Print Head Recovery Quick Guide with Print Head Doctor 5

WARNING: Print heads can be damaged by excessive use of ultrasound, pressure, temperature and aggressive chemicals. It is always a good idea to minimize the risk of a print head damage by using no ultrasound, low pressures, low temperatures and using less aggressive recovery fluids (1X, 1UV, 1DX, 1W). If no progress can be made this way, you can start introducing short periods of ultrasound, warming up the fluids, and using more aggressive chemicals.

Print Head Sensitivity

Here is the list of print heads sorted by sensitivity in an ascending order. Less sensitive print heads can handle more pressure, temperature, ultrasound and chemistry. Less sensitive heads can be cleaned starting with Step 3 below. Others should go through steps 1 and 2. If you are working with Epson heads, please read the Quick Guide for Epson head recovery with PHD4, as these heads are way too sensitive and require extra care.

Spectra S-class (SL128, SM128, SE128)	**Very low sensitivity.**	Spectra Q-Class	Medium to high sensitivity.
Spectra Nova and Galaxy	**Low sensitivity.**	Ricoh Gen4	Medium to high sensitivity.
Konica-Minolta KM512	Medium sensitivity.	Xaar 500	Medium to high sensitivity.
Konica-Minolta KM256	Medium sensitivity.	Xaar 1001	Medium to high sensitivity.
Konica-Minolta KM1024	Medium sensitivity.	Kyocera KJ	High sensitivity.
Xaar 128	Medium sensitivity.	HP Aprion	High sensitivity.
Seiko SPT510 and SPT508	Medium sensitivity.	Epson DX4	**Very high sensitivity.**
HP X2	Medium sensitivity.	Epson DX5	**Very high sensitivity.**
Hitachi (Ricoh) Gen3	Medium sensitivity.	Epson - all other models	**Very high sensitivity.**
		Canon PF-03	**Very high sensitivity.**

Explanation of the Recovery Cycles

Dr - Drain Cycle - is used to empty the tank, or when you need to pump fluids in a forward direction for a short time.
Ar - Air Cycle - is used to purge the fluid out of the internal filter and tubing. Do not start Air cycle when a print head is connected, as it will over-pressurize it.
F1 - Forward Normal Cycle - will pump the fluid in a forward direction (i.e. forward flush) with 5% of ultrasonic time.
F2 - Forward Easy Cycle - forward flushes your print head without using any ultrasound.
F3 - Forward Strong Cycle - forward flushing cycle with a lot of ultrasound, accounting for 30% of the cycle time.

Useful Tips

Protect your print head's electronics from the fluids. Wrap the areas where fluids may get on the electronics with tape. Make sure that the print head is submerged into the fluid by only 3mm (1/8") and not deeper.

Do not clean your print head for too long. One hour a day will be enough. Purge the print head with a weak flush and then with air, gently pushed by a syringe, and let it sit for a day without any fluids inside. Before installing the print head on your printer, test the nozzles by pushing the flushing solution that came with your ink through the print head using a syringe. Do not apply too much pressure. Once you see the nozzles are in a good condition, put the head on the printer. Otherwise you'll need to re-flush it.

Do not use alcohol to clean the electronics of a print head. If you want to remove moisture from the electronic parts, use the spray-on Contact Cleaner that can be found in automotive parts stores.

Precautions on Epson Heads

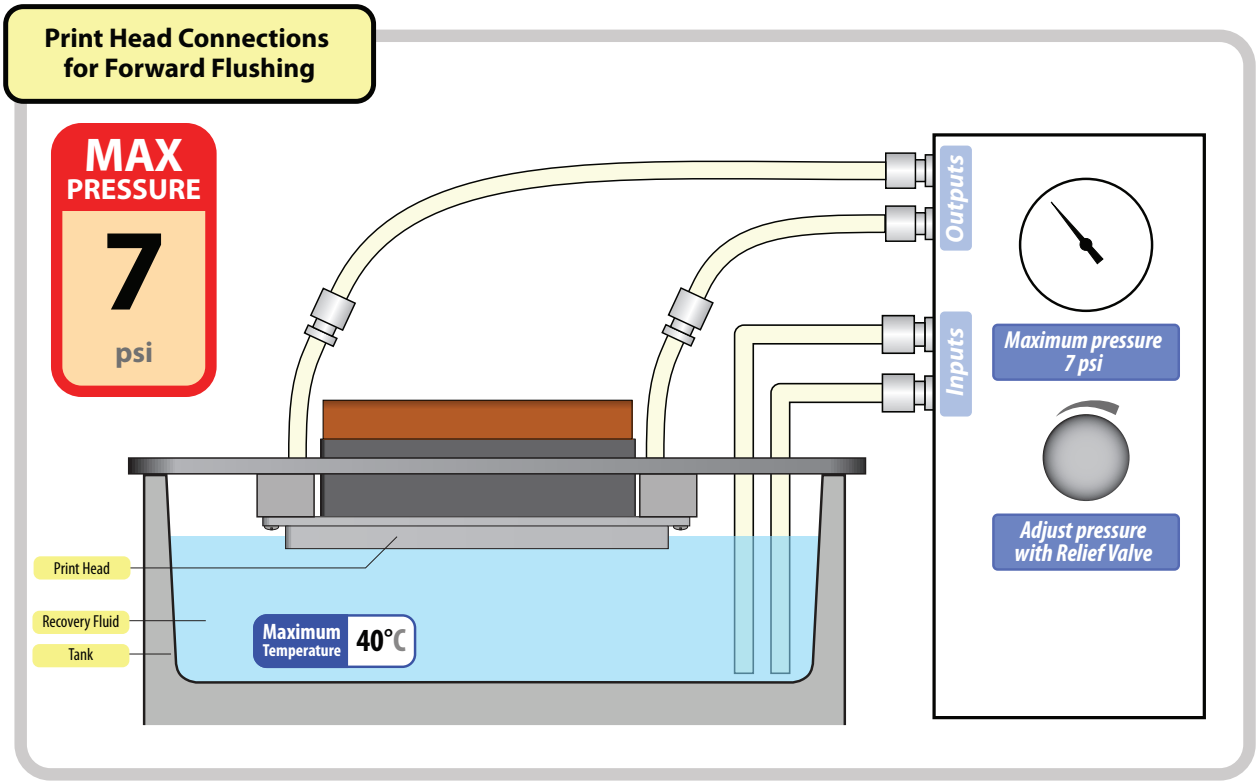
Epson heads are extremely sensitive to everything. Follow these precautions to keep them safe during recovery, and disregard the pressure settings shown on the diagrams in this document.

Epson heads cannot handle any kind of pressure applied to the input ports. Keep the print head pressure at a maximum of 3 psi.

Do not use any ultrasound, as it will damage Epson heads if applied for too long. When it's absolutely necessary to use the ultrasound, keep it on for a maximum of 30 seconds. The recovery cycle to use: F2 (Forward-Easy).

Do not pre-heat the recovery fluid, let it run at a room temperature. Watch the temperature: it should not get warmer than 30°C.

The most effective way of cleaning Epson heads is by using a vacuum-assisted forward flushing method with the maximum forward pressure of 2 psi. There is no limit to the vacuum: it can be as high as it gets. Vacuum cannot damage print heads.



Print Head Recovery Steps

Step 1. Light Flushing of Sensitive Print Heads

We will attempt to unclog your print head the safest way possible. Use fluid # 1X for solvent print heads, or 1UV for UV curable, or 1W for water-based ones. Do not set the temperature, but watch it not to exceed 30°C. Set up your print head as shown on the picture. Open the relief valve. Start the Drain cycle and watch the Print Head Pressure. Using the Relief Valve, adjust the pressure to be around 6 psi. Lift the print head for a moment to see the condition of the nozzles. Stop the cycle. Start the F2 (Forward Easy) cycle and let it run for 15 minutes. Watch the pressure: it should never exceed 7 psi. Adjust it when necessary. Check the nozzles. If you see an obvious progress, continue with the forward flushing for another full F2 cycle. If no progress has been observed, move on to Step 2.

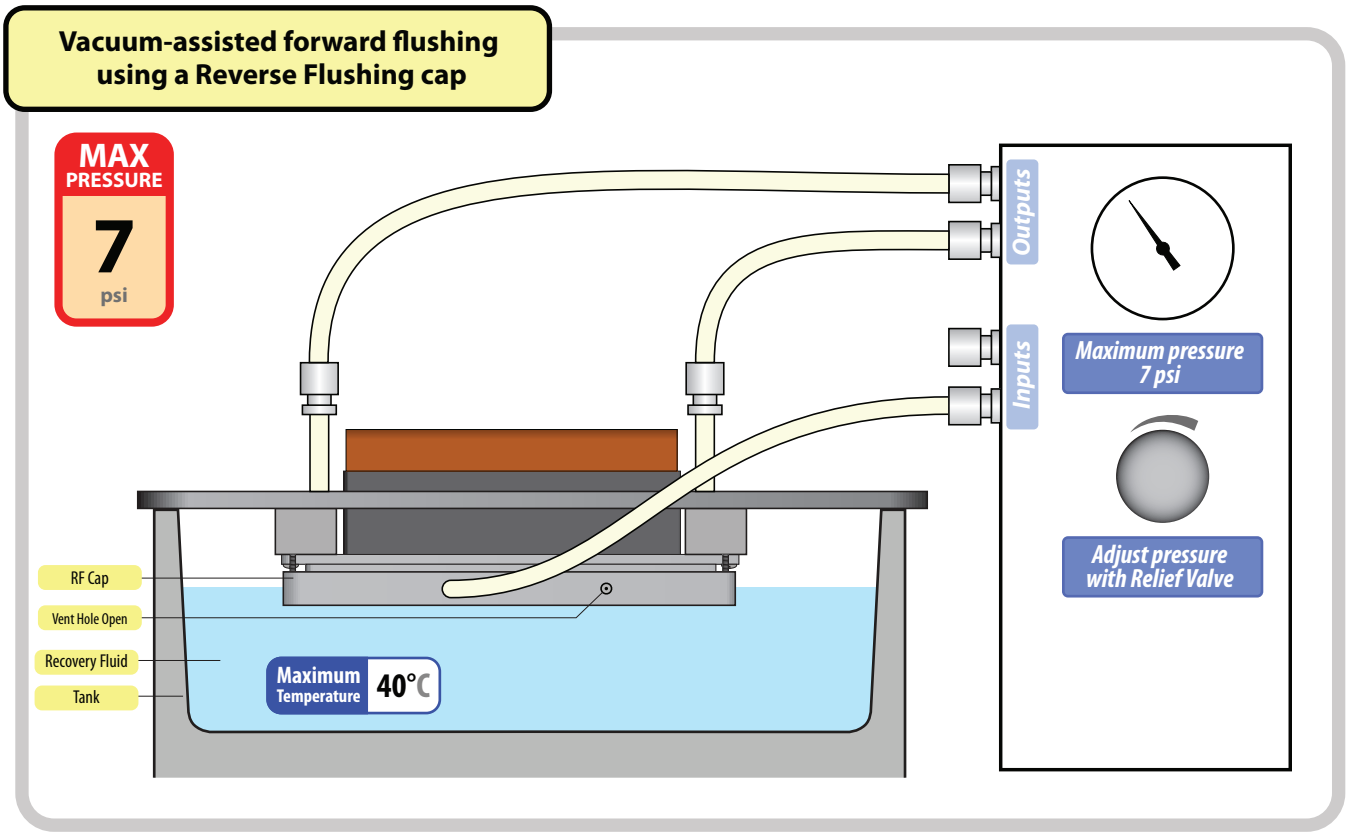
Step 2. Medium Strength Flushing of Sensitive Print Heads

Continue with the less aggressive recovery fluid (#1). Start F1(Forward Normal) cycle. Check the nozzles after 10 minutes. If no progress has been made, you'll need to change the recovery fluid. Follow the fluid changeover instructions. Always keep an eye on the forward pressure (7 psi max). Re-check the nozzles and if there was no progress, move on to Step 3.

Step 3. Powerful Flushing of Robust Print Heads

Please note that this process poses a higher risk for sensitive print heads.
Run F3 (Forward Strong) cycle for a full length of it. Re-check the nozzles. If you see a great deal of improvement, repeat the F3 cycle. If no further progress is observed, change the recovery fluid to the next one, following the Fluid Changeover Instructions contained in a separate document. Repeat the F1 cycle with the new fluid. Robust print heads can handle as much as 4 hours of continuous flushing, while other heads should be flushed for no longer than 1...2 hours per day. If no improvement is taking place after each cycle, it means that the recovery fluid should be changed to another one.

When you're done cleaning a print head, flush it out with fluid 1X (or a distilled water for water-based heads), and fill it with the flushing solution that comes with your ink.

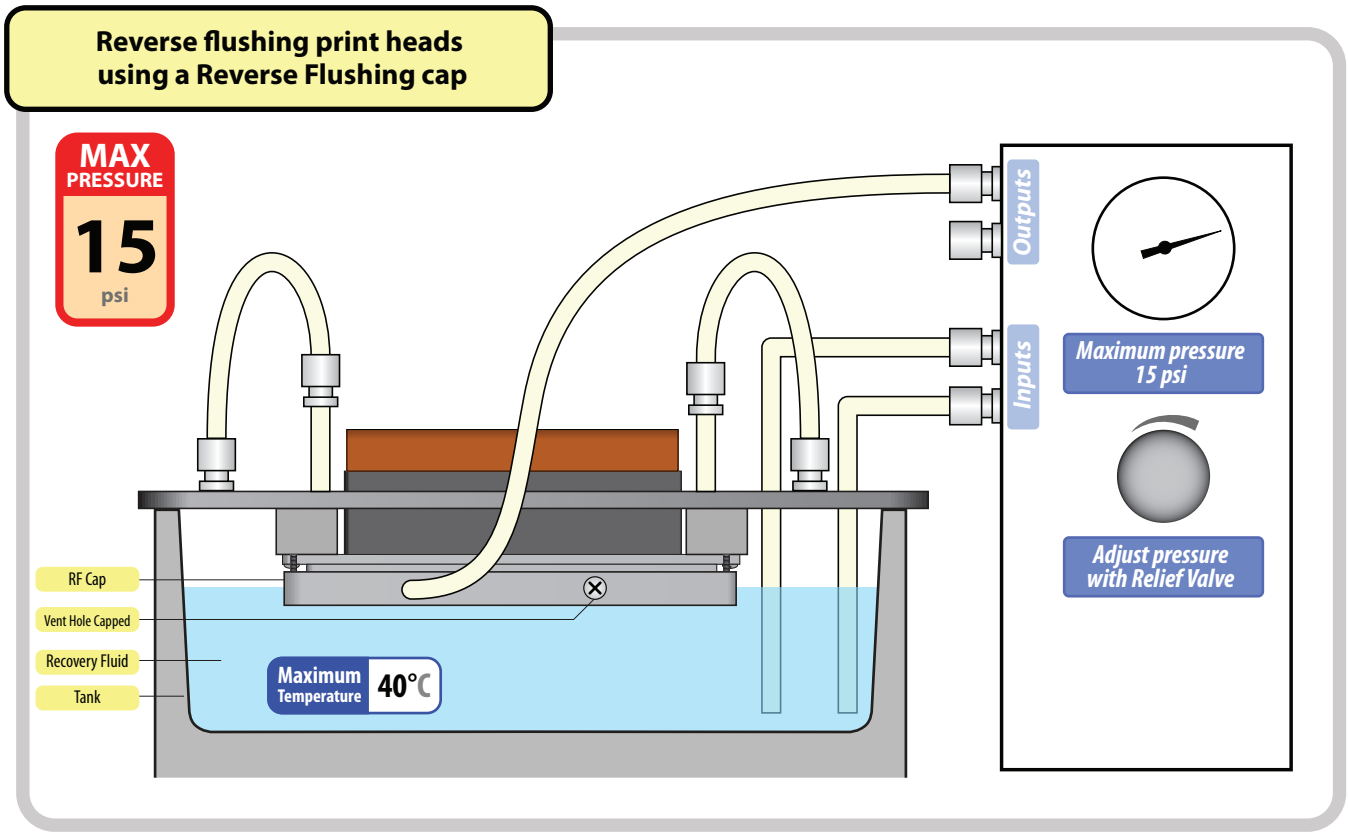


Vacuum-Assisted Forward Flushing

If you have a Reverse Flushing cap for your print head, you can do a so-called vacuum-assisted forward flushing. Set up your print head as show on the diagram above. Remove the screw that blocks the tiny vent hole on the side of the RF cap. This hole will allow the fluid to get into the cap without diminishing the suction strength.

Run the F1 cycle (for Epson heads use only F2 with no ultrasound). Make sure the print head pressure does not exceed 7 psi. Very sensitive print heads will get damaged at 7psi, so you should keep it at no more than 2 psi.

To get the highest effectiveness out of this flushing method, replace the small filters beforehand or make sure they are clean enough not to create too much resistance to the flow.



Reverse Flushing with an RF Cap

If you have a Reverse Flushing cap for your print head, here is another method of cleaning heavily clogged print heads. It will run the fluid in a reverse direction, pushing the clog out of the print head as opposed to pushing it through the nozzles, as it happens during the forward flushing.

Keep the vent hole capped with the screw.

Run the F1 cycle (for Epson heads use only F2 with no ultrasound). Because all the pressure is applied to the outside of the nozzles, it's safe to use a high pressure of up to 15 psi.

After reverse flushing like this, you should do a forward flushing, or better yet a vacuum-assisted forward flushing.