

ChemSynt 301

Chemical Reaction Station

A modular reaction workstation that combines automation, flexibility, and control to simplify complex chemistry and accelerate process development and scale-up.

velp[®]

Driven by curiosity



ChemSynt 301 Reaction Station

ChemSynt 301 is a modular and automated reaction workstation for process development and optimization. It enables precise control of temperature, pH, stirring, and dosing, while continuously collecting real-time data.

From One to Four. Scalable by Design.

Grow your reaction capabilities without changing platform. From a single experiment to multiple independent reactions, ChemSynt 301 evolves with your laboratory:

- Expand from 1 to 4 independent reaction stations
- Test multiple process variables in parallel
- Ideal for process definition and scale-up

Flexibility Without Limits

ChemSynt 301 adapts to your chemistry, enabling laboratories to configure each experiment according to process requirements rather than instrument limitations.

- Interchangeable reactor configurations from vials to 400 mL
- Magnetic or overhead stirring for different process needs
- Wide range of modular accessories and probes

Control Every Variable

Gain complete control over every critical process variable to improve reproducibility, accelerate optimization and generate reliable experimental data.

- Independent temperature monitoring and control from -30 °C to +150 °C (-40 °C with external chiller) with programmable heating and cooling ramps
- Real-time monitoring and control of pH
- Programmable dosing and stirring profiles

Turn Data into Insight

Transform every experiment into actionable process knowledge through continuous data acquisition and real-time monitoring of critical reaction parameters.

- Log temperature and pH data with up to 1-second resolution
- Monitor reaction progress in real time from the Control Pad
- Gain deeper process understanding for faster optimization and confident scale-up

Configurations



ChemSynt 301 System
SA110A0710



ChemSynt 301 Unit
F110A0710



Overview & Accessories

**Condenser
Coil**
A00000557



**Dropping
Funnels**
A00000556



**OHS RS
Digital**
A00000558



**Centrifugal
Shaft**
A00000567



**Propeller
Shaft**
A00000569



**Retreat Curved
Shaft**
A00000568



**pH
electrode**
A00000562



**Pt 100
probe PTFE**
A00000553



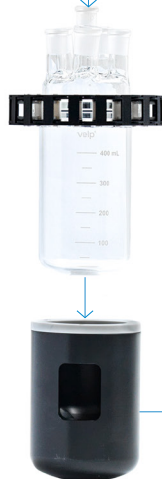
**Pt 100 glass
probe**
A00000572



**Pt 100
Stainless
Steel**
A00000587



Glass Reactor 100 mL
A00000552



100 mL Adapter

**Glass Reactor
400 mL**
A00000551



Glass Vials
A00000566



Vials Adapter



**Dry Air - Cooling Medium
Flowmeter**
A00000549
A00000561



ChemSynt 301 Reaction Station



DU50 Dosing units
A00000559 - A00000560
■ Single or double dosing unit
■ Syringe 25 mL or 50 mL

Reactor Configurations

The right reactor configuration is key to achieve reliable and reproducible results throughout process development. ChemSynt 301 offers dedicated reactor solutions for reaction screening, process optimization, and scale-up studies.



Glassware kit 400mL

Code: A00000551

The kit features a round-bottom glass reactor designed to reproduce laboratory reaction conditions representative of industrial processes. Its two-piece design simplifies cleaning and provides easy access to the reaction mixture, while the reactor geometry promotes efficient mixing and heat transfer.

When to use the 400 mL Glassware Kit:

- Developing and optimizing reactions under process-like conditions.
- Evaluating mixing, temperature, and reagent rate at representative scale.
- Assessing reaction robustness before pilot or production scale-up.

The kit includes:

Code	Description	Qty.
A00000589	Vessel 400mL	x1
A00000588	Lid for Vessel 400mL	x1
A00000593	FEP-O-S O-ring vessel 400 mL	x1
A00000595	Chain clamp for 400 mL Vessel	x1

Code	Description	Qty.
10010737	Vessel holder 400/100 mL	x1
A00000576	Probe adapter 14/20 d3 mm	x2
A00000579	Vessel stopper 19/22	x2
A00000577	Vessel stopper 14/20	x5



Glassware kit 100mL

Code: A00000552

The kit features a round-bottom glass reactor designed for process definition and reaction investigation. Its two-piece design provides easy access to the reaction mixture while simplifying cleaning and maintenance, making it ideal for iterative experimental workflows and rapid parameter evaluation.

When to use the 100 mL Glassware Kit:

- Investigating the influence of temperature, stirring, dosing, and pH on reaction performance.
- Comparing different reaction conditions while limiting reagent consumption.
- Defining the operating window before moving to larger-scale process optimization studies.

The kit includes:

Code	Description	Qty.
A00000590	Vessel 100mL	x1
A00000591	Lid for Vessel 100mL	x1
A00000592	FEP-O-S O-ring vessel 100 mL	x1
A00000596	Chain clamp for 100 mL Vessel	x1
10010737	Vessel holder 400/100 mL	x1

Code	Description	Qty.
A00000576	Probe adapter 14/20 d3 mm	x2
A00000578	Vessel stopper 10/18	x2
A00000577	Vessel stopper 14/20	x5
A00000550	Vessel Adapter 100 mL	x1

Glassware kit Vials

Code: A00000566

The kit enables rapid reaction screening using minimal sample volumes. Designed for early-stage process investigation, it allows laboratories to efficiently evaluate multiple reaction conditions while reducing reagent consumption and experimental costs.

When to use the 16 mm Vial Kit:

- Screening multiple reaction conditions using small sample volumes.
- Evaluating multiple reactions under the same reaction conditions.
- Identifying the most promising reaction conditions before progressing to process definition studies



The kit includes:

Description	Qty.
Adapter for Ø16 vials	x1

Code	Description	Qty.
10010737	Vessel holder 400/100 mL	x1

Reactors – Optional accessories

Code	Description	Qty.	Details
A00000589	Vessel 400mL	x1	400 mL round-bottom glass reactor
A00000588	Lid for Vessel 400mL	x1	6-port glass lid
A00000593	FEP-O-S O-ring vessel 400 mL	x1	Compatible with Lid (A00000588) and Vessel 400mL (A00000589)
A00000590	Vessel 100mL	x1	100 mL round-bottom glass reactor
A00000591	Lid for Vessel 100mL	x1	6-port glass lid
A00000592	FEP-O-S O-ring vessel 100 mL	x1	Compatible with Lid (A00000590) and Vessel 100mL (A00000591)
A00000351	Handle for block removal	x1	For the removal of the adapter for 100mL vessel from the reactor
A00000583	Glass stopper 14/23	x1	Glass alternative to A00000577 PTFE stopper 14/20
A00000584	Glass stopper 19/26	x1	Glass alternative to A00000579 PTFE stopper 19/22
A00000585	Glass stopper 10/19	x1	Glass alternative to A00000578 PTFE stopper 10/18
A00000581	Keck clamp J14	x1	For securing 14 mm glass joints, compatible with A00000583 glass stopper 14/23
A00000582	Keck clamp J19	x1	For securing 19 mm glass joints, compatible with A00000584 glass stopper 19/26 mm glass joints.
A00000580	Keck clamp J10	x1	For securing 10 mm glass joints, compatible with A00000585 glass stopper 10/18
A00000577	PTFE stopper 14/20	x1	Hex-head PTFE stopper
A00000579	PTFE stopper 19/22	x1	Hex-head PTFE stopper
A00000578	PTFE stopper 10/18	x1	Hex-head PTFE stopper
A00000574	D8mm 14/20 probe adapter	x1	Probe adapter with 14/20 joint for Ø8 mm probes
A00000576	D3mm 14/20 probe adapter	x1	Probe adapter with 14/20 joint for Ø3 mm probes
A00000575	D12mm 14/20 probe adapter	x1	Probe adapter with 14/20 joint for Ø12 mm probes
CM0091680	Pack of 20 Ø16mm glass vials	x1	Round-bottom vials compatible with A00000566

Dosing Units

Precise reagent dosing is essential for controlling reaction performance and ensuring reproducible results. ChemSynt 301 integrates a single or double DU 50 dosing unit for automated and independent reagents addition.



DU 50 Dosing Unit

Code: A00000559

The DU50 Single Dosing Unit is an automated dosing system designed for the precise and controlled addition of reagents. Compatible with 25 mL and 50 mL refillable syringes, it provides programmable dosing profiles and automatic syringe refilling for continuous reagent feeding and enhanced process reproducibility.

When to use the DU50 Single Dosing Unit:

- Continuous or programmed reagent feeding during the reaction.
- Controlled reagent addition for sensitive or exothermic reactions.
- Automated pH control through acid or base dosing.
- Process definition and optimization with reproducible dosing profiles.
- High-volume reagent addition thanks to automatic syringe refilling.

The DU50 Single Dosing Unit includes:

Code	Description	Qty.
10006502	610mm Male-to-Male Serial Cable	x1
10009358	Glass bottle 500mL with adaptor	x1

Code	Description	Qty.
A00000576	Adapter Ø3 mm – 14/20	x1



DU 50 Double Dosing Unit

Code: A00000560

The DU50 Double Dosing Unit is an automated dosing system designed to manage two independent dosing lines. Compatible with 25 mL and 50 mL refillable syringes, it provides programmable dosing profiles and automatic syringe refilling for continuous feeding of two reagents or simultaneous dosing to two reactors.

When to choose the DU50 Dual Dosing Unit:

- Dose two reagents independently during the same reaction.
- Combine automated pH control with the addition of a second reagent.
- Run independent dosing profiles for each reagent.
- Dose two ChemSynt reactors simultaneously using a single dosing unit.
- Develop more complex reaction protocols requiring multiple dosing strategies.

The DU50 Double Dosing Unit includes:

Code	Description	Qty.
10006502	610mm Male-to-Male Serial Cable	x1
10009358	Glass bottle 500mL with adaptor	x2

Code	Description	Qty.
A00000576	Adapter Ø3 mm – 14/20	x2

Compatible with: DU50 Single Dosing Unit - DU50 Double Dosing Unit:

Code	Description	Qty.
A00000565	25mL Syringe	x1

Code	Description	Qty.
A00000570	50mL Syringe	x1

Mechanical stirring

Stirring plays a critical role in reaction performance, influencing mixing efficiency, heat transfer, and process reproducibility. ChemSynt 301 supports mechanical stirring, with a range of impeller configurations and powerful compact stirrer.



OHS RS Digital - Overhead Stirrer

Code: A00000558

The OHS RS Digital is a compact yet powerful overhead stirrer designed to deliver reliable and uniform mixing, even in demanding applications. Compatible with three different PTFE impellers, it allows the stirring profile to be tailored to the specific reaction, ensuring effective homogenization and improved process reproducibility. The integrated screw-lock system enables quick, secure, and stable impeller installation, simplifying setup and ensuring reliable operation throughout the experiment.

When to choose the OHS RS Digital:

- To simulate industrial mixing conditions.
- To maximize process reproducibility during process development.
- To efficiently mix viscous or heterogeneous samples.
- To tailor the mixing profile using three interchangeable PTFE impellers.

Additional Accessories:

Code	Description	Qty.	Details
A00000573	OHS adapter cone for 100 mL vessel	x1	Required when using the 100 mL vessel

OHS RS Digital compatible with



PTFE Shaft Stirrer Centrifugal 8x300mm

Code: A00000567

Shaft stirrer in PTFE generates axial flow for efficient bulk mixing and improved heat and mass transfer

When to choose it:

- To promote efficient axial mixing.
- To improve heat and mass transfer.
- To ensure homogeneous reaction conditions.
- For low- to medium-viscosity samples.



PTFE Stirrer Shaft, Retreat Curve 8x300mm

Code: A00000568

Retreat Curve stirrer in PTFE generates combined axial and radial flow for mixing, mass transfer, and uniform conditions

When to choose it:

- To improve reagent dispersion.
- To achieve balanced axial and radial mixing.
- To ensure uniform reaction conditions.
- For medium- to high-viscosity samples.



PTFE Shaft Stirrer, Screw Propeller 8x300mm

Code: A00000569

Screw Propeller in PTFE Generates strong axial flow for high circulation efficiency and rapid, uniform mixing.

When to choose it:

- To maximize fluid circulation.
- To achieve rapid and uniform mixing.
- To enhance heat and mass transfer.
- For medium- to high-viscosity samples.

Temperature Probes

Real-time temperature monitoring with dedicated probes ensures accurate process control and stable reaction conditions throughout the experiment.



AISI 316 Ti Pt100 Ø3mm Probe

Code: A00000587

Temperature probe designed for accurate reaction temperature monitoring, delivering reliable measurements and precise process control.

When to choose it:

- For continuous reaction temperature monitoring.
- For standard laboratory applications.
- For fast and accurate temperature measurements.



Glass Pt100 Ø5 mm Probe

Code: A00000572

Temperature probe designed for accurate reaction temperature monitoring in applications requiring high chemical resistance. The glass coating provides excellent chemical inertness, minimizing the risk of sample contamination.

When to choose it:

- When working with highly corrosive media.
- When maximum chemical inertness is required.
- When metal contamination must be avoided.
- For acidic or aggressive reaction environments.

Includes:

Code	Description	Qty.
A00000574	14/20 Probe Adapter, 8 mm Diameter	x1



PTFE Pt100 Ø8 mm Probe

Code: A00000553

Temperature probe designed for accurate reaction temperature monitoring in applications involving chemically aggressive reagents. The PTFE coating provides excellent chemical resistance and a non-stick surface for easy cleaning.

When to choose it:

- When working with chemically aggressive reagents.
- When excellent chemical resistance is required.
- When a non-stick probe surface is preferred.
- For applications requiring easy cleaning.

Includes:

Code	Description	Qty.
A00000574	14/20 Probe Adapter, 8 mm Diameter	x1

Sensors and Electrode

pH drives reaction selectivity, ChemSynt 301 features real-time pH monitoring with dedicated electrodes. When paired with the DU50 Dosing Unit, pH measurements automatically trigger reagent addition for precise, automated pH control through the reaction.



pH electrode

Code: A00000562

pH electrode designed for continuous reaction pH monitoring. Integrated with ChemSynt 301, it enables real-time pH acquisition and automated pH control through the DU50 Dosing Unit, ensuring stable and reproducible reaction conditions.

When to choose it:

- For real-time reaction pH monitoring.
- To maintain a target pH through automated dosing.
- For pH-sensitive reactions.
- To improve process reproducibility.

Includes:

Description	Qty.
H63-320mm Combined pH Electrode	x1
L1 BCN Electrode Cable	x1

Description	Qty.
19/22 D12mm pH Adapter	x1

Additional Accessories

Magnetic Bars:

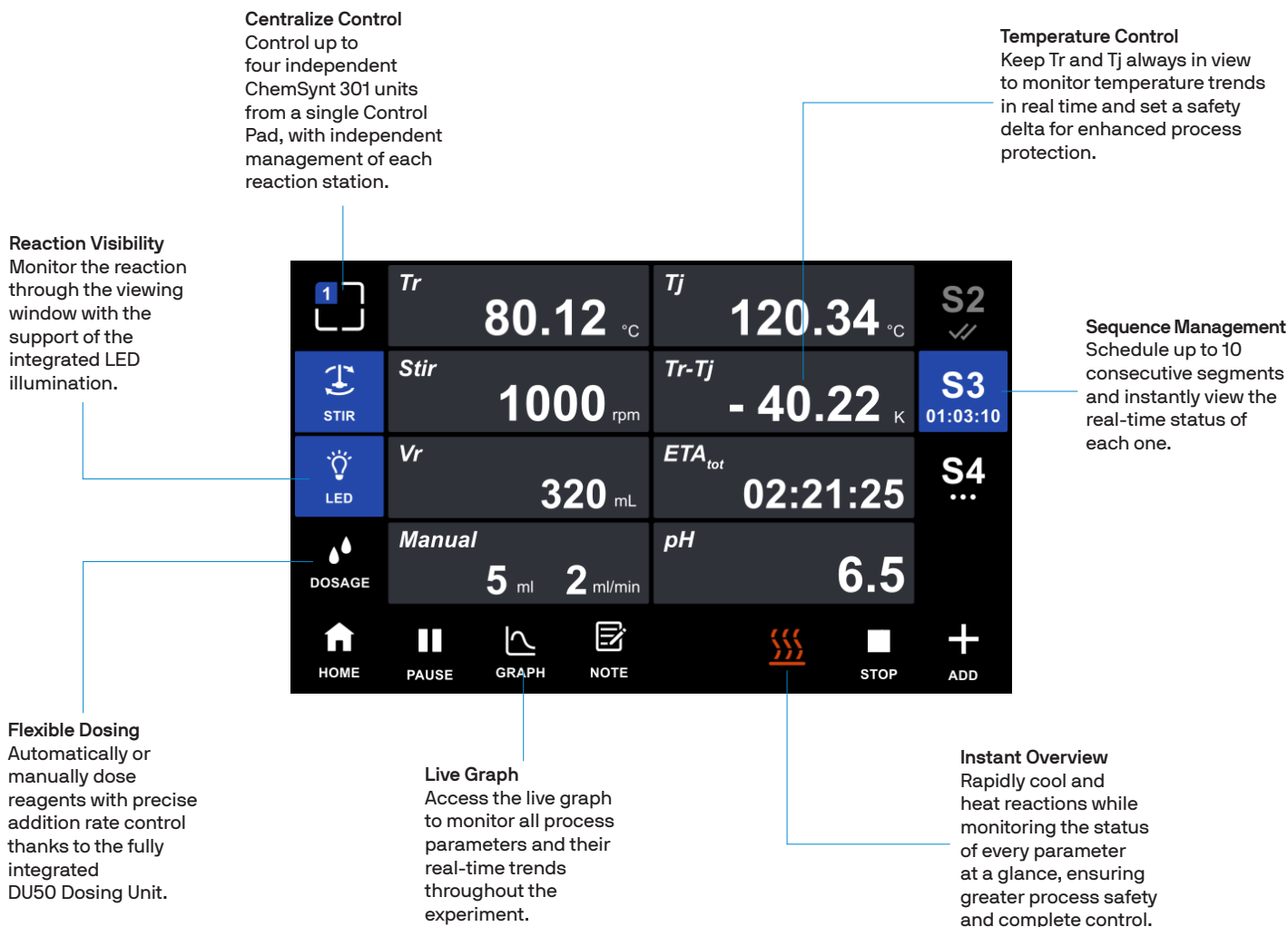
Code	Description	Qty.	Details
A00000336	Magnetic cross shape stir bar	x1	Ø10x5mm
A00000352	Magnetic cross shape stir bar	x1	Ø20x8mm
A00001057	Magnetic stir bar	x1	Ø6x20mm
A00001063	Magnetic stir bar	x1	Ø4.5x12mm
A00000355	Magnetic disc stir bar	x1	Ø20x10mm
A00000586	PTFE Stir Bar Retriever 350mm	x1	Magnetic rod for the safe retrieval of magnetic stir bars

Reactors Additional Accessories:

Code	Description	Qty.	Details
A00000557	Condenser coil 200 mL SJ: 14/23	x1	Minimizes solvent loss during reflux
A00000556	Dropping Funnels 100 mL SJ:14/23	x1	Controlled addition of 100 mL reagent during reaction
A00000564	Hydraulic Insulation Kit	x2	Insulated tubing kit for ChemSynt 301 - Chiller connection
A00000563	Hydraulic/Pneumatic Slave Expansion kit	x2	Splits the cooling medium or dry air flow between two reaction units for flexible operation.
A00000287	Slave Connection Cable	x1	Connects two units for synchronized control and operation.
A00000555	Clamp for accessories	x1	Holds accessories when not in use, keeping the fume hood organized and space-efficient.
A00000549	Support Kit	x1	Compact support for liquid and gas flowmeters, minimizing footprint and optimizing workspace.
A00000561	Flowmeter kit	x2	Flowmeter for precise control of inert gas and cooling medium

Intuitive interface and ControlPad

ChemSynt 301 features an intuitive Control Pad that provides immediate access to all critical process parameters, enabling users to monitor reaction conditions in real time and easily manage multiple reaction units from a single interface. Designed for simplicity and efficiency, it streamlines daily operation while maintaining complete process visibility.



Software Ecosystem for PC Connectivity

ControllerSoft™ enables users to connect and monitor up to four ChemSynt 301 units simultaneously from a PC. All process parameters are displayed and recorded in real time for efficient experiment monitoring and post-run analysis. Data can be exported in CSV format for seamless integration with LIMS and other data management systems.

Code	Description
A00000391	ControllerSoft™ Software

Connection to Velp Ermes Cloud Platform



Connect the ChemSynt 301 Reaction Station to the exclusive Velp Ermes Cloud Platform to improve your laboratory experience. The Velp Ermes Cloud Platform connection will unburden you from tedious tasks improving your lab productivity.

- Enhanced service support
- Real time monitor and control of the instrument from PC, smartphone and tablet whenever you want, wherever you are
- Immediate alert and notification with the possibility to stop the instrument for maximum safety
- Regular software updates will guarantee the best performance and new features with just one-click

ChemSynt 301 Configurations

Start with a single ChemSynt 301 System or expand the platform as your needs grow. Up to three Units (F110A0710) can be connected to the ChemSynt 301 System (SA110A0710), creating a scalable system with up to four fully independent reaction stations.



System

Code: SA110A0710

The System is equipped with the integrated Control Pad, it can operate as a standalone reaction workstation or serve as the central control unit for up to three additional Units, creating a fully scalable four-position system. As the starting point of the ChemSynt ecosystem, the System provides complete experiment control while offering the flexibility to expand the platform as laboratory requirements evolve.

When to choose the System:

- As the first or only ChemSynt 301 unit in the laboratory.
- When a standalone reaction workstation with integrated Control Pad is required.
- When future expansion to a multi-unit system is planned, while maintaining the same workflow and software.

ChemSynt 301 System with ControlPad includes:

Code	Description	Qty.	Details
F110A0710	ChemSynt 301 Unit	x1	
A00000539	ControlPad	x1	
A00000549	Support Kit	x1	Support rod for mounting the water, air flowmeters and the clamp, ensuring fume hood.
A00000561	Flowmeter Kit	x1	Pair of flowmeters for dry air and water
A00000555	Clamp for accessories	x1	Accessory storage clamp for holding accessories when not in use.



Units

Code: F110A0710

The Unit is designed to expand the ChemSynt 301 platform, enabling parallel experimentation while maintaining independent control of each reaction. Connected to a ChemSynt 301 System through the integrated Control Pad, each Unit operates independently as an individual reaction station with dedicated parameter control and data acquisition.

When to choose the Unit:

- To expand an existing ChemSynt 301 System.
- When additional independent reaction positions are required.
- To increase throughput by running multiple experiments in parallel under different conditions.

ChemSynt 301 Unit includes:

Code	Description	Qty.	Details
-	ChemSynt 301 Unit	x1	
A00000563	Hydraulic/ Pneumatic expansion Kit	x1	Expansion kit for water and air distribution to the Unit.
A00000287	Slave connection cable	x1	Control cable for connecting and controlling the Unit with the Control Pad.

Technical Data

	ChemSynt 301
Temperature Range	-40°C (with chiller) / -30°C to +150°C
Resolution	0.1 K
Temperature Control Mode	Jacket temperature control, reaction temperature control
Stirring	Magnetic stirring or mechanical stirring (Optional OHS)
Stirring Speed	50 rpm to 1000 rpm Mechanical and Magnetic Stirring
Data Transfer	USB: USB flash drive and/or optional software upgrade Ethernet - LAN
Software	ERMES Cloud Connectivity ControllerSoft PC Software
Connectivity	USB (type A) Ethernet (LAN) BNC (pH electrode) RS232 (Dosing unit) RS484 (Slave unit & control pad) LEMO connector (pt100) in/out cooling JG ø 8mm (tap water/ with chiller) in/out purging push in ø 4mm (dry air or N) LEMO connector (OHS)
Power Supply	115 V / 60 Hz and 230 V / 50-60 Hz
Dimensions (WxDxH)	System: 287 mm x 486 mm x 600 mm Unit: 232 mm x 326 mm x 281 mm
Weight	System: 12.33 kg Unit: 10.32 kg

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Every synthesis workflow is different. Configure your ChemSynt 301 in just a few steps and discover the combination of reactors, stirring systems, dosing units, and accessories best suited to your needs.



Service & Support

Velp products are designed by our engineers to resist years of laboratory use.

Our products are manufactured with premium materials to guarantee the best performance with maximum safety.

According to our experience, a proper and regular maintenance is necessary to ensure the highest performance of analytical instrument. Velp Service Department and Velp Official Partners are always ready to offer you maintenance and service support tailored to your needs.

Get the support you need choosing the options:

- Help-desk and Remote support
- Technical Assistance
- Analytical Support

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