



FISHER® Hydraulic Systems Flushing Procedures

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SAFETY INFORMATION

WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate injury and/or property damage if not avoided.

NOTE: Identifies tips, helpful hints and maintenance information the owner/operator should know.

NOTES

1. Dispose of used hydraulic fluid according to regulatory requirements.
2. Take up small spills with "oil dry". Place into containers for proper disposal.
3. Cover openings made in the hydraulic system, such as those created by disconnecting hoses, to prevent contamination from entering the system.
4. Hydraulic system maintenance should be performed in a clean area that is far removed from any dust- or particle-generating activities. Examples of these activities include sanding, grinding, welding, drilling, milling, turning, cutting, spray painting, and blasting.
5. Ensure that all containers or funnels used to add hydraulic fluid to the system are CLEAN! Do not use these containers or funnels with other types of fluids.
6. Heed the instructions and precautions given in the Material Safety Data Sheet. If needed, this may be obtained by contacting Fisher Engineering's Technical Service Department at (207) 701-4200 or by fax at (207) 596-2767.

REQUIRED EQUIPMENT

1. Flushing hose configured as follows (for systems equipped with quick-disconnect fittings):
 - a. 1/4" male NPT tee connection at one end of the hose.
 - b. One side of the tee fitted with the male half of a 1/4" quick-disconnect fitting.
 - c. The other side of the tee fitted with the female half of a 1/4" quick-disconnect fitting.
 - d. The opposite end of the hose is open.
2. Containers for collecting hydraulic fluid
3. 3 quarts hydraulic fluid:

Belt Drive Systems:
Automatic Transmission Fluid (ATF) only

All Other Systems:
FISHER® EZ Flow Hydraulic Fluid
4. Clean, light-colored, lint-free rags
5. Magnifying glass
6. Flashlight or work light
7. Clean funnel

BELT DRIVE HYDRAULIC SYSTEMS, NON-ELECTRIC CLUTCH

WARNING

FISHER® EZ Flow Hydraulic Fluid shall not be used in under hood engine areas. The flash point of this product is 246° F. Instead of FISHER EZ Flow Hydraulic Fluid, use Automatic Transmission Fluid (ATF) in under hood engine areas.

WARNING

Hydraulic fluid under pressure could cause skin injection injury. If you are injured by hydraulic fluid, get medical attention immediately.

1. Uncouple the quick-disconnect fittings on the ram hoses. Remove the rams and their hoses.
 2. Disassemble the rams and inspect them for damage or contamination. Remove the quick-disconnect fittings from the ram hoses.
 3. Clean the rams. Clean the quick-disconnect couplings by depressing and rotating the balls. Wash the parts to be reused in a clean wash tank. Flush the hoses.
 4. Reassemble the rams. Reattach the quick-disconnect fittings to the hoses. Reinstall the rams and reattach the hoses to the rams, but do not couple the quick-disconnect fittings.
 5. If the system does not have a FISHER in-line filter (part number 8764) installed in the low-pressure return line, it is recommended that one be installed at this time, **except for Ford vehicles**.
 6. Fill the reservoir to the “Full” mark and replace the cap. Couple the flushing hose to the upstream half of the quick-disconnect coupling for the driver-side angle ram hose. Place the free end of the flushing hose in the used fluid container.
 7. Start the engine. Place the valve control in the “Angle Right” position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the “Neutral” position. Shut off the engine.
 8. Fill the reservoir to the “Full” mark and replace the cap. Couple the flushing hose to the upstream half of the quick-disconnect coupling for the passenger-side angle ram hose. Place the free end of the flushing hose in the used fluid container. Start the engine. Place the valve control in the “Angle Left” position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the “Neutral” position. Shut off the engine.
 9. **For Minute Mount® snowplows only:**
 - a. Fill the reservoir to the “Full” mark and replace the cap. Couple the flushing hose to the upstream half of the swivel fitting for the lift ram hose. Place the free end of the flushing hose in the used fluid container.
 - b. Start the engine. Place the valve control in the “Raise” position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the “Neutral” position. Shut off the engine.
- For “conventional” (non-Minute Mount) snowplows only:**
- a. Fill the reservoir to the “Full” mark and replace the cap. Disconnect the hose from the swivel fitting at the base of the raise ram and place the free end of the lift ram hose in the used fluid container.
 - b. Start the engine. Place the valve control in the “Raise” position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the “Neutral” position. Shut off the engine. Reconnect the swivel fitting at the base of the raise ram.
10. Couple all quick-disconnect fittings.
 11. Fill the reservoir to the “Full” mark and replace the cap. Check for, and correct, hydraulic leaks. Check the system for proper operation. Properly dispose of the used hydraulic fluid.

BELT DRIVE HYDRAULIC SYSTEMS, ELECTRIC CLUTCH

WARNING

FISHER® EZ Flow Hydraulic Fluid shall not be used in under hood engine areas. The flash point of this product is 246° F. Instead of FISHER EZ Flow Hydraulic Fluid, use Automatic Transmission Fluid (ATF) in under hood engine areas.

WARNING

Hydraulic fluid under pressure could cause skin injection injury. If you are injured by hydraulic fluid, get medical attention immediately.

1. Uncouple the quick-disconnect fittings on the ram hoses. Remove the rams and their hoses.
2. Disassemble the rams and inspect them for damage or contamination. Remove the quick-disconnect fittings from the ram hoses.
3. Clean the rams. Clean the quick-disconnect couplings by depressing and rotating the balls. Wash the parts to be reused in a clean wash tank. Flush the hoses.
4. Reassemble the rams. Reattach the quick-disconnect fittings to the hoses. Reinstall the rams and reattach the hoses to the rams, but do not couple the quick-disconnect fittings.
5. If the system does not have FISHER in-line filter (part number 8764) installed in the low-pressure line, it is recommended that one be installed at this time, **except for Ford vehicles**.
6. Disconnect the electrical harness from the solenoid-operated control valve. Remove the three solenoid cartridges. Clean the solenoid cartridges in a clean wash tank filled with clean hydraulic fluid. Dry the solenoid cartridges with regulated, low-pressure, compressed air.
7. Reinstall the solenoid cartridges into the control valve. Follow the instructions given on the inside of the solenoid cartridges' cover. Reconnect the electrical harness to the control valve.
8. Fill the reservoir to the "Full" mark and replace the cap. Couple the flushing hose to the upstream half of the quick-disconnect coupling for the driver-side angle ram hose. Place the free end of the flushing hose in the used fluid container.
9. Start the engine. Place the valve control in the Angle Right position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the "Neutral" position. Shut off the engine.
10. Fill the reservoir to the "Full" mark and replace the cap. Couple the flushing hose to the upstream half of the quick-disconnect coupling for the passenger-side angle ram hose. Place the free end of the flushing hose in the used fluid container.
11. Start the engine. Place the valve control in the "Angle Left" position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the "Neutral" position. Shut off the engine.
12. Fill the reservoir to the "Full" mark and replace the cap. Uncouple the raise ram's quick-disconnect fitting. Couple the flushing hose to the quick-disconnect coupling for the lift ram hose. Place the free end of the flushing hose in the used fluid container.
13. Start the engine. Place the valve control in the "Raise" position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the "Neutral" position. Shut off the engine.
14. Couple all quick-disconnect fittings.
15. Fill the reservoir to the "Full" mark and replace the cap. Check for, and correct, hydraulic leaks. Check the system for proper operation. Properly dispose of the used hydraulic fluid.

ELECTRICALLY DRIVEN HYDRAULIC SYSTEMS

Solenoid Electric Hydraulic Pack (SEHP) and Electric Hydraulic Pack (EHP)

⚠ WARNING

Hydraulic fluid under pressure could cause skin injection injury. If you are injured by hydraulic fluid, get medical attention immediately.

1. Disconnect the cables to the electric motor.
2. Uncouple the angle ram hoses from the control valve. This may be done at the swivel fittings (Minute Mount® System) or at the quick-disconnect fittings (conventional system), as applicable.
3. Remove the angle rams.
4. Disassemble the angle rams and inspect them for damage or contamination. Remove the quick-disconnect fittings from the angle ram hoses (if applicable).
5. Clean the rams. Clean the quick-disconnect couplings, if applicable, by depressing and rotating the balls. Wash the parts to be reused in a clean wash tank. Flush the hoses.
6. Reassemble the rams. Reattach the quick-disconnect fittings to the hoses. Reinstall the rams and reattach the hoses to the rams. Do not couple the quick-disconnect fittings or the swivel fittings.
7. Remove the drain plug from the front, lower edge of the housing. Drain the fluid into a container.
8. Remove the motor from the housing.
9. Inspect the sump and the suction filter located on the pump. Clean or replace the filter as required.
10. Flush the housing with clean fluid.
11. Reinstall the drain plug. Reinstall the motor. Reconnect the electrical cables for the motor.
12. This step only applies to Solenoid Electric Hydraulic Packs. For Non-Solenoid Electric Hydraulic Packs, go to step 13.
 - (a) Disconnect the electrical harness from the solenoid-operated control valve. Remove the three solenoid cartridges. Clean the solenoid cartridges in a clean wash tank filled with clean hydraulic fluid. Dry the solenoid cartridges with regulated, low-pressure, compressed air.
 - (b) Reinstall the solenoid cartridges into the control valve. Follow the instructions given on the inside of the solenoid cartridge cover. Reconnect the electrical harness to the control valve.
13. Fill the housing.
14. **Minute Mount® System:** Couple the flushing hose to the swivel coupling for the driver-side angle ram hose.

Conventional: Connect the flushing hose to the upstream half of the driver-side angle ram quick-disconnect fitting.
15. Place the free end of the flushing hose in the used fluid container. Start the engine. Place the valve control in the “Angle Right” position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the “Neutral” position. Shut off the engine.
16. **Minute Mount System:** Reattach the hose to the swivel fitting at the valve.

Conventional: Couple the quick-disconnect fitting.
17. Fill the housing.
18. **Minute Mount System:** Couple the flushing hose to the swivel coupling for the passenger-side angle ram hose.

Conventional: Connect the flushing hose to the upstream half of the passenger-side angle ram quick-disconnect fitting.

19. Place the free end of the flushing hose in the used fluid container. Start the engine. Place the valve control in the “Angle Left” position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the Neutral position. Shut off the engine.

20. **Minute Mount® System:** Reattach the hose to the swivel fitting at the valve.

Conventional: Couple the quick-disconnect fitting.

21. Fill the housing to the appropriate level. Check for, and correct, hydraulic leaks. Check the system for proper operation. Properly dispose of the hydraulic fluid.

Insta-Act® Hydraulic Systems

Straight Blade

WARNING

Hydraulic fluid under pressure could cause skin injection injury. If you are injured by hydraulic fluid, get medical attention immediately.

1. Disconnect the cables to the electric motor.
2. Uncouple the ram hoses from the control valve. Remove the rams.
3. Disassemble the rams and inspect them for damage or contamination.
4. Clean the rams. Wash the parts to be reused in a clean wash tank. Flush the hoses.
5. Reassemble the rams. Reinstall the rams and reattach the hoses to the rams. Do not couple the hoses to the swivel fittings on the control valve.
6. Remove the drain plug from the front, lower edge of the reservoir. Drain the fluid into a container.
7. Remove the reservoir from the control valve.

8. Inspect the reservoir and the suction filter located on the pump. Clean or replace the filter as required.

9. Flush the reservoir with clean fluid.

10. Reinstall the reservoir. Reinstall the drain plug. Reconnect the electrical cables to the motor.

11. Disconnect the electrical harness from the control valve. Remove the three solenoid cartridges. Clean the solenoid cartridges in a clean wash tank filled with clean hydraulic fluid. Dry the solenoid cartridges with regulated, low-pressure, compressed air.

12. Reinstall the solenoid cartridges into the control valve. Follow the instructions given on the inside of the solenoid cartridge cover. Reconnect the electrical harness to the control valve.

13. Fill the reservoir.

14. Couple the flushing hose to the swivel fitting for the driver-side angle ram hose.

15. Place the free end of the flushing hose in the used fluid container. Start the engine. Place the valve control in the “Angle Right” position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the “Neutral” position. Shut off the engine.

16. Reattach the driver-side hose to the swivel fitting at the valve.

17. Fill the reservoir.

18. Couple the flushing hose to the swivel fitting for the passenger-side angle ram hose.

19. Place the free end of the flushing hose in the used fluid container. Start the engine. Place the valve control in the “Angle Left” position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the “Neutral” position. Shut off the engine.

20. Reattach the passenger-side hose to the swivel fitting at the valve.
21. Fill the reservoir.
22. Couple the flushing hose to the swivel fitting for the lift ram hose.
23. Place the free end of the flushing hose in the used fluid container. Start the engine. Place the valve control in the "Raise" position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the "Neutral" position. Shut off the engine.
24. Reattach the lift hose to the swivel fitting at the valve.
25. Fill the reservoir. Check for, and correct, hydraulic leaks. Check the system for proper operation. Properly dispose of the used hydraulic fluid.

EZ-V® Snowplows

WARNING

Hydraulic fluid under pressure could cause skin injection injury. If you are injured by hydraulic fluid, get medical attention immediately.

1. Disconnect the cables to the electric motor.
2. Uncouple the ram hoses from the control valve. Remove the rams.
3. Disassemble the rams and inspect them for damage or contamination.
4. Clean the rams. Wash the parts to be reused in a clean wash tank. Flush the hoses.
5. Reassemble the rams. Reinstall the rams and reattach the hoses to the rams. Do not couple the hoses to the swivel fittings on the control valve.
6. Remove the drain plug from the front, lower edge of the reservoir. Drain the fluid into a container.
7. Remove the reservoir from the control valve.

8. Inspect the reservoir and the suction filter located on the pump. Clean or replace the filter as required.
9. Flush the reservoir with clean fluid.
10. Reinstall the reservoir. Reinstall the drain plug. Reconnect the electrical cables to the motor.
11. Disconnect the electrical harness from the control valve. Remove the six solenoid cartridges. Clean the solenoid cartridges in a clean wash tank filled with clean hydraulic fluid. Dry the solenoid cartridges with regulated, low-pressure, compressed air.
12. Reinstall the solenoid cartridges into the control valve. Follow the instructions given on the inside of the solenoid cartridge covers. Reconnect the electrical harness to the control valve.
13. Fill the reservoir.
14. Couple the flushing hose to the swivel fitting for the driver-side angle ram/rod end hose (outside valve port on the passenger-side).
15. Place the free end of the flushing hose in the used fluid container. Start the engine. For:

9 Button Controls – Press the round L-WING button **twice** and hold it. . .

Joystick Controls – Move the lever to the WING position between L and LOWER **twice** and hold it. . .

6 Button Controls (MODE button in upper left corner of control face) – Place the cab control in the "Wing Mode" (mode light flashes). Push the L/SCP button **once** and hold it. . .

until about a pint of fluid has been flushed through the flushing holes, or until no contaminants are seen. Shut off the engine.

16. Reattach the driver-side angle ram/rod end hose to the swivel fitting at the valve.
17. Fill the reservoir.
18. Couple the flushing hose to the swivel fitting for the driver-side angle ram/blank end hose (second port from the passenger-side).

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19. Place the free end of the flushing hose in the used fluid container. Start the engine. For:
- 9 Button Controls** – Press the round L-WING button **once** and hold it. . .
- Joystick Controls** – Move the lever to the WING position between L and LOWER **once** and hold it. . .
- 6 Button Controls** (MODE button in upper left corner of control face) – Place the cab control in the “Wing Mode” (mode light flashes). Push the L/SCP button **twice** and hold it. . .
- until about a pint of fluid has been flushed through the flushing holes, or until no contaminants are seen. Shut off the engine.
20. Reattach the driver-side angle ram/blank end hose to the swivel fitting at the valve.
21. Fill the reservoir.
22. Couple the flushing hose to the swivel fitting for the passenger-side angle ram/rod end hose (second valve port from the driver-side).
23. Place the free end of the flushing hose in the used fluid container. Start the engine. For:
- 9 Button Controls** – Press the round R-WING button **twice** and hold it. . .
- Joystick Controls** – Move the lever to the WING position between R and LOWER **twice** and hold it. . .
- 6 Button Controls** (MODE button in upper left corner of control face) – Place the cab control in the “Wing Mode” (mode light flashes). Push the L/SCP button **once** and hold it. . .
- until about a pint of fluid has been flushed through the flushing holes, or until no contaminants are seen. Shut off the engine.
24. Reattach the passenger-side angle ram/rod end hose to the swivel fitting at the valve.
25. Fill the reservoir.
26. Couple the flushing hose to the swivel fitting for the passenger-side angle ram/blank end hose (third port from the driver-side).
27. Place the free end of the flushing hose in the used fluid container. Start the engine. For:
- 9 Button Controls** – Press the round R-WING button **once** and hold it. . .
- Joystick Controls** – Move the lever to the WING position between L and LOWER **once** and hold it. . .
- 6 Button Controls** (MODE button in upper left corner of control face) – Place the cab control in the “Wing Mode” (mode light flashes). Push the L/SCP button **twice** and hold it. . .
- until about a pint of fluid has been flushed through the flushing holes, or until no contaminants are seen. Shut off the engine.
28. Reattach the passenger-side angle ram/blank end hose to the swivel fitting at the valve.
29. Fill the reservoir.
30. Couple the flushing hose to the swivel fitting for the lift ram hose.
31. Place the free end of the flushing hose in the used fluid container. Start the engine. Place the valve control in the “Raise” position. Flush about a pint of fluid through the flushing hose, or until no contaminants are seen. Place the valve control in the “Neutral” position. Shut off the engine.
32. Fill the reservoir. Check for, and correct, hydraulic leaks. Check the system for proper operation. Properly dispose of the used hydraulic fluid.

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