

Installation guide

eFLEXFUEL™
TECHNOLOGY



Installation

youtube.com/c/eFlexFuel-E85-Upgrade



Support

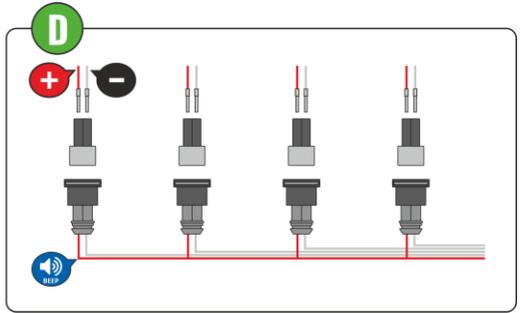
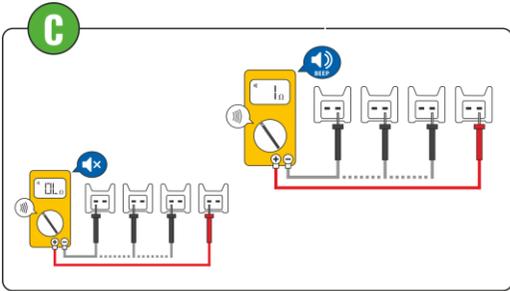
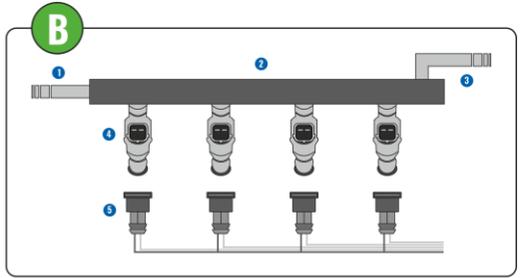
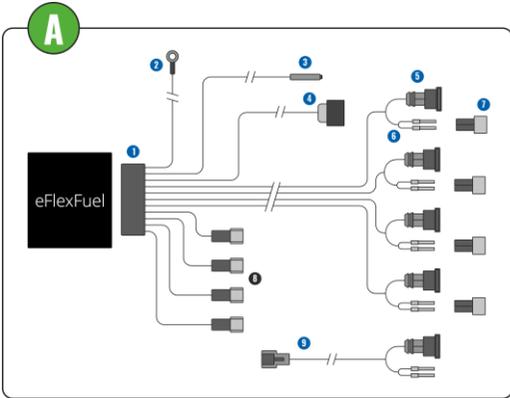
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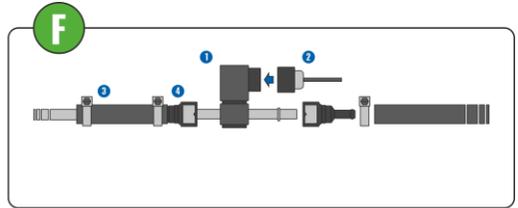
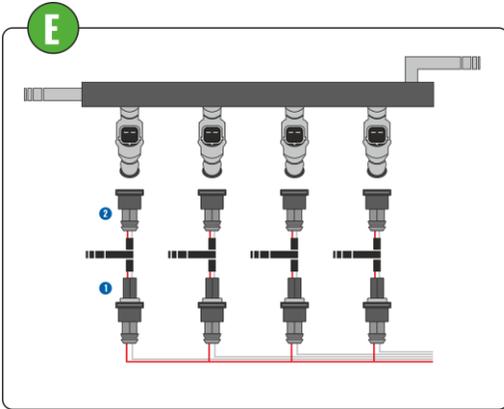
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WARNING:

Cancer and Reproductive Harm
— www.P65Warnings.ca.gov





Use quick connectors when installing the ethanol sensor!



WARNING: eFlexFuel™ systems are to be installed only by qualified mechanics with proper training and experience.

NOTICE: Not legal for sale or use on pollution-controlled vehicles

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Specification to VERPCB5.0+

Thank you for your decision to become an eFlexFuel™ driver. By choosing eFlexFuel™ technology and ethanol fuel you can significantly reduce your emissions, save money and improve performance.

eFlexFuel™ has been installed to thousands of different vehicles and our customers have driven hundreds of millions of miles with ethanol fuels. Furthermore, E85 ethanol fuel contains additives that improve its lubrication and corrosion prevention features. Therefore, you can trust that you can use E85 fuel in your vehicle safely.

eFlexFuel™ operates completely automatically and does not require any attention from the user after the installation. However, to ensure the optimal functionality of the device, the vehicle should be adequately maintained and in normal working condition. In this guide we will briefly tell about using eFlexFuel™ and E85 ethanol fuel to ensure that you have the best possible driving experience no matter which fuel you use.

Your eFlexFuel™ system is specific to your vehicle and engine family. Currently three models of the eFlexFuel™ system are available, allowing differing levels of programmable E85 optimization:

1. eFlexEco™ is our standard system featuring StepOne Tech's proprietary E85 fueling parameters specific for your vehicle and a broad range of typical operating conditions. See 2-year Limited Warranty terms.
2. eFlexPlus™ allows limited access to optimize fueling parameters for varying operating conditions. See 3-year Limited Warranty terms.
3. eFlexPro™ is intended for experienced engine tuners offering the broadest range of configurations to optimize E85 fueling for desired performance and conditions. See 3-year Limited Warranty terms.

NOTICE: eFlexFuel™ system was developed in Finland and has been in European use for years. **Pending U.S. emissions certification; your eFlexFuel™ system is sold only for competition and off-road use.**

eFlexFuel™ vehicle maintenance

When driving with eFlexFuel™ and E85 ethanol fuel you can still follow the regular maintenance schedule recommended by the manufacturer of your vehicle. We recommend ensuring that especially the following components are in normal working condition:

- **Spark plugs:** Usually the replacement interval recommended by the manufacturer is appropriate.
- **Fuel filter (if applicable):** Replacement preferably every 30 000 miles.
- **Engine oil and oil filter:** Always use the oil recommended by the vehicle manufacturer with SN classification. If the oil change interval is 10 000 miles or less, it is sufficient. If the oil change interval is 20 000 miles or 24 months, we recommend cutting it down to 12 000 miles and 18 months.
- **Fuel pump:** If the vehicle has done over 125 000 miles with the same fuel pump its performance might have deteriorated. Ethanol needs to be injected more than gasoline and thus the condition of the fuel pump is crucial. As the fuel pump is a component that wears out it should be replaced when needed. Based on our experiences we recommend pumps from reputable manufacturers.

NOTICE: Besides the mileage and the age of the vehicle the circumstances where it has been used and the way it has been driven has a great impact on the durability and maintenance needs. For instance, if the vehicle is driven for only short distances with a cold engine the maintenance intervals should be shorter no matter what fuel is used.

eFlexFuel™ vehicle in winter conditions

eFlexFuel™ has been designed, tested, and manufactured in one of the coldest countries on earth, Finland. Thus, a lot of emphasis has been put into ensuring that the device and the vehicle will also work in cold conditions. Vehicles equipped with eFlexFuel™ will start even in the coldest temperatures. However, in extreme conditions a couple of starts might be required with pure E85 fuel. We highly recommend using an engine heater whenever it is possible.

If the vehicle is properly maintained it can be driven with E85 fuel throughout the year. If there are issues with cold starts, we recommend filling up to 10 percent (%) of regular gasoline, for example filling up with 3 gallons (10 liters) of regular gasoline in every other fill up.

Filling up and expected consumption of eFlexFuel™ vehicle

eFlexFuel™ enables the usage of both regular gasoline and ethanol E85 or any mix of the two in the vehicle. We highly recommend using fuel with as high ethanol content as possible but if not available, the vehicle will still work perfectly with regular gasoline as well. When E85 is used the consumption of the vehicle compared to regular gasoline is increased by approx. 2.5 percent (%) depending on the vehicle. Please do note that the onboard computer of the vehicle does not recognize this change.

eFlexApp™

eFlexApp™ is an additional feature that is not required for using eFlexFuel™. It enables engine and fuel data monitoring in real time. The user can, for example, monitor the ethanol content of the fuel or the injector duty cycle. With eFlexPlus™ and eFlexPro™ devices eFlexApp™ has added features like ability to change drive modes or adjust engine startup. eFlexApp™ can be downloaded for free from Google Play Store or from Apple App Store.

Limited Warranty

What is covered?

Subject to the terms, exclusions and limitations herein, StepOne Tech America Inc¹ (“StepOne”) exclusively warrants the eFlexFuel™ units purchased through authorized StepOne resellers to be free of defects in workmanship or materials when properly installed on initial customer’s vehicle. This Limited Warranty is made as of the date of first retail purchase and is extended only to the initial retail purchaser.

- For eFlexEco™ units: your Limited Warranty term is two years from date of initial retail sale.
- For eFlexPlus™ and eFlexPro™ units: your Limited Warranty term is three years from date of initial retail sale.

What is not covered?

Your StepOne **Limited Warranty** does not cover damage or defect in the wiring harness and connectors if initial retail purchaser transfers harness or eFlexFuel™ unit to another vehicle. Damage to your vehicle, vehicle systems, other products or components not

¹ StepOne Tech America Inc 330 East Liberty, 4th floor, Ann Arbor, Michigan 48104

manufactured by StepOne to our high-quality standards **are not covered**. StepOne makes no warranty with respect to vehicle emissions, emissions compliance, or components of your vehicle emissions system.

Obtaining StepOne warranty & customer service

StepOne will coordinate and expedite all warranties, returns, and exchanges as quickly as possible. Many suspected issues can be resolved by a review of wiring and installation requirements directly with your authorized StepOne resellers. Failing resolution with your authorized reseller, contact our technical support team (support@eflexfuel.com). For all issues please have available:

1. Proof of product purchase with date, purchaser name, reseller contact and VIN or license of vehicle your eFlexFuel™ unit is installed upon (**REQUIRED**).
2. Photos or video with brief description of indicated issue(s).
3. Customer contact information and shipping address.

Remedy limited to repair/replacement. Limited time for filing warranty claims. BINDING, SINGLE CLAIM ARBITRATION-Venue

At StepOne's option and upon inspection and determination of covered defect, *the exclusive remedy provided hereunder* shall be either replacement with eFlexFuel™ products of equal or greater value *or* purchase price reimbursement to the initial retail customer. All labor, diagnostics, removal, installation and shipping costs are customer's responsibility. The Limited Warranty hereunder are not transferrable. No employee, reseller or other agent of StepOne is authorized to amend this written Limited Warranty or make additional representations or warranties regarding any eFlexFuel™ product. *Written notice of any claim for breach/damages related to this Limited Warranty must be provided StepOne* within 30 days of the date your Limited Warranty expires. For separate, valuable consideration received; *all claims arising from or related to purchase or use of eFlexFuel™ products are exclusively subject to binding arbitration between a single initial retail purchaser and StepOne using an arbitrator supplied by and according to Consumer Arbitration Rules of the American Arbitration Association ("AAA")*². Any claim for arbitration must be made and received by StepOne and AAA within ninety (90) days of the date your Limited Warranty expires. The venue/place for arbitration shall be Pierce County, Washington unless otherwise mutually agreed for the convenience of the parties.

Other exclusions – Limitation of damages & reduced implied warranties if purchased through unauthorized reseller – Your rights under state law

Excluded from this **Limited Warranty** are normal wear or loss of performance over time, damage caused by customer wiring or installation not according to eFlexFuel™ instructions/warnings or third-party negligence, lack of maintenance, accident, improper application or service. Further, in consideration of the purchase price paid, neither StepOne nor any independent StepOne reseller are responsible for any time loss, rental costs, or for any incidental, consequential, punitive or other damages you may have or incur in connection with any part or product purchased. **Your exclusive remedy hereunder for covered parts is replacement/reimbursement as described above.** The duration of any implied warranty shall be limited to the term of express warranty, provided above, except as to purchases from unauthorized StepOne resellers (see below). This **Limited Warranty** gives you specific rights. You may also have other rights that vary from state to state. For example, some states do not allow limitations of how long an implied warranty lasts

²Contact adr.org for additional information regarding AAA arbitrations.

and/or do not allow the exclusion or limitation of incidental or consequential damages, so the limitations and exclusions herein may not apply to you. All other warranties are hereby disclaimed, except to the extent prohibited by applicable law.

Important: Protect your Limited Warranty by avoiding unauthorized Internet resellers

StepOne chooses to distribute its eFlexFuel™ products only through independent Authorized Resellers and demonstrating full brand support, stocked inventory, technical expertise and customer support consistent with the premium qualities of these products. *BE AWARE if you purchase eFlexFuel™ products through an unauthorized reseller on Amazon, eBay, Walmart, Alibaba or other Internet site, the duration of any express warranty herein or implied warranty of merchantability, fitness for a particular purpose or other implied warranty is reduced to 3 months from date of initial retail purchase from the full Limited Warranty term offered purchasers through authorized resellers.* StepOne reserves the rights to make future revisions to these products and Limited Warranty without prior notice or obligation to upgrade your eFlexFuel™ unit. Please confirm you are buying from an authorized reseller by consulting eflexfuel.com.

1. Pre-Installation Checklist

Important safety messages used with these instructions & eFlexFuel™ System

Before installation, please take a moment to completely review the following safety information and installation instructions.

Important safety information is generally preceded by one of three signal words indicating the relative risk of injury. The signal words mean the following:



WARNING: a hazardous situation which could result in serious injury or death if you do not follow instructions properly.



CAUTION: a hazardous situation which could result in minor or moderate injury if you do not follow instructions properly.

NOTICE: careful attention is required to this instruction or operation but generally does not relate to personal injury. Damage to eFlexFuel™ components, vehicle, other property, or owner responsibilities for emissions compliance may result if you do not follow instructions properly.

1.1 Before you begin

- You have accepted the terms of use.
- The conversion kit is only compatible with gasoline powered vehicles.
- The conversion kit is compatible with high impedance fuel injectors. Low impedance injectors require a special harness.
- The conversion kit is not compatible with direct injection engines (FSI, TSI, GDI, etc.).
- Verify adequate flow rate of the fuel system.
- The vehicle needs to be in normal operating condition.

- The vehicles oxygen sensor needs to operate normally, i.e. smog check OK.
- The conversion kit is only compatible with 12V electrical systems.
- Temperature during installation should be above 50 °F (10 °C) . Plastic parts may break in lower temperatures.
- Do not fill up the tank with [E85](#) ethanol before installation.

1.2 Package contents

- Control unit.
- Wiring harness.
- Extension wiring harness for 5-8-cylinder cars (4 pcs).
- Male connectors (10 pcs).
- Ethanol sensor.
- Cable/zip ties

1.3 Accessories kit contents (sold separately)

- Hose clamp 4 pcs.
- Quick connectors (variations between 5/6" and 3/8" accessories kit).
- Fuel line hose (variations between 5/6" and 3/8" accessories kit).
- Fuel line disconnect tool.

1.4 Tools required

- Multimeter.
- Basic tools, e.g. a fuel line opening tool, flat blade screw drivers etc.
- Eye protection & gloves.
- Cleaning rags.
- Cutting- and Needle pliers.
- Hose cutter.

I have checked these things before moving on to the next phase

- The vehicle is in normal working condition and appropriately maintained.
- Spark plugs and ignition coils are in good condition and working normally.
- The product package contains all the correct accessories (injector connectors and fuel line hose sizes match with the vehicle etc.).

2. eFlexFuel™ Installation

2.1 Ethanol sensor



WARNING: Fire/explosion risk from gasoline & vapors. Disconnecting the fuel line in this step. Improper installation or routing may result in spilled fuel. Assure that the engine is cold, and no electrical or other ignition sources are within or adjacent to the working area. Use rags to remove any spilt fuel and dispose in appropriate sealed container.

2.1.1 Key points

- 1) Block or secure vehicle and confirm there are no combustion sources near or around vehicle and work area.
- 2) Open the fuel filling cap to release pressure from the fuel tank.
- 3) **NOTICE:** Ethanol sensor should be installed to a location free from moving parts and high temperatures. Engine movement may cause the fuel hose to rub against components and thus cause damage to the hose itself if installed incorrectly. Installing the fuel hose too close to a hot source may cause the hose to melt which can lead to slipping or leaking. Clean the fuel line connection before disconnecting them.
- 4) Clean the connectors before disconnecting.
- 5) The fuel hose should be installed as straight as possible. Avoid tight bends. Minimum radius for a bend is 3.1" (80 mm). Tight bending of a fuel hose may cause breaching and/or leaking.
- 6) **NOTICE:** Use quick connectors when installing the ethanol sensor.
- 7) If an additional fuel hose is required during the installation, use the fuel hose included in the eFlexFuel™ accessories kit.
- 8) Do not use solvents when installing the fuel hose.
- 9) Lubricate the quick connector seals with clean engine oil before installation.

2.1.2 Installation

- Ethanol sensor (**Figure F, 1**)
- Ethanol sensor connector (**Figure A, 4 / Figure F, 2**)
- Fuel hose and hose clamps (**Figure F, 3**)
- Fuel line quick connector (**Figure F, 4**)

The ethanol sensor can be installed to either the incoming fuel pressure line or the return line. Fuel flow direction does not affect the reading of the sensor. The ethanol sensor should be installed near the fuel rail. We recommend installing the sensor in the incoming pressure line.

After installing the quick connectors, make sure they are properly locked by pulling the connector back and forth.

I have checked the following before moving on to the next phase

- The ethanol sensor is properly fastened with the quick connectors included in the accessories kit.
- There are no tight bends in the fuel line.
- No solvents were used during the installation.

2.2 Wiring harness

- Row connector (Figure A, 1)
- Ground wire (Figure A, 2)
- Temperature sensor (Figure A, 3)
- Ethanol sensor connector (Figure A, 4)
- Fuel injector connector (female) (Figure A, 5)
- Terminal couple for male connectors (Figure A, 6)
- Male connector (Figure A, 7)
- Extension connectors (5-8-cylinder cars) (Figure A, 8)
- Extension wiring harness (5-8-cylinder cars) (Figure A, 9)

2.2.1 Disconnect the fuel injector connectors

- Fuel rail (Figure B, 2)
- The fuel supply line (incoming pressure line) (Figure B, 1)
- The fuel return line (Figure B, 3)
- Fuel injector (Figure B, 4)
- Vehicle's existing injector connectors (Figure B, 5)

Remove existing connectors connected to the fuel injectors.

2.2.2 Check the compatibility of the fuel injector connectors

Before proceeding with the installation make sure your vehicle's fuel connectors are compatible with the contents of the product package. If the connectors do not fit, please contact the seller.

2.2.3 Check the polarity of the injector connectors (Figure C)

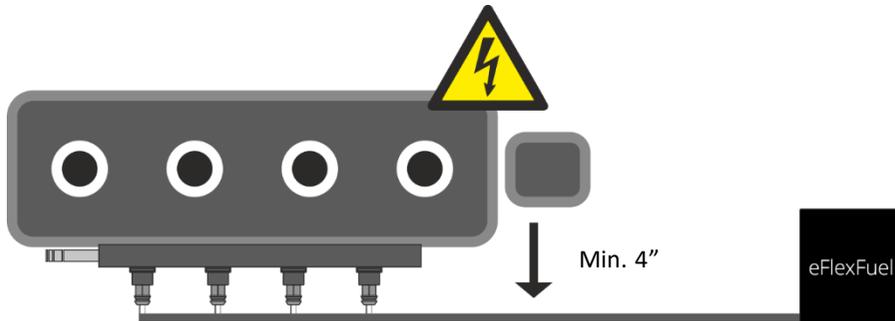


CAUTION: Check the polarity of the injector connectors so that the eFlexFuel™ wiring harness can be connected correctly. Use the multimeters conductivity position ("beep"-position). Usually the positive side (+12 V) has the same wiring color.

Measure all the connectors the same way. Remember which terminal made the beep sound. This information is required later during the installation. If you are unsure of the polarity or you are unable to get a solid reading, contact our technical support.

2.2.4 Connect the male connectors to wiring harness (Figure D)

Check which way the male connector plugs in. Push both wires of the wiring harness to the male connector and make sure that the **red wire (+)** inserts to the same side as the multimeter beep-tone indicated.



**Do not install the eFlexFuel™ wiring harness near high voltage components!
(spark plugs, ignition coils, distributor etc.)**

2.2.5 Install the wiring harness to the fuel injectors

Once the male connectors are connected to the eFlexFuel™ wiring harness, it is ready to be installed.  **CAUTION:** Do not change the order of the vehicle's original injector connectors! eFlexFuel™ injector wires can be in any order. The connector pair with the **red shrink tube** +12V (see image below) must be connected so that eFlexFuel™ gets its operating voltage.

- Connect the male connectors of the eFlexFuel™ wiring harness to the vehicle's injector wires you disconnected earlier. (Figure E, 1)
- Connect the female connectors of the eFlexFuel™ wiring harness to the injectors. (Figure E, 2)



2.2.6 Temperature sensor location



CAUTION: The temperature sensor must not be installed near the engine exhaust manifold.

An optimal location for the temperature sensor is near the cylinder head next to the fuel injectors.

2.2.7 Installing the control unit

Find an optimal location for the control unit in the engine bay. Make sure that the control unit is not exposed to excessive heat or moisture. Additionally, make sure that the control unit is not touching moving parts and is not located close to high voltage wires/components.

2.2.8 Secure the wiring harness



CAUTION: This is a multipin connector. Damaging the pins will affect intended operation of your eFlexFuel™ system.

Make sure that the terminals of the control unit's main connector are straight before connecting the wiring harness. Connect the wiring harness to the control unit. **Do not use excessive force!** Make sure that the connector is securely attached.

Connect the wiring harness to the ethanol sensor. The connector should click once correctly inserted.

2.2.9 Connect the ground wire

Ground the eFlexFuel™ wiring harness either directly to the negative terminal of the car's battery or to the vehicle chassis.

NOTICE: Make sure that the ground wire is connected properly.

I have checked the following before moving on to the next phase

- I have ensured that the wiring harness is not located next to high voltage wires/components, i.e. ignition coils etc.
- Male connectors have been verified with a multimeter using its conductivity measurement setting.
- The eFlexFuel™ system is grounded appropriately.

2.3 Finalizing the installation

Make sure the harness has a little bit of play to compensate for engine movement and that it does not touch any moving or hot components. The wiring harness can safely withstand 212 °F (100 °C) temperatures but avoid routing it close to hot components e.g. exhaust manifold etc.

2.4 Driving with the eFlexFuel™ system

The eFlexFuel™ system is sold as a competition and off road E85 conversion unit. Your eFlexFuel™ system may not be compatible with (and is not recommended for combination with) other aftermarket fuel management systems. The vehicle owner remains responsible for any use outside competition and/or off road, including Federal and State emissions and highway equipment laws. We recommend initially confirming your eFlexFuel™ installation has retained baseline operation using regular gasoline.

- 1) Start the engine.
- 2) The engine should be running normally. However, the initial start-up after the installation might be a bit longer if the ethanol sensor was installed in the incoming fuel pressure line.
- 3) Observe the installed fuel line connectors and fuel hose when the engine is running.



WARNING: Even a small leak could cause a fire hazard.

- 4) If the vehicle idles badly or will not start, check the polarity of the wiring harness connectors and that the connectors are connected properly.
- 5) eFlexFuel™ system can be monitored with the eFlexApp™ mobile application.

The installation is complete, and you can now refuel the vehicle with ethanol E85, gasoline or any mixture of these.

I have checked the following after the initial start

- I have verified that the data displayed on eFlexApp™ is correct.
- Ethanol content is at least 5 percent (%) or higher depending on the fuel in the tank.
- The temperature reading is accurate.
- The injector activity indicators display the correct amount of cylinders.
- The duty cycle is roughly 1 to 4 percent (%) on idle.
- There is no lack of power or torque while driving.
- The engine is running identically as pre-installation.

3. Cold climate use

If you encounter any problems with starting the engine in cold temperatures, *avoid* long cranking. We recommend short start-ups (2-3 seconds) and adequate pauses in between attempts (5-8 seconds). This helps ethanol to evaporate in the cylinders before attempting to start engine again.

If cold starting becomes worse, we recommend using an engine block heater or adding 5 - 10 percent (%) of regular gasoline to the fuel tank. Always use fresh, commercially graded ethanol E85 and plan on fill-ups mixed with regular gasoline in the event of cold weather, unusually hot or high-altitude operations.

NOTICE: Consult your eFlexFuel™ reseller/installer or our technical support for further recommended adjustments/steps if E85 fueling issues persist.

4. FAQ

The fuel consumption reading does not match actual consumption

In most vehicles the fuel consumption readout is calculated based on injection pulse width. The real fuel consumption may differ from the original fuel consumption using ethanol E85.

eFlexApp™ fault codes

Ethanol sensor not connected

- Check that the ethanol sensor connector is properly attached, and the wire is not damaged.
- Check that the ethanol sensor cable connector is properly connected to the ethanol sensor.
- Make sure the purple lock on the wiring harness is locked to the bottom section.
- Check that the pins on the connectors are not oxidized and/or damaged.

Low ethanol content

- The ethanol sensor has read a low ethanol content. The warning limit is 2 percent (%). Under normal circumstances, gasoline contains at least 5 percent (%) ethanol. Low ethanol content could show symptoms of low fuel pressure or a faulty ethanol sensor.
- If the ethanol content is 0 percent (%), make sure the ethanol sensor is connected to the fuel line and not to e.g. a breather hose.
- The fuel pump may be worn, or the fuel filter is clogged. The fuel line is not entirely filled and thus displays a varying ethanol content.

Fuel is contaminated

- The ethanol sensor has detected contaminated gasoline or water. If the sensor cannot detect the right ethanol content, the value is set to 40 percent (%) as a safety precaution. *NOTICE:* avoid driving with this condition or refuel the vehicle with a 50/50 percent (%) mixture of ethanol and gasoline.

Temperature sensor signal is too low

- Temperature sensor is faulty, or the wire is damaged.

Temperature sensor signal is too high

- Temperature sensor is faulty, or the wire is damaged.

Duty cycle warning

- The injector duty cycle has reached 100 percent (%). Monitor the duty cycle level with eFlexApp™ mobile application while driving. If the duty cycle reaches 100 percent (%) during hard accelerations, we recommend adding gasoline to lower the ethanol E85 content. Possible causes could be clogged fuel nozzles, a clogged fuel filter, a faulty fuel pump, or inadequate fuel system for E85.

Fault codes may appear if there are pre-existing electrical problems that influence the operation of the eFlexFuel™ control unit.

Troubleshooting

To access our technical support portal, visit the following website eflexfuel.com/en-us/support

