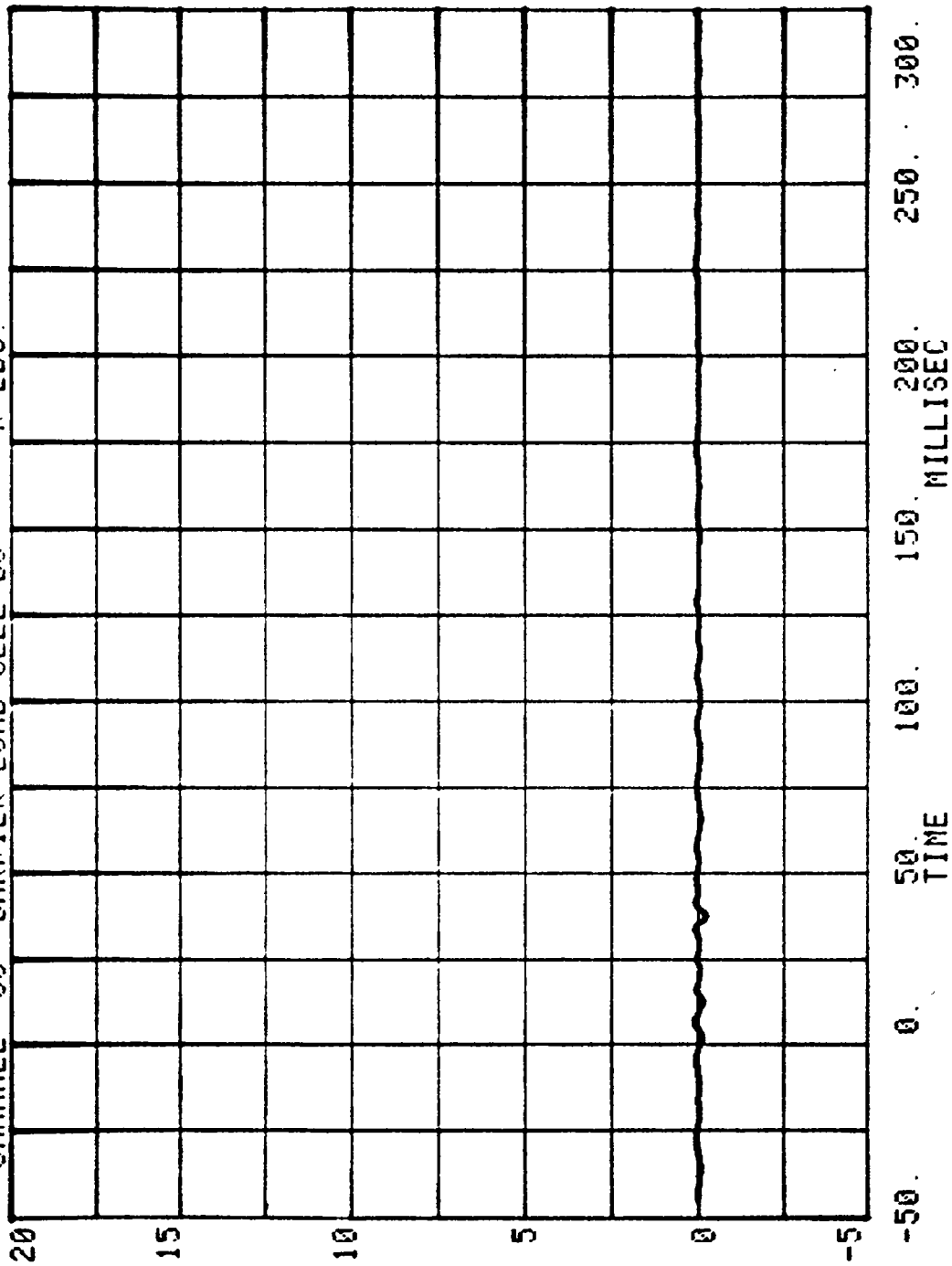
CHANNEL 64 BARRIER LOAD CELL D4 K LBS.

PUN# 975 SERIES# 201

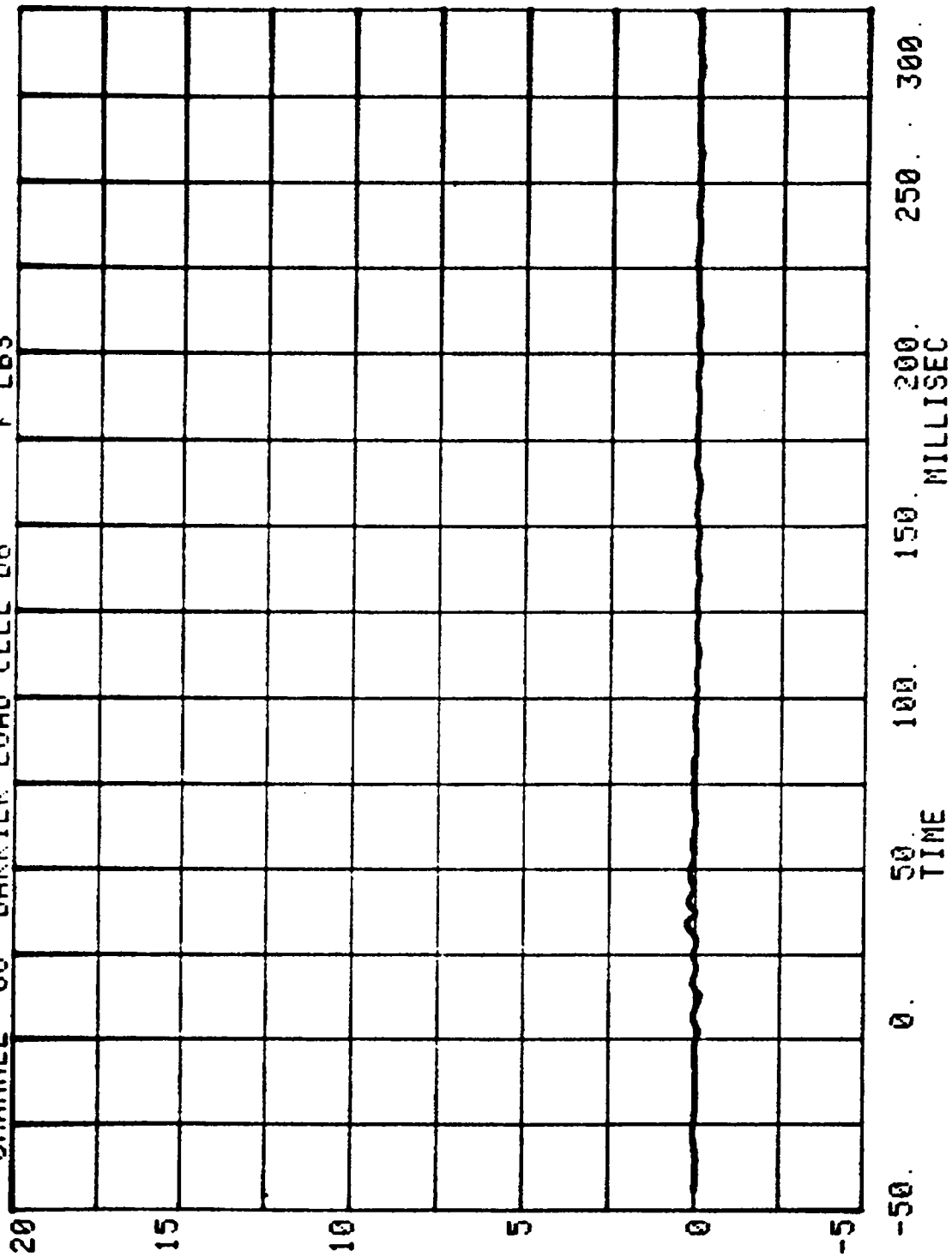


TIME
-50. 0. 50. 100. 150. 200. 250. 300.
MILLISEC

RUN= 875 SERIES= 201 K LBS.
CHANNEL 65 BARRIER LOAD CELL 05

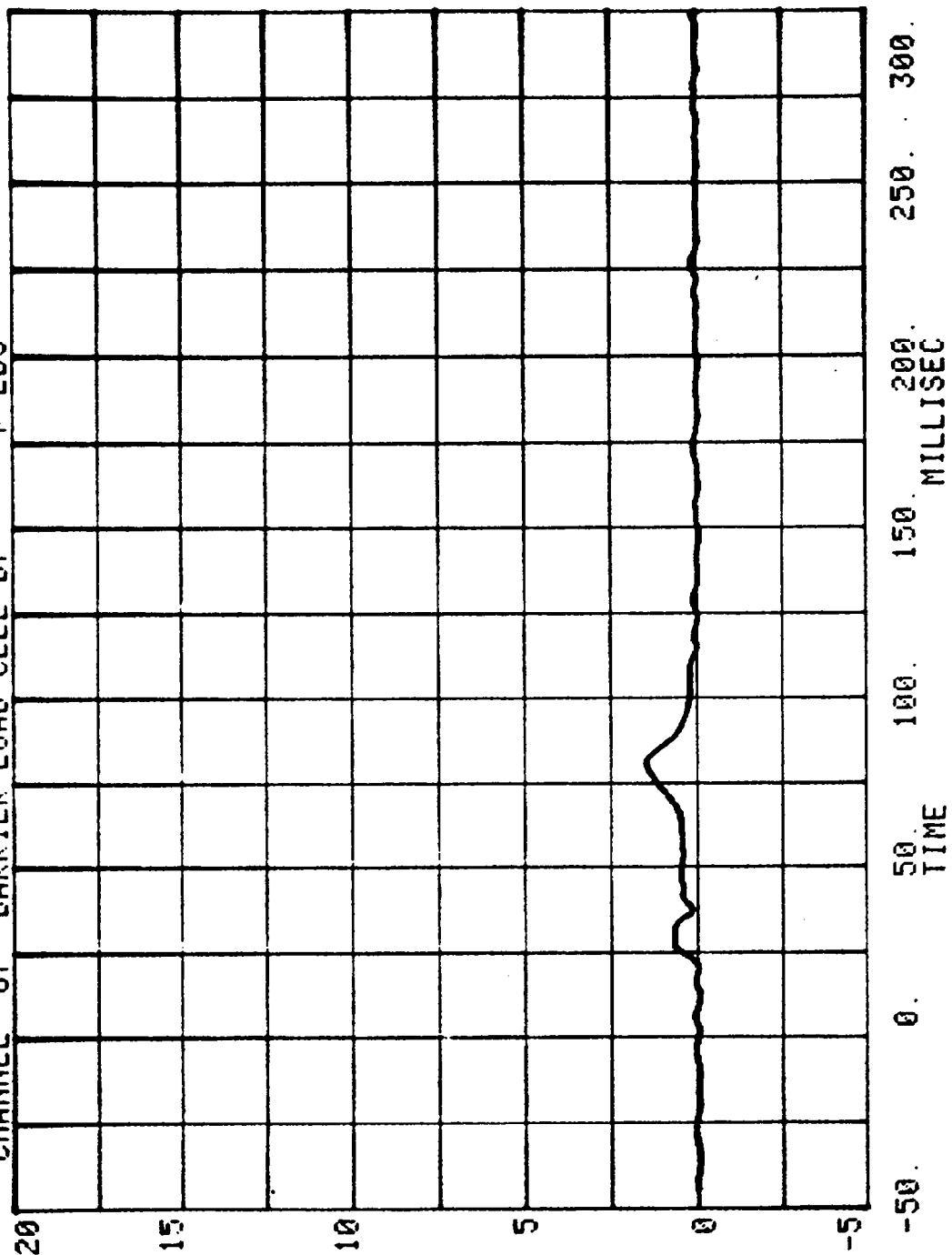


CHANNEL 66 RUN= 875 SERIES= 201
BARRIER LOAD CELL D6 LBS

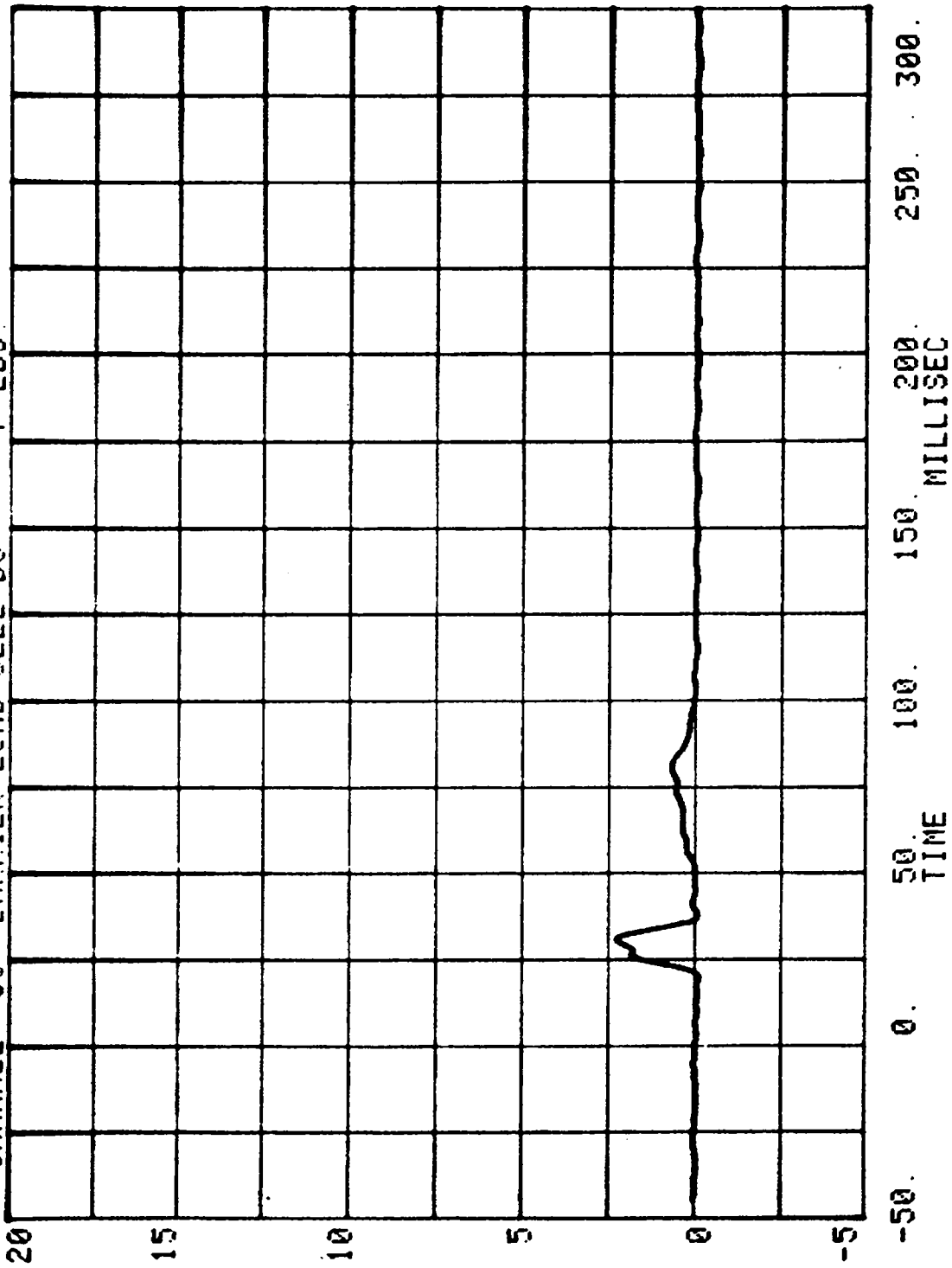


CHANNEL 67 BARRIER LOAD CELL 07 1 LBS

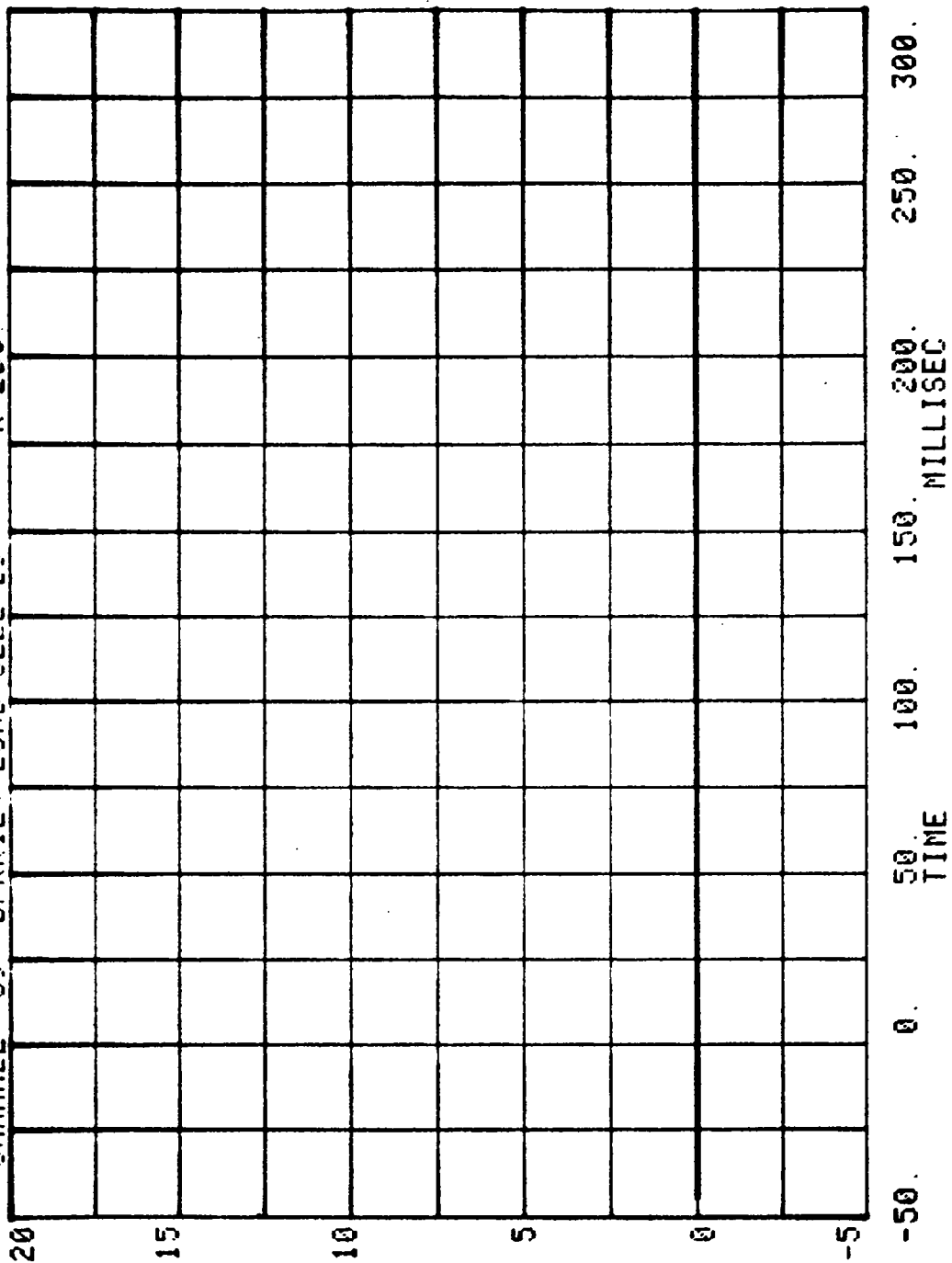
RUN= 875 SERIES= 201



CHANNEL 68 BARRIER LOAD CELL D8
RUH= 875 SERIES= 201 K LBS



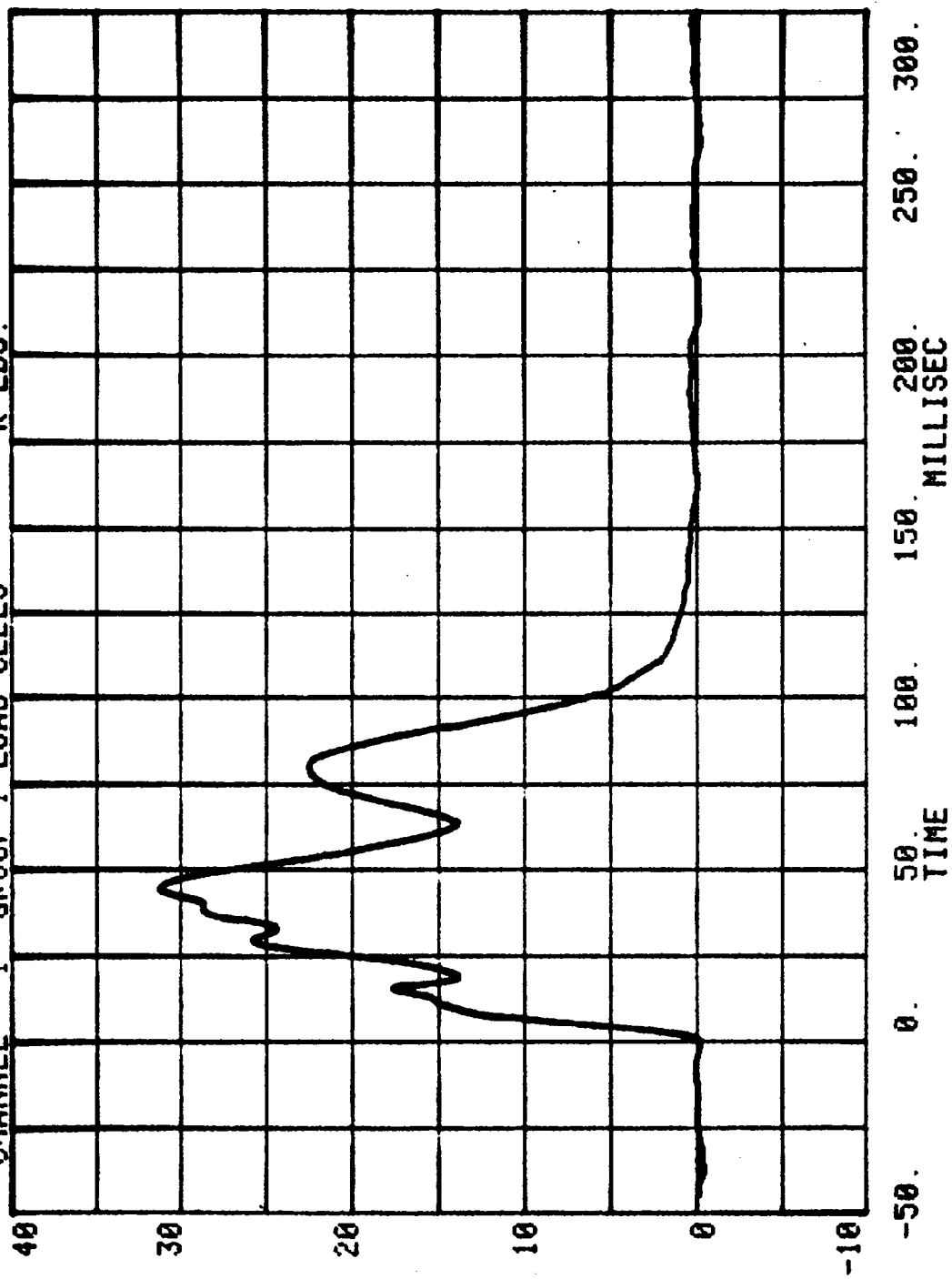
RUN= 875 SERIES= 201
CHANNEL 69 BARRIER LOAD CELL D9 K LBS



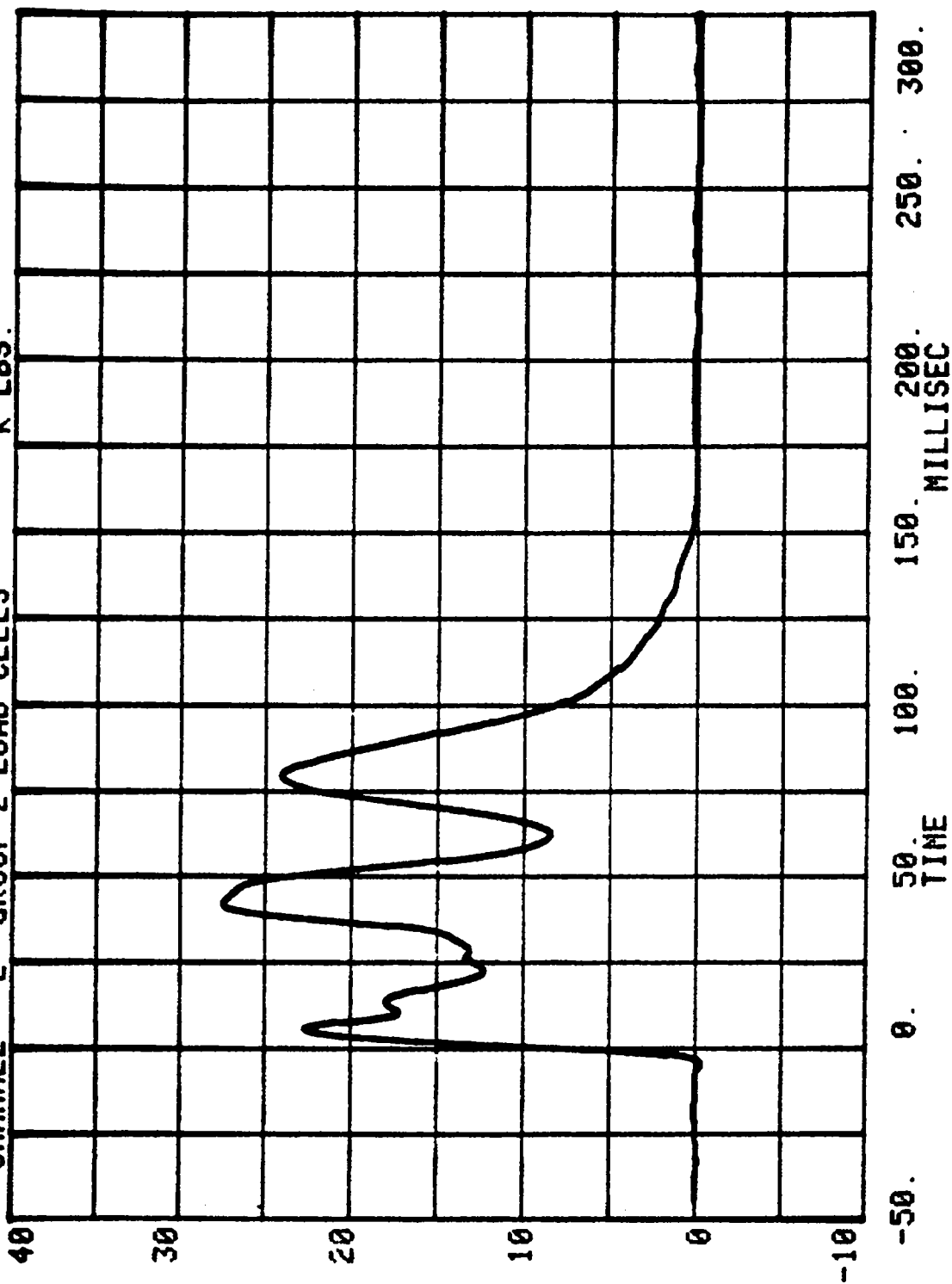
NEW CAR ASSESSMENT CRASH TEST - 1989

RUN # 875		SERIES # 201	
CHAN	TITLE	MINIMUM/MAXIMUM	AT TIME
1	GROUP 1 LOAD CELLS	- 273 K LBS. 31.465 K LBS.	-37.57 MS. 44.92 MS.
2	GROUP 2 LOAD CELLS	- 262 K LBS. 27.571 K LBS.	-4.43 MS. 41.85 MS.
3	GROUP 3 LOAD CELLS	- 308 K LBS. 37.674 K LBS.	- 45 MS. 43.72 MS.
4	GROUP 4 LOAD CELLS	- 164 K LBS. 15.261 K LBS.	1.88 MS. 35.62 MS.
5	GROUP 5 LOAD CELLS	- 341 K LBS. 15.831 K LBS.	97 MS. 48.00 MS.
6	GROUP 6 LOAD CELLS	- 292 K LBS. 14.096 K LBS.	148.35 MS. 33.75 MS.
7	TOTAL LOAD CELL SUM	- 841 K LBS. 127.389 K LBS.	-35.62 MS. 41.92 MS.

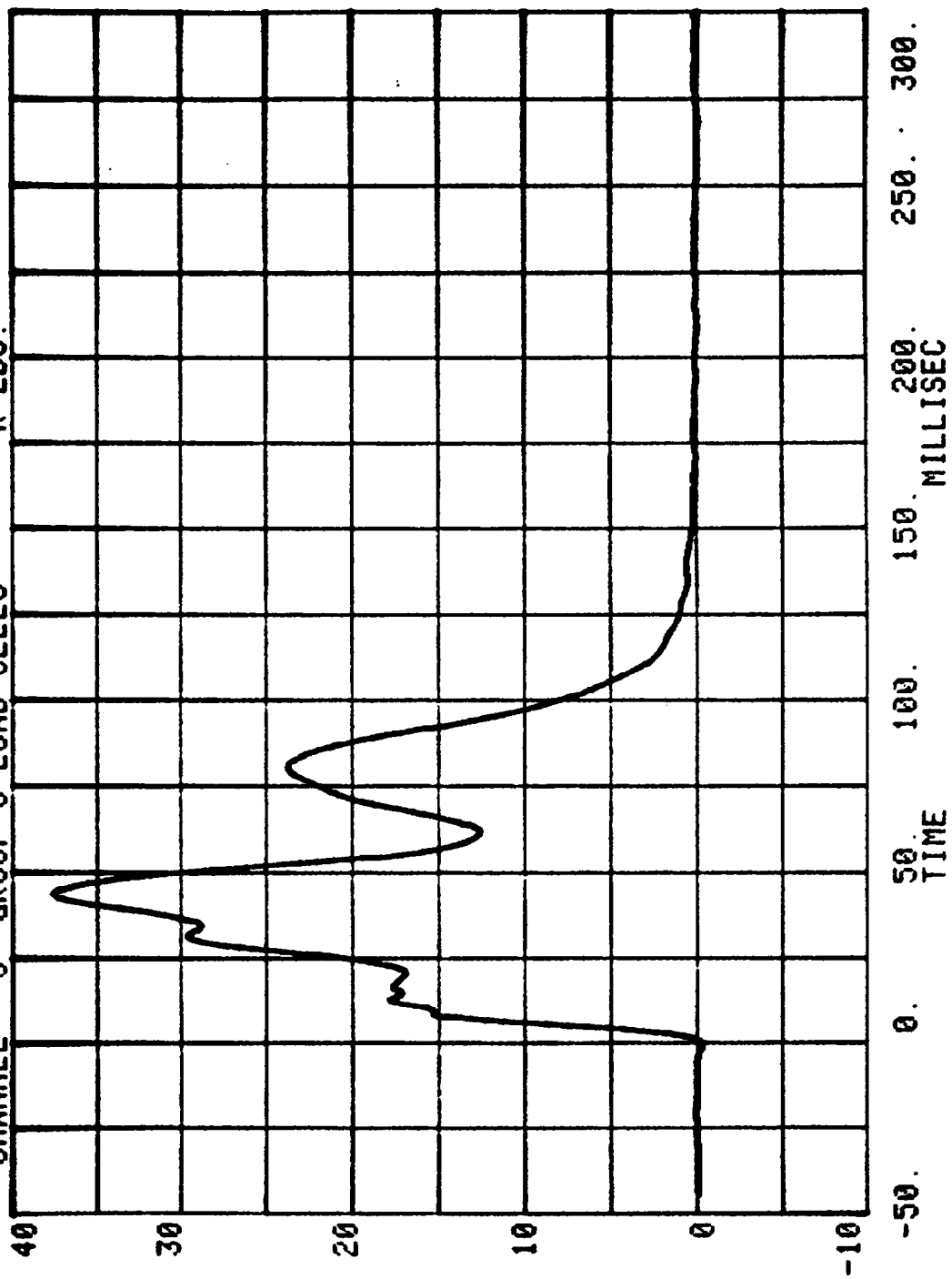
CHANNEL 1 GROUP 1 LOAD CELLS
RUN= 875 SERIES= 201 K LBS.



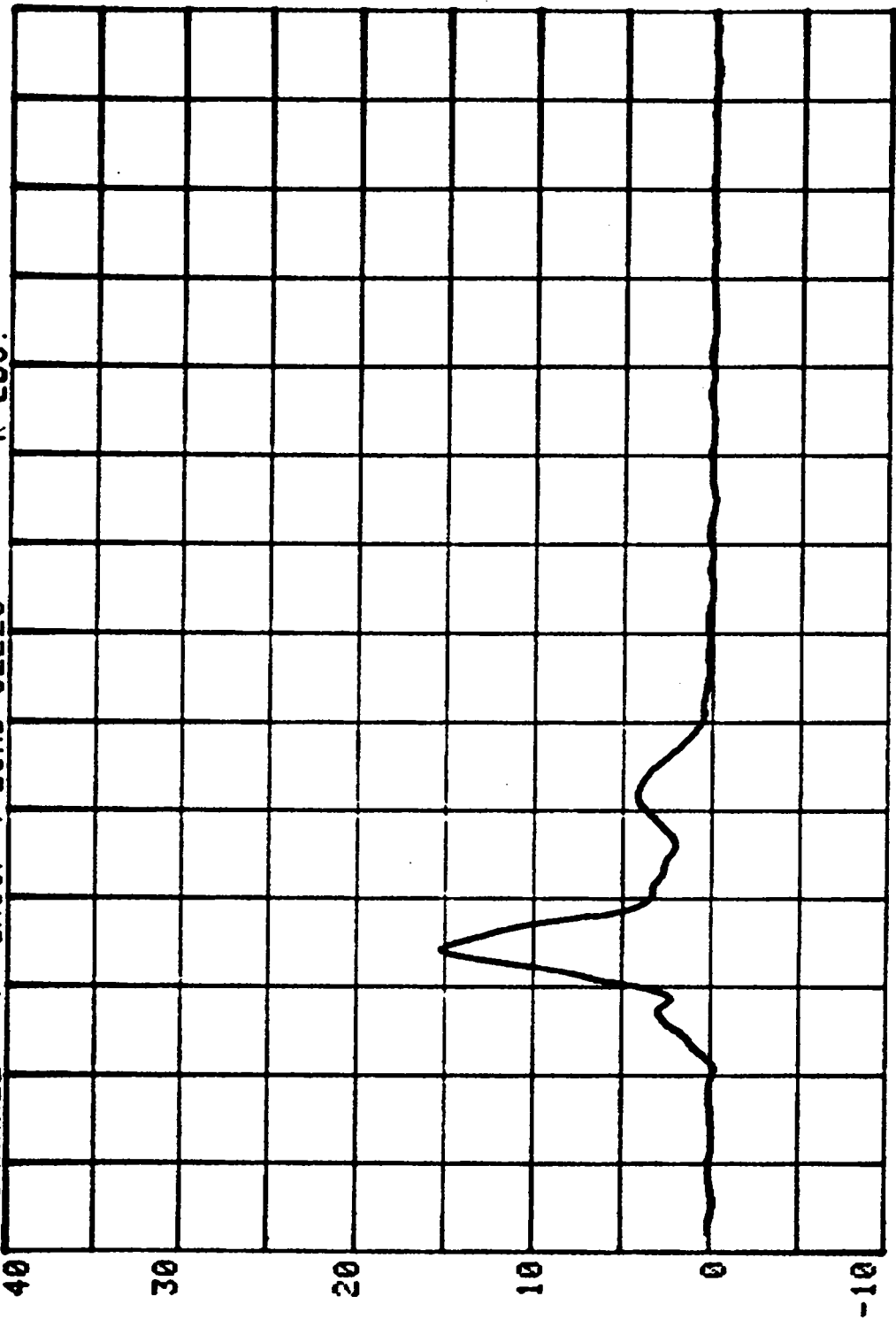
RUN= 875 SERIES= 201
CHANNEL 2 GROUP 2 LOAD CELLS K LBS.



CHANNEL 3 GROUP 3 LOAD CELLS
RUN= 875 SERIES= 201 K LBS.

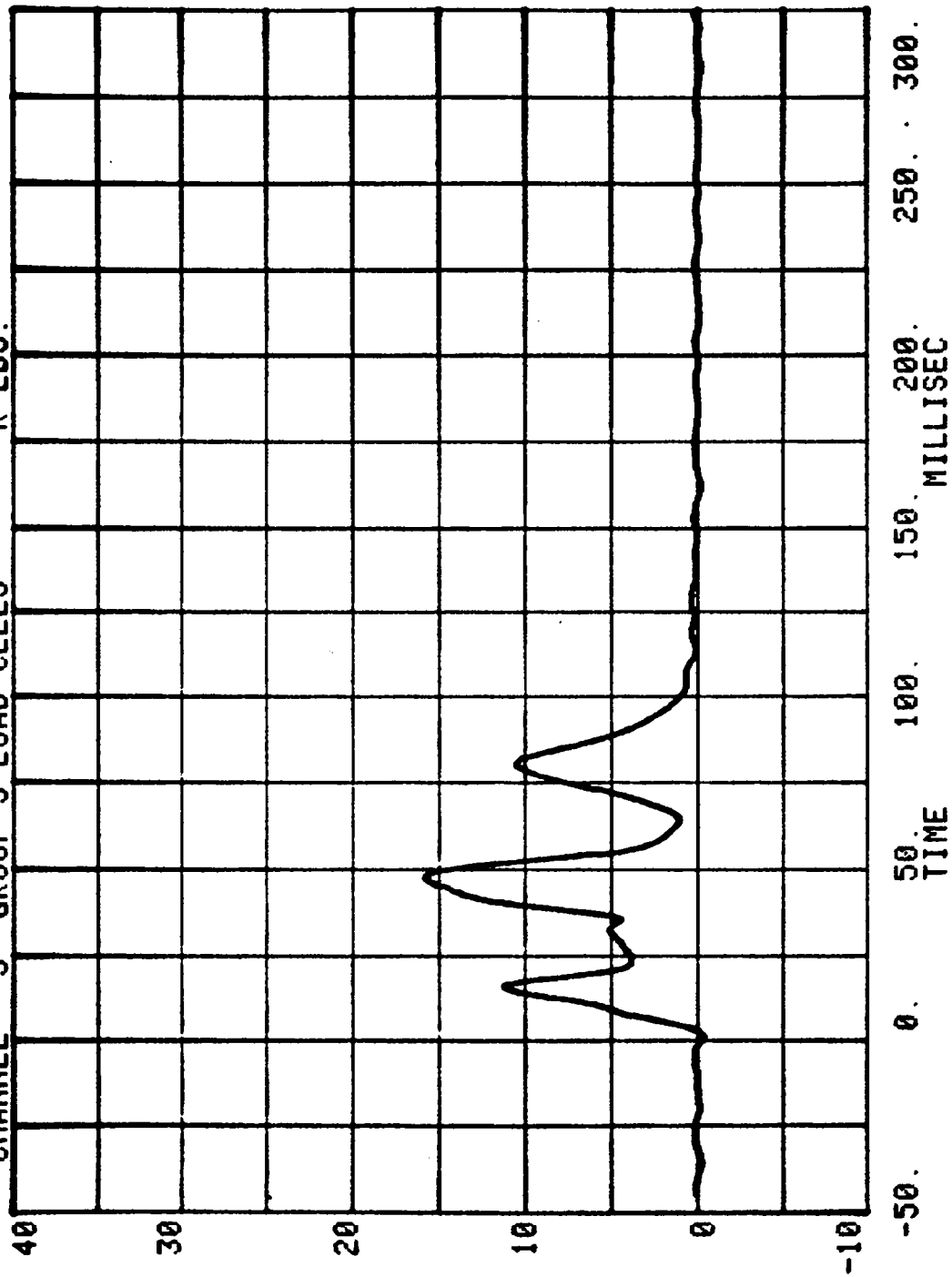


RUN= 875 SERIES= 201
CHANNEL 4 GROUP 4 LOAD CELLS K LBS.

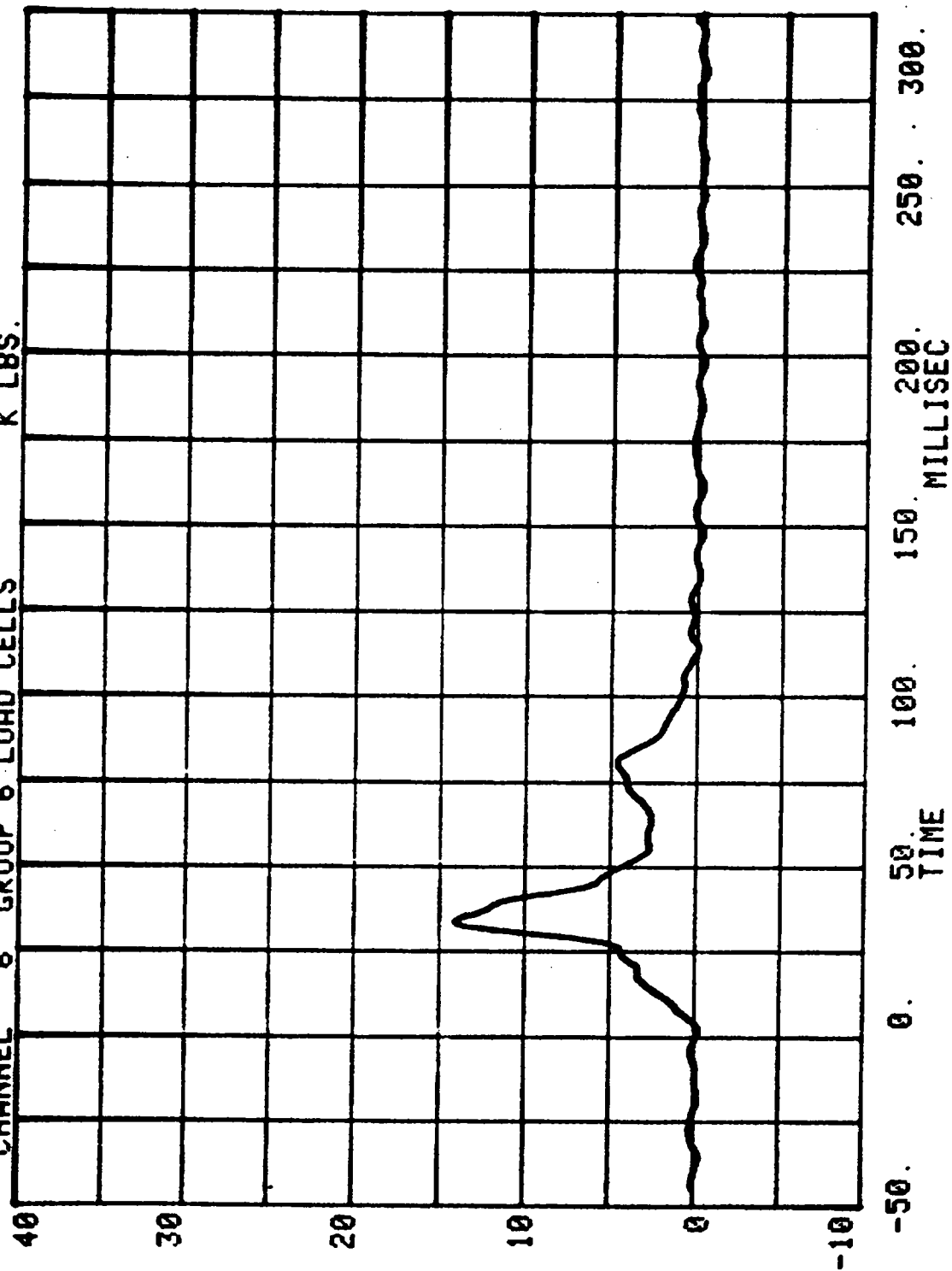


TIME
-50. 0. 50. 100. 150. 200. 250. 300.
MILLISEC

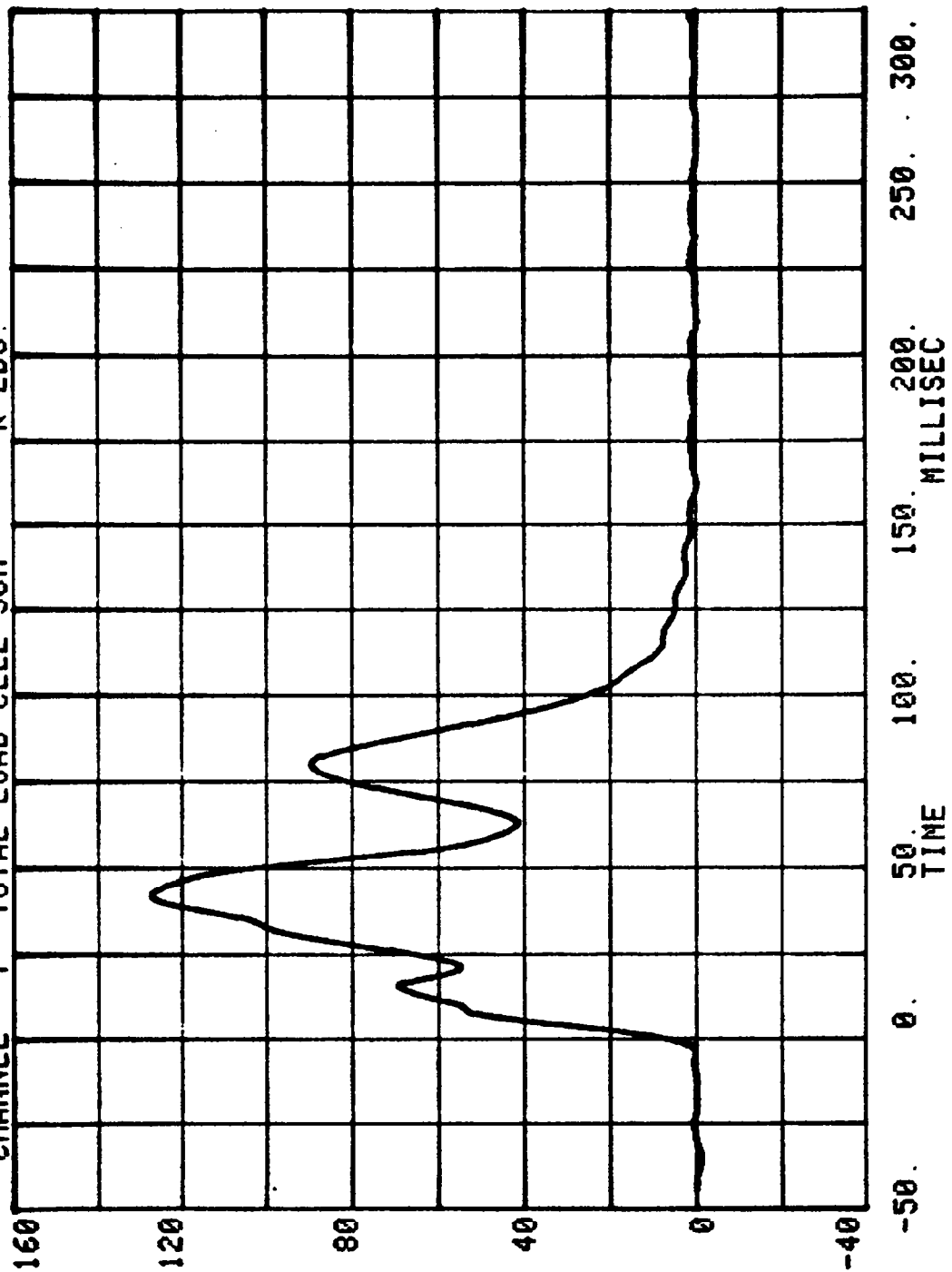
CHANNEL 5 GROUP 5 LOAD CELLS
RUN= 875 SERIES= 201 K LBS.



RUN= 875 SERIES= 201
CHANNEL 6 GROUP 6 LOAD CELLS K LBS.



CHANNEL 7 TOTAL LOAD CELL SUM RUN= 875 SERIES= 201 K LBS.



TEST NO. MK0201

DUMMY DATA

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

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

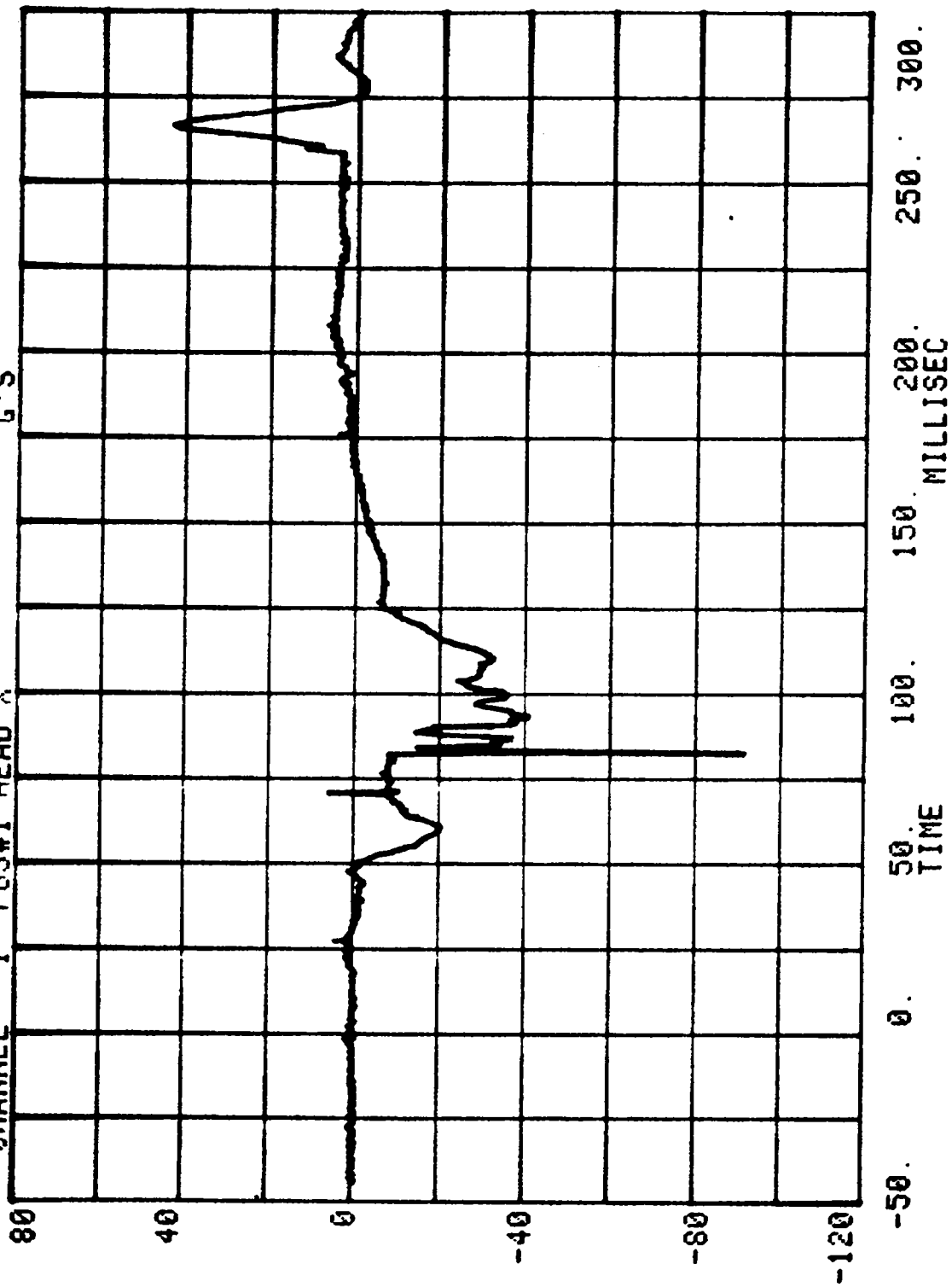
NEW CAR ASSESSMENT CRASH TEST - 1989

RUN= 975

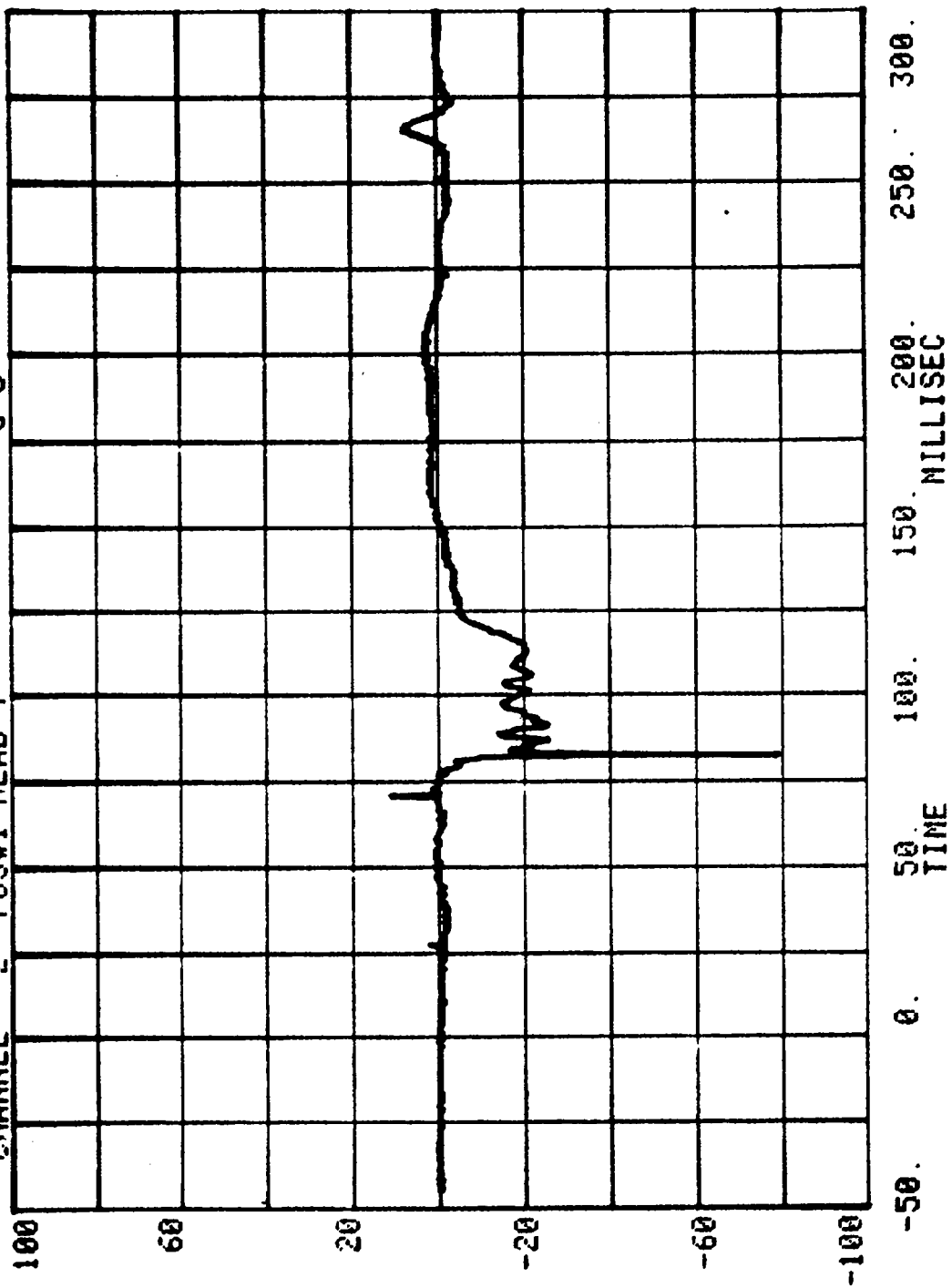
POS#1 HEAD R

HIC= 540.9 FROM T1= .08077 TO T2= .11602
AVERAGE ACCELERATION BETWEEN T1 AND T2= 47.2G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 817.1

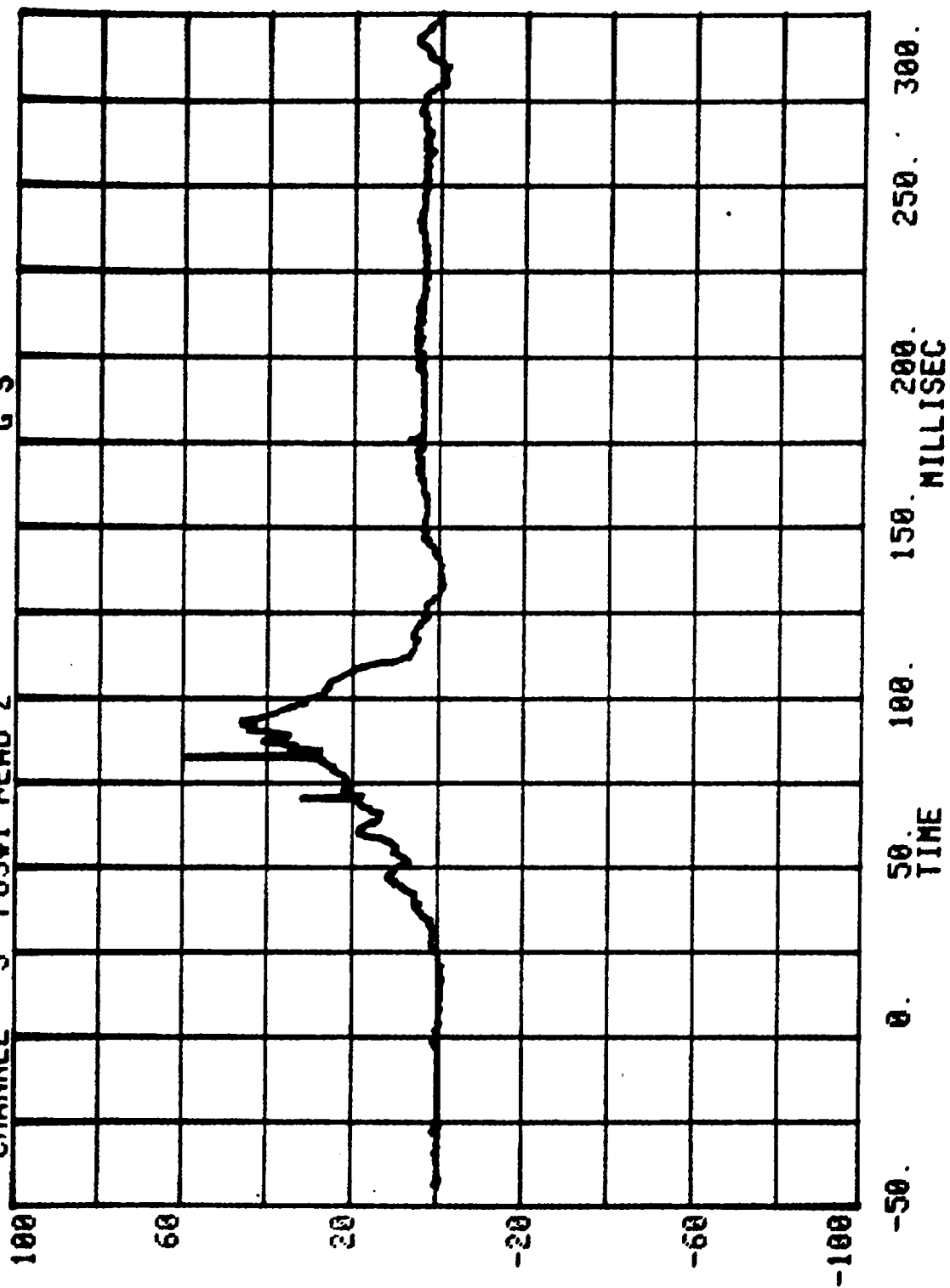
CHANNEL 1 POS#1 HEAD X
RUN= 875 SERIES= 201 G'S

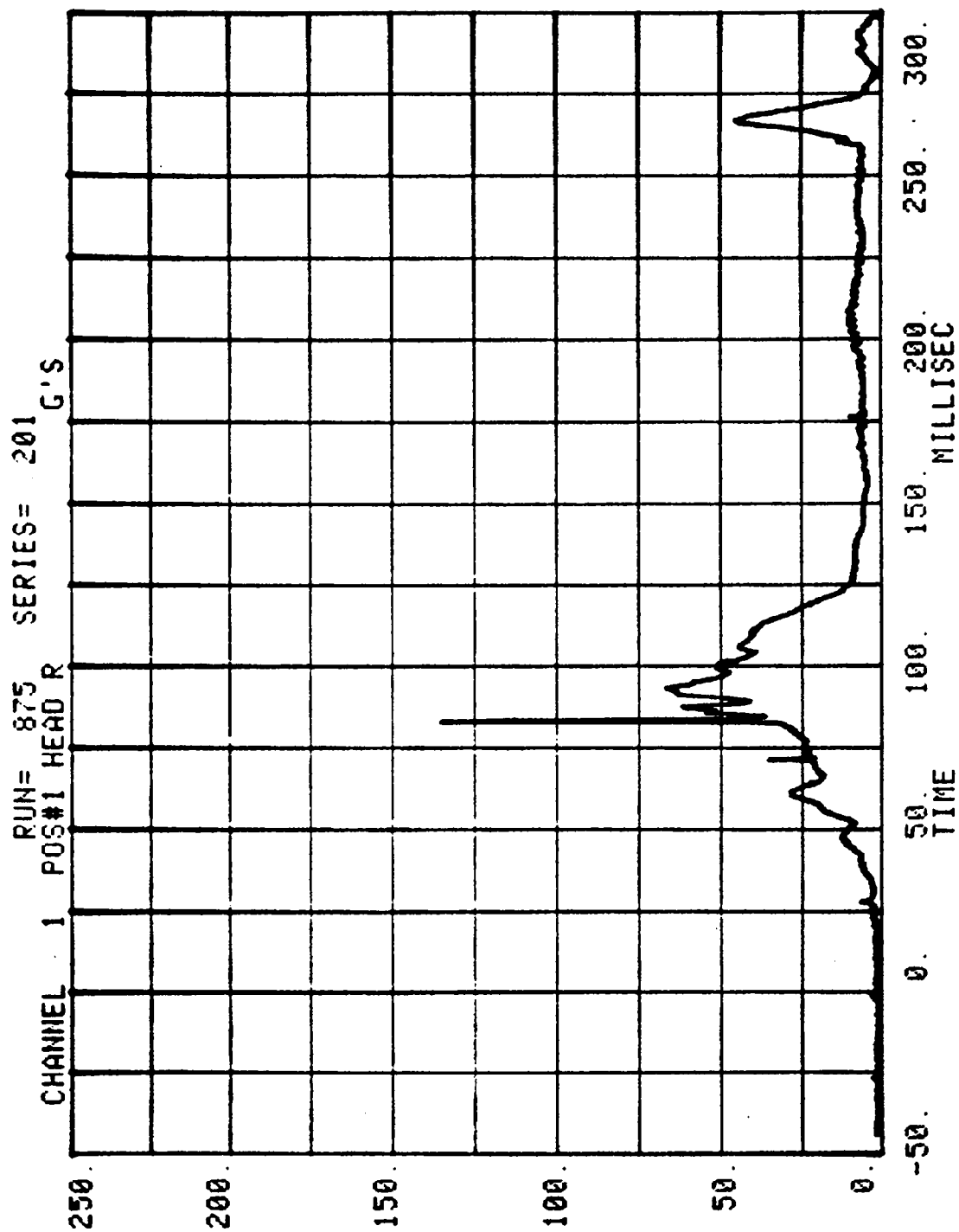


CHANNEL 2 POS#1 HEAD Y RUN= 875 SERIES= 201 G'S



CHANNEL 3 POS#1 HEAD 2 RUN= 875 SERIES= 201 G'S

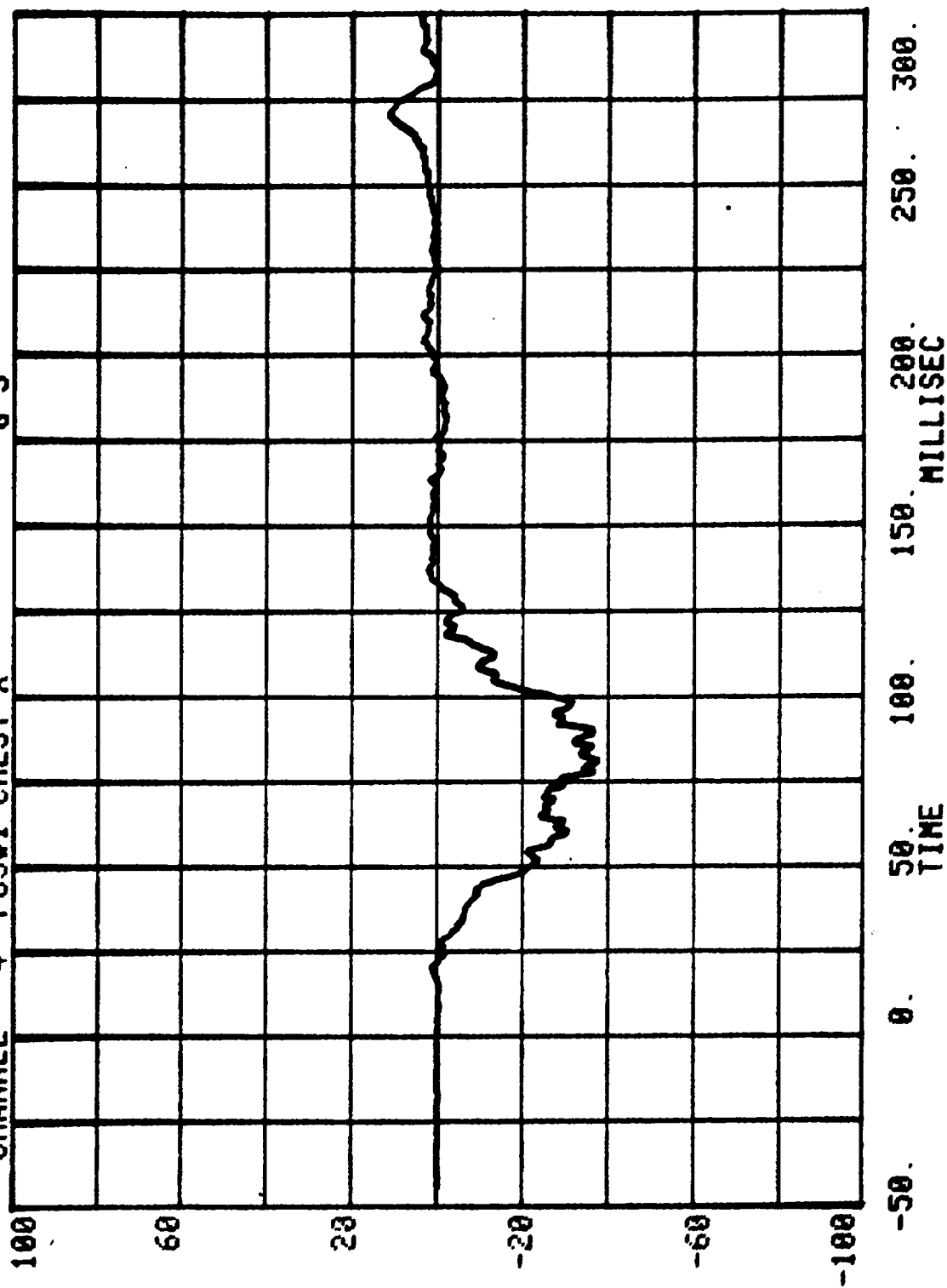




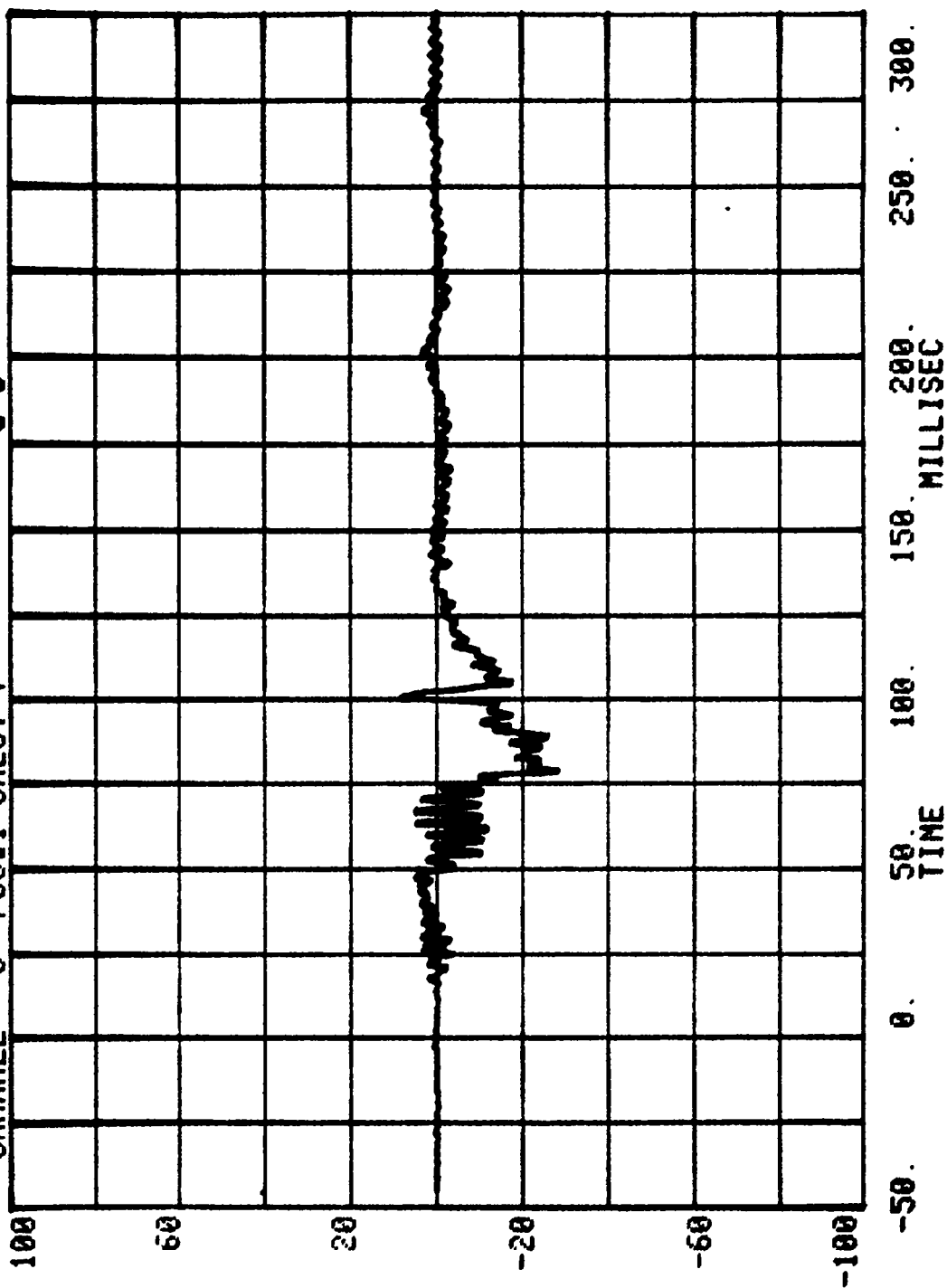
CHANNEL 4 POS#1 CHEST X G'S

RUN= 875

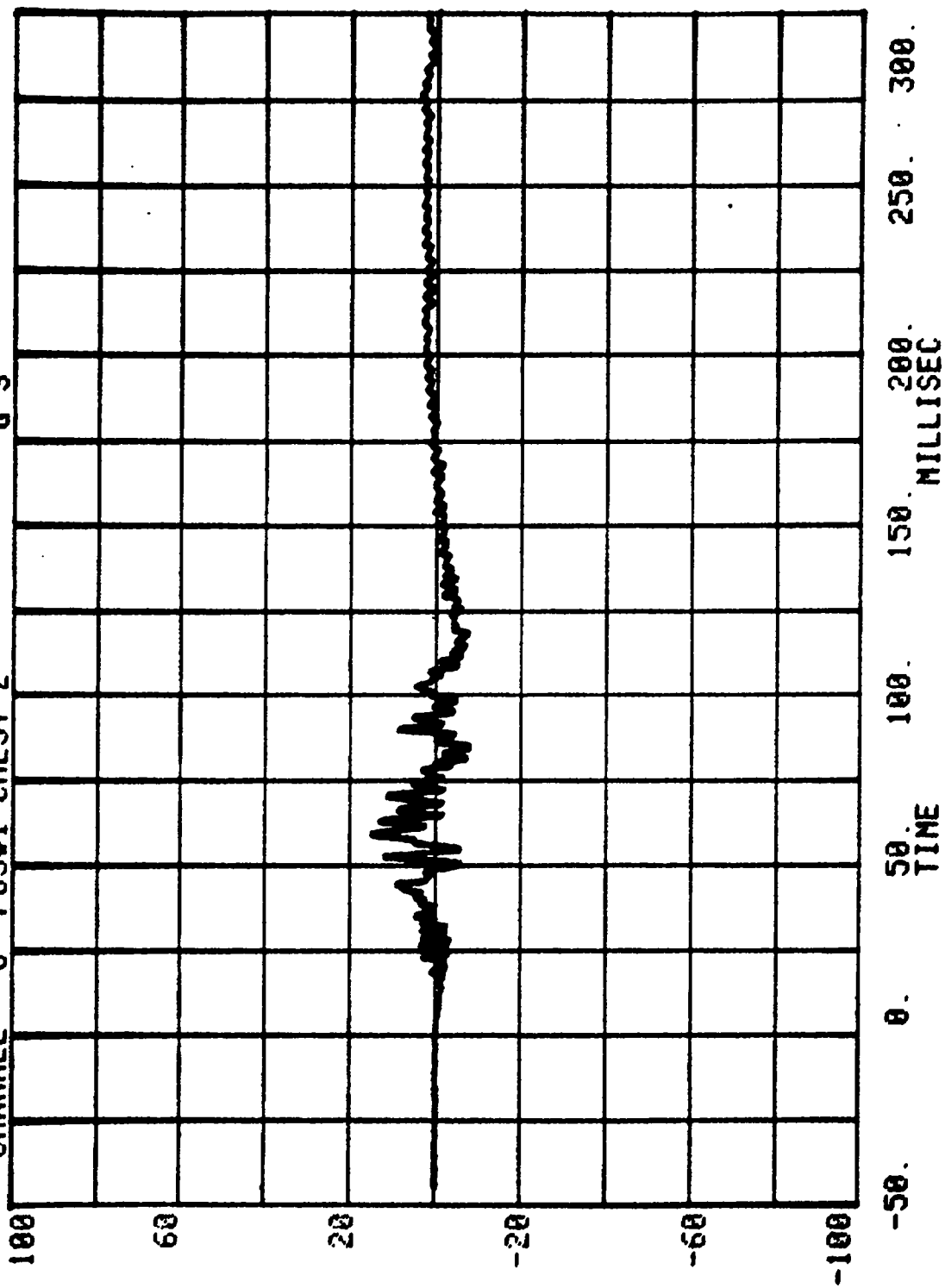
SERIES= 201

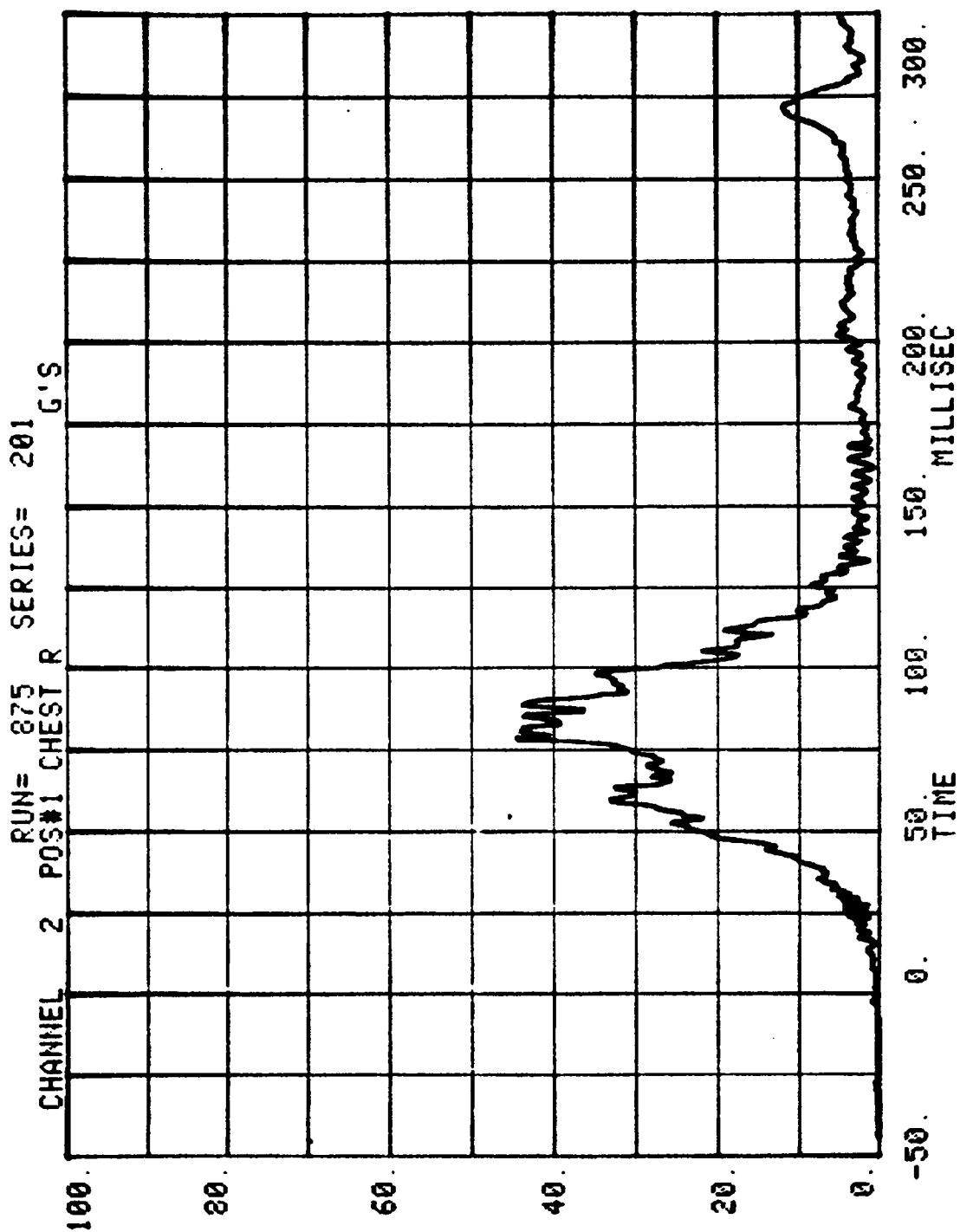


RUN= 875 SERIES= 201
CHANNEL 5 POS#1 CHEST Y G'S

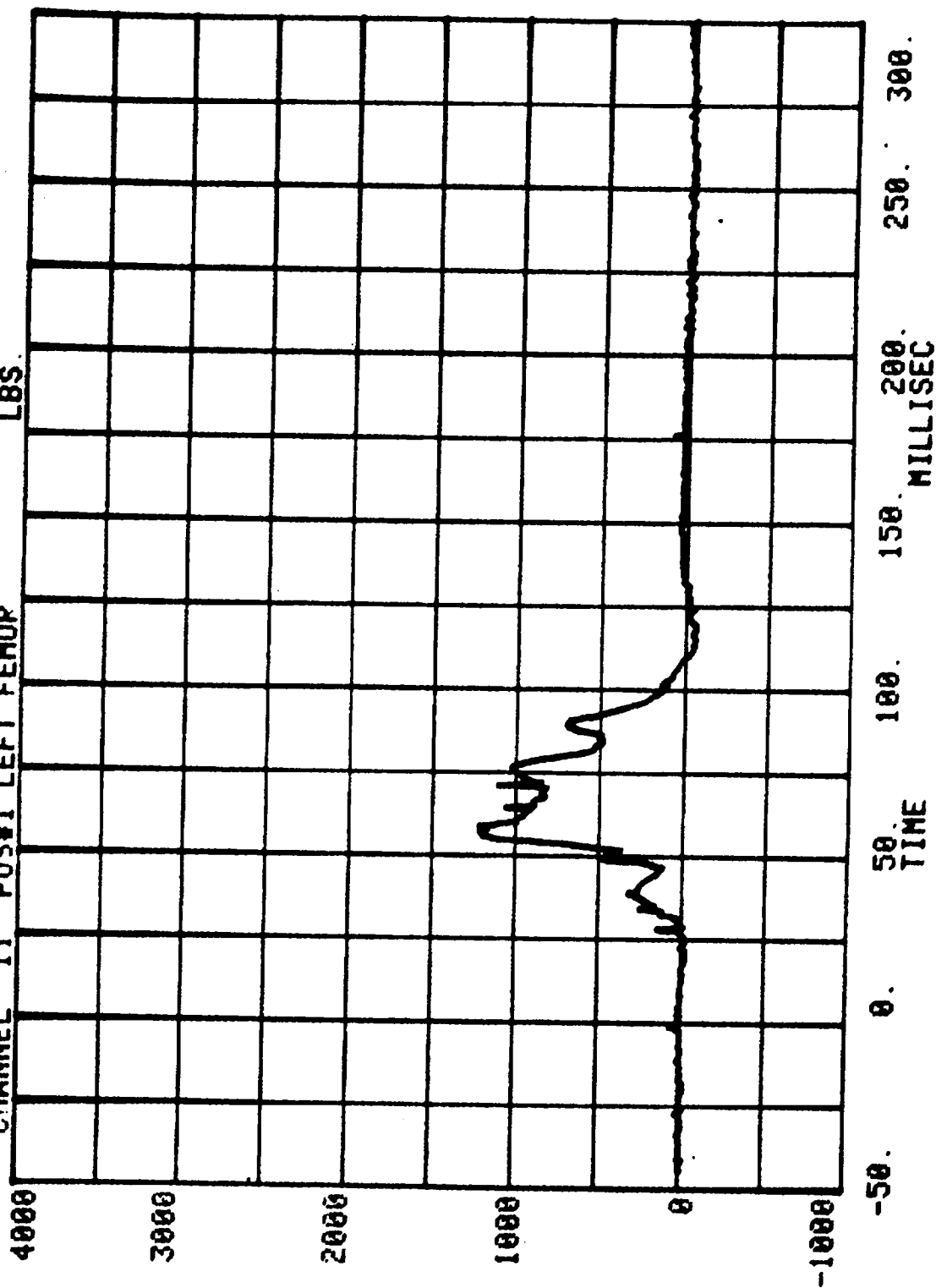


RUN= 875 SERIES= 201
CHANNEL 6 POS#1 CHEST 2 G'S

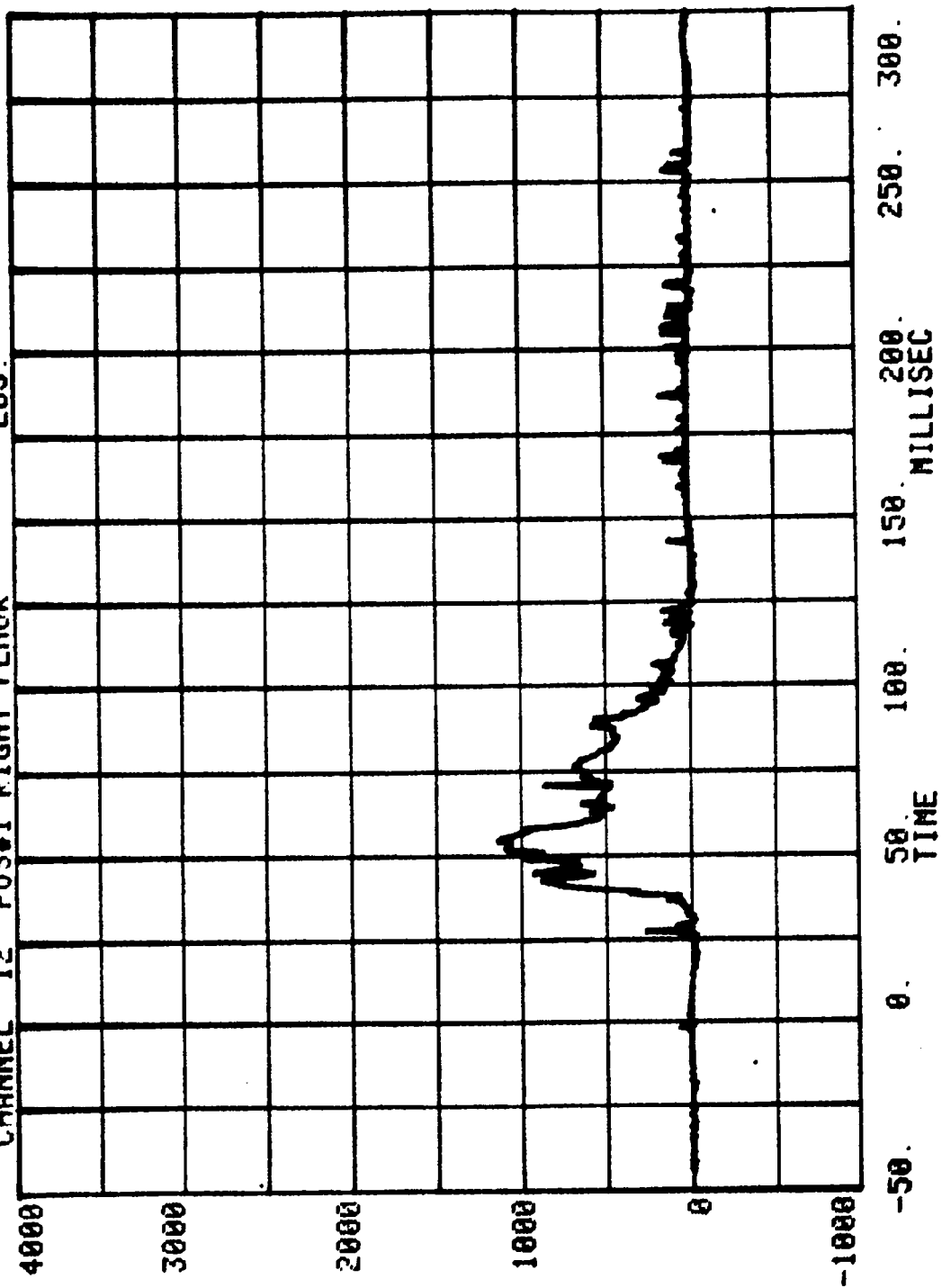




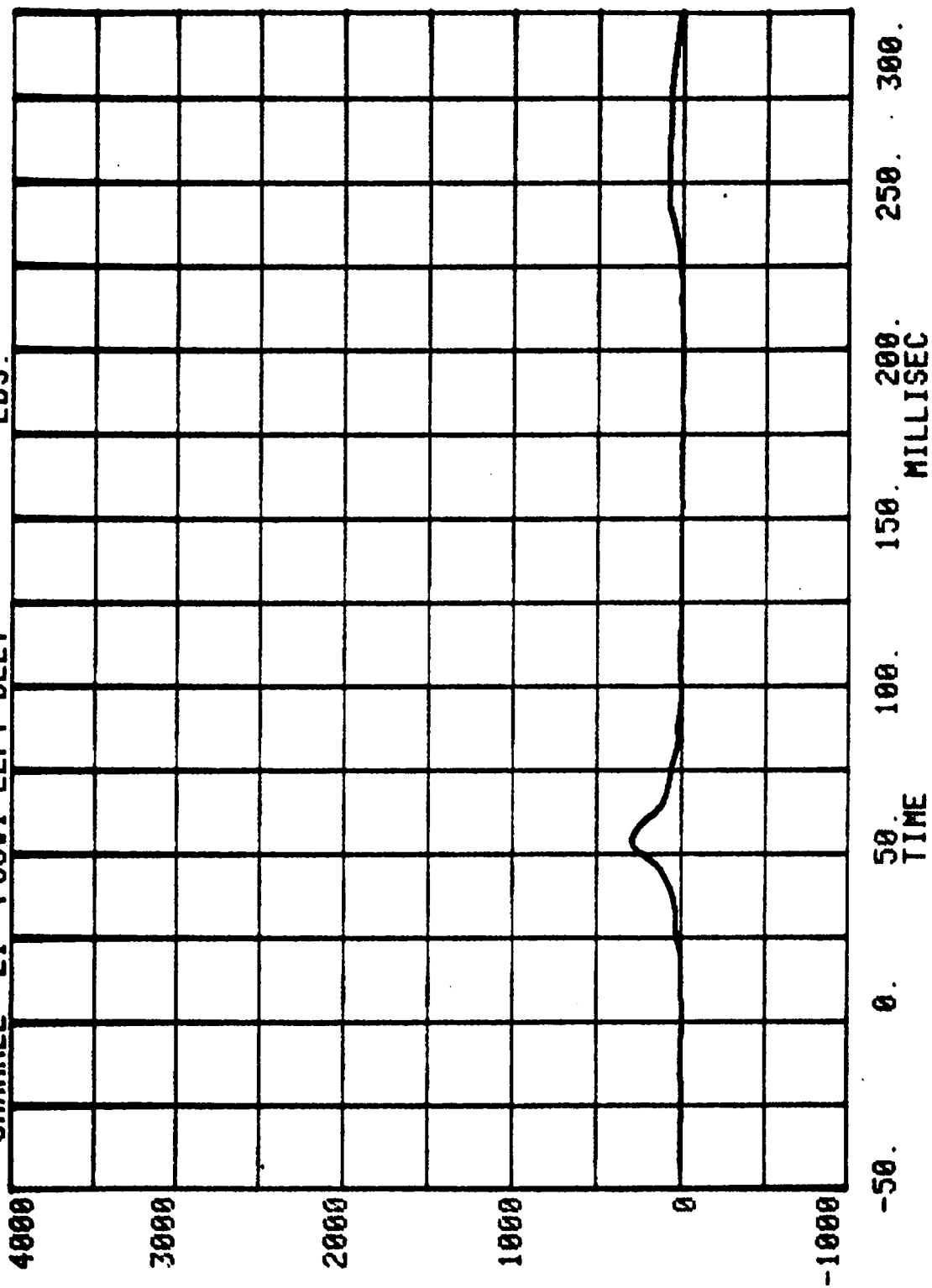
RUN= 875 SERIES= 201 LBS.
CHANNEL 11 POS#1 LEFT FEMUR



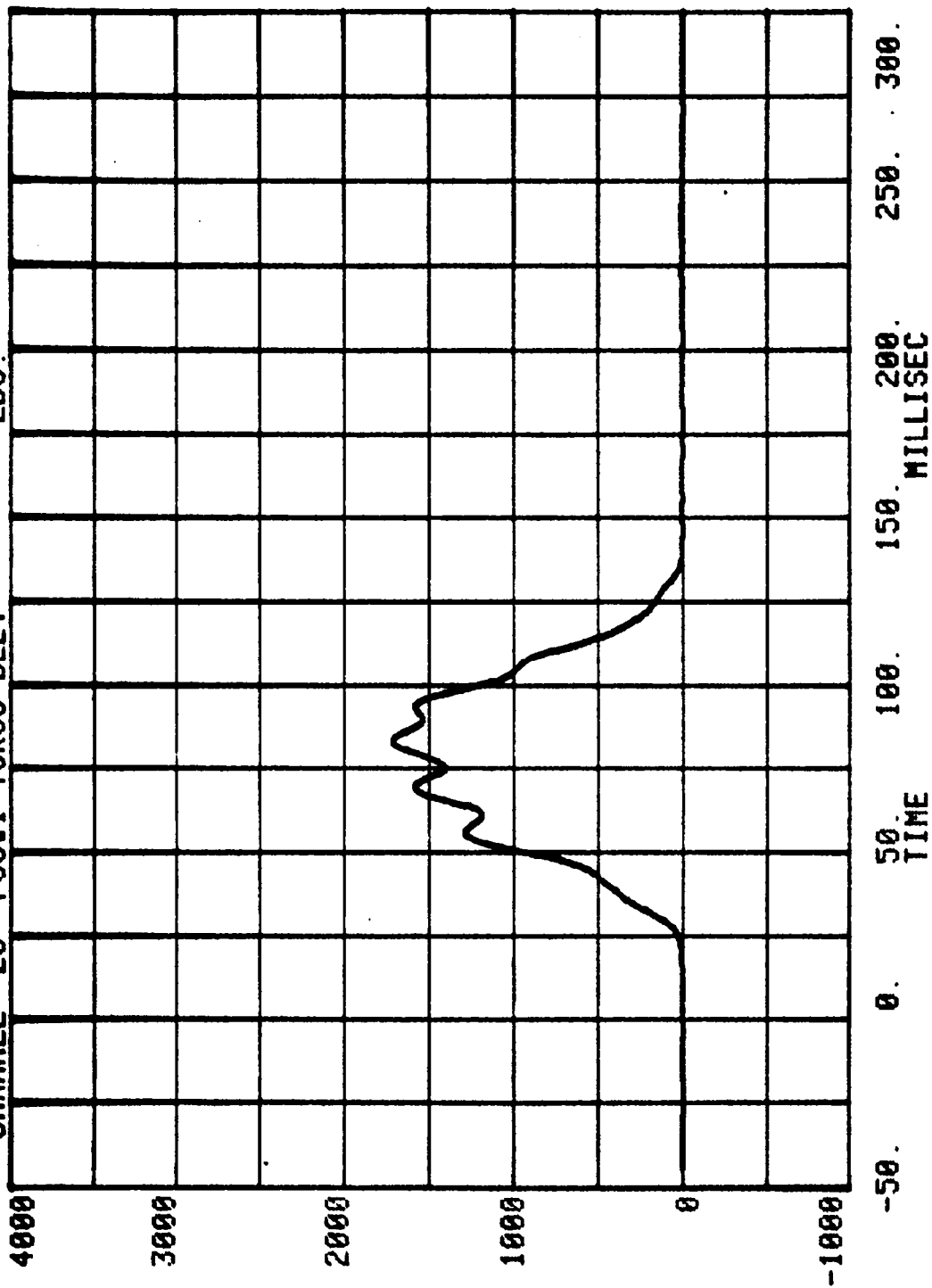
RUN= 875 SERIES= 201 LBS.
CHANNEL 12 POS#1 RIGHT FEMUR



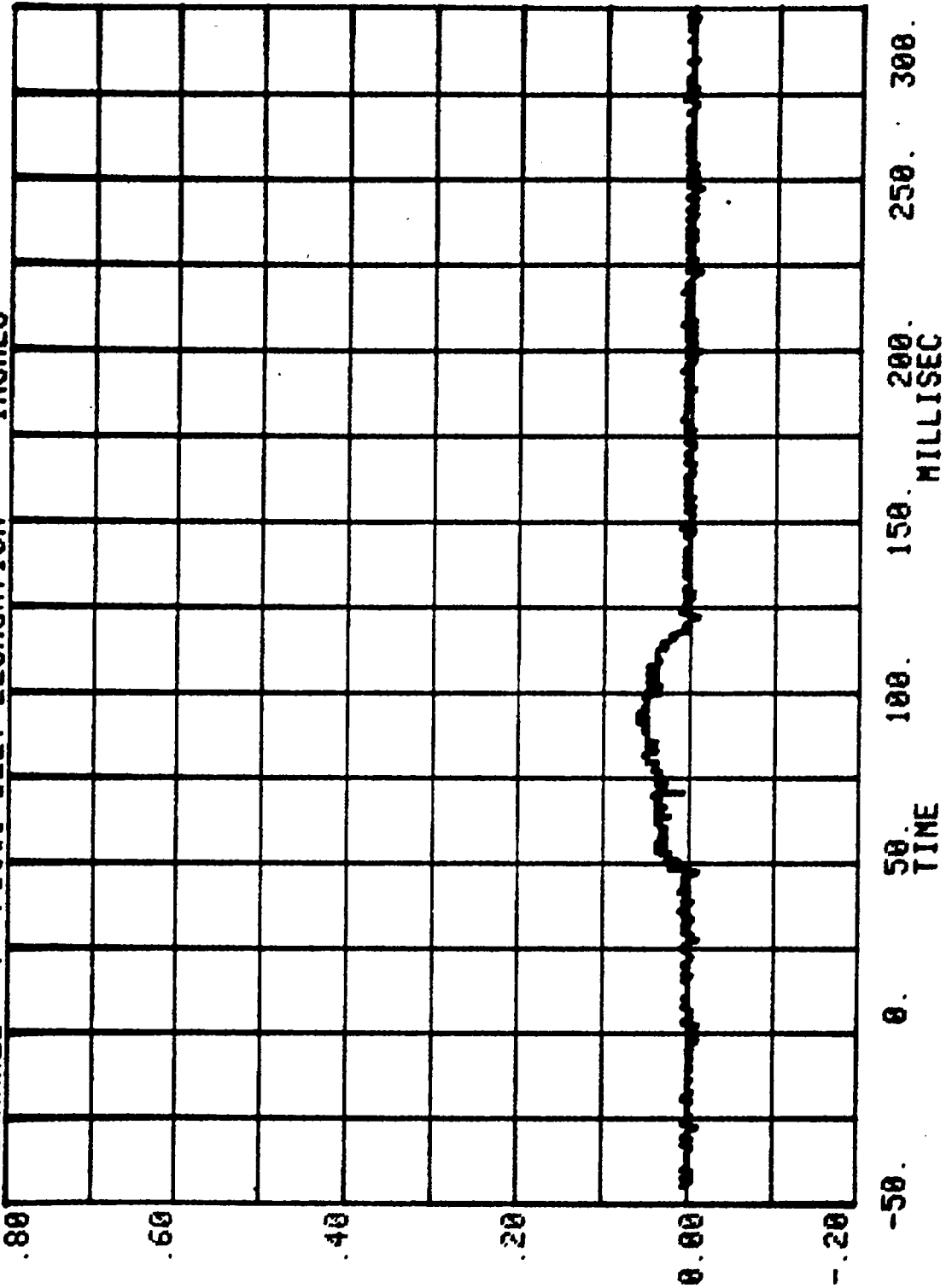
CHANNEL 21 POS#1 LEFT BELT
RUN= 875 SERIES= 201 LBS.



CHANNEL 23 POS#1 TORSO BELT
RUN= 875 SERIES= 201 LBS.



CHANNEL 7 POS#1 BELT ELONGATION RUN= 875 SERIES= 201 Measured over 2.5 inches



HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

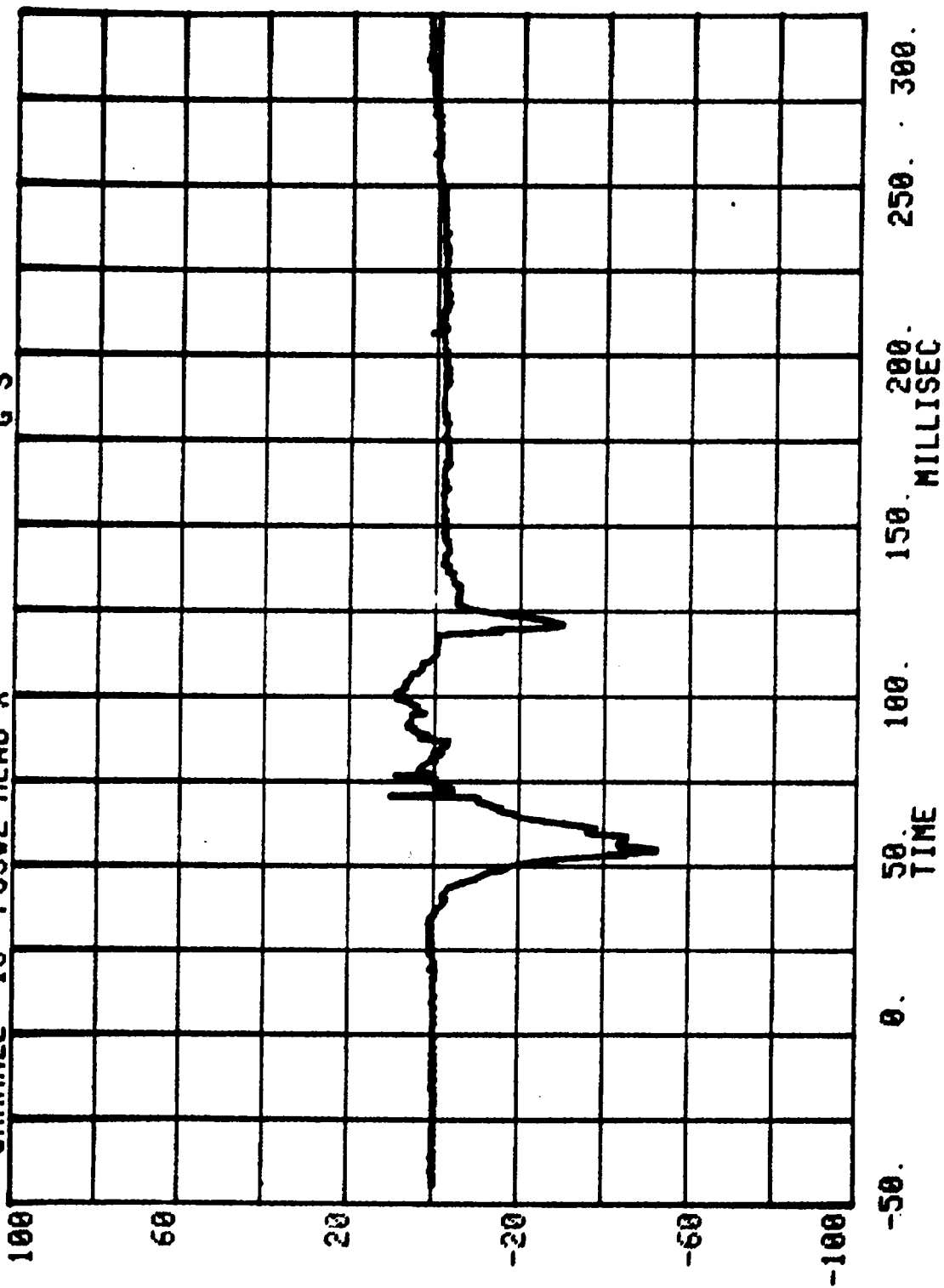
NEW CAR ASSESSMENT CRASH TEST - 1989

RUN= 975

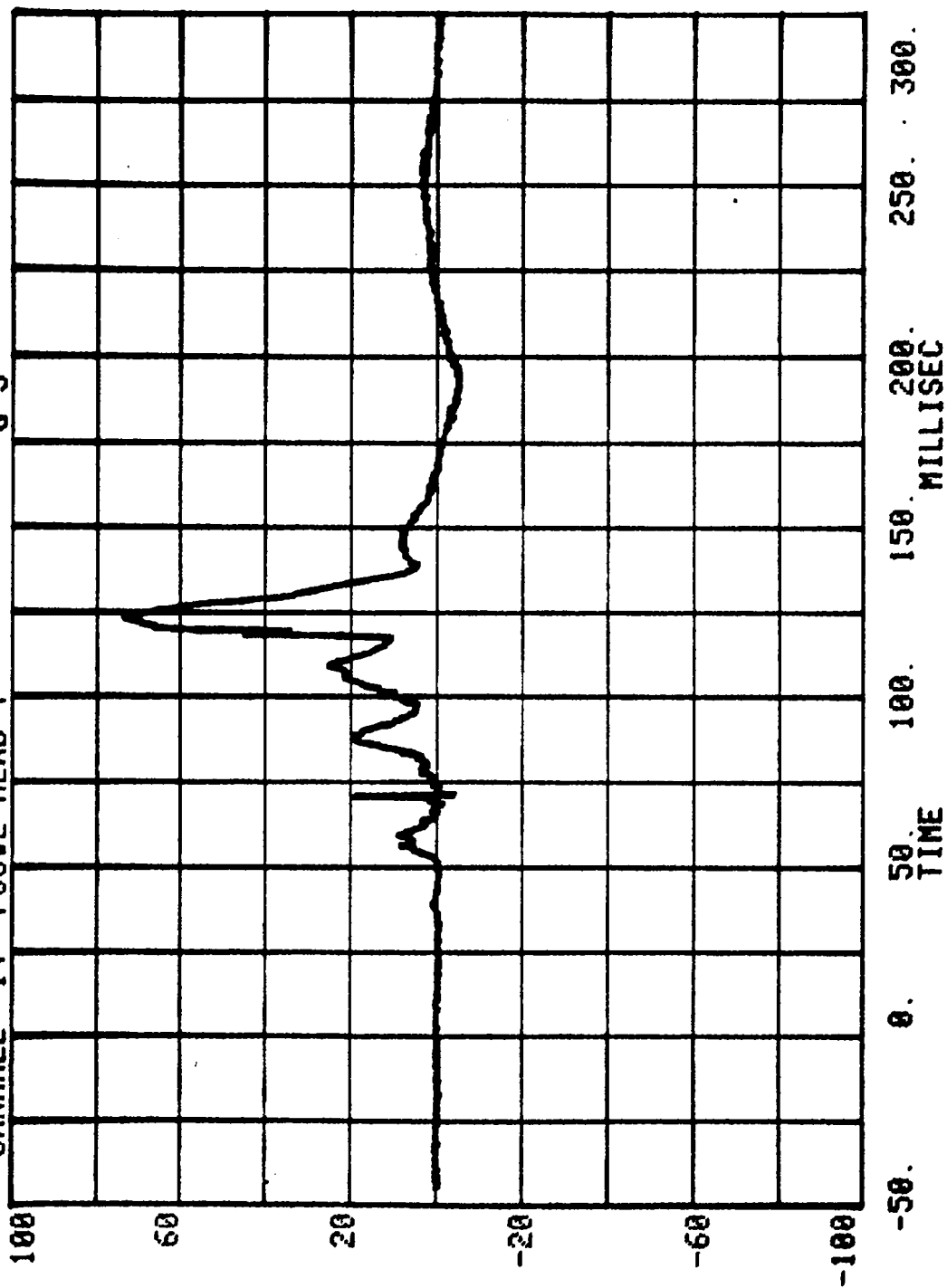
POS#2 HEAD R

HIC= 496.3 FROM T1= .10860 TO T2= .13132
AVERAGE ACCELERATION BETWEEN T1 AND T2= 54.4G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 909.5

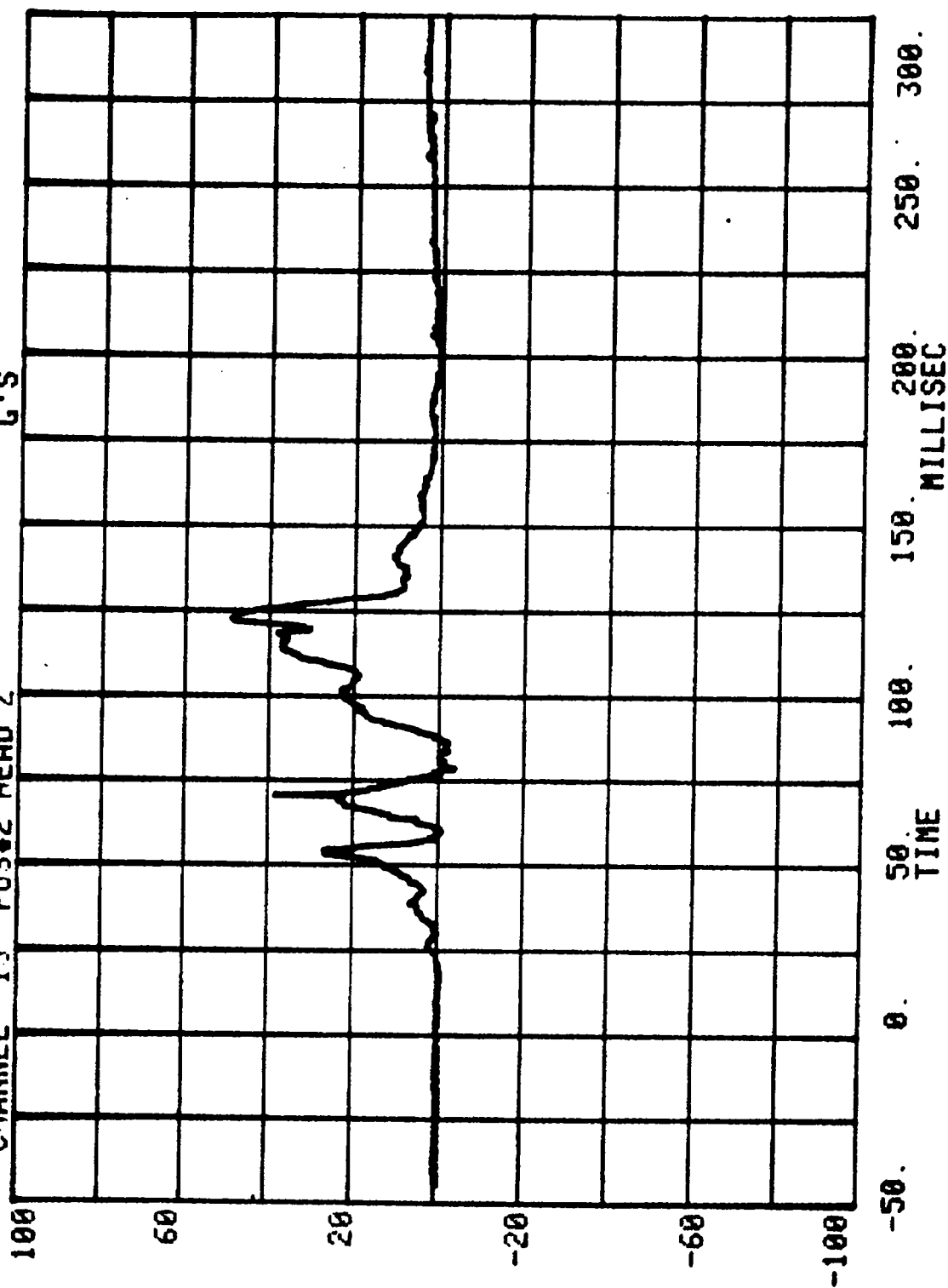
CHANNEL 13 POS#2 HEAD X
RUN= 875 SERIES= 201 G'S



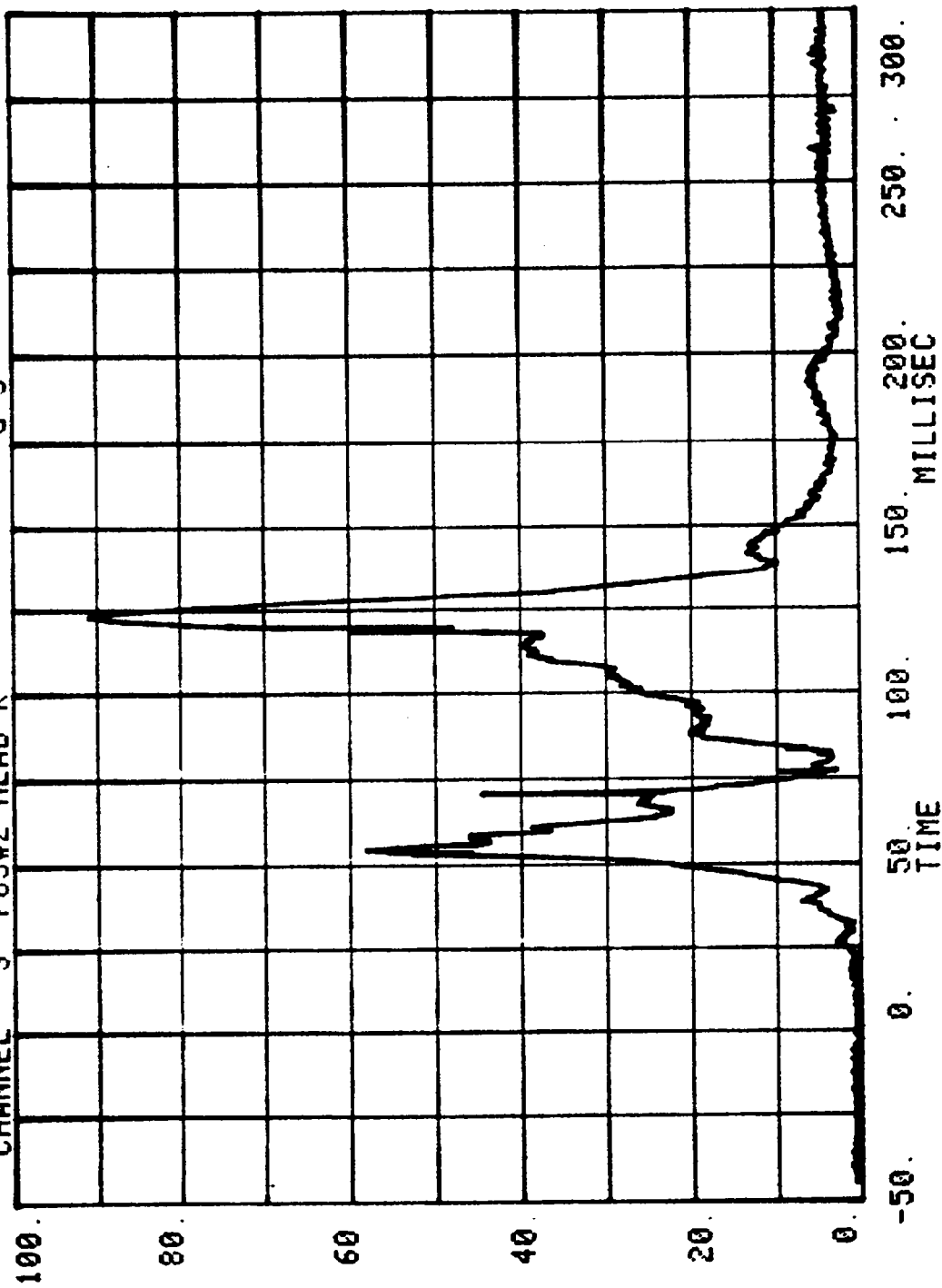
CHANNEL 14 POS#2 HEAD Y
RUN= 875 SERIES= 201 G'S



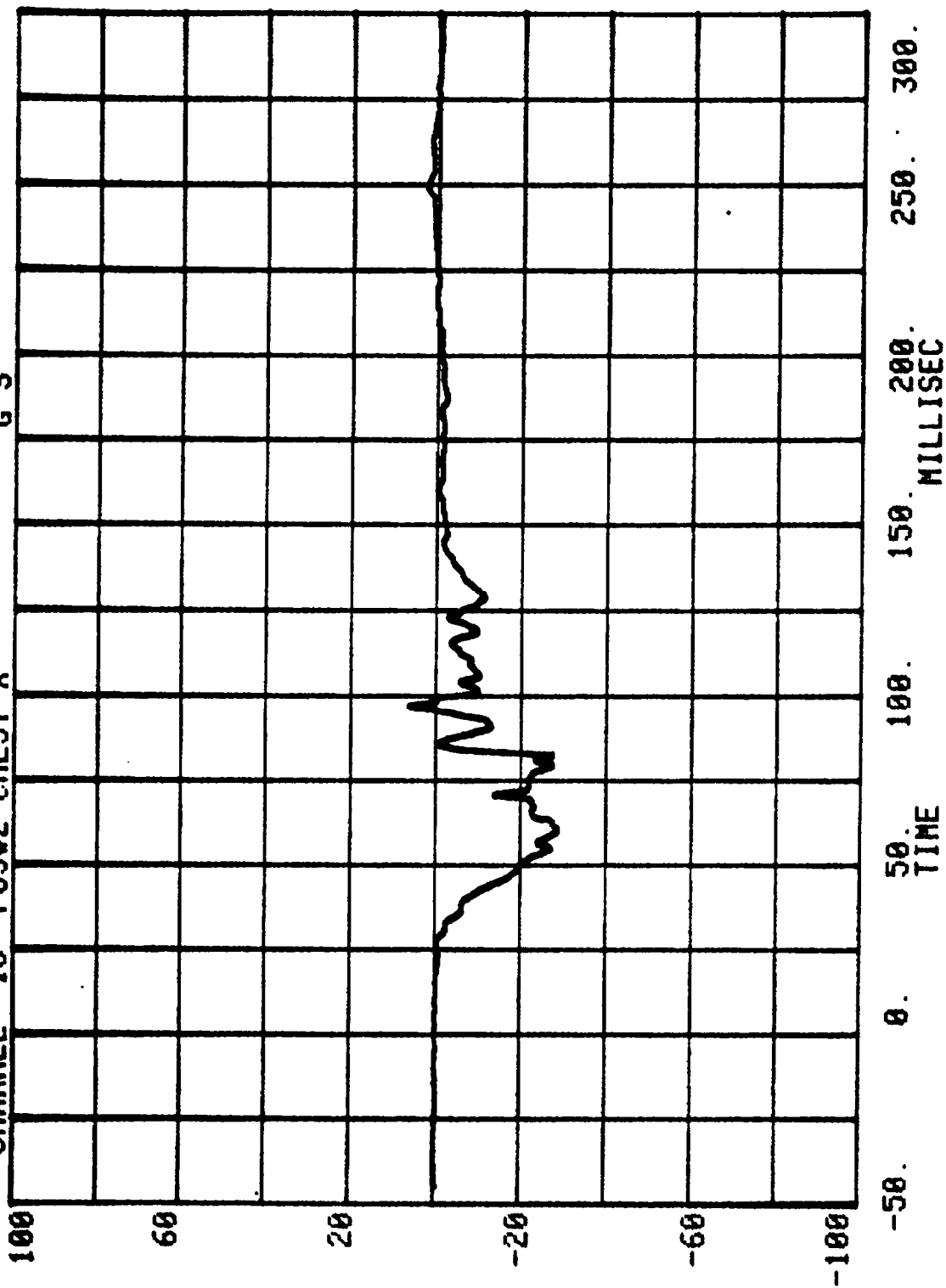
CHANNEL 15 POS#2 HEAD Z RUN= 875 SERIES= 201 G'S



CHANNEL 3 POS#2 HEAD R RUH= 875 SERIES= 201 G'S

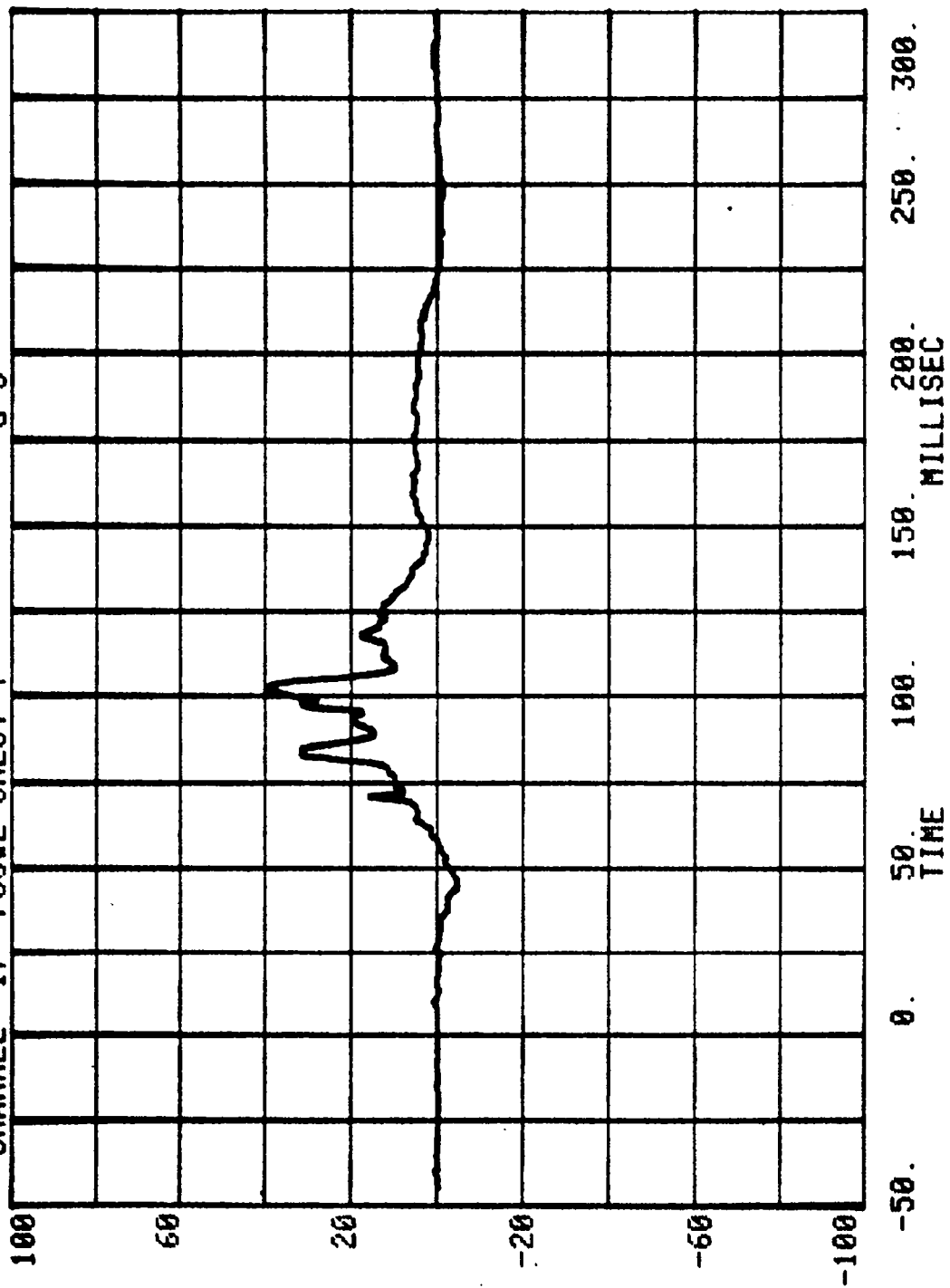


CHANNEL 16 POS#2 CHEST X
RUN= 875 SERIES= 201 G'S

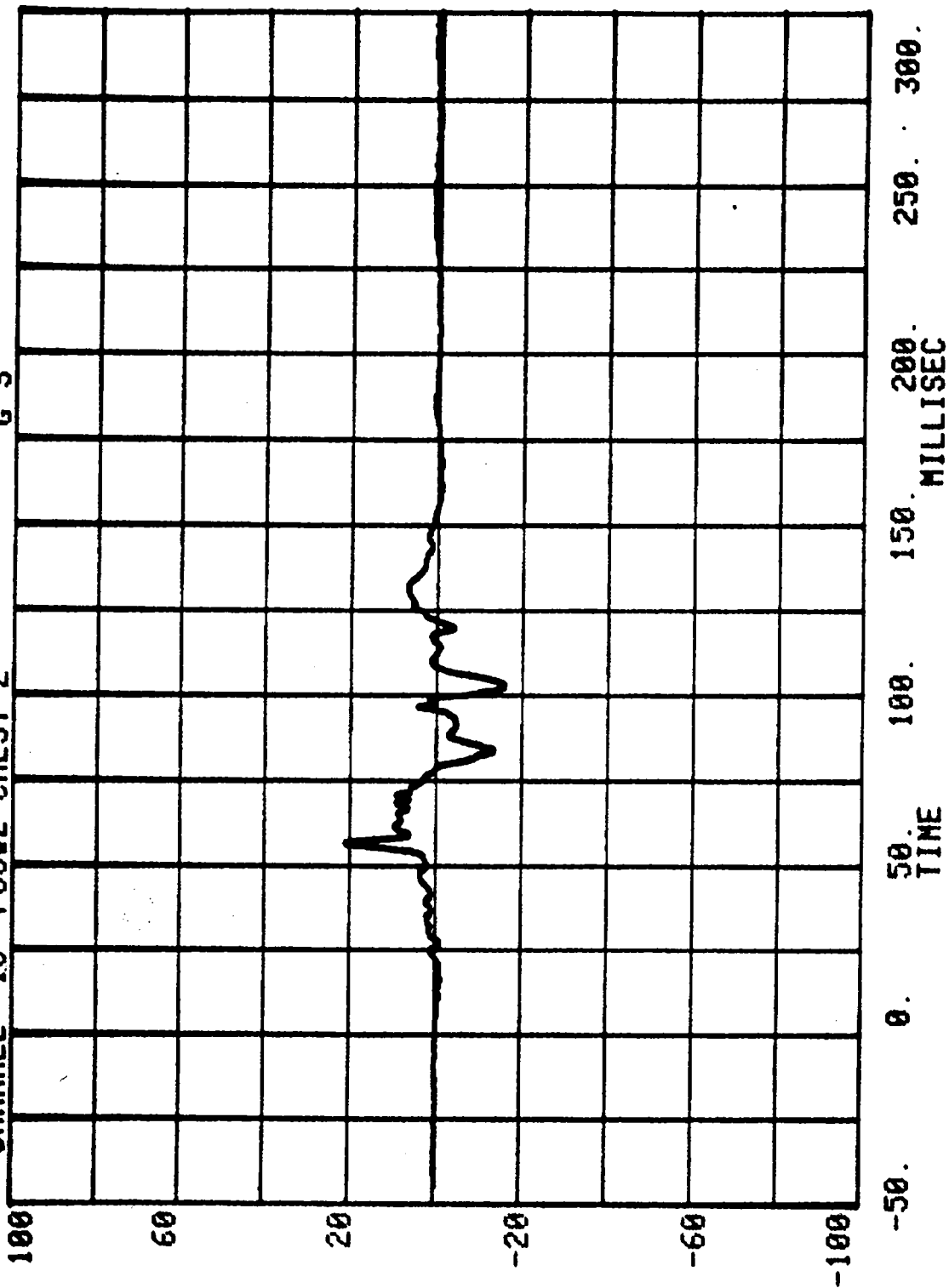


CHANNEL 17 POS#2 CHEST Y G'S

RUN= 875 SERIES= 201



CHANNEL 18 POS#2 CHEST Z RUN= 875 SERIES= 201 G'S

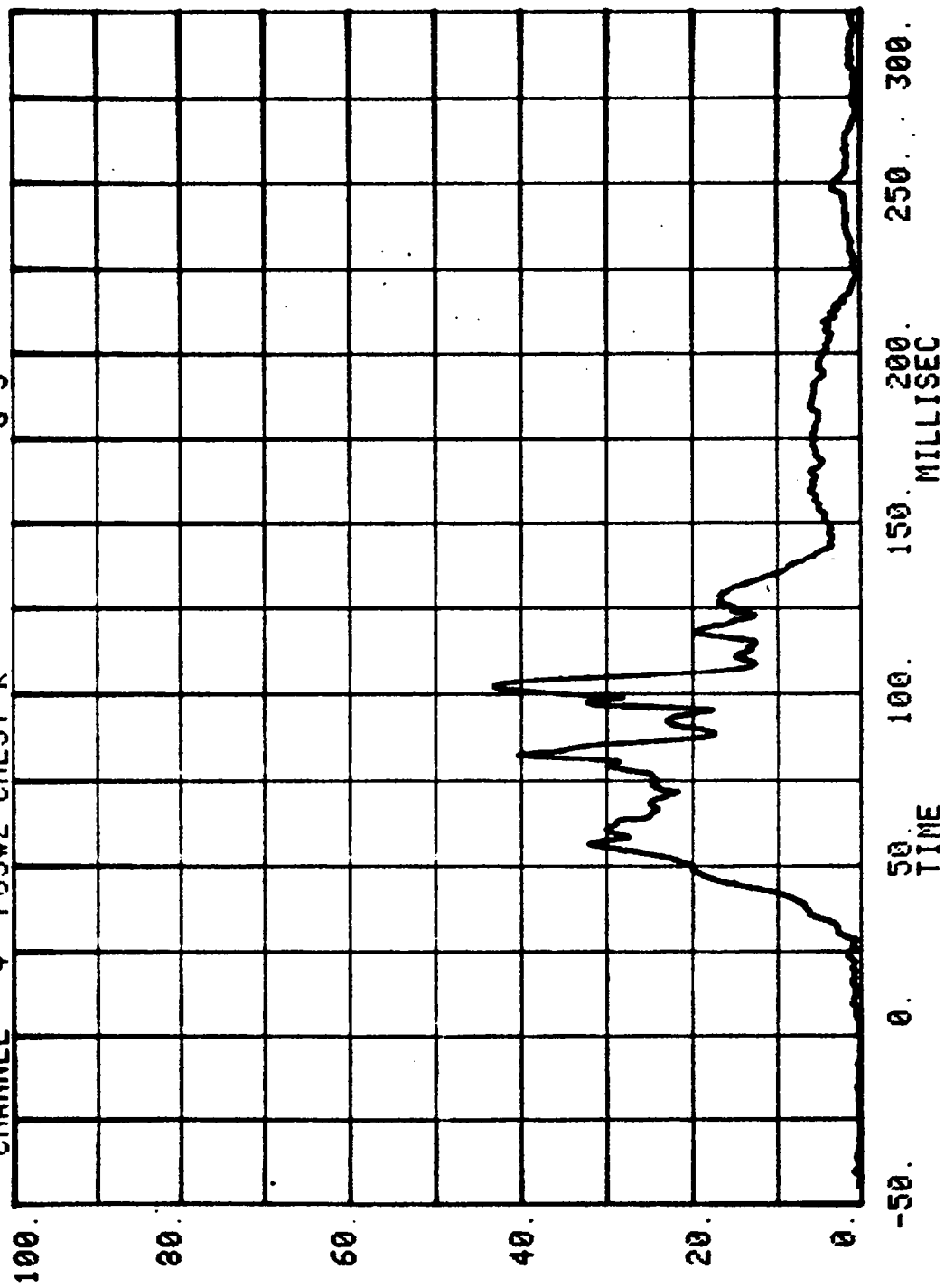


CHANNEL 4 POS#2 CHEST R

RUN= 875

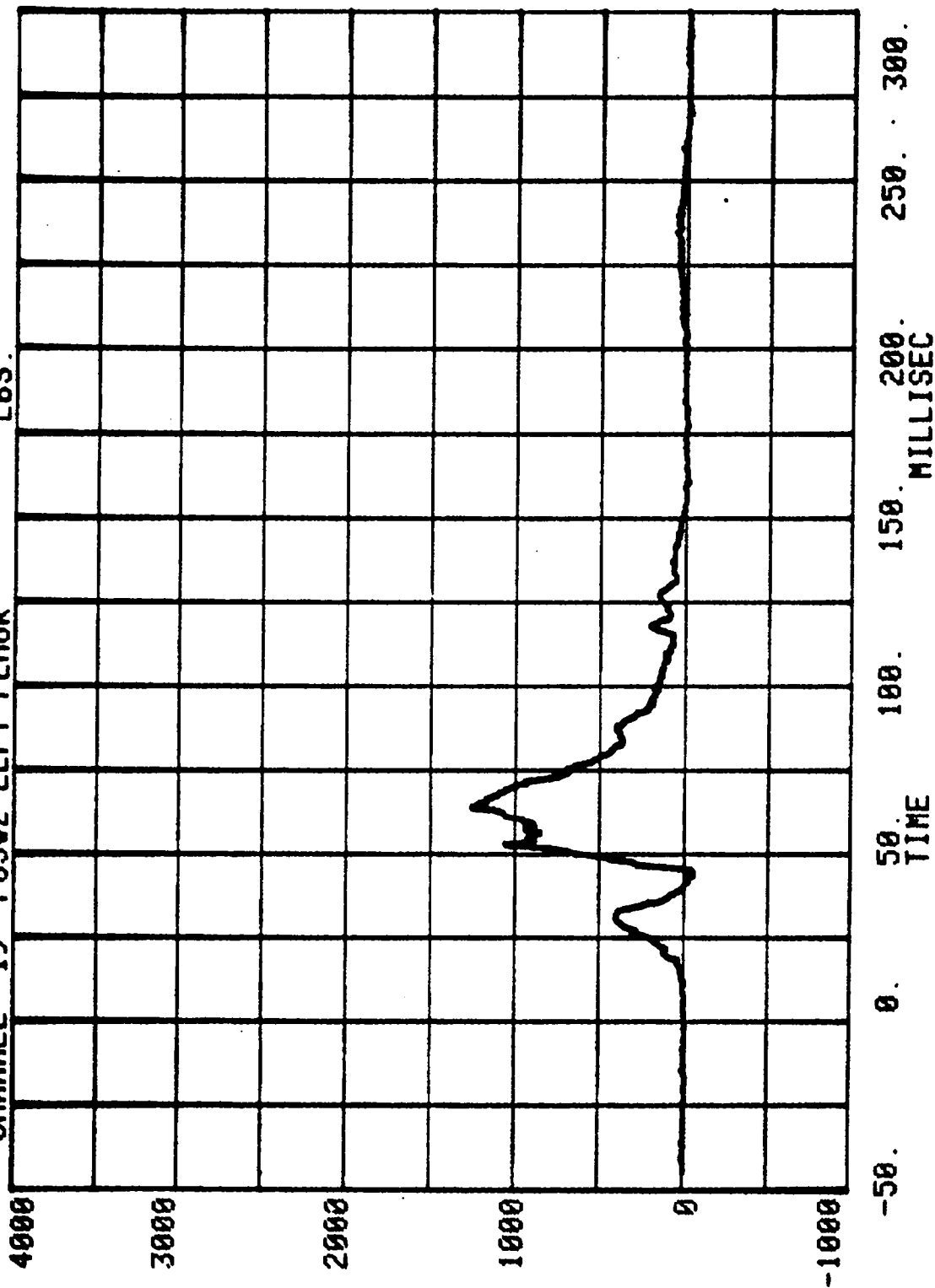
SERIES= 201

G'S

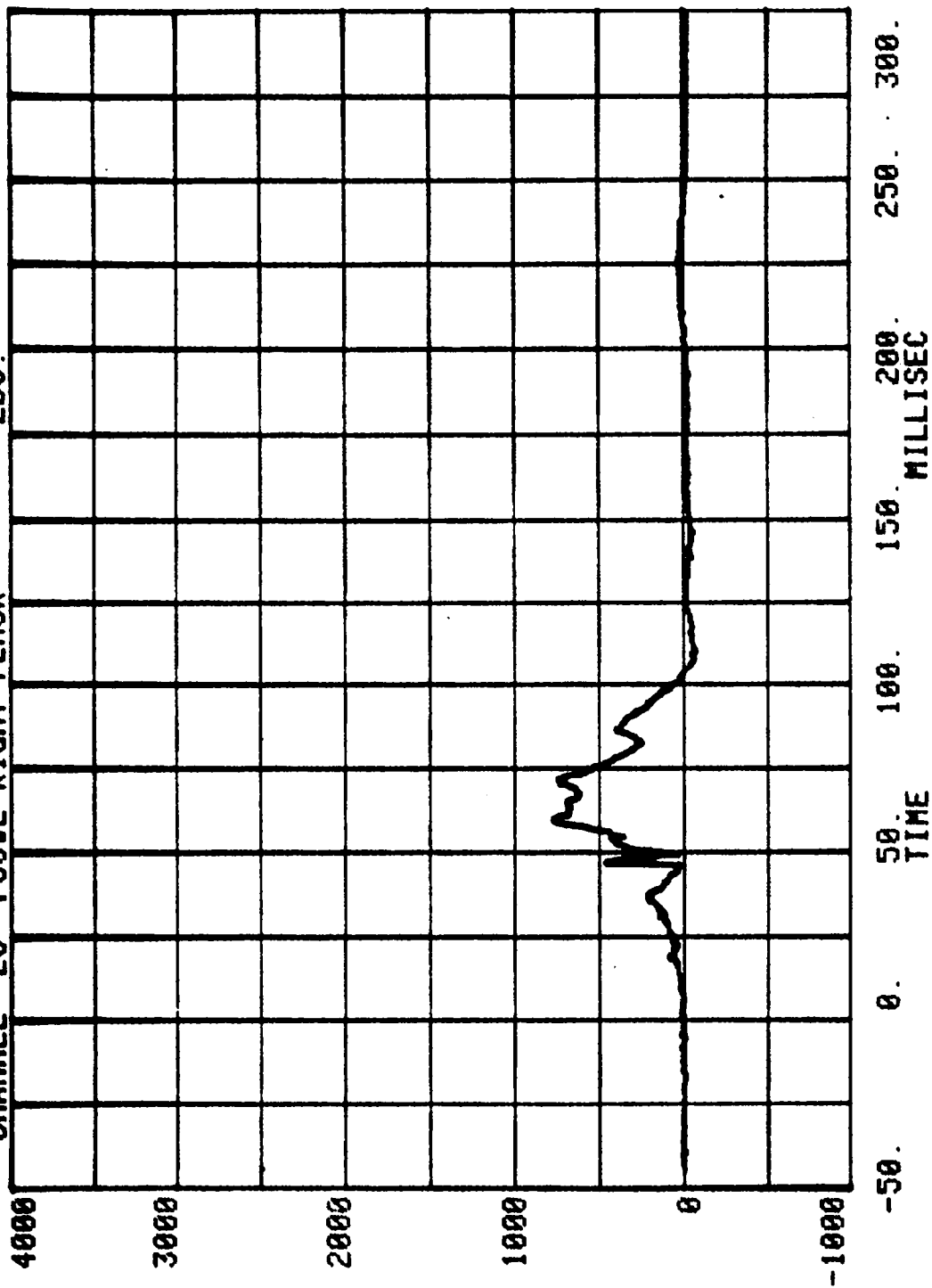


CHANNEL 19 POS#2 LEFT FEMUR LBS.

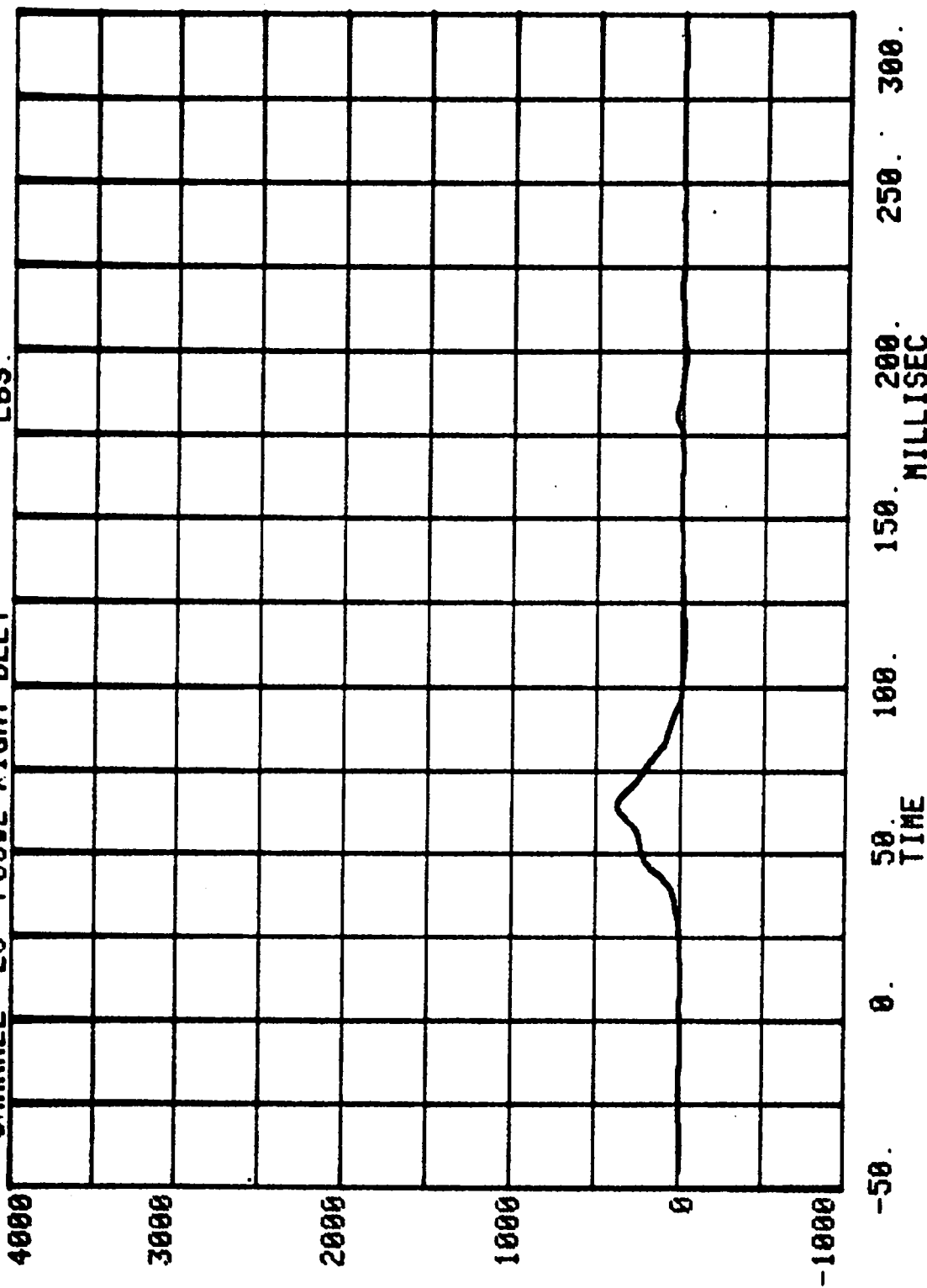
RUN= 875. SERIES= 201



CHANNEL 20 POS#2 RIGHT FEMUR
RUN= 875 SERIES= 201 LBS.

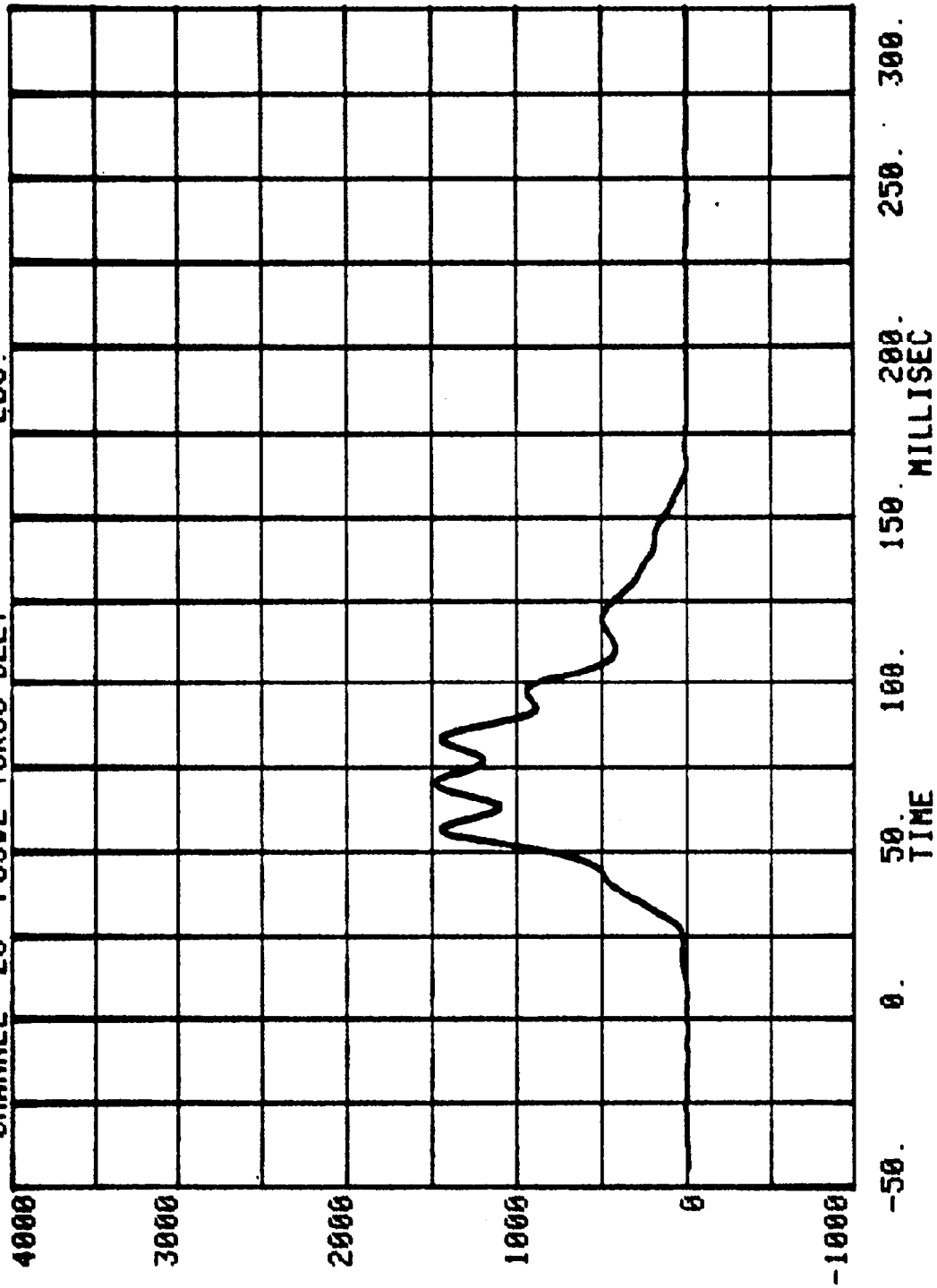


RUN= 875 SERIES= 201
CHANNEL 25 POS#2 RIGHT BELT LBS.



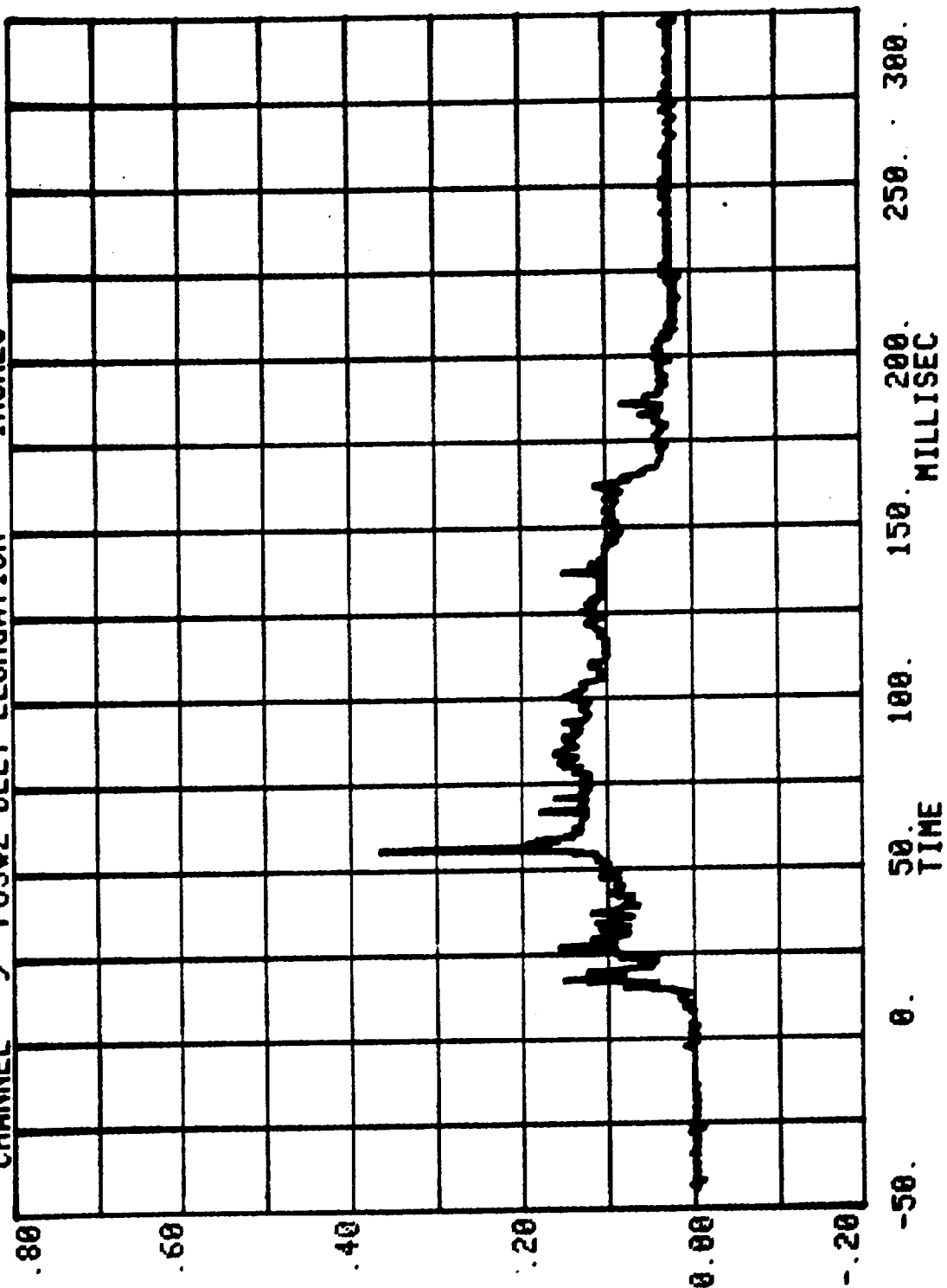
CHANNEL 26 POS#2 TORSO BELT LBS.

RUN= 875 SERIES= 201



Measured over 2.5 inches

CHANNEL 9 POS#2 BELT ELONGATION SERIES= 201 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.

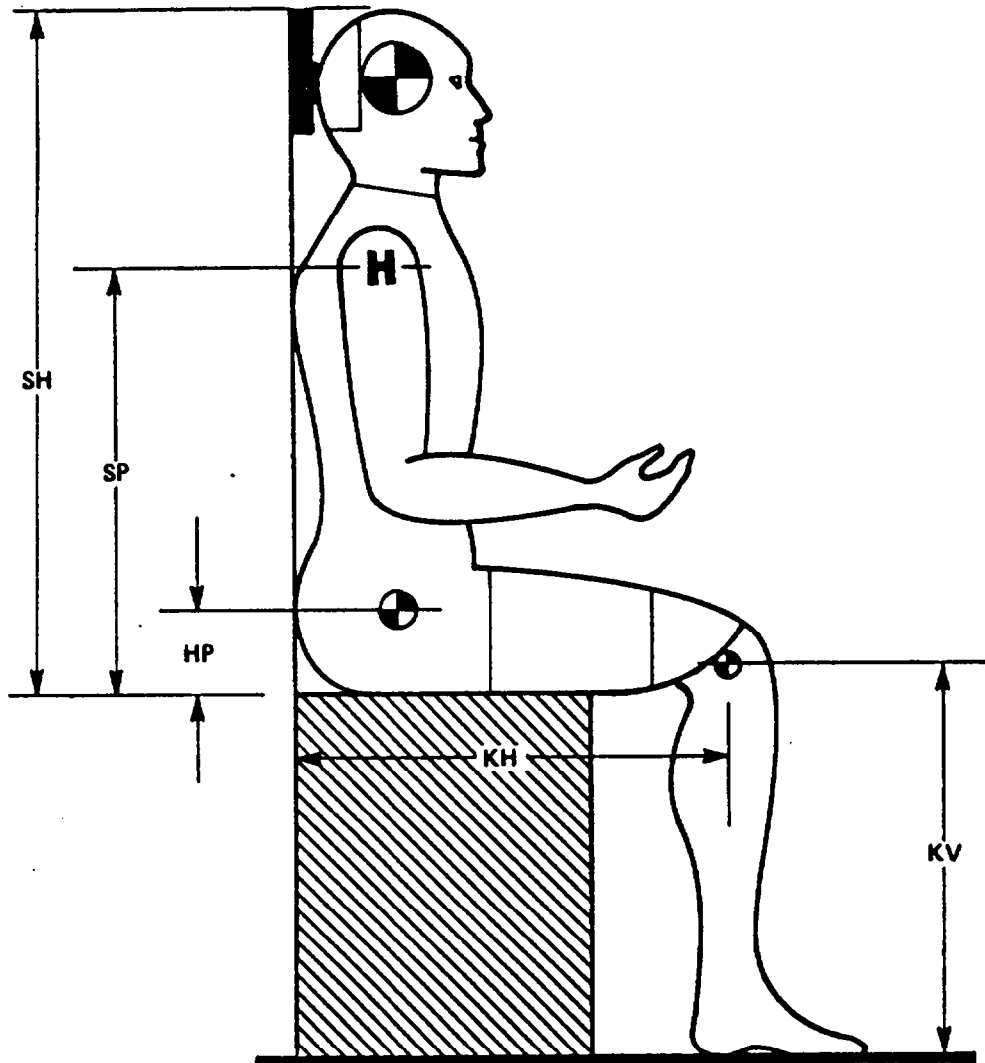
Dummy serial numbers and certification dates are:

<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's crash test program.

TECHNICIAN'S NAME:

John T. [Signature]

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PART 572 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)
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: *Don Whiting*

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DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
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 P. Smith

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DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
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:

[Signature]
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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's crash test program.

TECHNICIAN'S NAME:

Don McKinley

C-9

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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:

John T. Hinkley

C-10

7731-1

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
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:

James W. [Signature]

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
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:

[Signature]
C-12

7731-1

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**

BEFORE DRIVING YOUR VEHICLE

OCCUPANT RESTRAINT SYSTEMS

WARNING — Be sure to **LOCK ALL DOORS** before driving away. Locking the doors, along with using the safety belts provided, will minimize the risk of injury or ejection in an accident.

Ford Motor Company recommends that you always **BUCKLE UP**. In some areas restraint system use is required by law.

WARNING — Passengers should not be allowed to ride in the cargo area of any vehicle. Persons who are not riding in a seat with a fastened safety belt are much more likely to suffer serious bodily injury in the event of a collision.

WARNING — All vehicle occupants, including pregnant women, should wear their safety belts for maximum protection in the event of a collision. All vehicle occupants, including pregnant women, should be sure the lap belt or lap belt portion of the lap-shoulder belt, is fitted snugly and as low as possible around the hips, not on the waist. Shoulder belts should also be properly adjusted for minimum slack. Failure to properly utilize the safety belts may increase the chance and/or severity of injury in the event of a collision.

According to accident statistics, properly restrained children are safer in the rear seat than in the front seat.

For young children, infant and child restraints should be obtained and used in accordance with the instructions provided by the manufacturer of the infant and child restraint. See **Infant and Child Restraints**. Child restraint use is required by law in most states and provinces.

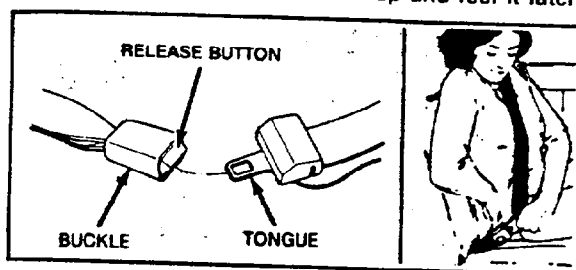
BEFORE DRIVING YOUR VEHICLE

Front Lap-Shoulder Belts

Manual Front Lap-Shoulder Belts (Canadian Vehicles Only)

The belt system allows freedom of movement, locking tight only on hard braking or impacts of approximately 5 mph (8 km/h) or more. The system cannot be made to lock by jerking on the belt.

After entering your vehicle, close the door and adjust the front seat to obtain the best position for your driving comfort, access to controls, and visibility. Then pull the lap-shoulder belt from the retractor so the shoulder portion of the belt crosses your outboard shoulder and chest and insert the belt tongue into the proper buckle until you hear a snap and feel it latch.



Pull up on the shoulder portion of the belt to tighten the lap portion to a snug fit. Be sure the belt is as low on your hips as possible. The front lap-shoulder belts are equipped with a comfort regulator to reduce belt pressure against your chest.

The shoulder belt can be adjusted much like a window shade to increase the shoulder belt length a small amount. The adjacent door must be closed to use this comfort regulator feature.

Adjustment Procedure (Front Lap-Shoulder Belts Only)

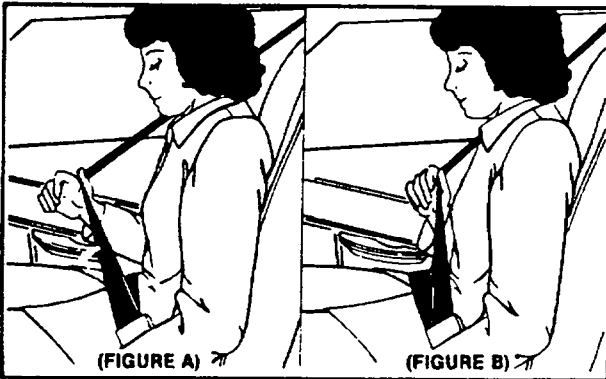
To set the comfort regulator, the shoulder belt initially should be positioned snugly against the chest. If the

BEFORE DRIVING YOUR VEHICLE

belt is not positioned snugly, the comfort regulator may already be engaged. Disengagement is accomplished by the following procedure:

Figure A — Pull the shoulder belt outward 4 or 5 inches (10 to 13 cm), then release it and allow belt to fully retract. Repeat procedure if belt is not snug to the chest.

Figure B — Now the belt tension may be adjusted by pulling down slightly on the shoulder belt and releasing. The least amount of shoulder belt length increase needed to relieve pressure, but not more than 1 inch (2.5 cm), should be pulled out when using the comfort regulator system as the belt does not retract at a sudden stop, but "locks" in its current adjusted position.

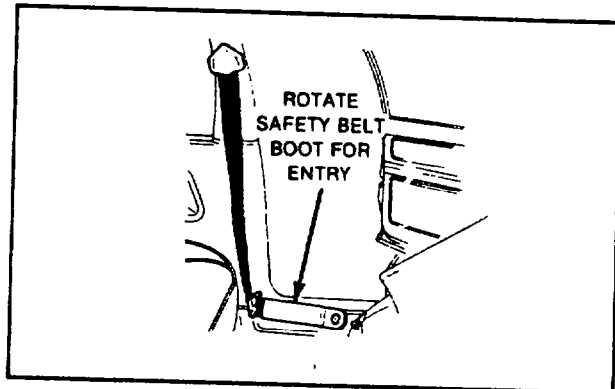


- If the desired setting is not achieved or excess slack develops as you change seat position, repeat the above procedure.
- When the door is opened, the comfort regulator will release automatically, permitting the lap-shoulder belt to retract. After unbuckling the belt it is recommended that you guide the tongue during retraction to prevent it from striking you or the vehicle.

BEFORE DRIVING YOUR VEHICLE

WARNING — The belt system must be snug to restrain you properly. Never allow more than 1 inch (2.5 cm) of slack to be introduced into your safety belt system because the belt locks upon impact where it is positioned. Wearing the belt too loosely will negate any real safety protection. Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Be sure the lap portion of the belt is fitted snugly and as low as possible around the hips, not on the waist. Failure to follow these precautions could increase the chance and/or severity of injury in an accident.

Rear Seat Entry



The rotating boot on the lap belt system is designed to facilitate both rear seat entry/exit and access to front seat passengers. To enter rear seat:

- Rotate safety belt boot rearward.
- Enter rear seat in front of safety belts.
- Return rotating safety belt boot to forward position to facilitate use by front seat passengers.

BEFORE DRIVING YOUR VEHICLE

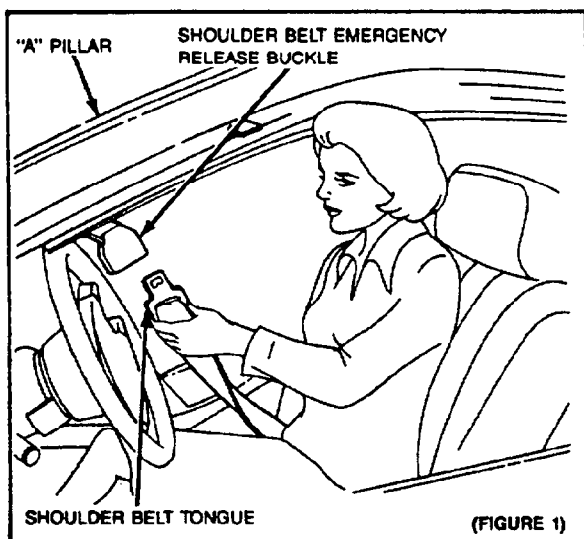
MOTORIZED PASSIVE RESTRAINT SYSTEM

(Not Available On Models Sold In Canada)

The Passive Restraint System, which operates electrically, restrains the driver and front seat passenger in the vehicle through the use of the automatic shoulder belt, the manual lap belt, and knee bolsters.

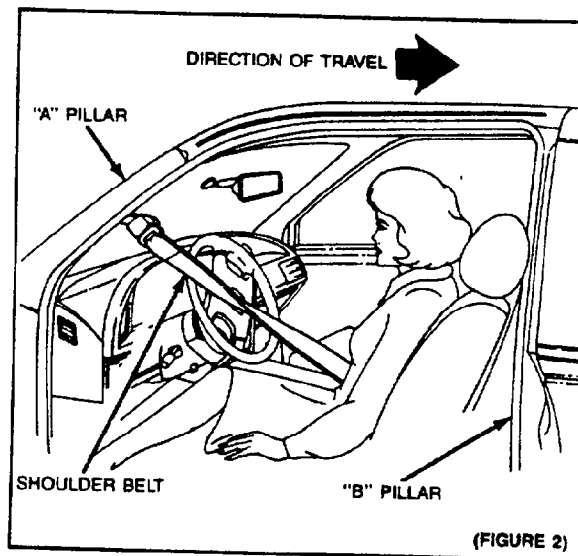
WARNING — The lap safety belt is to be manually buckled by the driver/passenger and should always be worn with the shoulder belt. Be sure the lap belt is on your hips as low as possible.

After entering the vehicle and closing the door, check to insure the shoulder belt is latched to the emergency release buckle at the "A" pillar (Figure 1).

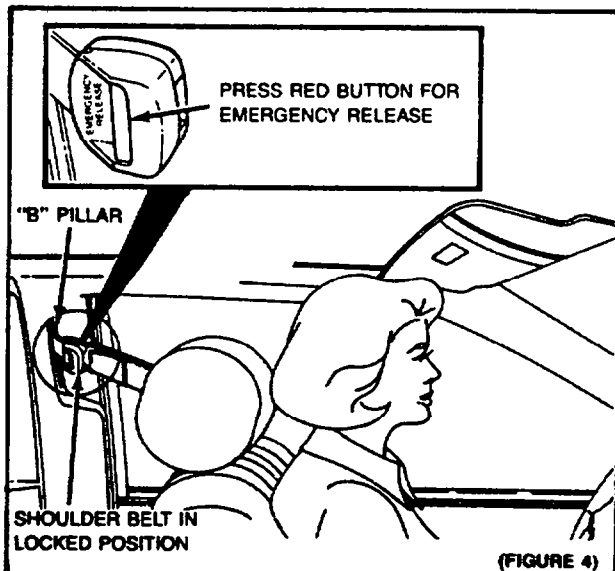
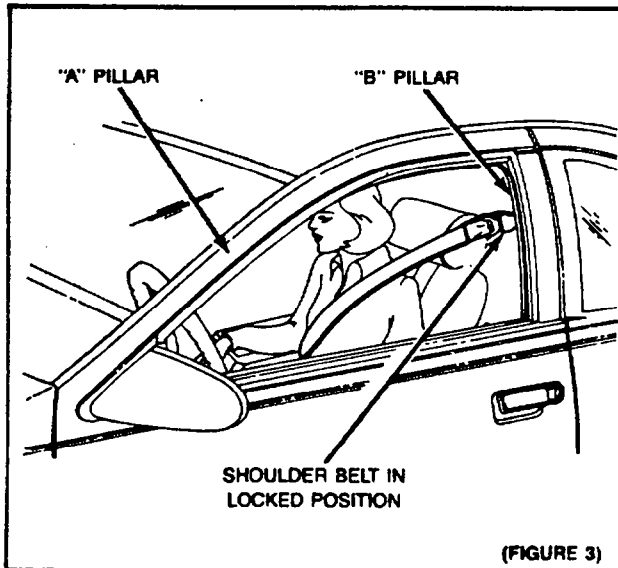


BEFORE DRIVING YOUR VEHICLE

If it is not latched, pull the shoulder belt from the retractor between the seat and console, and buckle it to the emergency release buckle. Insert the key into the ignition and turn the key to the ON position. A motor will cause the shoulder belt to slide along its track (Figure 2) starting at the front body "A" pillar and moving rearward to its locked position in the center body "B" pillar (Figures 3 and 4).



BEFORE DRIVING YOUR VEHICLE



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BEFORE DRIVING YOUR VEHICLE

The safety belt warning indicator lamp in the instrument cluster (Figure 7) will illuminate four (4) to eight (8) seconds. In the unlikely event the shoulder belt should stall before it reaches the "B" pillar, the indicator lamp will remain illuminated after nine (9) seconds until the shoulder belt is in its locked position in the "B" pillar. If the indicator lamp remains illuminated, check to insure both shoulder belts are latched to the emergency release buckle. If they are latched, refer to the Manual Override System in this section before driving the vehicle.

The shoulder belt will automatically adjust itself to allow for comfortable wear and freedom of movement by the occupant. It will lock tight only on extremely hard braking, or hard cornering or impacts of approximately 5 MPH (8 km/h) or more.

WARNING — Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Failure to follow these precautions could increase the chance and/or severity of injury in an accident. When the ignition is in any position and the door is opened, the shoulder belt will move forward to the "A" pillar. This will allow ample room for exit from the vehicle by the driver or passenger. **DO NOT** use the belt as an assist handle when entering or exiting the vehicle. The door should not be opened while the vehicle is in motion.

IMPORTANT FOR YOUR SAFETY

Before driving the vehicle, read the label on the back of the sun visor (Figures 5 and 6).

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