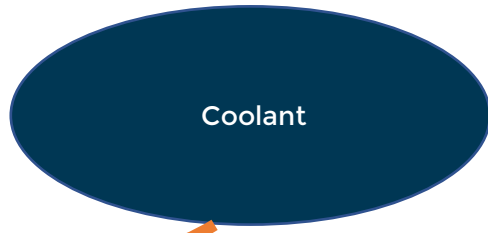
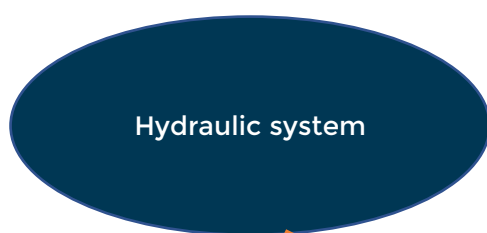
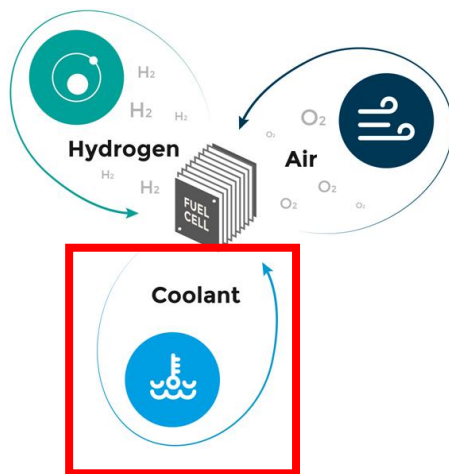




ÉQUIPEMENTIER AUTOMOBILE  
**LEADER MONDIAL** DANS LES  
FONCTIONS HYDRAULIQUES

# **Bontaz Fuel Cell Thermal Loop**

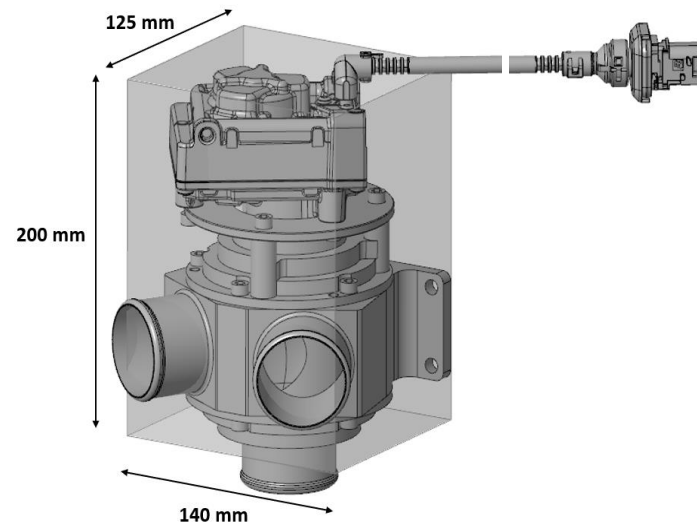
## **Coolant 3/2 Valve**



Direct & Mix Coolant in a continuous way according to the proportion chosen by vehicle control unit (ECU)

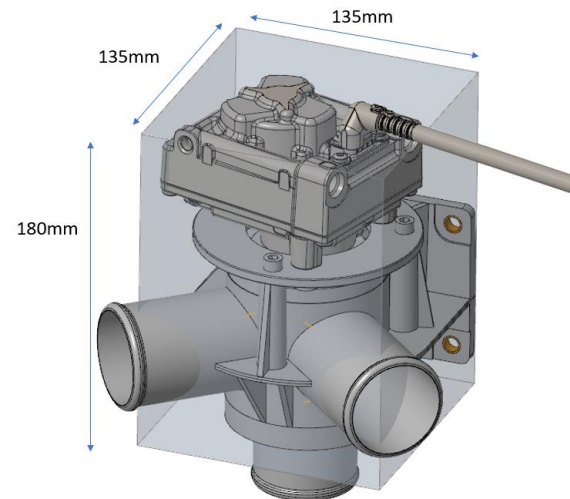
## Solution V1 – Prototype

\*Machined Aluminium



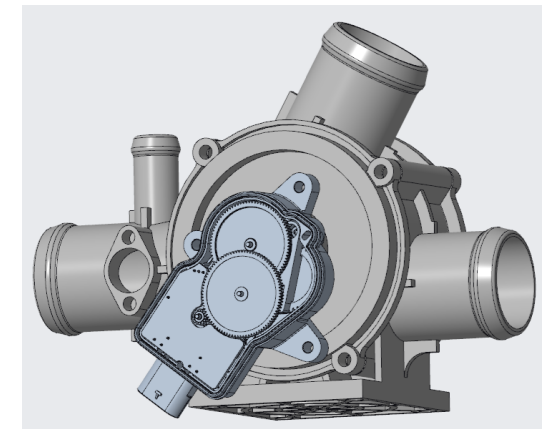
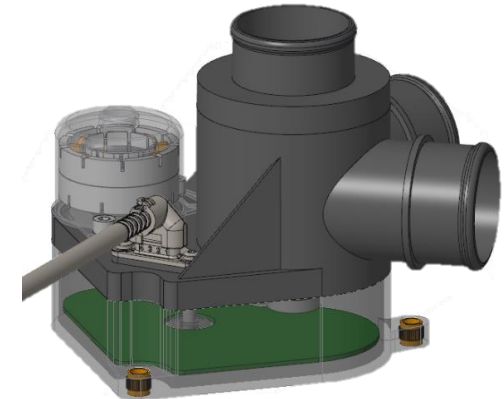
## Intermediate

\* Machined and injected plastic + aluminum



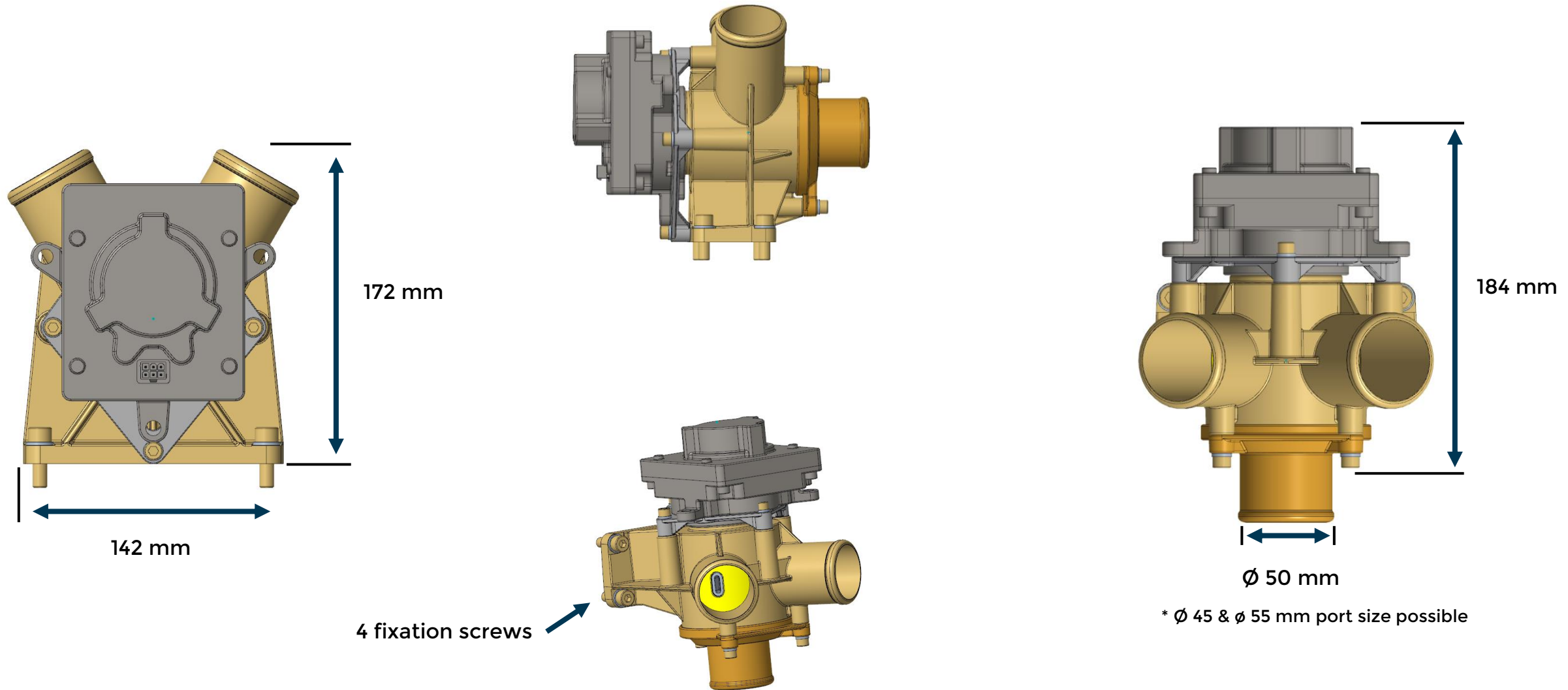
## Solution V2 – Integrated

\* Concept



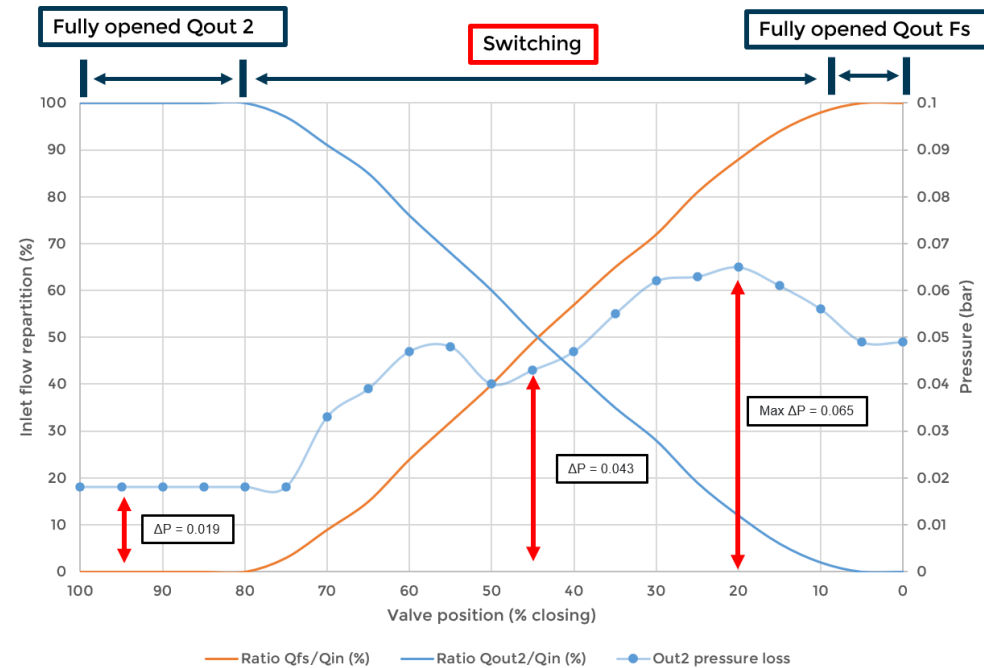
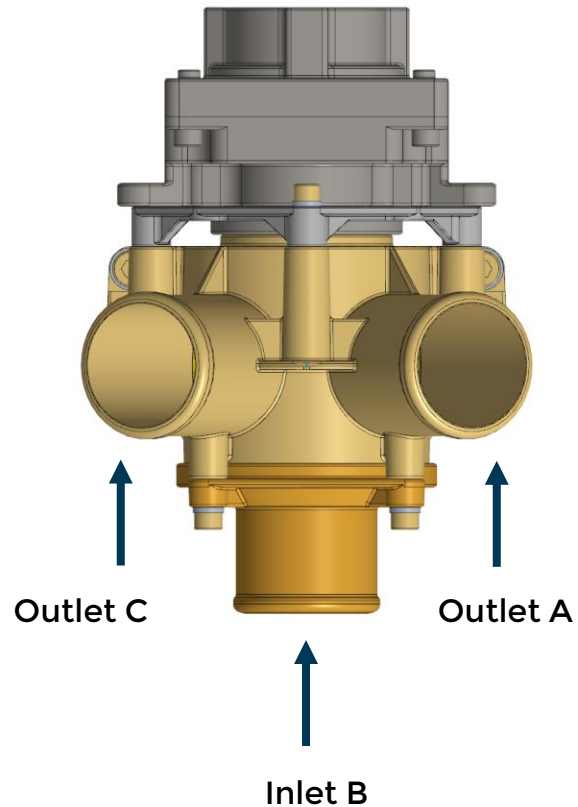
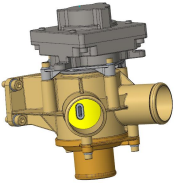


\* Prototype Injected part planned for April 2023



Aluminum : 3.8 Kg  
Plastic : 2 Kg

- \* Designed for proportionality efficiency
- \* Split and Mixing mode functional



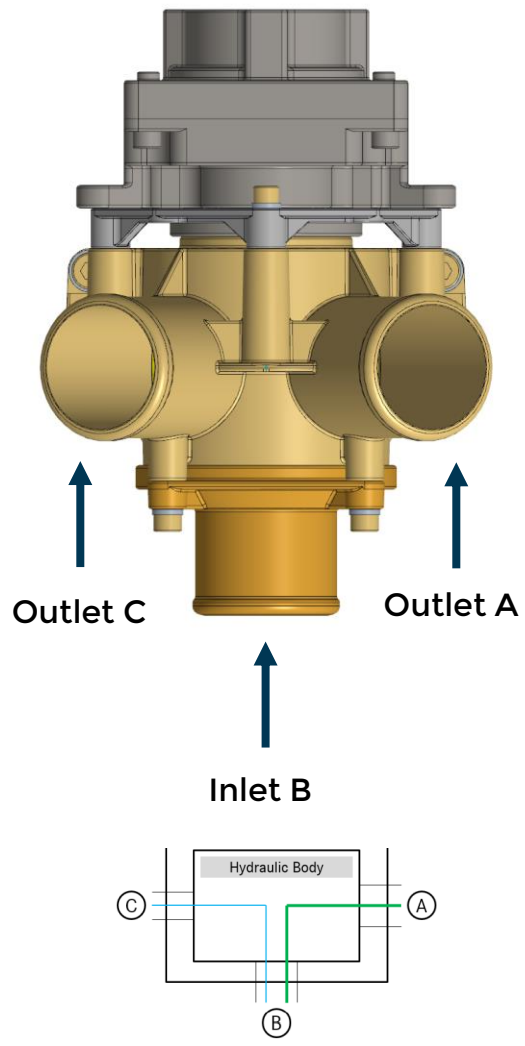
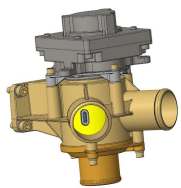
Testing environment :

- Flow rate : @400l/min
- Ambient Temperature : +50°C
- Fluid Temperature : +80°C

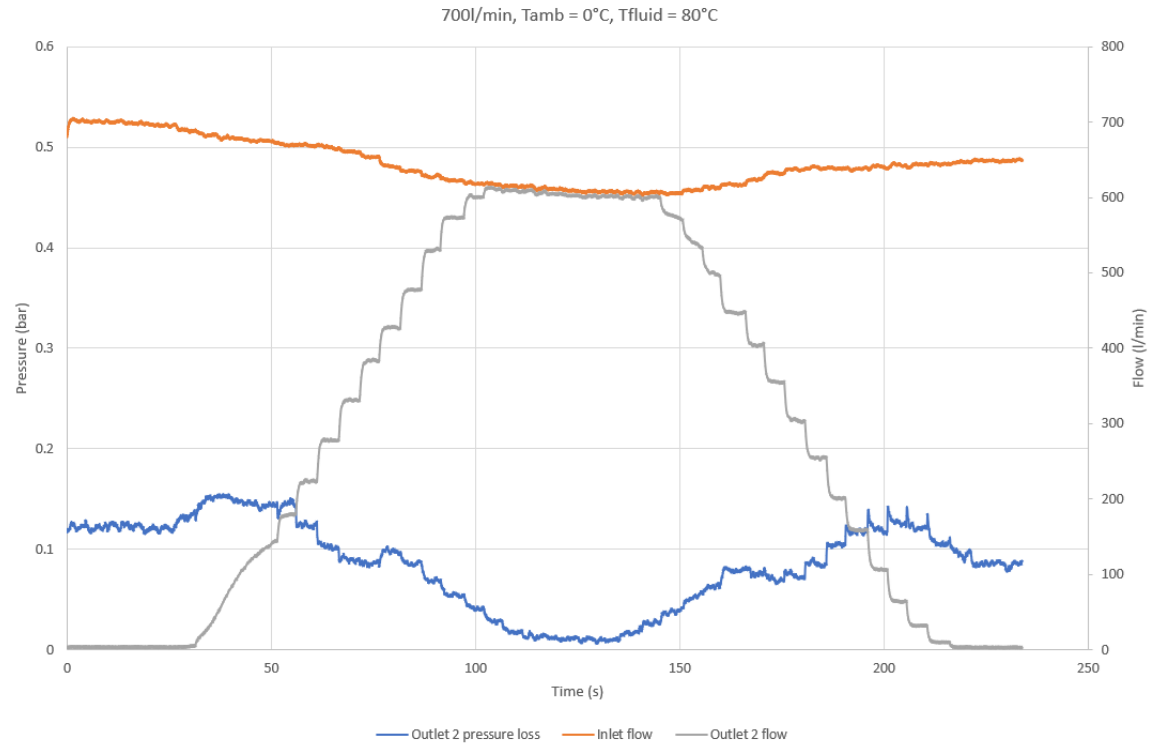
Pressure Drop = 0.065 Bar at 330 L/min

**Dedicated sealing solution**  
Expected < 0.3 % max flow

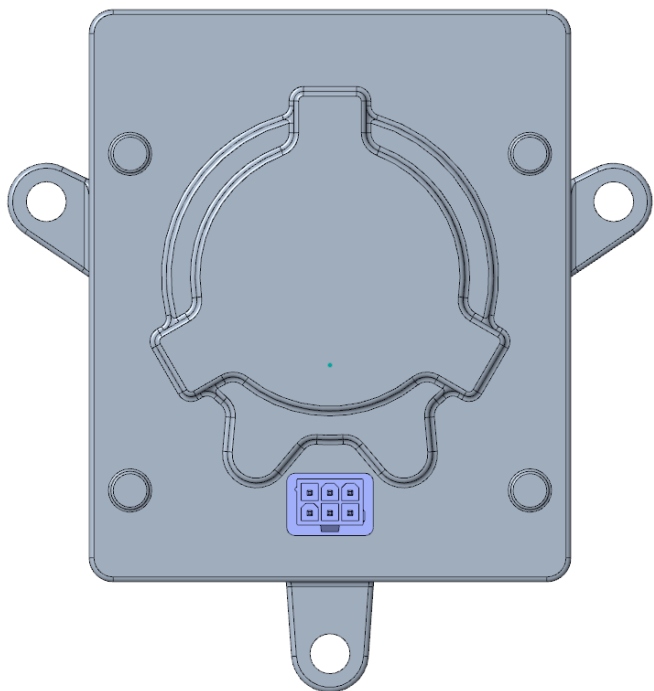
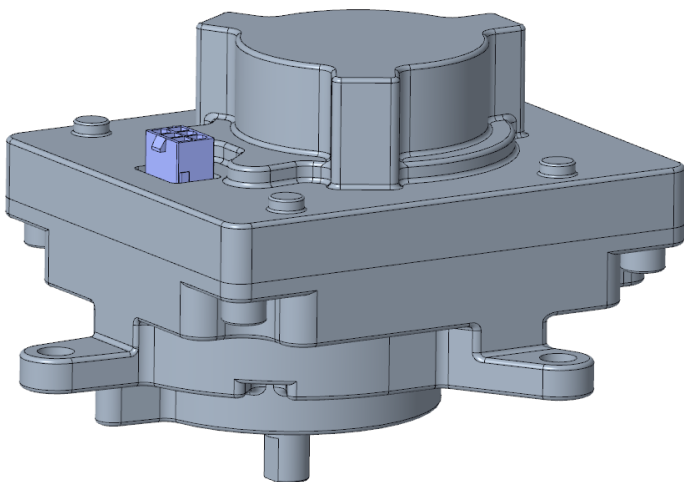
Internal Leakage Requirements for the 3-Port/2-Way Valve (XXX-3888)  
The 3-port/2-way valve shall not have any internal leakage.  
The supplier shall propose a sealing concept which eliminates any internal leakage.



Pressure drop at 700 lpm < 200 mbar at 80°C



BLDC Actuator



**Communication :** CAN FD (SAE J19 39), LIN possible

**Voltage :** 24 V

**Connector :** 6 pins

**Response time :** 1 sec

**Auto calibration start cycle**

**Position Accuracy :** Expected 1°

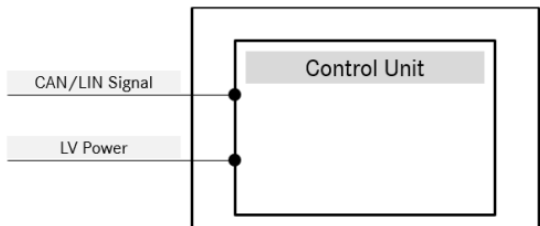
**Pig tail possible**

**Failsafe : ?**

**Cycle Switching Operation Velocity** (XXX-3840)

The valves shall be able to switch from one end position to the other end position in less than 2 seconds. This contains the switch from 0 % to 100 % and from 100 % to 0 %.

Therefore switching operations from intermediate positions to other intermediate positions shall be able in less than 2 seconds as well. This contains e.g. switches from 20 % to 80 % or from 75 % to 15 %.



## ➤ Anodized Aluminum

## ➤ Plastic Material → Weight Reduction but need to be validated in vibration testing

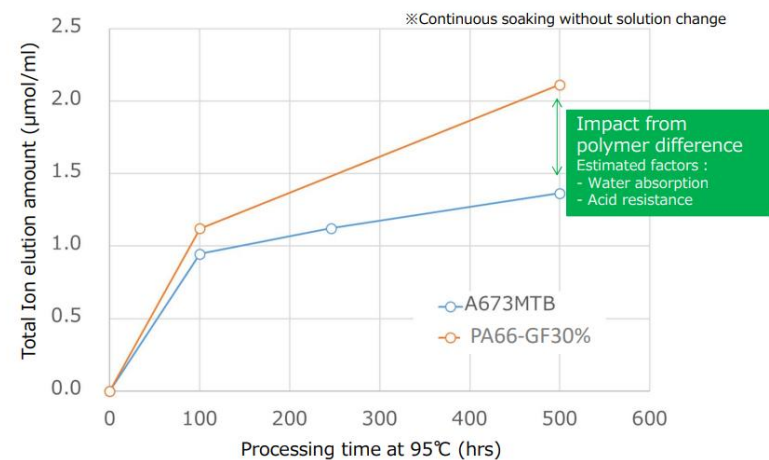
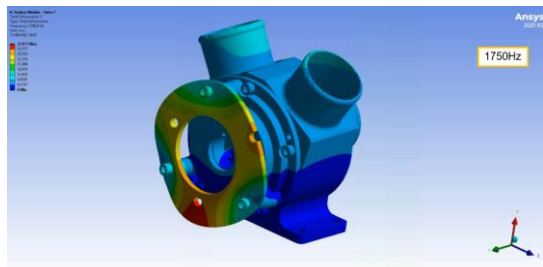
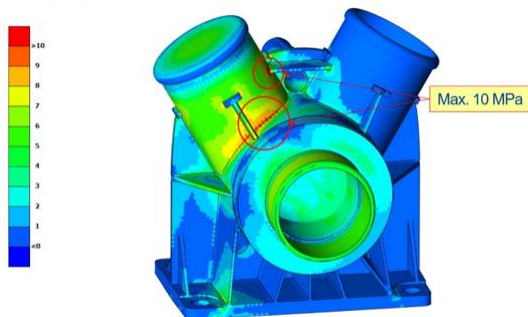
Toray - PPS A504CX13

\* DIC - PPS FZ 2140 T3

\* DIC - PPS Z 230 T3

\* Solvay - PPS Ryton R4 220BL

## Mechanical simulation



## Flammability

