

Vacuum Solutions



Efficient vacuum creation using diaphragm pumps





Buchi Labortechnik AG has been equipping laboratories all over the world with highly advanced and innovative devices for decades. We are continuously searching for new ways to facilitate our customers' routine laboratory work by providing them with robust, durable, and simple to operate equipment.

Our "Buchi Vacuum Solutions" provide complete systems for creating vacuum in the laboratory. At the heart of these devices are our high-performance oil-free diaphragm vacuum pumps that have many impressive technical innovations. Pump control and the various vacuum regulation functions are performed by V-850 or V-855 vacuum controllers. The pump together with its wide range of accessories forms a complete unit with connections that allow peripheral equipment to be plugged-in making laboratory tasks more efficient and easier to perform.

Diaphragm vacuum pumps also address to issues often associated with the use of water jet pumps: resource conservation and environmental awareness. It therefore makes good sense to choose a stand-alone vacuum system that is practically maintenance-free requires no oil changes and operates independently of a centralised laboratory vacuum source.

Solutions from a single source – from Buchi Labortechnik

Vacuum is needed for a wide range of laboratory tasks and is frequently used in combination with a Rotavapor. This perfect match of rotary evaporator, vacuum controller and vacuum pump allows Buchi to offer sophisticated totally integrated systems featuring optimised interfaces, small footprints, powerful software and the highest safety standards.

The modular approach means that individual components can be combined in any required way – a clear advantage in large laboratories or where many different applications are involved. The comprehensive range of accessories allows vacuum pumps to be extended at any time to form complete vacuum systems.

See the advantages of Buchi vacuum solutions for yourself!

Vacuum Pumps V-700 and V-710 – the innovative way of creating a vacuum

Vacuum Pump V-700

The V-700 is a chemical-resistant PTFE diaphragm pump for delivering all types of gases and vapours. With an volume flow rate of 1.8 m³/h and a final vacuum of less than 10 mbar it covers a large range of laboratory applications and is optimally designed for use with a rotary evaporator. Further typical applications include the evacuation of drying cabinets or centrifuges and the creation of vacuum for filtration or for delivery of liquids.

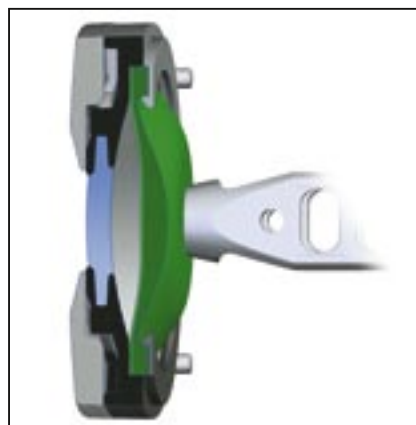


This pump features the following advantages:

- Quiet, low-vibration operation due to ingenious sound insulation system, full housing enclosure and weight balance.
- Integrated gas ballast: The constantly high suction volumes also dry the diaphragms during operation.
- The axial movement of the PTFE diaphragm increases service life.
- Effective safety features: the pump will only operate when the housing is closed, there is electrical surge protection with reset and an integrated operating hours meter.
- An innovative variable speed and stroke control for regulating speed to provide a precise hysteresis-free vacuum (in combination with vacuum controller V-850/855).



- Compact design and robust construction with integral carrying handle.



- The unique glass/PEEK head reveals the diaphragm and allows easy inspection of the evaporation conditions and visual detection of any contaminants.



- Oil-free, practically maintenance-free, but with removable upper housing and tools to allow easy access to the diaphragms.

Vacuum Pump V-710

The V-710 is the larger version and has four diaphragm heads. The three-stage vacuum creation process delivers an impressive 3.1 m³/h with a low final vacuum of less than 2 mbar. The pump can be used anywhere high suction capacity or low final vacuum is required. The full housing enclosure makes the pump universally applicable either on the laboratory bench or for integration into laboratory furniture.

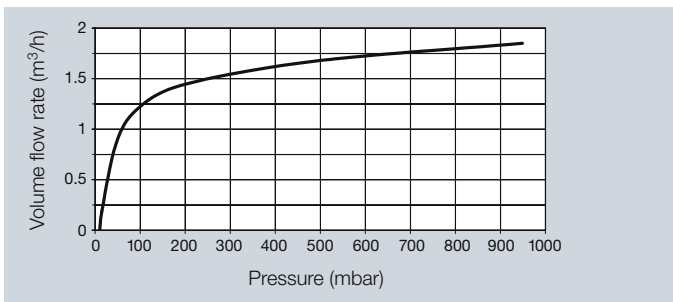
- The compact vacuum source for the Rotavapor R-220.



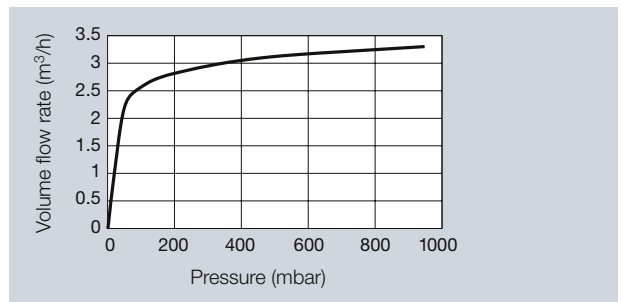
- V-710 LabVac – the value-for-money alternative for a laboratory system.



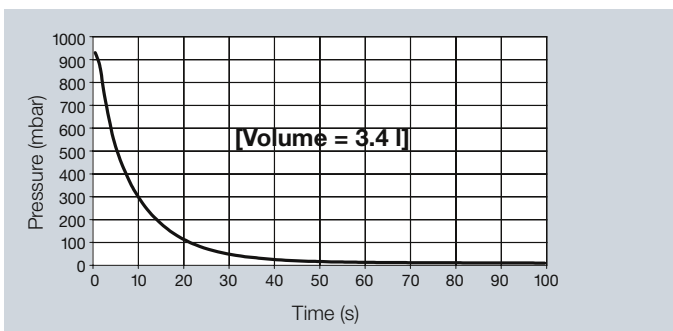
V-700: Graph of suction capacity against pressure



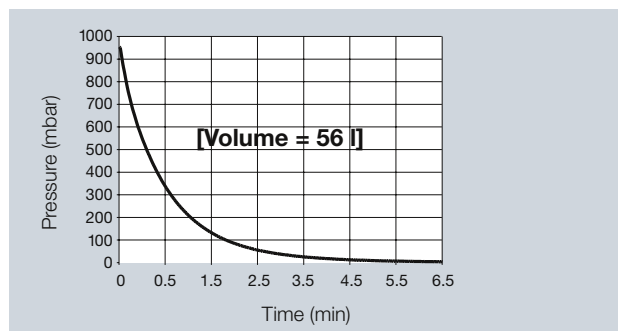
V-710: Graph of suction capacity against pressure



V-700: Evacuation time for a Rotavapor R-210/215



V-710: Evacuation time for a Rotavapor R-220



Vacuum Controllers V-850 and V-855 – the smart way of creating a vacuum

To make the most of the huge potential of the Vacuum Pumps they should be used with a Vacuum Controller V-850 or V-855. These devices are the result of close cooperation with our customers in order to match even more precisely our products to the everyday needs of the laboratory. The intuitive operating concept is suitable for a very wide range of applications and covers all your requirements, from the simple control of the set vacuum to the automatic distillation of complex mixtures.

Only a defined and regulated vacuum provides the controlled conditions necessary for a quick, reliable evaporation process. These conditions produce markedly

lower solvent emissions, less bumping and foaming and ensure reproducible process parameters. With the new V-850/855 vacuum controllers you can

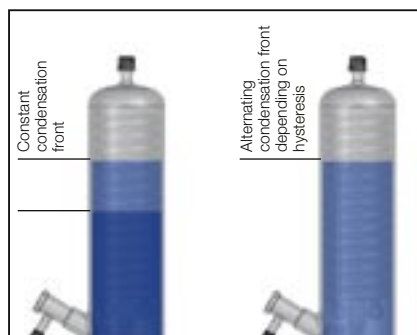
benefit from these advantages and increase your effectiveness and efficiency in the laboratory.

■ Reliable and simple to use



The consistent use of inert materials such as ceramic and PEEK at the pressure sensor ensures the highest resistance to aggressive chemicals. If the power supply is interrupted, the integral ventilation valve opens so that the product does not become overheated. The desired vacuum is quickly set by means of a rotary knob, other parameters by just a few button presses. All necessary information is clearly visible whenever required on a bright and uncluttered graphical display – and is available in various languages.

■ Variable Speed regulation using the V-700/710's single stroke control



A newly developed variable speed and stroke control in the V-700/710 pump regulates the speed and ensures that a hysteresis-free vacuum is created. The precise pressure curve produces a constant condensation front and ensures maximum evaporation performance. This type of regulation by the vacuum controllers V-850/855 leads to whisper-quiet operation. There is no need for an additional vacuum valve.

■ Compatibility with pump and Rotavapor



The V-850/855 generation of controllers is ideally suitable for the Rotavapor and V-700/710 vacuum pumps. The integrated RS-485 interface automatically recognises the connected devices and provides full communications. Compatibility with previous models is also guaranteed. The power comes directly from the pump or the Rotavapor – a separate mains cable is not required. However, if the vacuum controller is to be used as a stand-alone device it will require a mains adapter.



Vacuum Controller V-850

The V-850 is designed for standard applications with the following functions:



Vacuum Controller V-855

The V-855 is the top model and offers further impressive features:



- Vacuum regulation of set pressure – with V-700/710 pump by speed regulation or by the switching on and off of a vacuum valve.
- Timer function for stopping the process after a preset time.
- LabVac function: intelligent control of the pump in a laboratory system with several consumers (see page 8).
- Buchi wizard for a quick configuration using simple menu control.
- USB interface for data transfer to PC for storage, evaluation and optimization
- Solvent library: An integrated library that is expandable by the customer. The 43 preset commonly used solvents considerably simplifies evaporation parameter selection. After the selection of the solvent to be used, the related parameters for optimal distillation are entered as default values depending the bath temperature! Other solvents can be conveniently downloaded from the Buchi homepage (www.buchi.com).
- Programming function for pressure gradients for special distillation tasks: It is able to store up to 15 processes with programmable gradients. Ideal for difficult-to-distil products like foaming extracts or those that tend to bump.
- EasyVac function: automatic process control based on vapour pressure detection (see page 8) – it couldn't be easier!
- Automatic distillation with the unique stage probe: A probe installed in the condenser of the rotation evaporator detects the condensation limit and regulates the pressure appropriately. Particularly suitable for mixtures of solutions and distillation to dryness.
- Repeat function: The pressure curve of a manual or automatic distillation can be stored and retrieved anytime as the setpoint values for optimum process conditions.

Vacuum controllers V-801 and V-802 – the direct way of creating a vacuum

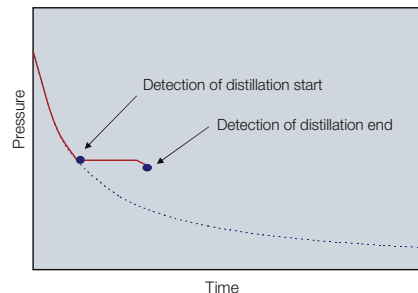


Vacuum Module V-801 EasyVac

The EasyVac vacuum module is a new concept for vacuum regulation during distillation. Nothing is simpler: the process is started at the press of a button and automatically finds the distillation start point. Then the pressure is controlled to follow the vapour pressure curve and the end point of the distillation is determined. Using the stored algorithms the process reliably runs to its end and gently processes the product.

With the EasyVac you are opting for the simplest and easiest control unit for the V-700 or V-710 vacuum pumps –

delegate your process settings and you will have more time for other tasks.



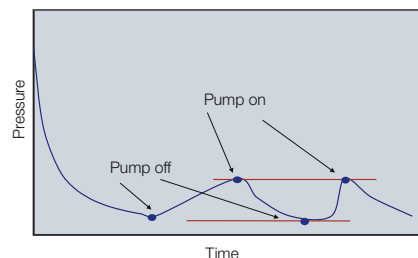
Order No. 47202



Vacuum Module V-802 LabVac

This module is a simplified vacuum controller that has been developed specifically as a laboratory vacuum source for multiple consumers. Pump operation is switched on and off to combine the provision of the required vacuum with minimum energy use. In CONT mode the pump operates continuously to create as low a vacuum as possible irrespective of the number of connected consumers.

With a wide range of hose fittings, adapter cables for valves from other manufacturers and connection pieces, the vacuum can be adapted to suit different systems – and even be completely integrated into laboratory furniture.



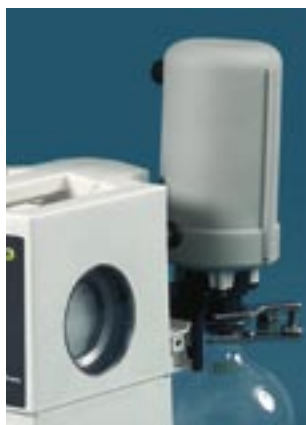
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Simple vacuum control by needle valve

Manual vacuum regulation can also be a very cost-effective solution. Air is drawn in through a fine regulation valve and the resulting vacuum is set. A manometer displays the pressure. The recommended Woulff bottle acts as a buffer vessel and condensate trap. This solution is a compromise between cost advantage and higher solvent emissions, and lack of vacuum regulation and reduced operator convenience.

Order No. 47291



Secondary condenser for V-700/710

The secondary condenser is a compact high performance condenser for producing maximum condensation of residual solvent vapour after the pump. At the same time it separates any liquid solvent from the pump, putting it directly into the receiving flask. Insulation sleeves prevent the formation of undesirable condensation and provide the condenser with effective protection against mechanical damage.

Order No. 47180



Secondary cold trap for V-700/710

If dry ice is used instead of cooling water, a suitable cold trap can also be installed.

Order No. 47190

Valve unit for vacuum controller



Valve combined with condensate trap and non-return valve with attachment for Rotavapor (not necessary with V-700/710 in stand-alone systems).

Order No. 47160

Wouff bottle



For trapping particles and droplets and for pressure equalisation (recommended in stand-alone systems with V-700/710).

Order No. 47170

Vacuum valve for vacuum controller



For use with a centralised vacuum source or a non-controlled pump.

Order No. 31353

Vacuum valve for R-220 for vacuum controller



Vacuum valve for Rotavapor R-220. Hose connections 12 mm, including bracket.

Order No. 31354

Vacuum valve for R-250 for vacuum controller



Vacuum valve for Rotavapor R-250. Hose connection 18 mm.

Order No. 31355

Remote control RC-81



The remote control can be used to control the vacuum controller and the Rotavapor: rotation, starting/stopping and raising and lowering of the flask.

Order No. 47230

Cooling water valve for vacuum controller



Helps to save water. The vacuum controller opens the cooling water feed only during distillation.

Order No. 31356

Vacuum sources – the right choice

1. The basic pump for creating a vacuum



- General vacuum use
- Vacuum Pump V-700

2. The stand-alone system for routine tasks in the laboratory – the direct method of automatic distillation



- Rotary Evaporator
- V-700 EasyVac
Vacuum Pump V-700
Vacuum Module V-801 EasyVac
Woulff bottle

3. The standard system is a flexible, compact unit with many uses



- Rotary Evaporator
- V-700 Advanced
Vacuum Pump V-700
Vacuum Controller V-850
Woulff bottle

4. The efficient system for the 20 L standard



- Large Rotary Evaporator
- Vacuum Pump V-710
- Vacuum Controller V-850 for R-220

5. The compact solution for parallel evaporation and synthesis



- Syncore
- V-700 Professional Vacuum Pump V-700
- Vacuum Controller V-855
- Woulff bottle
- Secondary condenser

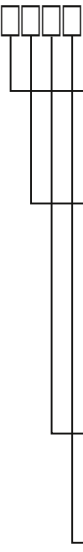
6. Extension to serve several workstations in the laboratory – ideal for providing all the required vacuum



- Several different consumers
- V-710 LabVac Vacuum Pump V-710
- Vacuum Module V-802 LabVac
- Woulff bottle

Ordering matrix

07



Vacuum Pumps

- 1 V-700 2 heads/2 stage (1,8 m³/h <10 mbar)
- 2 V-710 4 heads/3 stage (3,1 m³/h 2 mbar)

Vacuum Controller/vacuum modules

- 0 Without vacuum controller
- 1 Simple vacuum control by needle valve
- 2 Vacuum Controller V-850 (Advanced)
- 3 Vacuum Controller V-855 (Professional)
- 4 Vacuum Module V-801 EasyVac
- 5 Vacuum Module V-802 LabVac

Woulff bottle

- 0 Without Woulff bottle
- 1 With Woulff bottle (recommended for vacuum systems with controller/module)

Secondary condenser

- 0 Without secondary condenser
- 1 Secondary condenser (including insulation)
- 2 Secondary cold trap

Vakuum Controller V-850

Stand-alone device 100–230V, including mains adapter

Order No. 47231

For R-210/215 or V-700/710. 100–230 V, including bracket and communication cable, without vacuum valve/valve unit

Order No. 47299

For R-200/205. 100–230 V, including bracket, communication cable and mains adapter, without vacuum valve/valve unit

Order No. 47297

For R-220. 100–230 V, including bracket, communication cable and mains adapter, without vacuum valve 31354

Order No. 47295

For R-250. 100–230 V, including bracket, communication cable and mains adapter, without vacuum valve 31355

Order No. 47293



Vakuum Controller V-855

Stand-alone device 100–230V, including mains adapter

Order No. 47232

For R-210/215 or V-700/710. 100–230 V, including bracket and communication cable, without vacuum valve/valve unit

Order No. 47298

For R-200/205. 100–230 V, including bracket, communication cable and mains adapter, without vacuum valve/valve unit

Order No. 47296

For R-220. 100–230 V, including bracket, communication cable and mains adapter, without vacuum valve 31354

Order No. 47294

For R-250. 100–230 V, including bracket, communication cable and mains adapter, without vacuum valve 31355

Order No. 47292



Combinations of Rotavapor – vacuum systems

Selection matrix for communication cable RJ45/mini-DIN, Woulff bottle and valve unit

Rotavapor Vacuum systems	R-210/215	R-210/215 with V-850/855	More than one R-210/215 with V-850/855	On older generation Rotavapor (without controller)
V-700/710	Without V-850/855 no communication possible	<ul style="list-style-type: none"> Communication cable RJ45 (44989) Woulff bottle (Rotavapor) 	Per R-210/215 one each: <ul style="list-style-type: none"> Communication cable mini-DIN (38010) Valve unit (Rotavapor) 	<ul style="list-style-type: none"> Vacuum controller V-850/855 Woulff bottle (47170) Communication cable RJ45 (44989)
V-700/710 Simple vacuum regulation by needle valve	<ul style="list-style-type: none"> Woulff bottle (vacuum system) 	*	*	<ul style="list-style-type: none"> Woulff bottle (vacuum system)
V-700/710 with V-850/855	<ul style="list-style-type: none"> Communication cable RJ45 (44989) Woulff bottle (vacuum system) 	*	LabVac function <ul style="list-style-type: none"> Valve unit (per Rotavapor) Woulff bottle (vacuum system) 	<ul style="list-style-type: none"> Woulff bottle (vacuum system)
V-700/710 EasyVac	<ul style="list-style-type: none"> Woulff bottle (on vacuum system) 	*	*	<ul style="list-style-type: none"> Woulff bottle (vacuum system)
V-700/710 LabVac	<ul style="list-style-type: none"> Woulff bottle (vacuum system) 	<ul style="list-style-type: none"> Valve unit (Rotavapor) Woulff bottle (vacuum system) 	<ul style="list-style-type: none"> Valve unit (per Rotavapor) Woulff bottle (vacuum system) 	*
V-500/V-1000	Without V-850/855 no communication possible	<ul style="list-style-type: none"> Communication cable mini-DIN (38010) Valve unit (Rotavapor) 	Per R-210/215 each: <ul style="list-style-type: none"> Communication cable mini-DIN (38010) Valve unit (Rotavapor) 	<ul style="list-style-type: none"> Vacuum controller V-850/855 Communication cable mini-DIN (38010) Valve unit (47160)
Other vacuum source (in-house vacuum system, other pumps ...)	Without V-850/855 no communication possible	<ul style="list-style-type: none"> Valve unit (Rotavapor) 	Per R-210/215 each: <ul style="list-style-type: none"> Valve unit (Rotavapor) 	<ul style="list-style-type: none"> Vacuum controller V-850/855 Valve unit (47160)

Rotavapor:

Key to Rotavapor order number

23□□□□□□

- Valve unit
- 0 Without valve
 - 1 Woulff bottle for vacuum controller (for stand-alone system with V-700)
 - 2 Valve unit for vacuum controller (not necessary in stand-alone system with V-700)

Valve unit:

Key to vacuum system order number

07□□□□

- Woulff bottle
- 0 Without Woulff bottle
 - 1 With Woulff bottle (recommended for vacuum systems with controller/module)

* Combination not possible or not sensible

Spare parts

Replacement diaphragm

for V-700/710

Order No. 47153

Silicone hose

for cooling water, diameter 6/9 mm (per meter)

Order No. 04133

Vacuum hose, neoprene

(flexible) Diameter 6/16 mm (per meter)

Order No. 17622

Vacuum hose, PTFE (rigid)

Diameter 8/10 mm (per meter)

Order No. 27277

Control cable mini-DIN 1500 mm

For use in combination with the previous generation of pumps and vacuum controllers for switching on and off of the pump

Order No. 38010

Control cable RJ45 2000 mm

Rotavapor and vacuum pump RJ45 2000 mm V-700/710, compatible with V-850/855





Order No. 44989

Communication and mounting kit



for Rotavapor R-210/215 and vacuum pump V-700/710 (including bracket and 2 communication cables)

Order No. 47280

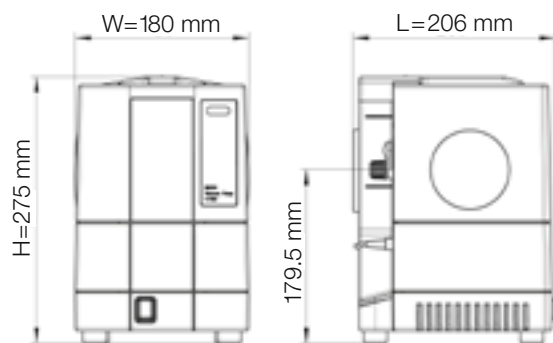
Technical data

Vacuum Pumps	V-700	V-710
Capacity (DIN 28432)	1.8 m ³ h ⁻¹	3.1 m ³ h ⁻¹
No. of steps (heads)	2 (2)	3 (4)
Final vacuum (absolute)	<10 mbar	2 mbar
Final vacuum (with gas ballast)	24 mbar	8 mbar
Connections	GL 14	GL 14
Power consumption	210 W	370 W
Electrical requirements	100–240 V, 50–60 Hz	100–240 V, 50–60 Hz
Pump motor	DC, brushless	DC, brushless
Nom. speed	max. 1600 min ⁻¹	max. 1600 min ⁻¹
Sound pressure level (DIN 45635)	40–52 dB (A) depending on type of operation	41–55 dB (A) depending on type of operation
Safety class	IP 34	IP 34
Materials in contact with media	PEEK, PTFE, glass, FEP	PEEK, PTFE, glass, FEP
Weight	5.3 kg	10.4 kg
Approvals	CE  	CE  

Vacuum Controllers V-850/V-855 and Vacuum Modules V-801/V-802

Measurement range	1400–0 mbar (hPa), 1050–1 Torr
Control range	1100–1 mbar (hPa), 825–1 Torr
Measuring principle	capacitance, independent of gas type, absolute pressure gauge/sensor made from aluminium oxide-ceramic
Measuring accuracy ^{Gradient}	±2 mbar (±1 digit) – after proper calibration at constant temperature
Vacuum connection	GL 14
Temperature compensation	0.07 mbar K ⁻¹
Allowable ambient temperature	+10 °C to +40 °C
Power consumption	10 W
Connections	USB* (data transfer), RS 232/RS 485* (communication), remote control, cooling water valve*, switch box, vacuum valve *connections V-801/802
Power connections	30 VDC, from connection to Rotavapor R-210/215, vacuum pump V-700/710 or mains adapter 85–264 V
Weight	540 g
L x W x H	120 x 160 x 105 mm
Approvals	CE  

V-700



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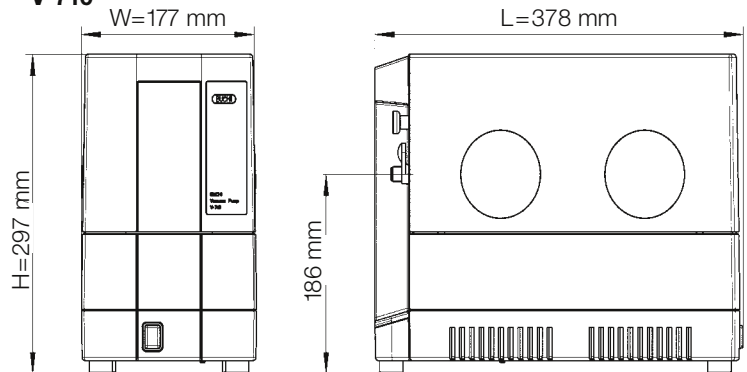
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