

V1841-V1845



U.S. Department  
of Transportation  
**National Highway  
Traffic Safety  
Administration**

---

**DOT HS 807 926  
Final Report**

**April 1992**

# **Final Report of a 1985 Nissan Sentra 4-Door Sedan Into a Pole Barrier in Support of Crash III Damage Algorithm Reformulation**

---

**This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' name or products are mentioned, it is because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.**

| 1. Report No.<br>DOT HS 807 926                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2. Government Accession No.                          | 3. Recipient's Catalog No.                                                                                                                         |                |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------|------|------|----------------|--------------------------------------|----------|----------|------|-----|------|----------|----------|------|-----|------|----------|----------|------|------|------|----------|----------|------|------|------|----------|----------|------|------|------|
| 4. Title and Subtitle<br>FINAL REPORT OF A 1985 NISSAN Sentra 4-DOOR SEDAN<br>INTO A POLE BARRIER IN SUPPORT OF CRASH III<br>DAMAGE ALGORITHM REFORMULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                      | 5. Report Date<br>MARCH - APRIL 1992                                                                                                               |                |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                      | 6. Performing Organization Code                                                                                                                    |                |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 7. Author(s)<br>C.A. Markusic, Project Engineer, TRC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                      | 8. Performing Organization Report No.<br>920309                                                                                                    |                |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 9. Performing Organization Name and Address<br>Vehicle Research and Test Center<br>10820 State Route 347<br>East Liberty, Ohio 43319                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                      | 10. Work Unit No. (TRAIS)                                                                                                                          |                |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                      | 11. Contract or Grant No.<br>DTNH22-88-C-07292                                                                                                     |                |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 12. Sponsoring Agency Name and Address<br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>400 Seventh St., S.W.<br>Washington, D.C. 20590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                      | 13. Type of Report and Period Covered<br>FINAL REPORT<br>MARCH - APRIL 1992                                                                        |                |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                      | 14. Sponsoring Agency Code<br>DOT/NHTSA/VRTC                                                                                                       |                |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 15. Supplementary Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                      |                                                                                                                                                    |                |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 16. Abstract<br><br>Five (5) 0° pole barrier impact tests were conducted for research and development in support of the CRASH III damage algorithm reformulation. These tests were conducted on a 1985 Nissan Sentra 4-door sedan, VIN JN1PB11S4GU671580, at the Transportation Research Center Inc. The following five tests were conducted on the vehicle: <table border="1" data-bbox="224 1113 1380 1375"> <thead> <tr> <th>TEST NO.</th> <th>DATE</th> <th>TIME</th> <th>SPEED<br/>(mph)</th> <th>MAXIMUM<br/>CUMULATIVE<br/>CRUSH (in.)</th> </tr> </thead> <tbody> <tr> <td>920309-1</td> <td>03/09/92</td> <td>1114</td> <td>9.7</td> <td>13.2</td> </tr> <tr> <td>920309-2</td> <td>03/09/92</td> <td>1224</td> <td>9.8</td> <td>15.4</td> </tr> <tr> <td>920309-3</td> <td>03/09/92</td> <td>1339</td> <td>14.7</td> <td>19.3</td> </tr> <tr> <td>920309-4</td> <td>03/09/92</td> <td>1441</td> <td>19.9</td> <td>24.0</td> </tr> <tr> <td>920309-5</td> <td>03/09/92</td> <td>1532</td> <td>35.0</td> <td>40.3</td> </tr> </tbody> </table> |                                                      |                                                                                                                                                    |                | TEST NO.                             | DATE | TIME | SPEED<br>(mph) | MAXIMUM<br>CUMULATIVE<br>CRUSH (in.) | 920309-1 | 03/09/92 | 1114 | 9.7 | 13.2 | 920309-2 | 03/09/92 | 1224 | 9.8 | 15.4 | 920309-3 | 03/09/92 | 1339 | 14.7 | 19.3 | 920309-4 | 03/09/92 | 1441 | 19.9 | 24.0 | 920309-5 | 03/09/92 | 1532 | 35.0 | 40.3 |
| TEST NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DATE                                                 | TIME                                                                                                                                               | SPEED<br>(mph) | MAXIMUM<br>CUMULATIVE<br>CRUSH (in.) |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 920309-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 03/09/92                                             | 1114                                                                                                                                               | 9.7            | 13.2                                 |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 920309-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 03/09/92                                             | 1224                                                                                                                                               | 9.8            | 15.4                                 |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 920309-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 03/09/92                                             | 1339                                                                                                                                               | 14.7           | 19.3                                 |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 920309-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 03/09/92                                             | 1441                                                                                                                                               | 19.9           | 24.0                                 |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 920309-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 03/09/92                                             | 1532                                                                                                                                               | 35.0           | 40.3                                 |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 17. Key Words<br>0° Frontal Pole Barrier Impact<br>Crash III Damage Algorithm<br>Reformulation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                      | 18. Distribution Statement<br><br>Document is available to the public<br>from the National Technical Information<br>Service, Springfield, VA 22161 |                |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |
| 19. Security Classif. (of this report)<br>Unclassified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20. Security Classif. (of this page)<br>Unclassified | 21. No. of Pages<br>160                                                                                                                            | 22. Price      |                                      |      |      |                |                                      |          |          |      |     |      |          |          |      |     |      |          |          |      |      |      |          |          |      |      |      |          |          |      |      |      |

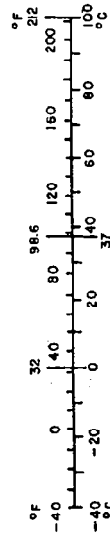
# METRIC CONVERSION FACTORS

## Approximate Conversions to Metric Measures

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

## Approximate Conversions from Metric Measures

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



\*1 in. = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10.286.

## TABLE OF CONTENTS

| SECTION    | TITLE                          | PAGE |
|------------|--------------------------------|------|
| 1.0        | PURPOSE AND TEST SUMMMARY      | 1-1  |
| 2.0        | VEHICLE AND TEST DATA          | 2-1  |
| 3.0        | TEST NO. 920309-1 SUMMARY      | 3-1  |
| 4.0        | TEST NO. 920309-2 SUMMARY      | 4-1  |
| 5.0        | TEST NO. 920309-3 SUMMARY      | 5-1  |
| 6.0        | TEST NO. 920309-4 SUMMARY      | 6-1  |
| 7.0        | TEST NO. 920309-5 SUMMARY      | 7-1  |
| APPENDIX A | PHOTOGRAPHS                    | A-1  |
| APPENDIX B | DATA PLOTS                     | B-1  |
| APPENDIX C | MISCELLANEOUS TEST INFORMATION | C-1  |

## SECTION 1.0

### PURPOSE AND TEST SUMMARY

The purpose of the five (5) 0° pole barrier impact tests was for research and development in support of the CRASH III damage algorithm reformulation.

The 1985 Nissan Sentra was equipped with a 1.6 liter, 4-cylinder, transverse, gasoline engine with a 4-speed manual transmission. The test weight of the vehicle was 2298 pounds.

The vehicle impacted a vertical steel cylinder 12 inches in diameter. The vehicle's intended impact point was the front of the vehicle at its longitudinal centerline.

The vehicle was instrumented with four (4) accelerometers to measure vehicle X-axis and Y-axis acceleration.

The crash test event was recorded by two (2) high-speed motion picture cameras.

SECTION 2.0

VEHICLE INFORMATION

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Nissan Motor Company, Ltd.

MAKE/MODEL: Nissan/Sentra

VIN: JN1PB11S4GU671580

BODY STYLE: 4-door sedan

MODEL YEAR: 1985

COLOR: Blue

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT: 1.6 liter

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

DATE VEHICLE RECEIVED: 02/25/92

ODOMETER READING: 56,556.0

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

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

REMARKS:

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

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Nissan Motor Company, Ltd.

DATE OF MANUFACTURE: 07/85

VIN: JN1PB11S4GU671580

GVWR: 2908 LBS

GAWR: FRONT: 1554 LBS., REAR: 1521 LBS.



TEST VEHICLE INFORMATION, CONT'D.

TIRES ON VEHICLE (MFR., LINE, SIZE): Ft: Atlas, Seasonaire, 175/70SR13  
Rr: Ultra, Supreme Sport, 175/70R13

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 32 PSI  
REAR: 32 PSI

SPARE TIRE (MFR., LINE, SIZE): Yokohama, Spare only, 155/80D13

TYPE OF SEATS: FRONT: Bucket  
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually adjustable

MAXIMUM WIDTH: 64.0 INCHES

WHEELBASE: 94.2 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA: The label was located in the glove box.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P175/70SR13

RECOMMENDED COLD TIRE PRESSURE: FRONT: 26 PSI; REAR: 26 PSI

DESIGNATED SEATING CAPACITY: 2 FRONT 3 REAR 5 TOTAL

VEHICLE CAPACITY WEIGHT: 750 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 24.9; RF 25.0; LR 24.6; RR 24.5

PRE-TEST ATTITUDE: LF 31.2; RF 31.5; LR 25.5; RR 25.8

TEST VEHICLE INFORMATION, CONT'D.

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

|                                  |           |                                 |          |
|----------------------------------|-----------|---------------------------------|----------|
| RIGHT FRONT                      | 583 LBS.  | RIGHT REAR                      | 396 LBS. |
| LEFT FRONT                       | 672 LBS.  | LEFT REAR                       | 324 LBS. |
| TOTAL FRONT WEIGHT               | 1255 LBS. | (63.5% OF TOTAL VEHICLE WEIGHT) |          |
| TOTAL REAR WEIGHT                | 720 LBS.  | (36.5% OF TOTAL VEHICLE WEIGHT) |          |
| TOTAL DELIVERED WEIGHT 1975 LBS. |           |                                 |          |

WEIGHT OF TEST VEHICLE:

|                    |            |                                 |          |
|--------------------|------------|---------------------------------|----------|
| RIGHT FRONT        | 925 LBS ** | RIGHT REAR                      | 208 LBS. |
| LEFT FRONT         | 910 LBS ** | LEFT REAR                       | 255 LBS. |
| TOTAL FRONT WEIGHT | 1835 LBS.  | (79.8% OF TOTAL VEHICLE WEIGHT) |          |
| TOTAL REAR WEIGHT  | 463 LBS.   | (20.2% OF TOTAL VEHICLE WEIGHT) |          |
| TOTAL TEST WEIGHT  | 2298 LBS * |                                 |          |

WEIGHT OF BALLAST SECURED IN VEHICLE: 0 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 14.5 INCHES REARWARD OF THE THIRD AXLE CENTERLINE

\*The total test weight includes the weight of the third axle.  
\*\*The front wheel weights are for third axle wheels.

# CRUSH MEASUREMENTS AT VEHICLE BUMPER HEIGHT

| LOCATION    | 0     |      | 1     |      | 2    |      | 3    |      | 4    |      | 5    |      | 6    |      | 7    |      | 8    |      |
|-------------|-------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|             | X     | Y    | X     | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    |
| PRE-TEST    | 104.3 | 29.1 | 101.3 | 29.0 | 98.3 | 29.0 | 95.3 | 28.9 | 92.3 | 28.9 | 89.3 | 28.9 | 86.3 | 28.9 | 83.2 | 28.9 | 80.3 | 28.9 |
|             | 104.9 | 29.0 | 101.9 | 29.2 | 98.9 | 29.2 | 95.9 | 29.0 | 92.9 | 28.9 | 89.9 | 28.9 | 86.9 | 28.9 | 83.9 | 28.9 | 80.9 | 28.9 |
|             | 104.3 | 28.8 | 101.3 | 28.8 | 98.3 | 28.8 | 95.3 | 28.8 | 92.3 | 28.8 | 89.3 | 28.8 | 86.3 | 28.8 | 83.3 | 28.8 | 80.2 | 28.8 |
|             | 104.5 | 29.1 | 101.5 | 29.0 | 98.5 | 29.0 | 95.5 | 29.0 | 92.5 | 29.0 | 89.5 | 28.3 | 86.6 | 29.0 | 83.4 | 29.0 | 80.5 | 29.1 |
|             | 104.5 | 29.1 | 101.5 | 29.1 | 98.5 | 29.1 | 95.5 | 29.1 | 92.6 | 29.0 | 89.6 | 29.0 | 86.7 | 29.1 | 83.6 | 29.1 | 80.6 | 29.1 |
| POST-TEST 5 | 104.8 | 28.7 | 101.9 | 28.2 | 98.9 | 28.2 | 95.7 | 28.1 | 92.9 | 28.1 | 89.9 | 28.1 | 86.8 | 28.0 | 83.8 | 28.1 | 80.8 | 28.1 |
| LOCATION    |       |      |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|             |       |      |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|             |       |      |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|             |       |      |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|             |       |      |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| PRE-TEST    | 77.4  | 29.0 | 74.3  | 29.0 | 71.3 | 29.0 | 68.3 | 29.1 | 65.3 | 29.2 | 62.4 | 29.2 | 59.4 | 29.1 | 56.4 | 28.8 | 53.4 | 28.8 |
|             | 78.0  | 28.9 | 75.0  | 28.9 | 72.0 | 29.0 | 68.9 | 29.0 | 66.0 | 29.1 | 63.0 | 29.1 | 60.0 | 29.0 | 57.1 | 28.8 | 54.2 | 28.8 |
|             | 77.3  | 28.8 | 74.2  | 28.9 | 71.3 | 28.9 | 68.2 | 28.9 | 65.3 | 29.0 | 62.1 | 29.2 | 59.0 | 29.3 | 56.1 | 29.1 | 53.2 | 29.1 |
|             | 77.6  | 29.1 | 74.5  | 29.2 | 71.6 | 29.2 | 68.4 | 29.3 | 65.6 | 29.4 | 62.2 | 29.8 | 59.2 | 29.8 | 56.4 | 29.6 | 53.5 | 29.8 |
|             | 77.7  | 29.1 | 74.6  | 29.2 | 71.6 | 29.2 | 68.5 | 29.2 | 65.6 | 29.3 | 62.2 | 29.7 | 59.2 | 29.8 | 56.4 | 29.8 | 53.5 | 30.0 |
| POST-TEST 5 | 77.9  | 28.2 | 74.9  | 28.2 | 71.9 | 28.3 | 68.9 | 28.6 | 66.1 | 29.6 | 64.1 | 32.0 | 61.6 | 33.2 | 60.0 | 33.4 | 58.0 | 33.3 |

All measurements are in inches. Column readings are three inches apart starting from the left B-pillar and continue around the front of the vehicle to the right B-pillar.  
 All X-axis measurements taken from a reference plane 180 inches from and parallel to the rear bumper.  
 All Y-axis measurements taken from a reference plane 60 inches from and parallel to the vehicle longitudinal centerline.

CRUSH MEASUREMENTS AT VEHICLE BUMPER HEIGHT

| LOCATION    | 18   |      | 19   |      | 20   |      | 21   |      | 22   |      | 23   |      | 24   |      | 25   |      | 26   |      |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|             | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    |
| PRE-TEST    | 50.6 | 28.8 | 47.4 | 28.8 | 44.4 | 28.9 | 41.4 | 29.1 | 38.4 | 29.2 | 35.2 | 29.6 | 32.2 | 30.9 | 29.2 | 31.3 | 26.3 | 32.1 |
| POST-TEST 1 | 51.4 | 28.9 | 48.2 | 29.0 | 45.2 | 29.2 | 42.2 | 29.5 | 39.0 | 29.8 | 35.8 | 30.3 | 33.0 | 30.6 | 30.0 | 31.9 | 26.9 | 32.4 |
| POST-TEST 2 | 50.4 | 29.1 | 47.2 | 29.3 | 44.2 | 29.6 | 41.2 | 29.9 | 38.2 | 30.2 | 35.0 | 30.9 | 32.2 | 32.4 | 29.2 | 32.7 | 26.2 | 33.3 |
| POST-TEST 3 | 50.6 | 29.9 | 47.5 | 30.4 | 44.5 | 30.8 | 41.5 | 31.2 | 38.5 | 31.9 | 35.4 | 32.6 | 32.8 | 34.1 | 29.8 | 34.6 | 26.8 | 35.8 |
| POST-TEST 4 | 50.6 | 30.3 | 47.5 | 30.8 | 44.5 | 31.2 | 41.6 | 31.8 | 38.6 | 32.6 | 35.5 | 33.7 | 33.2 | 35.2 | 30.3 | 36.4 | 27.6 | 37.8 |
| POST-TEST 5 | 55.6 | 33.2 | 52.8 | 33.0 | 49.9 | 33.0 | 47.1 | 33.6 | 44.5 | 35.1 | 41.8 | 36.6 | 39.9 | 38.9 | 37.7 | 41.1 | 35.9 | 43.7 |
| LOCATION    | 27   | Y    | 28   | Y    | 29   | Y    | 30   | Y    | 31   | Y    | 32   | Y    | 33   | Y    | 34   | Y    | 35   | Y    |
|             | X    |      | X    |      | X    |      | X    |      | X    |      | X    |      | X    |      | X    |      | X    |      |
| PRE-TEST    | 23.4 | 32.6 | 17.8 | 33.6 | 16.7 | 42.7 | 16.4 | 45.6 | 16.2 | 48.6 | 16.1 | 51.6 | 16.0 | 54.6 | 16.0 | 57.7 | 16.0 | 60.4 |
| POST-TEST 1 | 24.0 | 33.0 | 14.8 | 38.2 | 18.8 | 46.1 | 19.9 | 49.0 | 21.8 | 51.7 | 23.2 | 54.4 | 25.1 | 56.8 | 27.1 | 57.9 | 29.1 | 60.2 |
| POST-TEST 2 | 23.4 | 34.1 | 13.7 | 40.8 | 19.2 | 47.9 | 20.9 | 50.4 | 22.8 | 52.6 | 25.1 | 54.6 | 27.6 | 55.8 | 29.5 | 57.9 | 31.4 | 60.5 |
| POST-TEST 3 | 24.0 | 37.0 | 14.6 | 45.6 | 21.8 | 51.1 | 24.2 | 52.9 | 26.9 | 54.1 | 29.8 | 54.8 | 32.6 | 56.2 | 34.2 | 58.6 | 35.3 | 59.7 |
| POST-TEST 4 | 24.8 | 39.2 | 17.4 | 50.3 | 23.2 | 54.1 | 29.0 | 54.6 | 31.8 | 55.5 | 34.3 | 55.5 | 37.4 | 56.2 | 38.8 | 58.6 | 39.8 | 62.1 |
| POST-TEST 5 | 34.6 | 46.2 | 34.6 | 59.8 | 43.6 | 57.8 | 45.9 | 56.8 | 49.0 | 55.1 | 51.1 | 54.5 | 53.8 | 56.0 | 55.6 | 58.5 | 56.4 | 61.9 |

All measurements are in inches. Column readings are three inches apart starting from the left B-pillar and continue around the front of the vehicle to the right B-pillar.  
 All X-axis measurements taken from a reference plane 180 inches from and parallel to the rear bumper.  
 All Y-axis measurements taken from a reference plane 60 inches from and parallel to the vehicle longitudinal centerline.

CRUSH MEASUREMENTS AT VEHICLE BUMPER HEIGHT

| LOCATION    | 36   |      | 37   |      | 38   |      | 39   |      | 40   |      | 41   |      | 42   |      | 43   |      | 44   |      |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|             | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    |
| PRE-TEST    | 16.0 | 63.4 | 16.1 | 66.4 | 16.2 | 69.4 | 16.3 | 72.4 | 16.5 | 75.4 | 16.7 | 78.4 | 17.8 | 87.4 | 25.5 | 89.8 | 28.6 | 90.5 |
|             | 28.0 | 62.2 | 26.8 | 64.8 | 24.5 | 66.8 | 22.5 | 69.1 | 21.0 | 71.5 | 19.4 | 74.1 | 14.9 | 81.8 | 25.5 | 89.1 | 28.7 | 89.6 |
|             | 30.0 | 62.9 | 29.0 | 65.9 | 26.6 | 67.3 | 24.1 | 69.0 | 22.2 | 71.0 | 20.0 | 73.4 | 14.6 | 80.0 | 25.3 | 88.6 | 28.4 | 89.0 |
|             | 34.1 | 61.5 | 33.0 | 64.4 | 30.6 | 65.8 | 27.4 | 66.5 | 25.2 | 68.3 | 22.6 | 69.9 | 15.5 | 75.1 | 25.8 | 86.0 | 28.9 | 86.8 |
|             | 38.8 | 64.4 | 37.3 | 66.9 | 34.8 | 68.5 | 31.8 | 68.9 | 29.2 | 69.9 | 26.4 | 70.8 | 18.2 | 74.5 | 26.4 | 86.8 | 29.1 | 88.1 |
| POST-TEST 5 | 55.6 | 64.2 | 54.2 | 66.8 | 51.9 | 68.0 | 49.0 | 68.2 | 46.3 | 68.6 | 43.5 | 69.2 | 35.5 | 71.5 | 34.2 | 81.2 | 34.8 | 83.6 |
| LOCATION    | 45   |      | 46   |      | 47   |      | 48   |      | 49   |      | 50   |      | 51   |      | 52   |      | 53   |      |
|             | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    |
|             | 31.6 | 90.9 | 34.6 | 91.8 | 37.8 | 92.5 | 40.8 | 92.6 | 43.9 | 92.7 | 46.8 | 92.6 | 49.8 | 92.8 | 52.8 | 92.9 | 55.8 | 92.9 |
|             | 31.6 | 89.8 | 34.8 | 90.5 | 38.0 | 91.4 | 41.1 | 91.8 | 44.1 | 92.0 | 47.0 | 92.2 | 50.0 | 92.4 | 53.0 | 92.6 | 56.0 | 92.6 |
|             | 31.5 | 89.1 | 34.4 | 89.9 | 37.5 | 91.1 | 40.6 | 91.4 | 43.7 | 91.8 | 46.6 | 92.1 | 49.6 | 92.2 | 52.6 | 92.4 | 55.6 | 92.4 |
| POST-TEST 3 | 31.9 | 87.1 | 34.8 | 88.0 | 38.0 | 89.2 | 41.0 | 89.6 | 44.1 | 90.1 | 47.0 | 90.4 | 50.5 | 90.9 | 53.0 | 90.9 | 56.0 | 91.2 |
| POST-TEST 4 | 32.0 | 89.0 | 34.8 | 90.2 | 37.9 | 91.7 | 40.9 | 92.1 | 44.1 | 92.3 | 46.9 | 92.4 | 50.1 | 92.4 | 52.9 | 92.6 | 55.8 | 92.6 |
| POST-TEST 5 | 37.2 | 85.8 | 39.4 | 87.8 | 41.6 | 90.5 | 44.9 | 90.9 | 48.0 | 90.8 | 51.1 | 90.8 | 54.2 | 90.6 | 57.0 | 90.6 | 59.6 | 90.8 |

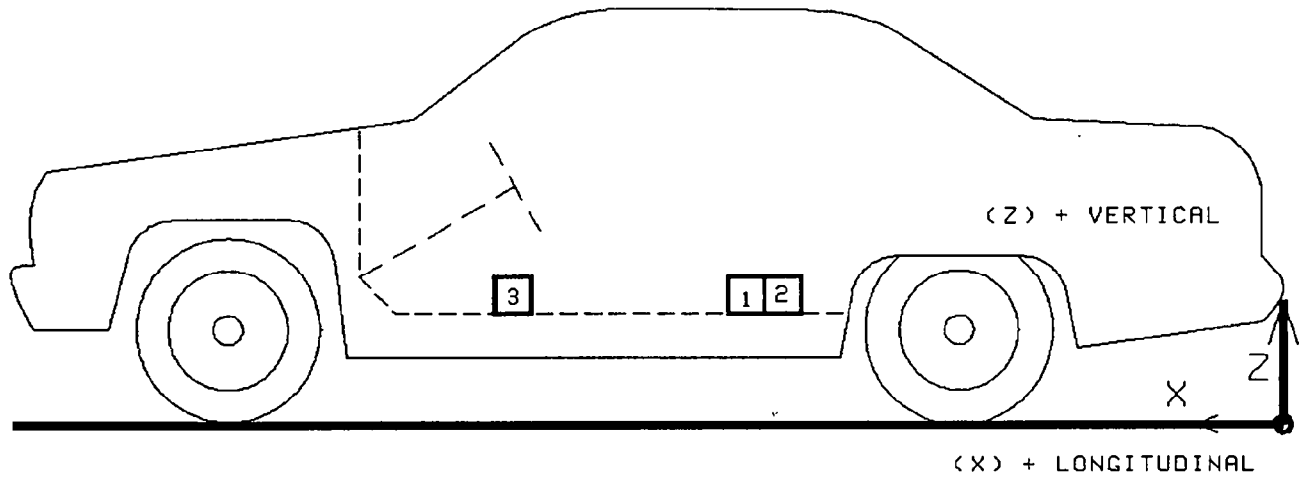
All measurements are in inches. Column readings are three inches apart starting from the left R-pillar and continue around the front of the vehicle to the right R-pillar.  
 All X-axis measurements taken from a reference plane 180 inches from and parallel to the rear bumper.  
 All Y-axis measurements taken from a reference plane 60 inches from and parallel to the vehicle longitudinal centerline.

CRUSH MEASUREMENTS AT VEHICLE BUMPER HEIGHT

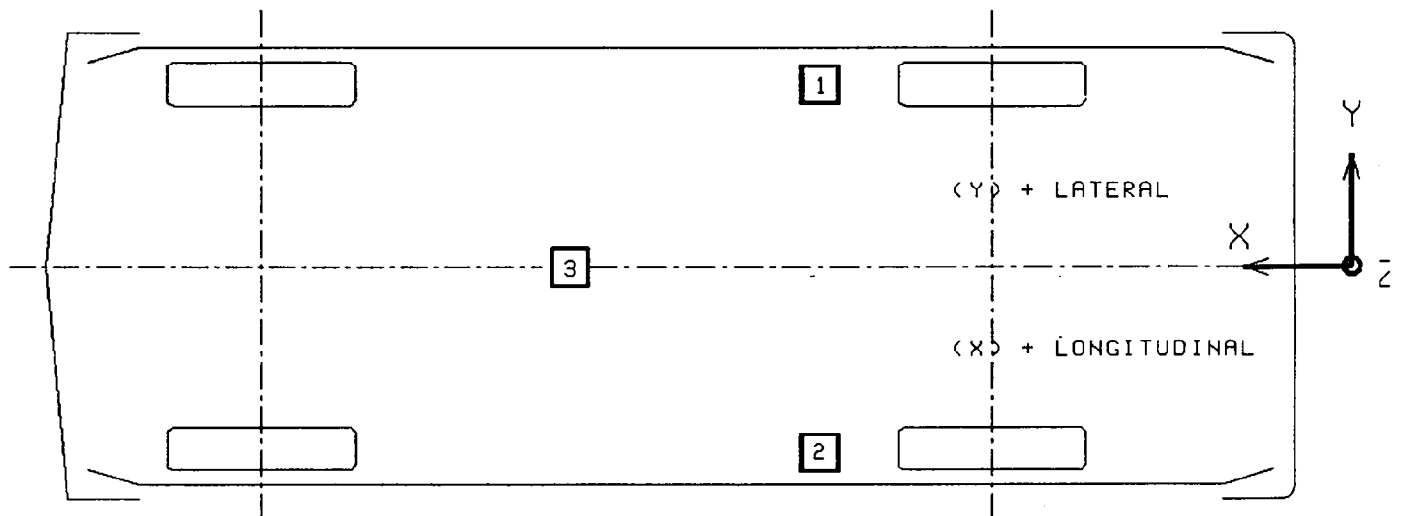
| LOCATION    | 54   |      | 55   |      | 56   |      | 57   |      | 58   |      | 59    |      | 60    |      | 61    |      | 62   |      |
|-------------|------|------|------|------|------|------|------|------|------|------|-------|------|-------|------|-------|------|------|------|
|             | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X     | Y    | X     | Y    | X     | Y    | X    | Y    |
| PRE-TEST    | 58.5 | 92.7 | 61.4 | 92.3 | 64.3 | 92.3 | 67.3 | 92.4 | 70.3 | 92.4 | 73.3  | 92.4 | 76.4  | 92.4 | 79.3  | 92.4 | 82.2 | 92.4 |
|             | 58.6 | 92.6 | 61.5 | 92.1 | 64.4 | 92.1 | 67.5 | 92.2 | 70.5 | 92.2 | 73.5  | 92.2 | 76.5  | 92.2 | 79.4  | 92.2 | 82.4 | 92.2 |
|             | 58.3 | 92.4 | 61.2 | 91.9 | 64.2 | 92.1 | 67.2 | 92.1 | 70.2 | 92.1 | 73.2  | 92.1 | 76.3  | 92.1 | 79.2  | 92.1 | 82.2 | 92.0 |
|             | 58.7 | 91.2 | 61.6 | 91.1 | 64.5 | 91.1 | 67.6 | 91.1 | 70.6 | 91.2 | 73.6  | 91.2 | 76.7  | 91.3 | 79.6  | 91.3 | 82.6 | 91.3 |
|             | 58.4 | 92.2 | 61.2 | 92.4 | 64.1 | 92.6 | 67.3 | 92.6 | 70.4 | 92.6 | 73.4  | 92.2 | 76.4  | 92.6 | 79.6  | 92.6 | 82.3 | 91.3 |
| POST-TEST 5 | 61.8 | 90.9 | 64.4 | 90.6 | 67.1 | 90.8 | 68.4 | 91.8 | 71.2 | 92.7 | 74.1  | 93.2 | 77.2  | 93.2 | 80.1  | 93.4 | 83.1 | 93.4 |
| LOCATION    | 63   |      | 64   |      | 65   |      | 66   |      | 67   |      | 68    |      | 69    |      | 70    |      |      |      |
|             | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X    | Y    | X     | Y    | X     | Y    | X     | Y    |      |      |
| PRE-TEST    | 85.2 | 92.3 | 88.4 | 92.2 | 91.4 | 92.2 | 94.4 | 92.2 | 97.4 | 92.2 | 100.4 | 92.1 | 103.4 | 92.0 | 104.6 | 91.9 |      |      |
|             | 85.4 | 92.2 | 88.6 | 92.2 | 91.5 | 92.1 | 94.5 | 92.1 | 97.5 | 92.0 | 100.5 | 91.9 | 103.5 | 91.9 | 104.9 | 91.9 |      |      |
|             | 85.2 | 92.0 | 88.4 | 92.0 | 91.4 | 91.9 | 94.4 | 91.9 | 97.4 | 91.8 | 100.4 | 91.8 | 103.4 | 91.7 | 104.6 | 91.7 |      |      |
|             | 85.6 | 91.3 | 88.7 | 91.2 | 91.7 | 91.2 | 94.7 | 91.2 | 97.8 | 91.2 | 100.8 | 91.2 | 103.7 | 91.2 | 105.0 | 91.2 |      |      |
|             | 85.3 | 92.6 | 88.4 | 92.5 | 91.4 | 92.4 | 94.4 | 92.4 | 97.4 | 92.4 | 100.4 | 92.3 | 103.4 | 92.2 | 104.5 | 91.2 |      |      |
| POST-TEST 5 | 86.1 | 93.3 | 89.1 | 93.3 | 92.1 | 93.3 | 95.1 | 93.2 | 98.1 | 93.2 | 101.1 | 93.1 | 104.1 | 92.4 | 105.0 | 92.5 |      |      |

All measurements are in inches. Column readings are three inches apart starting from the left B-pillar and continue around the front of the vehicle to the right B-pillar, All X-axis measurements taken from a reference plane 180 inches from and parallel to the rear bumper. All Y-axis measurements taken from a reference plane 60 inches from and parallel to the vehicle longitudinal centerline.

# VEHICLE ACCELEROMETER PLACEMENT

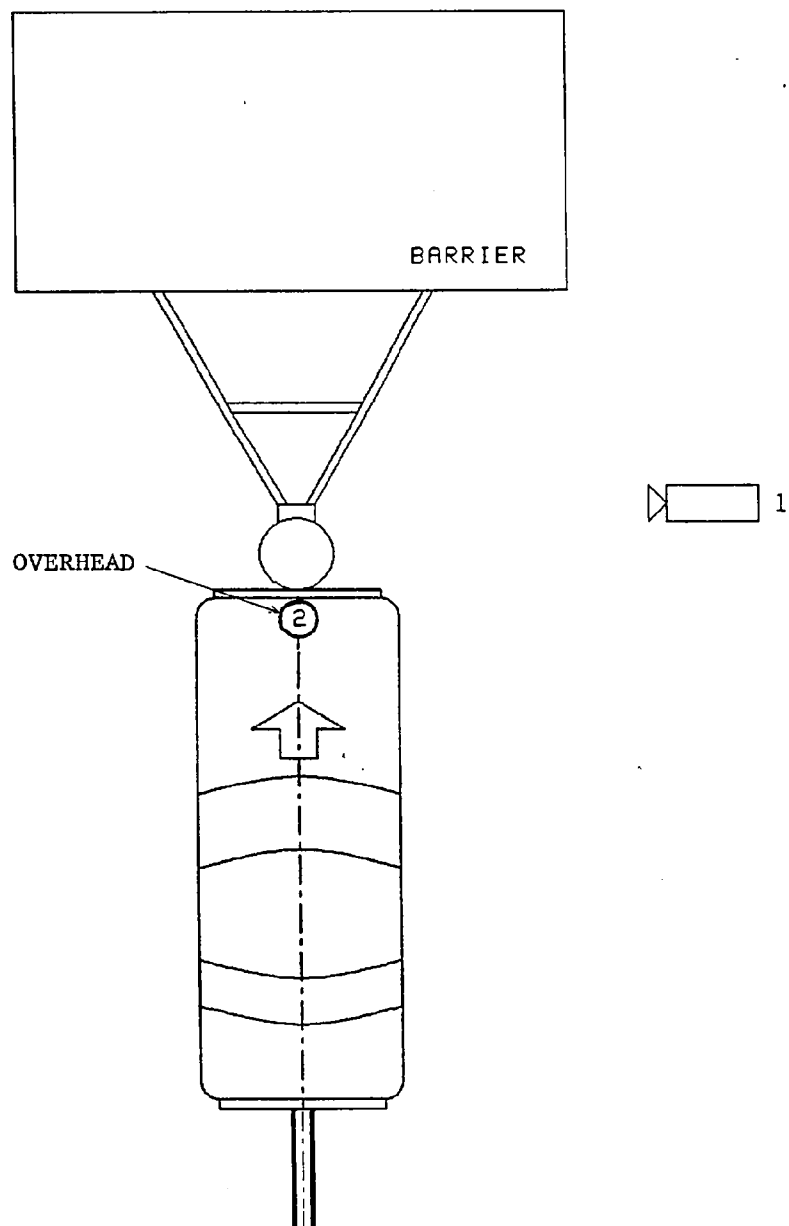


SIDE VIEW



BOTTOM VIEW

# CAMERA POSITIONS





### TEST ANOMALIES

TEST NO. 920309-5:

The vehicle center of gravity Y-axis accelerometer, VCGYG1, recorded anomalous data spikes at 39 and 54 milliseconds.

The above anomaly affected the vehicle center of gravity Y-axis velocity calculation, Y-axis displacement calculation, and resultant acceleration, velocity, and displacement calculations.

SECTION 3.0

TEST 920309-1 SUMMARY /

TEST CONDITIONS

TEST NUMBER: 920309-1

DATE OF TEST: 03/09/92

TIME OF TEST: 1114

AMBIENT TEMPERATURE AT IMPACT AREA: 78° F

VEHICLE VELOCITY: 9.7 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 12.0

MAXIMUM CUMULATIVE CRUSH  
AT VEHICLE BUMPER HEIGHT: 13.2

VEHICLE ATTITUDES:

POST-TEST: LF: 30.7 RF: 31.0 LR: 25.5 RR: 25.8

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

VEHICLE CRUSH AT VEHICLE BUMPER HEIGHT

TEST NO. 920309-1

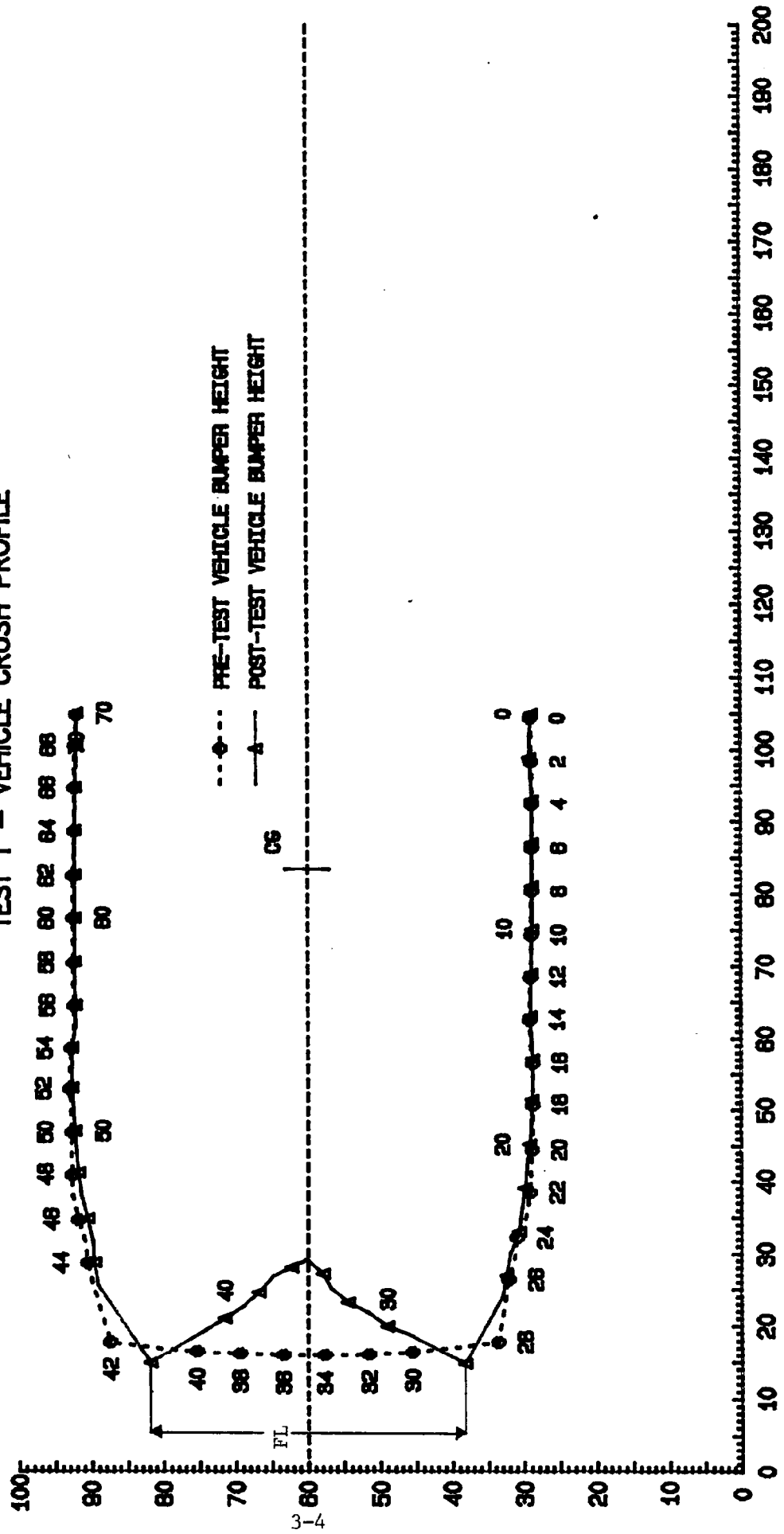
|    |             |
|----|-------------|
| FL | <u>43.7</u> |
| C1 | <u>-2.4</u> |
| C2 | <u>2.6</u>  |
| C3 | <u>7.9</u>  |
| C4 | <u>11.4</u> |
| C5 | <u>3.9</u>  |
| C6 | <u>-2.2</u> |

NOTE: FL is post-test length of damage surface

Measurements C1 - C6 were spaced equally apart over the post-impact corner to corner length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

ALL MEASUREMENTS ARE IN INCHES

# TEST 1 - VEHICLE CRUSH PROFILE



# IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Nissan/Sentra

TEST NUMBER: 920309-1

|     |                                                              | ALL MEASUREMENTS ARE IN INCHES |           |       |
|-----|--------------------------------------------------------------|--------------------------------|-----------|-------|
| NO. | TYPE OF MEASUREMENT                                          | PRE-TEST                       | POST-TEST | DIFF. |
| X1  | TOTAL LENGTH OF VEHICLE AT CENTERLINE                        | 164.2                          | 151.6     | 12.6  |
| X2  | REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK             | 144.5                          | NA        | NA    |
| X3  | REAR SURFACE OF VEHICLE TO FIREWALL                          | 126.2                          | NA        | NA    |
| X4  | REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR  | 115.0                          | 114.8     | 0.2   |
| X5  | REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR   | 114.9                          | 114.9     | 0.0   |
| X6  | REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR  | 114.9                          | 114.8     | 0.1   |
| X7  | REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR   | 114.9                          | 115.0     | -0.1  |
| X8  | REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR | 75.4                           | 75.2      | 0.2   |
| X9  | REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR  | 75.4                           | 75.5      | -0.1  |
| X10 | REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR | 76.2                           | 76.1      | 0.1   |
| X11 | REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR  | 76.2                           | 76.4      | -0.2  |
| X12 | REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE  | 114.8                          | 114.0     | 0.8   |
| X13 | REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE   | 114.2                          | 114.5     | -0.3  |
| X14 | REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE             | 125.5                          | NA        | NA    |
| X15 | REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE              | 125.5                          | NA        | NA    |
| X16 | REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER             | 100.5                          | 100.5     | 0.0   |
| X17 | CENTER OF STEERING COLUMN TO "A" POST                        | 12.0                           | 11.8      | 0.2   |
| X18 | CENTER OF STEERING COLUMN TO HEADLINER                       | 17.4                           | 17.1      | 0.3   |
| X19 | REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER        | 163.2                          | 163.9     | -0.7  |
| X20 | REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER         | 163.2                          | 164.4     | -1.2  |
| X21 | LENGTH OF ENGINE BLOCK                                       | 15.0                           | 16.0      | 0.0   |

# VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920309-1

| No. LOCATION                      | X*   | Y*    | Z*   | POSITIVE<br>DIRECTION |       | NEGATIVE<br>DIRECTION |       |
|-----------------------------------|------|-------|------|-----------------------|-------|-----------------------|-------|
|                                   |      |       |      | MAX G                 | MSEC  | MAX G                 | MSEC  |
| 1 LEFT REAR SILL<br>LONGITUDINAL  | 66.5 | 26.2  | 13.5 | 1.0                   | 170.0 | 10.1                  | 90.1  |
| 2 RIGHT REAR SILL<br>LONGITUDINAL | 66.4 | -26.2 | 13.5 | 1.3                   | 172.3 | 10.4                  | 89.1  |
| 3 VEHICLE CG<br>LONGITUDINAL      | 96.5 | 0.0   | 17.2 | 1.3                   | 161.3 | 12.3                  | 88.9  |
| LATERAL                           |      |       |      | 0.9                   | 88.4  | 0.7                   | 111.6 |
| RESULTANT                         |      |       |      | 12.3                  | 88.9  |                       |       |

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER  
Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE  
Z: + UPWARD FROM GROUND LEVEL

CAMERA INFORMATION

TEST NO. 920309-1

| CAMERA<br>NUMBER | LOCATION      | TYPE          | LENS<br>(mm) | SPEED<br>(fps) | PURPOSE OF<br>CAMERA DATA |
|------------------|---------------|---------------|--------------|----------------|---------------------------|
| 1                | Right wide    | Photosonic 1B | 25           | 498            | Vehicle crush             |
| 2                | Overhead wide | Photosonic 1B | 17           | 500            | Vehicle crush             |



SECTION 4.0

TEST 920309-2 SUMMARY

TEST CONDITIONS

TEST NUMBER: 920309-2

DATE OF TEST: 03/09/92

TIME OF TEST: 1224

AMBIENT TEMPERATURE AT IMPACT AREA: 78° F

VEHICLE VELOCITY: 9.8 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 12.0

MAXIMUM CUMULATIVE CRUSH

AT VEHICLE BUMPER HEIGHT: 15.4

VEHICLE ATTITUDES:

POST-TEST: LF: 31.1 RF: 31.8 LR: 25.5 RR: 25.5

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

VEHICLE CRUSH AT VEHICLE BUMPER HEIGHT

TEST NO. 920309-2

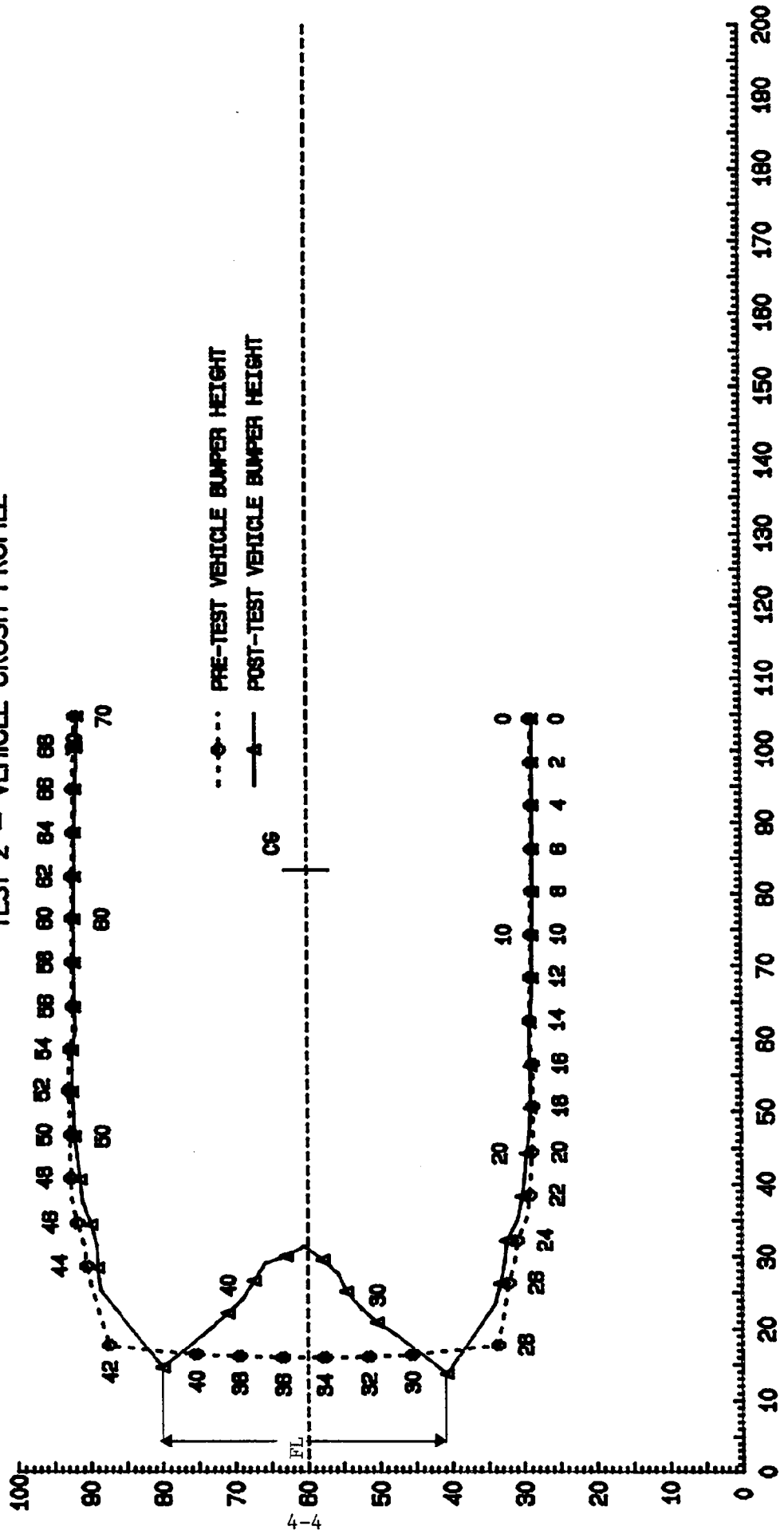
|    |             |
|----|-------------|
| FL | <u>39.4</u> |
| C1 | <u>-3.0</u> |
| C2 | <u>3.6</u>  |
| C3 | <u>12.2</u> |
| C4 | <u>13.4</u> |
| C5 | <u>4.7</u>  |
| C6 | <u>-2.0</u> |

NOTE: FL is post-test length of damage surface

Measurements C1 - C6 were spaced equally apart over the post-impact corner to corner length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

ALL MEASUREMENTS ARE IN INCHES

# TEST 2 - VEHICLE CRUSH PROFILE



# IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Nissan/Sentra TEST NUMBER: 920309-2

| NO. | TYPE OF MEASUREMENT                                          | ALL MEASUREMENTS ARE IN INCHES |           |       |
|-----|--------------------------------------------------------------|--------------------------------|-----------|-------|
|     |                                                              | PRE-TEST                       | POST-TEST | DIFF. |
| X1  | TOTAL LENGTH OF VEHICLE AT CENTERLINE                        | 151.6                          | 149.1     | 2.5   |
| X2  | REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK             | NA                             | NA        | NA    |
| X3  | REAR SURFACE OF VEHICLE TO FIREWALL                          | NA                             | NA        | NA    |
| X4  | REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR  | 114.8                          | 114.8     | 0.0   |
| X5  | REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR   | 114.9                          | 114.8     | 0.1   |
| X6  | REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR  | 114.8                          | 115.8     | -1.0  |
| X7  | REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR   | 115.0                          | 114.9     | 0.1   |
| X8  | REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR | 75.2                           | 75.4      | -0.2  |
| X9  | REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR  | 75.5                           | 75.4      | 0.1   |
| X10 | REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR | 76.1                           | 76.2      | -0.1  |
| X11 | REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR  | 76.4                           | 76.4      | 0.0   |
| X12 | REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE  | 114.0                          | 114.6     | -0.6  |
| X13 | REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE   | 114.5                          | 114.4     | 0.1   |
| X14 | REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE             | NA                             | NA        | NA    |
| X15 | REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE              | NA                             | NA        | NA    |
| X16 | REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER             | 100.5                          | 100.2     | 0.3   |
| X17 | CENTER OF STEERING COLUMN TO "A" POST                        | 11.8                           | 11.0      | 0.8   |
| X18 | CENTER OF STEERING COLUMN TO HEADLINER                       | 17.1                           | 17.0      | 0.1   |
| X19 | REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER        | 163.9                          | 163.6     | 0.3   |
| X20 | REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER         | 164.4                          | 163.6     | 0.8   |
| X21 | LENGTH OF ENGINE BLOCK                                       | 16.0                           | 16.0      | 0.0   |

# VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920309-2

| No. LOCATION                      | X*   | Y*    | Z*   | POSITIVE<br>DIRECTION |       | NEGATIVE<br>DIRECTION |      |
|-----------------------------------|------|-------|------|-----------------------|-------|-----------------------|------|
|                                   |      |       |      | MAX G                 | MSEC  | MAX G                 | MSEC |
| 1 LEFT REAR SILL<br>LONGITUDINAL  | 66.5 | 26.2  | 13.5 | 0.9                   | 128.4 | 14.4                  | 19.9 |
| 2 RIGHT REAR SILL<br>LONGITUDINAL | 66.4 | -26.2 | 13.5 | 1.1                   | 120.3 | 13.2                  | 20.0 |
| 3 VEHICLE CG                      | 96.5 | 0.0   | 17.2 |                       |       |                       |      |
| LONGITUDINAL                      |      |       |      | 1.2                   | 111.0 | 16.3                  | 19.0 |
| LATERAL                           |      |       |      | 2.1                   | 25.4  | 1.4                   | 37.9 |
| RESULTANT                         |      |       |      | 16.3                  | 19.0  |                       |      |

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER  
Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE  
Z: + UPWARD FROM GROUND LEVEL

CAMERA INFORMATION

TEST NO. 920309-2

| CAMERA<br>NUMBER | LOCATION      | TYPE          | LENS<br>(mm) | SPEED<br>(fps) | PURPOSE OF<br>CAMERA DATA |
|------------------|---------------|---------------|--------------|----------------|---------------------------|
| 1                | Right wide    | Photosonic 1B | 25           | 500            | Vehicle crush             |
| 2                | Overhead wide | Photosonic 1B | 17           | 505            | Vehicle crush             |

SECTION 5.0

TEST 920309-3 SUMMARY



TEST CONDITIONS

TEST NUMBER: 920309-3

DATE OF TEST: 03/09/92

TIME OF TEST: 1339

AMBIENT TEMPERATURE AT IMPACT AREA: 78° F

VEHICLE VELOCITY: 14.7 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 12.0

MAXIMUM CUMULATIVE CRUSH  
AT VEHICLE BUMPER HEIGHT: 19.3

VEHICLE ATTITUDES:

POST-TEST: LF: 31.2 RF: 31.5 LR: 25.8 RR: 25.5

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

VEHICLE CRUSH AT VEHICLE BUMPER HEIGHT

TEST NO. 920309-3

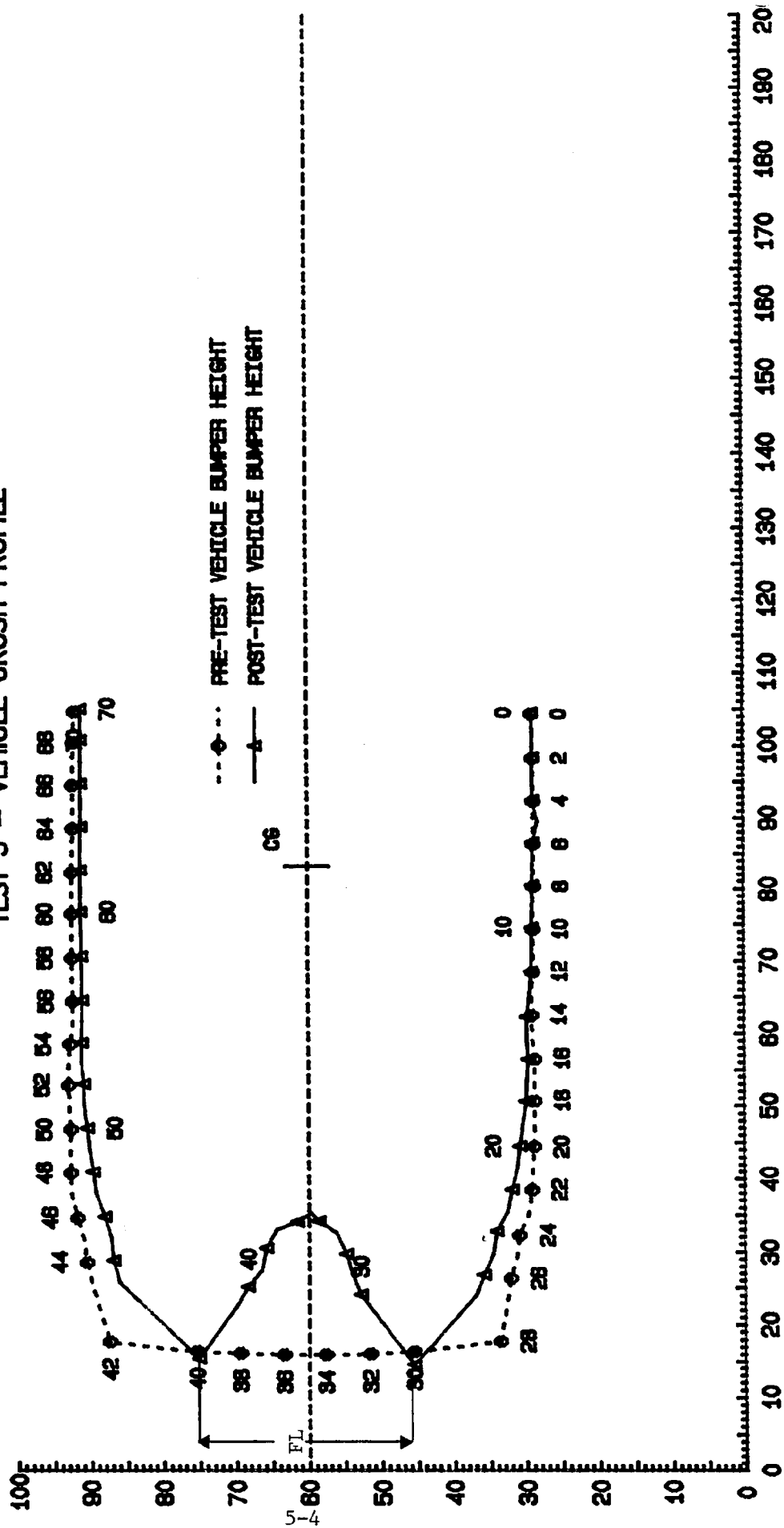
|    |             |
|----|-------------|
| FL | <u>29.8</u> |
| C1 | <u>-1.2</u> |
| C2 | <u>6.5</u>  |
| C3 | <u>17.3</u> |
| C4 | <u>17.7</u> |
| C5 | <u>17.1</u> |
| C6 | <u>-0.8</u> |

NOTE: FL is post-test length of damage surface

Measurements C1 - C6 were spaced equally apart over the post-impact corner to corner length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

ALL MEASUREMENTS ARE IN INCHES

# TEST 3 -- VEHICLE CRUSH PROFILE



# IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Nissan/Sentra

TEST NUMBER: 920309-3

ALL MEASUREMENTS ARE IN INCHES

| NO. | TYPE OF MEASUREMENT                                          | PRE-TEST | POST-TEST | DIFF. |
|-----|--------------------------------------------------------------|----------|-----------|-------|
| X1  | TOTAL LENGTH OF VEHICLE AT CENTERLINE                        | 149.1    | 145.4     | 3.7   |
| X2  | REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK             | NA       | NA        | NA    |
| X3  | REAR SURFACE OF VEHICLE TO FIREWALL                          | NA       | NA        | NA    |
| X4  | REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR  | 114.8    | 114.6     | 0.2   |
| X5  | REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR   | 114.8    | 114.6     | 0.2   |
| X6  | REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR  | 115.8    | 114.8     | 1.0   |
| X7  | REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR   | 114.9    | 114.8     | 0.1   |
| X8  | REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR | 75.4     | 75.2      | 0.2   |
| X9  | REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR  | 75.4     | 75.1      | 0.3   |
| X10 | REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR | 76.2     | 76.1      | 0.1   |
| X11 | REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR  | 76.4     | 76.1      | 0.3   |
| X12 | REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE  | 114.6    | 114.0     | 0.6   |
| X13 | REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE   | 114.4    | 114.1     | 0.3   |
| X14 | REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE             | NA       | NA        | NA    |
| X15 | REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE              | NA       | NA        | NA    |
| X16 | REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER             | 100.2    | 98.5      | 1.7   |
| X17 | CENTER OF STEERING COLUMN TO "A" POST                        | 11.0     | 11.2      | -0.2  |
| X18 | CENTER OF STEERING COLUMN TO HEADLINER                       | 17.0     | 16.6      | 0.4   |
| X19 | REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER        | 163.6    | 162.8     | 0.8   |
| X20 | REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER         | 163.6    | 162.5     | 1.1   |
| X21 | LENGTH OF ENGINE BLOCK                                       | 16.0     | 16.0      | 0.0   |

# VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920309-3

| No. | LOCATION                        | X*   | Y*    | Z*   | POSITIVE<br>DIRECTION |        | NEGATIVE<br>DIRECTION |        |
|-----|---------------------------------|------|-------|------|-----------------------|--------|-----------------------|--------|
|     |                                 |      |       |      | MAX                   | G MSEC | MAX                   | G MSEC |
| 1   | LEFT REAR SILL<br>LONGITUDINAL  | 66.5 | 26.2  | 13.5 | 0.7                   | 99.8   | 21.7                  | 42.3   |
| 2   | RIGHT REAR SILL<br>LONGITUDINAL | 66.4 | -26.2 | 13.5 | 1.9                   | 124.9  | 21.7                  | 43.6   |
| 3   | VEHICLE CG                      | 96.5 | 0.0   | 17.2 |                       |        |                       |        |
|     | LONGITUDINAL                    |      |       |      | 2.2                   | 94.0   | 23.9                  | 15.6   |
|     | LATERAL                         |      |       |      | 4.3                   | 41.8   | 6.1                   | 24.4   |
|     | RESULTANT                       |      |       |      | 24.0                  | 15.8   |                       |        |

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER  
Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE  
Z: + UPWARD FROM GROUND LEVEL

CAMERA INFORMATION

TEST NO. 920309-3

| CAMERA<br>NUMBER | LOCATION      | TYPE          | LENS<br>(mm) | SPEED<br>(fps) | PURPOSE OF<br>CAMERA DATA |
|------------------|---------------|---------------|--------------|----------------|---------------------------|
| 1                | Right wide    | Photosonic 1B | 25           | 502            | Vehicle crush             |
| 2                | Overhead wide | Photosonic 1B | 17           | 500            | Vehicle crush             |

SECTION 6.0

TEST 920309-4 SUMMARY

TEST CONDITIONS

TEST NUMBER: 920309-4

DATE OF TEST: 03/09/92

TIME OF TEST: 1441

AMBIENT TEMPERATURE AT IMPACT AREA: 78° F

VEHICLE VELOCITY: 19.9 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 12.0

MAXIMUM CUMULATIVE CRUSH  
AT VEHICLE BUMPER HEIGHT: 24.0

VEHICLE ATTITUDES:

POST-TEST: LF: 32.8 RF: 33.2 LR: 25.7 RR: 25.1

ALL DISTANCE MEASUREMENTS ARE IN INCHES.



VEHICLE CRUSH AT VEHICLE BUMPER HEIGHT

TEST NO. 920309-4

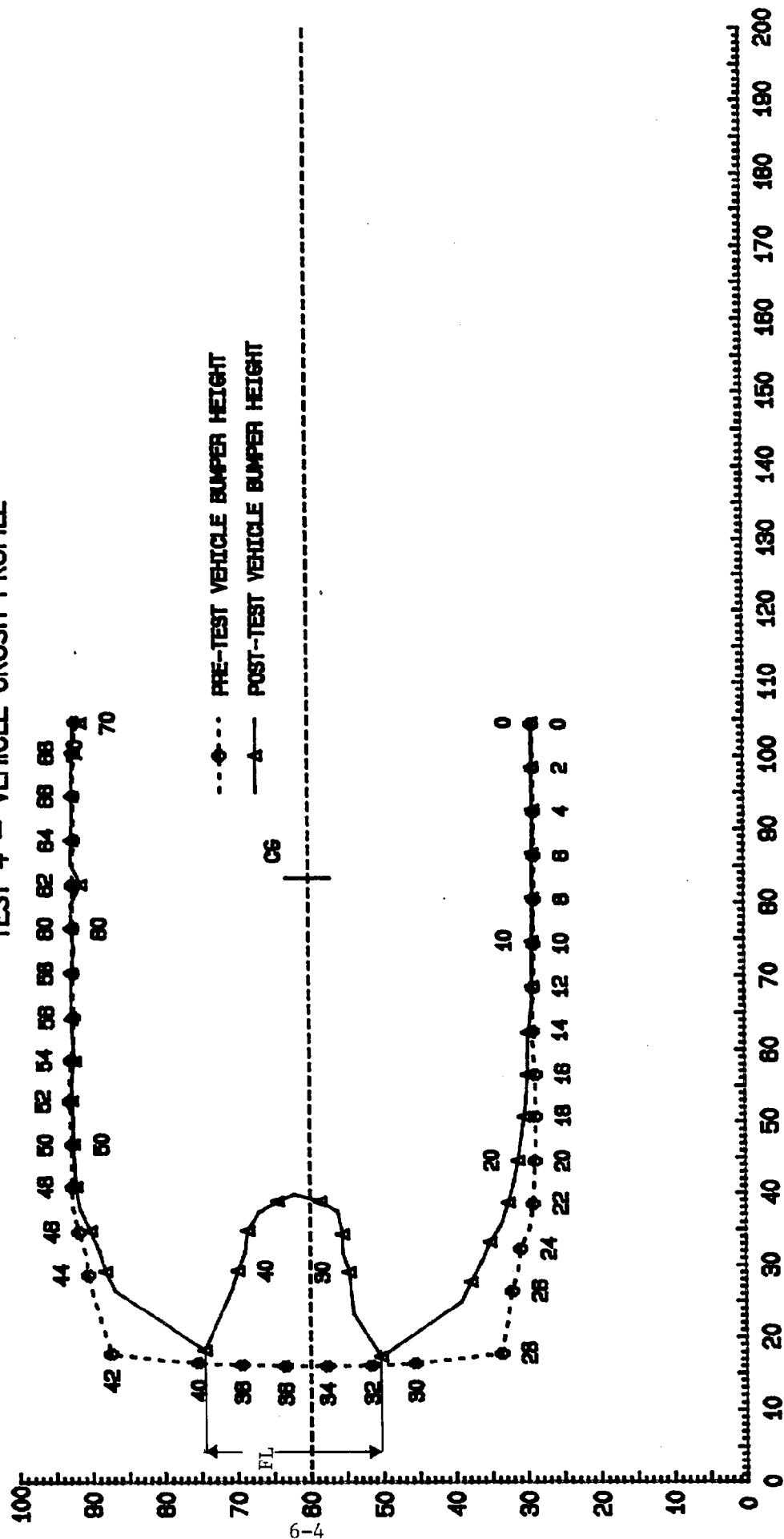
|    |             |
|----|-------------|
| FL | <u>24.8</u> |
| C1 | <u>1.4</u>  |
| C2 | <u>14.2</u> |
| C3 | <u>23.2</u> |
| C4 | <u>22.7</u> |
| C5 | <u>13.7</u> |
| C6 | <u>2.0</u>  |

NOTE: FL is post-test length of damage surface

Measurements C1 - C6 were spaced equally apart over the post-impact corner to corner length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

ALL MEASUREMENTS ARE IN INCHES

# TEST 4 - VEHICLE CRUSH PROFILE



# IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Nissan/Sentra

TEST NUMBER: 920309-4

|     |                                                              | ALL MEASUREMENTS ARE IN INCHES |           |       |
|-----|--------------------------------------------------------------|--------------------------------|-----------|-------|
| NO. | TYPE OF MEASUREMENT                                          | PRE-TEST                       | POST-TEST | DIFF. |
| X1  | TOTAL LENGTH OF VEHICLE AT CENTERLINE                        | 145.4                          | 141.4     | 4.0   |
| X2  | REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK             | NA                             | NA        | NA    |
| X3  | REAR SURFACE OF VEHICLE TO FIREWALL                          | NA                             | NA        | NA    |
| X4  | REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR  | 114.6                          | 114.2     | 0.4   |
| X5  | REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR   | 114.6                          | 114.8     | -0.2  |
| X6  | REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR  | 114.8                          | 114.5     | 0.3   |
| X7  | REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR   | 114.8                          | 114.9     | -0.1  |
| X8  | REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR | 75.2                           | 75.0      | 0.2   |
| X9  | REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR  | 75.1                           | 76.2      | -1.1  |
| X10 | REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR | 76.1                           | 76.1      | 0.0   |
| X11 | REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR  | 76.1                           | 75.1      | 1.0   |
| X12 | REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE  | 114.0                          | 113.9     | 0.1   |
| X13 | REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE   | 114.1                          | 113.6     | 0.5   |
| X14 | REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE             | NA                             | NA        | NA    |
| X15 | REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE              | NA                             | NA        | NA    |
| X16 | REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER             | 98.5                           | 97.4      | 1.1   |
| X17 | CENTER OF STEERING COLUMN TO "A" POST                        | 11.2                           | 10.2      | 1.0   |
| X18 | CENTER OF STEERING COLUMN TO HEADLINER                       | 16.6                           | 14.6      | 2.0   |
| X19 | REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER        | 162.8                          | 159.1     | 3.7   |
| X20 | REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER         | 162.5                          | 159.5     | 3.0   |
| X21 | LENGTH OF ENGINE BLOCK                                       | 16.0                           | 16.0      | 0.0   |

# VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920309-4

| No. LOCATION                      | X*   | Y*    | Z*   | POSITIVE<br>DIRECTION |       | NEGATIVE<br>DIRECTION |      |
|-----------------------------------|------|-------|------|-----------------------|-------|-----------------------|------|
|                                   |      |       |      | MAX G                 | MSEC  | MAX G                 | MSEC |
| 1 LEFT REAR SILL<br>LONGITUDINAL  | 66.5 | 26.2  | 13.5 | 2.7                   | 81.3  | 32.3                  | 39.8 |
| 2 RIGHT REAR SILL<br>LONGITUDINAL | 66.4 | -26.2 | 13.5 | 2.9                   | 84.0  | 33.6                  | 16.0 |
| 3 VEHICLE CG                      | 96.5 | 0.0   | 17.2 |                       |       |                       |      |
| LONGITUDINAL                      |      |       |      | 3.4                   | 109.4 | 43.8                  | 15.1 |
| LATERAL                           |      |       |      | 6.2                   | 19.4  | 6.4                   | 13.4 |
| RESULTANT                         |      |       |      | 43.9                  | 15.1  |                       |      |

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER  
Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE  
Z: + UPWARD FROM GROUND LEVEL

CAMERA INFORMATION

TEST NO. 920309-4

| CAMERA<br>NUMBER | LOCATION      | TYPE          | LENS<br>(mm) | SPEED<br>(fps) | PURPOSE OF<br>CAMERA DATA |
|------------------|---------------|---------------|--------------|----------------|---------------------------|
| 1                | Right wide    | Photosonic 1B | 25           | 502            | Vehicle crush             |
| 2                | Overhead wide | Photosonic 1B | 17           | 500            | Vehicle crush             |

SECTION 7.0

TEST 920309-5 SUMMARY

TEST CONDITIONS

TEST NUMBER: 920309-5

DATE OF TEST: 03/09/92

TIME OF TEST: 1532

AMBIENT TEMPERATURE AT IMPACT AREA: 78° F

VEHICLE VELOCITY: 35.0 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 12.0

MAXIMUM CUMULATIVE CRUSH  
AT VEHICLE BUMPER HEIGHT: 40.3

VEHICLE ATTITUDES:

POST-TEST: LF: 38.1 RF: 36.4 LR: 24.7 RR: 24.9

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

VEHICLE CRUSH AT VEHICLE BUMPER HEIGHT

TEST NO. 920309-5

|    |             |
|----|-------------|
| FL | <u>35.1</u> |
| C1 | <u>18.1</u> |
| C2 | <u>18.5</u> |
| C3 | <u>40.2</u> |
| C4 | <u>36.2</u> |
| C5 | <u>18.9</u> |
| C6 | <u>17.3</u> |

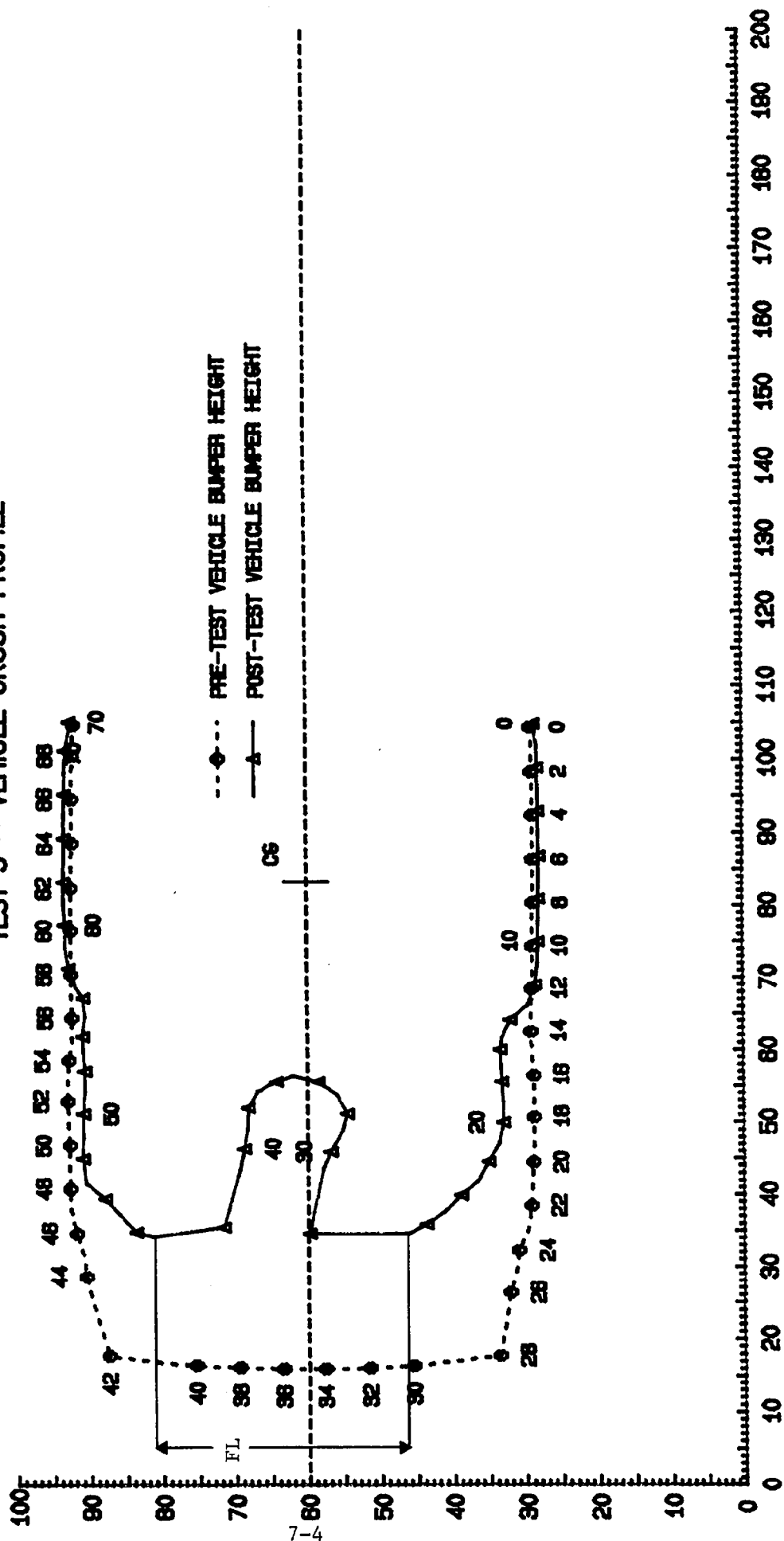
NOTE: FL is post-test length of damage surface

Measurements C1 - C6 were spaced equally apart over the post-impact corner to corner length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

ALL MEASUREMENTS ARE IN INCHES



# TEST 5 -- VEHICLE CRUSH PROFILE



# IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Nissan/Sentra

TEST NUMBER: 920309-5

ALL MEASUREMENTS ARE IN INCHES

| NO. | TYPE OF MEASUREMENT                                          | PRE-TEST | POST-TEST | DIFF. |
|-----|--------------------------------------------------------------|----------|-----------|-------|
| X1  | TOTAL LENGTH OF VEHICLE AT CENTERLINE                        | 141.4    | 122.8     | 18.6  |
| X2  | REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK             | NA       | 114.8     | NA    |
| X3  | REAR SURFACE OF VEHICLE TO FIREWALL                          | NA       | 102.6     | NA    |
| X4  | REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR  | 114.2    | 110.9     | 3.3   |
| X5  | REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR   | 114.8    | 111.8     | 3.0   |
| X6  | REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR  | 114.5    | 114.2     | 0.3   |
| X7  | REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR   | 114.9    | 114.4     | 0.5   |
| X8  | REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR | 75.0     | 75.2      | -0.2  |
| X9  | REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR  | 76.2     | 74.9      | 1.3   |
| X10 | REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR | 76.1     | 75.8      | 0.3   |
| X11 | REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR  | 75.1     | 75.9      | -0.8  |
| X12 | REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE  | 113.9    | 110.6     | 3.3   |
| X13 | REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE   | 113.6    | 111.5     | 2.1   |
| X14 | REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE             | NA       | 107.4     | NA    |
| X15 | REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE              | NA       | 112.9     | NA    |
| X16 | REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER             | 97.4     | 86.6      | 10.8  |
| X17 | CENTER OF STEERING COLUMN TO "A" POST                        | 10.2     | 5.5       | 4.7   |
| X18 | CENTER OF STEERING COLUMN TO HEADLINER                       | 14.6     | 14.4      | 0.2   |
| X19 | REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER        | 159.1    | 141.6     | 17.5  |
| X20 | REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER         | 159.5    | 141.2     | 18.3  |
| X21 | LENGTH OF ENGINE BLOCK                                       | 16.0     | 16.0      | 0.0   |

# VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920309-5

| No. LOCATION                      | X*   | Y*    | Z*   | POSITIVE<br>DIRECTION |       | NEGATIVE<br>DIRECTION |      |
|-----------------------------------|------|-------|------|-----------------------|-------|-----------------------|------|
|                                   |      |       |      | MAX G                 | MSEC  | MAX G                 | MSEC |
| 1 LEFT REAR SILL<br>LONGITUDINAL  | 66.5 | 26.2  | 13.5 | 3.6                   | 146.4 | 40.4                  | 27.5 |
| 2 RIGHT REAR SILL<br>LONGITUDINAL | 66.4 | -26.2 | 13.5 | 3.0                   | 169.0 | 34.8                  | 20.4 |
| 3 VEHICLE CG                      | 96.5 | 0.0   | 17.2 | 3.4                   | 149.0 | 51.4                  | 28.9 |
| LONGITUDINAL                      |      |       |      | ---                   | ---   | ---                   | ---  |
| LATERAL                           |      |       |      | ---                   | ---   | ---                   | ---  |
| RESULTANT                         |      |       |      | 64.8                  | 39.4Y |                       |      |

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER  
Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE  
Z: + UPWARD FROM GROUND LEVEL

Y See TEST ANOMALIES

CAMERA INFORMATION

TEST NO. 920309-5

| CAMERA<br>NUMBER | LOCATION      | TYPE          | LENS<br>(mm) | SPEED<br>(fps) | PURPOSE OF<br>CAMERA DATA |
|------------------|---------------|---------------|--------------|----------------|---------------------------|
| 1                | Right wide    | Photosonic 1B | 25           | 502            | Vehicle crush             |
| 2                | Overhead wide | Photosonic 1B | 17           | 500            | Vehicle crush             |

APPENDIX A

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

TEST NO. 920309-1

1. PRE-TEST FRONT VIEW
2. POST-TEST FRONT VIEW
3. PRE-TEST LEFT SIDE VIEW
4. POST-TEST LEFT SIDE VIEW
5. PRE-TEST RIGHT SIDE VIEW
6. POST-TEST RIGHT SIDE VIEW
7. PRE-TEST LEFT FRONT THREE-QUARTER VIEW
8. POST-TEST LEFT FRONT THREE-QUARTER VIEW
9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW
10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-1. PRE-TEST FRONT VIEW



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



Figure A-3. PRE-TEST LEFT SIDE VIEW



Figure A-4. POST-TEST LEFT SIDE VIEW

A-4





Figure A-5. PRE-TEST RIGHT SIDE VIEW



Figure A-6. POST-TEST RIGHT SIDE VIEW  
A-5



Figure A-7. PRE-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-8. POST-TEST LEFT FRONT THREE-QUARTER VIEW  
A-6



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



Figure A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW  
A-7

LIST OF PHOTOGRAPHS

TEST NO. 920309-2

1. POST-TEST FRONT VIEW
2. POST-TEST LEFT SIDE VIEW
3. POST-TEST RIGHT SIDE VIEW
4. POST-TEST LEFT FRONT THREE-QUARTER VIEW
5. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-1. POST-TEST FRONT VIEW



Figure A-2. POST-TEST LEFT SIDE VIEW  
A-9





Figure A-3. POST-TEST RIGHT SIDE VIEW



Figure A-4. POST-TEST LEFT FRONT THREE-QUARTER VIEW  
A-10



Figure A-5. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

LIST OF PHOTOGRAPHS

TEST NO. 920309-3

1. POST-TEST FRONT VIEW
2. POST-TEST LEFT SIDE VIEW
3. POST-TEST RIGHT SIDE VIEW
4. POST-TEST LEFT FRONT THREE-QUARTER VIEW
5. POST-TEST RIGHT FRONT THREE-QUARTER VIEW





Figure A-1. POST-TEST FRONT VIEW



Figure A-2. POST-TEST LEFT SIDE VIEW  
A-13



Figure A-3. POST-TEST RIGHT SIDE VIEW



Figure A-4. POST-TEST LEFT FRONT THREE-QUARTER VIEW  
A-14



Figure A-5. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

LIST OF PHOTOGRAPHS

TEST NO. 920309-4

1. POST-TEST FRONT VIEW
2. POST-TEST LEFT SIDE VIEW
3. POST-TEST RIGHT SIDE VIEW
4. POST-TEST LEFT FRONT THREE-QUARTER VIEW
5. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-1. POST-TEST FRONT VIEW



Figure A-2. POST-TEST LEFT SIDE VIEW  
A-17





Figure A-3. POST-TEST RIGHT SIDE VIEW



Figure A-4. POST-TEST LEFT FRONT THREE-QUARTER VIEW  
A-18



Figure A-5. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

LIST OF PHOTOGRAPHS

TEST NO. 920309-5

1. POST-TEST FRONT VIEW
2. POST-TEST LEFT SIDE VIEW
3. POST-TEST RIGHT SIDE VIEW
4. POST-TEST LEFT FRONT THREE-QUARTER VIEW
5. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



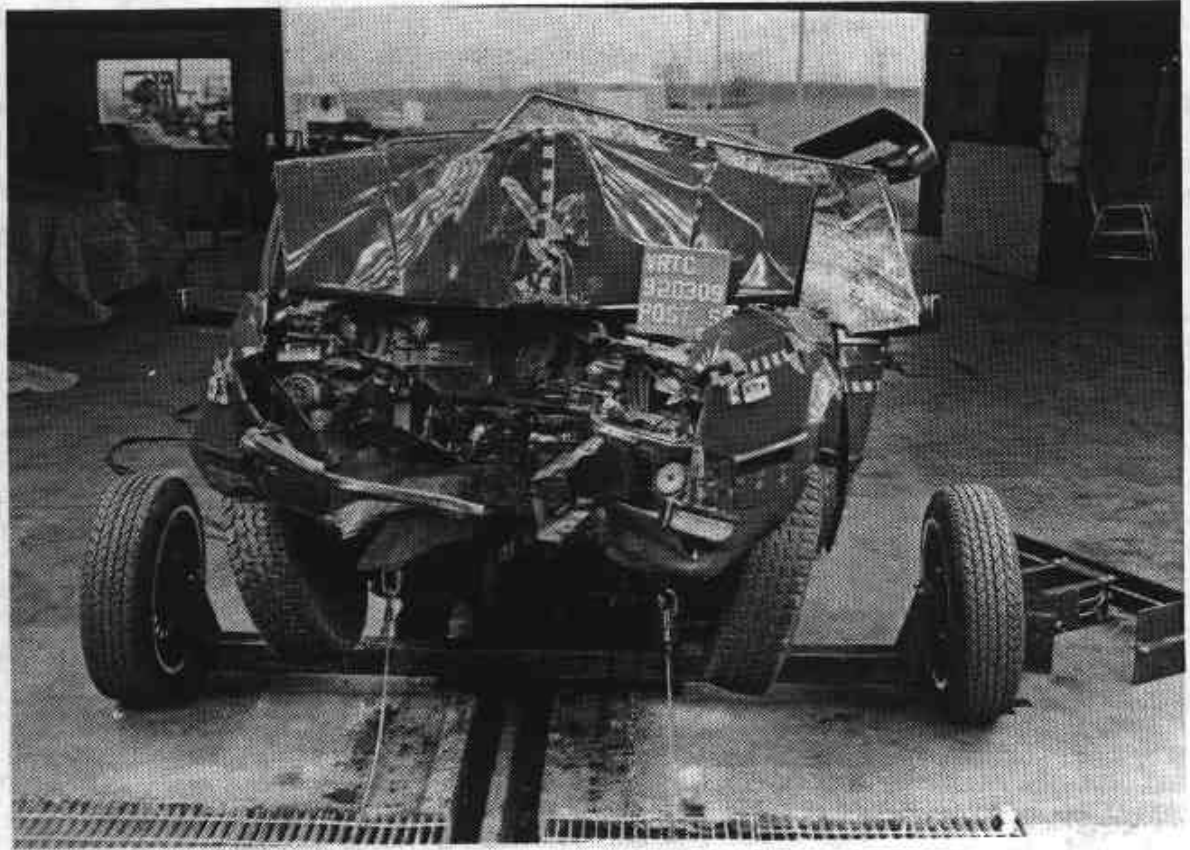


Figure A-1. POST-TEST FRONT VIEW



Figure A-2. POST-TEST LEFT SIDE VIEW  
A-21



Figure A-3. POST-TEST RIGHT SIDE VIEW



Figure A-4. POST-TEST LEFT FRONT THREE-QUARTER VIEW  
A-22



Figure A-5. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



APPENDIX B

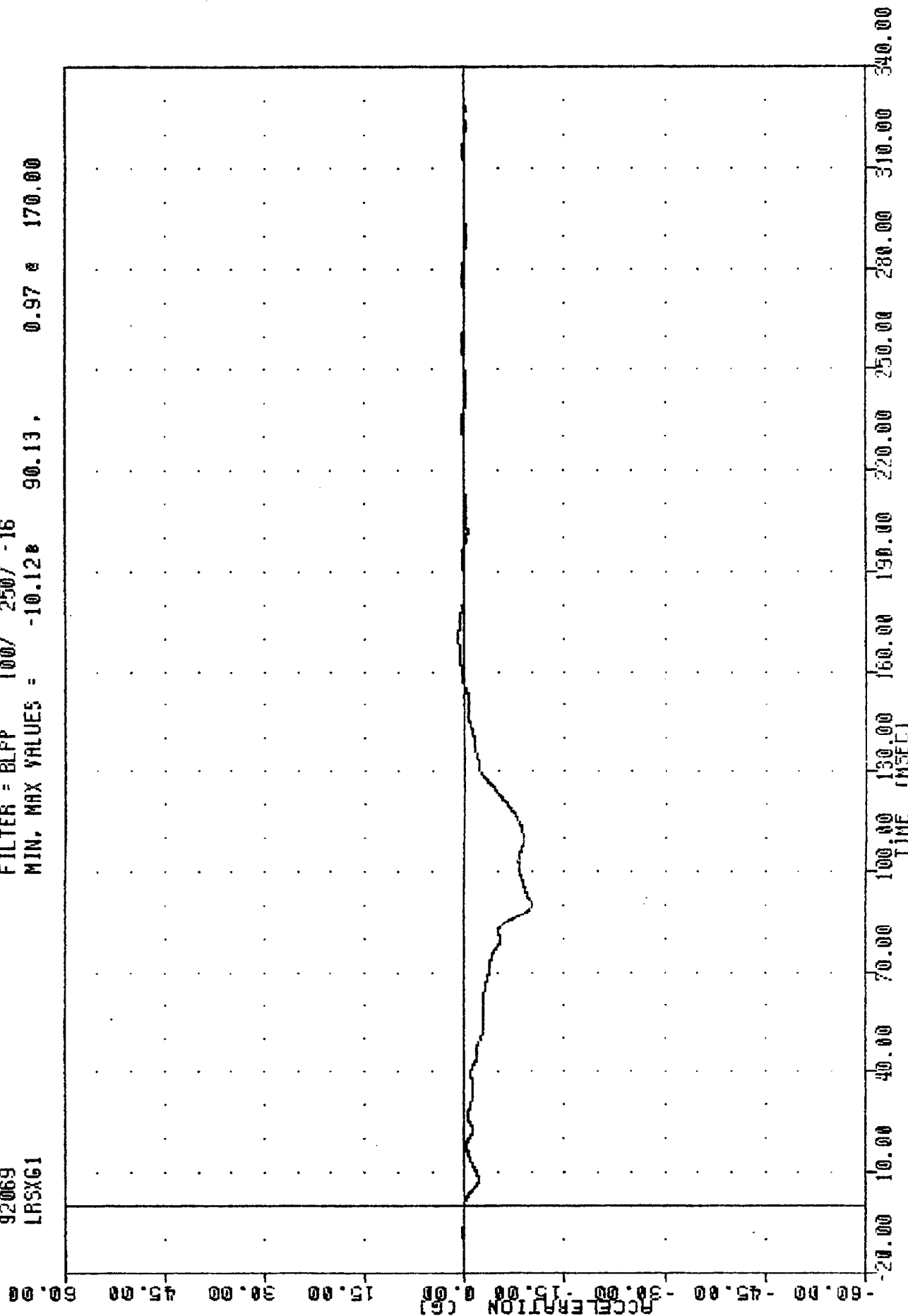
DATA PLOTS

DATA PLOTS

TEST NO. 920309-1

TRC , 920309-1  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXG1

FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -10.128 90.13, 0.97 @ 170.00

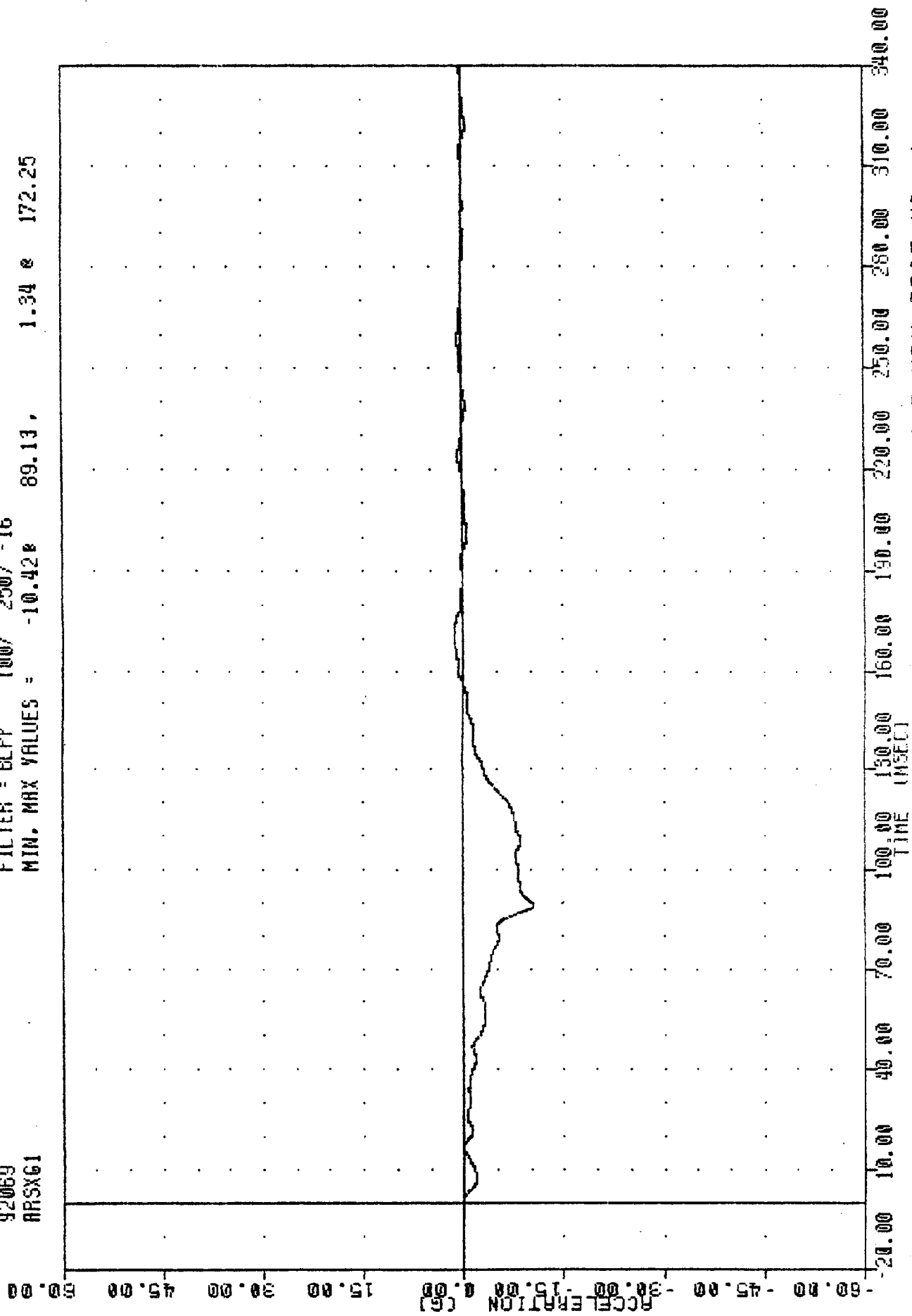


1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 LEFT REAR SILL X-AXIS ACCELERATION

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 ARSXG1

920309-1

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -10.428 89.13, 1.34 e 172.25



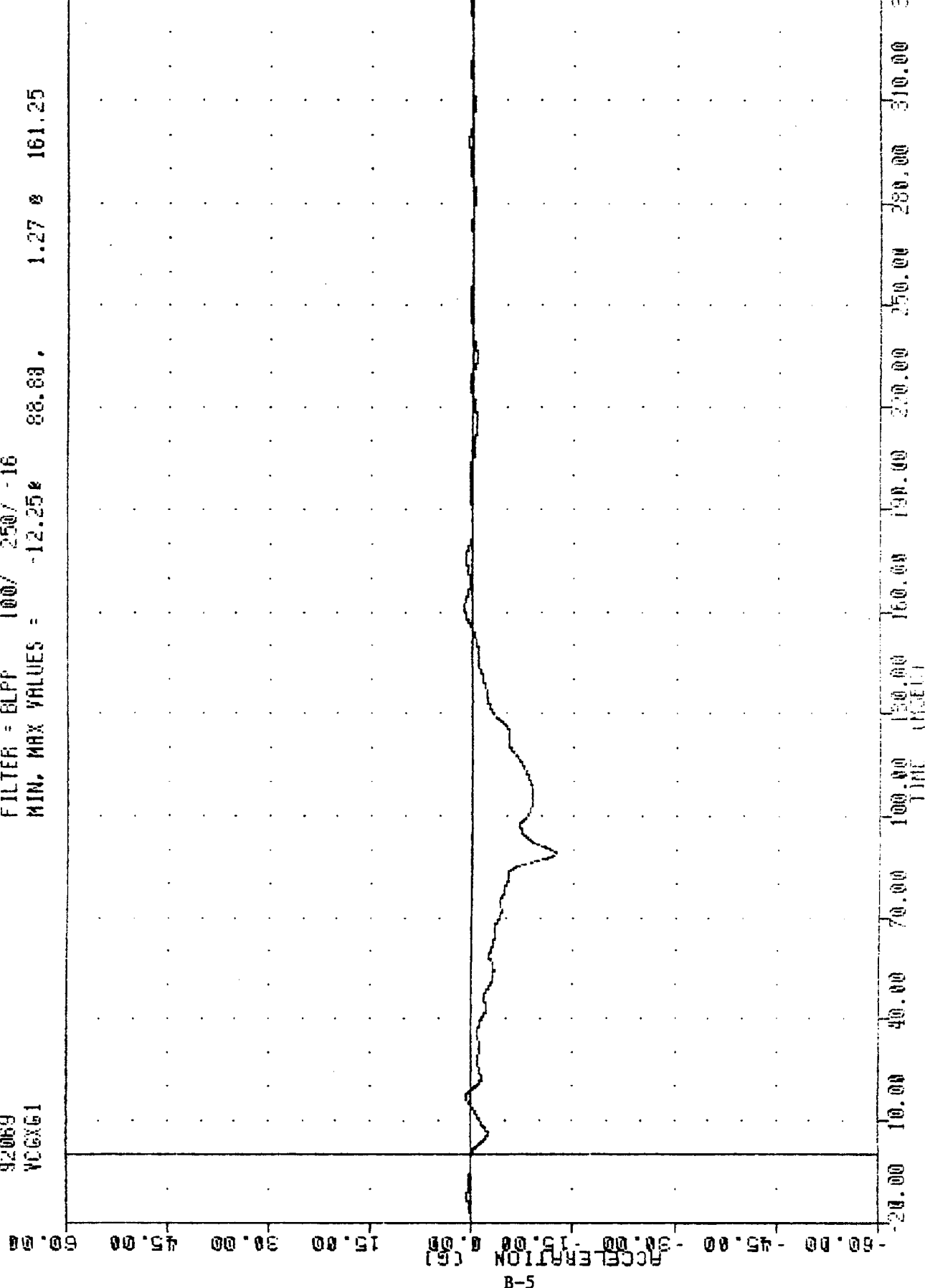
B-4

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 RIGHT REAR SILL X-AXIS ACCELERATION



TRC 920309 1  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGXG1

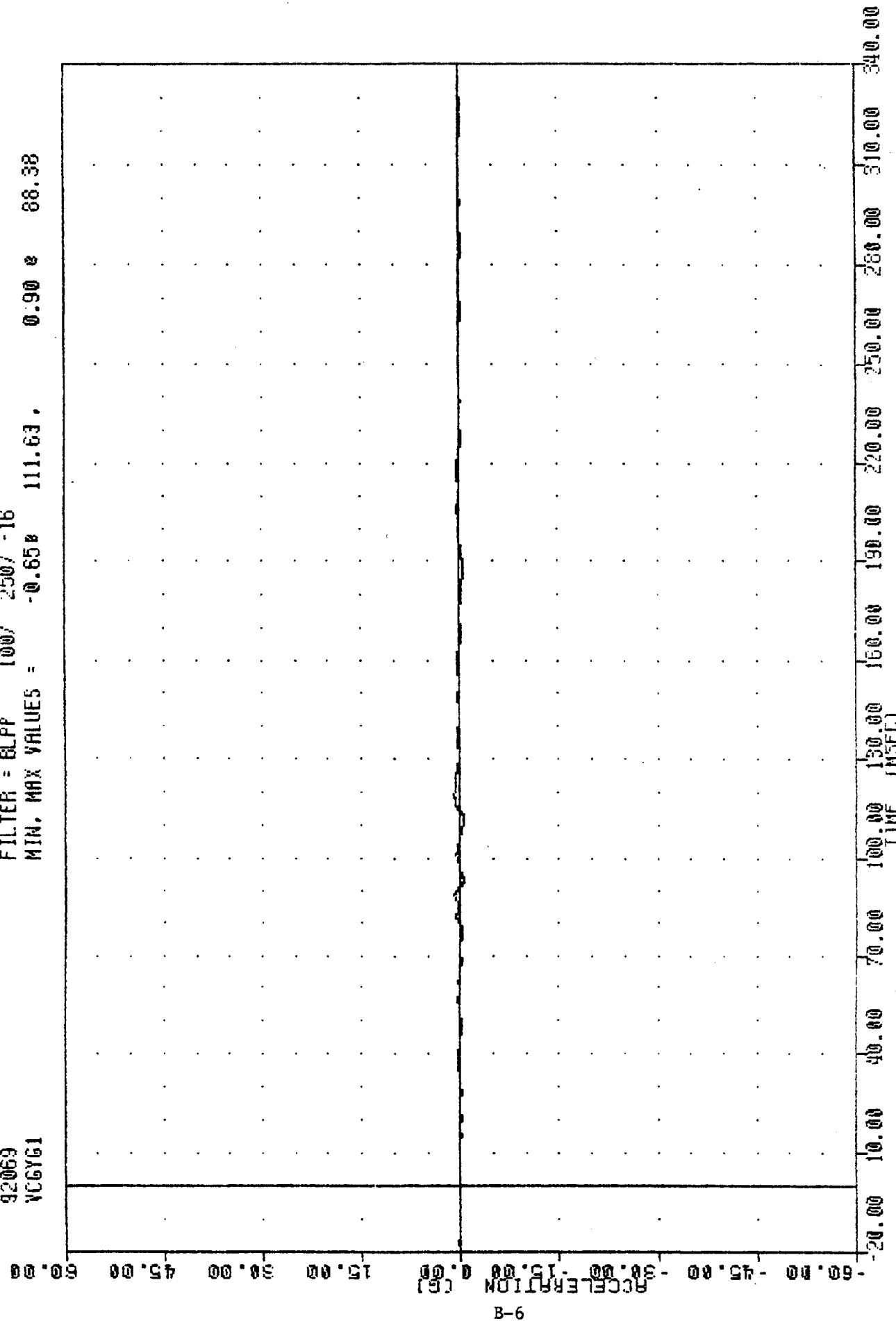
FILTER = BLPF 100/ 250/ -16  
 MIN. MAX VALUES = -12.25 88.83 1.27 0 161.25



1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 VEHICLE ON X-AXIS ACCELERATION

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCCYG1

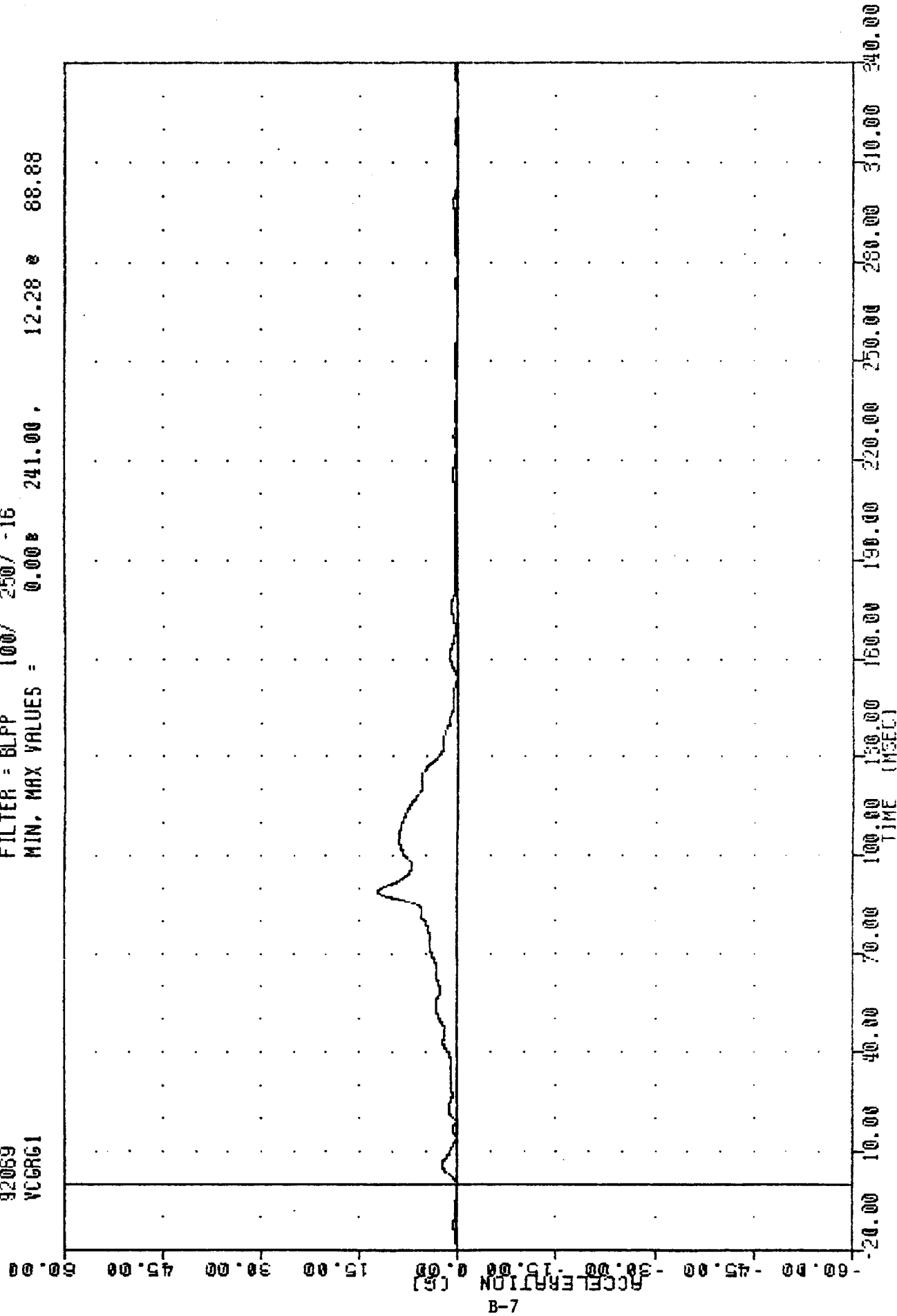
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -0.650 111.63, 0.90 & 88.38



1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 VEHICLE CG Y-AXIS ACCELERATION

IRC , 920309-1  
 CRASH III DAMAGE ALGORITHM  
 92059  
 VCCRG1

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = 0.00 241.00, 12.28 88.88



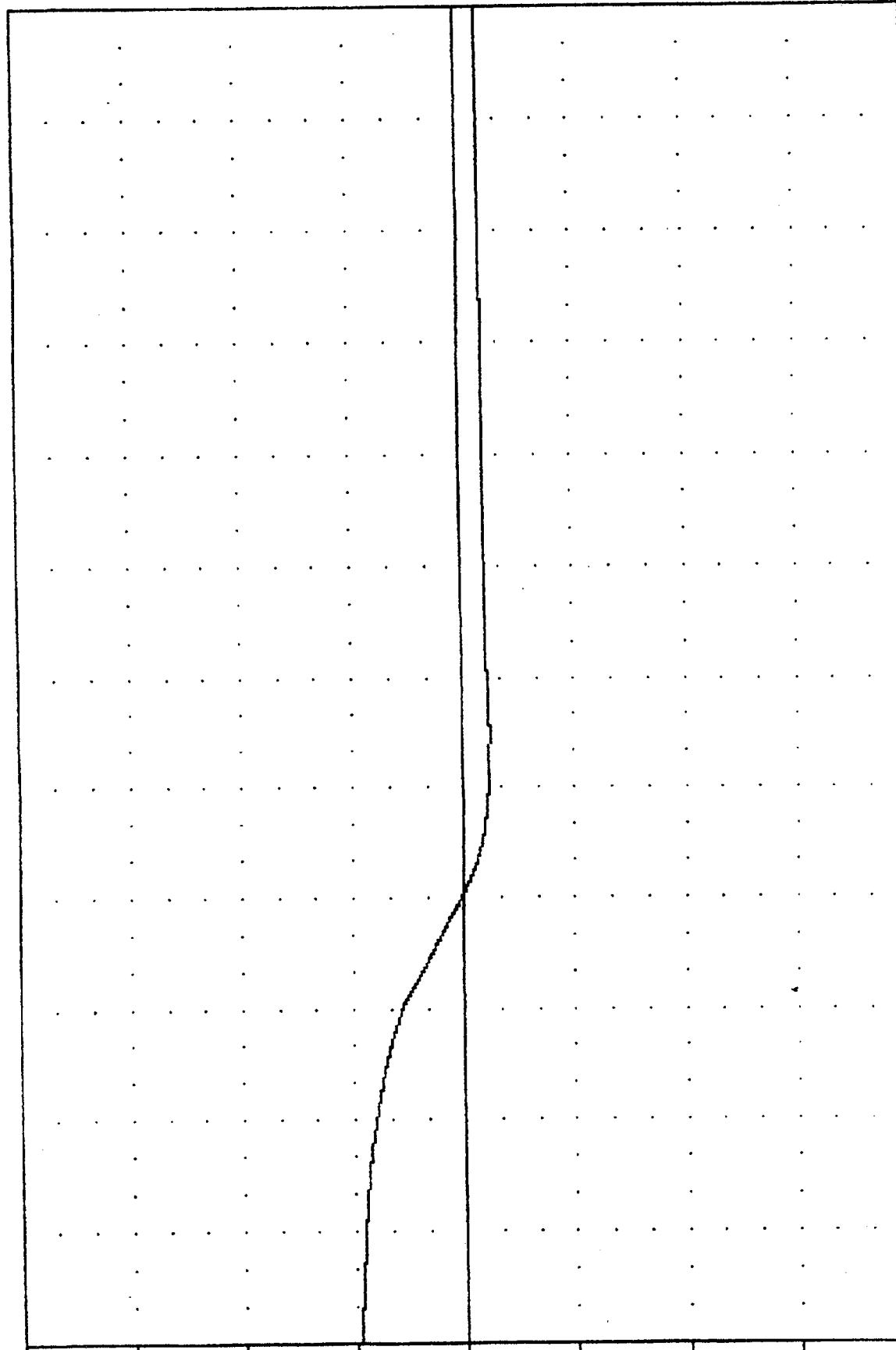
B-7

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 VEHICLE CG RESULTANT ACCELERATION

TRC , 920309-1  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -2.400 155.63, 9.70 0.00

VELOCITY (MPH)

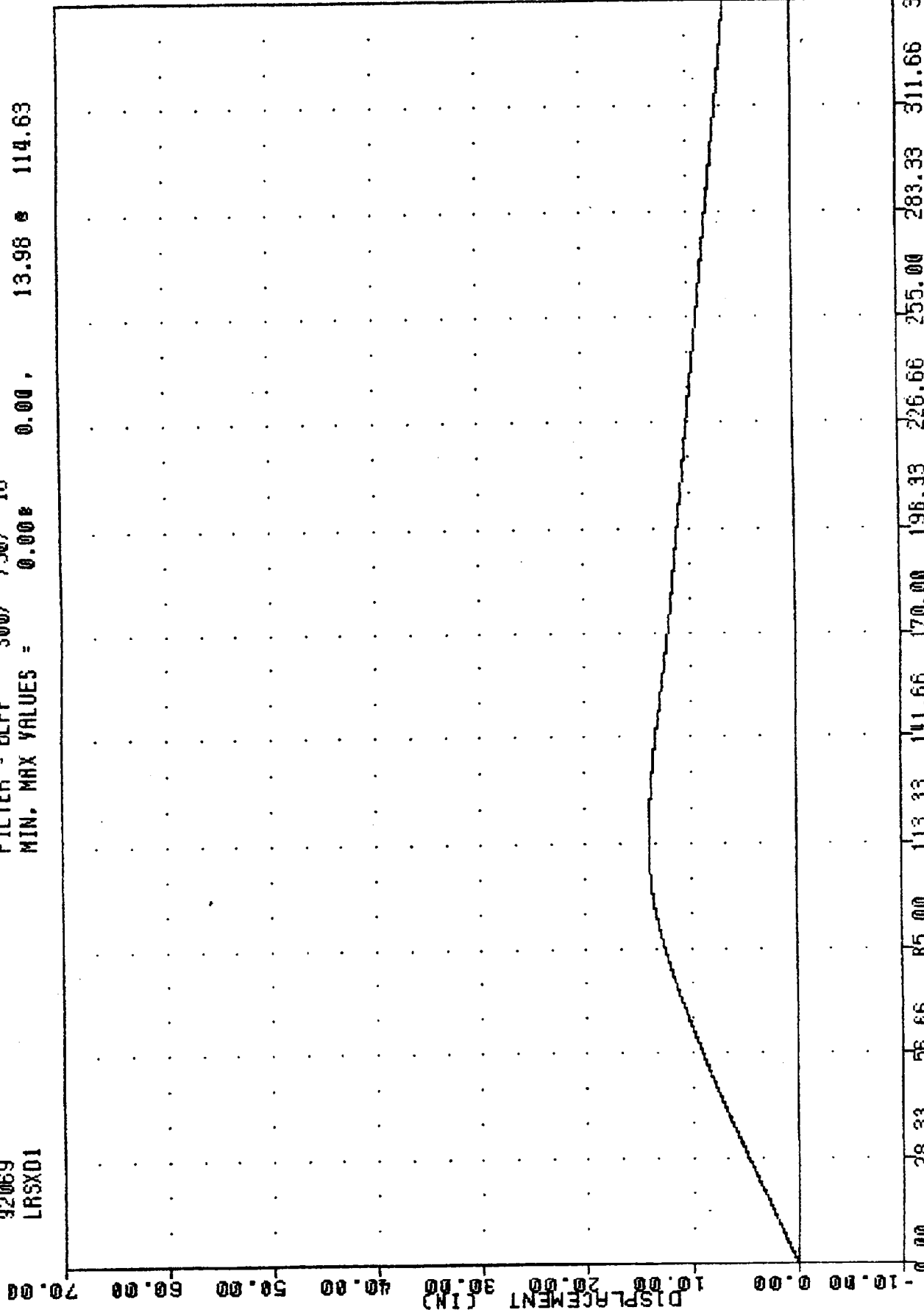


B-8

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 LEFT REAR SIDE X-AXIS VELOCITY

TRC 920309-1  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00 0.00 13.98 114.63



1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 LEFT REAR STILL V-Axis DISPLACEMENT

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 ARSXV1

, 920309-1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -2.27 156.38 9.72 2.88

VELOCITY (NPH)

40.00

30.00

20.00

10.00

0.00

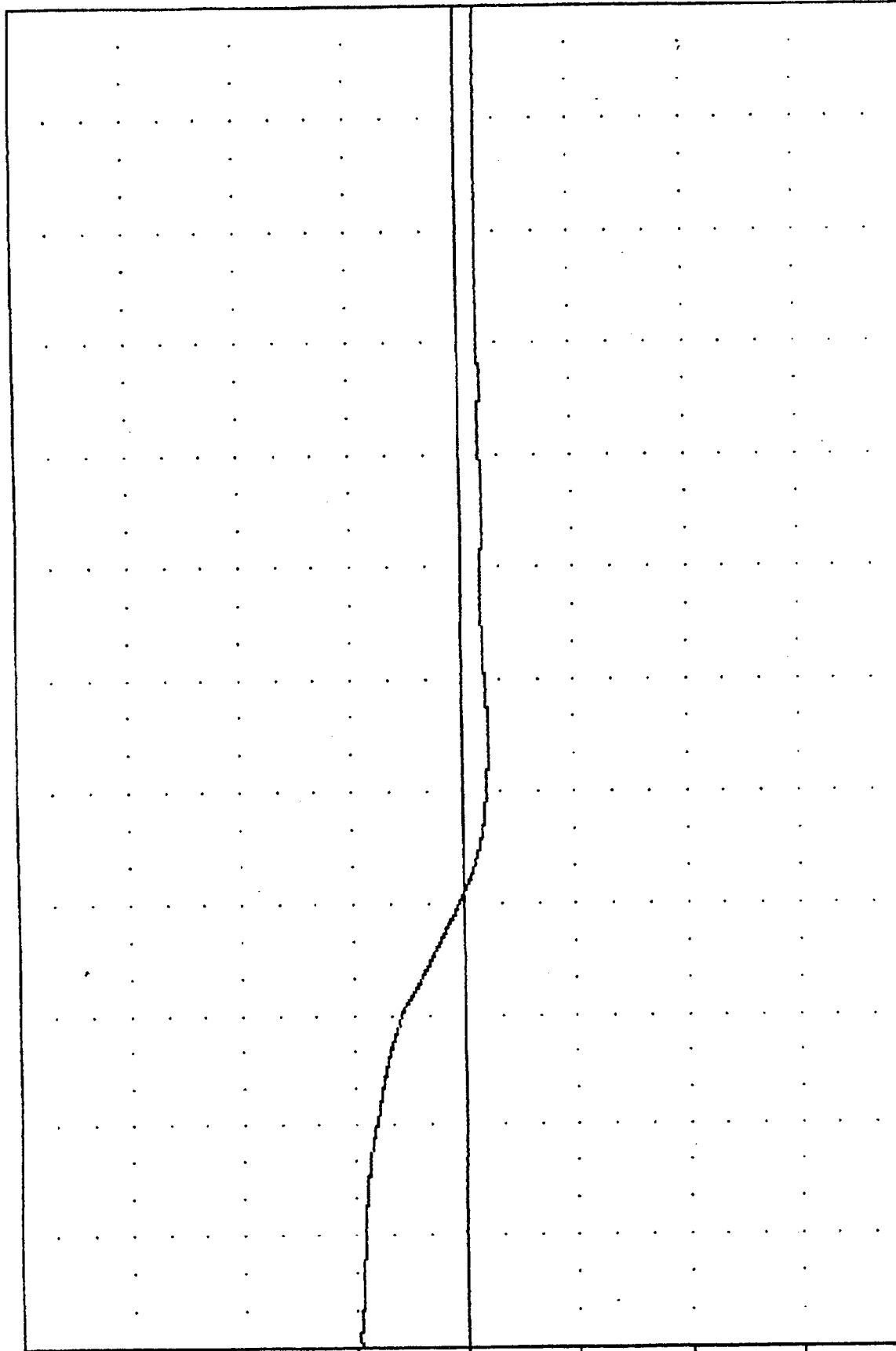
-10.00

-20.00

-30.00

-40.00

B-10



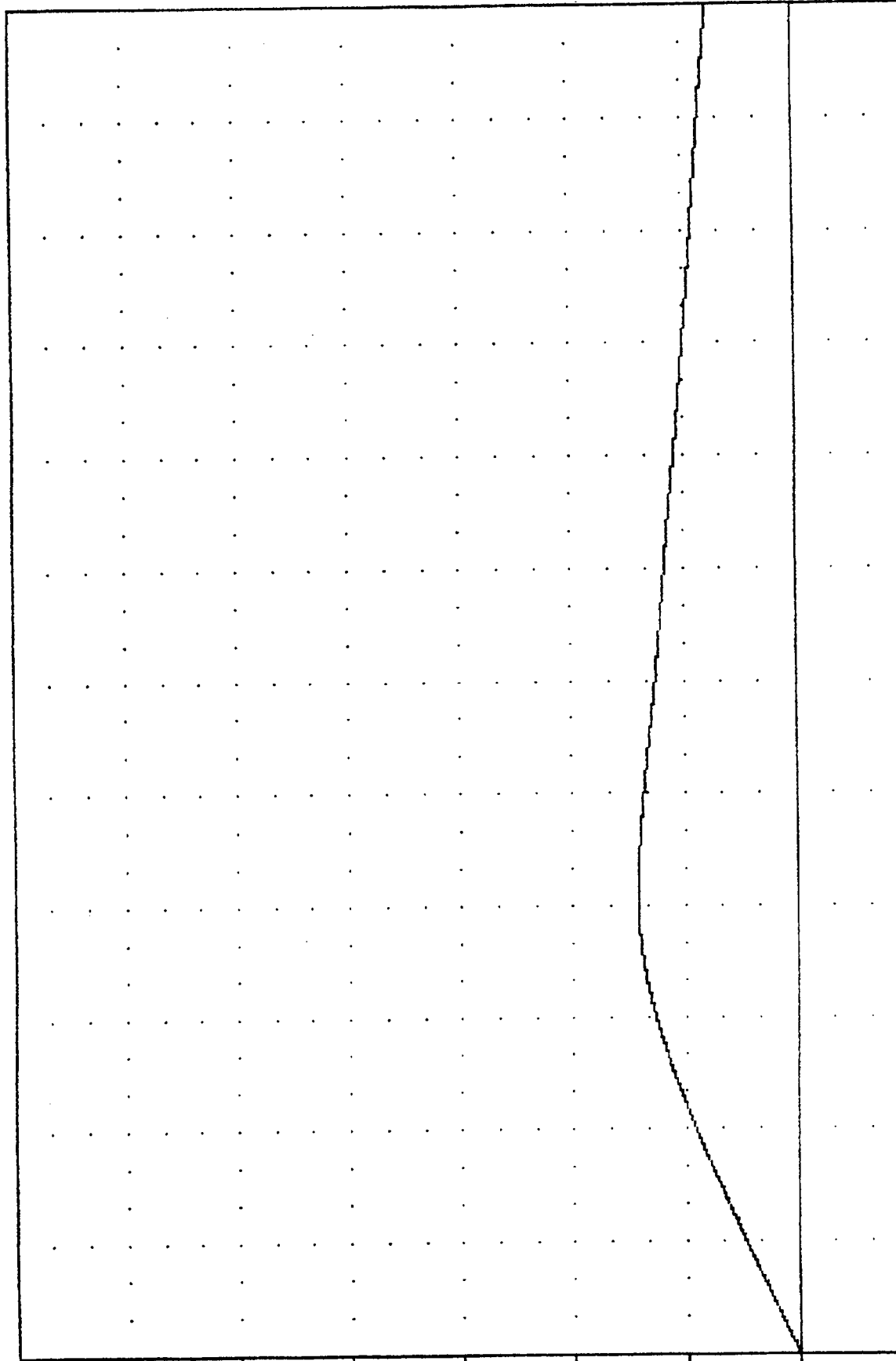
0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 RIGHT REAR STILL X-AXIS VELOCITY

TAC , 920309-1  
 CRASH III DAMAGE ALGORITHM  
 92069  
 ARSXD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00 0.00 14.22 116.50

DISPLACEMENT (IN)  
 70.00  
 60.00  
 50.00  
 40.00  
 30.00  
 20.00  
 10.00  
 0.00



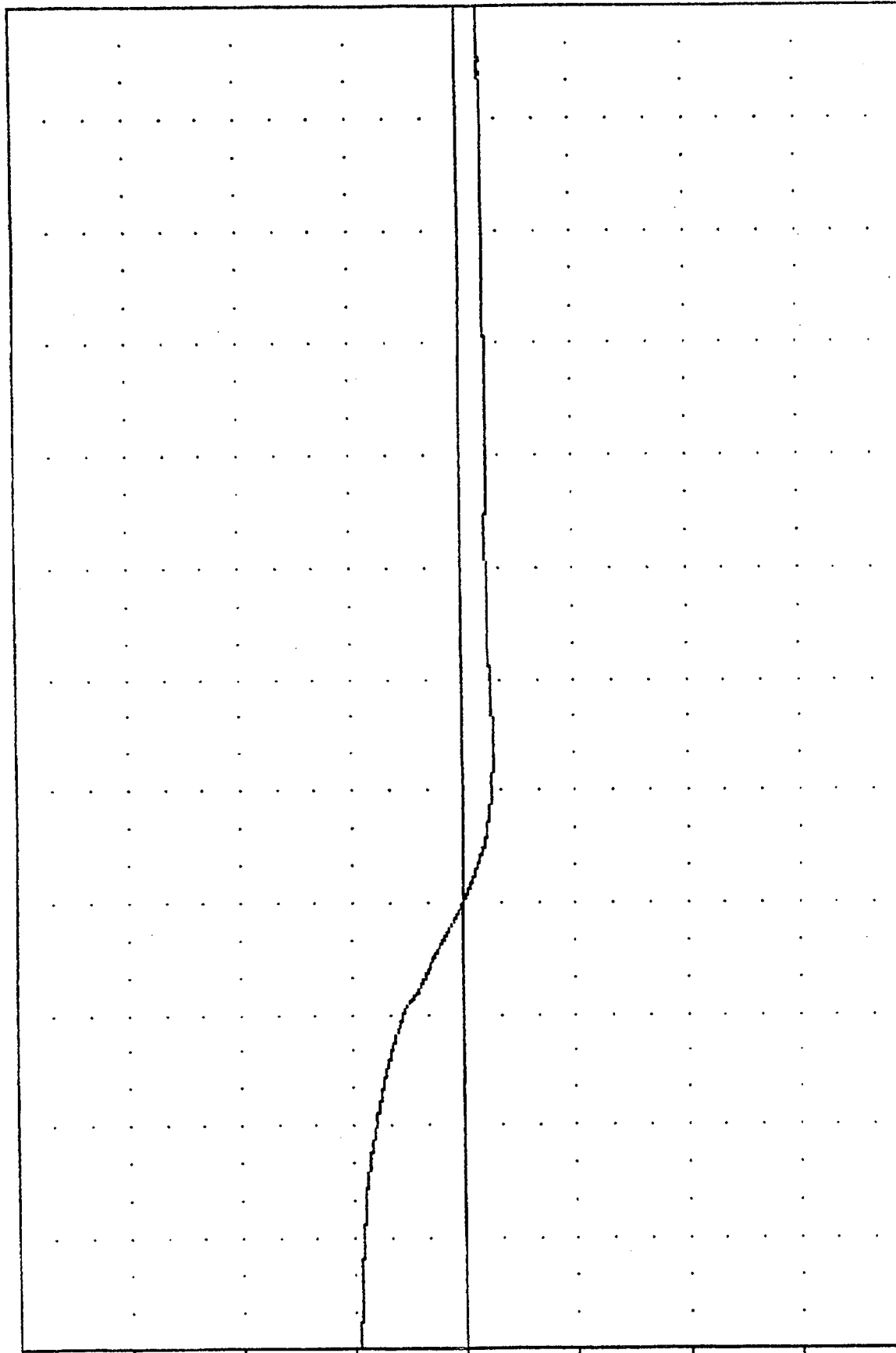
| TIME (SEC) | DISPLACEMENT (IN) |
|------------|-------------------|
| 0.00       | 0.00              |
| 28.33      | 10.00             |
| 56.66      | 20.00             |
| 85.00      | 30.00             |
| 113.33     | 40.00             |
| 141.66     | 50.00             |
| 170.00     | 60.00             |
| 198.33     | 70.00             |
| 226.66     | 80.00             |
| 255.00     | 90.00             |
| 283.33     | 100.00            |
| 311.66     | 110.00            |
| 340.00     | 120.00            |

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 RIGHT REAR STILL X-AXIS DISPLACEMENT

TRC , 920309-1  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCGXV1

FILTER = BLFP 300/ 750/ -16  
 MIN. MAX VALUES = -2.70e 155.75, 9.70 e 0.00

VELOCITY (MPH)



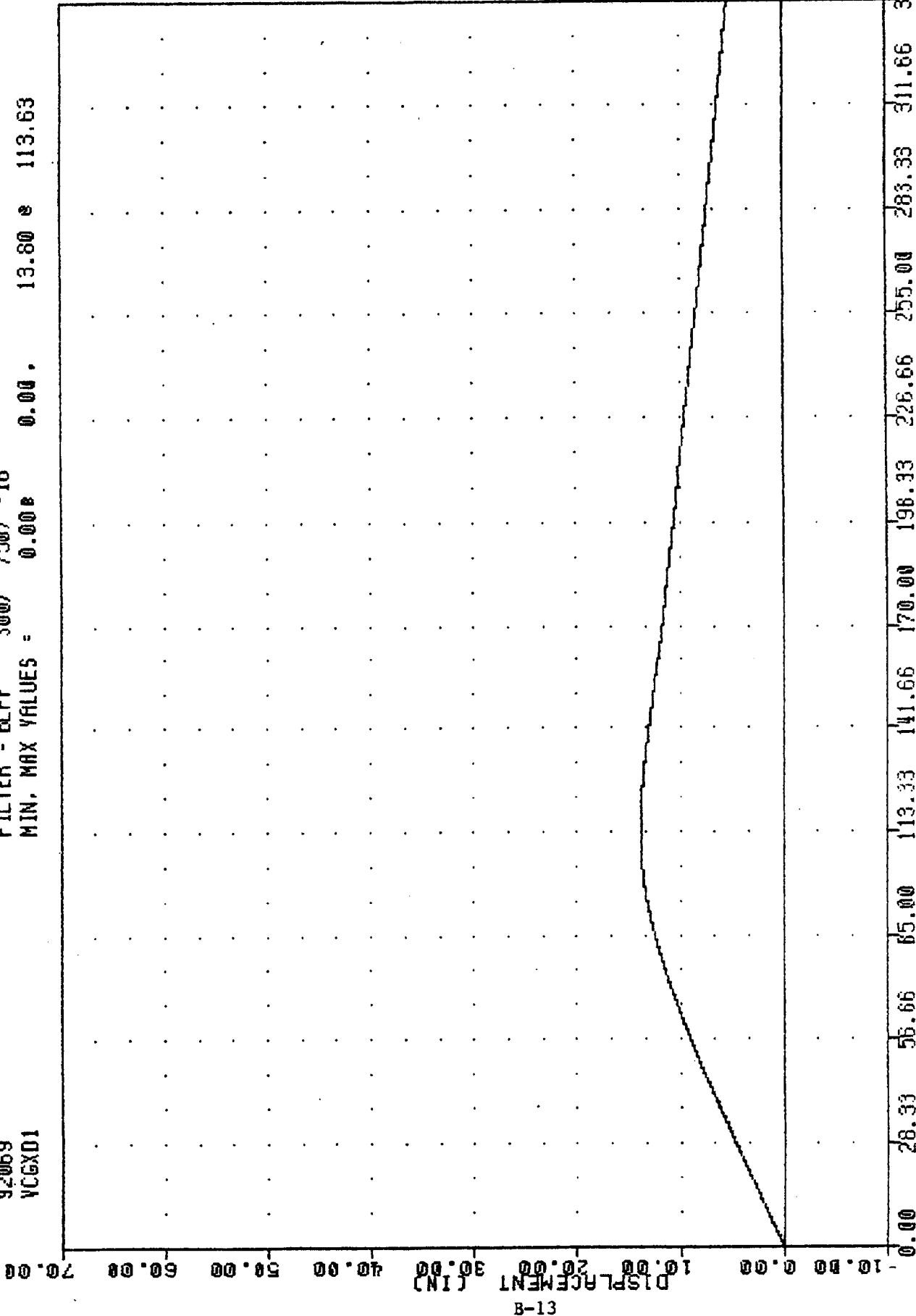
0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 VEHICLE CG X-AXIS VELOCITY



TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGXD1

FILTER = ELPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00 0.00 13.80 113.63



1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 VEHICLE CG X-AXIS DISPLACEMENT

TRC  
CRASH III DAMAGE ALGORITHM  
92069  
VCGYV1

, 920309-1

FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = 0.000 29.75, 0.56 e 163.50

40.00  
30.00  
20.00  
10.00  
0.00  
-10.00  
-20.00  
-30.00  
-40.00

VELOCITY (MPH)

B-14

0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

TIME (MSEC)

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
VEHICLE CG Y-AXIS VELOCITY

TRC , 920309-1  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCGYD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00 1.25 1.97 340.00

70.00

60.00

50.00

40.00

30.00

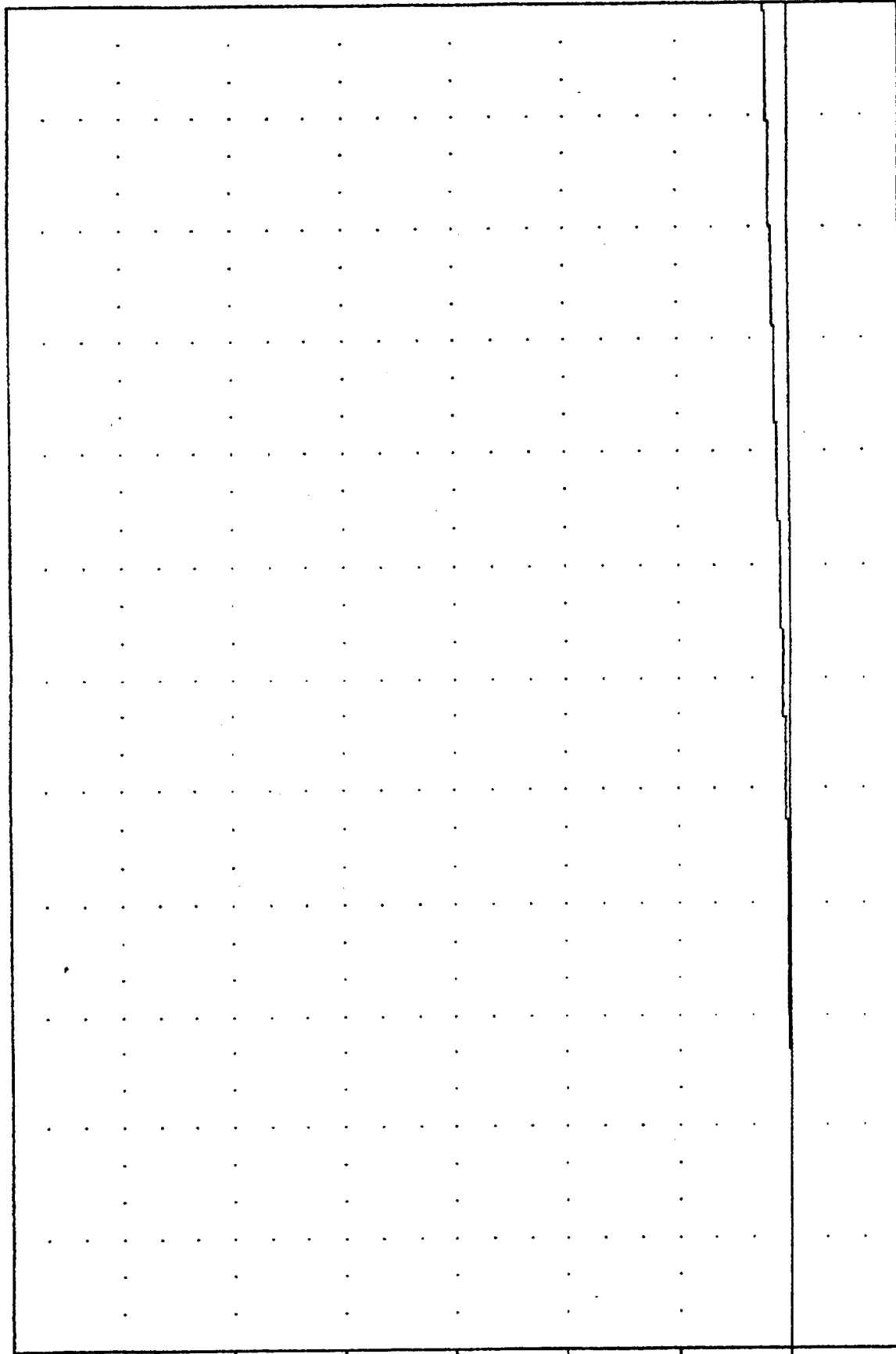
20.00

10.00

0.00

-10.00

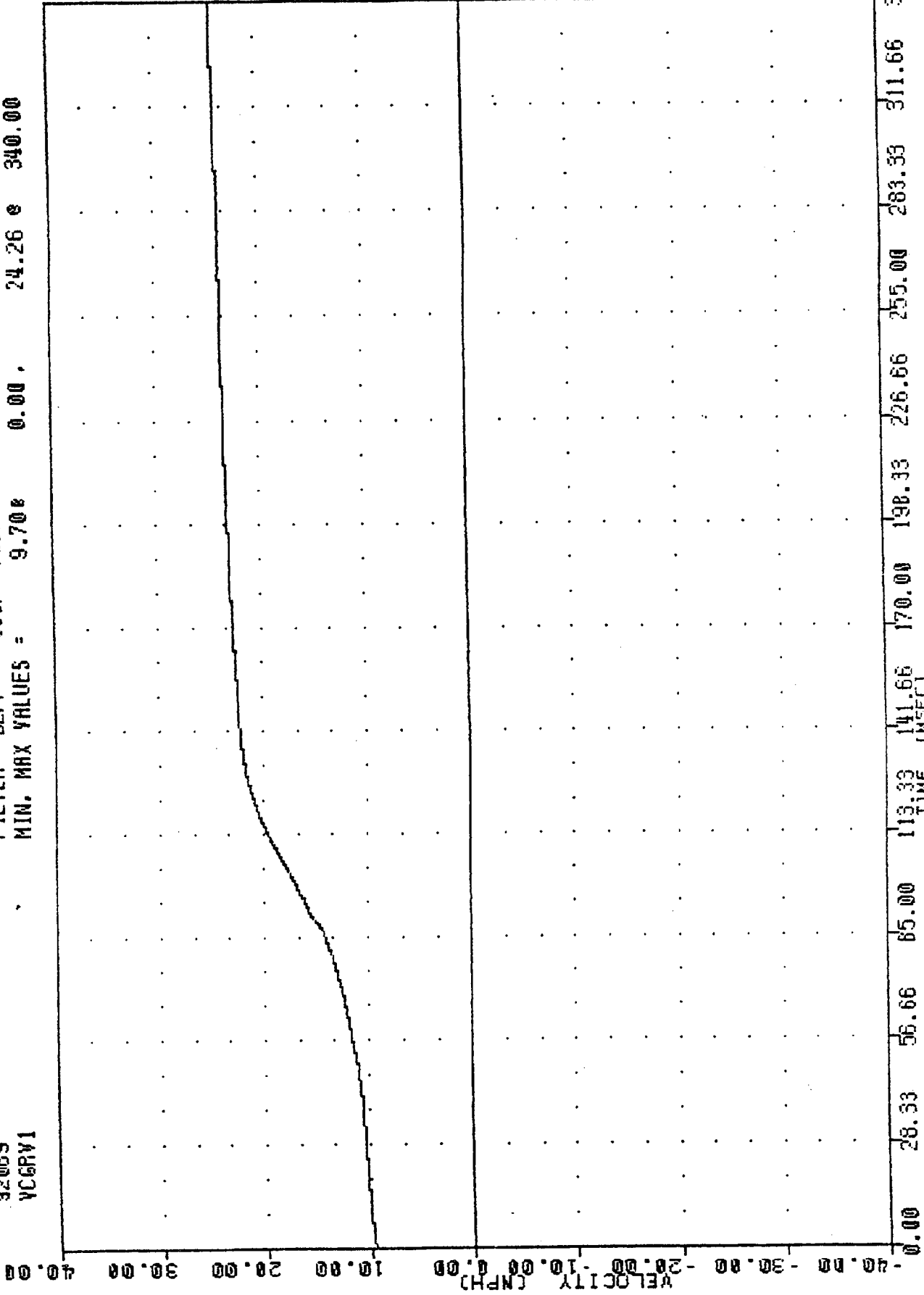
B-15



0.00 26.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00  
 TIME (MSEC)  
 1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 VEHICLE CG Y-AXIS DISPLACEMENT

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGRV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 9.70 24.26 340.00

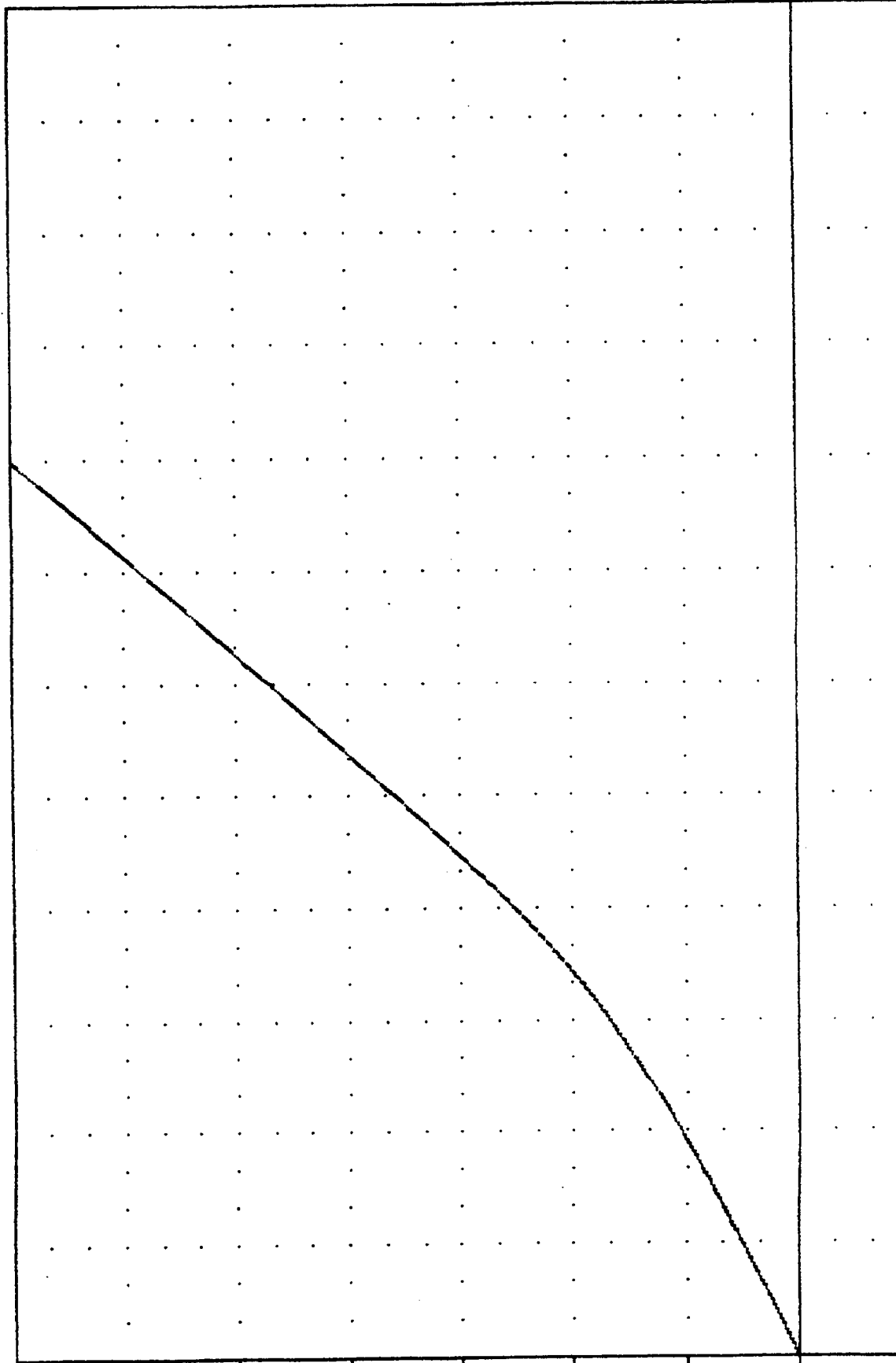


1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 VEHICLE CG RESULTANT VELOCITY

TRC . 920309-1  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCGRD1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = 0.00 0.00 117.63 340.00

DISPLACEMENT (IN)



B-17

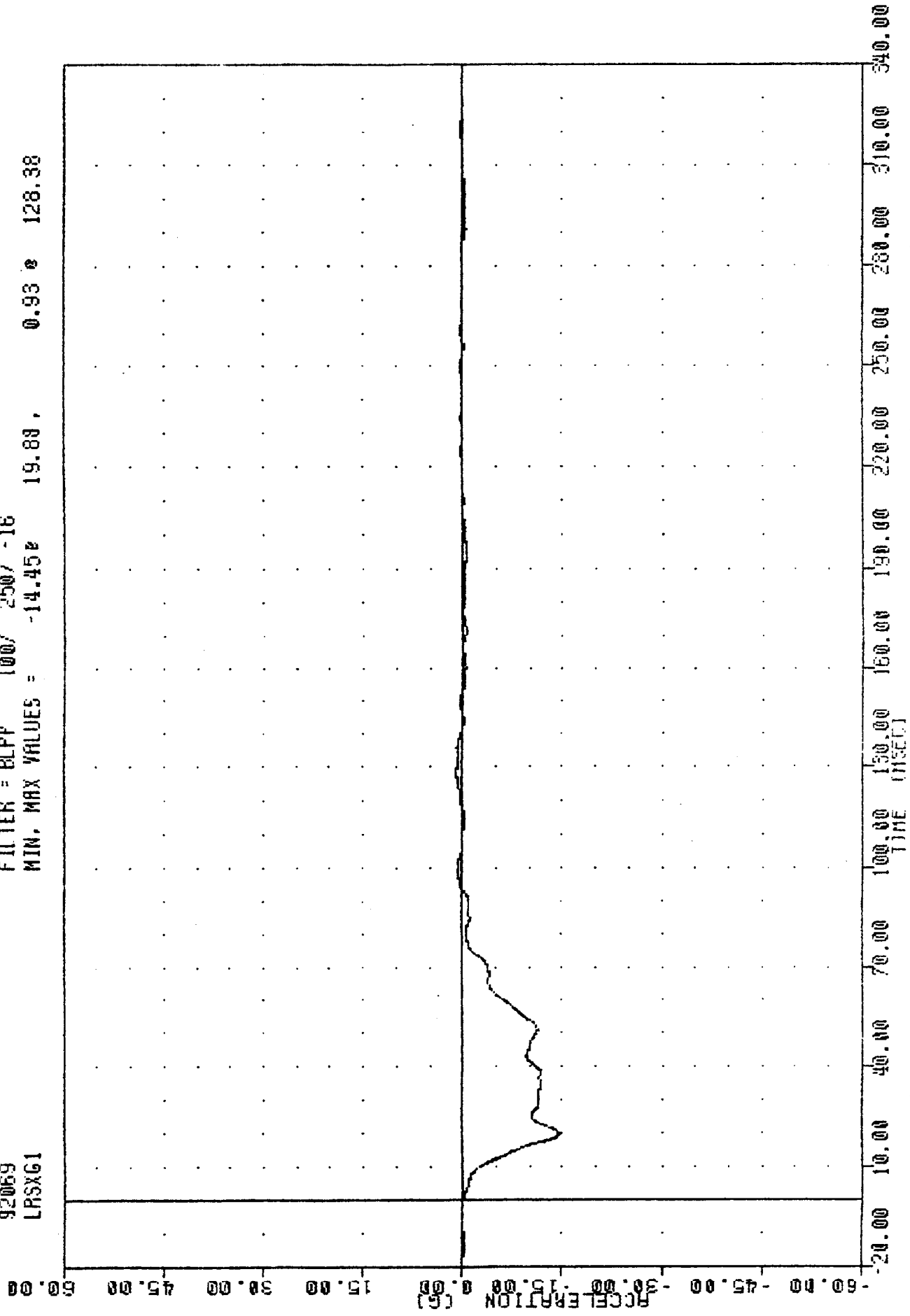
1985 NISSAN SENTRA INTO POLE BARRIER AT 9.7 MPH TEST NO. 1  
 VEHICLE CG RESULTANT DISPLACEMENT

DATA PLOTS

TEST NO. 920309-2

TRC  
CRASH III DAMAGE ALGORITHM  
92069  
LRSXG1

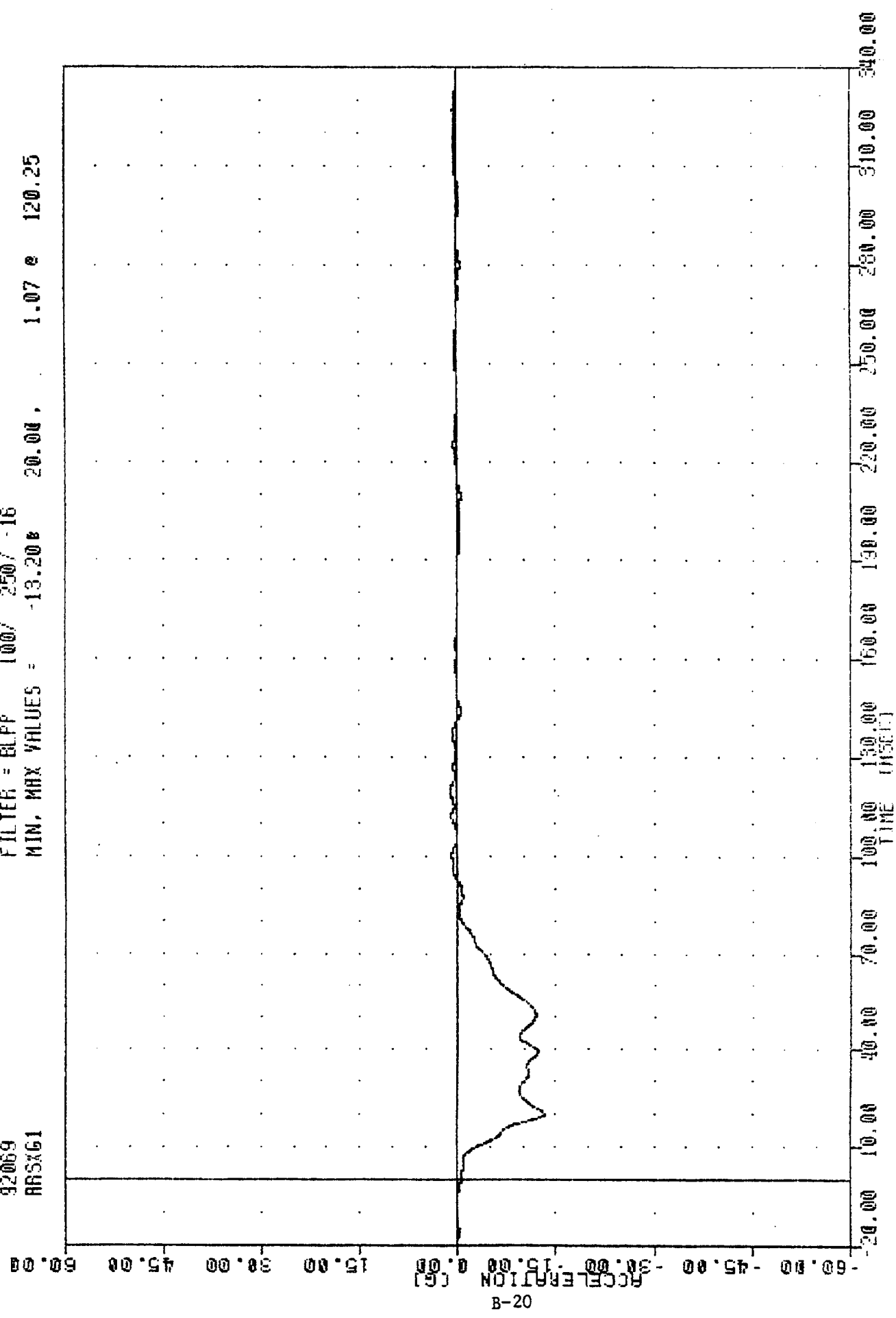
FILTER = BLPF 100/ 250/ -16  
MIN. MAX VALUES = -14.45e 19.83, 0.93 e 128.38



1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
LEFT REAR STILL Y-AXIS ACCELERATION

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 ARS161

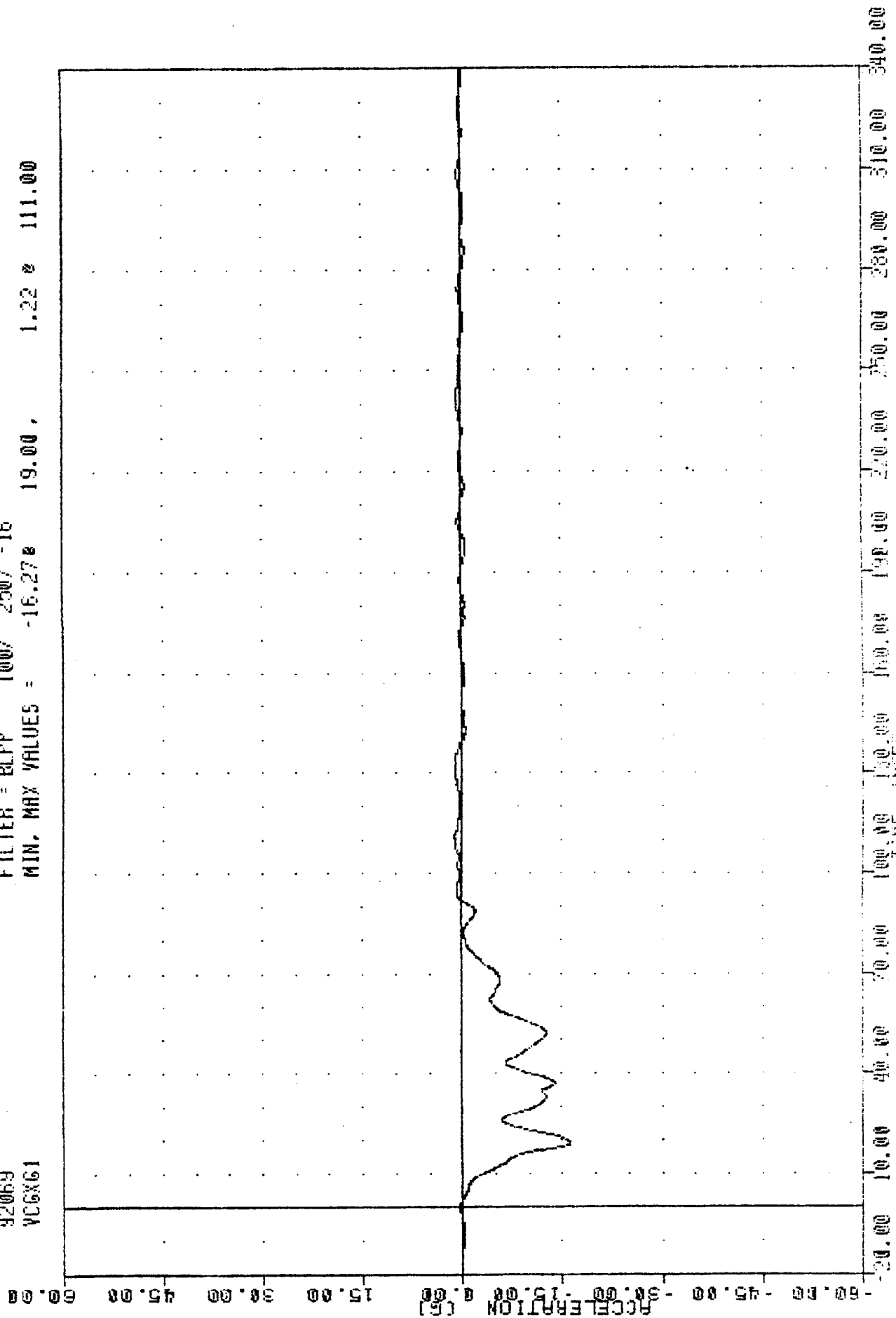
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -13.20 20.00 1.07 e 120.25





TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCCX61

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -16.27 19.00, 1.22 111.00



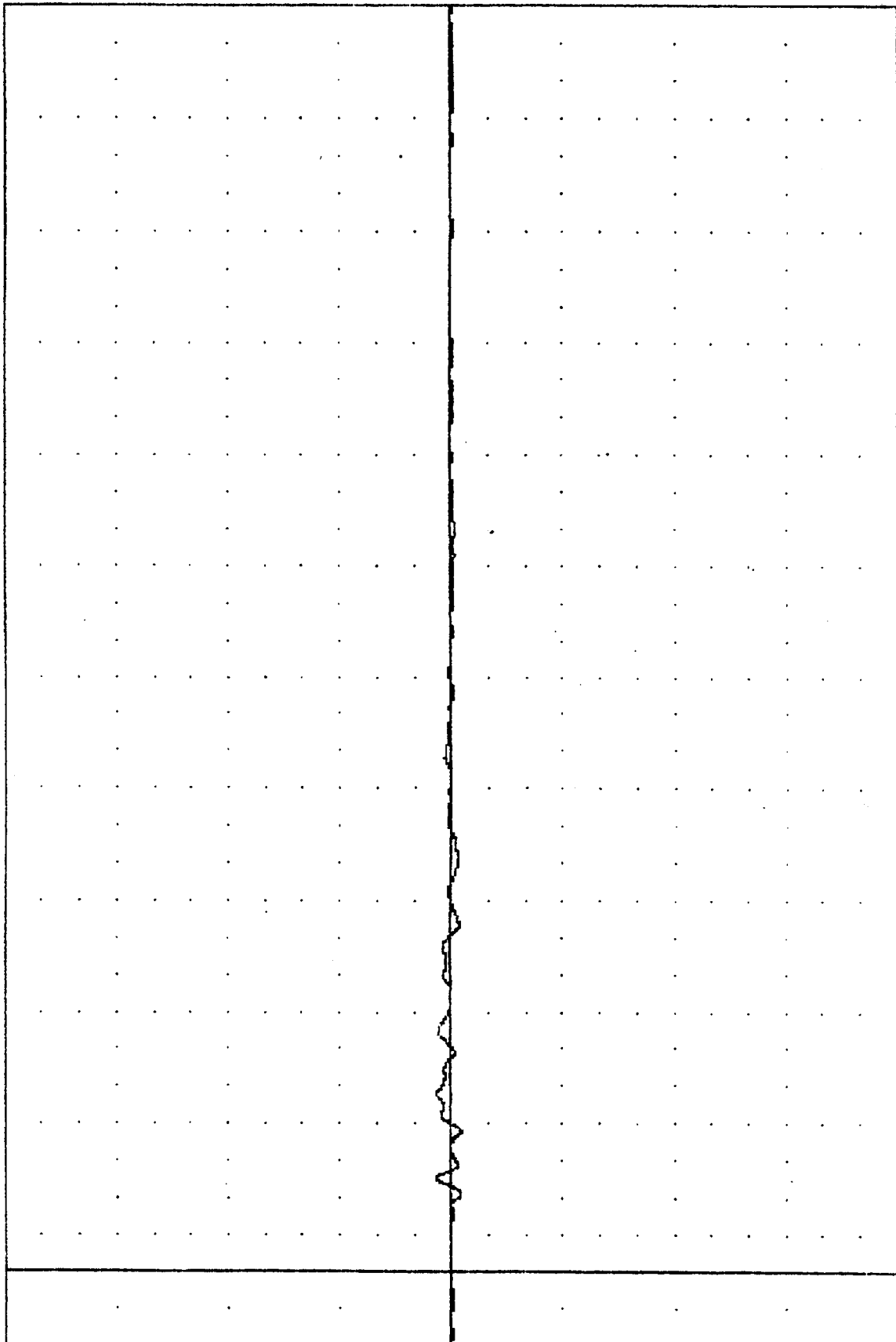
12-B

1989 NISSAN SENTRA INFO FOLF HARRIER AT 9.8 MPH TEST NO. 2  
 VEHICLE CR VAXIS ACCELERATION

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCCYC1

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -1.39 37.80 2.08 25.38

ACCELERATION (G)  
 -60.00 -45.00 -30.00 -15.00 0.00 15.00 30.00 45.00 60.00

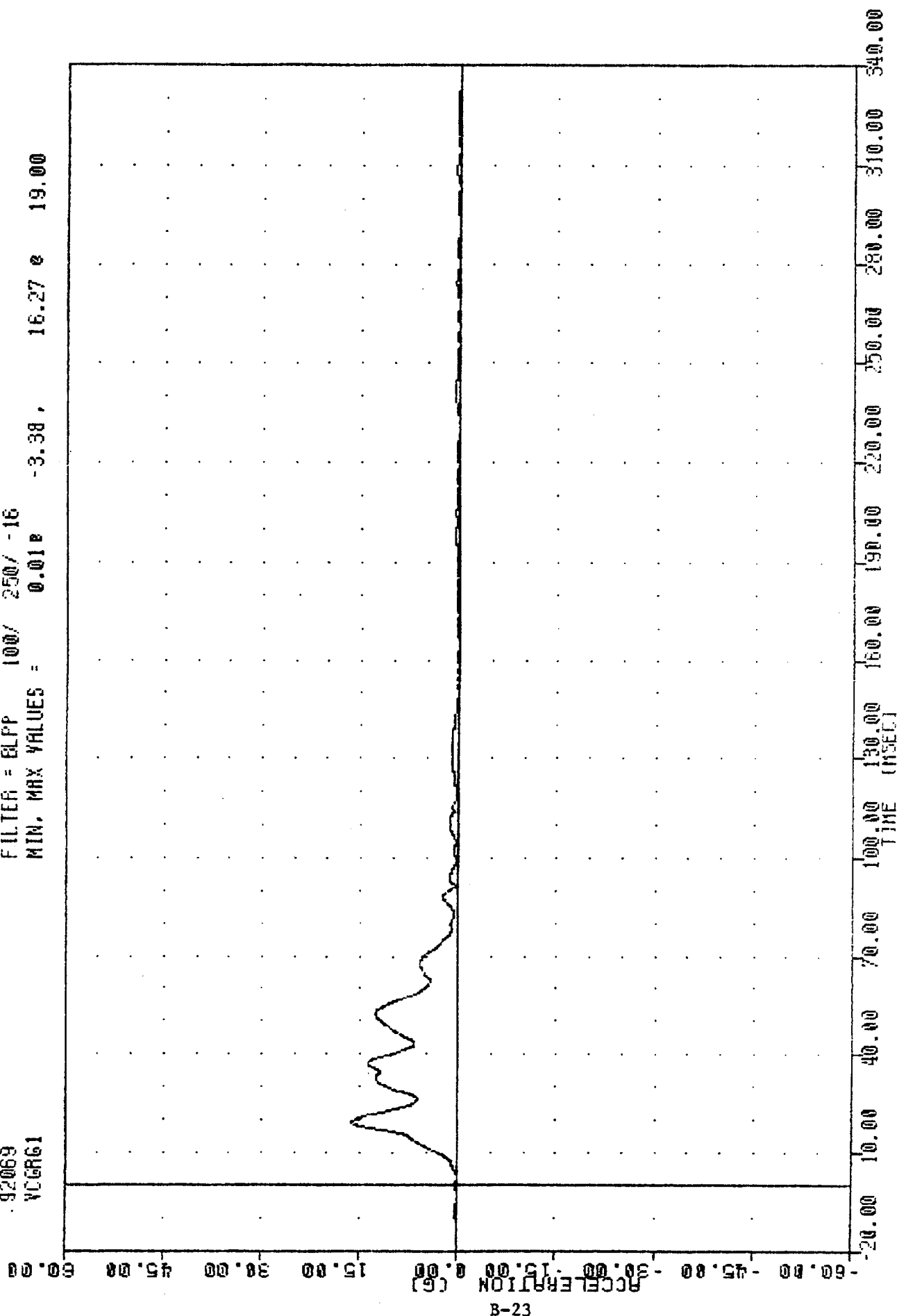


0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH. TEST NO. 2  
 VEHICLE CG Y-AXIS ACCELERATION

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGR61

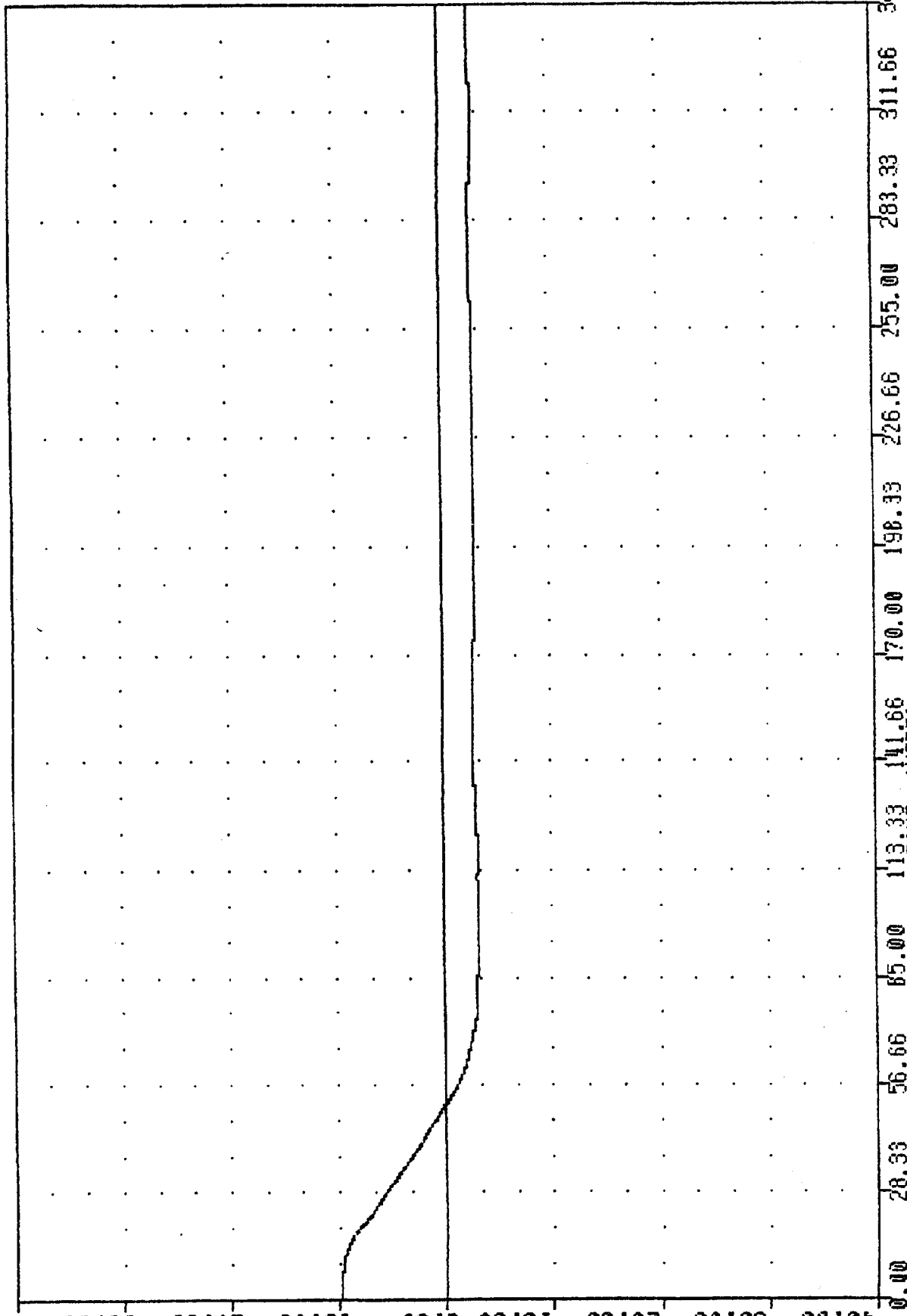
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = 0.01e -3.38, 16.27 e 19.00



TRC , 920309-2  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -3.16 92.50 9.80 0.63

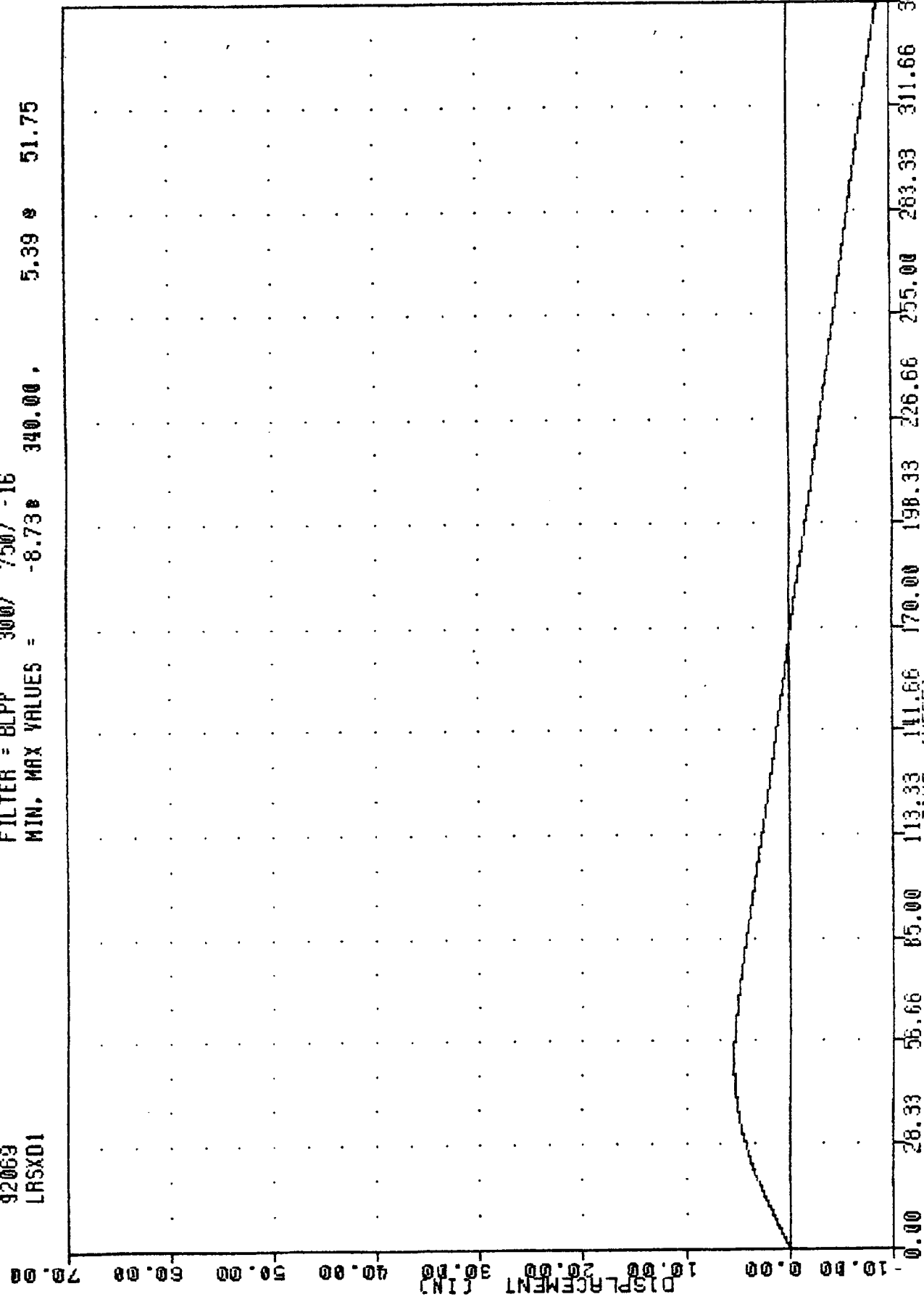
VELOCITY (MPH)



1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
 LEFT REAR SILL X-AXIS VELOCITY

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -8.73 340.00 5.39 51.75

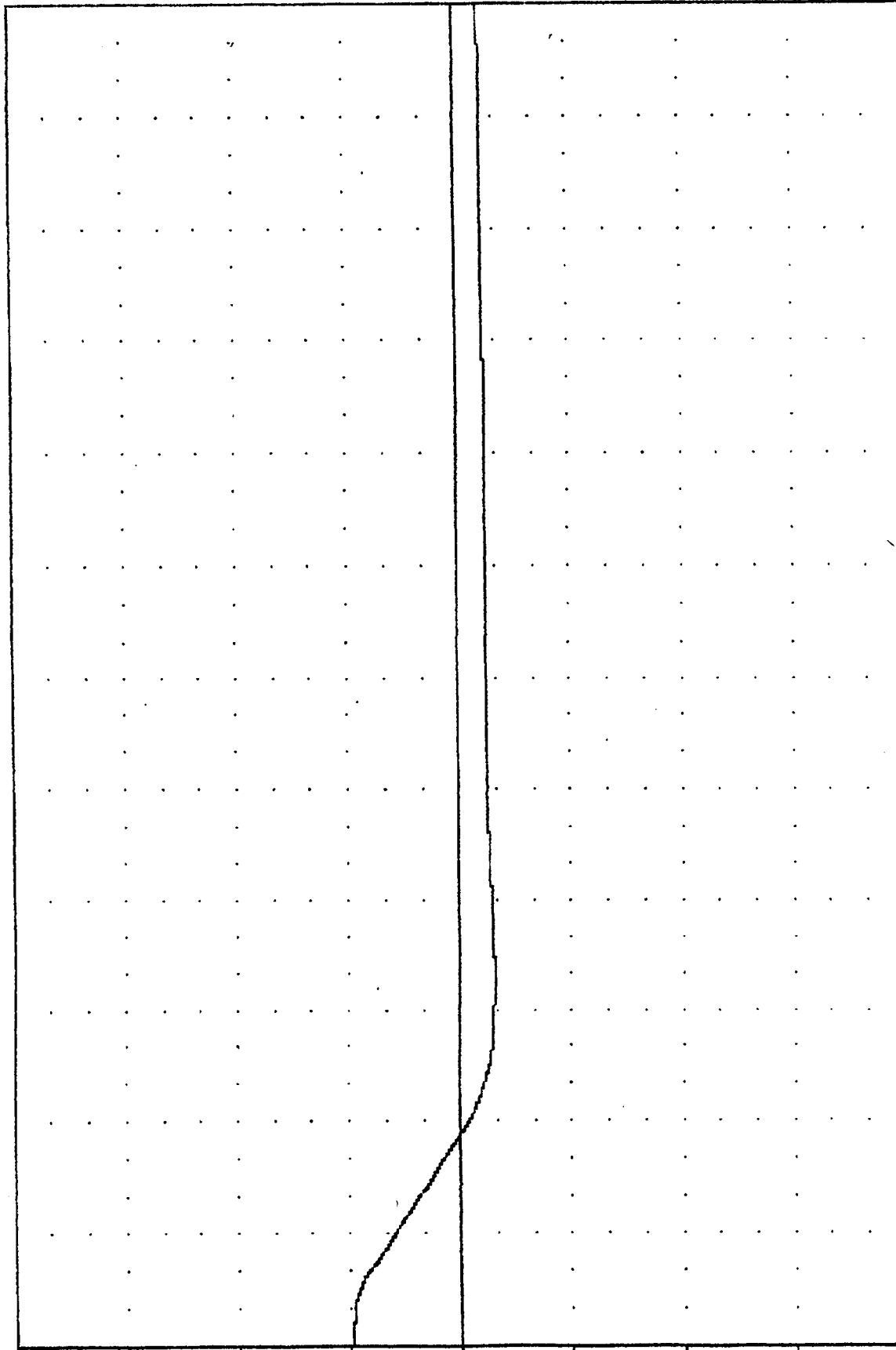


1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
 LEFT REAR SILL X-AXIS DISPLACEMENT

TAC  
CRASH III DAMAGE ALGORITHM  
92069  
ARSXV1

FILTER = BLPP 300/ 750/ -16  
MIN, MAX VALUES = -3.10e 92.50e 9.80e 0.00

40.00  
30.00  
20.00  
10.00  
0.00  
-10.00  
-20.00  
-30.00  
-40.00  
VELOCITY (MPH)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00  
TIME (MSEC)  
1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
RIGHT REAR GILL X-AXIS VELOCITY

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 HRSXD1

, 920309-2

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -6.80 340.00, 5.60 53.25

70.00

60.00

50.00

40.00

30.00

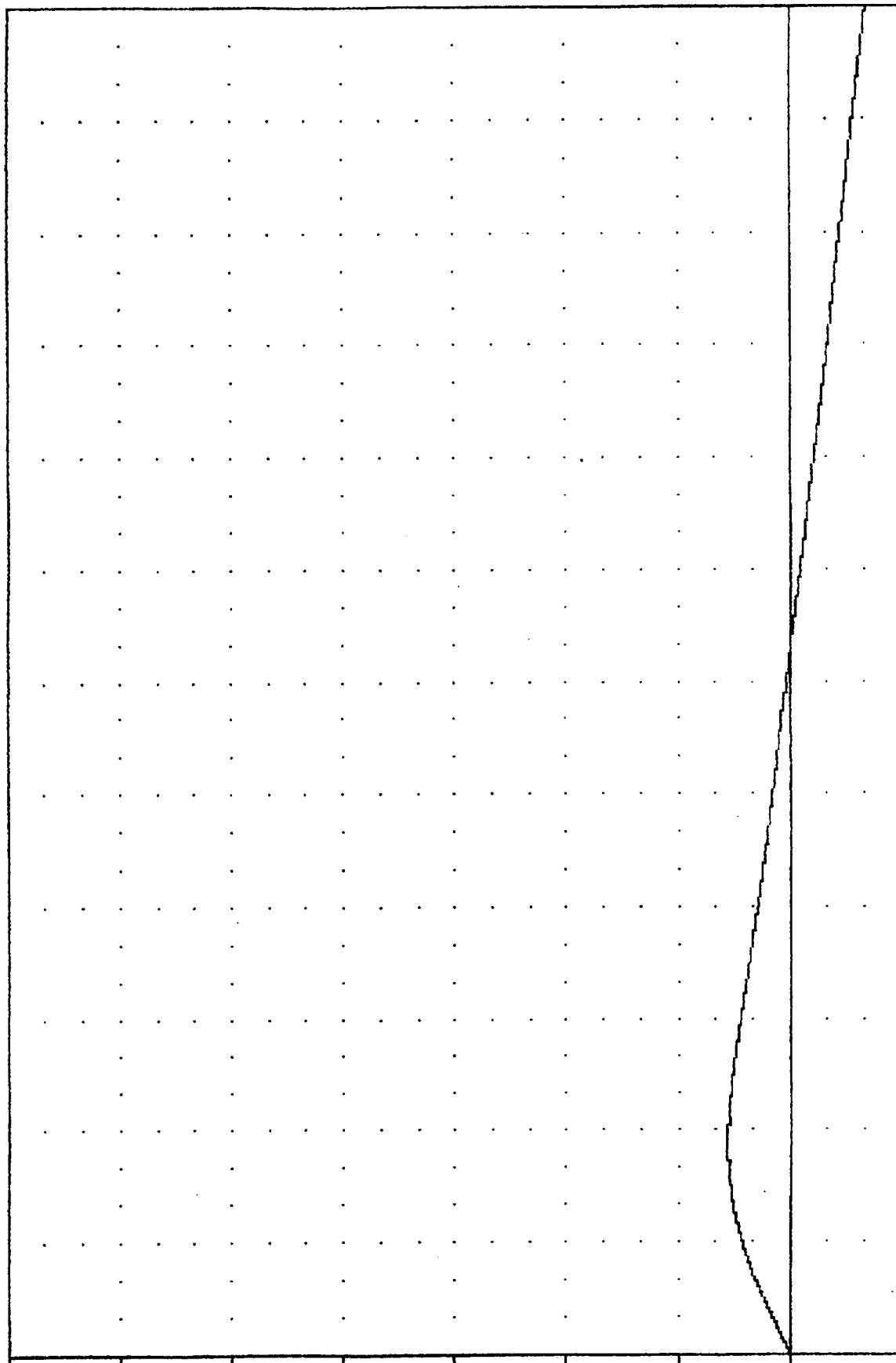
20.00

10.00

0.00

DISPLACEMENT (IN)

B-27



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
 RIGHT REAR SILL X-AXIS DISPLACEMENT

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGXV1

920309-2

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -3.210 91.00 9.82 e 2.50

40.00

30.00

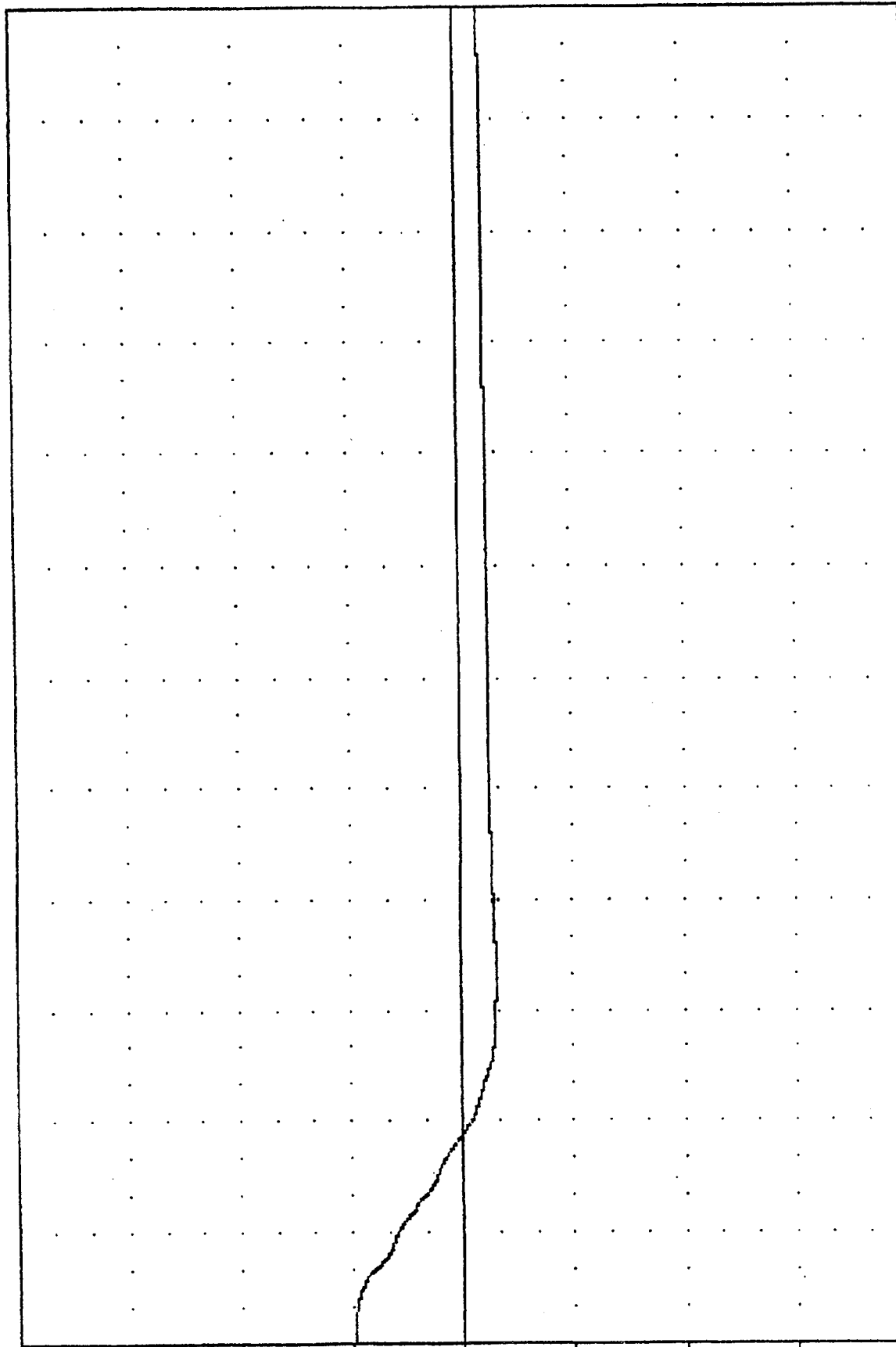
20.00

10.00

0.00

B-28

VELOCITY (MPH)



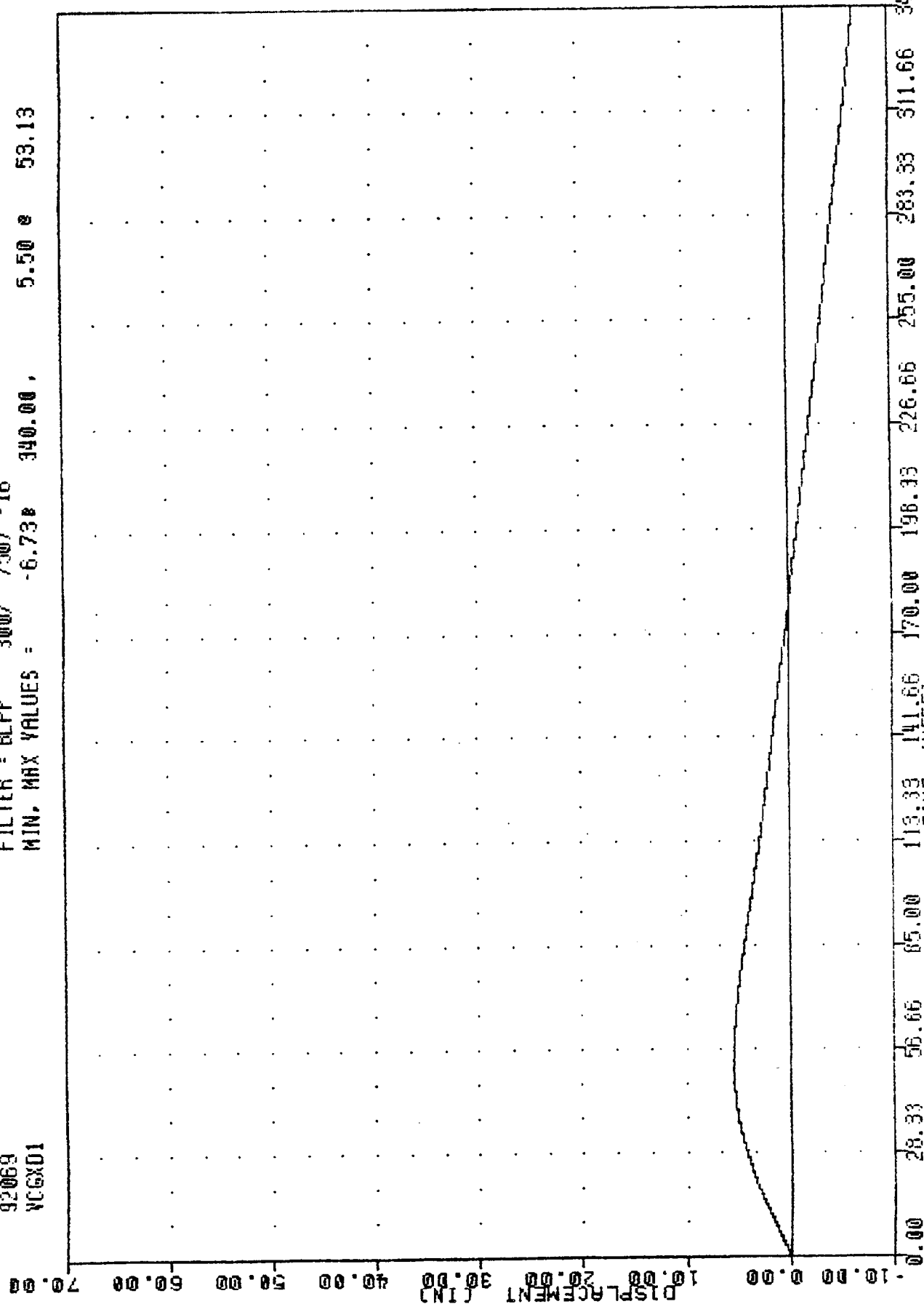
0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
 VEHICLE CG X-AXIS VELOCITY



TRC , 920309-2  
 CRASH III DAMAGE ALGORITHM  
 92069  
 WCGX01

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -6.73e 340.00, 5.50 e 53.13



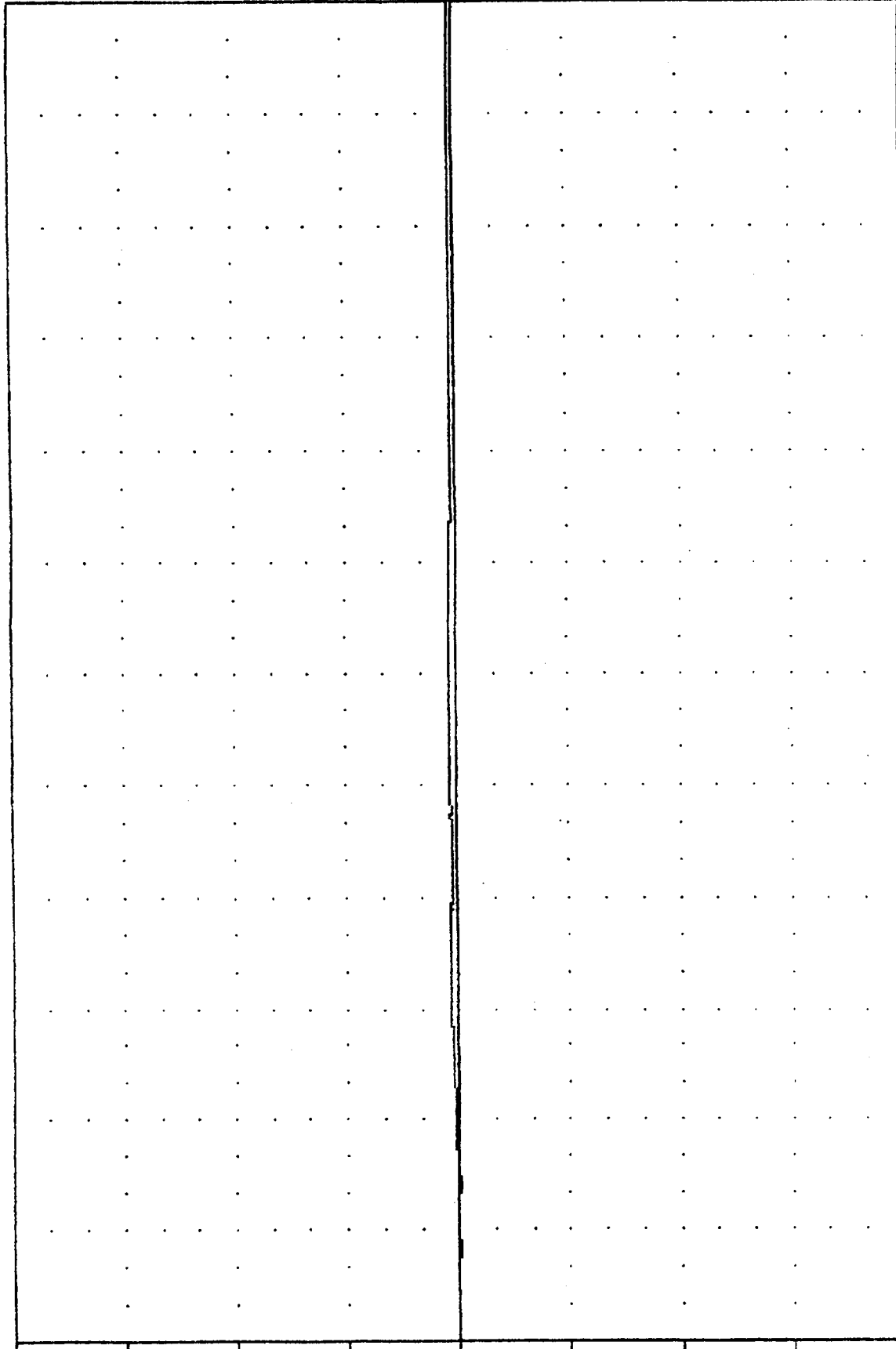
1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
 VEHICLE CG X-AXIS DISPLACEMENT

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCCYV1

, 920309-2

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -0.148 40.25, 0.77 e 171.13

40.00  
 30.00  
 20.00  
 10.00  
 0.00  
 -10.00  
 -20.00  
 -30.00  
 -40.00



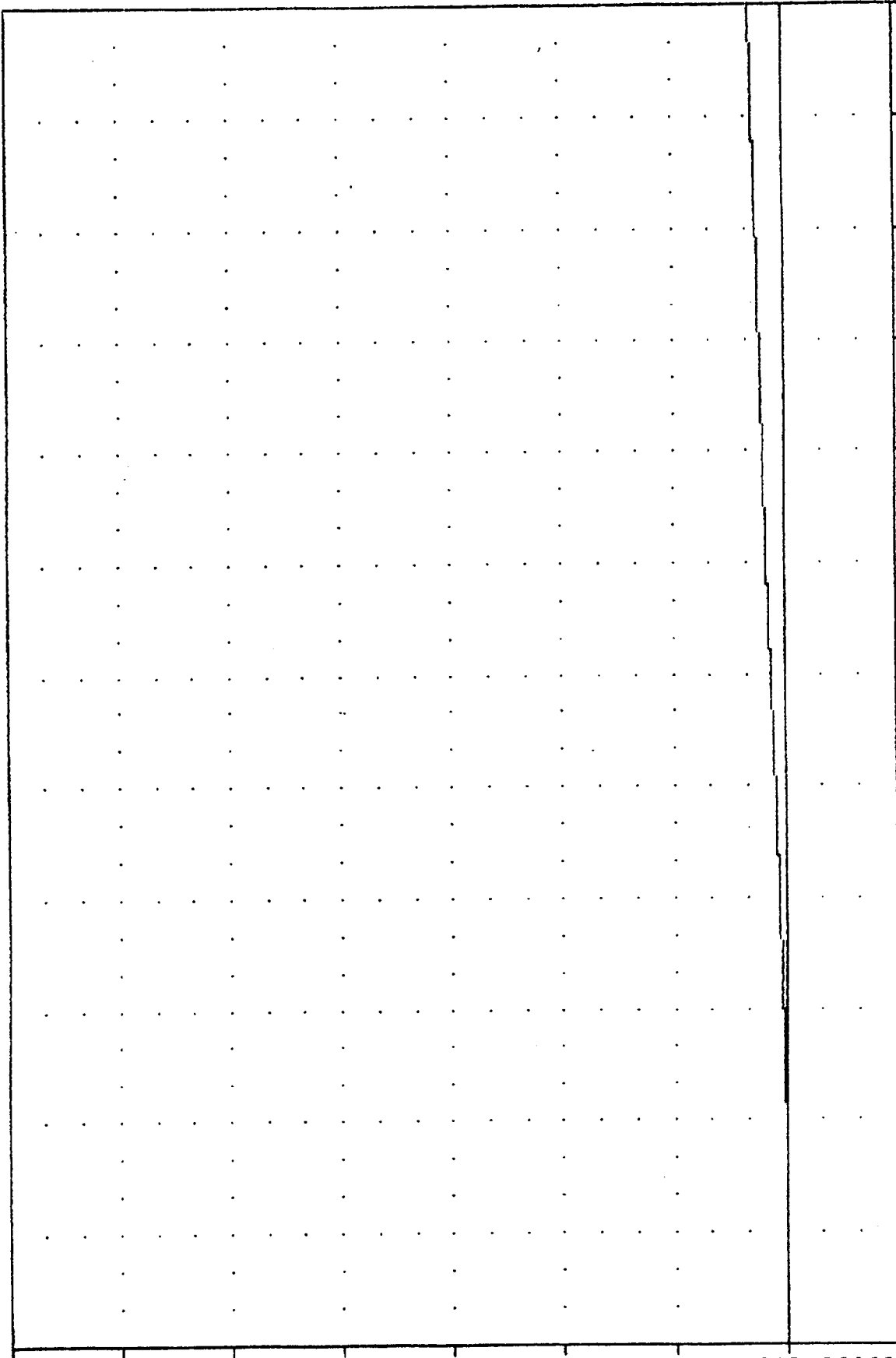
VELOCITY (MPH)

0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00  
 TIME (SEC)  
 1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
 VEHICLE CG Y-AXIS VELOCITY

TRC . 920009-2  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCCYD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -0.018 45.25, 2.87 e 340.00

DISPLACEMENT (IN)

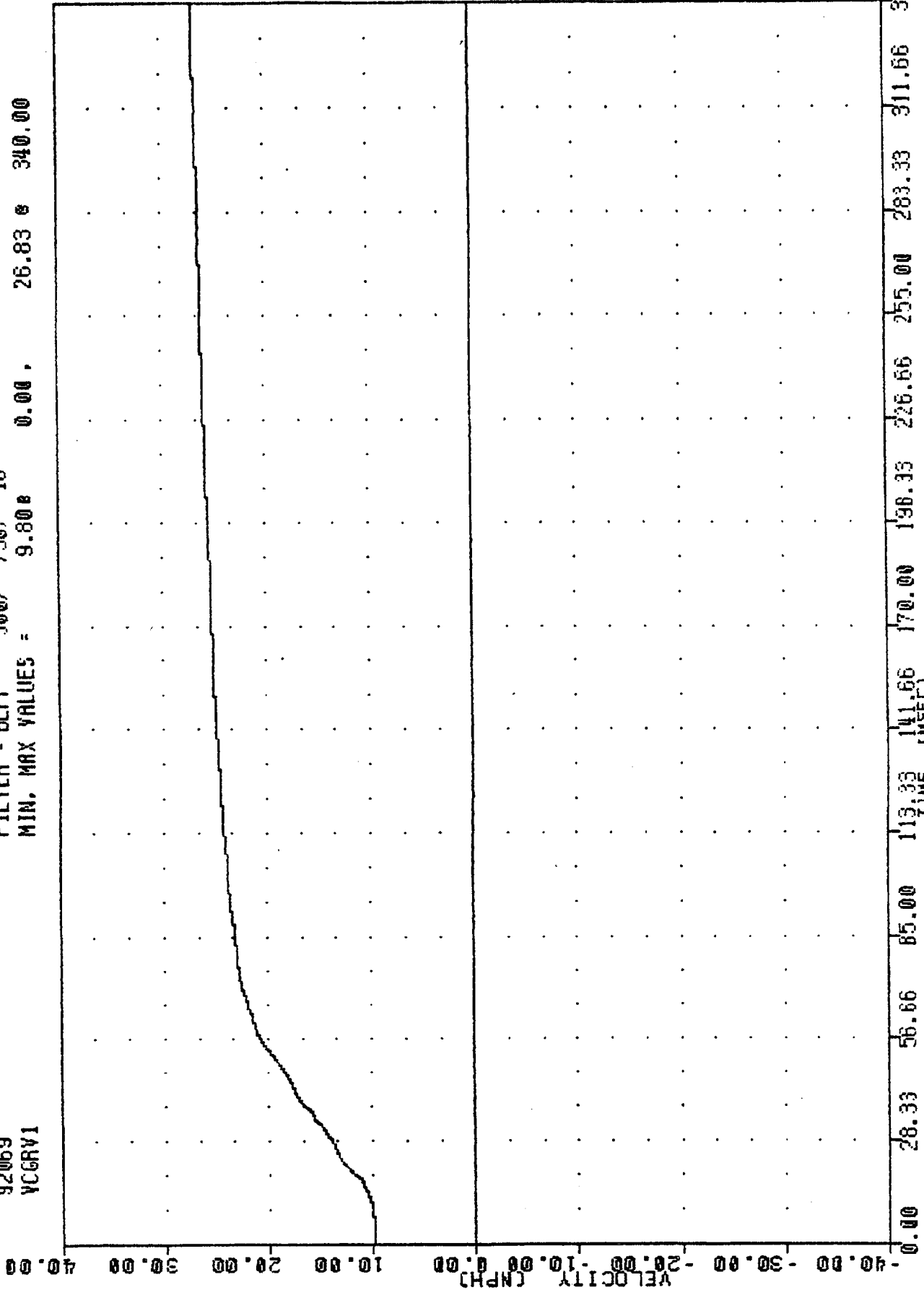


| TIME (MSEC) | DISPLACEMENT (IN) |
|-------------|-------------------|
| 0.00        | 0.00              |
| 28.33       | 56.66             |
| 65.00       | 65.00             |
| 113.33      | 65.00             |
| 141.66      | 170.00            |
| 198.33      | 226.66            |
| 255.00      | 283.33            |
| 311.66      | 340.00            |

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
 VEHICLE CG Y-AXIS DISPLACEMENT

TRC , 920309-2  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCCRV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 9.80 0.00 , 26.83 340.00

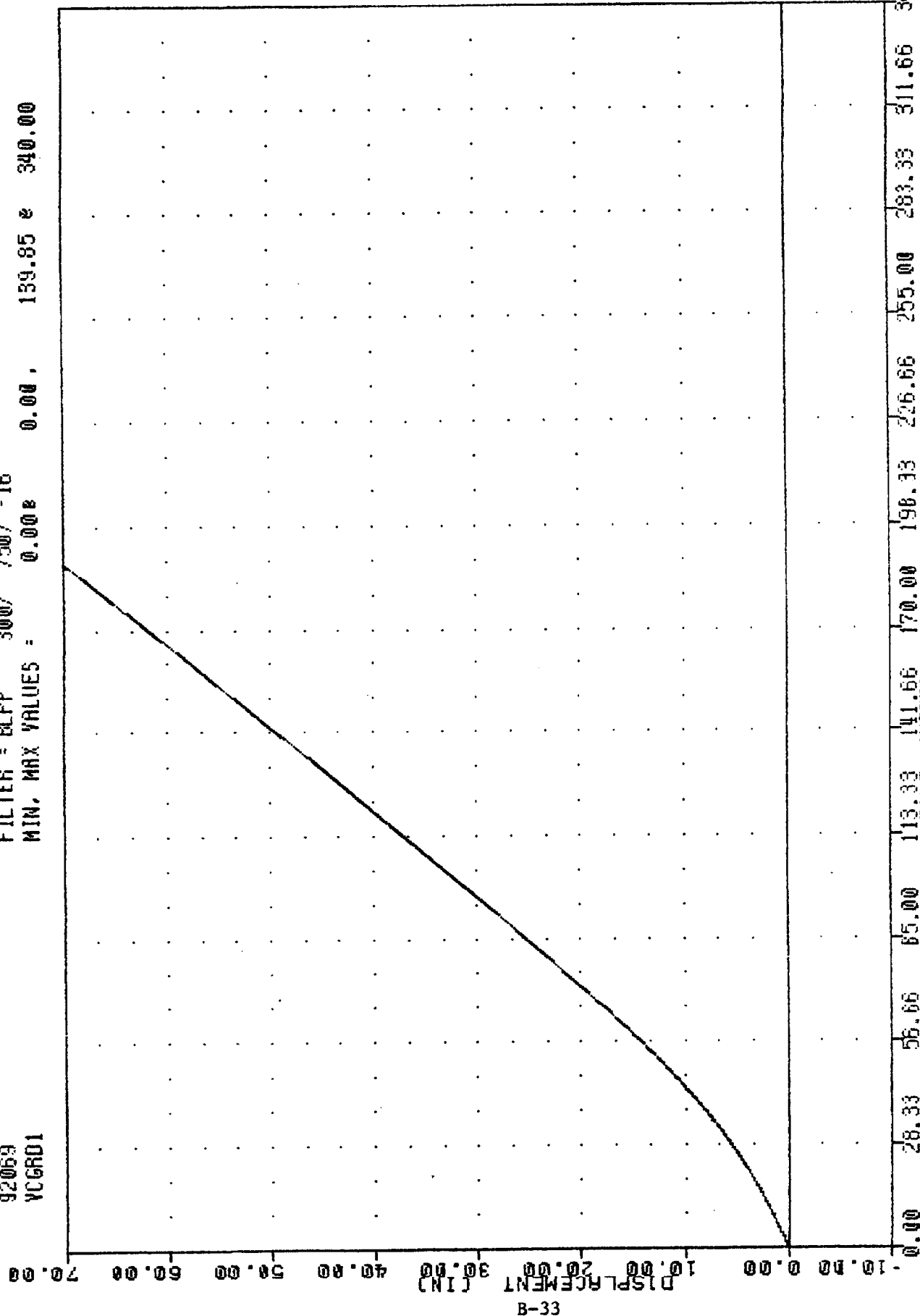


B-32

1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
 VEHICLE CG RESULTANT VELOCITY

TRC , 920309-2  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGRD1

FILTER = BLFP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00e 139.85 e 340.00



B-33

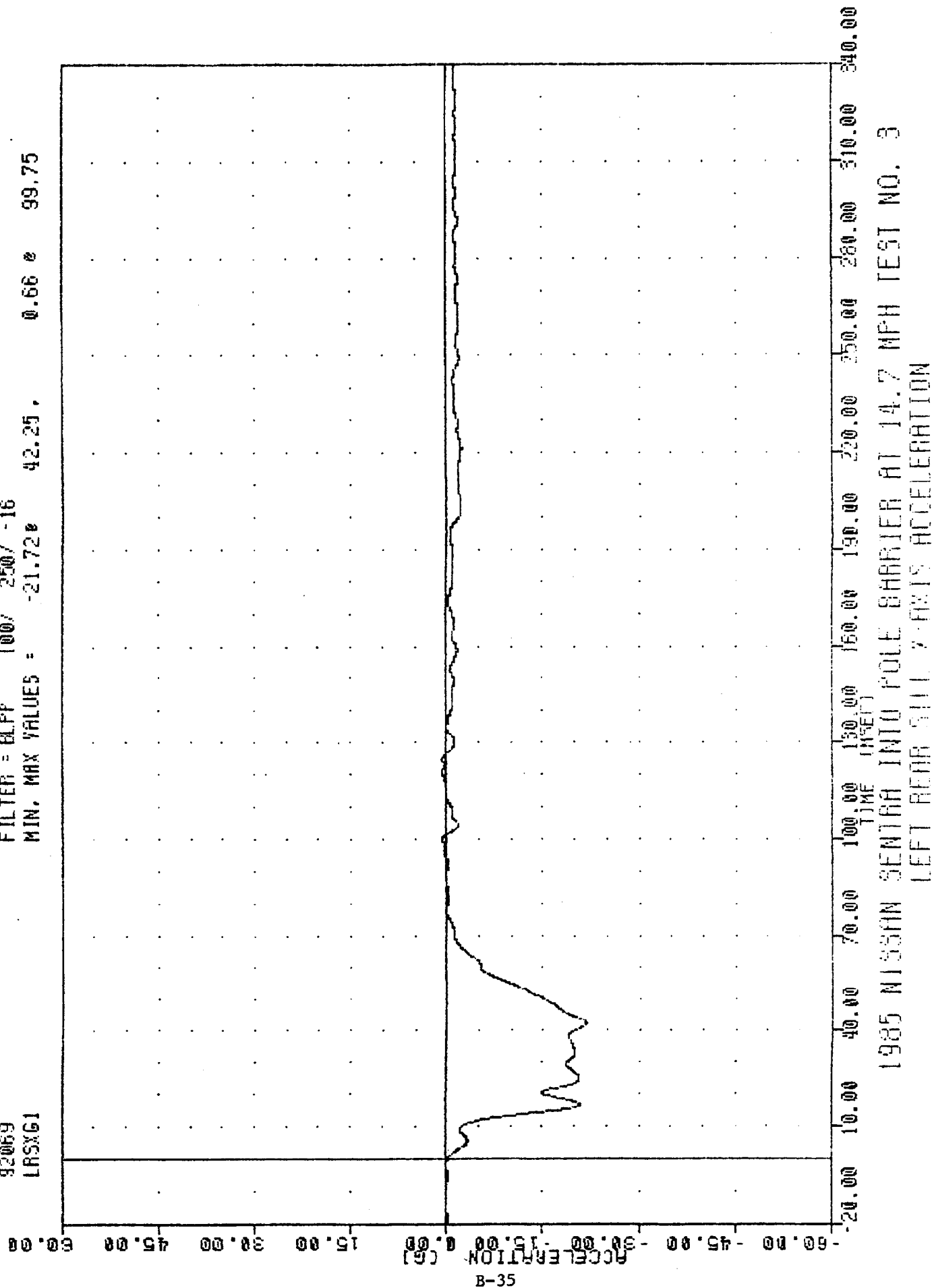
1985 NISSAN SENTRA INTO POLE BARRIER AT 9.8 MPH TEST NO. 2  
 VEHICLE CG RESULTANT DISPLACEMENT

DATA PLOTS

TEST NO. 920309-3

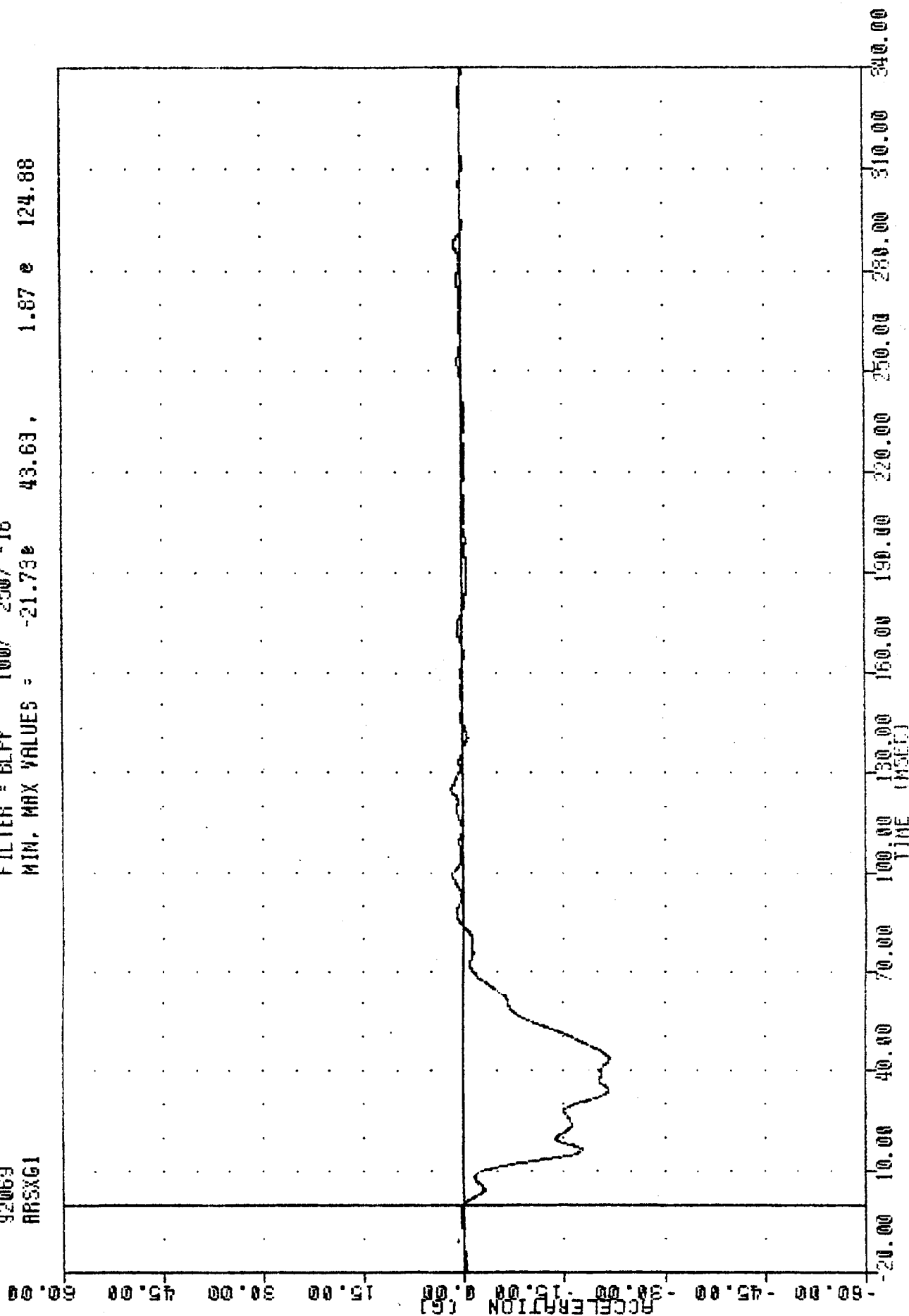
TAC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXG1

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -21.72 42.25, 0.66 99.75



1RC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 ARSXG1

FILTER = BLFY 100/ 250/ -16  
 MIN. MAX VALUES = -21.73e 43.63, 1.87 e 124.88

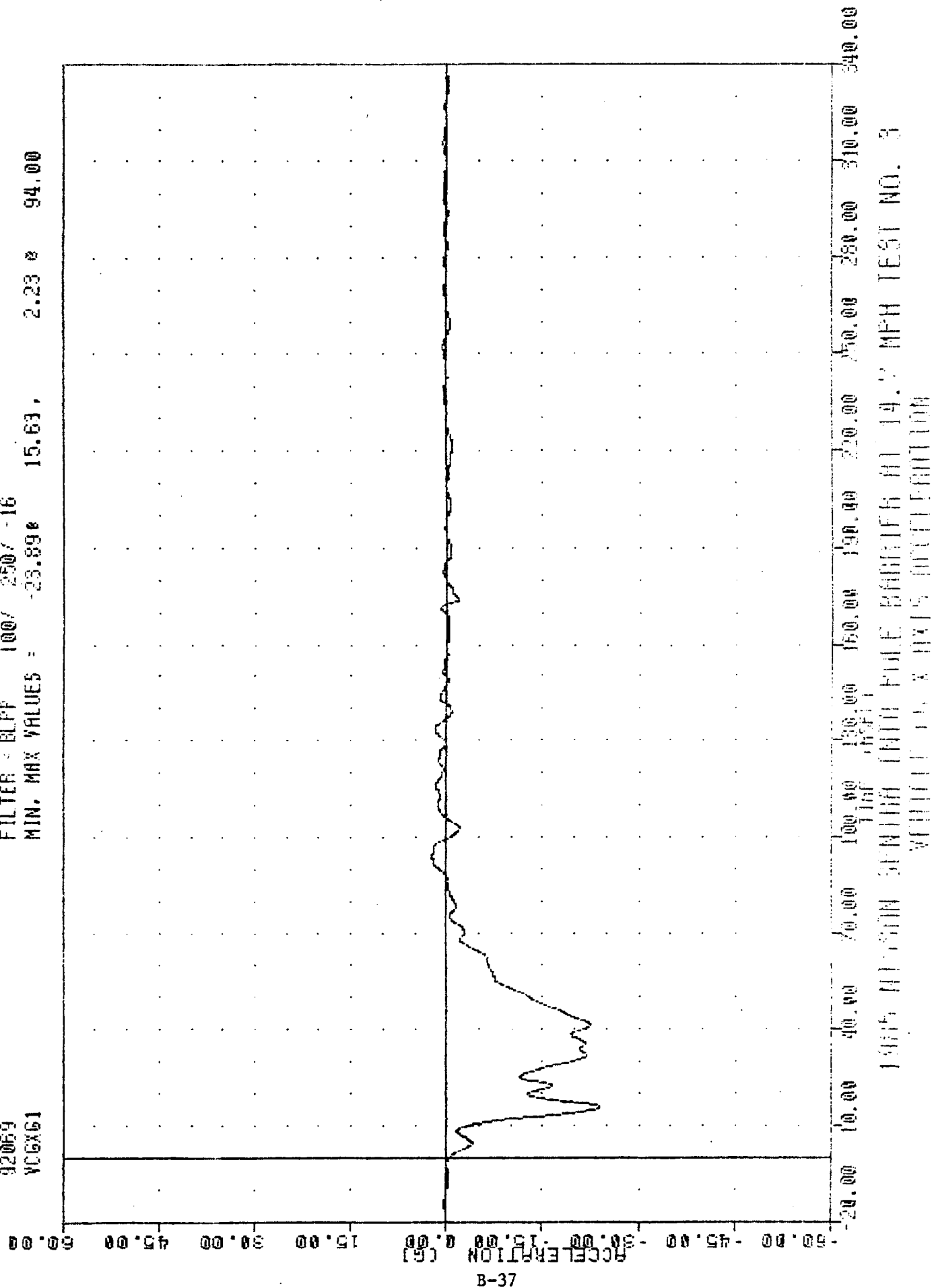


1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 RIGHT REAR SILL X-AXIS ACCELERATION



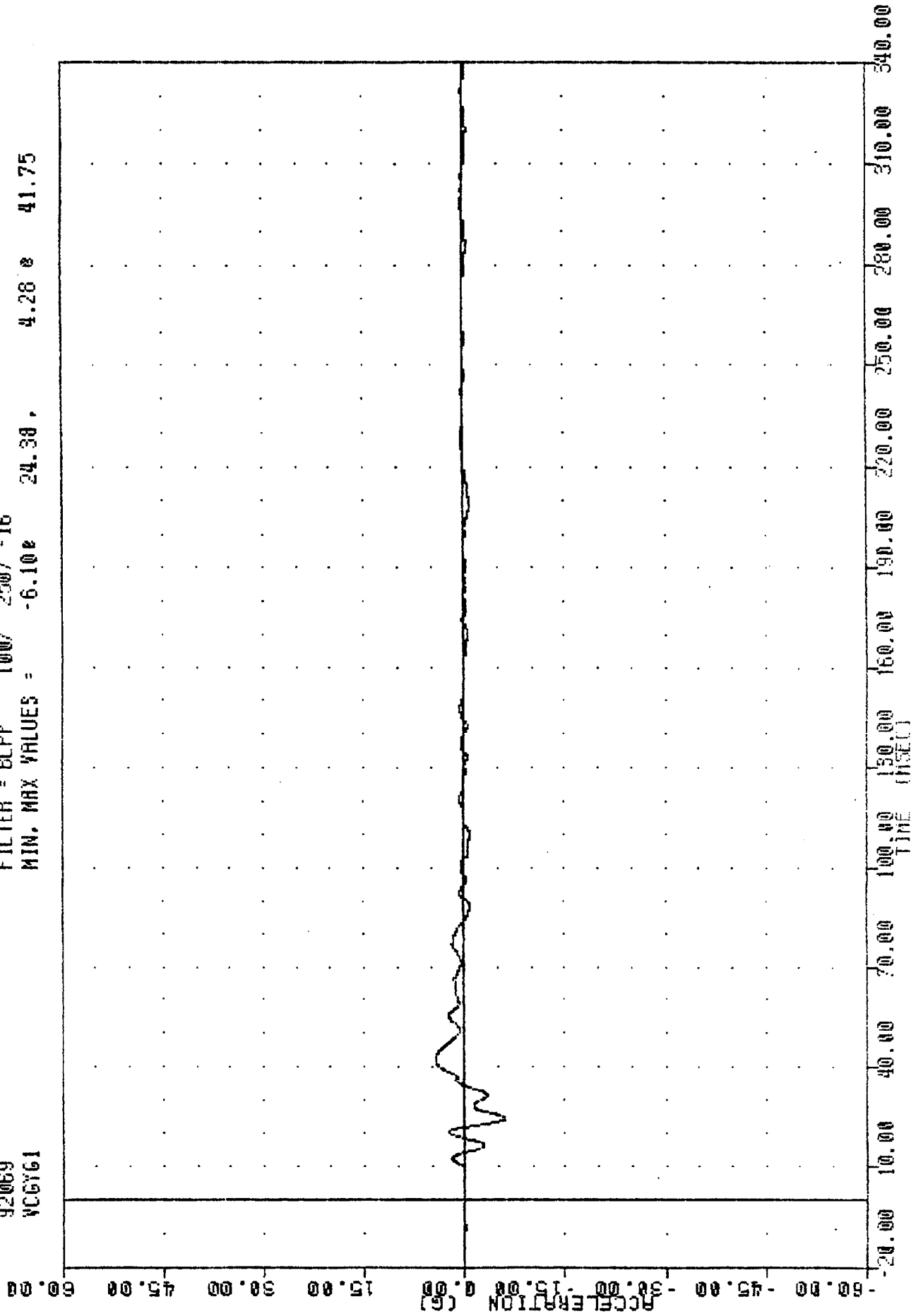
TRC 920909-3  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGXG1

FILTER = BLPP 100% 2507 -16  
 MIN. MAX VALUES = -23.89 15.63 2.23 94.00



TRC , 920309-3  
 CRASH III DAMAGE ALGORITHM  
 92069  
 WCCY61

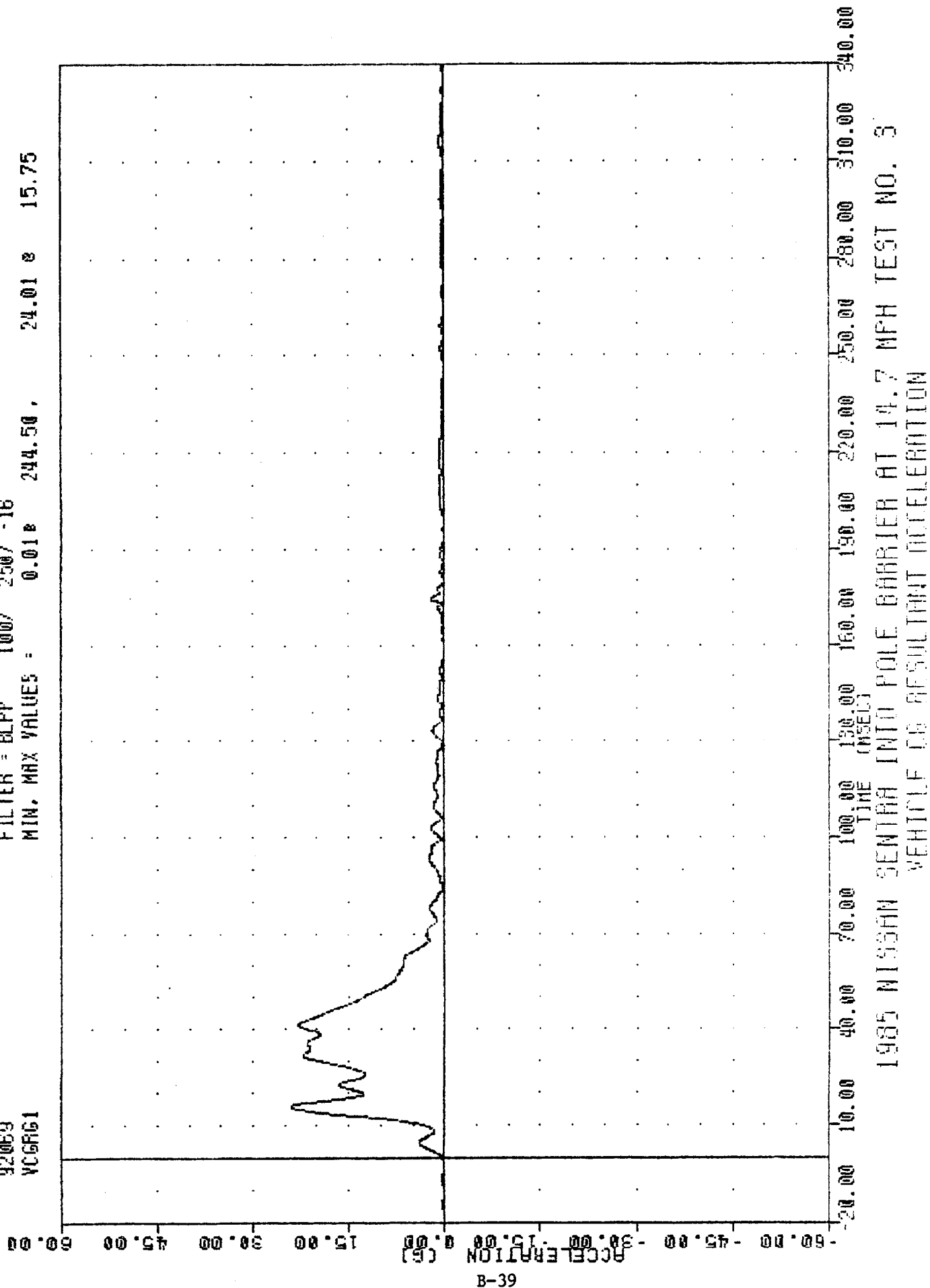
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -6.10e 24.38. 4.28e 41.75



1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 VEHICLE IN Y-AXIS ACCELERATION

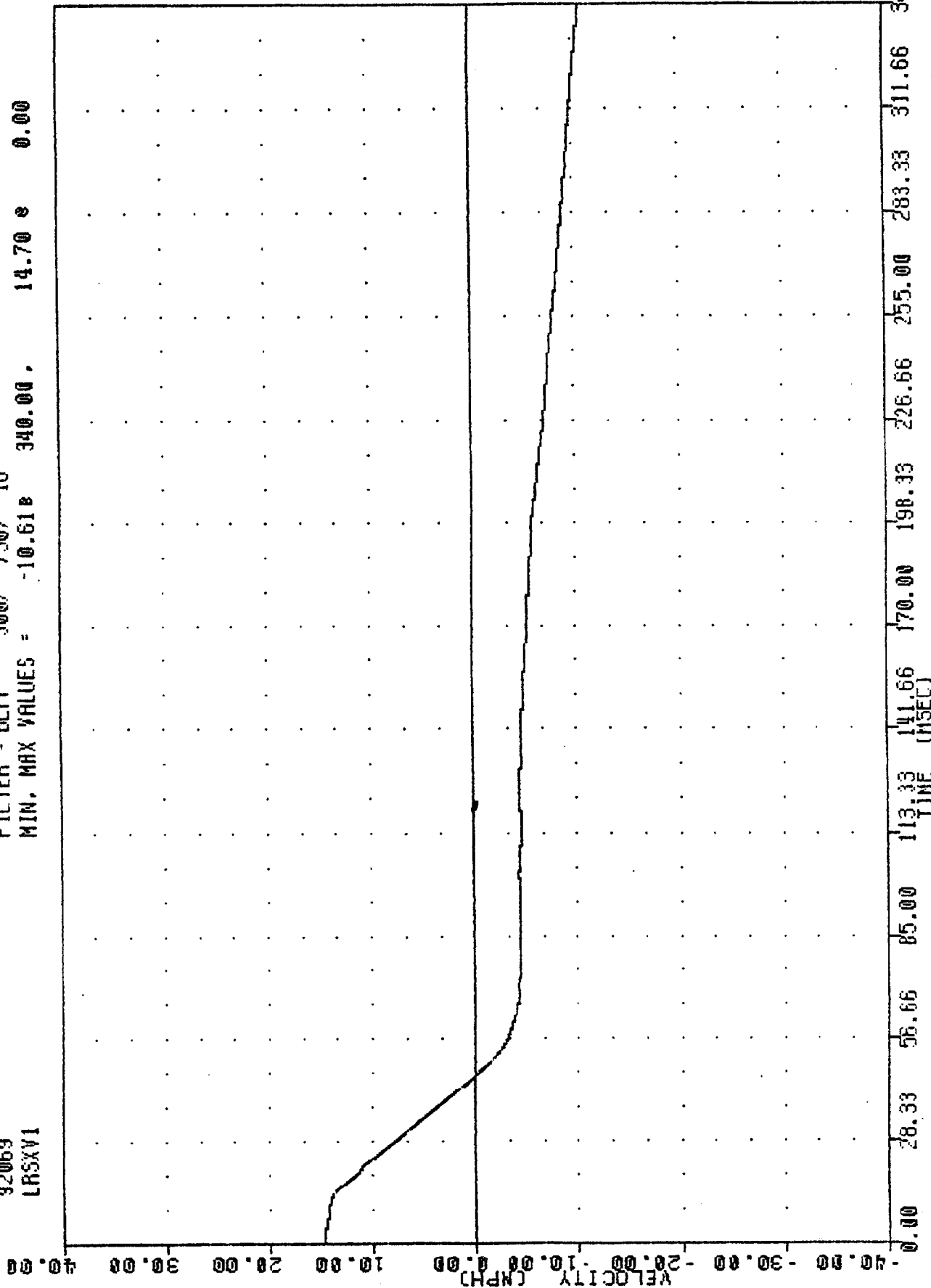
TRC  
 CRASH III DAMAGE ALGORITHM  
 92059  
 YCGRG1

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = 0.018 244.50 , 24.01 8 15.75



TRC 920309-3  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXV1

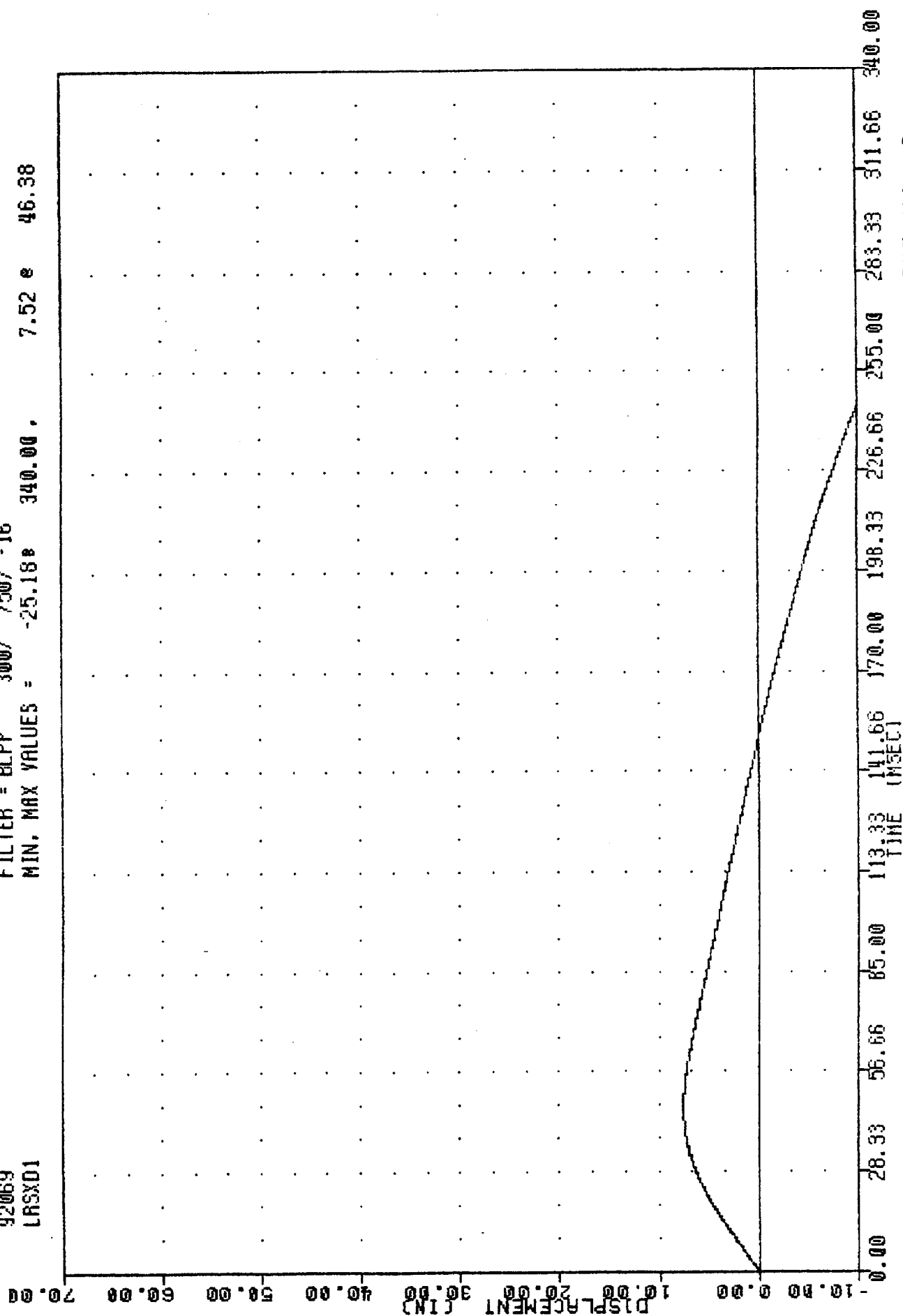
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -10.61 340.00 14.70 0.00



1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 LEFT REAR SILL X-AXIS VELOCITY

TRC , 920309-3  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXD1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -25.18e 340.00, 7.52 e 46.38



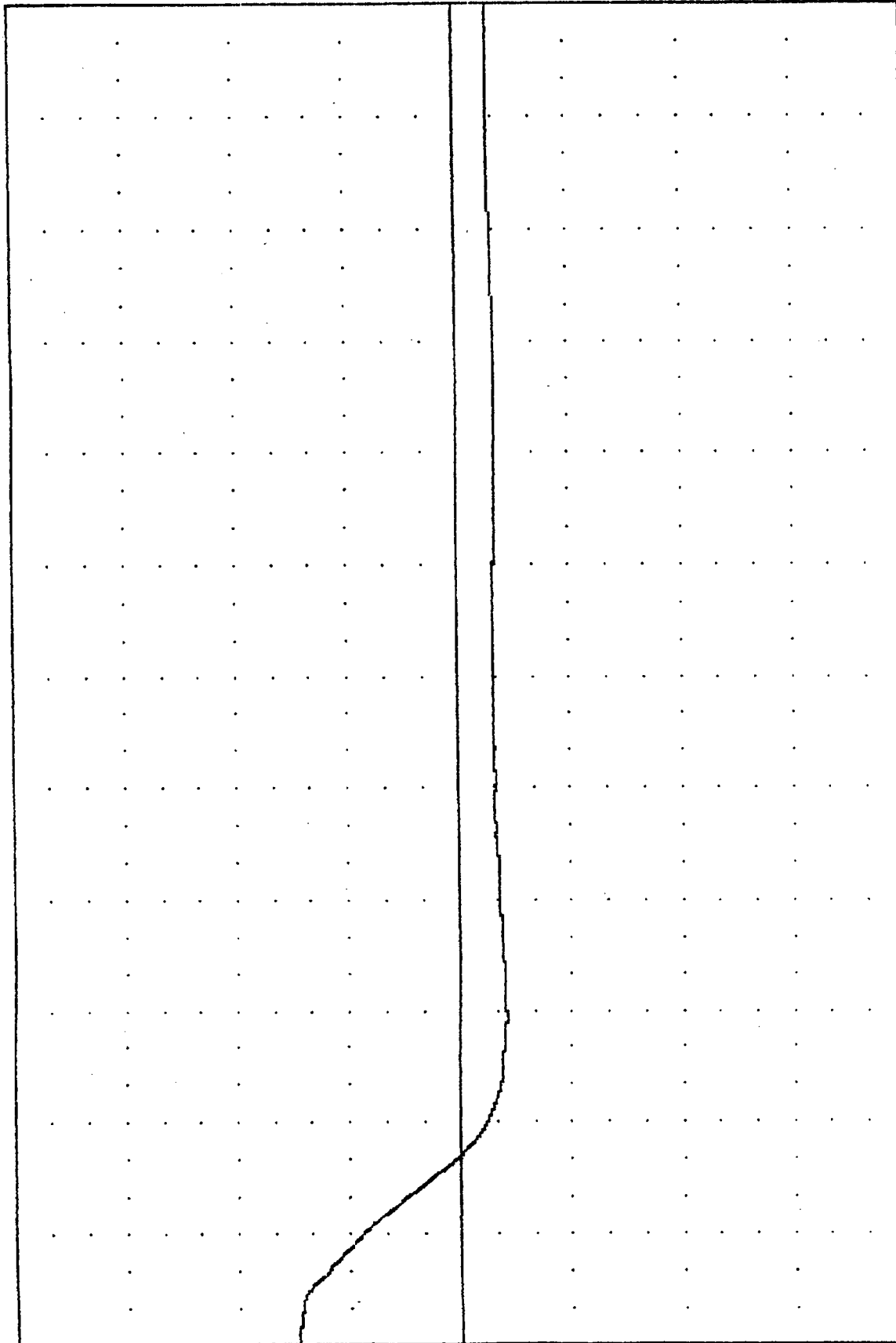
1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 LEFT REAR STILL X-AXIS DISPLACEMENT

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 HRSXV1

920309-3

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -4.09% 84.00. 14.71 % 2.25

VELOCITY (MPH)

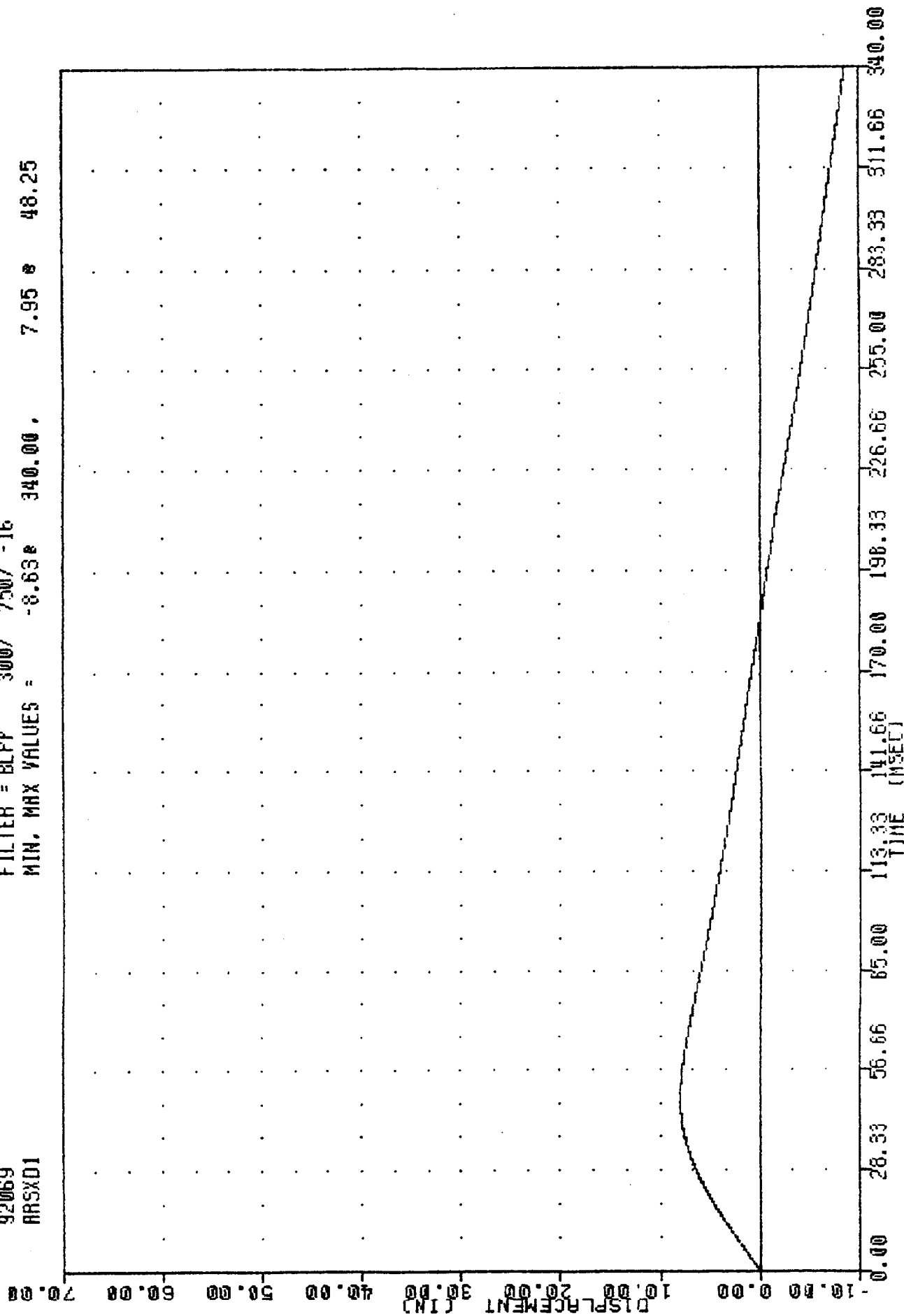


0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 RIGHT REAR SILL X-AXIS VELOCITY

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 ARSXD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -8.63e 340.00. 7.95 e 48.25



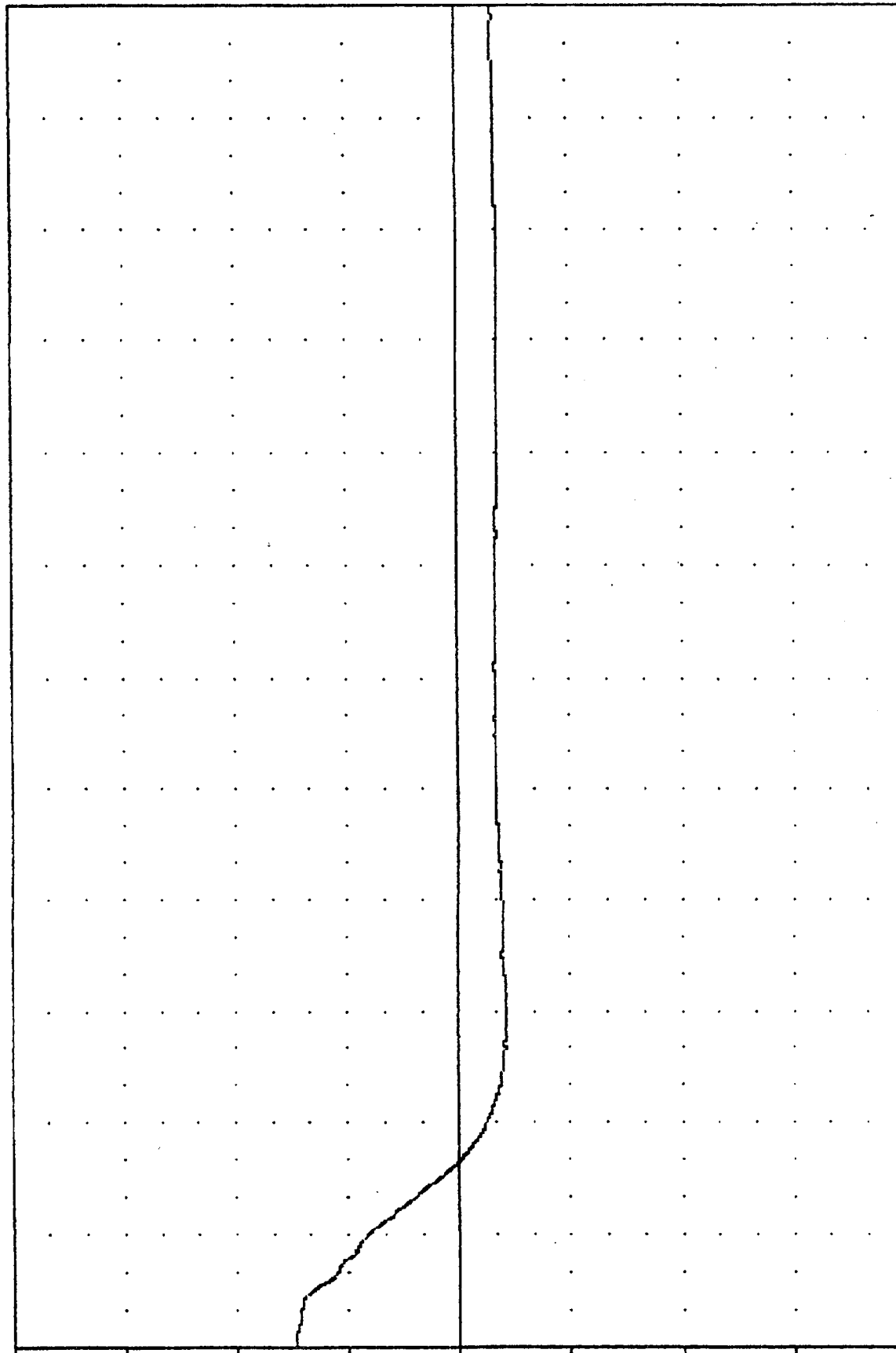
B-43

1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 RIGHT REAR SILL X-AXIS DISPLACEMENT

TRC , 920309-3  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGXV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -4.28e 14.70 e 0.00

VELOCITY (MPH)



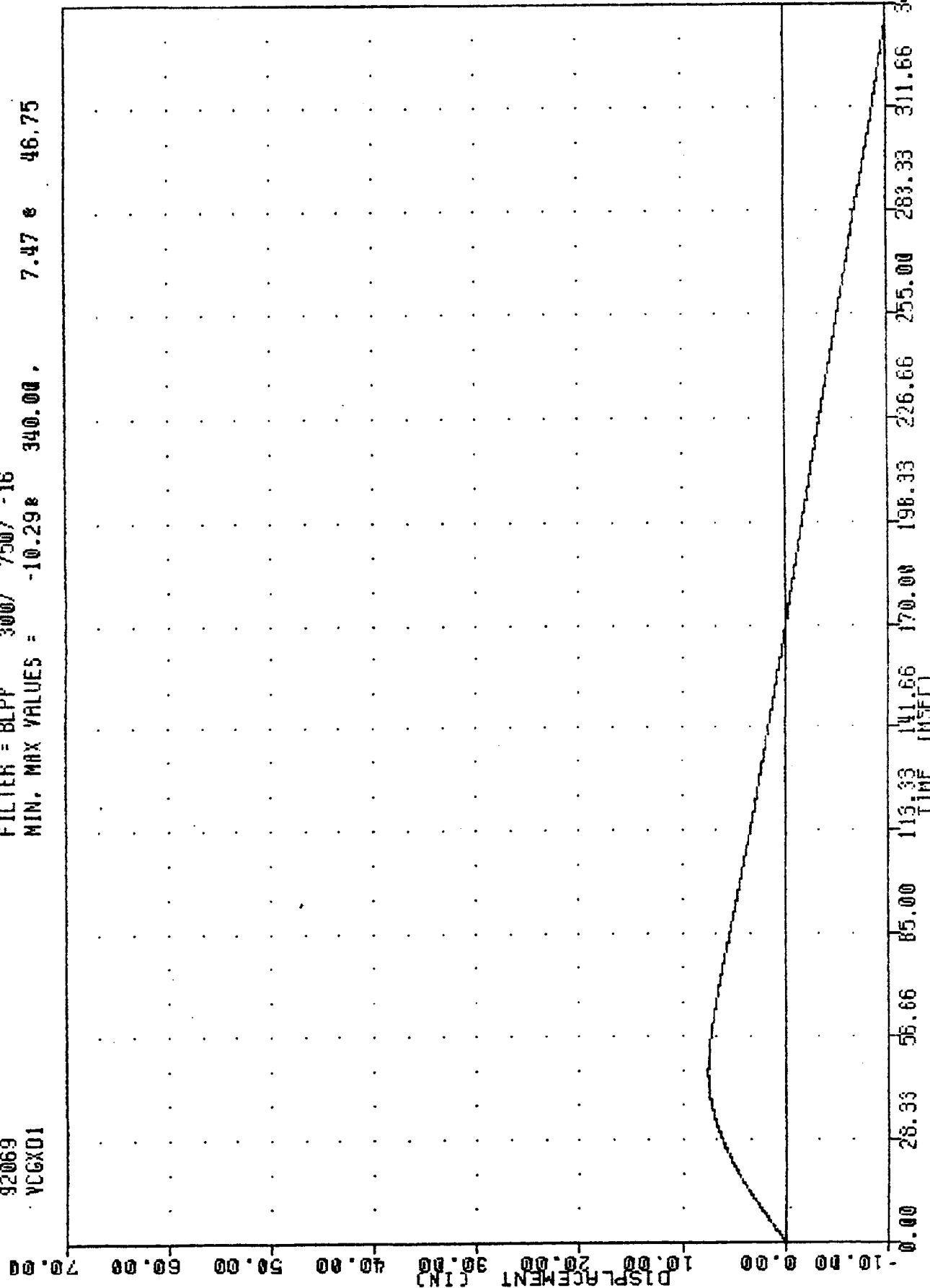
0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 VEHICLE CG X-AXIS VELOCITY



TRC 920309-3  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCGXD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -10.29 340.00 7.47 46.75

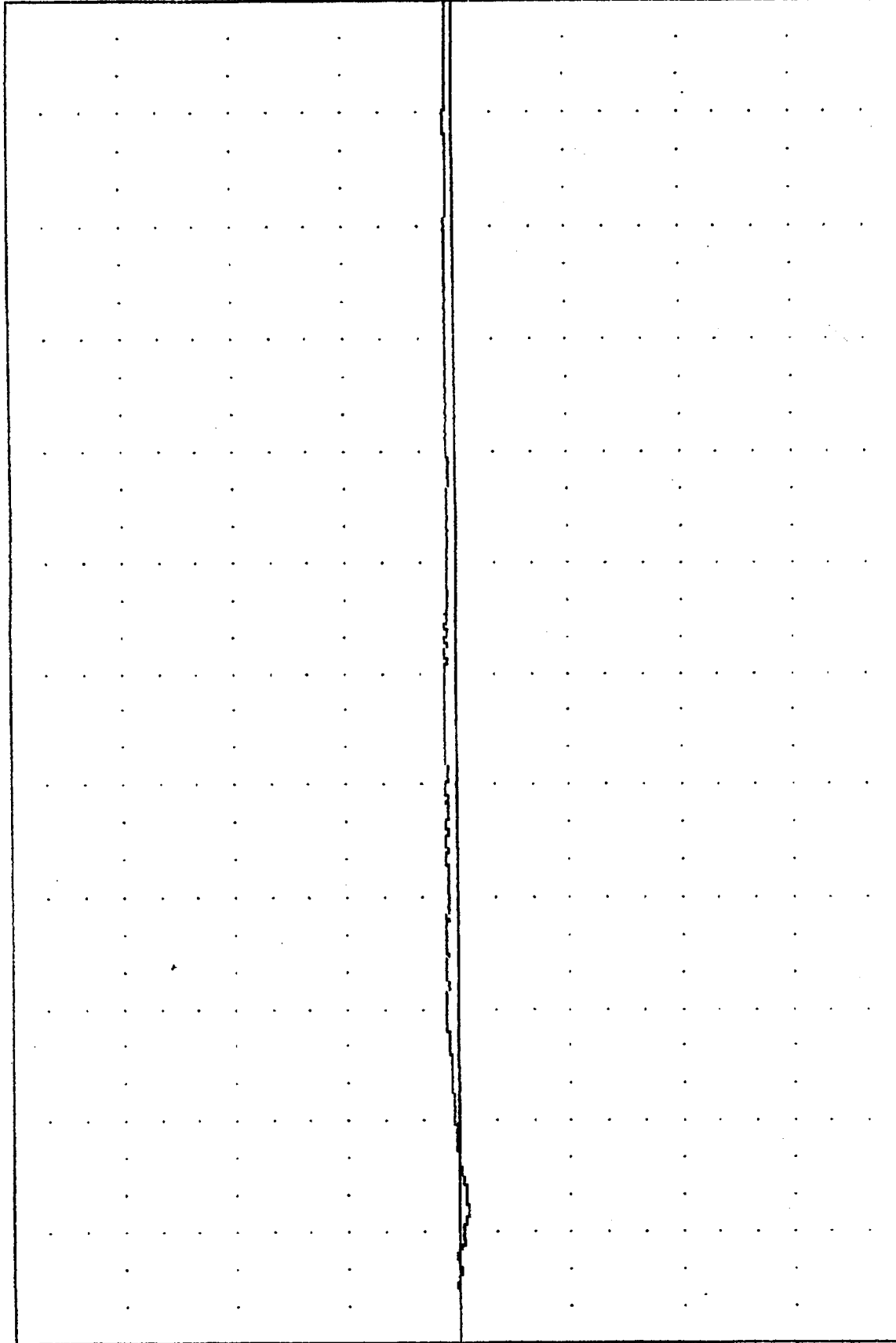


1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 VEHICLE CG X-AXIS DISPLACEMENT

1RC , 920309-3  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCGYV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -0.77 33.63 1.11 102.88

40.00  
 30.00  
 20.00  
 10.00  
 0.00  
 -10.00  
 -20.00  
 -30.00  
 -40.00  
 VELOCITY (MPH)



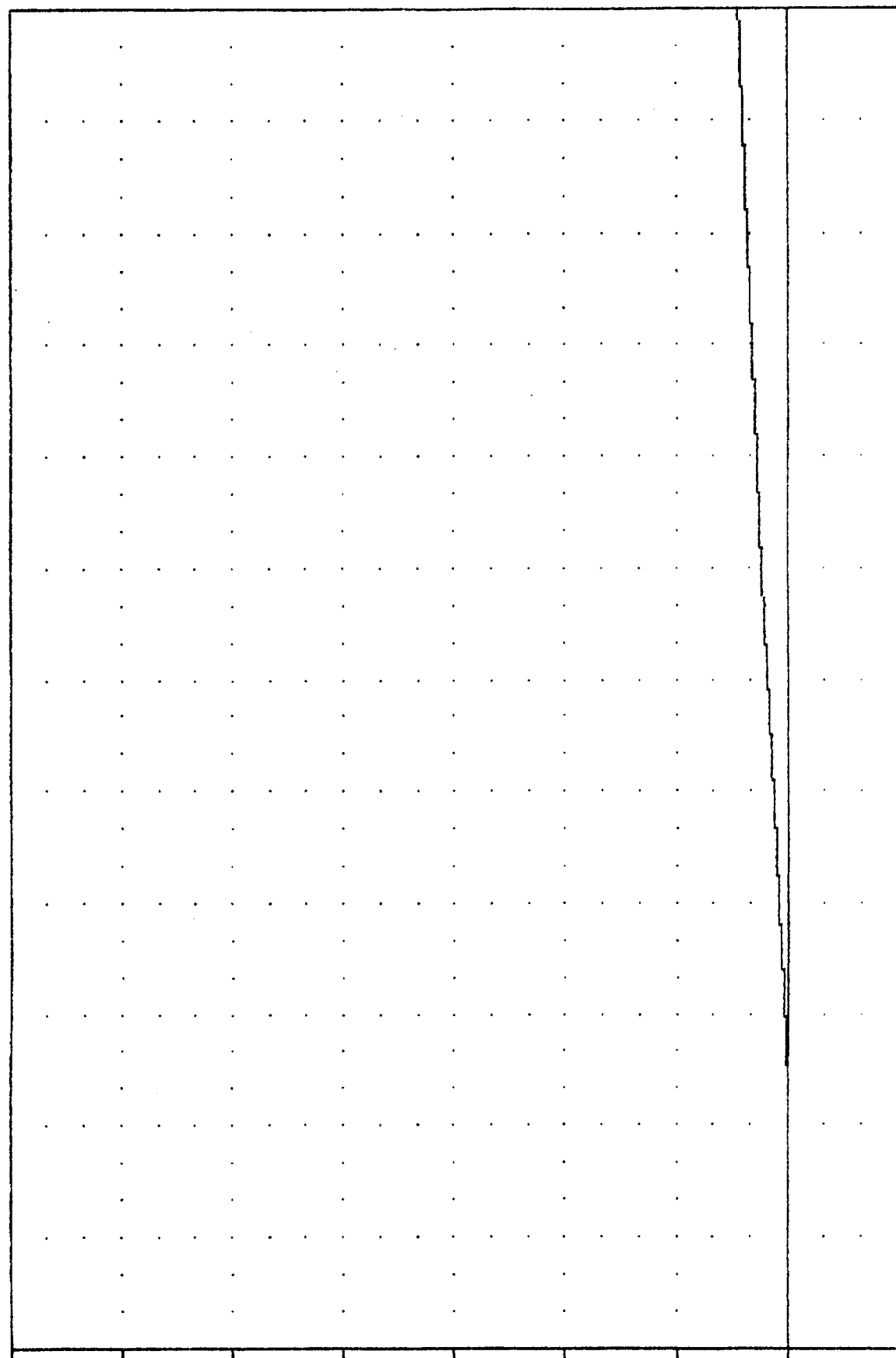
0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00  
 TIME (MSEC)

1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 VEHICLE CG Y-AXIS VELOCITY

TRC  
CRASH III DAMAGE ALGORITHM  
92069  
VCGYD1

FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -0.168 45.63, 4.32 & 340.00

DISPLACEMENT (IN)  
70.00  
60.00  
50.00  
40.00  
30.00  
20.00  
10.00  
0.00

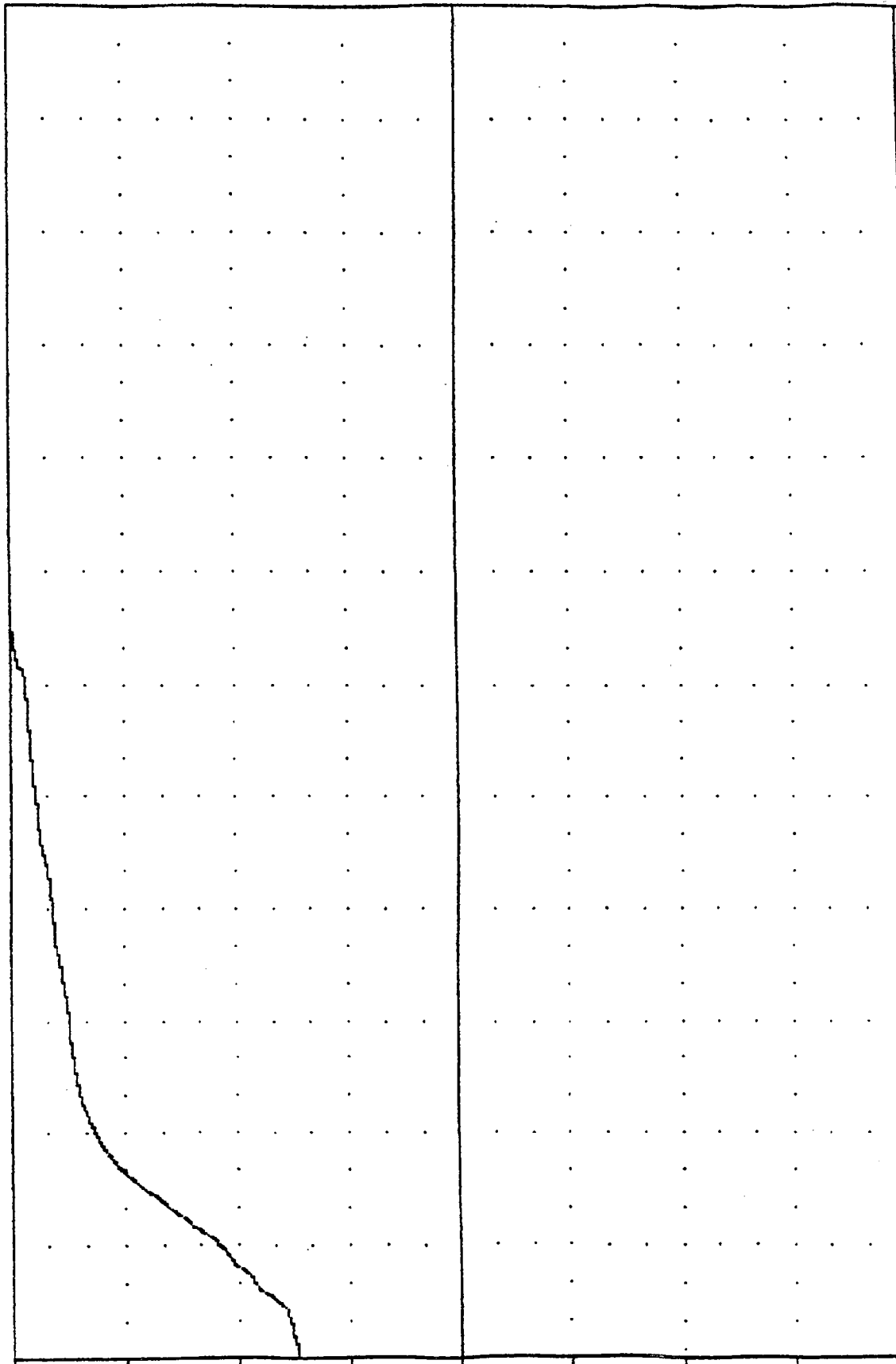


1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
VEHICLE CG Y-AXIS DISPLACEMENT

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCGRV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 14.70\* 0.00. 41.92 \* 340.00

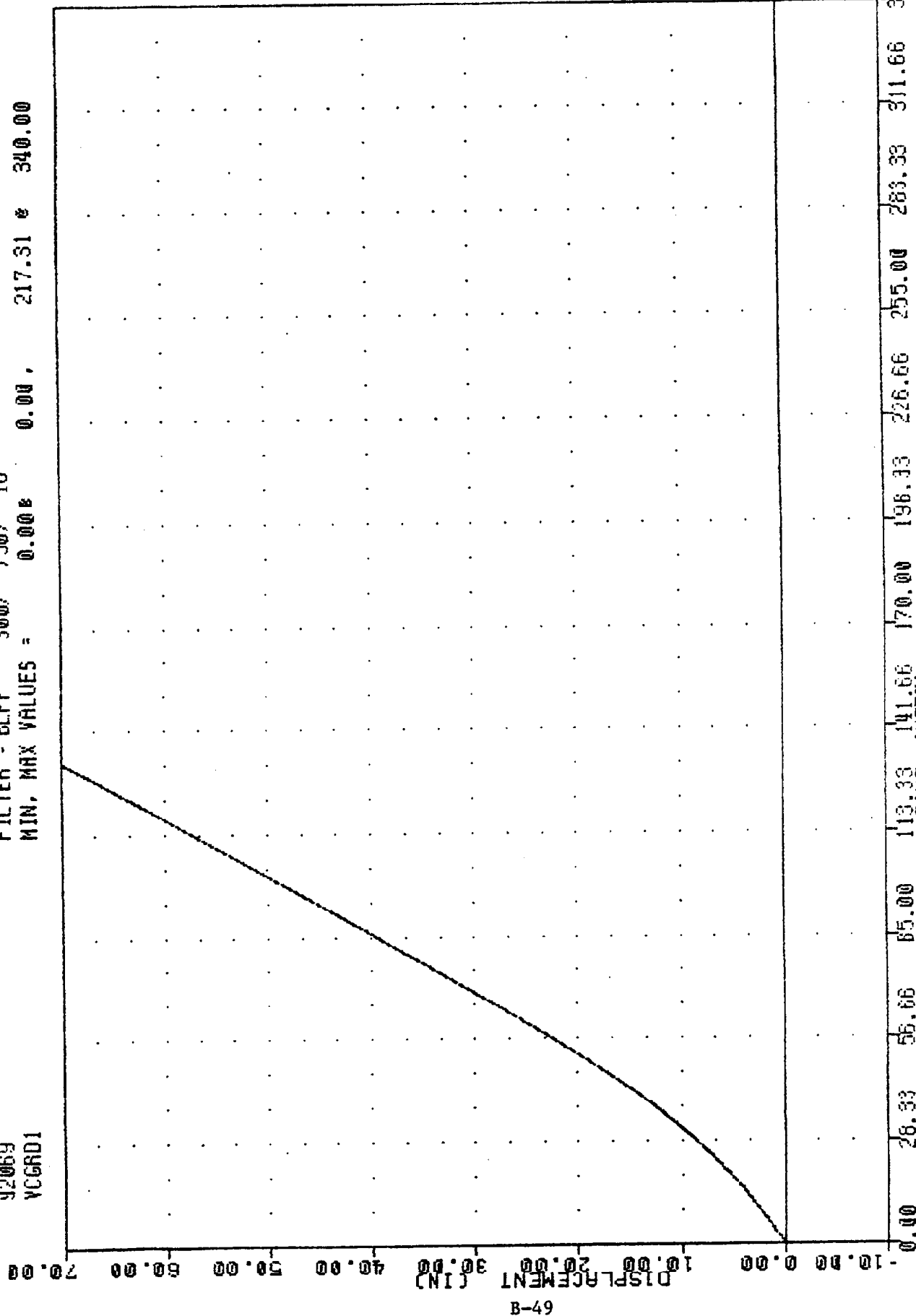
VELOCITY (MPH)



1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 VEHICLE CG RESULTANT VELOCITY

TAC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGRD1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = 0.00E 0.00, 217.31 e 340.00



B-49

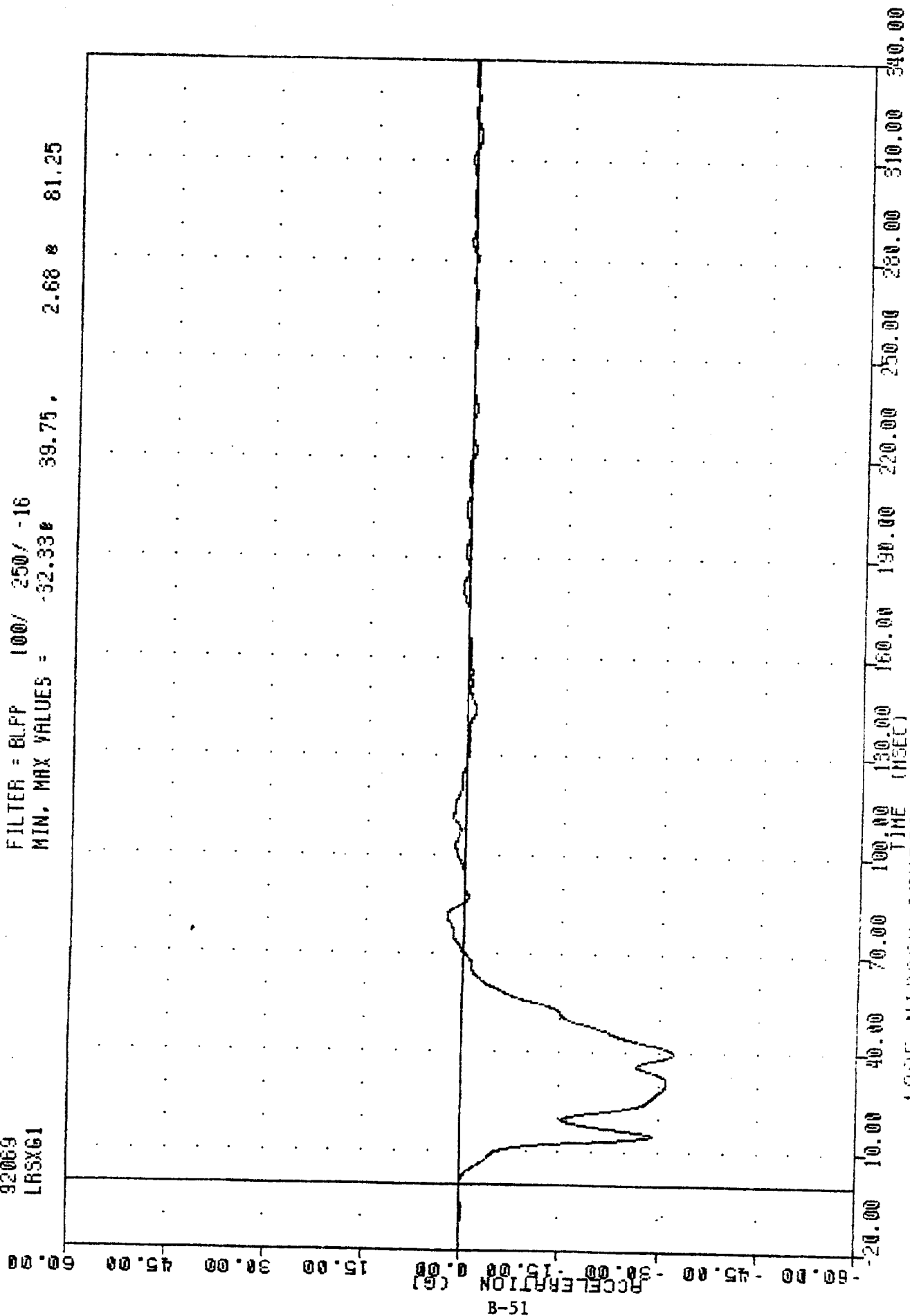
1985 NISSAN SENTRA INTO POLE BARRIER AT 14.7 MPH TEST NO. 3  
 VEHICLE CG RESULTANT DISPLACEMENT

DATA PLOTS

TEST NO. 920309-4

TRC 920309-4  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXG1

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -32.33 39.75, 2.68 81.25

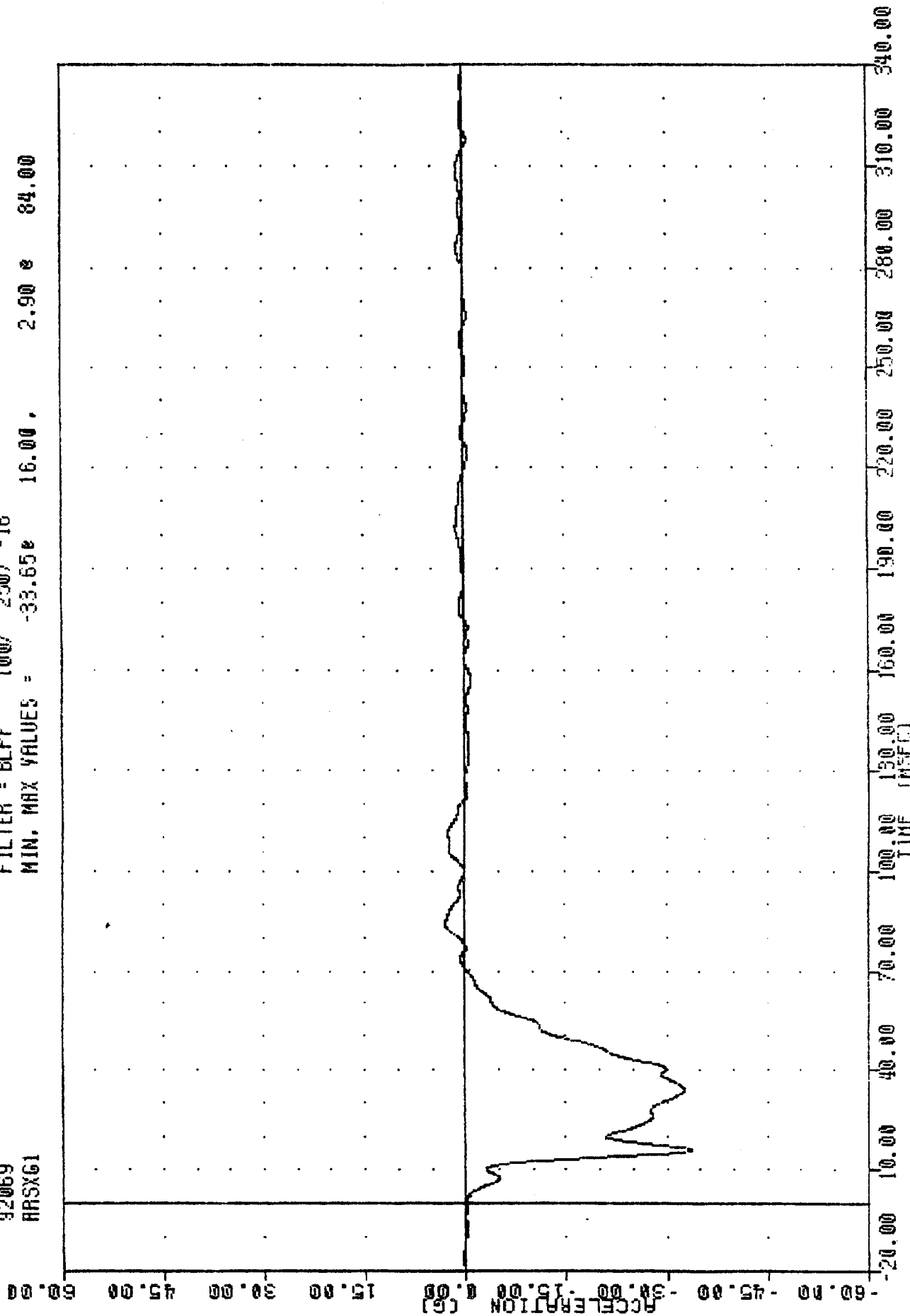


1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 LEFT REAR STIFF AXIS ACCELERATION

TRC  
CRASH III DAMAGE ALGORITHM  
92069  
RPSXG1

920309-4

FILTER = BLFF 100/ 250/ -16  
MIN. MAX VALUES = -33.650 16.00 2.90 84.00

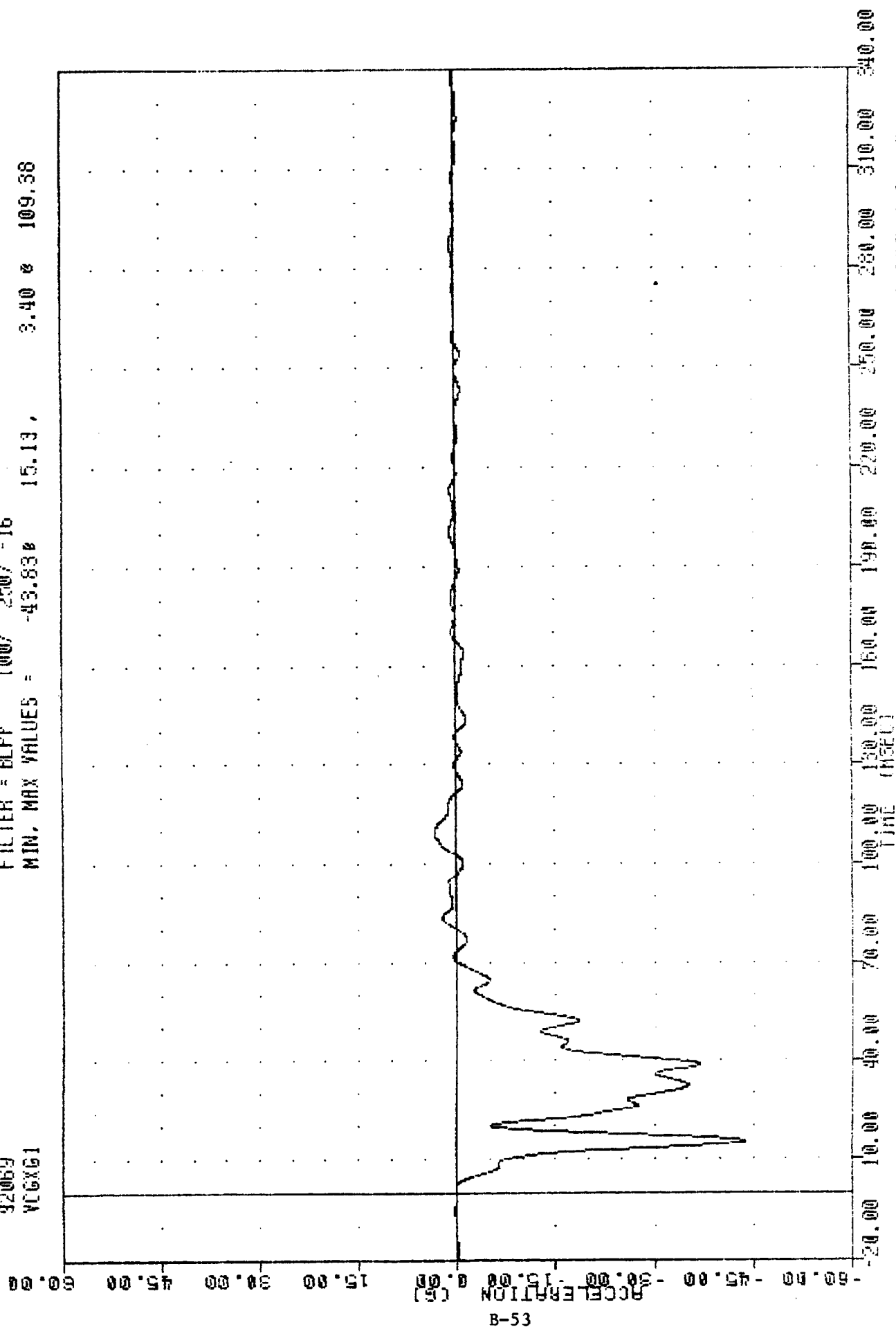


1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
RIGHT REAR BULL X-AXIS ACCELERATION



IRC  
 CRASH III DAMAGE ALGORITHM  
 92059  
 VCGXG1

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -43.83 15.13, 3.40 109.38

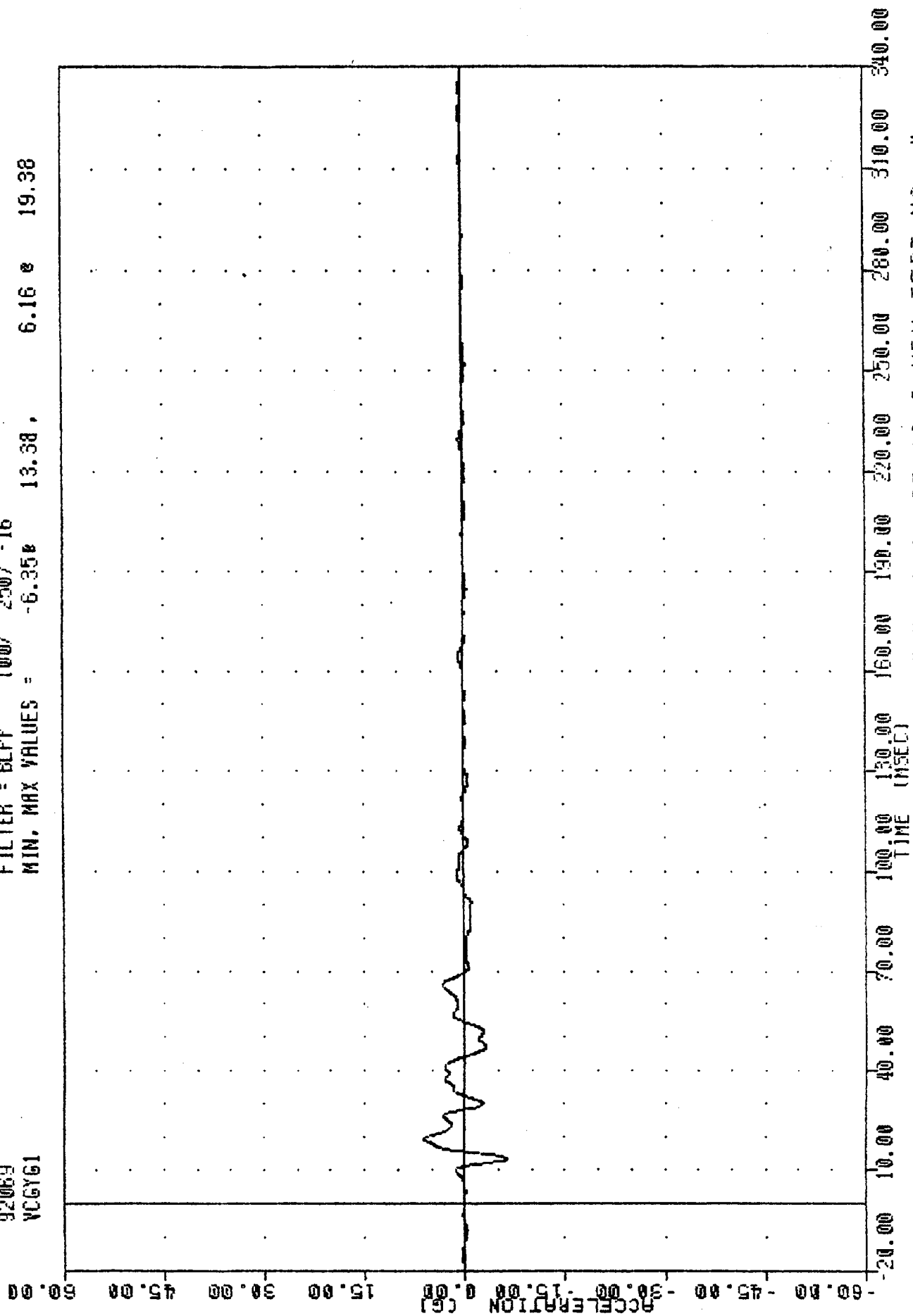


B-53

1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 VEHICLE CO X-AXIS ACCELERATION

TRC 920309-4  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGY61

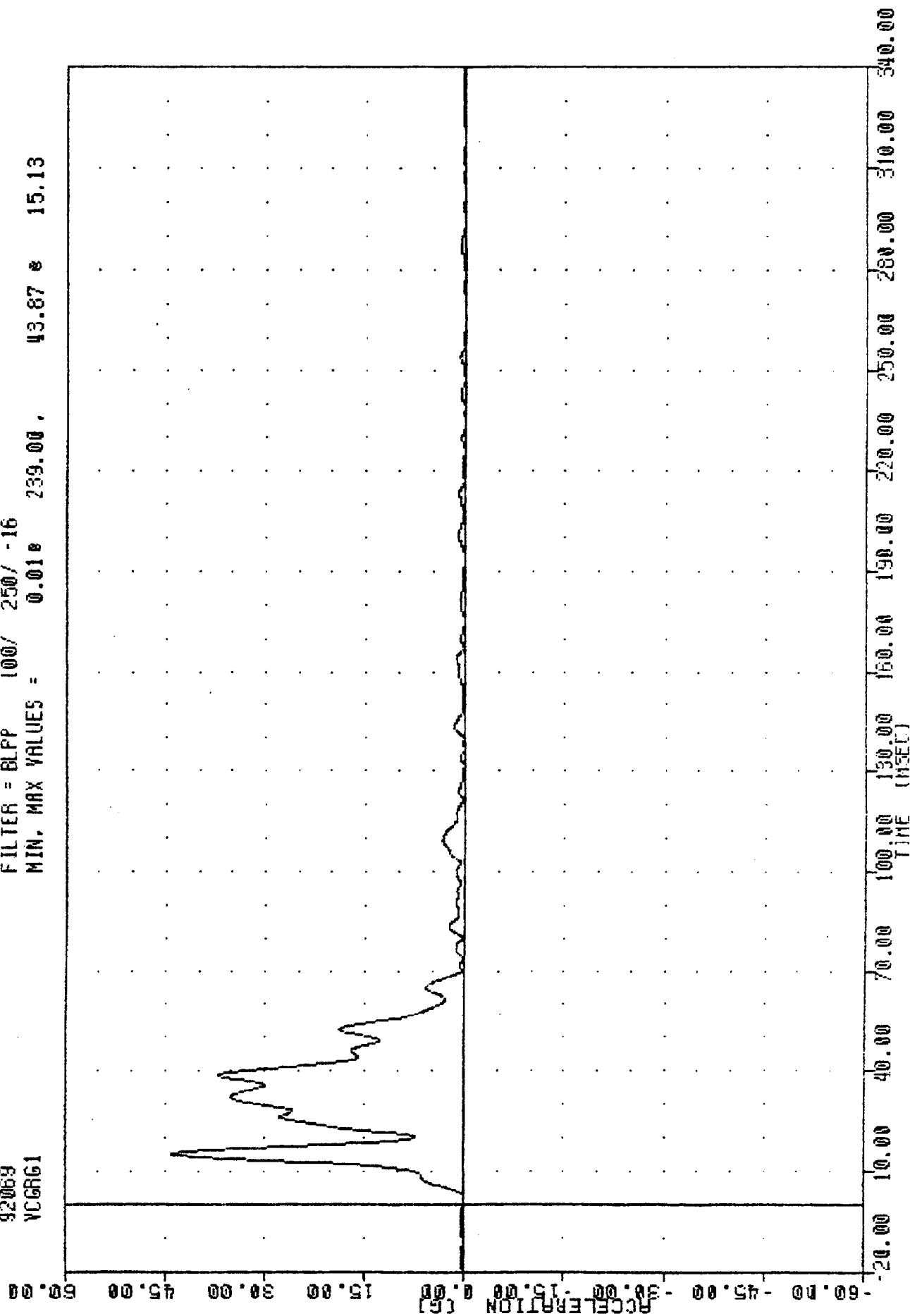
FILTER = BLFF 100/ 250/ -16  
 MIN. MAX VALUES = -6.356 13.38 6.16 19.38



1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 VEHICLE CG Y-AXIS ACCELERATION

TRC 920300-4  
CRASH III DAMAGE ALGORITHM  
92059  
YCGRG1

FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = 0.01e 239.00, 43.87 e 15.13



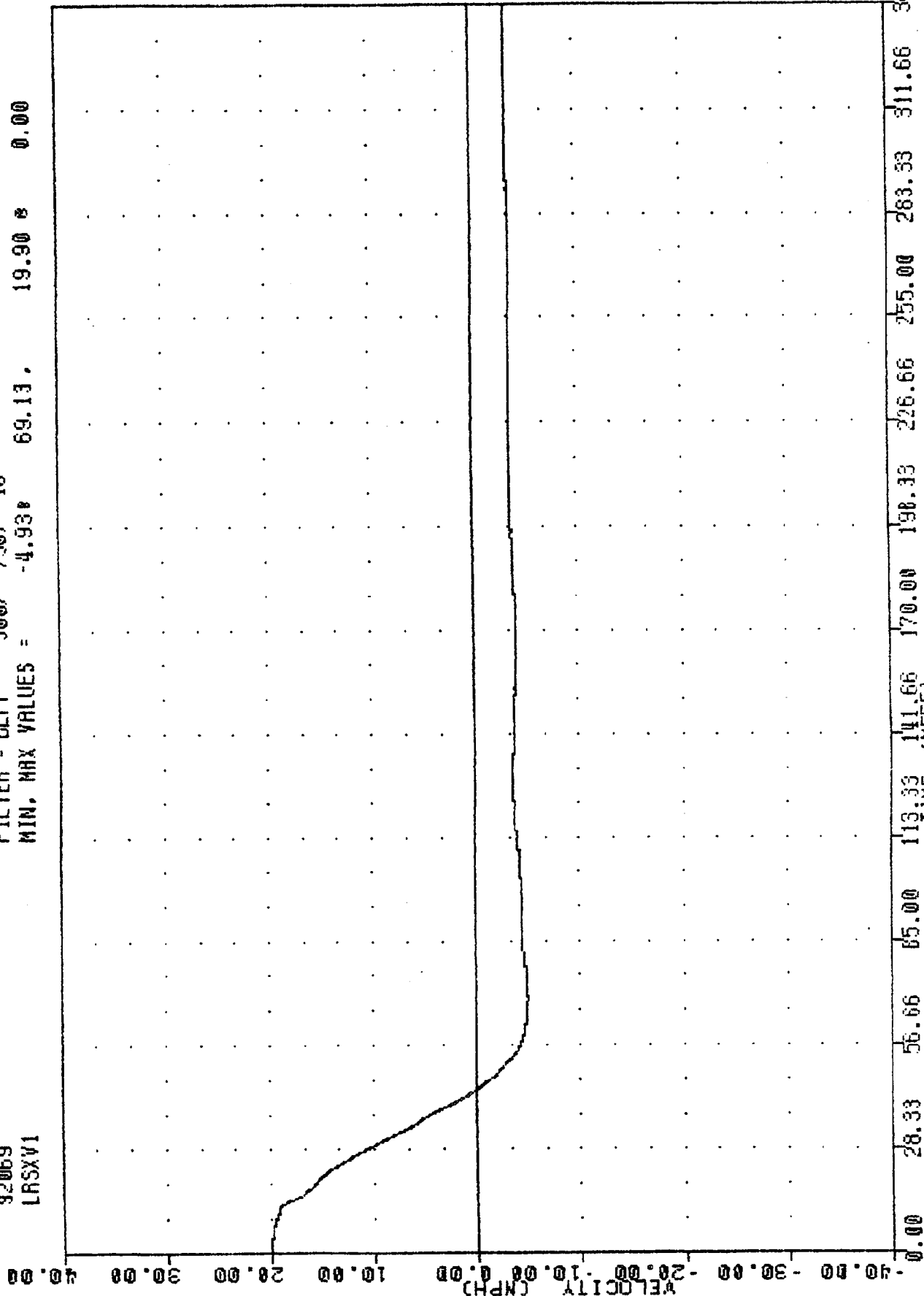
B-55

1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
VEHICLE CG RESULTANT ACCELERATION

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXV1

, 920309-4

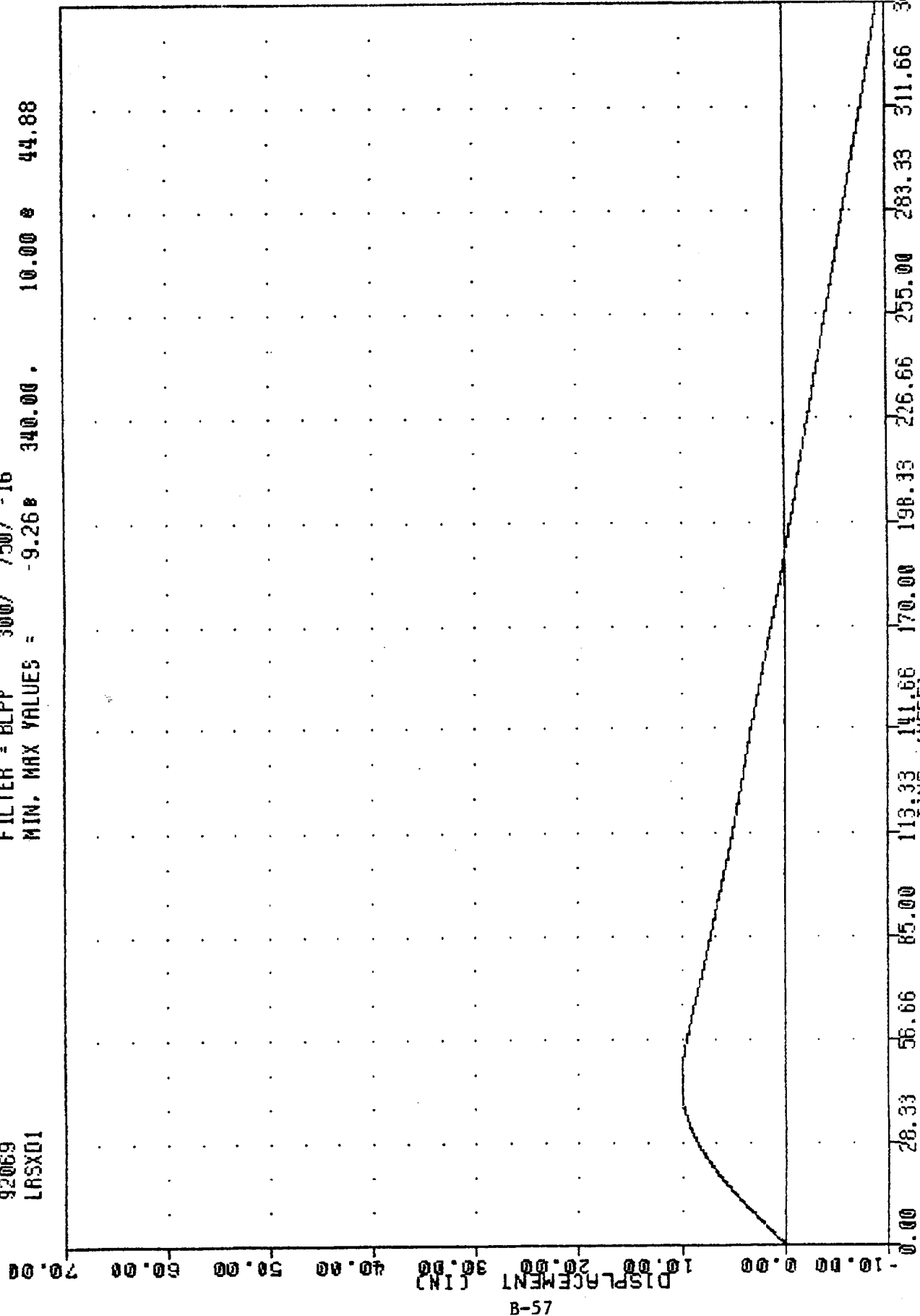
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -4.93 69.13 19.90 0.00



1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 LEFT REAR STILL X-AXIS VELOCITY

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LASXD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -9.26 340.00 10.00 44.88



B-57

1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 LEFT REAR SILL X-AXIS DISPLACEMENT

TRC  
CRASH III DAMAGE ALGORITHM  
92069  
ARSXV1

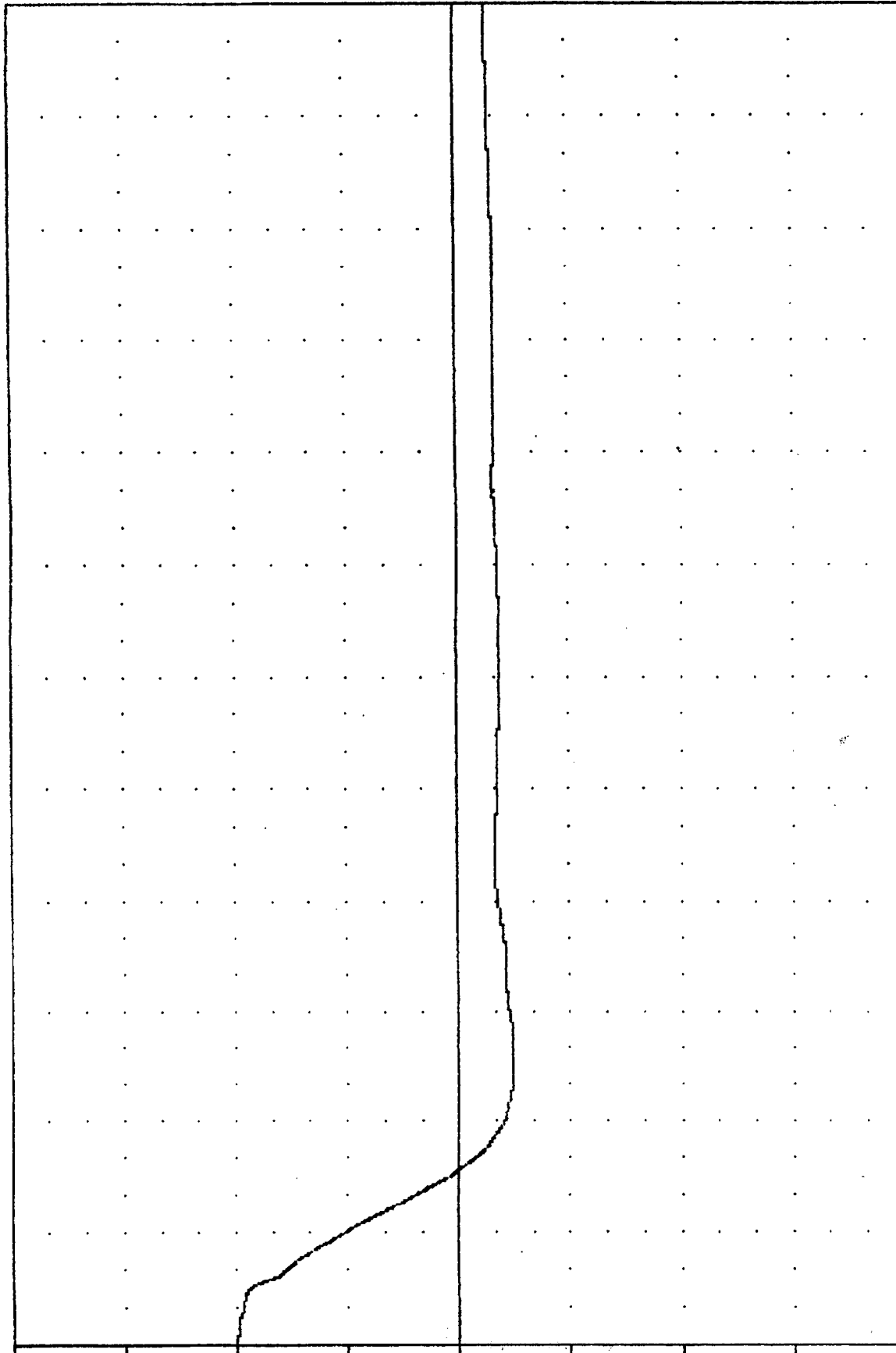
, 920309-4

FILTER = BLPP 300/ 750/ -16  
MIN, MAX VALUES = -4.878 70.00, 19.90 e 0.00

40.00  
30.00  
20.00  
10.00  
0.00  
-10.00  
-20.00  
-30.00  
-40.00

VELOCITY (MPH)

B-58

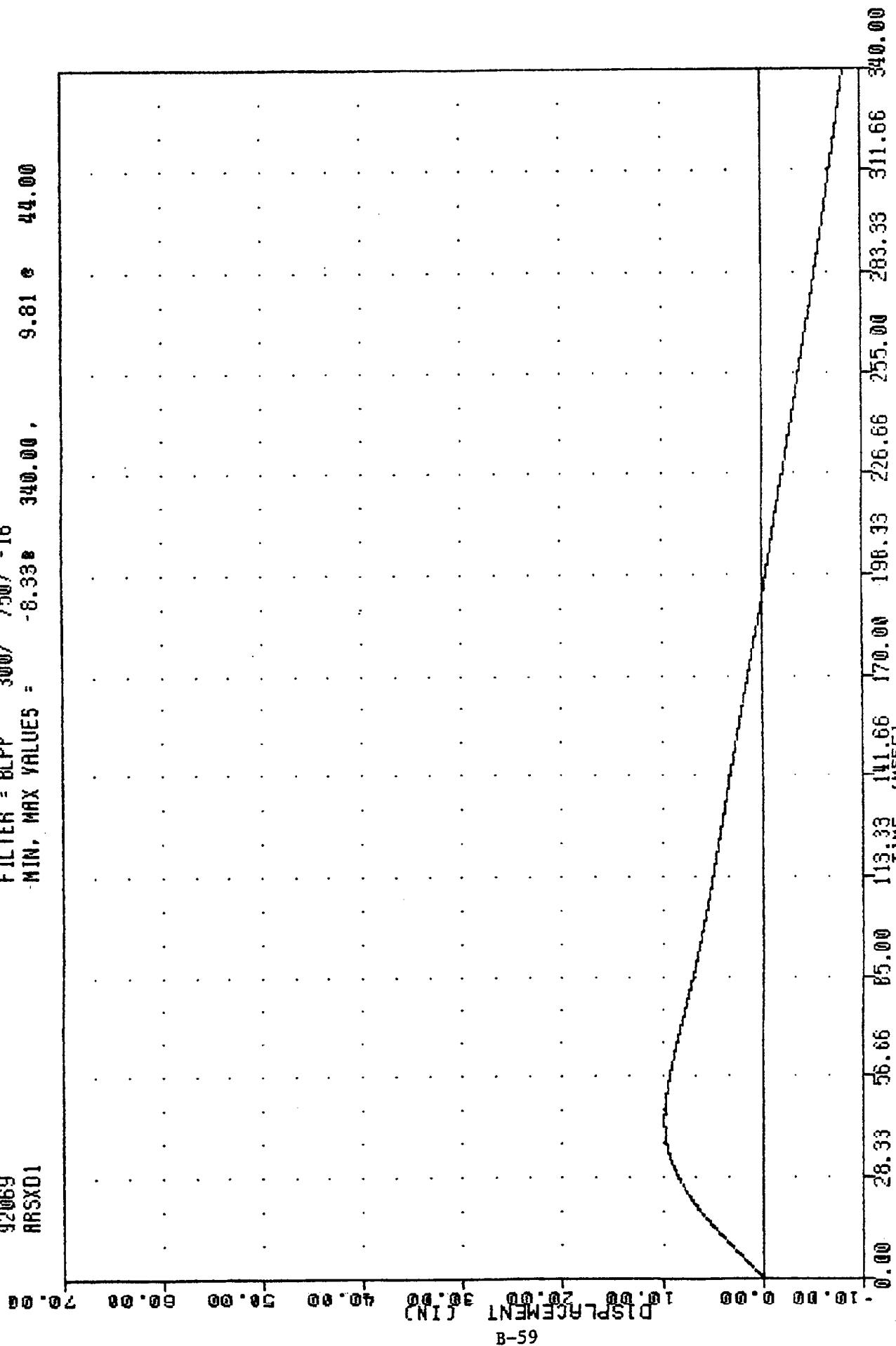


0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00  
TIME (MSEC)

1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
RIGHT REAR SILL X-AXIS VELOCITY

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 ARSX01

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -8.33 340.00, 9.81 44.00



B-59

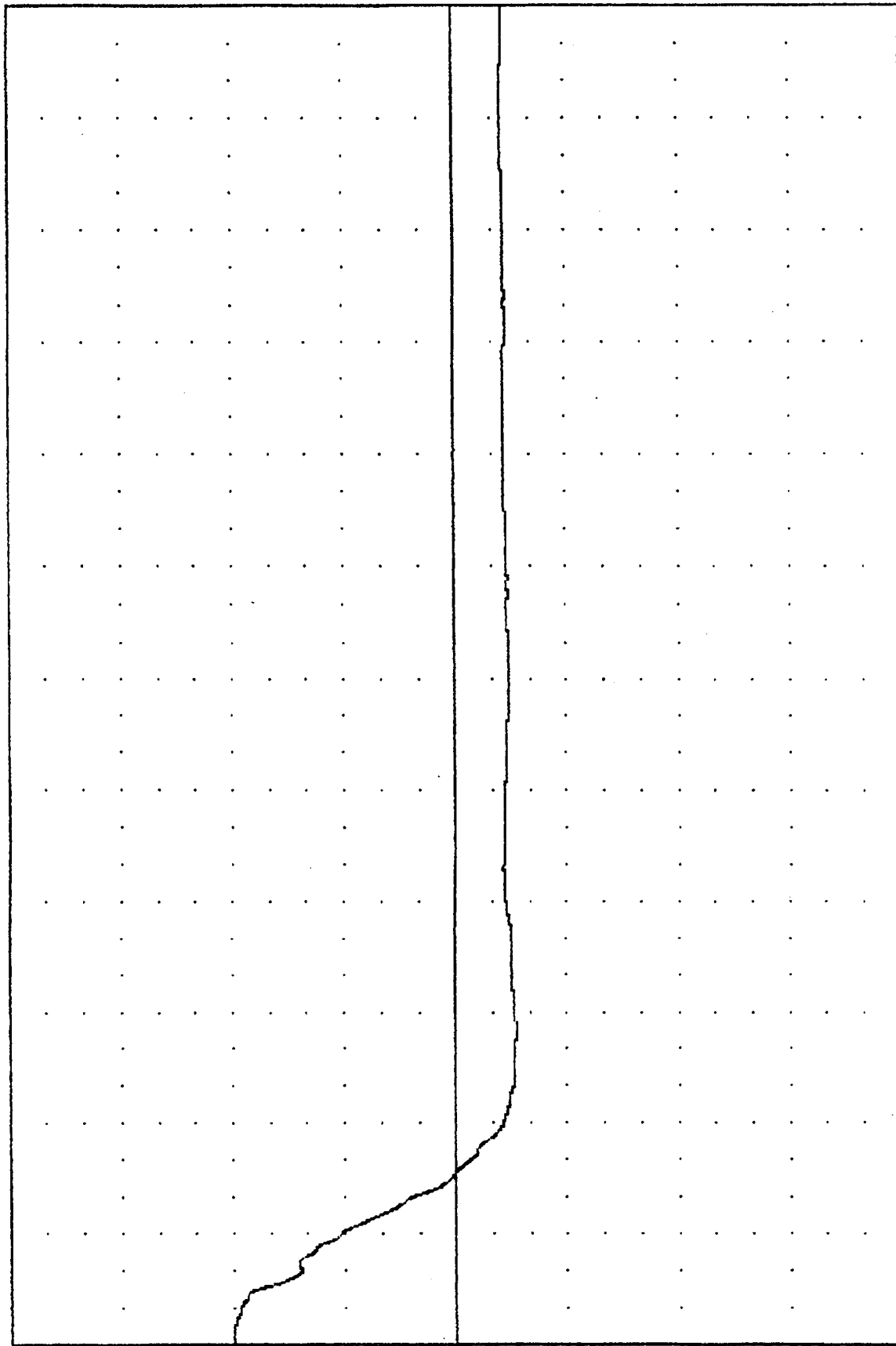
1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 RIGHT REAR SILL X-AXIS DISPLACEMENT

TRC 920309-4  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCGXV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -5.42 79.50 19.91 2.63

VELOCITY (MPH)

B-60

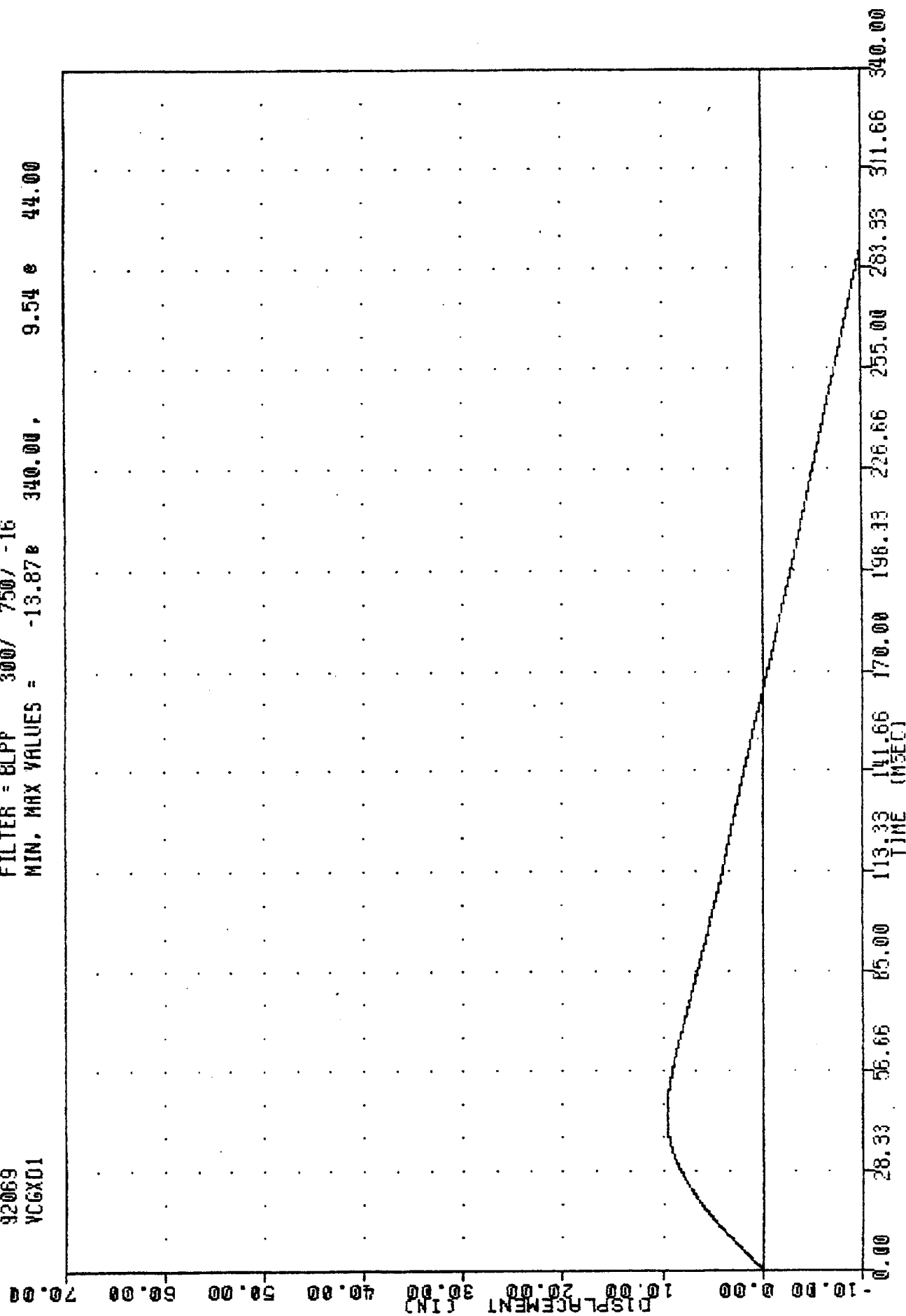


1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 VEHICLE CG X-AXIS VELOCITY



TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGXD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -13.87e 340.00, 9.54 e 44.00

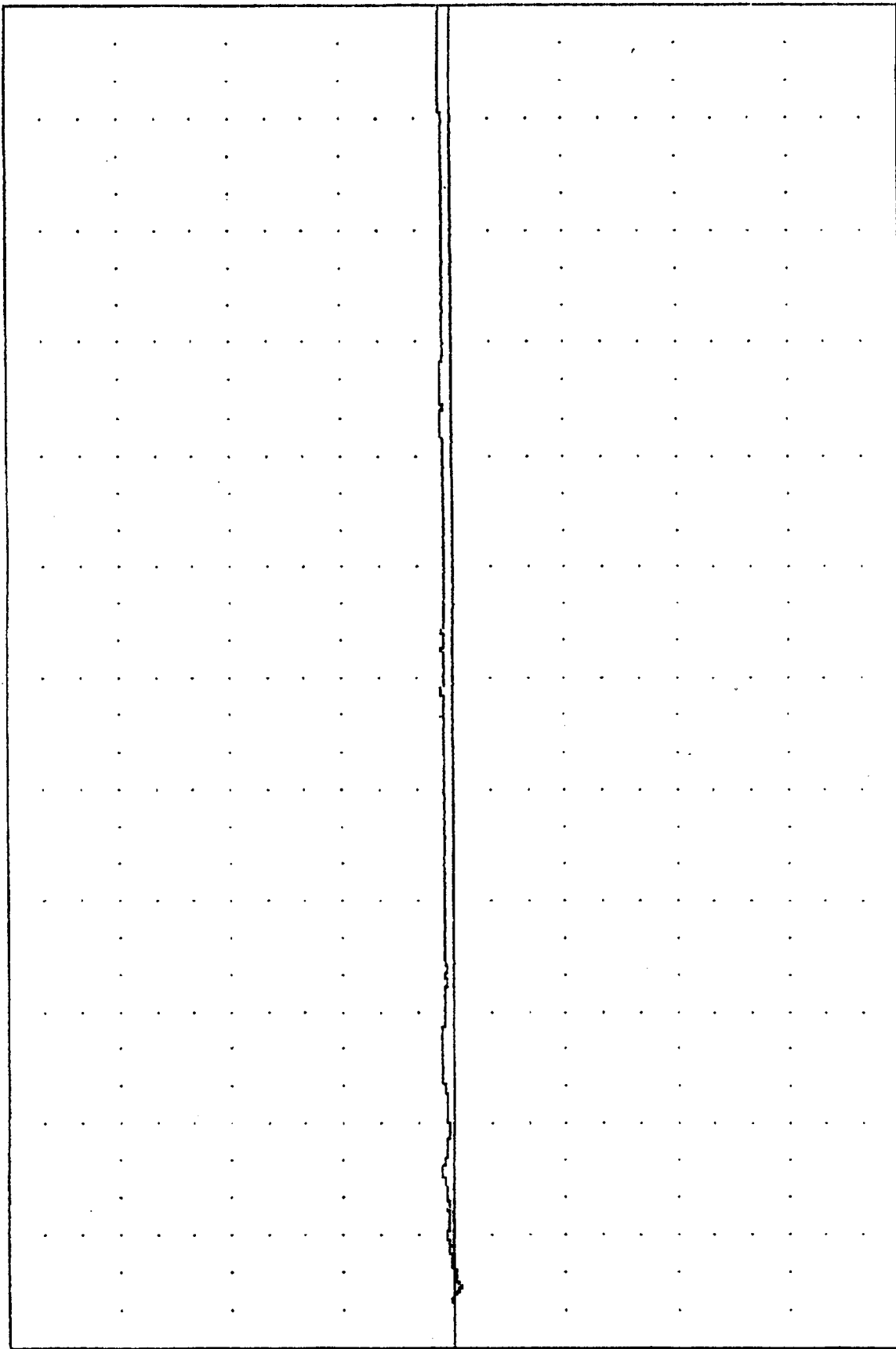


1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 VEHICLE CG X-AXIS DISPLACEMENT

TRC , 920309-4  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGYV1

FILTER = 3LPP 300/ 750/ -16  
 MIN. MAX VALUES = -0.500 15.25, 1.11 e 340.00

VELOCITY (MPH)  
 -40.00  
 -30.00  
 -20.00  
 -10.00  
 0.00  
 10.00  
 20.00  
 30.00  
 40.00



0.00 26.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00  
 TIME (MSEC)  
 1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 VEHICLE CG Y-AXIS VELOCITY

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCGYD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -0.028 19.38, 5.21 & 340.00

70.00

60.00

50.00

40.00

30.00

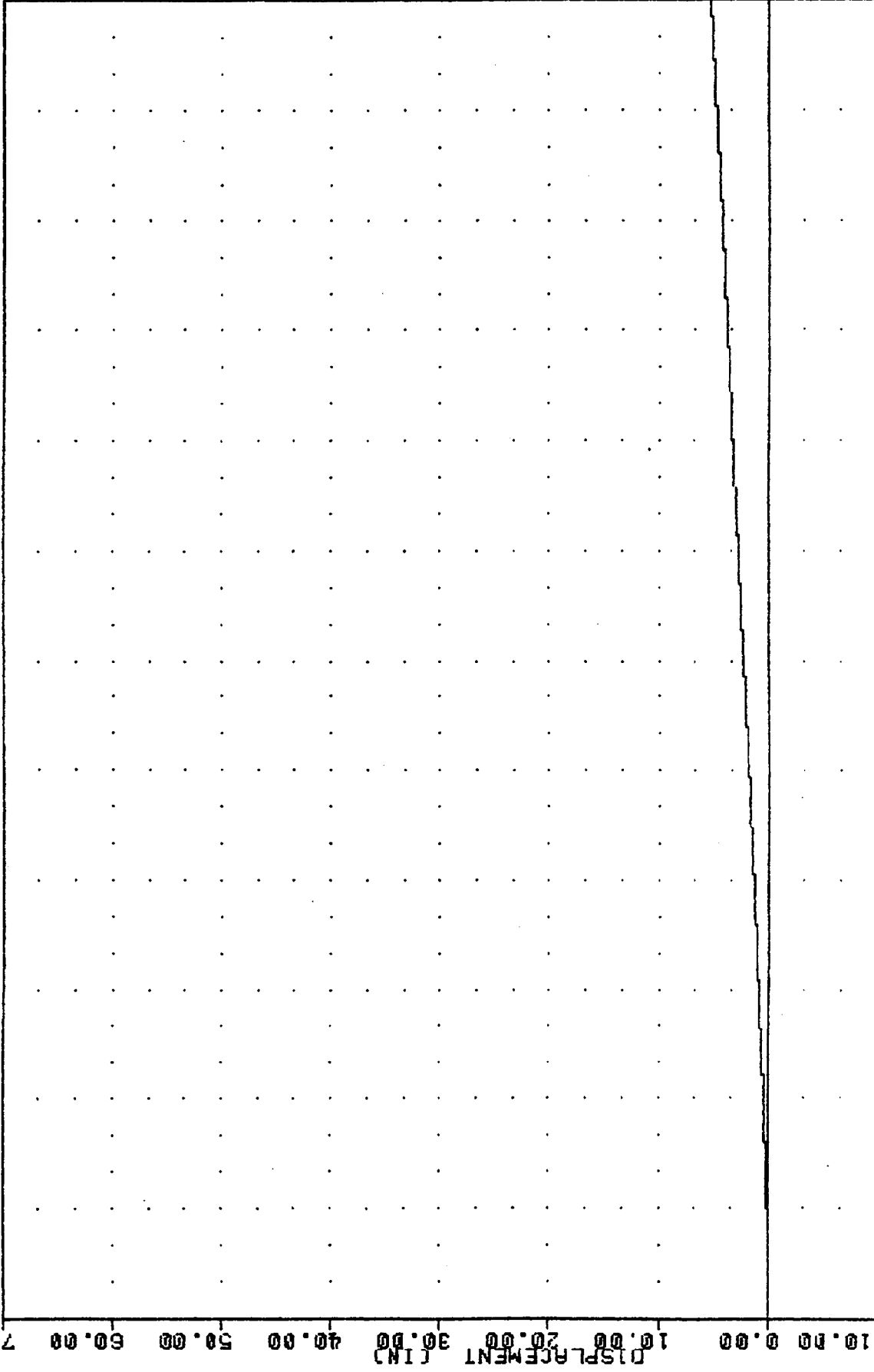
20.00

10.00

0.00

-10.00

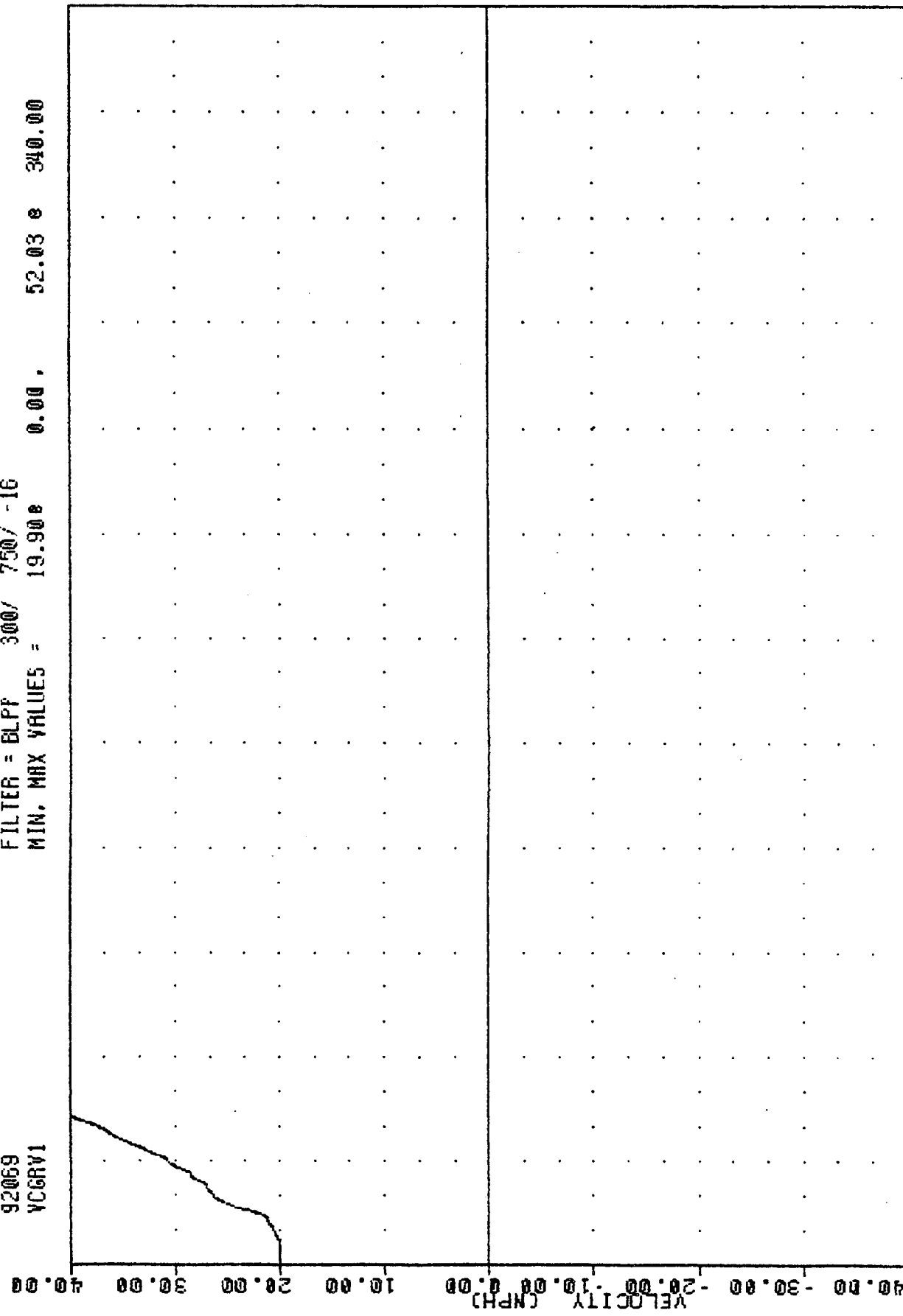
B-63



1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 VEHICLE CG Y-AXIS DISPLACEMENT

TRC 920309-4  
 CRASH III DAMAGE ALGORITHM  
 92059  
 YCGRV1

FILTER = BLPF 300/ 750/ -16  
 MIN. MAX VALUES = 19.90e 0.00 . 52.03 e 340.00

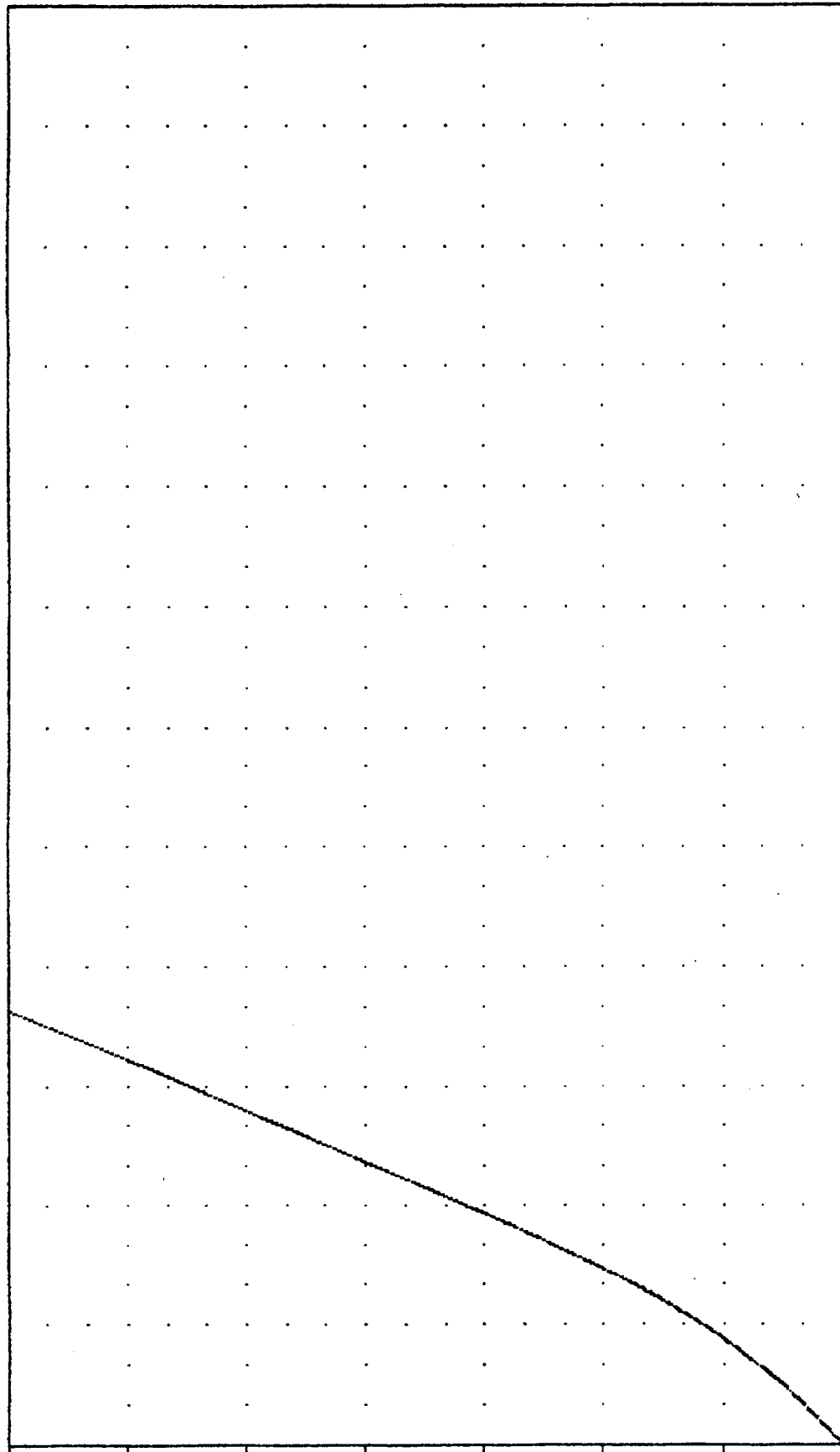


1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 VEHICLE CG RESULTANT VELOCITY

TAC , 920309-4  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGR01

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = 0.00 280.91 340.00

DISPLACEMENT (IN)  
 70.00  
 60.00  
 50.00  
 40.00  
 30.00  
 20.00  
 10.00  
 0.00



B-65

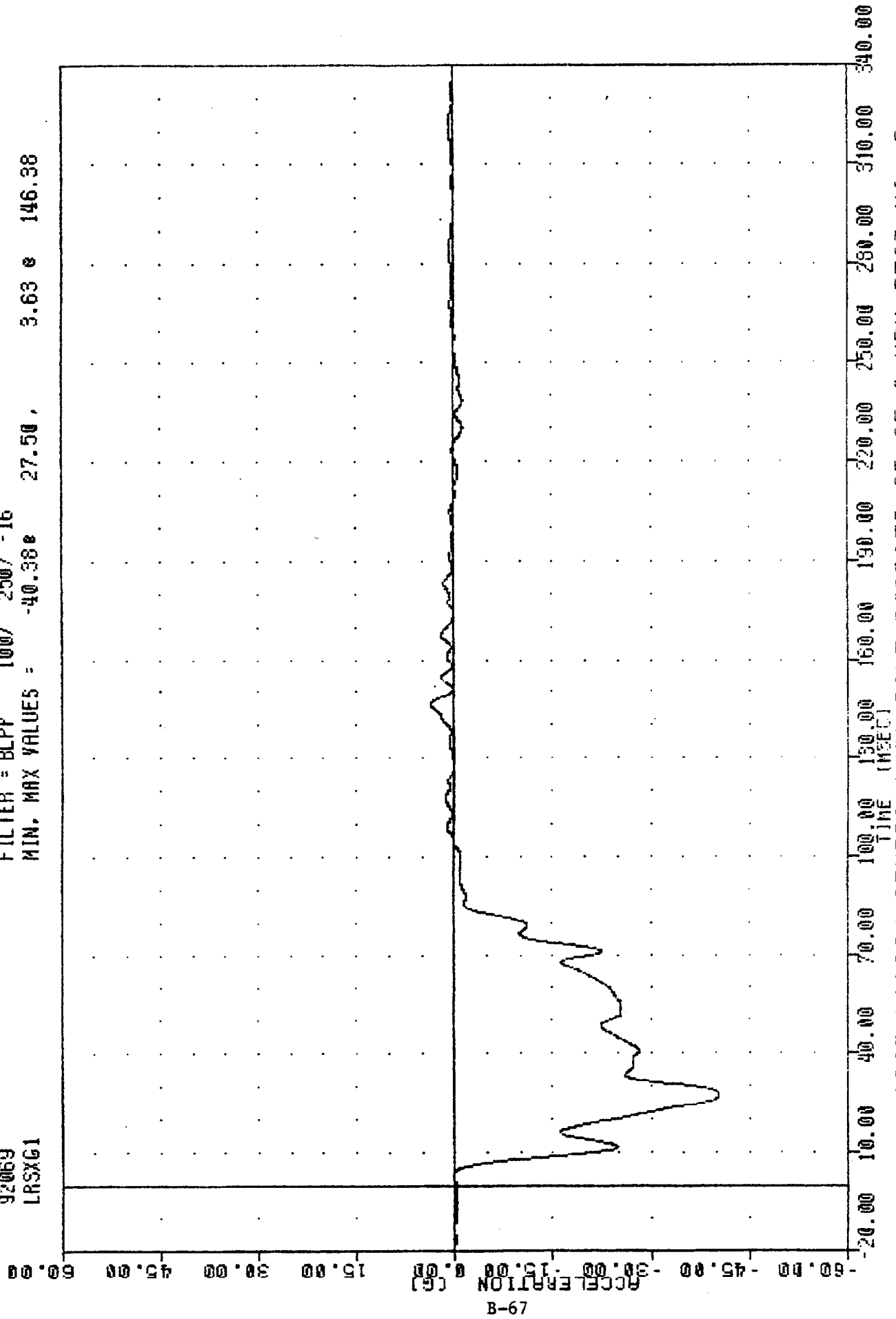
1985 NISSAN SENTRA INTO POLE BARRIER AT 19.9 MPH TEST NO. 4  
 VEHICLE CG RESULTANT DISPLACEMENT

DATA PLOTS

TEST NO. 920309-5

TRC  
CRASH III DAMAGE ALGORITHM  
92069  
LRSXG1

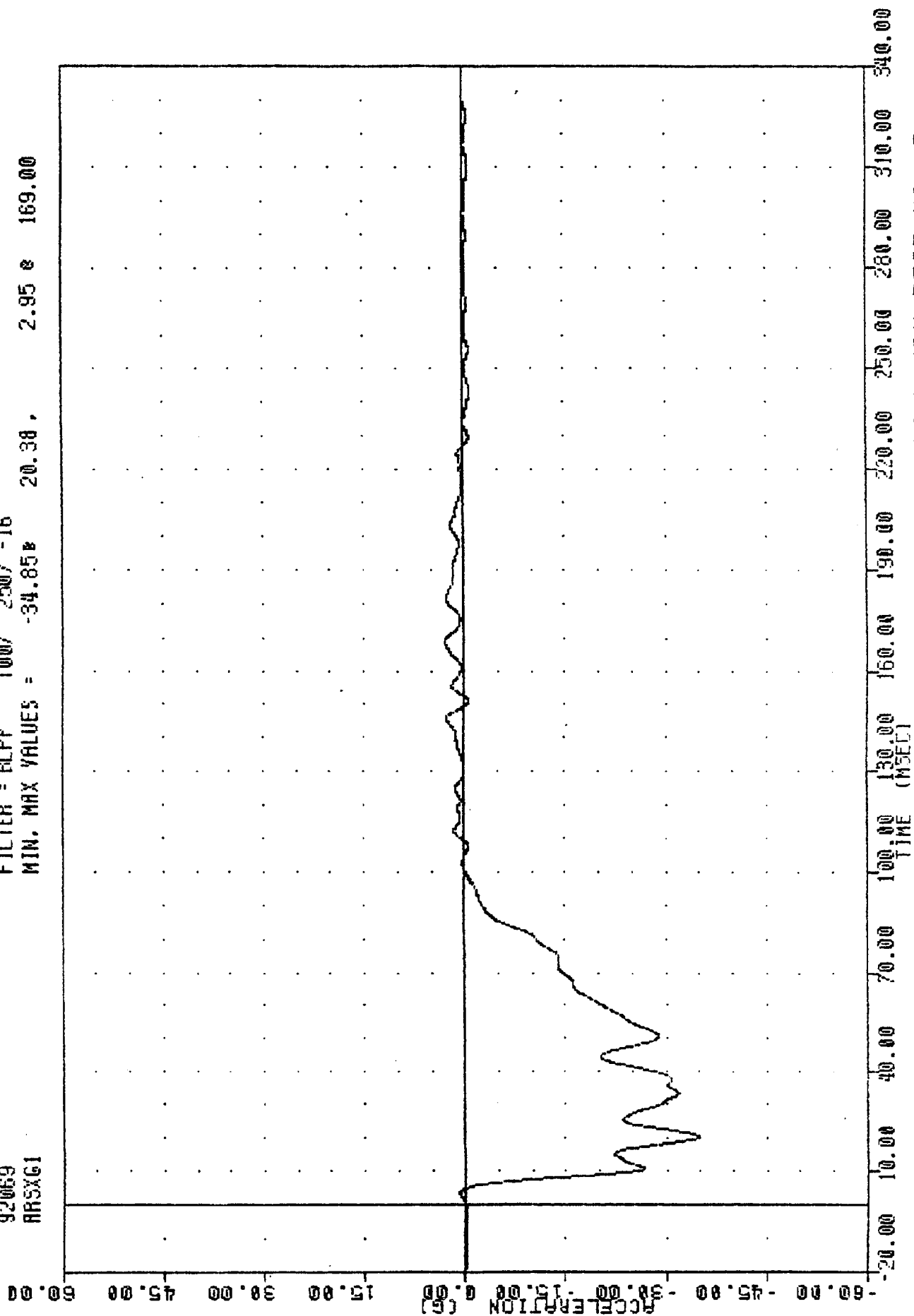
FILTER = BLPF 100/ 250/ -16  
MIN. MAX VALUES = -40.38 27.50 3.63 146.38



1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
LEFT REAR SILL X-AXIS ACCELERATION

TRC , 920309-5  
 CRASH III DAMAGE ALGORITHM  
 92069  
 RRSXG1

FILTER = RLPP 100/ 250/ -16  
 MIN. MAX VALUES = -34.85 20.38 , 2.95 169.00

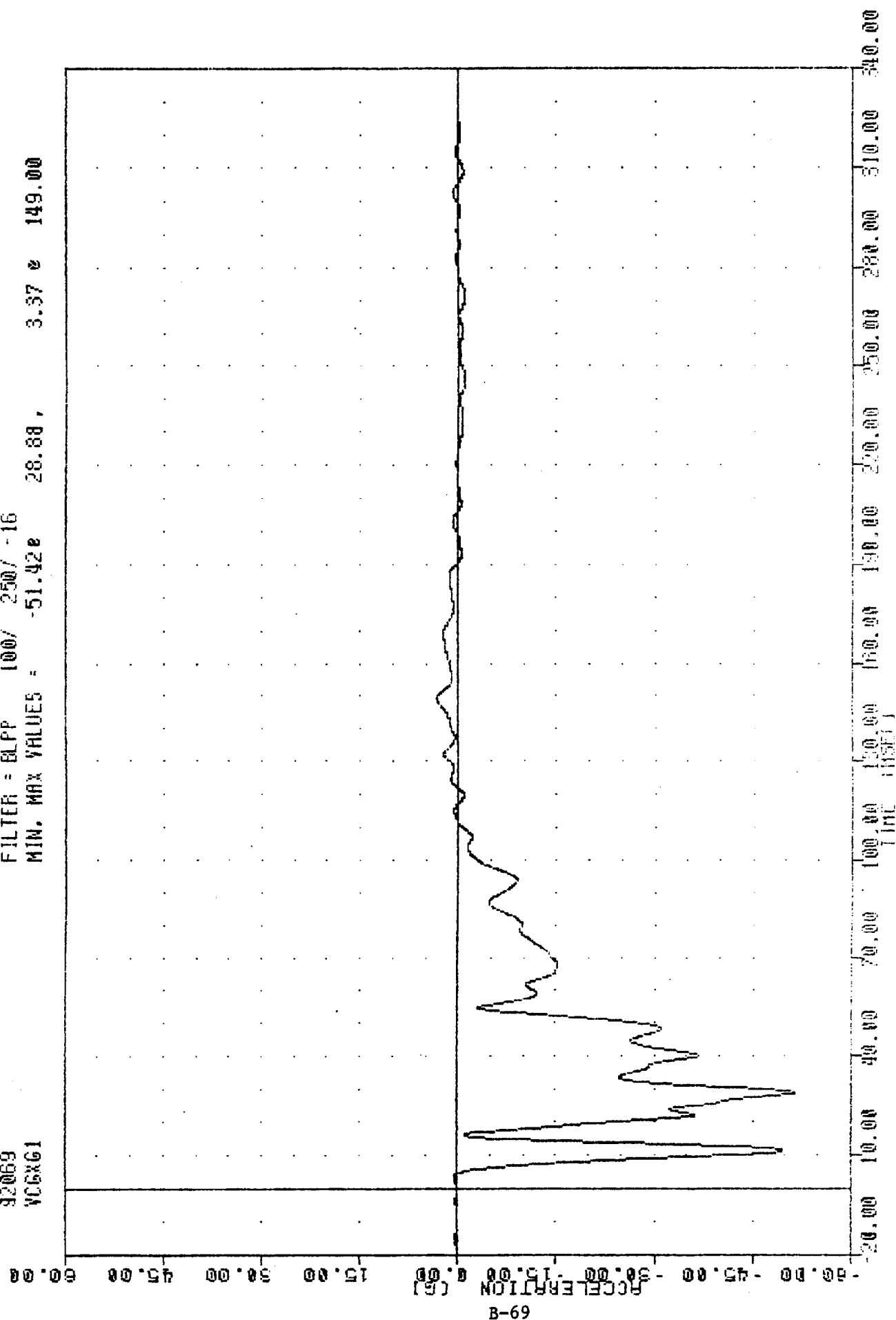


1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 RIGHT REAR GILL X-AXIS ACCELERATION



TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 WCCXG1

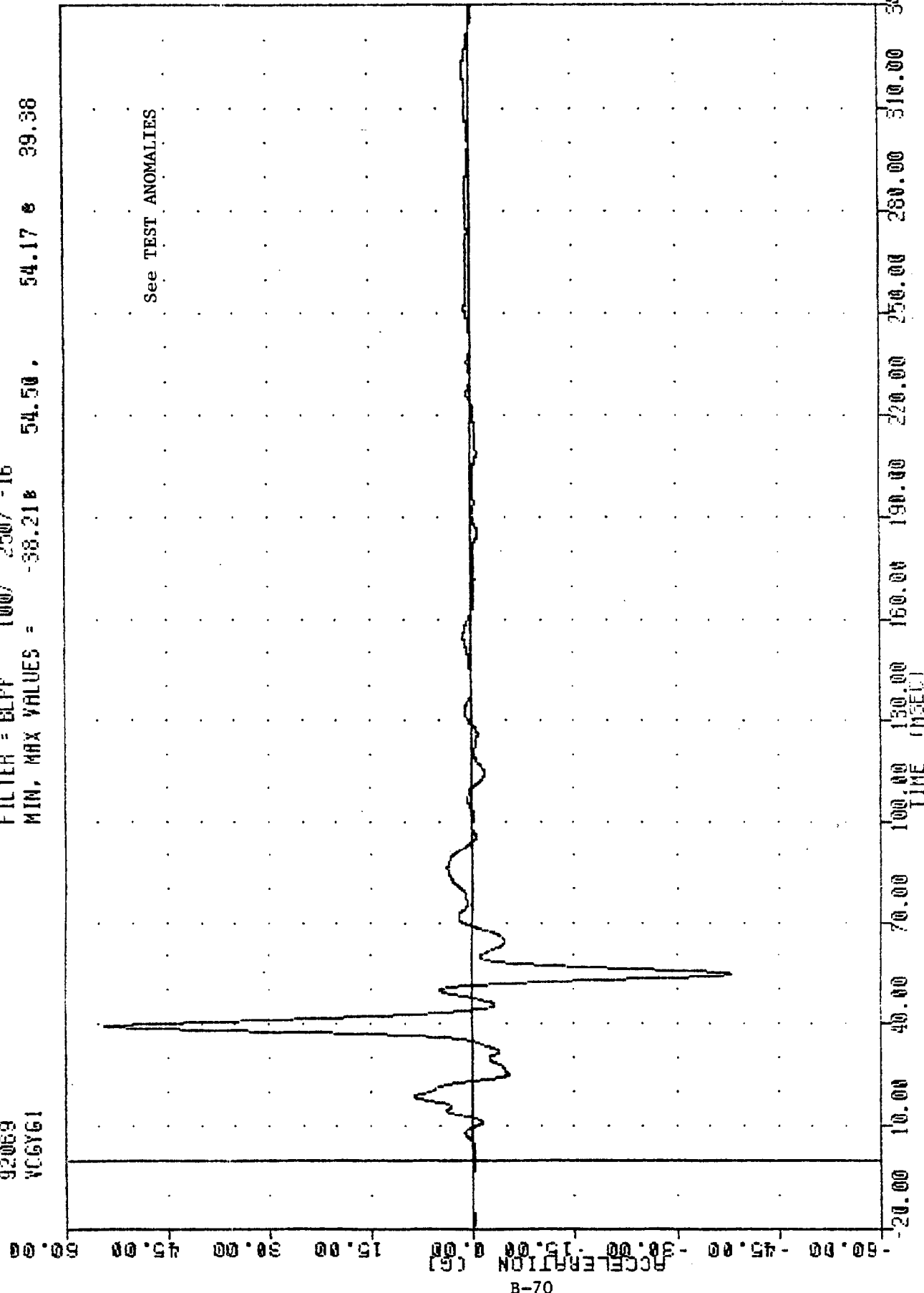
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -51.42e 28.88, 3.37 e 149.00



1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 VEHICLE CC V RYS SUPPLEMENT

TRC , 920303-5  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VC6Y61

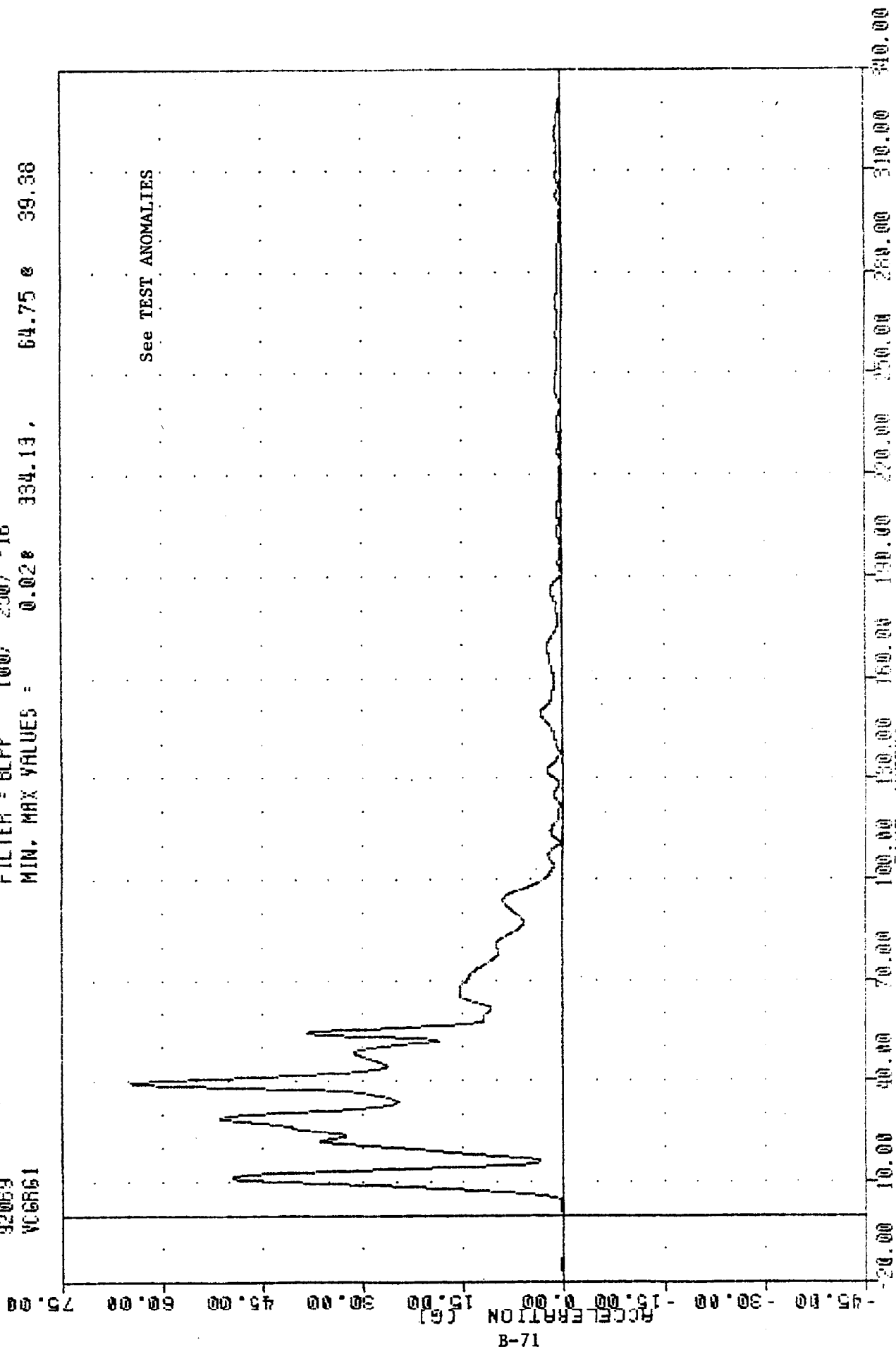
FILTER = BLFF 100/ 250/ -16  
 MIN, MAX VALUES = -38.21% 54.50. 54.17 % 39.38



1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 VEHICLE CG Y-AXIS ACCELERATION

TRC , 920309-5  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VC6R61

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = 0.02e 334.13, 64.75 e 39.38



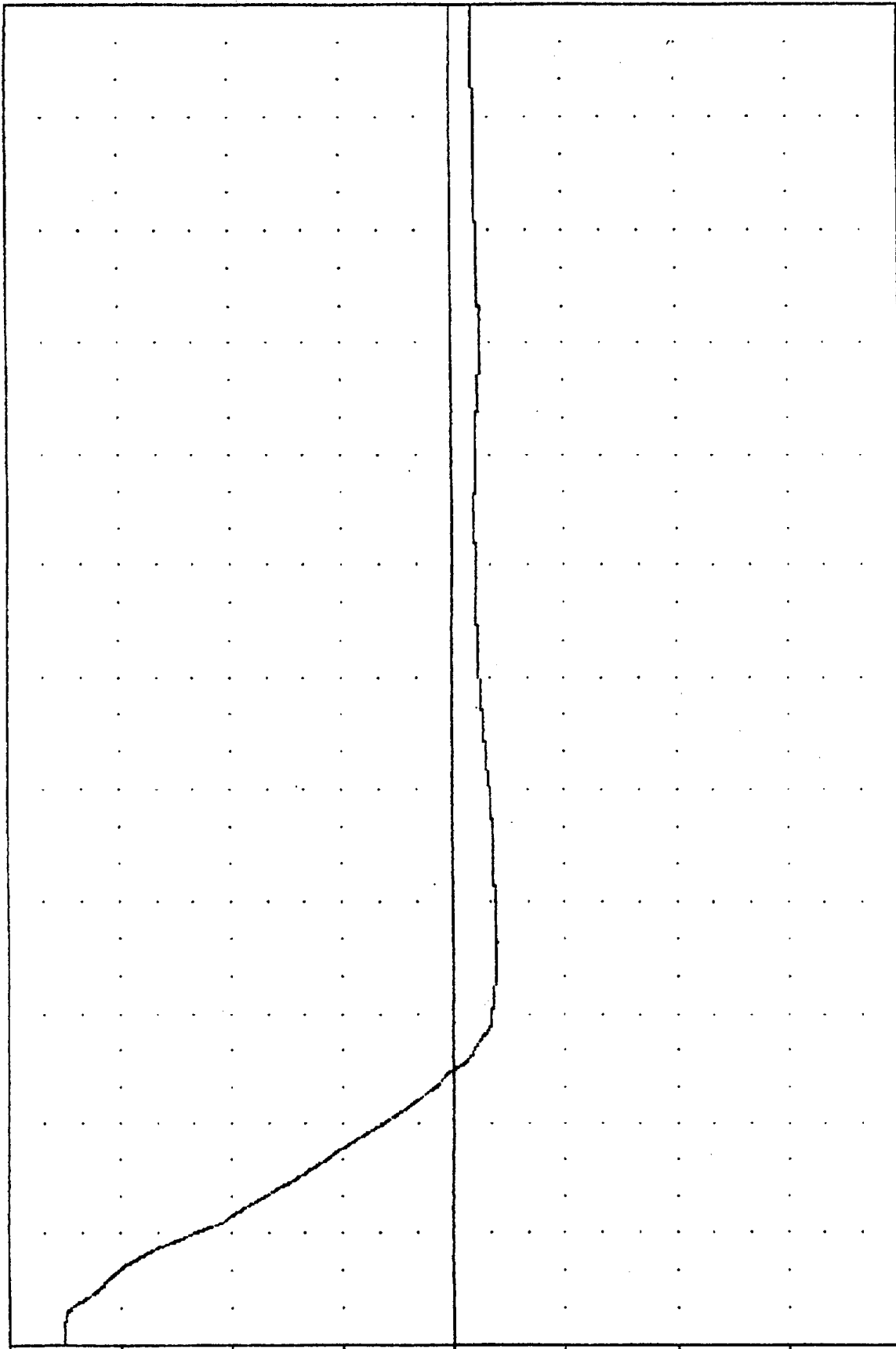
B-71

1985 N18744 CENTER INTO POLE OCCURRED AT 35.0 MPH TEST NO. 5  
 VEHICLE IS RESENTMENT OCCUPATION

TRC , 920309-5  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSXV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -3.87e 102.75, 35.00 e 0.00

VELOCITY (MPH)



1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 LEFT REAR SILL X-AXIS VELOCITY

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 LRSX01

FILTER = BLFF 300/ 750/ -16  
 MIN. MAX VALUES = 0.00 23.50 e 70.75

70.00

60.00

50.00

40.00

30.00

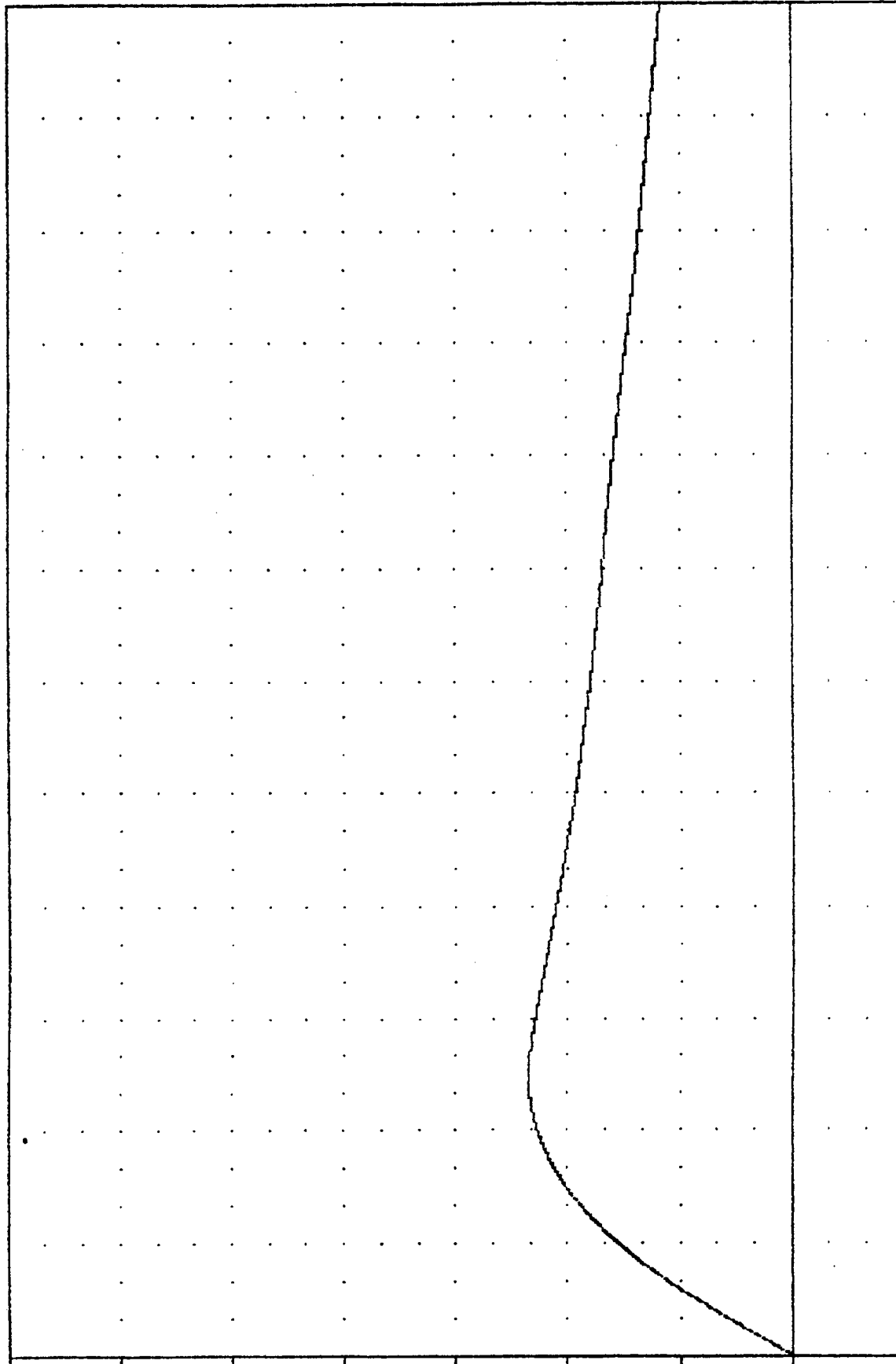
20.00

10.00

0.00

DISPLACEMENT (IN)

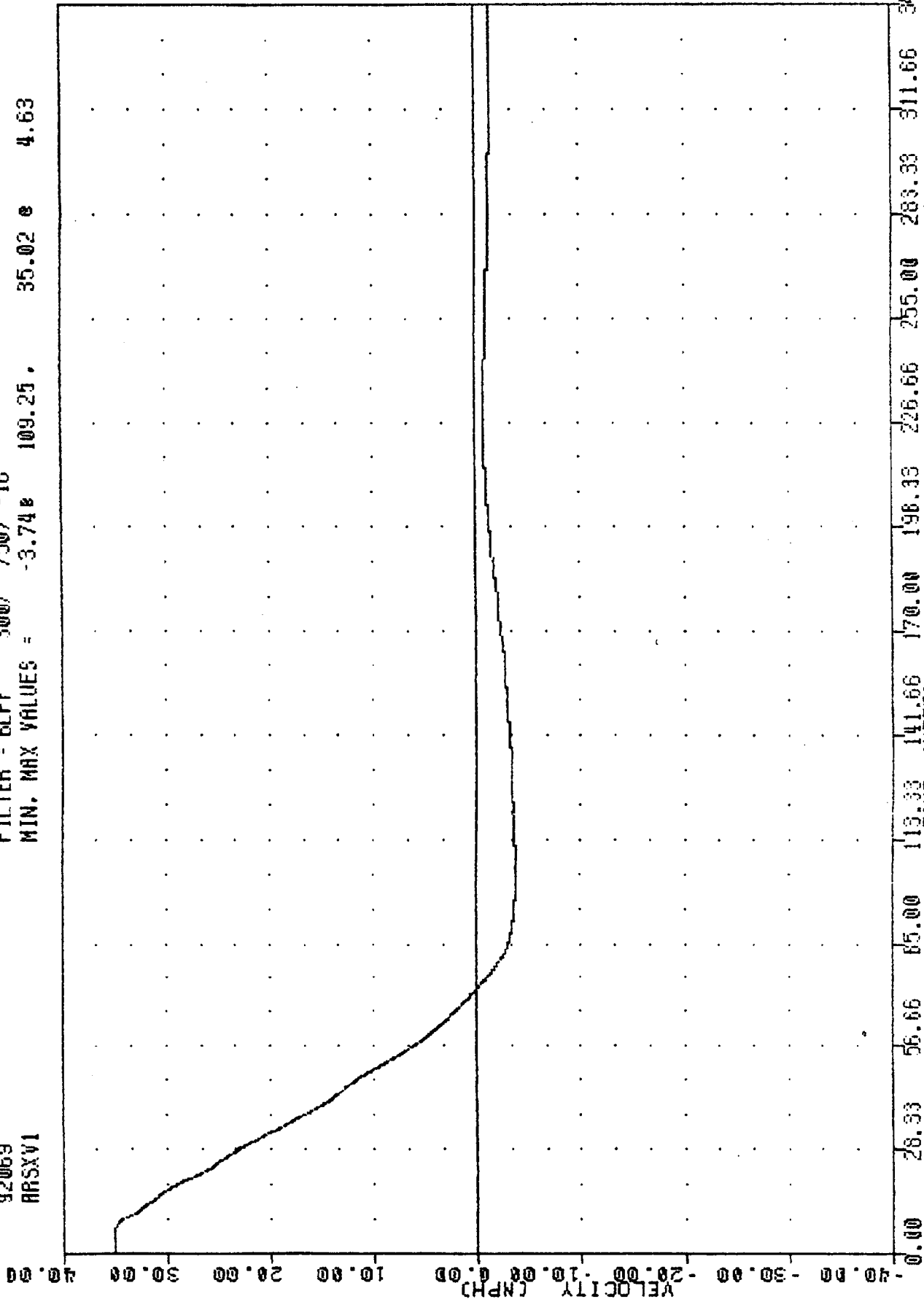
67-B



1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 LEFT REAR STILL X-AXIS DISPLACEMENT

TRC 920309-5  
 CRASH III DAMAGE ALGORITHM  
 92069  
 RRSXV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -3.748 109.25 35.02 4.63

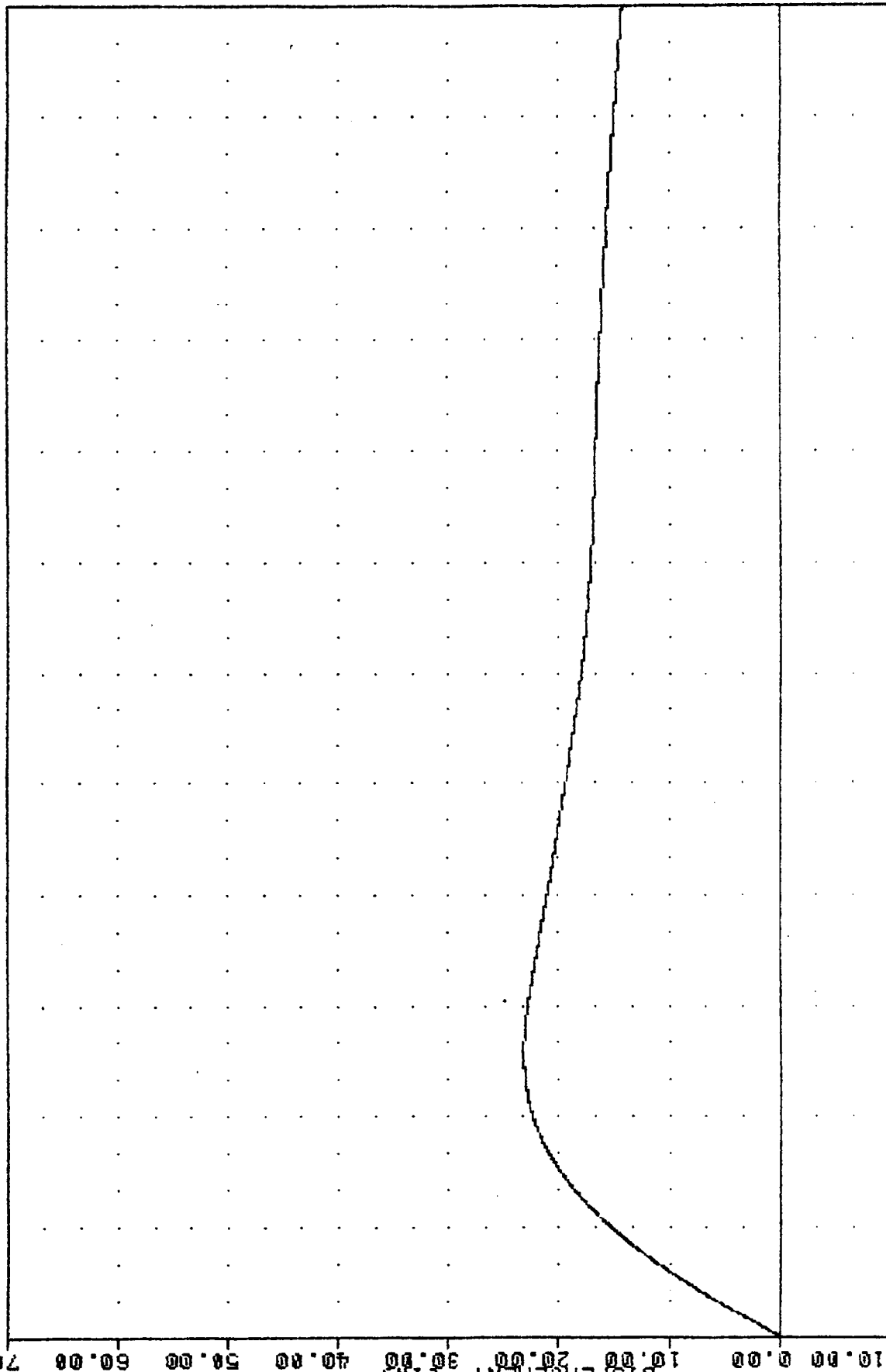


1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 RIGHT REAR STILL X-AXIS VELOCITY

TRC , 920309-5  
 CRASH III DAMAGE ALGORITHM  
 92069  
 APSXD1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = 0.00 23.19 72.63

DISPLACEMENT (IN)



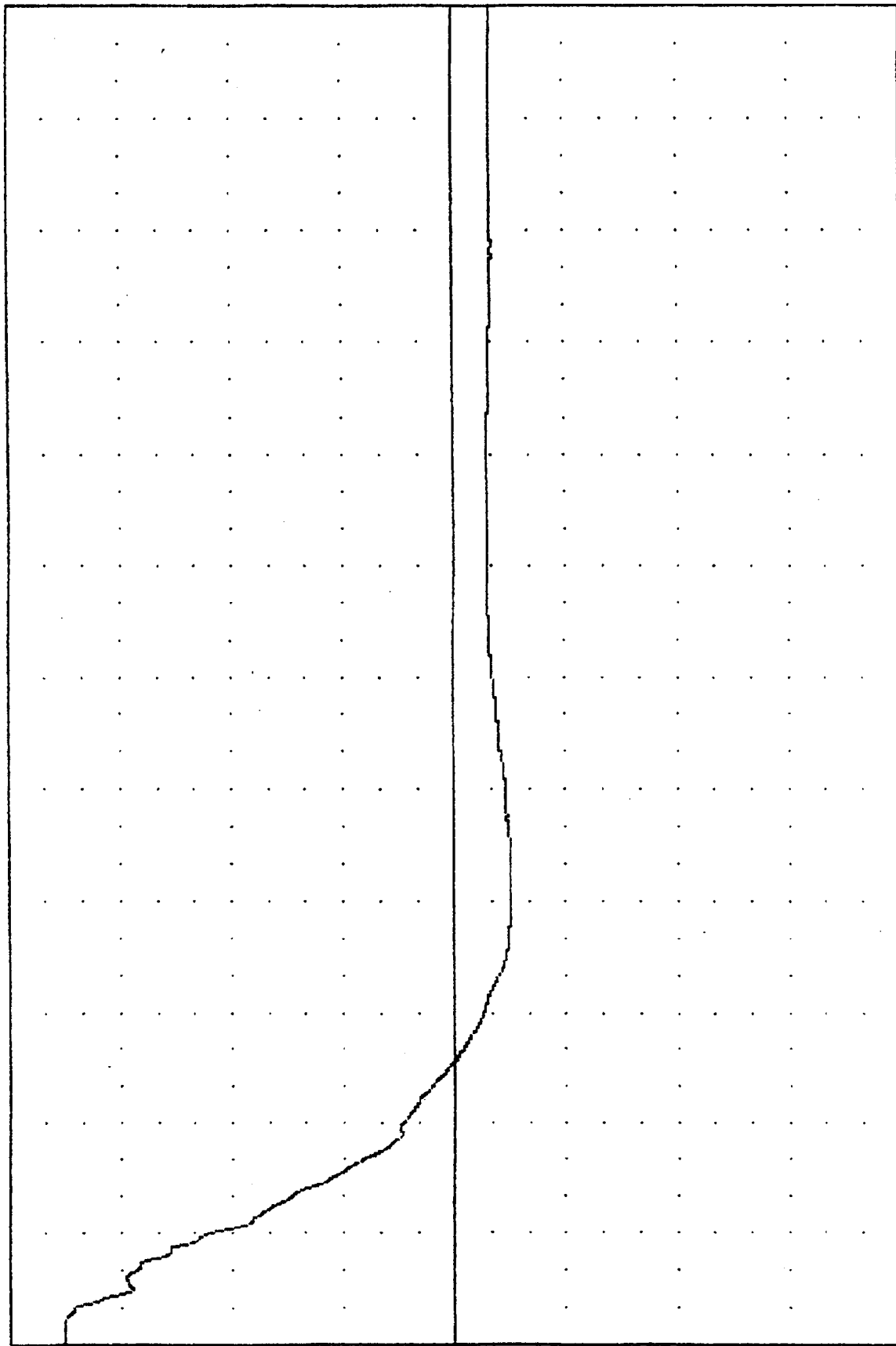
B-75

1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 RIGHT REAR SILL X-AXIS DISPLACEMENT

TRC , 920309-5  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCCXV1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -5.09% 121.25, 35.00 & 0.00

VELOCITY (MPH)



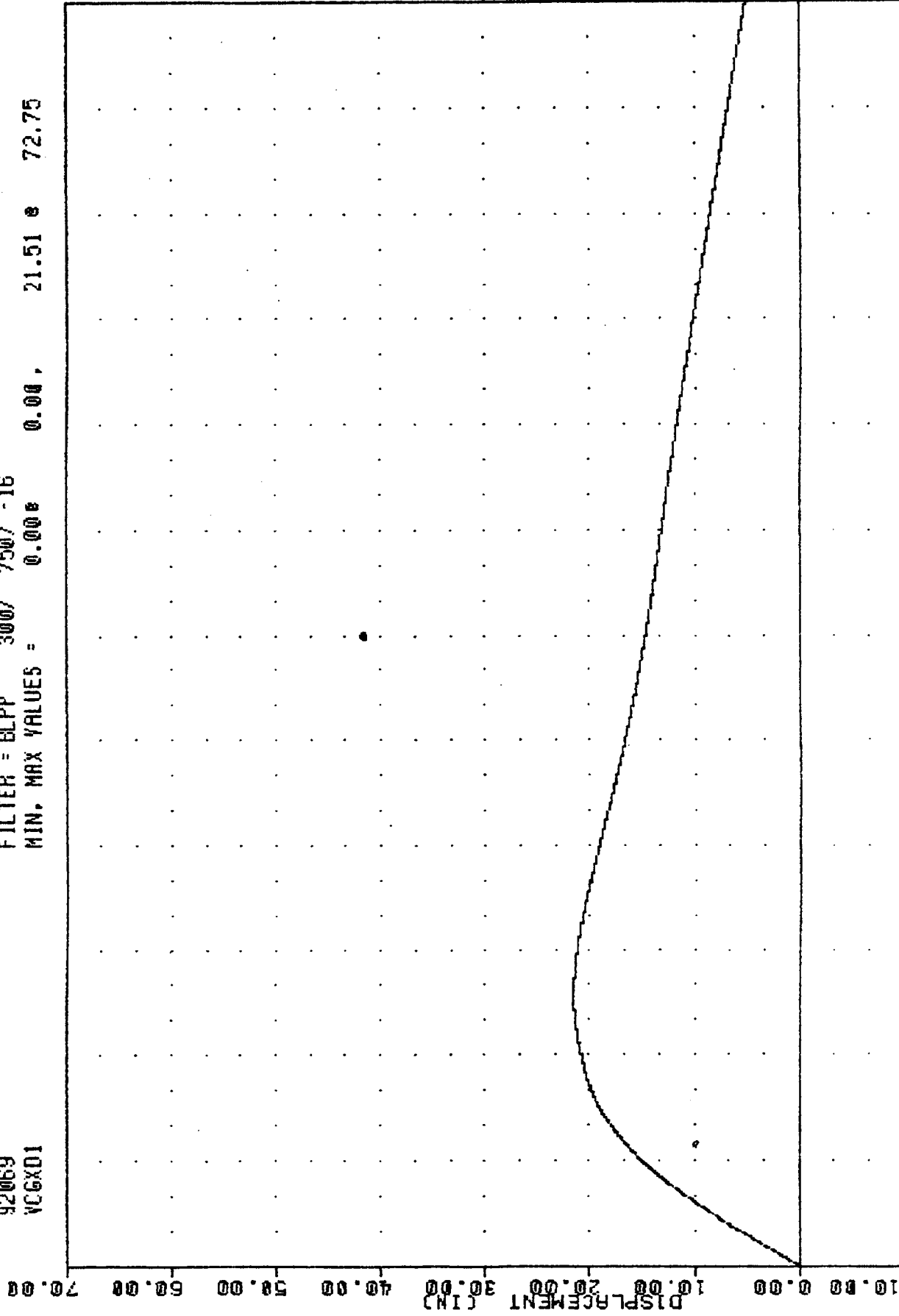
B-76

1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 VEHICLE CG X-AXIS VELOCITY



TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCCXD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00e 0.00, 21.51 e 72.75



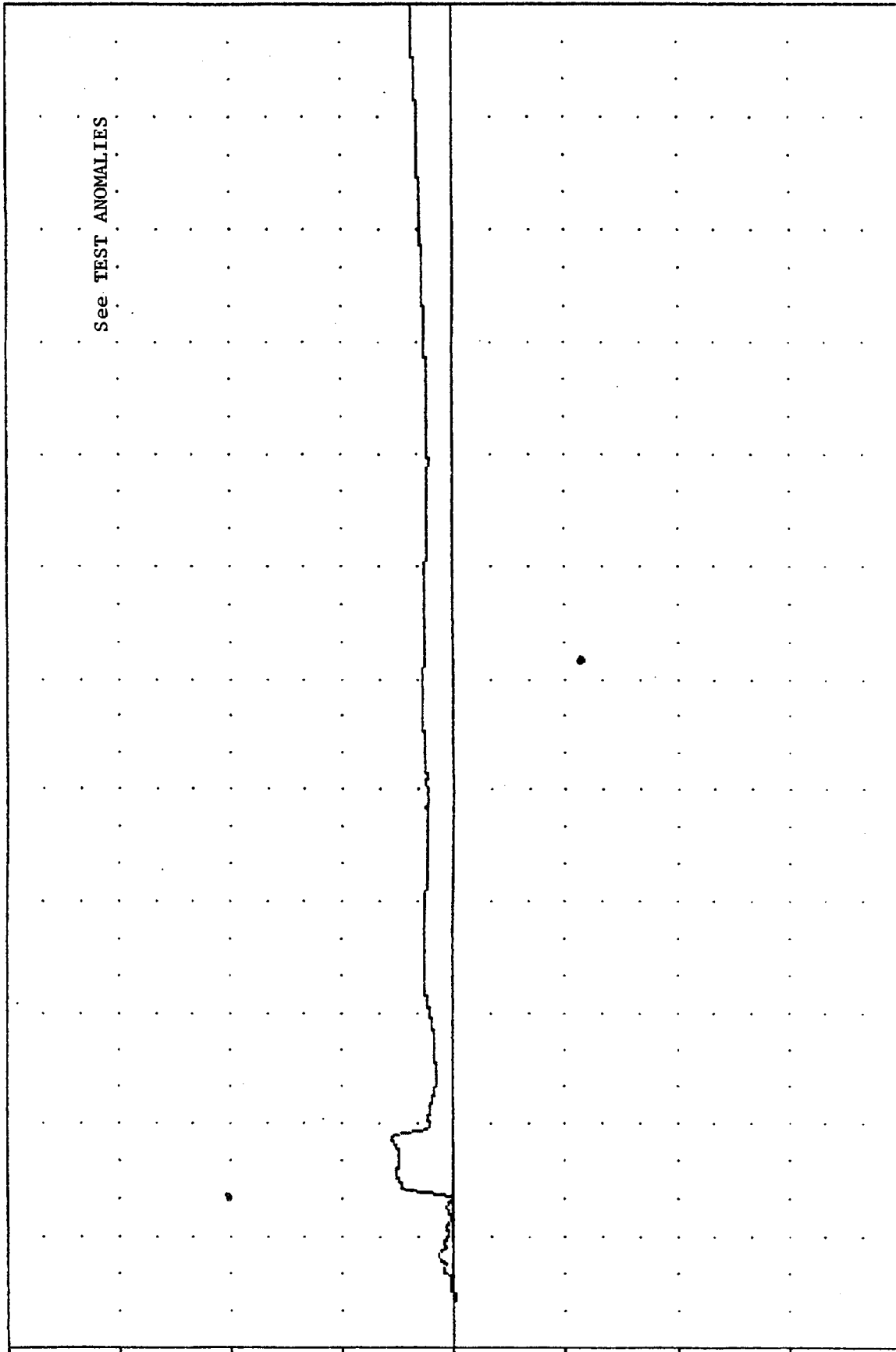
B-77

1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 VEHICLE CG X-AXIS DISPLACEMENT

TRC , 920309-5  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGYV1

FILTER = BLFF 300/ 750/ -16  
 MIN, MAX VALUES = -0.138 13.13 , 5.52 8 53.00

VELOCITY (MPH)



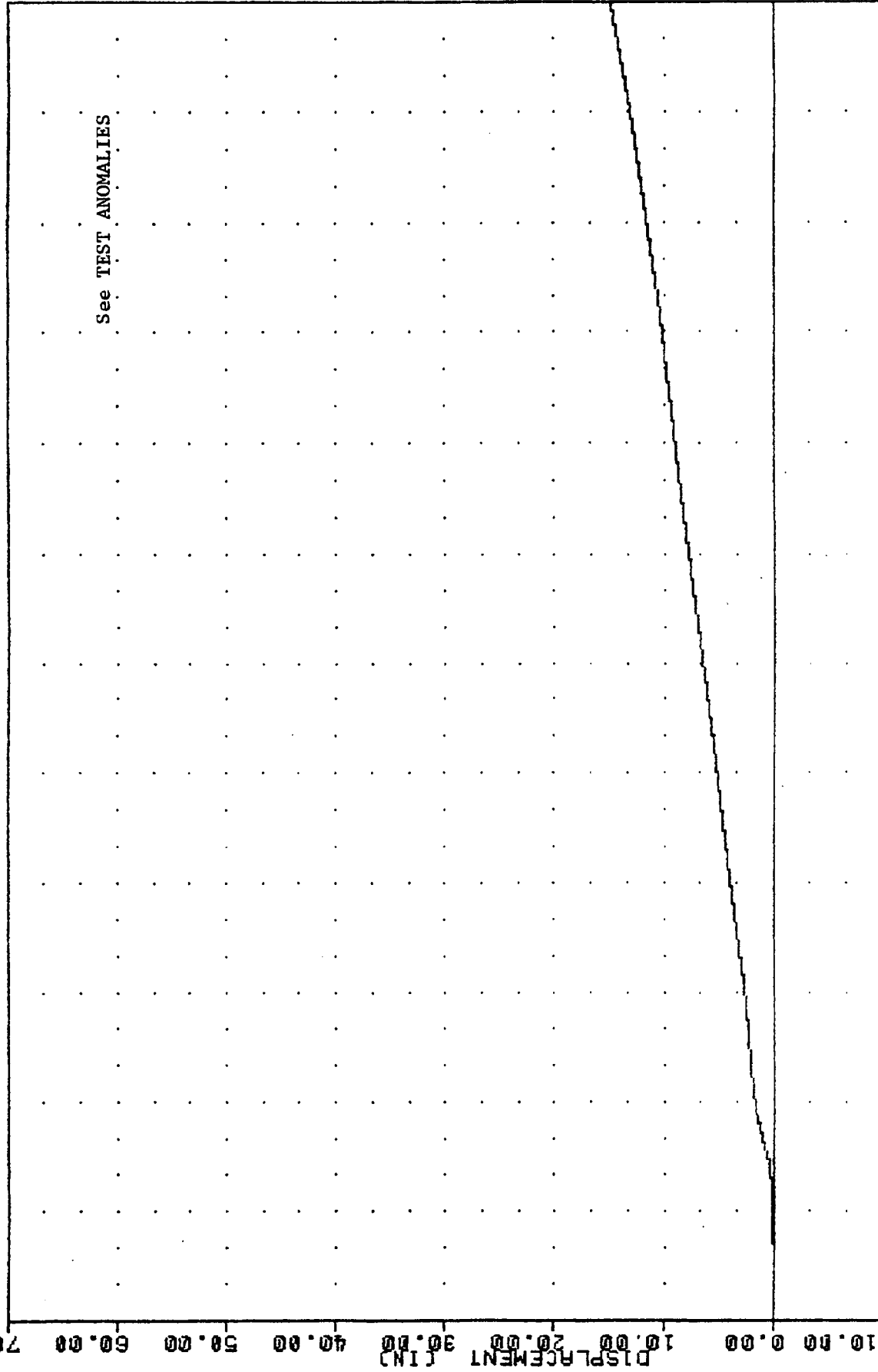
0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 VEHICLE CG Y-AXIS VELOCITY

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 YCGYD1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00e 8.00, 14.83 e 340.00

70.00



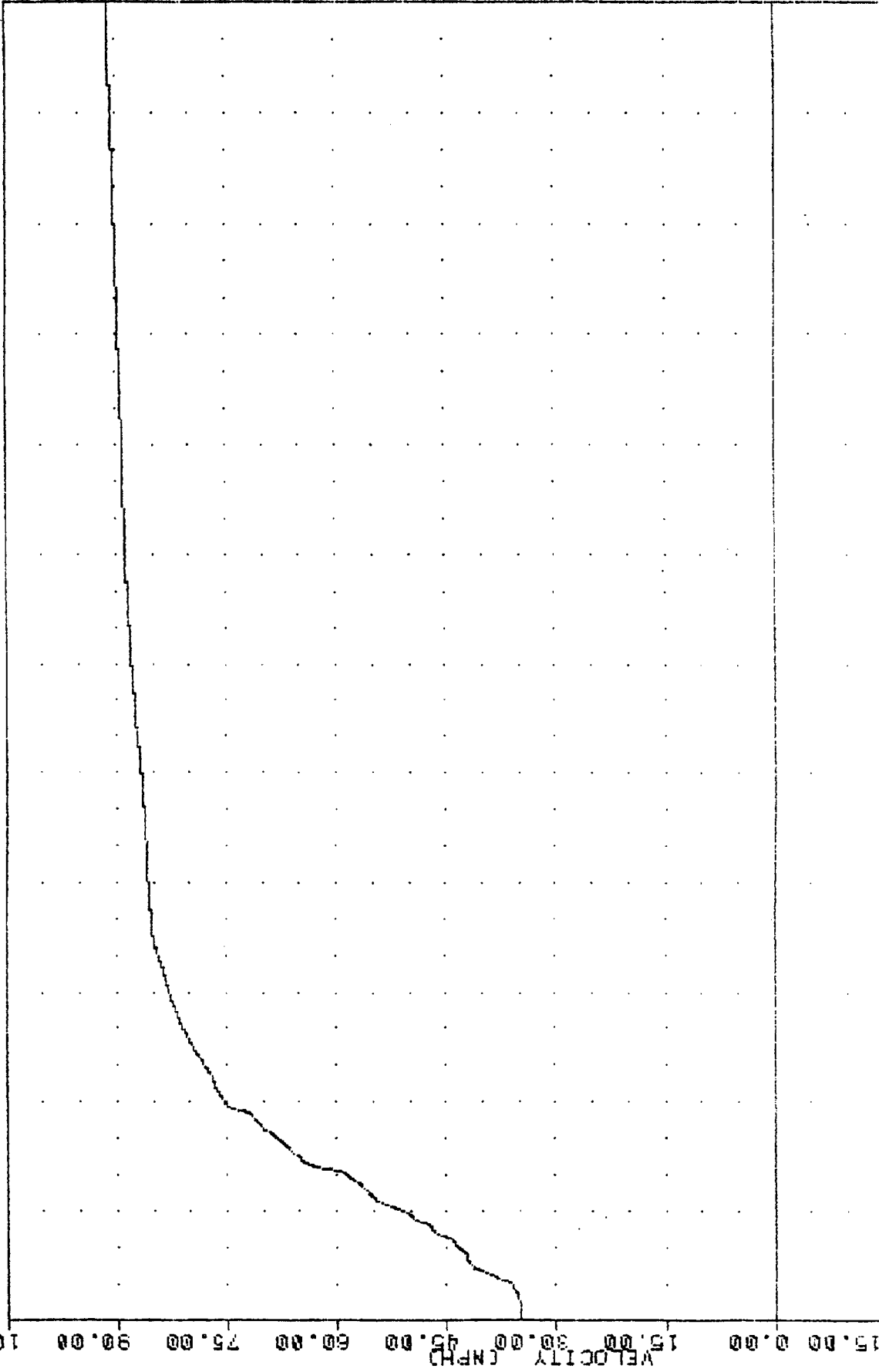
| TIME (MSEC) | DISPLACEMENT (IN) |
|-------------|-------------------|
| 0.00        | 0.00              |
| 28.33       | 56.66             |
| 65.00       | 65.00             |
| 113.33      | 65.00             |
| 141.66      | -10.00            |
| 170.00      | 10.00             |
| 198.33      | 10.00             |
| 226.66      | 10.00             |
| 255.00      | 10.00             |
| 283.33      | 10.00             |
| 311.66      | 10.00             |
| 340.00      | 10.00             |

1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 VEHICLE CG Y-AXIS DISPLACEMENT

TRC 920309 5  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGRV1

FILTER = BLFF 300/ 750/ -16  
 MIN. MAX VALUES = 95.00 0.00, 91.00 340.00

105.00



B-80

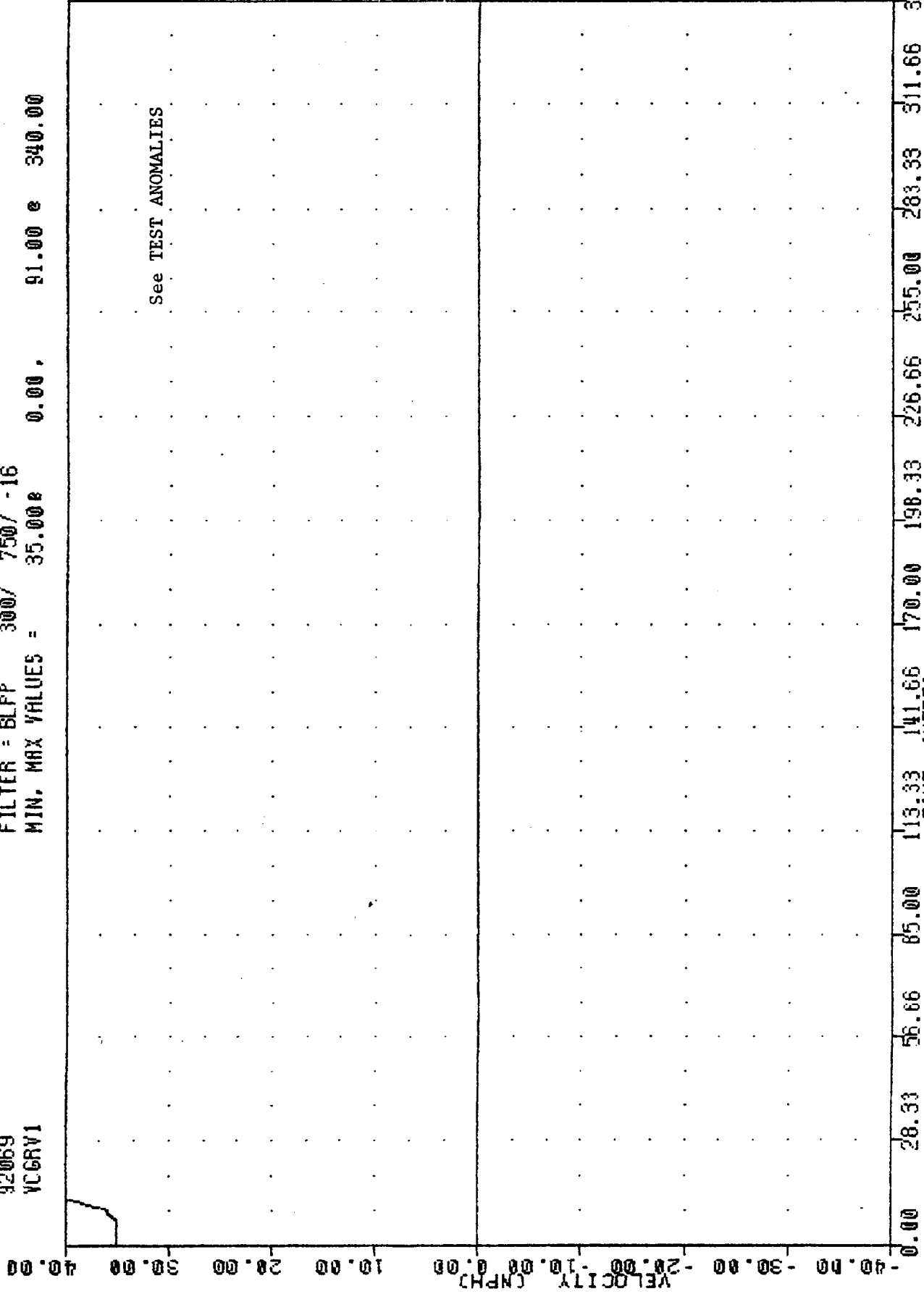
| TIME (SEC) | VELOCITY (MPH) | ACCELERATION (G) | DISPLACEMENT (IN) |
|------------|----------------|------------------|-------------------|
| 0.00       | 30.00          | 0.00             | 0.00              |
| 20.00      | 75.00          | 0.00             | 0.00              |
| 40.00      | 15.00          | 0.00             | 0.00              |
| 60.00      | 15.00          | 0.00             | 0.00              |
| 80.00      | 15.00          | 0.00             | 0.00              |
| 100.00     | 15.00          | 0.00             | 0.00              |
| 120.00     | 15.00          | 0.00             | 0.00              |
| 140.00     | 15.00          | 0.00             | 0.00              |
| 160.00     | 15.00          | 0.00             | 0.00              |
| 180.00     | 15.00          | 0.00             | 0.00              |
| 200.00     | 15.00          | 0.00             | 0.00              |
| 220.00     | 15.00          | 0.00             | 0.00              |
| 240.00     | 15.00          | 0.00             | 0.00              |
| 260.00     | 15.00          | 0.00             | 0.00              |
| 280.00     | 15.00          | 0.00             | 0.00              |
| 300.00     | 15.00          | 0.00             | 0.00              |
| 320.00     | 15.00          | 0.00             | 0.00              |
| 340.00     | 15.00          | 0.00             | 0.00              |

1985 FORD ESCORT INTERIOR DAMAGE AT 33.5 MPH TEST NO. 5

VELOCITY IN ACCIDENT VELOCITY

TRC  
 CRASH 1:1 DAMAGE ALGORITHM  
 92059  
 VCCRV1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = 35.00 0.00, 91.00 e 340.00



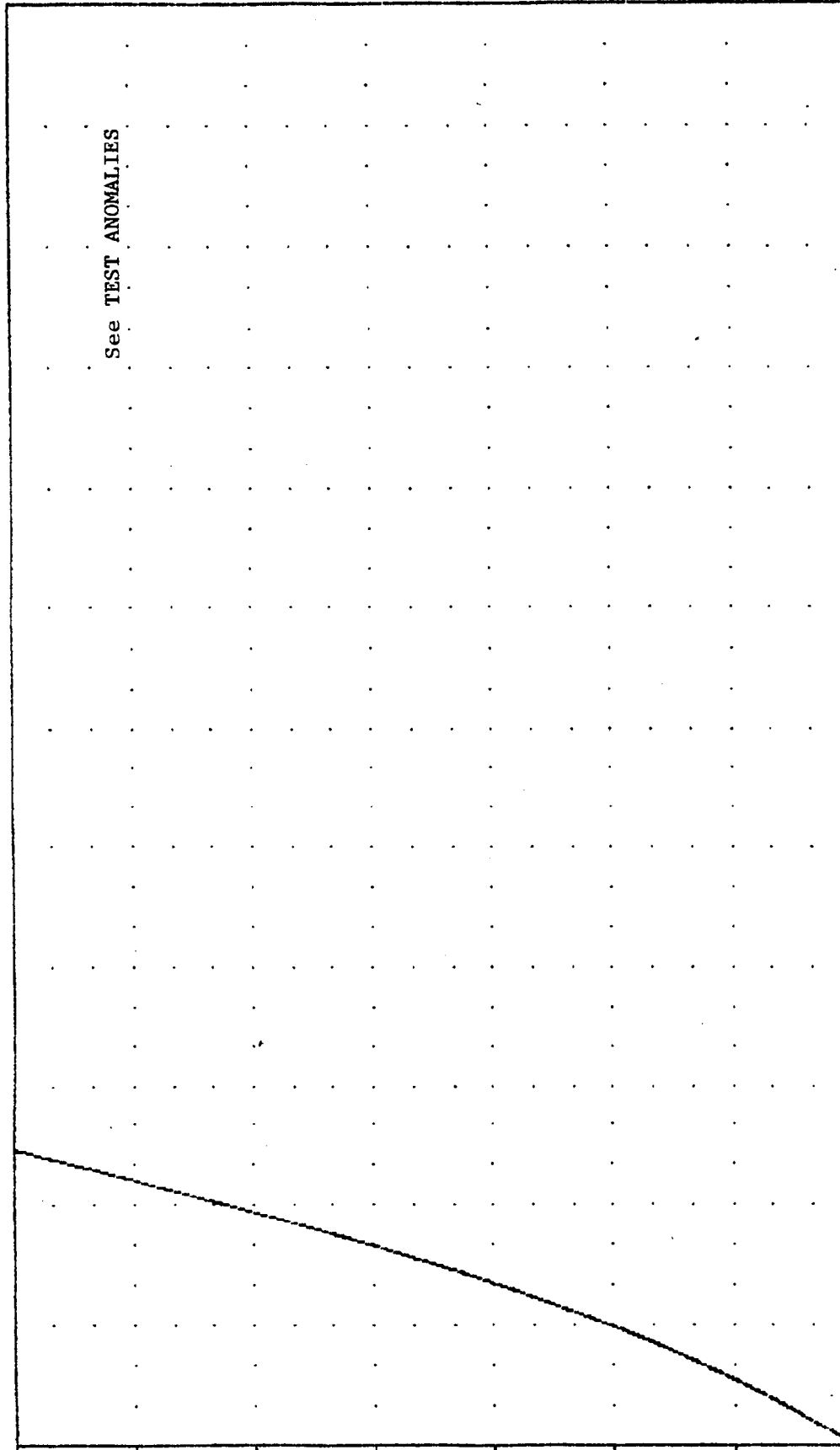
1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 VEHICLE CG RESULTANT VELOCITY

TRC  
 CRASH III DAMAGE ALGORITHM  
 92069  
 VCGR01

920309-5

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00e 0.00. 468.43 e 340.00

DISPLACEMENT (IN)  
 70.00  
 60.00  
 50.00  
 40.00  
 30.00  
 20.00  
 10.00  
 0.00



See TEST ANOMALIES

| TIME (MSEC) | DISPLACEMENT (IN) | VELOCITY (IN/SEC) | ACCELERATION (G) |
|-------------|-------------------|-------------------|------------------|
| 0.00        | 0.00              | 0.00              | 0.00             |
| 28.33       | 10.00             | 1.00              | 0.00             |
| 56.66       | 20.00             | 2.00              | 0.00             |
| 85.00       | 30.00             | 3.00              | 0.00             |
| 113.33      | 40.00             | 4.00              | 0.00             |
| 141.66      | 50.00             | 5.00              | 0.00             |
| 170.00      | 60.00             | 6.00              | 0.00             |
| 198.33      | 70.00             | 7.00              | 0.00             |
| 226.66      | 80.00             | 8.00              | 0.00             |
| 255.00      | 90.00             | 9.00              | 0.00             |
| 283.33      | 100.00            | 10.00             | 0.00             |
| 311.66      | 110.00            | 11.00             | 0.00             |
| 340.00      | 120.00            | 12.00             | 0.00             |

1985 NISSAN SENTRA INTO POLE BARRIER AT 35.0 MPH TEST NO. 5  
 VEHICLE CG RESULTANT DISPLACEMENT

APPENDIX C

MISCELLANEOUS TEST INFORMATION

VEHICLE ACCELEROMETER INFORMATION

| NO. | LOCATION                     | AXIS | MFR     | MODEL | S/N   | ORIENTATION<br>(+ SENSING) |
|-----|------------------------------|------|---------|-------|-------|----------------------------|
| 1   | LEFT REAR SILL               | X    | ENDEVCO | 7264  | CW82H | REAR                       |
| 2   | RIGHT REAR SILL              | X    | ENDEVCO | 7264  | CY12H | REAR                       |
| 3   | VEHICLE CENTER<br>OF GRAVITY | X    | ENDEVCO | 7264  | CY78H | REAR                       |
|     | VEHICLE CENTER<br>OF GRAVITY | Y    | ENDEVCO | 7264  | CJ81H | RIGHT                      |



SIGN CONVENTION

ALL DUMMY, BARRIER AND VEHICLE CHANNELS:

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