**OPERATING PRINCIPLE**

The maple tree naturally produces gases through the tap hole that are removed by the vacuum pump. To achieve the highest possible vacuum, the tubing system must be sealed as tight as possible.

There is a correlation between the vacuum level and the volume of sap harvested: an increase of vacuum increases sap yield. The use of high vacuum levels is profitable for the sugar maker, as it allows them to get higher volumes of sap for a given tap, without affecting sap quality or jeopardizing the future yields of the maple tree.

From an economic point of view, what is important is to maintain the vacuum level in each tap during the sugar season. However, if a system is leaking or if it’s not managed properly, it will not be possible to maintain a high vacuum.

The leaking of the tubing installation or its poor management cannot be compensated by the addition of a larger vacuum pump.

Assuming an average gain of 2Hg per tap, maple producers can expect an increase of 1.20 gallons (4.55L) of sap per tap.
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DESCRIPTION

An extractor is the centerpiece between maple sap tubing collection and the sap tank. The Viper is completely made of stainless steel and is easily adapted from 1 to 4 pumps.

The vacuum pump maintains a continuous vacuum in the network of tubing allowing sap to accumulate in the extractor. The Viper has two level switches (top and bottom switch); when sap reaches predetermined level of switch, evacuation pump(s) will start to transfer sap into the tank.

Viper extractor maintains a continuous vacuum. Even when the extractor pumps, the vacuum level will remain the same.

The H2O Innovation Viper extractors are suitable for sugar bushes, from 3 000 to 20 000 taps.
Components

Front View

***Optional sanitary clamp for manifold connections
**INSTALLATION & OPERATION**

**IMPORTANT:** Install the extractor in a place above freezing point. A freezing temperature could damage the evacuation pump. When using a manifold, it’s important to properly close unused holes with plugs to prevent leakage and loss of vacuum. *Remember to close your wash and drain valves.*

**NOTE:** Protect your vacuum pump. Refer to the manufacturer’s manual to know the installation recommendations. It is highly recommended to install a check-valve and to install a moisture trap. A moisture trap, equipped with an electrical protection, will automatically shut down the vacuum pump if a problem occurs. Without a moisture trap, humidity and sap could go in your vacuum pump and damage it.

**MODES**

- **ON MODE:** In on mode, the evacuation pumps will start but not stop by themselves. The float switches are deactivated. Do not run the pump out of sap.

- **OFF MODE:** Extractor completely stopped.

- **AUTO MODE:** In automatic mode the evacuation pumps will start and stop automatically with the combination pump/float switch selected.

**EVACUATION PUMP**

For operating flexibility, each pump has its own power supply. It is then easier, in auto mode, to choose which pump will start with which float switch (bottom or top).

Plug your pumps in the bottom or top float power socket. The right electrical connection box is for the top float; the left one is for the bottom float. Do not forget to connect the plugs of the two connection boxes to a wall socket. These plugs are located under the cabinet / control panel.
FLOW SCHEME

The aim of an extractor is to separate sap and air that the vacuum pump pulls from the tubing system in the sugar bush. Maple sap arrives in the manifold and a first separation of air and sap is made. Then maple sap will enter the transfer tank, the pumping tank and then the level control tank.

PUMP FLOAT

The extractor has two floats controlling the evacuation pumps. When maple sap reaches the activation level of the bottom float, the associated pump(s) will start automatically.

If pump(s) capacity is not sufficient, maple sap will reach the activation level of the top pump float and the associated pump(s) will start automatically.

Each of the Viper float can control the automatic start and stop of two pumps.

Warning: It’s not recommended to change the float level, sap mist could end up in the vacuum system, contaminate it, and damaged your vacuum pump.
TYPICAL INSTALLATION SCHEME

ELECTRICAL CONNECTION BOX

VACUUM PUMP

MOISTURE TRAP

VIPER

MAPLE SAP TANK

MAIN-LINE CONNECTION

MAPLE SAP FLOW

AIR VACUUM
**MAINTENANCE**

**WARNING:** Before any maintenance and before opening your extractor, ensure it is back to atmospheric pressure.

**NEVER USE:** Abrasive products, steel wool or products containing chlorine or muriatic acid.

**NOTE:** To bring back the shine of your Viper, use industrial foaming cleaner for glass. You can also use a mix of water and white vinegar (half and half).

The maintenance of the Viper is quite simple but remains very important in order not to degrade sap quality.

Always keep your extractor clean, it is recommended to clean it each day. For washing, use clear water. If you use mild soap, make sure you rinse well.

Use a water hose with an adapter to connect to the cleaning valve. Open the cleaning valve and close the pump outlet valve. Circulate water. Empty the Viper using the drain valve.

Below is the recommended daily maintenance:

**PUMP:**

Submersible evacuation pump transferring maple sap to your sap tank. Under normal operating conditions, ensure the pump will never run out of sap.

It is not recommended to change the float level adjustments, sap mist could end up in the vacuum system, contaminate it, and damaged your vacuum pump. See picture above.

**PUMP SWITCH:**

Check that the cable has not become worn or that the housing has not been damaged. Replace the product immediately if any damage is found or suspected.

Periodically check to see that the float and rod are free to move and operate the switch.
START OF SEASON

Clean your extractor well, fill it with clear water and ensure the automatic control of the pump is working properly. Check for leaks.

TRICK: You can use foam glass cleaner to find leaks. If there is a leak, foam will react by making bubbles. If you perform this check, use clear water and thoroughly rinse the extractor to remove any traces of cleaner.

TROUBLESHOOTING

SAP LEVEL RISES BUT PUMP DOES NOT START, OR THE EXTRACTOR DOES NOT EMPTY ENOUGH:

The extractor or the pumps are not plug in.
The extractor is in “OFF” mode, put it in “AUTO” mode.
Improper float adjustment readjust the level as needed. Theoretically, you will not have to readjust the float adjustment.

PUMP DOES NOT START EVEN IF THE HIGH LEVEL IS REACHED :

Electric problem with the pump or the float installation. Try the switch in “MAN” mode to see if the pump starts. If the pump starts it might be a float problem. Ensure the float is not broken. Replace the float immediately if any damage is found or suspected.

If the pump does not start in “MAN” mode it might be an electrical problem. Check the power supply.

To understand if it’s a pump, pump switch, or electrical connections issue, swap the pumps power supply by swapping the power sockets.

AIR LEAK:

Poorly installed cover, replace. Check the ferule and ensure they are well positioned and tightened. Open or badly closed valve on the manifold.

WARNING: Before any maintenance and before opening your extractor, ensure it is back to atmospheric pressure.