

"ASSIST – Smart valves based on soft materials
Project results and exploitation perspectives"



Dolphin Fluidics is an innovative startup, powered by Fluid-o-Tech, developing, producing and selling proportional valves and precision fluidics systems

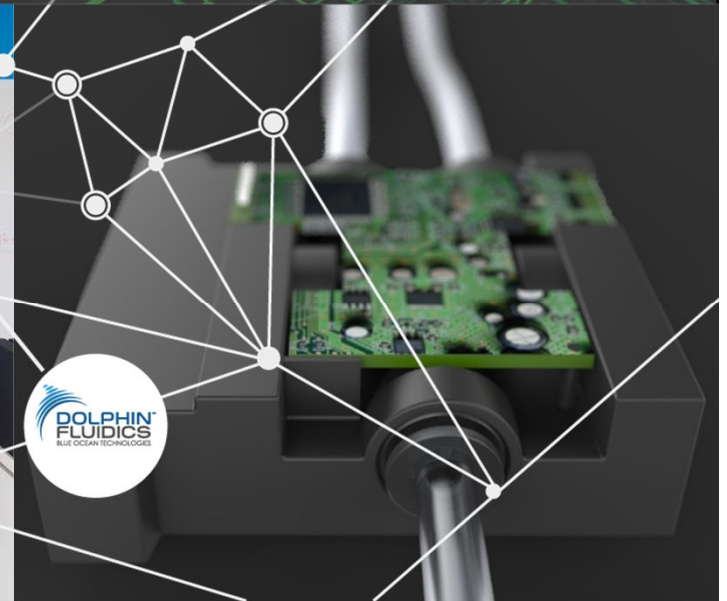
combining embedded electronics, connectivity and smart actuators, enabling new user's experience and customer value through data.

WE DIGITALIZE FLUIDICS

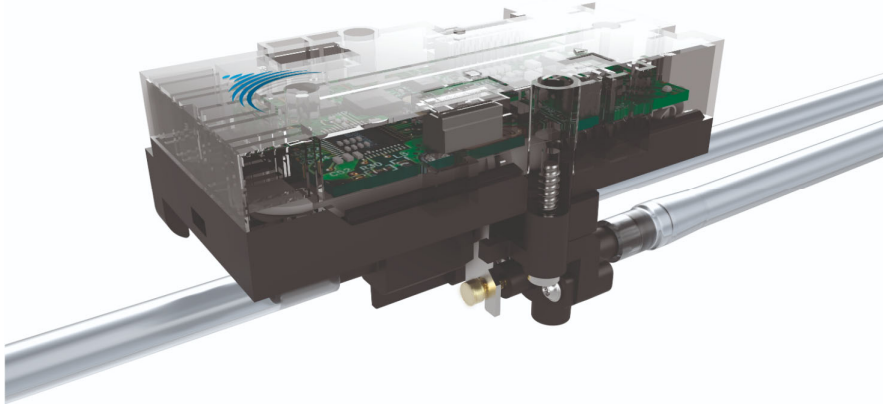


A «large shoulders» start up

70 years in fluidics, 25 years in smart actuators
a unique team at your fingertips !



Dolphin Fluidics smart valve platform



- Air/liquid dosing, dispensing and mixing in a **single digital device**
- Actuator technology based on Shape Memory Alloy technology, **totally noiseless** operation
- **Closed loop proportional** control keeping high accuracy and stability over time
- **No drift** in performances
- Reliable sealing system with **medium separation**
- **Wireless** data communication and remote control
- **Small, light, very low power** operation (10 times less than standard actuators)

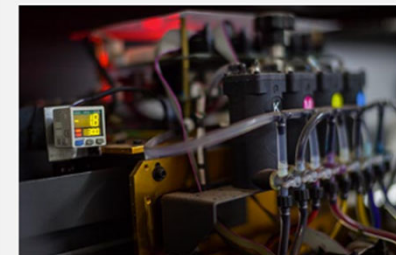
PROFESSIONAL FOOD & BEVERAGE



MEDICAL



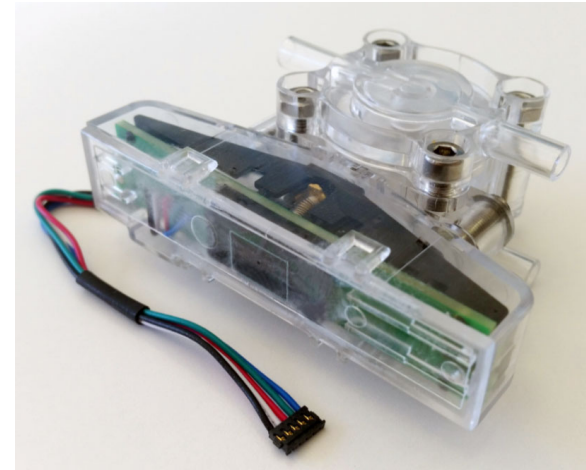
INDUSTRIAL



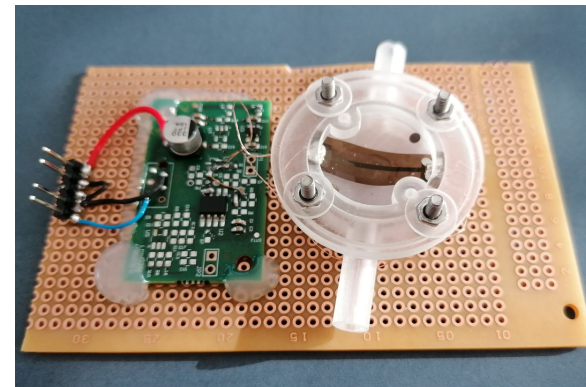
Objective of the project

Smart membrane development and integration in smart fluidic components

Direct membrane integration into Dolphin Valve
DFP-ON/OFF in order to control it proportionally in
closed loop



Membrane used as sensor in an innovative
pressure gauge for medical applications in
disposable devices



Main advantages in smart valves applications

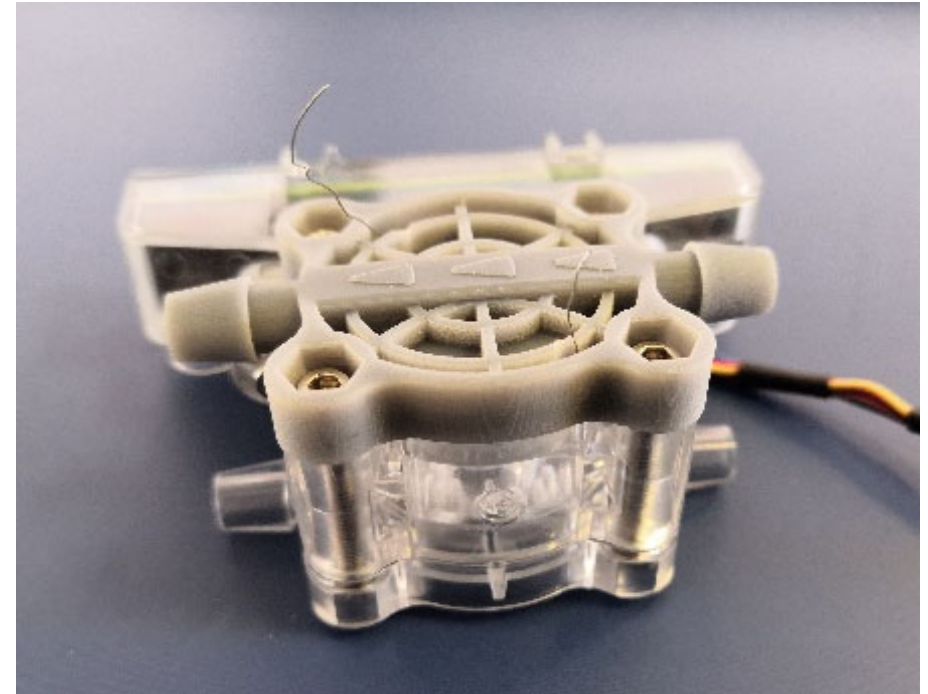
Proportional valve with smart membrane

Technical advantages:

- Sensor integrated in the valve
- Closed Loop Pressure/flow Control
- Fluidic circuit simplifications – No need for external sensor
- Real-time monitoring and data acquisition
- Low consumption – portable device
- ISO 10993 certified biocompatible material

Economical advantages:

- All in one platform – no additional hardware parts
- Easy fit with Dolphin Fluidics valves platform



Main advantages in smart sensors applications

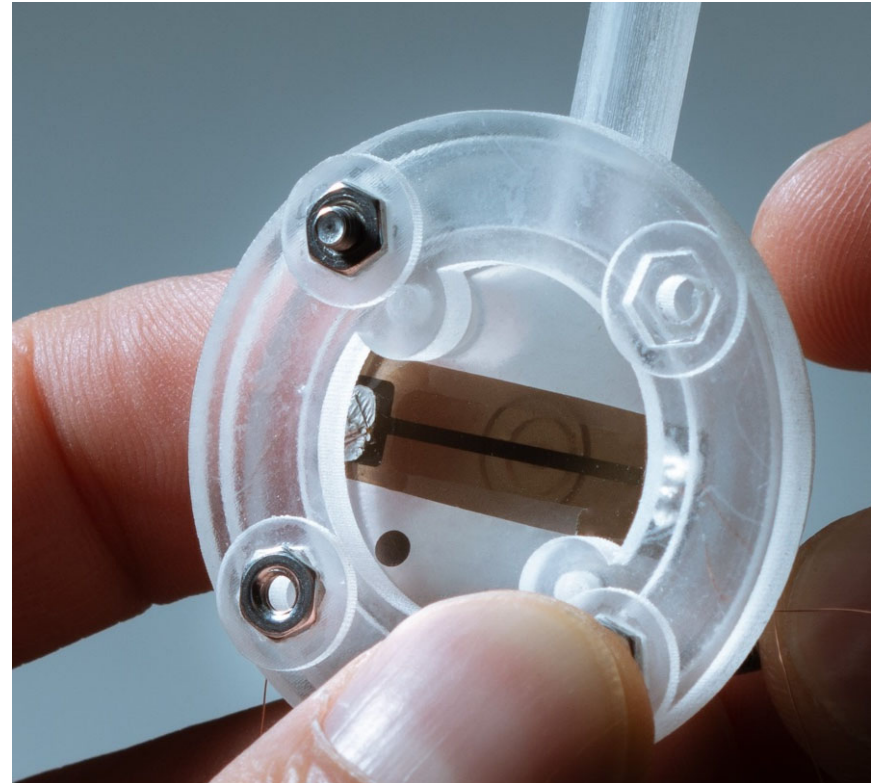
Pressure gauge with smart membrane

Technical advantages:

- Easy implementation in every fluidic circuit
- Customizable – easy to adapt to different design and application
- ISO 10993 certified biocompatible material
- Low weight, small device

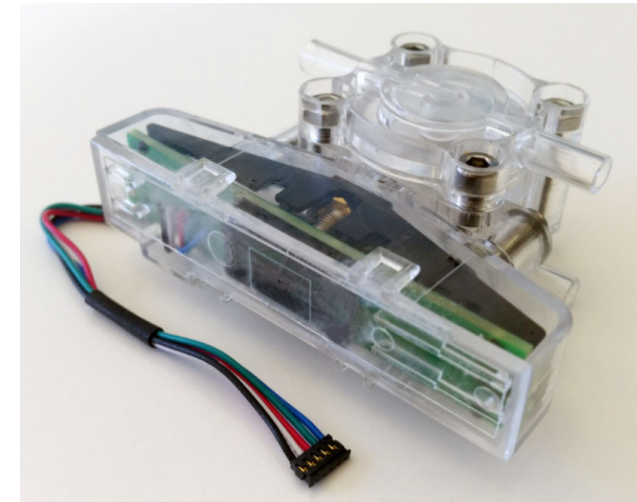
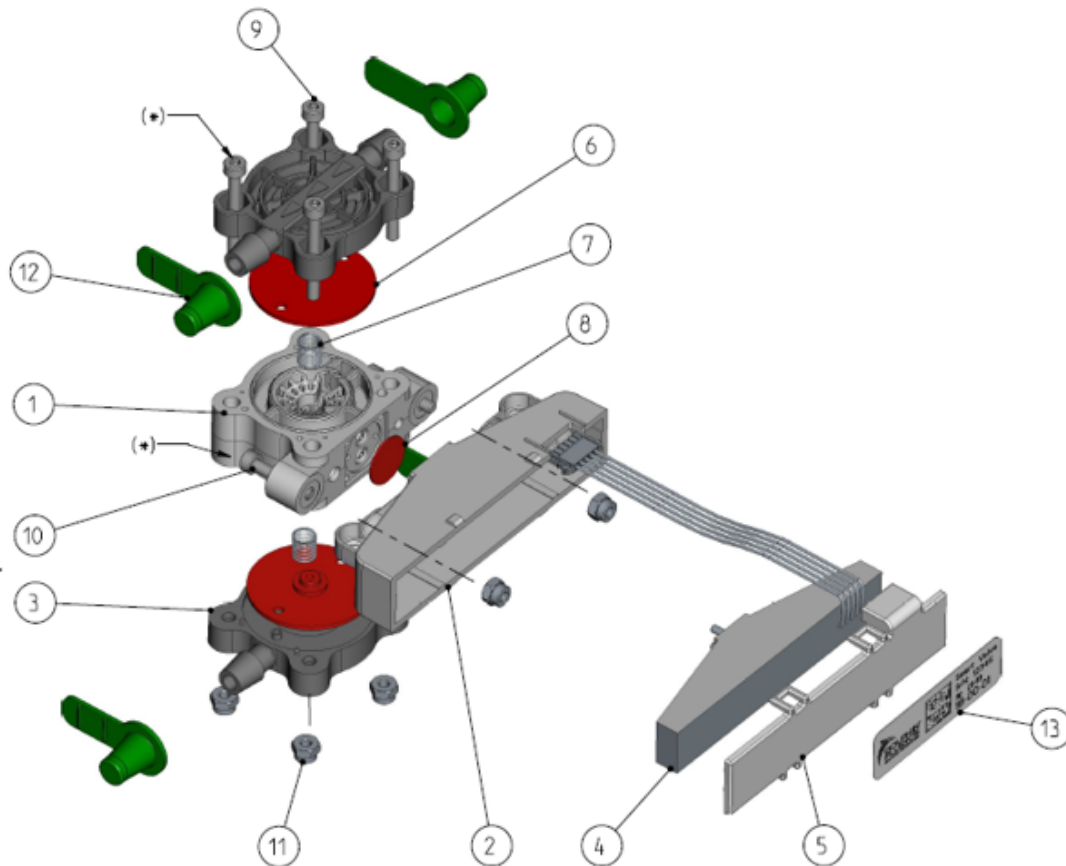
Economical advantages:

- Low number of components – high functional integration
- Opportunity to develop disposable sensors

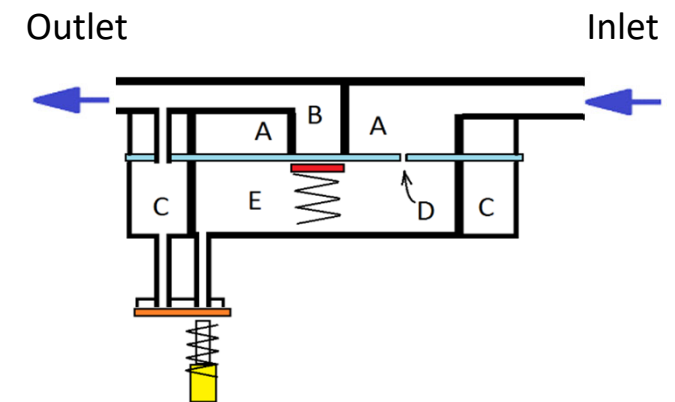


Valve prototype

Active membrane implementation in
DF valve

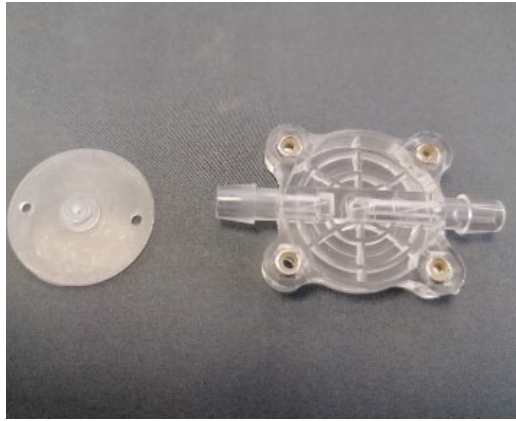


Pilot valve operation

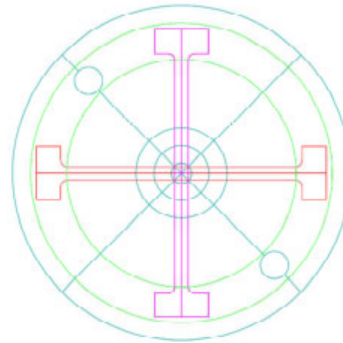


Valve prototype realization

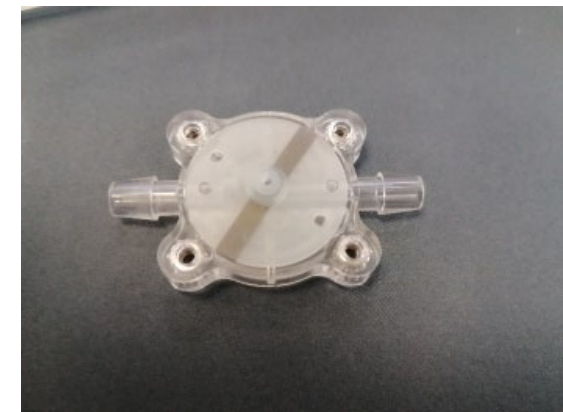
Phase I: soft material choice



Phase II: membrane sensorization hypothesis (thickness 220nm)



Phase III: final implementation into smart valve

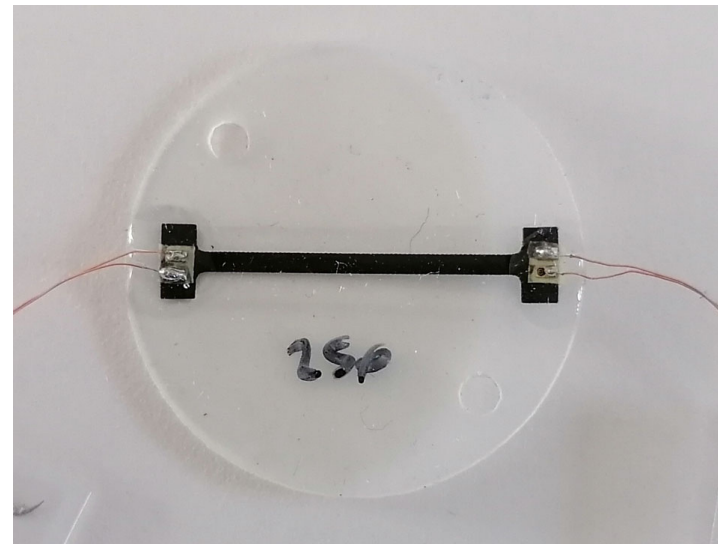
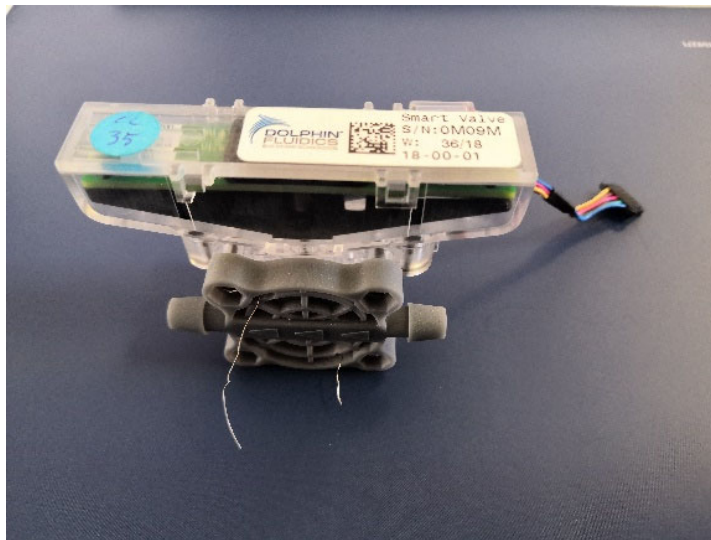
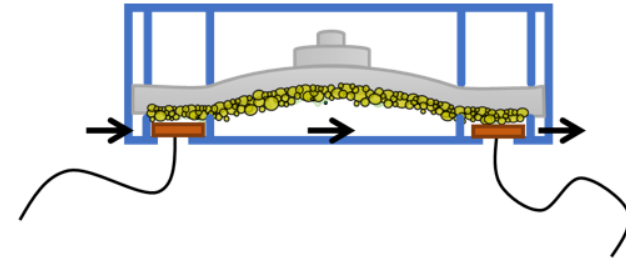


Valve prototype

Electrical membrane connection engineering

Connection realization:

- PCB - 8mm²
- Metal wires
- Silver thermoconductive paste
- PDMS shield (polymerization at 50°C)

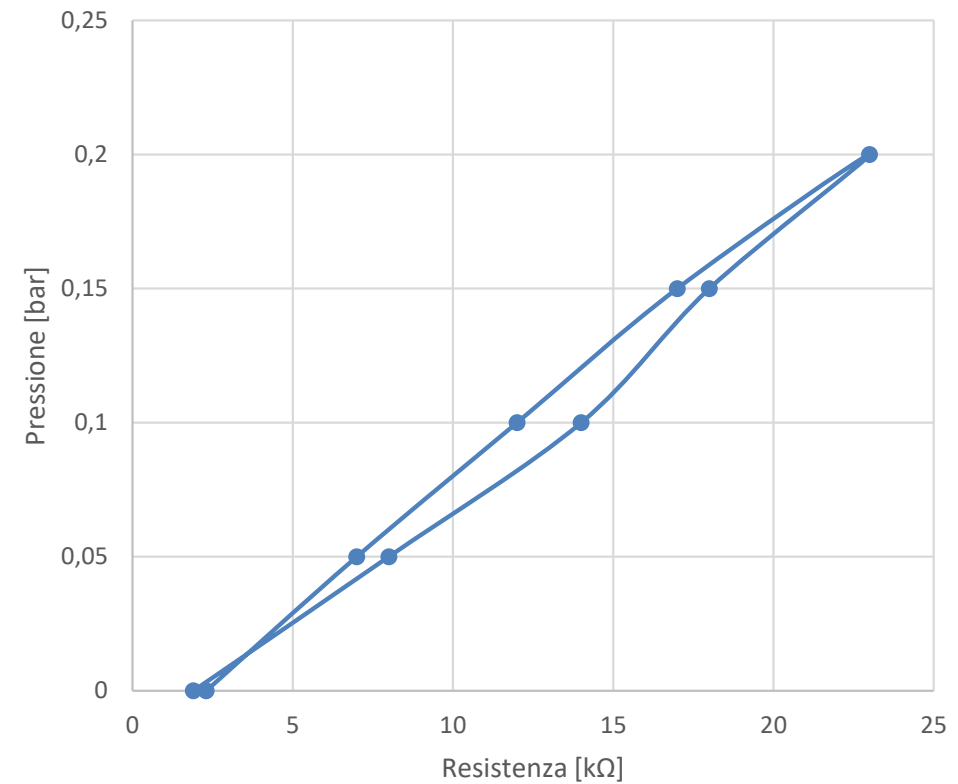
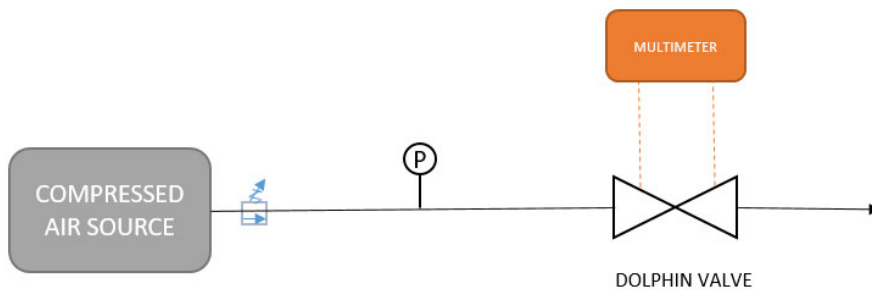


Pressure control Test

Pressure – Resistance diagram (0 – 0,2bar)

Pneumatic test circuit

- Compressed air (max 7 bar)
- Mechanical pressure regulator
- Bourdon pressure gauge 0-1 bar
- Digital multimeter
- ON-OFF valve Dolphin Fluidics 18-00-01

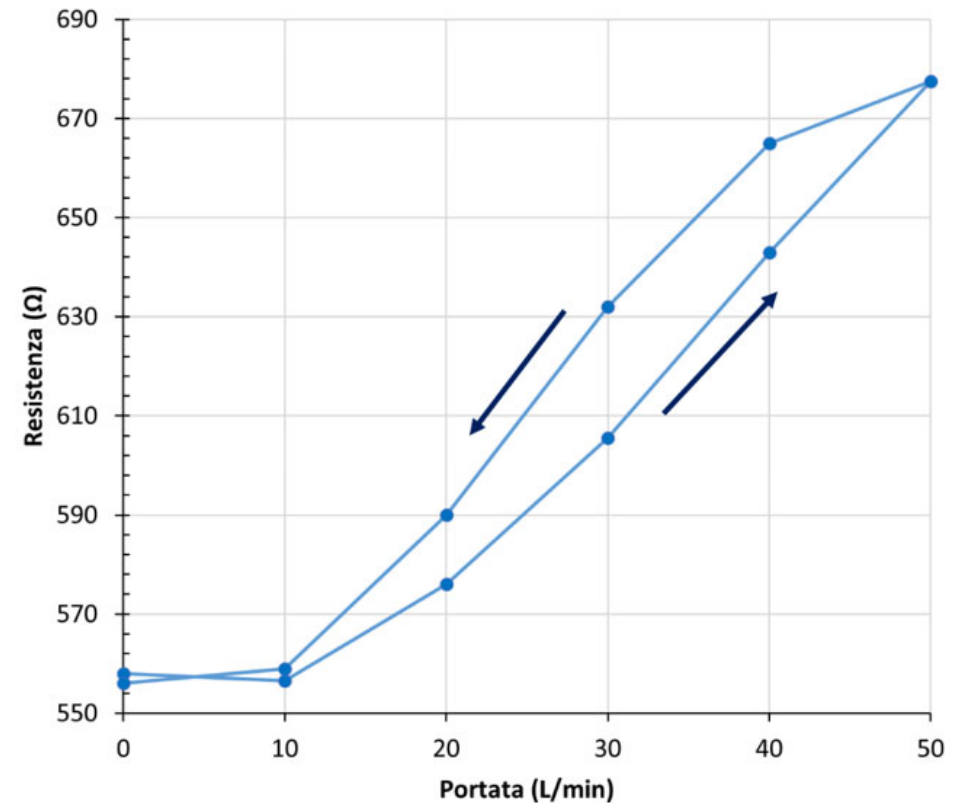
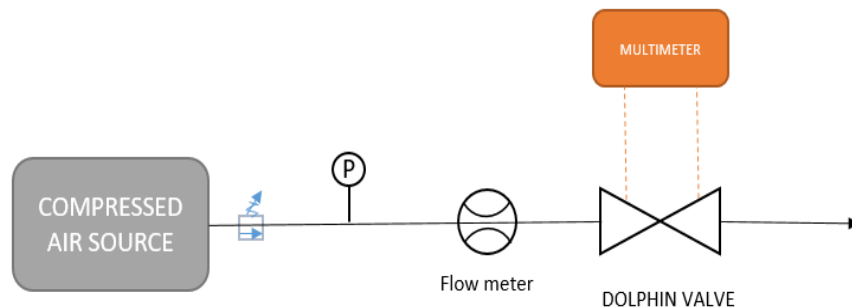


Flow control test

Resistance – Flow diagram (0-50 l/min)

Pneumatic test circuit

- Compressed air (max 7 bar)
- Mechanical pressure regulator
- Bourdon pressure gauge 0-1 bar
- Flowmeter 2-200 l/min
- Digital multimeter
- ON-OFF valve Dolphin Fluidics 18-00-01



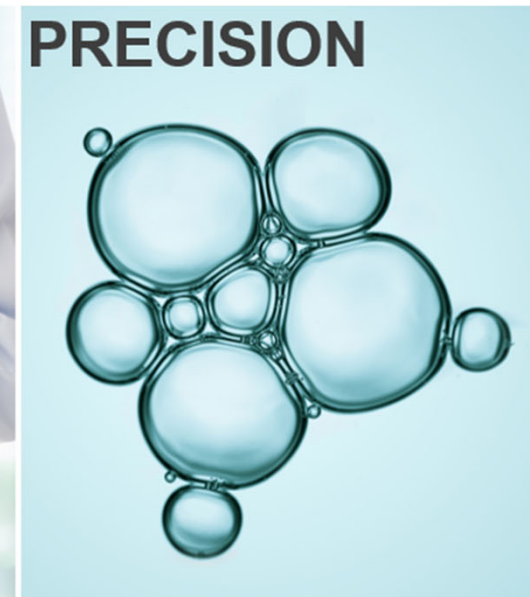
Results and future

- Technology for realization of active membranes has been successfully developed and tested
- Integration of active membranes with the DF valves has been realized
- Pressure and flow test results demonstrated the feasibility of the solution both as a stand-alone sensor and as an HW integration into DF valves to control them in closed-loop.

Next steps:

- Industrialization of active membrane production
- Industrialization of active membrane electrical connection
- Industrialization of active membrane valve

ASSIST to improve patients lives



LET'S START BUSINESS TOGETHER!



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For further information please visit our
www.dolphinfluidics.com
