

The NFP reactors can either be operated manually, semi automatically or fully automatically.

This will depend on the application and level of sophistication that you want to go to. The first part of these instructions describes the operation of the unit without the need for any supplementary equipment other than a reliable high sensitivity nitrate test kit which is not supplied with the unit.

We would generally recommend that you only follow the MANUAL OPERATION method for the smaller reactors; however the principles are valid for all models.

1 - Assemble and connect the unit as shown on the diagram for manual operation and position it in a cabinet or in an area where there is easy access. Note that the lid for the reactor unscrews in an anti-clockwise direction. Be careful not to over tighten the lid when reassembling. The outlet pipe can be directed downwards or upwards depending on where the unit is situated in relation to the tank or sump.

2 - Establish a method of feeding the reactor with water from the aquarium such as: Pressure feed: Use a suitable pump or power head to take water directly from the aquarium or sump and return water directly back to the aquarium / sump. This allows remote positioning of the unit at any height or in the cabinet below the aquarium. Ensure that connections and hoses from the power head to the unit are suitable for the pressure developed.

Gravity feed: The unit can be operated on a siphon from the tank and into a sump thus negating the requirement for a separate power head or pump.

Sumpless operation: Note that as the reactor is capable of withstanding pressures of up to 0.5 bars that it is possible to install the unit below the tank in a cabinet and to pump the water down, through and back up to the aquarium.

IMPORTANT POINT: always ensure that if you feed from the aquarium down to a sump that you fit the system with a siphon break to prevent the continued siphoning of the contents of the tank in the case of a power failure.

IMPORTANT POINT: when using the reactor under pressure or below the aquarium never remove the redox probe holder or remove the reactor lid without draining part of the water off first and switching off the pump.

3 - Fill the reactor with water from the aquarium. To speed up the initial seeding of the filter we suggest at this stage for you to add a commercial bacterial culture such as RowaBac or simply to squeeze the water from a filter sponge or similar taken from an established biological filter into the reactor chamber.

4 - Close the lid of the reactor and turn on the water feed supply using tap 'Y' to ensure that the chamber is completely full of water and that the system of feed and return is operational and has no leaks.

Ensure that if the reactor is mounted below the water level that the feed and return pipes are securely fastened to prevent one coming loose and allowing the tank to siphon out.

5 - Turn on the recirculation pump to circulate water around the reactor and once again check for any leaks.

You are now ready to start maturing the bacterial filter media.

6 - Shut off the water supply to the reactor using tap 'Y' and leave it like this for 3 days to allow the oxygen in the water to be used up and to allow growth of the anaerobic bacteria.

Feeding the system: The bacteria within the reactor must be supplied with a carbon based food, (Deltec Nitrate Fluid), on a daily basis throughout the duration of the reactor's use. To make this possible when using the manual method, Deltec supply you with a plastic syringe 'X' which should be first filled with Deltec Nitrate Fluid and then fitted to the end of the non return valve at the inlet to the recirculation pump.

The amount of Nitrate Fluid to add to the reactor will depend on a number of factors such as the flow rate and the level of nitrate in the water. When first starting the system we recommend that 4ml of Nitrate Fluid should be added for each litre of biological media within the reaction chamber over a period of 24 hours, (detailed in table).

For the purpose of these instructions we will use the NFP509 which has a reactor media volume of approximately 2lt.

On days 1 - 3 whilst the water flow rate is switched off it is necessary to add 8ml of Nitrate each day. This should be added in 2 doses of 4 ml, one in the morning and one in the evening.

7 - On day 4 open up the tap 'Y' very carefully until you achieve 1 drip every 3 seconds and wait for a further day before testing the outlet water. Continue to feed the unit morning and evening with the same volume of Nitrate Fluid as was used for the first 3 days.

8 - Day 5 - check the water coming out of the reactor at 'Z' for nitrate level using a reliable nitrate test kit. If the reading from the water is zero then increase the flow rate by no more than 1/3 of its current rate to one drip every 2 seconds and wait for 2-3 days for the level to drop back to zero. Continue to feed everyday with the starting volume of Nitrate Fluid.

If the reading still shows that there is nitrate coming from the reactor then wait another day and another day until you achieve a zero reading before increasing the flow rate. Continue to feed the unit morning and evening as on the first 3 days and wait until the reading drops to zero.

Initially, whilst there is still oxygen present at sufficient levels within the reactor, aerobic bacteria may grow within the media converting any ammonia in the water to nitrite or nitrate. This may show as a slightly elevated nitrate or nitrite level coming out of the reactor compared with that of the water going in.

Note: Large incremental jumps in flow rate especially at this stage can crash the growing bacterial culture within the reactor by the introduction of too much oxygen which will raise the redox and will slow down the maturation period.

9 - Gradually, in stages which will take 2-6 days between changes, it should be possible to slowly increase the drip rate from the reactor by 20-30% at each step, then to wait for the reading to come down to zero before increasing the flow again. The ultimate goal is to turn the volume of water in the tank through the reactor once every 14 days as a maximum and once every 28 days as a minimum. At this flow rate it will be possible to keep the nitrate levels fully under control.

Increasing the amount of food: As you increase the water flow rate through the reactor it will also be necessary to gradually increase the amount of food that is dosed every day. This is the tricky part and it will require a little trial and error by the user to learn how much extra to add as you increase the flow rate.

By the time the reactor is running at maximum capacity it will be necessary to be adding about 25% more food than was being added during the initial stages which for the example for the NFP509 means up to 11ml

per day. If due to the size of your tank relative to the reactor you do not need to achieve maximum capacity then it is possible to just continue at the initial feed rate.

Be careful not to overdo the additions of the food as this will tend to reduce the redox to below 200 and can often be seen as cloudiness in the tank.

If not enough food is added you will find that it will not be possible to increase the flow rate further as there will be insufficient food to support a large enough bacterial colony to achieve a zero nitrate reading for the set flow.

10 - Once the system is running in a stable manner at a flow rate which gives you sufficient volume from the reactor to turn the volume of the tank over every 14-28 days then continue to feed morning and night at that set volume to maintain the nitrate level in the system.

See the paragraph at the end of the section on fully automatic operation on what to do when the level of nitrate in your system gets down to zero.