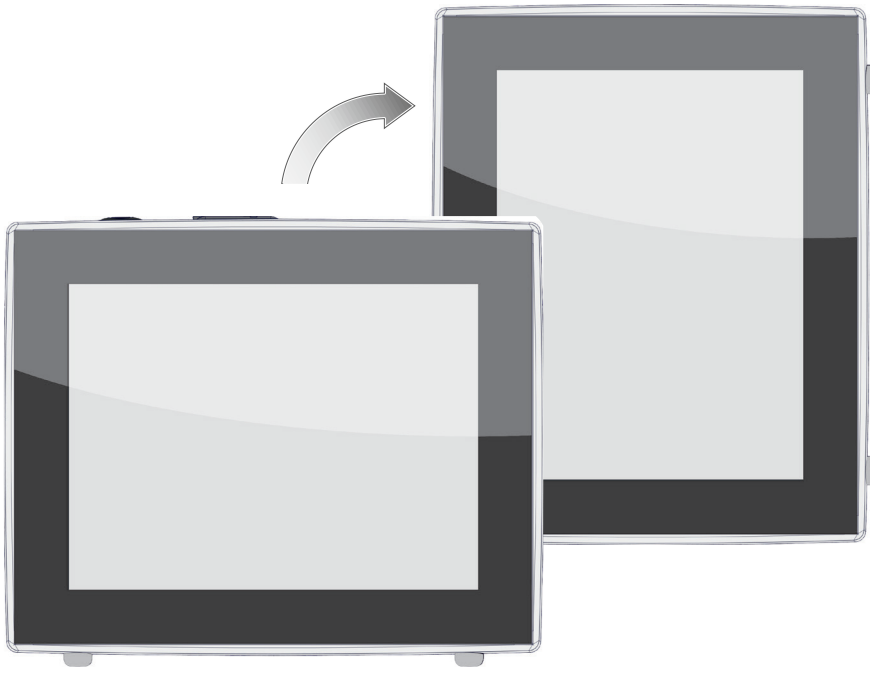
vacuubrand

Technology for Vacuum Systems

VACUUM CONTROLLER

VACUU·SELECT®



Instructions for use

Original instructions EN

OI no.: 20901059

Original instructions
Keep for further use!

This manual is only to be used and distributed in its complete and original form. It is strictly the user's responsibility to carefully check the validity of this manual with respect to the product.

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Thank you for purchasing this product from **VACUUBRAND GMBH + CO KG**. *You have chosen a modern and technically high quality product.*

TABLE OF CONTENTS

1 Introduction

This manual is part of your product.

1.1 User information

Safety

Instructions for use and safety

- Read this manual thoroughly and completely before using the product.
- Keep this manual in an easily accessible location.
- Correct use of the product is essential for safe operation. Comply with all safety information provided!
- In addition to this manual, adhere to the accident prevention regulations and industrial safety regulations applicable in the country of use.

General

General information

- For easier readability, the general term *controller* is used as an equivalent to and instead of the product name *VACUU·SELECT*®.
- If passing the product on to a third party, also give them this manual.
- The illustrations in this manual are only intended to facilitate comprehension.
- We reserve the right to make technical and design changes in the course of continuous product improvement.

Copyright

Copyright © and copyright law

Contact

Contact us

- If your manual is incomplete, you can request a replacement. Alternatively, you can use our download portal: www.vacuubrand.com
- When contacting our Service Department, please have the serial number and product type at hand → *see Rating plate on the product.*
- You are welcome to contact us at any time in writing or by telephone if you would like more information, have questions about our products or wish to share feedback with us.

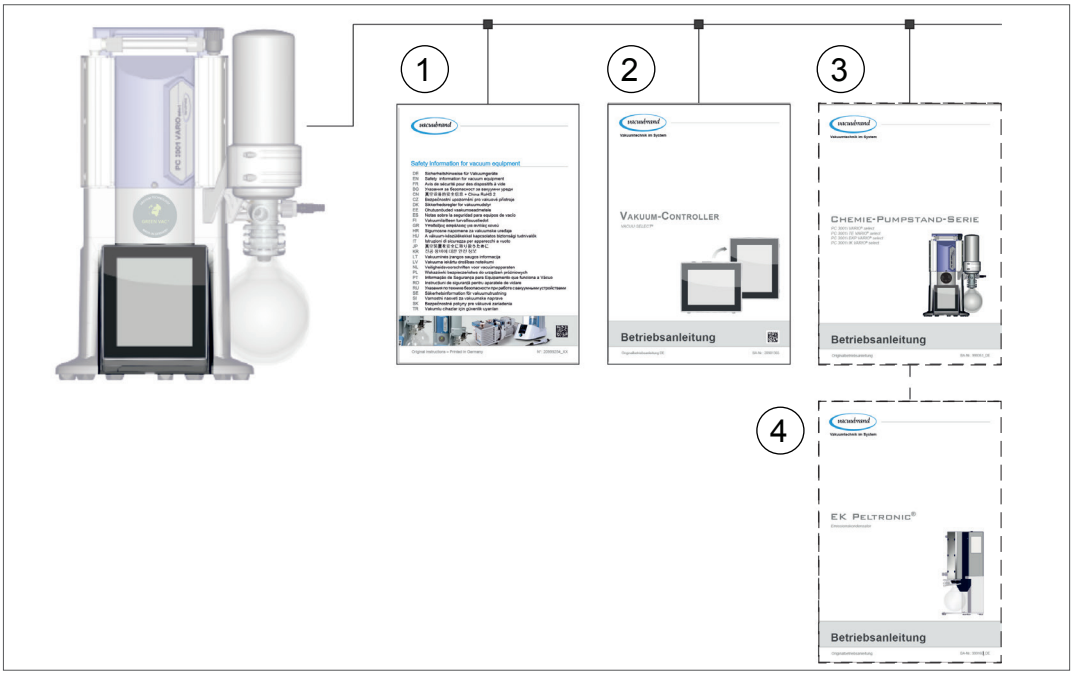
1.2 Manual structure

Modular instructions for use

The manuals have a modular structure with separate instruction modules for the controller, vacuum pumps, pumping units, and any accessories.

Instruction modules

→ Example Breakdown of the instructions for use



1	Safety information for vacuum equipment
2	Description: Vacuum controller – control and operation
3	Optional description: Pumping unit or vacuum pump – connection, operation, maintenance, mechanics
4	Optional description: Accessories

1.3 About this document

1.3.1 Display conventions

Warning levels

Display conventions

DANGER

Indicates an imminent hazardous situation.

Disregarding the situation could result in extremely serious injury or death.

⇨ Take appropriate action to avoid dangerous situations!

WARNING

Warns of a potentially hazardous situation.

Disregarding the situation could result in serious injury or death.

⇨ Take appropriate action to avoid dangerous situations!

CAUTION

Indicates a potentially hazardous situation.

Disregarding the situation could result in minor injury or damage to property.

⇨ Take appropriate action to avoid dangerous situations!

NOTE

Indicates a potentially harmful situation.

Disregarding the situation could result in damage to property.

Additional notes

IMPORTANT!

⇨ Information or specific recommendation which must be observed.

⇨ Important information for trouble-free operation of your product.

⇨ Helpful tips + tricks

⇨ Additional information

1.3.2 Symbols and icons

This manual uses symbols and icons. Safety symbols indicate specific risks associated with handling the product. Symbols and icons are designed to help you identify risks more easily.

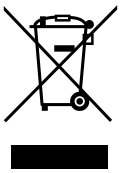
Safety symbols

Explanation of safety symbols

	General warning symbol.		Danger: electricity.
	Warning: hot surface.		General prohibition sign.
	General mandatory sign.		Disconnect power plug.
	Electrostatically sensitive components ESD.		

Additional symbols and icons

Additional symbols

	Positive example – **Do this!** Result – **OK**		Negative example – **Don't do this!**
	Refers to content in this manual.		Refers to content in other supplementary documents.
	Electric/electronic devices and batteries must not be disposed of in the domestic waste at the end of their service life.		
	Indication: Warning		Indication: Error
	Acoustic signal – signal sound/warning sound.		
	Frequency of beeping, frequency of acoustic signal		

Symbols and gestures for operation

→ *See chapter: 5.1.2 Gestures for operation on page 40*

⇨ Additional detailed descriptions of symbols (icons) and signals on the display can be found in chapter *5.4 Display and operating elements*.

1.3.3 Handling instructions (action steps)

Action steps as text

Instructions (single step)

⇨ Perform the step described.

☑ Result of action

Instructions (multiple steps)

1. First step

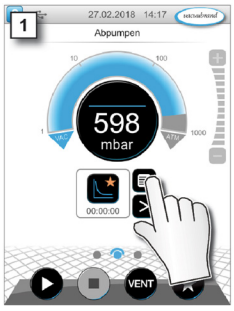
2. Next step

☑ Result of action

Perform the steps in the order described.

Schematic diagram Action steps as graphics

Instructions (shown graphically)



1. First step

2. Next step

☑ Result of action

1.3.4 Abbreviations

Abbreviations

abs.	Absolute
AK	Separator flask
ATM	Atmospheric pressure (bar graph, program)
d_i (di)	Interior diameter
DN	Nominal diameter
EX*	Outlet
FKM	Fluoroelastomer
FC	Frequency converter
GB	Gas ballast
---	---
Gr.	Size
hh:mm:ss	Time in hours/minutes/seconds
hPa	Pressure unit, hectopascal (1 hPa = 1 mbar = 0.75 Torr)
IN*	Inlet
KF	Small flange
max.	Maximum value
min.	Minimum value
mbar	Pressure unit, millibar (1 mbar = 1 hPa = 0.75 Torr)
PA	Polyamide
PBT	Polybutylene terephthalate
PC	Pumping unit chemistry with series identification number
PE	Polyethylene
RMA no.	Return Merchandise Authorization number
SW	Wrench size (tool)
Torr	Pressure unit (1 Torr = 1.33 mbar = 1.33 hPa)
USB	Universal serial bus
VAC	Vacuum (pressure curve)
resp.	Responsible
VMS-B	Vacuum management system – module
e. g.	For example

** Labeling on the vacuum pump*

1.3.5 Term definitions

Product-specific terms

Fine vacuum	Pressure measuring range in vacuum technology, from: 1 mbar–0.001 mbar (0.75 Torr–0.00075 Torr)
Rough vacuum	Pressure measuring range in vacuum technology, from: atmospheric pressure–1 mbar (atmospheric pressure–0.75 Torr)
PC 3001 VARIO select *	Vacuum pumping unit with variable speed motor for precise vacuum control including **VACUU·SELECT®** controller and **VACUU·SELECT® Sensor**.
PC 510 select **	Pumping unit with valve-actuated vacuum control.
VACUU·BUS®	Bus system from **VACUUBRAND** for communication between peripheral devices with **VACUU·BUS®**-enabled gauges and controllers. The maximum permissible cable length is 30 m.
VACUU·BUS® address	Address which enables the **VACUU·BUS®** client to be unambiguously assigned within the bus system, e.g., for connecting multiple sensors with the same measurement range.
VACUU·BUS® client	Peripheral device or component with **VACUU·BUS®** port which is integrated in the bus system, e.g., sensors, valves, level indicators, etc.
VACUU·BUS® configuration	Assigning a different **VACUU·BUS®** address to a **VACUU·BUS®** component using a gauge or controller.
VACUU·BUS® connector	4-pin round connector for the bus system from **VACUUBRAND**.
VACUU·LAN®	Local vacuum network.
VACUU·SELECT®	Vacuum controller, controller with touchscreen; consisting of operating panel and vacuum sensor.
VACUU·SELECT® Sensor ***	External vacuum sensor ▸ for **VACUU·SELECT®** *or* ▸ separately as an independent vacuum sensor.

** Also valid for: PC 3002 VARIO select, PC 3003 VARIO select, PC 3004 VARIO select*

*** Also valid for: PC 510 select, PC 511 select, PC 520 select, PC 610 select, PC 611 select, PC 620 select*

**** Available with and without venting valve*

2 Safety information

The information in this chapter must be observed by everyone who works with the product described here.

The safety information is valid for the entire life cycle of the product.

2.1 Usage

Only use the product if it is in perfect working condition.

2.1.1 Intended use

Intended use

The *VACUU·SELECT*® vacuum controller is a laboratory instrument which, with appropriate peripheral devices[1], is intended to regulate absolute pressure in the area of rough and fine vacuum.

The device may only be used indoors in a non-explosive atmosphere. It is designed for continuous operation between 10 °C–40 °C.

Intended use also includes:

- observing the information in the document **Safety information for vacuum equipment**,
- observing the manual,
- observing the manual of connected components,
- using only approved accessories or spare parts.

Any other use is considered improper use.

2.1.2 Improper use

Improper use

Incorrect use or any application which does not correspond to the technical data may result in injury or damage to property.

1 For vacuum pumps, sensors and accessories from VACUUBRAND
*→ see also **3.3 VACUU·BUS® peripheral devices on page 26***

Improper use includes:

Improper use

- using the product contrary to its intended use,
- operation under inadmissible environmental and operating conditions,
- vacuum control of potentially explosive atmospheres which does not correspond to the ATEX authorization of the sensor → *see sensor rating plate*,
- operation despite obvious faults or defective safety devices,
- usage despite incomplete assembly,
- pulling plug-in connections on the cable out of the socket,
- use in mines or underground.

2.1.3 Foreseeable misuse

In addition to improper use, there are types of use which are prohibited when handling the device:

Possibly foreseeable misuse

- installation and operation in potentially explosive atmospheres,
- unauthorized extensions or conversions, in particular when these impair safety,
- fully exposing the device to the vacuum, immersing it in liquids, exposing it to water spray or steam jets,
- vacuum control of hot, unstable, or explosive media,
- operation with sharp-edged objects,
- switching the device on/off with tools or one's foot,
- operating the controller by remote control without knowledge of the connected vacuum system.

2.2 Target group description

IMPORTANT! Users in the areas of competence in the *Responsibility matrix* must possess the relevant qualifications for the activities listed.

2.2.1 Personnel qualification

Meaning Personnel qualification

Operators	Laboratory staff, such as chemists, laboratory technicians
Specialist	Person with professional qualification in mechanics, electrical equipment or laboratory devices
Responsible specialist	Similar to a specialist, with additional specialist responsibility, or responsibility for a department or division

2.2.2 Responsibility matrix

Responsibility matrix and areas of competence

Activity	Operators	Specialist	Responsible specialist
Installation	x	x	x
Commissioning	x	x	x
Network integration			x
Updates		x	x
Data import/export		x	x
Data logger download	x	x	x
Troubleshooting	x	x	x
Operation	x	x	x
Advanced operation		x	x
Error report	x	x	x
Remedy	(x)	x	x
Changing circuit board fuse		x	x
Repair order			x
Cleaning, simple	x	x	x
Sensor cleaning*		x	x
Sensor calibration*		x	x
Shutdown	x	x	x
Decontamination**		x	x

* *Option*

** *Alternatively, arrange for decontamination by a qualified service provider*

2.2.3 Personal responsibility

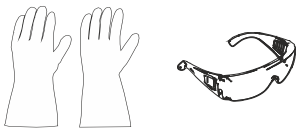
Work safely

The safety and protection of individuals has top priority. Activities and processes which represent a potential safety hazard are not permitted.

Always be conscious of safety and work in a safe manner. Observe instructions issued by the operator, and national regulations on accident prevention and industrial safety.

⇨ Use the controller only if you have understood its function and this manual.

Protective clothing



⇨ In the case of activities which require protective clothing, personal protective equipment as specified by the operator is to be worn.

2.3 Safety precautions

Quality standard and safety

Products from **VACUUBRAND GMBH + CO KG** are subject to stringent quality testing with regard to safety and operation. Each product undergoes a comprehensive test program prior to delivery.

2.3.1 Safety precautions, general

⇨ When handling contaminated parts, follow the relevant regulations and safety precautions.

⇨ Repairs are only to be carried out by the manufacturer's Service Department.

IMPORTANT!

Prior to any service, contamination from hazardous substances needs to be excluded.

⇨ Please note that residual process media may pose a danger to people and the environment. Take suitable decontamination measures.

⇨ Before sending devices to our Service Department, you must first fill out a Health and Safety Clearance form, sign it to confirm the information, and return it to us.

2.3.2 Awareness of potential dangers

Vacuum control of critical processes

Risk of explosion during critical processes

DANGER

Risk of explosion through control of critical processes.

Depending on the process, an explosive mixture can form in systems.

⇨ The control of critical processes must always be supervised!

Damaged components

IMPORTANT!

Damaged components, especially those which impair safety, must be promptly replaced.

⇨ Ensure that you are not working with damaged components.

⇨ Replace defective parts immediately, e.g., a broken cable or faulty plug.

Dangers due to electrical energy

Electrical energy

After the controller has been switched off and disconnected from the power supply, there may still be dangers at the plug-in power supply due to residual energy:

⇨ Replace the plug-in power supply if there are any defects.

⇨ Never open the plug-in power supply.

Service shipments

Safety during servicing

Devices which represent a potential safety hazard should be sent in, maintained or repaired only if all hazardous contamination has been removed.

⇨ The form for confirming safety is available as a PDF on our website: Health and Safety Clearance form.

2.3.3 ATEX equipment category (sensor)

Installation and potentially explosive atmospheres

The installation and operation of the operating panel in areas where potentially explosive atmospheres can develop to a hazardous degree is not permitted.

ATEX approval[2] of vacuum sensors only applies to the **internal, wetted parts of the sensor**, not to its surroundings.

ATEX equipment labeling

ATEX equipment category

Vacuum equipment labeled with Ex has ATEX approval in line with the ATEX marking on the rating plate.

- ⇨ Only use the product if it is in perfect working condition.
- ⇨ The devices are designed for a low level of mechanical stress and must be installed in such a way that they cannot sustain mechanical damage from the outside.
- ⇨ After any work on the device, check its leak rate.

ATEX approval

When using the device on equipment with potentially explosive atmospheres (according to ATEX approval), modifications to the device are not permitted and will invalidate the ATEX approval. Wetted parts attached to the device must have ATEX approval at least equivalent to that of the device itself, and must not adversely affect the ATEX approval of the device, in particular the temperature in the wetted area.

Prevent explosive mixtures

The use of gas ballast and/or venting valves is only permitted if this would not normally, or only rarely, cause explosive mixtures within the device, or do so only for a short time.

- ⇨ If necessary vent with inert gas.

Information on the ATEX equipment category is also available on our website at: www.vacuubrand.com/.../Information-ATEX

2 -> See rating plate: VACUU·SELECT Sensor, VACUU·VIEW (extended), VSK 3000

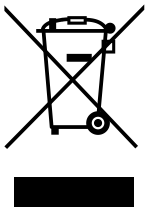
2.4 Disposal

NOTE

Electronic components and batteries must not be disposed of in the domestic waste at the end of their service life.

Used electronic devices and batteries contain harmful substances that can cause damage to the environment or human health. Disused electrical devices also contain valuable raw materials, which can be recovered for reuse if the device is disposed of correctly within the recycling process.

End users are legally obliged to take used electric and electronic devices to a licensed collection point and to return spent batteries.



- ⇨ It is your responsibility to save and delete any data before disposing of your electronic device.
- ⇨ If the device contains batteries: Remove spent batteries before disposal.
- ⇨ Correctly dispose of all electronic scrap and electric components at the end of their service life.
- ⇨ Observe the national regulations regarding disposal and environmental protection.

3 Product description

3.1 VACUU·SELECT® vacuum controller

Description of vacuum controller

VACUU·SELECT® is a vacuum controller consisting of an operating panel and an external vacuum sensor, e. g., the *VACUU·SELECT® Sensor*.

The controller was developed for applications which require a controlled vacuum. Various applications and menus are available for operation and vacuum control. The controller is operated using the touchscreen. The menus are designed to be user friendly.

Depending on the type of operation and peripheral devices connected, the controller regulates the process vacuum subject to demand.

As a component of the *VACUU·BUS®* system, the controller offers numerous connection options for a wide variety of applications.

Vacuum processes are controlled via vacuum pumps, in-line solenoid valves and/or venting valves. If several valves of one type are connected, they switch simultaneously, e.g., multiple venting valves.

To control a vacuum, a minimum combination of the controller, a vacuum sensor, valves and/or vacuum pumps is needed.
If only the built-in sensor is present, vacuum control is not possible.

3.2 Product views

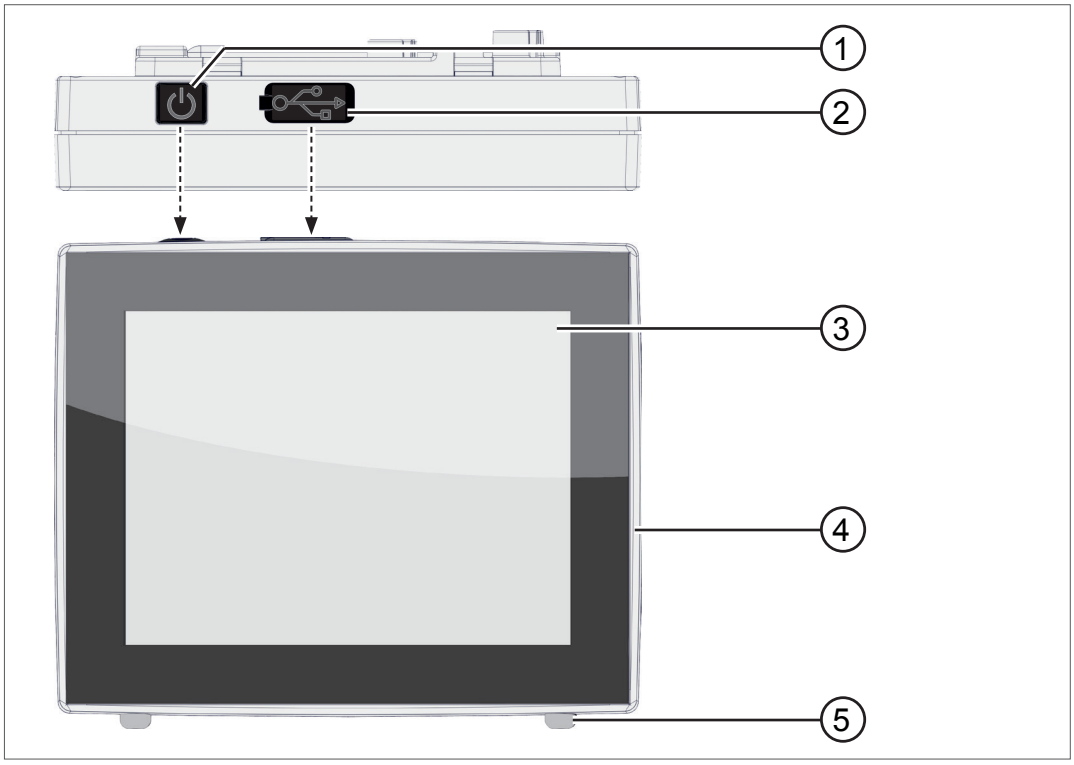
3.2.1 Operating panel

The operating panel has a color display with a touchscreen. Depending on the type of installation, the display can be rotated by 90°.

Top view + front view

Top view

Front view



Meaning

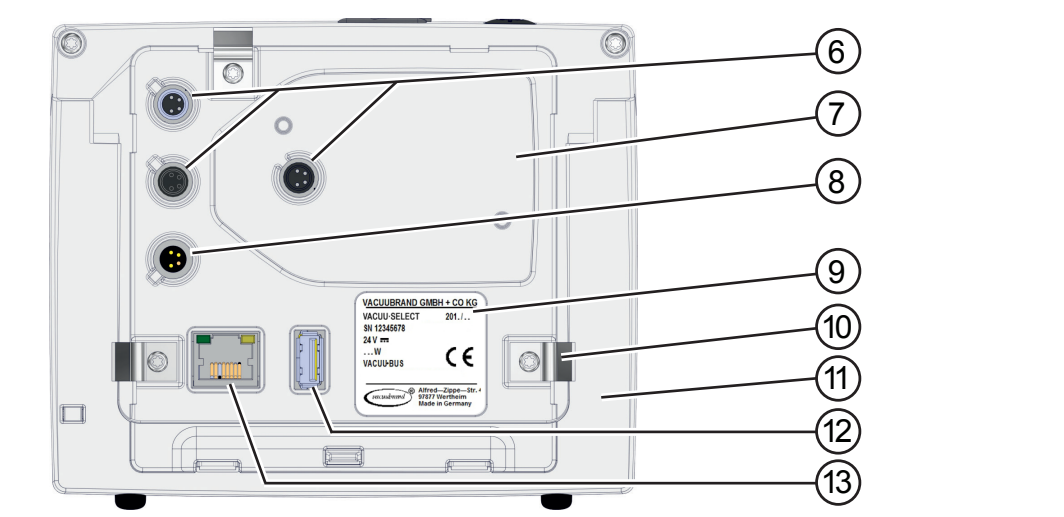
1	ON/OFF button
2	Cover of USB port, type A*
3	Screen
4	Chemically resistant plastic housing
5	Rubber feet

USB type A* is only suitable for connecting USB flash drives or WiFi USB dongles, and not for connection to a USB master, such as a PC.

3.2.2 Interfaces

Rear view

Interfaces at the back



Meaning

6	3x connection sockets for *VACUU·BUS®* components
7	Recess for *VACUU·SELECT® Sensor*
8	Power supply via *VACUU·BUS®*, plug-in power supply connection *or* vacuum pump/pumping unit
9	Rating plate
10	Option: Spring clip as fixing for built-in version
11	Stand for desktop version, foldable
12	USB port, type A
13	RJ45 socket – LAN connection

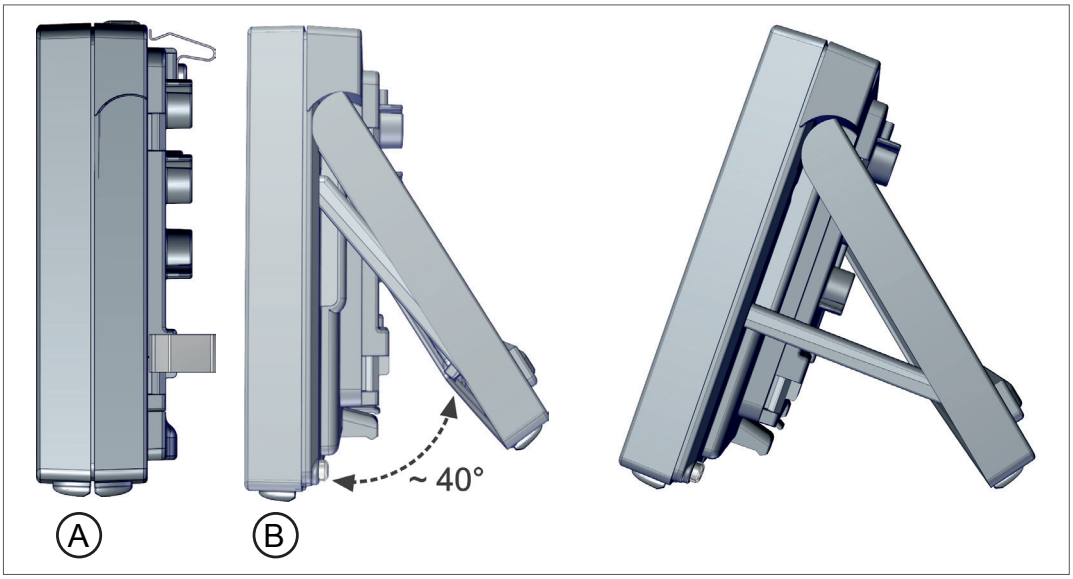
Note: The VACUU·BUS® ports are each equipped with a guide slot as an anti-rotation device and connection coding for VACUU·BUS® sockets and connectors.

IMPORTANT!

⇨ Do not use the USB ports as distributors, except for USB hubs with their own power supply.

Side view

Side view



Meaning

A	Mounted spring clips – fixing for built-in version
B	Stand and brace extended for desktop version

3.2.3 VACUU·SELECT® Sensor (optional)

Description of VACUU·SELECT® Sensor

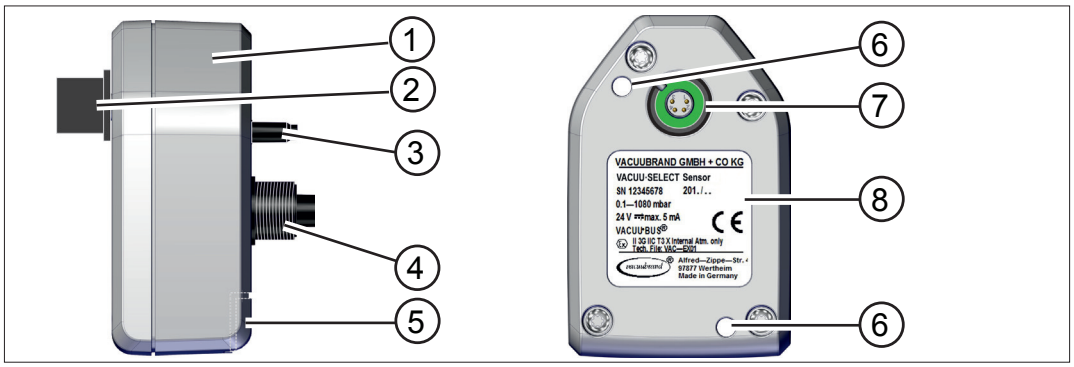
With the *VACUU·SELECT®* product, the vacuum sensor is mounted externally, e.g., on the housing of the VACUU·SELECT, on the appliance or in the pumping unit. Communication with the controller takes place via *VACUU·BUS*.

Two versions of the *VACUU·SELECT® Sensor* are available – with or without venting valve.

The vacuum sensor with high chemical resistance is designed for measurements in the rough vacuum range. There are three options for the vacuum connection: small flange, hose nozzle or direct hose connection.

Side view, top view

Side view, top view

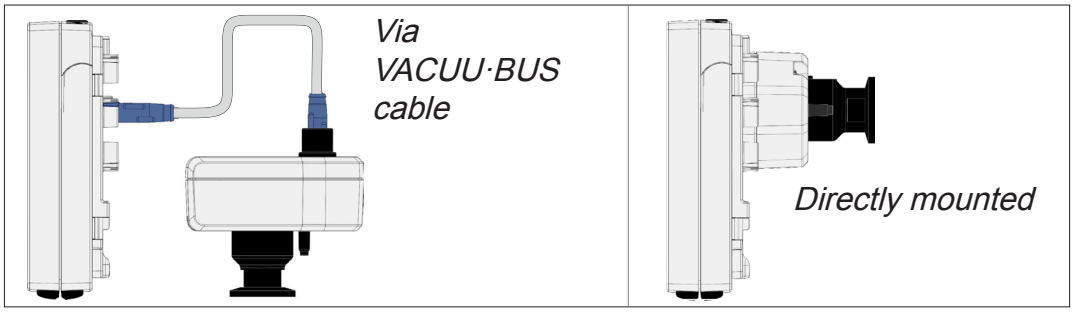


Meaning

1	*VACUU·SELECT® Sensor*
2	*VACUU·BUS®* plug attachment, detachable (option)
3	Venting valve (option)
4	Vacuum screw connection
5	Port for *VACUU·BUS®* plug attachment (park position)
6	Hole for screws
7	*VACUU·BUS®* port
8	Rating plate

Controller and VACUU·SELECT® Sensor

→ Example VACUU·SELECT Sensor connection options



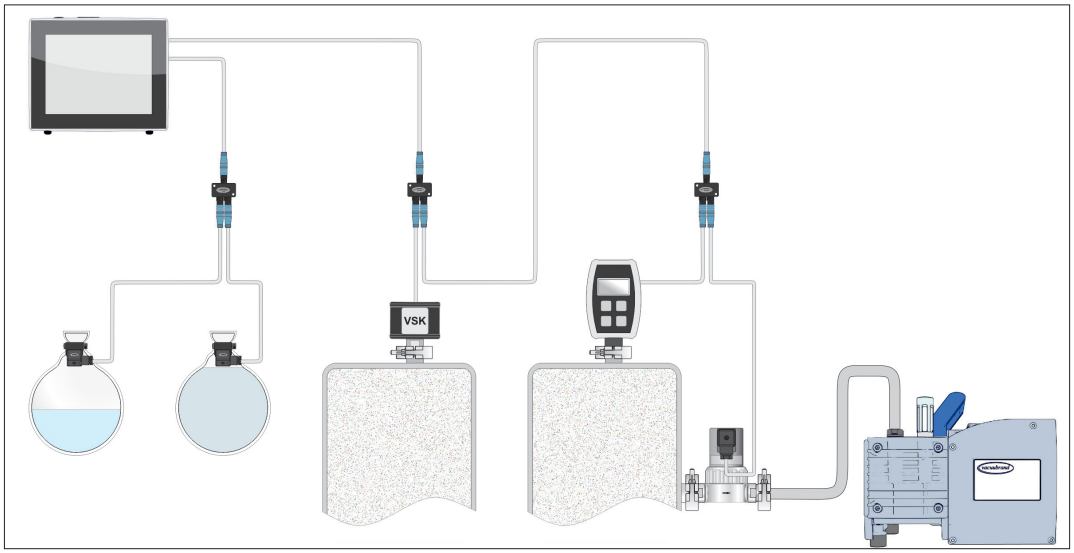
3.3 VACUU·BUS® peripheral devices

External valves, level sensors and vacuum sensors (up to the fine vacuum range) are components which can be connected via the *VACUU·BUS®* directly to the controller.

VACUU·BUS® components can be easily added or removed at any time via component detection. Component activation permits the activation or deactivation of connected components.

VACUU·BUS components[1] (clients)

→ Example VACUU·BUS principle with different components



When the controller is switched on, it checks the current configuration. *VACUU·BUS®* components are automatically detected and are used and monitored until the controller is switched off. If a previously connected component is no longer found, the controller displays an error message.

In the case of the *VACUU-SELECT®*, all *VACUU-BUS®* components can be individually activated or deactivated without disconnecting the plug. The venting valve of a *VACUU-SELECT® Sensor* can also be easily deactivated at the controller.

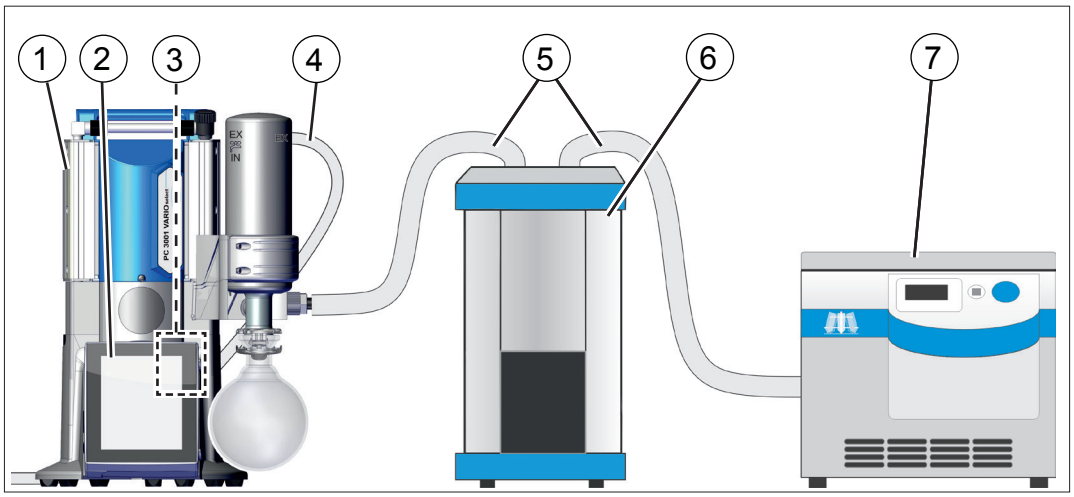
→ *See also chapter: 7.1.10 Administration – VACUU·BUS*

1 → *See also table in chapter: **9.2 Ordering information on page 87***

3.4 Examples of use

Vacuum concentrator

→ Example Vacuum concentrator

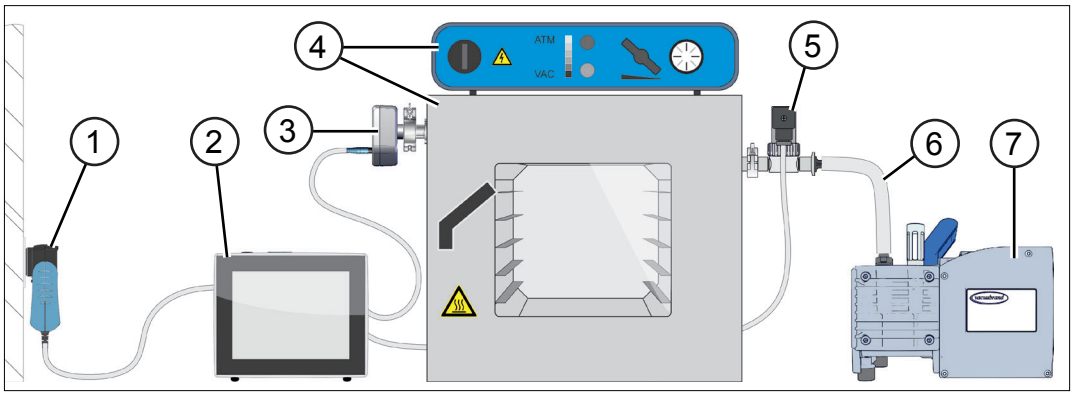


Meaning

1	**PC 3001 VARIO select** vacuum pumping unit
2	**VACUU·SELECT®** operating panel, removable
3	**VACUU·SELECT® Sensor** permanently mounted in the pumping unit
4	Exhaust hose (diverted into an exhaust hood)
5	Vacuum hose
6	Example: Cold trap
7	Example: Vacuum concentrator

Vacuum drying

→ Example Vacuum drying



Meaning

1	Plug-in power supply
2	**VACUU·SELECT®**
3	**VACUU·SELECT® Sensor**
4	Vacuum drying cabinet with its own control unit
5	Vacuum valve
6	Vacuum hose
7	Diaphragm pump, vacuum pump

3.5 Remote control and interfaces

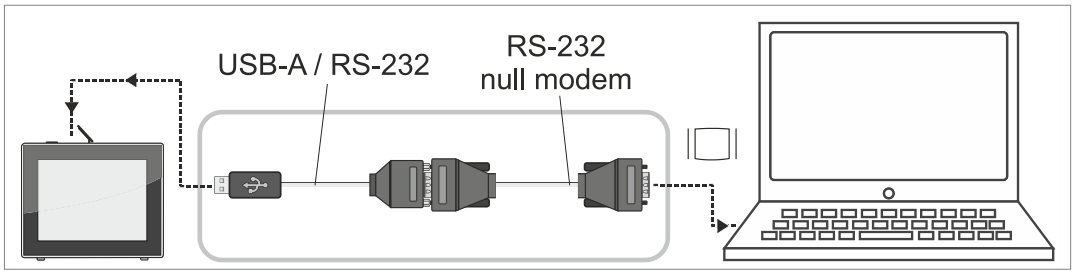
As of Softwareversion V1.04/V1.00 of the ***VACUU·SELECT***®, communication will be supported via RS-232 as well as Modbus TCP. This enables you to remotely monitor and control the controller from a central location, for example with a PC or process control system.

For connections → *see chapter: 3.2.2 Interfaces on page 23*

3.5.1 RS-232 serial interface

An RS-232 USB adapter can be connected to one of the USB ports of the controller, to act as a serial interface.

→ Example RS-232 connection



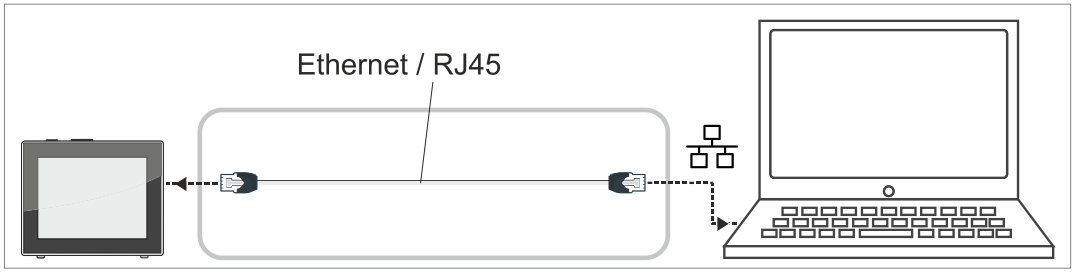
Required accessories

Adapter cable, USB to RS-232, 1 m	20637838
RS-232C null modem cable, 2x socket Sub-D 9-pin, 1.5 m	20637837

3.5.2 Modbus TCP

For remote control via Modbus TCP, use the Ethernet connection RJ45 on the back of the controller.

→ Example Ethernet connection



Detailed descriptions of the interfaces can be found here: Interface instructions for use.

4 Installation and connection

4.1 Transport

Products from **VACUUBRAND** are packed in sturdy, recyclable packaging.

The original packaging is accurately matched to your product for safe transport.

⇨ If possible, please keep the original packaging, e. g., for returning the product for repair.

Goods receipt

Check incoming goods

Check the shipment for transport damage and completeness.

⇨ Immediately report any transport damage in writing to the supplier.

⇨ Compare the scope of delivery with the delivery note.

4.2 Installation

Check installation conditions

Check installation conditions

- The device is acclimatized.
- Ambient conditions have been observed and are within the limitation of use.

Limitation of use		(US)
Ambient temperature	10–40 °C	50–104 °F
Max. altitude	2000 m above sea level	6562 ft above sea level
Relative humidity	30–85 %, non-condensing	
Protection class	IP 40 (IP 20 ⇨ PC 3001)	
Prevent condensation or contamination from dust, liquids, or corrosive gases.		

IMPORTANT!

⇨ Note the IP protection class of the controller.

⇨ IP protection is only guaranteed if the controller is appropriately mounted or installed.

NOTE

Condensate can damage the electronics.

A large temperature difference between the storage location and the installation location can cause condensation.

⇨ After goods receipt or storage, allow your vacuum device to acclimatize for at least 3-4 hours before initial use.

Desktop version

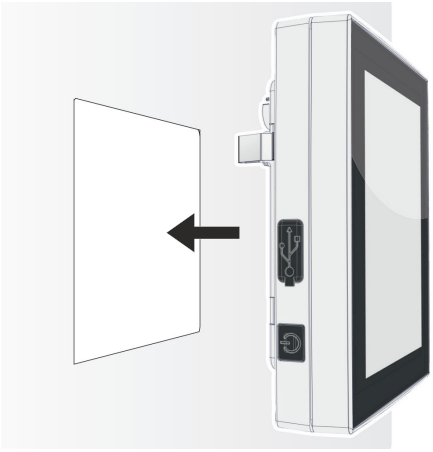
Use as desktop device

If the stand is extended backwards and secured with the brace, the controller can be set up directly on the work surface and connected, for example, on the lab bench.

Built-in version*

Use as built-in device

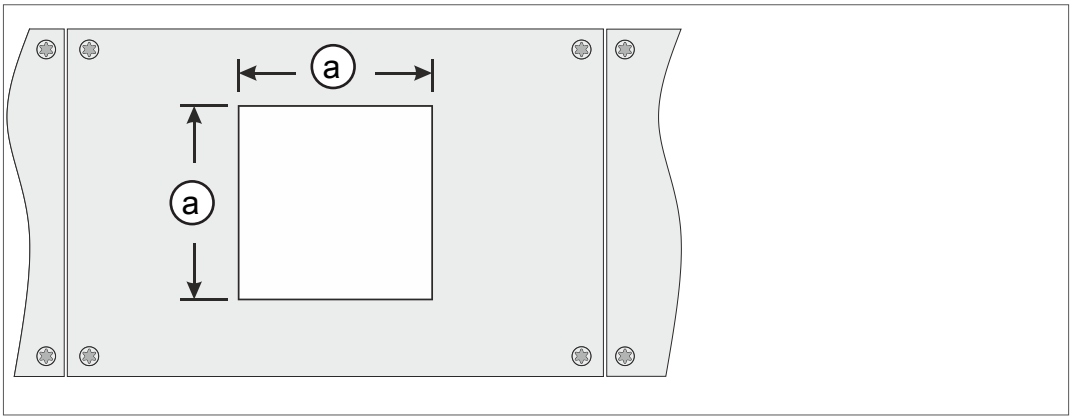
Holders are integrated in the controller or spring clips can be mounted for installation. The operating panel of the controller can then be directly clipped into a cut-out in a *VARIO*® pumping unit, lab furniture, or a control cabinet.



** The stand is attached to the device, i.e., the built-in version can be extended at any time for use as a desktop version.*

Installation cut-out (in control cabinet, lab furniture, cable duct)

Cut-out dimensions

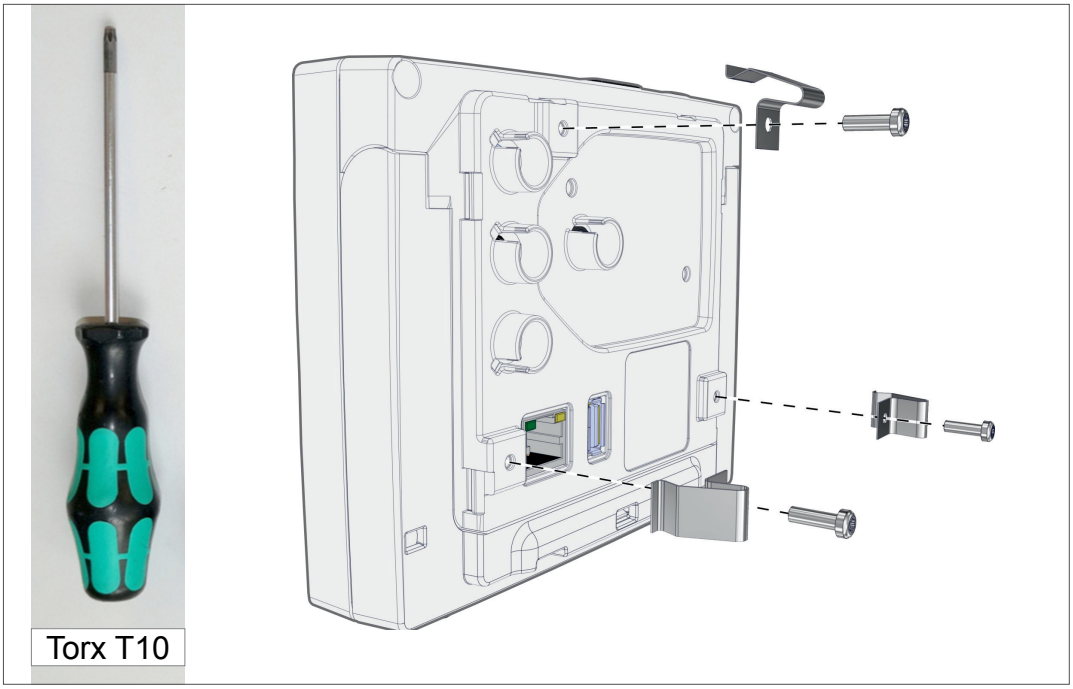


Wall thickness		Dimensions (a) for installation cut-out	
1 mm	0.04 in.	111.5 mm x 111.5 mm	4.39 in. x 4.39 in.
2 mm	0.08 in.	112 mm x 112 mm	4.41 in. x 4.41 in.
3 mm	0.12 in.	112.5 mm x 112.5 mm	4.43 in. x 4.43 in.

Depending on the thickness of the wall, appropriate tolerances should be allowed for the installation cut-out.

Mount spring clips

Mount spring clips

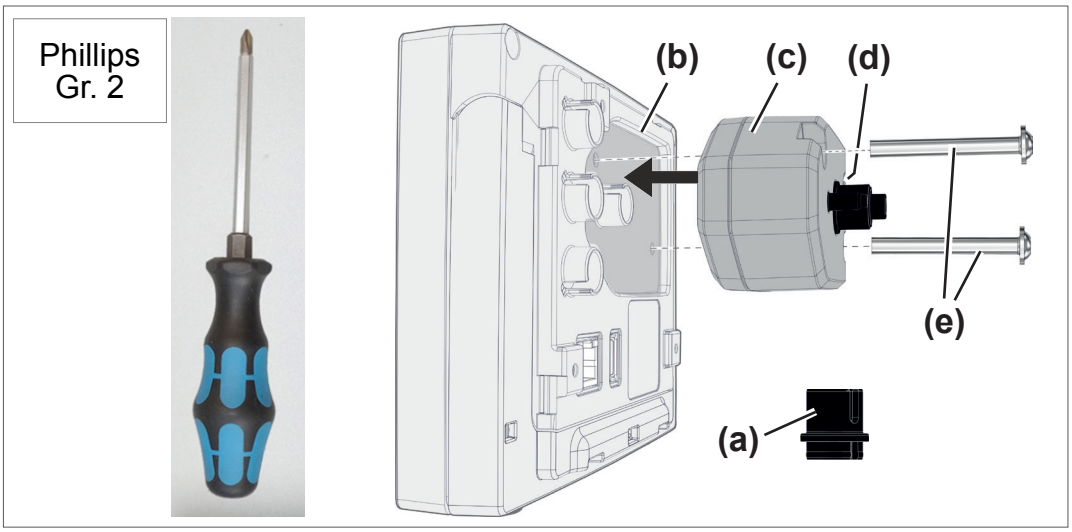


Spring clips + screw fittings D3 x 10	20636593

4.3 Sensor connection

Connect and mount the VACUU·SELECT® Sensor

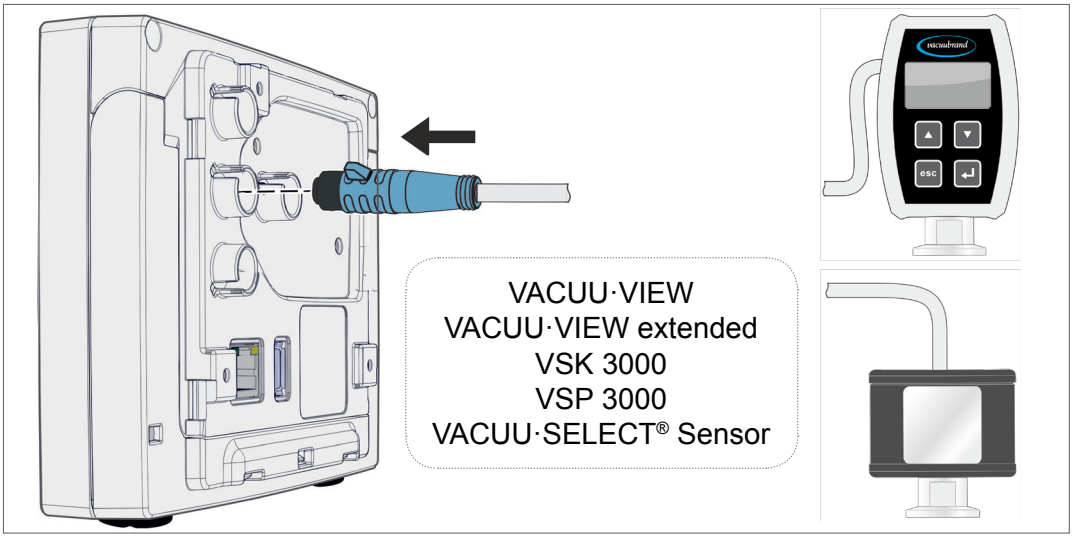
Mount and connect the VACUU·SELECT® Sensor



1. Pull out the VACUU·BUS® plug attachment **(a)** and insert it into **(d)**.
2. Insert the *VACUU·SELECT® Sensor* **(c)** into the VACUU·BUS® port of the controller **(b)** in the preformed recess.
3. Use the Phillips screwdriver to tighten the 2 screws **(e)** until hand-tight.

Connect other vacuum sensors (option)

→ Example Connection of other vacuum sensors



VACUU·BUS® extension cable 2 m	20612552
VACUU·BUS® Y adapter	20636656

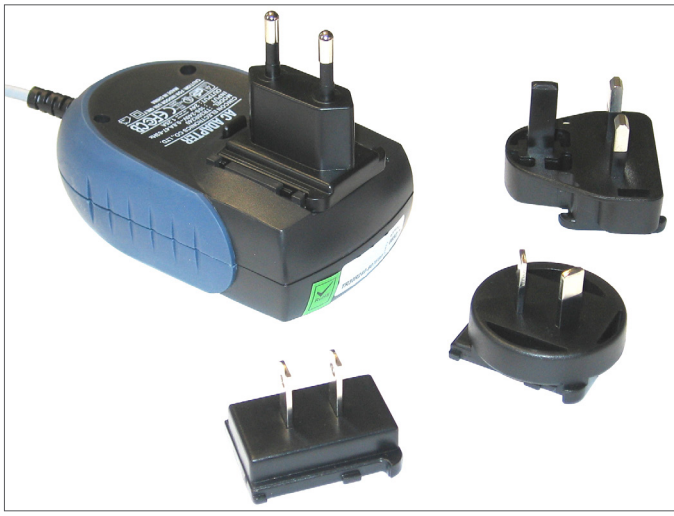
4.4 Electrical connection

IMPORTANT!

⇨ Lay the connection cable such that it cannot be damaged by sharp edges, chemicals, or hot surfaces.

Power supply via plug-in power supply*

Plug-in power supply



* *Short circuit-proof wide range power supply unit with integrated overload protection and country-specific plug attachments*

Prepare plug-in power supply

Prepare connection

1. Take the power supply unit and the plug attachments out of the packaging.
2. Select the plug attachment which fits your socket.
3. Place the plug attachment onto the metal contacts of the power supply unit.
4. Push the plug attachment until it clicks into place.

Remove plug attachment

Remove plug attachment from power supply unit

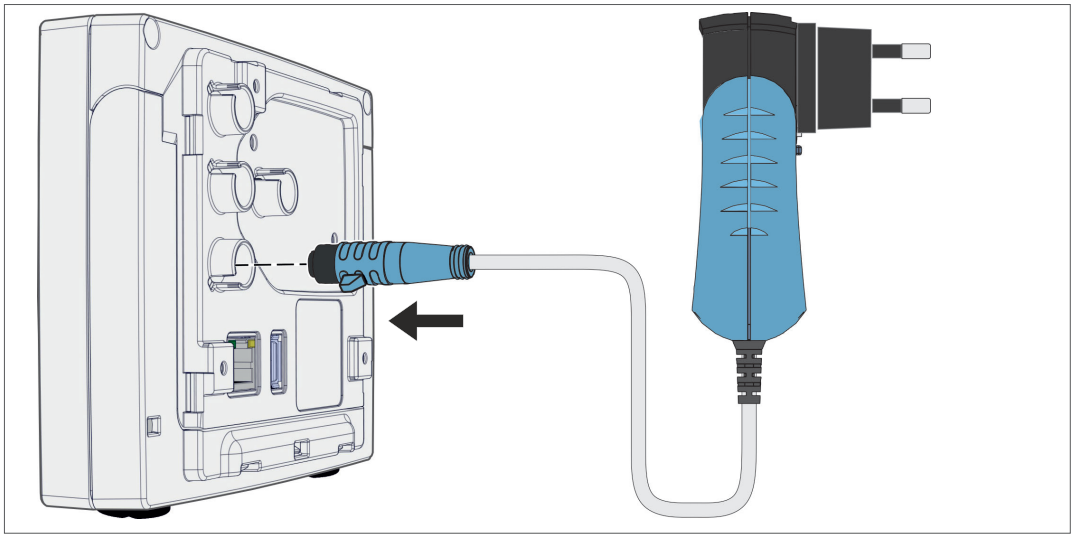
1. Press the locking button on the power supply unit.
2. Remove the plug attachment from the power supply unit.

   ☑ Another plug attachment can now be attached.

Connect plug-in power supply to the controller

⇨ Insert the ***VACUU-BUS***® cable of the plug-in power supply into the plug-in connection of the controller.

Power supply via plug-in power supply



Connect power supply

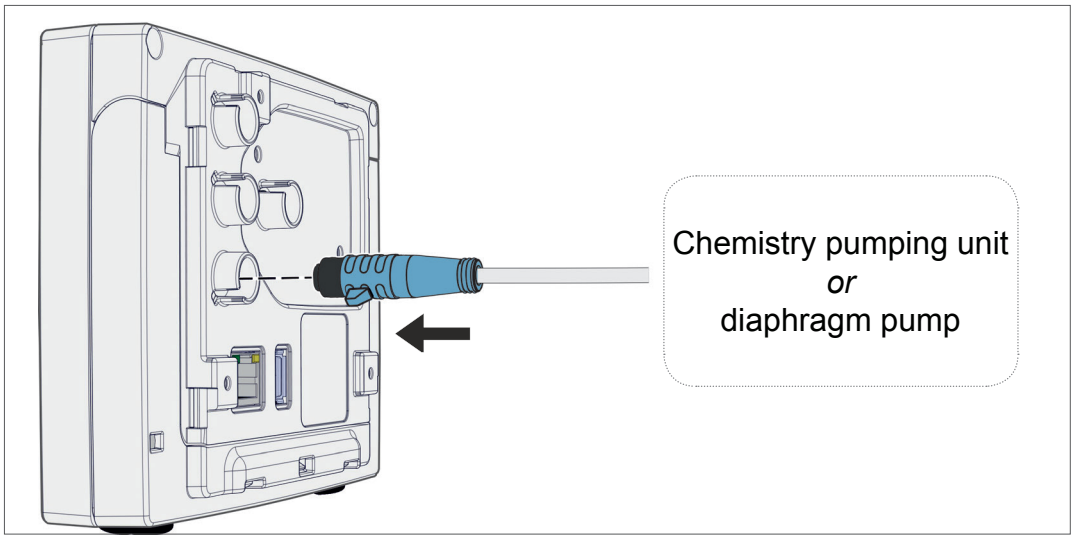
⇨ Insert the plug-in power supply into the power outlet.

☑ The green LED on the plug-in power supply lights up.

Connect power supply via peripheral device

⇨ Plug the ***VACUU-BUS***® cable of the peripheral device, such as a PC 3001 VARIO select chemistry pumping unit, into the plug-in connection of the controller.

Controller power supply via peripheral device



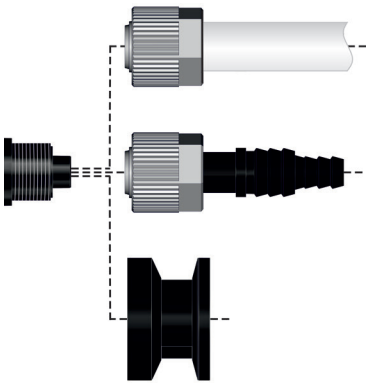
4.5 Vacuum connection

⚠	**WARNING** **Risk of bursting due to overpressure** ⇨ Prevent uncontrolled overpressure, such as when connecting to a locked or blocked tubing system.

The vacuum connection is made at the connected vacuum sensor. The connection can be made in various ways.

Connection options

Connection options on the VACUU·SELECT® Sensor



Connection via PTFE hose DN 8/10, e.g., installed in the chemistry pumping unit

or

Connection via hose nozzle DN 6/10, e.g., desktop controller

or

Connection via small flange KF DN 16, e.g., physical applications

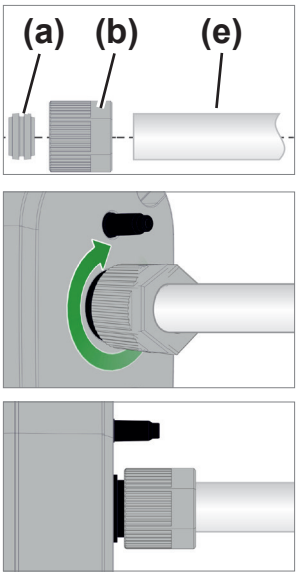
IMPORTANT!

⇨ Use a stable vacuum hose that is suitable for the required vacuum range.

⇨ Keep hose connections to the sensor as short as possible, or connect the sensor as close as possible to the application.

⇨ Dirt, hose kinks or damage to the sensor connection can impair the measurement.

Connect PTFE hose

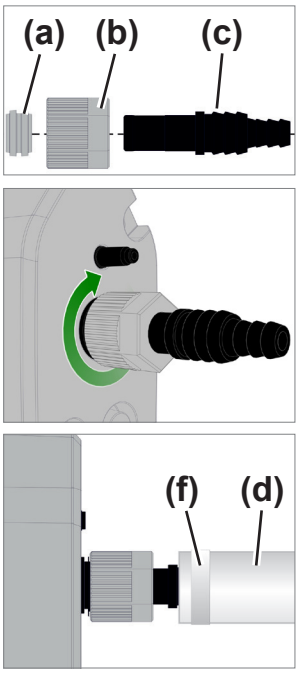


Required connection material: Union nut M14x1, sealing ring, PTFE hose.

1. Connect the sealing ring **(a)**, the union nut **(b)** and the PTFE hose **(e)** as shown.

2. Push the PTFE hose with the union nut into the vacuum connection of the sensor and tighten the union nut until hand-tight.

Connect sensor via hose nozzle to vacuum



Required connection material: Hose nozzle DN 6/10 mm, union nut M14x1, sealing ring; optional: vacuum hose and appropriate hose clip.

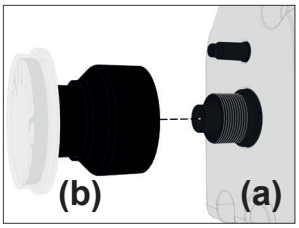
1. Connect the sealing ring **(a)**, the union nut **(b)** and the hose nozzle **(c)** as shown.

2. Push the hose nozzle with the union nut into the vacuum connection of the sensor and tighten the union nut until hand-tight.

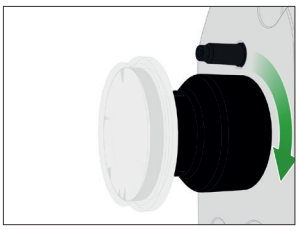
3. Push the vacuum hose **(d)** from the equipment onto the hose nozzle and secure the vacuum hose, for example, with a hose clip **(f)**.

Sensor connection via small flange

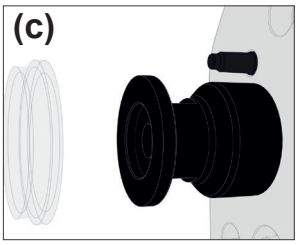
Required connection material: VACUU·BUS extension cable for connection to the controller (option), clamping ring with universal centering ring or inner centering ring for KF DN 16 (tool: open-end wrench SW17).



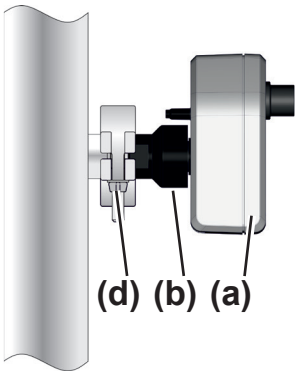
1. Remove the blind plug and place the small flange KF DN 16 **(b)** on the vacuum connection of the sensor **(a)**.



2. Tighten the small flange KF DN 16 until hand-tight.



3. Remove the protective dust cap **(c)**.



4. Place the sensor with the centering ring on the connection of the equipment → small flange KF DN 16 **(b)**.

5. Secure the sensor **(a)** with the clamping ring **(d)** to the vacuum line, as shown in the illustration.

4.6 Venting connection (option)

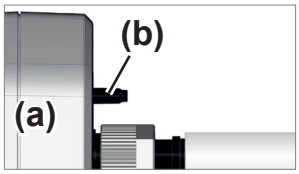
DANGER

Risk of explosion by venting with air.

Depending on the application, venting can cause explosive mixtures to form or other hazardous situations to arise.

⇨ Never vent processes with air which could form an explosive mixture.

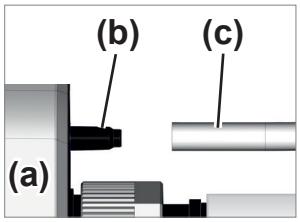
⇨ If necessary, vent with inert gas (max. 1.2 bar/900 Torr, abs.).

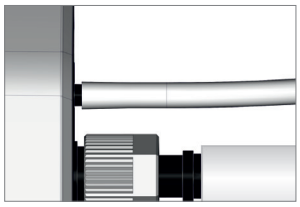


Venting with ambient air[1]

For venting **(b)** with ambient air, nothing needs to be connected to the sensor **(a)**.

Venting with inert gas – connect venting valve[1]





Required connection material: Hose for hose nozzle, e.g., silicone tube 4/5 mm

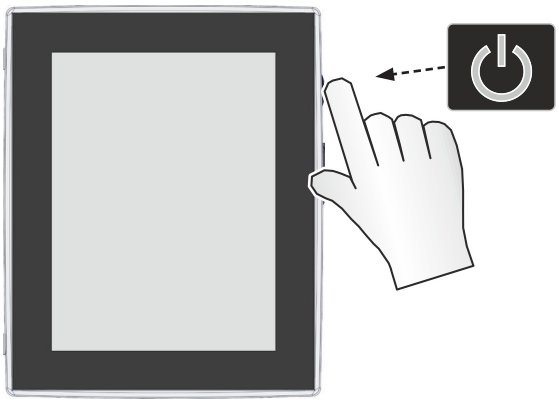
⇨ Attach the hose **(c)** to the connection of the venting valve **(b)**.

☑ Venting valve with hose for venting with inert gas[2].

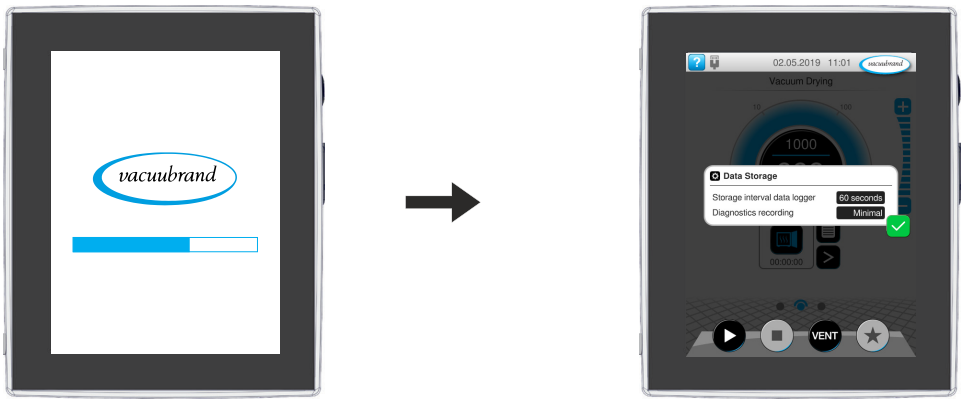
5 User interface

5.1 Switch on controller

Switch on device



⇨ Briefly press the ON/OFF button on the controller



☑ Device starts up.

☑ Information is displayed

Functions of the ON/OFF button

ON/OFF button

ON/OFF	Meaning
	***Switch on controller*** ▸ Briefly press ON/OFF button. ***Switch off controller*** ▸ Hold down ON/OFF button for ~3 seconds and confirm pop-up.
	Lock/unlock controller ▸ Briefly press ON/OFF button. ▸ Lock device against unintended operation, e.g., when cleaning the display.
	Controller restart (reboot) ▸ Hold down ON/OFF button for ~10 seconds.

5.1.1 Touchscreen

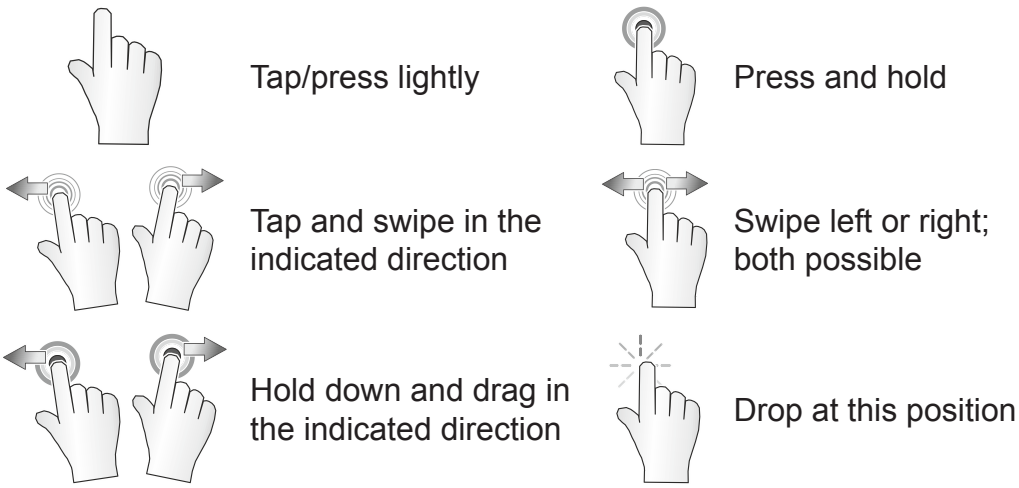
Touchscreen operation

The controller is a device operated via touchscreen. You can, for example, select, start, and stop an application by tapping the display.

By making various gestures, you can access advanced features: switch between views, edit applications, or use the help and context features.

5.1.2 Gestures for operation

Gesture symbols



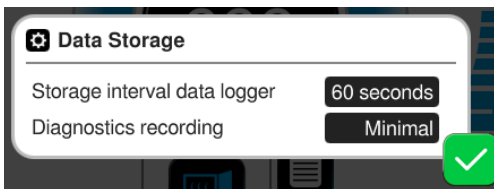
5.2 Set up device

To set up the device, follow the instructions on the screen when switching the device on for the first time or after restoring the factory settings.

5.2.1 Data storage message

Before the controller switches to the process screen, a pop-up window opens with information on current data storage.

→ Example Info pop-up on data storage



Data storage

- Data logger storage interval
- Diagnostics recording

⇨ Select your preferred settings and confirm the message.

In the delivered condition or following a reset to the factory settings, the data logger is switched off and recording of diagnostic data is preset to *Minimal*.

The message about data storage appears after every controller restart.

For subsequent adjustments to the data logger

→ *See chapter: 7.2 Data logger on page 73*

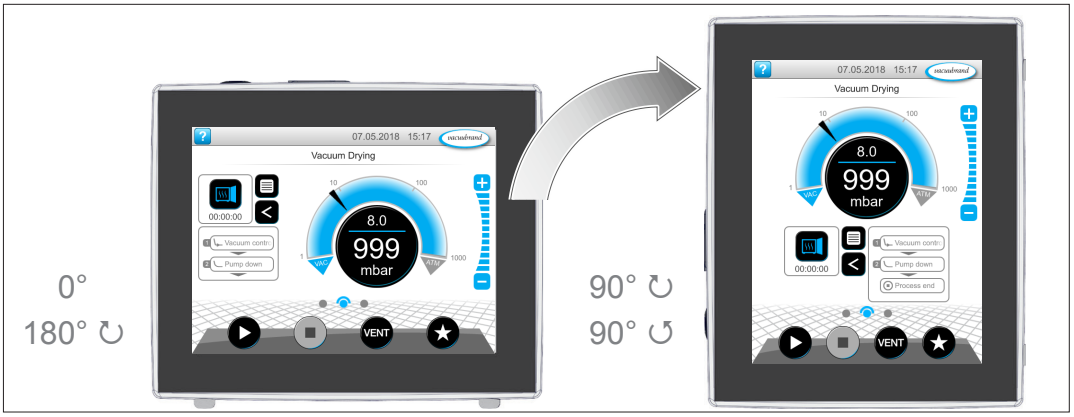
For subsequent adjustments to the diagnostic data

→ *See chapter: 7.3 Service on page 74*

5.3 Screen orientation

Supported screen orientations

→ Example
Landscape and portrait view



IMPORTANT!

The following descriptions for operation and function are described in vertical format (portrait). The descriptions are also valid for horizontal format (landscape), even though the operating elements may be arranged slightly differently.

Change the screen orientation

→ *See chapter: 7.1.7 Settings on page 66*

5.4 Display and operating elements

The display and operating elements of the controller are summarized and explained in this chapter.

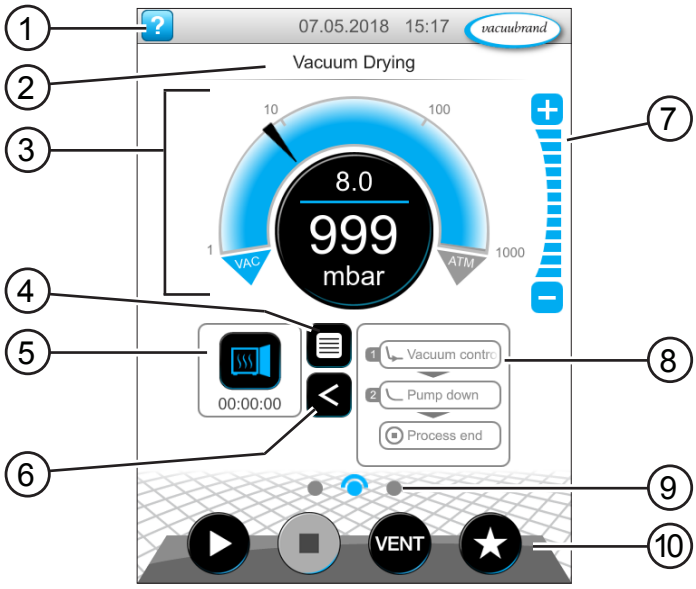
⇨ Refer to this chapter if you want to read about the meaning of a display or an operating element during operation.

5.4.1 Process screen (main screen)

After the device is switched on, the process screen appears. The process screen is the main screen of the controller. The display adapts to the selected application, e.g., by showing the name of the application, process steps, and target values.

Elements of the process screen

→ Example
Process screen with display and operating elements



Meaning

1	Status bar with help button, date/time, error message
2	Title line: name of the application, display or menu
3	Analog and digital pressure display with target and actual pressure
4	Button to open the application menu
5	Application icon with process time; open parameter list
6	Open/close process step display
7	Step buttons, adjust pressure value during operation
8	Process step display
9	Screen navigation
10	Operating buttons = operating elements for control

5.4.2 Display elements

Status bar

Status bar color codes

Color	Meaning
Gray	*Standard*
Yellow	*Warning*
Red	*Error*

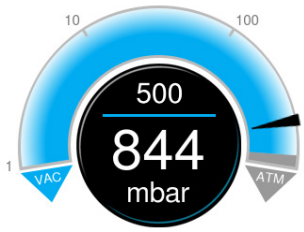
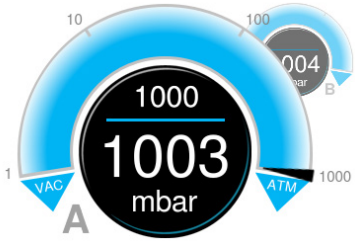
Sounds

Sounds

Sound	Meaning
	*Touch tone unless muted* ▸ Feedback entry
	*Warning or error* ▸ Shows that an error or warning is present. ▸ Active while error status persists.

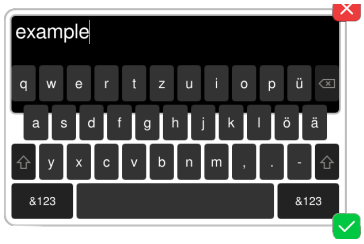
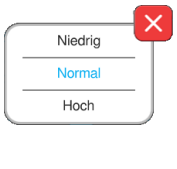
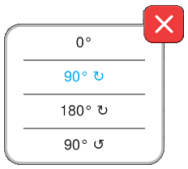
Pressure display

→ Example Standard pressure display

Symbol (icon)	Meaning
	*Standard pressure display* ▸ Pressure curve – analog pressure display. ▸ Digital pressure display. **Blue** Actual pressure **Gray** Control range
	Pressure setpoint Blue dividing line – animated during operation Actual pressure and pressure unit
→ Example Pressure display PC 520, PC 620 	*Pressure display for 2 vacuum connections* ▸ Analog and digital pressure display for 2 processes (A + B). ▸ Switch between the processes by tapping the symbol.

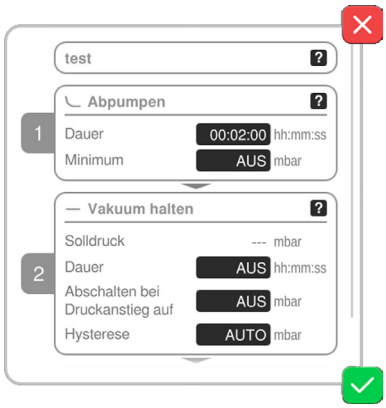
Pop-up windows (context menus)

→ Examples Pop-up window

Graphic	Function
	***Numeric keypad with special buttons*** ▸ Enter numerical values. ▸ Select a function using special buttons (OFF, ATM, AUTO). ▸ Min./max. values displayed. ▸ Values outside the permissible input range are not accepted.
	***Onscreen keyboard*** ▸ Enter alphanumeric values in the input field. ▸ Automatic switching between QUERTY or QUERTZ.
	***Time picker*** ▸ Adjust the time by scrolling through the numbers.
 	***Pop-up list*** ▸ Select a function or setting.
	***Message or error message*** ▸ Message, error message as plain text. ▸ Confirm message, acknowledge error.

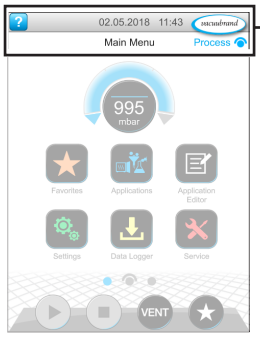
Parameter list

→ Example Parameter list

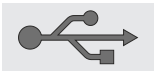
Graphic	Function
	***Parameter list with input fields*** ▸ Display and adjustment of application values. ▸ Display is divided into process steps. ▸ The parameter list display changes to reflect the selected application. **Blue** Active process step **Gray** Non-active process step

5.4.3 Operating elements and symbols

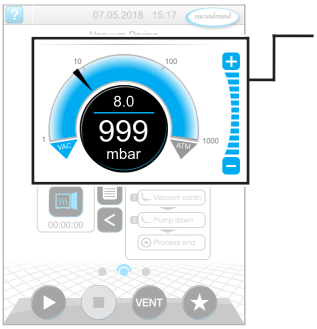
Status bar



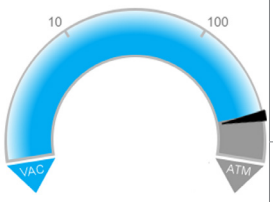
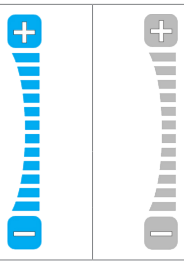
→ Example Main menu

Symbol (icon)	Meaning
	***Access help*** ▸ *Tips for operation* can be accessed from any menu level.
	***USB connected*** ▸ Shows that a device is connected via USB.
	***Ethernet connected*** (option) ▸ Indicates that an Ethernet cable is plugged in.
	***RS-232 adapter connected*** (option) ▸ Indicates that an RS-232 / USB converter is connected.
	***Date and time*** ▸ Shows the date and time in the preset format.
	***View process screen*** ▸ Switch back to the process screen from any menu level; process screen symbol:

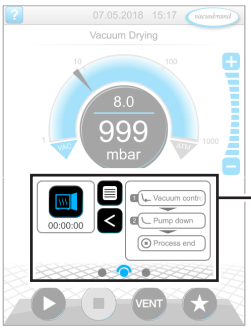
Operating elements – adjust pressure setpoint



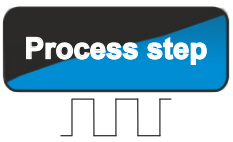
Process screen, adjust pressure setpoint, even during operation

Symbol (icon)	Meaning
	***Pressure curve – analog pressure display*** ▸ Adjust the pressure setpoint by moving the marker. Marker – pressure setpoint
	***Digital pressure display*** ▸ Adjust the pressure setpoint by tapping.
	***Step buttons*** (not a slider!) ▸ Adjust the pressure setpoint by tapping. **Blue** Active **Gray** Locked

Operating elements – process steps



Process screen

Button or icon		Meaning
Active	Locked	
		***Application icon*** ▸ Tap briefly to open the parameter list. ▸ Press and hold to open the context menu.
		***Shortcut*** ▸ Open the applications menu.
		***Right/left arrow*** ▸ Open/close the process step display.
		***Process step display*** ▸ View the *parameter list*. ▸ Process step display. **Blue** Active process step during operation **Gray** Non-active process step
		***Screen navigation*** ▸ Switch between the screens of a menu level. **Blue** Selected page **Gray** Additional pages in the level
		***Continue with [text on button] (if part of the process)*** ▸ By tapping on the button, start the next process step shown, e.g., hold vacuum.

Operating elements – parameter list

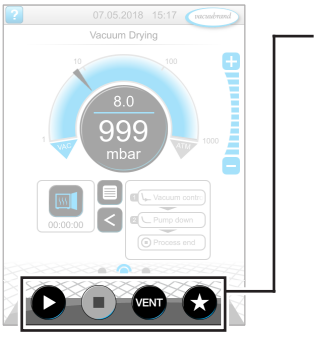
→ Example Parameter list

Symbol (icon)	Meaning
	***Cancel*** ▸ Cancel entry or selection. ▸ Go back to the previous display. ▸ Exit the menu.
	***Help with process step*** ▸ Display information about the process step.
	***Confirm*** ▸ Confirm entry or selection. ▸ Exit the menu. ▸ Acknowledge an error.

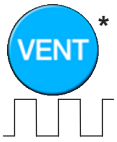
Parameter list

Txt/Num	***Input field or selection field*** ▸ Tap to open a pop-up window where you can enter values or select a function, even during operation.
Blue	Input field for active process
Black	Input field for inactive process

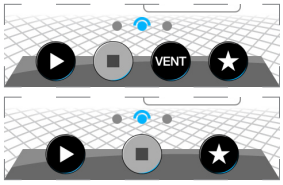
Operating elements for control



Process screen

Button		Function
Active	Locked	
		***Start*** ▸ Start application – only available on the process screen.
		***Stop*** ▸ Stop application – always possible.
		***VENT*** – vent the system (option) ▸ Press button < 2 sec = vent briefly; control continues.
		▸ Press button > 2 sec = vent to atmospheric pressure; vacuum pump is stopped. ▸ Press button during venting = venting is stopped.
		***Favorites*** ▸ View *Favorites* menu.

** Button is only displayed if venting valve is connected or activated.*



= venting valve connected and activated

= no venting valve connected or deactivated

Other icons and their functions

Icon	Meaning
	***Edit*** ▸ Enter description for new application in application editor
	***Process step configuration*** ▸ Adjust process step details in application editor.

6 Operation

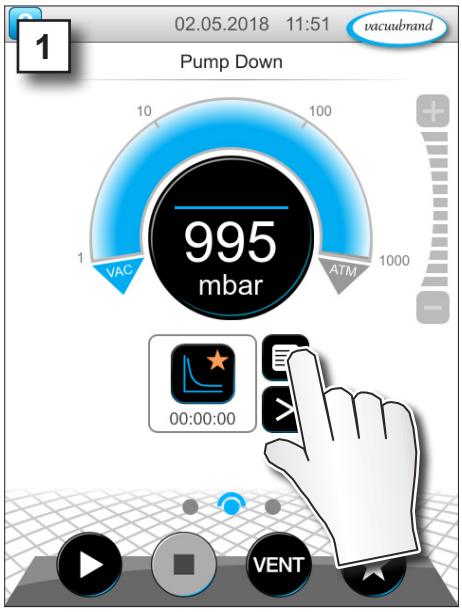
The controller has an application-based user interface. You can select, edit and start an application from a series of pre-defined basic applications. Fine adjustments for the selected application can be made at any time in the parameter list or directly via the *5.4.3 Operating elements and symbols on page 45*.

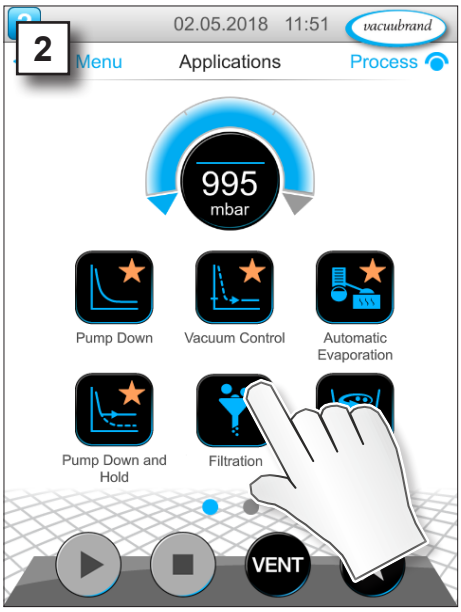
6.1 Applications

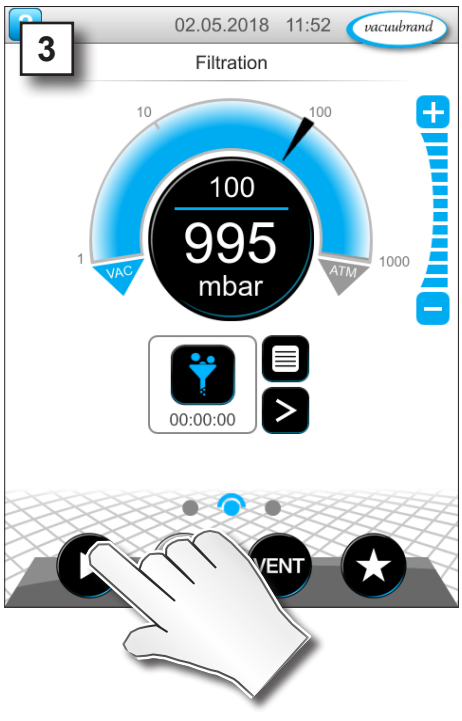
6.1.1 Select and start application

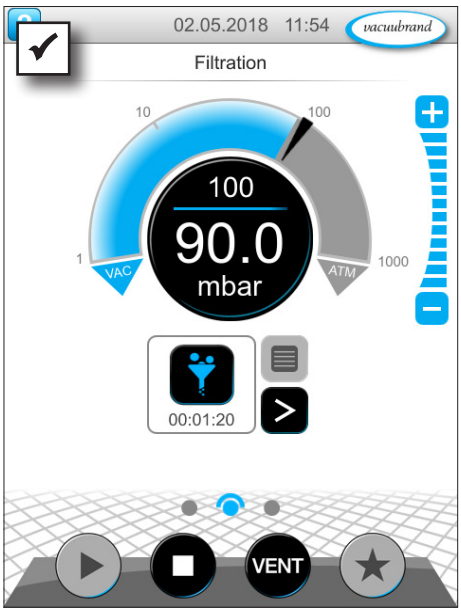
→ Example
Select and start application

Tap/press lightly









☑ Vacuum control running.

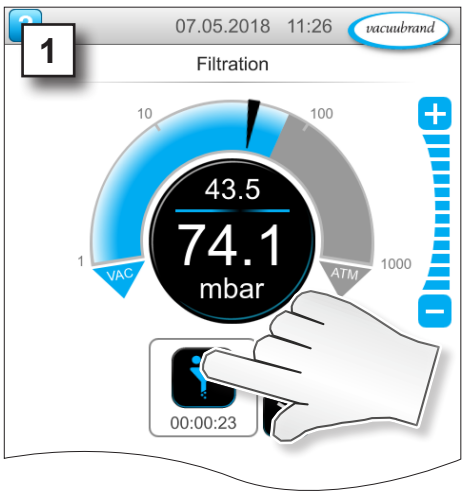
☑ Animated blue dividing line.

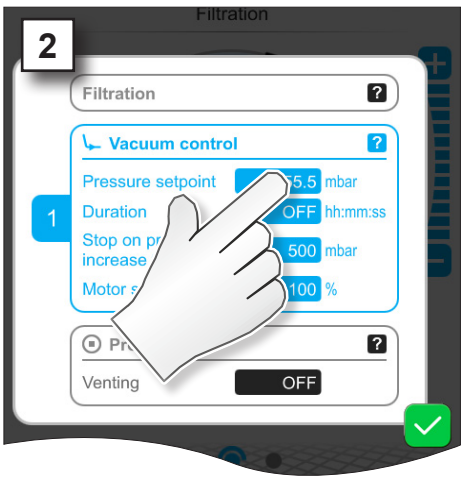
6.1.2 Adjust pressure setpoint

The controller offers a variety of options for adjusting the pressure setpoint during operation.

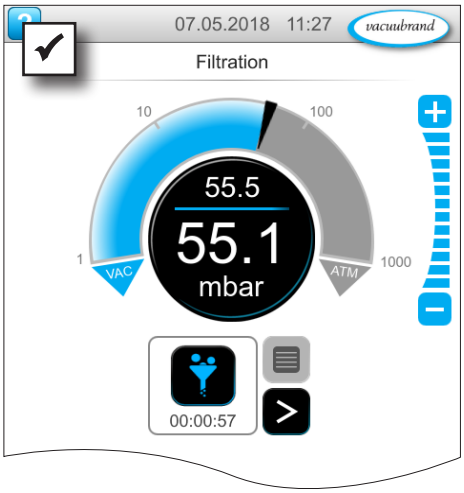
Change pressure setpoint in the parameter list

Tap/press lightly



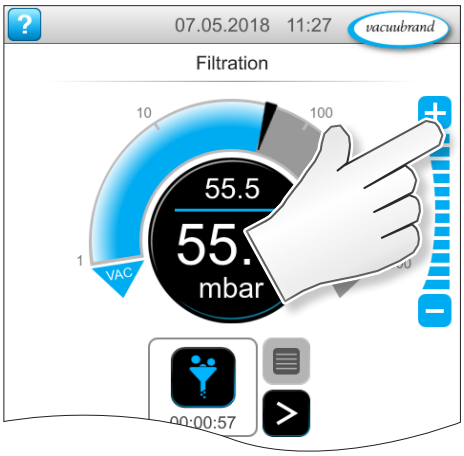


⇨ Enter a target value in the pop-up and confirm the entry 2x.



Fine adjustment via step buttons

Tap/press lightly



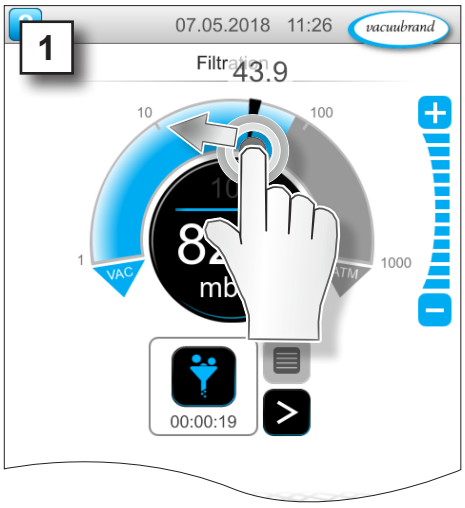
⇨ -Tap or hold down buttons = increase target value

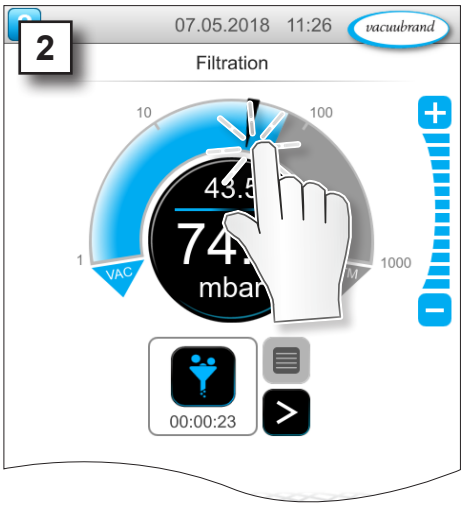
⇨ -Tap or hold down buttons = decrease target value

Adjust pressure setpoint using marker

Hold down and drag

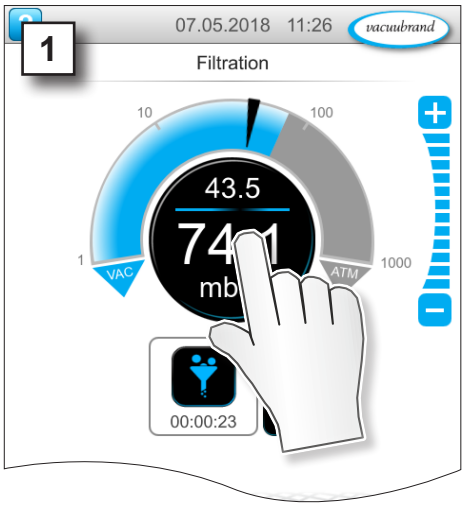
Release

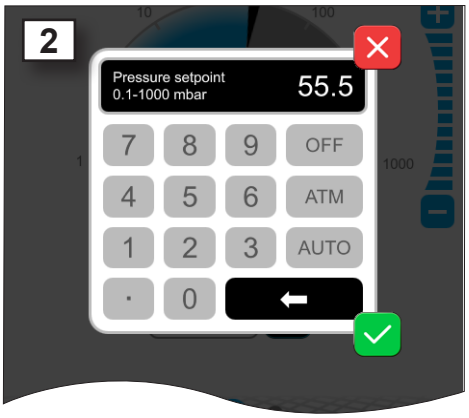




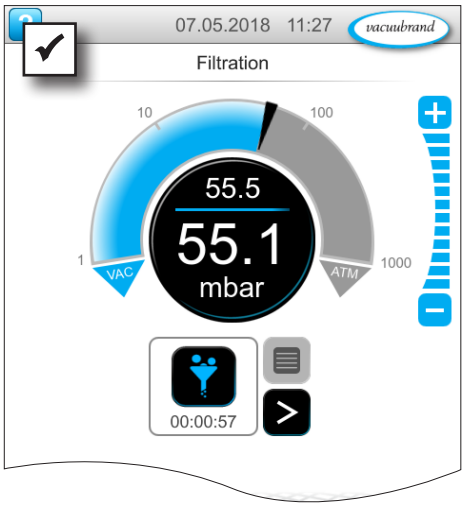
Adjust pressure setpoint in digital pressure display

Tap/press lightly





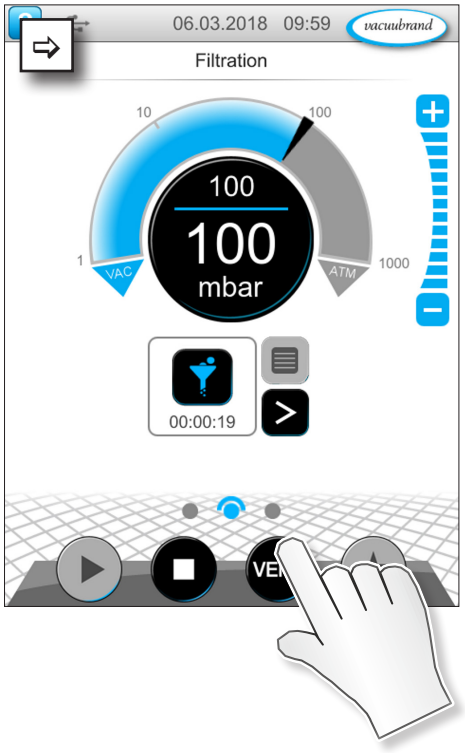
⇨ Enter a target value in the pop-up and confirm the entry.



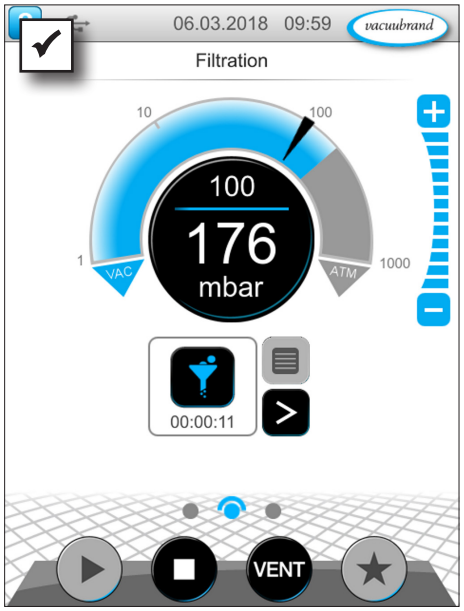
6.1.3 Venting

Vent briefly

Brief venting



Tap/press lightly

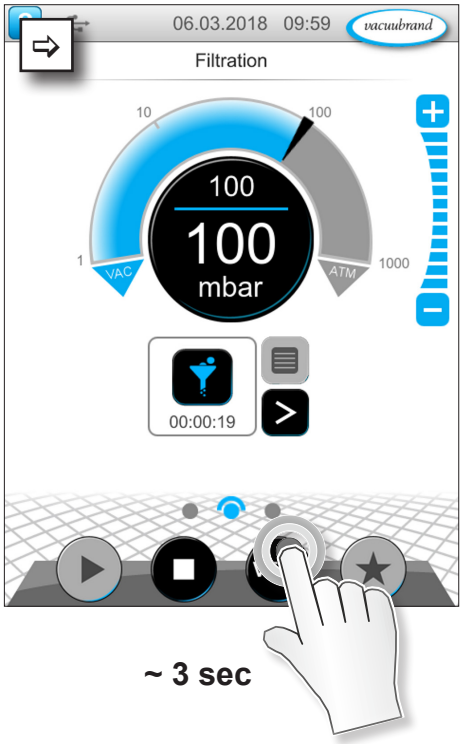


☑ Slight pressure increase.

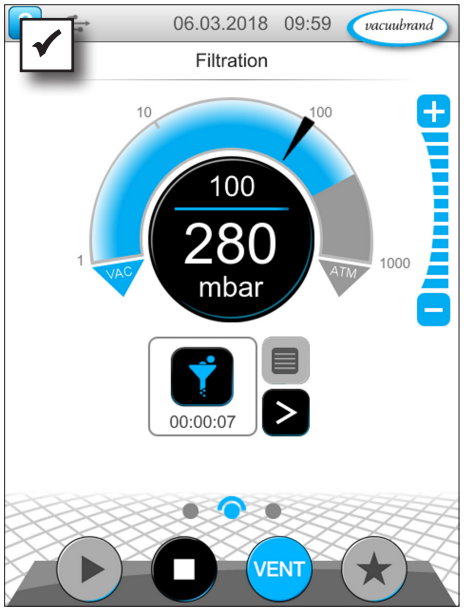
☑ Vacuum control running.

Vent to atmospheric pressure

Continuous venting



Hold down

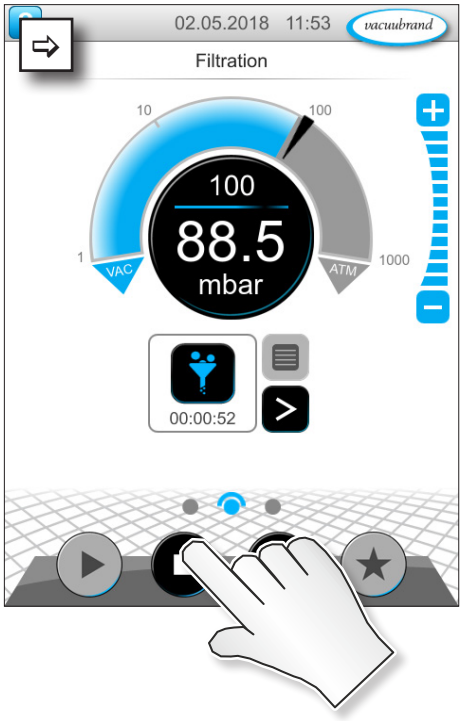


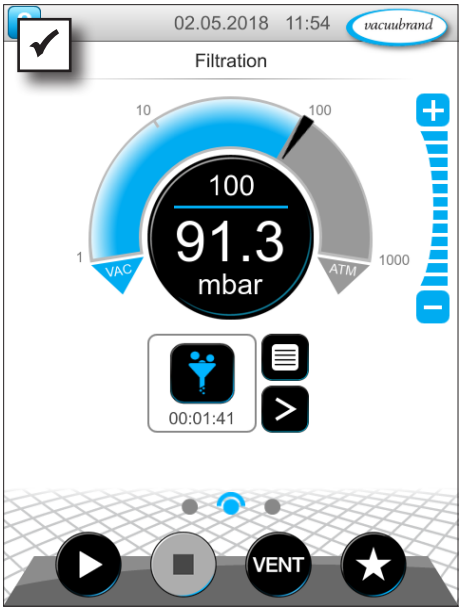
☑ Vacuum control stops.

☑ Pressure increase until atmospheric pressure is reached.

6.1.4 Stop application

Stop application





Tap/press lightly

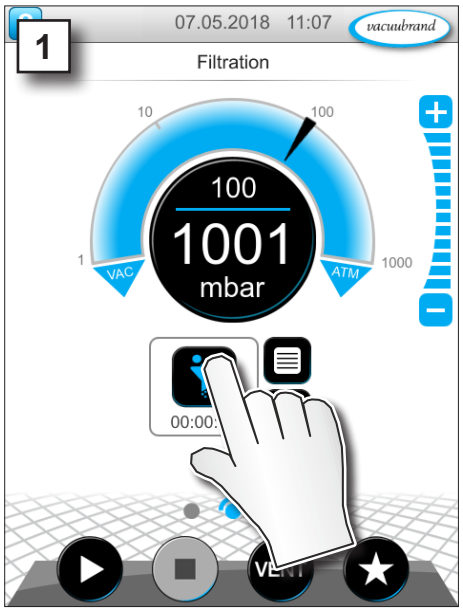
☑ Vacuum control stops.

6.2 Application parameters (parameter list)

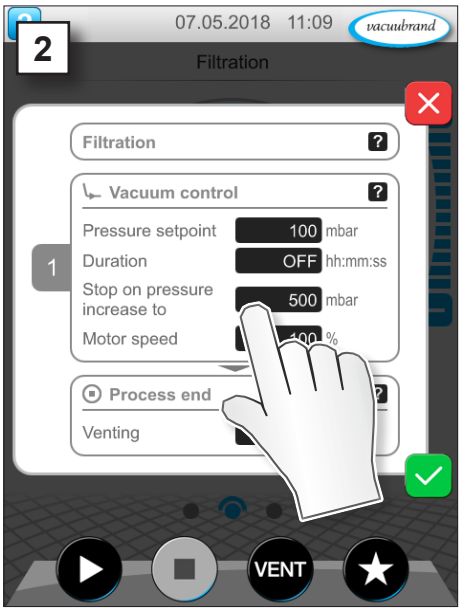
In the parameter list, you can individually change and adapt various process-related values before and during operation.

Adjust parameter

→ Example
Adjust *motor speed*

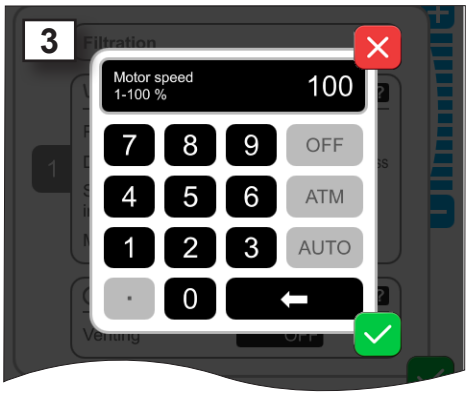


1. View parameter list.



2. Tap on desired input field.

→ Example
Adjust *motor speed* parameter



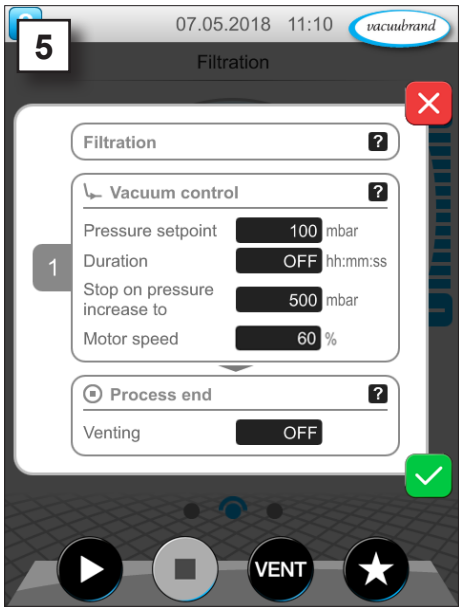
3. Enter the required motor speed in the pop-up.

4. Confirm entry.

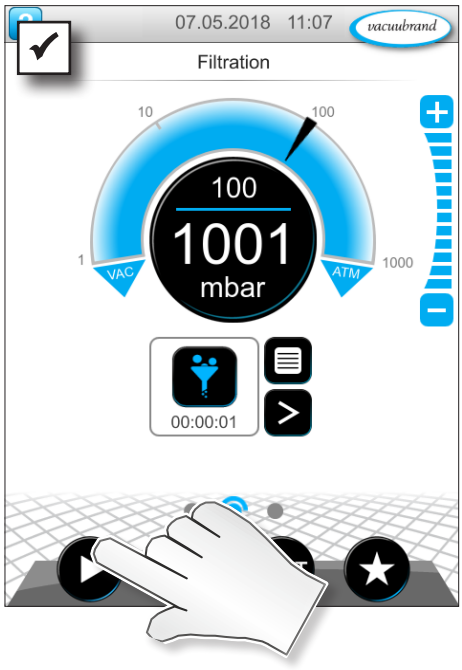
Cancel

Confirm

Tap/press lightly

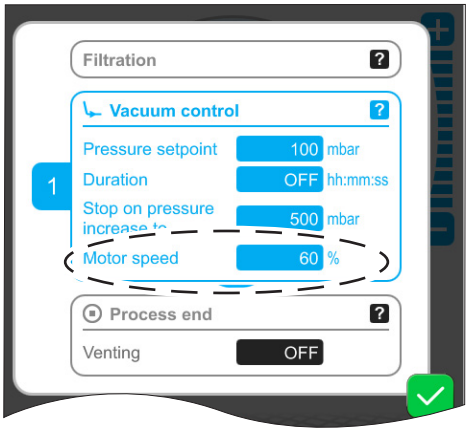


5. Confirm the change in the parameter list.



☑ Once the application starts, the motor runs at the adjusted speed.

→ Example
View of *motor speed* parameter during operation



⇨ You can make individual adjustments for your process in the parameter list at any time.

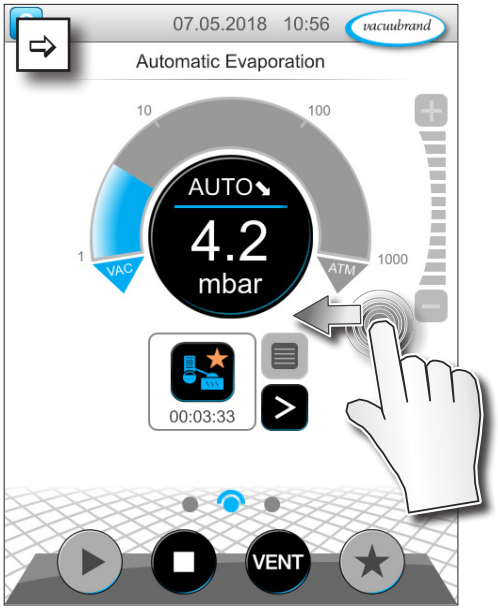
6.3 Pressure graph

The *pressure graph* is on the same level as the process screen. The menu shows pressure curves of measured vacuum values. The pressure curve is shown until a new application is started, at which point it is replotted.

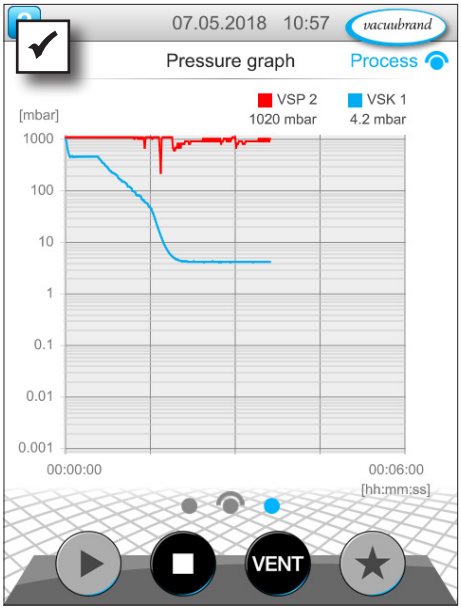
Calling up the Pressure graph

→ Example
View pressure graph

Swipe left



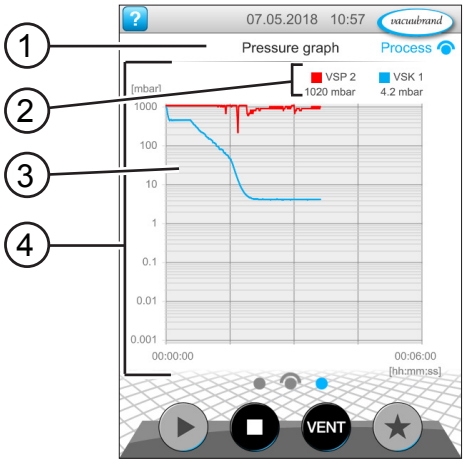
⇨ Swipe left on the display.



☑ Pressure graph display.

☑ Measurement curves of connected vacuum sensors.

Pressure graph display



1	Menu name
2	Key to colors
3	Measurement curve(s)
4	Pressure/time graph

VSK1 VSK1
VSP2 VSP2

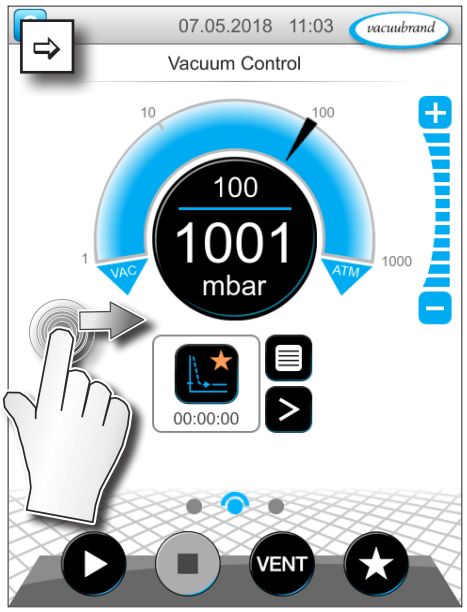
⇨ Tap on the color key of a vacuum sensor to display or hide individual measurement curves.

6.4 Main menu

The *main menu* is on the same level as the process screen. The submenus of the controller can be accessed from the main menu.

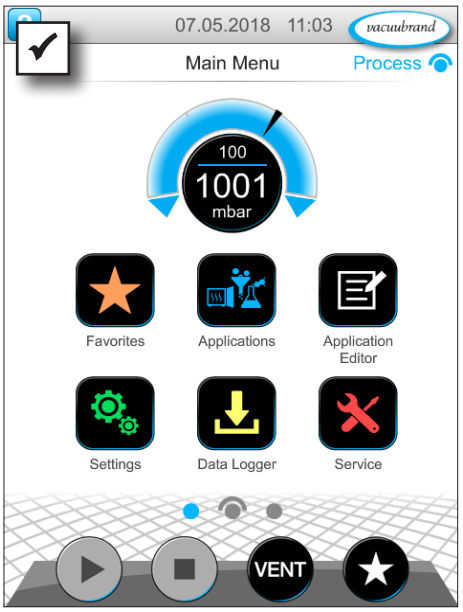
Calling up the Main menu

→ Example
View main menu



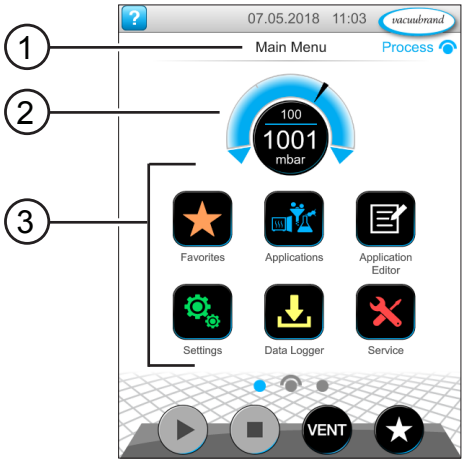
Swipe right

⇨ Swipe right on the display.



☑ Main menu display.

Main menu display



1	Menu name
2	Pressure display
3	Overview of submenus

The function of each submenu is shown by its icon and the text below it.

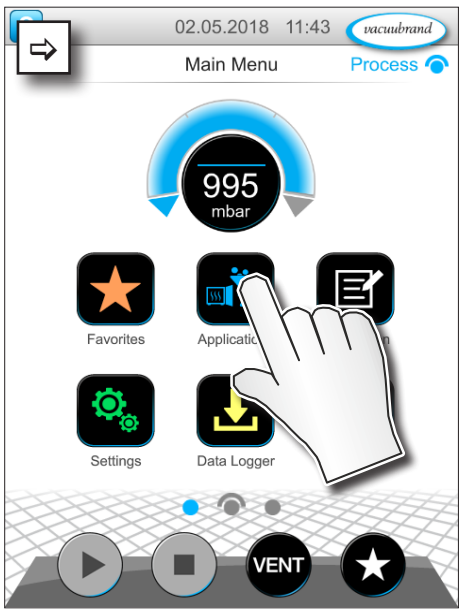
→ *See also chapter: 7.1 Advanced operation*

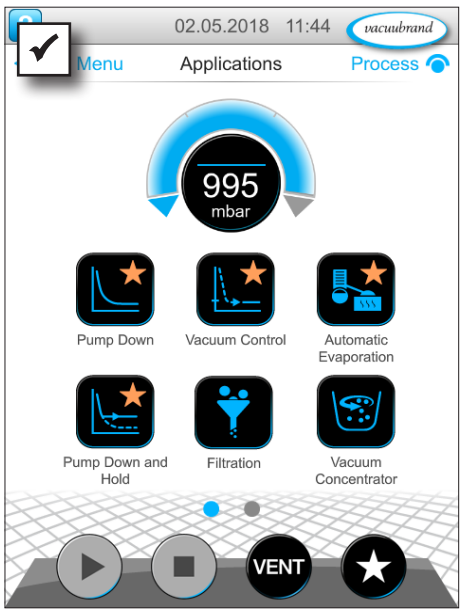
6.4.1 Applications

This menu lists all applications: default application, favorites, and newly created applications.

Calling up the Applications menu

View applications submenu





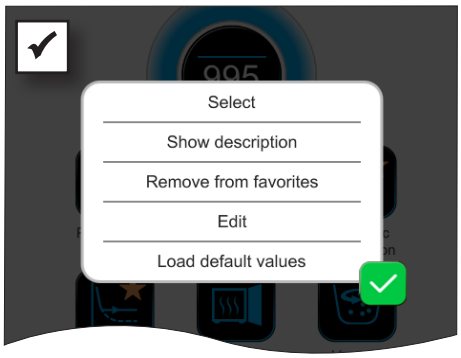
Tap/press lightly

☑ Display the applications submenu.

Show context menu

→ Example

View context menu for applications



Hold down

☑ The context menu appears.

⇨ Select the required function in the context menu.

Would you like to transfer your applications to another VACUU·SELECT?

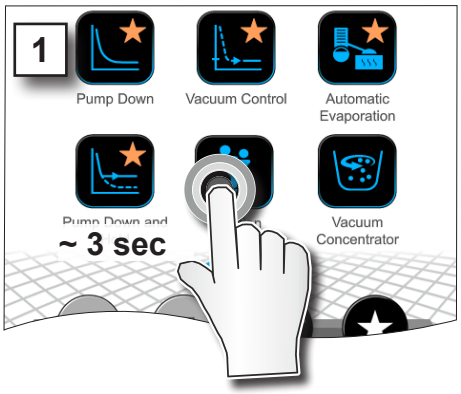
⇨ Simply use the export function as described in chapter: *7.1.9 Administration – Import/Export*

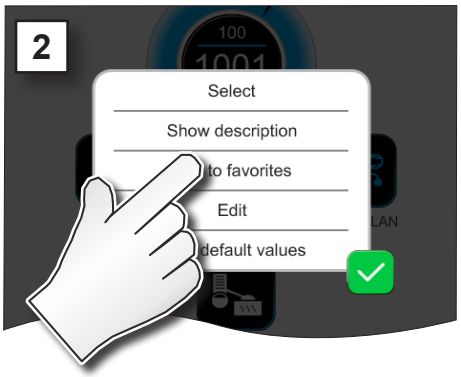
6.4.2 Favorites

Applications marked as favorites are identified by a star on the button.

Add favorites

→ Example Add favorites

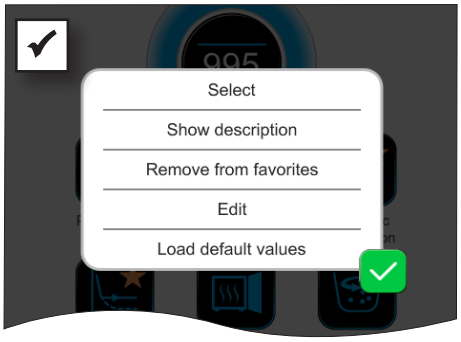




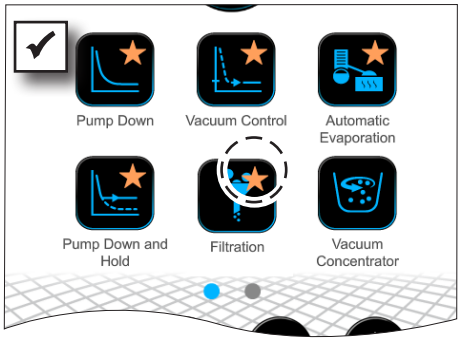
Hold down

Tap/press lightly

Confirm



☑ Text changed in the context menu.

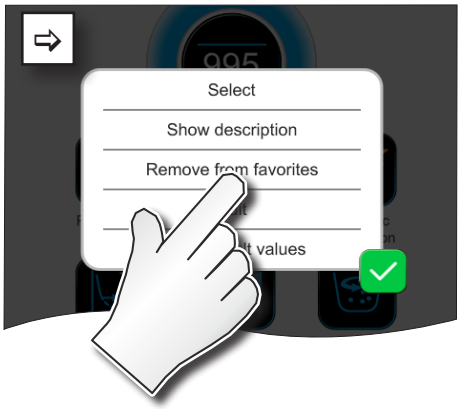


☑ Button with favorites star.

☑ Application listed in favorites menu.

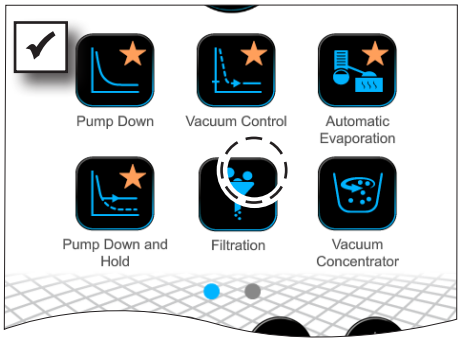
Remove favorites

→ Example Remove favorites



⇨ View the context menu.

⇨ Tap *Remove from favorites* and confirm.



☑ Button without favorites star.

☑ Application removed from favorites menu.

7 Main menu

7.1 Advanced operation

7.1.1 Application editor

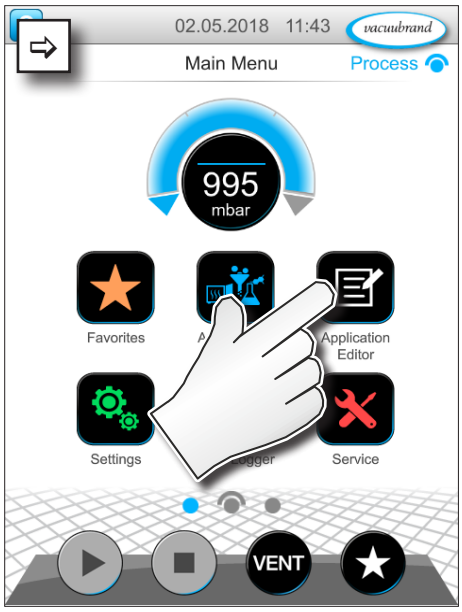
In the application editor, you can compile your own application using the building-block principle and save it with an appropriate name.

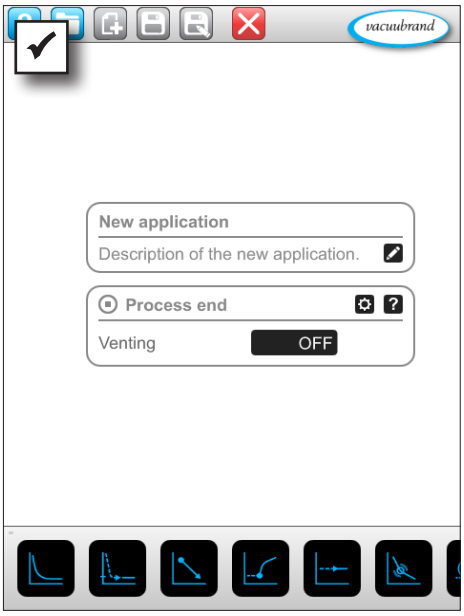
Existing applications can be used in the application editor as templates, and then saved with a new name.

In the case of lengthy applications, you can scroll through the overview of the process steps.

View application editor

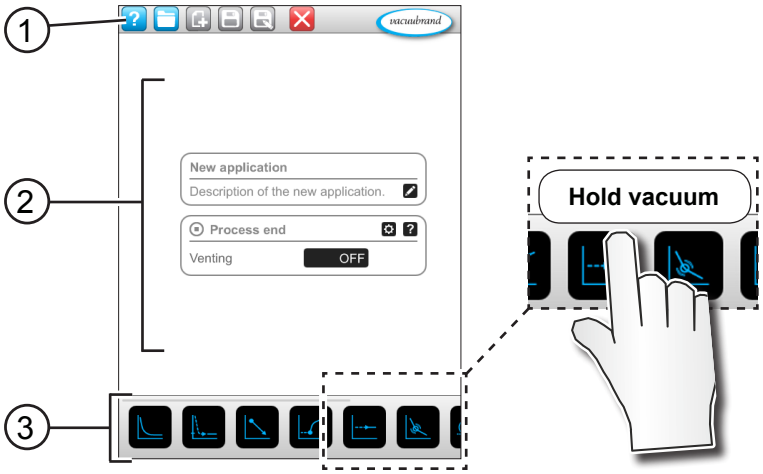
→ Example View application editor





Tap/press lightly

Application editor display

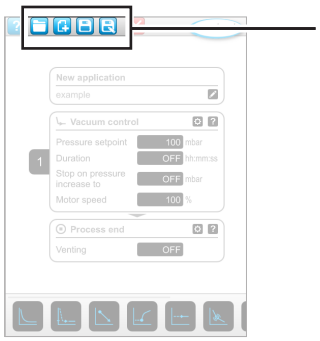


⇨ Tool tips help when selecting process steps.

1	Menu bar
2	Overview of process steps
3	Building blocks with individual process steps which you can scroll through and select as required.

7.1.2 Menu bar and description

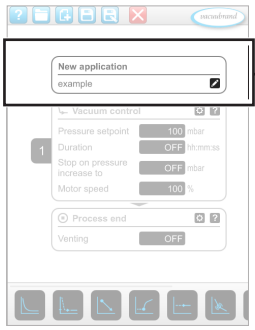
Menu bar



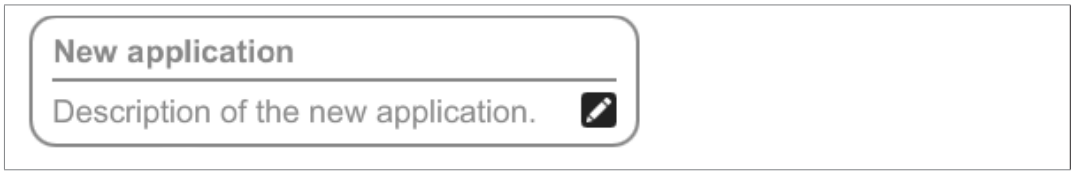
→ Example: Application editor

Icon buttons		Meaning
Active	Locked	
	- - -	***Application templates*** ▸ Search for an application for editing from a series of existing applications.
		***New*** ▸ Create a new application.
		***Save*** ▸ Save application.
		***Save as*** ▸ Name of the application.

Description of the application



→ Example:
Application editor



New application: this name is automatically changed as soon as you give your application an appropriate name using *Save as*.

Description of the new application: here, you can enter a brief description of your application. This description appears later in the parameter list. Custom descriptions are only shown in the creator's language.

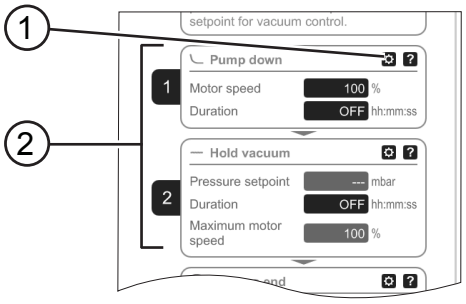
⇨ Open the context menu to enter a description by tapping on:

7.1.3 Overview of process steps

Individual process steps can be added or removed by dragging and dropping. If a process step is dragged onto the editor screen, the image changes. The process step is shown as a numbered process step section.

Meaning of process step section(s)

→ Example
Process step sections



1	Process step configuration
2	Process step section, numbered.

Using the **process step configuration**, you can specify which parameters will later be displayed in the parameter list and which are available for editing.

Each **process step section** represents a process step. By holding down and moving the numbers, process step sections can be (re)arranged as desired.

As a visual aid to help you rearrange the process step sections, a **blue bar** appears at the point where they can be placed.

The process step sections are **numbered** from top to bottom, from 1 to n. If a process step section is added, shifted or removed, the numbering is adjusted automatically.

7.1.4 Process end

Process end means the defined end of an application. Process steps can only be placed above this.

7.1.5 Edit application

Create a new application

→ Example
Create a new application

Tap/press lightly

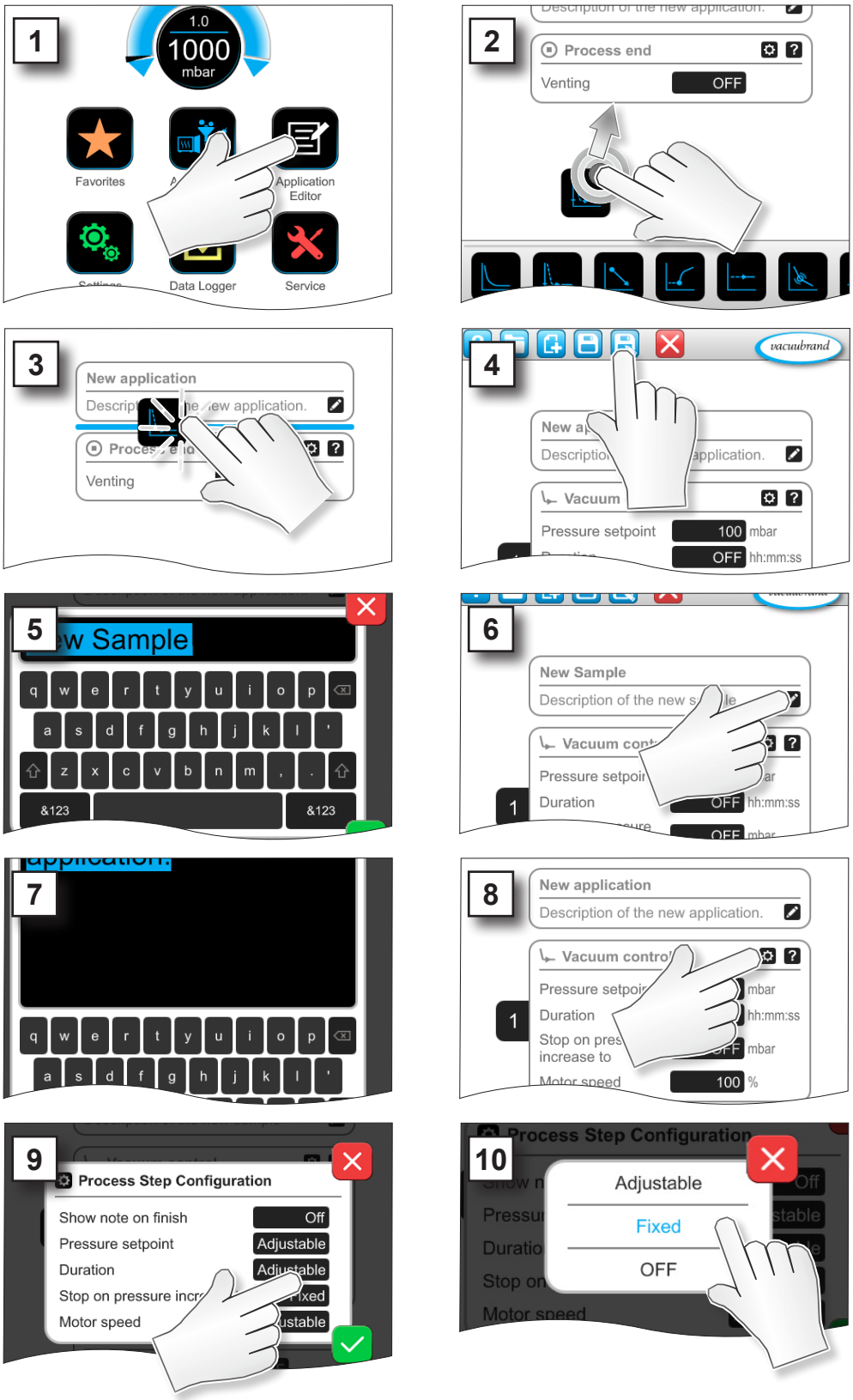
Hold down and drag

Release

Save as

Confirm

Exit menu



→ Example
Edit new application

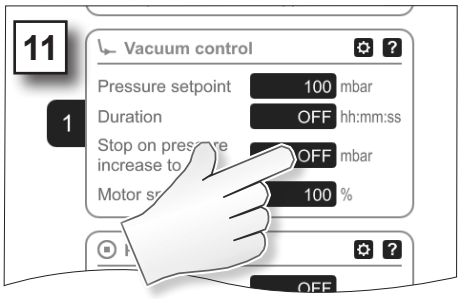
Tap/press lightly

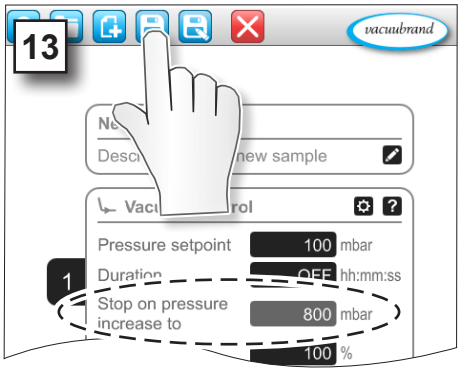
Hold down

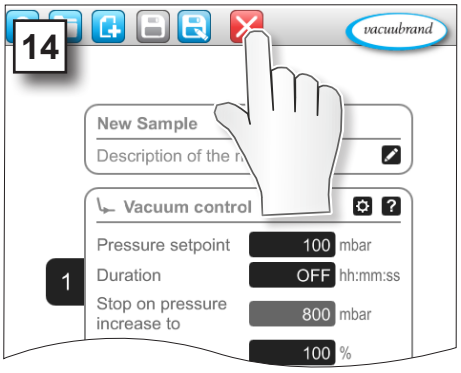
Save

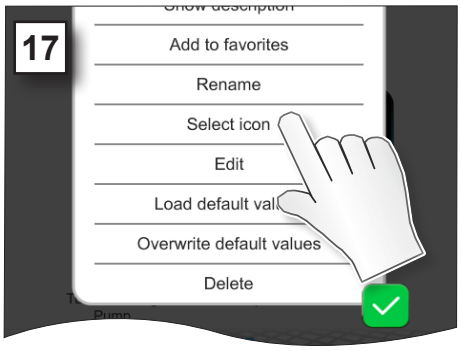
Confirm

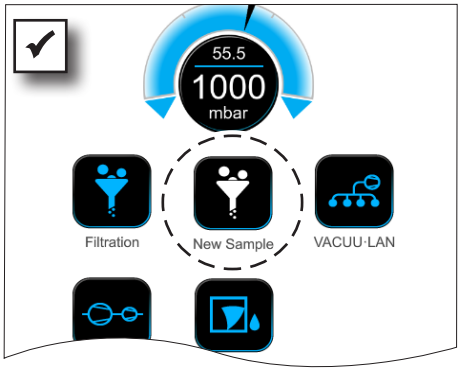
Exit menu











☑ New application listed with white symbol in applications submenu.

7.1.6 Remove process step

Change application

→ Example
Edit existing application


Hold down

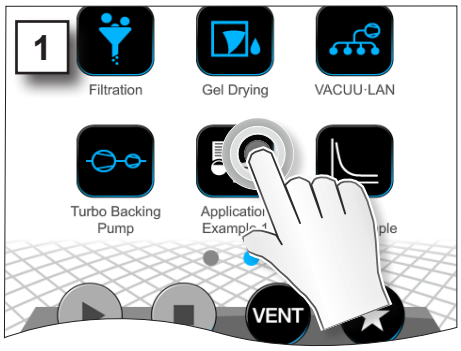

Tap/press lightly

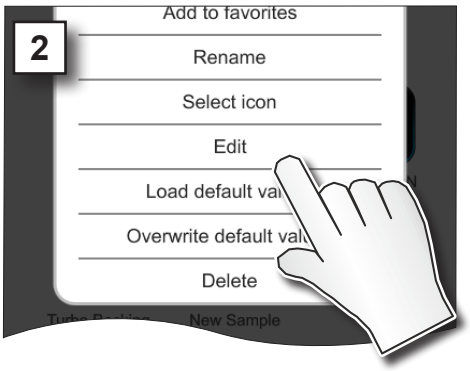

Hold down and drag

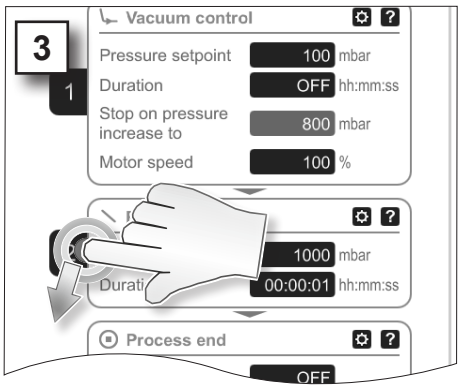

Release

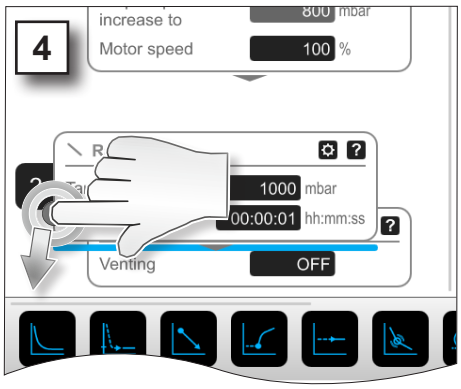

Save

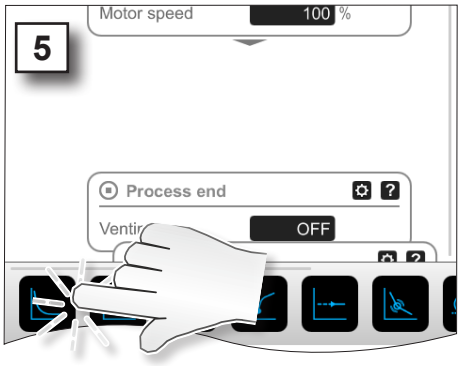

Exit menu

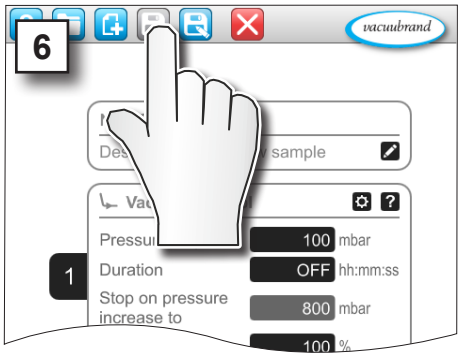


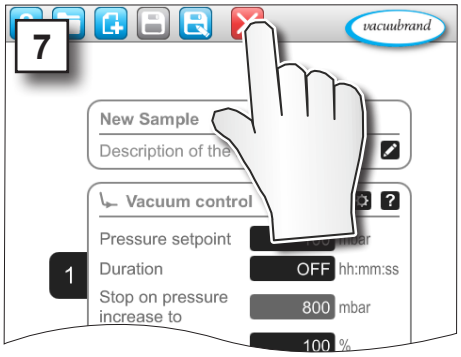


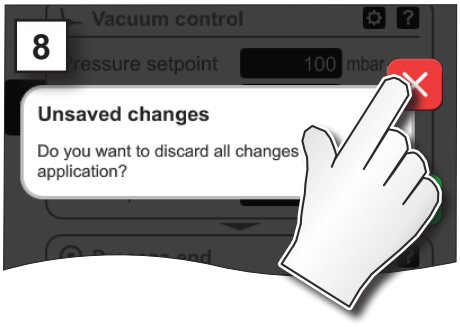












☑ The removed process step is no longer displayed in the parameter list of the application.

7.1.7 Settings

In this submenu you can adjust the display, switch to another language, and make presettings for connected VACUU·BUS peripheral devices.

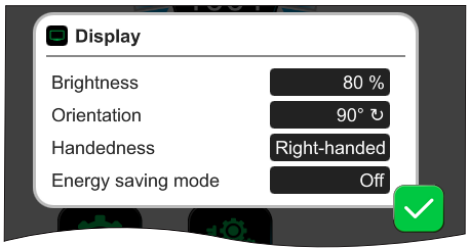
Calling up the Settings submenu

→ Example
Main menu \ Settings \ Basic settings

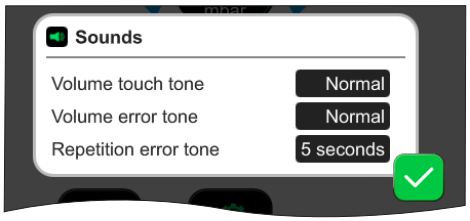
Tap/press lightly

Meaning of the context menu

→ Example
Overview of settings context menus



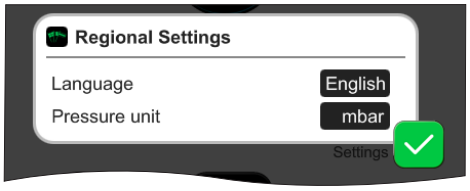
Under **Display**, you can change settings for the screen.



Under **Sounds**, the volume of the acoustic signals for warnings and haptics can be set or switched off.

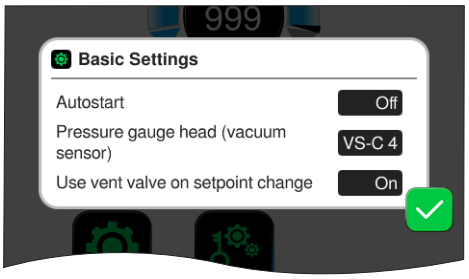
Cancel

Confirm



In **Regional Settings**, you can change the language and pressure unit.

→ Example
Overview of settings context menus



In the **Basic Settings** you can specify default settings for your process:

Description of basic settings

Overview of possible basic settings

Function	Setting	Description
Autostart	Off / On	Off: The controller remains on Stop when the power supply is switched on. On: A started application is continued after the power supply has dropped off (switch off or failure) and is subsequently switched on again. Recommended, for example, when an external switch in the lab furniture is to be used to start up a previously running controller.
Vacuum sensor	VS-C _ / VS-P _	Vacuum sensor selection for the controller, provided more than one is connected. VS-C _: rough vacuum; VS-P _: fine vacuum
Use venting valve when target value changes	Off / On	Off: Venting valve does not respond when target value changes. On: Venting valve responds if required for target value adjustment.
Coolant valve(s) run-on time*	Off / hh:mm:ss	Specified time for coolant run-on time.
Level sensor(s) delay time*	Off / hh:mm:ss	Delay time for switching off after full status indicator.

**Option: Shown if component is connected and recognized.*

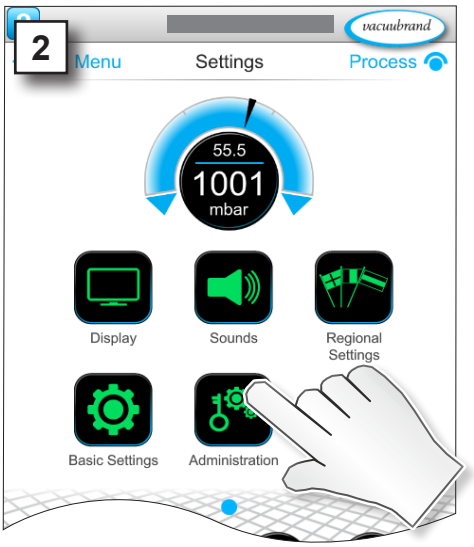
The *Basic Settings* context menu adapts to the connected ***VACUU·BUS*** components, e.g., a level sensor is connected and activated via *component recognition* ⇨ entry for delay time is listed in the context menu.

7.1.8 Settings/Administration

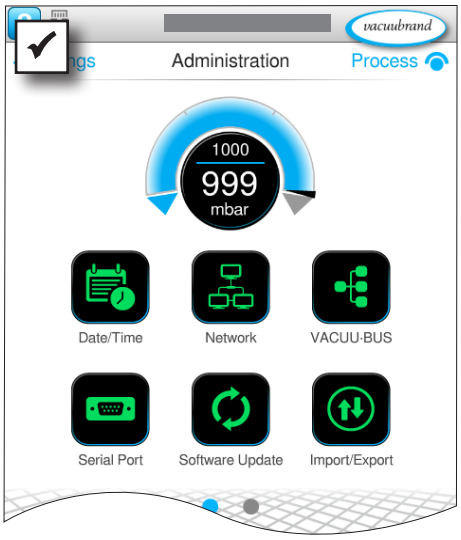
Administration area of the controller – only for authorized staff.

Calling up the Administration submenu

→ Example
Main menu \ Settings \ Administration



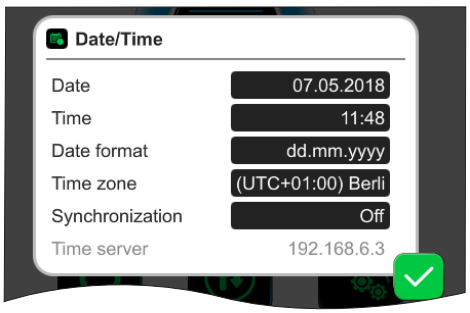
Tap/press lightly



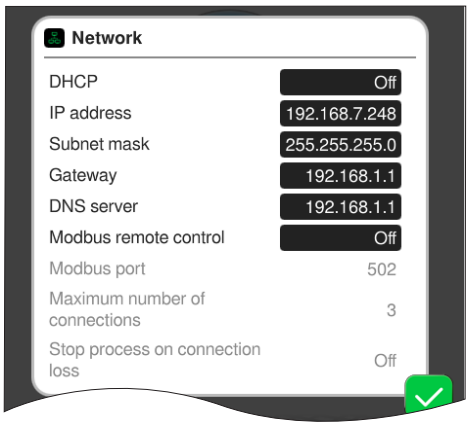
☑ Submenu with buttons for administrative submenus.

Meaning of the context menu

→ Example
Overview Context menu Administration

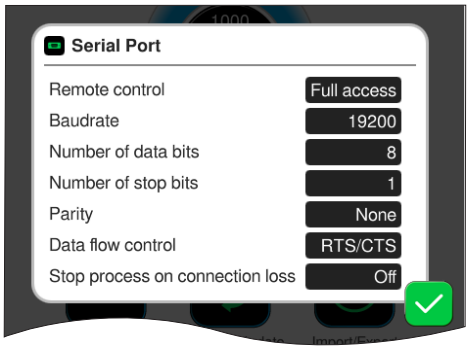


Adjustments for **date and time.**



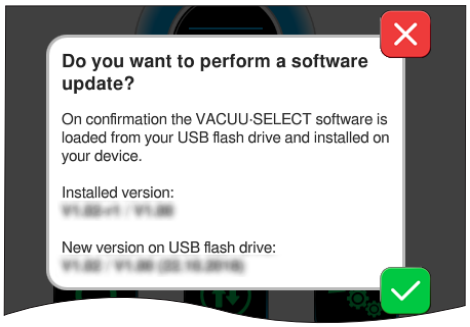
Default settings for integrating the controller into your **Network**.

Activate/deactivate remote control via Modbus.

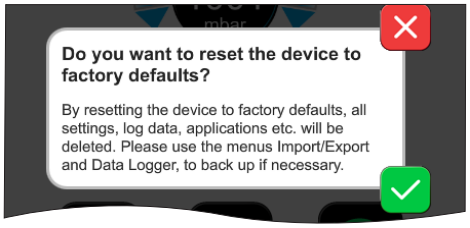


Default settings for **Serial port** and alignment of the communication settings (COM) for RS-232.

Activate/deactivate remote control via RS-232.



Activate command for loading **software update** from connected USB flash drive.



Reset the controller to the **factory settings**.

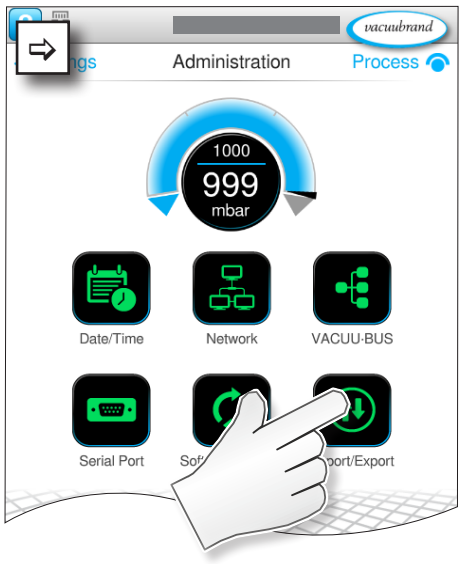
IMPORTANT! Restoring the factory settings deletes all data, settings and applications. The data logger is switched off and recording of diagnostic data is set back to *Minimal*.

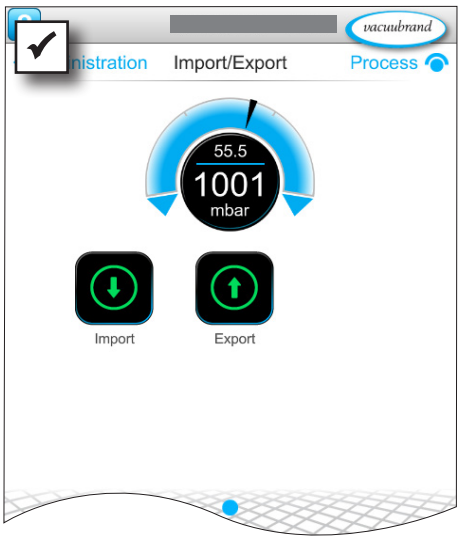
⇨ Back up your settings, applications and data beforehand; see chapters: *7.1.9 Administration – Import/Export* and *7.2 Data logger*

7.1.9 Administration – Import/Export

Calling up the Import/Export submenu

→ Example
Main menu \ Settings \ Administration \ Import/Export

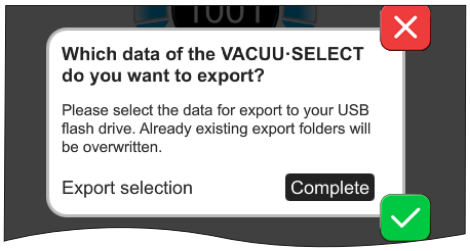




Tap/press lightly

Meaning of the context menu

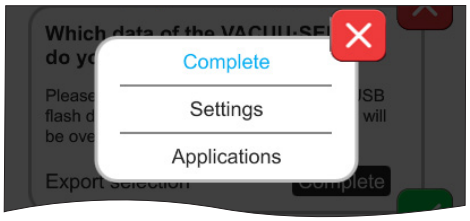
→ Example
Overview Context menu Import/Export



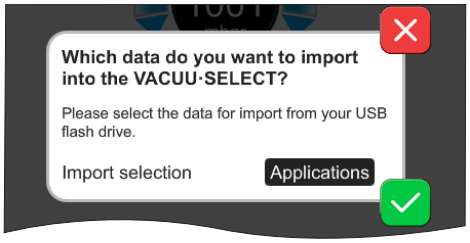
You can use the **export function** to transfer data, such as applications you have created, to other controllers via USB flash drive.

Cancel

Confirm



You can customize the data export by tapping **Complete**, **Settings**, or **Applications**.



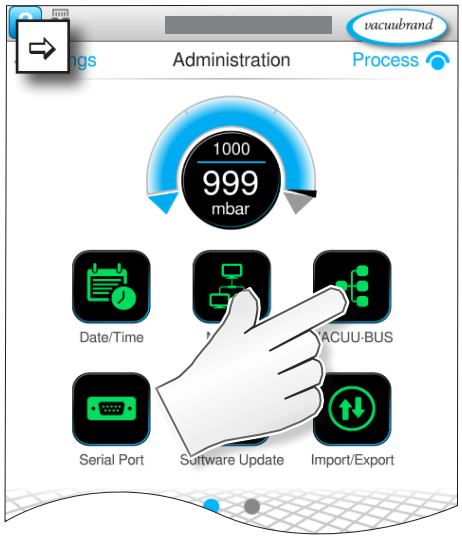
You can use the **import function** to transfer data from another external controller to this controller.

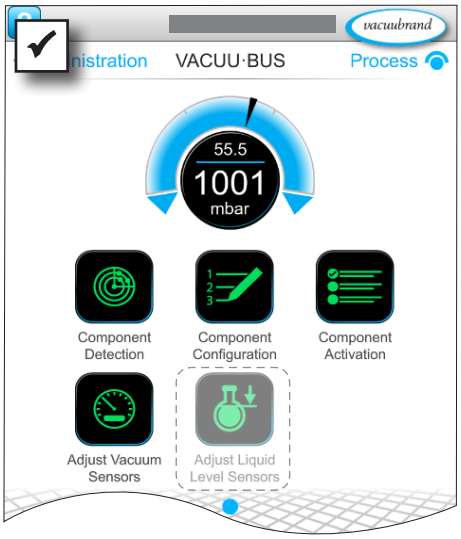
7.1.10 Administration – VACUU·BUS

The VACUU·BUS submenu simplifies the detection and management of VACUU·BUS components.

Calling up the VACUU·BUS submenu

→ Example
Main menu \ Settings \ Administration \ VACUU·BUS



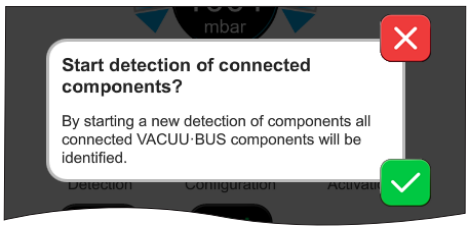


Tap/press lightly

The buttons retrieve context menus. The context menus facilitate the use of presettings for VACUU·BUS components, e.g., address configuration, detection of connected components. Vacuum sensors and level sensors, amongst others, can be calibrated in this submenu.

Meaning of the context menu

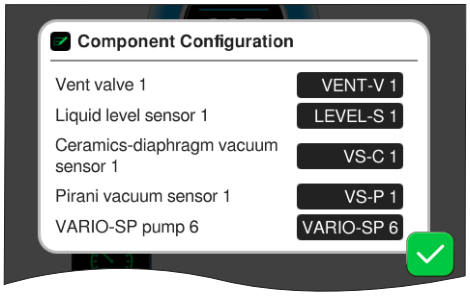
Overview Context menus VACUU·BUS



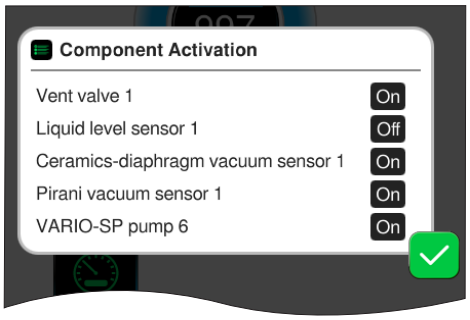
Cancel

Confirm

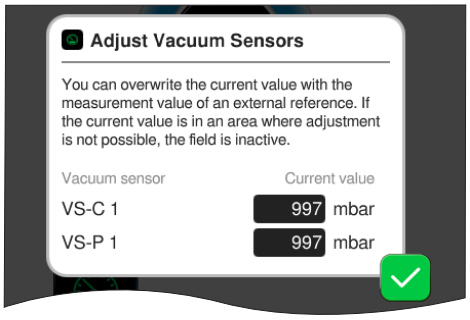
The **Component detection** function scans all connected components and updates the list of connected VACUU·BUS peripherals in the controller.
Example: If one level sensor is removed and component detection is performed, the level sensor will no longer be listed in the component configuration.



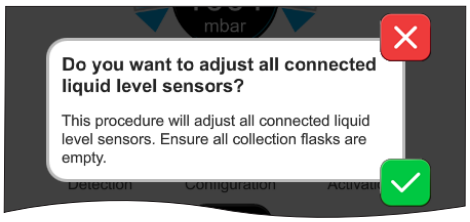
With **component configuration**, the addresses of connected components can be easily changed or reassigned.



Using **component activation**, connected VACUU·BUS components can be individually activated or deactivated, i.e., the components can remain connected but are switched on or off at the controller as required for the ongoing process.



Pop-up for the **calibration** of connected **vacuum sensors** at ambient pressure and under vacuum.



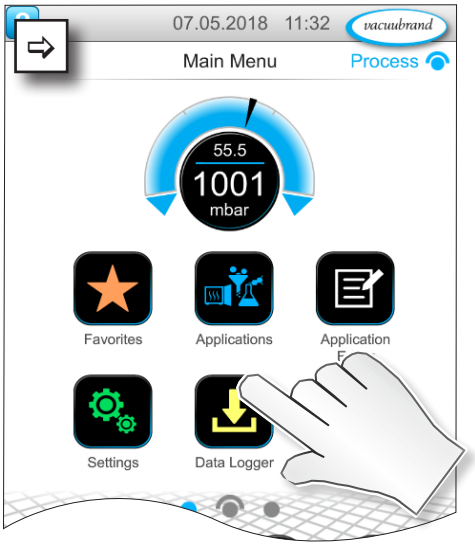
OPTION
Pop-up for the calibration of connected **level sensors.**

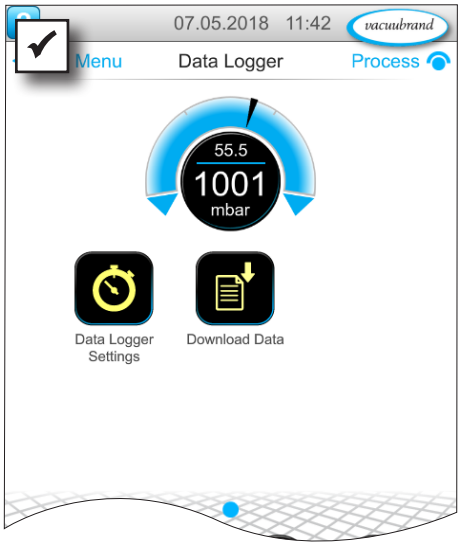
7.2 Data logger

If the function is switched on, the data logger records time/pressure curves and saves these at specified intervals, for a duration of up to 30 days. A separate data file is saved for each process, from start to stop.

Calling up the Data logger submenu

→ Example
Main menu \ Data logger

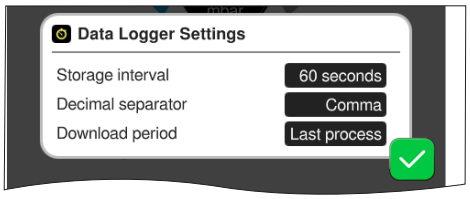




Tap/press lightly

Meaning of the context menu

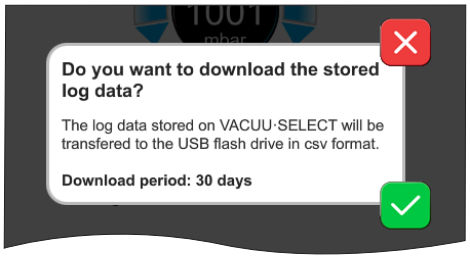
Overview Context menus Data logger



The **Data Logger Settings** enable you to select the storage interval, decimal separator and download period. Data logging can be switched off under *Storage interval*.

Cancel

Confirm



If a USB flash drive is connected, the **log data** for the preset time period can be downloaded here.

Loading the factory settings will reset all settings of the data logger, switch logging off and delete all recorded data.

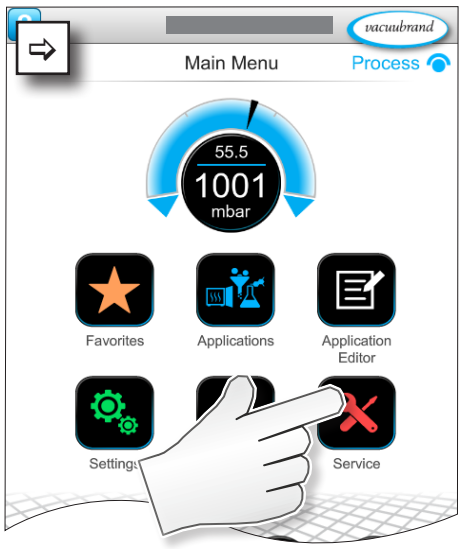
7.3 Service

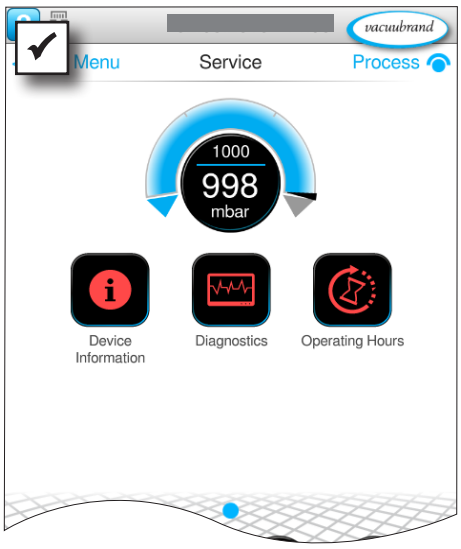
In this menu, you can find or download information about the device. In the event of an error, please forward this information to our Service Department.

7.3.1 Service information

Calling up the Service submenu

→ Example
Main menu \ Service

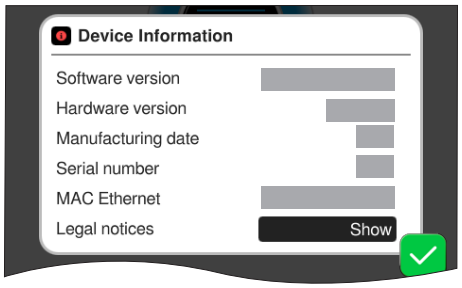




Tap/press lightly

Meaning of the context menu

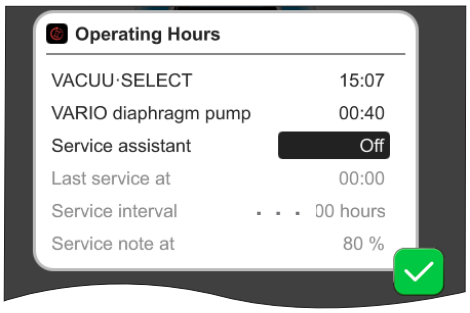
Overview of service context menus



This menu displays **Device Information**.
The *Legal notices* contain licensing information.

Cancel

Confirm



Counter for **hours of operation** with optional maintenance wizard.

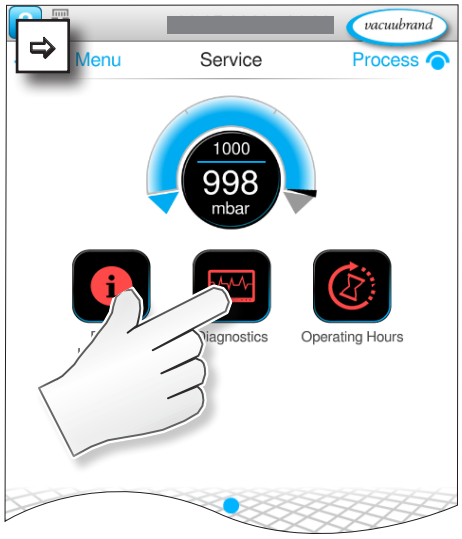
Off: No reminder message.
On: Reminder message for maintenance after specified hours of operation have elapsed.

7.3.2 Diagnostic data

To improve the diagnostics of the device condition in the event of an error or service, diagnostic data is stored on the device. The data can be downloaded onto a USB flash drive via the service menu and sent to our Customer service for evaluation.

Calling up the Diagnostic data submenu

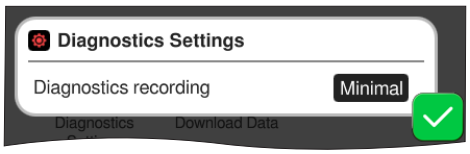
→ Example
Main menu \
Service \
Diagnostic data



Tap/press lightly

Description of context menus

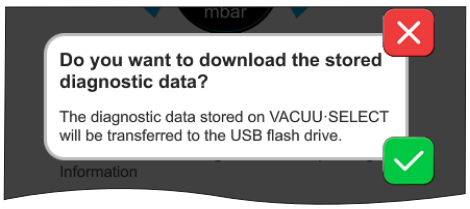
Overview of diagnostic data context menus



The **Diagnostic data settings** enable the extent of data recording to be adjusted.
Minimal: Recording of device data and component faults, without overpressure or full status indicator.
Complete: Same as minimal, plus parameters input by the operator and adjustment of settings.

Cancel

Confirm



If a USB flash drive is connected, the **Diagnostic data** can be downloaded here.

8 Troubleshooting

Technical support

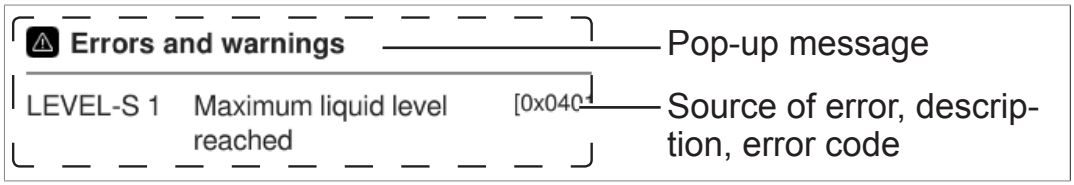
To identify errors and potential remedies, please refer to the troubleshooting table *Error – Cause – Remedy*.

For technical assistance or errors for which you require additional support, please contact your local distributor or our Service Department[1].

8.1 Error messages

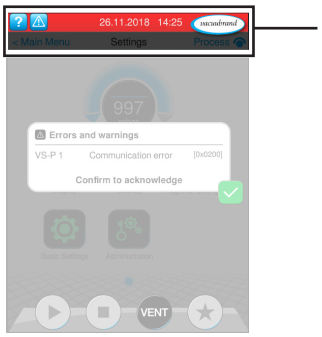
Errors are indicated immediately by the controller as plain text in a pop-up message. The status line provides a visual indication of the extent of the error. In addition, an acoustic signal is emitted while the error persists.

→ Example Error message pop-up



8.1.1 Error indication

Error indication



→ Example Error

Symbol	Meaning
	*Error indication* ▸ Indication in the case of error or warning. ▸ Tap to display text and acknowledge the error.

Color	Meaning
Yellow	*Warning* ▸ Indicates persisting error; process continues to run. ▸ Warnings will be reset automatically after remedy.
Red	*Error* ▸ Indicates persisting error; process stops. ▸ Only after fault elimination and acknowledgment of the error message the process can be restarted.

Sound	Meaning
	*Warning or error* ▸ Shows that an error or warning is present. ▸ Active while error status persists.

8.1.2 Acknowledge error indication

Errors must be acknowledged after the fault has been remedied.

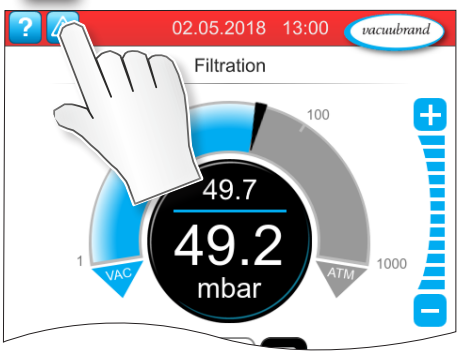
Error information and acknowledgement

View message

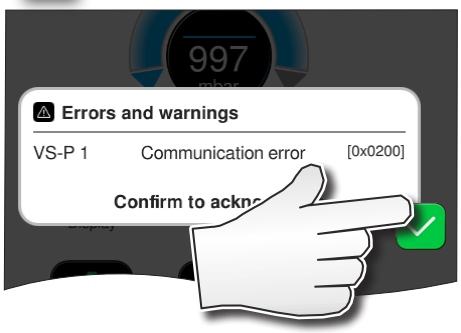
Acknowl-edge

Tap/press lightly

1



2



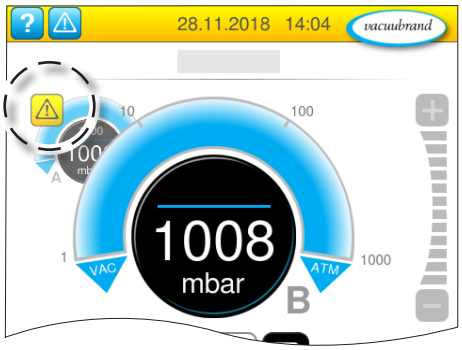
☑ Error message reset.

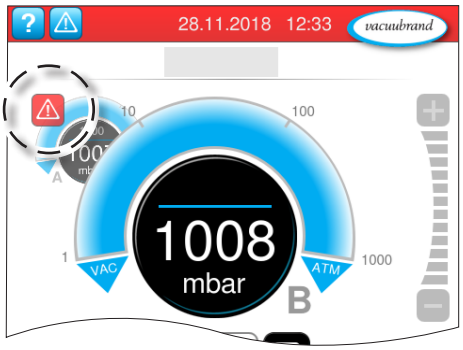
8.1.3 Error indication PC 520/PC 620

Warning

Error

Tap/press lightly





Warnings and / or errors are indicated by a flashing pressure curve. If the flashing pressure curve is pressed, the process with fault can be called up. The process without fault continues operation. If both processes are affected by the fault, both processes stop.

For errors the same rule applies, as for a controller with only one pressure curve: remedy fault and acknowledge error message.

8.2 Error – Cause – Remedy

8.2.1 Pop-up message

Error – Cause – Remedy

Error	▸ Possible cause	✓ Remedy	Personnel
Communication error	▸ One or more VACUU·BUS components were removed.	✓ Deactivate relevant VACUU·BUS components. ✓ Perform component detection.	Specialist
Error at frequency converter (FC)	▸ Address incorrectly configured. ▸ Temperature too high. ▸ FC defective.	✓ Configure correct address. ✓ Replace defective component.	Resp. specialist
Error at control system	▸ Valve defective.	✓ Check address. ✓ Replace defective component.	Specialist
Error at pump	▸ Check VMS-B (switching device).	✓ Send in defective device.	Resp. specialist
Error at digital I/O module	▸ No power supply at IN of I/O module. ▸ Plug pulled out. ▸ An error occurred in the system and the I/O module relayed it to the controller.	✓ Connect power supply. ✓ Check plug-in connection. ✓ Remedy cause of external error.	Specialist, resp. specialist
Error at analog I/O module	▸ No power supply.	✓ Connect power supply.	Specialist
Error at Peltronic	▸ Ambient temperature too high, Peltronic overheated. ▸ Performance requirements too high. ▸ Peltronic defective.	✓ Eliminate cause of overheating of the Peltronic. ✓ Send in defective component. ✓ Replace defective component.	Specialist
Error at vacuum sensor	▸ Vacuum sensor defective.	✓ Send in defective component.	Resp. specialist
Overpressure	▸ Pressure too high. ▸ Measuring range exceeded.	✓ Acknowledge warning indication. ✓ Eliminate cause of overpressure.	Operator, specialist
Underrange	▸ Pressure below measuring range. ▸ Vacuum sensor adjustment incorrect.	✓ Calibrate vacuum sensor correctly.	Specialist

Error	▸ Possible cause	✓Remedy	Personnel
Maximum liquid level reached	▸ Full status indicator of a level sensor. ▸ Level sensor disconnected. ▸ Level sensor not adjusted correctly. ▸ Component defective.	✓ Empty the glass flask or container in question. ✓ Connect level sensor. ✓ If permanently removed, perform the VACUU · BUS component detection. ✓ Re-adjust level sensor. ✓ Exchange defective component.	Operator

8.2.2 General faults

Error	▸ Possible cause	✓Remedy	Personnel
No display	▸ Power plug or plug-in power supply not correctly plugged in or pulled out. ▸ Pumping unit switched off. ▸ VACUU·BUS plug-in connection or cables defective or not connected. ▸ Controller switched off or defective. ▸ Device fuse tripped.	✓ Check power connection or plug-in power supply and cables. ✓ Check VACUU·BUS plug-in connection and cables to the controller. ✓ Replace defective components.	Operator
Display frozen	▸ Controller in undefined state. ▸ Controller has frozen.	✓ Restart the controller. Hold down ON/OFF button for more than 10 seconds until device reboots.	Operator
Circuit board fuse defective	▸ Short circuit on the circuit board. ▸ Defective accessory connected. ▸ Power consumption too high.	✓ Remedy cause of the short circuit and replace circuit board fuse. ✓ Send in.	Resp. specialist

Error	▸ Possible cause	✓ Remedy	Personnel
Transfer failed	▸ No USB flash drive connected. ▸ Not enough storage space on the USB flash drive.	✓ Connect a USB flash drive with sufficient storage space.	Specialist
Venting valve does not operate	▸ No voltage applied. ▸ VACUU·BUS plug-in connection or cables defective or not connected. ▸ Venting valve dirty (polluted). ▸ Venting valve in sensor defective. ▸ Venting valve deactivated.	✓ Check VACUU·BUS plug-in connection and cables to the controller. ✓ Clean venting valve. ✓ If necessary, use another external venting valve. ✓ Activate venting valve in the controller.	Specialist
No operation possible	▸ Interface connected: Ethernet and/or RS-232. ▸ Operation from external terminal.	✓ Have operation enabled from external terminal. ✓ Disconnect interface connection.	Resp. contractor

8.3 Device fuse

There is a device fuse, type: Nano fuse 4 A/t, on the circuit board of the controller. If blown, the fuse can be replaced under ESD conditions after the cause has been remedied.

NOTE

Damage possible if work is performed incorrectly.

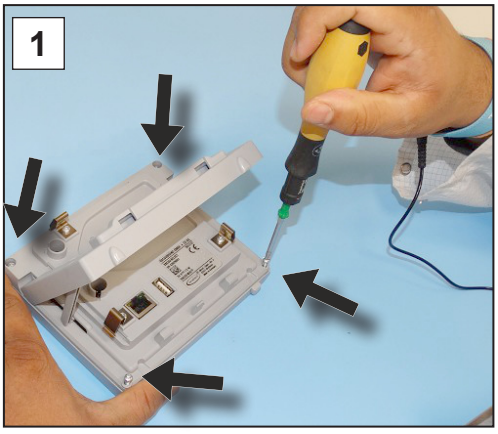
⇨ Have maintenance work performed by a trained electrician or at least by a person with electrotechnical expertise.

⇨ Ensure ESD safeguards when working with the circuit board.

Change device fuse

ESD tools required: Grounding wristband, flat-head screwdriver Gr. 1, Torx screwdriver with torque of TX10, tweezers.

Change device fuse



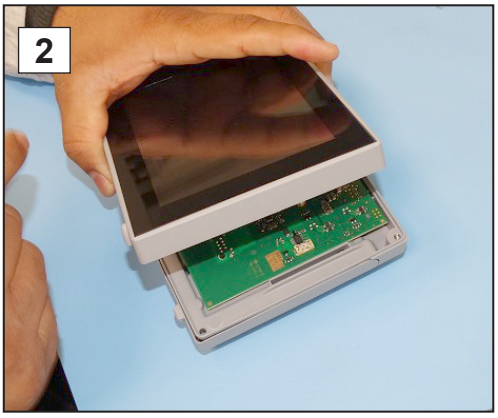
Preparation:

⇨ Have the tools ready (see image).

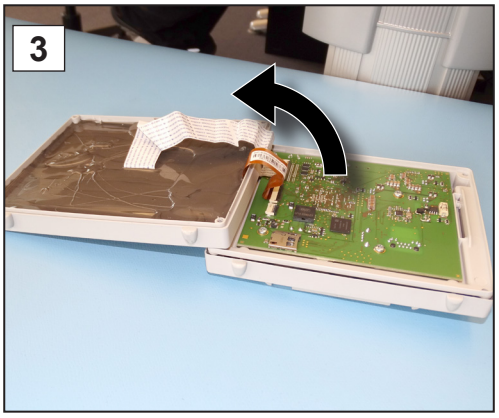
⇨ Disconnect the controller from the power supply.

1. Lay the controller carefully face down and unscrew the 4 screws in the housing.

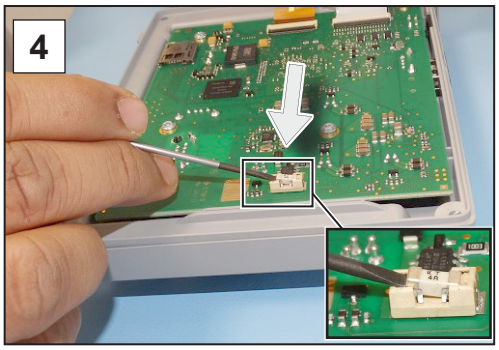
Change device fuse



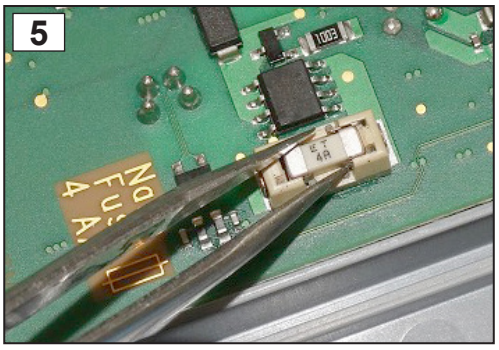
2. Carefully lift the display.



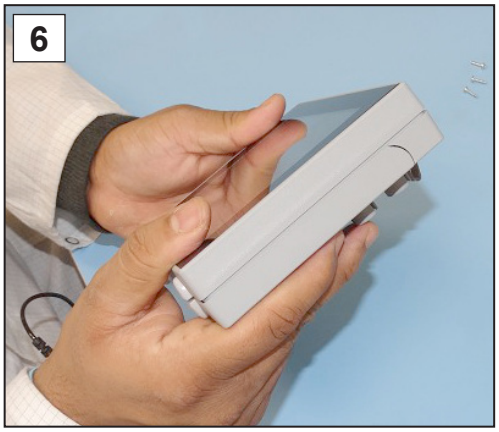
3. Carefully pivot back the display.



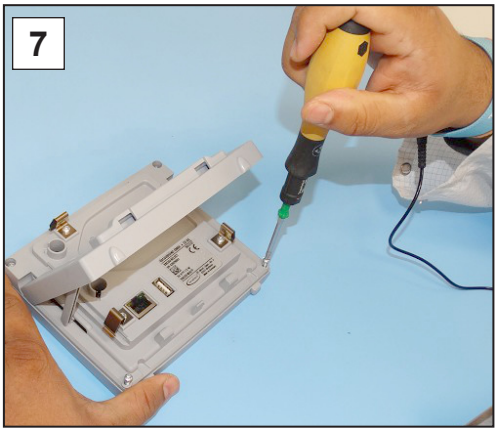
4. Lever the fuse out of the base.



5. Insert the new fuse into the base.



6. Close the housing tightly.



7. Tighten the housing screws with the Torx screwdriver; torque 1.1 Nm.

Nano fuse 4 A/t	20612952

9 Appendix

9.1 Technical information

Type	
Vacuum controller	***VACUU·SELECT***®
Software version	V1.04 / V1.00

9.1.1 Technical data

Technical data

Ambient conditions		(US)
Working temperature	10-40 °C	50–104 °F
Storage/transport temperature	-10-60 °C	14-140 °F
Max. altitude	2000 m above sea level	6562 ft above sea level
Protection class	IP 40 (IP 20 ⇨ PC 3001)	
Relative humidity	30-85 %, non-condensing	
Prevent condensation or contamination from dust or liquids		

Electrical data	
Nominal voltage	24 VDC
Controller output	1.2 W
Power supply via	VACUU·BUS®
Device fuse on circuit board	Nano fuse 4 A/t

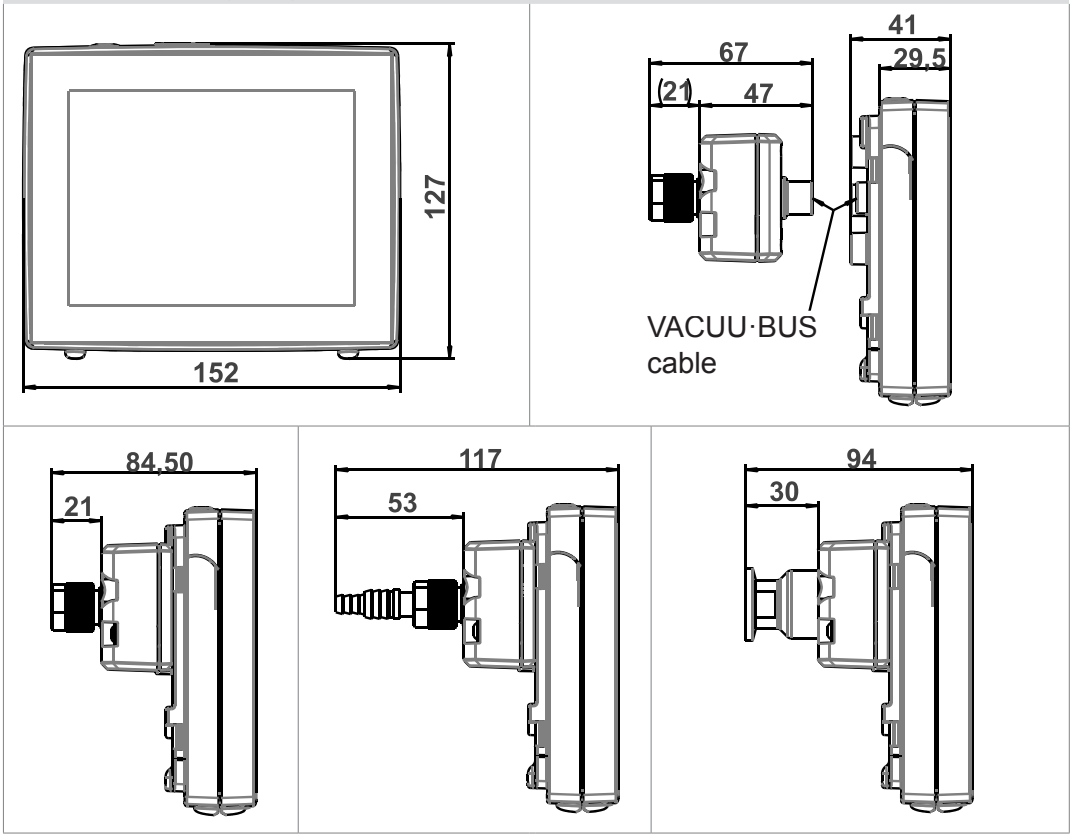
Interfaces	
Plug-in connector	VACUU·BUS®
Ethernet (LAN)	Patch cable min. cat. 5e RJ45
USB port (1.0–2.0)	2x USB-A 2.0, max. 0.5 A per port

Connections	
VACUU·SELECT® Sensor	Small flange KF DN 16 Hose nozzle DN 6/10 PTFE hose DN 8/10
Venting valve, optional	Silicone tube DN 4/6

Weights		(US)
Controller with sensor	745 g	1.64 lb
Controller without sensor	590 g	1.3 lb
Plug-in power supply	250 g	0.55 lb

Dimensions

Dimensions (mm)



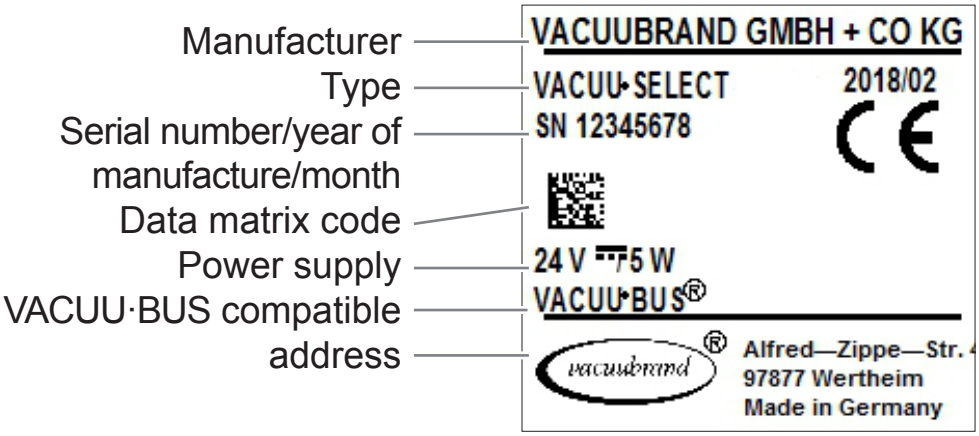
9.1.2 Rating plate

⇨ In the event of an error, make a note of the type and serial number on the rating plate.

⇨ When contacting our Service Department, please provide the type and serial number from the rating plate. This will allow us to provide you with specific support and advice for your device.

VACUU·SELECT® rating plate, general

Data on rating plate



9.1.3 VACUU·SELECT® Sensor (optional)

Wetted materials

Wetted materials

Component	Wetted materials
Sensor	Aluminum oxide ceramic, gold-coated (if applicable)
Measurement chamber	PPS
Small flange	PP
Sealing ring at the sensor	Chemically resistant fluoroelastomer
O-ring inside small flange	FKM
Hose nozzle	PP
Venting valve seal	FFKM
Optional: blind plugs without venting valve	Epoxy resin

Vacuum data

Vacuum data

Values		(US)
Measuring range (absolute)	1060–0.1 mbar	795–0.1 Torr
Accuracy of measurement	±1 mbar/hPa/Torr, ±1 digit, with VACUU·SELECT® vacuum controller (after adjustment, constant temperature)	
Measuring principle	Ceramic diaphragm (aluminum oxide, gold-coated), capacitive, gas type independent, absolute pressure	
Temperature coefficient	< ±0.15 mbar (hPa)/K	< ±0.11 Torr/K
Maximum admissible pressure, abs.	1.5 bar	1125 Torr
Maximum admissible media temperature (gas), non-explosive atmosphere:		
Short term (< 5 min)	80 °C	176 °F
Continuous operation	45 °C	113 °F
ATEX conformity	II 3/- G IIC T4 X Internal Atm. only	
Maximum admissible media temperature (gas) Ex atmosphere:		
Short term	40 °C	104 °F
Continuous operation	40 °C	104 °F

9.2 Ordering information

Ordering information

Vacuum controller	Order no.
VACUU·SELECT® with power supply unit, with sensor	20700000
VACUU·SELECT® without power supply unit, without sensor	20700040
VACUU·SELECT® with power supply unit, without sensor	20700050

Accessories	Order no.
Vacuum hose DN 6 mm (l = 1000 mm)	20686000
PTFE hose KF 16	20686031
Silicone rubber hose 3/6 (vent with inert gas)	20636156
VACUU·BUS wall duct	20636153
DAkkS calibration with first delivery	20900214
DAkkS recalibration	20900215
Adapter cable, USB to RS-232, 1 m	20637838
RS-232C null modem cable, 2x socket Sub-D 9-pin, 1.5 m	20637837

Overview of possible VACUU·BUS® components (Optional)

VACUU·BUS peripheral devices		Order no.
Vacuum sensor	VACUU·SELECT® Sensor	20700020
	VACUU·SELECT® Sensor without venting valve	20700021
	VSK 3000	20636657
	VSP 3000	20640530
Vacuum gauge	VACUU·VIEW	20683220
	VACUU·VIEW extended	20683210
Vacuum valve (in-line solenoid valve)	VV-B 6	20674290
	VV-B 6C	20674291
	VV-B 15C, KF 16	20674210
	VV-B 15C, KF 25	20674215
Cooling water valve	VKW-B	20674220
Venting valve	VBM-B	20674217
	VACUU·SELECT® Sensor	20700020
Module for switching a vacuum pump	VMS-B	20676030
...I/O module	Digital... IN: 5-75 VDC / OUT: 60 VDC (2.5 A) IN: 5-50 VAC / OUT: 40 VAC (2.5 A)	20636228
	Analog... IN: 0-10 V / OUT: 0-10 V	20636229
	Analog... IN: 4-20 mA / OUT: 0-10 V	20635425
Emission condenser	Peltronic	20699905
Level sensor	for 500 ml round bottom flask	20699908

Ordering information Spare parts

Spare parts		Order no.
Hose nozzle DN 6/10		20636635
Small flange KF 16 PP Protective cap DN 10/16 O-ring		20635008
Extension cable	VACUU·BUS® 0.5 m	20612875
	VACUU·BUS® 2 m	20612552
	VACUU·BUS® 10 m	22618493
VACUU·BUS® Y adapter		20636656
Safety information for vacuum equipment		20999254
Instructions for use		20901057

Sources of supply

International sales offices and distribution

Purchase original accessories and original spare parts from a subsidiary of **VACUUBRAND GMBH + CO KG** or your local distributor.

- ⇨ Information about our complete product range is available in the current product catalog.
- ⇨ Your local distributor or **VACUUBRAND GMBH + CO KG** sales ofice is available to assist you with orders, questions on vacuum control and optimal accessories.

9.3 Licensing information and data protection

Legal notices and diagnostic data

⇨ This product contains open source software. The associated licensing information can be found in the VACUU·SELECT, in the service menu
→ *Device Information* under the heading *Legal notices*

⇨ The controller records data for diagnostic purposes. The recording of *Diagnostic data* can be minimized. Restoring the factory settings will cause this data to be deleted.

To display Legal notices or adjust Diagnostic data

→ See chapter: *7.3 Service on page 74*

9.4 Services

Service offer and service range

Take advantage of the comprehensive range of services available from **VACUUBRAND GMBH + CO KG**.

Services in detail

- Product consultation and practical solutions
- Fast delivery of spare parts and accessories
- Professional maintenance
- Immediate repairs processing
- On-site service (on request)
- Calibration (DAkkS-accredited)
- With Health and Safety Clearance form: return, disposal.

⇨ Visit our website for further information: www.vacuubrand.com.

Service handling

Follow the terms of service

1. Contact your local distributor or our Service Department.
2. Request an RMA no. for your order.
3. Clean the product thoroughly or if necessary, decontaminate it professionally.
4. Download the Health and Safety Clearance form.
5. Fill out the Health and Safety Clearance form in full.
6. Return your product, including:
   - RMA no. and description of the error
   - Repair or service order
   - Health and Safety Clearance form
   - Attach everything to the outside of the package

Return (reshipment)

⇨ Reduce downtime, speed up processing. Please have the required data and documents at hand when contacting our Service Department.
- Your order can be quickly and easily processed.
- Hazards can be prevented.
- A brief description and/or photos will help locate the source of the error.

9.5 Index

Index

9.6 EU Declaration of conformity

EU-Konformitätserklärung
EC Declaration of Conformity
Déclaration CE de conformité

CE

Hersteller / Manufacturer / Fabricant:

VACUUBRAND GMBH + CO KG · Alfred-Zippe-Str. 4 · 97877 Wertheim · Germany

Hiermit erklärt der Hersteller, dass das Gerät konform ist mit den Bestimmungen der Richtlinien:

Hereby the manufacturer declares that the device is in conformity with the directives:

Par la présente, le fabricant déclare, que le dispositif est conforme aux directives:

2014/30/EU (EMV-RL), 2014/35/EU (N-RL), 2011/65/EU (RoHS-2)

Vakuum-Controller / Vacuum controller / Régulateur de vide

Typ / Type / Type: **VACUU·SELECT®**

Artikelnummer / Order number / Numéro d'article: **2070000, 20700040, 20700050 20700061, 20700100, 20700101, 20700110, 20700111, 20635118**

Seriennummer / Serial number / Numéro de série: Siehe Typenschild / See rating plate / Voir plaque signalétique

Angewandte harmonisierte Normen / Harmonized standards applied / Normes harmonisées utilisées: DIN EN 12100:2011, DIN EN 61326-1:2013, DIN EN 61010-1:2010 (Ed. 3), IEC 61010-1:2010, DIN EN 61010-1:2011, DIN EN IEC 63000:2019

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen / Person authorised to compile the technical file / Personne autorisée à constituer le dossier technique: Dr. F. Gitmans · VACUUBRAND GMBH + CO KG · Germany

Ort, Datum / place, date / lieu, date: Wertheim, 25.03.2019

(Dr. F. Gitmans)
Geschäftsführer / Managing Director / Gérant

i. A.

(Dr. A. Wollschläger)
Regulatory Affairs Manager / Directrice des affaires réglementaires

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vacuubrand

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Version: 20901059_EN_VACUU·SELECT_V1.4_250319