



Bio–Diesel Fuel Filter Kit

Part No. 112–9140

Form No. 3358–131 Rev A

Installation Instructions

Safety and Instruction Decals



Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



112-9141

Operating Tips

Biodiesel is an alternate form of fuel that contains natural substances derived from regionally grown crops, which is both biodegradable and environmentally sustainable. In addition, it can contain animal fats or cooking oil. The biodiesel blend stock used must meet specifications of either ASTM D 6751 or EN 14214. The final blended fuel composition needs to meet the specifications of ASTM D975 or EN590. It is a user's responsibility to verify if any emission exemptions are required on a local or national level for the use of biodiesel fuel. Toro Commercial Engineering has done extensive testing to evaluate the long-term effects of biodiesel fuel on product performance and durability. Biodiesel blends greater than B20 are not recommended at this time.

Known precautions associated with using B20 Biodiesel fuel are as follows:

- An energy content reduction of one to two percent and an increase in the fuel consumption rate should be expected.
- Painted surfaces may be damaged from any fuel spillage.
- The use of biodiesel fuel in cold weather requires taking extra precautions with blending to ensure an adequate pour point for the temperatures encountered. Biodiesel concentrations of 5% or lower are recommended for winter time operation. As with 2D petroleum based fuel, blending with 1D fuel and/or cold weather additives (pour point depressants) is required.

- The conditions of all seals, hoses, gaskets, and wire coatings will need to be monitored for degradation.
- The maximum on site fuel supply should be six months to maintain fuel quality.
- If the product will be in storage for more than three months, biodiesel must not be left in the fuel system. With biodiesel fuel, aging and oxidation will lead to increased acid numbers and formation of gum that will plug the fuel filters. Before placing the product in storage, operate the engine using petroleum based diesel fuel through the system for 30 minutes.
- The on site fuel supply tank should have a ten micron (or finer) filter installed.
- Following the conversion of a unit, which has run for some time on petroleum, based fuel, one or two occurrences of premature fuel filter plugging, can be expected. This is due to deposits being dissolved and washed into the filter and is considered normal.
- The producer of the B100 fuel and the marketer of the blended fuel should be BQ–9000 certified.
- Bio–Diesel Kits are covered by The Toro Commercial Parts Warranty. Using bio–diesel fuel up to and including B20 in selected 2007 Toro Commercial products or in Toro products as designated by the Installation Instructions of this kit will not affect the terms and conditions of the original new product warranty. Consistent with the Toro standard warranty policy, failures and performance issues resulting from the use of bio–diesel fuel (or any other fuel) are not considered as defects in Toro's materials or workmanship, and therefore would not be covered under Toro's product warranty.



Danger



Under certain conditions, diesel fuel and fuel vapors are highly flammable and explosive. A fire or explosion from fuel can burn you and others and can cause property damage.

- Use a funnel and fill the fuel tank outdoors, in an open area, when the engine is off and is cold. Wipe up any fuel that spills.
- Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 1/4 to 1/2 in. (6 to 13 mm) below the bottom of the filler neck. This empty space in the tank allows the fuel to expand.
- Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.
- Store fuel in a clean, safety-approved container and keep the cap in place.

Installation

This kit is intended for use on traction units with serial numbers 220000001 thru 279999999.

Note: Use the appropriate installation instructions for your machine.

Park the machine on a level surface, lower the cutting units, stop the engine, engage the parking brake and remove the key from the ignition switch.

Groundsmaster 4000/4100 (Fig. 1)

Replace Fuel Pump

1. Unplug the fuel pump connector from the machine's wire harness.
2. Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
3. Remove the fasteners securing the fuel pump to the machine. Remove and discard the fuel pump.
4. Mount the new fuel pump and clamp to the machine with a 1/4 x 1-3/8 inch capscrew and 1/4 flange nut. Use the inner mounting hole on the air cleaner mounting bracket and make sure the fuel pump wire harness extends downward.

Note: Additional components are included with the kit to allow it to be used on other applications.

5. Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

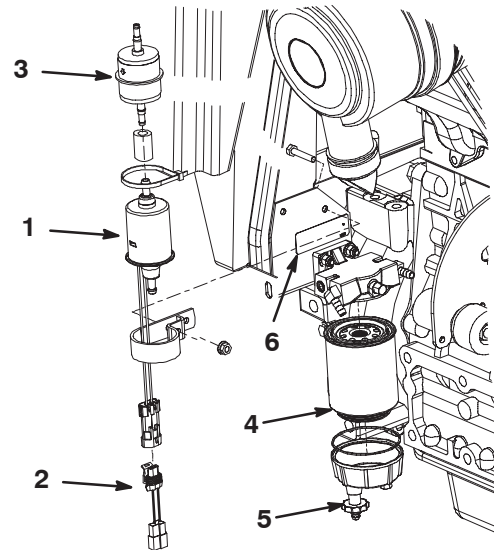


Figure 1

- | | |
|-----------------------------------|-------------------------------|
| 1. Fuel pump | 4. Water separator (canister) |
| 2. Fuel pump wire harness adapter | 5. Drain plug |
| 3. Fuel filter | 6. Decal |

Replace Fuel Filter

1. Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Discard the fuel filter but retain the hose clamps for re-use later.
2. After the new hoses are installed, insert the hoses onto the new fuel filter. Be sure the arrow on filter points in the same direction as the fuel flow. Tighten the hose clamps.

Replace Water Separator Canister

1. Clean area where filter canister mounts.
2. Remove the old filter canister and clean mounting surface.
3. Lubricate gasket on new filter canister with clean oil.
4. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On machines with serial numbers 260000001 and up, the fuel hoses **do not** need to be replaced.

Note: Before removing the fuel hoses from the machine, note how the hoses are routed and where they are secured to the machine.

1. Disconnect and remove the fuel hoses from the following locations:
 - From fuel tank to in-line filter
 - In-line filter to fuel pump
 - Fuel pump to water separator filter head
 - Filter head to injector assembly
 - Fuel tank return hose

Note: Retain all hose clamps for re-use

2. Use the following chart to determine the correct hose diameter and length for the required application.

Diameter	Length to cut	Application
5/16	26 inches	From fuel tank to in-line filter
5/16	5 inches	In-line filter to fuel pump
5/16	16 inches	Fuel pump to water separator filter head
5/16	12 inches	Filter head to injector assembly
3/16	30 inches	Fuel tank return hose

3. Cut the hoses to the required length and install at the locations shown. Secure the hoses with the hose clamps previously removed.
4. Secure the fuel hoses with cable ties.

Reelmaster 5210, 5410, 5510 & 5610 (Fig. 2)

Replace Fuel Pump

1. Unplug the fuel pump connector from the machine's wire harness.
2. Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
3. Remove the fasteners securing the fuel pump to the machine. Remove and discard the fuel pump.
4. Mount the new fuel pump and clamp to the machine with a 1/4 x 2 inch flangehead self tapping screw. Make sure the outlet of the fuel pump is pointed toward the engine.

Note: Additional components are included with the kit to allow it to be used on other applications.

5. Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

6. On traction units with serial numbers prior to 270000500, the controller must be re-programmed to update the software because it is not compatible with the new fuel pump. This incompatibility will cause the fault light on the dash to flash. To re-program your controller, contact your Authorized Toro Distributor for assistance.

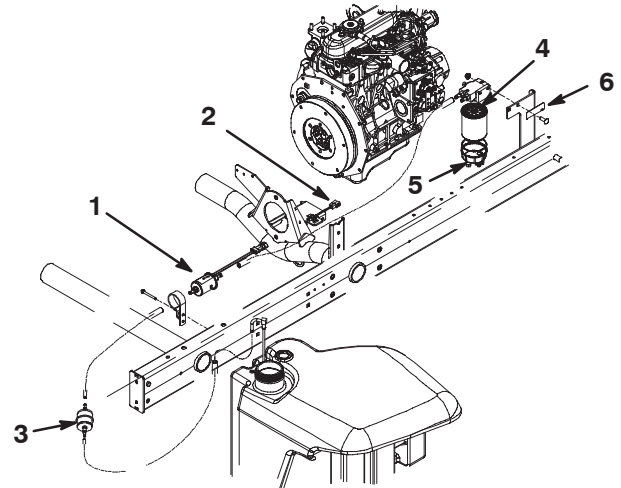


Figure 2

- | | |
|-----------------------------------|-------------------------------|
| 1. Fuel pump | 4. Water separator (canister) |
| 2. Fuel pump wire harness adapter | 5. Drain plug |
| 3. Fuel filter | 6. Decal |

Replace Fuel Filter

1. Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
2. Loosen the fasteners securing the fuel filter clamp to the machine. Remove and discard the fuel filter.
3. Insert the new fuel filter into the mounting clamp. Be sure the arrow on filter points in the same direction as the fuel flow. Tighten clamp mounting fasteners.

Replace Water Separator Canister

1. Clean area where filter canister mounts.
2. Remove the old filter canister and clean mounting surface.
3. Lubricate gasket on new filter canister with clean oil.
4. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Fuel hose replacement is not required on these models.

Multi-Pro 5700 Turf Sprayer (Fig. 3)

Replace Fuel Pump

1. Unplug the fuel pump connector from the machine's wire harness.
2. Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.

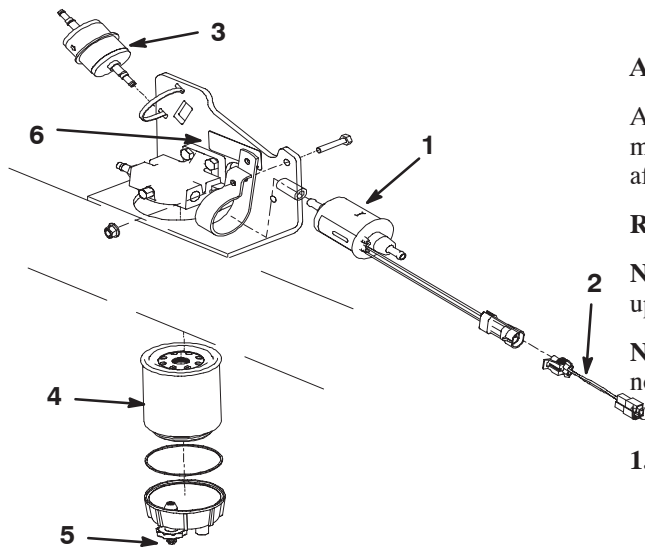


Figure 3

1. Fuel pump
2. Fuel pump wire harness adapter
3. Fuel filter
4. Water separator (canister)
5. Drain plug
6. Decal

3. Remove the fasteners securing the fuel pump to the machine. Remove and discard the fuel pump.
4. Mount the new fuel pump and clamp to the machine with a 1/4 x 1-3/8 inch capscrew and 1/4 flange locknut.

Note: Additional components are included with the kit to allow it to be used on other applications.

5. Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

Replace Fuel Filter

1. Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.

2. Remove the cable tie securing the fuel filter to the machine. Remove and discard the fuel filter.
3. Mount the new fuel filter to the machine with a new cable tie. Be sure the arrow on filter points in the same direction as the fuel flow.

Replace Water Separator Canister

1. Clean area where filter canister mounts.
2. Remove the old filter canister and clean mounting surface.
3. Lubricate gasket on new filter canister with clean oil.
4. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On machines with serial numbers 260000001 and up, the fuel hoses **do not** need to be replaced.

Note: Before removing the fuel hoses from the machine, note how the hoses are routed and where they are secured to the machine.

1. Disconnect and remove the fuel hoses from the following locations:
 - From fuel tank to in-line filter
 - In-line filter to fuel pump
 - Fuel pump to water separator filter head
 - Filter head to injector assembly
 - Fuel tank return hose

Note: Retain all hose clamps for re-use

2. Use the following chart to determine the correct hose diameter and length for the required application.

Diameter	Length to cut	Application
5/16	63 inches	From fuel tank to in-line filter
5/16	4.25 inches	In-line filter to fuel pump
5/16	22 inches	Fuel pump to water separator filter head
5/16	6.5 inches	Filter head to injector assembly
3/16	68.5 inches	Fuel tank return hose

3. Cut the hoses to the required length and install at the locations shown. Secure the hoses with the hose clamps previously removed.

- Secure the fuel hoses with cable ties.

Groundsmaster 7200/7210

Replace Fuel Pump

- Unplug the fuel pump connector from the machine's wire harness.
- Loosen the hose clamp securing the short fuel hose to the rear of the in-line fuel filter (Fig. 4). Remove the hose from the filter. Plug the hose end to prevent any fuel loss.

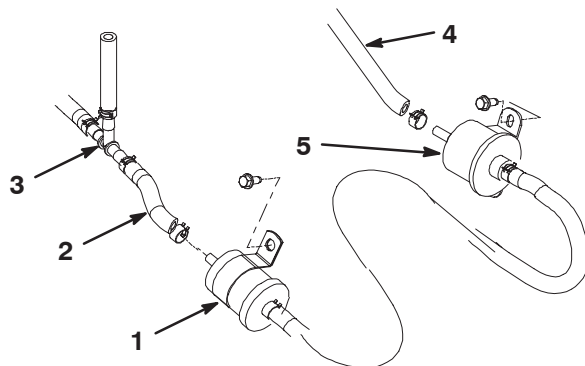


Figure 4

- Fuel filter
- Fuel hose (short)
- Fuel tank tee fitting
- Fuel hose (from water separator)
- Fuel pump

- Remove the fasteners securing the in-line fuel filter clamp to the machine (Fig. 4).
- Remove the fasteners securing the fuel pump to the machine (Fig. 4).
- Loosen the hose clamp securing the fuel hose from the water separator to the rear of fuel pump. Remove the hose from the pump. Plug the hose end to prevent any fuel loss.
- Remove the fuel pump, hose and in-line fuel filter from the machine.
- Using the lower, old pump mounting hole, mount the new fuel pump and clamp to the machine with a 1/4 x 2 inch self tapping screw, and .281 x .625 washer (Fig. 5). Make sure the pump wires are extending to the rear of the machine.

Note: Additional components are included with the kit to allow it to be used on other applications.

- Secure the hose from the water separator to the rear pump fitting (outlet) with the hose clamp previously removed (Fig. 5).
- Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

Replace Water Separator Canister

- Clean area where filter canister mounts (Fig. 5).
- Remove the old filter canister and clean mounting surface (Fig. 5).
- Lubricate gasket on new filter canister with clean oil.
- Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

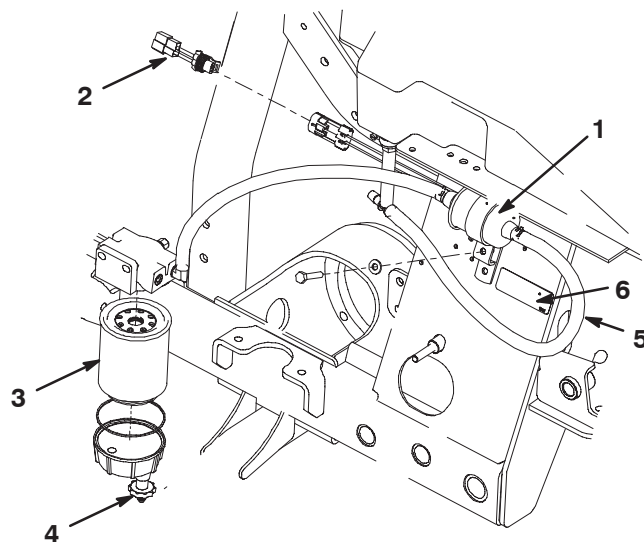


Figure 5

- Fuel pump
- Fuel pump wire harness adapter
- Water separator (canister)
- Drain plug
- New hose (19 inches)
- Decal

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location forward of new fuel pump (Fig. 5). Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On the Groundsmaster 7200/7210, an in-line fuel filter is no longer required with the new fuel pump.

- Use the following chart to determine the correct hose diameter and length for the required application.

Diameter	Length to cut	Application
5/16	19 inches	From fuel tank tee fitting to fuel pump

- Cut the hose to the required length and install at the location shown.
- Secure the hose to the front fuel pump fitting (inlet) with the hose clamp previously removed (Fig. 5).

- Loosen the hose clamp securing the short fuel hose to the fuel tank tee fitting (Fig. 4). Remove the hose from tee fitting and quickly insert the hose end from the fuel pump onto the tee fitting.

Reelmaster 4000 (Fig. 6)

Replace Fuel Pump

- Unplug the fuel pump connector from the machine's wire harness.
- Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.

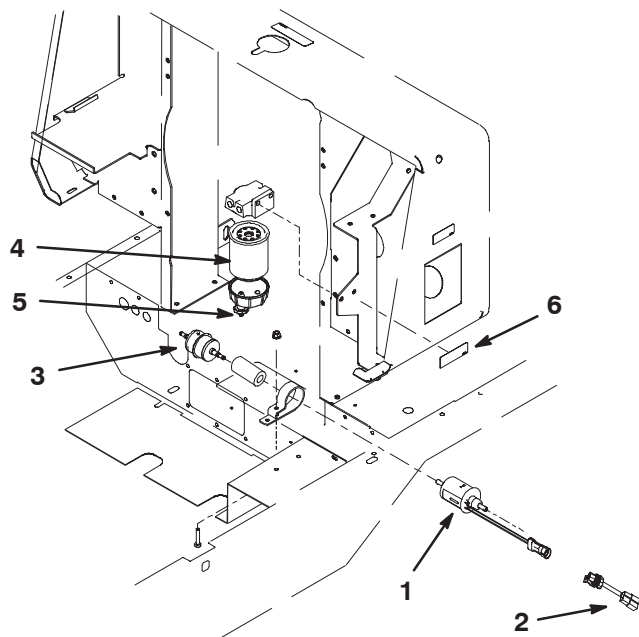


Figure 6

- | | |
|-----------------------------------|-------------------------------|
| 1. Fuel pump | 4. Water separator (canister) |
| 2. Fuel pump wire harness adapter | 5. Drain plug |
| 3. Fuel filter | 6. Decal |

- Remove the fasteners securing the fuel pump to the machine. Remove and discard the fuel pump.
- Mount the new fuel pump and clamp to the machine with a 1/4 x 1-3/8 inch capscrew and a 1/4 flange locknut.

Note: Additional components are included with the kit to allow it to be used on other applications.

- Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

Replace Fuel Filter

- Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
- Loosen the fasteners securing the fuel filter clamp to the machine. Remove and discard the fuel filter.
- Insert the new fuel filter into the mounting clamp. Be sure the arrow on filter points in the same direction as the fuel flow. Tighten clamp mounting fasteners.

Replace Water Separator Canister

- Clean area where filter canister mounts.
- Remove the old filter canister and clean mounting surface.
- Lubricate gasket on new filter canister with clean oil.
- Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On machines with serial numbers 260000001 and up, the fuel hoses **do not** need to be replaced.

Note: Before removing the fuel hoses from the machine, note how the hoses are routed and where they are secured to the machine.

- Disconnect and remove the fuel hoses from the following locations:
 - From fuel tank to in-line filter
 - In-line filter to fuel pump
 - Fuel pump to water separator filter head
 - Filter head to injector assembly
 - Fuel tank return hose

Note: Retain all hose clamps for re-use

2. Use the following chart to determine the correct hose diameter and length for the required application.

Diameter	Length to cut	Application
5/16	4.25 inches	From fuel tank to in-line filter
5/16	7.5 inches	In-line filter to fuel pump
5/16	13 inches	Fuel pump to water separator filter head
5/16	26 inches	Filter head to injector assembly
3/16	78 inches	Fuel tank return hose

3. Cut the hoses to the required length and install at the locations shown. Secure the hoses with the hose clamps previously removed.
4. Secure the fuel hoses with cable ties.

Reelmaster 6500/6700 (Fig. 7)

Replace Fuel Pump

1. Unplug the fuel pump connector from the machine's wire harness.
2. Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.

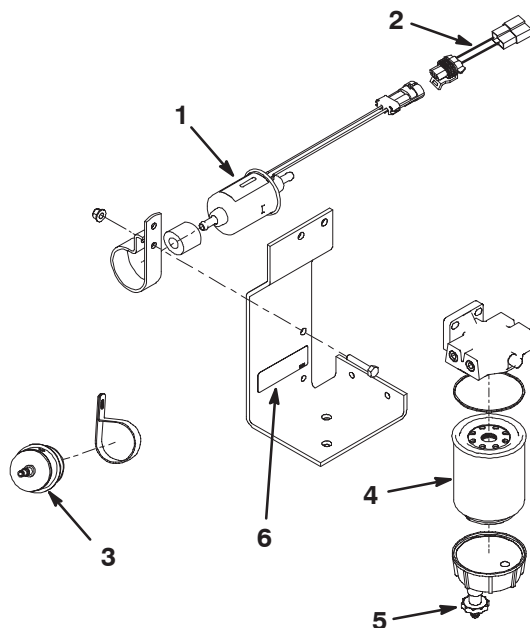


Figure 7

- | | |
|-----------------------------------|-------------------------------|
| 1. Fuel pump | 4. Water separator (canister) |
| 2. Fuel pump wire harness adapter | 5. Drain plug |
| 3. Fuel filter | 6. Decal |

3. Remove the fasteners securing the fuel pump to the machine. Remove and discard the fuel pump.
4. Mount the new fuel pump and clamp to the machine with a 1/4 x 1-3/8 inch capscrew and 1/4 flange locknut.

Note: Additional components are included with the kit to allow it to be used on other applications.

5. Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

Replace Fuel Filter

1. Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
2. Loosen the fasteners securing the fuel filter clamp to the machine. Remove and discard the fuel filter.
3. Insert the new fuel filter into the mounting clamp. Be sure the arrow on filter points in the same direction as the fuel flow. Tighten clamp mounting fasteners.

Replace Water Separator Canister

1. Clean area where filter canister mounts.
2. Remove the old filter canister and clean mounting surface.
3. Lubricate gasket on new filter canister with clean oil.
4. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On machines with serial numbers 260000001 and up, the fuel hoses **do not** need to be replaced.

Note: Before removing the fuel hoses from the machine, note how the hoses are routed and where they are secured to the machine.

1. Disconnect and remove the fuel hoses from the following locations:
 - From fuel tank to in-line filter
 - In-line filter to fuel pump
 - Fuel pump to water separator filter head
 - Filter head to injector assembly
 - Fuel tank return hose

Note: Retain all hose clamps for re-use

- Use the following chart to determine the correct hose diameter and length for the required application.

Diameter	Length to cut	Application
5/16	63 inches	From fuel tank to in-line filter
5/16	7.5 inches	In-line filter to fuel pump
5/16	20 inches	Fuel pump to water separator filter head
5/16	15.5 inches	Filter head to injector assembly
3/16	61 inches	Fuel tank return hose

- Cut the hoses to the required length and install at the locations shown. Secure the hoses with the hose clamps previously removed.

- Secure the fuel hoses with cable ties.

Reelmaster 5200/5400/5500 (Fig. 8 & 9)

Replace Fuel Pump

- Unplug the fuel pump connector from the machine's wire harness.
- Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
- Remove the fasteners securing the fuel pump to the machine. Remove and discard the fuel pump.
- Mount the new fuel pump and clamp to the machine as follows:
 - On the Reelmaster 5500 only**, mount the fuel pump and clamp to the machine with a 1/4 x 1-3/8 inch capscrew, .281 x .625 washer and a 1/4 flange locknut. Make sure the capscrew head and washer are positioned on the clamp side.

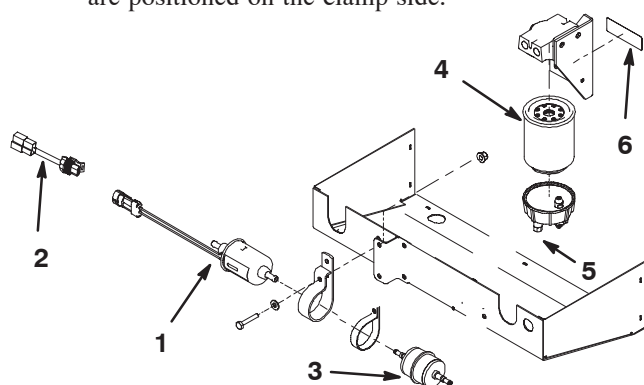


Figure 8

- | | |
|-----------------------------------|-------------------------------|
| 1. Fuel pump | 4. Water separator (canister) |
| 2. Fuel pump wire harness adapter | 5. Drain plug |
| 3. Fuel filter | 6. Decal |

- On the Reelmaster 5200 and 5400 only**, mount the fuel pump and clamp to the machine with a 1/4 x 1-3/8 inch capscrew and a 1/4 flange locknut. Make sure the flange locknut is positioned on the clamp side (Fig. 9).

Note: Additional components are included with the kit to allow it to be used on other applications.

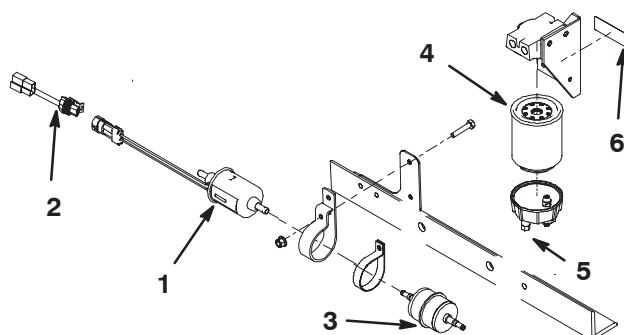


Figure 9

- | | |
|-----------------------------------|-------------------------------|
| 1. Fuel pump | 4. Water separator (canister) |
| 2. Fuel pump wire harness adapter | 5. Drain plug |
| 3. Fuel filter | 6. Decal |

- Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

Replace Fuel Filter

- Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
- Loosen the fasteners securing the fuel filter clamp to the machine. Remove and discard the fuel filter.
- Insert the new fuel filter into the mounting clamp. Be sure the arrow on filter points in the same direction as the fuel flow. Tighten clamp mounting fasteners.

Replace Water Separator Canister

- Clean area where filter canister mounts.
- Remove the old filter canister and clean mounting surface.
- Lubricate gasket on new filter canister with clean oil.
- Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On machines with serial numbers 260000001 and up, the fuel hoses **do not** need to be replaced.

Note: Before removing the fuel hoses from the machine, note how the hoses are routed and where they are secured to the machine.

1. Disconnect and remove the fuel hoses from the following locations:
 - From fuel tank to in-line filter
 - In-line filter to fuel pump
 - Fuel pump to water separator filter head
 - Filter head to injector assembly
 - Return hose to return tee
 - Return tee to fuel tank

Note: Retain all hose clamps for re-use

2. Use the following charts to determine the correct hose diameter and length for the required application.

Reelmaster 5200 and 5400 Traction Units

Diameter	Length to cut	Application
5/16	15 inches	From fuel tank to in-line filter
5/16	10 inches	In-line filter to fuel pump
5/16	43.5 inches	Fuel pump to water separator filter head
5/16	10 inches	Filter head to injector assembly
3/16	61 inches	Return hose to return tee
5/16	11 inches	Return tee to fuel tank

Reelmaster 5500 Traction Units

Diameter	Length to cut	Application
5/16	19 inches	From fuel tank to in-line filter
5/16	8.25 inches	In-line filter to fuel pump
5/16	43.5 inches	Fuel pump to water separator filter head
5/16	10 inches	Filter head to injector assembly
3/16	66 inches	Return hose to return tee
5/16	11 inches	Return tee to fuel tank

3. Cut the hoses to the required length and install at the locations shown. Secure the hoses with the hose clamps previously removed.

4. Secure the fuel hoses with cable ties.

Groundsmaster 4500/4700 (Fig. 10)

Replace Fuel Pump

1. Unplug the fuel pump connector from the machine's wire harness.
2. Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.

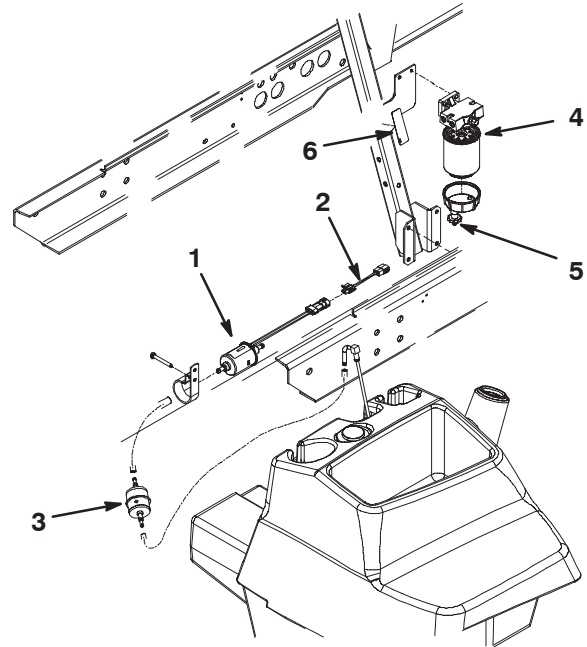


Figure 10

- | | |
|-----------------------------------|-------------------------------|
| 1. Fuel pump | 4. Water separator (canister) |
| 2. Fuel pump wire harness adapter | 5. Drain plug |
| 3. Fuel filter | 6. Decal |

3. Remove the fasteners securing the fuel pump to the machine. Remove and discard the fuel pump.
4. Mount the new fuel pump and clamp to the machine with a 1/4 x 2 inch flangehead self tapping screw.

Note: Additional components are included with the kit to allow it to be used on other applications.

5. Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

Replace Fuel Filter

1. Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.

2. Loosen the fasteners securing the fuel filter clamp to the machine. Remove and discard the fuel filter.
3. Insert the new fuel filter into the mounting clamp. Be sure the arrow on filter points in the same direction as the fuel flow. Tighten clamp mounting fasteners.

Replace Water Separator Canister

1. Clean area where filter canister mounts.
2. Remove the old filter canister and clean mounting surface.
3. Lubricate gasket on new filter canister with clean oil.
4. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On machines with serial numbers 2600000001 and up, the fuel hoses **do not** need to be replaced.

Note: Before removing the fuel hoses from the machine, note how the hoses are routed and where they are secured to the machine.

1. Disconnect and remove the fuel hoses from the following locations:
 - From fuel tank to in-line filter
 - In-line filter to fuel pump
 - Fuel pump to water separator filter head
 - Filter head to injector assembly
 - Fuel tank return hose

Note: Retain all hose clamps for re-use

2. Use the following chart to determine the correct hose diameter and length for the required application.

Diameter	Length to cut	Application
5/16	19 inches	From fuel tank to in-line filter
5/16	3.75 inches	In-line filter to fuel pump
5/16	28 inches	Fuel pump to water separator filter head
5/16	15.5 inches	Filter head to injector assembly
3/16	58 inches	Fuel tank return hose

3. Cut the hoses to the required length and install at the locations shown. Secure the hoses with the hose clamps previously removed.

- 4. Secure the fuel hoses with cable ties.**

Groundsmaster 3500/3505 and Reelmaster 3100 (Fig. 11)

Replace Fuel Pump

1. Unplug the fuel pump connector from the machine's wire harness.
2. Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.

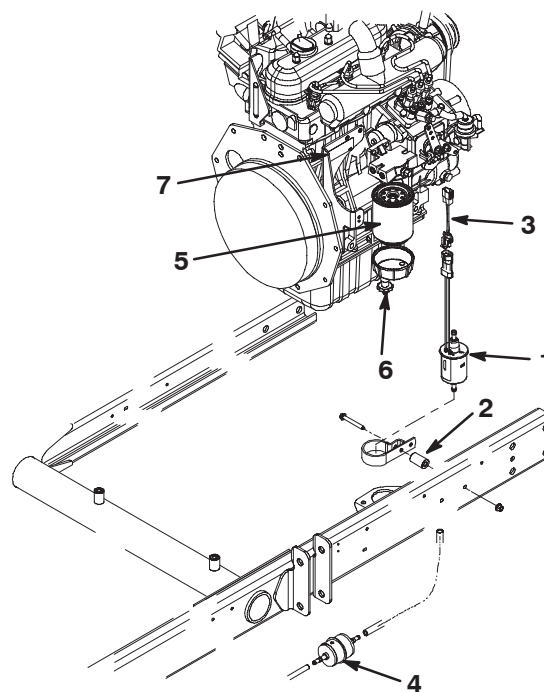


Figure 11

1. Fuel pump
2. Spacer
3. Fuel pump wire harness adapter
4. Fuel filter
5. Water separator (canister)
6. Drain plug
7. Decal

3. Remove the fasteners and spacers securing the fuel pump to the machine. Remove and discard the fuel pump and spacers.
4. Mount the new fuel pump and clamp to the machine with a 1/4 x 2 inch flangehead screw, spacer and flange locknut. Position the spacer between the clamp and the frame.

Note: Additional components are included with the kit to allow it to be used on other applications.

5. Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

Replace Fuel Filter

1. Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
2. Loosen the fasteners securing the fuel filter clamp to the machine. Remove and discard the fuel filter.
3. Insert the new fuel filter into the mounting clamp. Be sure the arrow on filter points in the same direction as the fuel flow. Tighten clamp mounting fasteners.

Replace Water Separator Canister

1. Clean area where filter canister mounts.
2. Remove the old filter canister and clean mounting surface.
3. Lubricate gasket on new filter canister with clean oil.
4. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On machines with serial numbers 260000001 and up, the fuel hoses **do not** need to be replaced.

Note: Before removing the fuel hoses from the machine, note how the hoses are routed and where they are secured to the machine.

1. Disconnect and remove the fuel hoses from the following locations:
 - From fuel tank to in-line filter
 - In-line filter to fuel pump
 - Fuel pump to water separator filter head
 - Fuel tank return hose

Note: Do not remove the hose from the filter head to injector assembly.

Note: Retain all hose clamps for re-use

2. Use the following chart to determine the correct hose diameter and length for the required application.

Diameter	Length to cut	Application
5/16	21 inches	From fuel tank to in-line filter
5/16	12 inches	In-line filter to fuel pump
5/16	14 inches	Fuel pump to water separator filter head
3/16	18 inches	Fuel tank return hose

3. Cut the hoses to the required length and install at the locations shown. Secure the hoses with the hose clamps previously removed.
4. Secure the fuel hoses with cable ties.

Groundsmaster 228 (Fig. 12)

Replace Fuel Pump

1. Unplug the fuel pump connector from the machine's wire harness.
2. Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.

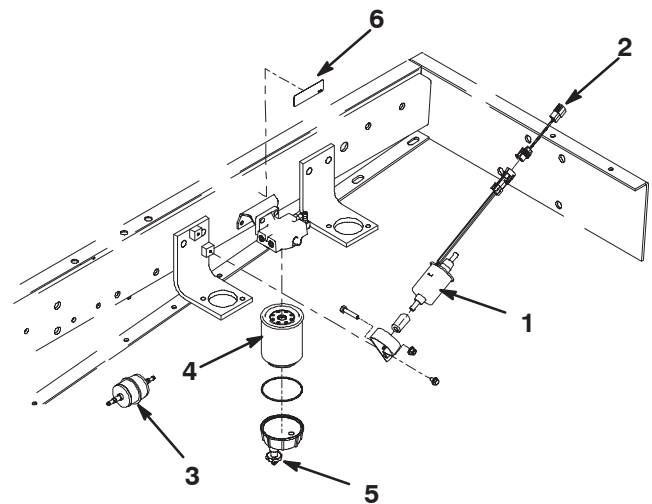


Figure 12

- | | |
|-----------------------------------|-------------------------------|
| 1. Fuel pump | 4. Water separator (canister) |
| 2. Fuel pump wire harness adapter | 5. Drain plug |
| 3. Fuel filter | 6. Decal |

3. Remove the fasteners securing the fuel pump to the machine. Remove and discard the fuel pump but retain the mounting screws.

4. Mount the new fuel pump to the clamp with a 1/4 x 2 inch capscrew and a 1/4 flange locknut. Position the clamp as shown in figure 12.
5. Mount the fuel pump clamp to the machine with one of the screws previously removed.

Note: Additional components are included with the kit to allow it to be used on other applications.

6. Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

Replace Fuel Filter

1. Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
2. Loosen the fasteners securing the fuel filter clamp to the machine. Remove and discard the fuel filter.
3. Insert the new fuel filter into the mounting clamp. Be sure the arrow on filter points in the same direction as the fuel flow. Tighten clamp mounting fasteners.

Replace Water Separator Canister

1. Clean area where filter canister mounts.
2. Remove the old filter canister and clean mounting surface.
3. Lubricate gasket on new filter canister with clean oil.
4. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On machines with serial numbers 260000001 and up, the fuel hoses **do not** need to be replaced.

Note: Before removing the fuel hoses from the machine, note how the hoses are routed and where they are secured to the machine.

1. Disconnect and remove the fuel hoses from the following locations:
 - From fuel tank to in-line filter
 - In-line filter to fuel pump
 - Fuel pump to water separator filter head
 - Filter head to injector assembly
 - Fuel tank return hose

Note: Retain all hose clamps for re-use

2. Use the following chart to determine the correct hose diameter and length for the required application.

Diameter	Length to cut	Application
5/16	26 inches	From fuel tank to in-line filter
5/16	9 inches	In-line filter to fuel pump
5/16	10 inches	Fuel pump to water separator filter head
5/16	15 inches	Filter head to injector assembly
3/16	52 inches	Fuel tank return hose

3. Cut the hoses to the required length and install at the locations shown. Secure the hoses with the hose clamps previously removed.
4. Secure the fuel hoses with cable ties.

Groundsmaster 328 (Fig. 13 & 14)

Replace Fuel Pump

1. Unplug the fuel pump connector from the machine's wire harness.
2. Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.

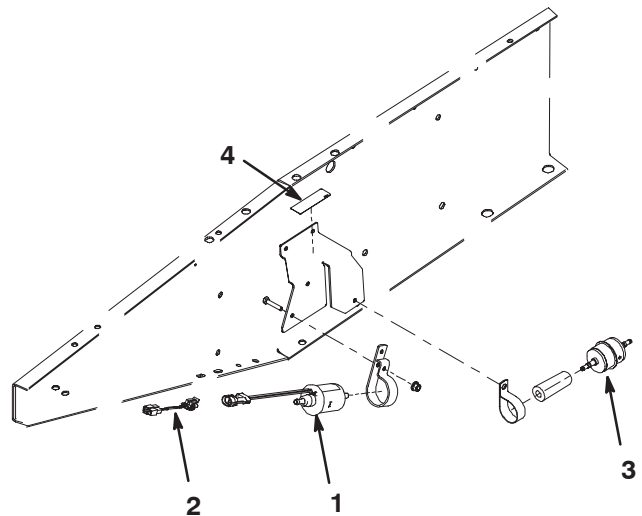


Figure 13

1. Fuel pump
2. Fuel pump wire harness adapter
3. Fuel filter
4. Decal

3. Remove the fasteners securing the fuel pump to the machine. Remove and discard the fuel pump.

4. Mount the new fuel pump and clamp to the machine with a 1/4 x 1-3/8 inch capscrew, .281 x .625 washer and a 1/4 locknut.

Note: Additional components are included with the kit to allow it to be used on other applications.

5. Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

Replace Fuel Filter

1. Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
2. Loosen the fasteners securing the fuel filter clamp to the machine. Remove and discard the fuel filter.
3. Insert the new fuel filter into the mounting clamp. Be sure the arrow on filter points in the same direction as the fuel flow. Tighten clamp mounting fasteners.

Replace Water Separator Canister

1. Clean area where filter canister mounts.
2. Remove the (2) capscrews securing the water separator filter head to the frame.

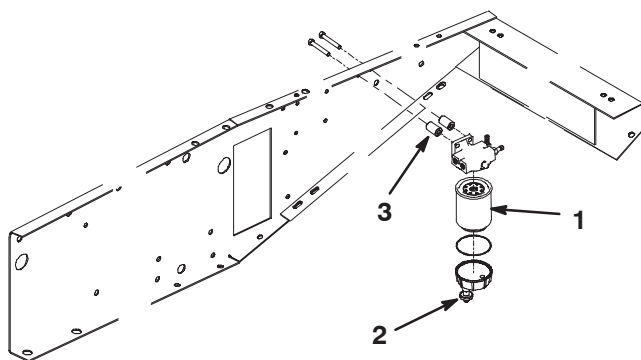


Figure 14

1. Water separator (canister)
2. Drain plug
3. Spacers (2)

3. Remove the old filter canister and clean mounting surface.
4. Lubricate gasket on new filter canister with clean oil.
5. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.
6. Mount the water separator filter head to the frame with (2) 5/16 x 2.25 inch capscrews and spacers.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On machines with serial numbers 260000001 and up, the fuel hoses **do not** need to be replaced.

Note: Before removing the fuel hoses from the machine, note how the hoses are routed and where they are secured to the machine.

1. Disconnect and remove the fuel hoses from the following locations:
 - From fuel tank to in-line filter
 - In-line filter to fuel pump
 - Fuel pump to water separator filter head
 - Filter head to injector assembly
 - Fuel tank return hose

Note: Retain all hose clamps for re-use

2. Use the following chart to determine the correct hose diameter and length for the required application.

Diameter	Length to cut	Application
5/16	10 inches	From fuel tank to in-line filter
5/16	3 inches	In-line filter to fuel pump
5/16	52 inches	Fuel pump to water separator filter head
5/16	16 inches	Filter head to injector assembly
3/16	78 inches	Fuel tank return hose

3. Cut the hoses to the required length and install at the locations shown. Secure the hoses with the hose clamps previously removed.
4. Secure the fuel hoses with cable ties.

Groundsmaster 3280 (Fig. 15)

Replace Fuel Pump

1. Unplug the fuel pump connector from the machine's wire harness.
2. Loosen the hose clamps securing the fuel hoses to the fuel pump. Remove the hoses from the pump. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
3. Remove the fasteners securing the fuel pump to the machine. Remove and discard the fuel pump.
4. Mount the new fuel pump and clamp to the machine with a 1/4 x 2 inch capscrew and a 1/4 flange locknut.

Note: Additional components are included with the kit to allow it to be used on other applications.

5. Plug the fuel pump wire harness adapter into the fuel pump harness. Plug the fuel pump adapter into the machine's wire harness.

Replace Fuel Filter

1. Loosen the hose clamps securing the fuel hoses to the in-line fuel filter. Remove the hoses from the filter. Plug the hose ends to prevent any fuel loss. Retain the hose clamps for re-use later.
2. Loosen the fasteners securing the fuel filter clamp to the machine. Remove and discard the fuel filter.
3. Insert the new fuel filter into the mounting clamp. Be sure the arrow on filter points in the same direction as the fuel flow. Tighten clamp mounting fasteners.

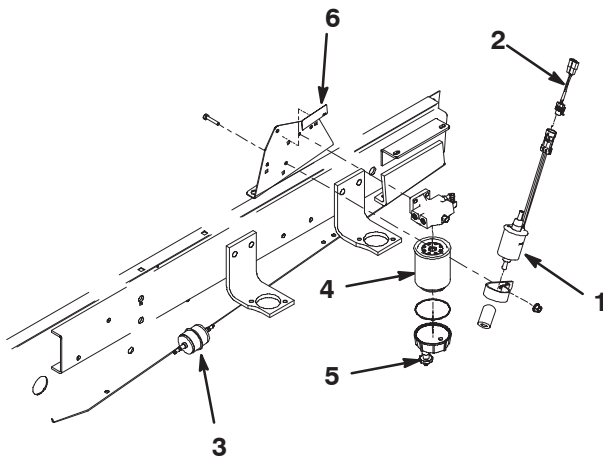


Figure 15

- | | |
|-----------------------------------|-------------------------------|
| 1. Fuel pump | 4. Water separator (canister) |
| 2. Fuel pump wire harness adapter | 5. Drain plug |
| 3. Fuel filter | 6. Decal |

Replace Water Separator Canister

1. Clean area where filter canister mounts.
2. Remove the old filter canister and clean mounting surface.
3. Lubricate gasket on new filter canister with clean oil.
4. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Affix Fuel Filter Kit Decal

Affix the fuel filter kit decal to a visible location on the machine. Make sure to clean the mounting surface before affixing the decal.

Replace Hoses

Note: On machines with serial numbers 260000001 and up, the fuel hoses **do not** need to be replaced.

Note: Before removing the fuel hoses from the machine, note how the hoses are routed and where they are secured to the machine.

1. Disconnect and remove the fuel hoses from the following locations:
 - From fuel tank to in-line filter
 - In-line filter to fuel pump
 - Fuel pump to water separator filter head
 - Filter head to injector assembly
 - Fuel tank return hose

Note: Retain all hose clamps for re-use

2. Use the following chart to determine the correct hose diameter and length for the required application.

Diameter	Length to cut	Application
5/16	32 inches	From fuel tank to in-line filter
5/16	10 inches	In-line filter to fuel pump
5/16	10 inches	Fuel pump to water separator filter head
5/16	15.5 inches	Filter head to injector assembly
3/16	47 inches	Fuel tank return hose

3. Cut the hoses to the required length and install at the locations shown. Secure the hoses with the hose clamps previously removed.
4. Secure the fuel hoses with cable ties.

Inspection and Checks

1. Fill fuel tank with fuel.
2. Move the ignition key to the RUN position allowing the fuel pump to pressurize the fuel system.
3. Check the fuel lines and tank for leaks and correct as necessary.

Water Separator

Drain water or other contaminants from water separator (Fig. 16) daily.

1. Place a clean container under water separator. Water separator is mounted to inside of frame, next to left side of engine.
2. Loosen drain plug on bottom of filter canister. Tighten plug after draining.

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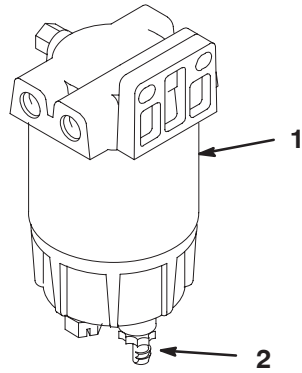


Figure 16

1. Water separator 2. Drain plug
-

Replace filter canister after every 400 hours of operation.

1. Clean area where filter canister mounts.
2. Remove filter canister and clean mounting surface.
3. Lubricate gasket on filter canister with clean oil.
4. Install filter canister by hand until gasket contacts mounting surface, then rotate an additional 1/2 turn.

Replacing Fuel Filter

If the fuel filter (Fig. 17), becomes badly contaminated or plugged it should be replaced. Periodic replacement is not otherwise required.

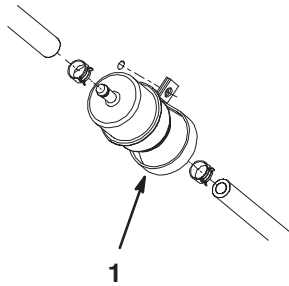


Figure 17

1. Fuel filter
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