V2711

REPORT NO. MGA-98-N01

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

1998 DODGE GRAND CARAVAN SE
NHTSA NO. MW0305

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105

Test Date: October 31, 1997

Report Date: December 1, 1997

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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15. Supplementary Notes

16. Abstract

A 56 kph (35 mph) frontal barrier impact using a 30 load cell barrier was conducted on a 1998 Dodge Grand Caravan SE in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure No. TP-NCAP090196 for the determination of vehicle crashworthiness on October 31, 1997.

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 566 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 "Occupant Crash Protection" injury criteria, the driver's HIC was 1026 and the 3 msec. Clip (Chest g's) was 54.3 g's. The left and right femur loads for the driver were 5115 and 6304 Newtons, respectively. The passenger's HIC was 994 and the 3 msec Clip was 60.0 g's. The left and right 7744 femur maximum loads were 6544 and Newtons respectively.

17. Key Words	18. Distribution Statement
35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP) FMVSS 212 Indicant Testing FMVSS 219 (partial) Indicant Testing FMVSS 301 Indicant Testing	Copies of this report are available from: Technical Ref. Division, NHTSA, NASSIF Building, Room 5108 400 Seventh Street, S.W. Washington, D.C. 20590

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PREPARED BY: _____
Dave Kosloske, Project Engineer
MGA Research Corporation

APPROVED BY: _____
John Fleck, Facility Director
MGA Research Corporation

FINAL REPORT ACCEPTED BY:

_____
Manager, New Car Assess. Program (NCAP)

_____
Date of Report Acceptance

_____
Contracting Officer's Tech. Rep. (COTR)

_____
Date of Report Acceptance

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SECTION 1
PURPOSE AND SUMMARY OF NCAP TEST

This 35 mph frontal barrier impact test is part of the Composite FY'98 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-96-D-12010. 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.

A rigid load cell barrier consisting of 30 load cells was impacted by a 1998 Dodge Grand Caravan a velocity of 56.6 kph (35.2 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on October 31, 1997. 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 instrumented with head and chest primary and redundant triaxial accelerometers, pelvis triaxial accelerometers, a chest displacement transducer, a six axis neck load cell, right/left femur load cells, right/left lower leg sensors, and right/left foot

accelerometers. Seat belt load cells were used 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 111 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 1026 and the maximum chest (CLIP) deceleration over 3 milliseconds was 54.3 g's. The maximum chest compression was 46 mm. The left and right femur loads were 5115 and 6304 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 994 and maximum chest (CLIP) deceleration over 3 milliseconds was 60.0 g's. The maximum chest compression was 36 mm. The left and right femur loads were 7744 and 6544 Newtons respectively.

SECTION 2

OCCUPANT AND VEHICLE

INFORMATION/DATA SHEETS

DATA SHEET NO. 1

CRASH TEST SUMMARY

Vehicle Yr/Make/Model/Body Style: 1998/Dodge/Grand Caravan/SE

NHTSA No.: MW0305 VIN.: 2B4GP44G6WR587812

Vehicle Test Weight: 2021.7 kgs.

Impact Velocity: 56.6 kph Maximum Static Crush: 566 mm

Vehicle Rebound: 413 mm

DUMMIES:	DRIVER	PASSENGER
Serial Number:	065	066
Restraint System:	Type II belt and frontal airbag	Type II belt and frontal airbag
No. Data Channels:	40	40

Number of Cameras: 1 Real Time

16 High Speed

Door Opening Data: Yes LF Yes RF Yes LR Yes RR
(without use of tools)

FRONT SEAT(S) DATA	DRIVER	FRONT PASSENGER
Seat Shift:	5 mm forward;	4 mm forward
Seat Back Movement:	None	None

VISIBLE DUMMY

CONTACT POINTS:	DRIVER	PASSENGER
Head	to airbag	to airbag
Chest	to airbag and steering wheel	to airbag
Left Knee	to dash	to airbag and glove box
Right Knee	to dash	to airbag and glove box

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

Vehicle Yr/Make/Model/Body Style: 1998/Dodge/Grand Caravan/SE

NHTSA No.: MW0305 VIN.: 2B4GP44G6WR587812

Body color: Cranberry Date of Manufacture: 10-97

Engine: 6 Cylinders; ___ C.I.D.; 3.3 Liters;

X Gas; ___ Diesel; ___Turbocharged

___ Longitudinal; X Transverse

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

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

Odometer Reading: 85 miles

Major Option:

X A/C; X P/S; X P/B; X P/wdo;

X P/locks; X Tilt Wheel; X Cruise Control; ___ABS

Other: _____

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 303 kPa (44 Psi) Rear 303 kPa (44 Psi)

Recommended Tire Size: P215/65R15

Recommended Cold Tire Pressure: Front 241 kPa (35 Psi) Rear 241 kPa (35 Psi)

Tires on Vehicle: P215/65R15 Manufacturer: Goodyear

Number of Occupants: 2 Front; 2 Rear; 3 3rd Seat; 7 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) = 521.6 kg. (A)

No. of Occupants x 68.0 kg. = 476.0 kg. (B)

Rated Cargo Weight (RCW) A-B = 45.6 kg.

GVWR 2426.7 kg. GAWR: Front 1245.6 kg.; Rear 1245.6 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 504.8 kg Right Rear = 382.4 kg

Left Front = 548.4 kg Left Rear = 386.0 kg

TOTAL FRONT WEIGHT = 1053.2 kg (57.8 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 768.4 kg (42.2 % of Total Vehicle Weight)

TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1821.6 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1821.6 kg

VCW = Vehicle Capacity Weight 521.6 kg

DSC = Designated Seating Capacity 7 RCW = VCW - 68 (DSC) = 45.6 kg*

Target Test Weight = UDW + RCW + (2 dummies x 78.0 kg/dummy)

Target Test Weight = 2023.2 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 564.2 kg Right Rear = 429.2 kg

Left Front = 588.8 kg Left Rear = 439.5 kg

TOTAL FRONT WEIGHT = 1153.0 kg (57.0 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 868.7 kg (43.0 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 2021.7 kg

Weight of ballast secured behind right front passenger = 36.3 kg

Vehicle components removed to meet target weight: Spare tire, right taillight side molding and rear interior

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude:	RF 762	LF 750	RR 771	LR 768
Test Attitude:	RF 741	LF 739	RR 754	LR 750
Post Test	RF 844	LF 877	RR 871	LR 880

Wheel Base: 3040 mm; C.G. = 1330 mm rearward of front wheel C/L

Remarks: none

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

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 75.7 liters

Usable Capacity Figure Furnished by COTR = 75.7 liters

Test Volume Range (92 to 94% of Usable Capacity) = 69.6 to 71.2 liters

ACTUAL TEST VOLUME = 70.4 liters

Test Fluid Type: Stoddard Solvent; Spec. Grav. = 0.77

Kinematic Viscosity = 1.788 centistrokes; Color = Purple

Type of Fuel Pump; Electric X; Mechanical _____

Does Electric Pump operate with ignition switch "ON" & engine "Off"?

Yes X No _____

DATA SHEET NO. 3

POST-IMPACT DATA

Vehicle Yr/Make/Model/Body Style: 1998/Dodge/Grand Caravan/SE

NHTSA No.: MW0305 VIN.: 2B4GP44G6WR587812

Type of Test: 35 mph Frontal Impact Impact Angle: 0°

Date of Test: October 31, 1997 Time of Test: 5:12 p.m.

Ambient Temperature: °C (°F) (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 = 57.0 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	= Right	4794	C/L	4983	Left 4822
	Post-test	= Right	4332	C/L	4580	Left 4310
	Crush	= Right	462	C/L	403	Left 512

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

R 397 mm C_L 355 mm L 488 mm

Average = 413 mm

DATA SHEET NO. 4

TEST VEHICLE INFORMATION

	Front		Front Passenger	
Post-Test Door Opening	Left	Right	Left	Right
(without use of tools)	Yes	Yes	Yes	Yes

	Driver	Front Passenger
Seat Movement		
Seat Back Movement	None	None
Seat Shift (mm)	5 mm forward	4 mm forward

Glazing Damage

Backlight/Windshield Windshield cracked, test run without back glass

Other Notable Impact Effects: Driver and passenger frontal airbags deployed

SECTION 3

SUMMARY OF RESULTS FOR-------

FMVSS 212, "Windshield Mounting"

FMVSS 219 (Partial), "Windshield Zone Intrusion"

FMVSS 301-75, "Fuel System Integrity"

DATA SHEET 5

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

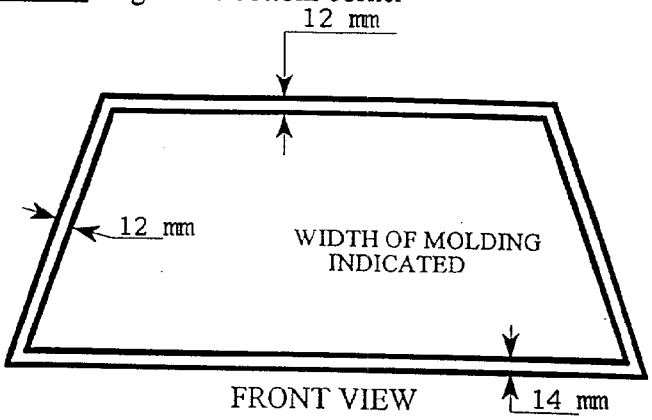
Details of windshield mounting such as retention method, trim type, etc.:
Windshield set in rubber molding with glue

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		
	PRE-TEST (mm)	POST-TEST (mm)	PERCENT RETENTION
RIGHT SIDE	2333	2287	98%
LEFT SIDE	2333	2333	100%
TOTAL	4666	4620	99%

AREA OF RETENTION FAILURE: Right side bottom corner



FAILURE DETAILS: The windshield became detached from its molding starting at the bottom right corner and running vertically for approximately 46 mm.

DATA SHEET 6

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 ½" 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= 1230 mm

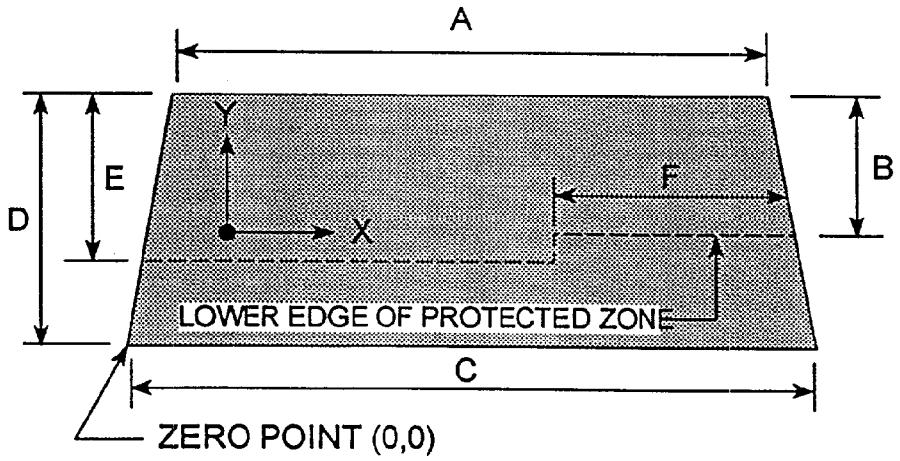
B= 517 mm

C= 1641 mm

D= 900 mm

E= 625 mm

F= 645 mm



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

(Show location of penetration)

NONE

DATA SHEET 7

FMVSS NO. 301-75, FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: MW0305 Test Date: October 31, 1997

Vehicle Mfgr./Make/Model: Dodge/Grand Caravan/SE

Usable Capacity of Vehicle's Fuel Tank: 75.7 Liters
(figure furnished by vehicle manufacturer)

TEST REQUIREMENTS:

Drain the test vehicle's fuel system and operate the engine until the fuel system is dry. Add Stoddard solvent, which has been dyed purple, until 92-94% of the stated usable capacity is reached. Operate the engine to assure the Stoddard solvent is present throughout the entire fuel system.

AMOUNT OF STODDARD SOLVENT ADDED TO VEHICLE'S FUEL TANK:

70.4 Liters which is 93.0 % of the stated USABLE CAPACITY.

TEST VEHICLE IMPACT TYPE: X Frontal (35 mph)

____ Oblique (30 mph) with __° barrier face first contacting (driver/passenger) side

___ Rear Moving Barrier (30 mph)

___ Side Impact MDB (33.2 mph)

FUEL SPILLAGE MEASUREMENT:

	ACTUAL	MAX ALLOWED
1. From impact until vehicle motion ceases	0	1 OZ
2. For 5 minute period after vehicle motion ceases	0	5 OZ
3. For next 25 minutes	0	1 oz./1 MIN

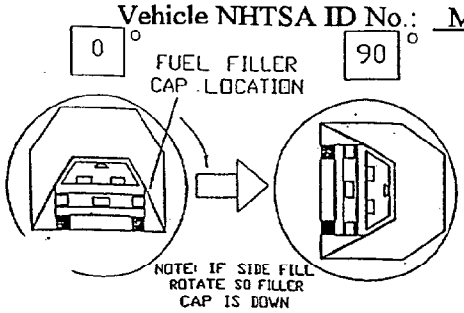
SOLVENT SPILLAGE DETAILS: None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90°

Vehicle NHTSA ID No.: MW0305



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 46 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 46 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

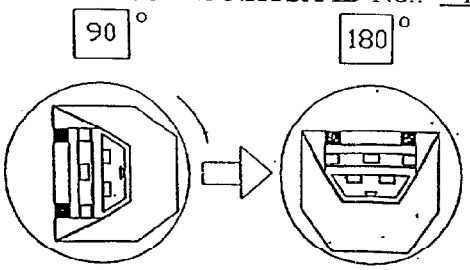
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST PHASE: 90° - 180° Vehicle NHTSA ID No.: MW0305



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 20 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 20 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

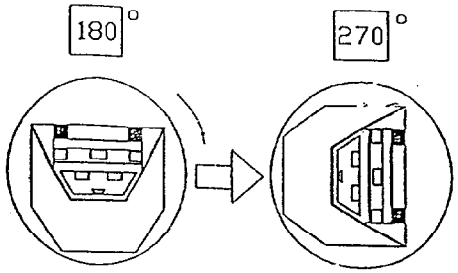
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST PHASE: 180° - 270° Vehicle NHTSA ID No.: MW0305



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 26 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 26 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

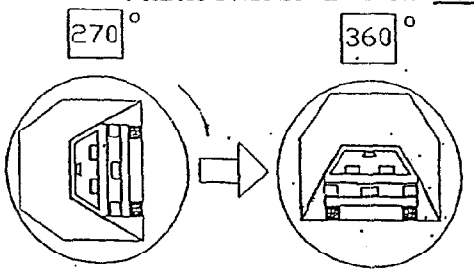
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST PHASE: 270° - 360° Vehicle NHTSA ID No.: MW0306



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 47 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 47 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

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. Post-Test Airbag Data
4. Test Vehicle Measurements

III. AID DATA

1. Accident Investigation Damage Data Summary

DATA SHEET 9

DUMMY INJURY CRITERIA VALUES DATA SHEET

VEH. YR./MAKE/MODEL/BODY STYLE: 1998/Dodge/Grand Caravan/SE

VEH. NHTSA NO.: MW0305 TEST DATE: October 31, 1997

ACCELERATION VALUES: (g's)	DRIVER # 065		PASSENGER # 066	
	Min.	Max.	Min.	Max.
Head Channel X	-89.0	15.3	-74.8	29.9
Head Channel Y	-2.6	9.7	-13.8	5.8
Head Channel Z	15.2	7.1	-36.6	5.4
HEAD RESULTANT	89.4		77.9	
Chest Channel X	-56.2	7.6	-63.8	9.6
Chest Channel Y	-5.5	4.8	-6.5	2.9
Chest Channel Z	-4.9	9.7	-13.5	6.6
CLIP	54.3		60.0	
TIME INTERVAL (msec) [3. msec. minimum]	$t_1 = 69.6$ $t_2 = 72.7$		$t_1 = 80.8$ $t_2 = 83.9$	

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	1026	994
t_1 = (msec)	66.6	72.3
t_2 = (msec)	91.3	108.3
Avg. Accel. t_1 to t_2 (g's)	70.4	59.8

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

MAXIMUM COMPRESSIVE FEMUR FORCES:

Left Side (N)	5115	7744
Right Side (N)	6304	6544

SEAT BELT FORCES:

Lap Belt (N)	3494	621
Shoulder Belt (N)	5931	5766

DATA SHEET 9

DUMMY INJURY CRITERIA VALUES DATA SHEET (Cont'd)

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

MAXIMUM VALUES	DRIVER DUMMY #065	PASSENGER DUMMY #066
Neck Load X (N)	416	536
Neck Load Y (N)	-195	-165
Neck Load Z (N)	-2671	-2210
Neck Moment X (NM)	-16.1	-19.5
Neck Moment Y (NM)	-39.6	-44.6
Neck Moment Z (NM)	-8.8	8.2
Chest Deflection X (mm)	46	36
Time of Max. Occurrence	74	78
Pelvis X Acceleration (g's)	-69.6	-81.7
Pelvis Y Acceleration (g's)	-12.5	-16.1
Pelvis Z Acceleration (g's)	-26.3	-23.5
Pelvis Resultant (g's)	71.8	84.8

DATA SHEET 10

DUMMY POSITIONING IN VEHICLE

Vehicle NHTSA No.: MW0305 Vehicle: 1998/Dodge/Grand/Caravan/SE

SEAT TYPE:	ADJUSTER TYPE:		BUCKET SEAT BACK TYPE:
____Bench	Driver:	X Manual	____Fixed
X Bucket		____ Power	X Adjustable Reclining
____Split Bench			
	Passenger:	X Manual	____Fixed
		____ Power	X Adjustable Reclining

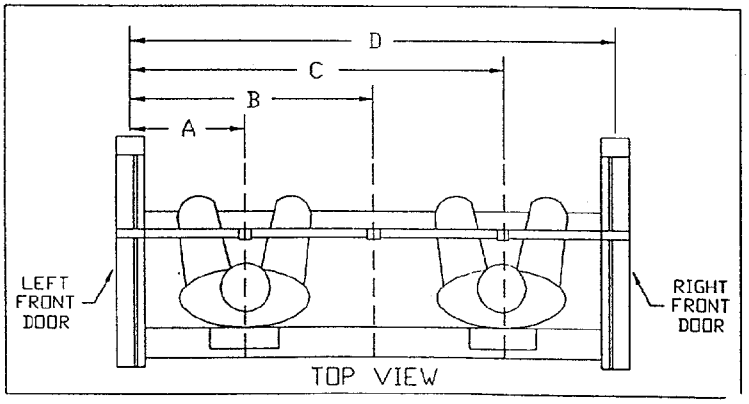
DRIVER SEAT POSITION
11th detent out of 21 detents

Seat back angle 22.5°

PASSENGER SEAT POSITION
11th detent of 21 detents

Seat back angle 22.5°

Steering column set to sixth position with full up being one. Steering column angle 28°



065 DUMMY ID 066

A = Left Door to Driver Centerline 464 mm

B = Left Door to Center Passenger Centerline 877 mm

C = Left Door to Right Passenger Centerline 1302 mm

D = Left Door to Right Door 1754 mm

DATA SHEET 10

DUMMY POSITIONING IN VEHICLE (Cont'd)

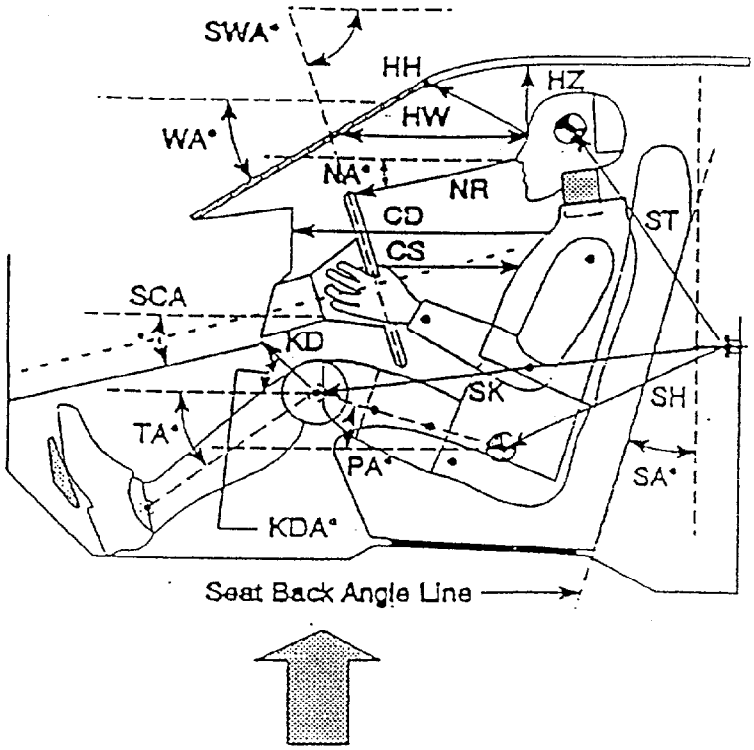
Units (mm)

	DRIVER (Serial #065)	PASSENGER (Serial #066)
WA°	N/A	
SWA°	28.1°	N/A
SCA°	28.0°	N/A
SA°	22.5°	22.5°
HZ	206	198
HH	341	346
HW	584	600
HR	234	228
NR	392 Angle 12°	N/A
CD	558	571
CS	297	N/A
RA	168	N/A
KDL	184 Angle (KDA) 14.8°	164
KDR	186	168 Angle 9.8 °
PA°	24.2°	21.9°
TA°	46.2°	49.6°
KK	300	230
ST*	662 Angle 10.9°	677 Angle 9.0°
SK*	628 Angle 8.1°	652 Angle 7.2°
SH*	230 Angle 9.2°	238 Angle 3.3°
SHY	273	241
HS	332	334
HD	134	118
AD	134	120

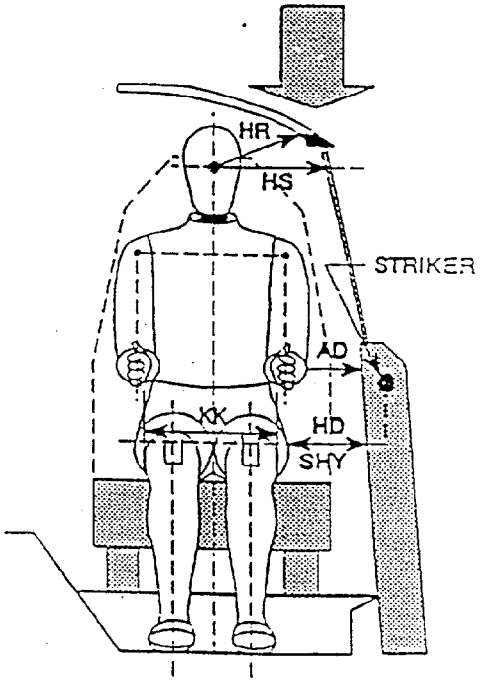
N/A = Not Applicable

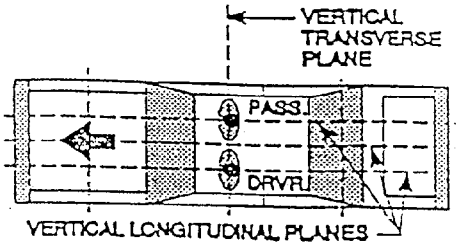
* Angles measured from vertical

FRONT SEAT MEASUREMENTS



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)

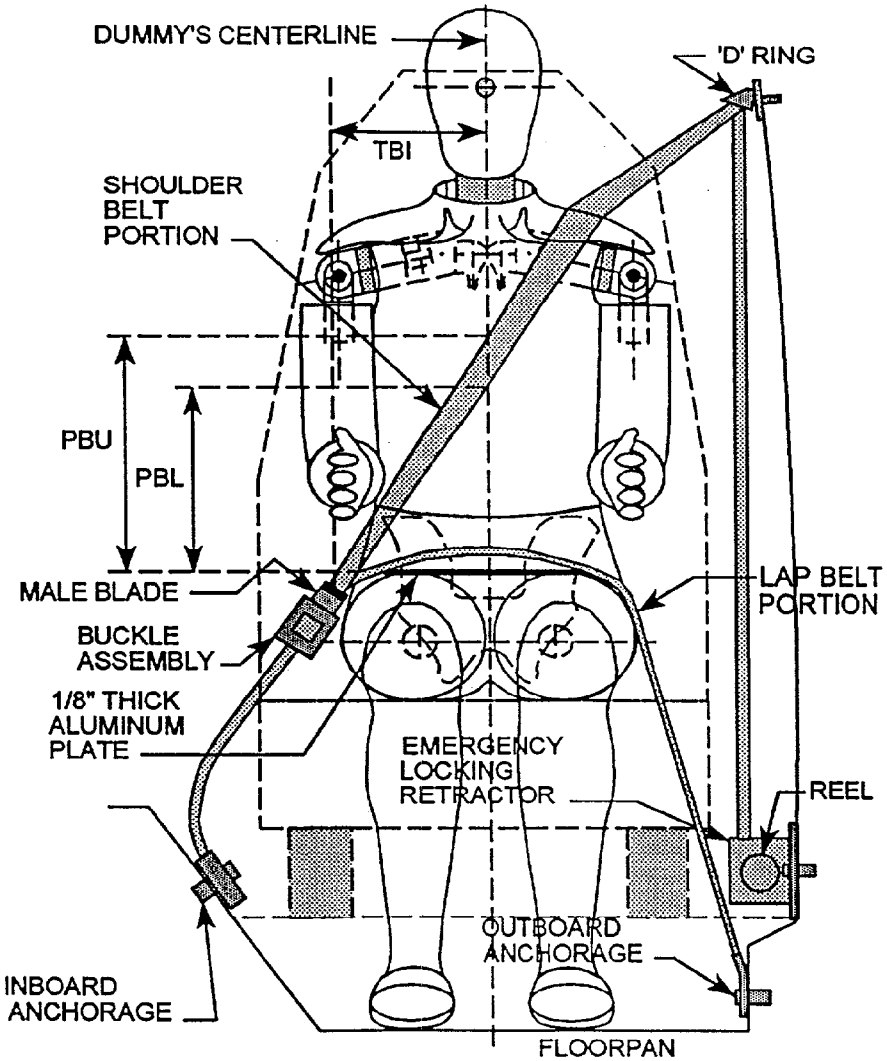




CD	-	Chest to Dash
CS	-	Steering Wheel to Chest
HH	-	Head to Header
HW	-	Head to Windshield
HZ	-	Head to Roof
KDA	-	Knee to Dash Angle
KDL	-	Left Knee to Dash
KDR	-	Right Knee to Dash
NA	-	Nose to Rim Angle
NR	-	Nose to Rim
PA	-	Pelvic Angle
RA	-	Rim to Abdomen
SA	-	Seat Back Angle
SCA	-	Steering Column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

DATA SHEET 11

SEAT BELT POSITIONING DATA



FRONT VIEW OF DUMMY

(illustration)

Dimension = mm

	DRIVER DUMMY	PASSENGER DUMMY
PBU -- Top surface of alum. plate to upper edge	343	342
PBL -- Top surface of alum. plate to belt lower edge	273	264

DATA SHEET 12

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Length from trim above retractor reel to "D" ring as measured on dummy.	300 mm	294 mm
Shoulder belt length as measured on Part 572 Dummy.	870 mm	882 mm
Lap belt length as measured on Part 572 Dummy.	1000 mm	997 mm
SHOULDER BELT SPOOL-OFF DATA:		
As determined by film analysis	94 mm	80 mm
As determined mechanically	104 mm	94 mm
Measured electronically	84 mm	69 mm
RETRACTOR LOCK-UP TIME:		
As determined by shoulder belt spool-off observed in on-board cameras	70 msec.	62 msec.

DATA SHEET 13

CAMERA LOCATIONS

VEH. NHTSA NO.: MW0305; TEST DATE: October 31, 1997

VEH YEAR/MAKE/MODEL/BODY STYLE: 1998/Dodge/Grand/Caravan/SE

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	1120	8260	1550	90	7780	25	549
3	Steering Column Top	2010	8790	1560	90	8310	25	1005
4	Steering Column Bottom	2000	8780	1030	90	8300	25	1159
5	Driver Close-up	1500	10380	1510	90	9900	75	1156
6	Driver Angle	4830	5440	2040			50	1053
7	Onboard Driver						35	985
8	Onboard Passenger						35	1005
9	Right Overall	2600	-8380	1410	90	7910	13	952
10	Right Front	1000	-7950	1475	90	7480	25	990
11	Passenger Close-up	1440	-10110	1370	90	9640	75	1099
12	Passenger Angle	5110	-5520	1960			50	1176
13	Full Windshield	-380	0	2750			13	1111
14	Driver Windshield	100	470	1760			13	917
15	Passenger Windshield	100	-470	1770			13	772
16	Pit Front	1170	0	-3165			13	1005
17	Pit Rear	3070	0	-3175			13	926

* COORDINATES:

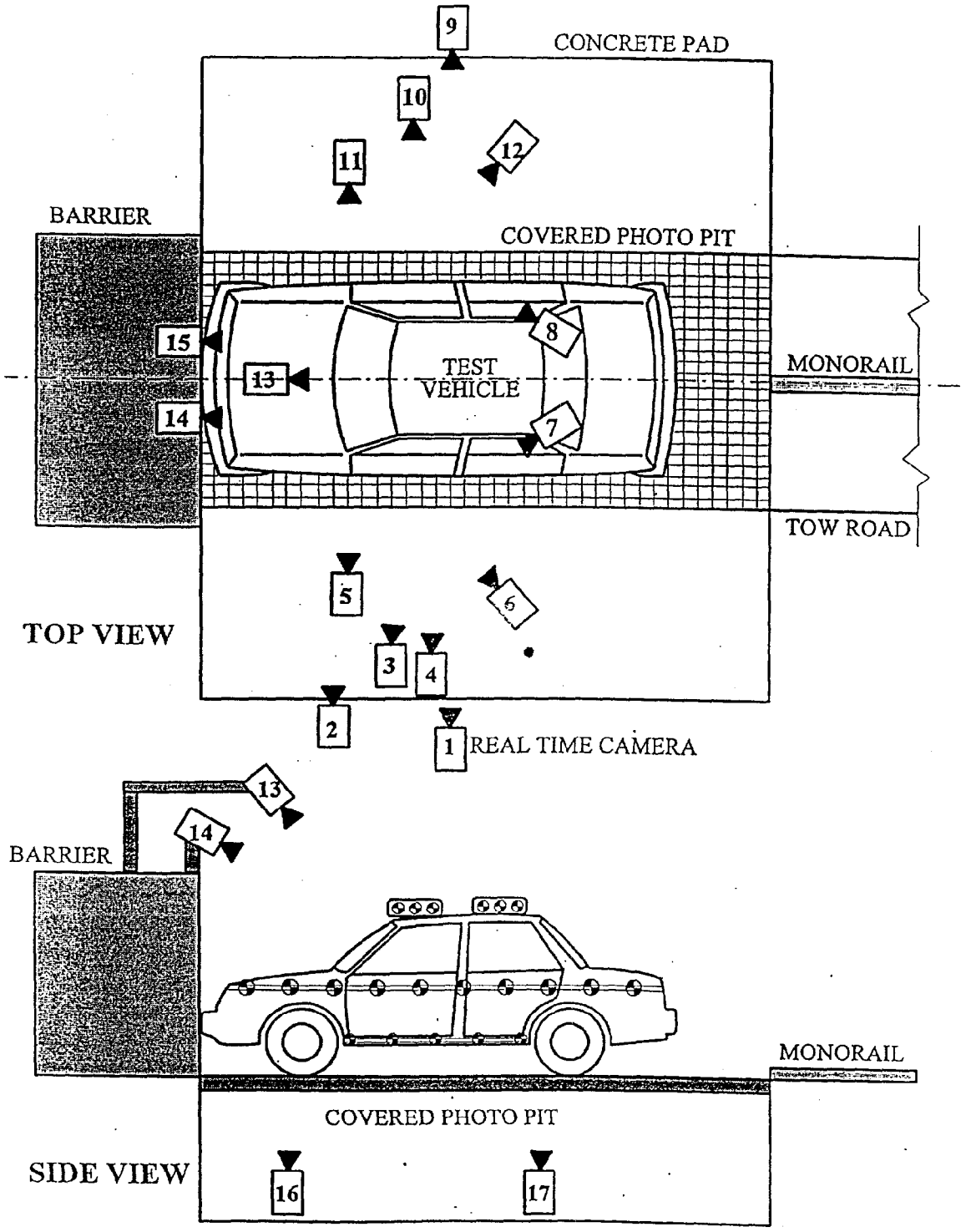
+X = film plane rearward of barrier

+Y = film plane to left of monorail centerline

+Z = film plane to above ground level

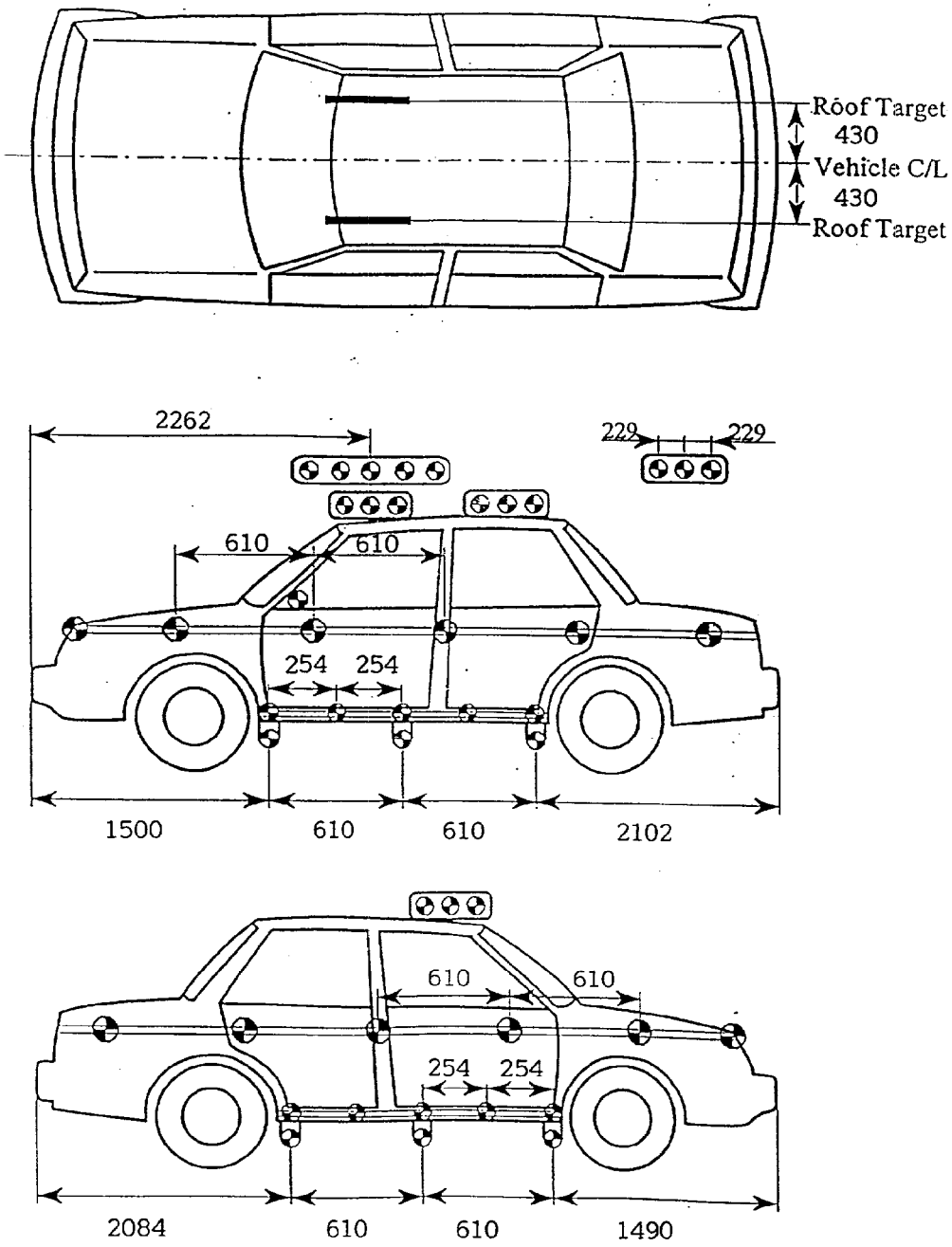
ORIGIN: For X and Y it is the Impact Point. For Z it is the Floor.

CAMERA LOCATIONS (Cont'd)



DATA SHEET 14

VEHICLE TARGET LOCATIONS



(DIMENSIONS IN MM)

DATA SHEET 15

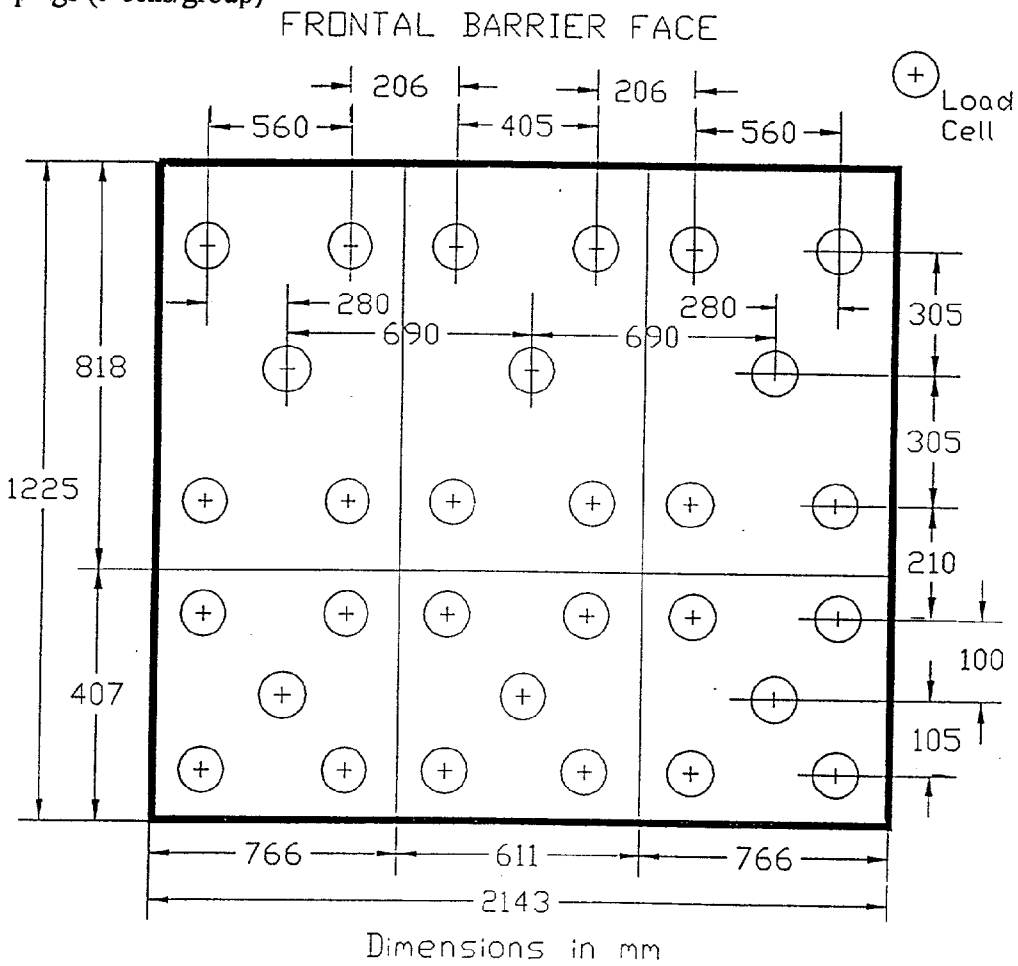
LOAD CELL LOCATIONS ON FIXED BARRIER

30 Load Cells

6 Rows

9 Columns

6 Groupings (5 cells/group)



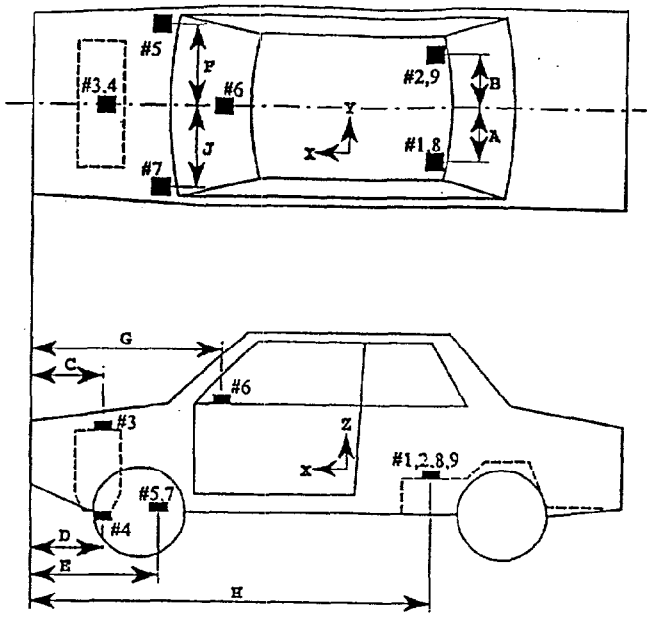
The following data is presented in Appendix B:

(1) Total or Sum of 30 individual load cells

(2) Data from 6 Groupings shown above (5 cells/group)

DATA SHEET 16

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



Units: (mm)

Dimension	Length
A	715
B	715
C	722
D	699
E	898
F	667
G	1501
H	3291
J	667

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 Side Brake Caliper	X

DATA SHEET 17

POST TEST AIRBAG DATA

A. Number of Vent Holes: Driver 0 ; Passenger 0

B. Size of Vent Holes: Driver N/A . Passenger N/A

C. Total Vent Area; Driver N/A Passenger N/A

D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter

Driver; Length____mm, Width _____mm, Diameter 670 mm

Passenger; Length 828 mm, Width 475 mm, Diameter ____ mm

E. Is the Airbag Tethered?

Driver; X (2) Yes; ___ No; If yes, record length of tether 230 mm and 270 mm

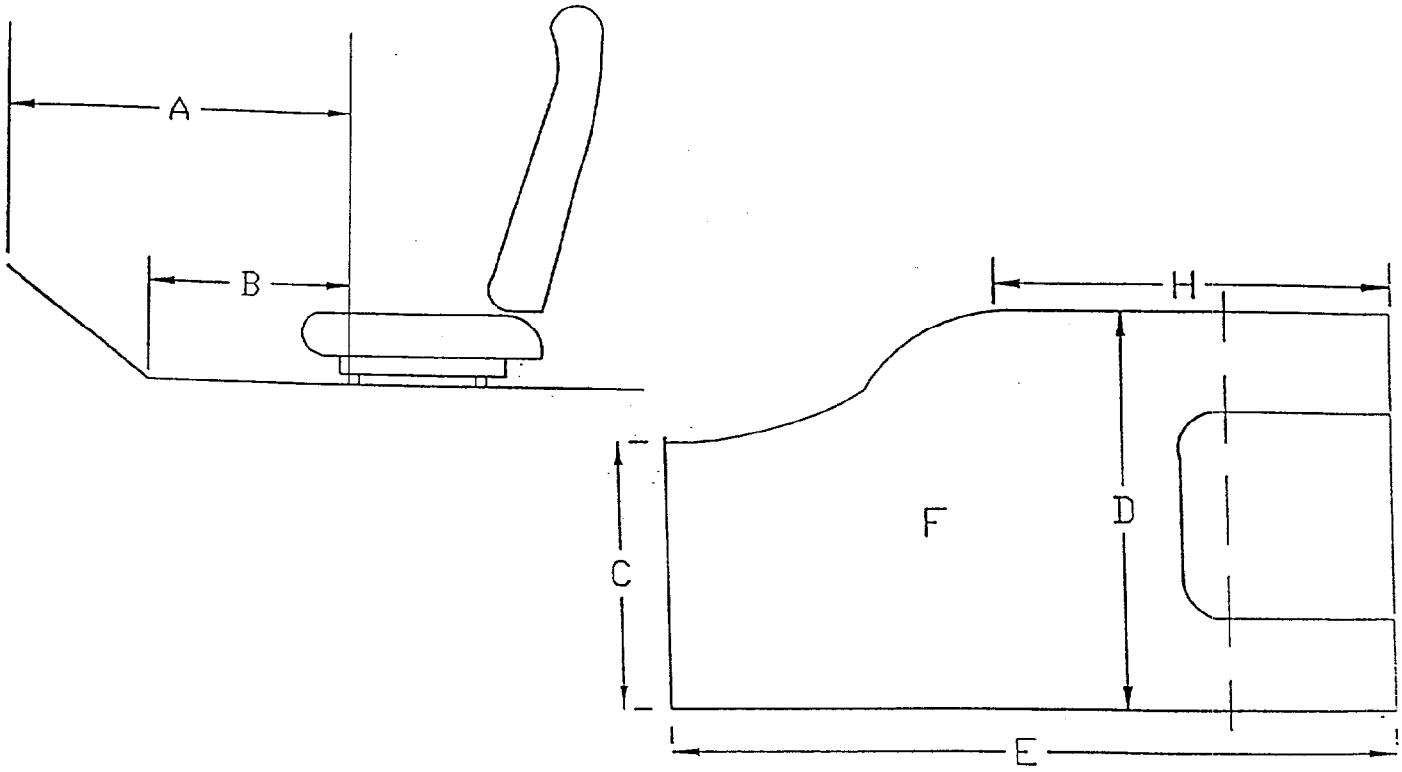
Passenger; _____ Yes; X No, If yes, record length of tether____ mm

DATA SHEET 18

TEST VEHICLE MEASUREMENTS

STATIC FOOTWELL DEFORMATION

Driver's Side



Units = mm

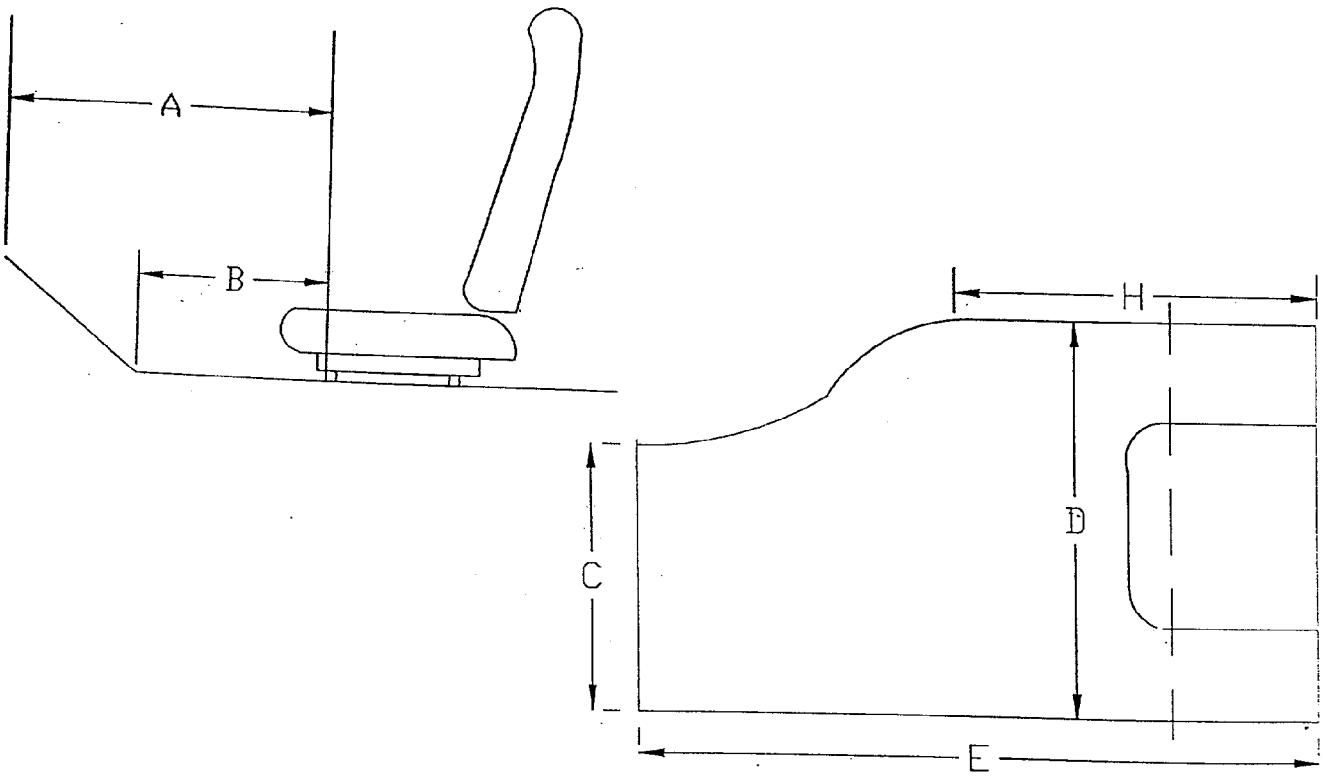
MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	770	586	184
B	535	375	160
C	535	510	25
D	522	515	7
E	1987	1977	10
H	1780	1717	63

DATA SHEET 18

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC FOOTWELL DEFORMATION

Passenger's Side



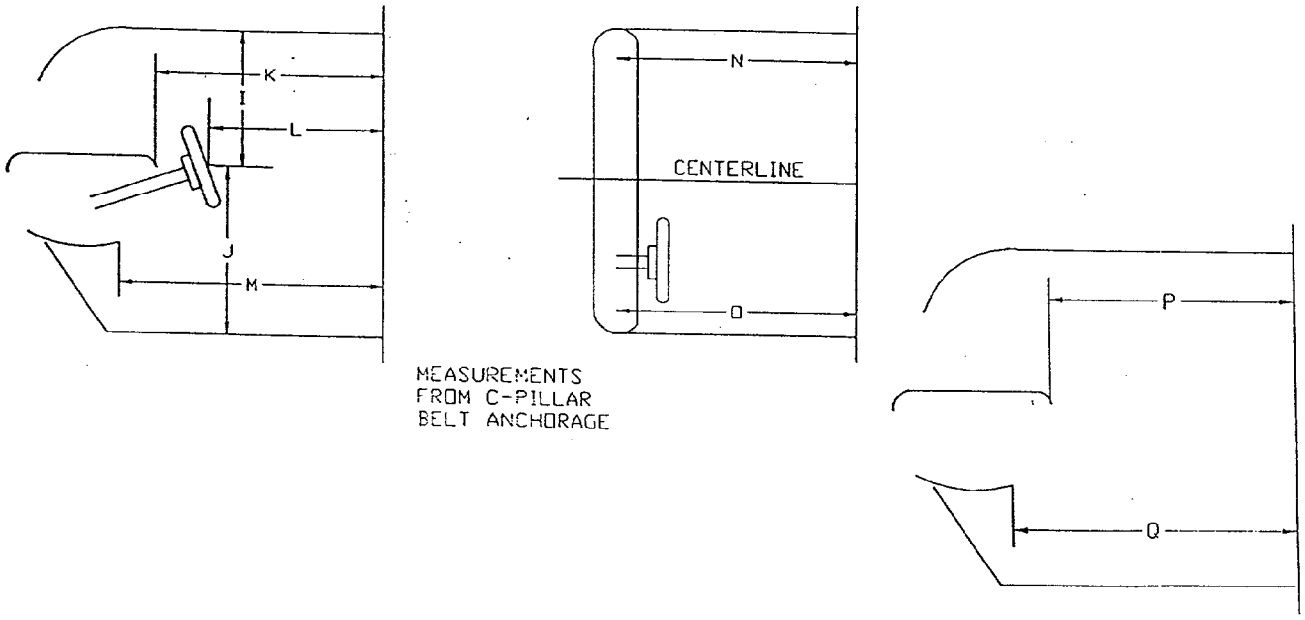
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	682	513	169
B	532	406	126
C	500	557	57
D	492	485	7
E	1999	1919	80
H	1828	1751	77

DATA SHEET 18

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC PASSENGER COMPARTMENT INTRUSION



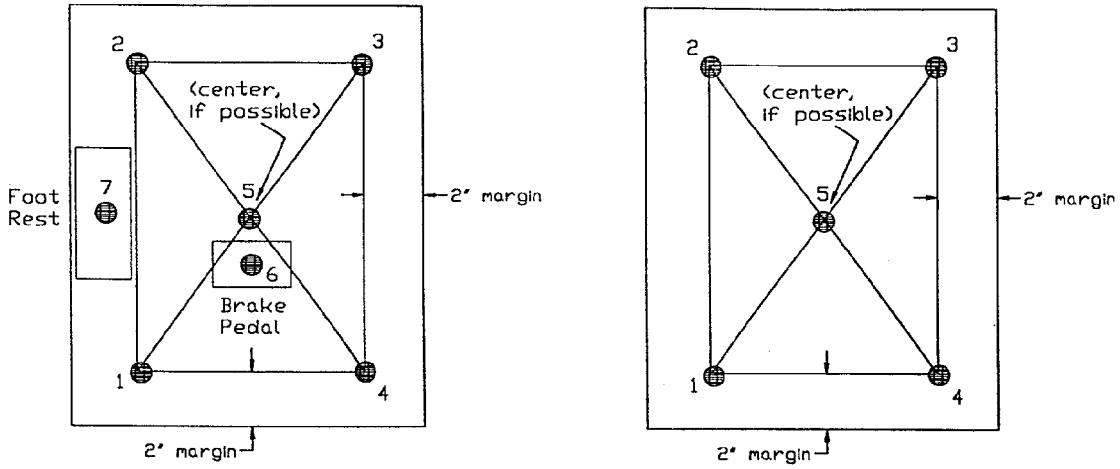
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
I	466	395	71
J	719	736	17
K	1828	1777	51
L	1547	1530	17
M	1983	1936	47
N	2283	2244	39
O	2271	2270	1
P	1798	1820	22
Q	1945	1864	81

DATA SHEET 18

TEST VEHICLE MEASUREMENTS (Cont'd)

TOE PAN MEASUREMENTS



DRIVER **PASSENGER**

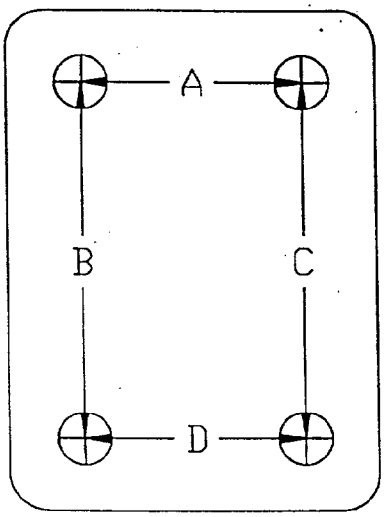
Driver						
Location	X			Z		
	Pre-Test	Post-Test	Def.	Pre-Test	Post-Test	Def.
1	548	395	153	18	74	56
2	634	471	163	146	205	59
3	630	428	202	102	176	74
4	538	334	204	50	79	29
5	595	422	173	82	134	52
6	490	352	138	205	226	21
7	---	---	---	---	---	---
Passenger						
Location	X			Z		
	Pre-Test	Post-Test	Def.	Pre-Test	Post-Test	Def.
1	526	355	171	35	128	93
2	640	405	235	140	268	128
3	622	455	167	149	262	113
4	530	391	139	31	148	117
5	592	387	205	86	188	102

DATA SHEET 18

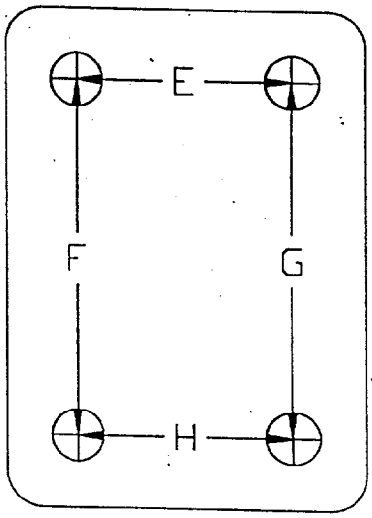
TEST VEHICLE MEASUREMENTS (Cont'd)

UNDERBODY FLOORBOARD DEFORMATION

DRIVER'S SIDE



PASSENGER'S SIDE



MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	287	305	18
B	282	277	5
C	311	247	64
D	286	292	6
E	295	298	3
F	236	208	28
G	239	242	3
H	286	293	7

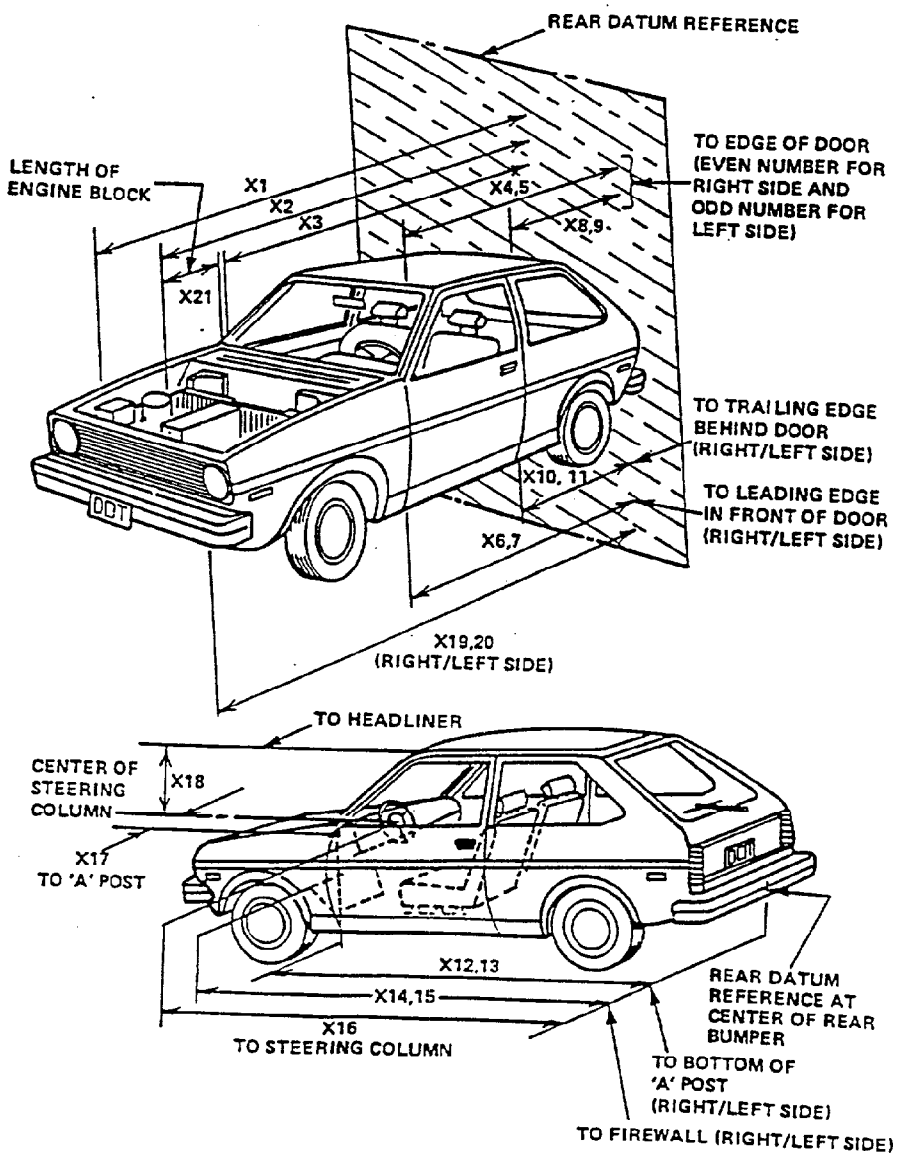
DATA SHEET 18

TEST VEHICLE MEASUREMENTS (Cont'd)

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	4983	4580	403
X2	Rear Surface of Vehicle to Front of Engine	4415	4208	207
X3	Rear Surface of Vehicle to Firewall	4251	4300	-49
X4	Rear Surface to Upr. Leading Edge of Rt. Door	3574	3585	-11
X5	Rear Surface to Upr. Leading Edge of Left Door	3570	3582	-12
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	3542	3530	12
X7	Rear Surface to Lwr. Leading Edge of Left Door	3545	3523	22
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	2551	2562	-11
X9	Rear Surface to Upr. Trailing Edge of Left Door	2550	2563	-13
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	2543	2531	12
X11	Rear Surface to Lwr. Trailing Edge of Left Door	2544	2525	19
X12	Rear Surface to Bottom of A-Post on Rt. Side	3541	3528	13
X13	Rear Surface to Bottom of A-Post on Left Side	3550	3523	27
X14	Rear Surface to Firewall on Right Side	4061	4040	21
X15	Rear Surface to Firewall on Left Side	4091	4070	21
X16	Rear Surface to Steering Column	3126	3145	-19
X17	Center of Steering Column to A-Post	400	370	30
X18	Center of Steering Column to Headlining	449	405	44
X19	Rear Surface to Right Side of Front Bumper	4794	4332	462
X20	Rear Surface to Left Side of Front Bumper	4822	4310	512
X21	Length of Engine Block	395	395	0

DATA SHEET 18

TEST VEHICLE MEASUREMENTS (Cont'd)



DATA SHEET 19

ACCIDENT INVESTIGATION DIVISION DATA

FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1998/Dodge/Grand/Caravan/SE

VEH. NHTSA NO.: MW0305; VIN: 2B4GP44G6WR587812

MODEL YEAR: 1998; BUILD DATE: 10-97; TEST DATE: 10/31/97

VEH. SIZE CATEGORY: Van; TEST WEIGHT: 2021.7 kg

VEH. WHEELBASE: 3040 mm; FRONT OVERHANG: 965 mm; OVERALL WIDTH: 1912 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: 220 msec

VELOCITY CHANGE: 68.1 kph

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

CRUSH DEPTH DIMENSIONS:

C1 = 512 mm

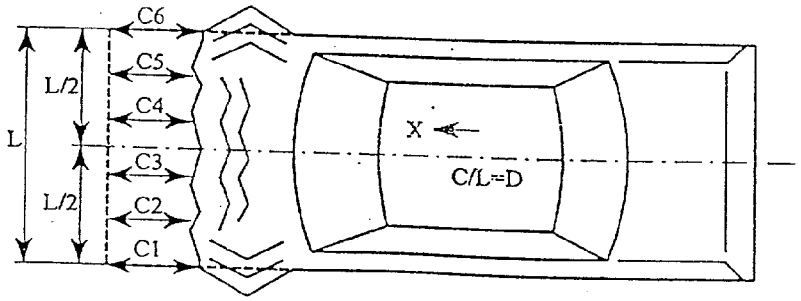
C2 = 541 mm

C3 = 566 mm

C4 = 557 mm

C5 = 532 mm

C6 = 462 mm



MIDPOINT OF DAMAGE: D = Vehicle Centerline (Longitude)

LENGTH OF DAMAGED REGION: L = 1460 mm

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (Cont'd)

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

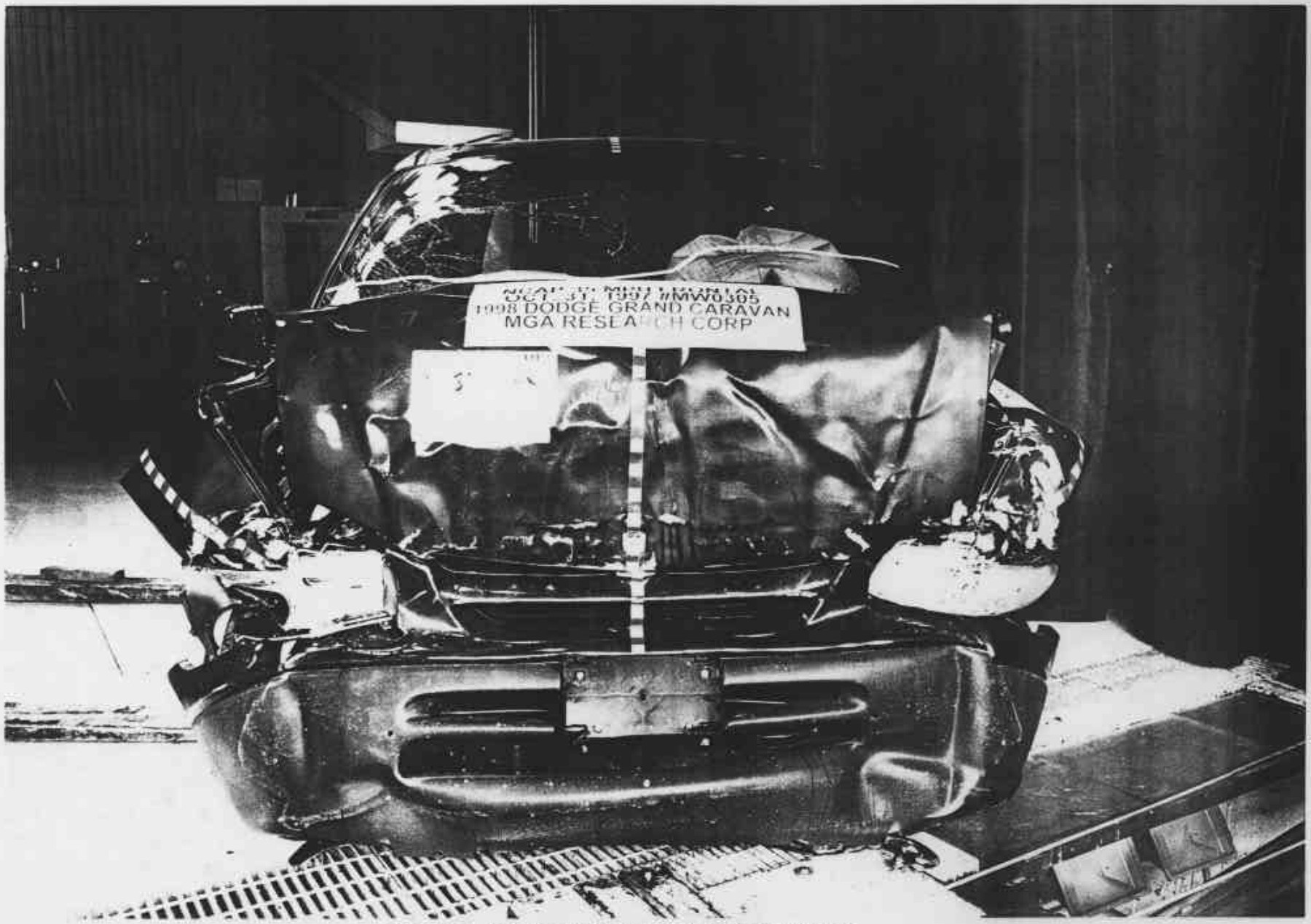
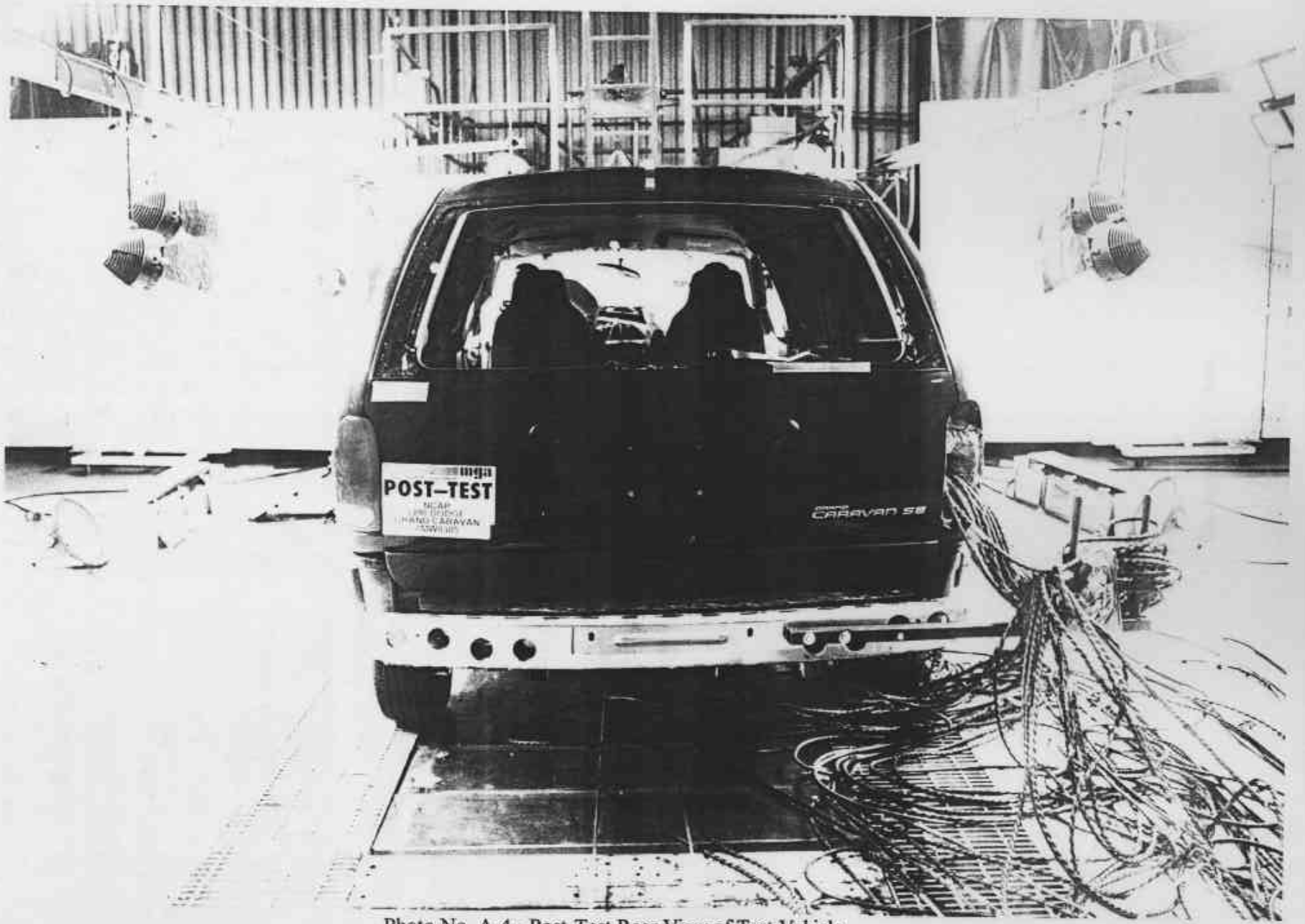


Photo No. A-2 - Post-Test Front View of Test Vehicle

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



A-4

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

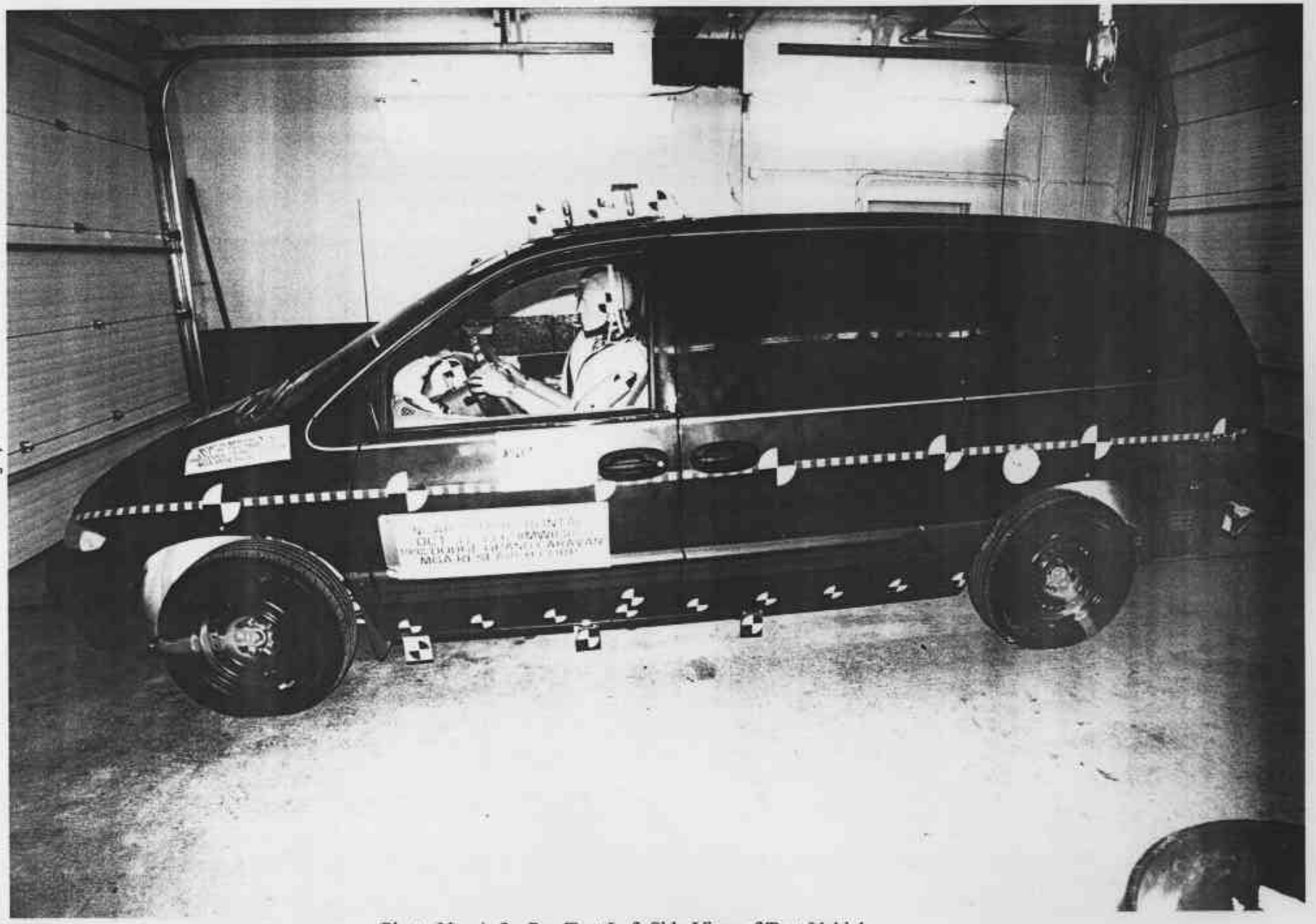
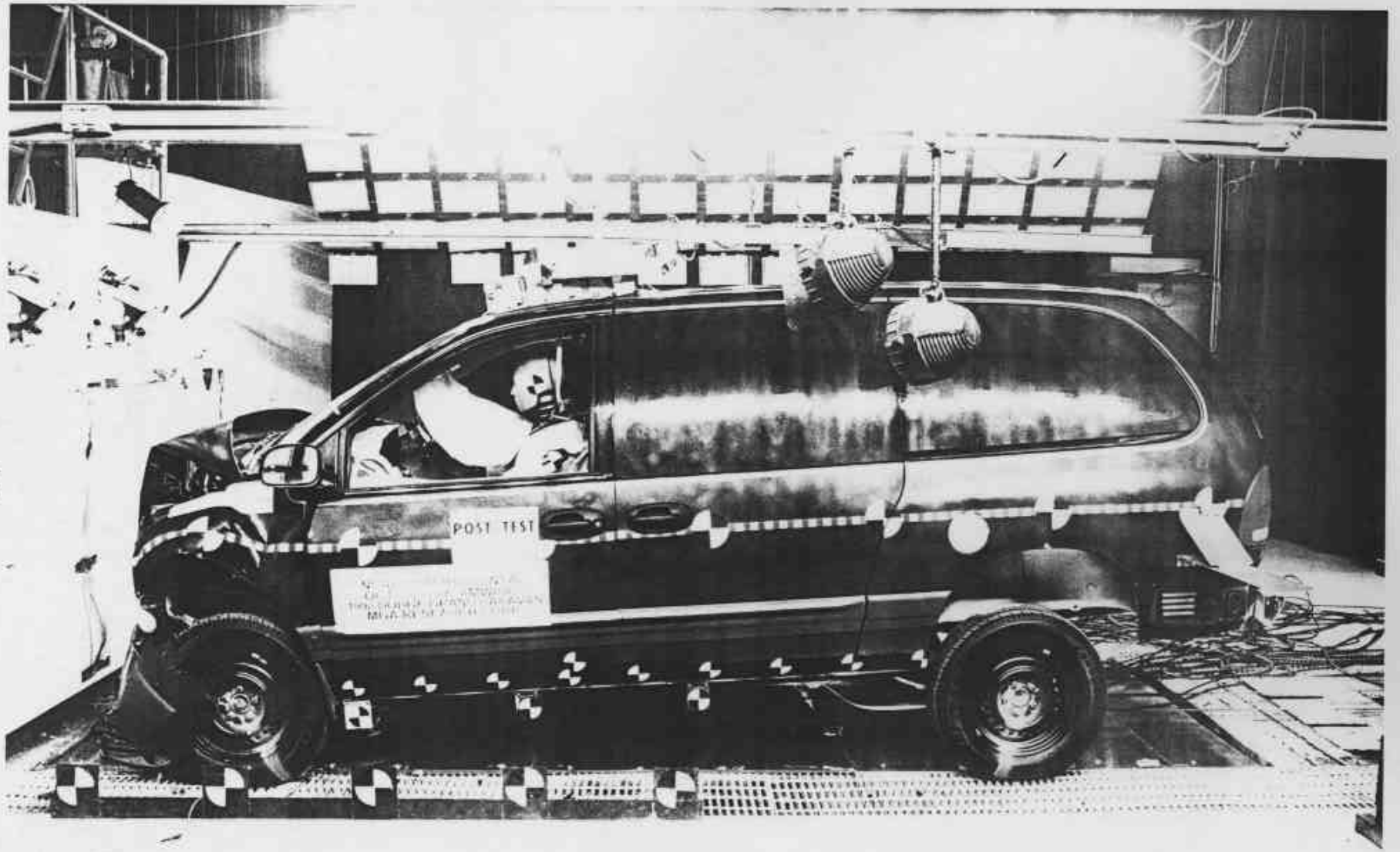


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle



A-6

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

A-7

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

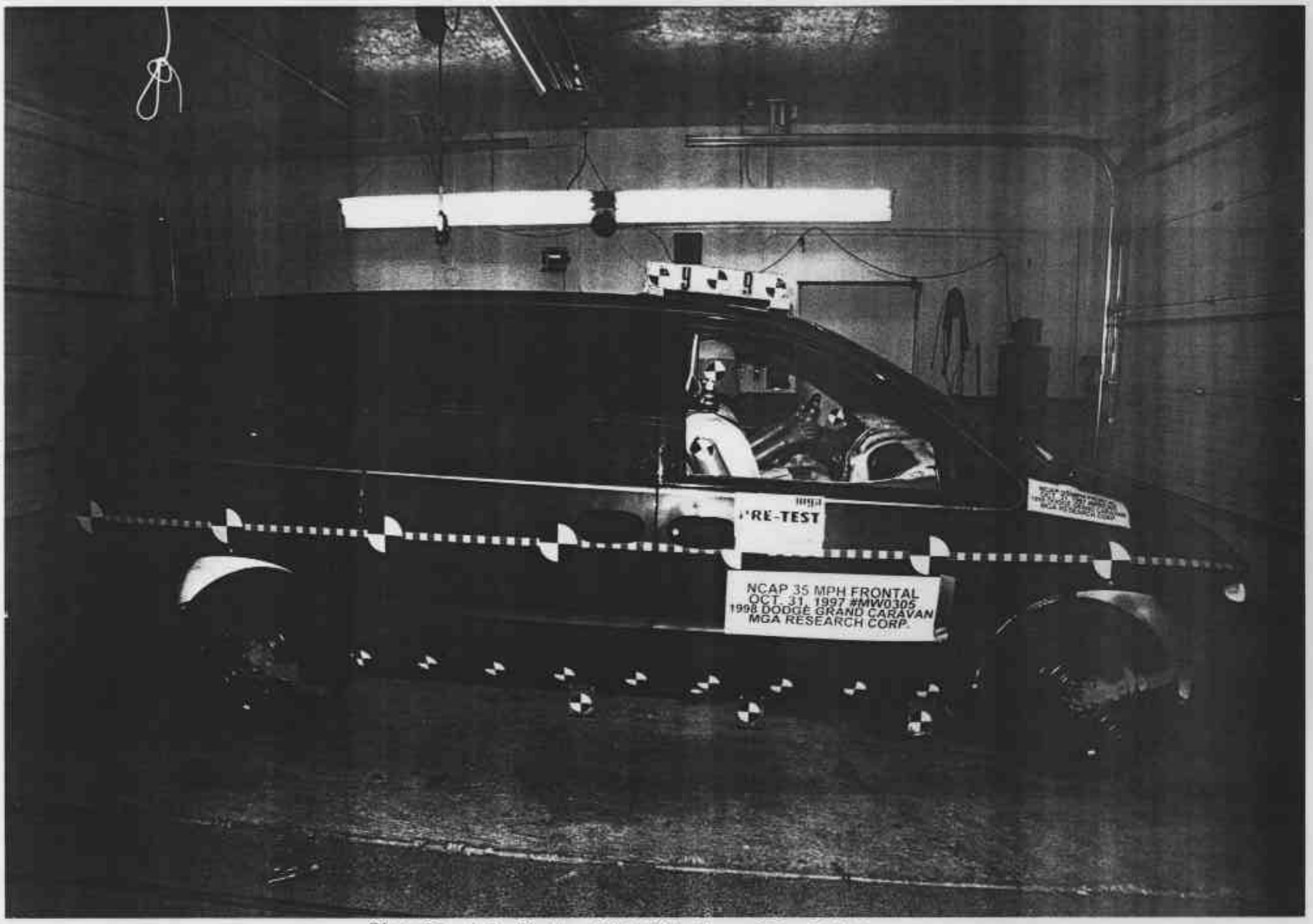


Photo No. A-9 - Pre-Test Right Side View of Test Vehicle

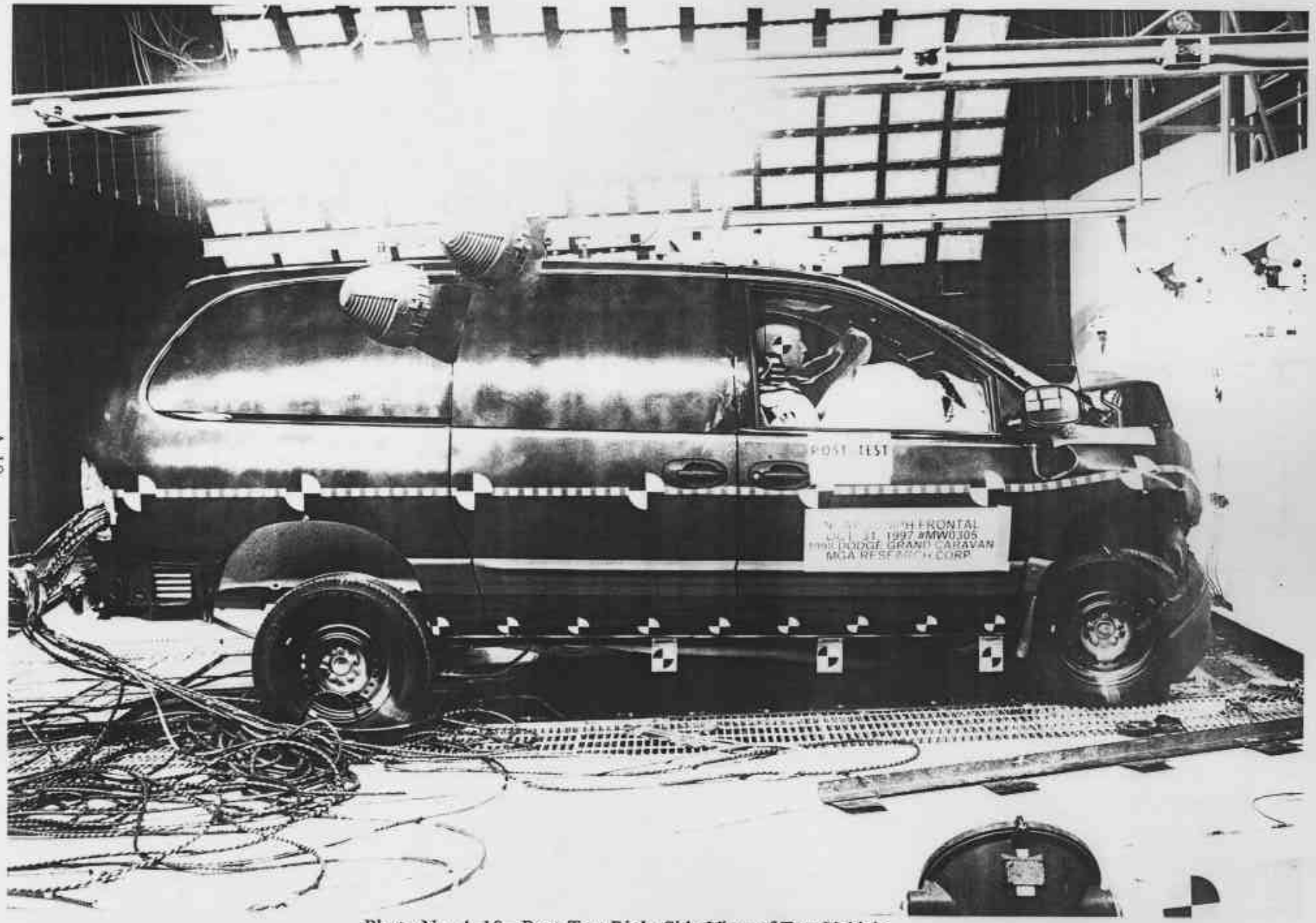


Photo No. A-10 - Post-Test Right Side View of Test Vehicle

A-11

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

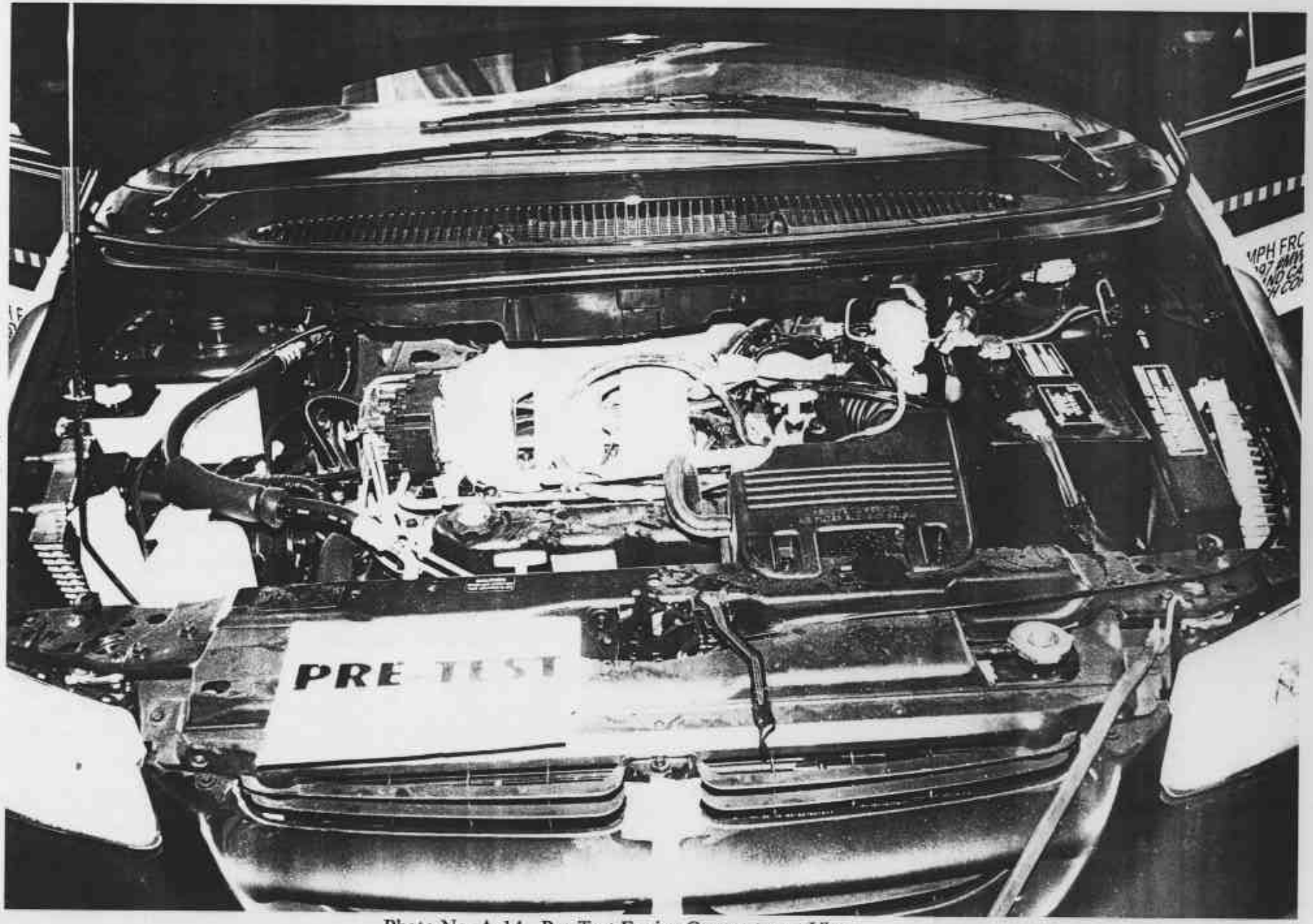


Photo No. A-14 - Pre-Test Engine Compartment View

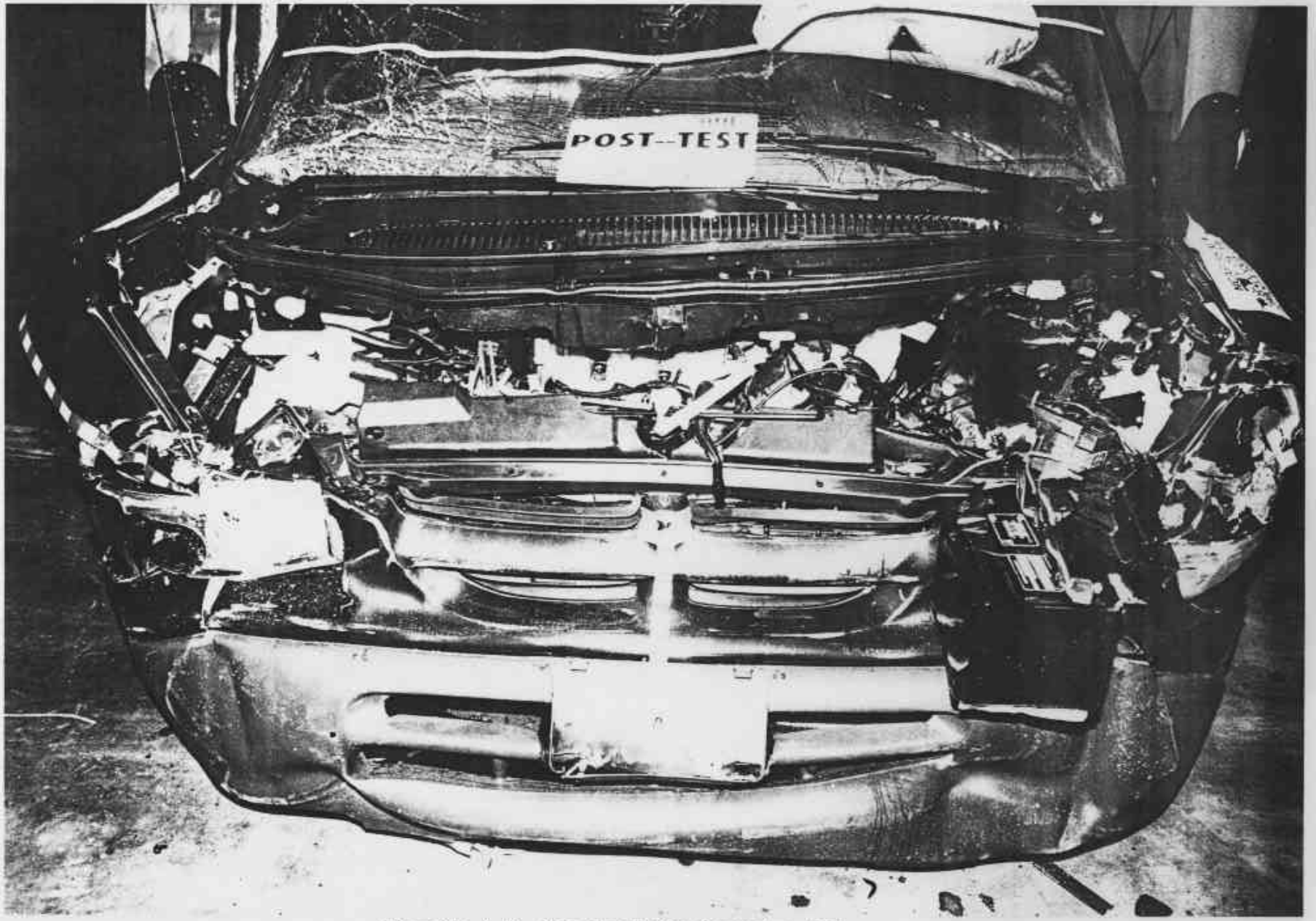


Photo No. A-15 - Post-Test Engine Compartment View

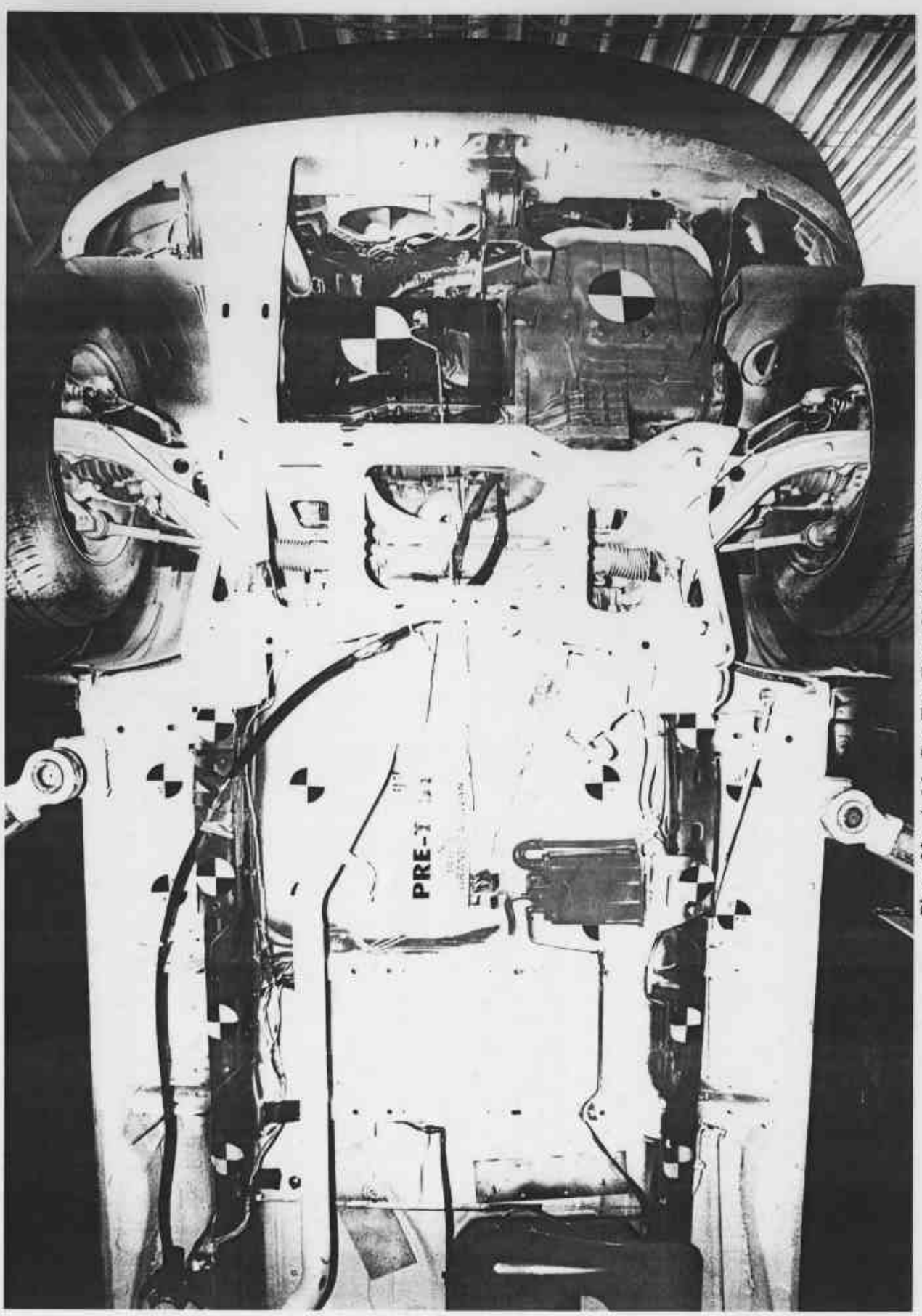


Photo No. A-16 - Pre-Test Front Underbody View

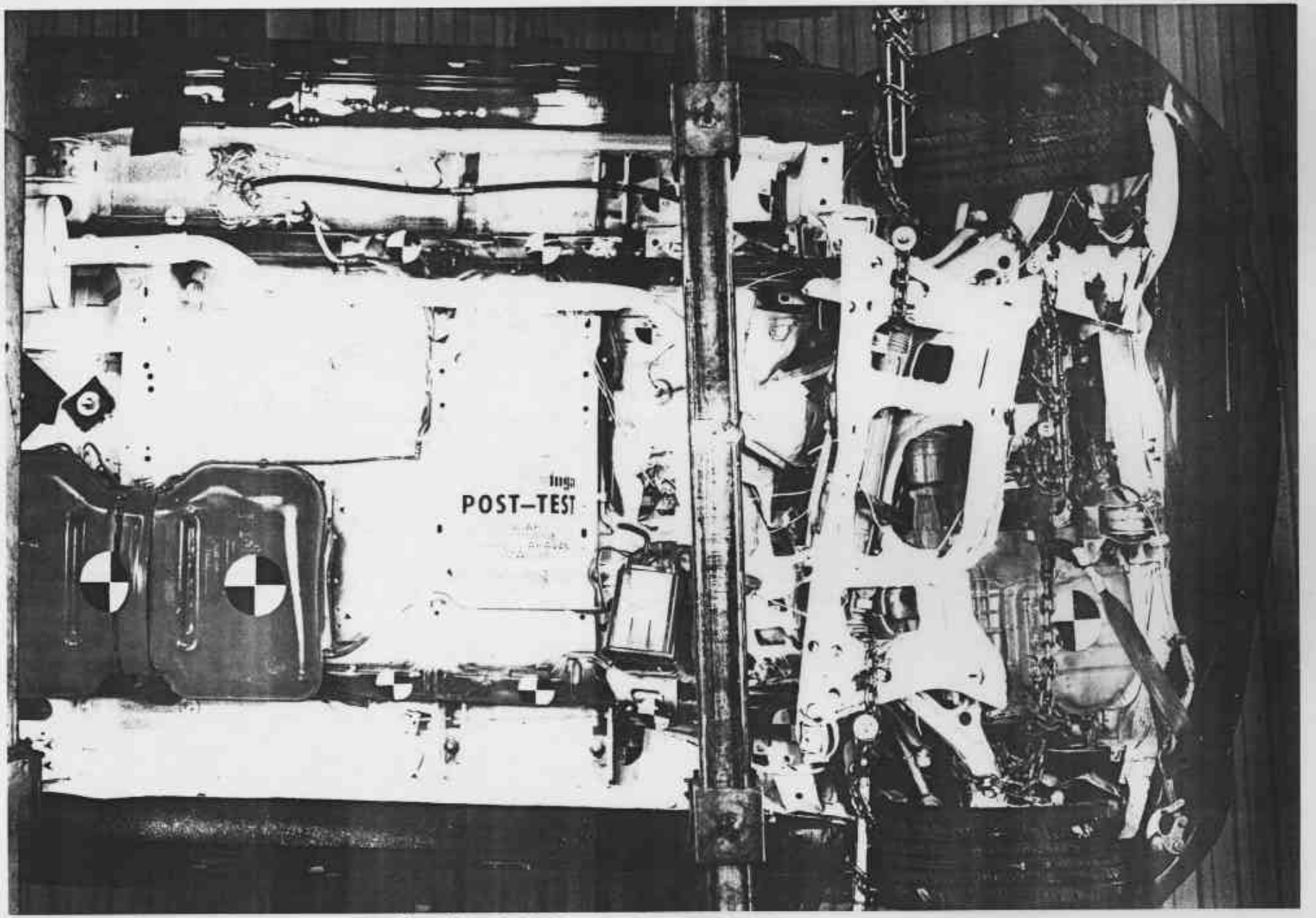
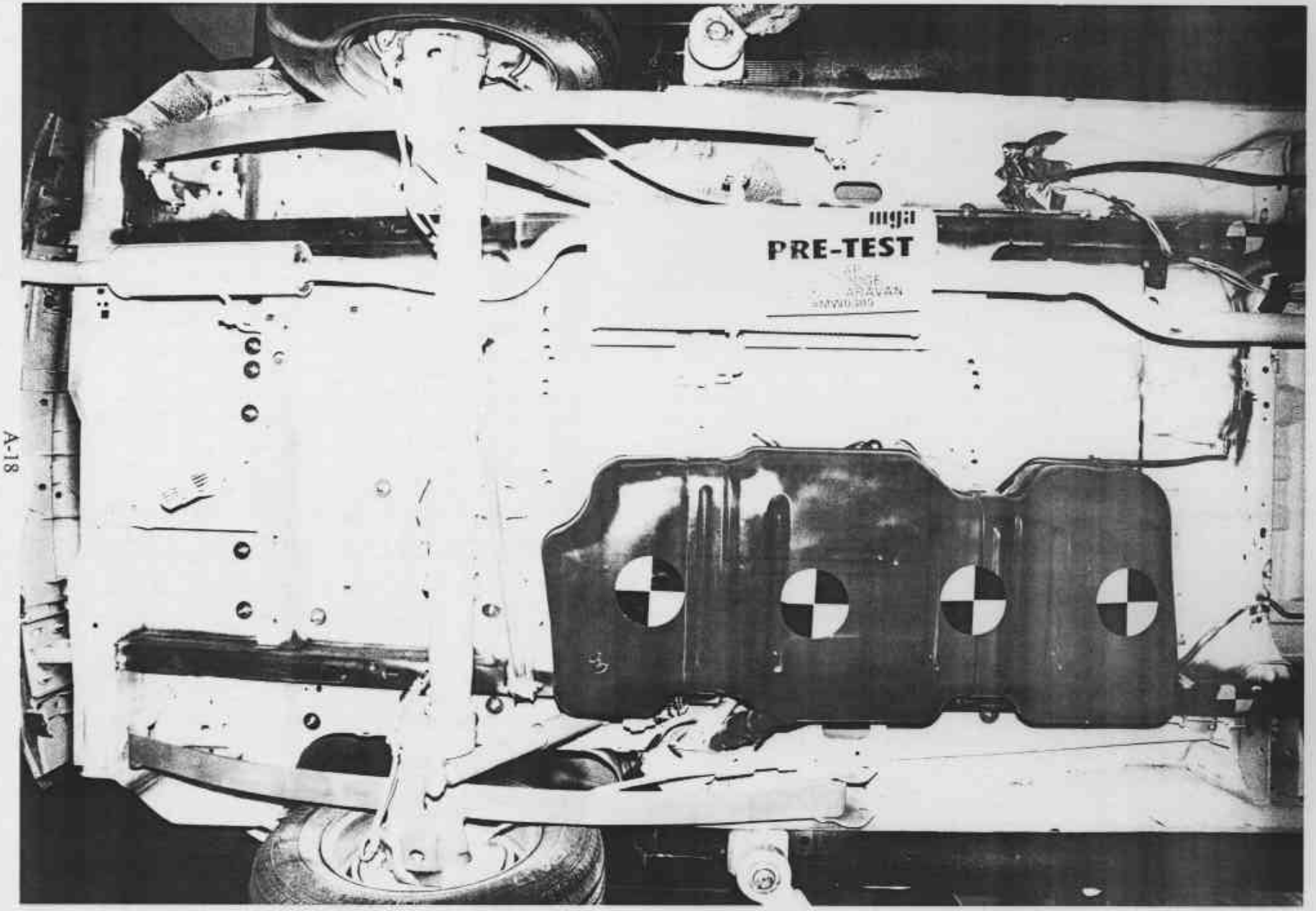


Photo No. A-17 - Post-Test Front Underbody View



A-18

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

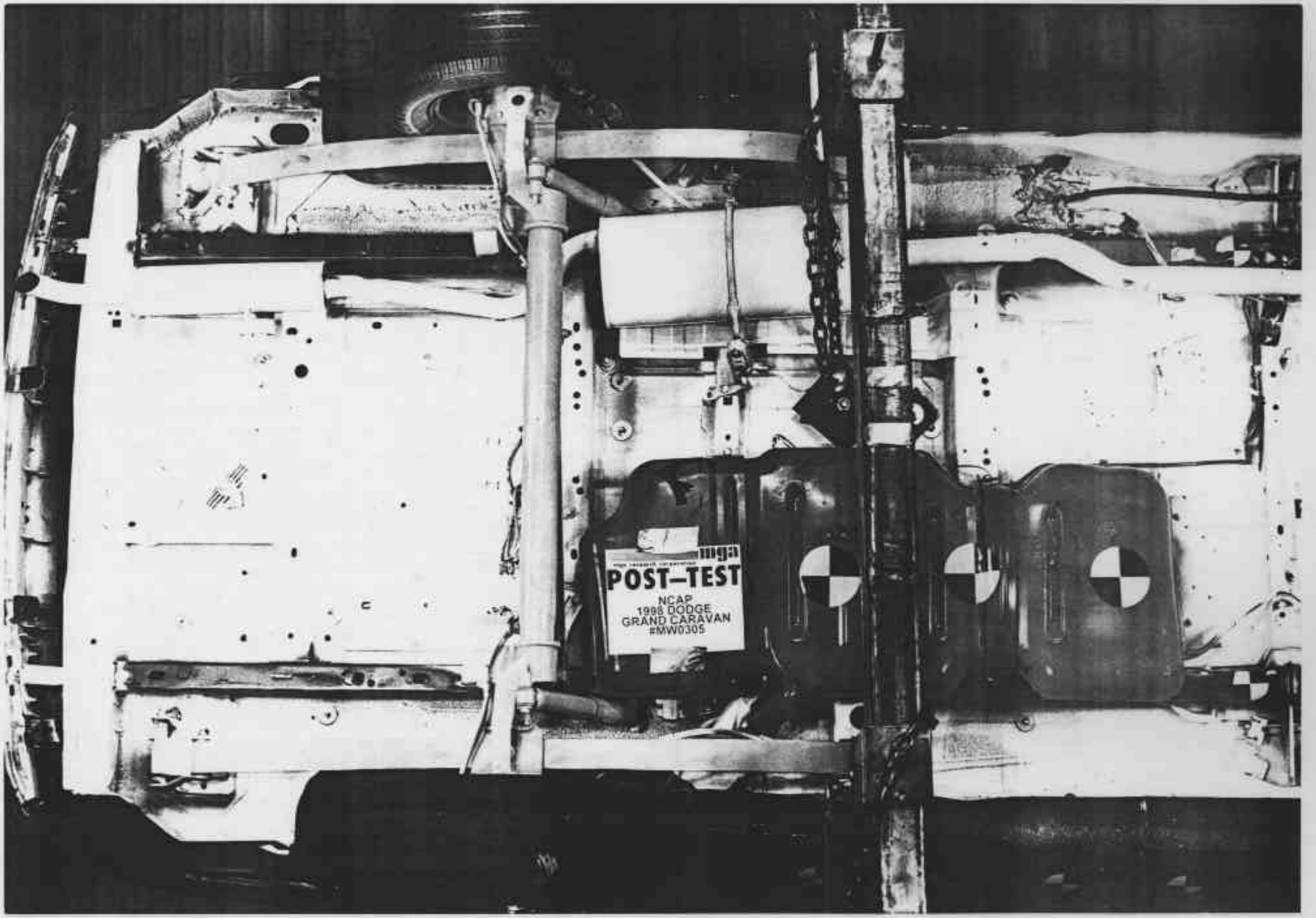
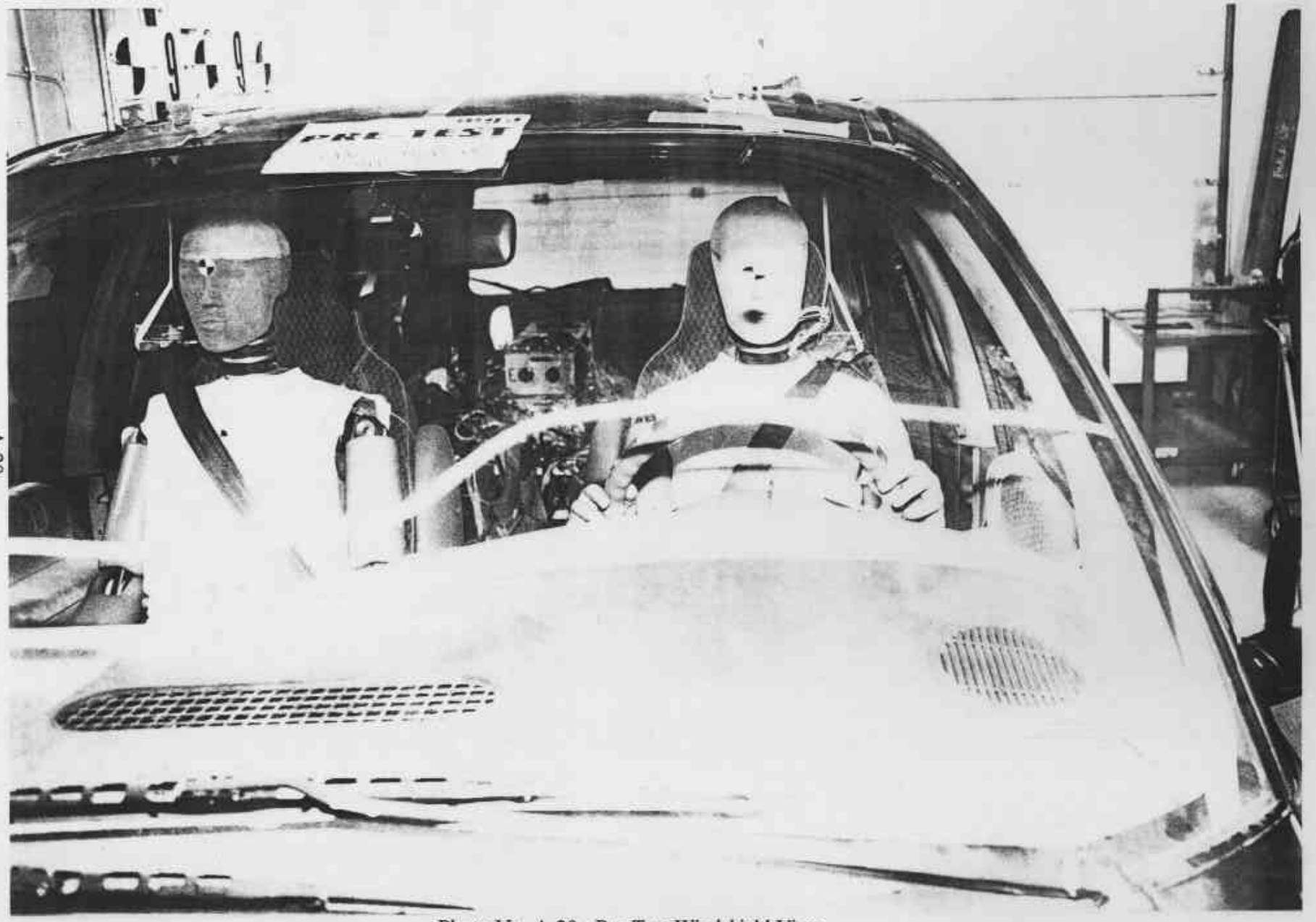
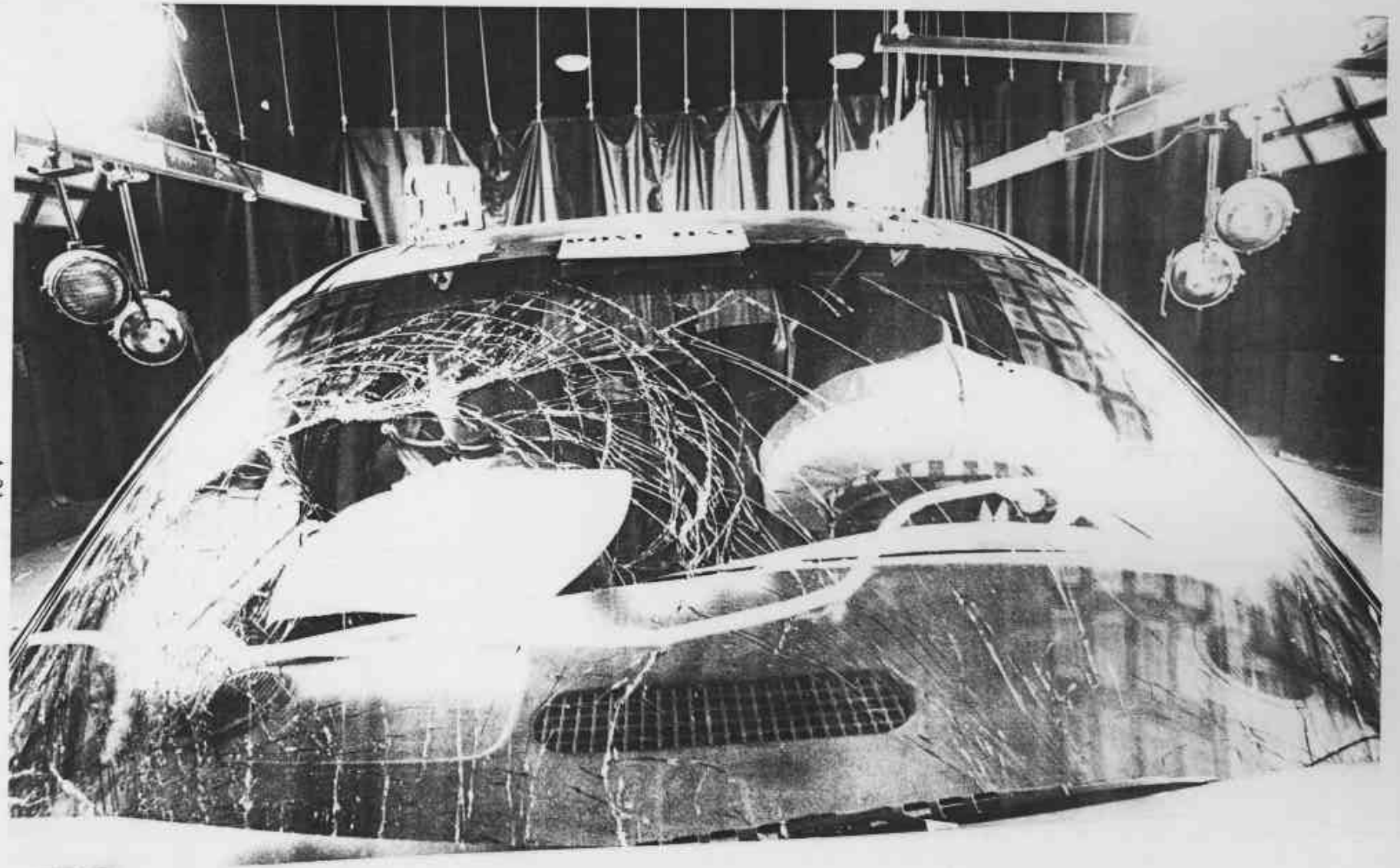


Photo No. A-19 - Post-Test Rear Underbody View



A-20

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



NCAP 35 MPH FRONTAL

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

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

A-23

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

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

A-25

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

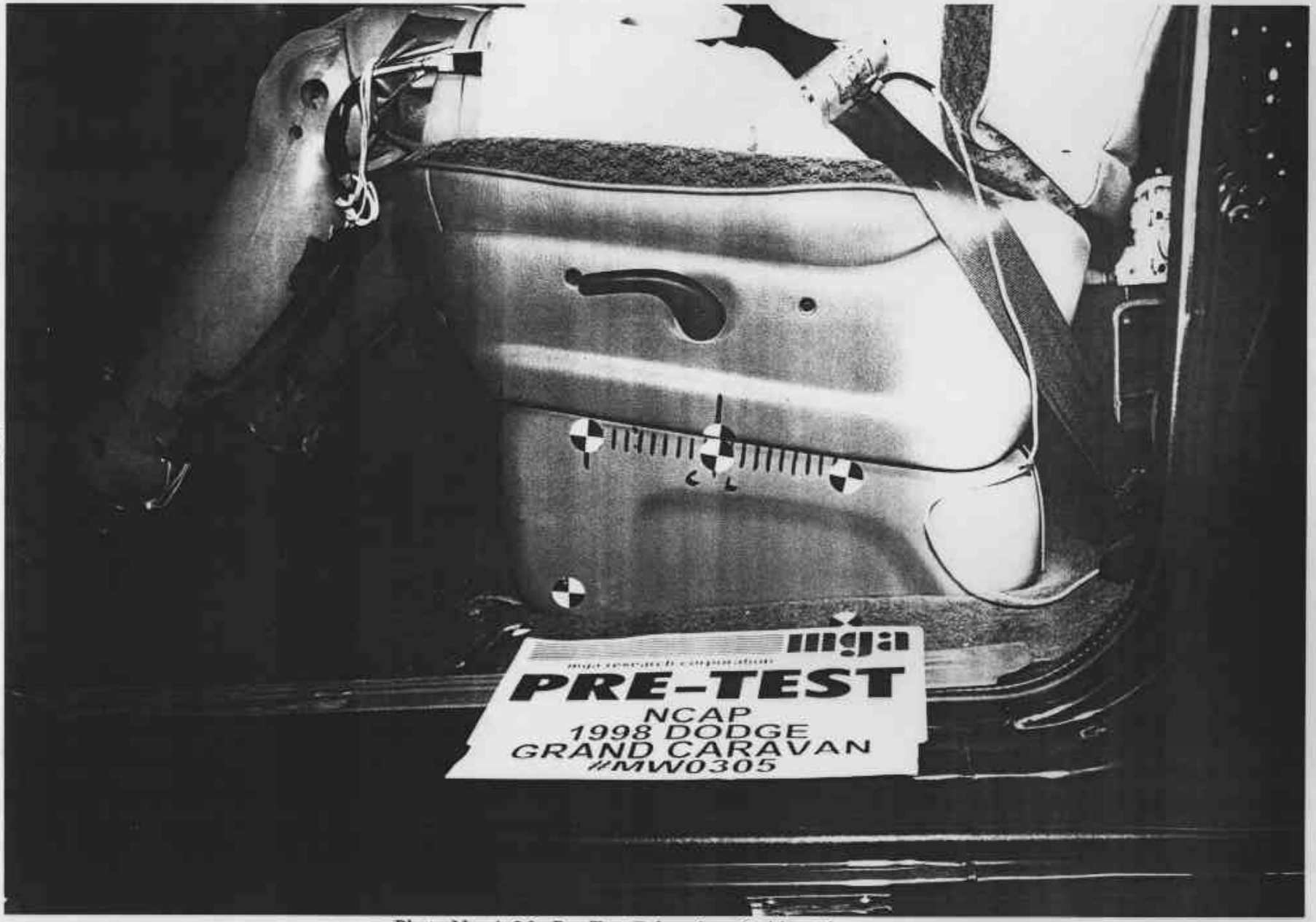


Photo No. A-26 - Pre-Test Driver Seat Position View

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

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

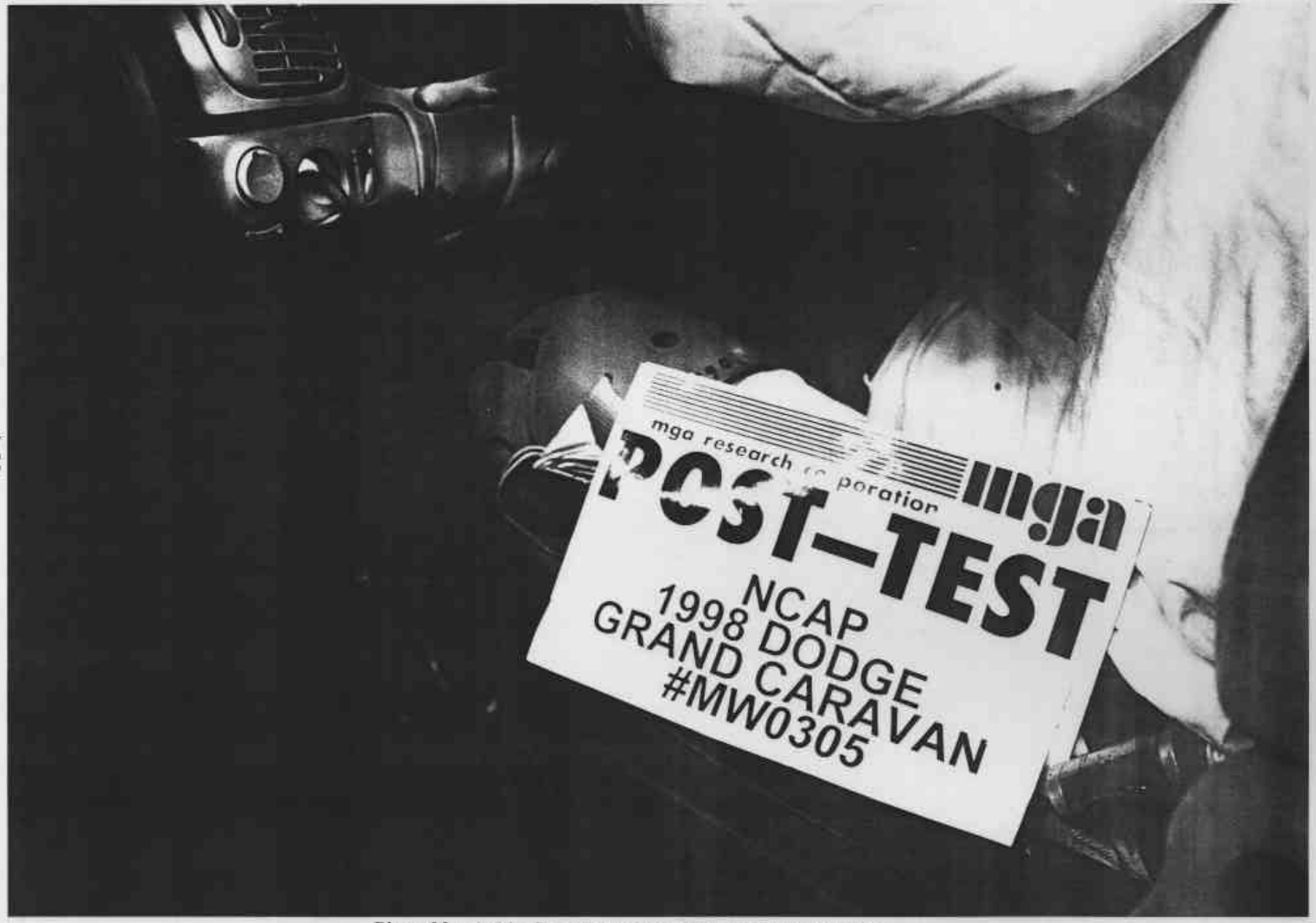


Photo No. A-29 - Post-Test Driver Dummy Knee Position

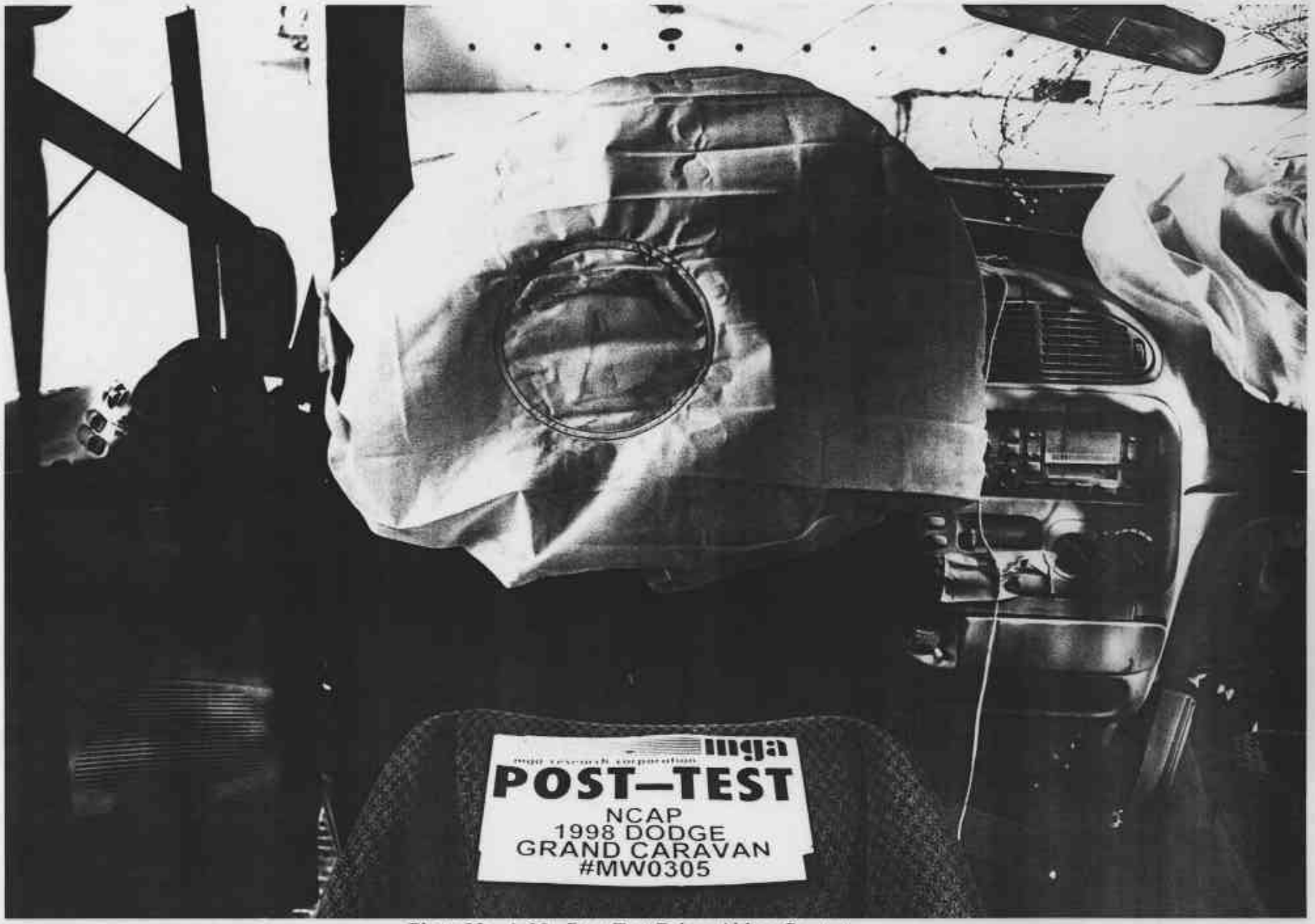


Photo No. A-30 - Post-Test Driver Airbag Contact

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

Photo No. A-32 - Pre-Test Passenger Dummy Position Right Side View

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

Photo No. A-34 - Pre-Test Passenger Dummy Position Right Side View (Door Open)

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

Photo No. A-36 - Pre-Test Passenger Seat Position View

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

Photo No. A-38 - Pre-Test Passenger Dummy Knee Position

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

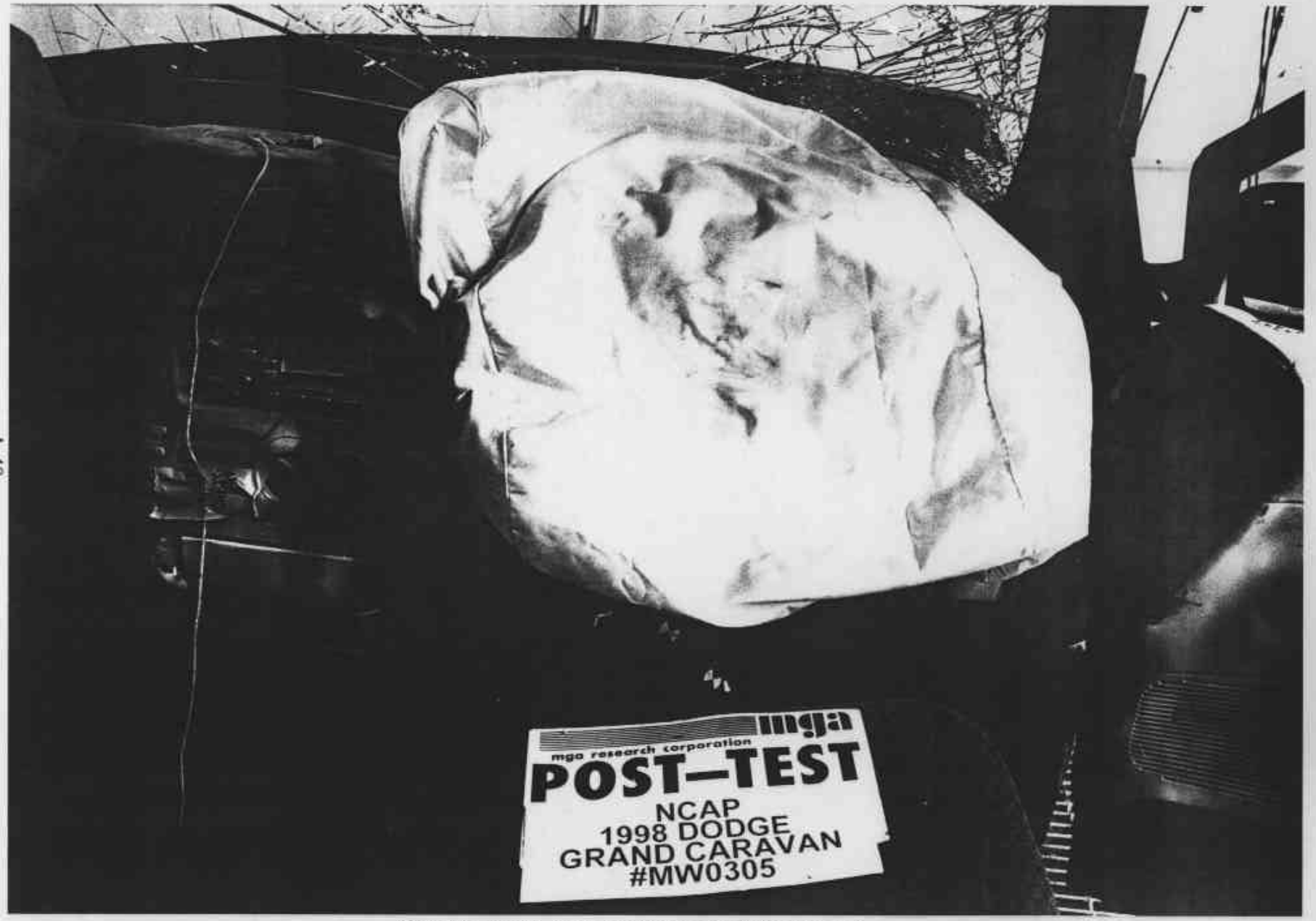


Photo No. A-40 - Post-Test Passenger Airbag Contact

Photo No. A-41 - Post-Test Passenger Knee Contact View

A-42

Photo No. A-42 - Vehicle Certification Label and Tire Placard

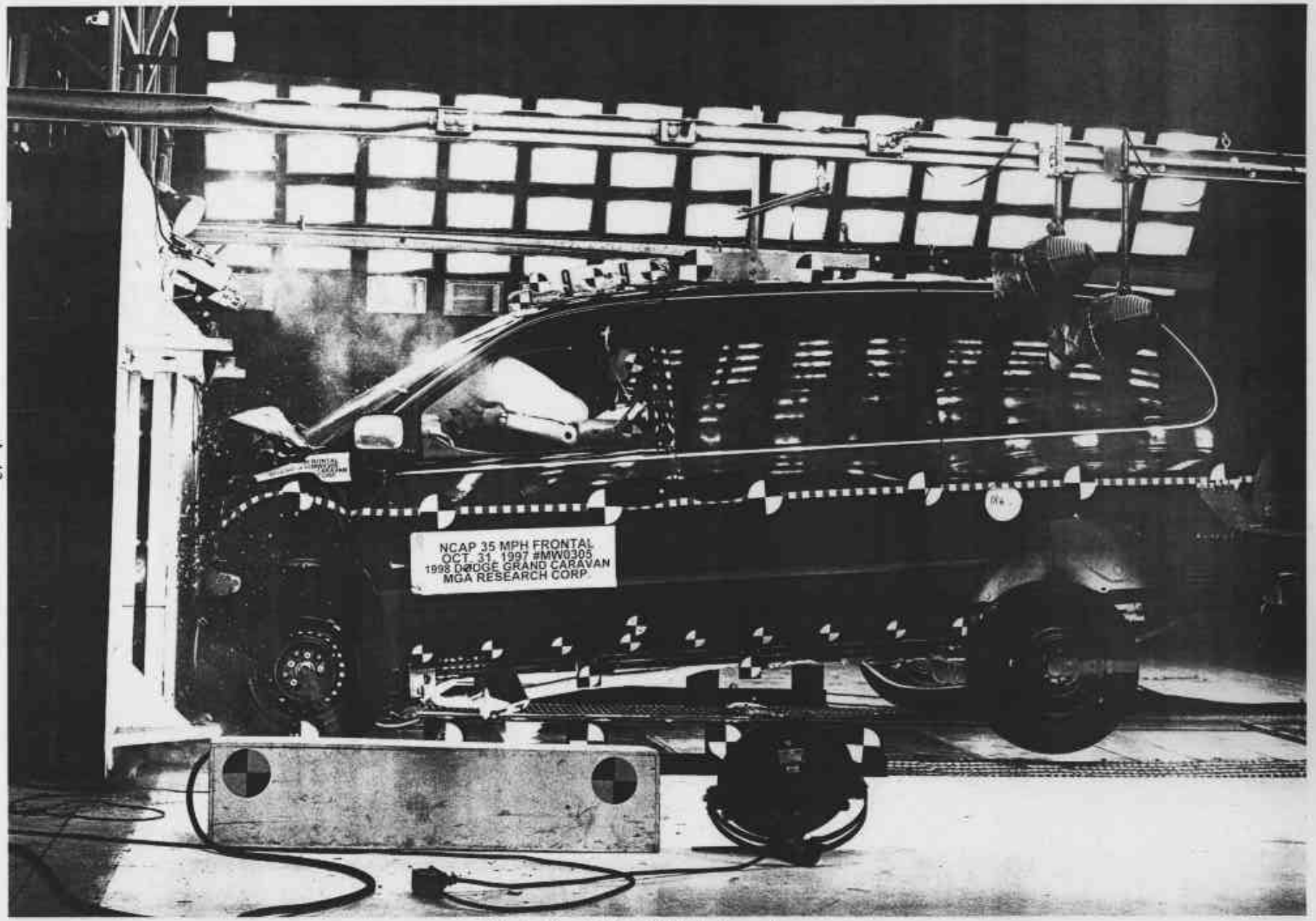


Photo No. A-43 - Vehicle Impact

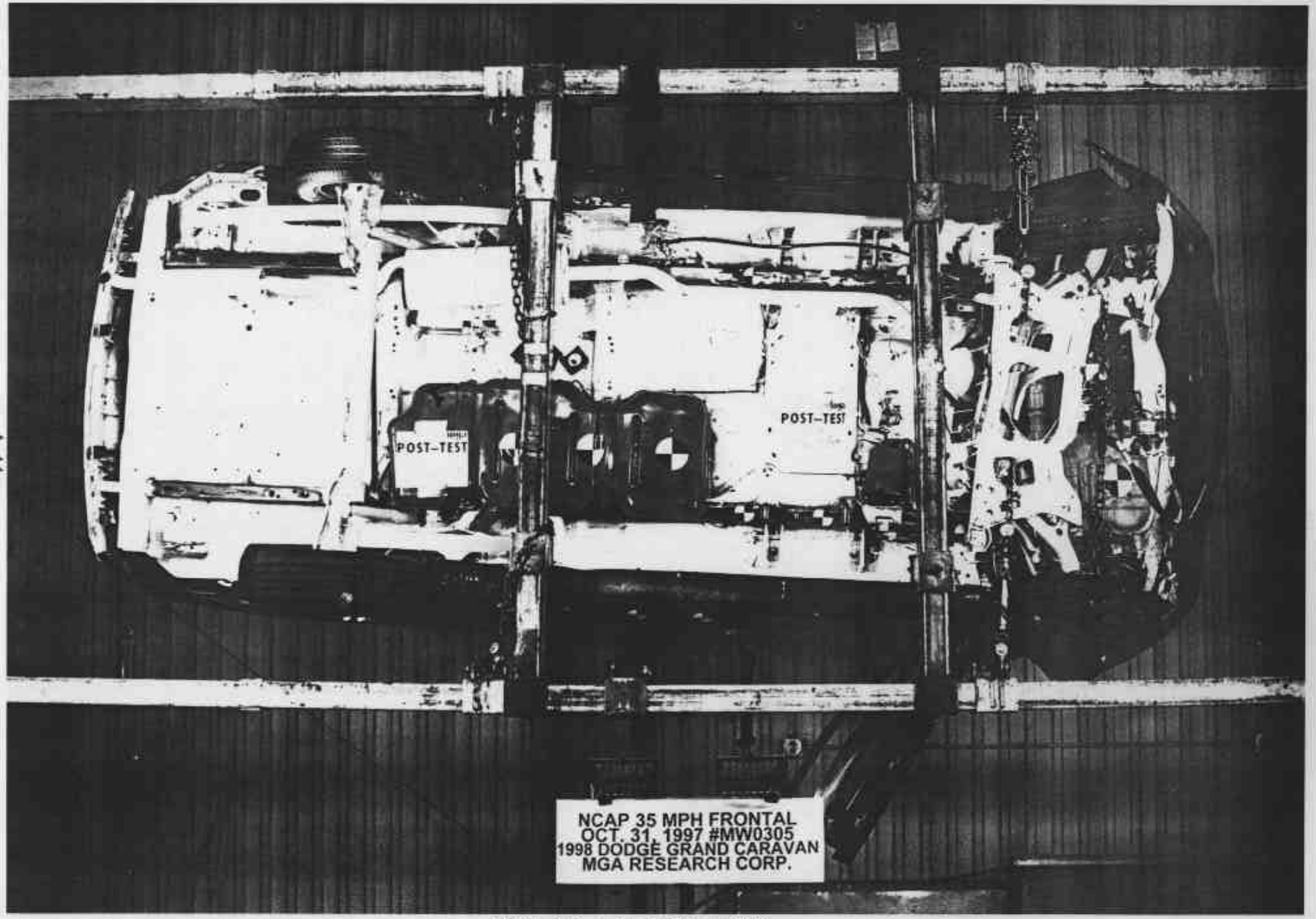


Photo No. A-44 - Rollover 90°

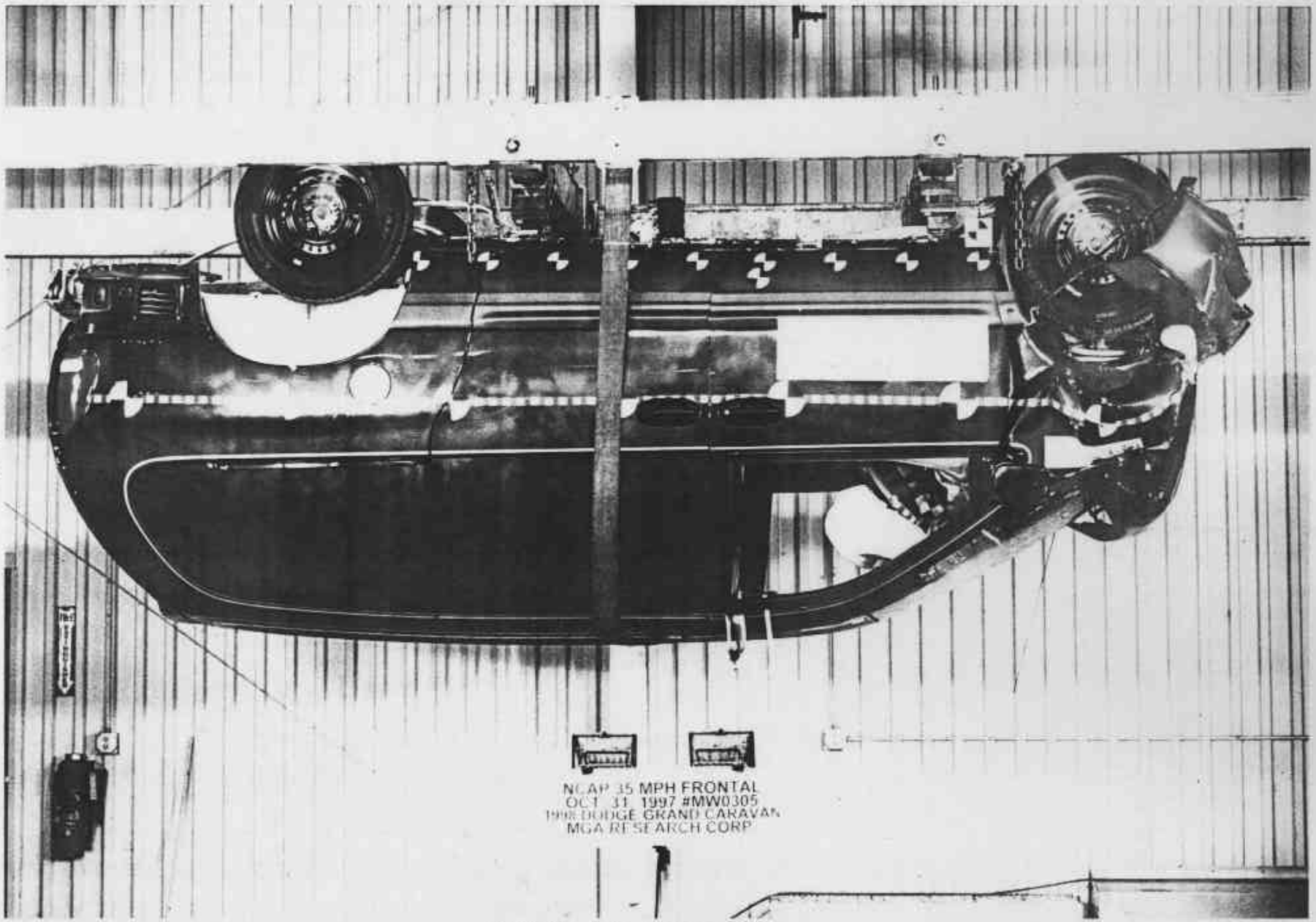


Photo No. A-45 - Rollover 180°

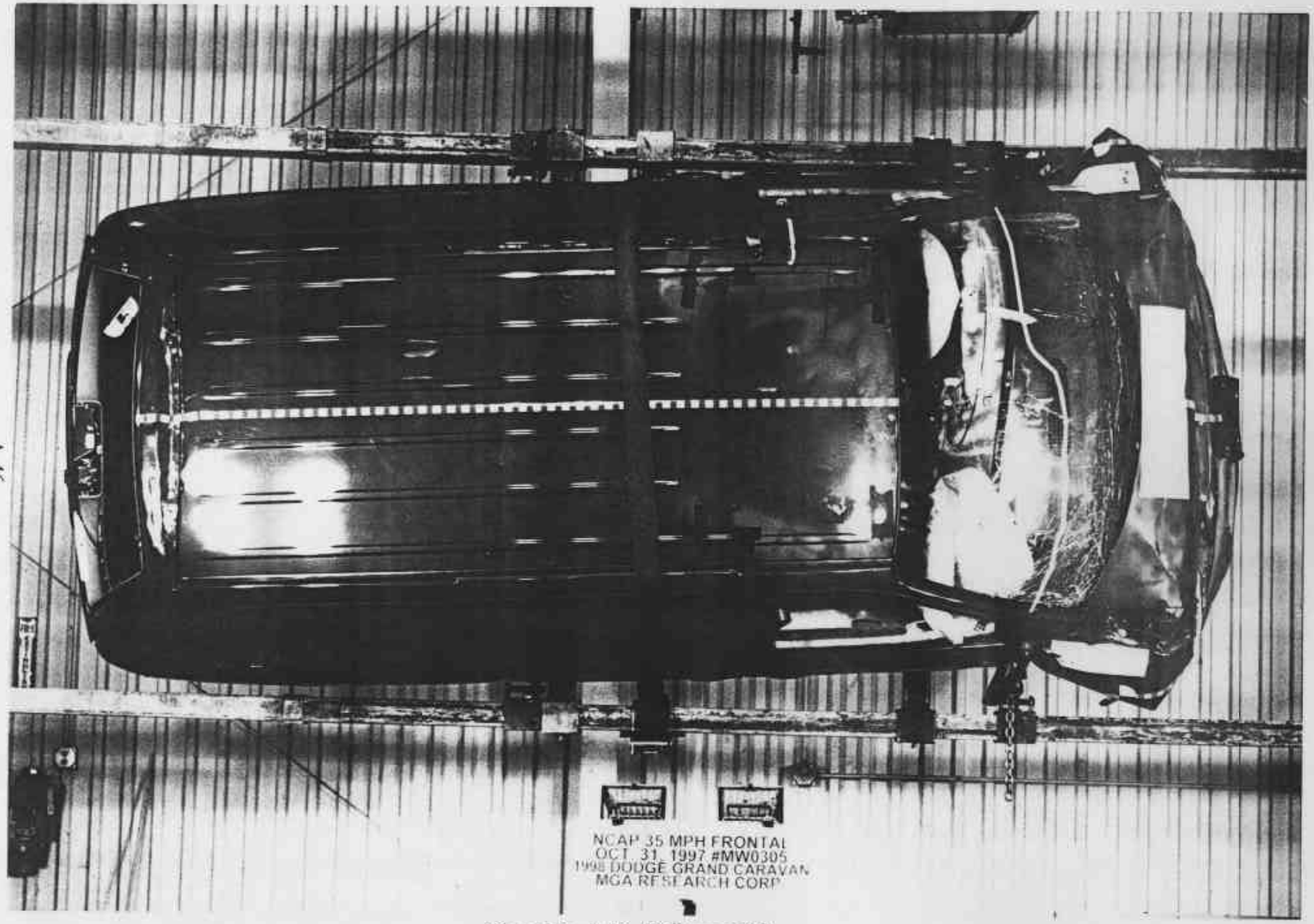


Photo No. A-46 - Rollover 270°

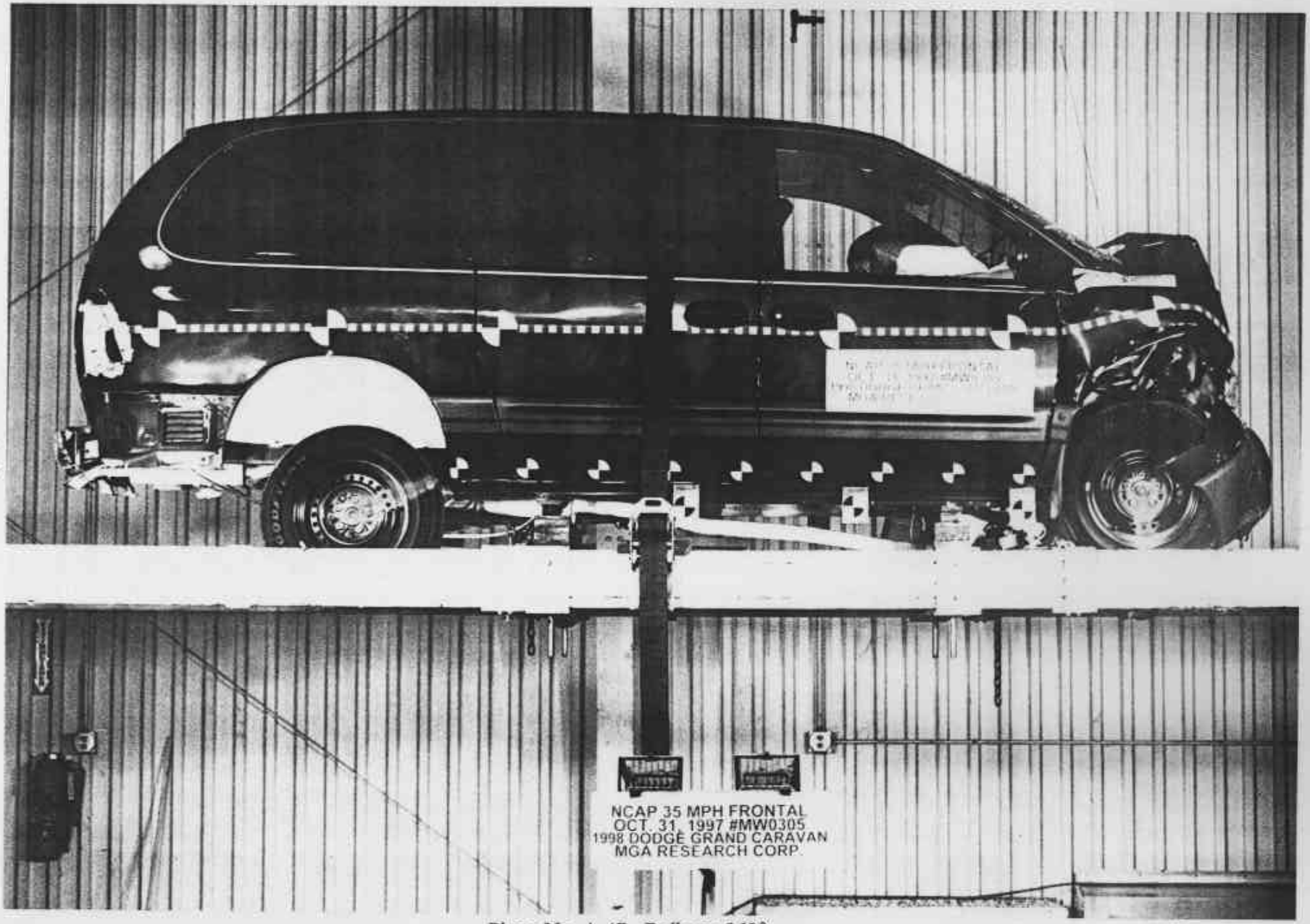


Photo No. A-47 - Rollover 360°

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1998 Dodge Grand Caravan

NHTSA NO.: MW0305

VEHICLE DATA FILTER CHANNEL CLASS

Head Accelerations 1000 (1650 Hz)

Chest Accelerations 180 (300 Hz)

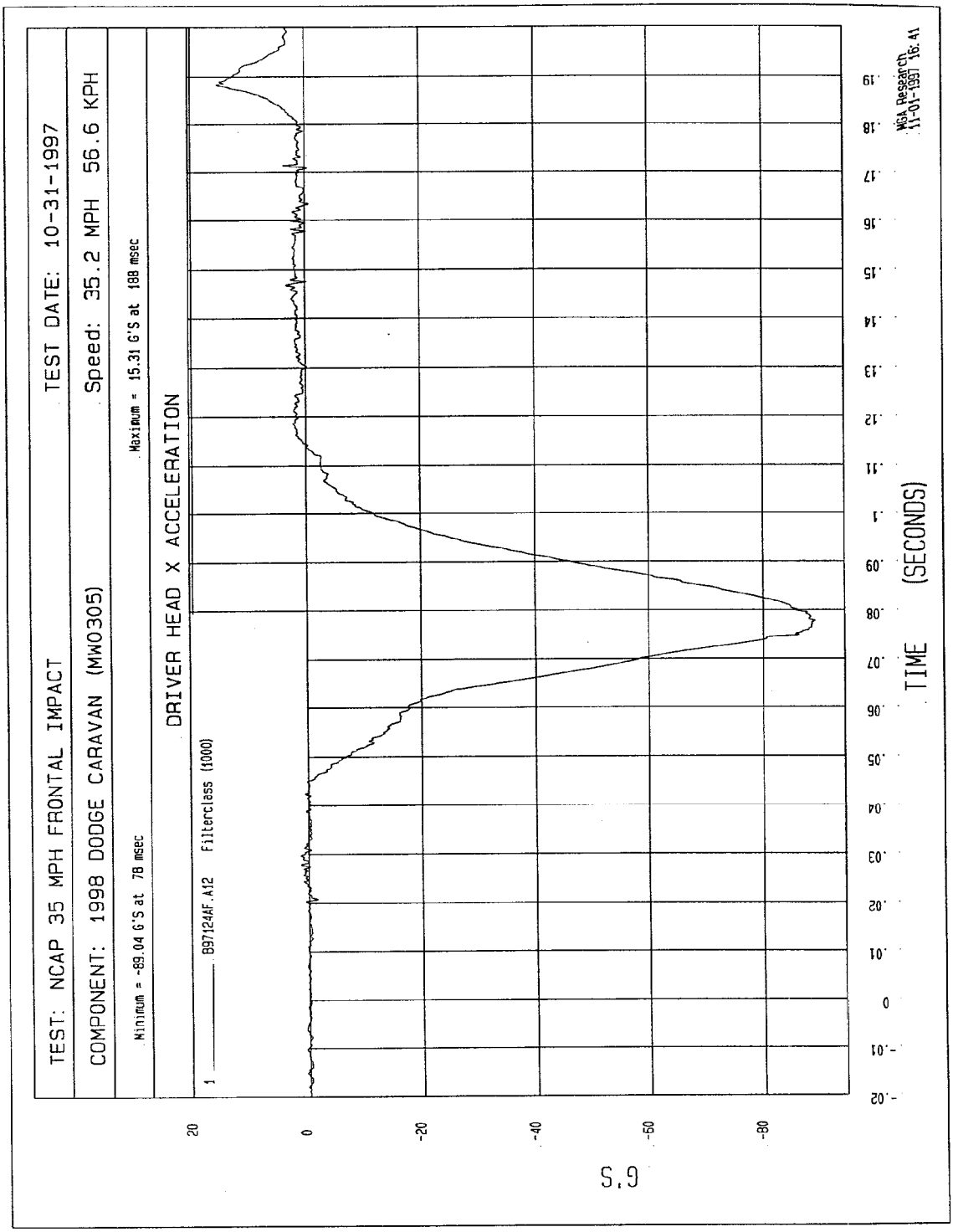
Vehicle Accelerations 60 (100 Hz)

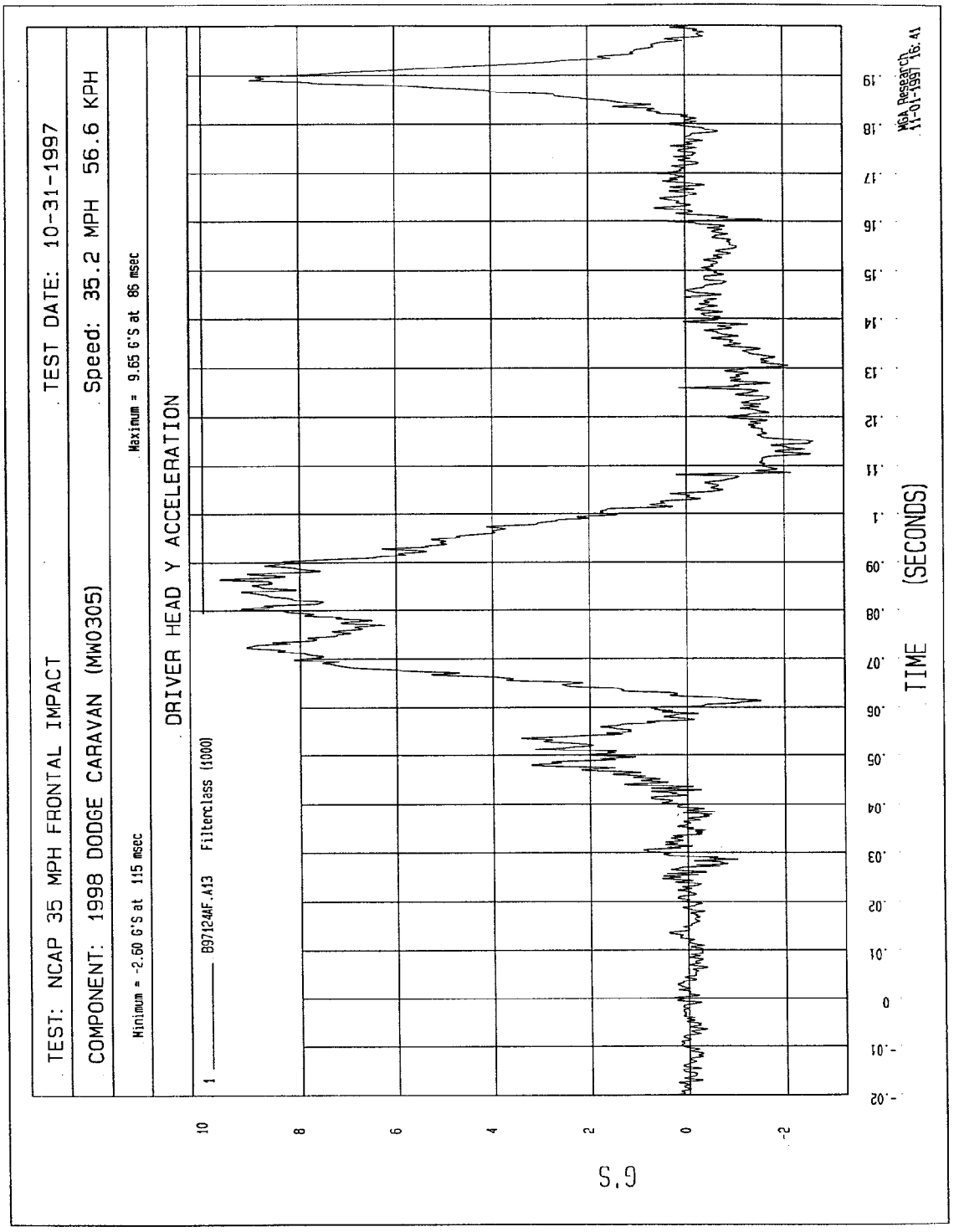
Barrier Load Cells 60 (100 Hz)

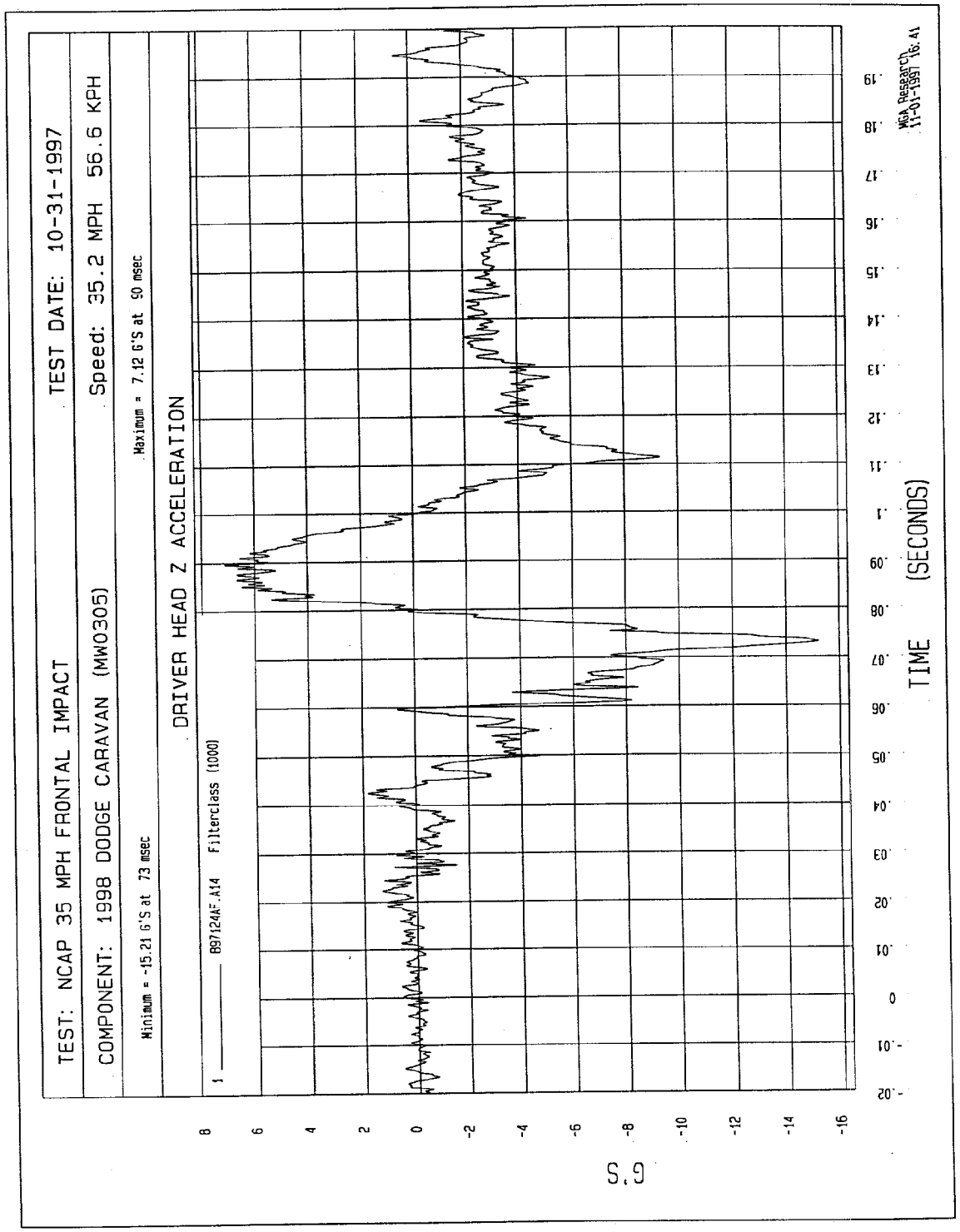
Femur Load Cells 600 (1000 Hz)

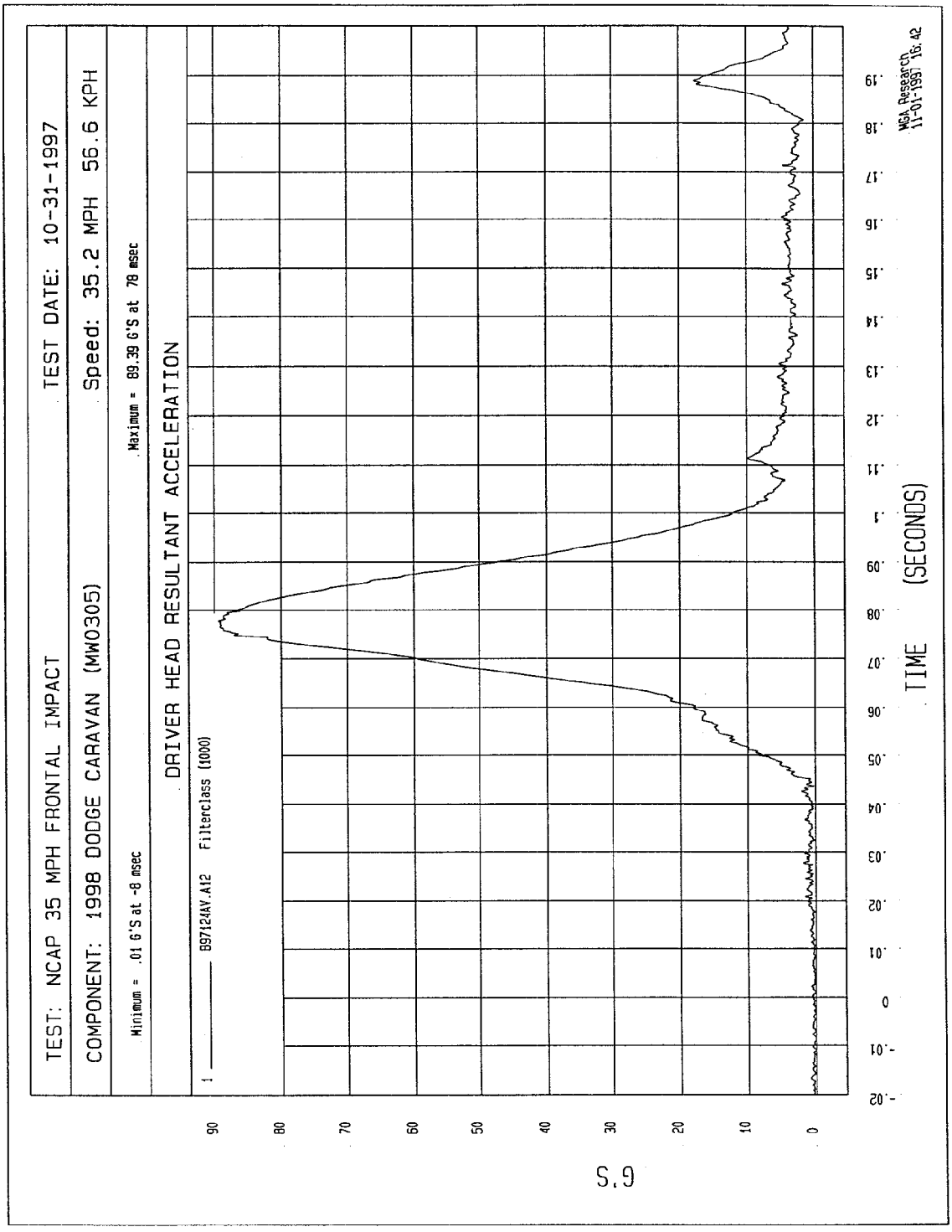
Lap and Torso Belts 60 (100 Hz)

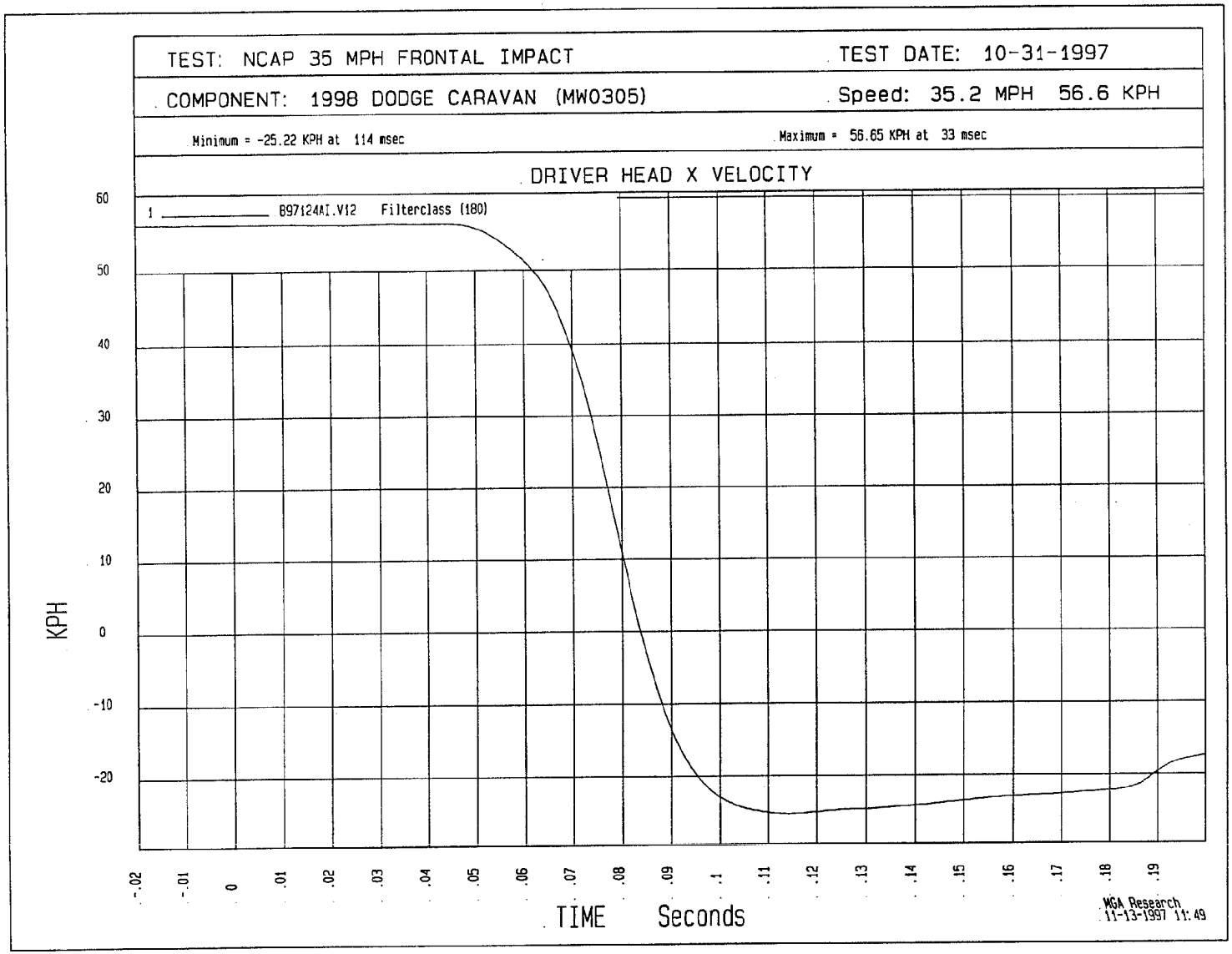
* Data not valid after approximately 42 msec.

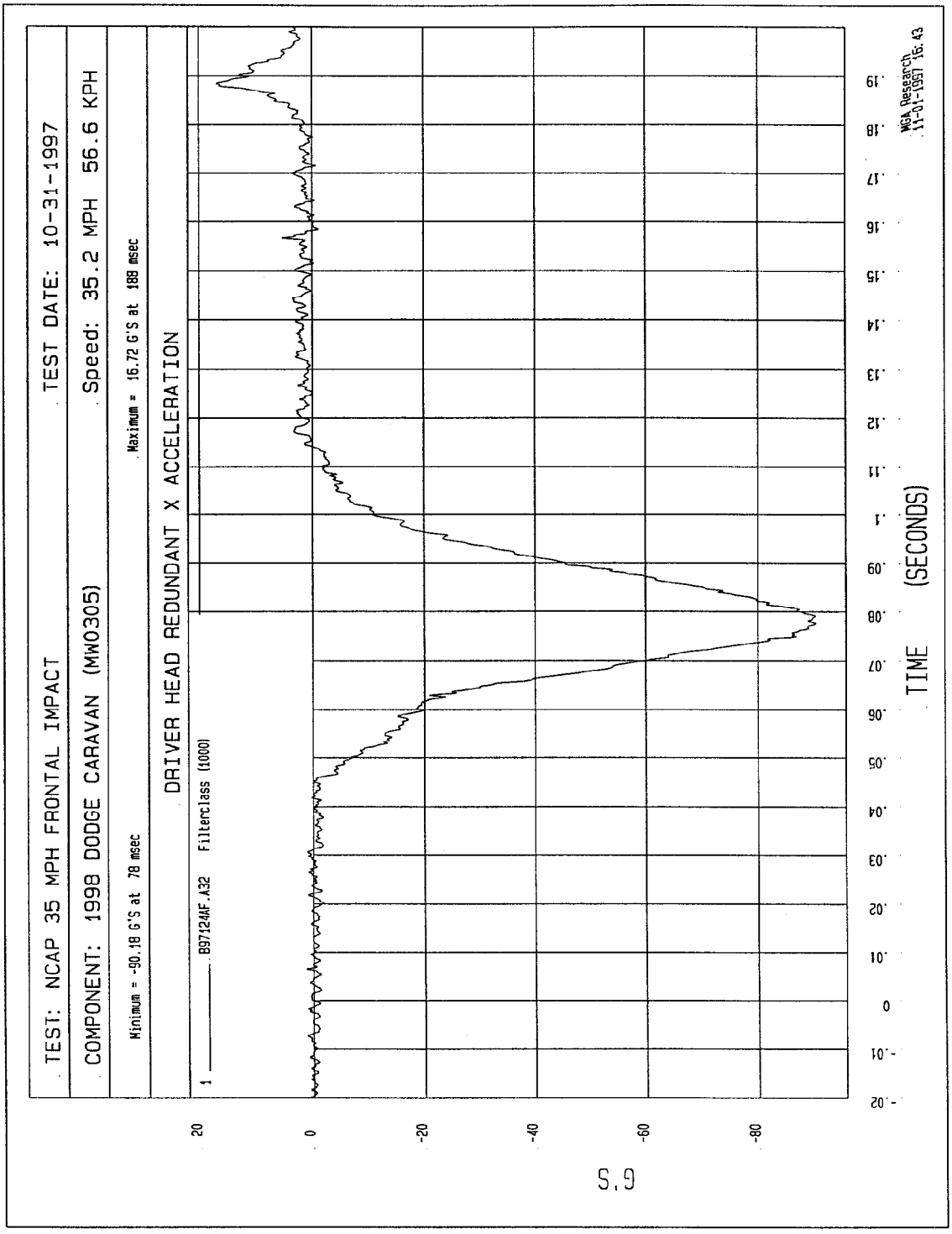

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -89.04 G'S at 78 msec
Maximum = 15.31 G'S at 188 msec
DRIVER HEAD X ACCELERATION
1 B97124AF.A12 Filterclass (1000)
20
0
-20
-40
-60
-80
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:41
S.9

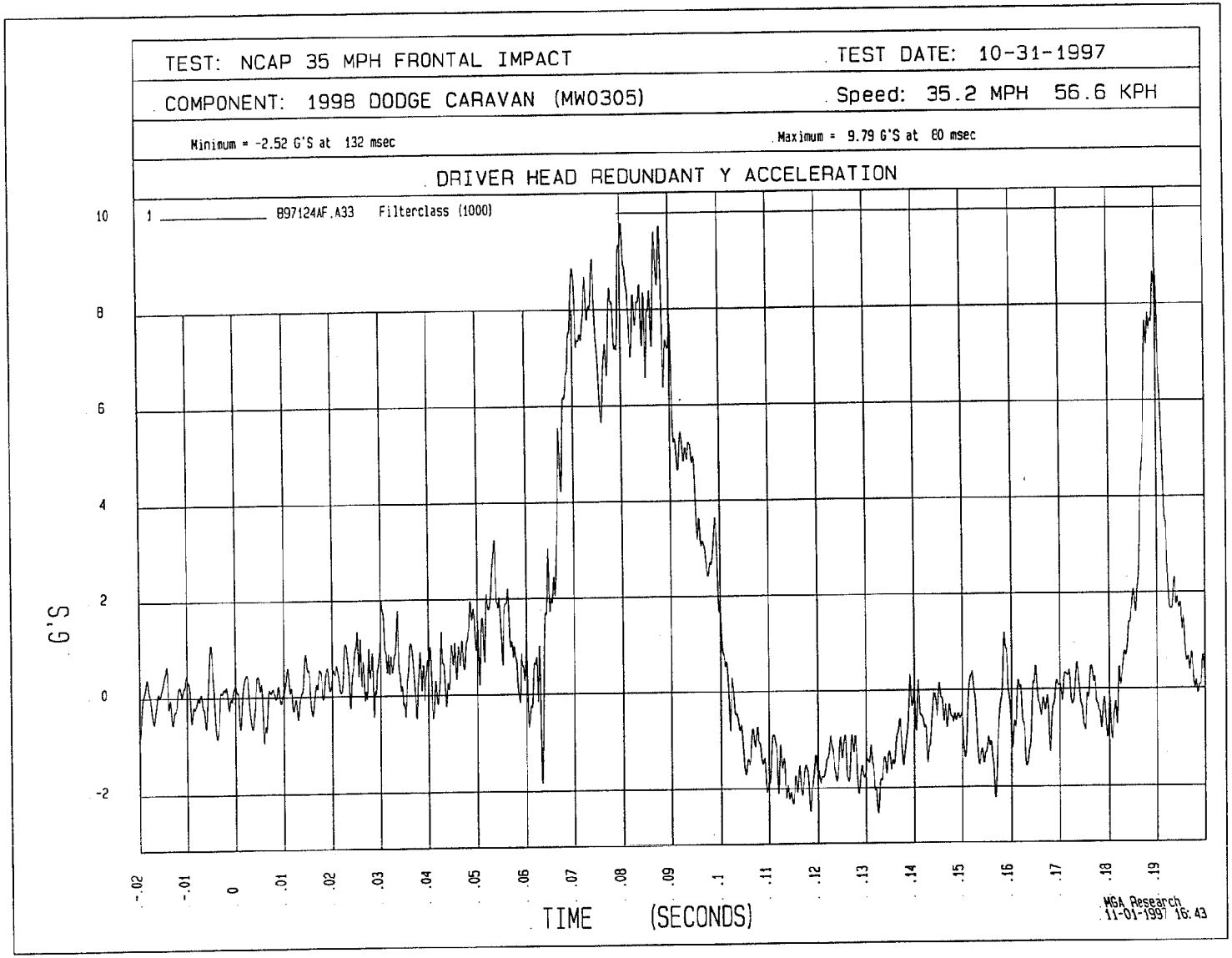

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -2.60 G'S at 115 msec
Maximum = 9.65 G'S at 86 msec
DRIVER HEAD Y ACCELERATION
1 B971244F.A13 Filterclass (1000)
MGA Research 11-01-1997 16:41
TIME (SECONDS)
10
8
6
4
2
0
-2
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19

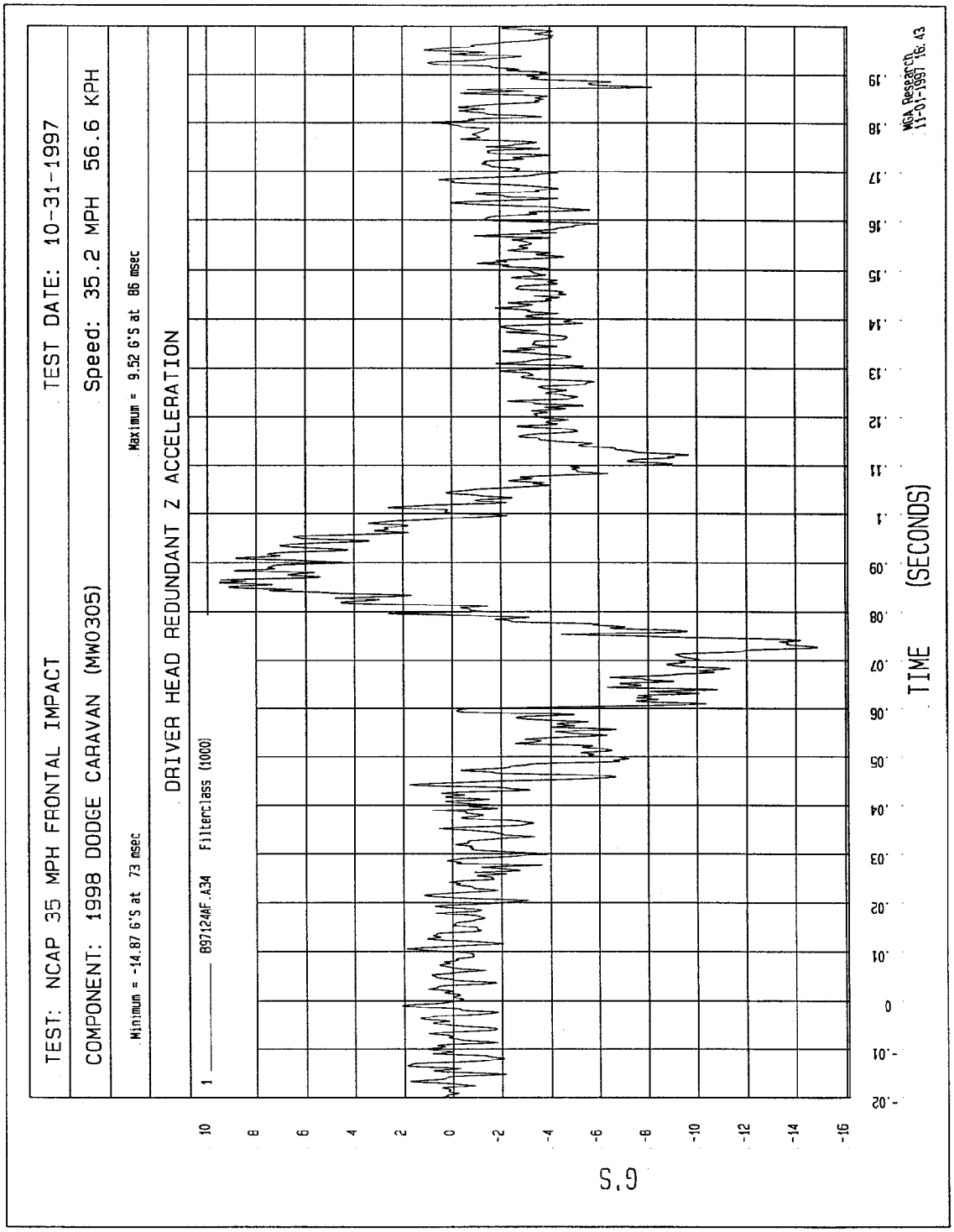

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -15.21 G'S at 73 msec
Maximum = 7.12 G'S at 90 msec
DRIVER HEAD Z ACCELERATION
1 B97124AF.A14 Filterclass (1000)
G'S
TIME (SECONDS)
MGA Research 11-01-1997 16: A1

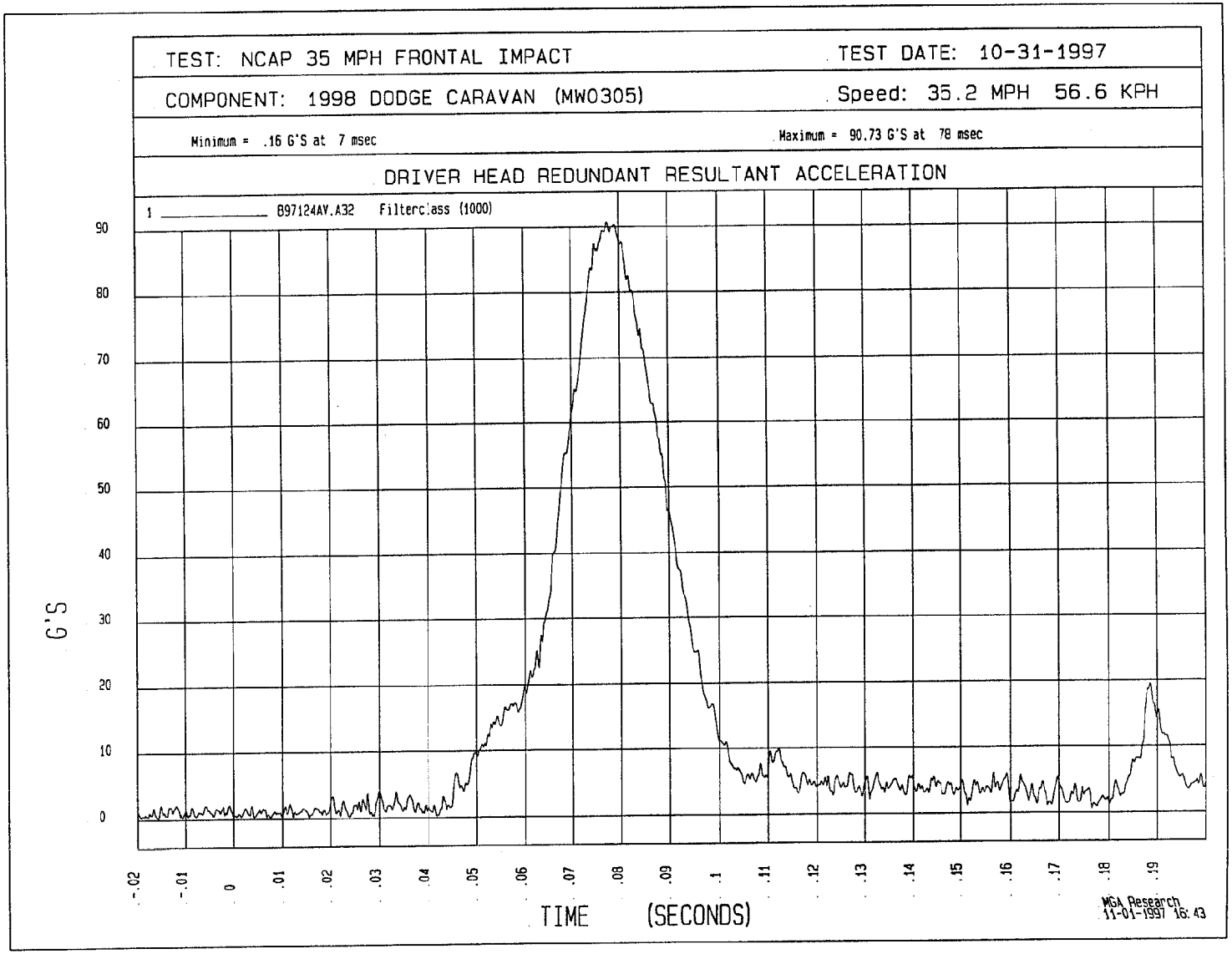

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = .01 G'S at -8 msec
Maximum = 89.39 G'S at 78 msec
DRIVER HEAD RESULTANT ACCELERATION
1 B97124AY.A12 Filterclass (1000)
G'S
TIME (SECONDS)
MGA Research
11-01-1997 16:42

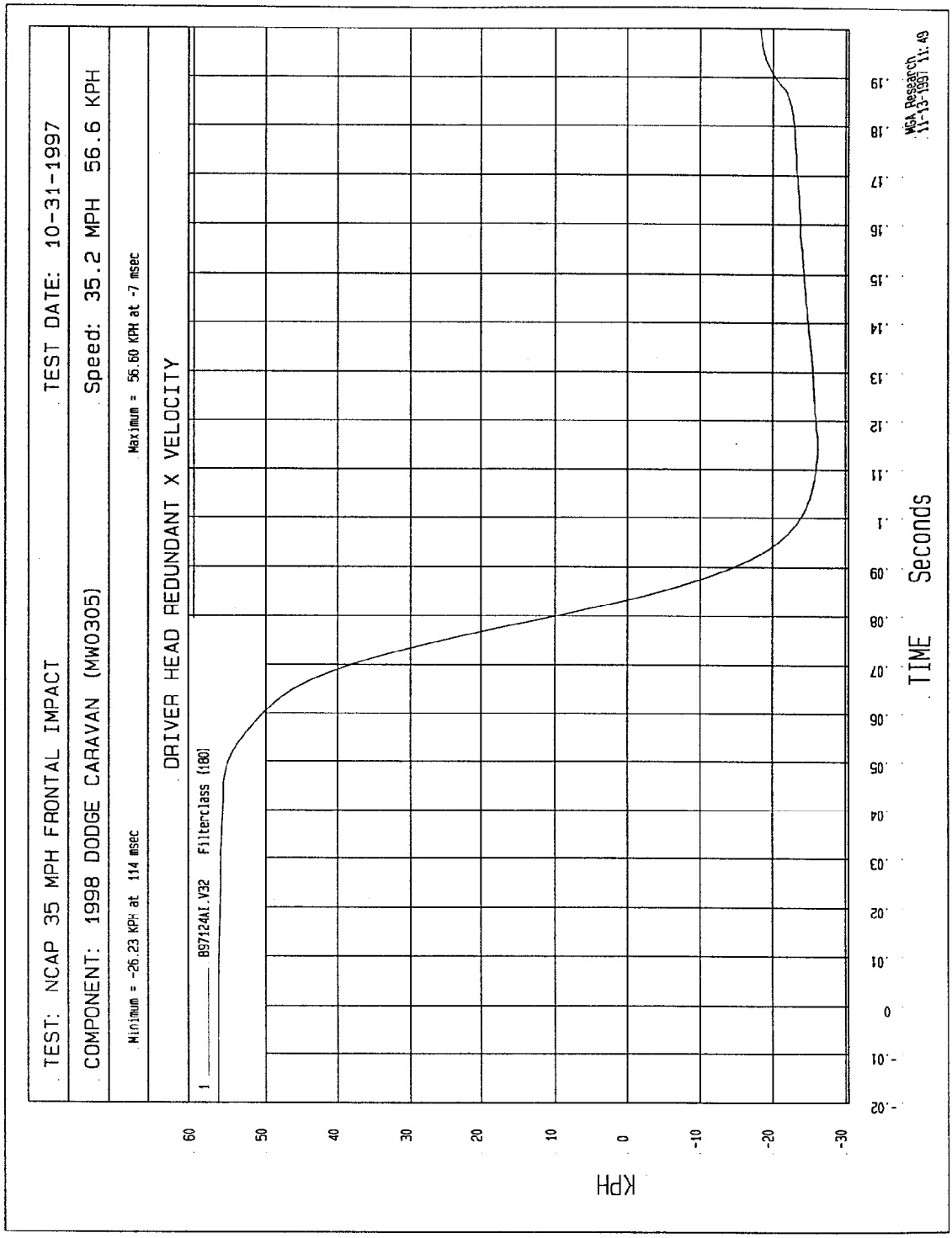

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -25.22 KPH at 114 msec
Maximum = 56.65 KPH at 33 msec
DRIVER HEAD X VELOCITY
1 897124AI.V12 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-13-1997 11:49

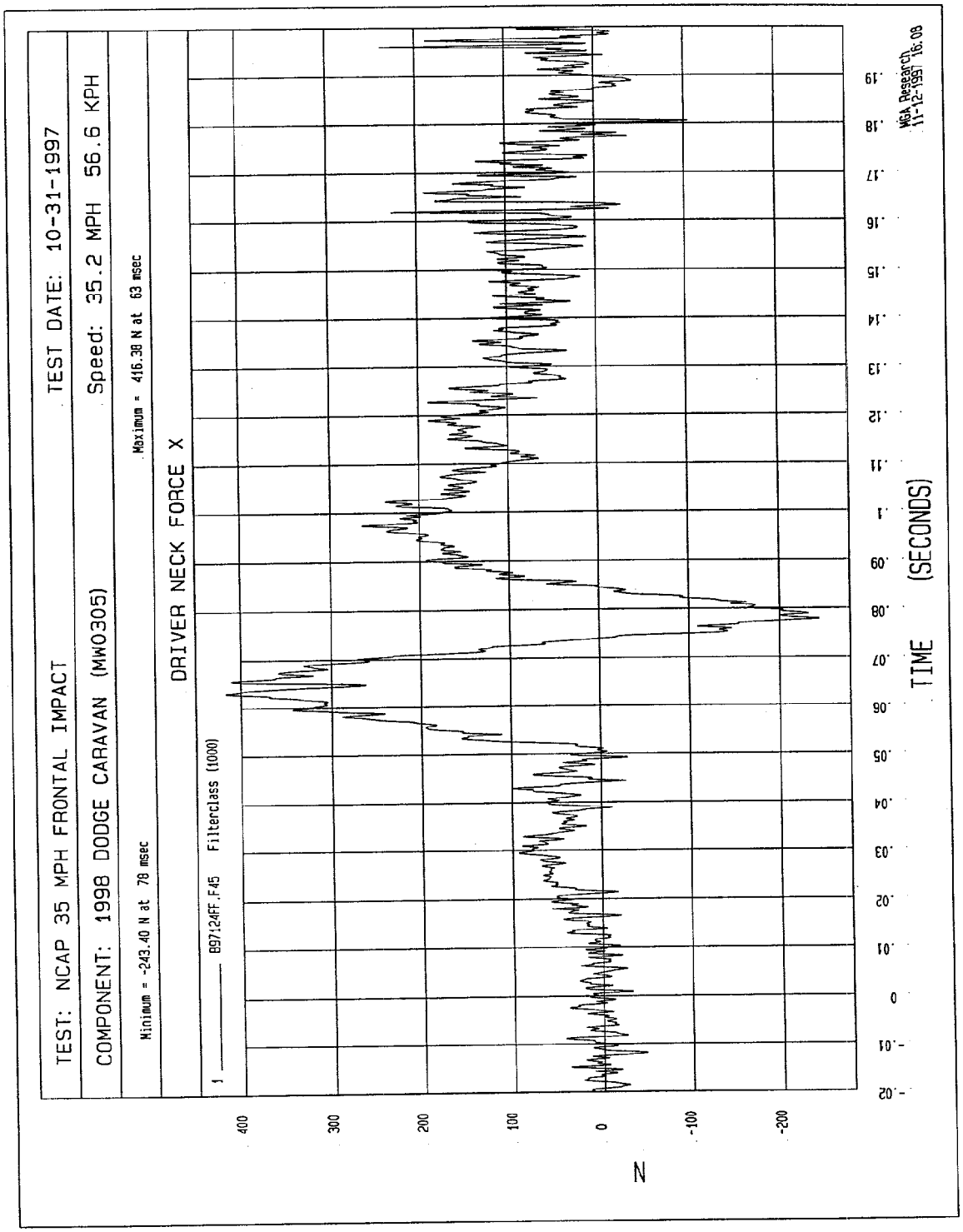

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -90.18 G'S at 78 msec
Maximum = 16.72 G'S at 188 msec
DRIVER HEAD REDUNDANT X ACCELERATION
1 B971204F.A32 Filterclass (1000)
20
0
-20
-40
-60
-80
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
11-01-1997 16:43

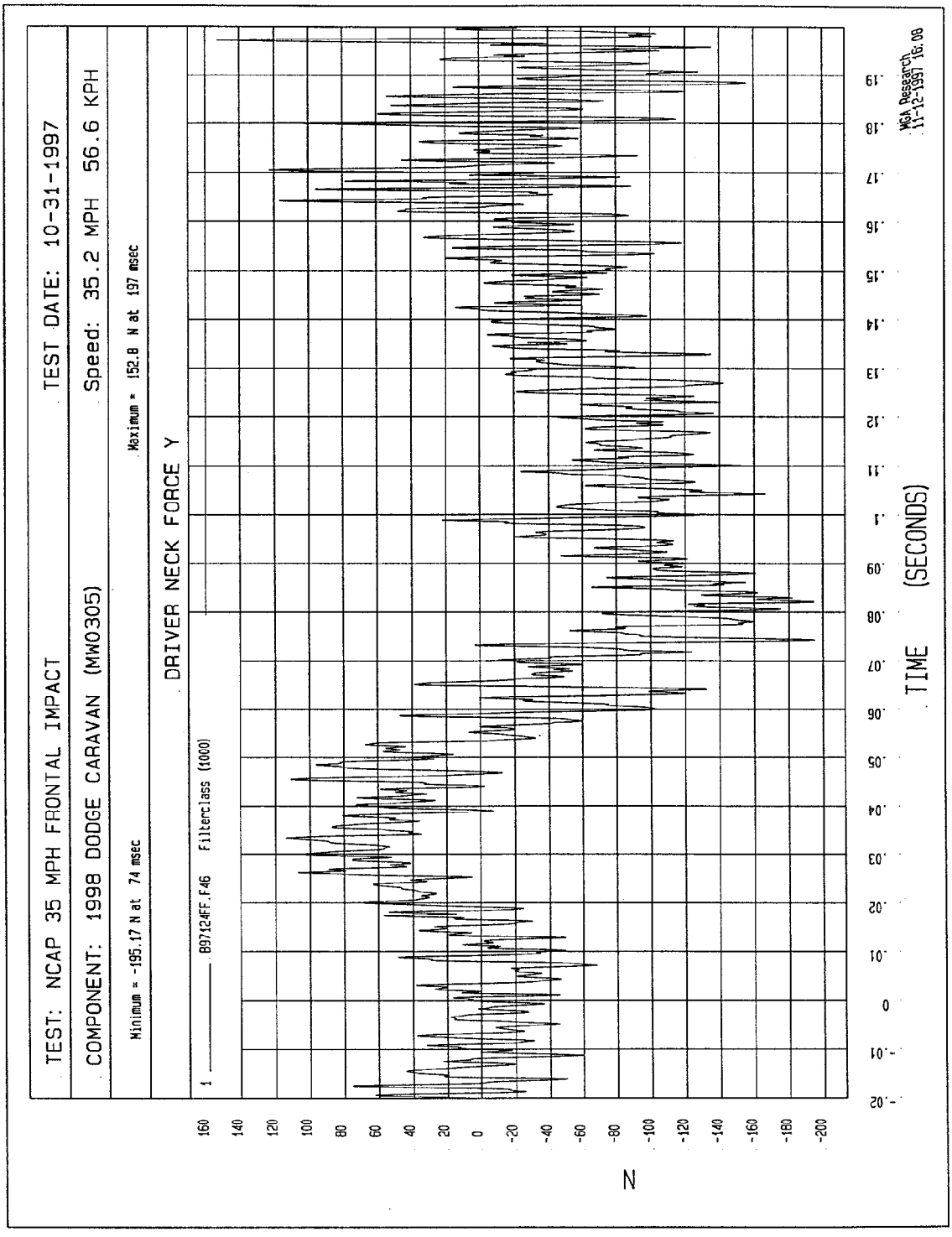

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -2.52 G'S at 132 msec
Maximum = 9.79 G'S at 80 msec
DRIVER HEAD REDUNDANT Y ACCELERATION
1 897124AF.A33 Filterclass (1000)
G'S
10
8
6
4
2
0
-2
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:43

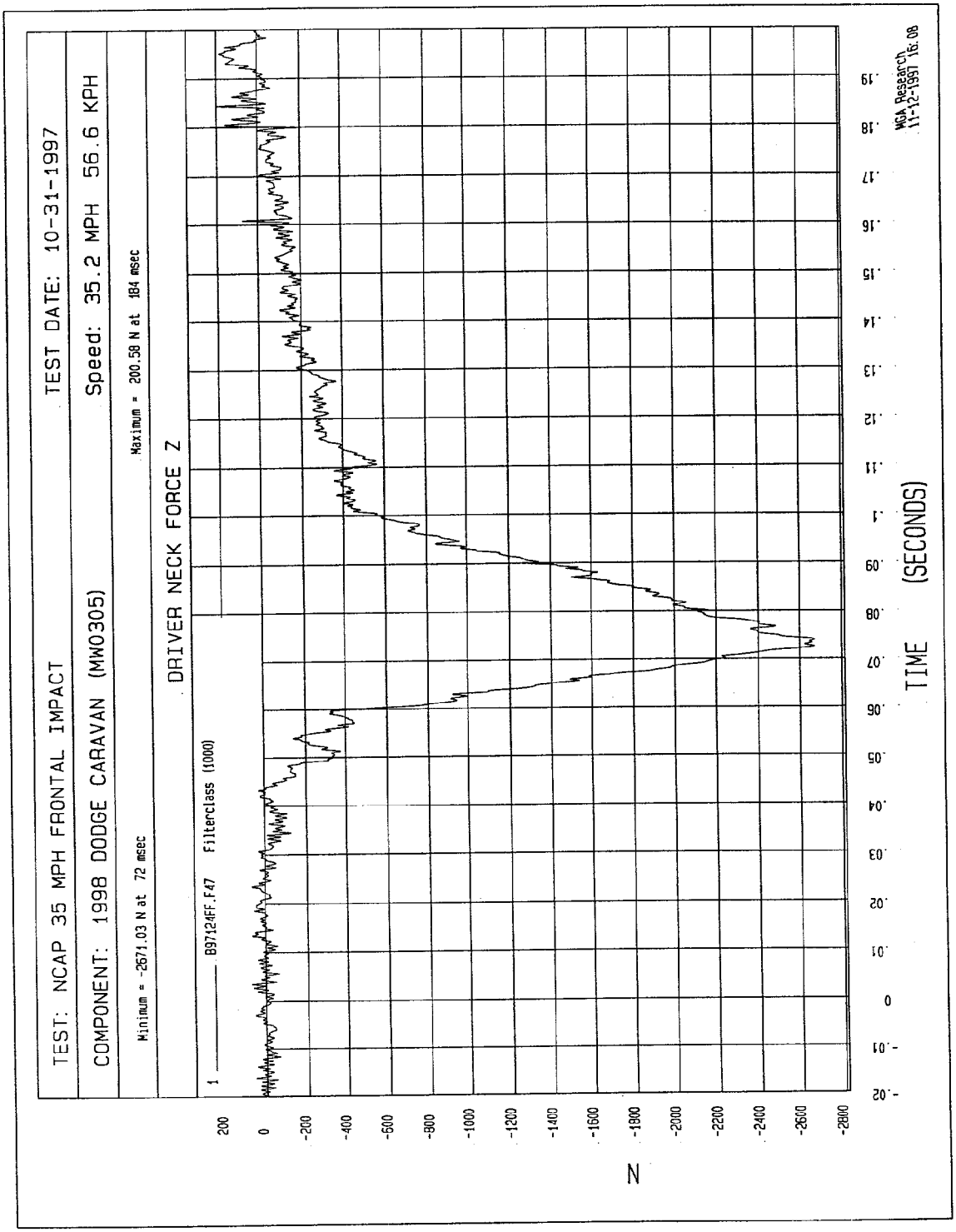

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -14.87 G'S at 73 msec
Maximum = 9.52 G'S at 86 msec
DRIVER HEAD REDUNDANT Z ACCELERATION
1 _____ B97124AF.A34 Filterclass (1000)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:43

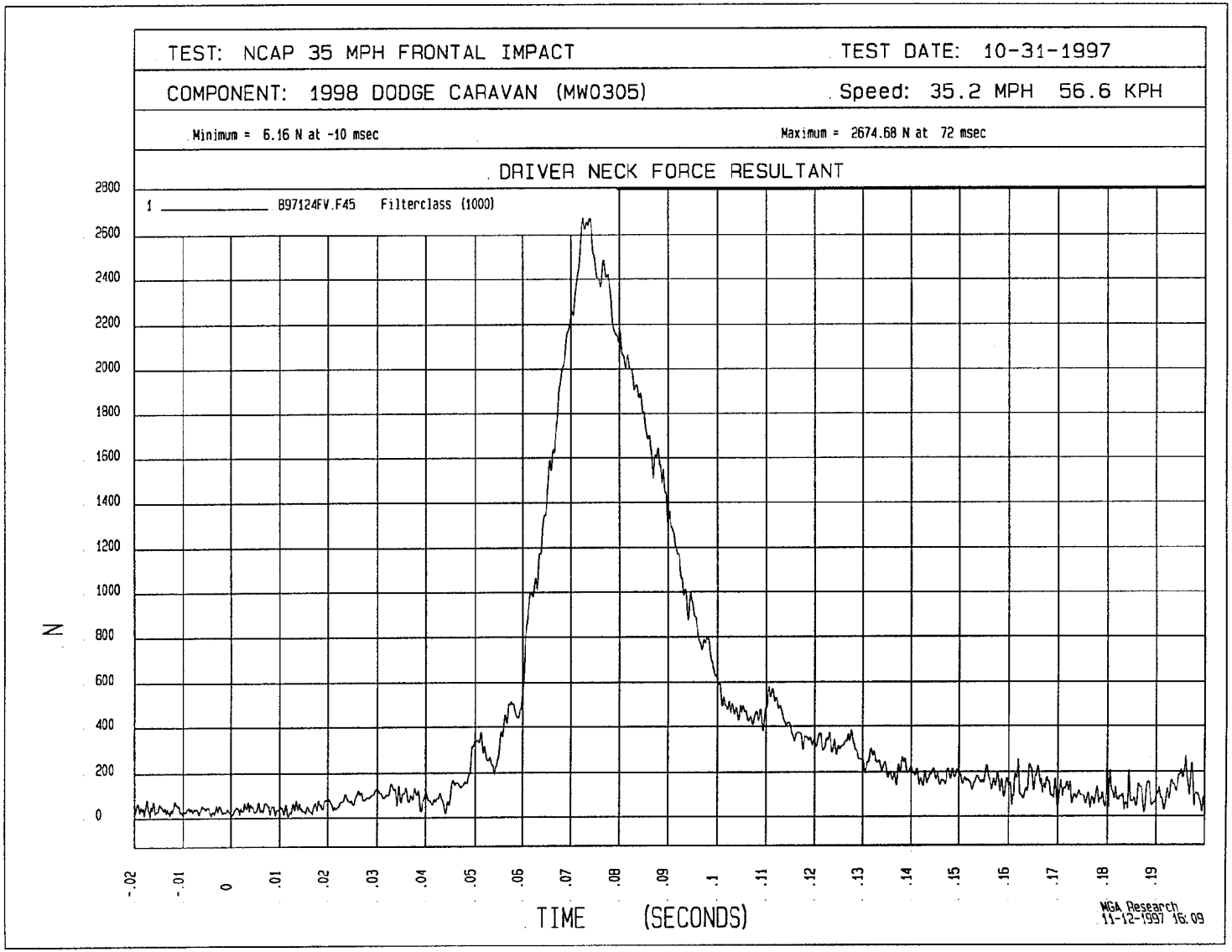

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = .16 G'S at 7 msec
Maximum = 90.73 G'S at 78 msec
DRIVER HEAD REDUNDANT RESULTANT ACCELERATION
1 B97124AV.A32 Filterclass (1000)
G'S
90
80
70
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:43

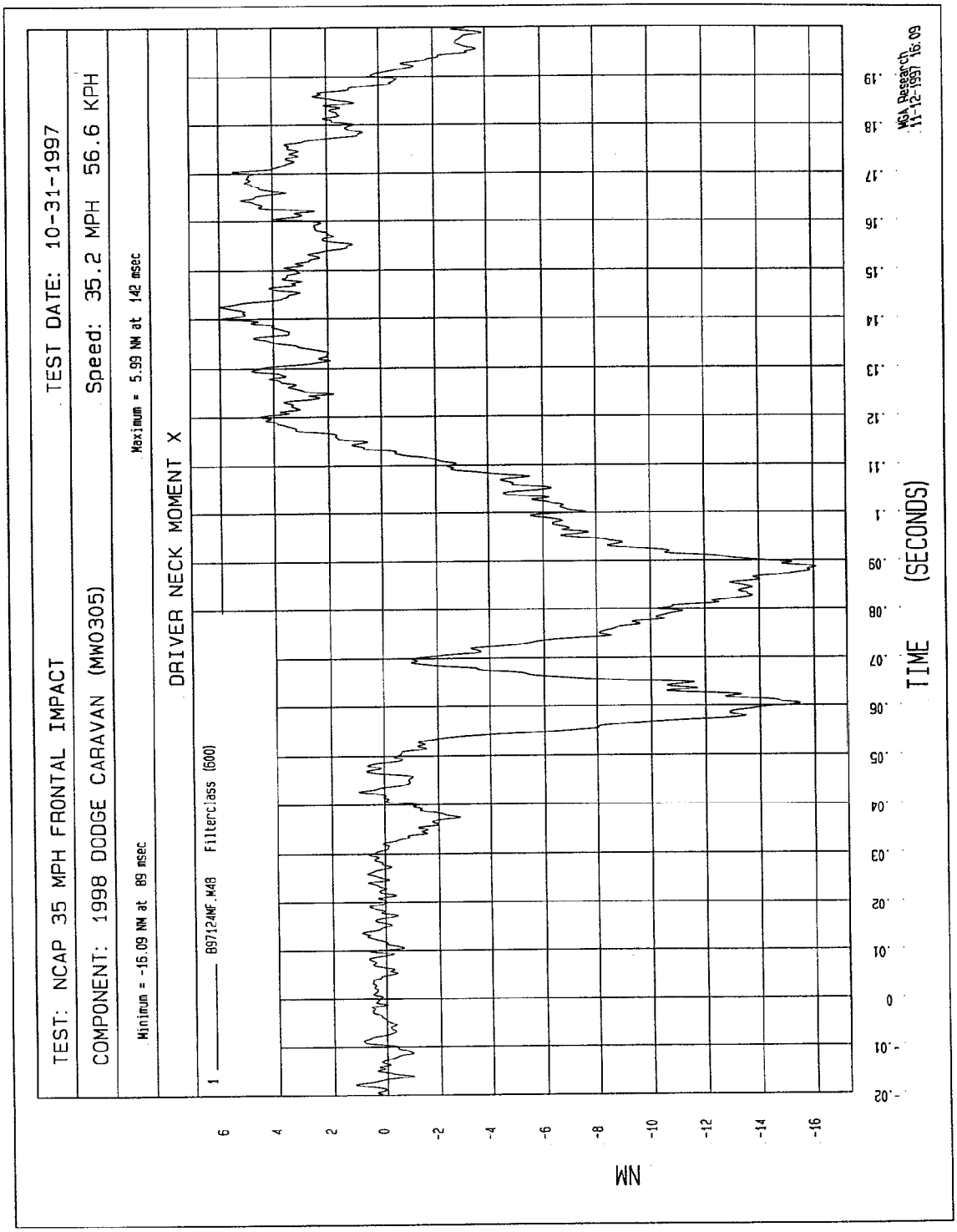

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -26.23 KPH at 114 msec
Maximum = 56.60 KPH at -7 msec
DRIVER HEAD REDUNDANT X VELOCITY
1 B97124AI.V32 Filterclass (180)
KPH
TIME Seconds
MGA Research
11-13-1997 11:49

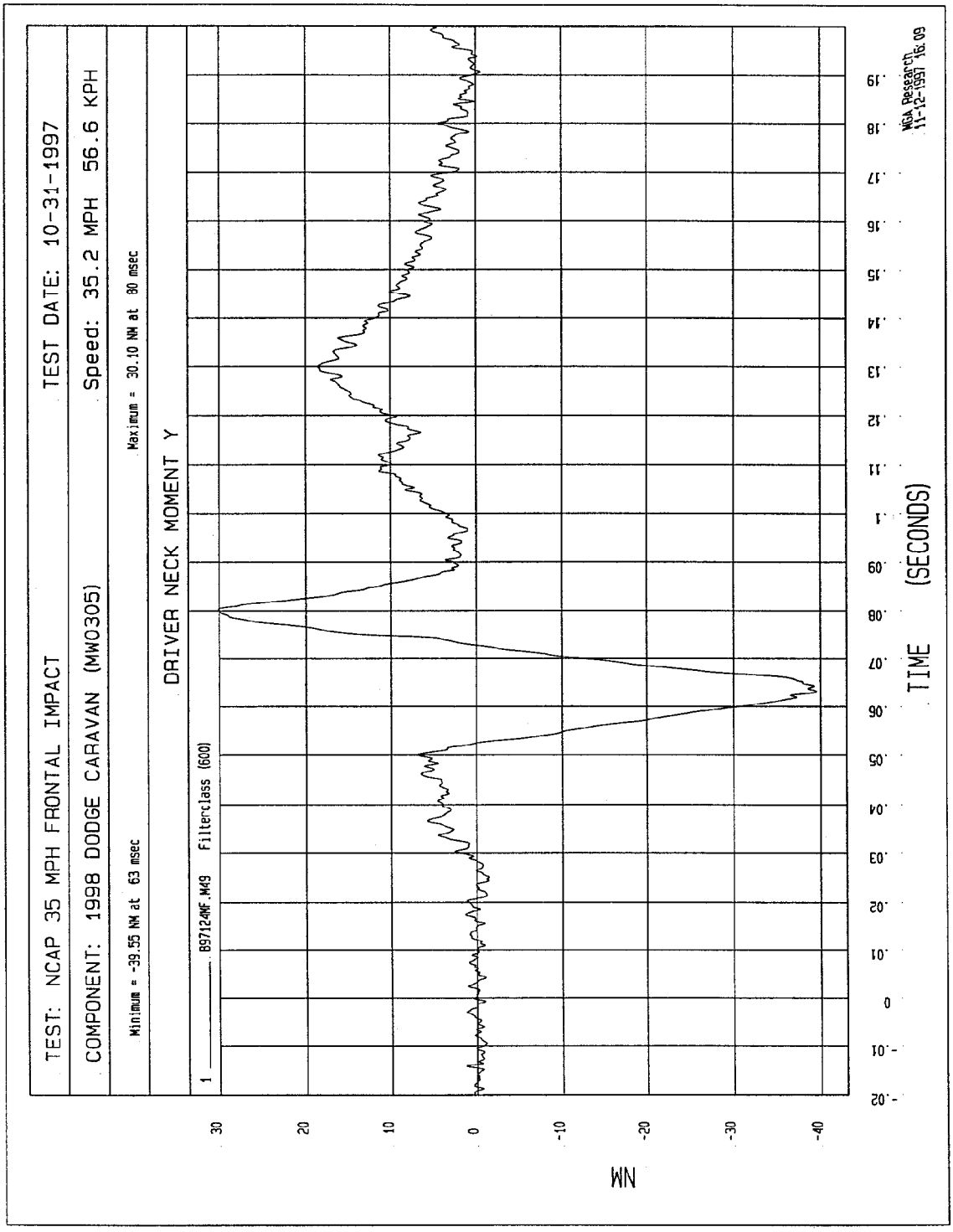

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -243.40 N at 78 msec
Maximum = 416.38 N at 63 msec
DRIVER NECK FORCE X
1 B97:24FF.F45 Filterclass (1000)
400
300
200
100
0
-100
-200
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:09

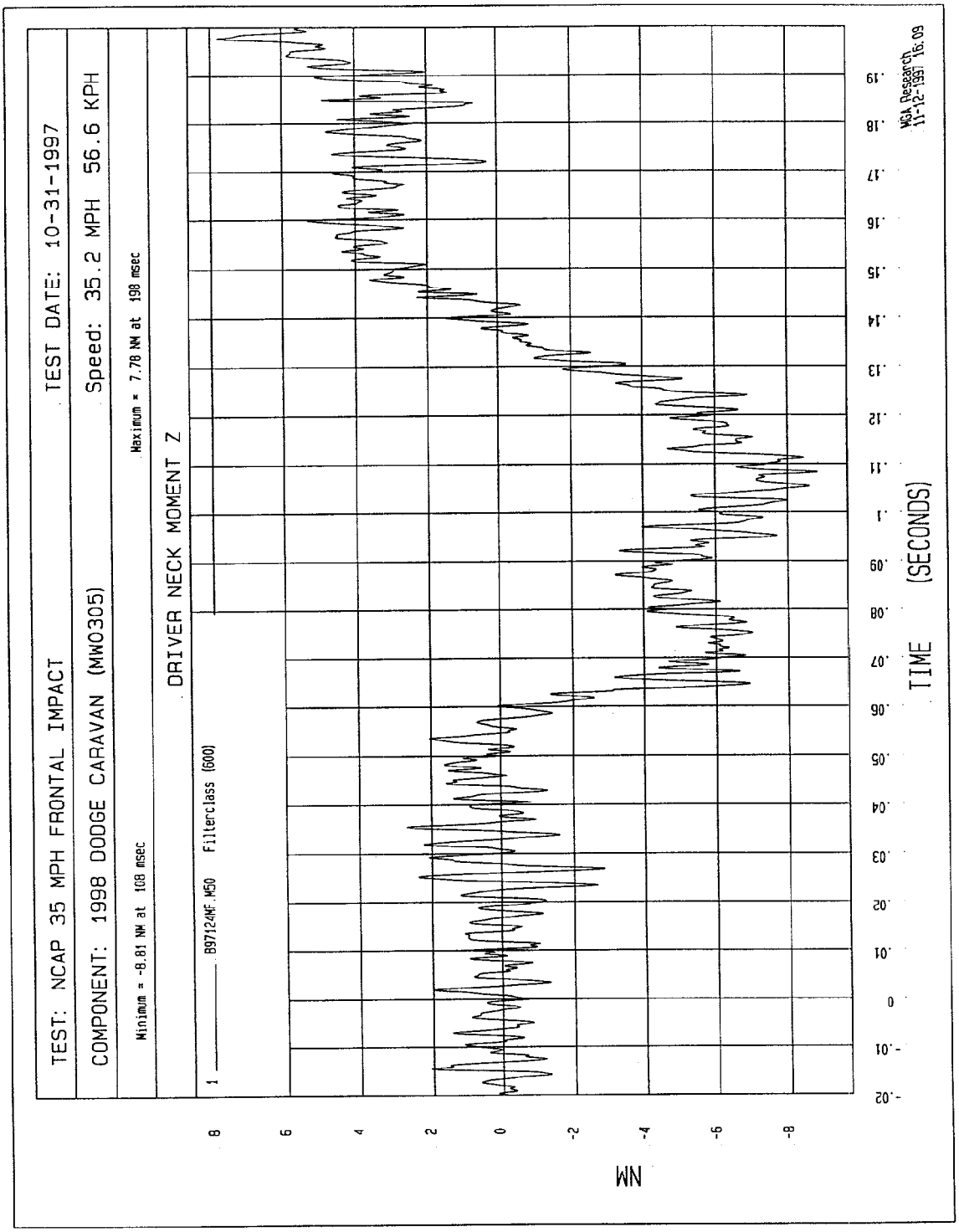

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -195.17 N at 74 msec
Maximum = 152.8 N at 197 msec
DRIVER NECK FORCE Y
1 B97124FF.F46 Filterclass (1000)
N
TIME (SECONDS)
MGA Research
11-12-1997 16:06

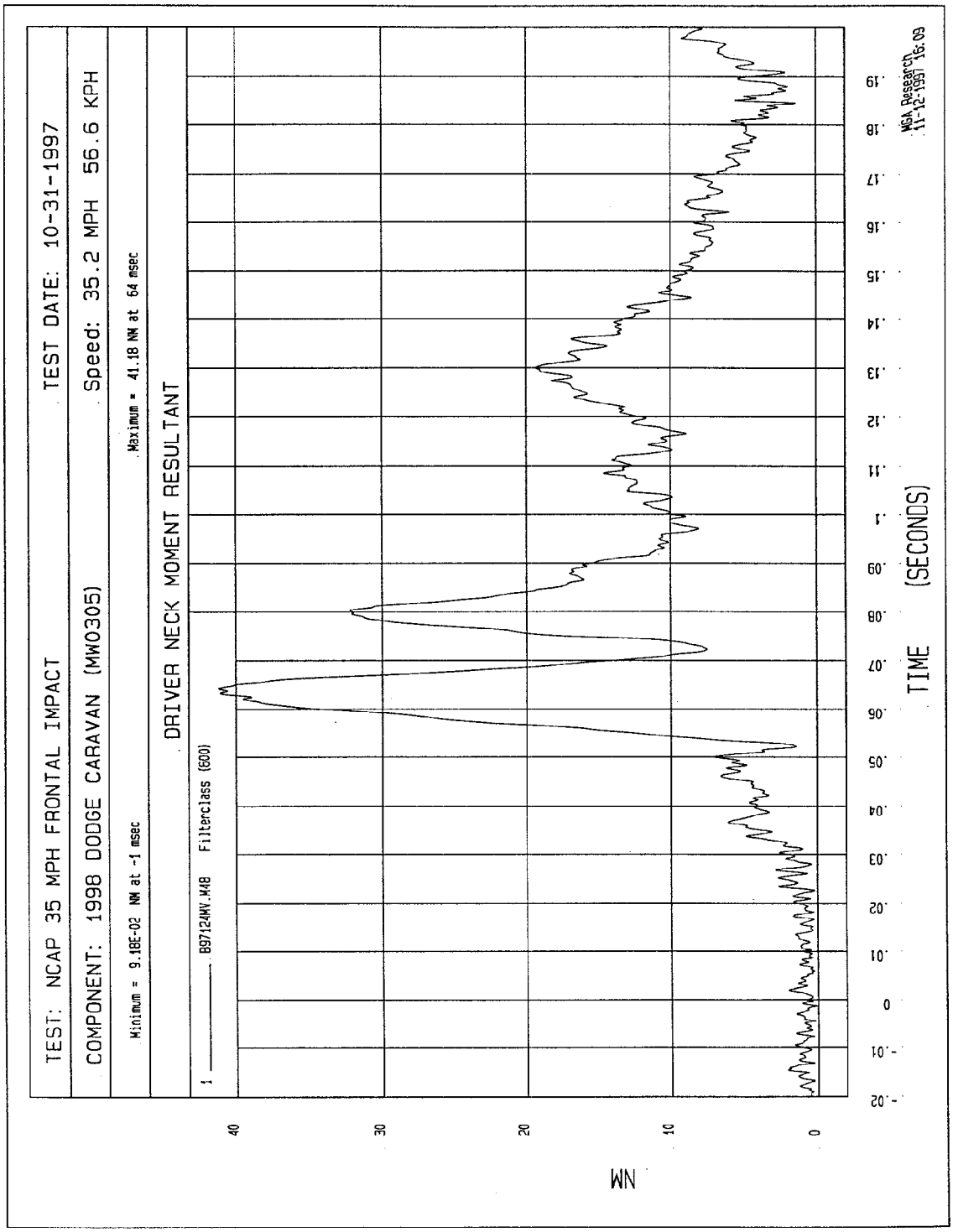

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -2671.03 N at 72 msec
Maximum = 200.58 N at 184 msec
DRIVER NECK FORCE Z
1 B97124FF.F47 Filterclass (1000)
N
TIME (SECONDS)
MGA Research
11-12-1997 16:08

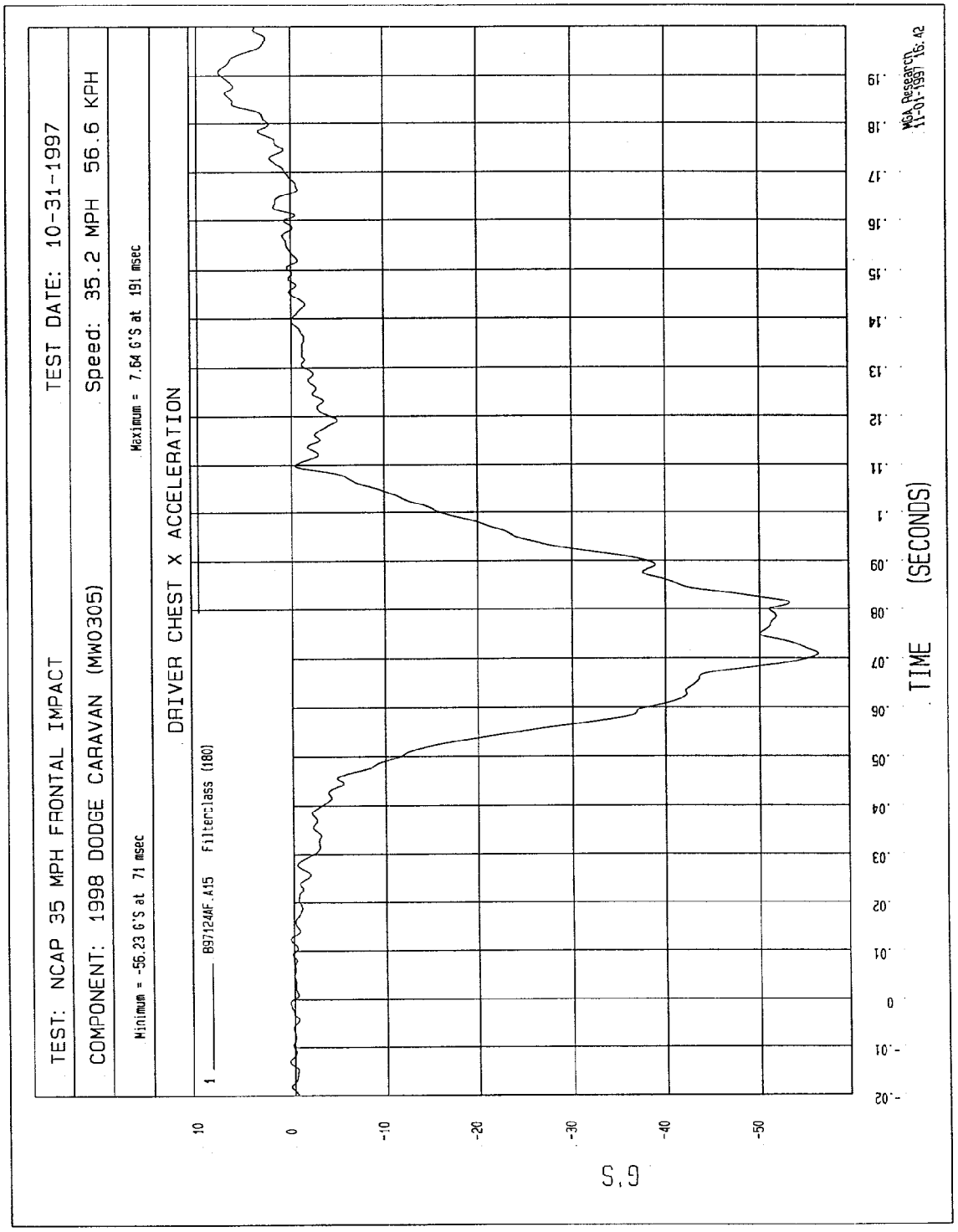

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 6.16 N at -10 msec
Maximum = 2674.68 N at 72 msec
DRIVER NECK FORCE RESULTANT
1 B97124FV.F45 Filterclass (1000)
N
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:09

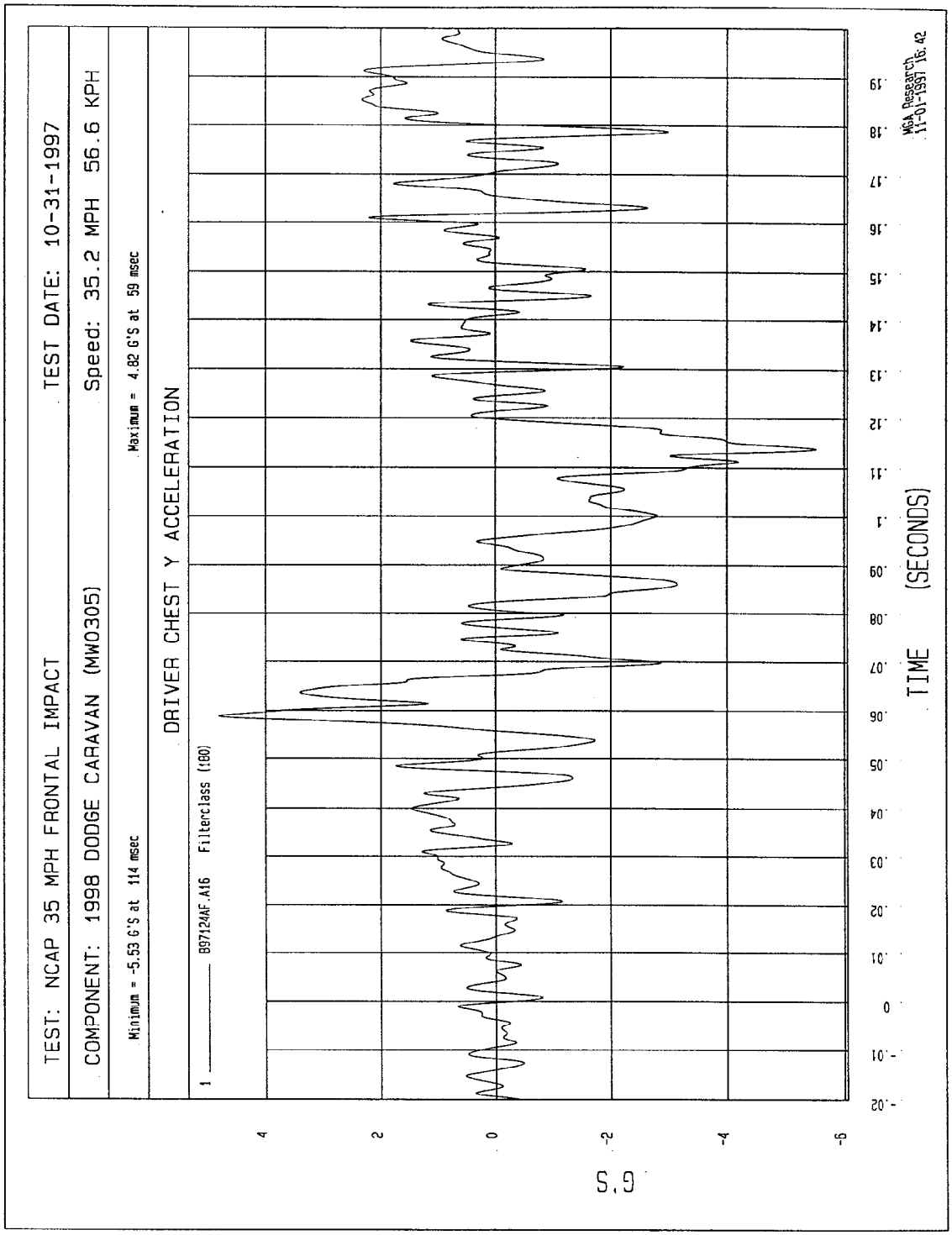

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -16.09 NM at 89 msec
Maximum = 5.99 NM at 142 msec
DRIVER NECK MOMENT X
1 B97124MF.M48 FilterClass (600)
NM
TIME (SECONDS)
MGA Research
11-12-1997 16:09

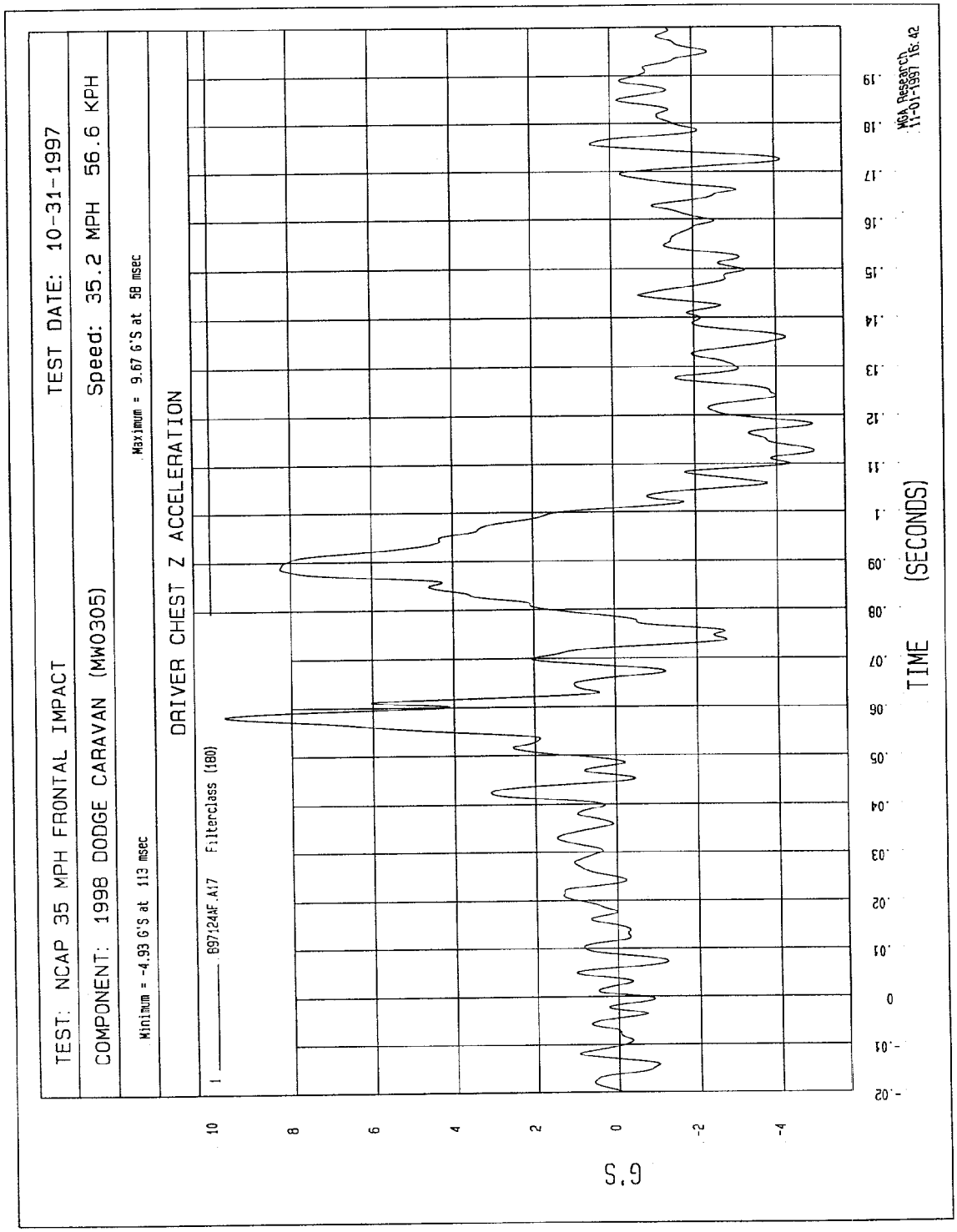

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -39.55 NM at 63 msec
Maximum = 30.10 NM at 80 msec
DRIVER NECK MOMENT Y
1 _____ 897124MF.M49 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-12-1997 16:09

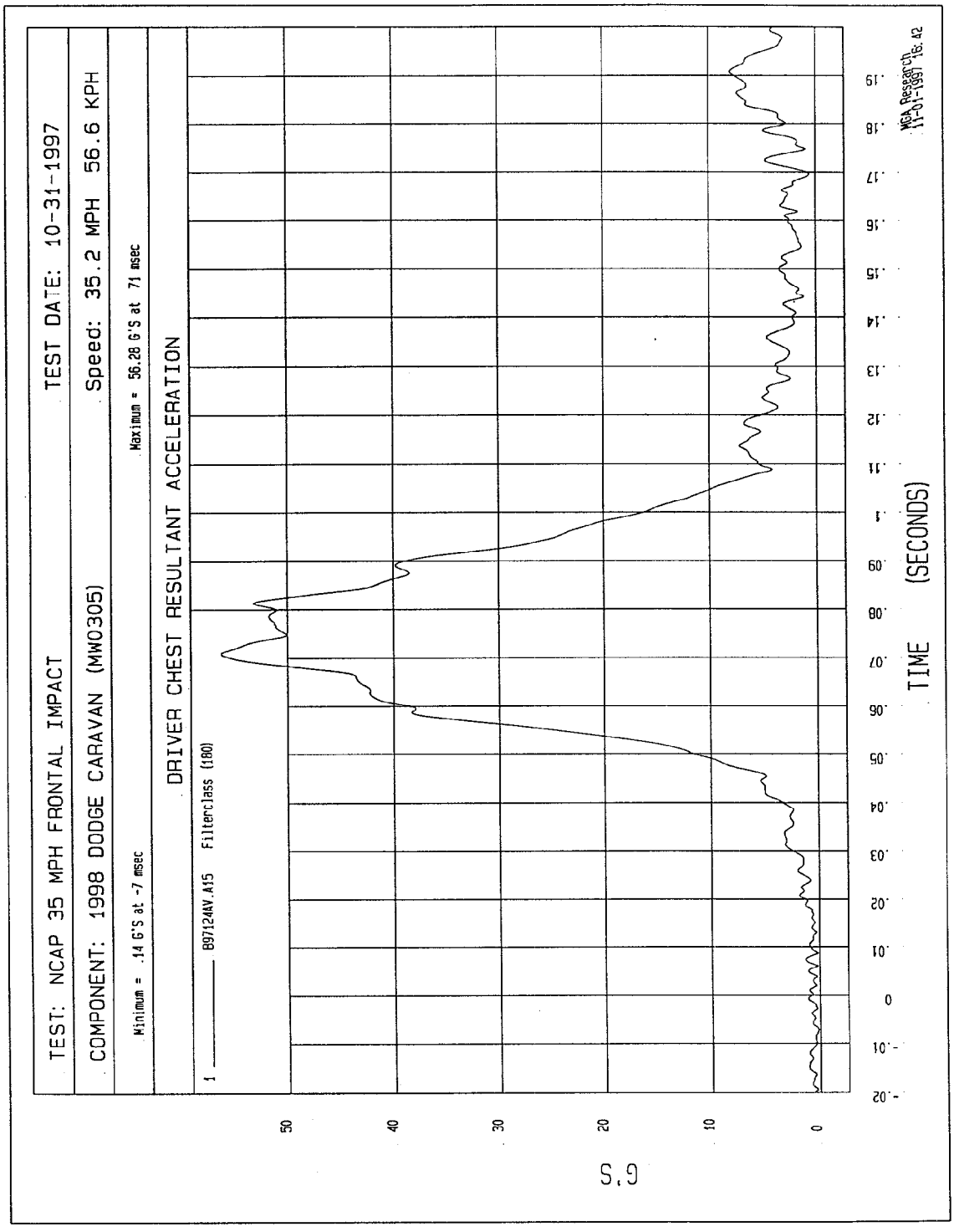

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -8.81 NM at 108 msec
Maximum = 7.78 NM at 198 msec
DRIVER NECK MOMENT Z
1 B97124MF.M50 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-12-1997 16:09

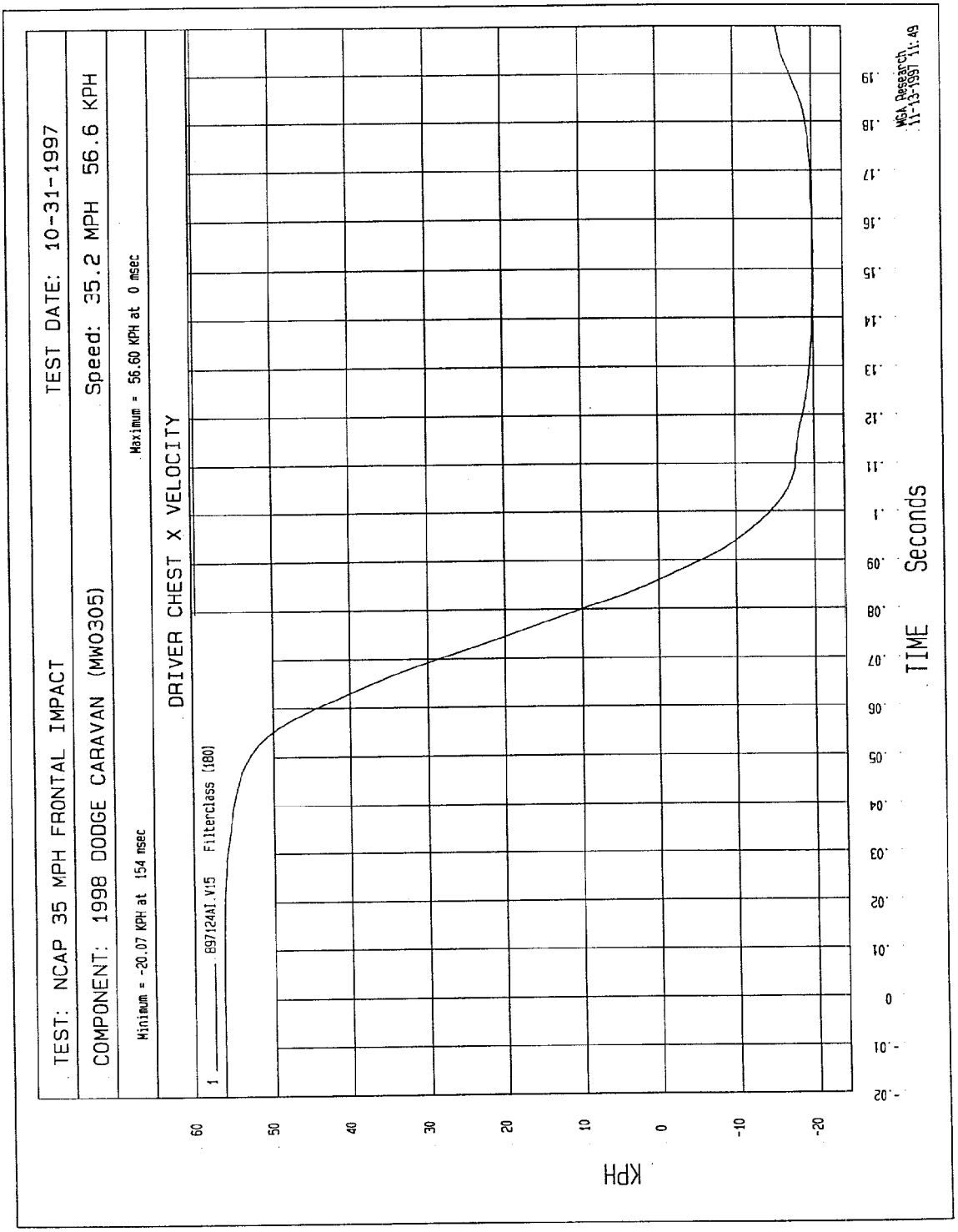

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 9.18E-02 NM at -1 msec
Maximum = 41.18 NM at 64 msec
DRIVER NECK MOMENT RESULTANT
1 _____ B97124MW.MAB Filterclass (600)
NM
TIME (SECONDS)
NGA Research
11-12-1997 16:09

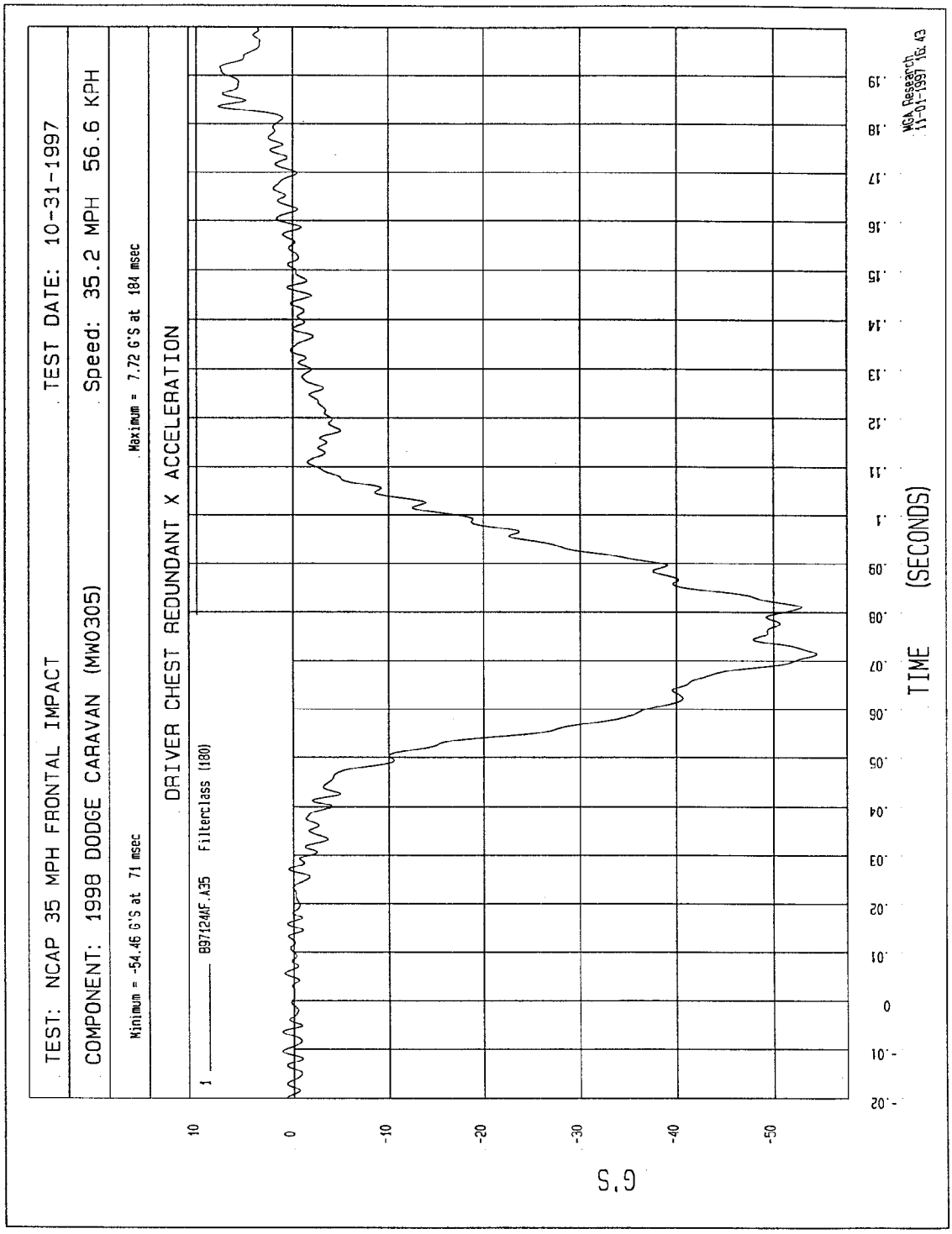

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -56.23 G'S at 71 msec
Maximum = 7.64 G'S at 191 msec
DRIVER CHEST X ACCELERATION
1 B97124AF.A15 Filterclass (180)
10
0
-10
-20
-30
-40
-50
G's
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-01-1997 16:42

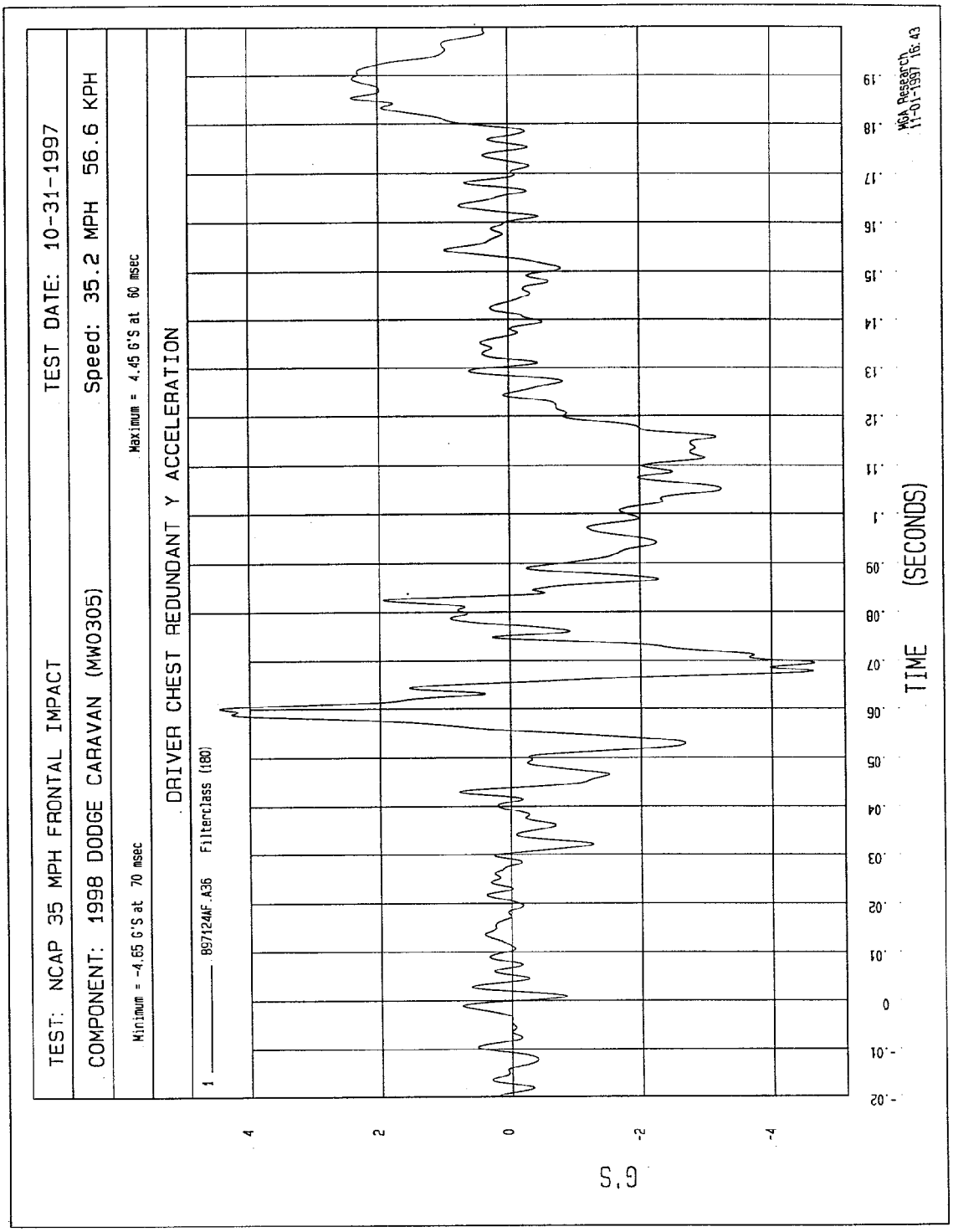

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -5.53 G'S at 114 msec
Maximum = 4.82 G'S at 59 msec
DRIVER CHEST Y ACCELERATION
1 B97124AF.A16 Filterclass (180)
G'S
TIME (SECONDS)
MGA Research
11-01-1997 16:42

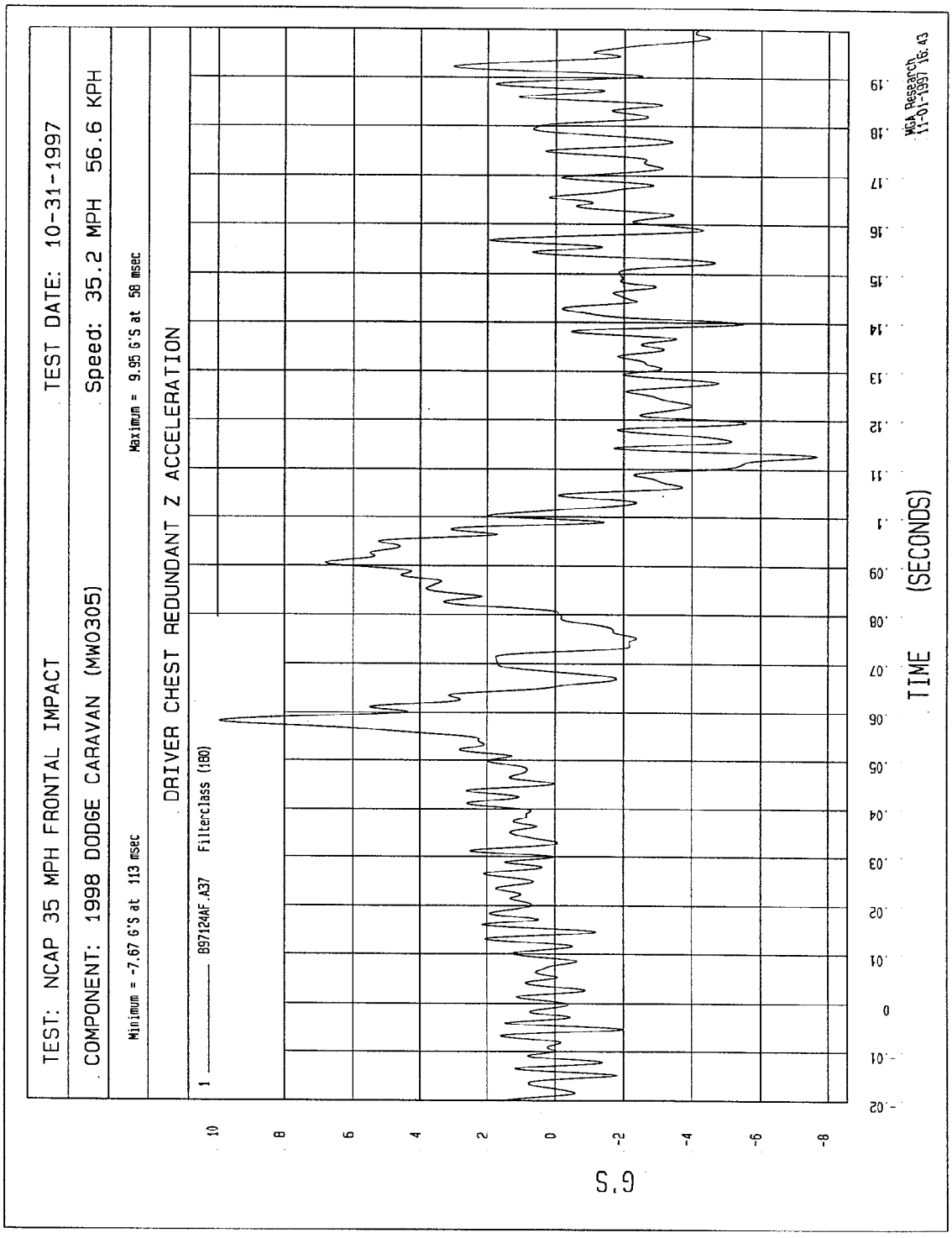

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -4.93 G'S at 113 msec
Maximum = 9.67 G'S at 58 msec
DRIVER CHEST Z ACCELERATION
1 B97124AF.A17 Filterclass (180)
10
8
6
4
2
0
-2
-4
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
11-01-1997 16:42

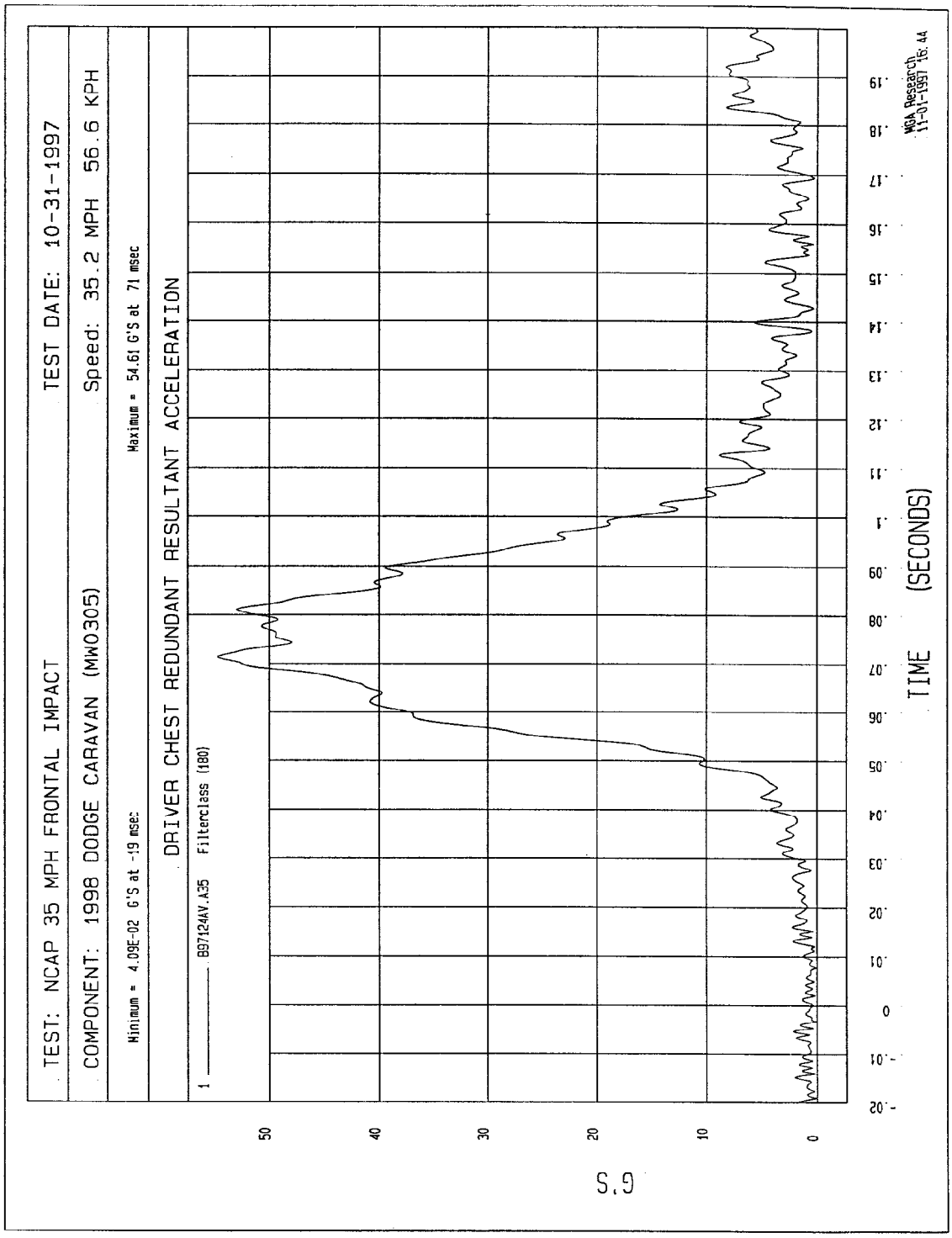

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = .14 G'S at -7 msec
Maximum = 56.28 G'S at 71 msec
DRIVER CHEST RESULTANT ACCELERATION
1 _____ B97124AV.A15 Filterclass (180)
G'S
TIME (SECONDS)
MGA Research
11-01-1997 16:42

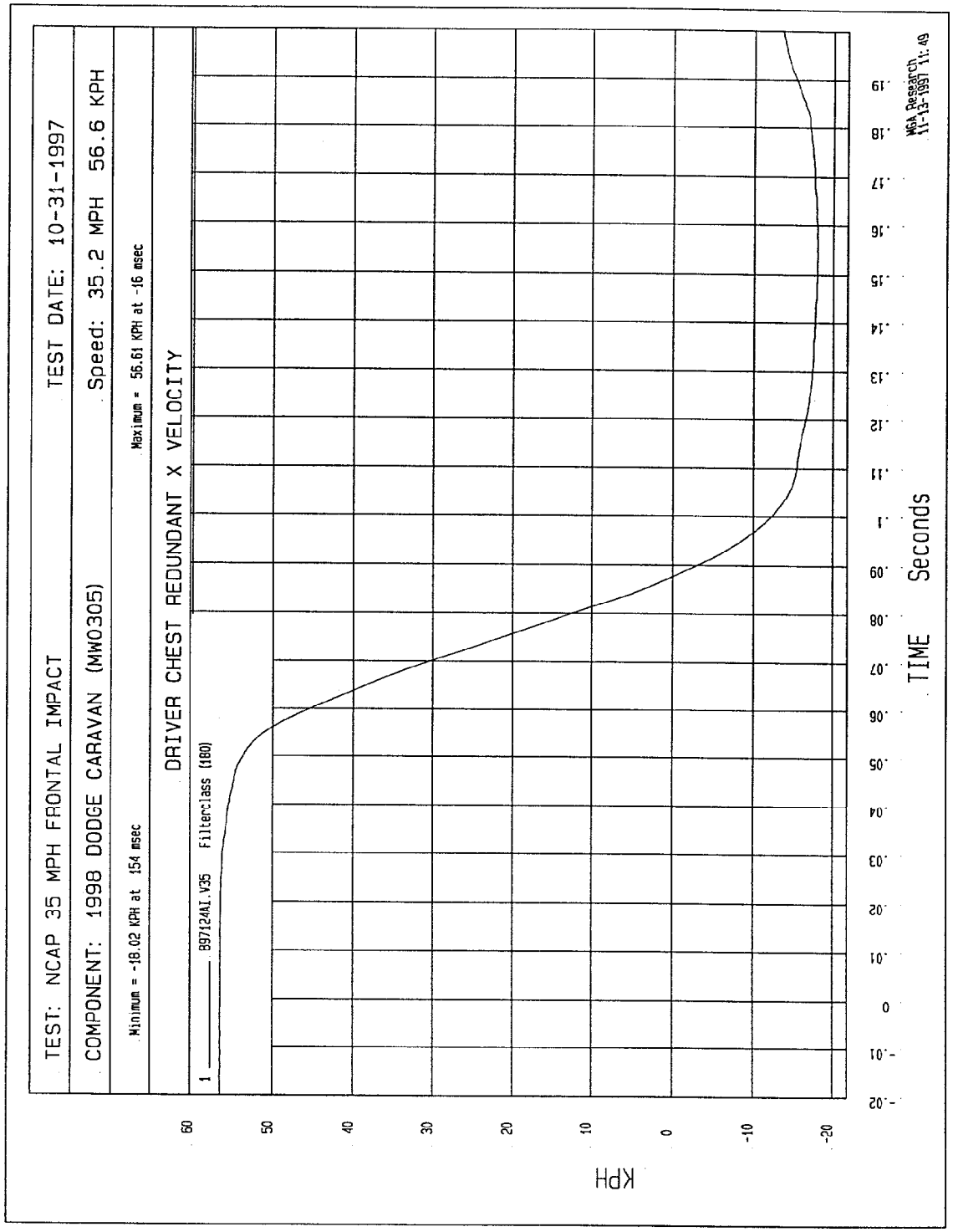

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -20.07 KPH at 154 msec
Maximum = 56.60 KPH at 0 msec
DRIVER CHEST X VELOCITY
1 ——— 897124AI.V15 Filterclass (180)
KPH
TIME Seconds
MGA Research
11-13-1997 11:49

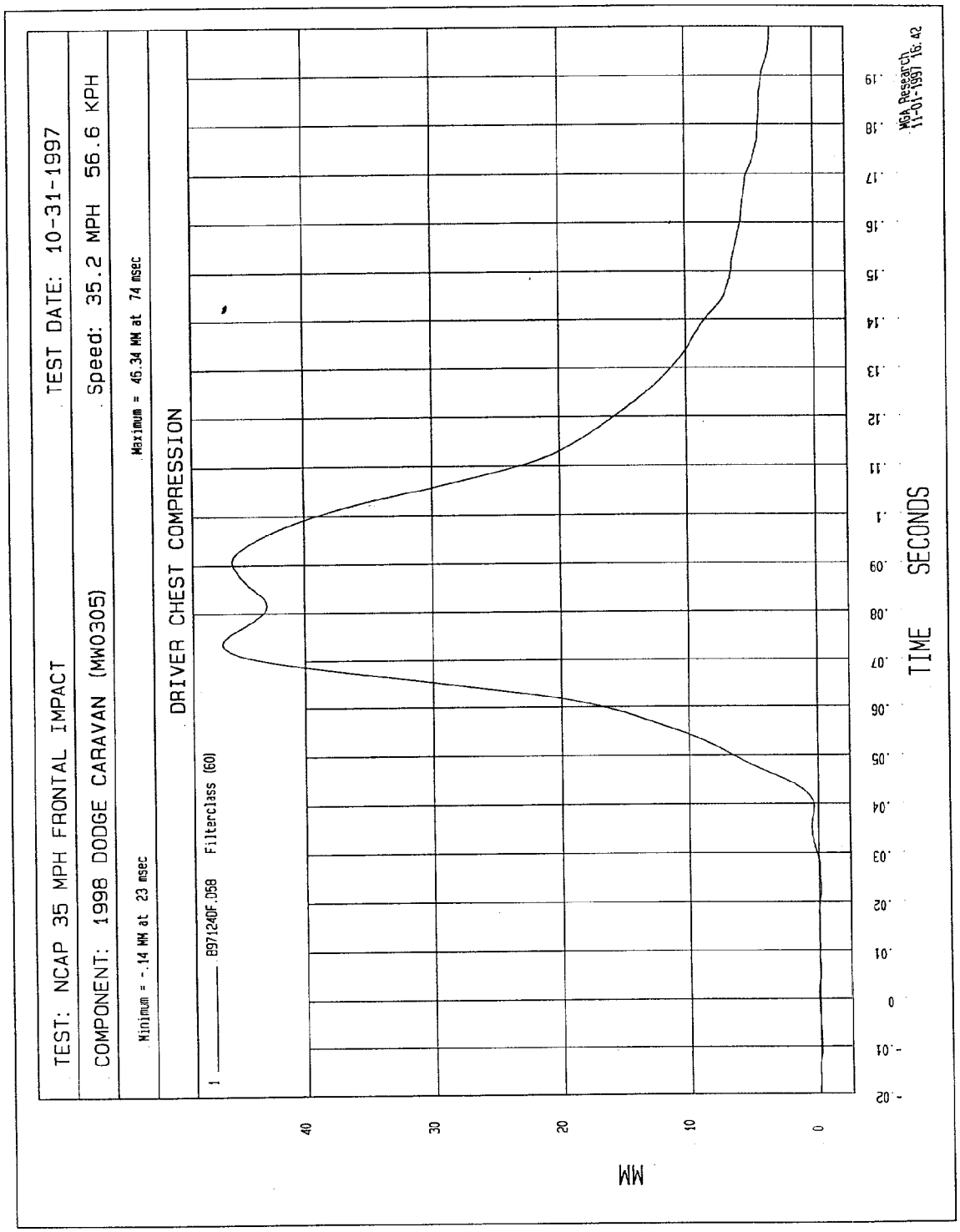

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -54.46 G'S at 71 msec
Maximum = 7.72 G'S at 184 msec
DRIVER CHEST REDUNDANT X ACCELERATION
1 B971244F.A35 Filterclass (180)
G'S
TIME (SECONDS)
MGA Research
11-01-1997 16:43

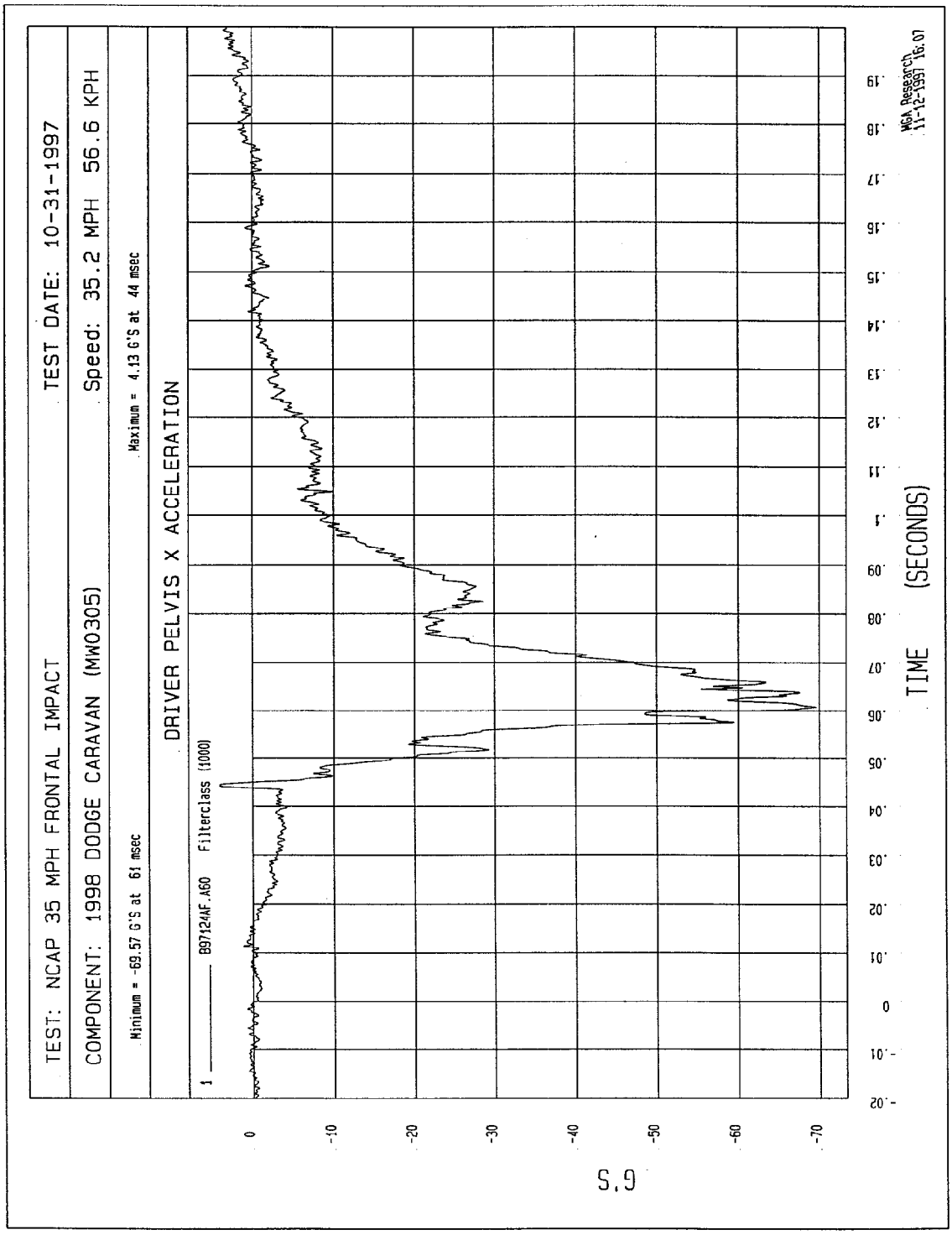

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -4.65 G'S at 70 msec
Maximum = 4.45 G'S at 60 msec
DRIVER CHEST REDUNDANT Y ACCELERATION
1 B97124AF.A36 Filterclass (180)
MGA Research
11-01-1997 16:43
TIME (SECONDS)
G'S

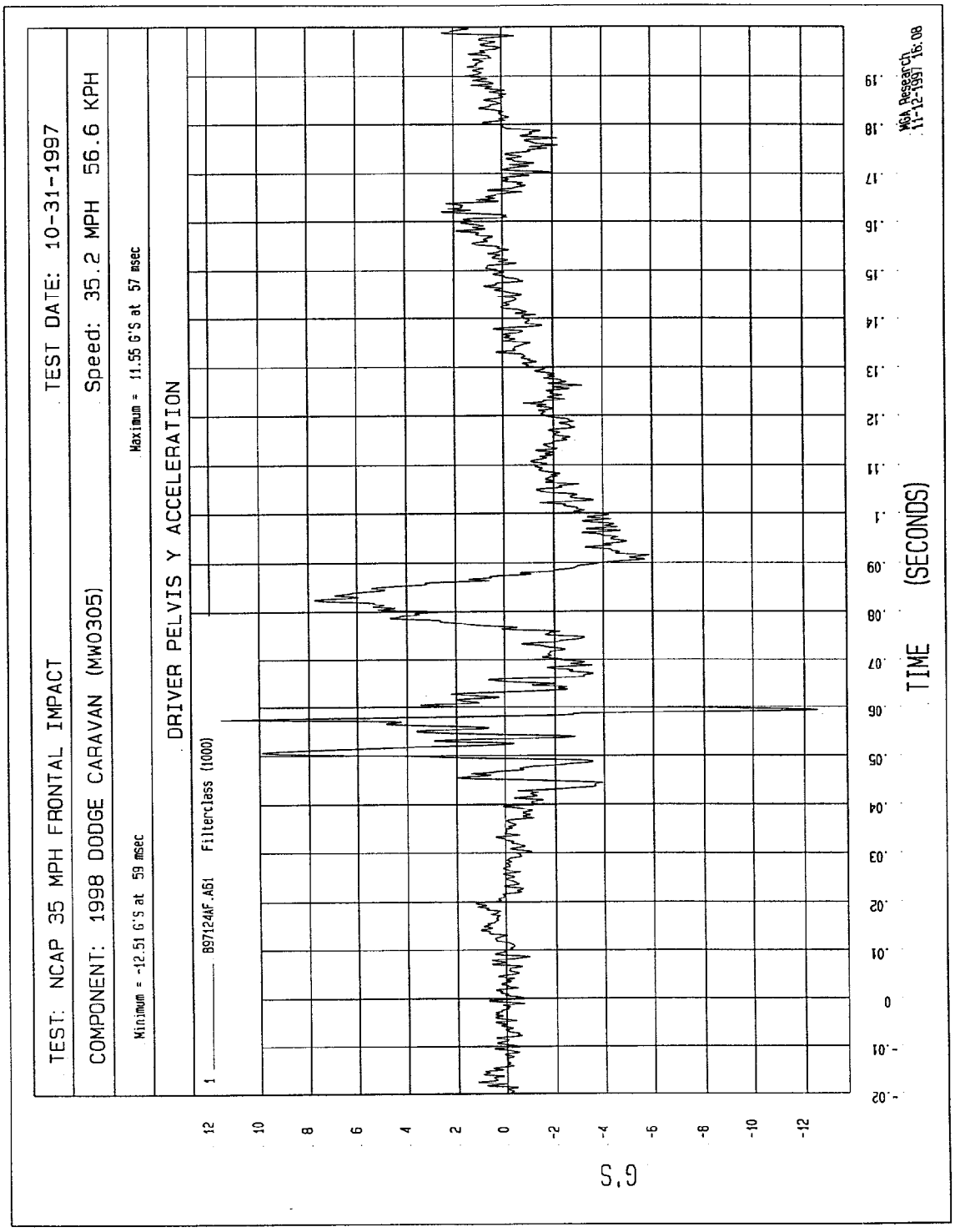

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -7.67 G'S at 113 msec
Maximum = 9.95 G'S at 58 msec
DRIVER CHEST REDUNDANT Z ACCELERATION
1 B97124AF.A37 Filterclass (180)
10
8
6
4
2
0
-2
-4
-6
-8
G'S
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:43

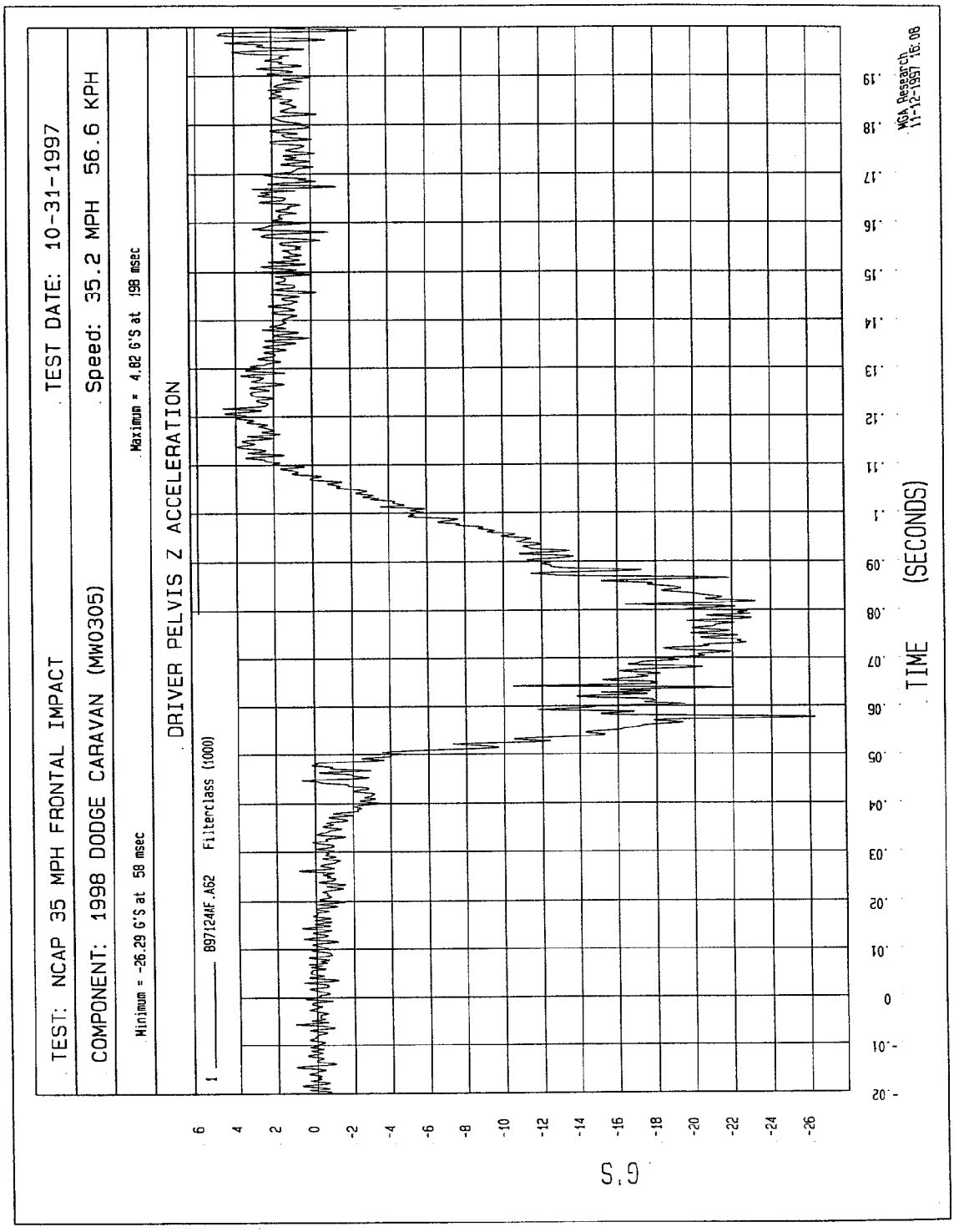

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 4.09E-02 G'S at -19 msec
Maximum = 54.61 G'S at 71 msec
DRIVER CHEST REDUNDANT RESULTANT ACCELERATION
1 B97124AV.A35 Filterclass (180)
G'S
TIME (SECONDS)
MGA Research
11-01-1997 16:44

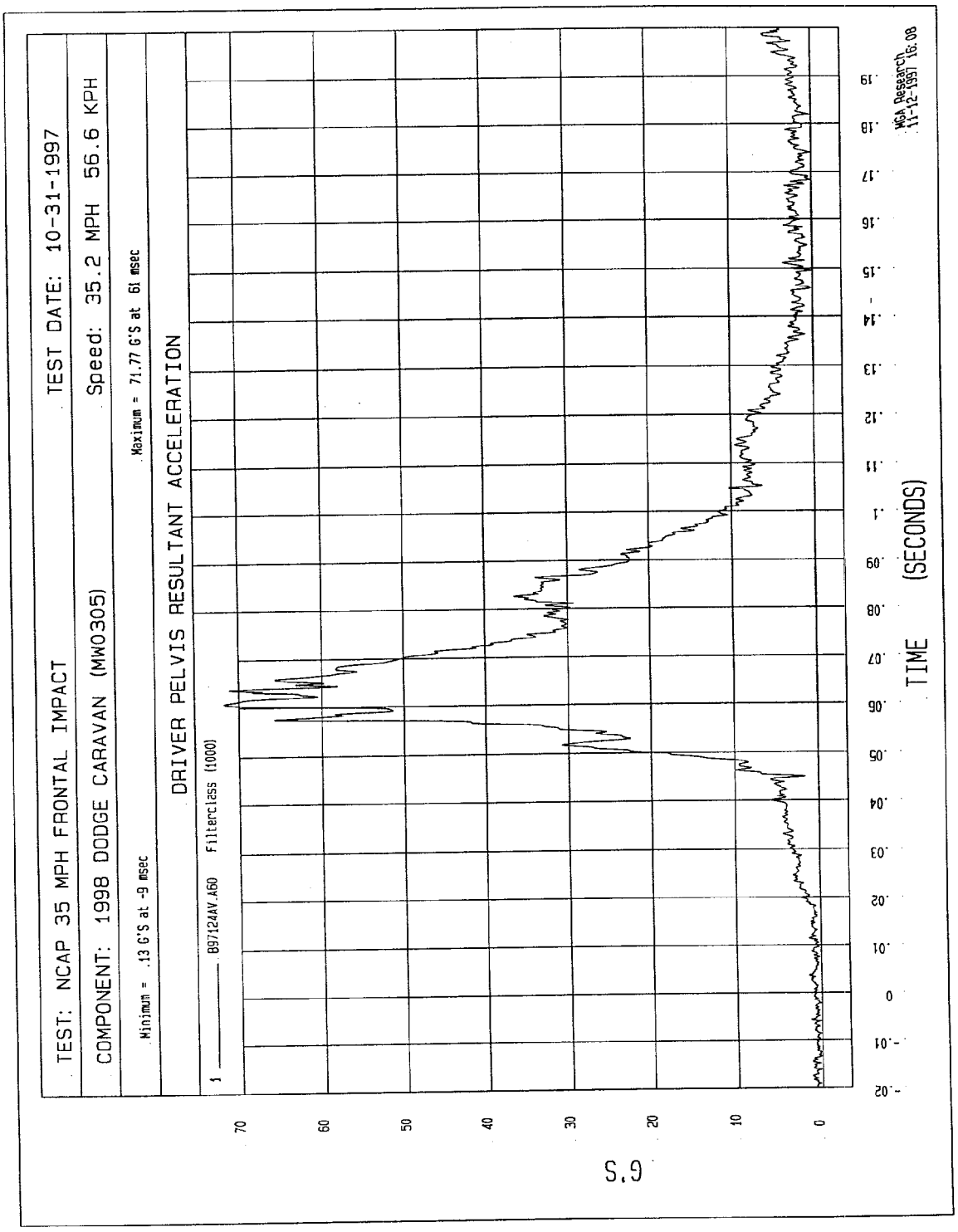

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -18.02 KPH at 154 msec
Maximum = 56.61 KPH at -16 msec
DRIVER CHEST REDUNDANT X VELOCITY
1 B97124AI.V35 Filterclass (180)
KPH
TIME Seconds
MGA Research
11-13-1997 11:49

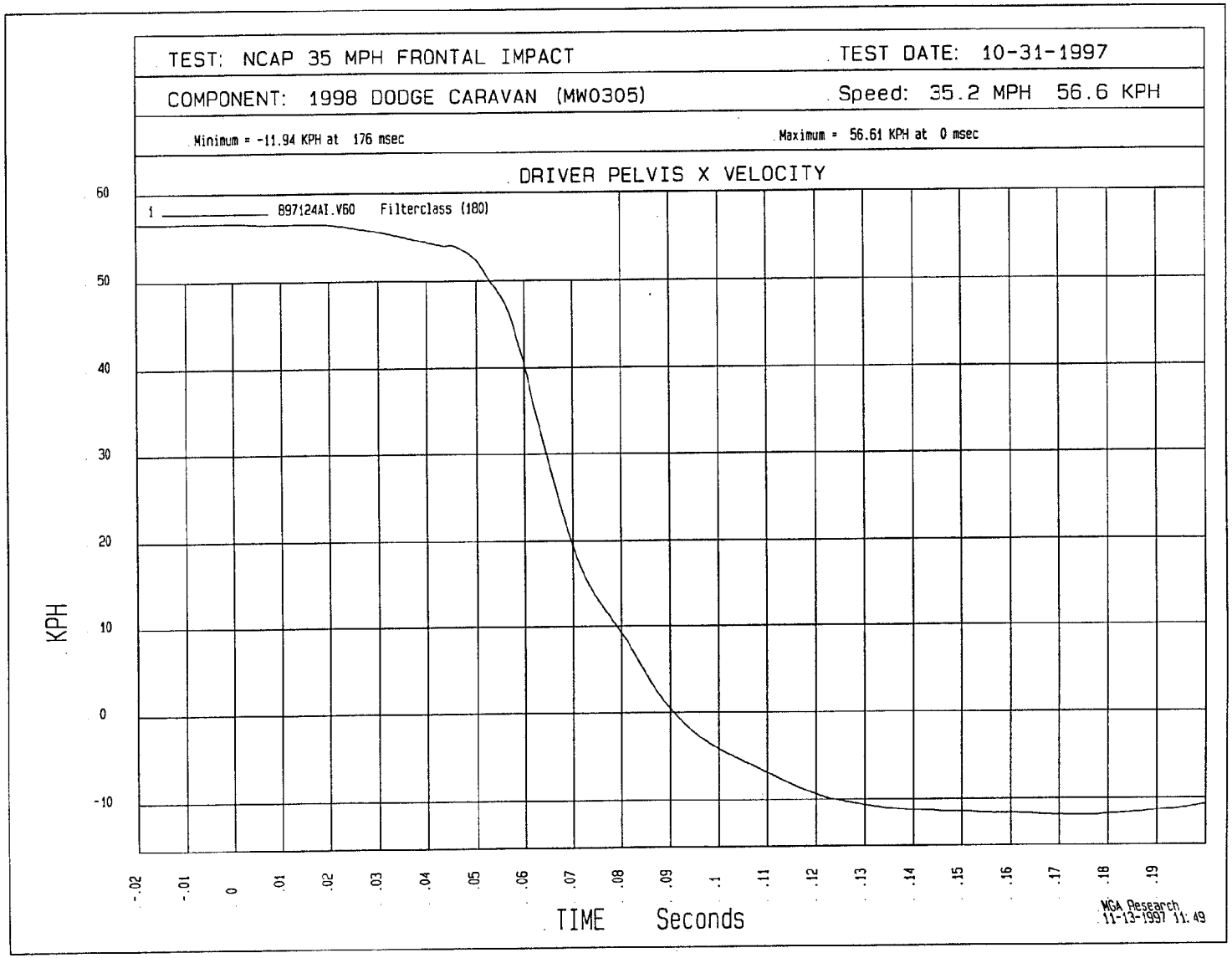

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -.14 MM at 23 msec
Maximum = 46.34 MM at 74 msec
DRIVER CHEST COMPRESSION
1 _____ B971240F.058 Filterclass (60)
MM
TIME SECONDS
MGA Research
11-01-1997 16:42

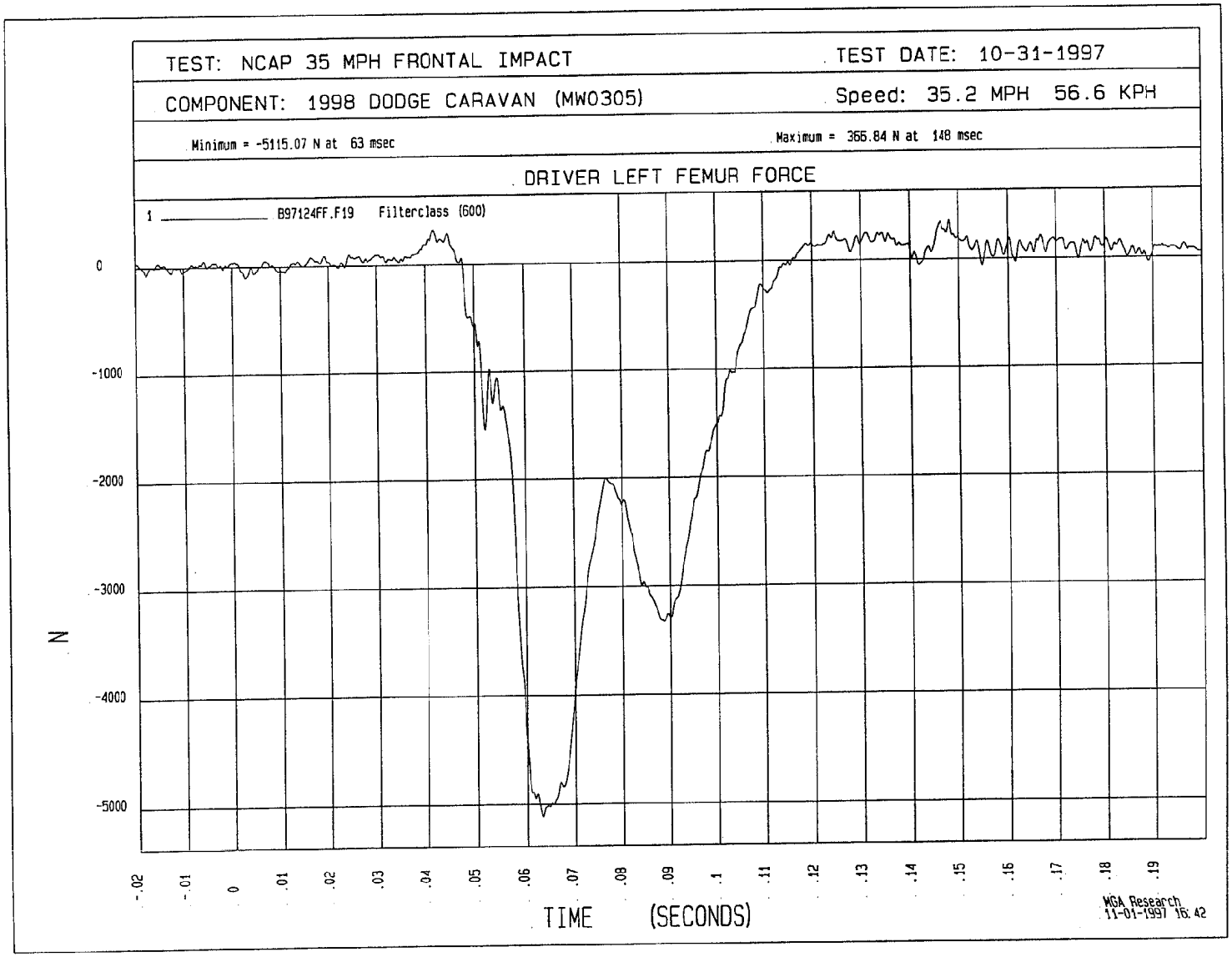

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -69.57 G'S at 61 msec
Maximum = 4.13 G'S at 44 msec
DRIVER PELVIS X ACCELERATION
1 B97124AF.A60 Filterclass (1000)
0
-10
-20
-30
-40
-50
-60
-70
G'S
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-12-1997 16:07

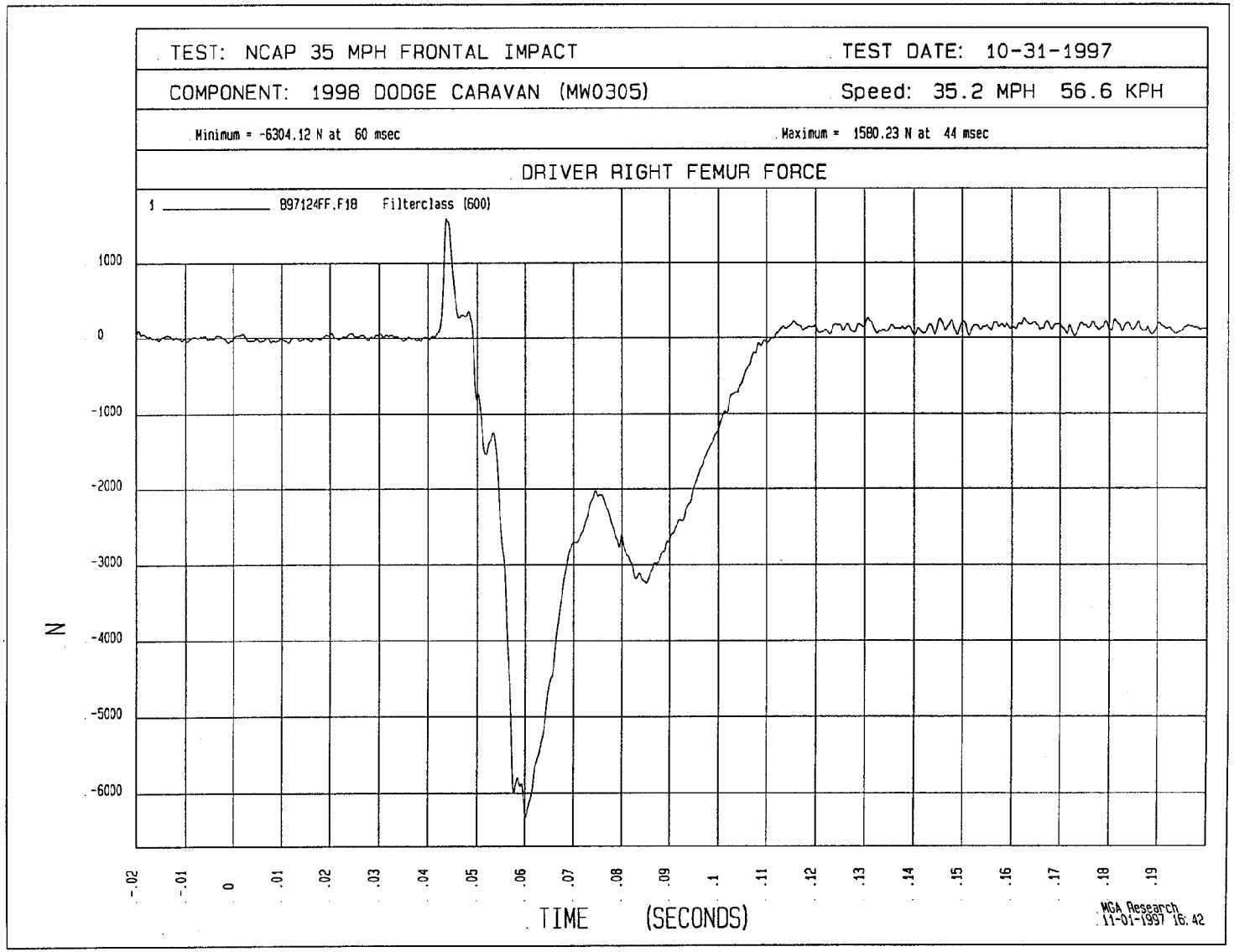

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -12.51 G'S at 59 msec
Maximum = 11.55 G'S at 57 msec
DRIVER PELVIS Y ACCELERATION
1 B97124AF.A61 Filterclass (1000)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
G'S
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:08

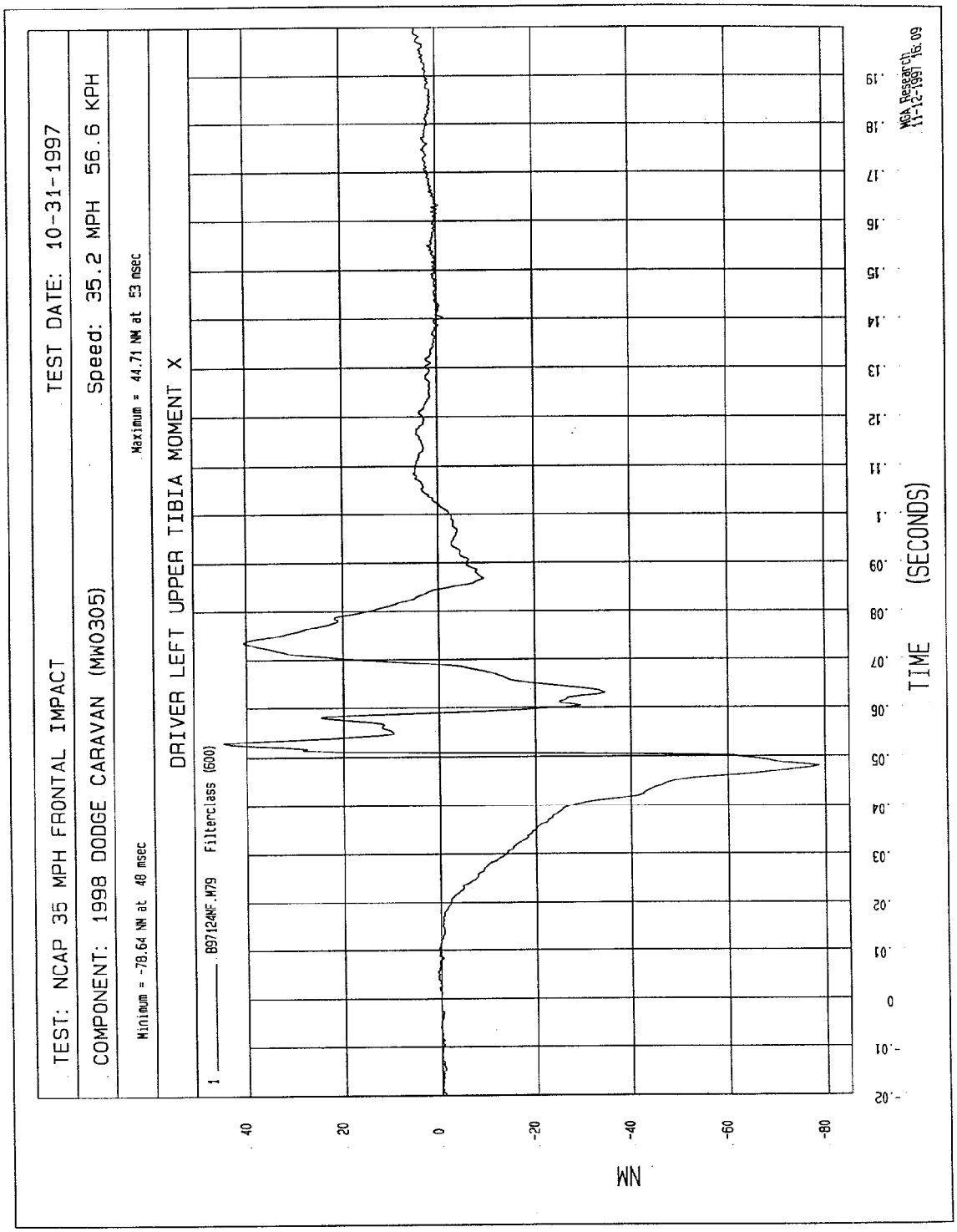

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -26.29 G'S at 58 msec
Maximum = 4.82 G'S at 198 msec
DRIVER PELVIS Z ACCELERATION
1 _____ 897124AF.A62 Filterclass (1000)
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:08

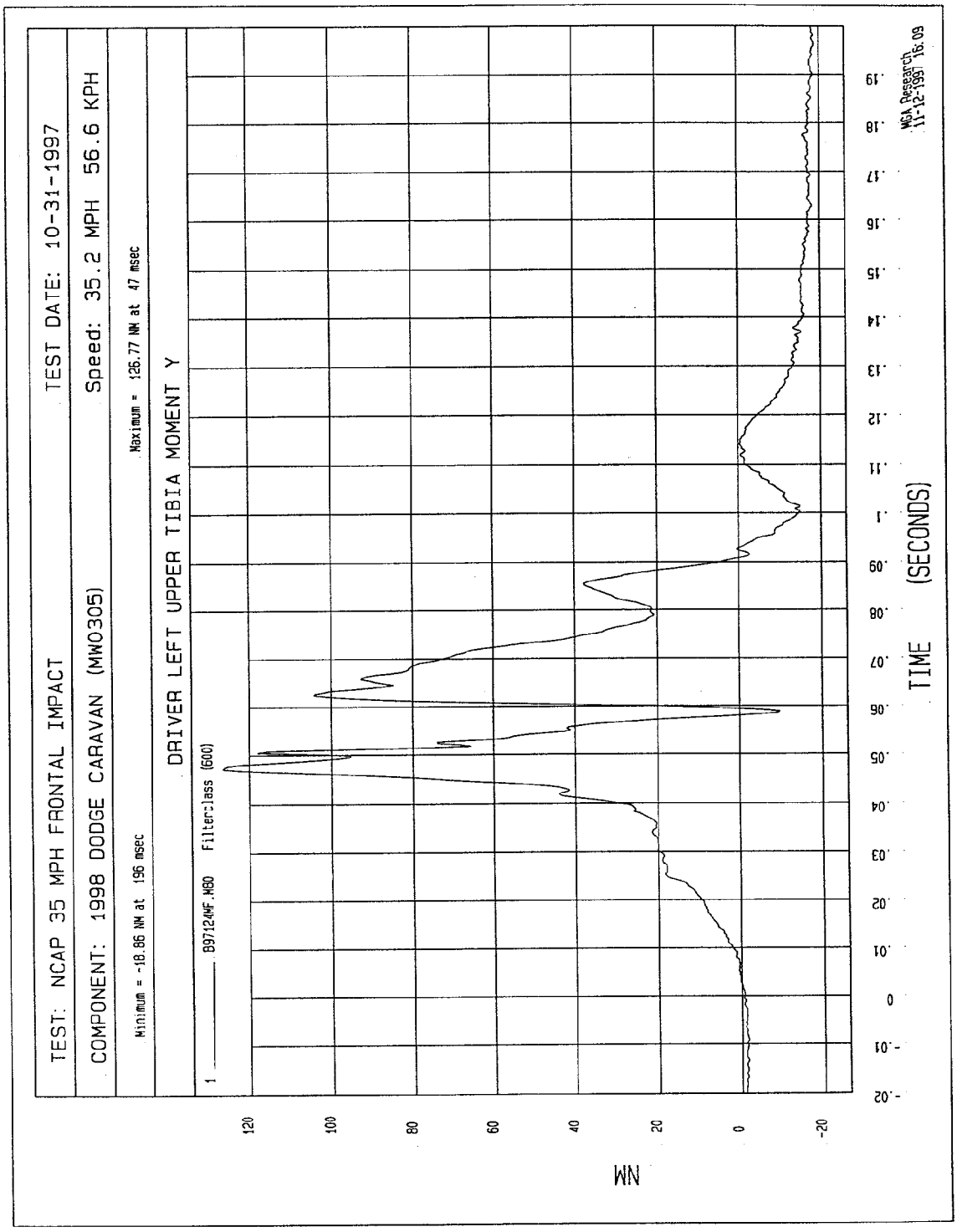

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = .13 G'S at -9 msec
Maximum = 71.77 G'S at 61 msec
DRIVER PELVIS RESULTANT ACCELERATION
1 B97124AV.A60 Filterclass (1000)
G's
TIME (SECONDS)
MGA Research
11-12-1997 16:08

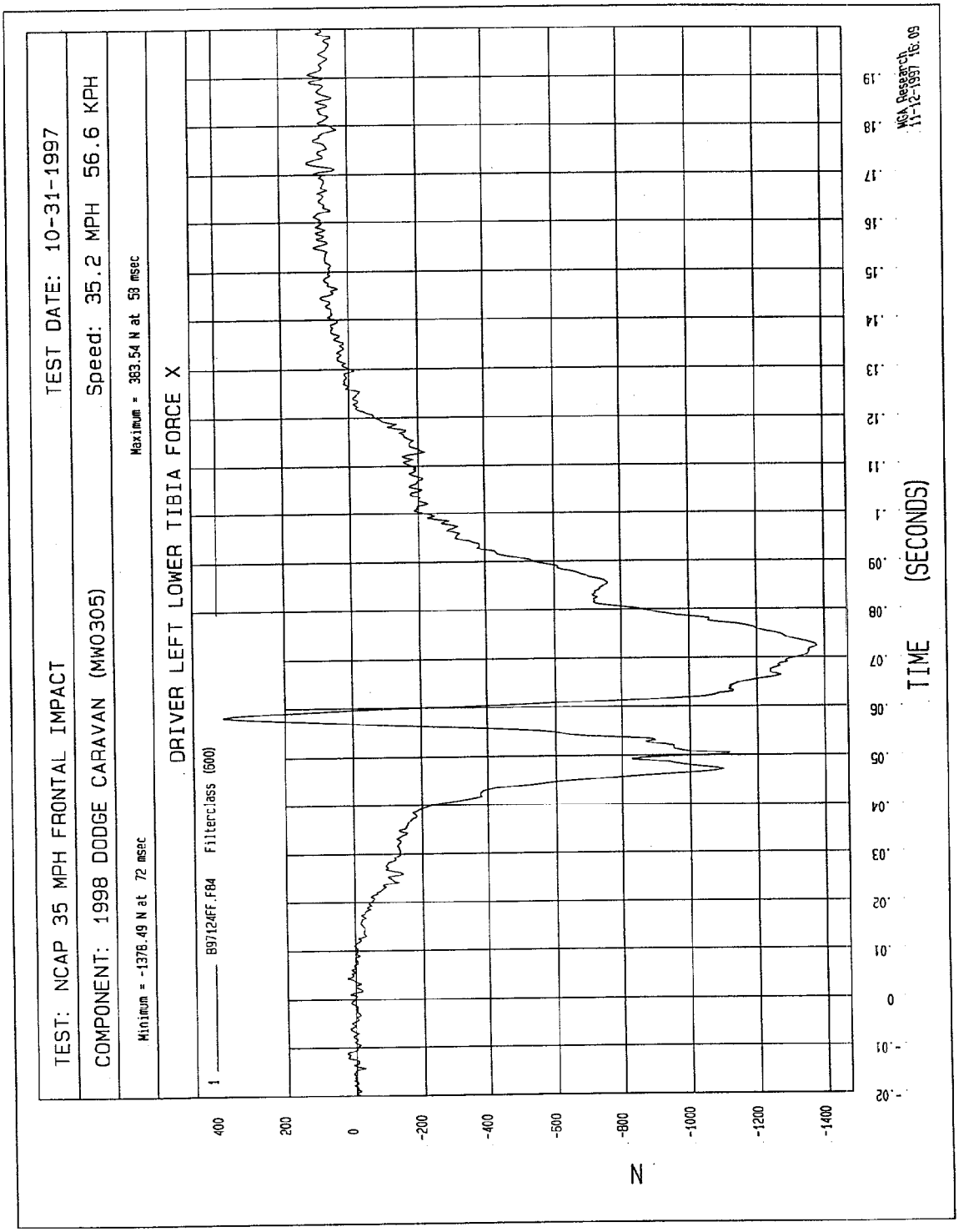

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -11.94 KPH at 176 msec
Maximum = 56.61 KPH at 0 msec
DRIVER PELVIS X VELOCITY
1 897124AI.V60 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-13-1997 11:49

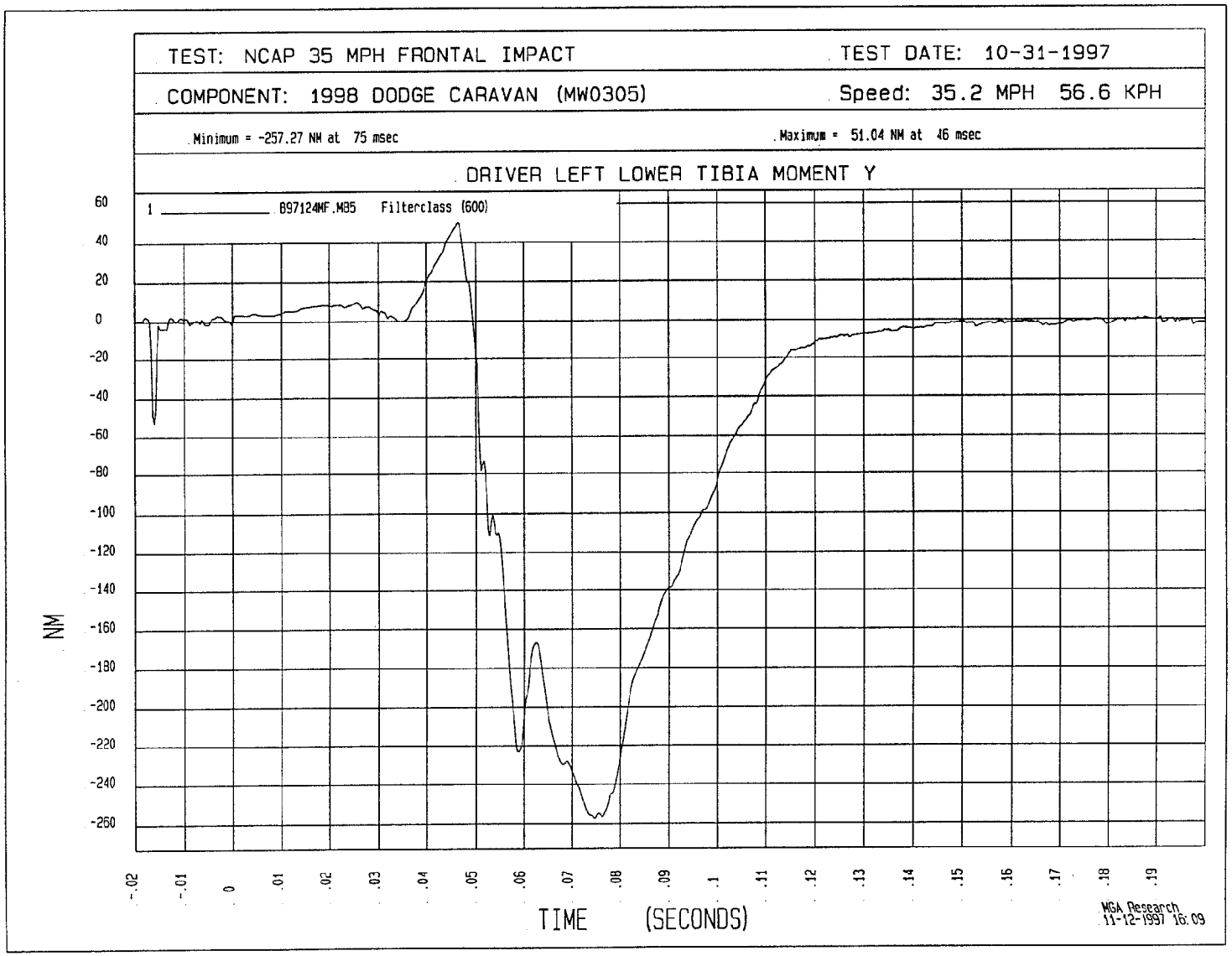

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -5115.07 N at 63 msec
Maximum = 365.84 N at 148 msec
DRIVER LEFT FEMUR FORCE
1 B97124FF.F19 Filterclass (600)
0
-1000
-2000
-3000
-4000
-5000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:42

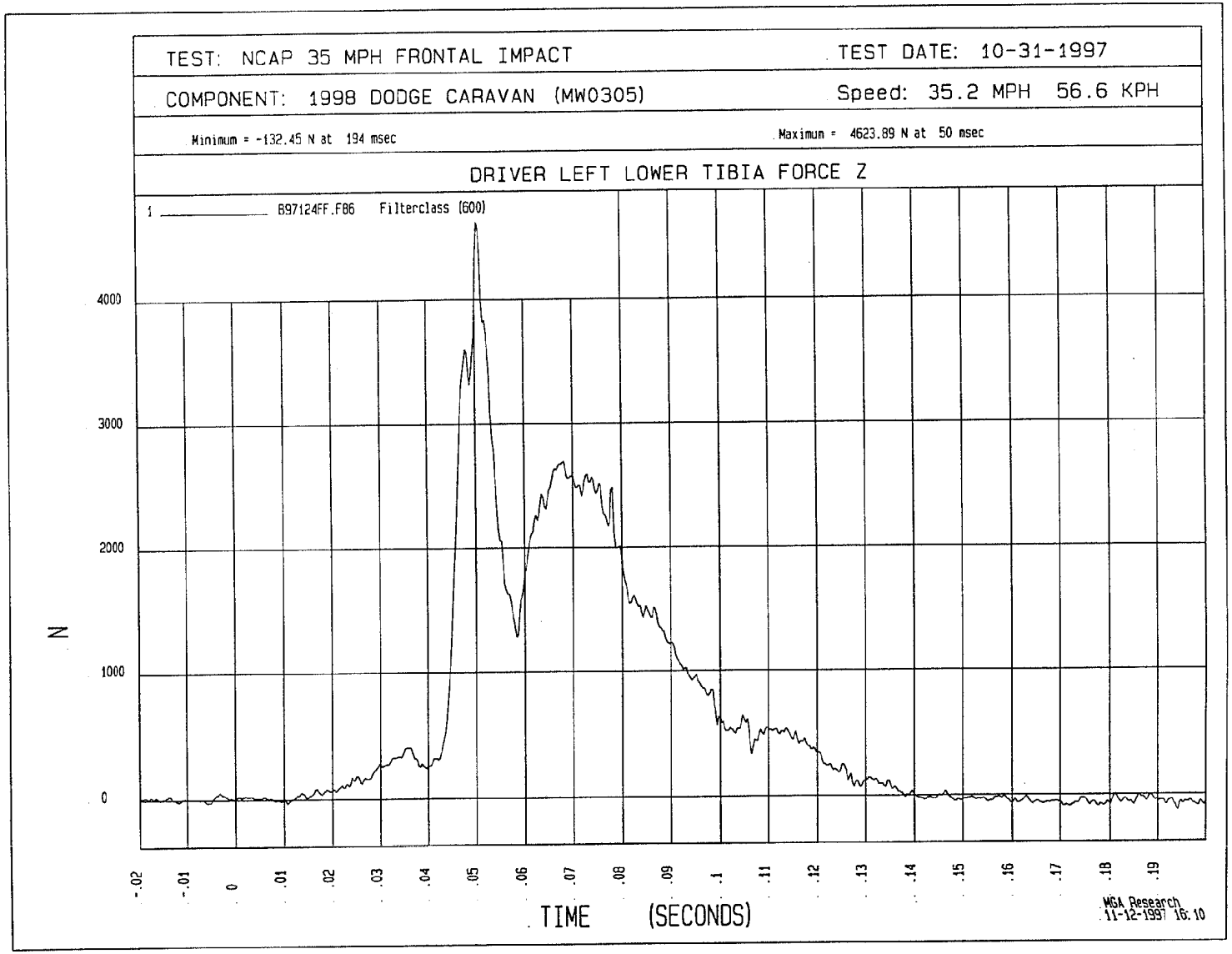

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -6304.12 N at 60 msec
Maximum = 1580.23 N at 44 msec
DRIVER RIGHT FEMUR FORCE
1 897124FF.F18 Filterclass (600)
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:42

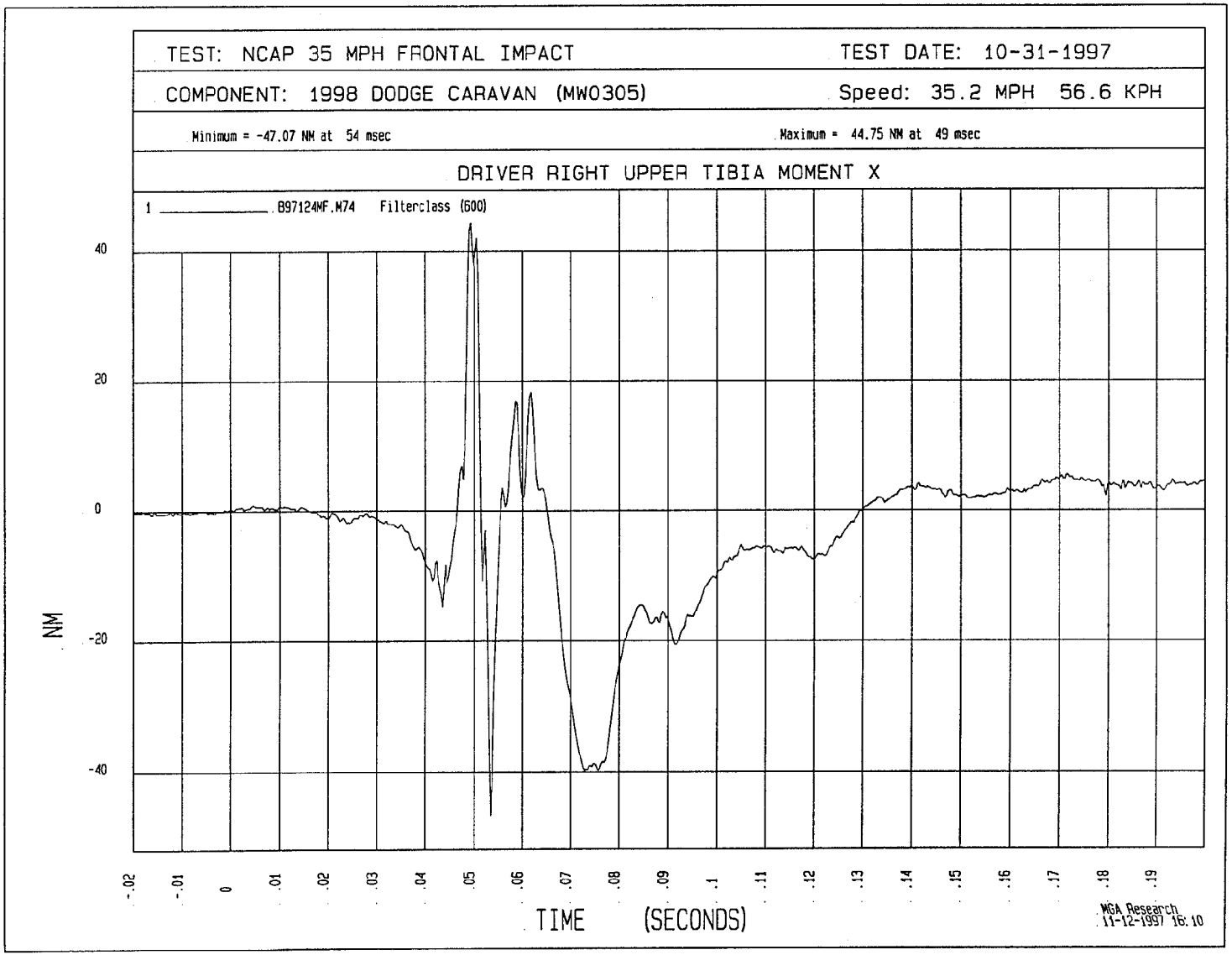

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -78.64 NM at 48 msec
Maximum = 44.71 NM at 53 msec
DRIVER LEFT UPPER TIBIA MOMENT X
1 B97124NF.M79 Filterclass (600)
NM
TIME (SECONDS)
NCA Research
11-12-1997 16:09

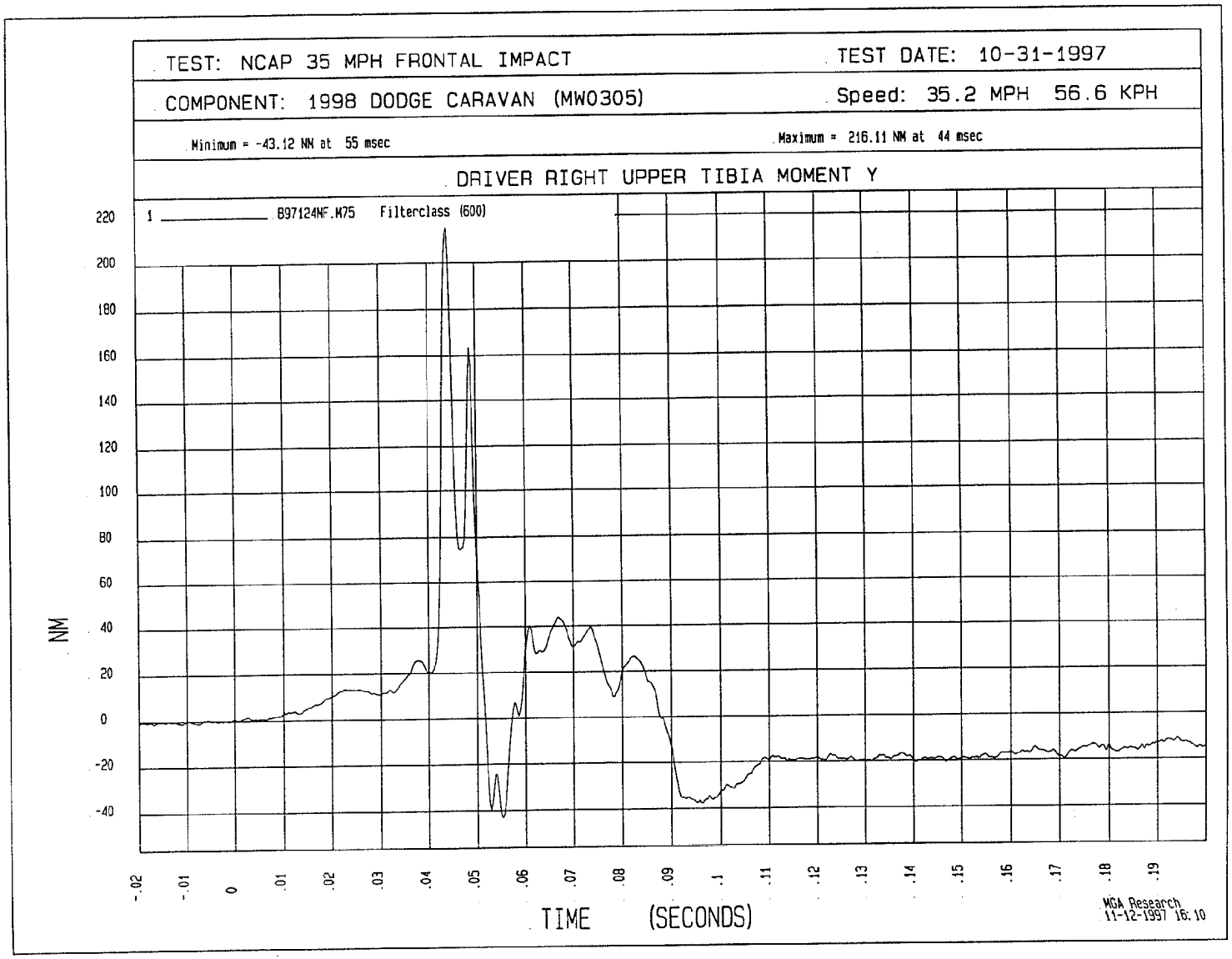

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -18.86 NM at 196 msec
Maximum = 126.77 NM at 47 msec
DRIVER LEFT UPPER TIBIA MOMENT Y
1 B97124MF.M80 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-12-1997 16:09

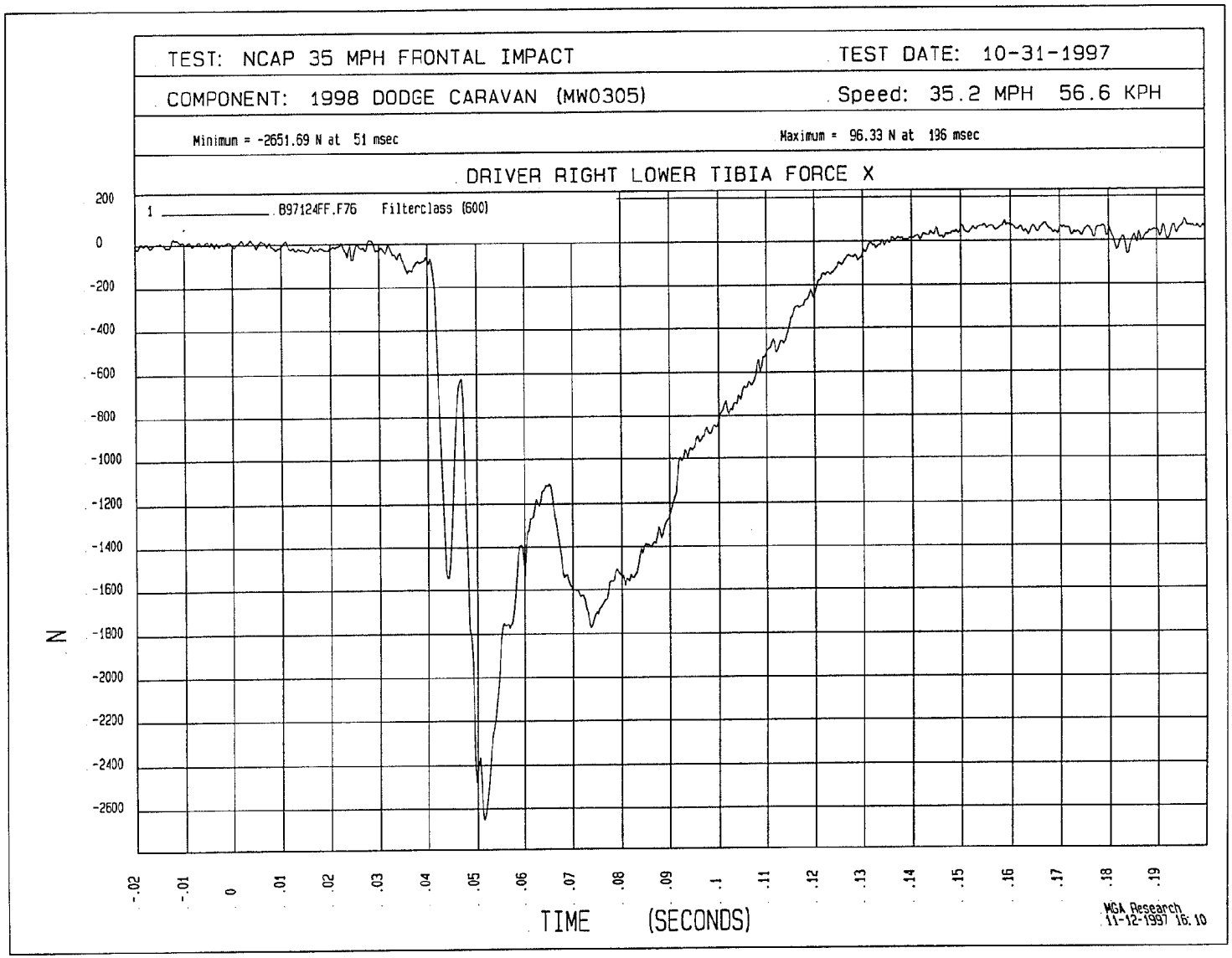

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -1378.49 N at 72 msec
Maximum = 383.54 N at 59 msec
DRIVER LEFT LOWER TIBIA FORCE X
1 B97124FF.F84 Filterclass (600)
400
200
0
-200
-400
-600
-800
-1000
-1200
-1400
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:09

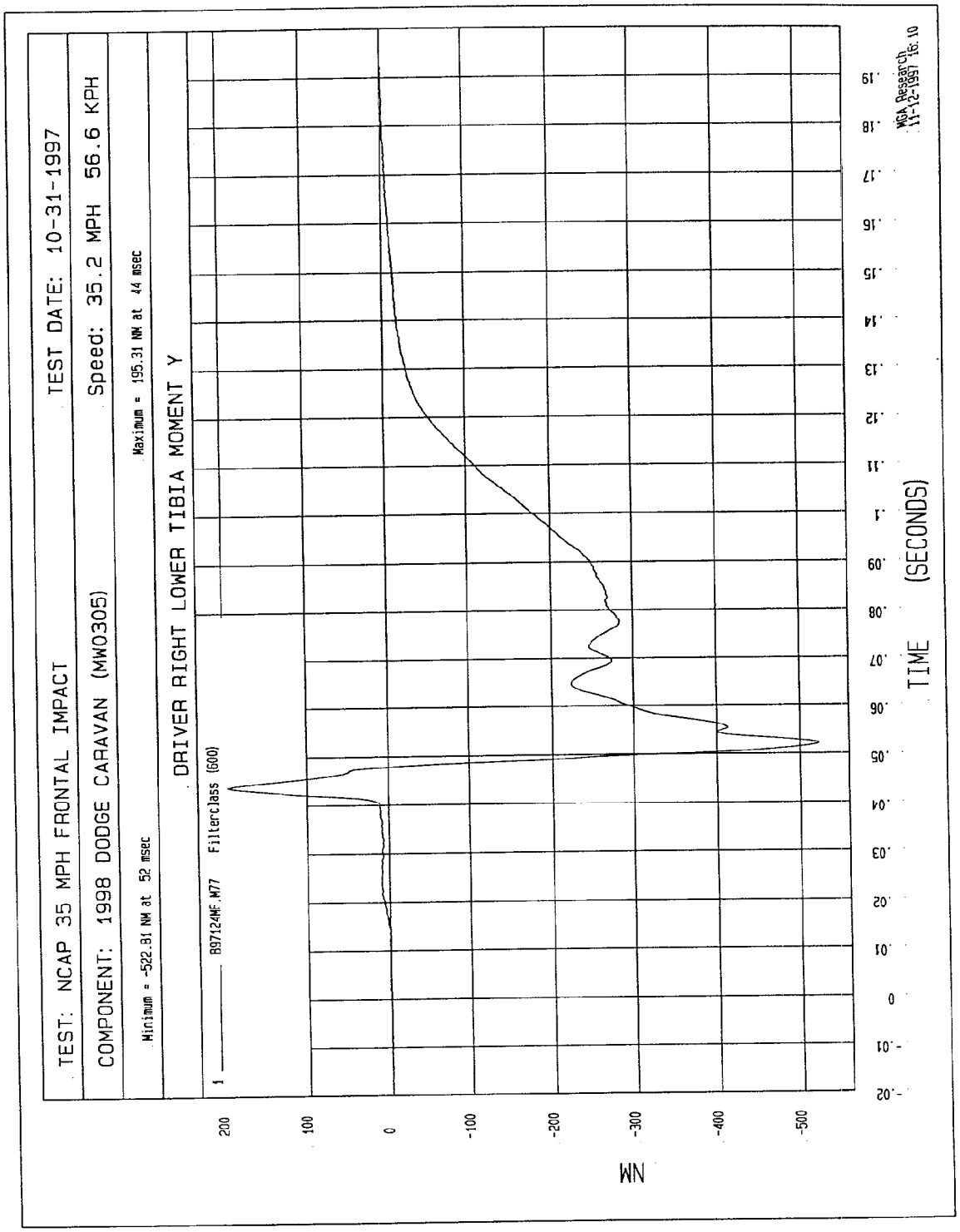

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -257.27 NM at 75 msec
Maximum = 51.04 NM at 46 msec
DRIVER LEFT LOWER TIBIA MOMENT Y
1 B97124MF.M85 Filterclass (600)
NM
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
-220
-240
-260
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:09

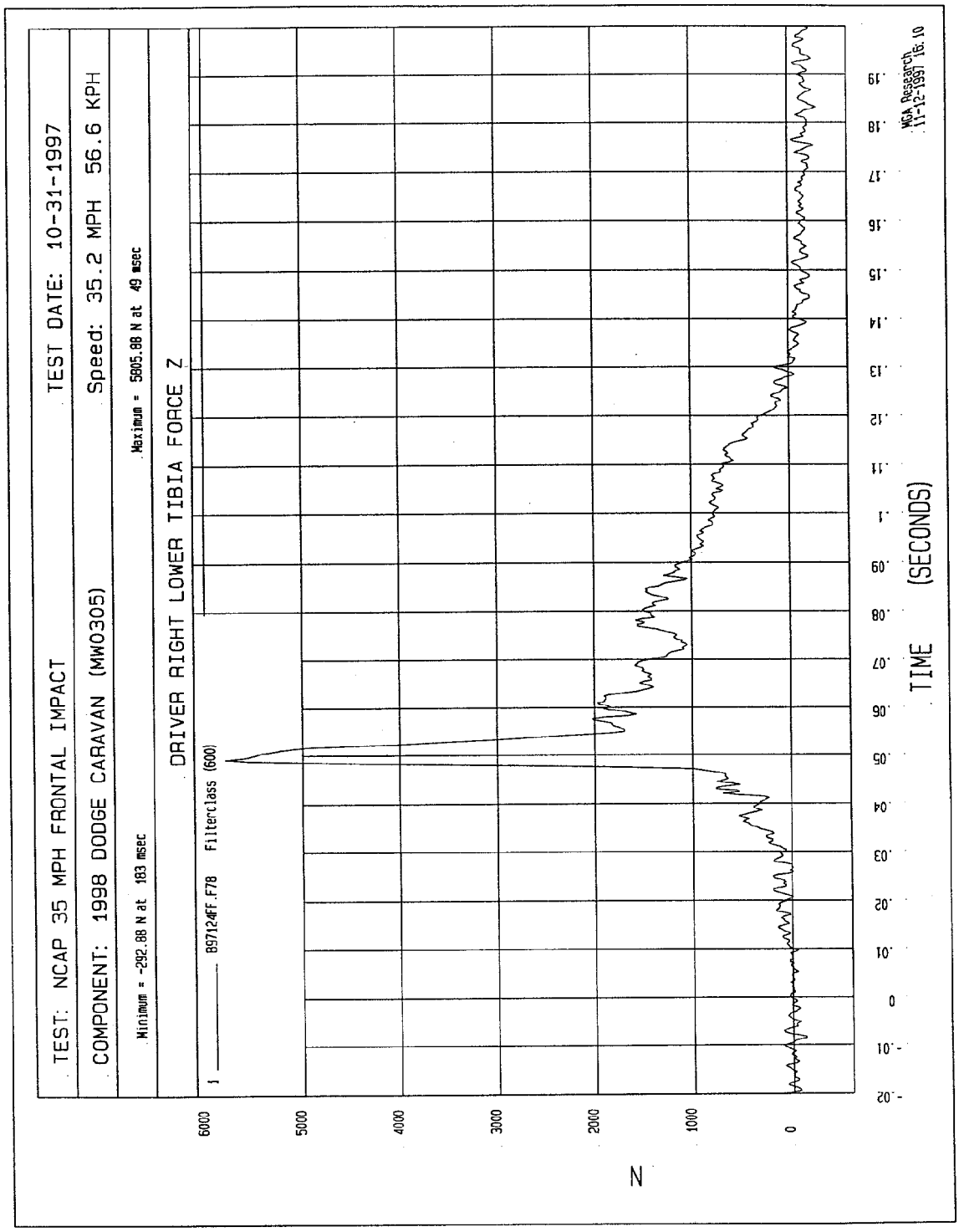

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -132.45 N at 194 msec
Maximum = 4623.89 N at 50 msec
DRIVER LEFT LOWER TIBIA FORCE Z
1 B97124FF.F86 Filterclass (600)
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:10

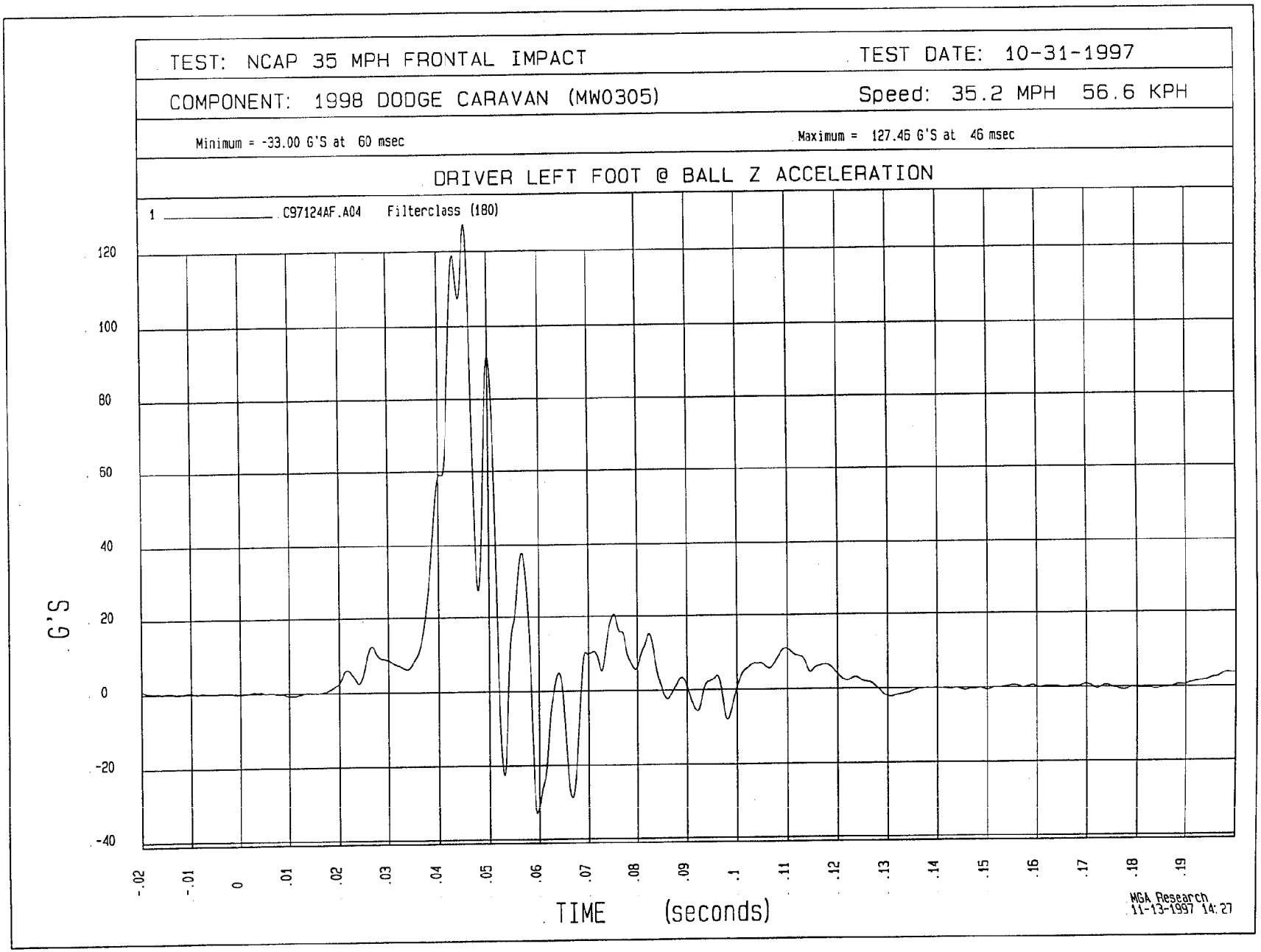

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -47.07 NM at 54 msec
Maximum = 44.75 NM at 49 msec
DRIVER RIGHT UPPER TIBIA MOMENT X
1 B97124MF.M74 Filterclass (600)
NM
40
20
0
-20
-40
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:10

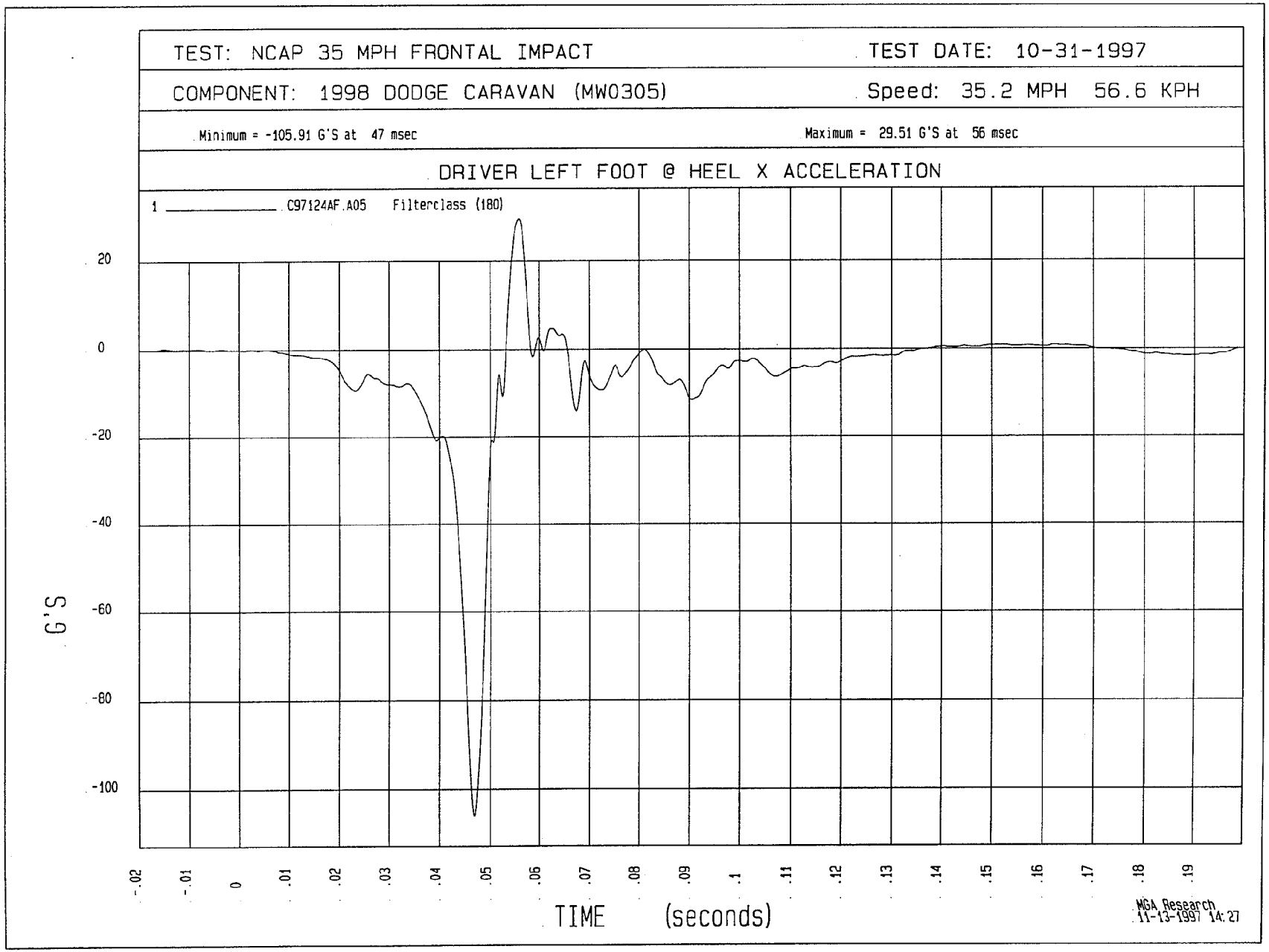

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -43.12 NM at 55 msec
Maximum = 216.11 NM at 44 msec
DRIVER RIGHT UPPER TIBIA MOMENT Y
1 B97124NF.M75 Filterclass (600)
NM
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:10

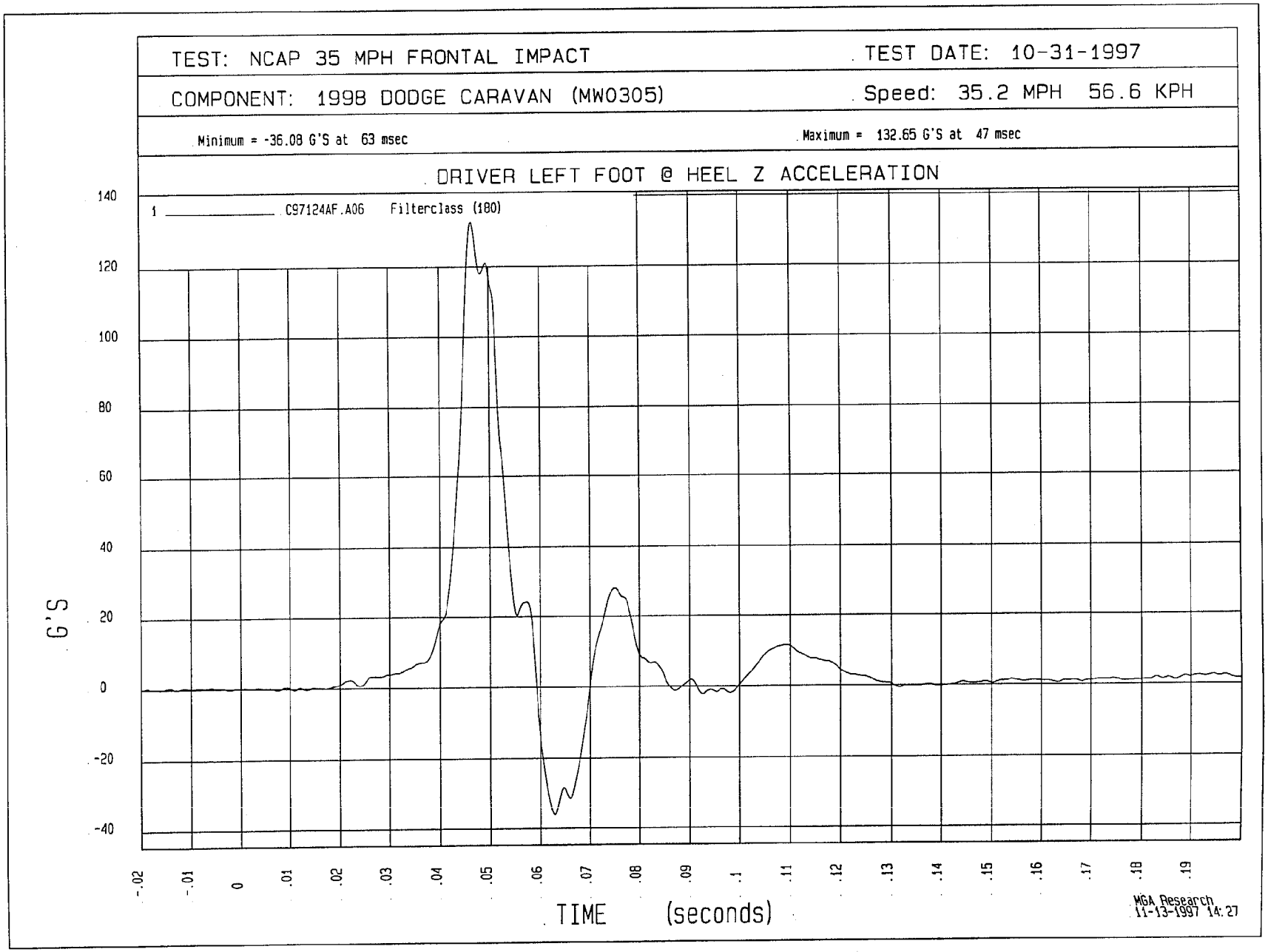

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -2651.69 N at 51 msec
Maximum = 96.33 N at 196 msec
DRIVER RIGHT LOWER TIBIA FORCE X
1 B97124FF.F76 Filterclass (600)
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
-2200
-2400
-2600
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:10

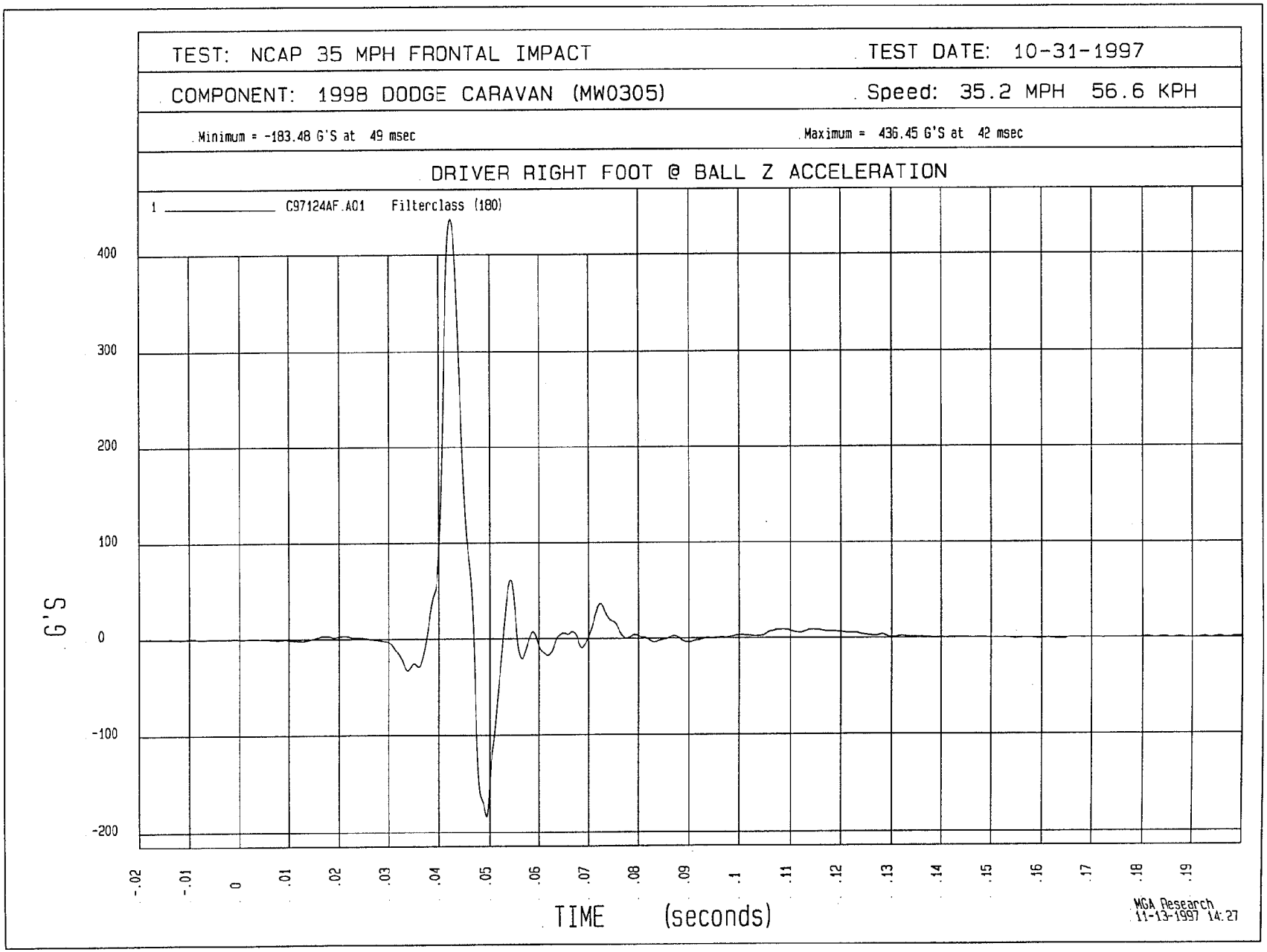

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -522.81 NM at 52 msec
Maximum = 195.31 NM at 44 msec
DRIVER RIGHT LOWER TIBIA MOMENT Y
1 B97124ME.M77 FilterClass (600)
NM
200
100
0
-100
-200
-300
-400
-500
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-12-1997 16:10

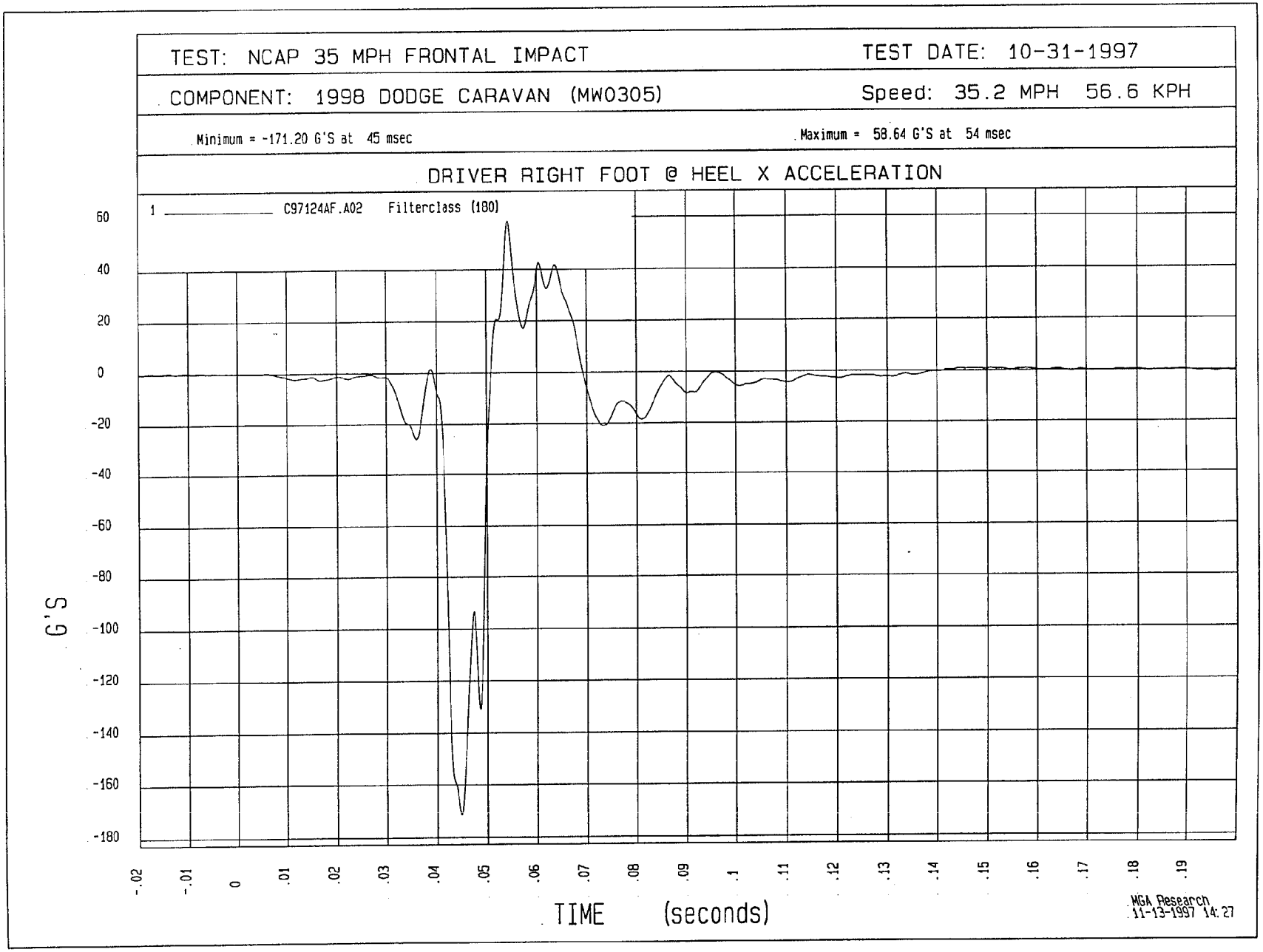

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -292.88 N at 183 msec
Maximum = 5805.88 N at 49 msec
DRIVER RIGHT LOWER TIBIA FORCE Z
1 B97124ff.F78 Filterclass (600)
6000
5000
4000
3000
2000
1000
0
N
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:10

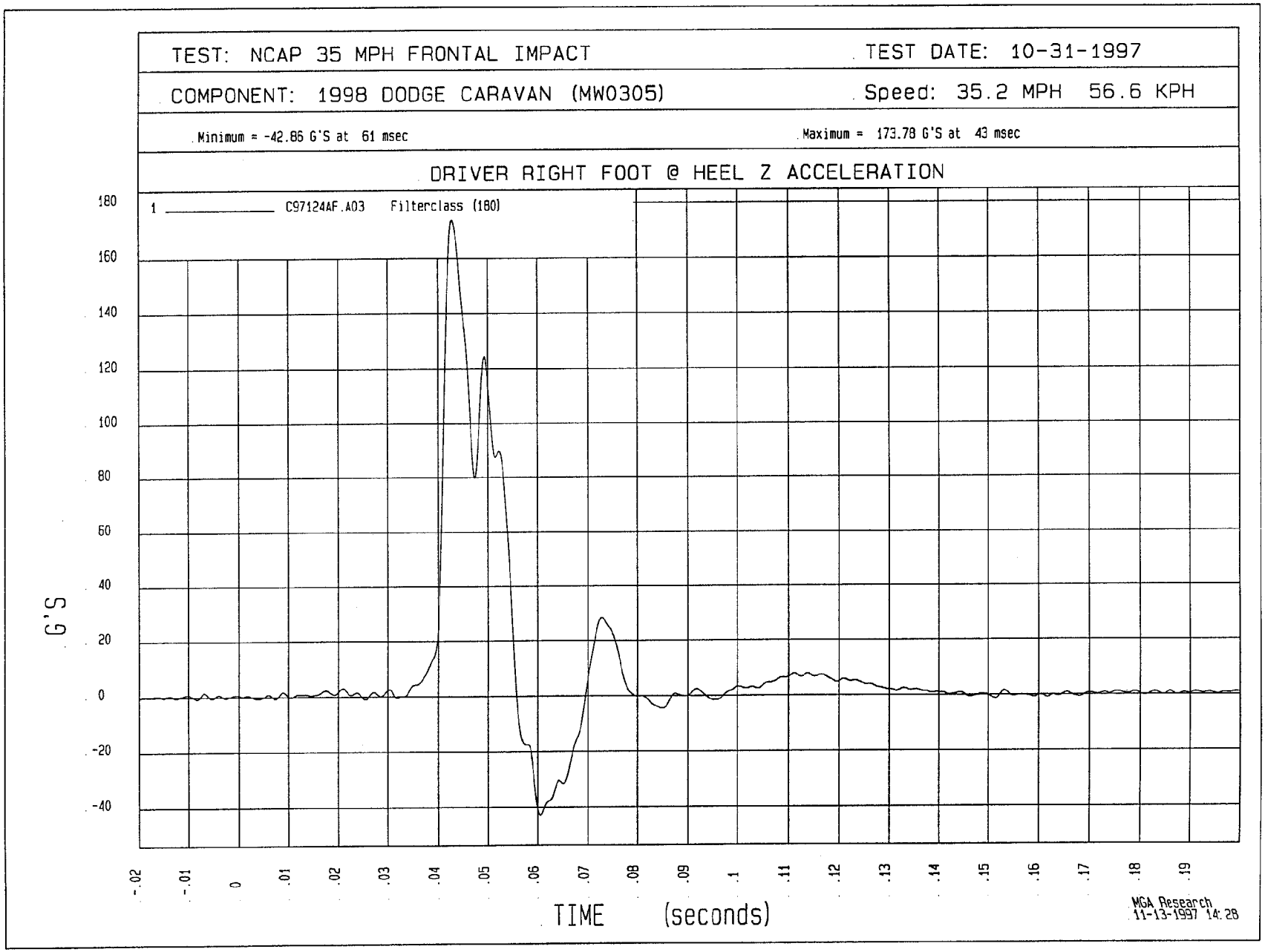

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -33.00 G'S at 60 msec
Maximum = 127.46 G'S at 46 msec
DRIVER LEFT FOOT @ BALL Z ACCELERATION
1 C97124AF.A04 Filterclass (180)
120
100
80
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:27

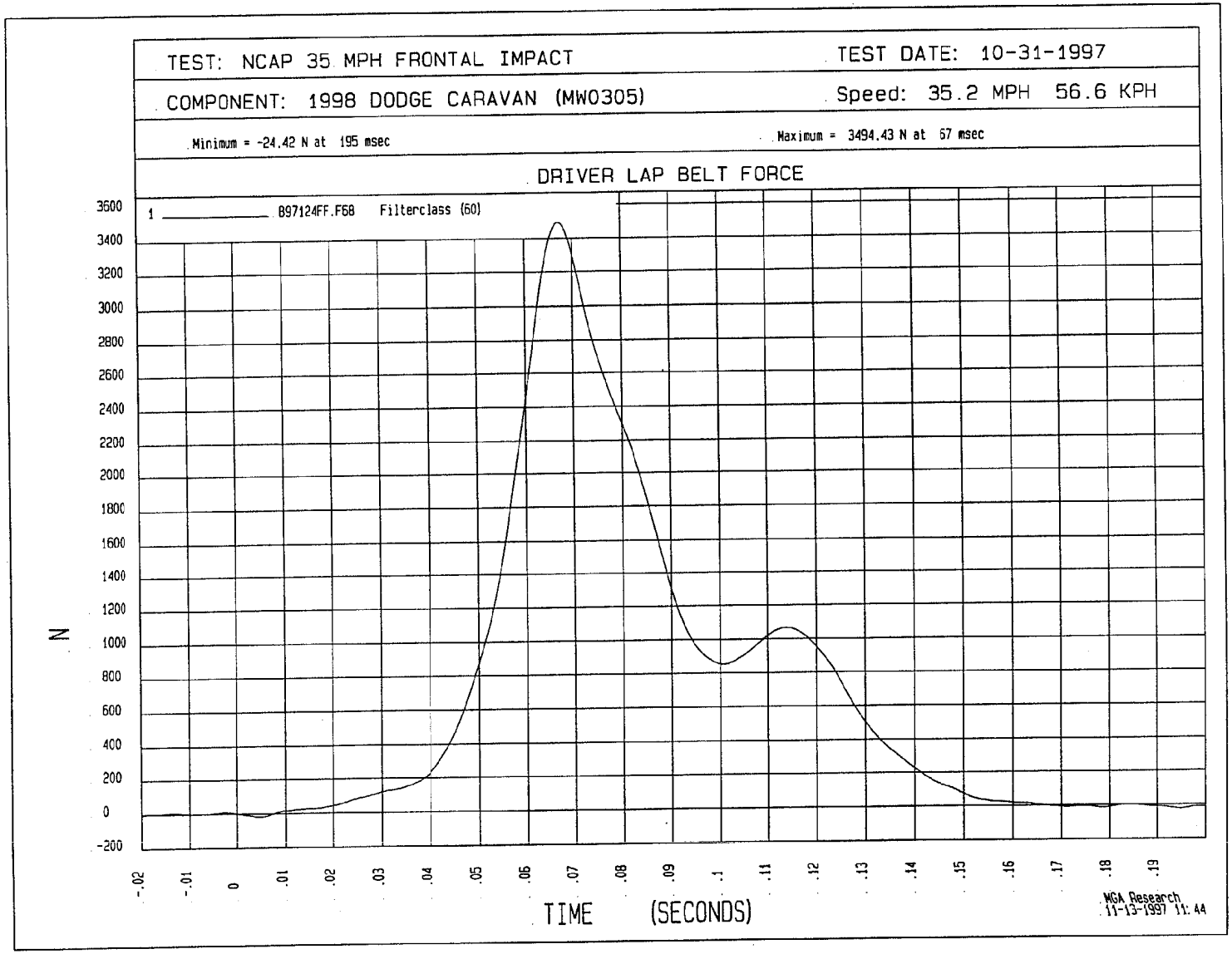

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -105.91 G'S at 47 msec
Maximum = 29.51 G'S at 56 msec
DRIVER LEFT FOOT @ HEEL X ACCELERATION
1 C97124AF.A05 Filterclass (180)
20
0
-20
-40
-60
-80
-100
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:27

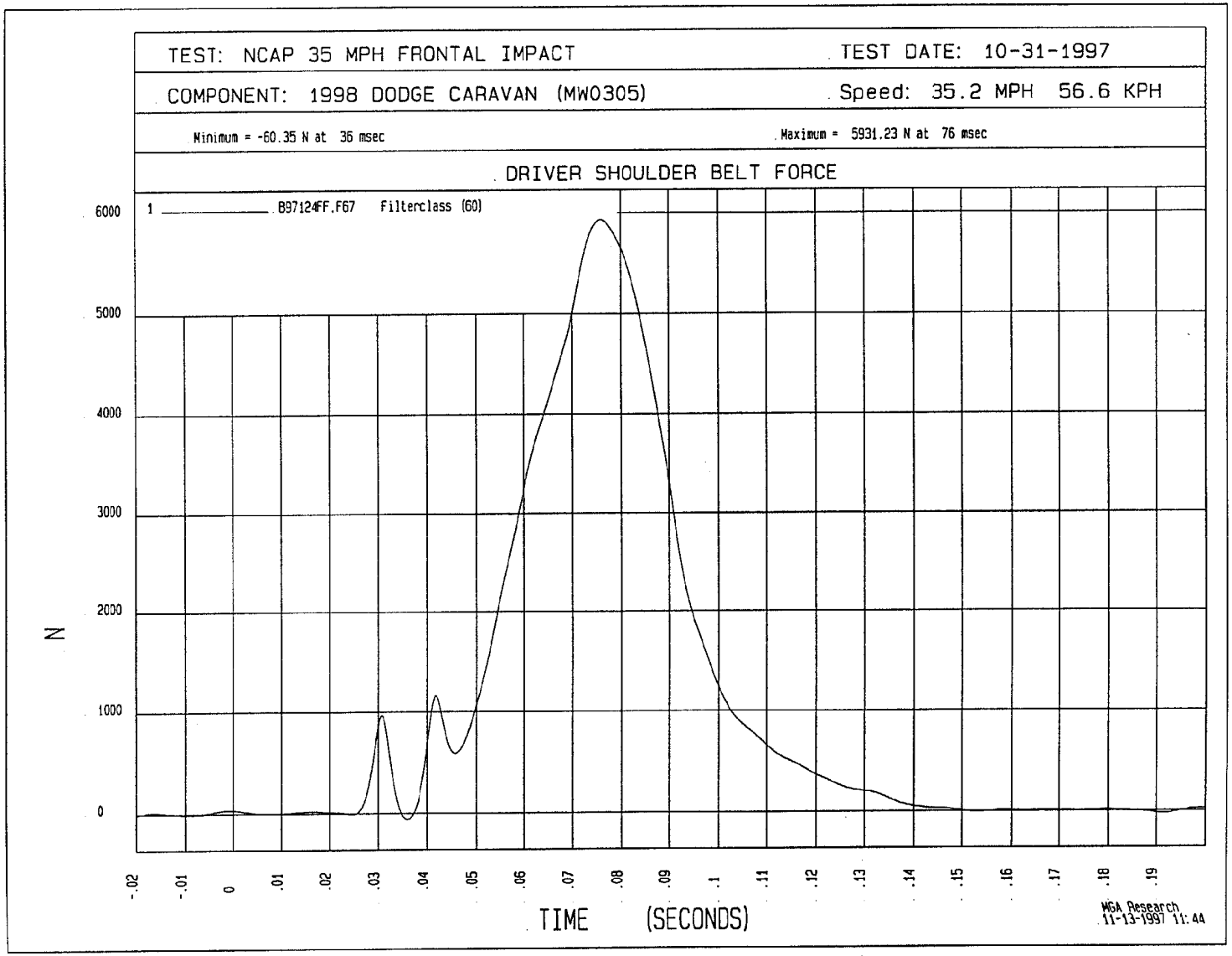

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -36.08 G'S at 63 msec
Maximum = 132.65 G'S at 47 msec
DRIVER LEFT FOOT @ HEEL Z ACCELERATION
1 C97124AF.A06 Filterclass (180)
140
120
100
80
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:27

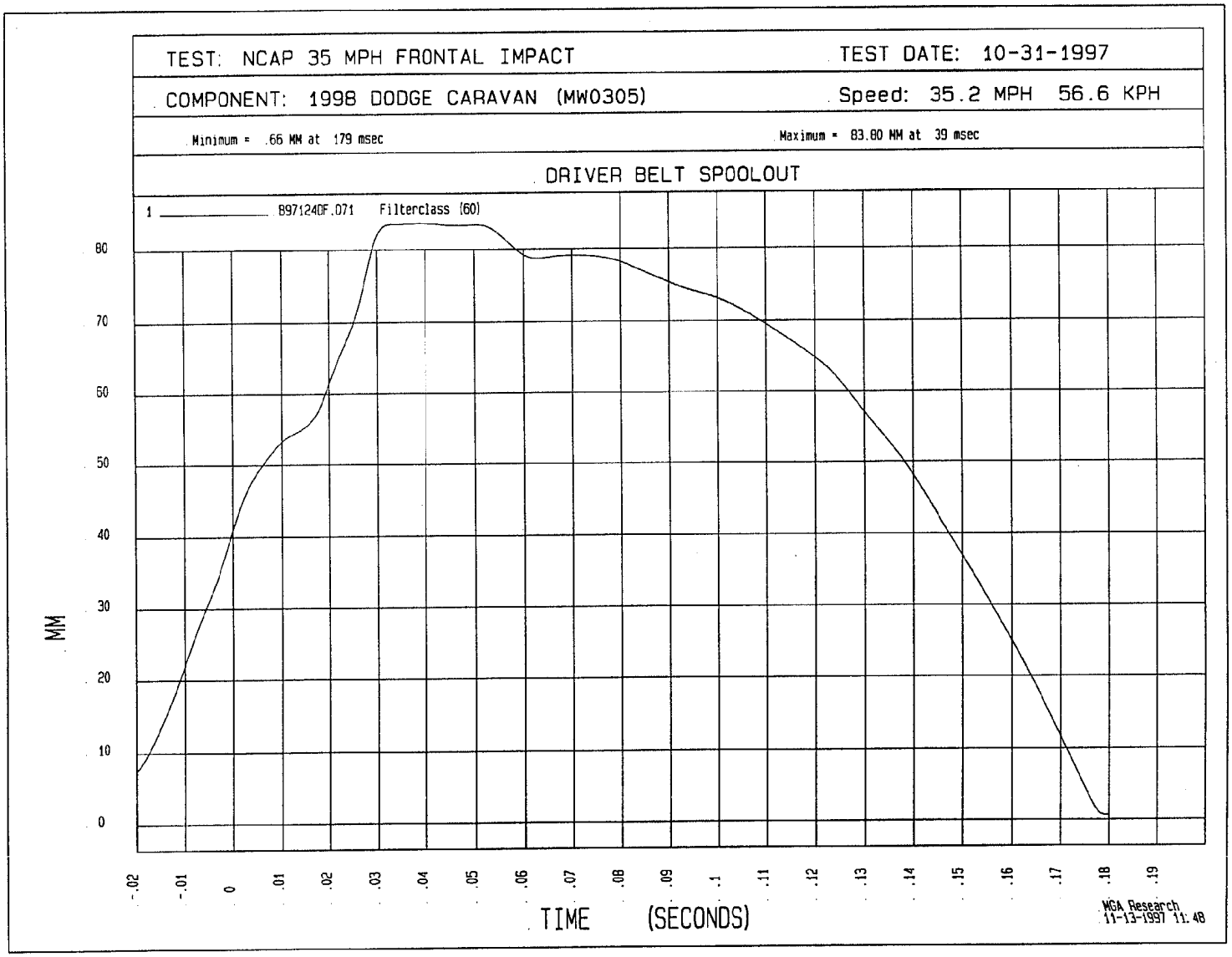

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -183.48 G'S at 49 msec
Maximum = 436.45 G'S at 42 msec
DRIVER RIGHT FOOT @ BALL Z ACCELERATION
1 C97124AF.A01 Filterclass (180)
400
300
200
100
0
-100
-200
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:27

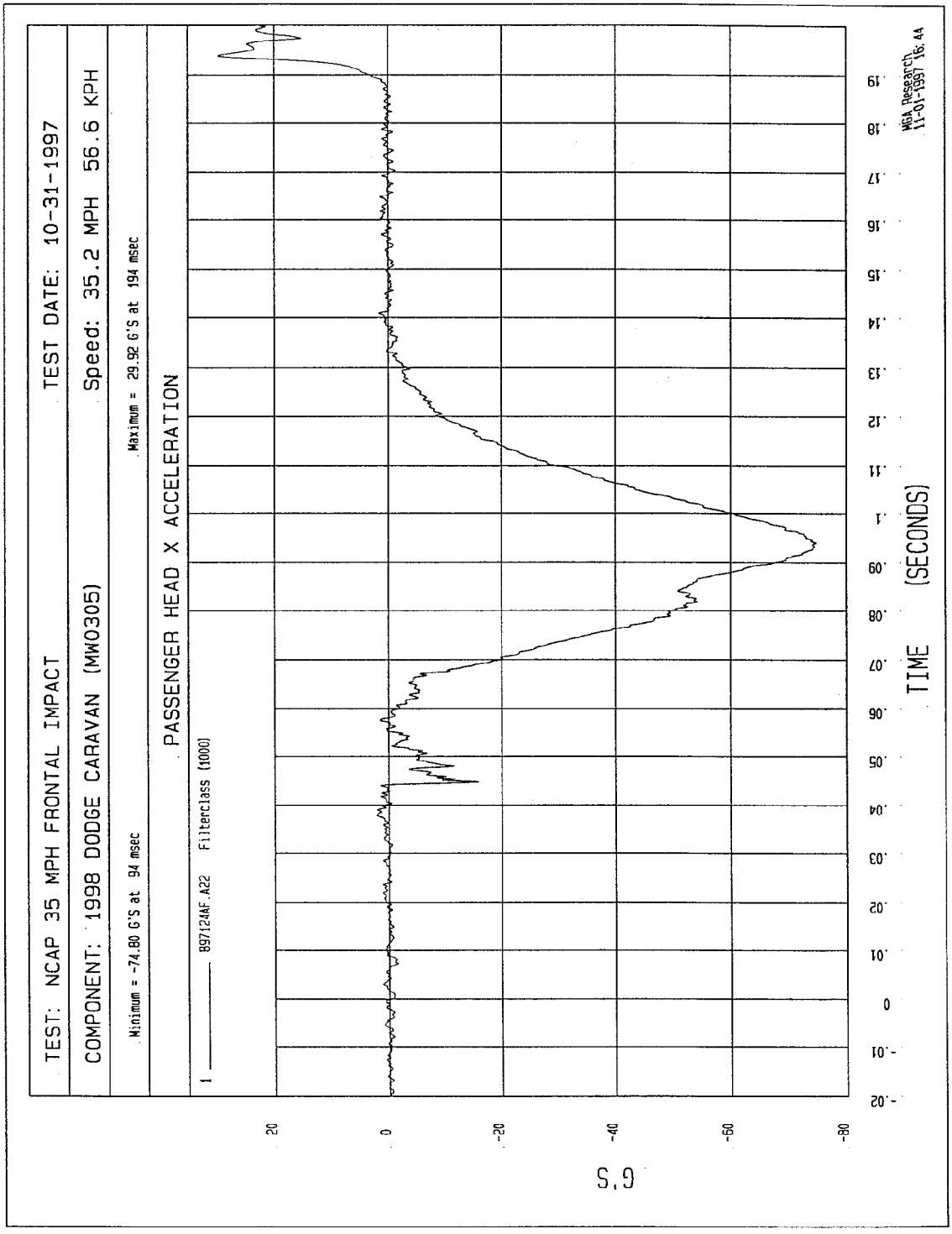

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -171.20 G'S at 45 msec
Maximum = 58.64 G'S at 54 msec
DRIVER RIGHT FOOT @ HEEL X ACCELERATION
1 C97124AF.A02 Filterclass (180)
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:27

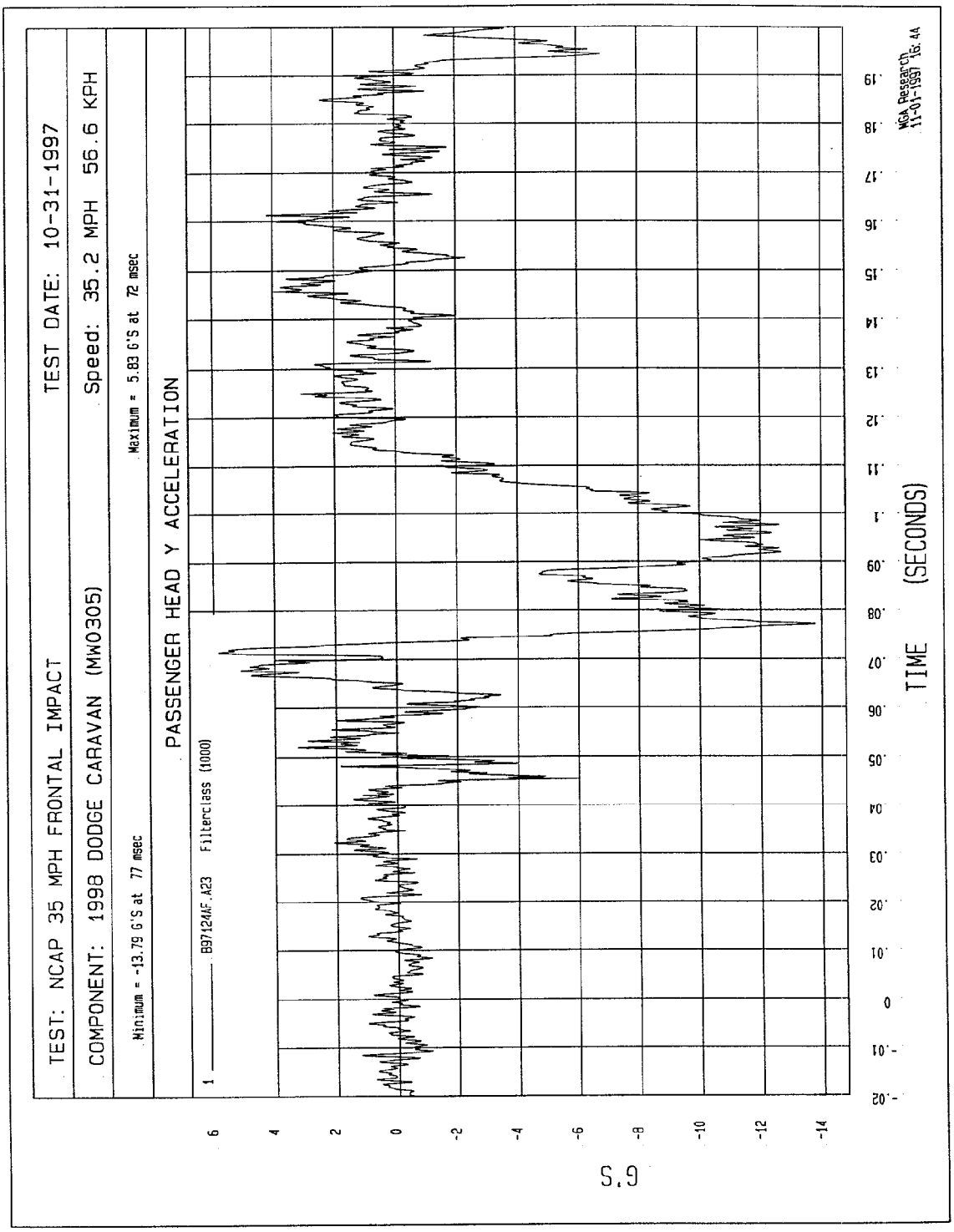

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -42.86 G'S at 61 msec
Maximum = 173.78 G'S at 43 msec
DRIVER RIGHT FOOT @ HEEL Z ACCELERATION
1 C97124AF.A03 Filterclass (180)
180
160
140
120
100
80
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:28

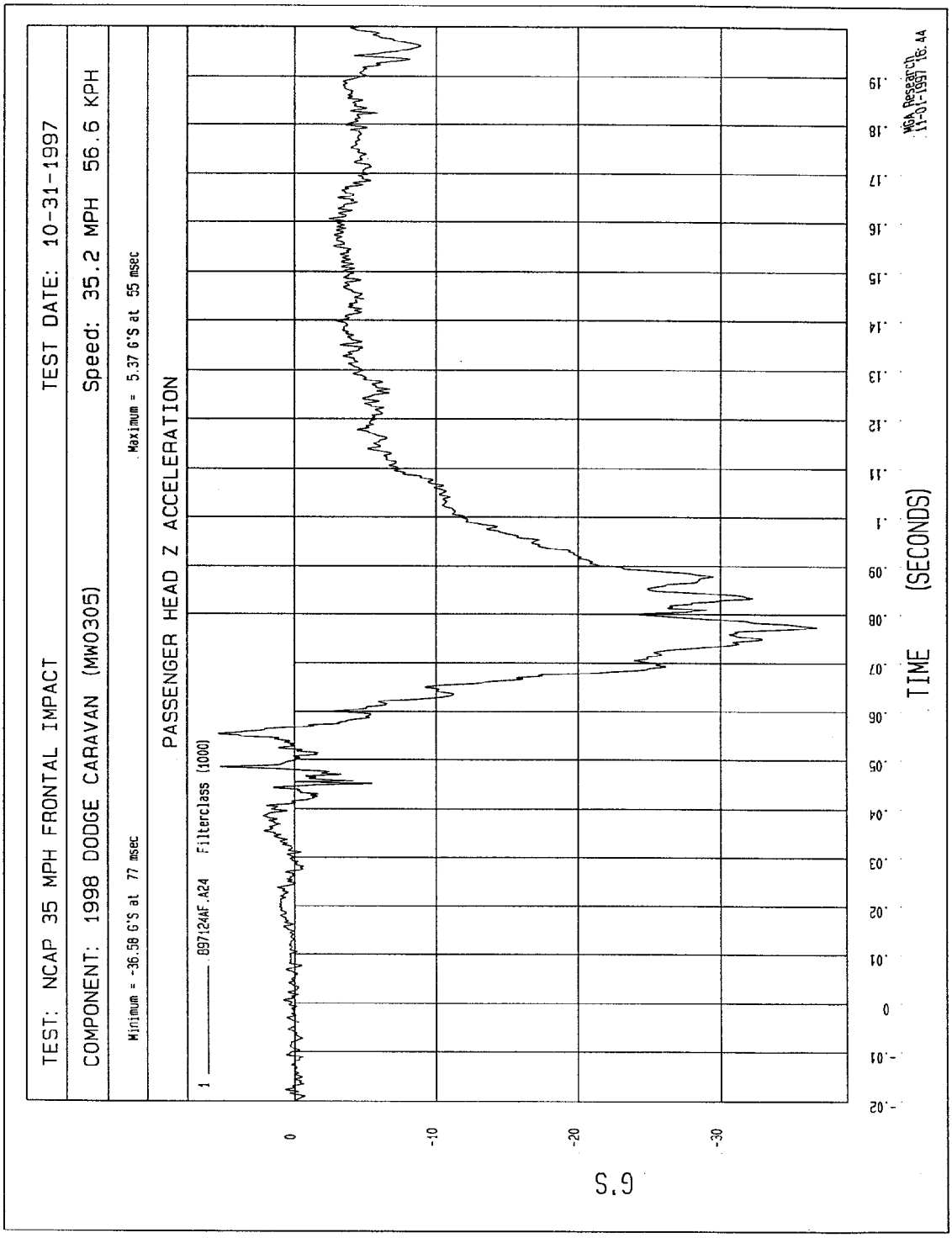

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -24.42 N at 195 msec
Maximum = 3494.43 N at 67 msec
DRIVER LAP BELT FORCE
1 B97124FF.F68 Filterclass (60)
N
3600
3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
-200
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
NGA Research
11-13-1997 11:44

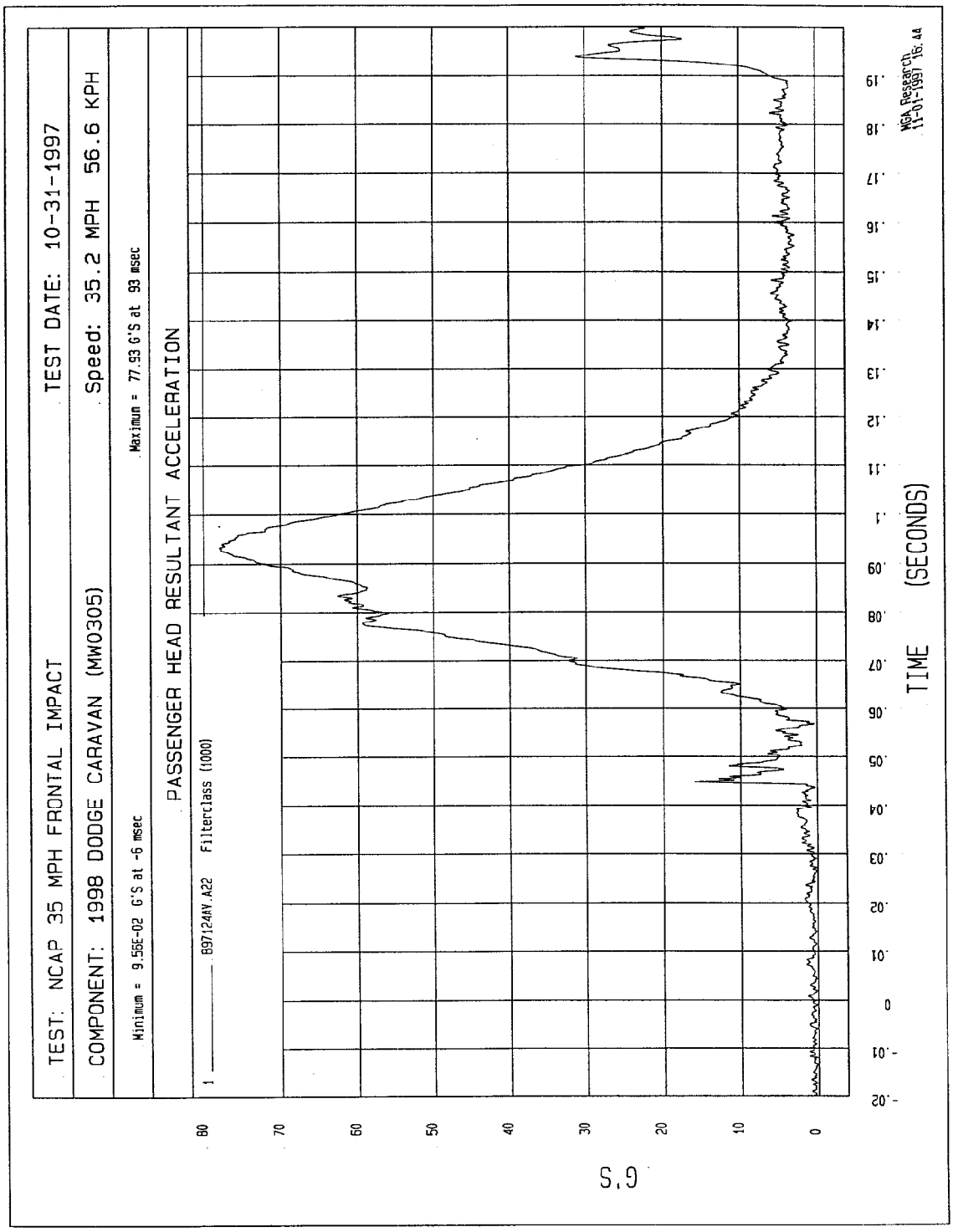

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -60.35 N at 36 msec
Maximum = 5931.23 N at 76 msec
DRIVER SHOULDER BELT FORCE
1 B97124FF.F67 Filterclass (60)
6000
5000
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-13-1997 11:44

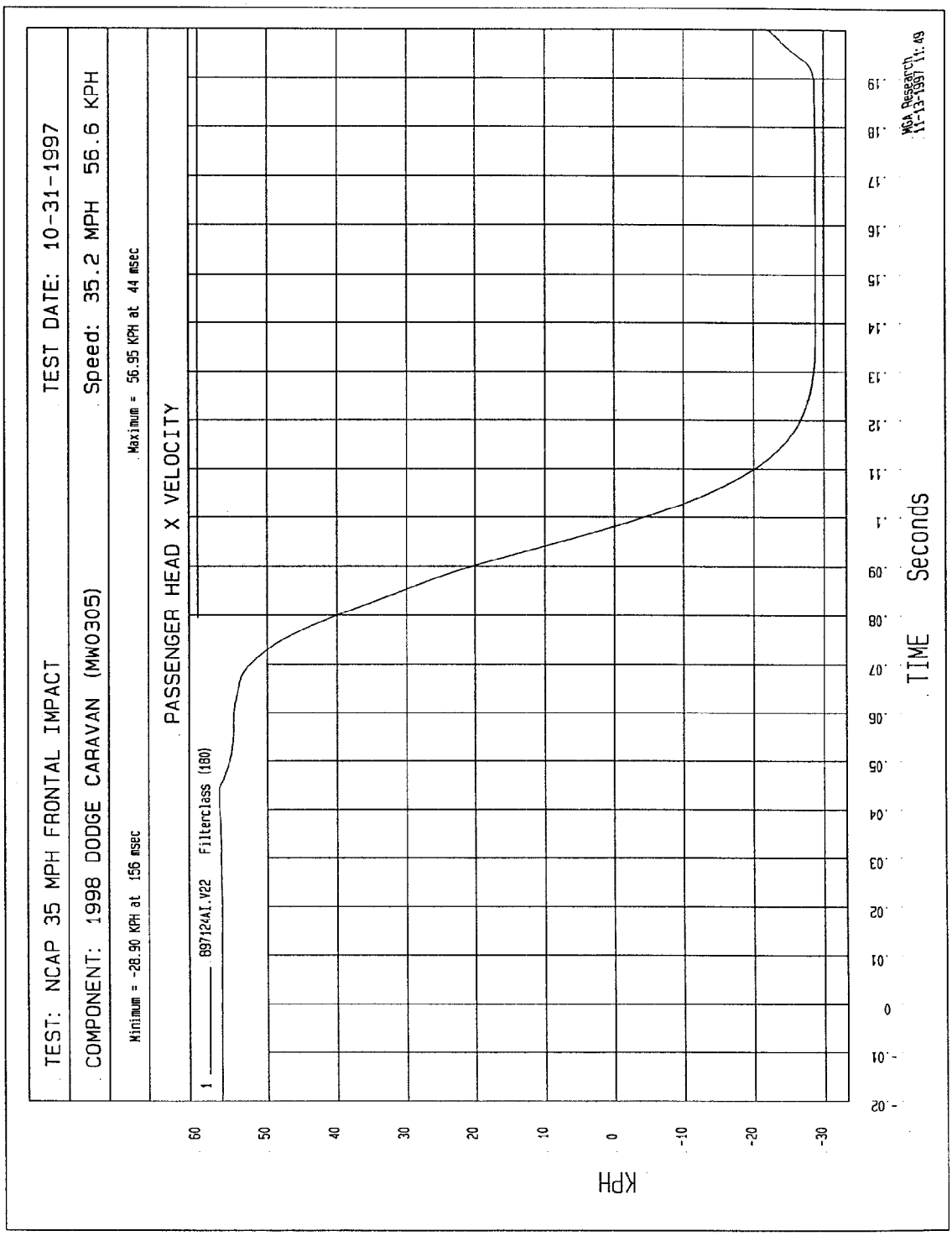

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = .66 MM at 179 msec
Maximum = 83.80 MM at 39 msec
DRIVER BELT SPOOLOUT
1 B971240F.071 Filterclass (60)
MM
0
10
20
30
40
50
60
70
80
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-13-1997 11:48

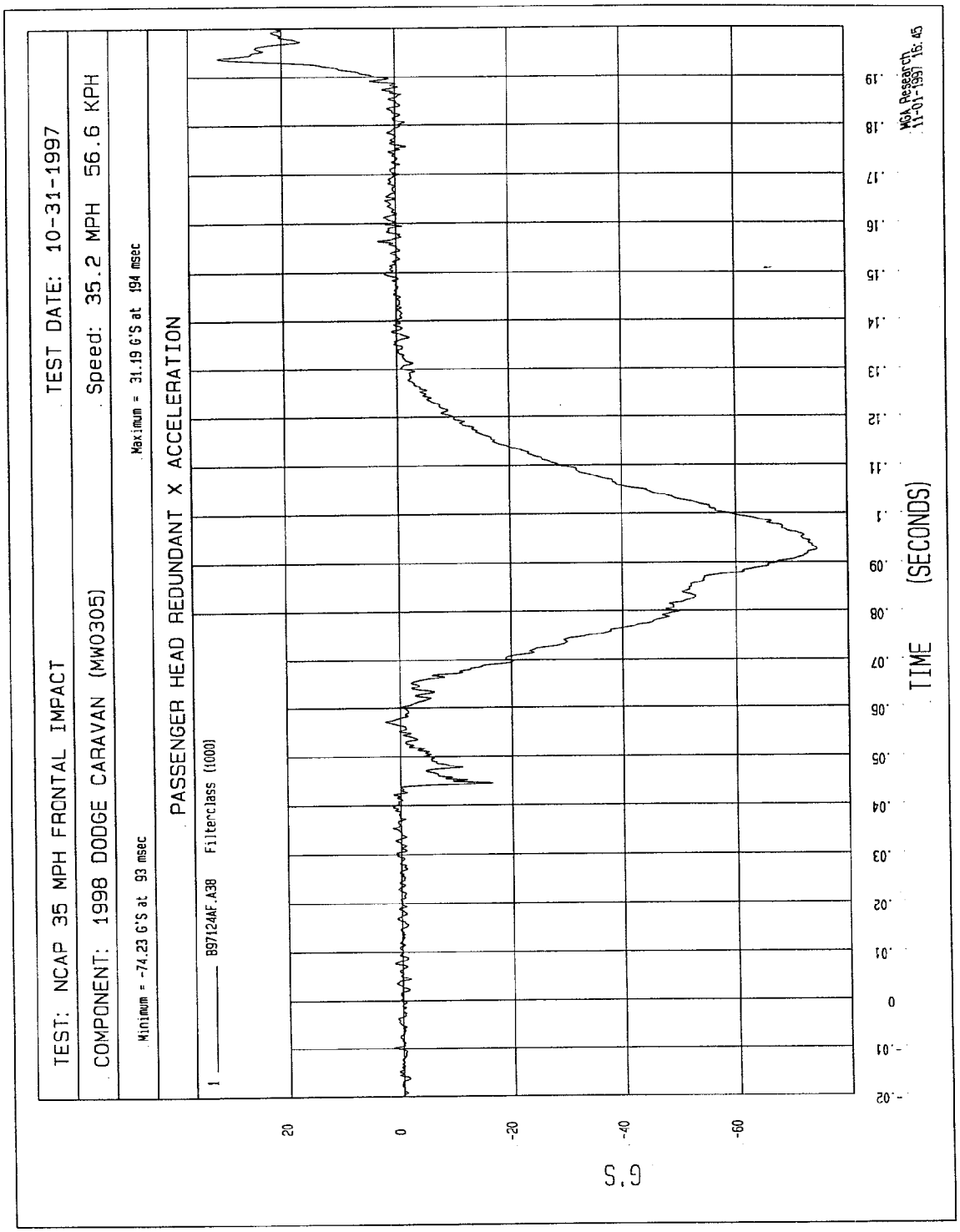

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -74.80 G'S at 94 msec
Maximum = 29.92 G'S at 194 msec
PASSENGER HEAD X ACCELERATION
1 _____ 897124AF.A22 Filterclass (1000)
MGA Research
11-01-1997 16:44
20
0
-20
-40
-60
-80
G'S
-02
-01
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
TIME (SECONDS)

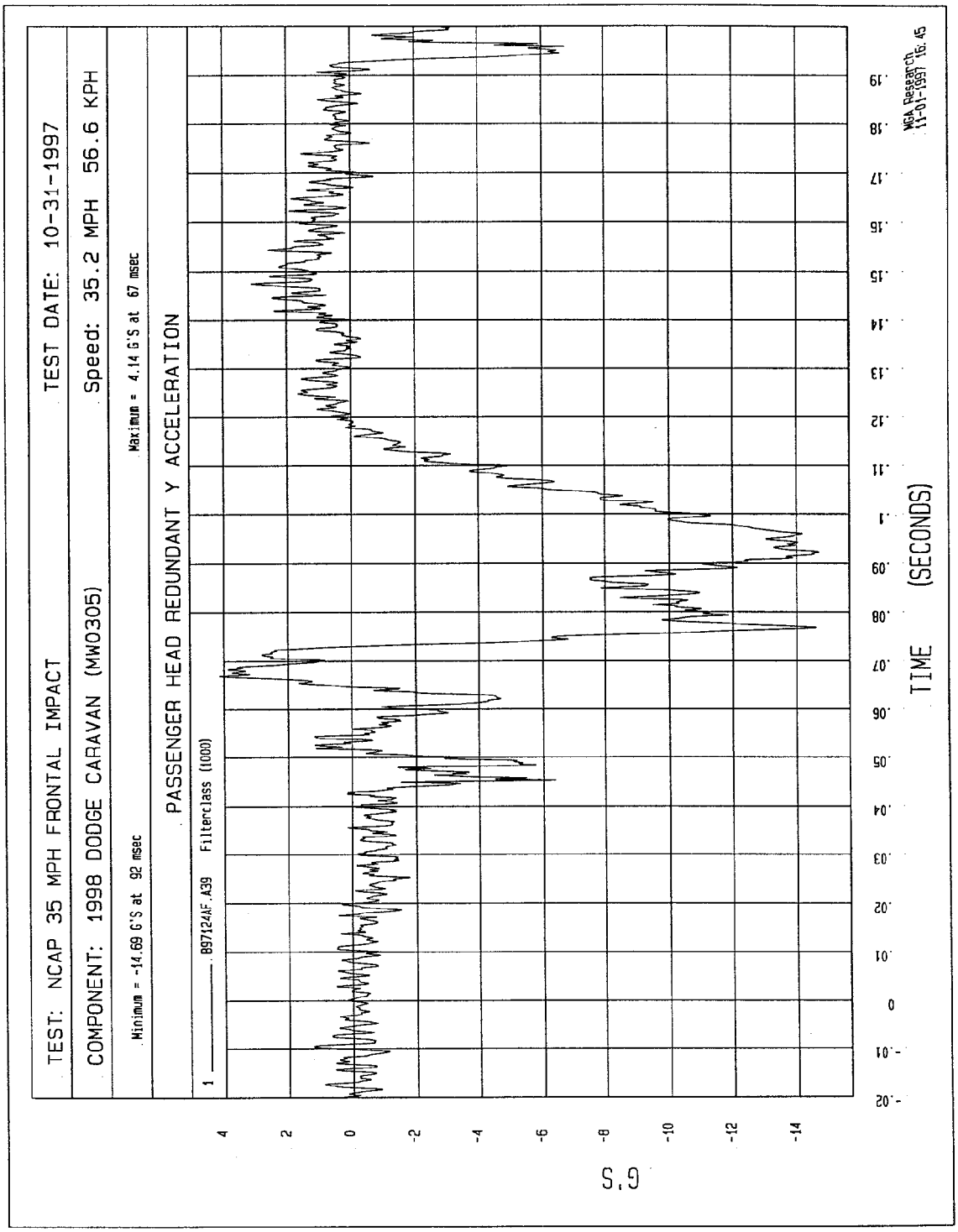

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -13.79 G'S at 77 msec
Maximum = 5.83 G'S at 72 msec
PASSENGER HEAD Y ACCELERATION
1 B97124AF.A23 Filterclass (1000)
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
NGA Research
11-01-1997 15:44
65
5.9

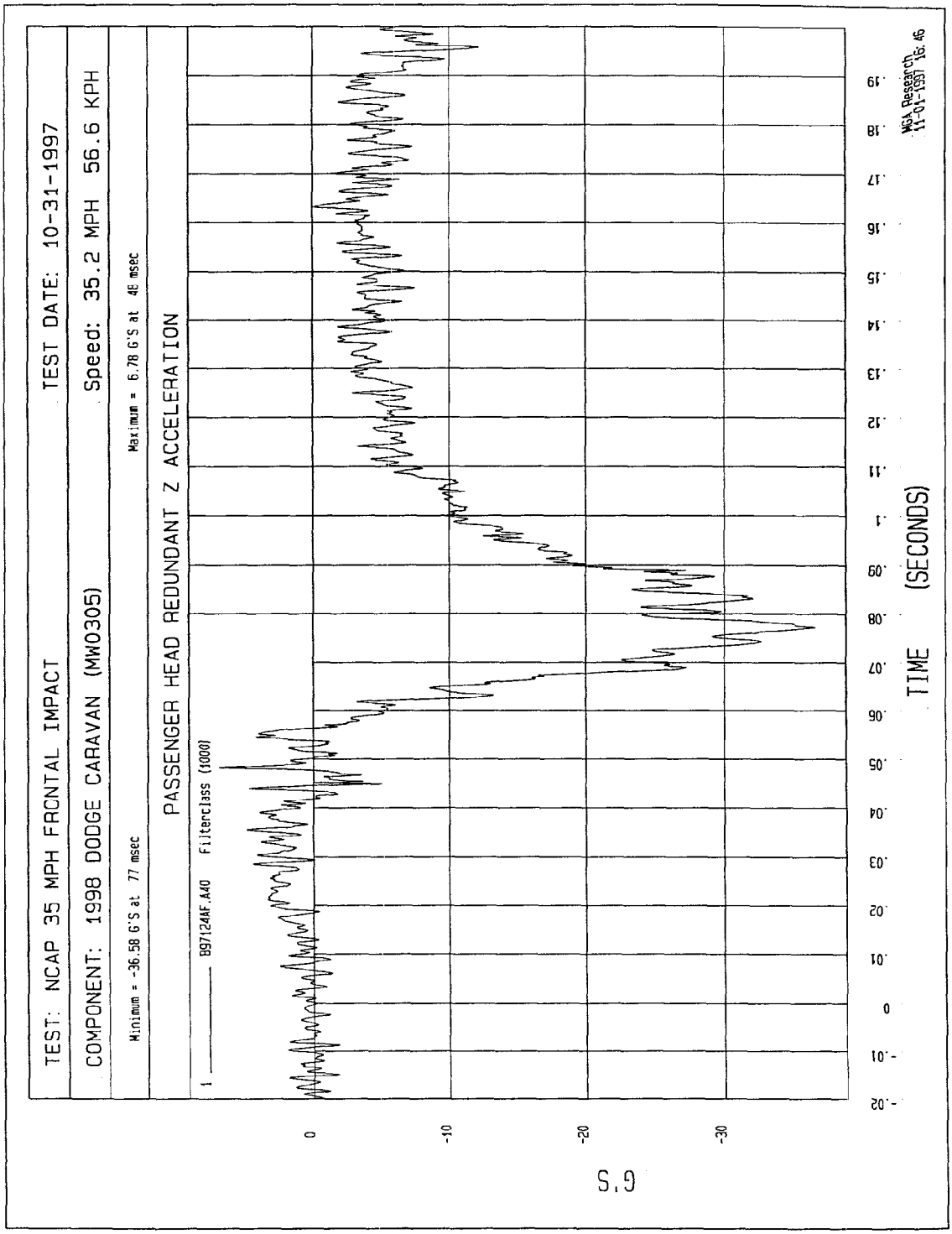

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -36.58 G'S at 77 msec
Maximum = 5.37 G'S at 55 msec
PASSENGER HEAD Z ACCELERATION
1 _____ 897I24AF.A24 Filterclass (1000)
0
-10
-20
-30
G'S
TIME (SECONDS)
MGA Research
11-01-1997 16: 44

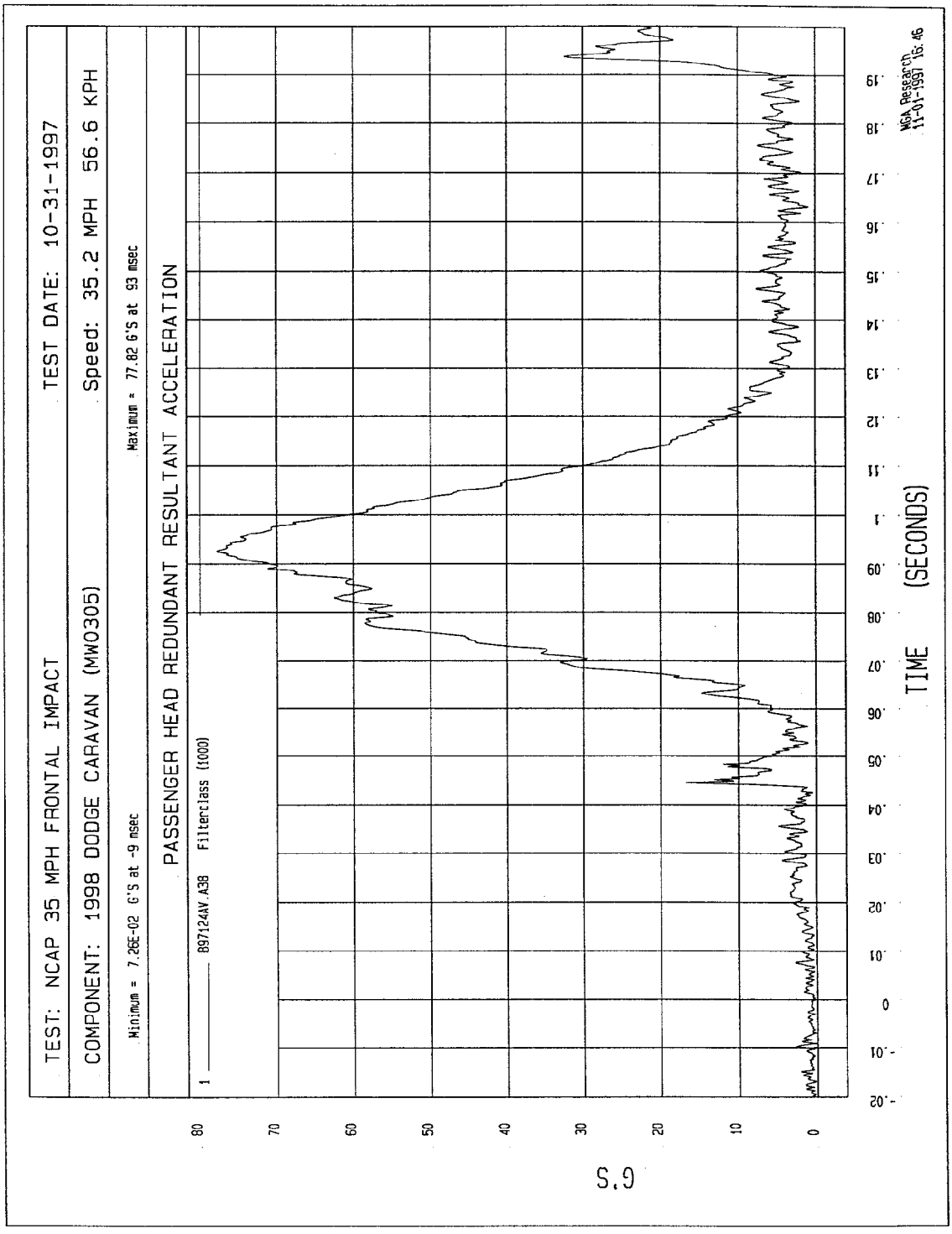

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 9.55E-02 G'S at -6 msec
Maximum = 77.93 G'S at 93 msec
PASSENGER HEAD RESULTANT ACCELERATION
1 B97124NY.A22 Filterclass (1000)
80
70
60
50
40
30
20
10
0
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:44

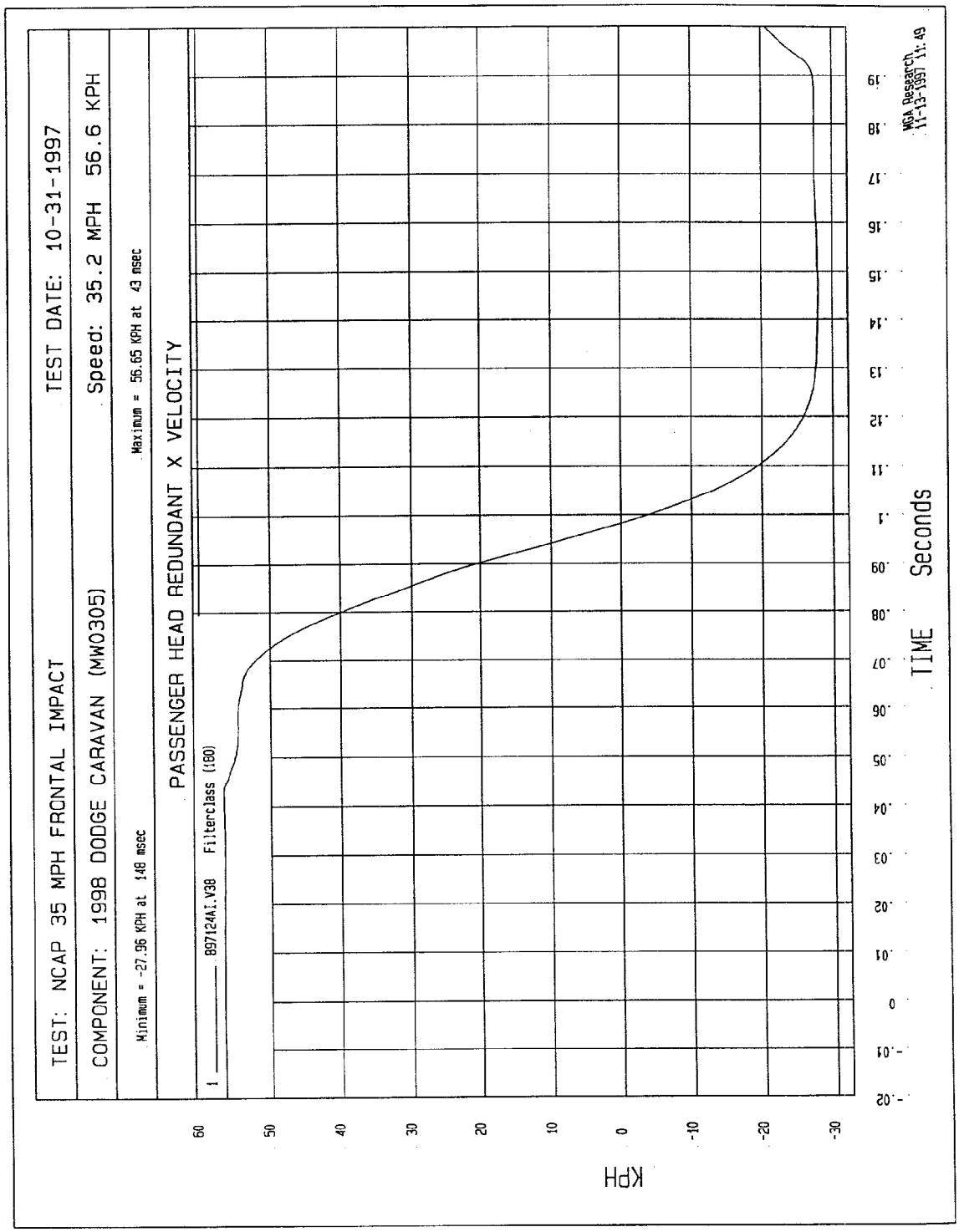

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -28.90 KPH at 156 msec
Maximum = 56.95 KPH at 44 msec
PASSENGER HEAD X VELOCITY
1 _____ 897124AI.Y22 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-30
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-13-1997 11:49


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -74.23 G'S at 93 msec
Maximum = 31.19 G'S at 194 msec
PASSENGER HEAD REDUNDANT X ACCELERATION
1 B97124AF.A3B Filterclass (1000)
20
0
-20
-40
-60
G'S
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-01-1997 15:45


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -14.69 G'S at 92 msec
Maximum = 4.14 G'S at 67 msec
PASSENGER HEAD REDUNDANT Y ACCELERATION
1 B97124AF.A39 Filterclass (1000)
4
2
0
-2
-4
-6
-8
-10
-12
-14
G'S
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:45


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -36.58 G'S at 77 msec
Maximum = 6.78 G'S at 48 msec
PASSENGER HEAD REDUNDANT Z ACCELERATION
1 B97124AF.A4D Filterclass (1000)
MGA Research
11-01-1997 16:46
G'S
TIME (SECONDS)
0
-10
-20
-30
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 7.26E-02 G'S at -9 msec
Maximum = 77.82 G'S at 93 msec
PASSENGER HEAD REDUNDANT RESULTANT ACCELERATION
1 897124AV.A38 Filterclass (1000)
G'S
TIME (SECONDS)
MGA Research
11-01-1997 15:46


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -27.96 KPH at 148 msec
Maximum = 56.65 KPH at 43 msec
PASSENGER HEAD REDUNDANT X VELOCITY
1 _____ 897124AI.V38 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-30
TIME Seconds
-.02
-.01
0
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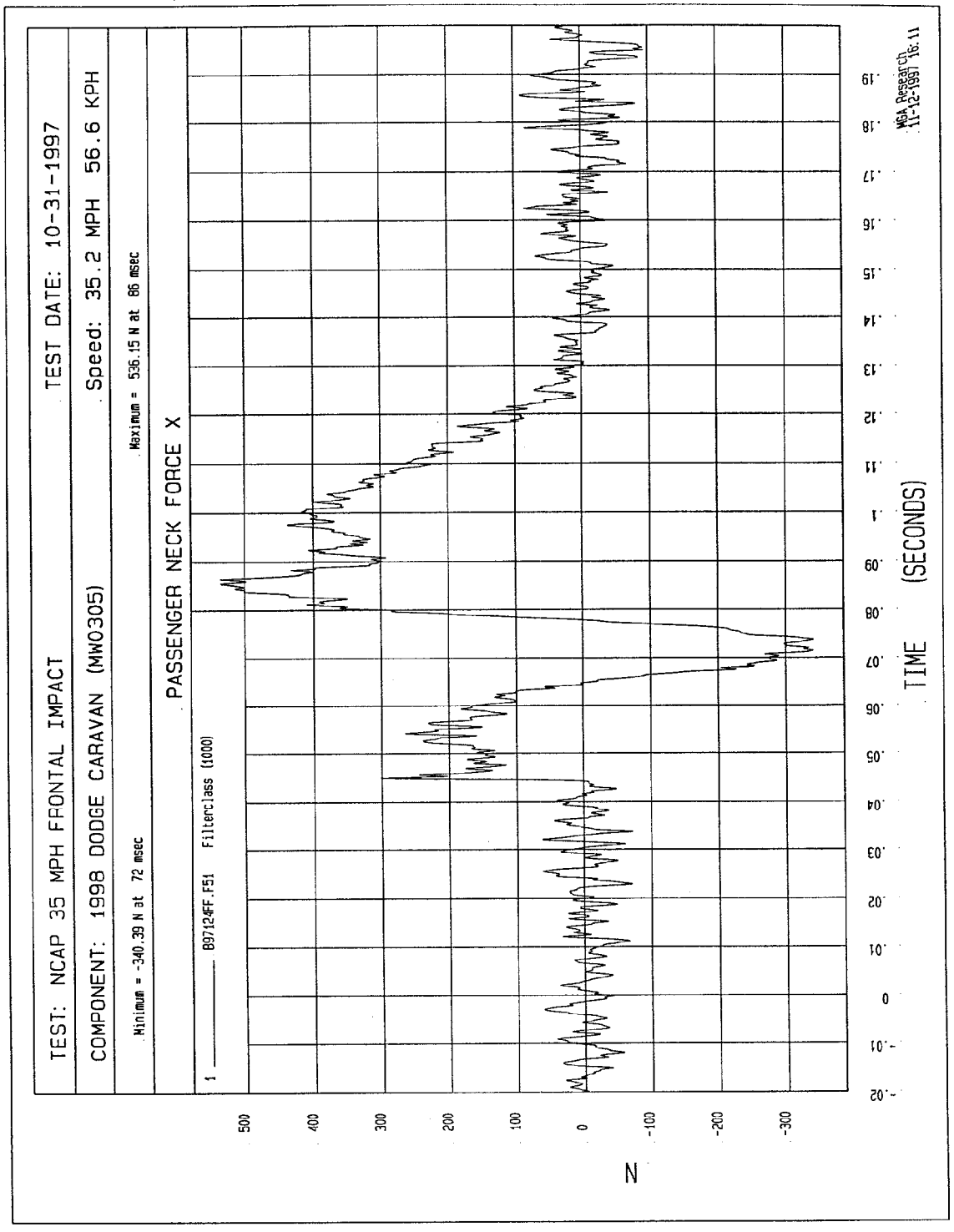
MGA Research
11-13-1997 11:49


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -340.39 N at 72 msec
Maximum = 536.15 N at 86 msec
PASSENGER NECK FORCE X
1 B97124FF.F51 Filterclass (1000)
500
400
300
200
100
0
-100
-200
-300
N
-.02
-.01
0
.01
.02
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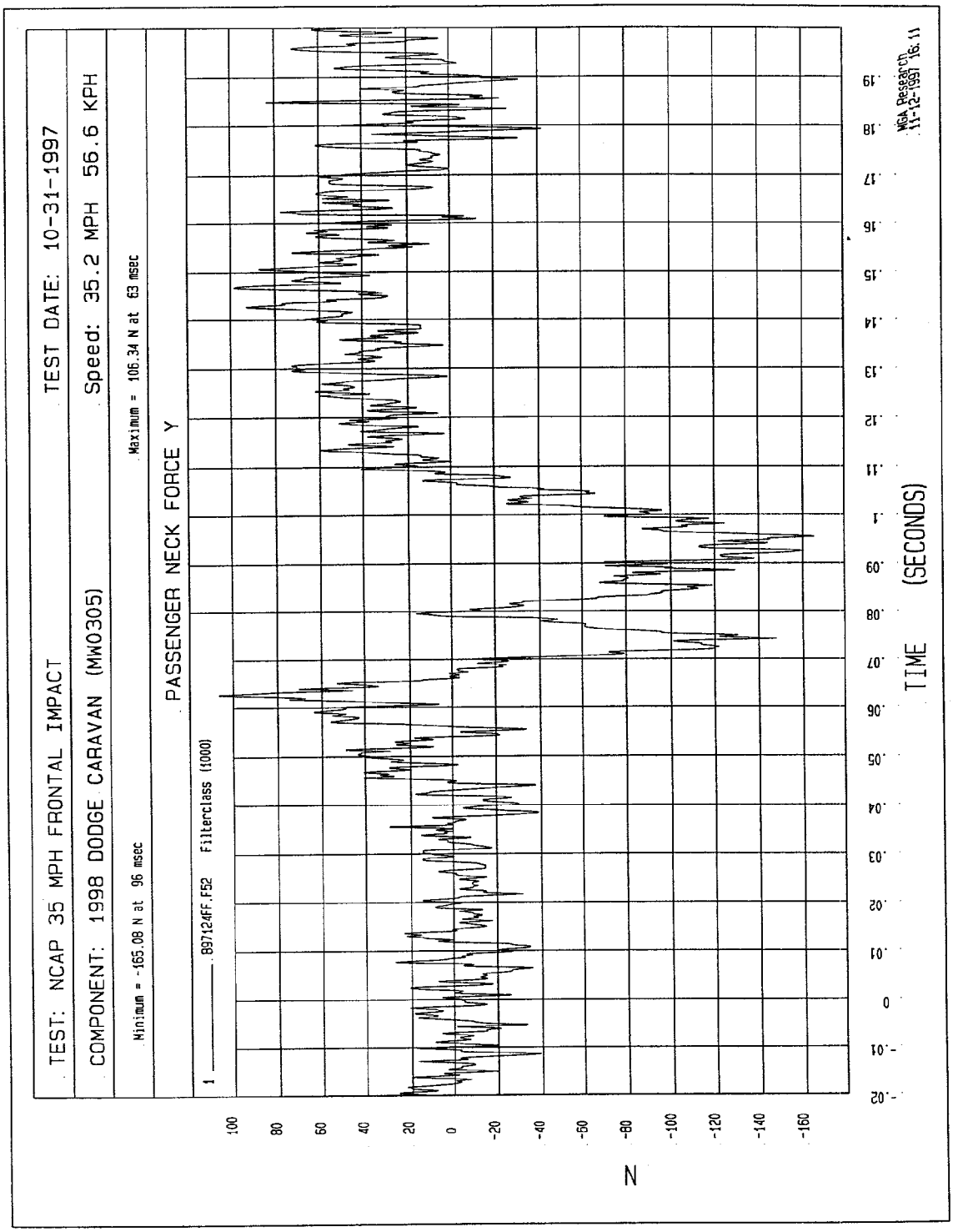
TIME (SECONDS)
MGA Research
11-12-1997 16:11


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -165.08 N at 96 msec
Maximum = 106.34 N at 63 msec
PASSENGER NECK FORCE Y
1 _____ 897124FF.F52 Filterclass (1000)
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
N
-.02
-.01
0
.01
.02
.03
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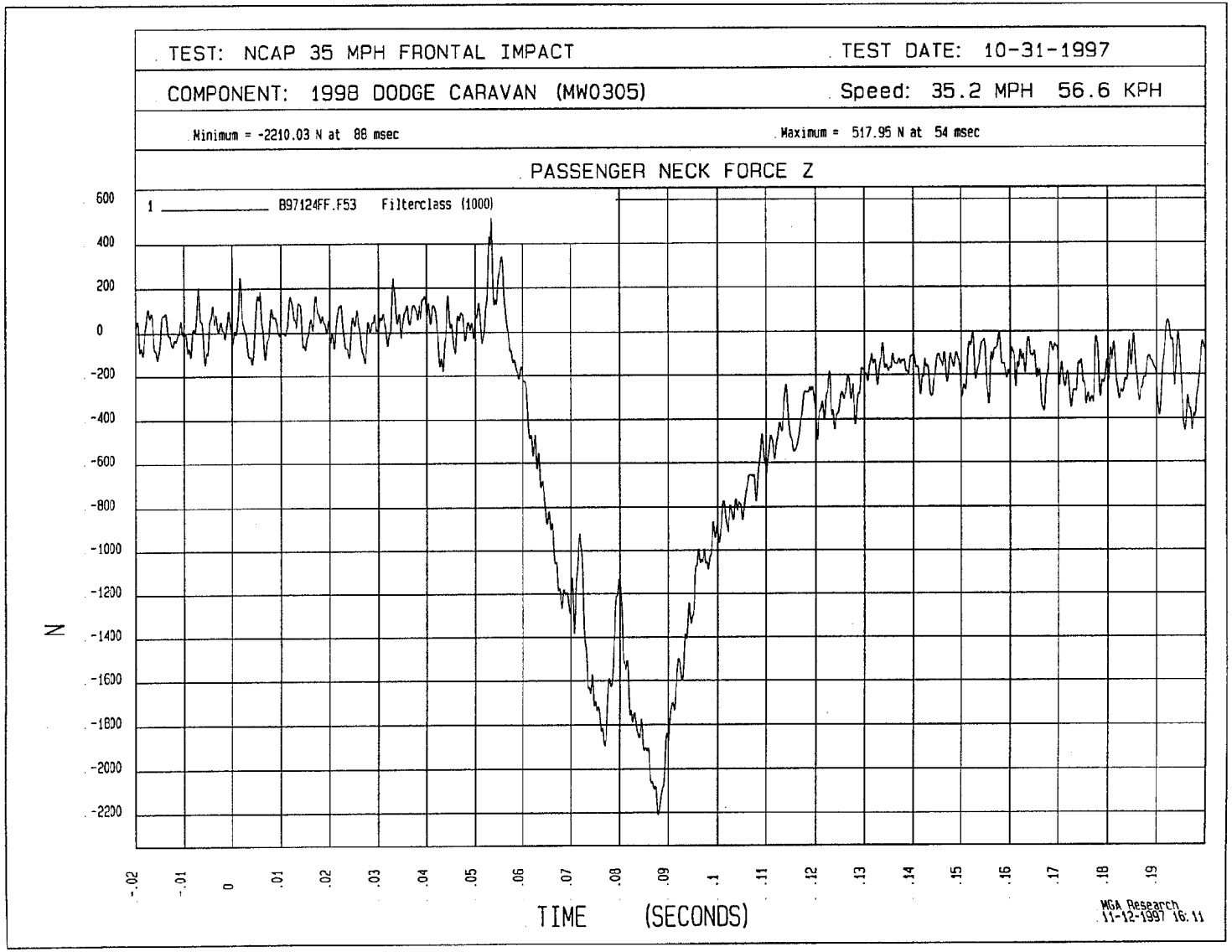
TIME (SECONDS)
MGA Research
11-12-1997 16:11


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -2210.03 N at 88 msec
Maximum = 517.95 N at 54 msec
PASSENGER NECK FORCE Z
1 B97124FF.F53 Filterclass (1000)
600
400
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
-2200
N
-.02
-.01
0
.01
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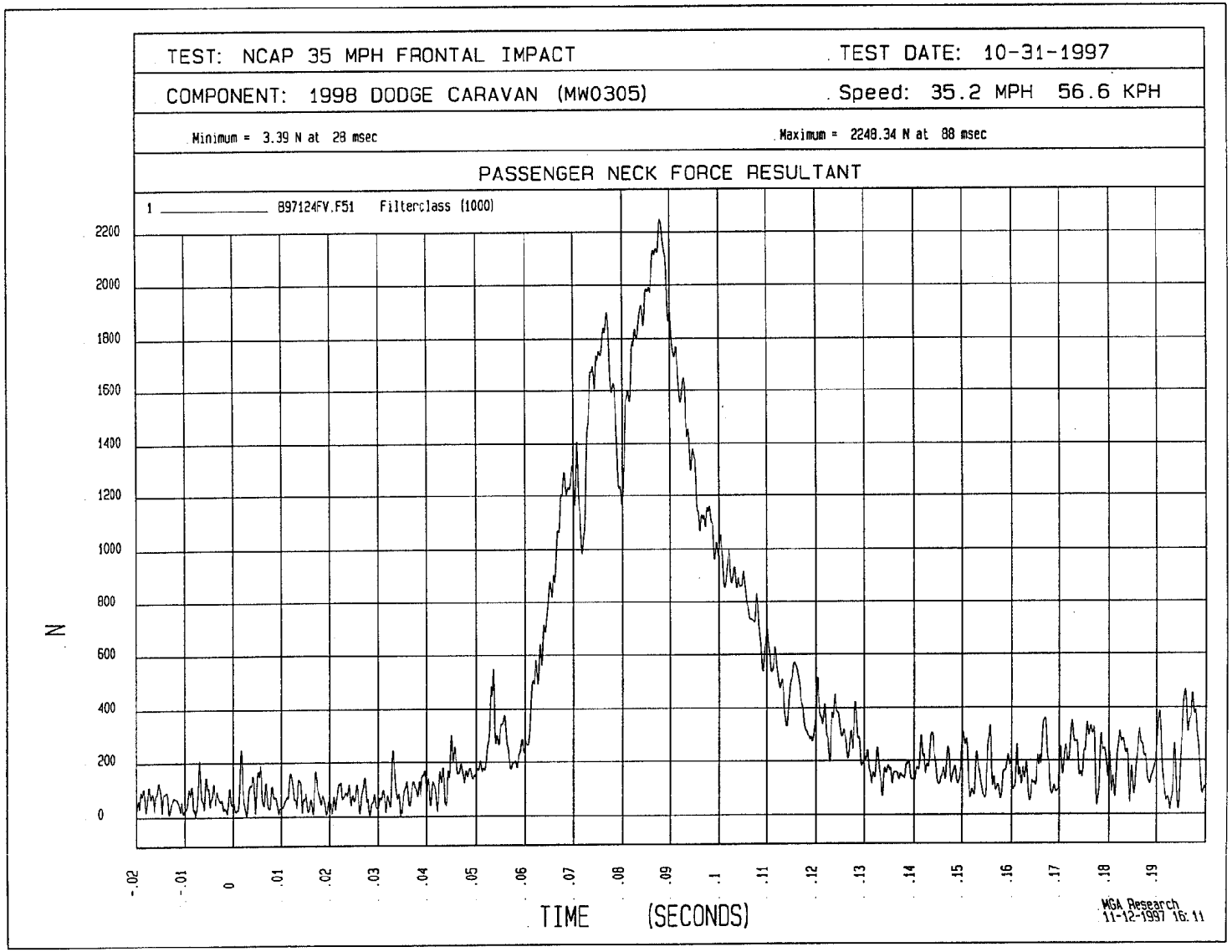
TIME (SECONDS)
MGA Research
11-12-1997 16:11


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 3.39 N at 28 msec
Maximum = 2248.34 N at 88 msec
PASSENGER NECK FORCE RESULTANT
1 897124FV.F51 Filterclass (1000)
N
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
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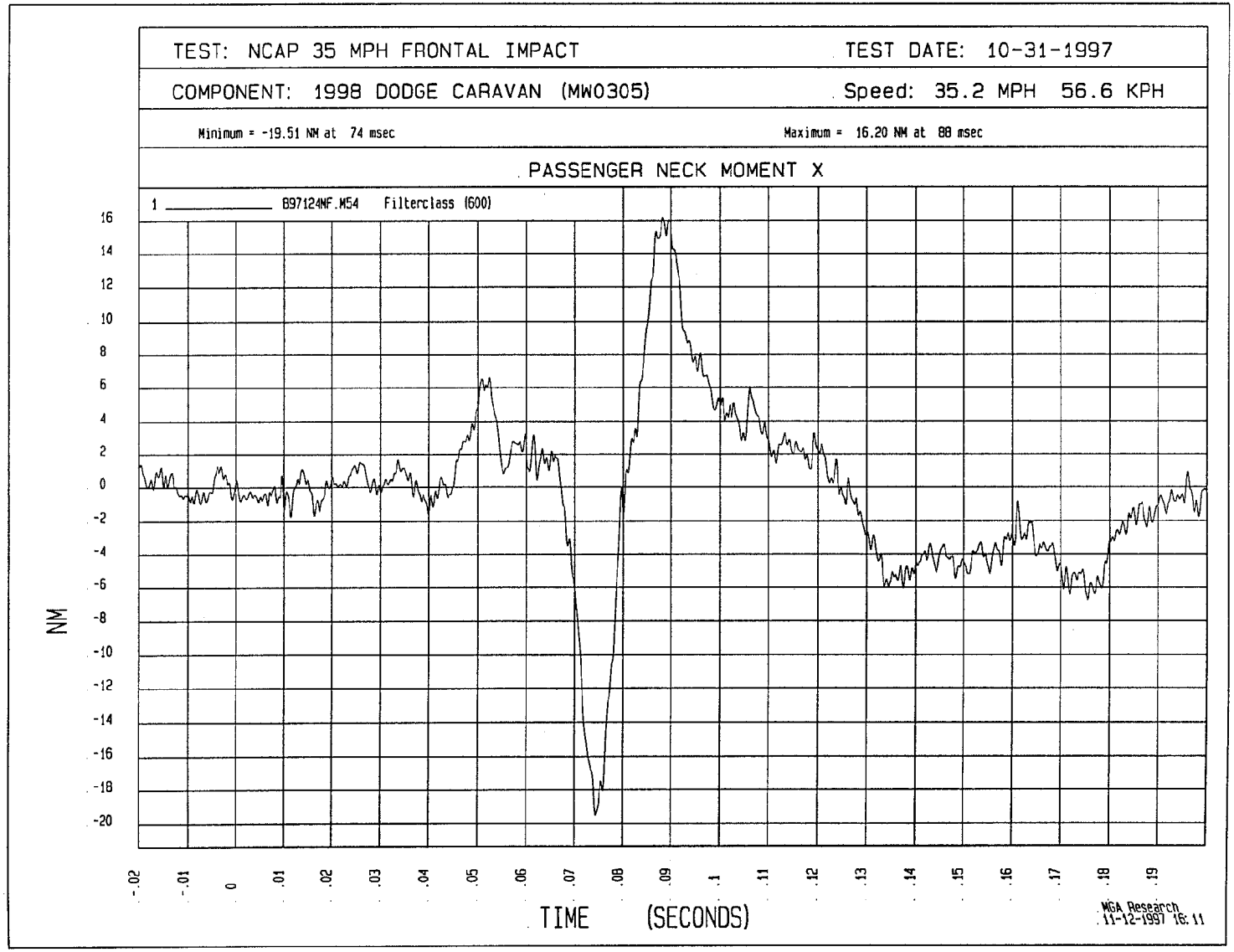
TIME (SECONDS)
MGA Research
11-12-1997 16:11


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -19.51 NM at 74 msec
Maximum = 16.20 NM at 88 msec
PASSENGER NECK MOMENT X
1 B97124NF.M54 Filterclass (600)
NM
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-.02
-.01
0
.01
.02
.03
.04
.05
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.13
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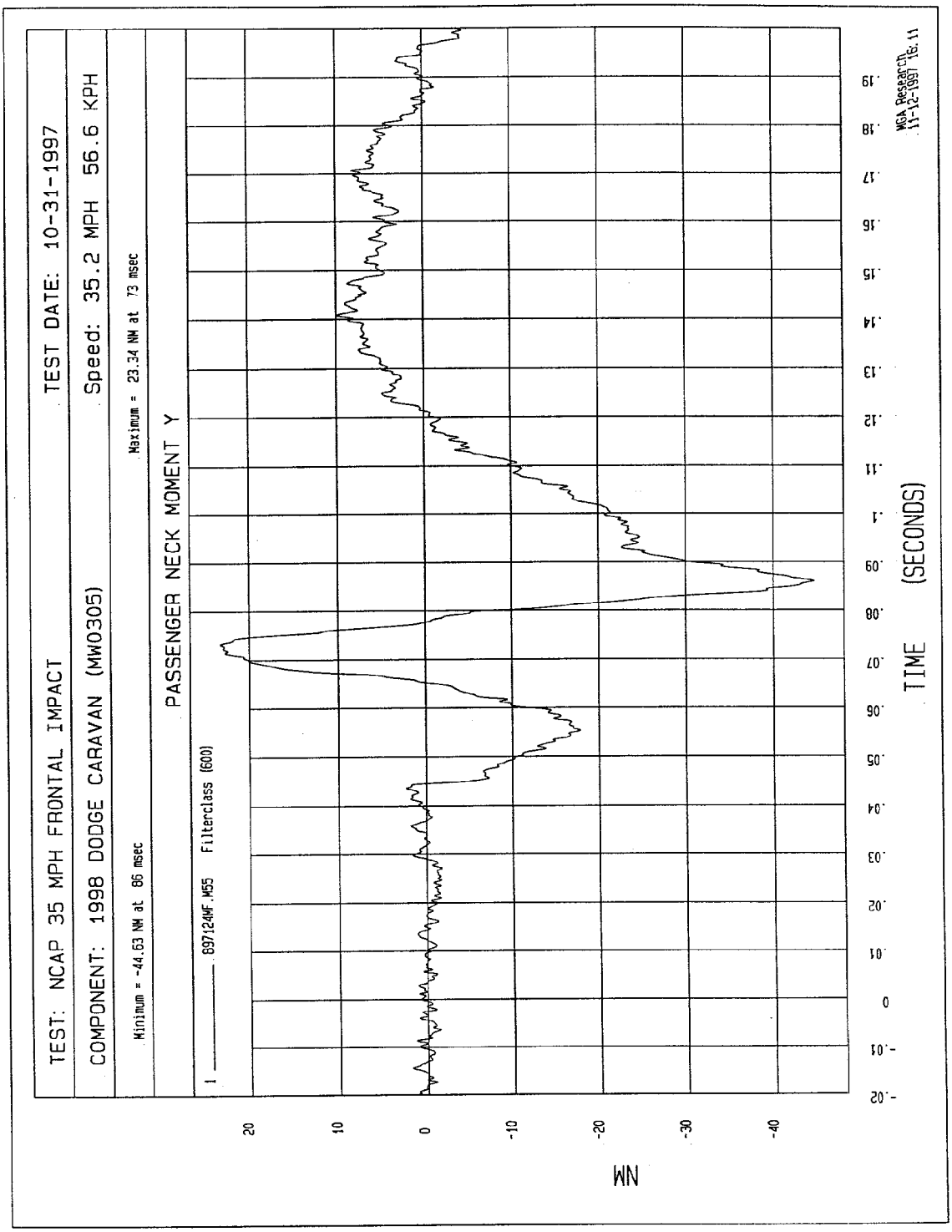
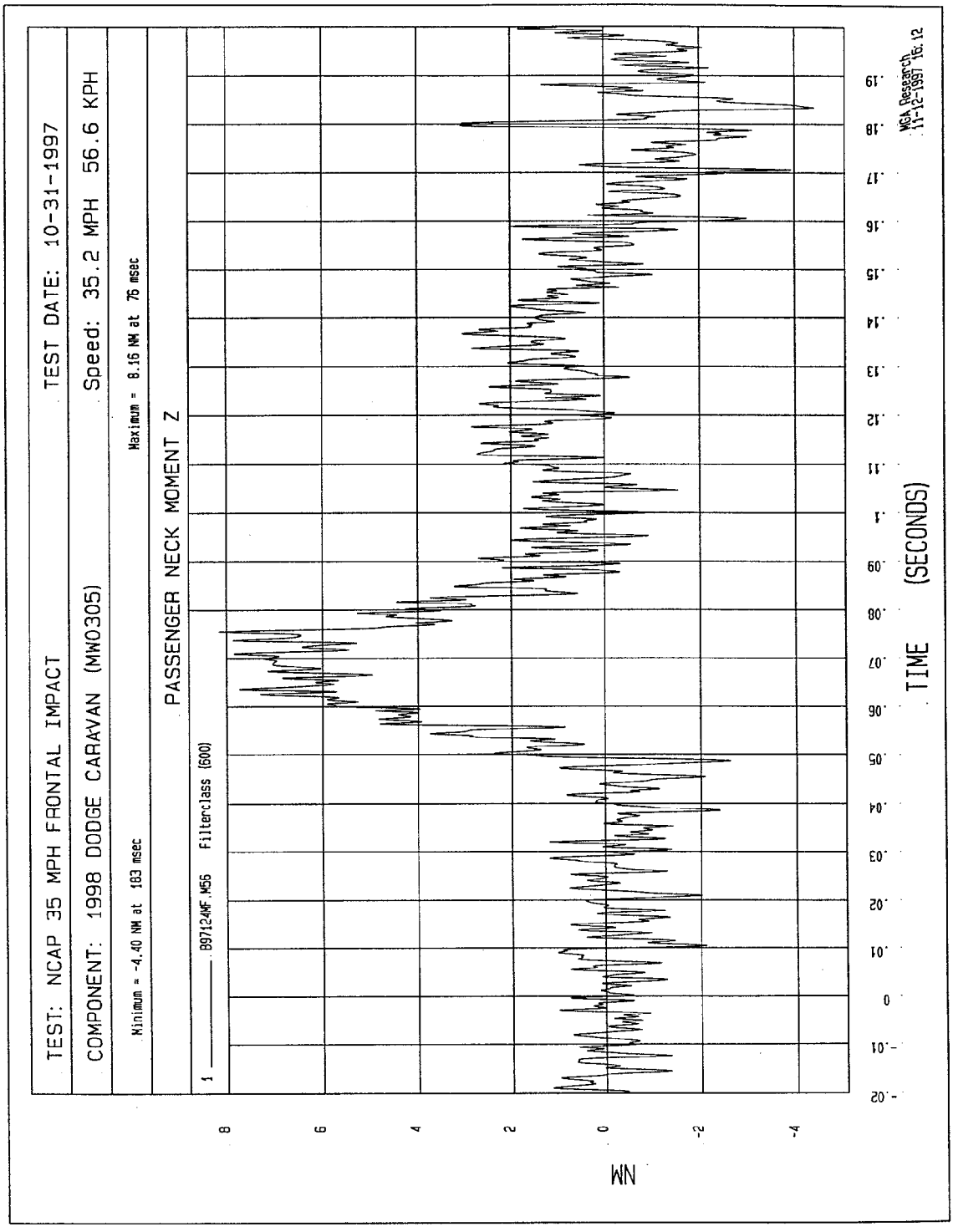
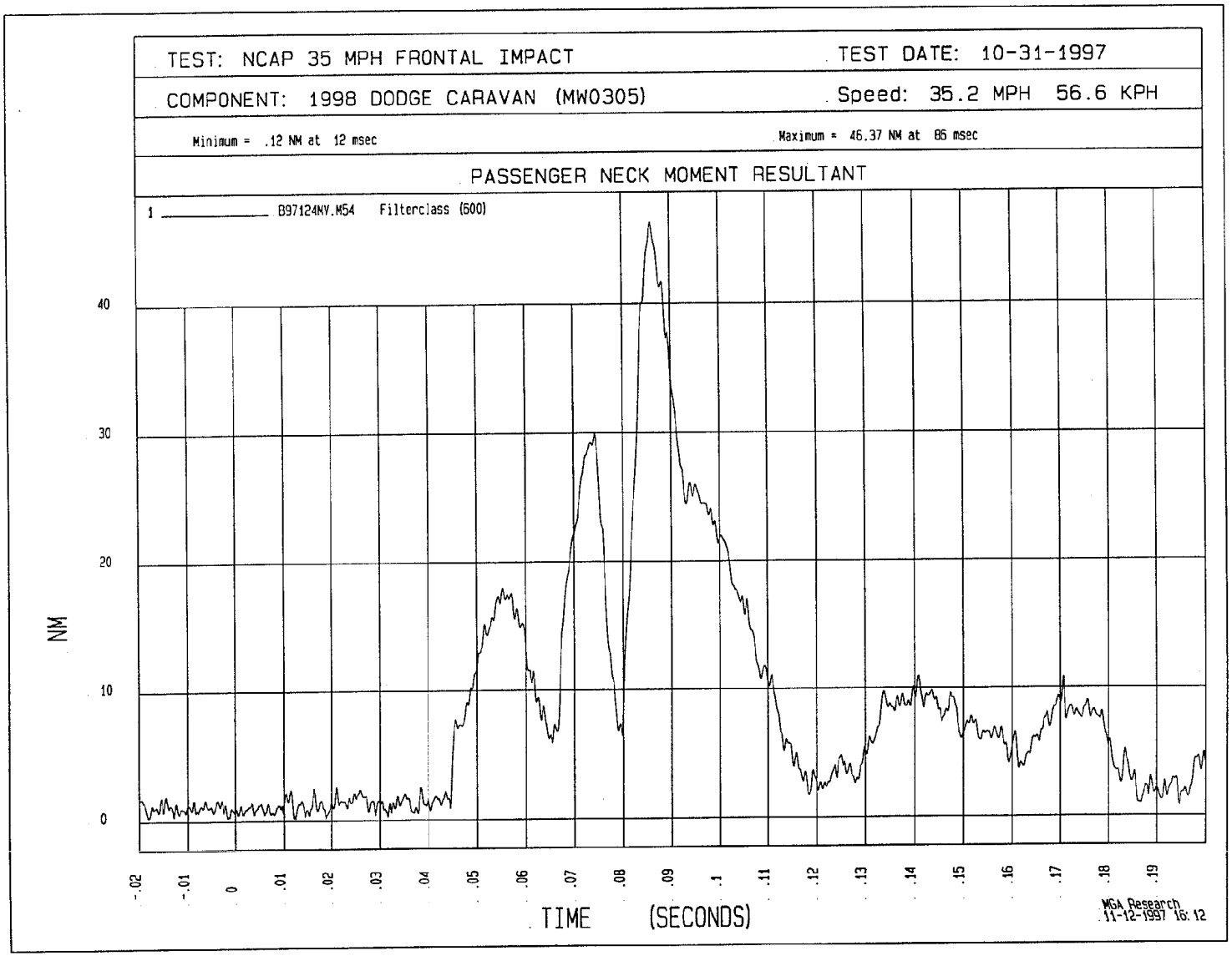
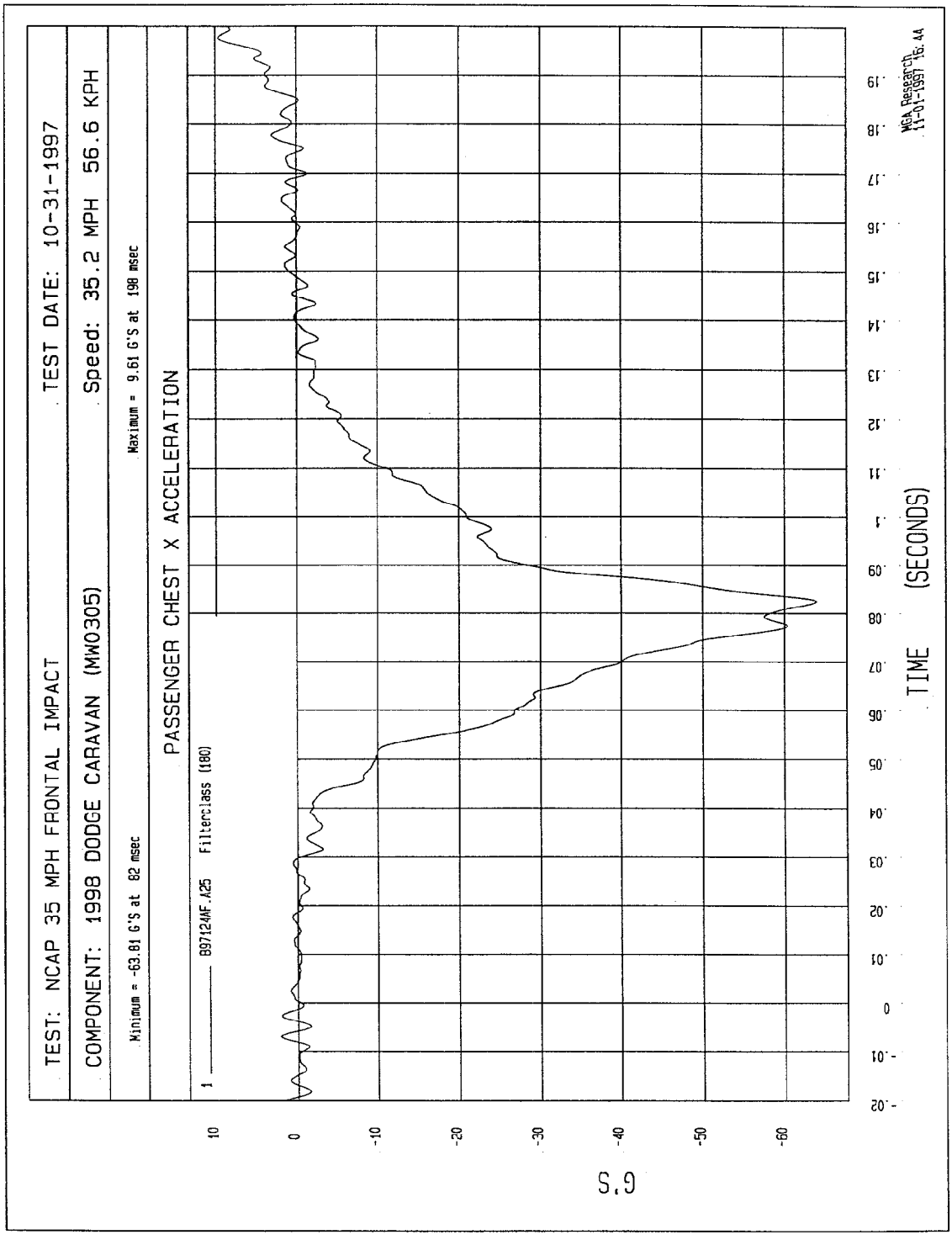
TIME (SECONDS)
MGA Research
11-12-1997 16:11


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -44.63 NM at 86 msec
Maximum = 23.34 NM at 73 msec
PASSENGER NECK MOMENT Y
1 _____ 897124NF.M55 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-12-1997 16:11


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -4.40 NM at 183 msec
Maximum = 8.16 NM at 76 msec
PASSENGER NECK MOMENT Z
1 B97124MF.M55 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-12-1997 16:12


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = .12 NM at 12 msec
Maximum = 46.37 NM at 85 msec
PASSENGER NECK MOMENT RESULTANT
1 B97124MY.M54 Filterclass (600)
NM
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:12


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -63.81 G'S at 82 msec
Maximum = 9.61 G'S at 190 msec
PASSENGER CHEST X ACCELERATION
1 B97124MF.A25 Filterclass (180)
10
0
-10
-20
-30
-40
-50
-60
G'S
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
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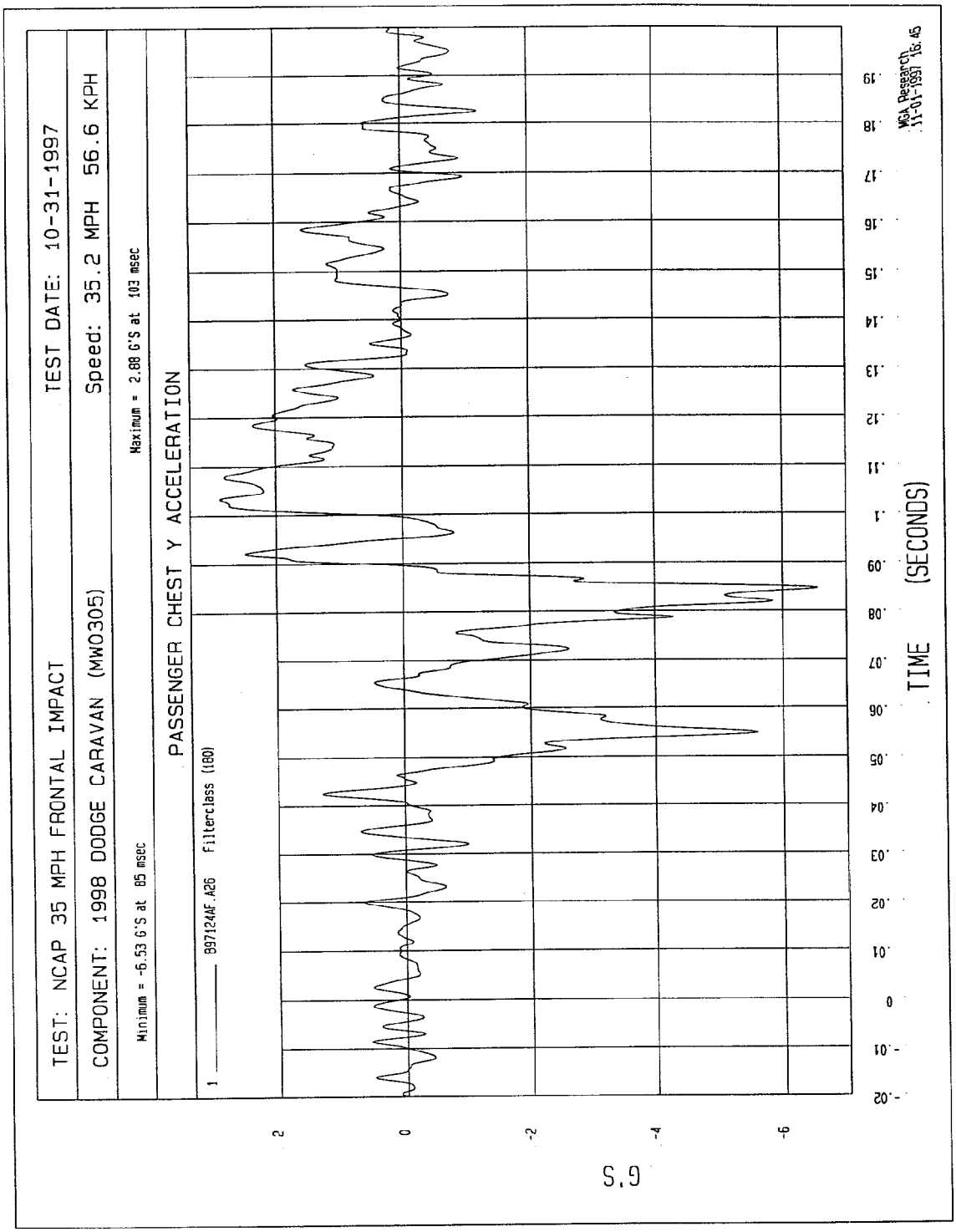
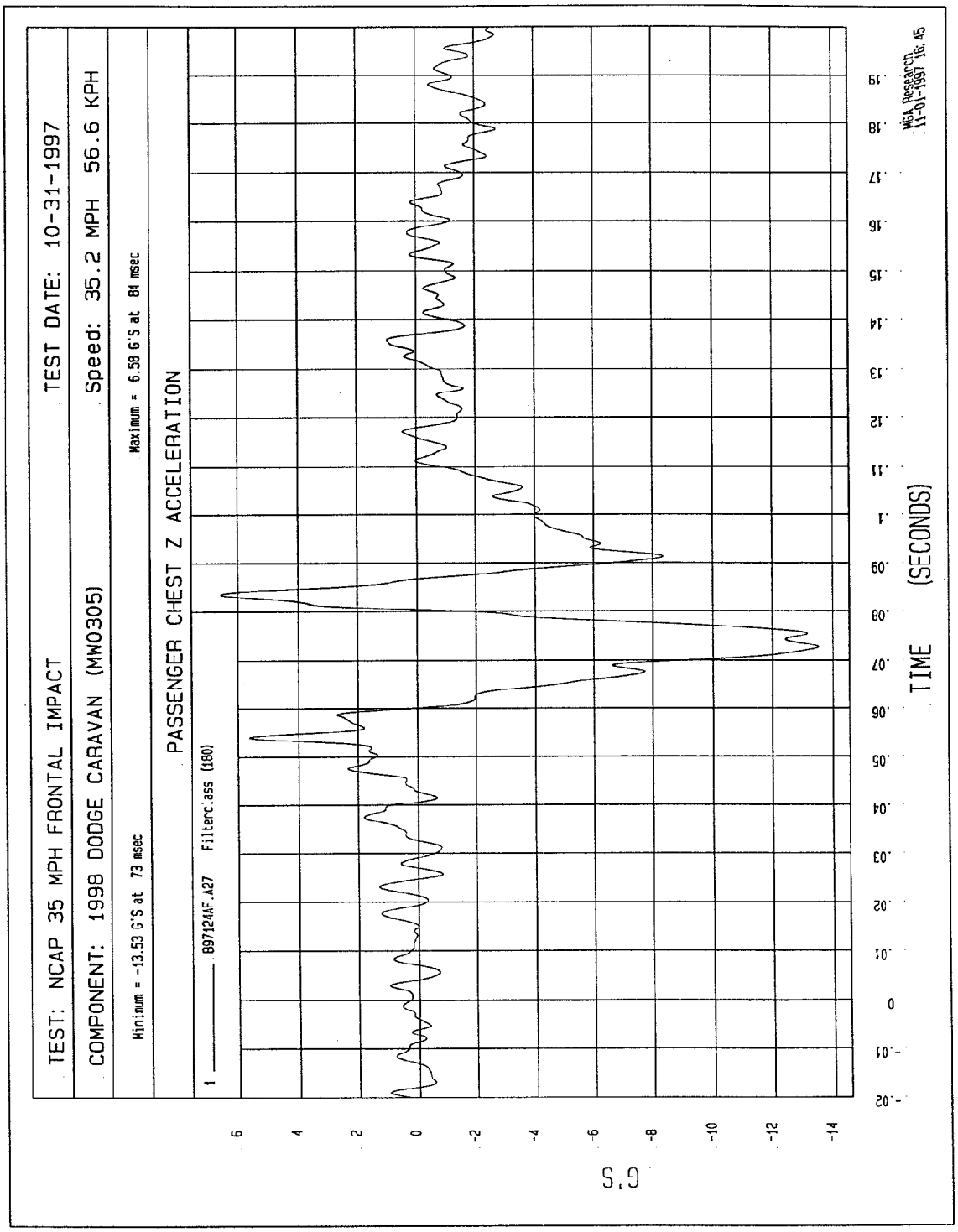
TIME (SECONDS)
MGA Research
11-01-1997 15:44


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -6.53 G'S at 85 msec
Maximum = 2.88 G'S at 103 msec
PASSENGER CHEST Y ACCELERATION
1 _____ B97124AF.A26 filterclass (180)
2
0
-2
-4
-6
G'S
.02
.01
0
-.01
-.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:45


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -13.53 G'S at 73 msec
Maximum = 6.58 G'S at 84 msec
PASSENGER CHEST Z ACCELERATION
1 B97124AF.A27 Filterclass (180)
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
G'S
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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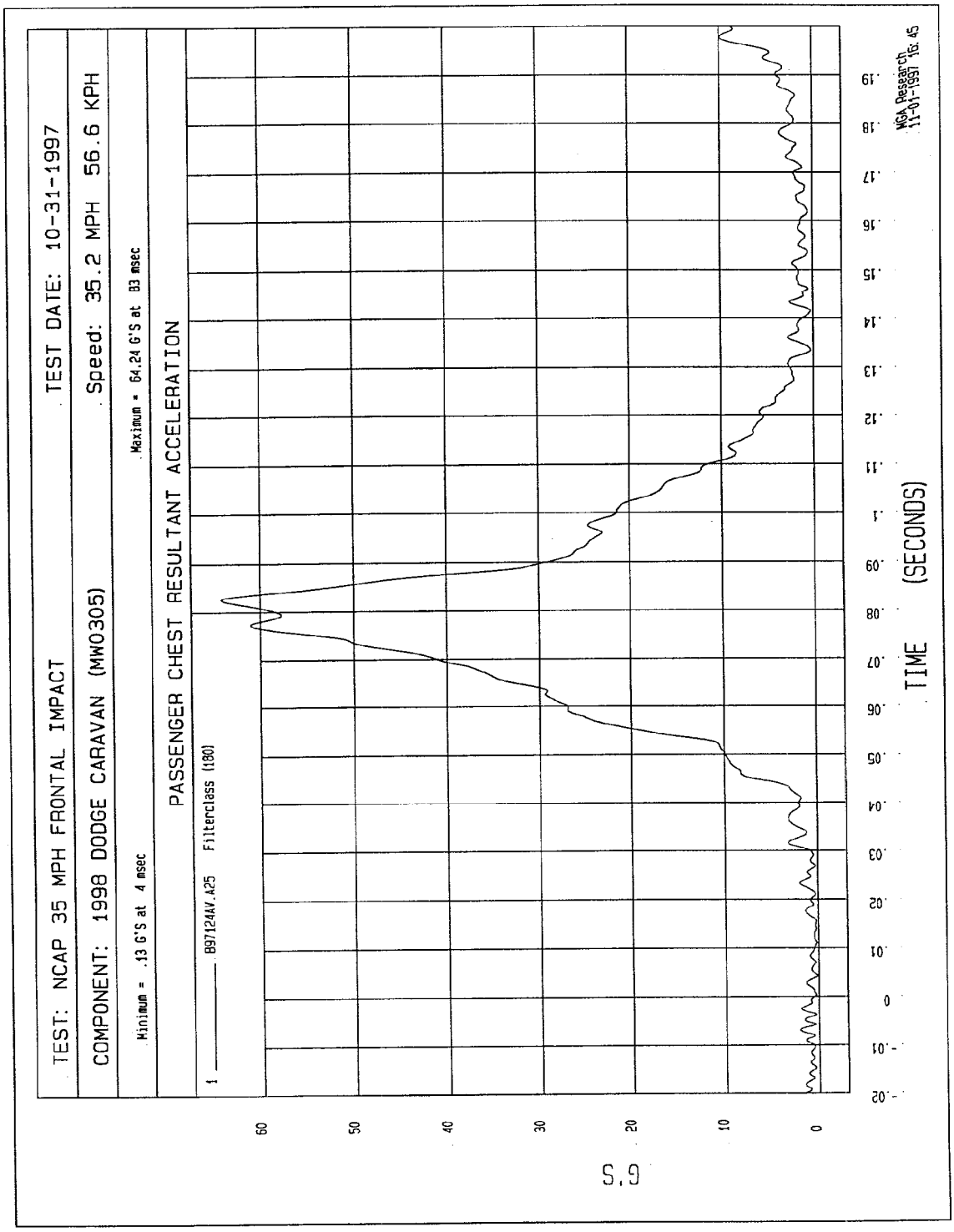
TIME (SECONDS)
MGA Research
11-01-1997 16:45


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = .13 G'S at 4 msec
Maximum = 64.24 G'S at 83 msec
PASSENGER CHEST RESULTANT ACCELERATION
1 B97124AV.A25 Filterclass (180)
60
50
40
30
20
10
0
G'S
-.02
-.01
0
.01
.02
.03
.04
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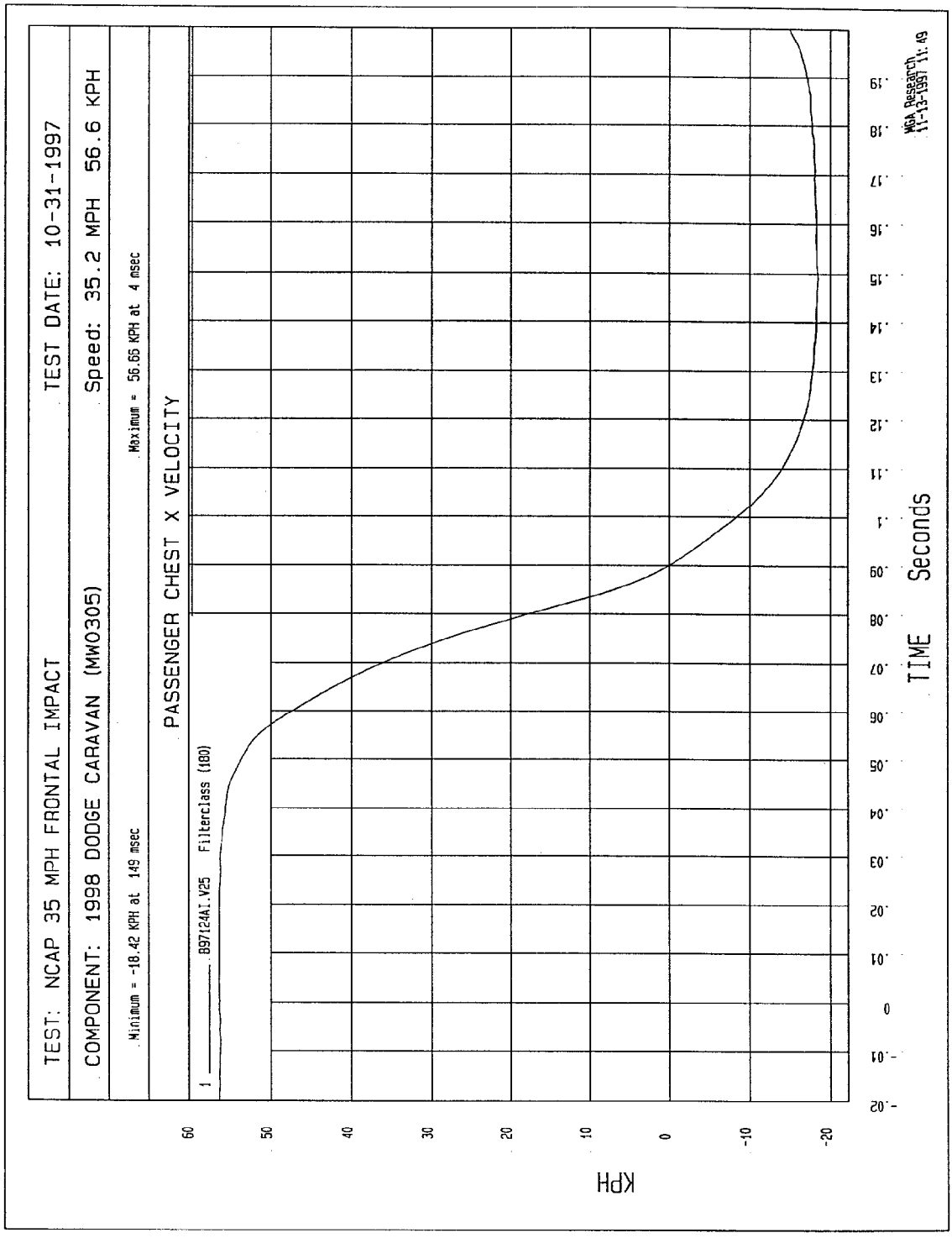
TIME (SECONDS)
MGA Research
11-01-1997 16:45


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -18.42 KPH at 149 msec
Maximum = 56.65 KPH at 4 msec
PASSENGER CHEST X VELOCITY
1 B97124AI.V25 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
TIME Seconds
-.02
-.01
0
.01
.02
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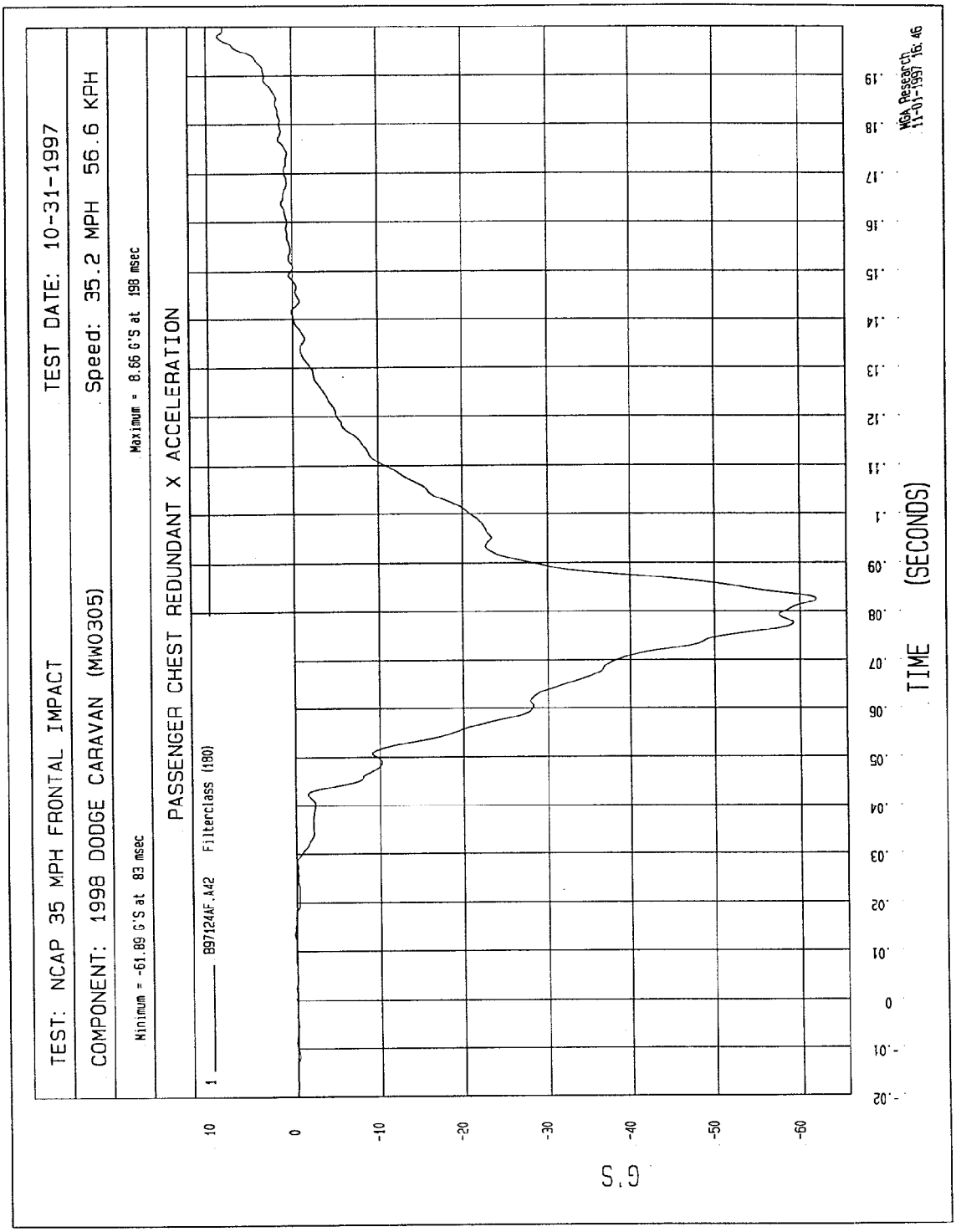
MGA Research
11-13-1997 11:49


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -61.89 G'S at 83 msec
Maximum = 8.66 G'S at 198 msec
PASSENGER CHEST REDUNDANT X ACCELERATION
1 B97124AF.A42 Filterclass (180)
10
0
-10
-20
-30
-40
-50
-60
G'S
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
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.11
.12
.13
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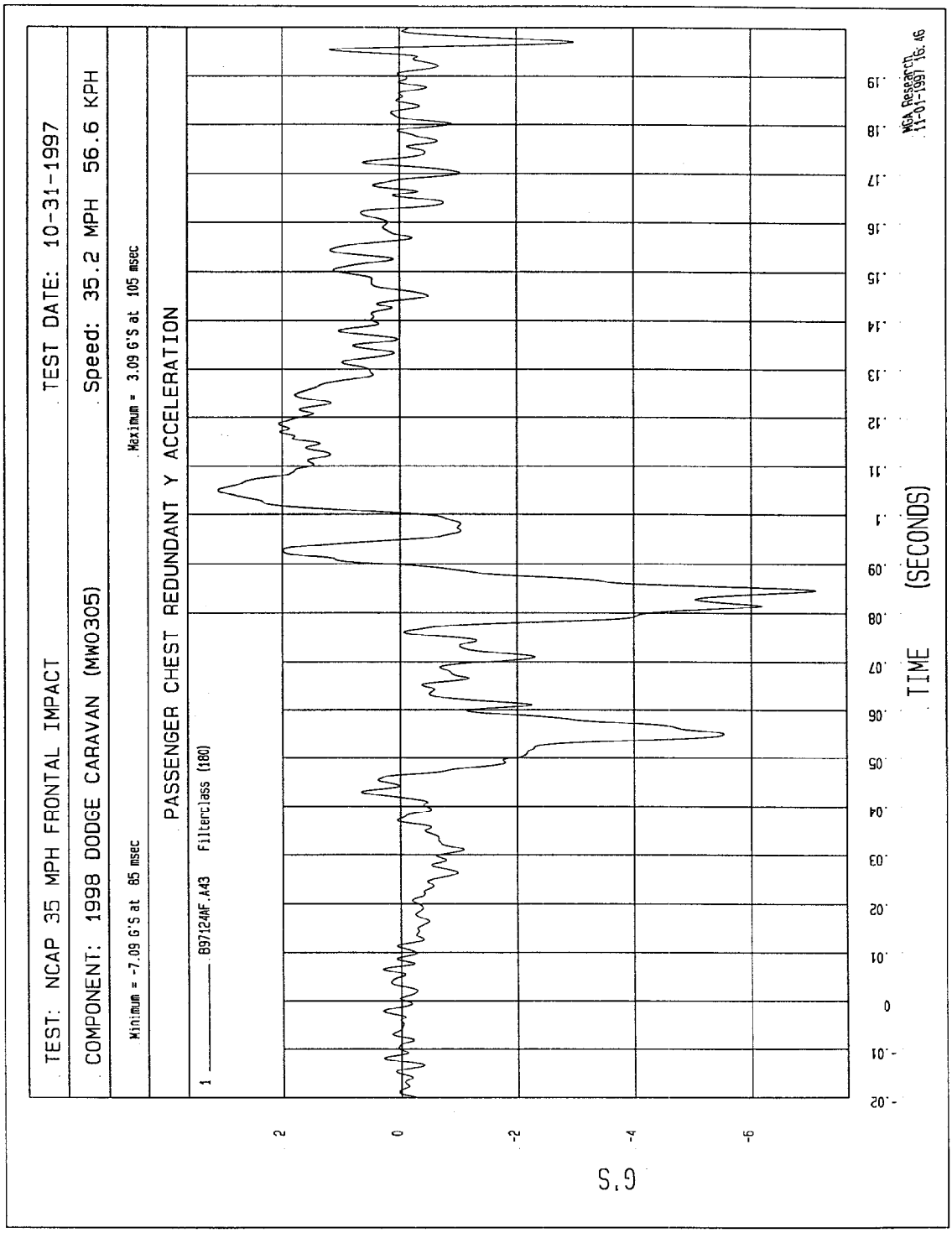
.15
.16
.17
.18
.19
MGA Research
11-01-1997 16:46


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -7.09 G'S at 85 msec
Maximum = 3.09 G'S at 105 msec
PASSENGER CHEST REDUNDANT Y ACCELERATION
1 _____ 897124AF.A43 Filterclass (180)
2
0
-2
-4
-6
G'S
.02
.01
0
.01
.02
.03
.04
.05
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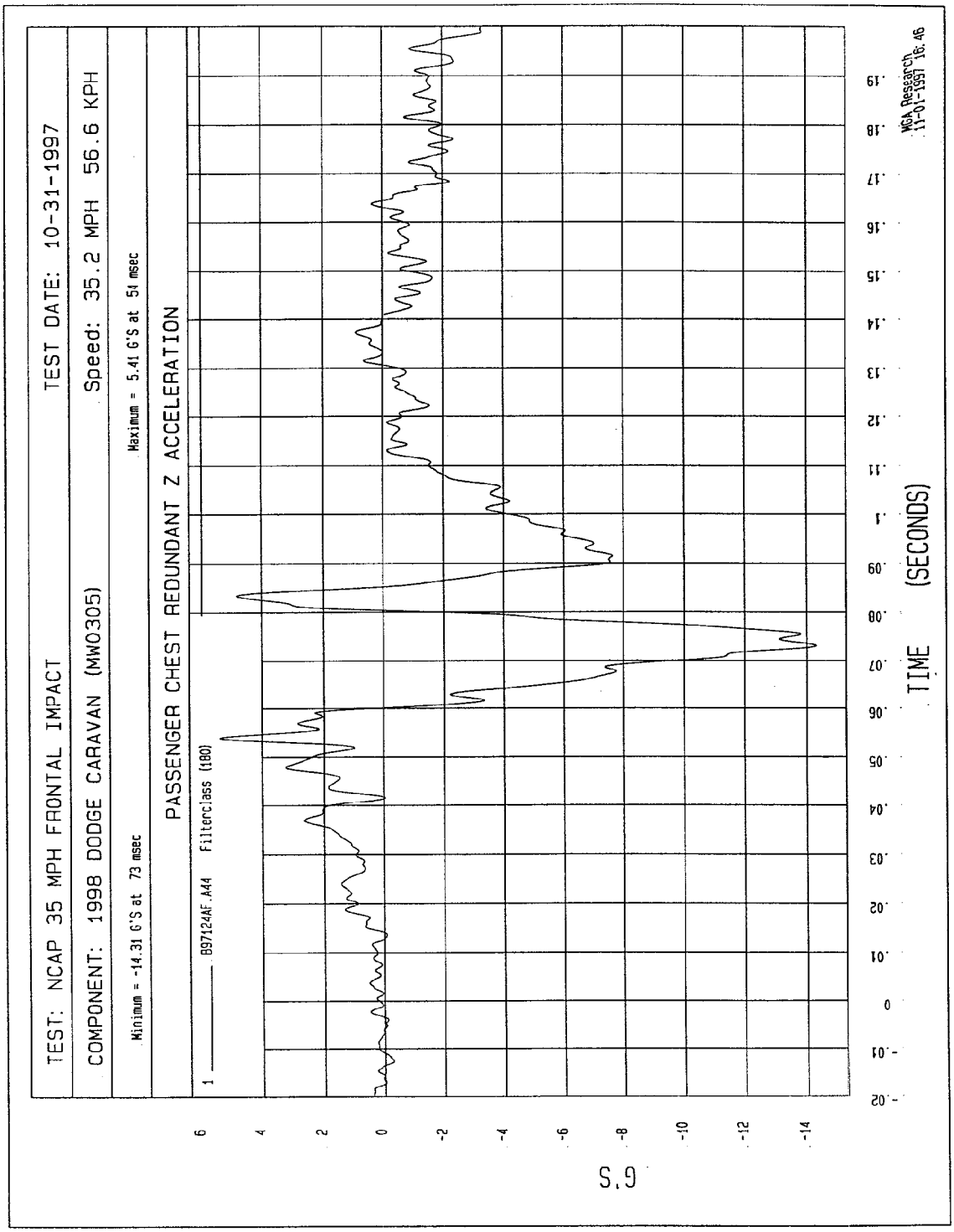
TIME (SECONDS)
MGA Research
11-07-1997 16:46


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -14.31 G'S at 73 msec
Maximum = 5.41 G'S at 51 msec
PASSENGER CHEST REDUNDANT Z ACCELERATION
1 B97124AF.A44 Filterclass (180)
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
G's
.02
-.01
0
.01
.02
.03
.04
.05
.06
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.09
.1
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.12
.13
.14
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.16
.17
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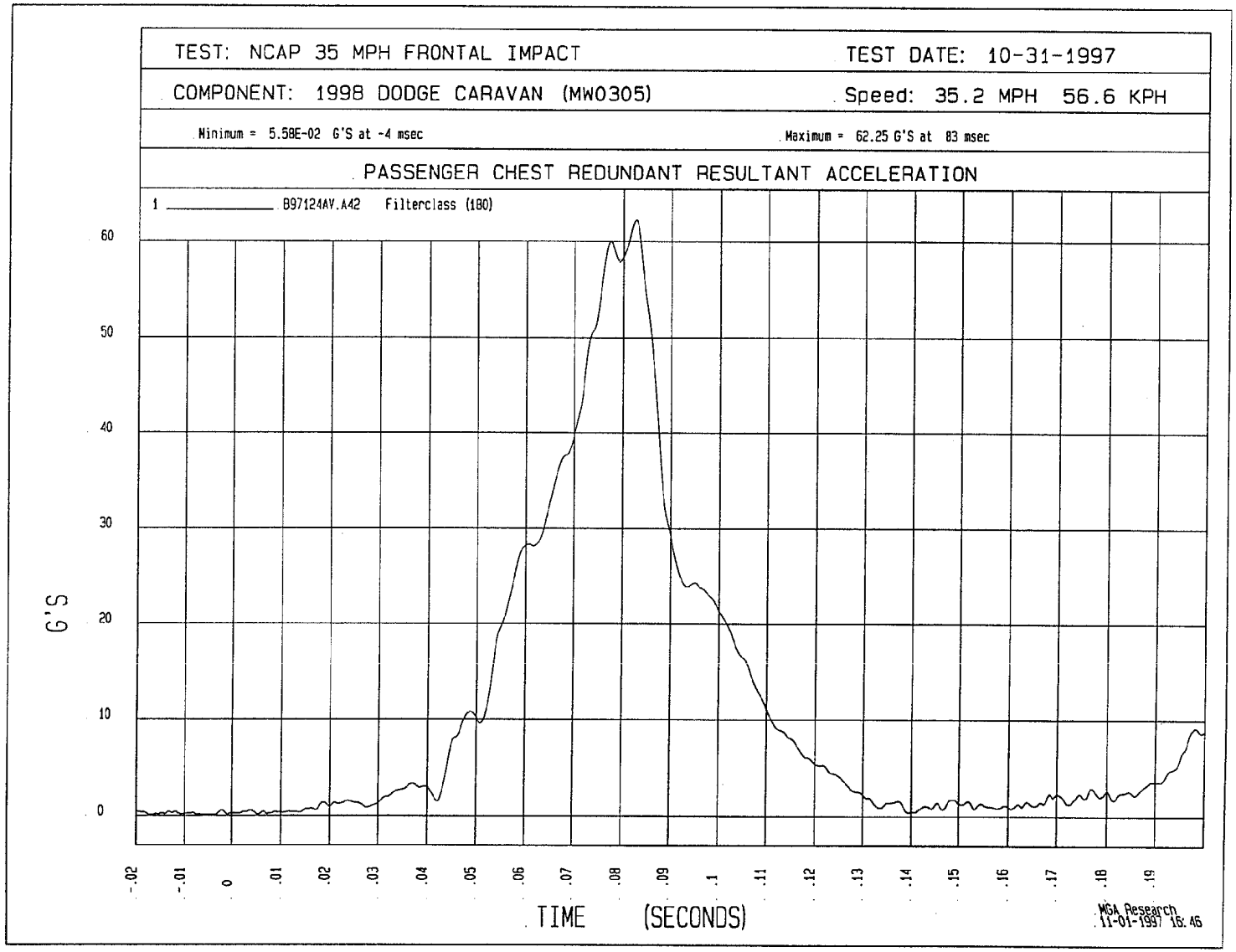
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:46


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 5.58E-02 G'S at -4 msec
Maximum = 62.25 G'S at 83 msec
PASSENGER CHEST REDUNDANT RESULTANT ACCELERATION
1 B97124AV.A42 Filterclass (180)
G'S
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
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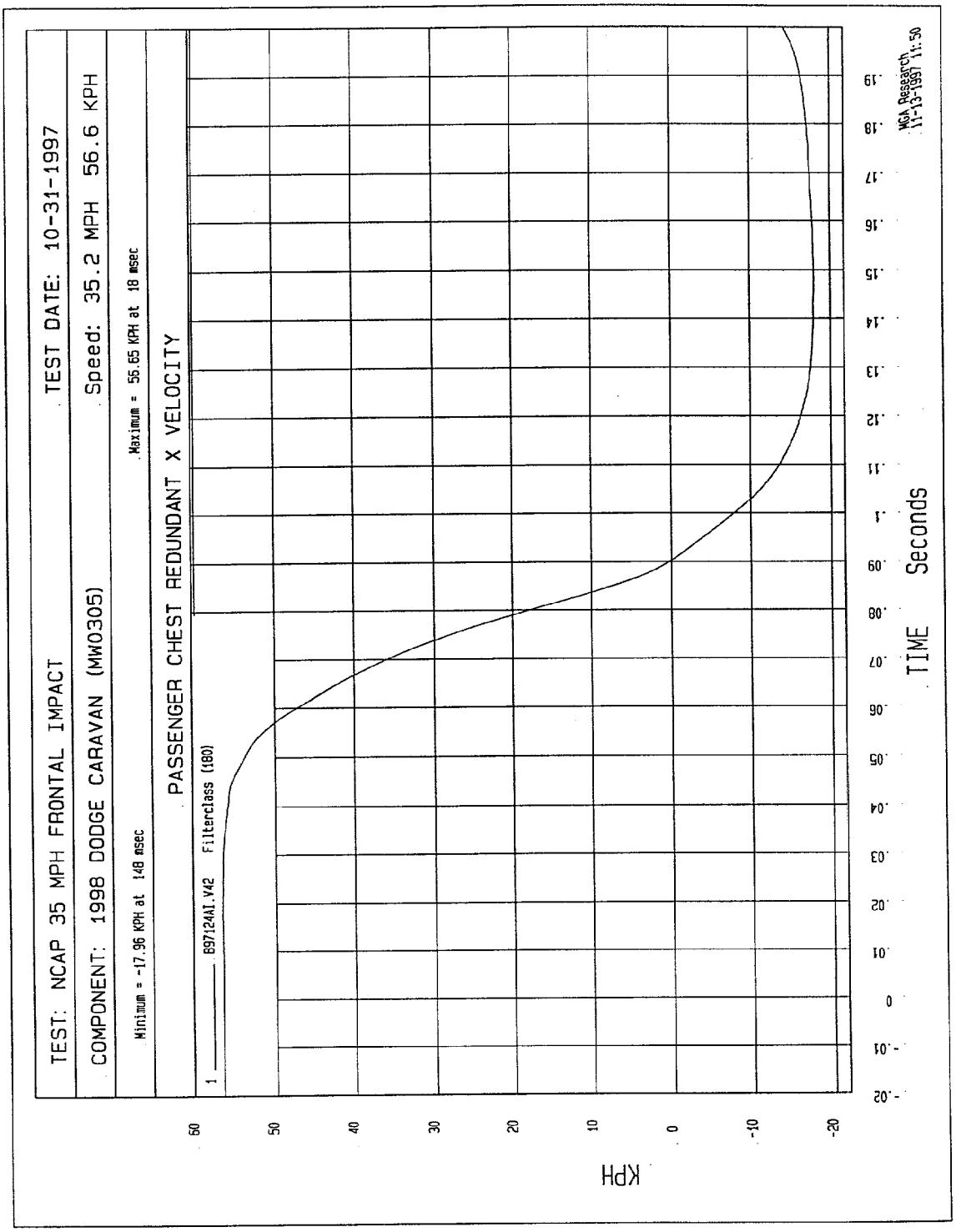
TIME (SECONDS)
MGA Research
11-01-1997 16:46


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -17.96 KPH at 148 msec
Maximum = 55.65 KPH at 18 msec
PASSENGER CHEST REDUNDANT X VELOCITY
1 _____ B97124AI.V42 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
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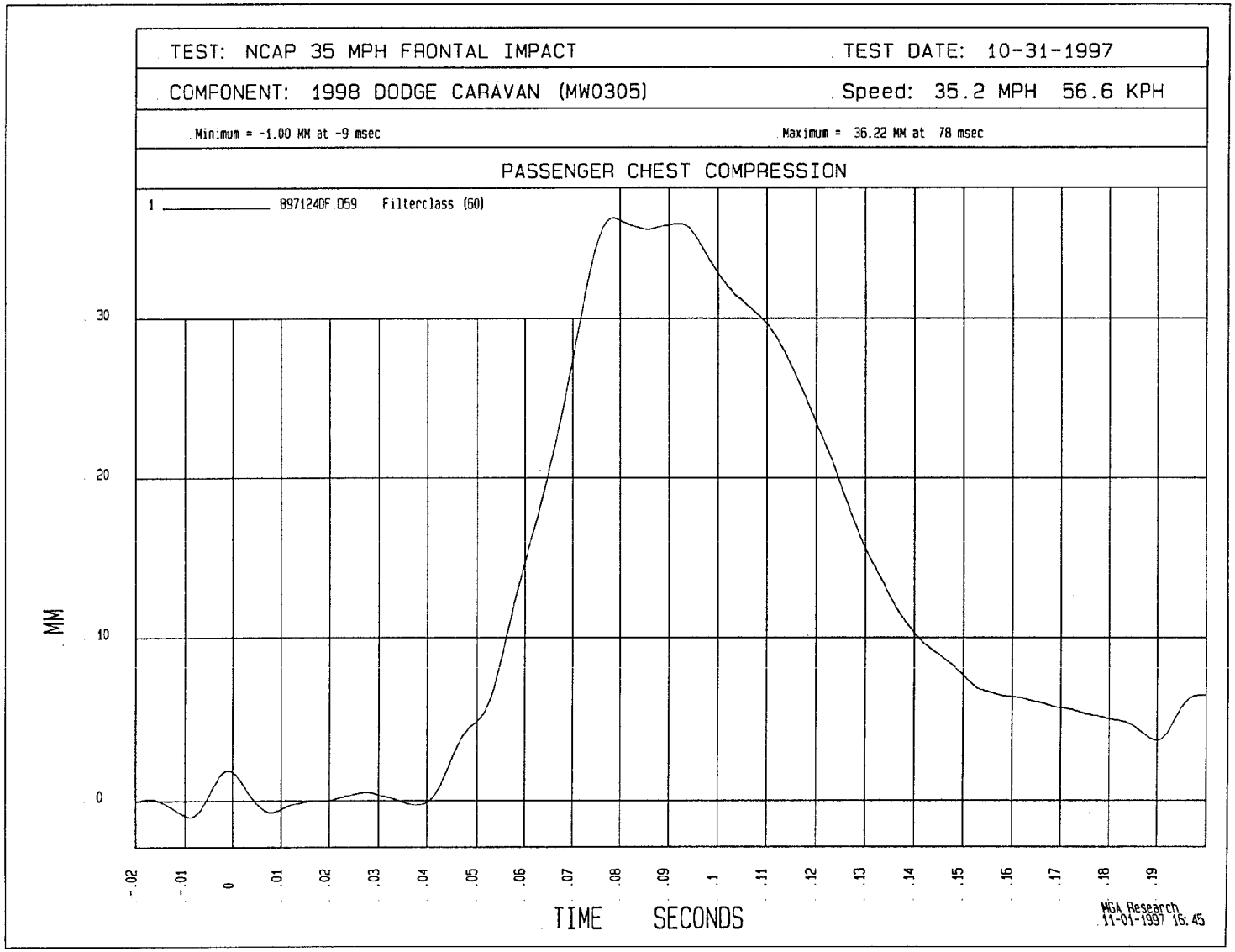
TIME Seconds
MGA Research
11-13-1997 11:50


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -1.00 MM at -9 msec
Maximum = 36.22 MM at 78 msec
PASSENGER CHEST COMPRESSION
1 B971240F.059 Filterclass (60)
MM
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
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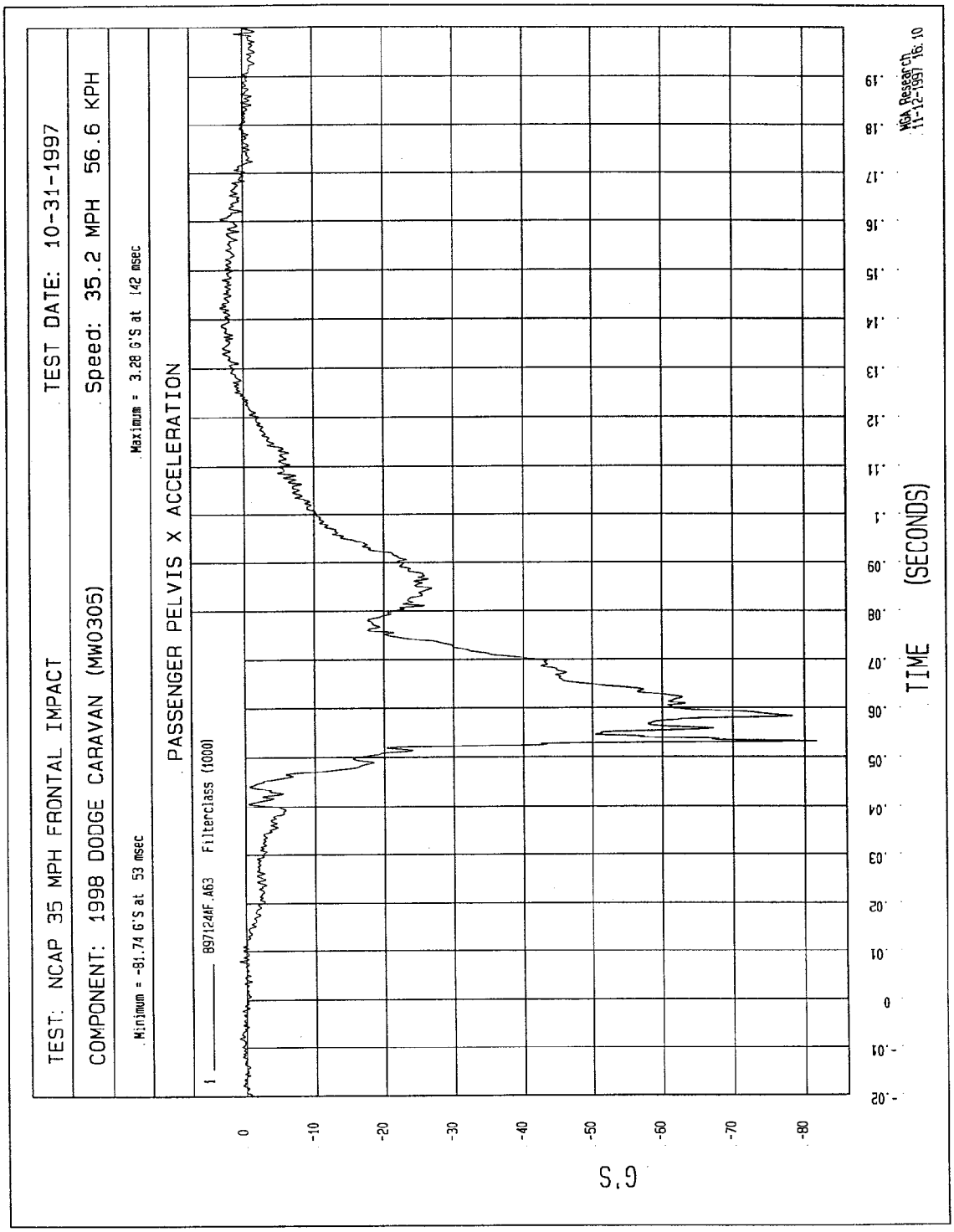
TIME SECONDS
MGA Research
11-01-1997 16:45


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -81.74 G'S at 53 msec
Maximum = 3.28 G'S at 142 msec
PASSENGER PELVIS X ACCELERATION
1 B97124AF.A63 Filterclass (1000)
0
-10
-20
-30
-40
-50
-60
-70
-80
G'S
.02
.01
0
.01
.02
.03
.04
.05
.06
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.08
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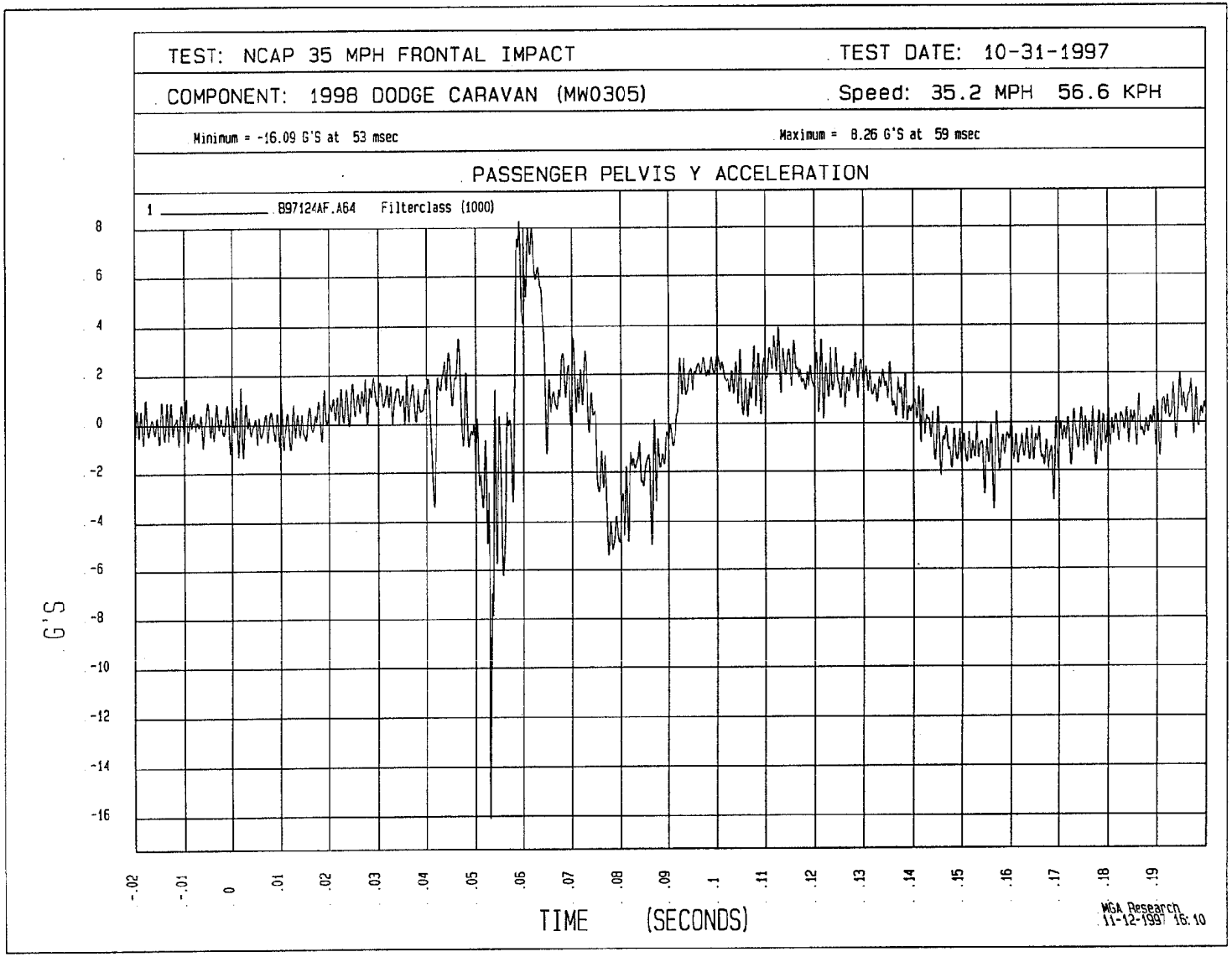
TIME (SECONDS)
NGA Research
11-12-1997 16:10


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -16.09 G'S at 53 msec
Maximum = 8.26 G'S at 59 msec
PASSENGER PELVIS Y ACCELERATION
1 897124AF.A64 Filterclass (1000)
G'S
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
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.16
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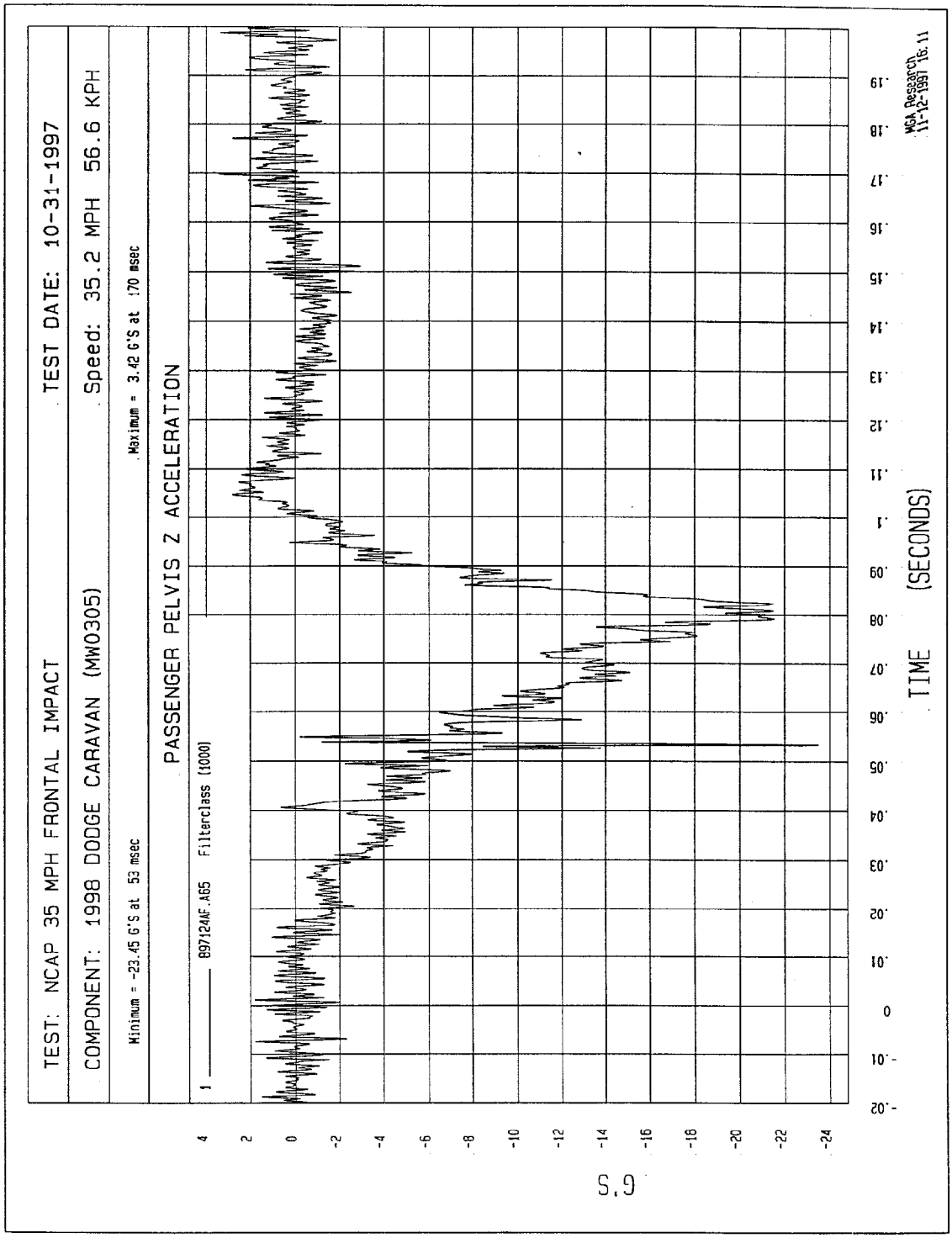
TIME (SECONDS)
MGA Research
11-12-1997 16:10


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -23.45 G'S at 53 msec
Maximum = 3.42 G'S at 170 msec
PASSENGER PELVIS Z ACCELERATION
1 897124AF.A65 Filterclass (1000)
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
G'S
.02
.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
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.16
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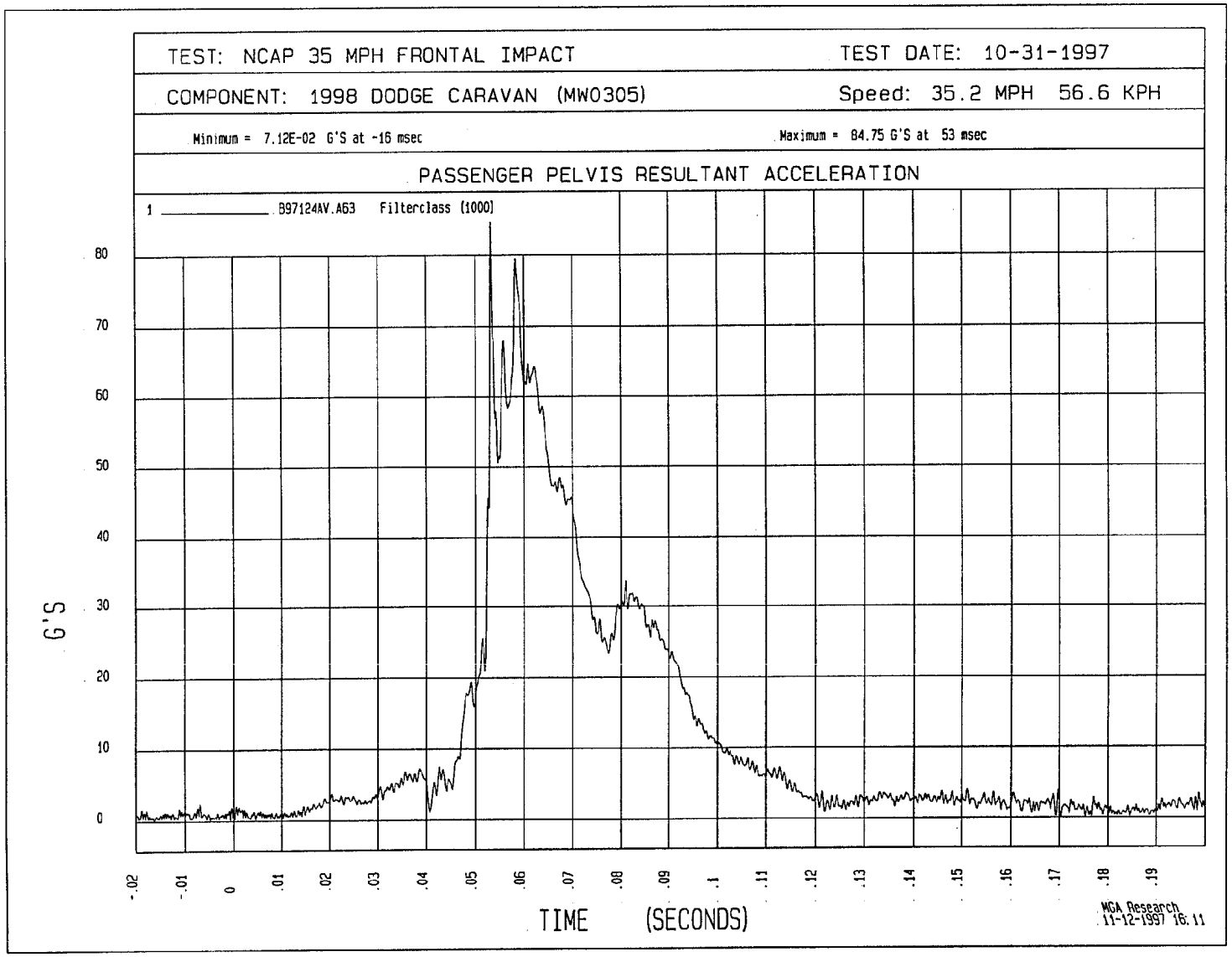
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:11


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 7.12E-02 G'S at -16 msec
Maximum = 84.75 G'S at 53 msec
PASSENGER PELVIS RESULTANT ACCELERATION
1 B97124AV.A63 Filterclass (1000)
G'S
80
70
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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.13
.14
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.16
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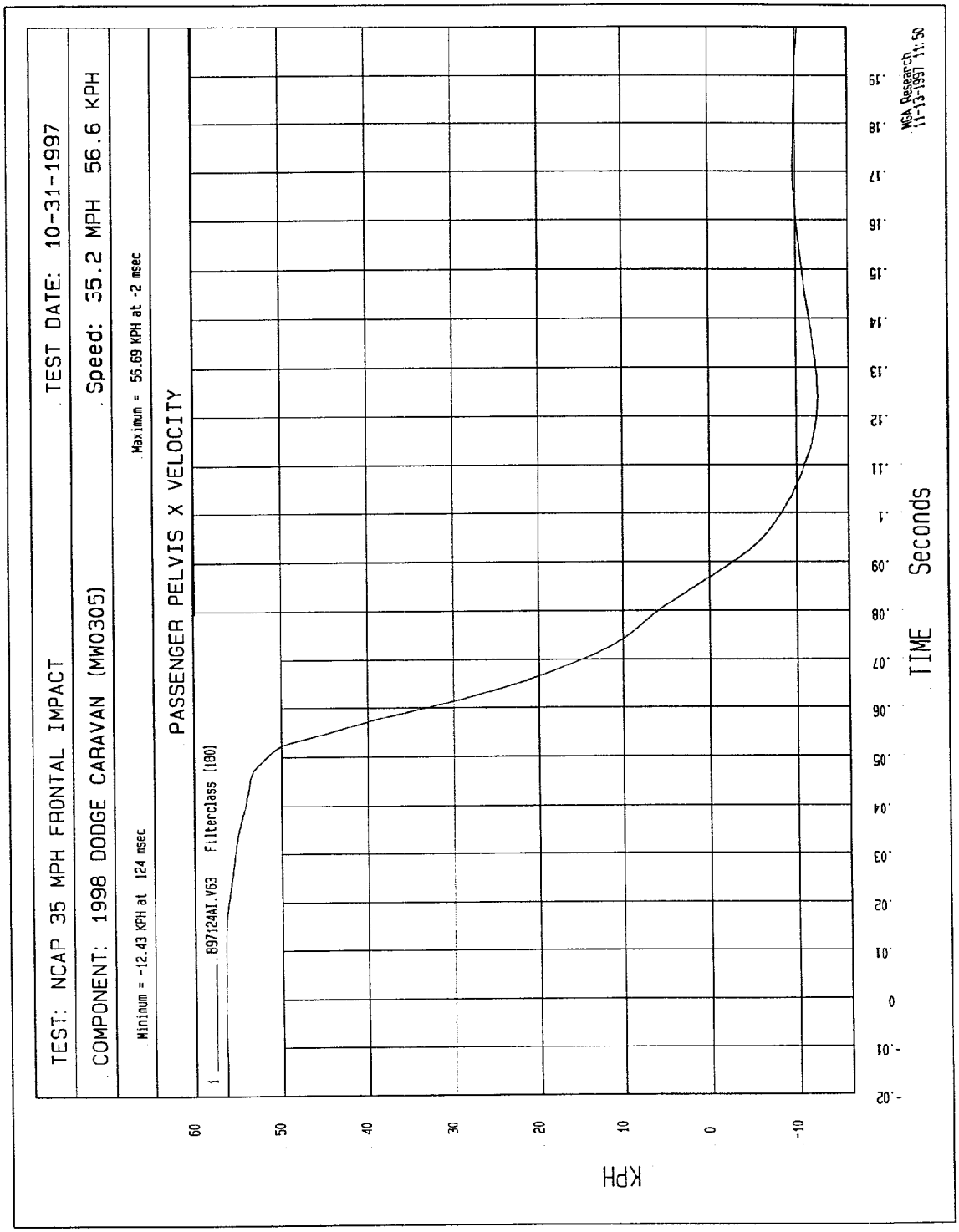
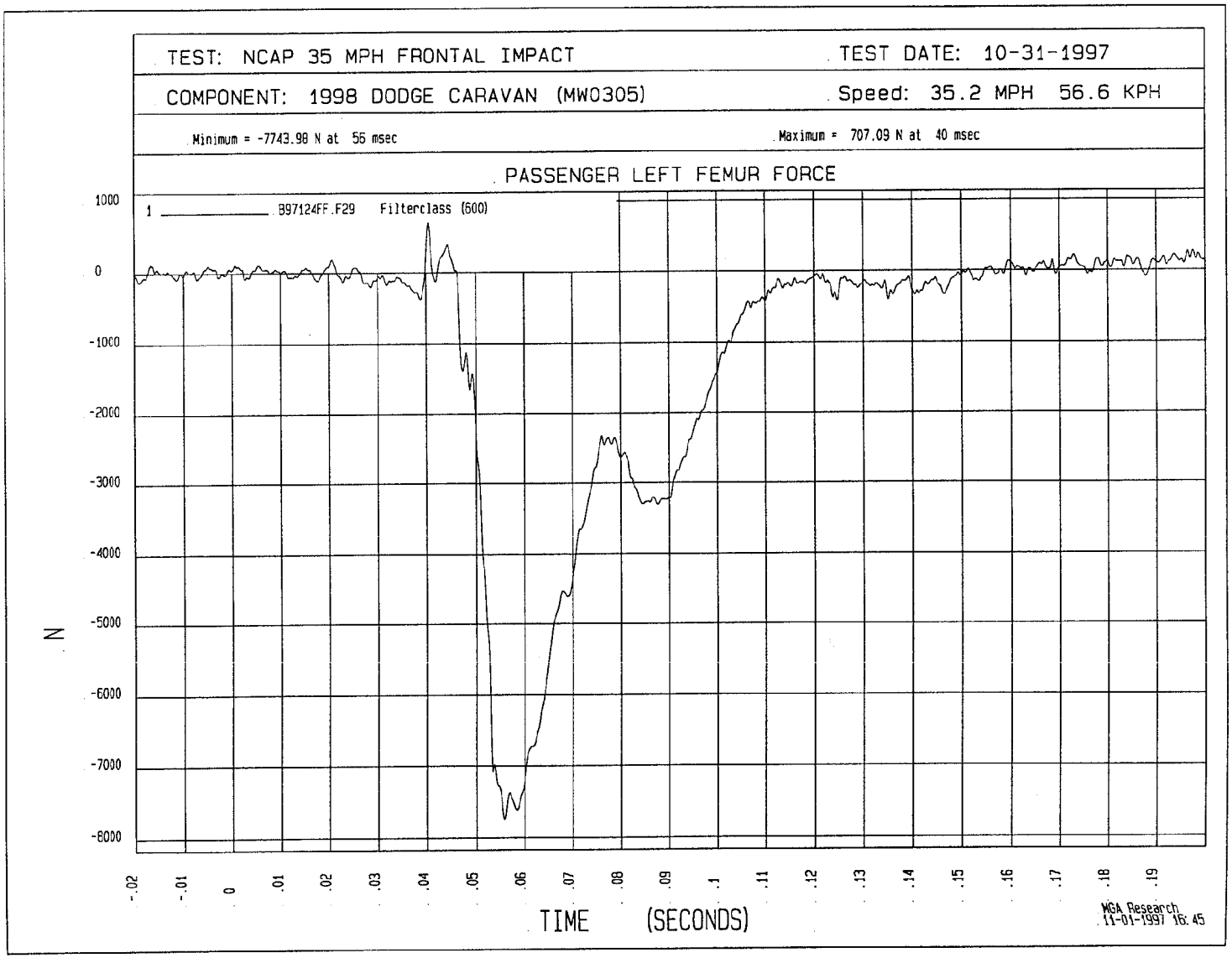
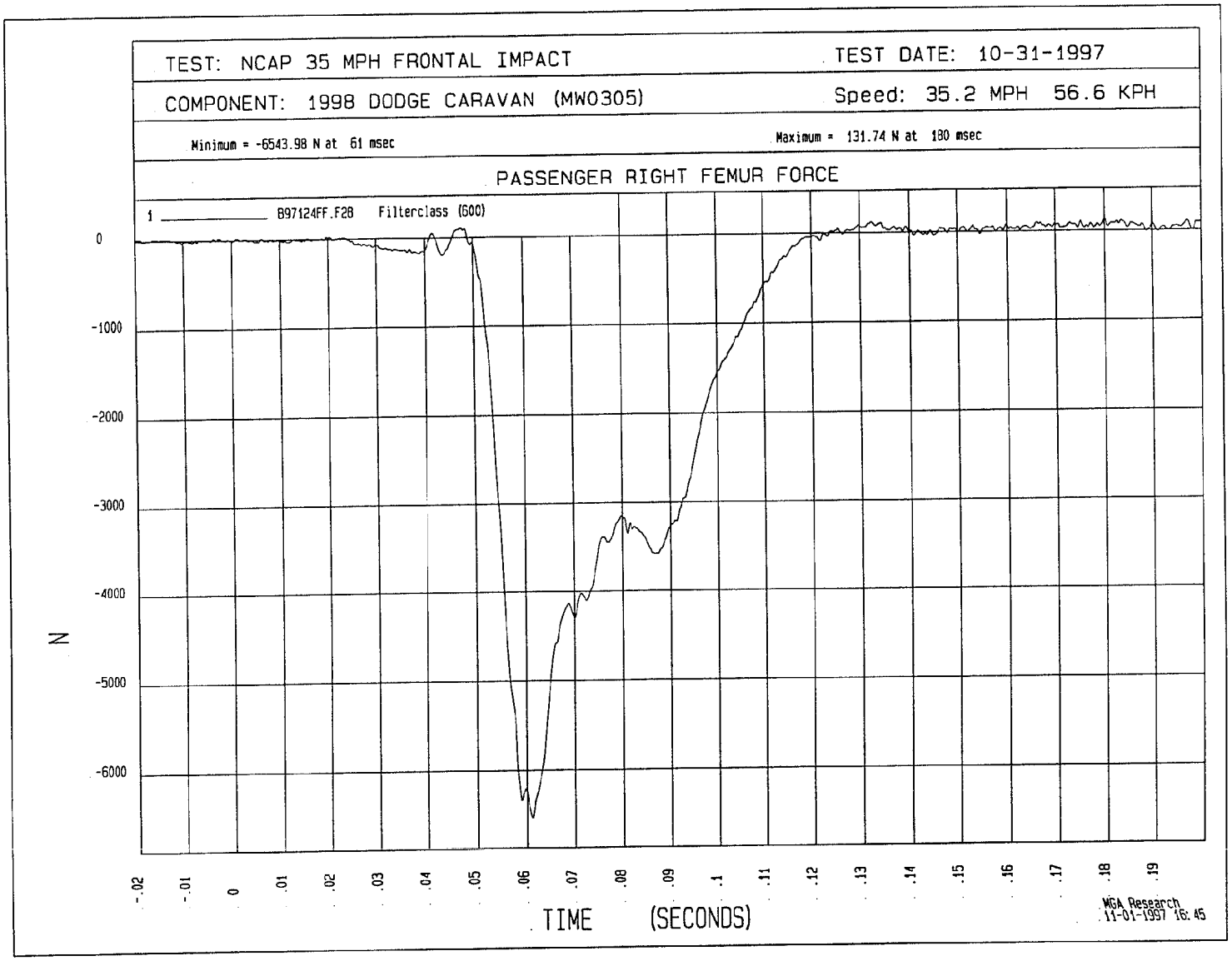
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:11


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -12.43 KPH at 124 msec
Maximum = 55.69 KPH at -2 msec
PASSENGER PELVIS X VELOCITY
1 ——— 897:124AI.V63 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-13-1997 11:50


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -7743.98 N at 56 msec
Maximum = 707.09 N at 40 msec
PASSENGER LEFT FEMUR FORCE
1 B97124FF.F29 Filterclass (600)
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
-7000
-8000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-01-1997 16:45


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -6543.98 N at 61 msec
Maximum = 131.74 N at 180 msec
PASSENGER RIGHT FEMUR FORCE
1 B97124FF.F28 Filterclass (600)
0
-1000
-2000
-3000
-4000
-5000
-6000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
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.16
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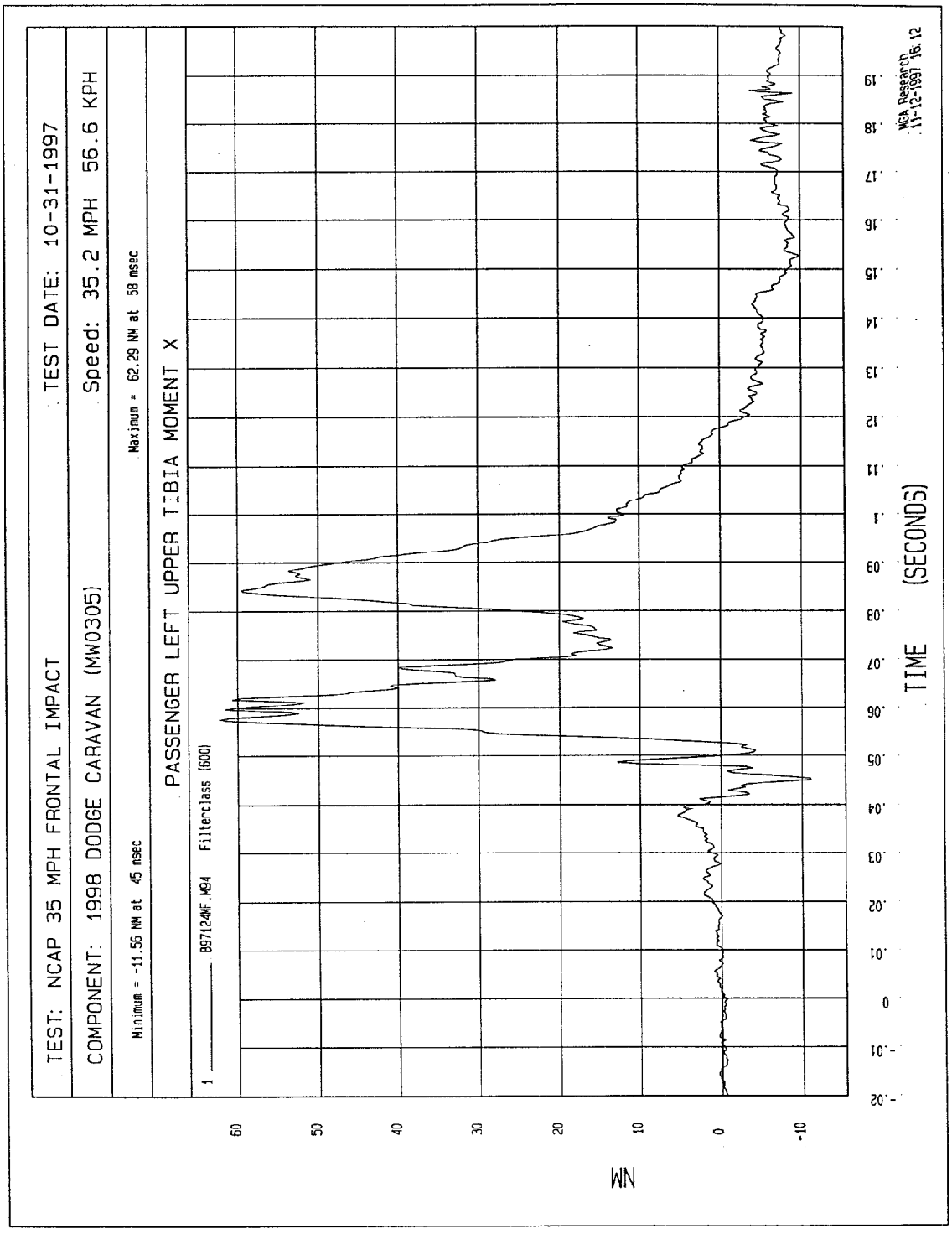
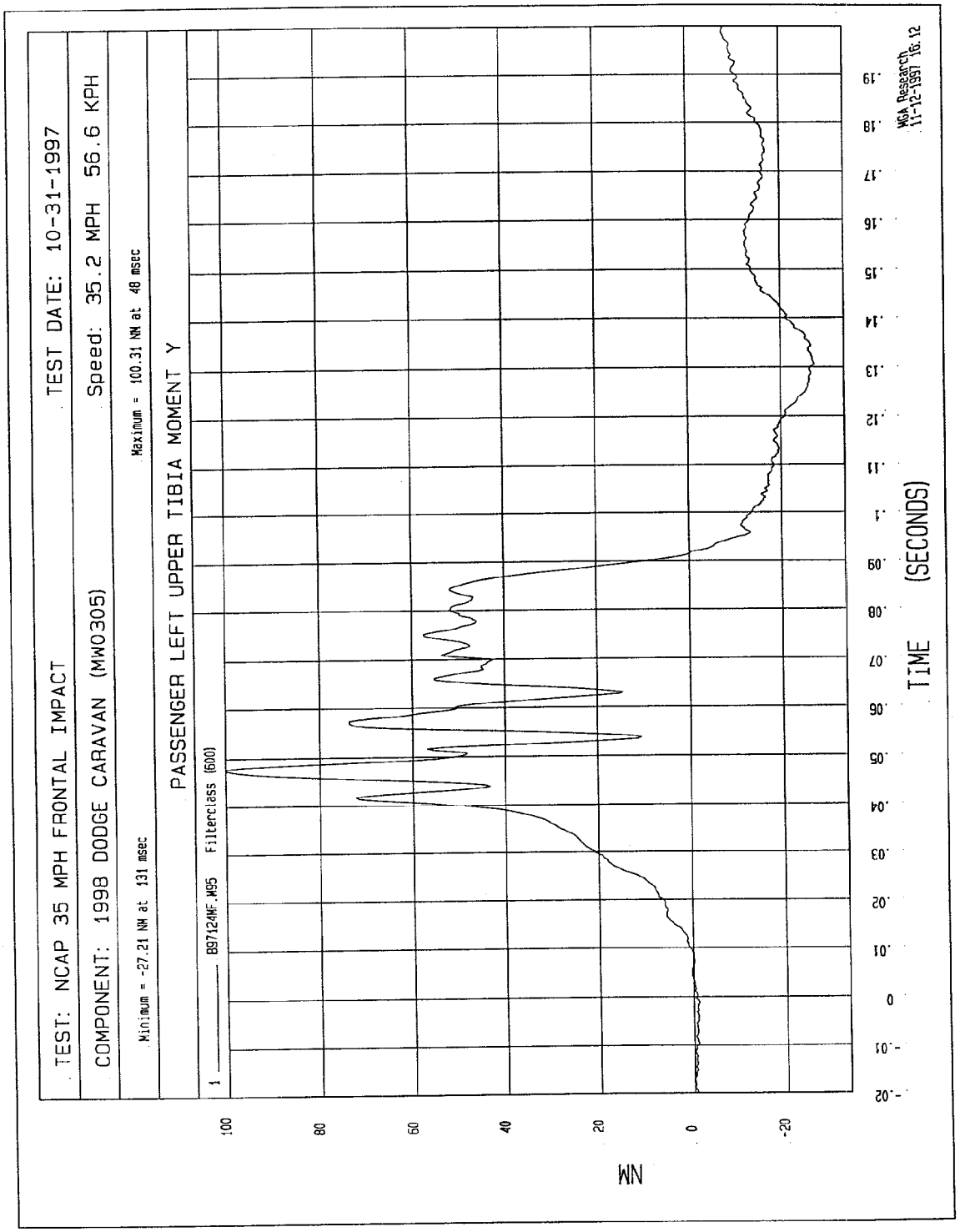
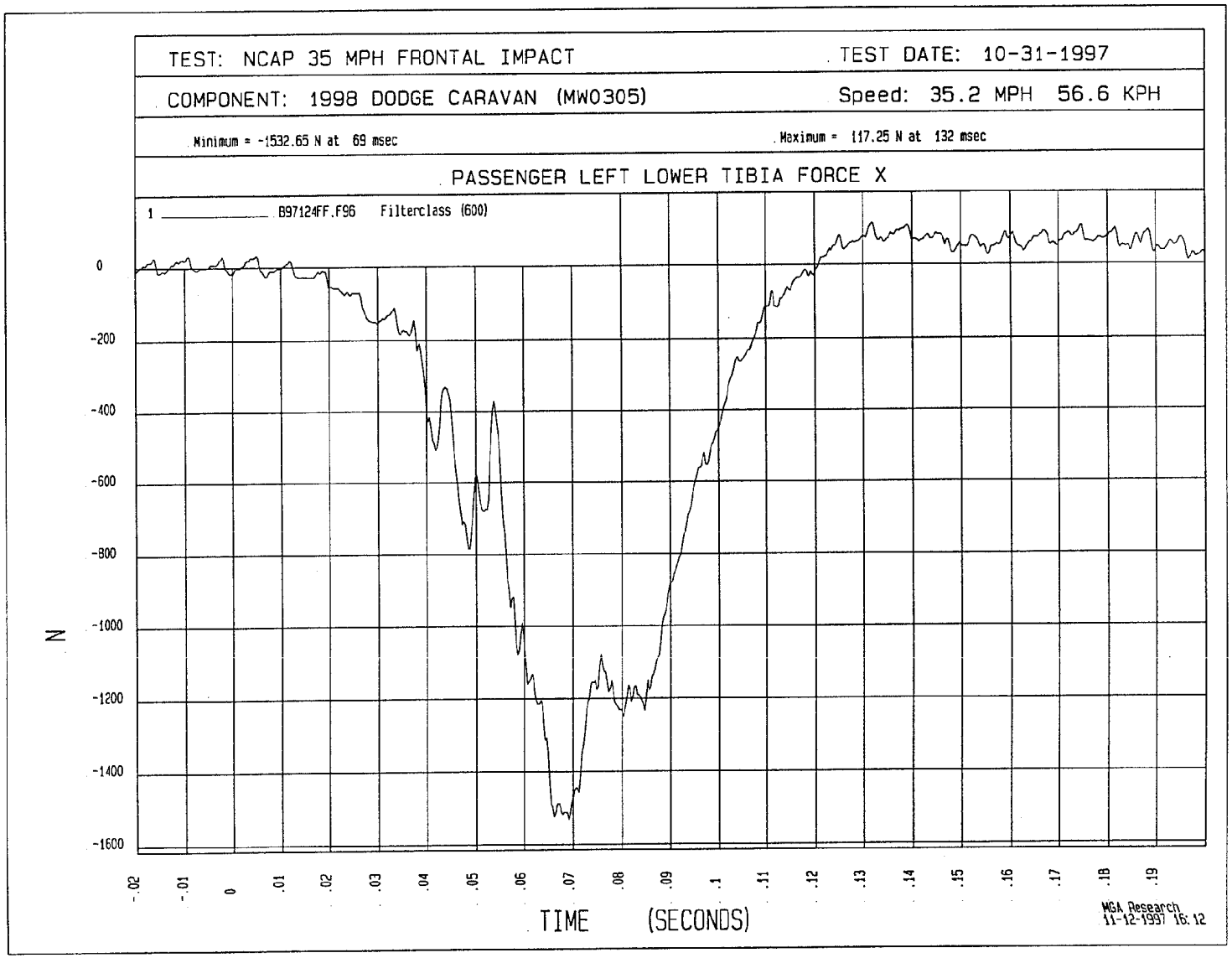
TIME (SECONDS)
MGA Research
11-01-1997 16:45


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -11.56 NM at 45 msec
Maximum = 62.29 NM at 58 msec
PASSENGER LEFT UPPER TIBIA MOMENT X
1 B97124MF.M94 Filterclass (600)
NM
TIME (SECONDS)
MGA Research
11-12-1997 16:12


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -27.21 kN at 131 msec
Maximum = 100.31 kN at 48 msec
PASSENGER LEFT UPPER TIBIA MOMENT Y
1 B97124MF.M95 Filterclass (600)
kN
100
80
60
40
20
0
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:12


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -1532.65 N at 69 msec
Maximum = 117.25 N at 132 msec
PASSENGER LEFT LOWER TIBIA FORCE X
1 B97124FF.F96 Filterclass (600)
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
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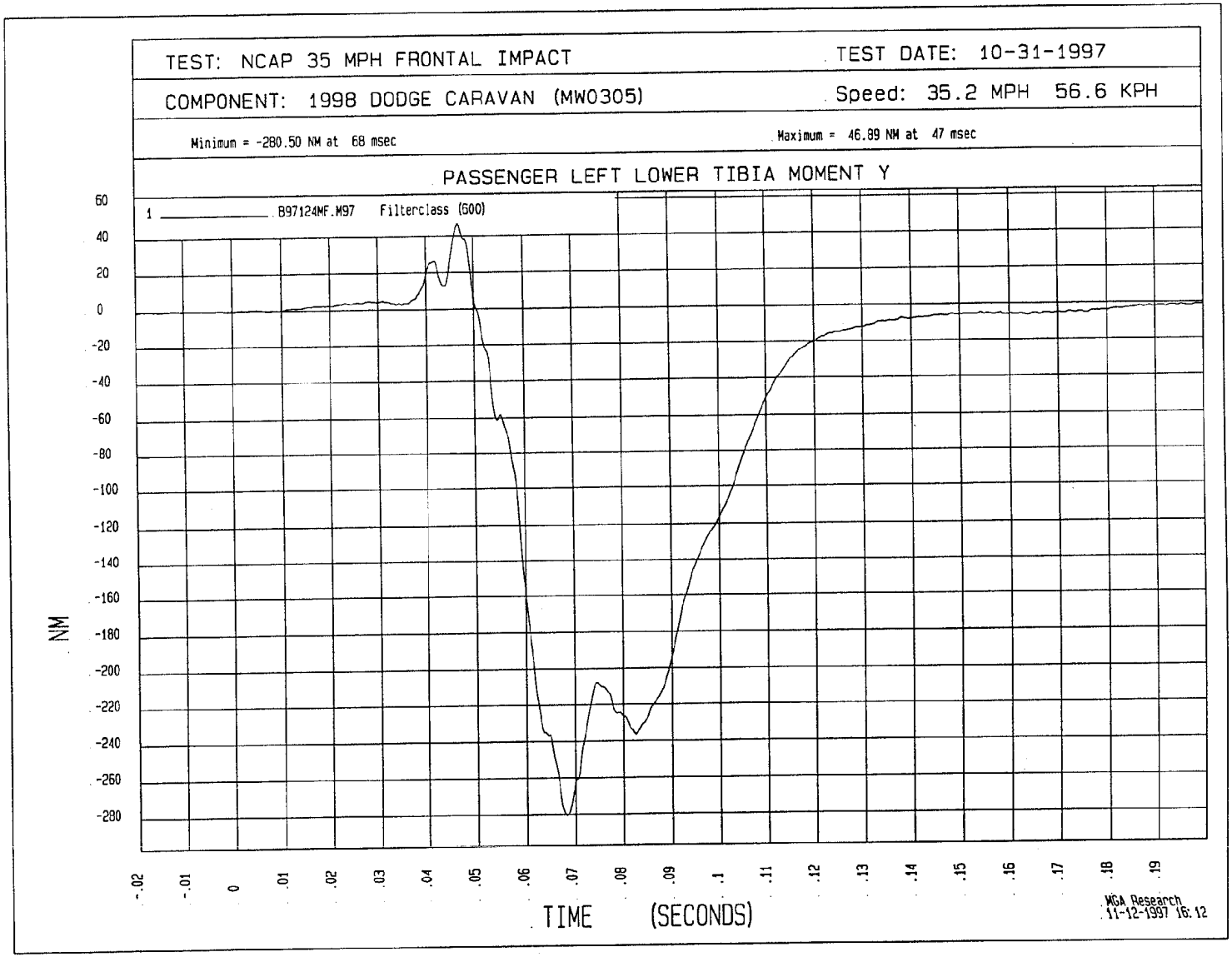
TIME (SECONDS)
MGA Research
11-12-1997 16:12


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -280.50 NM at 68 msec
Maximum = 46.89 NM at 47 msec
PASSENGER LEFT LOWER TIBIA MOMENT Y
1 B97124MF.M97 Filterclass (600)
NM
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
-220
-240
-260
-280
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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.14
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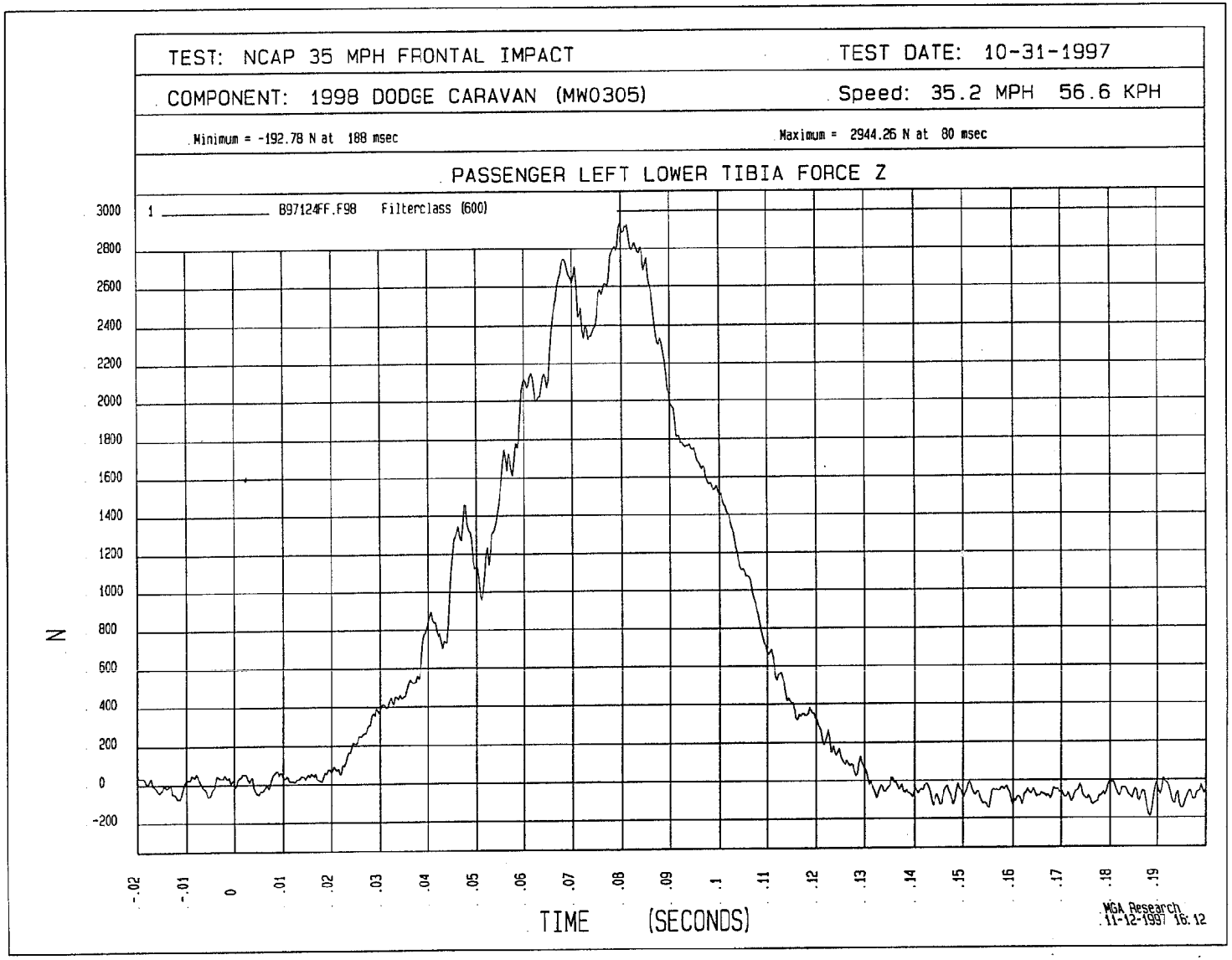
TIME (SECONDS)
MGA Research
11-12-1997 16:12


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -192.78 N at 188 msec
Maximum = 2944.26 N at 80 msec
PASSENGER LEFT LOWER TIBIA FORCE Z
1 B97124FF.F98 Filterclass (600)
N
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
-200
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
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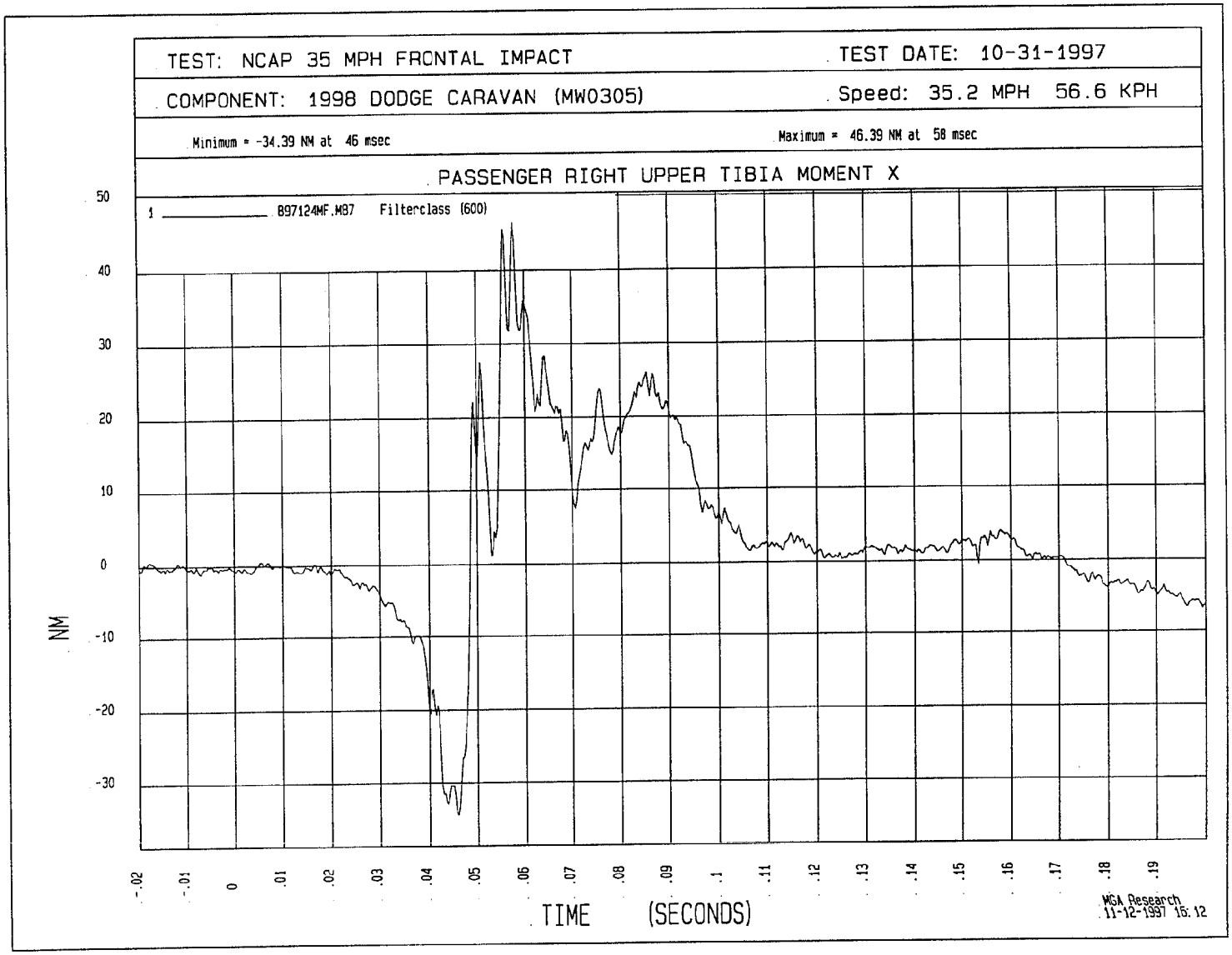
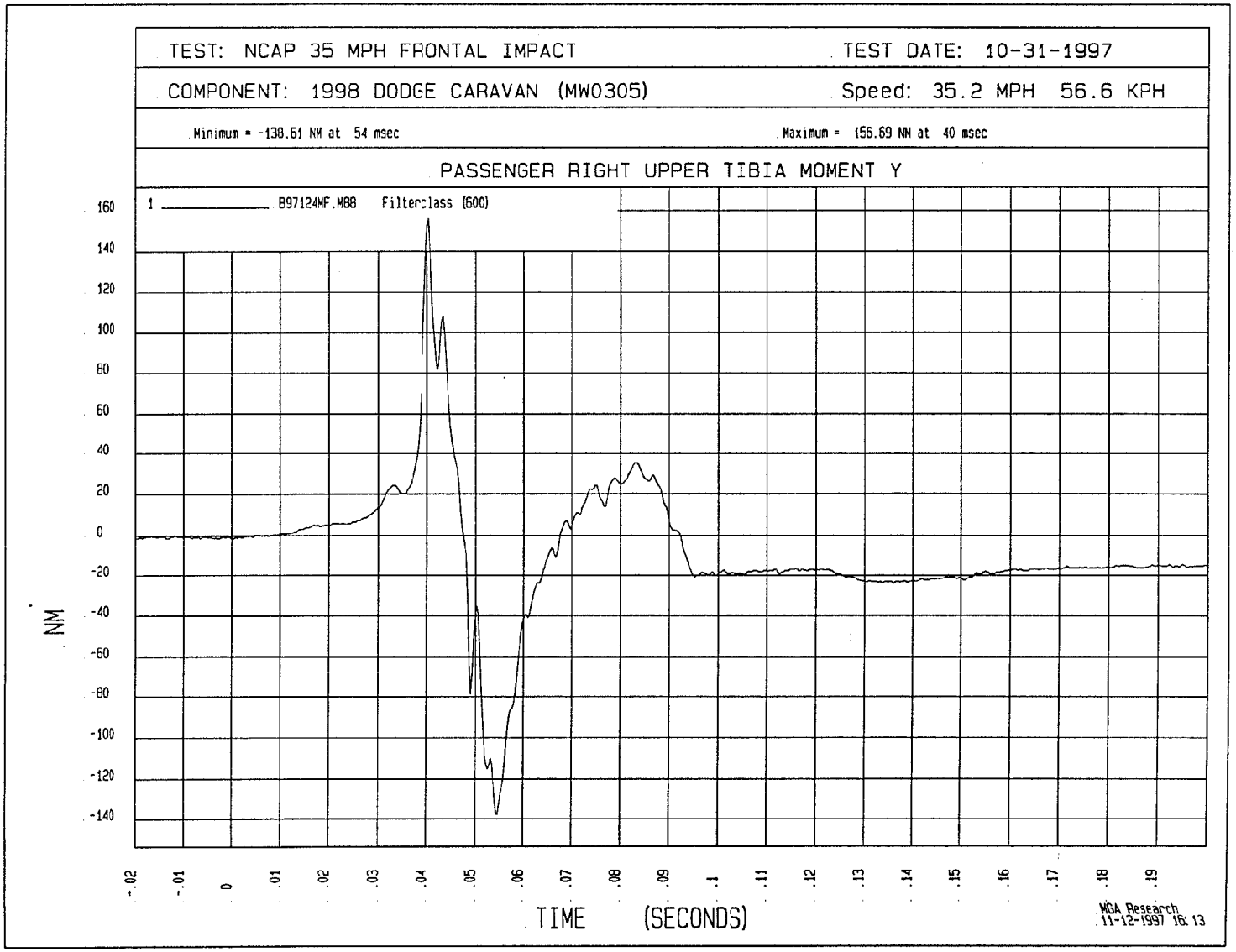
TIME (SECONDS)
MGA Research
11-12-1997 16:12


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -34.39 NM at 46 msec
Maximum = 46.39 NM at 58 msec
PASSENGER RIGHT UPPER TIBIA MOMENT X
1 B97124MF.M87 Filterclass (600)
NM
50
40
30
20
10
0
-10
-20
-30
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-12-1997 16:12


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -138.61 NM at 54 msec
Maximum = 156.69 NM at 40 msec
PASSENGER RIGHT UPPER TIBIA MOMENT Y
1 B97124MF.M88 Filterclass (600)
NM
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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.11
.12
.13
.14
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.16
.17
.18
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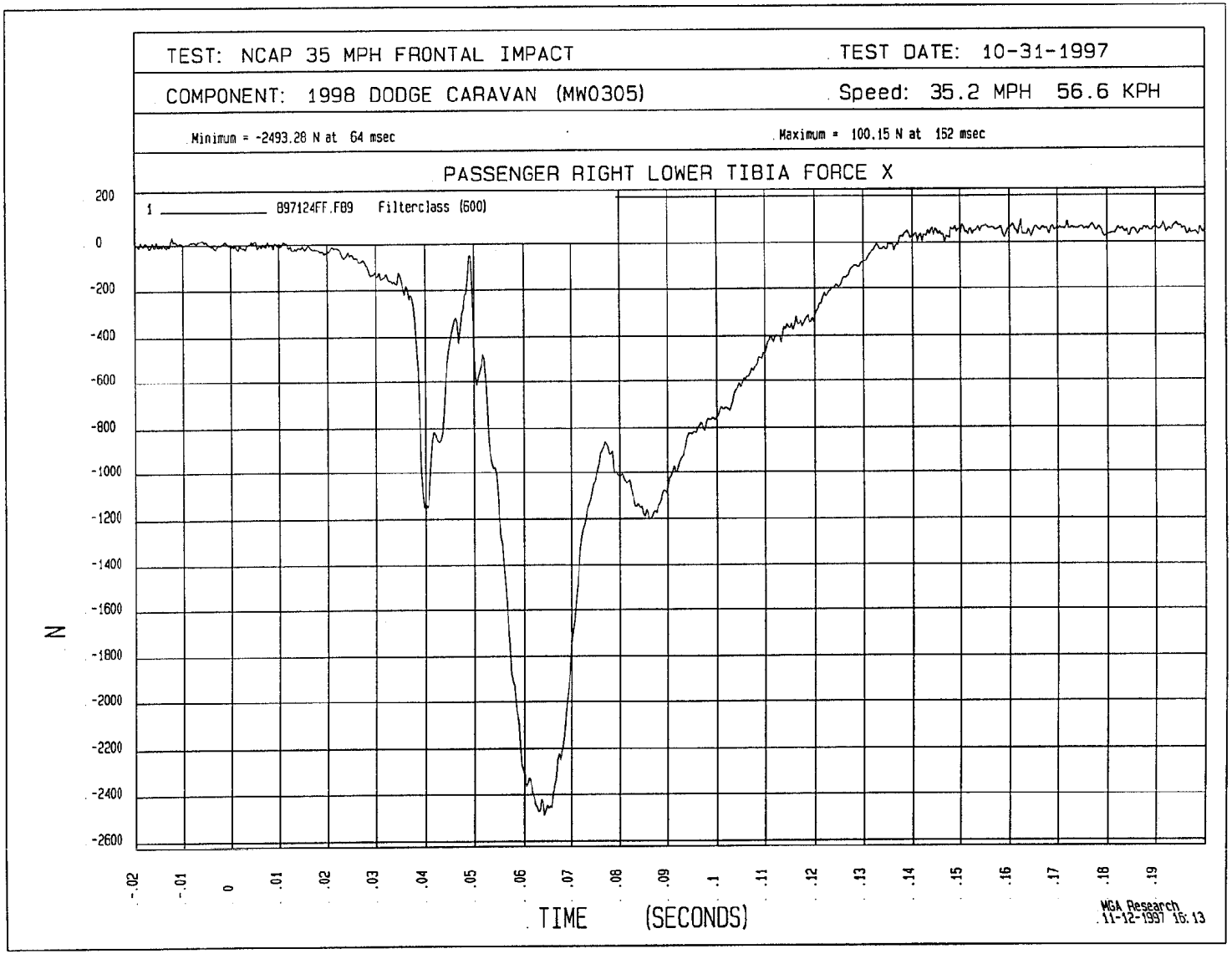
TIME (SECONDS)
MGA Research
11-12-1997 16:13


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -2493.28 N at 64 msec
Maximum = 100.15 N at 152 msec
PASSENGER RIGHT LOWER TIBIA FORCE X
1 897124FF.F89 Filterclass (600)
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
-2200
-2400
-2600
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
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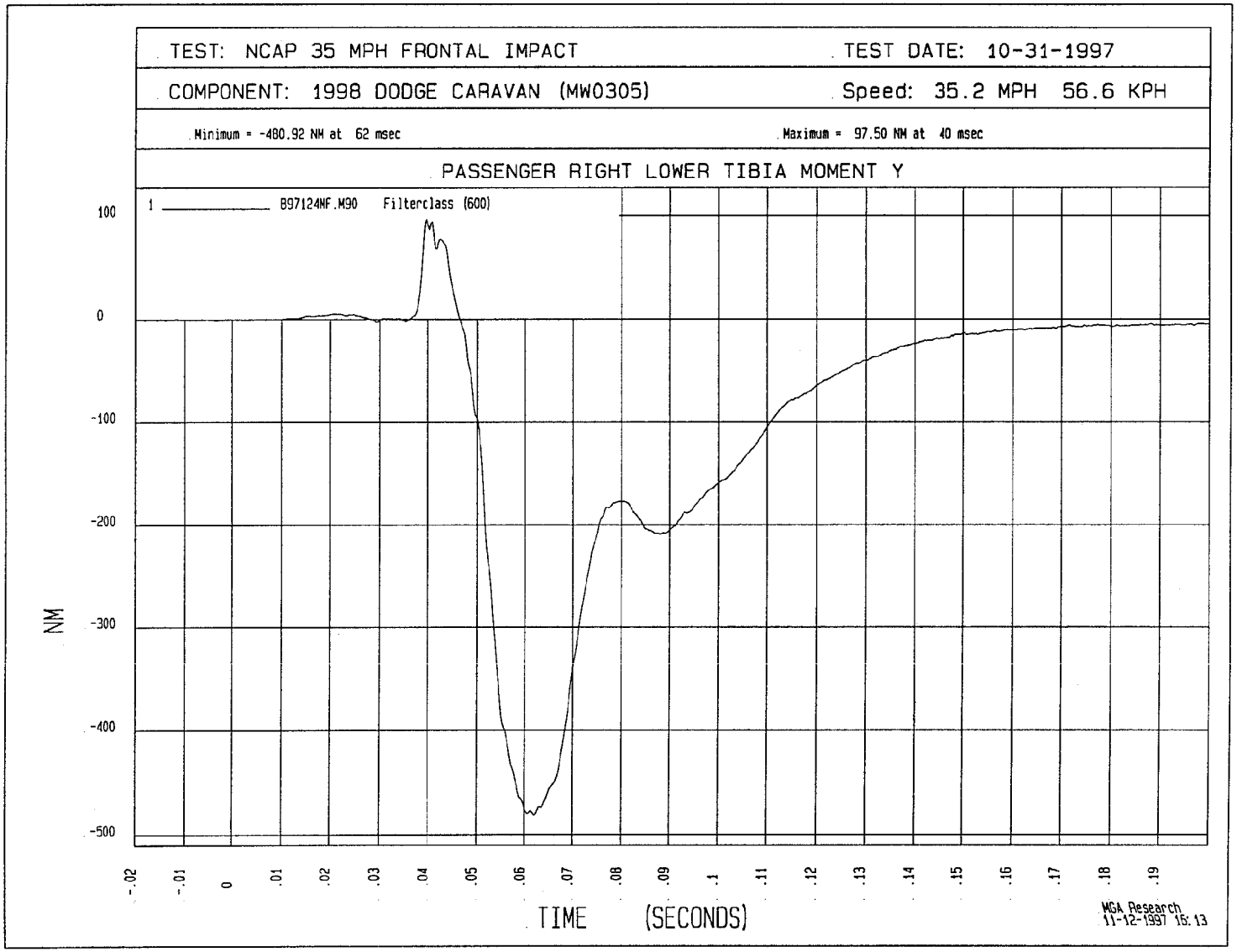
TIME (SECONDS)
MGA Research
11-12-1997 15:13


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -480.92 NM at 62 msec
Maximum = 97.50 NM at 40 msec
PASSENGER RIGHT LOWER TIBIA MOMENT Y
1 B97124MF.M90 Filterclass (600)
100
0
-100
-200
-300
-400
-500
NM
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
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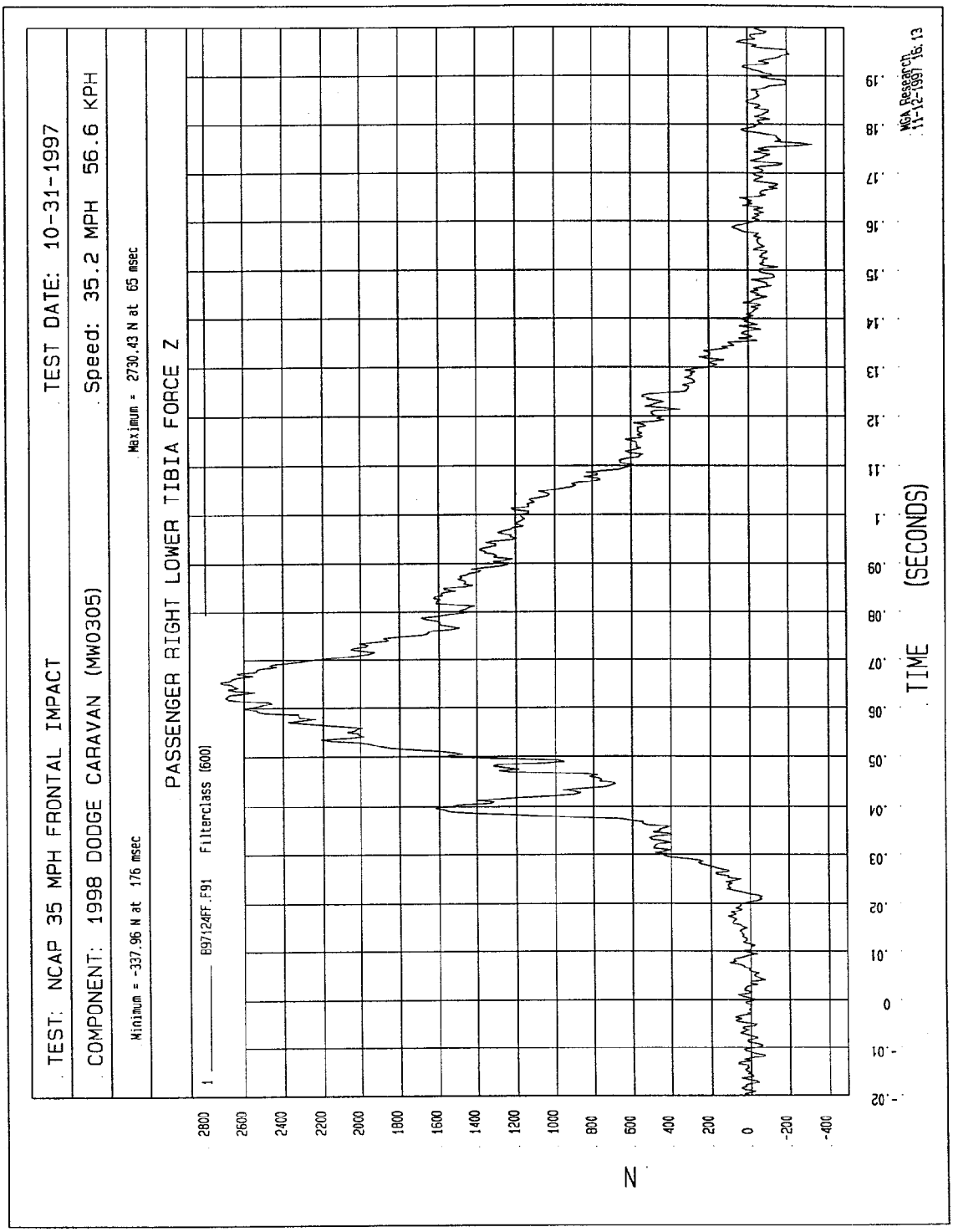
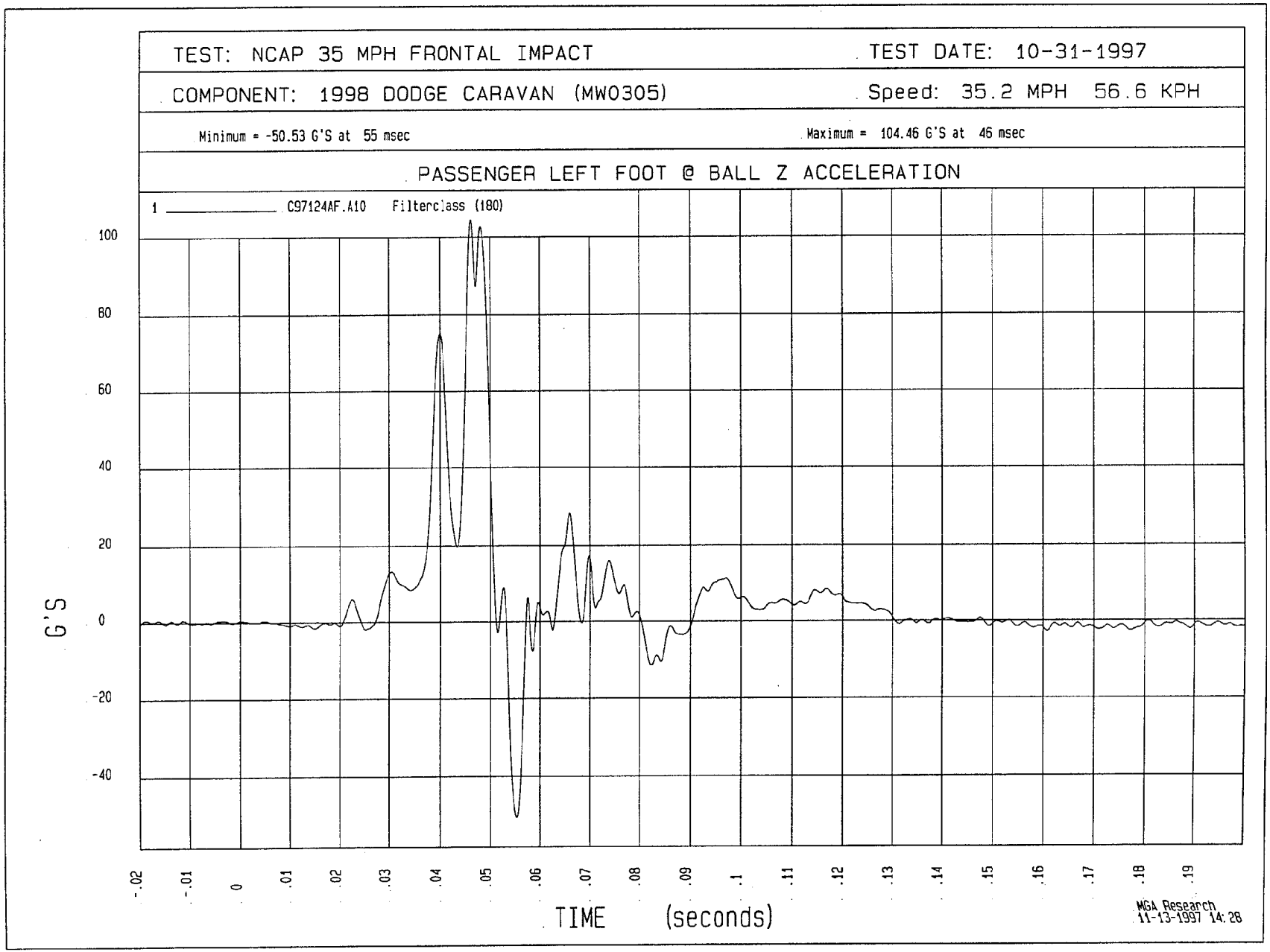
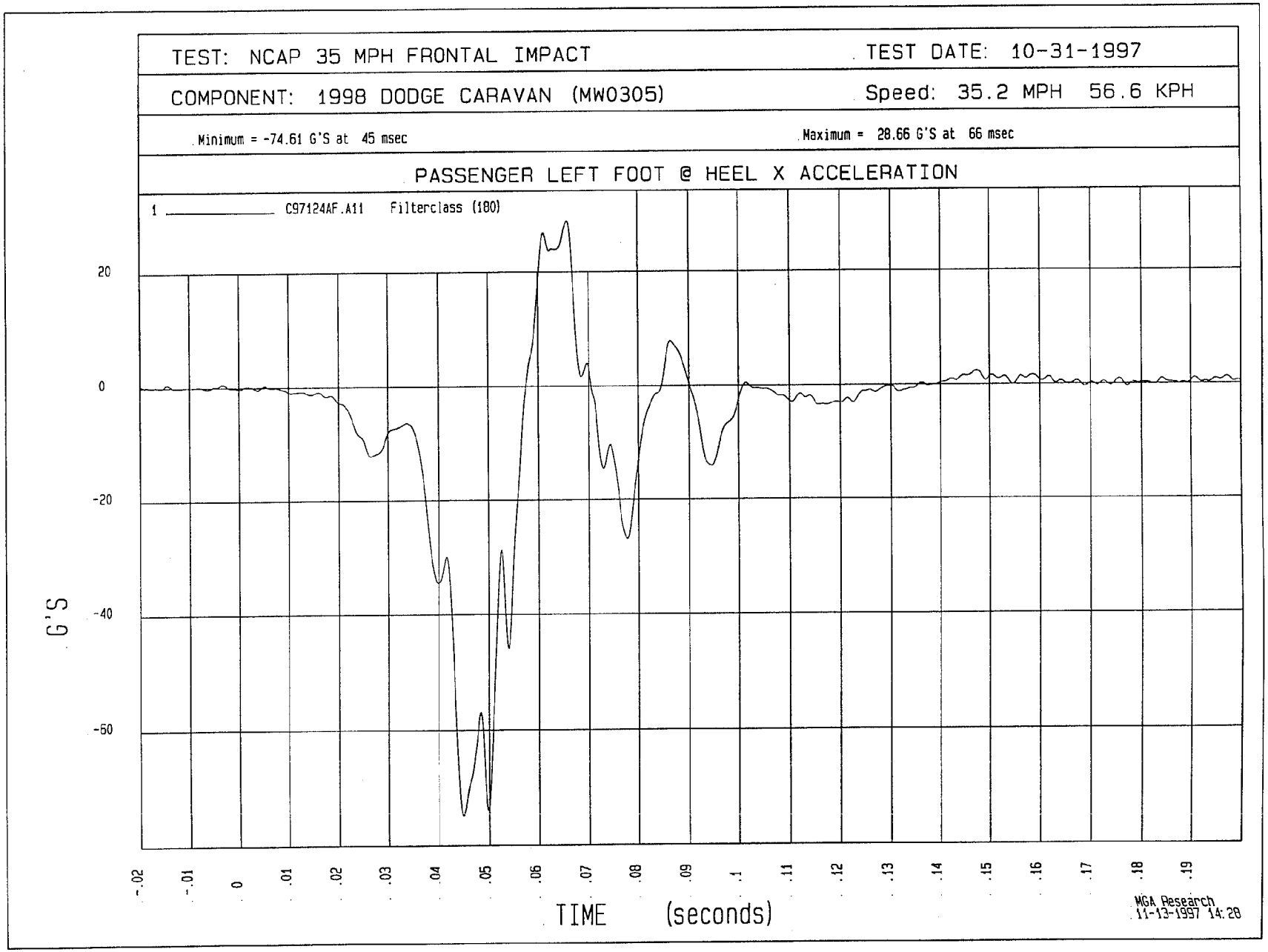
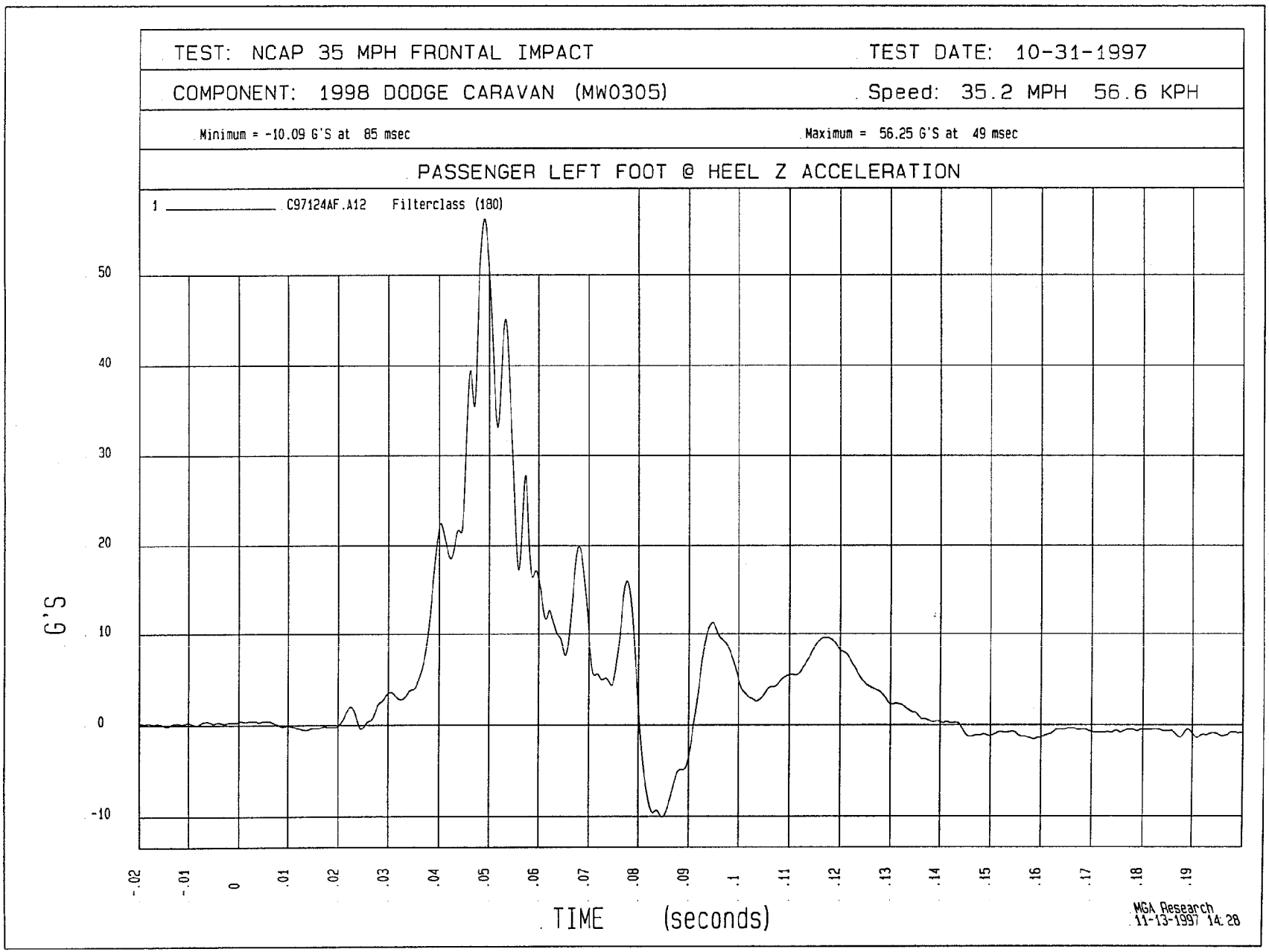
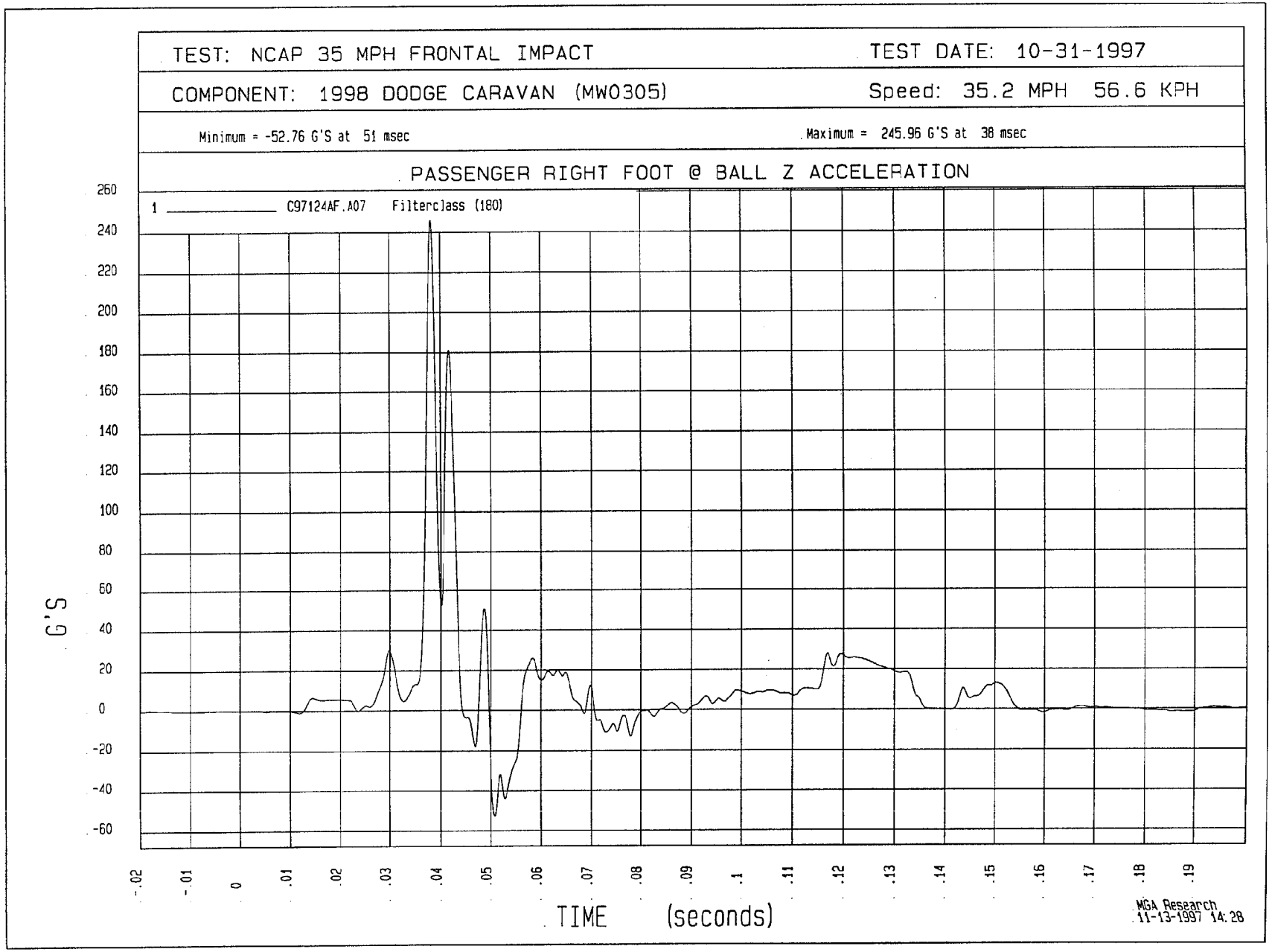
TIME (SECONDS)
MGA Research
11-12-1997 15:13

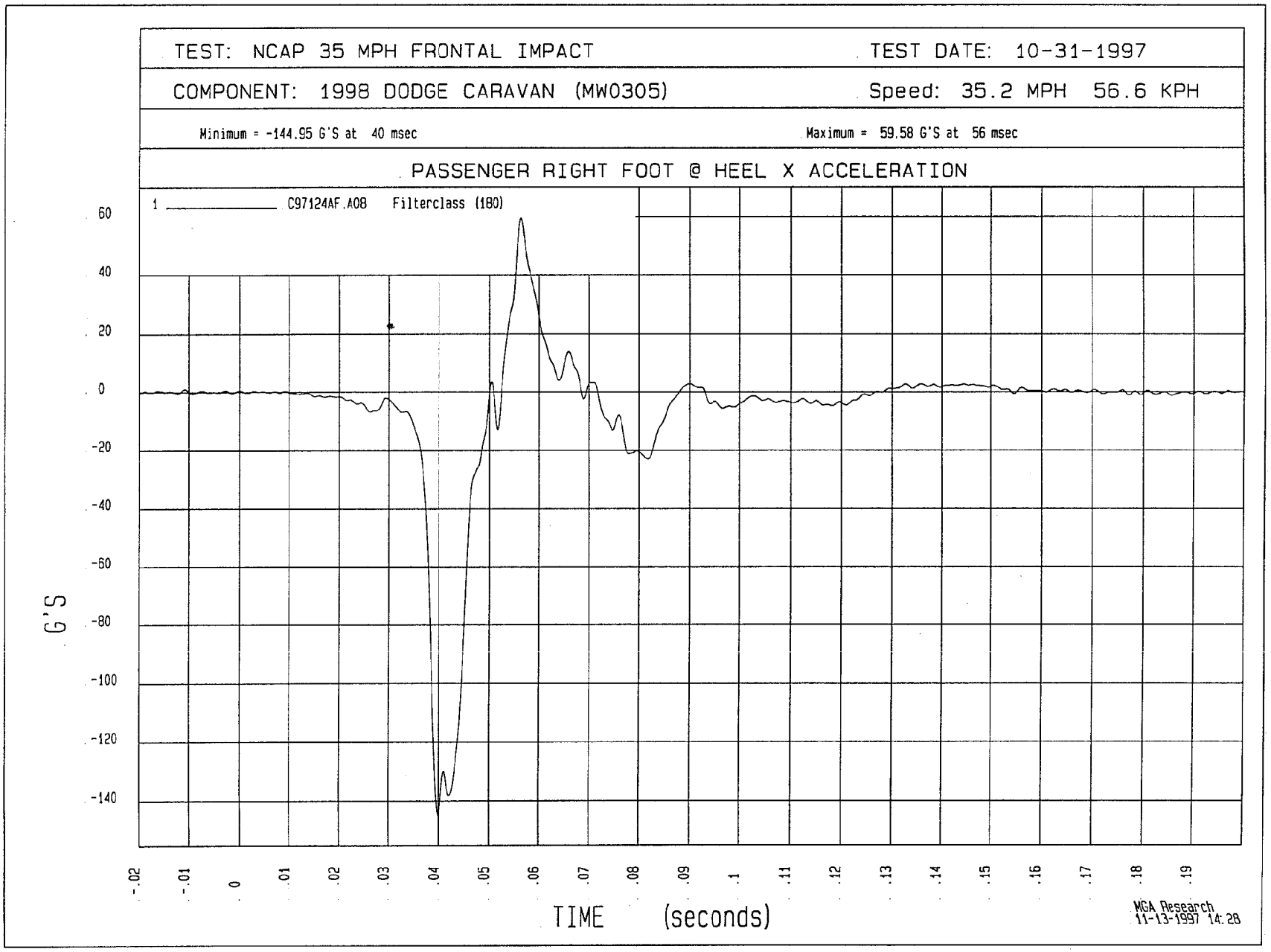

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -337.96 N at 176 msec
Maximum = 2730.43 N at 65 msec
PASSENGER RIGHT LOWER TIBIA FORCE Z
1 B97124FF.F91 Filterclass (600)
N
TIME (SECONDS)
MGA Research
11-12-1997 16:13


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -50.53 G'S at 55 msec
Maximum = 104.46 G'S at 46 msec
PASSENGER LEFT FOOT @ BALL Z ACCELERATION
1 C97124AF.A10 Filterclass (180)
100
80
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:28


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -74.61 G'S at 45 msec
Maximum = 28.66 G'S at 66 msec
PASSENGER LEFT FOOT @ HEEL X ACCELERATION
1 C97124AF.A11 Filterclass (180)
20
0
-20
-40
-60
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:28


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -10.09 G'S at 85 msec
Maximum = 56.25 G'S at 49 msec
PASSENGER LEFT FOOT @ HEEL Z ACCELERATION
1 C97124AF.A12 Filterclass (180)
50
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:28


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -52.76 G'S at 51 msec
Maximum = 245.96 G'S at 38 msec
PASSENGER RIGHT FOOT @ BALL Z ACCELERATION
1 C97124AF.A07 Filterclass (180)
G'S
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:28


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -144.95 G'S at 40 msec
Maximum = 59.58 G'S at 56 msec
PASSENGER RIGHT FOOT @ HEEL X ACCELERATION
1 C97124AF.A08 Filterclass (180)
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
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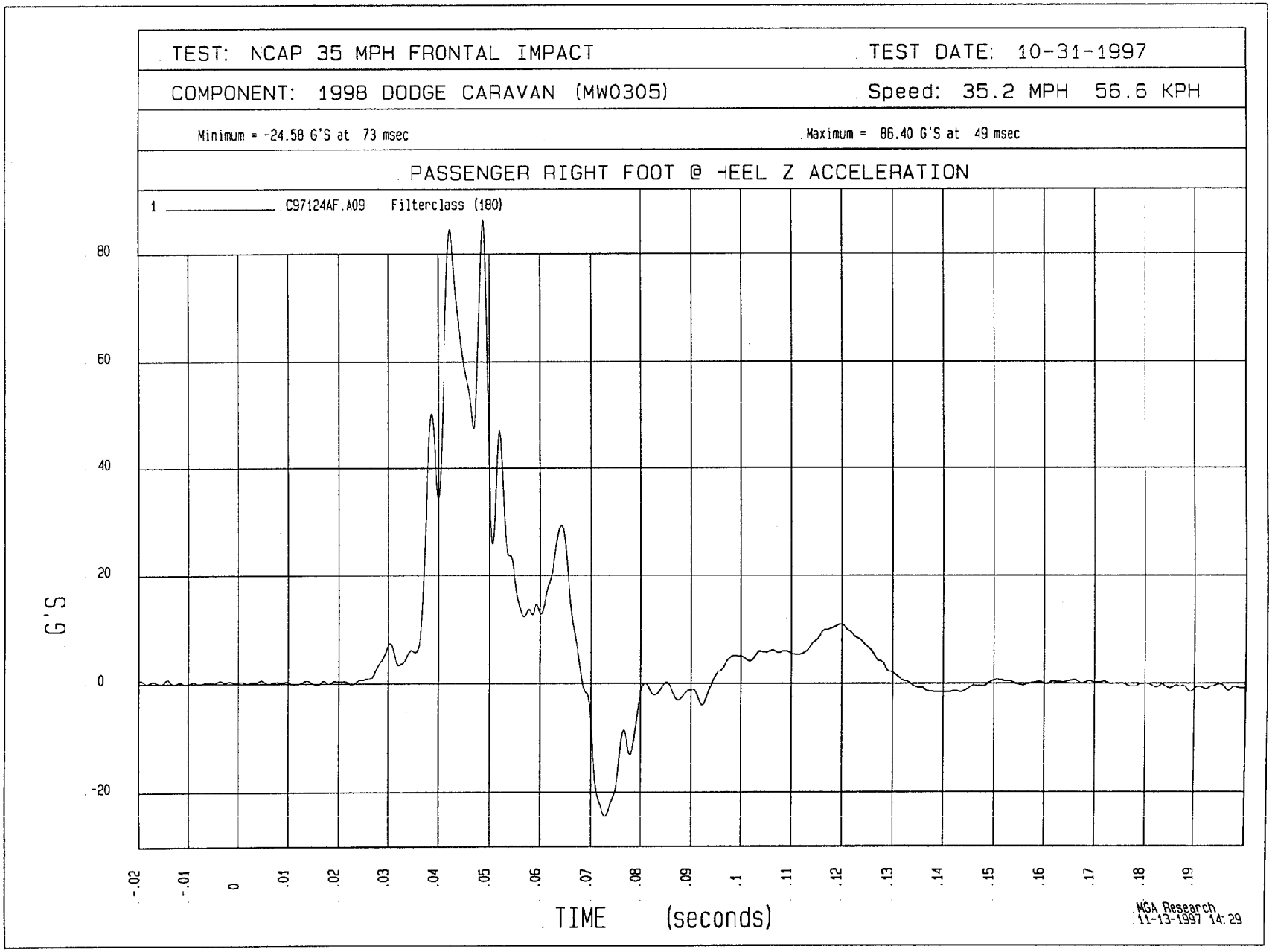
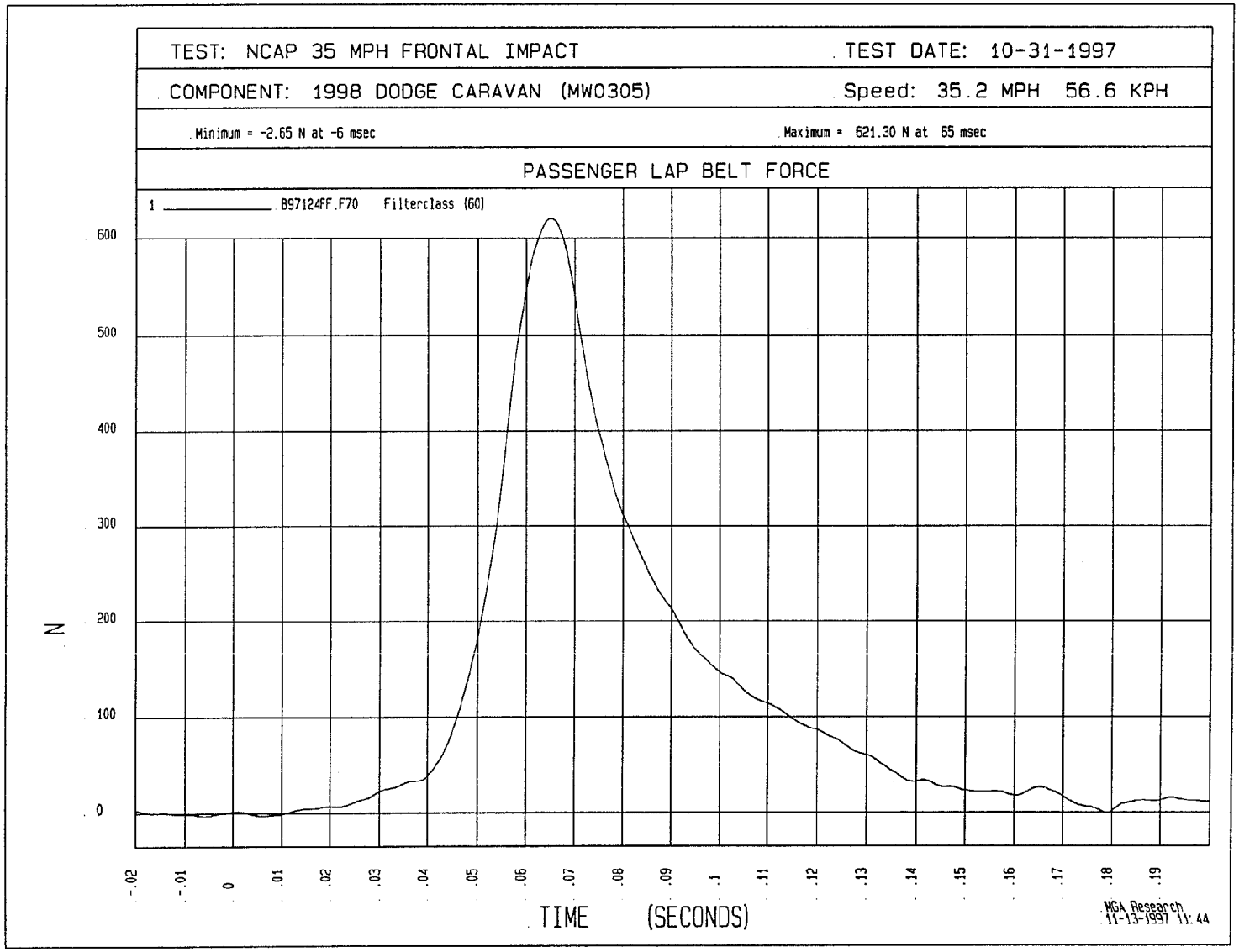
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:28


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -24.58 G'S at 73 msec
Maximum = 86.40 G'S at 49 msec
PASSENGER RIGHT FOOT @ HEEL Z ACCELERATION
1 C97124AF.A09 Filterclass (180)
80
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-13-1997 14:29


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -2.65 N at -6 msec
Maximum = 621.30 N at 55 msec
PASSENGER LAP BELT FORCE
1 B97124FF.F70 Filterclass (60)
600
500
400
300
200
100
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
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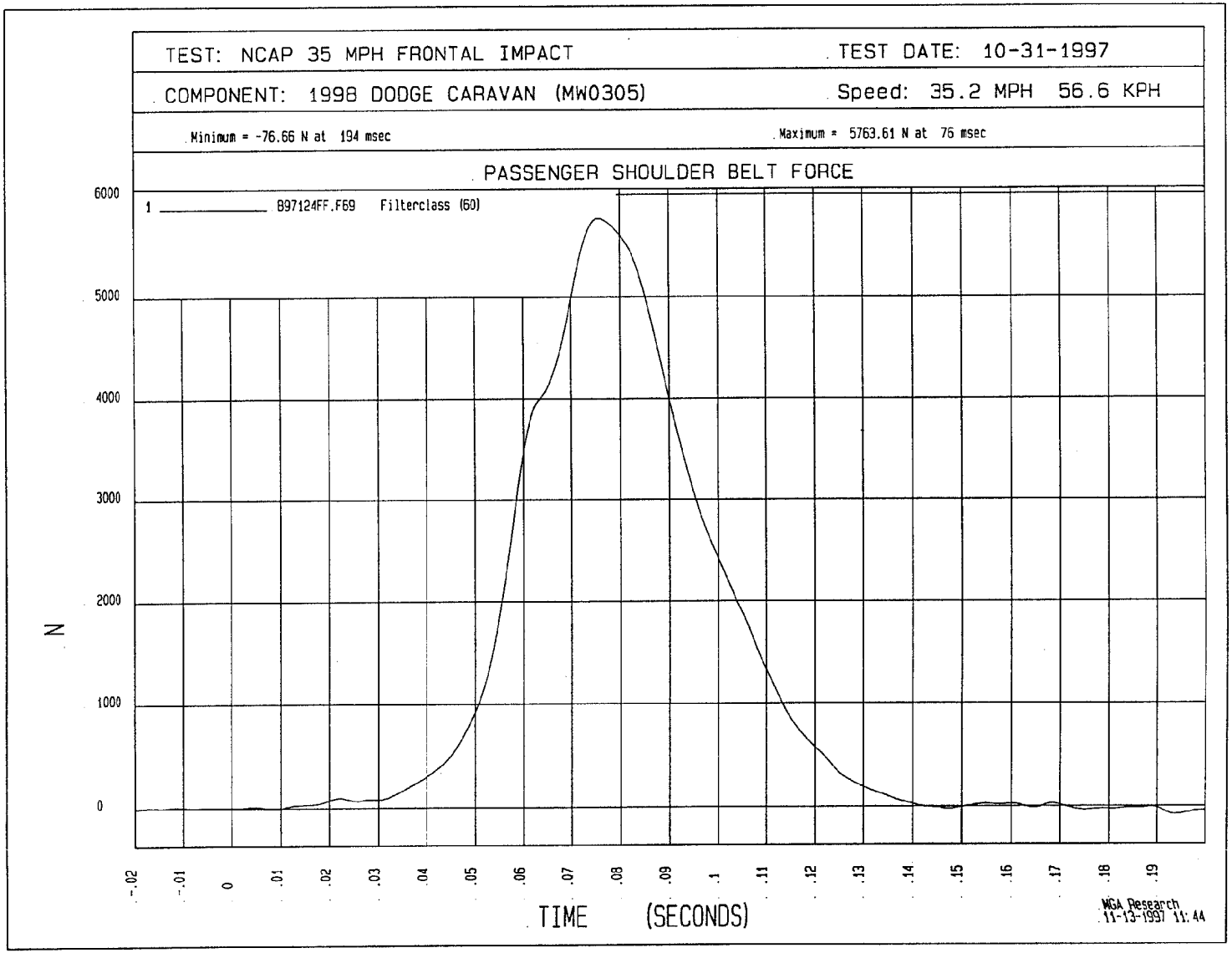
TIME (SECONDS)
MGA Research
11-13-1997 11:44


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -76.66 N at 194 msec
Maximum = 5763.61 N at 76 msec
PASSENGER SHOULDER BELT FORCE
1 B97124FF.F69 Filterclass (60)
6000
5000
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
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.04
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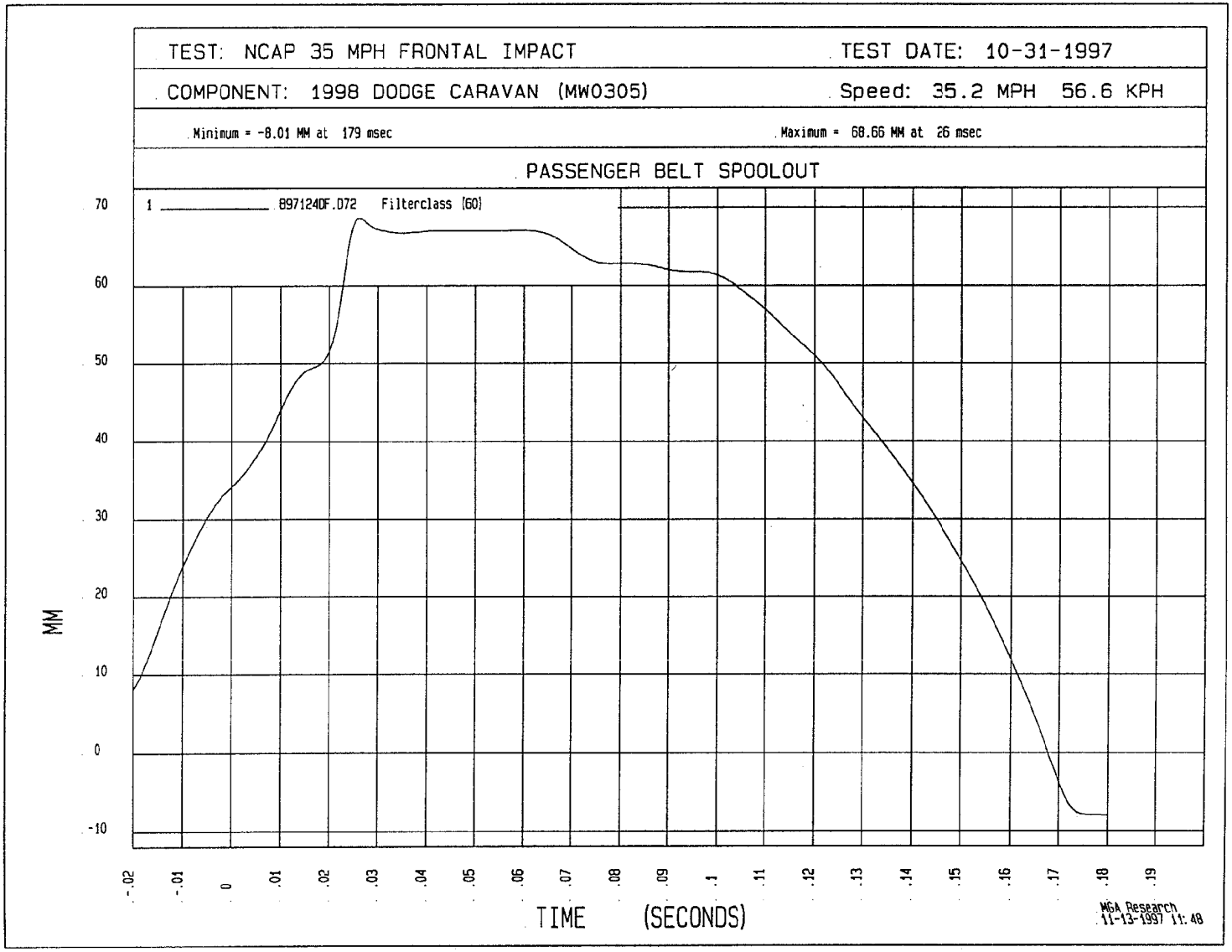
TIME (SECONDS)
MGA Research
11-13-1997 11:44


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -8.01 MM at 179 msec
Maximum = 68.66 MM at 26 msec
PASSENGER BELT SPOOLOUT
1 897124DF.D72 Filterclass (60)
MM
70
60
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
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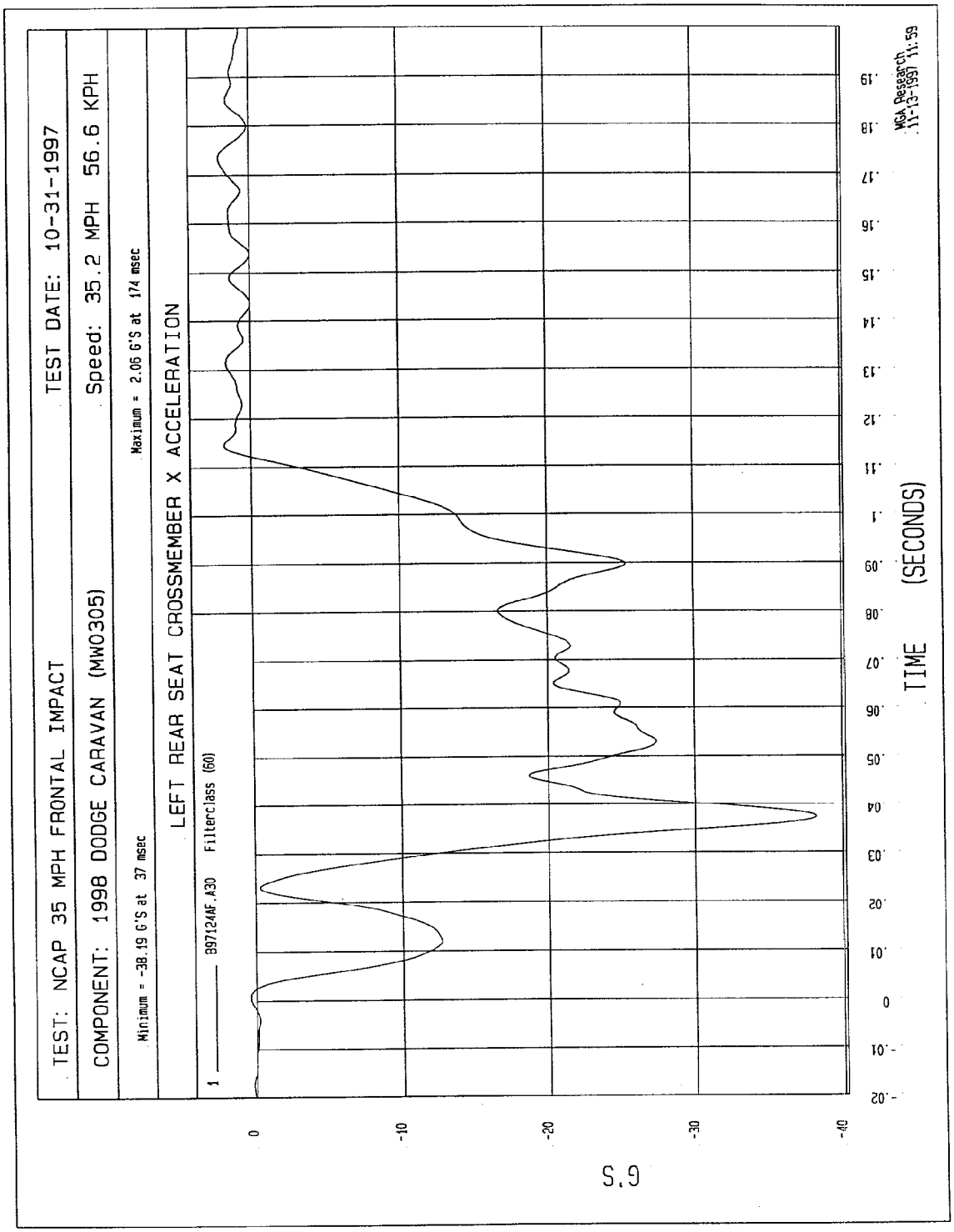
TIME (SECONDS)
MGA Research
11-13-1997 11:48


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -38.19 G'S at 37 msec
Maximum = 2.06 G'S at 174 msec
LEFT REAR SEAT CROSSMEMBER X ACCELERATION
1 ——— 9971244F.A30 Filterclass (60)
0
-10
-20
-30
-40
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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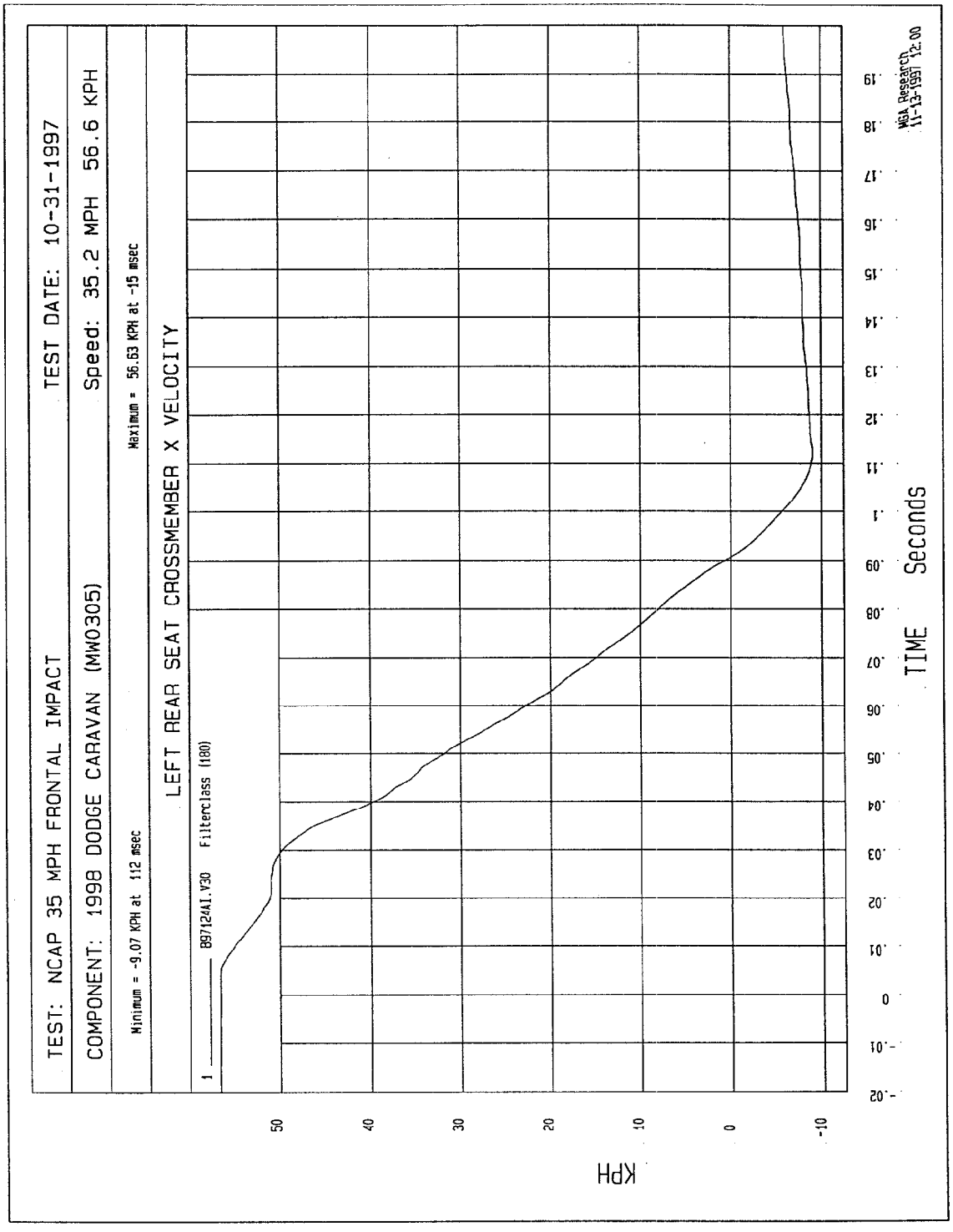
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-13-1997 11:59
6.5
5.9


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -9.07 KPH at 112 msec
Maximum = 56.63 KPH at -15 msec
LEFT REAR SEAT CROSSMEMBER X VELOCITY
1 ——— 897124AI.Y30 Filterclass (180)
KPH
50
40
30
20
10
0
-10
TIME Seconds
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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.12
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.16
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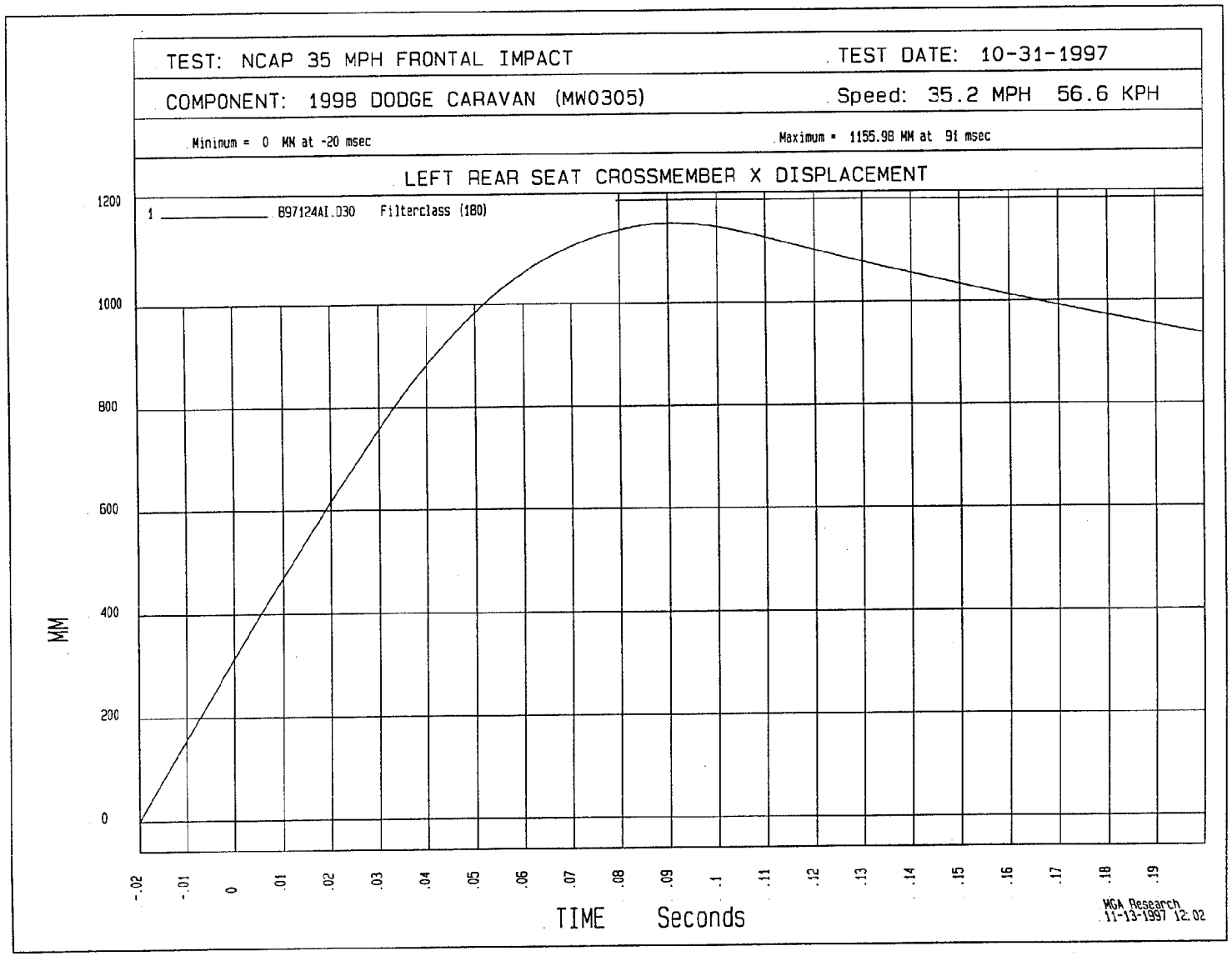
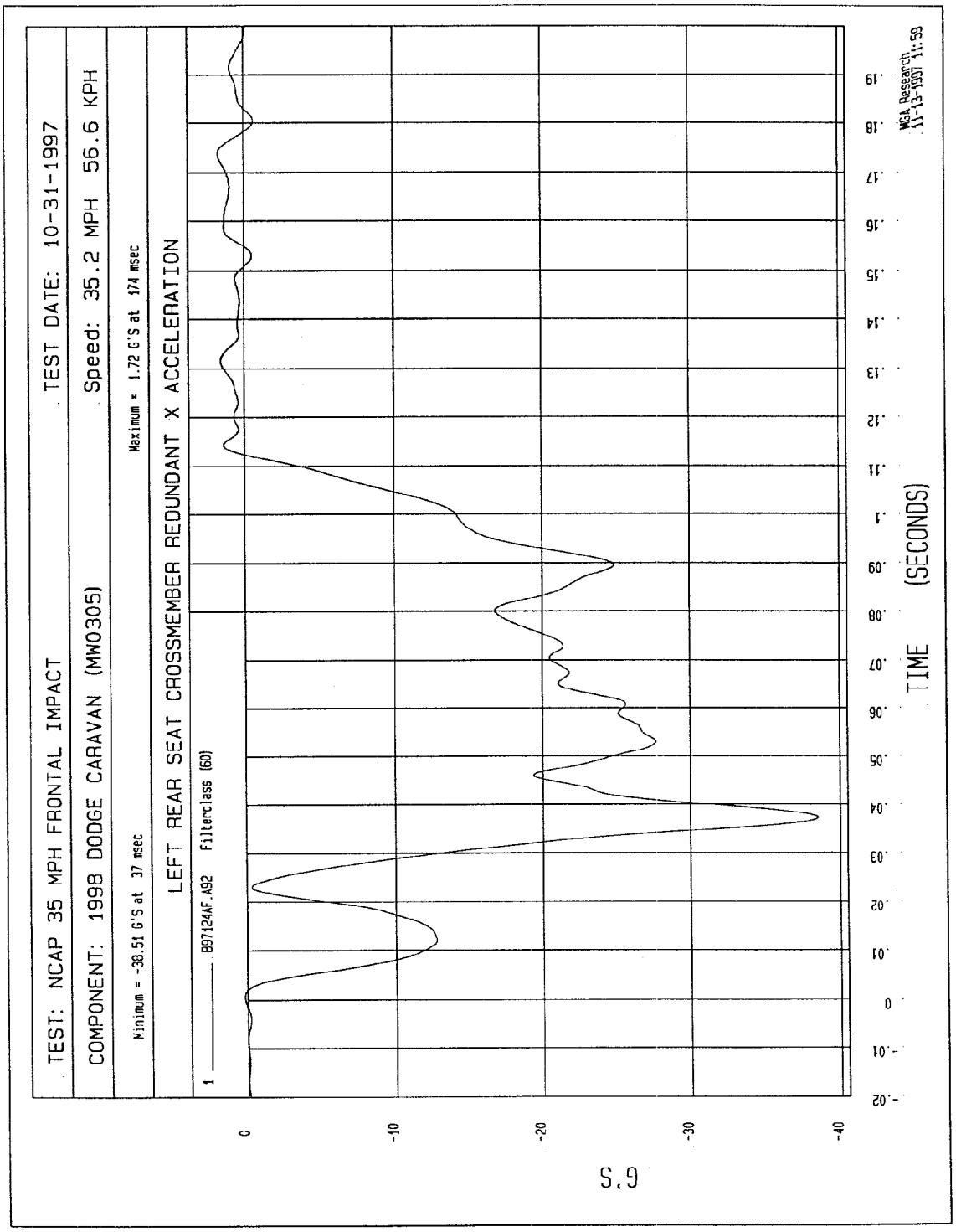
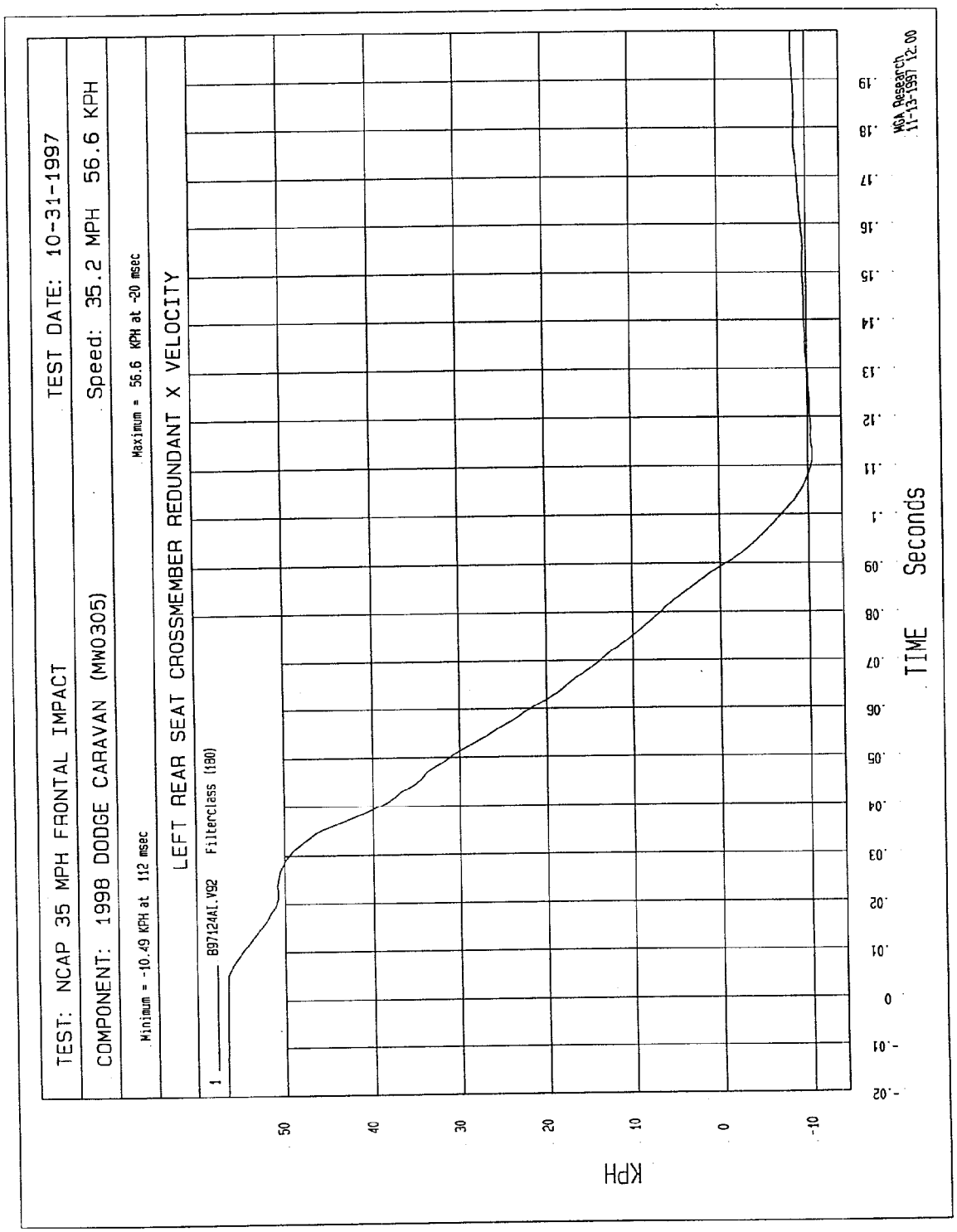
MGA Research
11-13-1998 12:00


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 0 MM at -20 msec
Maximum = 1155.98 MM at 91 msec
LEFT REAR SEAT CROSSMEMBER X DISPLACEMENT
1 B97124AI.D30 Filterclass (180)
MM
1200
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-13-1997 12:02


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -38.51 G'S at 37 msec
Maximum = 1.72 G'S at 174 msec
LEFT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION
1 B97124AF.A92 Filterclass (60)
0
-10
-20
-30
-40
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
11-13-1997 11:59


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -10.49 KPH at 112 msec
Maximum = 56.6 KPH at -20 msec
LEFT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY
1 B97124AI.V92 Filterclass (180)
KPH
50
40
30
20
10
0
-10
TIME Seconds
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
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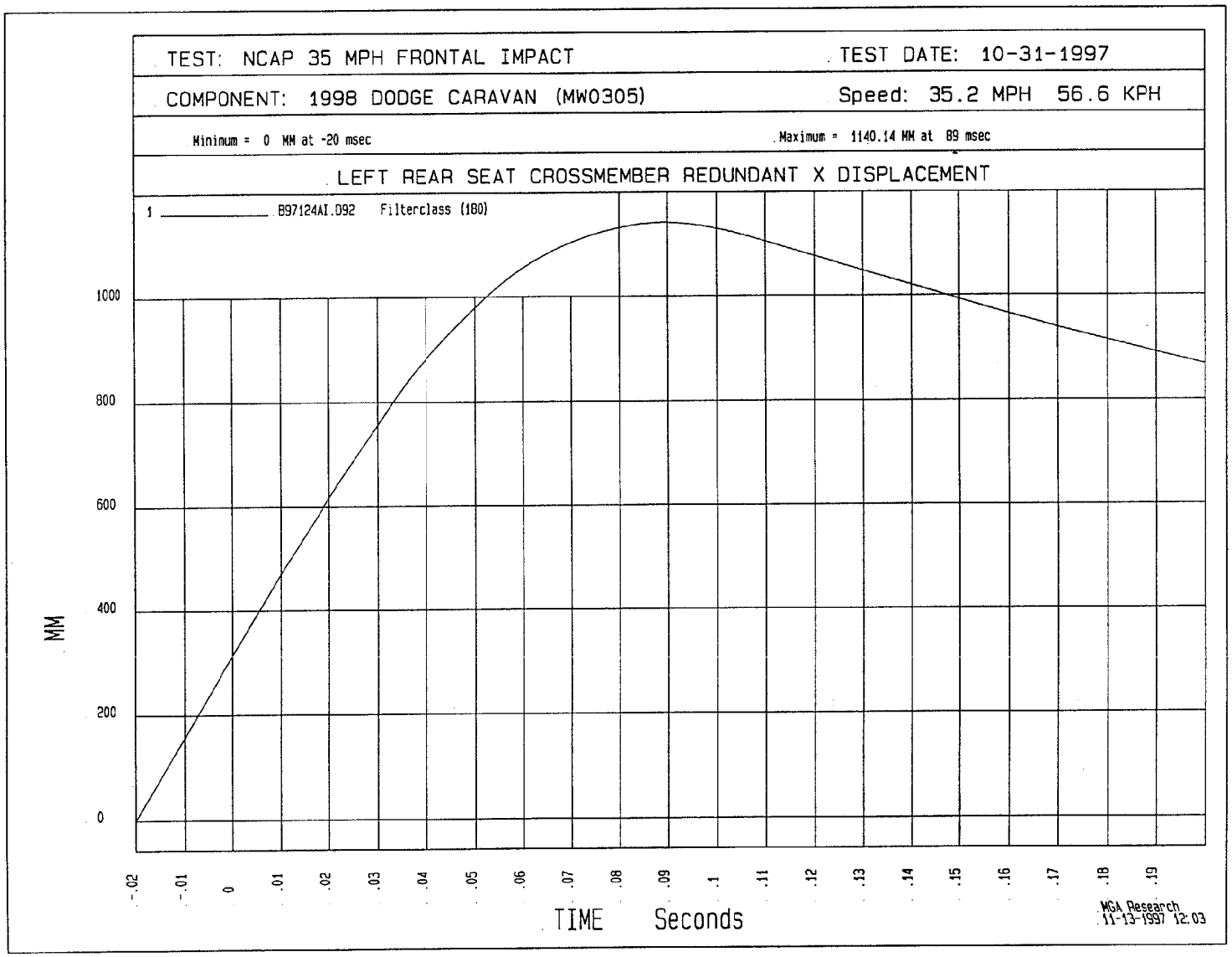
.18
.19
MGA Research
11-13-1997 12:00


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 0 MM at -20 msec
Maximum = 1140.14 MM at 89 msec
LEFT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT
1 B97124AI.092 Filterclass (180)
MM
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
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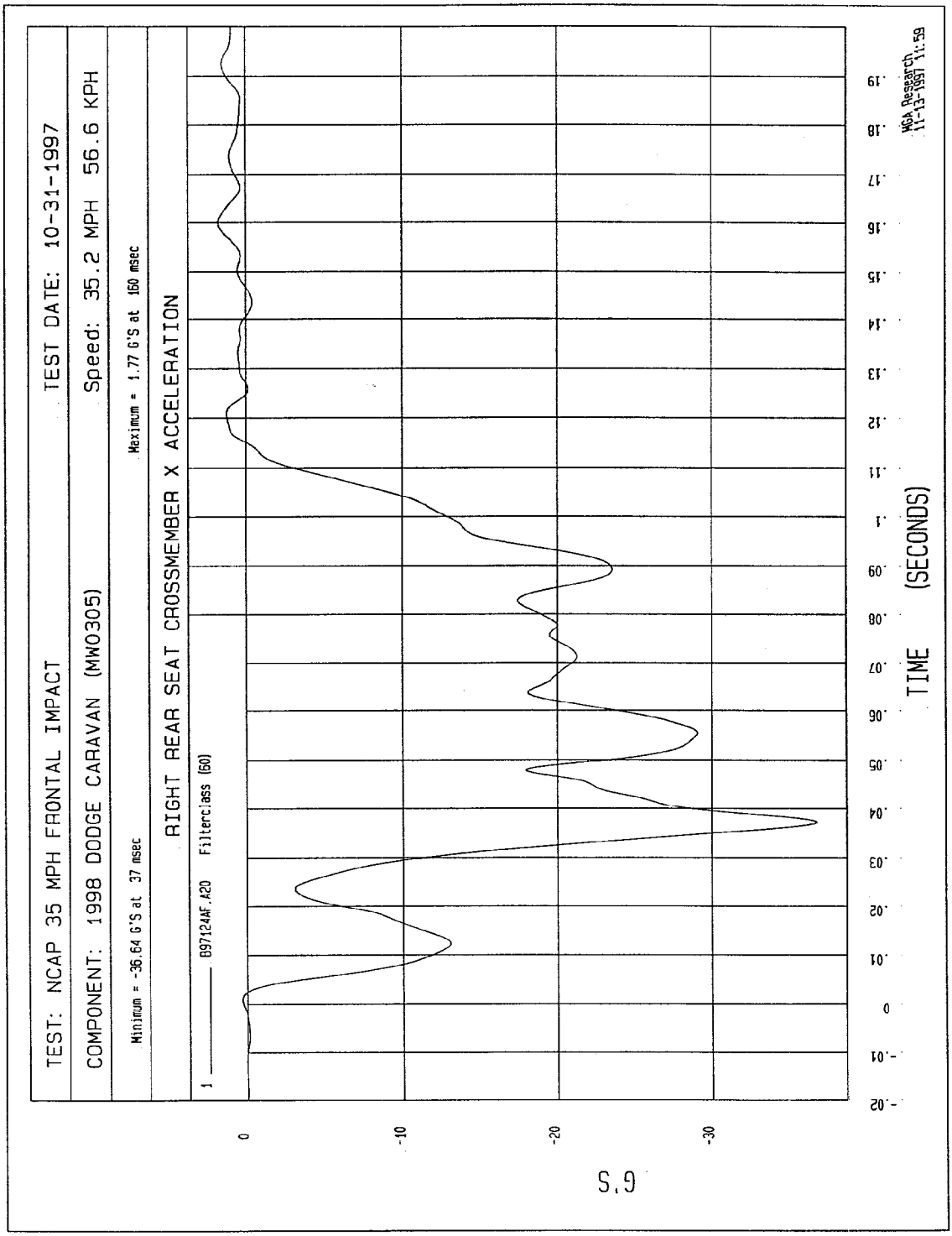
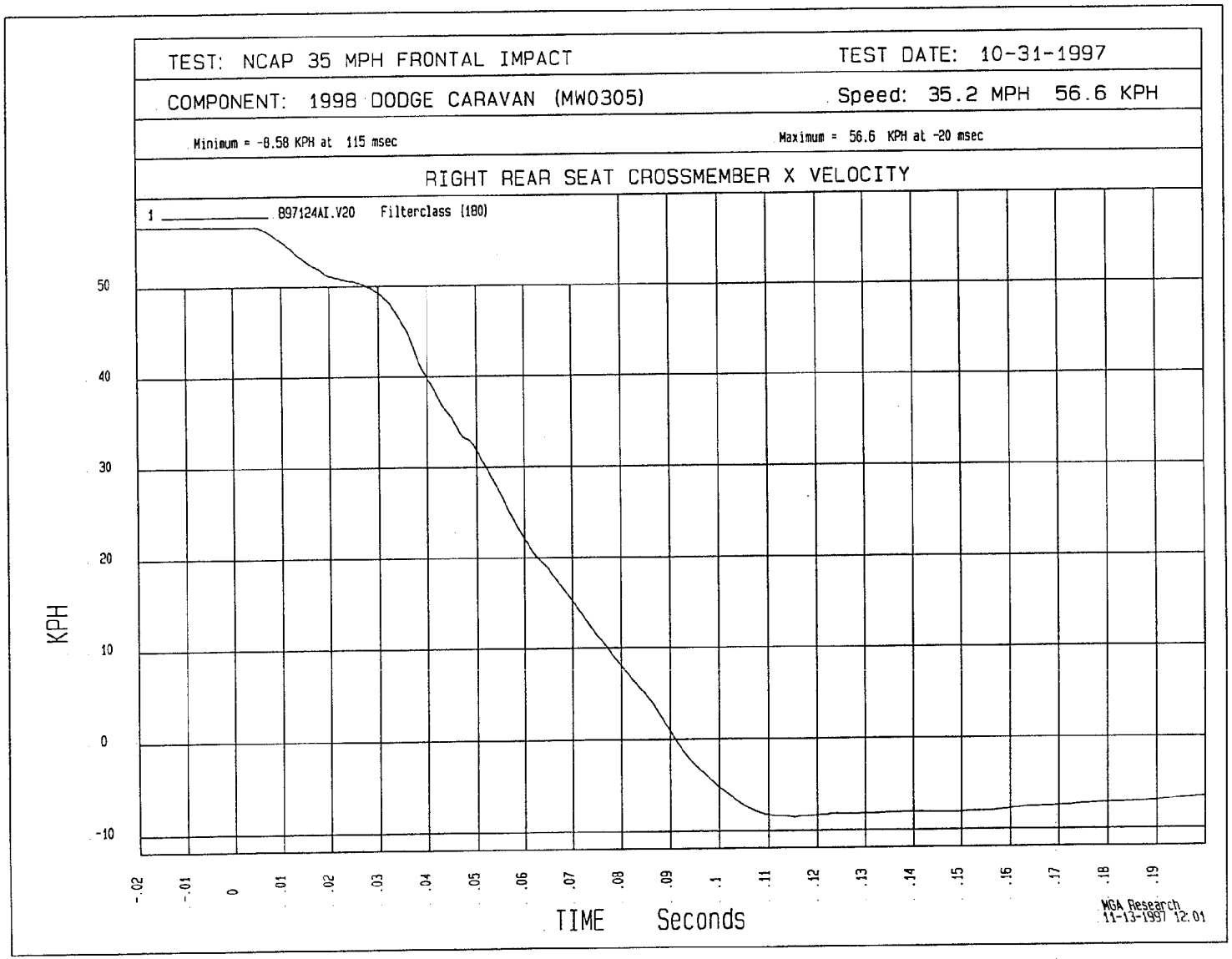
.19
TIME Seconds
MGA Research
11-13-1997 12:03


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -36.64 G'S at 37 msec
Maximum = 1.77 G'S at 160 msec
RIGHT REAR SEAT CROSSMEMBER X ACCELERATION
1 _____ B971244F.A20 Filterclass (60)
0
-10
-20
-30
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
11-13-1997 11:59


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -8.58 KPH at 115 msec
Maximum = 56.6 KPH at -20 msec
RIGHT REAR SEAT CROSSMEMBER X VELOCITY
1 897124AI.V20 Filterclass (180)
KPH
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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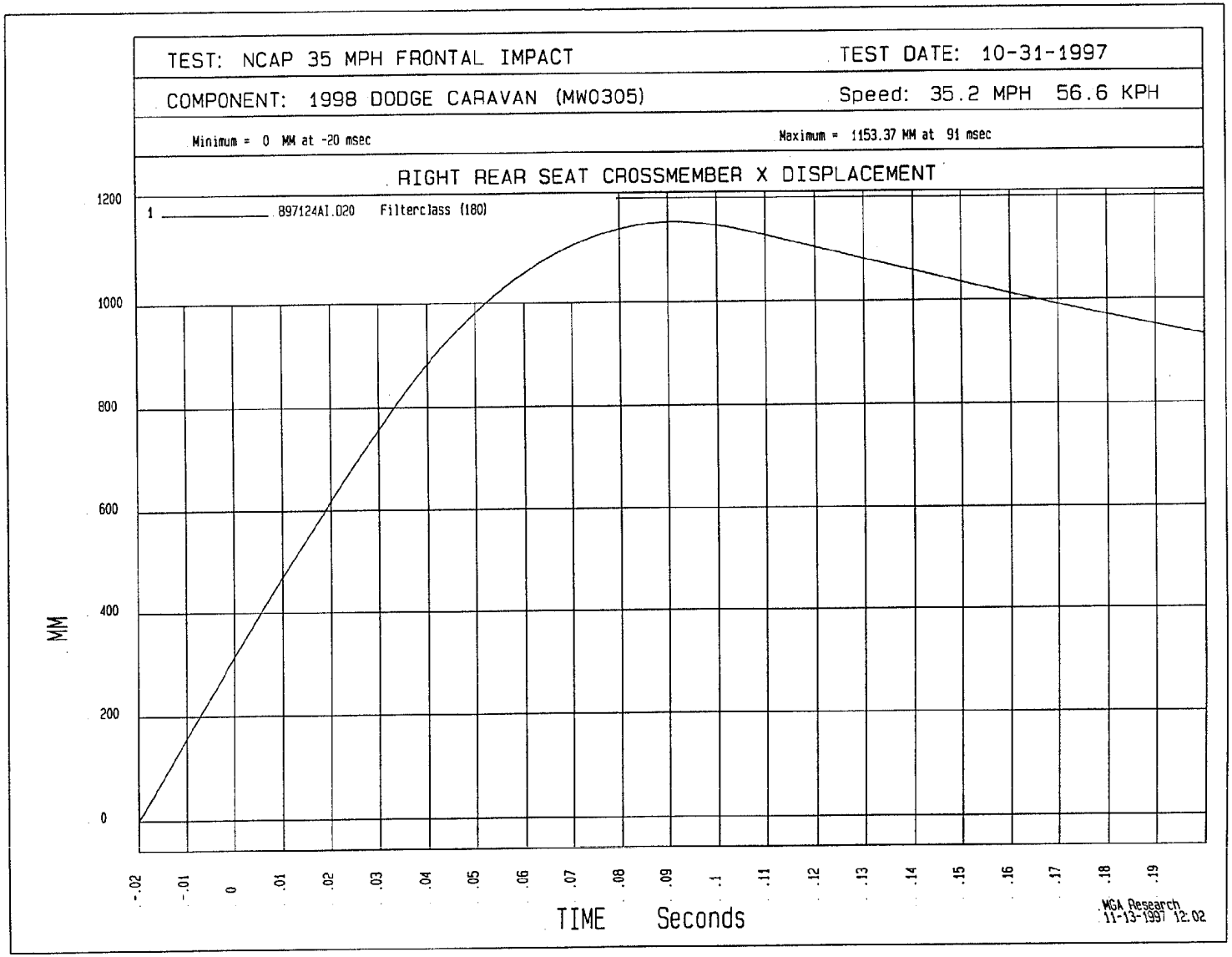
TIME Seconds
MGA Research
11-13-1997 12:01


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 0 MM at -20 msec
Maximum = 1153.37 MM at 91 msec
RIGHT REAR SEAT CROSSMEMBER X DISPLACEMENT
1 897124AI.D20 Filterclass (180)
MM
1200
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
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.07
.08
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.14
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.16
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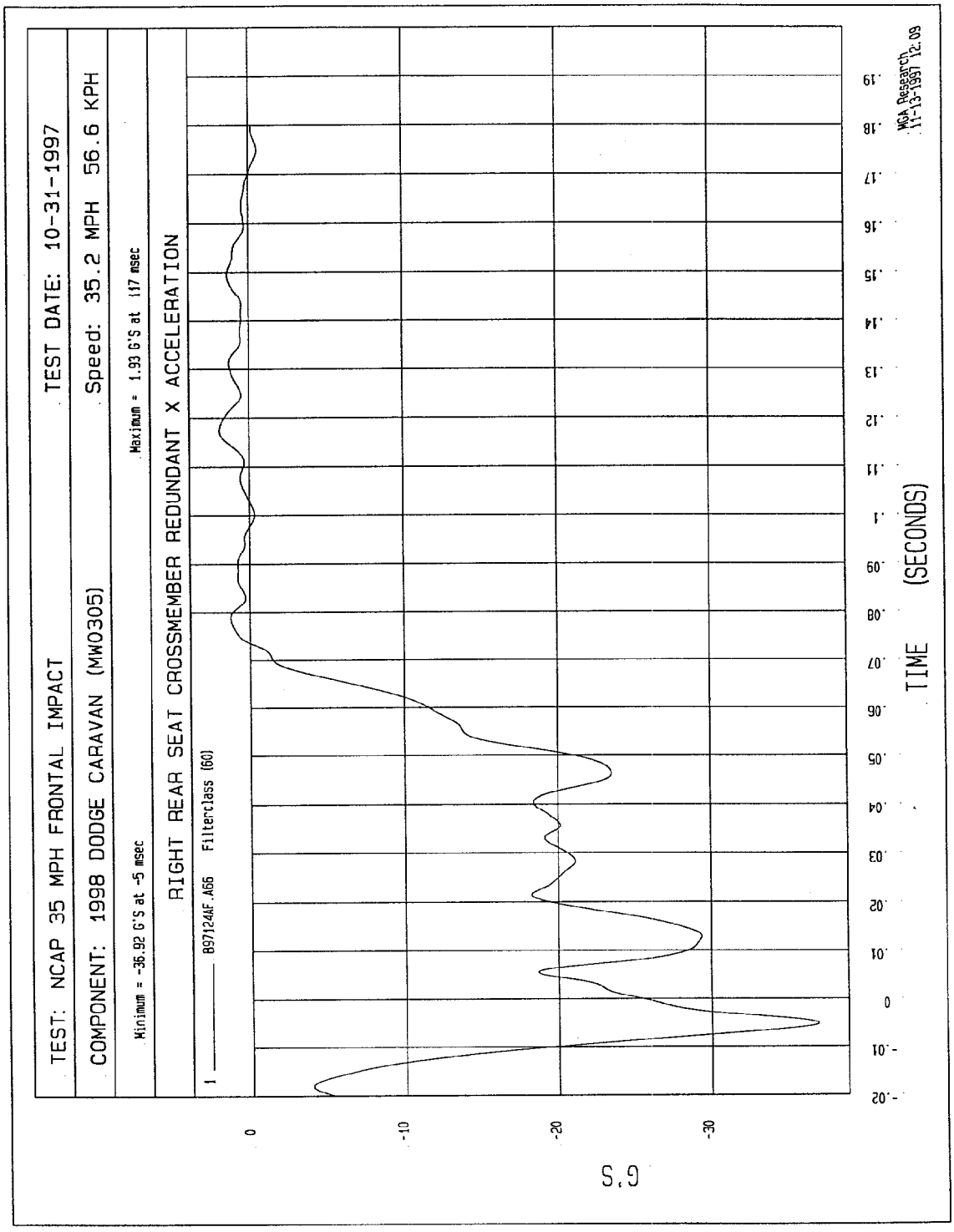
TIME Seconds
MGA Research
11-13-1997 12:02


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -36.92 G'S at -5 msec
Maximum = 1.93 G'S at 117 msec
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION
1 _____ 897124AF.A66 Filterclass (60)
G'S
0
-10
-20
-30
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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.15
.16
.17
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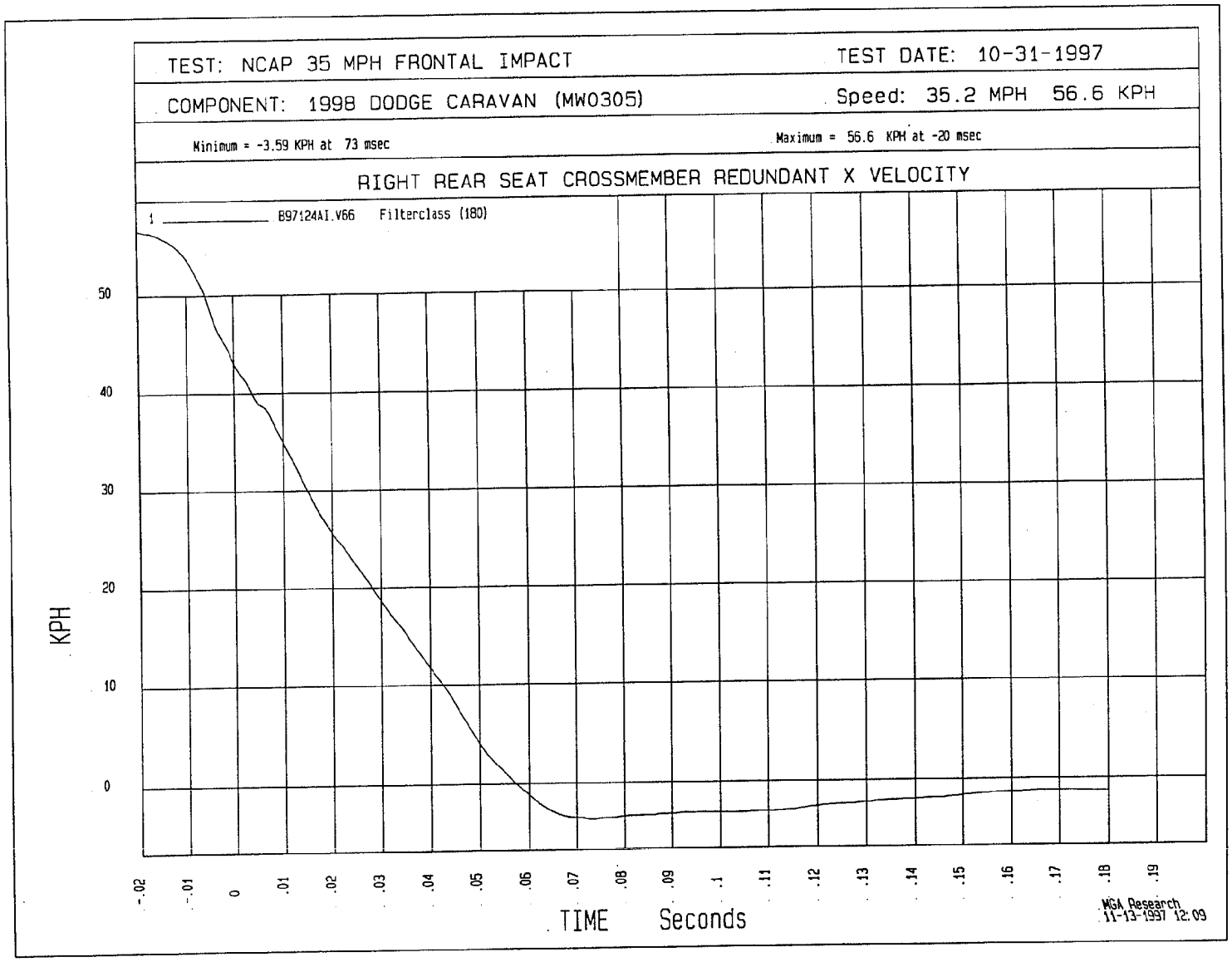
TIME (SECONDS)
MGA Research
11-13-1997 12:09


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -3.59 KPH at 73 msec
Maximum = 56.6 KPH at -20 msec
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY
1 B97124AI.V66 Filterclass (180)
KPH
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
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.08
.09
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.14
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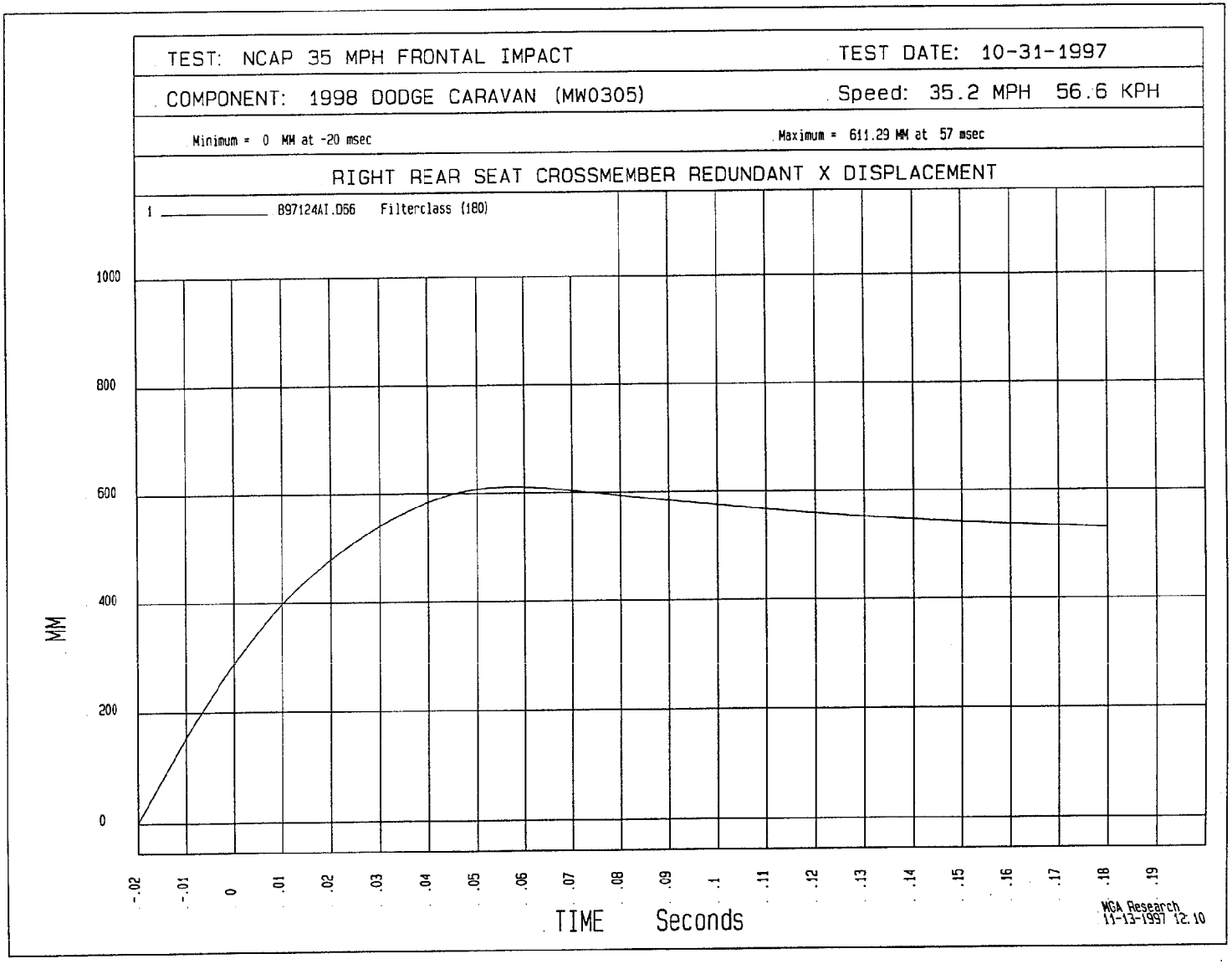
TIME Seconds
MGA Research
11-13-1997 12:09


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 0 MM at -20 msec
Maximum = 611.29 MM at 57 msec
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT
1 897124AI.D56 Filterclass (180)
1000
800
600
400
200
0
MM
-.02
-.01
0
.01
.02
.03
.04
.05
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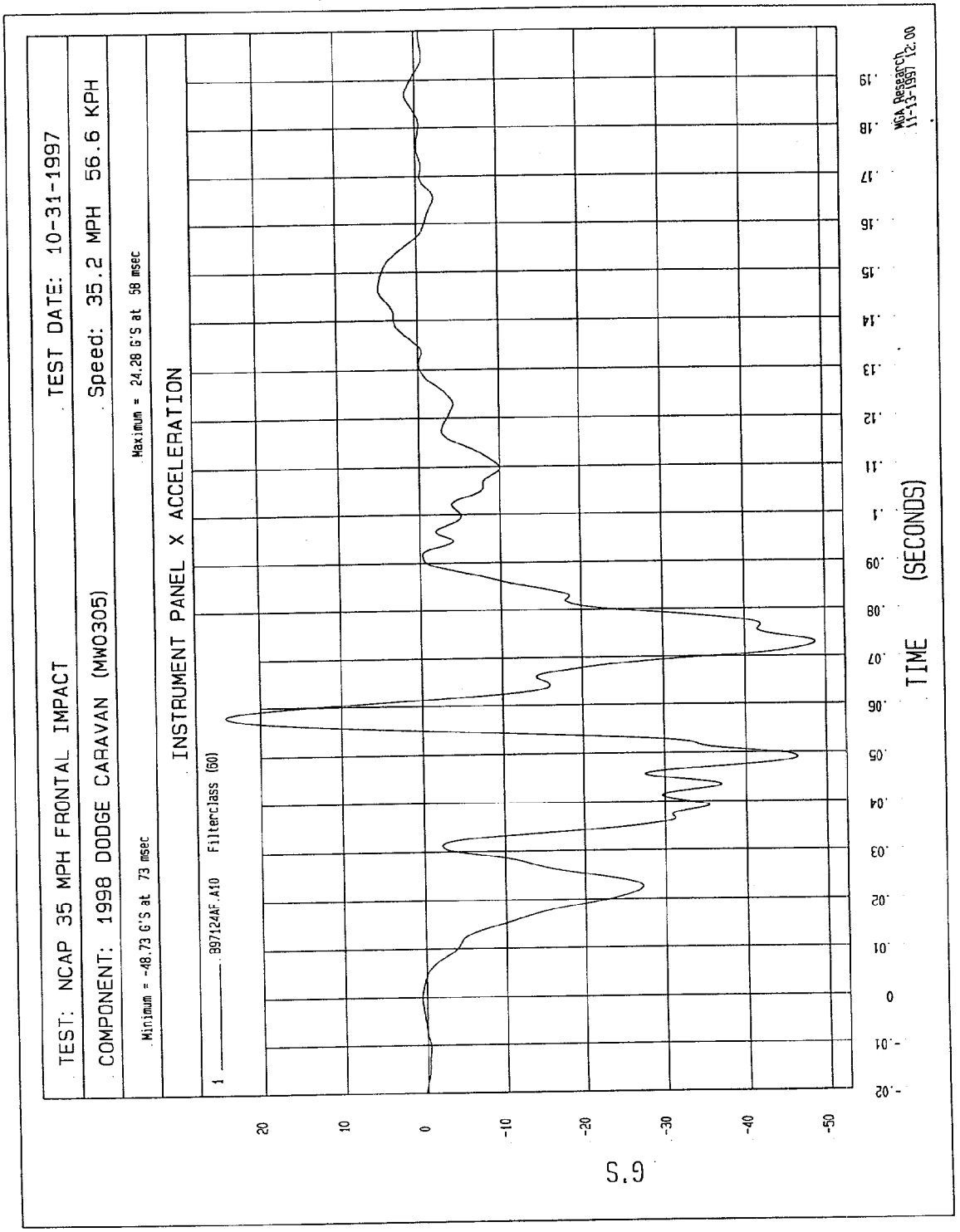
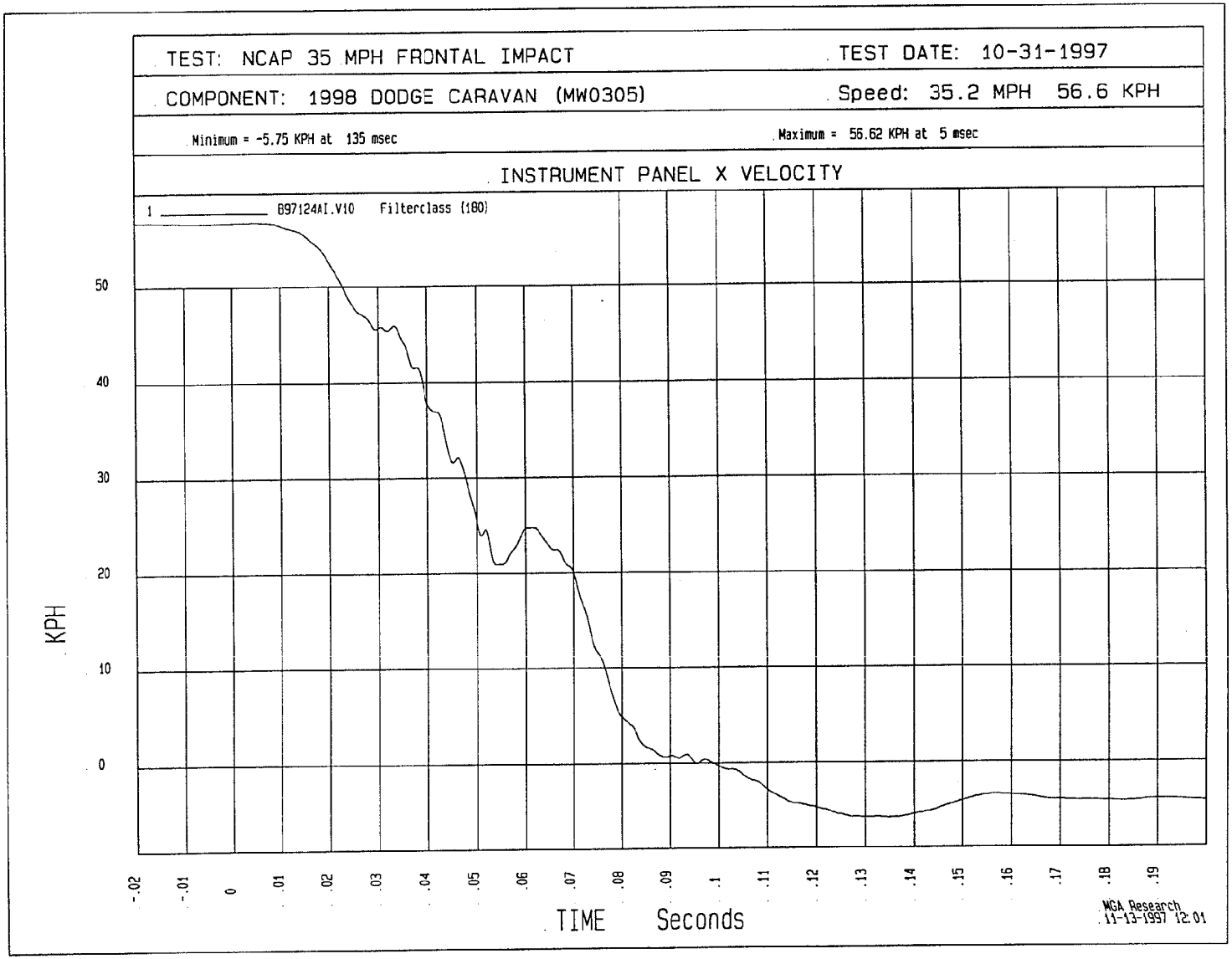
TIME Seconds
MGA Research
11-13-1997 12:10


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -48.73 G'S at 73 msec
Maximum = 24.28 G'S at 58 msec
INSTRUMENT PANEL X ACCELERATION
1 _____ 997124AF.A10 Filterclass (60)
MGA Research 11-13-1997 12:00
TIME (SECONDS)
S.9
65


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -5.75 KPH at 135 msec
Maximum = 56.62 KPH at 5 msec
INSTRUMENT PANEL X VELOCITY
1 B97124AI.V10 Filterclass (180)
KPH
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
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.14
.15
.16
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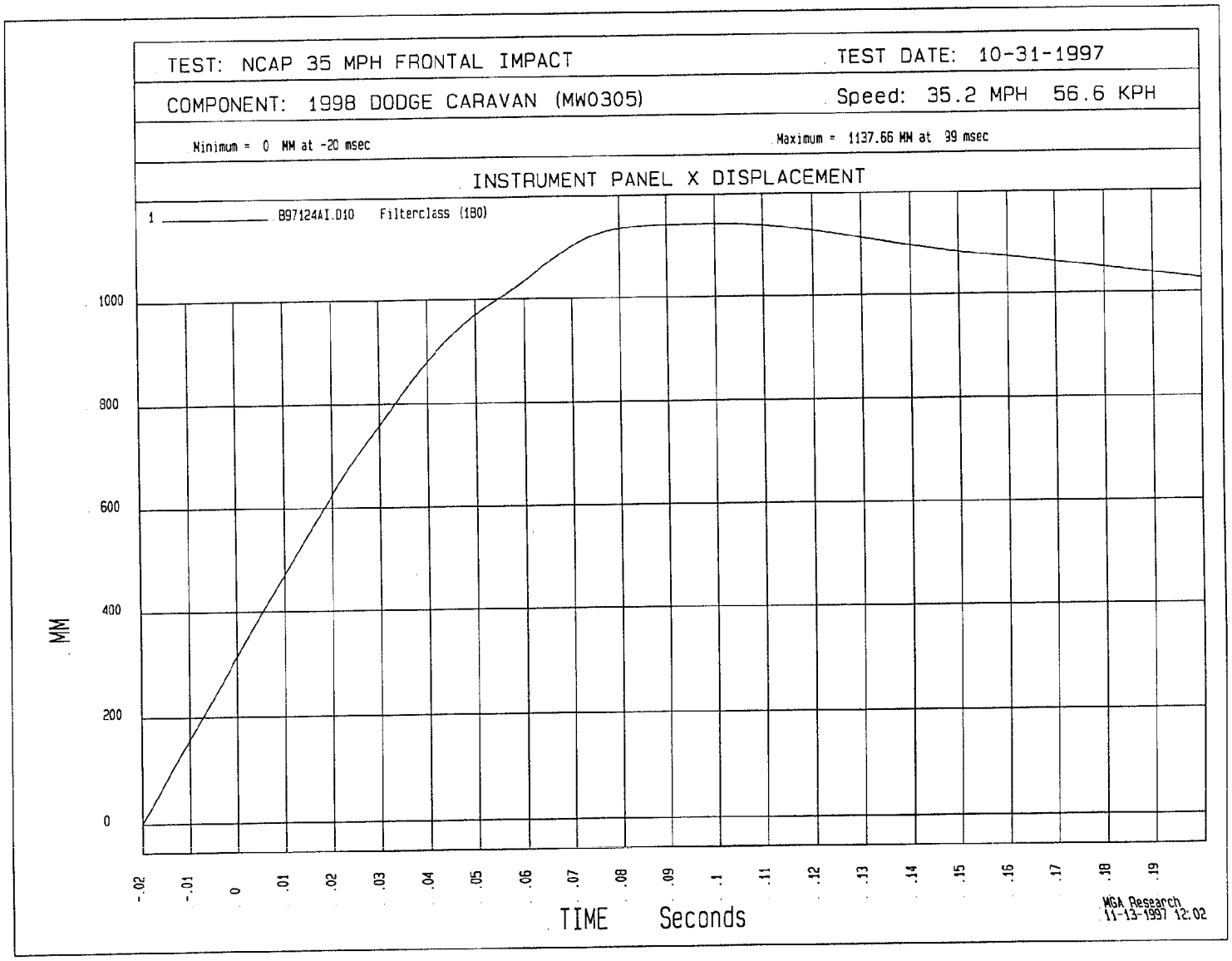
.18
.19
TIME Seconds
NGA Research
11-13-1997 12:01


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 0 MM at -20 msec
Maximum = 1137.66 MM at 99 msec
INSTRUMENT PANEL X DISPLACEMENT
1 B97124AI.D10 Filterclass (180)
MM
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
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.08
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.14
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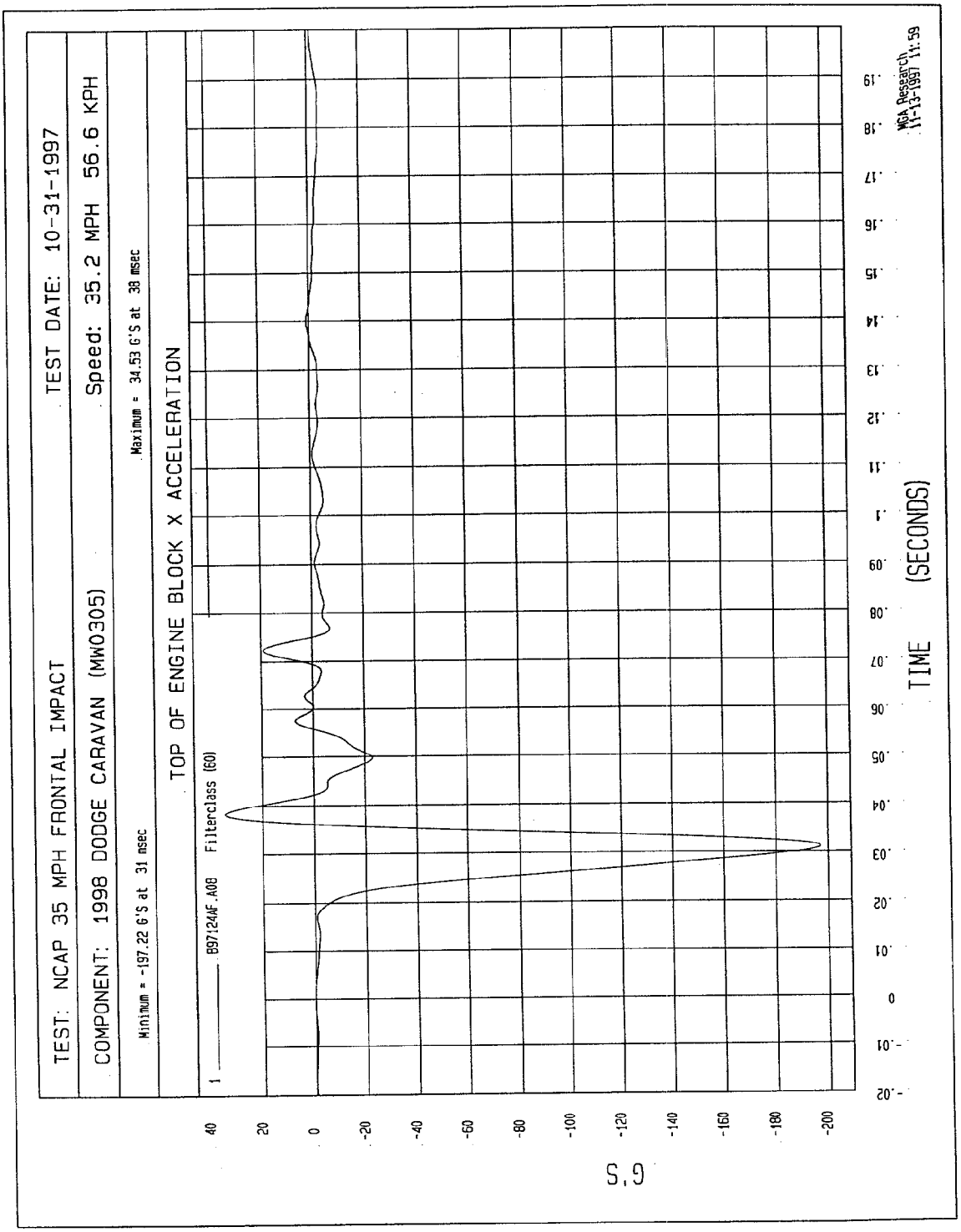
.19
TIME Seconds
MGA Research
11-13-1997 12:02


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -197.22 G'S at 31 msec
Maximum = 34.53 G'S at 38 msec
TOP OF ENGINE BLOCK X ACCELERATION
1 B97124AF.A0B Filterclass (60)
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
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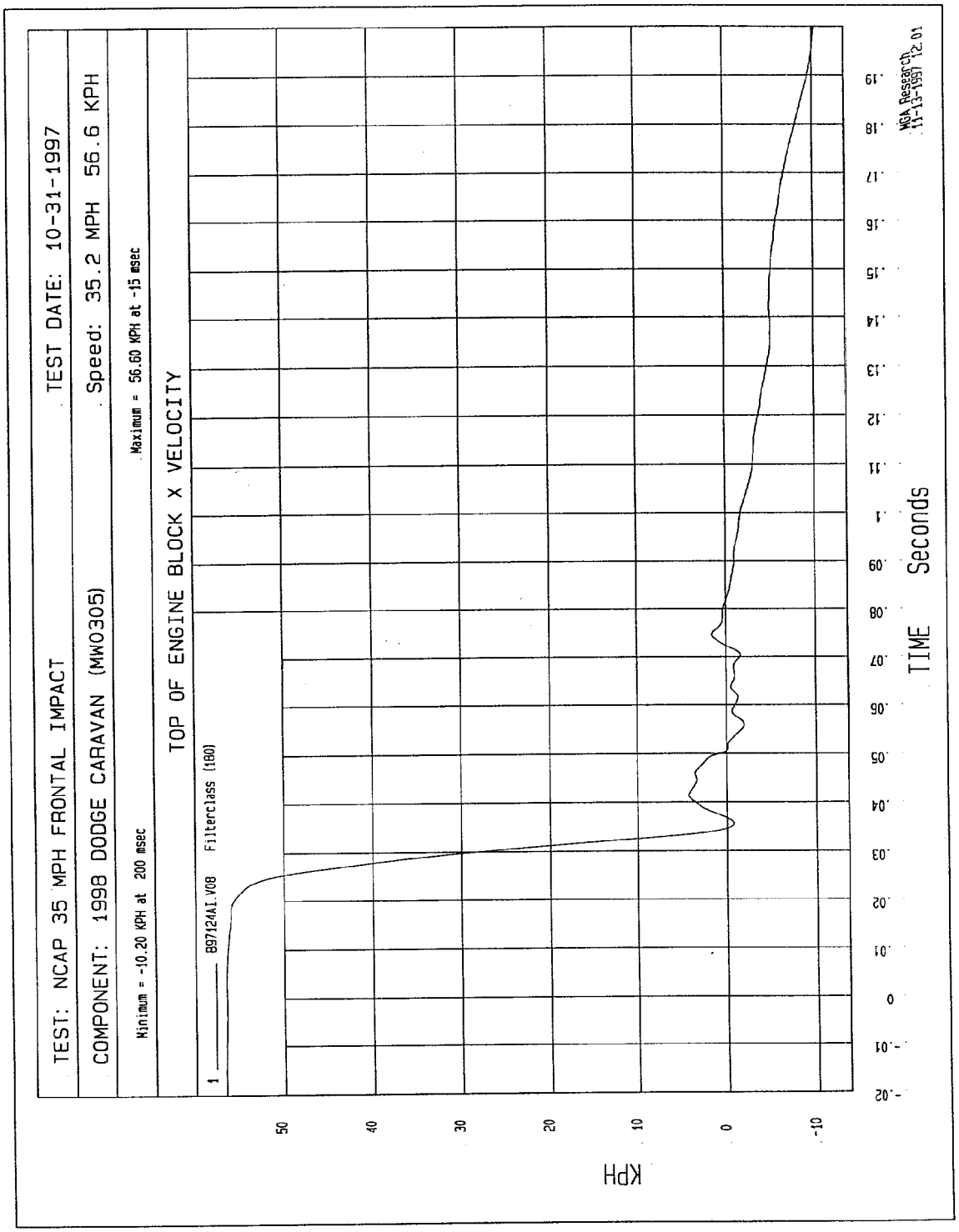
.19
TIME (SECONDS)
MGA Research
11-13-1997 11:59


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -10.20 KPH at 200 msec
Maximum = 56.60 KPH at -15 msec
TOP OF ENGINE BLOCK X VELOCITY
1 B97124AI.V08 Filterclass (180)
KPH
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
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.07
.08
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.13
.14
.15
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.17
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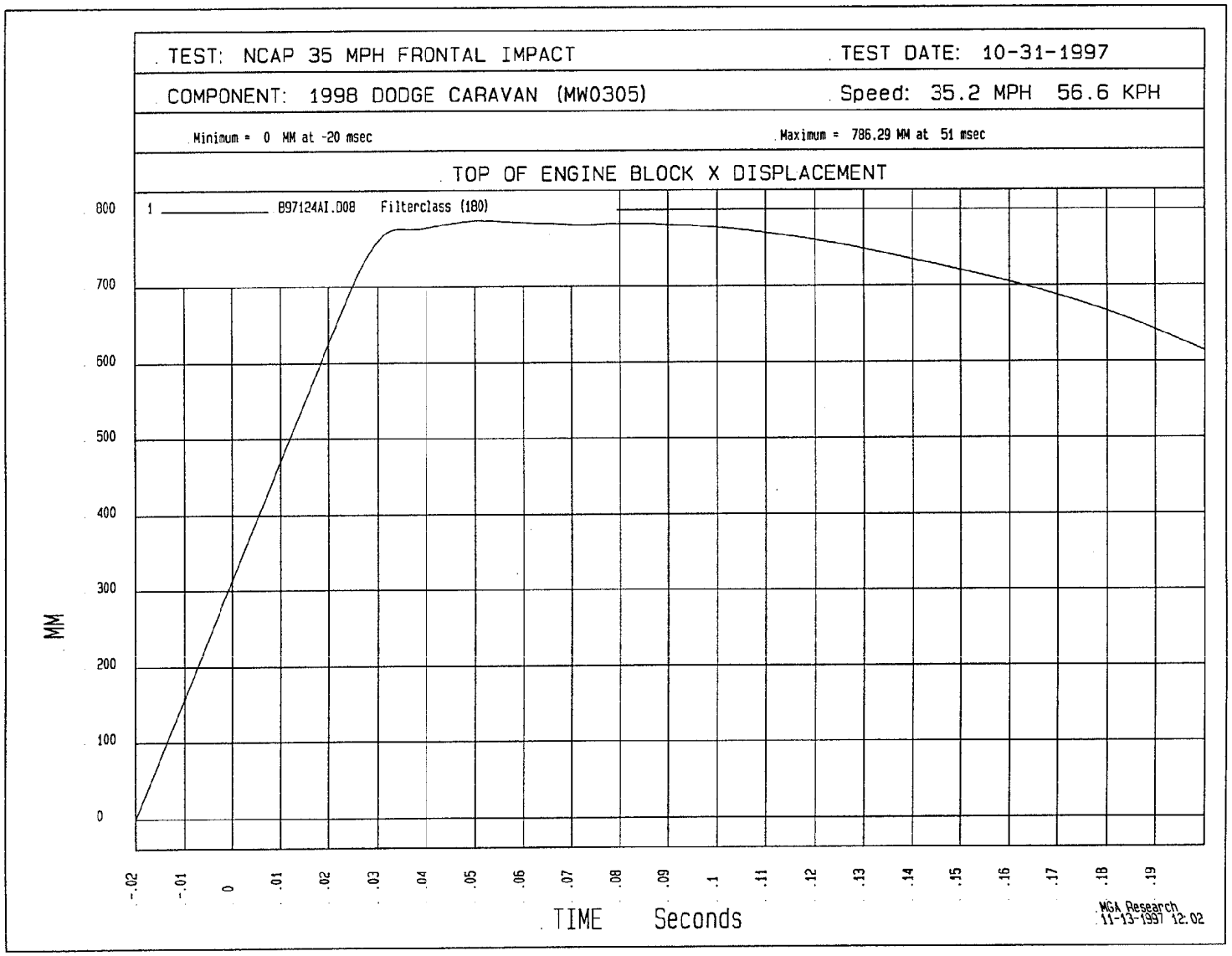
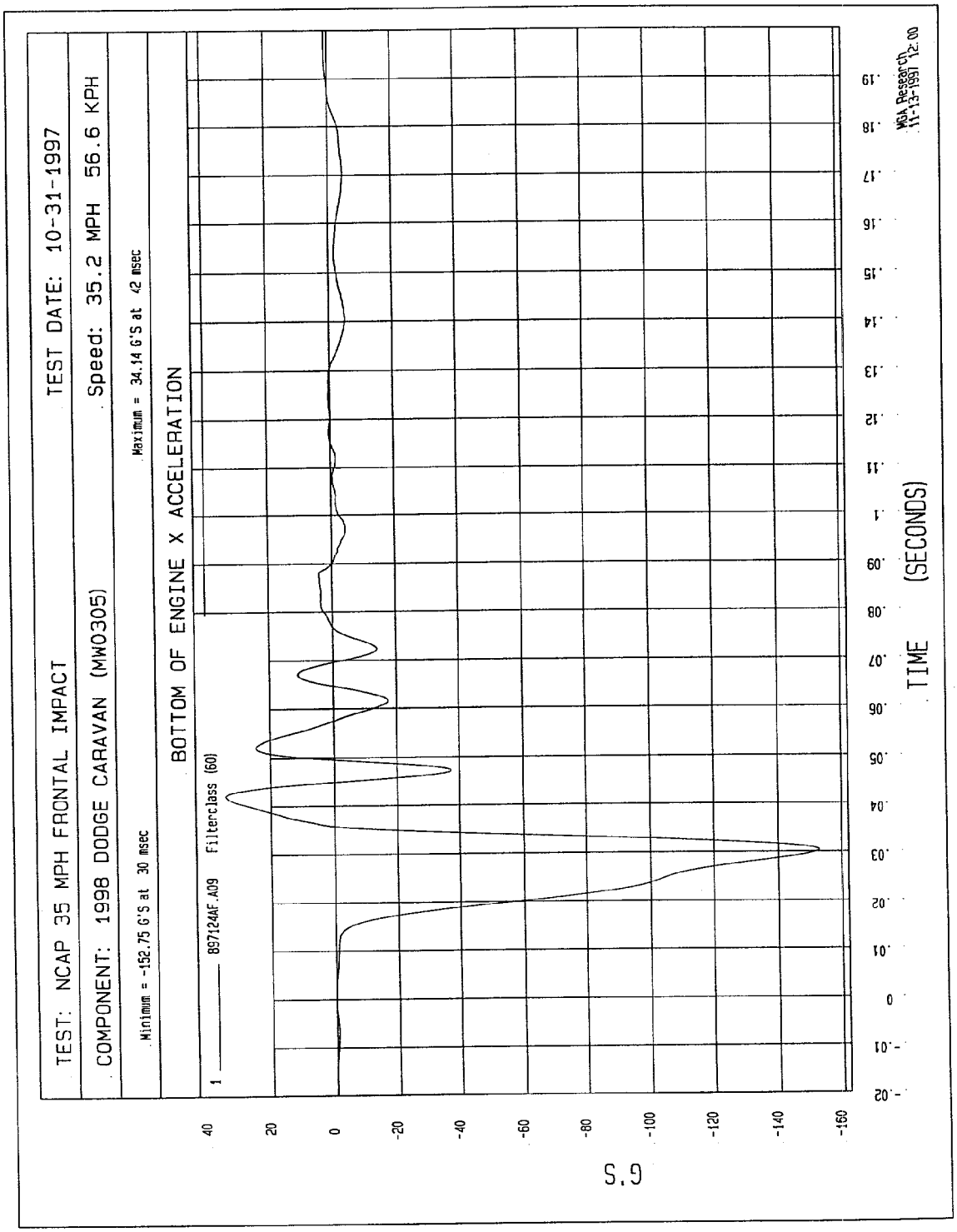
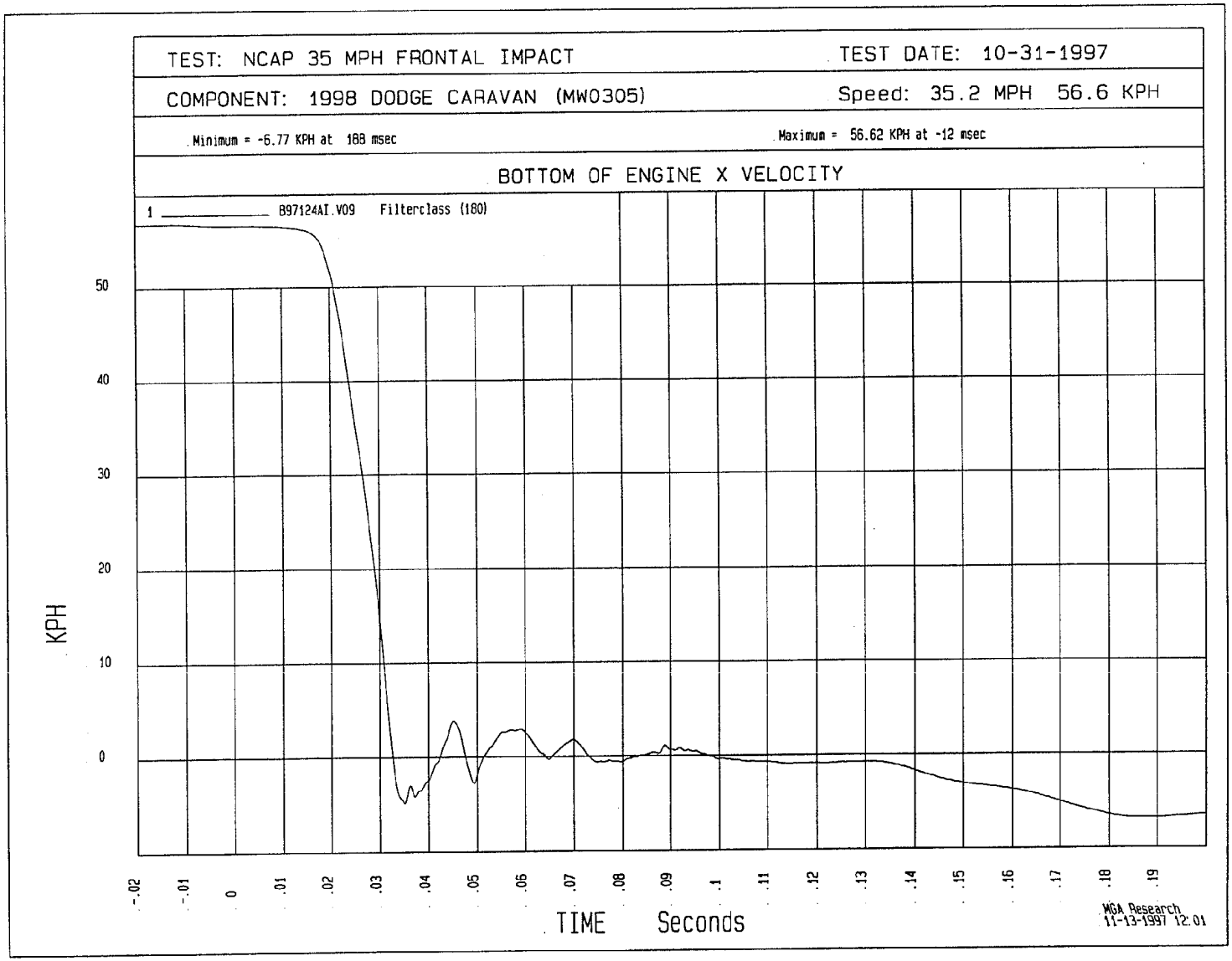
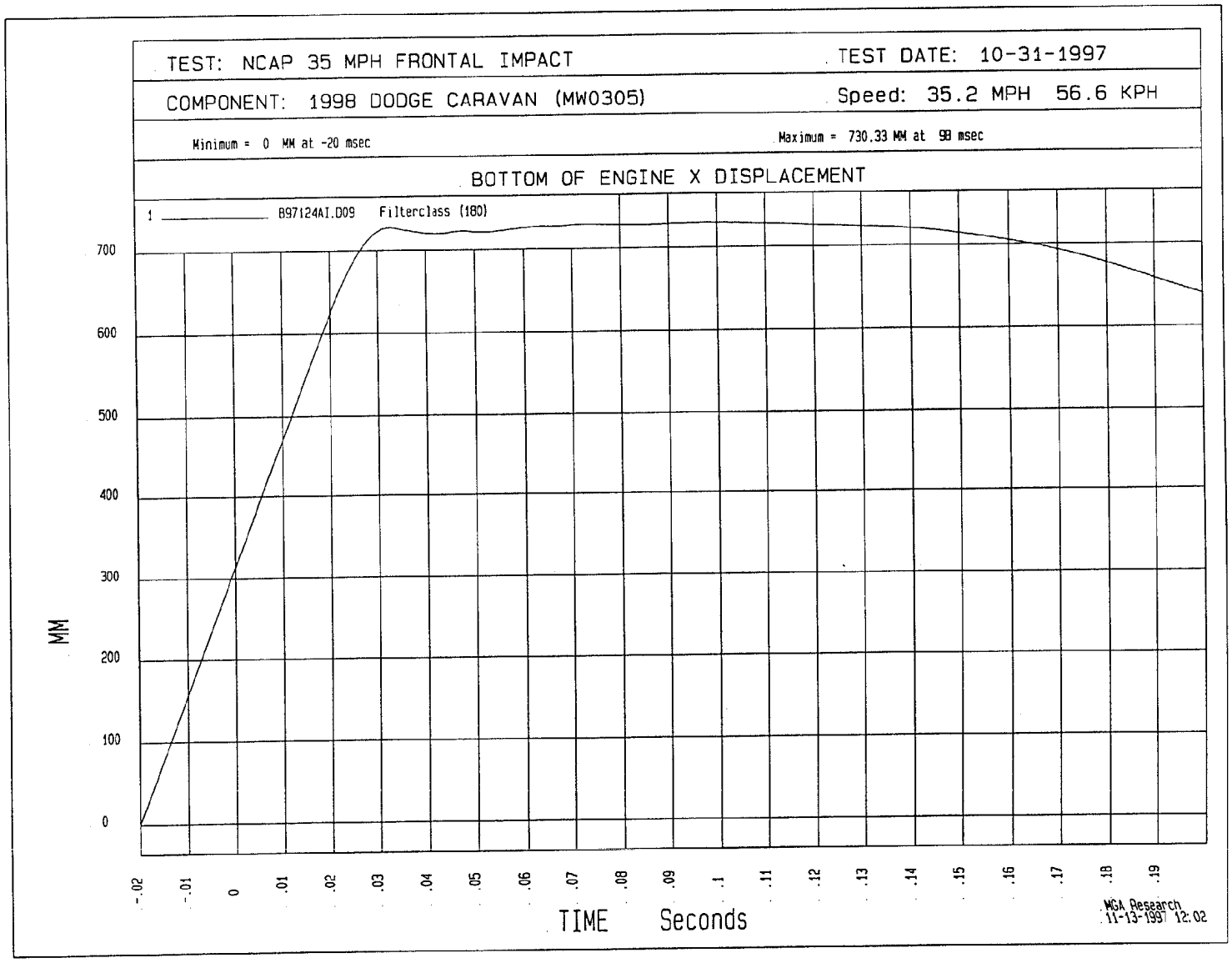
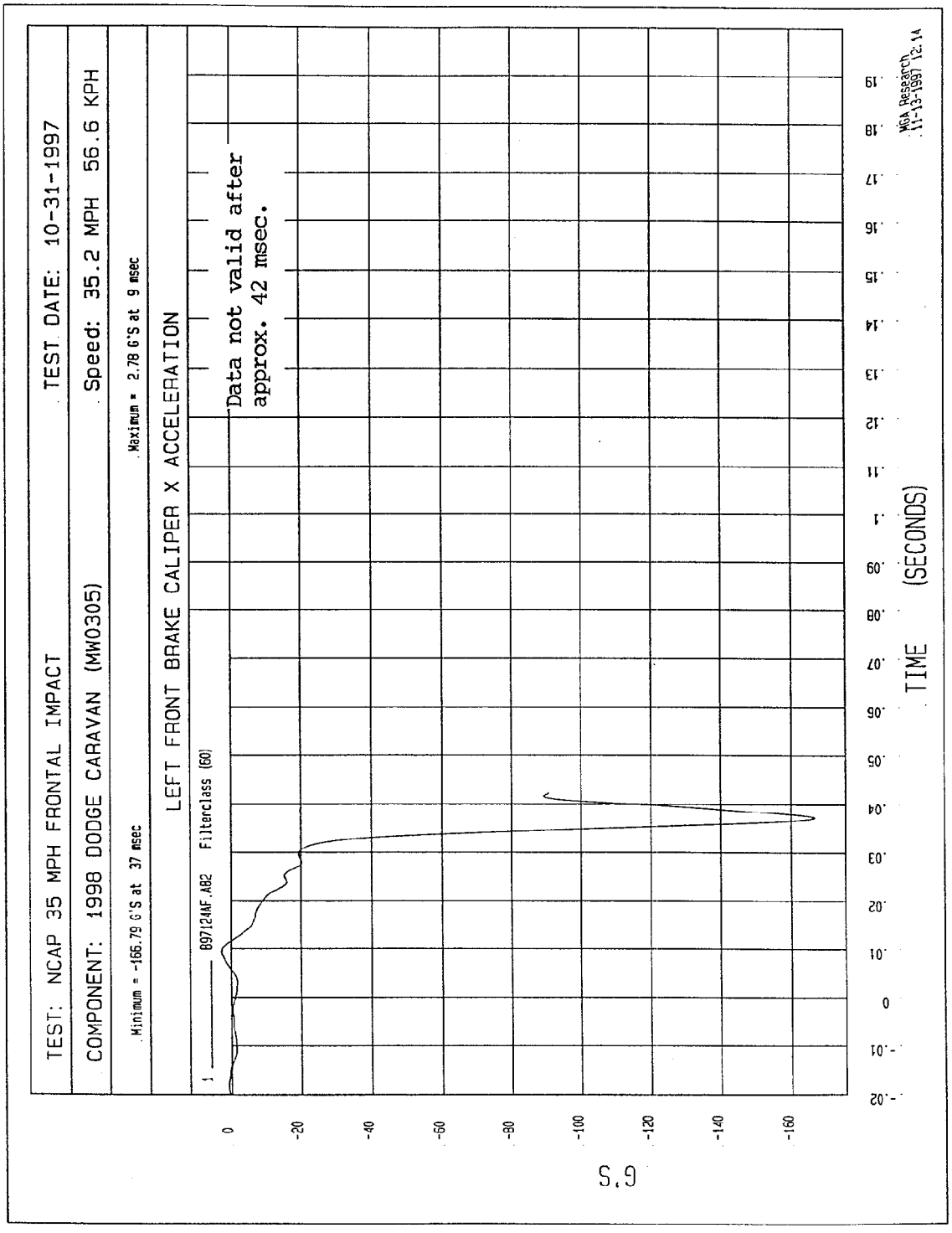
.19
TIME Seconds
MGA Research
11-13-1997 12:01

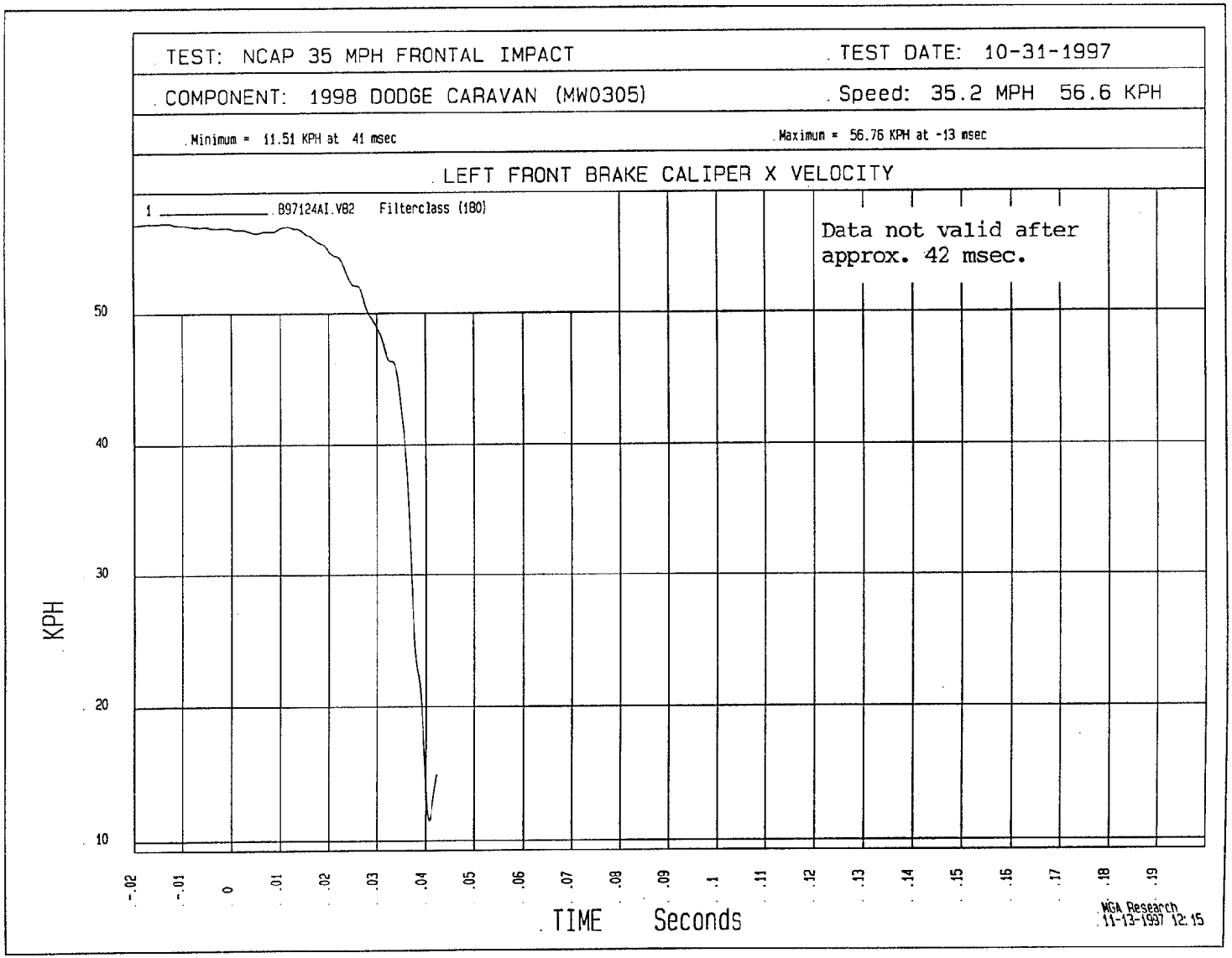

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 0 MM at -20 msec
Maximum = 786.29 MM at 51 msec
TOP OF ENGINE BLOCK X DISPLACEMENT
1 B97124AI.D08 Filterclass (180)
800
700
600
500
400
300
200
100
0
MM
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-13-1997 12:02

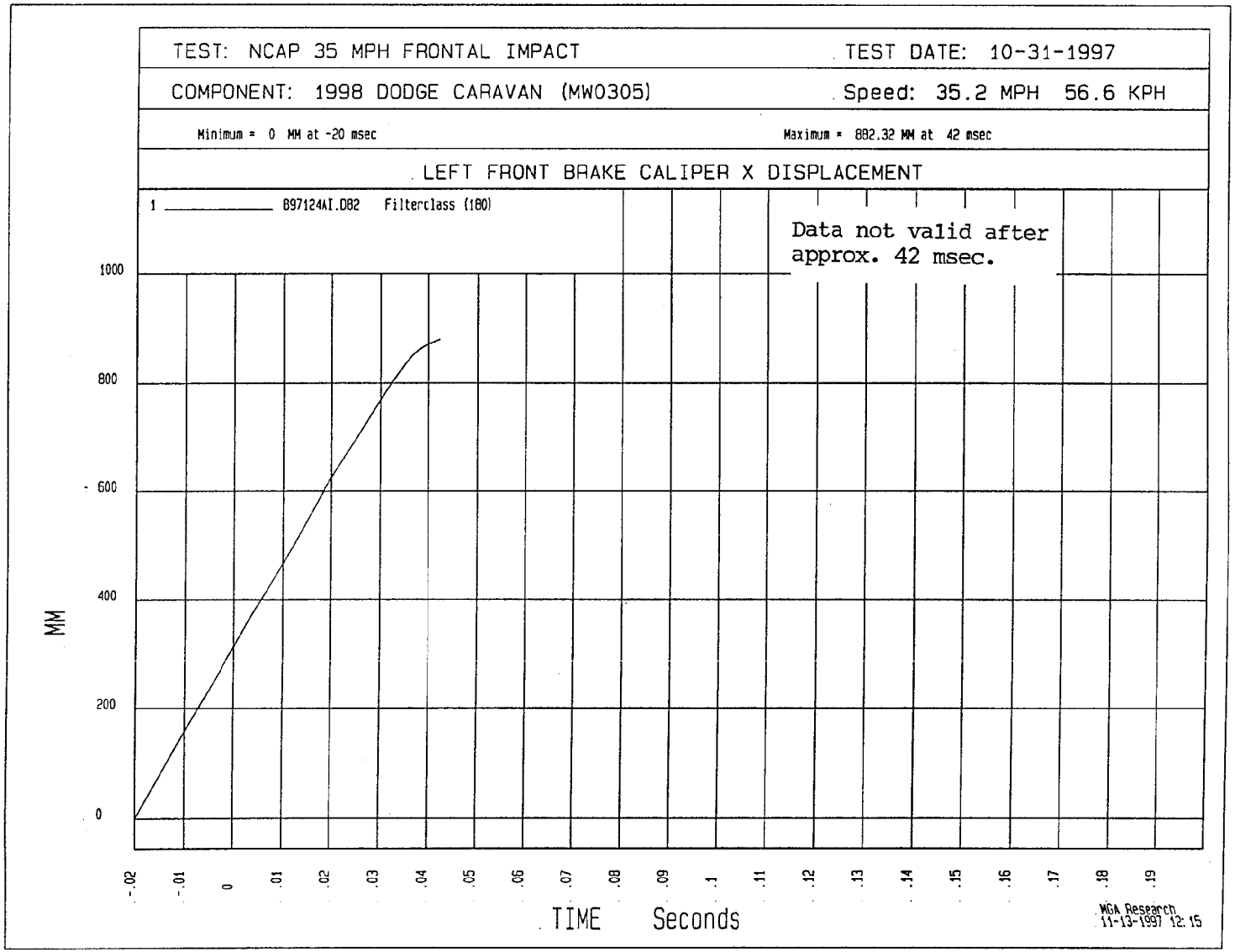

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -152.75 G'S at 30 msec
Maximum = 34.14 G'S at 42 msec
BOTTOM OF ENGINE X ACCELERATION
1 _____ 8971244F.A09 Filterclass (60)
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-13-1997 12:00

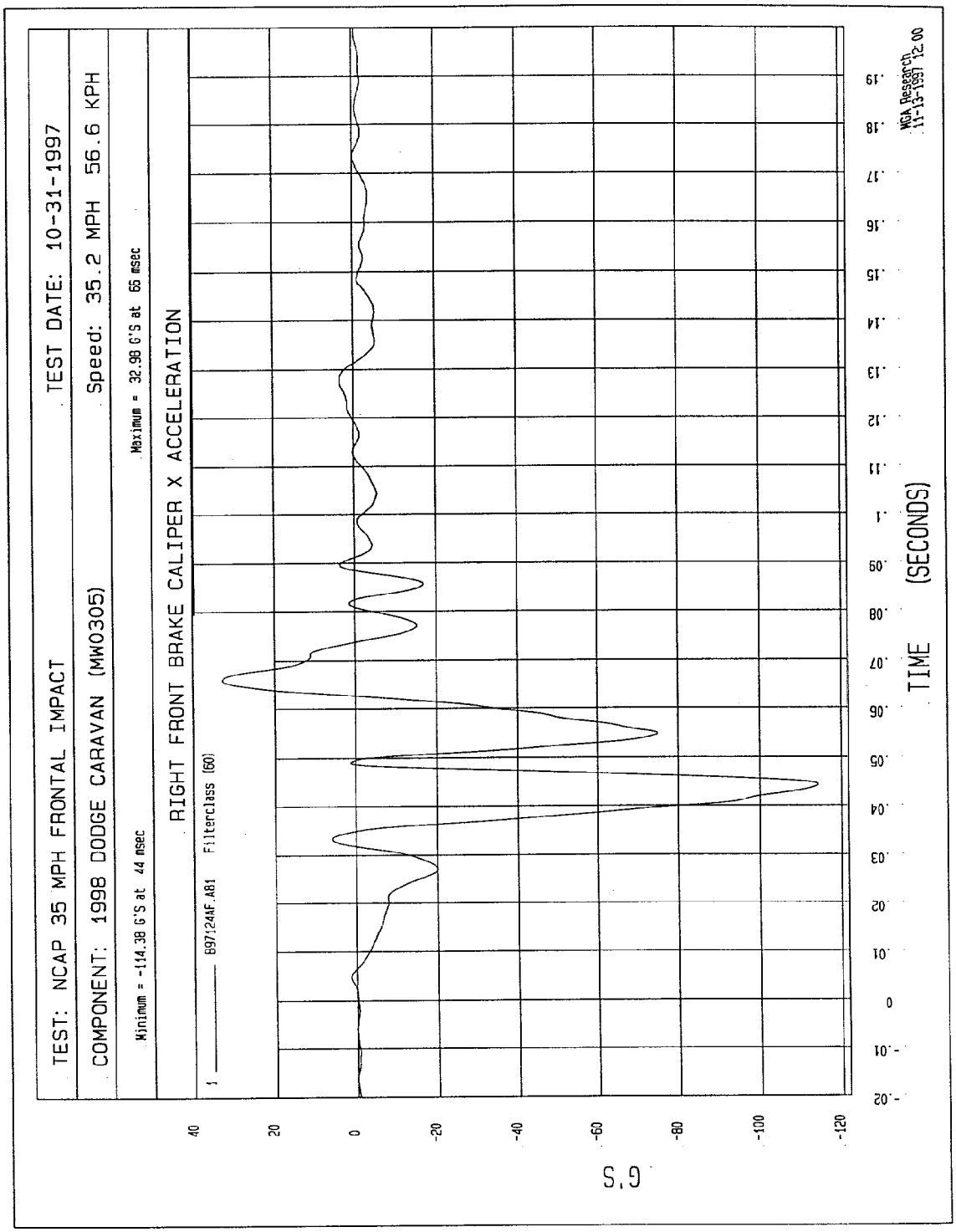

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -6.77 KPH at 188 msec
Maximum = 56.62 KPH at -12 msec
BOTTOM OF ENGINE X VELOCITY
1 B97124AI.V09 Filterclass (180)
KPH
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-13-1997 12:01

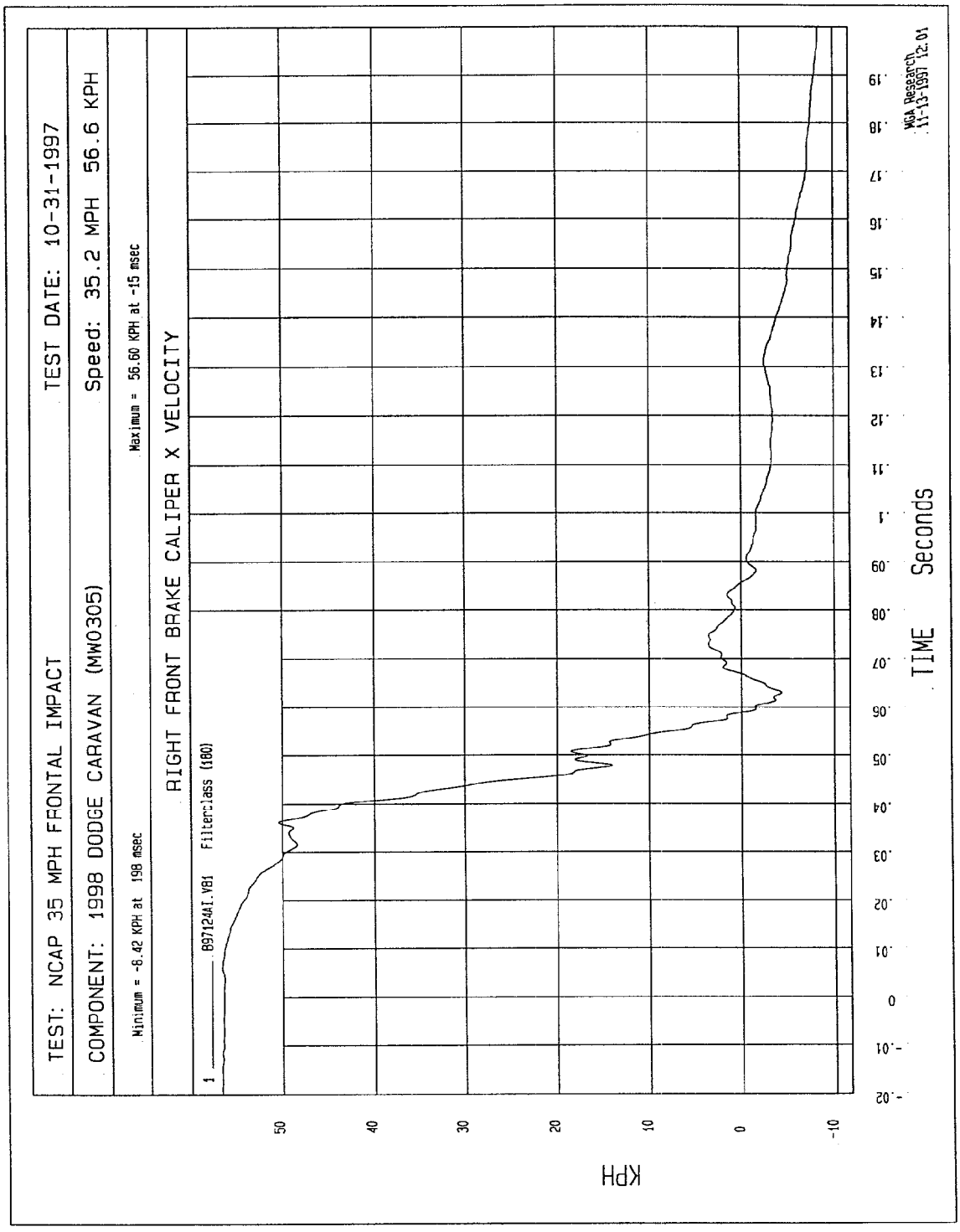

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 0 MM at -20 msec
Maximum = 730.33 MM at 98 msec
BOTTOM OF ENGINE X DISPLACEMENT
1 B97124AI.D09 Filterclass (180)
MM
700
600
500
400
300
200
100
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-13-1997 12:02

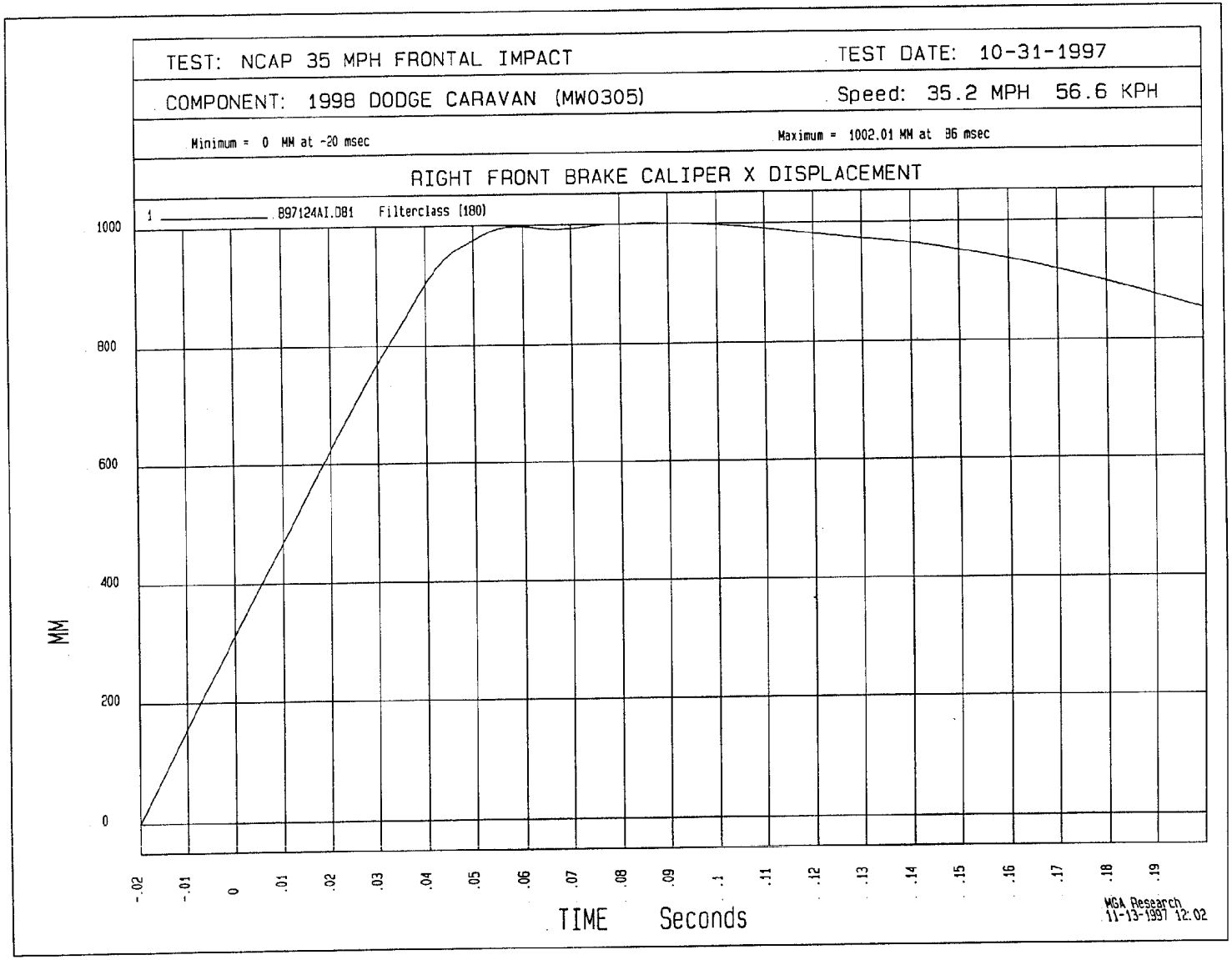

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -166.79 G'S at 37 msec
Maximum = 2.78 G'S at 9 msec
LEFT FRONT BRAKE CALIPER X ACCELERATION
1 ——— 897124AF.A82 Filterclass (60)
Data not valid after approx. 42 msec.
0
-20
-40
-60
-80
-100
-120
-140
-160
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
11-13-1997 12:14
6.5

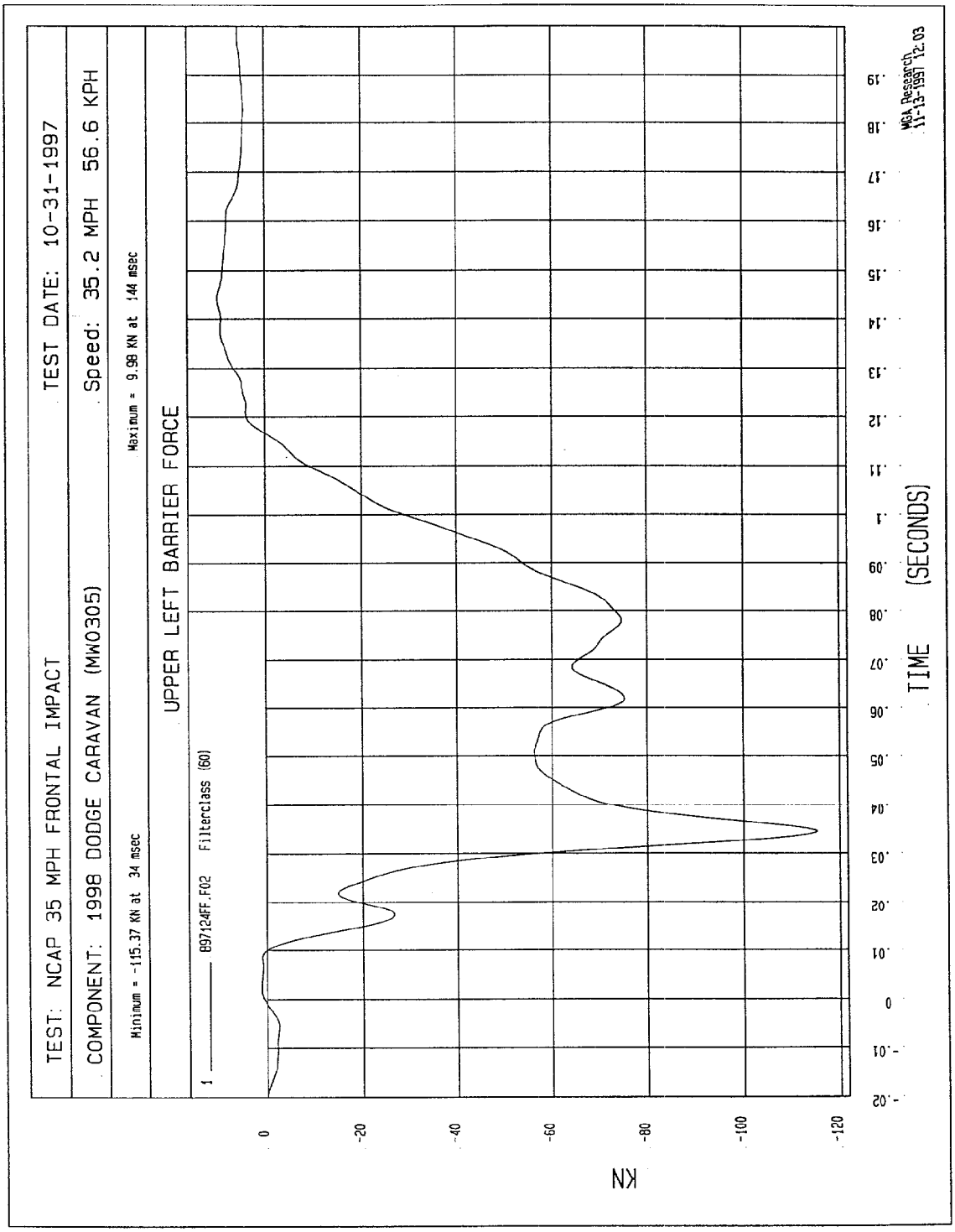

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 11.51 KPH at 41 msec
Maximum = 56.76 KPH at -13 msec
LEFT FRONT BRAKE CALIPER X VELOCITY
1 B97124AI.V82 Filterclass (180)
Data not valid after approx. 42 msec.
KPH
50
40
30
20
10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research 11-13-1997 12:15

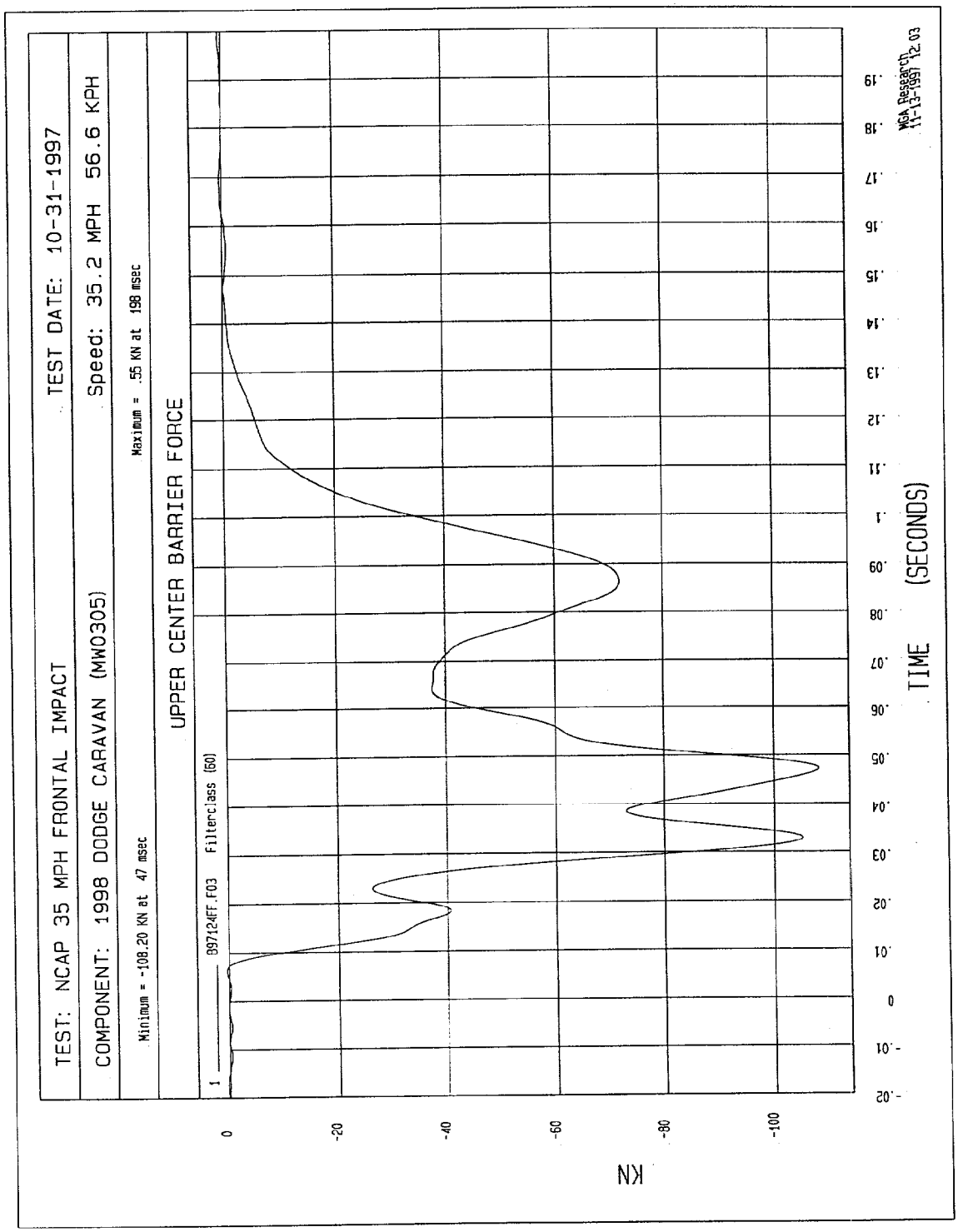

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 0 MM at -20 msec
Maximum = 882.32 MM at 42 msec
LEFT FRONT BRAKE CALIPER X DISPLACEMENT
1 B97124AI.D82 Filterclass (180)
Data not valid after approx. 42 msec.
MM
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-13-1997 12:15

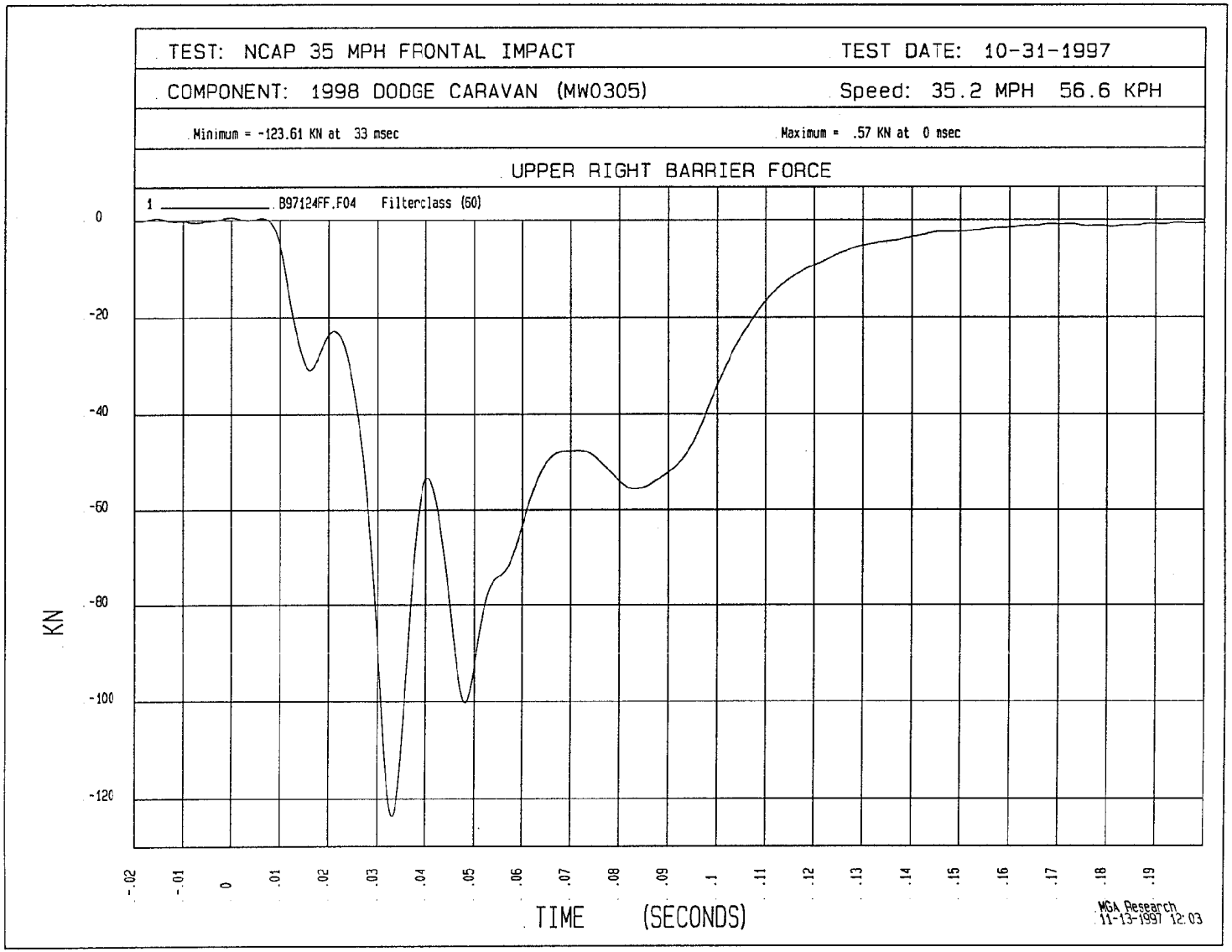

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -114.38 G'S at 44 msec
Maximum = 32.98 G'S at 65 msec
RIGHT FRONT BRAKE CALIPER X ACCELERATION
1 B97124AF.A01 Filterclass (60)
G'S
TIME (SECONDS)
MGA Research
11-13-1997 12:00

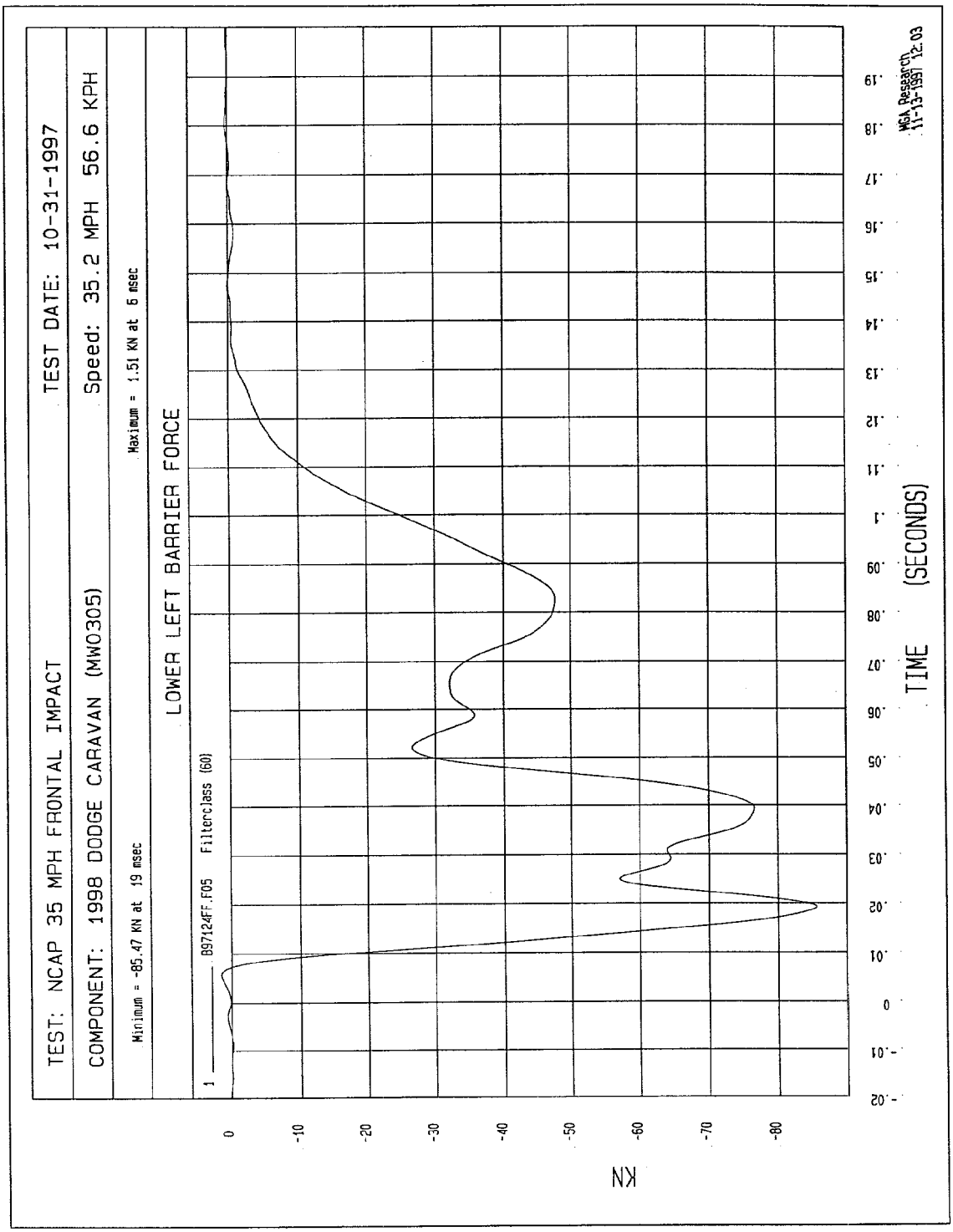

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -6.42 KPH at 198 msec
Maximum = 56.60 KPH at -15 msec
RIGHT FRONT BRAKE CALIPER X VELOCITY
1 _____ 8971244I.V81 Filterclass (180)
KPH
50
40
30
20
10
0
-10
TIME Seconds
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-13-1997 12:01

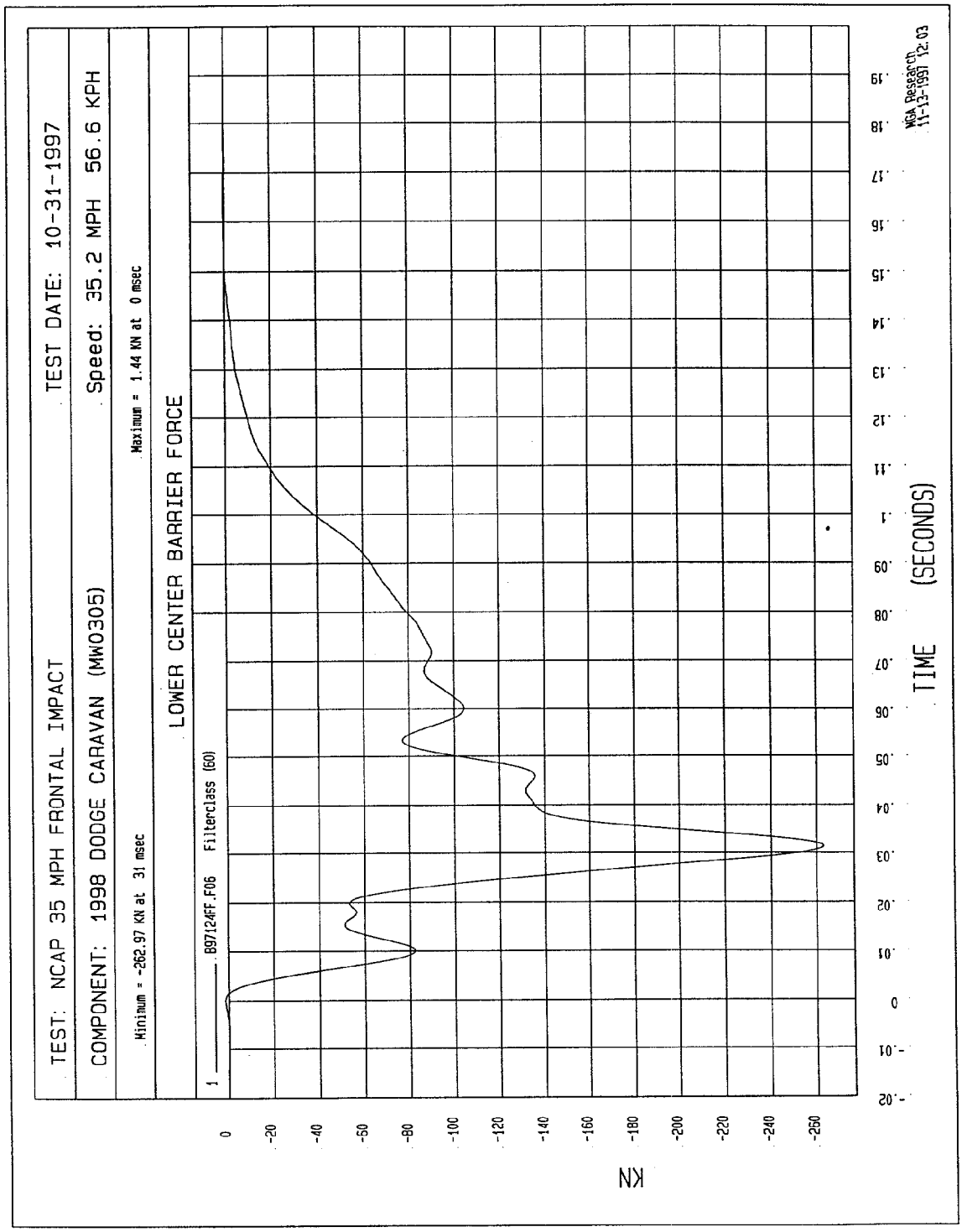

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = 0 MM at -20 msec
Maximum = 1002.01 MM at 86 msec
RIGHT FRONT BRAKE CALIPER X DISPLACEMENT
1 897124AI.DB1 Filterclass (180)
MM
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-13-1997 12:02

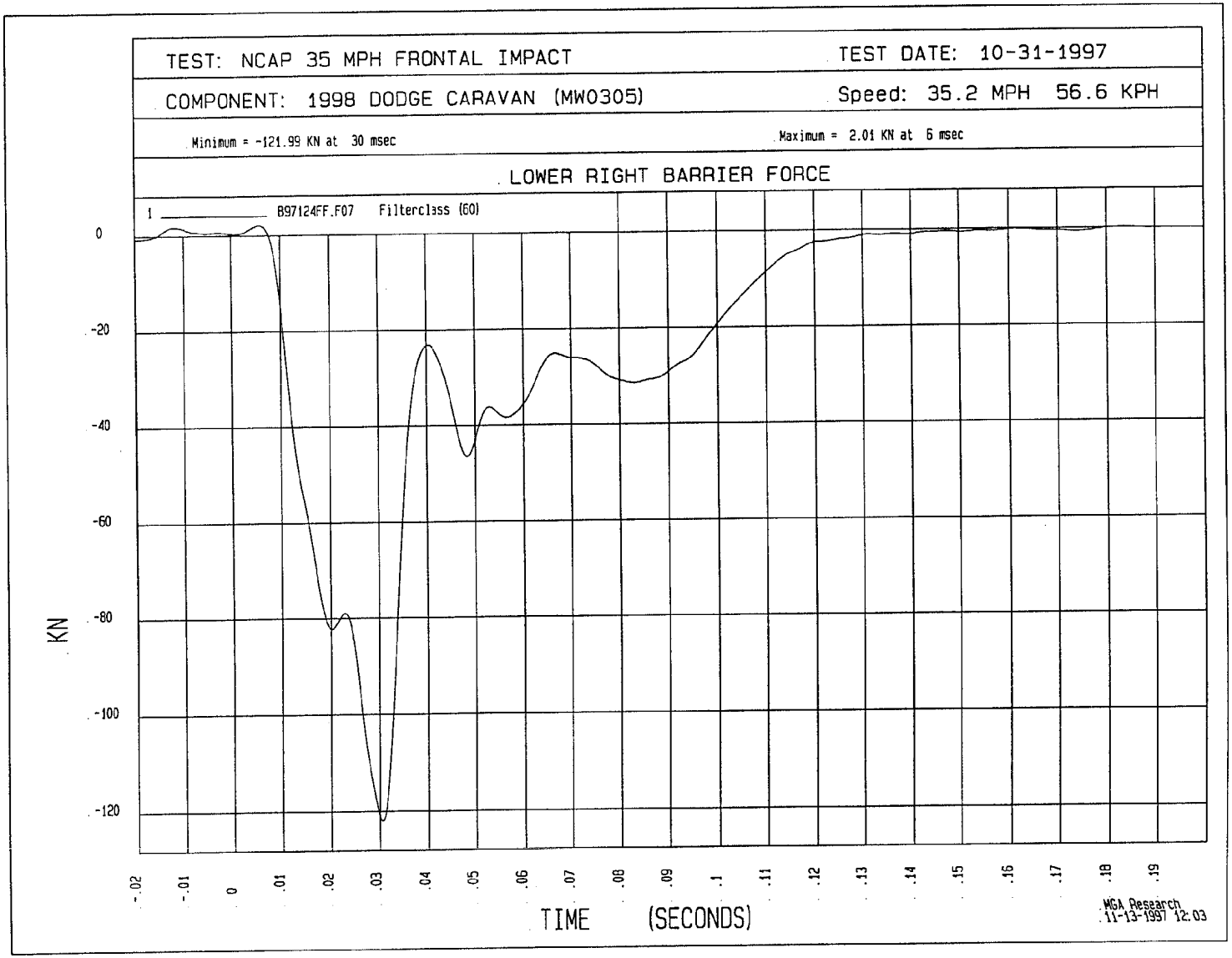

TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -115.37 KN at 34 msec
Maximum = 9.98 KN at 144 msec
UPPER LEFT BARRIER FORCE
1 B97124FF.F02 Filterclass (60)
KN
0
-20
-40
-60
-80
-100
-120
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-13-1997 12:03


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -108.20 KN at 47 msec
Maximum = .55 KN at 198 msec
UPPER CENTER BARRIER FORCE
1 B97124FF.F03 Filterclass (60)
KN
0
-20
-40
-60
-80
-100
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-13-1997 12:03


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -123.61 KN at 33 msec
Maximum = .57 KN at 0 msec
UPPER RIGHT BARRIER FORCE
1 B97124FF.F04 Filterclass (60)
KN
0
-20
-40
-60
-80
-100
-120
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-13-1997 12:03


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -85.47 KN at 19 msec
Maximum = 1.51 KN at 6 msec
LOWER LEFT BARRIER FORCE
1 B97124FF.F05 Filterclass (60)
KN
0
-10
-20
-30
-40
-50
-60
-70
-80
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-13-1997 12:03


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -262.97 KN at 31 msec
Maximum = 1.44 KN at 0 msec
LOWER CENTER BARRIER FORCE
1 B97124FF.F06 Filterclass (60)
KN
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
-220
-240
-260
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-13-1997 12:03


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -121.99 KN at 30 msec
Maximum = 2.01 KN at 6 msec
LOWER RIGHT BARRIER FORCE
1 B97124FF.F07 Filterclass (60)
0
-20
-40
-60
-80
-100
-120
KN
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
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.15
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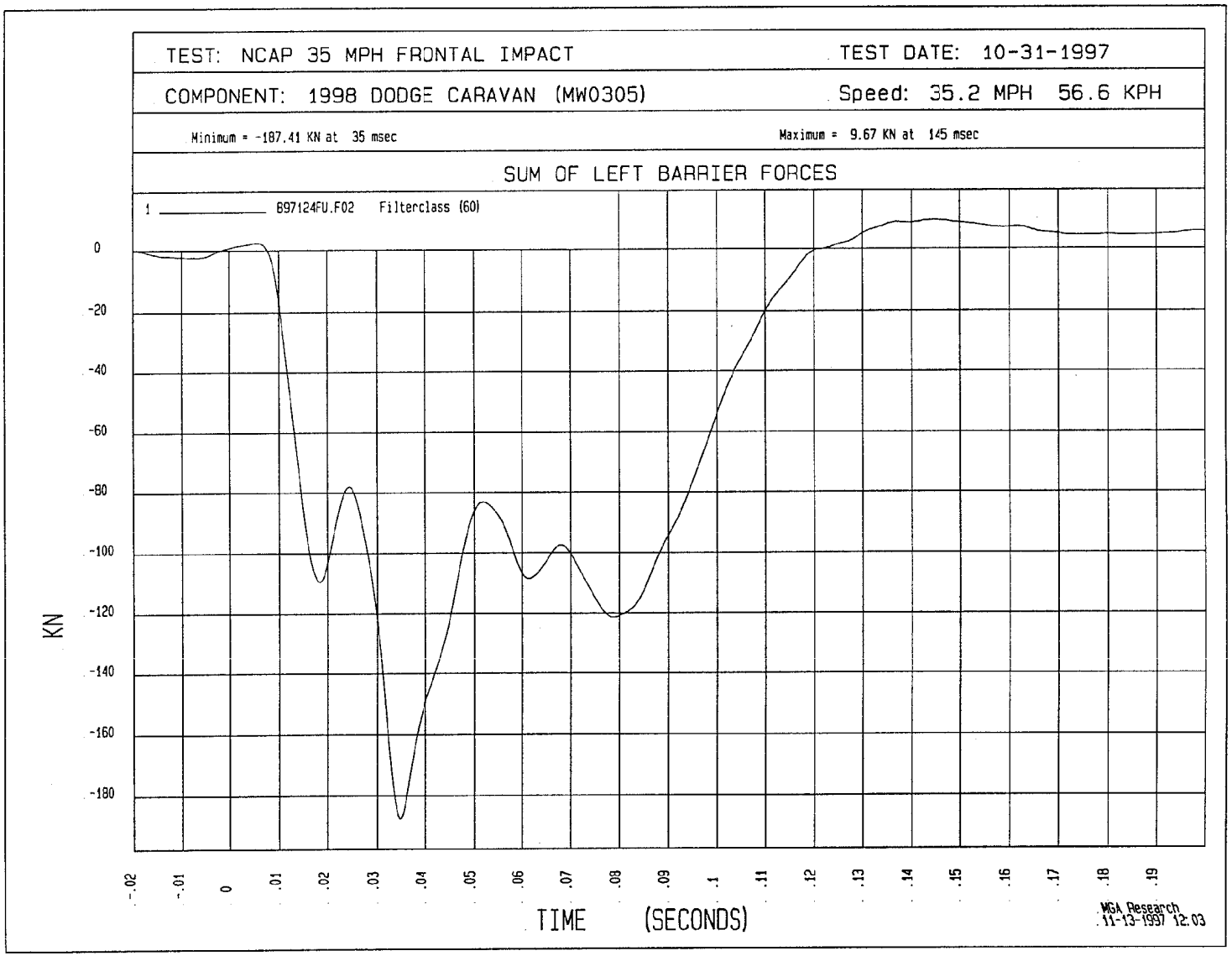
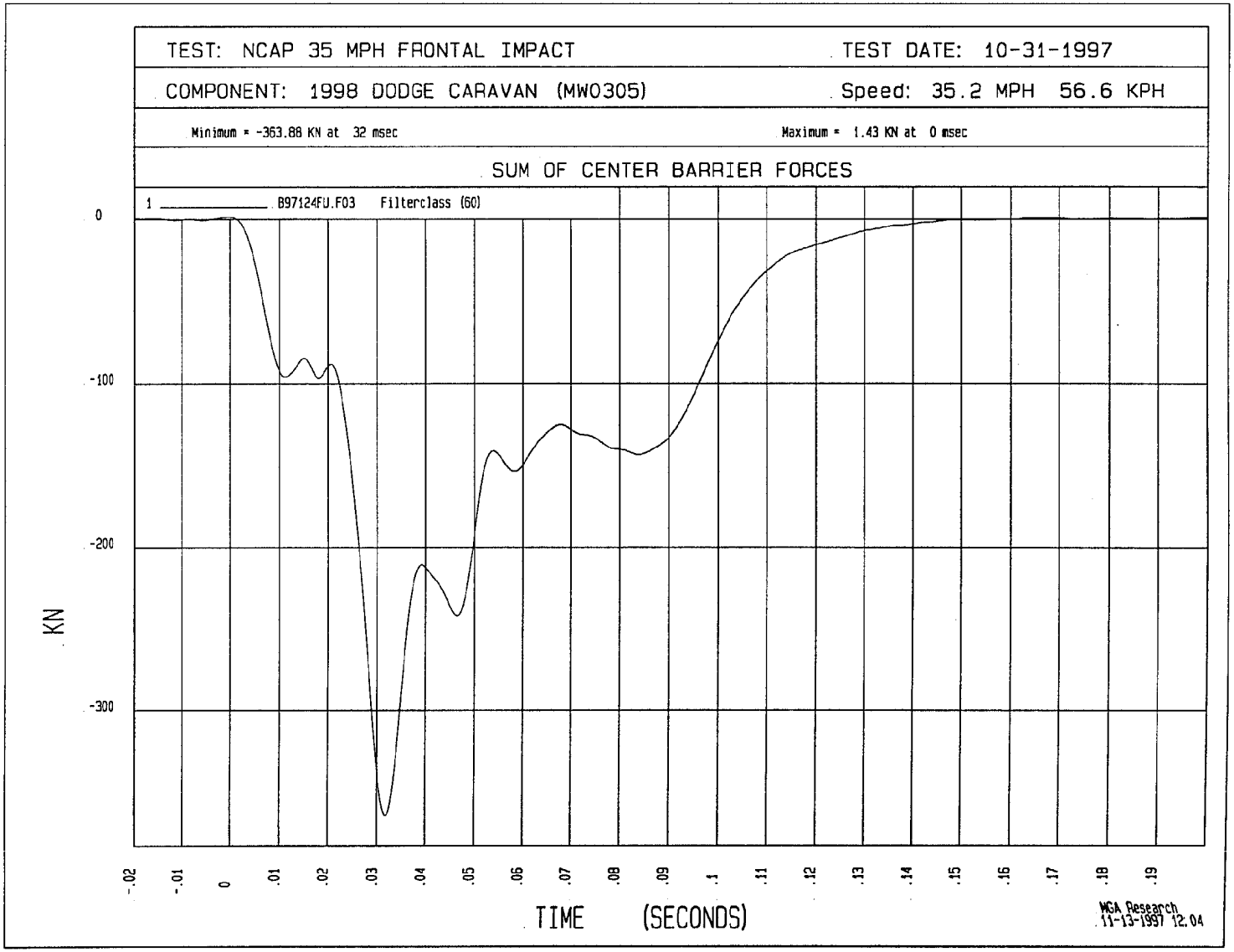
.18
.19
TIME (SECONDS)
MGA Research
11-13-1997 12:03


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -187.41 KN at 35 msec
Maximum = 9.67 KN at 145 msec
SUM OF LEFT BARRIER FORCES
1 B97124FU.F02 Filterclass (60)
KN
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-13-1997 12:03


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -363.88 KN at 32 msec
Maximum = 1.43 KN at 0 msec
SUM OF CENTER BARRIER FORCES
1 B97124FU.F03 Filterclass (60)
0
-100
-200
-300
KN
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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.09
.1
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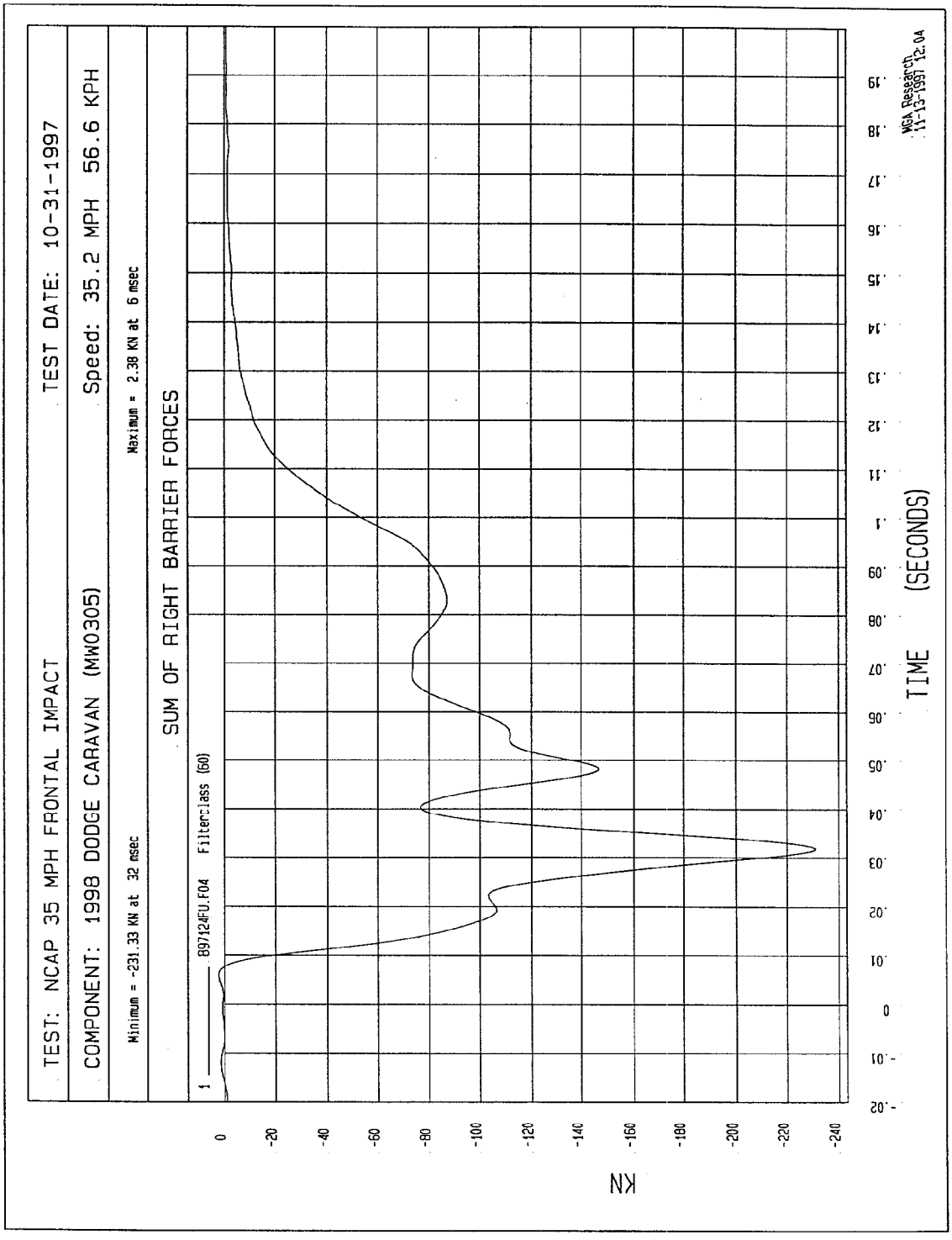
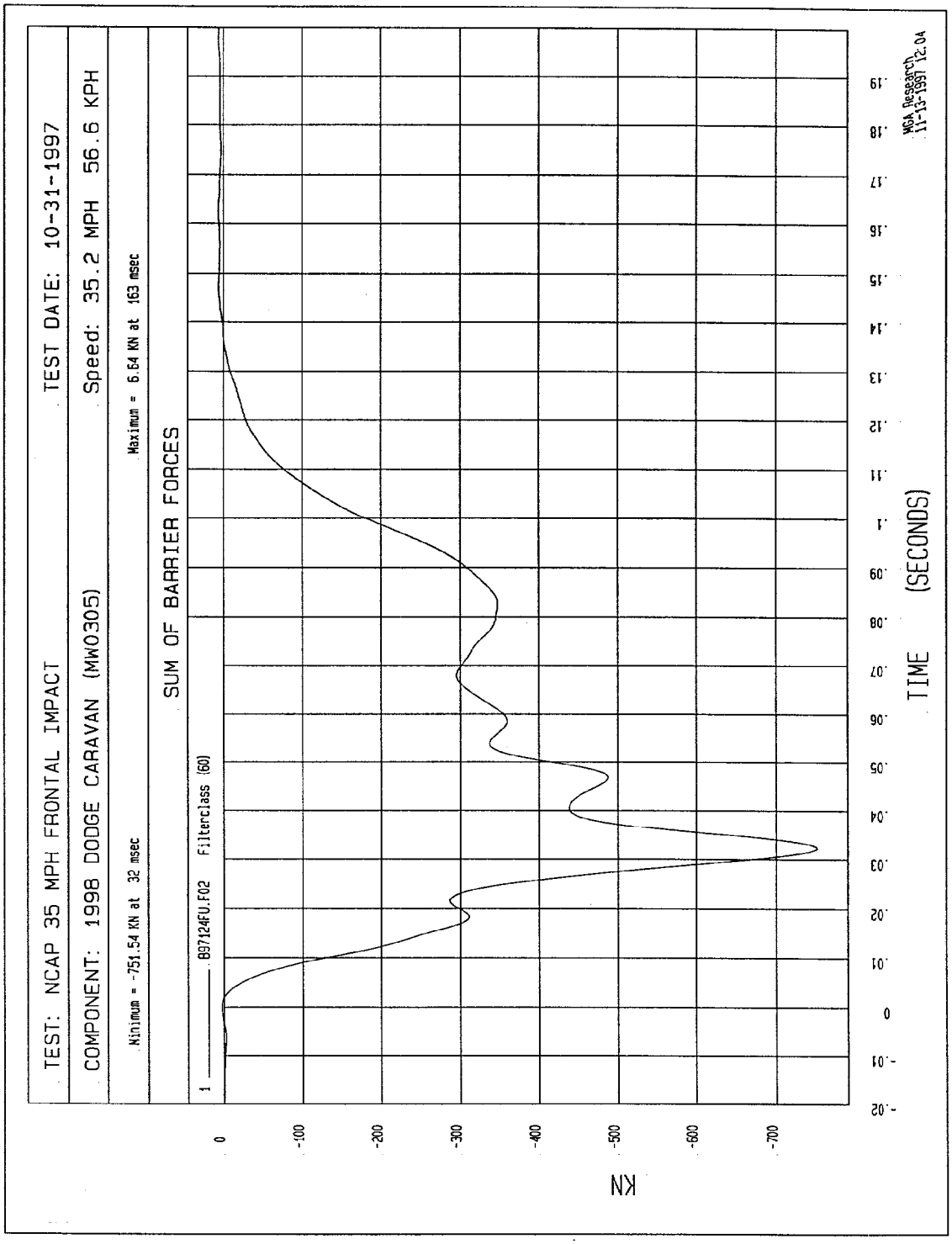
.19
TIME (SECONDS)
MGA Research
11-13-1997 12:04


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -231.33 KN at 32 msec
Maximum = 2.38 KN at 6 msec
SUM OF RIGHT BARRIER FORCES
1 897124FU.F04 Filterclass (60)
KN
TIME (SECONDS)
MGA Research
11-13-1997 12:04


TEST: NCAP 35 MPH FRONTAL IMPACT
TEST DATE: 10-31-1997
COMPONENT: 1998 DODGE CARAVAN (MW0305)
Speed: 35.2 MPH 56.6 KPH
Minimum = -751.54 KN at 32 msec
Maximum = 6.64 KN at 163 msec
SUM OF BARRIER FORCES
1 _____ 897124FU.F02 Filterclass (60)
KN
0
-100
-200
-300
-400
-500
-600
-700
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
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TIME (SECONDS)
MGA Research
11-13-1997 12:04

APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 065 DUMMY CALIBRATION BY: Tim Michnay

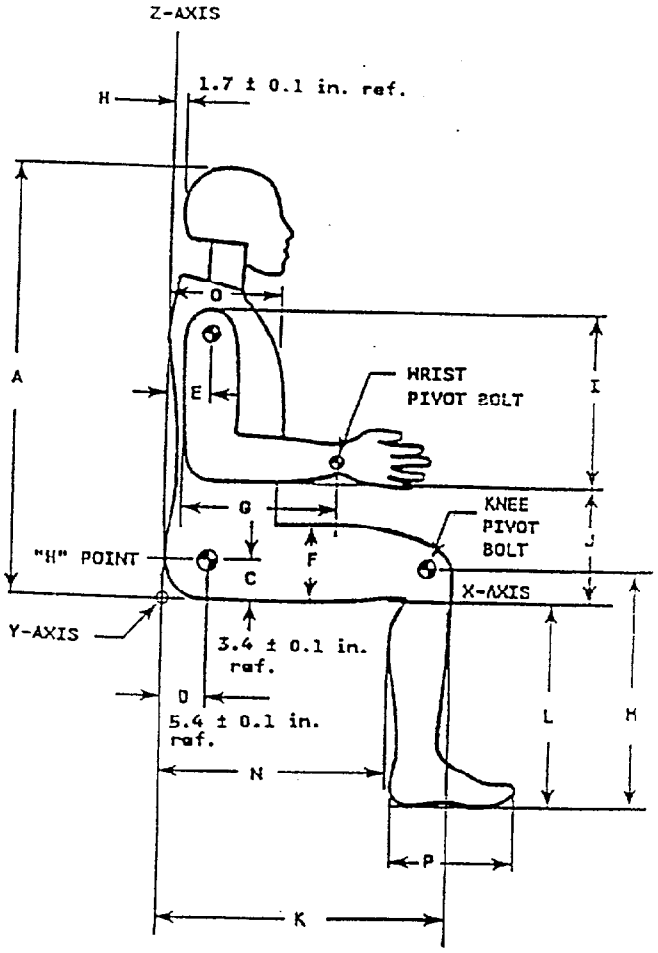
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: February 4, 1997

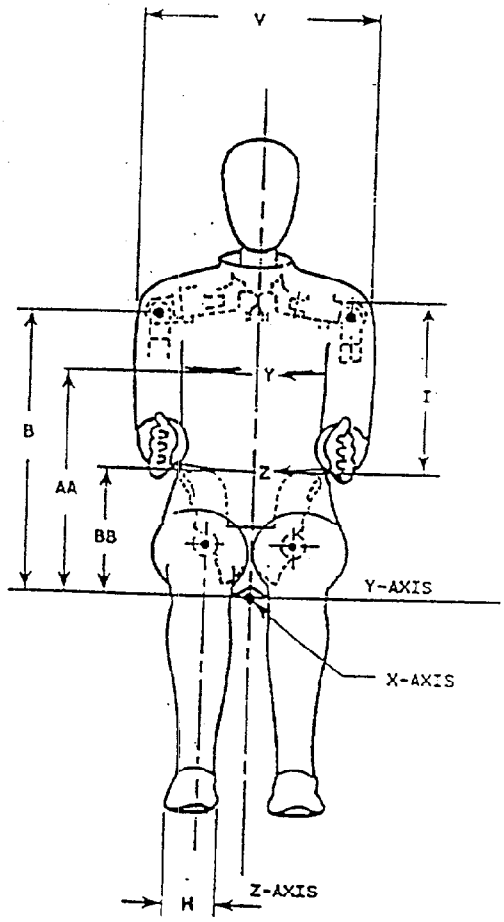
DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	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)

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 (CONT.)

DUMMY NO.: 065 DUMMY CALIBRATION BY: Tim Michnay

VERIFICATION DATE: November 2, 1997

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	27%
Peak Resultant Acceleration	225 - 275 G	249
Peak Lateral Acceleration	15 G. MAX	-7
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	31%
Pendulum Speed		22.6 - 23.4 FT/SEC	23.1
Pendulum Deceleration	10 MS	22.50 - 27.50 G	25.21
	20 MS	17.60 - 22.60 G	21.92
	30 MS	12.50 - 18.50 G	15.97
Max. Pendulum G Above 30 MS		29.0 G MAX	15.9
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	35
D Plane Rotation	MAX	64 - 78 DEG.	76
	TIME	57 - 64 MS	57
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	47
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	103

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	31%
Pendulum Speed		19.50 - 20.30 F/S	20.24
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.09
	20 MS	14.00 - 19.00 G	16.21
	30 MS	11.00 - 16.00 G	12.86
Max. Pendulum G Above 30 MS		22 G Max	13
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	41
D Plane Rotation	MAX	81 - 106 DEG.	99
	TIME	72 - 82 MS	75
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	156
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-50.
	TIME	65 - 79 MS	70
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	137

4.0 THORAX IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	33%
Probe Speed	21.6 to 22.4 F/S	22.0
Peak Deflection	2.50 to 2.86 IN.	2.52
Peak Resistive Force	1160 to 1325 LBS.	1216
Internal Hysteresis	69 to 85%	71%

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	25%
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1270

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	25%
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1066

6.0 HIP JOINT-FEMUR FLEXION TEST

	SPECIFICATION	MEASUREMENT	
		LEFT	RIGHT
Relative Humidity	10 - 70%	27%	
Rotation Rate	5-10 DEG/SEC.	Yes	Yes
70 FT-LBF	30 DEGREE MAX. ROTATION	49	45
150 FT-LBF	40-50 DEGREE MAX. ROTATION	43	44

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 066 DUMMY CALIBRATION BY: Tim Michnay

I. CONFIGURATION VERIFICATION DATA
DATE OF VERIFICATION: February 4, 1997

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 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 Page C-2)

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET

DUMMY NO.: 066 DUMMY CALIBRATION BY: Tim Michnay

VERIFICATION DATE: November 2, 1997

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	27%
Peak Resultant Acceleration	225 - 275 G	273
Peak Lateral Accceleration	15 G. MAX	-7
Is Acceleration Curve Unimodel	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	31%
Pendulum Speed		22.6 - 23.4 FT/SEC	23.18
Pendulum Deceleration	10 MS	22.50 - 27.50 G	25.1
	20 MS	17.60 - 22.60 G	20.64
	30 MS	12.50 - 18.50 G	15.64
Max. Pendulum G Above 30 MS		29.0 G MAX	15.6
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	36
D Plane Rotation	MAX	64 - 78 DEG.	76
	TIME	57 - 64 MS	58
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	114
Moment About Occipital Condyle	MIN.	65 - 80 FT. LBS	68
	TIME	47 - 58 MS	49
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	104

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	27%
Pendulum Speed		19.50 - 20.30 F/S	20.20
Pendulum Deceleration	10 MS	17.20 - 21.20 G	18.98
	20 MS	14.00 - 19.00 G	16.07
	30 MS	11.00 - 16.00 G	13.38
Max. Pendulum G Above 30 MS		22 G Max	13
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	41
D Plane Rotation	MAX	81 - 106 DEG.	99
	TIME	72 - 82 MS	75
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	155
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-50.2
	TIME	65 - 79 MS	71
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	141

4.0 THORAX IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	22%
Probe Speed	21.6 to 22.4 F/S	21.9
Peak Deflection	2.50 to 2.86 IN.	2.61
Peak Resistive Force	1160 to 1325 LBS.	1218
Internal Hysteresis	69 to 85%	71%

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	22%
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1226

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	22%
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1222

6.0 HIP JOINT-FEMUR FLEXION TEST

	SPECIFICATION	MEASUREMENT	
		LEFT	RIGHT
Relative Humidity	10 - 70%	22%	
Rotation Rate	5-10 DEG/SEC.	Yes	Yes
70 FT-LBF	30 DEGREE MAX. ROTATION	46	47
150 FT-LBF	40-50 DEGREE MAX. ROTATION	45	43

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	October 28, 1997
Head Y	ACC61	Endevco	October 28, 1997
Head Z	ACCW9	Endevco	October 28, 1997
Head X Redundant	AJ621	Endevco	October 28, 1997
Head Y Redundant	AJ619	Endevco	October 28, 1997
Head Z Redundant	AHY54	Endevco	October 28, 1997
Chest X	ACC78	Endevco	October 28, 1997
Chest Y	ACCE6	Endevco	October 28, 1997
Chest Z	ACCY3	Endevco	October 28, 1997
Chest X Redundant	AJ9J7	Endevco	October 28, 1997
Chest Y Redundant	AJ7A2	Endevco	October 28, 1997
Chest Z Redundant	AJ819	Endevco	Octobe 28, 1997
Right Femur Load Cell	259	Denton	October 31, 1997
Left Femur Load Cell	260	Denton	October 31, 1997
Pelvis X	ALB87	Endevco	October 28, 1997
Pelvis Y	AHRP5	Endevco	October 28, 1997
Pelvis Z	AJ9T6	Endevco	October 28, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	442	Denton	September 22, 1997
Neck Load Cell Y	442	Denton	September 22, 1997
Neck Load Cell Z	442	Denton	September 22, 1997
Neck Moment X	442	Denton	September 22, 1997
Neck Moment Y	442	Denton	September 22, 1997
Neck Moment Z	442	Denton	September 22, 1997
Chest Deflection Gauge	065	Servo	October 30, 1997
Lap Belt Load Cell	212	GSE	June 12, 1997
Torso Belt Load Cell	657	Lebow	June 3, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	036	Denton	September 23, 1997
Upper Right Tibia Moment Y	036	Denton	September 23, 1997
Lower Right Tibia Moment Y	040	Denton	September 26, 1997
Lower Right Tibia Force X	040	Denton	September 26, 1997
Lower Right Tibia Force Z	040	Denton	Septembe 26, 1997
Upper Left Tibia Moment X	039	Denton	September 23, 1997
Upper Left Tibia Moment Y	039	Denton	September 23, 1997
Lower Left Tibia Moment Y	033	Denton	September 26, 1997
Lower Left Tibia Force X	033	Denton	September 26, 1997
Lower Left Tibia Force Z	033	Denton	September 26, 1997
Right Foot Ball Z	J11625	Endevco	October 28, 1997
Right Foot Heel X	J10730	Endevco	October 28, 1997
Right Foot Heel Z	J11014	Endevco	October 28, 1997
Left Foot Ball Z	J11784	Endevco	October 28, 1997
Left Foot Heel X	J11047	Endevco	October 28, 1997
Left Foot Heel Z	J11046	Endevco	October 28, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	October 28, 1997
Head Y	ACCH1	Endevco	October 28, 1997
Head Z	AAMW5	Endevco	October 28, 1997
Head X Redundant	AJ9D2	Endevco	October 28, 1997
Head Y Redundant	AH1E2	Endevco	October 28, 1997
Head Z Redundant	AJ7K3	Endevco	October 28, 1997
Chest X	ACCY1	Endevco	October 29, 1997
Chest Y	ACCC8	Endevco	October 29, 1997
Chest Z	ACCT7	Endevco	October 29, 1997
Chest X Redundant	AJ9D4	Endevco	October 29, 1997
Chest Y Redundant	AJ9F3	Endevco	October 29, 1997
Chest Z Redundant	AJ9D9	Endevco	October 29, 1997
Right Femur Load Cell	261	Denton	October 31, 1997
Left Femur Load Cell	262	Denton	October 31, 1997
Pelvis X	ALDY8	Endevco	October 28, 1997
Pelvis Y	ALEK9	Endevco	October 28, 1997
Pelvis Z	ALE80	Endevco	October 28, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	443	Denton	September 22, 1997
Neck Load Cell Y	443	Denton	September 22, 1997
Neck Load Cell Z	443	Denton	September 22, 1997
Neck Moment X	443	Denton	September 22,1997
Neck Moment Y	443	Denton	September 22, 1997
Neck Moment Z	443	Denton	September 22, 1997
Chest Deflection Gauge	066	Servo	October 30, 1997
Lap Belt Load Cell	211	GSE	June 12, 1997
Torso Belt Load Cell	624	Lebow	June 12, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	040	Denton	September 23, 1997
Upper Right Tibia Moment Y	040	Denton	September 23, 1997
Lower Right Tibia Moment Y	019	Denton	September 26, 1997
Lower Right Tibia Force X	019	Denton	September 26, 1997
Lower Right Tibia Force Z	019	Denton	September 26, 1997
Upper Left Tibia Moment X	023	Denton	September 23, 1997
Upper Left Tibia Moment Y	023	Denton	September 23, 1997
Lower Left Tibia Moment Y	034	Denton	September 26, 1997
Lower Left Tibia Force X	034	Denton	September 26, 1997
Lower Left Tibia Force Z	034	Denton	September 26, 1997
Right Foot Ball Z	J13652	Endevco	October 30, 1997
Right Foot Heel X	J14006	Endevco	October 30, 1997
Right Foot Heel Z	J13628	Endevco	October 30, 1997
Left Foot Ball Z	J13650	Endevco	October 30, 1997
Left Foot Heel X	J13424	Endevco	October 30, 1997
Left Foot Heel Z	J14007	Endevco	October 30, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	D05-R12	Entran	July 2, 1997
Right Rear Seat Crossmember X	C20-J10	Entran	August 6, 1997
Top of Engine Block X	C05-Z13	Entran	July 2, 1997
Bottom of Engine X	J23-E13	Entran	August 1, 1997
Left Brake Caliper X	E13-D07	Entran	April 23, 1997
Right Brake Caliper X	L14-D16	Entran	July 7, 1997
Instrument Panel X	C05-Z10	Entran	April 23, 1997
Redundant Left Rear Seat Crossmember X	A09-G02	Entran	July 11, 1997
Redundant Right Rear Seat Crossmember X	J13-F16	Entran	August 6,1997

	LABORATORY INSTRUMENTS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	C12871	Endevco	October 27, 1997
Neck Bending Head Rotary Potentiometer	018	Spectrol	August 7, 1997
Neck Bending Pendulum Rotary Potentiometer	019	Spectrol	August 7, 1997
Chest Probe Accelerometer	J13780	Endevco	September 15, 1997
Knee Impact Accelerometer	J13530	Entran	June 4, 1997

APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions

OCCUPANT RESTRAINTS

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

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

WARNING!

It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed.

Do not allow people to ride in any area of your vehicle that is not equipped with seats and seat belts.

Be sure everyone in your vehicle is in a seat and using a seat belt properly.

WARNING!

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

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

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

Unibelts

The UNIBELT, or single continuous-belt restraint system, is installed for the driver, front seat passenger, and right and left rear seating positions.

Each unibelt is a combined lap / shoulder belt system. The belt webbing retractor will lock only during very sudden stops or impacts. This feature allows the shoulder part of the belt to move freely with you under normal conditions. But in a collision, the belt will lock and reduce the risk of your striking the inside of the vehicle or being thrown out.

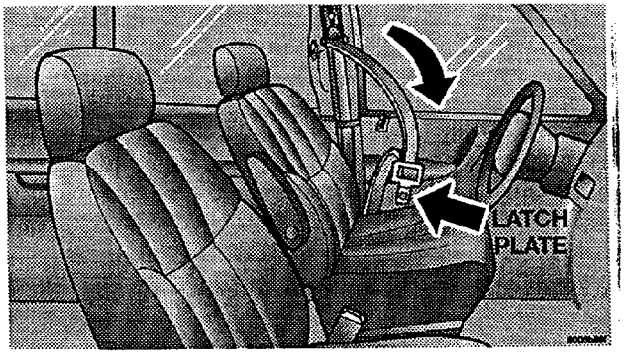
WARNING!

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

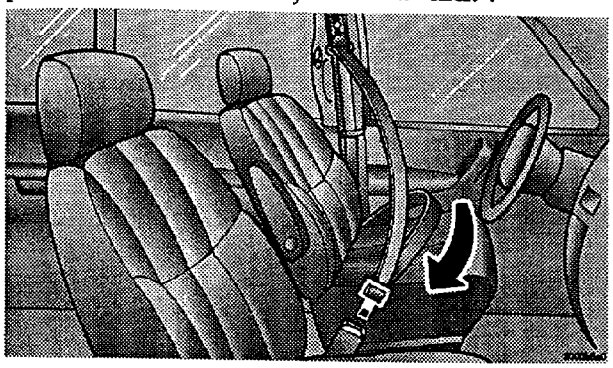
Unibelt Operating Instructions

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

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



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



WARNING!

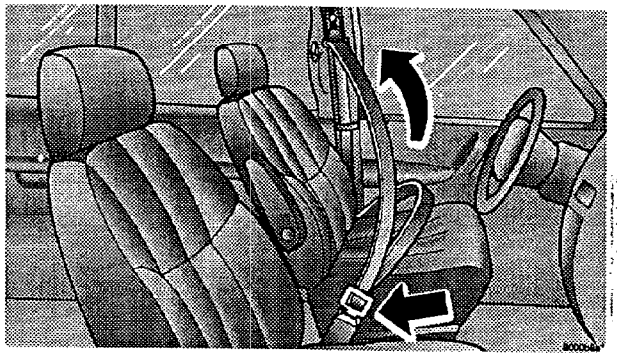
- **A belt that is buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.**
- **A belt that is too loose will not protect you as well. In a sudden stop you could move too far forward, increasing the possibility of injury. Wear your seat belt snugly.**
- **A belt that is worn under your arm is very dangerous. Your body could fall into the inside surfaces of the vehicle in a collision, increasing head and neck injury. And a belt worn under the arm can cause internal injuries. Ribs aren't as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will take the force in a collision.**

4. Position the lap belt across your thighs, below your abdomen. To remove slack in the lap belt portion, pull up a bit on the shoulder belt. To loosen the lap belt if it is too tight, tilt the latch plate and pull on the lap belt. A snug lap belt reduces the risk of sliding under the belt in a collision.

WARNING!

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

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



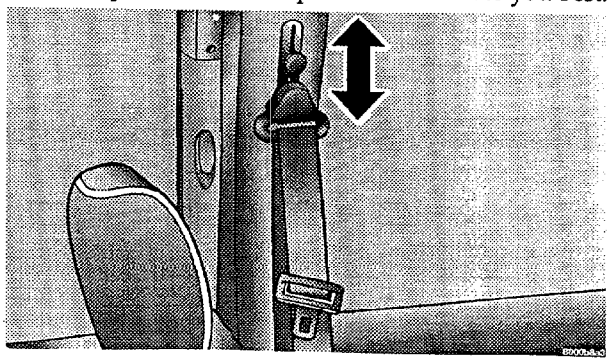
WARNING!

A twisted belt can't do its job as well. In a collision it could even cut into you. Be sure the belt is straight. Use the unibelt untwisting procedure outlined in this section. If this does not straighten the belt, take it to your dealer to have it fixed.

6. To release the belt, push the red button on the buckle. The belt will automatically retract to its stowed position. If necessary, slide the latch plate down the webbing to allow it to retract fully.

Adjustable Upper Shoulder Belt Anchorage

In the front seats and the second row outboard seats, the shoulder belt can be adjusted upward or downward to position the belt away from your neck. Push up or down on the release lever to release the anchorage, and then move it up or down to the position that serves you best.



As a guide, if you are shorter than average, you will prefer a lower position, and if you are taller than average, you'll prefer a higher position. When you release the anchorage, try to move it up or down to make sure that it is locked in position.

In the rear most seat, move toward the center of the seat to position the belt away from your neck.

Seat Belts and Pregnant Women

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

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

WARNING!

A frayed or torn belt could rip apart in a collision and leave you with no protection. Inspect the belt system periodically, checking for cuts, frays, or loose parts. Damaged parts must be replaced immediately. Do not disassemble or modify the system. Seat belt assemblies must be replaced after an accident if they have been damaged (bent retractor, torn webbing, etc.).

Center Seat Lap Belts

Center seating positions have a lap belt only. To fasten a lap belt, slip the latch plate into the buckle. To lengthen a lap belt, tilt the latch plate and pull. To remove slack, pull the loose end of the webbing.

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

WARNING!

- **A lap belt worn too loose or too high is dangerous.**
- **A belt worn too loose can allow you to slip down and under the belt in a collision.**
- **A belt that is too high will apply crash forces to the abdomen, not to the stronger hip bones. In either case, the risk of internal injuries is greater. Wear the lap belt low and snug.**
- **Belting two people into one seat belt can lead to greater injury. People belted together can crash into one another in an accident, hurting one another badly. Never use a unibelt or a lap belt for more than one person, no matter what their size.**

Seat Belt Extender

If a seat belt is too short, even when fully extended and when the adjustable upper shoulder belt anchorage (if so equipped) is in the lowest position, your dealer can provide you with a seat belt extender. This extender should be used only if the existing belt is not long enough. When it is not required, remove the extender and stow it.

WARNING!

Using a seat belt extender when not needed can increase the risk of injury in a collision. Only use when the lap belt is not long enough when it is worn low and snug, and in the recommended seating positions. Remove and stow when not needed.

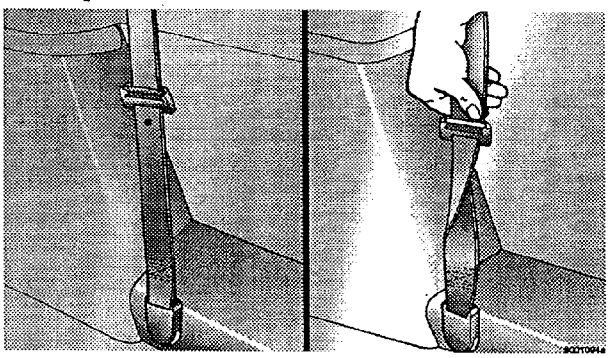
Latch Plate Untwisting Procedure

WARNING!

A twisted belt can't do its job as well. In a collision it could even cut into you. Be sure the belt is straight. Use the unibelt untwisting procedure. If this does not straighten the belt, take it to your dealer to have it fixed.

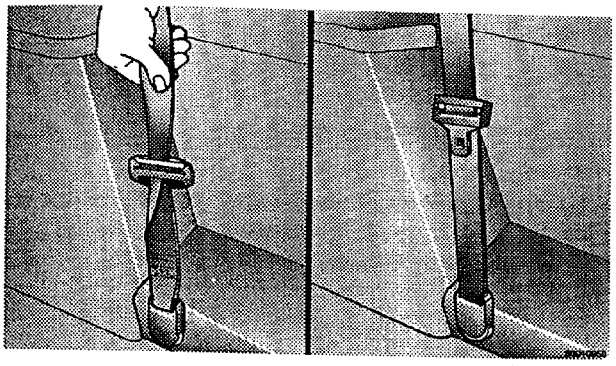
Use the following procedure to untwist a twisted latch plate:

1. Position the latchplate as close as possible to the lower anchor point.



2. At approximately 6 to 12 inches above the latchplate, grasp and twist the webbing 180° to create a fold that begins immediately above the latchplate.

3. Slide the latchplate upward over the folded webbing. Care must be taken at the start of this procedure to ensure that the folded webbing enters the slot at the top of the latchplate.



4. Continue to slide the latchplate upward until it has cleared the portion of folded webbing. Release the webbing and verify that the latch plate has been properly untwisted.

Chrysler Integrated Child Seat—Optional

Operating instructions for this seat are included with the seat. If the instructions are not with the seat or in the Owner's Manual Package, replacement instructions can be obtained.

To obtain replacement instructions:
Use the order form at the back of this manual and specify publication number 81-016-9850.

Child Restraint

Everyone in your vehicle needs to be buckled up all the time, babies and children, too.

WARNING!

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

All states and Canadian provinces require small children to ride in proper restraint systems. This is the law, and you can be prosecuted for ignoring it.

WARNING!

A rearward-facing child restraint should only be used in a rear seat. A child may be seriously or fatally injured in a rearward-facing child restraint placed in the front seat if the restraint is struck by a deploying passenger airbag.

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

Two different child restraint systems are generally available:

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

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

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

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

WARNING!

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

- Infant and child restraints are secured in the vehicle seats by the lap belt or the lap part of the lap/shoulder belt. In the rear seats, you may have trouble tightening the belt on the child restraint because the buckle or latch plate interferes with the belt path opening on the restraint. Disconnect the latch plate from the buckle and twist the short buckle-end belt several turns to

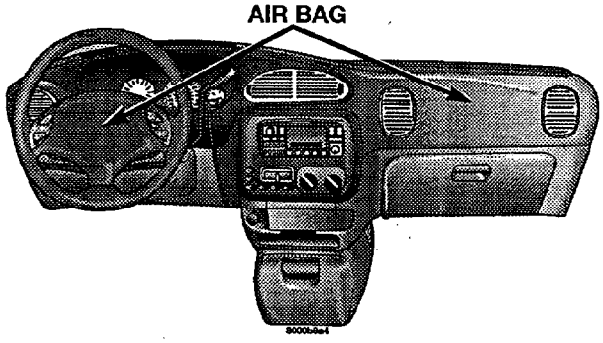
to the middle of the vehicle. If this doesn't solve the problem, move the child to the center rear seating position and use the lap belt.

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

Driver and Right Front Passenger Supplemental Restraint System - Airbag

This airbag is certified to the new federal regulations that allow less forceful airbags.

This vehicle has airbags for the driver and right front passenger as a supplement to the seat belt restraint systems. The driver's airbag is mounted in the steering wheel. The passenger side airbag is mounted in the instrument panel above the glove compartment. These airbags inflate in higher speed frontal impacts. They work with the instrument panel knee bolsters and the seat belts to provide improved protection for the driver and right front passenger.



WARNING!

Relying on airbags alone could lead to more severe injuries in a collision. The airbags do not provide any restraint in side or rear collisions or rollovers. Always wear the seat belt.

The seat belt system is designed to protect you in many types of collisions. The airbags deploy only in frontal collisions. They will not deploy in collisions at slow speed. But even in collisions where the airbags deploy, you need the seat belt to keep you in the right position for the airbags to protect you properly.

Ignoring the AIRBAG light in your message center could mean you won't have the airbags to protect you in a collision. If the light does not come on when starting, stays on for more than 8 seconds after you start the vehicle, or if it comes on as you drive, have the airbag system checked right away.

Here are four simple steps you can take to minimize the risk of harm from a deploying airbag.

1. Infants in a rear facing child safety seats designed for children up to one year or 20 pounds (9 kg) should NEVER ride in the front seat of a vehicle with a passenger side airbag unless the Airbag Switch is turned OFF. See the paragraph on Passenger Side Airbag Shut Off Switch.

Children up to 60 pounds (27 kg) should be secured in child seats or booster seats. Older children who do not use child safety seats or booster seats should ride properly buckled up.

Never allow children to slide the shoulder belt behind them or under the arm.

2. All occupants should wear their lap and shoulder belts properly.

3. The driver and front seat passenger seats should be moved as far back as practical to allow the airbags room to inflate.

4. You should read the instructions provided with your child safety seat or booster seat to make sure that you are using it properly.

The airbag system consists of the following:

- Airbag Control Module and Internal Crash Sensor
- AIRBAG Light
- Driver and Passenger Airbag/Inflator Units
- Unique Steering Wheel and Column
- Unique Instrument Panel
- Interconnecting Wiring
- Knee Impact Bolster

How The Airbag System Works

- **The Airbag Control Module** in the occupant compartment determines if a frontal impact is severe enough to require the airbags. The sensor in the control module will not detect side, rollover, or rear impacts. The control module signals the airbag/inflator units to deploy the airbags.

  This module also monitors the readiness of the electronic parts of the system whenever the ignition switch is in the START or RUN positions. These include all of the items listed above except the knee bolster, instrument panel and the steering wheel and column.

The airbag control module also turns on the Airbag light in the instrument panel for 6 to 8 seconds when the ignition is first turned on, then turns the light off. If it detects a malfunction in any part of the system, it turns on the light either momentarily or continuously.

NOTE: A frontal collision that is not severe enough to need airbag protection will not activate the system. This does not mean something is wrong with the airbag system.

If you do have a collision which deploys the airbag, any or all of the following may occur:

- The nylon airbag material may sometimes cause abrasions and/or skin reddening to the driver and right front passenger as the airbags deploy and unfold.
- The abrasions are similar to friction rope burns or those you might get sliding along a carpet or gymnasium floor. They are not caused by contact with chemicals. They are not permanent and normally heal quickly. However, if you haven't healed significantly within a few days, or if you have any blistering, see your doctor immediately.
- As the airbags deflate you may see some smoke-like particles. The particles are a normal by-product of the process that generates the non-toxic nitrogen and argon gas used for airbag inflation. These airborne particles may irritate the skin, eyes, nose, or throat. If you have skin or eye irritation, rinse the area with cool water. For nose or throat irritation, move to fresh air. If the irritation continues, see your doctor.

  If these particles settle on your clothing, follow the garment manufacturer's instructions for cleaning.
- Your vehicle may be driveable after the airbags deploy. If so, you can tuck the deployed airbags inside the opening in the steering wheel hub and instrument panel trim covers to make driving somewhat easier

WARNING!

Deployed airbags cannot protect you in another collision. Have the airbags replaced by an authorized dealer as soon as possible.

Enhanced Accident Response

If the airbags deploy after an impact and the electrical system remains functional, vehicles equipped with power door locks will unlock automatically. In addition, after the vehicle has stopped moving for approximately 10 seconds, the interior lights will illuminate until the key is removed from the ignition switch.

Transporting Pets

Airbags deploying in the front seat could harm your pet. An unrestrained pet could be thrown about and possibly injured, or injure a passenger during panic braking or in a collision.

Pets should be restrained in the rear seat in pet harnesses or pet carriers that are secured by seat belts.

Maintaining Your Airbag System

WARNING!

- **Modifications to any part of the airbag system could cause it to fail when you need it. You could be injured because the airbag is not there to protect you. Do not modify the components or wiring, including adding any kind of badges or stickers to the airbag covers. Do not modify the front bumper or vehicle body structure.**
- **You need proper knee impact protection in a collision. Do not mount or locate any aftermarket equipment on or behind the knee bolsters.**
- **It is dangerous to try to repair any part of the airbag system yourself. Don't try to repair the airbag system. Be sure to tell anyone who works on your vehicle that it has airbags.**

You will want to have the airbags ready for your protection in a collision. While the airbag Supplemental Restraint System (SRS) is designed to be maintenance free, if any of the following occurs, have an authorized dealer service the system immediately.

- The AIRBAG light does not come on or flickers during the 6 to 8 seconds when the ignition switch is first turned on.
- The light remains on or flickers after the 6 to 8 second interval.
- The light flickers or comes on and remains on while driving.

ENGINE BREAK-IN RECOMMENDATIONS

A long break-in period is not required for the engine in your new vehicle.

Drive moderately during the first 300 miles (500 km). After the initial 60 miles (100 km), speeds up to 50 or 55 mph (80 or 90 km/h) are desirable.

While cruising, brief full-throttle acceleration, within the limits of local traffic laws, contributes to a good break-in. Wide open throttle acceleration in low gear can be detrimental and should be avoided.

The engine oil installed in the engine at the factory is a high quality energy conserving type lubricant. Oil changes should be consistent with anticipated climate conditions under which vehicle operations will occur. The recommended viscosity and quality grades are shown in Section 7 of this manual. NON-DETERGENT OR STRAIGHT MINERAL OILS MUST NEVER BE USED.

A new engine may consume some oil during its first few thousand miles of operation. This should be considered as a normal part of the break-in and not interpreted as an indication of difficulty.