INSTALLATION MANUAL TITANUM SERIES

FS-1001

TITANIUM F. 25957

FWS-3003 Fuel Filter Water Separator

ALL 1/2" FUEL PORTS AND FUEL LINE!

APPLICATION:

T 220G (220GPH @ 16-18psi)

CLASS 1-CLASS 8 *Requires a Fuel Line Kit*



Diesel Fuel Systems Diesel Fuel Systems

Dear Valued Customer,

"Made in the USA" is not just a slogan at FASS; it's what we live by! FASS is not only assembled in the USA but 98%+ of the FASS product is manufactured in the USA, helping to employ Americans and strengthen America. At FASS, we scrutinize our suppliers and demand the highest quality American-made components. However, this does come at a price, which is one of the main reasons FASS products are more expensive than the competition. Remember price does not dictate quality but quality does dictate price! Here at FASS, we believe it's worth the commitment and will continue this practice to support America! Our competition is doing exactly the opposite by using foreign-made components.

Building extremely "High-Quality" fuel products is our business. We concentrate all of our efforts in this arena. No one else is as specialized as FASS in what we do! This is one of the ingredients to insure you are running with the "Highest-Quality" fuel system in the world! We have implemented very rigorous testing procedures to provide the "Highest Quality" we have become known for. Not only is our product superior, but customer satisfaction is #1 at FASS. It is our goal to provide the best service possible. Our confidence is evident in the products we make as each product is backed by an industry leading warranty!

Our R & D department, in conjunction with our Dealer Support department, is continually searching for ways to improve quality, expand our product line, and provide support to our network of dealers so our customers' needs and expectations will be exceeded.

To help insure you receive the proper system and customer support at the local level, FASS has a VIP and Authorized Dealer network representing FASS products. This is one reason you <u>must</u> purchase through a dealer to comply with our warranty policies. If you do not, there is no warranty! We recommend you go to www.FASSride.com, click "Find A Dealer", put in their ZIP code, select the type of dealer, and see if the company you purchased from is listed. If they are not, put their phone number in the field below the ZIP code field to see if they are listed. Below these two fields is a list of "Terminated/Unauthorized" dealers. You may want to review this list. If the company is not listed or is on the "Terminated/Unauthorized" list, we suggest you return the product immediately to that dealer and call FASS. We'll recommend you to the nearest dealer.

<u>VERY IMPORTANT</u>: Make sure to fill out your product registration form and return the original form to FASS Fuel Systems within 30 days of purchase accompanied with a copy of the purchase receipt. Complying with these guidelines will qualify you for the Extended Warranty!

See the Owner's Manual online at www.FASSride.com for full Limitation of Warranty. In the event that the buyer does not agree with this agreement: the buyer may promptly return this product, in a new and unused condition, with a dated receipt, to the place of purchase within thirty (30) days from date of purchase for a full refund less shipping.

The installation of this product indicates that the buyer has read and understands the Limitation of Warranty agreement and accepts its terms and conditions.

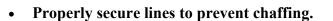
WARNINGS!

WARNING: Do not tie FASS Return in with engine return. Back pressure can cause damage to engine.

- Read all instructions before starting installation of this product!
- Installing the improper FASS Pump can cause *severe* engine damage. This unit was not designed to be used on Unit Injected Mechanical Engines. Refer to the FASS kits with UIME in the model number.

FASS	Recommended Application
T 220G	Class 1– Class 8, Agriculture, Industrial, Recreational, Hwy and off-road. Applications requiring fuel flow demands of 16-18psi and less than 220gph

- Do Not Remove any factory installed secondary fuel filter! Removal of a factory installed secondary fuel filter may void the engine manufacturer's warranty. This is the fuel filter between the engines fuel pump and the injectors.
- Be sure that the serial # on this installation manual matches that of the outside of the box.
- Keep debris from entering the internals of the system during installation. Getting debris in the water separator nipple can lock up the motor. If the motor does lock up from debris call FASS for technical assistance.





• Use caution when drilling. Steer clear of any electrical wires , air lines or other damageable components.

INSTALLATION MANUAL

Follow these steps to ensure a simple installation of your new FASS TITANIUM FUEL SYSTEM

- 1. Read the installation manual completely before attempting installation. The installation of this product indicates that the buyer has read and understands the limitations of the FASS manufacturers warranty agreement and accepts the responsibility of its terms and conditions.
- 2. Inventory the package components. Notify the place of purchase immediately of any parts missing or damaged.
- 3. The installation recommendations contained herein are guidelines. Use good judgment and take into consideration your vehicles' accessories.
- 4. For best results in accuracy and efficiency (due to training, communication, and our relationship with our dealer network), we recommend a ViP FASS dealer for the installation. They are prepared to install the FASS fuel pumps with the most efficiency. If a situation/problem arises during the installation, they are the most prepared for that situation/problem. DPPI is not responsible for any installation mistakes.
- 5. If you have any questions or concerns that can not be addressed with your dealer, email or call FASS.

Serial # Found

000

- 6. If any installation procedure is uncertain, contact FASS technical support. Email techsupport@FASSride.com with the following information:
 - Your Name, address and daytime phone number
 - Model (T 220G)
 - Serial Number
 - Last 6 of vehicles' VIN
 - Date of purchase
 - Nature of Your Concern

Call customer service; 636-433-5410 with the following information:

(T 220G)

- Model
- Serial Number
- Last 6 of vehicles' VIN
- Date of purchase

TITANIUM SERIES 220 GPH 16-18 PSI (APPROXIMATELY)

A fuel pressure gauge is highly recommended to identify fuel filter life and to prevent engine damage!



- Step 3: Mount Fuel System
- Step 4: Install Fuel Line
- Step 5: Check Installation



MOUNTING PACKAGE CONTENTS



10-273



Ring Terminal







Spade Terminal









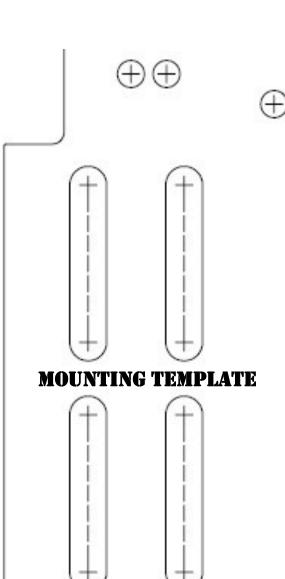
4) Locking Nut 3/8"



(3) Hex Bolt 1/4-20 13/4"



(3) WA-1001D



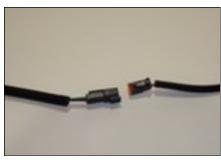
STEP 1: INSTALLING ELECTRICAL HARNESS

The installation of the electrical harness is done first, allowing power to be applied to the pump for lubrication purposes.

- A. Select best location in firewall for passage of wiring harness from cab to engine compartment.
- B. Find or drill a 7/8" hole in firewall. Install RS-2684 grommet for ease of installation and protection of wire harness.
- C. Connect WE-1001 wire extension to the WH-1005.
- D. Route red wire/ loom of the wire extension through the grommet in the firewall to the ignition or fuse panel. Use of corrosion preventative spray and dielectric grease is recommended where electrical connection are made..
- E. Connect the "Red" lead to the "ON" terminal of the ignition switch or a terminal on the circuit breaker board that is "hot" when the key is on. Use a test probe to locate the "hot side" of the circuit in the fuse block.
- F. Using the ring terminals, connect the green wire of the wire harness to the negative post and the red wire to the positive post of the battery.
- G. Secure relay in an upright position, preferably on the firewall out of the weather.
- H. Properly secure all electrical leads and harness.

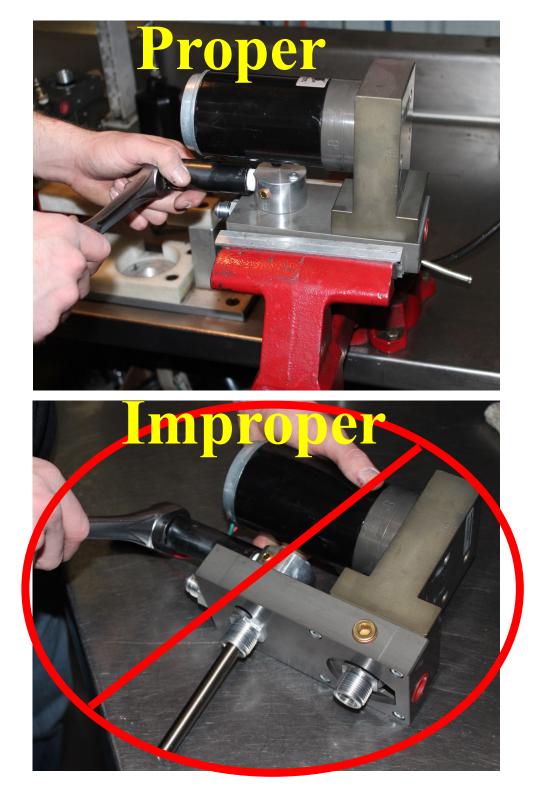








<u>ATTENTION</u>: While installing fittings into Titanium pump **DO NOT** Apply side pressure to draw tube of pump



TEP 2: MOUNTING THE FASS

Some of the photo's are of a different application, procedures are the same.

A. Remove primary fuel and/or water separator. If primary filter is part of the fuel pump, ignore this step.

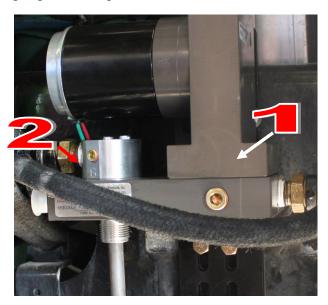


NOTE: Before installing fittings make sure to inspect for burs or flare imperfections. When cutting fuel line make sure to blow out line to keep debris from moving forward.

Note: Use thread tape on "ALL" male pipe threads, do not use on male flared fittings.

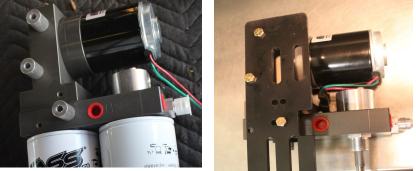


- B. **Skip this step if primary filter is part of the engine's fuel pump.** If 90° fitting is needed use OEM fitting (as seen in this photo)
- B1. Remove upside down "T" Block pump assembly (Item # 1) by removing the 4 bolts holding it to the FASS filter base. Pay attention to the O-rings (2) and ball
- B2. Remove the fuel manifold (Item #2) and assemble 90° fitting directing it in the correct direction.
- B3. Reassemble fuel manifold then pump assembly to FASS filter base making sure all O-rings & the ball are seated in their proper place. Torque to 110 in./lbs.

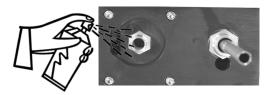


STEP 2: MOUNTING THE FASS Some of the photo's are of a different application, procedures are the same.

C. Attach BR-2001 to back of system using the spacers and 1/4" bolts. Use the two bottom bolts and the very top one bolt opening.



- D. Position system where it will be mounted. Mark the (4) mounting points (using the template located on the contents page). Prior holes may be used. Drill these marked locations with a 13/32 bit.
- E. Connect factory plug into the FASS harness. Turn key to "on". With pump operating, turn pump over, liberally spray WD-40 (or equivalent) into water separator nipple lubricating the Gerotor.



F. Assemble to frame using the (4) - 3/8" bolts & flange nuts placing the RS-1001 between the frame and bracket.



G. Apply motor oil to O-rings located on filters. Attach to system and tighten appropriately



STEP 3: IDENTIFY FUEL LINE CONFIGURATION

For optimal engine performance gains, the return line should return to its own port.

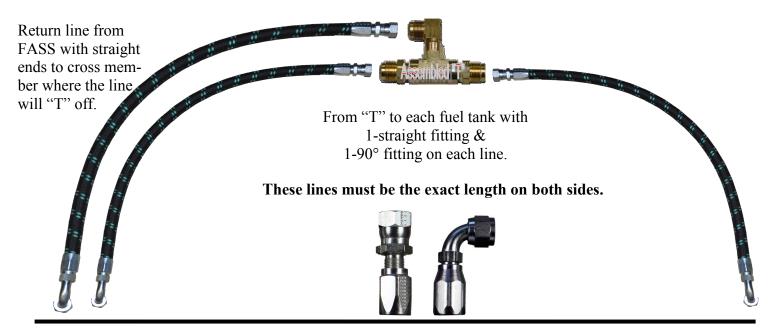
- Below is a chart of available fuel line kits FASS has to offer. Using one of these kits will make the installation cost effective and easier. This manual will refer to these FLK #'s
- Take caution when producing extra ports. Do only as directed as to be careful not to cause back pressure to engine return or severe engine damage.

Application	Accessory
#10 Feed Line Kit	FLK-S01
Single pick up/ Single Return	FLK-S02
Double pick up/Double Return	FLK-S03
Mercedes 4000 Series	FLK-S03, FLK-S06, FLK-S04
Volvo D12-D15	FLK-S03, FLK-S06, FLK-S05

- A. Fuel lines, excluding nylon type fuel lines, in excess of 6 years old should be replaced due to interior lining deterioration. This condition can cause many problems including but not limited to: fuel starva-tion, uneven fuel tank levels and etc.
- B. When routing the return line from the FASS Fuel System, you will need to first identify your current fuel system. Now match with the correct fuel line section below and follow the corresponding procedures. Uneven fuel level conditions can occur between the tanks if the pickup/return lines are improperly installed.
- B1. Most Popular Usually on 1994 Trucks & Newer including Volvo and Mercedes Engines: Double Draw/Double Return Line System. FASS fuel line kit (FLK-S03) or Double Vent Return Line Kit for trucks without the extra port of the fuel tanks(FLK-SO6)should have all of the product to complete this process
- B2. 2nd Most Popular Usually on 1993 Trucks & Older (except 359 Peterbilt next selection): Single Draw/Single Return Line System. FASS fuel line kit (FLK-S02) should have all of the product to complete this process
- B3. 359 Peterbilt: Single Draw Out of Cross Over Fuel Line/Single Return Line System
 Dual Tank Recommendation:
 1st Choice Convert to a complete Double Draw/Double Return Line System(FLK-S03) or Double Vent Return Line Kit (FLK-S06).
 2nd Choice Convert to a true Single Draw/Single Return Line System FLK-S02).

STEP 4: double draw/double return fuel line system

Caution: <u>Do Not</u> use sealant on AN fittings. Only use sealant on threads installed into pump assembly or joining fittings. Note: No extra ports? - Refer to the option located at the back of the manual.



A. Locate extra bung on the fuel tanks, most KW's have a 1/4", Peterbilt have 3/8" or 1/2" extra pipe plug located by the fuel lines at the top of the fuel tank. Other models may have an extra port some where at the top of the fuel tank. Remove the plugs and install a -8 AN fitting into each tank. It maybe necessary to use a bushing to adapt fitting to tank.



- B. Install (90° or straight) fitting into fuel line using the following procedures: refer to this procedure when necessary.
- B1. Assemble fuel line into female hose fitting (reverse threads), then apply a modest amount of oil to the interior lining.
- B2. Secure female end in vise.
- B3. Oil male JIC swivel (90° or straight) and assemble into female end.
- B4. The male portion should tightened all the way, as seen.

STEP 4: double draw/double return fuel line system

C. Assemble the "T" using (1) 3/8 NPT 'T', (2) -8 ANx3/8 MPT & (1) -8 ANx3/8 MPT 90° as seen in the photo.

Note: Hose clamps are not recommended for push lock fittings. They will hold up to 300psi! Use oil on fittings and inside fuel line when installing Push-Lok fittings

- Attach the line completed in Step 4b to the return port of the FASS labeled with D. an "R". Route to the center of the nearest cross member aligned with the ports in the fuel tank being used for return fuel. Measure & mark this line as it will connect to the 90° fitting of the "T" in this location.
- Cut the fuel line and assemble a -8 AN hydraulic fitting in the opposite end of E. the line connecting to the "R" port of the FASS.
- F. Assemble a -8 AN hydraulic fitting into one end of the remaining fuel line. Route this fuel line from straight fitting of the "T" to the return port in the fuel tank, mark & cut.
- G. Caution: Route the side with the exhaust first as it will be necessary to travel below the frame to avoid the exhaust, each side has to be the exact same length. Later it will install as seen.
- H. Cut the remaining fuel line to the "Exact" same length line as the line in Step 4f.
- Assemble (1) of each -8 AN 90° & -8 AN Straight into each line addressed in I. Steps 4f & 4g.
- J. In the same manner as previously covered, route and loosely connect the assembled fuel lines discussed in this section to the appropriate points of connection including the 'T'.
- K. Torque all connections to 18 ft./lbs. Secure the fuel line and all fittings. Continue to Step 5



















STEP 4: single draw/single return fuel line system

Caution: <u>Do Not</u> use sealant on AN fittings. Only use sealant on threads installed into pump assembly or joining fittings.

Note: No extra ports? - Refer to the option located at the back of the manual.



- A. Locate a fuel return port into the fuel tank. Most KW's have a 1/4", Peterbilts have 3/8" or 1/2" extra pipe plug located by the fuel lines at the top of the fuel tank. Other models may have an extra port some where at the top of the fuel tank. Remove the plugs and install the -8 ANx5/16 NPT into each tank, it maybe necessary to use a brass bushing.
- B. Install –8 AN hydraulic fitting into fuel line using the following procedures: refer to this procedure when necessary.
- B1. Assemble fuel line into female hose fitting (reverse threads), then apply a modest amount of oil to the interior lining.
- B2. Secure female end in vise.
- Oil male end of 90° JIC swivel fitting and assemble into female end. B3.
- B4. The male portion should tightened all the way, as seen.













STEP 4: single draw/single return fuel line system

Note: Hose clamps are not recommended for push lock fittings. They will hold up to 300psi! Use oil on fittings and inside fuel line when installing Push-Lok fittings

- C. Attach the line completed in Step 4b to the return port of the FASS labeled with an "R". Route to the port in the fuel tank being used for return fuel. Measure, mark & cut.
- In the same manner as previously covered, route and loosely connect the fuel D. lines discussed in this section to the appropriate points of connection.

E. Torque all connections to 18 ft./lbs. Secure all fuel lines and fittings. Continue to Step 5



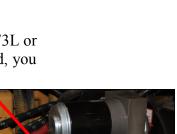




STEP 5: FUEL SUPPLY LINE

- A. Attach the fuel supply line from the fuel tank to the FASS using a 10-273L or one of the fitting from the filter housing removed in step 2. IF fuel supply line connects directly to engine-the primary fuel filter is not remote mounted-skip to step C (Usually, not always, on NTC/STC's and N-14's).
- B. Attach the fuel supply line from the FASS to the engine pump using a 10-273L or one of the fittings from the filter housing removed in step 2. Once completed, you are finished with step 5 and you may go directly to step 6.
- Disconnect fuel line from engine. Connect to "T" port of the FASS. C.
- D. Assemble a -10 AN hydraulic fitting into one end of the #10 fuel line and loosely connect to either the FASS or the engine.
- E. Route fuel line to open port (engine or FASS) measure and cut.
- F. Assemble a -10 AN hydraulic fitting into the cut end. Remember, clocking of the fuel fittings may be necessary to connect to ports in discussion.
- Attach the assembled fuel line to the FASS and engine. CAUTION: IT IS VERY IMPORTANT TO G. BLOW THIS FUEL LINE OUT BEFORE FINAL ASSSEMBLY TO ENGINE!!

Note: Secure all fuel lines with cable ties. Cable ties are an economical way to prevent the possibility of problems occurring!

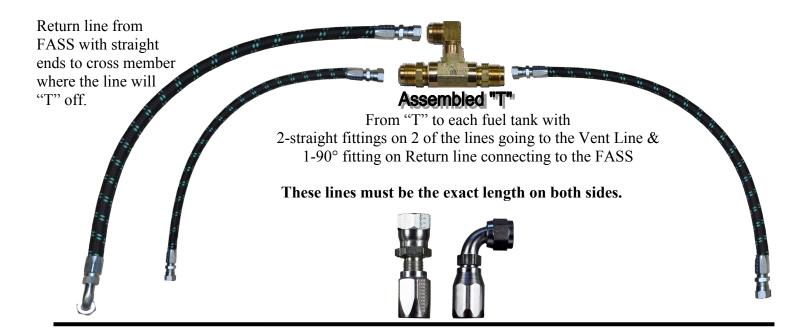






STEP 6: DOUBLE VENT LINE RETURN SYSTEM

Caution: <u>Do Not</u> use sealant on AN fittings. Only use sealant on threads installed into pump assembly or joining fittings.



- A. Assemble fuel line into female hose fitting (reverse threads), then apply a modest amount of oil to the interior lining.
- B. Secure female end in vise.
- C. Oil male JIC swivel (90° or straight) and assemble into female end.
- D. The male portion should tightened all the way, as seen.
- E. Assemble the "T" using (1) 3/8 NPT 'T', (2) -8 ANx3/8 MPT & (1) -8 ANx3/8 MPT 90° as seen in the photo.











STEP 6: DOUBLE VENT LINE RETURN SYSTEM

- F. Attach the line completed in Step 4b to the return port of the FASS labeled with an "R". Route to the center of the nearest cross member aligned with the ports in the fuel tank being used for return fuel. Measure & mark this line as it will connect to the 90° fitting of the "T" in this location.
- G. Cut the fuel line and assemble a –8 AN hydraulic fitting in the opposite end of the line connecting to the "R" port of the FASS.
- H. Assemble a -8 AN hydraulic fitting into one end of the remaining fuel line. Route this fuel line from straight fitting of the "T" to the return port in the fuel
- I. Caution: Route the side with the exhaust first as it may be necessary to travel below the frame to avoid the exhaust, each side has to be the exact same length. Later it will install as seen.
- J. Cut the remaining fuel line to the "Exact" same length line as the line in Step 4f.
- K. Assemble (2) of each -8 AN Straight into each side of the line addressed in Steps 4f & 4g.

- L. In the same manner as previously covered, route and loosely connect the assembled fuel lines discussed in this section to the appropriate points of connection including the 'T'.
- M. Torque all connections to 18 ft./lbs. Secure the fuel line and all fittings. Continue to Step 5







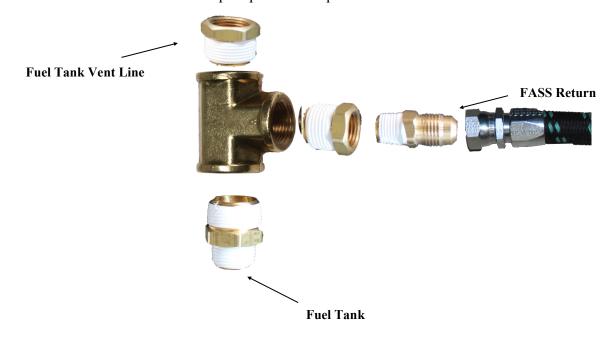




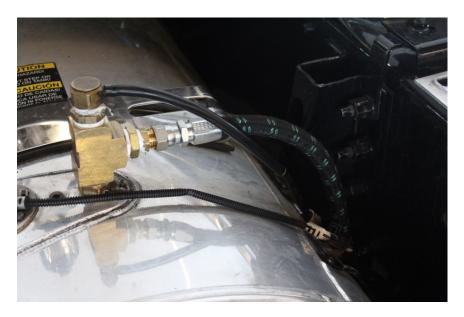


STEP 6: DOUBLE VENT LINE RETURN SYSTEM

N. Locate Fuel Tank Vent Line and remove vent and vent line from tank. Thread tape reducer on both ends and install reducer into tank. Once reducer has been secured install "T" onto reducer and secure. Thread tape bushings and install them on the "T". NOTE: Not all configurations will be able to be assembled this way. Install the vent line on the top portion of the "T" and the FASS return line the middle of the "T". Repeat previous steps on other tank to install the Double Vent Line Return Kit.



O. The below picture illustrates the configuration previously mentioned..



STEP 7: REVIEW INSTALLATION & SECURE CONNECTIONS

- A. Bolts and fasteners properly tightened?
- B. Electrical harness and fuel lines secured and properly tightened?
- C. Has the system been primed, refer to owners manual?
- D. Check for leaks.
- E. Start the engine
- F. Recheck all fluid and filter connections for leaks
- G. Product registration filled out and ready to be mailed or faxed.

OPTION: 2 WAYS OF PRODUCING EXTRA PORTS (Bung fitting)

A. Most Preferred & Easiest

- 1. Drill and tap a 3/8" fpt in the thicker band of aluminum as seen.
- 2. If possible, install the fuel tank vent in this port and connect the FASS



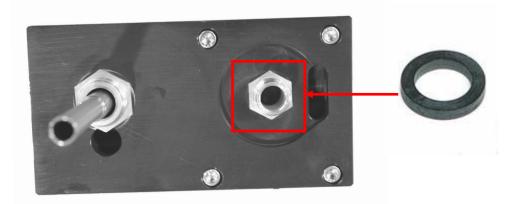
1. Fire Hazard, must be accomplished by a professional.

To assist with priming your FASS pump crack the FWS-3003. Put power to the FASS pump to activate the pump. When the tone of the pump changes you can tighten up the fuel filter. If you need a video of the priming process go to www.FASSride.com.



Note: The Red Plastic Plugs located in the "H" ports can stay in place fuel will not flow through these ports. Coolant can be plumbed into these ports to heat the fuel in the Winter months.

STEP 7: REVIEW INSTALLATION & SECURE CONNECTIONS



Note: O-Ring must be put back on suction side of pump. Failure to do so can result in priming issues, cavitation, or pressure loses.



Water Separator Filter –Install FS-1001 on water separator nipple without the draw tube. Make sure to insert O-Ring provided on nipple.

LIMITATION OF 4 YEAR WARRANTY

Disclaimer: To help insure you receive the proper system and customer support at the local level, FASS has a VIP and Authorized Dealer network representing FASS products. This is one reason you <u>must</u> purchase through a dealer to comply with our warranty policies. If you do not, there is no warranty! We recommend you go to <u>www.FASSride.com</u>, click "Find a Dealer", put in their ZIP code, select the type of dealer, and see if the company you purchased from is listed. If they are not, put their phone number in the field below the ZIP code field to see if they are listed. Below these two fields is a list of "Terminated/Unauthorized" dealers. You may want to review this list. If the company is not listed or is on the "Terminated/Unauthorized" list, we suggest you return the product immediately to that dealer and call FASS. We'll recommend you to the nearest dealer.

Diesel Performance Products, Inc. (hereafter "SELLER") gives Limited Warranty as to description, quality, merchantability, fitness for any product's purpose, productiveness, or any other matter of SELLER'S product sold herewith. The SELL-ER shall be in no way responsible for the product's open use and service and the BUYER hereby waives all rights other than those expressly written herein. This Warranty shall not be extended or varied except by a written instrument signed by SELLER and BUYER.

When MANUFACTURER receives the "ORIGINAL" PRODUCT REGISTRATION form with a copy of the "BILL OF SALE/SALES RECEIPT" within 30 days of the sale, then the following applies! The Warranty will then and only then be validated to that of which typically accompanies your unit for your specific application from the date of sale or for recommended service life and limited solely to the original purchaser and/or vehicle and parts contained within the product's kit. This warranty does not cover normal wear on consumable items such as but not limited to filters, fuel line, wire harness & etc. The warranty does not cover seized gears due to lack of filtration. Warranty is voided if used with other than diesel fuel. Returned items will arrive prepaid to the place of purchase. Diesel Performance Products, Inc. will repair, without cost, any product found to be defective during the warranty period; parts only, or at its option, will replace such products in exchange for the product. Repair or replacements are warranted for the remainder of the original warranty period. All Warranty claims are subject to approval by Diesel Performance Products, Inc.

A Return Material Authorization (RMA) number must be obtained before any product is to be returned to Diesel Performance Products, Inc. for warranty consideration, repair or product return. Requests for product returns must be offset by an equal value order. Return parts must be completed and in resalable condition. No returns after 30 days.

The following information is required to obtain a RMA number before returning product:

Your Name, Address, and Phone Number's Model and Serial Number (Not Motor Number) Example: Model HD Series, Serial: 00125966 VIN Number of Vehicle Date of Purchase Nature of Problem

RMA and Product Serial Number must be on all paperwork and correspondence. Failure to obtain the required information or paperwork will result in \$25.00/item penalty and delay or denial of any warranty claim.

Under no circumstances shall the SELLER and/or MANUFACTURER be liable for any labor charged or travel time incurred in diagnosis for defects, removal, or reinstallation of this product, or any other contingent expenses.

Under no circumstances shall the SELLER and/or MANUFACTURER be liable for any damage or expenses insured by reason of the use or sale of any such equipment. This warranty does not apply to products which Diesel Performance Products, Inc. has determined to have been misused or abused, improperly maintained by the user, or where the malfunction or defect can be attributed to the use of non-genuine Diesel Performance Products, Inc. parts.

IN THE EVENT THAT THE BUYER DOES NOT AGREE WITH THIS AGREEMENT: THE BUYER MAY PROMPLY RETURN THIS PRODUCT, IN A NEW AND UNUSED CONDITION, WITH A DATED PROOF OF PURCHASE, TO THE PLACE OF PURCHASE WITHIN THIRTY (30) DAYS FROM DATE OF PURCHASE FOR A FULL REFUND LESS SHIPPING.

THE INSTALLATION OF THIS PRODUCT INDICATES THAT THE BUYER HAS READ AND UNDER-STANDS THIS AGREEMENT AND ACCEPTS ITS TERMS AND CONDITIONS.

Technical Support:

Diesel Performance Products, Inc. 16240 State Hwy O Suite B Marthasville, MO 63357 636-433-5410

NOTES