# Vacuum Soldering System for processing also for contaminating processes

VSS-450-300 Vacuum Solder System

## VSS-300-CAB

- For substrate size up to 300 mm x 300 mm x 65 mm
- Ramp up rate up to 150 K/min
- SIMATIC® Controller with 7" touch panel
- Vacuum up to $10^{-3}$ hPa (opt. $10^{-6}$ hPa)
- Process gas line with Mass Flow Controller for Nitrogen
- Temperature up to 450 °C (opt. up to 650 °C)
- Vertical automatical open/close

### Application

- Small foot print
- 3 heating zones programmable
- with rack
- with integrated universal heat exchanger (cooling tank 80 l)
- integrated in process control
- secondary water circuit 4 – 5 bars
- use with purified water

### Features

- Precise ramp up and fast ramp down rates
- Up to 4 gas lines (MFC)
- Heated by Infrared lamps
- SIMATIC® Controller
- 50 programs with 50 steps each
- Top and bottom heating (selection by Software)

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# VSS-300

- Vacuum Solder System
- Programmable temperature profiles
- Record of process data
- Process in different gas atmospheres

## The VSS-300 Vacuum Process Oven

The VSS-300 Reflow Solder System is an excellent tool for various solder processes up to 300 mm diameter wafer or 300 mm x 300 mm substrate size and 65 mm height (Option: EH with 120 mm height.)
Some examples for applications:

Laboratory furnace for all kind of developers implementing and researching new processes, prototype research, environmental research purposes and for small pre-series or series.

## Process Gases

The VSS-300 can be used with standard process gases, like Nitrogen, Oxygen, Forming Gas. The chamber is sealed and can easily be cleaned.

## Gas flow control

One gas line with Mass Flow Controller (MFC) for Nitrogen (5 nlm = norm liter per minute) is default, three more gas lines (Option: MFC) are possible.

## Vacuum

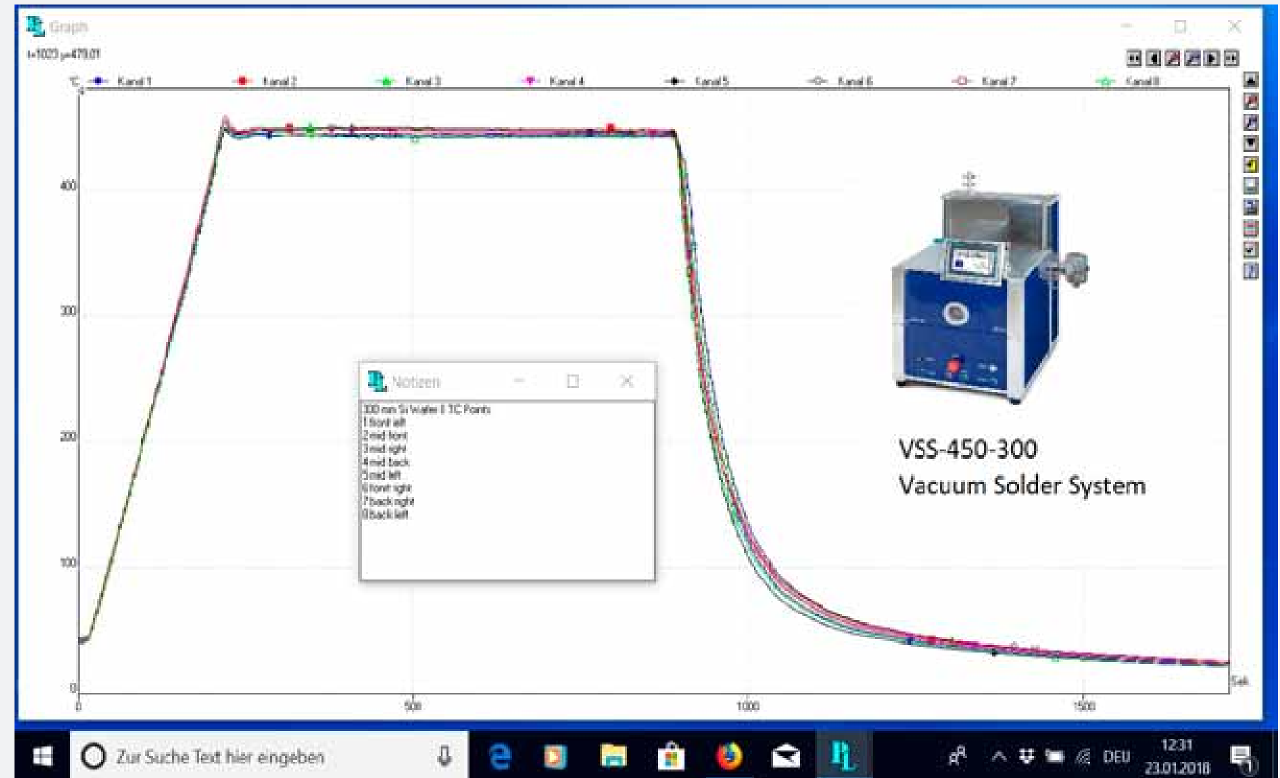
The system is vacuum capable of up to $10^{-3}$ hPa (optionally up to $10^{-6}$ hPa).

## Heating

The maximal achievable temperature is 400 °C (opt. 650 °C). Key features are precisely controlled fast ramp-up (150 K/min) and excellent ramp-down rates (depend on temperature and loading)

## Temperature distribution

The VSS-300 allows an excellent temperature distribution and homogeneity. Optionally a graphite susceptor can be inserted on the quartz bottom plate.



VSS-300 Example for a standard temperature profile with VSS-450-300

## Programming

The VSS-300 is controlled by SPS SIMATIC® controller. A 7" touch panel allows a very comfortable programming and control of the process. There can be saved up to 50 programs with 50 steps each (unlimited programs can be down- and uploaded from an external data storage).

## Process control

The software allows the permanent monitoring, readout and analysis of

- temperature
- process gas flow
- cooling water level status
- pressure value and status

## Cooling process

The hot plate is active cooled with homogenous cooling from both sides.

## Others

An interlock function as well as an Emergency-OFF-Button (EMO) are default.

## Special

This oven can also be integrated into a production line. The chamber open/close is realized by push button operation.

## Specification

| | |
|---|---|
| **Max. part size** | 300 mm dia. or 300 mm x 300 mm |
| **Chamber material** | Aluminium chamber (chamber area: 350 mm x 350 mm) inclusive quartz glass bottom plate |
| **Chamber height** | 70 mm (optional: 120 mm) |
| **Vacuum capability** | Up to $10^{-3}$ hPa (optional up to $10^{-6}$ hPa) |
| **Temperature max.** | 450 °C (higher temp. on request) |
| **Temp. uniformity** | ≤ 1 % of set temperature (on a 200 mm wafer) (e.g. ± 3 K @ 300 °C) |
| **Heating** | Bottom Heating: Infrared lamps cross aligned (18 kW) |
| **Ramp up rate** | **150 K/min** |
| **Ramp down rate** | T = 450 °C > 200 °C: 90 K/min, T = 200 °C > 100 °C: 60 K/min |
| **Flow Controller** | One Mass Flow Controller for 5 nlm (=norm liter per minute) as default, up to 3 more Mass Flow Controllers are available as option |
| **Controller** | SIMATIC® controller, 50 programs with 50 steps each |
| **Chamber cooling** | By internal water cooling system with 80 l tank volume |
| **Substrate Cooling** | By Nitrogen Gas |

## Technical Data

| | |
|---|---|
| **Dimension oven** | 600 mm x 780 mm 1730 mm (W x D x H) |
| **Weight** | 170 kg |
| **Electrical connection** | 400/230 V, 18 kW |

# VSS-300

| No. | Options: | |
|---|---|---|
| | **Additional process gas lines:** | |
| 1 | VSS-MFC-Ar-2nlm | Additional process gas line for Argon (Ar) gas controlled by Mass Flow Controller |
| 2 | VSS-MFC-O2-2nlm | Additional process gas line for Oxygen ($O_2$) gas controlled by Mass Flow Controller |
| 3 | VSS-MFC-FG-2nlm | Additional process gas line for Forming Gas (max. 10 % H2/N2) gas controlled by Mass Flow Controller |
| | **Formic acid module and trap:** | |
| 4 | FA II | Upgrade with integrated formic acid module with individually controlled process gas line |
| 5 | FA III | Upgrade with integrated formic acid module (process gas line shared with base VSS system) |
| 6 | FA IV | Formic acid mudule with separate gas line and automatic refilling |
| 7 | FA-T | Trap for formic acid vapors |
| 8 | FA-T-2 | Double Trap for formic acid |
| | **Flux options:** | |
| 9 | VSS-FluxHeat | |
| 10 | VSS-FT | Flux trap |
| 11 | VSS-FT-2 | Flux trap |
| | **Height and lift pins options:** | |
| 12 | VSS-EH | Extended chamber height up to 120 mm |
| 13 | VSS-LiftPins | Upgrade with Lift pins for lifting up of single wafer (150 mm, 200 mm or 300 mm diameter) |
| | **Hydrogen gas options** | |
| 14 | H2 | Hydrogen option for use of pure hydrogen gas (100% H2) |
| 15 | H2S | Safety hood |
| | **Additional thermocouples:** | |
| 16 | TC I | Upgrade with additional (flexible) thermocouple (not connected to process control, for external data logging) |
| 17 | TC II | additional thermocouple to measure on device (plugged in chamber); for external measurement tool (max. 4 pcs) |
| | **Vacuum options (not including vacuum pumps):** | |
| 18 | VAC I | Vacuum basic up to 3 hPa incl. vacuum sensor and valve |
| 19 | VAC II | Vacuum comfort up to $10^{-3}$ hPa incl. vacuum sensor and valve |
| | **Interfaces:** | |
| 20 | VSS-RC | Remote control of top cover opening and closing, including connection to safety of external cabinet |
| 21 | VSS-SI | Serial interface between VSS system and external PC using USB 2.0 port and through USB 2.0 cable |
| | **Measurement options:** | |
| 22 | MM | Moisture measurement |
| 23 | OxAtAn | Atmospheric oxygen analyser |
| | **Other options:** | |
| 24 | CAB | Cabinet with integrated Universal Heat Exchanger (UHE) |
| 25 | PT | Upgrade with 3 colors pat light |
| 26 | VSS-QP | Additional quartz glass plate at top |
| 27 | VSS-ET | Extension of max temperature to 650 °C |
| | **Accessories (vacuum pumps, chiller):** | |
| 28 | MP | Membrane/diaphragm pump (not chemically resistant) |
| 29 | MPC | Chemically resistant membrane/diaphragm pump |
| 30 | RVP | Rotary vane pump for vacuum up to 10exp.$^{-3}$ with oil filter |
| 31 | WC III | Closed loop water cooling system |
| 32 | UHE | Universal Heat exchanger (as alternative to WC-III, requires cooling water for its primary side) |

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