Carnot Batteries Pump Model

**Inputs :**

* Volume/mass flow rate
* Supply state

**Outputs :**

* Pump consumption
* Exhaust state

**Pump Model**

**Parameter(s) :**

* /

# Pump model

## Head of the pump

The head of the pump is determined based on the pressure difference:

Where the fluid velocity and the potential energy are neglected.

## Frequency

The frequency is determined based on the mass flow rate and the head of the pump. First an interpolation for the first frequency ( 60 Hz) is made based on the operating map.

The frequency corresponding to any Head and mass flow rate can then be determined based on the similarity laws.

## Pump consumption

The pump consumption is determined based on the mass flow rate and the frequency. First an interpolation for the first frequency ( 60 Hz) is made based on the operating map.

The pump consumption corresponding to any frequency and mass flow rate can then be determined based on the similarity laws.

A graph with lines and numbers

Description automatically generated

Figure 1: Head [m] versus volume flow rate [m3/h]

A graph with lines and numbers

Description automatically generated

Figure 2: Pump consumption [kW] versus volume flow rate [m3/h]