A stylized graphic of a microfluidic channel, represented by a blue line that meanders and loops across the page. It starts at the top right, moves left, then down, then right, then down again, forming a series of connected loops and turns. The line is a solid blue color.

Advanced MicroFluidics

Innovative
automation solutions

**YOUR PARTNER
FOR OEM
MICROFLUIDIC SYSTEMS**

We're experts in automating miniaturised liquid handling

To perform reliable liquid analyses, you need to create an automatic management system. This requires various tools and a specific know-how. This is where we come in. We aim to make your liquid sequence simple, precise and with minimal contamination. We create robust industrial microfluidics, allowing to reduce sample size and reagent cost. Our products are in-house and Swiss-made. We provide quality engineering.

WHERE ARE AMF PRODUCTS USEFUL?



MANY DOMAINS
need to analyse liquids

LIQUID ANALYSES
require a liquid automation system

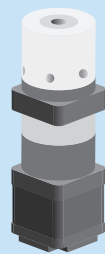
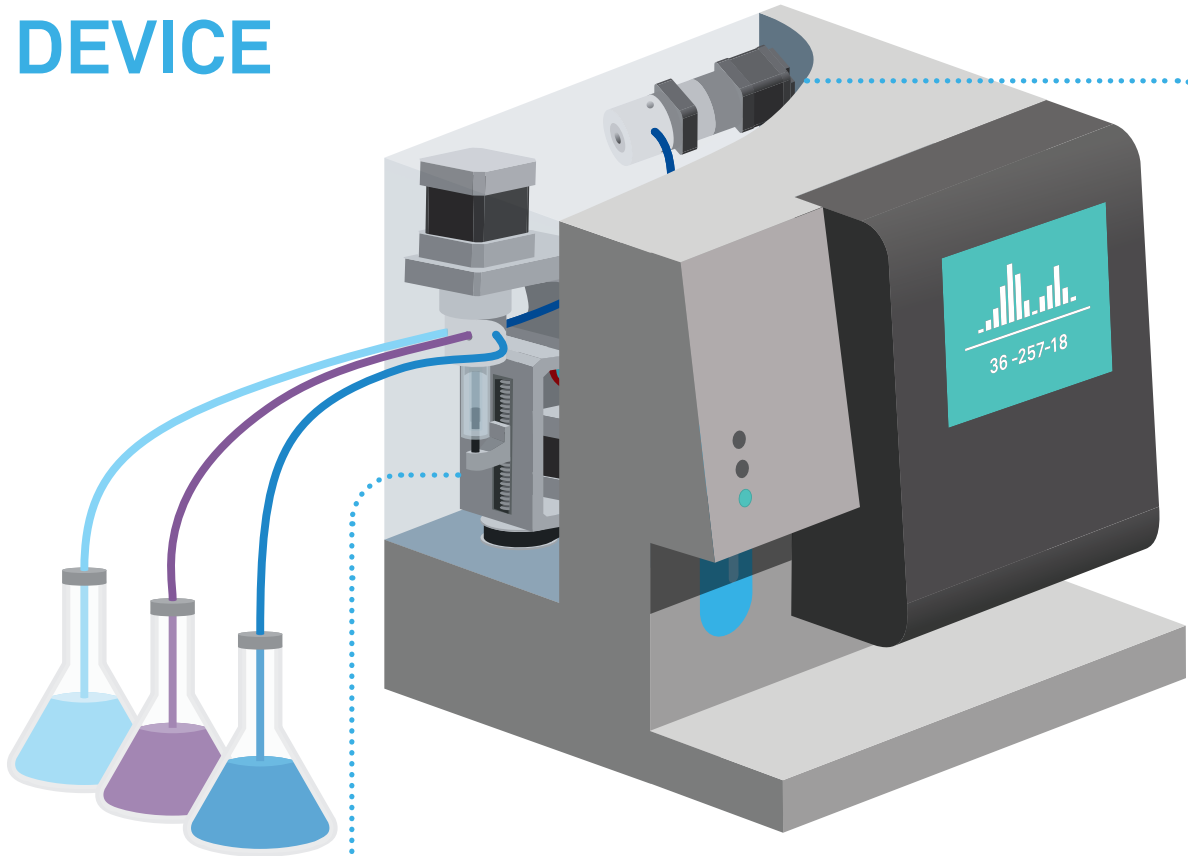
LIQUID MANAGEMENT
uses tools to control, mix and do other features

AMF SERVICES

VALVES & PUMPS
are the solution

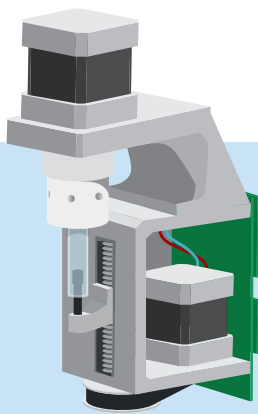
AMF PRODUCTS

AMF PRODUCTS INTEGRATED IN AN ANALYTICAL DEVICE



RVM OEM ROTARY VALVE

Optimised for minimal contamination
Simple integration
Light and compact



SPM OEM SYRINGE PUMP

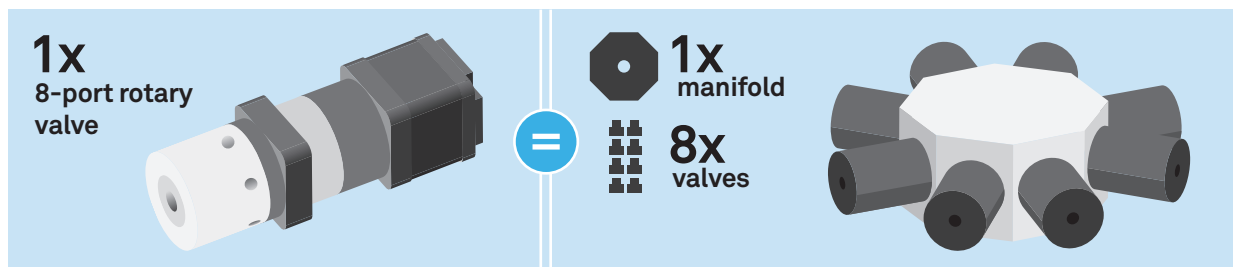
Allows for multiple liquids
Simple air removal
Optimised for minimal contamination

WHY WOULD I USE A ROTARY VALVE?

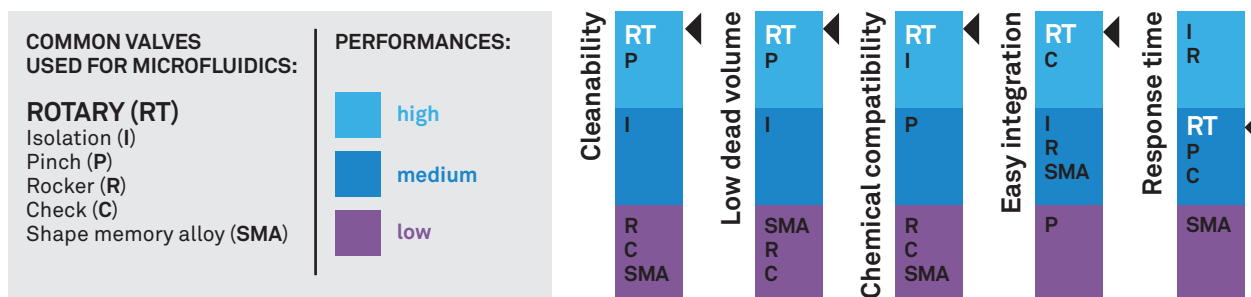
A rotary valve designed for complex multi-liquid flow path change. By acting as a manifold, it saves you space and is much easier to program and integrate.

It's main advantages are:

Tube-like fluidic path | **Constant power consumption** | **Volume variation**



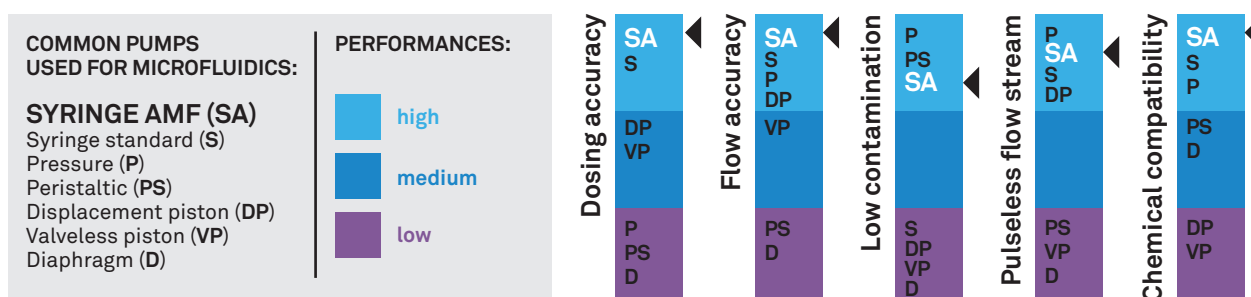
The performance of rotary valves compared to other valve types



WHY WOULD I USE A SYRINGE PUMP?

AMF's syringe pump directly integrates a multi-port rotary valve. It is then optimised for dosing and handling multiple liquids, while standard syringe pumps are optimised for a single liquid.

The performance of syringe pump compared to other pump types



WE CAN HELP YOU DESIGN THE PERFECT FLUIDIC SYSTEM FOR YOUR OWN PROJECT

MORE ABOUT US

We make everything ourselves and can tailor each solution for YOU. You can also get started straight away with our ready-to-integrate modules.

OUR STORY

All this began when someone needed a solution that didn't exist. Our first partners were developing a complex lab automation project and could not find suitable components on the market. Knowing our passion for microfluidics, they approached us. Together, we developed a solution that specifically corresponded to their needs. Our first product was born, the automated sample preparator.

The know-how that resulted in this partnership enabled us to identify several additional market needs and develop more products. Thus Advanced Microfluidics was created.

Based in the heart of the Swiss watch and med-tech valley, in the EPFL innovation park, our team is committed to designing high-end, user-friendly fluidic solutions.

OUR VISION

As pioneers in the revolutionary link between microfluidics and automation, we bring together a field, long considered as purely academic, into the industrial sector. With our innovative solutions, we strive to keep our clients satisfied by delivering high-performing and quality products. We are aiming to be the new reference for industrial microfluidics.

IF WE WERE TO QUALIFY OUR STRENGTHS IN A FEW WORDS, THESE WOULD BE:



NON-
CONTAMINATION



NO DEAD
VOLUME



COMPACT
SOLUTIONS



EASY
INTEGRATION

AMF PRODUCTS ARE USEFUL IN MANY FIELDS

MEDICAL

Clinical diagnostics
Allergy testing



ENVIRONMENT

Drinking water monitoring
Waste water testing



FORENSICS

Urine analysis
Toxicology



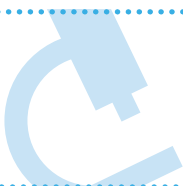
FOOD AND BEVERAGE

Dairy monitoring
Wine analysis



RESEARCH

Analytical chemistry
Analytical biology



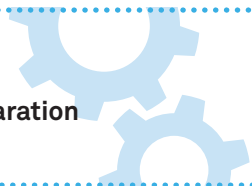
LIFE SCIENCES

Biosensing
Cell culture



INDUSTRIAL

Automatic sample preparation
Quality testing



PHARMA / COSMETICS

Perfume
Product testing



**Check out other applications and
application notes on our website.**



MULTI-FUNCTION
INTEGRATED SYSTEMS



ULTRA-
PRECISE



HOME-MADE
DESIGNS



GREAT CUSTOMER
SERVICE

AMF FEATURES OVERVIEW

1. Selection

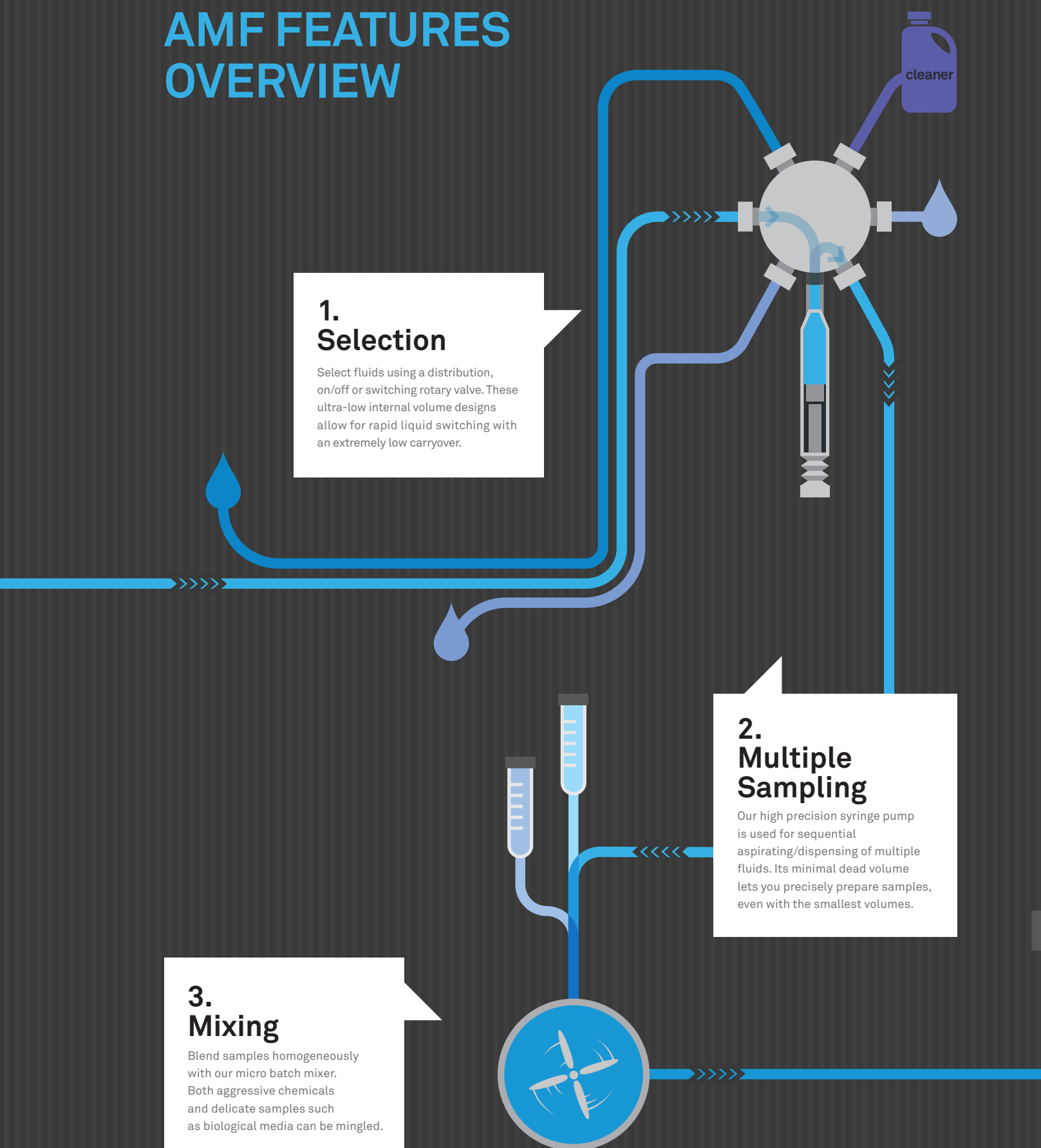
Select fluids using a distribution, on/off or switching rotary valve. These ultra-low internal volume designs allow for rapid liquid switching with an extremely low carryover.

2. Multiple Sampling

Our high precision syringe pump is used for sequential aspirating/dispensing of multiple fluids. Its minimal dead volume lets you precisely prepare samples, even with the smallest volumes.

3. Mixing

Blend samples homogeneously with our micro batch mixer. Both aggressive chemicals and delicate samples such as biological media can be mingled.

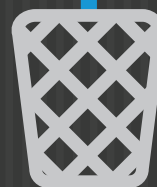


5. Dispensing

Our dispensing solutions accurately control volume and flow rate. Using a multi-port valve, you can transfer the liquids between multiple sources and targets.



YOUR
TECHNOLOGY

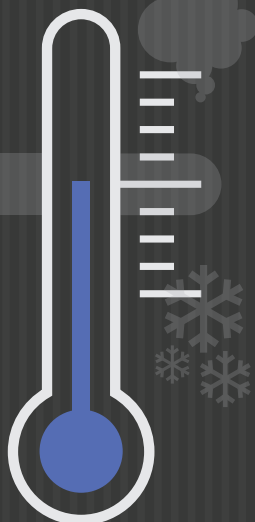
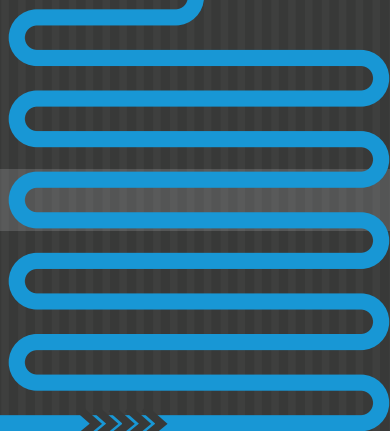


waste



4. Temperature Control

Thermal regulation is an optional regulation. Mix, incubate or dispense your samples at a controlled temperature.



6. Cleaning

Fully automated sample preparation requires thorough cleaning and minimal carryover between batches. Our solutions can be efficiently cleaned or rinsed thus preventing cross-contamination and biofilm formation.

OEM Module

RVM

Rotary valve



Selection



Switch



ON / OFF

This is an OEM product.

It can be tailored for the needs of your instrument.



BENEFITS

- Optimised to limit contamination
- Excellent chemical and biological compatibility
- Replaces a manifold with multiple valves
- Light and compact
- Easy to use and integrate
- Swiss quality



APPLICATIONS

- Sample preparation automation
- Multiplexing
- Sample loops
- Adapted for battery operated devices



FUNCTIONS

- Select channel
- Change flow path
- Stop flow or isolation

THE ULTRA-LOW INTERNAL VOLUME ROTARY VALVE

CREATE YOUR OWN OPTIMISED FLOW PATH

Our OEM valve is a precise low-pressure electric rotary valve designed for automated microfluidic applications. Its exceptionally small channels and accurate positioning system make it ideal for precise liquid handling.

Showing an unrivaled small wetted volume and an exceptional ease of use, this valve is the perfect companion for liquid distribution in your instrument or laboratory experiments at a reduced cost. A low power model exists for a minimum battery use and a fast one exists for your time-specific applications.




Model specifications

CONFIGURATION	POWER	ROTATION TIME FOR 180°	WEIGHT (TOTAL MODULE)	DIMENSIONS
Low power motor	5-10 VDC, 0.5 A peak	1.5 s	250 g	29 x 38.3 x 111.8 mm
Fast motor	18-24 VDC, 2 A peak	400 ms	450 g	42.3 x 60 x 95.9 mm

Other specifications

Operating temperature	5-40°C (41-104°F)
Operating humidity	20-80%, non condensing
Max. pressure	5 bars (72 psi)
Wetted materials	PTFE, PCTFE
Channel diameter	0.5 mm (0.020 in) / 0.4-1 mm (0.015-0.039 in) available upon request
Internal volume	2.32-2.84 µL port-to-port (Configuration dependent)
Carryover volume	0.55-1.07 µL port-to-port (Configuration dependent)
Dead volume	None
Tube port fittings	Standard 1/4-28 UNF, flat-bottom
Electrical interface	USB mini, (RS-232, RS-485 upon request)
Communication type	Serial, I2C (other upon request)

Valves types

SERIES TYPE	DISTRIBUTION	ON/OFF	SWITCH
#PORTS	6, 8, 10, 12	2, 4, 8	4, 6
LIQUID PATH			
INTERNAL VOLUME	2.5–13.7 μ L	3–6.6 μ L	2.5–2.75 μ L
CARRYOVER VOLUME	1.5–6.7 μ L	1 μ L	0.55–0.8 μ L
CHANNEL \varnothing	0.5 mm, 1 mm	0.5 mm, 0.75 mm	0.5 mm
DEAD VOLUME	None		

Other models available upon request. Check website for new models.

Fast liquid switching

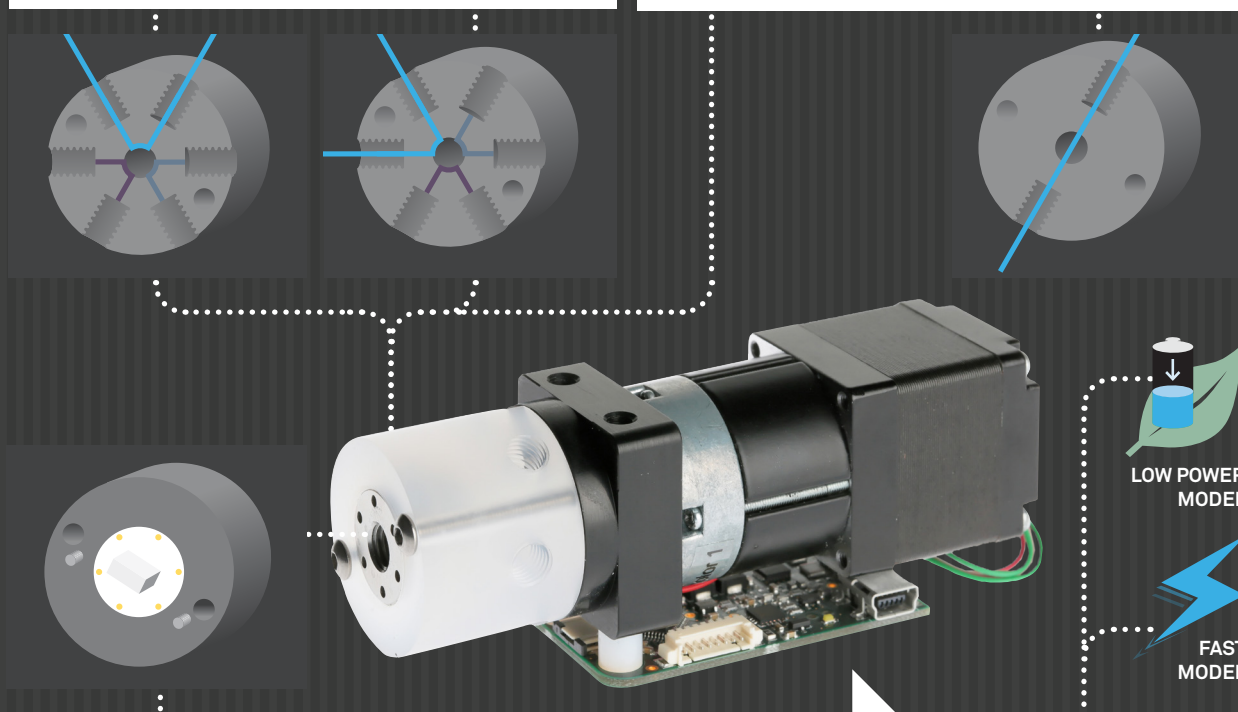
This extremely small internal volume selection valve allows to rapidly switch liquid, while maintaining an ultra low carryover.

Valid for all models.

Ultra-low internal volume

Our unique precise valves exhibit an internal volume (port-to-port) of 2.5 to 4 μ L due to their exceptionally small 0.5 mm diameter channels.

Valid for 0.5 mm diameter channels.



Integrated sensor

The position sensor is directly integrated into the valve to ensure precise positioning. An automatic procedure at power-up allows the valve to know its precise location. This is called the «homing».

Choice of motor

LOW POWER MODEL

This valve was designed in the most simple way to reduce its power consumption. It is USB powered. A smaller power consumption allows for a smaller power supply, and thus better portable device integration.

FAST MODEL

This valve is designed to reduce the switching speed, taking no more than 400 ms.

OEM Module

SPM

Zero dead volume dilutor



Selection



Sampling



Temperature



Dispensing



Cleaning

This is an OEM product.

It can be tailored for the needs of your instrument.



BENEFITS

- Allows for multiple liquids
- Optimised to limit contamination
- Excellent chemical and biological compatibility
- Simple air removal
- Easy to use and integrate
- Swiss quality



APPLICATIONS

- Sample preparation automation
- Industry
- Lab-on-chip
- Research & Education
- Biological sample handling
- Accurate flow streams of fluids
- High-precision sampling and dosing



FUNCTIONS

- Dilute samples or reagents
- Aspirate liquids
- Dispense liquids
- Control the flow rate
- Prepare complex mixes
- Alternate air / liquid samples

Syringes and valves specifications, see next page

THE ALL-IN-ONE SYRINGE PUMP

HANDLE DELICATE SAMPLES WITH GREAT PRECISION

Our OEM syringe pump is a high-precision dosing device for automated microfluidic applications. The high-accuracy dosing and nearly pulseless flow stream capabilities make it the perfect tool for multiple liquid handling in the range of milliliter down to nanoliter.

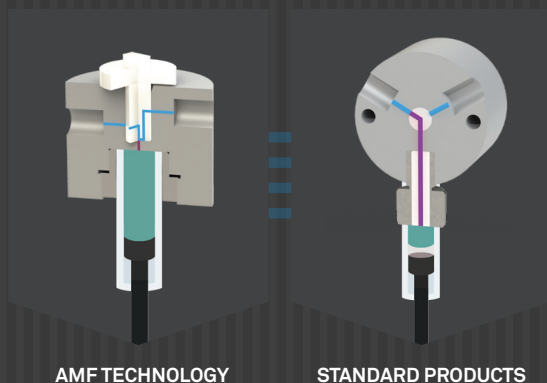
The integrated zero dead volume selection valve allows you to handle multiple fluids with one syringe pump thanks to the high cleaning efficiency and low carryover. Coupled with its ease of use, this syringe pump is thus the ideal companion for your instruments and laboratory experiments at a reduced investment cost.

Pump Specifications

Operating temperature	5-40°C (41-104°F)
Operating humidity	20-80%, non condensing
Max. pressure	5 bars (72 psi)
Wetted materials	PTFE, PCTFE and borosilicate glass
Dead volume	None
Carryover volume	< 1.5 µl
Plunger travel	30 mm with 96'000 micro-steps for nearly pulseless flow
Plunger resolution	Selectable 3'000 steps (standard) / 24'000 steps (high)
Plunger drive	Screw drive with linear encoder for step loss detection
Valves configuration	Zero dead-volume multi-port distribution with angular encoder
Tube port fittings	Standard 1/4-28 UNF, flat-bottom
Cross-contamination	Typically from 1/100 to 1/1000 per cleaning cycle
Accuracy	< 1% deviation from expected value at full stroke
Interface	USB mini, RS-232, RS-485
Communication type	Serial, I2C (other upon request)
Power	18-24 VDC, 2.2 A peak, 40 W / 18 VDC optimised for battery use
Time for full stroke	2 to 3000 seconds
Dimensions	199.7 x 126.3 x 50.5 mm
Weight	1.5 kg

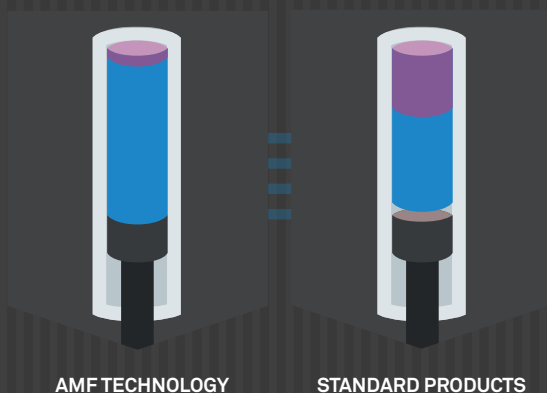
Dead, internal and carryover volumes

Our unique valve geometry limits the carryover volume to 1.5 μL (purple) whereas standard products exhibit up to 50 μL . The exceptionally small channel diameter of 0.5 mm reduces the internal volume to only 4 μL (blue + purple). There is no dead volume.



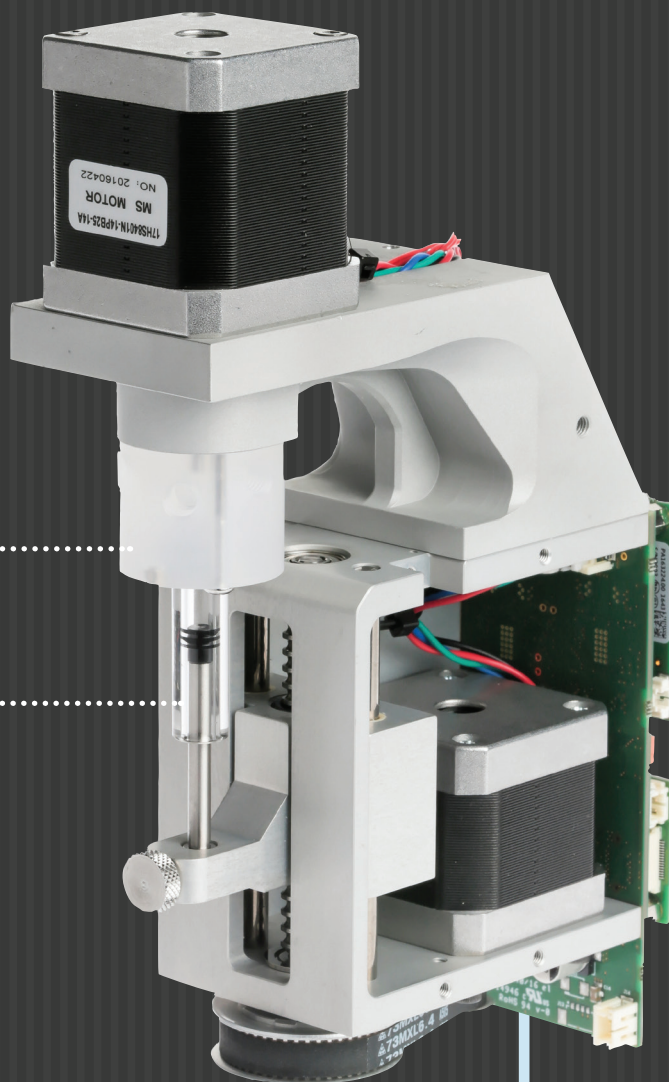
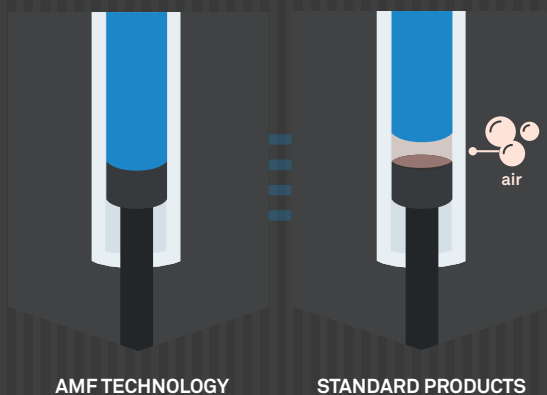
High dilution ratio

When rinsing, diluting or switching liquid, our minimal carryover volume (purple) leads to a maximal dilution ratio with the diluent (blue).



Bubble free priming

Our distinct valve design expels the air from the syringe and valve immediately, eliminating the traditional cumbersome priming procedure.



Sample A

Rinsing solution



Sample B

Fast liquid switching

The zero dead volume selection valve allows to rapidly switch liquid with an ultra low carryover.

SPM OTHER SPECIFICATIONS

Syringes Specifications

REFERENCE	VOLUME	PLUNGER MATERIAL	MIN. FLOW RATE	MAX. FLOW RATE	MIN. DOSING VOLUME
S25-P	25 µL	PTFE	0.25 µL/min	750 µL/min	0.05 µL
S50-P	50 µL	PTFE	0.5 µL/min	1500 µL/min	0.1 µL
S100-P or S100-U	100 µL	PTFE or UHMW-PE	1 µL/min	3000 µL/min	0.2 µL
S250-P or S250-U	250 µL	PTFE or UHMW-PE	2.5 µL/min	8000 µL/min	0.5 µL
S500-P or S500-U	500 µL	PTFE or UHMW-PE	5 µL/min	15000 µL/min	1 µL
S1000-P or S1000-U	1000 µL	PTFE or UHMW-PE	10 µL/min	30000 µL/min	2 µL

Chemical compatibility The wetted materials being PTFE, PCTFE and borosilicate glass, the pump offers an exceptional compatibility to most chemicals and biological samples.

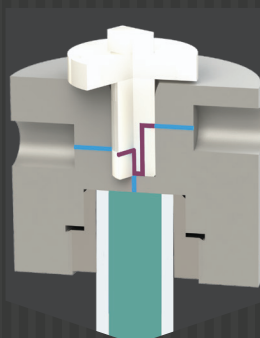
Optional:

It is possible to add a heating/cooling module around the syringe to suit your specific application.

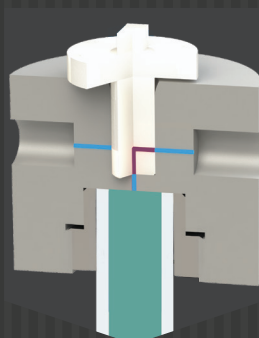
Valves Specifications

REF.	CONFIGURATION	WETTED MATERIALS	INTERNAL VOL.	CARRYOVER VOL.	FLUID PATH DIAMETER	MAX. PRESSURE
VD2-6-050	6-ports ultra-low carryover volume	PCTFE, PTFE	5.2 µL	1.5 µL	0.5 mm	5 bars
VD1-6-050	6-ports low carryover volume	PCTFE, PTFE	3.5 µL	2.6 µL	0.5 mm	5 bars
VD1-8-050	8-ports low carryover volume	PCTFE, PTFE	3.5 µL	2.6 µL	0.5 mm	5 bars
VD1-8-100	8-ports low carryover volume	PCTFE, PTFE	14.1 µL	10.2 µL	1 mm	5 bars
VFD1-8-100	8-ports low carryover volume	PCTFE, PTFE	18.1 µL	11 µL	1 mm	5 bars
VFD1-10-050	10-ports low carryover volume	PCTFE, PTFE	4.5 µL	2.8 µL	0.5 mm	5 bars
VFD1-10-100	10-ports low carryover volume	PCTFE, PTFE	18.1 µL	11 µL	1 mm	5 bars
VFD1-12-050	12-ports low carryover volume	PCTFE, PTFE	4.5 µL	2.8 µL	0.5 mm	5 bars

Other models available upon request. Check website for new models.



6-ports ultra-low
carryover volume



multiport low
carryover volume

CUSTOM SOLUTIONS

WE TAILOR A SOLUTION FOR YOU

Are you designing a new instrument?

Do you want to check if your idea is feasible?

Are you having problems with your system and need a redesign?

Do you have the next great fluidic idea, but don't how to realise it?

Just ask us. We are the experts.

Automatic, robust microfluidic systems are what we do. Whether you think rotary valves and syringe pumps are the solutions that you need, or of you need a solution that just does not exist on the market, or is not good enough for you, we are there to help you.

We have successfully created fluidic systems for technologically-advanced commercial instruments.

This is an example
of a custom solution.
Let us be your OEM partner
to develop your own solution.



SELECTION



SAMPLING



MIXING



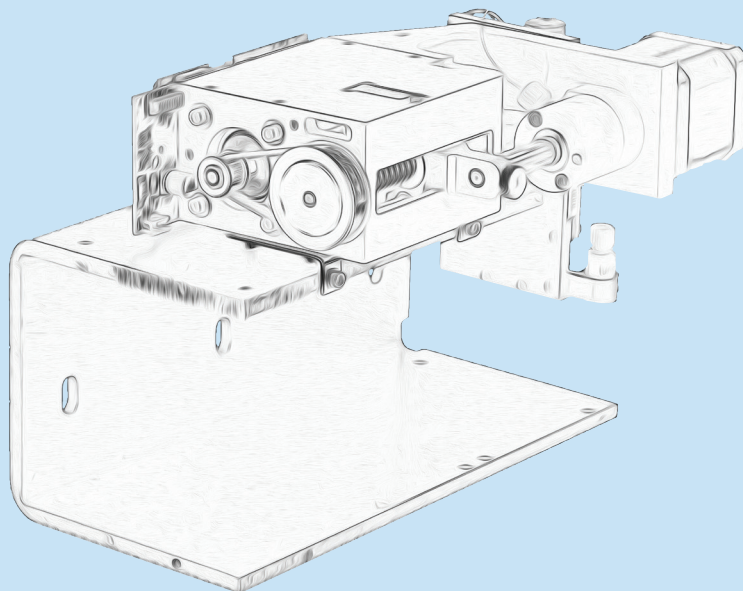
TEMPERATURE



DISPENSING



CLEANING



CONTACT US FOR MORE INFORMATION

Advanced Microfluidics SA
Ch. de la Dent d'Oche 1a
CH-1024 Ecublens
Switzerland

T. +41 21 552 14 30

info@amf.ch
www.amf.ch