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US English/Metric Conversion

US English	Multiply/ Divide by	Metric
In order to calculate US English measurement, divide by the number in the center column.		
In order to calculate metric measurement, multiply by the number in the center column.		
Length		
in	25.4	mm
ft	0.3048	m
yd	0.9144	
mi	1.609	km
Area		
sq in	645.2	sq mm
	6.45	sq cm
sq ft	0.0929	sq m
sq yd	0.8361	
Volume		
cu in	16,387.0	cu mm
	16.387	cu cm
	0.0164	L
qt	0.9464	
gal	3.7854	
cu yd	0.764	cu m
Mass		
lb	0.4536	kg
ton	907.18	
	0.907	tonne (t)
Force		
kg F	9.807	newtons (N)
oz F	0.2780	
lb F	4.448	
Acceleration		
ft/s²	0.3048	m/s²

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in/s²	0.0254	
Torque		
lb in	0.11298	N·m
lb ft	1.3558	
Power		
hp	0.745	kW
Pressure (Stress)		
inches of H2O	0.2488	kPa
inches of Mercury (Hg)	3.377	
lb/sq in	6.895	
Energy (Work)		
Btu	1055.0	J (J= one Ws)
lb ft	1.3558	
kW hour	3,600,000.0	
Light		
Foot Candle	10.764	lm/m²
Velocity		
mph	1.6093	km/h
Temperature		
(°F - 32) 5/9	=	°C
°F	=	(9/5 °C + 32)
Fuel Performance		
235.215/mpg	=	100 km/L

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Decimal and Metric Equivalents

Fraction (in)	Decimal (in)	Metric (mm)
1/64	0.015625	0.39688
1/32	0.03125	0.79375
3/64	0.046875	1.19062
1/16	0.0625	1.5875
5/64	0.078125	1.98437
3/32	0.09375	2.38125
7/64	0.109375	2.77812
1/8	0.125	3.175
9/64	0.140625	3.57187
5/32	0.15625	3.96875
11/64	0.171875	4.36562
3/16	0.1875	4.7625
13/64	0.203125	5.15937
7/32	0.21875	5.55625
15/64	0.234375	5.95312
1/4	0.25	6.35
17/64	0.265625	6.74687
9/32	0.28125	7.14375
19/64	0.296875	7.54062
5/16	0.3125	7.9375
21/64	0.328125	8.33437
11/32	0.34375	8.73125
23/64	0.359375	9.12812
3/8	0.375	9.525
25/64	0.390625	9.92187
13/32	0.40625	10.31875
27/64	0.421875	10.71562
7/16	0.4375	11.1125





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29/64	0.453125	11.50937
15/32	0.46875	11.90625
31/64	0.484375	12.30312
1/2	0.5	12.7
33/64	0.515625	13.09687
17/32	0.53125	13.49375
35/64	0.546875	13.89062
9/16	0.5625	14.2875
37/64	0.578125	14.68437
19/32	0.59375	15.08125
39/64	0.609375	15.47812
5/8	0.625	15.875
41/64	0.640625	16.27187
21/32	0.65625	16.66875
43/64	0.671875	17.06562
11/16	0.6875	17.4625
45/64	0.703125	17.85937
23/32	0.71875	18.25625
47/64	0.734375	18.65312
3/4	0.75	19.05
49/64	0.765625	19.44687
25/32	0.78125	19.84375
51/64	0.796875	20.24062
13/16	0.8125	20.6375
53/64	0.828125	21.03437
27/32	0.84375	21.43125
55/64	0.859375	21.82812
7/8	0.875	22.225
57/64	0.890625	22.62187
29/32	0.90625	23.01875
59/64	0.921875	23.41562





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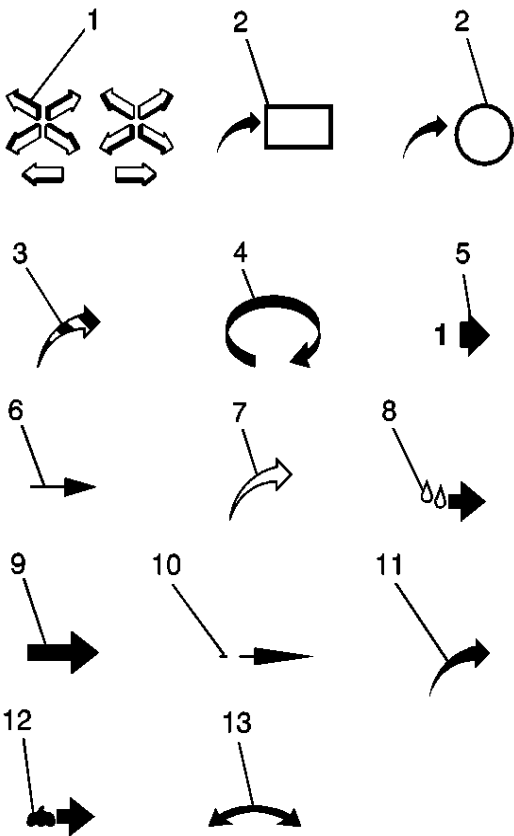


15/16	0.9375	23.8125
61/64	0.953125	24.20937
31/32	0.96875	24.60625
63/64	0.984375	25.00312
1	1.0	25.4



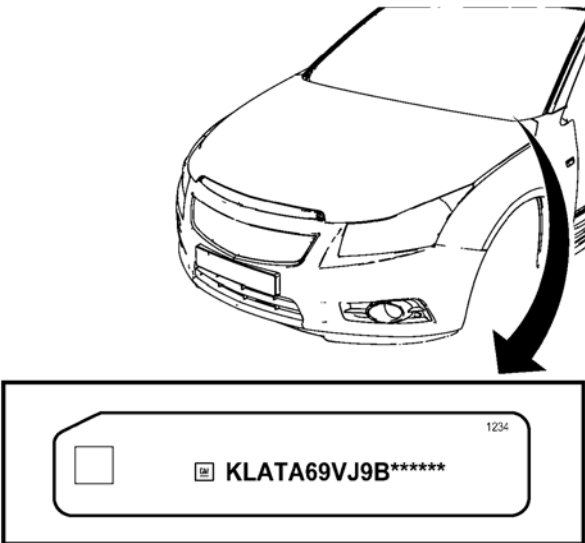
Arrows and Symbols

This service manual uses various symbols in order to describe different service operations.



- (1) Front of Vehicle
- (2) View Detail
- (2) View Detail
- (3) Ambient Air Mixed with Another Gas or Indicate Temperature Change
- (4) Motion or Direction
- (5) View Angle
- (6) Dimension (1:2)
- (7) Ambient/Clean Air Flow or Cool Air Flow
- (8) Lubrication Point - Oil or Fluid
- (9) Task Related
- (10) Sectioning (1:3)
- (11) Gas Other Than Ambient Air or Hot Air Flow
- (12) Lubrication Point - Grease or Jelly
- (13) Multidirectional Arrow

Vehicle, Engine and Transmission ID and VIN Location, Derivative and Usage

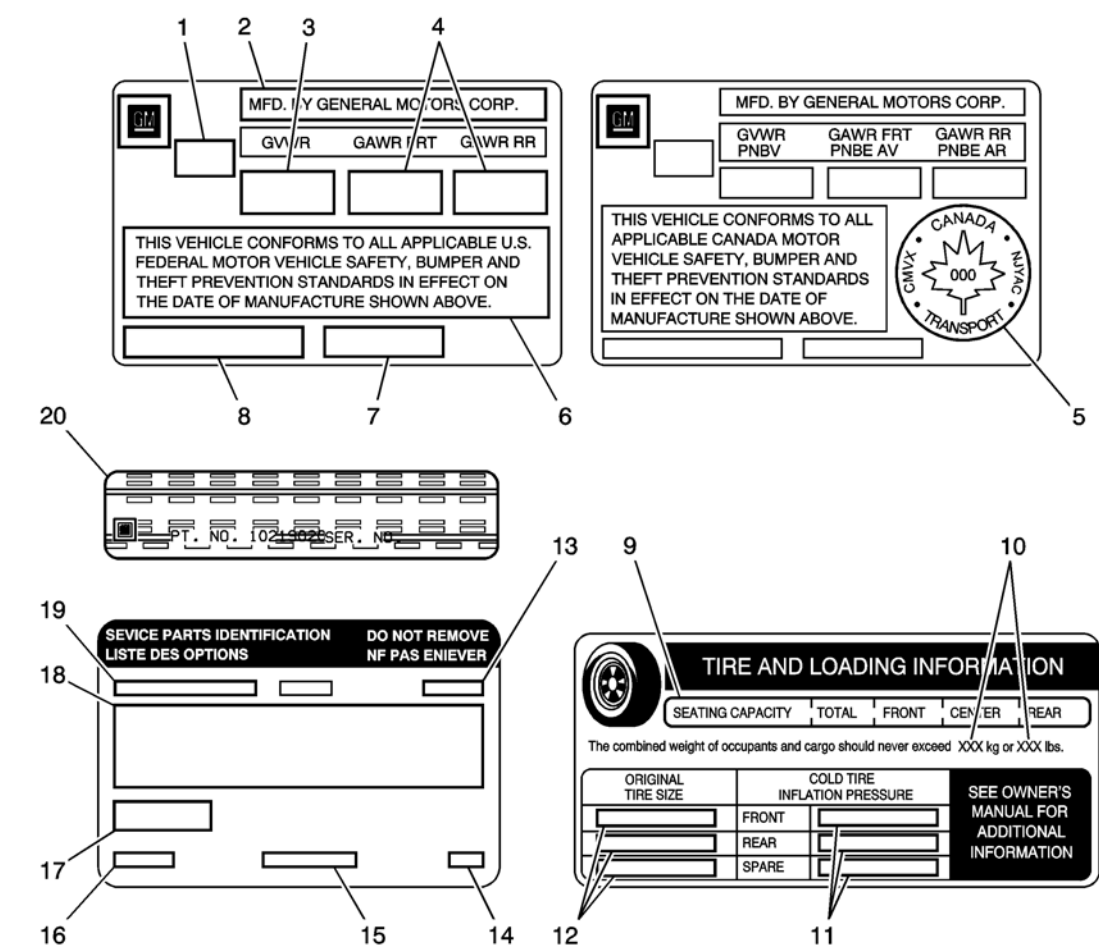


Note:: Graphic shows exemplary VIN.

The VIN plate is the legal identifier of the vehicle. The VIN plate is located on the upper left corner of the instrument panel (I/P) and can be seen through the windshield from the outside of the vehicle:

Position	Definition	Character	Description
1-3	Manufacturer	KL1 KLA KL3	Chevrolet Daewoo Holden
4	Carline	J	J300 Series (Cruze/Lacetti)
5	Transmission	F A	Forward Wheel Drive with Manual Transmission Forward Wheel Drive with Automatic Transmission
6-7	Body Style	69	4-door Sedan (Notchback)
8	Engine Type	U 6 E 5 R J	1.6L Gas LDE 1.6L Gas LXT 1.6L Gas LXV 1.8L Gas 2H0 2.0L Diesel LLW 2.4L Gas LAF
9	Emission Level	E 1 J 9	EEC 96/Euro-2 (NT2) EEC 00/Euro-3 (NT3) EEC 05/Euro-4 (NT4) EEC 09/Euro-5 (NE9)
10	Model Year	9	2009 (Modelyear according to FMVSS 115, alphanumeric)
11	Plant Code	C B K	Changwon Bupyung Kunsan
12-17	Production Sequence Number	--	Starting with "000001" for each new modelyear.

Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label



Callout	Description
<i>Vehicle Certification Label</i> The vehicle certification label is located on the driver door and displays the following assessments: • Gross Vehicle Weight Rating (GVWR) • Gross Axle Weight Rating (GAWR), front and rear • The gross vehicle weight (GVW) is the weight of the vehicle and everything it carries. The gross vehicle weight must not exceed the Gross Vehicle Weight Rating. Include the following items when figuring the GVW: - The base vehicle weight (factory weight) - The weight of all vehicles accessories - The weight of the driver and the passengers - The weight of the cargo	
1	Name of Manufacturer
2	Gross Vehicle Weight Rating
3	Gross Axle Weight Rating (Front, Rear)
4	Canadian Safety Mark (w/RPO Z49)
5	Certification Statement
6	Vehicle Class Type (Pass Car, etc.)
7	Vehicle Identification Number
8	Date of Manufacture (Mo/Yr)
<i>Tire Placard</i> The tire placard label is located on the driver door and displays the following assessments:	
9	Specified Occupant Seating Positions
10	Maximum Vehicle Capacity Weight

11	Original Equipment Tires Size
12	Tire Pressure, Front, Rear, and Spare (Cold)
<i>Service Parts ID Label</i> The vehicle service parts identification label is located in the rear compartment under the spare tire cover. The label is use to help identify the vehicle original parts and options.	
13	Vehicle Identification Number
14	Engineering Model Number (Vehicle Division, Line, and Body Style)
15	Interior Trim Level and Decor
16	Exterior (Paint Color) WA Number
17	Paint Technology
18	Special Order Paint Colors and Numbers
19	Vehicle Option Content
<i>Anti-Theft Label</i>	
20	The Federal law requires that General Motors label certain body parts on this vehicle with the VIN. The purpose of the law is to reduce the number of motor vehicle thefts by helping in the tracing and recovery of parts from stolen vehicles. Labels are permanently affixed to an interior surface of the part. The label on the replacement part contains the letter R, the manufacturer's logo, and the DOT symbol. The anti-theft label must be covered before any painting, rustproofing procedures, and uncovered after the procedures. Failure to follow the precautionary steps may result in liability for violation of the Federal Vehicle Theft Prevention Standard and possible suspicion to the owner that the part was stolen.

RPO Code List (GME)

The following table provides the description of the Regular Production Option (RPO) codes that are available on the vehicle. The vehicle's RPO list is printed on the Service Parts Identification Label.

RPO	Description
01K	TRIM COLOR SEAT - BRICK
01S	TRIM COLOR SEAT - MED TITANIUM
01Y	TRIM COLOR SEAT - SONIC BLUE
1A1	TRIM COLOR DR PANEL - SONIC BLUE
1AR	TRIM COLOR DR PANEL - MED TITANIUM
1BF	TRIM COLOR DR PANEL - BRICK
2H0	ENGINE - GAS, 4 CYL, 1.8L, MFI, 103KW, DOHC
4AA	INTERIOR TRIM - JET BLACK
4AQ	INTERIOR TRIM - V DK PEWTER
A01	WINDOW TINTED - ALL, SHADED WINDSHIELD (DO NOT USE AFTER M.Y. 2011)
A51	SEAT - FRT BKT, CUSTOM
A64	SEAT RR - SPLIT, FOLDING, 40/60
A69	RESTRAINT - SEAT BELT TENSIONER, FRT, VAR. 2
A99	COMPARTMENT DOOR - LOCKABLE GLOVE DOOR
AAY	INTERIOR TRIM CONFIG - #16
ADL	RESTRAINT SYSTEM - SEAT, INFLATABLE, DRIVER & PASS, SINGLE STAGE
AEC	WINDOW - POWER OPERATED, DRIVER EXPRESS DOWN
AED	WINDOW - POWER OPERATED, PASSENGER, EXPRESS DOWN
AEQ	WINDOW - POWER OPERATED, RR DRS, EXPRESS DOWN
AF8	LOCK CONTROL - SIDE DOOR, ANTI THEFT PROTECTION
AFA	INTERIOR TRIM CONFIG - #1
AFB	INTERIOR TRIM CONFIG - #2
AFD	INTERIOR TRIM CONFIG - #4
AFE	INTERIOR TRIM CONFIG - #5
AFG	INTERIOR TRIM CONFIG - #7
AFH	INTERIOR TRIM CONFIG - #8
AFI	INTERIOR TRIM CONFIG - #9

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AFL	INTERIOR TRIM CONFIG - #12
AFM	INTERIOR TRIM CONFIG - #13
AFN	INTERIOR TRIM CONFIG - #14
AG5	ADJUSTER PASS ST - MANUAL, 2 WAY
AG6	ADJUSTER PASS ST - MANUAL, 4 WAY
AH3	ADJUSTER FRT ST - MANUAL, 4 WAY, DRIVER
AH9	ADJUSTER FRT ST - MANUAL, 2 WAY, DRIVER
AHN	RESTRAINT PROVISIONS - LATCH
AJC	RESTRAINT - HEAD, FRT SEAT, UP/DOWN ADJUSTMENT
AJG	RESTRAINT SYSTEM - SEAT, INFLATABLE, DRIVER & PASS, FRT & SEAT SIDE, SINGLE STAGE
AQP	RESTRAINT - HEAD, RR SEAT, CENTER
ASV	EQUIPMENT - SENSOR AIR MOISTURE & W/S TEMP
ATH	LOCK CONTROL, ENTRY - REMOTE ENTRY, EXTENDED RANGE, PASSIVE ENTRY
AWO	RESTRAINT SYSTEM RR - SEAT BELT, REAR, 3 POINT, CTR
AXG	WINDOW - POWER OPERATED-EXPRESS DRIVER UP/DOWN
AXJ	VEHICLE TYPE - PASSENGER CAR
AYC	RESTRAINT SYSTEM - SEAT, INFLATABLE, DRIVER & PASS FRT, SEAT SIDE, ROOF SIDE, SINGLE STAGE
B76	CLUSTER COLOR - INST, BLACK
BAH	EQUIPMENT - SECURITY SYSTEM, IMMOBILIZATION, STEP TWO
BTM	SWITCH - ENGINE START, KEYLESS
C32	HEATER - HEATING/DEFROSTER SYSTEM, REINFORCED, ELECTRIC
C42	HVAC SYSTEM - HEATER, OUTSIDE AIR, DELUXE
C49	DEFOGGER - RR WINDOW, ELECTRIC
C67	HVAC SYSTEM - AIR CONDITIONER FRT, ELECTRONIC CONTROLS
C68	HVAC SYSTEM - AIR CONDITIONER FRT, AUTO, ELECTRONIC CONTROLS
C91	LAMP - INTR, ROOF, COURTESY
C95	LAMP - INTR, ROOF, COURTESY & DUAL READING
C99	SWITCH - INFL RST I/P MDL MAN SUPPRESSION
CE1	WIPER SYSTEM - WINDSHIELD, PULSE, MOISTURE SENSITIVE
CF5	ROOF - SUN, GLASS, SLIDING, ELEC
CJ6	COUNTRY - IRELAND

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CJ8	COUNTRY - BULGARIA
CJ9	COUNTRY - ROMANIA
CK4	COUNTRY - GREECE
CR2	COUNTRY - SLOVENIA
CR5	COUNTRY - CROATIA
CR6	COUNTRY - POLAND
CR7	COUNTRY - HUNGARY
CS0	COUNTRY - CZECH REPUBLIC
CT0	COUNTRY - SLOVAKIA
CT1	COUNTRY - BELGIUM
CT2	COUNTRY - AUSTRIA
CT3	COUNTRY - GERMANY
CT4	COUNTRY - LUXEMBOURG
CT5	COUNTRY - NETHERLANDS
CT6	COUNTRY - ITALY
CT7	COUNTRY - DENMARK
CT8	COUNTRY - PORTUGAL
CT9	COUNTRY - SPAIN
CU0	COUNTRY - UKRAINE
CU1	COUNTRY - NORWAY
CU2	COUNTRY - FINLAND
CU3	COUNTRY - FRANCE
CU4	COUNTRY - SWEDEN
CU5	COUNTRY - SWITZERLAND
CU9	COUNTRY - UNITED KINGDOM
CV0	COUNTRY - ALBANIA
CV1	COUNTRY - ICELAND
CV9	COUNTRY - TURKEY
CY5	COUNTRY - SERBIA
CY9	COUNTRY - ESTONIA
CZ3	COUNTRY - RUSSIA

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CZ8	COUNTRY - MACEDONIA
D2I	COUNTRY - LITHUANIA
D31	MIRROR I/S R/V - TILT
D3C	COUNTRY - BOSNIA-HERZEGOVINA
D3N	COUNTRY - YUGOSLAVIA
D4A	COUNTRY - LATVIA
D72	HANDLE O/S DOOR - BLACK
D75	HANDLE O/S DOOR - BODY COLOR
D7A	HANDLE O/S DOOR - BODY COLOR, CHROME STRIP
D91	HANDLE - O/S, L/GATE, R/CMPT, COLOR
DA1	ARM REST - RR SEAT, STORAGE
DBU	CONSOLE - FRT COMPT, FLOOR, ARM REST SLIDING
DD8	MIRROR I/S R/V - LT SENSITIVE
DLU	MIRROR I/S FRT VAN - SUNSHADE, DRIVER, W/O MIRROR, PASS, W/MIRROR & COVER
DP6	MIRROR PROVISIONS - HOUSING, PAINTED
DT4	ASHTRAY - CIGARETTE LIGHTER
DWE	MIRROR O/S - LH & RH, RC, ELEC, HEAT, AUX WFOV/DRVR, MANFOLD, CNVX/PASS
DWF	MIRROR O/S - LH & RH, RC, ELEC, HEAT, AUX WFOV/DRVR, PWRFOLD, CNVX/PASS
E17	BUMPER - 2.5 MPH
E3E	HANDLE - O/S, L/GATE, R/CMPT, CHROME
E7M	COUNTRY - MONTENEGRO
EA1	POCKET - FRONT SEAT BACK, LH
EA2	POCKET - FRONT SEAT BACK, RH
EBG	TRIM SEAT - CLOTH, FLAT WOVEN
EBF	TRIM SEAT - LEATHER, MERIDIAN
EBJ	TRIM SEAT - CLOTH, MESH
F82	RATIO - TRANSAXLE FINAL DRIVE 3.23
FCT	TRIM DOOR - MESH FABRIC
FCU	TRIM DOOR - PU LEATHER
FCV	TRIM DOOR - PU PAINT
FJB	RATIO - TRANSAXLE FINAL DRIVE 3.37

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FV1	RATIO - TRANSAXLE FINAL DRIVE 3.72
FX1	RATIO - TRANSAXLE FINAL DRIVE 3.94
FX3	RIDE AND HANDLING - AUTOMATIC ELECTRONIC CONTROLLED
FX6	RATIO - TRANSAXLE FINAL DRIVE 3.87
FXF	RATIO - TRANSAXLE FINAL DRIVE 3.26
FXQ	RATIO - TRANSAXLE FINAL DRIVE 2.29
GAR	PRIMARY COLOR - EXTERIOR, CARBON FLASH MET (G) 501Q
GCB	PRIMARY COLOR - EXTERIOR, GALAXY WHITE (G)
GCS	PRIMARY COLOR - EXTERIOR, VELVET RED MET (G)
GCT	PRIMARY COLOR - EXTERIOR, MOROCCAN BLUE MET (G)
GCU	PRIMARY COLOR - EXTERIOR, ATLANTIS BLUE MET (G)
GCV	PRIMARY COLOR - EXTERIOR, PEWTER GREY MET(G)
GCW	PRIMARY COLOR - EXTERIOR, MISTY LAKE MET (G)
GCY	PRIMARY COLOR - EXTERIOR, POLY SILVER MET(G)
GCZ	PRIMARY COLOR - EXTERIOR, LIGHT GOLD MET (G)
GGE	PRIMARY COLOR - EXTERIOR, SUPER RED (G) 717R
GNA	CHASSIS EQUIP FRONT - STRUT ASM
GNF	CHASSIS EQUIP REAR - REAR AXLE, COMPOUND CRANK
J60	BRAKE SYSTEM - POWER, FRT & RR DISC, ABS, 16"
J67	BRAKE SYSTEM - POWER, FRT & RR DISC, ABS, 15"
J93	BRAKE SYSTEM - POWER, FRT DISC, RR DRUM, ABS, 15"
K34	CRUISE CONTROL - AUTOMATIC, ELECTRONIC
K60	GENERATOR - 100 AMP
K3L	BATTERY - LBN2, FLA, 12V, 60AH, 438 ENCCA
K3S	BATTERY - LBN4, FLA, 12V, 75AH, 720 ENCCA
KA1	HEATER - SEAT, FRT
KCL	HEATER - DUCT, RR PASS (2ND POSN)
KTD	KEY - PRIMARY RIGID, ADDITIONAL RIGID
KTF	KEY - PRIMARY FOLDABLE, ADDITIONAL FOLDABLE
KTM	KEY - PRIMARY FOLDABLE, ADDITIONAL RIGID
KC7	RECEPTACLE - ELECTRICAL, RR SEAT

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KG9	GENERATOR - 140 AMP
KTA	AUDIO INTERFACE -
KUA	PLANT CODE - GUNSAN, KOREA
LHD	VEHICLE DRIVE - LEFTHAND DRIVE
LLW	ENGINE - DIESEL, 4 CYL, L4, 2.0L, CRI, SOHC, TURBO, 110 KW,
LXT	ENGINE - GAS, 4 CYL, 1.6L, MFI, DOHC, 80KW (GMDAT)
LXV	ENGINE - GAS, 4 CYL, 1.6L, MFI, DOHC, PT-JV, VARIABLE CAMSHAFT PHASING, 82KW
MDB	MOLDING B/S UPPER - BLACK
MDC	MOLDING B/S UPPER - BRIGHT
MFH	TRANSMISSION - MAN 5 SPD, D16 M/CR
MFV	TRANSMISSION - MAN 5 SPD, D33 SUPER-WIDE, 3.947 1ST, 0.721 5TH
MH7	TRANSMISSION - AUTO 6 SPD, HMD, X23FHD
MH8	TRANSMISSION - AUTO 6 SPD, HMD, X23F
MH9	TRANSMISSION - AUTO 6 SPD, HMD, X24F
MYJ	TRANSMISSION - MAN 6 SPD, (F40-6, FWD) 1ST 4.167, SIXTH 0.623
N33	STEERING COLUMN - TILT TYPE
N34	STEERING WHEEL - LEATHER, 3 SPOKES
N37	STEERING COLUMN - TILT, TELESCOPING
N45	STEERING WHEEL - 3 SPOKES
N92	COVER, WHEEL - BOLT-ON
NE9	EMISSION SYSTEM - EEC 09
NT4	EMISSION SYSTEM - EEC 05
PWL	WHEEL - 15 X 6.5, STEEL, DESIGN1 TBD GLOBAL DELTA (DO NOT USE AFTER M.Y. 2011)
PWM	WHEEL - 16 X 6.5, STEEL, DESIGN2 TBD GLOBAL DELTA (DO NOT USE AFTER M.Y. 2011)
Q0G	TIRE ALL - 205/65R15-94V BW R/ST TL HW3
Q0H	TIRE ALL - 205/60R16-92V BW R/ST TL HW3
Q0I	TIRE ALL - 215/50R17-91V BW R/ST TL HW3
Q0J	TIRE ALL - 225/50R17-94V BW R/ST TL HW3
QQ5	TIRE & WHEEL - SPARE, FULL SIZE, STEEL - DO NOT USE AFTER MY 2009
RHD	VEHICLE DRIVE - RIGHTHAND DRIVE
T39	LAMP - TURN SIGNAL, AUX

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T74	HEADLAMPS CONTROL - AUTOMATIC, DELAY
T83	HEADLAMPS CONTROL - AUTOMATIC ON-OFF
T94	HEADLAMPS CONTROL - LH RULE OF THE ROAD
T3U	LAMP - FRT FOG
T3X	LAMP SYSTEM - DAYTIME RUNNING, REGULAR INTENSITY LOW BEAM
T4A	HEADLAMPS - HALOGEN
T79	LAMP - FOG, RR
TBT	PLANT CODE - ST.PETERSBURG, RUSSIA
TCU	LICENSE PLATE - FRT & RR MOUNTING, ECE
TPV	GRILLE - RADIATOR, BLACK, W/CHROME BAR
TPX	GRILLE - RADIATOR, BLACK, W/COLORED BAR
TR6	HEADLAMPS CONTROL - LEVELING SYSTEM, MANUAL
TS6	LAMP - STOP, HIGH LEVEL
TTO	RADIO EQUIPMENT - COOLING SYSTEM
TTX	RADIO EQUIPMENT - AUX CONNECTOR (LINE IN)
U04	HORN - SINGLE NOTE
U68	DISPLAY - DRIVER INFO CENTER
U91	ANTENNA - SHORT, ROOF, RADIO
UAG	INFOTAINMENT DISPLAY - GRAPHIC INFO DISPLAY (GID), VAR 1
UD7	SENSOR INDICATOR - REAR PARKING ASSIST
UDB	DISPLAY INSTRUMENT - DRIVER INFO ENHANCED (SEGMENTED)
UDG	DISPLAY INSTRUMENT - TRIP ODOMETER (SEGMENTED)
UDK	INFOTAINMENT DISPLAY - COLOR INFO DISPLAY (CID) 7", QVGA
UEC	SENSOR INDICATOR - AUTOMATIC AIR RECIRCULATION
UFD	INFOTAINMENT DISPLAY - TIME, EXTERNAL TEMP, RADIO
UH0	INDICATOR - SEAT BELT WARNING , LH
UH1	INDICATOR - SEAT BELT WARNING , RH
ULS	LOCK CONTROL - STEERING COLUMN
UQF	SPEAKER SYSTEM - STANDARD AUDIO
UTJ	THEFT DETERENT - ELECTRICAL, UNAUTHORIZED ENTRY
UTP	ALARM, HORN - CONTENT THEFT DETERENT

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UTR	ALARM, HORN - CONTENT THEFT DETERENT, SELF POWERED
UTT	THEFT DETERENT - BODY SECURITY CONTENT
UTU	SENSOR, VEHICLE - INCLINATION
UTV	SENSOR, VEHICLE - INTERIOR MOVEMENT
UW4	SPEAKER SYSTEM - 4, CUSTOM
UW6	SPEAKER SYSTEM - 6, CUSTOM
UXW	RADIO - AM/FM STEREO, NAV, CD-ROM, CAF, USB, RSA, TMC, (GME VERSION)
UYB	RADIO - AM/FM STEREO, CD-ROM, CAF, RSA (GME/ME/TAIWAN VERSION)
UYI	RADIO - AM/FM STEREO, CDX-ROM, CAF, RSA, MUSIC NAVIGATOR (GME/ME/TAIWAN VERSION)
UZ6	SPEAKER SYSTEM - 6, PREMIUM
VHY	PROTECTOR - BODY SHEET METAL, HIGH CORROSION PREVENTIVE
VK8	HOLDER - EYEGLASSES
VNF	ISOLATOR - BATTERY
VTW	COMPARTMENT - STOWAGE, I/P, W/LID
VTX	COMPARTMENT - STOWAGE, I/P, WO/LID
VY7	KNOB - TRANS CONT LEVER, LEATHER
W1Y	CONTROL - STEERING WHEEL, RADIO, REDUNDANT CONTROLS
WQS	WHEEL - 16 X 6.5, ALUMINUM, DESIGN 17 TBD GLOBAL DELTA (DO NOT USE AFTER M.Y. 2011)
WQX	WHEEL - 17 X 7, ALUMINUM, DESIGN 19 TBD GLOBAL DELTA (DO NOT USE AFTER M.Y. 2011)
WTC	TIRE & WHEEL - INFLATOR KIT (DO NOT USE AFTER M.Y. 2011)
XQ9	EQUIPMENT - CHEVROLET
Z1F	IDENTIFICATION - SPEEDOMETER KILOMETER
Z1G	IDENTIFICATION - SPEEDOMETER MILES

Fasteners

- Table 1: [Metric Prevailing Torque Fastener Minimum Torque Development](#)
- Table 2: [English Prevailing Torque Fastener Minimum Torque Development](#)

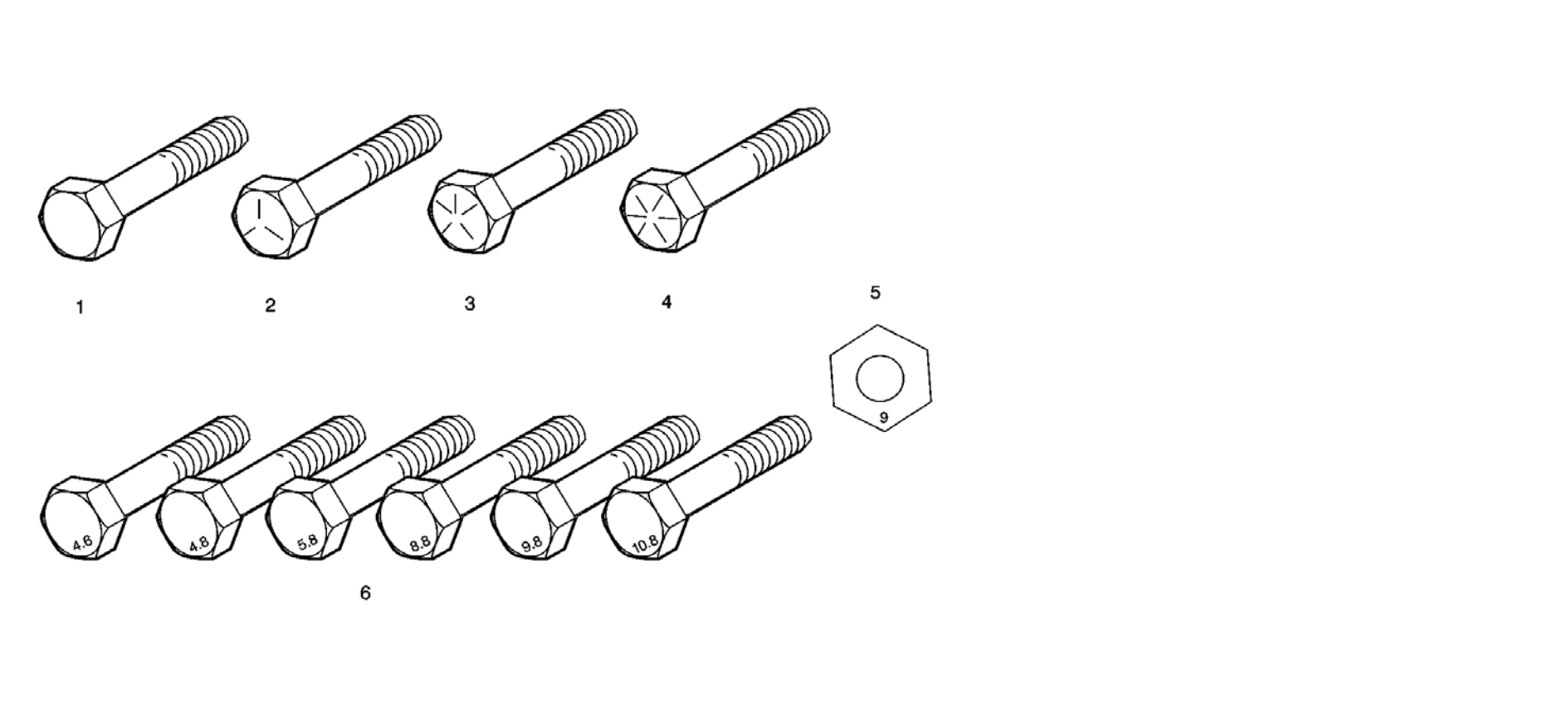
Metric Fasteners

This vehicle provides fastener dimensions using the metric system. Most metric fasteners are approximate in diameter to equivalent English fasteners. Make replacements using fasteners of the same nominal diameter, thread pitch, and strength.

A number marking identifies the OE metric fasteners except cross-recess head screws. The number also indicates the strength of the fastener material. A Posidrive® or Type 1A cross-recess identifies a metric cross-recess screw. For best results, use a Type 1A cross-recess screwdriver, or equivalent, in Posidrive® recess head screws.

GM Engineering Standards and North American Industries have adopted a portion of the ISO-defined standard metric fastener sizes. The purpose was to reduce the number of fastener sizes used while retaining the best thread qualities in each thread size. For example, the metric M6.0 X 1 screw, with nearly the same diameter and 25.4 threads per inch replaced the English 1/4-20 and 1/4-28 screws. The thread pitch is midway between the English coarse and fine thread pitches.

Fastener Strength Identification



- (1) English Bolt, Grade 2 (Strength Class)
- (2) English Bolt, Grade 5 (Strength Class)
- (3) English Bolt, Grade 7 (Strength Class)
- (4) English Bolt, Grade 8 (Strength Class)
- (5) Metric Nut, Strength Class 9
- (6) Metric Bolts, Strength Class Increases as Numbers Increase

The most commonly used metric fastener strength property classes are 9.8 and 10.9. The class identification is embossed on the head of each bolt. The English, inch strength classes range from grade 2 to grade 8. Radial lines are embossed on the head of each bolt in order to identify the strength class. The number of lines on the head of the bolt is 2 lines less than the actual grade. For example, a grade 8 bolt will have 6 radial lines on the bolt head. Some metric nuts are marked with a single digit strength identification number on the nut face.

The correct fasteners are available through GM SPO. Many metric fasteners available in the aftermarket parts channels are designed to metric standards of countries other than the United States, and may exhibit the following:

- Lower strength
- No numbered head marking system
- Wrong thread pitch

The metric fasteners on GM products are designed to new, international standards. The following are the common sizes and pitches, except for special applications:

- M6.0 X 1
- M8 X 1.25
- M10 X 1.5
- M12 X 1.75
- M14 X 2.00
- M16 X 2.00

Prevailing Torque Fasteners

Prevailing torque fasteners create a thread interface between the fastener and the fastener counterpart in order to prevent the fastener from loosening.

All Metal Prevailing Torque Fasteners

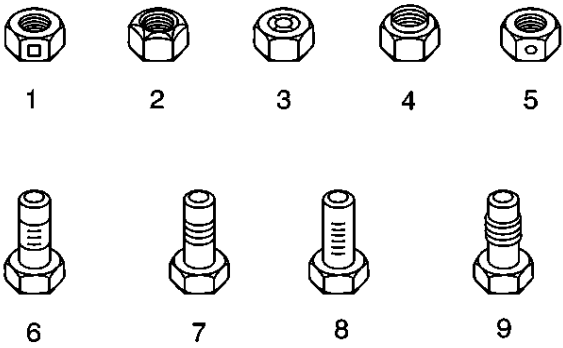
These fasteners accomplish the thread interface by a designed distortion or deformation in the fastener.

Nylon Interface Prevailing Torque Fasteners

These fasteners accomplish the thread interface by the presence of a nylon material on the fastener threads.

Adhesive Coated Fasteners

These fasteners accomplish the thread interface by the presence of a thread-locking compound on the fastener threads. Refer to the appropriate repair procedure in order to determine if the fastener may be reused and the applicable thread-locking compound to apply to the fastener.



- (1) Prevailing Torque Nut, Center Lock Type
- (2) Prevailing Torque Nut, Top Lock Type
- (3) Prevailing Torque Nut, Nylon Patch Type
- (4) Prevailing Torque Nut, Nylon Washer Insert Type
- (5) Prevailing Torque Nut, Nylon Insert Type
- (6) Prevailing Torque Bolt, Dry Adhesive Coating Type
- (7) Prevailing Torque Bolt, Thread Profile Deformed Type
- (8) Prevailing Torque Bolt, Nylon Strip Type
- (9) Prevailing Torque Bolt, Out-of-Round Thread Area Type

A prevailing torque fastener may be reused ONLY if:

- The fastener and the fastener counterpart are clean and not damaged
- There is no rust on the fastener
- The fastener develops the specified minimum torque against its counterpart prior to the fastener seating

Metric Prevailing Torque Fastener Minimum Torque Development

Application	Specification	
	Metric	English
All Metal Prevailing Torque Fasteners		
6 mm	0.4 N·m	4 lb in
8 mm	0.8 N·m	7 lb in
10 mm	1.4 N·m	12 lb in
12 mm	2.1 N·m	19 lb in
14 mm	3 N·m	27 lb in
16 mm	4.2 N·m	37 lb in
20 mm	7 N·m	62 lb in
24 mm	10.5 N·m	93 lb in
Nylon Interface Prevailing Torque Fasteners		
6 mm	0.3 N·m	3 lb in



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8 mm	0.6 N·m	5 lb in
10 mm	1.1 N·m	10 lb in
12 mm	1.5 N·m	13 lb in
14 mm	2.3 N·m	20 lb in
16 mm	3.4 N·m	30 lb in
20 mm	5.5 N·m	49 lb in
24 mm	8.5 N·m	75 lb in

English Prevailing Torque Fastener Minimum Torque Development

Application	Specification	
	Metric	English
All Metal Prevailing Torque Fasteners		
1/4 in	0.5 N·m	4.5 lb in
5/16 in	0.8 N·m	7.5 lb in
3/8 in	1.3 N·m	11.5 lb in
7/16 in	1.8 N·m	16 lb in
1/2 in	2.3 N·m	20 lb in
9/16 in	3.2 N·m	28 lb in
5/8 in	4 N·m	36 lb in
3/4 in	7 N·m	54 lb in
Nylon Interface Prevailing Torque Fasteners		
1/4 in	0.3 N·m	3 lb in
5/16 in	0.6 N·m	5 lb in
3/8 in	1 N·m	9 lb in
7/16 in	1.3 N·m	12 lb in
1/2 in	1.8 N·m	16 lb in
9/16 in	2.5 N·m	22 lb in
5/8 in	3.4 N·m	30 lb in
3/4 in	5 N·m	45 lb in

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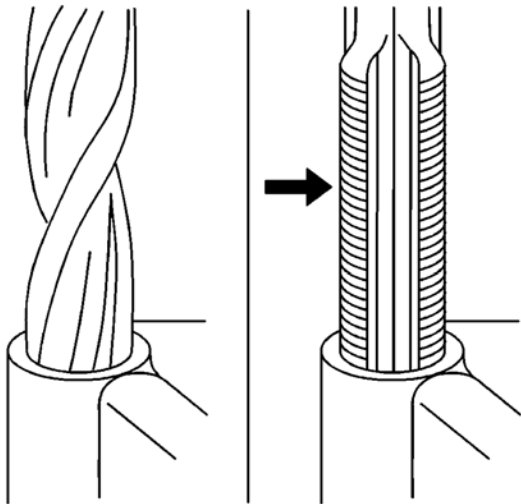
Thread Inserts

General Purpose Thread Repair Kits.

These kits are available commercially.

Repair Procedure

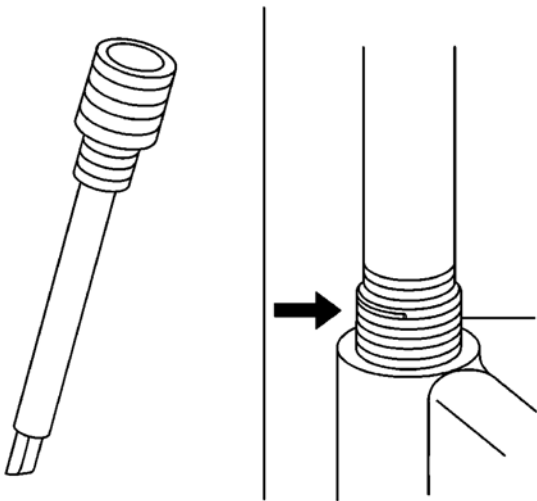
Warning: Refer to [Safety Glasses Warning](#) in the Preface section.



Note: Refer to the thread repair kit manufacturer's instructions regarding the size of the drill and tap to use.

Avoid any buildup of chips. Back out the tap every few turns and remove the chips.

1. Determine the size, the pitch, and the depth of the damaged thread. If necessary, adjust the stop collars on the cutting tool and tap to the required depth.
2. Drill out the damaged threads. Clean out any chips.
3. Lubricate the tap with light engine oil. Tap the hole. Clean the threads.



4. Thread the thread insert onto the mandrel of the installer. Engage the tang of the insert onto the end of the mandrel.

Note: The insert should be flush to one turn below the surface.

5. Lubricate the insert with light engine oil, except when installing in aluminum and install the insert.
6. If the tang of the insert does not break off when backing out the installer, break the tang off with a drift.

Abbreviations and Meanings

Abbreviation	Meaning
A	
A	Ampere(s)
ABS	Antilock Brake System
A/C	Air Conditioning
AC	Alternating Current
ACC	Accessory, Automatic Climate Control
ACL	Air Cleaner
ACM	Air Conditioning Module
ACR4	Air Conditioning Refrigerant, Recovery, Recycling, Recharging
AD	Automatic Disconnect
A/D	Analog to Digital
ADL	Automatic Door Lock
A/F	Air/Fuel Ratio
AH	Active Handling
AIR	Secondary Air Injection
ALC	Automatic Level Control, Automatic Lamp Control
AM/FM	Amplitude Modulation/Frequency Modulation
Ant	Antenna
AP	Accelerator Pedal
APCM	Accessory Power Control Module
API	American Petroleum Institute
APP	Accelerator Pedal Position
APT	Adjustable Part Throttle
ASM	Assembly, Accelerator and Servo Control Module
ASR	Acceleration Slip Regulation
AT	Automatic Transmission
ATC	Automatic Transfer Case, Automatic Temperature Control
ATDC	After Top Dead Center

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ATSLC	Automatic Transmission Shift Lock Control
Auto	Automatic
avg	Average
A4WD	Automatic Four-Wheel Drive
AWG	American Wire Gauge
B	
B+	Battery Positive Voltage
BARO	Barometric Pressure
BATT	Battery
BBV	Brake Booster Vacuum
BCA	Bias Control Assembly
BCM	Body Control Module
BG	Beige
BHP	Brake Horsepower
BK	Black
BLK	Black
BLU	Blue
BN	Brown
BP	Back Pressure
BPCM	Battery Pack Control Module
BPMV	Brake Pressure Modulator Valve
BPP	Brake Pedal Position
BRN	Brown
BTDC	Before Top Dead Center
BTM	Battery Thermal Module
BTSI	Brake Transmission Shift Interlock
Btu	British Thermal Units
BU	Blue
C	
°C	Degrees Celsius
CAC	Charge Air Cooler

CAFE	Corporate Average Fuel Economy
Cal	Calibration
Cam	Camshaft
CARB	California Air Resources Board
CC	Coast Clutch
cm ³	Cubic Centimeters
CCM	Convenience Charge Module, Chassis Control Module
CCOT	Cycling Clutch Orifice Tube
CCP	Climate Control Panel
CD	Compact Disc
CE	Commutator End
CEAB	Cold Engine Air Bleed
CEMF	Counter Electromotive Force
CEX	Cabin Exchanger
cfm	Cubic Feet per Minute
cg	Center of Gravity
CID	Color Info Display
CID	Cubic Inch Displacement
CKP	Crankshaft Position
CKT	Circuit
C/Ltr	Cigar Lighter
CL	Clear
CL	Closed Loop
CLS	Coolant Level Switch
CMC	Compressor Motor Controller
CMP	Camshaft Position
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO2	Carbon Dioxide
Coax	Coaxial
COMM	Communication

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Conn	Connector
CPA	Connector Position Assurance
CPP	Clutch Pedal Position
CPS	Central Power Supply
CPU	Central Processing Unit
CR	Cream
CRT	Cathode Ray Tube
CRTC	Cathode Ray Tube Controller
CS	Charging System
CSFI	Central Sequential Fuel Injection
CTP	Closed Throttle Position
cu ft	Cubic Foot/Feet
cu in	Cubic Inch/Inches
CV	Constant Velocity Joint
CVRSS	Continuously Variable Road Sensing Suspension
Cyl	Cylinder(s)
D	
D	Dark
D	Diesel
DAB	Delayed Accessory Bus
dB	Decibels
dBA	Decibels on A-weighted Scale
DC	Direct Current, Duty Cycle
DCM	Door Control Module
DE	Drive End
DEC	Digital Electronic Controller
DERM	Diagnostic Energy Reserve Module
DI	Distributor Ignition
dia	Diameter
DIC	Driver Information Center
Diff	Differential

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DIM	Dash Integration Module
DK	Dark
DLC	Data Link Connector
DMCM	Drive Motor Control Module
DMM	Digital Multimeter
DMSDS	Drive Motor Speed and Direction Sensor
DMU	Drive Motor Unit
DOHC	Dual Overhead Camshafts
DPM	Driver Position Module
DR, Drvr	Driver
DRL	Daytime Running Lamps
DSCC	Distance Sensing Cruise Control
DTC	Diagnostic Trouble Code
E	
EBCM	Electronic Brake Control Module
EBTCM	Electronic Brake and Traction Control Module
EC	Electrical Center, Engine Control
ECC	Electronic Climate Control
ECI	Extended Compressor at Idle
ECL	Engine Coolant Level
ECM	Engine Control Module, Electronic Control Module
ECS	Emission Control System
ECT	Engine Coolant Temperature
EEPROM	Electrically Erasable Programmable Read Only Memory
EEVIR	Evaporator Equalized Values in Receiver
EFE	Early Fuel Evaporation
EGR	Exhaust Gas Recirculation
EGR TVV	Exhaust Gas Recirculation Thermal Vacuum Valve
EHPS	Electro-Hydraulic Power Steering
EI	Electronic Ignition
ELAP	Elapsed

ELC	Electronic Level Control
E/M	English/Metric
EMF	Electromotive Force
EMI	Electromagnetic Interference
Eng	Engine
EOP	Engine Oil Pressure
EOT	Engine Oil Temperature
EPA	Environmental Protection Agency
EPR	Exhaust Pressure Regulator
EPROM	Erasable Programmable Read Only Memory
ESB	Expansion Spring Brake
ESC	Electronic Suspension Control
ESD	Electrostatic Discharge
ESN	Electronic Serial Number
ESP	Electronic Stability Program
ETC	Electronic Throttle Control, Electronic Temperature Control, Electronic Timing Control
ETCC	Electronic Touch Climate Control
ETR	Electronically Tuned Receiver
ETS	Enhanced Traction System
EVAP	Evaporative Emission
EVO	Electronic Variable Orifice
Exh	Exhaust
F	
°F	Degrees Fahrenheit
FC	Fan Control
FDC	Fuel Data Center
FED	Federal All United States except California
FEDS	Fuel Enable Data Stream
FEX	Front Exchanger
FF	Flexible Fuel
FFH	Fuel-Fired Heater



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FI	Fuel Injection
FI	Petrol
FMVSS	Federal U.S. Motor Vehicle Safety Standards
FP	Fuel Pump
ft	Foot/Feet
FT	Fuel Trim
F4WD	Full Time Four Wheel Drive
4WAL	Four Wheel Antilock
4WD	Four Wheel Drive
FW	Flat Wire
FWD	Front Wheel Drive, Forward
G	
g	Grams, Gravitational Acceleration
GA	Gauge
gal	Gallon
gas	Gasoline
GCW	Gross Combination Weight
GD	Gold
Gen	Generator
GL	Gear Lubricant
GM	General Motors
GME	General Motors Europe
GM SPO	General Motors Service Parts Operations
GN	Green
gnd	Ground
gpm	Gallons per Minute
GRN	Green
GRY	Gray
GVWR	Gross Vehicle Weight Rating
GY	Gray
H	



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H	Hydrogen
H2O	Water
Harn	Harness
HC	Hydrocarbons
HCM	HVAC Control Module
H/CMPR	High Compression
HD	Heavy Duty
HDC	Heavy Duty Cooling
hex	Hexagon, Hexadecimal
Hg	Mercury
Hi Alt	High Altitude
HO2S	Heated Oxygen Sensor
hp	Horsepower
HPL	High Pressure Liquid
HPS	High Performance System
HPV	High Pressure Vapor
HPVS	Heat Pump Ventilation System
Htd	Heated
HTR	Heater
HUD	Head Up Display
HVAC	Heater Ventilation Air Conditioning
HVACM	Heater Vent Air Conditioning Module
HVIL	High Voltage Interlock Loop
HVM	Heater Vent Module
Hz	Hertz
/	
IAC	Idle Air Control
IAT	Intake Air Temperature
IC	Integrated Circuit, Ignition Control
ICCS	Integrated Chassis Control System
ICM	Ignition Control Module



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ID	Identification, Inside Diameter
IDI	Integrated Direct Ignition
IGBT	Insulated Gate Bi-Polar Transistor
ign	Ignition
ILC	Idle Load Compensator
in	Inch/Inches
INJ	Injection
inst	Instantaneous, Instant
IP	Instrument Panel
IPC	Instrument Panel Cluster
IPM	Instrument Panel Module
I/PEC	Instrument Panel Electrical Center
ISC	Idle Speed Control
ISO	International Standards Organization
ISS	Input Speed Shaft, Input Shaft Speed
ITCM	Integrated Transmission Control Module
K	
KAM	Keep Alive Memory
KDD	Keyboard Display Driver
kg	Kilogram
kHz	Kilohertz
km	Kilometer
km/h	Kilometers per Hour
km/l	Kilometers per Liter
kPa	Kilopascals
KS	Knock Sensor
kV	Kilovolts
L	
L	Light
L	Liter
L4	Four Cylinder Engine, In-Line

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L6	Six-Cylinder Engine, In-Line
lb	Pound
lb ft	Pound Feet Torque
lb in	Pound Inch Torque
LCD	Liquid Crystal Display
LDCL	Left Door Closed Locking
LDCM	Left Door Control Module
LDM	Lamp Driver Module
LED	Light Emitting Diode
LEV	Low Emissions Vehicle
LF	Left Front
lm	Lumens
LR	Left Rear
LT	Left
LT	Light
LT	Long Term
LTPI	Low Tire Pressure Indicator
LTPWS	Low Tire Pressure Warning System
LWB	Long Wheel Base
M	
MAF	Mass Air Flow
Man	Manual
MAP	Manifold Absolute Pressure
MAT	Manifold Absolute Temperature
max	Maximum
M/C	Mixture Control
MDP	Manifold Differential Pressure
MFI	Multiport Fuel Injection
mi	Miles
MIL	Malfunction Indicator Lamp
min	Minimum

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MIN	Mobile Identification Number
mL	Milliliter
mm	Millimeter
mpg	Miles per Gallon
mph	Miles per Hour
ms	Millisecond
MST	Manifold Surface Temperature
MSVA	Magnetic Steering Variable Assist, Magnasteer®
MT	Manual Transmission
MV	Megavolt
mV	Millivolt
N	
NA	Natural
NAES	North American Export Sales
NC	Normally Closed
NEG	Negative
Neu	Neutral
NI	Neutral Idle
NiMH	Nickel Metal Hydride
NLGI	National Lubricating Grease Institute
N·m	Newton-meter Torque
NO	Normally Open
NOx	Oxides of Nitrogen
NPTC	National Pipe Thread Coarse
NPTF	National Pipe Thread Fine
NOVRAM	Non-Volatile Random Access Memory
O	
O2	Oxygen
O2S	Oxygen Sensor
OBD	On-Board Diagnostics
OBD II	On-Board Diagnostics Second Generation

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OC	Oxidation Converter Catalytic
OCS	Opportunity Charge Station
OD	Outside Diameter
ODM	Output Drive Module
ODO	Odometer
OE	Original Equipment
OEM	Original Equipment Manufacturer
OG	Orange
OHC	Overhead Camshaft
Ω	Ohm
OL	Open Loop, Out of Limits
ORC	Oxidation Reduction Converter Catalytic
ORN	Orange
ORVR	On-Board Refueling Vapor Recovery
OSS	Output Shaft Speed
oz	Ounce(s)
<i>P</i>	
PAG	Polyalkylene Glycol
PAIR	Pulsed Secondary Air Injection
PASS, PSGR	Passenger
PASS-Key®	Personalized Automotive Security System
P/B	Power Brakes
PC	Pressure Control
PCB	Printed Circuit Board
PCM	Powertrain Control Module
PCS	Pressure Control Solenoid
PCV	Positive Crankcase Ventilation
PEB	Power Electronics Bay
PID	Parameter Identification
PIM	Power Inverter Module
PK	Pink

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PM	Permanent Magnet Generator
P/N	Part Number
PNK	Pink
PNP	Park/Neutral Position
PRNDL	Park, Reverse, Neutral, Drive, Low
POA	Pilot Operated Absolute Valve
POS	Positive, Position
POT	Potentiometer Variable Resistor
PPL	Purple
ppm	Parts per Million
PROM	Programmable Read Only Memory
P/S, PS	Power Steering
PSCM	Power Steering Control Module, Passenger Seat Control Module
PSD	Power Sliding Door
PSP	Power Steering Pressure
psi	Pounds per Square Inch
psia	Pounds per Square Inch Absolute
psig	Pounds per Square Inch Gauge
pt	Pint
PTC	Positive Temperature Coefficient
PU	Purple
PWM	Pulse Width Modulated
Q	
QDM	Quad Driver Module
qt	Quart(s)
R	
R-12	Refrigerant-12
R-134a	Refrigerant-134a
RAM	Random Access Memory, Non-permanent memory device, memory contents are lost when power is removed.
RAP	Retained Accessory Power
RAV	Remote Activation Verification

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RCDLR	Remote Control Door Lock Receiver
RD	Red
RDCM	Right Door Control Module
Ref	Reference
Rev	Reverse
REX	Rear Exchanger
RIM	Rear Integration Module
RF	Right Front, Radio Frequency
RFA	Remote Function Actuation
RFI	Radio Frequency Interference
RH	Right
RKE	Remote Keyless Entry
Rly	Relay
ROM	Read Only Memory, Permanent memory device, memory contents are retained when power is removed.
RPM	Revolutions per Minute Engine Speed
RPO	Regular Production Option
RR	Right Rear
RSS	Road Sensing Suspension
RTD	Real Time Damping
RT	Right
RTV	Room Temperature Vulcanizing Sealer
RU	Rust
RWAL	Rear Wheel Antilock
RWD	Rear Wheel Drive
S	
s	Second(s)
SAE	Society of Automotive Engineers
SC	Supercharger
SCB	Supercharger Bypass
SCM	Seat Control Module
SDM	Sensing and Diagnostic Module

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SEO	Special Equipment Option
SFI	Sequential Multiport Fuel Injection
SI	System International Modern Version of Metric System
SIAB	Side Impact Air Bag
SIR	Supplemental Inflatable Restraint
SGM	Shanghai General Motors
SLA	Short/Long Arm Suspension
sol	Solenoid
SO2	Sulfur Dioxide
SP	Splice Pack
S/P	Series/Parallel
SPO	Service Parts Operations
SPS	Service Programming System, Speed Signal
sq ft, ft²	Square Foot/Feet
sq in, in²	Square Inch/Inches
SR	Silver
SRC	Service Ride Control
SRI	Service Reminder Indicator
SRS	Supplemental Restraint System
SS	Shift Solenoid
ST	Scan Tool
STID	Station Identification Station ID
S4WD	Selectable Four-Wheel Drive
Sw	Switch
SWB	Short Wheel Base
SWPS	Steering Wheel Position Sensor
syn	Synchronizer
T	
TAC	Throttle Actuator Control
Tach	Tachometer
TAP	Transmission Adaptive Pressure, Throttle Adaptive Pressure



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TBI	Throttle Body Fuel Injection
TC	Turbocharger, Transmission Control
TCC	Torque Converter Clutch
TCS	Traction Control System
TDC	Top Dead Center
TEMP	Temperature
Term	Terminal
TFP	Transmission Fluid Pressure
TFT	Transmission Fluid Temperature
THM	Turbo Hydro-Matic
TIM	Tire Inflation Monitoring, Tire Inflation Module
TL	Teal
TN	Tan
TOC	Transmission Oil Cooler
TP	Throttle Position
TPA	Terminal Positive Assurance
TPM	Tire Pressure Monitoring, Tire Pressure Monitor
TQ	Turquoise
TR	Transmission Range
TRANS	Transmission/Transaxle
TT	Tell Tail Warning Lamp
TV	Throttle Valve
TVRS	Television and Radio Suppression
TVV	Thermal Vacuum Valve
TWC	Three Way Converter Catalytic
TWC+OC	Three Way + Oxidation Converter Catalytic
TXV	Thermal Expansion Valve
U	
UART	Universal Asynchronous Receiver Transmitter
U/H	Underhood
U/HEC	Underhood Electrical Center

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GENERAL INFORMATION

U-joint	Universal Joint
UTD	Universal Theft Deterrent
UV	Ultraviolet
V	
V	Volt(s), Voltage
V6	Six-Cylinder Engine, V-Type
V8	Eight-Cylinder Engine, V-Type
Vac	Vacuum
VAC	Vehicle Access Code
VATS	Vehicle Anti-Theft System
VCIM	Vehicle Communication Interface Mode
VCM	Vehicle Control Module
V dif	Voltage Difference
VDOT	Variable Displacement Orifice Tube
VDV	Vacuum Delay Valve
vel	Velocity
VES	Variable Effort Steering
VF	Vacuum Fluorescent
VIO	Violet
VIN	Vehicle Identification Number
VLR	Voltage Loop Reserve
VMV	Vacuum Modulator Valve
VR	Voltage Regulator
V ref	Voltage Reference
VSES	Vehicle Stability Enhancement System
VSS	Vehicle Speed Sensor
VT	Violet
W	
w/	With
W/B	Wheel Base
WH	White



GENERAL INFORMATION



WHL	Wheel
WHT	White
w/o	Without
WOT	Wide Open Throttle
W/P	Water Pump
W/S	Windshield
WSS	Wheel Speed Sensor
WU-OC	Warm Up Oxidation Converter Catalytic
WU-TWC	Warm Up Three-Way Converter Catalytic
X	
X-valve	Expansion Valve
Y	
yd	Yard(s)
YE	Yellow
YEL	Yellow



Registered and Non-Registered Trademarks

Listed below are Registered Trademarks (®) or Non-Registered Trademarks (™) which may appear in this service manual.

A
AC®
ACCUTURN®
ACDelco®
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AUTOFUSE®
AUTOTRAC®
B
Bendix®
BON-AMI®
Bosch®
Bose®
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Catapillar®
CAT®
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D
Delco®
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GENERAL INFORMATION



Delco Supreme®
Delco Tech®
DELCORE®
Delphi®
DEX-COOL®
DEXOIL®
DEXRON®
DEXSTEER™
DNR®
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DR®
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G
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GM Optikleen®
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GM Pass®
GM Ultralite®
GMAC®
Goodwrench®





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GTP®
<i>H</i>
Homelink™
HYDRA-MATIC®
<i>I</i>
Illumination®
INSTA-TRAC®
Intune®
<i>L</i>
LOCTITE™
<i>M</i>
MAGNASTEER®
Maxifuse®
Metripack®
Micropack®
Minifuse®
Mr Goodwrench®
<i>N</i>
Northstar®
<i>O</i>
OnStar®
Optikleen®
<i>P</i>
PASS-KEY®
PASS-KEYII®
PASSLOCK™
PK3®
Posidrive®
Pro®
<i>Q</i>
Quad 4®





GENERAL INFORMATION

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R
RAINSENSE™
Rapid Fire®
S
ScotchBrite™
Scotchguard™
Signals®
Sikkens™
Soft-Ray®
Solar-Ray®
Stabilitrak®
Sunrayce®
Superlube®
Syclone®
T
Tech 2®
Techline®
Teflon®
Tefzel®
Theft-I®
Theftlock®
Tiltmaster®
TORX®
Transjel®
Transguide®
Twilight Sentinel®
U
Ultralite®
V
Velcro®
W





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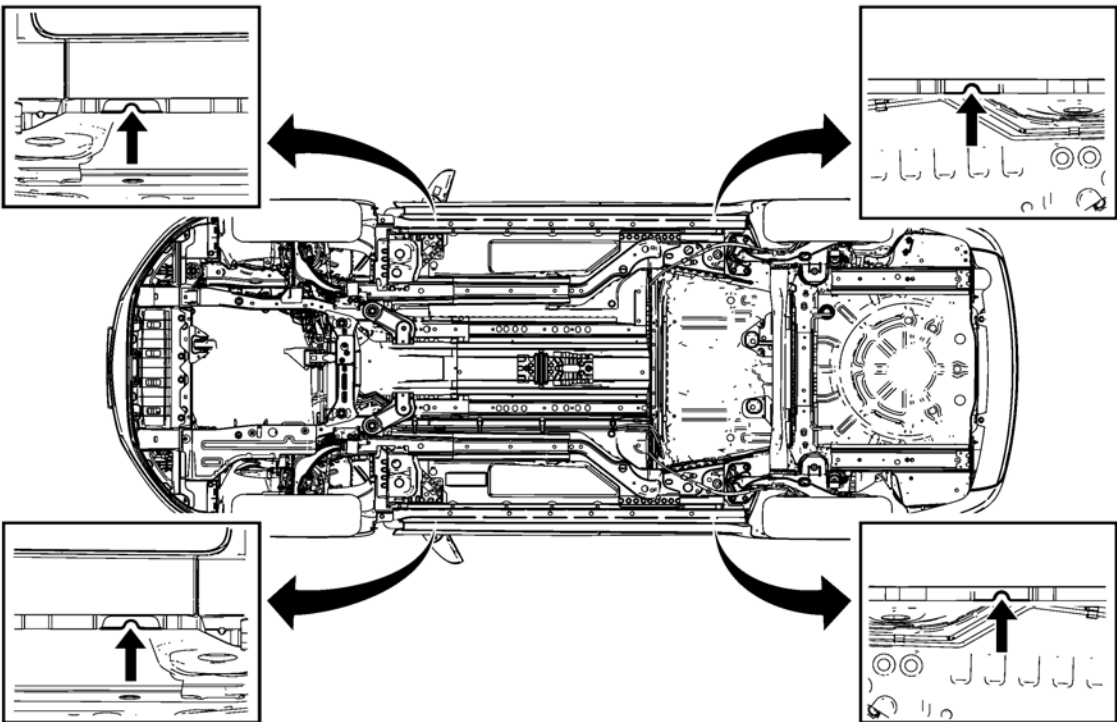


Weatherpack™



Lifting and Jacking the Vehicle

Note: The use of a LOW PROFILE LIFT ARMS SYSTEM may be required to avoid unwanted contact with the vehicle's body and structure depending on lifting equipment used. Refer to the manufacture's recommendation for their applications of low profile lift arms system for their lifting equipment.



Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

Danger: To avoid any vehicle damage, serious personal injury or death, always use the jackstands to support the vehicle when lifting the vehicle with a jack.

Caution: Perform the following steps before beginning any vehicle lifting or jacking procedure:

- Remove or secure all of the vehicle contents in order to avoid any shifting or any movement that may occur during the vehicle lifting or jacking procedure.
- The lifting equipment or the jacking equipment weight rating must meet or exceed the weight of the vehicle and any vehicle contents.
- The lifting equipment or the jacking equipment must meet the operational standards of the lifting equipment or jacking equipment manufacturer.
- Perform the vehicle lifting or jacking procedure on a clean, hard, dry, level surface.
- Perform the vehicle lifting or jacking procedure only at the identified lift points. DO NOT allow the lifting equipment or jacking equipment to contact any other vehicle components.

Failure to perform the previous steps could result in damage to the lifting equipment or the jacking equipment, the vehicle, and/or the vehicle contents.

Vehicle Lifting - Frame Contact Lift

Front Lift Pads

When lifting the vehicle with a frame-contact lift, place the front lift pads on the rocker outer panel weld flange, as shown

Rear Lift Pads

When lifting the vehicle with a frame-contact lift, place the rear lift pads on the rocker outer panel weld flange, as shown.

Vehicle Jacking

Caution: When you are jacking the vehicle at the front locations, be certain that the jack or the jack lift pad does not contact the front fascia, front fascia air dam, or the front fenders. If such contact occurs, vehicle damage may result. When jacking at selected front locations additional clearance may be required for the jacking points.

Note: When you are lifting a vehicle with a service jack, block the wheels at the opposite end from which you are lifting. Use jack stands to provide additional support.

Front of Vehicle

When using a service jack under the front of the vehicle use one of the following locations:

Place the service jack pad in the same location as shown for the front lift pads.

Rear of Vehicle

Note: Place jackstands ONLY under strong and stable vehicle structures.

Place the service jack pad in the same location as shown for the rear lift pads.



Select a Document:

-  [Air/Wind Noise](#)
-  [Tracing Powder or Chalk Test](#)
-  [Air Pressure Test](#)
-  [Soap Suds or Bubble Test](#)
-  [Exterior Windnoise](#)
-  [Interior Windnoise](#)
-  [Special Tools and Equipment](#)



Air/Wind Noise

Special Tools

- CH-39570 Chassis Ear
- GE-41416 Ultrasonic Leak Detector

Warning: Refer to [Assistant Driving Warning](#) in the Preface section.

To analyze a reported windnoise condition, test drive the vehicle to determine the origin of the noise.

Choose a regular route with smooth and straight streets that run in all 4 directions: North, South, East, and West. The area should have little traffic or little noise in order to eliminate interference with the test.

Note: Often there is one primary leak source and one or more secondary leaks that contribute to the noise condition. Repairing only one of the contributing leak sources may not completely repair the total condition but only reduce the condition.

Drive the vehicle at the speed in which the noise was noticed, or until the noise is heard. Maintain safe and legal speeds.

Many of the waterleak diagnosis tests are also used for the windnoise diagnosis.

Most windnoise is caused either by leaking seals or by misaligned body surfaces. You can diagnose the following types of windnoise with the aid of CH-39570 Chassis Ear or GE-41416 Leak Detector .

- Wind whistle
- Wind roar
- Wind rush

When moving at highway speeds, air pressure inside the vehicle becomes greater than the air pressure outside. When a leak occurs, the escaping air causes a hiss or a whistle.

Wind roar occurs when air passes over or through an opening between the 2 body surfaces. To correct the condition, adjust the alignment to the body surfaces.

Wind rush occurs when air presses over the vehicle's body, and is related to the aerodynamics of the vehicle. Wind whistle and wind roar are repairable. Rule out wind whistle and wind roar before concluding that the wind noise is due to wind rush.

Use the following inspections in order to aid in diagnosing wind whistle or wind roar:

1. Note the details for wind noise:
 - The perceived location
 - The location where the noise is loudest
 - When the noise occurs
 - The vehicle speed
 - The interior fan speed
 - The position of the windows
 - What the noise sounds like
2. Inspect the vehicle for the possible cause of the windnoise.
3. Test drive the vehicle and determine if the windnoise is external or internal.
4. Perform a visual inspection of the following components:
 - Loose fasteners
 - Torn weatherstrips
 - Broken weld joints
 - Sealer and/or adhesive skips

Tracing Powder or Chalk Test

Clean the weatherstrips and the contact surfaces with cleaning solvent.

1. Apply powder or chalk in an unbroken line to the contact surface of the weatherstrip surrounding the perimeter of the suspected areas.
2. Close the panel completely without slamming the panel. Closing the panel completely presses the weatherstrip firmly against the mating surface.
3. Inspect the applied line on the weatherstrip. The applied line is marred where contact is good. A corresponding imprint is on the mating surfaces.
4. Gaps or irregularities in the powder or the chalk line on the mating surfaces indicate the areas with a poor seal.

Air Pressure Test

1. Mask off both the pressure relief valves.
2. Close all the windows.
3. Turn the vehicles ventilation fan to the on position, with the selector on high speed and in the defrost mode.
4. Unlock and close the doors.
5. Listen for escaping air along the door and the window seals with a stethoscope or a length of heater hose.



Soap Suds or Bubble Test

1. Mask off the pressure relief valves.
2. Close all the windows and the doors.
3. Turn the vehicles ventilation fan to the on position, with the selector on high speed and in the defrost mode.
4. Unlock and close the doors.
5. Apply the soap solution to the potential leak areas.
6. Look for bubbles revealing escaping air.



Exterior Windnoise

Warning: Refer to [Assistant Driving Warning](#) in the Preface section.

Exterior windnoise is louder when the vehicle is driven with one or more windows down. Exterior windnoise occurs when air passes over the body panels, the seams, or the openings. Use the following items during the test drive in order to aid in the detection of leaks:

- Mechanic's stethoscope or heater hose
 - Masking tape-51 mm (2 in) width
 - Strip caulk
 - A water soluble marking pencil
1. While driving, determine the location of the exterior windnoise by lowering one window at a time. If the location corresponds with the condition in step 2, pull over and make a temporary repair with 51 mm (2 in) wide masking tape.
 2. Tape over the gaps and the moldings one at a time. Test between each taping. Taping over the gaps and moldings will correct the condition.
 3. Temporarily repair the condition with masking tape. Adjust the tape when needed.
 4. Continue testing in order to determine if the noise has been eliminated or other leak areas exist.
 5. When all the reported leak conditions are located, make permanent repairs using the proper alignment techniques and the sealing materials.



Interior Windnoise

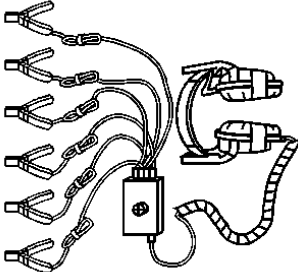
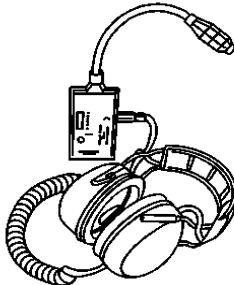
Warning: Refer to [Assistant Driving Warning](#) in the Preface section.

Interior windnoise is not heard when the window is lowered. Interior windnoise is caused by the air leaving the inside of the vehicle through a seal or a seam.

1. Tape over the relief valves to cause added air pressure within the vehicle.
2. Test drive the vehicle and listen for windnoise or a whistle.
3. Pull the vehicle over and make the temporary repairs using masking tape. If you cannot determine the source of the windnoise, perform one or more of the following diagnostic tests:
 - [Air Pressure Test](#)
 - [Soap Suds or Bubble Test](#)
 - [Tracing Powder or Chalk Test](#)



Special Tools

Illustration	Tool Number / Description
	CH-39570 J 39570 Chassis Ear
	GE-41416 J 41416 Ultrasonic Leak Detector



Select a Document:

-  [Squeaks and Rattles](#)
-  [Symptoms - Squeaks and Rattles](#)





Squeaks and Rattles

Note: Squeaks and rattles are caused by improperly controlled relative motion between vehicle components. There are 4 ways to prevent squeaks and rattles.

- Attach the component that squeaks or rattles securely.
- Separate the components that squeak or rattle to prevent contact.
- Insulate the components that squeak or rattle.
- Insulate low uniform friction surfaces to eliminate stickslip motion.



Symptoms - Squeaks and Rattles

- Table 1: [Rattle Coming From the Side Rail](#)
- Table 2: [Rattle Under Vehicle at Higher RPM](#)
- Table 3: [Thump From Rear of Vehicle on Bumps](#)
- Table 4: [Glass Knock Coming From the Rear of the Vehicle When Driving Over Bumps](#)
- Table 5: [Rattle Coming From Door](#)
- Table 6: [Squeak When Operating Doors](#)
- Table 7: [Squeak Coming From Console When Shifting Manual Transmission Condition Occurs In Cold Weather with a Cold Engine](#)
- Table 8: [Buzz From the Left Side of Instrument Panel](#)
- Table 9: [Squeak Coming From Instrument Cluster Trim Plate](#)

Rattle Coming From the Side Rail

Checks	Action
Check the brake lines.	• Tap lightly on the brake lines and listen for a rattle. • Install plastic tie straps to secure the brake lines tightly together.

Rattle Under Vehicle at Higher RPM

Checks	Action
Check for heat shield contact with the underbody.	• Raise the vehicle and perform a visual inspection. • Bend the heat shield slightly to gain clearance from the underbody.

Thump From Rear of Vehicle on Bumps

Checks	Action
Check for a properly secured spare tire or tire repair kit in the rear compartment.	• Open the rear compartment and perform a visual inspection of the spare tire or the tire repair kit and the tools. • Tightly secure the spare tire or the tire repair kit and all tools. • Perform a road test to verify that the noise is eliminated.

Glass Knock Coming From the Rear of the Vehicle When Driving Over Bumps

Checks	Action
Check for an out-of-adjustment hatchback latch.	• Test drive the vehicle in order to verify this condition. • Loosen the latch nuts and adjust the latch downward.

Rattle Coming From Door

Checks	Action
Check for rattling electrical connectors inside the door trim panel.	• Tap on the trim panel and listen for a rattle. • Remove the trim panel and wrap foam padding around the connectors as required.

Squeak When Operating Doors

Checks	Action
Check for a lack of lubrication of the door hinge pins.	• Operate the doors and listen for squeaks. • Lubricate the door hinge pins with light oil and coat with lithium grease.

Squeak Coming From Console When Shifting Manual Transmission Condition Occurs In Cold Weather with a Cold Engine

Checks	Action
Check the manual transaxle control lever lower boot.	• Move the control lever between gears and listen for squeaks. • Remove the floor console and replace the lower shift boot or apply talcum powder to the lower shift boot.

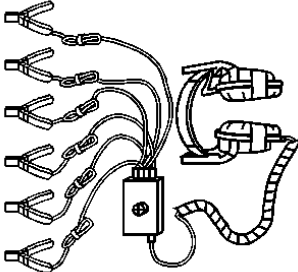
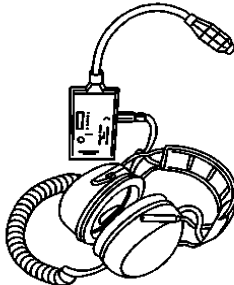
Buzz From the Left Side of Instrument Panel

Checks	Action
Check for vibration of the fuse box cover against the instrument panel side trim.	• Tap on the cover with a finger and listen for a buzz. • Apply felt pads to the side trim where the cover makes contact.

Squeak Coming From Instrument Cluster Trim Plate

Checks	Action
Check for rubbing the cluster trim plate on the instrument panel.	• Test drive the vehicle in order to verify this condition. • Remove the instrument cluster trim plate and install felt tape to the edges.

Special Tools

Illustration	Tool Number / Description
	CH-39570 J 39570 Chassis Ear
	GE-41416 J 41416 Ultrasonic Leak Detector



Select a Document:

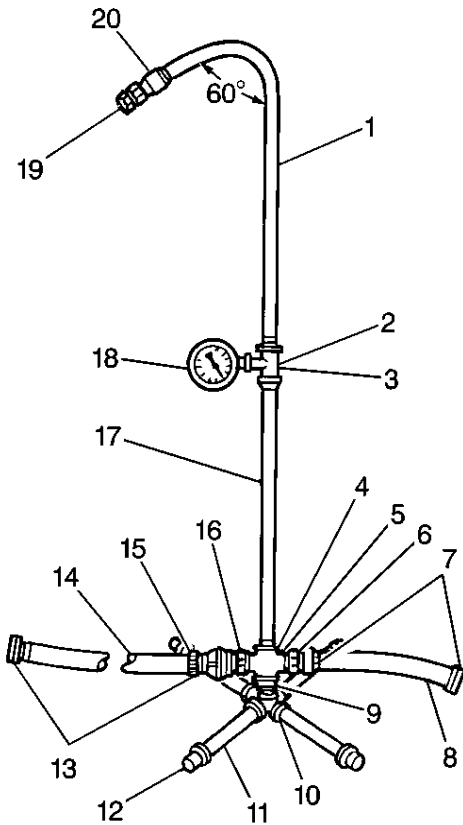
-  [Waterleak Test Preparation](#)
-  [Water Hose Test](#)
-  [Air Hose Test](#)
-  [Body Waterleak Repair](#)
-  [Stationary Window Waterleak Repair](#)

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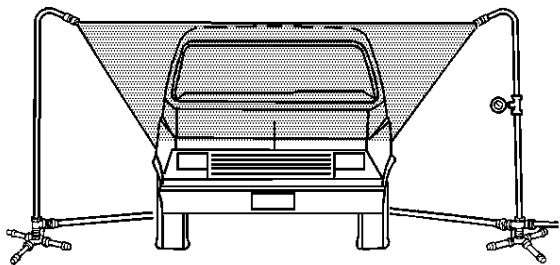
Waterleak Test Preparation

- GM vehicles are designed to operate under normal environmental conditions.
- The design criteria for sealing materials and components takes into consideration the sealing forces required to withstand the natural elements. These specifications cannot take into consideration any artificial conditions, i.e., high pressure car washes.
- The water leak test procedure has been correlated to the natural elements and will determine the ability of a vehicle to perform under normal operating conditions.
- The first step in diagnosing a leak is determining the conditions under which a leak occurs. If the general leak area can be found, the exact entry point can be isolated using a water hose or an air hose. Some trim panels or components may need to be removed in order to repair the leak.
- If leaks are found around a door, door window, rear compartment lid or liftgate area this does not necessarily indicate a bad weatherstrip. An adjustment to these areas may resolve the condition.

Watertest Stand Assembly



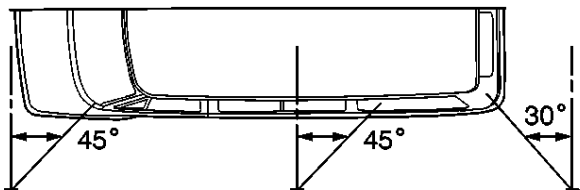
- (1) Pipe (0.5 x 36 in)
 - (2) Reducing Tee, Right Stand Only (0.5 x 0.5 x 0.25 in)
 - (3) Coupling, Left Stand Only, (0.5 in)
 - (4) Tee, Left Stand Only (0.5 in)
 - (5) Cross, Right Stand Only (0.5 in)
 - (6) Pipe to Hose Nipple, Right Stand Only (0.5 in)
 - (7) Female Hose Coupling (5/8 in)
 - (8) Input Hose, Right Stand Only (2.0 ft) (5/8 in diameter)
 - (9) Close Nipple (0.5 in)
 - (10) Cross (0.5 in) with Weld-On Cap (0.5 in)
 - (11) Nipple (0.5 x 12 in)
 - (12) Cap (0.5 in)
 - (13) Female Hose Coupling (5/8 in)
 - (14) Cross Hose (12 ft) (5/8 in diameter)
 - (15) Hose Quick Connect
 - (16) Pipe to Hose Nipple (0.5 in)
 - (17) Pipe (0.5 x 60 in)
 - (18) Water Pressure Gauge. Right Stand Only
 - (19) Full Jet Spray Nozzle, No. 1/2GG-25 or Equivalent
 - (20) Coupling (0.5 in)
1. Assemble the water test stand as shown.



2. Position the stands as shown.

The water spray from the stands should overlap the vehicle as shown.

3. Have an assistant inside of the vehicle during the test in order to locate any leaks.
4. The water pressure at the nozzle should maintain a 155 kPa (22 psi), for at least 4 minutes.

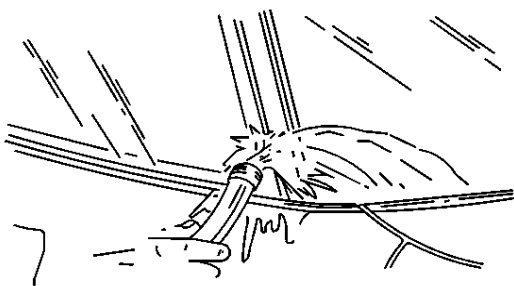


5. In order to check the windshield, aim the water spray 30 degrees down and 45 degrees toward the rear.

Aim the water towards the corner of the windshield.

6. In order to check the side windows for leaks, position the water stand towards the center of the rear quarter, aiming the water spray 30 degrees down and 45 degrees toward the rear.
7. In order to check the back window, aim the water spray 30 degrees down and 30 degrees toward the front.

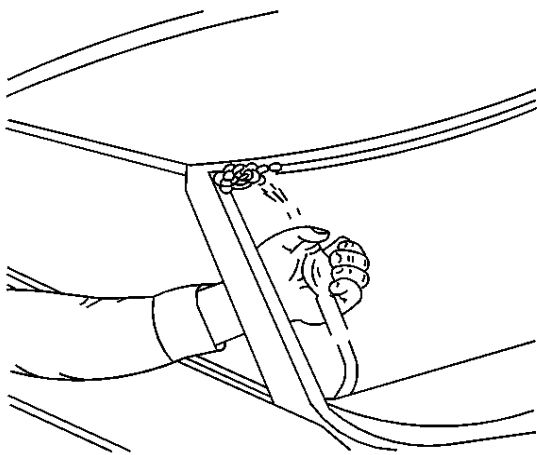
Water Hose Test



Note: Use a water hose without the nozzle attached.

1. Have an assistant inside of the vehicle in order to locate the leak.
2. Begin testing at the base of the window or the windshield.
3. Slowly move the hose upward and across the top of the vehicle.

Air Hose Test

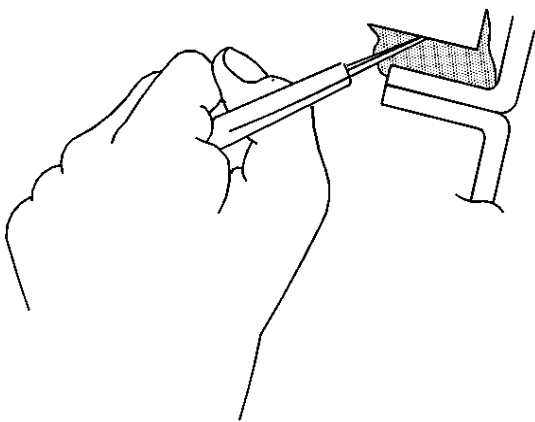


Caution: The air hose test should only be used on fully cured urethane adhesive. Otherwise, damage to the urethane adhesive bead could result in additional leaks.

1. Using a liquid detergent, diluted with water in a spray bottle, spray the window at the edges. Begin at the bottom and gradually move up and across the top.
- Note:** The compressed air should not exceed 205 kPa (30 psi).
2. Have an assistant inside of the vehicle with an air hose.
3. Have the assistant aim the compressed air at the suspected areas.

Bubbles will form in the soap solution at the location of the leak.

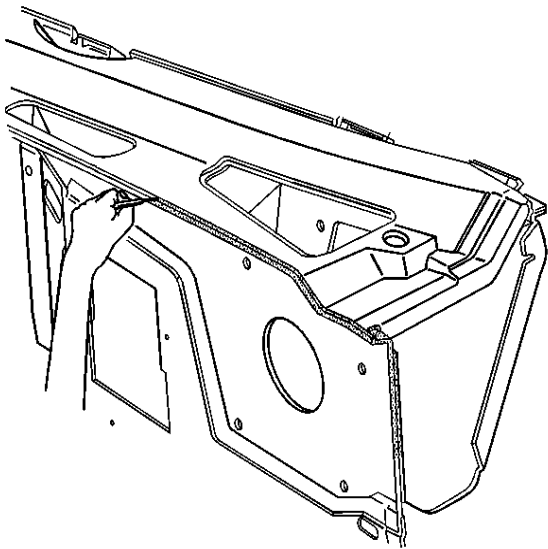
Body Waterleak Repair



Warning: If the vehicle interior is exposed to moisture and becomes soaked up to the level of the sensing and diagnostic module (SDM), the SDM and SDM harness connector must be replaced. The SDM could be activated when powered, which could cause airbag deployment and result in personal injury.

Depending on the location of the waterleak, you may have to remove certain interior components in order to repair the leak.

1. If the floor carpet is wet refer to [Floor Carpet Drying](#).



2. Cut out a portion of the adhesive caulking in the leak area from inside or outside of the vehicle.
3. Clean and remove all loose particles of the adhesive old caulking from the area.
4. Apply joint body and seam sealer where the old adhesive caulking was removed.
5. Allow the adhesive caulking to dry for several hours.
6. Test for leaks.
7. Install the trim, if removed.

Stationary Window Waterleak Repair

Note: If any water enters the vehicle interior up to the level of the carpet or higher and soaks the carpet, the sensing and diagnostic module (SDM) and the SDM harness connector may need to be replaced. The SDM could be activated when powered, which could cause deployment of the air bag(s) and result in personal injury. Before attempting these procedures, the SRS system must be disabled. Refer to Disabling the SRS System.

With the ignition OFF, inspect the SDM mounting area, including the carpet. If any significant soaking or evidence of significant soaking is detected, you must perform the following tasks:

1. Remove all water.
2. Repair the water damage.
3. Replace the SDM harness connector.
4. Replace the SDM.

Carefully follow these tasks to ensure personal safety, avoid air bags deployment or unneeded SRS system repairs.

1. If the floor carpet is wet, refer to [Floor Carpet Drying](#).
2. Remove the trim moldings or the headlining assembly in order to repair the leak, if needed. Refer to interior trim and panelling section, for appropriate procedures.
3. Determine the source of water entry.
4. If water is leaking at the edge of the windshield, reseal the windshield using a GM approved Urethane Adhesive Caulking Kit
5. If water leaks into the vehicle at the sides of the stationary windows, reseal the window using a GM approved Urethane Adhesive Caulking Kit.