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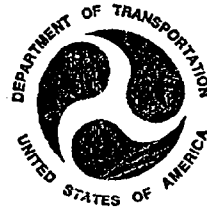
REPORT NO. MGA-96-N014

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

GENERAL MOTORS CORPORATION
1996 GEO TRACKER 4X4
NHTSA NO. MT0107

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: February 5, 1996

Report Date: February 15, 1996

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
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16. Abstract A 56 kph (35 mph) frontal barrier impact using a 30 load cell barrier was conducted on a 1996 Geo Tracker 4x4 at the MGA Proving Grounds and Crash Test Center in Burlington, WI. on February 5, 1996. The barrier impact velocity was 56.6 kph (35.2 mph), and the ambient temperature at the time of impact was 21°C. The post-test maximum static crush was 424 mm. The test vehicle appeared to comply with the requirements of the following Federal Motor Vehicle Safety Standards: 1. FMVSS 212, "Windshield Mounting" 2. FMVSS 219 (partial), "Windshield Zone Intrusion" 3. FMVSS 301, "Fuel System Integrity" With regard to FMVSS 208, "Occupant Crash Protection" injury criteria, the driver's HIC was 930 and the 3 msec. Clip (Chest g's) was 64 g's. The left and right femur loads for the driver were 5883 and 5908 Newtons, respectively. The passenger's HIC was 666 and the 3 msec Clip was 62 g's. The left and right femur maximum loads were 3174 and 7018 Newtons respectively.			
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Date of Report Acceptance

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SECTION 1
PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY'96 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-D-12121. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48 kph (30 mph) FMVSS 208/212/219/301-75 requirements.

The 56 kph (35 mph) frontal barrier impact test was conducted in accordance with the National Highway Traffic Safety Administration (NHTSA) Indicant Test Procedure for New Car Assessment Program (NCAP) dated January 1, 1990. Data for FMVSS No. 212, "Windshield Mounting", FMVSS No. 219 (Partial), "Windshield Zone Intrusion", FMVSS No. 301-75, "Fuel System Integrity," as well as occupant performance data are provided herein.

SECTION 2

SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 30 load cells was impacted by a 1996 Geo Tracker 4x4 at a velocity of 56.6 kph (35.2 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on February 5, 1996. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 16 high speed cameras. Camera locations and other pertinent camera information can be found in this report.

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

Both ATDs were fully instrumented with head and chest primary and redundant triaxial accelerometers, pelvis triaxial accelerometers, chest displacement transducer, neck load cell, right/left femur load cells, right/left lower leg sensors, and right/left feet accelerometers. Seat belt load cells were also on the driver and passenger shoulder and lap belts to measure dummy torso and pelvic section loading. Calibrated ATDs, driver (serial No. 065), and the right front passenger (Serial No. 066), were used for this test. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 109 channels of data were recorded on 10 computers. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the inflated airbag. The driver HIC was 930 and the maximum chest (CLIP) deceleration over 3 milliseconds was 64 g's. The maximum chest displacement was 43 mm. The left and right femur loads were 5883 and 5908 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 666 and maximum chest (CLIP) deceleration over 3 milliseconds was 62 g's. The maximum chest displacement was 44 mm. The left and right femur loads were 3174 and 7018 Newtons respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1996/Geo/Tracker/4x4

NHTSA No.: MT0107 VIN.: 2CNBJ1864T6925862

Body color: Purple Date of Manufacture: 12/95

Engine: 4 Cylinders; C.I.D.; 1.6 Liters;
 X Gas; Diesel; Turbocharged

 X Longitudinal; Transverse

Transmission: 3 Speed; Manual; X Automatic; X Overdrive

Final Drive: Front Wheel; Rear Wheel; X Four Wheel

Odometer Reading: 53 miles

 A/C; X P/S; X P/B; P/wdo;
 P/seats; Tilt Wheel; Cruise Control;

Type of Occupant Restraint: Type II belts with driver and passenger airbags

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 159 kPa (23 Psi) Rear 159 kPa (23 Psi)

Recommended Tire Size: P205/75R15

Recommended Cold Tire Pressure: Front 159 kPa (23 Psi) Rear 159 kPa (23 Psi)

Tires on Vehicle: P205/75R15; Manufacturer: Goodyear

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

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

Type of Front Seat Back: Fixed; X Adj. With; Power; X Lever

Vehicle Capacity Weight (VCW) = 335.7 kg. (A)

No. of Occupants x 68.0 kg. = 272.0 kg. (B)

Rated Cargo Weight (RCW) A-B = 63.7 kg.

GVWR 1500 kg. GAWR: Front 710 kg.; Rear 900 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 313.9 kg Right Rear = 258.6 kg
Left Front = 314.3 kg Left Rear = 247.7 kg
TOTAL FRONT WEIGHT = 628.2 kg (55.4% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 506.3 kg (44.6% of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1134.5 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1134.5 kg
VCW = Vehicle Capacity Weight 335.7 kg
DSC = Designated Seating Capacity 4 RCW = VCW - 68 (DSC) = 63.7 kg
Target Test Weight = UDW + RCW + (2 dummies x 78.0 kg/dummy)
Target Test Weight = 1354.2 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 345.6 kg Right Rear = 328.0 kg
Left Front = 350.6 kg Left Rear = 322.5 kg
TOTAL FRONT WEIGHT = 696.2 kg (51.7% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 650.5 kg (48.3% of Total Vehicle Weight)
TOTAL TEST WEIGHT = 1346.7 kg
Weight of ballast secured in vehicle trunk area = 0 kg
Vehicle components removed to meet target weight: Spare tire and mount

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude: RF 768 LF 769 RR 794 LR 796
Test Attitude: RF 758 LF 760 RR 768 LR 769
Wheel Base: 2210 mm; C.G. = 1068 mm rearward of front wheel C/L
Remarks: None Noted

* light trucks and MPVs RCW is 136 kgs or manufacturer's value, whichever is less

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

POST-IMPACT DATA:

Type of Test: 35 mph Frontal Impact Impact Angle: 90°
Date of Test: February 5, 1996 Time of Test: 2:44 p.m.
Ambient Temperature: 21 °C (Spec. Range = 18.8 to 25.6°C)
Temperature in Occupant Compartment: 21.° C
Windshield Molding Temperature: 21.° C
Required Impact Velocity Range: 55.5 to 57.1 kph
Impact Velocity: primary = 56.6 kph; secondary = 56.8 kph
Distance From Front Bumper to Barrier Face When
Entering Speed Trap: 1305 mm
Exiting Speed Trap: 305 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length: Pre-test = R 3446 C_L 3557 L 3450
Post-test = R 3083 C_L 3133 L 3049
Crush = R 363 C_L 424 L 401

Distance from front of test vehicle to point of impact (rebound):

R 348 mm C_L 247 mm L 355 mm

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Airbag and side header</u>	<u>Airbag and B-Post</u>
Chest	<u>Airbag</u>	<u>Airbag</u>
Abdomen	<u>Airbag</u>	<u>Airbag</u>
Left Knee	<u>Dash panel</u>	<u>Dash panel</u>
Right Knee	<u>Dash panel</u>	<u>Dash panel</u>

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

Front

<u>Post-Test Door Opening</u>	<u>Left</u>	<u>Right</u>
(without use of tools)	<u>No</u>	<u>Yes</u>

Front

<u>Seat Movement</u>	<u>Left</u>	<u>Right</u>
Seat Back Movement	<u>0</u>	<u>0</u>
Seat Shift (mm)	<u>6 mm forward</u>	<u>8 mm forward</u>

Glazing Damage

Backlight/Windshield Windshield cracked

Other Notable Impact Effects: None

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

POST TEST AIRBAG DATA

Vehicle Yr/Make/Model/Body Style: 1996/Geo/Tracker/4x4

NHTSA No.: MT0107 VIN.: 2CNBJ1864T6925862

- A. Number of Vent Holes: Driver 2; Passenger 2
- B. Size of Vent Holes: Driver 38 mm; Passenger 50 mm
- C. Total Vent Area; Driver 11.3 cm² Passenger 19.6 cm²
- D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter
Driver; Length __, Width __, Diameter 559 mm
Passenger; Length 648 mm, Width 457, Diameter __ mm
- E. Is the Airbag Tethered?
Driver; __ Yes; X No;
Passenger; __ Yes; X No,

SECTION 3

SUMMARY OF RESULTS FOR-----

FMVSS 212, "Windshield Mounting"

FMVSS 219 (Partial), "Windshield Zone Intrusion"

FMVSS 301-75, "Fuel System Integrity"

FMVSS NO. 212, "WINDSHIELD MOUNTING", DATA SHEET

Details of windshield mounting such as retention method, trim type, etc.:

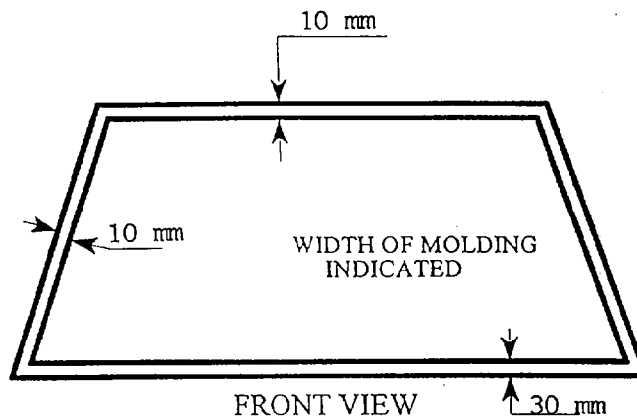
Windshield set in rubber molding with glue

FMVSS 212 Requirements: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		PERCENT RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	1804	1804	100%
LEFT SIDE	1807	1807	100%
TOTAL	3611	3611	100%

AREA OF RETENTION FAILURE: None



FAILURE DETAILS: None

FMVSS NO. 219, "WINDSHIELD ZONE INTRUSION", DATA SHEET

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the surface of the instrument panel, including padding, and drawing the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contact points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 1/2" distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

FMVSS 219 TEST DATA:

A= 1030 mm

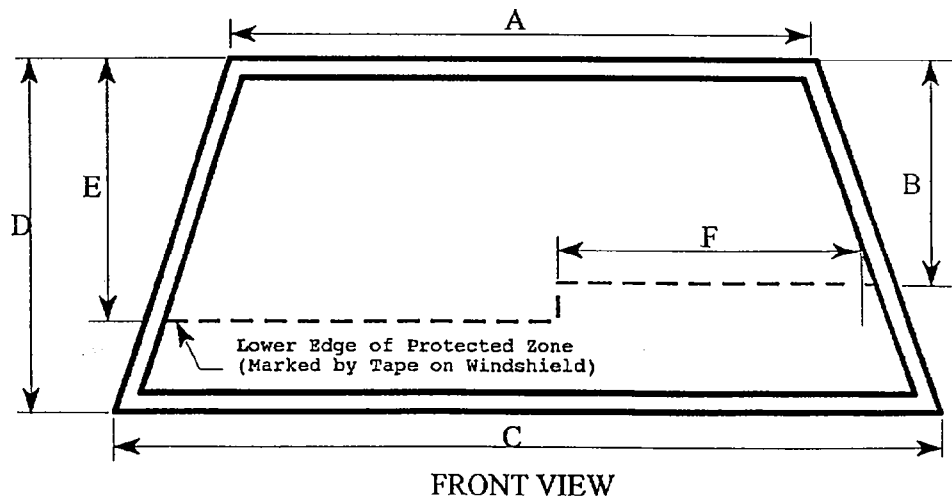
B= 536 mm

C= 1324 mm

D= 627 mm

E= 442 mm

F= 436 mm



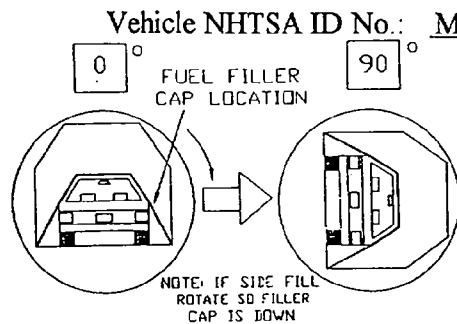
DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":

(Show location of penetration)

NONE

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 45 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 45 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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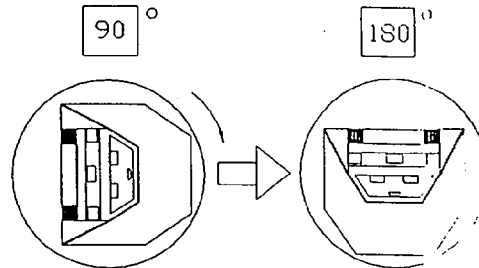
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° - 180°

Vehicle NHTSA ID No.: MT0107



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 30 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 30 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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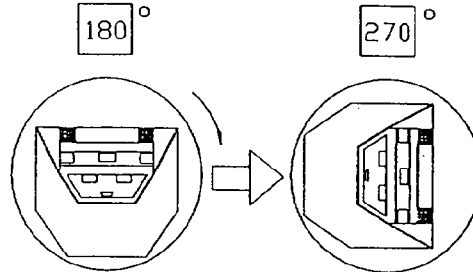
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° - 270°

Vehicle NHTSA ID No.: MT0107



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 15 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 15 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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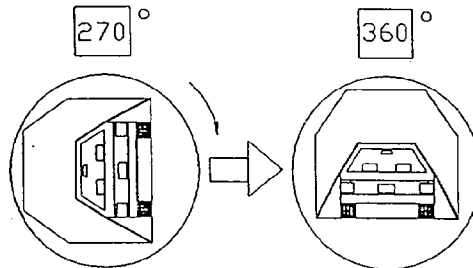
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° - 360°

Vehicle NHTSA ID No.: MT0107



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 35 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 35 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.
------------------------------------	----------	----------	-------------------

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0
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Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

SECTION 4
OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Camera Locations
6. Vehicle Target Locations

II. OVR DATA

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

III. AID DATA

1. Accident Investigation Damage Data Summary

FMVSS NO. 208, "OCCUPANT CRASH PROTECTION", DATA SHEET

VEH. YR./MAKE/MODEL/BODY STYLE: 1996/Geo/Tracker/4x4

VEH. NHTSA NO.: MT0107 TEST DATE: February 5, 1996

MAX. ACCELERATION VALUES: (g's)	DRIVER #065	PASSENGER #066
Head Channel X	-74.2 @ 68 msec.	-61.8 @ 74 msec.
Head Channel Y	54.1 @ 196 msec.	-9.2 @ 51 msec.
Head Channel Z	39.2 @ 196 msec.	31.9 @ 69 msec.
HEAD RESULTANT	96.4 @ 196 msec.	68.3 @ 72 msec.
Chest Channel X	-65.6 @ 68 msec.	-64.1 @ 65 msec.
Chest Channel Y	-6.0 @ 47 msec.	5.1 @ 53 msec.
Chest Channel Z	-16.9 @ 91 msec.	-13.1 @ 86 msec.
CLIP	63.9	61.9
TIME INTERVAL (msec) [0.003 seconds minimum]	$t_1 = 66.4$ $t_2 = 69.5$	$t_1 = 63.8$ $t_2 = 66.9$

HEAD INJURY CRITERIA (HIC)
VALUES:

HIC	929.7	666.1
$t_1 =$ (msec)	53.8	56.8
$t_2 =$ (msec)	86.7	90.1
Avg. Accel. t_1 to t_2 (g's)	60.3	52.5

[The maximum time interval from t_1 to t_2 is 36 milliseconds.]

MAX. COMPRESSIVE FEMUR FORCES:

Left Side (N)	5883	3174
Right Side (N)	5908	7018

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	2383	2419
Shoulder Belt (N)	8145	9457

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1996/Geo/Tracker/4x4

VEHICLE NHTSA NO.: MT0107 TEST DATE: February 5, 1996

MAXIMUM VALUES	DRIVER DUMMY #065	PASSENGER DUMMY #066
Neck Load X (N)	-482 @ 53 msec.	-843 @ 115 msec.
Neck Load Y (N)	-278 @ 199 msec.	167 @ 104 msec.
Neck Load Z (N)	-2606 @ 66 msec.	-2152 @ 68 msec.
Neck Moment X (NM)	14.2 @ 199 msec.	-14.6 @ 57 msec.
Neck Moment Y (NM)	45.3 @ 117 msec.	57.6 @ 120 msec.
Neck Moment Z (NM)	18.4 @ 85 msec.	No Valid Data Collected
Chest Deflection X (mm)	43.1	44.0
Time of Max. Occurrence	68 msec.	73 msec.
Pelvis X Acceleration (g's)	-71.0 @ 49 msec.	-67.1 @ 48 msec.
Pelvis Y Acceleration (g's)	26.1 @ 65 msec.	-15.2 @ 72 msec.
Pelvis Z Acceleration (g's)	-30.4 @ 67 msec.	-26.8 @ 74 msec.
Pelvis Resultant (g's)	72.5 @ 49 msec.	69.1 @ 48 msec.

PART 572 DUMMY IN-VEHICLE POSITION

Vehicle NHTSA No.: MT0107 Vehicle: 1996 Geo Tracker 4x4

SEAT TYPE:

 Bench
 X Bucket
 Split Bench

ADJUSTER TYPE:

Driver: X Manual
 Power

Passenger: X Manual
 Power

BUCKET SEAT BACK TYPE:

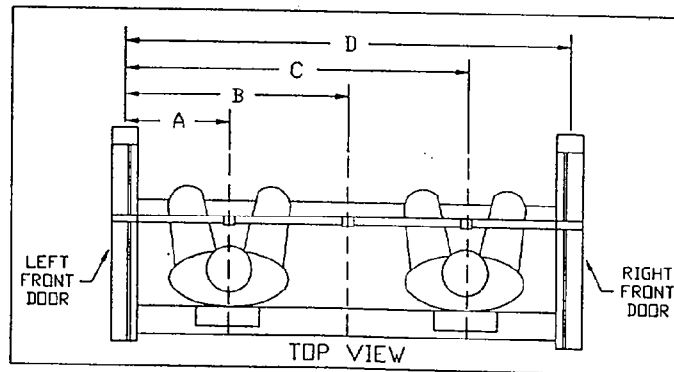
 Fixed
 X Adjustable Reclining

DRIVER SEAT POSITION

7th detent of 13 detents

PASSENGER SEAT POSITION

7th detent of 13 detents



065 DUMMY ID 066

A = Left Door to Driver Centerline	<u>335</u> mm
B = Left Door to Center Passenger Centerline	<u>697</u> mm
C = Left Door to Right Passenger Centerline	<u>1045</u> mm
D = Left Door to Right Door	<u>1394</u> mm

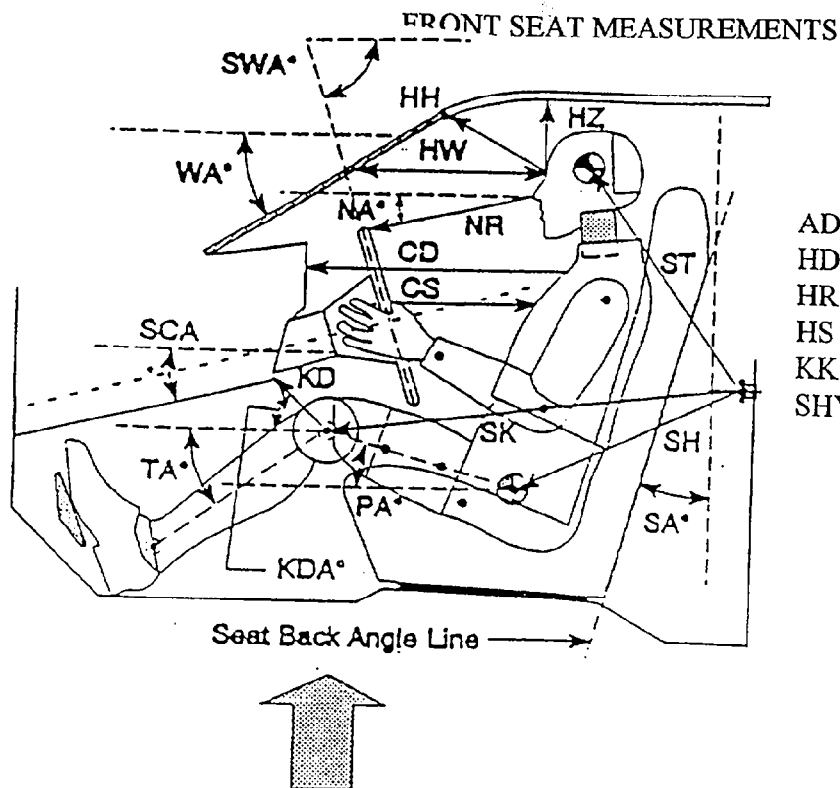
FRONT SEAT MEASUREMENT TABLE

Units (mm)

	DRIVER (Serial #065)	PASSENGER (Serial #066)
WA°	44.7°	
SWA°	30.8°	N/A
SCA°	30.9°	N/A
SA°	4th notch rearward (1st is zero)	4th notch rearward (1st is zero)
HZ	233	237
HH	508	486
HW	655	631
HR	234	242
NR	455 Angle (NA) 11.5°	N/A
CD	549	563
CS	354	N/A
RA	224	N/A
KDL	200 Angle (KDA) 1.0°	193
KDR	194	195 Angle 23.4°
PA°	21.5°	22.6°
TA°	38.6°	41.1°
KK	272	238
ST*	617 Angle 11.5°	626 Angle 17.5°
SK*	656 Angle 89.0°	659 Angle 91.0°
SH*	247 Angle 101.6°	269 Angle 106.8°
SHY	182	188
HS	255	257
HD	118	110
AD	72	65

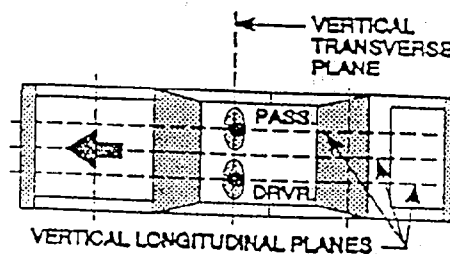
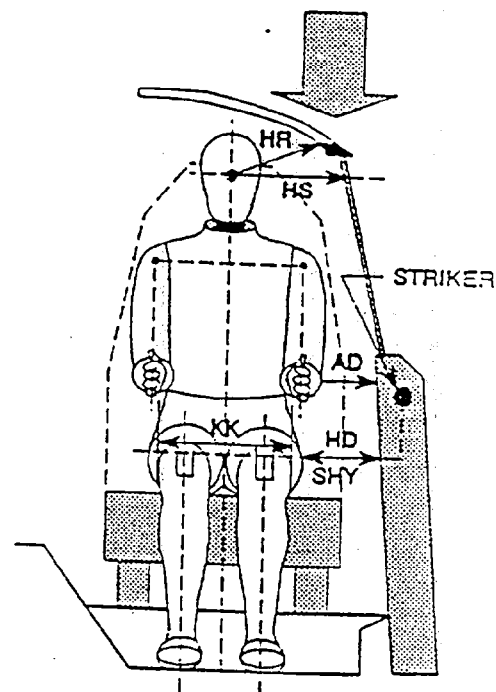
N/A = Not Applicable

* Angles measured from vertical

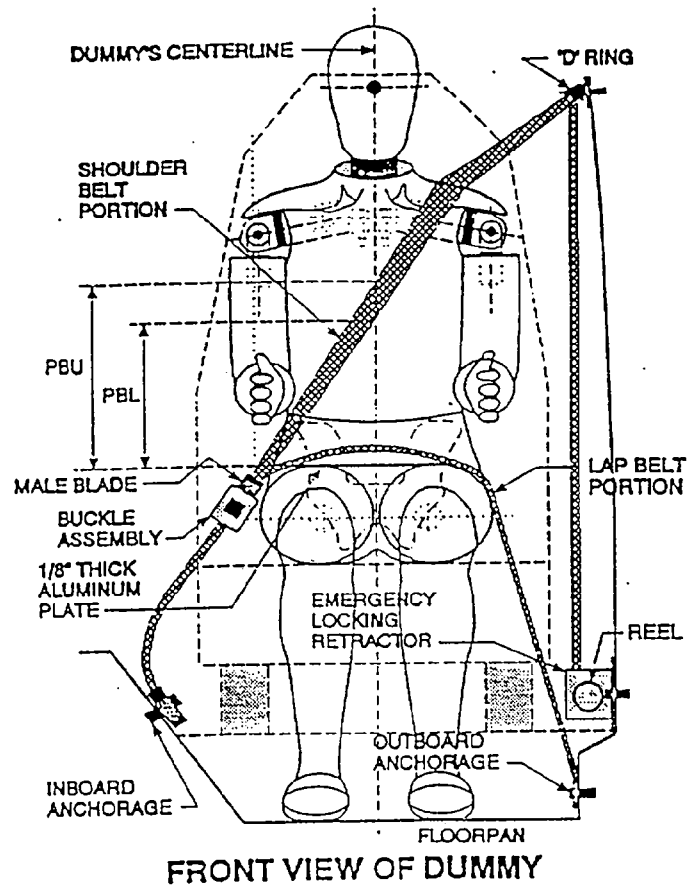


- AD - Arm to Door
- HD - H-Point to Door
- HR - Head to Side Header
- HS - Head to Side Window
- KK - Knee to Knee
- SHY - Striker to H-Point (Y-Direction)

- CD - Chest to Dash
- CS - Steering Wheel to Chest
- HH - Head to Header
- HW - Head to Windshield
- HZ - Head to Roof
- KDA - Knee to Dash Angle
- KDL - Left Knee to Dash
- KDR - Right Knee to Dash
- NA - Nose to Rim Angle
- NR - Nose to Rim
- PA - Pelvic Angle
- RA - Rim to Abdomen
- SA - Seat Back Angle
- SCA - Steering Column Angle
- SH - Striker to H-Point
- SK - Striker to Knee
- ST - Striker to Head
- SWA - Steering Wheel Angle
- TA - Tibial Angle
- WA - Windshield Angle



SEAT BELT POSITIONING DATA



(illustration)

		Dimension = mm	
		DRIVER DUMMY	PASSENGER DUMMY
PBU --	Top surface of alum. plate to upper edge	360	342
PBL --	Top surface of alum. plate to belt lower edge	275	254

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

	<u>Driver</u>	<u>Passenger</u>
Length from trim above retractor reel to "D" ring as measured on dummy.	<u>340 mm</u>	<u>331 mm</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>893 mm</u>	<u>911 mm</u>
Lap belt length as measured on Part 572 Dummy.	<u>895 mm</u>	<u>899 mm</u>

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis	<u>NR</u>	<u>NR</u>
As determined mechanically	<u>111 mm</u>	<u>106 mm</u> at retractor
	<u>108 mm</u>	<u>131 mm</u> at D-ring
As determined electronically	<u>NR</u>	<u>NR</u>

BELT STRETCH DATA:

Measured electronically between shoulder belt load cell and the "D" ring.	<u>NR</u>	<u>NR</u>
Measured mechanically	<u>NR</u>	<u>NR</u>

RETRACTOR LOCK-UP TIME:

As determined by shoulder belt spool-off observed in on-board cameras	<u>NR</u>	<u>NR</u>
---	-----------	-----------

NR Not Recorded

CAMERA LOCATIONS

VEH. NHTSA NO.: MT0107 ; TEST DATE: February 5, 1996 ; TIME: 2:44 p.m.

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1996/Geo/Tracker/4x4

CAMERA POSITION NO.	VIEW	CAMERA POSITIONS (mm.)*			ANGLE (deg)	FILM PLANE TO HEAD TARGET (mm)	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Left Side View	-	-	-	-	-		
2	Left Front View	710	9740	1570	90°	9280	25	1087
3	Steering Column Top	1410	8540	1550	90°	8080	25	1015
4	Steering Column Bottom	1410	8540	1030	90°	8080	25	1020
5	Left Driver Close-up	1180	8000	1490	90°	7540	50	1026
6	Left Angle	5000	6000	2170			50	1198
7	Driver Onboard						35	NR
8	Passenger Onboard						35	NR
9	Right Overall	1900	1680	1320	90°	1220	13	971
10	Right Front	950	7950	1370	90°	7490	25	1538
11	Right Passenger Close-up	1300	7550	1380	90°	7090	50	1031
12	Right Angle	5000	6810	2080			50	952
13	Top View Wide	1830	0	5025			8	1042
14	Top Driver	-350	335	2470			13	1015
15	Top Passenger	-340	-380	2470			13	948
16	Pit Engine	1060	0	3255			13	1000
17	Fuel Tank	2260	0	3180			13	1081

*** COORDINATES:**

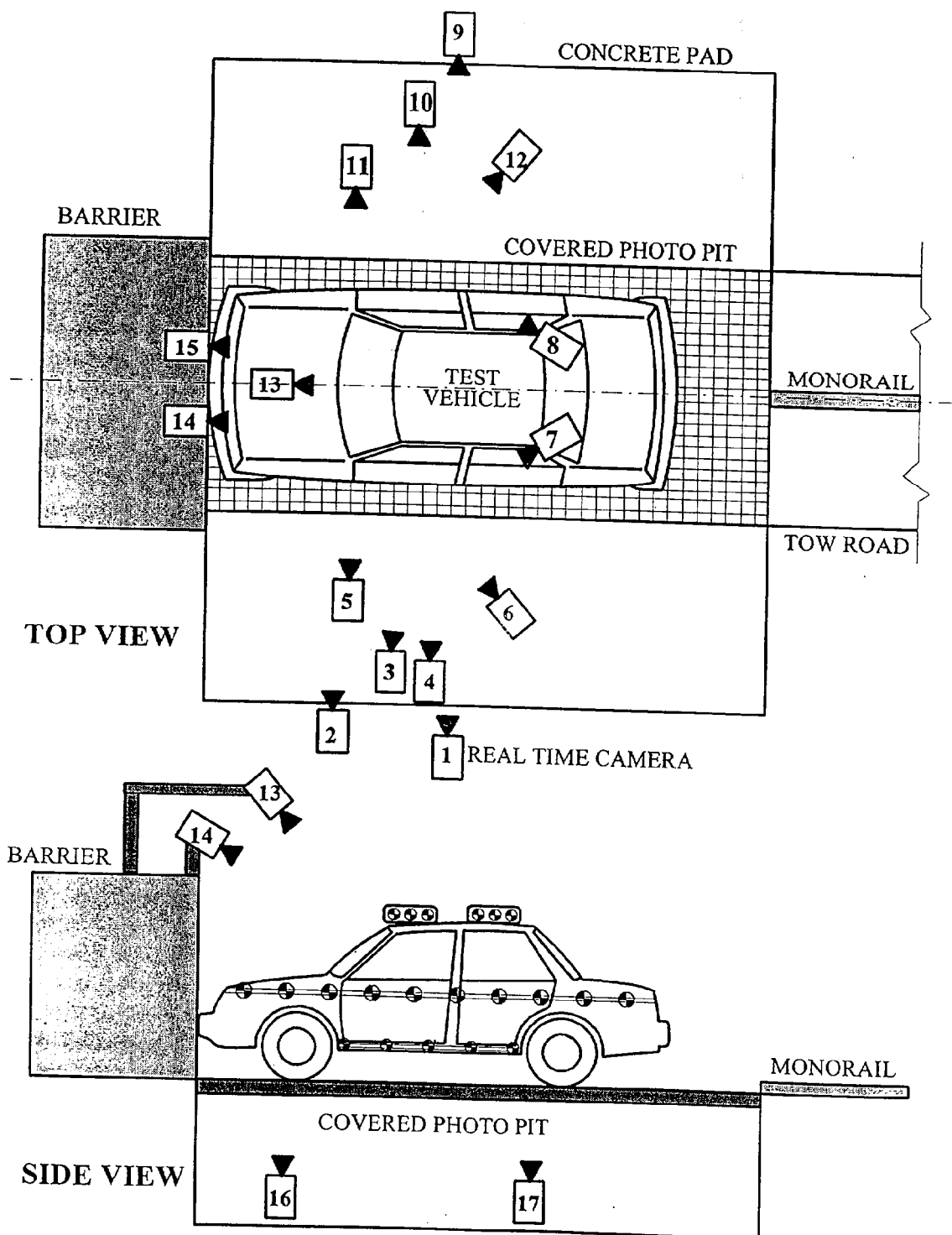
+X = film plane rearward of barrier

+Y = film plane to left of monorail centerline

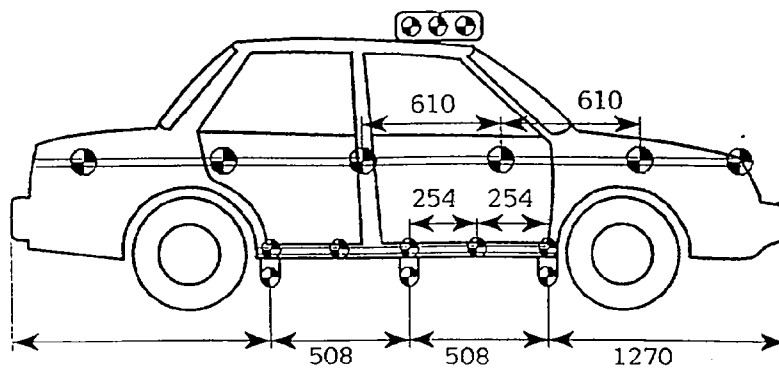
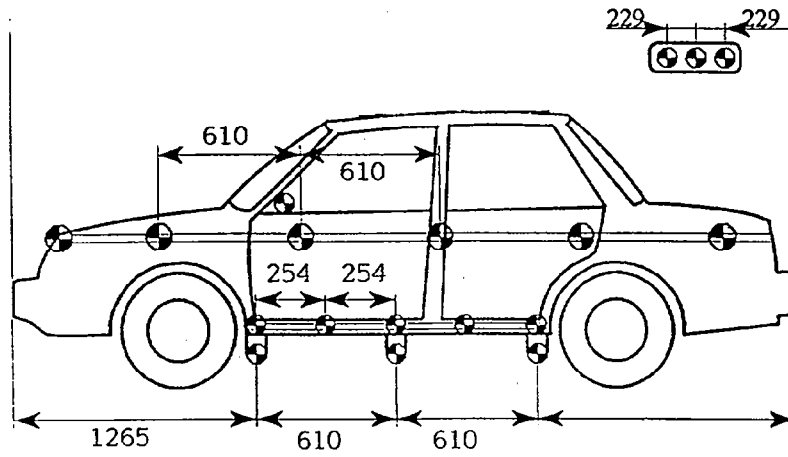
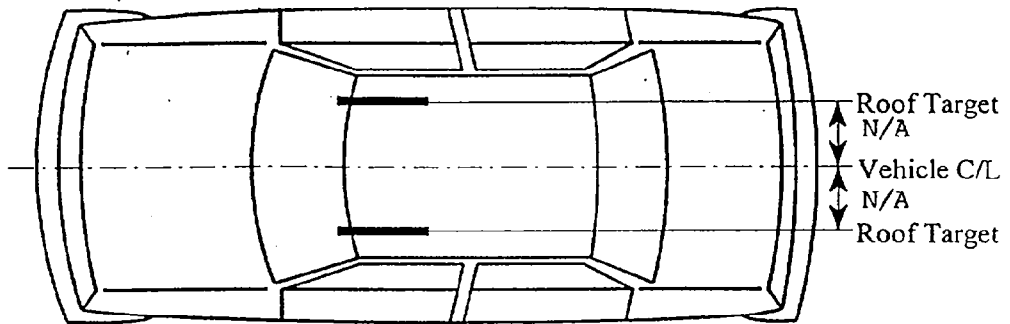
+Z = film plane to above ground level

ORIGIN: For X and Y it is the Impact Point. For Z it is the Floor.

CAMERA LOCATIONS (Cont'd)



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(DIMENSIONS IN MM)

LOAD CELL LOCATIONS ON FIXED BARRIER

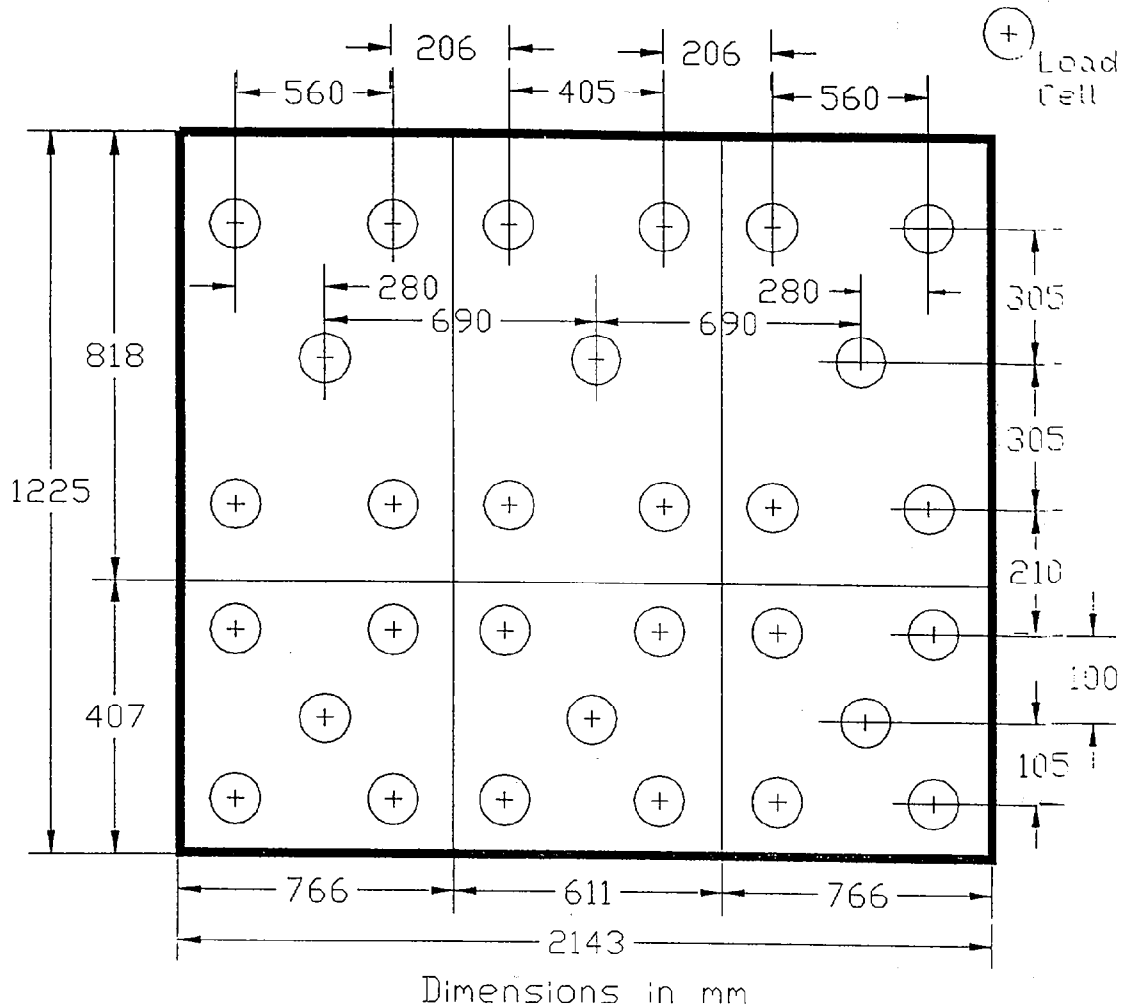
30 Load Cells

6 Rows

9 Columns

6 Groupings (5 cells/group)

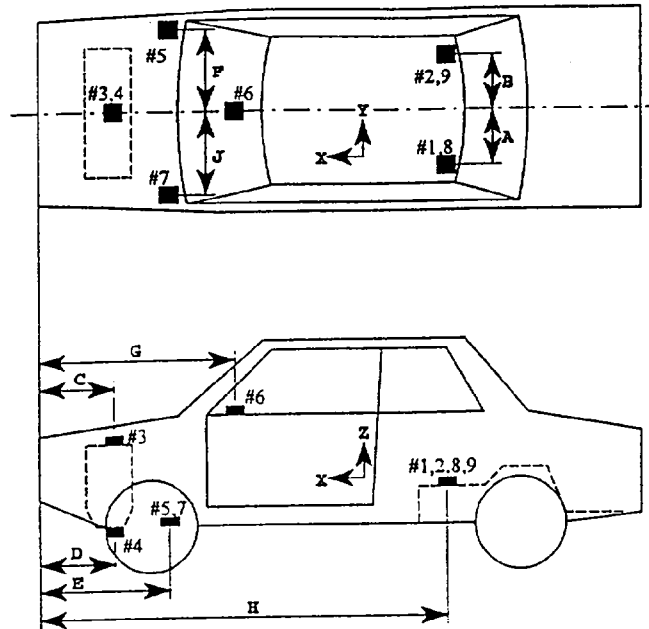
FRONTAL BARRIER FACE



The following data is presented in Appendix B:

- (1) Total or Sum of 30 individual load cells
- (2) Data from 6 Groupings shown above (5 cells/group)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



Units: (mm)

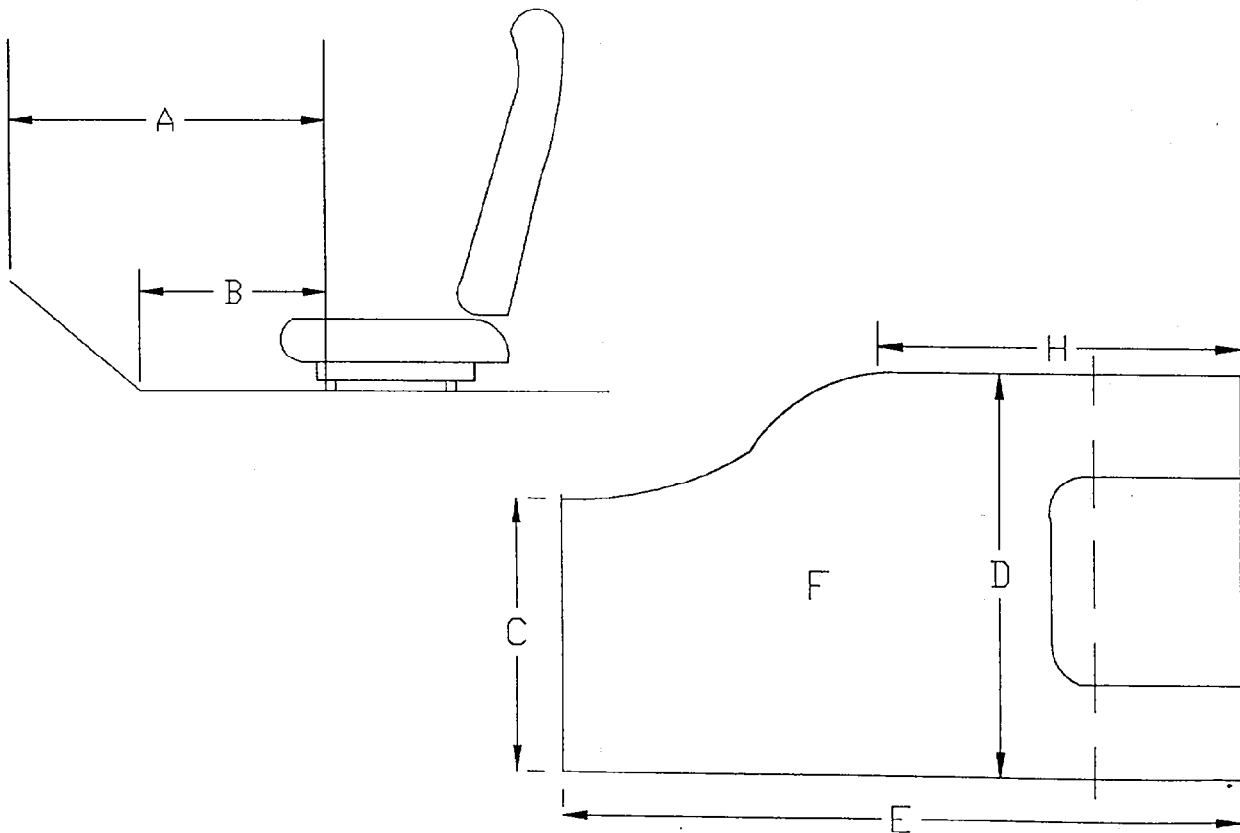
Dimension	Length
A	420
B	420
C	688
D	829
E	825
F	605
G	1476
H	2586
J	605

ACCEL. NO.	ACCELEROMETER	DIRECTION
1 and 8	Left Rear Seat Crossmember	X
2 and 9	Right Rear Seat Crossmember	X
3	Top of Engine	X
4	Bottom of Engine	X
5	Right Side Brake Caliper	X
6	Instrument Panel	X
7	Left Disc Brake Caliper	X

TEST VEHICLE MEASUREMENTS

STATIC FOOTWELL DEFORMATION

Driver's Side



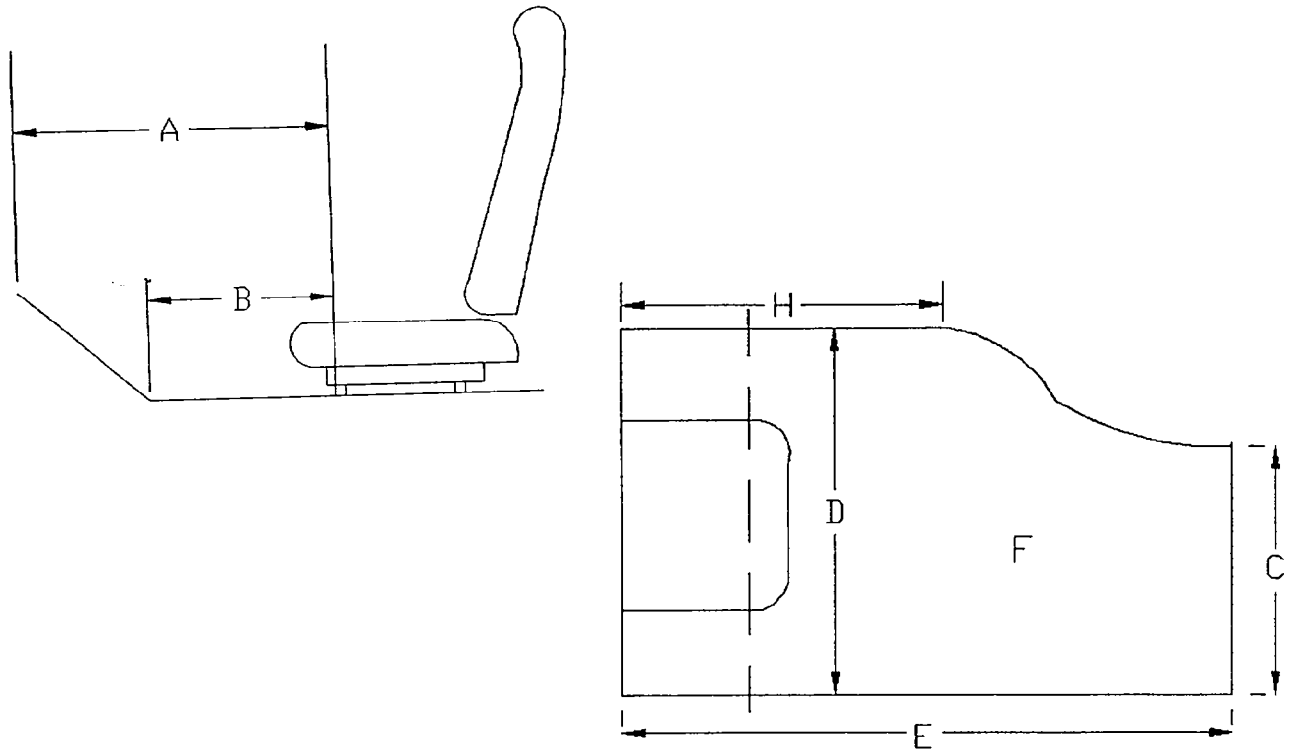
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	802	600	202
B	607	542	65
C	454	412	42
D	403	404	-1
E	1998	1952	46
H	1811	1750	61
F (cm ²)	8571	7964	607

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC FOOTWELL DEFORMATION

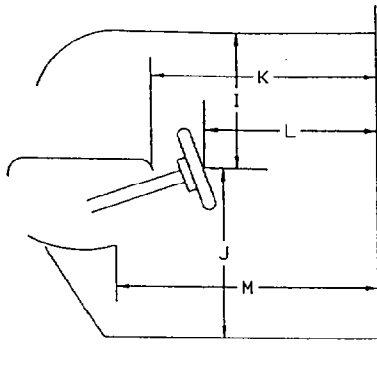
Passenger's Side



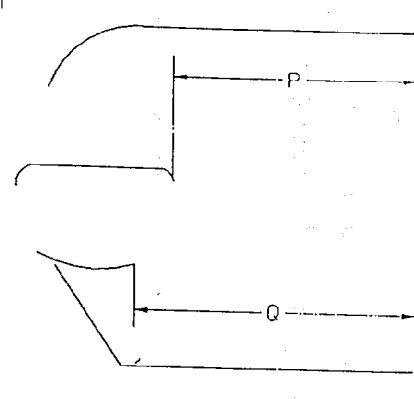
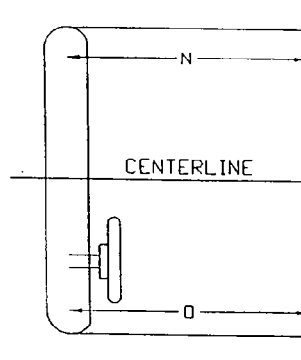
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	599	588	11
B	566	558	8
C	346	342	4
D	387	386	1
E	1967	1950	17
H	1706	1760	-54
F (cm ²)	7219	7098	121

TEST VEHICLE MEASUREMENTS (Cont'd)
STATIC PASSENGER COMPARTMENT INTRUSION



MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



Units = mm

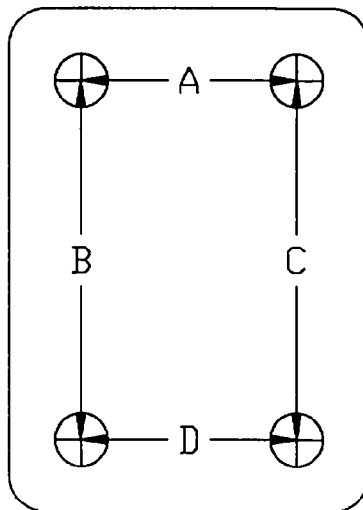
MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
I	551	474	77
J	683	754	-71
K	1684	1628	56
L	1503	1474	29
M	1745	1780	-35
N	1952	1902	50
O	1957	1894	63
P	NR	NR	N/A
Q	1854	1782	72

NR = Not Recorded

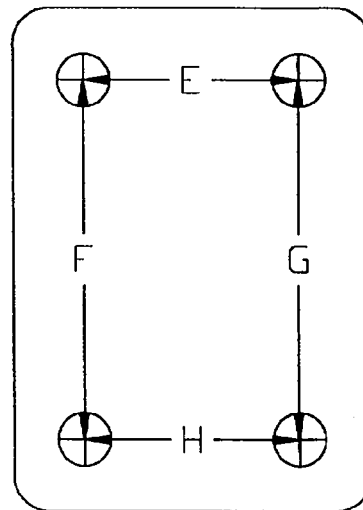
TEST VEHICLE MEASUREMENTS (Cont'd)

UNDERBODY FLOORBOARD DEFORMATION

DRIVER'S SIDE



PASSENGER'S SIDE

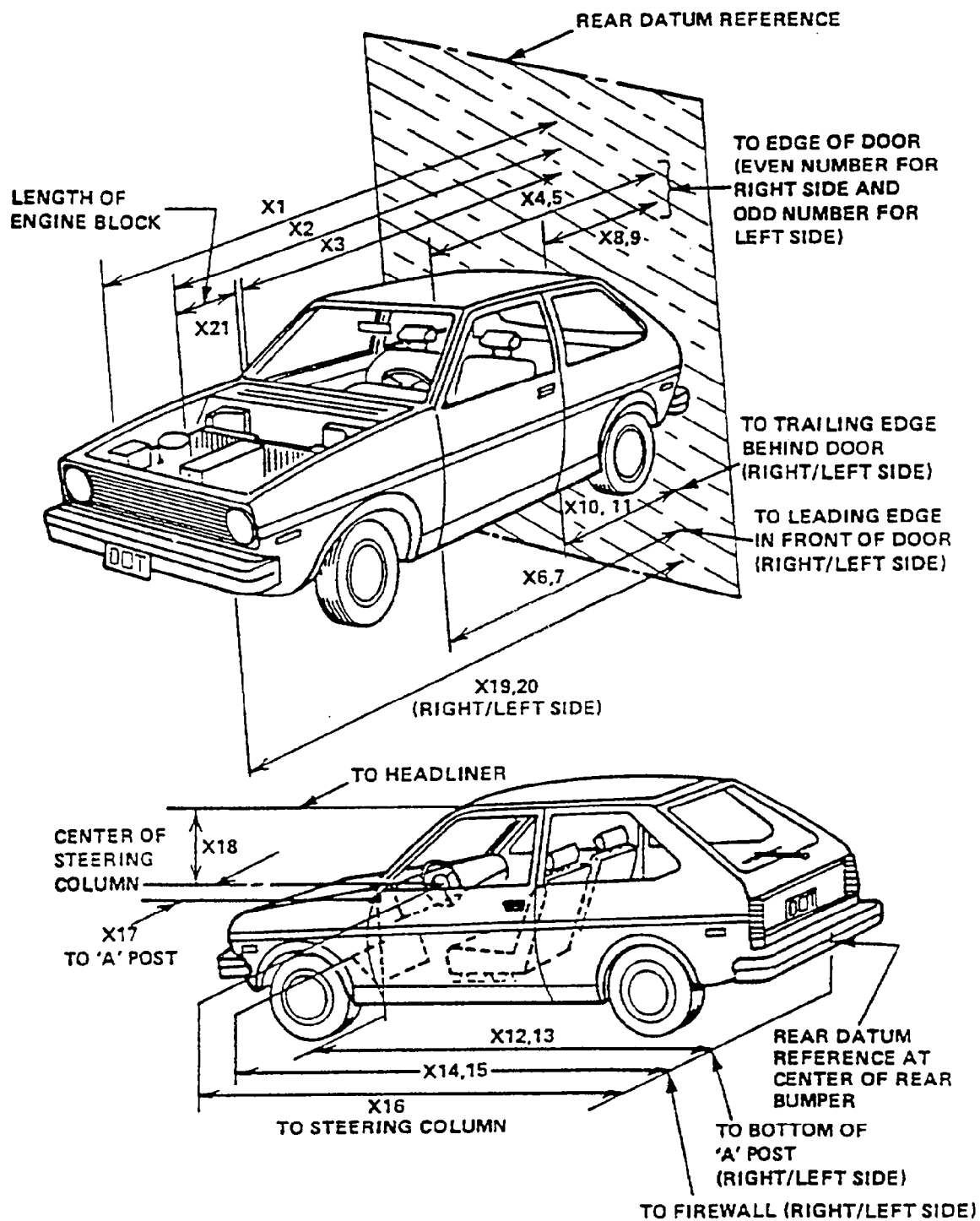


MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	375	355	20
B	610	606	4
C	659	650	9
D	384	384	0
E	314	318	-4
F	604	604	0
G	599	594	5
H	378	380	-2

TEST VEHICLE MEASUREMENTS (Cont'd)

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	3557	3133	424
X2	Rear Surface of Vehicle to Front of Engine	3052	2874	178
X3	Rear Surface of Vehicle to Firewall	2502	2353	149
X4	Rear Surface to Upr. Leading Edge of Rt. Door	2310	2297	13
X5	Rear Surface to Upr. Leading Edge of Left Door	2307	2297	10
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	2286	2256	30
X7	Rear Surface to Lwr. Leading Edge of Left Door	2281	2274	7
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	1204	1179	25
X9	Rear Surface to Upr. Trailing Edge of Left Door	1184	1202	-18
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	1253	1231	22
X11	Rear Surface to Lwr. Trailing Edge of Left Door	1252	1245	7
X12	Rear Surface to Bottom of A-Post on Rt. Side	2289	2267	22
X13	Rear Surface to Bottom of A-Post on Left Side	2293	2286	7
X14	Rear Surface to Firewall on Right Side	2565	2520	45
X15	Rear Surface to Firewall on Left Side	2552	2504	48
X16	Rear Surface to Steering Column	1811	1881	-70
X17	Center of Steering Column to A-Post	451	445	6
X18	Center of Steering Column to Headlining	500	480	20
X19	Rear Surface to Right Side of Front Bumper	3446	3083	363
X20	Rear Surface to Left Side of Front Bumper	3450	3049	401
X21	Length of Engine Block	395	395	0

TEST VEHICLE MEASUREMENTS (Cont'd)



ACCIDENT INVESTIGATION DIVISION DATA
FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1996/Geo/Tracker/4x4

VEH. NHTSA NO.: MT0107; VIN: 2CNBJ1864T6925862

MODEL YEAR: 1996; BUILD DATE: 12/95; TEST DATE: February 5, 1996

VEH. SIZE CATEGORY: Special Purpose; TEST WEIGHT: 1347 kg

VEH. WHEELBASE: 2210 mm; FRONT OVERHANG: 685 mm; OVERALL WIDTH: 1605 mm

ACCELEROMETER DATA:

LOCATION: As per measurements on pages 4-13

CALIBRATION PROCEDURE: As per MGA Calibration Procedure

LINEARITY: >99.9%; INTEGRATION ALGORITHM: Trapezoidal

VEH. IMPACT SPEED: 56.6 kph; TIME OF SEPARATION: 62 msec

VELOCITY CHANGE: 61.6 kph

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE: F (Frontal)

CRUSH DEPTH C1 = 401 mm

DIMENSIONS: C2 = 395 mm

C3 = 392 mm

C4 = 400 mm

C5 = 387 mm

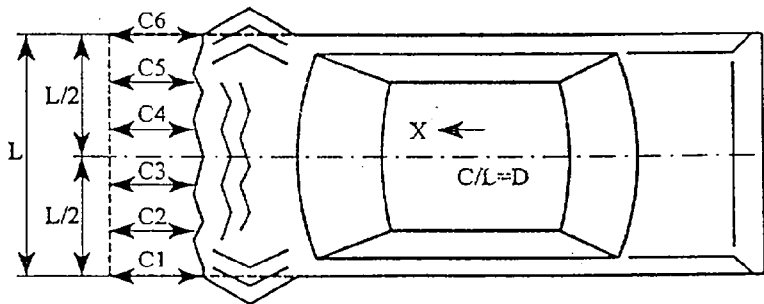
C6 = 363 mm

MIDPOINT OF D = Vehicle Centerline

DAMAGE: (Longitude)

LENGTH OF L = 1460 mm

DAMAGED REGION:



APPENDIX A
PHOTOGRAPHS

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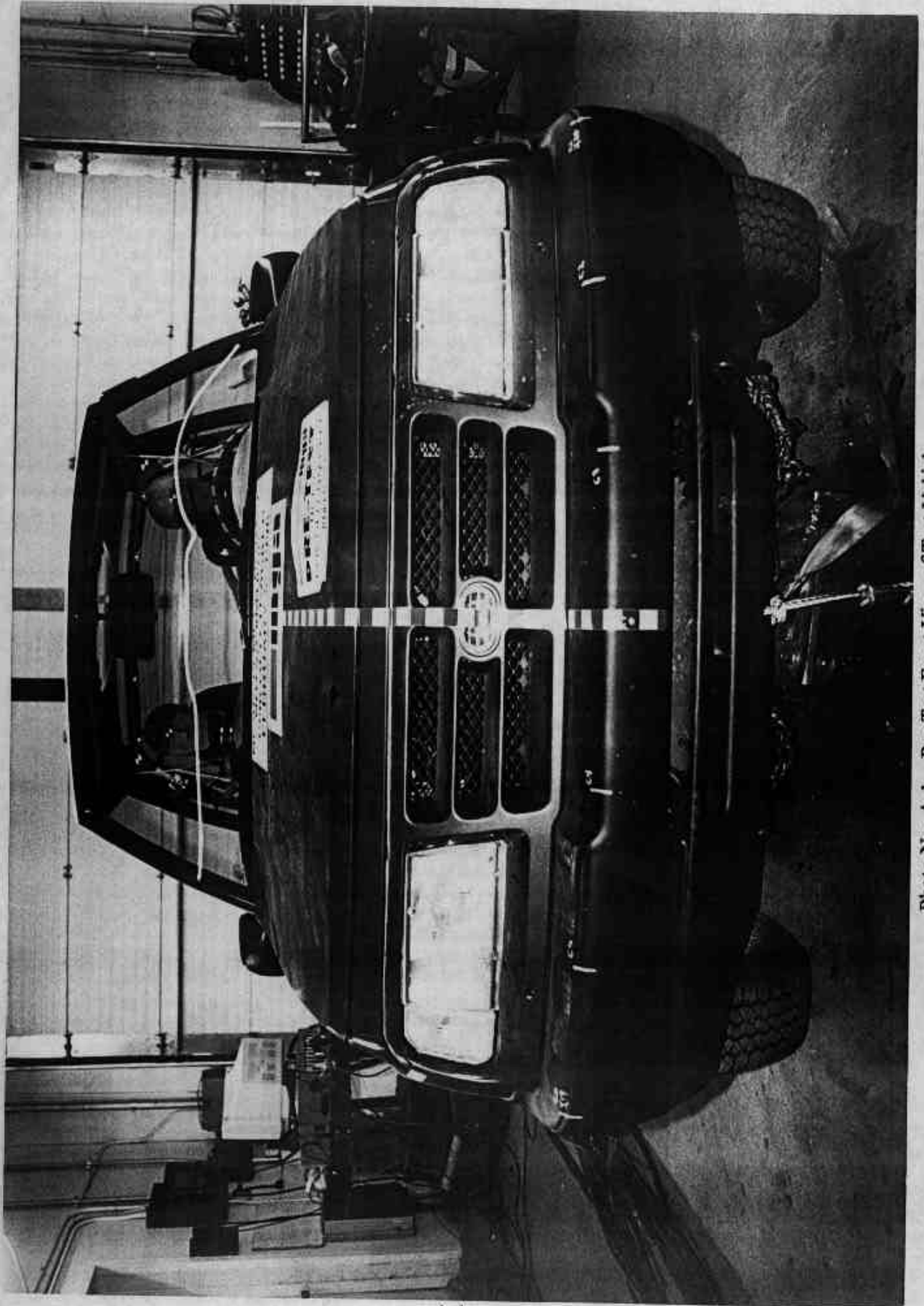


Photo No. A-1 - Pre-Test Front View of Test Vehicle



Photo No. A-2 - Post-Test Front View of Test Vehicle

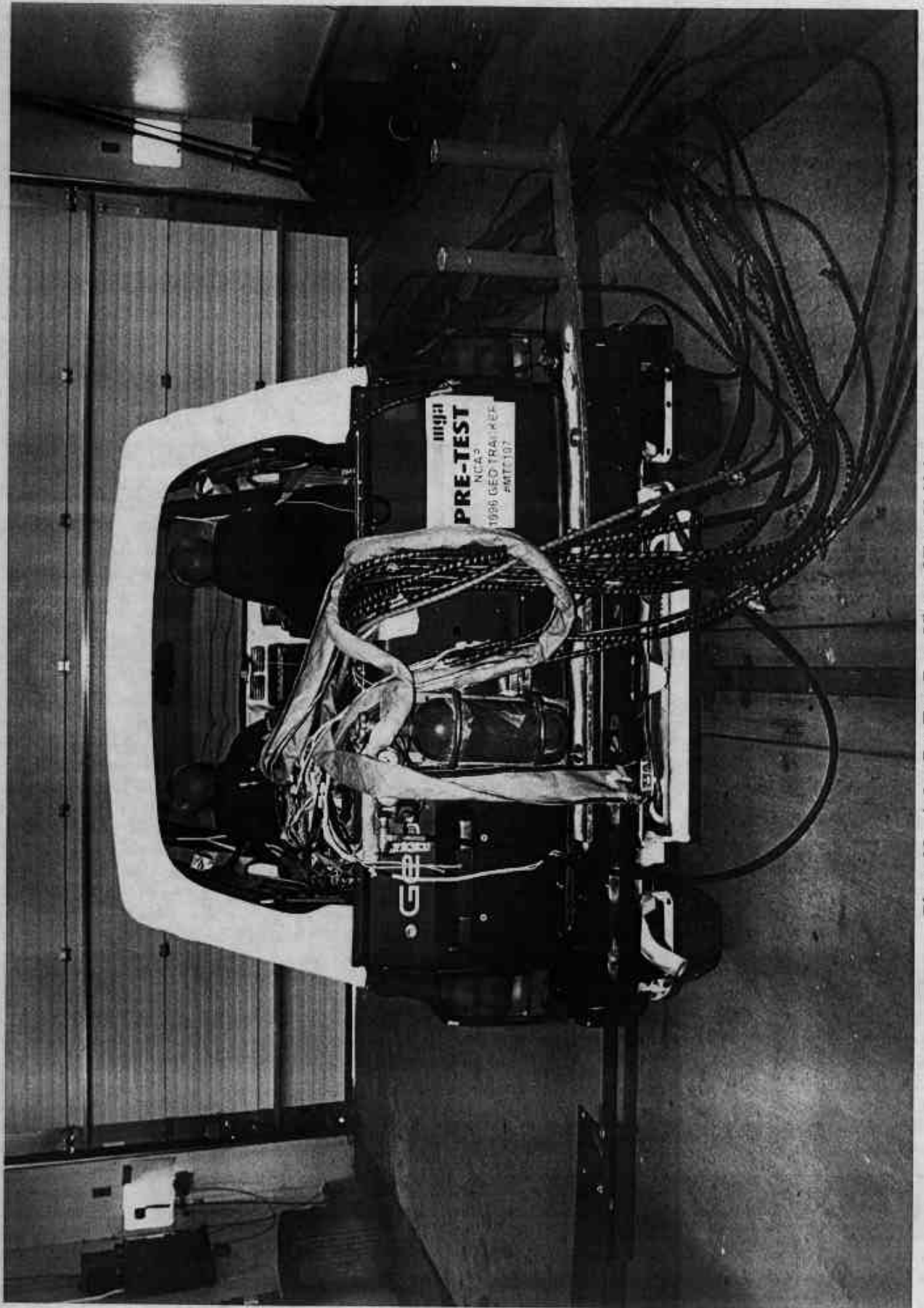


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

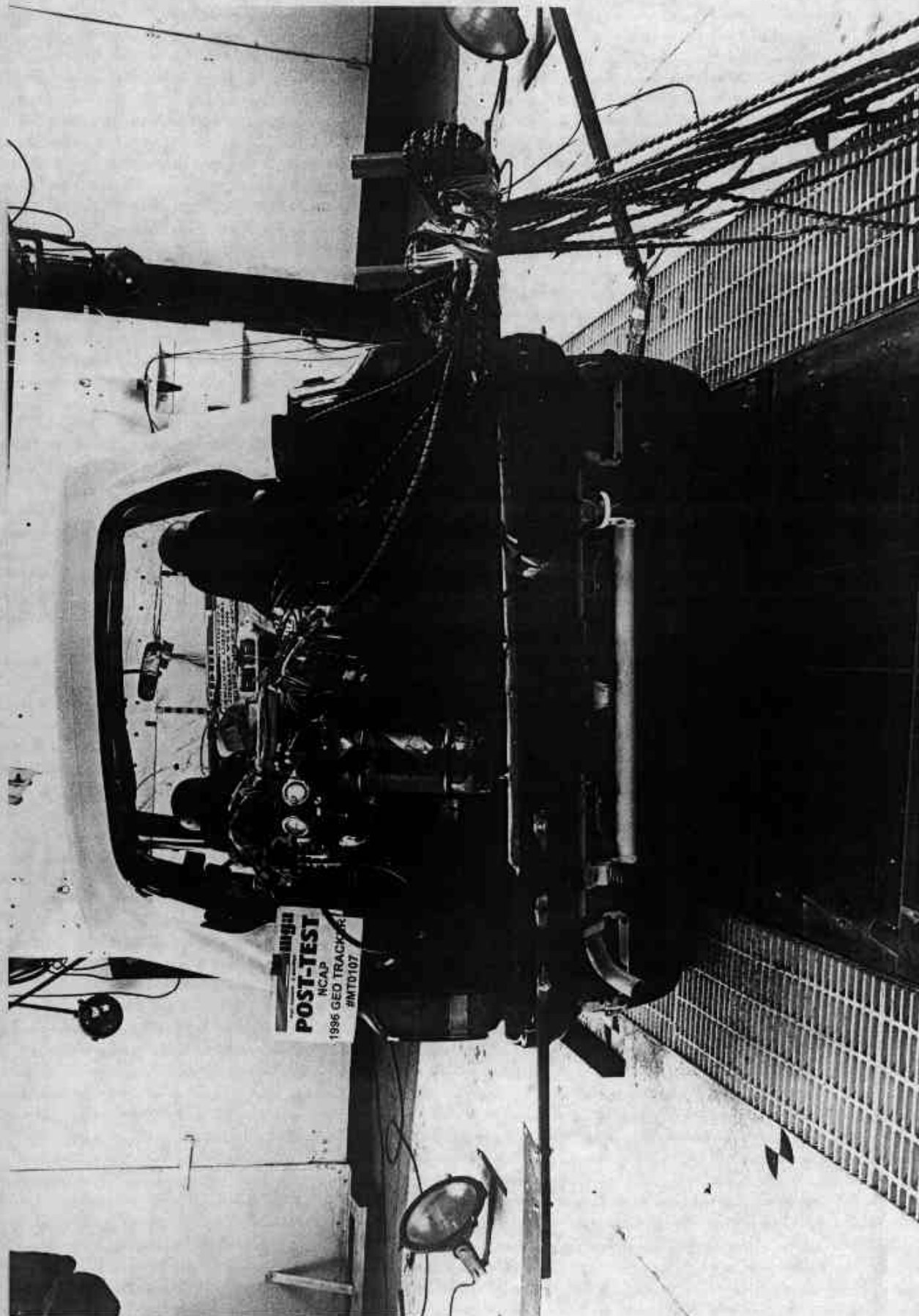


Photo No. A-4 - Post-Test Rear View of Test Vehicle

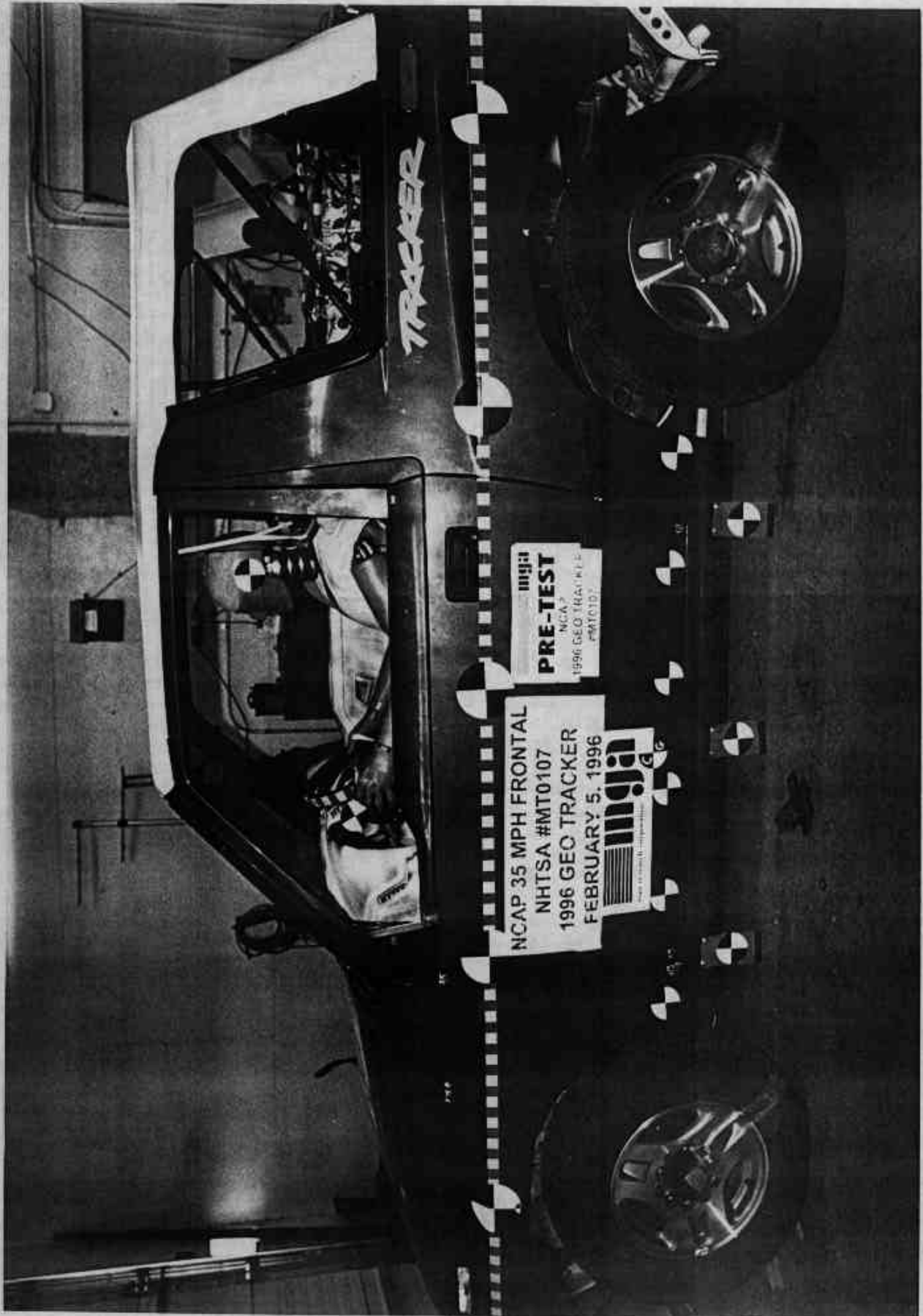


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

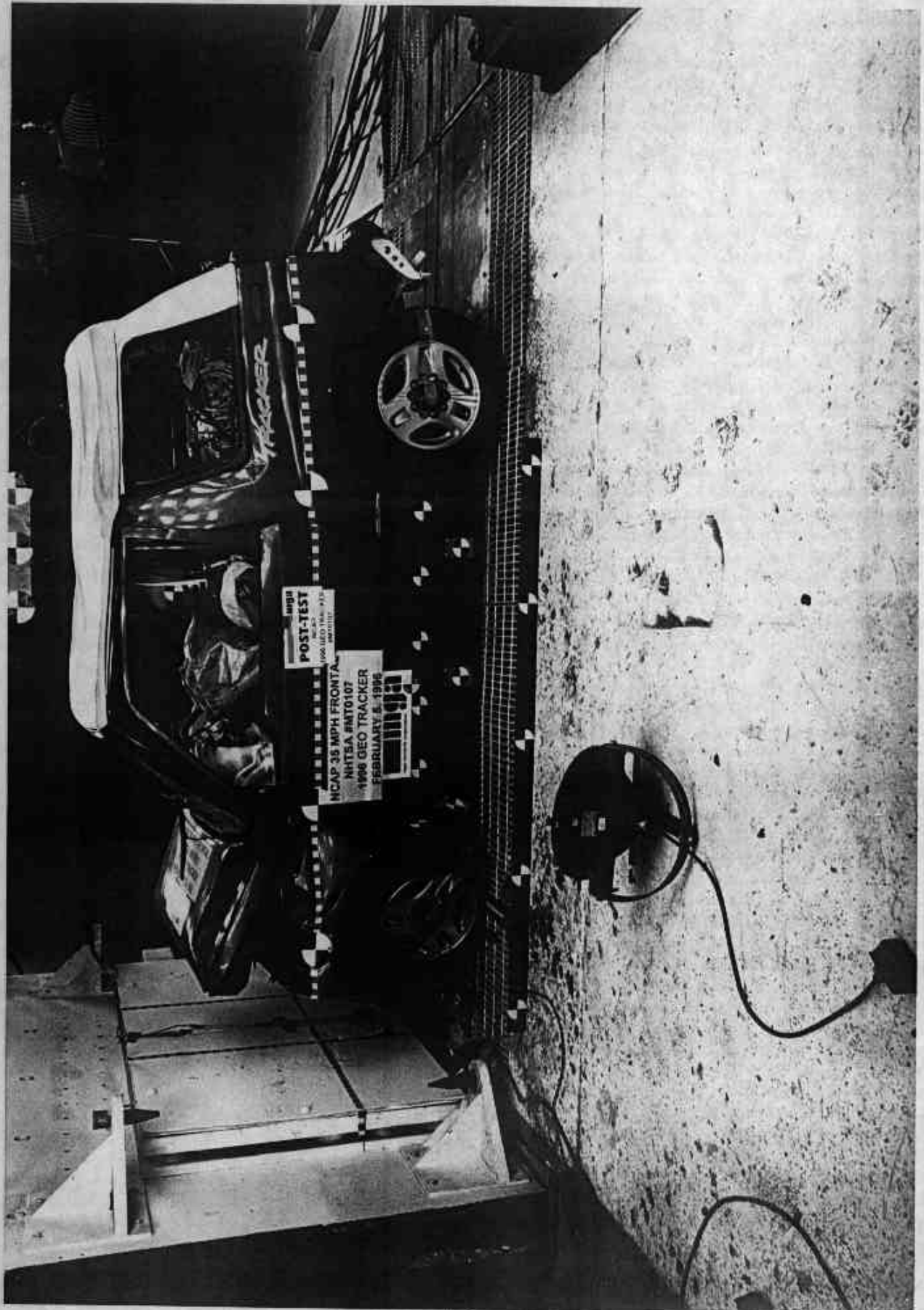


Photo No. A-6 - Post-Test Left Side View of Test Vehicle

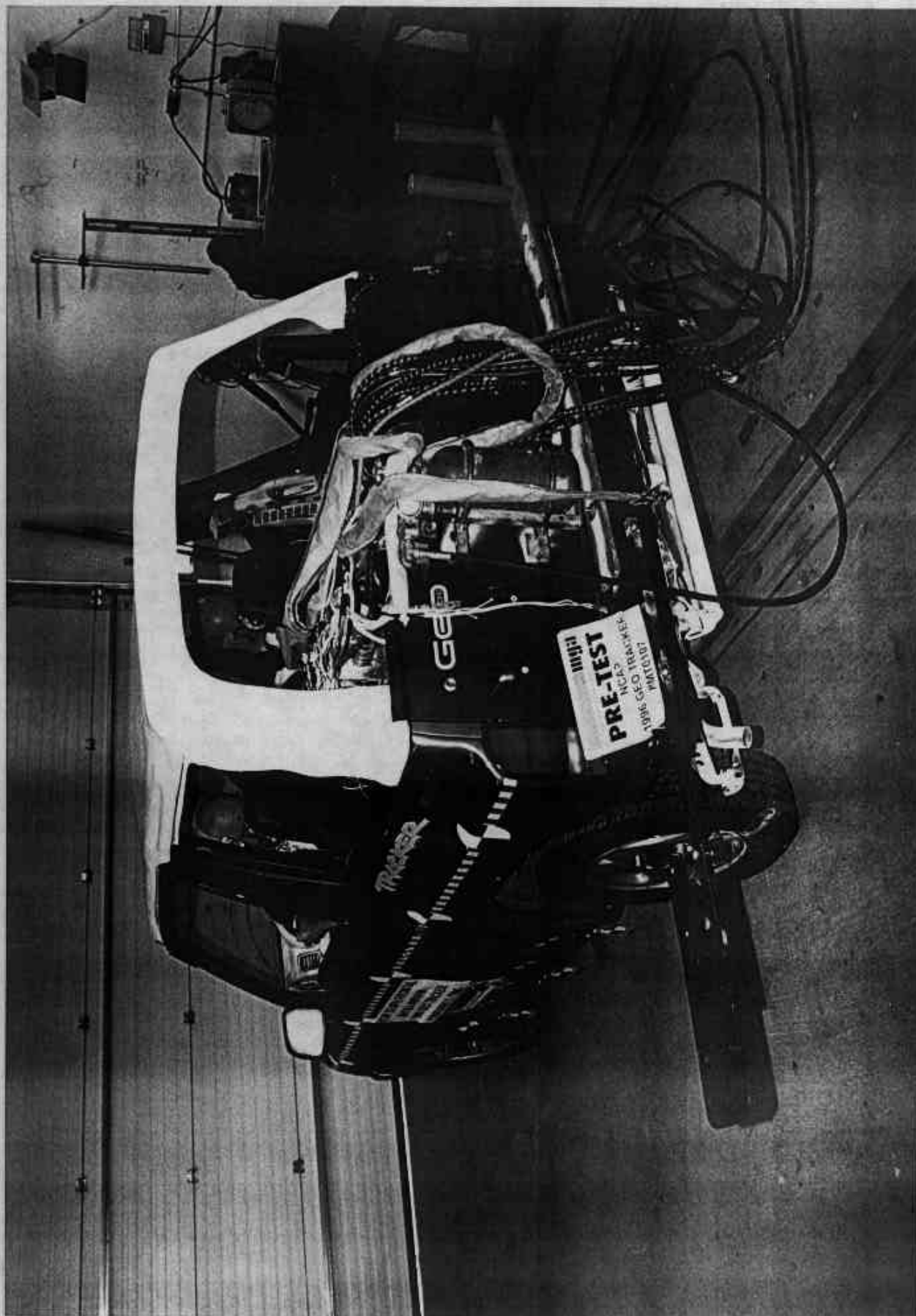


Photo No. A-7 - Pre-Test Left Rear Three-Quarter View of Test Vehicle



Photo No. A-8 - Post-Test Left Rear Three-Quarter View of Test Vehicle

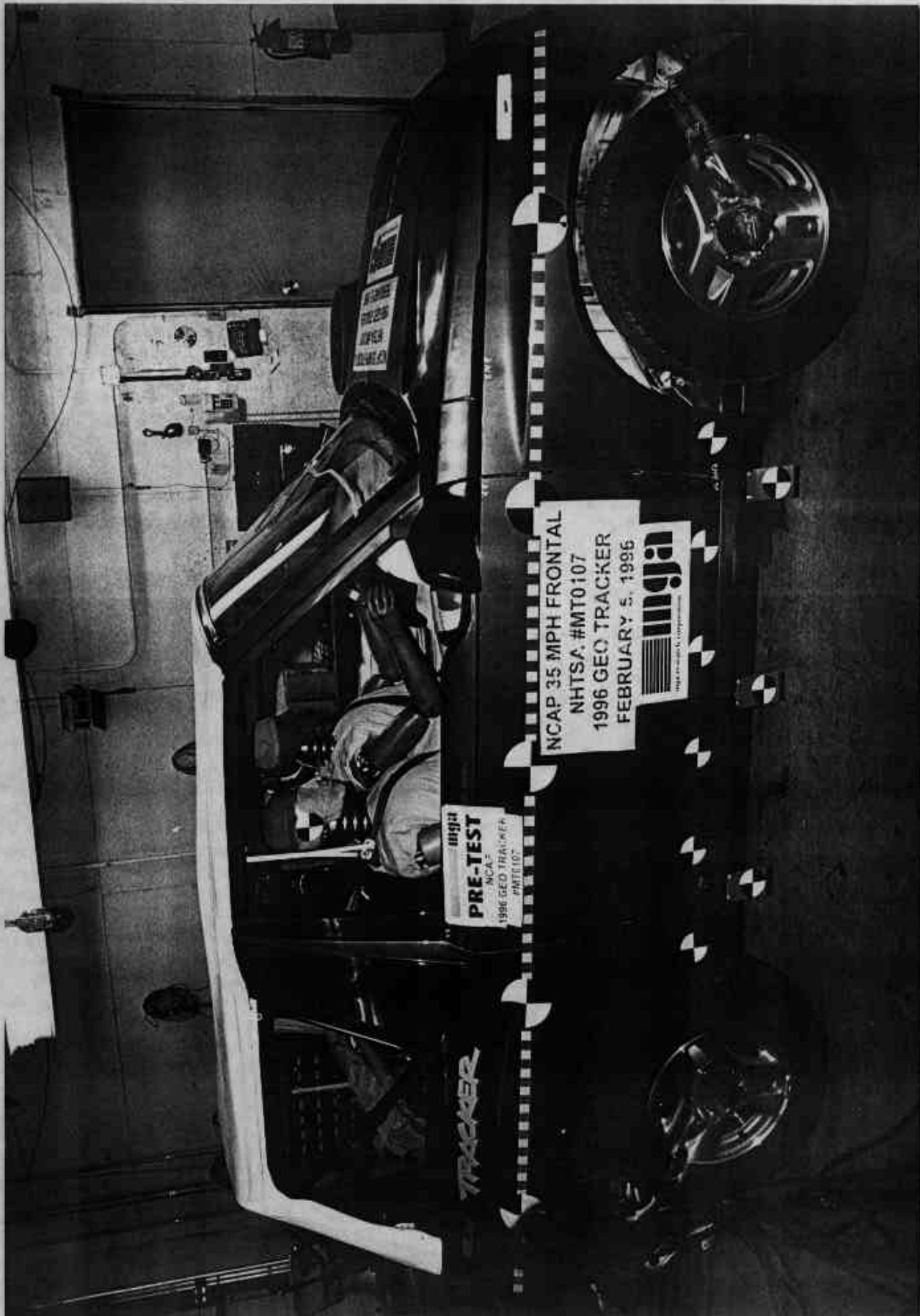


Photo No. A-9 - Pre-Test Right Side View of Test Vehicle

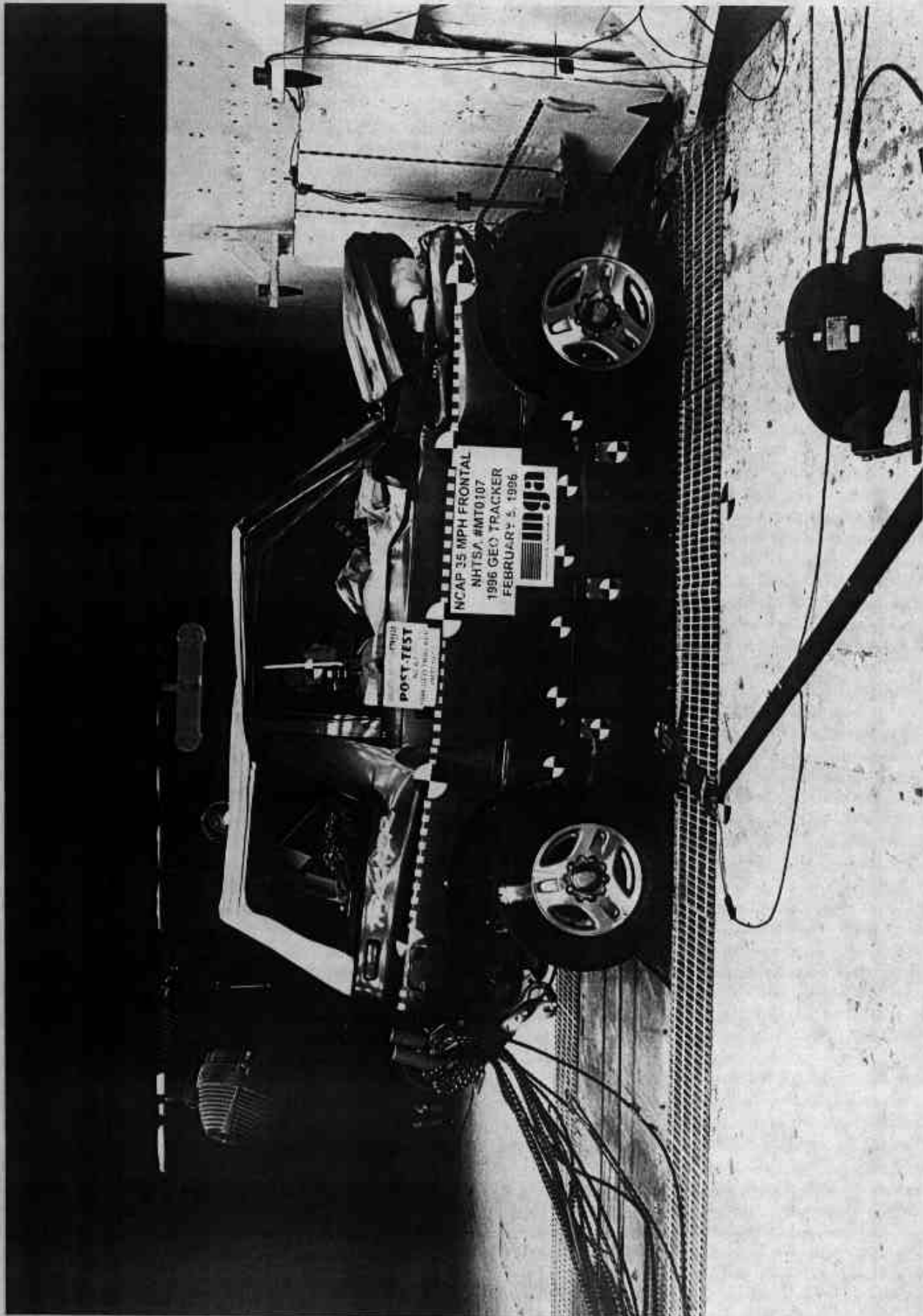


Photo No. A-10 - Post-Test Right Side View of Test Vehicle

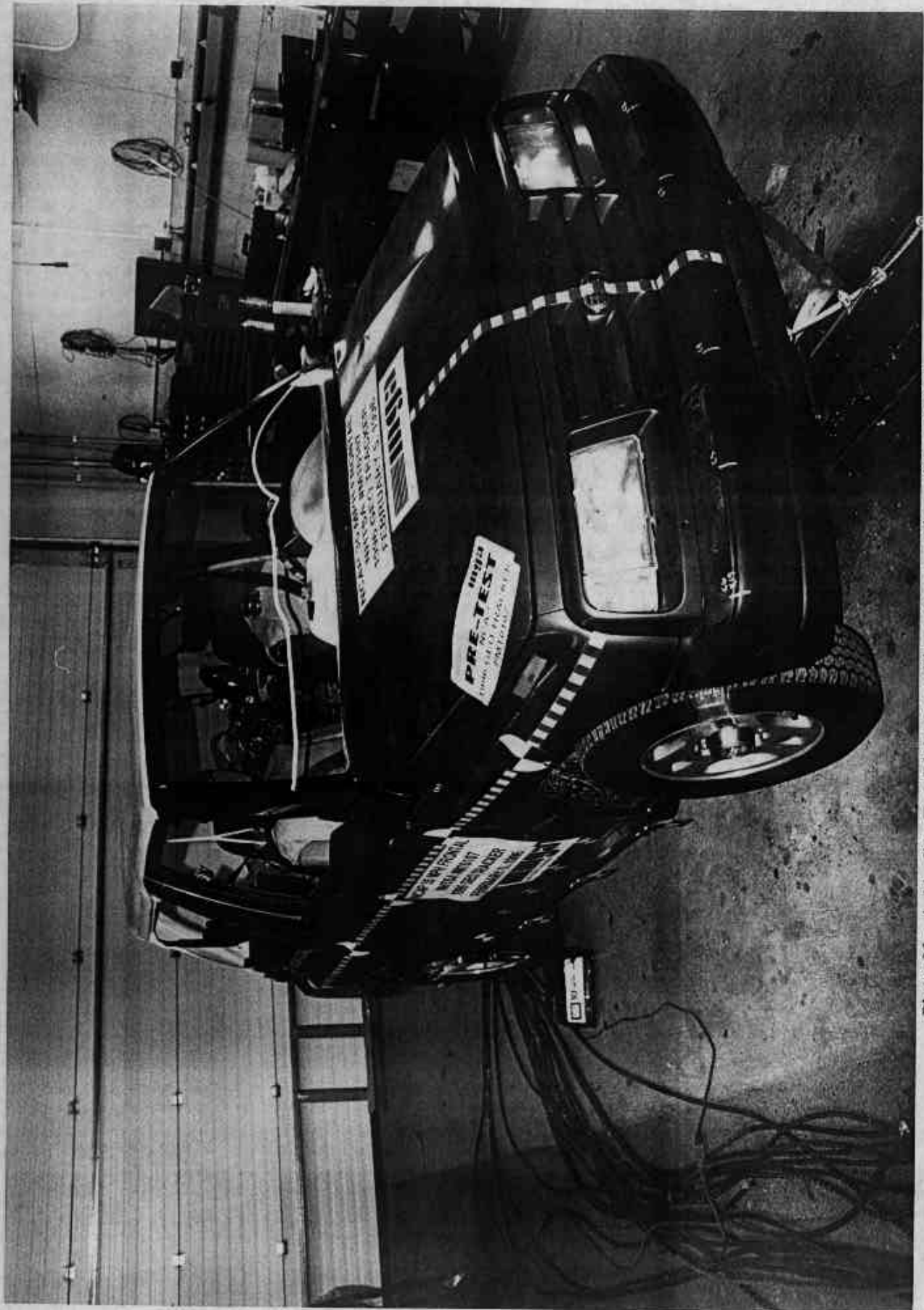


Photo No. A-11 - Pre-Test Right Front Three-Quarter View of Test Vehicle



Photo No. A-12 - Post-Test Right Front Three-Quarter View of Test Vehicle



Photo No. A-13 - Pre-Test Fuel Filler Cap View

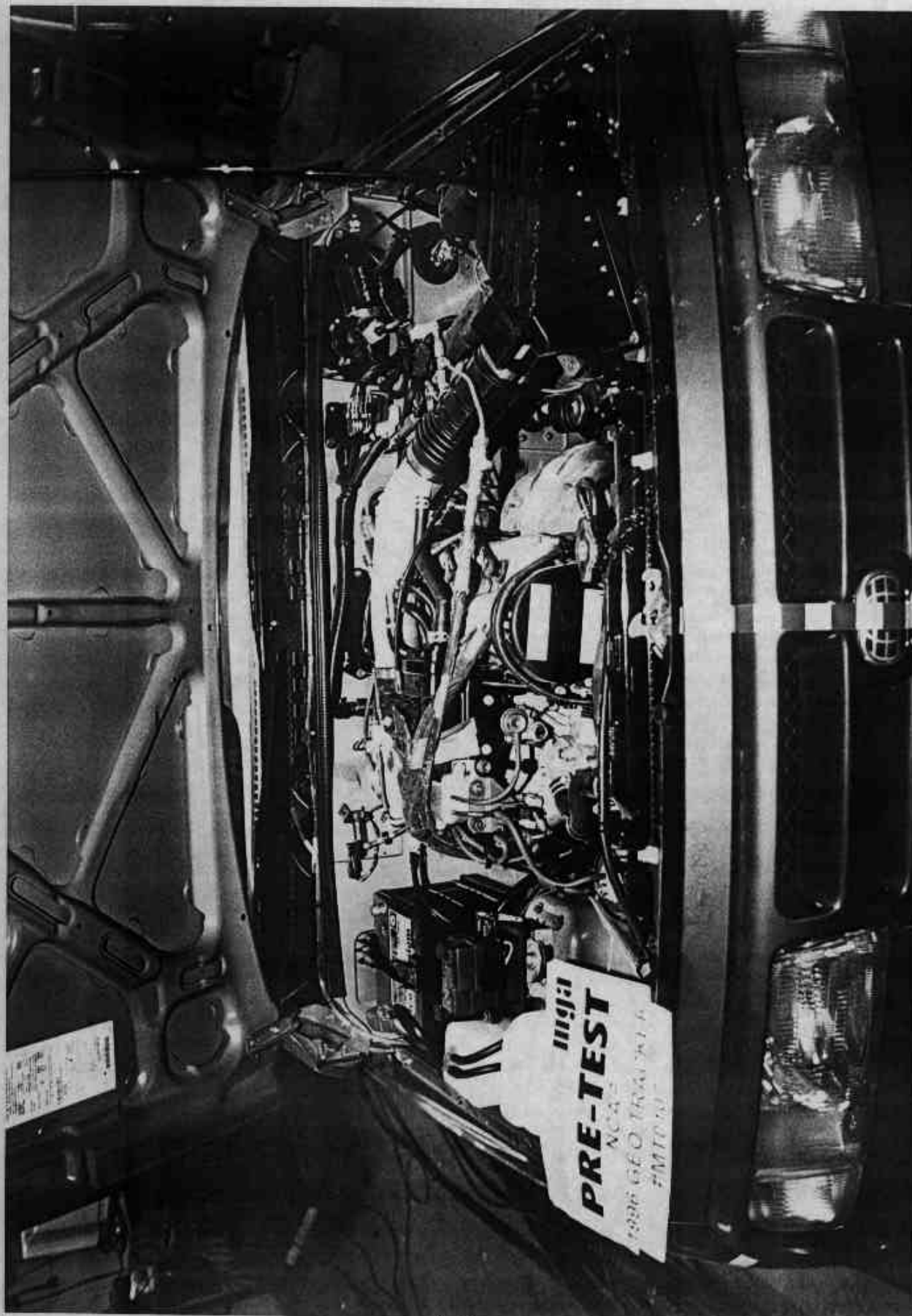
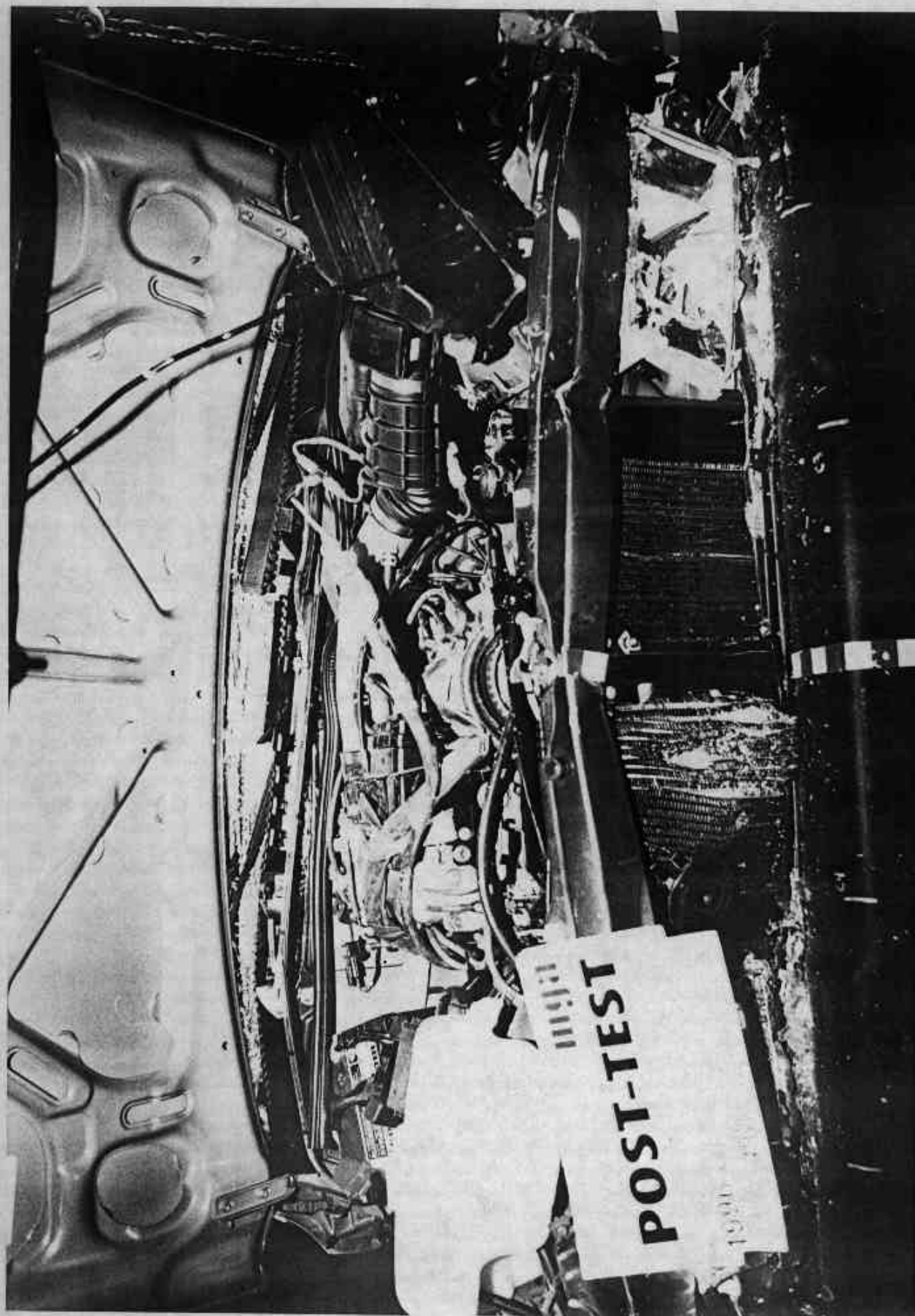


Photo No. A-14 - Pre-Test Engine Compartment View

A-14



A-15

Photo No. A-15 - Post-Test Engine Compartment View

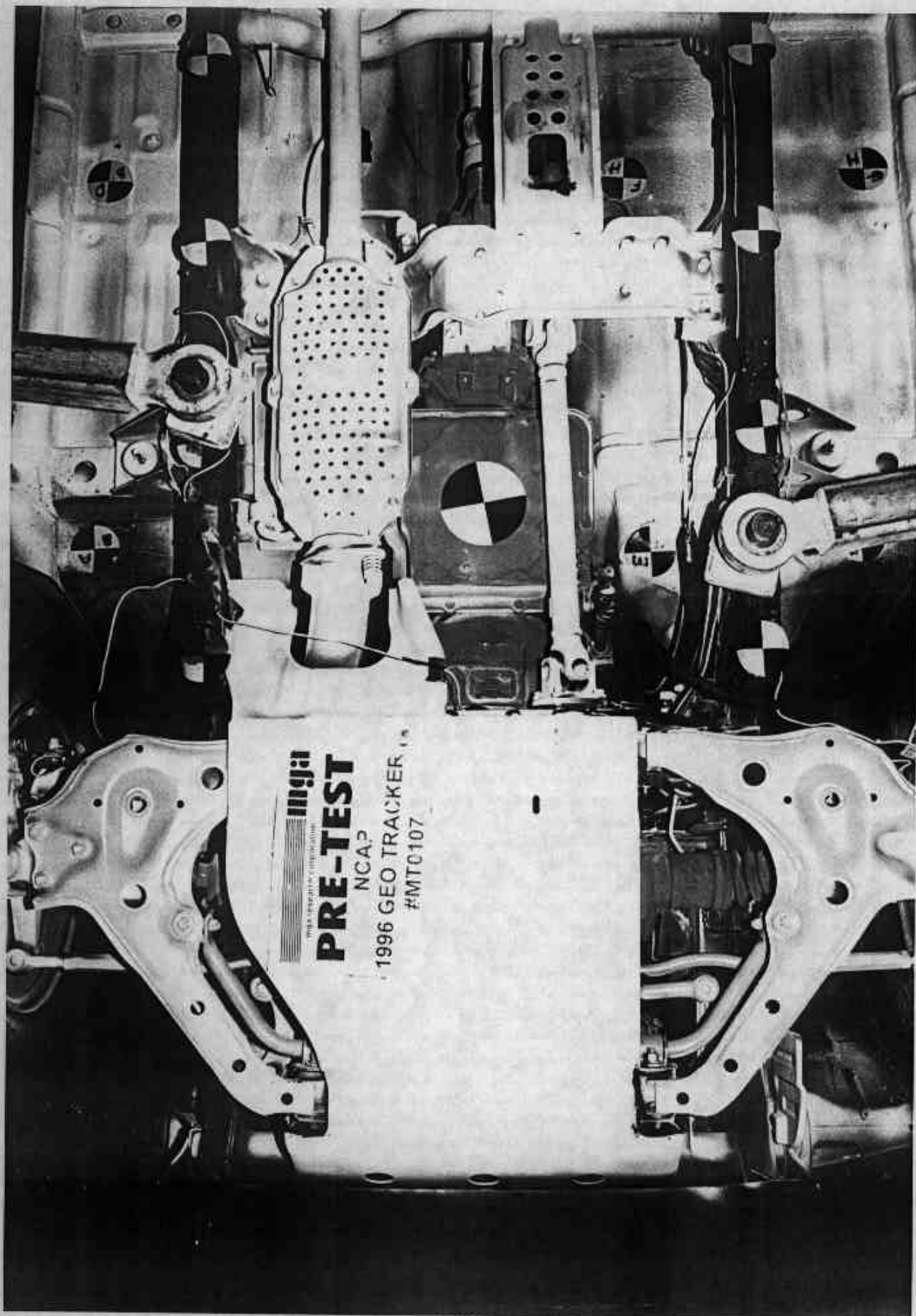


Photo No. A-16 - Pre-Test Front Underbody View

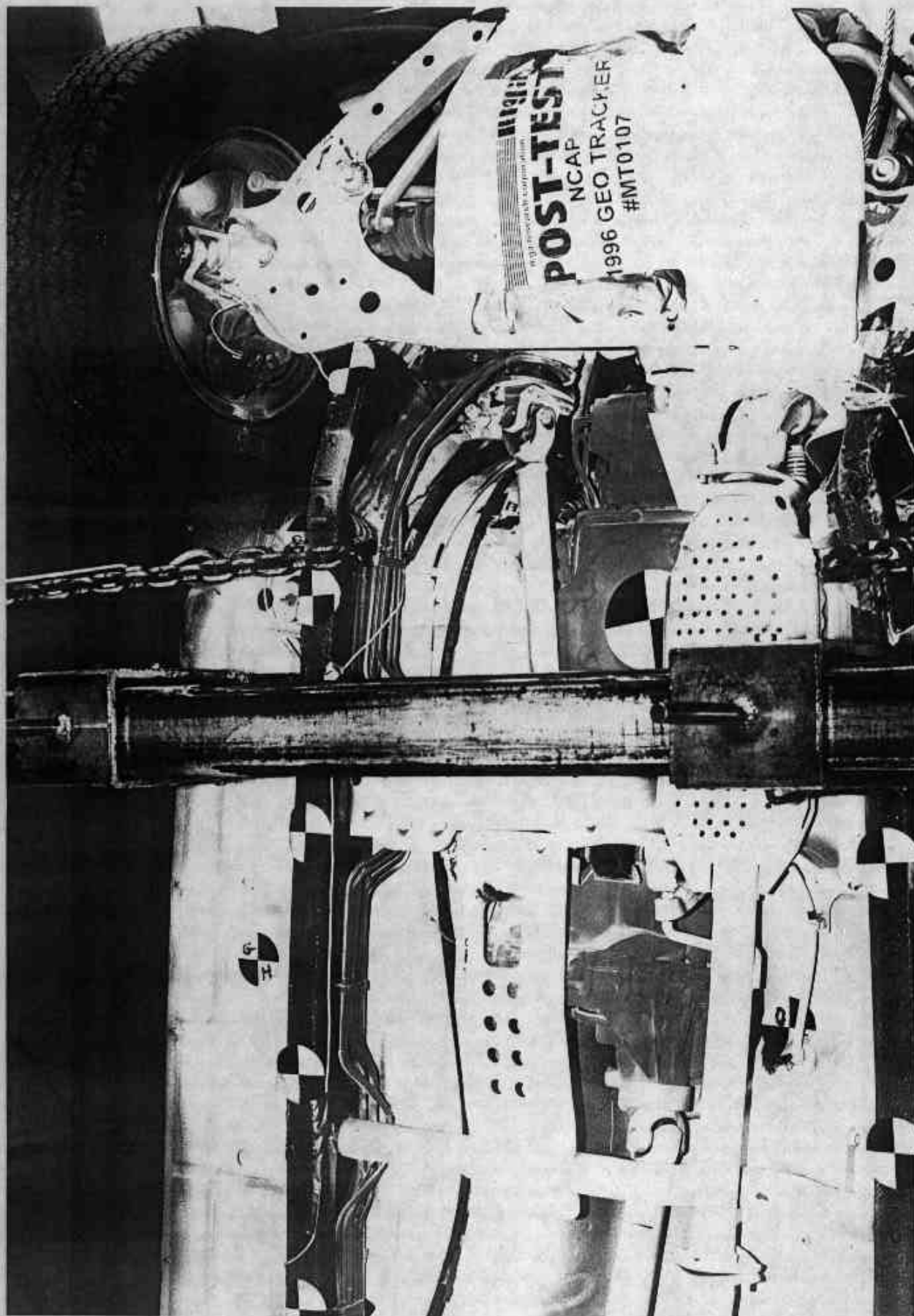


Photo No. A-17 - Post-Test Front Underbody View

A-17

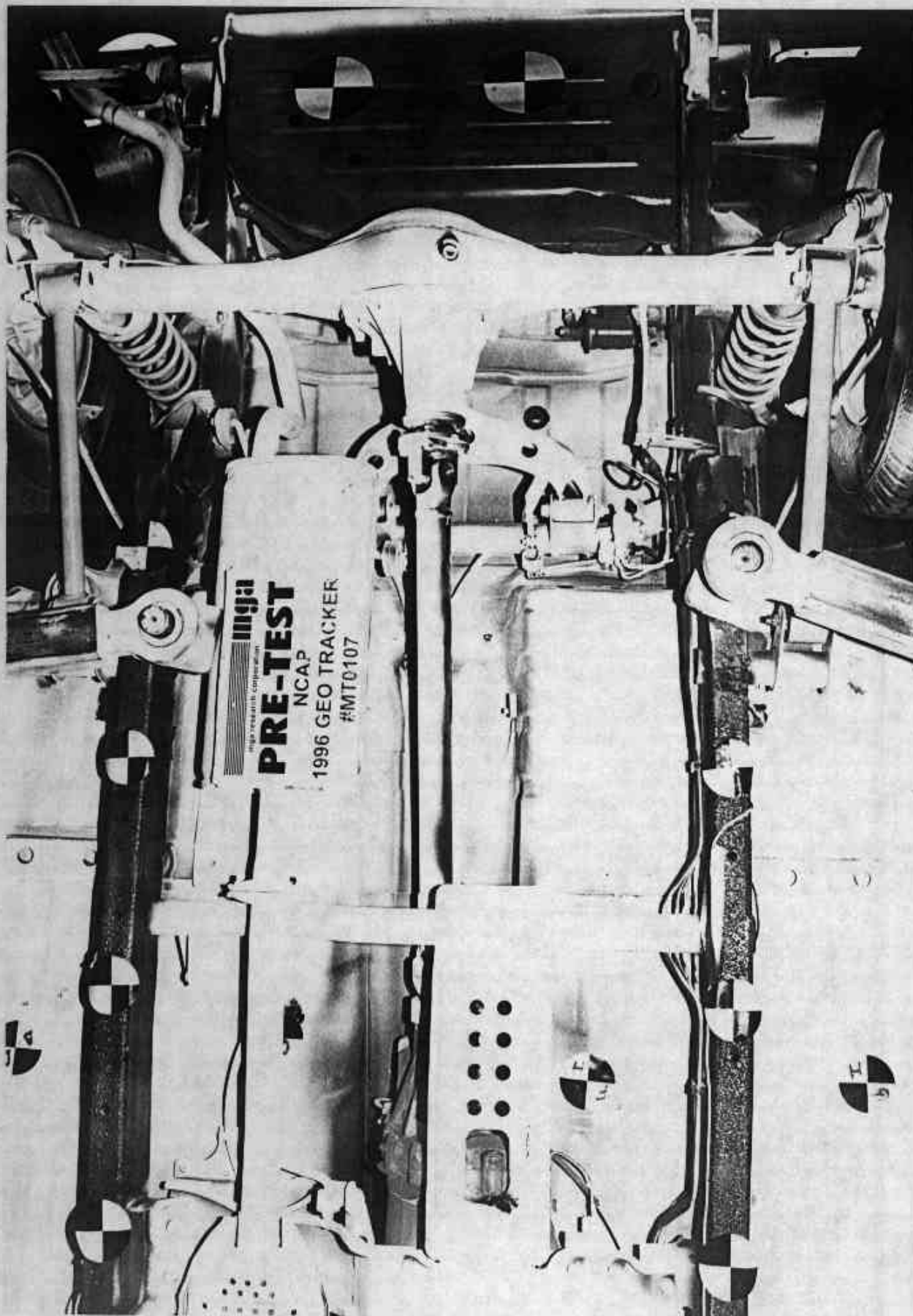


Photo No. A-18 - Pre-Test Rear Underbody View

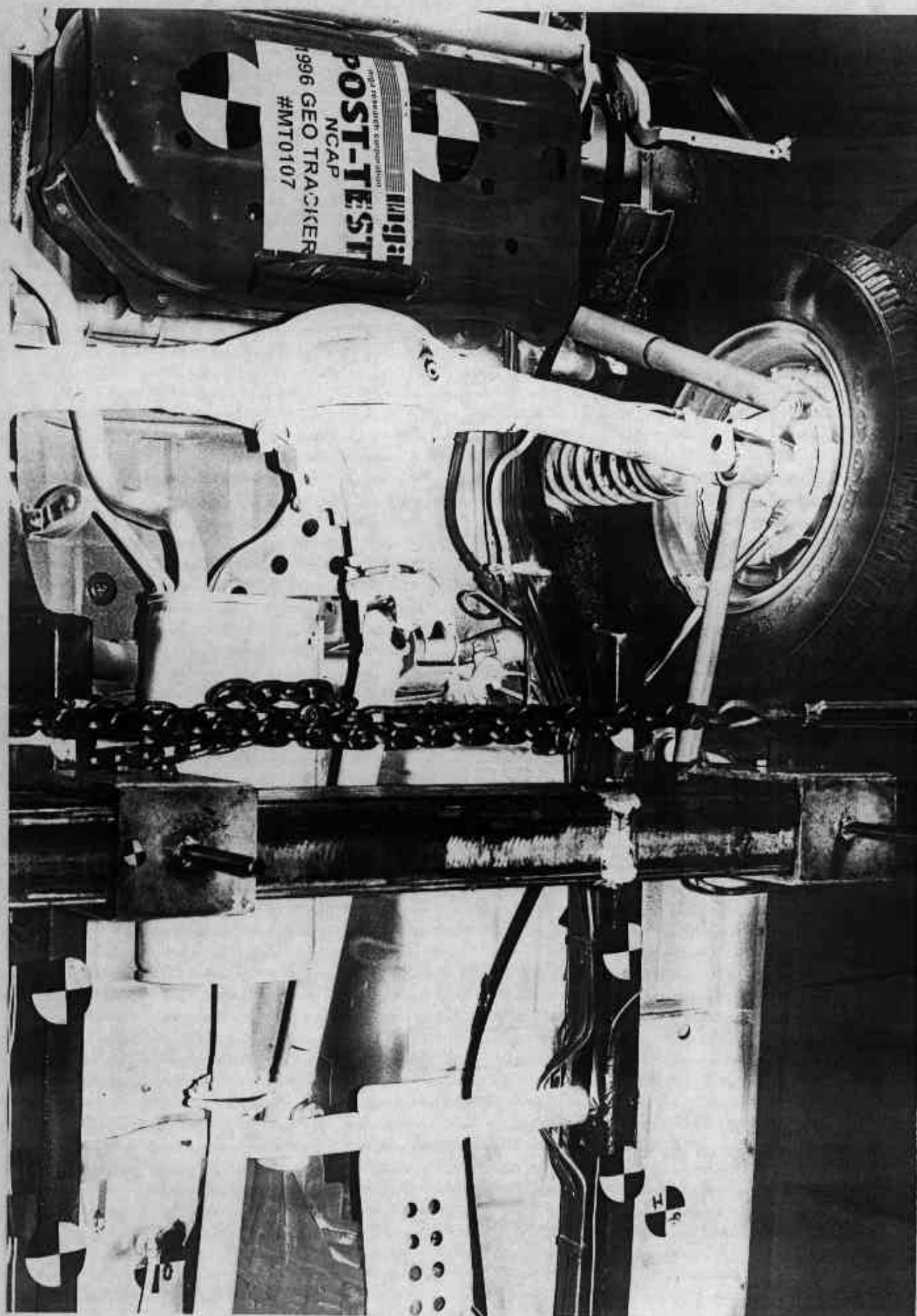
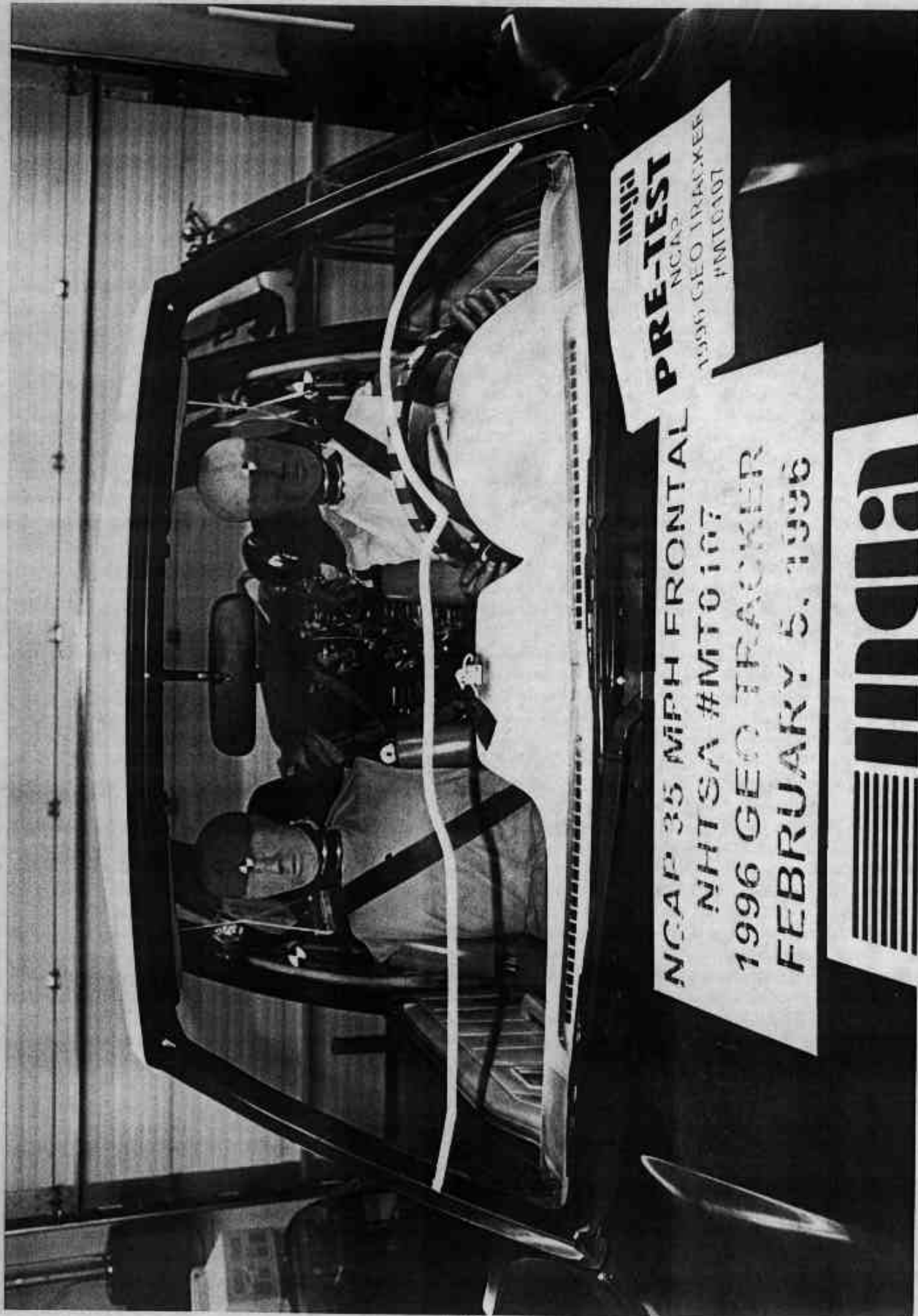


Photo No. A-19 - Post-Test Rear Underbody View

A-19

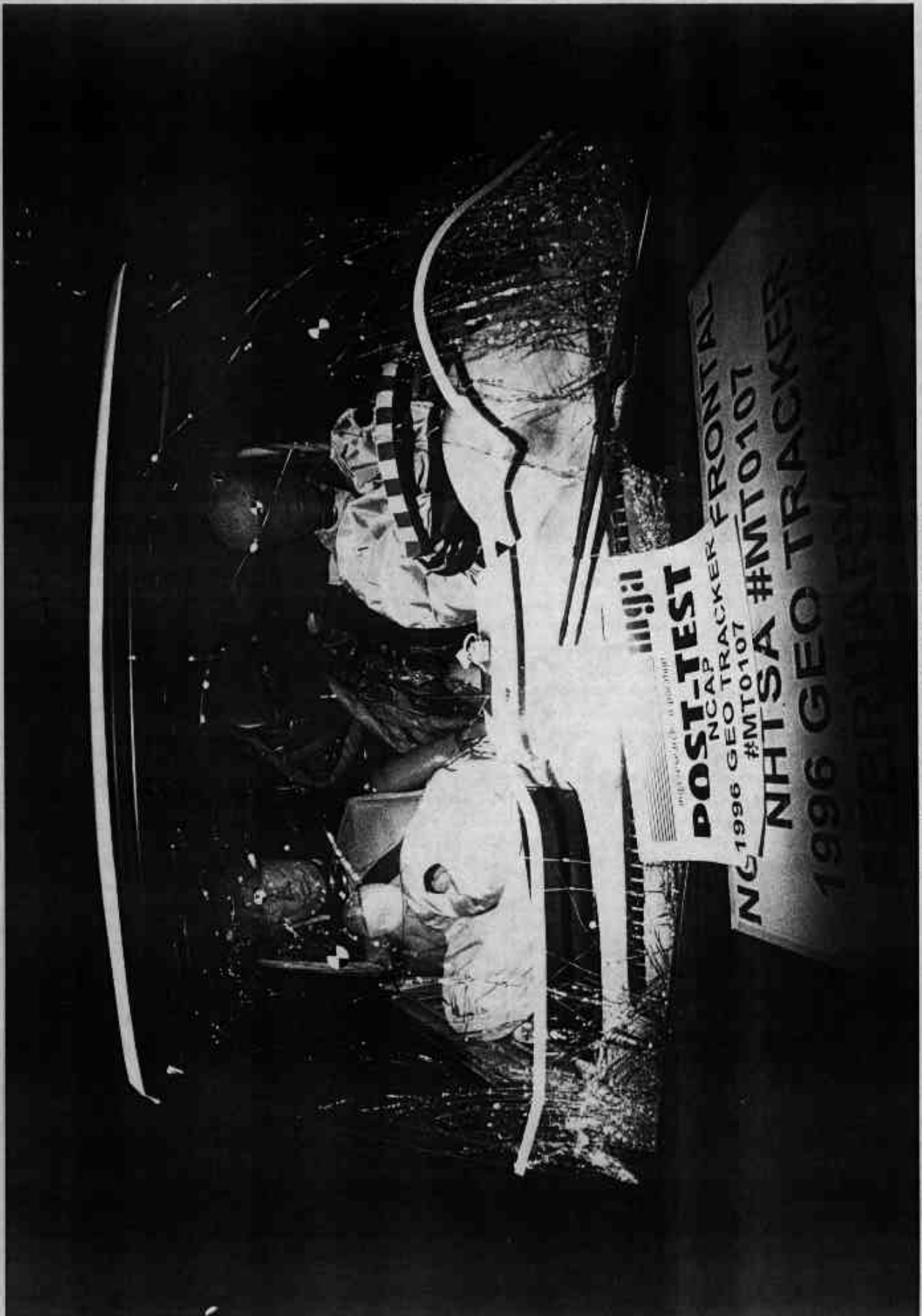


PRE-TEST
NHTSA
1996 GEO TRACKER
#MTCA07

**NCAP 35 MPH FRONTAL
NHTSA #MTCA07
1996 GEO TRACKER
FEBRUARY 5, 1996**



Photo No. A-20 - Pre-Test Windshield View



A-21

Photo No. A-21 - Post-Test Windshield View

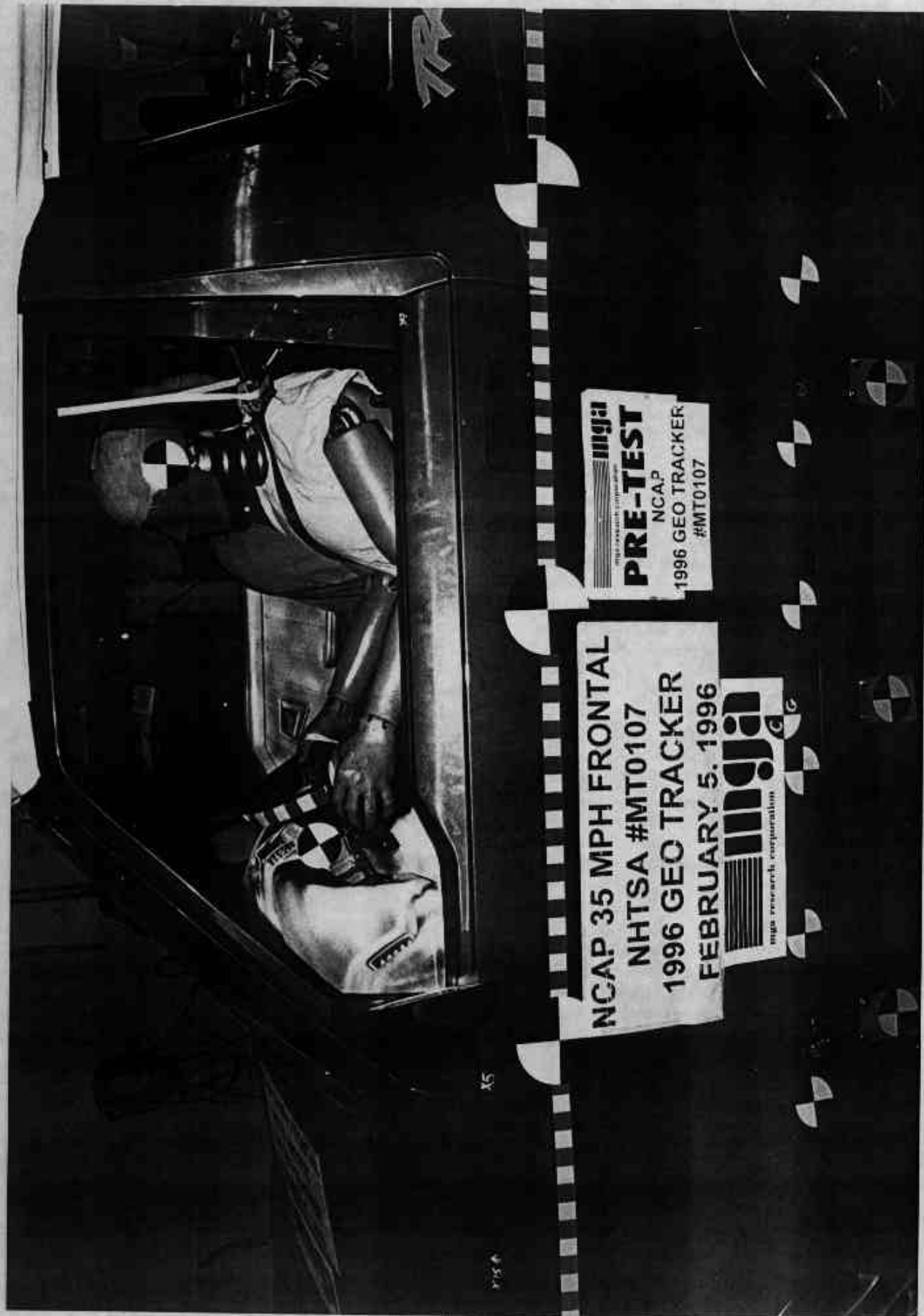
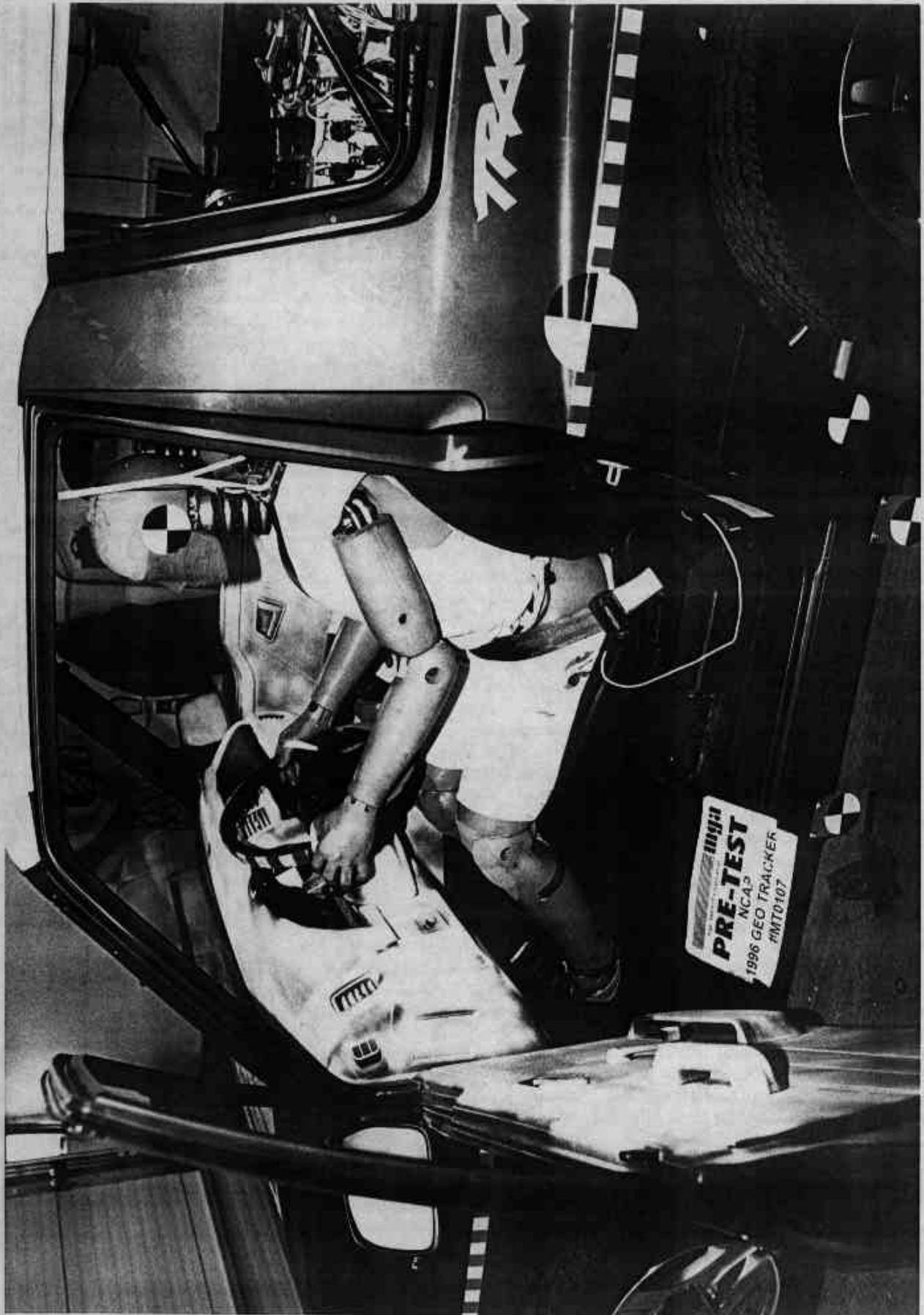


Photo No. A-22 - Pre-Test Driver Dummy Position Left Side View



Photo No. A-23 - Post-Test Driver Dummy Position Left Side View



A-24

Photo No. A-24 - Pre-Test Driver Dummy Position Left Side View (Door Open)



Photo No. A-25 - Post-Test Driver Dummy Position Left Side View (Door Open)



Photo No. A-26 - Pre-Test Driver Seat Position View

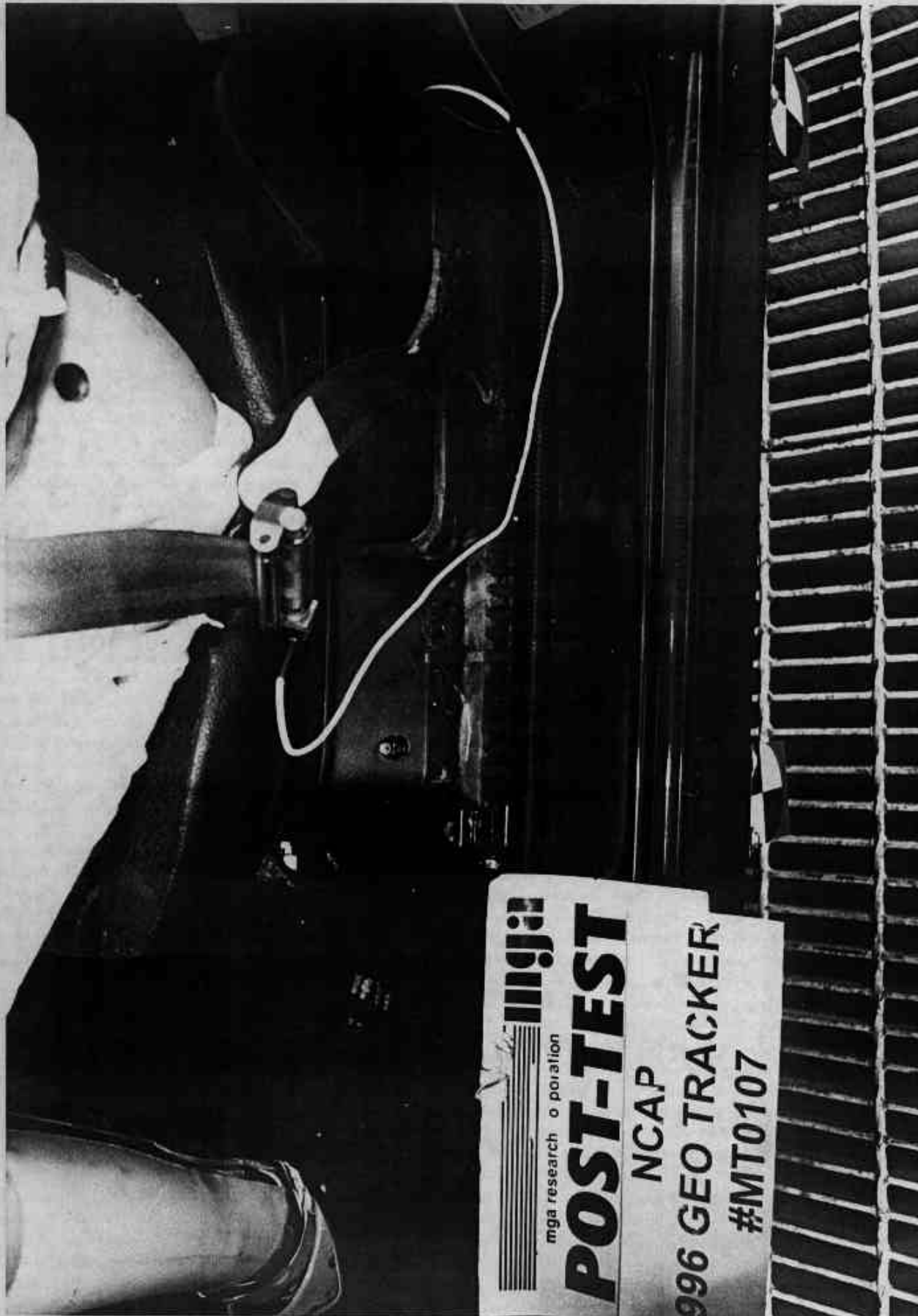


Photo No. A-27 - Post-Test Driver Seat Position View

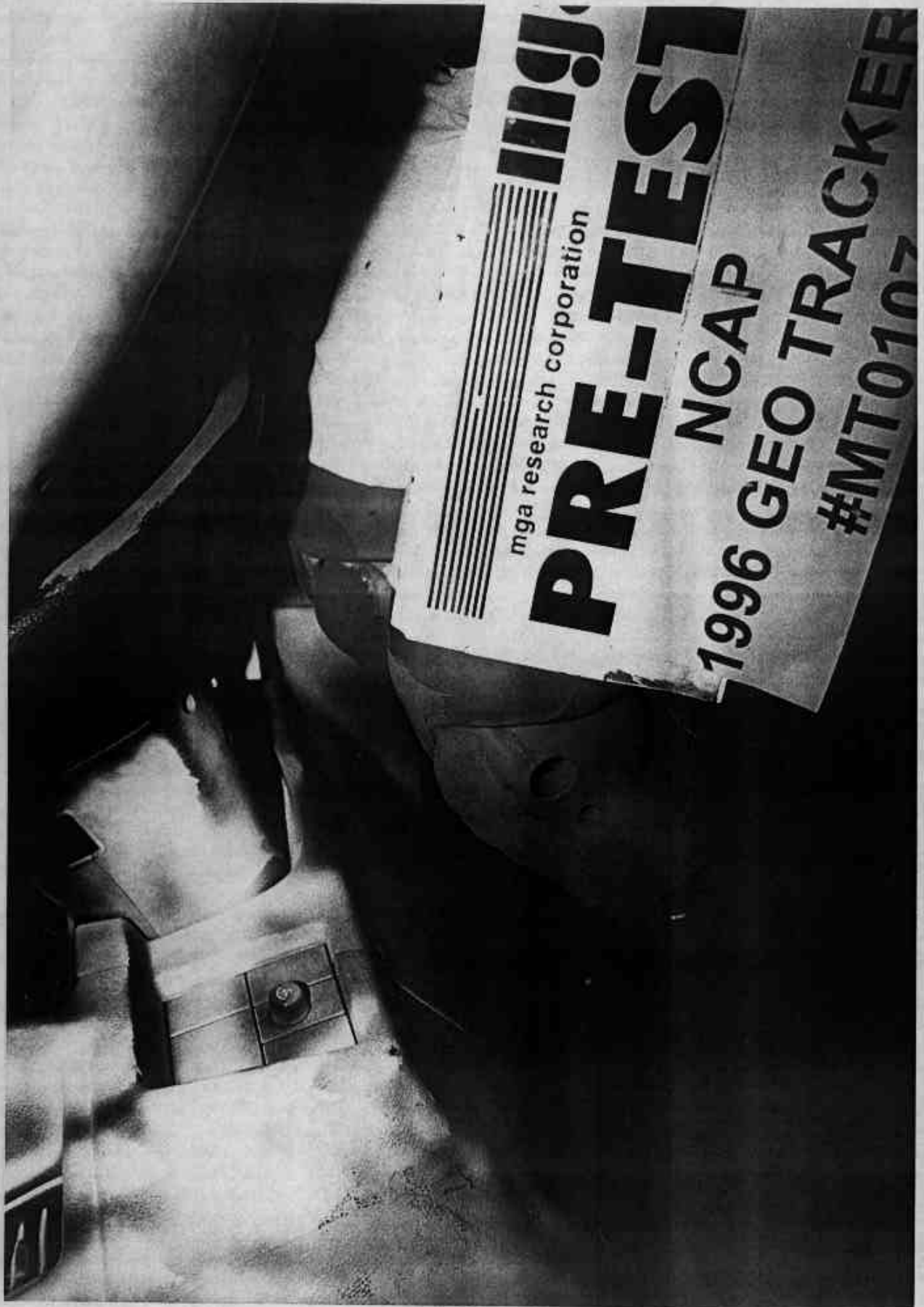


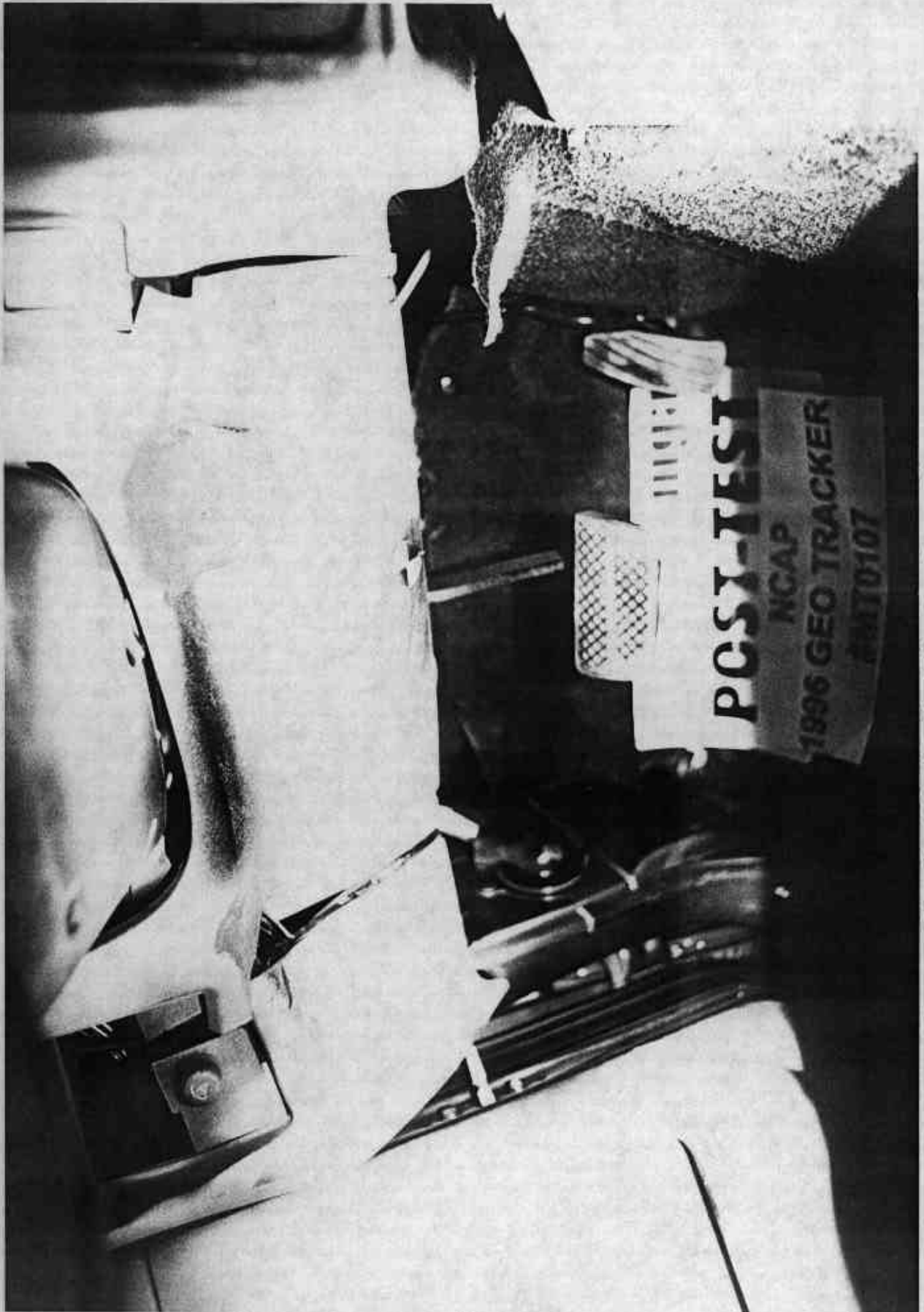
Photo No. A-28 - Pre-Test Driver Dummy Knee Position



Photo No. A-29 - Post-Test Driver Dummy Knee Position

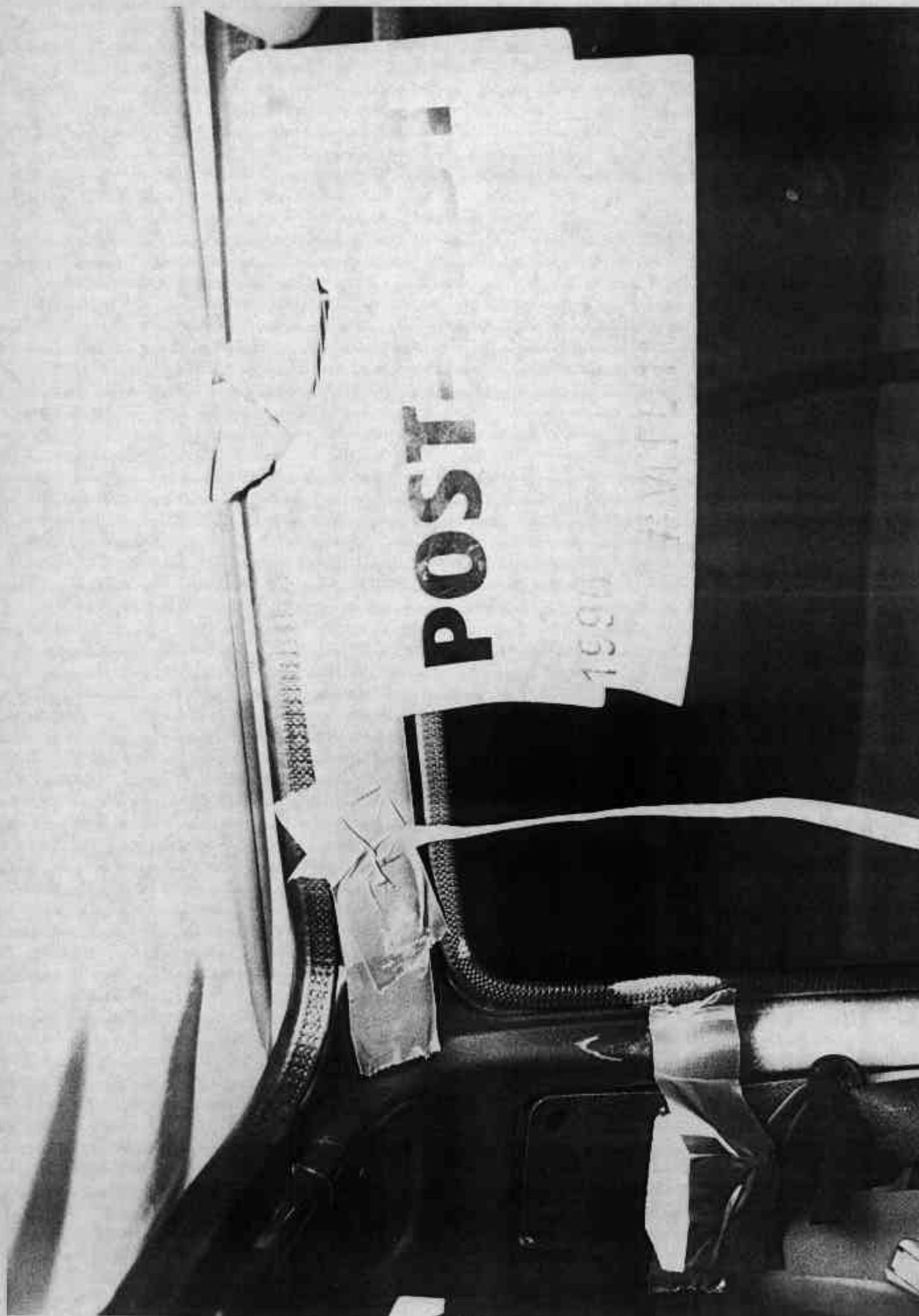


Photo No. A-30 - Post-Test Driver Airbag Contact



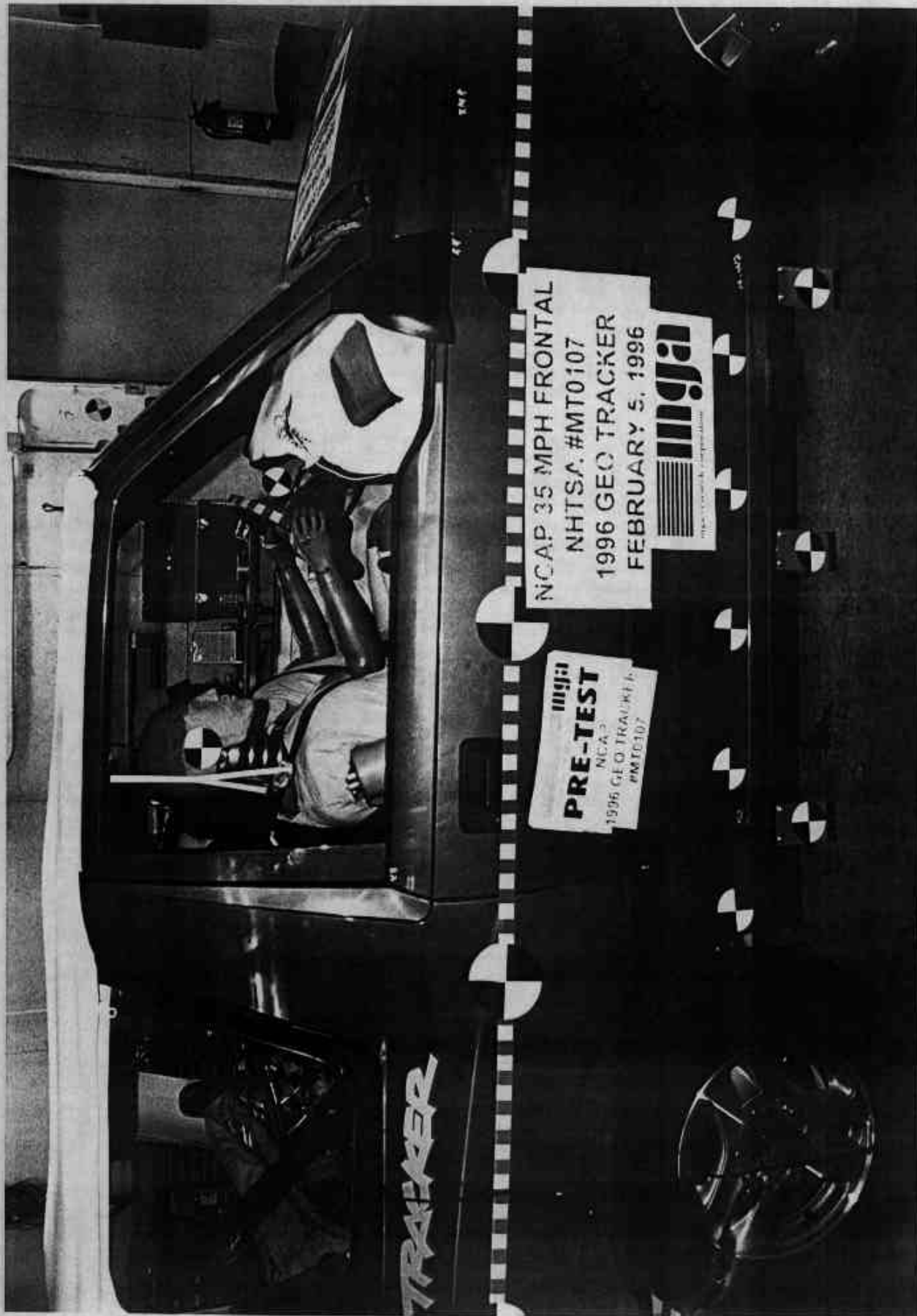
A-31

Photo No. A-31 - Post-Test Driver Knee Contact View



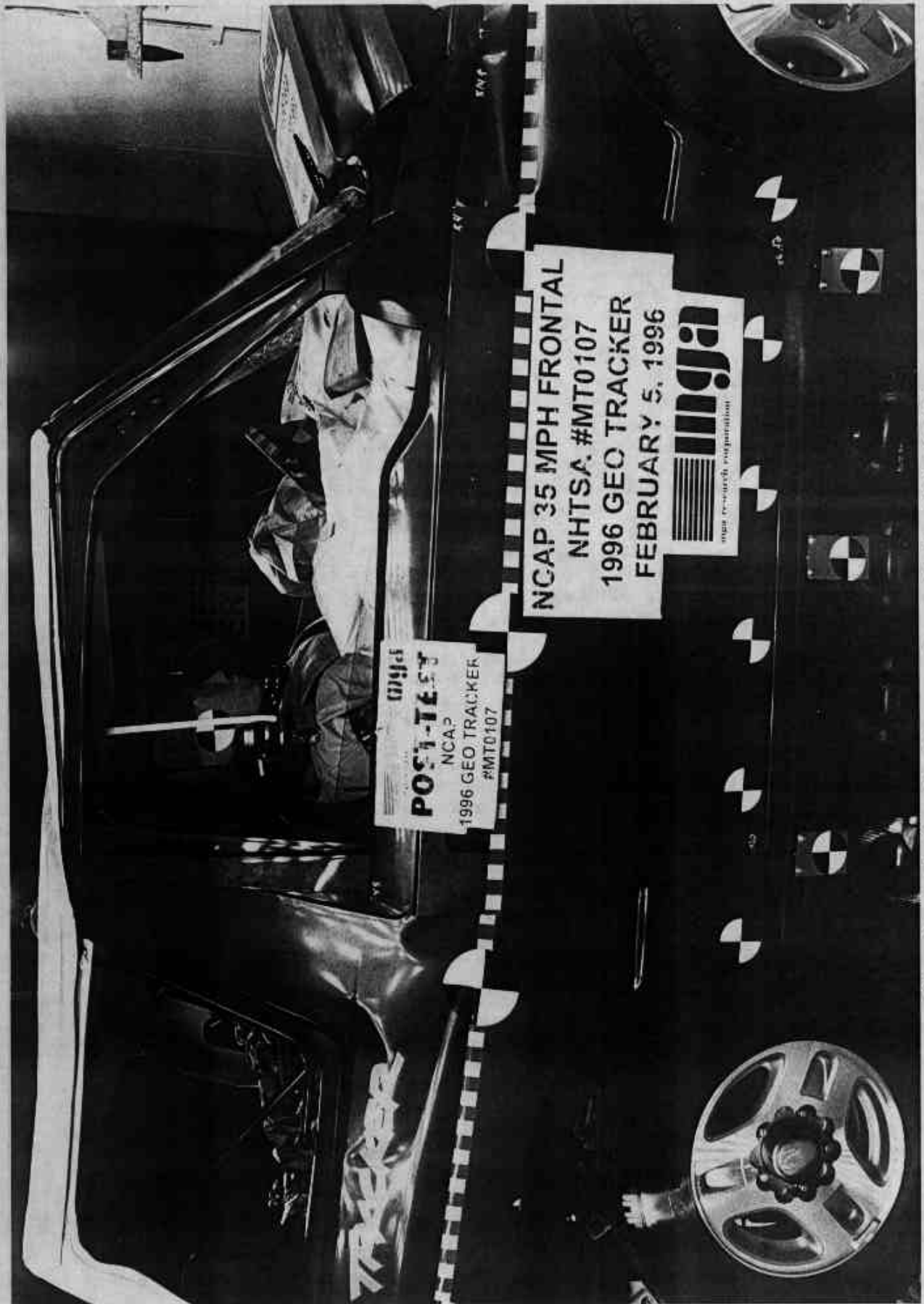
A-32

Photo No. A-32 - Post-Test Head Contact View



A-33

Photo No. A-33 - Pre-Test Passenger Dummy Position Right Side View



A-34

Photo No. A-34 - Post-Test Passenger Dummy Position Right Side View



Photo No. A-35 - Pre-Test Passenger Dummy Position Right Side View (Door Open)



Photo No. A-36 - Post-Test Passenger Dummy Position Right Side View (Door Open)

A-36



Photo No. A-37 - Pre-Test Passenger Seat Position View

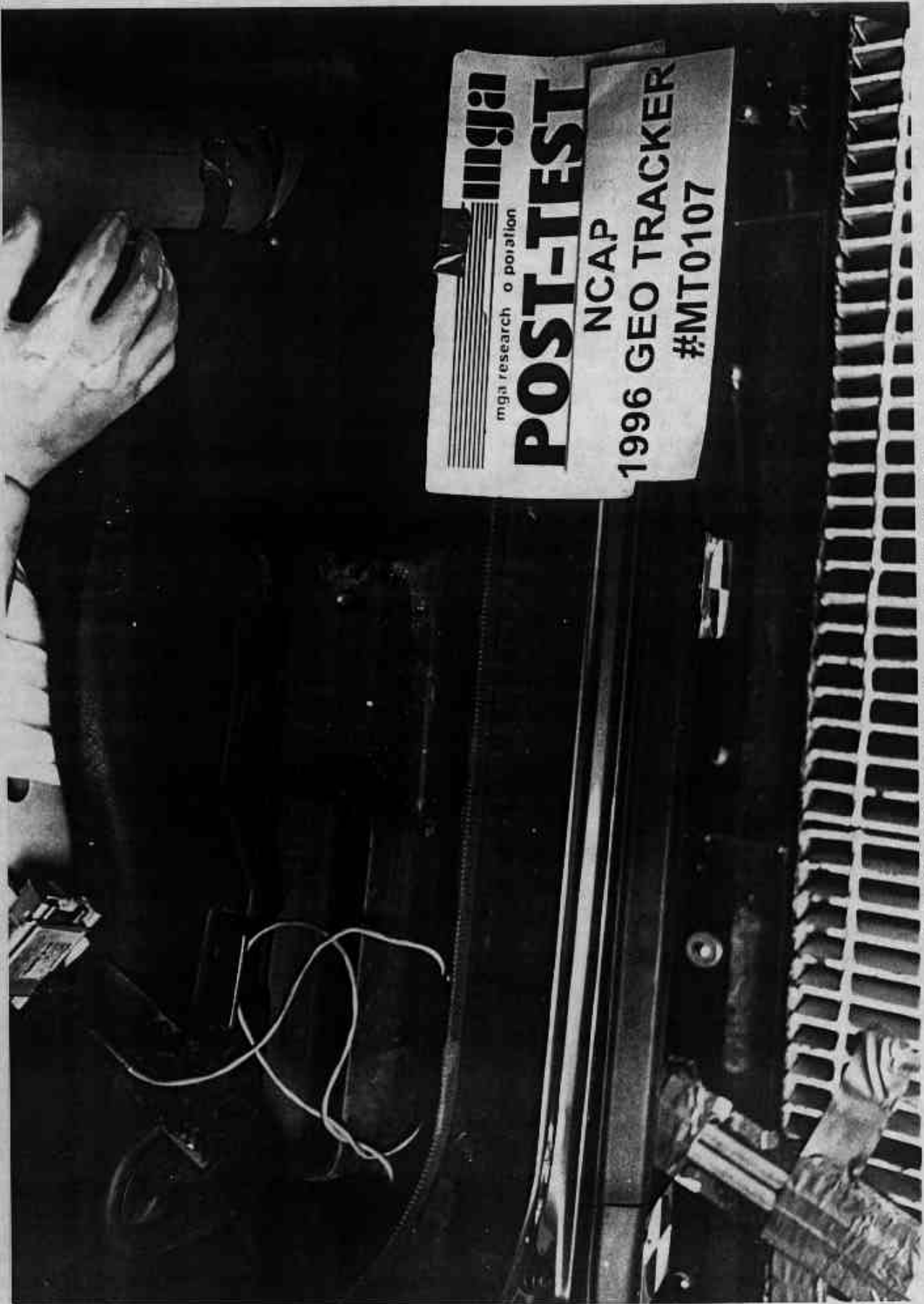


Photo No. A-38 - Post-Test Passenger Seat Position View



Photo No. A-39 - Pre-Test Passenger Dummy Knee Position



Photo No. A-40 - Post-Test Passenger Dummy Knee Position



A-41

Photo No. A-41 - Post-Test Passenger Airbag Contact

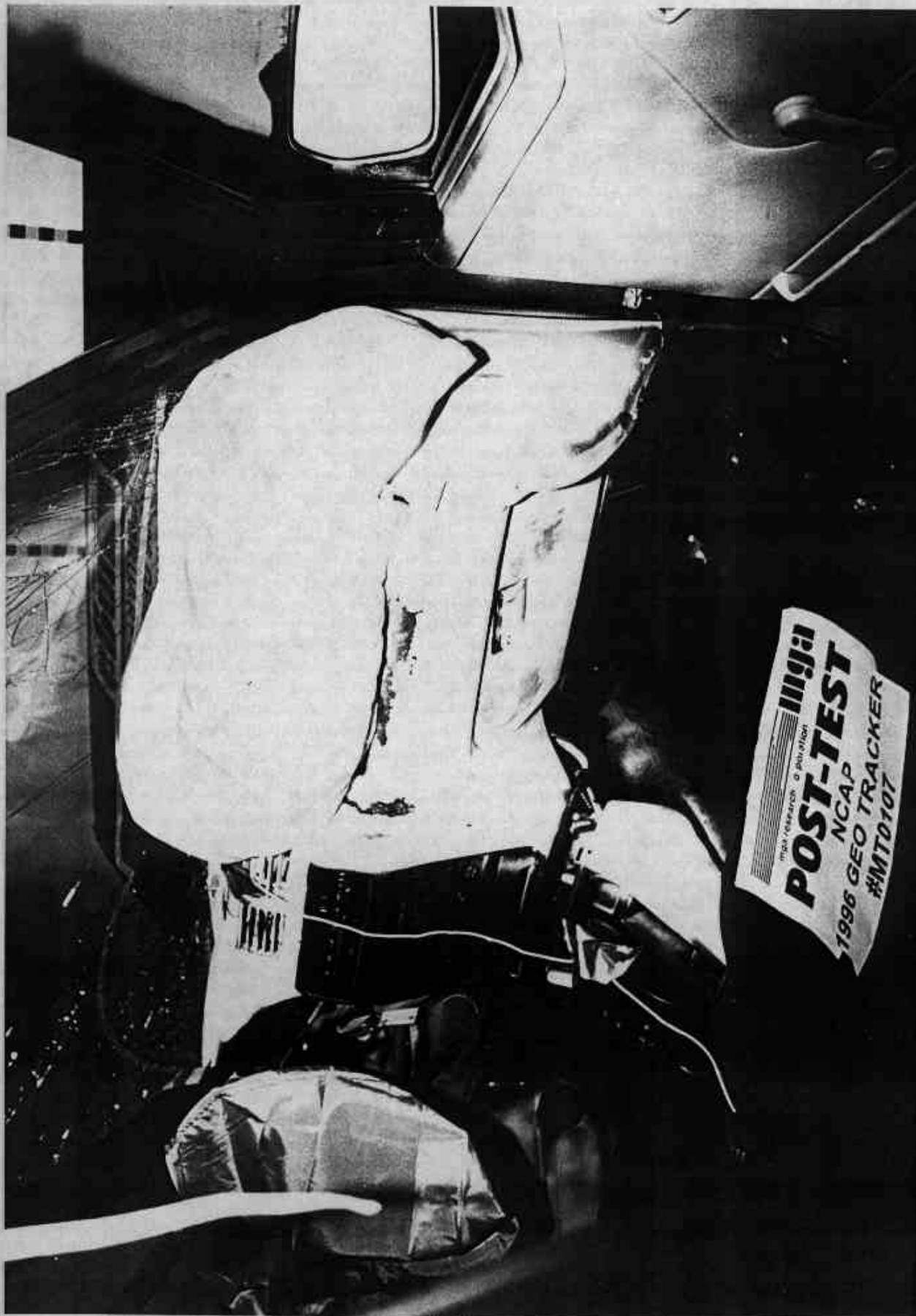


Photo No. A-42 - Post-Test Passenger Knee Contact View

MFD. BY CAMIAUTOMOTIVE INC. CANADA

DATE

12/95

GVWR

3306LB
1500KG

GAWR FRT

1565LB
710KG

GAWR RR

1984LB
900KG

TIRES: P205/75R15 (FRT&RR) RIMS: 15X5 1/2JJ (FRT&RR)
MAX COLD TIRE PRESS: 23PSI (160KPA) FRT&RR

THIS VEHICLE CONFORMS TO ALL
APPLICABLE U.S. FEDERAL MOTOR VEHICLE

SAFETY STANDARDS IN EFFECT ON THE
DATE OF MANUFACTURE SHOWN ABOVE.

2CNBJ1864T6925862

MULTIPURPOSE PASSENGER VEHICLE

THIS VEHICLE EQUIPPED FOR 740LB/ 336KG PAYLOAD.
SEE OWNER MANUAL FOR ADDITIONAL INFORMATION.

TIRE PLAC			
kg/LB	GVWR	GAWR	
	1500/3307	710/1	
TIRES		P205/7	
RIMS		15X5	
INFLATION PRESSURE COLD kPa/PSI			160/

UTOMOTIVE INC. CANADA

LB GAWR FRT GAWR RR

1505LB 1984LB
710KG 900KG

MAX. RIDE LEVEL 1120UJ (FRT&RR)
(160KPA) FRT&RR

FORMS TO ALL
GENERAL MOTOR VEHICLE
IN EFFECT ON THE
BE SHOWN ABOVE

PASSENGER VEHICLE
FOR 400 3200G PAYLOAD
OPTIONAL INFORMATION

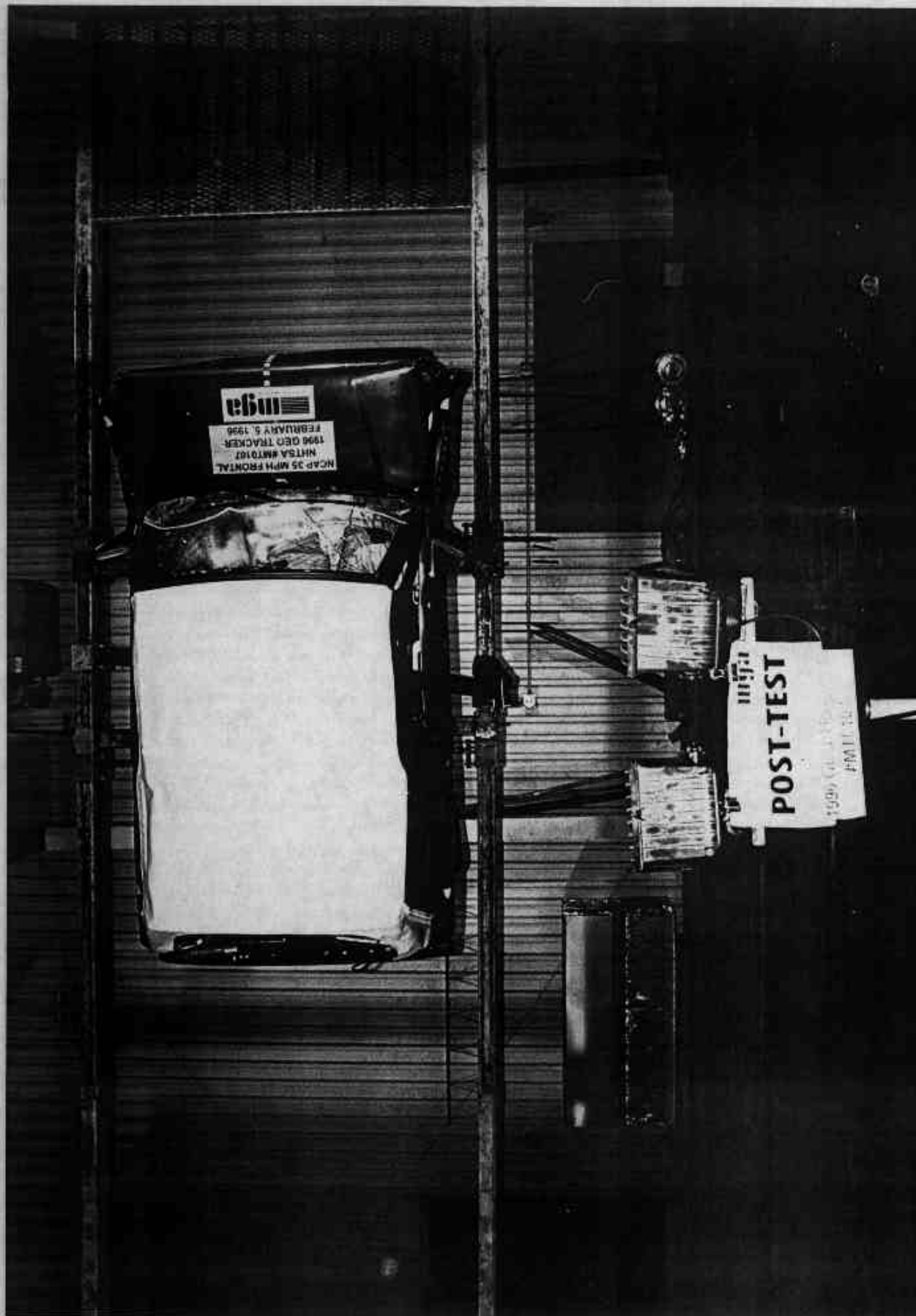
TIRE PLACARD

kg/LB	GAWR	GAWR FRT	GAWR RR
	1500/3307	710/1565	900/1984
TIRES		P205/75R15	P205/75R15
RIMS		15X5 1/2 JJ	15X5 1/2 JJ
INFLATION PRESSURE COLD kPa/PSI		160/23	160/23

60A80

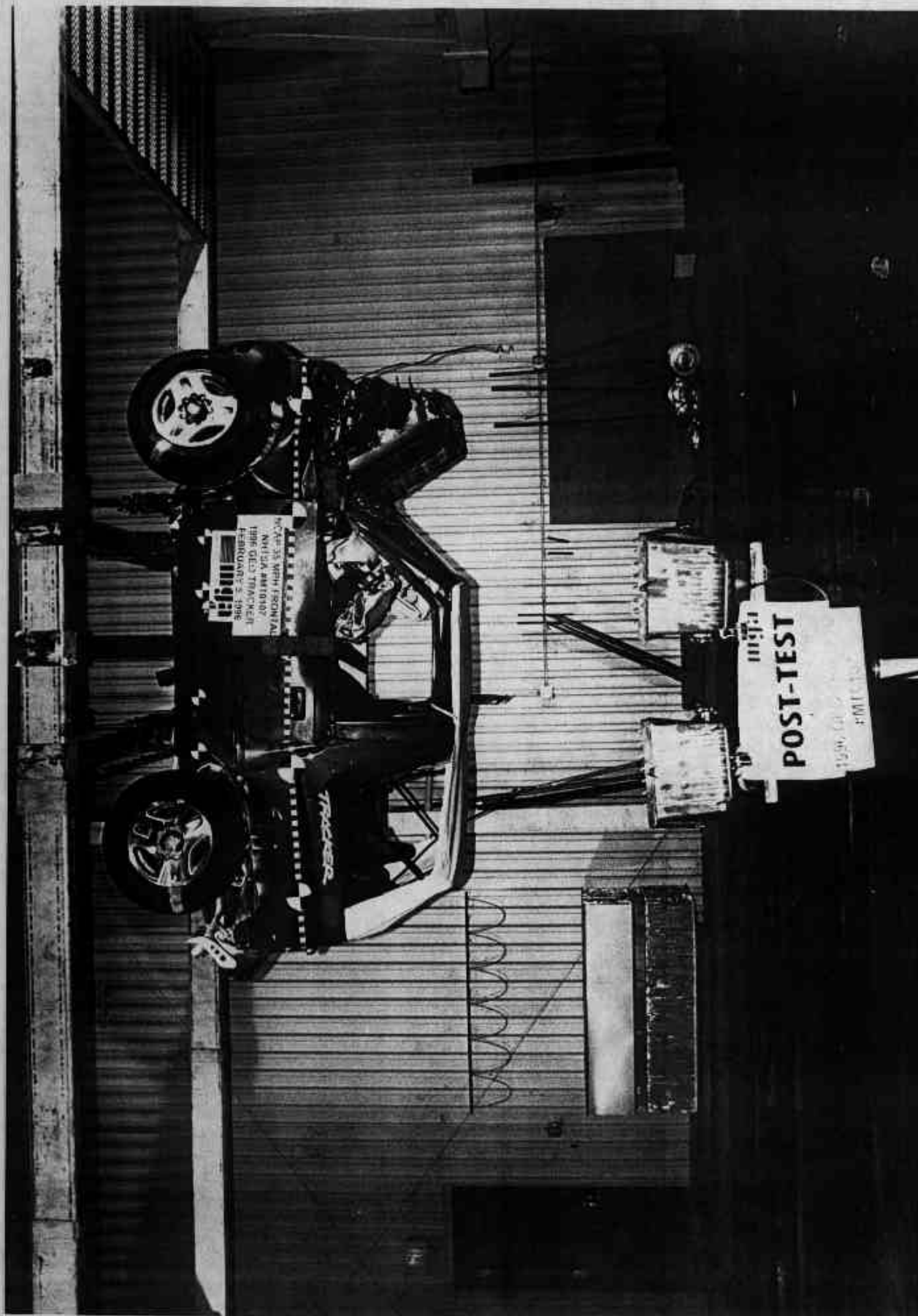


Photo No. A-45 - Vehicle Impact



A-46

Photo No. A-46 - Rollover 90°



A-47

Photo No. A-47 - Rollover 180°

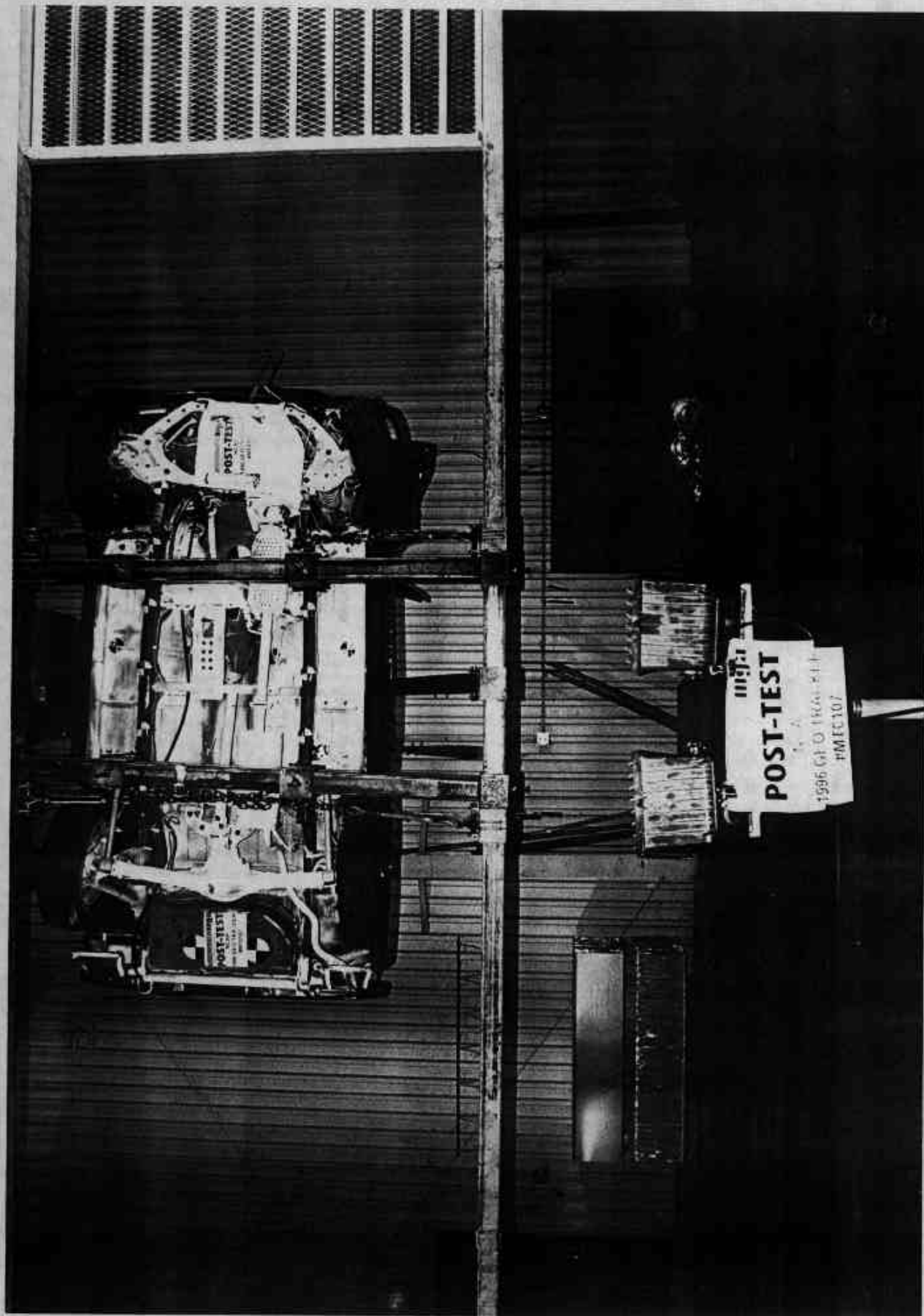
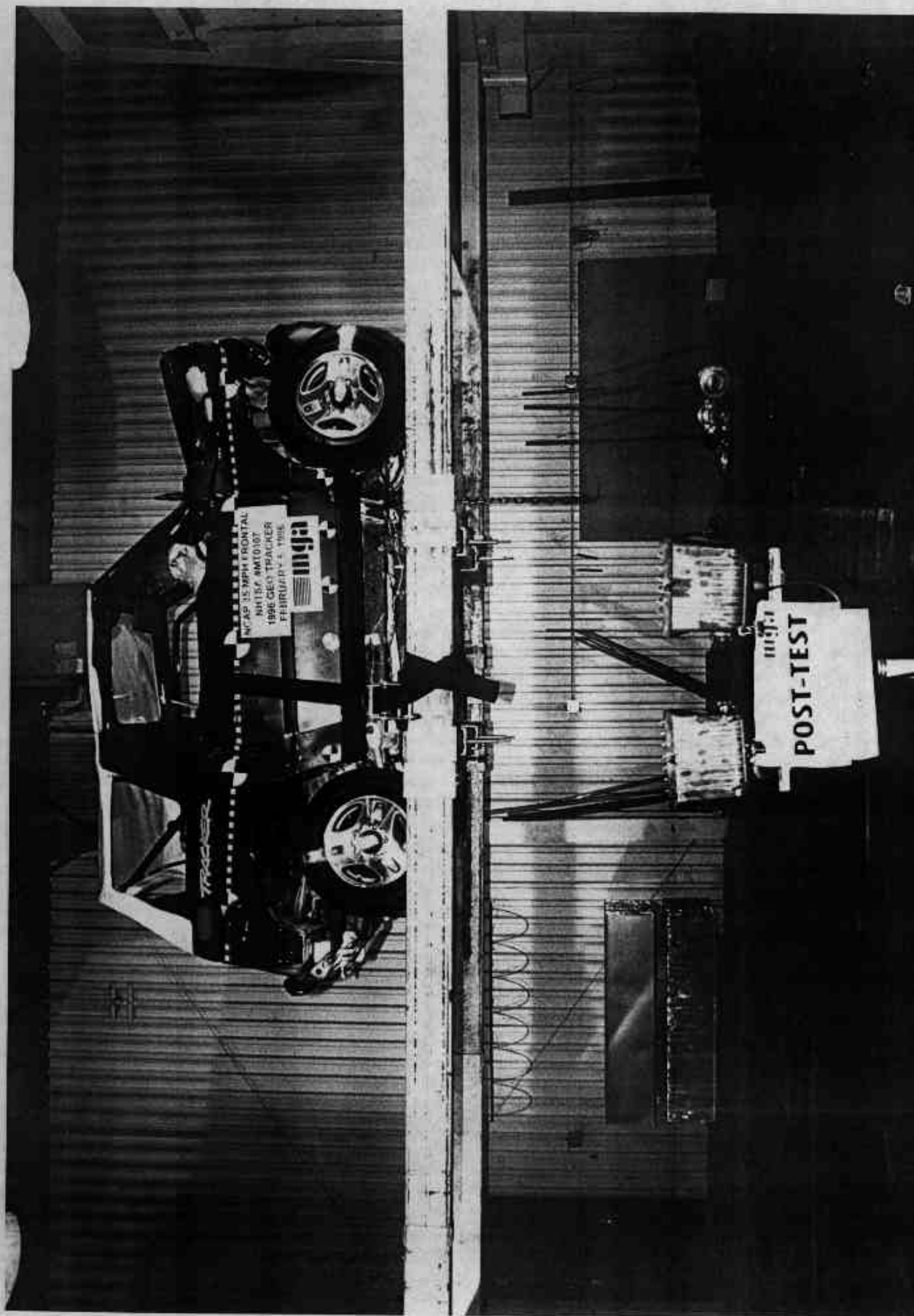


Photo No. A-48 - Rollover 270°



A-49

Photo No. A-49 - Rollover 360°

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1996 Geo Tracker 4x4
NHTSA NO.: MT0107

VEHICLE DATA FILTER CHANNEL CLASS

Head Accelerations 1000 (1650 Hz)
Chest Accelerations 180 (300 Hz)
Vehicle Accelerations 60 (100 Hz)
Barrier Load Cells 60 (100 Hz)
Femur Load Cells 600 (1000 Hz)
Lap and Torso Belts 60 (100 Hz)

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* No valid data collected

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* No valid data collected

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B-141

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B-142

Figure B-143 - Passenger Right Foot Ball Z Acceleration vs. Time

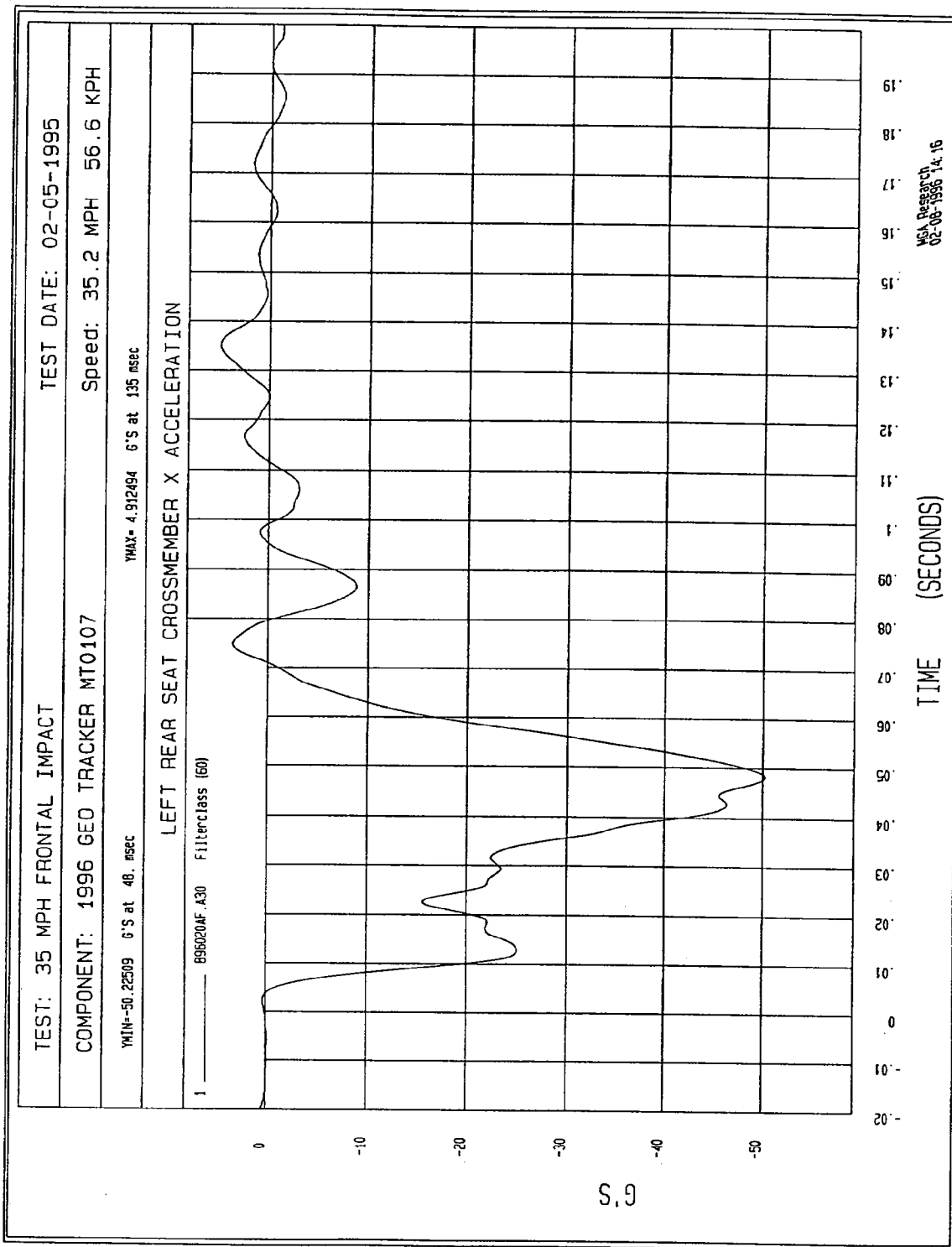
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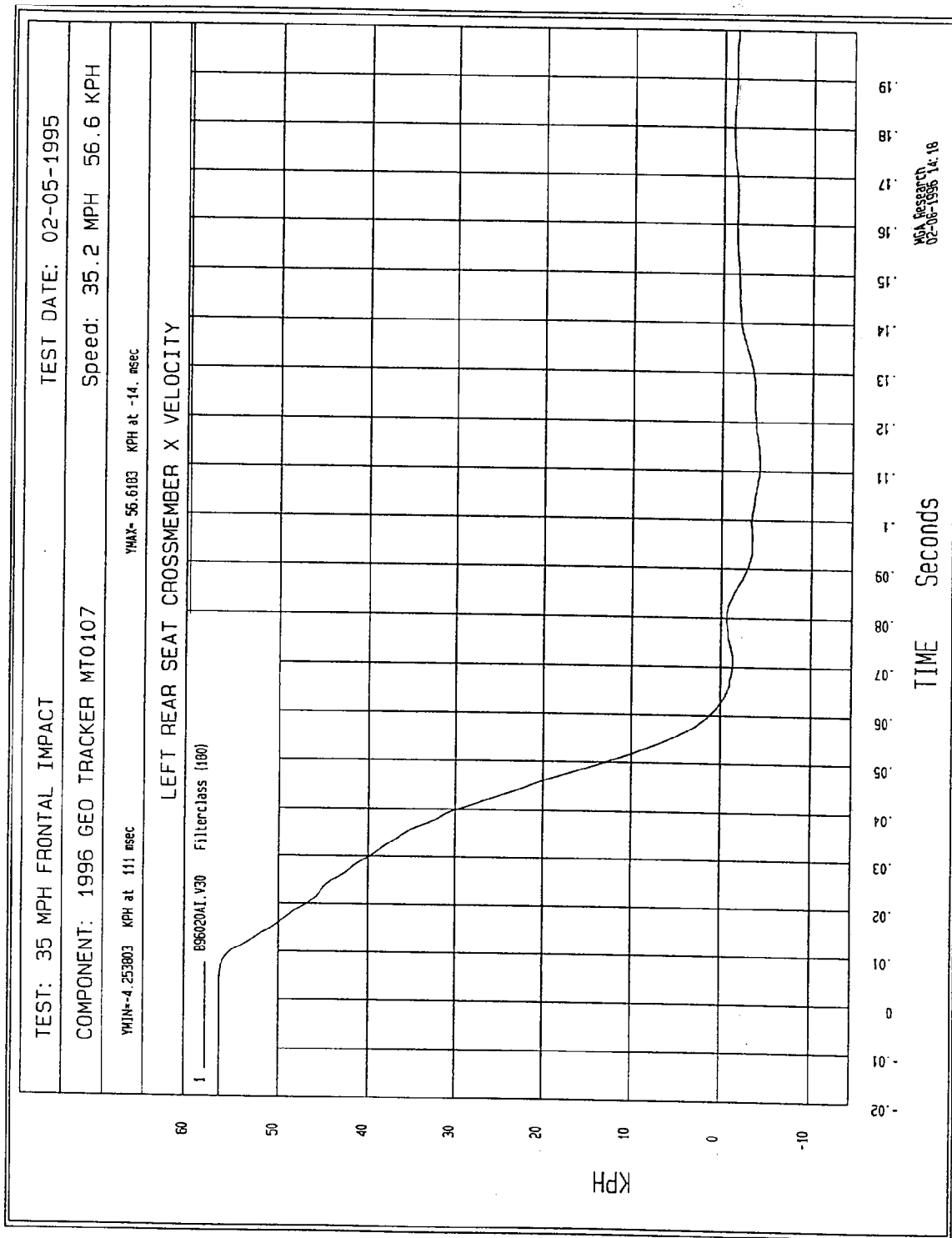
Figure B-144 - Passenger Right Foot Heel X Acceleration vs. Time

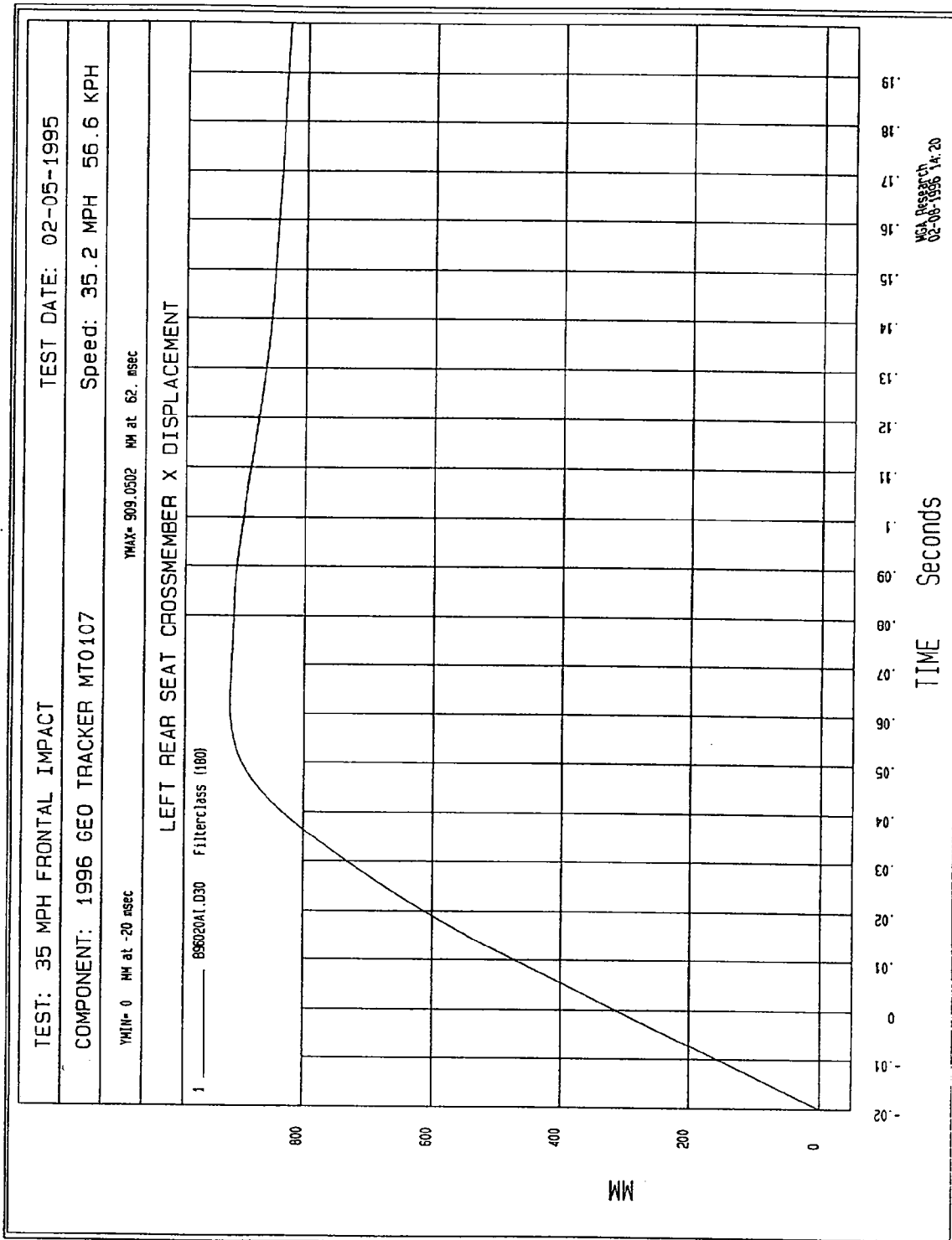
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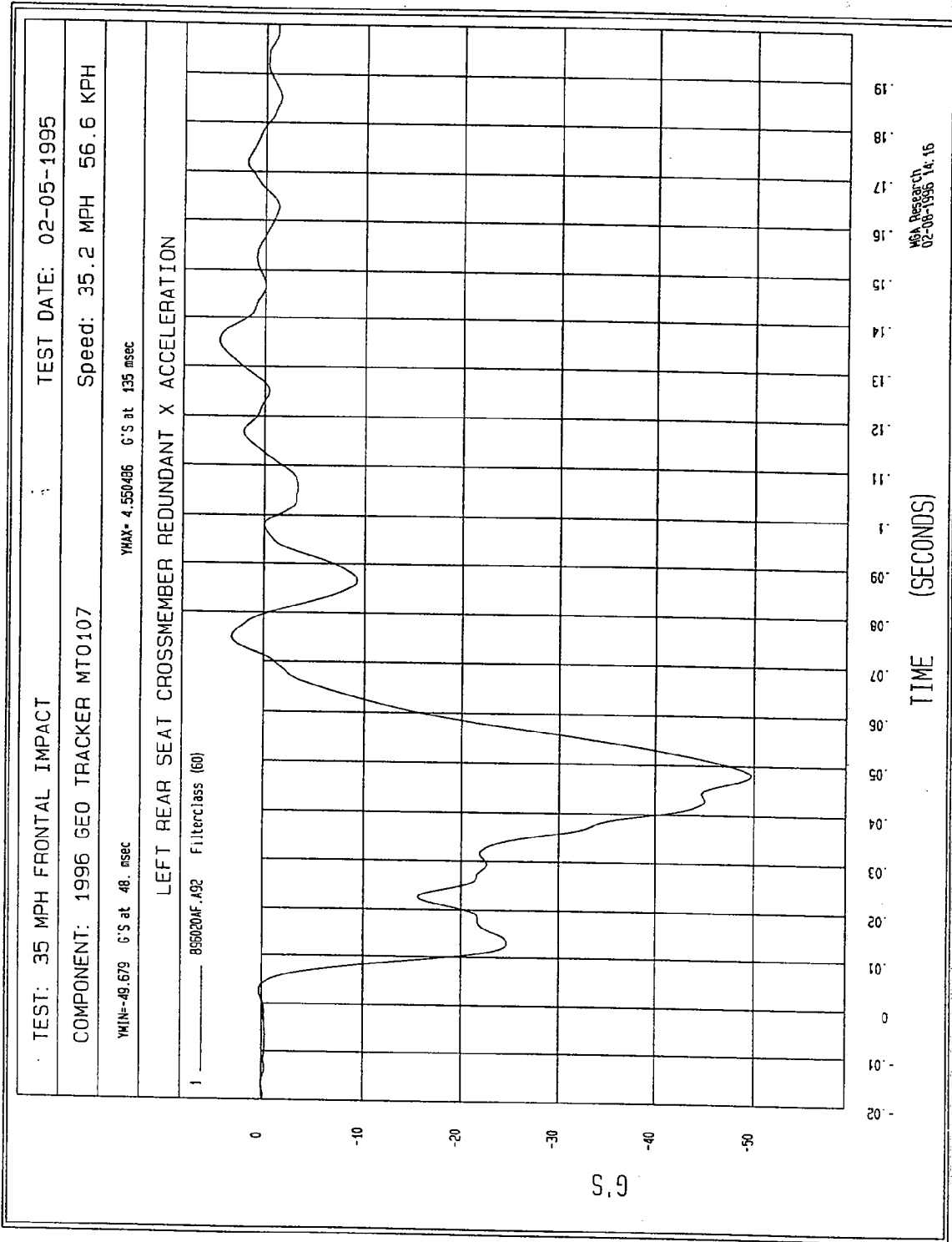
Figure B-145 - Passenger Right Foot Heel Z Acceleration vs. Time

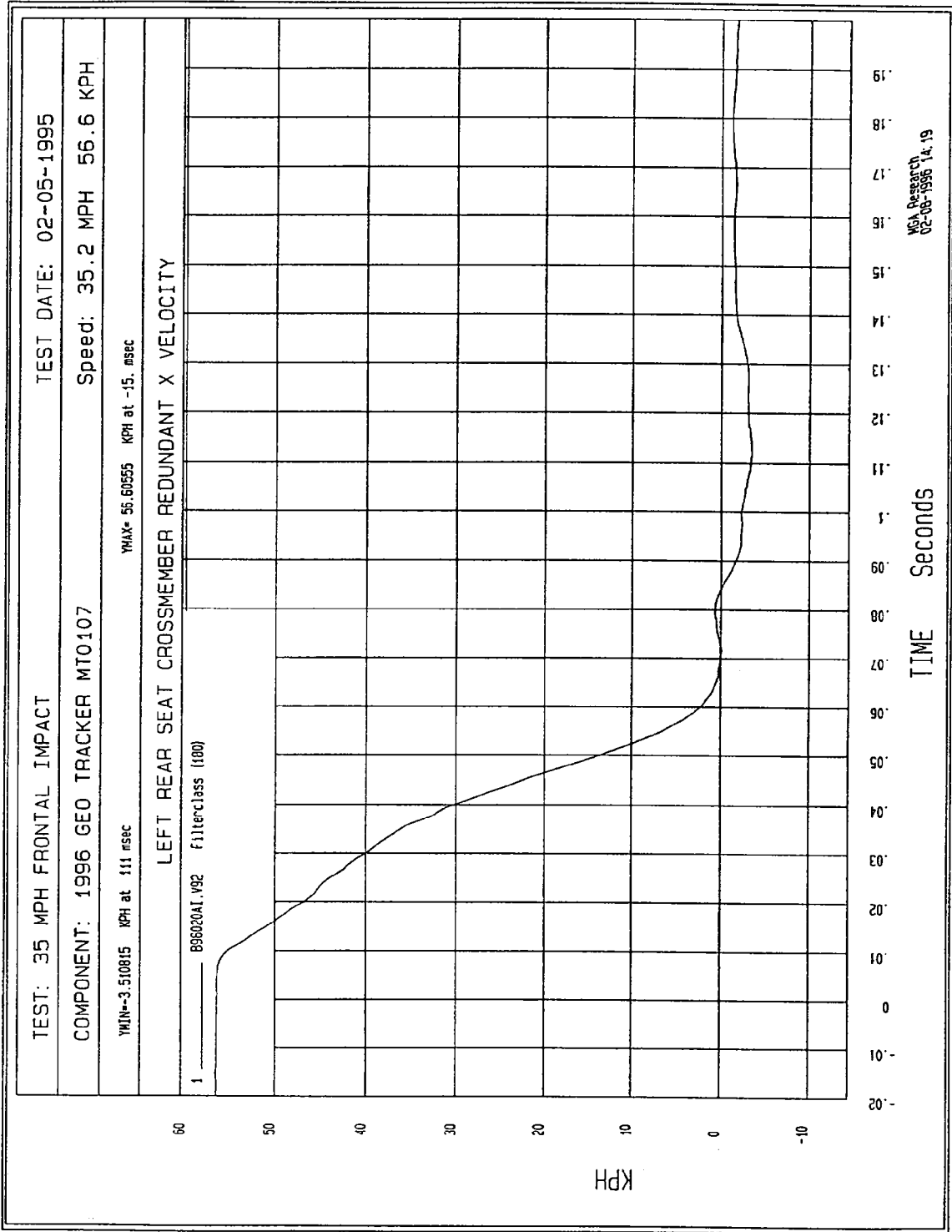
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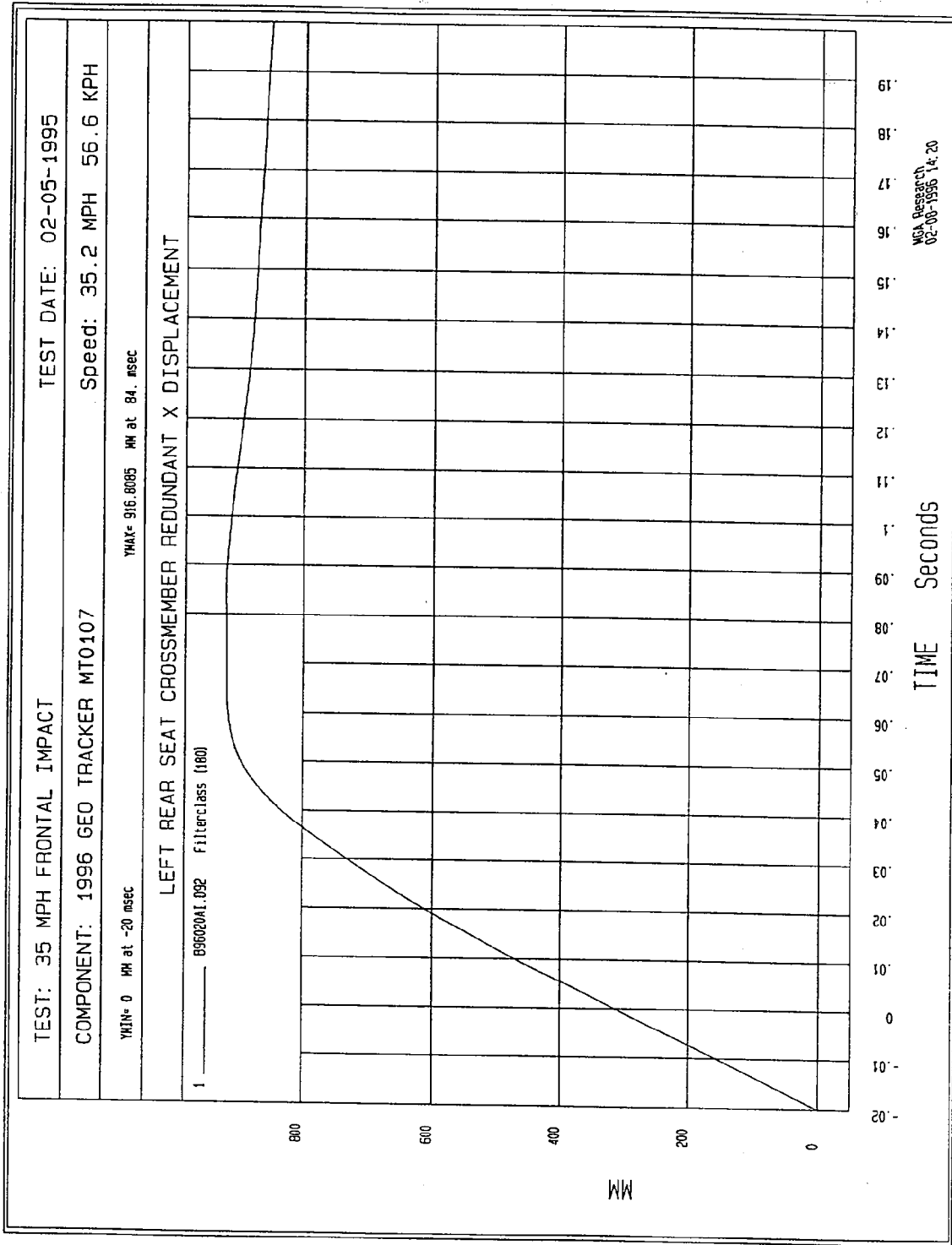












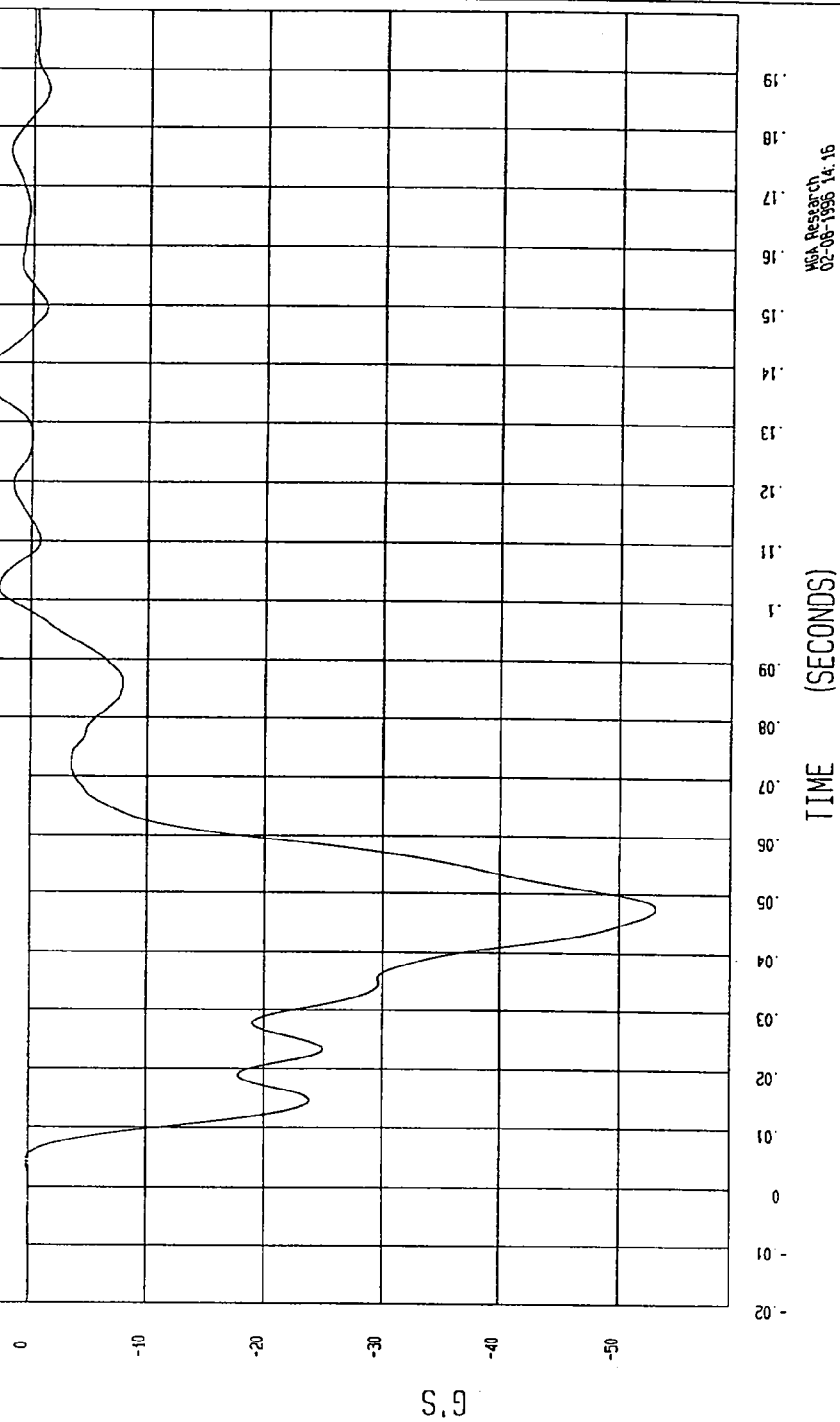
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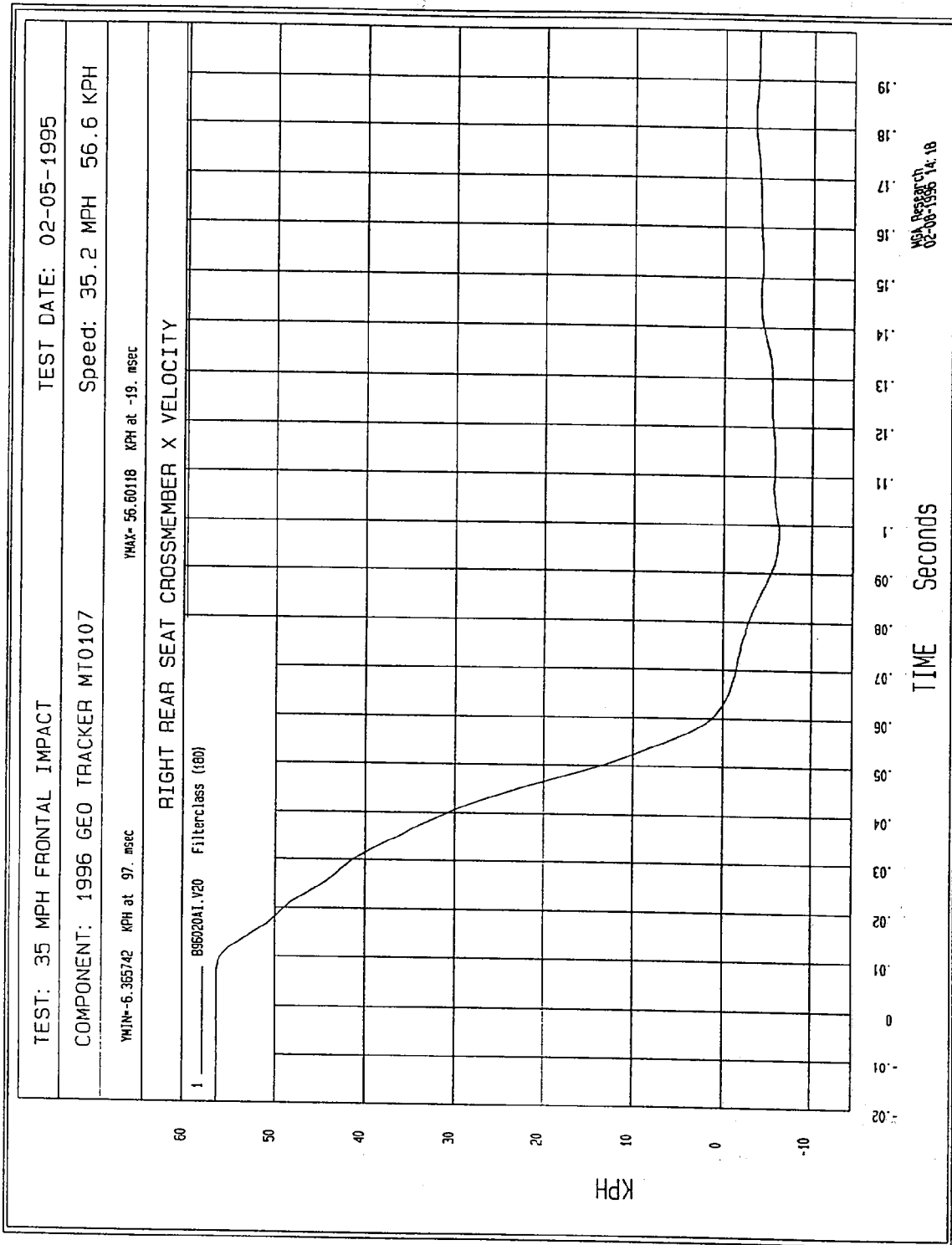
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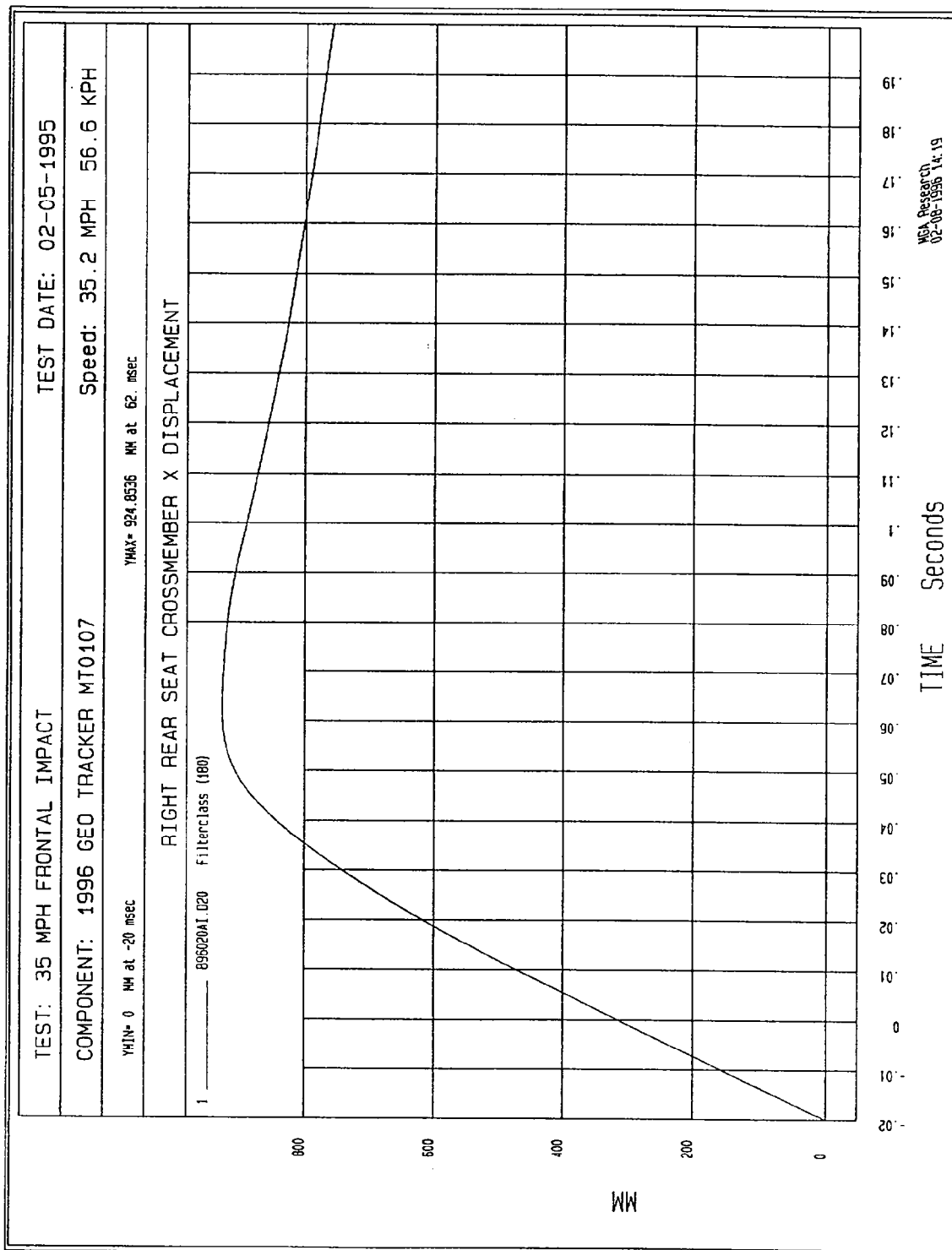
RIGHT REAR SEAT CROSSMEMBER X ACCELERATION

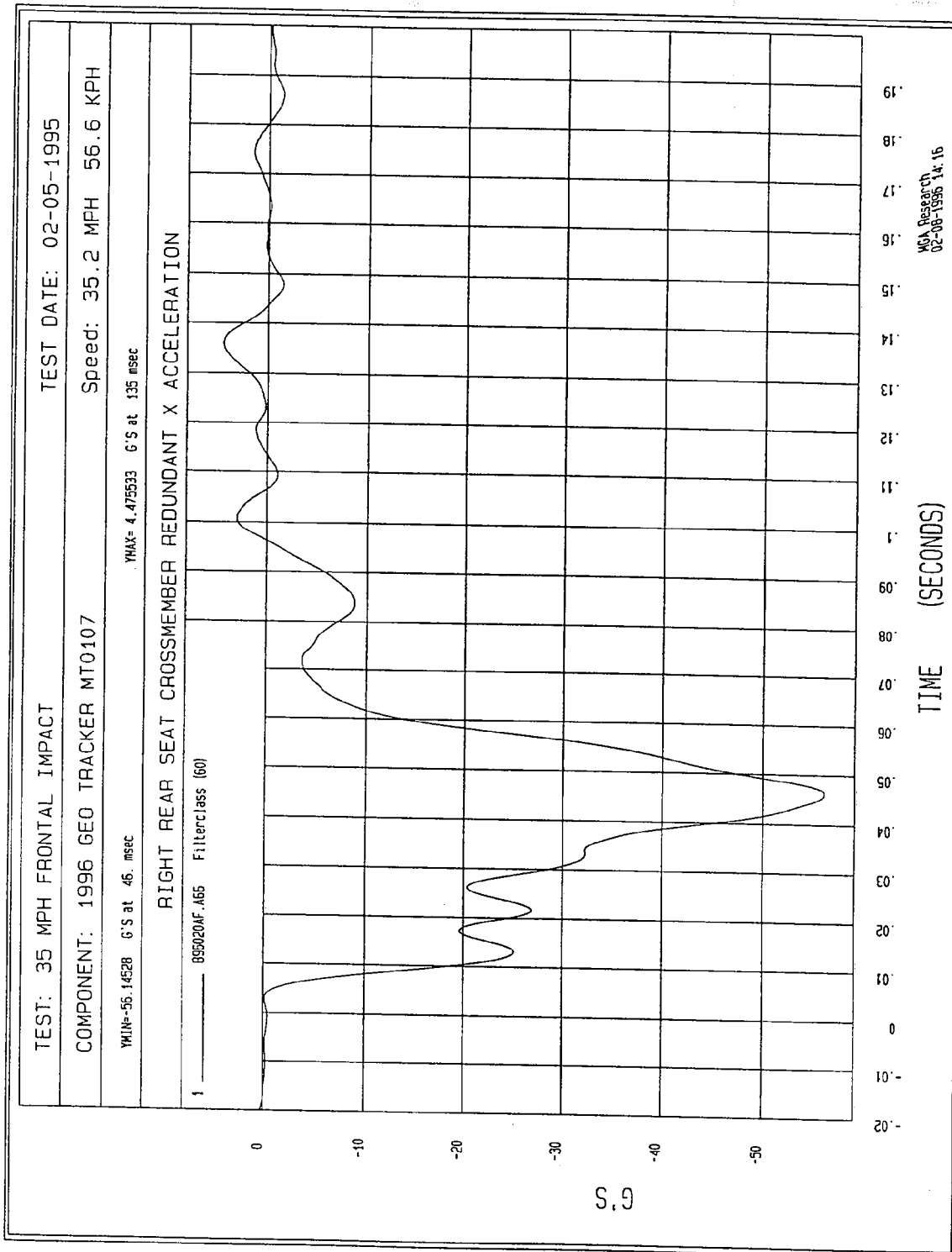
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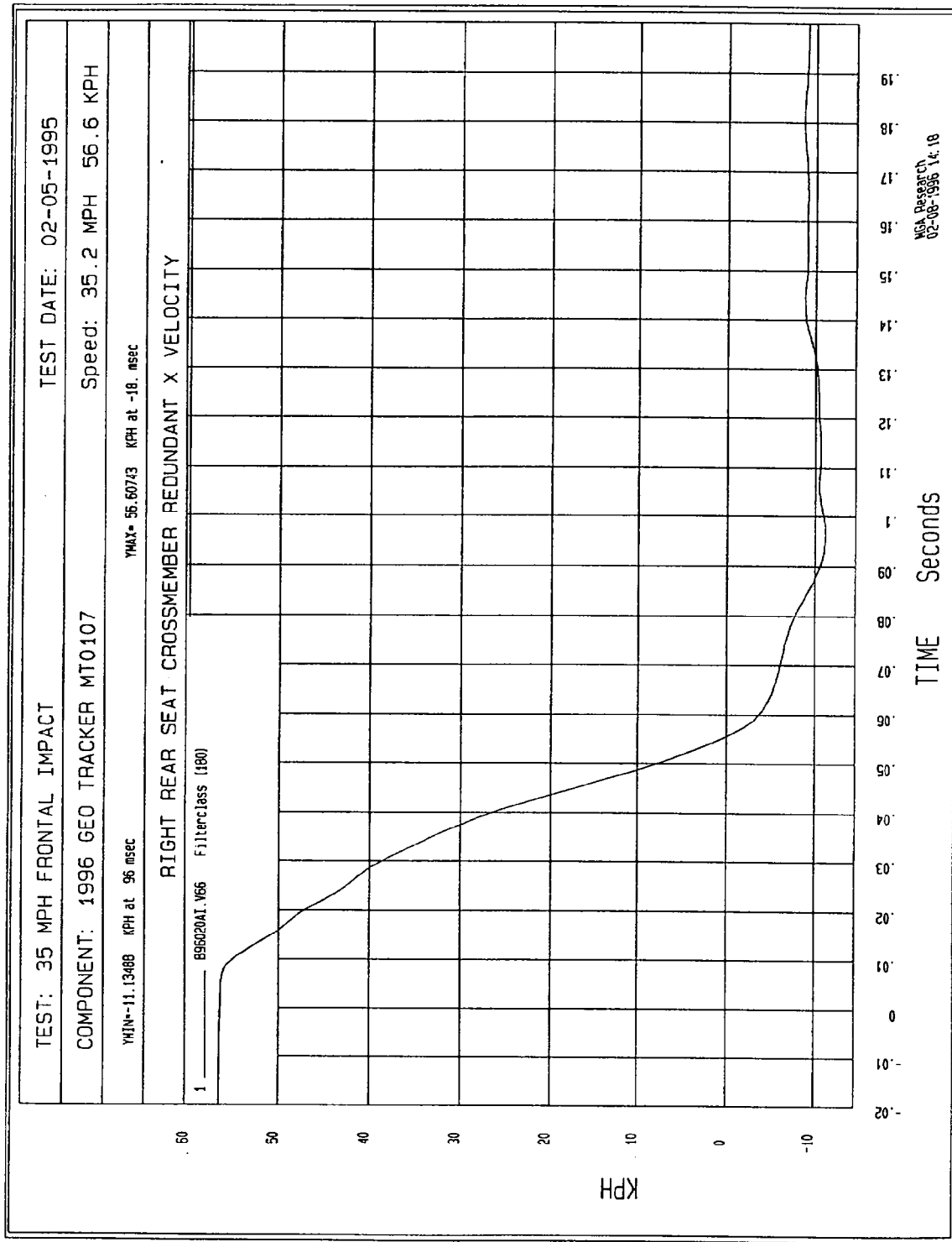


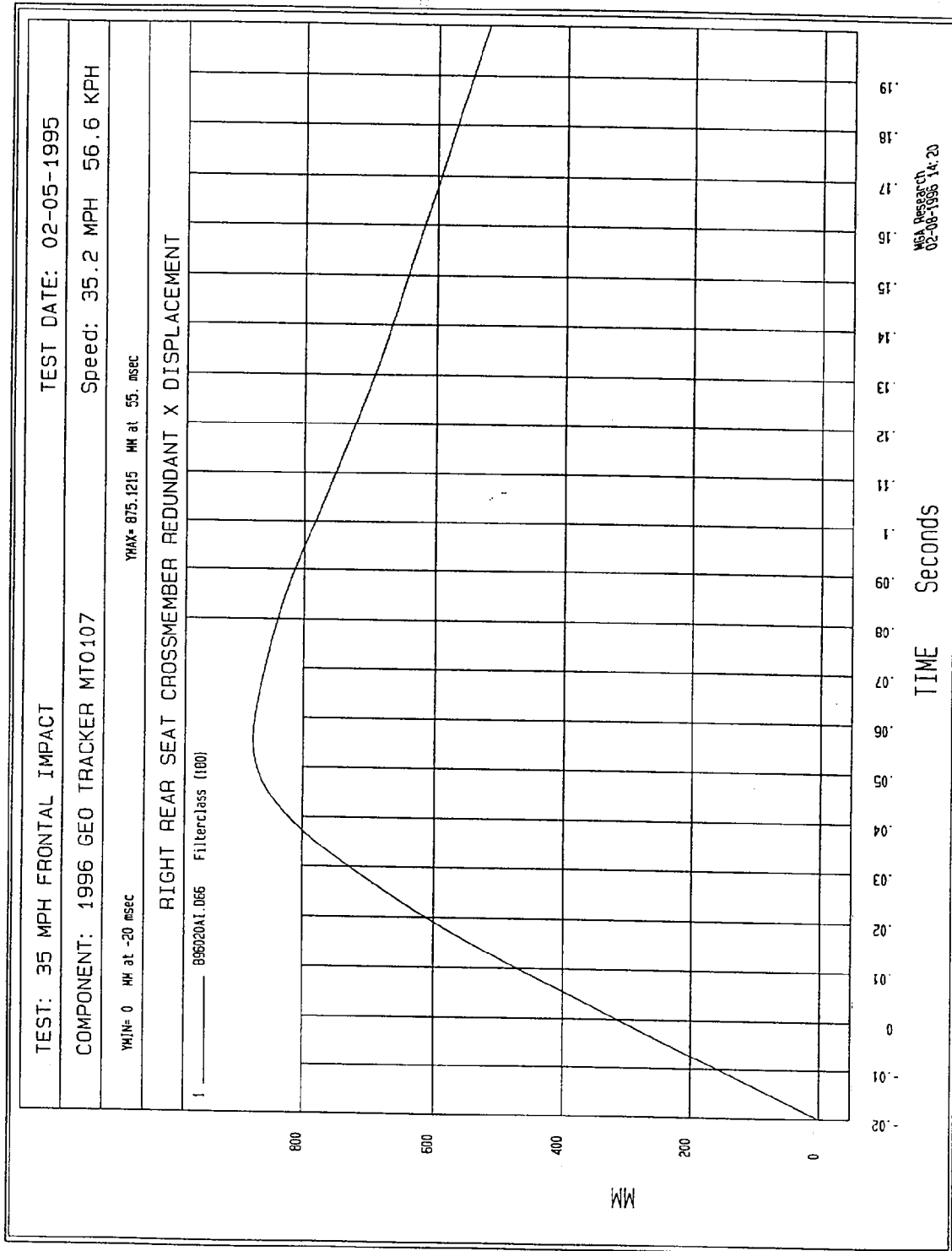
HGA Research
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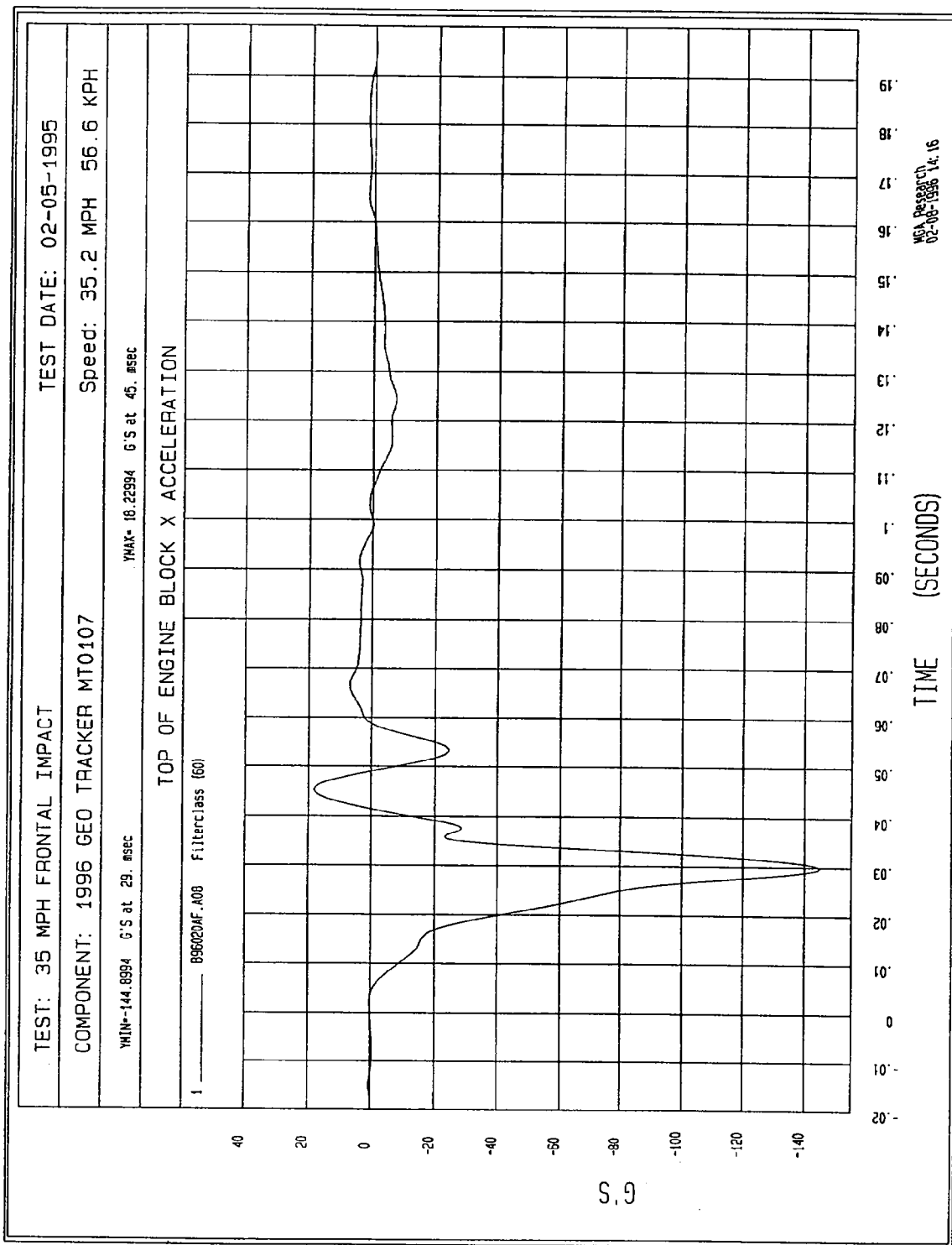


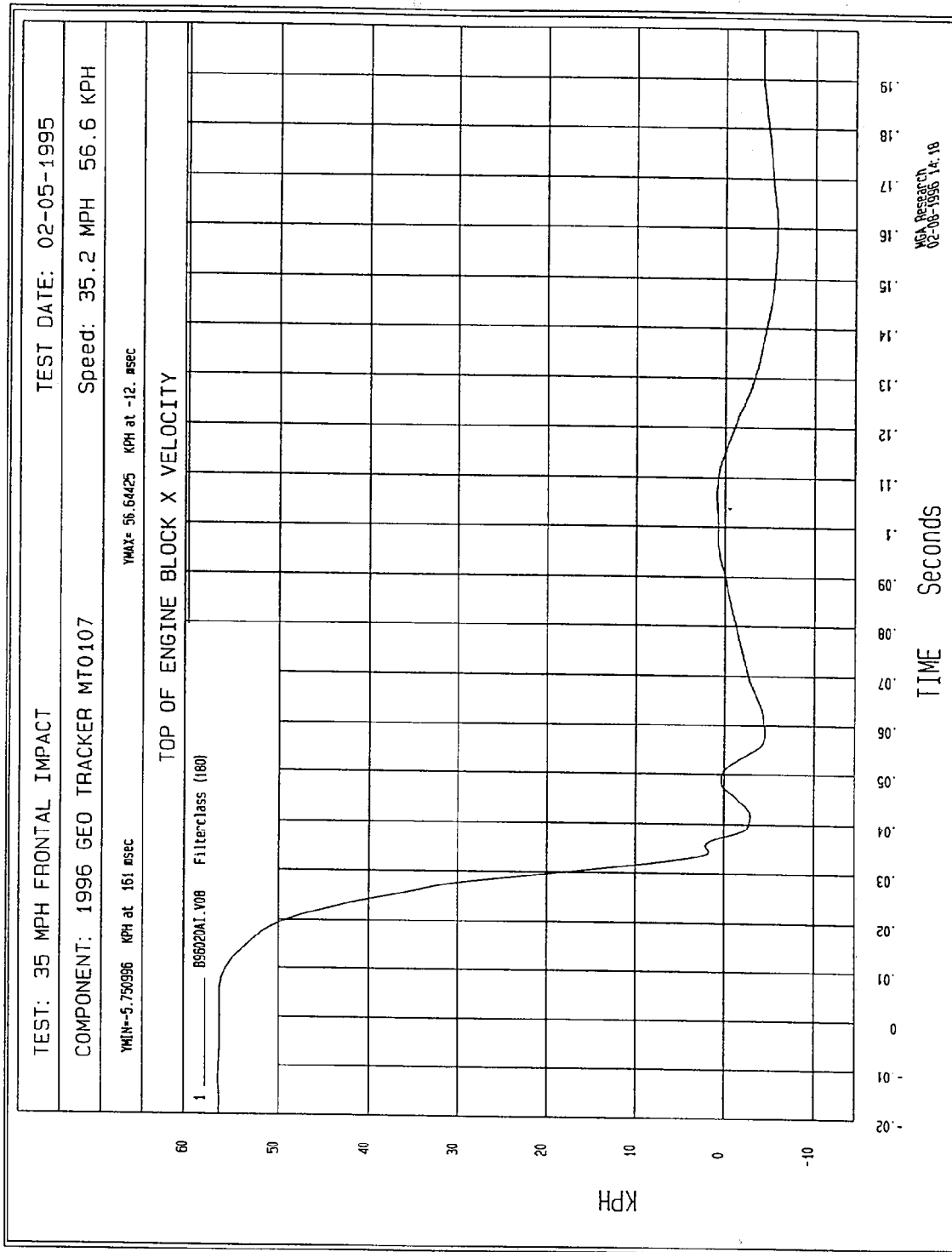


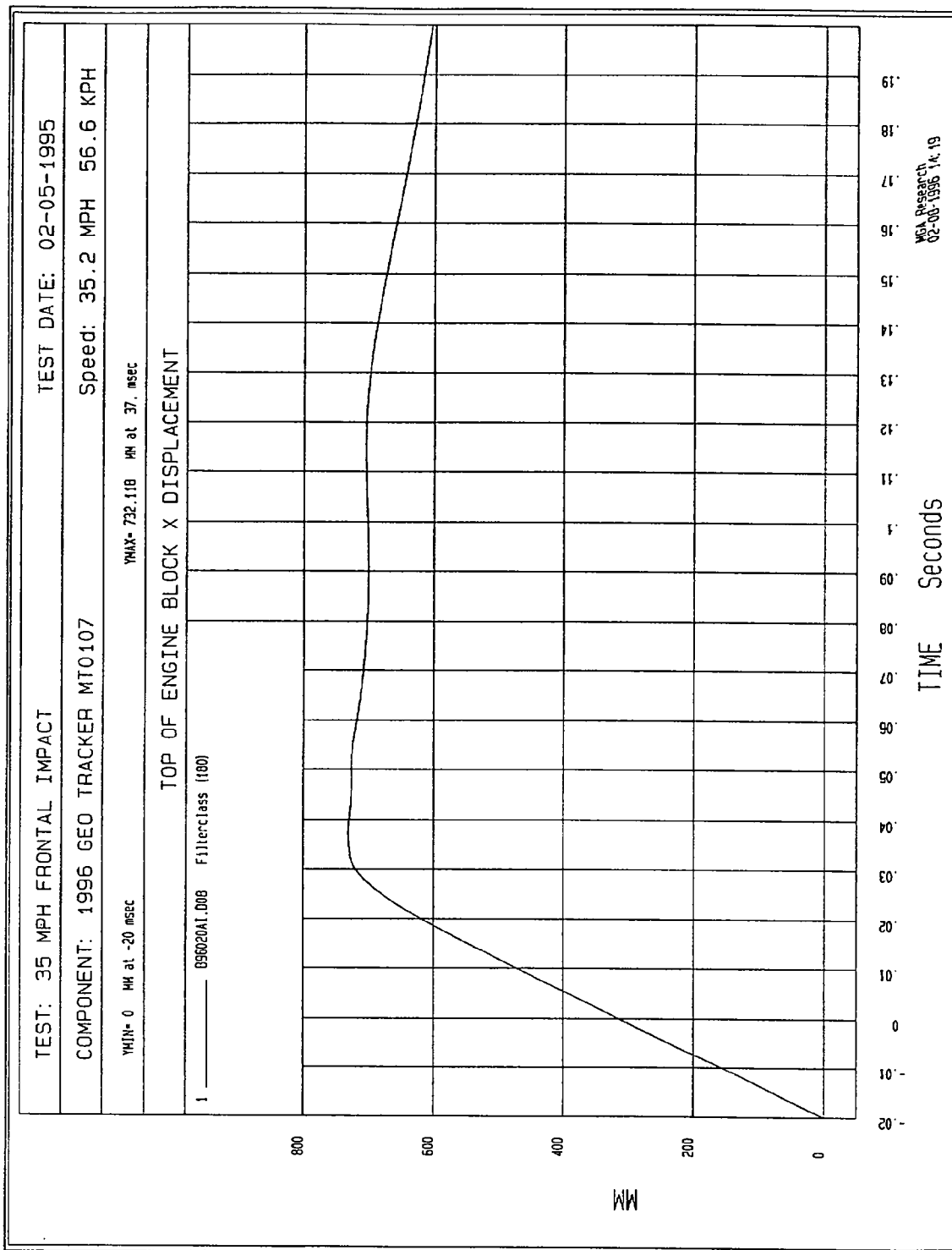


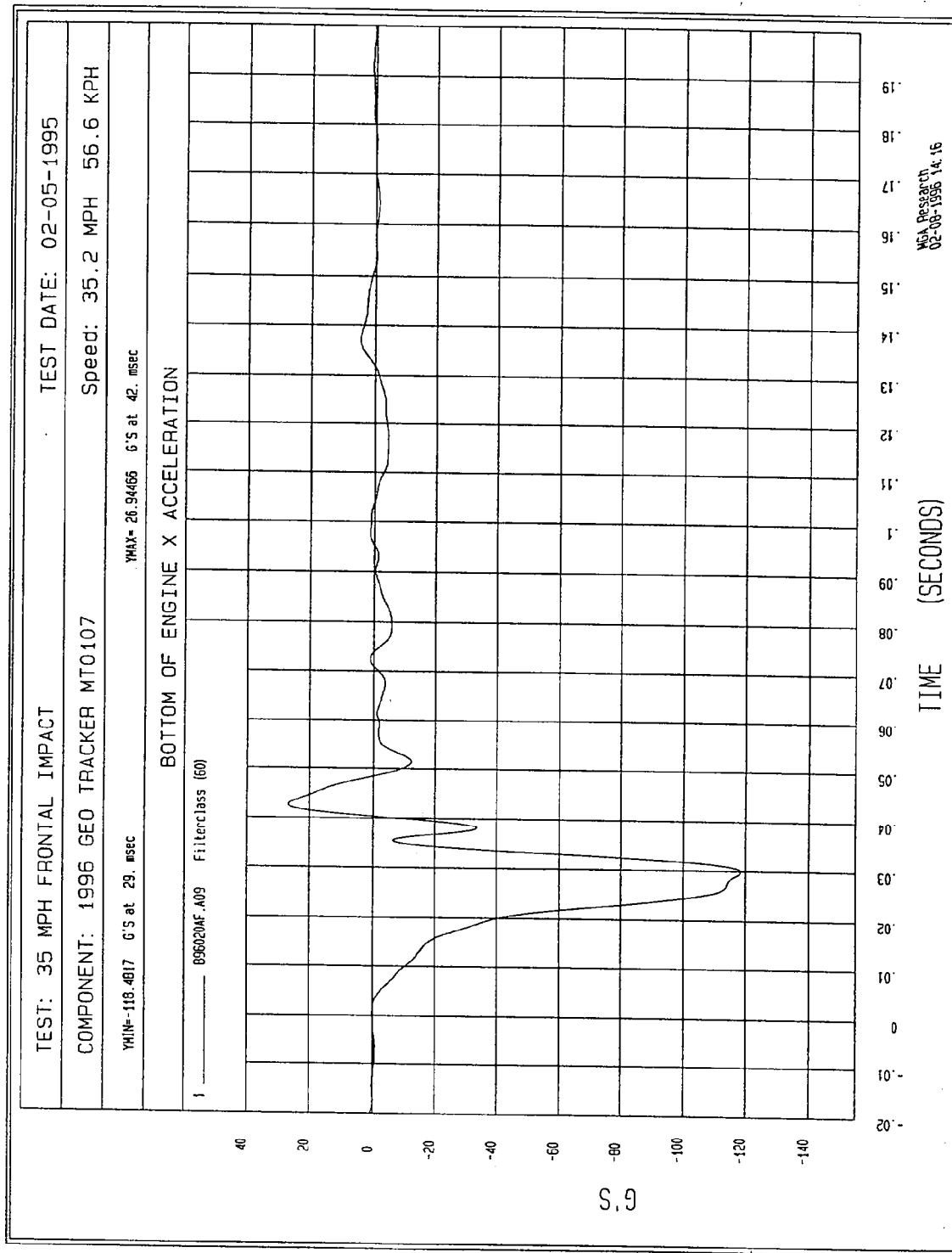


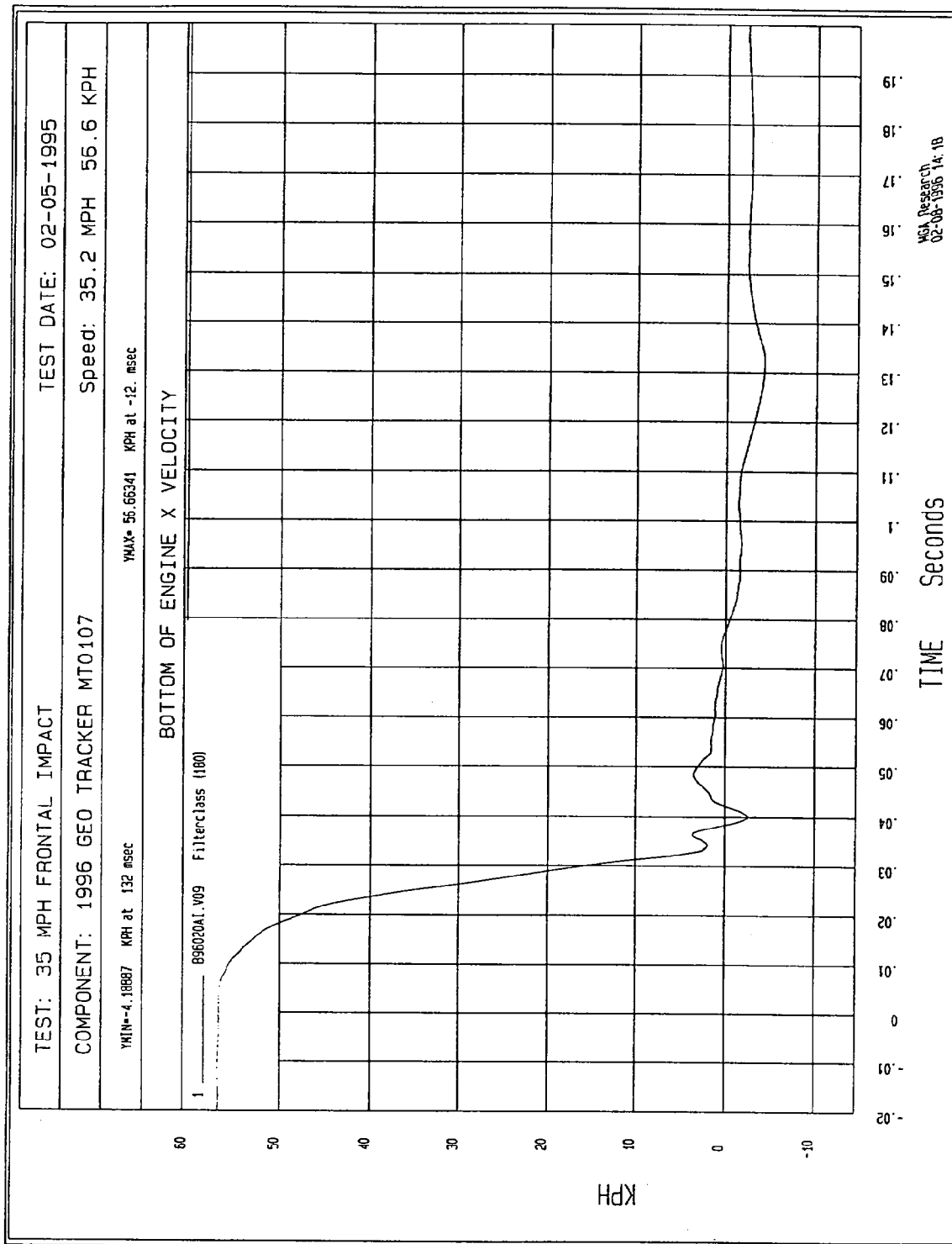


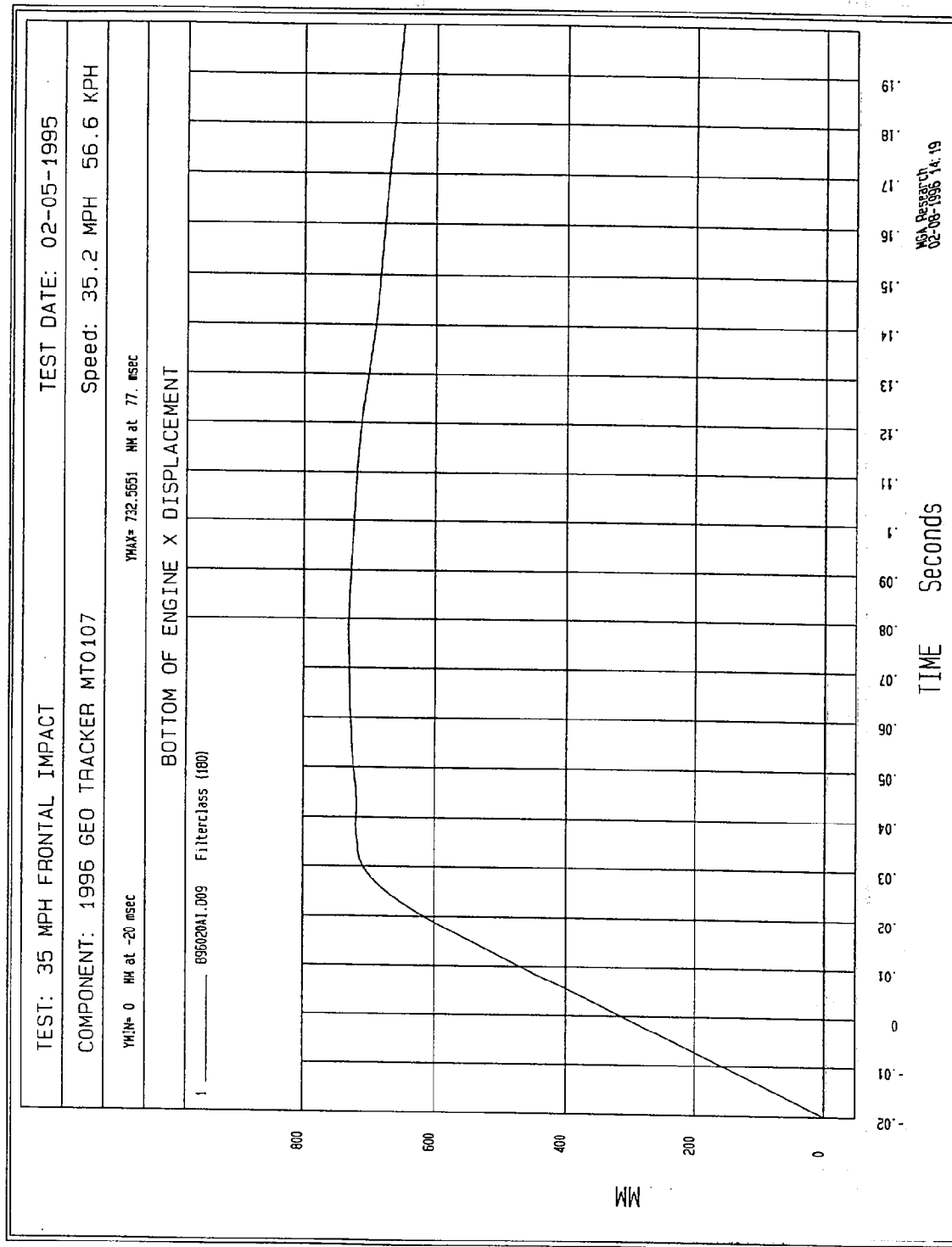


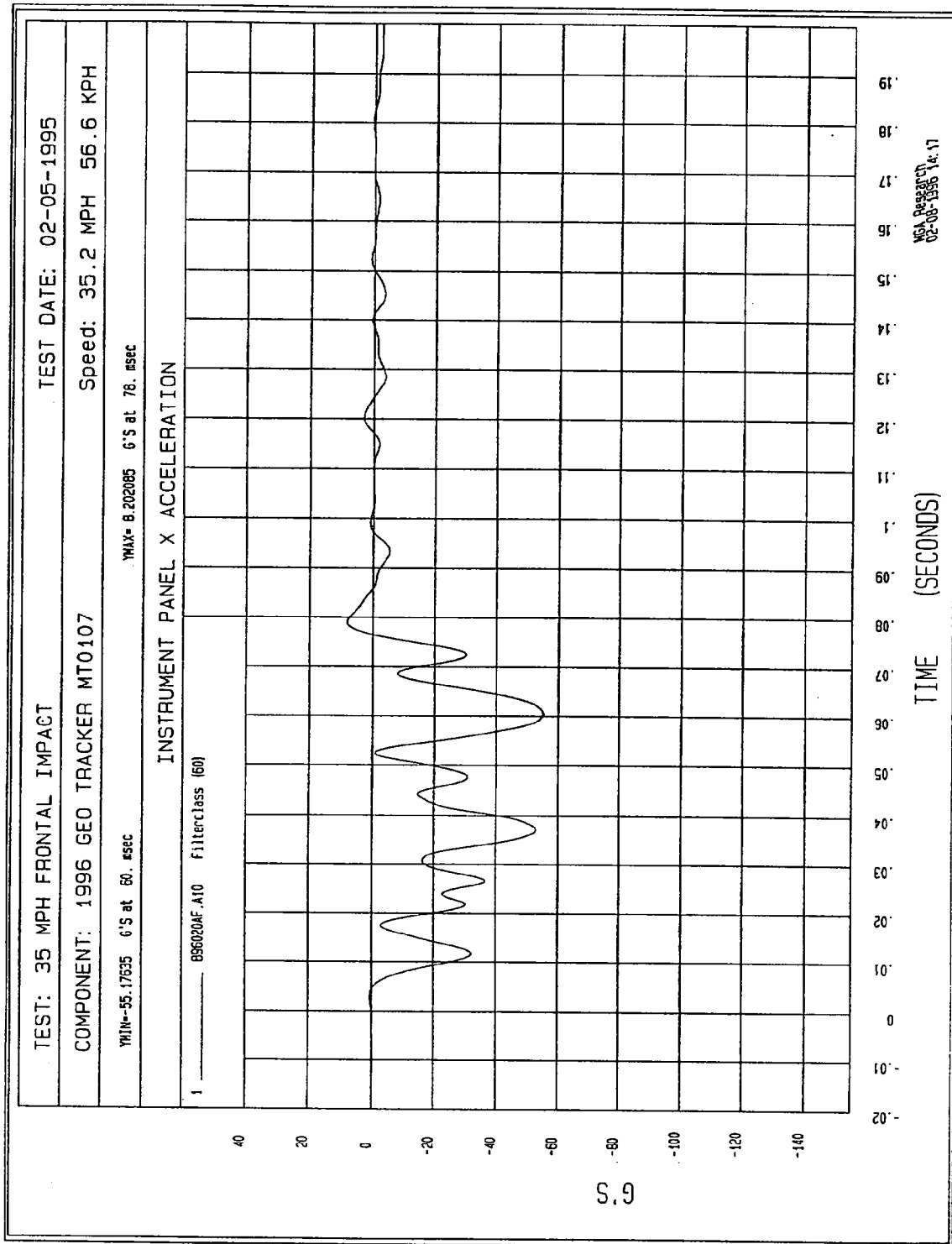


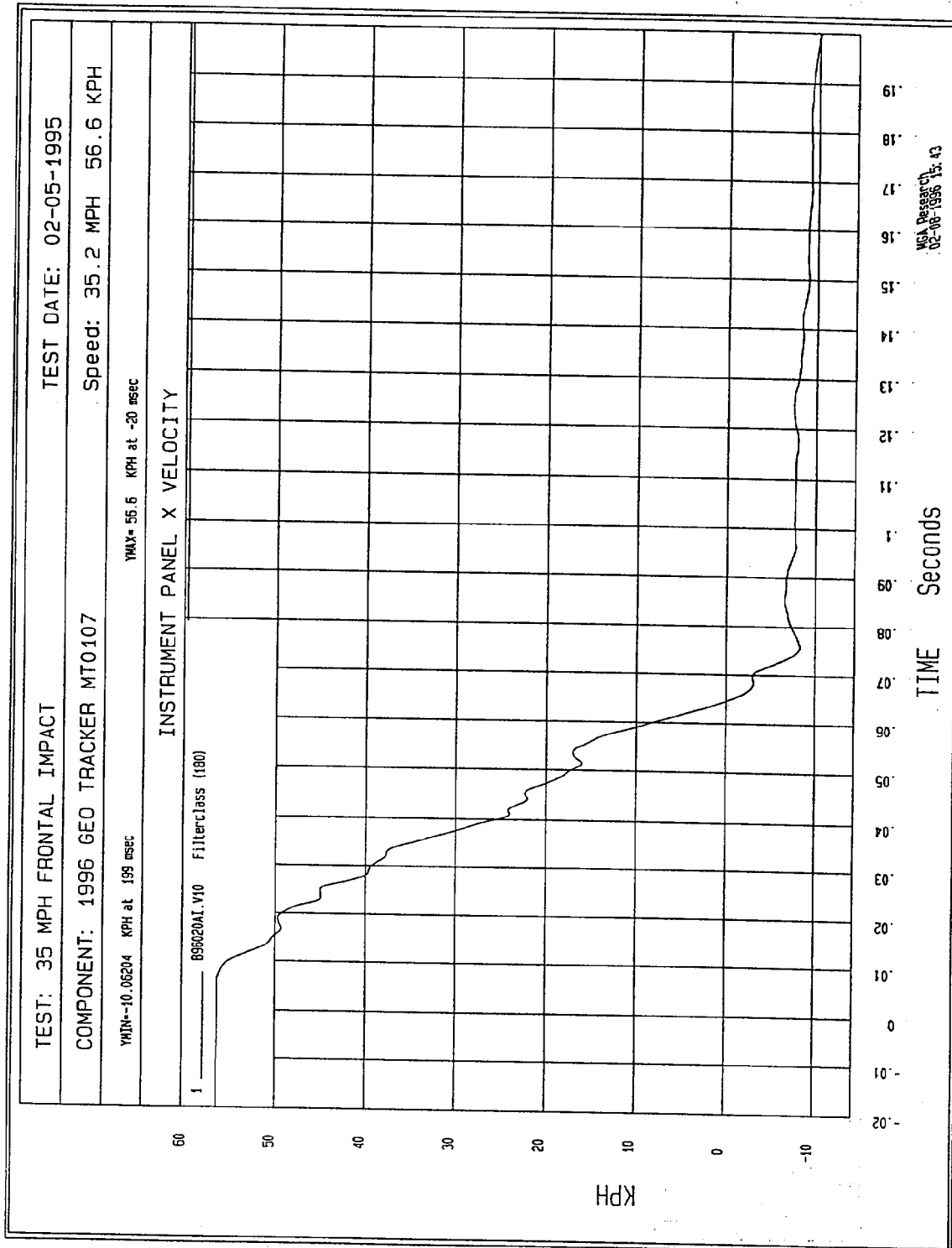


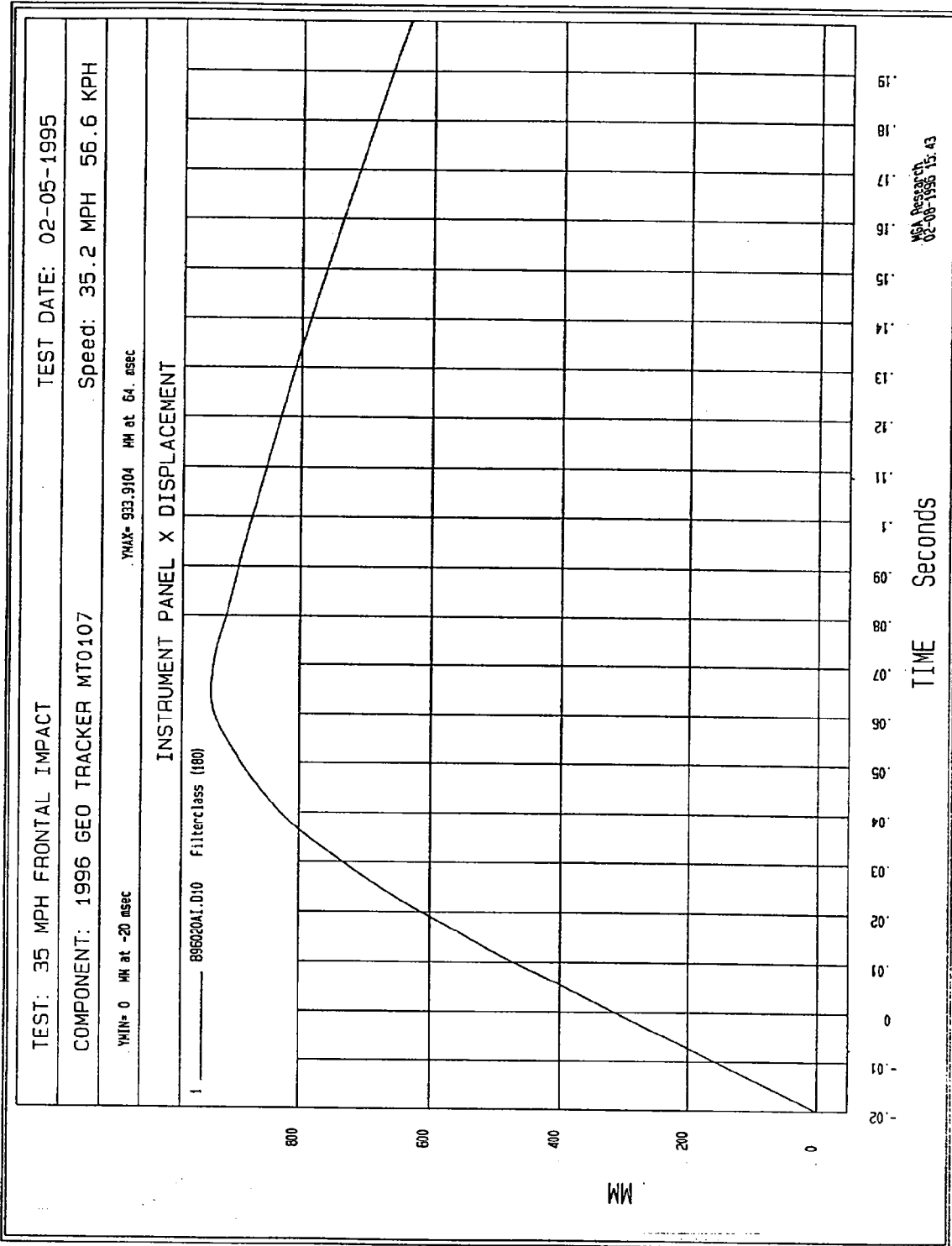


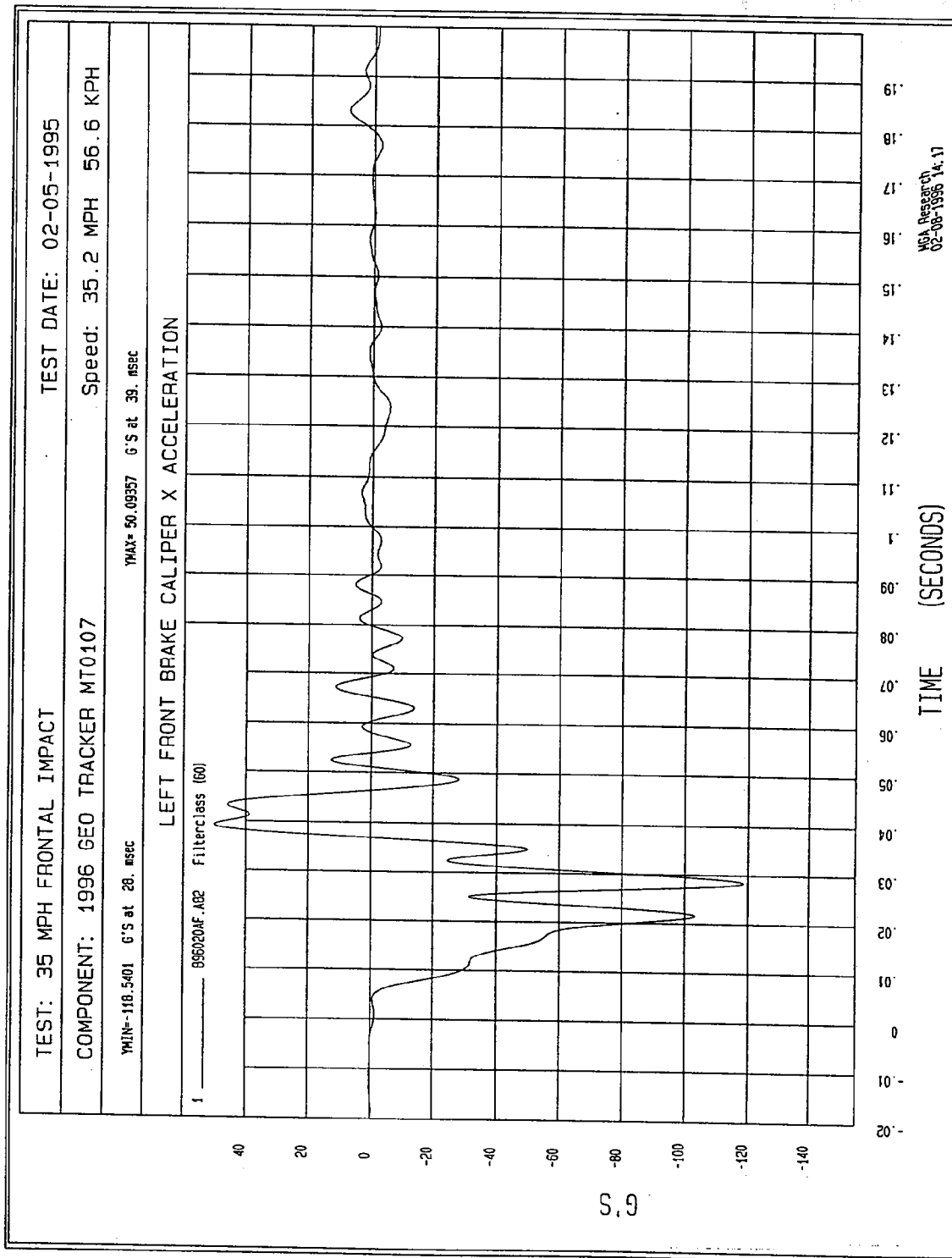


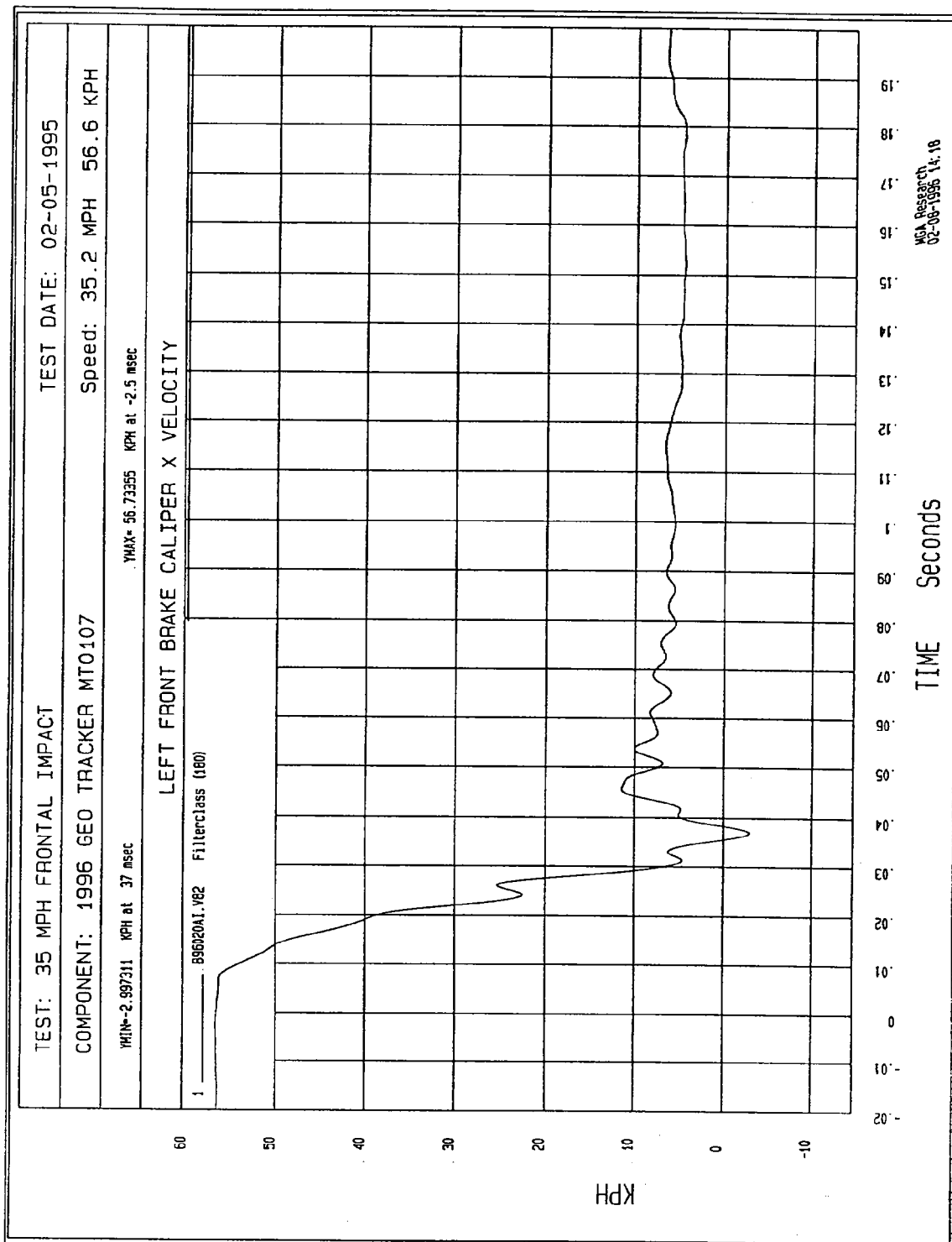


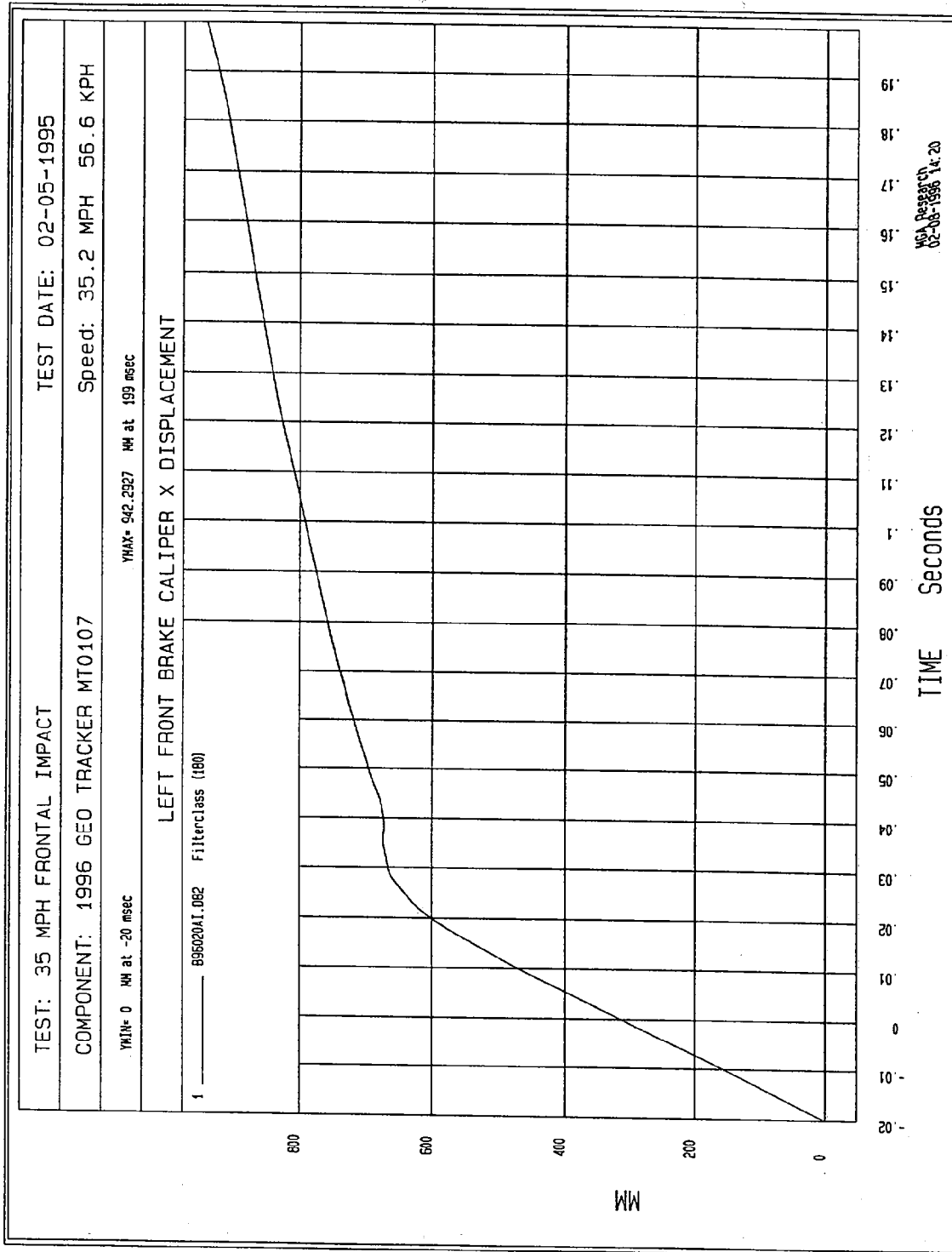


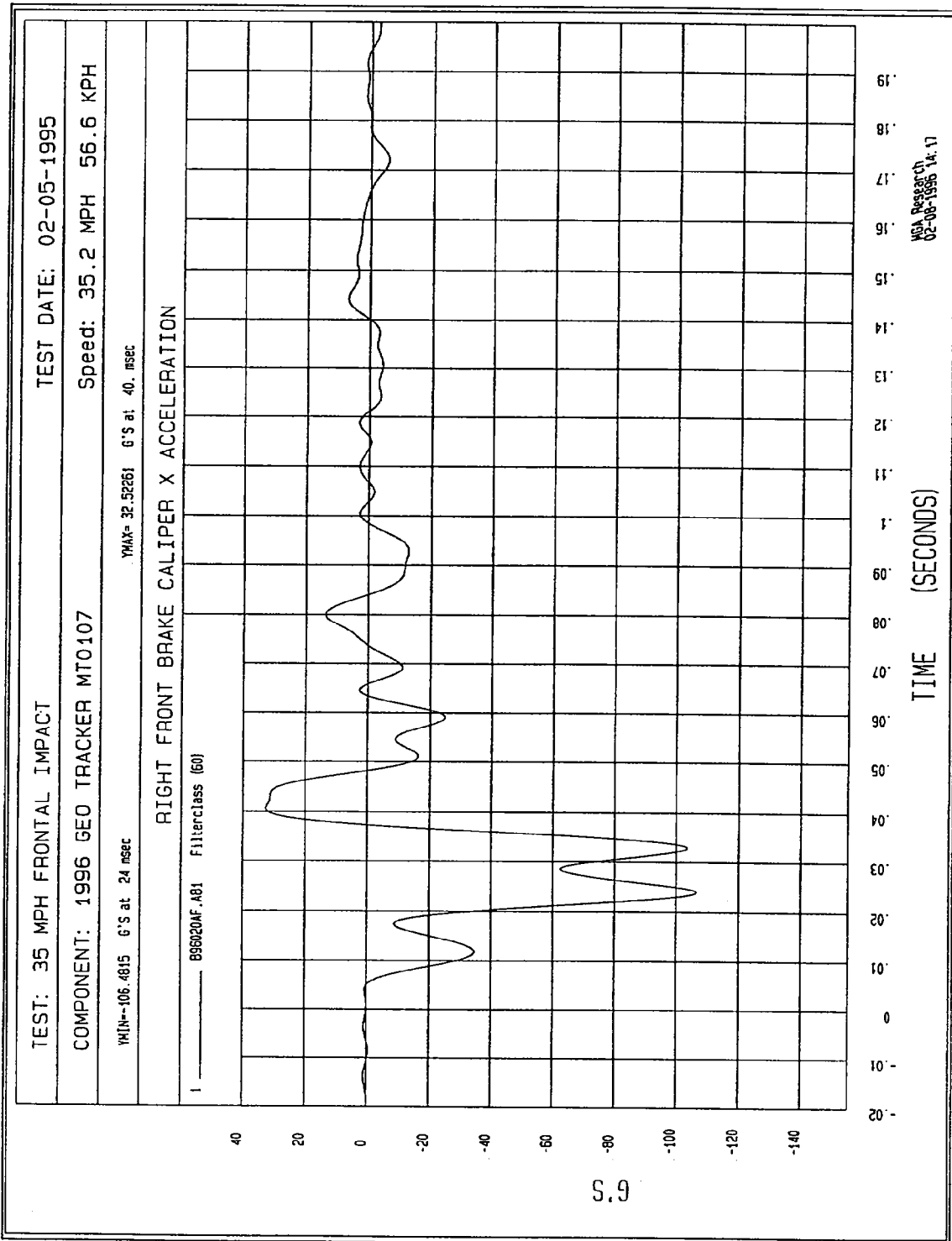


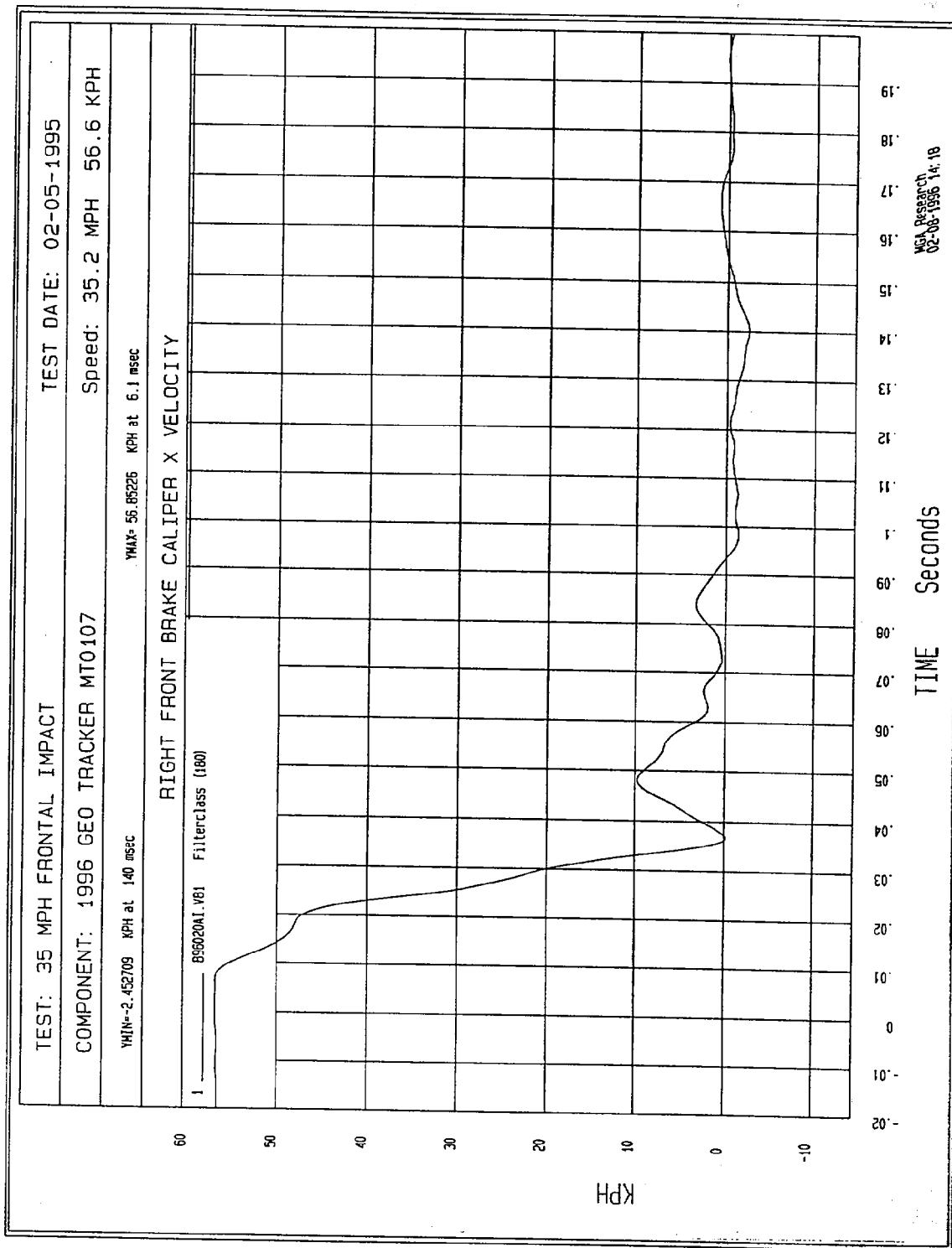


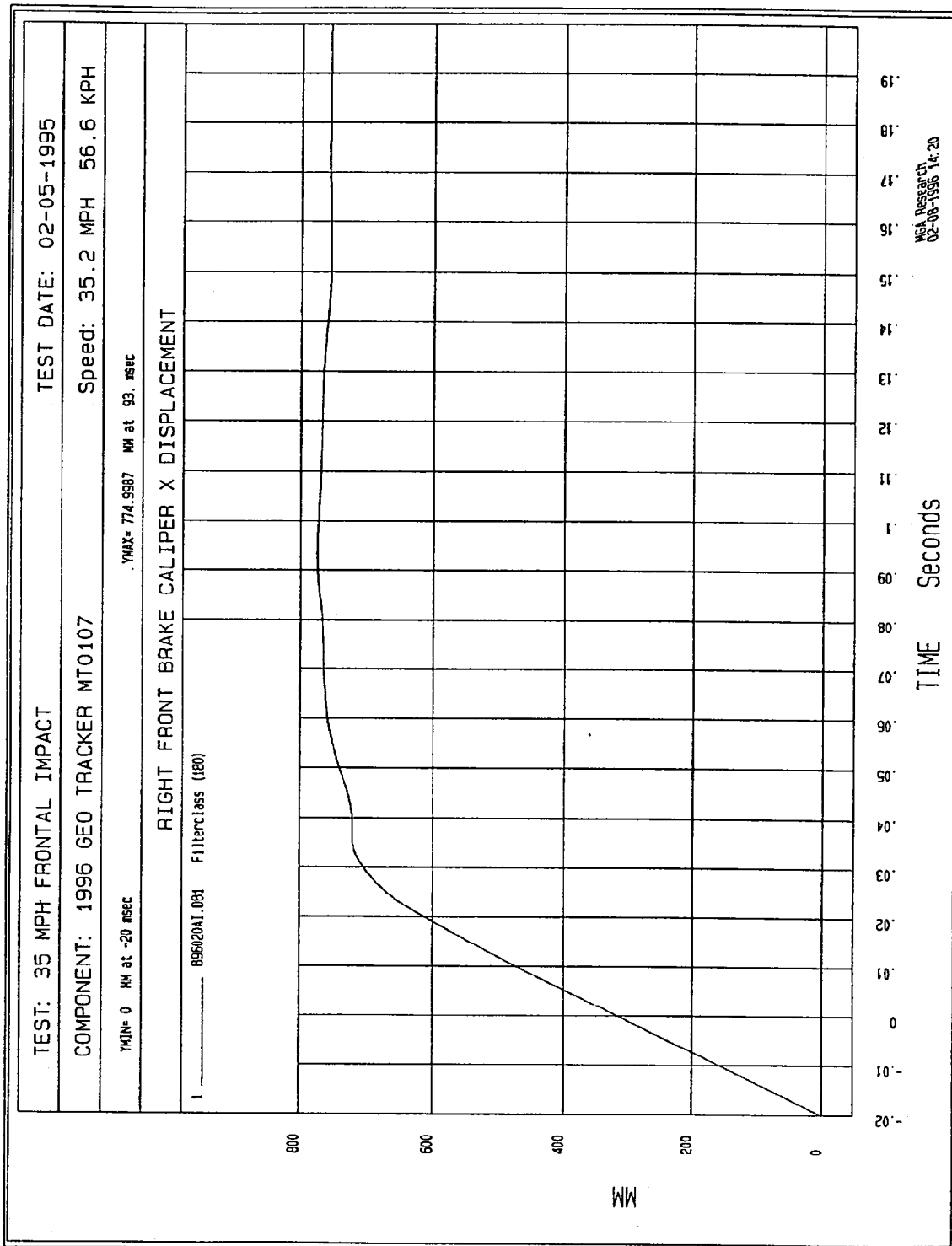


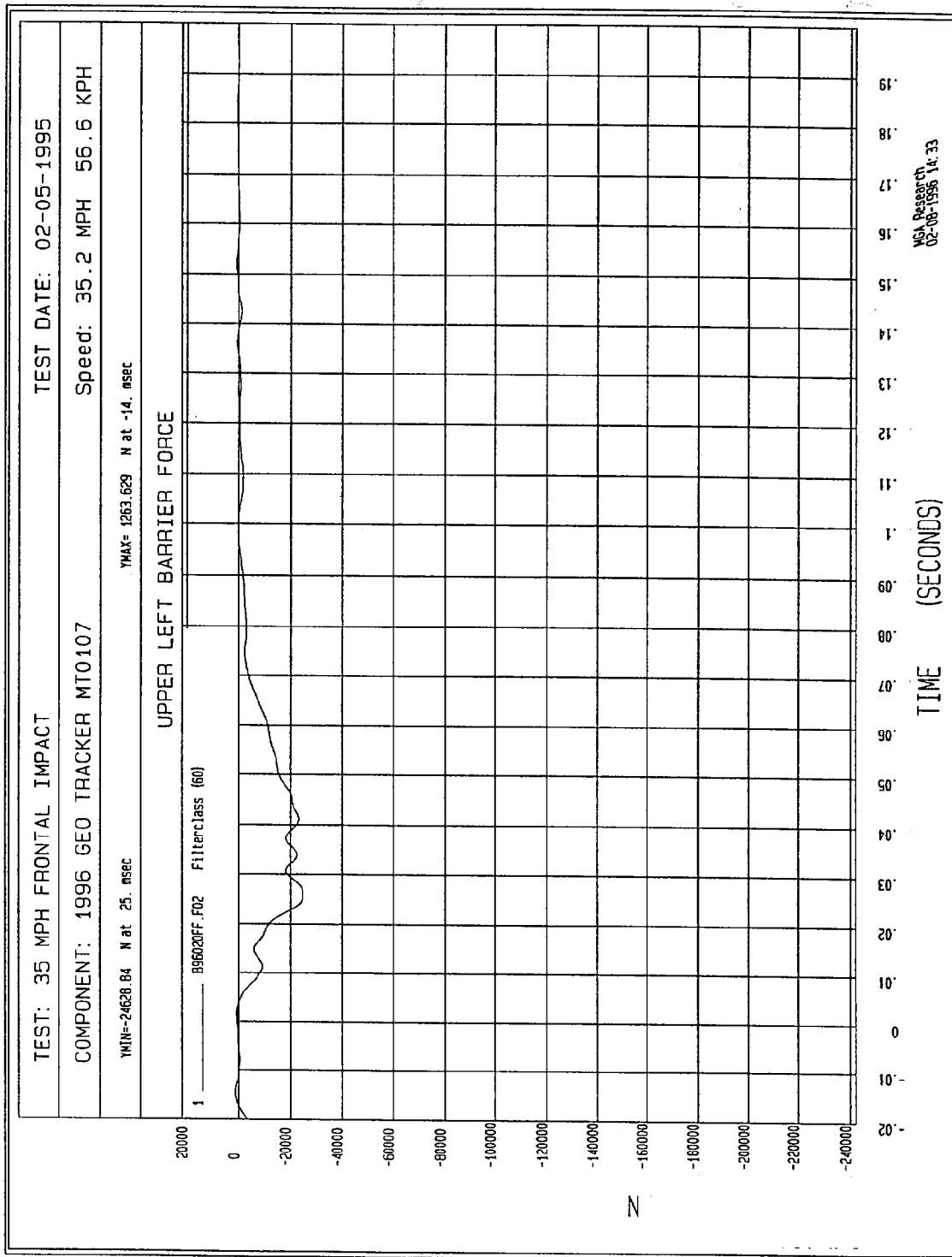


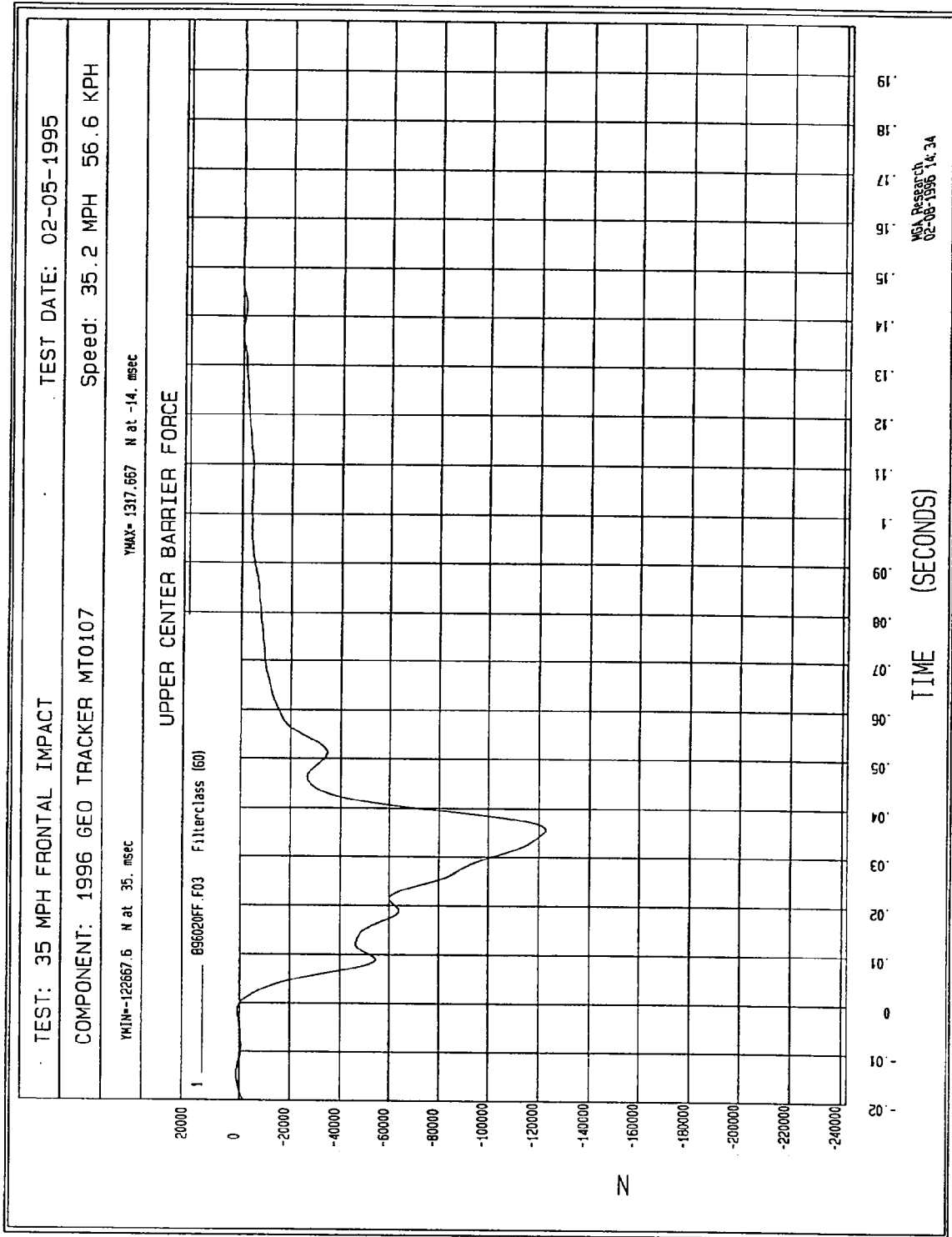


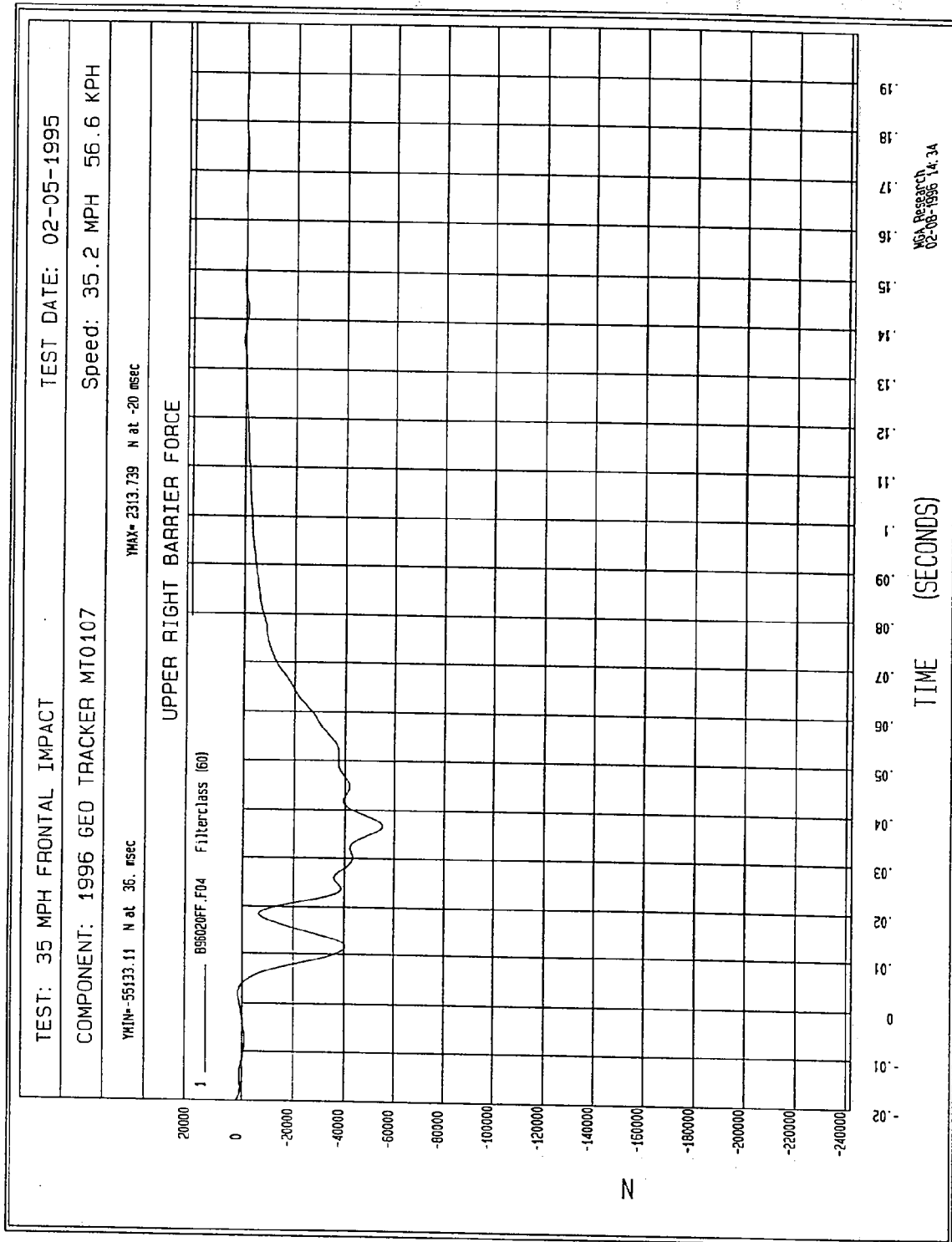


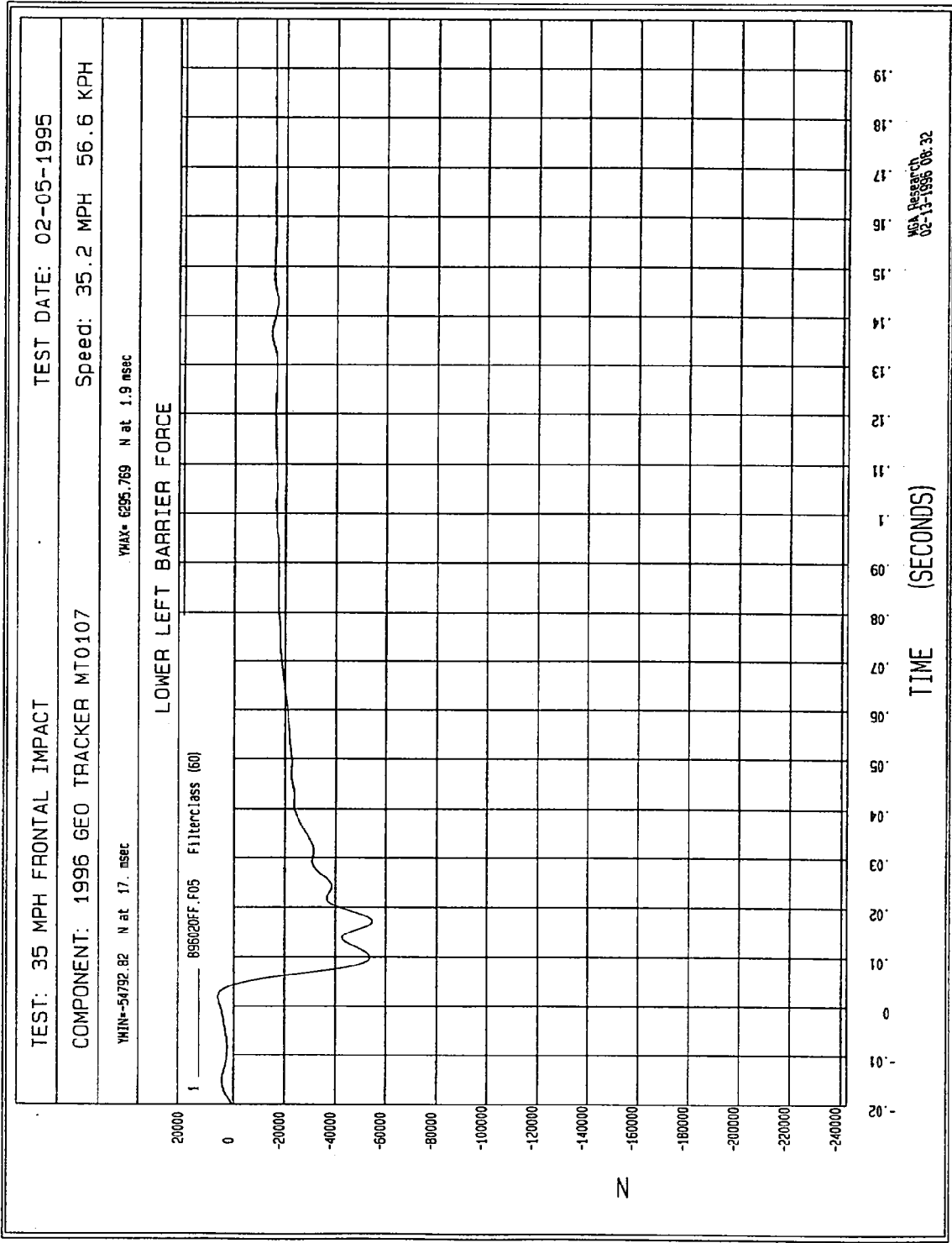


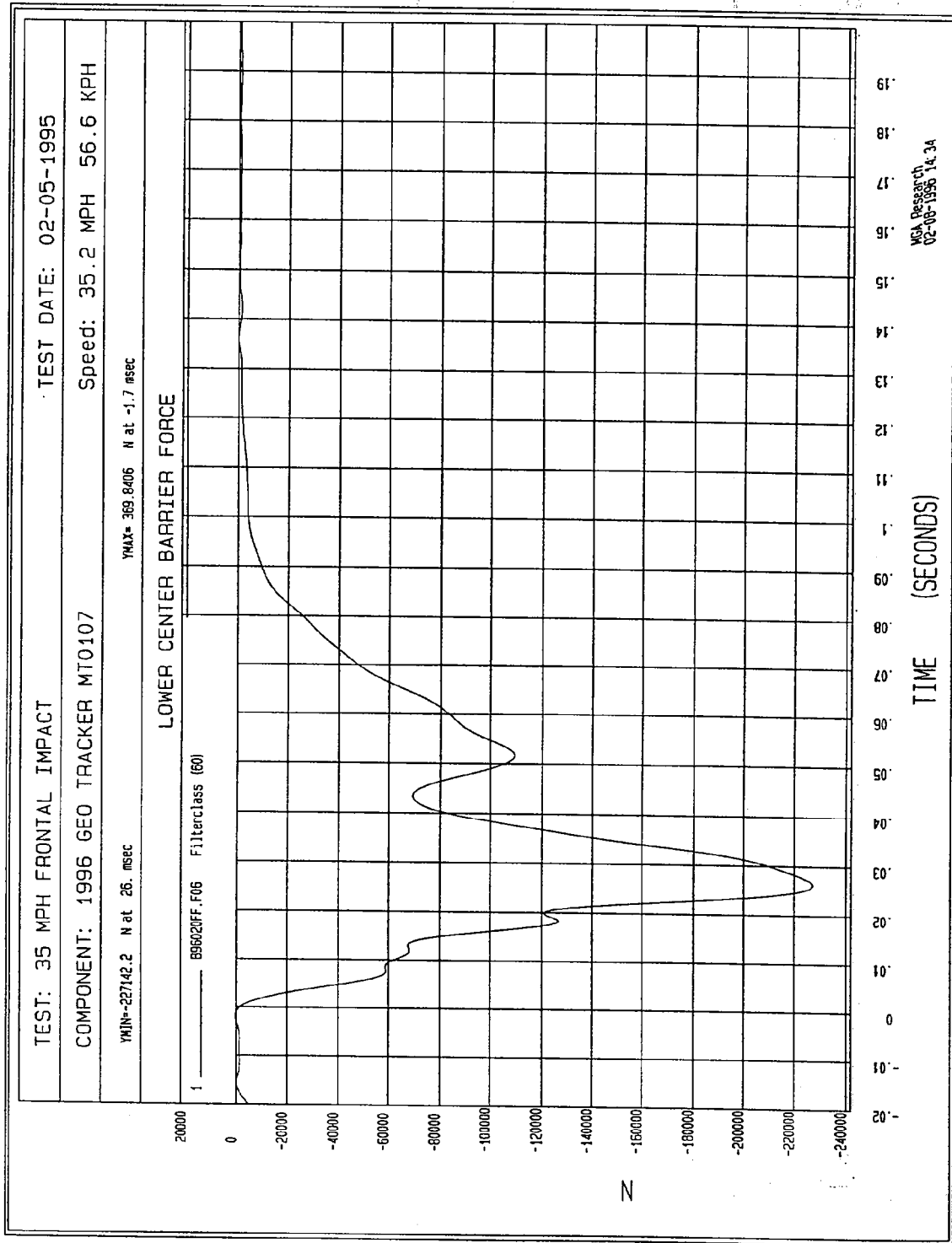












TEST: 35 MPH FRONTAL IMPACT

TEST DATE: 02-05-1995

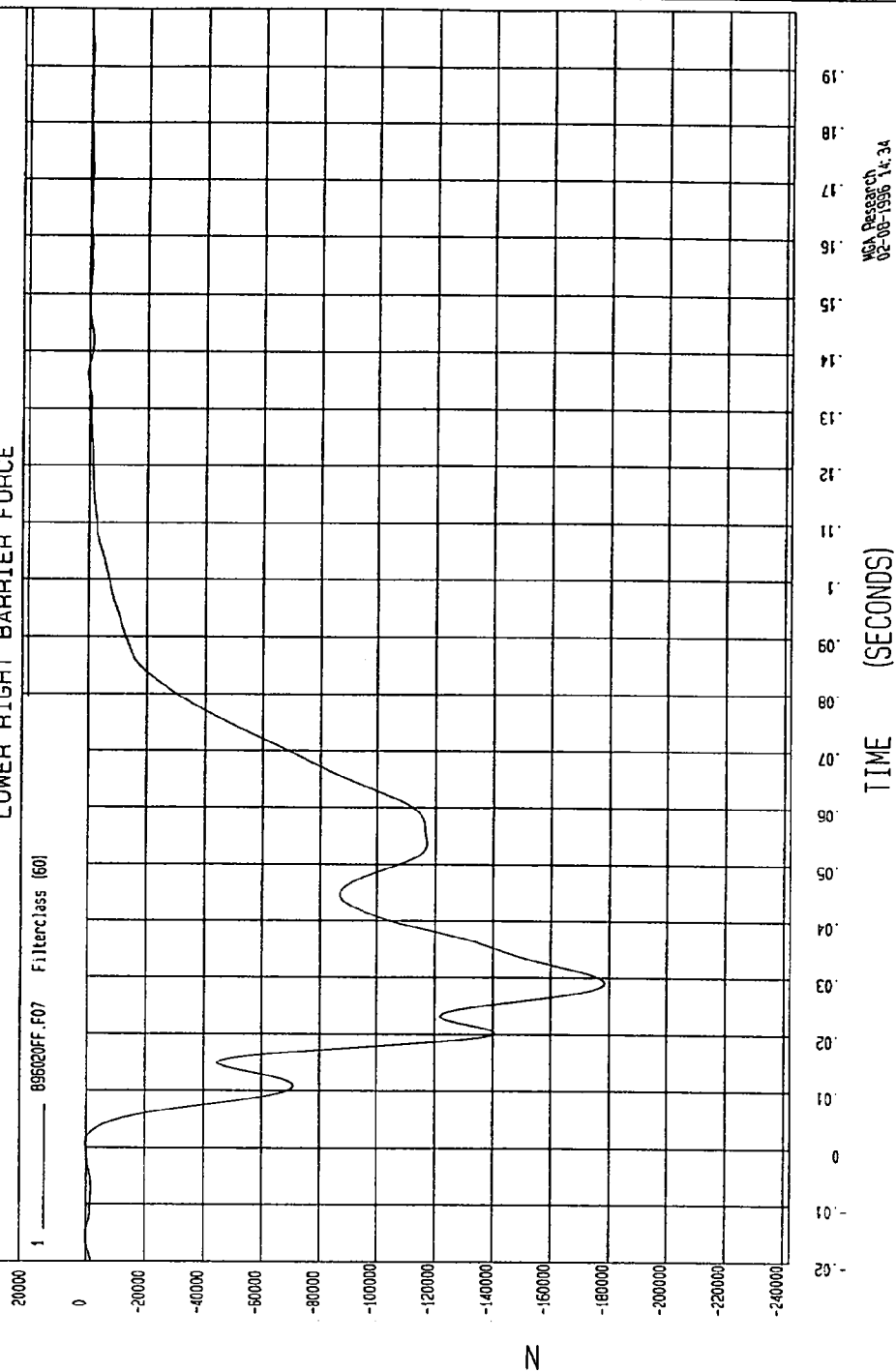
COMPONENT: 1996 GEO TRACKER MT0107

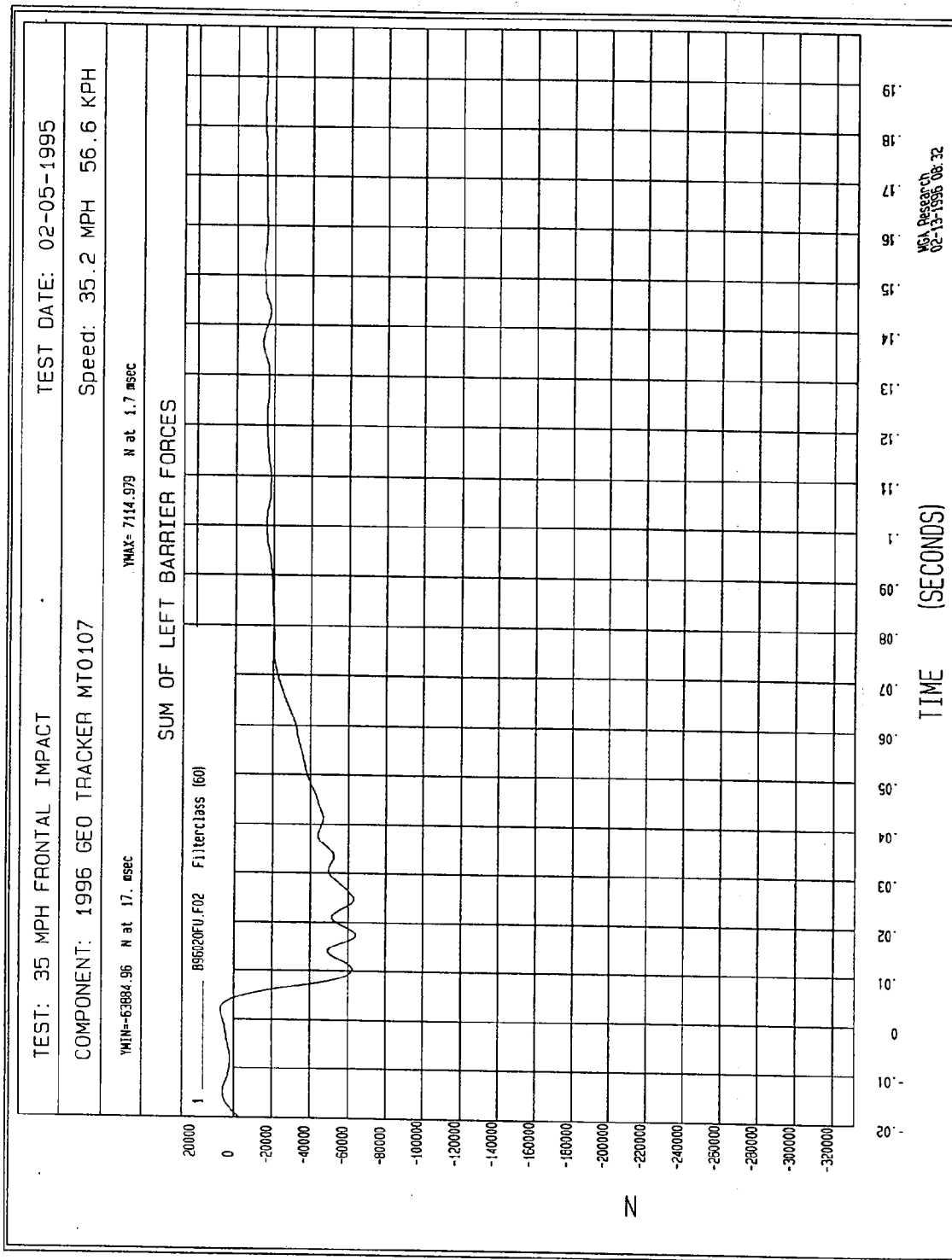
Speed: 35.2 MPH 56.6 KPH

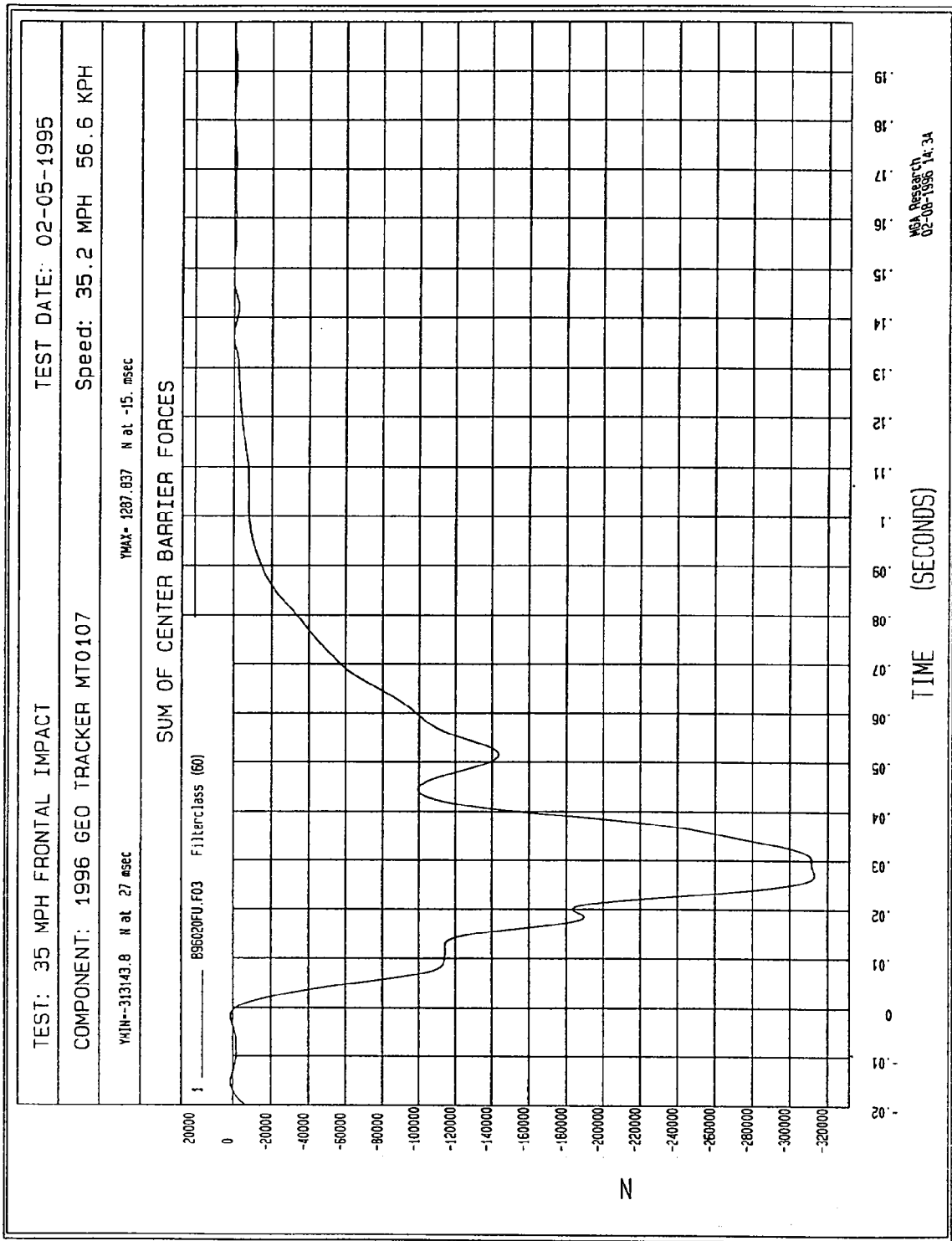
YMIN=-178328.5 N at 29. msec

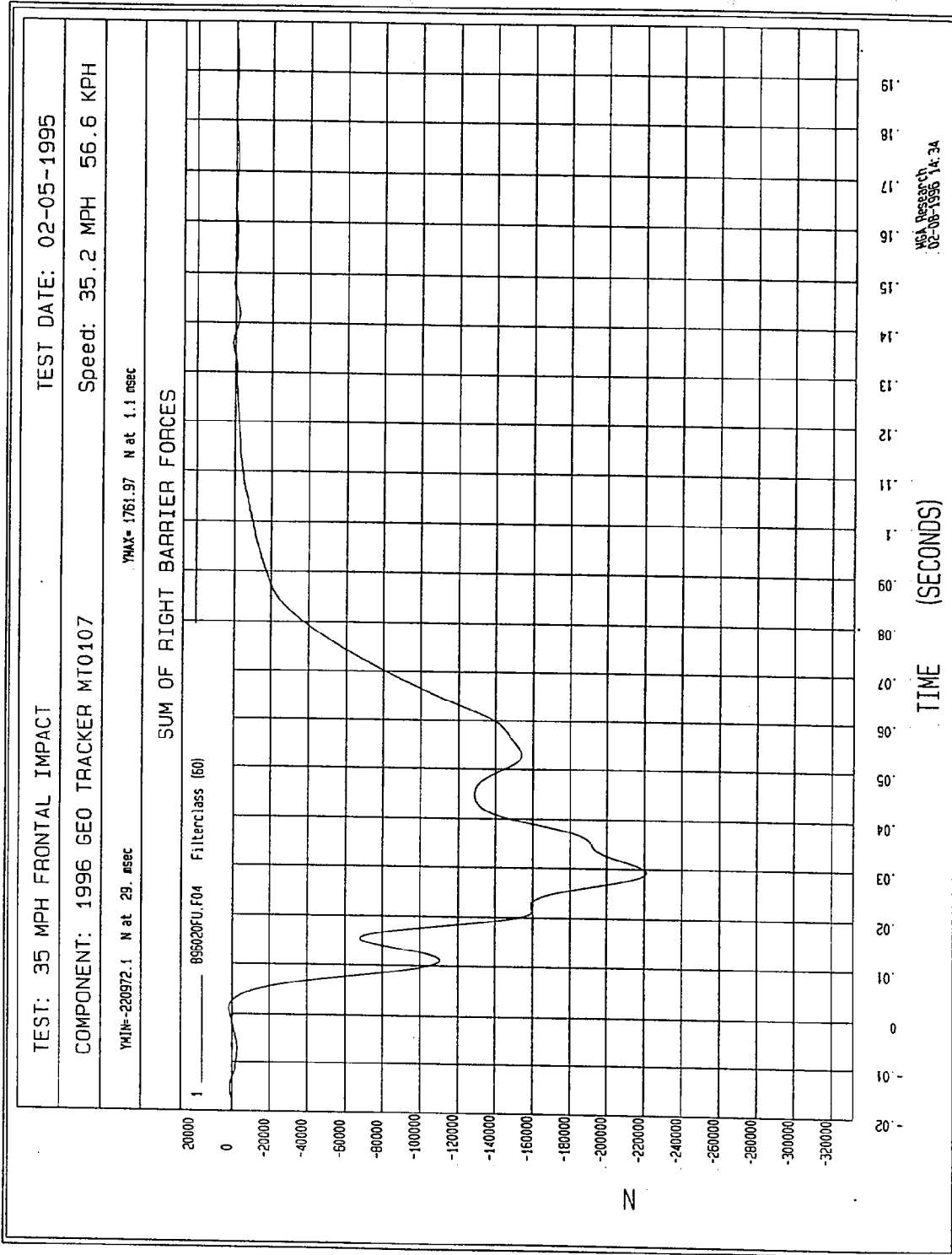
YMAX= 476.654 N at 135 msec

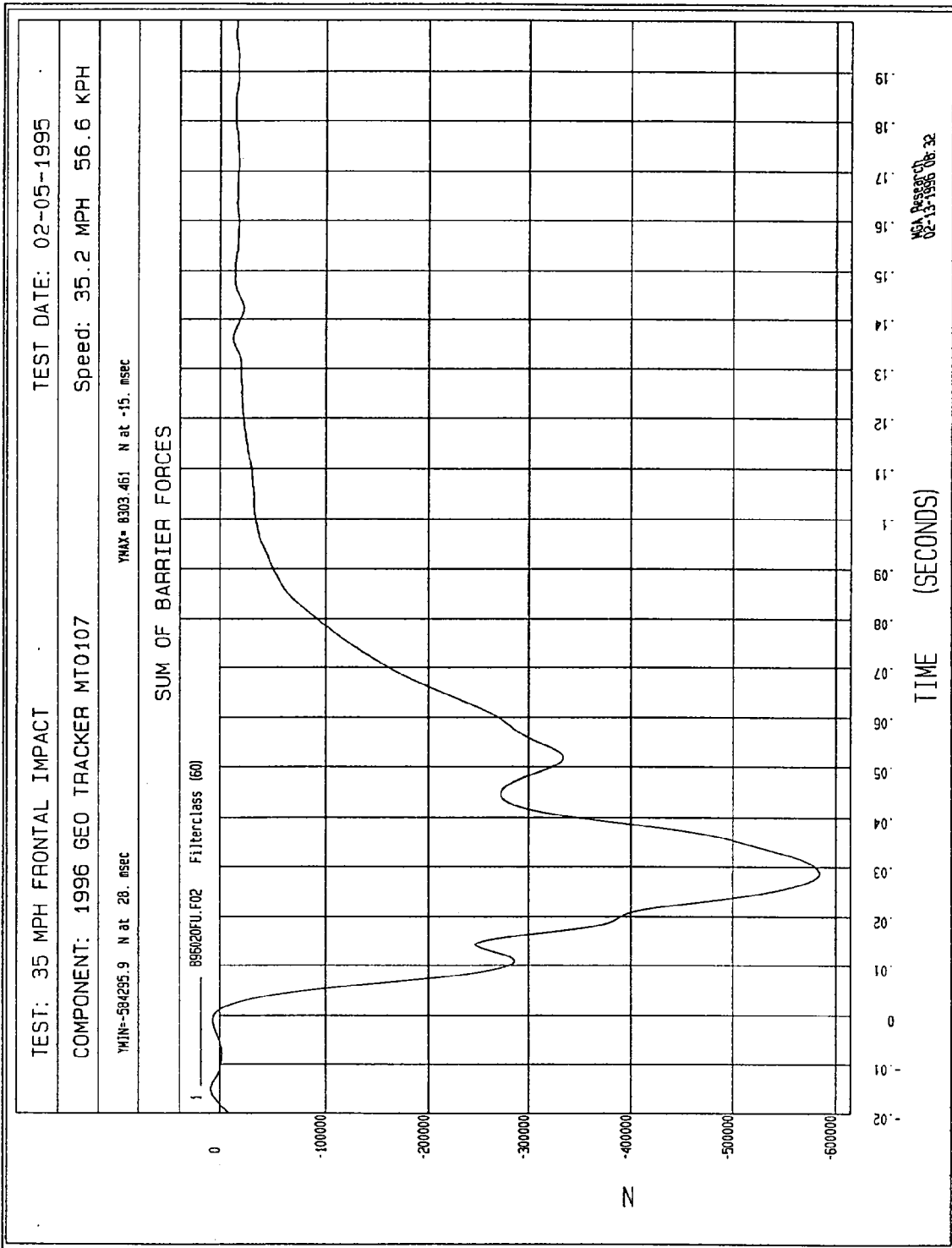
LOWER RIGHT BARRIER FORCE

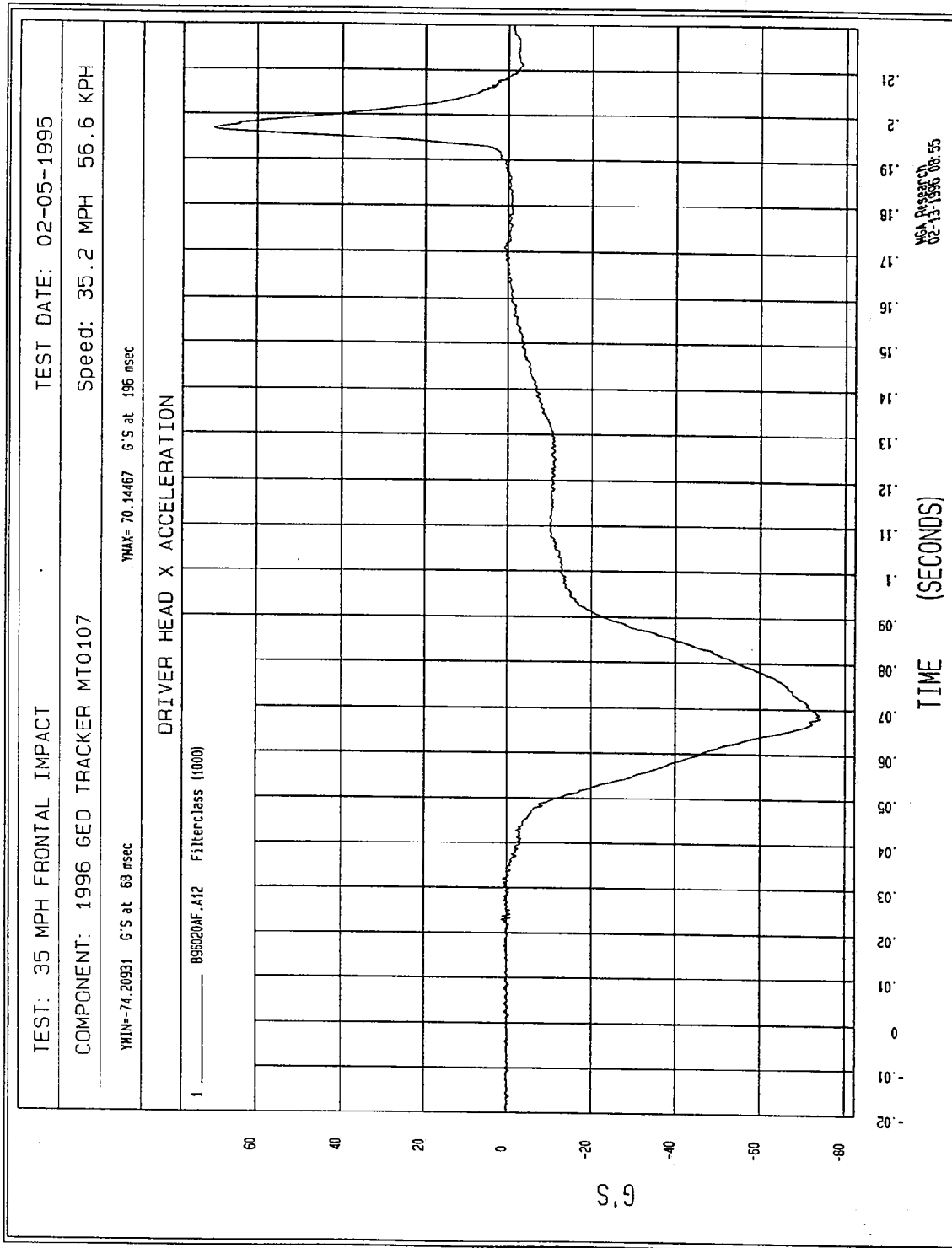


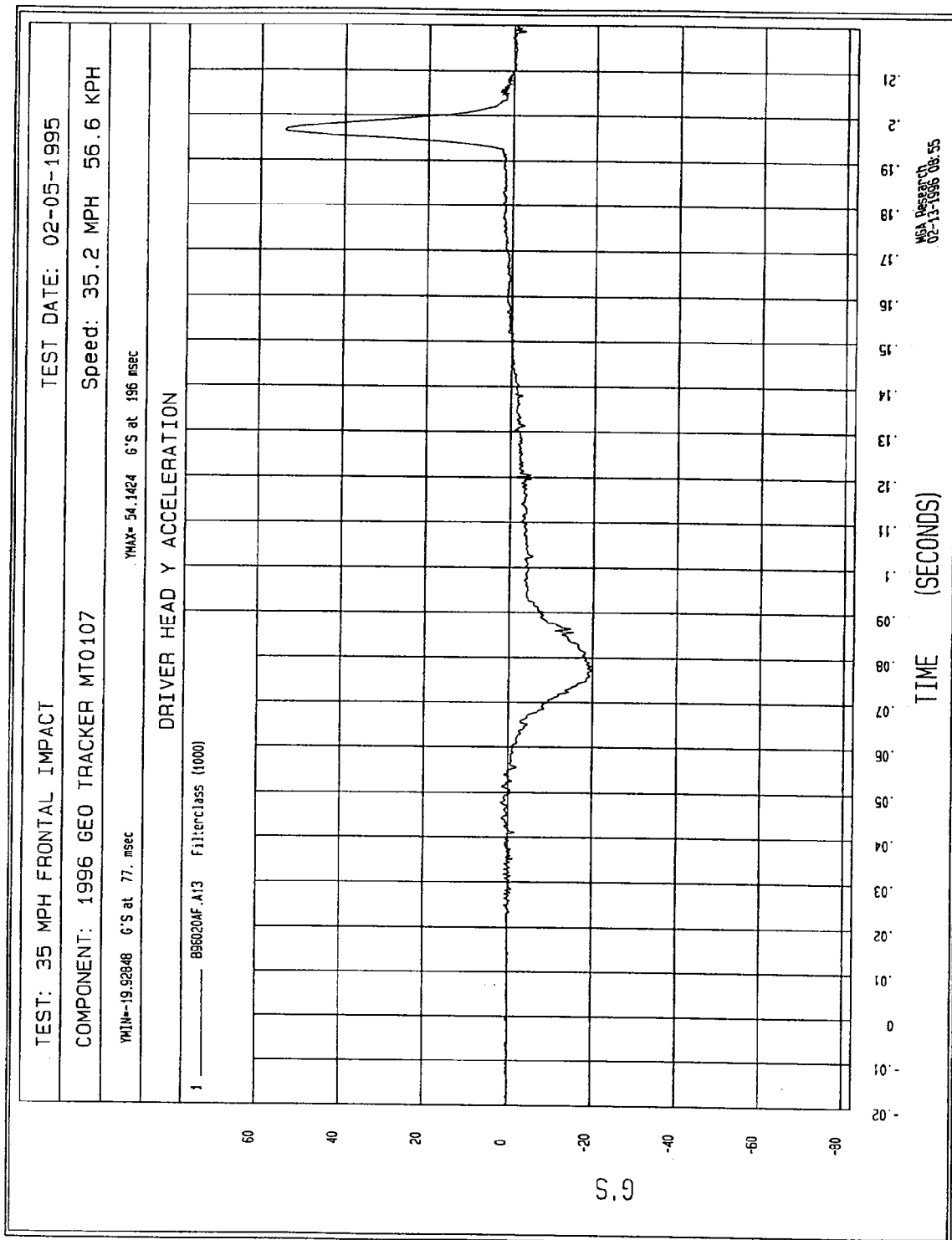


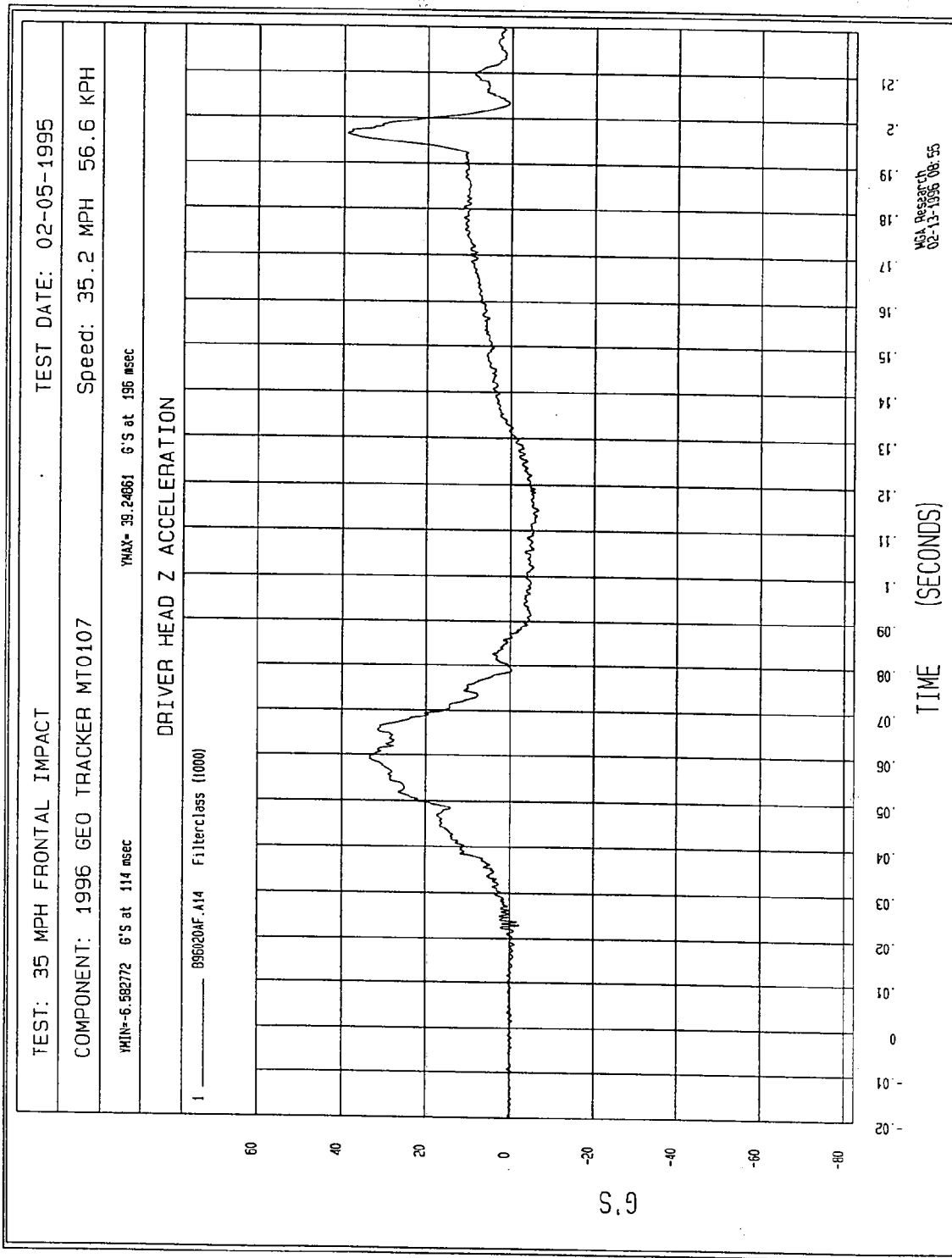


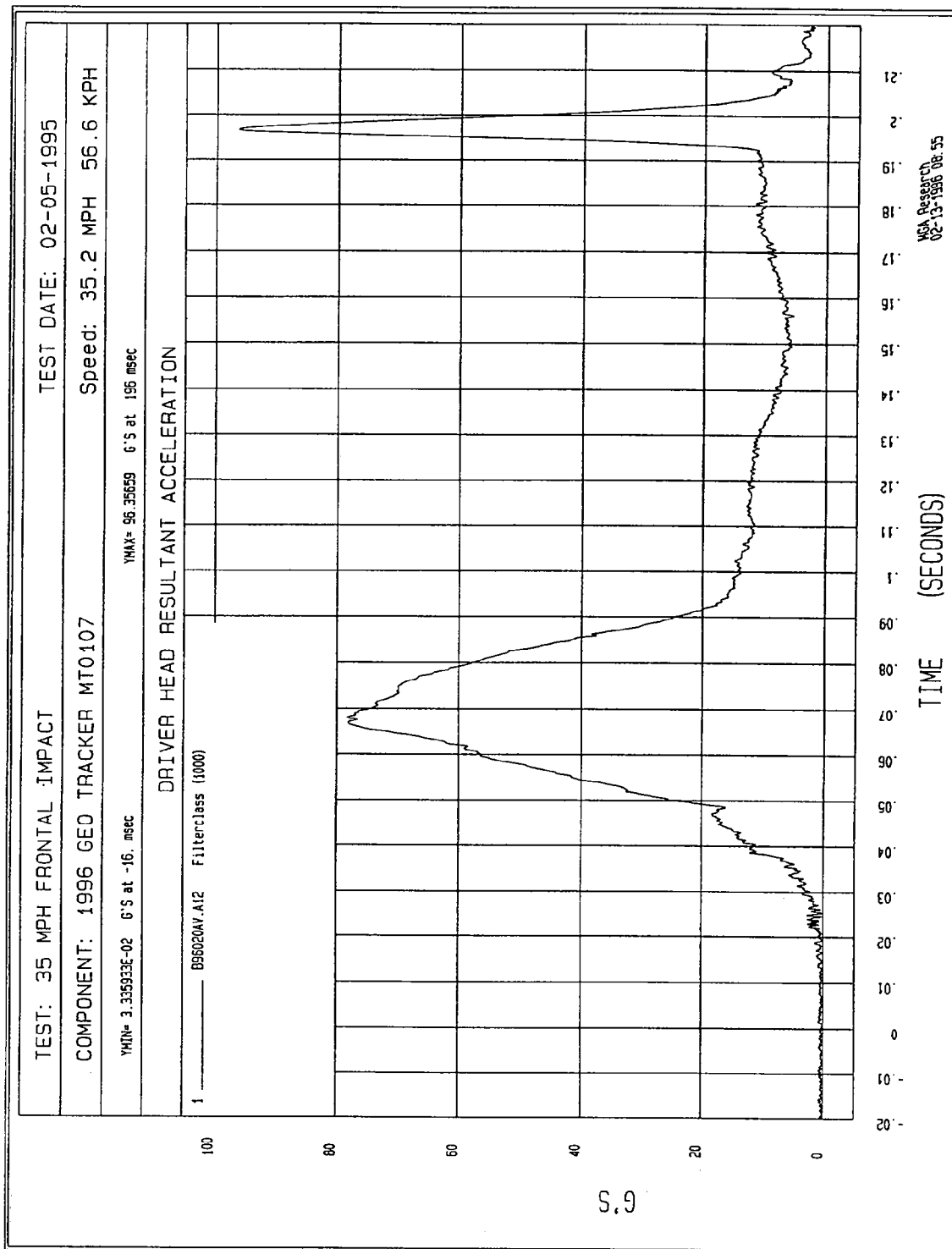


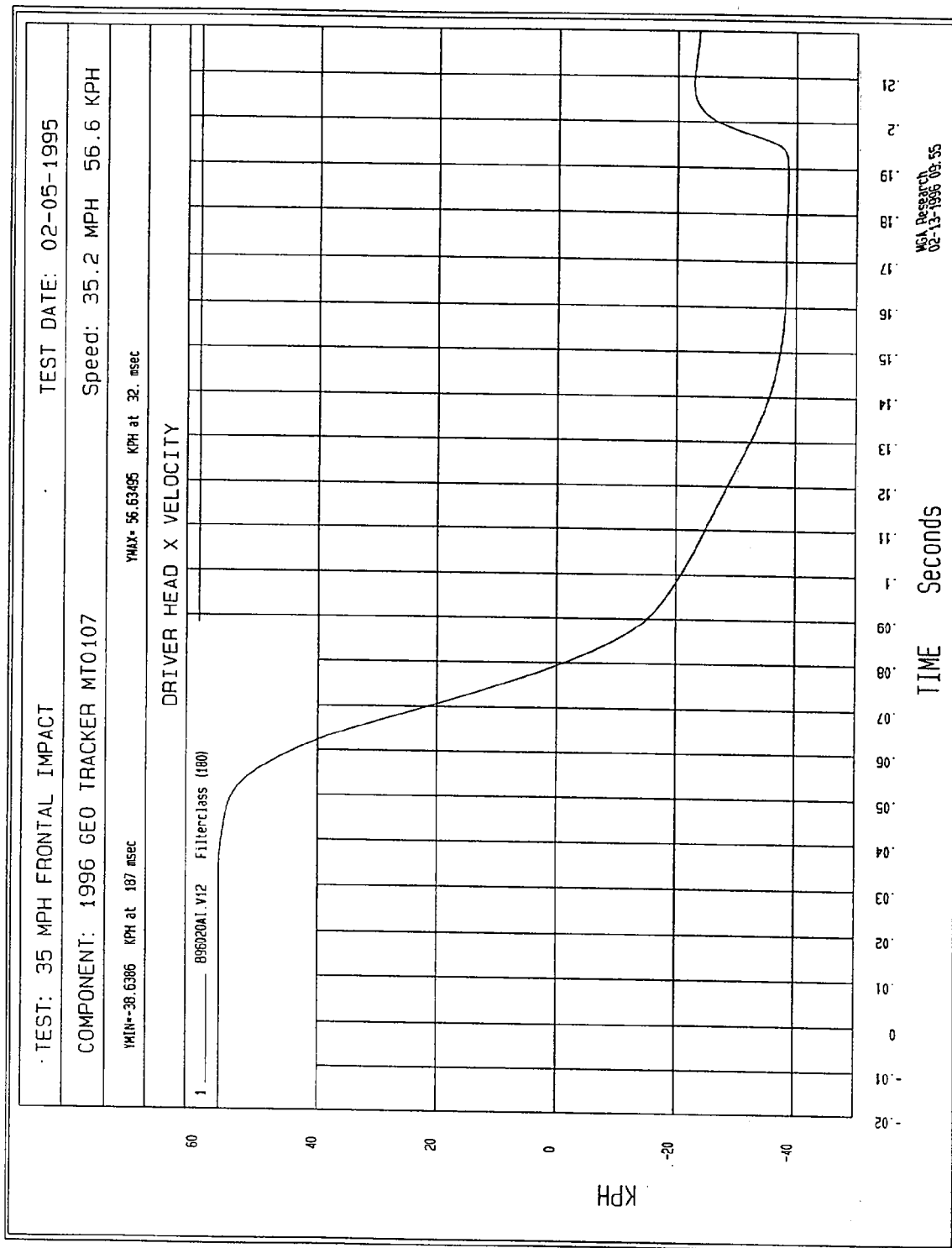


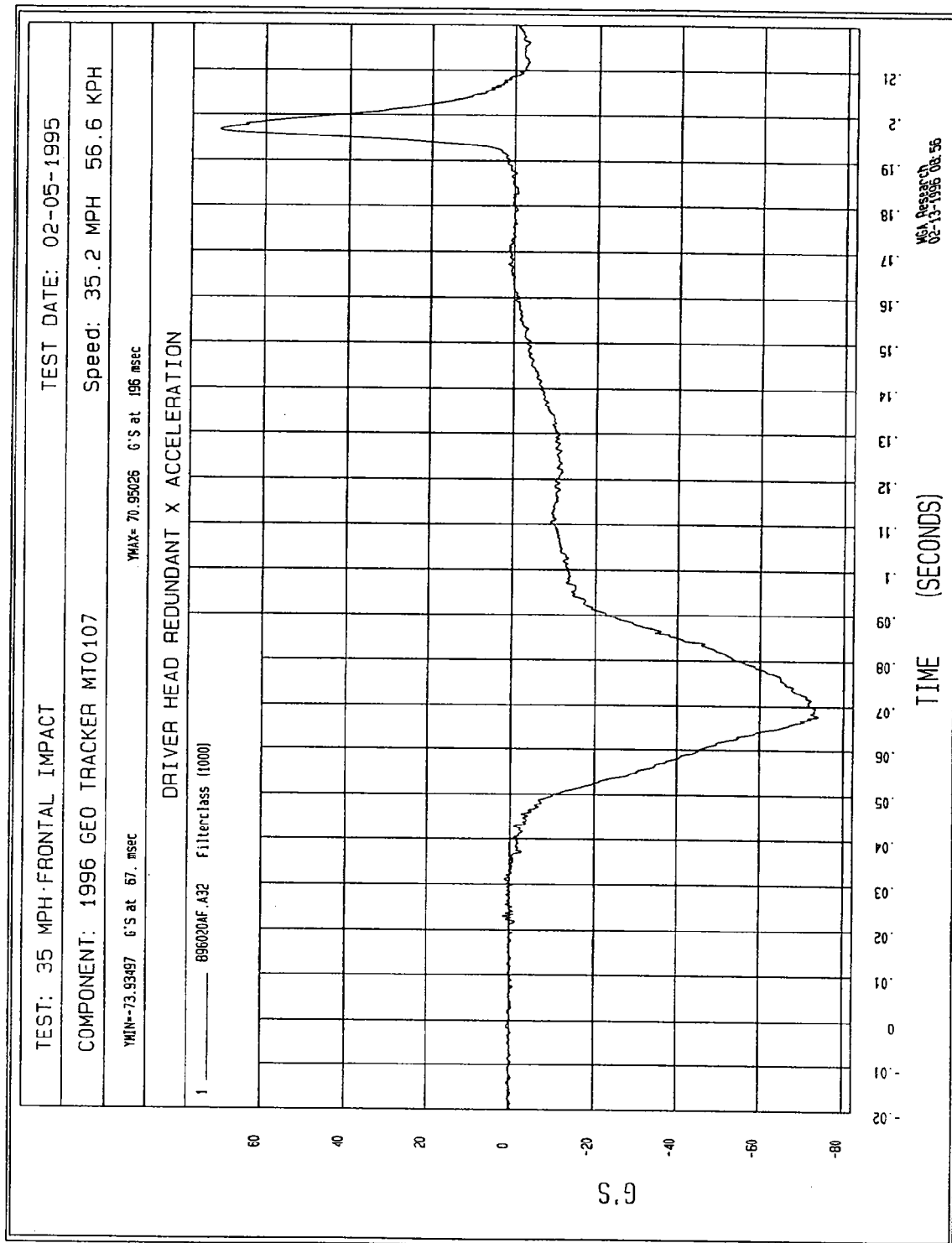


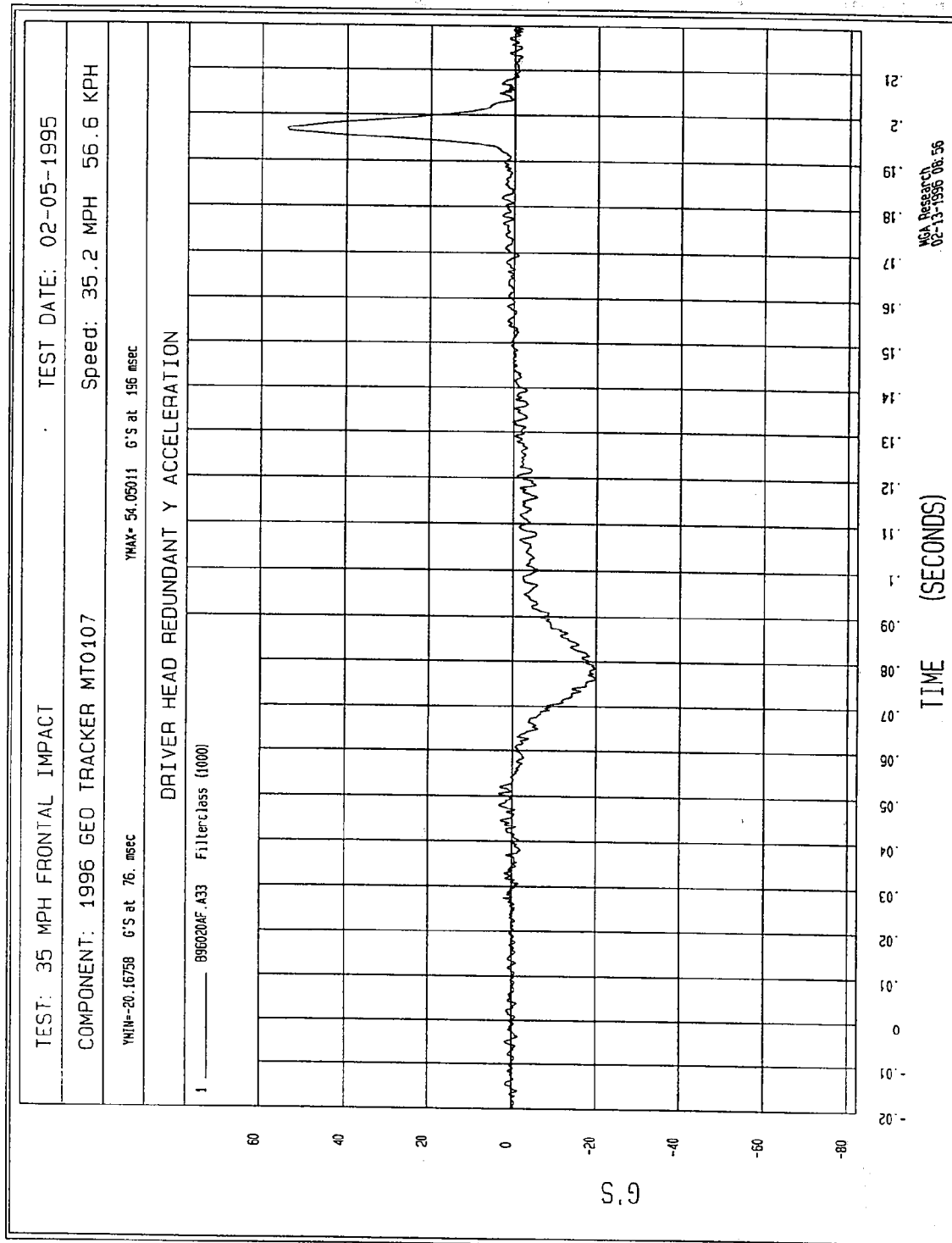


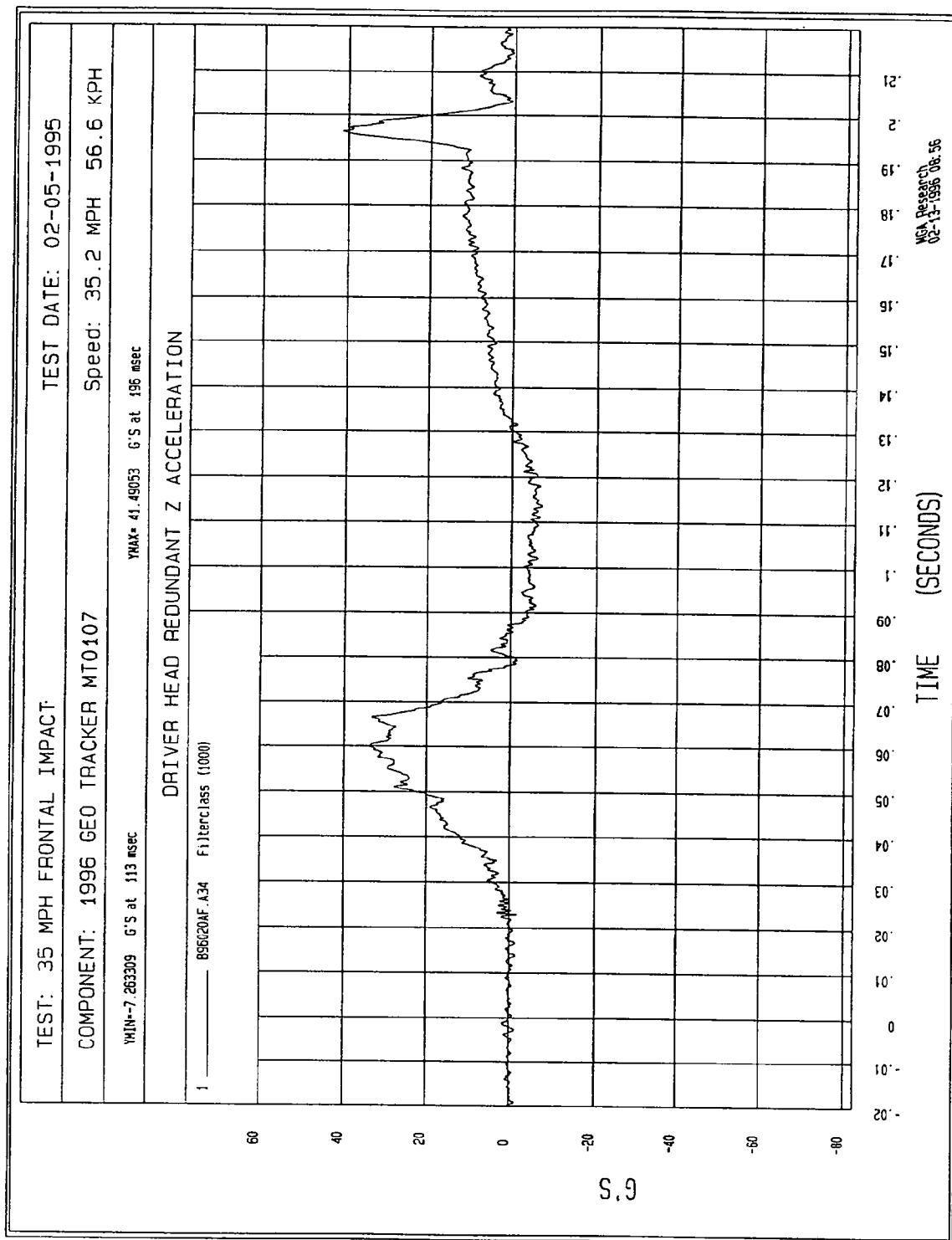


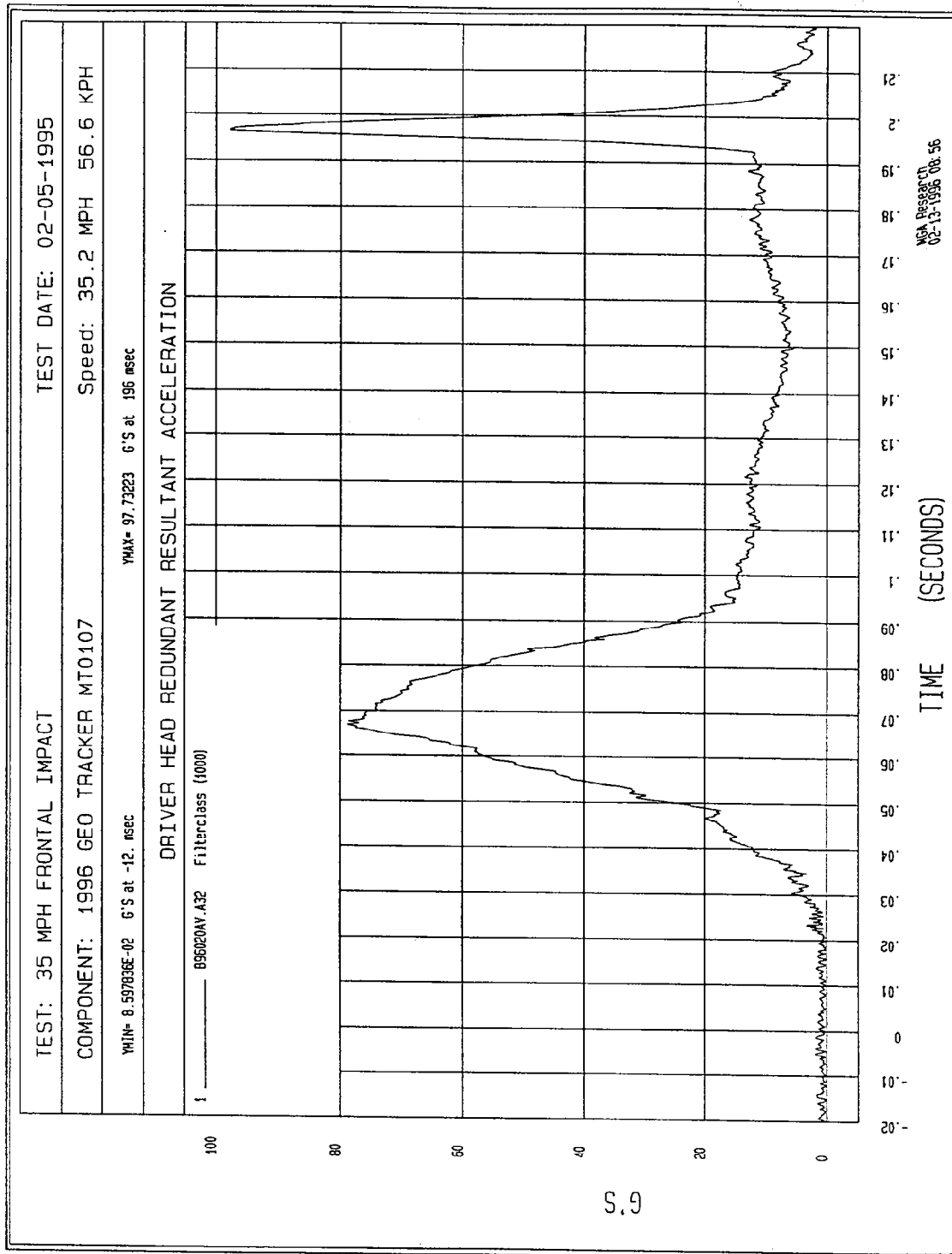


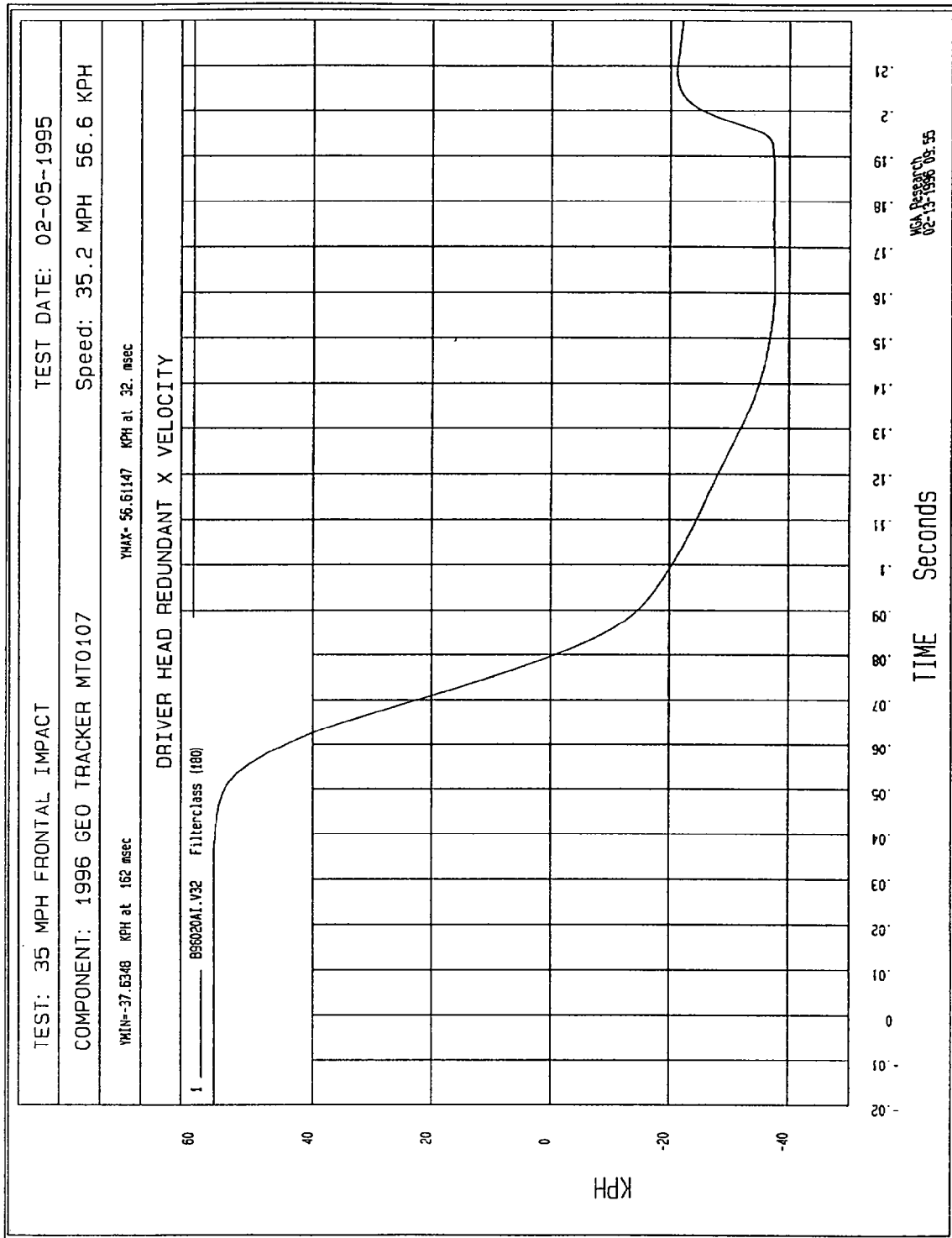


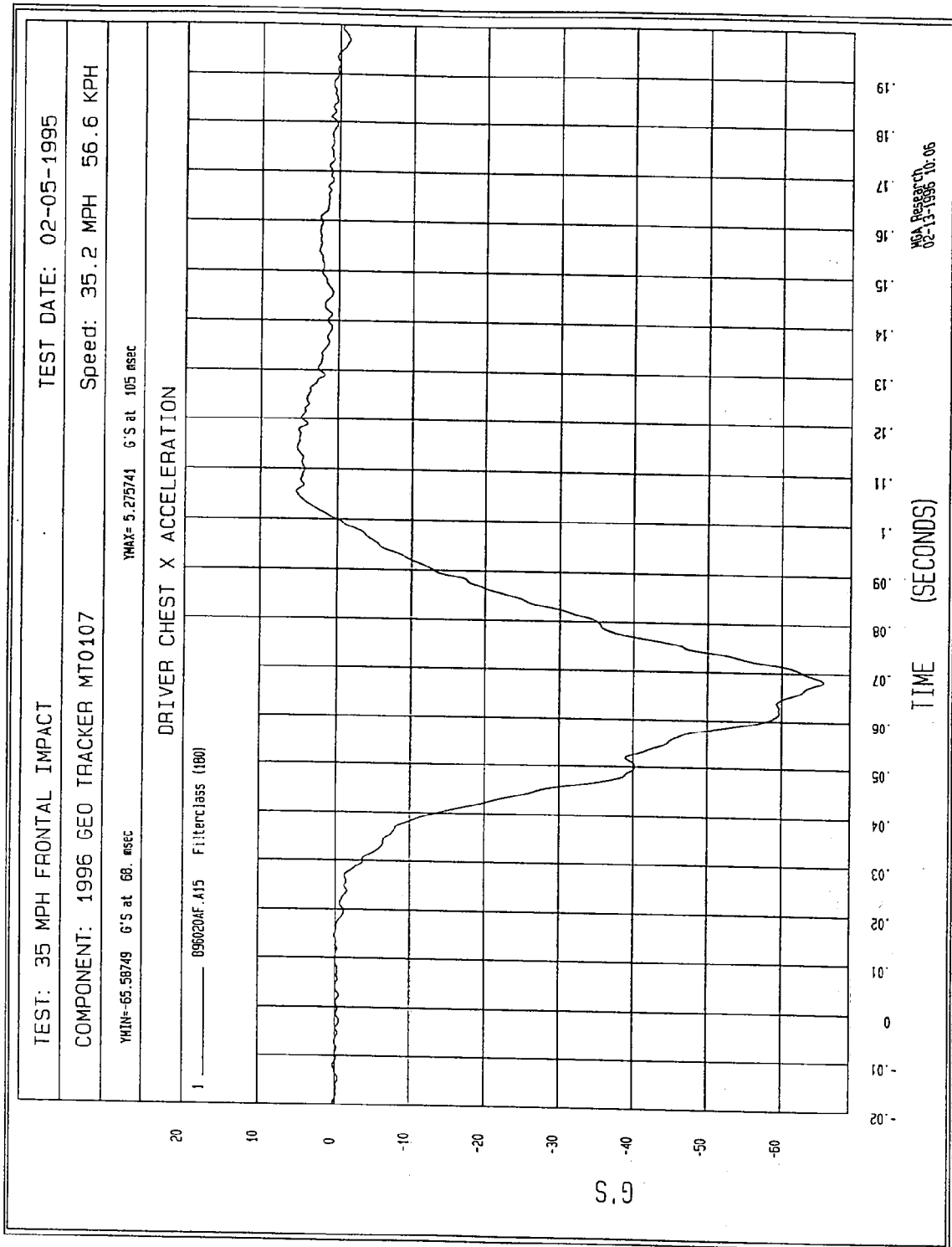


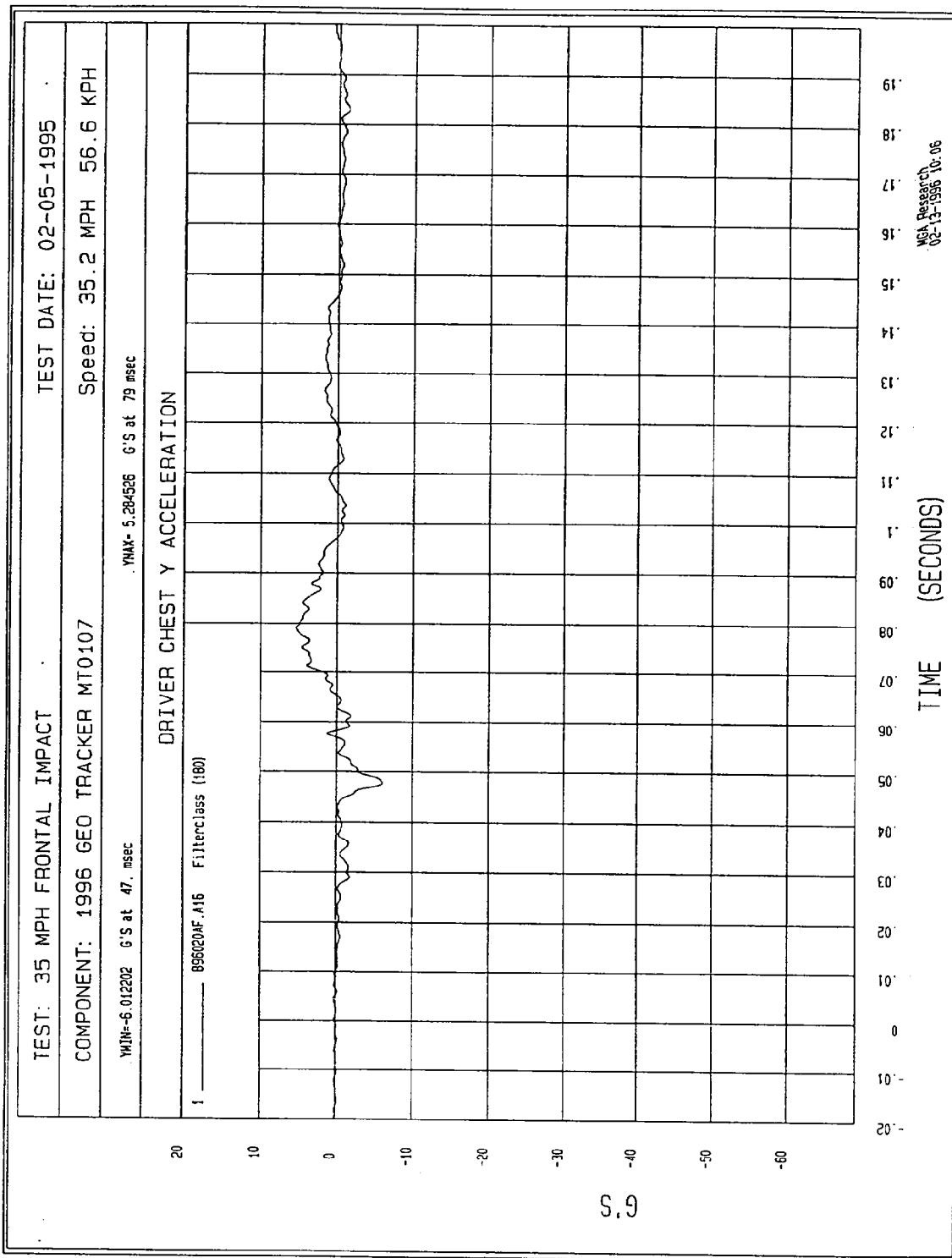


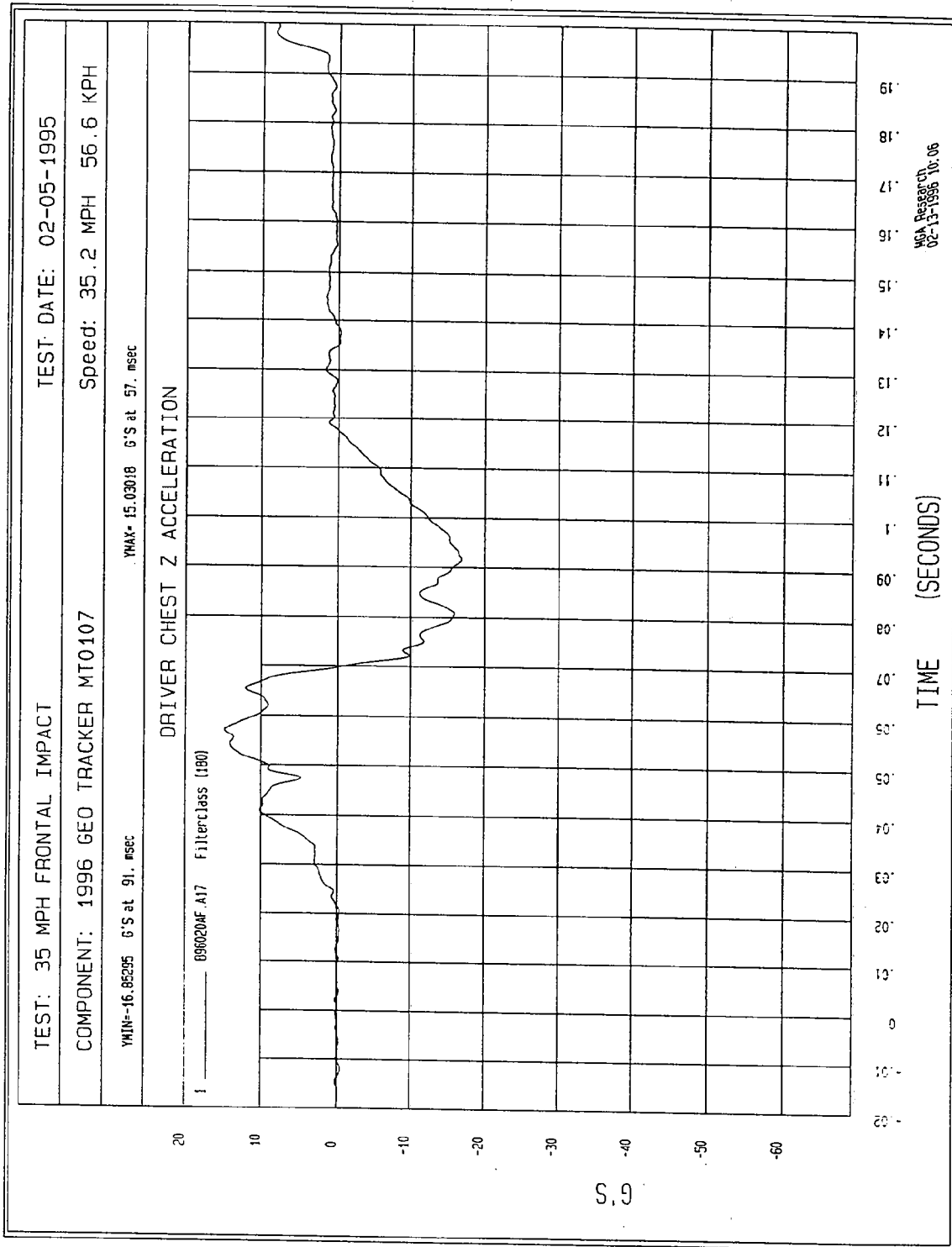


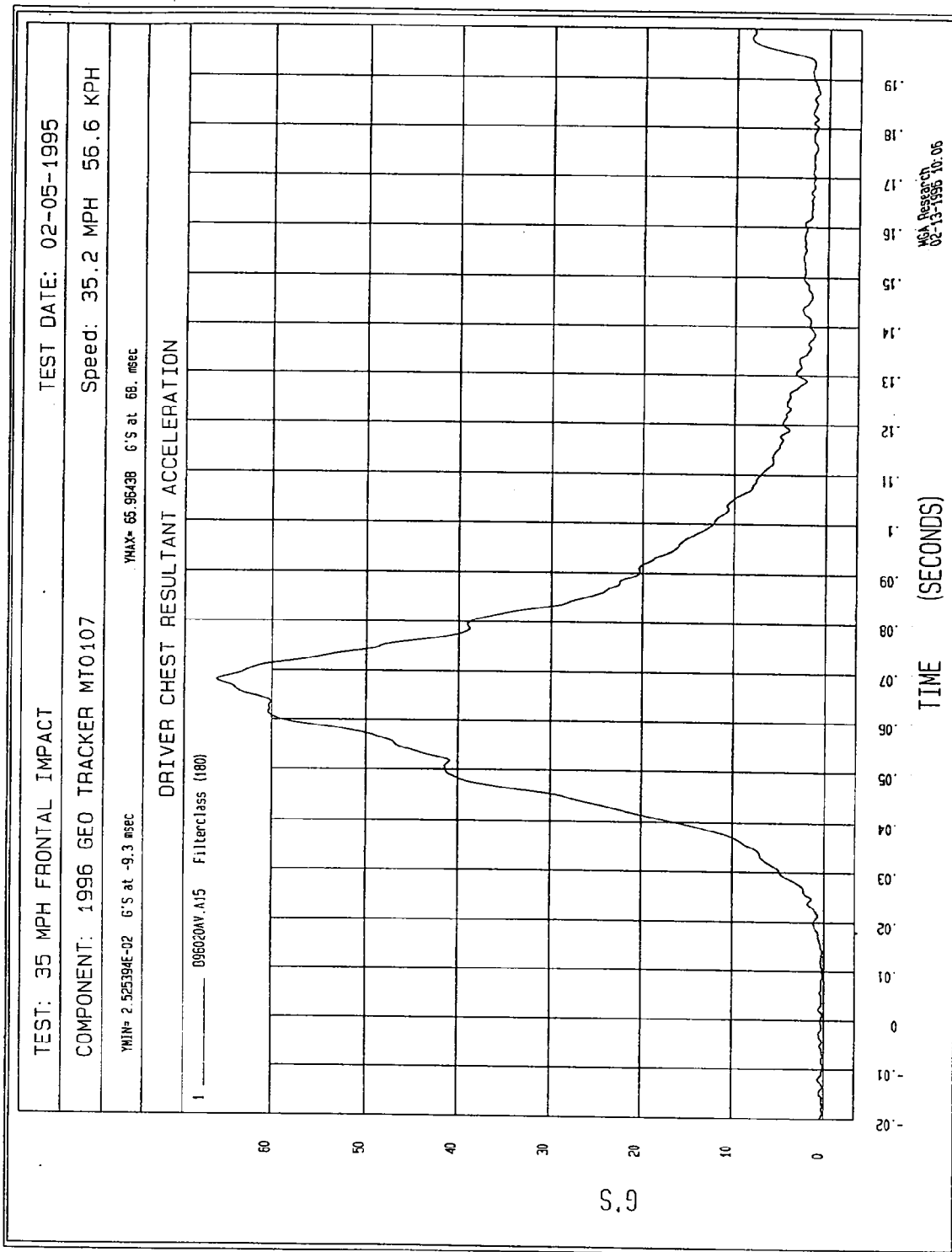


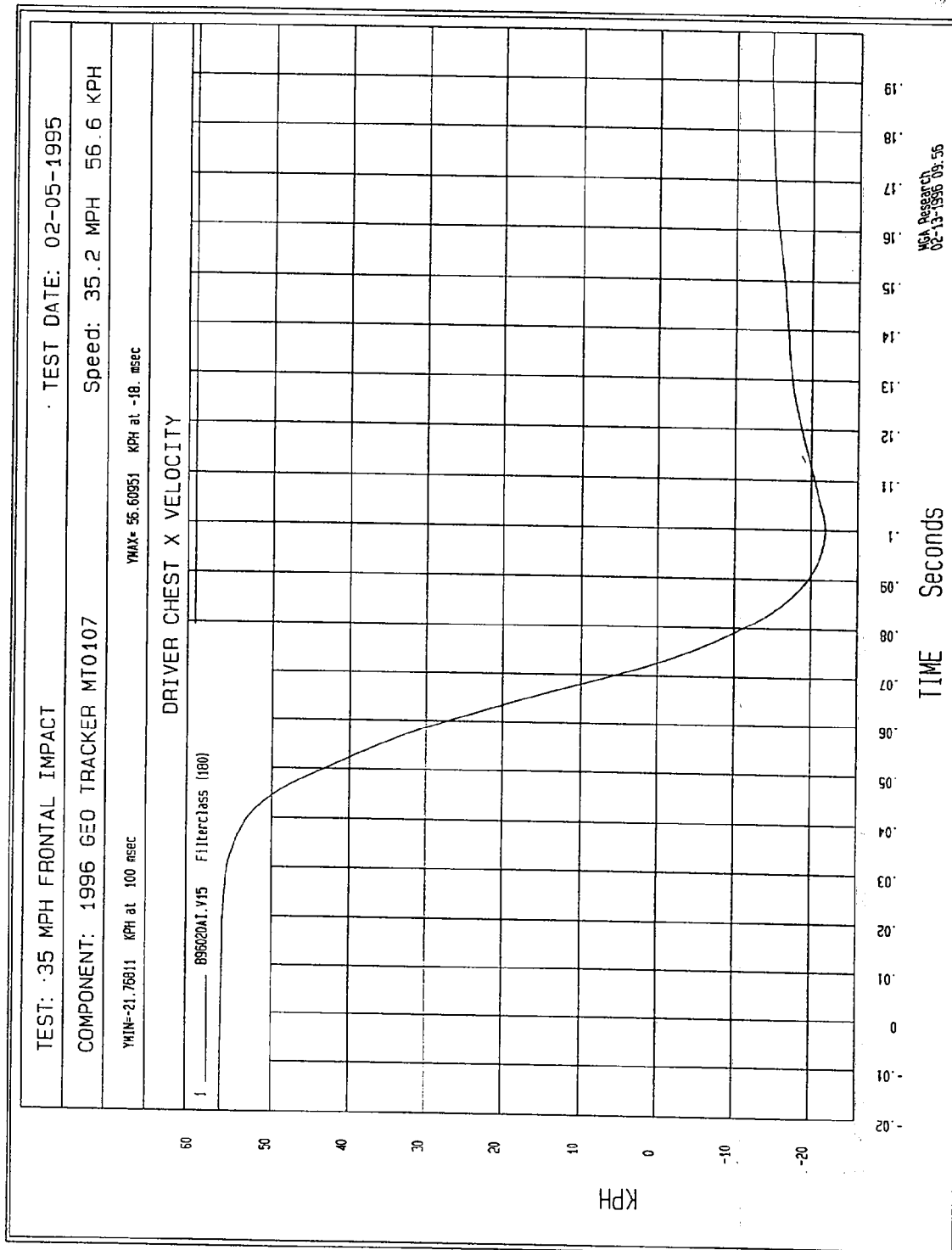


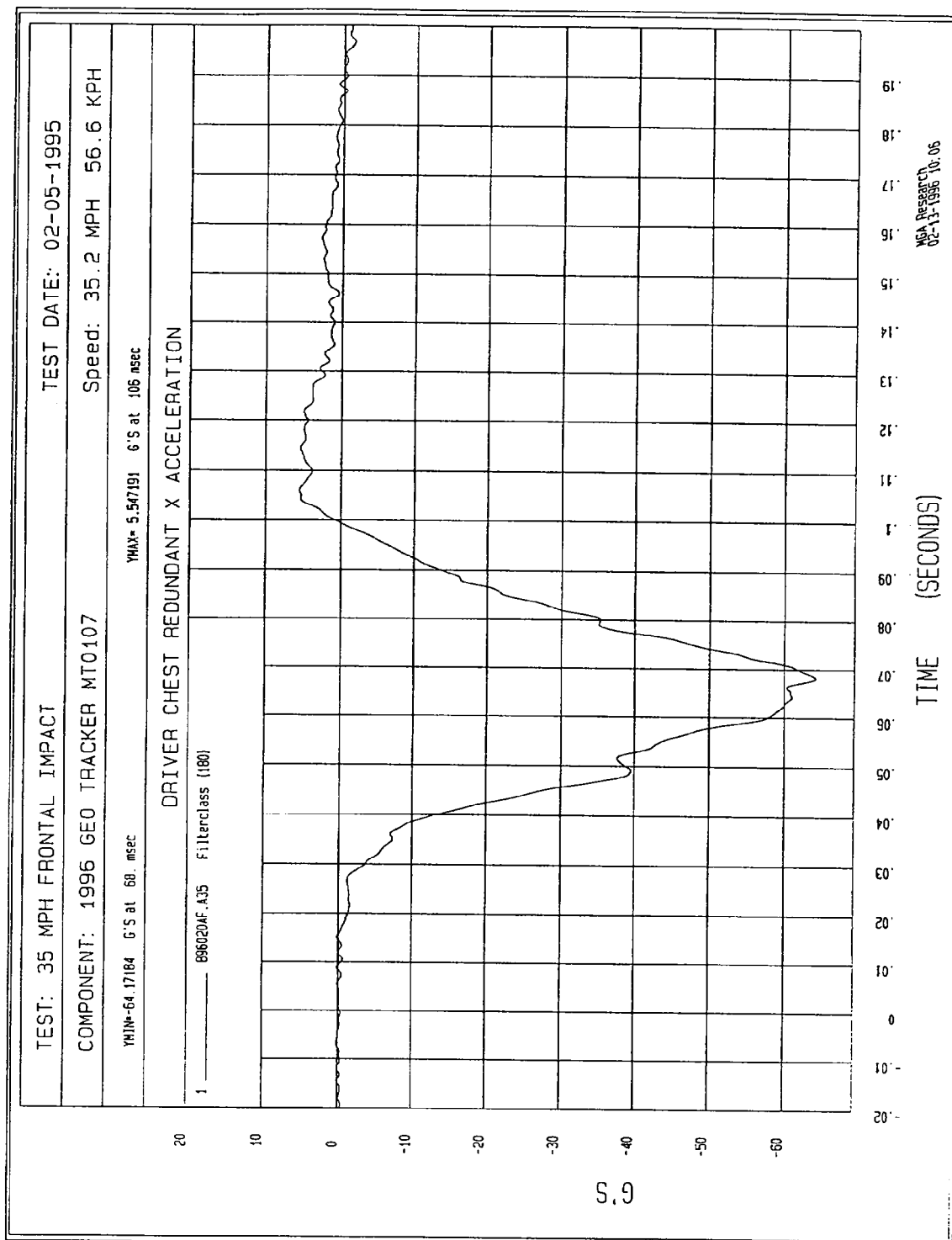


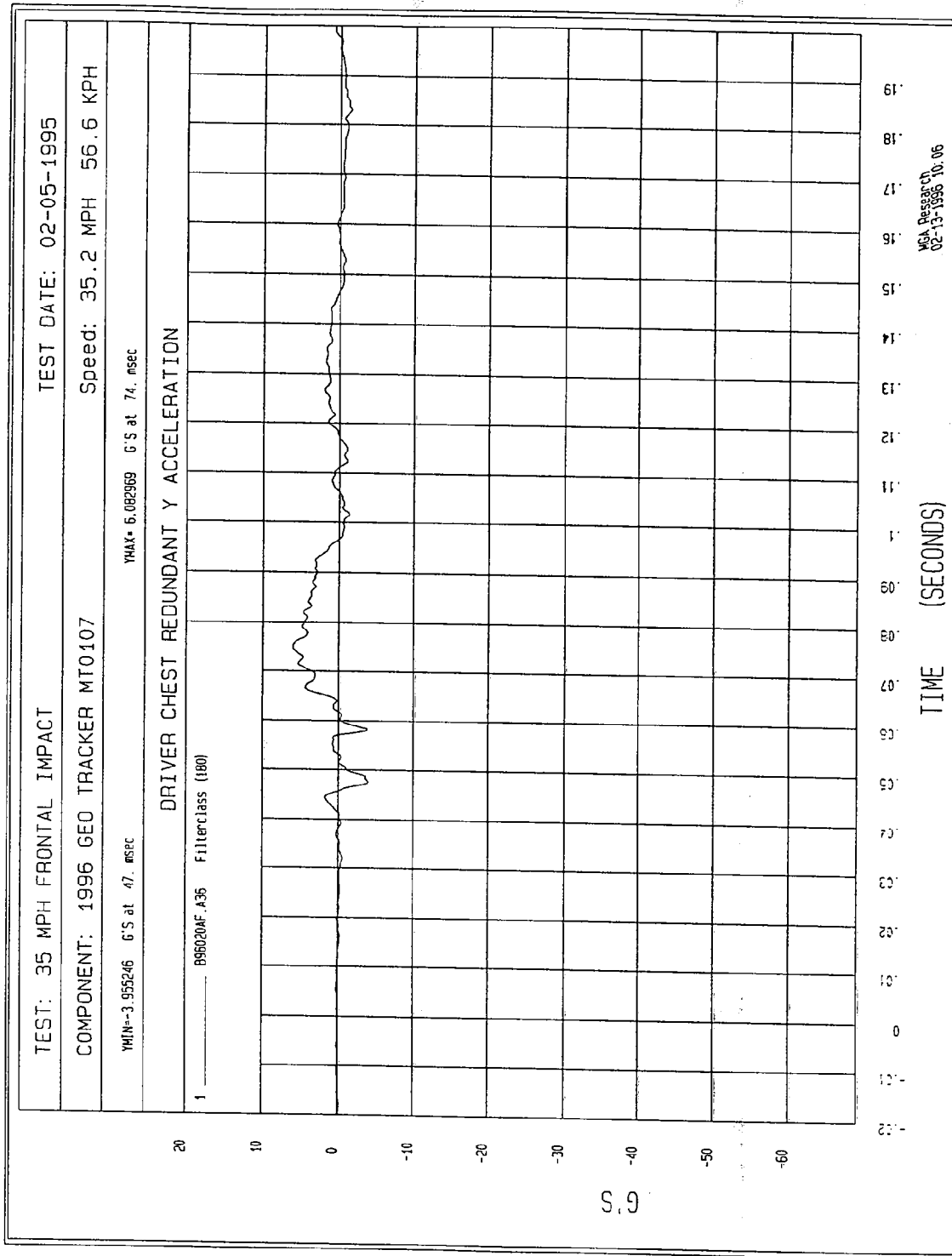


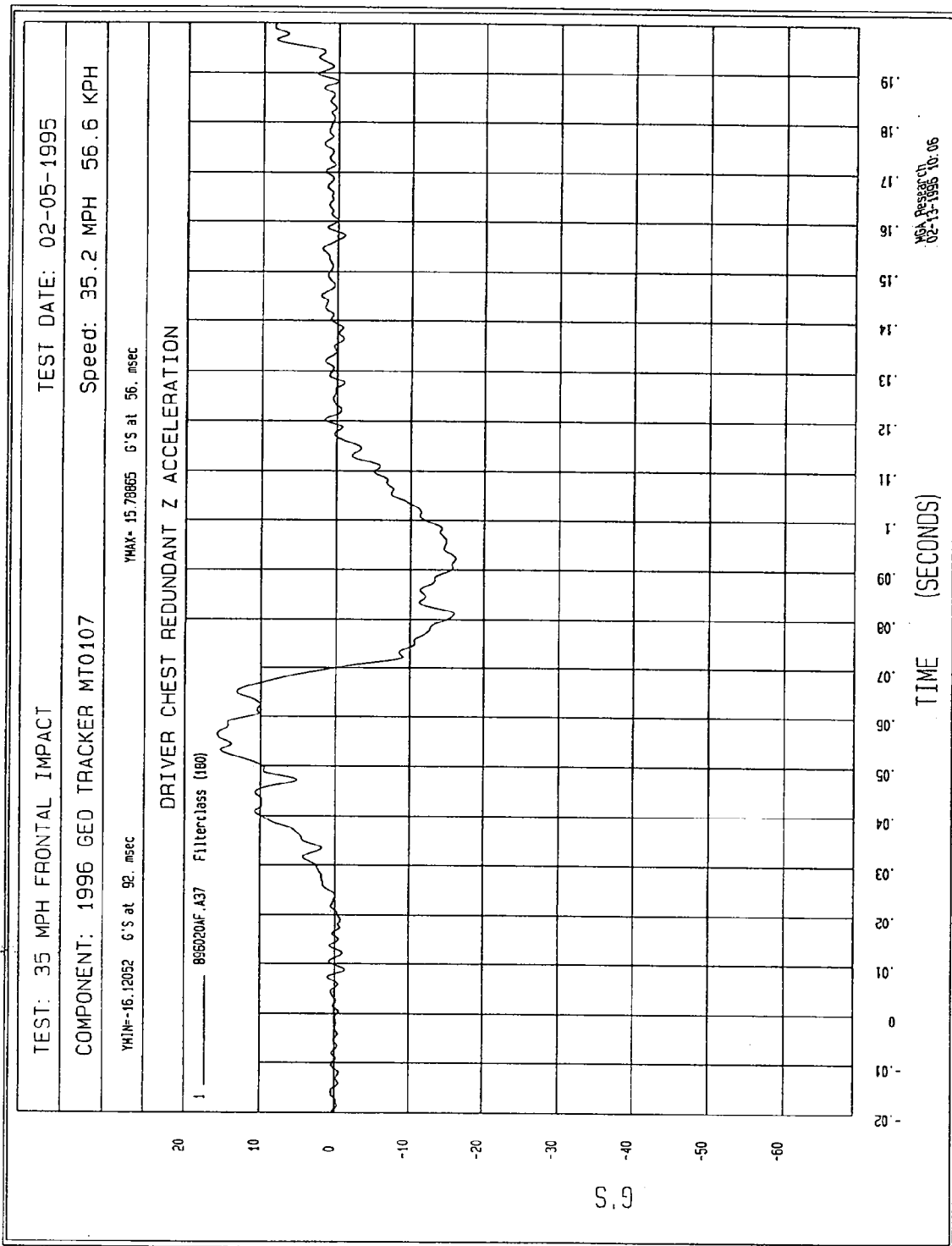


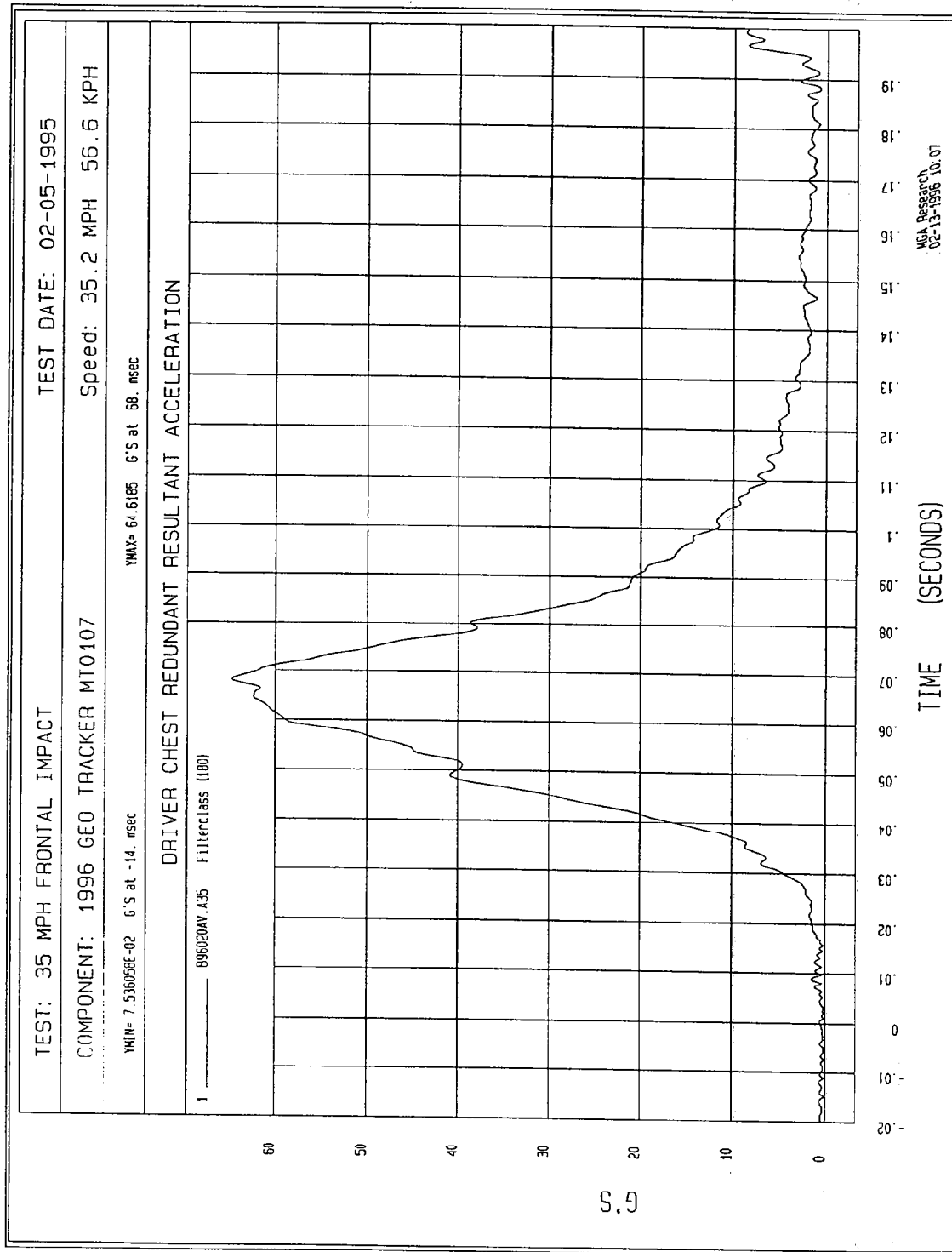


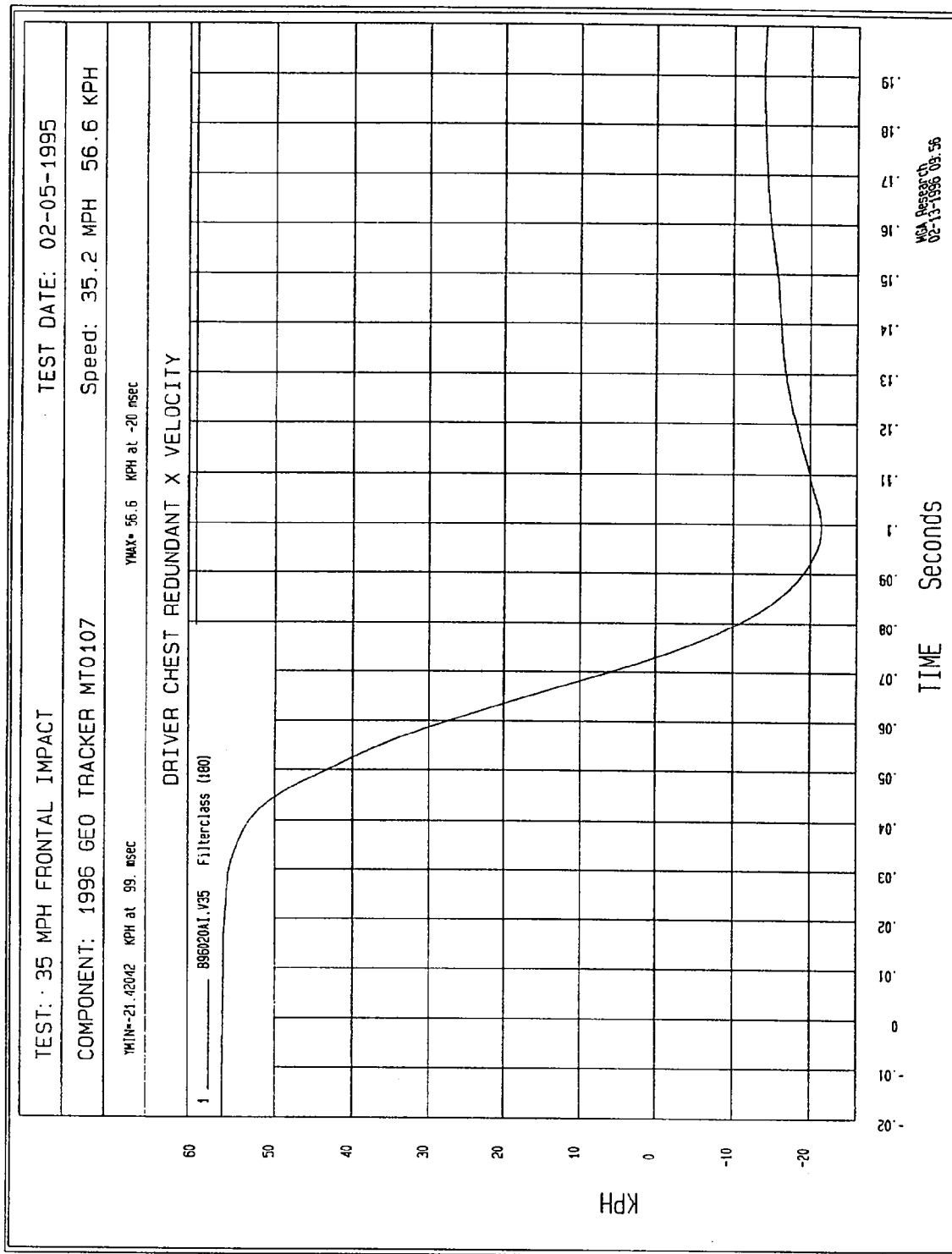


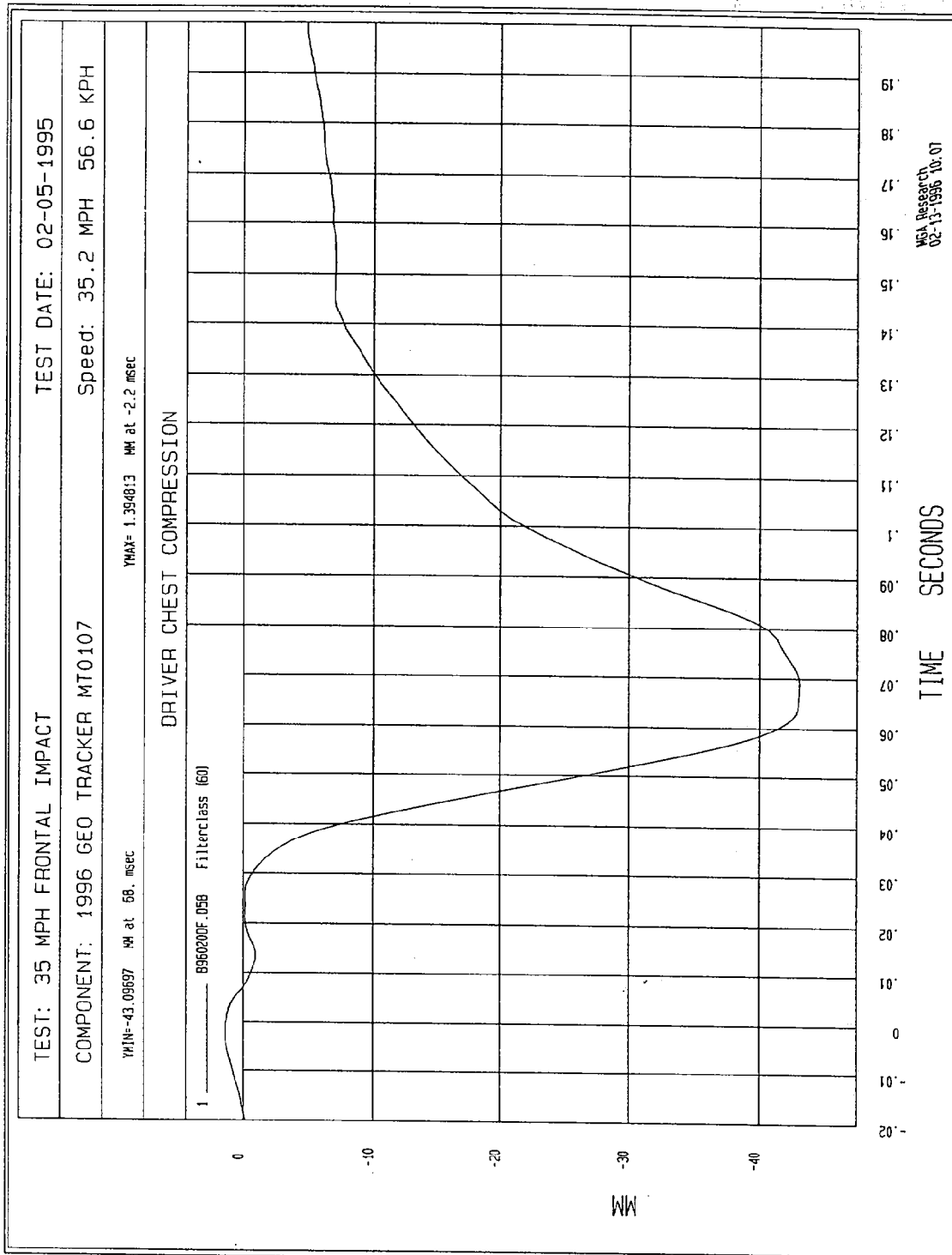


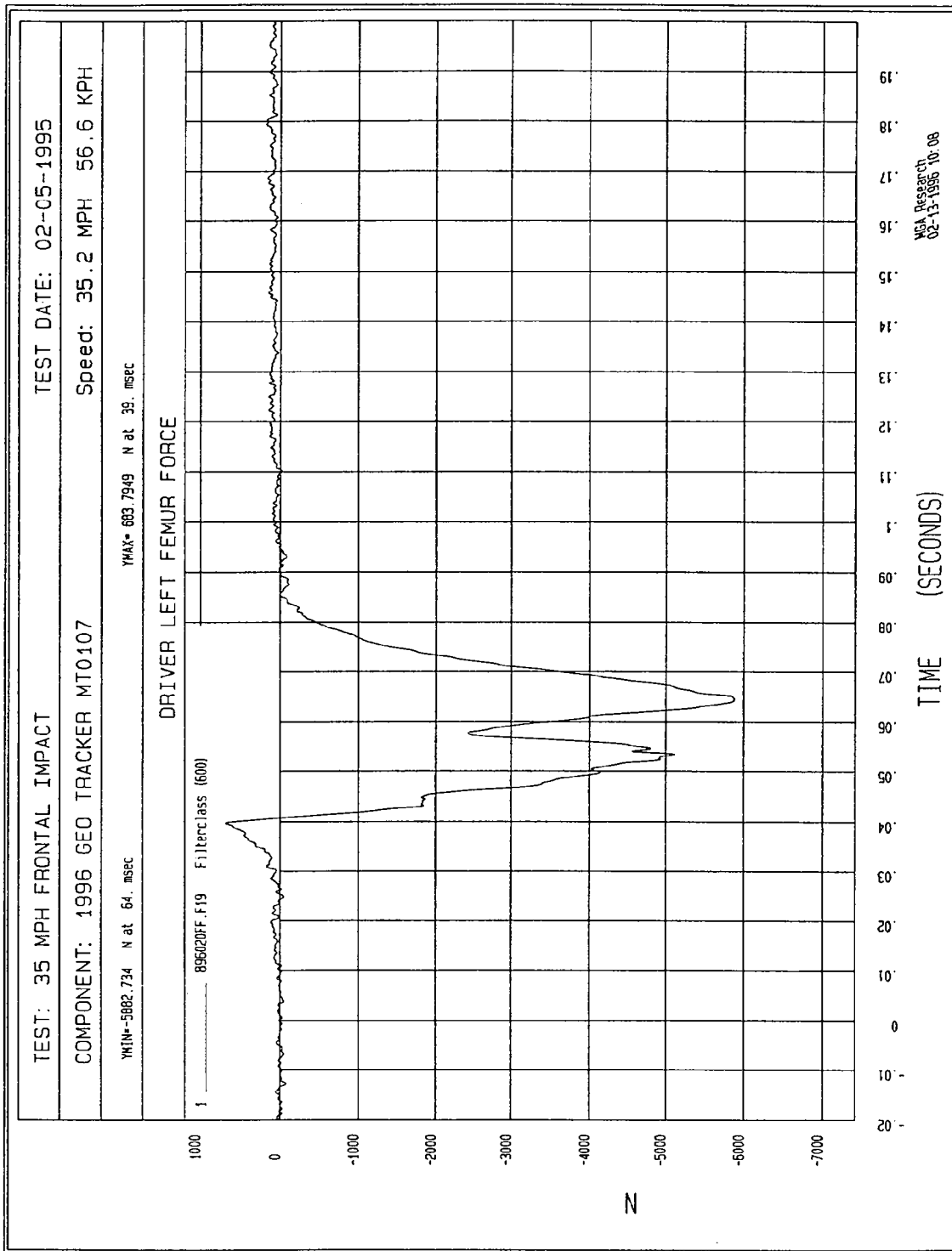


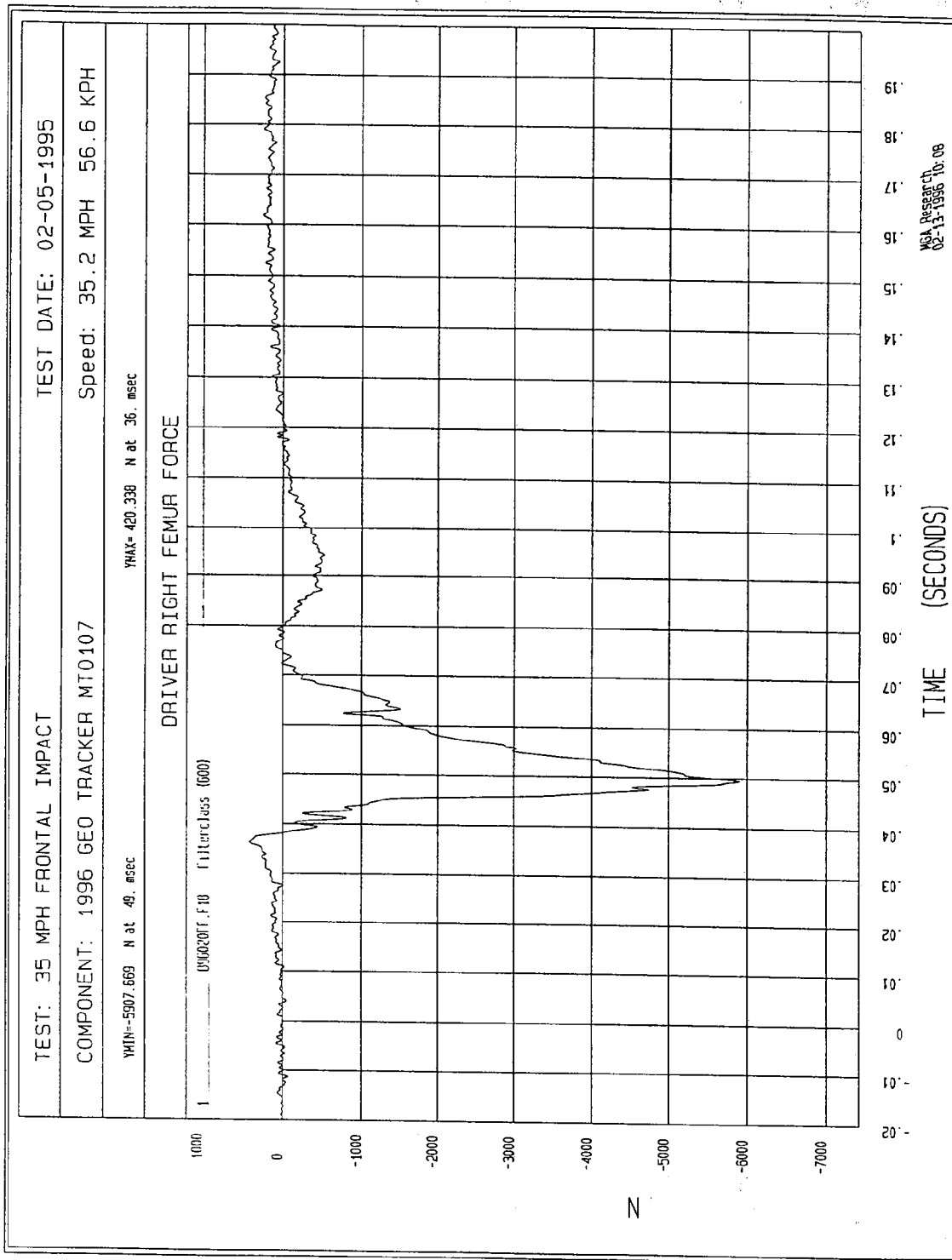


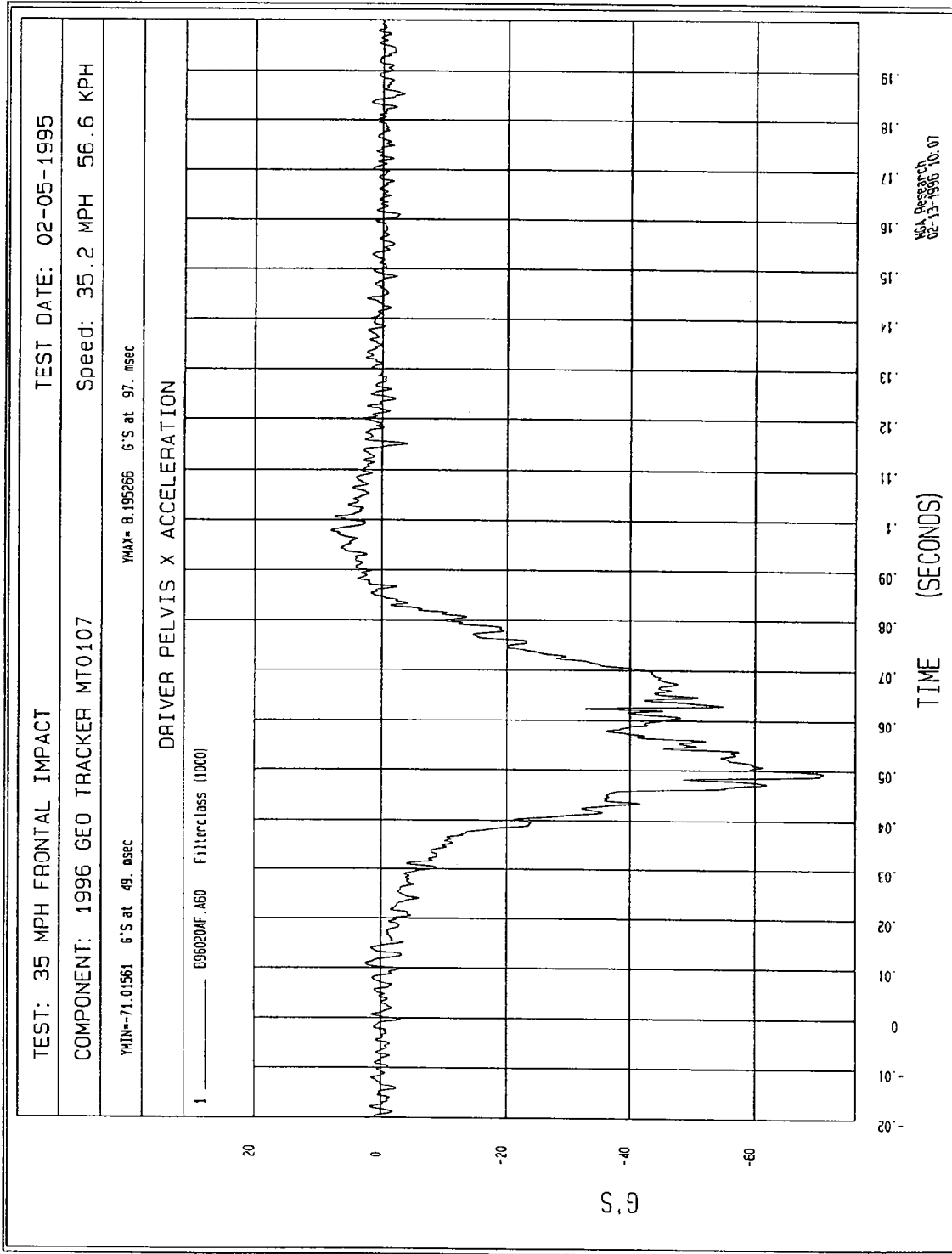


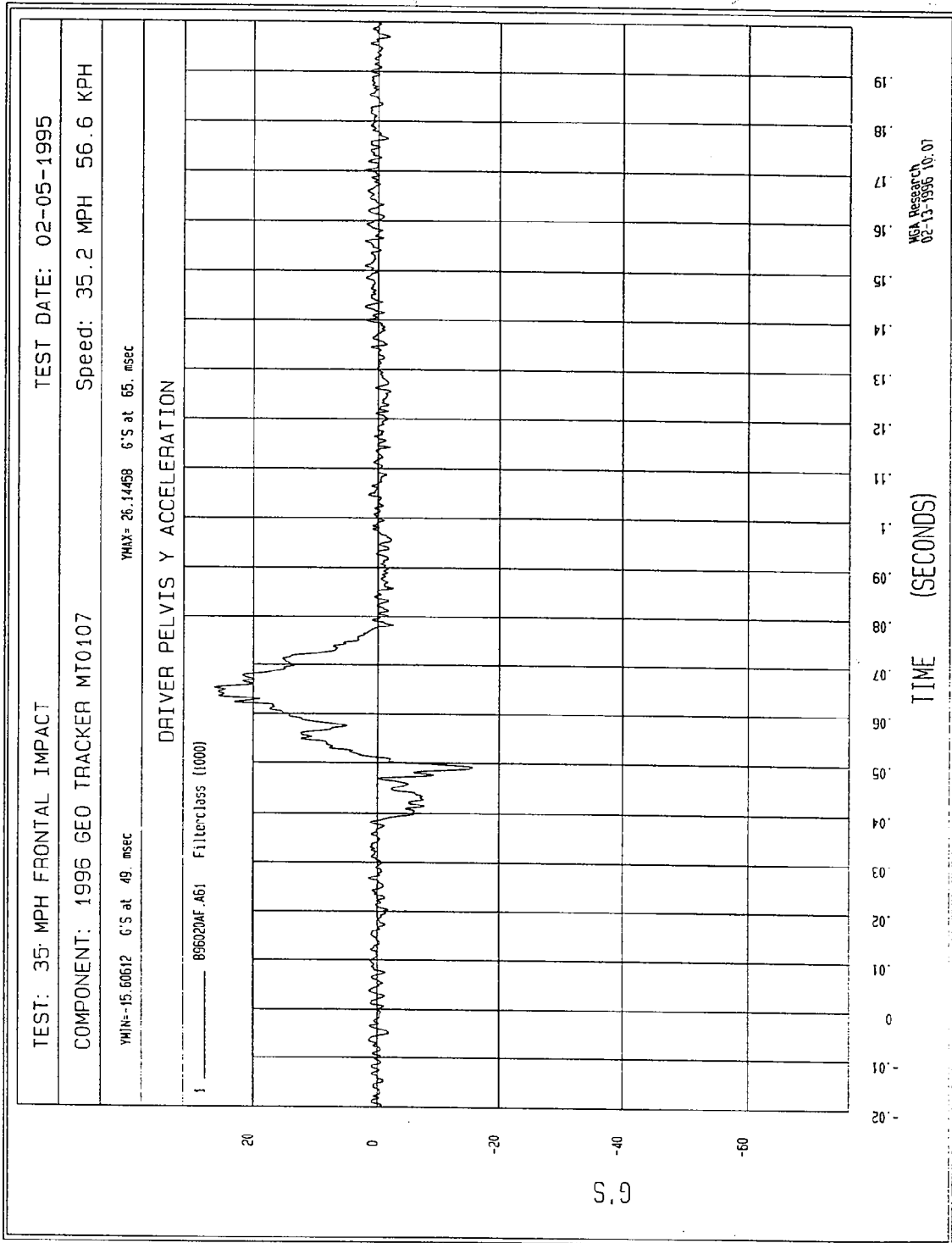


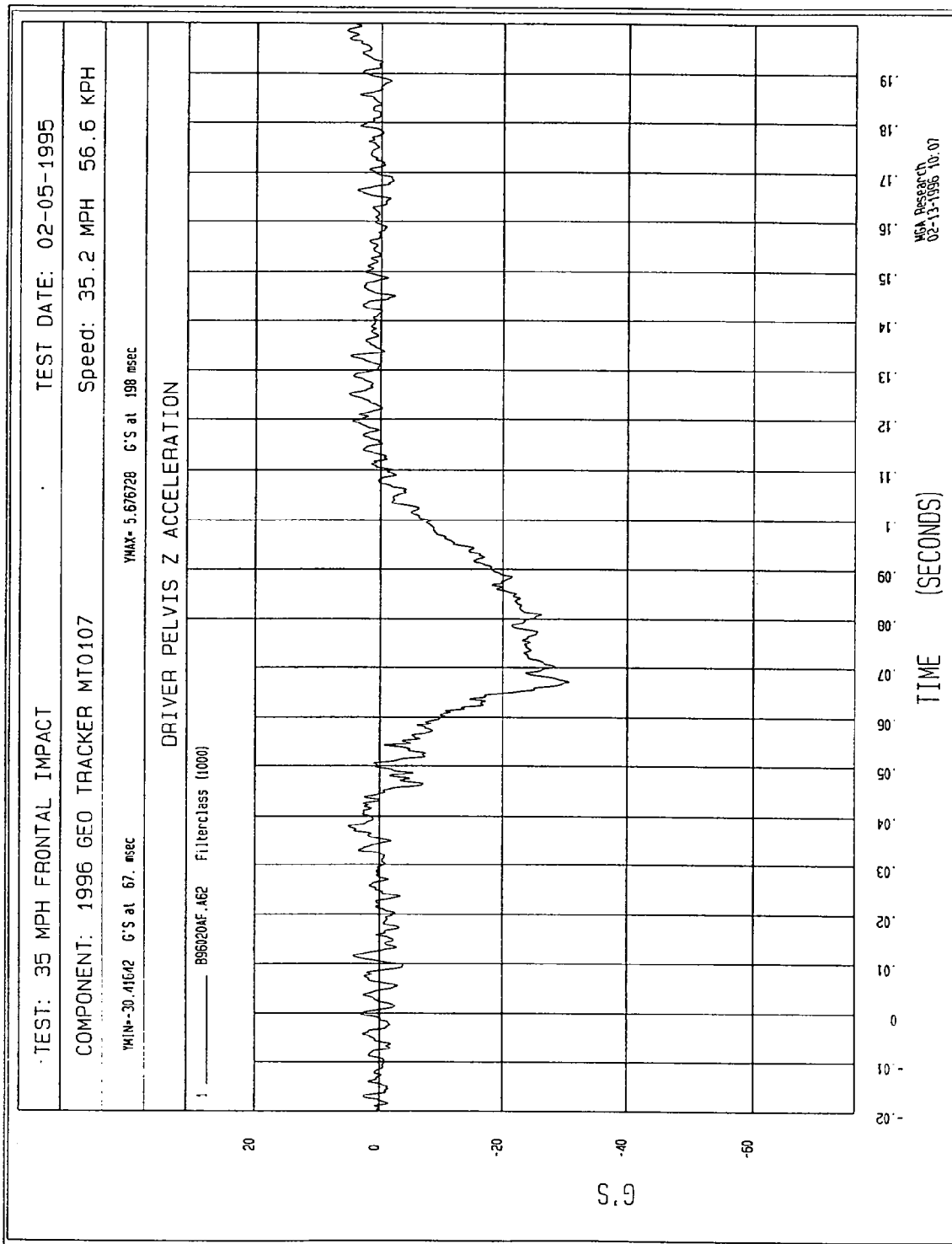


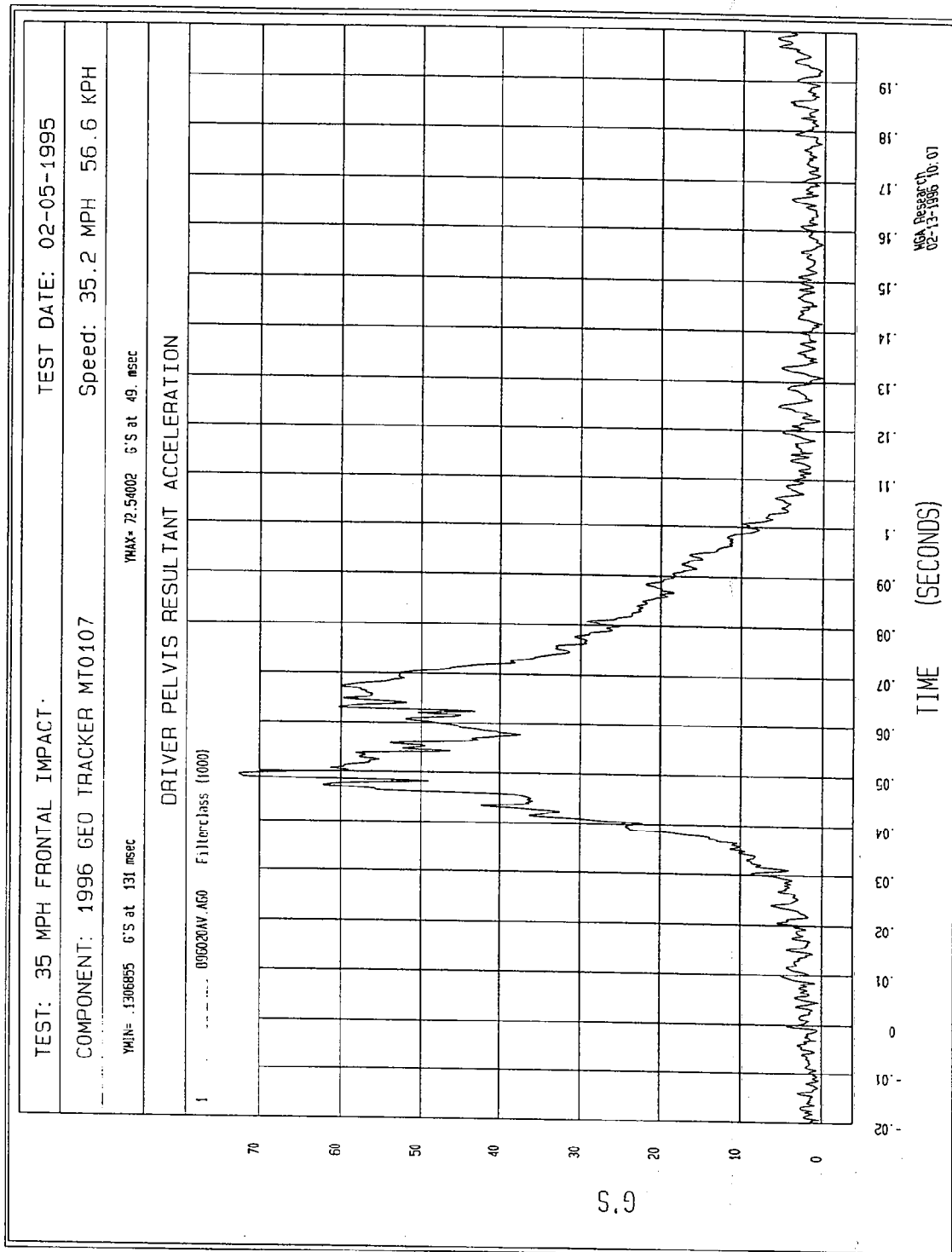


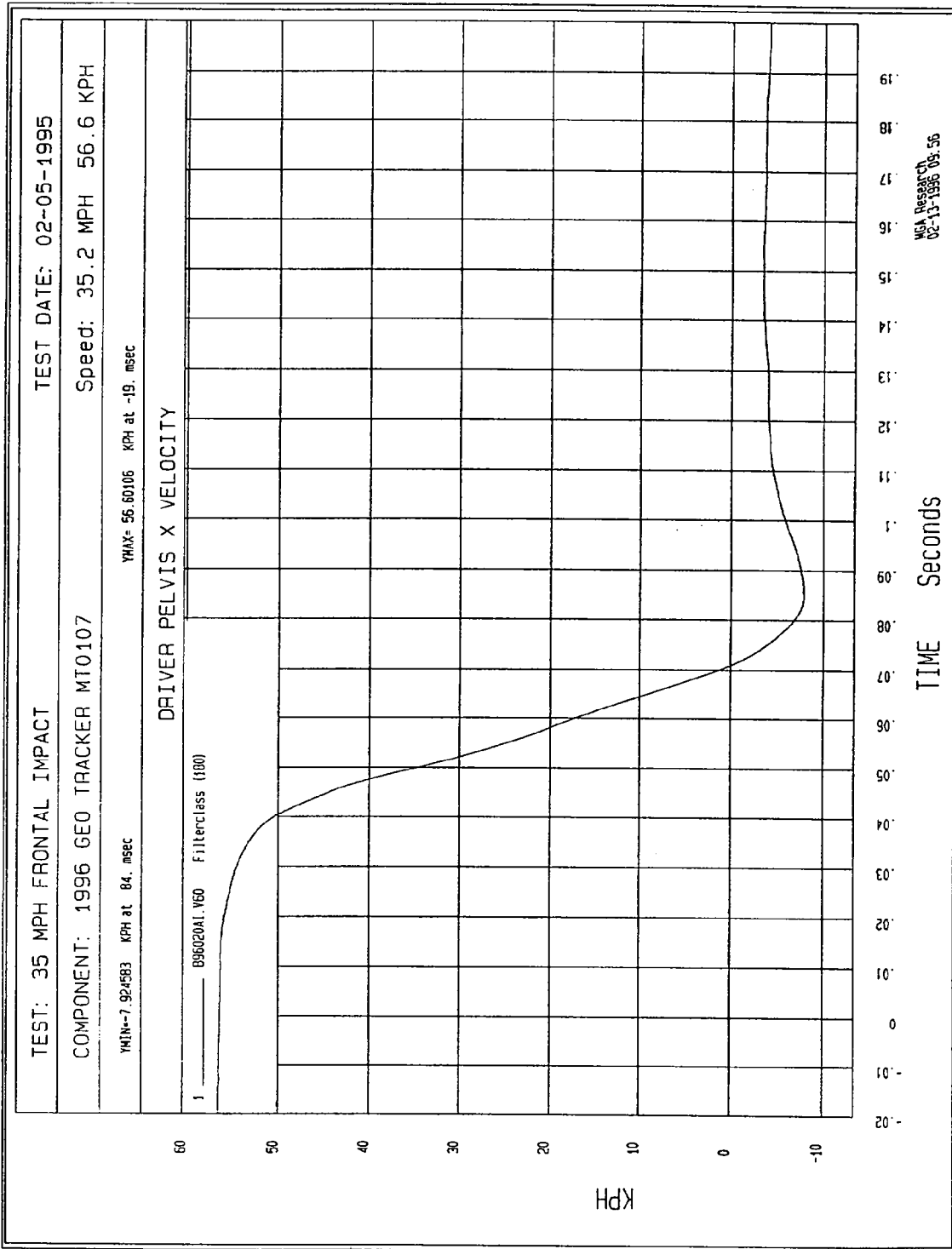


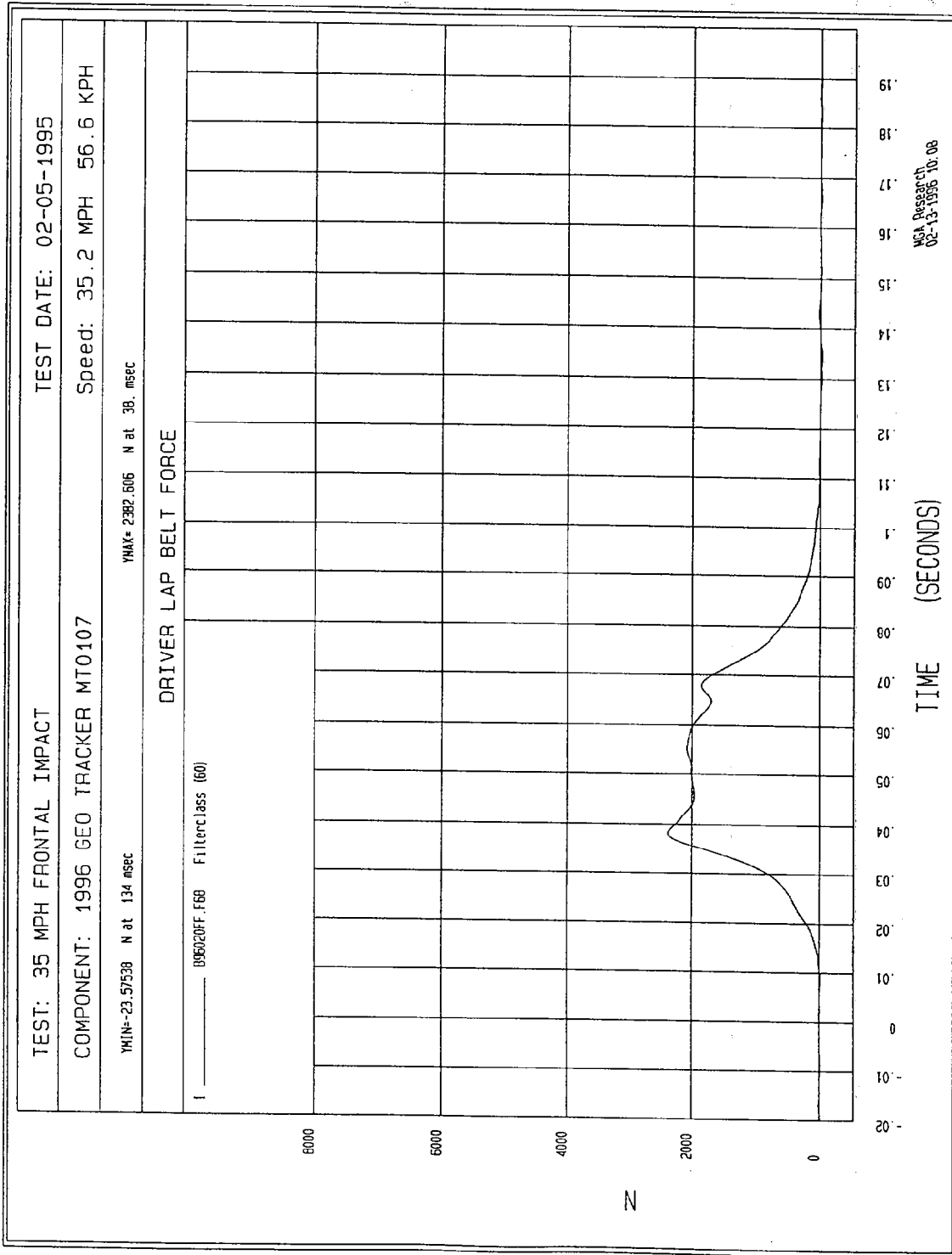


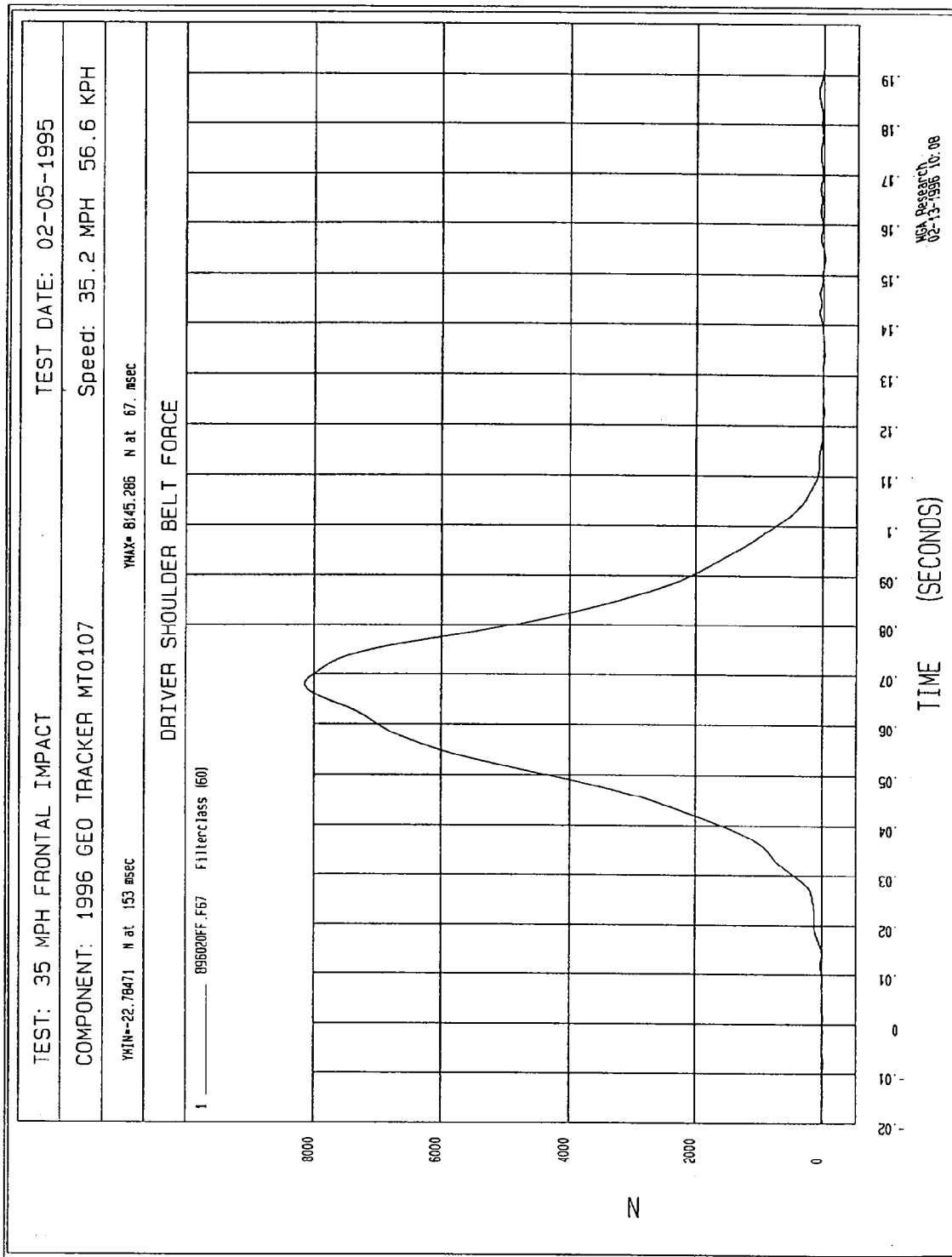


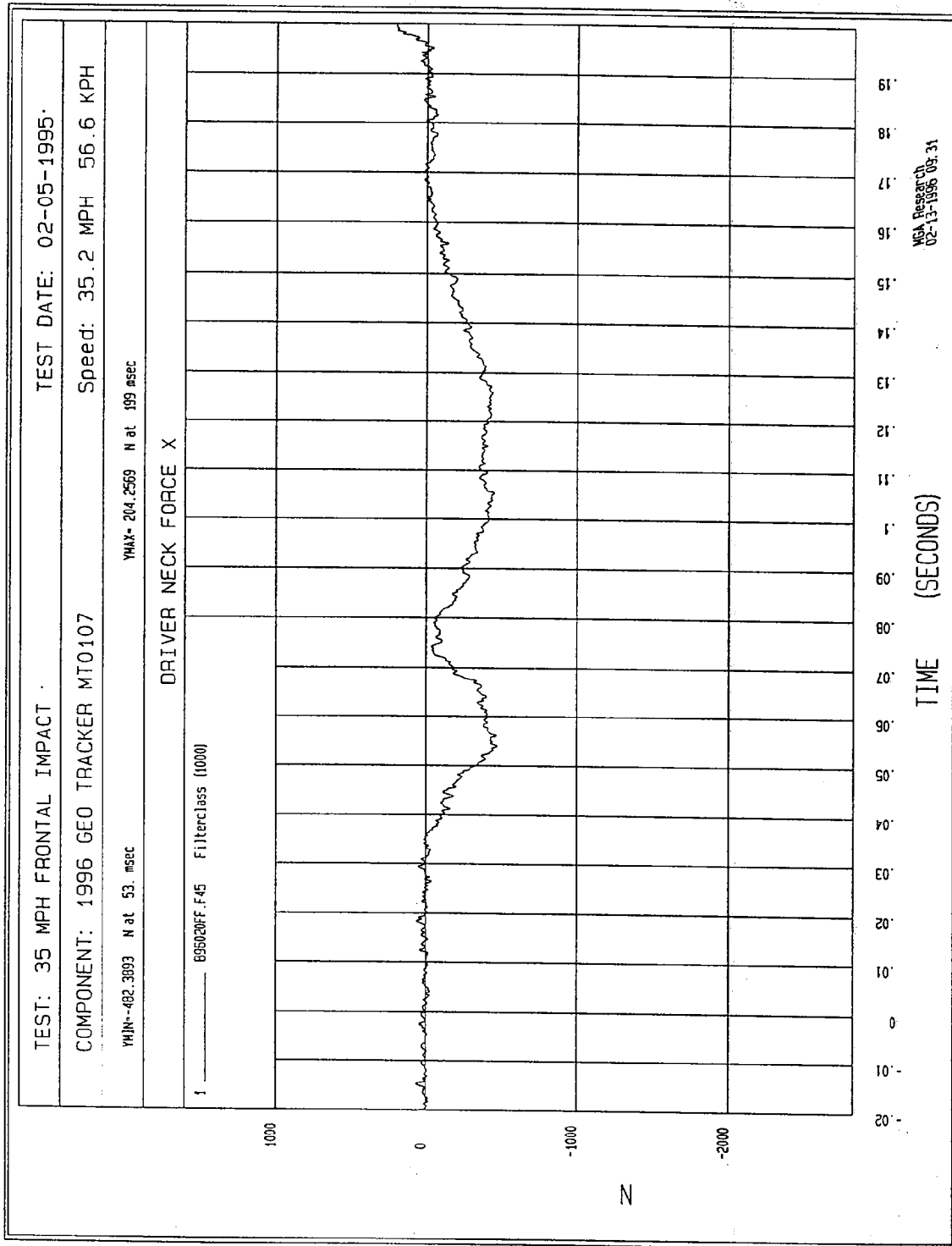


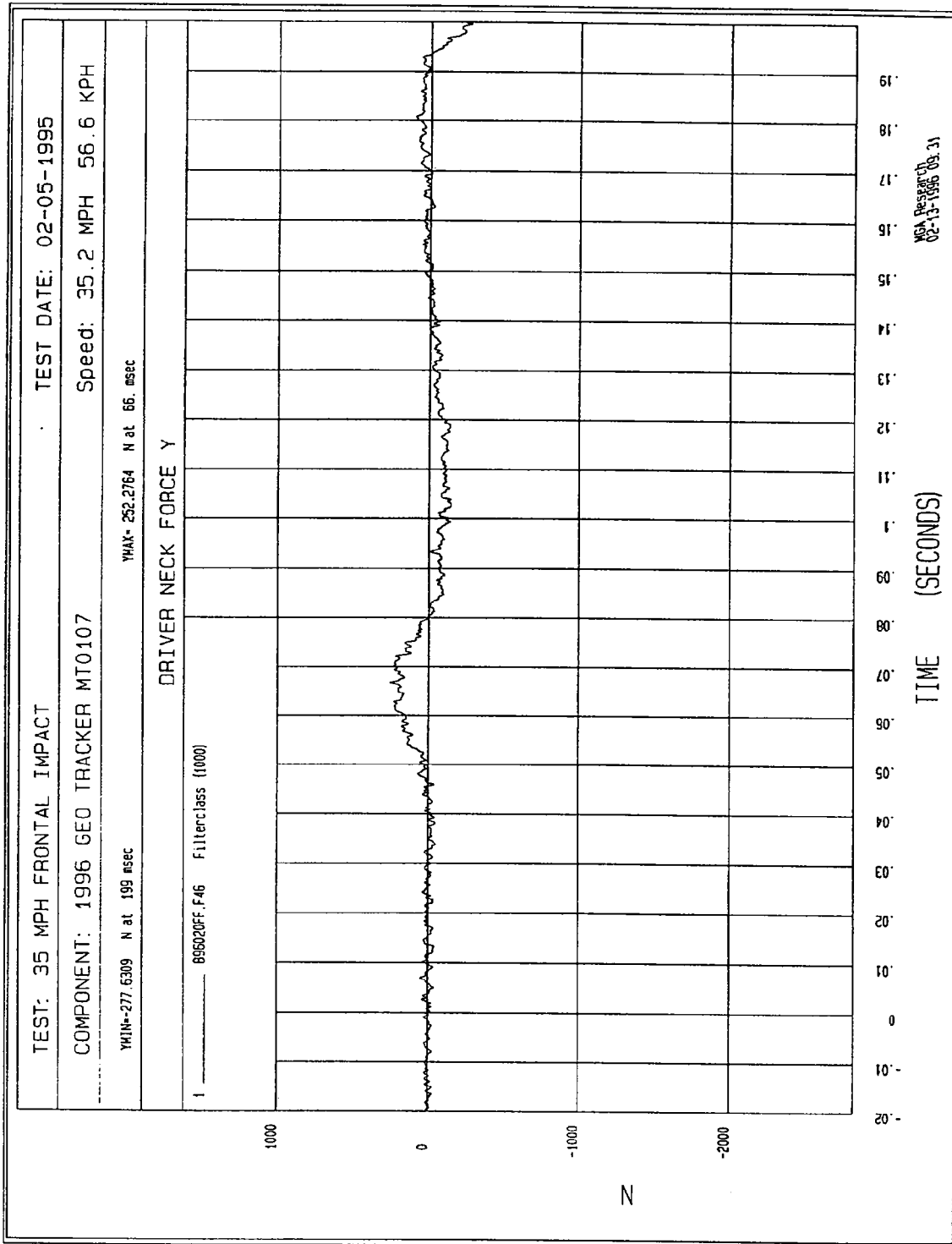


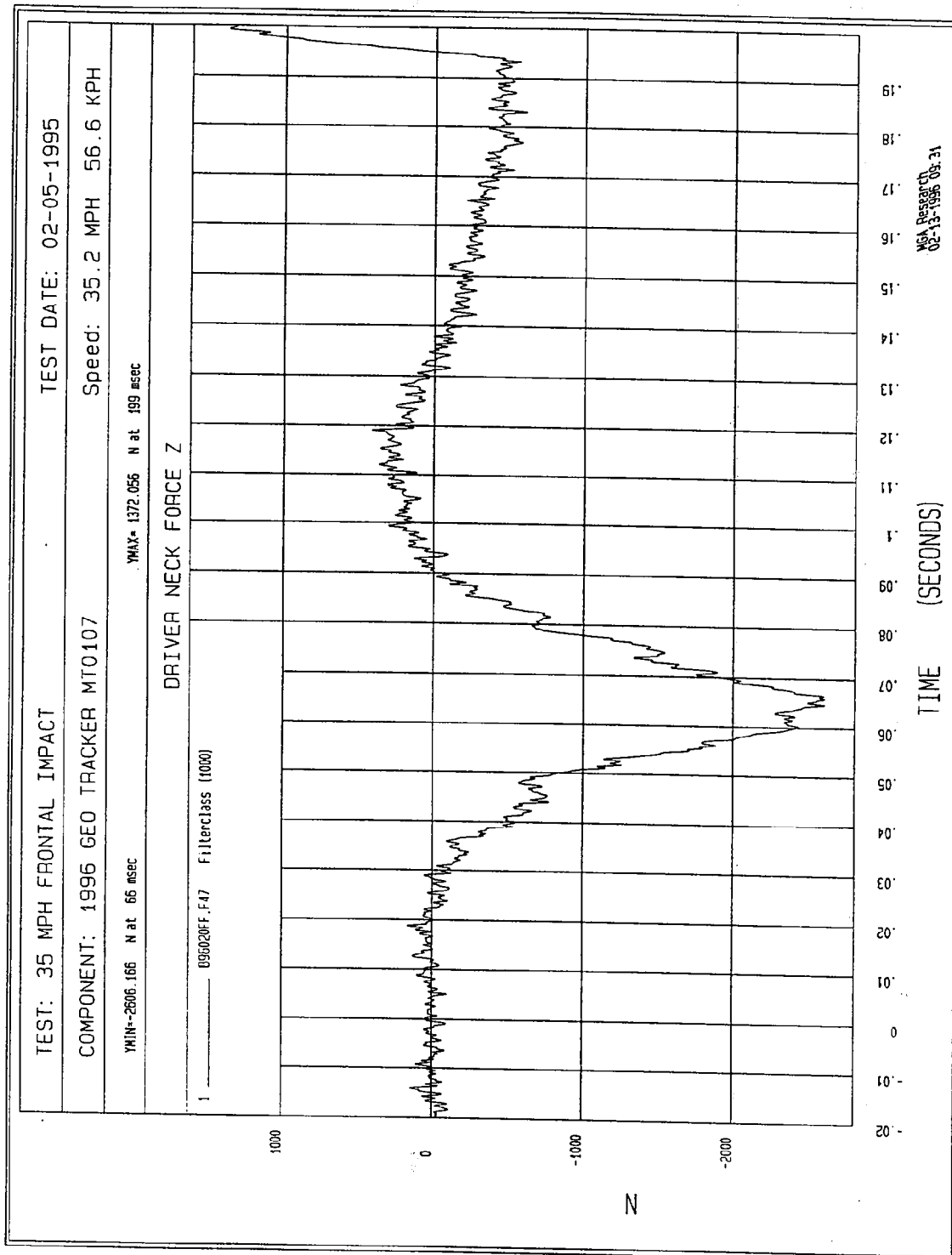


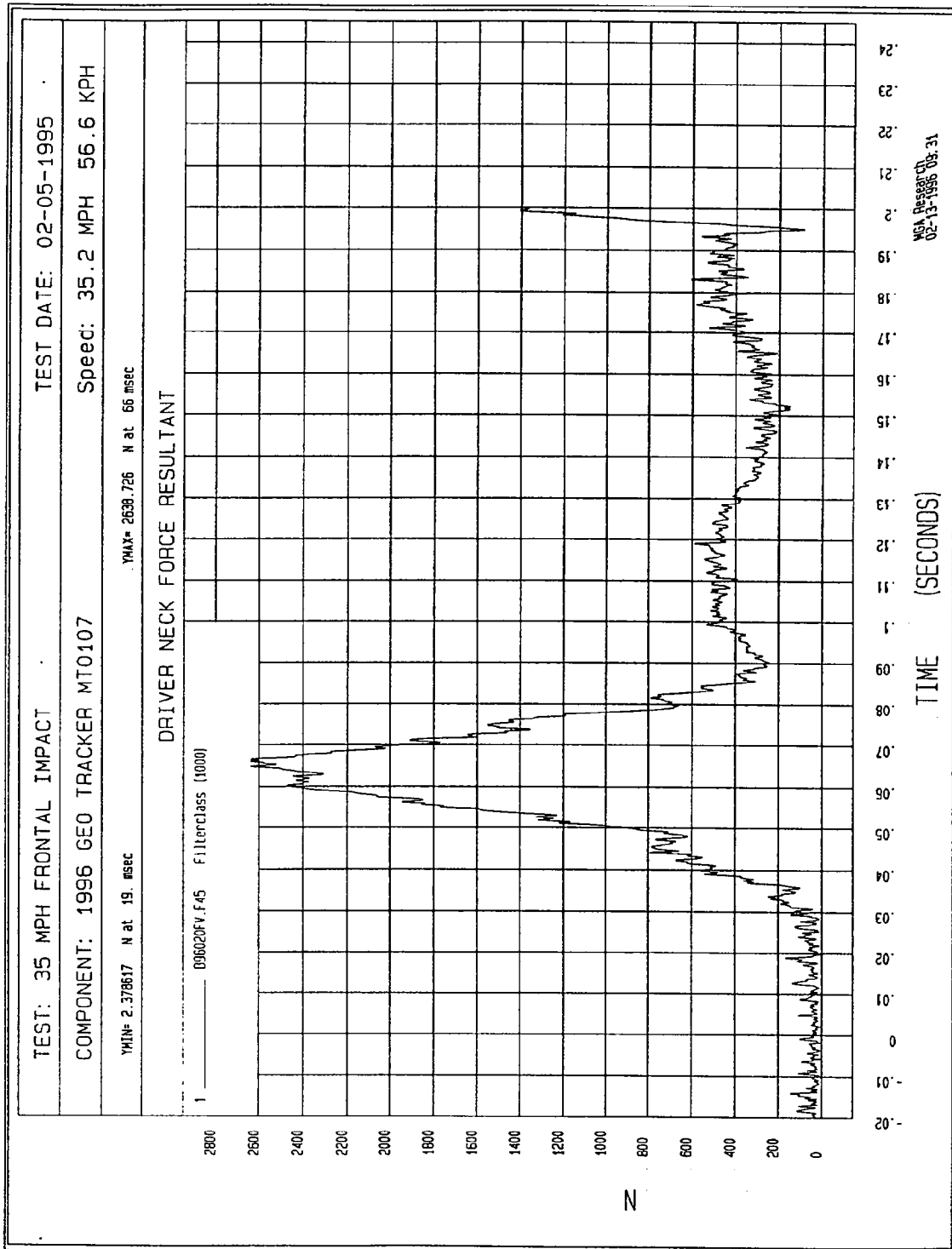


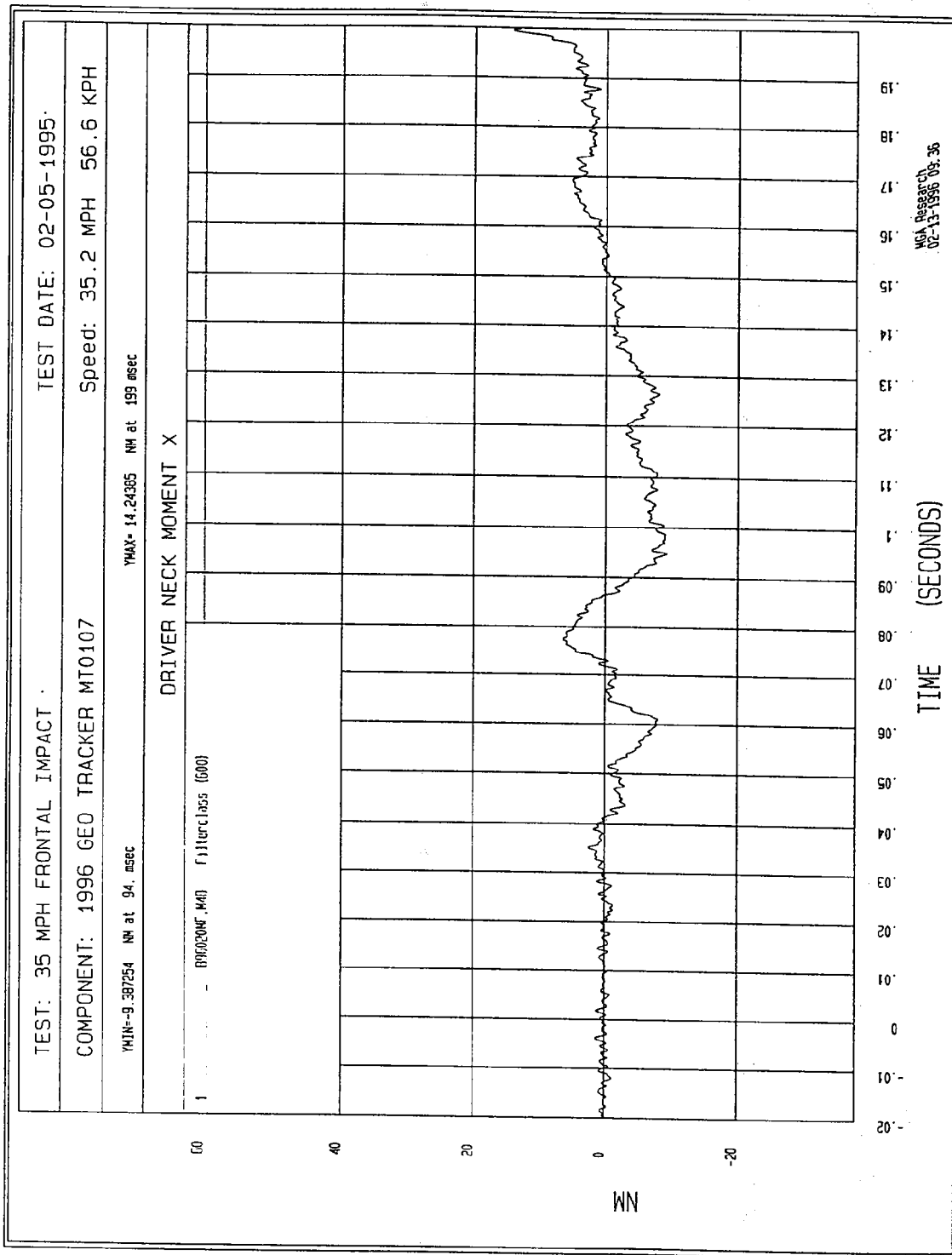


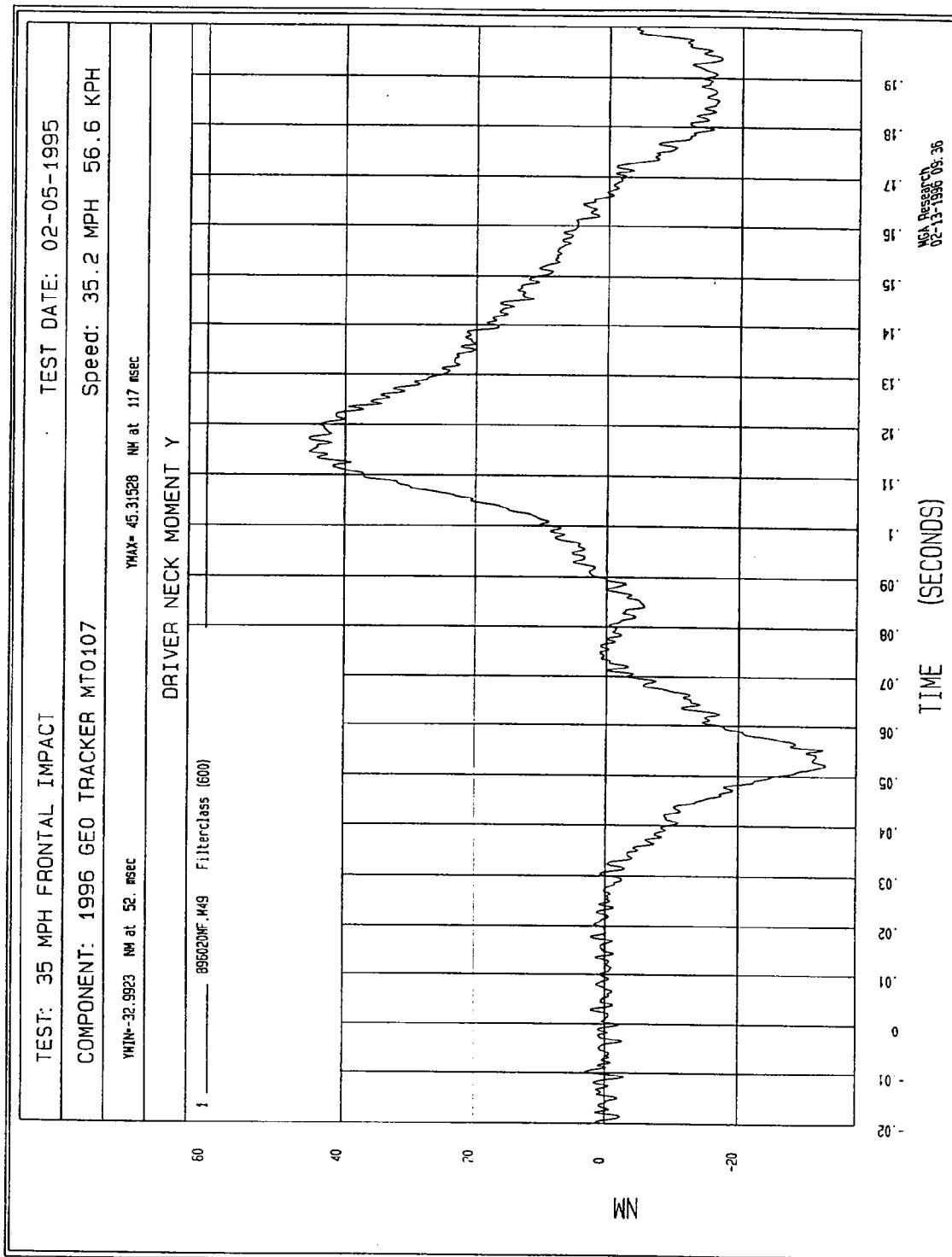


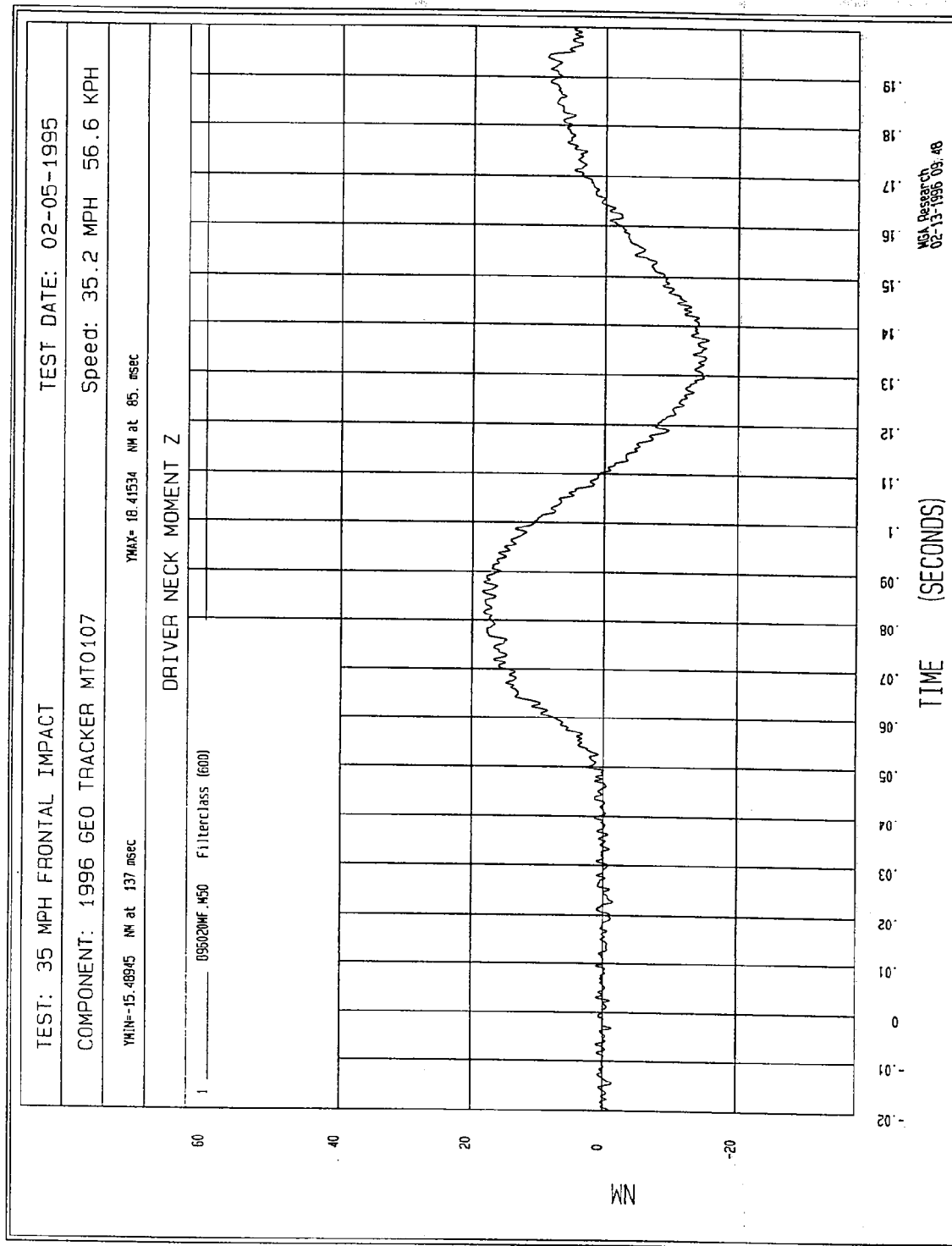


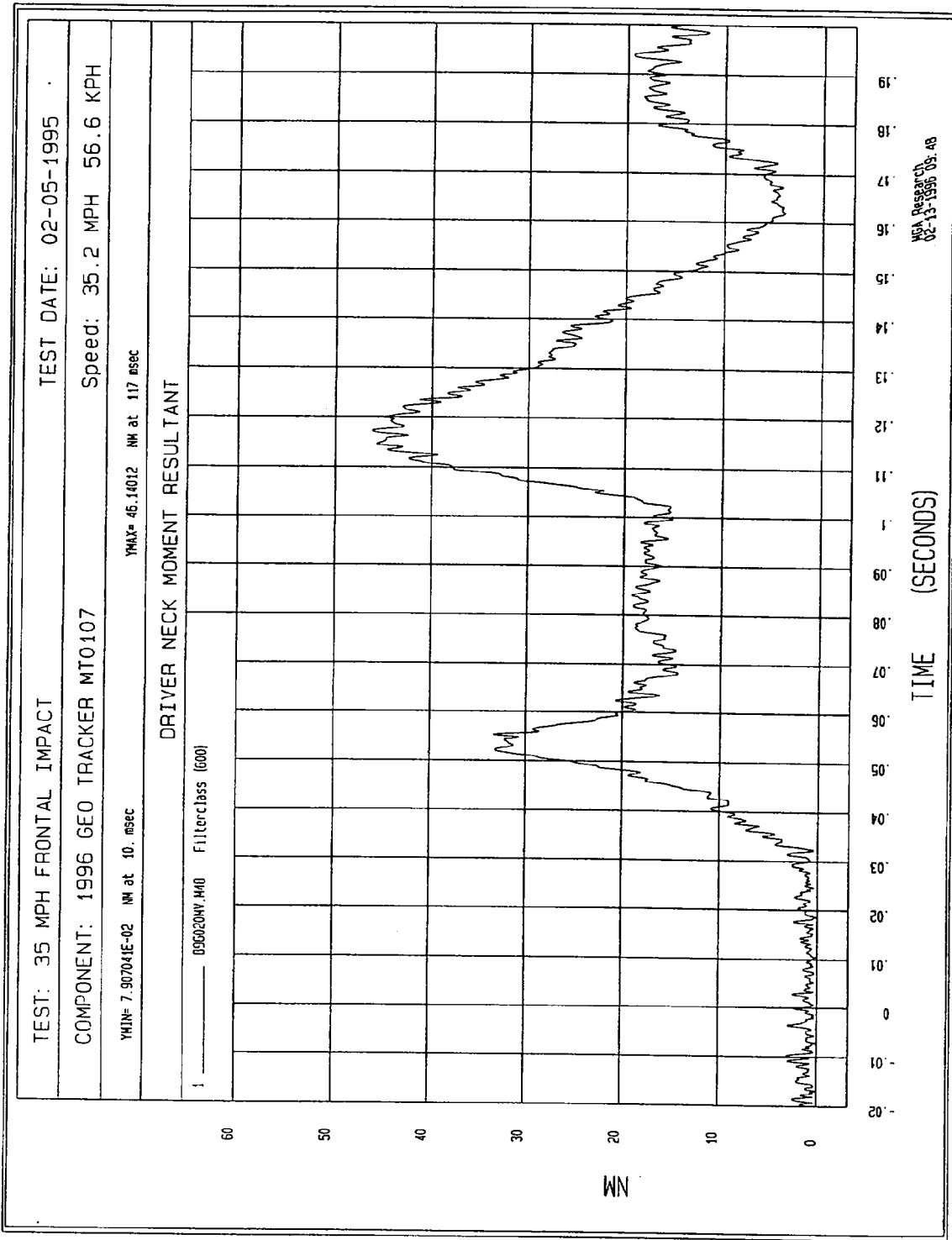


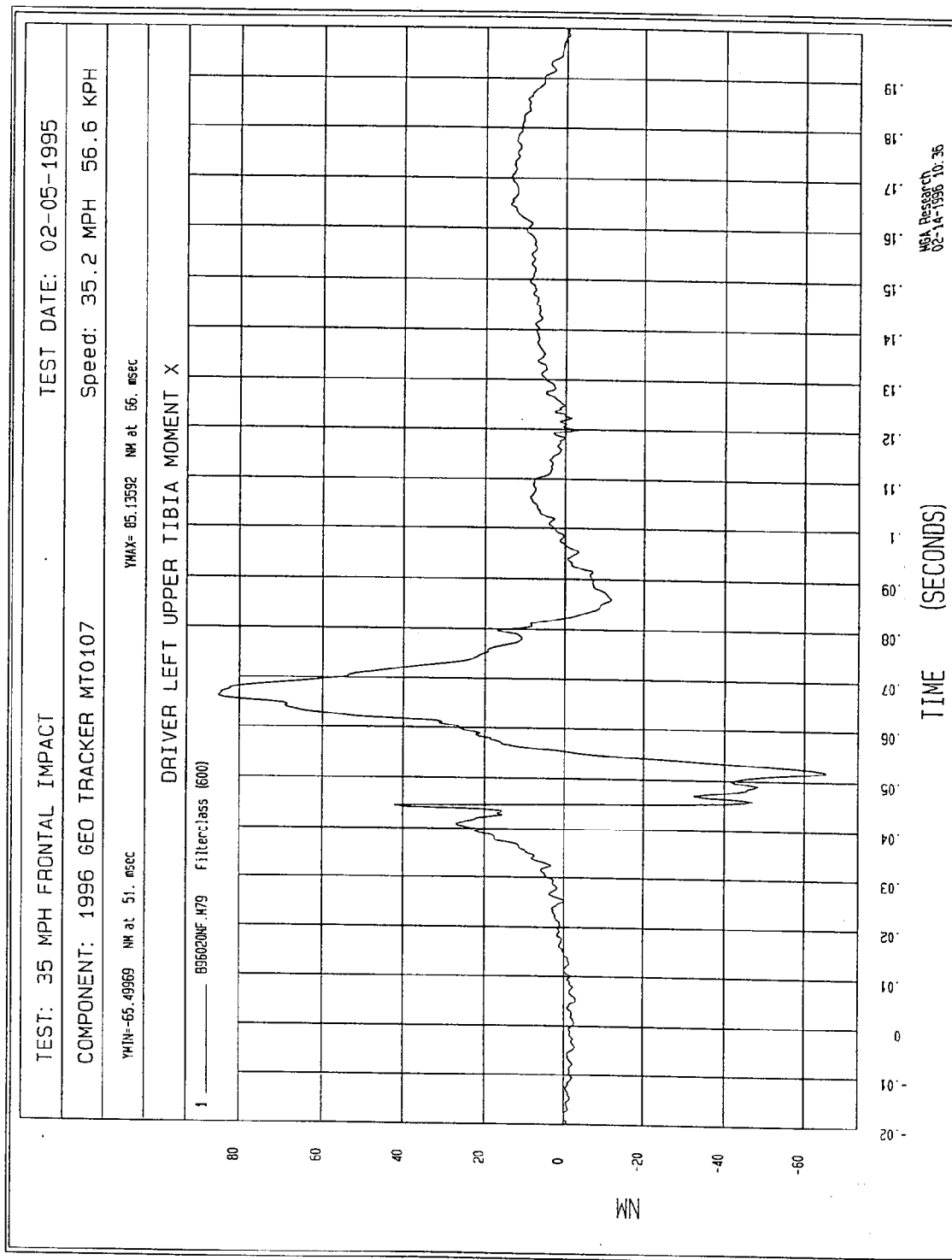


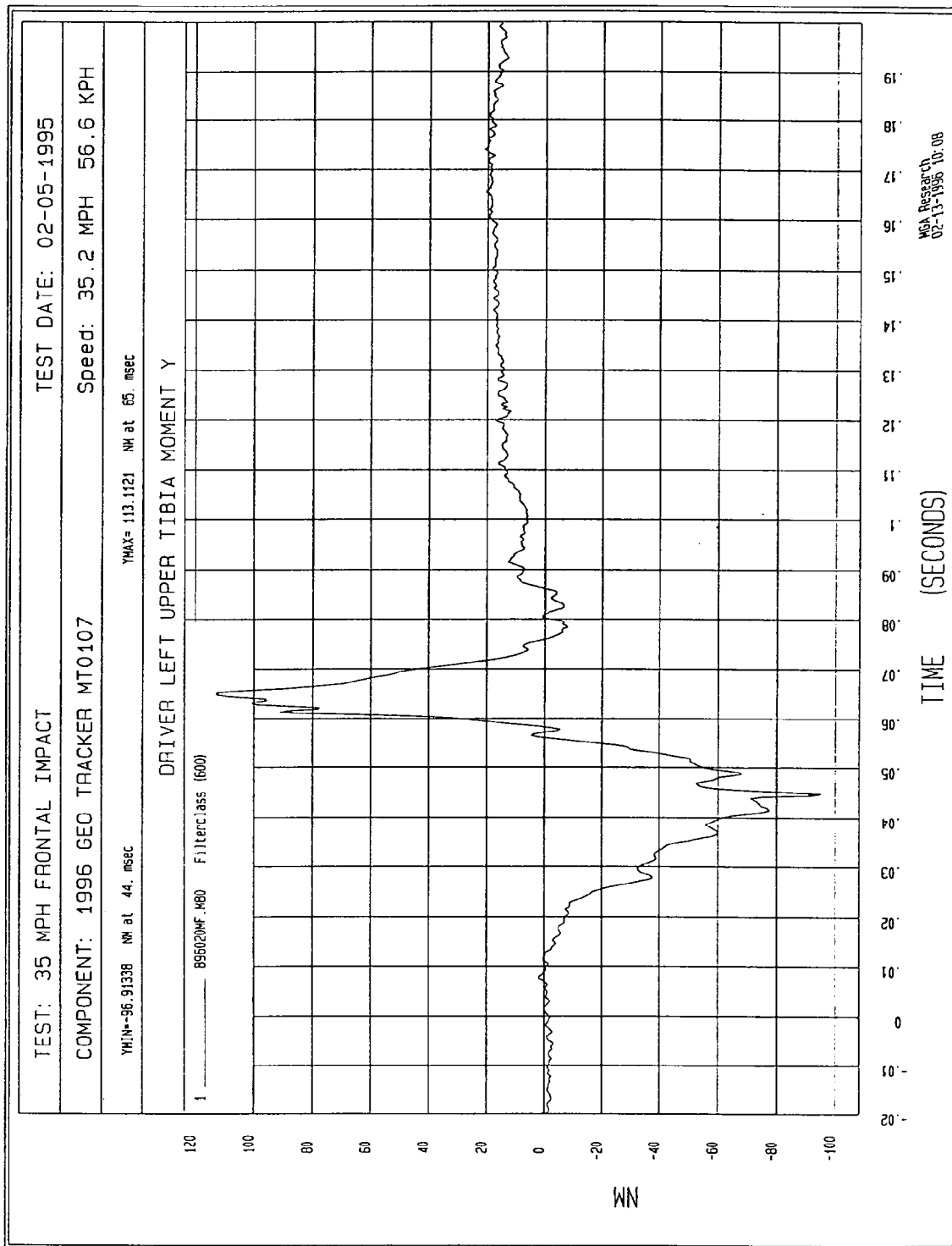


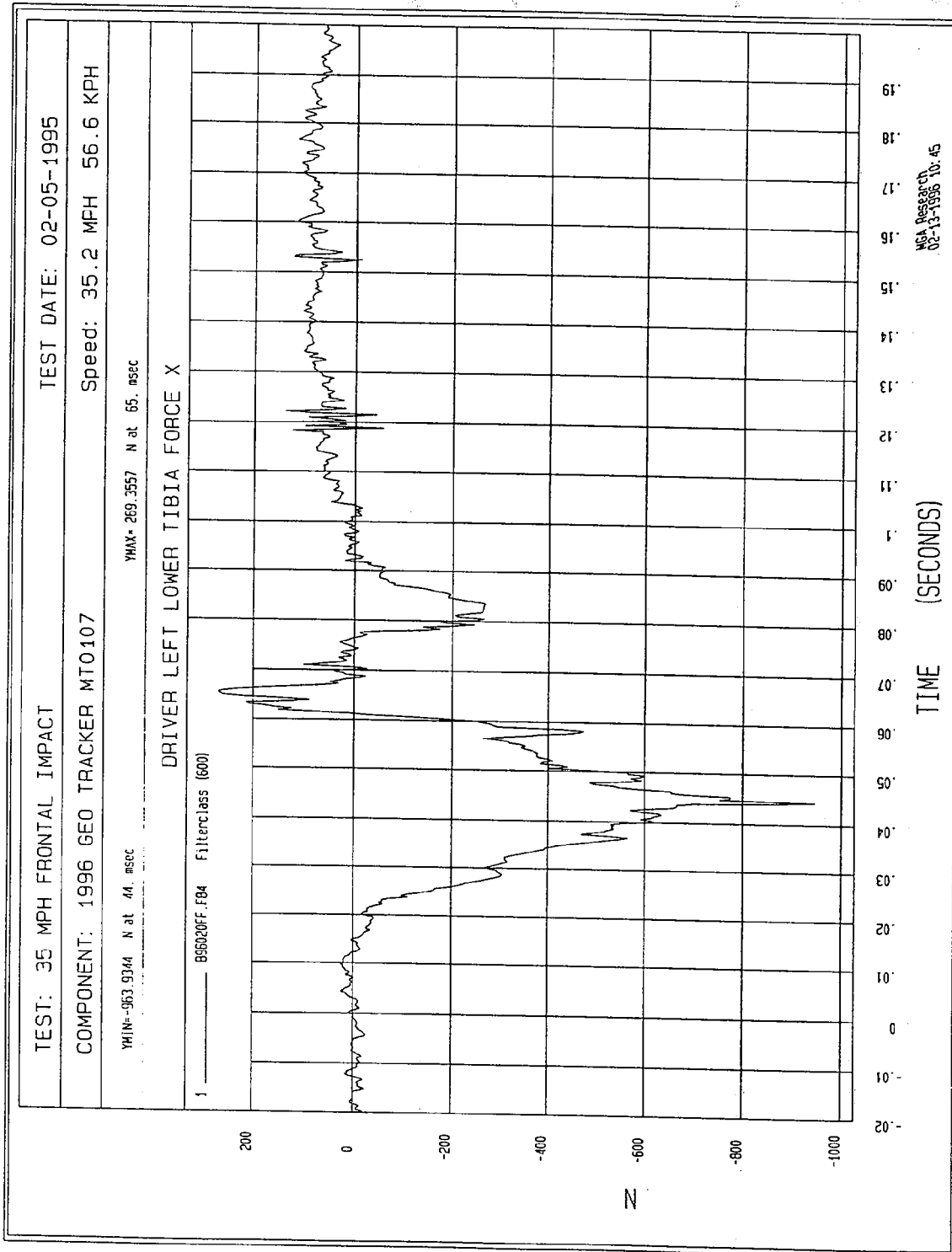


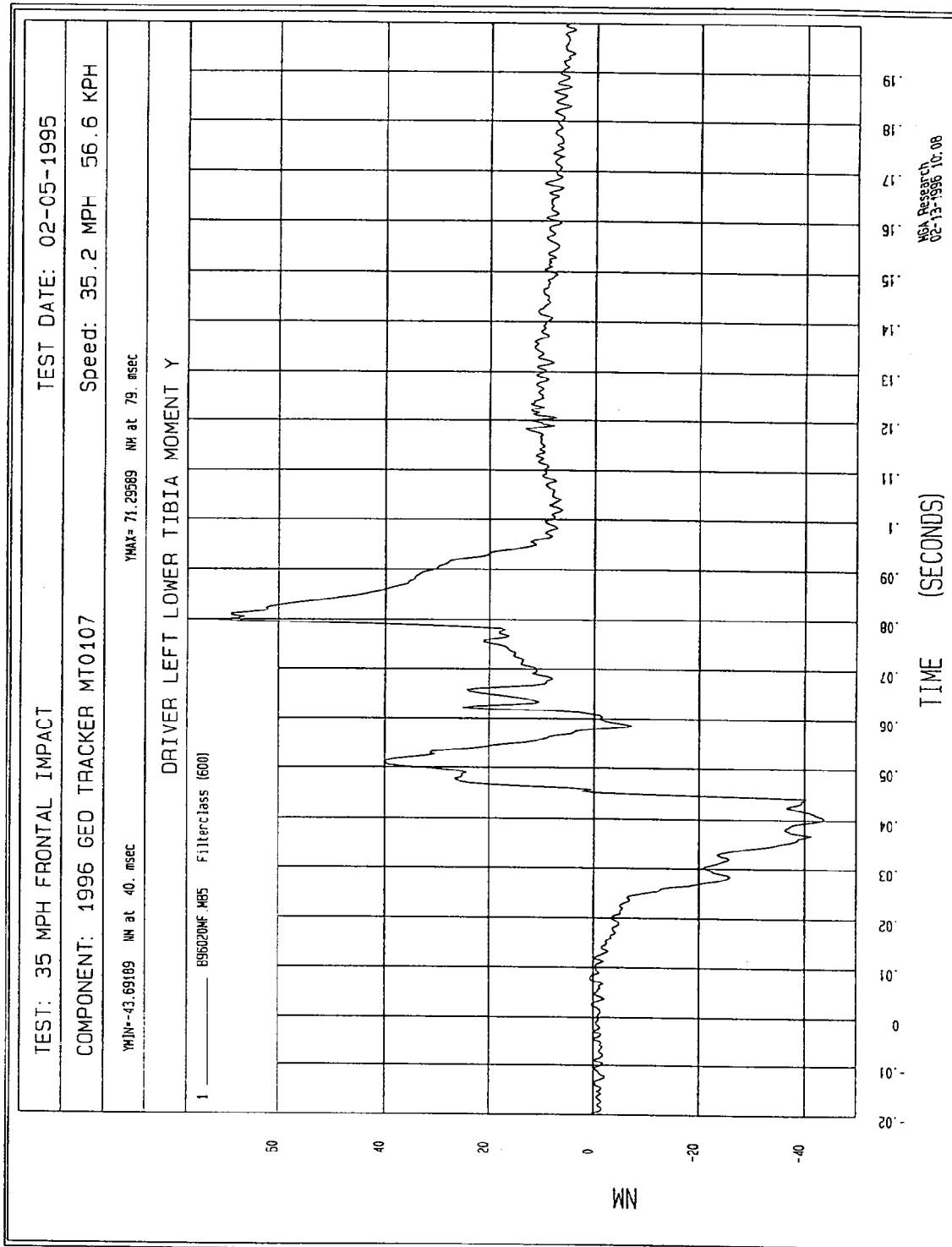


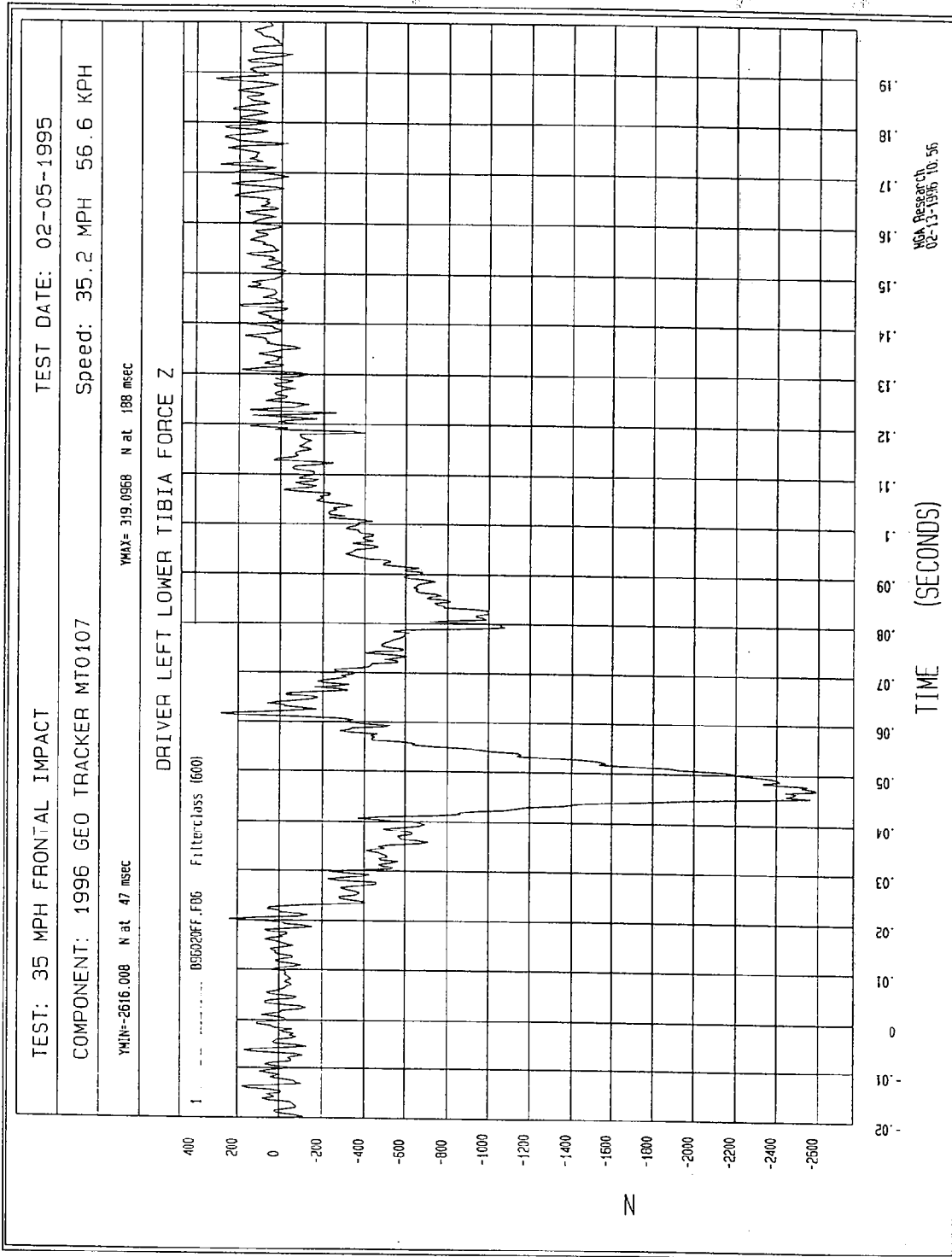


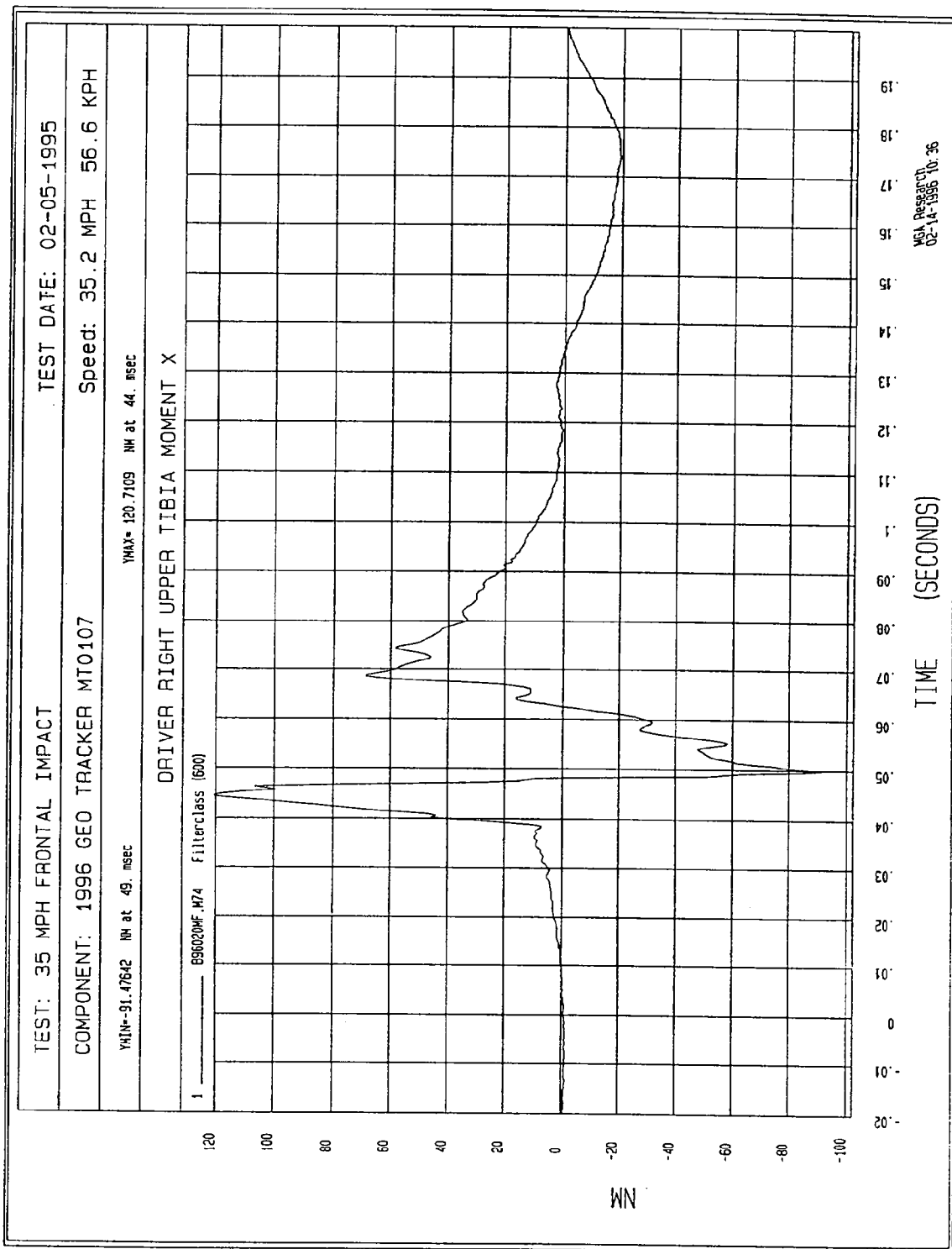


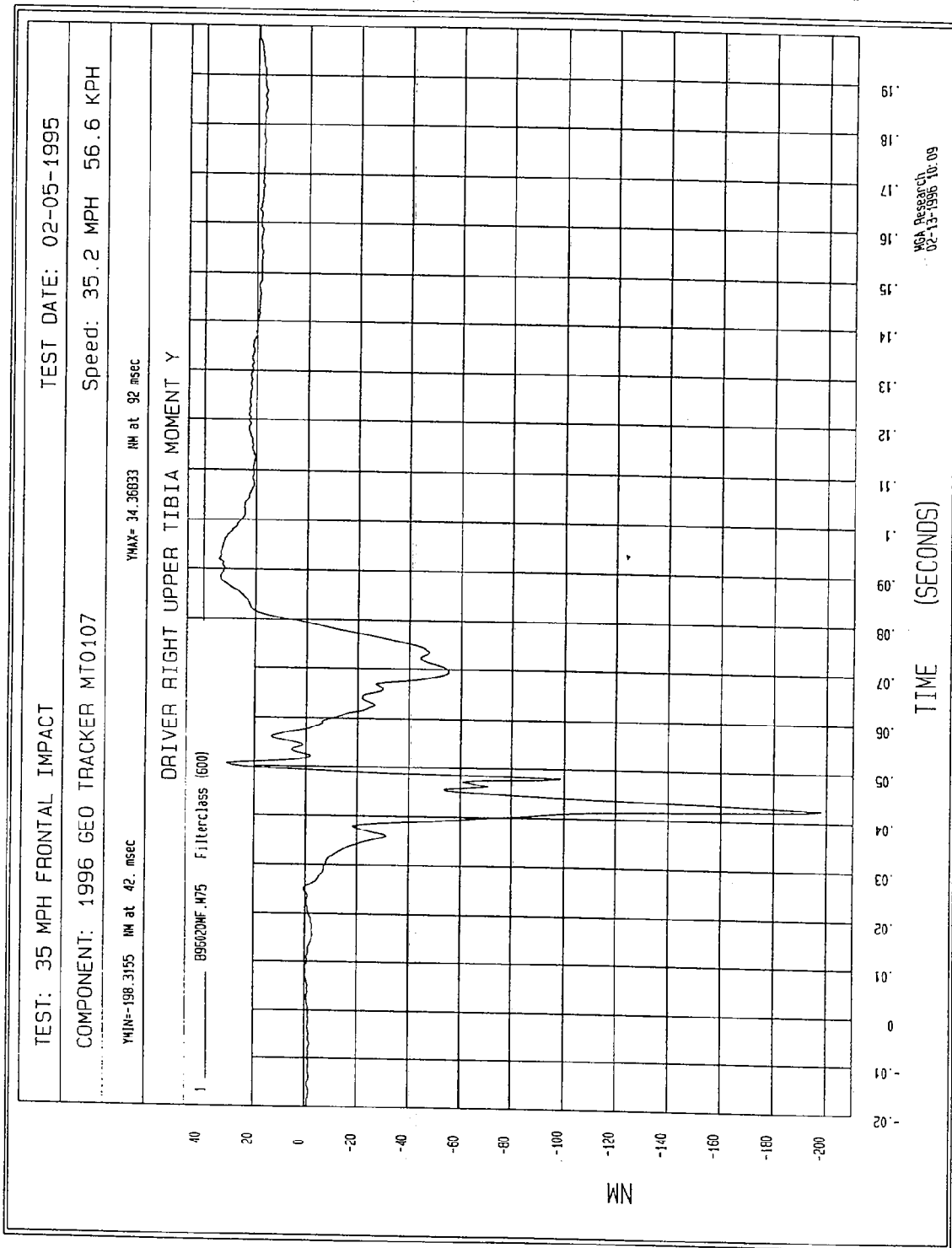


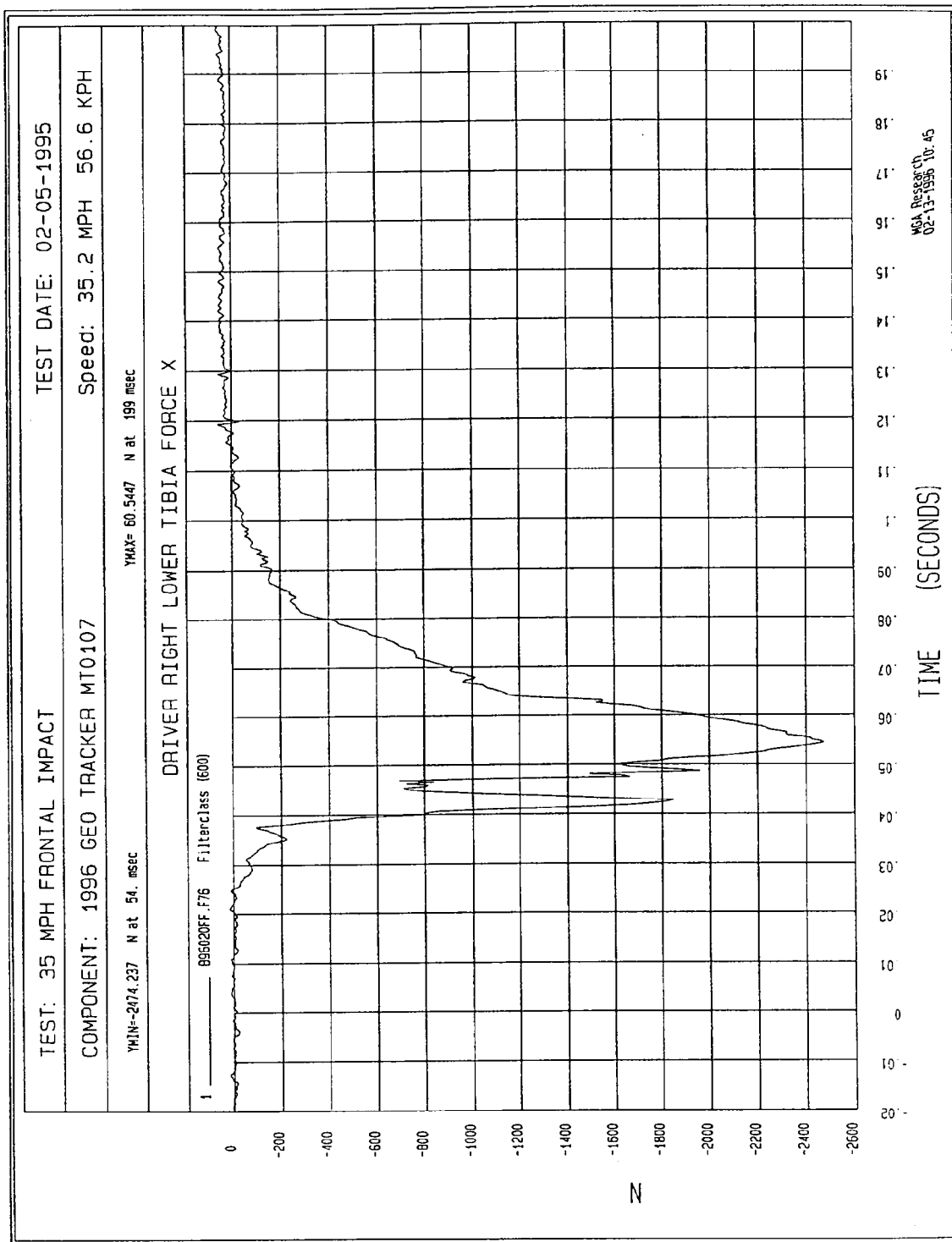






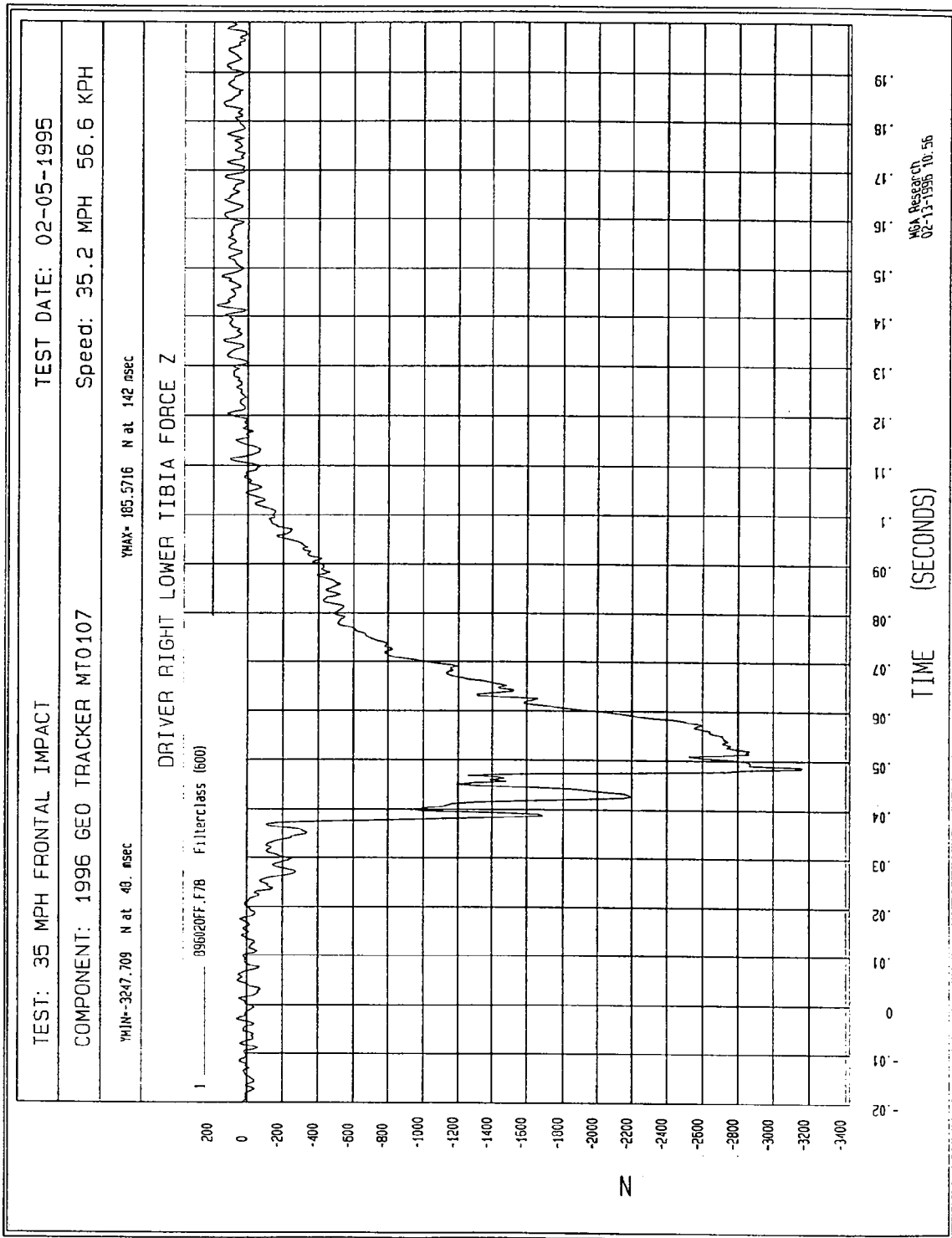


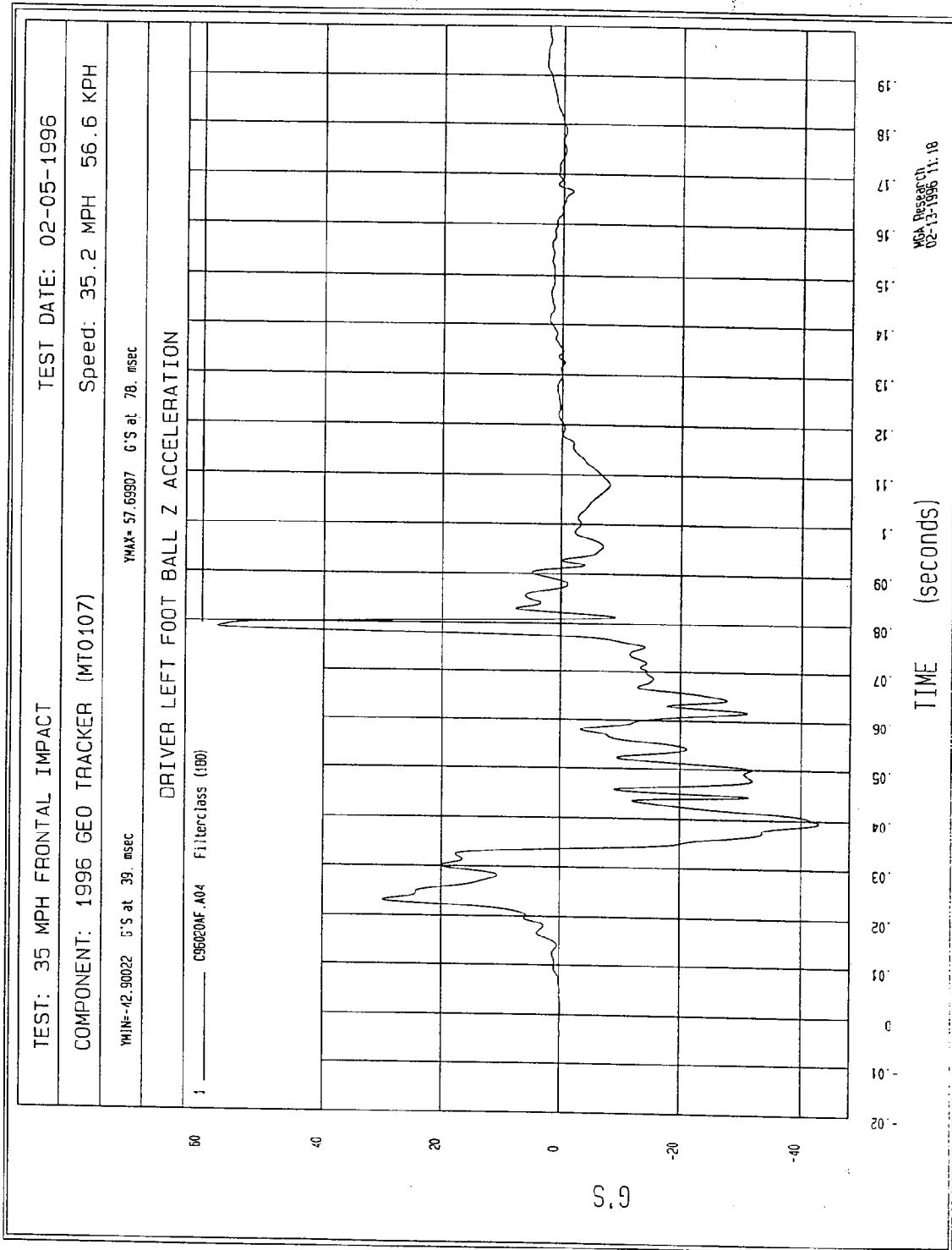


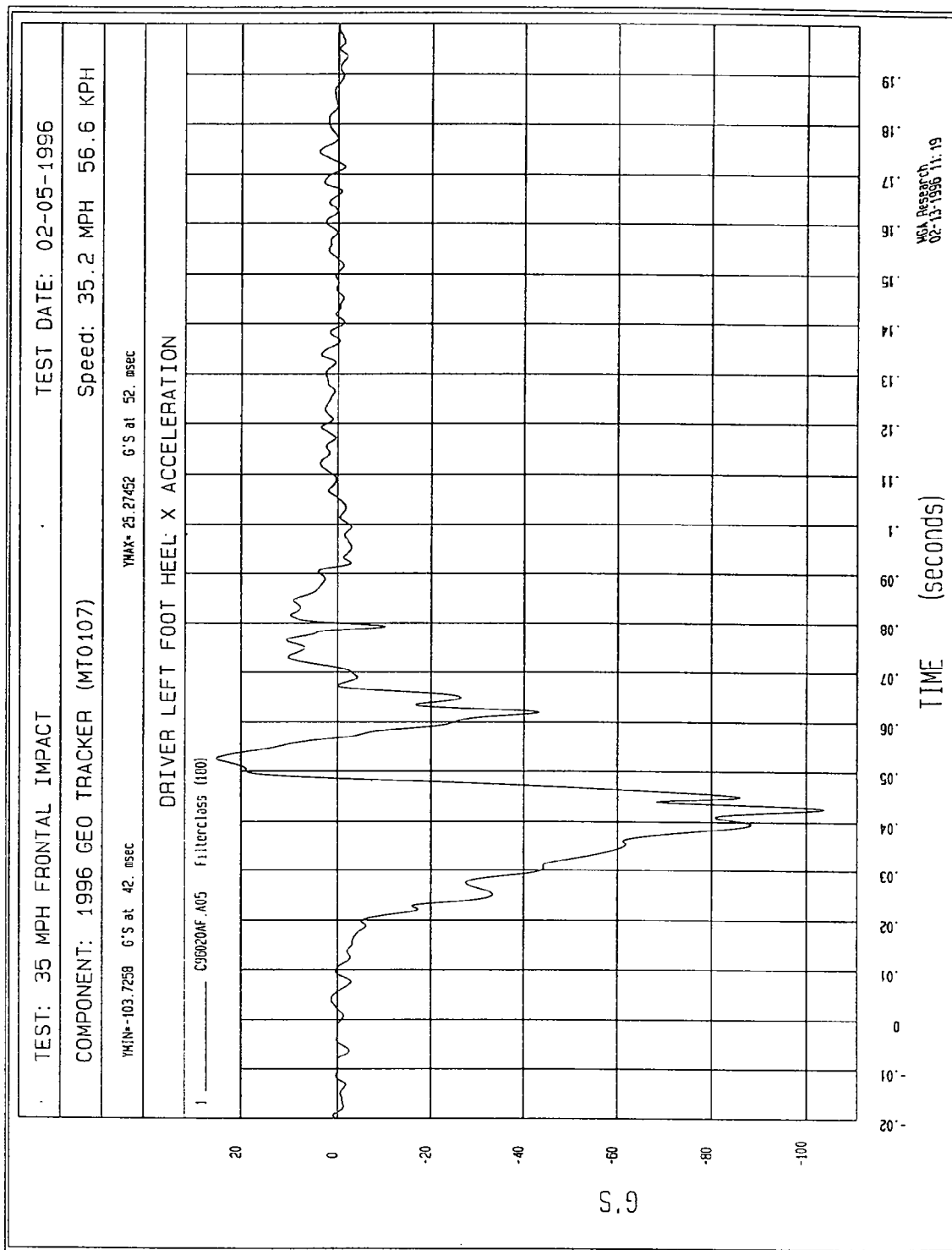


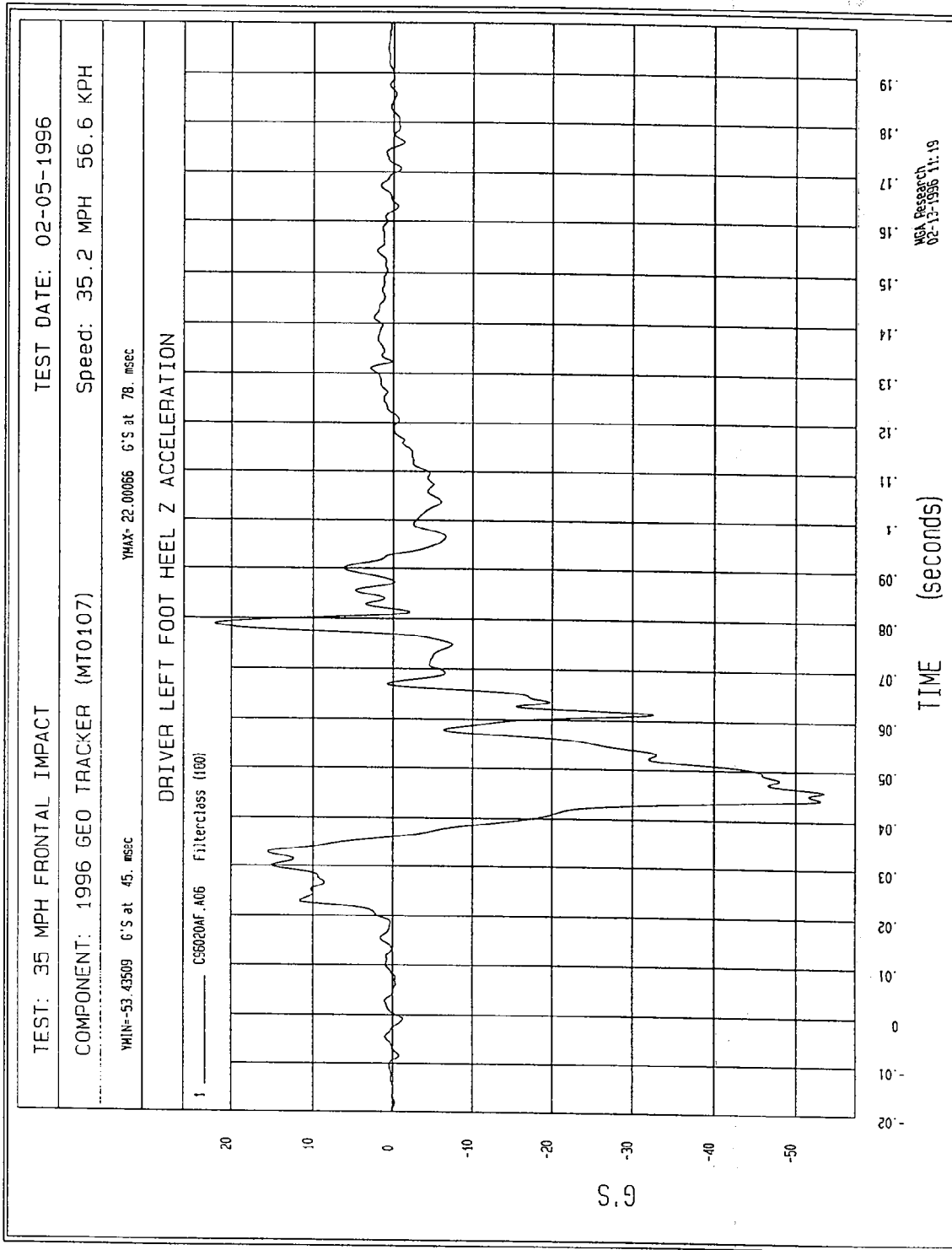
DRIVER RIGHT LOWER TIBIA MOMENT Y ACCELERATION VS. TIME

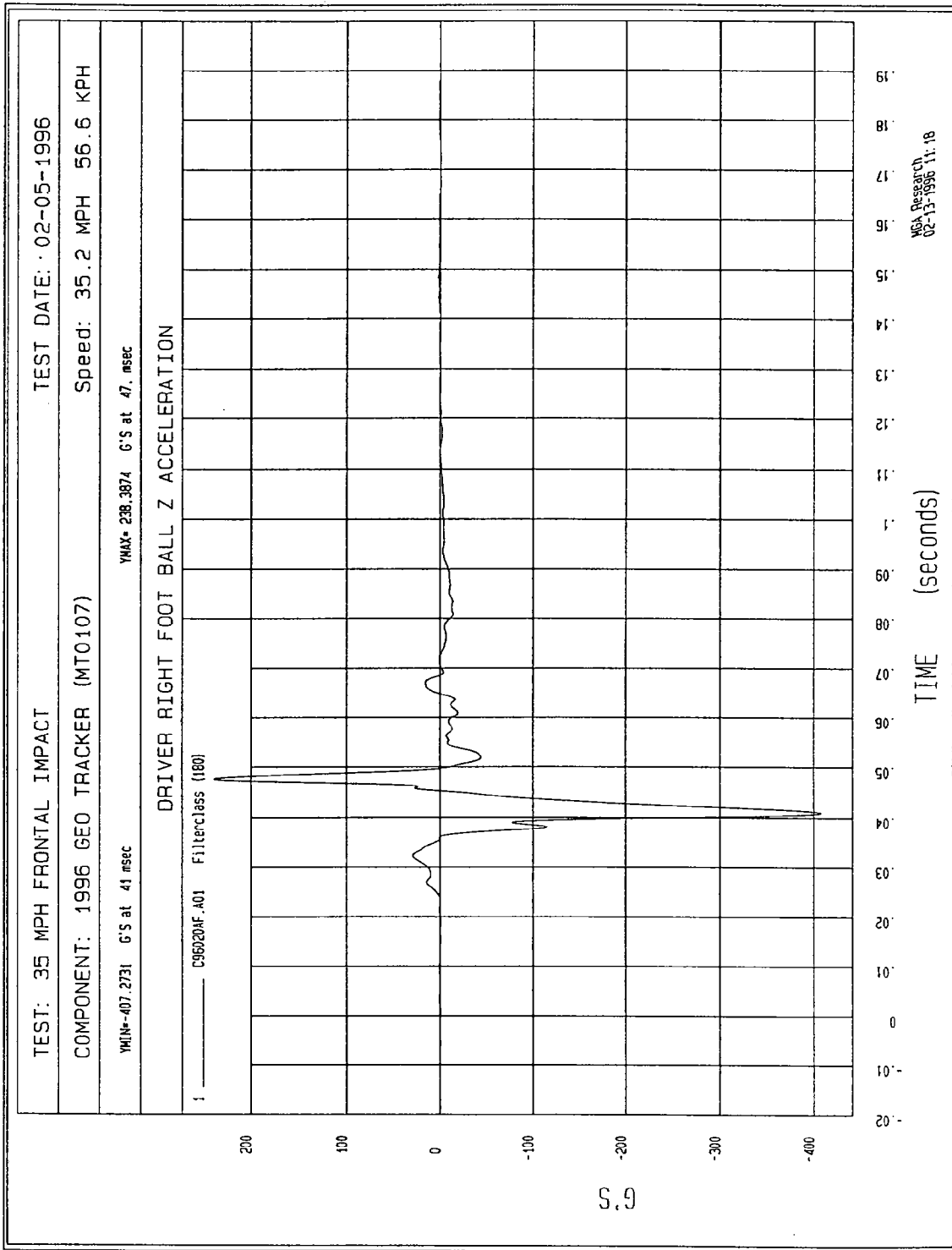
NO VALID DATA COLLECTED

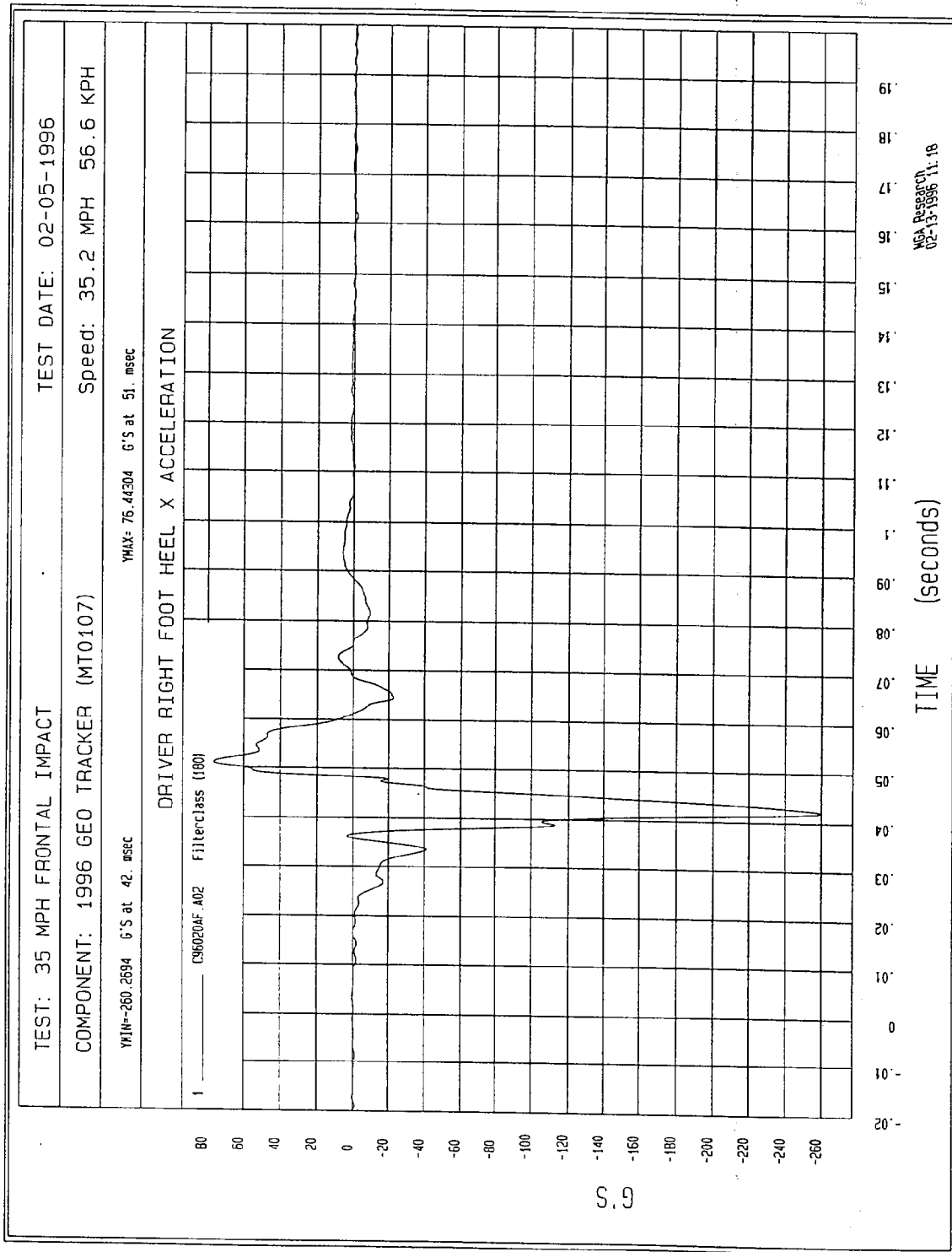










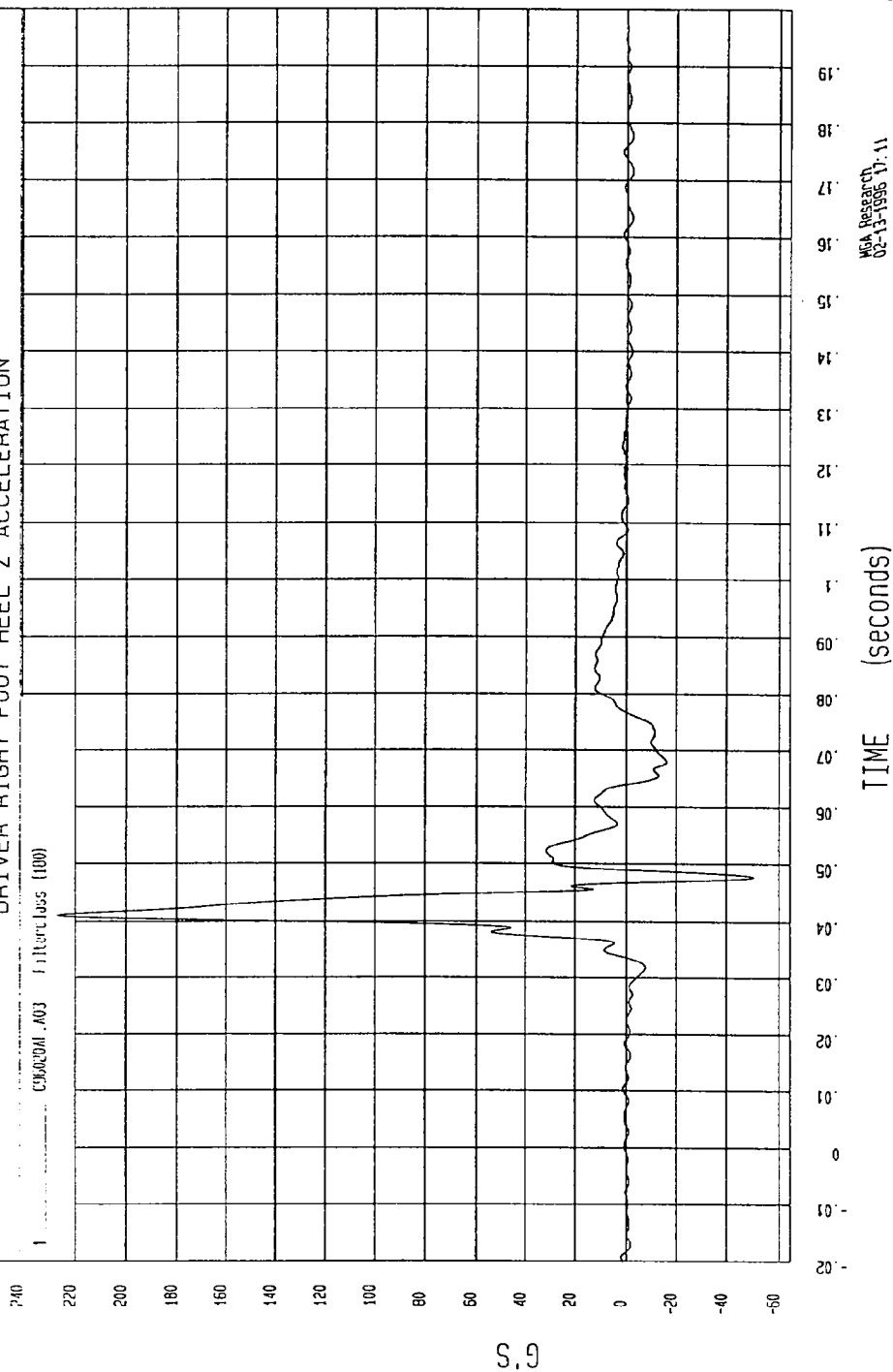


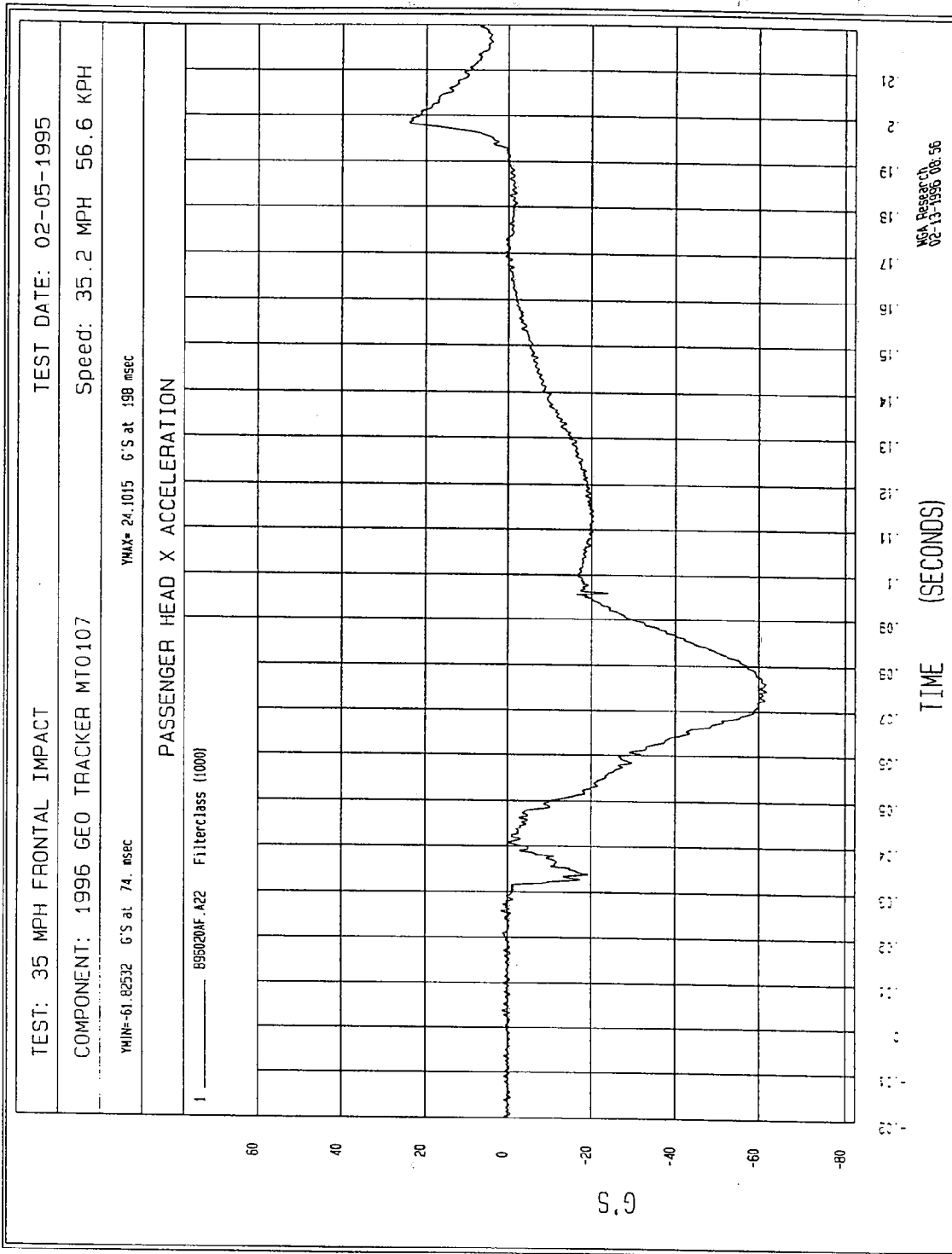
TEST DATE: 02-05-1996

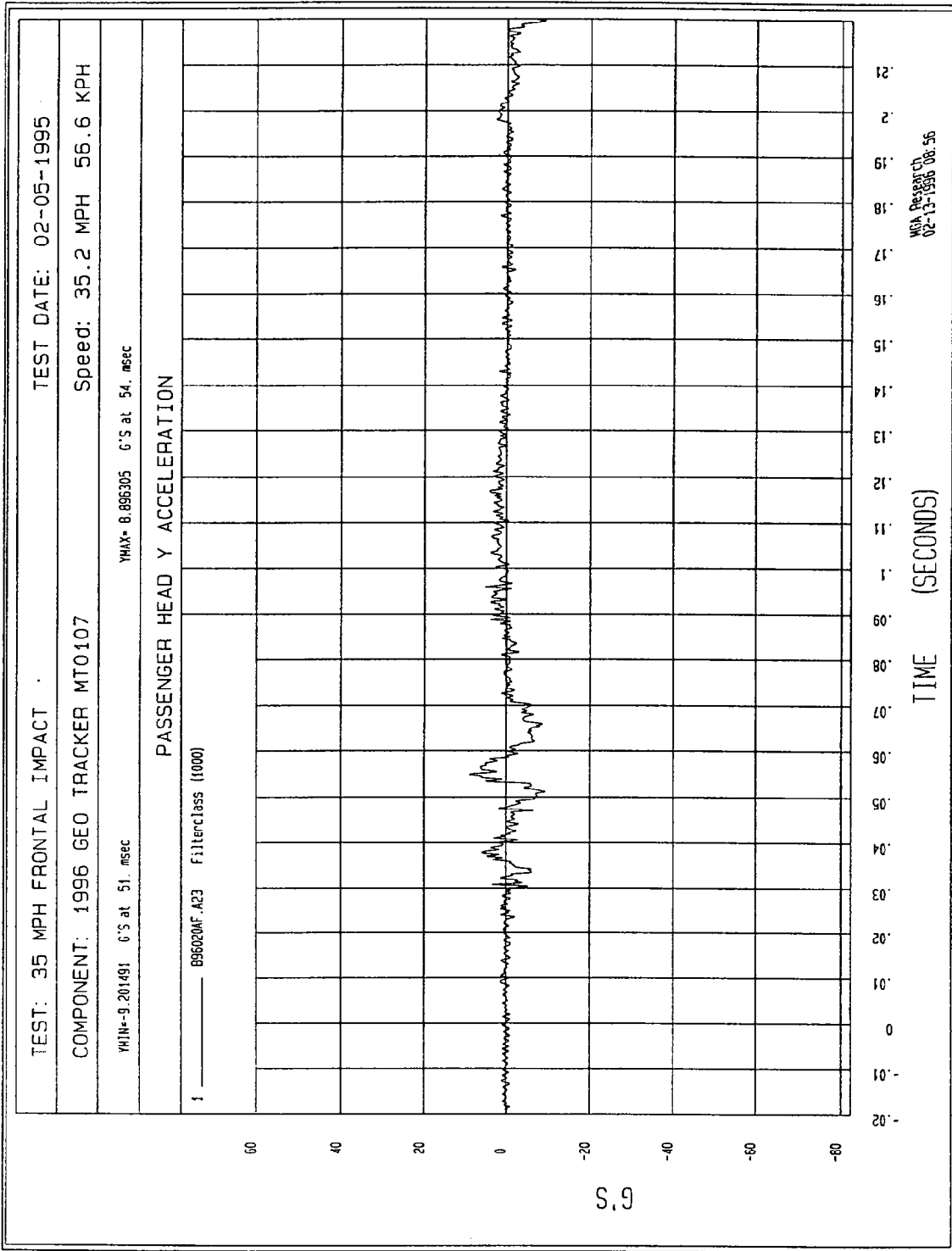
Speed: 35.2 MPH 56.6 KPH

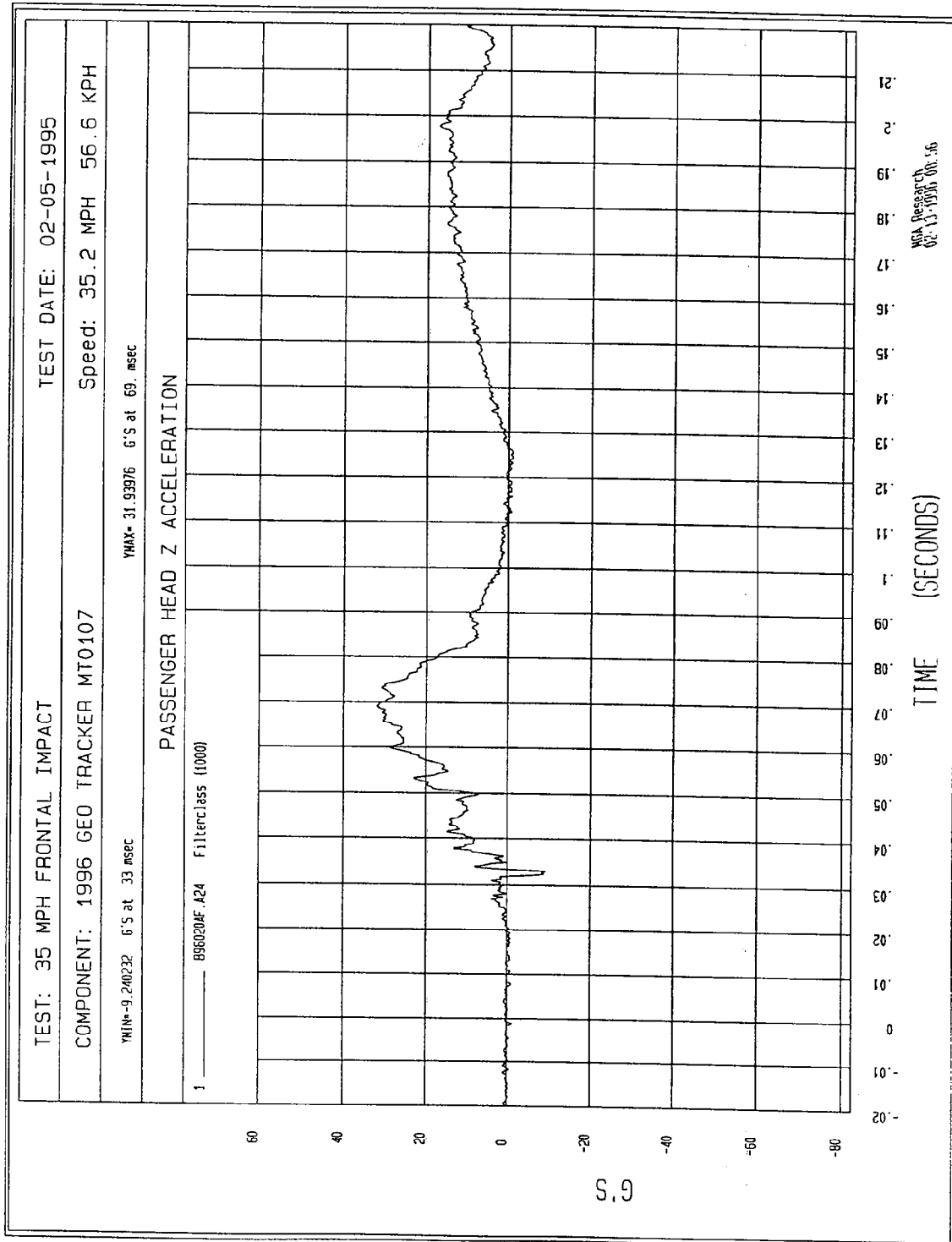
YMAX= 227.0341 G'S at 41 msec

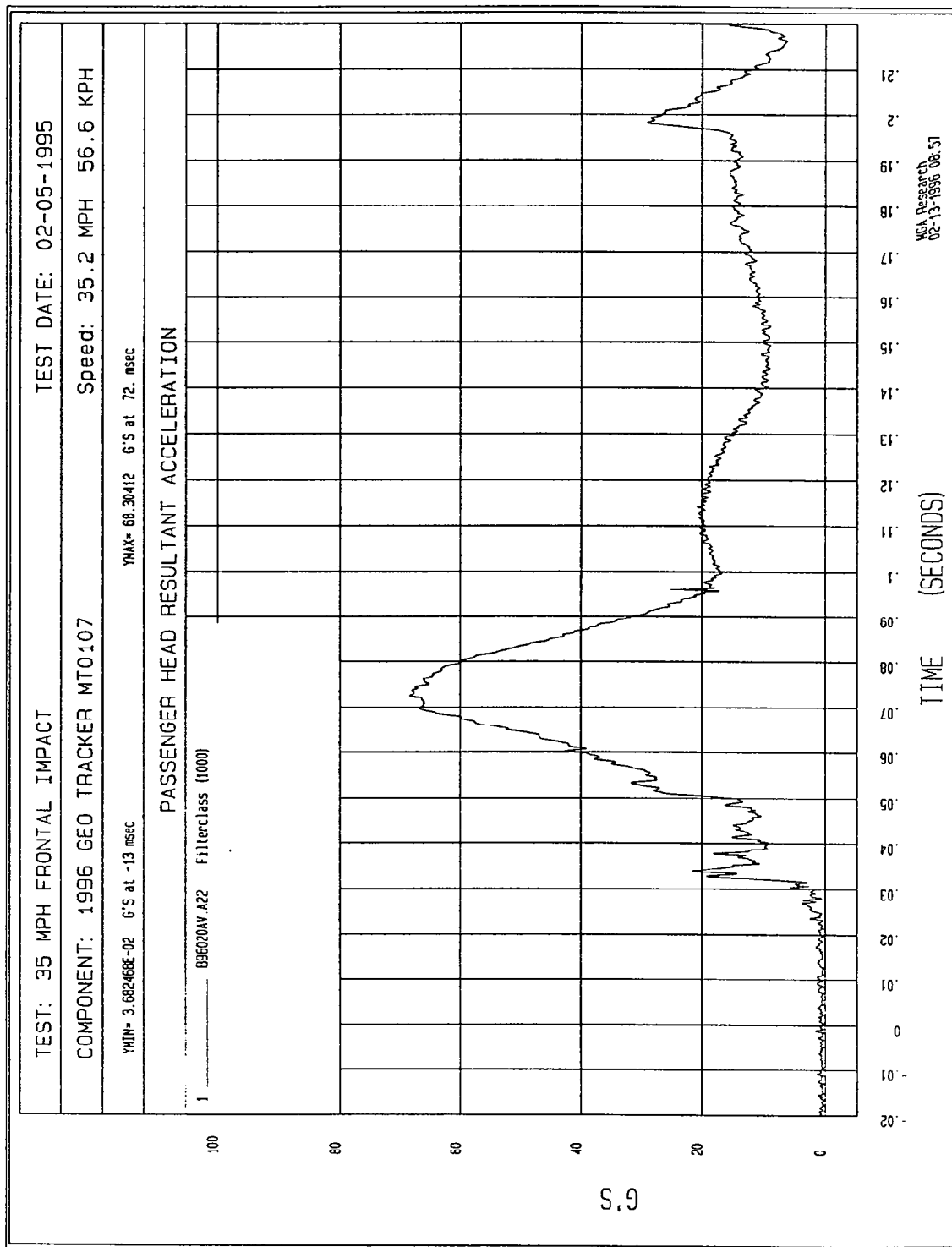
DRIVER RIGHT FOOT HEEL Z ACCELERATION

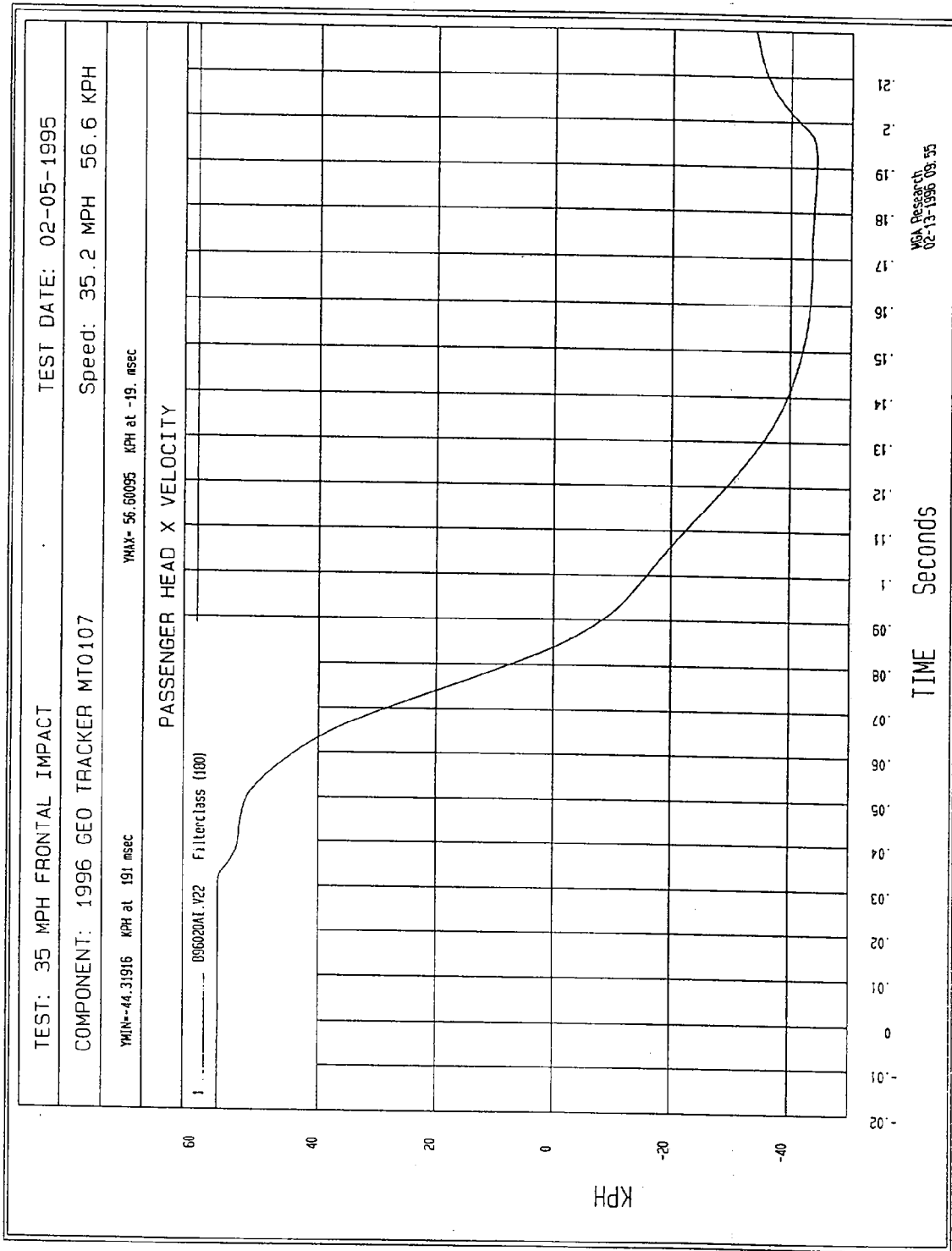


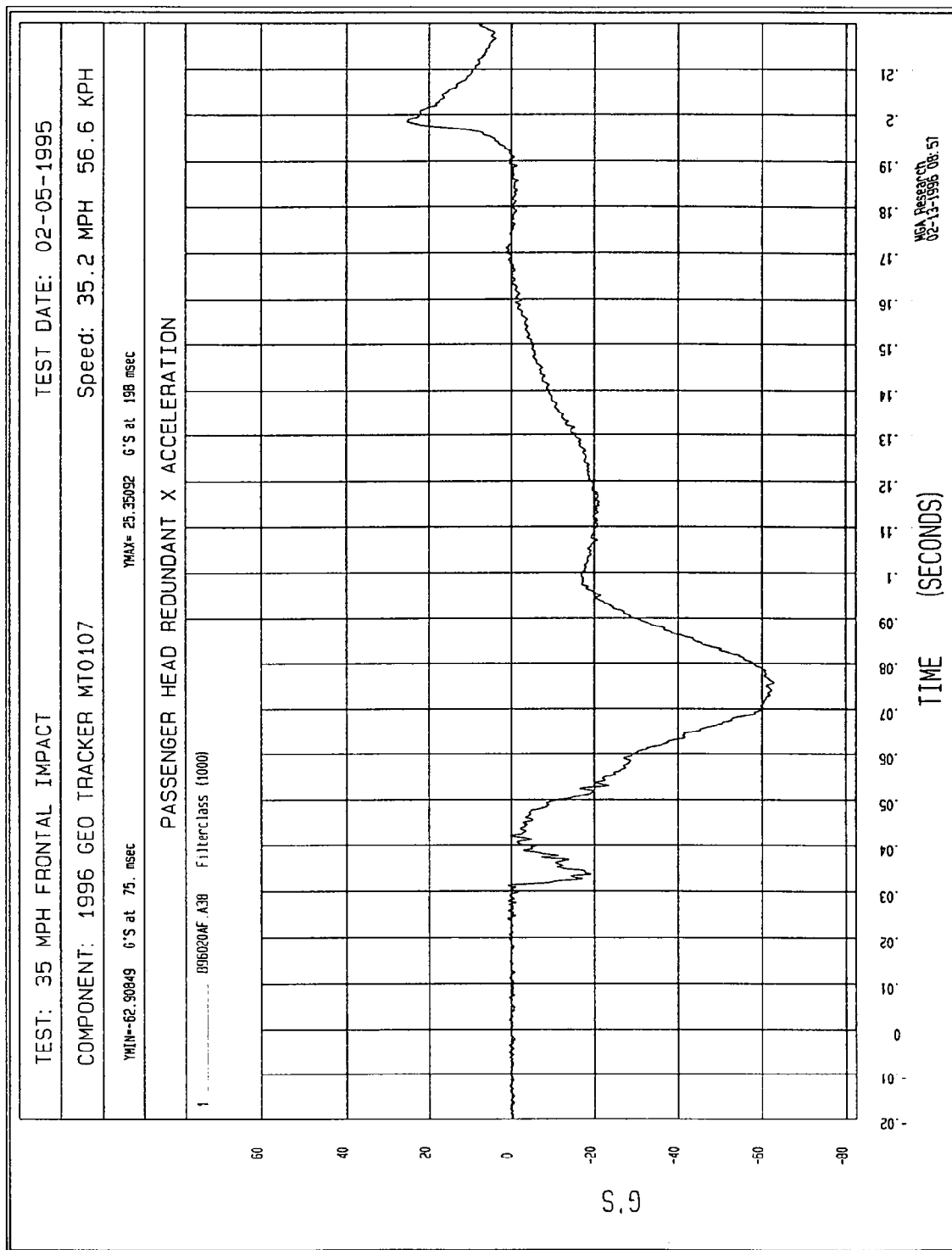


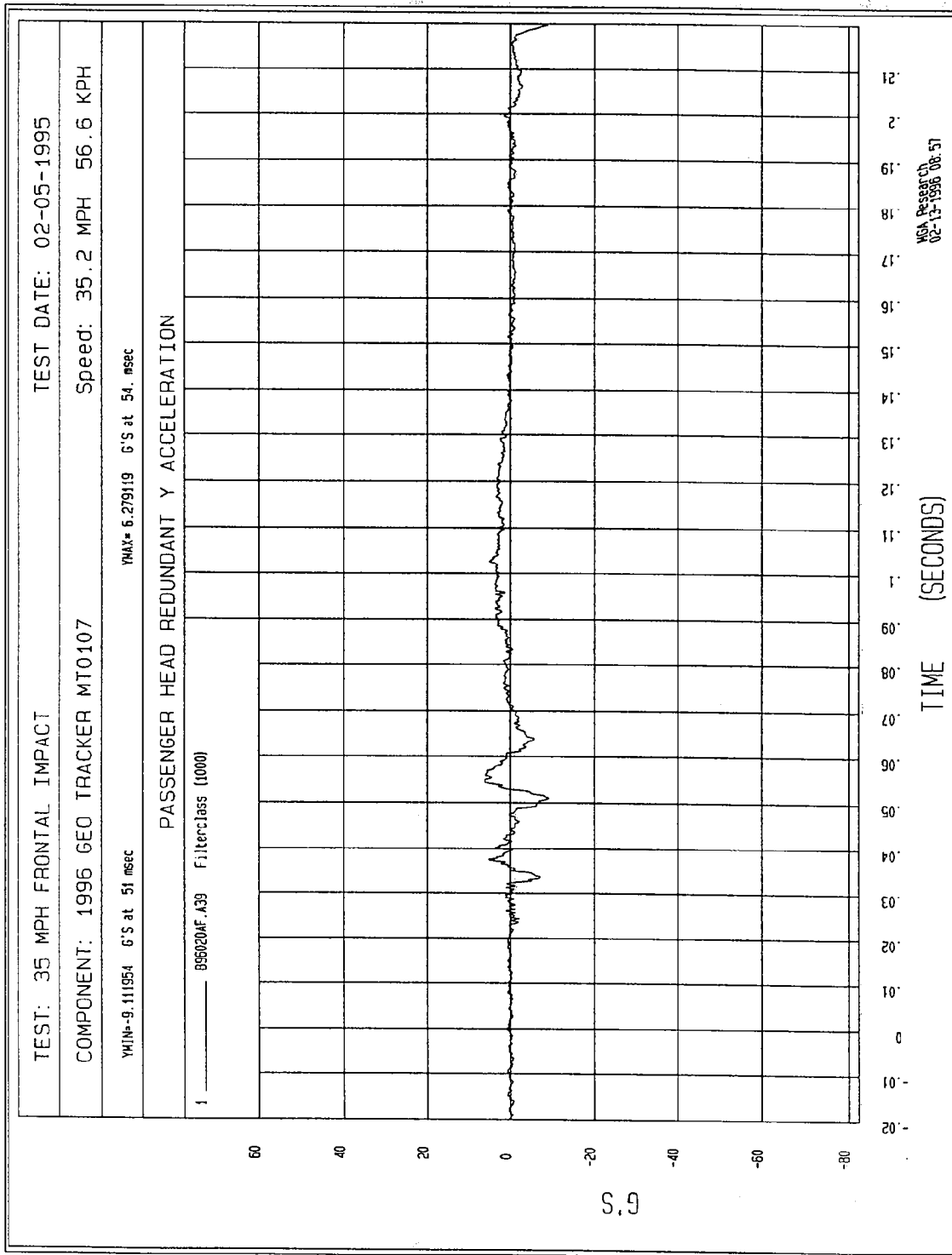


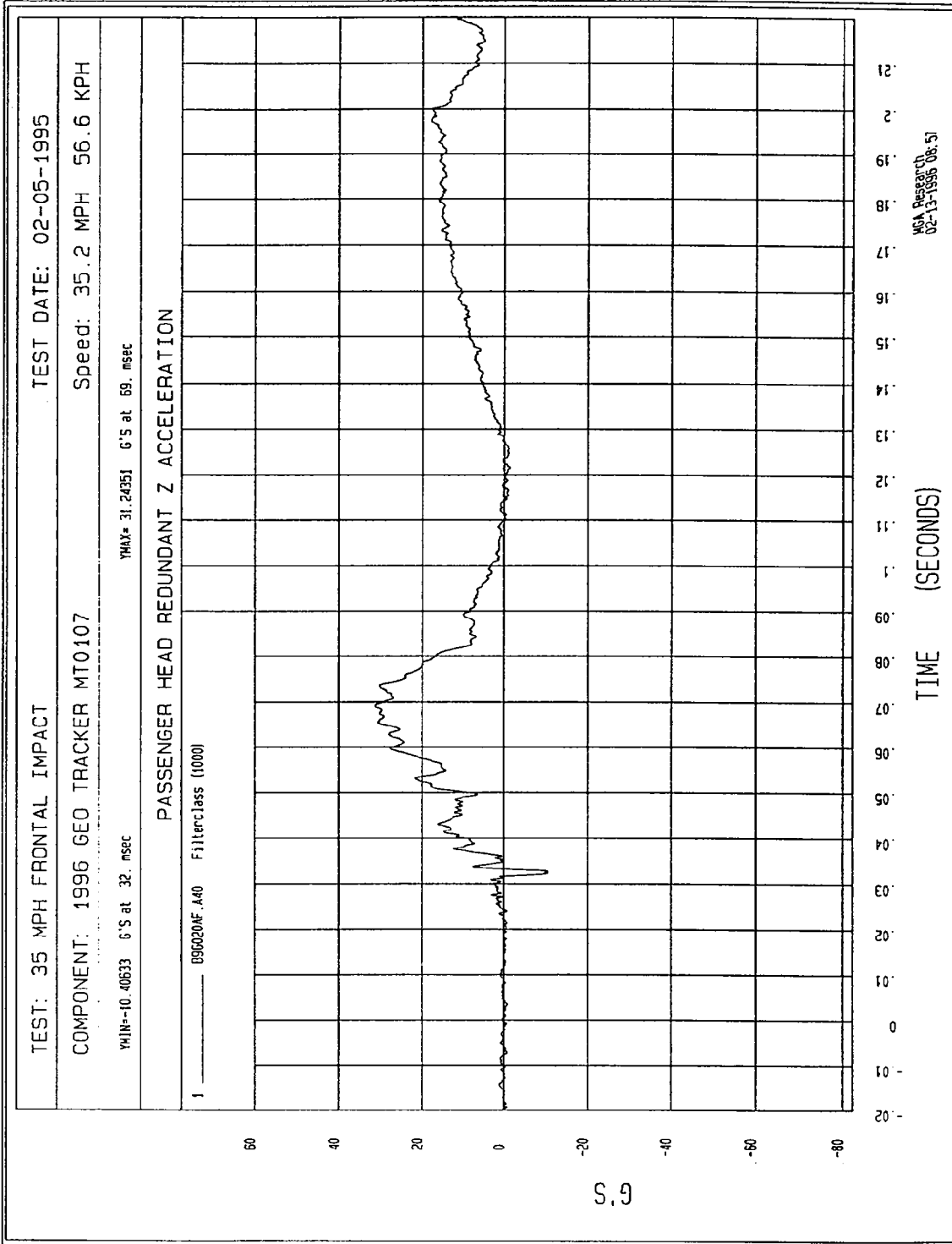


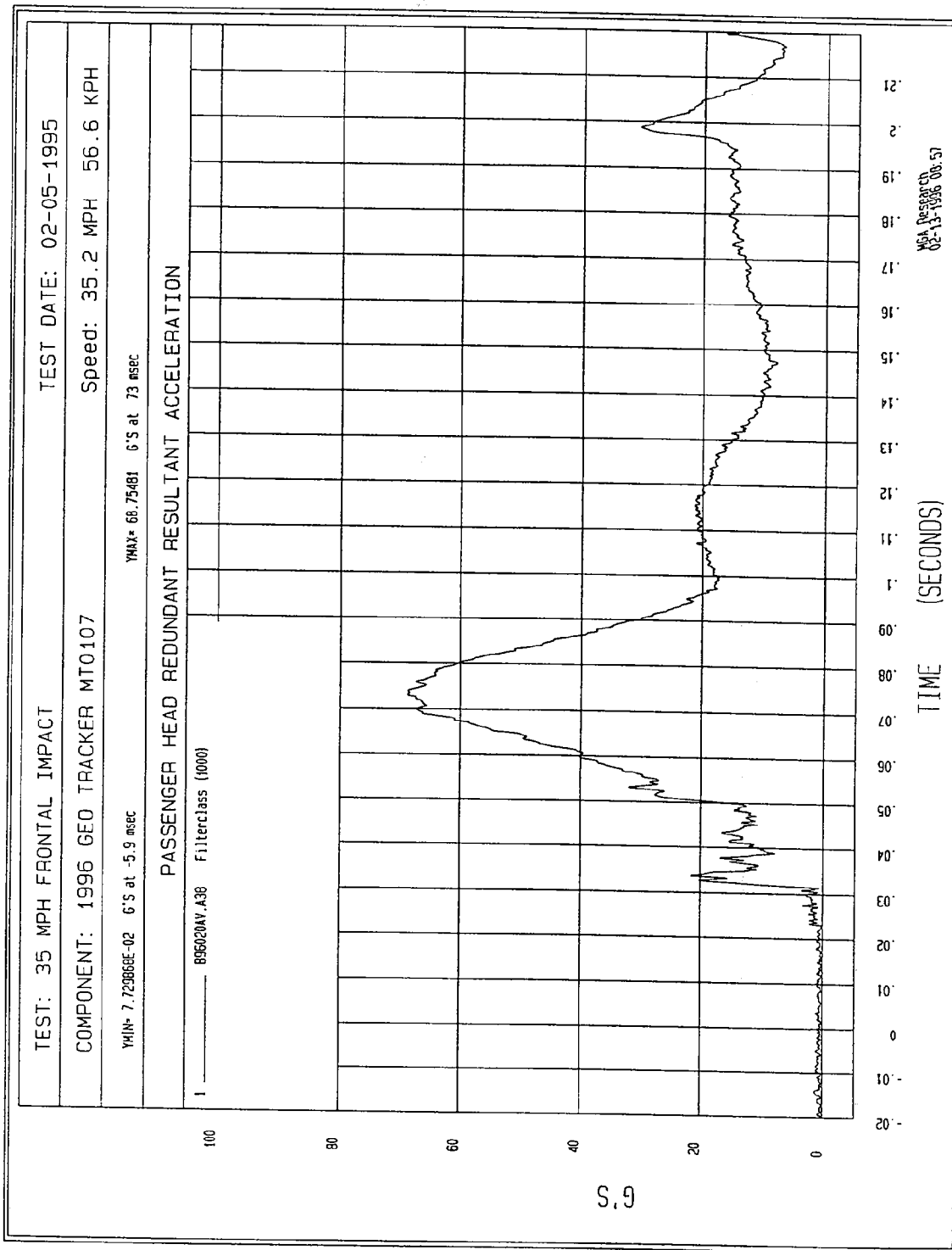


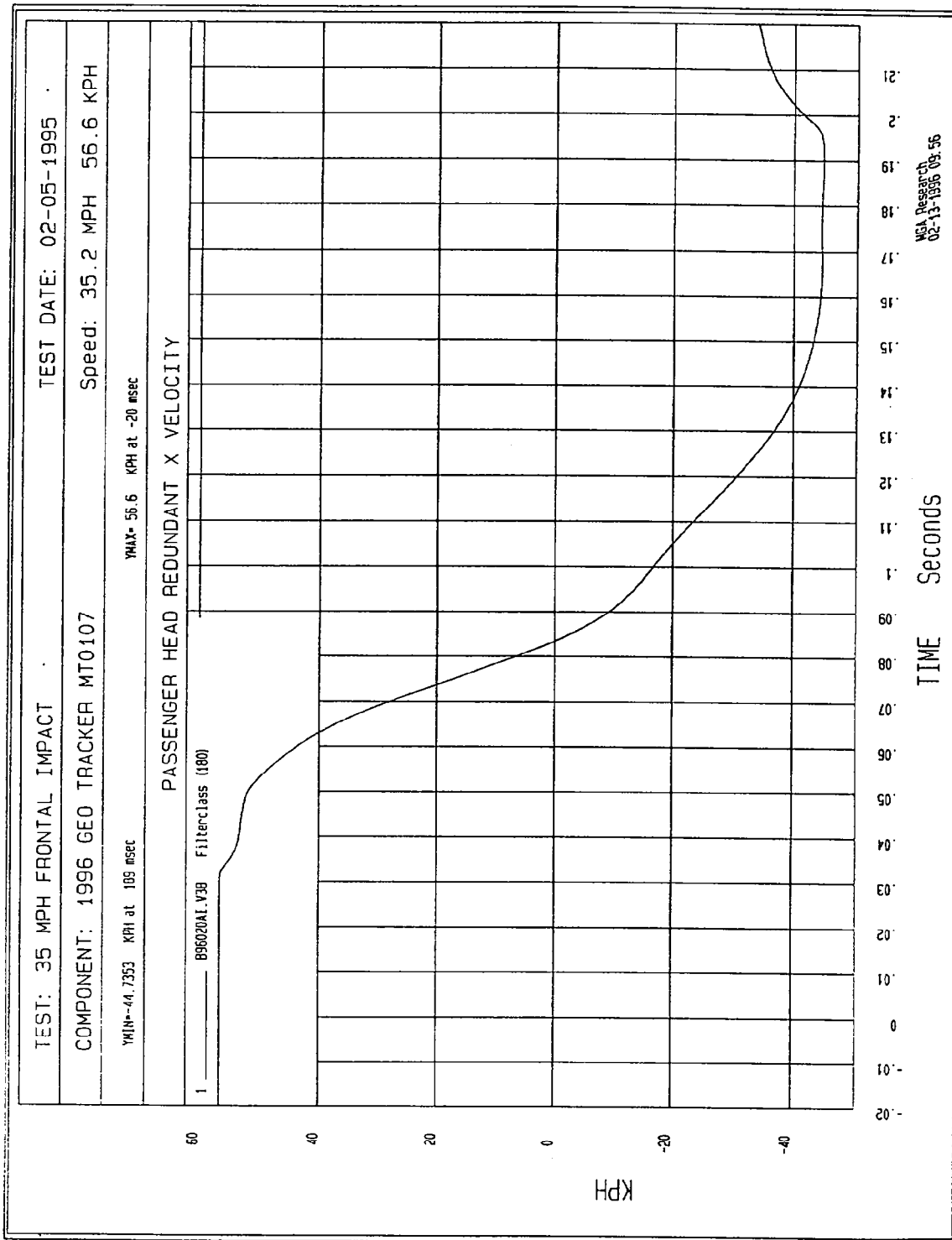


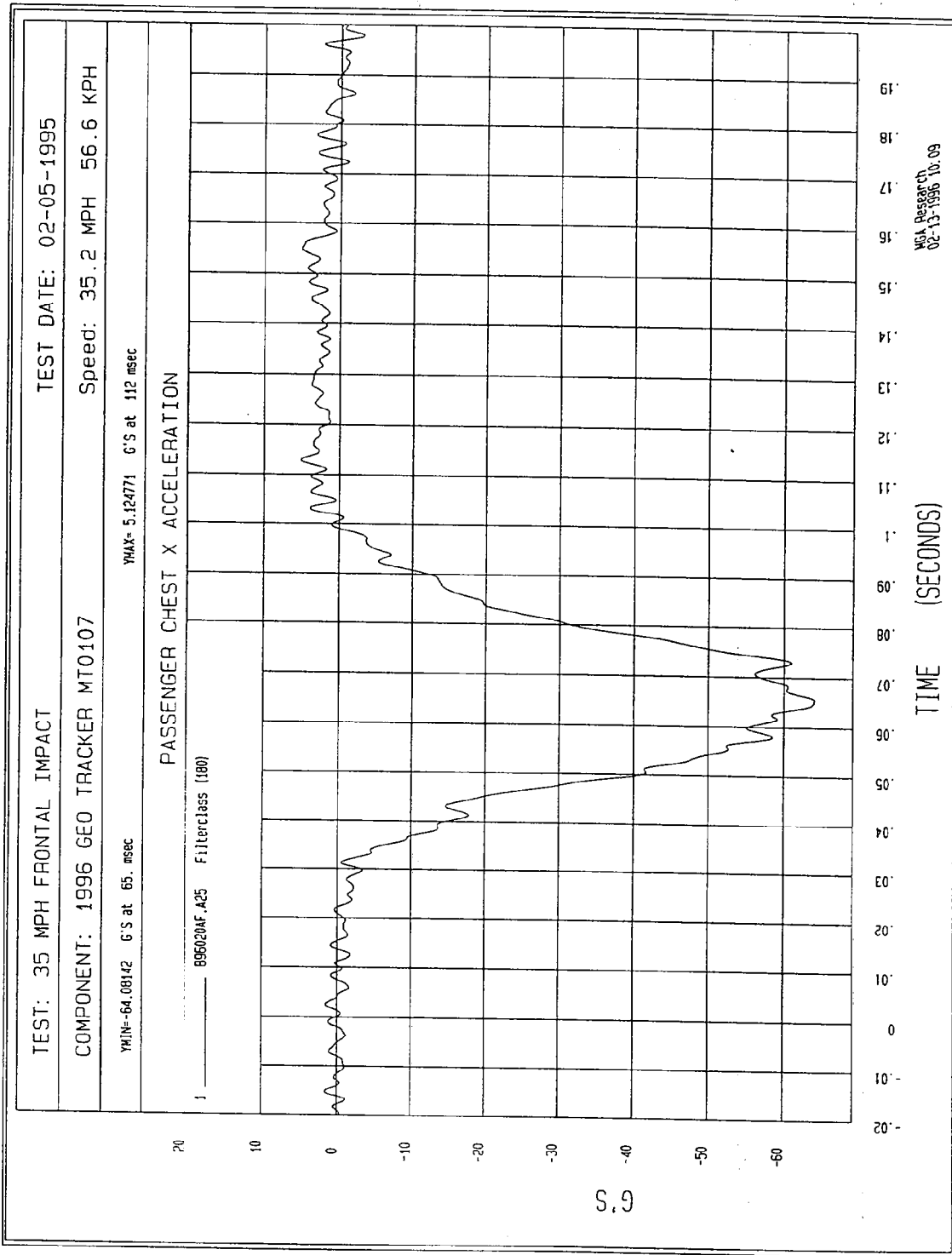


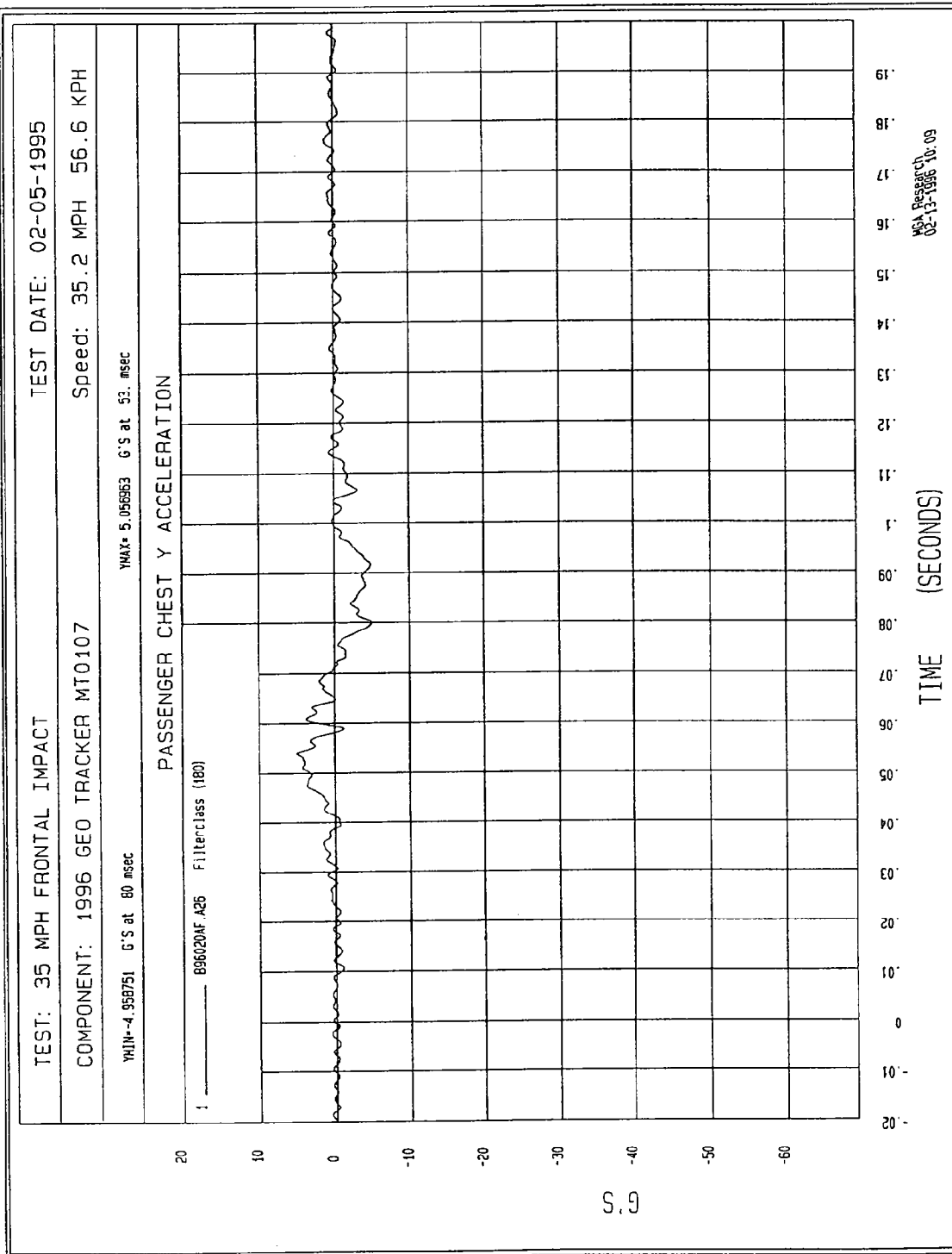


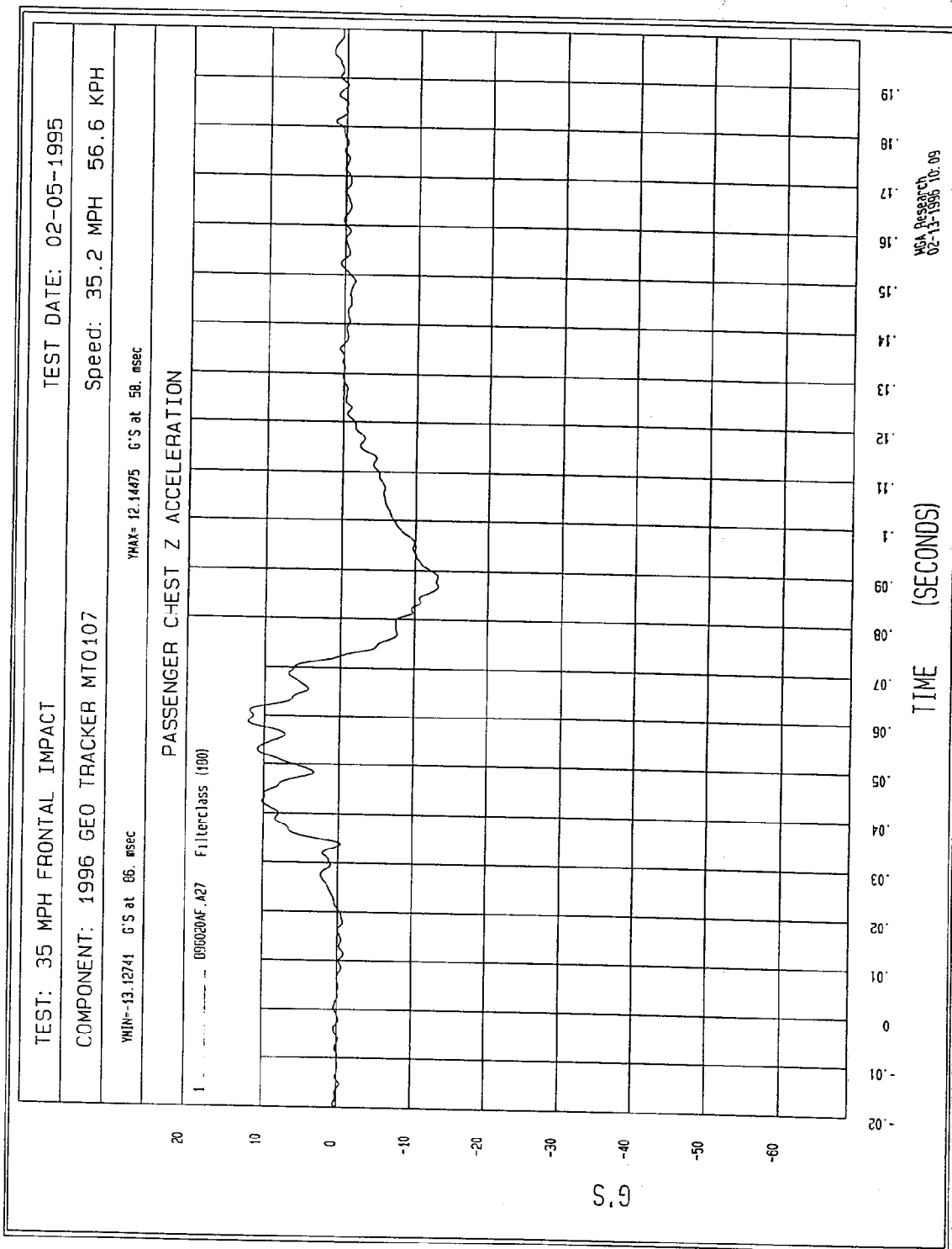


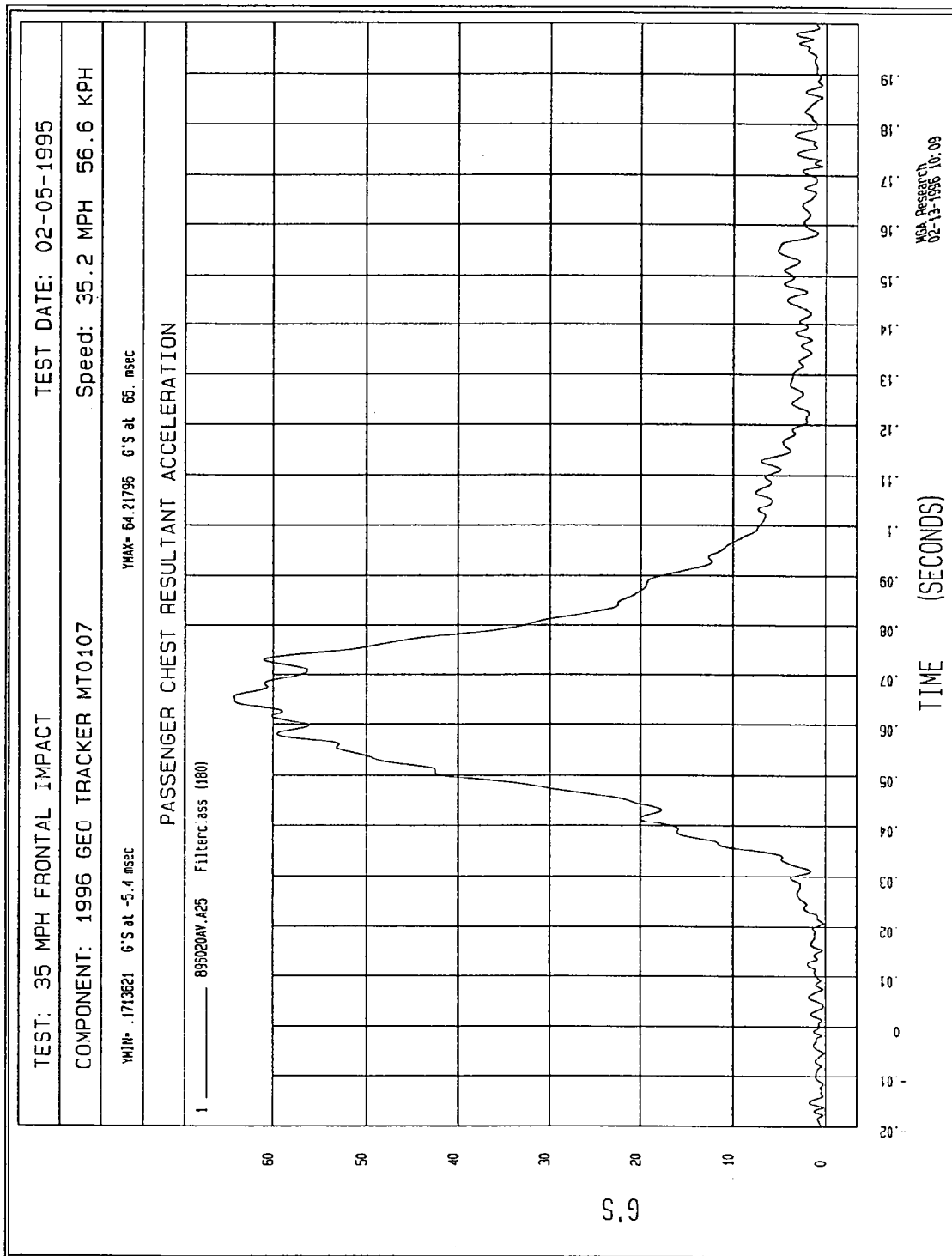


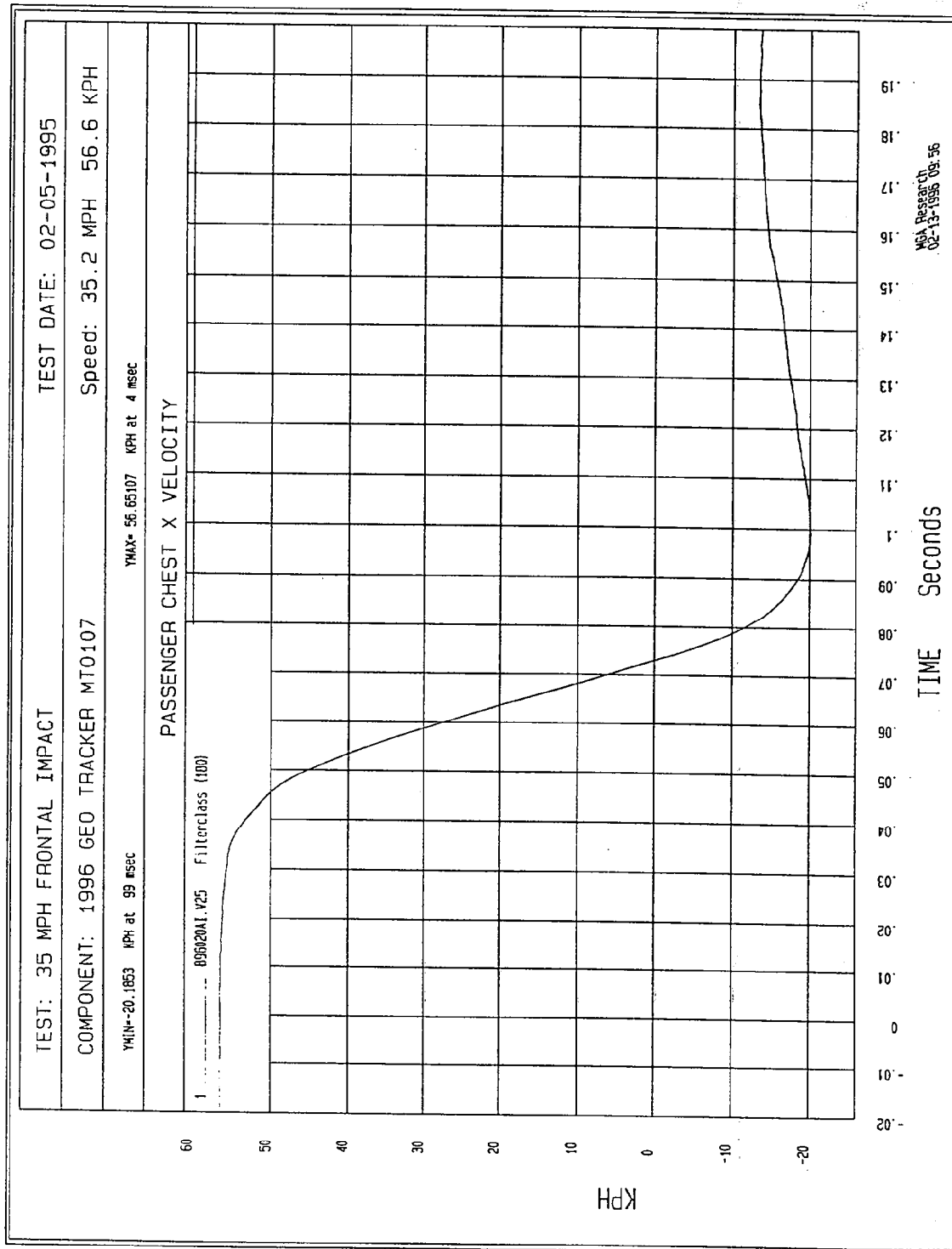


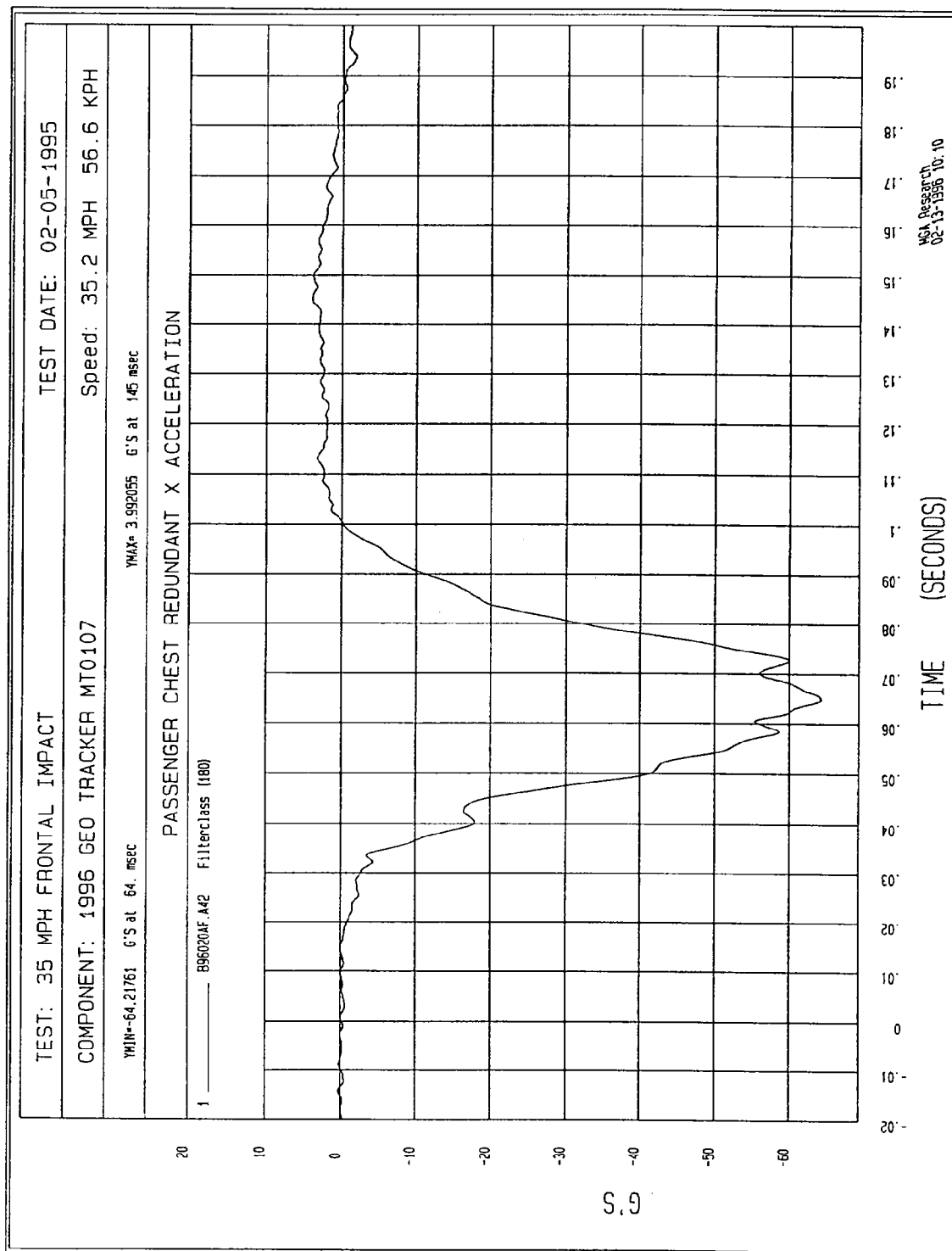


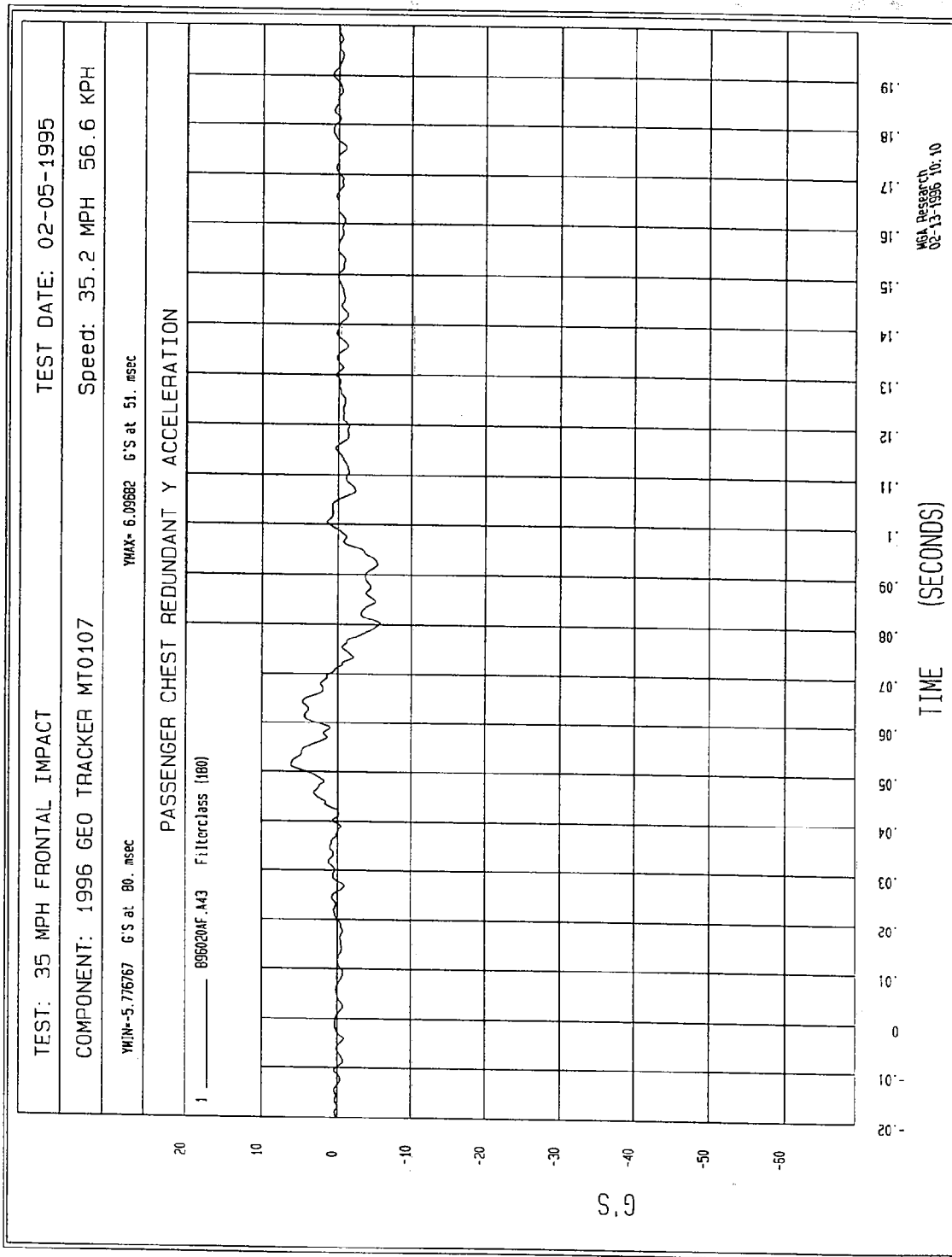


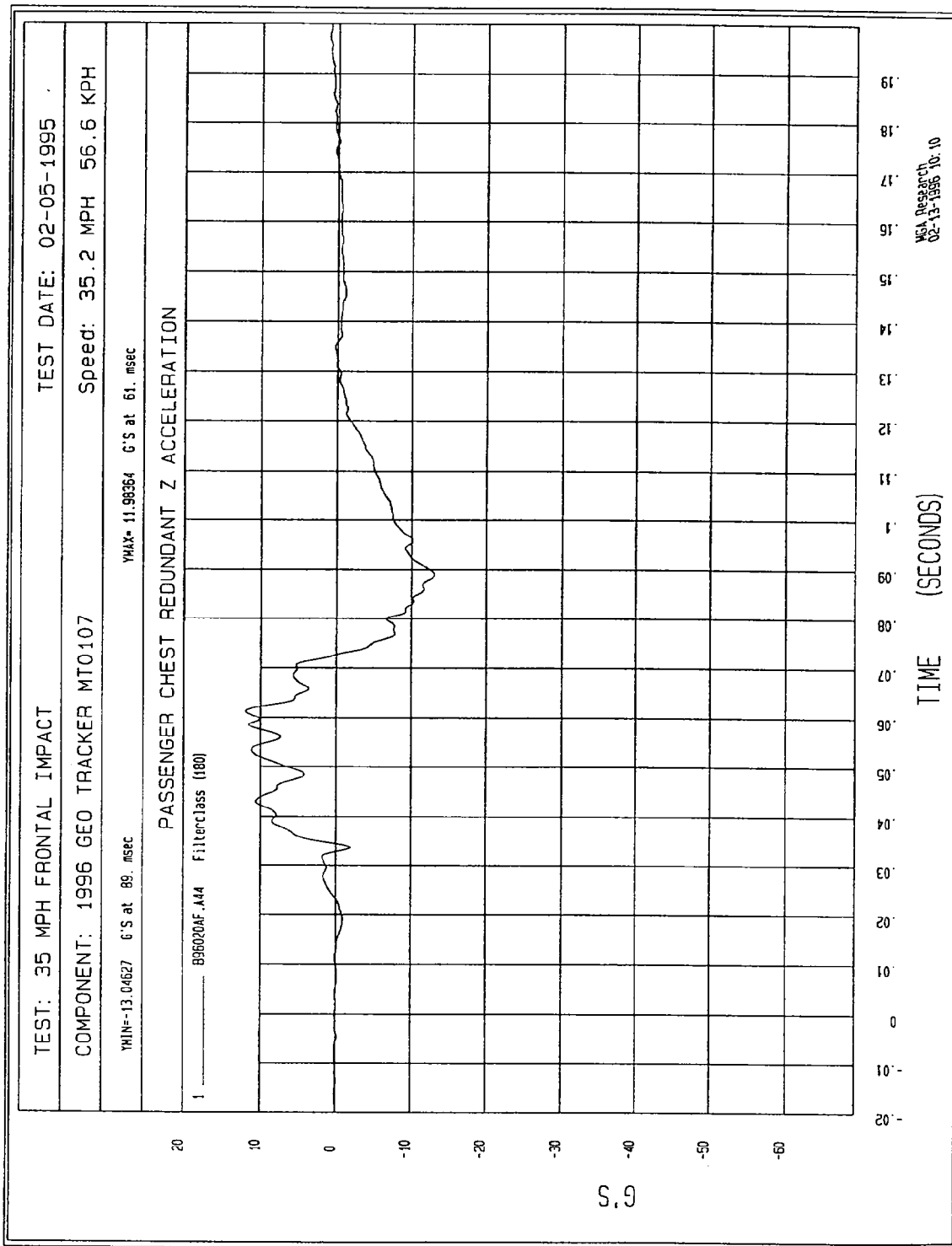


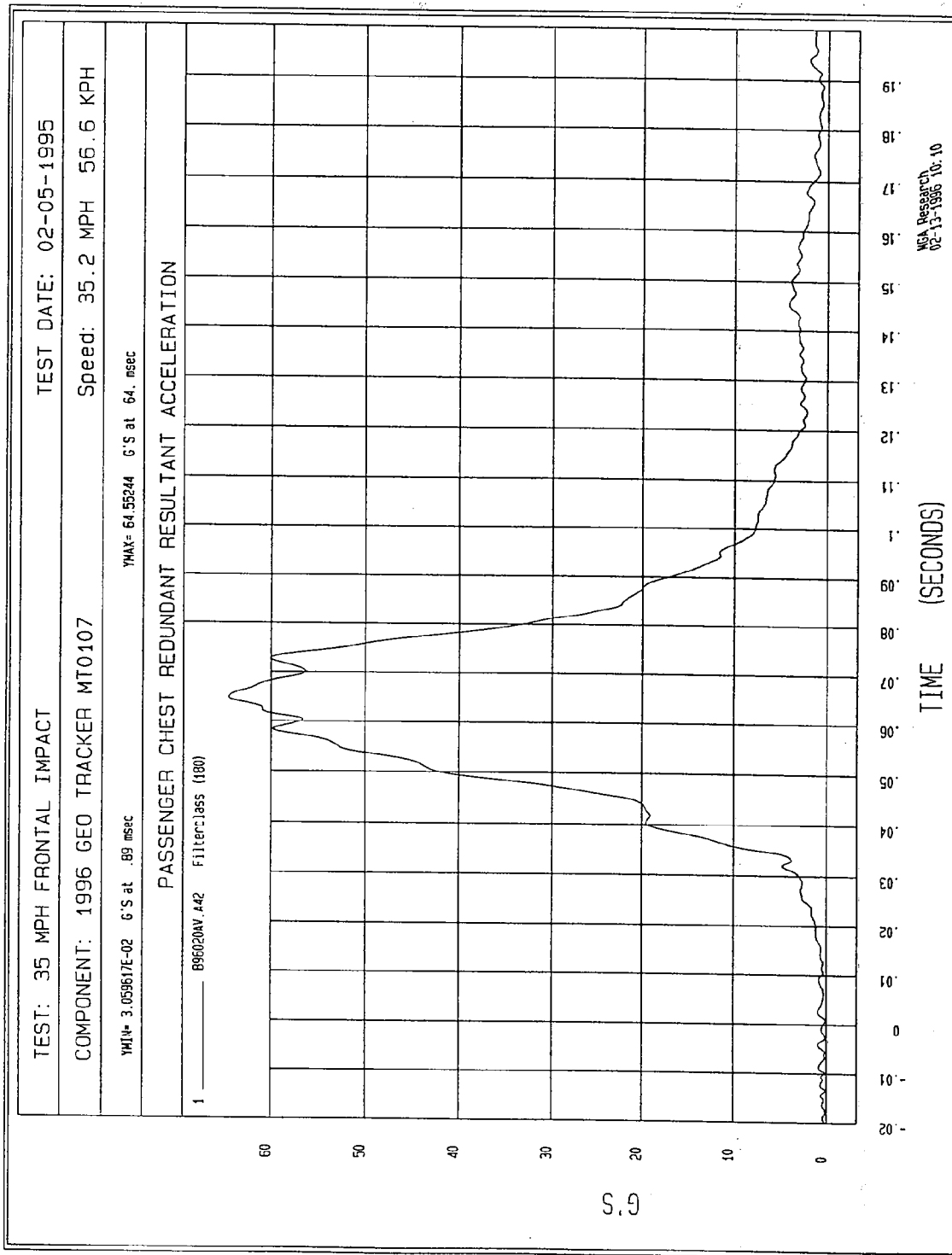


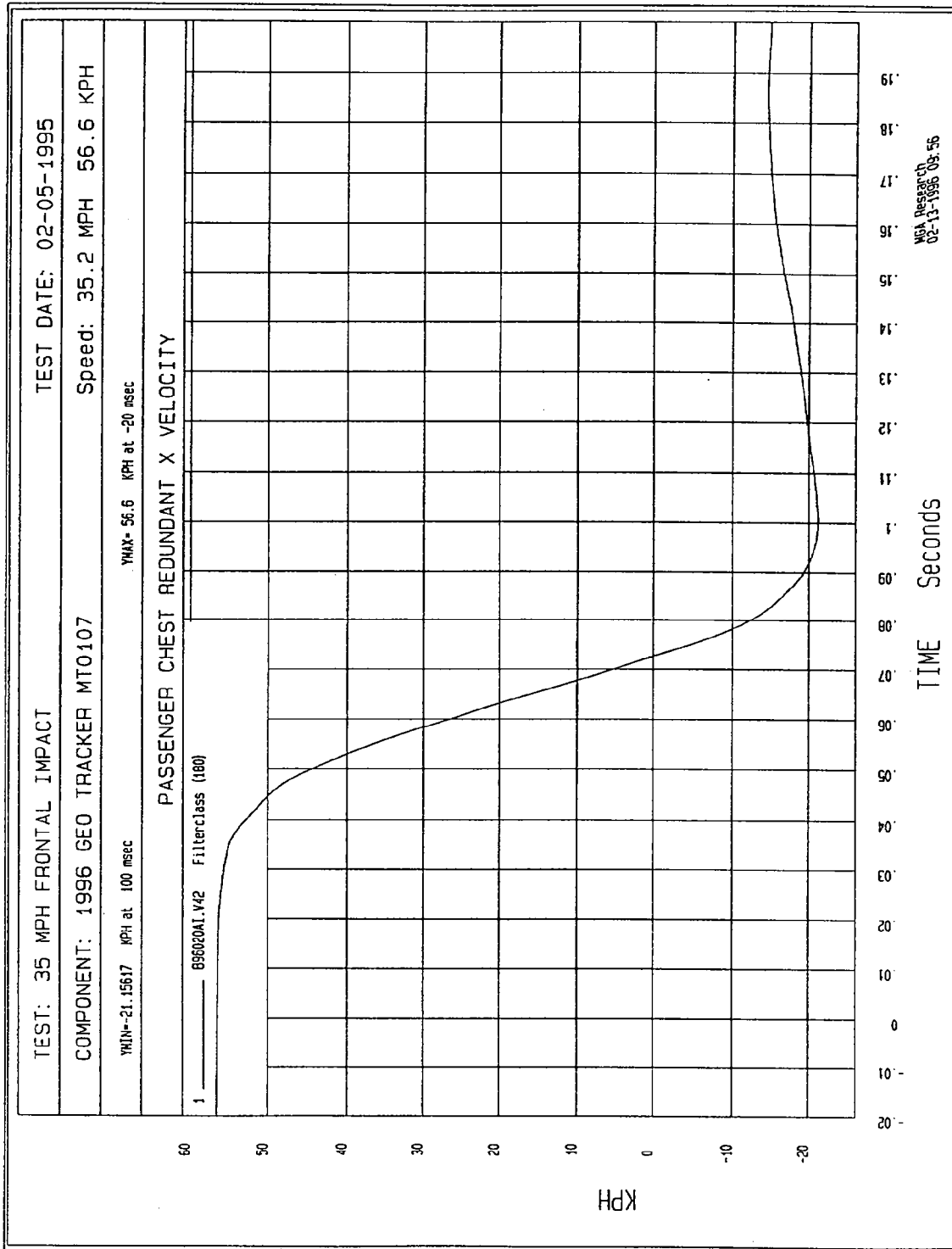


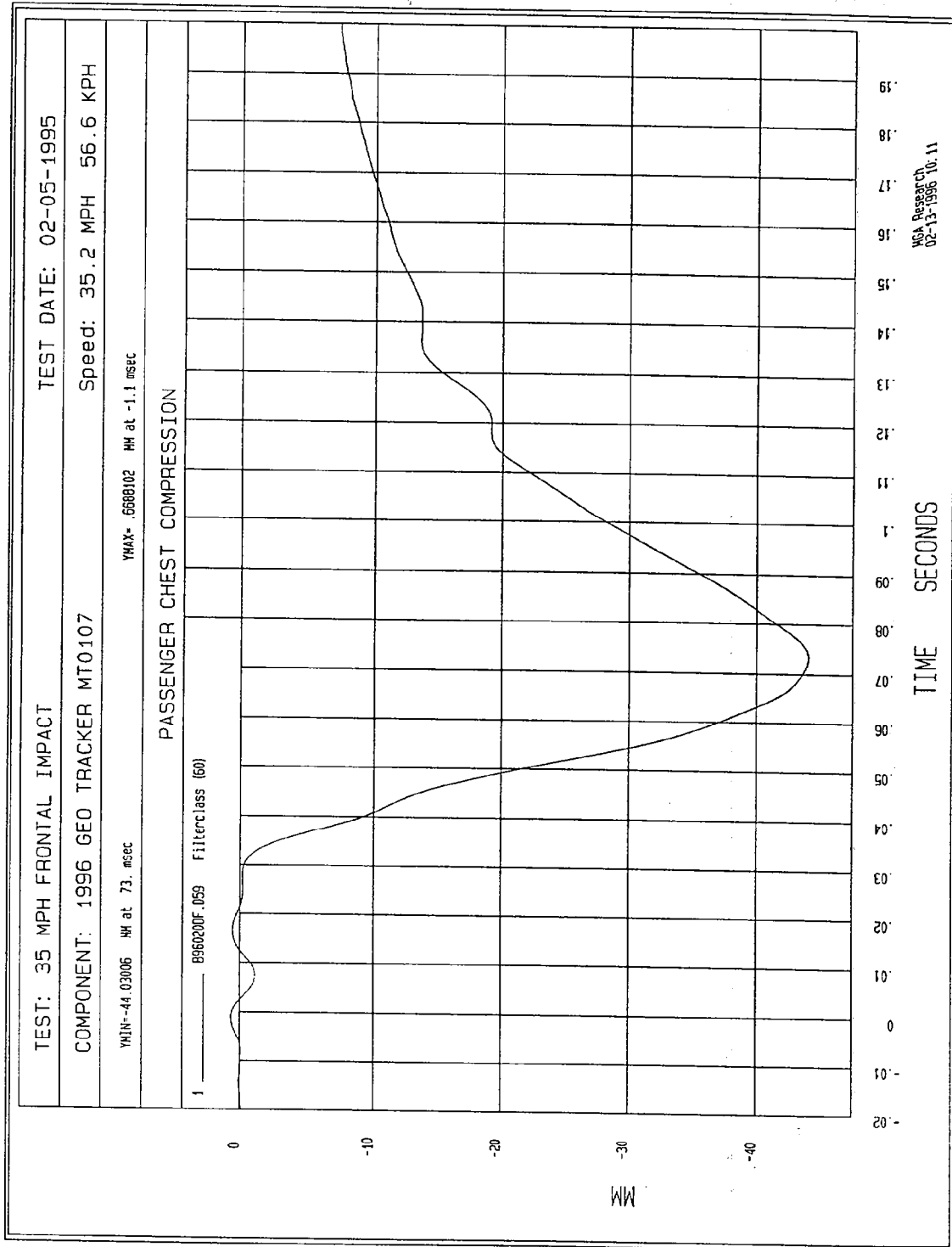


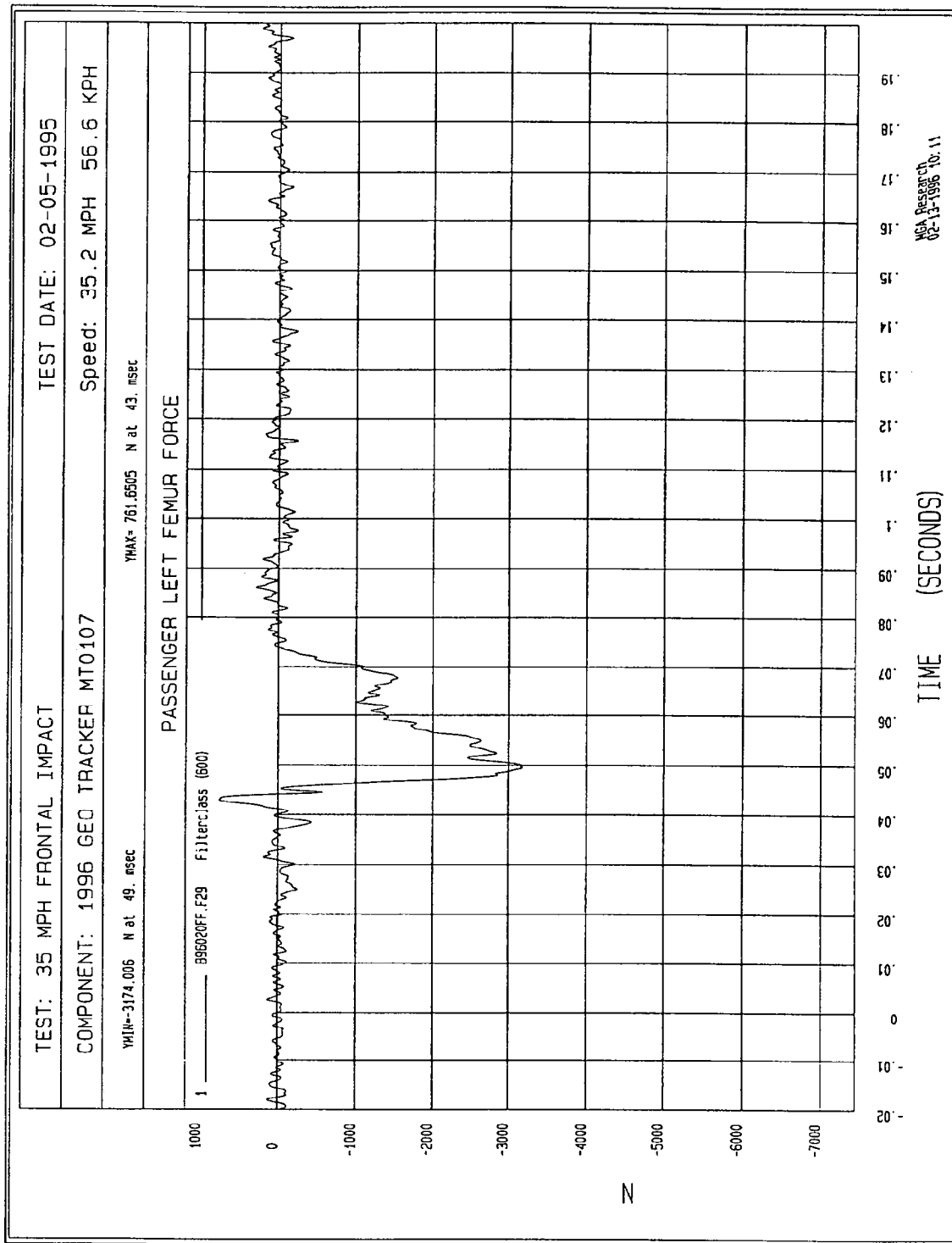


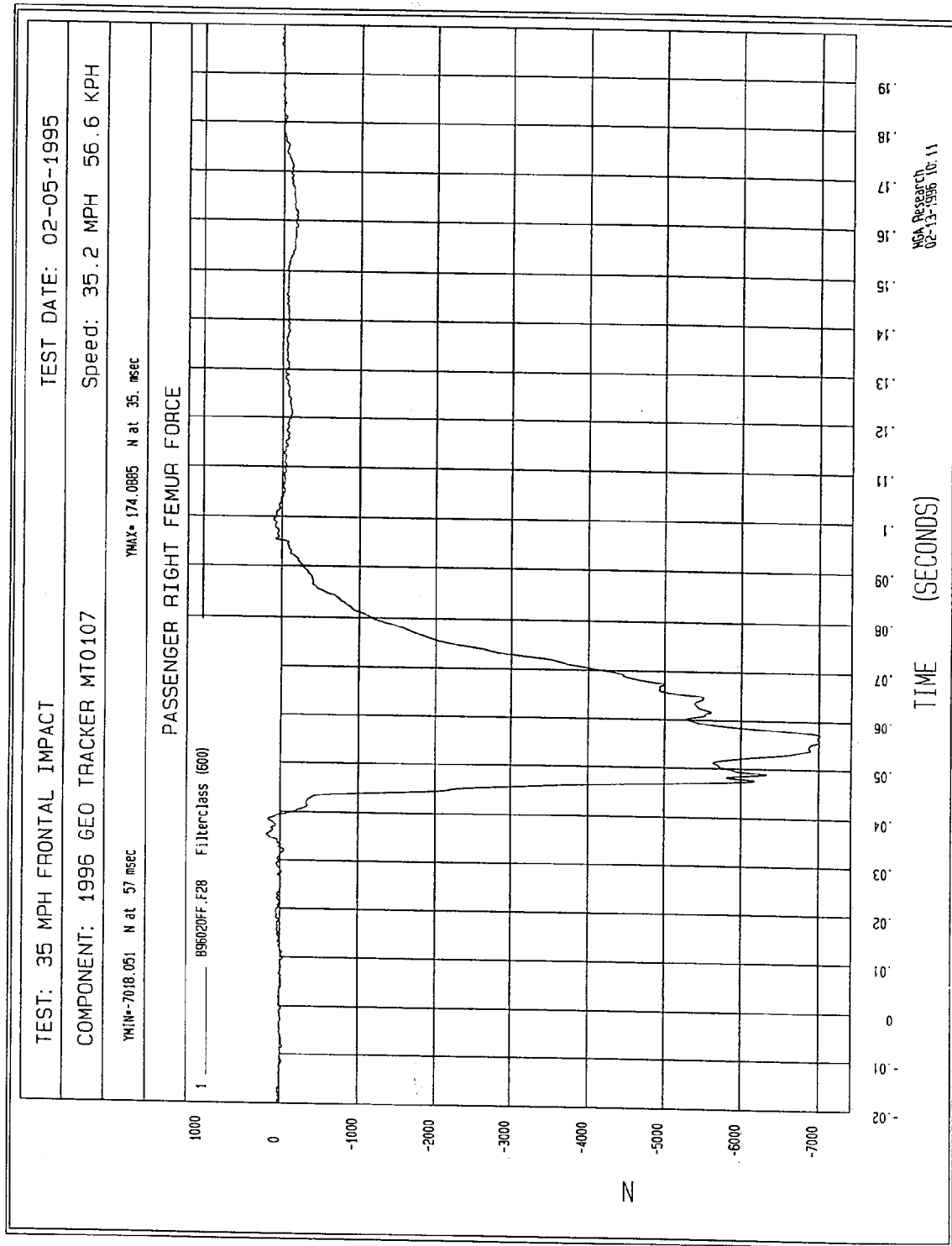


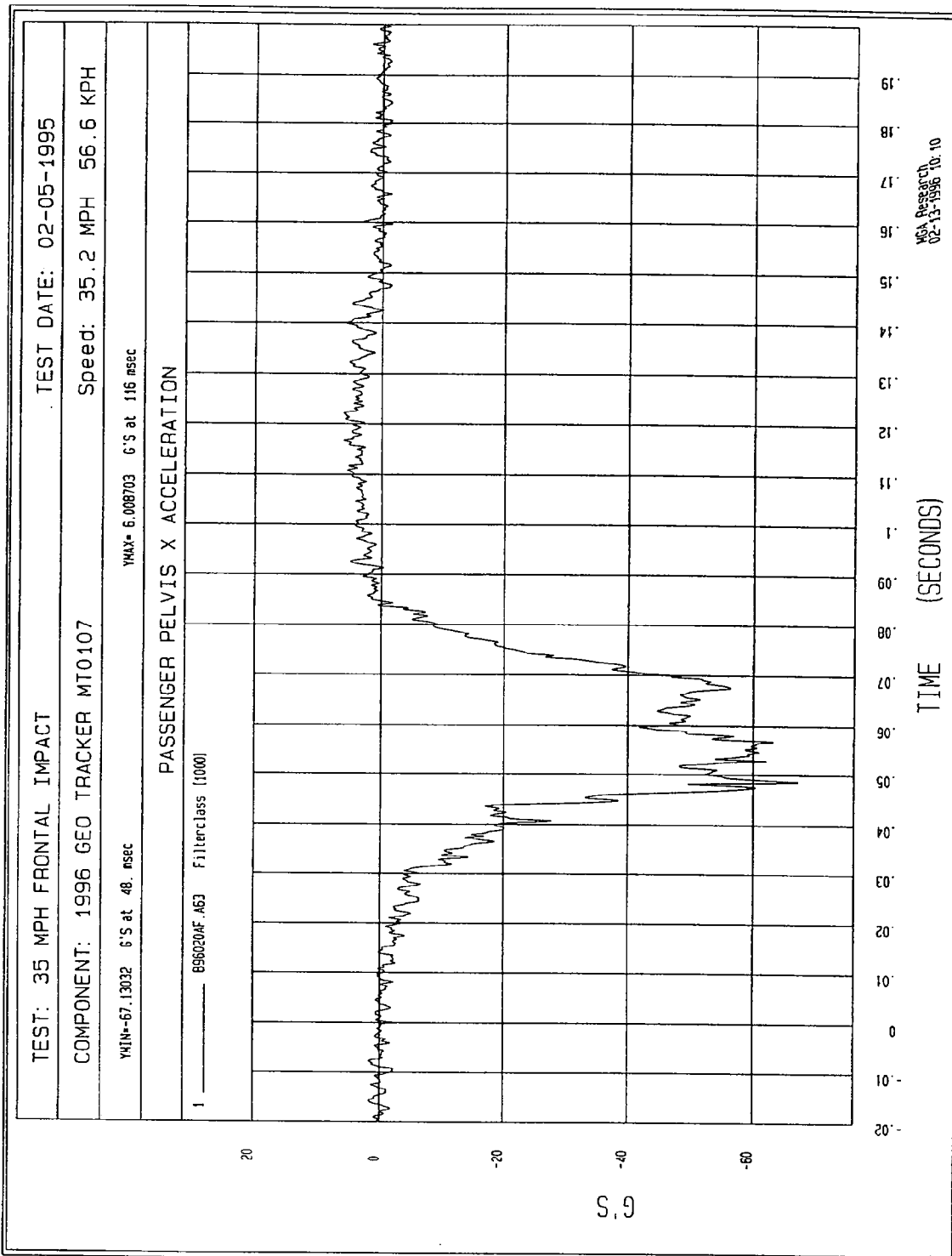


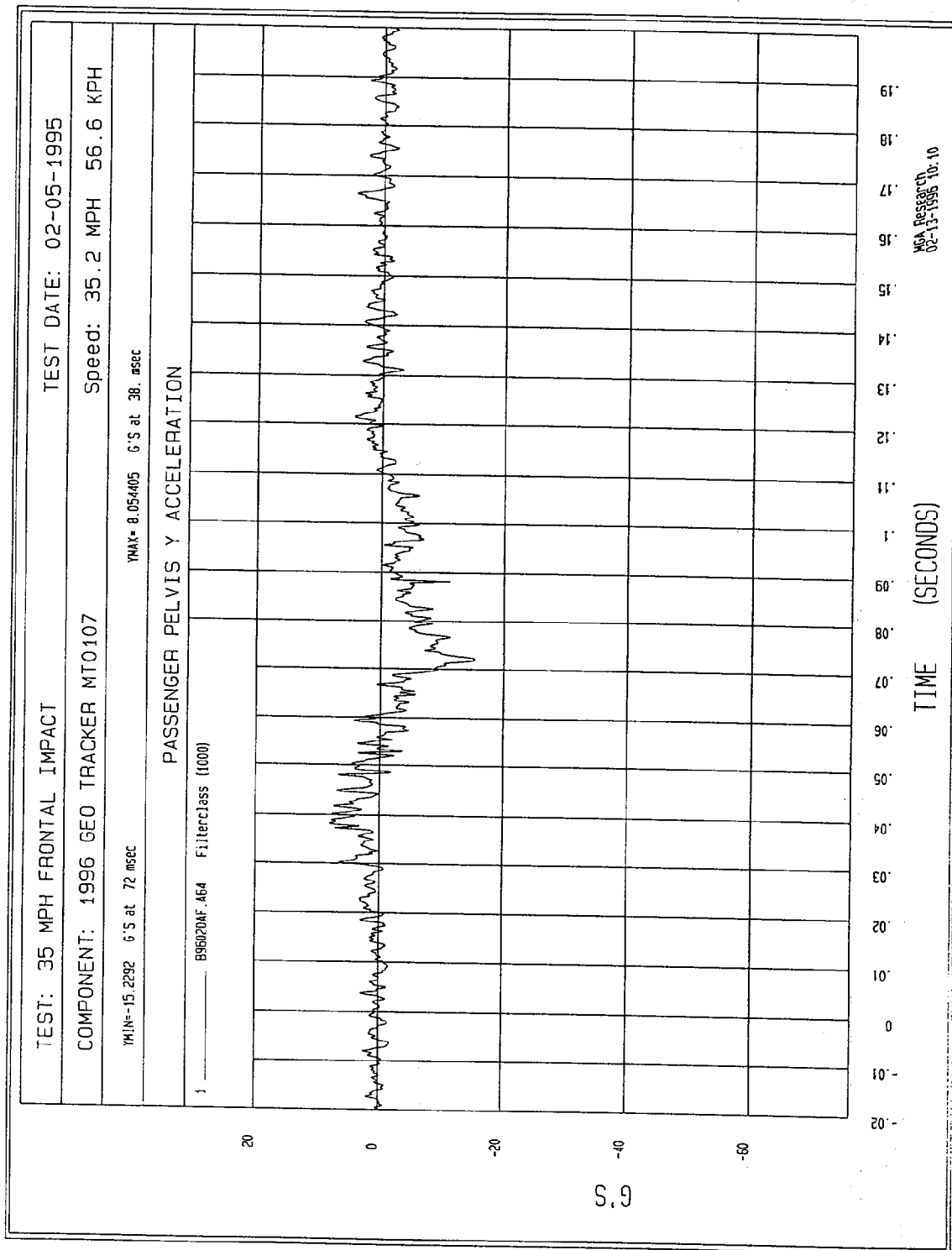


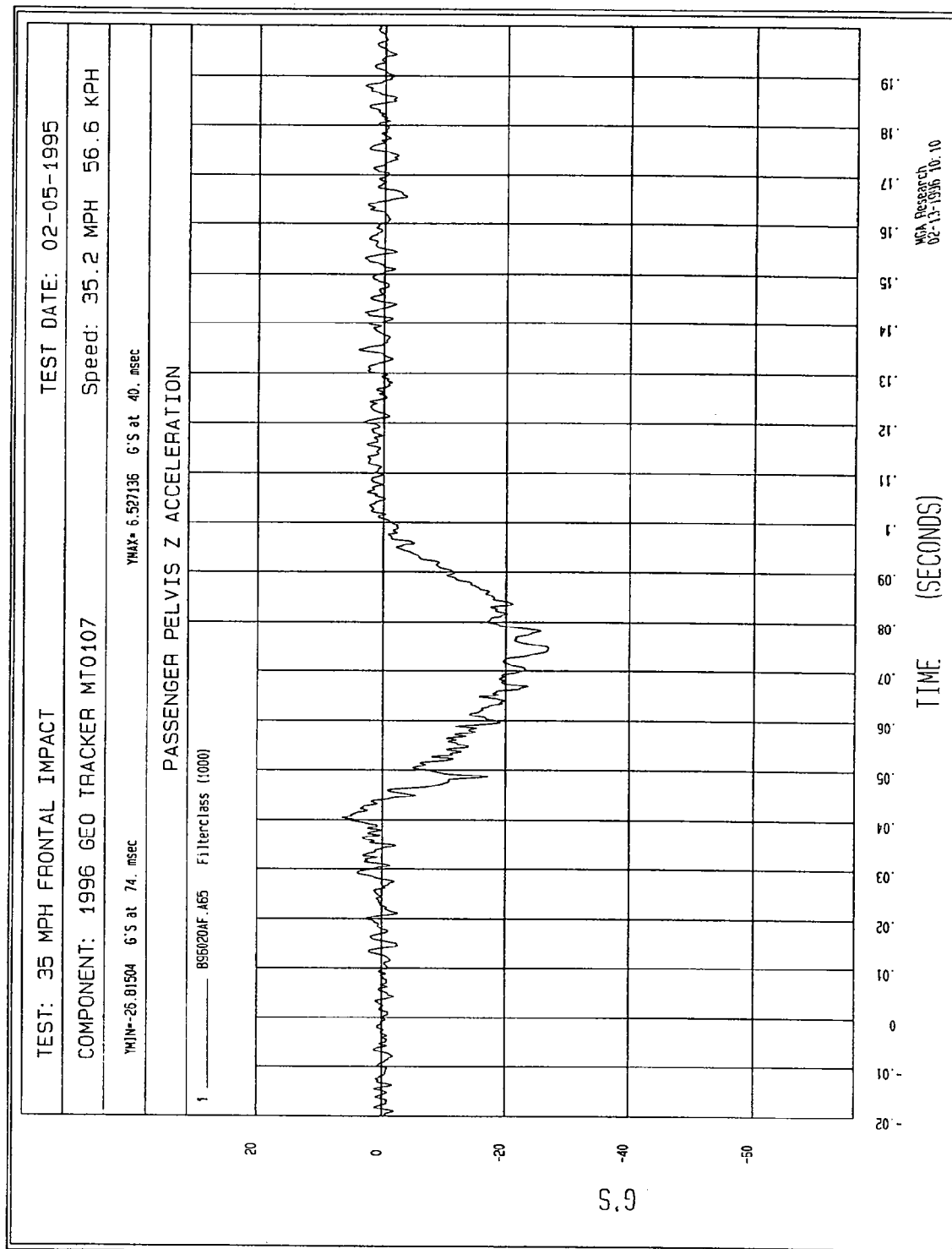




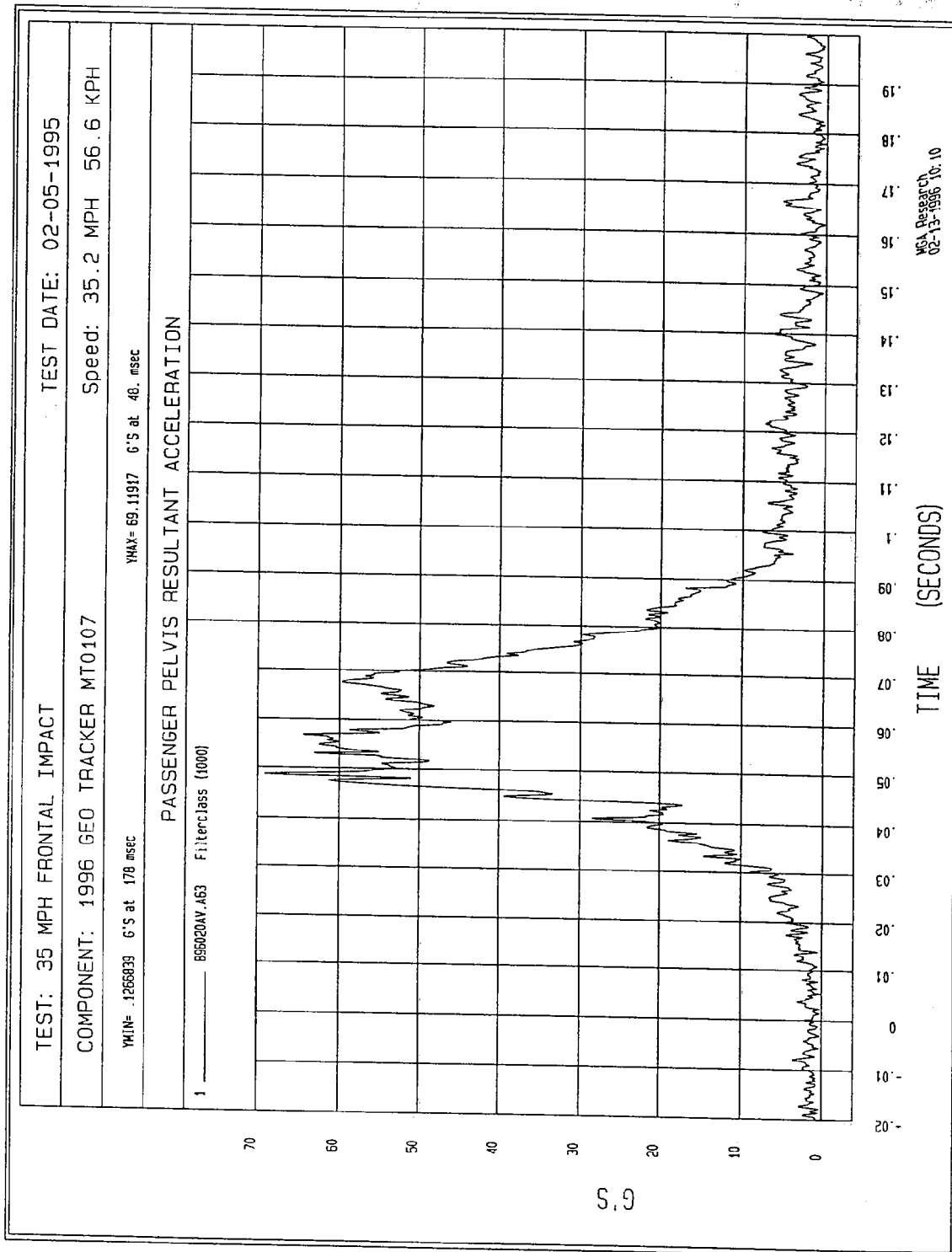


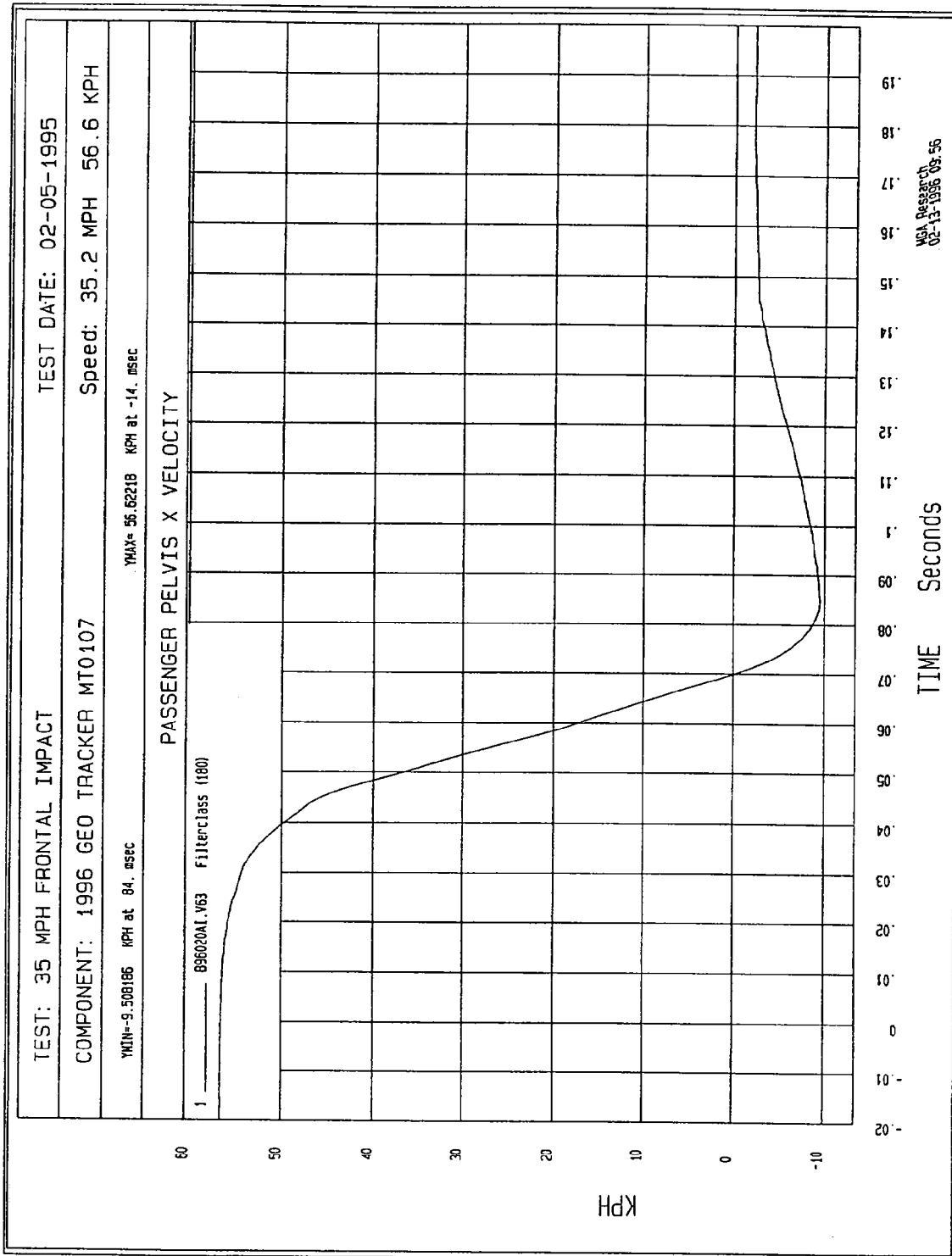


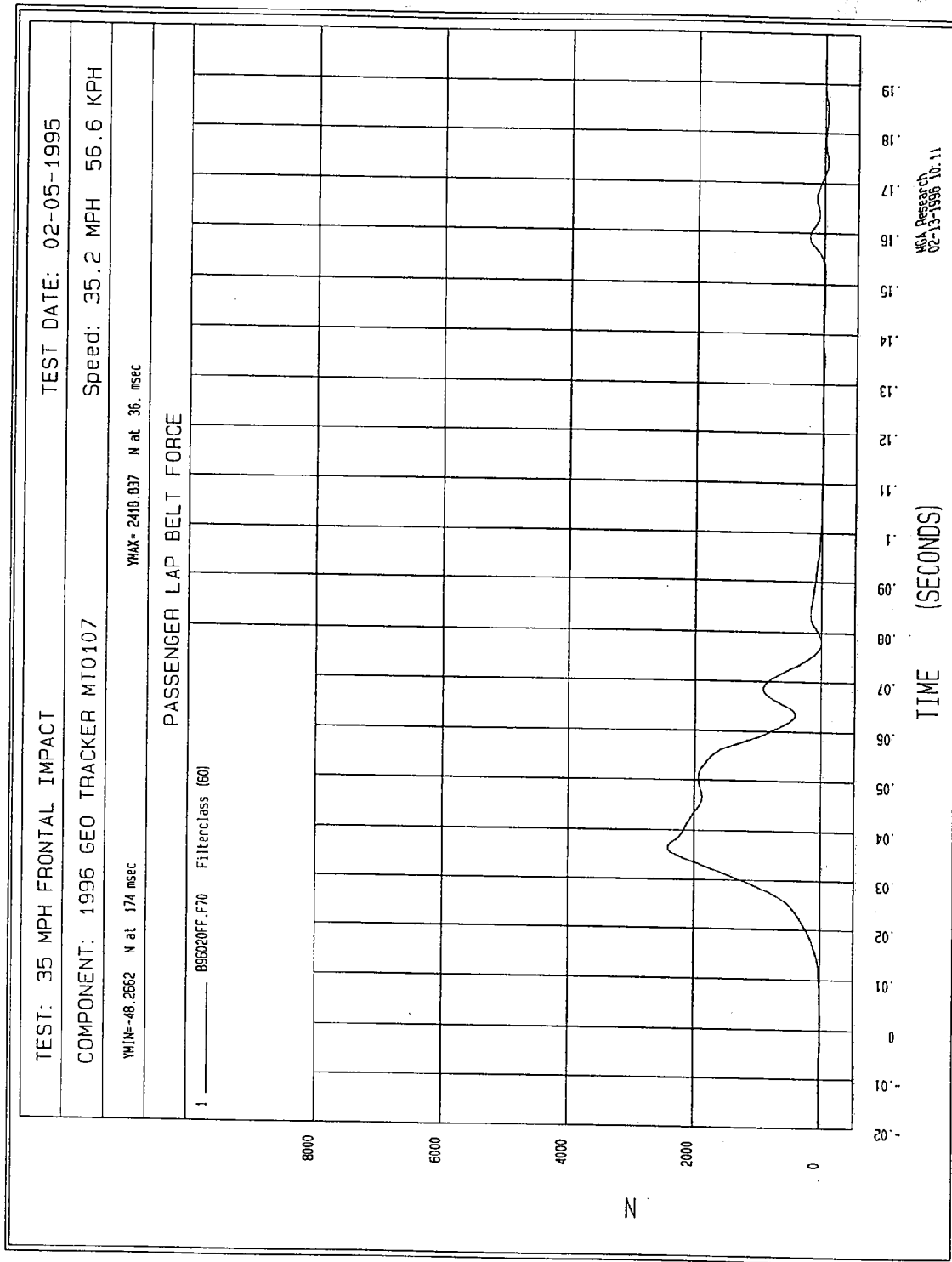


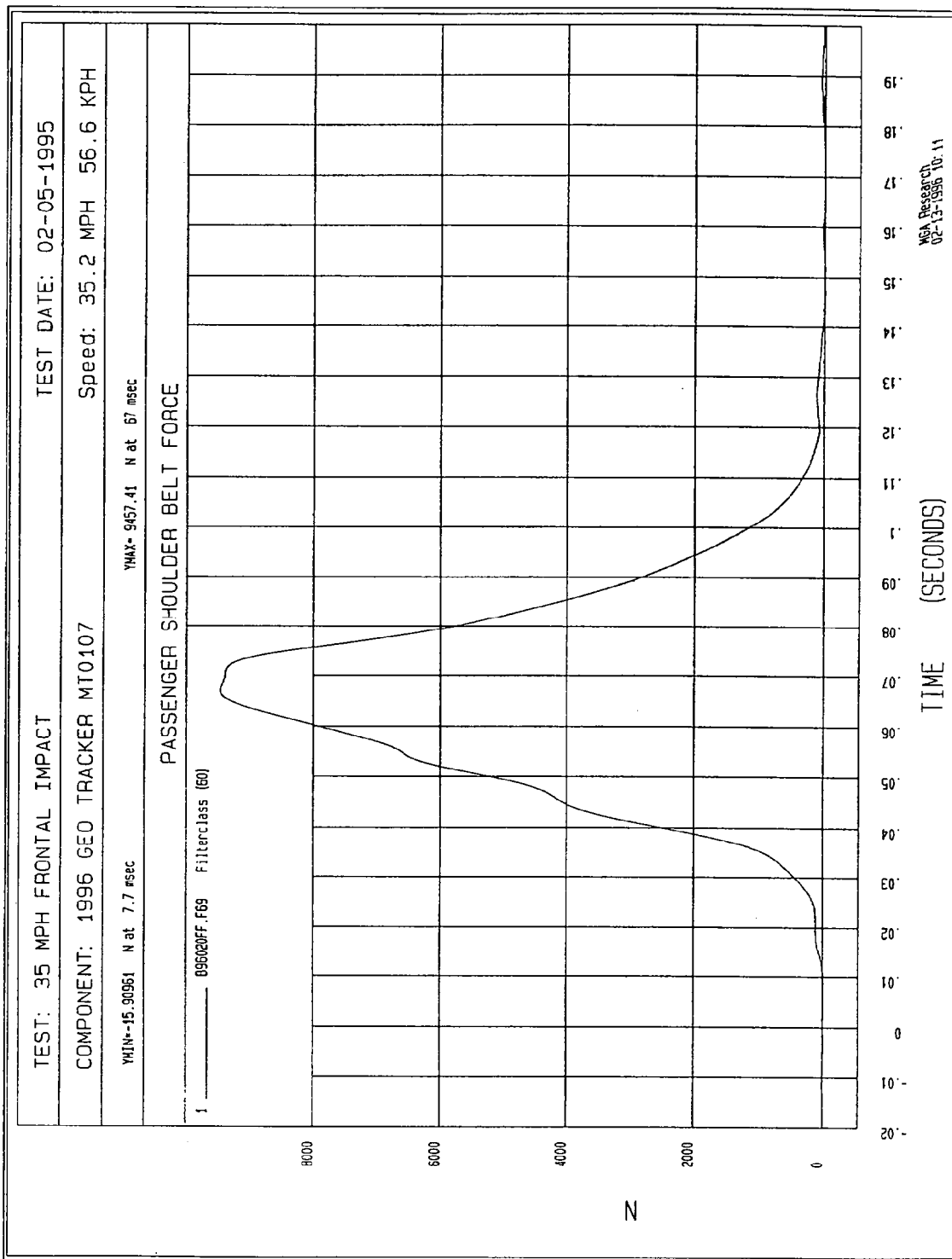


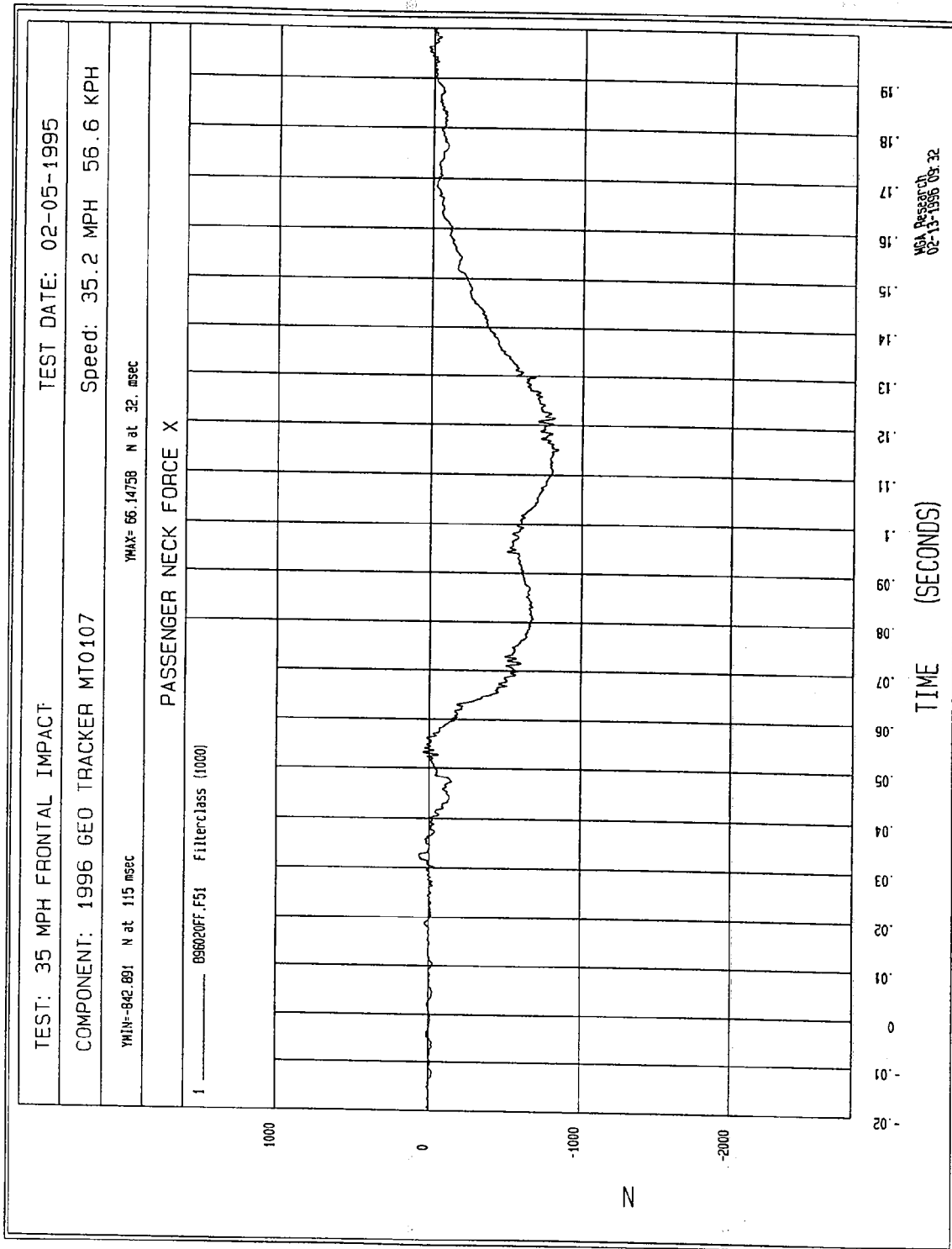
MCA Research
02-13-1996 10.10

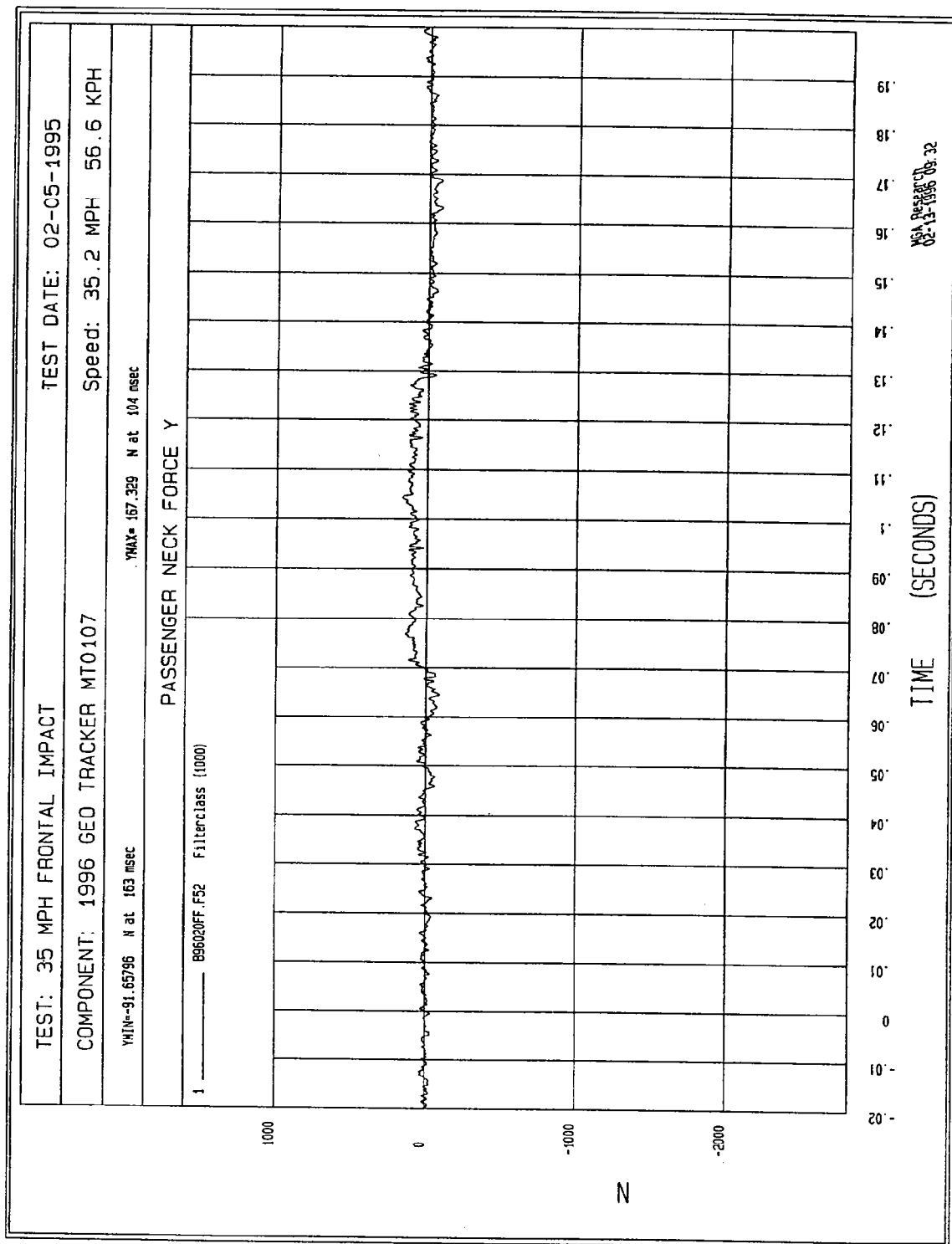


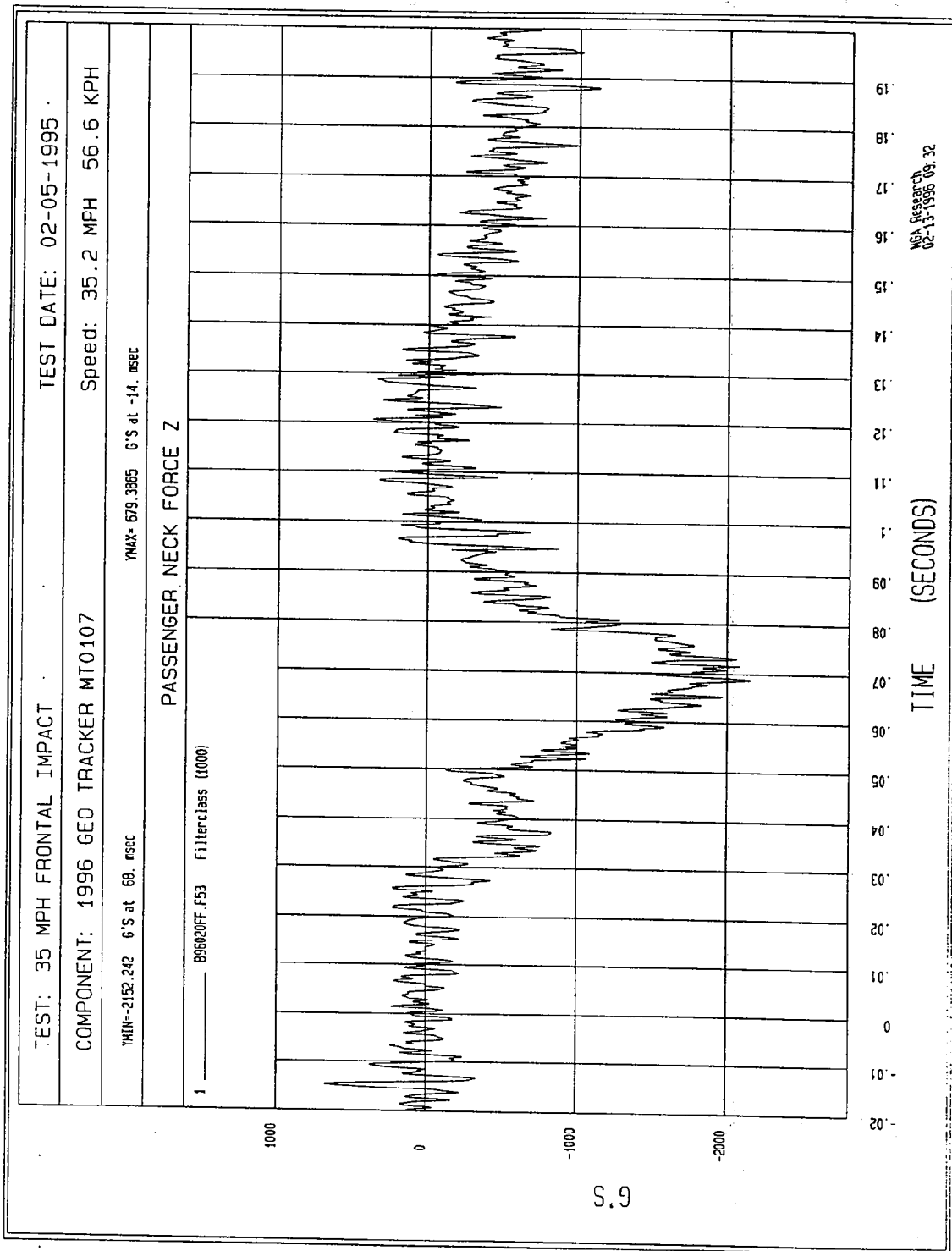


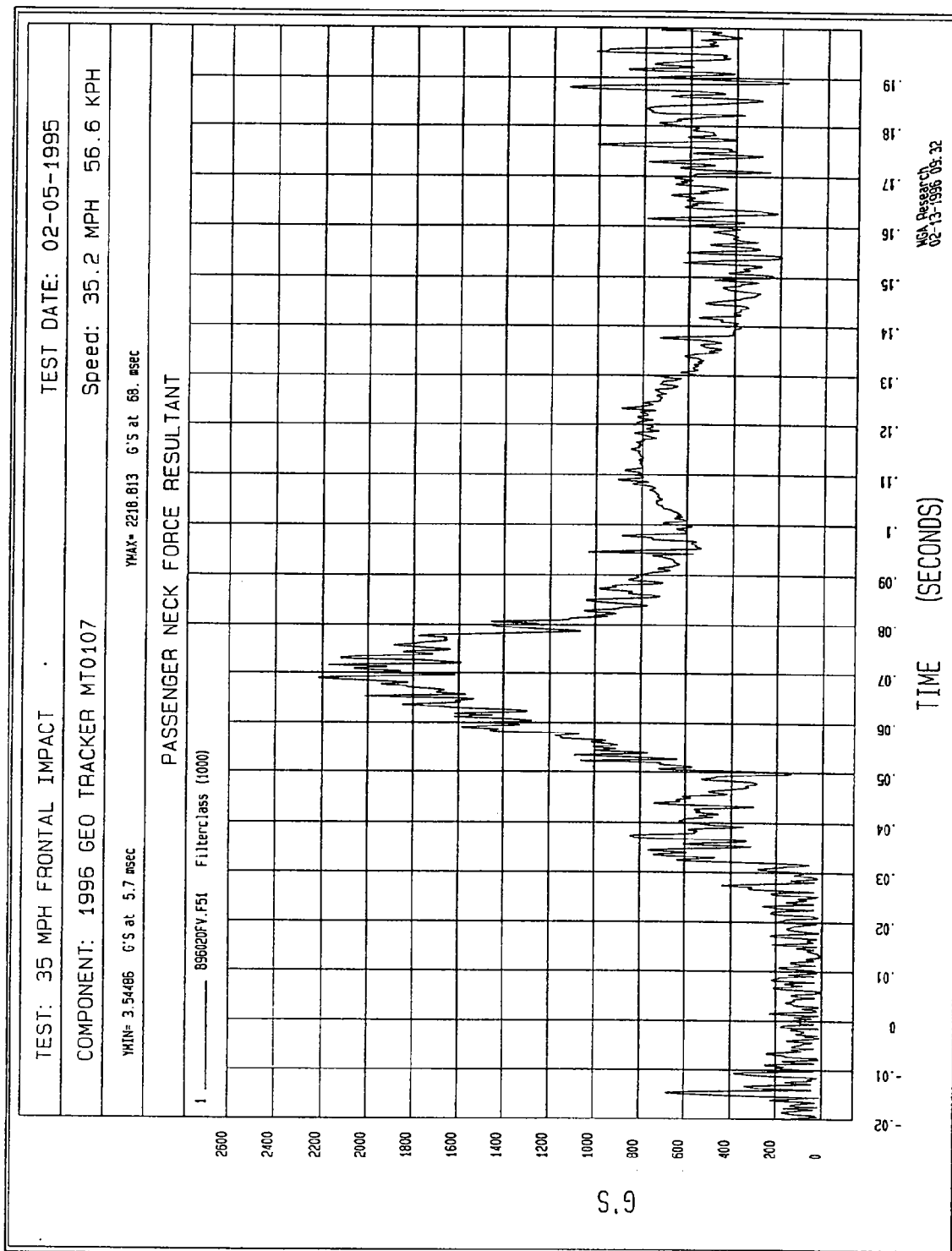


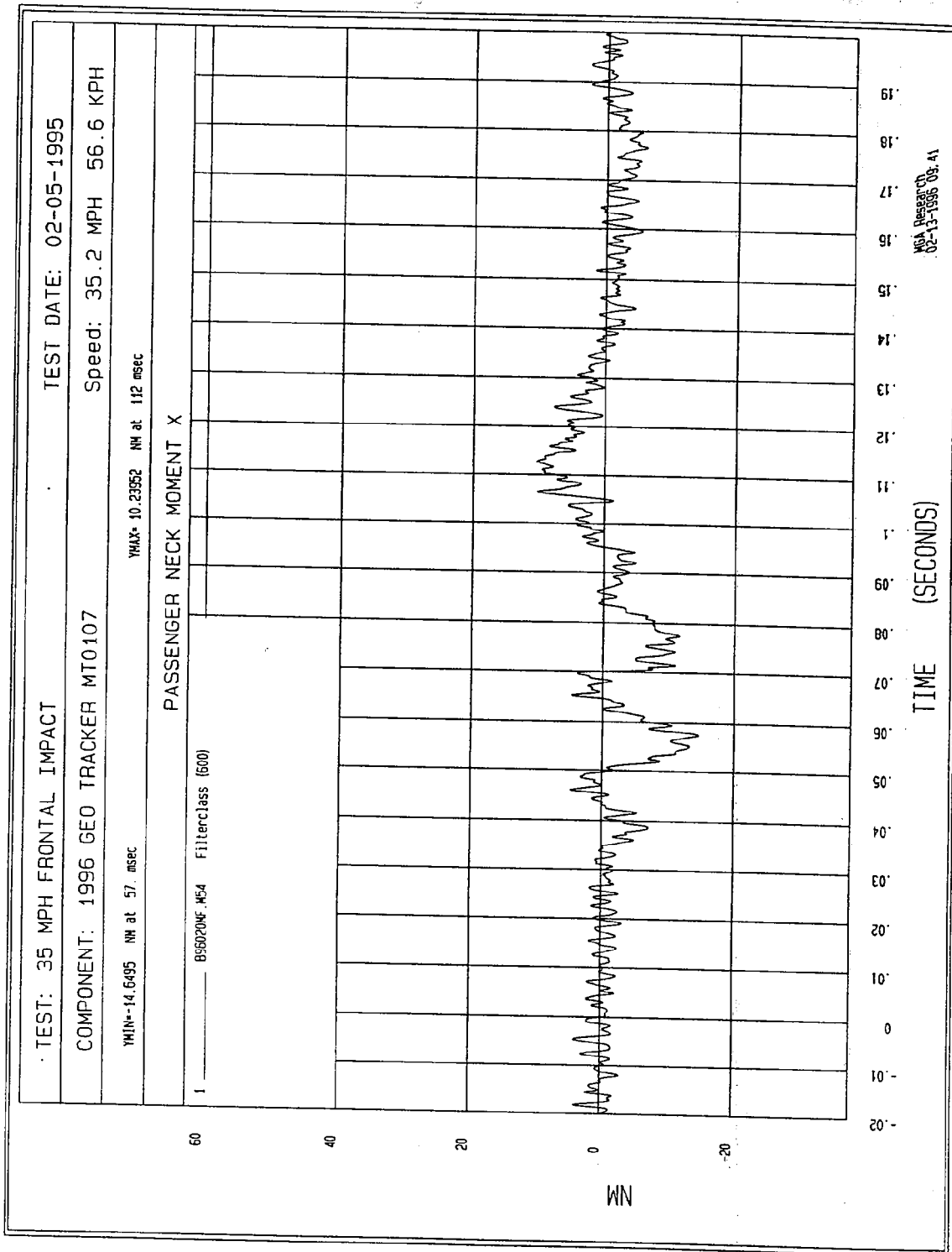


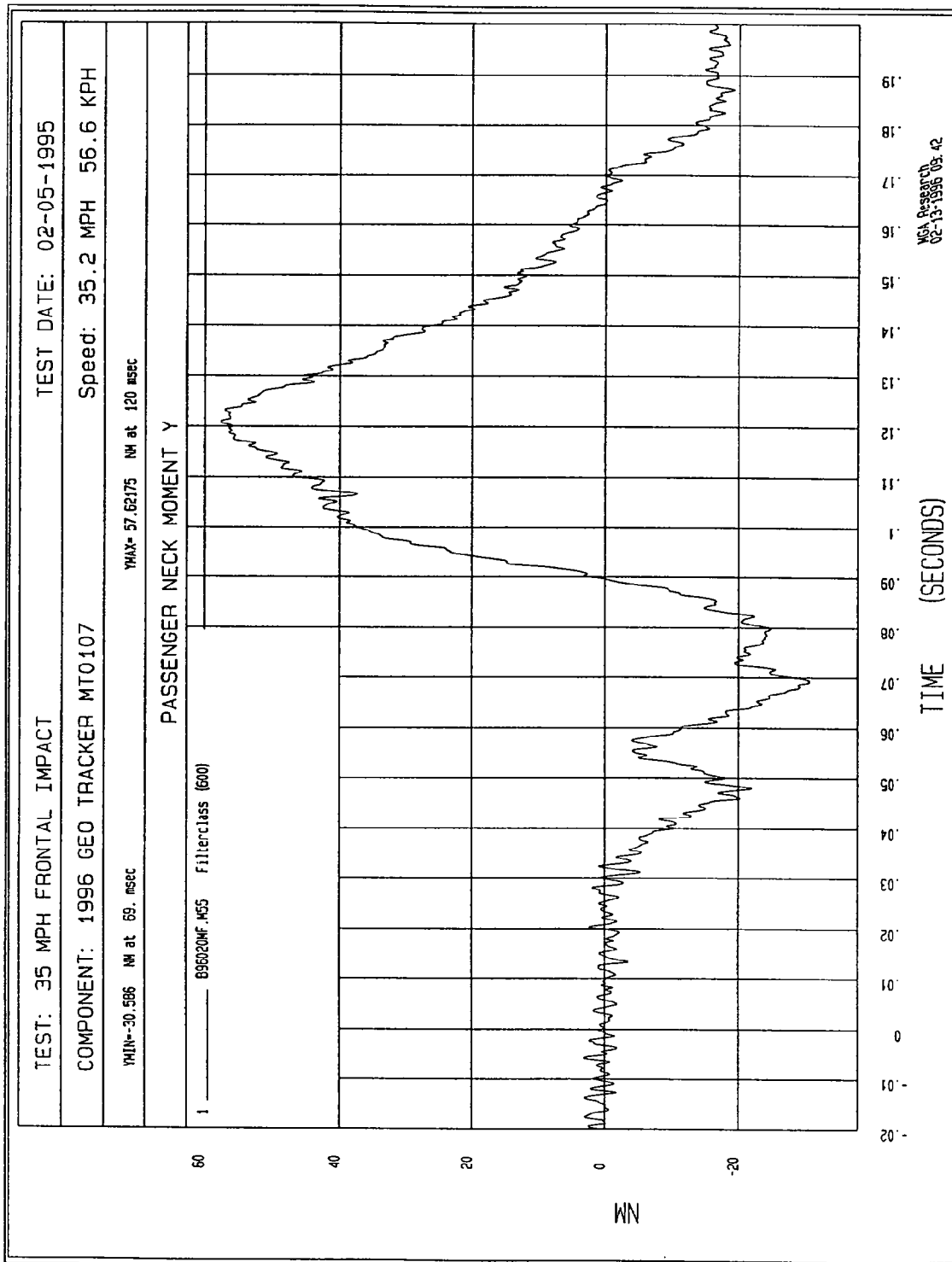










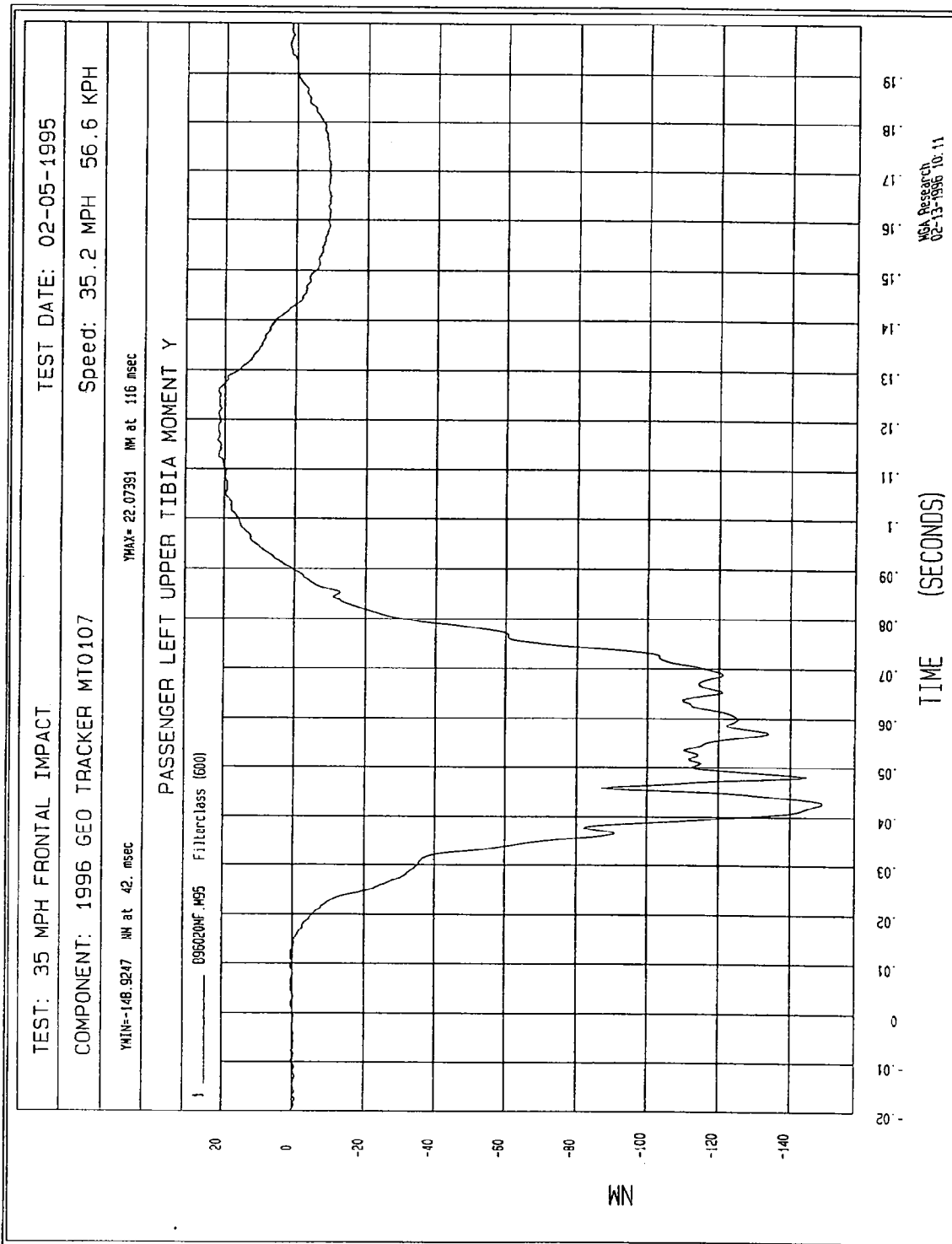


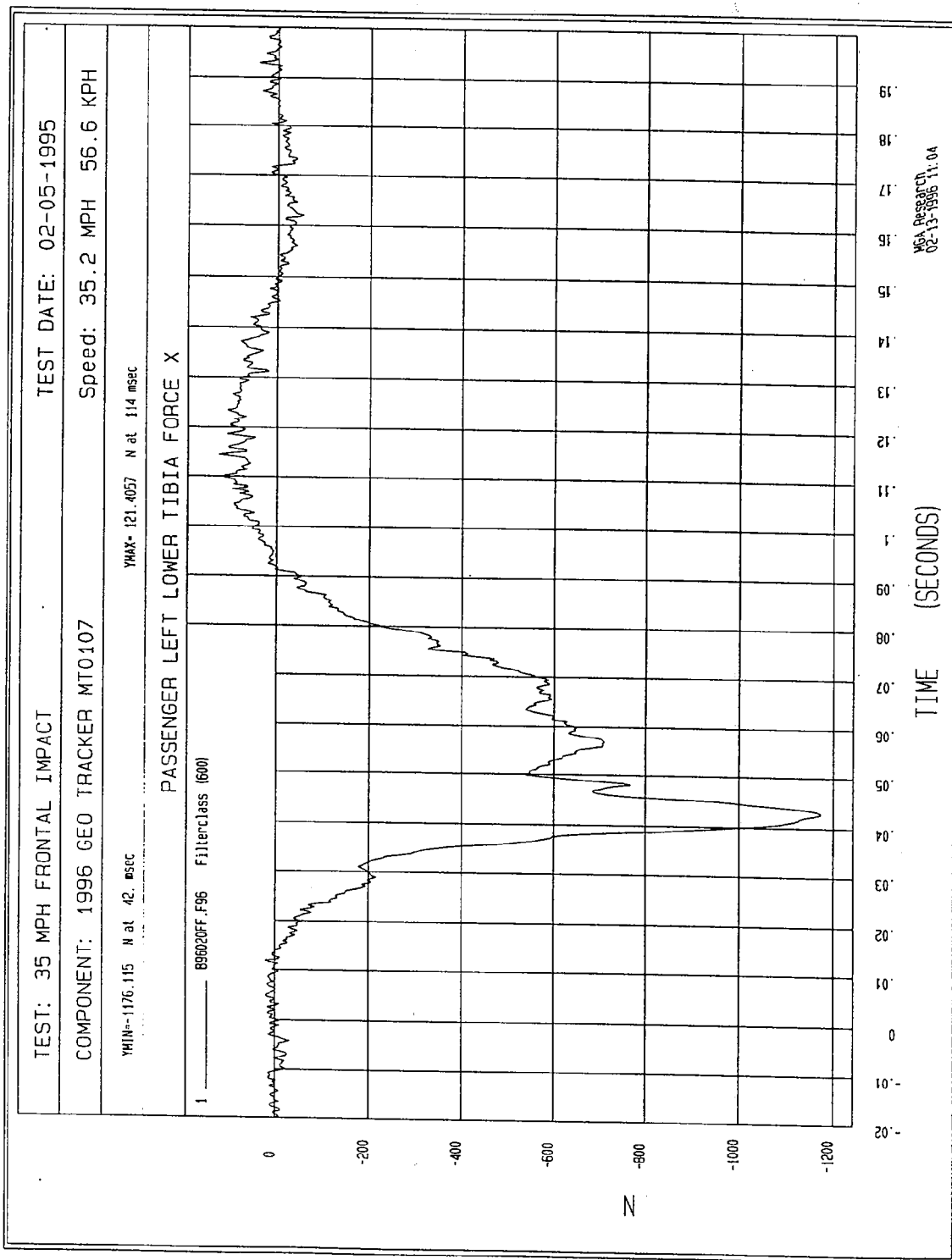
PASSENGER NECK MOMENT Z ACCELERATION VS. TIME

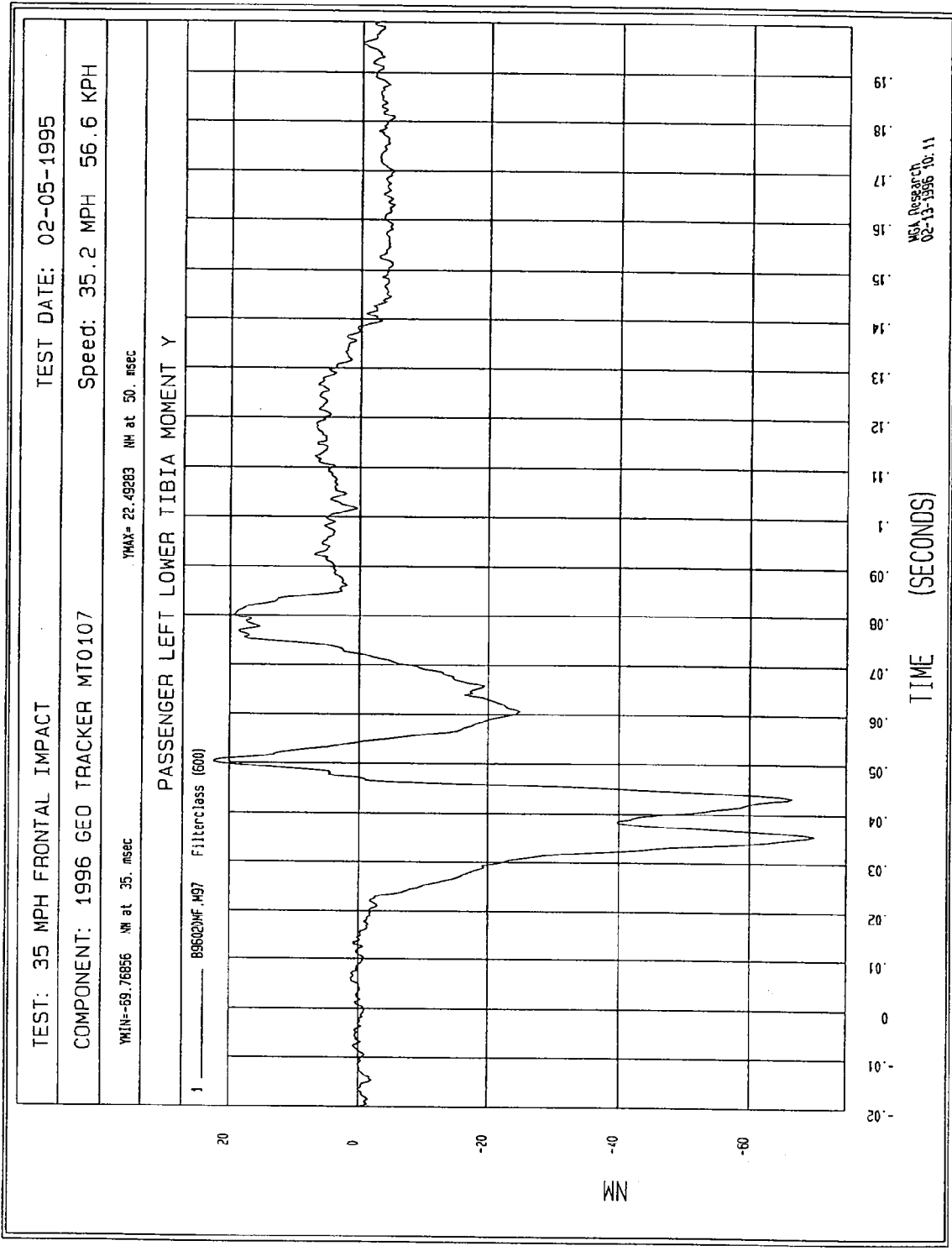
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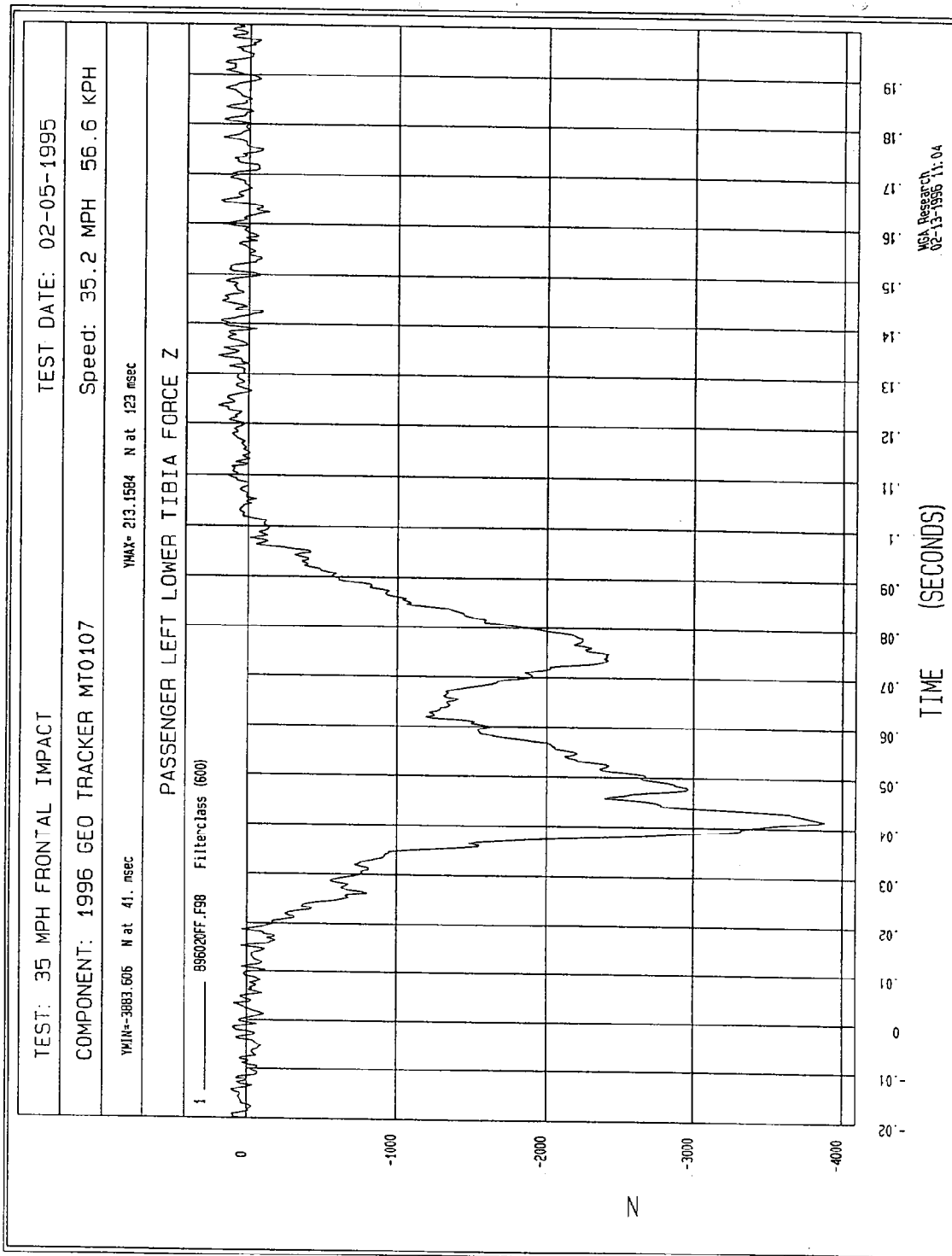
PASSENGER NECK MOMENT RESULTANT VS. TIME

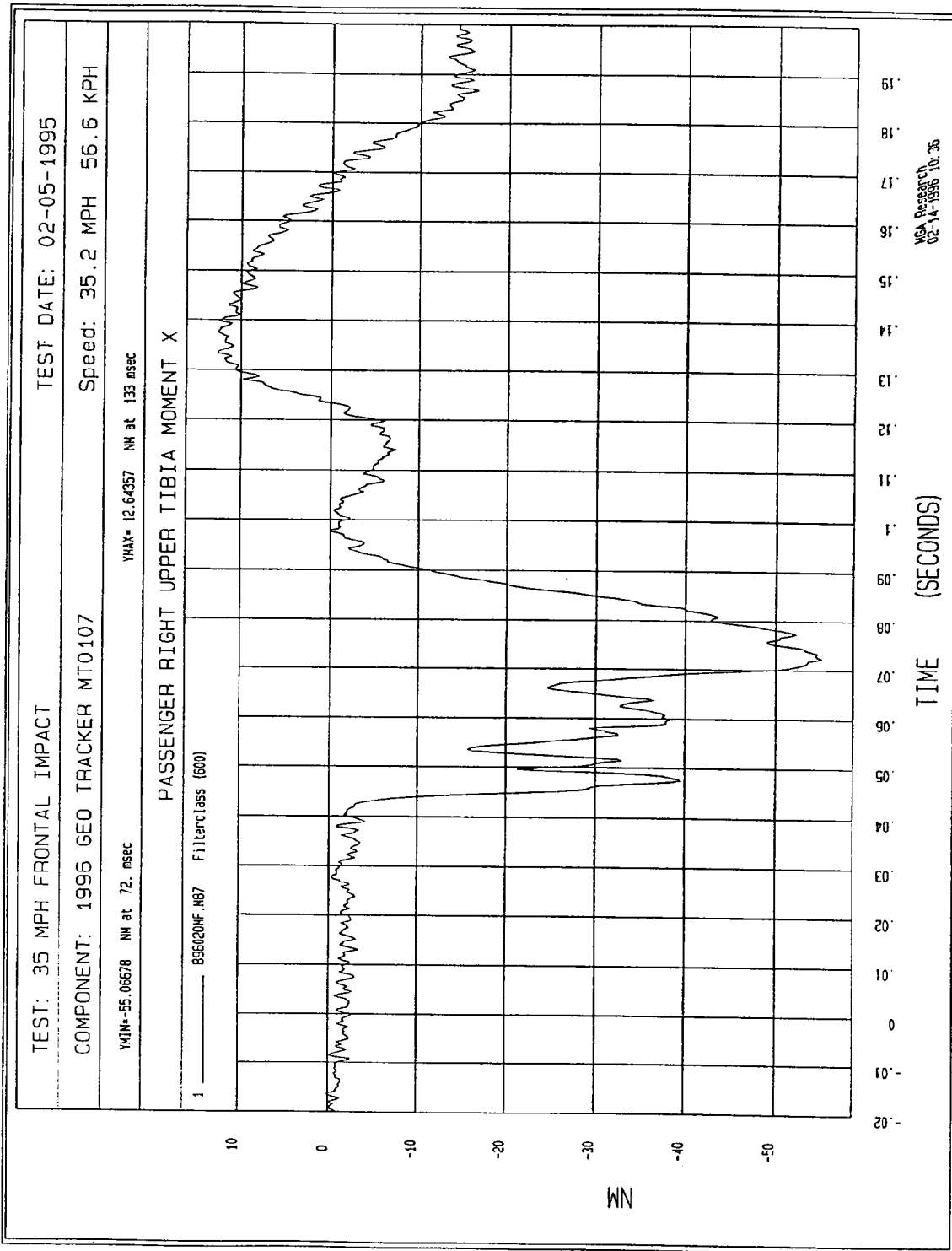
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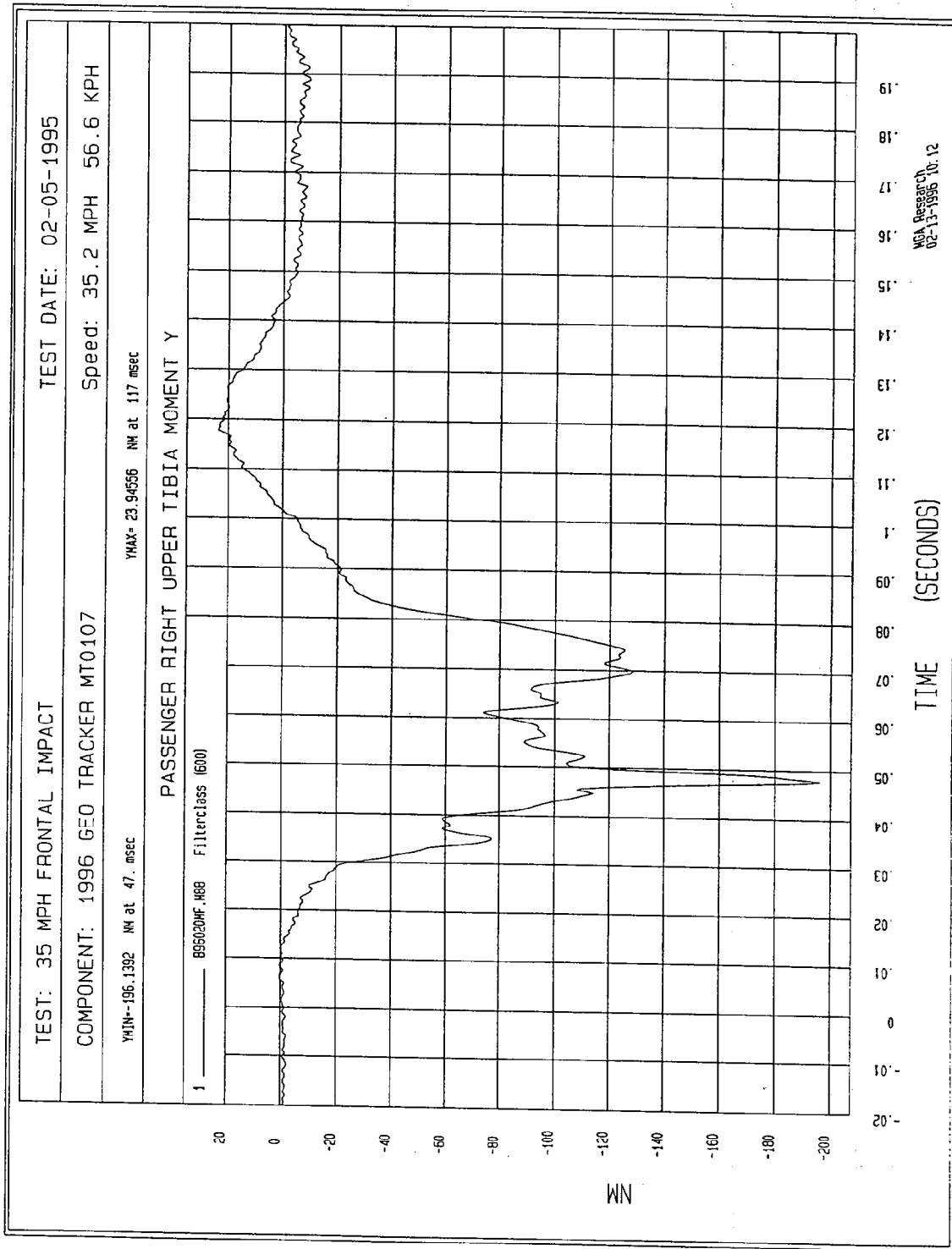


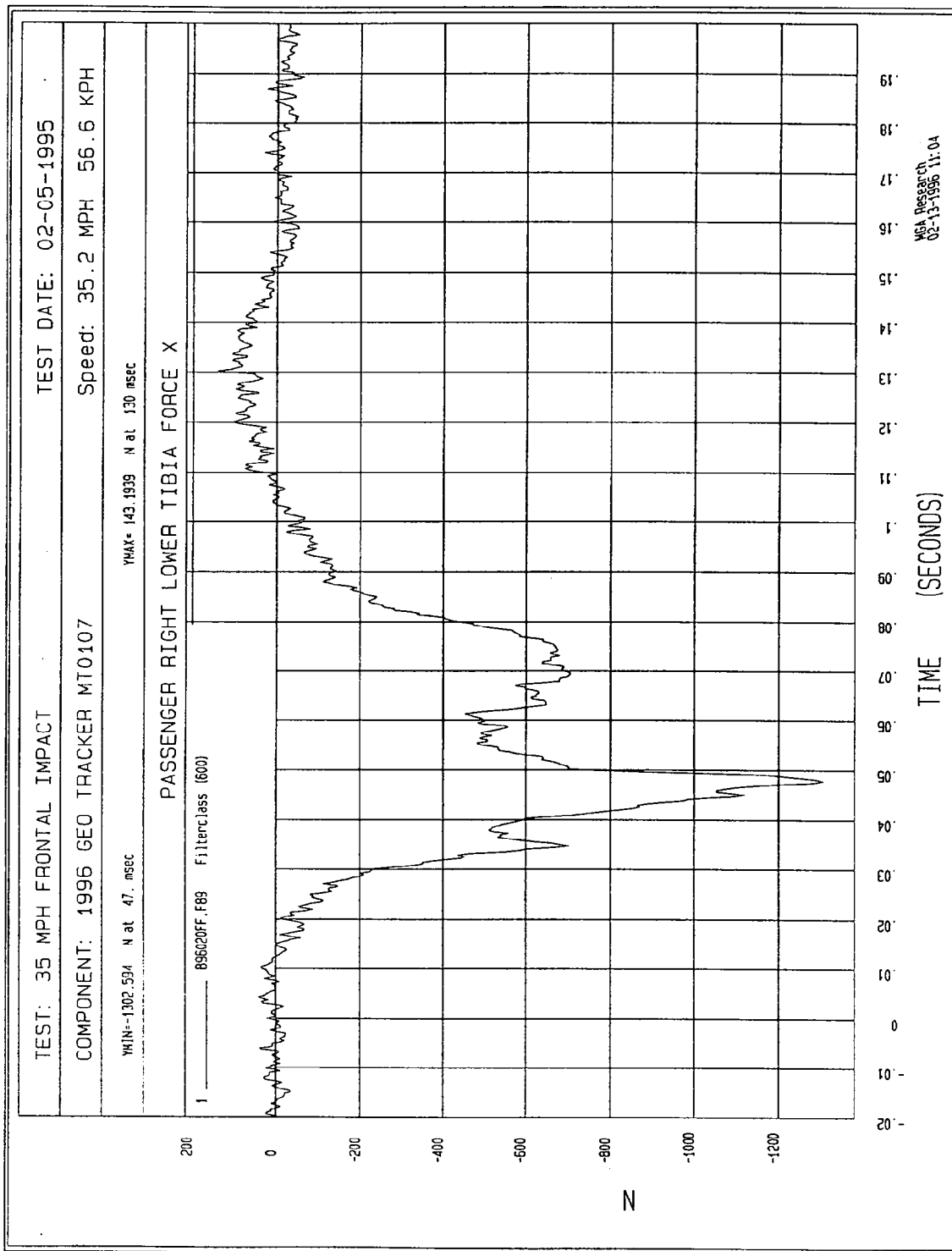


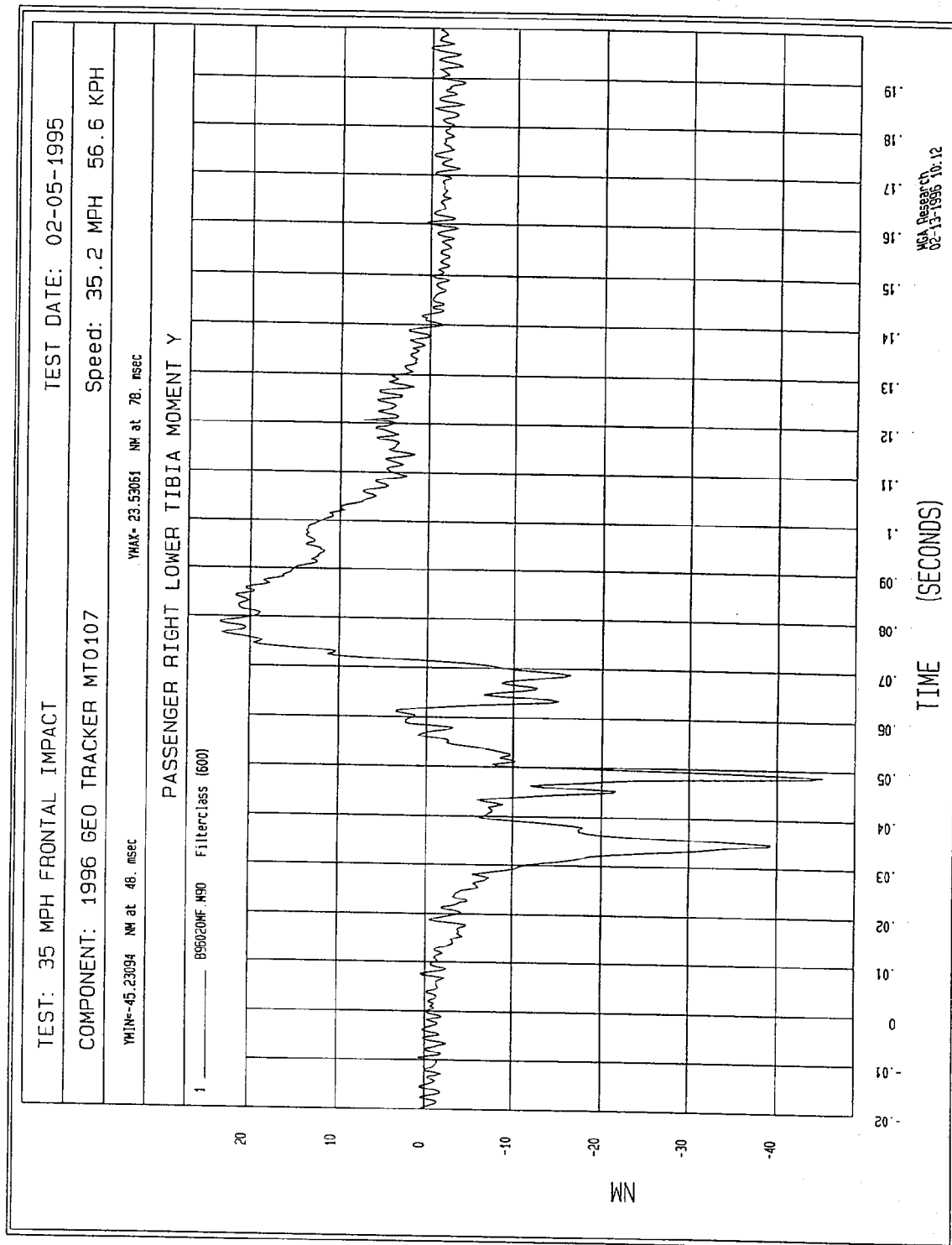


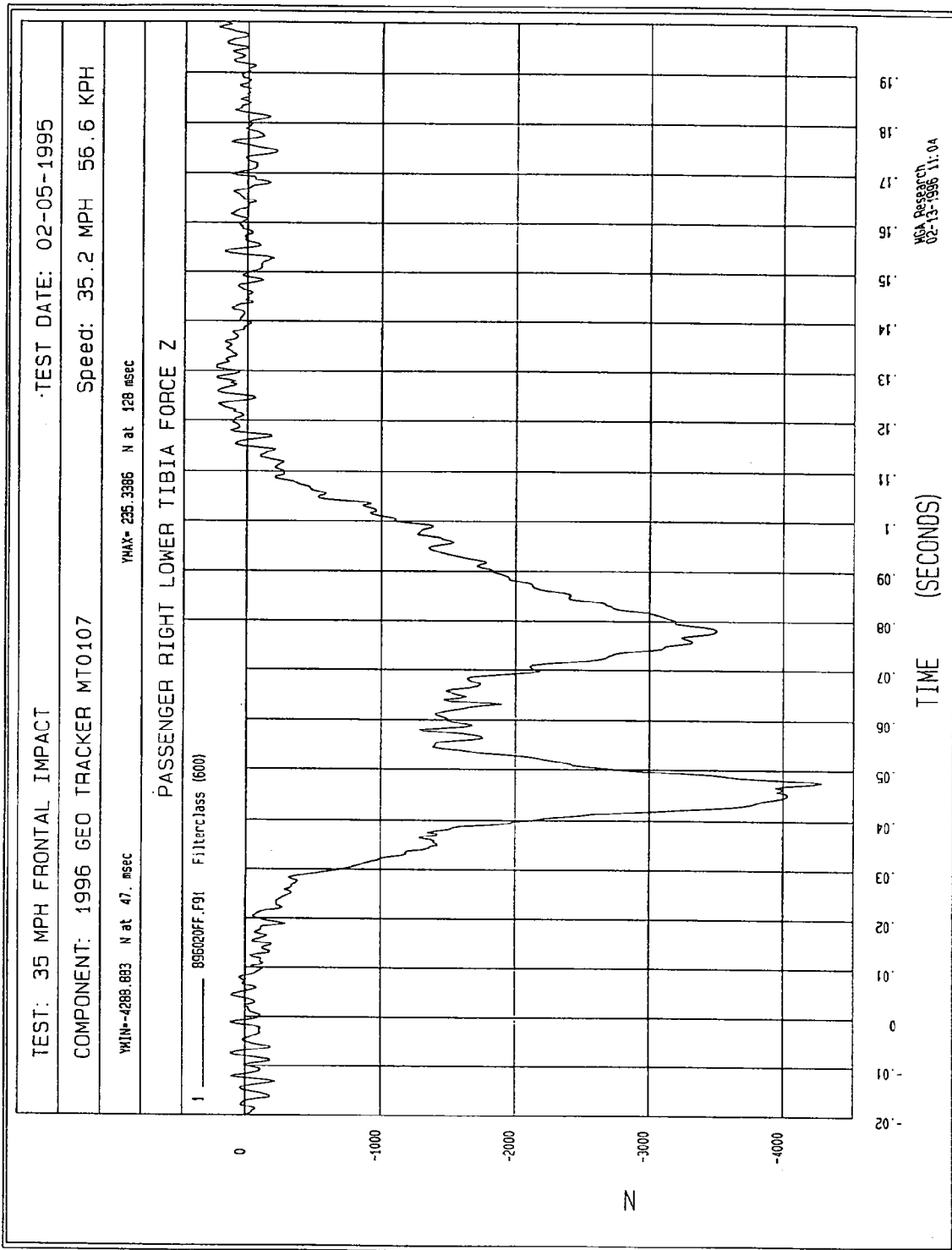


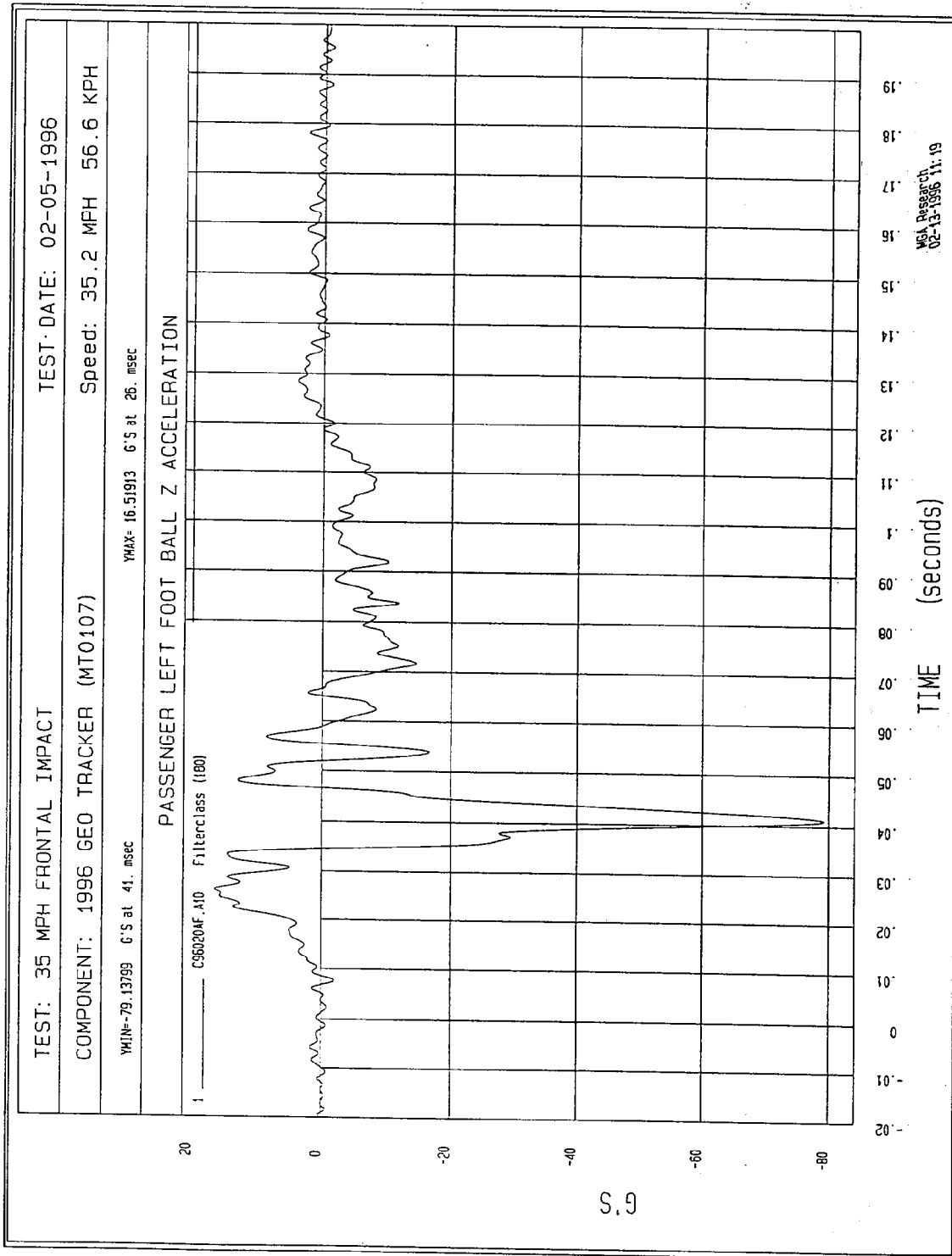


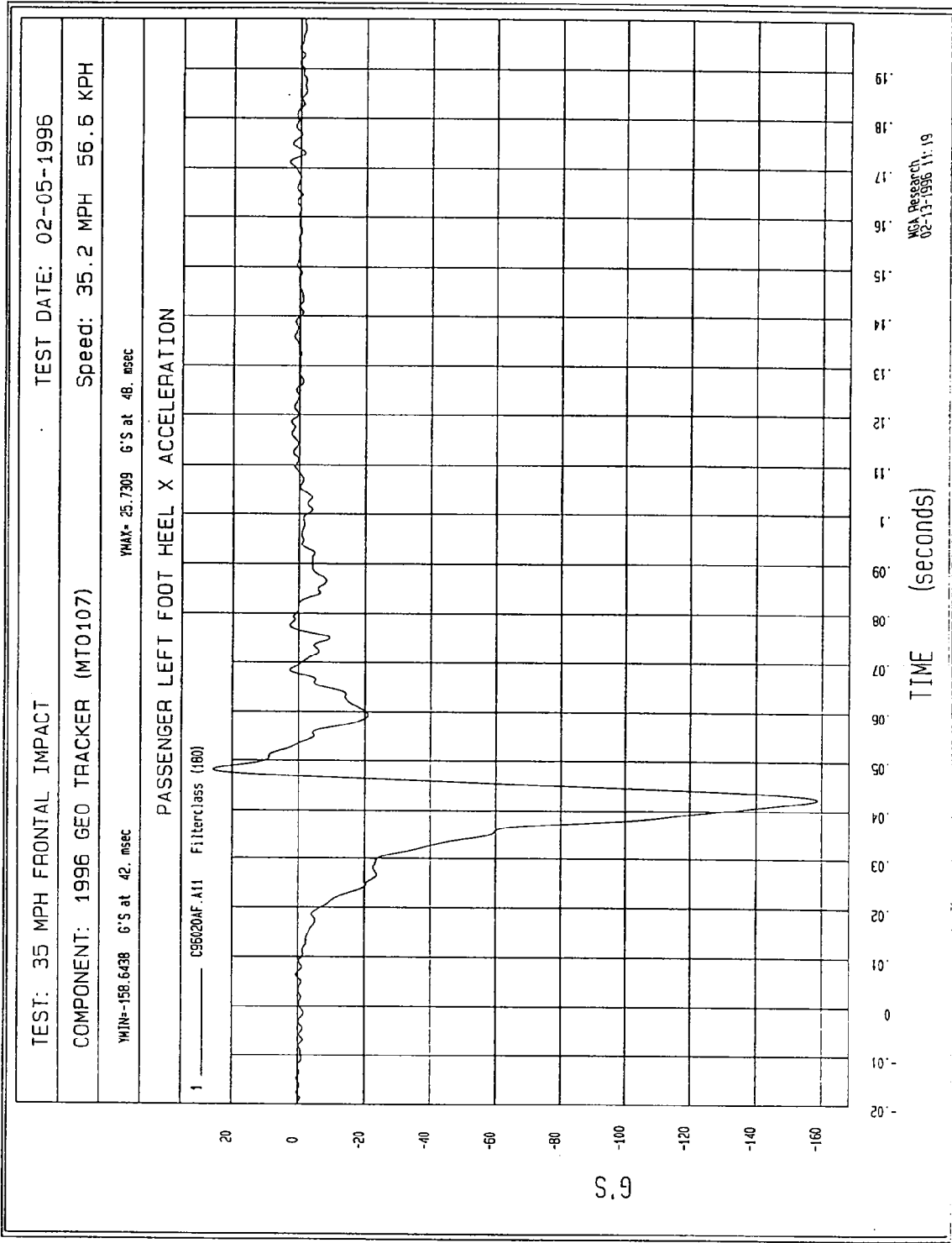


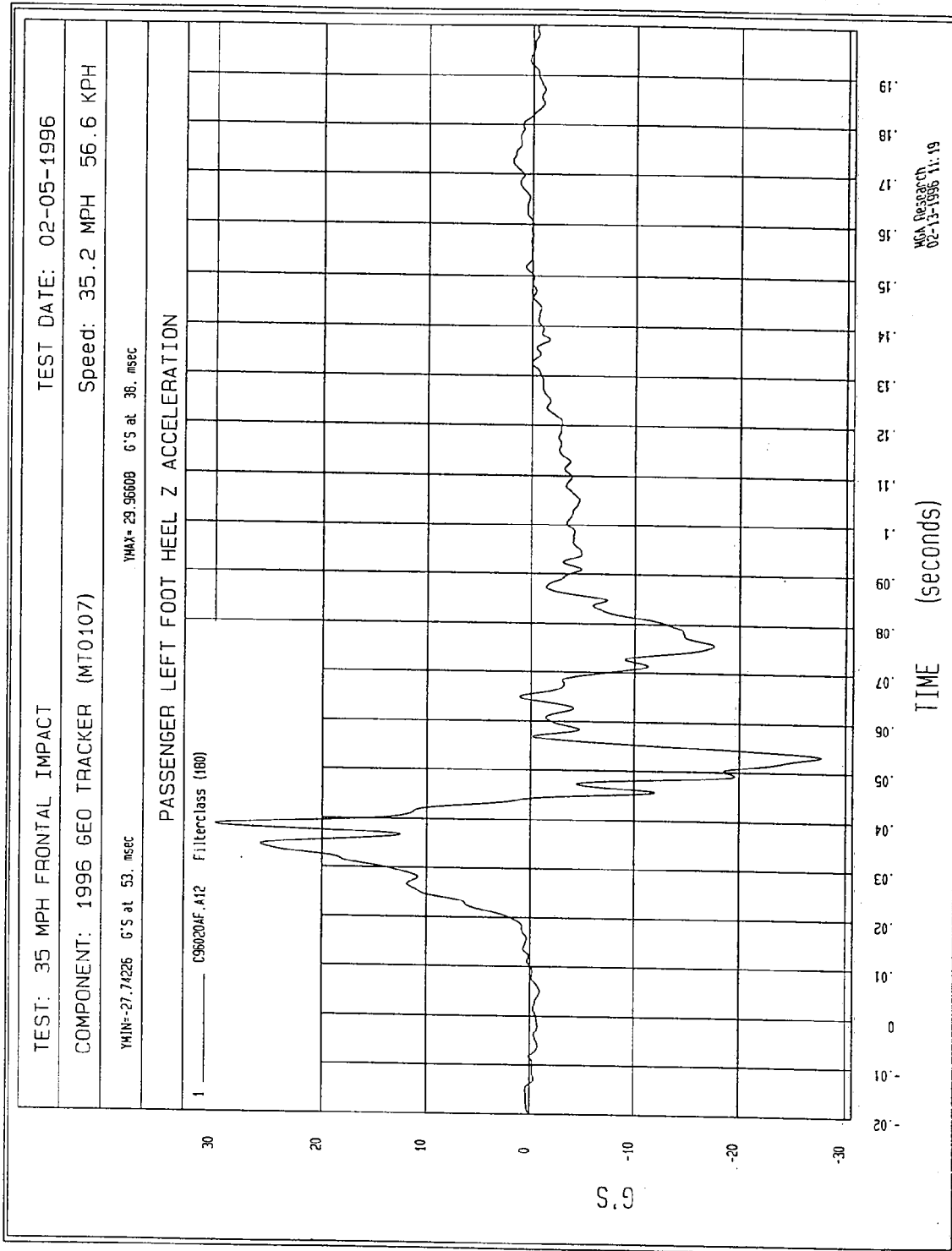


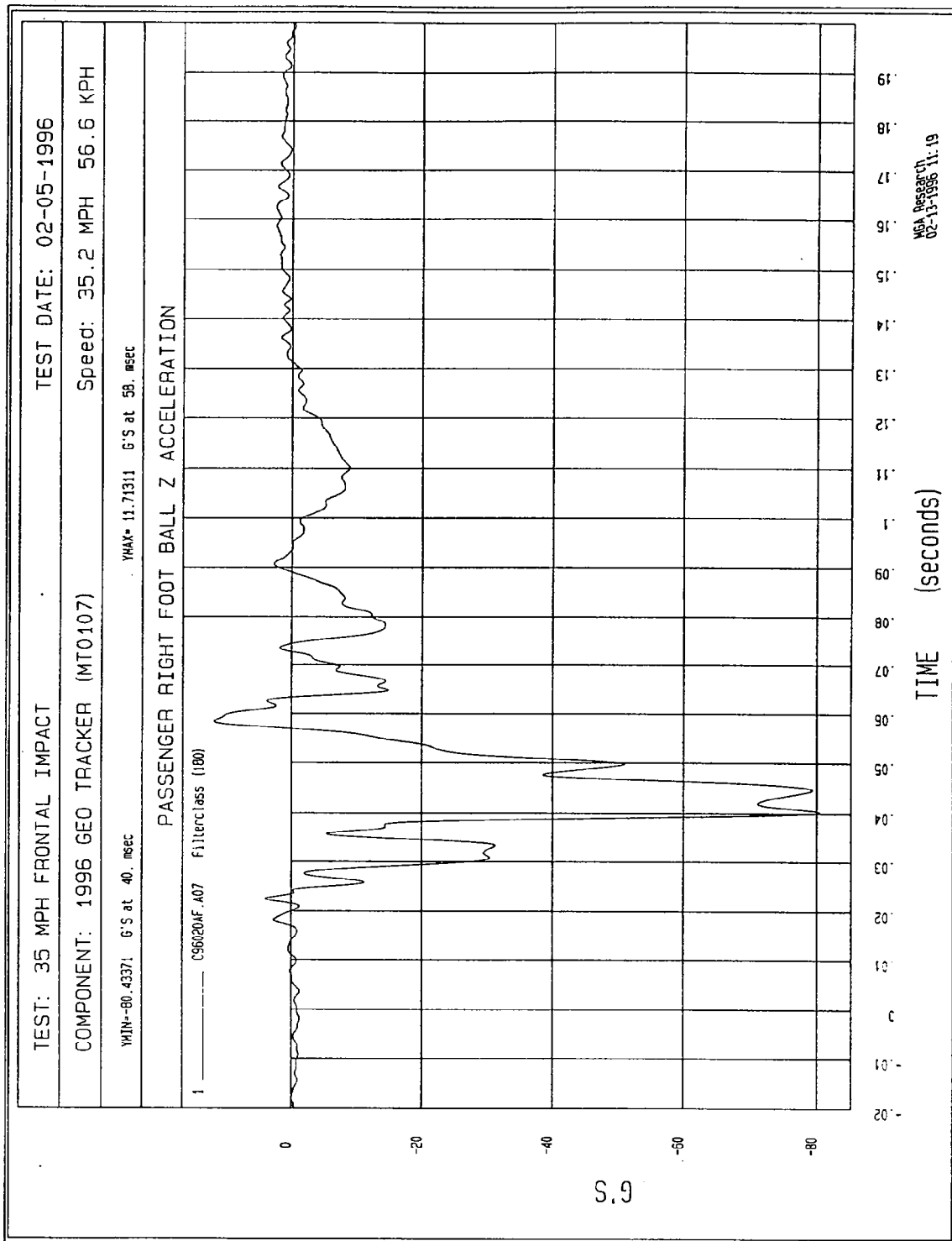


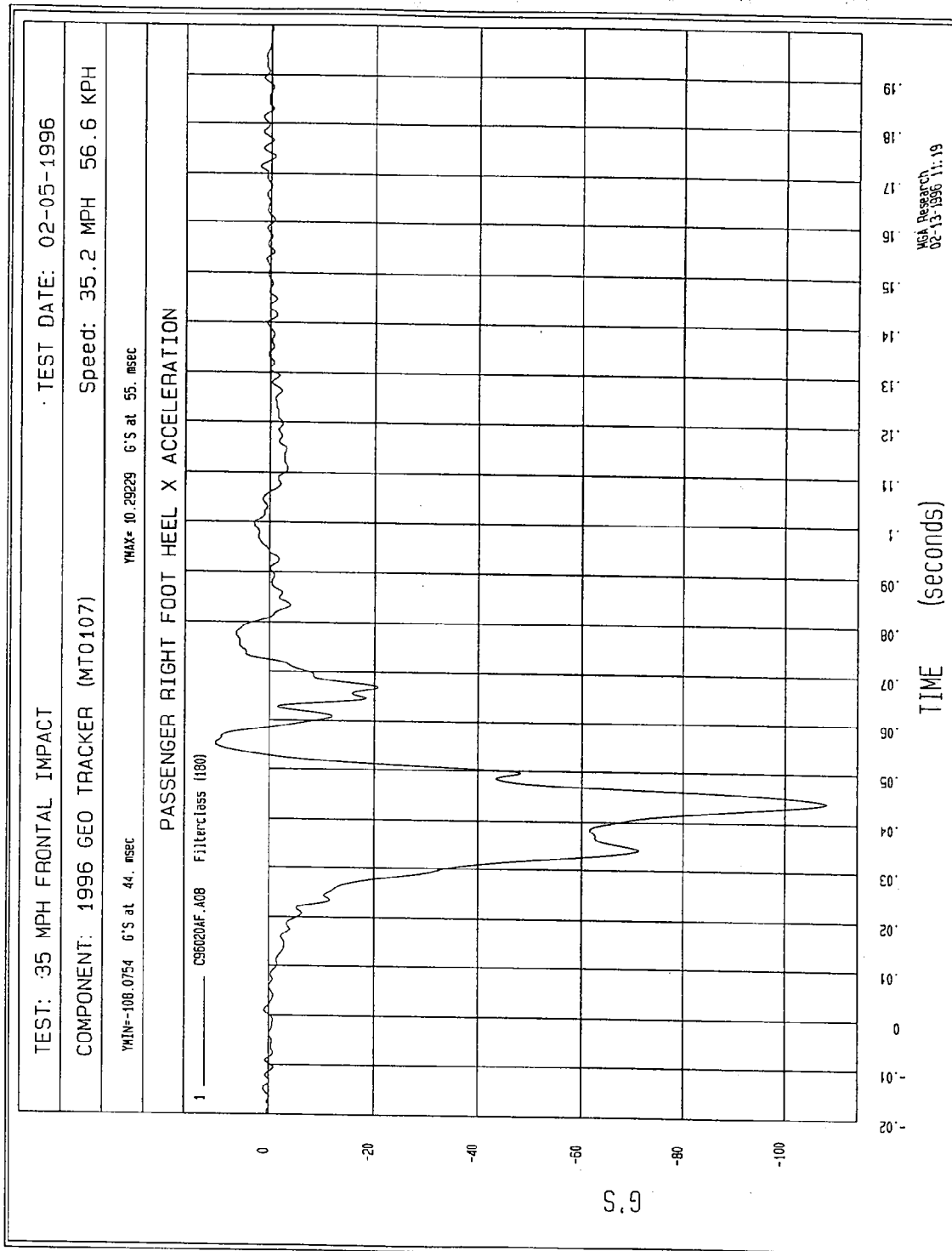


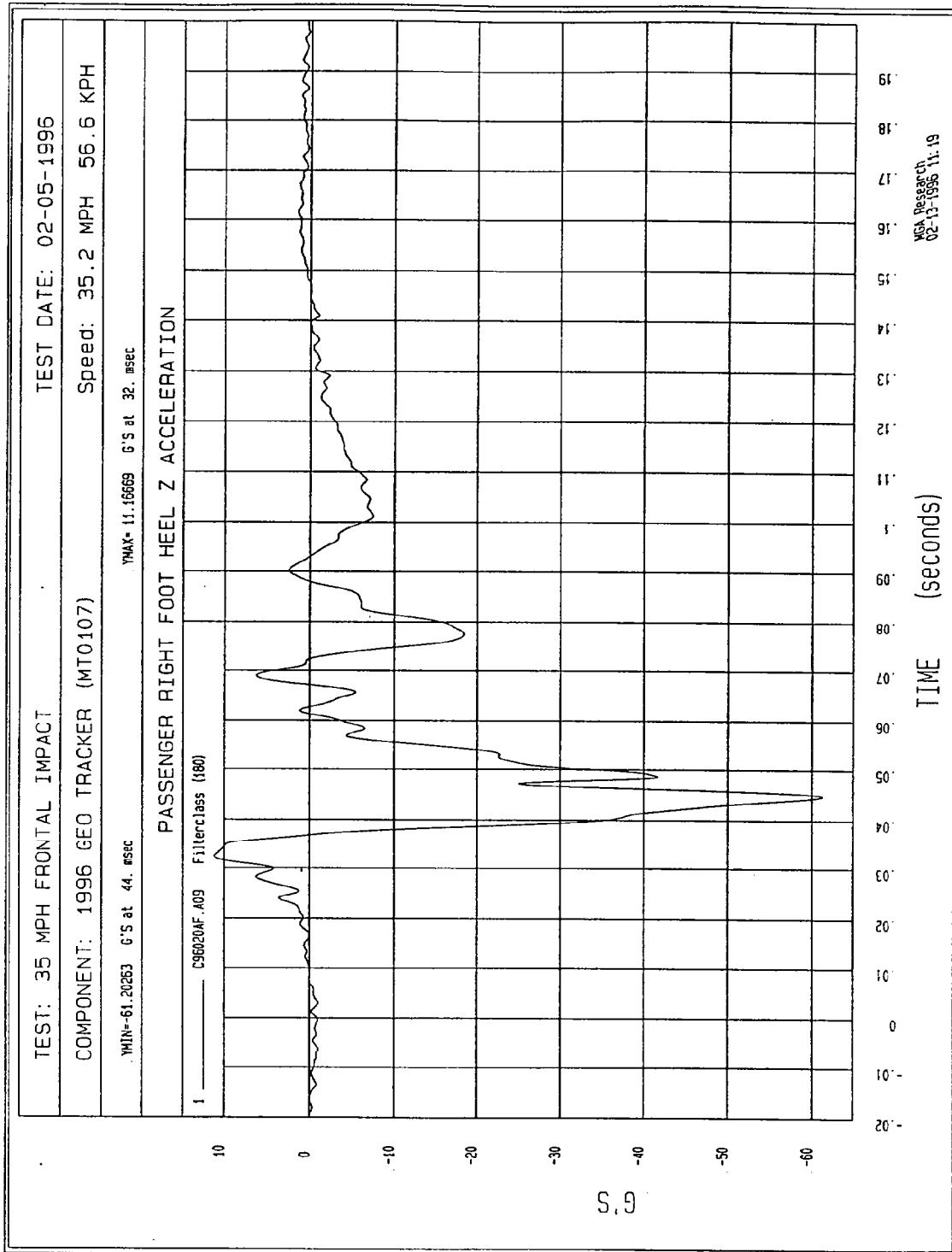












APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 065 DUMMY CALIBRATION BY: Al Chalmers

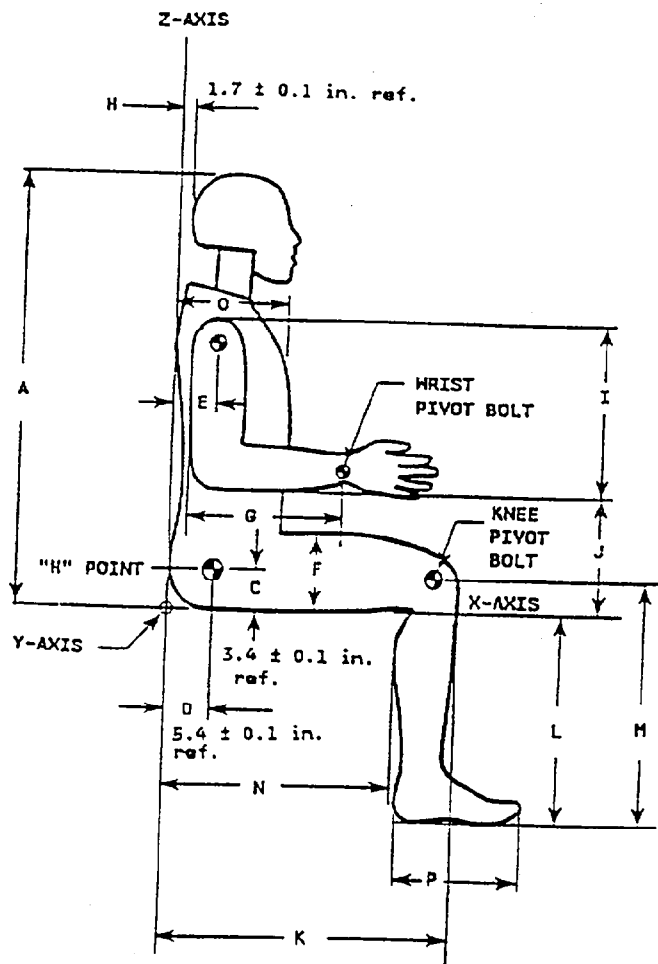
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 1-16-96

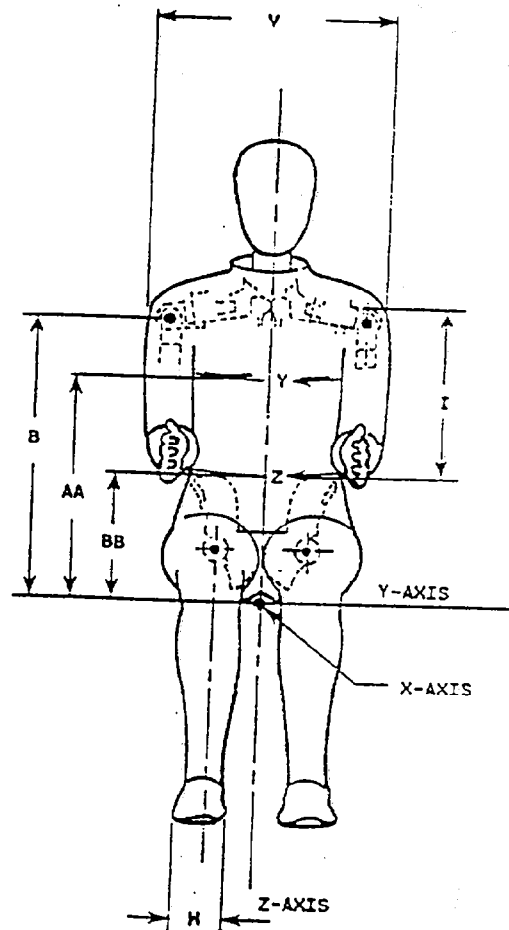
DESCRIPTION	SPECIFICATION (inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder - Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock to Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.6 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See next page for external dimensions)

HYBRID III EXTERNAL DIMENSIONS



SIDE VIEW



FRONT VIEW

Note: Figure is referenced to the erect seated position. The curved lumbar does not allow the hybrid III to be positioned in a perfect erect attitude.

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET

DUMMY NO.: 065 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 1-16-96

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 70°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	228
Peak Lateral Acceleration	15 G. MAX	6
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	23.1
Pendulum Deceleration	10 MS	22.50 - 27.50 G	23.78
	20 MS	17.60 - 22.60 G	21.10
	30 MS	12.50 - 18.50 G	16.01
Max. Pendulum G Above 30 MS		29.0 G MAX	15.9
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	40
D Plane Rotation	MAX	64 - 78 DEG.	69
	TIME	57 - 64 MS	63
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	114
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	69
	TIME	47 - 58 MS	53
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	105

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.00
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.22
	20 MS	14.00 - 19.00 G	15.76
	30 MS	11.00 - 16.00 G	12.70
Max. Pendulum G Above 30 MS		22 G Max	13
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	45
D Plane Rotation	MAX	81 - 106 DEG.	99
	TIME	72 - 82 MS	78
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	156
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-47.0
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	144

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.9
Peak Deflection	2.50 to 2.86 IN.	2.51
Peak Resistive Force	1160 to 1325 LBS.	1324
Internal Hysteresis	69 to 85%	71

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1122

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1148

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

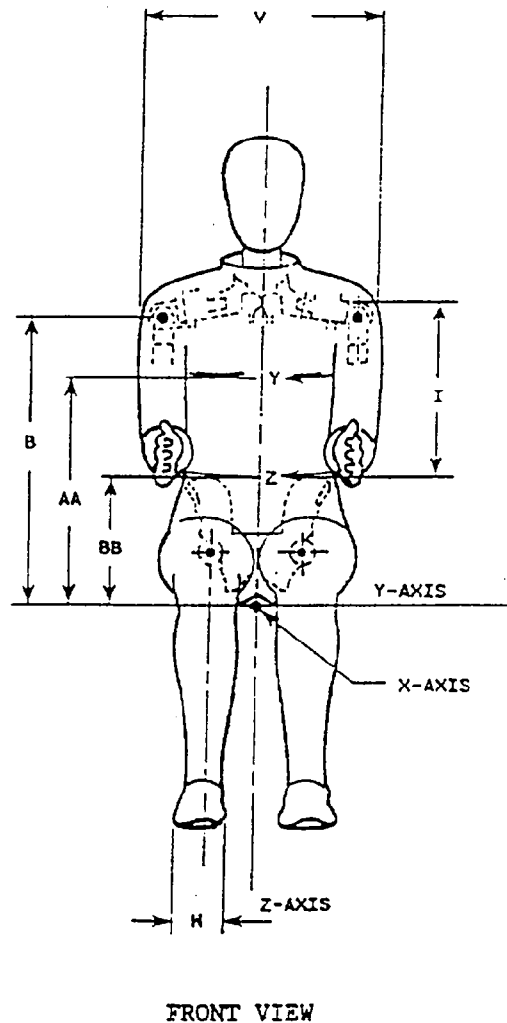
DUMMY NO.: 066 DUMMY CALIBRATION BY: Al Chalmers

I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 1-16-96

DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.5 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See next page for external dimensions)

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C-7

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

DUMMY NO.: 066 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 1-16-96

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 70°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	259
Peak Lateral Acceleration	15 G. MAX	3
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	23.0
Pendulum Deceleration	10 MS	22.50 - 27.50 G	23.66
	20 MS	17.60 - 22.60 G	20.90
	30 MS	12.50 - 18.50 G	14.88
Max. Pendulum G Above 30 MS		29.0 G MAX	14.8
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	41
D Plane Rotation	MAX	64 - 78 DEG	68
	TIME	57 - 64 MS	59
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	114
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	70
	TIME	47 - 58 MS	53
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	104

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.06
Pendulum Deceleration	10 MS	17.20 - 21.20 G	18.83
	20 MS	14.00 - 19.00 G	16.70
	30 MS	11.00 - 16.00 G	12.58
Max. Pendulum G Above 30 MS		22 G Max	13
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	45
D Plane Rotation	MAX	81 - 106 DEG.	98
	TIME	72 - 82 MS	78
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	156
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-44.6
	TIME	65 - 79 MS	70
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	141

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.8
Peak Deflection	2.50 to 2.86 IN.	2.59
Peak Resistive Force	1160 to 1325 LBS.	1310
Internal Hysteresis	69 to 85%	70

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1145

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1186

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	1/03/96
Head Y	ACC61	Endevco	1/03/96
Head Z	ACCW9	Endevco	1/03/96
Head X Redundant	AJ621	Endevco	1/03/96
Head Y Redundant	AJ619	Endevco	1/03/96
Head Z Redundant	AHY54	Endevco	1/03/96
Chest X	ACC78	Endevco	12/21/95
Chest Y	ACCE6	Endevco	12/21/95
Chest Z	ACCY3	Endevco	12/21/95
Chest X Redundant	AJ9J7	Endevco	12/21/95
Chest Y Redundant	AJ7A2	Endevco	12/21/95
Chest Z Redundant	AJ819	Endevco	12/21/95
Right Femur Load Cell	259	Denton	1/03/96
Left Femur Load Cell	260	Denton	1/03/96
Pelvis X	ALB87	Endevco	12/21/95
Pelvis Y	AGNB3	Endevco	12/21/95
Pelvis Z	AJ834	Endevco	12/21/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	442	Denton	12/18/95
Neck Load Cell Y	442	Denton	12/18/95
Neck Load Cell Z	442	Denton	12/18/95
Neck Moment X	442	Denton	12/18/95
Neck Moment Y	442	Denton	12/18/95
Neck Moment Z	442	Denton	12/18/95
Chest Deflection Gauge	065	Servo	1/04/96
Lap Belt Load Cell	313	Lebow	10/17/95
Torso Belt Load Cell	624	Lebow	10/17/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		CALIBRATION DATE
	SERIAL NO.	MANUFACTURER	
Upper Right Tibia Moment X	040	Denton	9/26/95
Upper Right Tibia Moment Y	040	Denton	9/26/95
Lower Right Tibia Moment Y	034	Denton	9/26/95
Lower Right Tibia Force X	034	Denton	9/26/95
Lower Right Tibia Force Z	034	Denton	9/26/95
Upper Left Tibia Moment X	023	Denton	9/26/95
Upper Left Tibia Moment Y	023	Denton	9/26/95
Lower Left Tibia Moment Y	019	Denton	9/26/95
Lower Left Tibia Force X	019	Denton	9/26/95
Lower Left Tibia Force Z	019	Denton	9/26/95
Right Foot Ball Z	AP0P6	Endevco	12/21/95
Right Foot Heel X	AP0T3	Endevco	12/21/95
Right Foot Heel Z	AP122	Endevco	12/21/95
Left Foot Ball Z	ACC81	Endevco	12/21/95
Left Foot Heel X	AP1Y1	Endevco	12/21/95
Left Foot Heel Z	AMTB8	Endevco	12/21/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	12/22/95
Head Y	ACCH1	Endevco	12/22/95
Head Z	AAMW5	Endevco	12/22/95
Head X Redundant	AJ9D2	Endevco	12/22/95
Head Y Redundant	AH1E2	Endevco	12/22/95
Head Z Redundant	AJ7K3	Endevco	12/22/95
Chest X	ACCY1	Endevco	12/21/95
Chest Y	ACCC8	Endevco	12/21/95
Chest Z	ACCT7	Endevco	12/21/95
Chest X Redundant	AJ9D4	Endevco	12/21/95
Chest Y Redundant	AJ9F3	Endevco	12/21/95
Chest Z Redundant	AJ9D9	Endevco	12/21/95
Right Femur Load Cell	261	Denton	1/03/96
Left Femur Load Cell	262	Denton	1/03/96
Pelvis X	ALBY8	Endevco	12/21/95
Pelvis Y	ALEK9	Endevco	12/21/95
Pelvis Z	ALE80	Endevco	12/21/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	443	Denton	12/18/95
Neck Load Cell Y	443	Denton	12/18/95
Neck Load Cell Z	443	Denton	12/18/95
Neck Moment X	443	Denton	12/18/95
Neck Moment Y	443	Denton	12/18/95
Neck Moment Z	443	Denton	12/18/95
Chest Deflection Gauge	066	Servo	1/04/96
Lap Belt Load Cell	657	Lebow	10/17/95
Torso Belt Load Cell	661	Lebow	10/17/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	036	Denton	12/20/95
Upper Right Tibia Moment Y	036	Denton	12/20/95
Lower Right Tibia Moment Y	040	Denton	12/22/95
Lower Right Tibia Force X	040	Denton	12/22/95
Lower Right Tibia Force Z	040	Denton	12/22/95
Upper Left Tibia Moment X	039	Denton	12/20/95
Upper Left Tibia Moment Y	039	Denton	12/20/95
Lower Left Tibia Moment Y	033	Denton	12/22/95
Lower Left Tibia Force X	033	Denton	12/22/95
Lower Left Tibia Force Z	033	Denton	12/22/95
Right Foot Ball Z	AP120	Endevco	12/14/95
Right Foot Heel X	AP2C4	Endevco	12/14/95
Right Foot Heel Z	AP042	Endevco	12/14/95
Left Foot Ball Z	AN8M6	Endevco	12/14/95
Left Foot Heel X	AHY99	Endevco	12/14/95
Left Foot Heel Z	APOE1	Endevco	12/14/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

VEHICLE ACCELEROMETERS			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	C25-A07	Entran	9/1/95
Right Rear Seat Crossmember X	H07-A25	Entran	9/5/95
Top of Engine Block X	H07-A03	Entran	9/15/95
Bottom of Engine X	D06-A16	Entran	2/2/96
Left Brake Caliper X	C25-A04	Entran	1/31/96
Right Brake Caliper X	F07-A12	Entran	1/31/96
Instrument Panel X	B02-G06	Entran	1/31/96
Redundant Left Rear Seat Crossmember X	L14-D03	Entran	10/23/95
Redundant Right Rear Seat Crossmember X	L14-D04	Entran	10/24/95

LABORATORY INSTRUMENTS			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	AH5N9	Endevco	5/08/95
Neck Bending Head Rotary Potentiometer	018	Spectrol	3/13/95
Neck Bending Pendulum Rotary Potentiometer	019	Spectrol	3/13/95
Chest Probe Accelerometer	AN8A4	Endevco	6/12/95
Knee Impact Accelerometer	MGA001	Entran	4/21/95

APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions

Safety Belts: They're for Everyone

This part of the manual tells you how to use safety belts properly. It also tells you some things you should not do with safety belts.

And it explains the air bag system.



CAUTION:

Don't let anyone ride where he or she can't wear a safety belt properly. If you are in a crash and you're not wearing a safety belt, your injuries can be much worse. You can hit things inside the vehicle or be ejected from it. You can be seriously injured or killed. In the same crash, you might not be if you are buckled up. Always fasten your safety belt, and check that your passengers' belts are fastened properly too.



Your vehicle has a light that comes on as a reminder to buckle up. (See "Safety Belt Reminder Light" in the Index.)

In most states and Canadian provinces, the law says to wear safety belts. Here's why: *They work.*

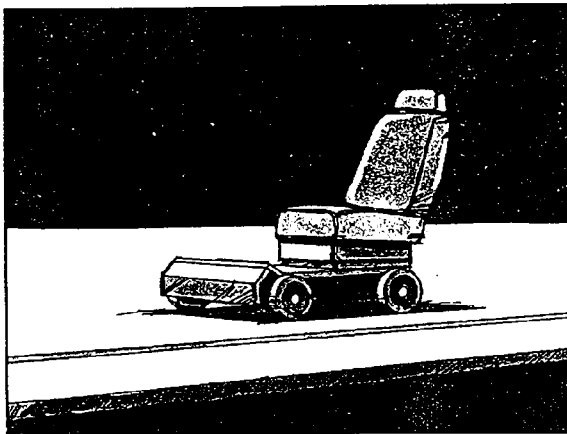
You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one.

A few crashes are mild, and some crashes can be so serious that even buckled up a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

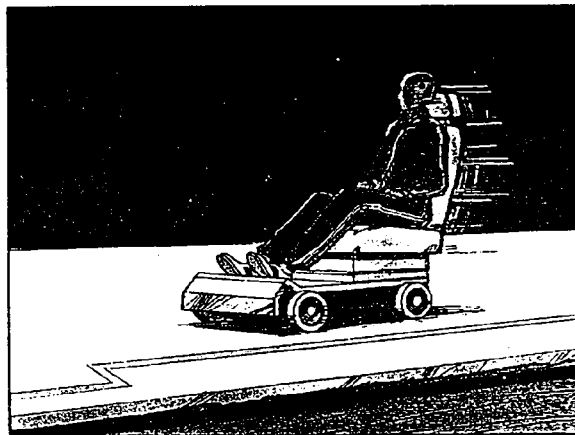
After more than 25 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter ... a lot!

Why Safety Belts Work

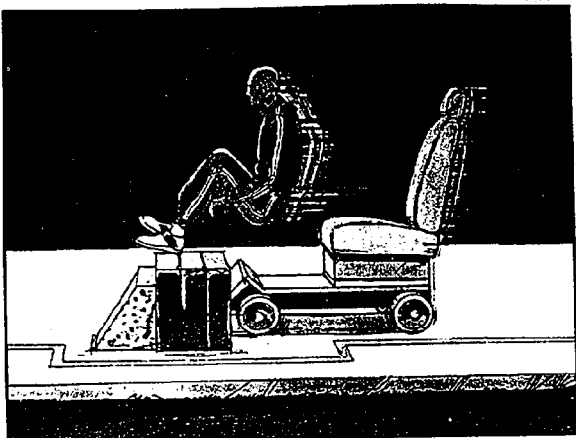
When you ride in or on anything, you go as fast as it goes.



Take the simplest vehicle. Suppose it's just a seat on wheels.



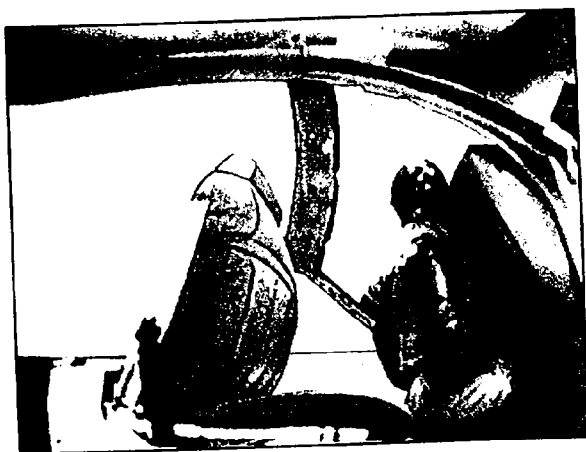
Put someone on it.



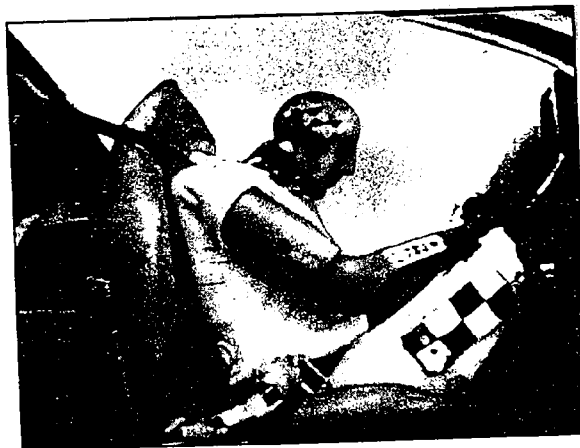
Get it up to speed. Then stop the vehicle. The rider doesn't stop.



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



or the instrument panel ...



or the safety belts!

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

Here Are Questions Many People Ask About Safety Belts -- and the Answers

Q: Won't I be trapped in the vehicle after an accident if I'm wearing a safety belt?

A: You *could* be -- whether you're wearing a safety belt or not. But you can unbuckle a safety belt, even if you're upside down. And your chance of being conscious during and after an accident, so you *can* unbuckle and get out, is *much* greater if you are belted.

Q: If my vehicle has air bags, why should I have to wear safety belts?

A: Air bags are in many vehicles today and will be in most of them in the future. But they are supplemental systems only; so they work *with* safety belts -- not instead of them. Every air bag system ever offered for sale has required the use of safety belts. Even if you're in a vehicle that has air bags, you still have to buckle up to get the most protection. That's true not only in frontal collisions, but especially in side and other collisions.

Q: If I'm a good driver, and I never drive far from home, why should I wear safety belts?

A: You may be an excellent driver, but if you're in an accident -- even one that isn't your fault -- you and your passengers can be hurt. Being a good driver doesn't protect you from things beyond your control, such as bad drivers.

Most accidents occur within 25 miles (40 km) of home. And the greatest number of serious injuries and deaths occur at speeds of less than 40 mph (65 km/h).

Safety belts are for everyone.

How to Wear Safety Belts Properly

Adults

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your Geo, see the part of this manual called "Children." Follow those rules for everyone's protection.

First, you'll want to know which restraint systems your vehicle has.

We'll start with the driver position.

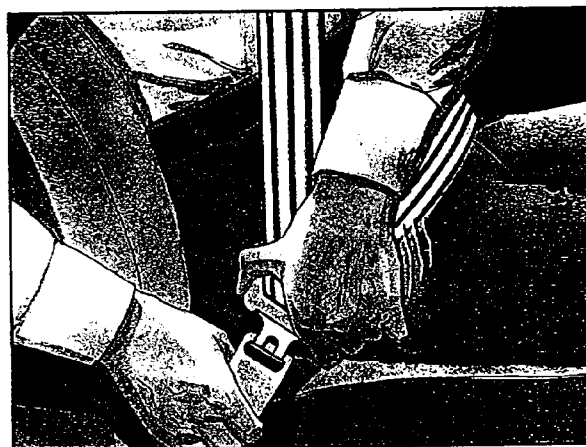
Driver Position

This part describes the driver's restraint system.

Lap-Shoulder Belt

The driver has a lap-shoulder belt. Here's how to wear it properly.

1. Close and lock the door.
2. Adjust the seat (to see how, see "Seats" in the Index) so you can sit up straight.



3. Pick up the latch plate and pull the belt across you. Don't let it get twisted.

The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

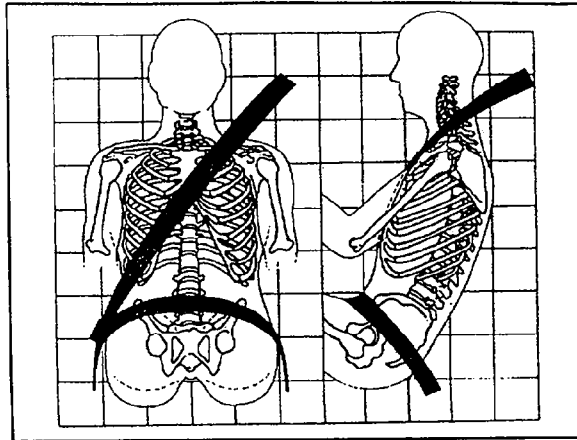
4. Push the latch plate into the buckle until it clicks.

Pull up on the latch plate to make sure it is secure. If the belt isn't long enough, see "Safety Belt Extender" at the end of this section.

Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



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

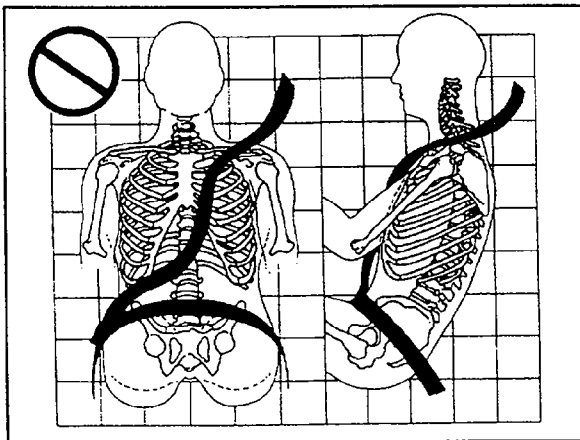


The lap part of the belt should be worn low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even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

The safety belt locks if there's a sudden stop or crash, or if you pull the belt very quickly out of the retractor.

1-19

Q: What's wrong with this?

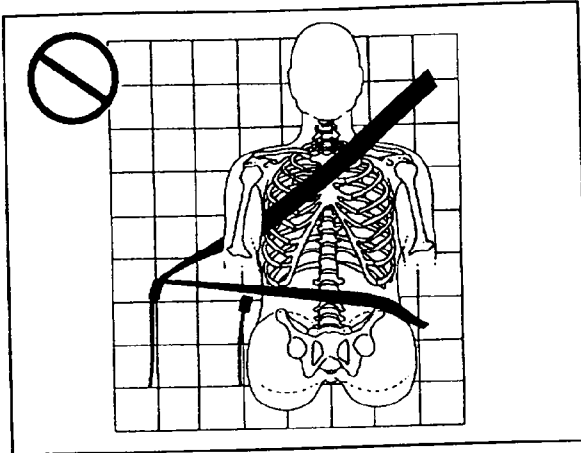


A: The shoulder belt is too loose. It won't give nearly as much protection this way.

⚠ CAUTION:

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

Q: What's wrong with this?

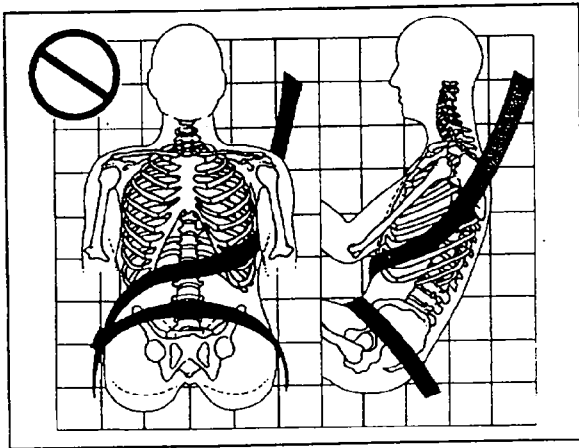


A: The belt is buckled in the wrong place.

⚠ CAUTION:

You can be seriously injured if your belt is buckled in the wrong place like this. In a crash, the belt would go up over your abdomen. The belt forces would be there, not at the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

Q: What's wrong with this?

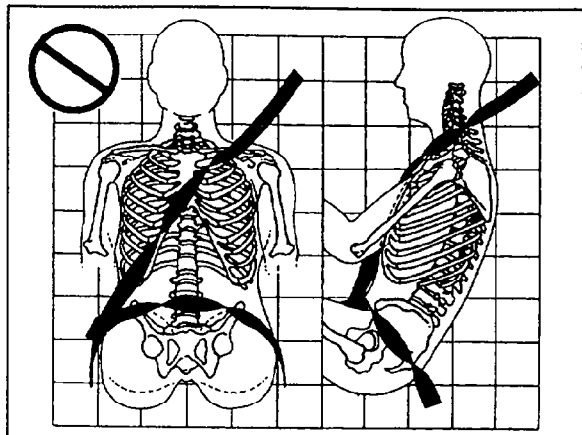


A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

⚠ CAUTION:

You can be seriously injured if you wear the shoulder belt under your arm. In a crash, your body would move too far forward, which would increase the chance of head and neck injury. Also, the belt would apply too much force to the ribs, which aren't as strong as shoulder bones. You could also severely injure internal organs like your liver or spleen.

Q: What's wrong with this?



A: The belt is twisted across the body.



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

Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

⚠ CAUTION:

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

Air Bag System

This part explains the air bag system.

Your Geo has two air bags -- one air bag for the driver and another air bag for the right front passenger.

Here are the most important things to know about the air bag system:

⚠ CAUTION:

You can be severely injured or killed in a crash if you aren't wearing your safety belt -- even if you have an air bag. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. The air bag is only a "supplemental restraint." That is, it works with safety belts but doesn't replace them.

CAUTION: (Continued)

CAUTION: (Continued)

Air bags are designed to work only in moderate to severe crashes where the front of your vehicle hits something. They aren't designed to inflate at all in rollover, rear, side or low-speed frontal crashes. Everyone in your vehicle, including the driver, should wear a safety belt properly -- whether or not there's an air bag for that person.

⚠ CAUTION:

Air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, it could seriously injure you. Safety belts help keep you in position for an air bag inflation in a crash. Always wear your safety belt, even with an air bag. The driver should sit as far back as possible while still maintaining control of the vehicle.

⚠ CAUTION:

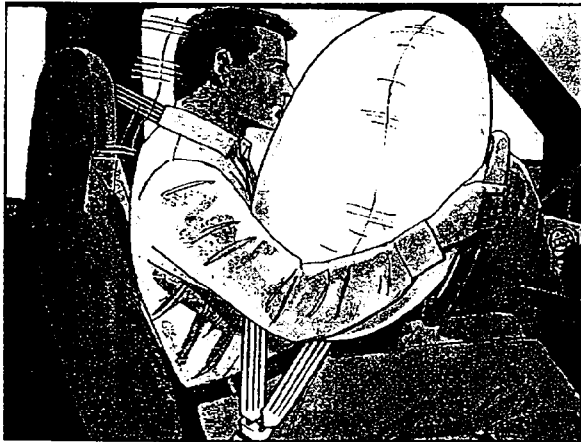
An inflating air bag can seriously injure small children. Always secure children properly in your vehicle. To read how, see the part of this manual called "Children" and the caution label on the right front passenger's safety belt.

**AIR
BAG**

There is an air bag readiness light on the instrument panel, which shows AIR BAG.

The system checks the air bag's electrical system for malfunctions. The light tells you if there is an electrical problem. See "Air Bag Readiness Light" in the Index for more information.

How the Air Bag System Works



Where is the air bag?

The driver's air bag is in the middle of the steering wheel.



The right front passenger's air bag is in the instrument panel on the passenger's side.

CAUTION:

Don't put anything on, or attach anything to, the steering wheel or instrument panel. Also, don't put anything (such as pets or objects) between any occupant and the steering wheel or instrument panel. If something is between an occupant and an air bag, it could affect the performance of the air bag -- or worse, it could cause injury.

When should an air bag inflate?

The air bag is designed to inflate in moderate to severe frontal or near-frontal crashes. The air bag will inflate only if the impact speed is above the system's designed "threshold level." If your vehicle goes straight into a wall that doesn't move or deform, the threshold level is about 9 to 15 mph (14 to 24 km/h). The threshold level can vary, however, with specific vehicle design, so that it can be somewhat above or below this range. If your vehicle strikes something that will move or deform, such as a parked car, the threshold level will be higher.

How does an air bag restrain?

In moderate to severe frontal or near-frontal collisions, even belted occupants can contact the steering wheel or the instrument panel. The air bag supplements the protection provided by safety belts. Air bags distribute the force of the impact more evenly over the occupant's upper body, stopping the occupant more gradually. But air bags would not help you in many types of collisions, including rollovers, rear impacts and side impacts, primarily because an occupant's motion is not toward the air bag. Air bags should never be regarded as anything more than a supplement to safety belts, and then only in moderate to severe frontal or near-frontal collisions.

What will you see after an air bag inflates?

After the air bag inflates, it quickly deflates. This occurs so quickly that some people may not even realize the air bag inflated. Some components of the air bag module in the steering wheel hub for the driver's air bag, or the instrument panel for the right front passenger's bag, will be hot for a short time. The part of the bag that comes into contact with you may be warm, but it will never be too hot to touch. There will be some smoke and dust coming from vents in the deflated air bags. Air bag inflation will not prevent the driver from seeing or from being able to steer the vehicle, nor will it stop people from leaving the vehicle.

The air bag is not designed to inflate in rollovers, side impacts or rear impacts, because inflation would not help the occupant.

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage to a vehicle or because of what the repair costs were. Inflation is determined by the angle of the impact and the vehicle's deceleration. Vehicle damage is only one indication of this.

The air bag system is designed to work properly under a wide range of conditions, including off-road usage. Observe safe driving speeds, especially on rough terrain. As always, wear your safety belt. See "Off-Road Driving" in the Index for more tips on off-road driving.

What makes an air bag inflate?

In a frontal or near-frontal impact of sufficient severity, the air bag sensing system detects that the vehicle is suddenly stopping as a result of a crash. The sensing system signals the inflator to produce a gas that inflates the air bags. The inflator, air bag and related hardware are all part of the air bag modules packed inside the steering wheel and in the instrument panel in front of the right front passenger.

CAUTION:

When an air bag inflates, there is dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but can't get out of the vehicle after an air bag inflates, then get fresh air by opening a window or door.

In many crashes severe enough to inflate an air bag, windshields are broken by vehicle deformation. Additional windshield breakage may also occur from the right front passenger air bag.

- The air bags are designed to inflate only once. After they inflate, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include air bag modules and possibly other parts. The service manual for your vehicle covers the need to replace other parts.

- Your vehicle is equipped with a crash sensing and diagnostic module, which records information about the air bag system. The module records information about the readiness of the system, when the sensors are activated and driver's safety belt usage at deployment.
- Let only qualified technicians work on your air bag system. Improper service can mean that your air bag system won't work properly. See your dealer for service.

NOTICE:

If you damage the cover for the driver's or the right front passenger's air bag, they may not work properly. You may have to replace the air bag module in the steering wheel or both the air bag module and the instrument panel for the right front passenger's air bag. Do not open or break the air bag covers.

Servicing Your Air Bag-Equipped Geo

Air bags affect how your Geo should be serviced. There are parts of the air bag system in several places around your vehicle. You don't want the system to inflate while someone is working on your vehicle. Your Geo dealer and the Tracker Service Manual have information about servicing your vehicle and the air bag system. To purchase a service manual, see "Service and Owner Publications" in the Index.

CAUTION:

For up to 10 seconds after the ignition key is turned off and the battery is disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Avoid wires wrapped with yellow tape or yellow connectors. They are probably part of the air bag system. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

The air bag system does not need regular maintenance.

Adding Equipment to Your Air Bag-Equipped Geo

Q: If I add a push bumper or a bicycle rack to the front of my vehicle, will it keep the air bags from working properly?

A: As long as the push bumper or bicycle rack is attached to your vehicle so that the vehicle's basic structure isn't changed, it's not likely to keep the air bags from working properly in a crash.

Q: Is there anything I might add to the front of the vehicle that could keep the air bags from working properly?

A: Yes. If you add things that change your vehicle's frame, bumper system, front end sheet metal or height, they may keep the air bag system from working properly. Also, the air bag system may not work properly if you relocate any of the air bag sensors. If you have any questions about this, you should contact Customer Assistance before you modify your vehicle. (The phone numbers and addresses for Customer Assistance are in Step Two of the Customer Satisfaction Procedure in this manual. See "Customer Satisfaction Procedure" in the Index.)