



ChemSynt 301

Chemical Reaction Station

A modular reaction workstation that combines chemistry and accelerates process development and scale-up.



velp[®]

ChemSynt 301

Chemical 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 400mL
- 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

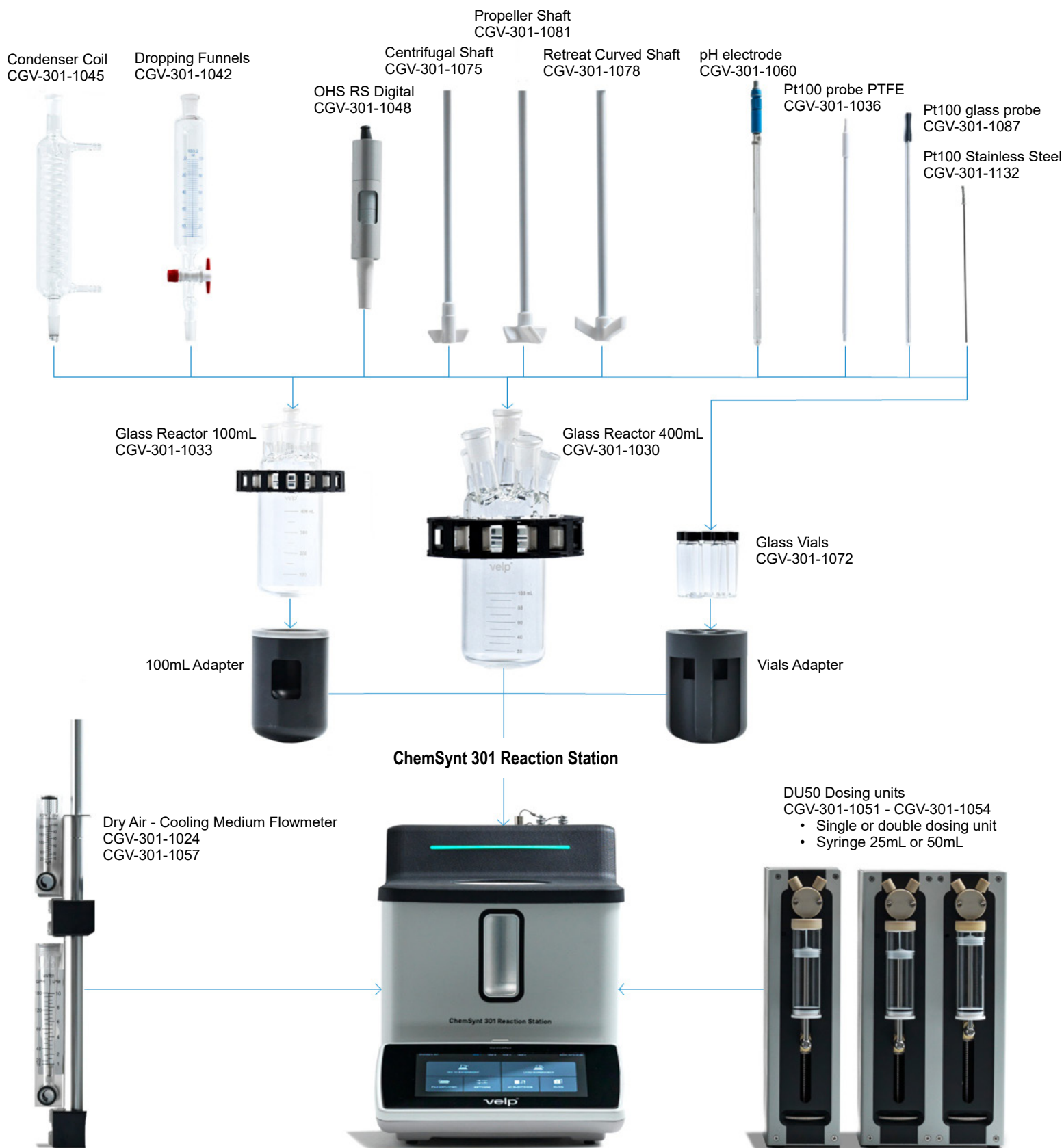


ChemSynt 301 System
CGV-301-1003



ChemSynt 301 Unit
CGV-301-1000

Overview & Accessories



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

CGV-301-1030

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 400mL 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:

Part Number	Description	Qty.
CGV-301-1138	Vessel 400mL	x1
CGV-301-1135	Lid for Vessel 400mL	x1
CGV-301-1150	FEP-O-S O-ring for vessel 400mL	x1
CGV-301-1153	Chain clamp for 400mL Vessel	x1

Part Number	Description	Qty.
CGV-301-1228	Vessel holder 400/100mL	x1
CGV-301-1099	Probe adapter 14/20 d3 mm	x2
CGV-301-1108	Vessel stopper 19/22	x2
CGV-301-1102	Vessel stopper 14/20	x5



Glassware Kit 100mL

CGV-301-1033

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 work-flows and rapid parameter evaluation.

When to use the 100mL 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:

Part Number	Description	Qty.
CGV-301-1141	Vessel 100mL	x1
CGV-301-1144	Lid for Vessel 100mL	x1
CGV-301-1147	FEP-O-S O-ring for vessel 100mL	x1
CGV-301-1156	Chain clamp for 100mL Vessel	x1
CGV-301-1228	Vessel holder 400/100mL	x1

Part Number	Description	Qty.
CGV-301-1099	Probe adapter 14/20 d3 mm	x2
CGV-301-1105	Vessel stopper 10/18	x2
CGV-301-1102	Vessel stopper 14/20	x5
CGV-301-1027	Vessel Adapter 100mL	x1



Glassware Kit Vials

CGV-301-1072

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 16mm 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

Part Number	Description	Qty.
CGV-301-1228	Vessel holder 400/100mL	x1

Reactors – Optional Accessories

Part Number	Description	Qty.	Details
CGV-301-1138	Vessel 400mL	x1	400mL round-bottom glass reactor
CGV-301-1135	Lid for Vessel 400mL	x1	6-port glass lid
CGV-301-1150	FEP-O-S O-ring for vessel 400mL	x1	Compatible with Lid (CGV-301-1135) and Vessel 400mL (CGV-301-1138)
CGV-301-1141	Vessel 100mL	x1	100mL round-bottom glass reactor
CGV-301-1144	Lid for Vessel 100mL	x1	6-port glass lid
CGV-301-1147	FEP-O-S O-ring for vessel 100mL	x1	Compatible with Lid (CGV-301-1141) and Vessel 100mL (CGV-301-1144)
CGV-301-1012	Handle for block removal	x1	For the removal of the adapter for 100mL vessel from the reactor
CGV-301-1120	Glass stopper 14/23	x1	Glass alternative to CGV-301-1102 PTFE stopper 14/20
CGV-301-1123	Glass stopper 19/26	x1	Glass alternative to CGV-301-1108 PTFE stopper 19/22
CGV-301-1126	Glass stopper 10/19	x1	Glass alternative to CGV-301-1105 PTFE stopper 10/19
CGV-301-1114	Keck clamp J14	x1	For securing 14mm glass joints, compatible with CGV-301-1120 glass stopper 14/23
CGV-301-1117	Keck clamp J19	x1	For securing 19mm glass joints, compatible with CGV-301-1123 glass stopper 19/26mm glass joints.
CGV-301-1111	Keck clamp J10	x1	For securing 10mm glass joints, compatible with CGV-301-1126 glass stopper 10/18
CGV-301-1102	PTFE stopper 14/20	x1	Hex-head PTFE stopper
CGV-301-1108	PTFE stopper 19/22	x1	Hex-head PTFE stopper
CGV-301-1105	PTFE stopper 10/18	x1	Hex-head PTFE stopper
CGV-301-1093	D8mm 14/20 probe adapter	x1	Probe adapter with 14/20 joint for Ø8mm probes
CGV-301-1099	D3mm 14/20 probe adapter	x1	Probe adapter with 14/20 joint for Ø3mm probes
CGV-301-1096	D12mm 14/20 probe adapter	x1	Probe adapter with 14/20 joint for Ø12mm probes
CGV-301-1165	Pack of 20 Ø16mm glass vials	x1	Round-bottom vials compatible with CGV-301-1072

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

CGV-301-1051

The DU50 Single Dosing Unit is an automated dosing system designed for the precise and controlled addition of reagents. Compatible with 25mL and 50mL 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:

Part Number	Description	Qty.
CGV-301-1192	610mm Male-to-Male Serial Cable	x1
CGV-301-1204	Glass bottle 500mL with adapter	x1

Part Number	Description	Qty.
CGV-301-1099	Adapter Ø3mm – 14/20	x1

DU 50 Double Dosing Unit

CGV-301-1054

The DU50 Double Dosing Unit is an automated dosing system designed to manage two independent dosing lines. Compatible with 25mL and 50mL 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:

Part Number	Description	Qty.
CGV-301-1192	610mm Male-to-Male Serial Cable	x1
CGV-301-1204	Glass bottle 500mL with adapter	x2

Part Number	Description	Qty.
CGV-301-1099	Adapter Ø3mm – 14/20	x2

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

Part Number	Description	Qty.
CGV-301-1069	25mL Syringe	x1

Part Number	Description	Qty.
CGV-301-1084	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

CGV-301-1048

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:

Part Number	Description	Qty.	Details
CGV-301-1090	OHS adapter cone for 100mL vessel	x1	Required when using the 100mL vessel



PTFE Shaft Stirrer Centrifugal 8x300mm

CGV-301-1075

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

CGV-301-1078

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

CGV-301-1081

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

CGV-301-1132

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.



14/20 Probe Adapter,
5-8mm Diameter included

Glass Pt100 Ø5mm Probe

CGV-301-1087

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.



14/20 Probe Adapter,
5-8mm Diameter included

PTFE Pt100 Ø8mm Probe

CGV-301-1036

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.

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

CGV-301-1060

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
19/22 D12mm pH Adapter	x1

Additional Accessories

Magnetic Bars:

Part Number	Description	Qty.	Details
CGV-301-1009	Magnetic cross shape stir bar	x1	Ø10x5mm
CGV-301-1015	Magnetic cross shape stir bar	x1	Ø20x8mm
CGV-301-1159	Magnetic stir bar	x1	Ø6x20mm
CGV-301-1162	Magnetic stir bar	x1	Ø4.5x12mm
CGV-301-1018	Magnetic disc stir bar	x1	Ø20x10mm
CGV-301-1129	PTFE Stir Bar Retriever 350mm	x1	Magnetic rod for the safe retrieval of magnetic stir bars

Reactors Additional Accessories:

Part Number	Description	Qty.	Details
CGV-301-1045	Condenser coil 200mL SJ: 14/23	x1	Minimizes solvent loss during reflux
CGV-301-1042	Dropping Funnels 100mL SJ:14/23	x1	Controlled addition of 100mL reagent during reaction
CGV-301-1066	Hydraulic Insulation Kit	x2	Insulated tubing kit for ChemSynt 301 - Chiller connection
CGV-301-1063	Hydraulic/Pneumatic Slave Expansion kit	x2	Splits the cooling medium or dry air flow between two reaction units for flexible operation.
CGV-301-1006	Slave Connection Cable	x1	Connects two units for synchronized control and operation.
CGV-301-1039	Clamp for accessories	x1	Holds accessories when not in use, keeping the fume hood organized and space-efficient.
CGV-301-1024	Support Kit	x1	Compact support for liquid and gas flowmeters, minimizing footprint and optimizing workspace.
CGV-301-1057	Flowmeter Kit	x2	Flowmeter for precise control of inert gas and cooling medium

Intuitive Interface and Control Pad

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.

Centralize Control

Control up to four independent ChemSynt 301 units from a single Control Pad, with independent management of each reaction station.

Temperature Control

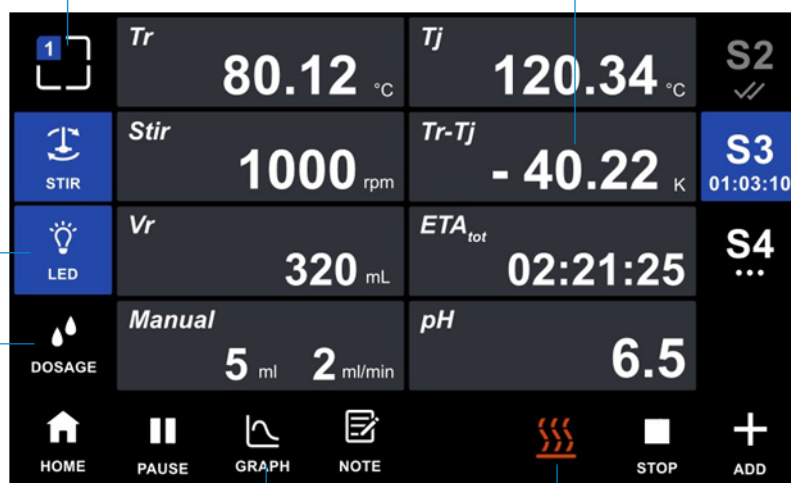
Keep Tr and Tj always in view to monitor temperature trends in real time and set a safety delta for enhanced process protection.

Reaction Visibility

Monitor the reaction through the viewing window with the support of the integrated LED illumination.

Sequence Management

Schedule up to 10 consecutive segments and instantly view the real-time status of each one.



Flexible Dosing

Automatically or manually dose reagents with precise addition rate control thanks to the fully integrated DU50 Dosing Unit

Live Graph

Access the live graph to monitor all process parameters and their real-time trends throughout the experiment.

Instant Overview

Rapidly cool and heat reactions while monitoring the status of every parameter at a glance, ensuring greater process safety and complete control.

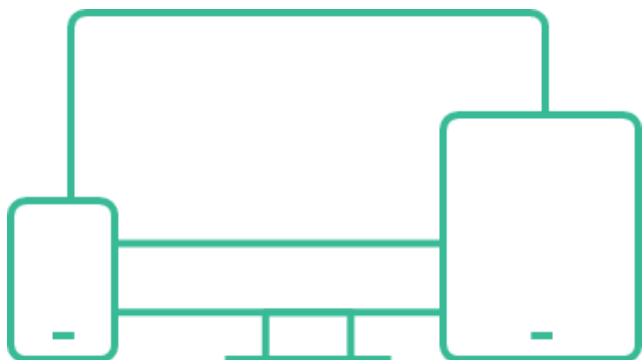
Software Ecosystem For PC Connectivity

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.

Part Number Description

CGV-301-1021	ControllerSoft™ Software
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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 (CGV-301-1000) can be connected to the ChemSynt 301 System (CGV-301-1003), creating a scalable system with up to four fully independent reaction stations.



System

CGV-301-1003

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 work-flow and software.

ChemSynt 301 System With Control Pad Includes:

Part Number	Description	Qty.	Details
CGV-301-1000	ChemSynt 301 Unit	x1	
CGV-301-1168	Control Pad	x1	
CGV-301-1024	Support Kit	x1	Support rod for mounting the water, air flowmeters and the clamp, ensuring fume hood.
CGV-301-1057	Flowmeter Kit	x1	Pair of flowmeters for dry air and water
CGV-301-1039	Clamp for accessories	x1	Accessory storage clamp for holding accessories when not in use.

Units

CGV-301-1000

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:

Part Number	Description	Qty.	Details
CGV-301-1000	ChemSynt 301 Unit	x1	
CGV-301-1063	Hydraulic/ Pneumatic expansion Kit	x1	Expansion kit for water and air distribution to the Unit.
CGV-301-1006	Slave connection cable	x1	Control cable for connecting and controlling the Unit with the Control Pad.

ChemSynt 301 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	50rpm to 1000rpm 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: 287mm × 486mm × 600mm Unit: 232mm × 326mm × 281mm
Weight	System: 12.33 kg Unit: 10.32 kg

Find Out More About Our ChemRxnHub Compact And ChemRxnHub Reactor Systems

CG-1949-X -ChemRxnHub System

CG-1949-M -ChemRxnHub Compact System



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ChemRxnHub Vessel Volume	50mL to 500mL	100mL to 5L
Temperature Range	-70 °C to +230 °C	-70 °C to +230 °C
Tool-Free™ Jacket Connections	•	•
Quick Vessel Swap	•	•
Dimensions (WxDxH)	10.5" x 13.35" x 32.44" 270 x 339 x 824 mm	15" x 17.25" x 44" 456 x 570 x 1103 mm
Lid Flange Size(s)	60mm	100mm and 150mm
Synthesis	•	•
Reflux / Distillation	•	•
Weight of Frame	30lbs	44lbs