

2018 ENGINE PERFORMANCE**Engine Controls And Fuel - 1.6L (LH7) Diesel - Specifications - Equinox & Terrain****SPECIFICATIONS****TEMPERATURE VERSUS RESISTANCE - ENGINE COOLANT TEMPERATURE SENSOR**

Temperature	Resistance
150°C (302°F)	47 to 49 ohms
140°C (284°F)	58 to 62 ohms
130°C (266°F)	76 to 80 ohms
120°C (248°F)	98 to 104 ohms
110°C (230°F)	130 to 136 ohms
100°C (212°F)	174 to 182 ohms
90°C (194°F)	237 to 247 ohms
80°C (176°F)	327 to 341 ohms
70°C (158°F)	459 to 479 ohms
60°C (140°F)	656 to 686 ohms
50°C (122°F)	958 to 1002 ohms
45°C (113°F)	1167 to 1223 ohms
40°C (104°F)	1430 to 1500 ohms
35°C (95°F)	1763 to 1849 ohms
30°C (86°F)	2185 to 2295 ohms
25°C (77°F)	2725 to 2865 ohms
20°C (68°F)	3418 to 3604 ohms
15°C (59°F)	4318 to 4564 ohms
10°C (50°F)	5493 to 5823 ohms
5°C (41°F)	7041 to 7485 ohms
0°C (32°F)	9097 to 9701 ohms
-5°C (23°F)	11844 to 12678 ohms
-10°C (14°F)	15540 to 16700 ohms
-15°C (5°F)	20559 to 22183 ohms
-20°C (-4°F)	27439 to 29725 ohms
-30°C (-22°F)	50264 to 54924 ohms
-40°C (-40°F)	95953 to 105777 ohms

TEMPERATURE VERSUS RESISTANCE - INTAKE AIR TEMPERATURE SENSOR

Temperature C°/F°	Resistance Minimum Ohms	Resistance Maximum Ohms
Bosch Intake Air Temperature (IAT) Sensor		
-40/-40	36, 595	42, 717
-20/-4	12, 947	14, 744
-10/14	8, 082	9, 105
0/32	5, 191	5, 789
20/68	2, 309	2, 530
25/77	1, 913	2, 088
40/104	1, 122	1, 210
60/140	587	625
80/176	328	345

Temperature CÂ°/FÂ°	Resistance Minimum Ohms	Resistance Maximum Ohms
Bosch Intake Air Temperature (IAT) Sensor		
100/212	193	201
120/248	119	125
140/284	76	81

ALTITUDE VERSUS BAROMETRIC PRESSURE

Altitude Measured in Meters (m)	Altitude Measured in Feet (ft)	Barometric Pressure Measured in Kilopascals (kPa)	Barometric Pressure Measured in Pounds Per Square Inch (PSI)
Determine your altitude by contacting a local weather station or by using another reference source.			
4, 267	14, 000	56 - 64	8.1 - 9.3
3, 962	13, 000	58 - 66	8.4 - 9.6
3, 658	12, 000	61 - 69	8.8 - 10.0
3, 353	11, 000	64 - 72	9.3 - 10.4
3, 048	10, 000	66 - 74	9.6 - 10.7
2, 743	9, 000	69 - 77	10.0 - 11.2
2, 438	8, 000	71 - 79	10.3 - 11.5
2, 134	7, 000	74 - 82	10.7 - 11.9
1, 829	6, 000	77 - 85	11.2 - 12.3
1, 524	5, 000	80 - 88	11.6 - 12.8
1, 219	4, 000	83 - 91	12.0 - 13.2
914	3, 000	87 - 95	12.6 - 13.8
610	2, 000	90 - 98	13.1 - 14.2
305	1, 000	94 - 102	13.6 - 14.8
0	0 Sea Level	96 - 104	13.9 - 15.1
-305	-1, 000	101 - 105	14.6 - 15.2

FASTENER SPECIFICATIONS

Single Use Non-Threaded Fasteners/Components

NOTE:

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application
Charge Air Bypass Regulator Solenoid Valve Vacuum Tube Seal
Emission Reduction Fluid Supply Pump Module O-Ring
Exhaust Gas Recirculation Cooler housing Gasket
Exhaust Gas Recirculation Cooler Outlet Pipe Gasket
Exhaust Gas Recirculation Cooler Outlet Pipe Seal
Exhaust Gas Recirculation Cooler Pipe Gasket
Exhaust Gas Recirculation Valve Gasket
Exhaust Gas Recirculation Valve Seat Gasket
Exhaust Manifold Pipe Gasket
Exhaust Pressure Differential Sensor Hose Clamp
Fuel Filter Seal
Fuel Injection Pump Metering Valve O-Ring
Fuel Injection Pump Seal Ring
Fuel Injection Pump Sprocket Access Hole Plug
Fuel Injector Fuel Return Hose Seal Ring
Fuel Injector Washer

NOTE:

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application
Fuel Return Hose Clamp
Fuel Tank Fuel Pump Module O-Ring
Throttle Body Gasket

Single Use Threaded Fastener/Component Tightening Specifications

NOTE:

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application	Specification
	Metric (English)
Fuel Injection Fuel Feed Pipe	28 N.m (21 lb ft)
Fuel Injector Bracket Bolt	
First Pass:	10 N.m (89 lb in)
Final Pass:	60 Degrees
Fuel Pressure Sensor	35 N.m (26 lb ft)

Reusable Threaded Fastener Tightening Specifications

NOTE:

All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
Accelerator Pedal Position Sensor Bolt	9 N.m (80 lb in)
Air Cleaner Bolt	9 N.m (80 lb in)
Air Cleaner Outlet Duct Clamp	3.5 N.m (31 lb in)
Air Cleaner Upper Housing Bolt	4 N.m (35 lb in)
Camshaft Position Sensor Bolt	10 N.m (89 lb in)
Charge Air Bypass Regulator Solenoid Valve Vacuum Tube Bracket Bolt	10 N.m (89 lb in)
Charge Air Cooler Bolt	9 N.m (80 lb in)
Charge Air Temperature Sensor	19 N.m (14 lb ft)
Crankshaft Position Sensor Bolt	10 N.m (89 lb in)
Diesel Fuel Separator Bolt	10 N.m (89 lb in)
Emission Reduction Fluid Controller Bolt	2 N.m (18 lb in)
Emission Reduction Fluid Injector Nut	9 N.m (80 lb in)
Emission Reduction Fluid Tank Bolt - M8	22 N.m (16 lb ft)
Emission Reduction Fluid Tank Bolt - M10	58 N.m (43 lb ft)
Engine Coolant Temperature Sensor	45 N.m (33 lb ft)
Engine Oil Pressure Sensor	35 N.m (26 lb ft)
Engine Wiring Harness Conduit Bolt	9 N.m (80 lb in)
Exhaust Gas Recirculation Cooler Housing Bolt	25 N.m (18 lb ft)
Exhaust Gas Recirculation Cooler Outlet Pipe Bolt	10 N.m (89 lb in)
Exhaust Gas Recirculation Cooler Temperature Sensor	45 N.m (33 lb ft)
Exhaust Gas Recirculation Pipe Bolt	10 N.m (89 lb in)

NOTE:

All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
Exhaust Gas Recirculation Vacuum Regulator Solenoid Valve Bolt	7 N.m (62 lb in)
Exhaust Gas Recirculation Valve Bolt	10 N.m (89 lb in)
Exhaust Manifold Pipe Bolt	10 N.m (89 lb in)
Exhaust Particulate Sensor	45 N.m (33 lb ft)
Exhaust Particulate Sensor Control Module Bracket Nut	9 N.m (80 lb in)
Exhaust Pressure Differential Sensor Bolt	9 N.m (80 lb in)
Exhaust Pressure Differential Sensor Bracket Bolt	9 N.m (80 lb in)
Exhaust Temperature Sensor	45 N.m (33 lb ft)
Front Intake Air Duct Nut	9 N.m (80 lb in)
Fuel Filter Drain Plug	1.6 N.m (14 lb in)
Fuel Cooler Bolt	9 N.m (80 lb in)
Fuel Injection Fuel Feed Pipe Bracket Bolt	9 N.m (80 lb in)
Fuel Injection Fuel Rail Bolt	25 N.m (18 lb ft)
Fuel Injection Pump Driven Sprocket Nut	64 N.m (47 lb ft)
Fuel Injection Pump Metering Valve Fastener	9 N.m (80 lb in)
Fuel Injection Pump Bolt	25 N.m (18 lb ft)
Fuel Injection Pump Drive Pulley Nut	64 N.m (47 lb ft)
Fuel Pump Power Control Module Bolt	9 N.m (80 lb in)
Fuel Pump Power Control Module Bracket Bolt	9 N.m (80 lb in)
Fuel Pump Power Control Module Nut	9 N.m (80 lb in)
Fuel Tank Filler Hose Clamp	4 N.m (35 lb in)
Fuel Tank Filler Pipe Ground Bolt	9 N.m (80 lb in)
Fuel Tank Strap Bolt	22 N.m (16 lb ft)
Fuel/Water Separator Reservoir	25 N.m (18 lb ft)
Glow Plug	16.5 N.m (12 lb ft)
Heater Inlet Pipe Bracket Bolt	9 N.m (80 lb in)
Intake Air Pressure and Temperature Sensor Bolt	1.6 N.m (14 lb in)
Intake Manifold Brace Bolt	10 N.m (89 lb in)
Mass Airflow Sensor Bolt	4 N.m (35 lb in)
Nitrogen Oxides Sensor	50 N.m (37 lb ft)
Nitrogen Oxides Sensor Control Module Nut	9 N.m (80 lb in)
Nitrogen Oxides Sensor Nut	9 N.m (80 lb in)
Oil Pump Flow Control Solenoid Valve Bolt	10 N.m (89 lb in)
Piston Oil Nozzle Oil Control Solenoid Valve Bolt	10 N.m (89 lb in)
Power Brake Booster Inlet Hose Connector Fitting Bolt	10 N.m (89 lb in)
Power Brake Booster Inlet Hose Connector Fitting Bracket Bolt	10 N.m (89 lb in)
Radiator Surge Tank Outlet Hose Bracket Bolt	10 N.m (89 lb in)
Throttle Body Bolt	10 N.m (89 lb in)
Transmission Bolt	58 N.m (43 lb ft)
Turbocharger Actuator Pipe Bracket Bolt	10 N.m (89 lb in)
Turbocharger Wastegate Actuator Pipe Bolt	10 N.m (89 lb in)
Turbocharger Wastegate Actuator Pipe Nut	10 N.m (89 lb in)
Turbocharger Wastegate Actuator Vacuum Control Solenoid Valve Bolt	10 N.m (89 lb in)
Turbocharger Wastegate Actuator Vacuum Control Solenoid Valve Bracket Bolt	10 N.m (89 lb in)

APPROXIMATE FLUID CAPACITIES

Application	Specification	
	Metric	English
Fuel Tank Capacity - AWD	59.0 liters	15.6 gallons
Fuel Tank Capacity - FWD	56.0 liters	14.8 gallons
Emission Reduction Fluid Tank Capacity	19.8 liters	5.2 gallons

FUEL SYSTEM SPECIFICATIONS

What Fuel to Use in the United States

CAUTION: Use of diesel fuel other than Ultra Low Sulfur Diesel (15 ppm sulfur maximum) or engine oil other than low ash CJ-4 oil will cause permanent damage to the DPF and related components.

In the United States, for best results use Number 2-D diesel fuel year-round, above and below freezing conditions, as oil companies blend Number 2-D fuel to address climate differences. Number 1-D diesel fuel may be used in very cold temperatures when the temperature stays below -18°C (0°F). However, the fuel will produce a power and fuel economy loss. The use of Number 1-D diesel fuel in warm or hot climates may result in stalling, poor starting when the engine is hot and may damage the fuel injection system.

It is acceptable to use diesel fuel containing up to 20 percent biodiesel (B20), but the final blended fuel must meet the same specification, ASTM D 975 (Grades No. 2-D or No. 1-D S15 commonly known as Ultra Low Sulfur diesel), as the other fuels used in your vehicle, and the biodiesel used for making this fuel must meet the latest version of ASTM specification D 6751. Biodiesel is produced from vegetable oils or animal fat that have been chemically modified to reduce the possibility of damage to the fuel system and engine. Higher concentration (i.e. greater than B20) biodiesel-containing fuels or the use of unmodified bio-oils blended into diesel fuel at any concentration is not recommended and could damage the fuel system and engine. Such damage would not be covered by your warranty. If there are questions about the biodiesel-containing fuels you are using, contact your fuel supplier.

Because of the cleansing properties of biodiesel, switching from straight diesel to a biodiesel blend can prematurely restrict the fuel filter with normal deposits in the fuel system. A fuel filter replacement might be required sooner than the recommended interval.

Diesel fuel may foam when filling the tank. This can cause the automatic pump nozzle to shut OFF, even though the tank is not full. If this happens, just wait for the foaming to stop and then continue to fill the tank.

What Fuel to Use in Canada

Canadian fuels are blended for seasonal changes. Diesel Type A fuel is blended for better cold weather starting, when it stays below -18°C (0°F). However, the fuel will produce a power and fuel economy loss. The use of Type A diesel fuel in warmer climates may result in stalling, poor starting. Diesel Type B fuel is blended for temperatures above -18°C (0°F). The emission control system requires the use of diesel fuel with ultra low sulfur, 15 ppm (maximum), content. Both low and higher sulfur fuels will be available in Canada. Only ultra low sulfur diesel fuels are available in the United States. Diesel-powered trucks must be refueled with ultra low sulfur fuel only. Use of fuels with higher-sulfur content will affect the function of the emission components and may cause reduced performance, excessive smoke and unpleasant odor.

It is acceptable to use diesel fuel containing up to 20 percent biodiesel (B20), but the final blended fuel must meet the same specification, CAN/CGSB-3.517 (ULS) in Canada, as other fuels used in your vehicle, and the biodiesel used for making this fuel must meet the latest version of ASTM specification D 6751. Biodiesel is produced from vegetable oils or animal fat that have been chemically modified to reduce the possibility of damage to the fuel system and engine. Higher concentration (i.e. greater than B20) biodiesel-containing fuels or the use of unmodified bio-oils blended into diesel fuel at any concentration is not recommended and could damage the fuel system and engine. Such damage would

not be covered by your warranty. If there are questions about the biodiesel-containing fuels you are using, contact your fuel supplier.

Very Cold Weather Operation

If the vehicle is driven in very cold temperatures and cannot get a winterized Number 2-D that has been adapted to cold weather or a Number 1-D, use one gallon of kerosene for every 2 gallons of diesel fuel. Once you add kerosene, run the engine for several minutes to mix the fuels. Only add kerosene when the temperature falls below -18°C (0°F), because the fuel economy and lubricating qualities of kerosene is not as good as that of diesel fuel.

In cold weather, the fuel filter may become clogged (waxed). To unclog the filter, move the vehicle to a warm garage area and warm the filter to a temperature between $0 - 10^{\circ}\text{C}$ ($32 - 50^{\circ}\text{F}$). Replacing the filter is not necessary.

Fuel Specific Gravity Testing

Use a **J 38641-B** Diesel Fuel Quality Tester to measure the fuel specific gravity (API Rating). Follow the instructions on the tool to obtain the proper temperature-adjusted value. This information must be accurate for the proper diagnosis of the fuel system.

Water in Fuel

Sometimes, water can be found in the fuel tank along with diesel fuel. This can happen if the service station does not regularly inspect and clean their fuel storage tanks, or the fuel is contaminated as received from the service stations suppliers.

If water is detected by the Water in Fuel Sensor, a Water-In-Fuel light will illuminate. If the Water-In-Fuel light illuminates, the water must be drained from the fuel system on the vehicle.

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number
Anti-Seize Compound	Lubricant	GM P/N 88862477 (Canadian P/N 88862478)
Camshaft Gear Access Hole Plug	Sealant	GM P/N 12346004 (Canadian P/N 10953480)
Coolant Temperature Sensor Threads	Sealant	GM P/N 12346004 (Canadian P/N 10953480)
Dielectric Grease for Spark Plug Wires	Lubricant	GM P/N 19260901 (Canadian P/N 19260902)
Fuel Injection Fuel Rail Bolt	Threadlocker	GM P/N 12345382 (Canadian P/N 10953489)

Application	Type of Material	GM Part Number
High Pressure Fuel Pump Bolt	Threadlocker	GM P/N 12345382 (Canadian P/N 10953489)
Silicon Free Engine Oil	5W-30	GM P/N 19293000 (Canadian P/N 19386321)
Top Engine Cleaner	Cleaner	GM P/N 1052626 (Canadian P/N 993026)

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