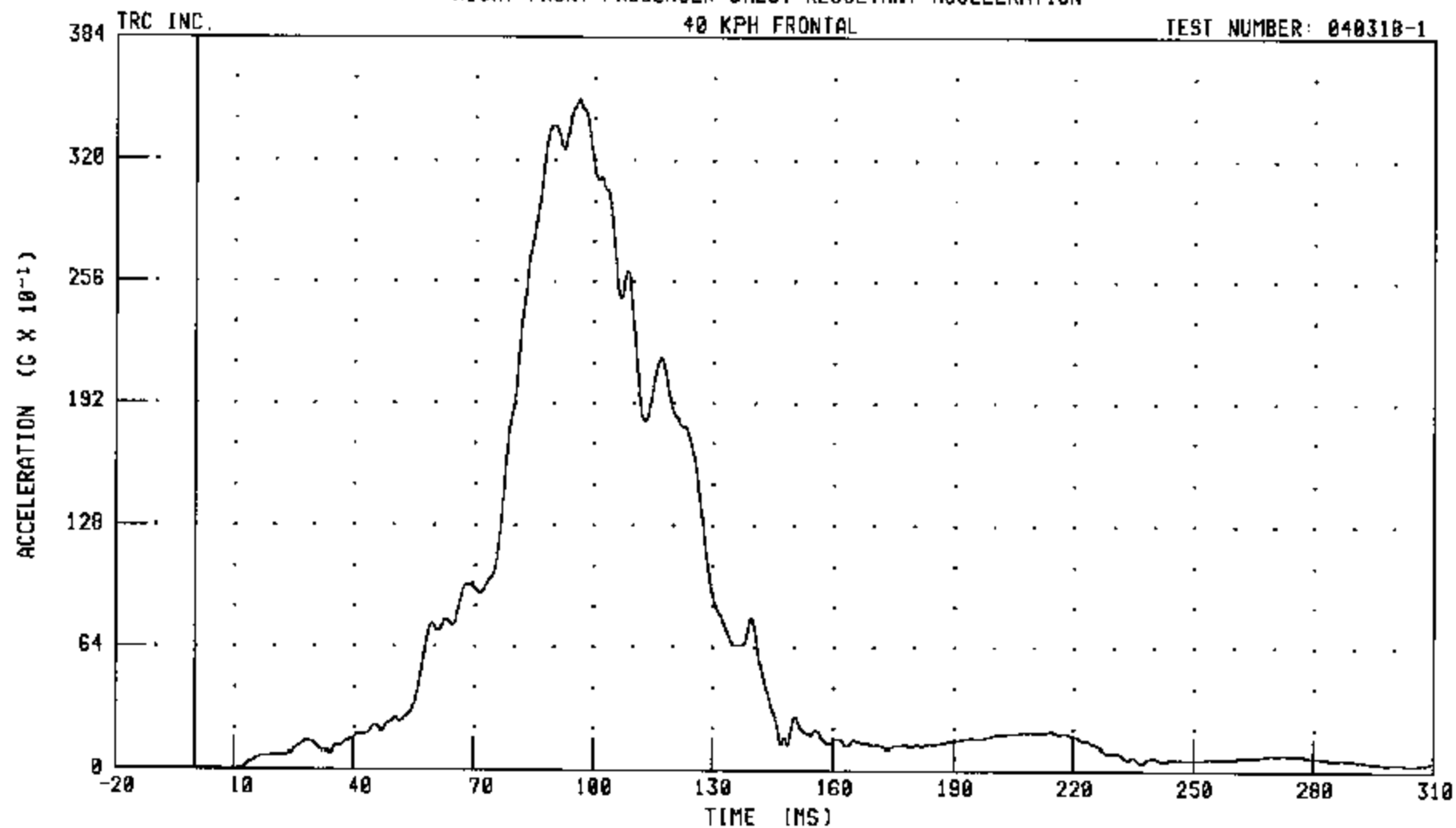


40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



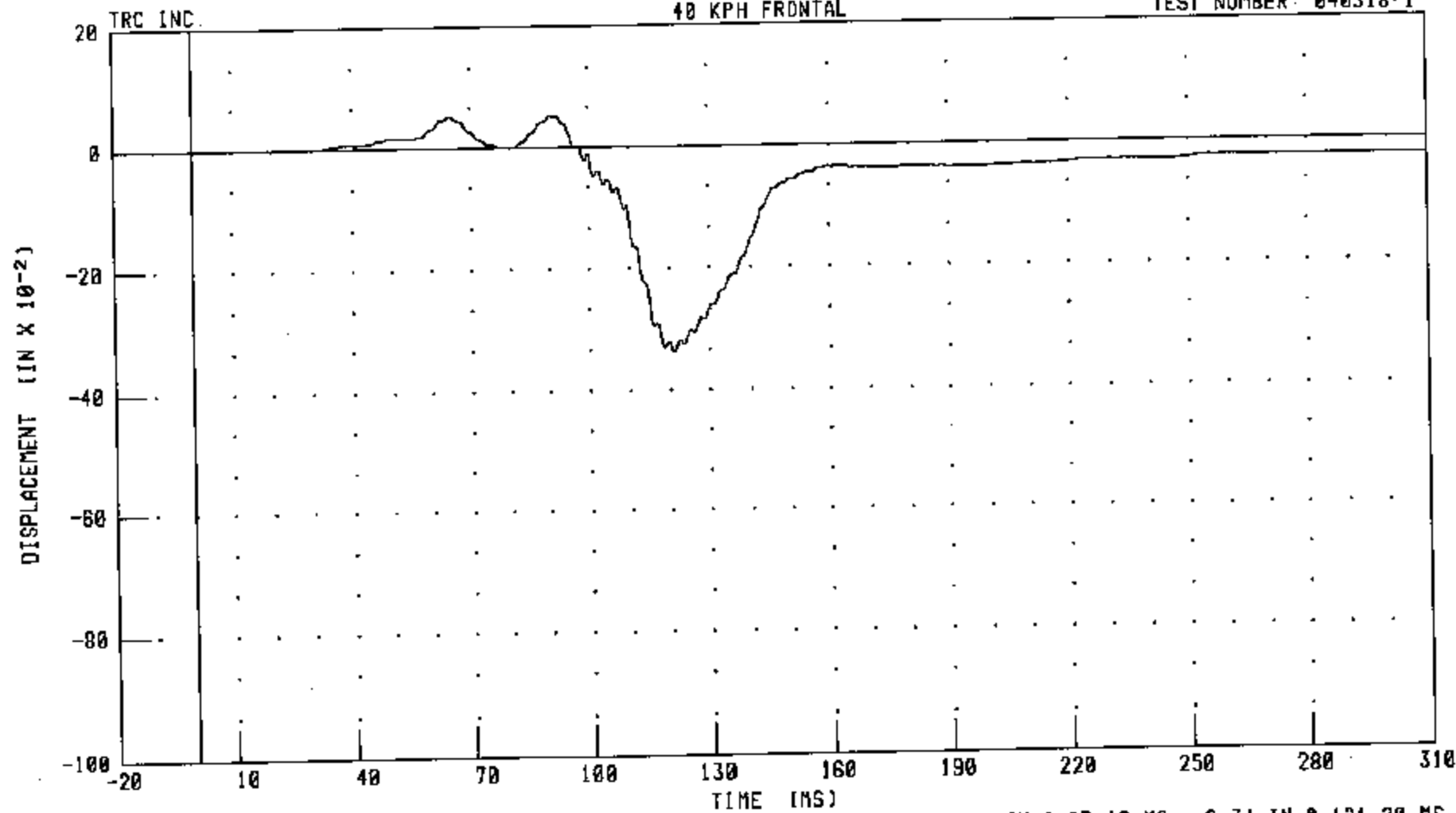
CHANNEL: CSTRG2 FILTER: CH. CLASS 100

6-42

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER CHEST DEFLECTION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: CSTXD2 FILTER: CH. CLASS 600

PEAK DATA: 0.05 IN @ 65.12 MS; -0.34 IN @ 121.20 MS

643

040318-1

40 KPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER LEFT FEMUR FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1

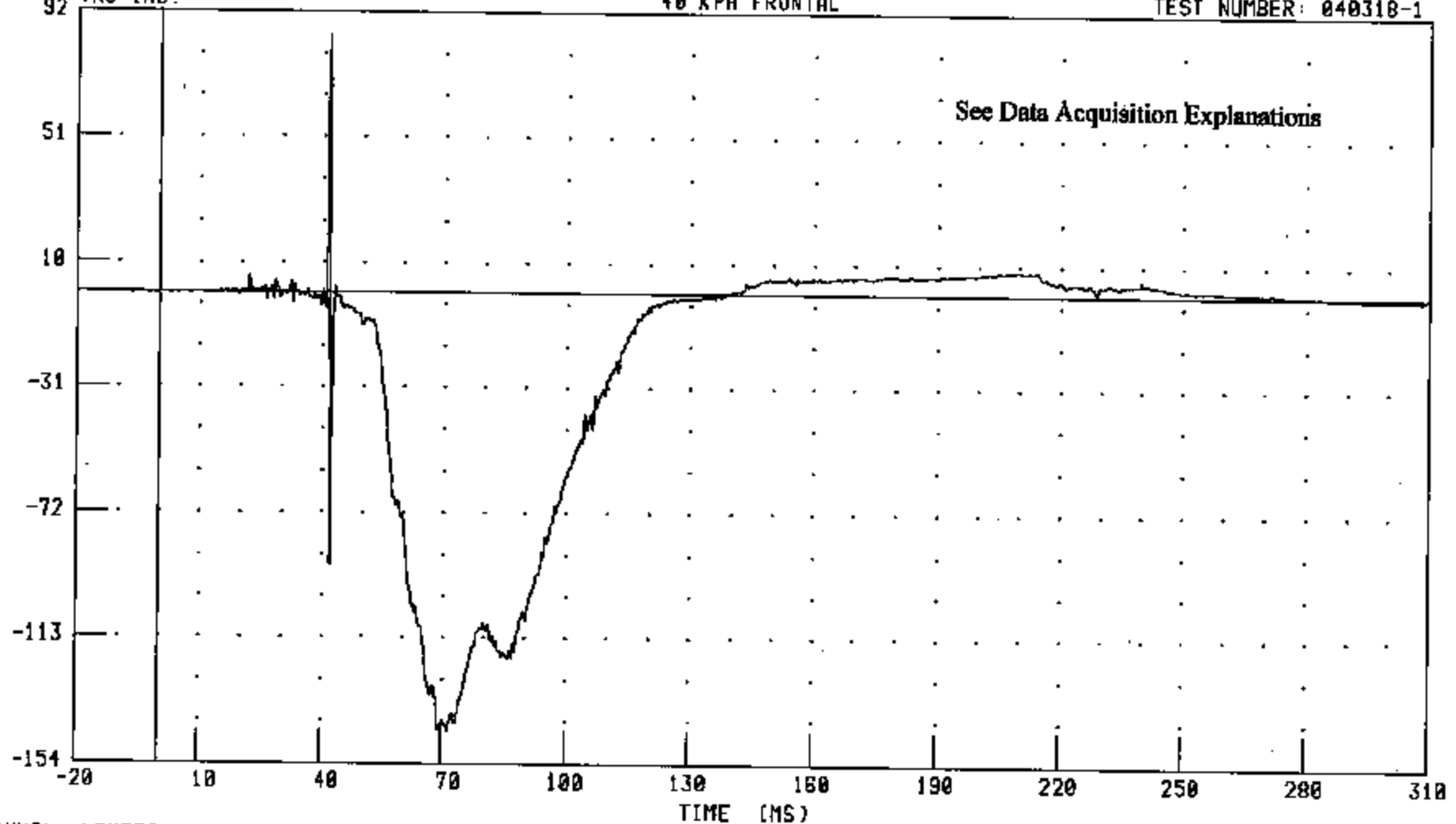
TRC INC.

See Data Acquisition Explanations

FORCE (LBF X 10¹)

6-44

040318-1



CHANNEL: LFNZF2 FILTER: CH. CLASS 600

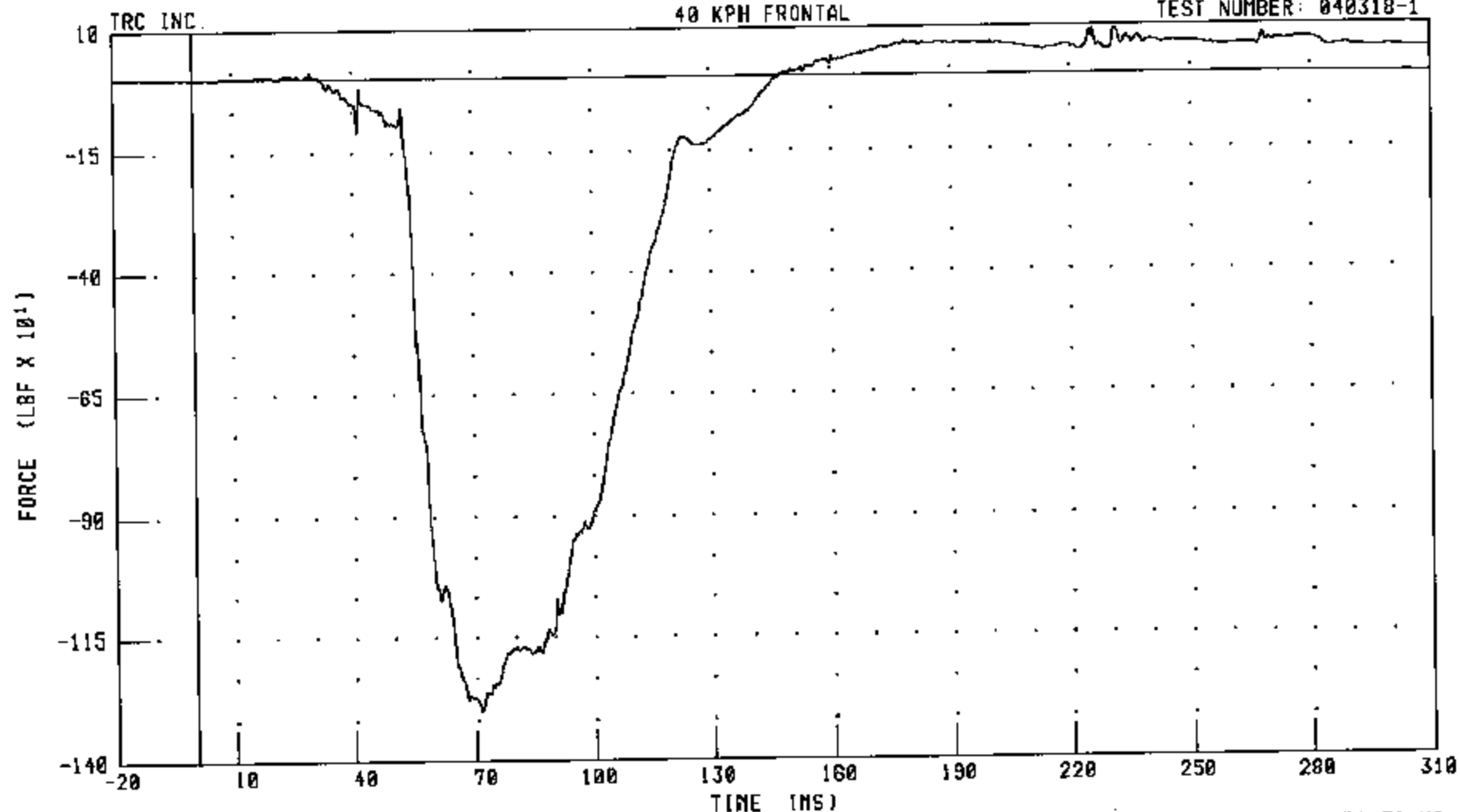
TIME (MS)

PEAK DATA: 845.31 LBF @ 41.44 MS; -1436.69 LBF @ 71.28 MS

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

TEST NUMBER: 040318-1

40 KPH FRONTAL



CHANNEL: RMZF2 FILTER: CH. CLASS 600

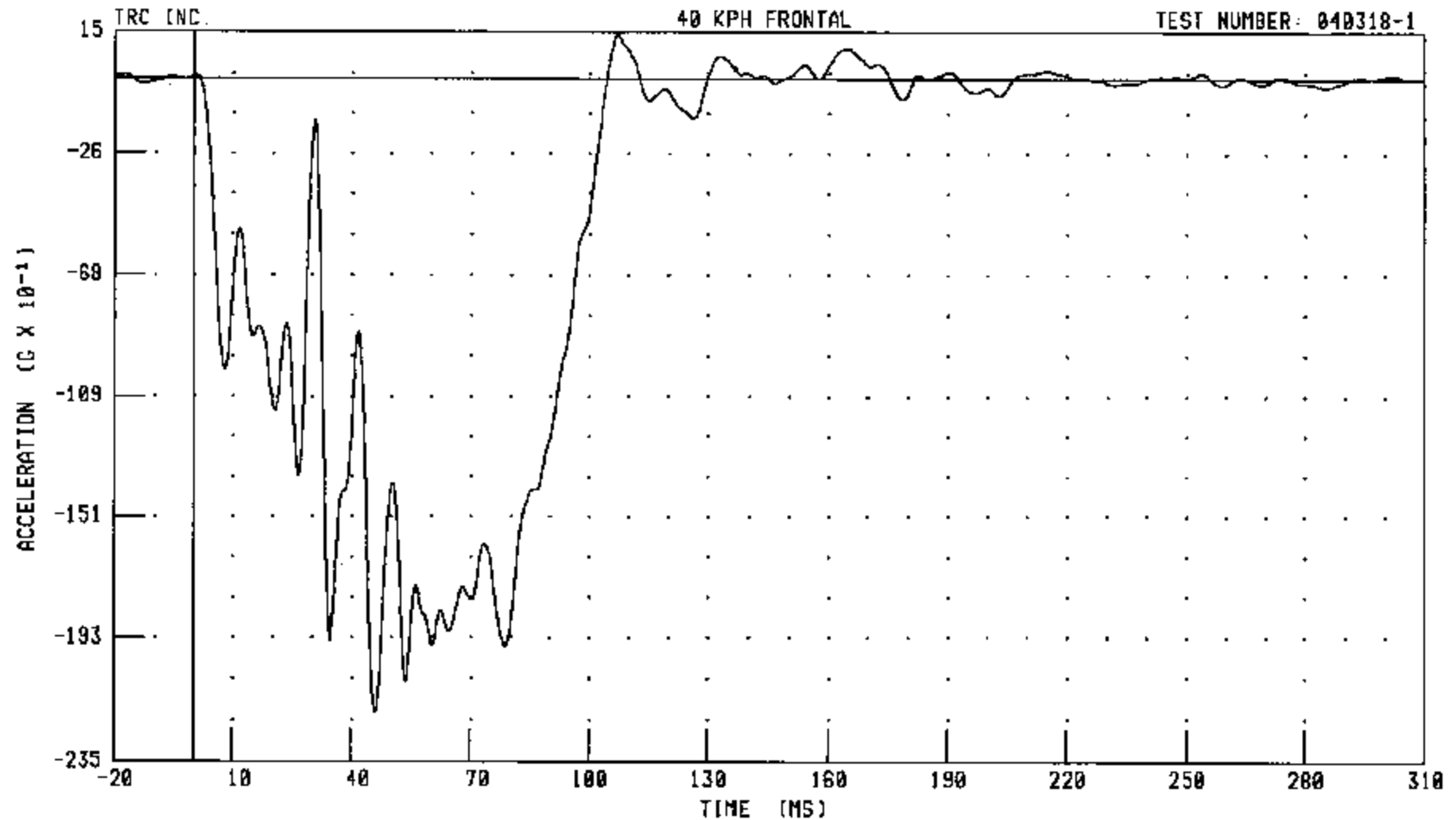
PEAK DATA: 93.38 LBF @ 231.68 MS; -1301.44 LBF @ 71.36 MS

6-45

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LEFT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION

TEST NUMBER: 040318-1



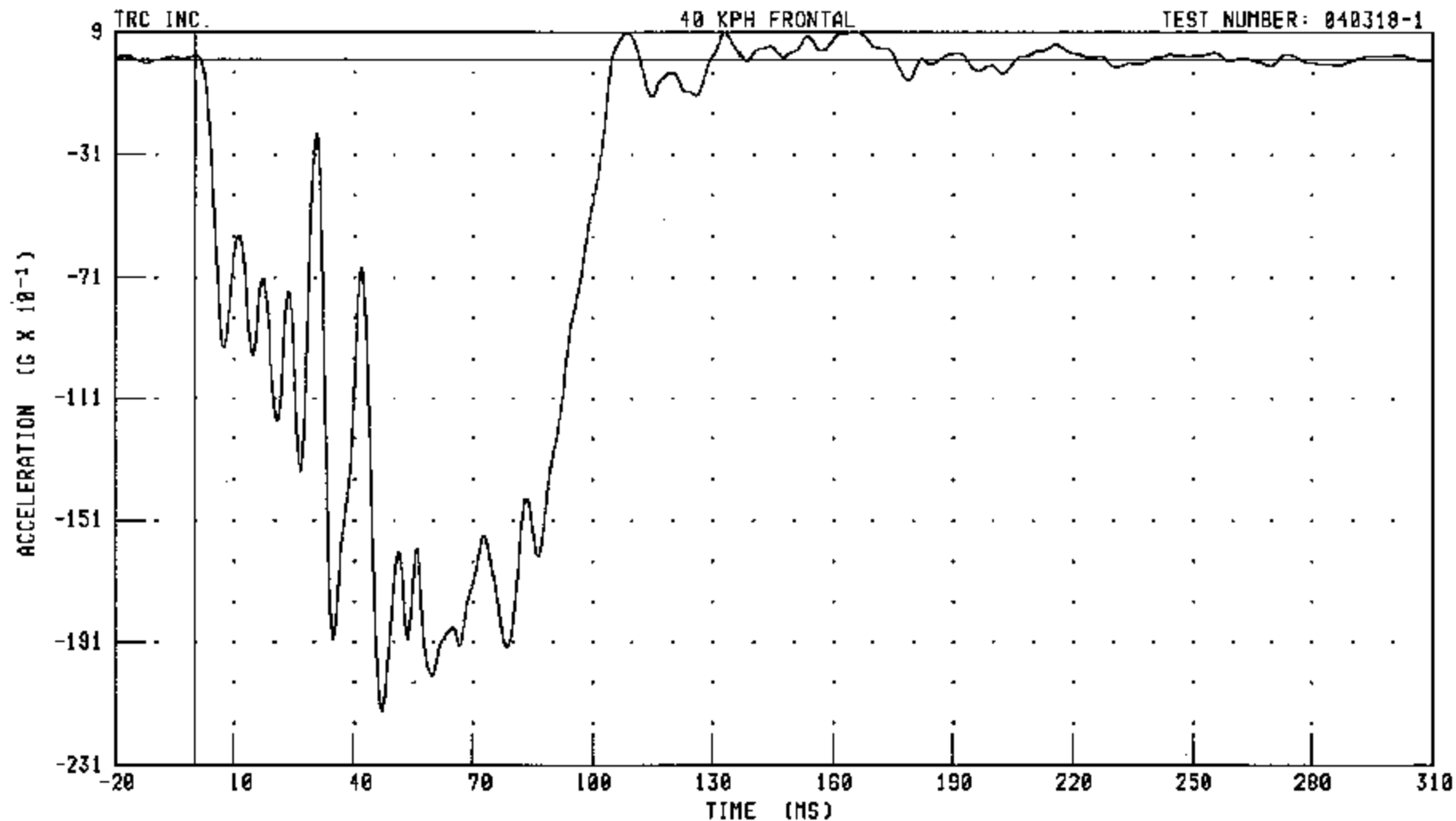
CHANNEL: LSXXG FILTER: CH. CLASS 60

6-46

040318-1

40 KPH FRONTAL 2004 SATURN ION C40113
RIGHT REAR SEAT CROSSMEMBER X-AXIS ACCELERATION

TEST NUMBER: 040318-1



CHANNEL: RSXXG

FILTER: CH. CLASS 60

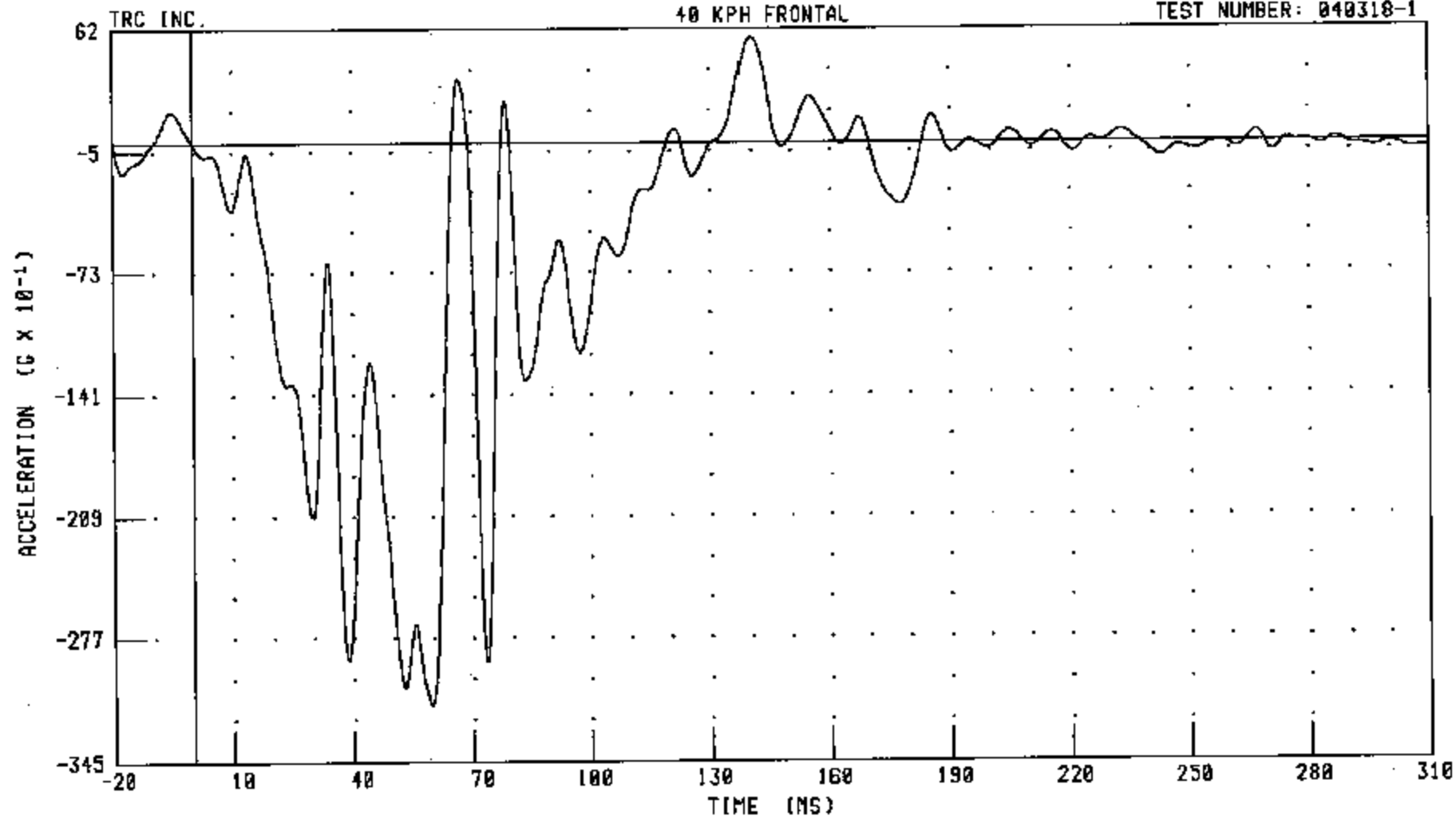
PEAK DATA: 0.90 G @ 166.00 MS; -21.30 G @ 47.20 MS

6-47

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LEFT FRONT BRAKE CALIPER X-AXIS ACCELERATION

TEST NUMBER: 040318-1



CHANNEL: LFCXG

FILTER: CH. CLASS 60

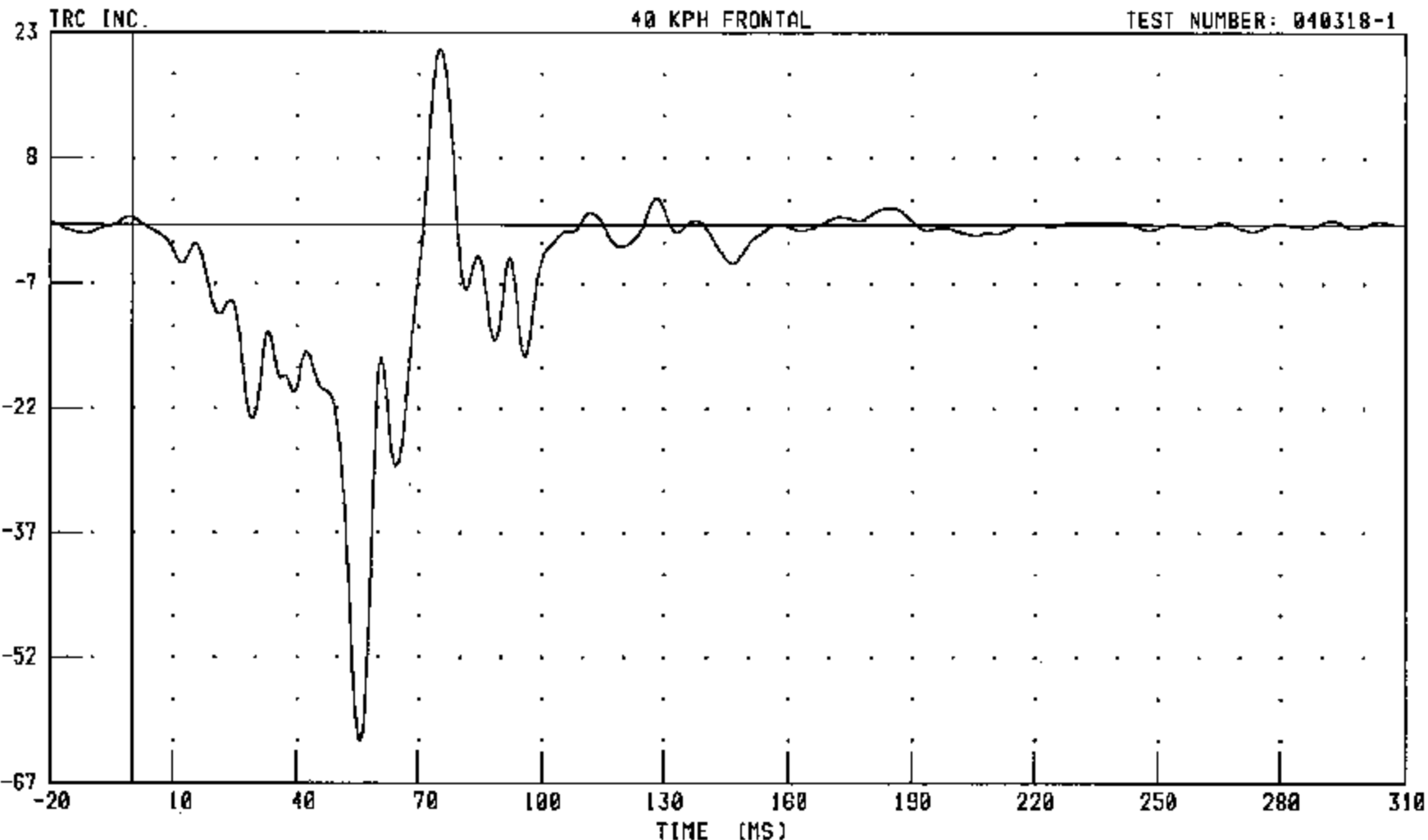
PEAK DATA: 5.78 G @ 140.32 MS; -31.45 G @ 59.60 MS

6-48

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
RIGHT FRONT BRAKE CALIPER X-AXIS ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: RFXG

FILTER: CH. CLASS 60

PEAK DATA: 20.98 G @ 75.28 MS, -62.05 G @ 55.75 MS

6-49

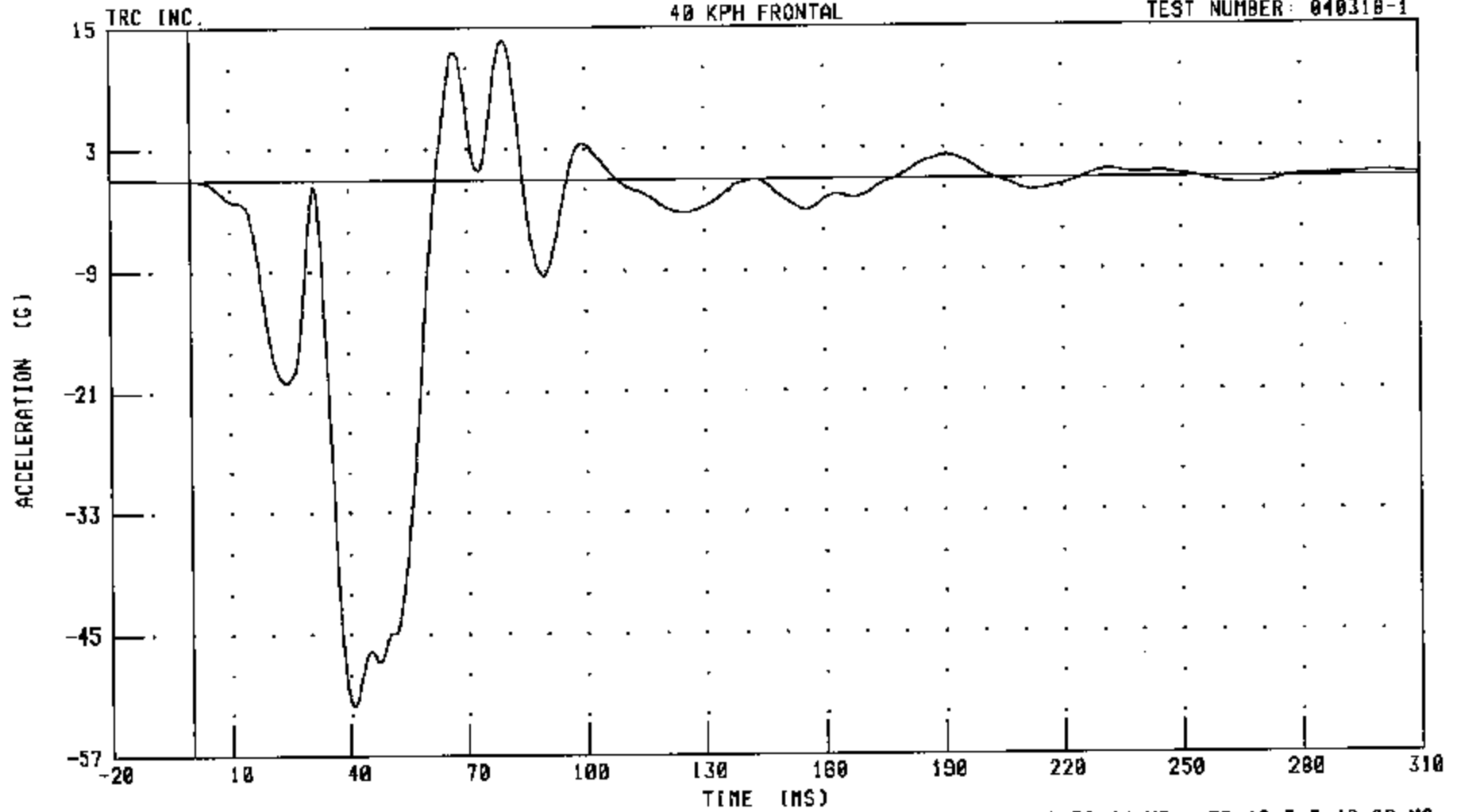
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

ENGINE TOP X-AXIS ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: TENXC

FILTER: CH. CLASS 60

PEAK DATA: 13.66 G @ 79.44 MS; -52.12 G @ 40.96 MS

6-50

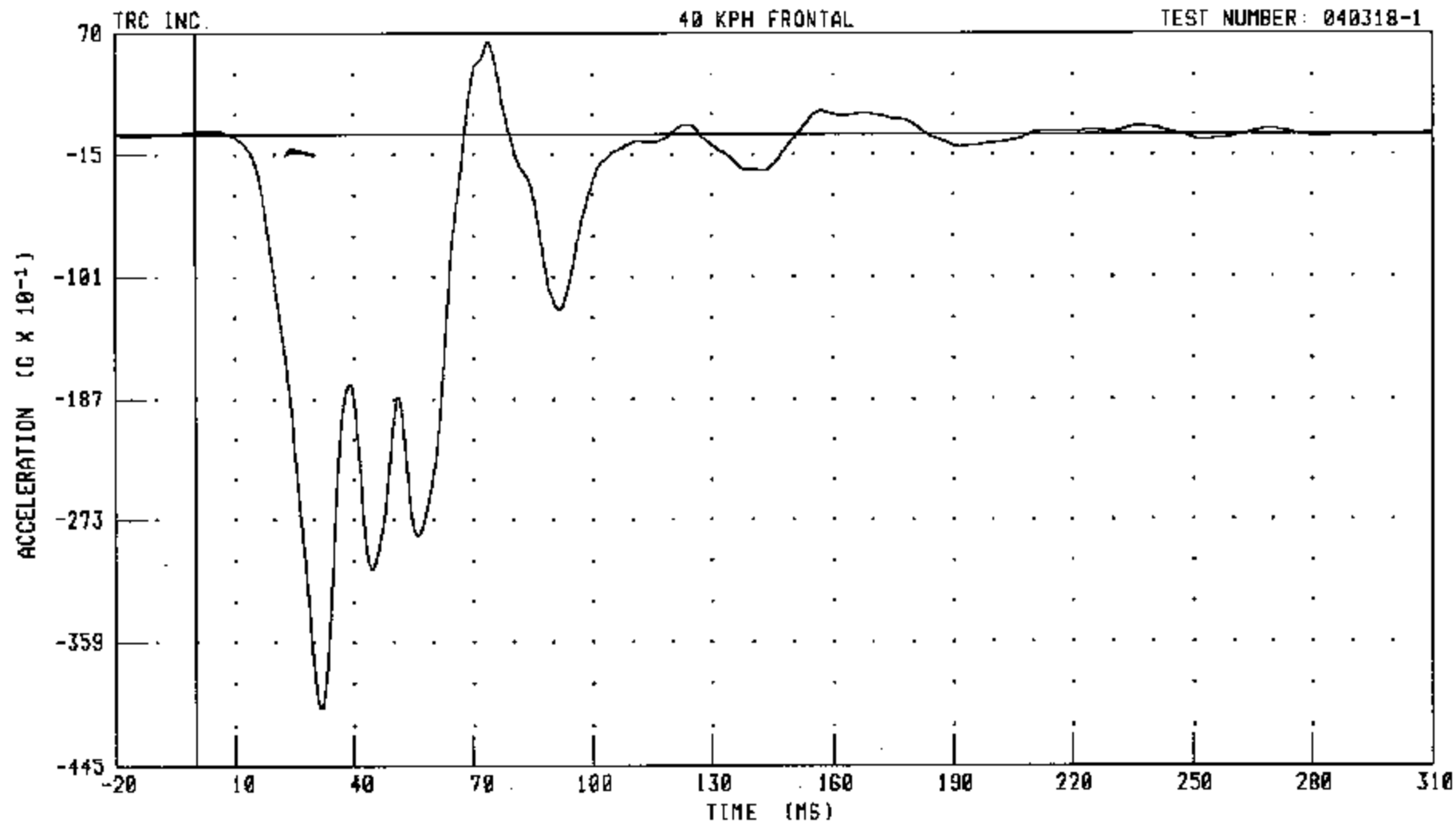
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

ENGINE BOTTOM X-AXIS ACCELERATION

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BENXC

FILTER: CH. CLASS 60

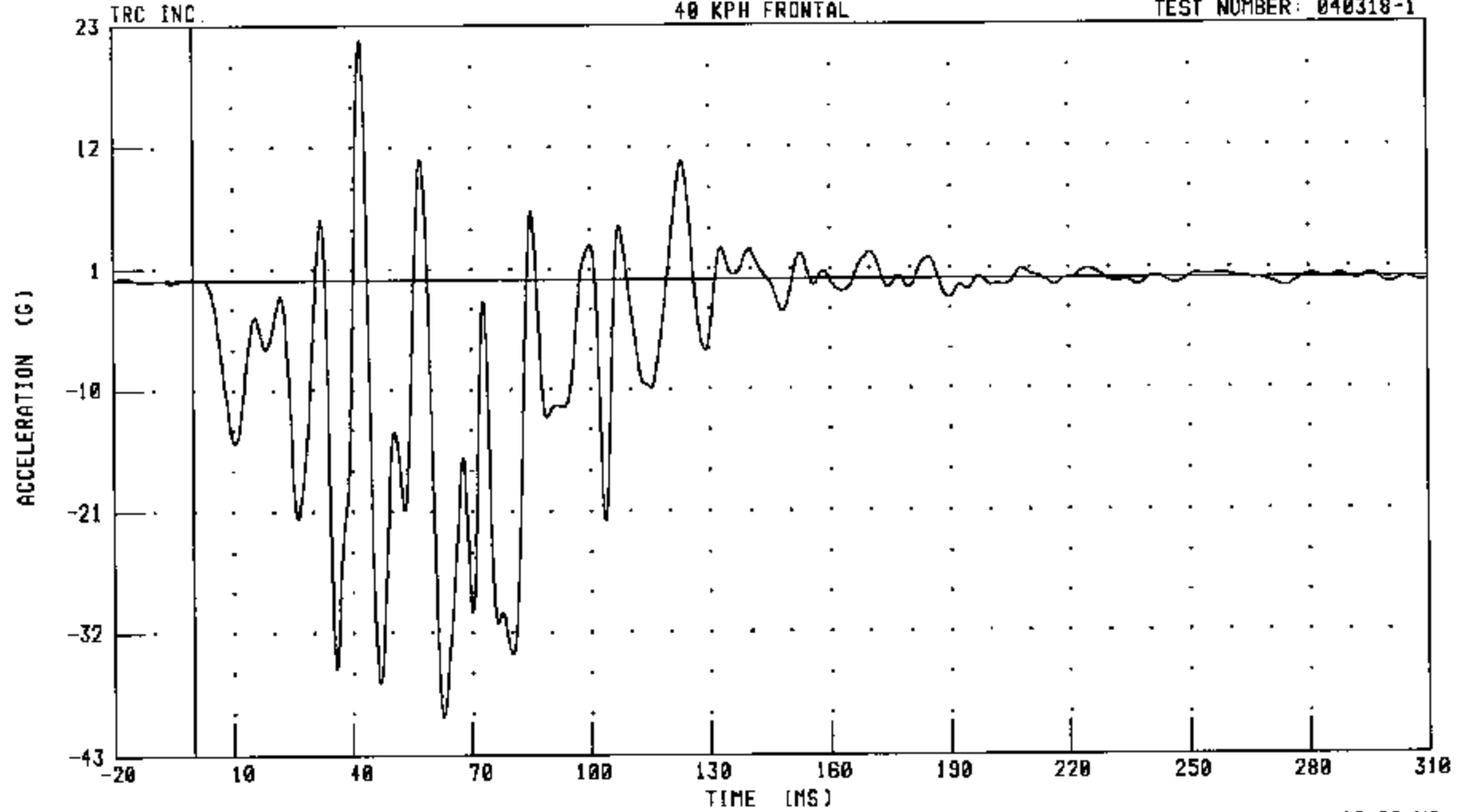
PEAK DATA: 6.48 G @ 73.84 MS; -40.54 G @ 31.92 MS

6-51

040318-1

40 KPH FRONTAL 2004 SATURN ION C40113
INSTRUMENT PANEL CENTERLINE X-AXIS ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: DPCXC FILTER: CH. CLASS 60

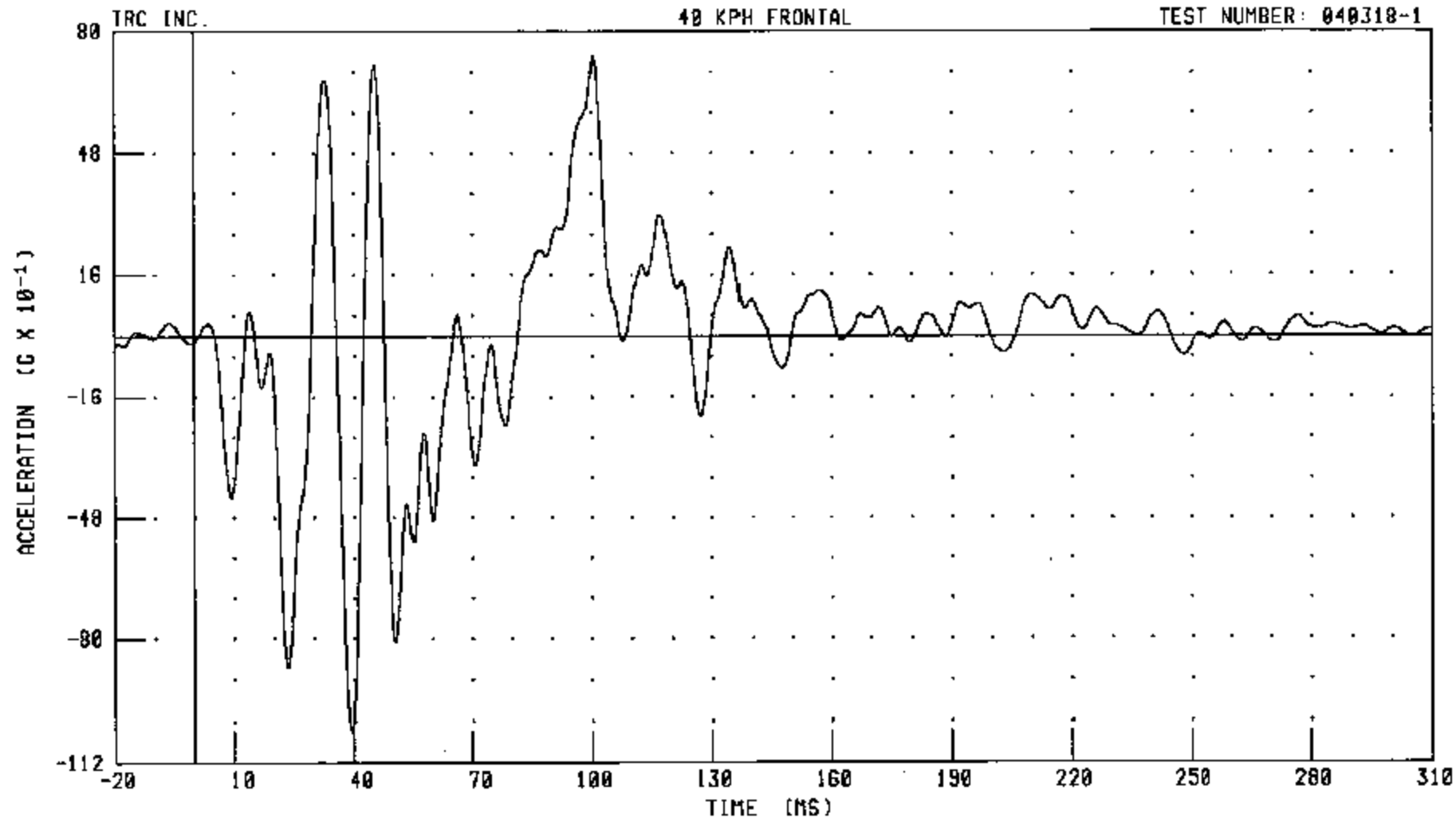
PEAK DATA: 21.65 G @ 42.40 MS, -39.63 G @ 62.88 MS

6-52

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
REAR TRUNK CENTERLINE Z-AXIS ACCELERATION
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: RDKZG FILTER: CH. CLASS 60

PEAK DATA: 7.35 G @ 100.64 MS; -10.41 G @ 39.52 MS

6-53

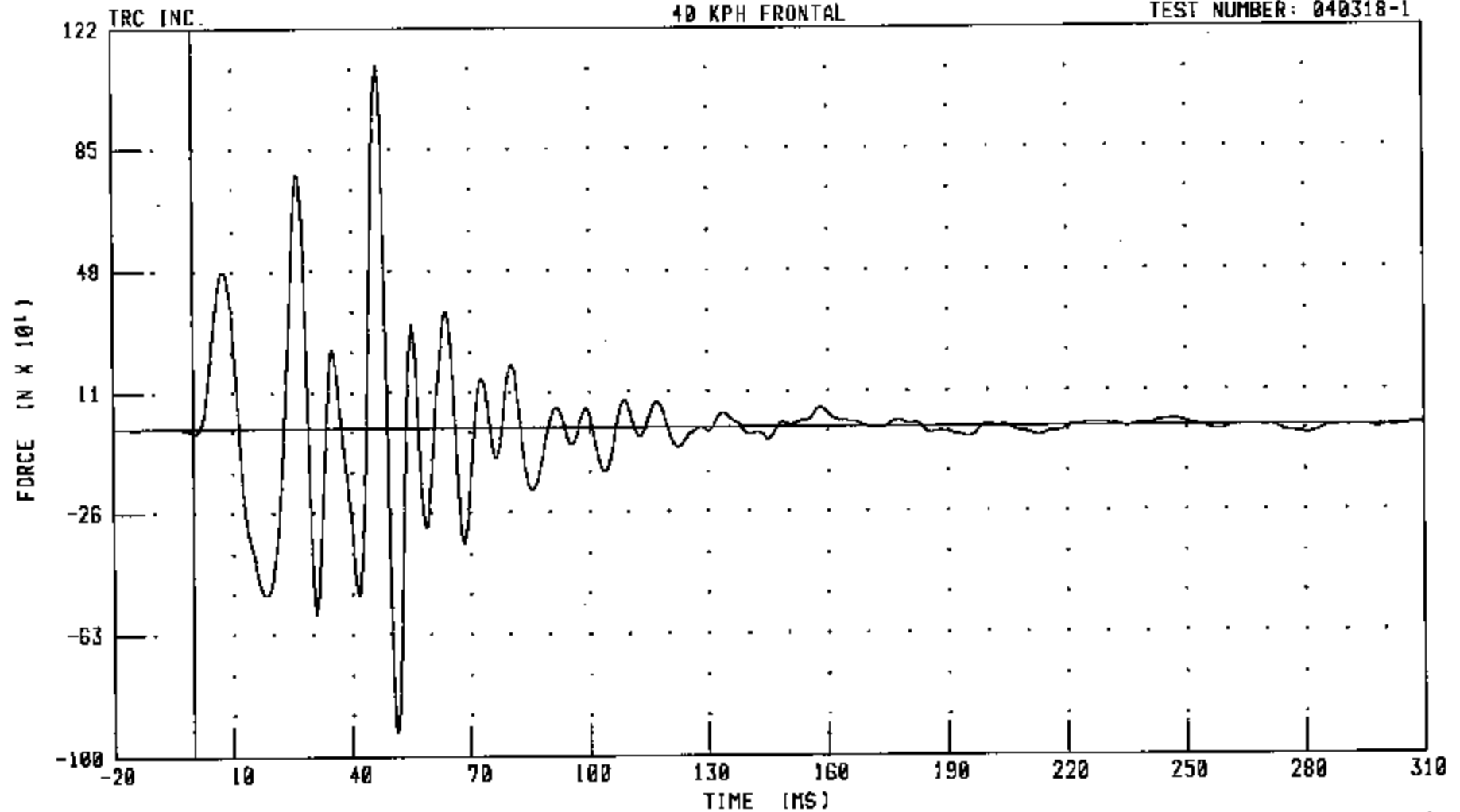
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A1 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA1F

FILTER: CH. CLASS 60

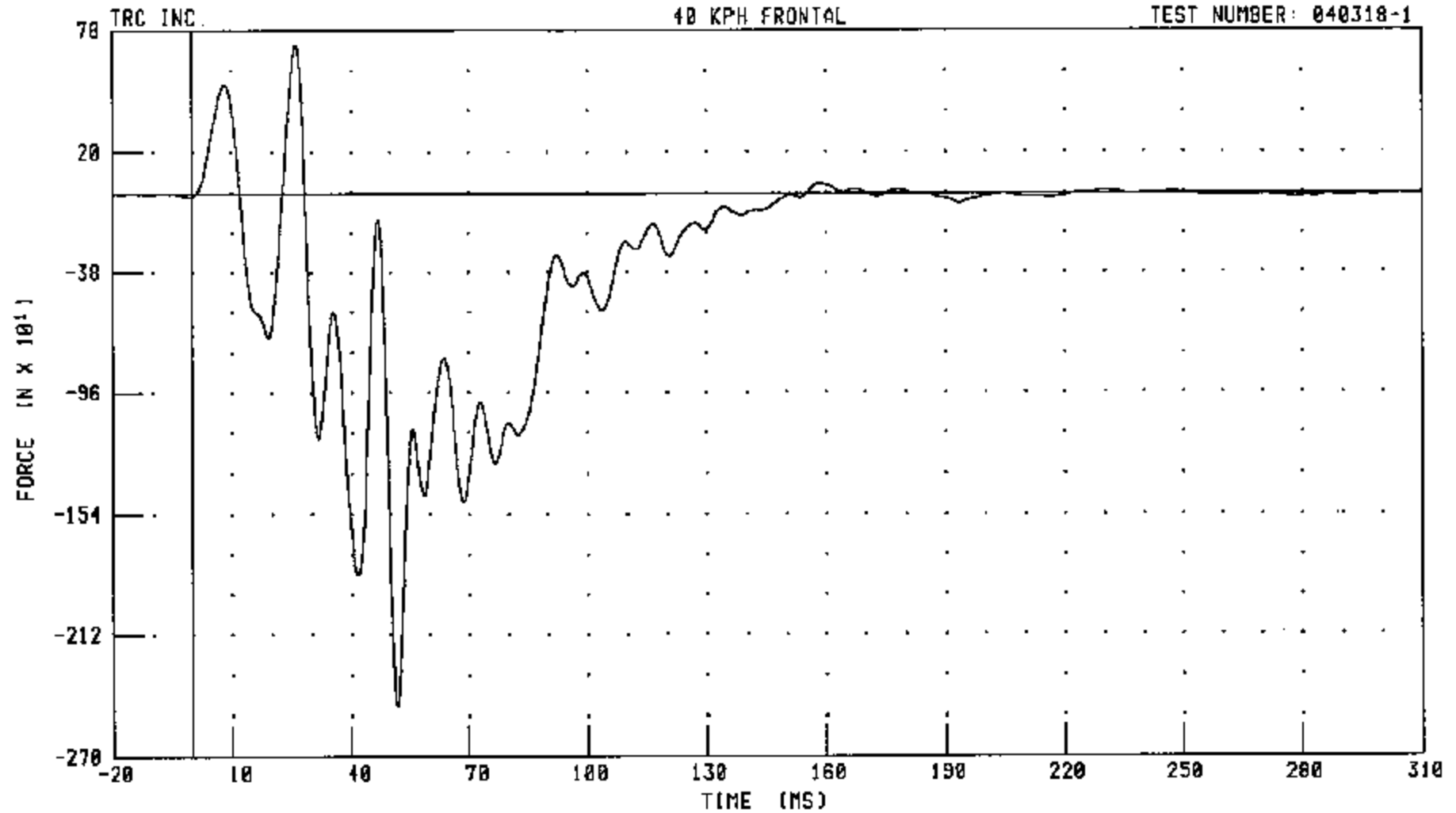
PEAK DATA: 1103.37 N @ 46.00 MS; -925.30 N @ 51.52 MS

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A2 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA2F

FILTER: CH. CLASS 60

PEAK DATA: 714.80 N @ 26.24 MS; -2462.35 N @ 51.76 MS

6-55

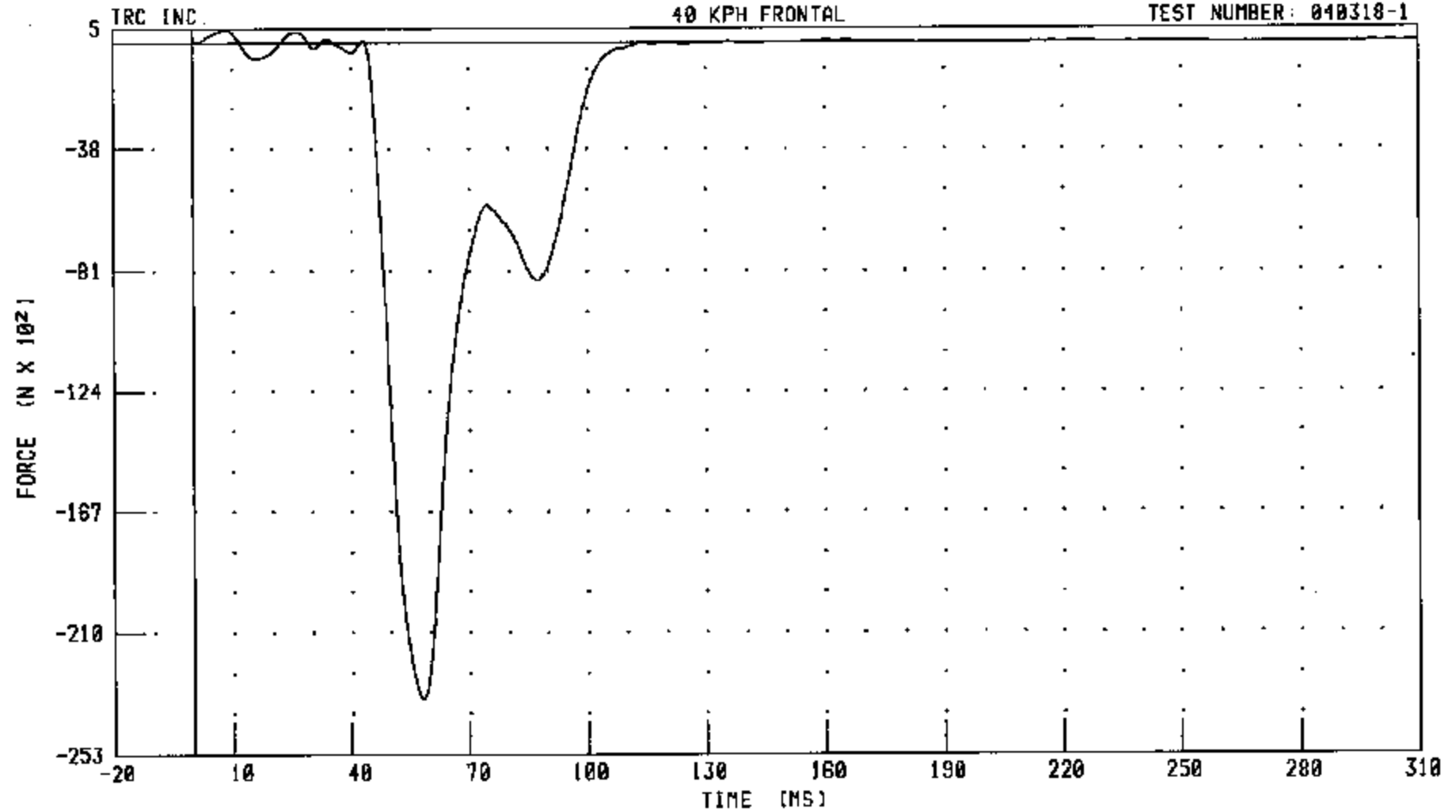
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A3 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA3F

FILTER: CH. CLASS 60

PEAK DATA: 458.40 N @ 8.56 MS; -23363.97 N @ 58.24 MS

956

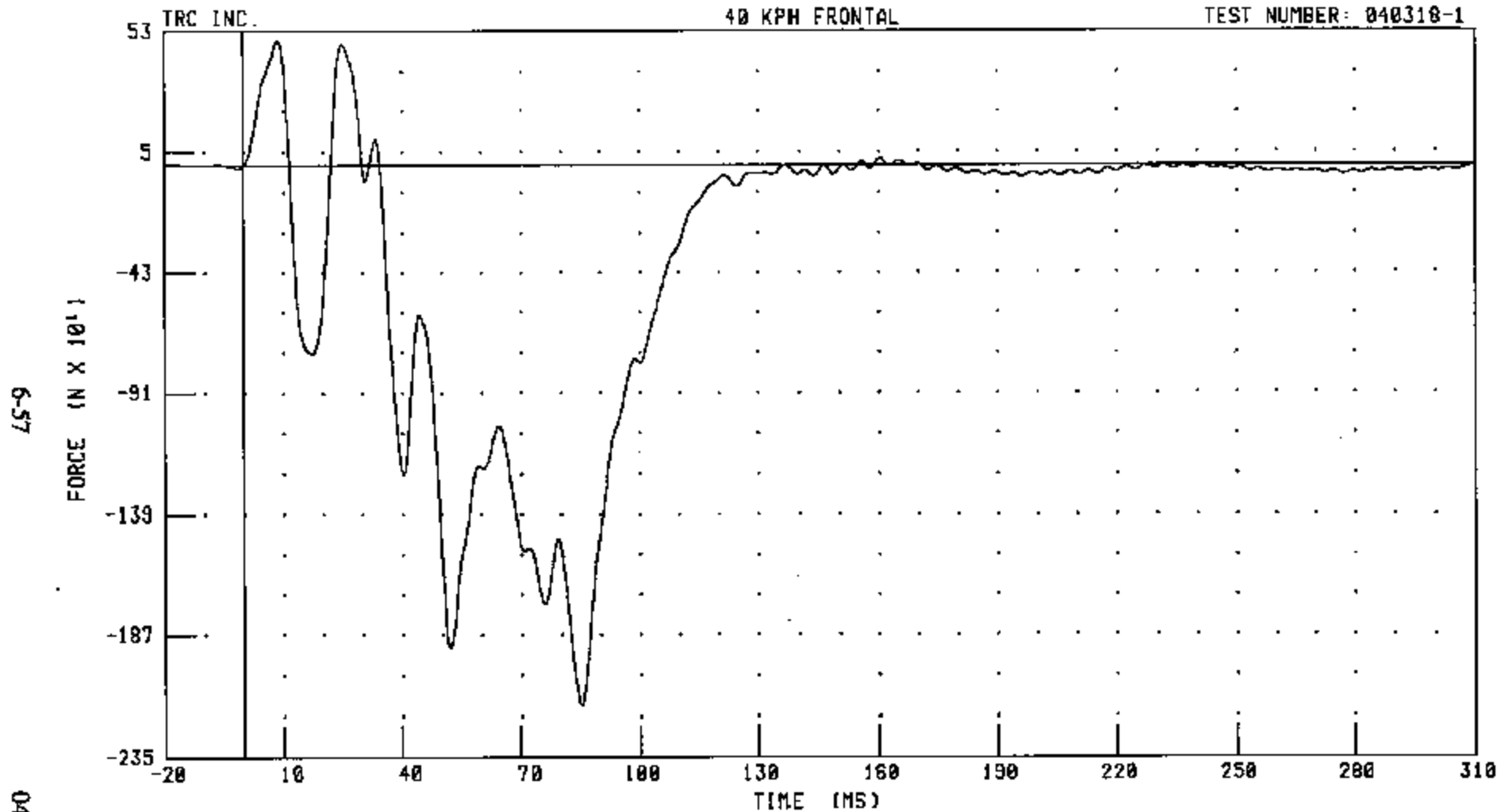
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A4 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA4F

FILTER: CH. CLASS 60

PEAK DATA: 490.22 N @ 8.88 MS; -2152.65 N @ 85.20 MS

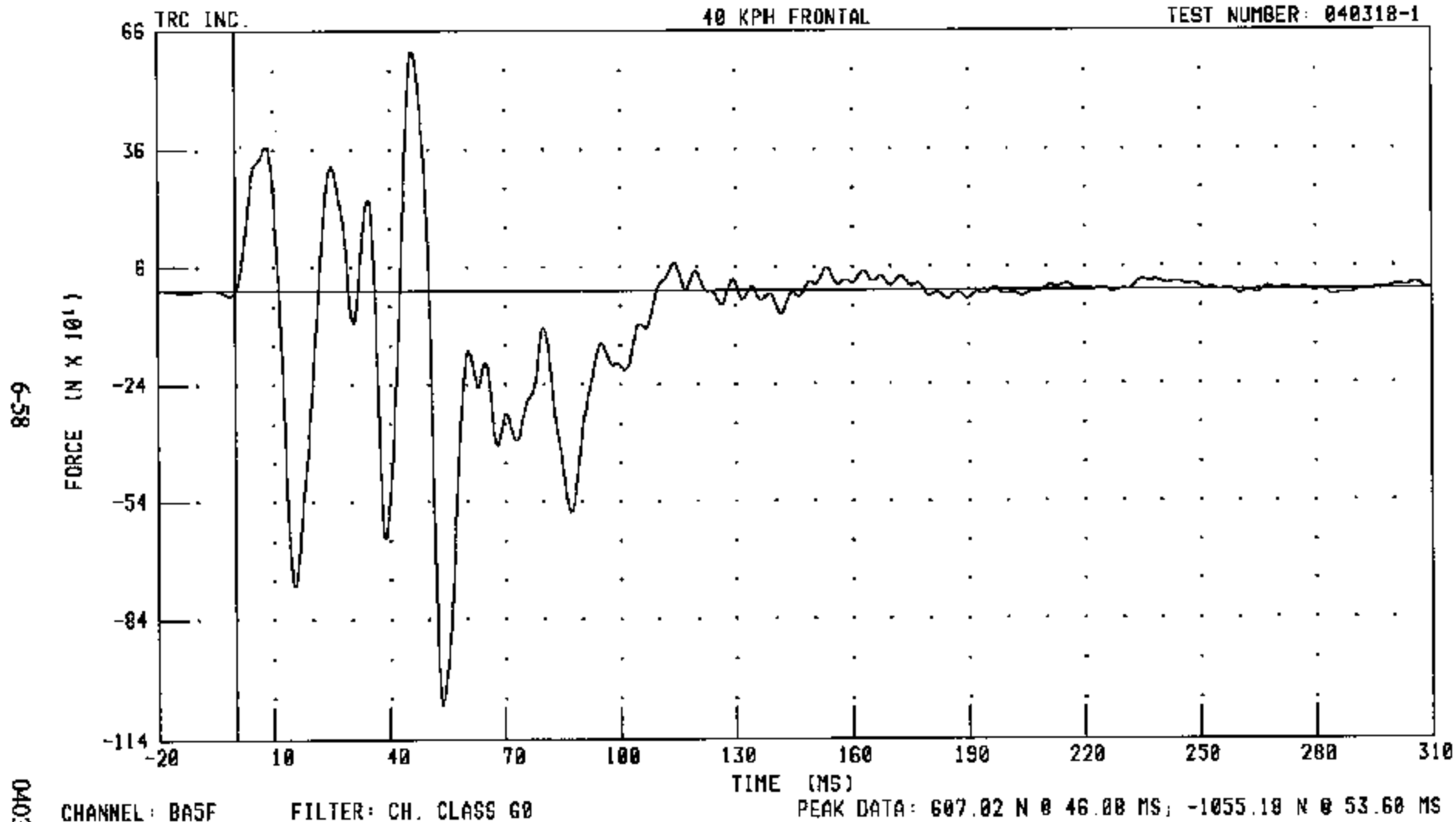
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A5 FORCE

40 KPH FRONTAL

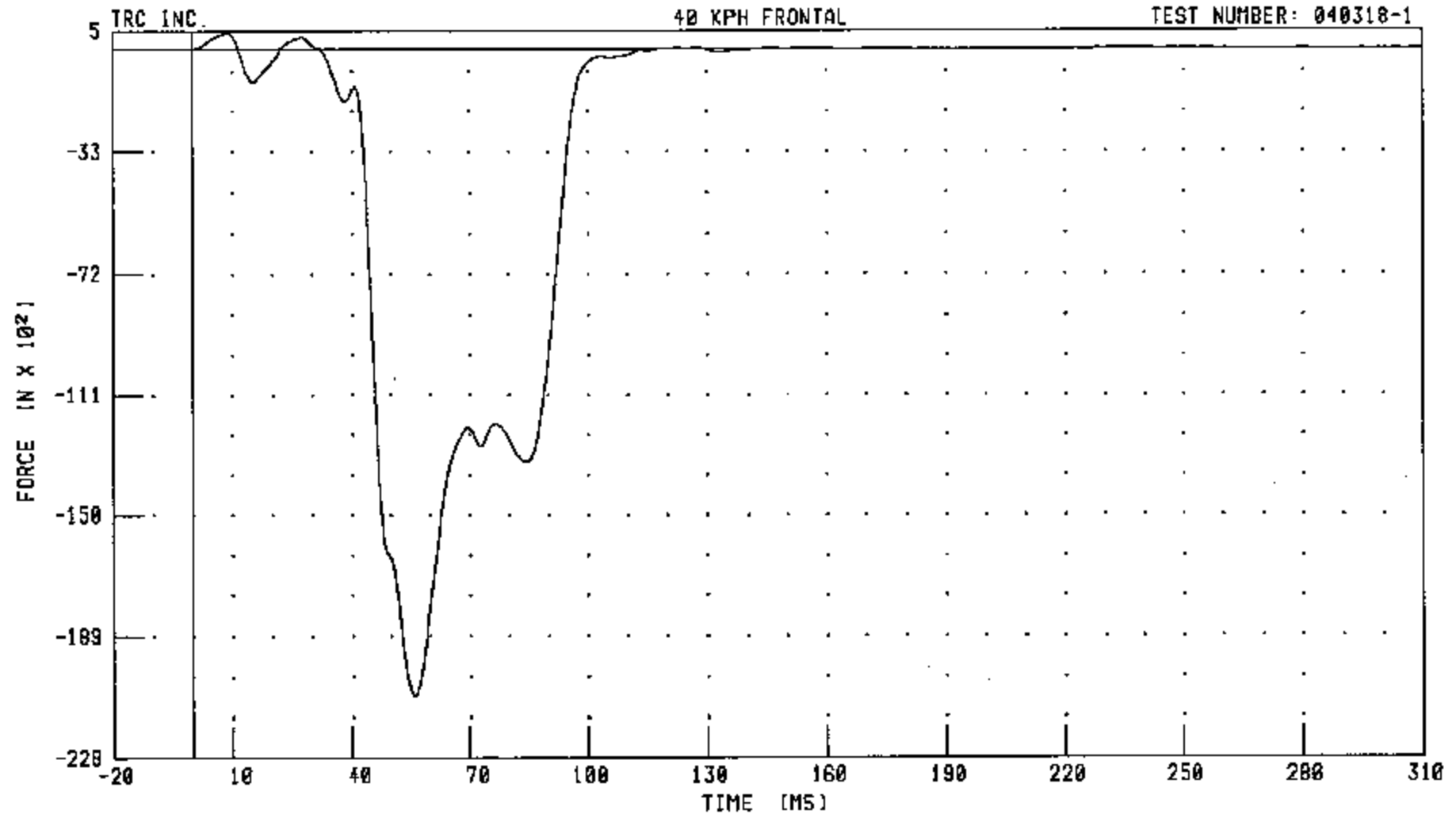
TEST NUMBER: 040318-1



40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION AG FORCE

TEST NUMBER: 040318-1



CHANNEL: BAGF

FILTER: CH. CLASS 60

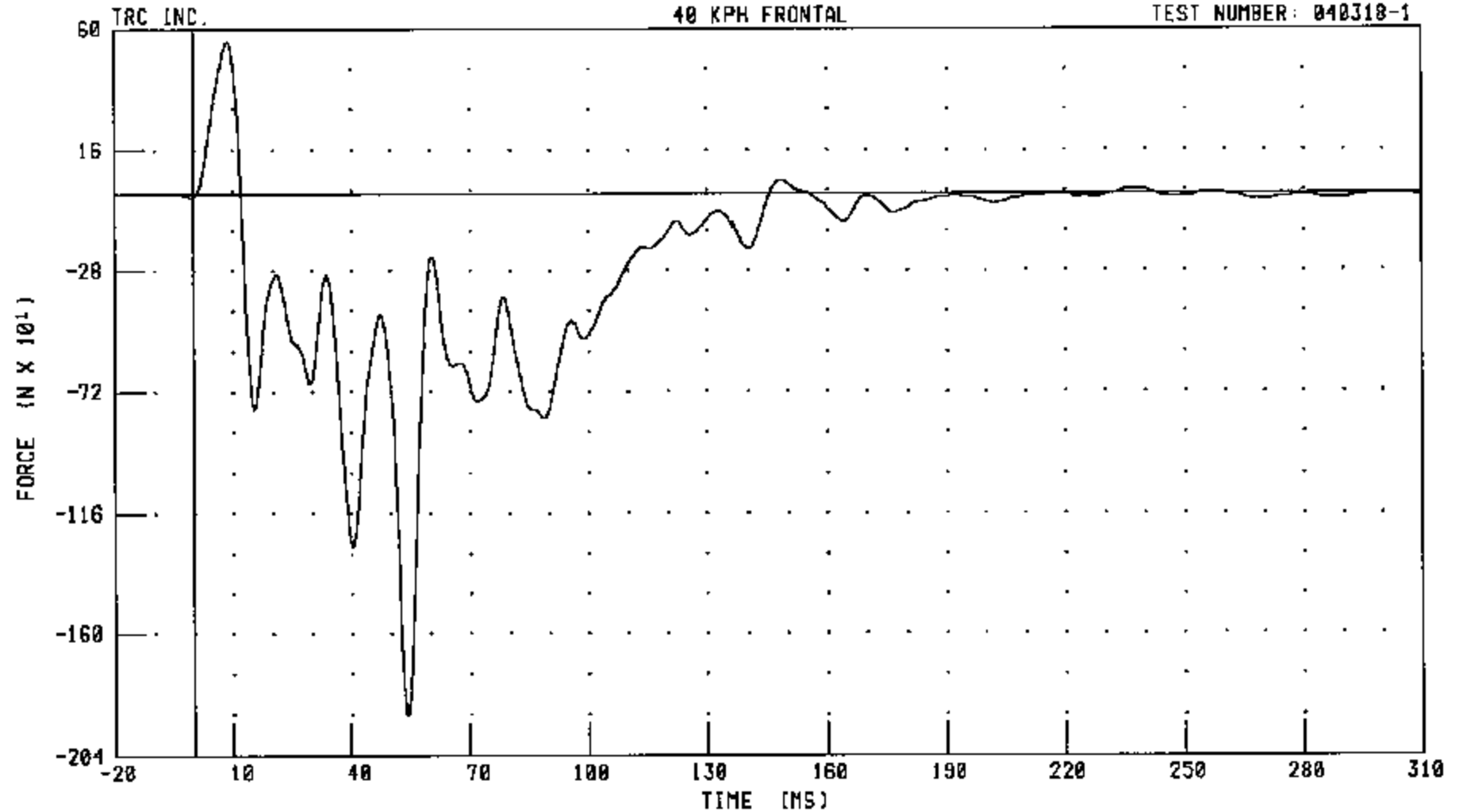
PEAK DATA: 532.01 N @ 8.00 MS; -20850.14 N @ 56.00 MS

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A7 FORCE

TEST NUMBER: 040318-1

40 KPH FRONTAL



CHANNEL: BA7F

FILTER: CH. CLASS 60

PEAK DATA: 551.74 N @ 8.72 MS, -1900.68 N @ 54.24 MS

6-60

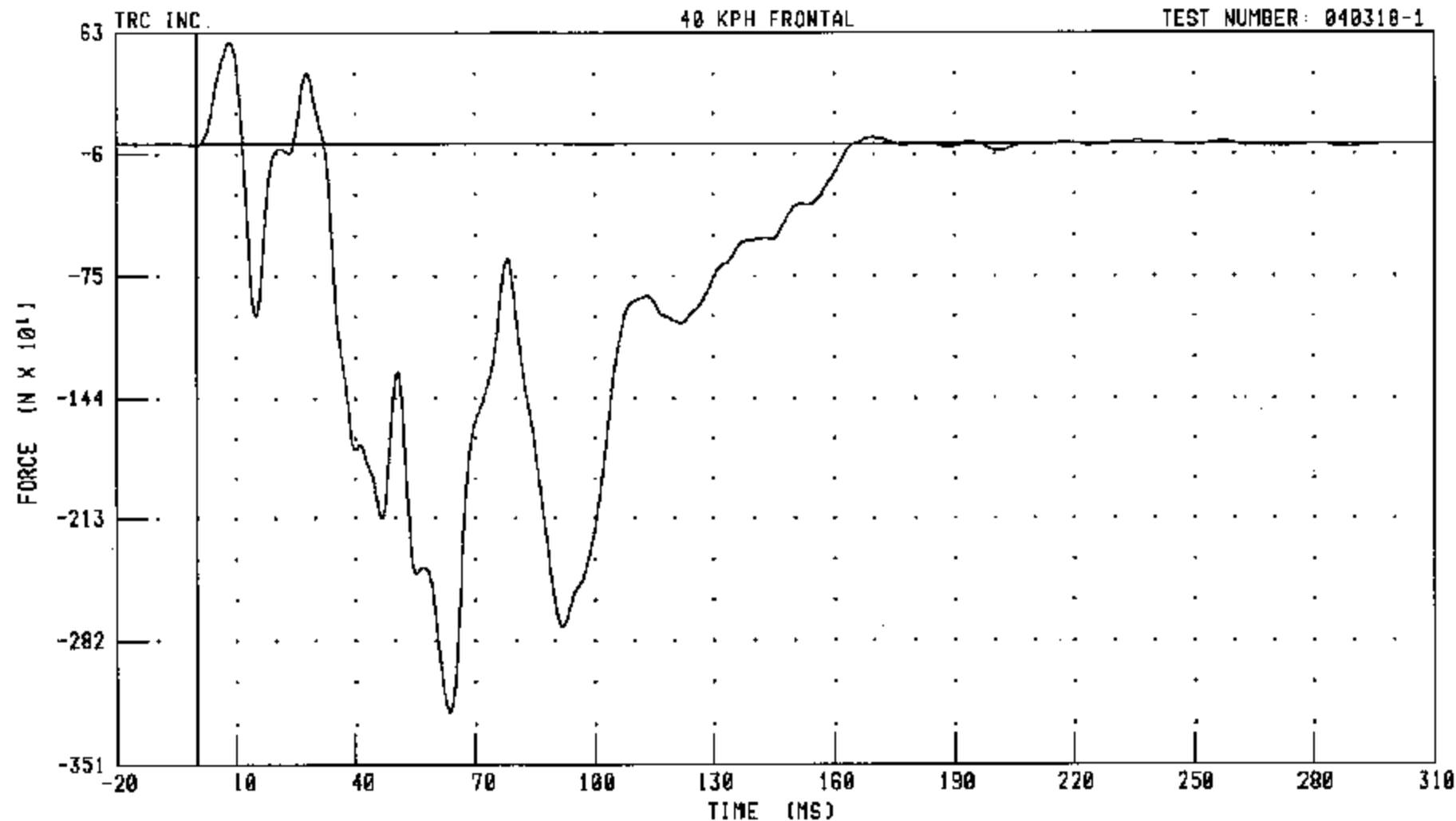
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A0 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



6-61

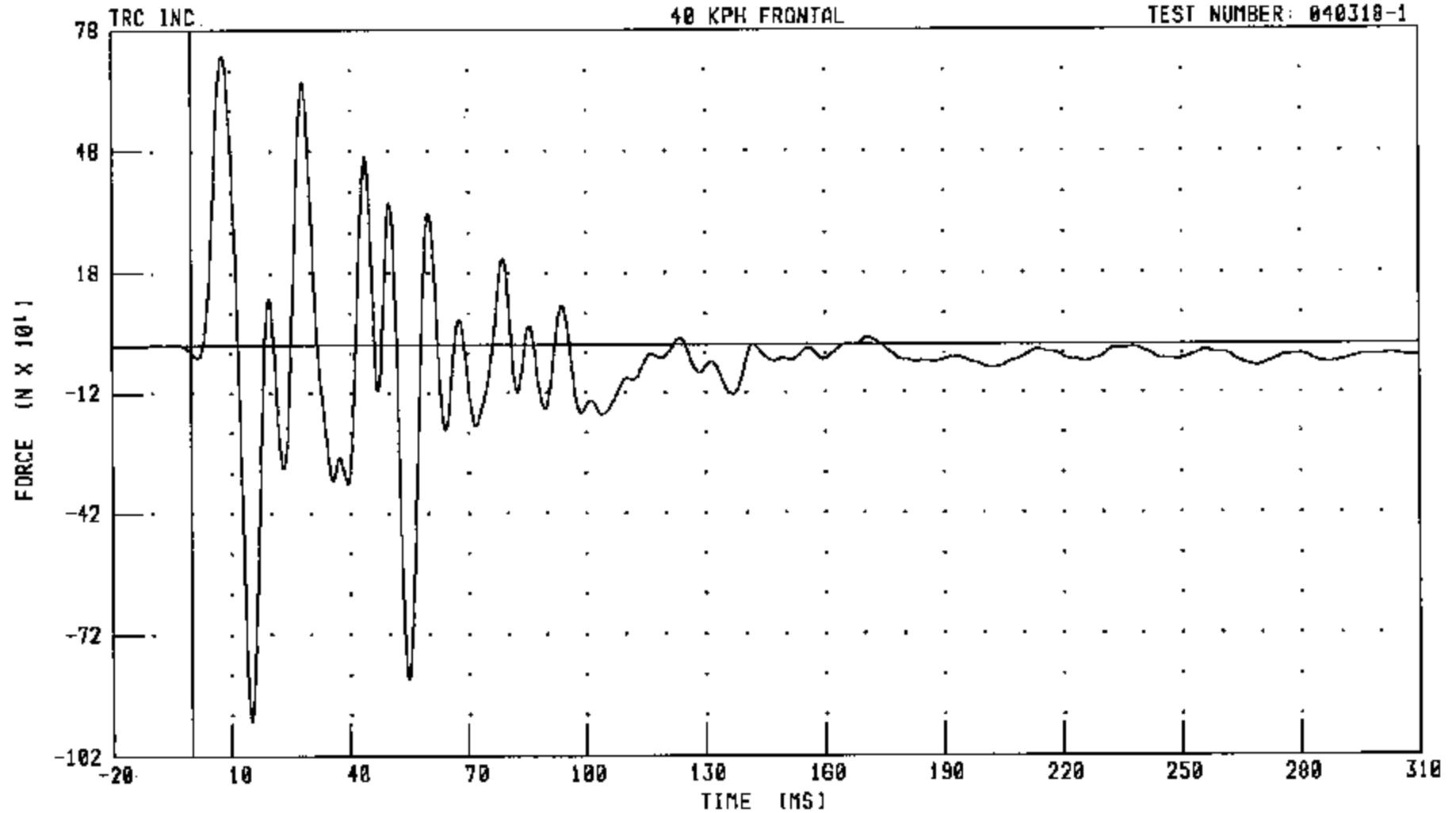
040318-1

40 KPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION A9 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BA9F

FILTER: CH. CLASS 60

PEAK DATA: 714.23 N @ 7.92 MS; -938.29 N @ 15.04 MS

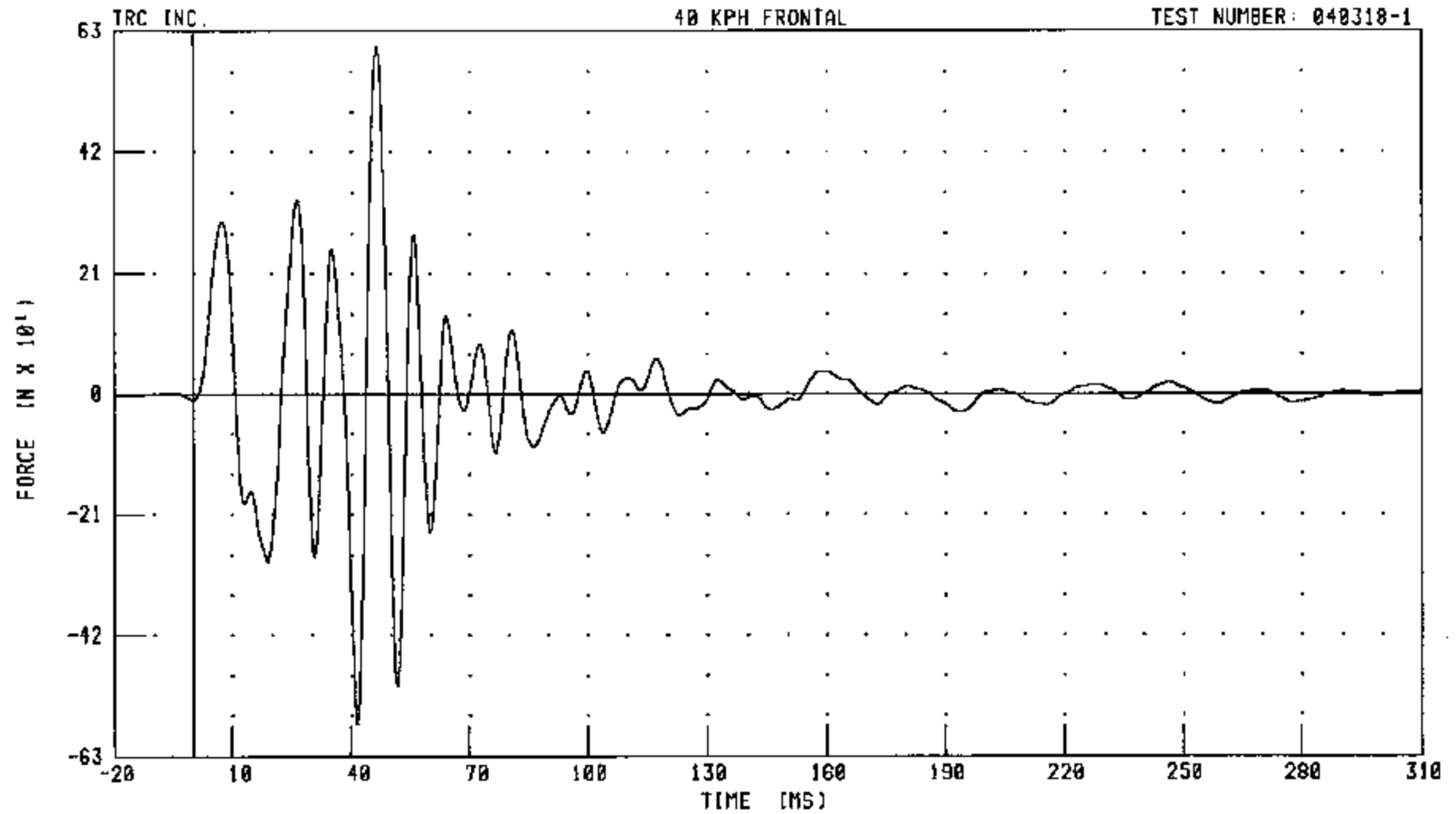
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION B1 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BB1F

FILTER: CH. CLASS 60

PEAK DATA: 602.59 N @ 46.56 MS; -573.55 N @ 41.52 MS

6-63

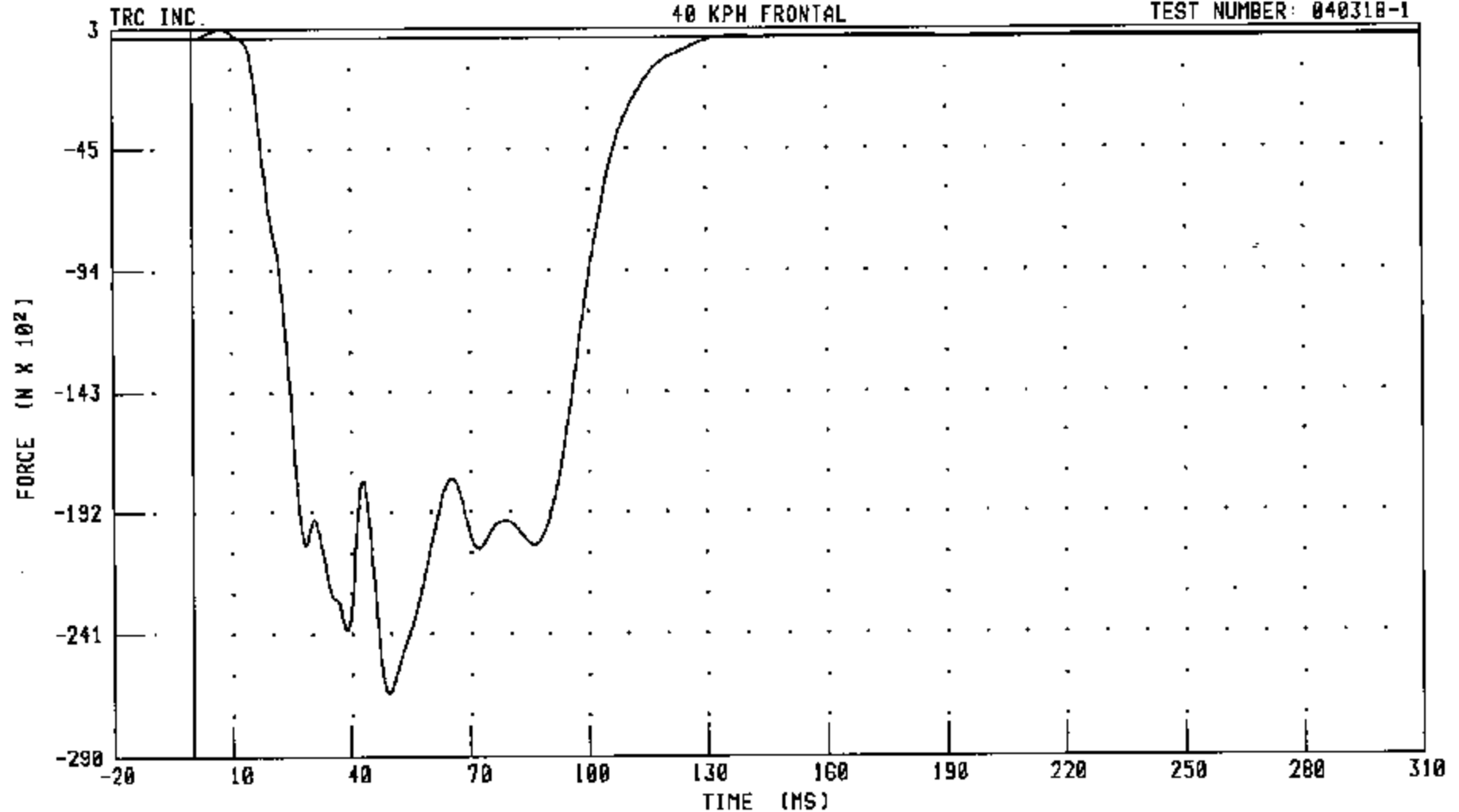
040318-1

40 KPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION B2 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BB2F

FILTER: CH. CLASS 60

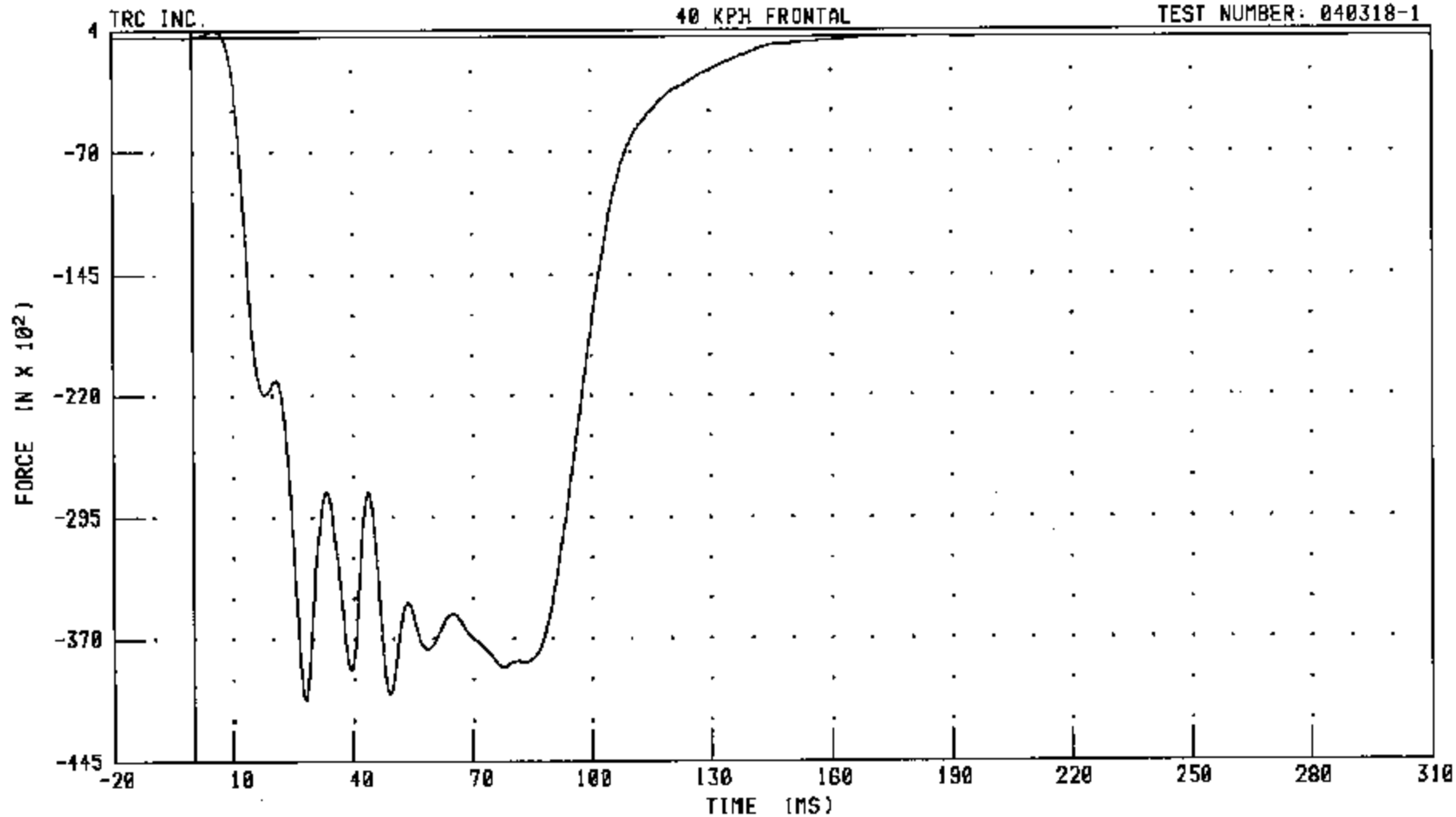
PEAK DATA: 320.61 N @ 7.52 MS, -265.172 N @ 49.52 MS

6-64

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION B3 FORCE

TEST NUMBER: 040318-1



CHANNEL: BB3F

FILTER: CH. CLASS 60

PEAK DATA: 413.62 N @ 5.76 MS; -40853.43 N @ 28.24 MS

6-65

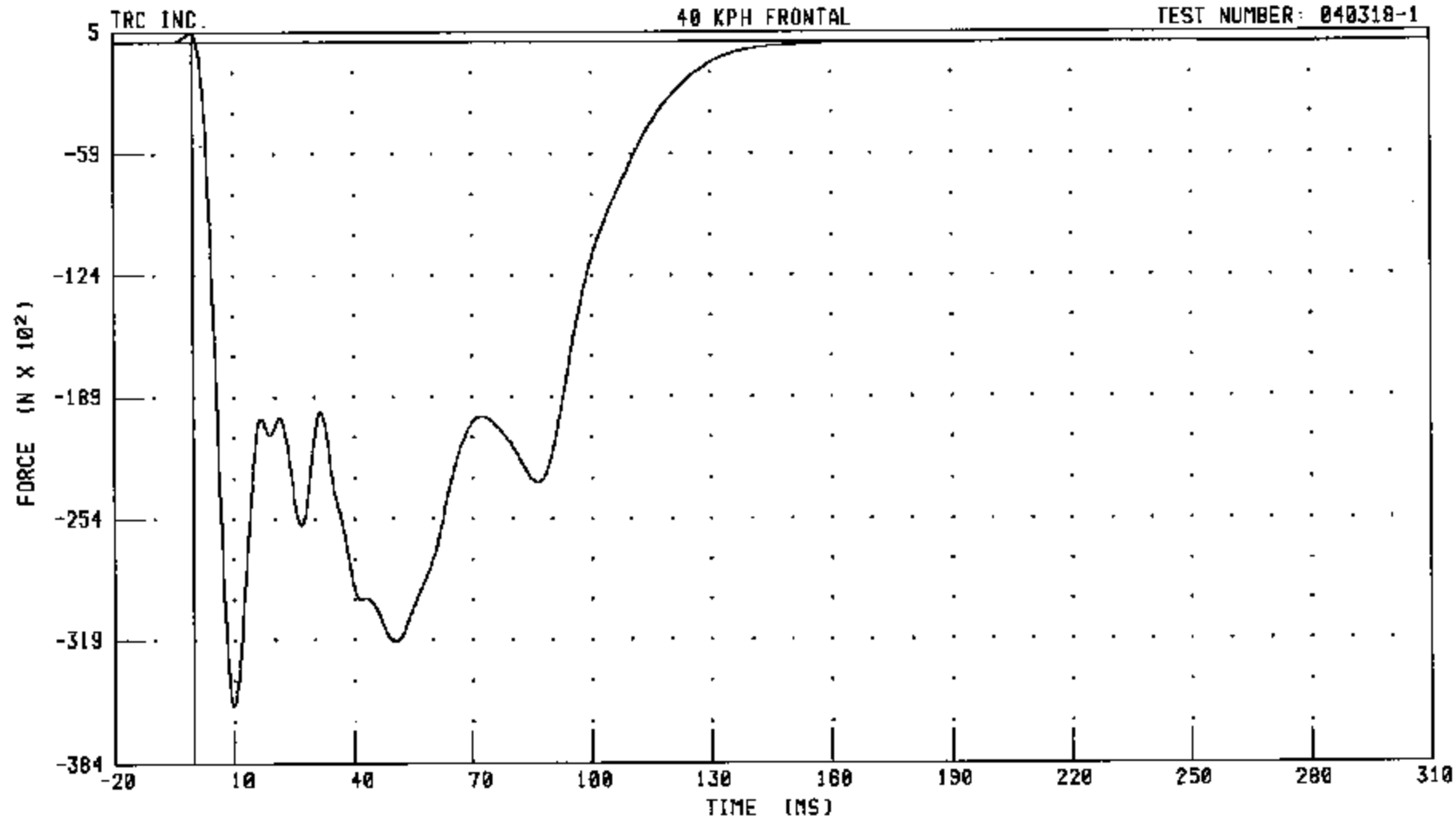
040318-1

40 KPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION B4 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BB4F

FILTER: CH. CLASS G0

PEAK DATA: 490.86 N @ -0.40 MS; -35464.84 N @ 9.92 MS

99-9

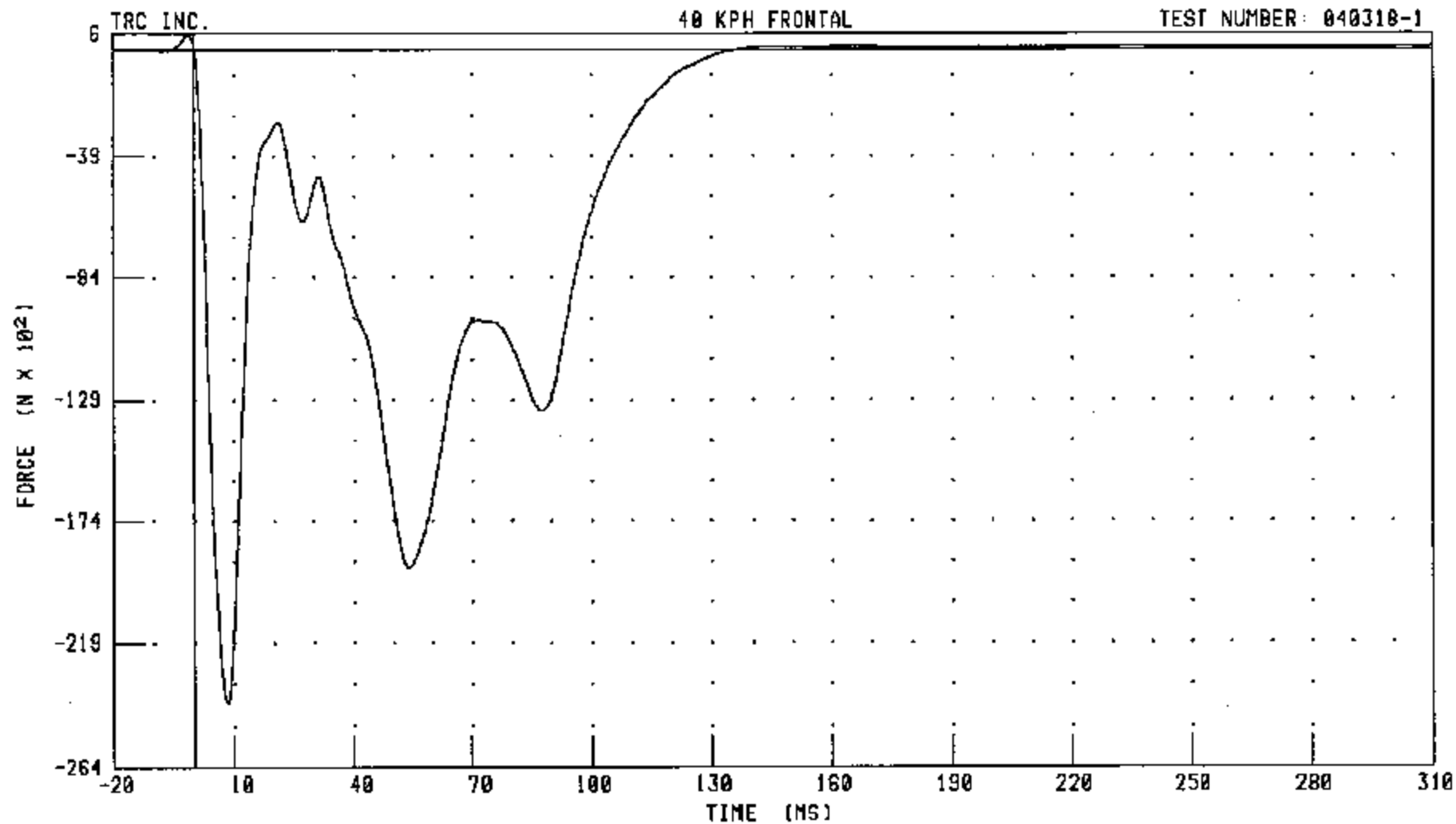
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION 85 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BB5F

FILTER: CH. CLASS 60

6-67

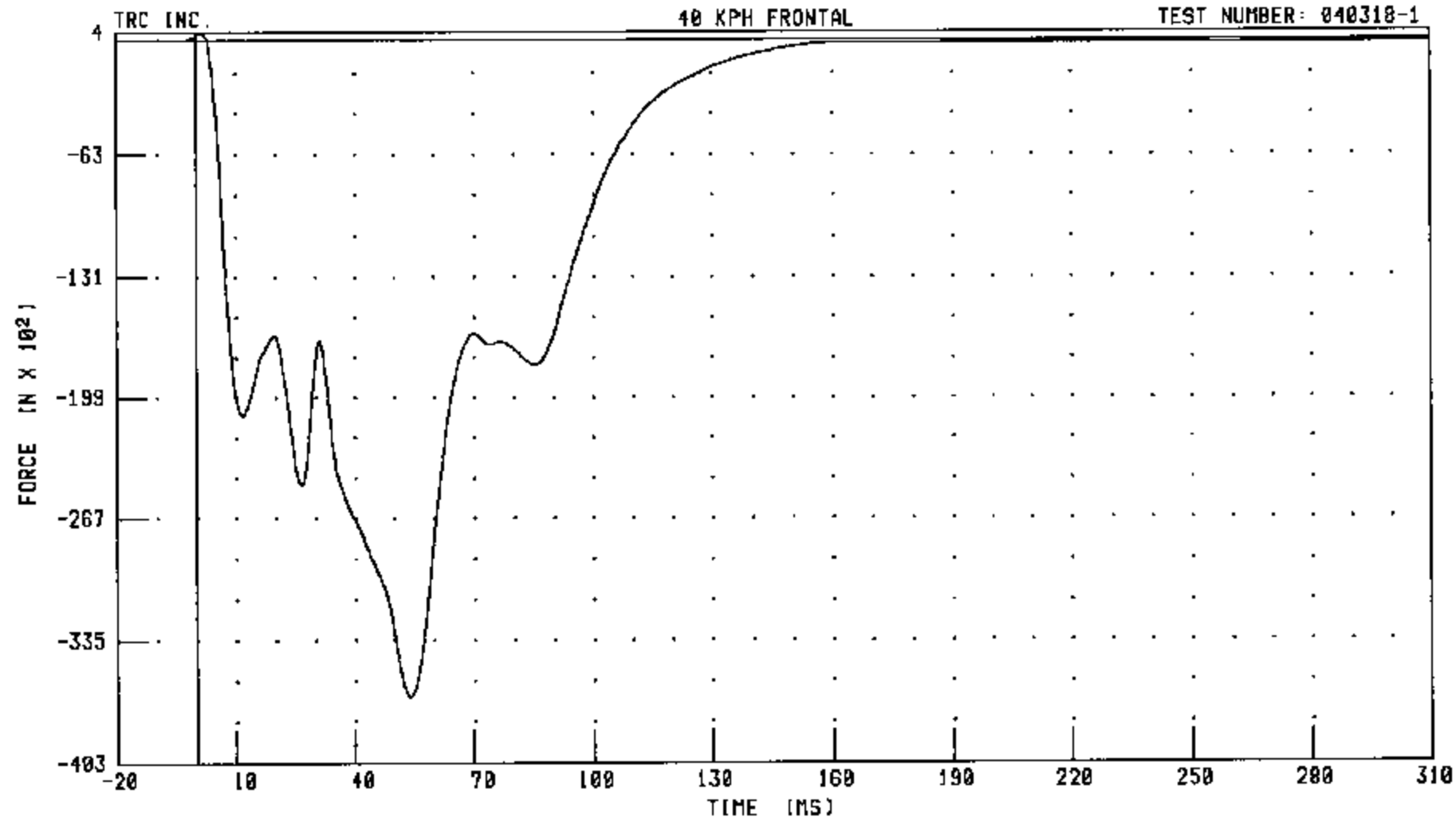
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION B6 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BB6F

FILTER: CH. CLASS 60

PEAK DATA: 423.16 N @ 1.36 MS; -36694.97 N @ 54.00 MS

89-9

040318-1

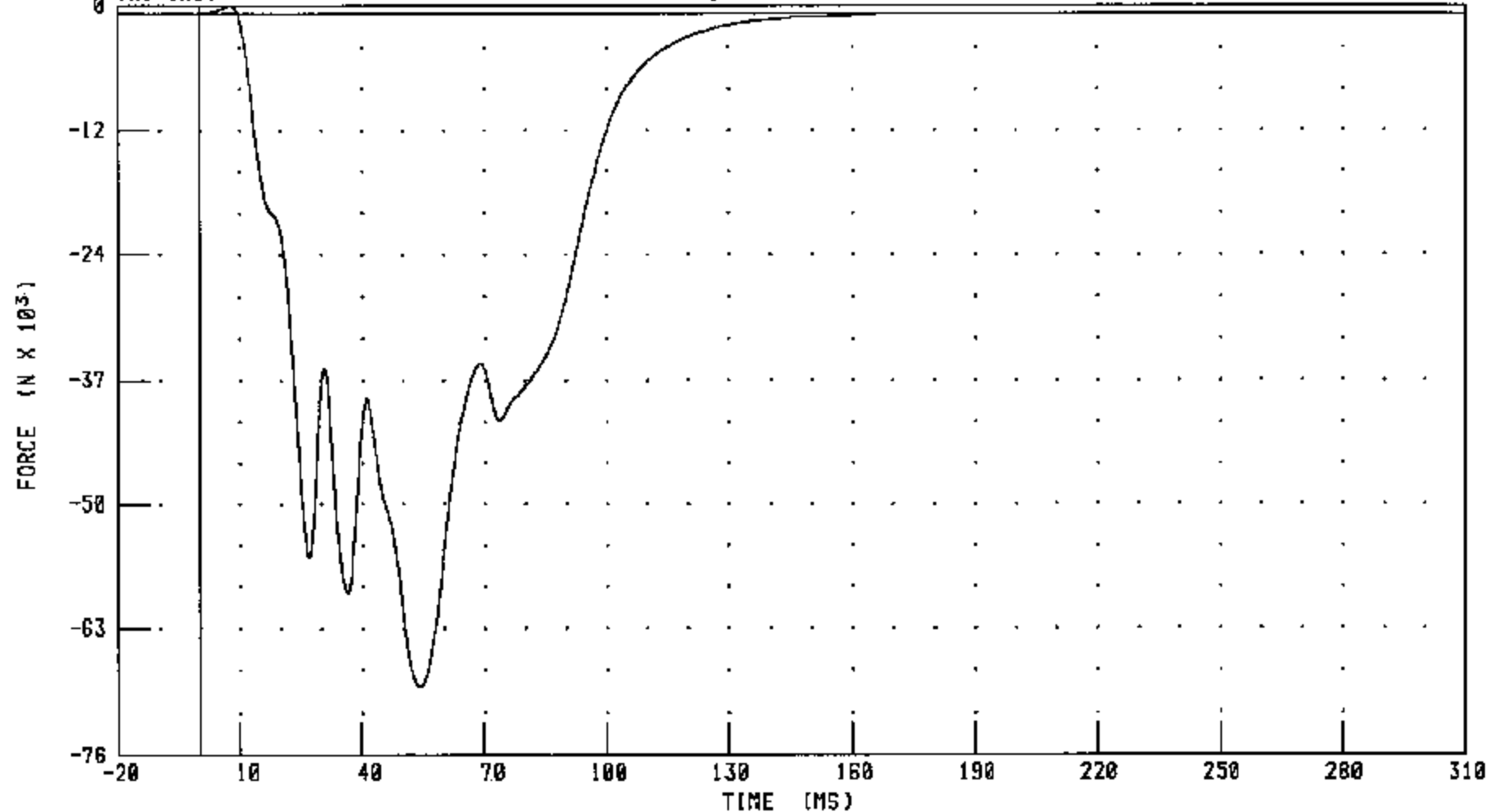
40 KPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION B7 FORCE

TEST NUMBER: 040318-1

TRC INC.

40 KPH FRONTAL



CHANNEL: BB7F

FILTER: CH. CLASS 60

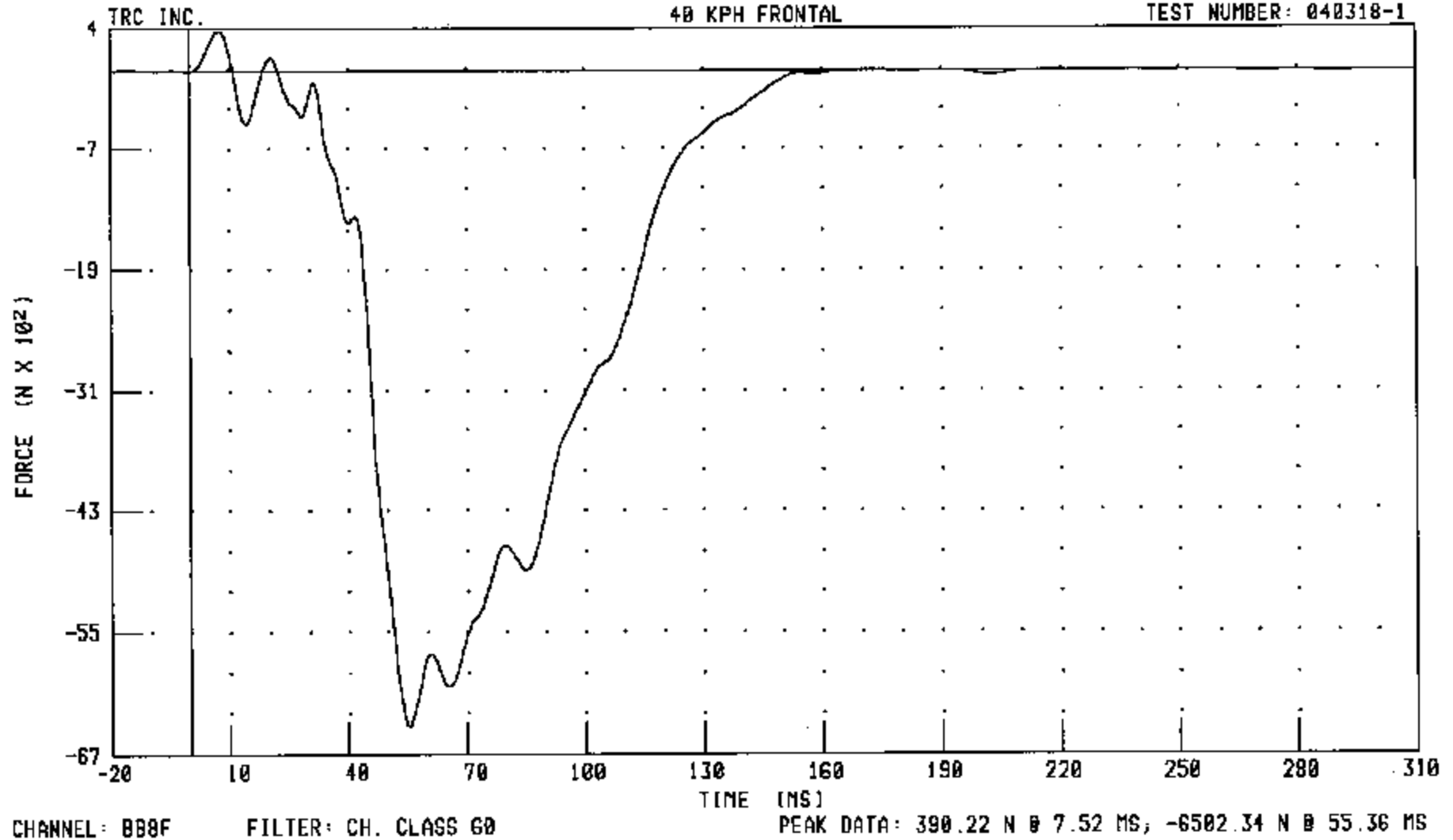
PEAK DATA: 724.43 N @ 7.60 MS; -69230.60 N @ 54.16 MS

69-9

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION B8 FORCE

TEST NUMBER: 040318-1



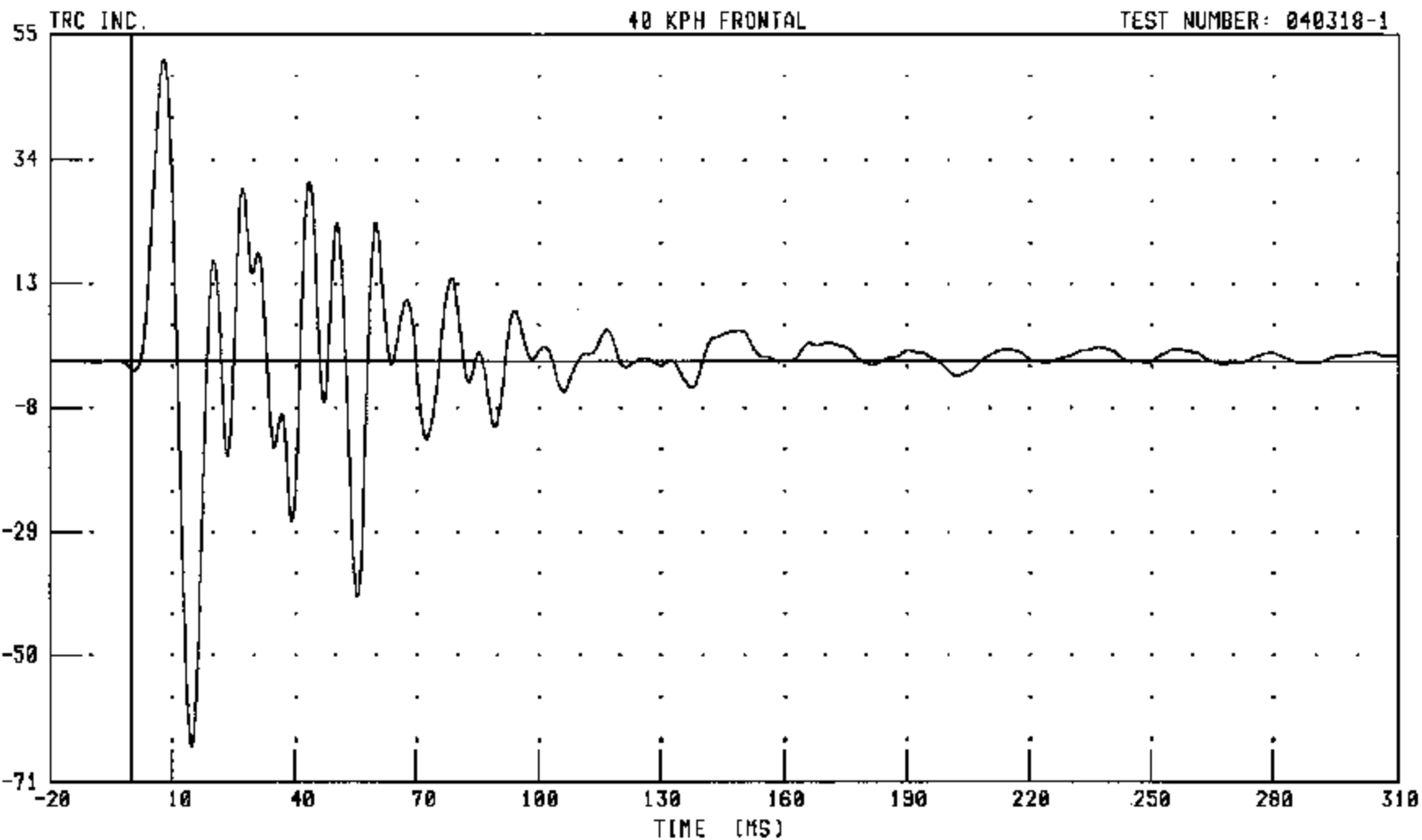
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION 89 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BB9F

FILTER: CH. CLASS 60

PEAK DATA: 506.48 N @ 8.00 MS; -650.65 N @ 14.88 MS

6-71

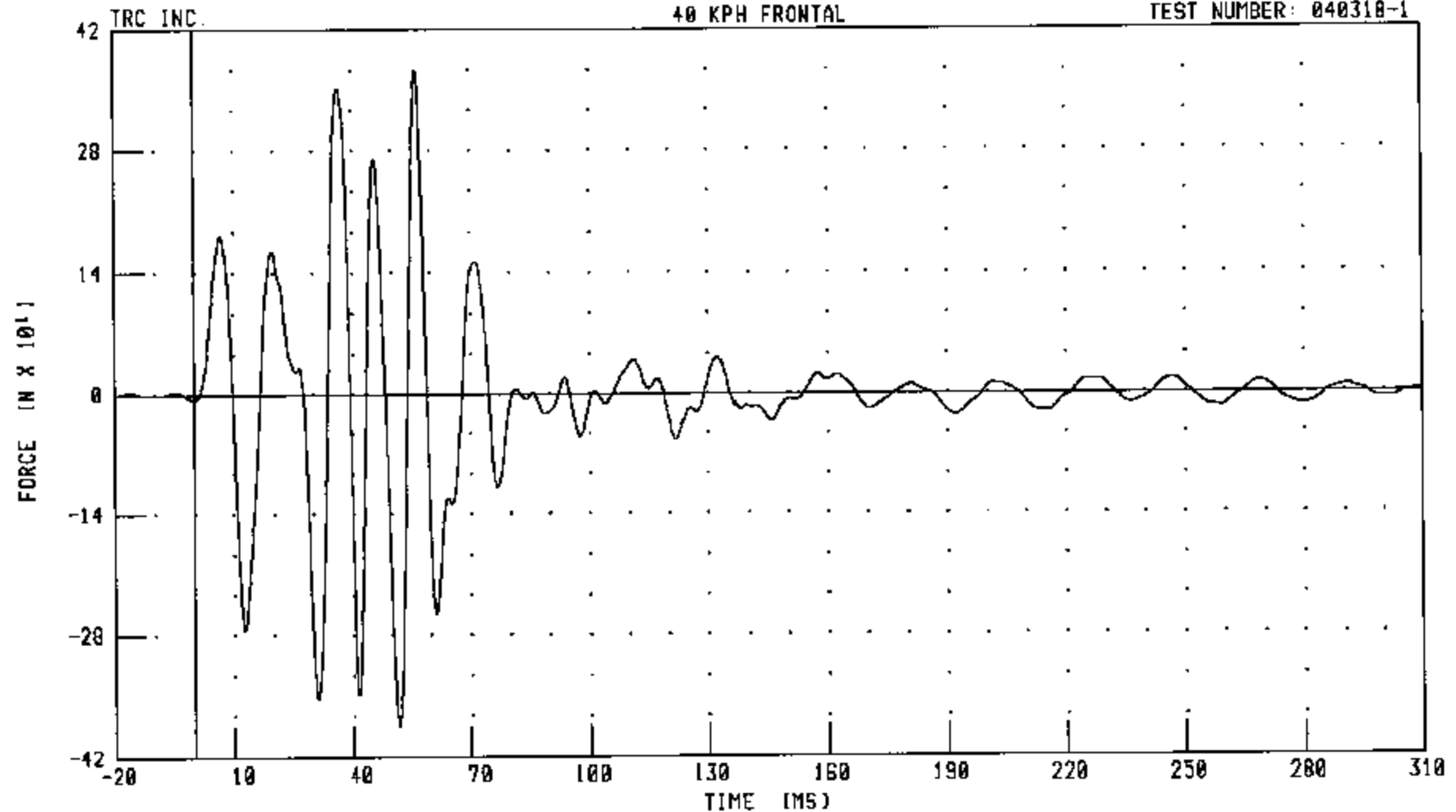
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION C1 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BC1F

FILTER: CH. CLASS 60

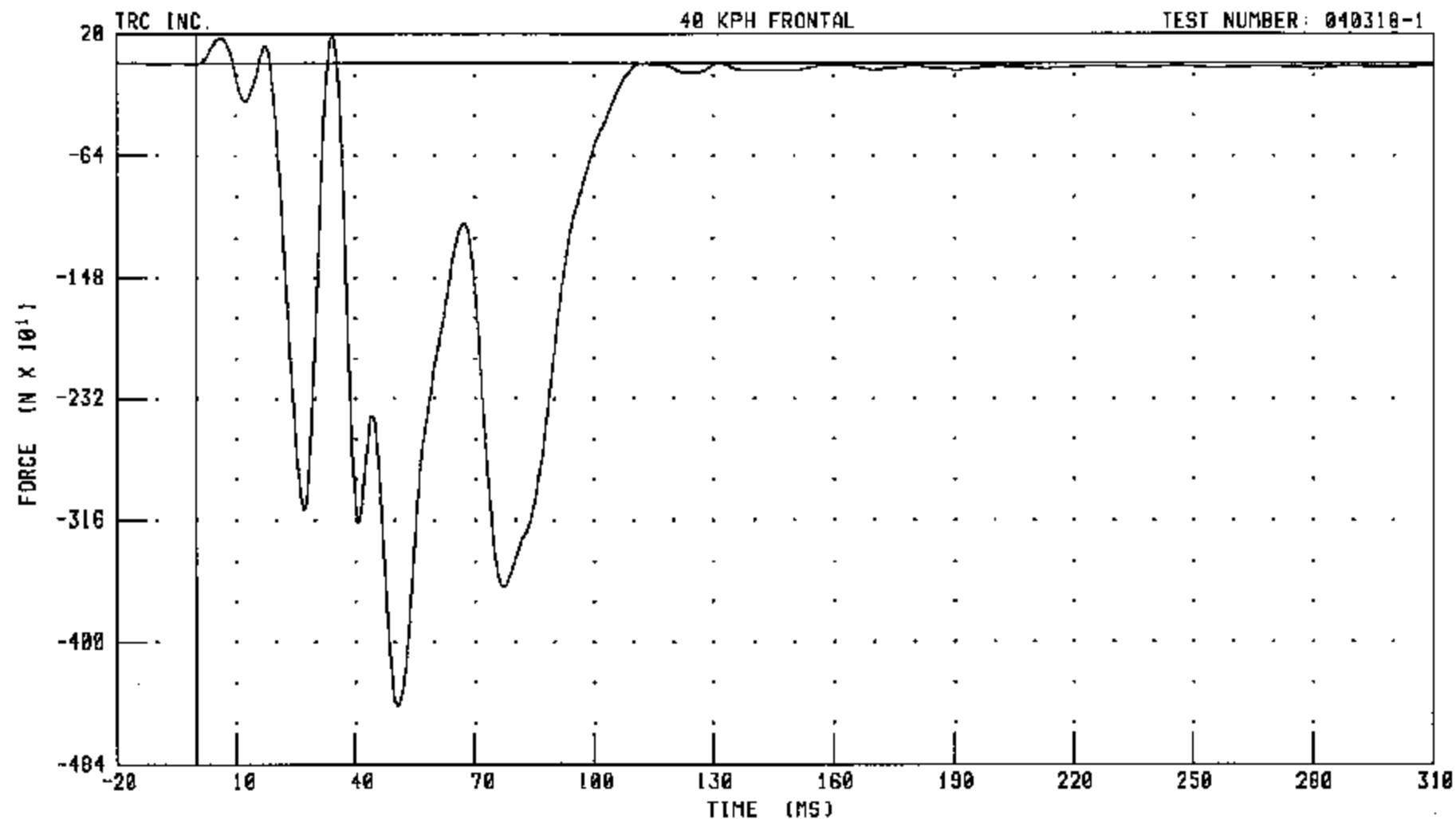
PEAK DATA: 372.86 N @ 56.64 MS; -383.87 N @ 51.84 MS

6-72

040318-1

40 KPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION C2 FORCE

TEST NUMBER: 040318-1



CHANNEL: BC2F

FILTER: CH. CLASS 60

6-73

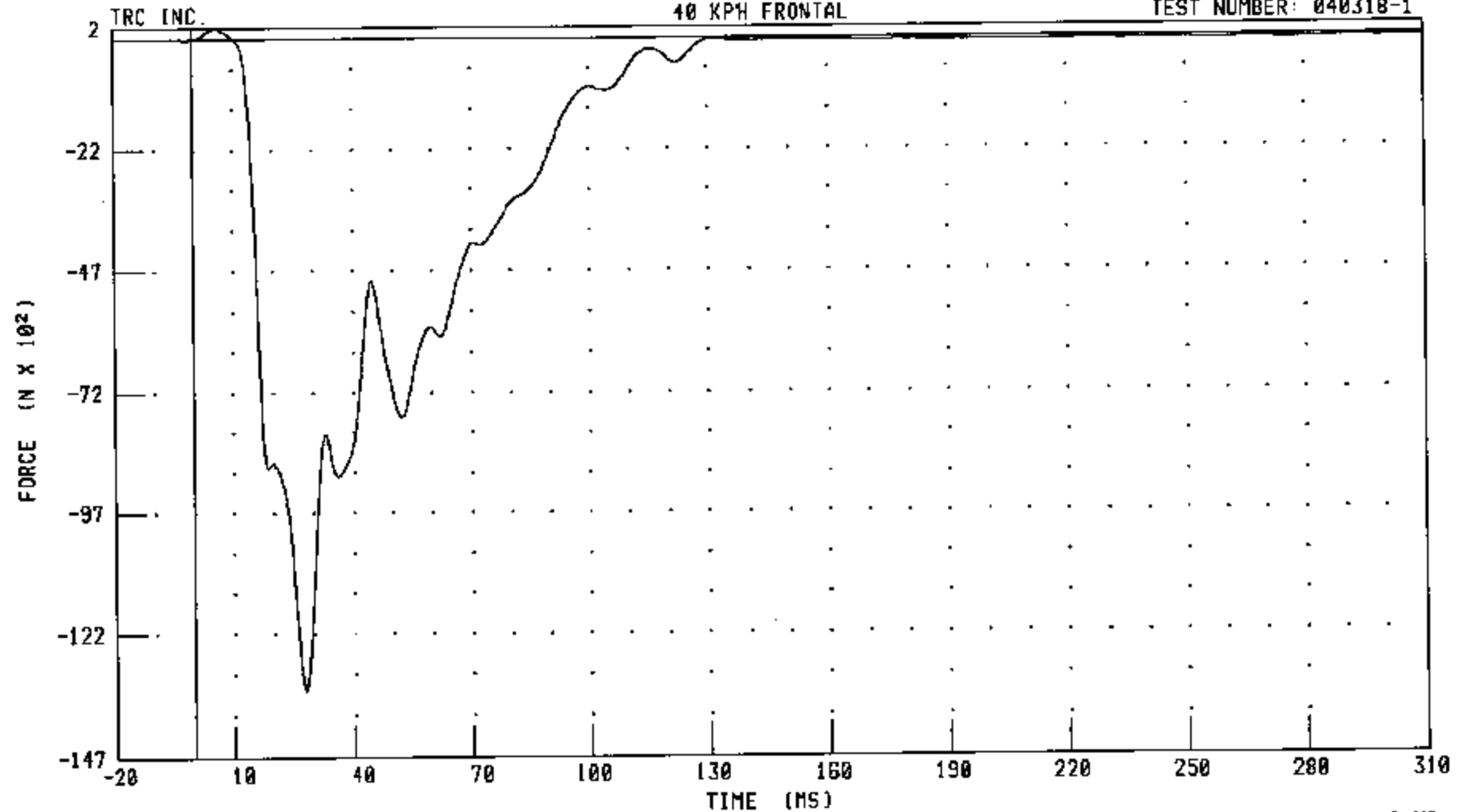
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION C3 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BC3F

FILTER: CH. CLASS 60

PEAK DATA: 216.63 N @ 5.84 MS, -13439.48 N @ 27.92 MS

6-74

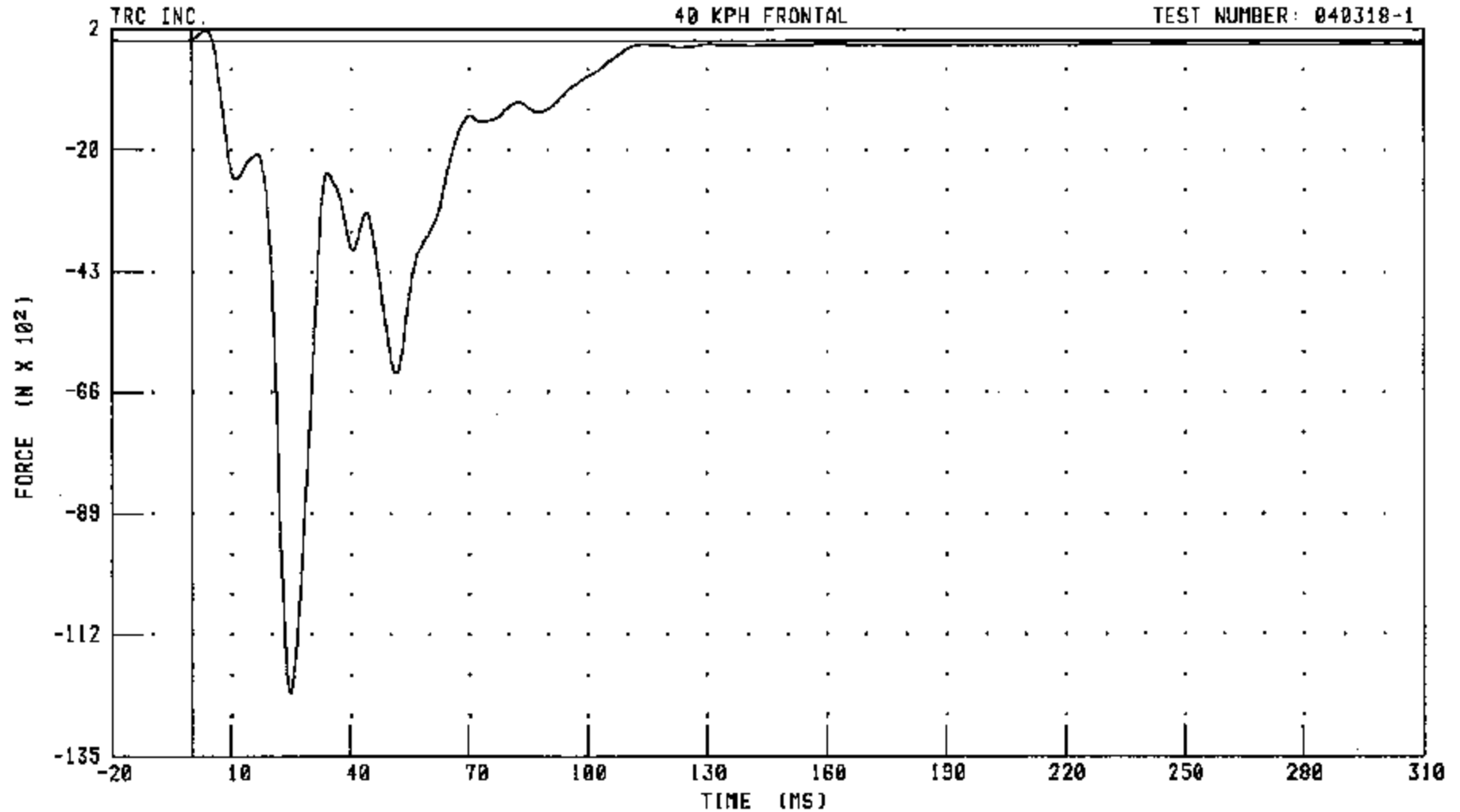
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION C4 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BC4F

FILTER: CH. CLASS 60

PEAK DATA: 203.32 N @ 3.52 MS; -12406.27 N @ 24.80 MS

6-75

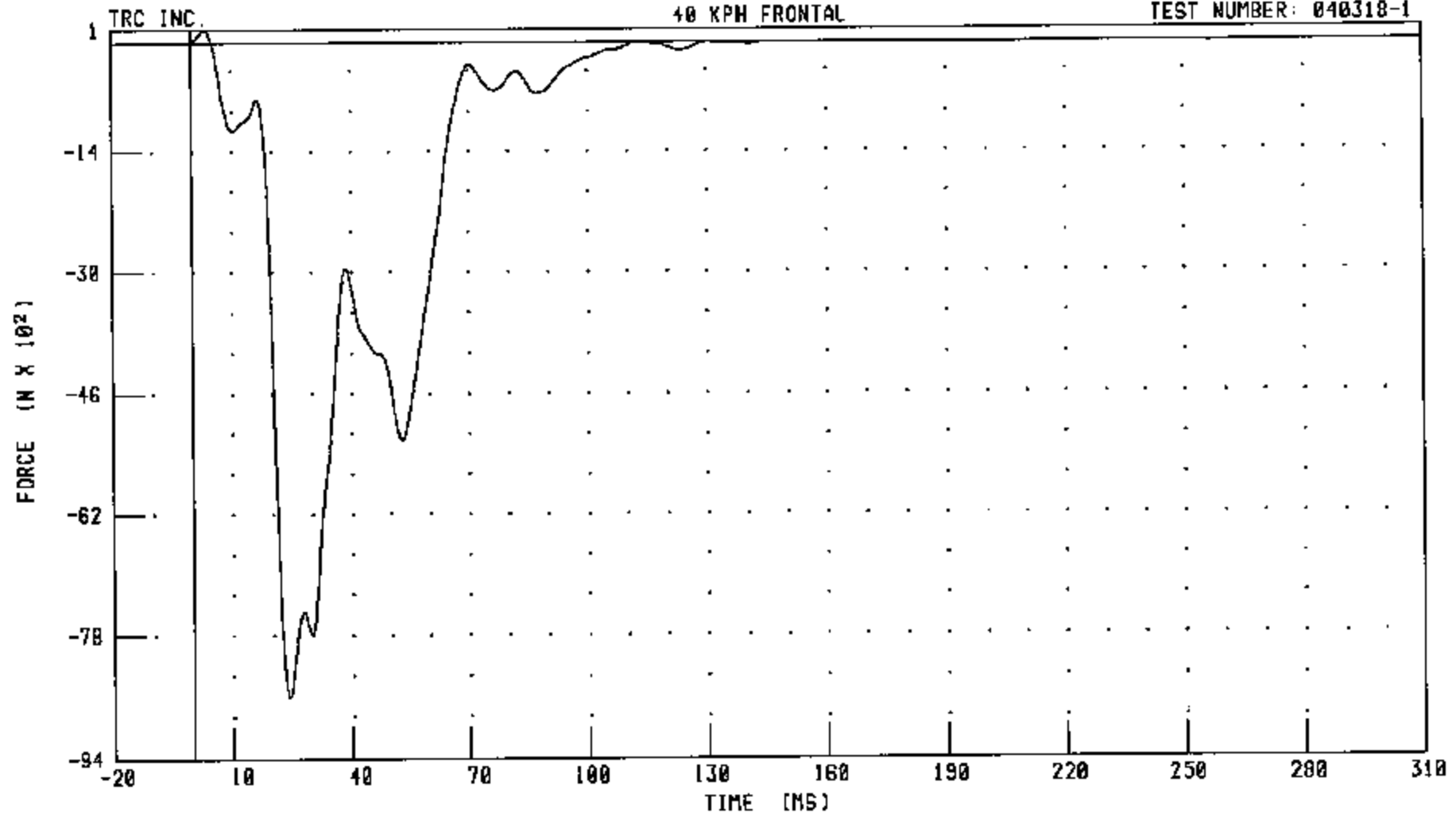
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION C5 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BC5F

FILTER: CH. CLASS 60

PEAK DATA: 160.88 N @ 3.52 MS; -8635.05 N @ 24.16 MS

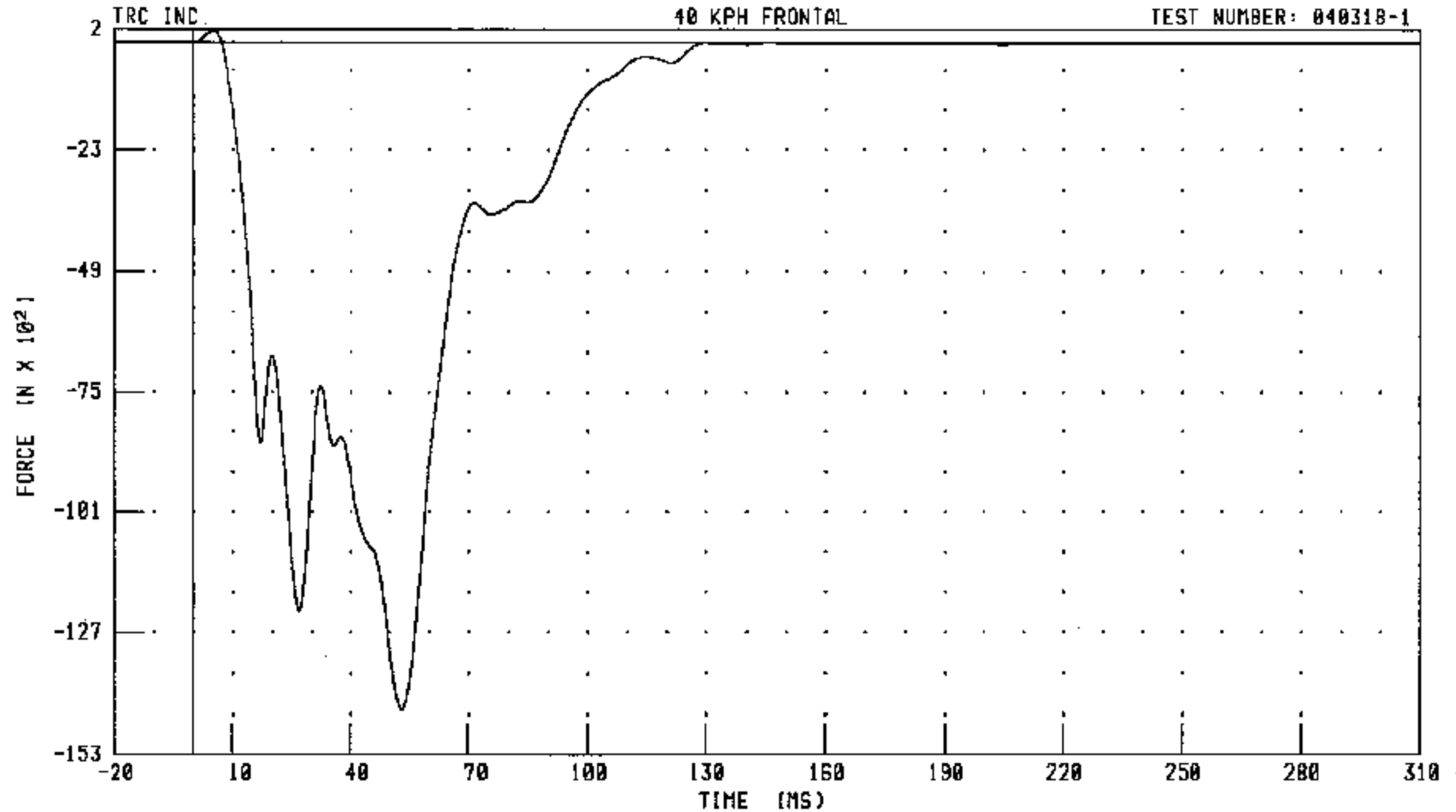
6-76

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION C6 FORCE

TEST NUMBER: 040318-1



CHANNEL: BC6F

FILTER: CH. CLASS 60

6-77

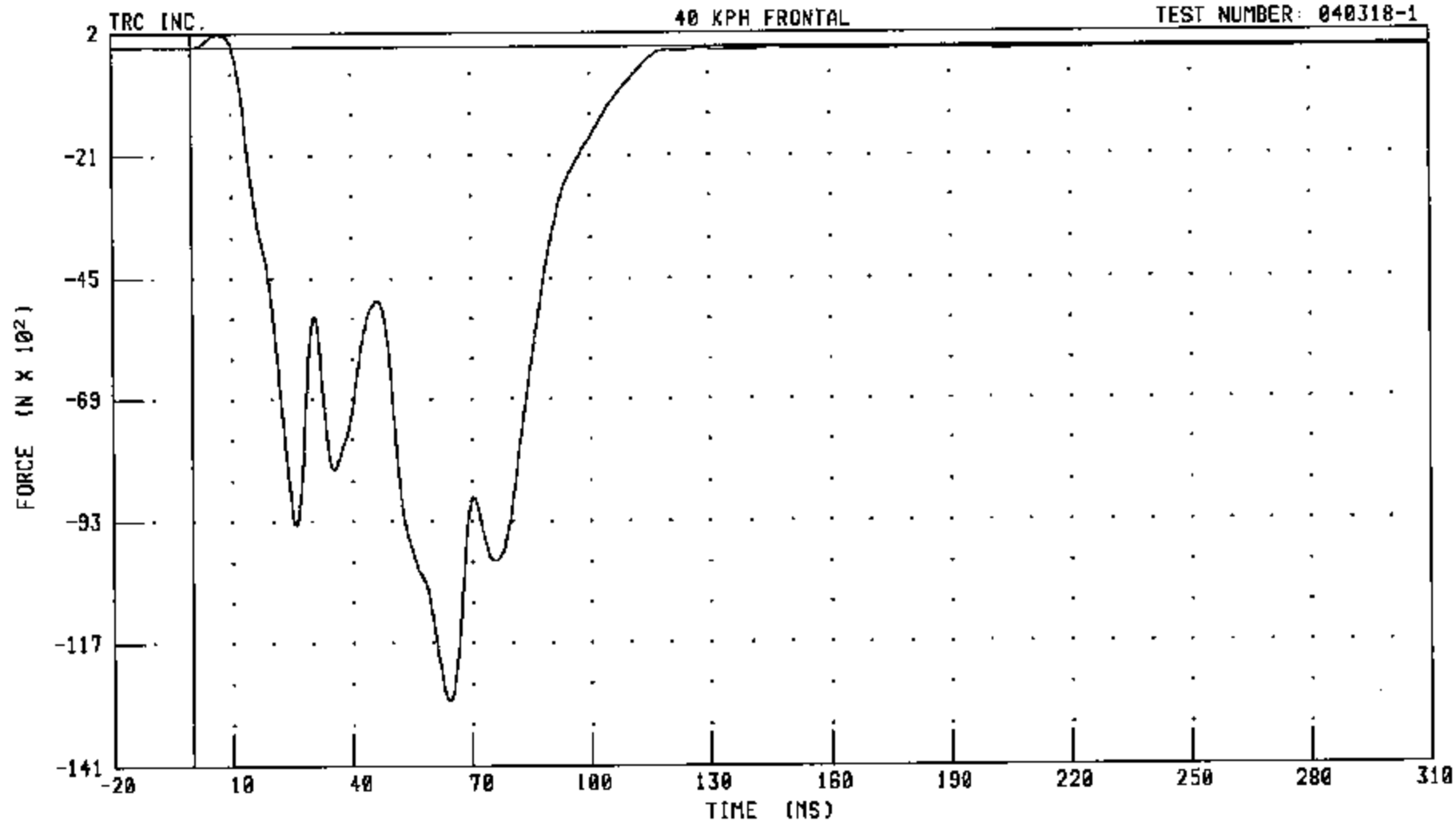
040318-1

40 KPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION C7 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BC7F

FILTER: CH. CLASS 60

PEAK DATA: 258.02 N @ 6.88 MS; -12869.00 N @ 64.40 MS

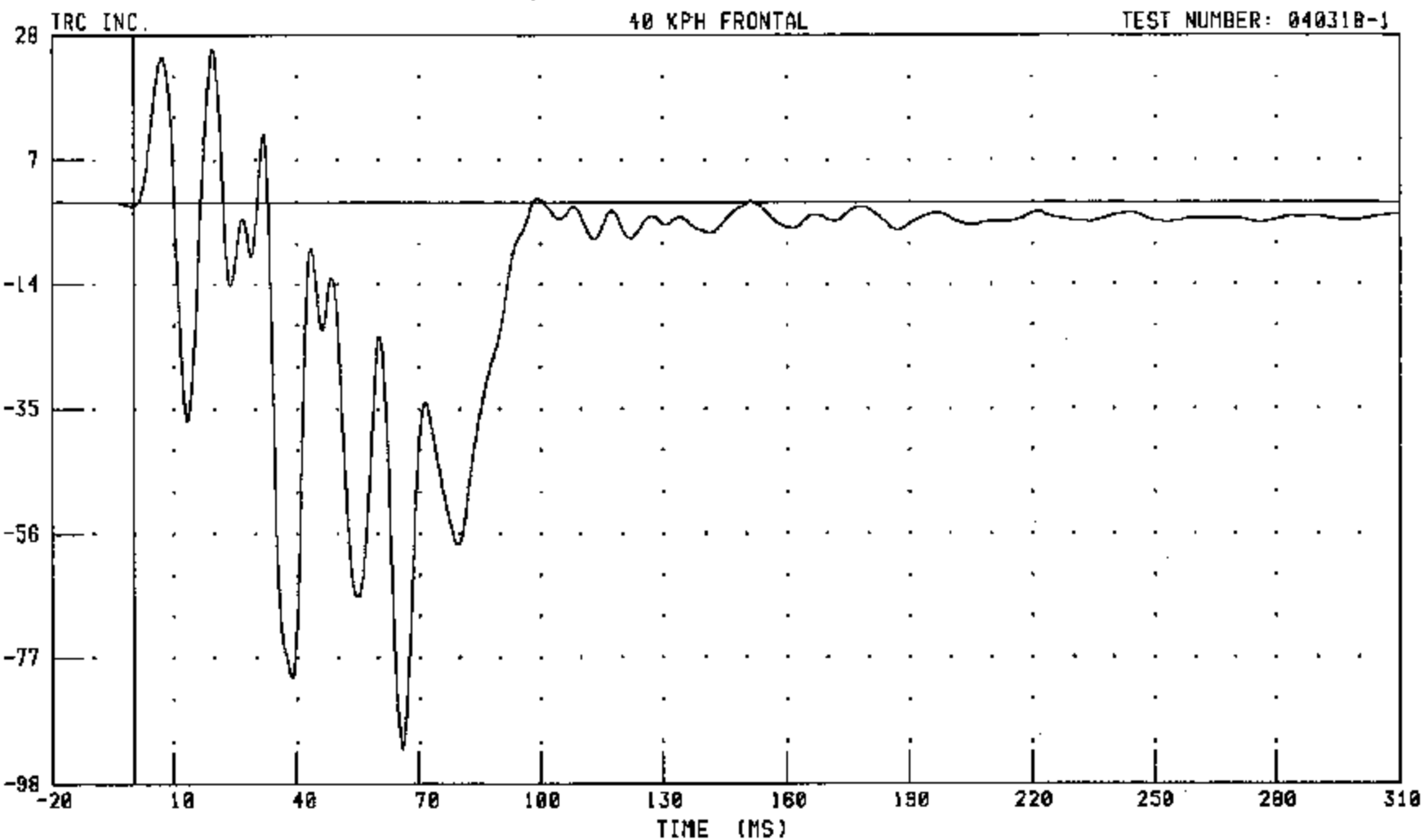
6-78

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION C8 FORCE

TEST NUMBER: 040318-1



CHANNEL: BC0F

FILTER: CH. CLASS 60

PEAK DATA: 256.59 N @ 19.76 MS; -921.65 N @ 65.92 MS

6-79

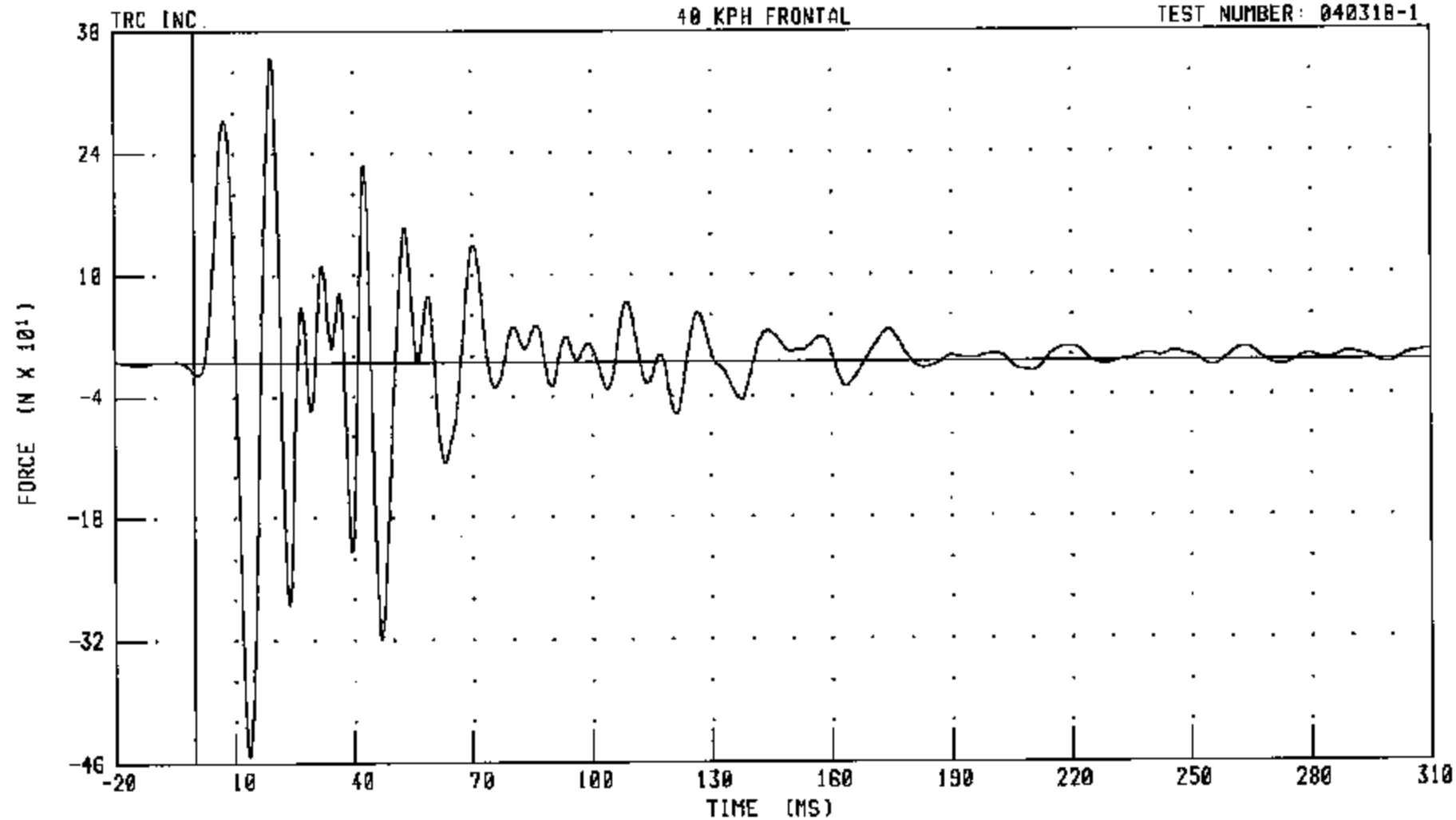
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION C9 FORCE

TEST NUMBER: 040318-1

40 KPH FRONTAL



CHANNEL: BC9F

FILTER: CH. CLASS 60

08-9

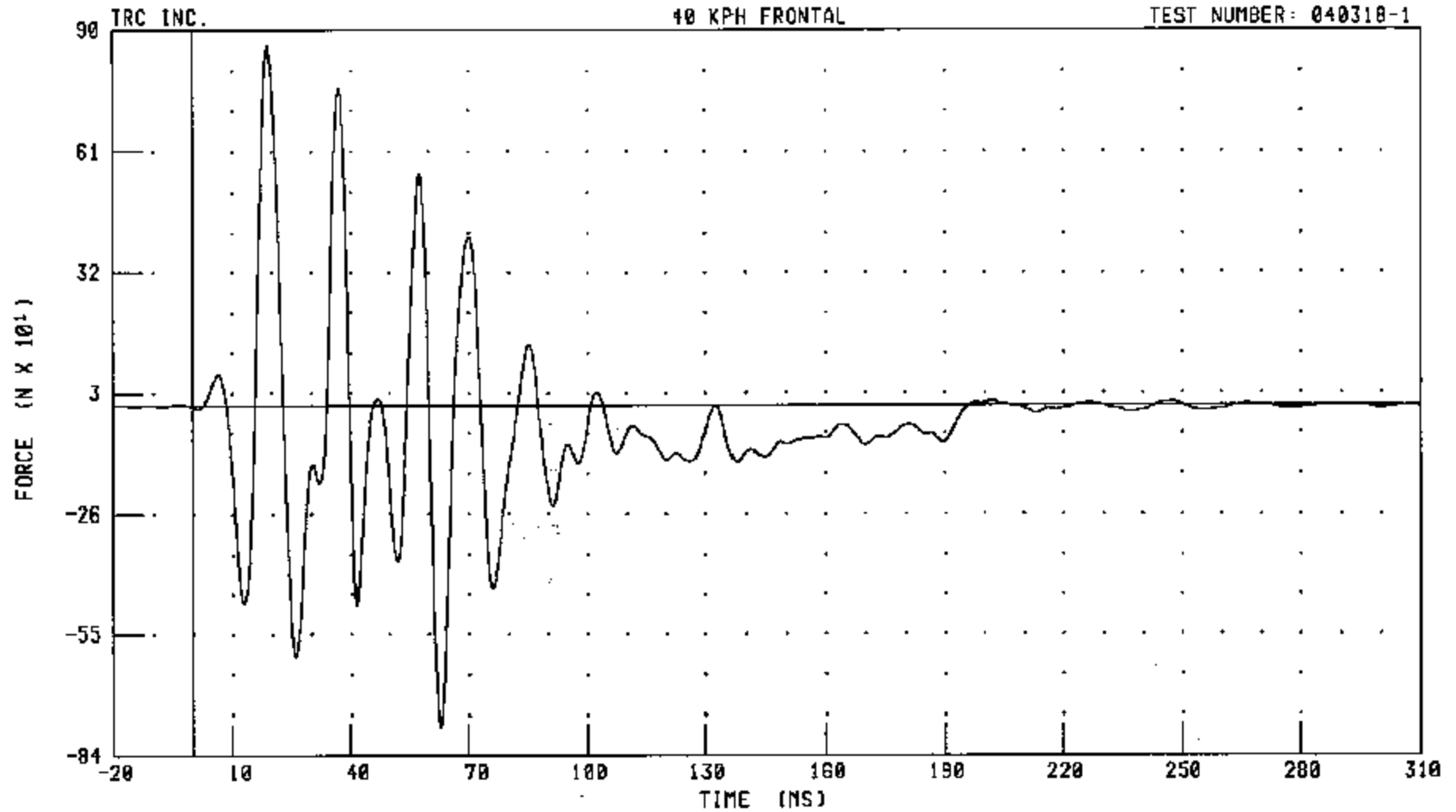
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D1 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD1F

FILTER: CH. CLASS 60

PEAK DATA: 863.62 N @ 19.04 MS; -772.52 N @ 62.96 MS

18-81

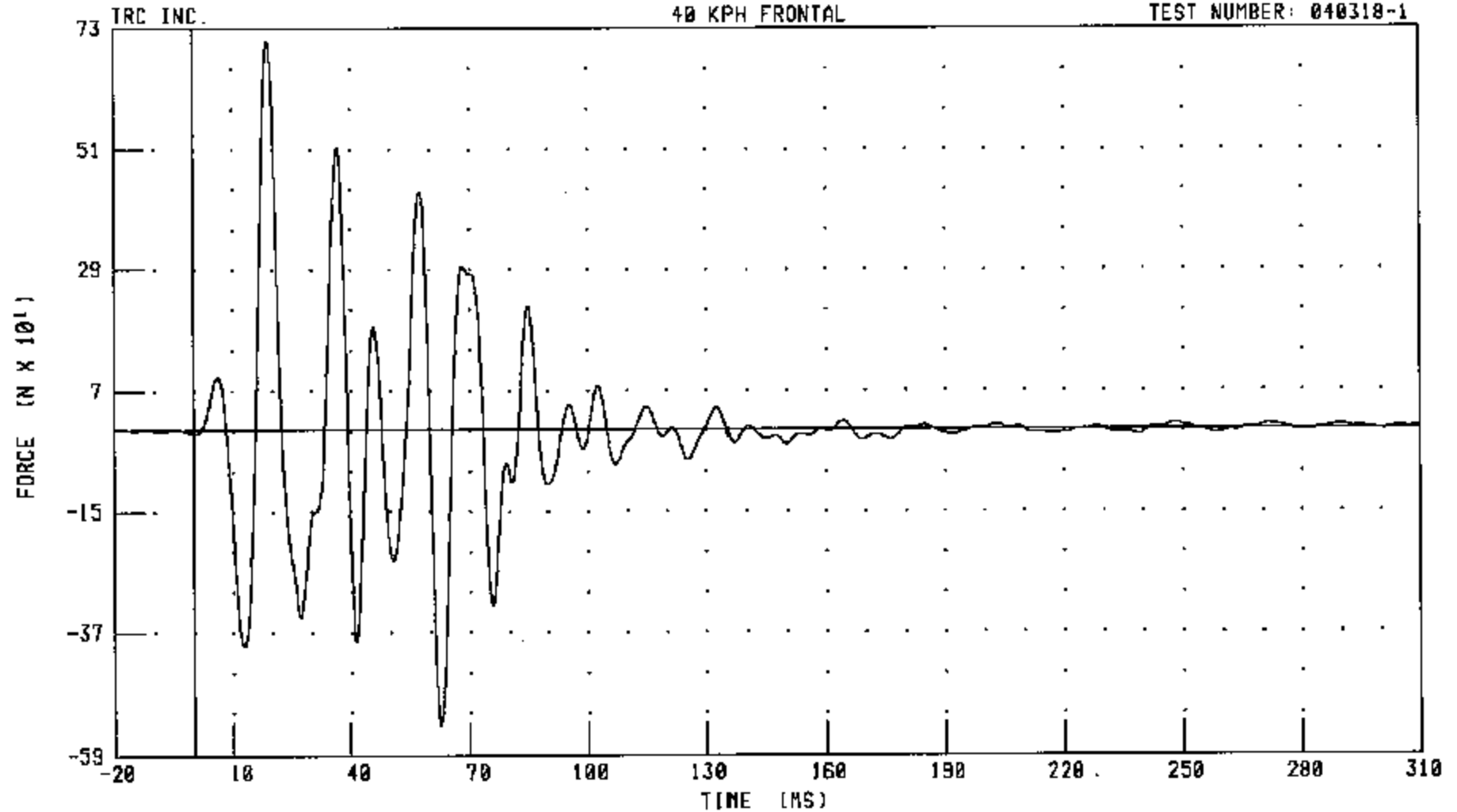
040318-1

40 KPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D2 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



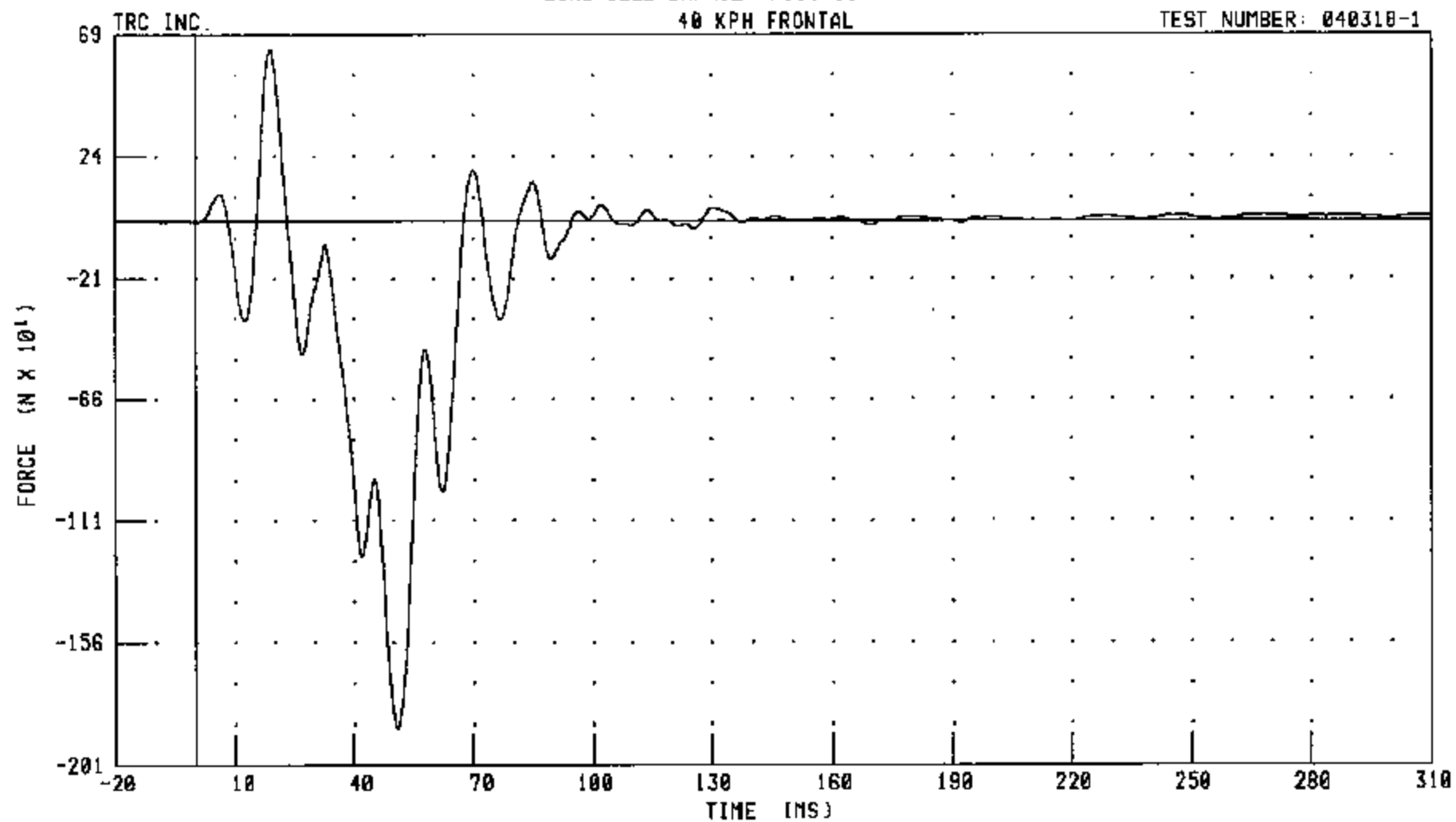
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D3 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD3F

FILTER: CH. CLASS 60

PEAK DATA: 632.80 N @ 19.04 MS; -1874.81 N @ 51.12 MS

6-83

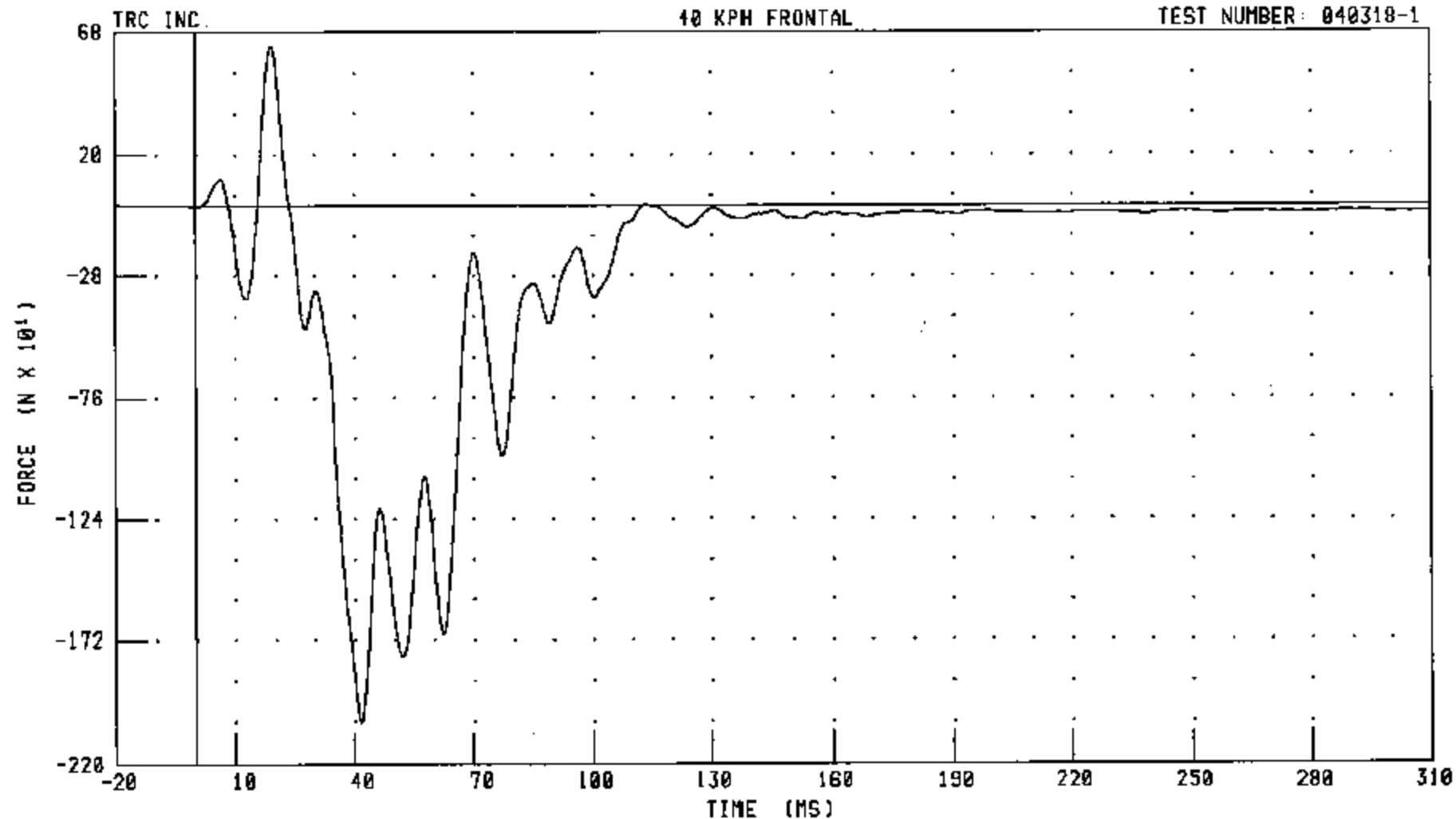
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D4 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD4F

FILTER: CH. CLASS 60

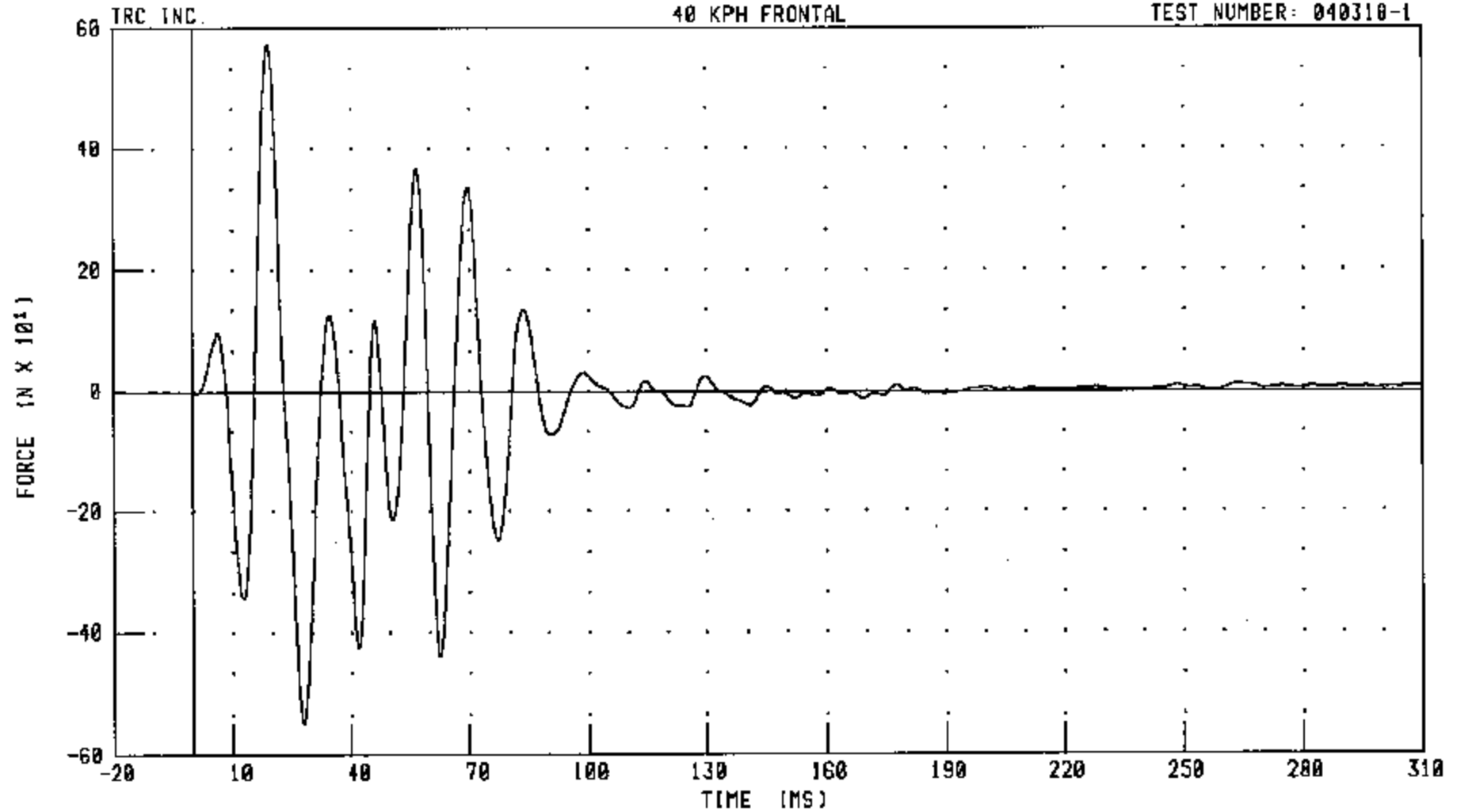
PEAK DATA: 624.31 N @ 19.20 MS; -2044.15 N @ 41.76 MS

6-84

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER POSITION 05 FORCE
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD5F

FILTER: CH. CLASS 60

PEAK DATA: 573.90 N @ 19.12 MS; -547.85 N @ 27.92 MS

6-85

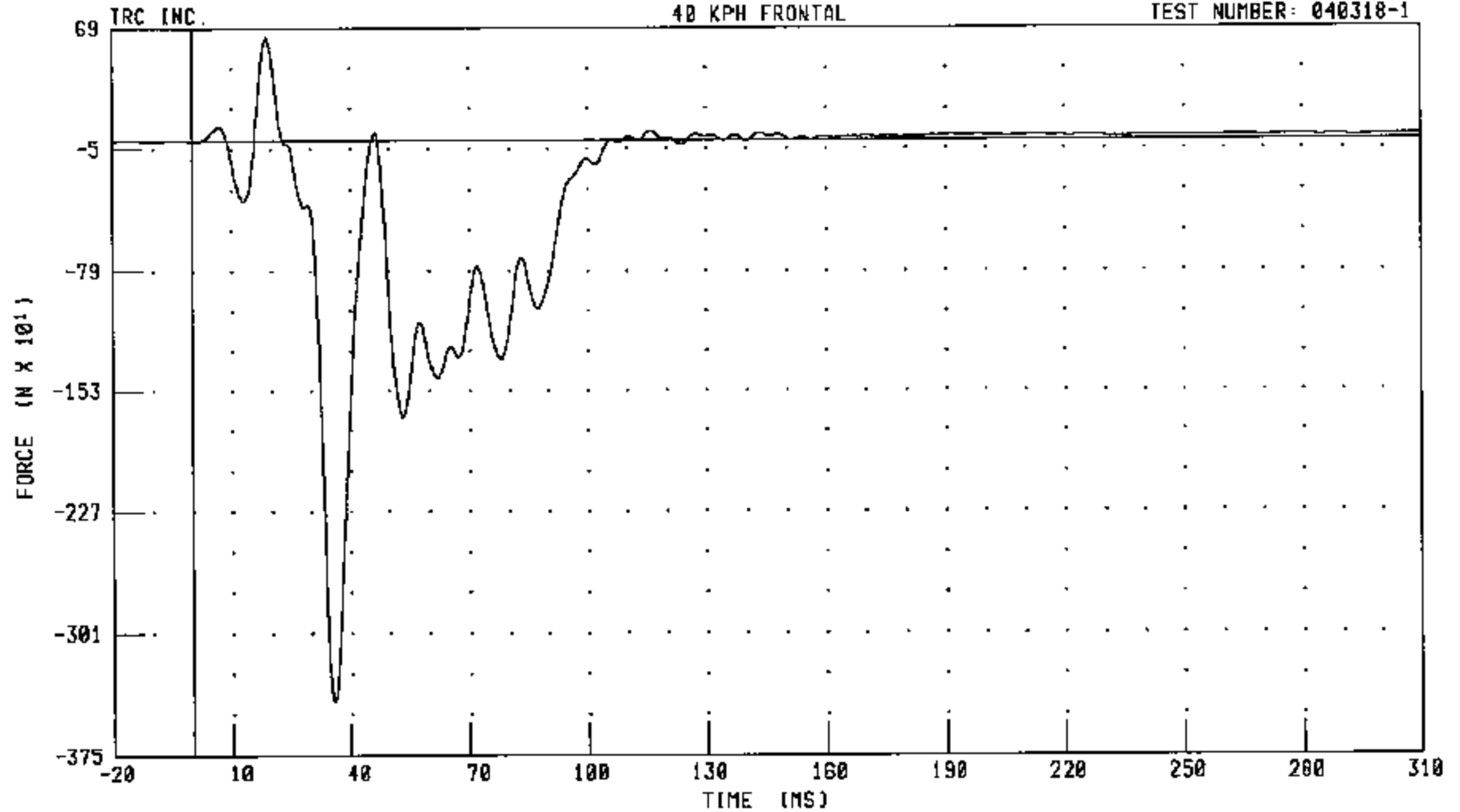
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D6 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD6F

FILTER: CH. CLASS 60

PEAK DATA: 634.22 N @ 18.96 MS; -3420.62 N @ 35.76 MS

6-86

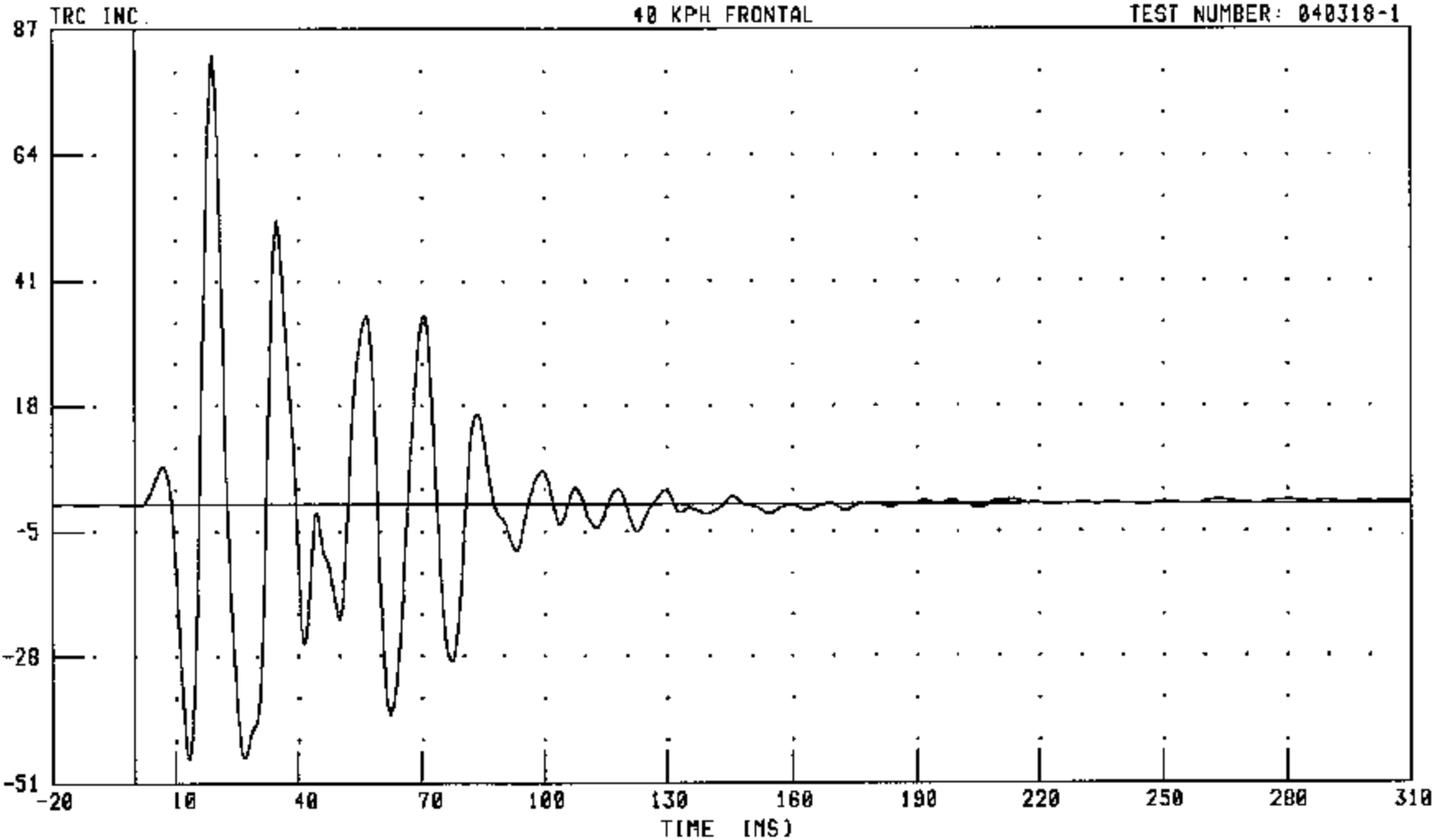
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D7 FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: BD7F

FILTER: CH. CLASS 60

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6-87

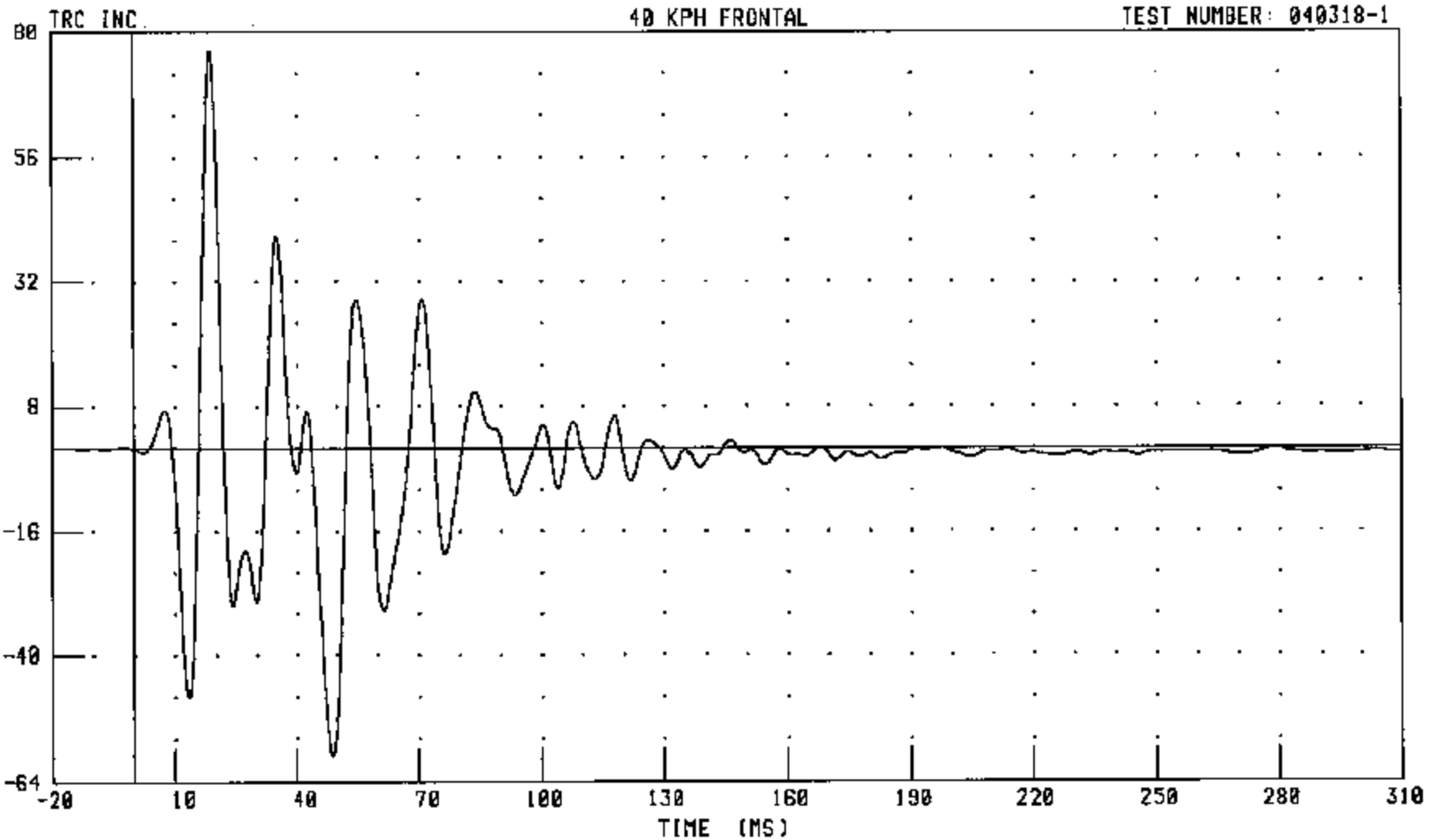
040318-1

40 KPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION DB FORCE

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: B08F

FILTER: CH. CLASS 60

6-88

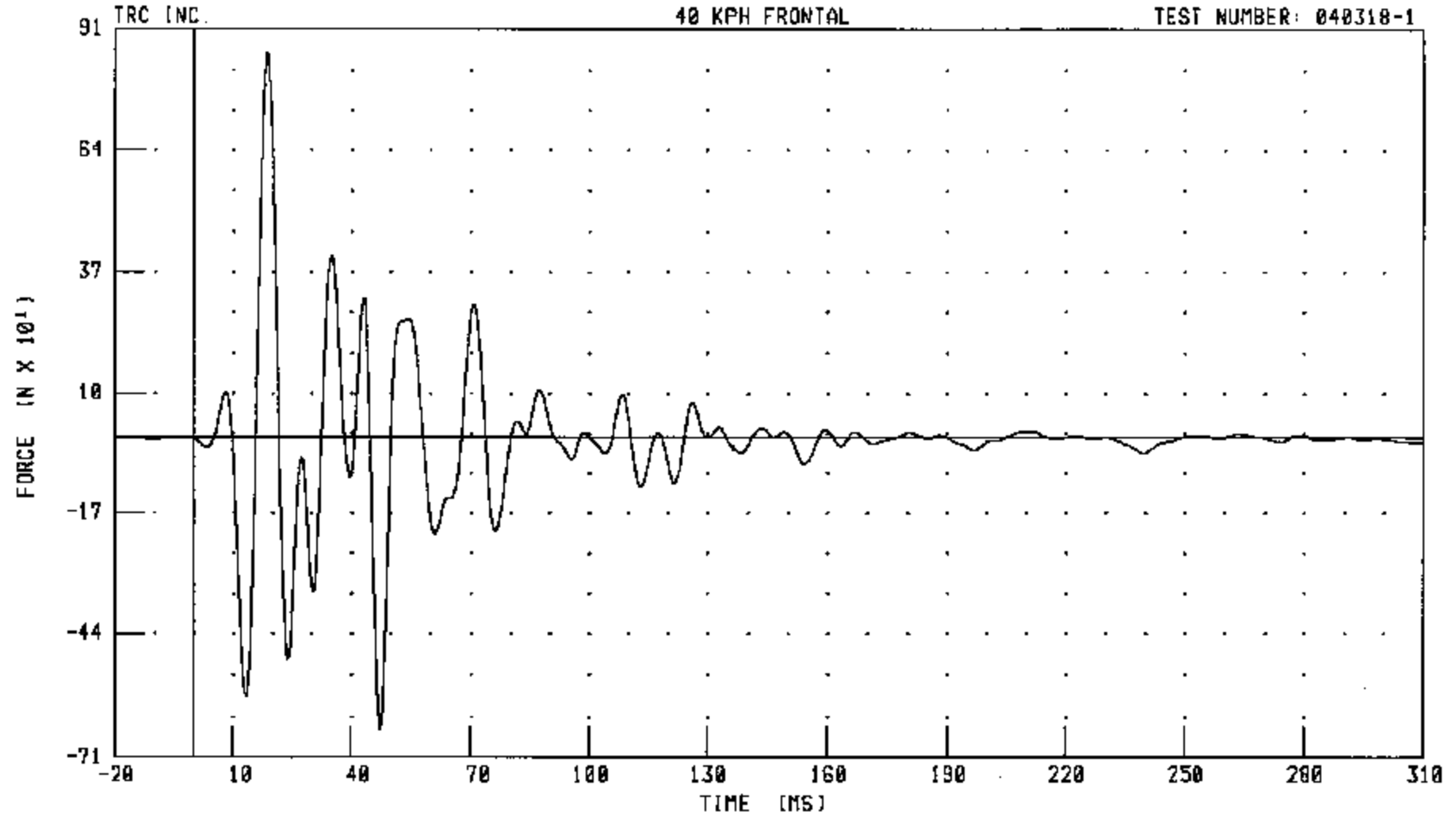
040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

LOAD CELL BARRIER POSITION D9 FORCE

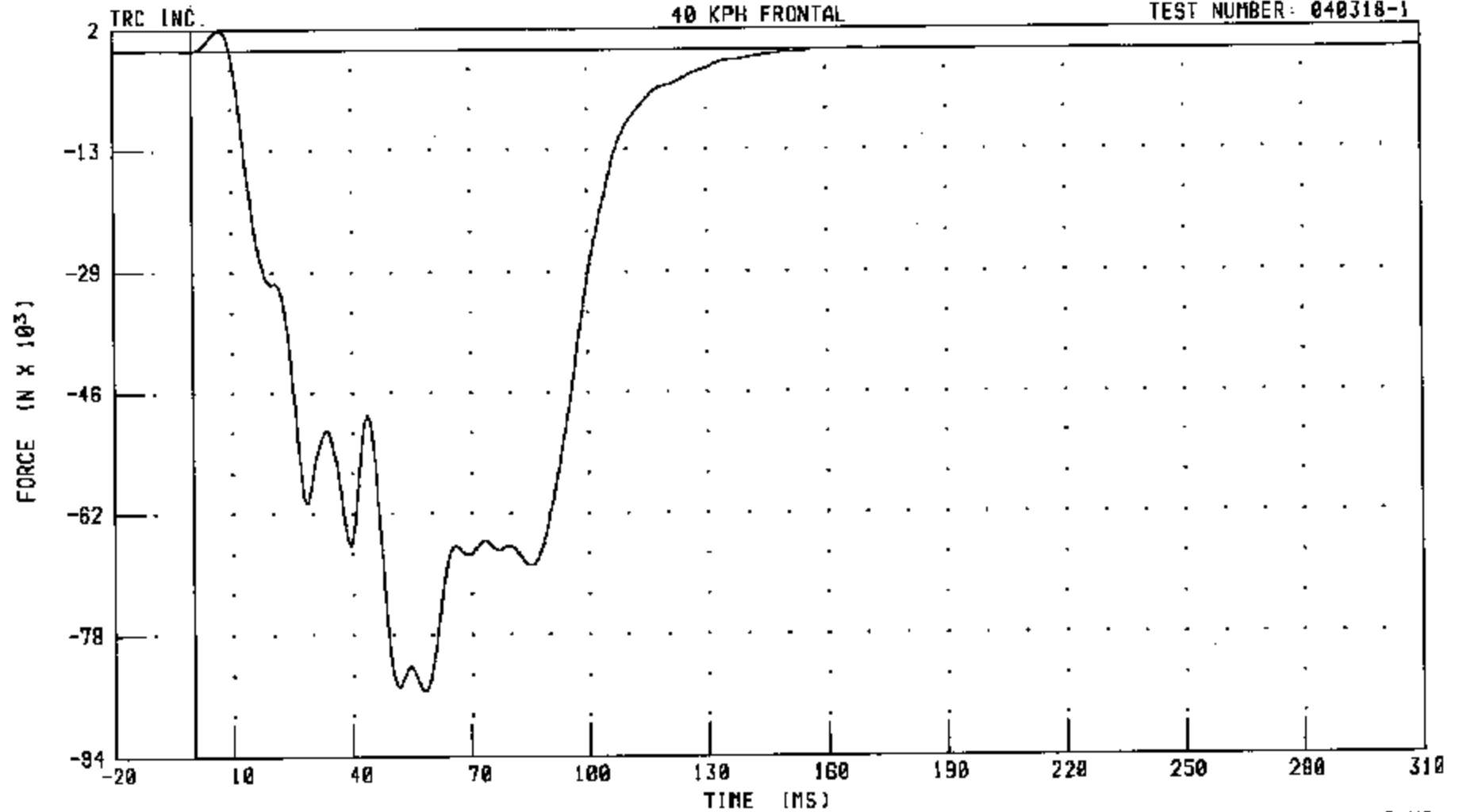
40 KPH FRONTAL

TEST NUMBER: 040318-1



40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER GROUP # 1 FORCE TOTAL

TEST NUMBER: 040318-1



CHANNEL: LCBG1F FILTER: CH. CLASS 60

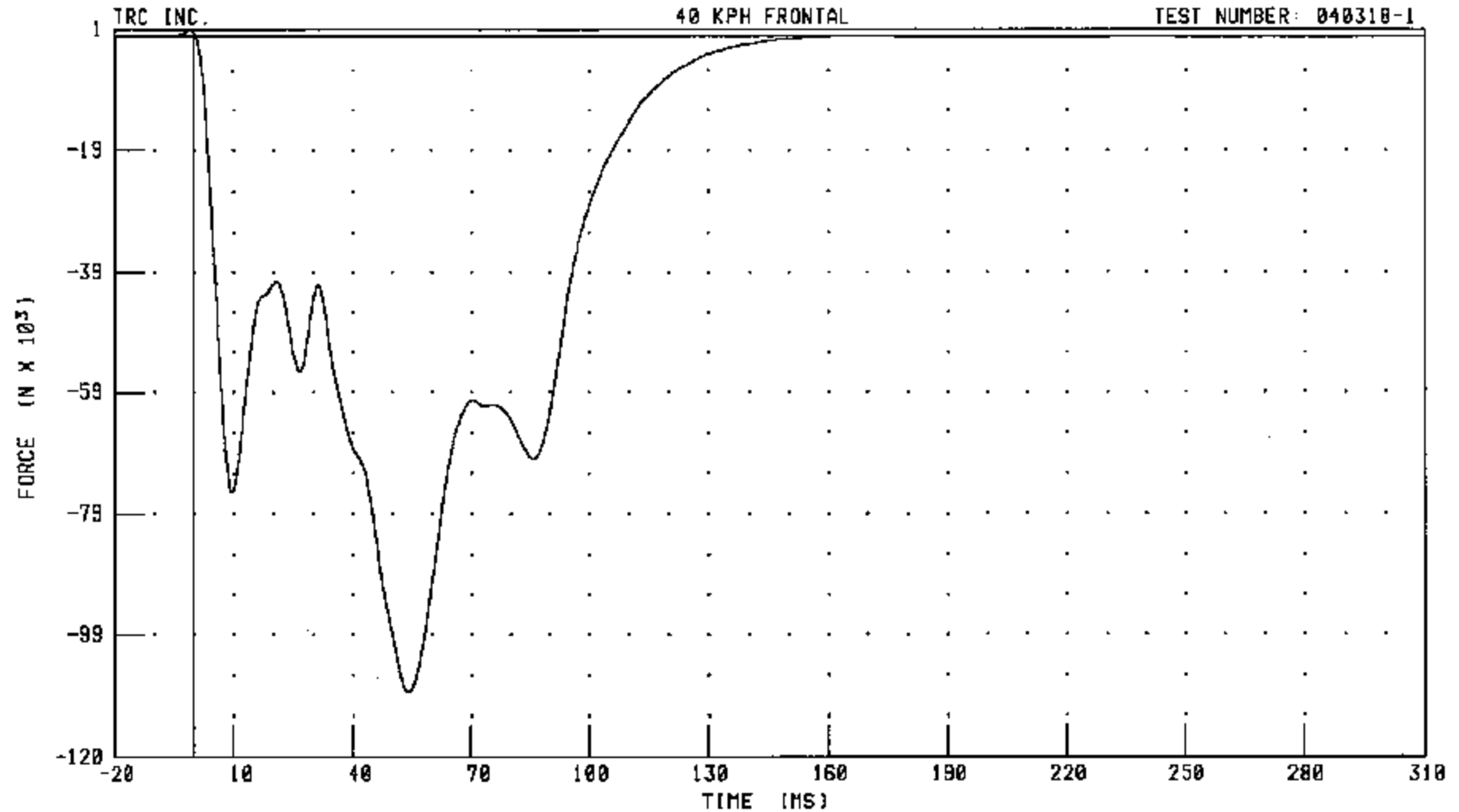
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6-90

040318-1

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TEST NUMBER: 040318-1



CHANNEL: LCBG2F FILTER: CH. CLASS 60

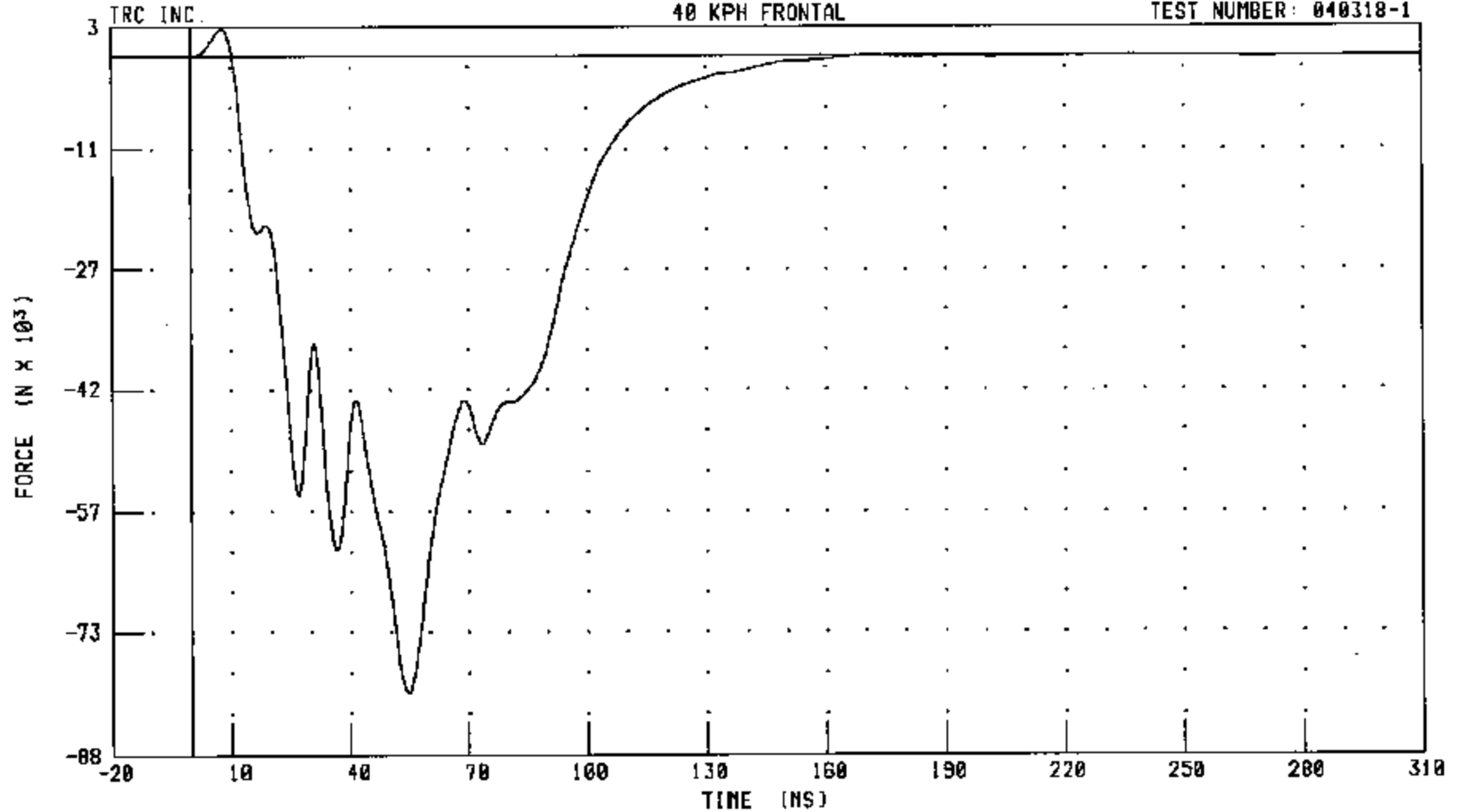
PEAK DATA: 1106.99 N @ -0.72 MS; -109350.60 N @ 54.00 MS

16-9

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113
LOAD CELL BARRIER GROUP # 3 FORCE TOTAL
40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: LCBG3F FILTER: CH. CLASS 60

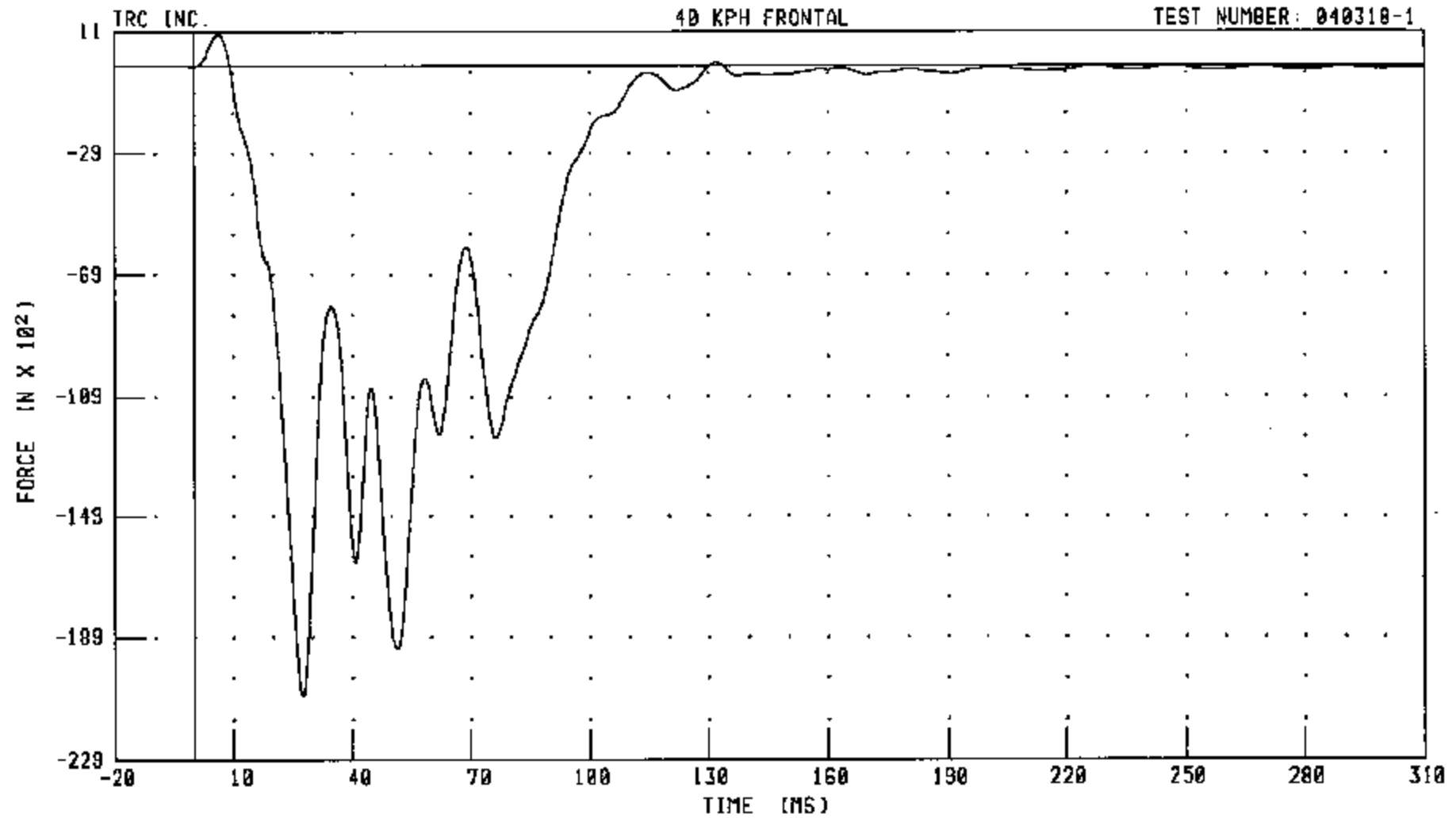
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6-92

040318-1

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TEST NUMBER: 040318-1



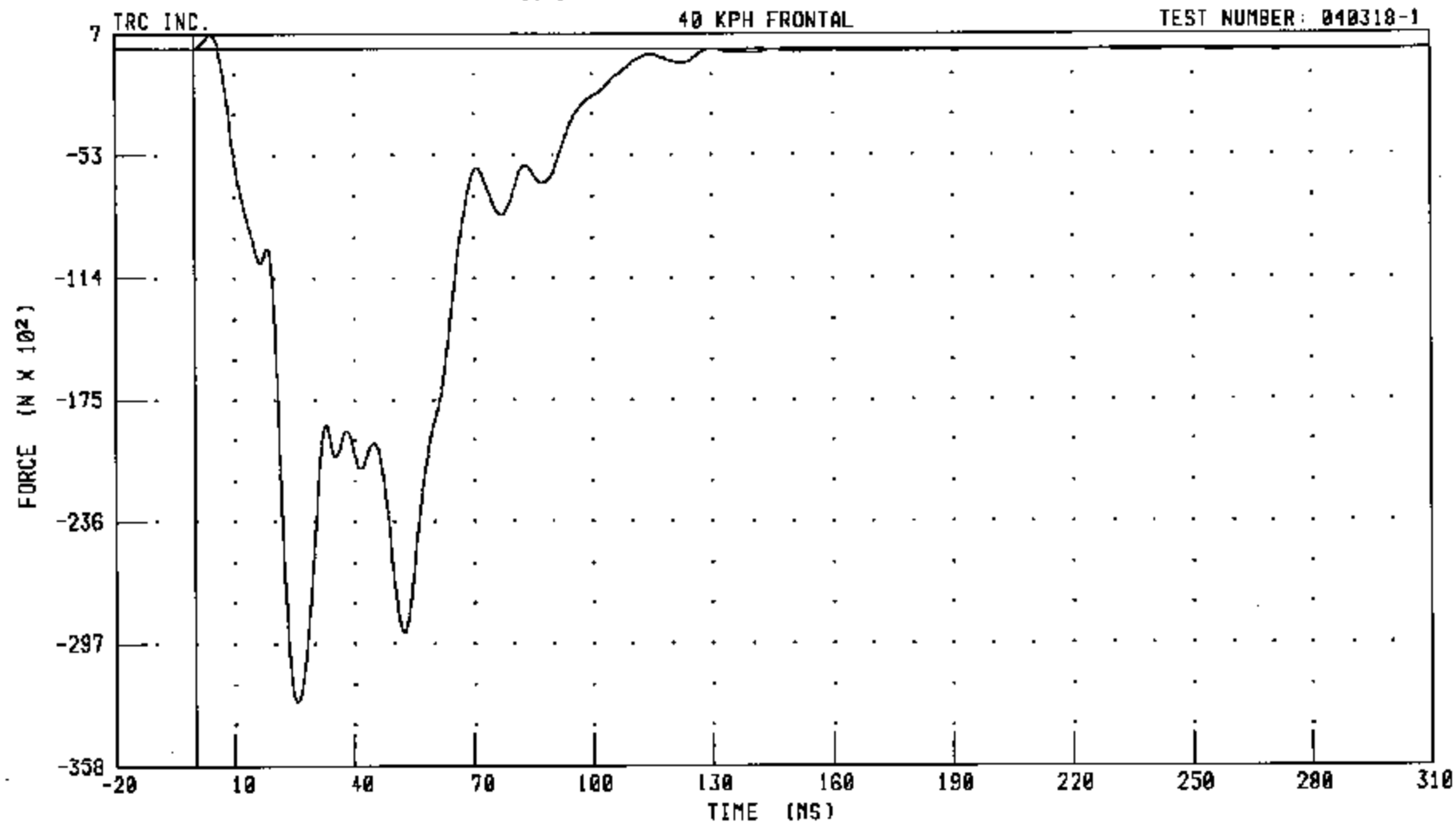
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6-9

040318-1

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LOAD CELL BARRIER GROUP # 5 FORCE TOTAL

TEST NUMBER: 040318-1

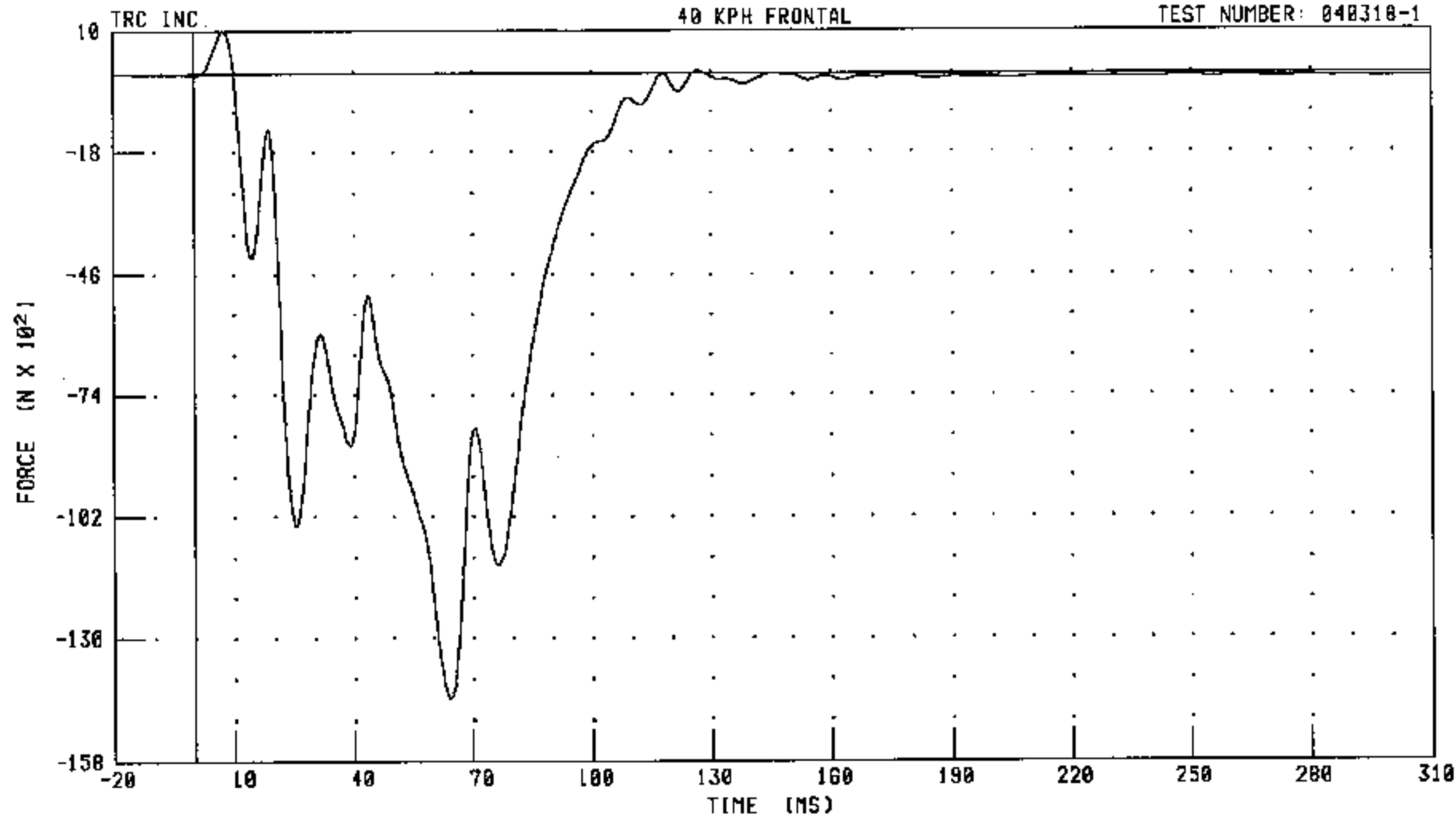


6-94

040318-1

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LOAD CELL BARRIER GROUP # 6 FORCE TOTAL

TEST NUMBER: 040318-1



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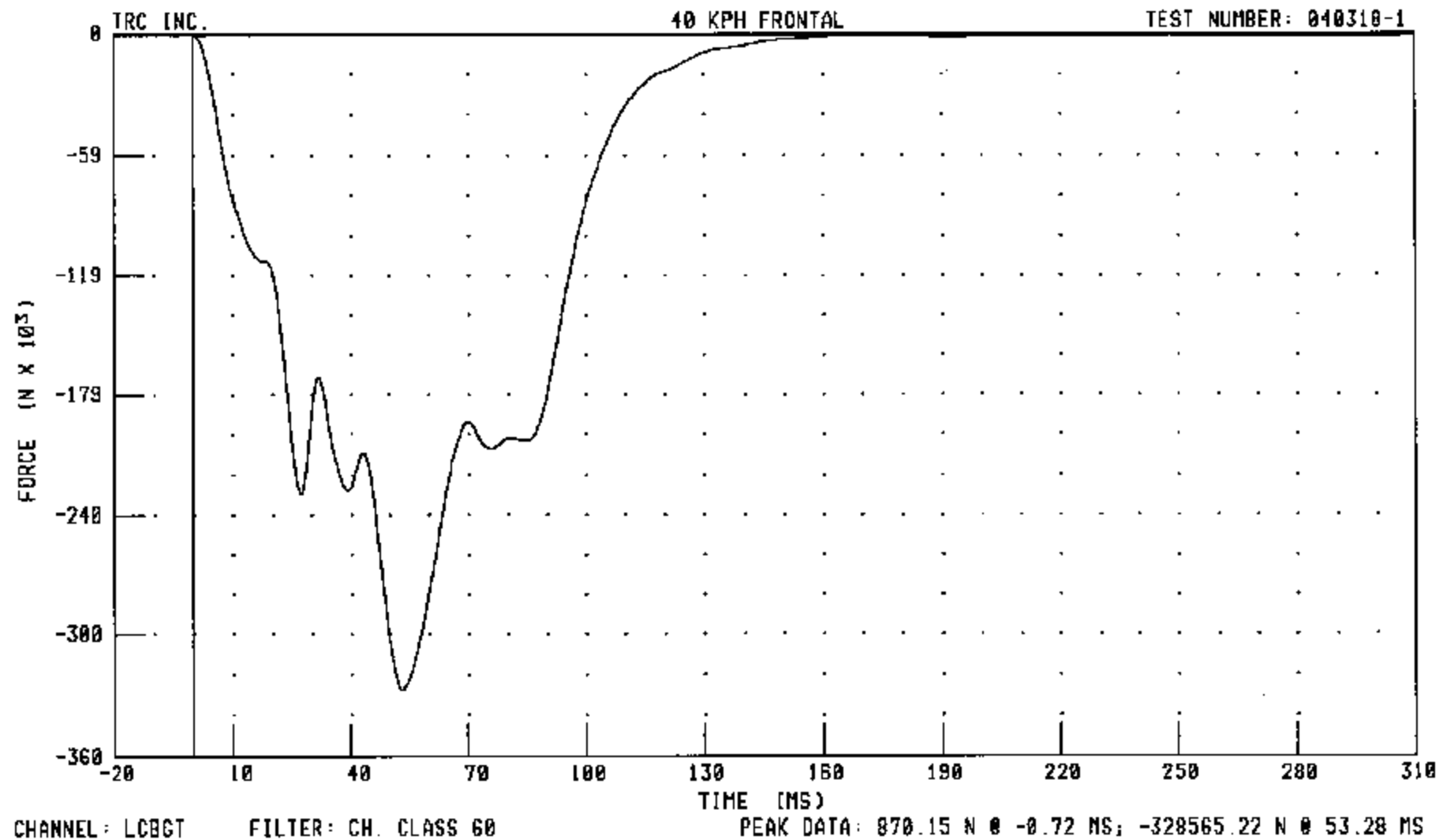
6-95

040318-1

40 KMPH FRONTAL 2004 SATURN ION C40113

TOTAL LOAD CELL BARRIER FORCE

TEST NUMBER: 040318-1



96-9

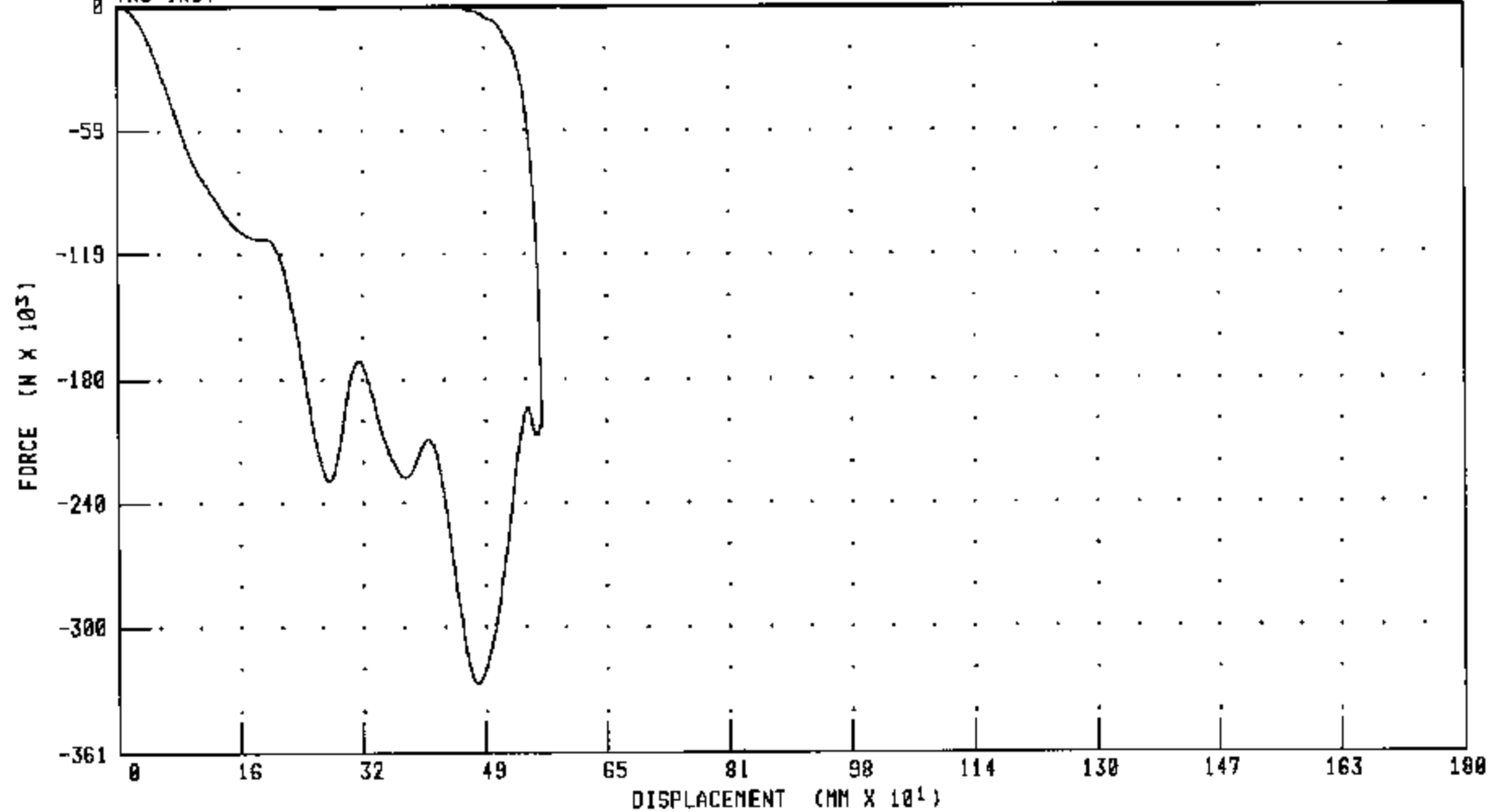
040318-1

40 KPH FRONTAL 2004 SATURN ION C40113
TOTAL LOAD CELL BARRIER FORCE VS AVERAGE VEHICLE X-AXIS DISPLACEMENT

TRC INC.

40 KPH FRONTAL

TEST NUMBER: 040318-1



CHANNEL: AVGXD
LCBGT

FILTER: CH. CLASS 100
CH. CLASS 60

PEAK DATA: 569.31 MM @ 85.68 MS; 0.00 MM @ 0.00 MS
666.55 N @ 0.00 MS; -328565.22 N @ 53.28 MS

6-97

040318-1



Section 7
Photographs

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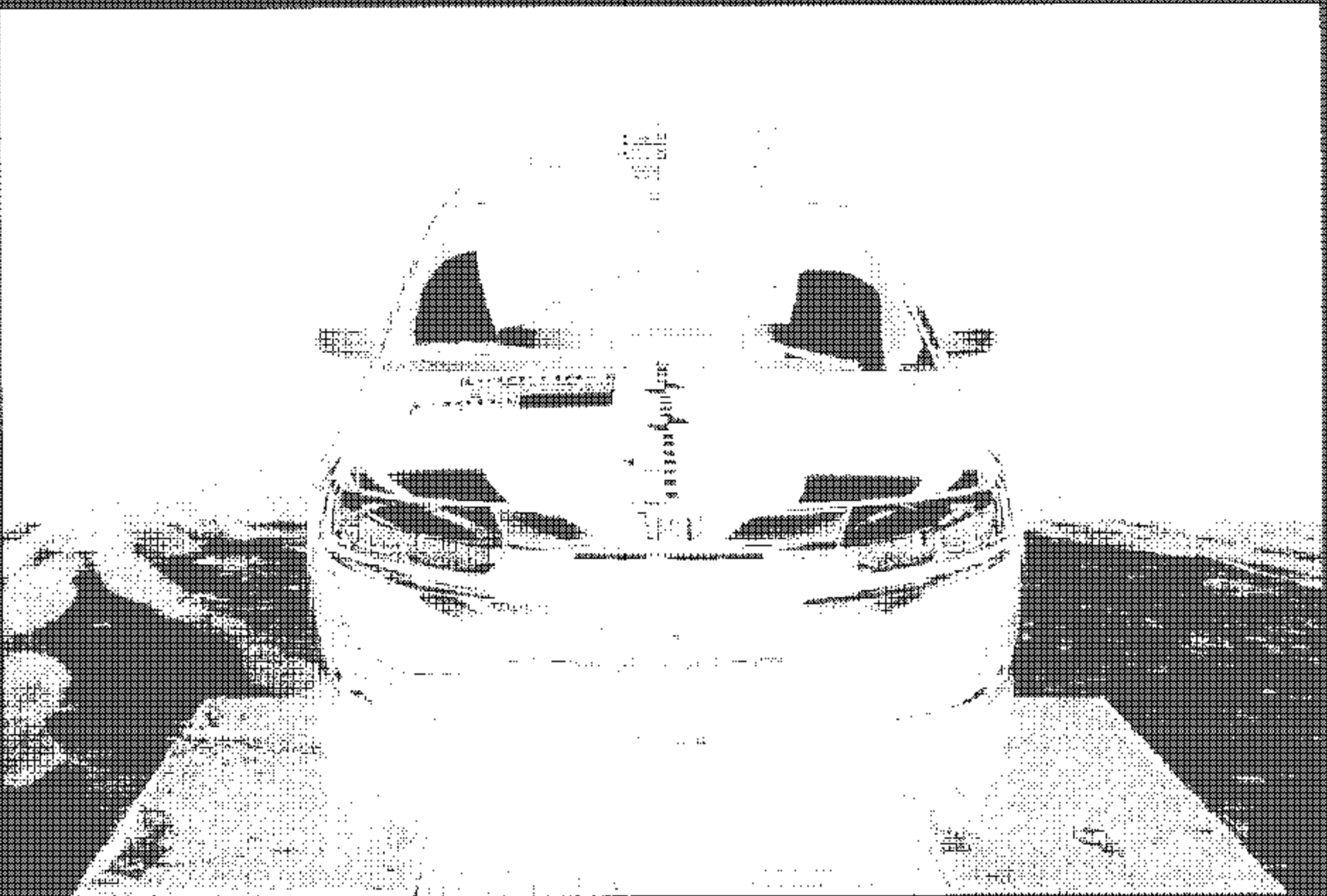


Figure A-1 Pre-Test View
7-5

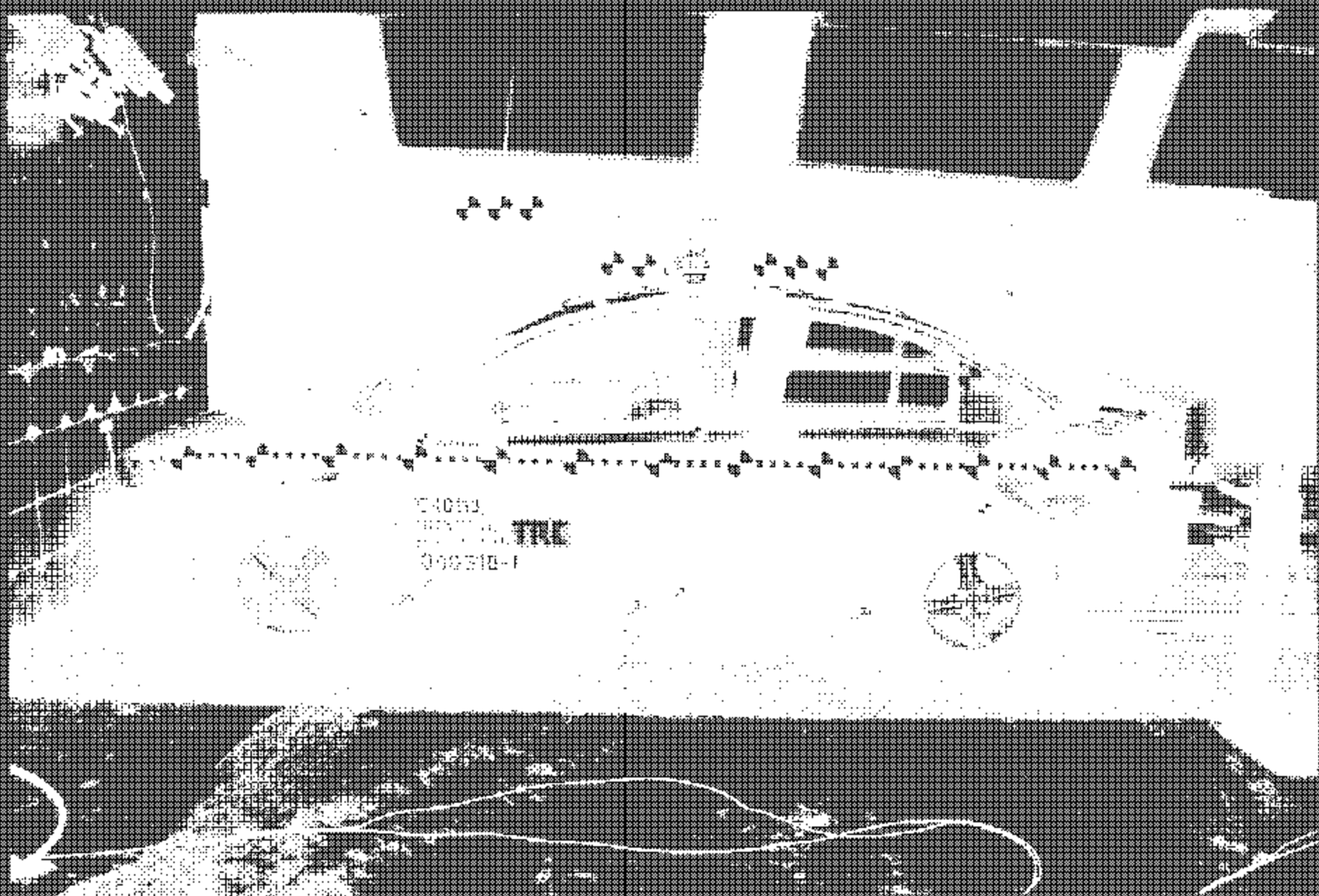


Figure A-2 Post-Fire Front View
7-6

040318-1

Figure A-9 Pe-Tex 105 Side View

77



000318-1

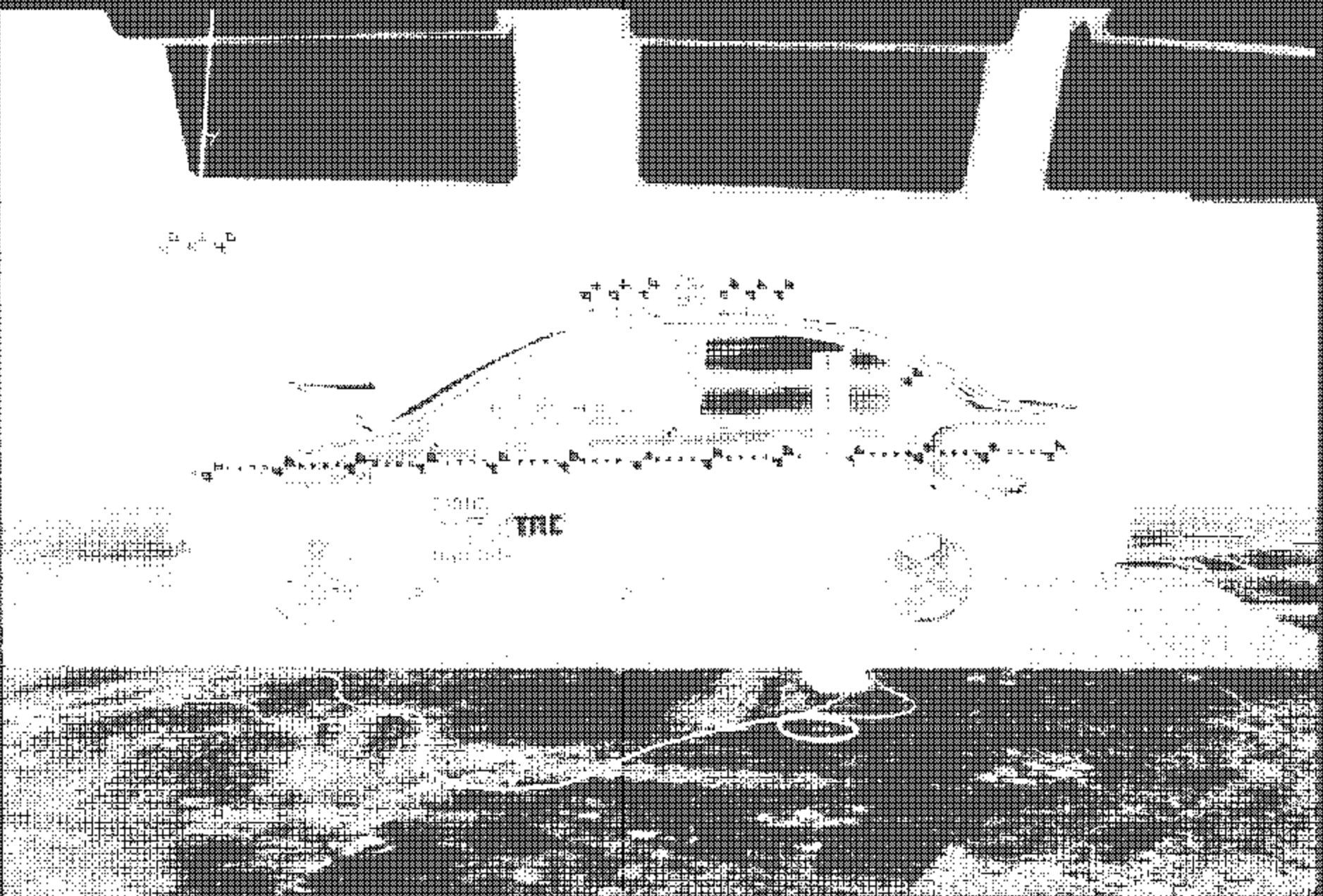


Figure A-4 Post-Test Left Side View
2-8

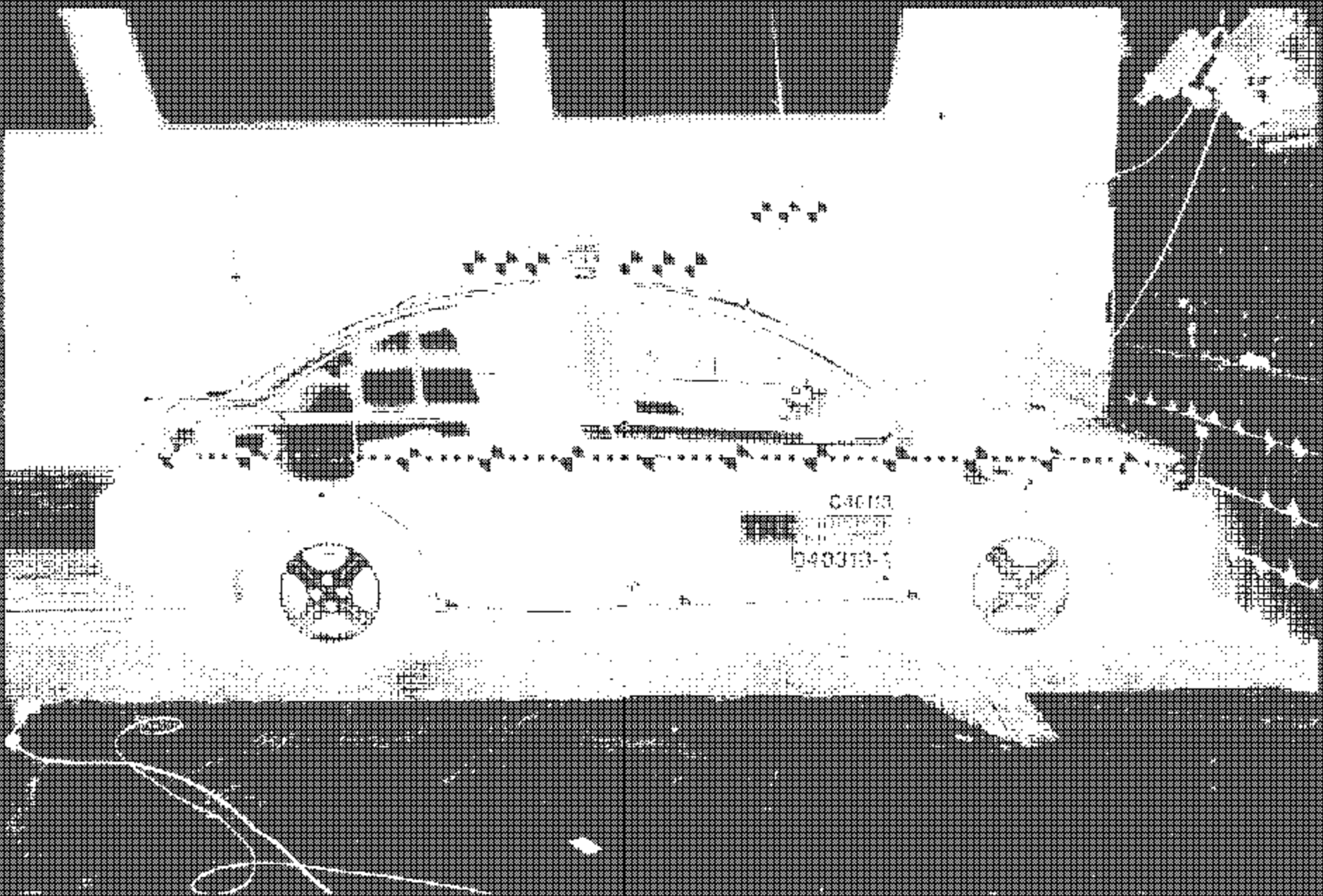


Figure A-5 Pre-Test Right Side View
29

040318-1

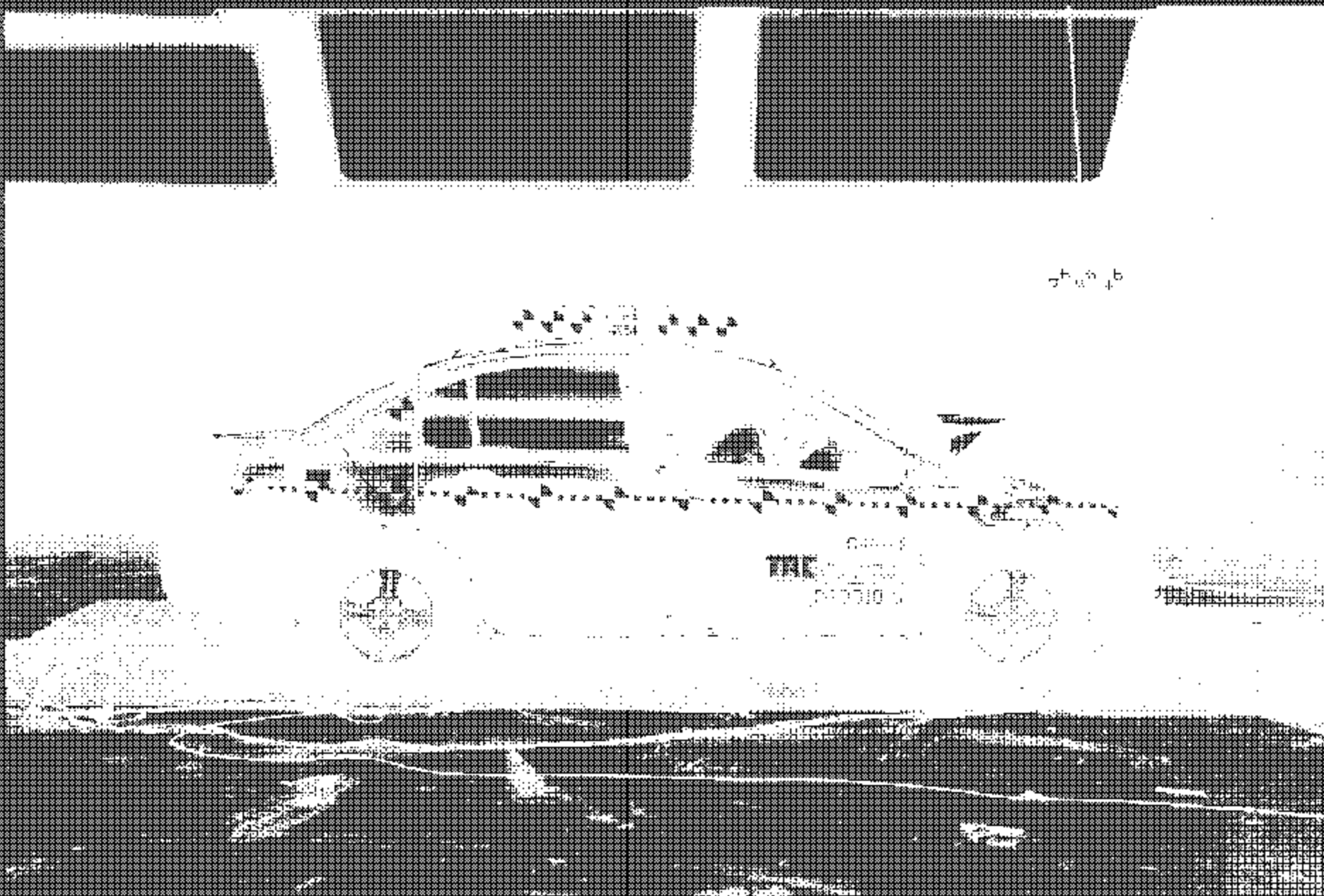


Figure A-6 Post-Test Right Side View
7-10

040318-1

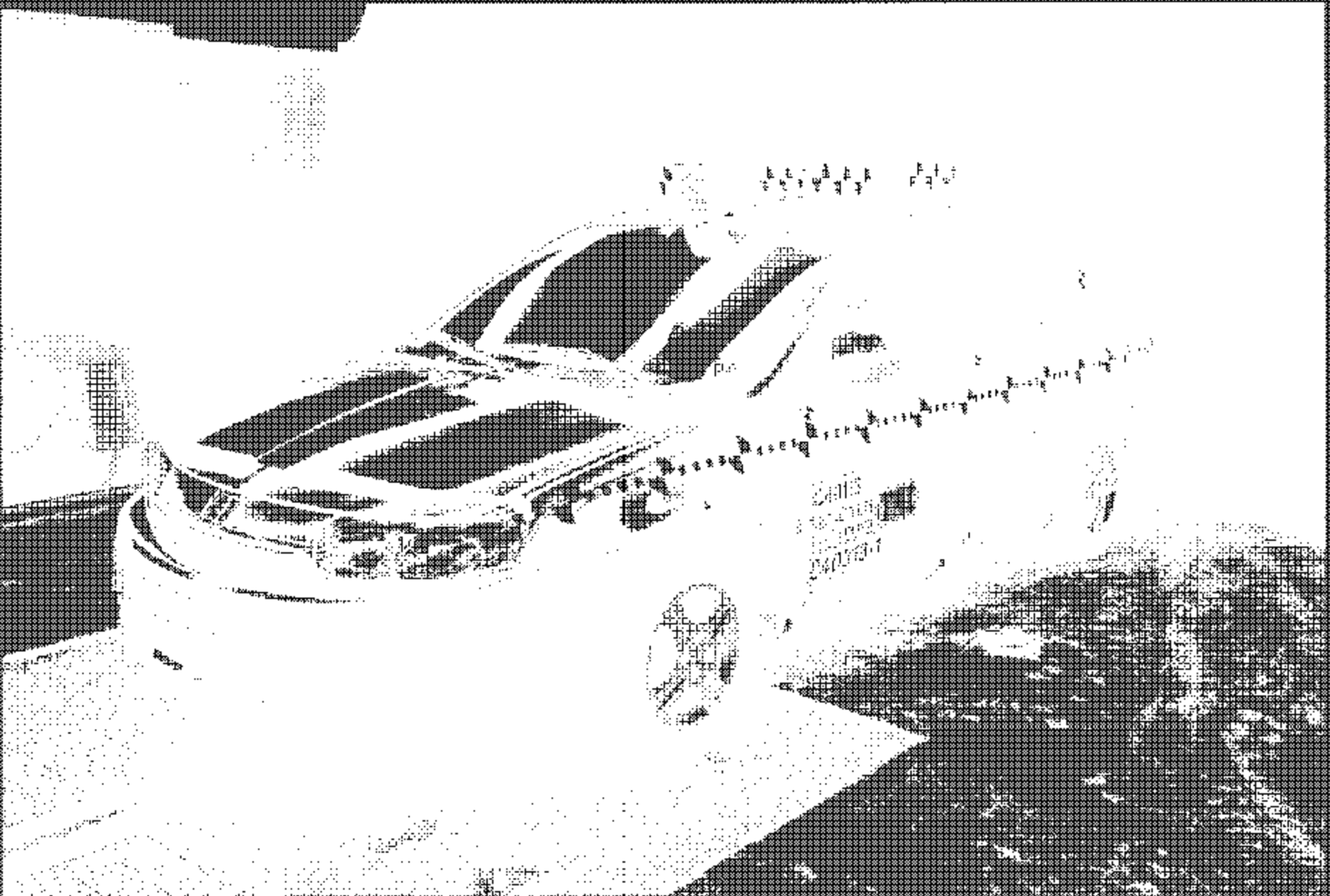


Figure A-7 Pre-Test Left Front Three-Quarter View
7-21

040318-1

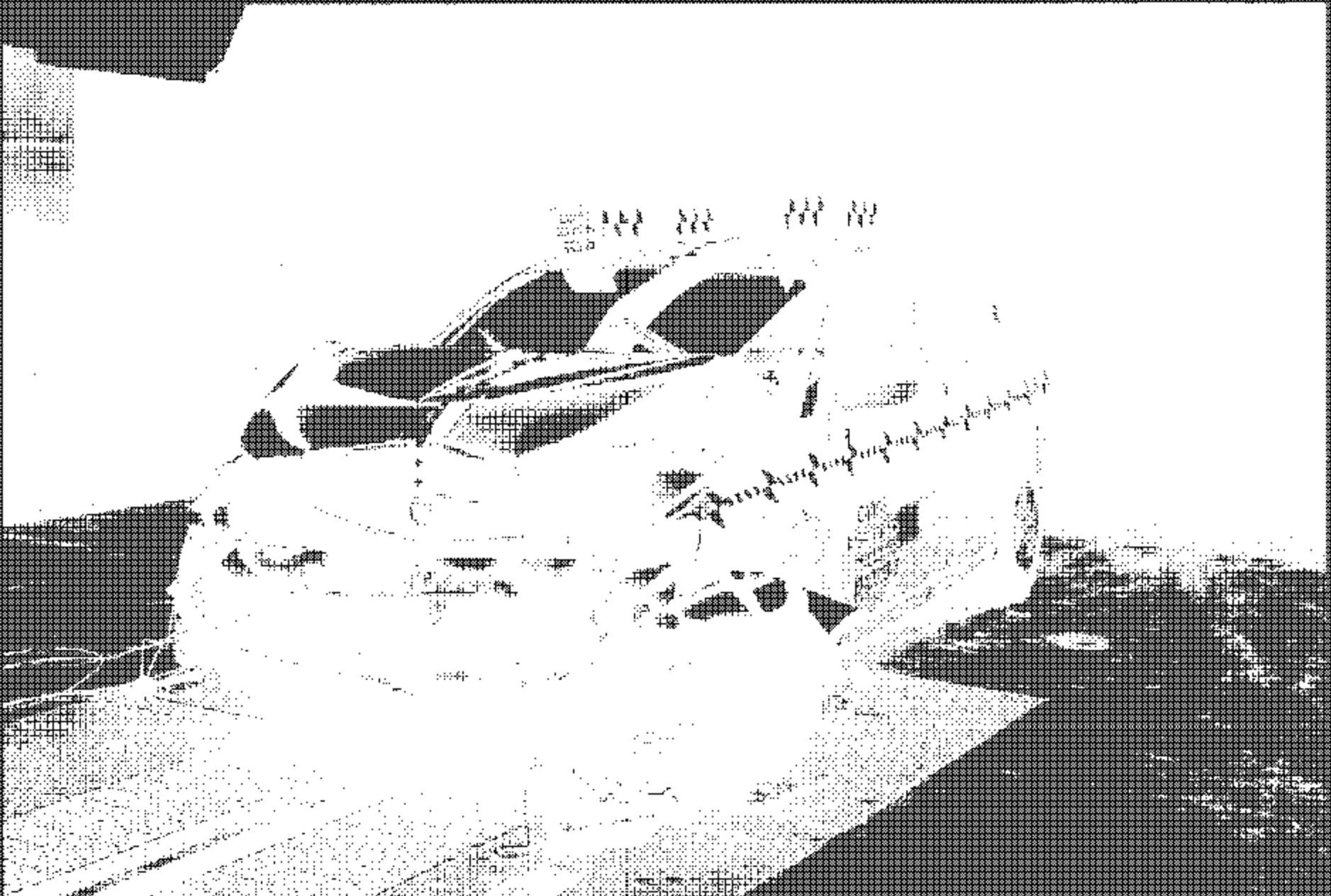


Figure A-8 Post-Ten Leif From Three-Quarter View
7-12

04018-1

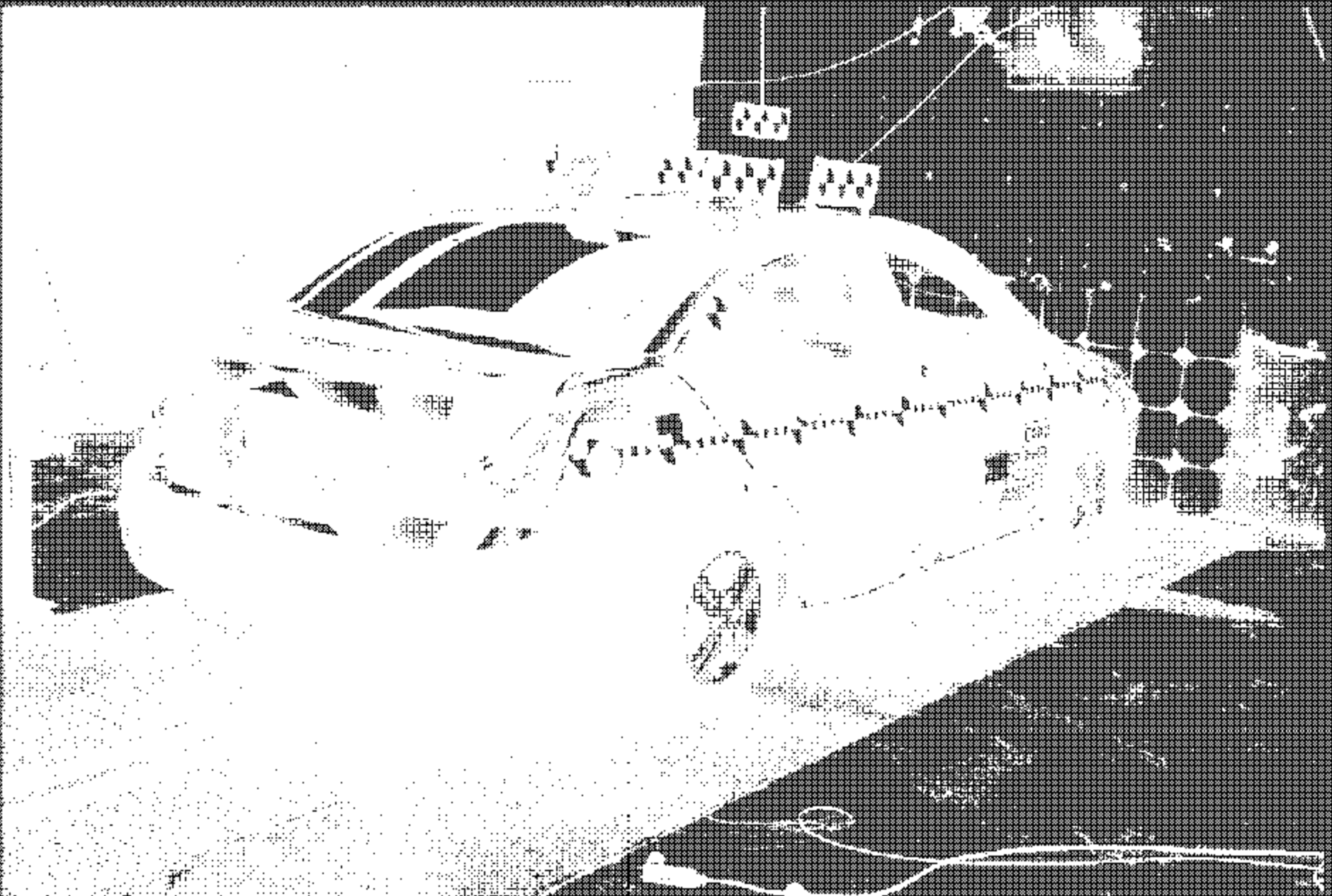


Figure A-9 Pre-Test Right Rear Three-Quarter View
7-13

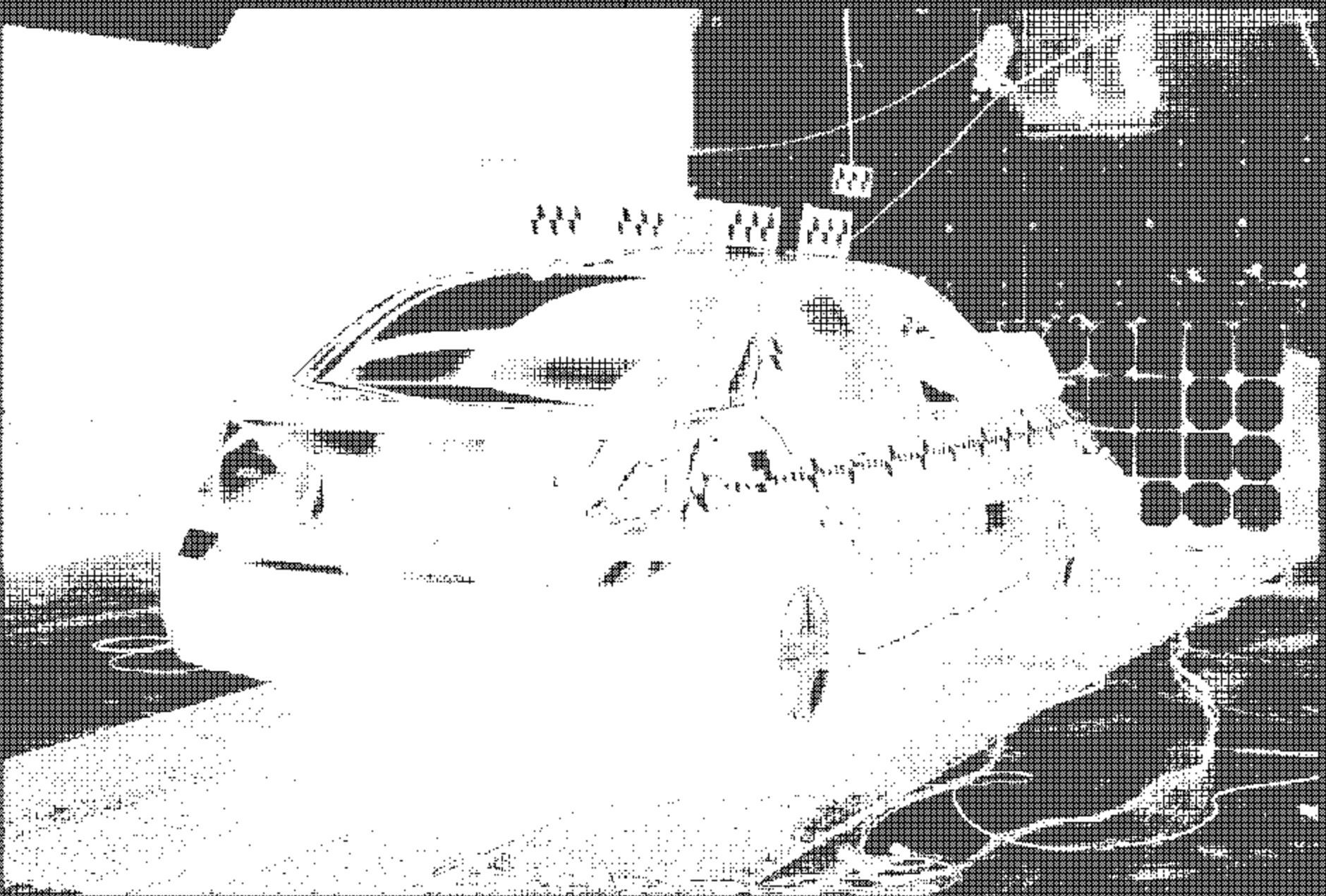


Figure A-10 Post-Test Right Rear Three-Quarter View

7-14

640518-1

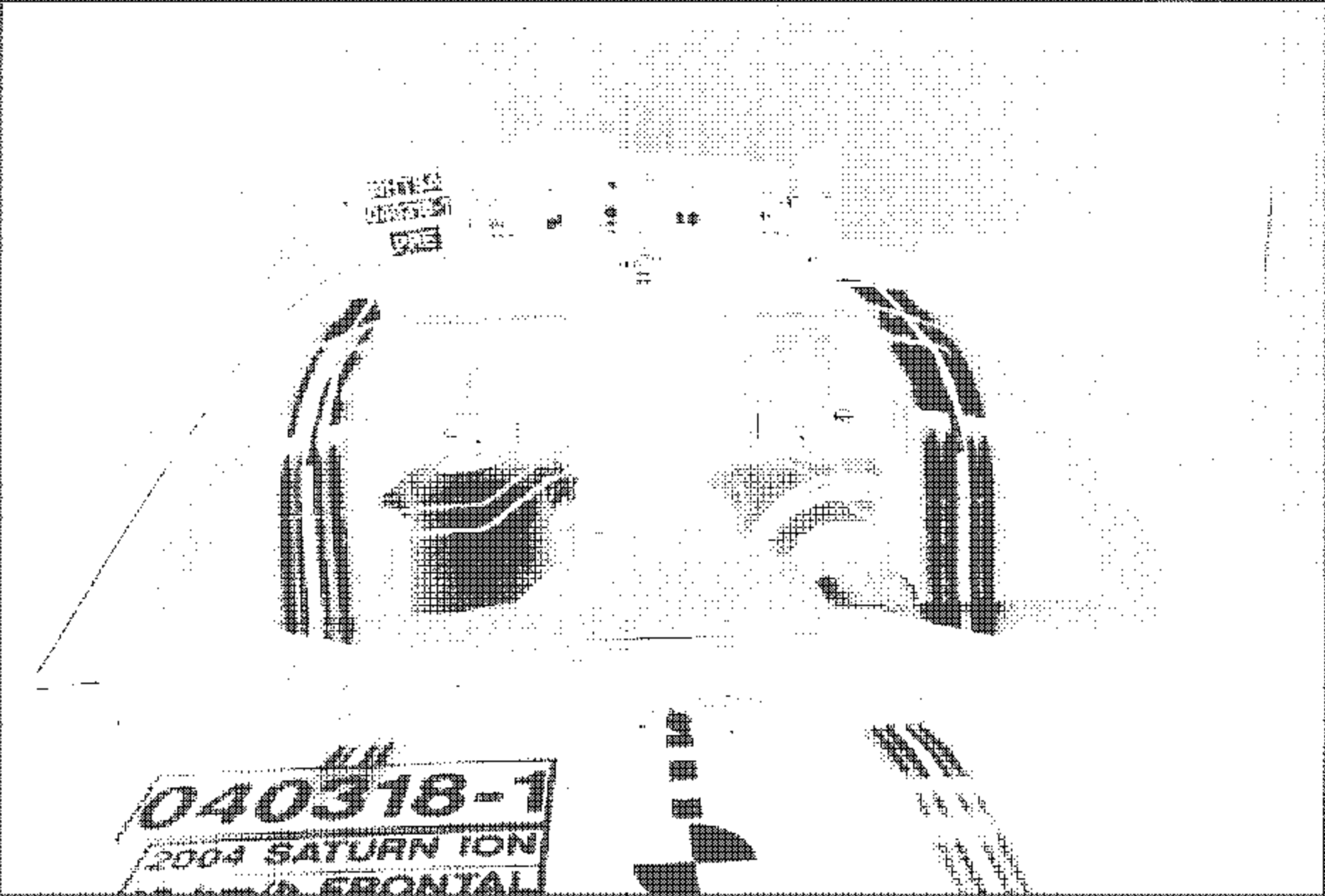


Figure A-11. Pre-Tax Windshield View
7-15

040318-1

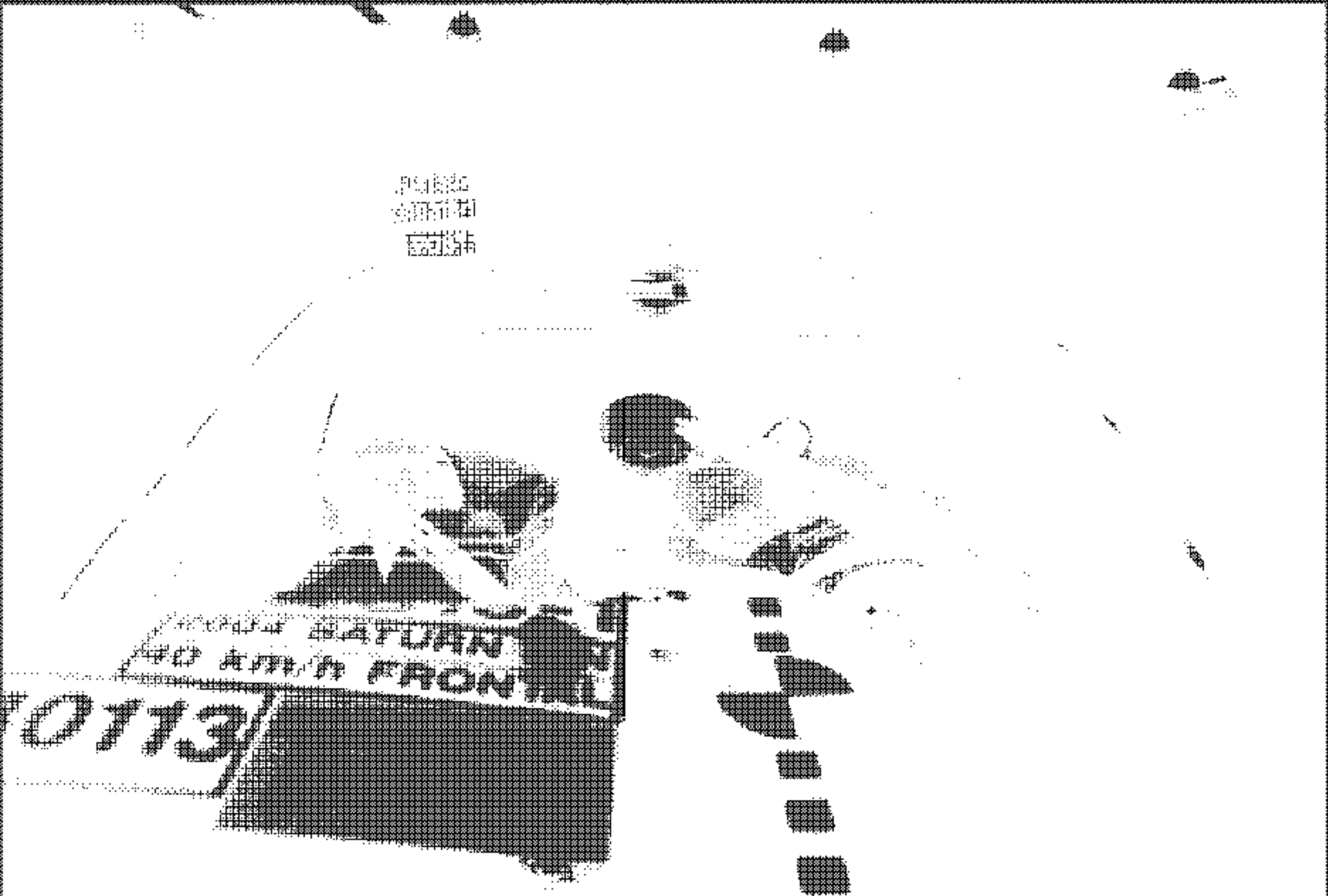


Figure A-12 Post-Test Windshield View

7-16

040318-1

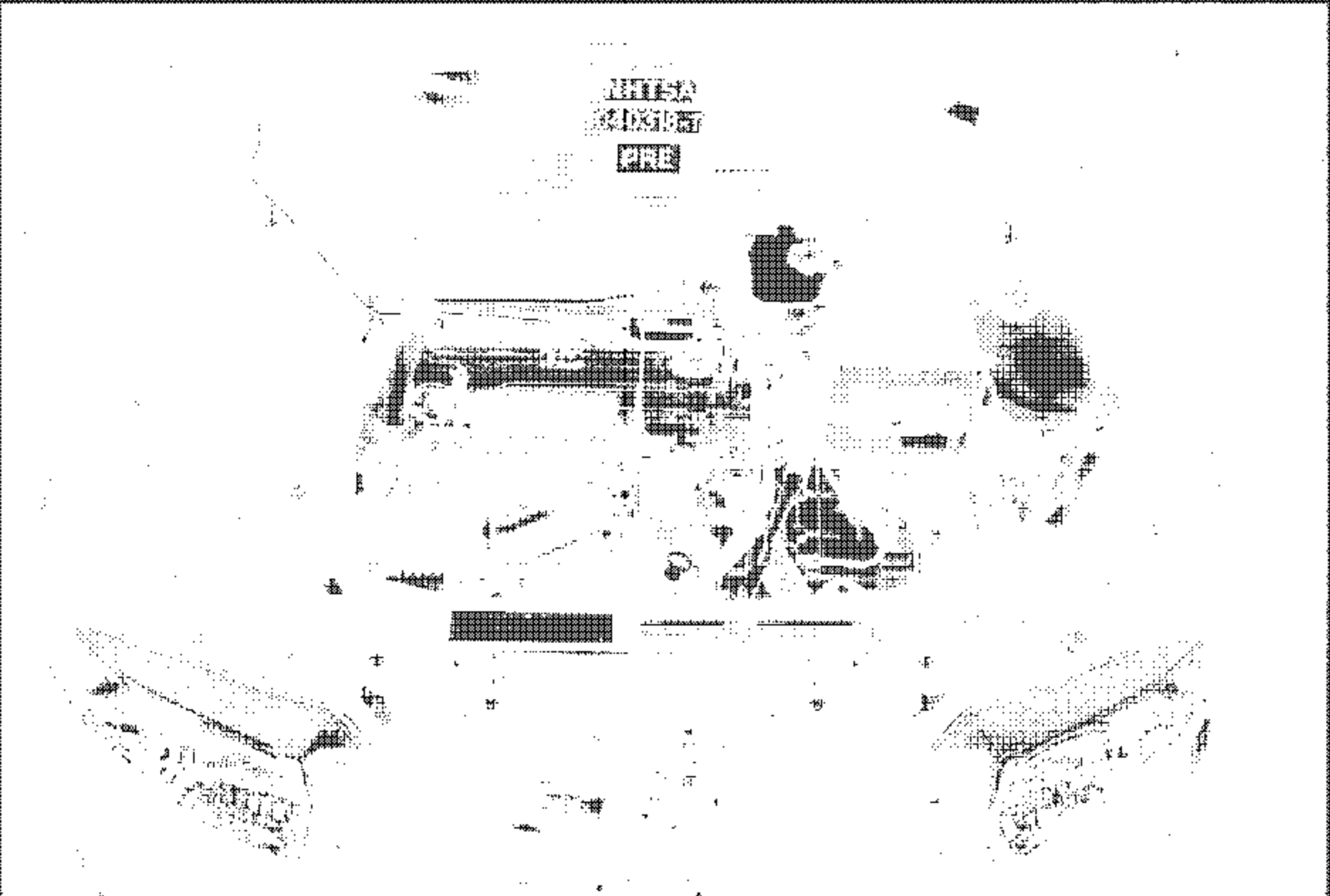


Figure A-13 Pre-Test Engine Compartment View

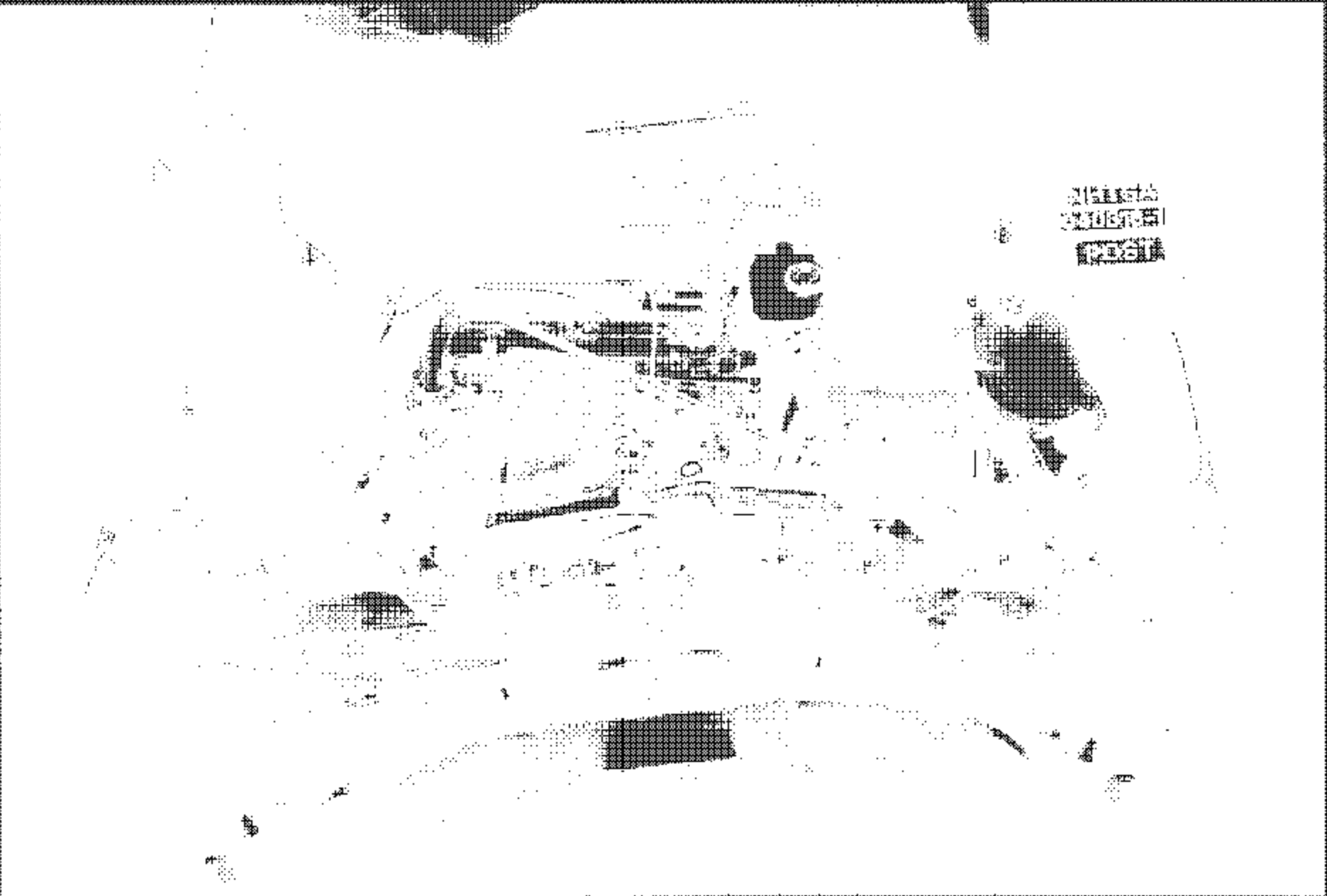


Figure A-14 Post-Test Engine Compartment View

7-18

040318-1

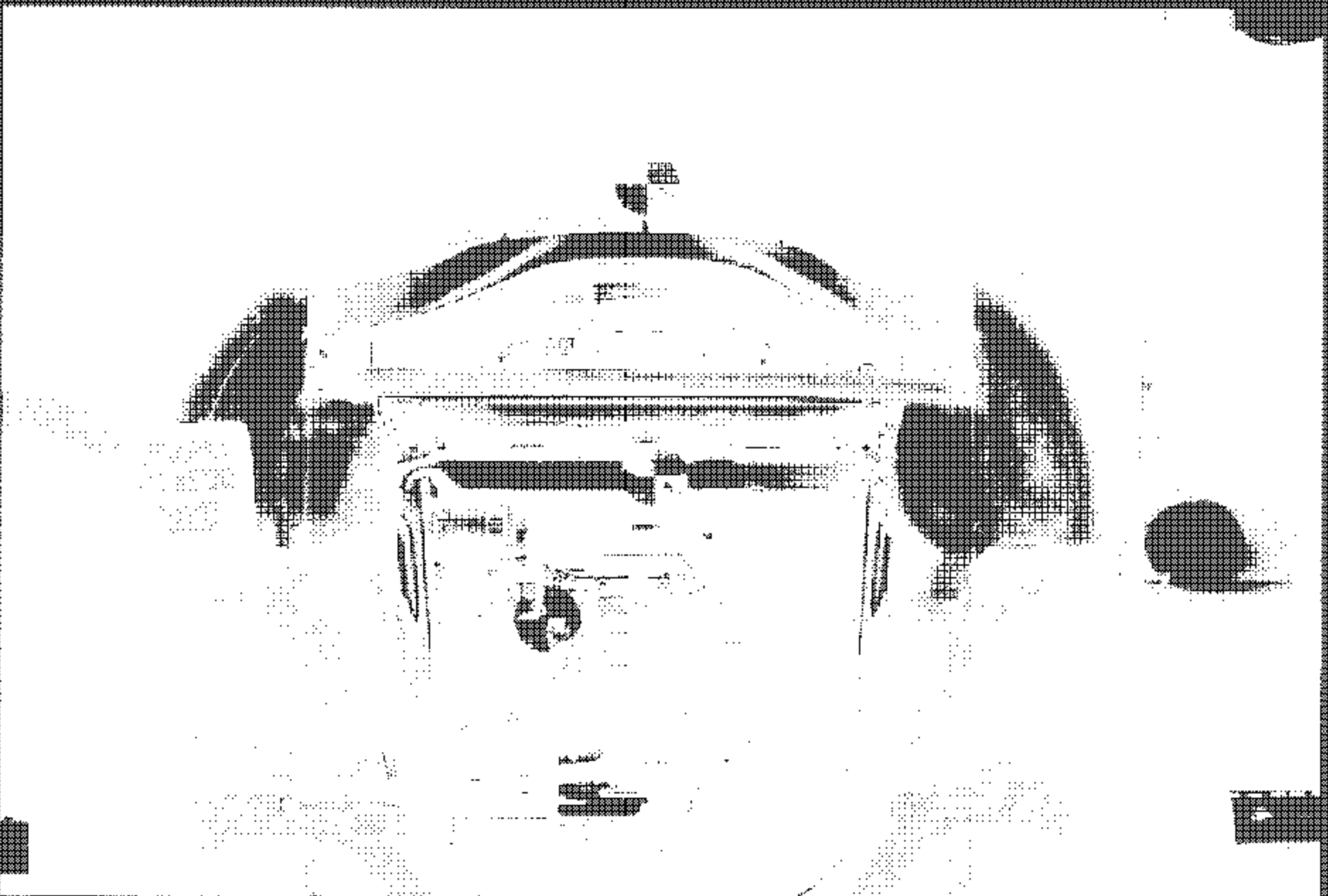


Figure A-13 Pre Test From Underbody View
7-19

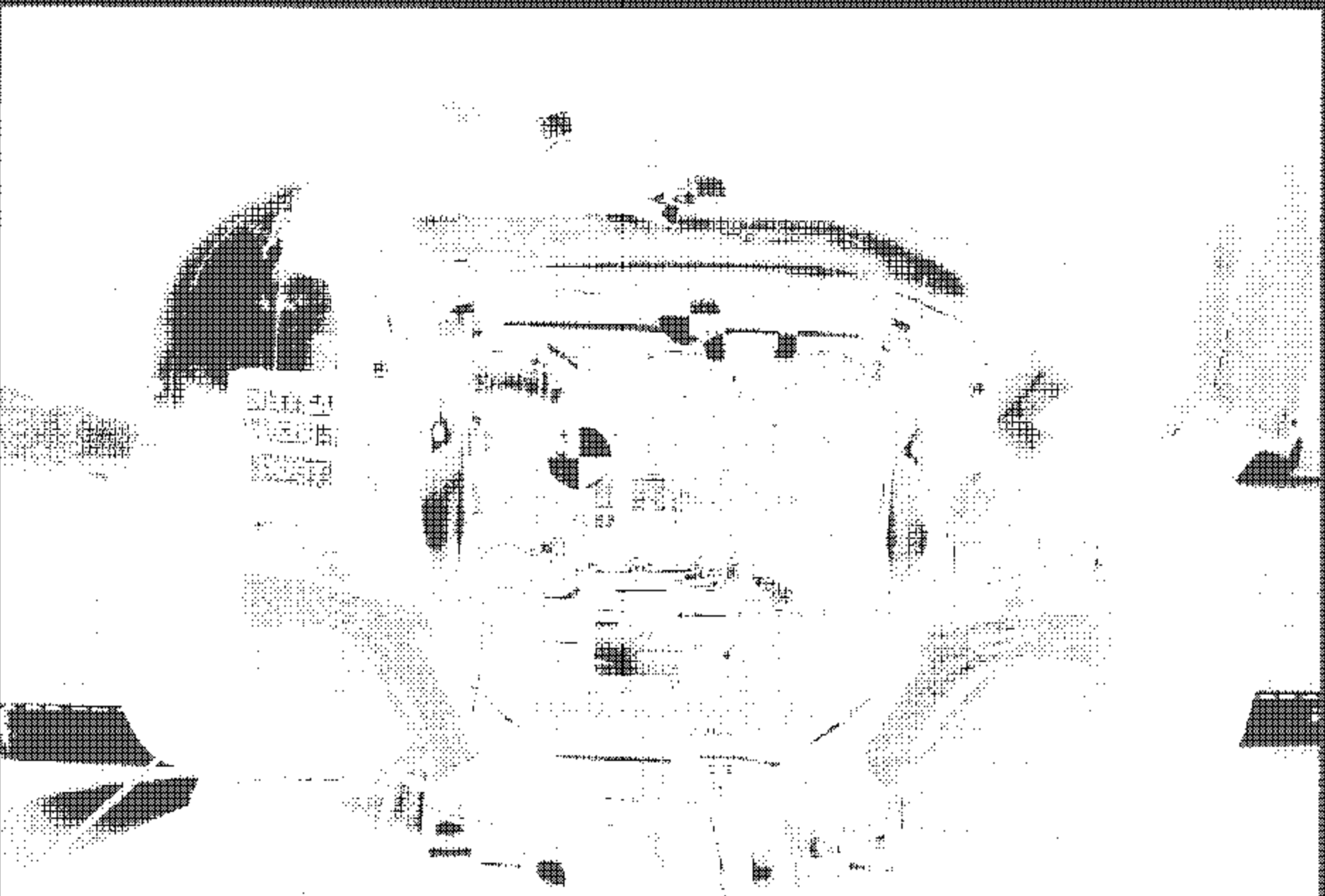


Figure A-16 Post-Ten From Galactico View
7-20



Figure A-17 Pre-Test From Mid Underbody View
7-21



Figure A-18 Post Test Front Mid Underbody View

7-22

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Figure A-19 Pre-Tax Midlinebody View
7-23

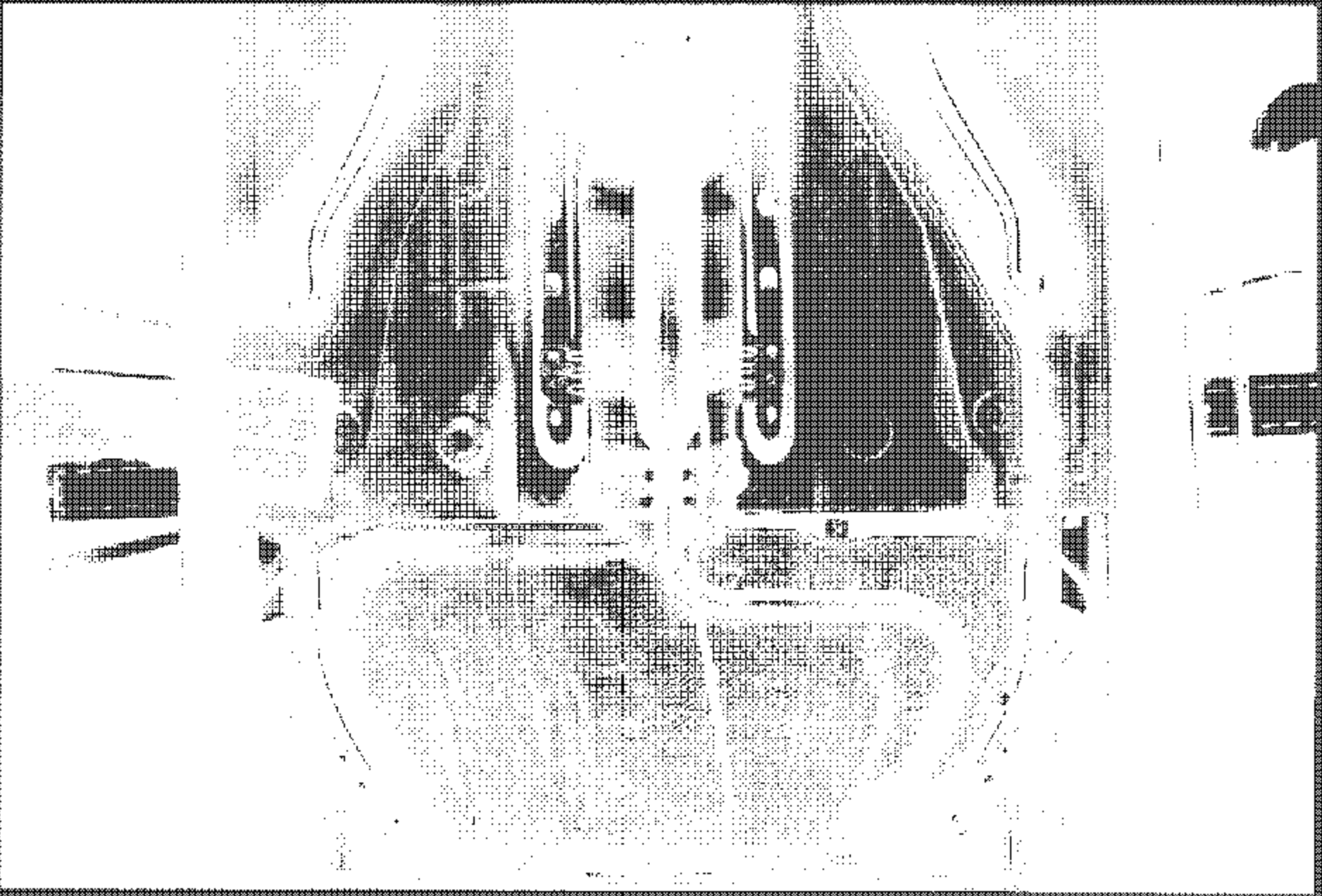


Figure A-20 Post-T661 Mid Underbody View
7-24



Figure A-21 Pre-Test Rear Midlinebody View

7-26

040318-1

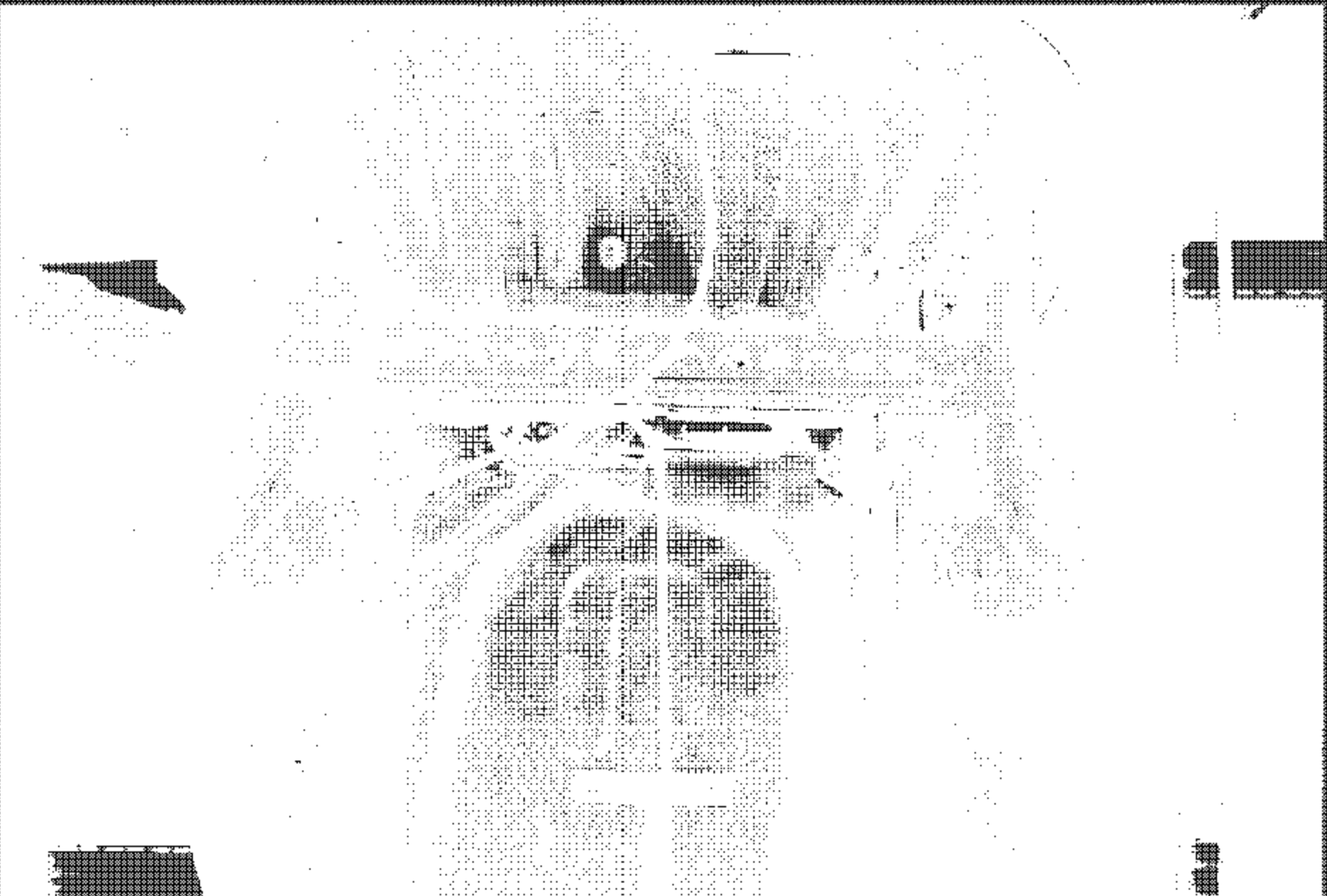


Figure A-22 Post-Test Rear-Mid Lindebody View

7-26

040318-1

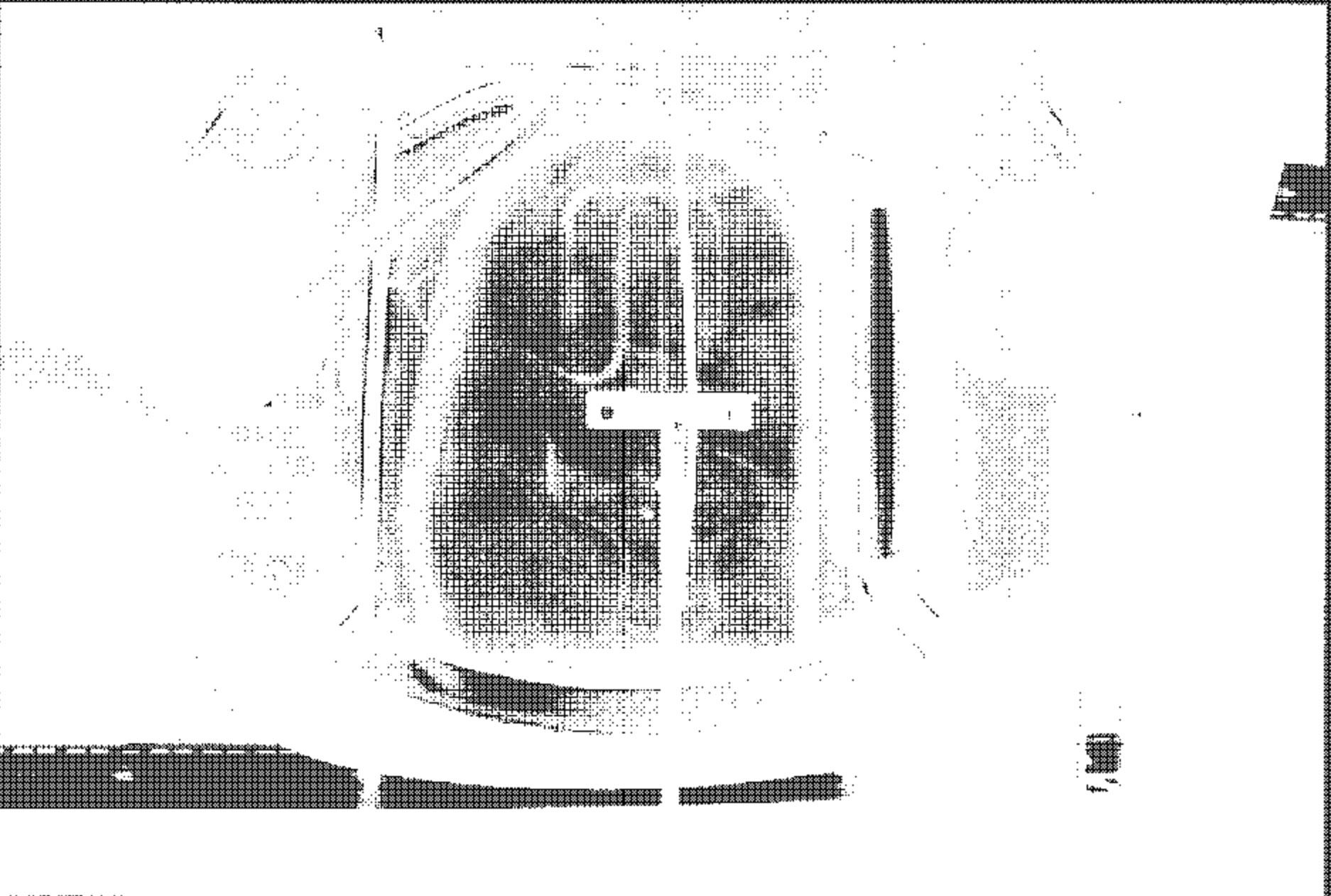


Figure A-23 Pre-Ten Rear Underbody View
7-27

040318-1

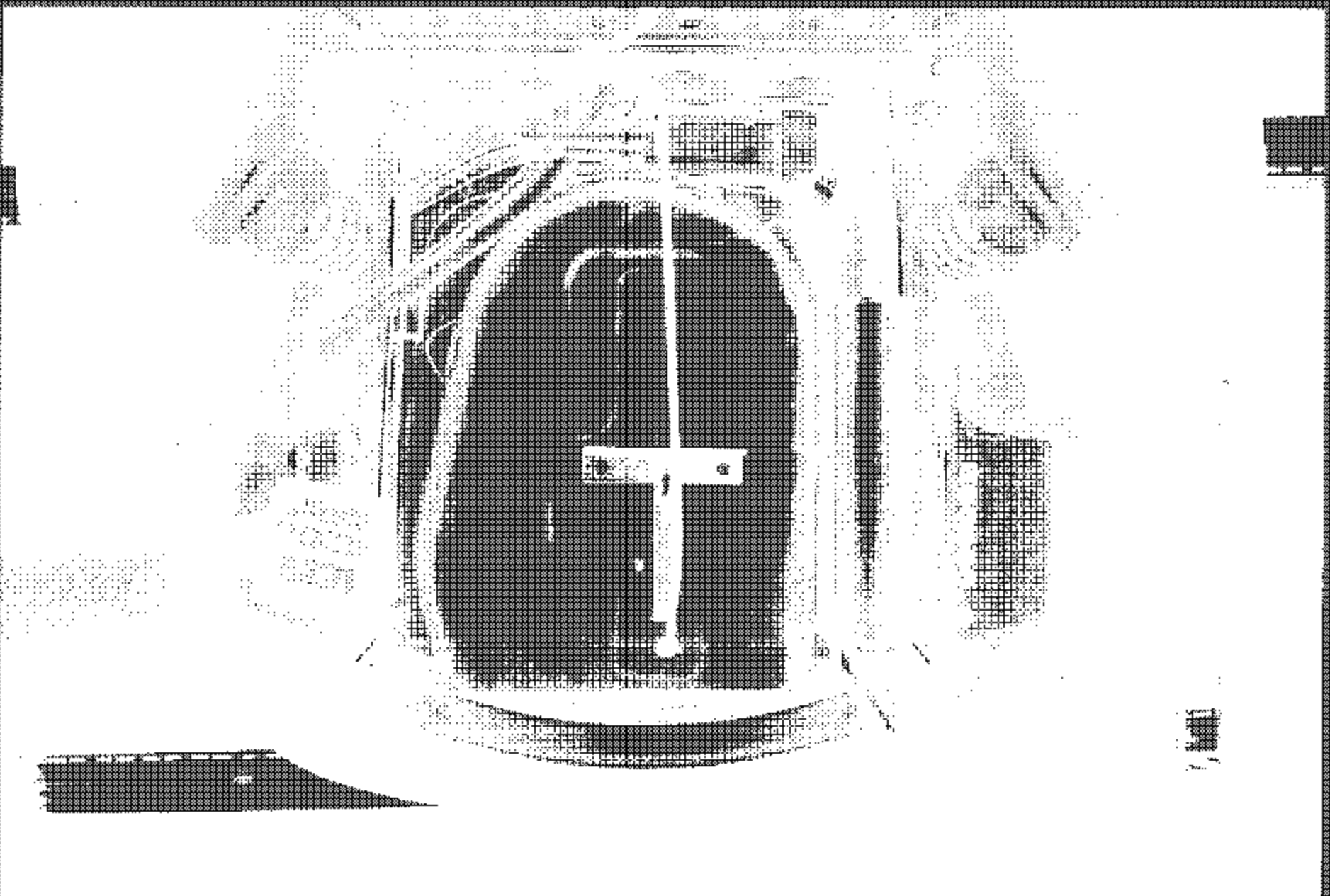


Figure A-24 Post-Ten Rear Underbody View
7-28

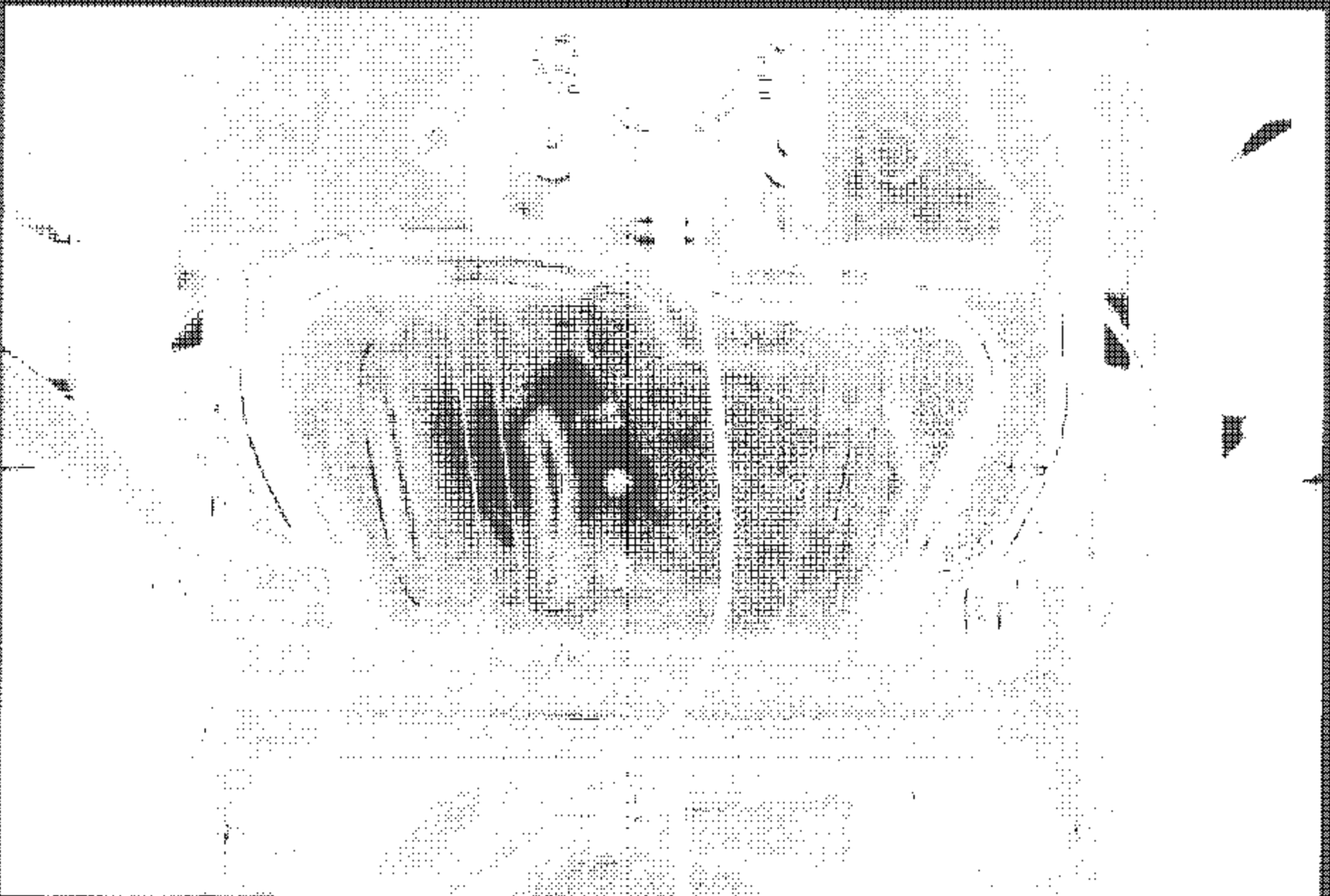


Figure A-25 Pro-Fit Fuel Tank Yaw
7-29

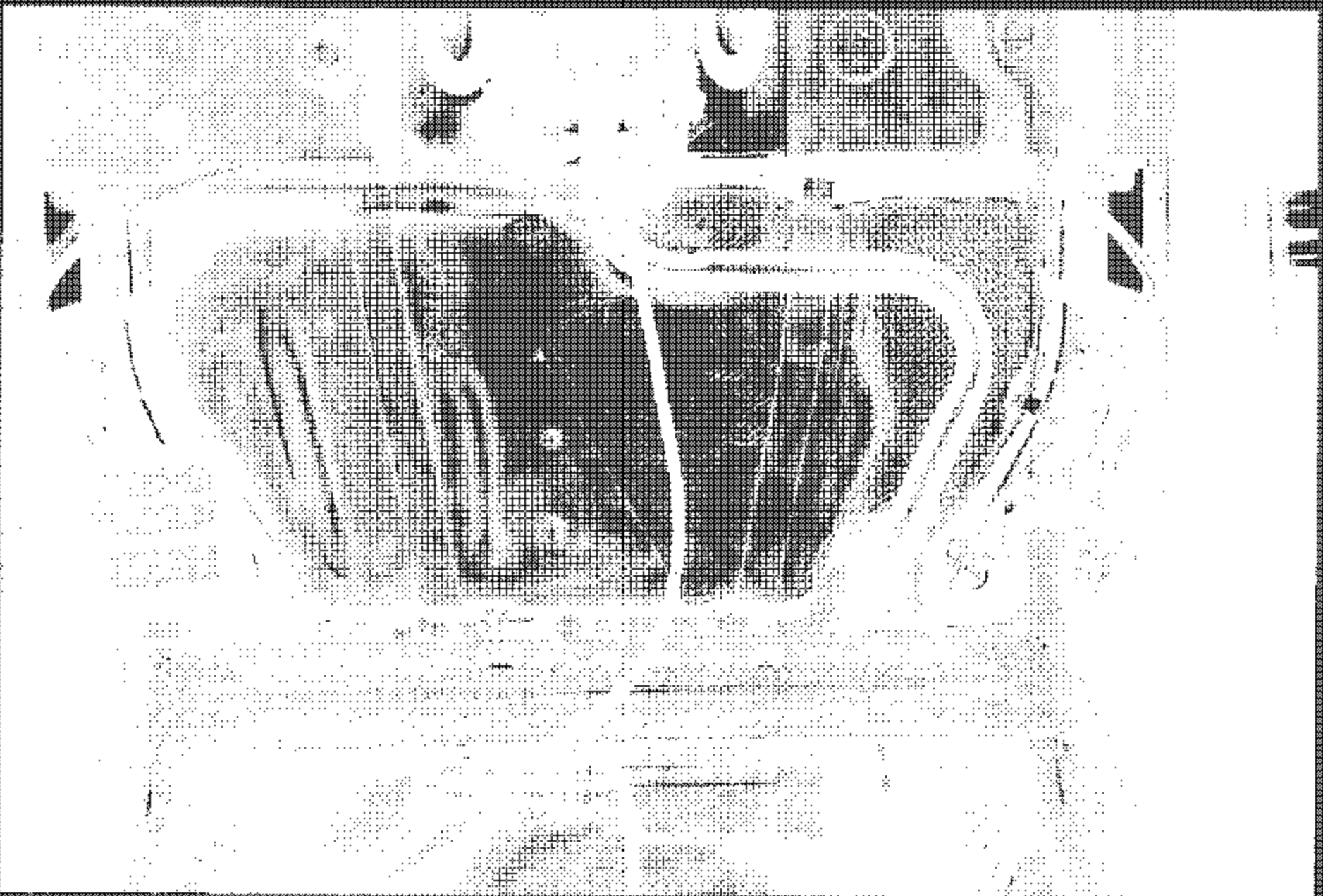


Figure A-26 Post-Test Fuel Tank View
7-30

NHTSA

040318-1

-RE

NH-3A

040318-1

POST

Figure A-28 Post Test Fuel Filter Cap View

1-32

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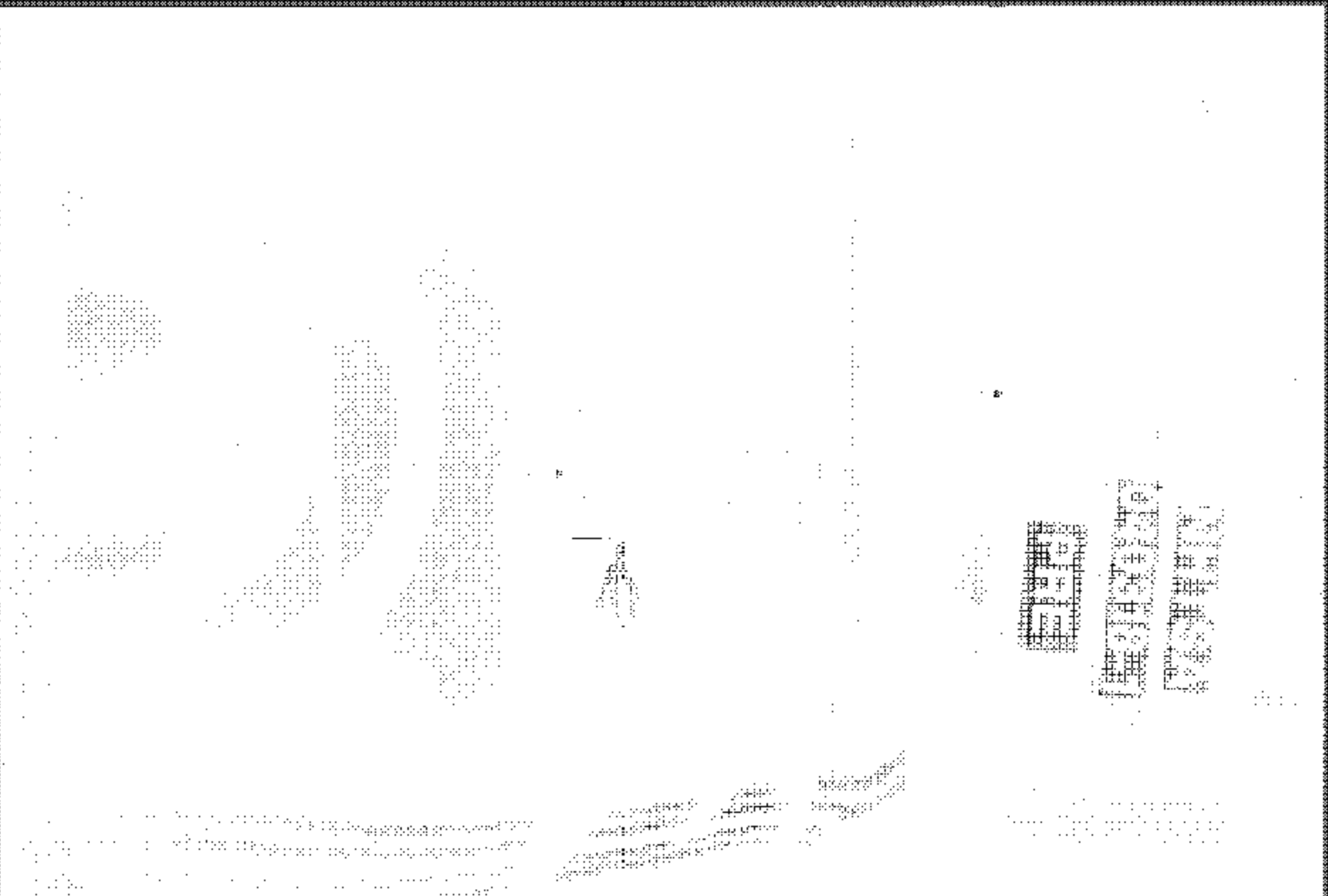


Figure A-29 Pre-Test Driver Dummy Front View
7-83

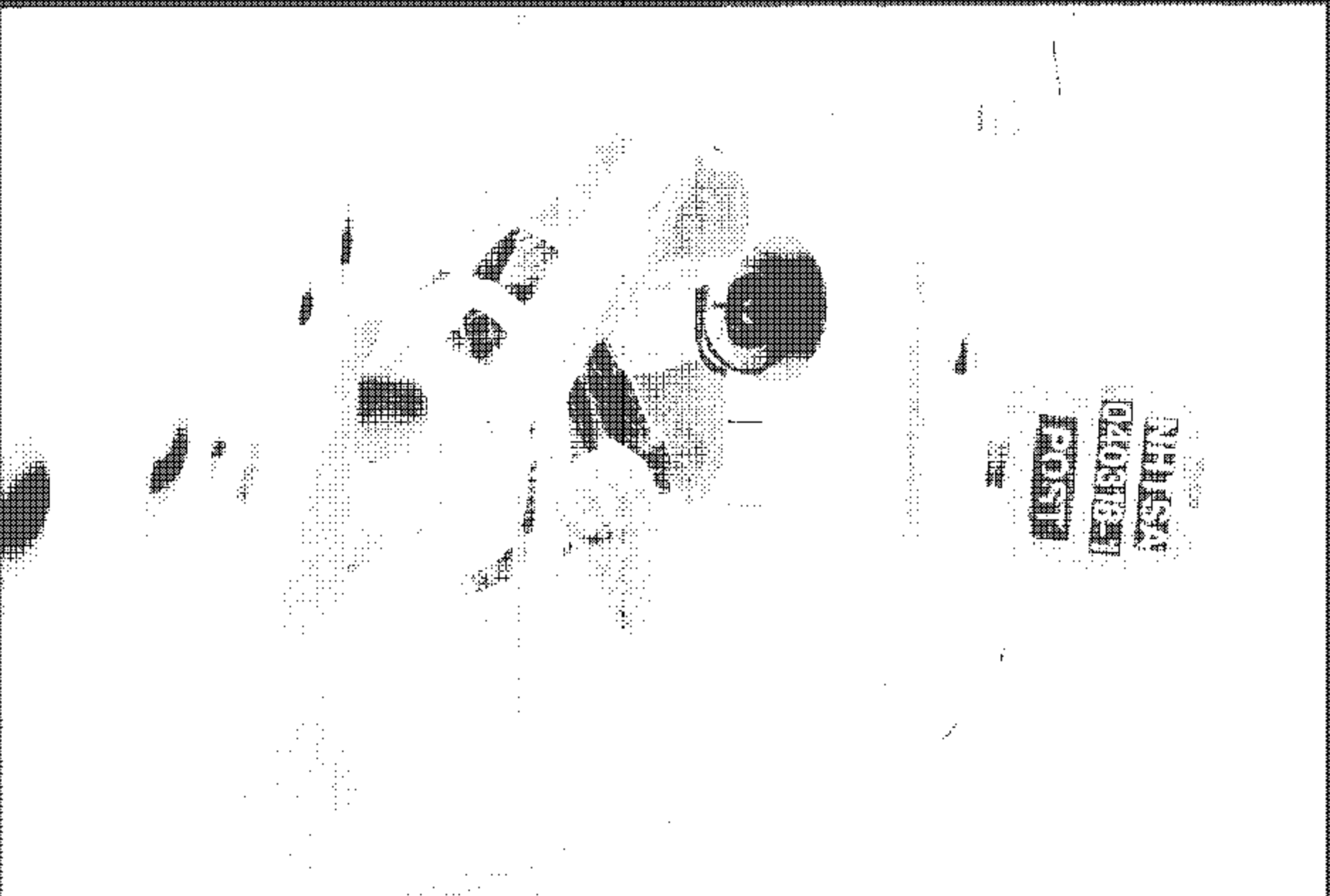


Figure A-30 Post-Ten Driver Dummy Front View
7-34



Figure A-41 Pre-Test Delivery Position View
7-35

NHTSA
040318-1
POST

Figure A-32 Post-Test Driver Dummy Position View

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040318-1



Figure A-33 Pre-Test Driver Dummy & Vehicle Interior View

2-37

040318-1

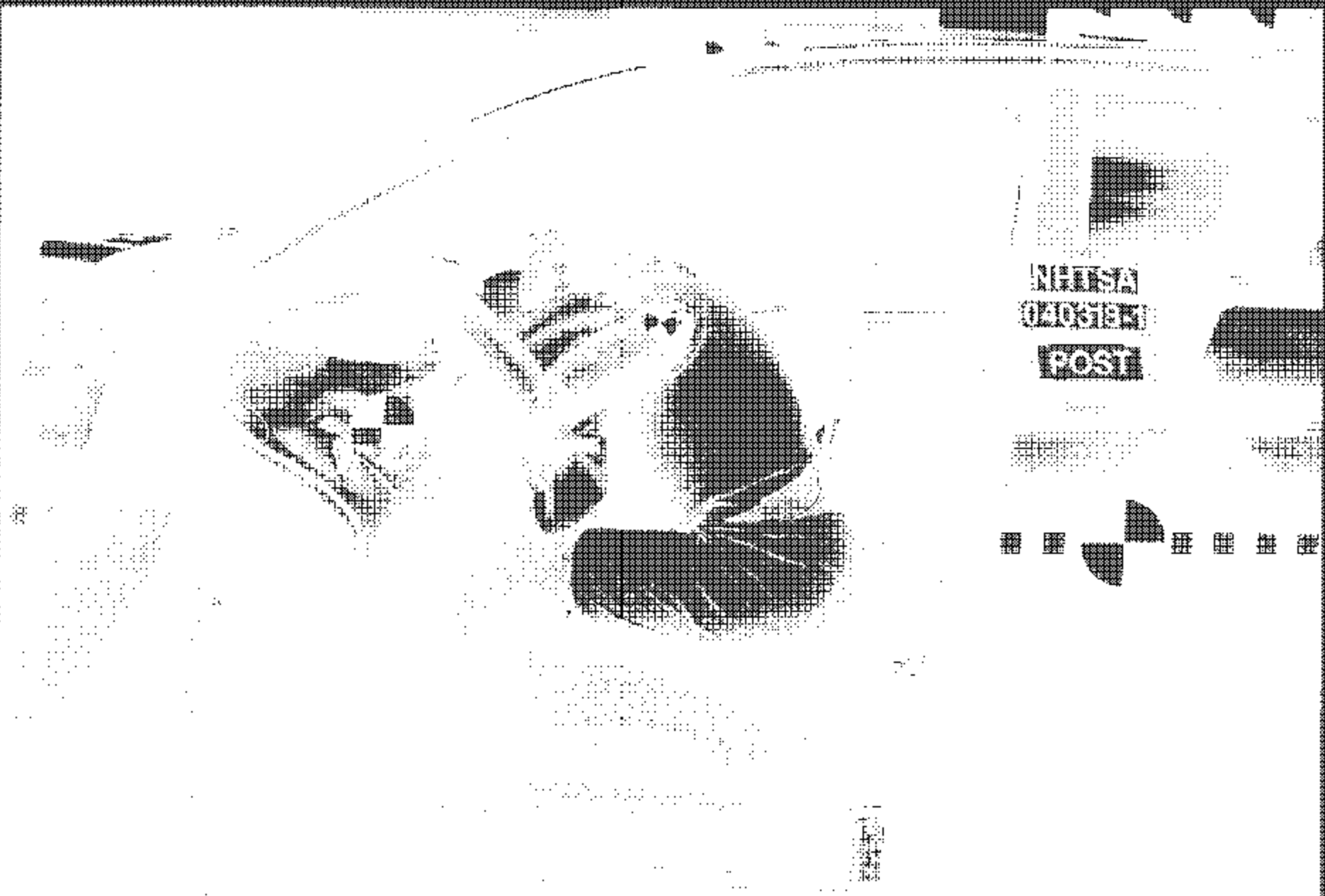


Figure A-34 Post-Test Driver Dummy & Vehicle Intrusion View
7-38

040318-1

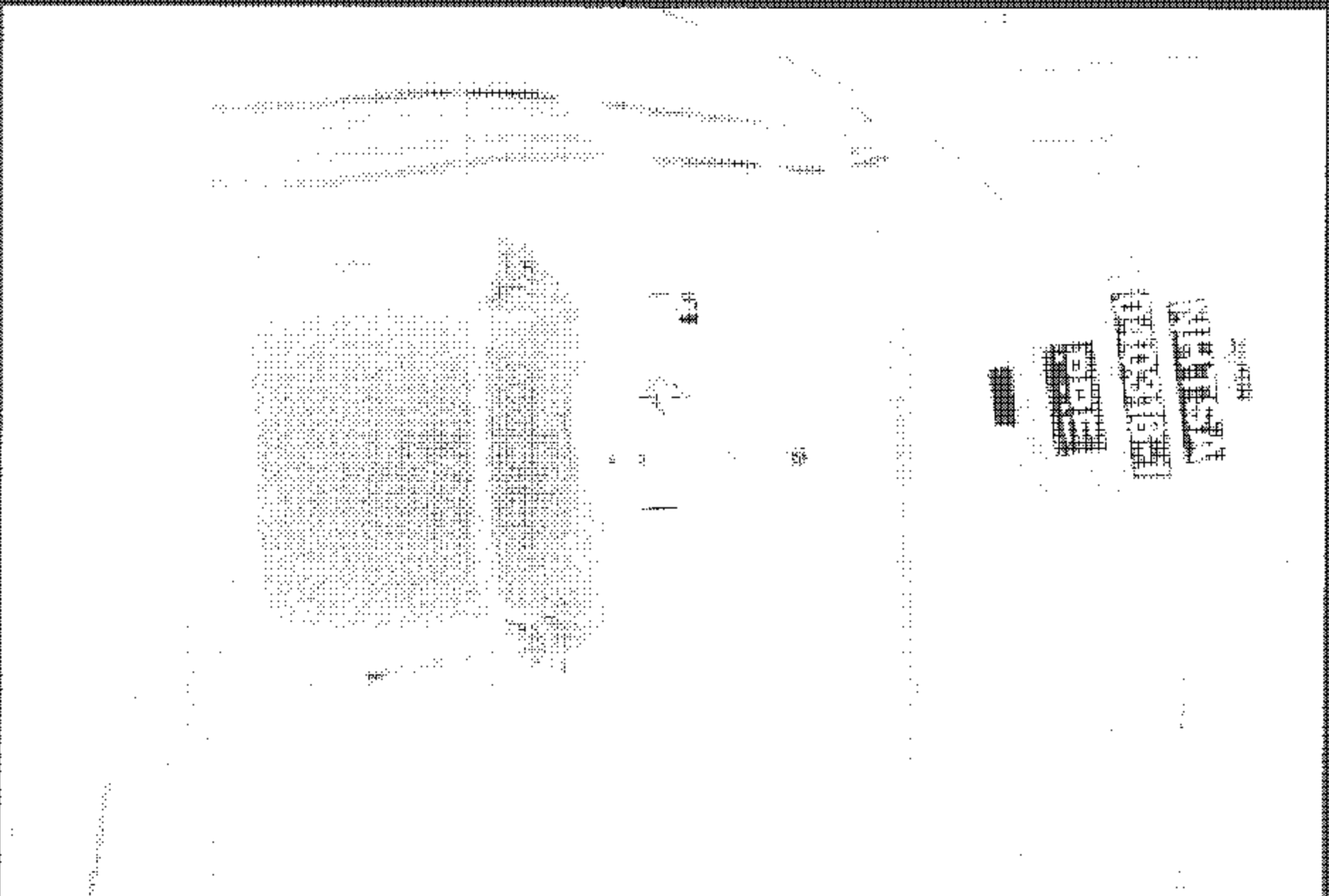


Figure A-35 Pre-Test Passenger Dummy Front View
7-39

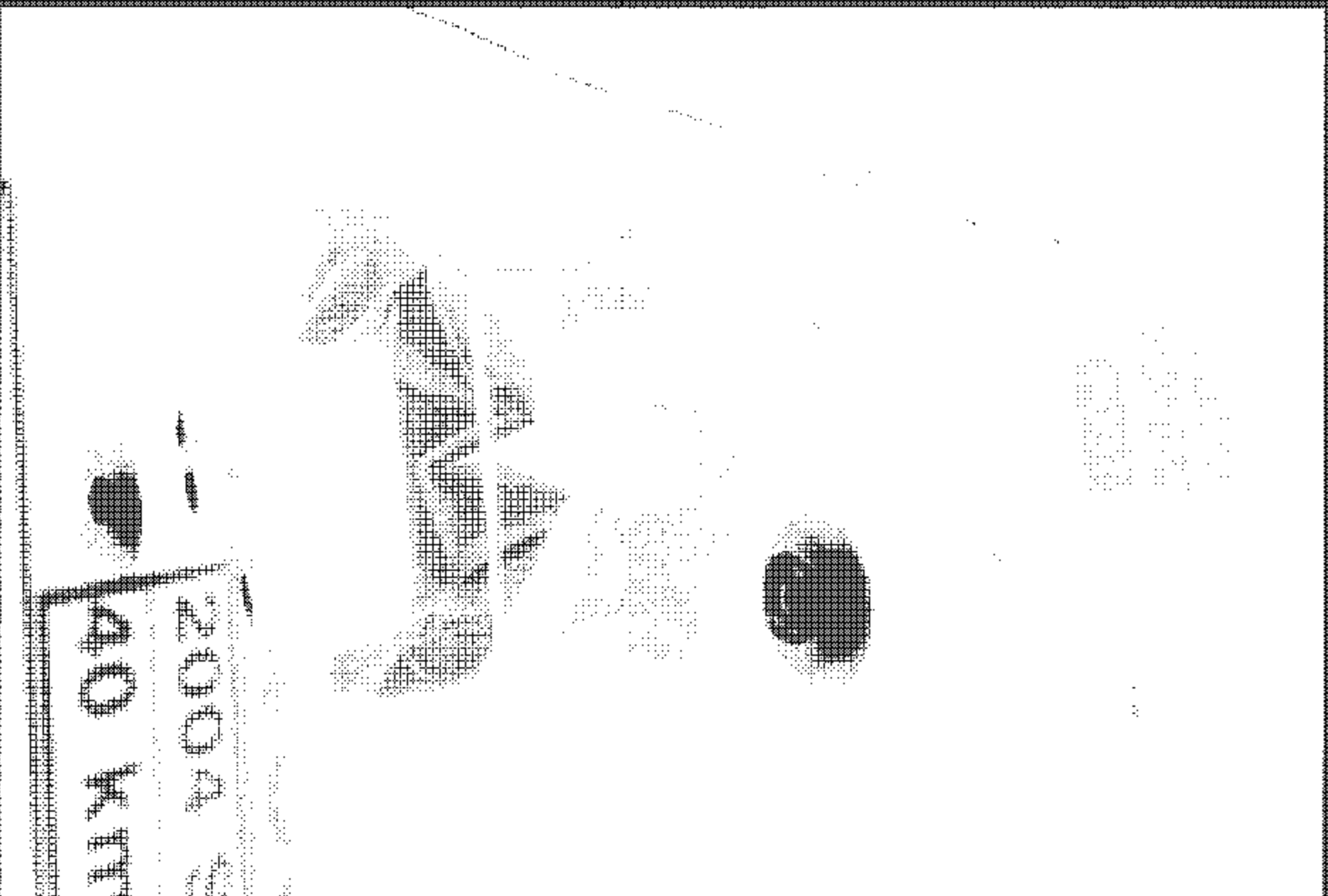


Figure A-36 Post-Ten Passenger Dummy From View

7-48

040318-1



Figure A-37 Pre-Trial Passenger Dummy Position View

7-41

040318-1

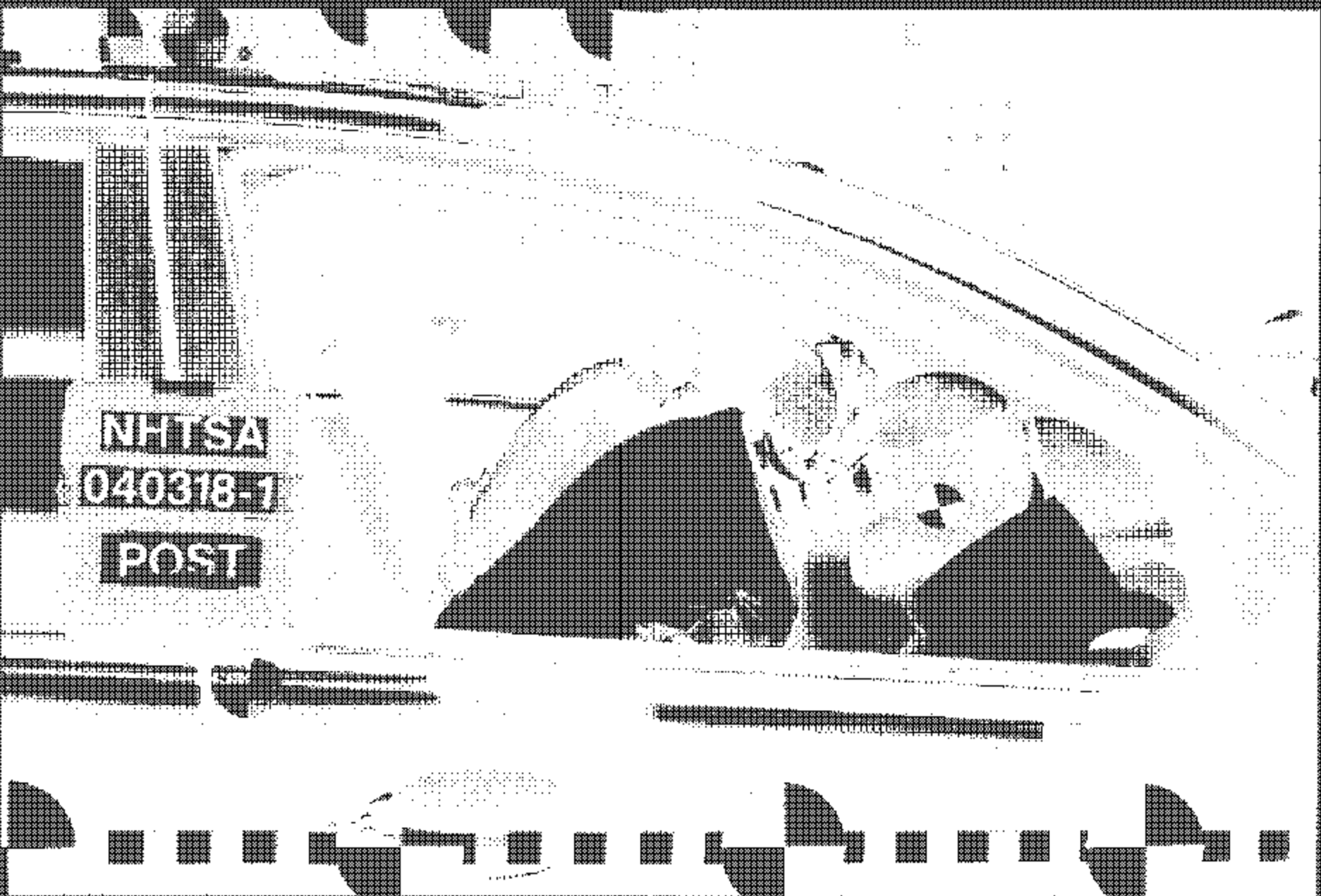


Figure A-38 Front-Left Passenger Dummy Position View

7-42

040318-1



Figure A-39 Pre-Test Passenger Dummy & Vehicle Intrusion View
7-43

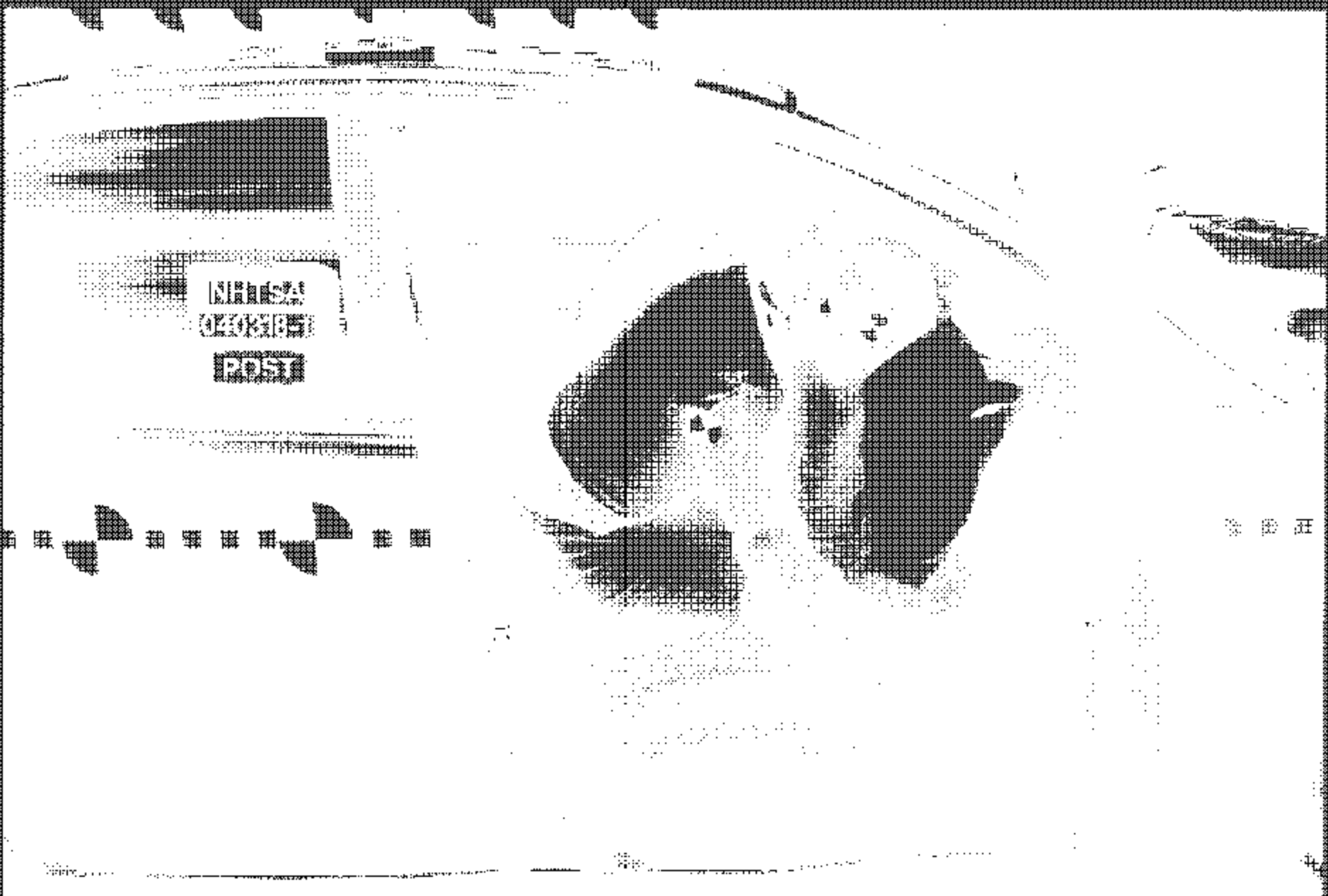


Figure A-40 Post-Tra Passenger Dummy & Vehicle Interior View

7-44

040318-1



Figure A-41 Post-Test Driver Dummy View
7-45

040218-1

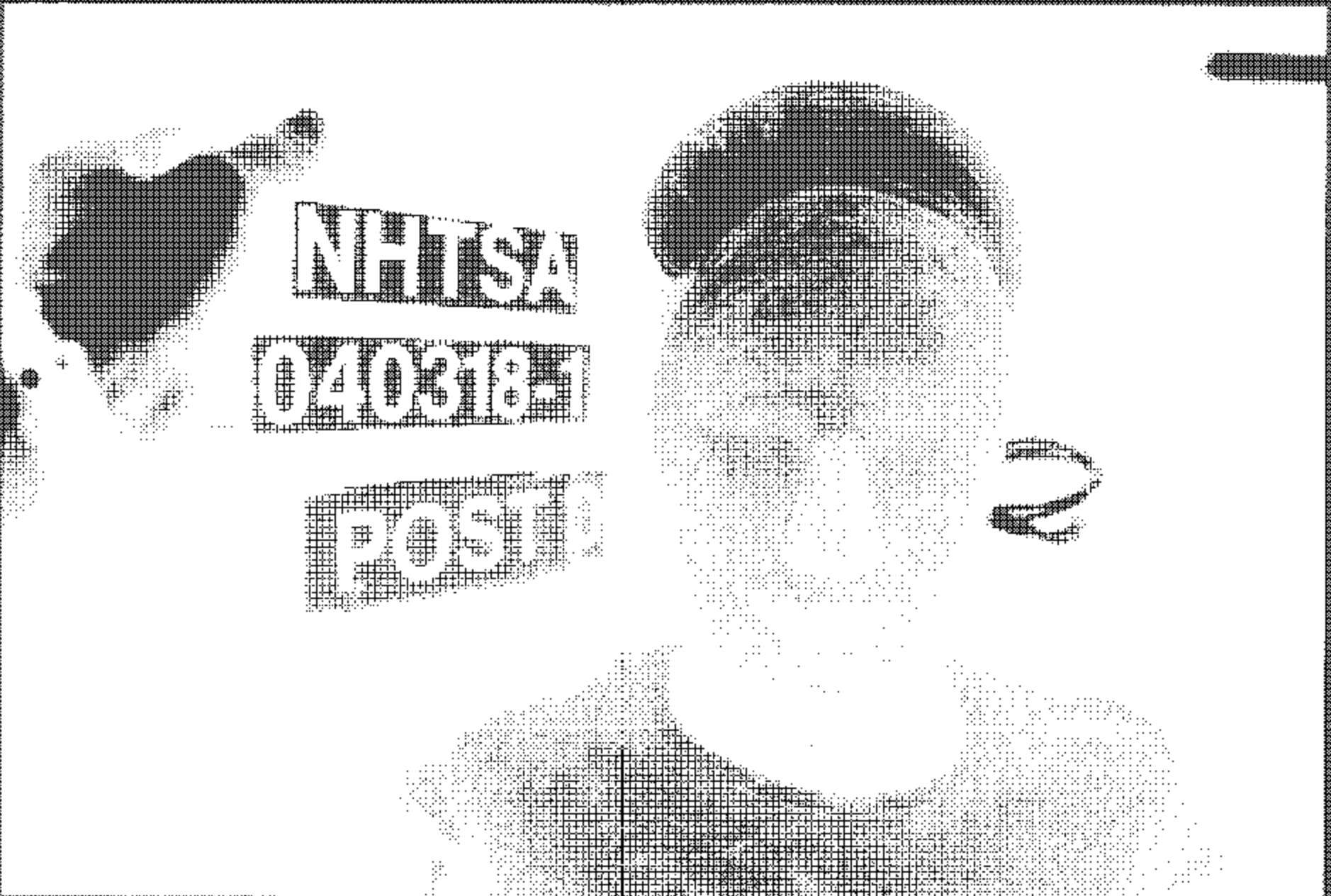


Figure A-42 Post-Test Driver Dummy Head Contact - View 1

7-46

040318-1



Figure A-44 Post-Test Driver Dummy Head Contact - View 2
7.47



Figure A-4 Post-Test Driver Dummy Head Contact - View 3

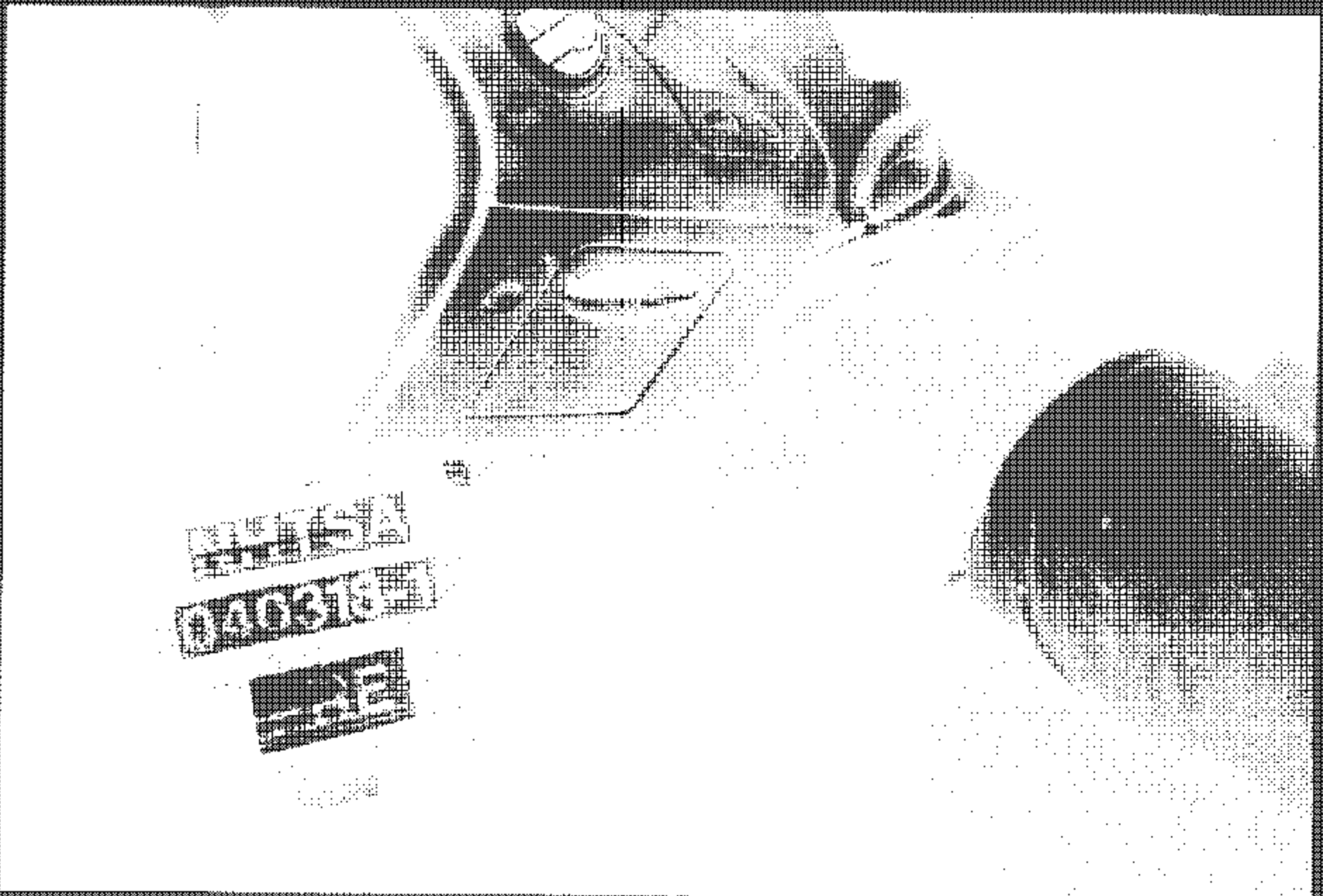


Figure A-45 Pre-Test Driver Dummy Knee Position View

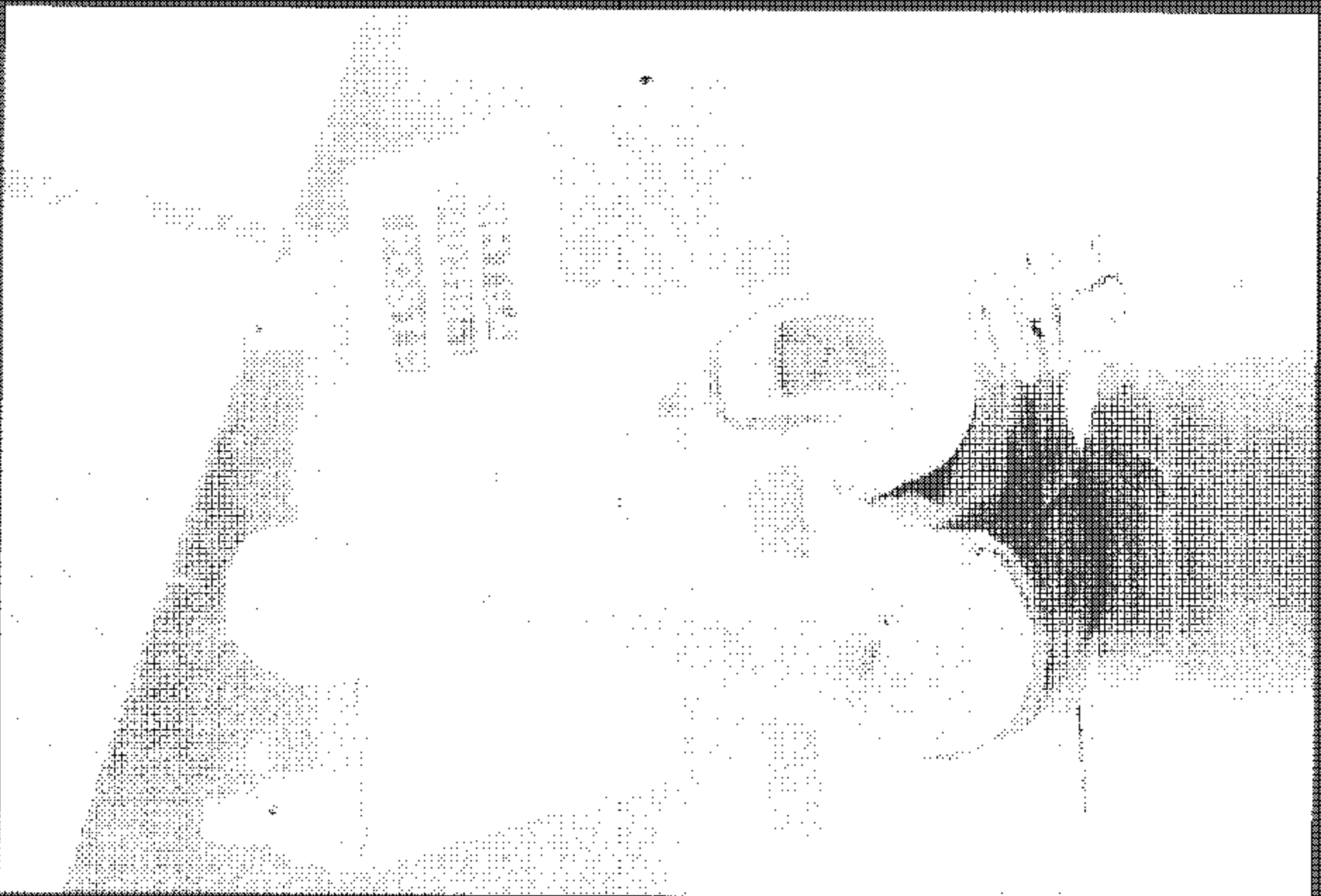


Figure A-46 Post-Test Driver Dummy Knee Contact - View 1
7-30



Figure A-47 Pre-Test Drive Dimming Knee Contact - View 2
7-51

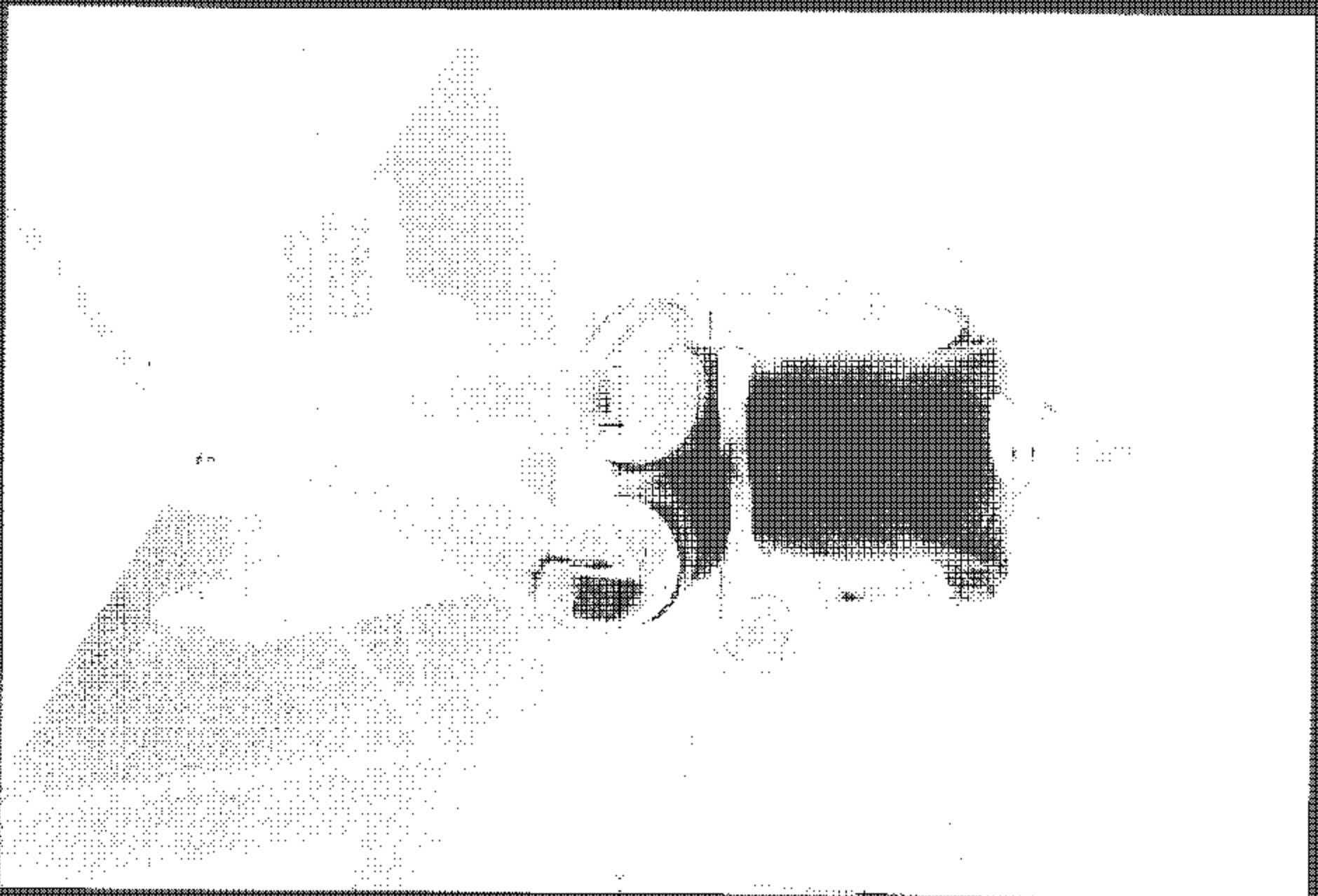


Figure A-48 Post-Test Passenger Dummy View
7-12

NHTSA

040318-1

POSTER

Figure A-49 Post-Tet Posture Dummy Head Contact - View 1

7-33

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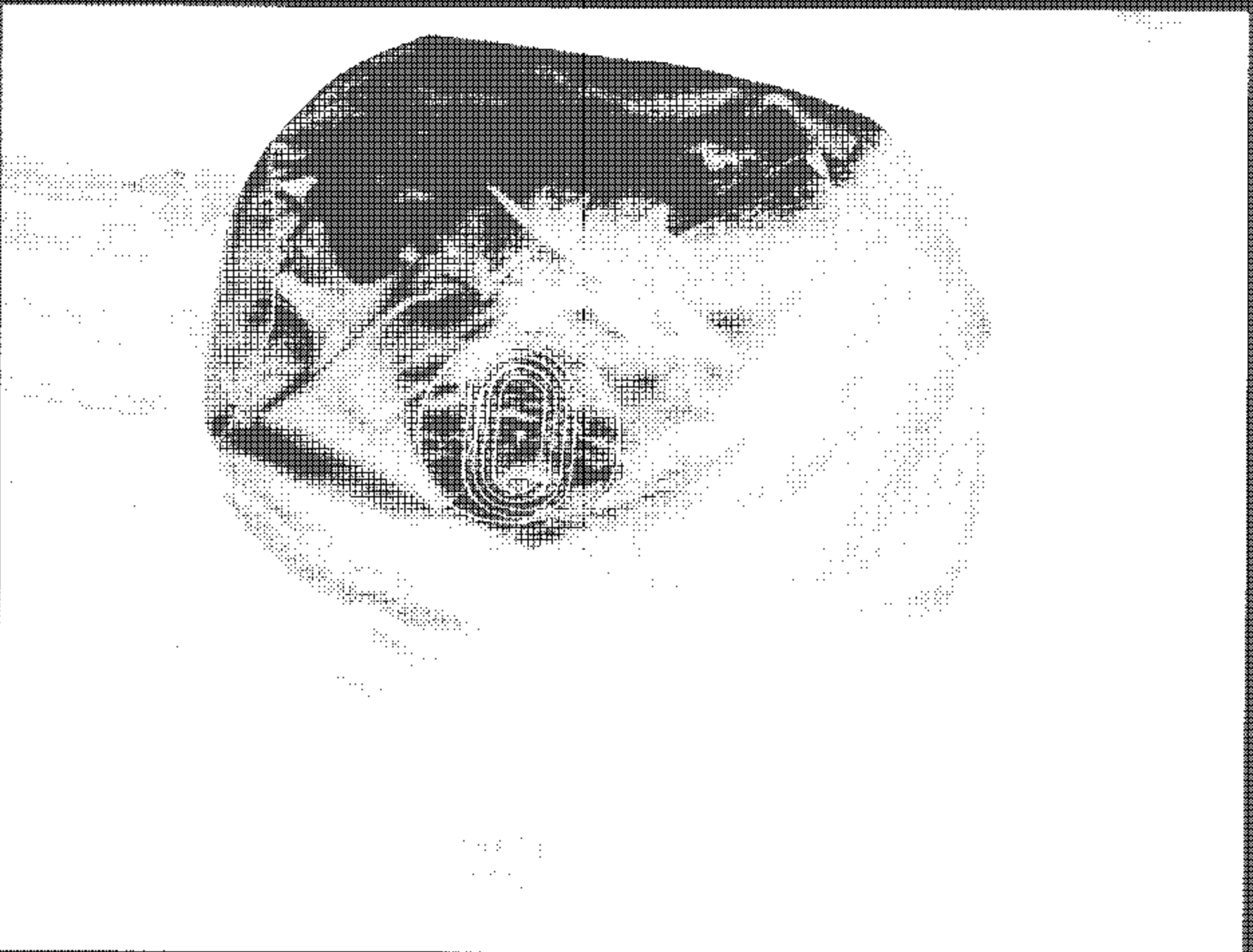


Figure A-50 Post Test Passenger Dummy Head Contour - View 2

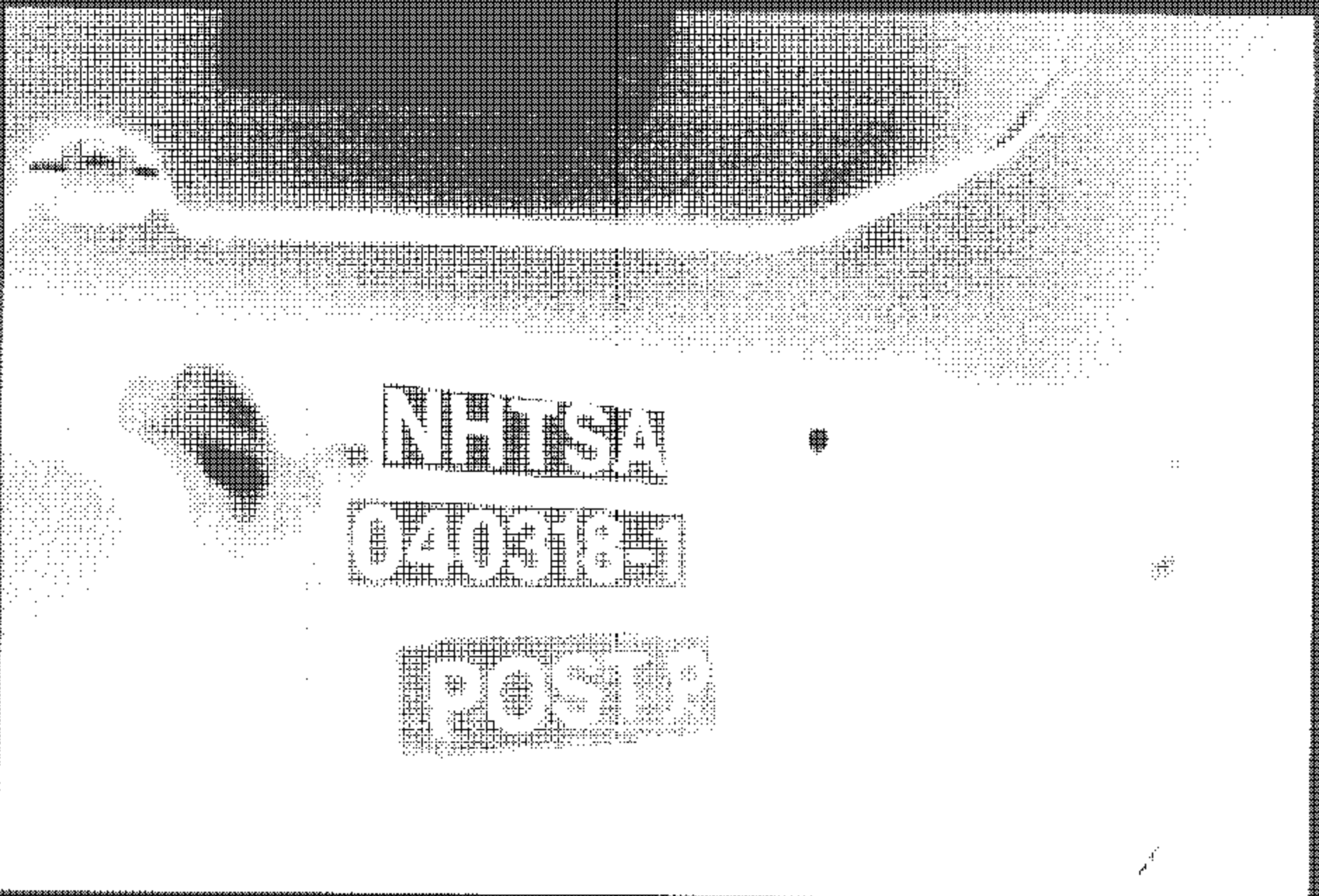


Figure A-3 | Post-Tail Passenger Dummy Head Contact - View 3

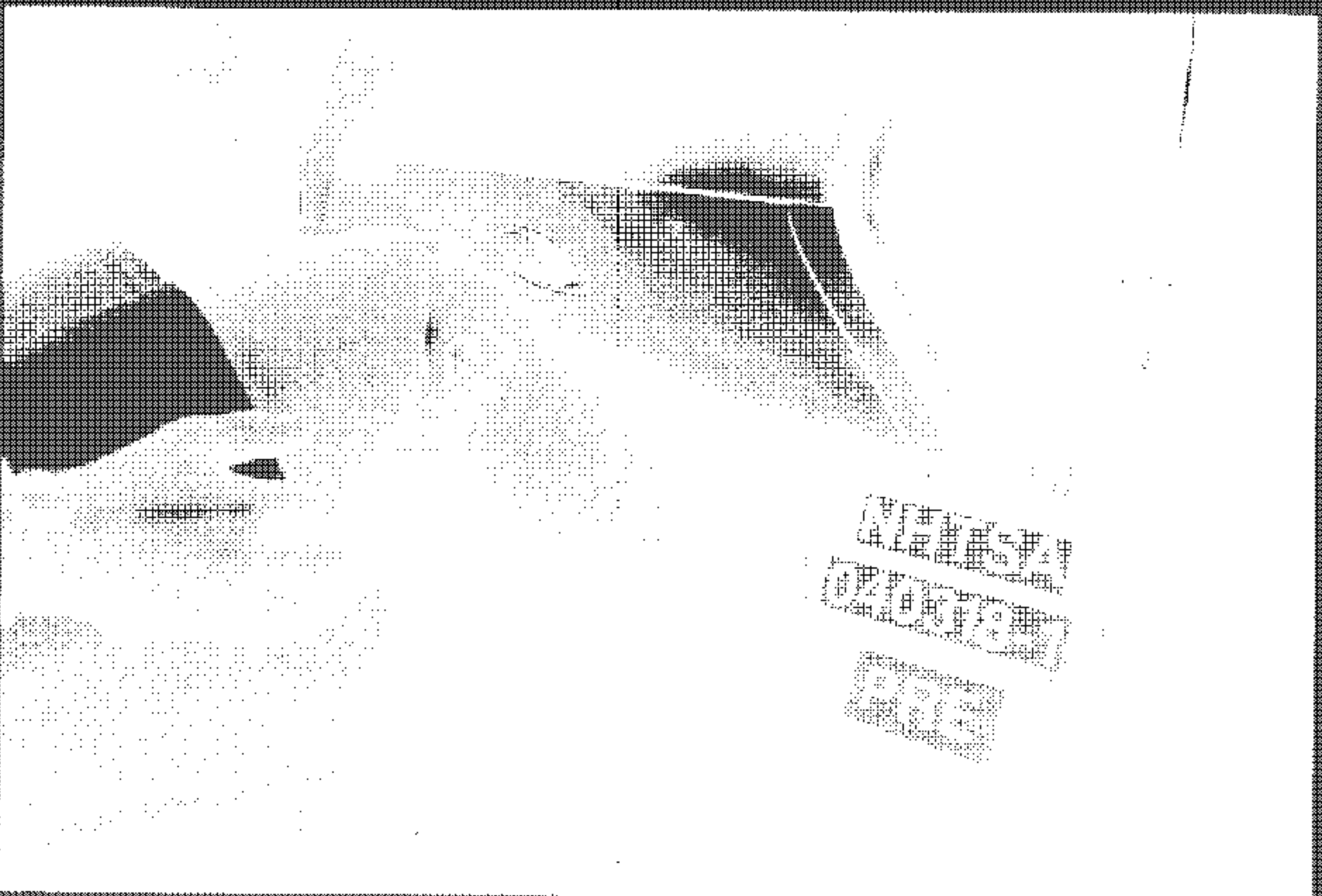


Figure A-32 Pre-Test Passenger Dummy Knee Bolster View



Figure A-55 Post-Test Passenger Dummy Knee Control - View 1



Figure A-54 Post Test Passenger Dummy Knee Contact - View 2
7-58

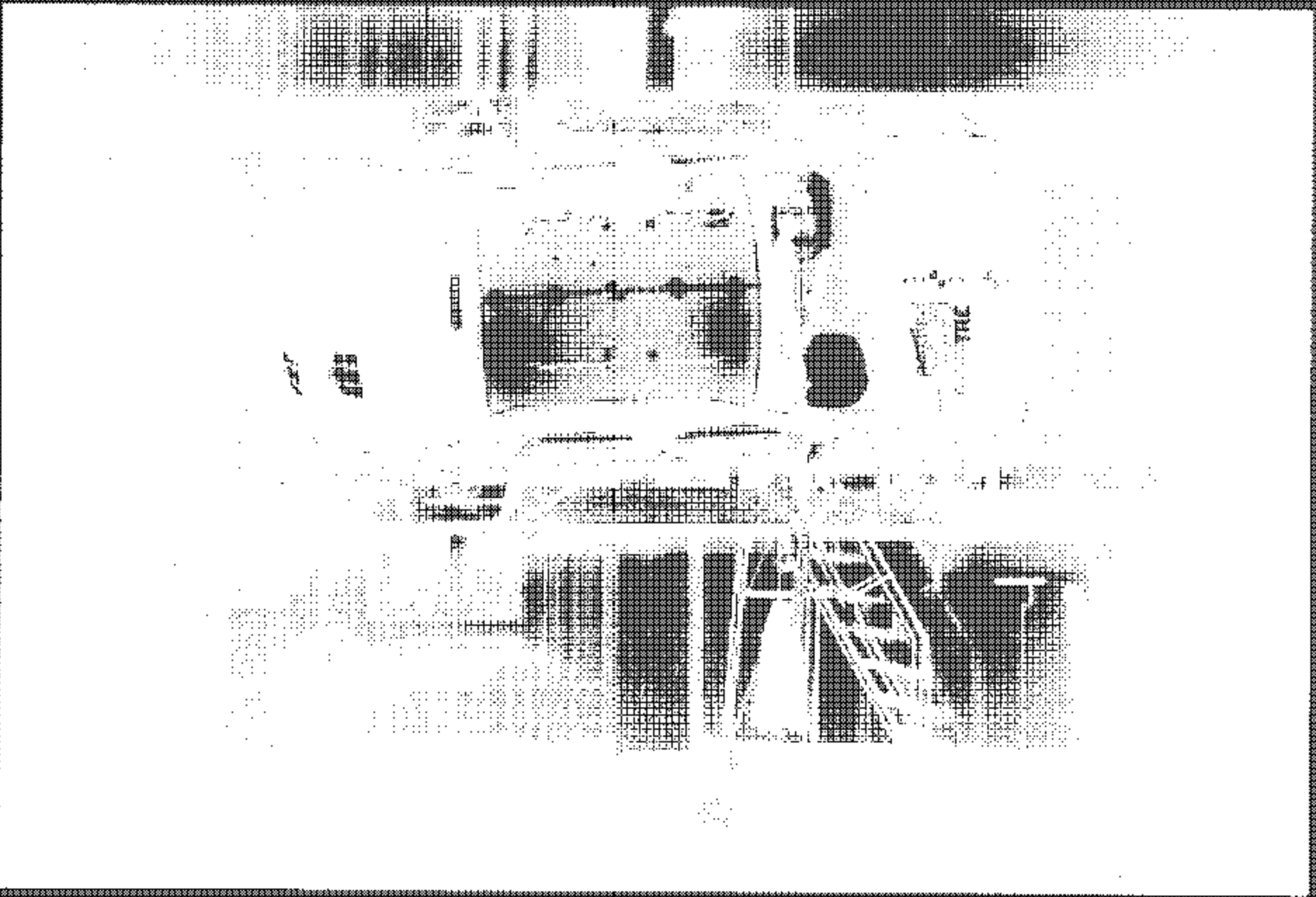


Figure A-55 Post-Truck Vehicle on Static Rollover Device - 90° View
7-59

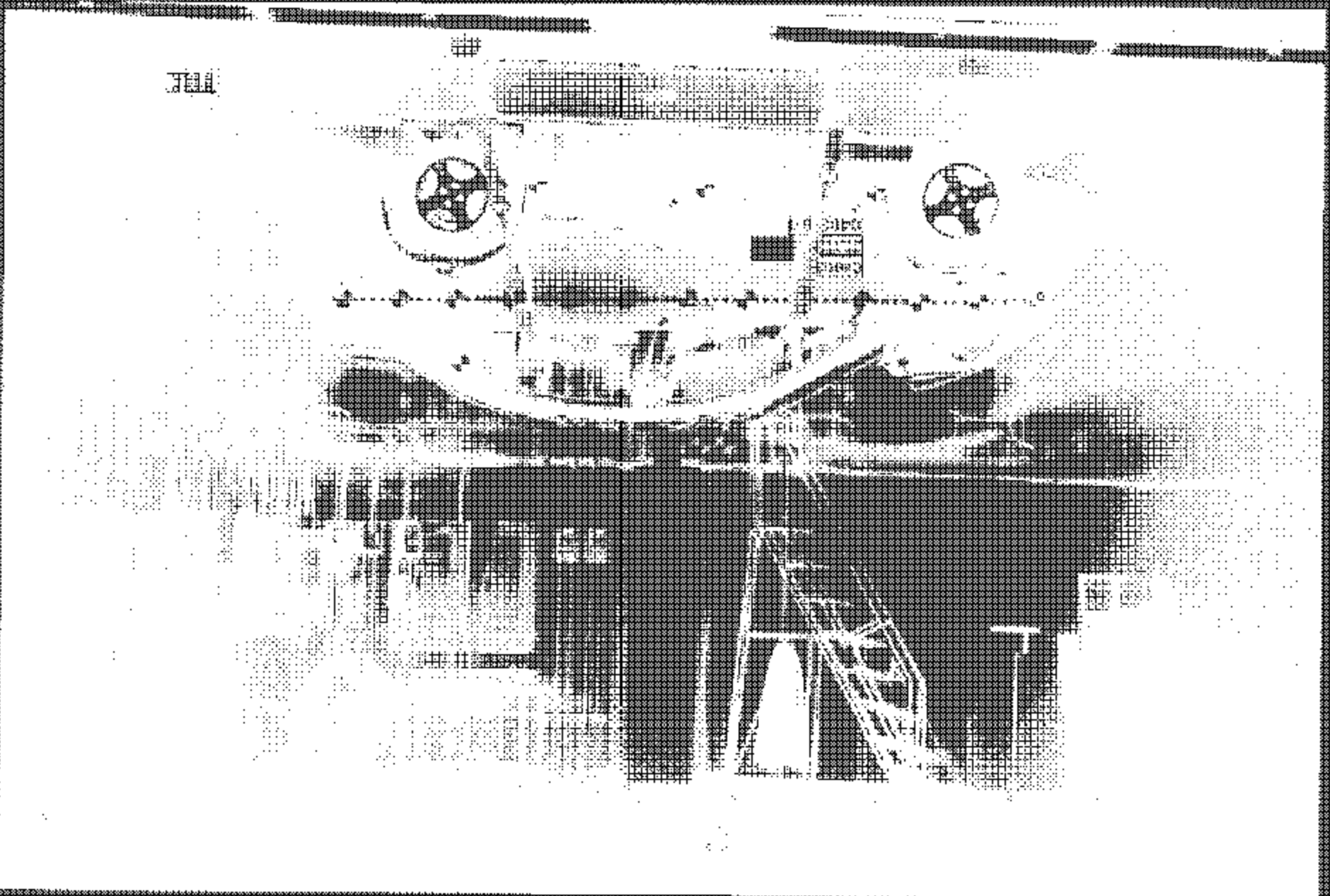


Figure A-16 Post-Ten Vehicle on State Roller Device - 180° View
7-63

(440318-1)

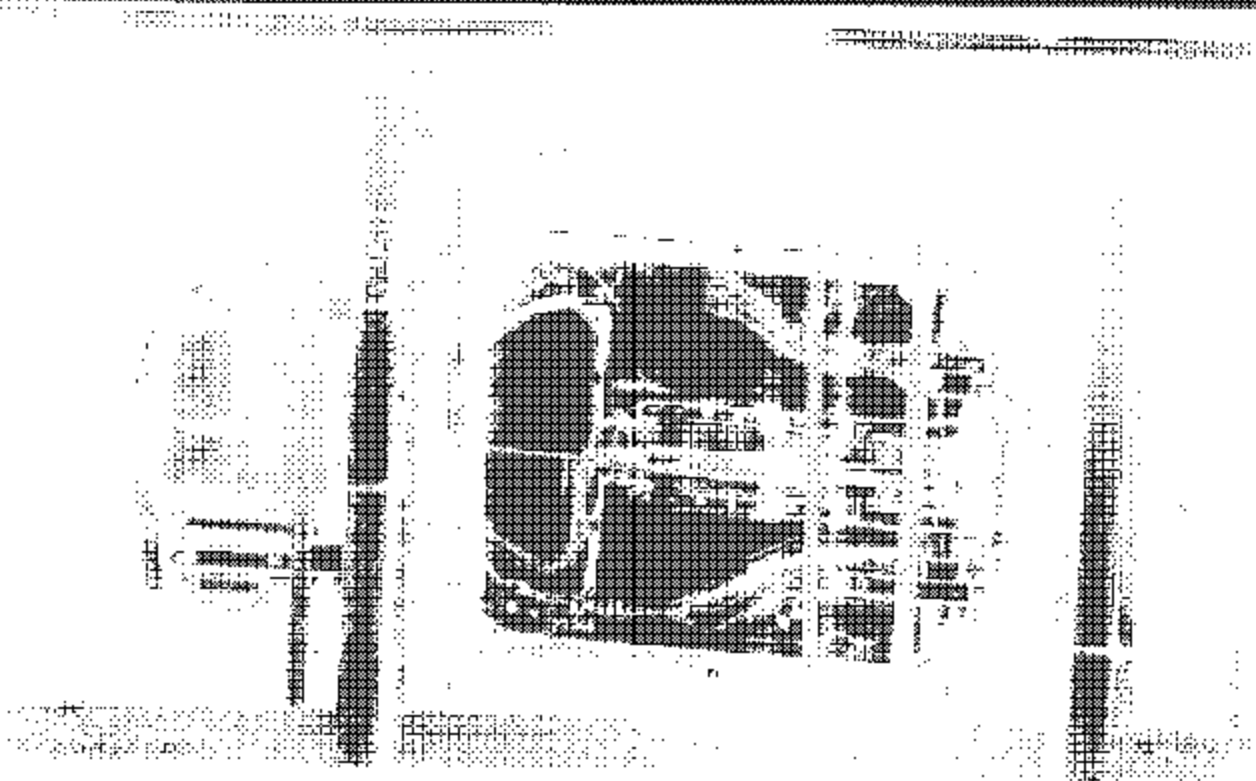


Figure A-37 Post-Test Vehicle on Static Rollover Device - 270° View
7.61

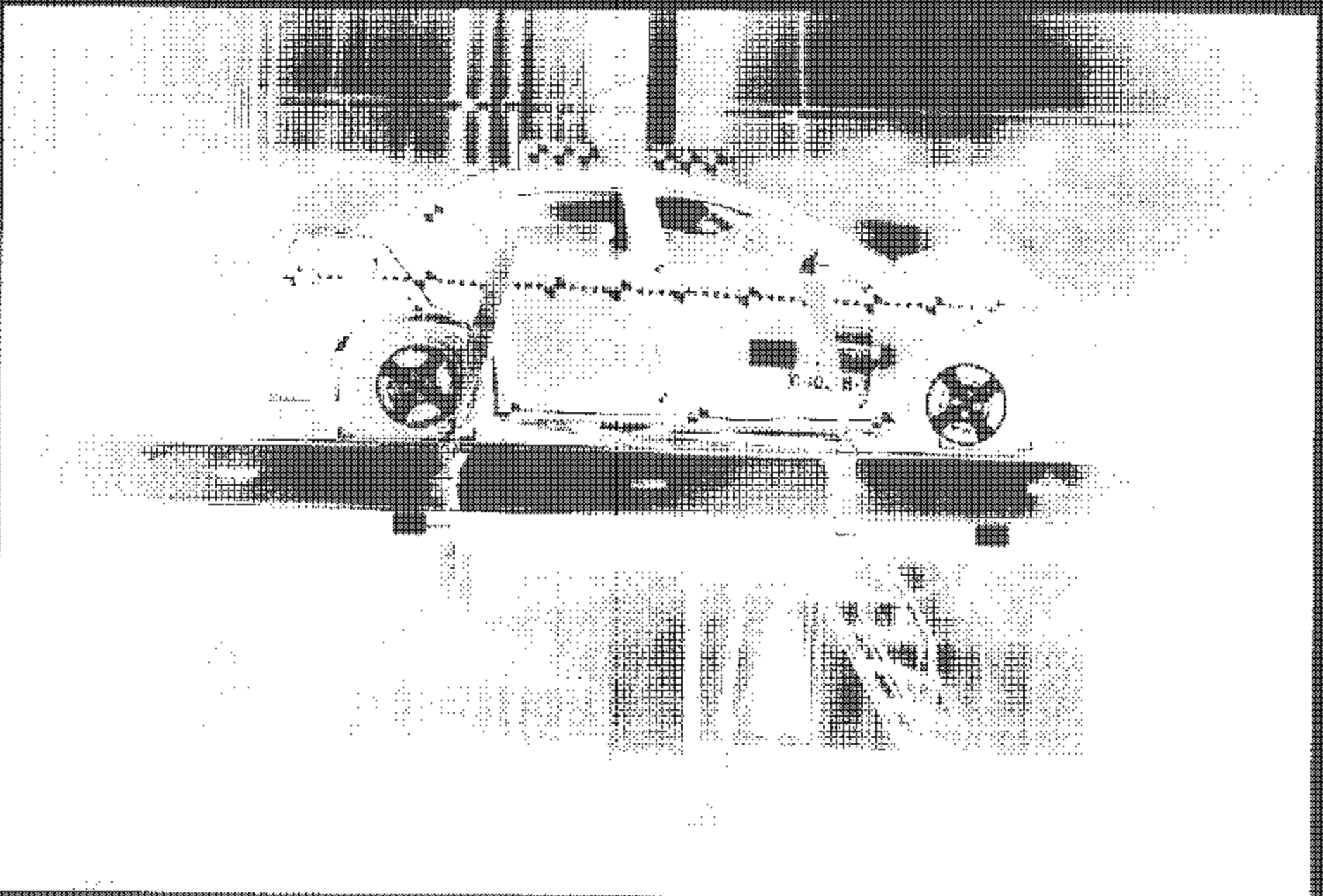


Figure A-18 Post-Test Vehicle on Static Roller Device - 360° View
7-62

040316-1



MFD BY SATURN
DATE GWR
11/03 3661LB
1651KG

THIS VEHICLE CONFORMS TO ALL
CABLE U.S. FEDERAL MOTOR VEHICLE
SAFETY, BUMPER, AND LIGHTING
STANDARDS IN EFFECT AT THE
MANUFACTURE SHOWN ABOVE

1G8AF52FS4Z



Figure A-59 Pre-Test Vehicle Certification Label View

TIRE TYPE	COLD TIRE INFLATION PRESSURE	
	FRONT	REAR
Passenger	270 kPa, 39 PSI	270 kPa, 39 PSI
Light Truck	270 kPa, 39 PSI	270 kPa, 39 PSI
Heavy Truck	420 kPa, 60 PSI	420 kPa, 60 PSI

Figure A-60 Pre-Trip Recommended the Pressure Label View



Figure A-61 Pre-Tax Vehicle Window Shot

Appendix A

Test Equipment List and Calibration Information

Channel Report

3/18/2004 7:46:47 AM

Name of Test 040318-1

System MINIDAU

Name of DAU DAUR

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model	
0001	EVENT	EVENT	EVENT		5.12	V	+ 11/8/2003	OK	-1	TRC	Event
0002	62467	BA1F	ROW A CELL 1		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0003	122042A	BA2F	ROW A CELL 2		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220BZY-50K
0004	68054	BA3F	ROW A CELL 3		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0005	68061	BA4F	ROW A CELL 4		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0006	68058	BA5F	ROW A CELL 5		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0007	68042	BA6F	ROW A CELL 6		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0008	68032	BA7F	ROW A CELL 7		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0009	68026	BA8F	ROW A CELL 8		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0010	68045	BA9F	ROW A CELL 9		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0011	68027	BB1F	ROW B CELL 1		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0012	68055	BB2F	ROW B CELL 2		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0013	68046	BB3F	ROW B CELL 3		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0014	68068	BB4F	ROW B CELL 4		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0015	68024	BB5F	ROW B CELL 5		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0016	68044	BB6F	ROW B CELL 6		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0017	68069	BB7F	ROW B CELL 7		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0018	68034	BB8F	ROW B CELL 8		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0019	68047	BB9F	ROW B CELL 9		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0020	62466	BC1F	ROW C CELL 1		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0021	62510	BC2F	ROW C CELL 2		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0022	68052	BC3F	ROW C CELL 3		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0023	68028	BC4F	ROW C CELL 4		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0024	68064	BC5F	ROW C CELL 5		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0025	68012	BC6F	ROW C CELL 6		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0026	68063	BC7F	ROW C CELL 7		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0027	68015	BC8F	ROW C CELL 8		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0028	62453	BC9F	ROW C CELL 9		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0029	68050	BD1F	ROW D CELL 1		221731.41	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0030	68021	BD2F	ROW D CELL 2		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0031	68039	BD3F	ROW D CELL 3		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K
0032	68018	BD4F	ROW D CELL 4		222977.09	N	+ 12/19/2003	OK	TRC	Interface	1220TX-50K

Channel Report

3/18/2004 7:46:48 AM

0033	68067	BD5F	ROW D CELL 5	222977.09	N	+	12/19/2003	OK	TRC	Interface	1220TX-50K
0034	62456	BD6F	ROW D CELL 6	221731.41	N	+	12/19/2003	OK	TRC	Interface	1220TX-50K
0035	68014	BD7F	ROW D CELL 7	221731.41	N	+	12/19/2003	OK	TRC	Interface	1220TX-50K
0036	68051	BD8F	ROW D CELL 8	222977.09	N	+	12/19/2003	OK	TRC	Interface	1220TX-50K
0037	68033	BD9F	ROW D CELL 9	222977.09	N	+	12/19/2003	OK	TRC	Interface	1220TX-50K

Channel Report

3/18/2004 7:46:48 AM

Name of Test 040318-1

System MINIDAU

Name of DAU DAUG

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
0001	GB86	HEDXG1	Head Accel X	Rwd	791.99344	g	- 3/15/2004	OK 229n	Endevco	7231C
0002	GB77	HEDYG1	Head Accel Y	Lft	810.19067	g	- 3/15/2004	OK 229n	Endevco	7231C
0003	A54F	HEDZG1	Head Accel Z	Up	810.53698	g	- 3/15/2004	OK 229n	Endevco	7231C
0004	1716A-1222-FX	NEKXF1	Neck Force X	Hd	13375.549	N	- 3/15/2004	OK 229n	Denton	1716A
0005	1716A-1222-FY	NEKYF1	Neck Force Y	Hd	13350.438	N	+ 3/15/2004	OK 229n	Denton	1716A
0006	1716A-1222-FZ	NEKZF1	Neck Force Z	Hd	20040.080	N	+ 3/15/2004	OK 229n	Denton	1716A
0007	1716A-1222-MX	NEKXM1	Neck Moment X	Rt Ear	425.01209	N-m	- 3/15/2004	OK 229n	Denton	1716A
0008	1716A-1222-MY	NEKYM1	Neck Moment Y	Chn	425.26598	N-m	+ 3/15/2004	OK 229n	Denton	1716A
0009	1716A-1222-MZ	NEKZM1	Neck Moment Z	Chn	424.05252	N-m	+ 3/15/2004	OK 229n	Denton	1716A
0010	C14135	CSTXG1	Chest Accel X	Fwd	397.28727	g	+ 3/15/2004	OK 229n	Endevco	7231C
0011	A35D	CSTYG1	Chest Accel Y	Lft	399.67526	g	- 3/15/2004	OK 229n	Endevco	7231C
0012	AH5G8	CSTZG1	Chest Accel Z	Down	399.66902	g	+ 3/15/2004	OK 229n	Endevco	7231C
0013	14CB1-2847-229	CSTXD1	Chest Deflection X	Strum	119.48175	mm	+ 3/16/2004	OK 229n	Servo	14CB1-2847
A-4 0014	2430-901	LFMZFI	Left Femur Force Z 603	Knee	33325.522	N	+ 3/15/2004	OK 229n	GSE	2430
0015	2430-902	RFMZFI	Right Femur Force Z 744	Knee	33389.852	N	+ 3/15/2004	OK 229n	GSE	2430
0016	AD4H9	HEDXG2	Head Accel X	Rear	807.67289	g	- 3/15/2004	OK 230n	Endevco	7231C
0017	AD4J7	HEDYG2	Head Accel Y	Left	791.18569	g	- 3/15/2004	OK 230n	Endevco	7231C
0018	AD4J8	HEDZG2	Head Accel Z	Up	803.89386	g	- 3/15/2004	OK 230n	Endevco	7231C
0019	1716-0235-FX	NEKXF2	Neck Force X	Hd	13340.281	N	- 3/15/2004	OK 230n	Denton	1716
0020	1716-0235-FY	NEKYF2	Neck Force Y	Hd	13357.125	N	+ 3/15/2004	OK 230n	Denton	1716
0021	1716-0235-FZ	NEKZF2	Neck Force Z	Hd	20036.943	N	+ 3/15/2004	OK 230n	Denton	1716
0022	1716-0235-MX	NEKXM2	Neck Moment X	Rt Ear	425.71519	N-m	- 3/15/2004	OK 230n	Denton	1716
0023	1716-0235-MY	NEKYM2	Neck Moment Y	Chn	424.50656	N-m	+ 3/15/2004	OK 230n	Denton	1716
0024	1716-0235-MZ	NEKZM2	Neck Moment Z	Chn	424.26040	N-m	+ 3/15/2004	OK 230n	Denton	1716
0025	ACTR4	CSTXG2	Chest Accel X	Fwd	400.04688	g	+ 3/15/2004	OK 230n	Endevco	7231C
0026	ACTT4	CSTYG2	Chest Accel Y	Left	402.15530	g	- 3/15/2004	OK 230n	Endevco	7231C
0027	ACTW0	CSTZG2	Chest Accel Z	Down	399.23583	g	+ 3/15/2004	OK 230n	Endevco	7231C
0028	85427-1	CSTXD2	Chest Deflection X	Strum	119.73457	mm	+ 3/16/2004	OK 230n	Servo	14CB1-2847
0029	2430-984	LFMZFI	Left Femur Force Z 60	Knee	33385.498	N	+ 3/15/2004	OK 230n	GSE	2430
0030	2430-985	RFMZFI	Right Femur Force Z S1511	Knee	33334.418	N	+ 3/15/2004	OK 230n	GSE	2430
0031	P27172	LSXXG	LT RR SEAT X-MEMBER	RR	1009.2647	g	- 1/23/2004	OK -1	Endevco	7264C-2K-2-180
0032	P28339	RSXXG	RT RR SEAT X-MEMBER	FWD	1010.4797	g	+ 12/12/2003	OK -1	Endevco	7264C-2K-2-180

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3/18/2004 7:46:48 AM

Name of Test 040318-1

System MINIDAU

Name of DAU DAUH

Chan.#	Sensor #	Mnemonic	Description	Dir.	Range	Pol.	Cal.	Group	Mfg.	Model
0001	P33074	TENXG	TOP OF ENGINE X-AXIS	FWD	1557.3197 g	+	2/27/2004	OK -1	Endevco	7264C-2K-2-180
0002	P33049	BENXG	BOTTOM OF ENGINE X-AXIS	RR	1547.2952 g	-	2/27/2004	OK -1	Endevco	7264C-2K-2-180
0003	P33028	RFCXG	RT FR BRAKE CALIPER	RR	1012.0177 g	-	2/27/2004	OK -1	Endevco	7264C-2K-2-180
0004	P33151	LFCXG	LT FR BRAKE CALIPER	FWD	1015.8327 g	+	2/27/2004	OK -1	Endevco	7264C-2K-2-180
0005	P29888	DPCXG	INSTRUMENT PANEL TOP	RR	999.68759 g	-	1/23/2004	OK -1	Endevco	7264C-2K-2-180
0006	P28337	RDKZO	RR DECK Z-AXIS	UP	996.88473 g	-	12/26/2003	OK -1	Endevco	7264C-2K-2-180

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Dummy	229n	Type	HYBRID III 50TH	Description	NHTSA - 229n HYBRID III 50TH. CAL DUE 9-15-04 (DKS 3-15-04)J211					
Channel	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Calidat	Pos Output	Flip	
HEDXG	Head Accel X	7231C	GB86	Endevco	0.01959 g	750	3/15/2004	Rwd	1	
HEDYG	Head Accel Y	7231C	GB77	Endevco	0.01915 g	750	3/15/2004	Lft	1	
HEDZG	Head Accel Z	7231C	A54F	Endevco	0.01974 g	750	3/15/2004	Up	1	
NEKXF	Neck Force X	1716A	1716A-1222-FX	Denton	0.0001953 N	8896.4	3/15/2004	Hd Fd,Cst Rr	1	
NEKYF	Neck Force Y	1716A	1716A-1222-FY	Denton	0.0001908 N	8896.4	3/15/2004	Hd Lt,Cst Rt	0	
NEKZF	Neck Force Z	1716A	1716A-1222-FZ	Denton	0.0000998 N	13344.6	3/15/2004	Hd Up,Cst Dn	0	
NEKXM	Neck Moment X	1716A	1716A-1222-MX	Denton	0.0060842 N	282.5	3/15/2004	Rt Ear to Rt Shld	1	
NEKYM	Neck Moment Y	1716A	1716A-1222-MY	Denton	0.0059308 N	282.5	3/15/2004	Chn to Strnm	0	
NEKZM	Neck Moment Z	1716A	1716A-1222-MZ	Denton	0.0085028 N	282.5	3/15/2004	Chn to Lt Shld	0	
CSTXG	Chest Accel X	7231C	C14135	Endevco	0.02742 g	750	3/15/2004	Fwd	0	
CSTYG	Chest Accel Y	7231C	A35D	Endevco	0.01912 g	750	3/15/2004	Lft	1	
CSTZG	Chest Accel Z	7231C	AH5G8	Endevco	0.01941 g	750	3/15/2004	Down	0	
CSTXD	Chest Deflection X	14CB1-2847	14CB1-2847-229	Servo	1.1389 m	100	3/15/2004	Strnm Away Frm Spn	0	
LPMZF	Left Femur Force Z 603	2430	2430-901	GSE	0.0000708 N	13344.7	3/15/2004	Knee Fd,Pel Rr	0	
RPMZF	Right Femur Force Z 744	2430	2430-902	GSE	0.0000697 N	13344.7	3/15/2004	Knee Fd,Pel Rr	0	

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Chsnum	Location	Model	Name	Manufacturer	Sens./mV/V/	Fullscal	Caldat	Pos Output	Flip
IEDXG	Head Accel X	7231C	AD4H9	Endevco	0.01981	g 750	3/15/2004	Rear	1
IEDYG	Head Accel Y	7231C	AD4J7	Endevco	0.01961	g 750	3/15/2004	Left	1
IEDZG	Head Accel Z	7231C	AD4I8	Endevco	0.0193	g 750	3/15/2004	Up	1
NEKXF	Neck Force X	1716	1716-0235-FX	Denton	0.0001919	N 8896.4	3/15/2004	Hd Fd,Cst Rr	1
NEKYF	Neck Force Y	1716	1716-0235-FY	Denton	0.0001879	N 8896.4	3/15/2004	Hd Lt,Cst Rt	0
NEKZF	Neck Force Z	1716	1716-0235-FZ	Denton	0.0000936	N 13344.6	3/15/2004	Hd Up,Cst Dn	0
NEKXM	Neck Moment X	1716	1716-0235-MX	Denton	0.0058955	N 282.5	3/15/2004	Rt Ear to Rt Shld	1
NEKYM	Neck Moment Y	1716	1716-0235-MY	Denton	0.0058266	N 282.5	3/15/2004	Chn to Strmn	0
NEKZM	Neck Moment Z	1716	1716-0235-MZ	Denton	0.0083228	N 282.5	3/15/2004	Chn to Lt Shld	0
CSIXG	Chest Accel X	7231C	ACTR4	Endevco	0.01969	g 750	3/15/2004	Fwd	0
CSIVG	Chest Accel Y	7231C	ACTF4	Endevco	0.01929	g 750	3/15/2004	Left	1
CSIZG	Chest Accel Z	7231C	ACTWD	Endevco	0.01973	g 750	3/15/2004	Down	0
CSIXD	Chest Deflection X	14CB1-2847	85427-1	Servo	1.1403	m 100	3/15/2004	Strmn Away Frm Spn	0
LFMZG	Left Femur Force Z 60	2430	2430-984	GSE	0.000071	N 13344.7	3/15/2004	Knee Fd,Pel Rr	0
RFMZG	Right Femur Force Z 51511	2430	2430-983	GSE	0.0000695	N 13344.7	3/15/2004	Knee Fd,Pel Rr	0

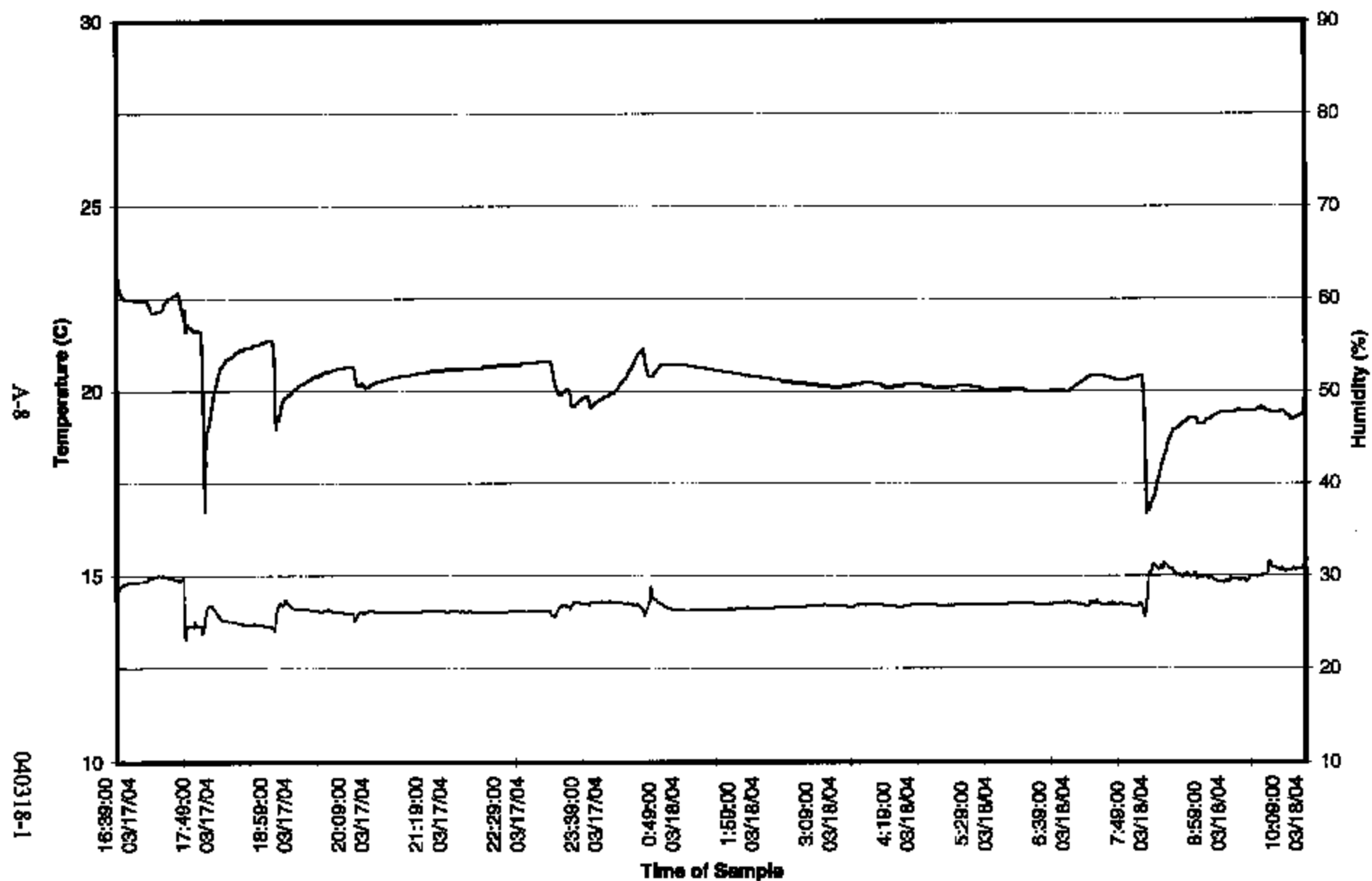
A-7

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40 KM/H FRONTAL C40113 / 040318-1



Appendix B

Manufacturer's Information

⚠ CAUTION:

If the seatback is not locked, it could move forward in a sudden stop or crash. That could cause injury to the person sitting there. Always pull forward on the top of the seatback at the area of the latch to be sure it is locked.

⚠ CAUTION:

A safety belt that is improperly routed, not properly attached, or twisted won't provide the protection needed in a crash. The person wearing the belt could be seriously injured. After raising the rear seatback, always check to be sure that the safety belts are properly routed and attached, and are not twisted.

Safety Belts

Safety Belts: They Are for Everyone

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

⚠ CAUTION:

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

⚠ CAUTION:

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



Your vehicle has a light that comes on as a reminder to buckle up. See *Safety Belt Reminder* Light on page 3-51.

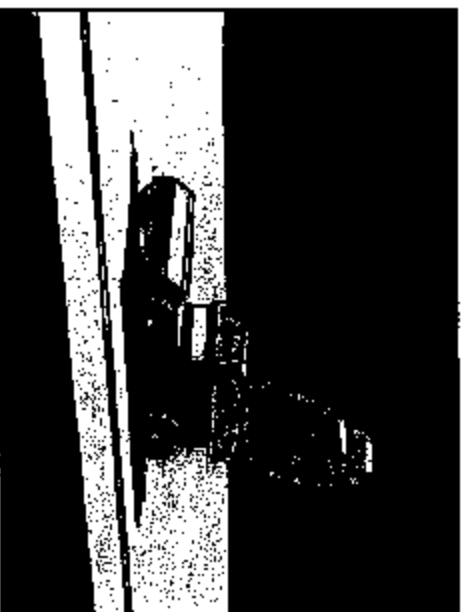
In most states and in all Canadian provinces, the law says to wear safety belts. Here's why: They work. You never know if you'll be in a crash. If you do have a crash, you don't know if it will be a bad one. A few crashes are mild, and some crashes can be so serious that even buckled up, a person wouldn't survive. But most crashes are in between. In many of them, people who buckle up can survive and sometimes walk away. Without belts they could have been badly hurt or killed.

After more than 30 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter... a lot!

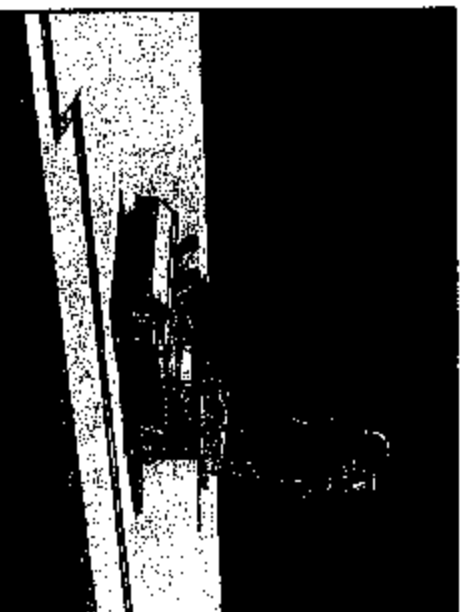
1-12

Why Safety Belts Work

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



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



Put someone on it.



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



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

1-14



or the instrument panel...



or the safety belts!

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

Questions and Answers About Safety Belts

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

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

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

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

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

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

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

Safety belts are for everyone.

How to Wear Safety Belts Properly

This part is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and babies. If a child will be riding in your vehicle, see *Older Children* on page T-32 or *Infants and Young Children* on page T-34. Follow those rules for everyone's protection.

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

We'll start with the driver position.

1-16

Driver Position

This part describes the driver's restraint system.

Lap-Shoulder Belt

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

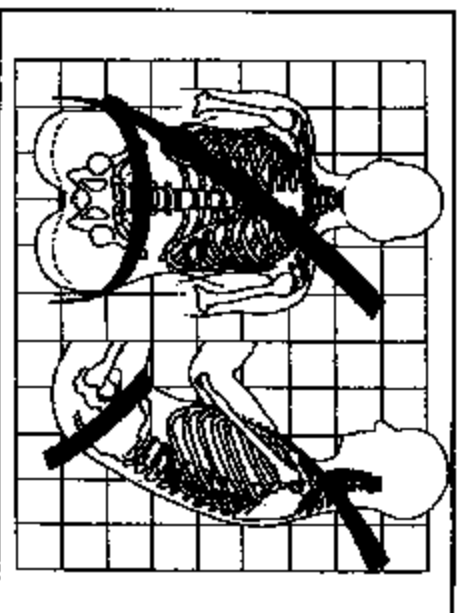
1. Close and lock the door.
2. Adjust the seat so you can sit up straight. To see how, see "Seats" in the Index.



3. Pick up the latch plate and pull the belt across you. Do not let it get twisted.
The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.
4. Push the latch plate into the buckle until it clicks. If the belt stops before it reaches the buckle, let it go back all the way and start again.
Pull up on the latch plate to make sure it is secure. If the belt is not long enough, see *Safety Belt Extender* on page T-31.
Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



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



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

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

1-18

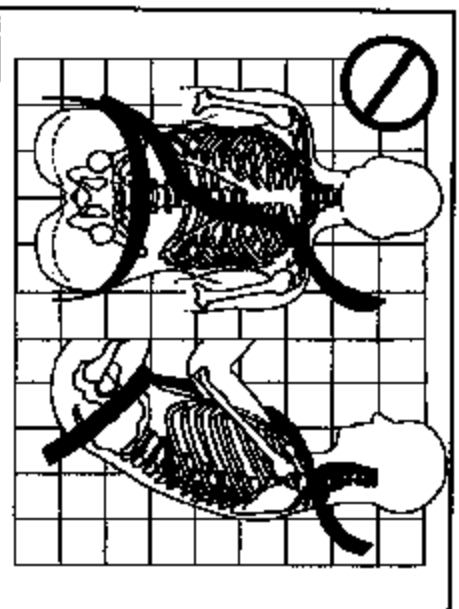
Shoulder Belt Height Adjuster (Sedan)

Before you begin to drive, move the shoulder belt adjuster to the height that is right for you. Adjust the height so that the shoulder portion of the belt is centered on your shoulder. The belt should be away from your face and neck, but not falling off your shoulder.



To move it up or down, press the square button in the center of the height adjuster knob and move the height adjuster to the desired position. After you move the adjuster to where you want it, release the button. Try to move the adjuster up and down without touching the square button to make sure it has locked into position.

Q: What's wrong with this?



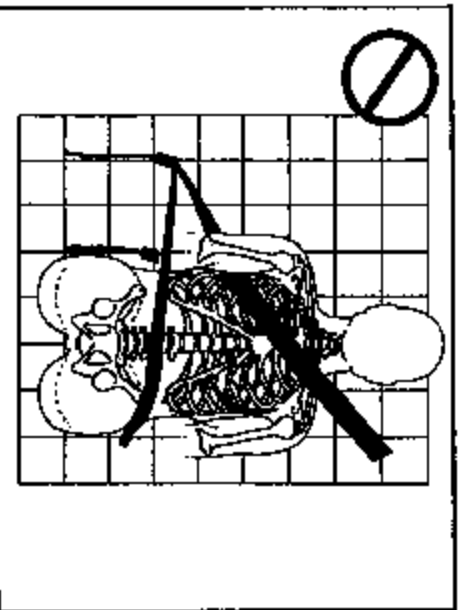
A: The shoulder belt is too loose. It will not give nearly as much protection this way.

⚠ CAUTION:

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

1-20

Q: What's wrong with this?

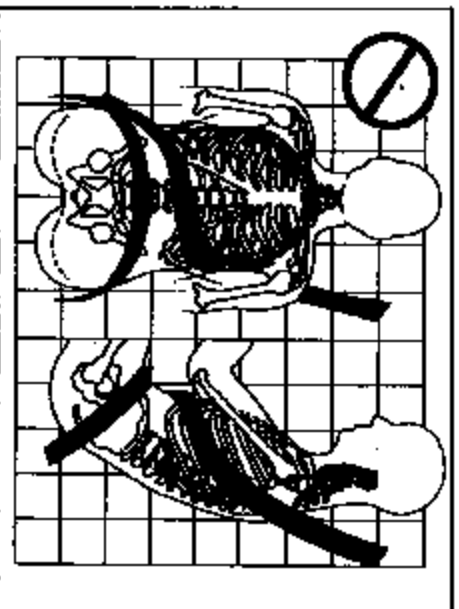


A: The belt is buckled in the wrong place.

⚠ CAUTION:

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

Q: What's wrong with this?



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

⚠ CAUTION:

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

1-22

Q: What's wrong with this?



A: The belt is twisted across the body.

⚠ CAUTION:

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



To unfasten the belt, just push the button on the buckle. The belt should go back out of the way. Before you close the door, be sure the belt is out of the way. If you slam the door on it, you can damage both the belt and your vehicle.

Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts.



A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible, below the rounding, throughout the pregnancy.

1-24

The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.

Right Front Passenger Position

To learn how to wear the right front passenger's safety belt properly, see *Driver Position* on page 1-17.

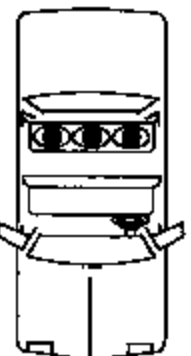
The right front passenger's safety belt works the same way as the driver's safety belt — except for one thing. If you ever pull the shoulder portion of the belt out all the way, you will engage the child restraint locking feature. If this happens, just let the belt go back all the way and start again.

Rear Seat Passengers

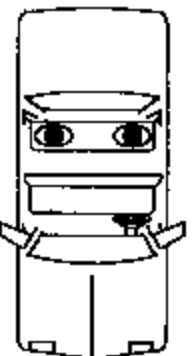
It is very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

Rear passengers who are not safety belted can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

Rear Seat Passenger Positions



Sedan



Coupe

Lap-Shoulder Belt

All rear seating positions have lap-shoulder belts. Here is how to wear one properly.

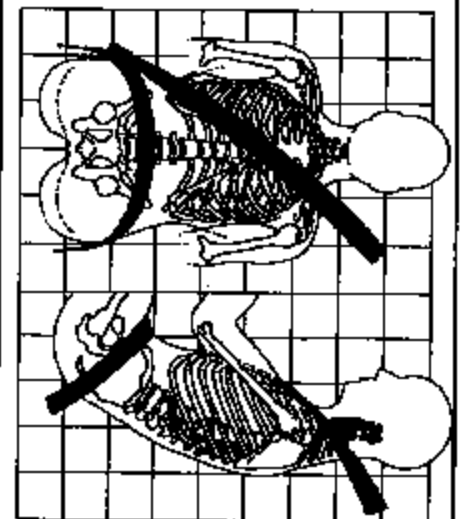


1. Pick up the latch plate and pull the belt across you. Do not let it get twisted. The shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

2. Push the latch plate into the buckle until it clicks. If your vehicle has a center passenger position, be sure to use the correct buckle when buckling your lap-shoulder belt. If you find that the latch plate will not go fully into the buckle, see if you are using the buckle for the center passenger position. Pull up on the latch plate to make sure it is secure. When the shoulder belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again. Make sure the release button on the buckle is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

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





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

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



To unlatch the belt, just push the button on the buckle.

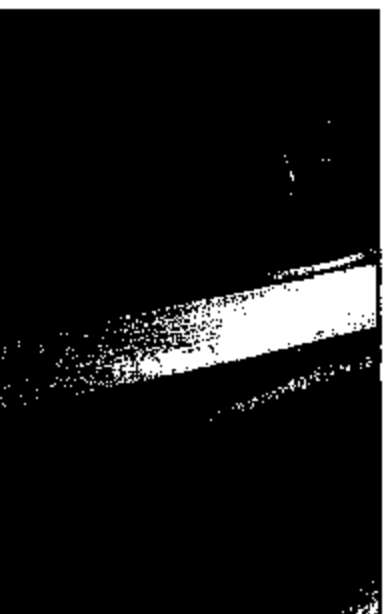
1-28

Rear Safety Belt Comfort Guides for Children and Small Adults

Rear shoulder belt comfort guides will provide added safety belt comfort for older children who have outgrown booster seats and for small adults. When installed on a shoulder belt, the comfort guide better positions the belt away from the neck and head.

There is one guide available for each outside passenger position in the rear seat. To provide added safety belt comfort for children who have outgrown child restraints and booster seats and for smaller adults, the comfort guides may be installed on the shoulder belts. Here is how to install a comfort guide and use the safety belt.

1. Fold down the rear seatback of the desired seating position. See *Split Folding Rear Seat* on page 1-9 for instructions about how to fold the rear seatback.



2. Remove the guide located on the trim behind the seatback from its storage clip. Pull the guide around the rear seatback.

⚠ CAUTION:

If the seatback isn't locked, it could move forward in a sudden stop or crash. That could cause injury to the person sitting there. Always press rearward on the seatback to be sure it is locked.

3. Return the rear seatback to its upright position and make sure it is latched into place.



4. Slide the guide under and past the belt. The elastic cord must be under the belt. Then, place the guide over the belt, and insert the two edges of the belt into the slots of the guide.



5. Be sure that the belt is not twisted and it lies flat. The elastic cord must be under the belt and the guide on top.

1-30

Safety Belt Pretensioners

Your vehicle has safety belt pretensioners. You'll find them on the retractor portion of the safety belts for the driver and right front passenger. They help the safety belts reduce a person's forward movement in a moderate to severe crash in which the front of the vehicle hits something.

Pretensioners work only once. If they activate in a crash, you'll need to get new pretensioners and may need other new parts for your safety belt system. See *Replacing Restraint System Parts After a Crash* on page 1-53 for more information.

Safety Belt Extender

If the vehicle's safety belt will fasten around you, you should use it.

But if a safety belt is not long enough to fasten, your retailer will order you an extender. When you go in to order it, take the heaviest coat you will wear, so the extender will be long enough for you. The extender will be just for you, and just for the seat in your vehicle that you choose. Do not let someone else use it, and use it only for the seat it is made to fit. To wear it, just attach it to the regular safety belt.



5. Buckle, position and release the safety belt as described in *Rear Seat Passengers* on page 1-25. Make sure that the shoulder belt crosses the shoulder.

To remove and store the comfort guides, squeeze the belt edges together so that you can take them out of the guides. Fold down the rear seatback. Store the guides on their storage clips. Lift the rear seatbacks to their original seating position.

Child Restraints

Older Children



Older children who have outgrown booster seats should wear the vehicle's safety belts.

Q: What is the proper way to wear safety belts?

A: If possible, an older child should wear a lap-shoulder belt and get the additional restraint a shoulder belt can provide. The shoulder belt should not cross the face or neck. The lap belt should fit snugly below the hips, just touching the top of the thighs. It should never be worn over the abdomen, which could cause severe or even fatal internal injuries in a crash.

Accident statistics show that children are safer if they are restrained in the rear seat.

In a crash, children who are not buckled up can strike other people who are buckled up, or can be thrown out of the vehicle. Older children need to use safety belts properly.

1-32



⚠ CAUTION:

Never do this.

Here two children are wearing the same belt. This belt can't properly spread the impact force. In a crash, the two children can be crushed together and seriously injured. A belt must be used by only one person at a time.

Q: What if a child is wearing a lap-shoulder belt, but the child is so small that the shoulder belt is very close to the child's face or neck?

A: If the child is sitting in a seat next to a window, move the child toward the center of the vehicle. See *Rear Safety Belt Constraint Guides for Children and Small Adults* on page 1-28. If the child is sitting in the center rear seat passenger position, move the child toward the safety belt buckle. In either case, be sure that the shoulder belt still is on the child's shoulder, so that in a crash the child's upper body would have the restraint that belts provide.

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1-39



⚠ CAUTION:

Never do this.

Here a child is sitting in a seat that has a lap-shoulder belt, but the shoulder part is behind the child. If the child wears the belt in this way, in a crash the child might slide under the belt. The belt's force would then be applied right on the child's abdomen. That could cause serious or fatal injuries.

Wherever the child sits, the lap portion of the belt should be worn low and snug on the hips, just touching the child's thighs. This applies belt force to the child's pelvic bones in a crash.

Infants and Young Children

Everyone in a vehicle needs protection! This includes infants and all other children. Neither the distances traveled nor the age and size of the traveler changes the need, for everyone, to use safety restraints. In fact, the law in every state in the United States and in every Canadian province says children up to some age must be restrained while in a vehicle.

1-34

Every time infants and young children ride in vehicles, they should have the protection provided by appropriate restraints. Young children should not use the vehicle's adult safety belts alone, unless there is no other choice. Instead, they need to use a child restraint.



⚠ CAUTION:

People should never hold a baby in their arms while riding in a vehicle. A baby doesn't weigh much — until a crash. During a crash a baby will become so heavy it is not possible to hold it. For example, in a crash at only 25 mph (40 km/h), a 12-lb. (5.5 kg) baby will suddenly become a 240-lb. (110 kg) force on a person's arms. A baby should be secured in an appropriate restraint.



⚠ CAUTION:

Children who are up against, or very close to, any air bag when it inflates can be seriously injured or killed. Air bags plus lap-shoulder belts offer outstanding protection for adults and older children, but not for young children and infants. Neither the vehicle's safety belt system nor its air bag system is designed for them. Young children and infants need the protection that a child restraint system can provide.

Q: What are the different types of add-on child restraints?

A: Add-on child restraints, which are purchased by the vehicle's owner, are available in four basic types. Selection of a particular restraint should take into consideration not only the child's weight, height and age, but also whether or not the restraint will be compatible with the motor vehicle in which it will be used.

1-36

For most basic types of child restraints, there are many different models available. When purchasing a child restraint, be sure it is designed to be used in a motor vehicle. If it is, the restraint will have a label saying that it meets federal motor vehicle safety standards.

The restraint manufacturer's instructions that come with the restraint, state the weight and height limitations for a particular child restraint. In addition, there are many kinds of restraints available for children with special needs.

⚠ CAUTION:

Newborn infants need complete support, including support for the head and neck. This is necessary because a newborn infant's neck is weak and its head weighs so much compared with the rest of the body. In a crash, an infant in a rear-facing seat settles into the restraint, so the crash forces can be distributed across the strongest part of an infant's body, the back and shoulders. Infants always should be secured in appropriate infant restraints.

⚠ CAUTION:

The body structure of a young child is quite unlike that of an adult or older child, for whom the safety belts are designed. A young child's hip bones are still so small that the vehicle's regular safety belt may not remain low on the hip bones, as it should. Instead, it may settle up around the child's abdomen. In a crash, the belt would apply force on a body area that's unprotected by any bony structure. This alone could cause serious or fatal injuries. Young children always should be secured in appropriate child restraints.

Child Restraint Systems

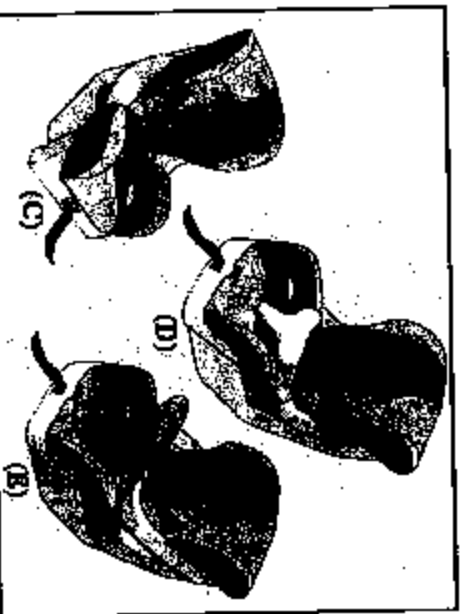


An infant car bed (A), a special bed made for use in a motor vehicle, is an infant restraint system designed to restrain or position a child on a continuous flat surface. Make sure that the infant's head rests toward the center of the vehicle.



A rear-facing infant seat (B) provides restraint with the seating surface against the back of the infant. The harness system holds the infant in place and, in a crash, acts to keep the infant positioned in the restraint.

1-38



A forward-facing child seat (C-E) provides restraint for the child's body with the harness and also sometimes with surfaces such as T-shaped or shelf-like shields.



A booster seat (F-G) is a child restraint designed to improve the fit of the vehicle's safety belt system. Some booster seats have a shoulder belt positioner, and some high-back booster seats have a five-point harness. A booster seat can also help a child to see out the window.

Q: How do child restraints work?

A: A child restraint system is any device designed for use in a motor vehicle to restrain, seat, or position children. A built-in child restraint system is a permanent part of the motor vehicle. An add-on child restraint system is a portable one, which is purchased by the vehicle's owner.

For many years, add-on child restraints have used the adult belt system in the vehicle. To help reduce the chance of injury, the child also has to be secured within the restraint. The vehicle's belt system secures the add-on child restraint in the vehicle, and the add-on child restraint's harness system holds the child in place within the restraint.

One system, the three-point harness, has straps that come down over each of the infant's shoulders and buckle together at the crotch. The five-point harness system has two shoulder straps, two hip straps and a crotch strap. A shield may take the place of hip straps. A T-shaped shield has shoulder straps that are attached to a flat pad which rests low against the child's body. A shelf- or armrest-type shield has straps that are attached to a wide, shelf-like shield that swings up or to the side.

When choosing a child restraint, be sure the child restraint is designed to be used in a vehicle. If it is, it will have a label saying that it meets federal motor vehicle safety standards.

Then follow the instructions for the restraint. You may find these instructions on the restraint itself or in a booklet, or both. These restraints use the belt system or the LATCH system in your vehicle, but the child also has to be secured within the restraint to help reduce the chance of personal injury. When securing an add-on child restraint, refer to the instructions that come with the restraint which may be on the restraint itself or in a booklet, or both, and to this manual. The child restraint instructions are important, so if they are not available, obtain a replacement copy from the manufacturer.

1-40

Where to Put the Restraint

Accident statistics show that children are safer if they are restrained in the rear rather than the front seat. We, therefore, recommend that child restraints be secured in a rear seat, including an infant riding in a rear-facing infant seat, a child riding in a forward-facing child seat and an older child riding in a booster seat. Never put a rear-facing child restraint in the front passenger seat. Here's why:

⚠ CAUTION:

A child in a rear-facing child restraint can be seriously injured or killed if the right front passenger's air bag inflates. This is because the back of the rear-facing child restraint would be very close to the inflating air bag. Always secure a rear-facing child restraint in a rear seat.

If you secure a forward-facing child restraint in the right front seat, always move the front passenger seat as far back as it will go. It is better to secure the child restraint in a rear seat.

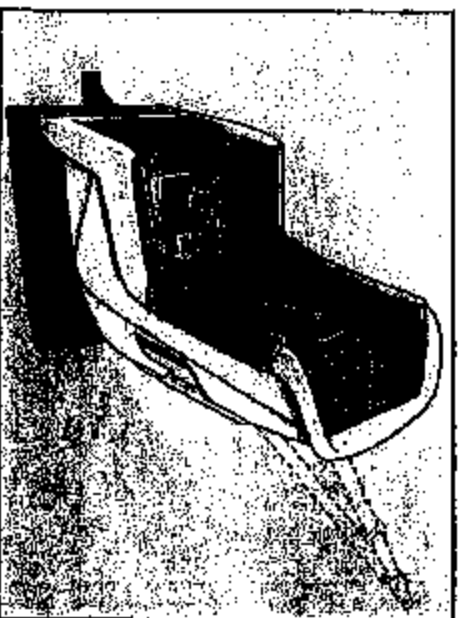
Whenever you install it, be sure to secure the child restraint properly.

Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle — even when no child is in it.

Top Strap

Some child restraints have a top strap, or "top tether." It can help restrain the child restraint during a collision. For it to work, a top strap must be properly anchored to the vehicle. Some top strap-equipped child restraints are designed for use with or without the top strap being anchored. Others require the top strap always to be anchored. Be sure to read and follow the instructions for your child restraint. If yours requires that the top strap be anchored, don't use the restraint unless it is anchored properly.

If the child restraint does not have a top strap, one can be obtained, in kit form, for many child restraints. Ask the child restraint manufacturer whether or not a kit is available.



In Canada, the law requires that forward-facing child restraints have a top strap, and that the strap be anchored. In the United States, some child restraints also have a top strap. If your child restraint has a top strap, it should be anchored.

Anchor the top strap to an anchor point specified in *Top Strap Anchor Location* on page 1-43. Be sure to use an anchor point located on the same side of the vehicle as the seating position where the child restraint will be placed.

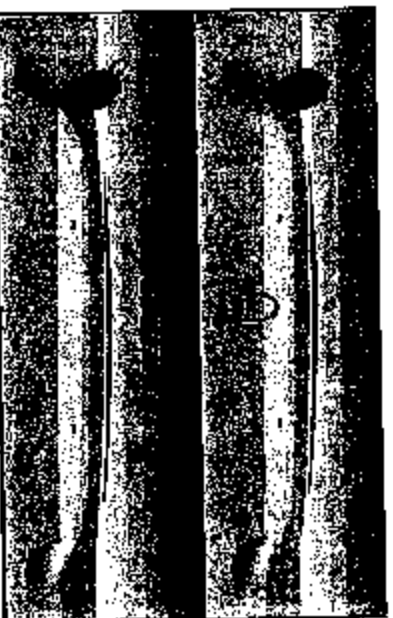
⚠ CAUTION:

Each top tether bracket is designed to anchor only one child restraint. Attaching more than one child restraint to a single bracket could cause the anchor to come loose or even break during a crash. A child or others could be injured if this happens. To help prevent injury to people and damage to your vehicle, attach only one child restraint per bracket.

Once you have the top strap anchored, you'll be ready to secure the child restraint itself. Tighten the top strap when and as the child restraint manufacturer's instructions say.

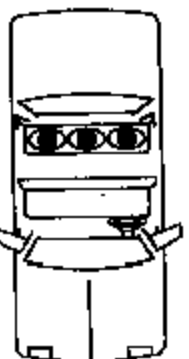
Top Strap Anchor Location

Your vehicle has top strap anchors installed for the rear seating positions only. Do not use a child restraint with a top strap in the right front passenger seat, because there is no place to anchor the top strap.



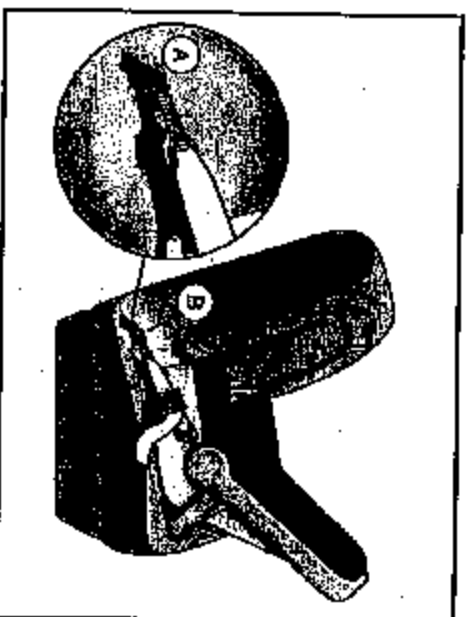
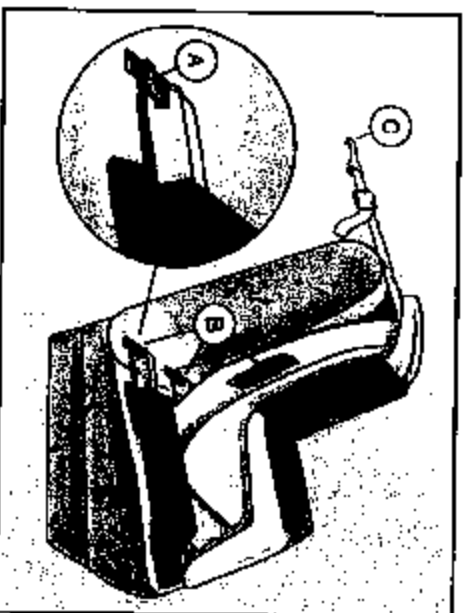
The coupe (B) has two top tether anchors located behind the rear seat on the filler panel. The sedan (A) has three top tether anchors located at the left, right and center positions on the rear window trim. In order to access the anchors, you'll have to open the covers if the anchor has one.

Lower Anchorages and Top Tethers for Children (LATCH System)

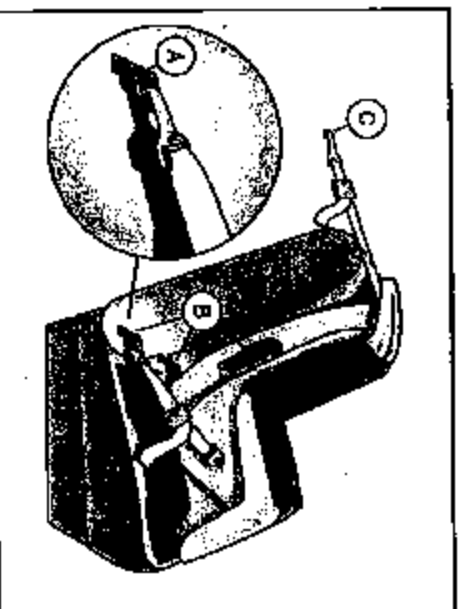


Your vehicle has the LATCH system. You will find anchors (A) for all three rear seating positions on the sedan and both rear seat outside passenger positions on the coupe.

This system, designed to make installation of child restraints easier, does not use the vehicle's safety belts. Instead, it uses vehicle anchors (A, B) and child restraint attachments to secure the restraints. Some restraints also use another vehicle anchor to secure a top tether strap (C).



1-44



In order to use the LATCH system in your vehicle, you need a child restraint designed for that system.



To assist you in locating the lower anchors for this child restraint system, each seating position with the LATCH system has a label on the seatback at each lower anchor position.

The labels are located where the seatback meets the seat cushion.

⚠ CAUTION:

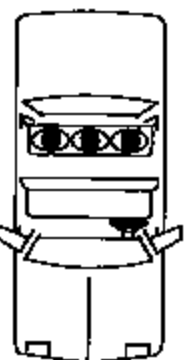
If a LATCH-type child restraint is not attached to its anchorage points, the restraint will not be able to protect the child correctly. In a crash, the child could be seriously injured or killed. Make sure that a LATCH-type child restraint is properly installed using the anchorage points, or use the vehicle's safety belts to secure the restraint, following the instructions that came with that restraint, and also the instructions in this manual.

Securing a Child Restraint Designed for the LATCH System

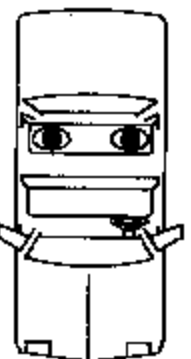
1. Find the LATCH anchorages for the seating position you want to use, where the bottom of the seatback meets the back of the seat cushion. See *Lower Anchorages and Top Tethers for Children (LATCH System)* on page 1-43.
2. Put the child restraint on the seat.
3. Attach and tighten the LATCH attachments on the child restraint to the LATCH anchorages in the vehicle. The child restraint instructions will show you how.
4. If the child restraint is forward-facing, attach and tighten the top tether to the top tether anchorage. The child restraint instructions will show you how. Also see *Top Strap* on page 1-41.
5. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, simply unhook the top tether from the top tether anchorage and then disconnect the LATCH attachments from the LATCH anchorages.

Securing a Child Restraint in a Rear Seat Position



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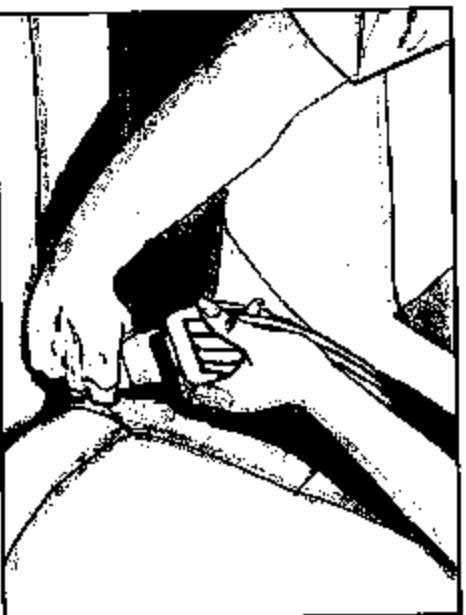
Coupe

If your child restraint is equipped with the LATCH system, see *Lower Anchorages and Top Tethers for Children (LATCH System)* on page 1-43. See *Top Strap* on page 1-41 if the child restraint has one.

1-40

If your child restraint does not have the LATCH system, you will be using the lap-shoulder belt. Be sure to follow the instructions that came with the child restraint. Secure the child in the child restraint when and as the instructions say.

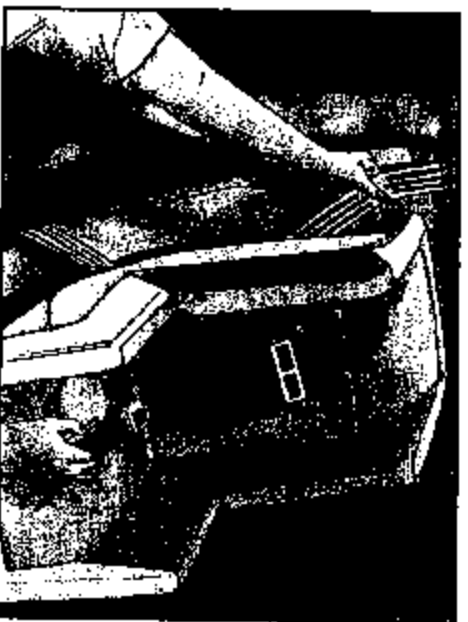
1. Put the restraint on the seat.
2. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.



3. Buckle the belt. Be sure the latch plate clicks when you put it into the buckle. This means you are using the correct buckle. Also, make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



4. Pull the rest of shoulder belt all the way out of the retractor to set the lock.

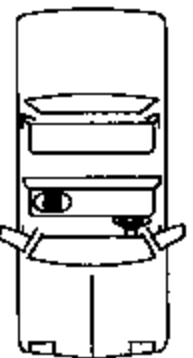


5. To tighten the belt, push down on the child restraint, pull the shoulder portion of the belt to tighten the lap portion of the belt and feed the shoulder belt back into the retractor. If you are using a forward-facing child restraint, you may find it helpful to use your knee to push down on the child restraint as you tighten the belt.
6. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

1-48

Securing a Child Restraint in the Right Front Seat Position



If your child restraint is equipped with the LATCH system, see *Lower Anchors and Top Tethers for Children (LATCH System)* on page 1-43. See *Top Strap* on page 1-41 if the child restraint has one.

Your vehicle has a right front passenger air bag. Never put a rear-facing child restraint in this seat. Here is why:

⚠ CAUTION:

A child in a rear-facing child restraint can be seriously injured or killed if the right front passenger's air bag inflates. This is because the back of the rear-facing child restraint would be very close to the inflating air bag. Always secure a rear-facing child restraint in a rear seat.

A rear seat is a safer place to secure a forward-facing child restraint. If you need to secure a forward-facing child restraint in the right front seat, you will be using the lap-shoulder belt to secure the child restraint. Be sure to follow the instructions that came with the child restraint. Secure the child in the child restraint when and as the instructions say.

1. Because your vehicle has a right front passenger air bag, always move the seat as far back as it will go before securing a forward-facing child restraint. See *Manual Seats* on page 1-2.
2. Put the restraint on the seat.

3. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.



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



5. Pull the rest of the shoulder belt all the way out of the retractor to set the lock.



6. To tighten the belt, push down on the child restraint, pull the shoulder portion of the belt to tighten the lap portion of the belt and feed the shoulder belt back into the retractor. You may find it helpful to use your knee to push down on the child restraint as you tighten the belt.
7. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

Air Bag Systems

This part explains the frontal and side impact air bag systems.

Your vehicle has air bags – a frontal air bag for the driver and another frontal air bag for the right front passenger. Your vehicle may also have roof mounted side impact air bags. Roof mounted side impact air bags are available for the driver and the passenger seated directly behind the driver and for the right front passenger and the passenger seated directly behind that passenger.

If your vehicle has side impact air bags, the words AIR BAG will appear on the air bag covering on the ceiling near the driver's and right front passenger's window.

Frontal air bags are designed to help reduce the risk of injury from the force of an inflating frontal air bag. But these air bags must inflate very quickly to do their job and comply with federal regulations.

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

⚠ CAUTION:

You can be severely injured or killed in a crash if you are not wearing your safety belt – even if you have air bags. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. Air bags are designed to work with safety belts but do not replace them.

Frontal air bags for the driver and right front passenger are designed to deploy only in moderate to severe frontal and rear frontal crashes. They are not designed to inflate in rollover, rear or low-speed frontal crashes, or in many side crashes. And, for some unrestrained occupants, frontal air bags may provide less protection in frontal crashes than more forceful air bags have provided in the past.

CAUTION: (Continued)

1-53

CAUTION: (Continued)

The side impact air bags are designed to inflate only in moderate to severe crashes where something hits the side of your vehicle. They are not designed to inflate in frontal, in rollover or in rear crashes.

Everyone in your vehicle should wear a safety belt properly – whether or not there is an air bag for that person.

⚠ CAUTION:

Both frontal and side impact air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, as you would be if you were leaning forward, it could seriously injure you. Safety belts help keep you in position for air bag inflation before and during a crash. Always wear your safety belt even with frontal air bags. The driver should sit as far back as possible while still maintaining control of the vehicle. Occupants should not lean on or sleep against the door.

⚠ CAUTION:

Anyone who is up against, or very close to, any air bag when it inflates can be seriously injured or killed. Air bags plus lap-shoulder belts offer the best protection for adults, but not for young children and infants. Neither the vehicle's safety belt system nor its air bag system is designed for them. Young children and infants need the protection that a child restraint system can provide. Always secure children properly in your vehicle. To read how, see the part of this manual called "Older Children" or "Infants and Young Children."



AIR BAG

There is an air bag readiness light on the instrument panel cluster, which shows the air bag symbol.

The system checks the air bag electrical system for malfunctions. The light tells you if there is an electrical problem. See *Air Bag Readiness Light* on pages 3-32 for more information.

1-64

Where Are the Air Bags?



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



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

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The side impact air bag for the driver and the person seated directly behind the driver is in the ceiling above the side windows.



The side impact air bag for the right front passenger and the person seated directly behind that passenger is in the ceiling above the side windows.

1-56

⚠ CAUTION:

If something is between an occupant and an air bag, the bag might not inflate properly or it might force the object into the person causing severe injury or even death. The path of an inflating air bag must be kept clear. Don't put anything between an occupant and an air bag, and don't attach or put anything on the steering wheel hub or on or near any other air bag covering. And, because your vehicle has side impact air bags, never secure anything to the roof of your vehicle by routing the rope or tiedown through any door or window opening. If you do, the path of an inflating side impact air bag will be blocked. The path of an inflating air bag must be kept clear.

When Should an Air Bag Inflate?

The driver's and right front passenger's frontal air bags are designed to inflate in moderate to severe frontal or near-frontal crashes. But they are designed to inflate only if the impact speed is above the system's designed "threshold level."

In addition, your vehicle has "dual stage" frontal air bags, which adjust the amount of restraint according to crash severity. For moderate frontal impacts, these air bags inflate at a level less than full deployment. For more severe frontal impacts, full deployment occurs.

If the front of your vehicle goes straight into a wall that does not move or deform, the threshold level for the reduced deployment is about 16 to 20 mph (26 to 32 km/h), and the threshold level for a full deployment is 25 to 30 mph (40 to 48 km/h). The threshold level can vary, however, with specific vehicle design, so that it can be somewhat above or below this range. If your vehicle strikes something that will move or deform, such as a parked car, the threshold level will be higher.

The driver's and right front passenger's frontal air bags are not designed to inflate in rollovers, rear impacts, or in many side impacts because inflation would not help the occupant.

The side impact air bags are designed to inflate in moderate to severe side crashes. A side impact air bag will inflate if the crash severity is above the system's designed "threshold level." The threshold level can vary with specific vehicle design. Side impact air bags are not designed to inflate in frontal or near-frontal impacts, rollovers or rear impacts, because inflation would not help the occupant. A side impact air bag will only deploy on the side of the vehicle that is struck.

It is possible that, in a crash involving the front of your vehicle, only one of the two frontal air bags in your vehicle will deploy. This is rare, but it can happen in a crash just severe enough to make a frontal air bag inflate.

In any particular crash, no one can say whether an air bag should have inflated simply because of the damage to a vehicle or because of what the repair costs were. For frontal air bags, inflation is determined by the angle of the impact and how quickly the vehicle slows down in frontal and near-frontal impacts. For side impact air bags, inflation is determined by the location and severity of the impact.

What Makes an Air Bag Inflate?

In an impact of sufficient severity, the air bag sensing system detects that the vehicle is in a crash. For both frontal and side impact air bags, the sensing system triggers a release of gas from the inflator, which inflates the air bag. The inflator, air bag, and related hardware are all part of the air bag modules inside the steering wheel and in the instrument panel in front of the right front passenger and in the ceiling of the vehicle, near the side windows.

How Does an Air Bag Restrain?

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

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as anything more than a supplement to safety belts, and then only in moderate to severe frontal or near-frontal collisions for the driver's and right front passenger's frontal air bags, and only in moderate to severe side collisions for vehicles with a driver's and right front passenger's side impact air bag.

What Will You See After an Air Bag Inflates?

After an air bag inflates, it quickly deflates, so quickly that some people may not even realize the air bag inflated. Some components of the air bag module — the steering wheel hub for the driver's air bag, the instrument panel for the right front passenger's bag or the ceiling of your vehicle near the side windows — will be hot for a short time. The parts of the bag that come into contact with you may be warm, but not too hot to touch. There will be some smoke and dust coming from the vents in the deflated air bags. Air bag inflation doesn't prevent the driver from seeing or being able to steer the vehicle, nor does it stop people from leaving the vehicle.

⚠ CAUTION:

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

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

- Air bags are designed to inflate only once. After an air bag inflates, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include air bag modules and possibly other parts. The service manual for your vehicle covers the need to replace other parts.
- Your vehicle is equipped with a crash sensing and diagnostic module, which records information about the air bag system. The module records information about the readiness of the system, when the system commands air bag inflation and driver's safety belt usage at deployment.

- Let only qualified technicians work on your air bag system. Improper service can mean that your air bag system won't work properly. See your dealer for service.

Notice: If you damage the covering for the driver's or the right front passenger's air bag, or the side impact air bag covering on the ceiling near the side windows, the bag may not work properly. You may have to replace the air bag module in the steering wheel, both the air bag module and the instrument panel for the right front passenger's air bag, or side impact air bag module and ceiling covering for the roof-mounted side impact air bag. Do not open or break the air bag coverings.

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Service Your Air Bag-Equipped Vehicle

Air bags affect how your vehicle should be serviced. There are air bag system parts in several places around your vehicle. You don't want the system to inflate while someone is working on your vehicle. Your retailer and the Saturn Service Manual have information about servicing your vehicle and the air bag systems. To purchase a service manual, see *Service Publications Ordering Information* on page 7-9.

⚠ CAUTION:

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

Air bag systems do not need regular maintenance.

Adding Equipment to Your Air Bag-Equipped Vehicle

Q: If I add a luggage carrier or sunroof to the roof of my vehicle, will it keep the roof-mounted side impact air bags from working properly?

A: As long as the luggage carrier or sunroof is properly installed so that the vehicle's basic structure isn't changed, it's not likely to keep the roof-mounted side impact air bags from working properly in a crash.

Restraint System Check

Checking Your Restraint Systems

Now and then, make sure the safety belt reminder light and all your belts, buckles, latch plates, retractors and anchorages are working properly. Look for any other loose or damaged safety belt system parts. If you see anything that might keep a safety belt system from doing its job, have it repaired.

Torn or frayed safety belts may not protect you in a crash. They can rip apart under impact forces. If a belt is torn or frayed, get a new one right away.

Also look for any opened or broken air bag covers, and have them repaired or replaced. (The air bag system does not need regular maintenance.)

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Replacing Restraint System Parts After a Crash

⚠ CAUTION:

A crash can damage the restraint systems in your vehicle. A damaged restraint system may not properly protect the person using it, resulting in serious injury or even death in a crash. To help make sure your restraint systems are working properly after a crash, have them inspected and any necessary replacements made as soon as possible.

If you have had a crash, do you need new belts or LATCH system parts?

After a very minor collision, nothing may be necessary. But if the belts were stretched, as they would be if worn during a more severe crash, then you need new parts.

If the LATCH system was being used during a more severe crash, you may need new LATCH system parts.

If belts are cut or damaged, replace them. Collision damage also may mean you will need to have LATCH system, safety belt or seat parts repaired or replaced. New parts and repairs may be necessary even if the belt or LATCH system was not being used at the time of the collision.

If your seat adjuster will not work after a crash, the special part of the safety belt that goes through the seat to the adjuster may need to be replaced.

If the frontal air bags inflate you will need to replace the driver's and right front passenger's safety belt retractor assembly. Be sure to do so. Then the new retractor assembly will be there to help protect you in a collision.

If an air bag inflates, you will need to replace air bag system parts. See the part about the air bag system earlier in this manual.