



Operating and Installation Instructions

CAUTION!

This product is to be installed only by persons knowledgeable in the repair and modification of vehicle fuel systems and general vehicle systems modification. Only a qualified technician or mechanic who is aware of applicable safety procedures and fabrication skills should perform the installation of this product.

This fuel pump utilizes an electronic DC motor system that is not typical of conventional fuel pumps, and therefore extra precautions must be adhered to as contained in instructions herein

GASOLINE AND OTHER FUELS ARE FLAMMABLE AND CAN BE EXPLOSIVE!

Perform the installation in a well-ventilated location only to minimize the buildup of fuel vapors. **NO** open flames, smoking or other sources of ignition are to be present during installation, to prevent fire or explosion that can cause serious injury or death. Grinding, cutting, and drilling must be performed with care to prevent ignition. Draining and removal of all fuel and ventilation of vapors in vehicle and fuel system is recommended when performing such procedures. Proper eye and personal protection are always required during installation.

WARNING!

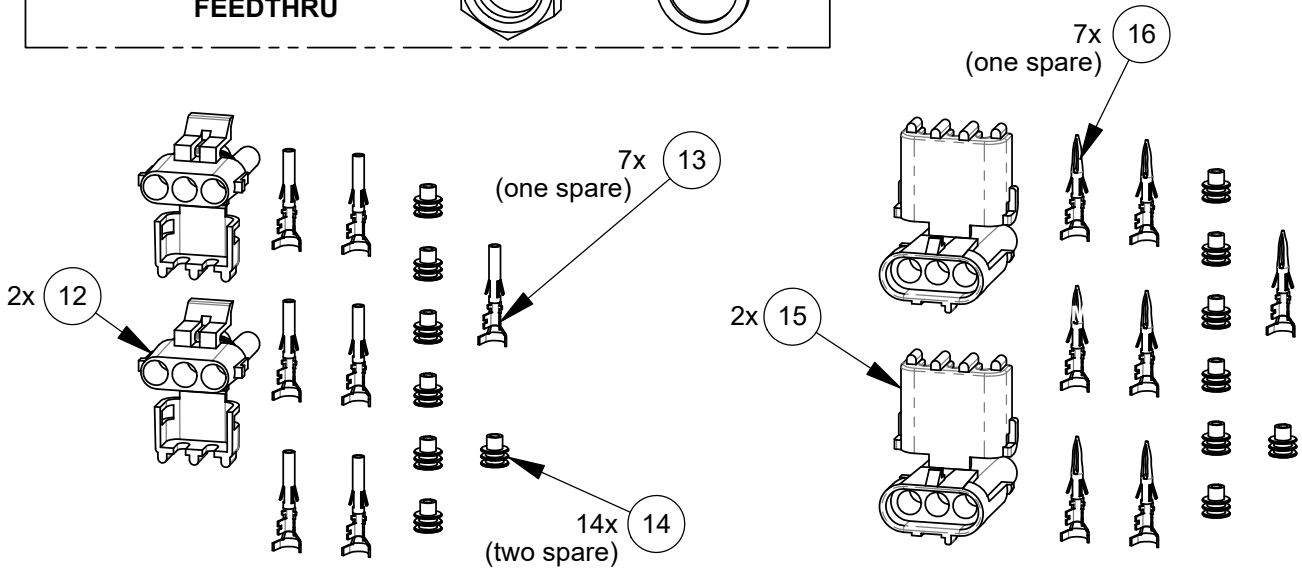
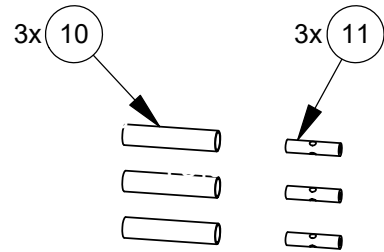
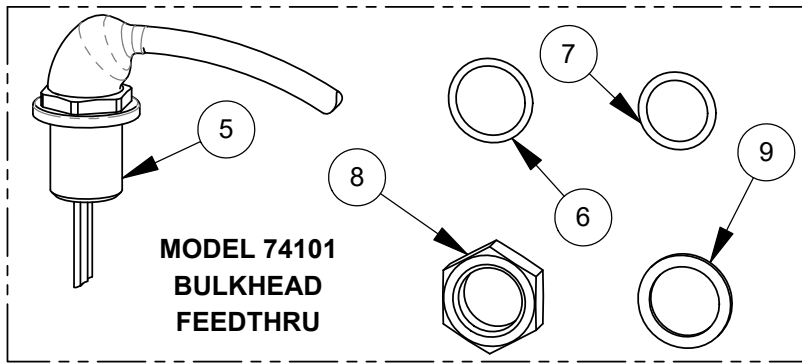
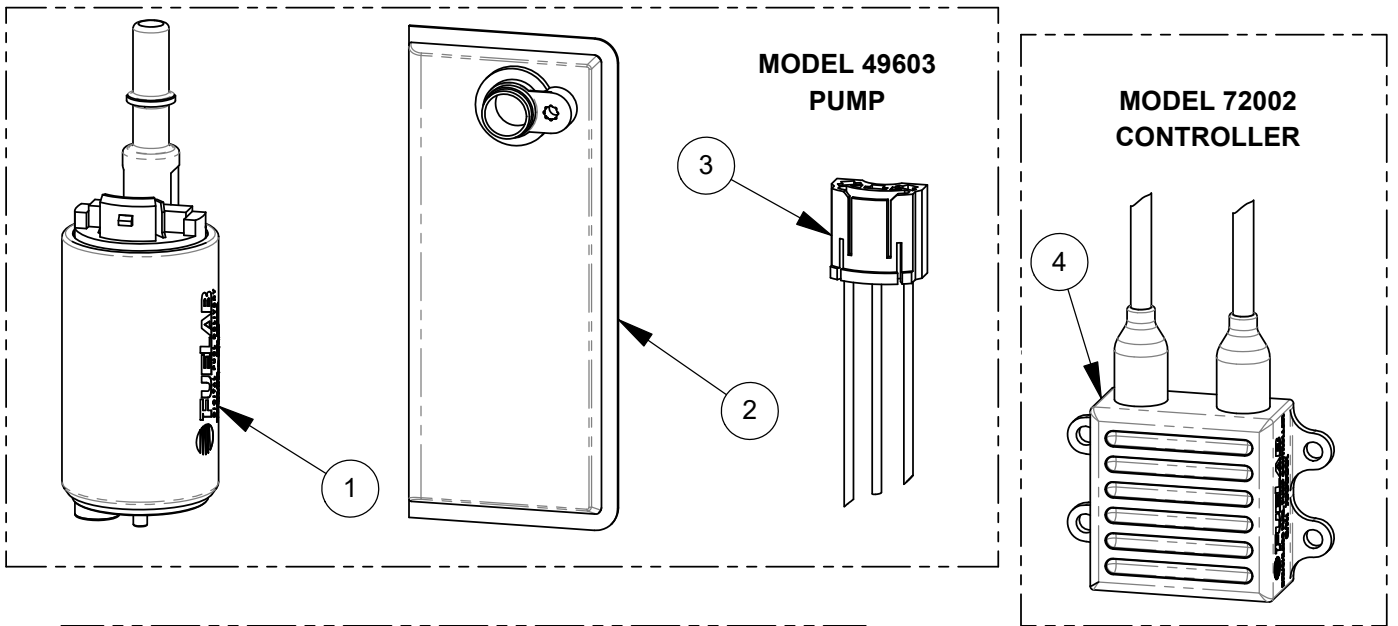
The Vehicle's fuel system may be under pressure! Do not loosen any fuel connections until relieving all fuel system pressure. Consult an applicable service manual for instructions to relieve fuel system pressure safely.

This product is intended for racing, off-road, or marine use only. This fuel system component may not be legal for sale or use on emission-controlled motor vehicles; consult local, state, and national laws.

Product Contents:

Verify the contents of this box, against list of components below and on the next sheet, to ensure that nothing is missing. Contact your Fuelab® distributor immediately for replacement. This kit includes Fuelab® Models 49603 Fuel Pump, 72002 Controller, and 74101 Bulkhead Feedthru. Consult those included instructions for reference during the installation of this kit, including performance features, specifications, and ratings.

ITEM	Description	Qty
1	Model 49603 In-Tank Fuel Pump	1
2	Inlet Straining Filter	1
3	Fuel Pump Electrical Connector	1
4	Model 72002 DC Brushless Fuel Pump Controller with PWM Speed Control	1
5	Bulkhead Feedthru	1
6	Panel Mount O-ring (Size 19mm I.D. x 2mm C.S., Thinner)	1
7	Boss Mount O-ring (Size -908, Thicker)	1
8	Nut	1
9	Flat Washer	1
10	Fuel Resistant Shrink Wrap Segment	3
11	Wire Splice	3
12	Delphi (Aptiv) 3-Conductor Weather Pack Female Connector Shroud	2
13	Female Terminal for Delphi Connector (one is a spare)	7
14	Wire Seal (14 total used for both styles of connectors, two are spares)	14
15	Delphi (Aptiv) 3-Conductor Weather Pack Male Connector Shroud	2
16	Male Terminal for Delphi Connector (one is a spare)	7



Check above diagram and list shown on previous page, to ensure no components are missing or damaged. Contact your Fuelab® distributor immediately for replacement.

FOLLOW ALL INSTRUCTIONS HEREIN. INSTRUCTIONS BOXED WITHIN PUMP, CONTROLLER AND BULKHEAD FEEDTHRU ARE NEEDED TO COMPLETE INSTALLATION. ALL SETS OF INSTRUCTIONS CONTAIN IMPORTANT INFORMATION!

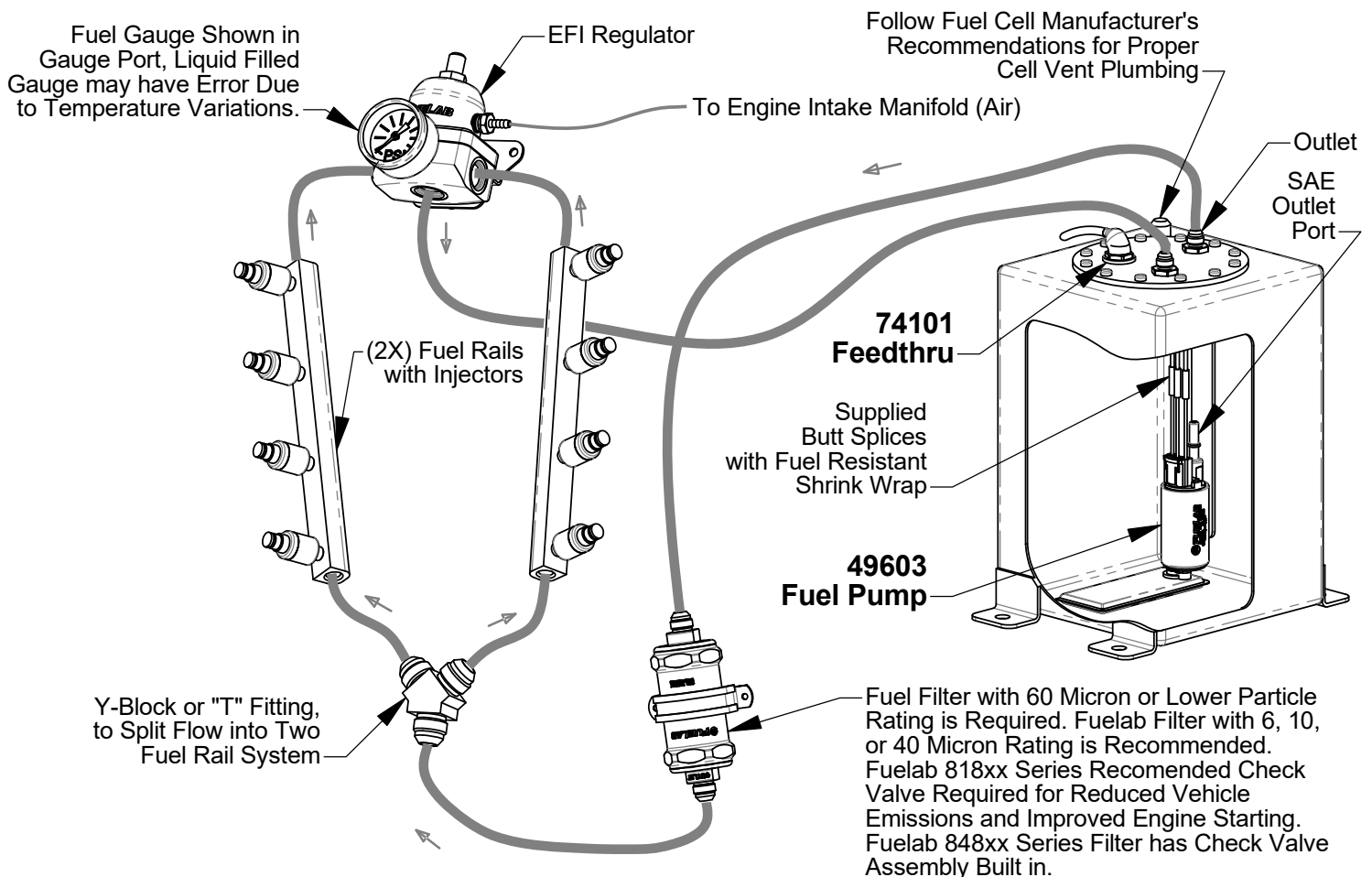
Before Installation, Plan Entire Fuel System:

A complete design plan of entire fuel system must be created for the specific application. These instructions are a guide to help design this plan with respects to integrating this model of fuel pump only. Consult other sources of information and manufacturer's instructions for the various components of the fuel system. These instructions are limited to general topics of fuel pump kit installation and may not include specific information pertaining to your specific application. These instructions are written assuming the use of Multi-Point Electronic Fuel Injection using a standard return (bypass) style fuel pressure regulator. This fuel pump kit may be integrated in some general carbureted systems using a bypass system. Visit our company website (www.fuelab.com) for specific details pertaining to example fuel systems and other solution ideas. Additional information including advanced troubleshooting, any special alerts and FAQ's pertaining to this and other products is also available. A good design plan for the fuel system must contain consideration for: pressure and flow rate through various components, quality of components, operating environment (temperature, vibration, shock, general exposure to elements) and local area laws. Begin installation of fuel pump only after a complete plan is established to help avoid fuel system component failure, costly rework, and excessive installation time.

Plumbing Planning Notes:

Fuel pump is intended to be mounted inside a fuel tank or cell. Adequate structural mounting and support for the fuel pump kit components are the responsibility of the fabricator / installer. While an electrical bulkhead connector is supplied with this kit (Model 74101), outlet flow fittings and tank bulkhead is not provided. The use of fuel line such as PTFE (or Nylon) line and SAE style fitting connection is recommended. The main outlet fuel port (3/8" SAE) uses a push-on or "SAE" style fitting. A fuel filter with a 60 micron or finer particle rating is required to be used upstream of regulator and downstream from fuel pump to protect it and the fuel injectors from foreign object damage. Reference the schematic diagram below for filter location. Use of a liquid filled gauge exposed to engine compartment heat is not recommended as the liquid inside the gauge may exert measurement errors. **DO NOT** plumb to any gauge mounted inside the vehicle or in passenger compartment. A line burst can spill fuel inside passenger compartment and on occupants, possibly causing serious injury or death. An electric gauge or pressure transducer system is recommended for readings in a passenger compartment.

Typical EFI V-8 Fuel System Plumbing Schematic Diagram:



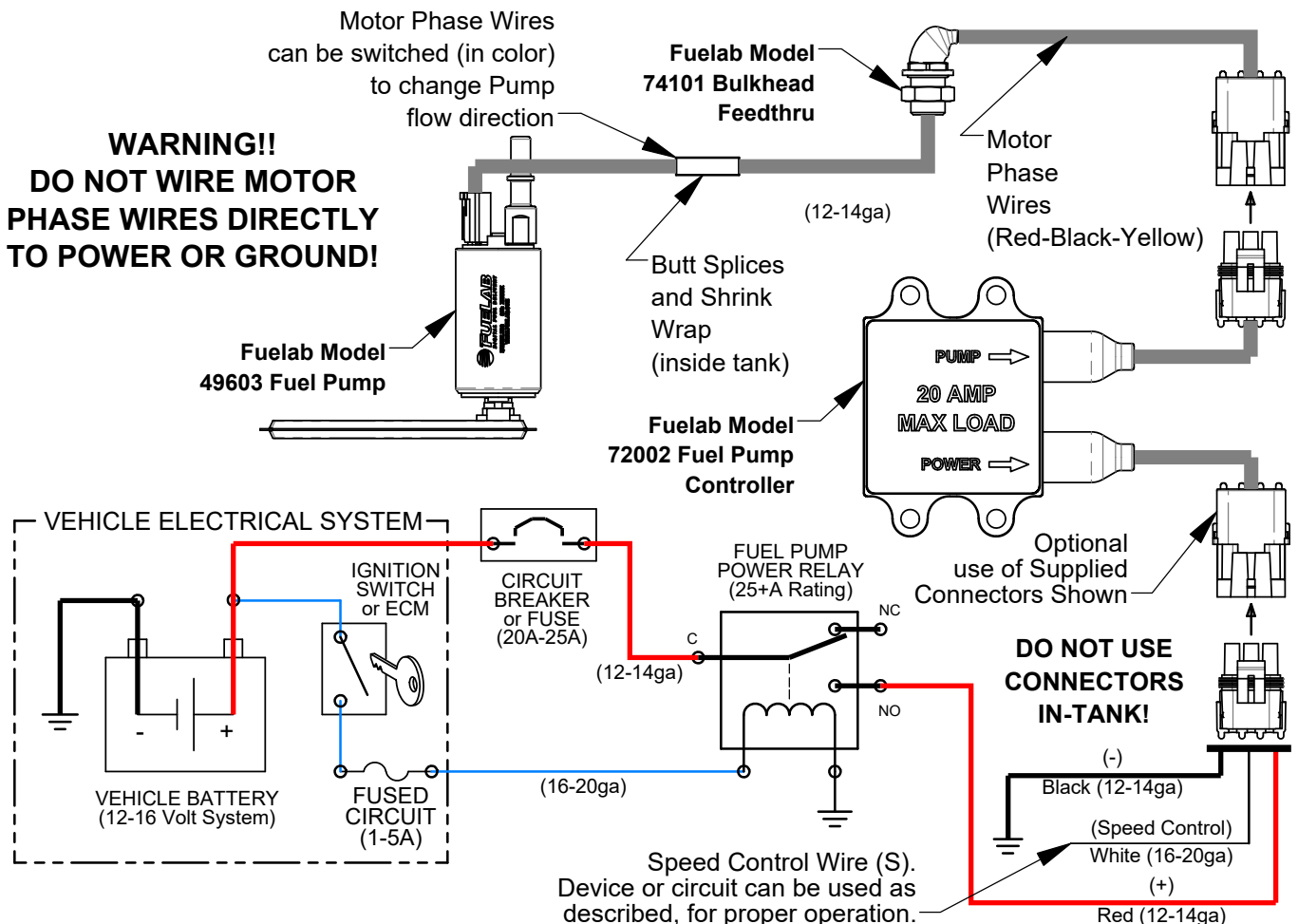
**Special Note: Use in carbureted systems require a bypass return or relief valve.
Do not "Dead Head" Fuel Pump.**

Electrical Planning Notes:

SPECIAL NOTE: The three wires coming from the supplied fuel pump (Red, Yellow and Black 14 gage stranded wires with Teflon insulation) come directly from the motor's stator internal windings. The color and order of these three wires determines the rotational direction of the fuel pump. During initial operation, direction of motor (and therefore direction of flow) requires it to be determined. If pump is determined to be operating in reverse, swap positions of two of the three wires with each other to reverse direction of flow. **DO NOT** reverse the polarity of the input DC voltage to the supplied Controller operating the fuel pump. This will result in damage to the controller. Supplied butt splices and shrink tubes can be used to facilitate splicing of wiring to the supplied feedthru within the fuel tank. These butt splices and shrink tubes are intended for one time use, not for rework. Be sure to check proper fuel pump delivery direction before committing to permanently attaching the wiring. Also supplied are two sets of connectors that can be used for convenience. The connectors can be used for wiring between the vehicle and supplied Controller and between the supplied Controller and supplied Bulkhead Feedthru as shown. Reference below, for schematic wiring diagram example. Use electrical components as described including electrical connectors that are appropriate for the operating environment of the fuel system, whether its use in street, racing, or marine applications. Electrical connectors for the power leads must be capable of high current draw, note all connections, wire, and component rating requirements herein. Solder and use shrink wrap for wire splices for extra reliability. Main wiring schematic diagram below shows the control of relay by ignition switch. This source can be changed as described, or by a toggle switch. Some forms of racing have specific rules regarding electrical switching of fuel system. Consult appropriate racing guidelines, rules, and regulations.

Speed Control: A "PWM (Pulse Width Modulation) Signal" is a signal that alternates between a "High" voltage level that is limited to approximately 5 Volts to near 0 Volts or ground level (relative to the Power Ground Wire). The signal shape is typically a square wave (when viewed on an oscilloscope) at a fixed frequency. This signal is measured differentially between the PWM Signal (White) Wire and the Power Ground (Black) Wire. The ratio of the signal being "High" vs. "Low" defines the "Dwell Time" in percentage. The Controller interprets a PWM signal's "Dwell Time" range between 5% and 95% to communicate pump flow performance between the minimum speed available and the maximum speed available respectively. If the Controller fails to interpret or losses the signal, the Controller will default to the maximum speed (or flow) setting. Electronic devices such as Engine Management Units may have an output that can produce PWM Signals compatible with this Controller. Attach this white signal wire to ground to operate system in Full Speed Mode (not using speed control).

MAIN WIRING SCHEMATIC DIAGRAM: (Some electrical components shown are not supplied with kit)



Installation Steps:

SPECIAL NOTE: Follow the three sets of installation steps as outlined in the included instructions (and maintain order):

1. Model 49603 Fuel Pump
2. Model 74101 Bulkhead Feedthru
3. Model 72002 Fuel Pump Controller

Fuel System Maintenance Notes:

Periodic inspection and general maintenance is required for longevity and reliability of the fuel system. This action directly affects the fuel pump's performance and reliability. Included with that are periodic inspection and/or filter element replacement. The straining filter (upstream of pump) should be checked and cleaned at least every 30,000 miles (more often for off-road operating conditions). Replace or clean downstream filters (after pump) every year or 15,000 miles (more often for off-road operating conditions). Dirty fuel filters can block flow and adversely affect fuel system performance as well as can directly damage the fuel pump.

Special alert for E85 Users: **DO NOT** use cellulose (paper) based filter elements! Water can contaminate the fuel and break down the element, creating debris that can damage injectors and fuel pump. E85 and other oxygenated fuels can absorb water. Long term storage of this fuel within the fuel tank of vehicle is not recommended and can contribute to rusting of the fuel pump's tool steel components. Draining the fuel tank and replacement with small amount of Gasoline or Kerosene (along with operating the fuel system for a small period of time) is recommended for long term storage of the vehicle.

Troubleshooting Notes:

For diagnostic information, refer to instructions for both the supplied Model 49603 Fuel Pump and Model 72002 Controller under Troubleshooting Notes.

Please do not return this product to your retailer. If you experience any performance, reliability or problems during installation or use of this product, please contact Fuelab immediately!

For more tips, advice or troubleshooting please visit our website at www.fuelab.com, e-mail message to info@fuelab.com or call our tech department at 618-344-3300 between 8am and 5pm Central Standard Time.

LIMITED LIFETIME WARRANTY

FUELAB, a division of FCP, Inc., having its principal place of business at **1605 Eastport Plaza Drive, Suite 125, Collinsville, IL 62234, USA** ("Manufacturer") warrants its **FUELAB** products (the "Products") as follows:

1. Limited Lifetime Warranty

Manufacturer warrants that the Products sold hereunder will be free from defects in material and workmanship from the date of purchase for so long as the original purchaser owns the Products. This Limited Lifetime Warranty does not extend to any subsequent owner or transferee of the Products. If the Products do not conform to this Limited Lifetime Warranty during the warranty period (as herein above specified), Buyer shall notify Manufacturer in writing of the claimed defects and demonstrate to Manufacturer's satisfaction that said defects are covered by this Limited Lifetime Warranty. If the defects are properly reported to Manufacturer within the warranty period, and the defects are of such type and nature as to be covered by this Limited Lifetime Warranty, Manufacturer shall, at its option and own expense, furnish replacement Products or replacement parts for the defective Products or refund the purchase price. Removal of Products from vehicle, shipping to Manufacturer and installation of the replacement Products or replacement parts shall be at purchaser's expense. (*Vehicle means any automotive, bike or marine transportation device powered by an internal combustion engine to which the Product is attached. This Product is **NOT** intended or designed for use on aircraft, experimental or otherwise.*)

2. Other Limits

THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. This Limited Lifetime Warranty does not cover any damage due to: (a) transportation; (b) storage; (c) improper use; (d) failure to follow instructions for the Products or to perform any preventive maintenance; (e) modification; (f) unauthorized repair; (g) normal wear and tear; or (h) external causes such as accidents, abuse, or other actions beyond Manufacturer's reasonable control. This Limited Lifetime Warranty also does not apply to Products upon which repairs have been effected or attempted by persons other than pursuant to written authorization by Manufacturer. This Limited Lifetime Warranty is not extended if we repair or replace the Products.

3. Exclusive Obligation

THIS LIMITED LIFETIME WARRANTY IS EXCLUSIVE. The sole and exclusive obligation of Manufacturer shall at its option be to repair or replace the defective Products in the manner and for the period provided above or to refund the purchase price. Manufacturer shall not have any other obligation with respect to the Products or any part thereof, whether based on contract, tort, strict liability or otherwise.

4. Other Statements

ORAL OR OTHER WRITTEN STATEMENTS BY MANUFACTURER'S EMPLOYEES, REPRESENTATIVES AND/OR RESELLERS DO NOT CONSTITUTE WARRANTIES, SHALL NOT BE RELIED UPON BY BUYER, AND ARE NOT A PART OF THE CONTRACT FOR SALE OR THIS LIMITED LIFETIME WARRANTY.

5. Entire Obligation

This Limited Lifetime Warranty states the entire obligation of Manufacturer with respect to the Products. If any part of this Limited Lifetime Warranty is determined to be void or illegal, the remainder shall remain in full force and effect.

6. Warranty Service

How Do You Get Service?

If something goes wrong with your Product, contact FUELAB at 618-344-3300, or send an e-mail with proof of purchase to: info@fuelab.com for a Return Authorization Number (RMA). After receiving your RMA send the product postage paid, fully insured, with a brief written description of the problem to:

FUELAB Warranty Department, 1605 Eastport Plaza Drive, Suite 125, Collinsville, IL 62234

We will inspect your Product and contact you within three business days of receipt to give the results of our inspection and an estimate of the labor and/or parts charges required to fix the Product, if applicable. If covered under this Limited Lifetime Warranty, Manufacturer will repair or replace the Product and return it to you at no cost or refund the purchase price. If the Product is NOT covered under this warranty and if you authorize repairs, we will return the repaired Product to you COD, or prepaid via credit card, within three business days. If we find no issues with the returned product and it meets all performance specifications, there will be a \$25 charge to cover technician labor and inspection time. Additional return shipping charges will apply. We will return the repaired Product to you COD, or prepaid via credit card, within three business days.

Limitation of Liability

THE REMEDIES DESCRIBED ABOVE ARE YOUR SOLE AND EXCLUSIVE REMEDIES AND OUR ENTIRE LIABILITY FOR ANY BREACH OF THIS LIMITED LIFETIME WARRANTY, OUR LIABILITY SHALL UNDER NO CIRCUMSTANCES EXCEED THE ACTUAL AMOUNT PAID BY YOU FOR THE DEFECTIVE PRODUCT, NOR SHALL WE UNDER ANY CIRCUMSTANCES BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL OR PUNITIVE DAMAGES OR LOSSES, WHETHER DIRECT OR INDIRECT.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.