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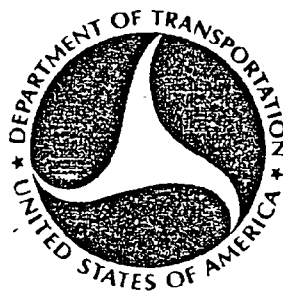
R2150-003

RETEST

REPORT NO. 212-MSE-83-003
219-MSE-83-003
301-MSE-83-003

NHTSA NEW VEHICLE ASSESSMENT AND
STANDARDS ENFORCEMENT INDICANT TESTING
FMVSS 212, 219, & 301-75

1983 Mitsubishi Cordia



APPROVED: *[Signature]*
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FMVSS 204/208/212/301
DATE: DEC 08 1983

November 1983

FINAL REPORT

Prepared Under Contract No. DTNH22-82-D-21140

For


U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
Office of Vehicle Safety Compliance
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Date 11/17/83

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DEC 08 1983

Date

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SECTION 1
INTRODUCTION

The test was conducted as part of the 1983 Barrier Impact Test Program being conducted for the National Highway Traffic Safety Administration (NHTSA) by Mobility Systems and Equipment Company (MSE) under Contract DTNH22-82-D-21140. The compliance tests provide data for evaluation of FMVSS 212, 219, and 301-75; occupant response; and vehicle acceleration environment. The test was conducted in accordance with the NHTSA test procedures TP-212-02 and IP-212-02.

This test was conducted as a retest of an identical vehicle that was tested at a nominal 35 mph impact speed. The 35 mph test resulted in a failure to satisfy the FMVSS 301-75 requirements; the reference report number is 2150-008.

SECTION 2
SUMMARY OF TEST CONDITIONS

A compliance test was conducted on a 1983 Mitsubishi Cordia, NHTSA No. CD5602 on 10/31/83. The vehicle was impacted into a flat rigid barrier. The general test and vehicle descriptive information are presented in Table 1. The camera location data are presented in Table 2 and Figure 1. The list of measurements recorded during the test is presented in Table 3. Pretest and posttest photographs of the vehicle and occupants are presented in Appendix A.

Two fully instrumented Part 572, 50th percentile male anthropomorphic test dummies (ATD's) were installed in the driver and right front passenger designated seating positions (DSP's). The ATD's were restrained with the standard production 3-point lap and shoulder belt system.

The test event was photographed with one real time camera and eight high-speed cameras. All cameras functioned properly.

Twenty-six channels of data were recorded on two FM tape recorders. Time history plots of all recorded channels and appropriate resultants and HIC and chest peak acceleration values are presented in Appendix B.

TABLE 1 - CRASH TEST SUMMARY

PROJECT: FMVSS 212, 219, 301 Compliance TEST NO. 3

DATE: 10/31/83 TIME: 1:08 PM TEMP. 78°F

VEHICLE 1983 Mitsubishi Cordia
TEST WEIGHT (lbs) 2,632
IMPACT ANGLE (deg) 0
IMPACT VELOCITY (mph) 29.45
MAX. CRUSH (in) 19 5/8

ATD'S

TYPE	<u>Part 572 50th Percentile Male</u>	<u>Part 572 50th Percentile Male</u>
LOCATION	<u>Front Left</u>	<u>Front Right</u>
RESTRAINT	<u>Production 3-Point Restraint</u>	<u>Production 3-Point Restraint</u>

NUMBER OF DATA CHANNELS 28

NUMBER OF HIGH SPEED CAMERAS 8

BARRIER Flat Rigid

TABLE 2 SUMMARY OF CAMERA LOCATIONS AND DESCRIPTIONS

Loc. No.	Location	Field of View	Lens Size	Frame Rate	Timing Speed	Mfg/Serial Number	Impact Dist-X in.	Center-line Dist-Y in.	Camera Height in.	Film Quality
1	Overhead (Barrier)	Windshield styrofoam up to barrier-vehicle contact if possible	16 mm	734 fps	None	HIMAC 135	6	6	156	Good
2	Ground Based (Right)	Windshield	20 mm	907 fps	None	HIMAC 138	0	108	65	Good
3	Pit	Engine underside and fuel pump	13 mm	648 fps	None	PHOTO-SONICS 45	51	2	-59	Good
4	Ground Based (Left)	Views entire left side of vehicle	50 mm	562 fps	None	FASTAX 1258	96	-944	65	Good
5	Ground Based	Documentary	Zoom	24 fps	None	ARIFLEX NR6837	489	-972	57	Good
6	Ground Based	Driver dummy closeup	25 mm	615 fps	.001 sec	FASTAX 41650	195	-340	66	Good
7	Ground Based	Passenger dummy closeup	25 mm	857 fps	.001 sec	HIMAC 143	108	160	62	Good
8	Pit	Fuel tank	13 mm	605 fps	.001 sec	PHOTO-SONICS 573	59	- 4	-51	Good
9	Ground Based (Left)	Same view as Camera No. 6	25 mm	562 fps	None	FASTAX 41667	10	-106	66	Good

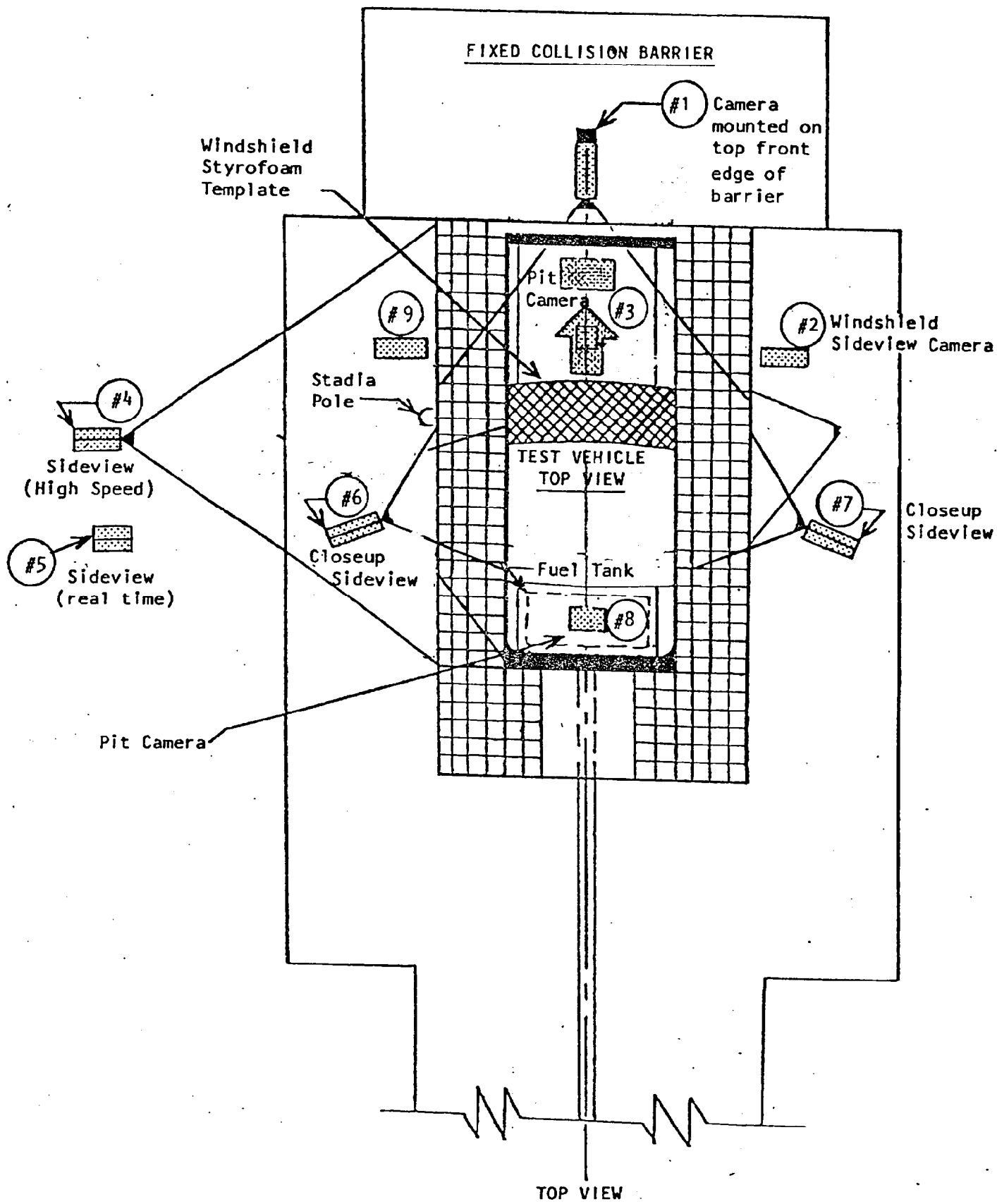


FIGURE 1 CAMERA LOCATIONS

TABLE 3 MEASUREMENT SYSTEM CHANNEL DESIGNATION

DIGITAL TAPE CHANNEL NO.	SENSOR	CHANNEL DESCRIPTION	DATA QUALITY
01	AC	DR HED X	Good
02	AC	DR HED Y	Good
03	AC	DR HED Z	Good
04	AC	DR CST X	Good
05	AC	DR CST Y	Good
06	AC	DR CST Z	Good
07	AC	PA HED X	Good
08	AC	PA HED Y	Good
09	AC	PA HED Z	Good
10	AC	PA CST X	Good
11	AC	PA CST Y	Good
12	AC	PA CST Z	Good
13	LC	DR FEMUR L	Good
14	LC	DR FEMUR R	Good
15	LC	PA FEMUR L	Noisy
16	LC	PA FEMUR R	Noisy
17	AC	VEH. RFF X	Good
18	AC	VEH. LRF X	Good
19	AC	VEH. ENG TOP X	Good
20	AC	VEH. ENG. BOT. X	Good
21	AC	VEH. BCR X	Good
22	AC	VEH. BCL X	Good
23	LC	DR LBO	Good
24	LC	DR SHB	Good
25	LC	PA LBO	Good
26	LC	PA SHB	Good

2.1 GENERAL COMMENTS

The 1983 Mitsubishi Cordia 2-door hatchback was equipped with a 1.795 liter transversely mounted 4 cylinder engine and five speed manual transmission. The total test weight of the Cordia with two ATD's and instrumentation was 2,632 pounds.

The Mitsubishi Cordia was involved in a frontal rigid barrier impact at a velocity of 29.45 mph. The vehicle appears to comply with FMVSS No. 212 - Windshield Mounting, and FMVSS No. 219 - Windshield Zone Intrusion. During impact the front side of the Cordia's fuel tank was contacted by the exhaust pipe moving rearward. A rubber strap that held the exhaust pipe to the car's floor in that area did not break during the crash. There was no fuel leakage either after impact or during the subsequent rollover test. The vehicle appears to comply with FMVSS No. 301-75 - Fuel System Integrity.

The maximum static crush of the vehicle was 19 5/8 inches. After impact both the driver's door and passenger's door were opened without tools. The windshield was slightly cracked near its upper left corner. All other vehicle glazing remained intact.

The driver ATD's head hit the steering wheel rim, and the top edge of the steering wheel hub. His chest hit the lower steering wheel rim. His knees hit the dash panel, and his left knee also hit the side of the steering column. The driver's Head Injury Criteria value of 885 maximum chest acceleration (resultant clipped) of 34 g's, maximum femur loads of 275 and 337 pounds satisfy the FMVSS 208 requirements.

The passenger ATD's head hit the dash panel, and his knees pushed in the glove compartment door. The passenger's Head Injury Criteria value of 807, maximum chest acceleration (resultant clipped) of 34 g's, and a maximum femur loads of 945 and 510 pounds satisfy the FMVSS 208 requirements. Because of noise in the femur load cell data,

the maximum amplitudes are questionable but are definitely below the limit.

The left side of the passenger's seat came loose from its rail during the impact, allowing that side of the seat to move forward. The resulting rotation of the seat caused the right side of the seat to be disengaged from its rail. The right side of the seat did not appear to move appreciably.

The steering column moved downward relative to the dash panel approximately 1/4 inch. After the crash, the displacement link of the steering system was nearly perpendicular to the steering column. There were no signs of collapse in the steering column itself.

SECTION 3

COMPLIANCE DATA

FMVSS 212, 219, and 301-75

Compliance data for FMVSS No.'s 212, 219, and 301-75 were acquired during the test. The results are presented in Tables 4 through 7.

TABLE 4 SUMMARY OF FMVSS 212 DATA

TEST VEHICLE NHTSA NO. CD5602 TEST DATE: 10/31/83

VEH. MFR/MAKE/MODEL Mitsubishi Cordia Sport Coupe

Details of windshield mounting (method of retention, type of trim, etc.)

The windshield is bonded to a rubber perimeter molding with an adhesive,
and reinforced with a hard rubber retainer attached with clips.

	WINDSHIELD PERIPHERY	
	PRETEST	POSTTEST
RIGHT SIDE	70 in.	70 in.
LEFT SIDE	70 in.	70 in.
TOTAL	140 in.	140 in.

The standard requires that POSTTEST be a minimum of 75 percent of the PRETEST total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles which are equipped with occupant passive restraints.

AREA OF RETENTION FAILURE:

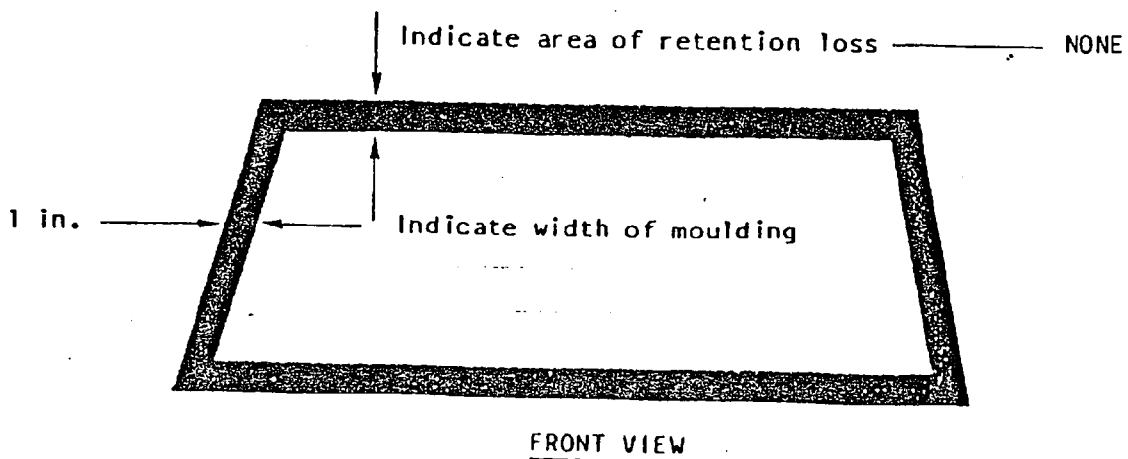
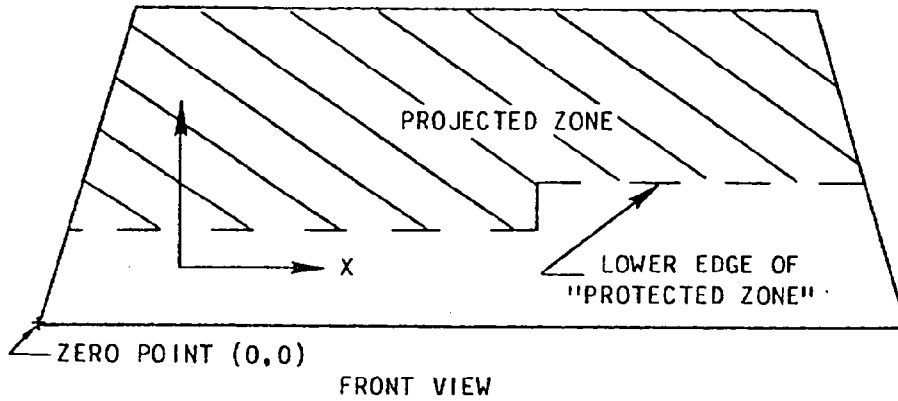


TABLE 5 WINDSHIELD ZONE INTRUSION, FMVSS 219

TEST VEHICLE NHTSA NO. CD5602

TEST DATE: 10/31/83

VEH. MFR/MAKE/MODEL Mitsubishi Cordia Sport Coupe



With the zero coordinate for the X-Y grid located at the lower right corner (passenger side) of the windshield, record the following positions:

- Ⓐ The area that the "Protected Zone" template was penetrated more than .25 inches by a vehicle component other than one which is normally in contact with the windshield.

Coordinates

X	Y

NONE

- Ⓑ The area beneath the "Protected Zone" that the inner surface of the windshield was penetrated by a vehicle component.

Coordinates

X	Y

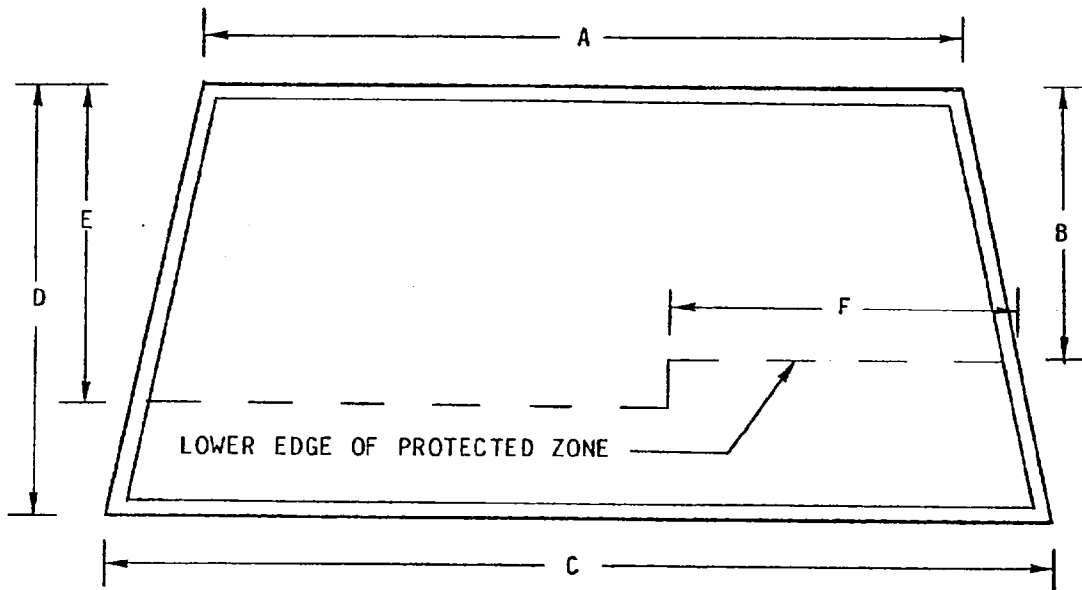
NONE

TABLE 6 PROTECTED ZONE

TEST VEHICLE NHTSA NO. CD5602

TEST DATE: 10/31/83

VEH. MFR/MAKE/MODEL Mitsubishi Cordia Sport Coupe



FRONT VIEW OF WINDSHIELD

Provide all dimensions necessary to reproduce the protected zone.
Method of adhering styrofoam to the windshield:

Glued with GE silicone sealant.

A = 39 1/2 D = 24 3/8
B = 16 E = 18 3/8
C = 53 1/2 F = 29

TABLE 7 FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

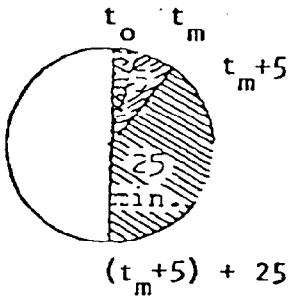
TEST VEHICLE NHTSA NO. CD5602 TEST DATE 10/31/83
 VEH. MFR/MAKE/MODEL Mitsubishi Cordia Sport Coupe

Test vehicle fuel tank filled to 90-91% of capacity with Stoddard Solvent and with electric fuel pump operating (if it will operate without engine operation. Part 572 test dummies located at each front designated seating position.

A. TEST VEHICLE IMPACT TYPE

- Frontal (30 mph)
- Oblique (30 mph) with ° barrier face first contacting (driver/passenger) side
- Rear Moving Barrier (35 mph)
- Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT - - -



1. From impact until vehicle motion ceases - - - - -
2. For 5 minute period after veh. motion ceases - - -
3. For next 25 minutes - - -

ACTUAL	MAX. ALLOW.
0	1 oz
0	5 oz
0	1 oz/1 min.

B. TEST VEHICLE STATIC ROLLOVER

DETAIL TEST RESULTS ARE RECORDED ON THE FOLLOWING DATA SHEETS:

- (1) Rollover data for 0° to 90° test phase.
- (2) Rollover data for 90° to 180° test phase.
- (3) Rollover data for 180° to 270° test phase.
- (4) Rollover data for 270° to 360° test phase.

C. SOLVENT SPILLAGE DETAILS

NONE.

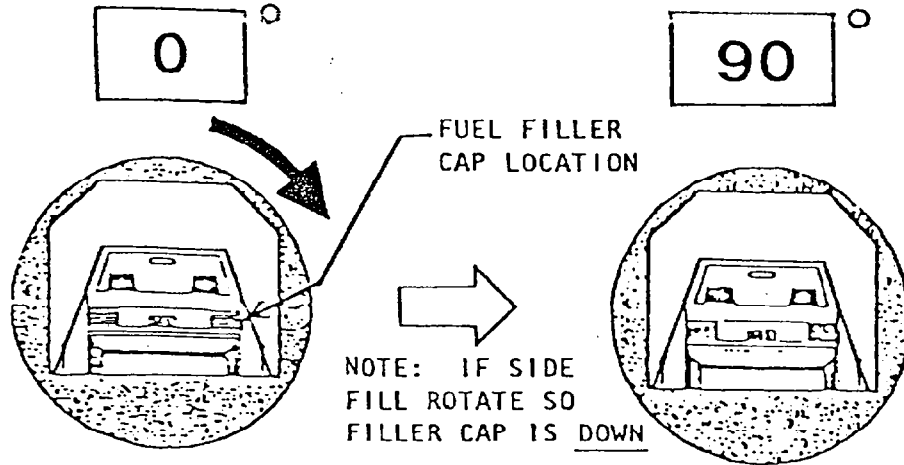
TABLE 7 FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET (CONT)

TEST VEHICLE NHTSA NO. CD5602

TEST DATE 10/31/83

VEH. MFR/MAKE/MODEL Mitsubishi Cordia Sport Coupe

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time - - -	=	<input type="text" value="1"/> minutes	<input type="text" value="2"/> <input type="text" value="0"/> seconds
(Spec. Range = 1 to 3 minutes)			
FMVSS 301-75 Position Hold Time - - -	=	<input type="text" value="5"/> minutes	<input type="text" value="0"/> <input type="text" value="0"/> seconds
	+		
TOTAL - - - - -	=	<input type="text" value="6"/> minutes	<input type="text" value="2"/> <input type="text" value="0"/> seconds
Next Whole Minute Interval - - - - -	=	<input type="text" value="7"/> minutes	

II. FMVSS 301-75 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	-
---	---	---	---

NOTE: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

NONE.

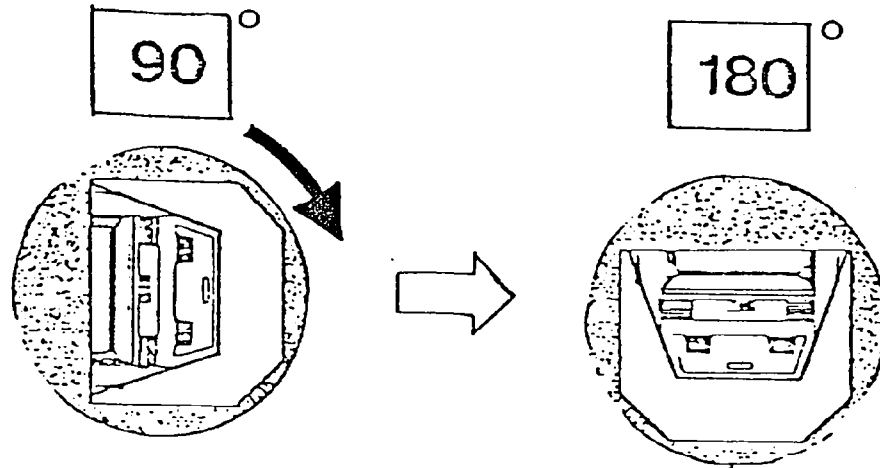
TABLE 7 FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET (CONT)

TEST VEHICLE NHTSA NO. CD5602

TEST DATE 10/31/83

VEH. MFR/MAKE/MODEL Mitsubishi Cordia Sport Coupe

TEST PHASE



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time - - = minutes seconds
 (Spec. Range - 1 to 3 minutes)
 FMVSS 301-75 Position Hold Time - - - = minutes seconds
 +
 TOTAL - - - - - = minutes seconds
 Next Whole Minute Interval - - - - - = minutes

II. FMVSS 301-75 REQUIREMENTS:

(1) Time Period --

First 5 min <u>FROM</u> 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	-
---	---	---	---

NOTE: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

NONE.

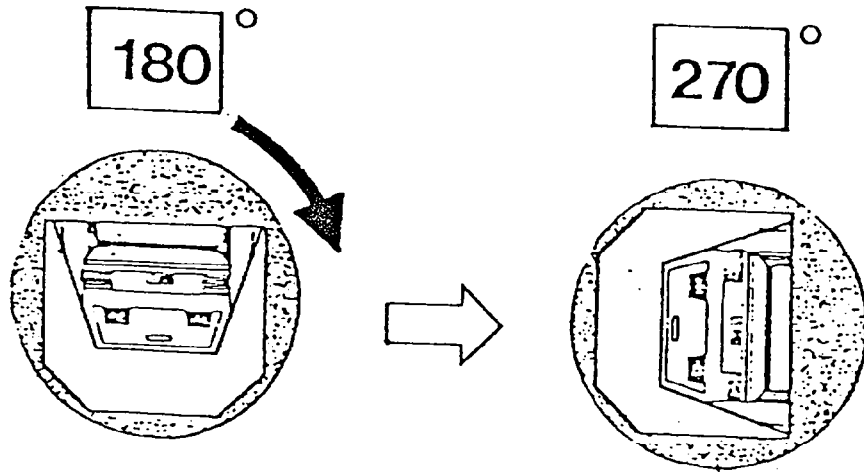
TABLE 7 FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET (CONT)

TEST VEHICLE NHTSA NO. CD5602

TEST DATE 11/31/83

VEH. MFR/MAKE/MODEL Mitsubishi Cordia Sport Coupe

TEST PHASE



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time - - -	=	<input type="text" value="1"/> minutes	<input type="text" value="2"/> <input type="text" value="1"/> seconds
(Spec. Range - 1 to 3 minutes)			
FMVSS 301-75 Position Hold Time - - -	=	<input type="text" value="5"/> minutes	<input type="text" value="0"/> <input type="text" value="0"/> seconds
			+
TOTAL - - - - -	=	<input type="text" value="6"/> minutes	<input type="text" value="2"/> <input type="text" value="1"/> seconds
Next Whole Minute Interval - - - - -	=	<input type="text" value="7"/> minutes	

II. FMVSS 301-75 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	-
---	---	---	---

NOTE: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

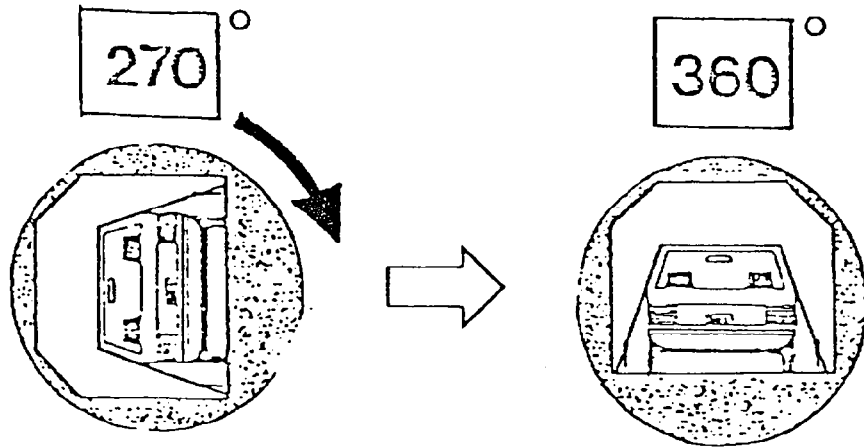
NONE.

TABLE 7 FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET (CONT)

TEST VEHICLE NHTSA NO. CD5602

TEST DATE 10/31/83

VEH. MFR/MAKE/MODEL Mitsubishi Cordia Sport Coupe



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FMVSS 301-75 Position Hold Time - - - = + minutes seconds

TOTAL - - - - - = minutes seconds

Next Whole Minute Interval - - - - - = minutes

II. FMVSS 301-75 REQUIREMENTS:

(1) Time Period --

First 5 min. <u>FROM</u> 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	-
---	---	---	---

NOTE: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

NONE.

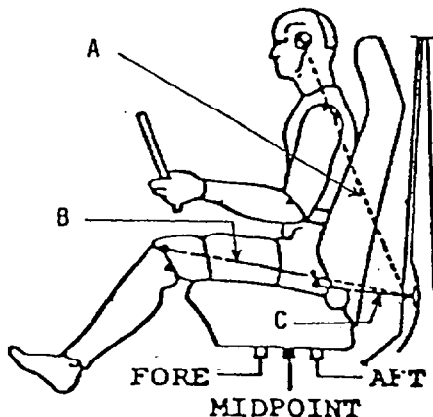
SECTION 4
OCCUPANT DATA

Two Part 572 50th percentile male ATD's were installed in the test vehicle. One was positioned in the driver's DSP, and the other in the right front passenger's DSP. Both ATD's were fully instrumented with three accelerometers mounted both in the head and the chest, and a load cell mounted in each femur.

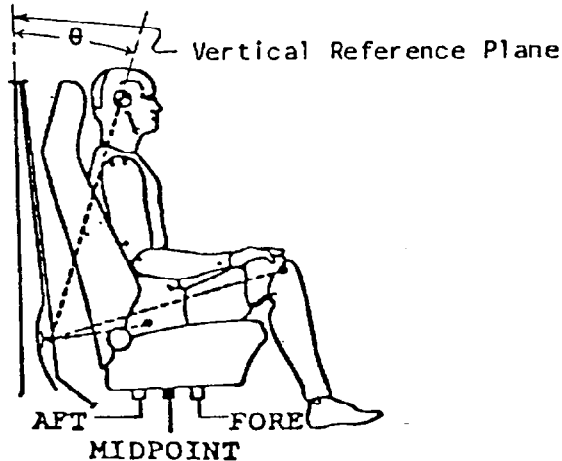
The pretest position of each ATD is shown in Tables 8 and 9. A summary of the recorded ATD data is shown in Table 10. A description of the posttest ATD positions is presented in Table 11.

TABLE 8 - DUMMY IN-VEHICLE POSITION RECORDING

DRIVER ATD

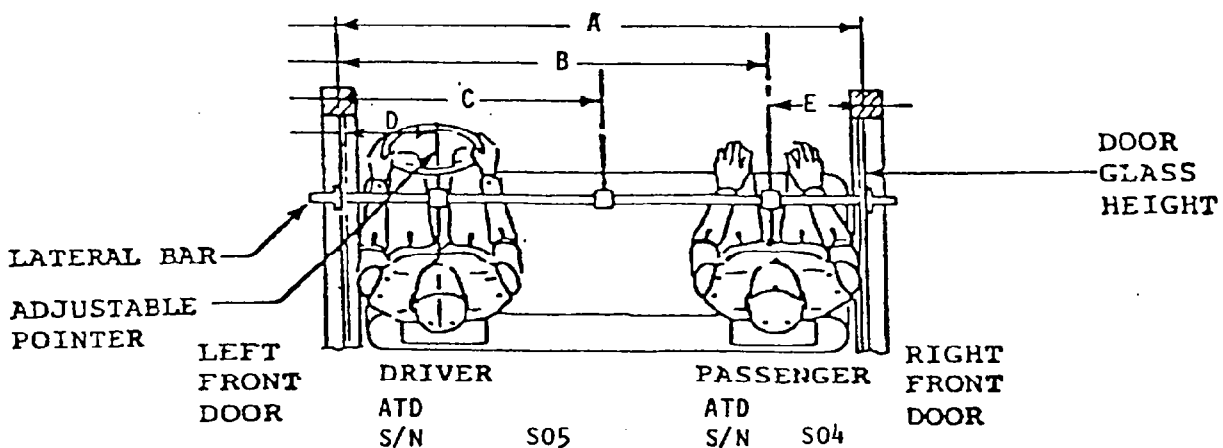


PASSENGER ATD



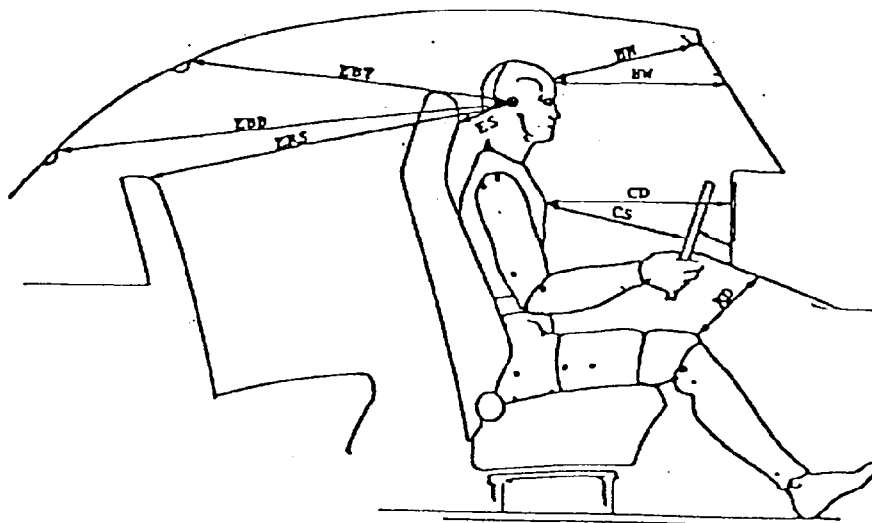
Dimension	(in.)	(θ°)	Dimension	(in.)	(θ°)
A	25 1/8	26	A	24 3/4	23
B	30 3/8	90	B	30 5/8	91
C	13 1/8	103	C	13 1/2	105
Torso Angle = 12°			Torso Angle = 10°		
Seat Back Angle = 21°			Seat Back Angle = 19°		

All angles are relative to the vertical plane.

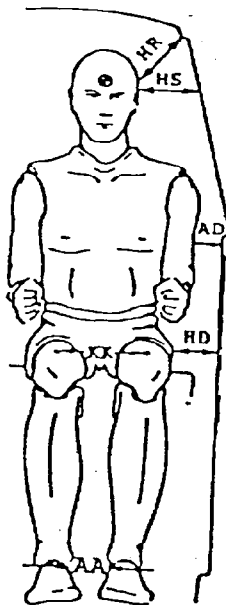


A = 54 7/8 D = 15 3/4
 B = 38 1/2 E = 16 3/8
 C = 27 1/2

TABLE 9 PART 572 ATD IN-VEHICLE POSITION



	DRIVER	PASSENGER
HH	9 1/8	9
HW	13 1/8	12 7/8
CD	21	20 1/8
CS	12 7/8	--
KD L	6 1/4	8 1/8
KD R	5 1/8	7



	DRIVER	PASSENGER
HR	5 5/8	5 1/2
HS	8 7/8	7 3/8
AD	3 1/4	4 1/2
HD	7 5/8	7
KK	14 3/8	11 3/4
AA	12 3/4	8 1/2

HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD = Knees to Dash
 HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door
 KK = Knee to Knee
 AA = Ankle to Ankle

TABLE 10 PART 572 ATD DATA SUMMARY

Test Vehicle: 1983 Mitsubishi Cordia	Driver ATD				Passenger ATD			
	Positive Direction*		Negative Direction**		Positive Direction*		Negative Direction**	
	Peak (G)	Time (msec)	Peak (G)	Time (msec)	Peak (G)	Time (msec)	Peak (G)	Time (msec)
Head Acceleration Longitudinal	3	173	91	89	20	180	77	104
Lateral	7	192	33	94	6	124	6	110
Vertical	53	89	3	118	56	103	1	24
Resultant	100	94	--	--	96	103	--	--
HIC	885 btwn 76 and 110 msec				807 btwn 79 and 122 msec			
Chest Acceleration Longitudinal	5	127	32	73	10	271	33	83
Lateral	10	127	26	95	15	97	4	73
Vertical	16	55	11	103	23	60	16	124
Resultant (Max)	35	95	--	--	35	79	--	--
Resultant (clip)	34	--	--	--	34	--	--	--
Femur Loads	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)
	Left	275	92	225	178	945 ⁽¹⁾	145	267 ⁽¹⁾
Right	337	76	235	100	599 ⁽¹⁾	94	178 ⁽¹⁾	48
Belt Loads Lap	916	67	--	--	887	97	--	--
Torso	1429	81	--	--	1483	96	--	--
(1) Estimated - Noisy data.								
Vehicle Impact Speed (mph): <u>29.45</u>								
* Longitudinal: Forward Lateral: Rightward Vertical: Downward				** Longitudinal: Rearward Lateral: Leftward Vertical: Upward				

TABLE 11 GENERAL ATD POSTTEST DESCRIPTIONS

<u>ATD Positions</u>		
<p>Driver: Leaning toward his right with left hand on the steering wheel, and right hand on the center console.</p>		
<p>Passenger: Slouched forward and leaning slightly toward his right with both knees against the dash panel, and the top of his head below the bottom of the headrest.</p>		
<u>Visible ATD Contact Areas</u>		
Component	Driver	Passenger
Head	Steering wheel rim and hub	Dash panel
Chest	Steering wheel rim	None
Abdomen	None	None
Left Knee	Dash panel	Glove compartment door
Right Knee	Dash panel	Glove compartment door

SECTION 5
VEHICLE DATA

The test vehicle is a 1983 Mitsubishi Cordia. General vehicle descriptive information is presented in Table 12.

The pretest and posttest vehicle dimensional data are presented in Table 13.

The accelerometer placement locations and a summary of the measured peak amplitudes are presented in Table 14.

TABLE 12 TEST VEHICLE INFORMATION

Vehicle Manufacturer: Mitsubishi Motors Corporation
 Make/Model: 1983 Mitsubishi Cordia
 Body Style: Sport Coupe 2 Door Hatchback Model Year: 1983
 VIN: JA3BF3441D2550734 Build Date: May 1983
 NHTSA No.: CD5602 Color: Blue
 Engine Data: 4 Cylinders: 1795 in³/cc Displacement
 Transmission Data: 5 Speed (X) Manual/ () Automatic
 Date Vehicle Received by Laboratory: 09/09/83
 Dealer's Name & Address: Upland Mitsubishi, Upland, California

DATA FROM CERTIFICATION LABEL ON LEFT DOOR REAR FACE OR 'B' POST

Vehicle Manufactured By: Mitsubishi Motors Corporation
 Date of Manufacturer: May 1983 VIN: JA3BF3441D2550734
 GVWR: 3,250 lbs. GAWR: Front = 1,765 lbs. Rear = 1,485 lbs.

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVE BOX. ETC.

Vehicle Load: FRONT REAR
 Up to Capacity 29 psi 29 psi

RECOMMENDED TIRE SIZE: P165/80R13	LOAD RANGE: <u>B</u> C D
--------------------------------------	-----------------------------

Vehicle Capacity:
 Type of seats Bench
 Bucket
 Split Bench

RECOMMENDED COLD TIRE PRESSURE	F <u>29</u> : R <u>29</u>
--------------------------------	---------------------------

CARGO LOAD = 77 lbs

TOTAL = 827 lbs.

Number of Occupants = 2 Front
 (Designated Seating Capacity) 3 Rear
5 Total

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with max. fluids): UDW

Right Front = 672 lbs

Right Rear = 418 lbs

Left Front = 706 lbs

Left Rear = 431 lbs

TOTAL FRONT WEIGHT = 1378 lbs

(62 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 849 lbs.

(38 % of Total Vehicle Weight)

TOTAL DELV. WEIGHT = 2227 lbs

CALCULATION FOR TARGET TEST WEIGHT

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (2,227 lbs)

VCW = Vehicle Capacity Weight (827 lbs)

DSC = Designated Seating Capacity (5)

RCLW = VCW - 150 (DSC) = 77 lbs

Target Test Weight = UDW + RCLW + (2 dummies X 164 lbs/dummy)

Target Test Weight = 2,632 lbs

TABLE 12 TEST VEHICLE INFORMATION (CONT'D)

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 77 lbs CARGO:	
Right Front = <input type="text" value="761"/> lbs	Right Rear = <input type="text" value="537"/> lbs
Left Front = <input type="text" value="804"/> lbs	Left Rear = <input type="text" value="530"/> lbs
TOTAL FRONT WEIGHT = <input type="text" value="1565"/> lbs	(<u>59</u> % of Total Vehicle Weight)
TOTAL REAR WEIGHT = <input type="text" value="1067"/> lbs	(<u>41</u> % of Total Vehicle Weight)
TOTAL TEST WEIGHT = <input type="text" value="2632"/> lbs	
Weight of ballast secured in vehicle trunk area = <input type="text" value="45"/> lbs	

VEHICLE ATTITUDE: (all dimensions in inches)

Delivered Attitude: RF 26 1/8 LF 25 3/4 RR 21 1/4 LR 21 1/8
 Test Attitude: RF 26 LF 25 1/2 RR 21 1/8 LR 21
 Wheelbase: 96.3 in.; Distance from c.g. to front axle: 39.0 in.

TEST FLUID DATA:

Test Fluid Type: Red Stoddard Solvent Spec. Grav.: 0.764
 Viscosity: 0.96 Centistokes
 Fuel System Capacity (data from NHTSA): 12.90 gal.
 Fuel System Capacity (data from Owners Manual): 13.2 gal.
 Test Volume: 12.0 Gallons (92 to 94% of NHTSA capacity)
 Electric Fuel Pump: ___ Yes: X No; Fuel Injection: ___ Yes X No
 Does electric fuel pump operate with ignition switch "on" and the engine not operating: ___ Yes ___ No N/A

Details of Fuel System: The fuel tank is located between the rear wheels. The filler tube goes into the left side of the tank. Three metal fuel lines go from the top of the tank along the left side of the floor bottom to the engine compartment. One line goes to the carburetor located on the rear side of the engine. One line goes to a cannister mounted to the firewall. The third line goes through a filter on the firewall to the fuel pump located directly below the carburetor.

TABLE 12 TEST VEHICLE INFORMATION (CONT'D)

TEST CONDITIONS:

Date of Test: 10/31/83 Time of Test: 1:08 am/pm
Ambient Temperature: 78 °F at impact area
Temp. In Occ. Compart.: 77 °F: W/Shld. Mldg. Temp.: 78 °F

IMPACT VELOCITY:

Trap No. 1 = 29.45 mph; Trap No. 2 = 29.45 mph
Distance from the vehicle's front bumper to the barrier face
entering the vehicle velocity measurement device = 60 inches
Exiting the vehicle velocity measurement device = 12 inches

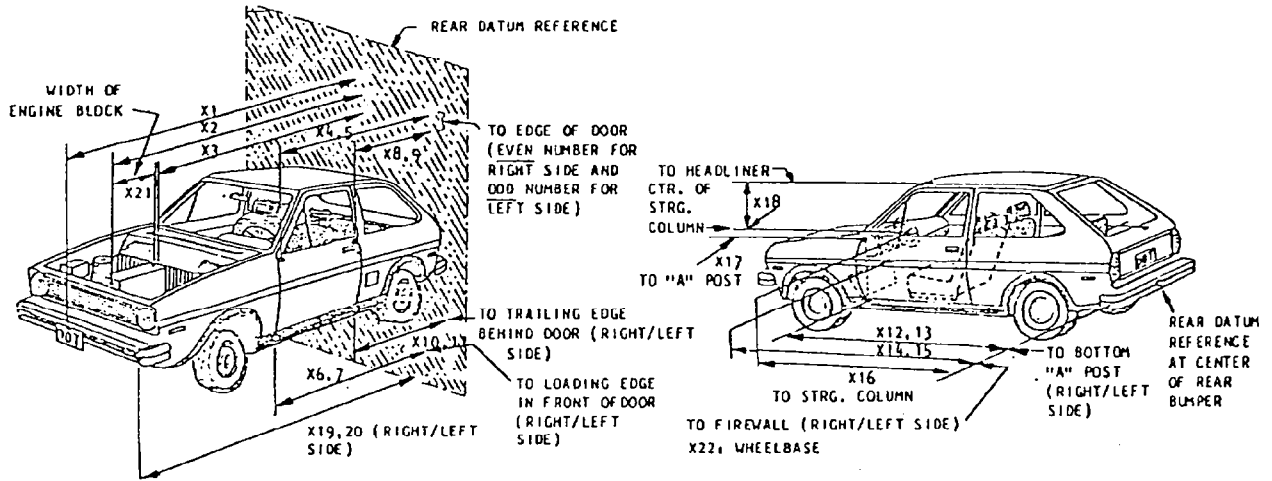
VEHICLE REBOUND

Distance from front of test vehicle to the barrier
after impact: Ave. = 18 1/4 ; R = 18 7/8 ; L = 17 3/4

VEHICLE MAXIMUM CRUSH:

Left Side : <u>17 1/4</u> inches	Ave.: <u>18 1/8</u> inches
Right Side: <u>19 1/8</u> inches	Max.: <u>19 5/8</u> inches

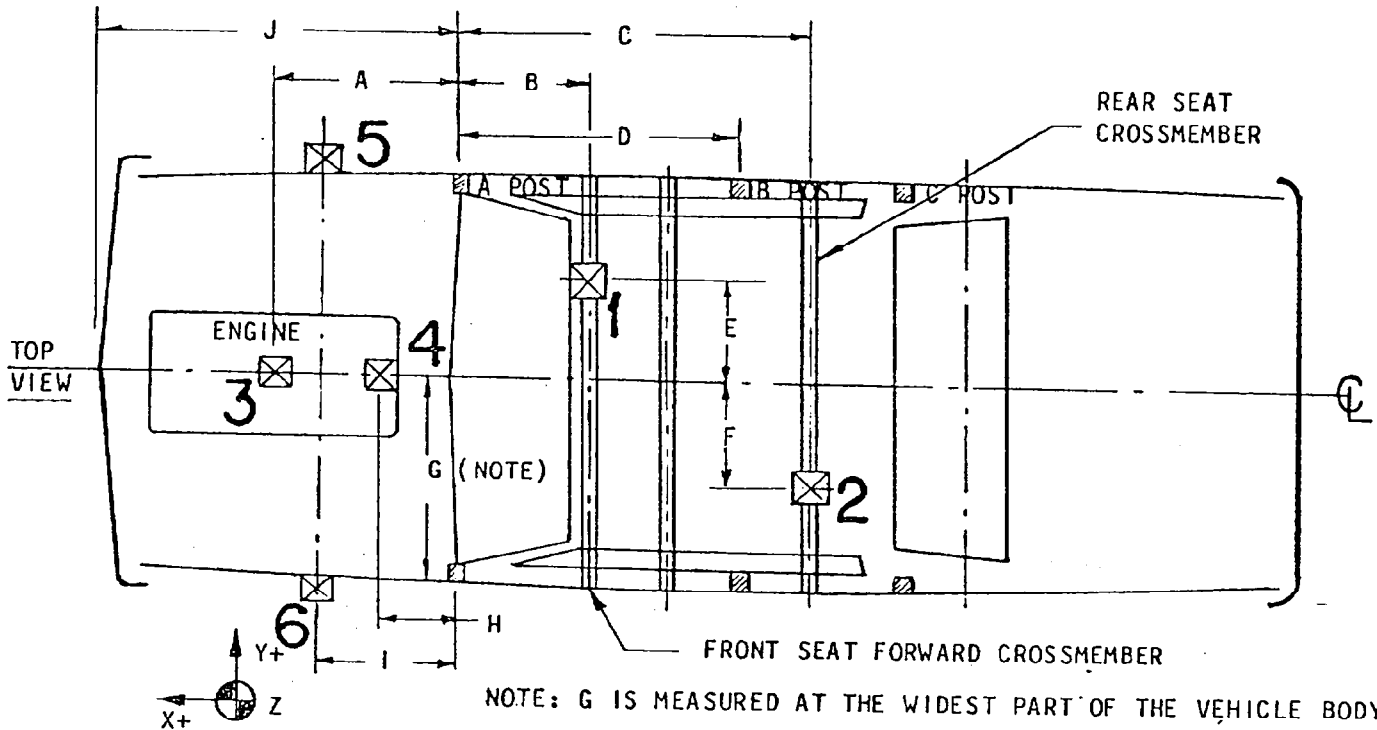
TABLE 13 PRE-/POST-TEST STATIC MEASUREMENT DATA



VEHICLE: Mitsubishi Cordia NHTSA NO.: CD5602
 TEST DATE: 10/31/83

REFERENCE DIMENSION	PRE-TEST MEASUREMENT	POST-TEST MEASUREMENT	CHANGE
X1	172 7/8	153 1/4	-19 5/8
X2	146 1/4	139 3/4	- 6 1/2
X3	126 1/2	123 5/8	- 2 7/8
X4	113 7/8	114	+ 1/8
X5	114 1/16	113 7/8	- 3/16
X6	114 7/16	114 3/16	- 1/4
X7	114 1/2	114 1/8	- 3/8
X8	67 7/8	68 1/2	+ 5/8
X9	68 1/4	68	- 1/4
X10	69 1/4	69 1/8	- 1/8
X11	69 3/8	69 1/4	- 1/8
X12	114	113 7/8	- 1/8
X13	114 1/8	113 15/16	- 3/16
X14	118 11/16	118 5/8	- 1/16
X15	118 1/4	117 7/8	- 3/8
X16	99 5/8	99 3/8	- 1/4
X17	16	17 3/4	+ 1 3/4
X18	16 1/2	16 1/2	0
X19	170 1/2	151 3/8	-19 1/8
X20	169 5/8	152 3/8	-17 1/4
X21	11 1/2	11 1/2	0
X22	96 5/16	92 1/2	- 3 13/16

TABLE 14 VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



LOCATION NO. AND DESCRIPTION	LOCATION DIMENSION (IN.)	AXIS	PEAK (G'S)		TIME TO PEAK(MSEC)	
			POSITIVE	NEGATIVE	POSITIVE	NEGATIVE
1 - Below Front Seat Area	E - 15 B - 15	X	3	36	115	63
2 - Below Rear Seat Area	F - 14 C - 35 1/2	X	3	34	119	64
3 - Top of Engine at Carb. Mount	A - 21 1/2	X	66	197	39	76
4 - Bottom of Engine at Oil Pan	H - 24 3/8	X	10	58	57	31
5 - Right Front Brake Caliper	I - 24 3/4	X	14	60	71	52
6 - Left Front Brake Caliper	I - 25 1/4	X	15	39	67	56
- Vehicle Half Width	G - 29 5/8	NOTE: NEGATIVE ACCELERATION IS REARWARD				
- Forward Most Point At \bar{c} to A Post	J - 58 1/2					
- Distance from 'A' post to 'B' post	D - 46 7/8					

APPENDIX A

PHOTOGRAPHIC COVERAGE



A-1 FULL LEFT SIDE, PRETEST



A-2 HALF LEFT SIDE, PRETEST



A-3 LEFT FRONT 3/4 VIEW, PRETEST



A-4 RIGHT REAR 3/4 VIEW, PRETEST



A-5 WINDSHIELD WITH STYROFOAM, PRETEST



A-6 DRIVER ATD GENERAL POSITION, PRETEST

A-7



A-7 PASSENGER ATD GENERAL POSITION, PRETEST

A-8



A-8 SEAT POSITIONS, PRETEST



A-9 FULL LEFT SIDE, POSTTEST



A-10 HALF RIGHT SIDE, POSTTEST



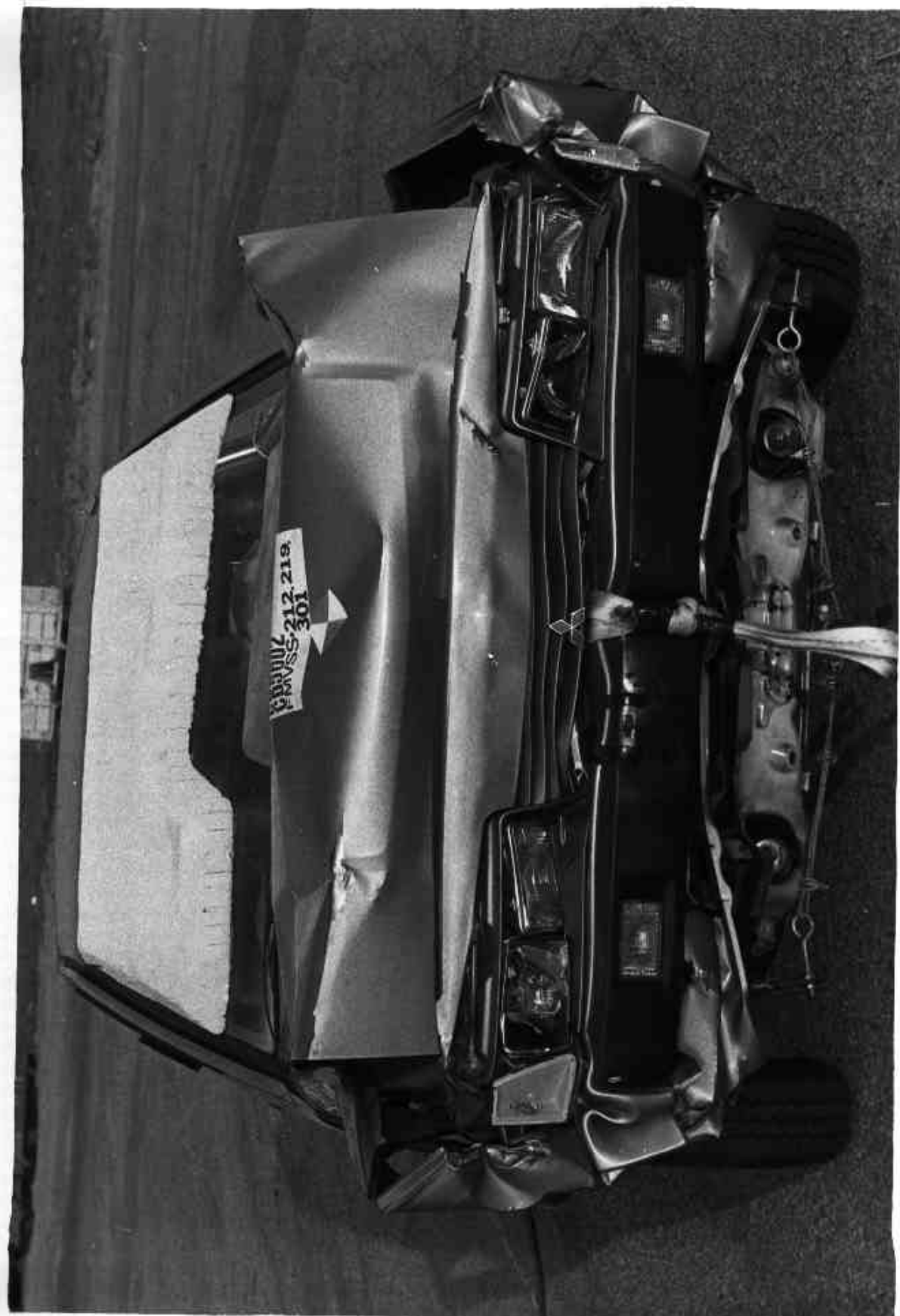
A-11 HALF LEFT SIDE, POSTTEST



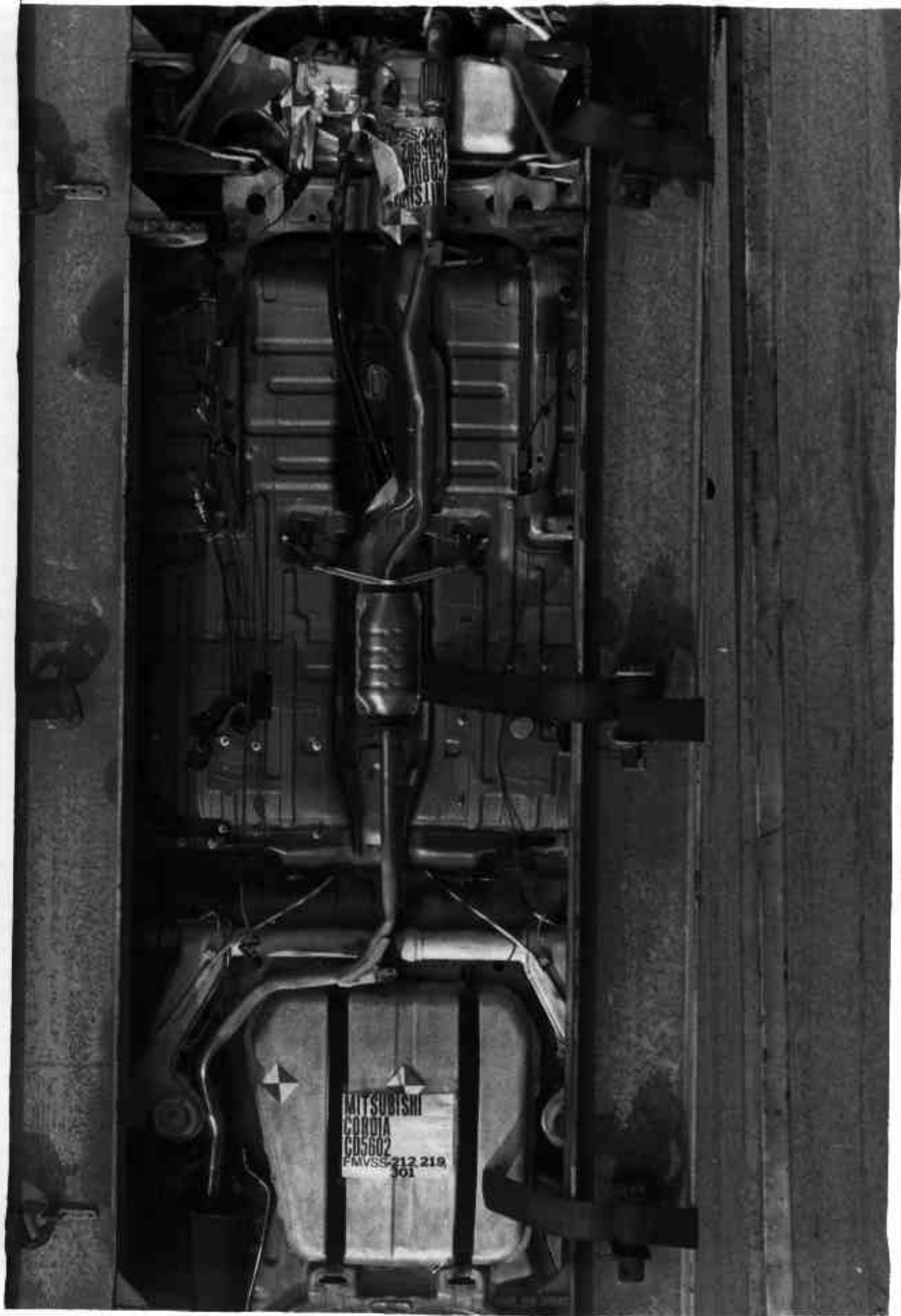
A-12 RIGHT FRONT 3/4 VIEW, POSTTEST



A-13 WINDSHIELD WITH STYROFOAM, POSTTEST



A-14 FULL FRONT VIEW, POSTTEST



A-15 FULL UNDERBODY, POSTTEST



A-16 DRIVER ATD GENERAL POSITION, POSTTEST

A-17



A-17 PASSENGER ATD GENERAL POSITION, POSTTEST

A-18



A-18 DRIVER ATD STEERING WHEEL, POSTTEST



A-19 DRIVER ATD KNEES, POSTTEST



A-20 PASSENGER ATD KNEES, POSTTEST



A-21 SEAT POSITIONS, POSTTEST

APPENDIX B
TEST DATA PLOTS

PRINTOUT OF HEADER DATA FOR DIGITAL TAPE

ICOMB. TST-212,219,301 10/31/83MSED TNH2282D21140R3 TEST VEHICLE FOR COMPLIANCE WITH FMVSS 212,219, & 301
 COMVSB29.5 00.0 999.9ASHDRY 78FMTUMBENG
 219999834-TVF1.795LITERS MF302632096.3172.964.939.0S0THP
 29.5 0 012FDW5999 52.917.217.618.219.519.219.100.019.5
 3FFB 0.0 0 0.0 0R9 0.0 0 0
 411CD 0 0 050M 0HUMANOID S05 09.113.105.608.921.012.903.207.605.13PTSTONASHSDP
 412CD 0 0 050M 0HUMANOID S04 09.012.905.507.428.199.904.507.008.13PTSTONADPNODP
 501AC011HED 6000 1600 .72860 360 125G'SX29.5G000
 502AC011HED 2800 1600 .72860 360 125G'SY 0.0G000
 503AC011HED 6000 1600 .72860 360 125G'SZ 0.0G000
 504AC011CST 6000 1600 .72860 360 125G'SX29.5G000
 505AC011CST 2800 1600 .72860 360 125G'SY 0.0G000
 506AC011CST 6000 1600 .72860 360 125G'SZ 0.0G000
 507AC012HED 6000 1600 .72860 360 125G'SX29.5G000
 508AC012HED 6000 1600 .72860 360 125G'SY 0.0G000
 509AC012HED 6000 1600 .72860 360 125G'SZ 0.0G000
 510AC012CST 6000 1600 .72860 360 125G'SX29.5G000
 511AC012CST 2800 1600 .72860 360 125G'SY 0.0G000
 512AC012CST 6000 1600 .72860 360 125G'SZ 0.0G000
 513LC011LFM 9999 1600999.92860 360 125LBS0 0000
 514LC011RFM 9999 1600999.92860 360 125LBS0 0000
 515LC012LFM 9999 1600999.92860 360 125LBS0 NOISY
 516LC012RFM 9999 1600999.92860 360 125LBS0 NOISY
 517AC01NRFF 2800 1600 .72860 360 125G'SX29.5G000
 518AC01NRF 2800 1600 .72860 360 125G'SX29.5G000
 519AC01NENG 2800 1600 .72860 360 125G'SX29.5G000
 520AC01NENG 2800 1600 .72860 360 125G'SX29.5G000
 521AC01NBCL 2800 1600 .72860 360 125G'SX29.5G000
 522AC01NBCL 2800 1600 .72860 360 125G'SX29.5G000
 523LC011LBO 9999 1600999.92860 360 125LBS0 0000
 524LC011SHB 9999 1600999.92860 360 125LBS0 0000
 525LC012LBO 9999 1600999.92860 360 125LBS0 0000
 526LC012SHB 9999 1600999.92860 360 125LBS0 0000

OCCUPANT RESPONSE COMPARISON
TO FMVSS REQUIREMENTS

10/31/83

HIC

VEHICLE	OCCUPANT	HIC	T1	T2	T2-T1	%COMP. MARG.
1983 MITSUBISHI CORDIA	DRIVER	884.54	76.12	110.50	34.37	.88
1983 MITSUBISHI CORDIA	PASSENGER	807.19	79.12	121.75	42.63	.81

* VALUES GREATER THAN 1 REPRESENT NON-COMPLIANCE

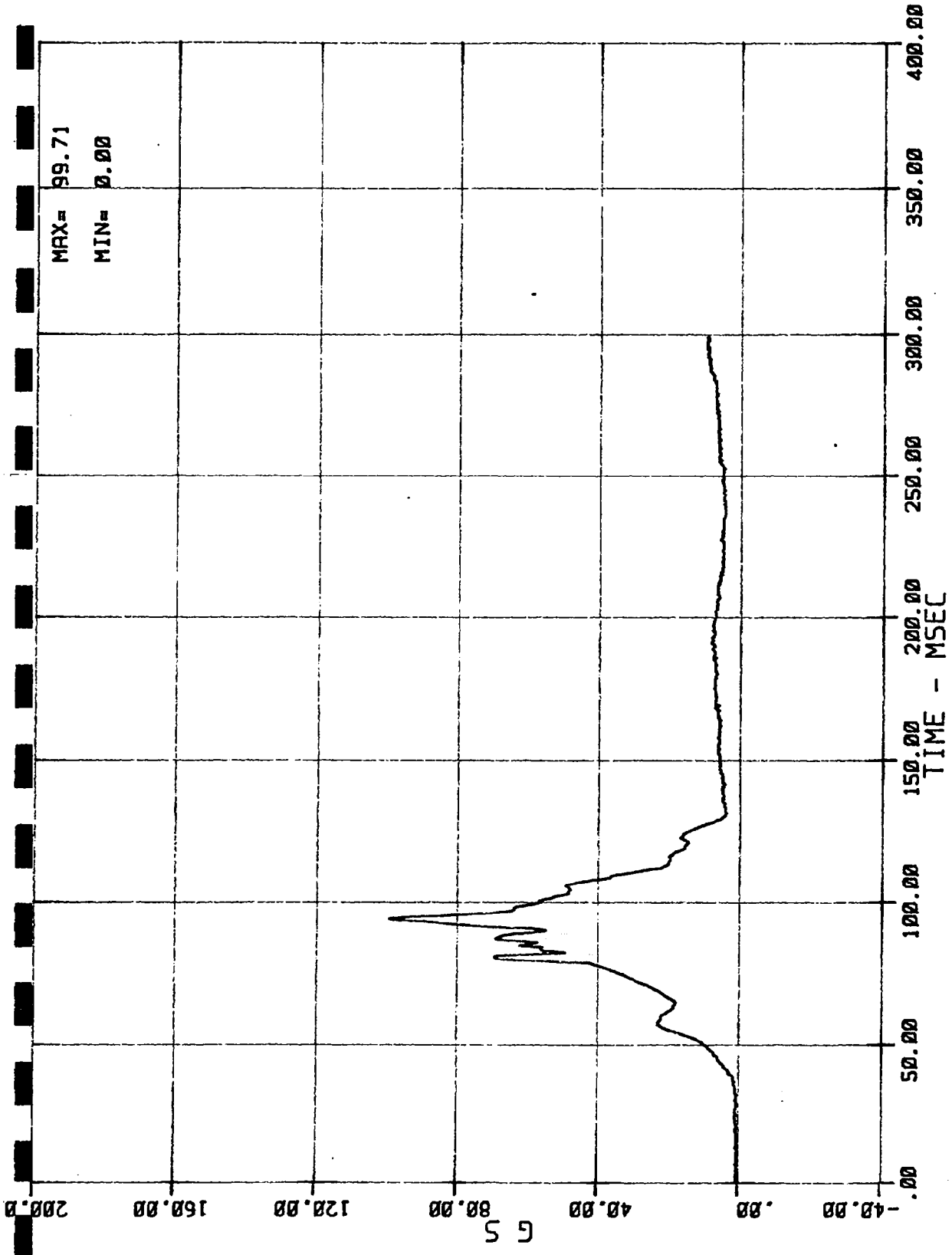
OCCUPANT RESPONSE COMPARISON
TO FMVSS REQUIREMENTS

10/31/83

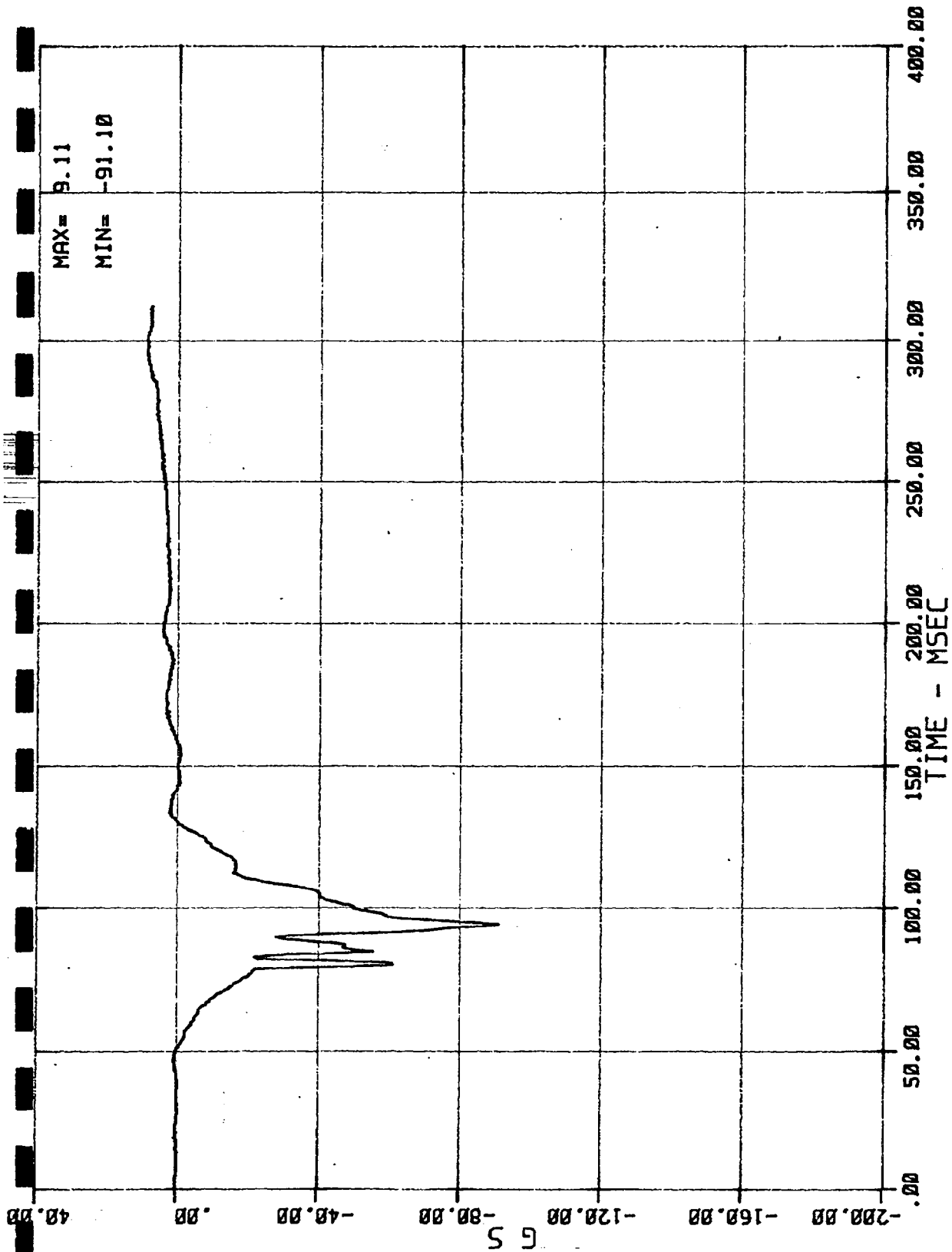
CHEST ACCELERATION (3 MSEC CLIPPED PEAK)

CHAN.	VEHICLE	REQUIREMENT	RESPONSE	% COMP. MARG.	
RES	1983 MITSUBISHI CORDIA	DRIVER	60.00	33.95	.57
RES	1983 MITSUBISHI CORDIA	PASSENGER	60.00	34.25	.57

* ABS(VALUE) GREATER THAN 1 REPRESENT NON-COMPLIANCE

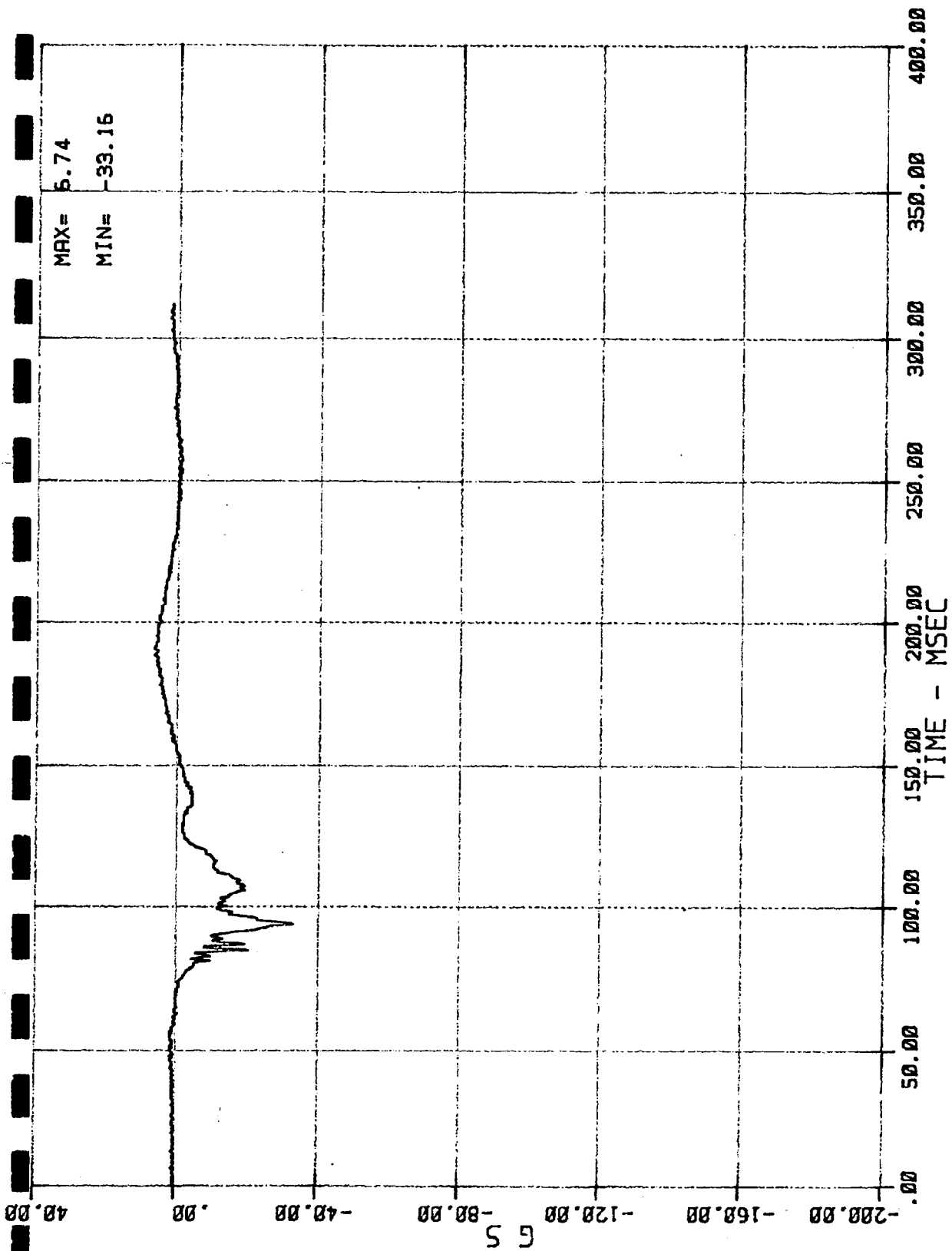


DRIVERS HEAD RESULTANT ACCELERATION
MSE N99R33 1983 MITSUBISHI CORDIA 10/31/83



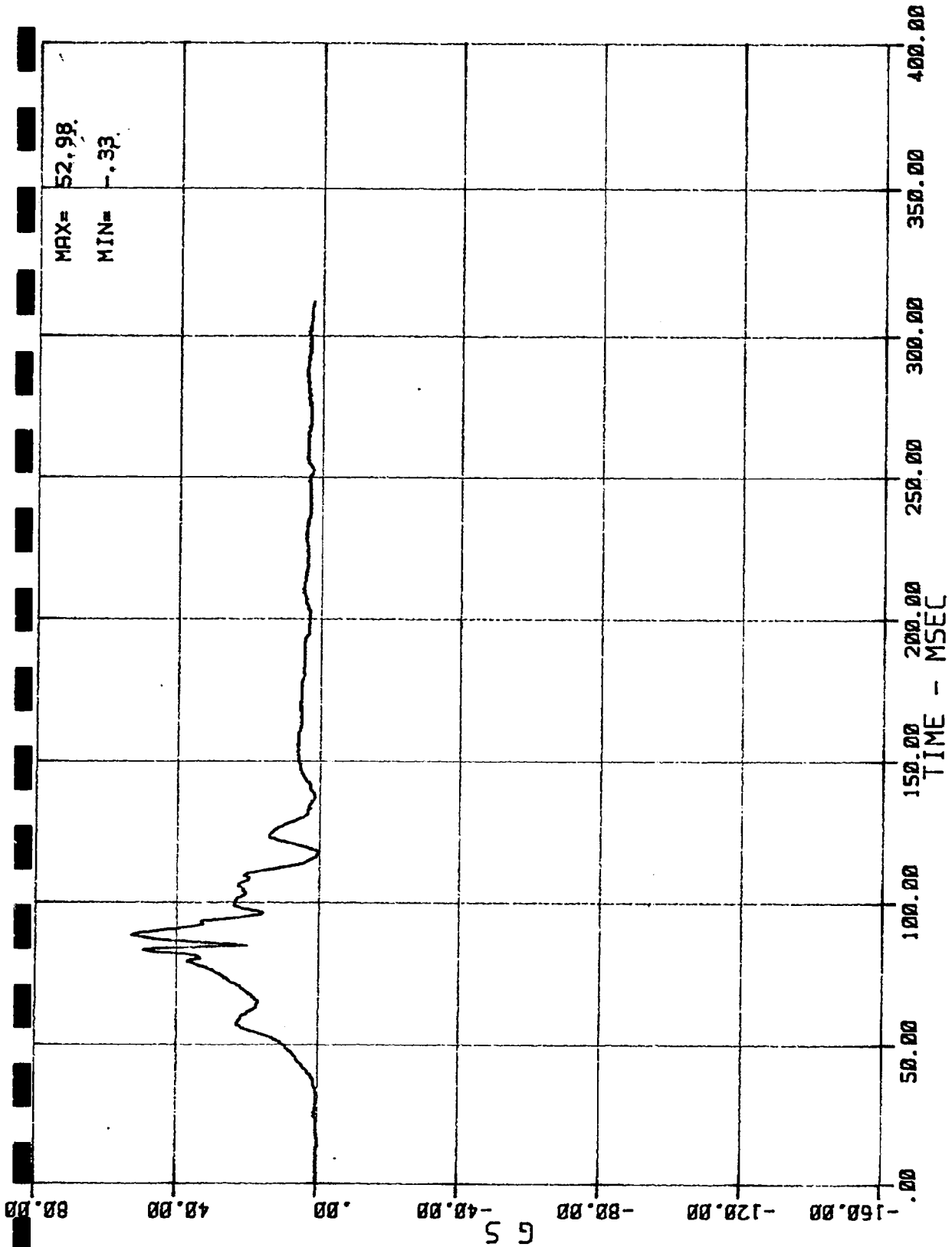
01 AC 01 1 HED X (DRIVER HEAD ACCEL. -- X AXIS)
MSE N98033 1983 MITSUBISHI CORDIA

10/31/83



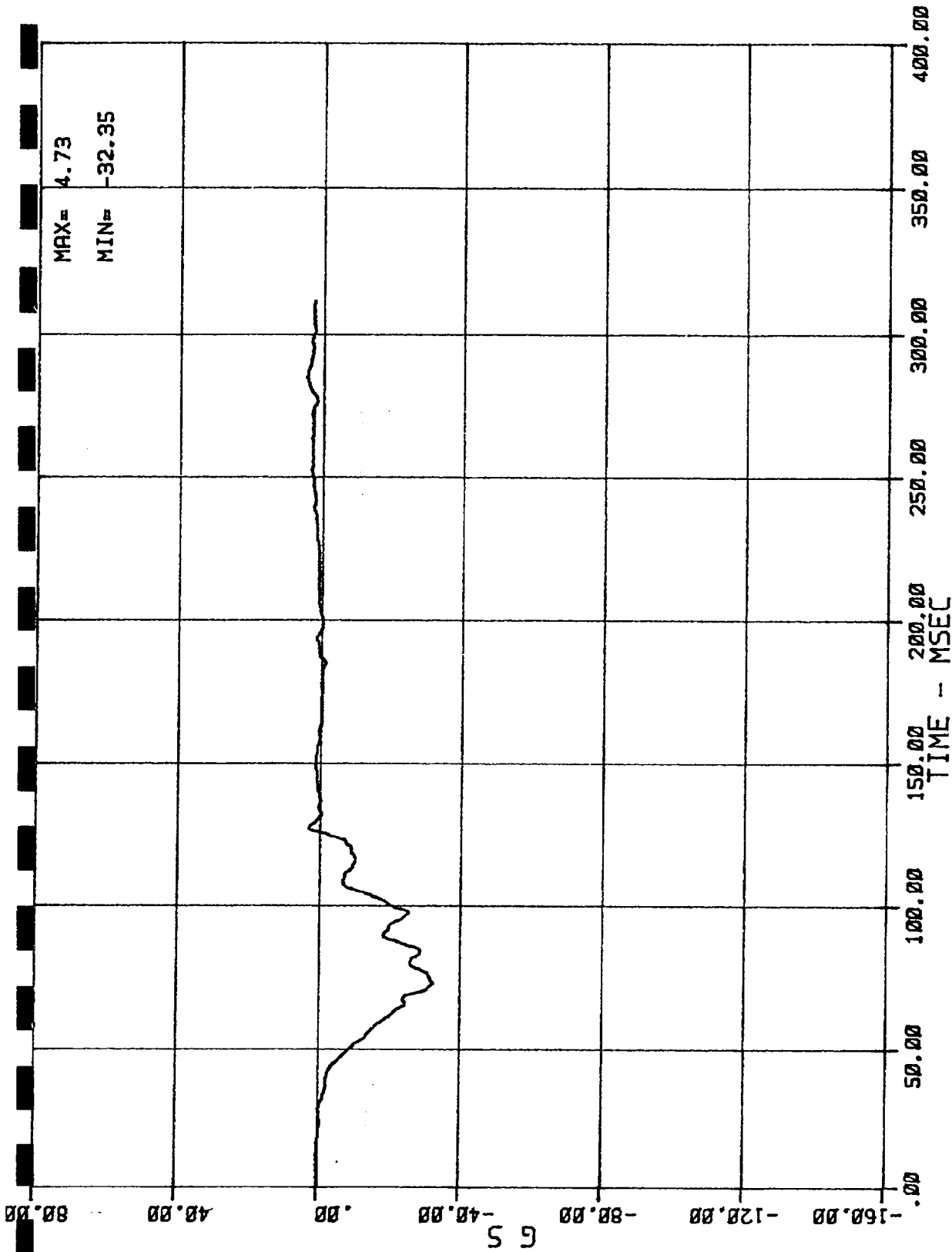
02 AC 01 1 HED Y (DRIVER HEAD ACCEL. -- Y AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



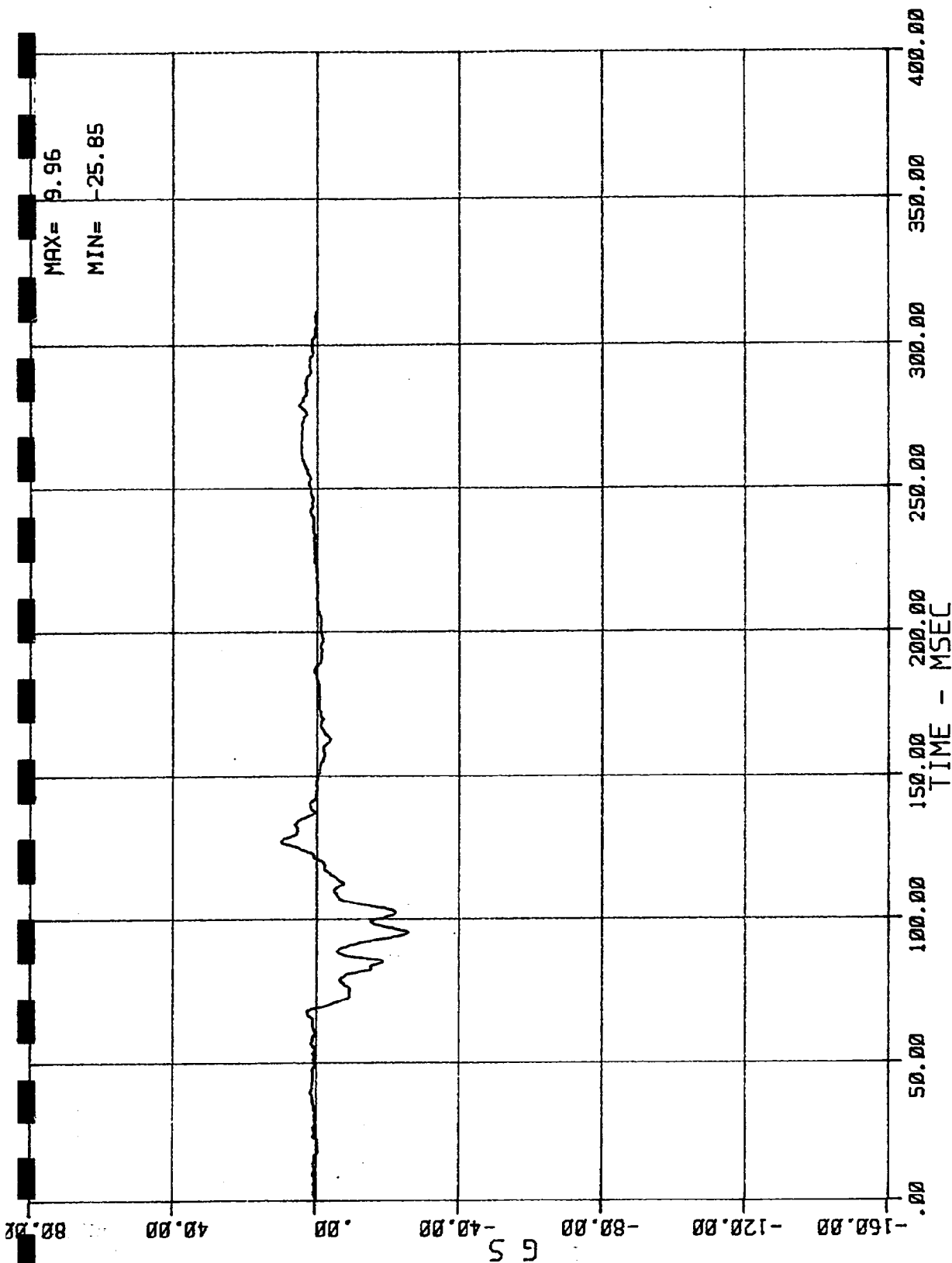
03 AC 01 1 HED Z (DRIVER HEAD ACCEL. -- Z AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



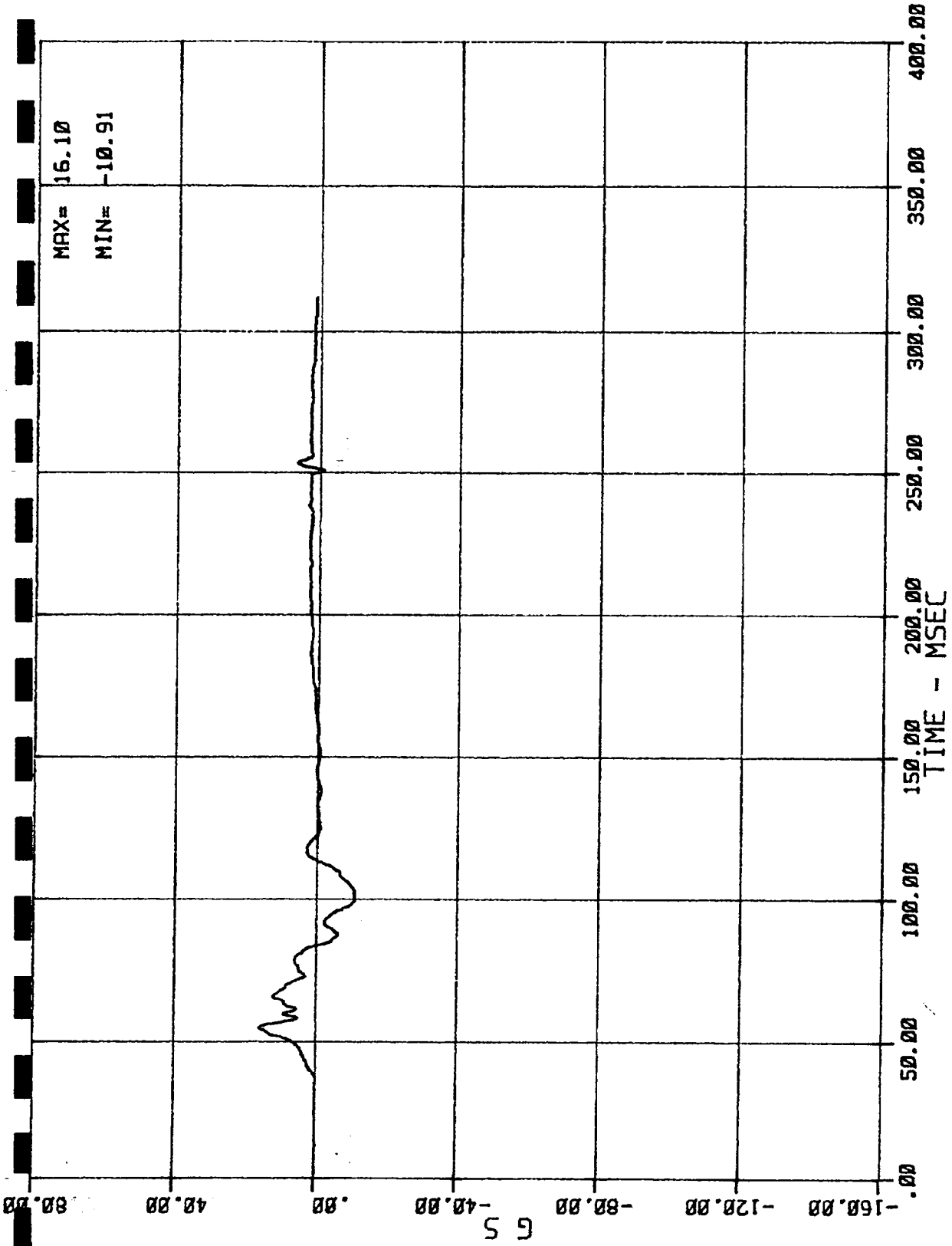
04 AC 01 1 CST X (DRIVERS CHEST ACCEL, --- X AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



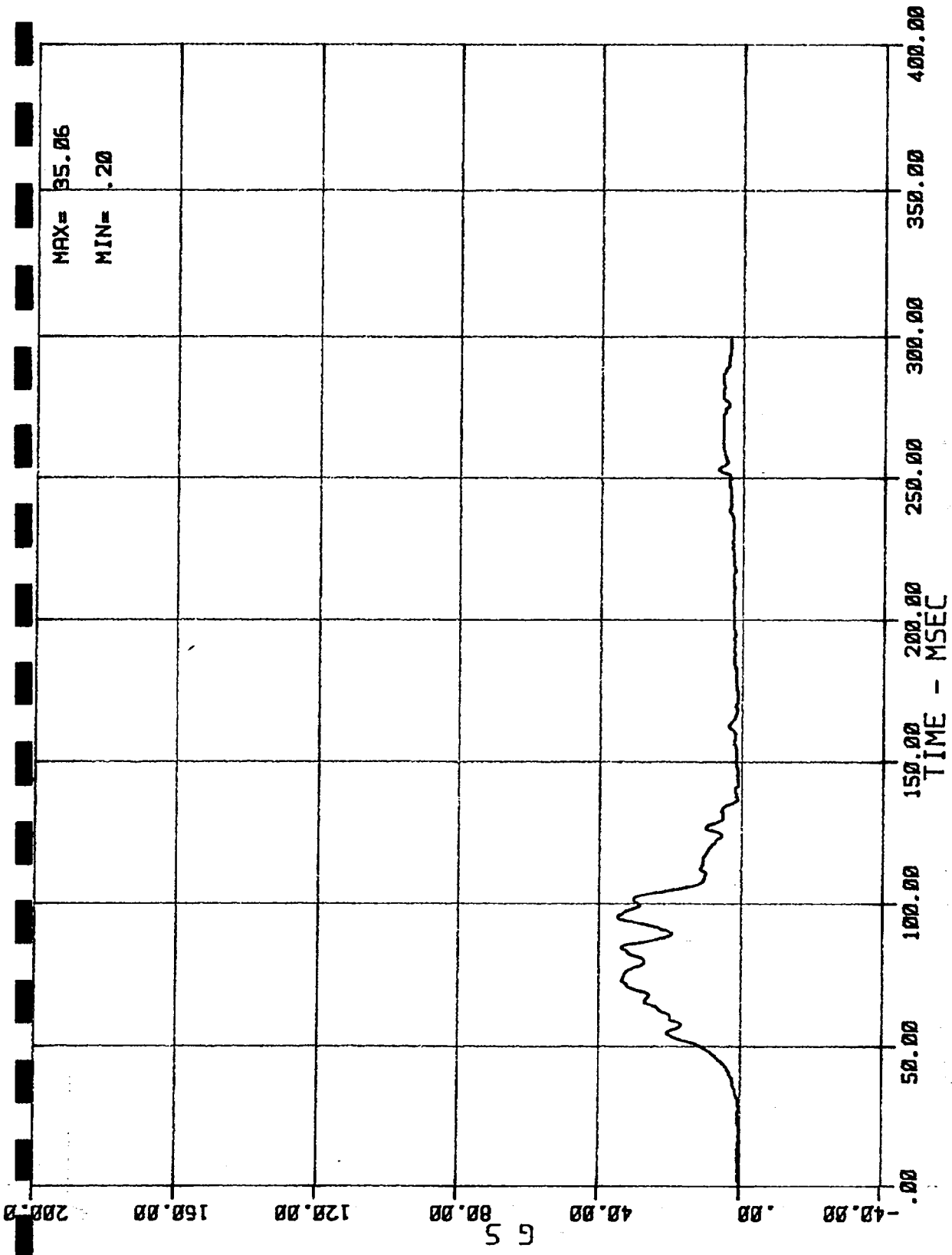
05 AC 01 1 CST Y (DRIVERS CHEST ACCEL. --- Y AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83

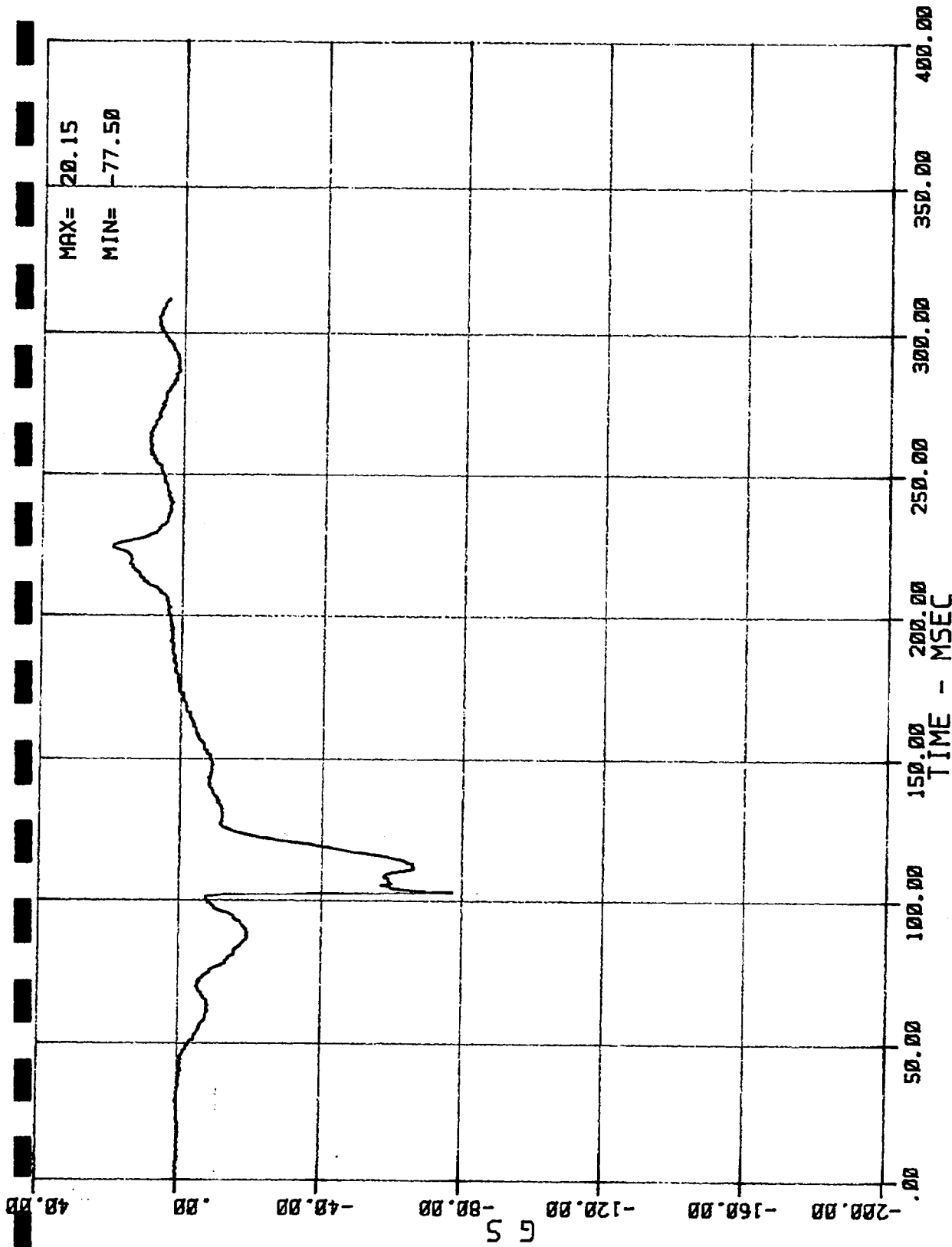


06 AC 01 1 CST Z (DRIVERS CHEST ACCEL. -- Z AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83

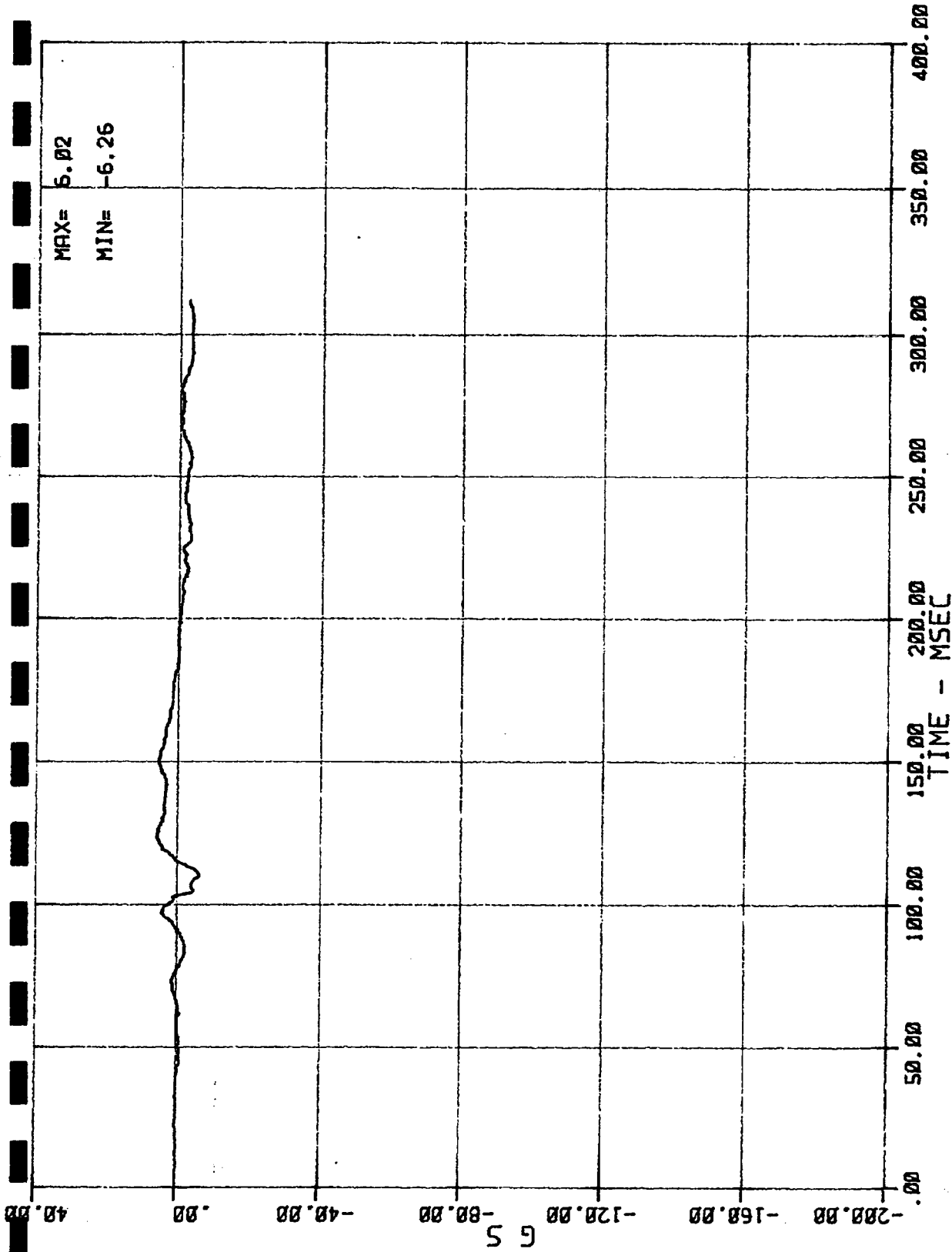


DRIVERS CHEST RESULTANT ACCELERATION
MSE N99R33 1983 MITSUBISHI CORDIA 10/31/83



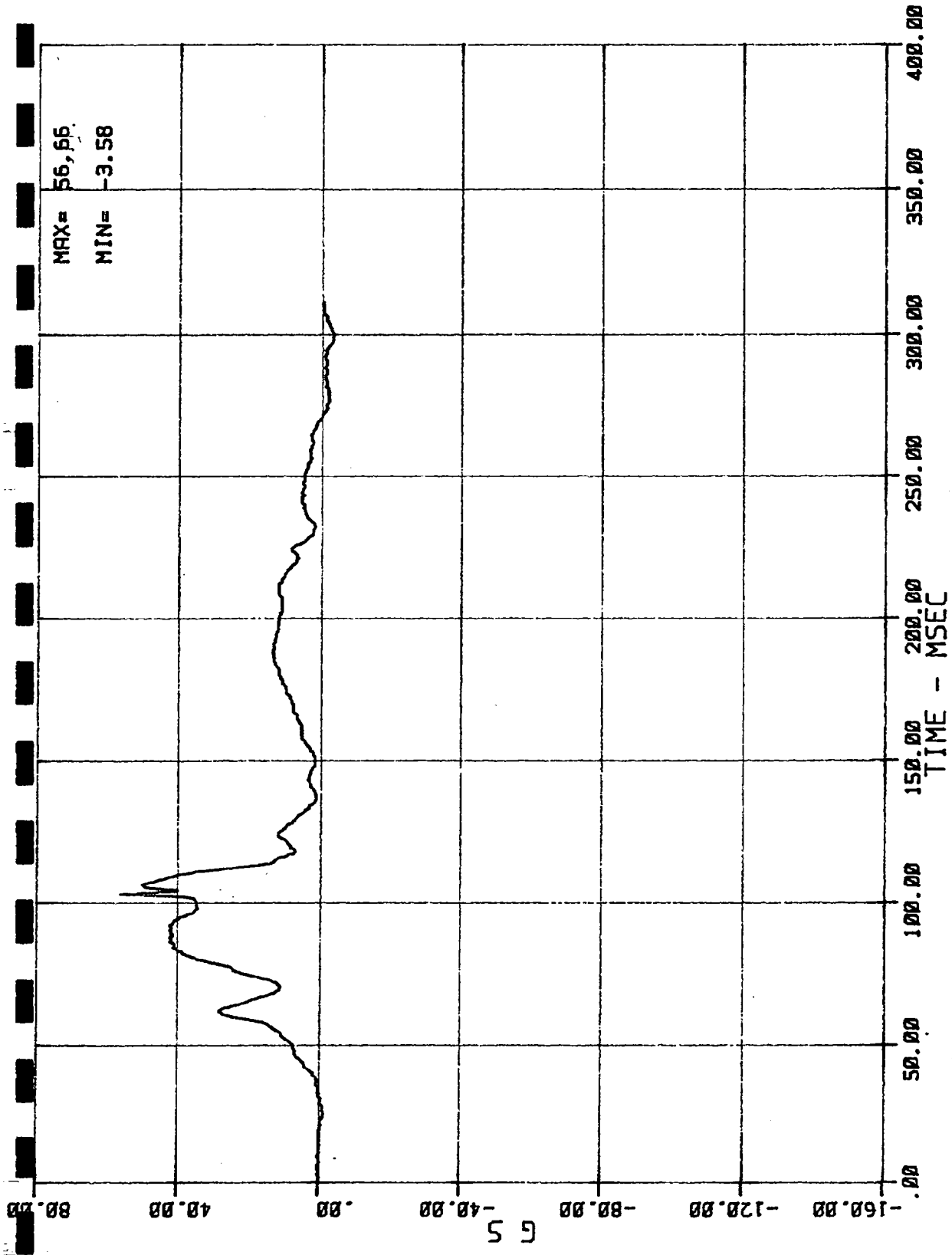
07 AC 01 2 HED X (PASSENGER HEAD ACCEL. --- X AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83

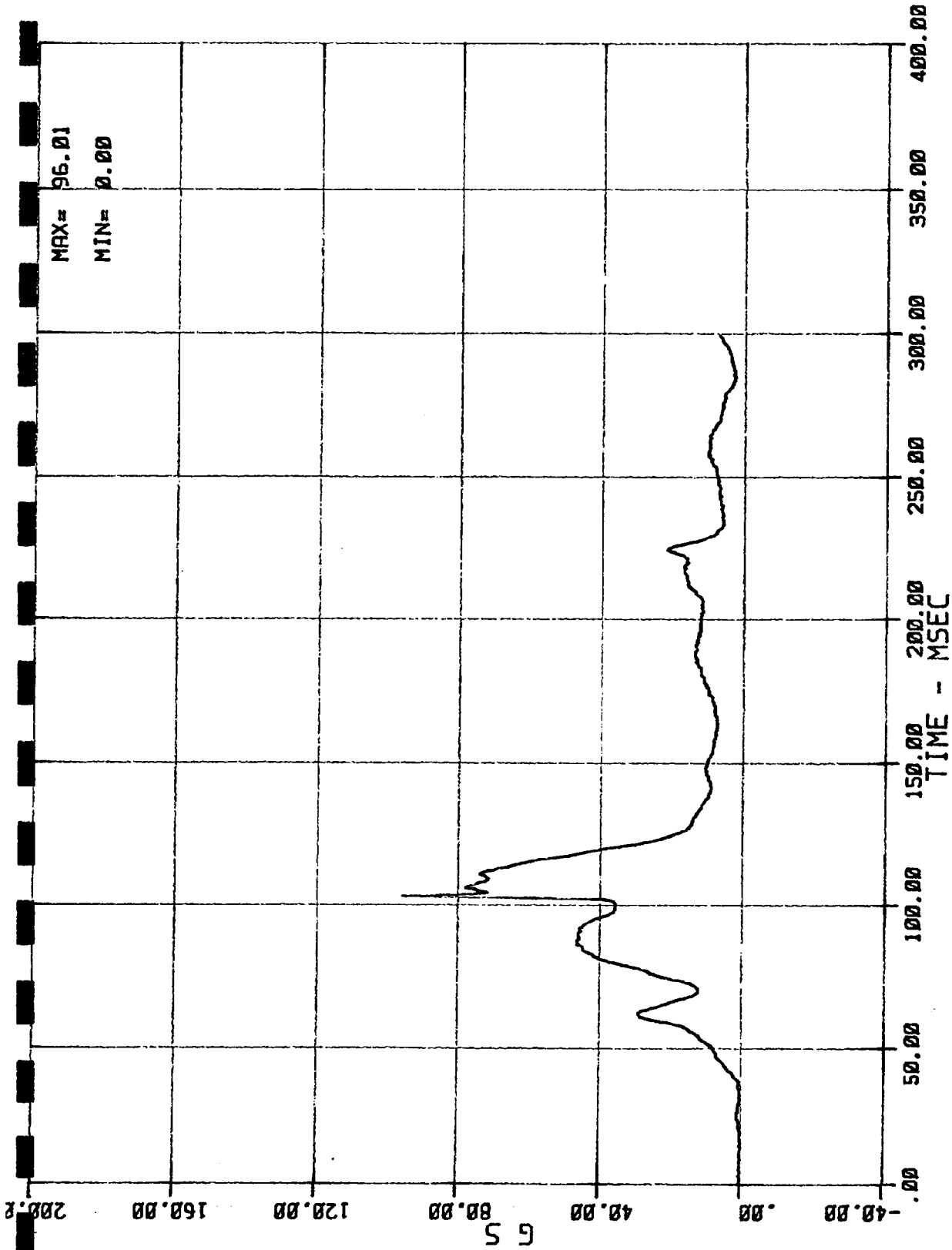


08 AC 01 2 HED Y (PASSENGER HEAD ACCEL. -- Y AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83

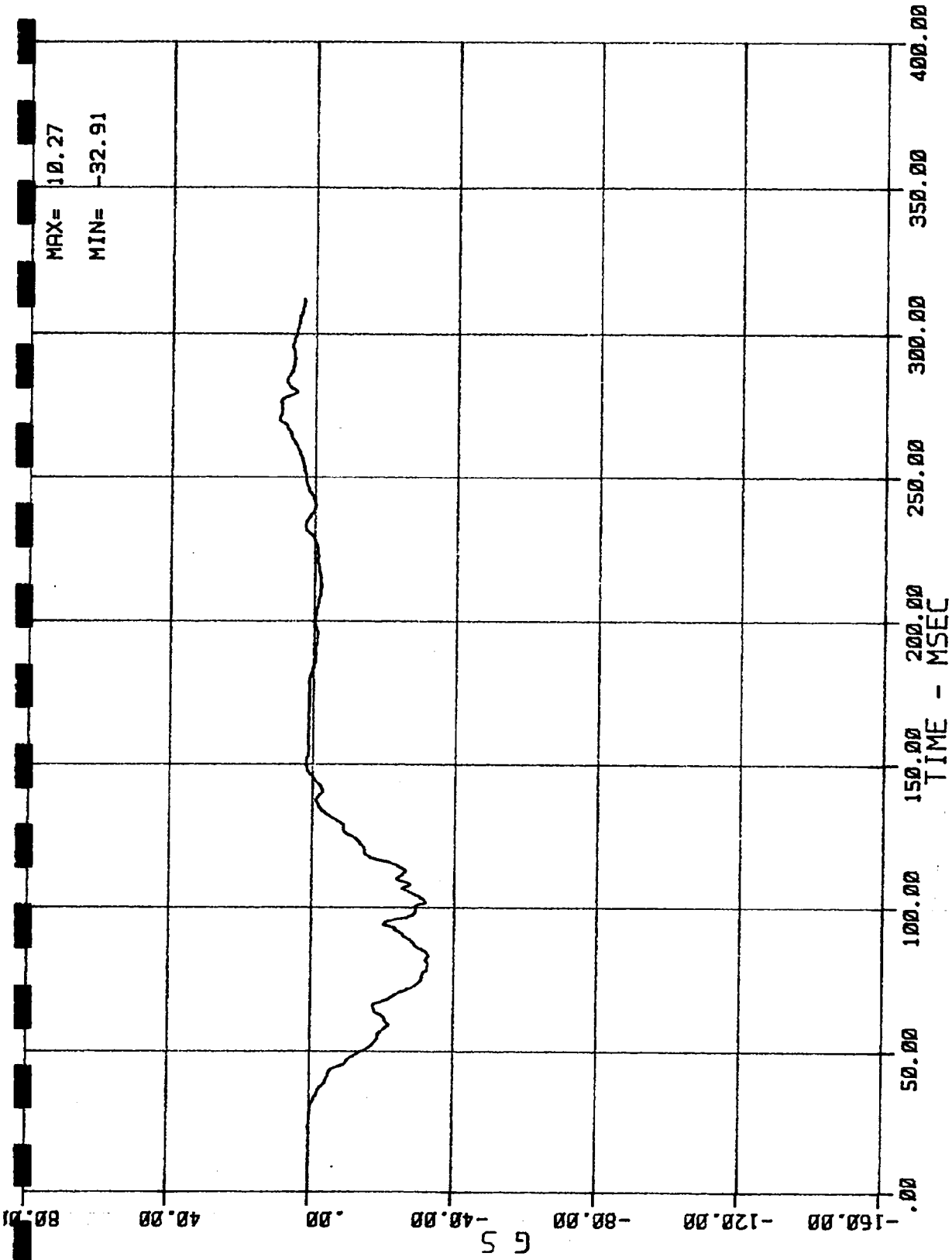


09 AC 01 2 HED Z (PASSENGER HEAD ACCEL. --Z AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA 10/31/83



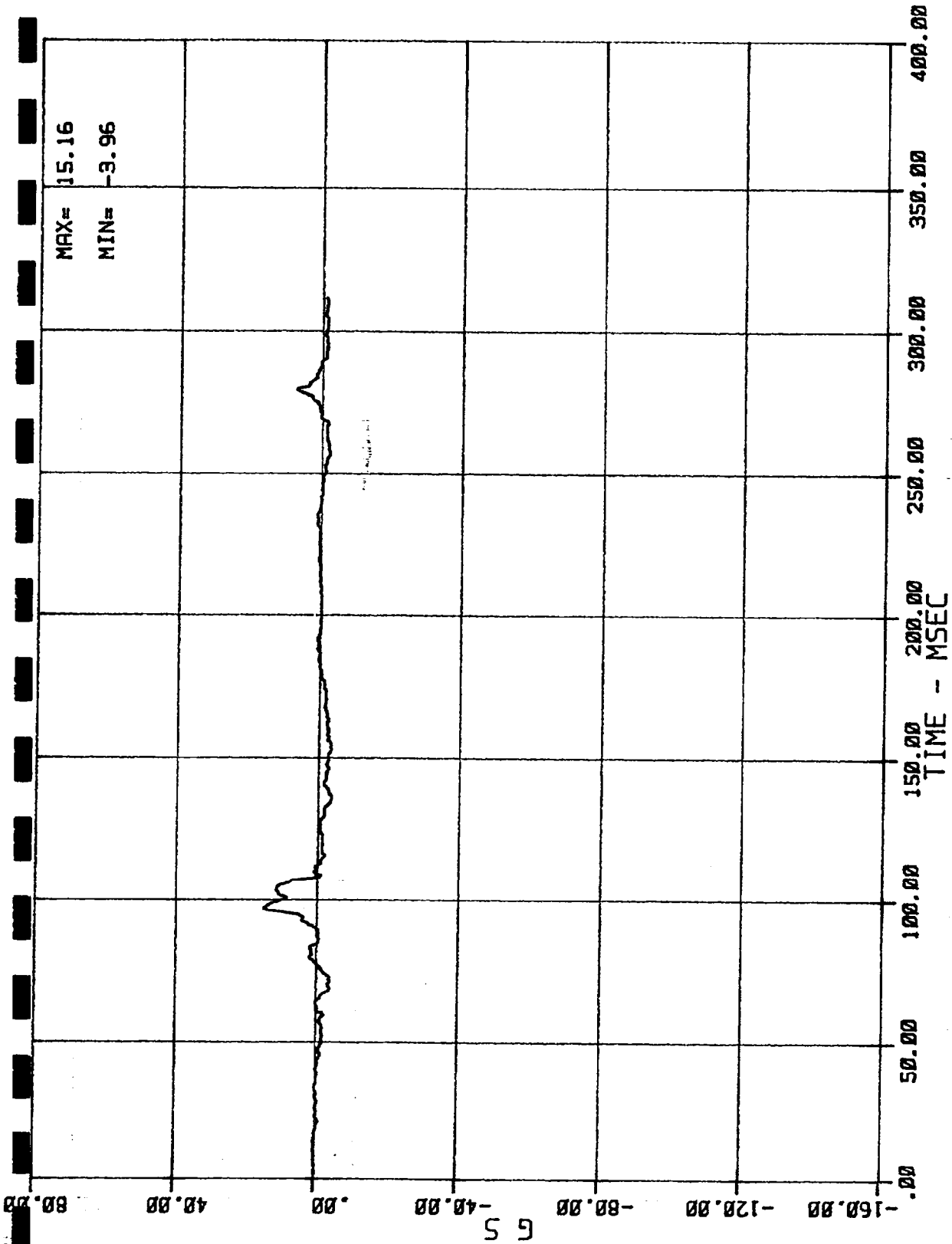
PASSENGERS HEAD RESULTANT ACCELERATION
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



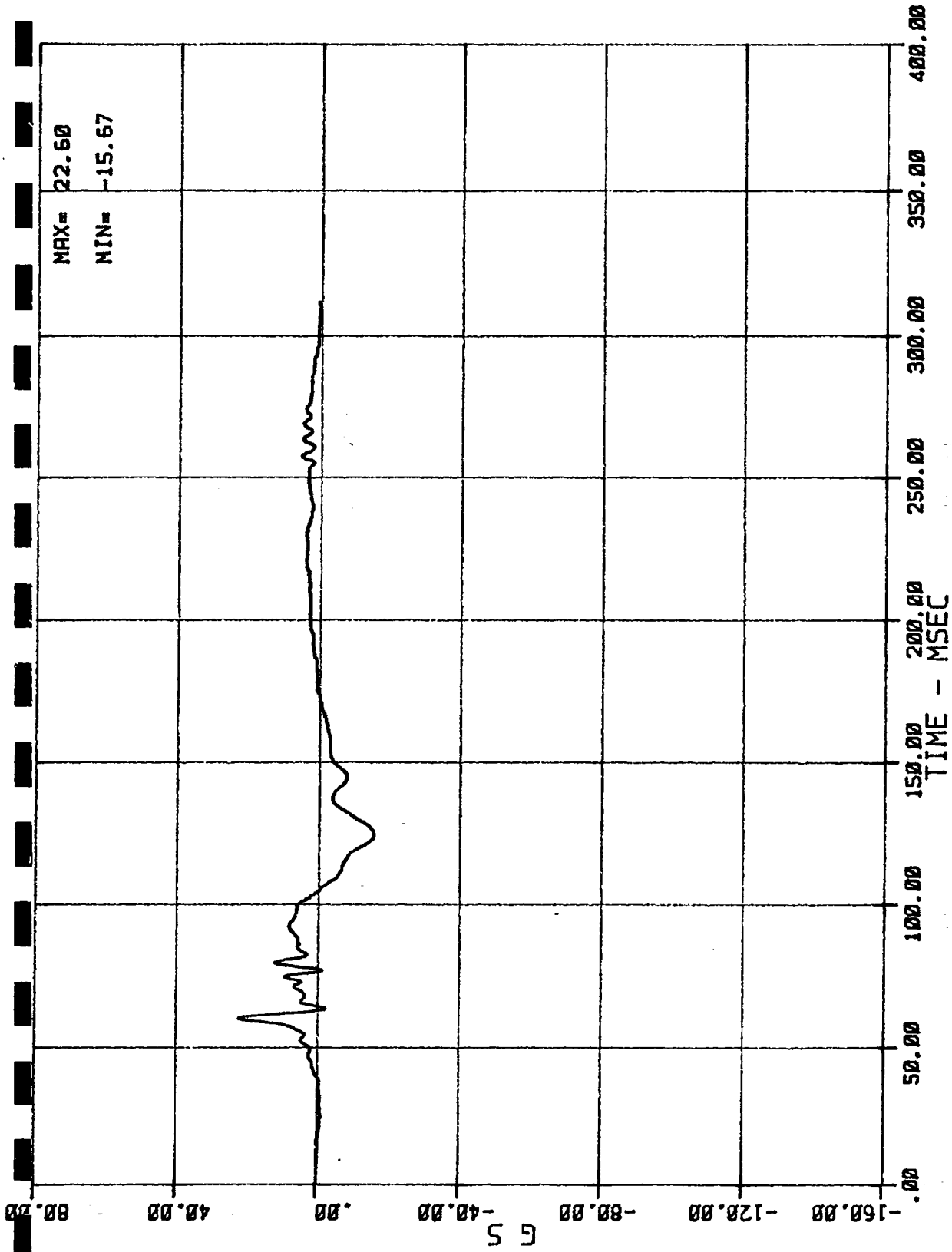
10 AC 01 2 CST X (PASSENGERS CHEST ACCEL. -- X AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



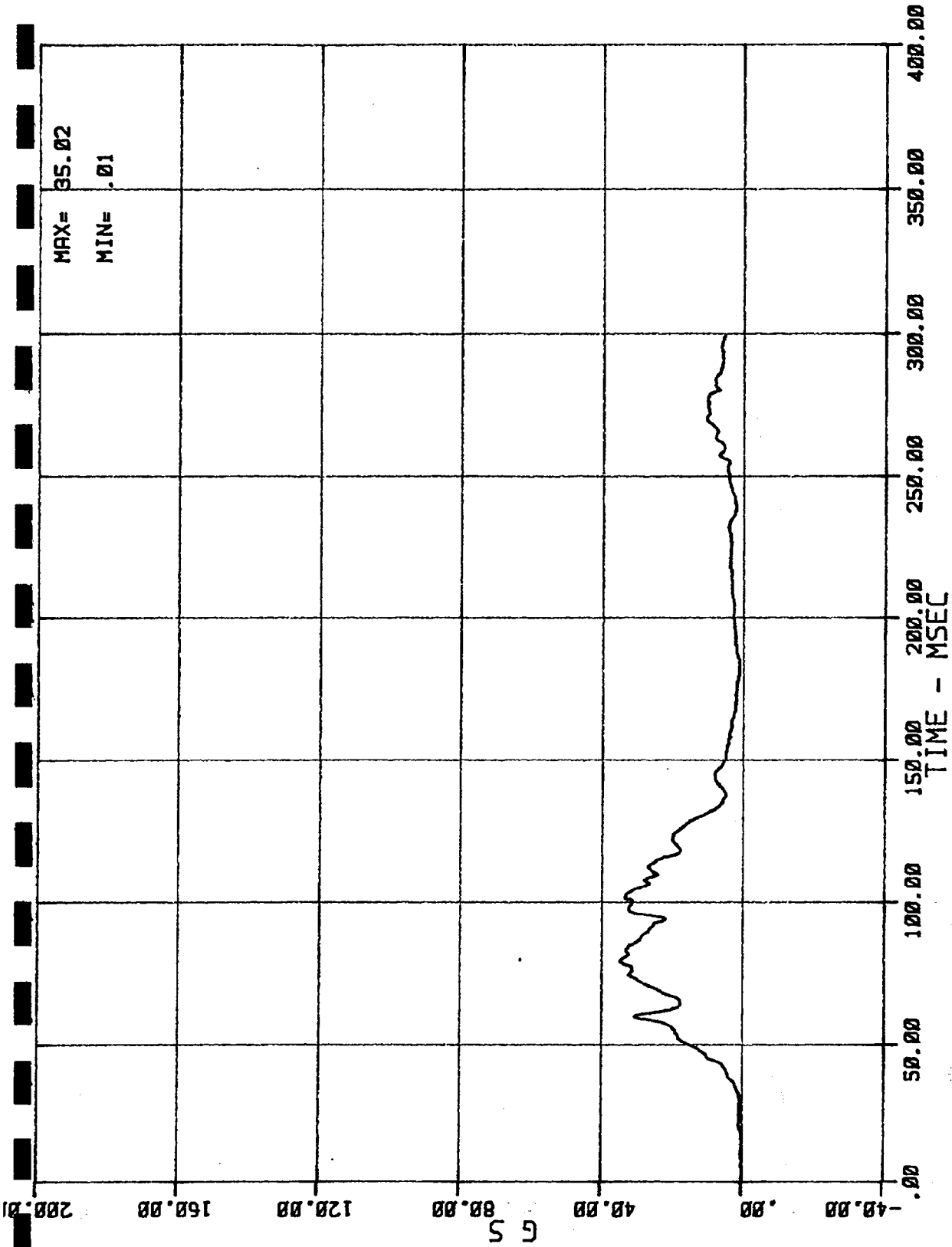
11 AC 01 2 CST Y (PASSENGERS CHEST ACCEL. --- Y AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83

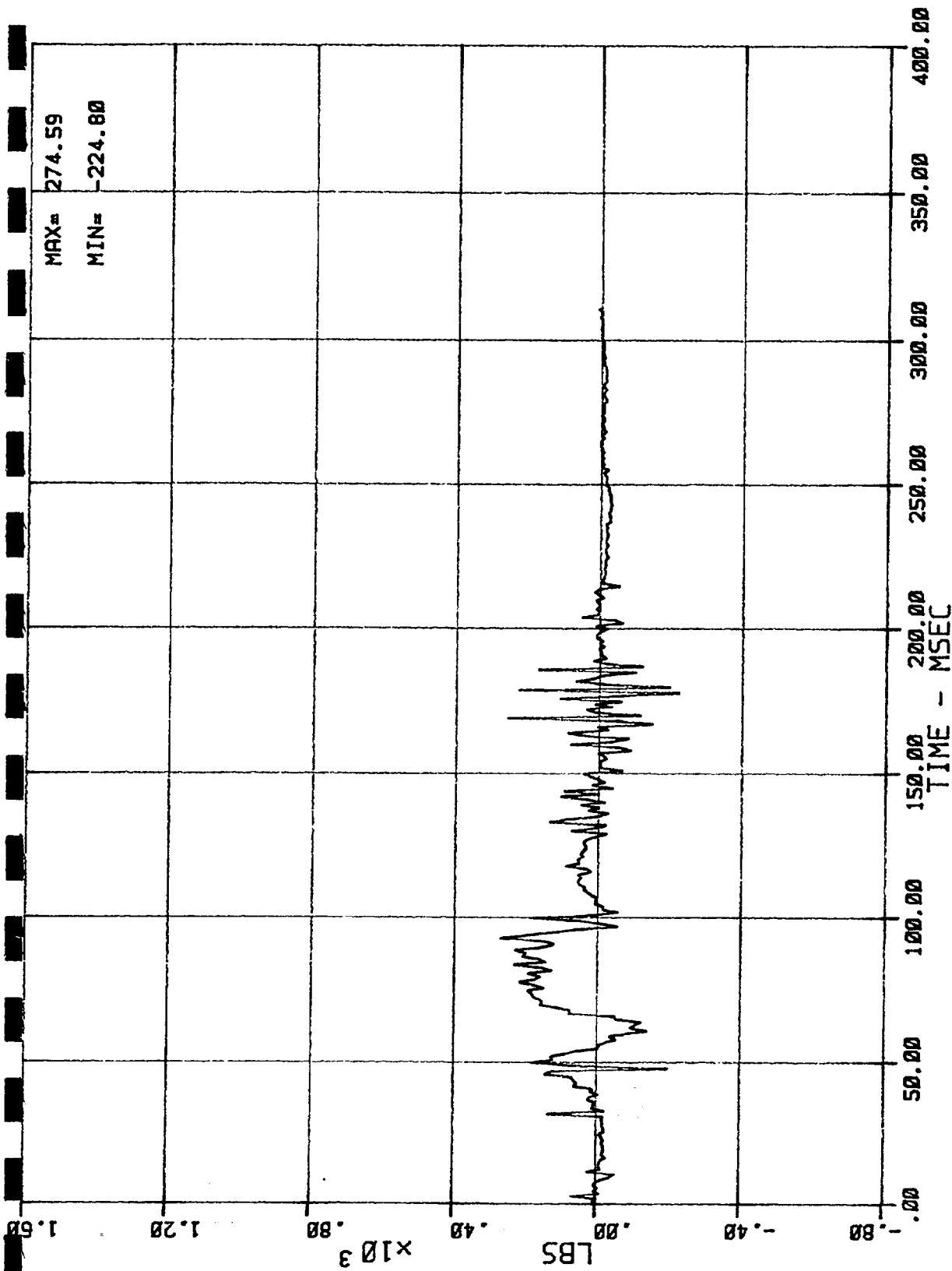


12 AC 01 2 CST Z (PASSENGERS CHEST ACCEL. -- Z AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83

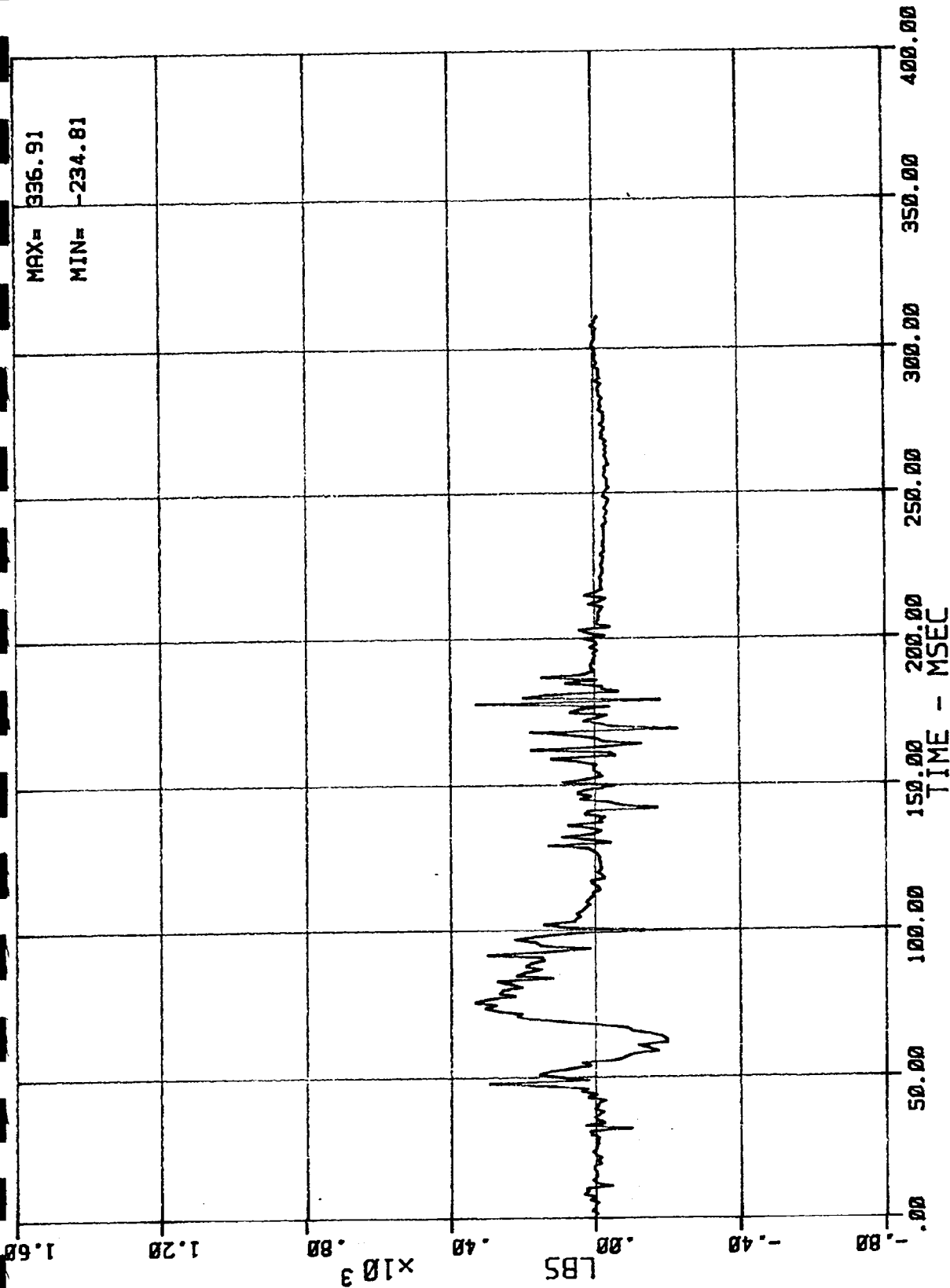


PASSENGERS CHEST RESULTANT ACCELERATION
MSE N99R33 1983 MITSUBISHI CORDIA
10/31/83



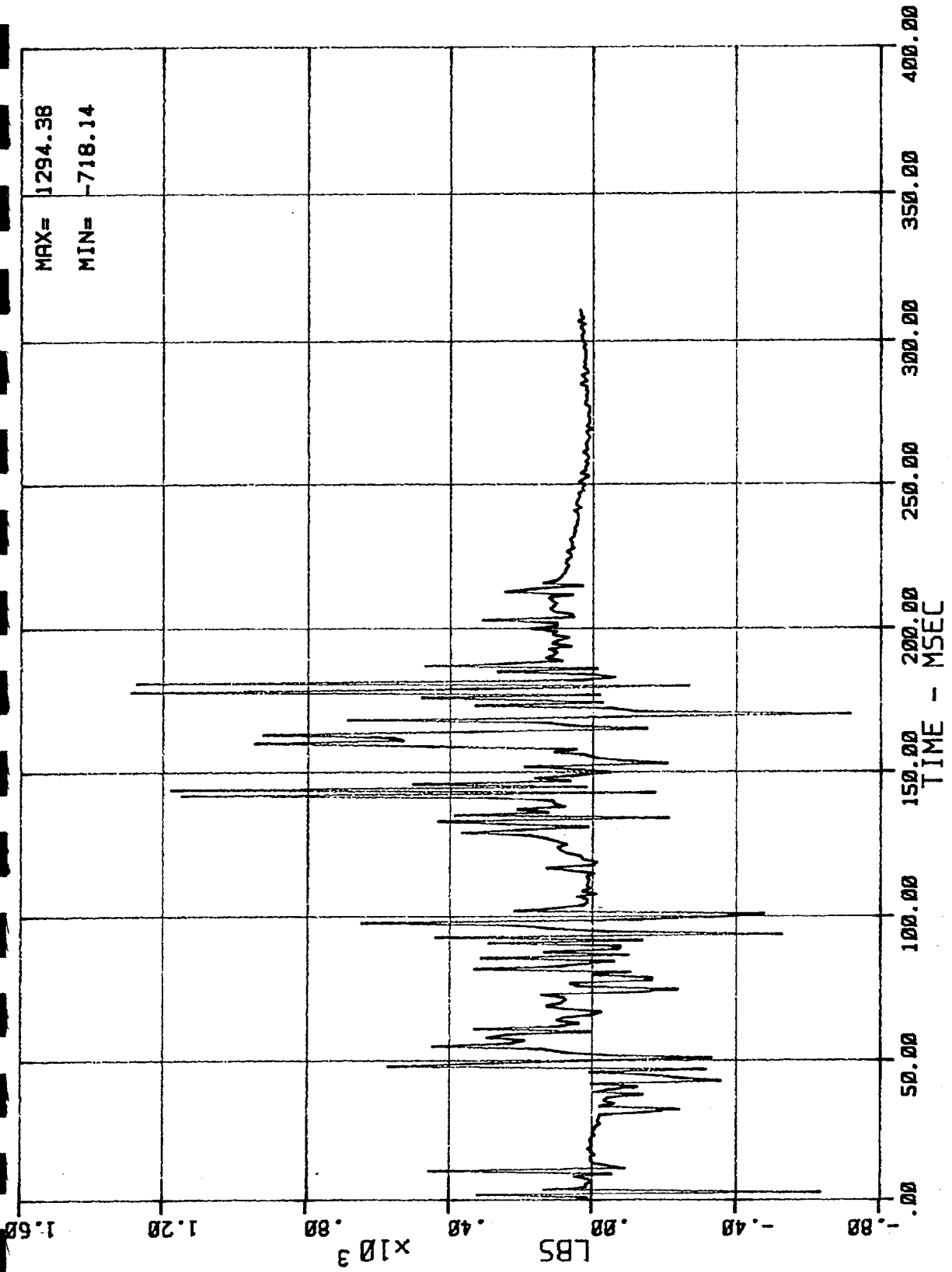
13 LC 01 1 LFM (DRIVERS LEFT FEMUR FORCE)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



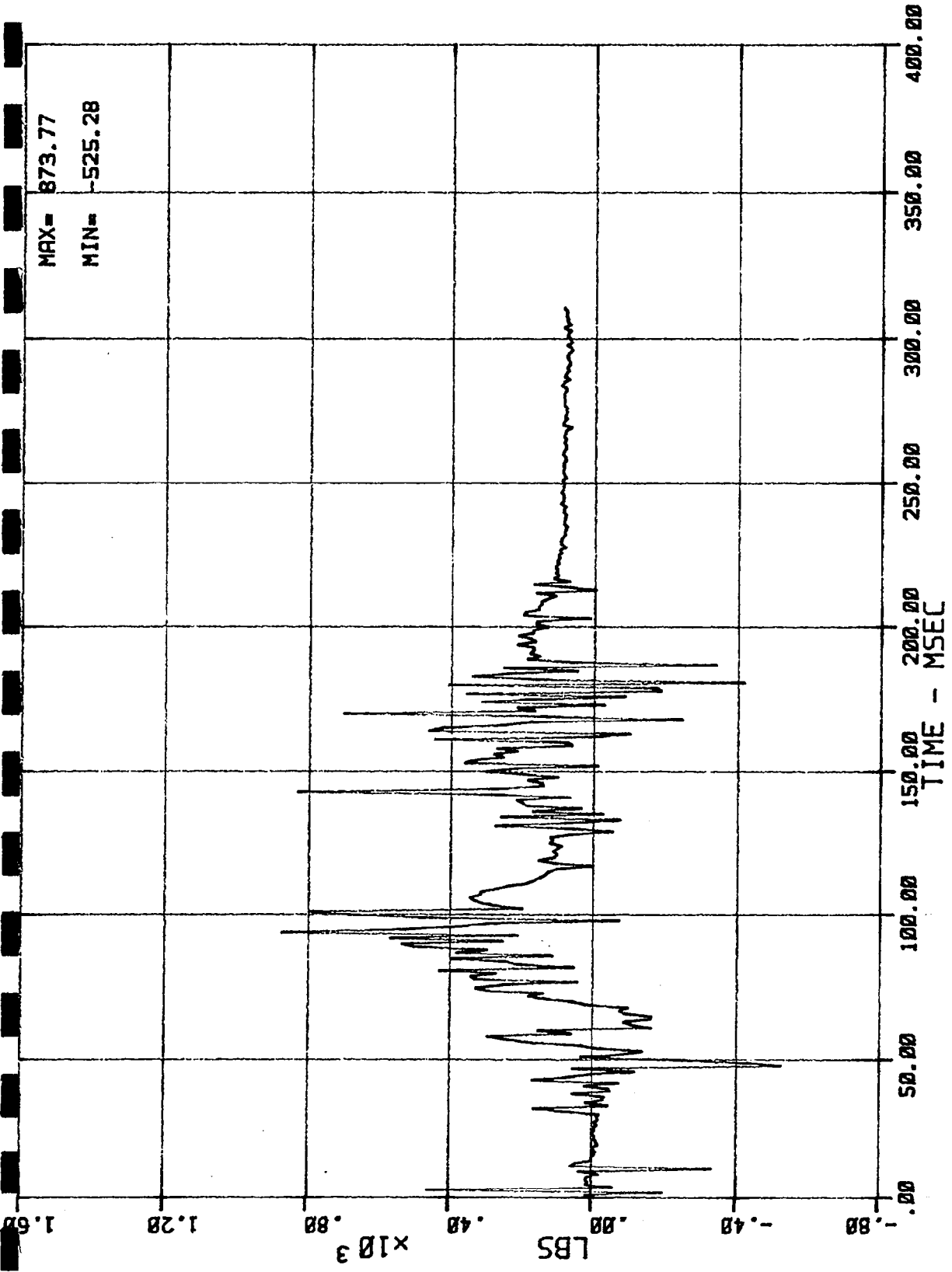
14 LC 01 1 RFM (DRIVERS RIGHT FEMUR FORCE)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



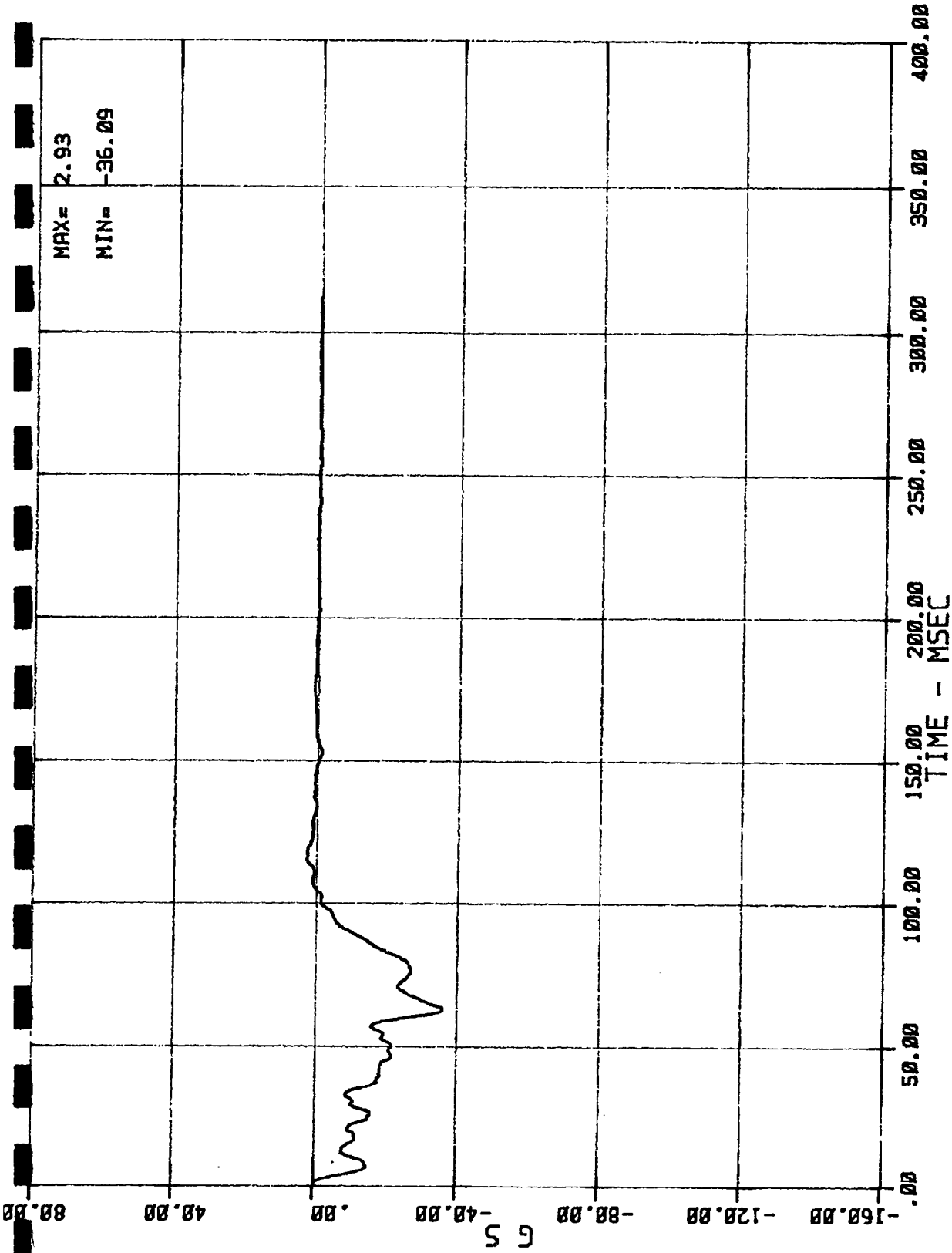
15 LC 01 2 LFM (PASSENGERS LEFT FEMUR FORCE)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83

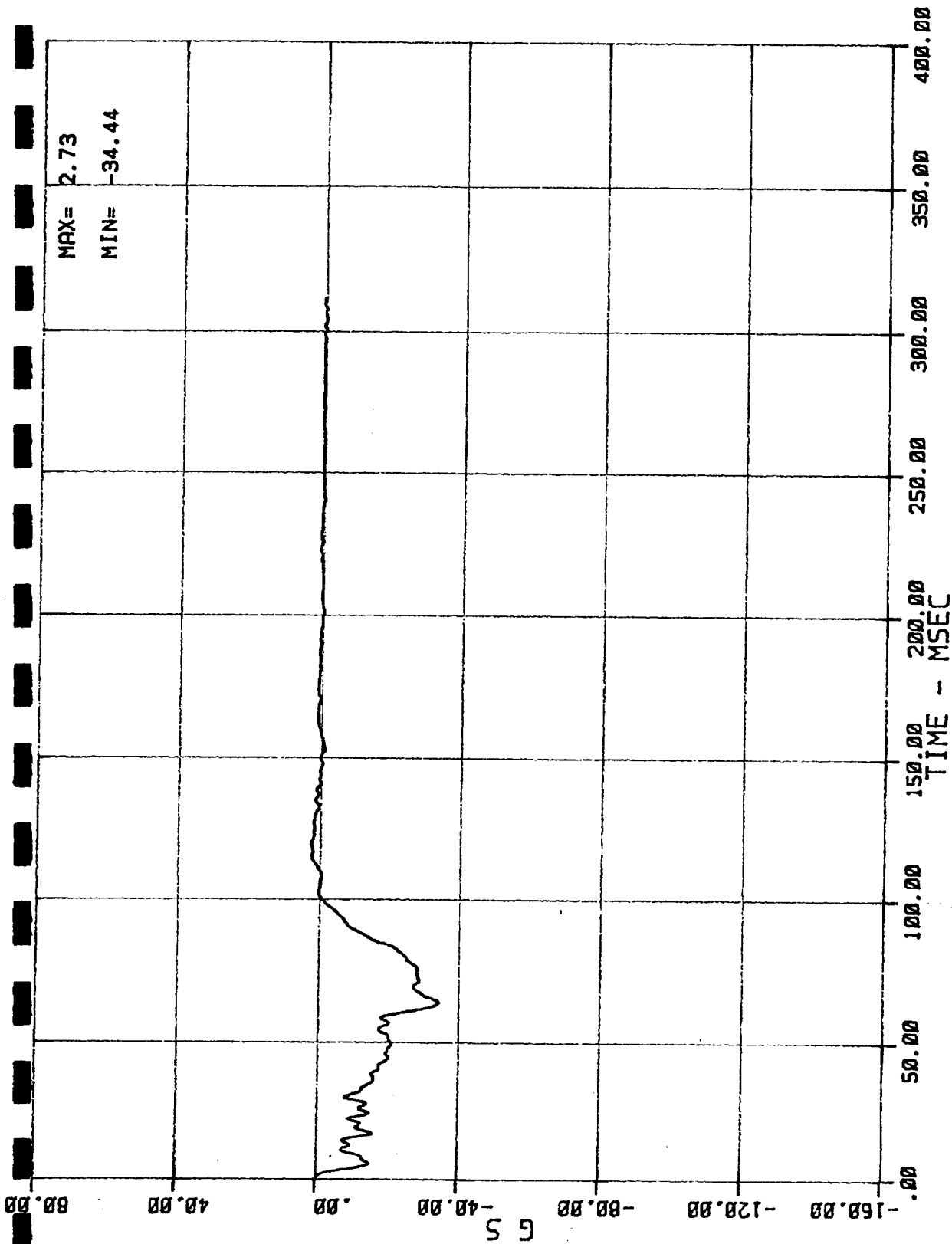


16 LC 01 2 RFM (PASSENGERS RIGHT FEMUR FORCE)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83

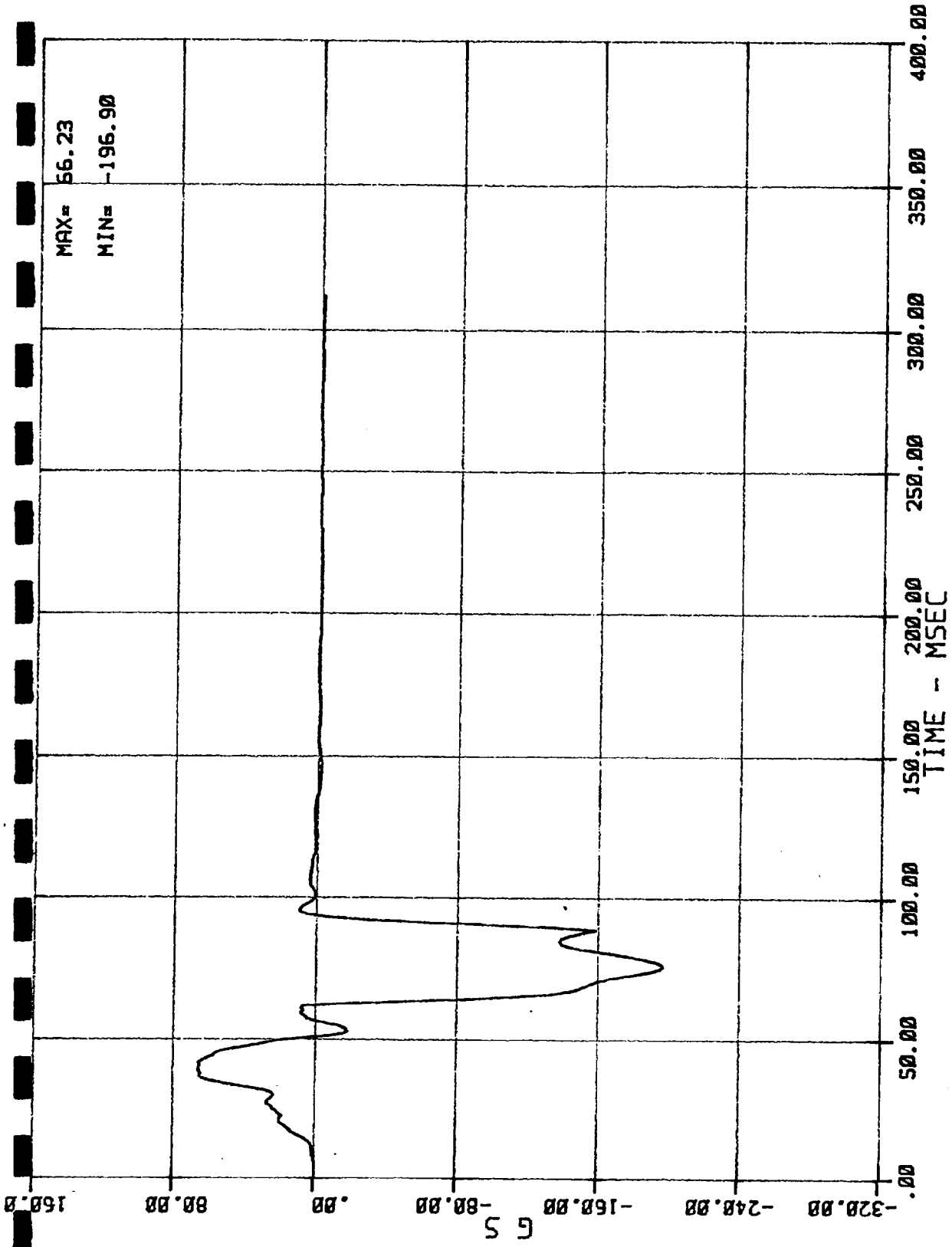


17 AC 01 N RFF X (RIGHT FRONT FLOOR ACCEL. -- X AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA
10/31/83



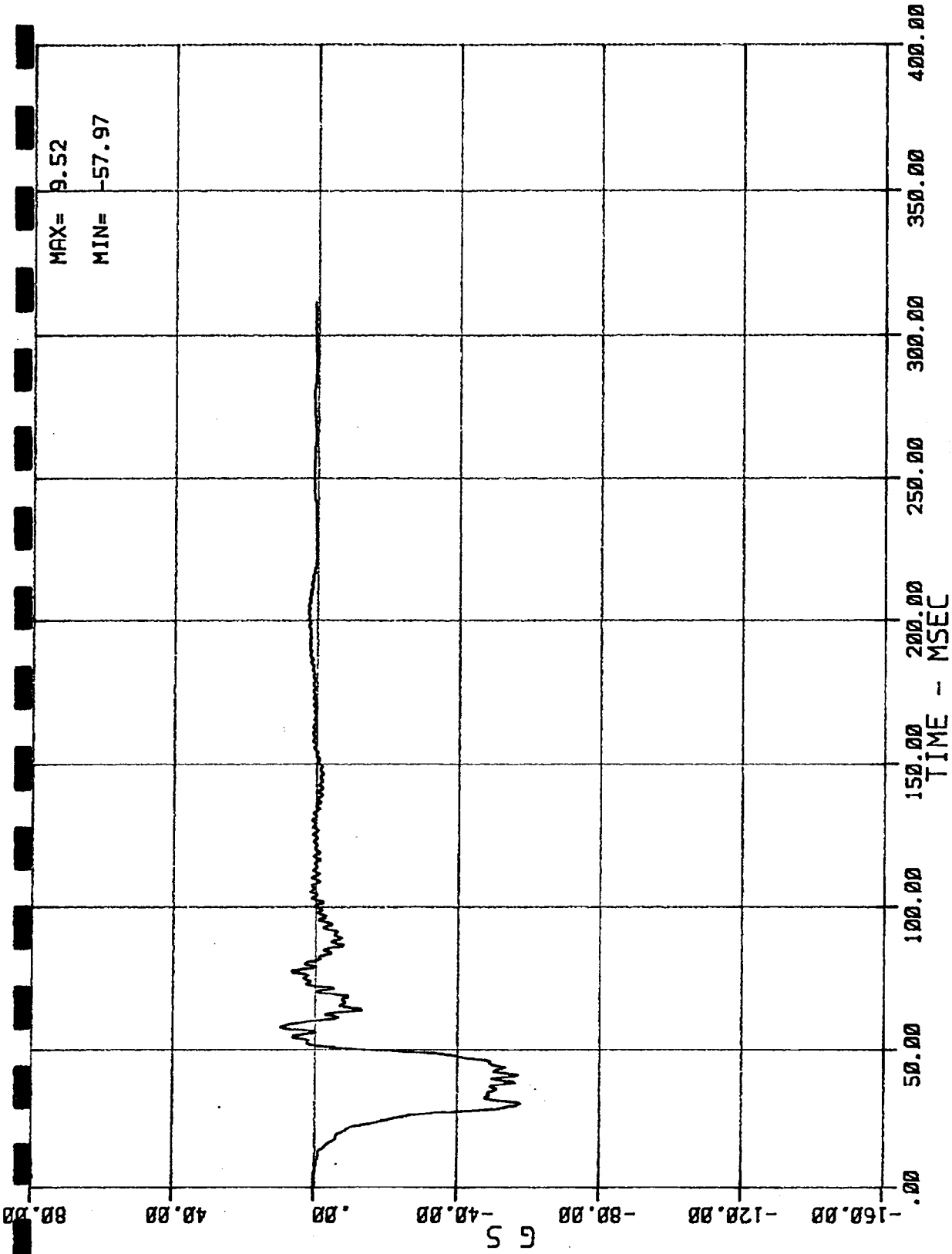
18 AC 01 N LRF X (LEFT REAR FLOOR ACCEL. --- X AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



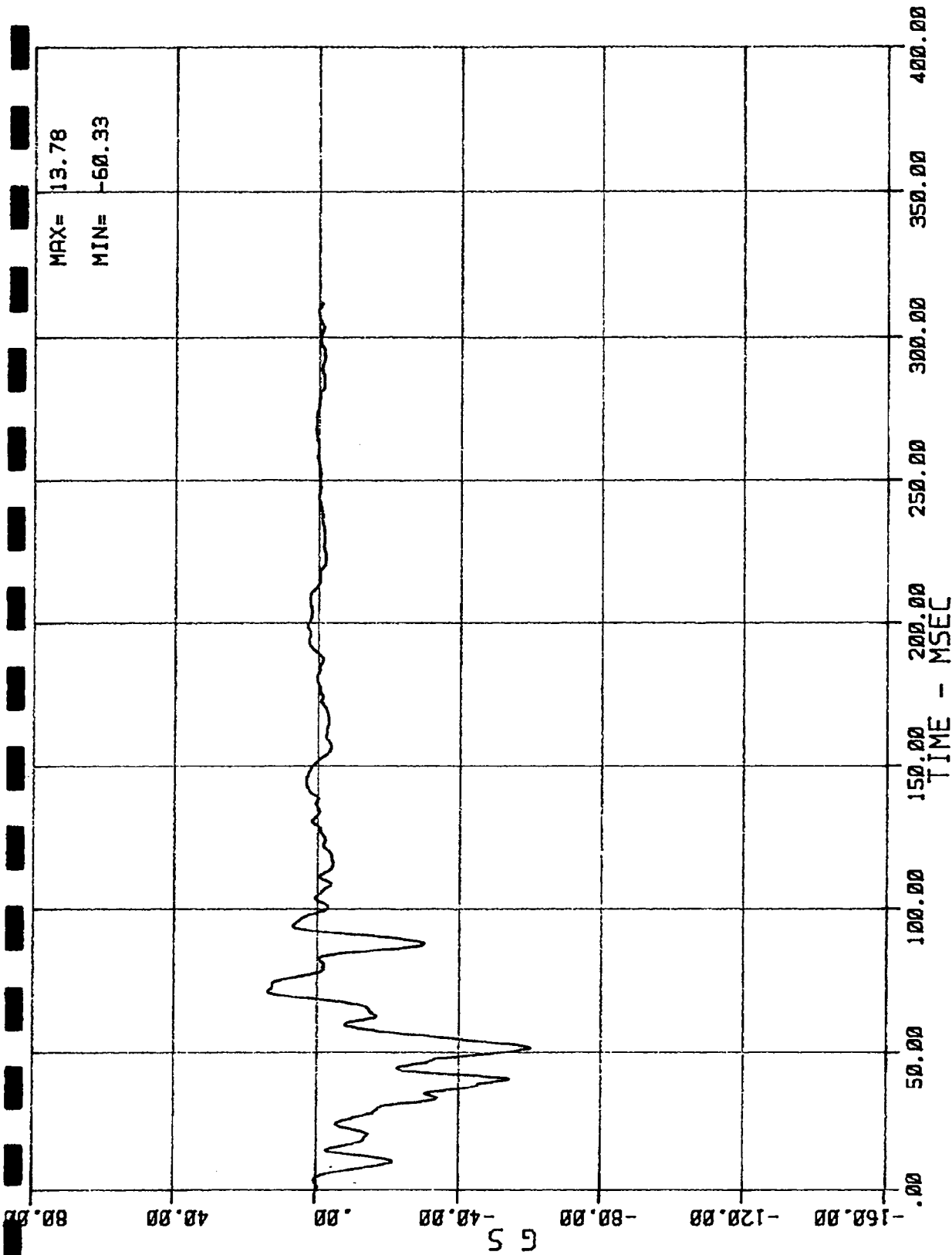
19 AC 01 N ENG X (ENGINE ACCEL. TOP -- X AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



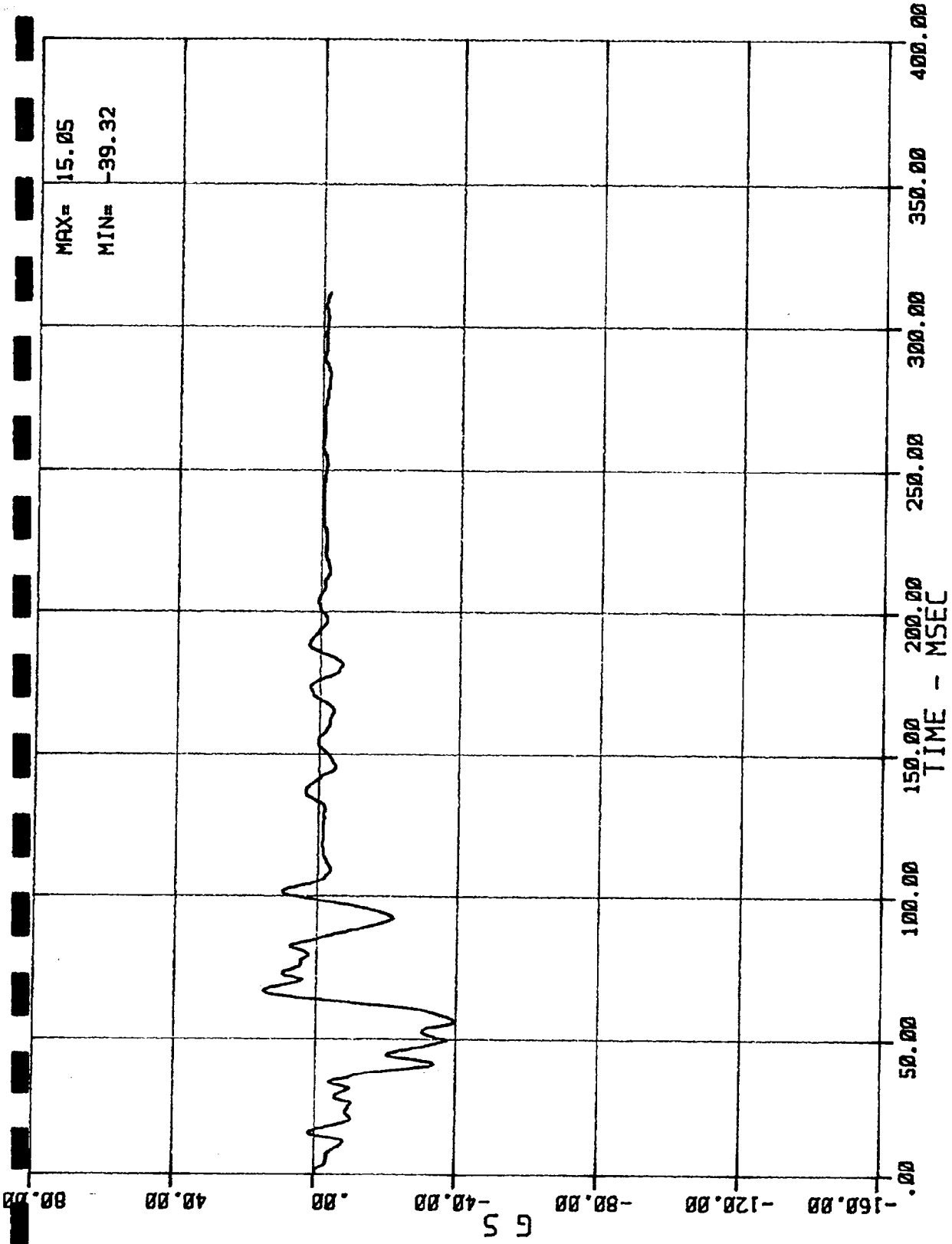
20 AC 01 N ENG X (ENGINE ACCEL. BOTTOM -- X AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



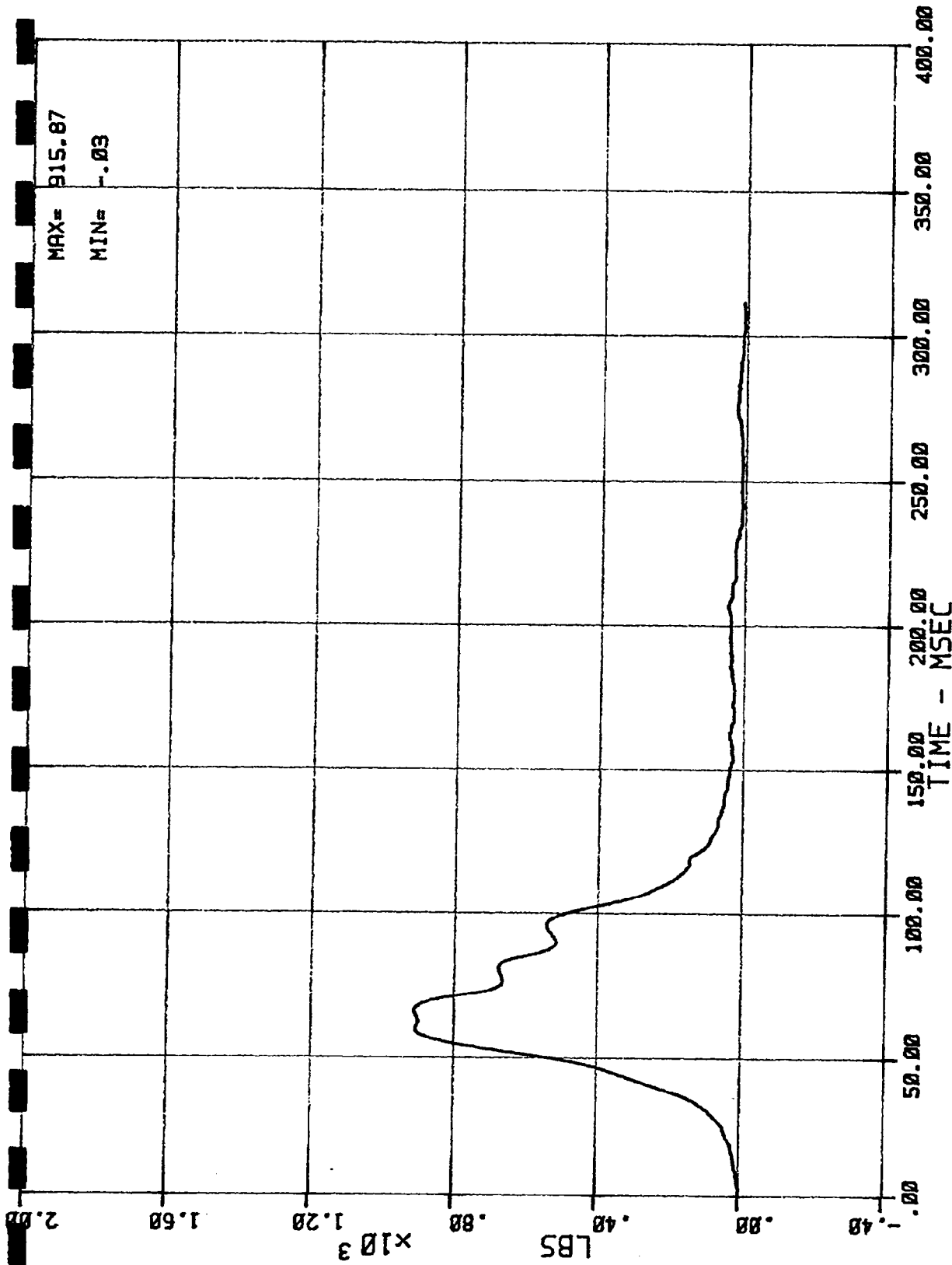
21 AC 01 N BCR X (RIGHT FRONT WHEEL ACCEL. -- X AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



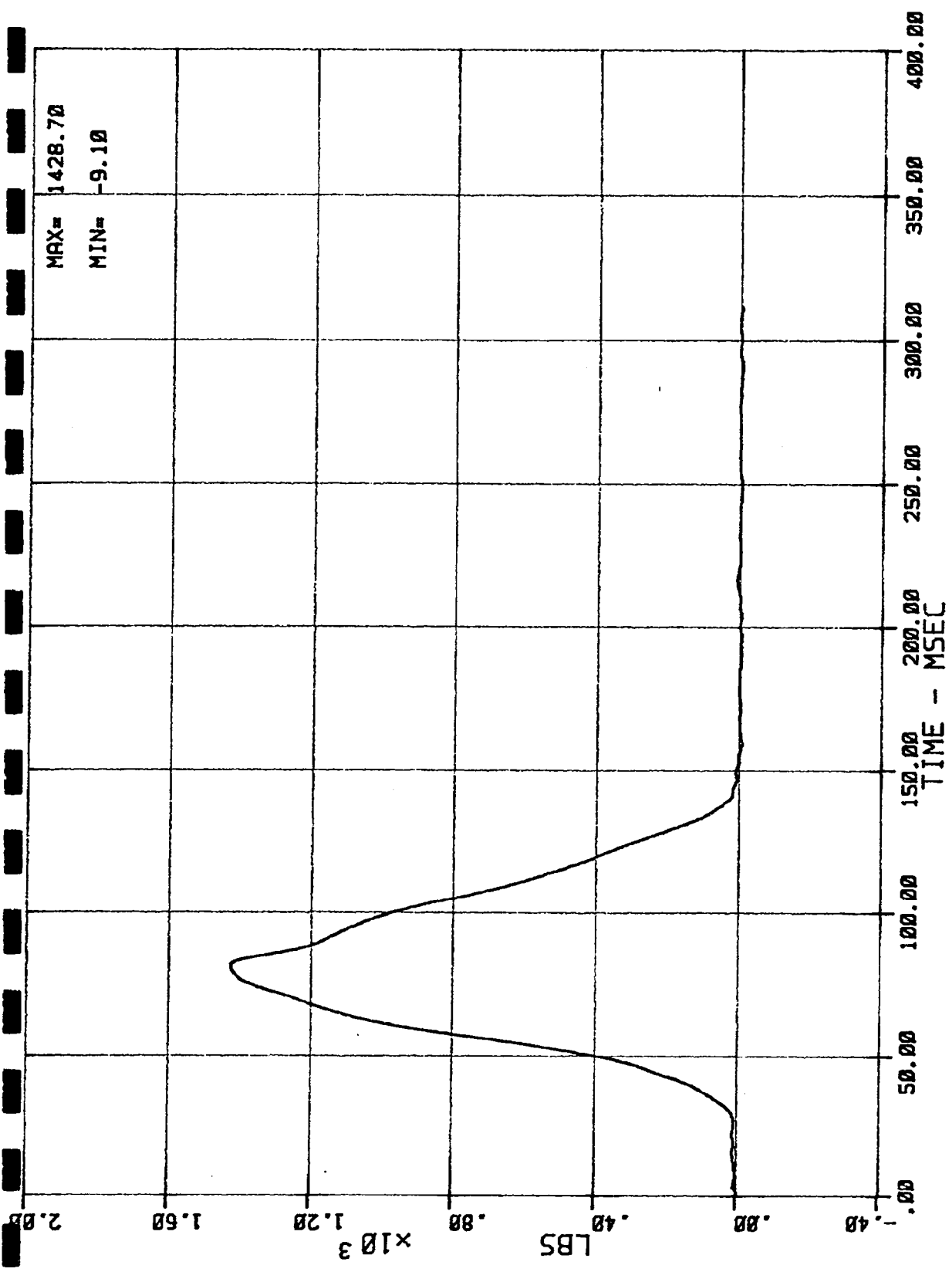
22 AC 01 N BCL X (LEFT FRONT WHEEL ACCEL. -- X AXIS)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



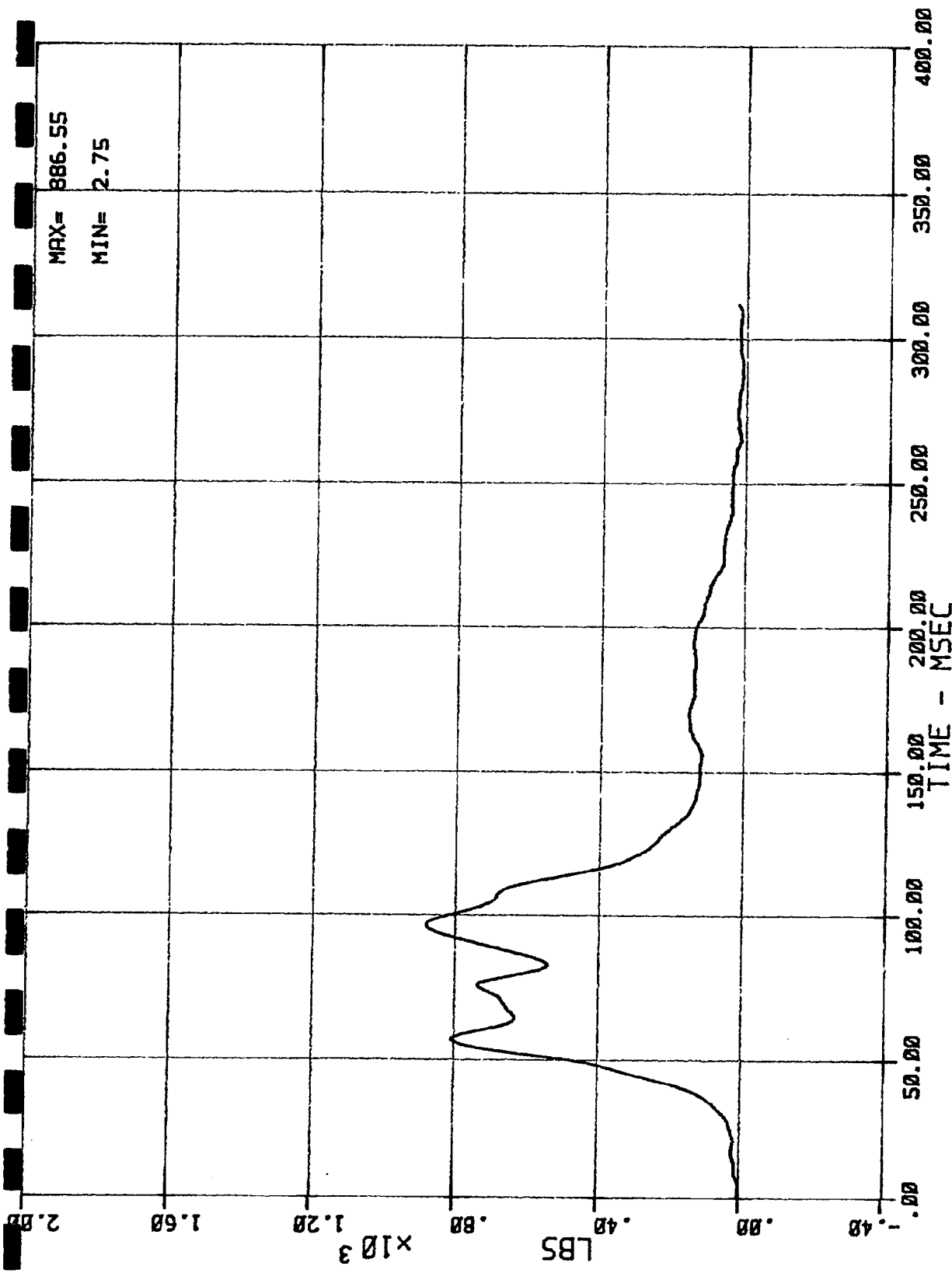
23 LC 01 1 L80 0 (DRIVERS LAP BELT FORCE)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



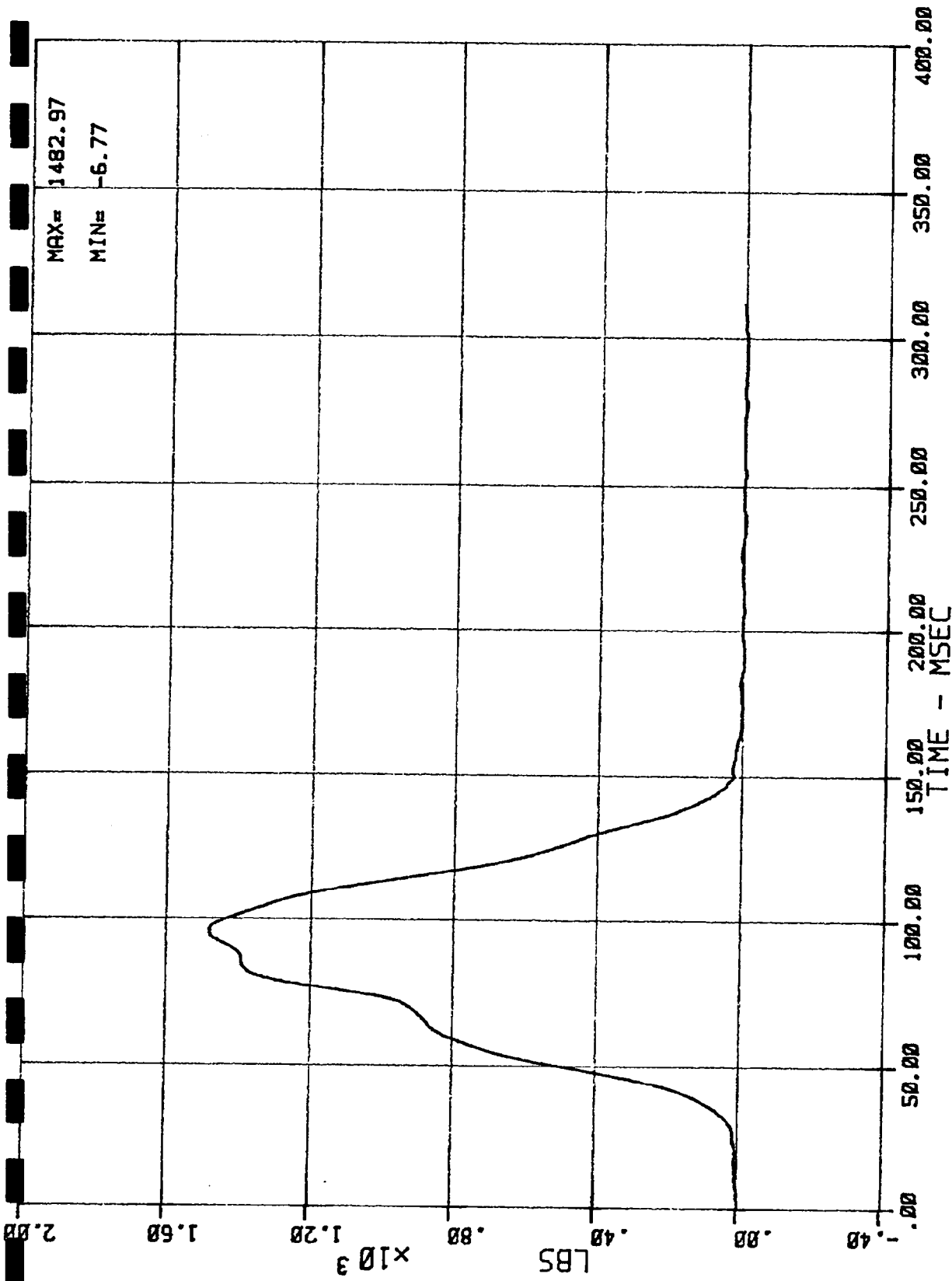
24 LC 01 1 SHB 0 (DRIVERS SHOULDER BELT FORCE)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



25 LC 01 2 LBD 0 (PASSENGERS LAP BELT FORCE)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83



26 LC 01 2 SHB 0 (PASSENGERS SHOULDER BELT FORCE)
MSE N99R33 1983 MITSUBISHI CORDIA

10/31/83