

VACUUM CONTROLLER

VACUU·SELECT® Complete controller (lab scaffold version)

VACUU·SELECT® Complete controller (built-in version)

VACUU·SELECT® Complete controller (benchtop version)



Instructions for use



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	7
1.1	User information	7
1.2	Manual structure.	8
1.3	About this document.	9
1.3.1	Display conventions	9
1.3.2	Symbols and icons	10
1.3.3	Handling instructions (action steps).	11
1.3.4	Abbreviations	12
1.3.5	Term definitions.	13
2	Safety information	14
2.1	Usage.	14
2.1.1	Intended use	14
2.1.2	Improper use.	15
2.1.3	Foreseeable misuse	15
2.2	Target group description.	16
2.2.1	Personnel qualification	16
2.2.2	Responsibility matrix.	16
2.2.3	Personal responsibility	17
2.3	Safety precautions	17
2.3.1	Safety precautions, general	17
2.3.2	Awareness of potential dangers	18
2.3.3	ATEX equipment category (sensor)	19
2.4	Disposal	20
3	Product description	21
3.1	VACUU·SELECT Complete	21
3.2	Product views.	23
3.2.1	VACUU·SELECT Complete (schematic design)	23
3.2.2	VACUU·SELECT Sensor	26
3.2.3	Chemically resistant in-line solenoid valve	27
3.3	VACUU·BUS peripheral devices (option)	28
3.4	Example	29
3.5	Remote control and interfaces	30
3.5.1	RS-232 serial interface	30
3.5.2	Modbus TCP.	30
4	Installation and connection	31
4.1	Transport	31
4.2	Installation	31
4.2.1	Benchtop version	32
4.2.2	Lab scaffold version	32

4.2.3	Built-in version	35
4.3	Electrical connection	37
4.4	Vacuum connection	39
4.5	Venting connection (option)	41
5	User interface	42
5.1	Switch on controller	42
5.1.1	Touchscreen	43
5.1.2	Gestures for operation	43
5.2	Set up device	43
5.2.1	Data storage message	43
5.3	Screen orientation	44
5.4	Display and operating elements	45
5.4.1	Process screen (main screen)	45
5.4.2	Display elements	46
5.4.3	Operating elements and symbols	48
6	Operation	52
6.1	Applications	52
6.1.1	Select and start application	52
6.1.2	Adjust pressure setpoint	53
6.1.3	Vent	55
6.1.4	Stop application	56
6.2	Application parameters (parameter list)	56
6.3	Pressure graph	58
6.4	Main menu	59
6.4.1	Applications	60
6.4.2	Favorites	61
7	Main menu	62
7.1	Advanced operation	62
7.1.1	Application editor	62
7.1.2	Menu bar and description	63
7.1.3	Overview of process steps	64
7.1.4	Process end	65
7.1.5	Edit application	66
7.1.6	Remove process step	68
7.1.7	Settings	69
7.1.8	Settings/administration	71
7.1.9	Administration – import/export	73
7.1.10	Administration – VACUU·BUS	74
7.2	Data logger	77
7.3	Service	78
7.3.1	Service information	78
7.3.2	Diagnostic data	79

8	Troubleshooting	80
8.1	Error messages	80
8.1.1	Error indication	80
8.1.2	Acknowledge error indication	81
8.2	Error – Cause – Remedy	81
8.2.1	Pop-up message	81
8.2.2	General faults	82
8.3	Device fuse.	84
9	Appendix	86
9.1	Technical information	86
9.1.1	Technical data.	86
9.1.2	Rating plate.	89
9.1.3	Wetted materials.	89
9.1.4	Vacuum data.	90
9.2	Ordering information.	91
9.3	Licensing information and data protection	92
9.4	Service	93
9.5	Index.	94
9.6	EC Declaration of conformity	96
9.7	UKCA Declaration of Conformity	97
9.8	CU Certificate.	98

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 Complete***.
- 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

The content of this manual is protected by copyright. Only copies for internal use are allowed, e.g., for professional training.

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- 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.

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

- 1 Safety information for vacuum equipment
- 2 Description: Vacuum controller – control and operation
- 3 Optional description: vacuum pump, accessories, etc.

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.



Cadmium free

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.



Acoustic signal – signal sound/warning sound.



Frequency of beeping, frequency of acoustic signal



Electric/electronic devices and batteries must not be disposed of in the domestic waste at the end of their service life.



Flow arrow
Vacuum

Symbols and gestures for operation

→ See chapter: **5.1.2 Gestures for operation on page 43**



⇒ 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

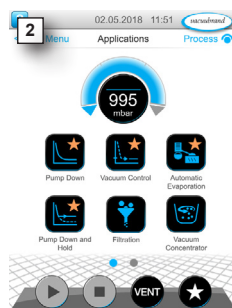
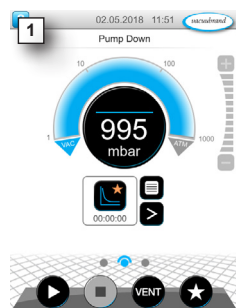
2. Next step

☒ Result of action

Perform the steps in the order described.

Instructions (shown graphically)

Schematic diagram
Action steps as
graphics



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 / OUT*	Outlet
FKM	Fluoroelastomer
GB	Gas ballast
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 type identification number
PE	Polyethylene
resp.	Responsible
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)
VMS-B	Vacuum management system – module

* Labeling on the vacuum pump

1.3.5 Term definitions

Product-specific
terms

Fine vacuum	Pressure measuring range in vacuum systems, from: 1 mbar-0.001 mbar (0.75 Torr–0.00075 Torr)
Rough vacuum	Pressure measuring range in vacuum systems, from: atmospheric pressure–1 mbar (atmospheric pressure–0.75 Torr)
VACUU·BUS	Bus system from VACUUBRAND for communication between peripheral devices with VACUU·BUS -enabled gauges and controllers. The maximum admissible 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·SELECT	Vacuum controller, controller with touchscreen; consisting of operating panel and vacuum sensor.
VACUU·SELECT Complete	Vacuum controller in two-point version for existing vacuum sources such as individual pumps or powerful local area vacuum networks
VACUU·SELECT Sensor *	External vacuum sensor ‣ for VACUU·SELECT or ‣ separately as an independent vacuum sensor.

* Available with or 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 Complete** is a lab instrument intended to regulate absolute pressure in the area of rough and fine vacuum for existing vacuum sources such as individual pumps or powerful local area vacuum networks.

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.

Improper use includes:

- 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

**Possible
foreseeable misuse**

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



- 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 of
personnel
qualifications

Operator	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	Operator	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

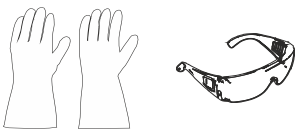
Work safely

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 standards
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



Installation and operation in areas where potentially explosive atmospheres can develop to a hazardous degree is not permitted.

ATEX approval only applies if applicable to the **internal wetted parts of the device**, not to its surroundings.

ATEX equipment labeling

ATEX-
equipment category



Vacuum equipment labeled with  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

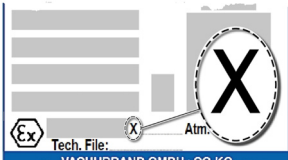
The use of gas ballast and/or venting valves is only permitted if this would not normally, or only rarely, cause explosive mixtures within the device, or do so only for a short time.

- ⇒ If necessary vent with inert gas.

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

Explanation of usage
conditions X

Example extract
type plate



Restrictions on operating conditions

Meaning for devices marked with X:

- The devices have a low mechanical protection and must be installed so that they cannot be mechanically damaged from the outside; e.g., installing pump stations with impact protection, attaching shatter protection for glass flasks, etc.
- The devices are designed for an ambient and media temperature of +10 °C to +40 °C during operation. These ambient and media temperatures must never be exceeded. When conveying/measuring non-explosive gases, extended gas suction temperatures apply, see chapter: Technical information, media temperature (gas).

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.



<https://www.vacuubrand.com/20901491>

3 Product description

3.1 VACUU-SELECT Complete

Description of
vacuum controller

The **VACUU-SELECT Complete** is a fully equipped two-point vacuum controller for existing vacuum sources such as individual pumps or powerful local area vacuum networks.

The controller comprises the **VACUU-SELECT** vacuum controller with integrated ceramic vacuum sensor and venting valve, a non-return valve and a chemically resistant in-line solenoid valve.

Simply connect the controller between the vacuum pump and the application.

The controller is available as a benchtop device, for lab scaffold mounting, or as a built-in version for lab workstations.

Controller versions



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. In the case of solvent evaporation, it detects boiling pressure automatically and switches to two-point control mode.

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 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

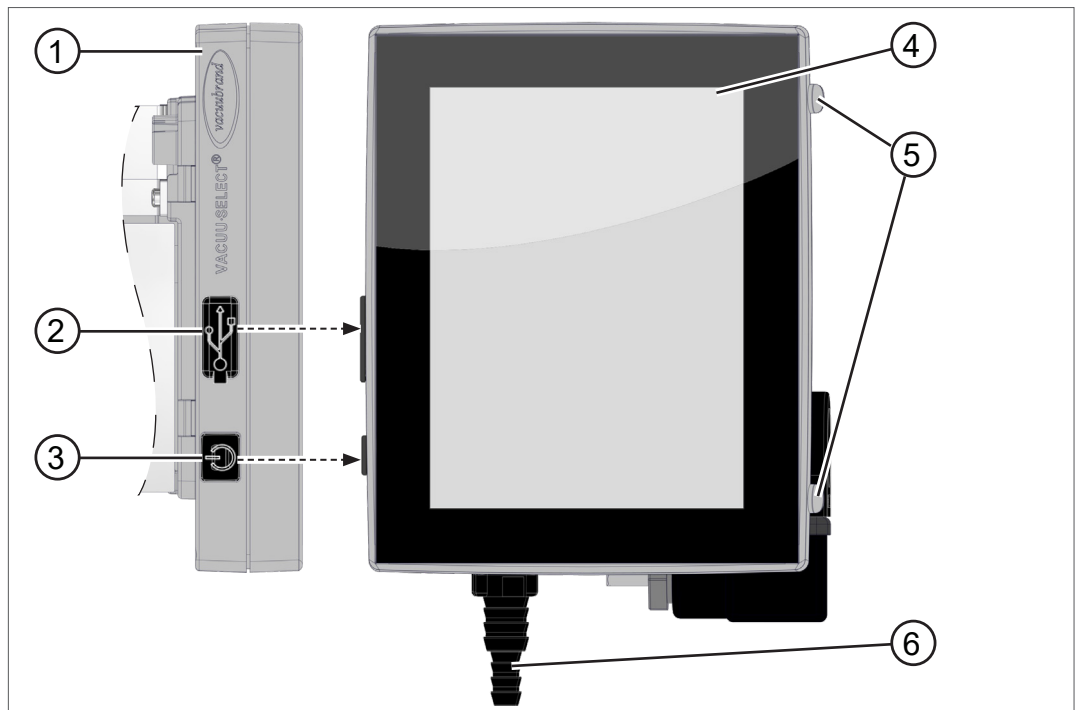
3.2.1 VACUU-SELECT Complete (schematic design)

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

All controller versions have the same connections, as described here in the example for the lab scaffold version.

Side view + front

→ Example
Side view and front
view
Lab scaffold version



Meaning

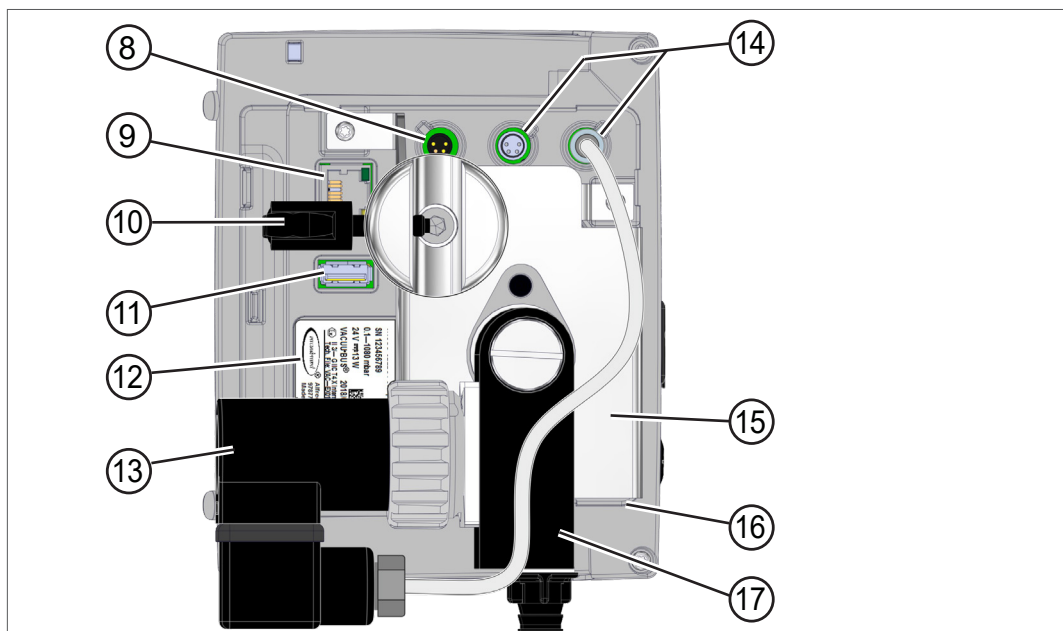
- | | |
|---|---------------------------------------|
| 1 | Chemically resistant plastic housing |
| 2 | Cover of USB port, type A* |
| 3 | ON/OFF button |
| 4 | Screen |
| 5 | Rubber feet |
| 6 | Vacuum connection (here: hose nozzle) |



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.

Rear view

→ Example
Back and interfaces,
lab scaffold version



Meaning

8	Power supply via VACUU·BUS plug-in power supply
9	RJ45 socket – LAN connection
10	Stand holder with wing nut
11	USB port, type A
12	Rating plate
13	Chemically resistant in-line solenoid valve
14	Connection sockets for VACUU·BUS components
15	Stand panel
16	VACUU·SELECT Sensor
17	Valve block with connections

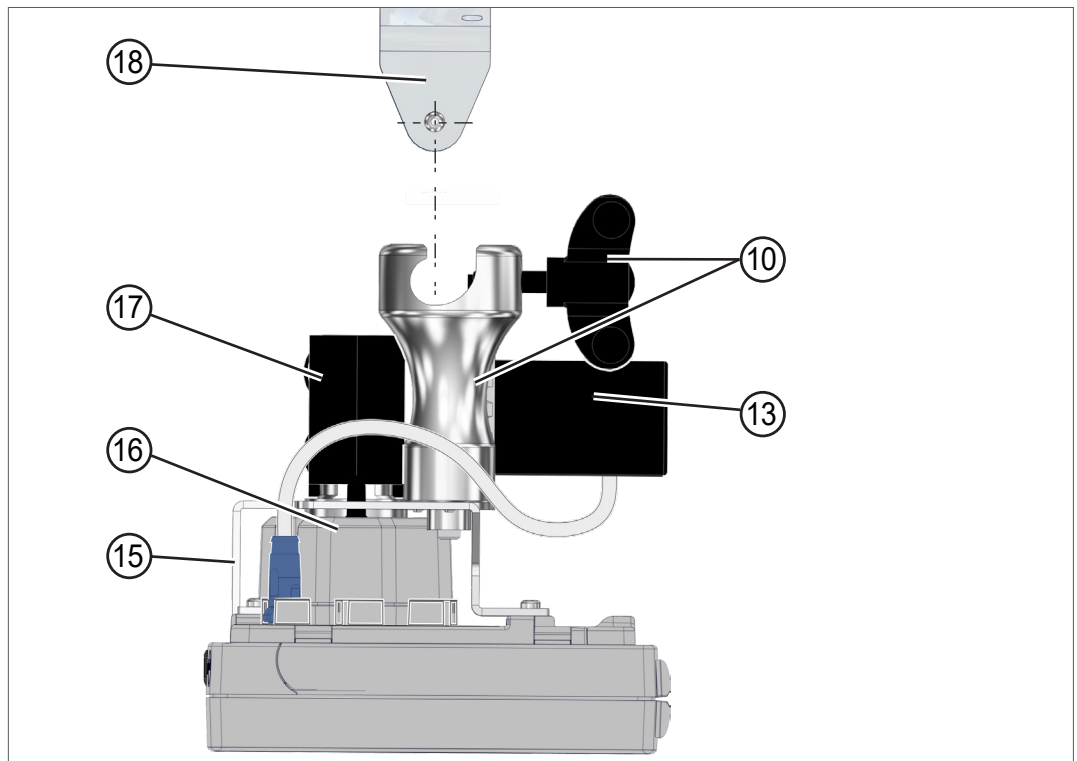
Note: The VACUU·BUS ports are each equipped with a guide slot as an anti-rotation device and connection coding for VACUU·BUS sockets and connectors.

IMPORTANT!

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

Top view

→ Example
Plan view, lab
scaffold version



Meaning

10	Stand holder with wing nut
13	Chemically resistant in-line solenoid valve
15	Stand panel
16	VACUU-SELECT Sensor
17	Valve block with connections
18	Wall bracket (option)

3.2.2 VACUU-SELECT Sensor

Description of VACUU-SELECT Sensor

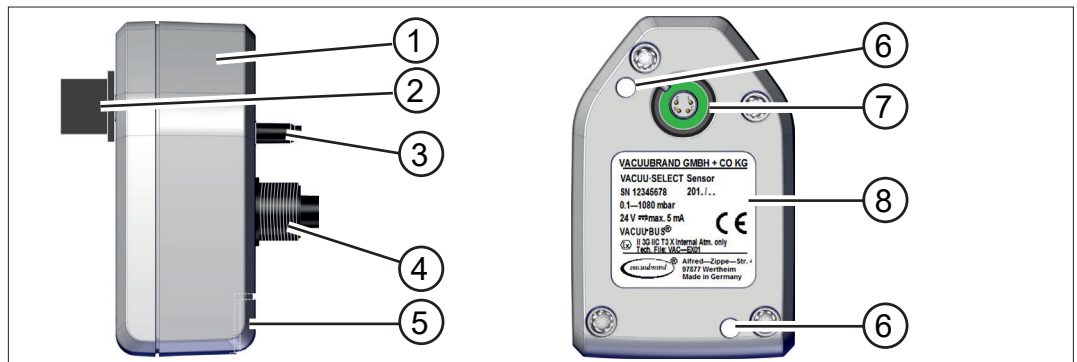
The vacuum sensor is mounted on the **VACUU-SELECT Complete**. Communication with the controller takes place via the **VACUU-BUS**.

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. Vacuum connection is carried out via the valve block.

Side view, plan view

→ Example Views of VACUU-SELECT Sensor



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 |

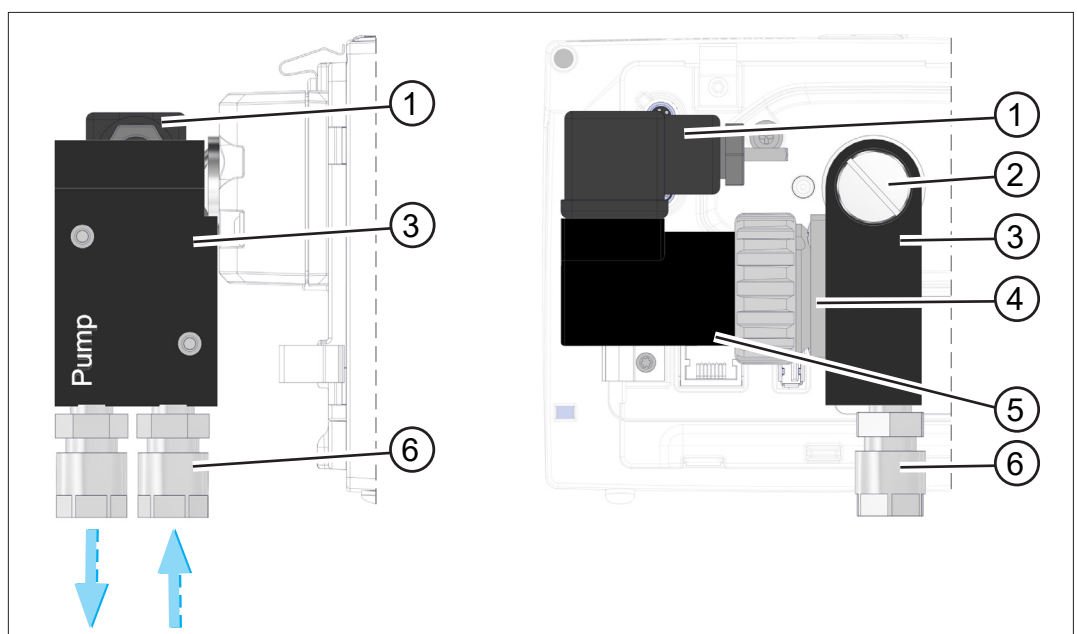
3.2.3 Chemically resistant in-line solenoid valve

The fitted chemically resistant in-line solenoid valve comprises an electromagnetic drive and valve block, and is used as a vacuum regulating valve. A built-in non-return valve prevents this from affecting nearby applications on one vacuum supply.

Depending on the controller version, hose nozzles or screw-in connectors are available to connect the vacuum pump and application.

Side view, plan view

→ Example
Views
Chemistry resistant
in-line solenoid
valve



Meaning

- | | |
|---|---------------------------------------|
| 1 | Valve connector |
| 2 | Cheese head screw M6 x 10 |
| 3 | Valve block |
| 4 | Internal: non-return valve |
| 5 | Electromagnetic drive |
| 6 | Vacuum connections: pump, application |



In the built-in version, the complete valve block can be pivoted 90°, as can the stand holder in the lab scaffold version.

This means the controller can be used either horizontally or vertically.

3.3 VACUU·BUS peripheral devices (option)

VACUU·BUS
principle

External valves, level sensors and vacuum sensors (up to the fine vacuum range) are components that can be connected via 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 components¹ (clients)

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 Complete**, 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.

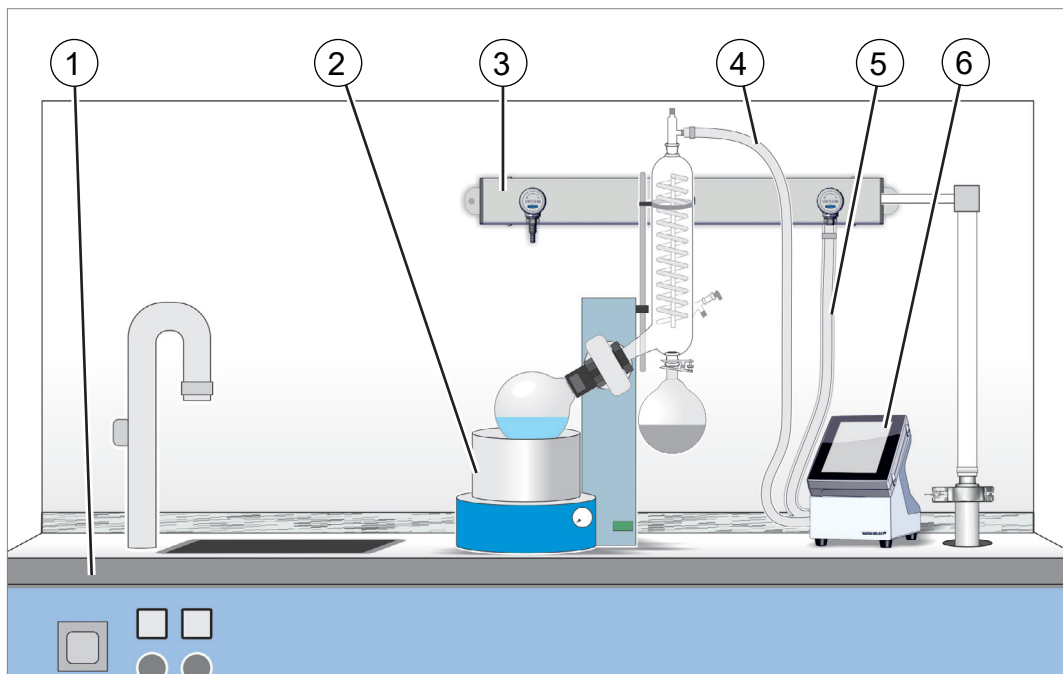
→ See also chapter: **7.1.10 Administration – VACUU·BUS**

¹ → See also table in chapter: **9.2 Ordering information on page 91**

3.4 Example

Local area vacuum network

→ Example
Local area vacuum
network with rotary
evaporation



Meaning

- | | |
|---|--|
| 1 | Lab furniture |
| 2 | Example: rotary evaporator |
| 3 | VACUU·LAN – local area vacuum network with three valve modules |
| 4 | Vacuum hose for application |
| 5 | Vacuum hose from vacuum pump/local area vacuum network |
| 6 | VACUU·SELECT Complete |

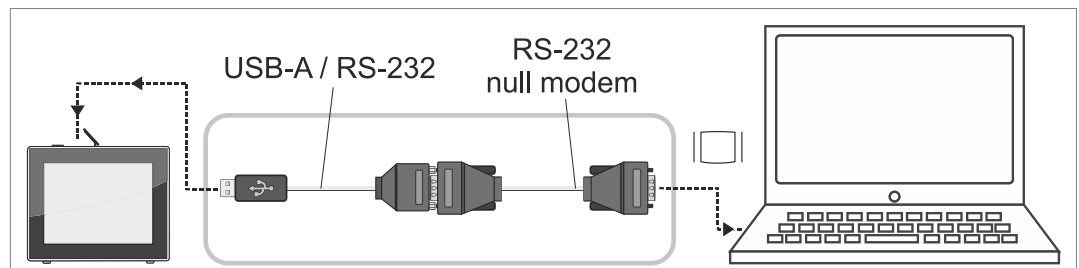
3.5 Remote control and interfaces

As of software version 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: 3.2.1 VACUU-SELECT Complete (schematic design)*

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



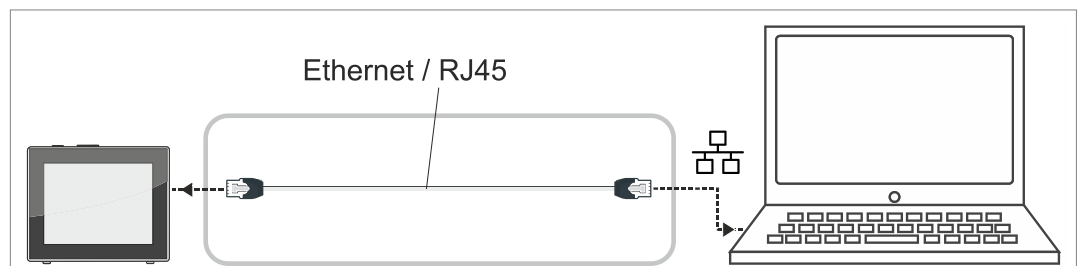
Required accessories

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	30–80 %, non-condensing	
Protection class (front)	IP 40 (IP 41)	
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.

4.2.1 Benchtop version

Use as benchtop
device

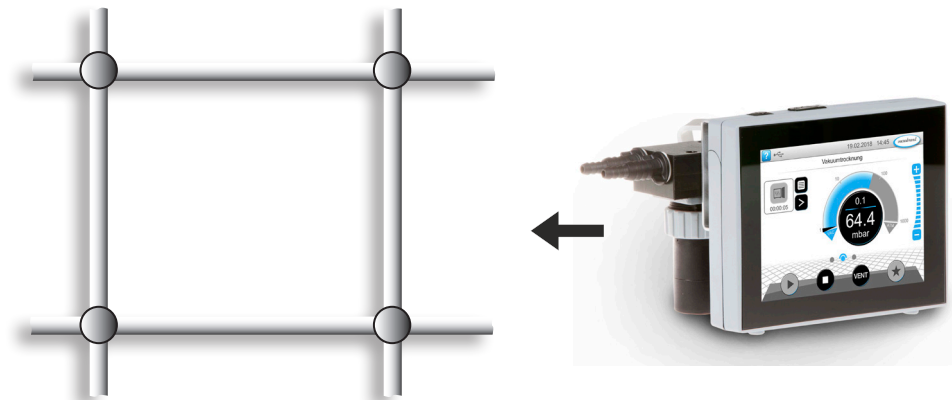
As a benchtop version, the controller can be set up directly on the work surface and connected, for example on the lab bench.



4.2.2 Lab scaffold version

Use as lab scaffold
device

With the lab scaffold version, a stand holder is fitted to the back of the controller. The stand holder enables the controller to be attached directly to a scaffold bench in the lab or mounted on the wall using the wall bracket.



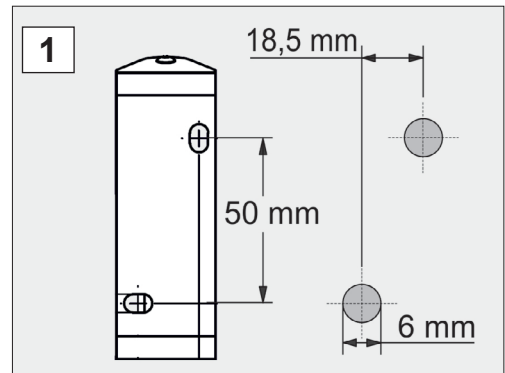
Mount the wall bracket

Mount the wall
bracket

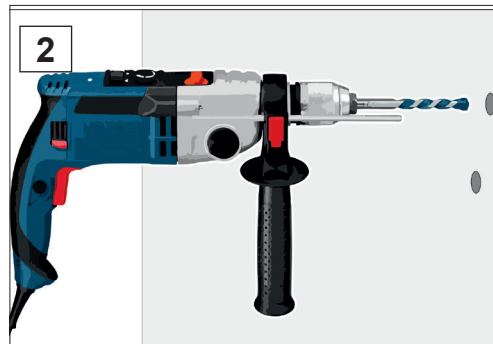


Preparation:

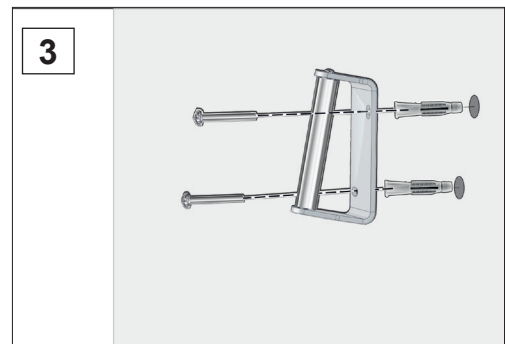
⇒ Have the tool and fittings ready; e.g., impact drill, masonry drill Ø6 mm, wall plugs size 6, universal screws, min. 5x30, screwdriver.



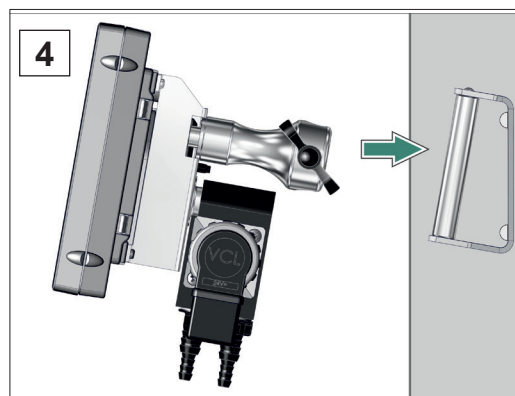
1. Use the drilling template to mark the dimensions on the surface where the wall bracket should be mounted.



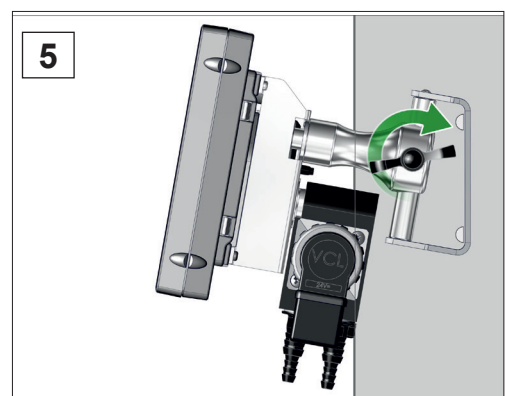
2. Drill 2 holes in the wall and remove the debris.



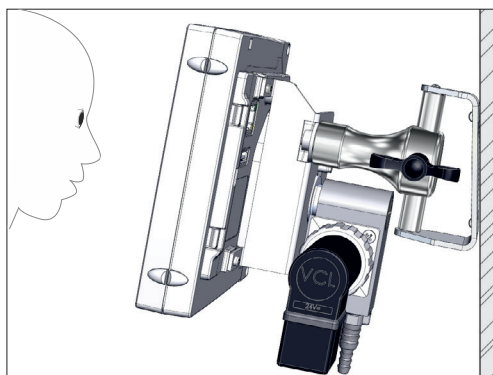
3. Insert the rawl plugs and then secure the wall bracket using the screws.



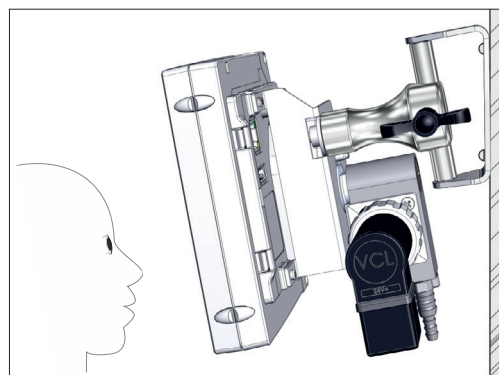
4. Mount the controller with the stand holder.



5. Secure the controller with the wing nut.



☑ Mounted wall bracket with controller.

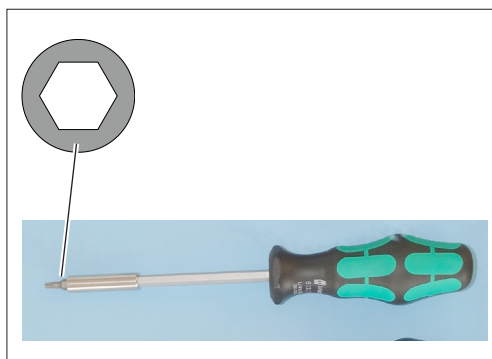


Alternatively, the wall bracket can be mounted so that it is pivoted at an angle.

Pivot stand holder

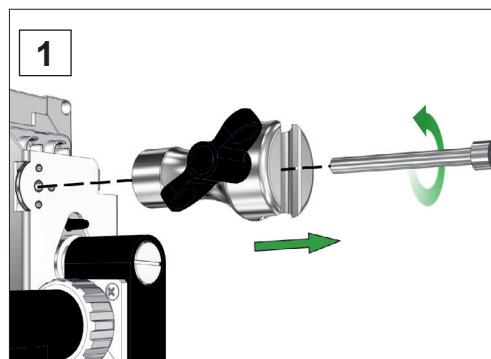
Pivot stand holder
90°

To use the controller horizontally, the stand holder can be pivoted 90° at the back.

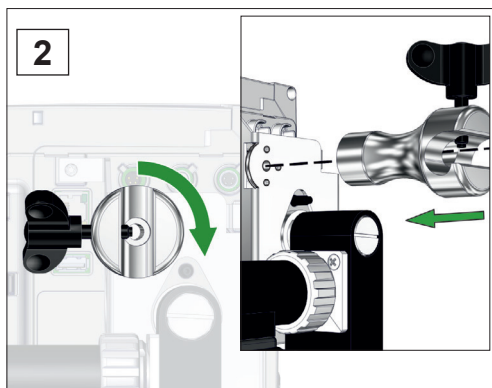


Preparation:

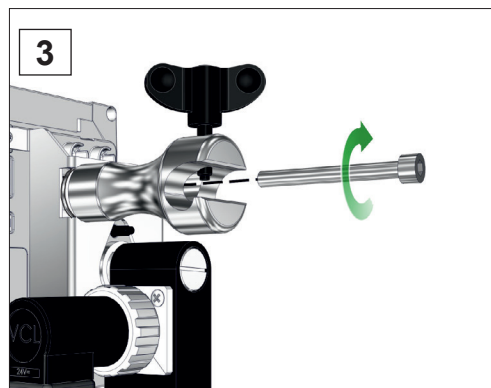
⇒ Have the tool ready;
Hex key size 5.



1. First open the wing nut and then unscrew the hexagon socket screw.



2. Pivot the stand holder 90° and push the stand holder with the locating pins into the corresponding holes.



3. Screw in the hexagon socket screw, then hand-tighten the wing nut.

4.2.3 Built-in version

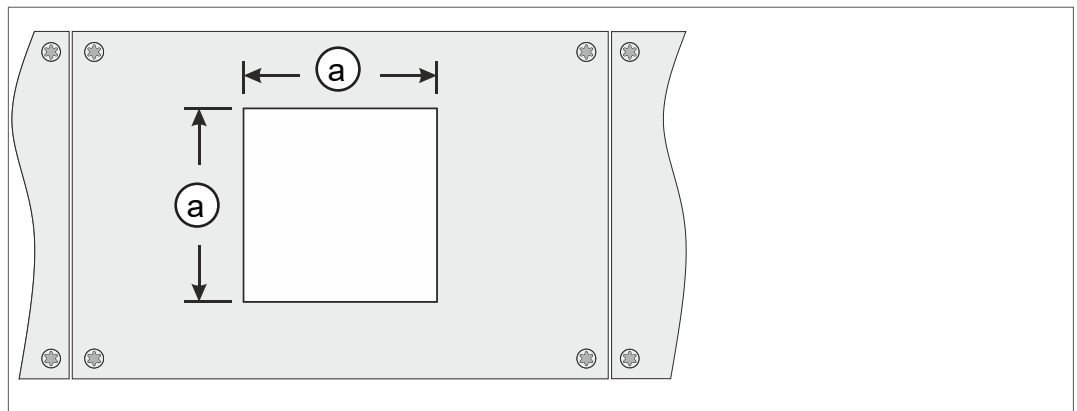
Use as built-in device

In the built-in version, spring clips are fitted on the back of the controller. This means the controller can be clipped directly into the installation cut-out of lab furniture or a control cabinet. The display can be pivoted so that the controller can be clipped into place either horizontally or vertically.



Installation cut-out

Cut-out dimensions
(in control cabinet,
lab furniture, cable
duct)



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.

Spring clips + screw fittings D3 x 10

20636593

Pivot valve block

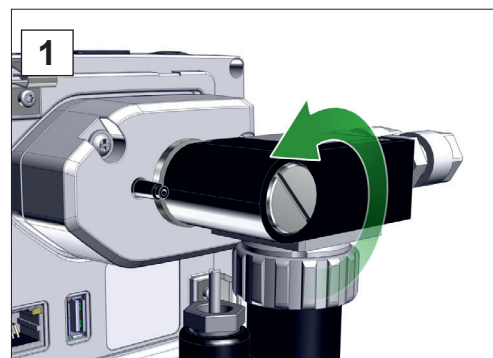
Depending on the installed orientation, the valve block can be pivoted 90°, e.g., for better access and connection of the hoses.

Pivot valve block of
the built-in version
90°

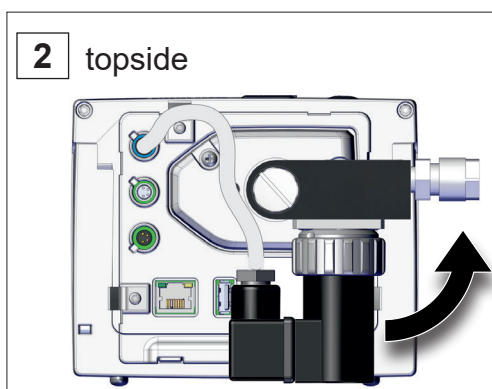


Preparation:

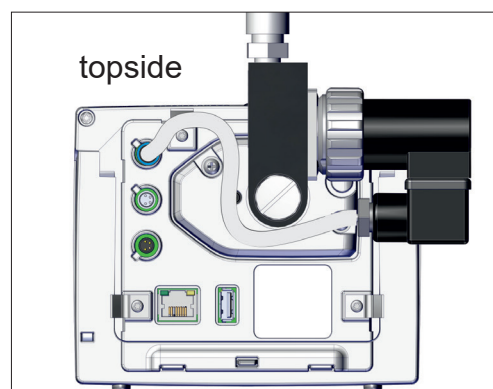
⇒ Have the tool ready;
flat-head screwdriver size 6
(alternatively, a suitable coin).



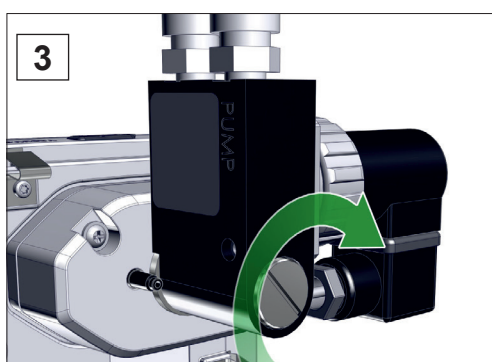
1. Turn the fastening screw half a turn to the left.



2. Pivot the valve block 90°.



Pivoted valve block.



3. Tighten the fastening screw.

4.3 Electrical connection

IMPORTANT!

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

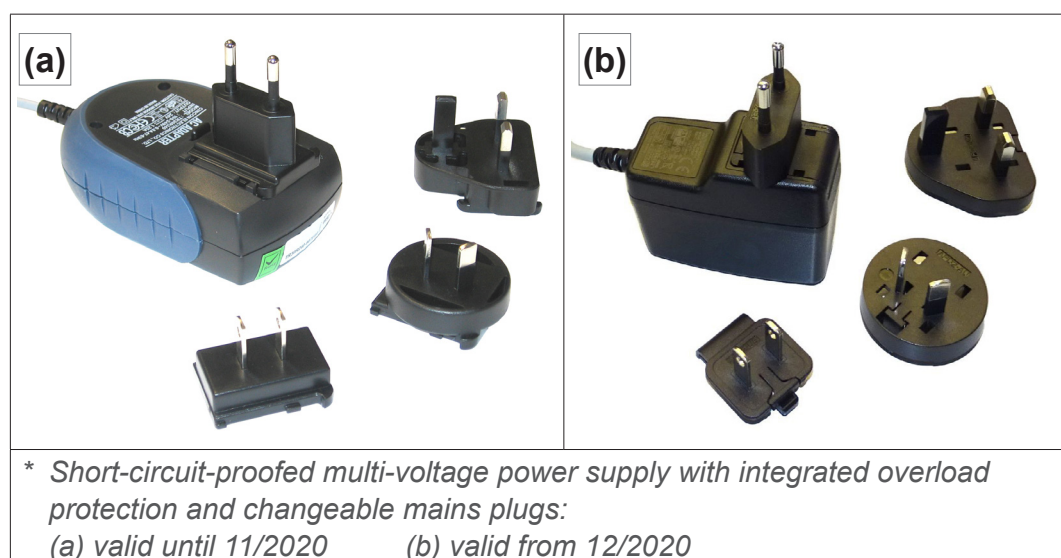
NOTICE

The CE/UKCA mark and a cTÜVus mark (see rating plate) may be voided if not using a VACUUBRAND power supply.

- ⇒ Use a VACUUBRAND wall power supply plug to provide the supply voltage.
- ⇒ If the supply voltage is not provided by VACUUBRAND wall power supply plug, the power supply must provide a stabilized 24 V DC voltage which must not provide more than 6.25 A even in case of failure.
- ⇒ If using additional overcurrent protection devices (e. g., fuses), these protection devices must interrupt the supply voltage at a maximum current of 8.4 A after 120 s at the latest.

Power supply via plug-in power supply*

Plug-in power supply



Prepare wall power supply plug

Prepare connection

1. Take the wall power supply kit out of the packaging.
2. Select the mains plug that fits to your mains socket.
3. Connect the mains plug to the metal contacts of the wall power supply plug.
4. Slide the mains plug until it locks.

Remove mains plug

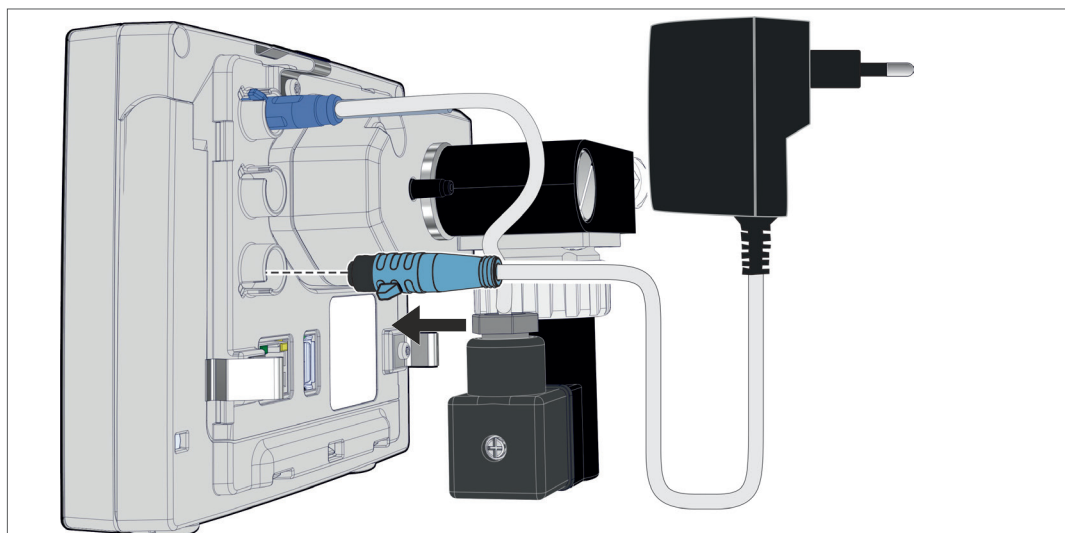
Remove plug attachment from power supply unit

1. Press the locking knob on top of the wall power supply plug.
 2. Remove the mains plug.
- ☒ Another mains plug can be fixed.

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.

4.4 Vacuum connection



WARNING

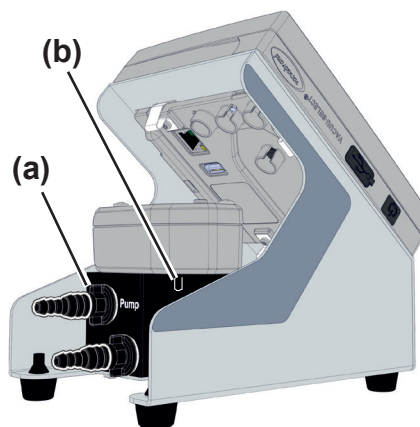
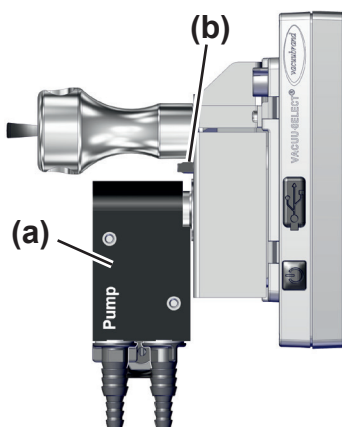
Risk of bursting due to overpressure.

⇒ Prevent uncontrolled overpressure, such as when connecting to a locked or blocked tubing system.

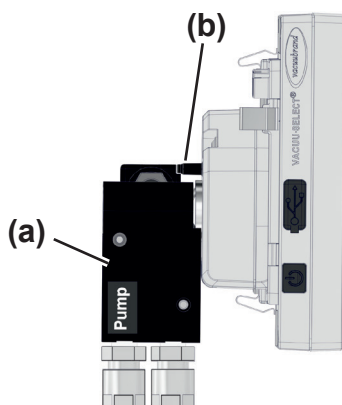
Vacuum connection is carried out at the back of the controller, at the chemically resistant in-line solenoid valve. Various connection options are available depending on the controller version. Hose material is not part of the standard delivery.

Connection options

Controller version
and connection
options



Connection via hose nozzle DN 6/10



(a) chemically resistant in-line solenoid valve
(b) Venting valve on sensor

Connection via PTFE hose DN 8/10

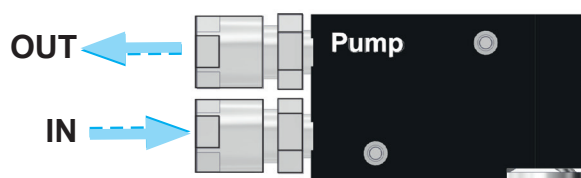
IMPORTANT!

- ⇒ Use a stable vacuum hose that is suitable for the required vacuum range.
- ⇒ Dirt, hose kinks or damage can impair function.

Connect PTFE hose

Required connection material: PTFE hose.

Vacuum connection
PTFE



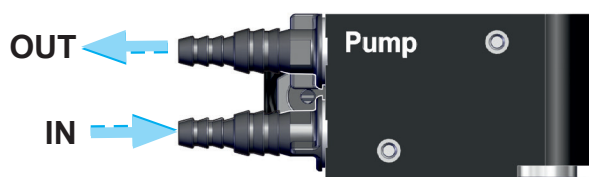
OUT Connect vacuum pump or VACUU·LAN.
IN Connect application

1	1. Unscrew the union nuts and slide them on to the hoses.
2	2. Insert the hoses into the screw-in connector and secure them with the union nuts.

Connect hose to hose nozzle

Required connection material: vacuum hose and suitable hose clip.

Vacuum connection,
hose nozzle



OUT Connect vacuum pump or VACUU·LAN.
IN Connect application

1	1. Push the vacuum hoses on to the hose nozzles.
2	2. Secure the vacuum hoses with hose clips.

4.5 Venting connection (option)



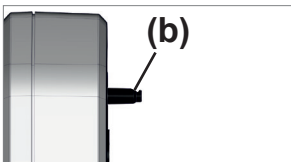
DANGER

Risk of explosion by venting with air.

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

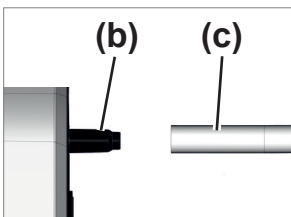
- ⇒ Never vent processes with air which could form an explosive mixture.
- ⇒ If necessary, vent with inert gas (max. 1.2 bar/900 Torr, abs.).

Venting gas is connected at the back of the controller, at the hose nozzle of the **VACUU·SELECT Sensor**. The sensor is installed in different ways depending on the controller version. Hose material is not part of the standard delivery.



Venting with ambient air¹

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



Venting with inert gas – connect venting valve¹

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 gas².



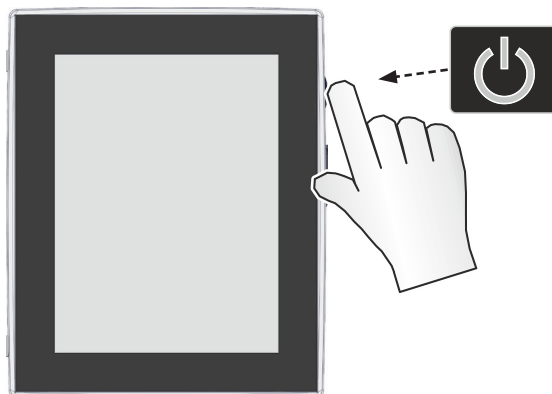
¹ Only applicable to sensors **with** an integrated venting valve.

² Avoid overpressure.

5 User interface

5.1 Switch on controller

Switch on device



⇒ Briefly press the ON/OFF button on the controller



✓ The 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

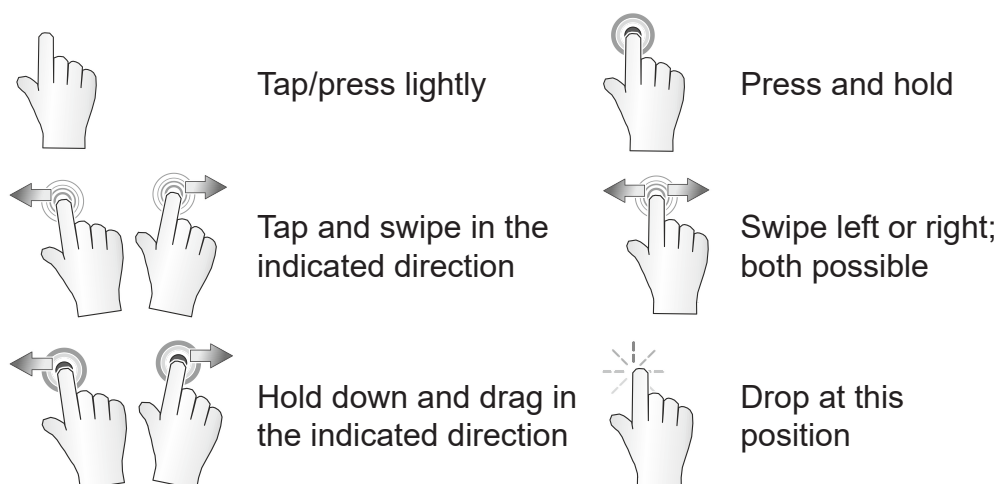
Touchscreen
operation

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



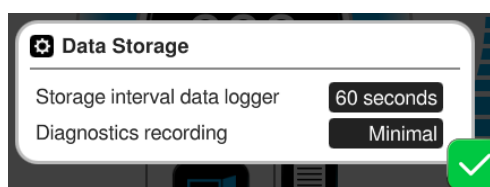
5.2 Set up device

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 77**

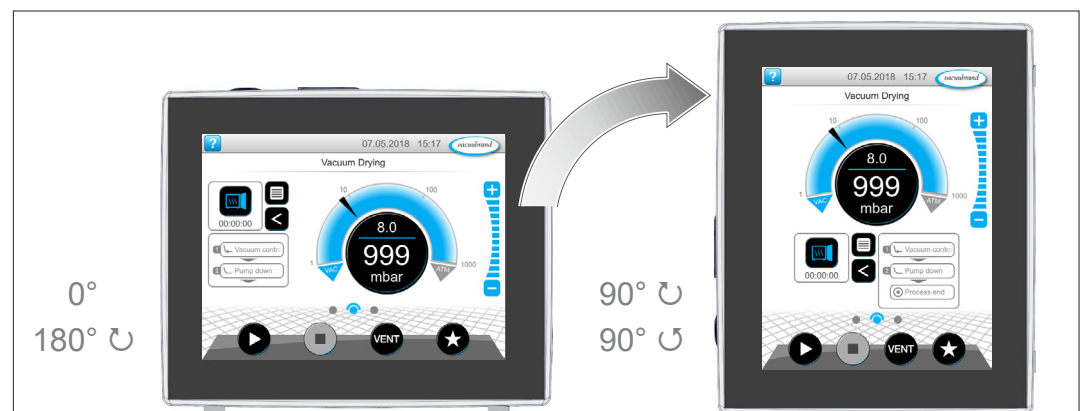
For subsequent adjustments to the diagnostic data

→ See chapter: **7.3 Service on page 78**

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 69**

5.4 Display and operating elements

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



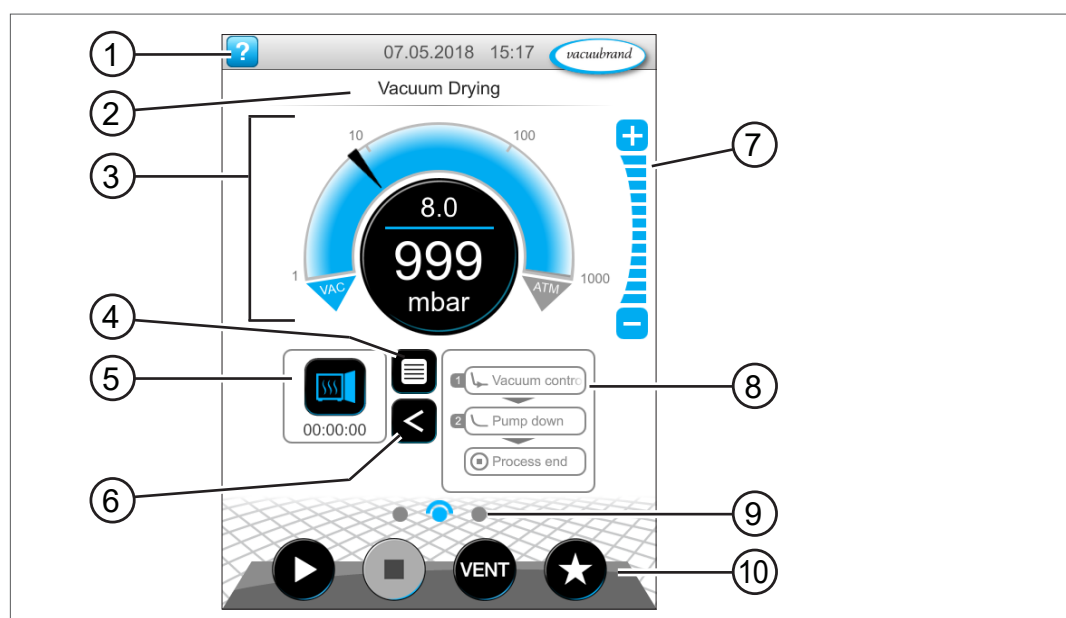
⇒ Refer to this chapter if you want to read about the meaning of a display or an operating element during operation.

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	<i>Standard</i>
Yellow	<i>Warning</i>
Red	<i>Error</i>

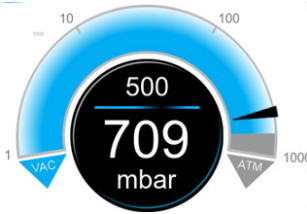
Sounds

Sounds

Sound	Meaning
	<i>Touch tone unless muted</i> ▶ Feedback entry
	<i>Warning or error</i> ▶ Shows that an error or warning is present. ▶ Active while error status persists.

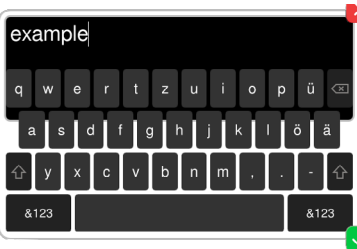
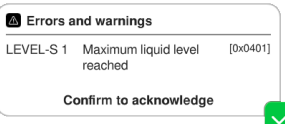
Pressure display

→ Example
Standard pressure display

Symbol (icon)	Meaning
	<i>Standard pressure display</i> ▶ 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

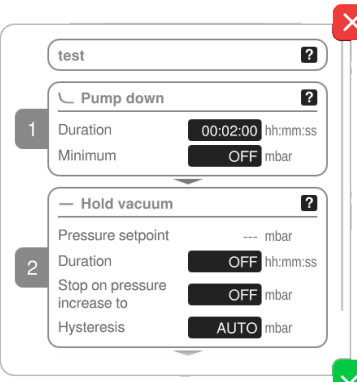
Pop-up windows (context menus)

→ Examples
Pop-up window

Graphic	Meaning
	Numeric keypad with special buttons ▶ Enter numerical values. ▶ Select a function using special buttons (AUS, 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.

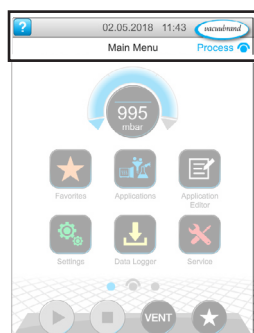
Parameter list

→ Example
Parameter list

Graphic	Meaning
	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

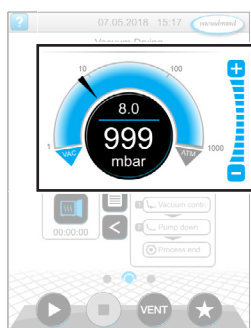
Status bar



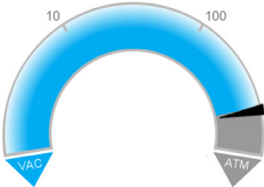
→ Example
Main menu

Symbol (icon)	Meaning
	Access help ► <i>Tips for operation</i> 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.
	WiFi active (option) ► Shows that a WiFi USB dongle is inserted.
	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: 

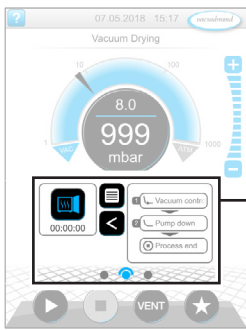
Operating elements – adjust pressure setpoint



Process screen,
adjust pressure
setpoint, even
during operation

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

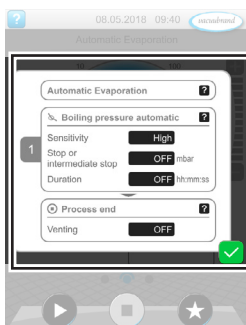
Operating elements – process steps



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 <i>parameter list</i>. ▶ 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

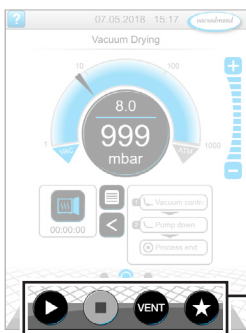
→ Example
Parameter list

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

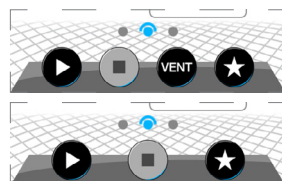
Operating elements for control



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 <i>Favorites</i> 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 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 48**.

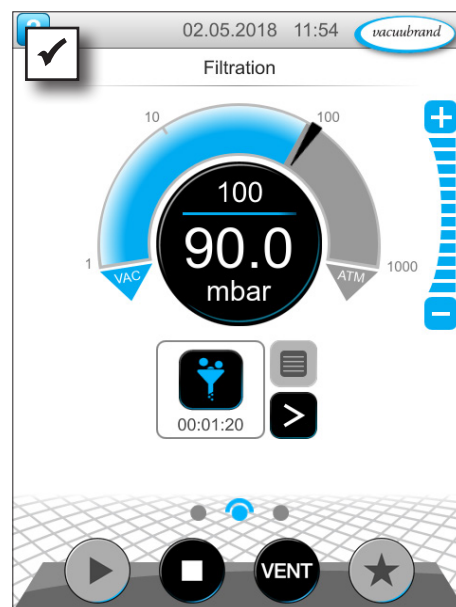
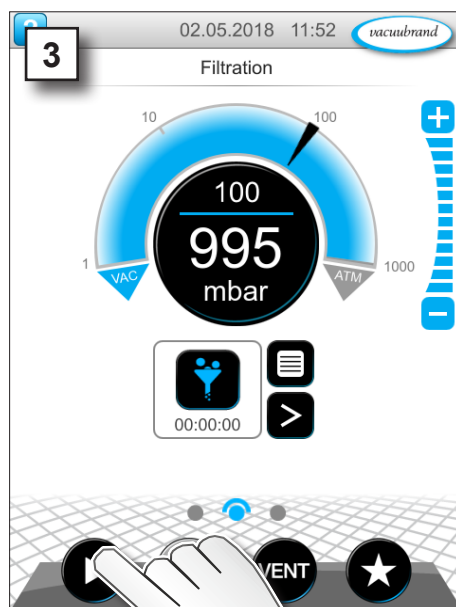
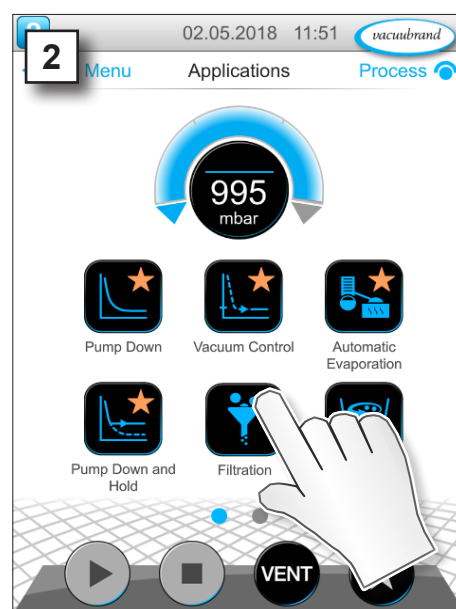
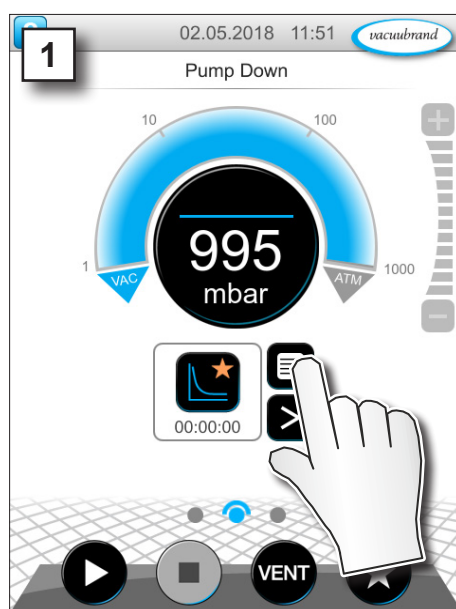
6.1 Applications

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

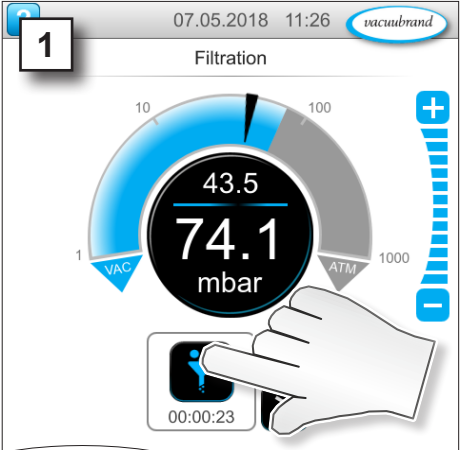
The controller offers a variety of options for adjusting the pressure setpoint during operation.

Change pressure setpoint in the parameter list

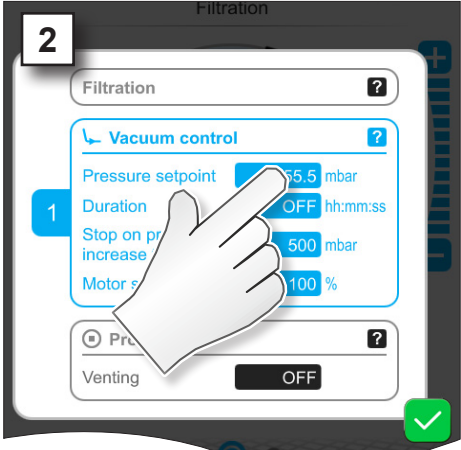


Tap/press lightly

1

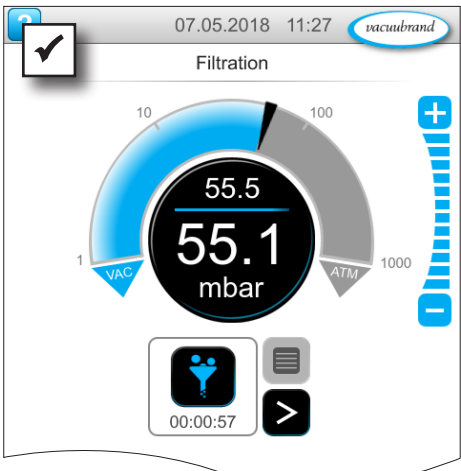


2



3



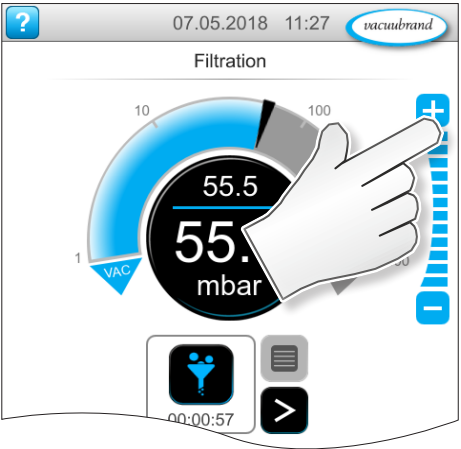


⇒ Enter a target value in the pop-up and confirm the entry 2x.

Fine adjustment via step buttons



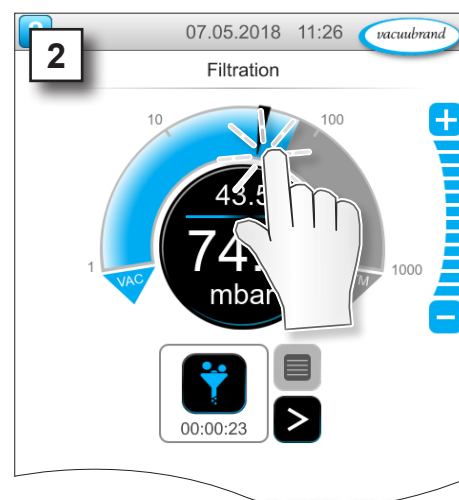
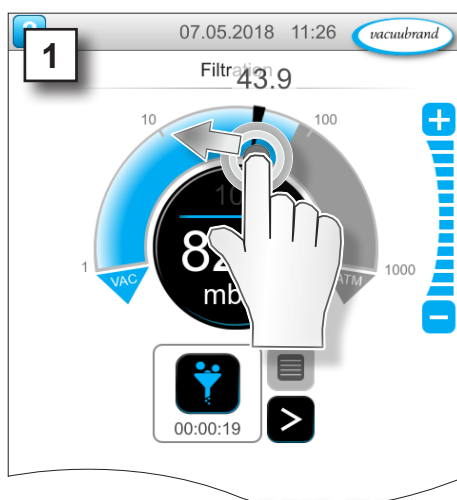
Tap/press lightly



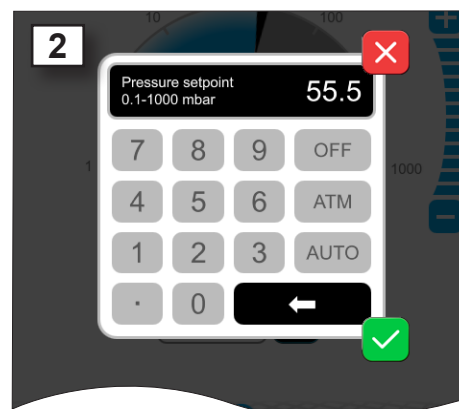
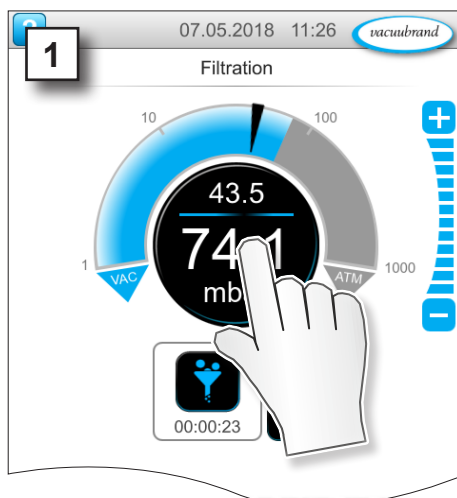
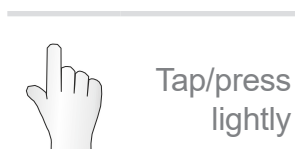
⇒  - Tap or hold down buttons = increase target value

⇒  - Tap or hold down buttons = decrease target value

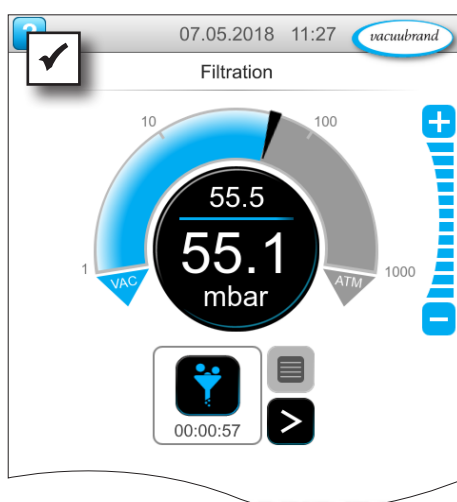
Adjust pressure setpoint using marker



Adjust pressure setpoint in digital pressure display



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



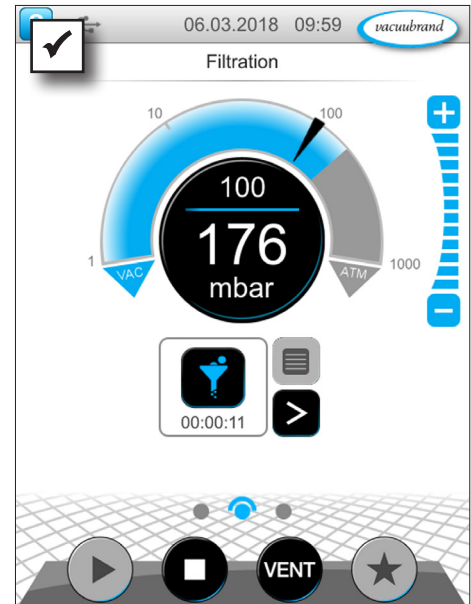
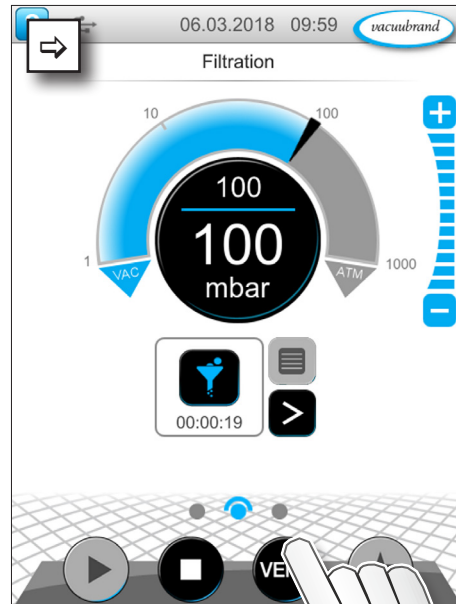
6.1.3 Vent

Vent briefly

Brief venting



Tap/press lightly



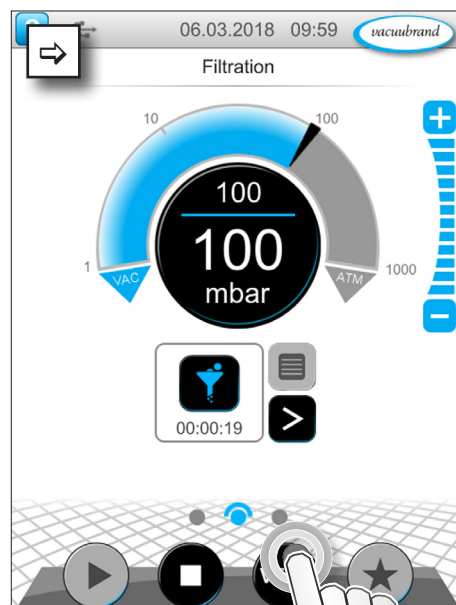
- ✓ Slight pressure increase.
- ✓ Vacuum control running.

Vent to atmospheric pressure

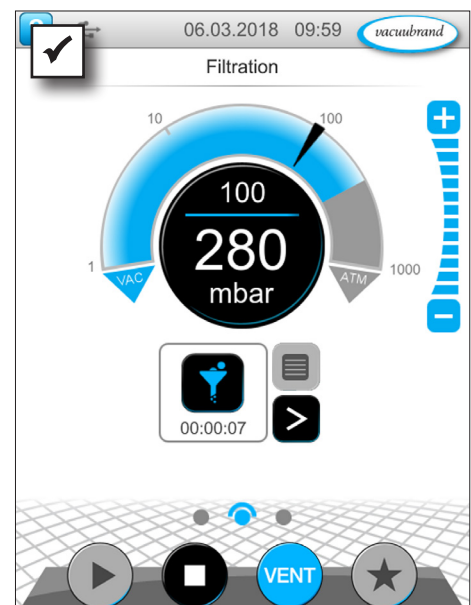
Continuous venting



Hold down



~ 3 sec



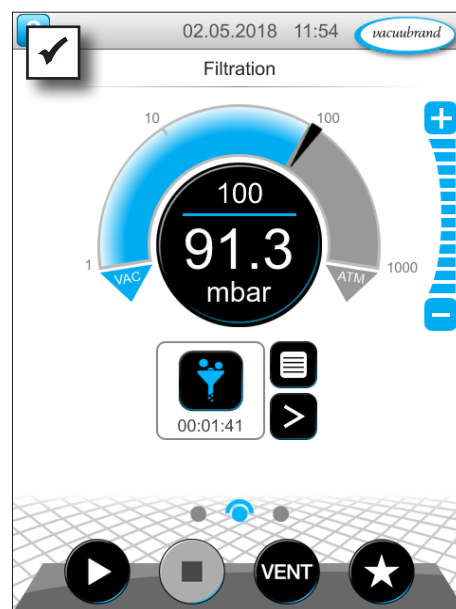
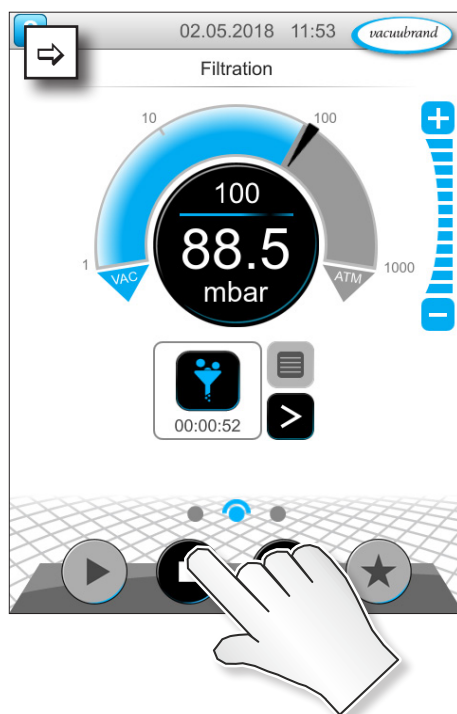
- ✓ Vacuum control stops.
- ✓ Pressure increase until atmospheric pressure is reached.

6.1.4 Stop application

Stop application



Tap/press
lightly



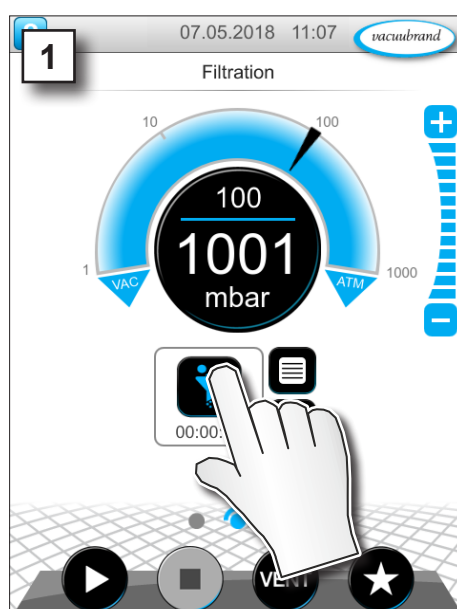
☒ Vacuum control stops.

6.2 Application parameters (parameter list)

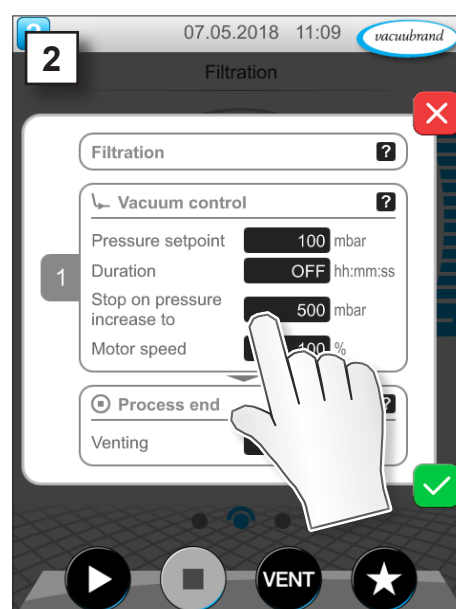
In the parameter list, you can individually change and adapt various process-related values before and during operation.

Adjust parameter

→ Example
Adjust *motor speed*

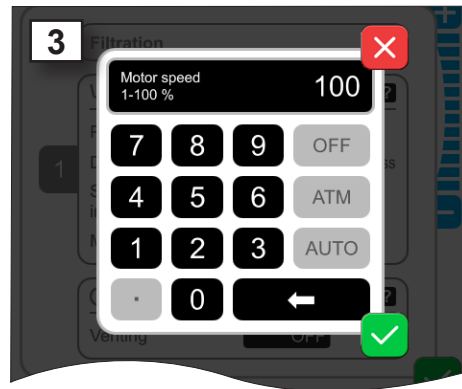


1. View parameter list.

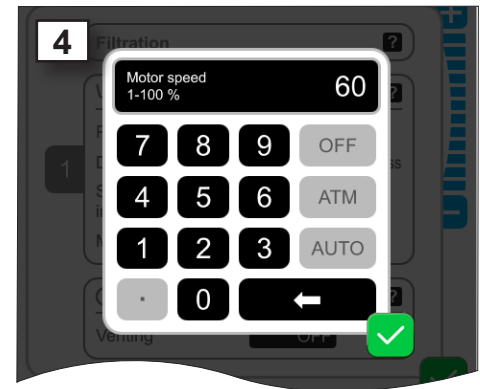


2. Tap on desired input field.

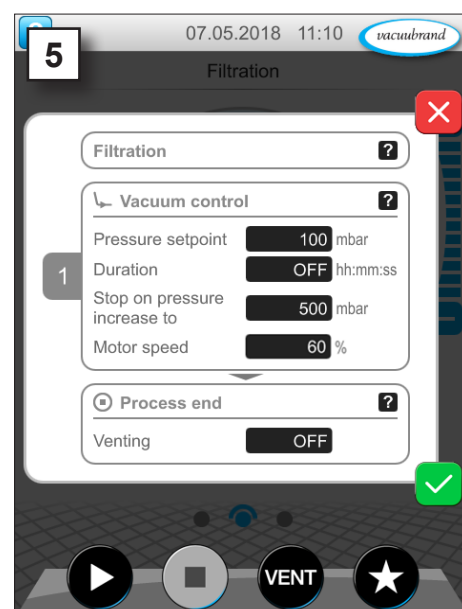
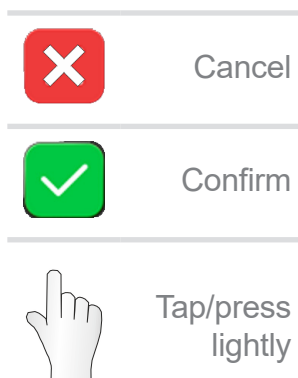
→ Example
Adjust *motor speed*
parameter



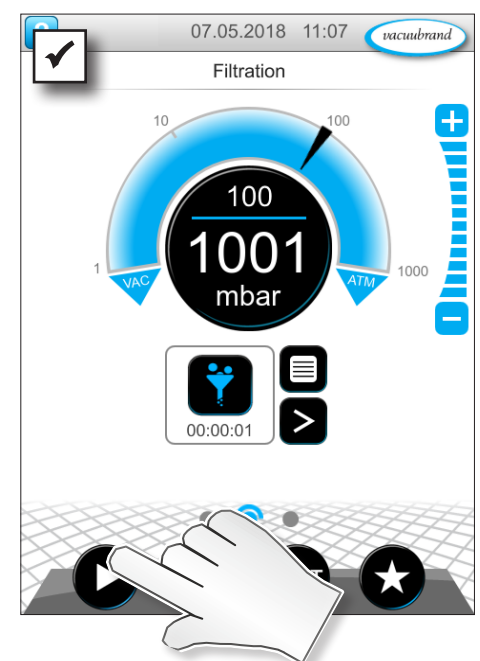
3. Enter the required motor speed in the pop-up.



4. Confirm entry.

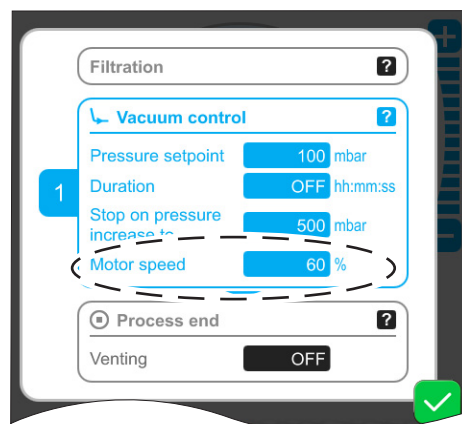


5. Confirm the change in the parameter list.



✓ 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.

View Pressure graph

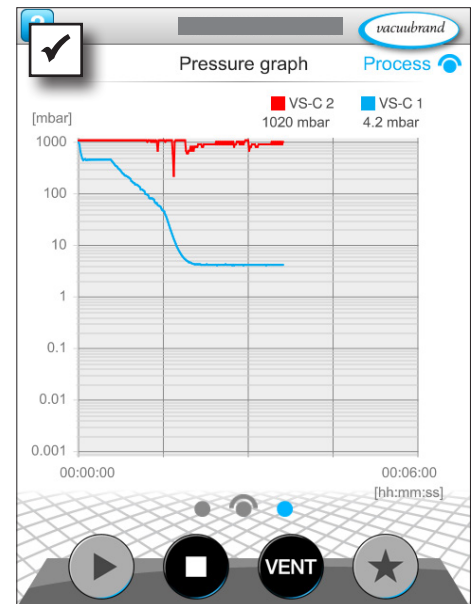
→ Example
View pressure graph



Swipe left

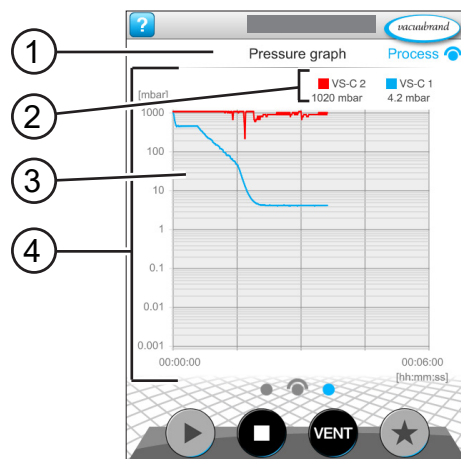


⇒ Swipe left on the display.



- ☒ 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 |

■ VS-C 1 ■ VS-C 1
■ VS-C 2 ■ VS-C 2

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

6.4 Main menu

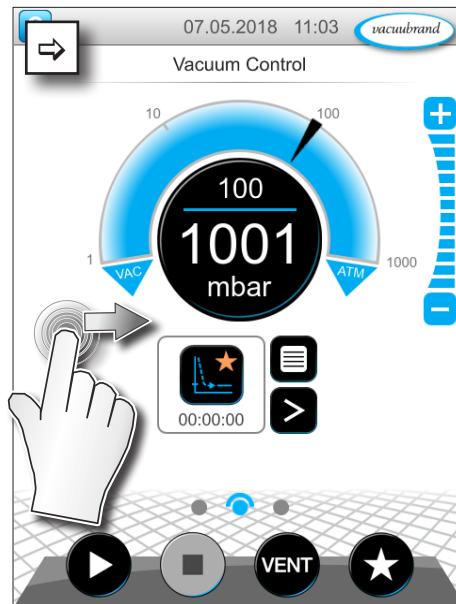
The *main menu* is on the same level as the process screen. The submenus of the controller can be accessed from the main menu.

View main menu

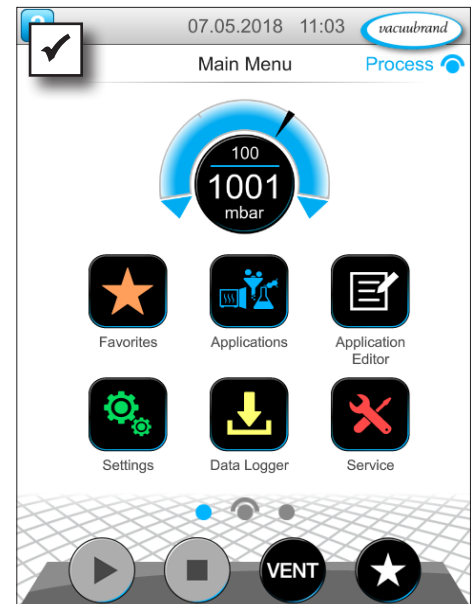
→ Example
View main menu



Swipe
right

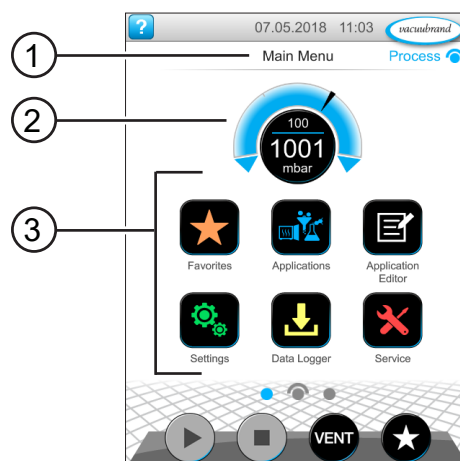


⇒ Swipe right on the display.



☑ 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



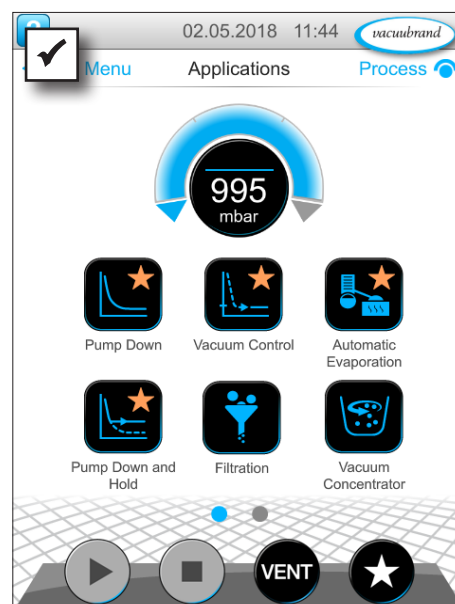
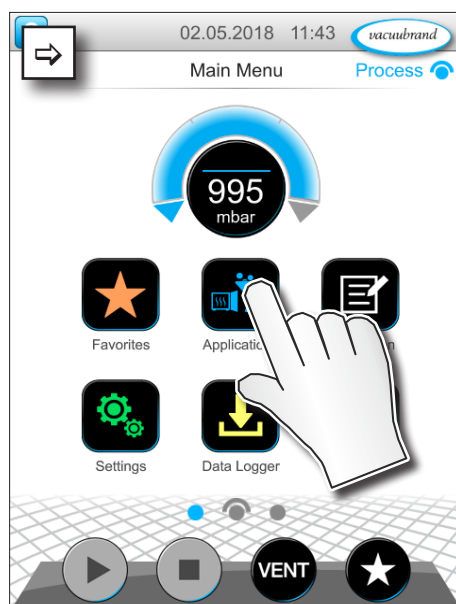
This menu lists all applications: standard applications, favorites, and newly created applications.

View application menu

View applications submenu



Tap/press lightly



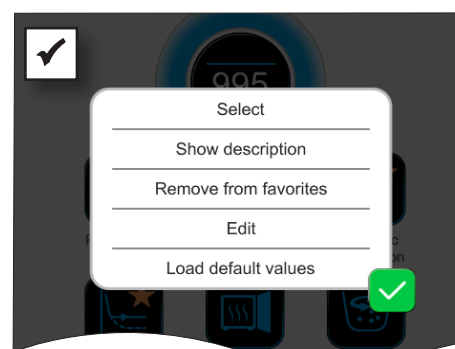
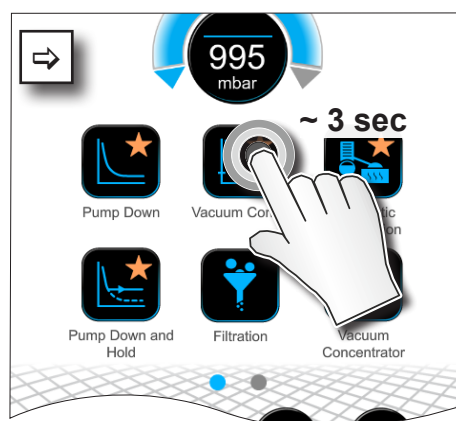
☒ Display the applications submenu.

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



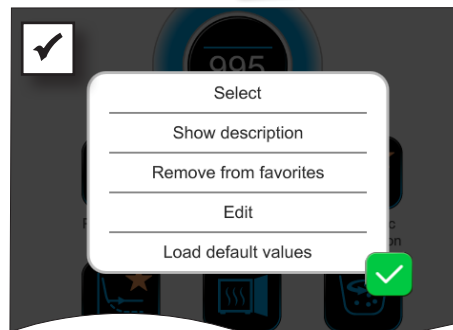
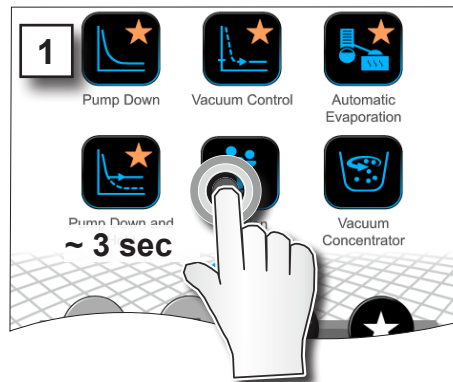
Hold down



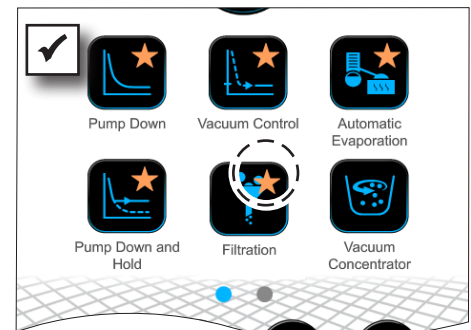
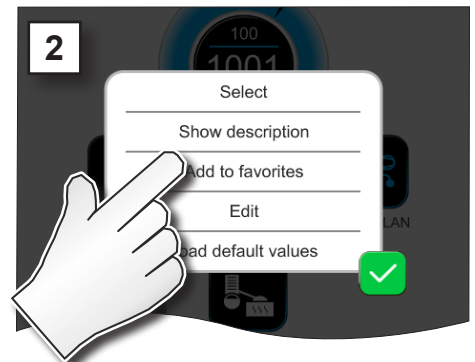
Tap/press
lightly



Confirm



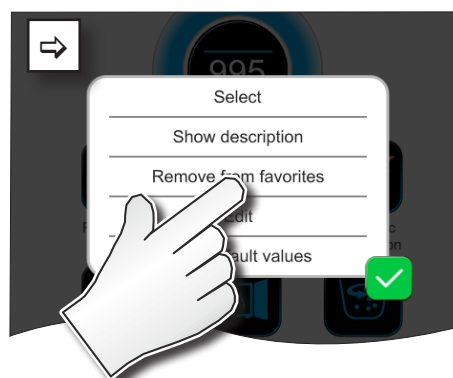
- ☒ Text changed in the context menu.



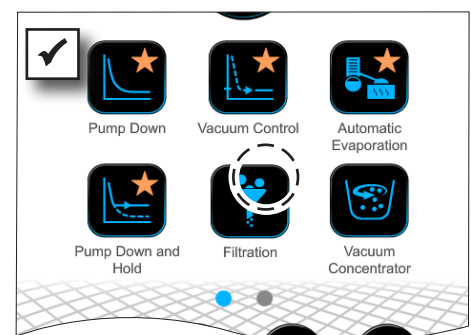
- ☒ Button with favorites star.
- ☒ Application listed in favorites menu.

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.

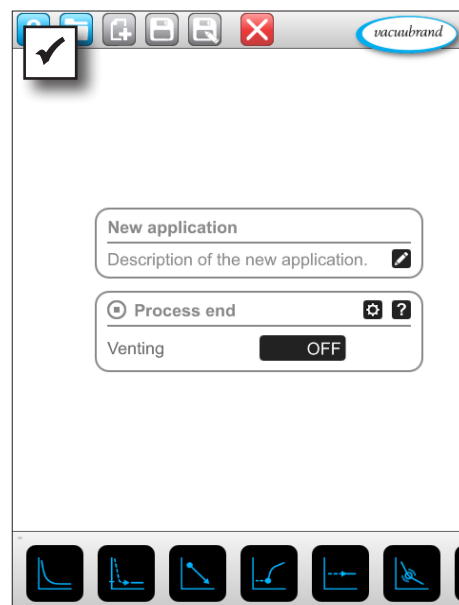
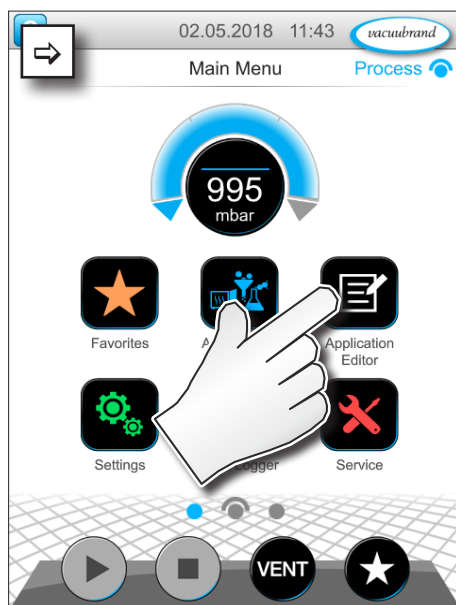
In the case of lengthy applications, you can scroll through the overview of the process steps.

View application editor

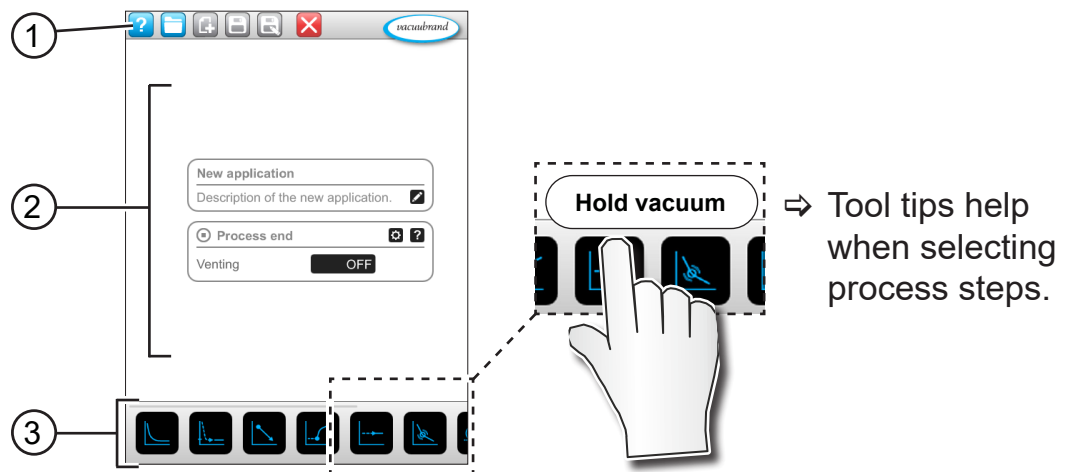
→ Example
View application
editor



Tap/press
lightly



Application editor display



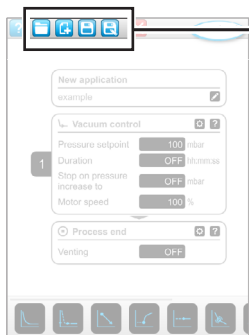
1 Menu bar

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

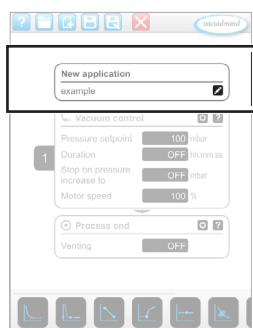
Menu bar



→ 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

Description of the new application. 

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:

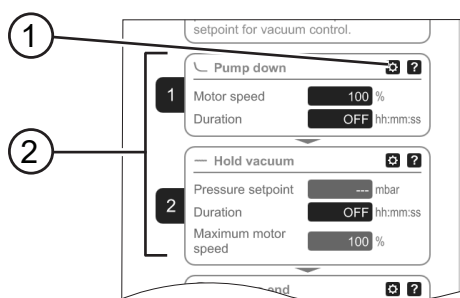


7.1.3 Overview of process steps

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 in front of this.

7.1.5 Edit application

Create a new application

→ Example
Create a new application



Tap/press
lightly



Hold down
and drag



Release



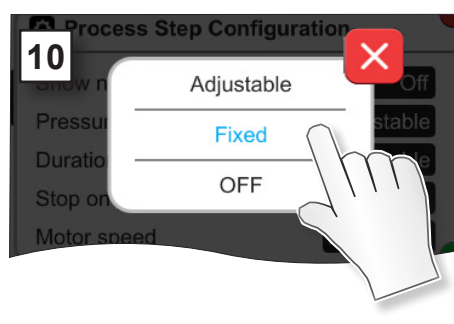
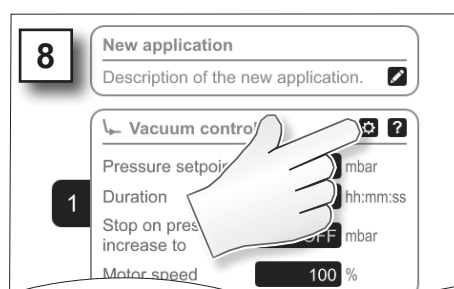
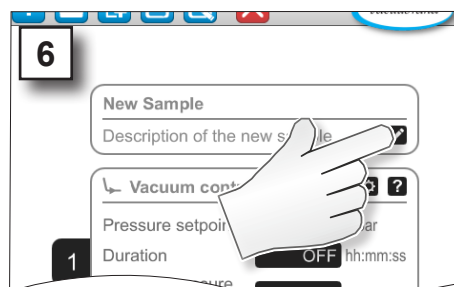
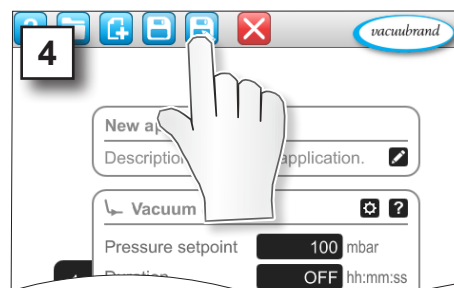
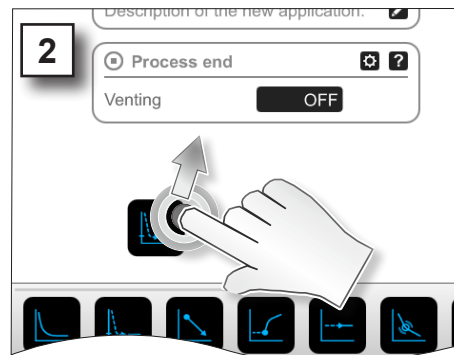
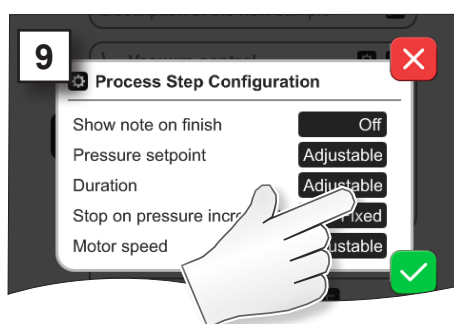
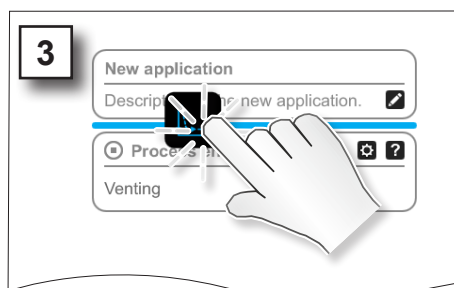
Save as



Confirm



Exit menu



→ Example
Edit new application



Tap/press
lightly



Hold down



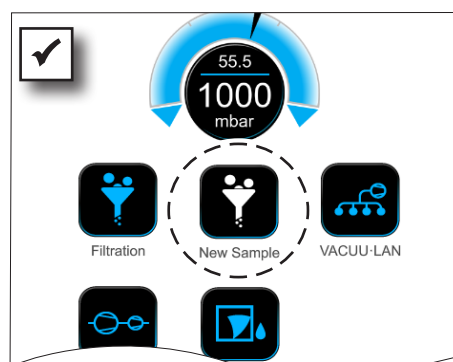
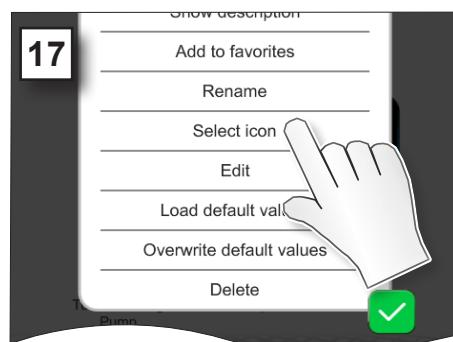
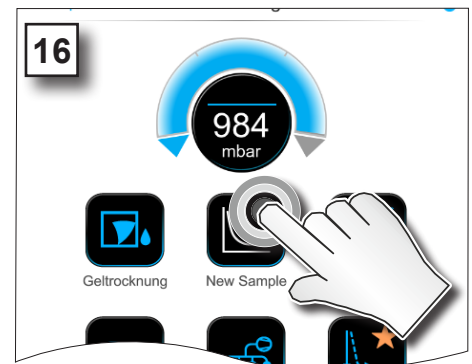
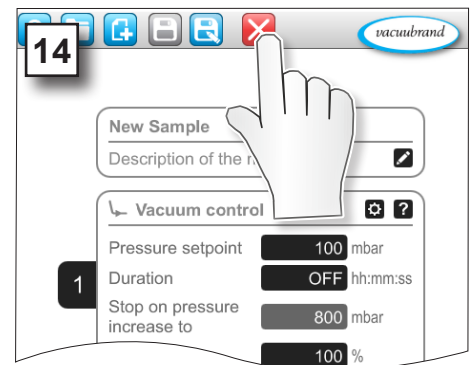
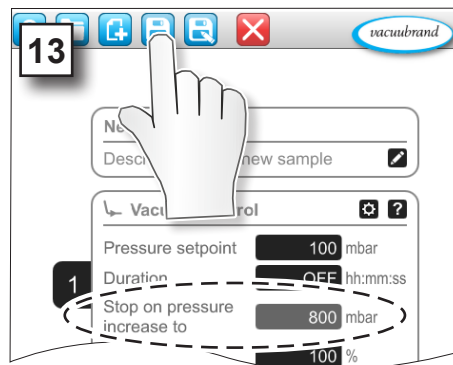
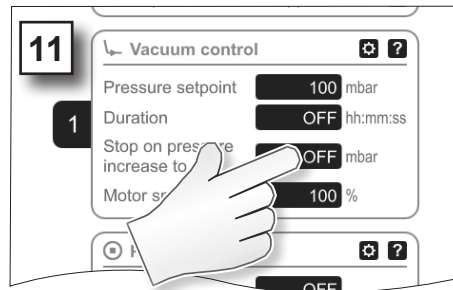
Save



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



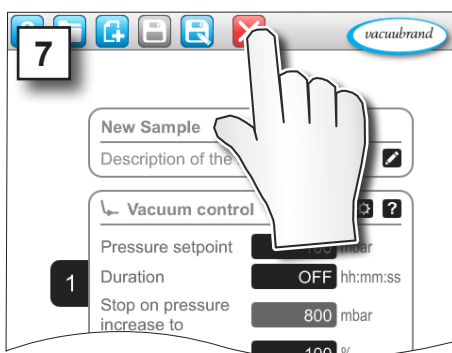
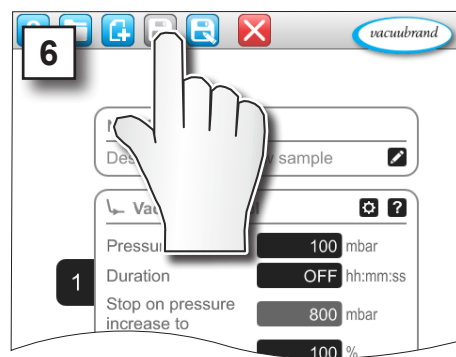
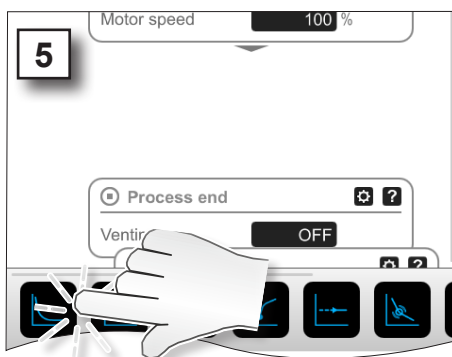
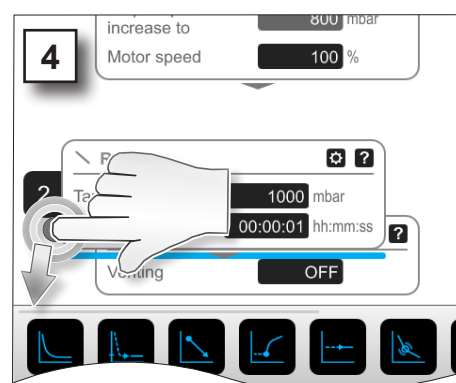
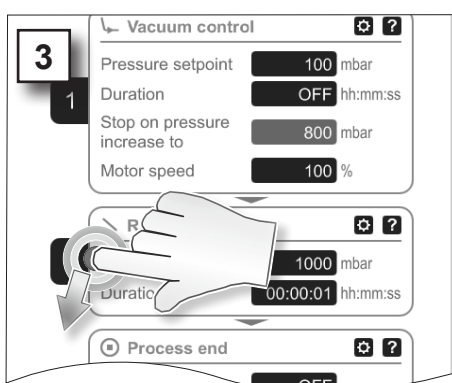
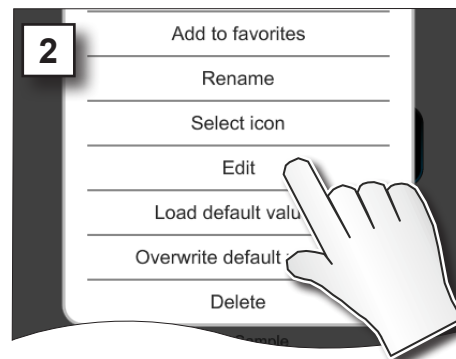
Release



Save



Exit menu



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

7.1.7 Settings



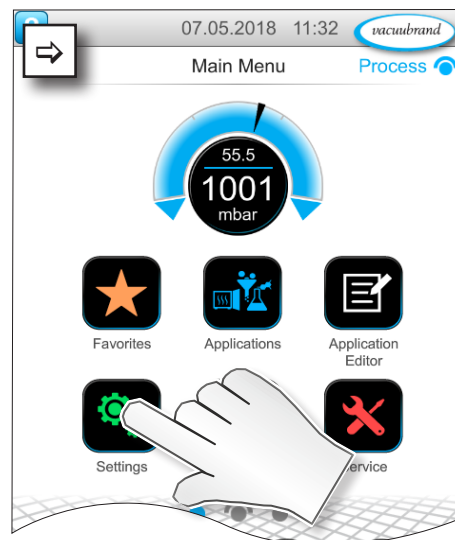
In this submenu you can adjust the display, switch to another language, and make presets for connected VACUU·BUS peripheral devices.

View settings submenu

→ Example
Main menu \
Settings \ Basic
settings

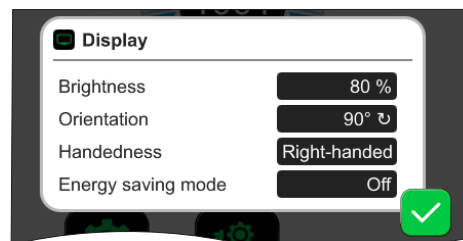


Tap/press
lightly

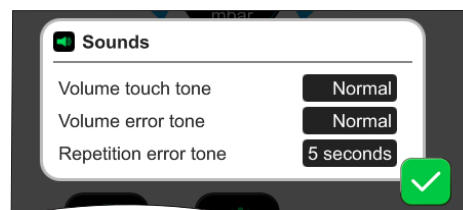


Meaning of the context menus

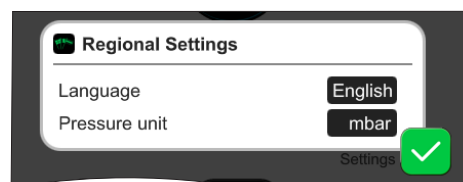
→ Example
Overview
Context menu
settings



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.



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

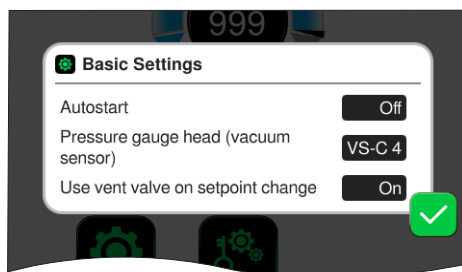


Cancel



Confirm

→ Example
Overview
Context menu
settings



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

Overview of possible
basic settings

Description of 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



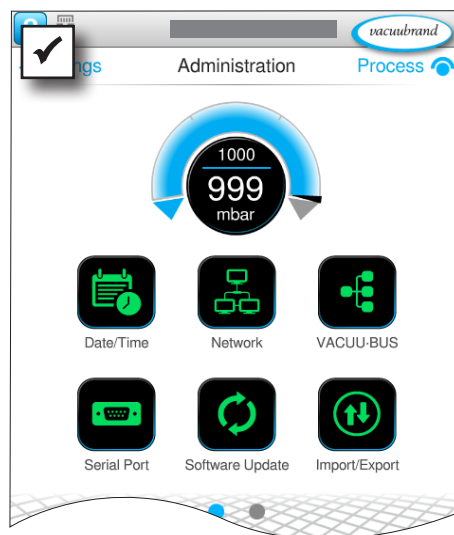
Admin area of the controller – only for authorized staff.

View administration submenu

→ Example
Main menu
 \ Settings
 Administration



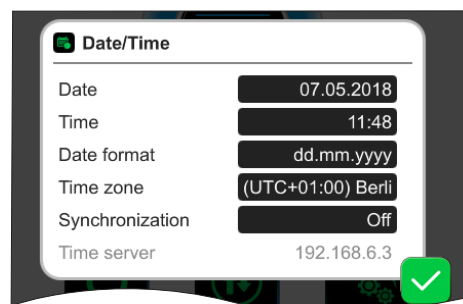
Tap/press
lightly



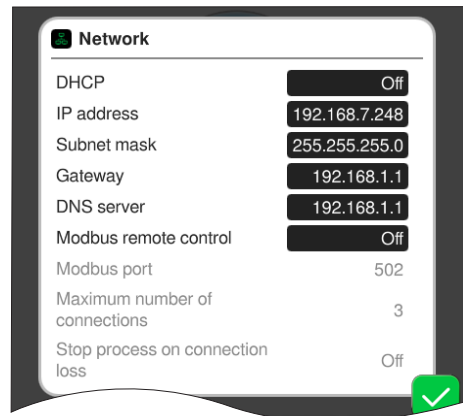
☒ Submenu with buttons for administrative submenus.

Meaning of the context menus

→ Example
Overview
Context menus
administration

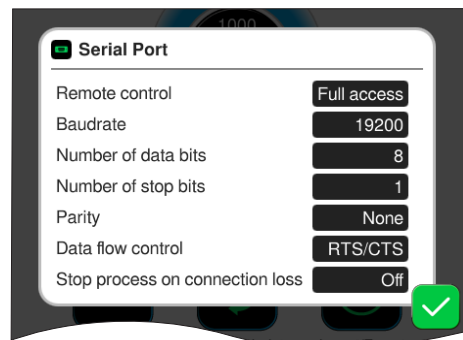


Adjustments for **date and time**.



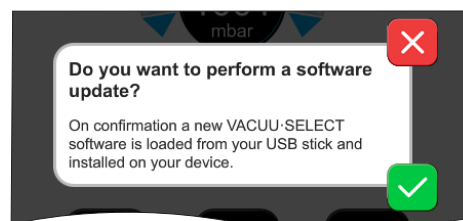
Default settings for integrating the controller into your **Network**.

Activate/deactivate remote control via Modbus.

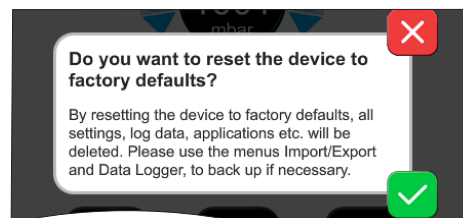


Default settings for **Serial port** and alignment of the communication settings (COM) for RS-232.

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

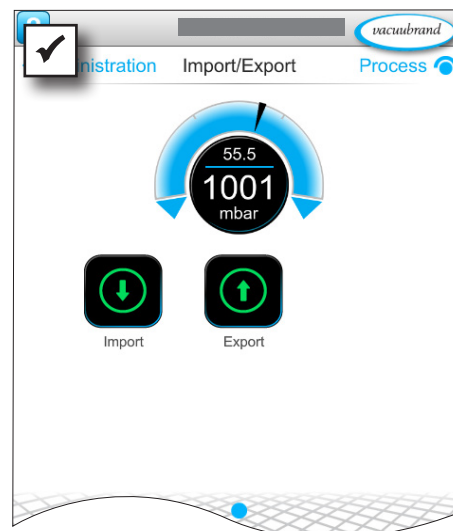
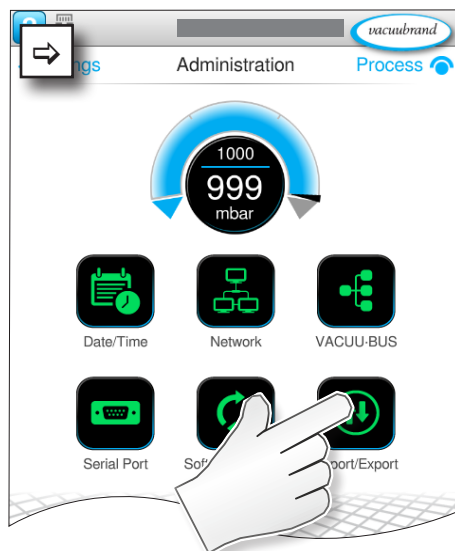
7.1.9 Administration – import/export

View import/export submenu

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



Tap/press
lightly



Meaning of the context menus

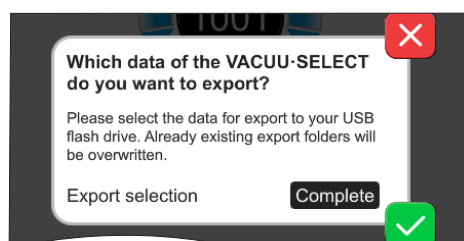
→ Example
Overview
Context menus
Import/Export



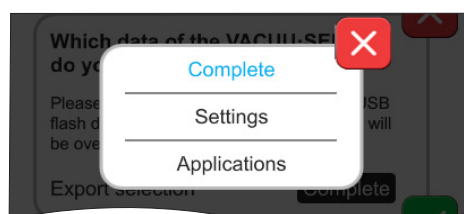
Cancel



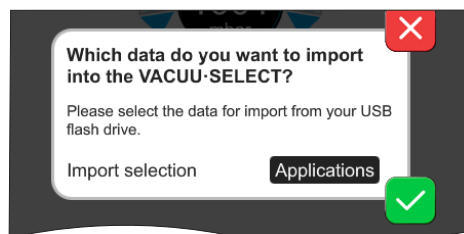
Confirm



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



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



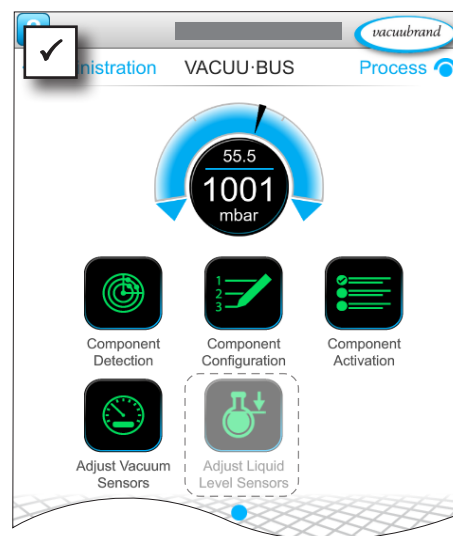
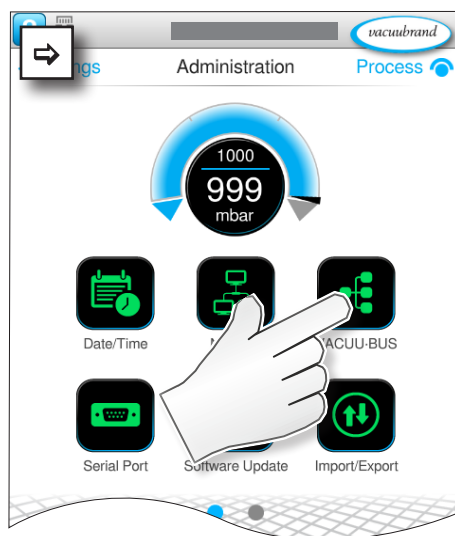
The VACUU·BUS submenu simplifies the detection and management of VACUU·BUS components.

View 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 presets 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 menus

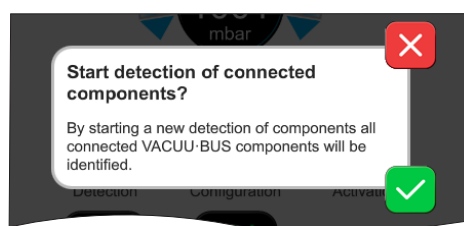
Overview
Context menus
VACUU·BUS



Cancel

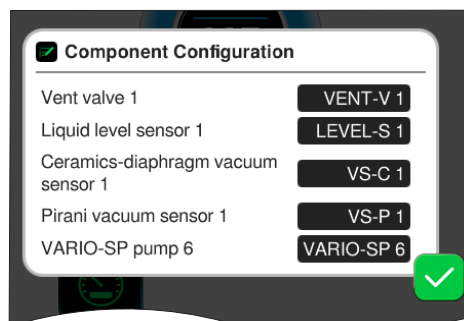


Confirm

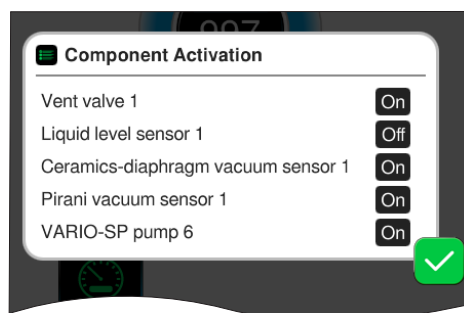


The **Component detection** function scans all connected components and updates the list of connected VACUU·BUS peripherals in the controller.

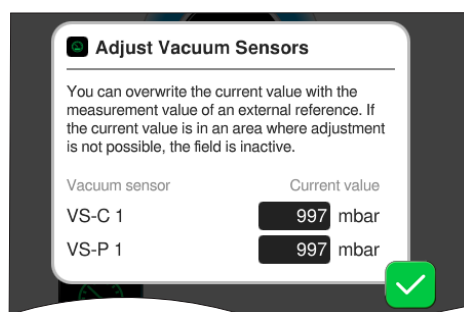
Example: If one level sensor is removed and component detection is performed, the level sensor will no longer be listed in the component configuration.



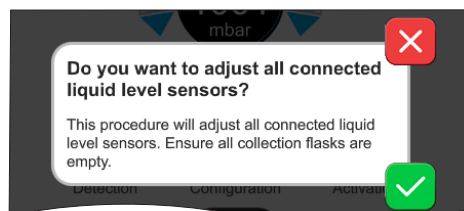
With **component configuration**, the addresses of connected components can be easily changed or reassigned.



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**.

7.1.11 Administration/Function Enhancements



The **Function Enhancements** submenu is provided for the activation of additional functions. To activate additional functions you must have a USB stick with a valid license file or enter a license code via the on-screen keyboard.

Opening the Function Enhancements submenu

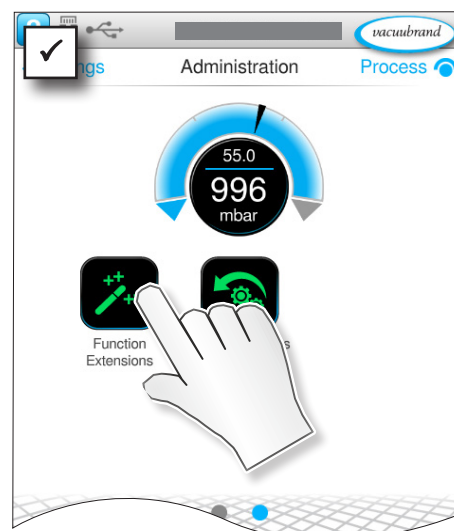
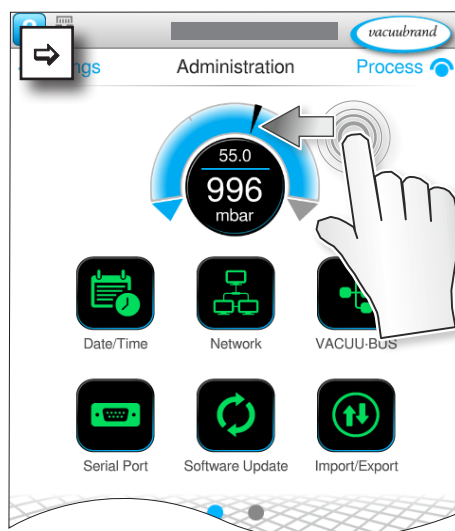
→ Example
Main Menu \
Settings \ Adminis-
tration \ Function
Enhancements



Press and
swipe
in the
direction
shown



Tap, press



Meaning of the context menus

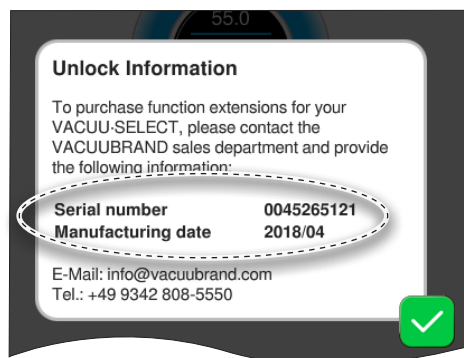
Overview
VACUU-BUS context
menu



Cancel



Confirm



Activation Information shows you the contact details and the information that you need for your device. To order a license for activating additional functions, please always specify the serial number and manufacturing date of your device.

Function activation

If you have a valid license, please follow the user prompts that appear once you have inserted the USB stick with the license file. Alternatively, you can enter the license code using the on-screen keyboard.



<https://www.vacuubrand.com/20901537>

7.2 Data logger



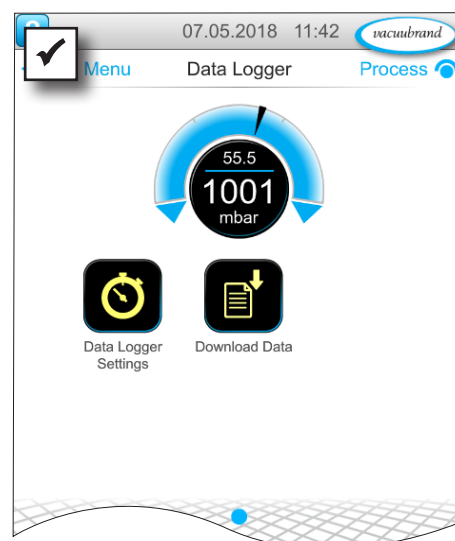
If the function is switched on, the data logger records time/pressure curves and saves these at specified intervals, for a duration of up to 30 days. A separate data file is saved for each process, from start to stop.

Calling up the Data logger submenu

→ Example
Main menu \ Data
logger



Tap/press
lightly



Meaning of the context menu

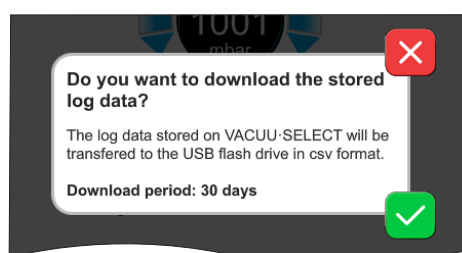
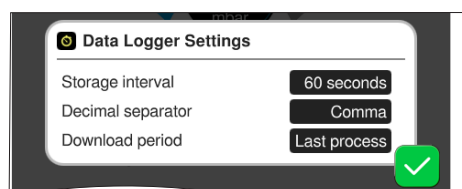
Overview
Context menus
Data logger



Cancel



Confirm



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*. 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.

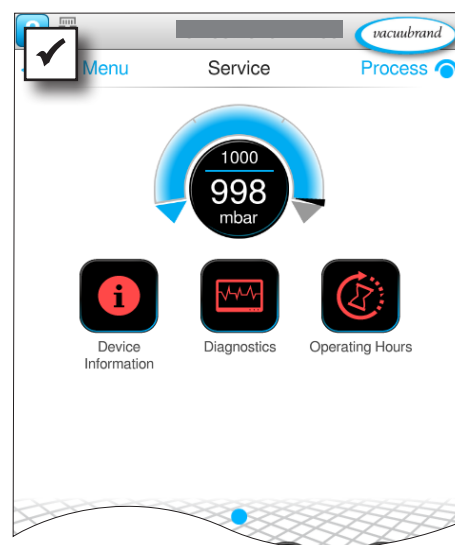
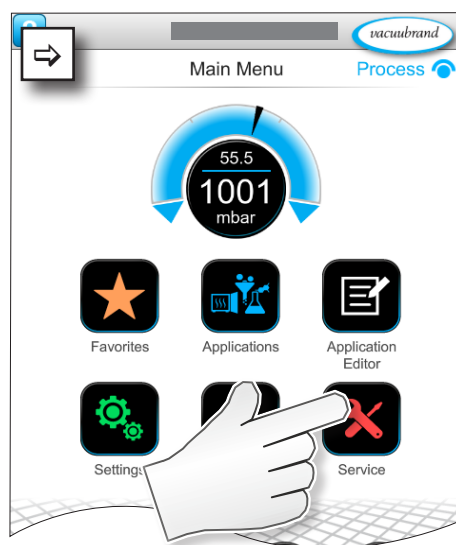
7.3.1 Service information

Calling up the Service submenu

→ Example
Main menu \ Service



Tap/press
lightly



Meaning of the context menu

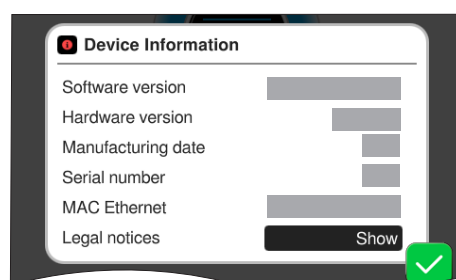
Overview
Context menus
Data logger



Cancel

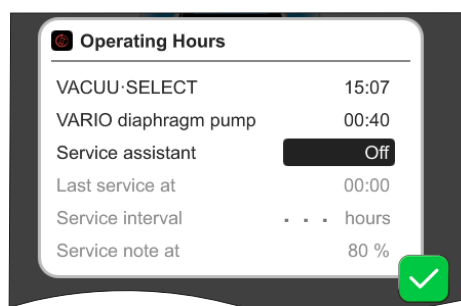


Confirm



This menu displays **Device Information**.

The *Legal notices* contain licensing information.



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



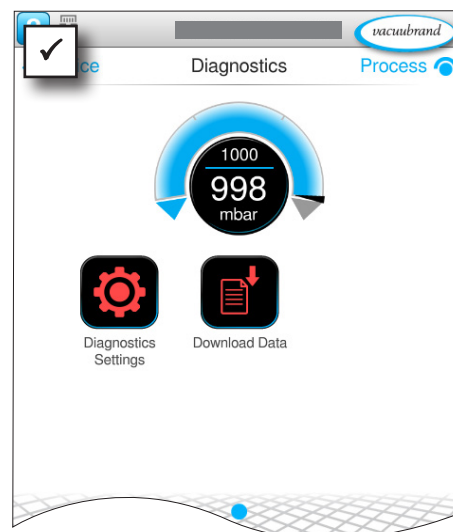
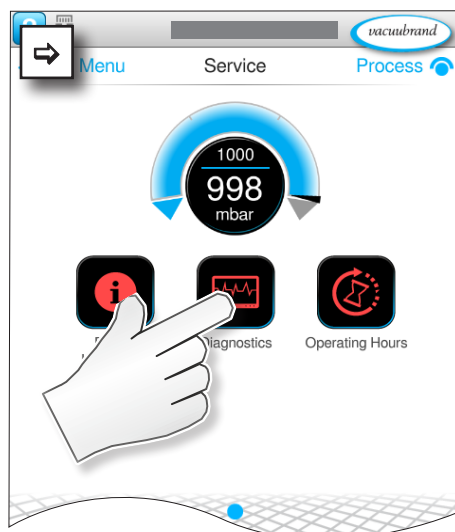
To improve the diagnostics of the device condition in the event of an error or service, diagnostic data is stored on the device. The data can be downloaded onto a USB flash drive via the service menu and sent to our [Customer service](#) for evaluation.

Calling up the submenu

→ Example
Main menu \
Service \
Diagnostic data



Tap/press
lightly



Description of context menus

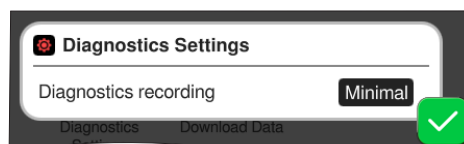
Overview of
diagnostic data
context menus



Cancel



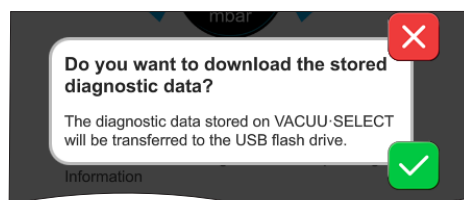
Confirm



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.

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

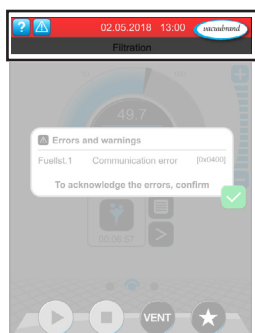
Errors are indicated immediately by the controller as plain text in a pop-up message. The status line provides a visual indication of the extent of the error. In addition, an acoustic signal is emitted while the error persists.

→ Example
Error message
pop-up

 Errors and warnings			Pop-up message
Fuellst.1	Maximum liquid level reached	[0x040]	Source of error, description, error code

8.1.1 Error indication

Error indication



→ Example
Error

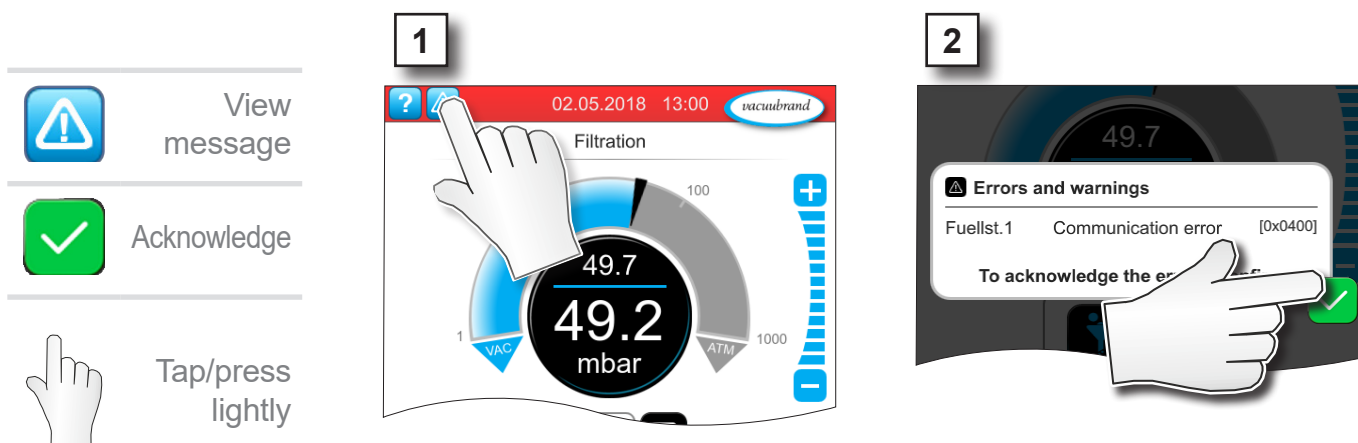
Symbol	Meaning
	Error indication ▶ Indication in the case of error or warning. ▶ Tap to display text and acknowledge the error.
Color	Meaning
Yellow	Warning ▶ Indicates persisting error; process continues to run. ▶ Warnings will be reset automatically after remedy.
Red	Error ▶ Indicates persisting error; 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.

1 -> Phone: +49 9342 808-5660, fax: +49 9342 808-5555, service@vacuubrand.com

8.1.2 Acknowledge error indication

Errors must be acknowledged after the fault has been remedied.

Error information and acknowledgement



☒ Error message reset.

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	► Possible cause	✓ Remedy	Personnel
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
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
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

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
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
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
No license file found	► No USB stick inserted. ► USB stick inserted without valid license.	✓ Insert a USB stick with a valid license.	Specialist

8.3 Device fuse

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

NOTE

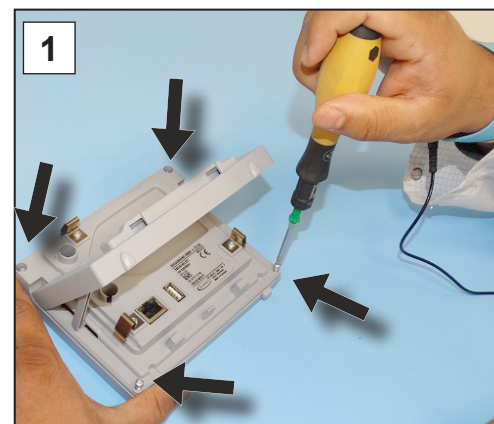
Damage possible if work is performed incorrectly.

- ⇒ 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: Grounded wrist strap, flat-head screwdriver, Gr. 1, Torx screwdriver with torque of TX10, tweezers.

Change device fuse

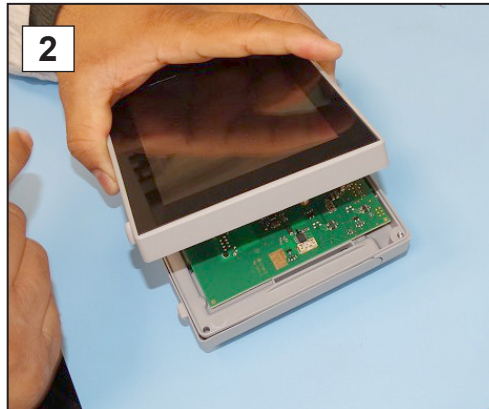


Preparation:

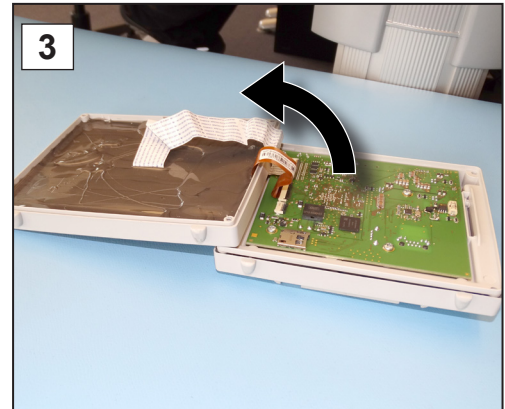
- ⇒ Have the tools ready (see image).
- ⇒ Disconnect the controller from the power supply.
- ⇒ Remove fitted attachments, e.g., sensor, in-line solenoid valve or benchtop housing.

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

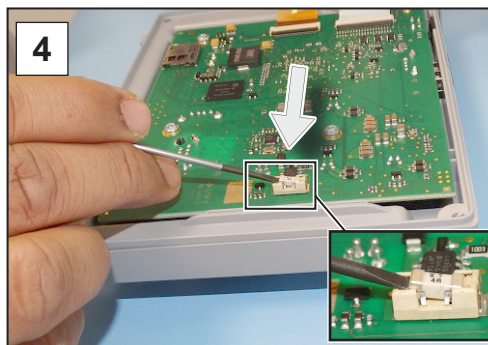
Change device fuse



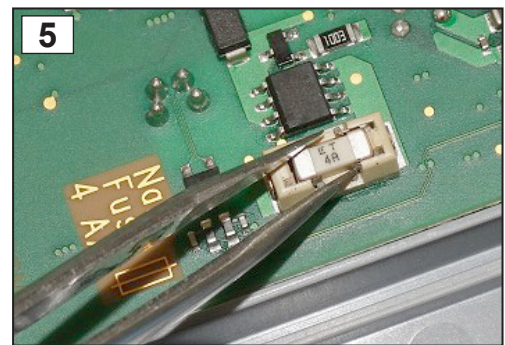
2. Carefully lift the display.



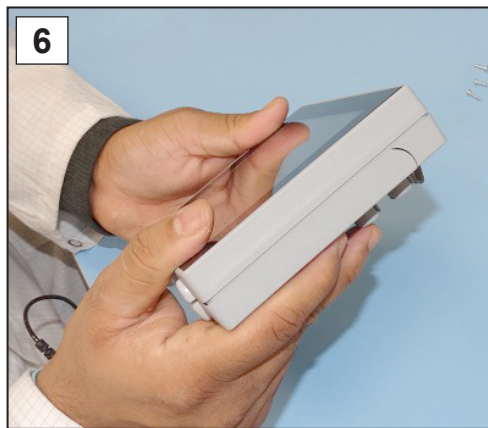
3. Carefully pivot back the display.



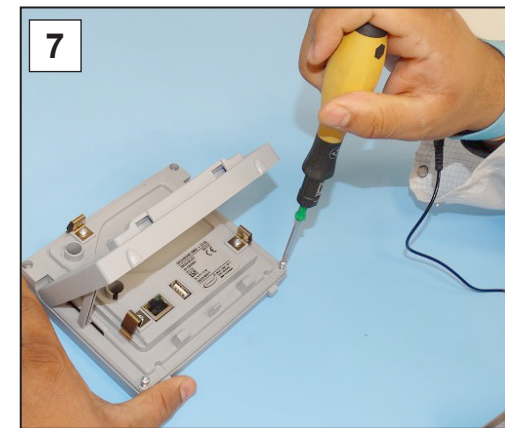
4. Lever the fuse out of the base.



5. Insert the new fuse in the base.



6. Close the housing tightly.



7. Tighten the housing screws using the Torx screwdriver (torque 1.1 Nm) and secure the attachments when work is complete.

Nano fuse 4 A/t

20612952

9 Appendix

9.1 Technical information

Type	
Vacuum controller	VACUU-SELECT Complete
Software version	V1.07 / 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 (IEC 60529)	IP 40	
Protection class (IEC 60529), front	IP 41	
Protection class (UL 50E)	Type 1	
Protection class (UL 50E), front	Type 2	
Relative humidity	30-85 %, non-condensing	
Prevent condensation or contamination from dust or liquids		

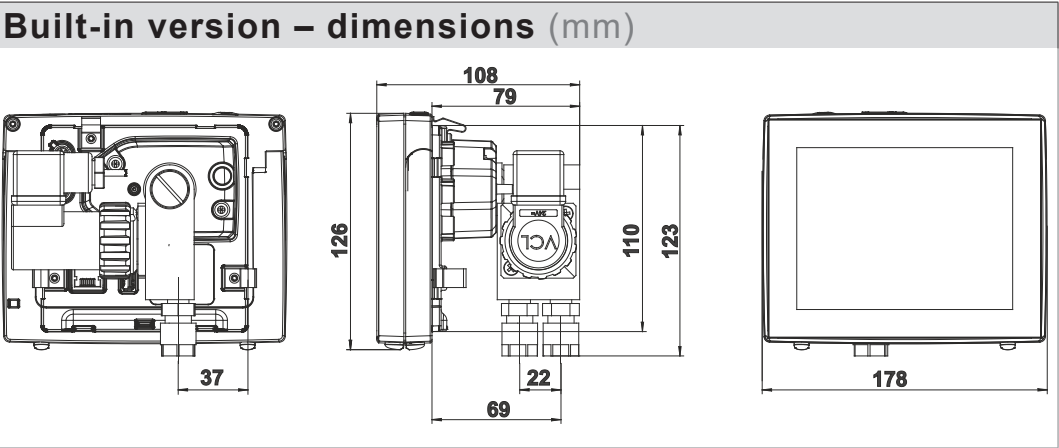
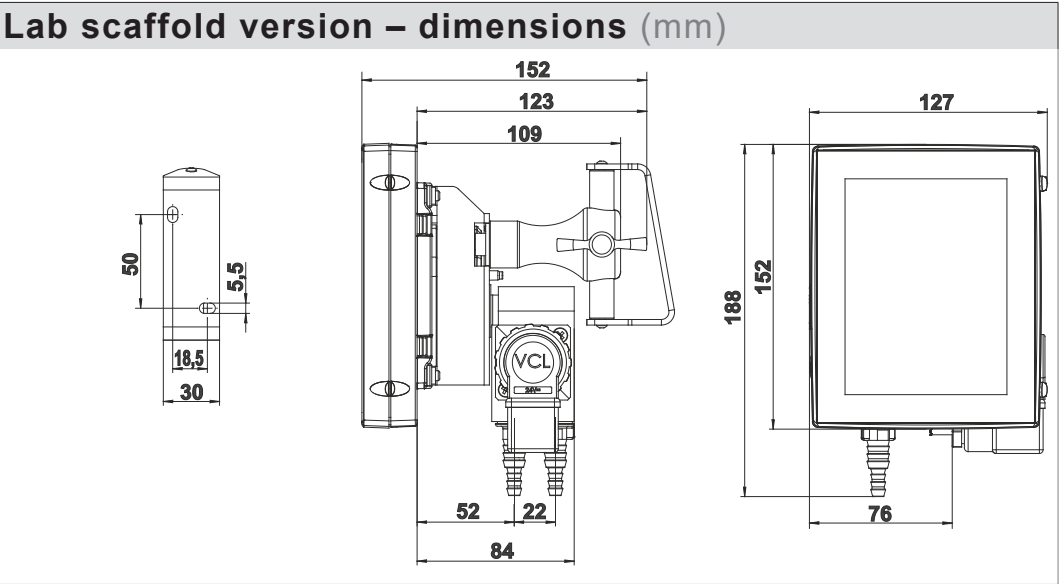
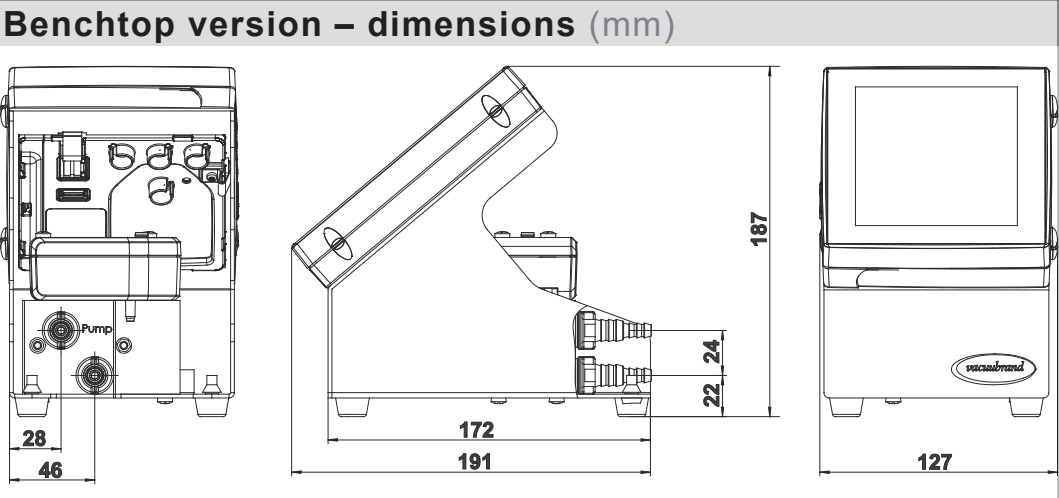
Electrical data	
Nominal voltage	24 VDC
Controller output	1.2 W
Power supply via	VACUU-BUS
Device fuse on circuit board	Nano fuse 4 A/t

Plug-in power supply	30 W	25 W
Input voltage	90–264 VAC	100–240 VAC
Frequency	50–60 Hz	50–60 Hz
Power consumption, max.	0.8 A	0.7 A
Output current, max.	1.25 A	1.05 A
Output voltage, short circuit proof	24 VDC	24 VDC
Cable length, approx.	2 m	79 in.
Dimensions	108 mm x 58 mm x 34 mm 4.3 in. x 2.3 in. x 1.4 in.	
Weight	140–300 g	0.31–0.66 lb
Power plug	AC, replaceable: CEE/CH/UK/US/AUS/CN	

Technical data

Chemically resistant in-line solenoid valve (US)		
Power supply	24 V DC ±10 %	
Valve connector	3-pole on VACUU·BUS	
Power consumption, approx.	0.22 A	
Power	6 W	
Switching frequency/minute, max.	50	
Switching state	NO contact	NC contact
Leak rate	1*10 ⁻² mbar l/s	
Operating pressure	1.5 bar	1125 Torr
Controller 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	
Controller connections		
Benchtop version, lab scaffold version	2x hose nozzles DN 6/10 mm	
Built-in version	2x straight screw-in connectors DN 8/10	
Venting valve, optional	Hose nozzle DN 4-5 mm	
Weights		(US)
Benchtop version	2.0 kg	4.4 lb
Lab scaffold version	2.0 kg	4.4 lb
Built-in version	1.3 kg	2.9 lb
Plug-in power supply	250 g	0.55 lb
VACUU·SELECT Sensor	145 g	0.3 lb
Chemically resistant in-line solenoid valve	210 g	0.46 lb

Dimensions



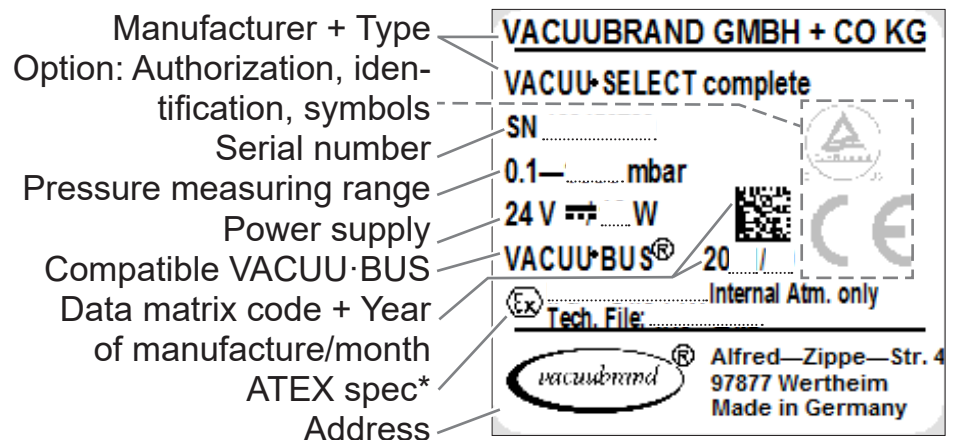
9.1.2 Rating plate



- ⇒ 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



* Indicating documentation, group and category, marking G (gas), type of protection, explosion group, temperature class (see also: [Approval for ATEX equipment category](#)).

9.1.3 Wetted materials

Wetted materials

Component	Wetted materials
Sensor	Aluminum oxide ceramic, gold-coated (if applicable)
Measurement chamber	PPS
Venting valve seal	FFKM
Option: blind plugs without venting valve	Epoxy resin
Seals	Chemically resistant fluoro-elastomer, PTFE
Connections to pump/application	PVDF
Valve block	PP
O-rings	FKM
Valve body	PVDF
Non-return valve	FFKM
Screw-in connector, diaphragm, sealing ring	PTFE
Hose nozzle	PP

9.1.4 Vacuum data

Vacuum data

Values	(US)	
Measuring range (abs.)	1080–0.1 mbar	810–0.1 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 approval if the ATEX marking is shown on the rating plate	II 3/- G Ex h IIC T4 Gc X Internal Atm. only Tech.File: VAC-EX02	
Inner part (pumped gases)		
Maximum admissible media temperature (gas)  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 benchtop version		20700070
VACUU·SELECT lab scaffold version		20700080
VACUU·SELECT built-in version		20700060
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 (option)

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
Digital I/O module	IN: 5-75 VDC / OUT: 60 VDC (2.5 A)	20636228
	IN: 5-50 VAC / OUT: 40 VAC (2.5 A)	
Analog I/O module	IN: 0-10 V / OUT: 0-10 V	20636229
	IN: 4-20 mA / OUT: 0-10 V	20635425
Vapor 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
Cheese head screw M6 x 10		23110179
Non-return valve (inlet/outlet valve)		20638836
Solenoid valve VCL-C3, 24 V DC		20636667
Valve cable B VV, complete		20612753
Straight screw-in connector VCL-G		20637221
Extension cable	VACUU·BUS 0.5 m	20612875
	VACUU·BUS 2 m	20612552
	VACUU·BUS 10 m	22618493
VACUU·BUS Y adapter		20636656
Wall power supply plug 30 W, 24 V; with adapters		20612090
Wall power supply plug 25 W, 24 V; with adapters		20612089
Safety information for vacuum equipment		20999254
Instructions for use		20901170

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 office](#) is available to assist you with orders, questions on vacuum control and optimal accessories.

9.3 Licensing information and data protection

- ⇒ 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.

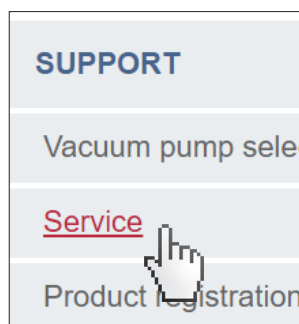
To display Legal notices or adjust Diagnostic data

→ See chapter: **7.3 Service on page 78**

9.4 Service

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.

Return (reshipment)

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



⇒ 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

A

Abbreviations	12
Action steps	11
Activate/deactivate remote control via Modbus	72
Activate/deactivate remote control via RS-232	72
Add favorites	61
Additional symbols	10
Adjust motor speed	56, 57
Adjust parameter	57
Adjust pressure setpoint	49
Administration	71
ATEX equipment category	19
ATEX equipment labeling	19

B

Basic settings	69, 70
Benchtop device	32
Benchtop version	21, 32
Built-in device	35
Built-in version	21, 35

C

Change device fuse	84, 85
Change language	69
Color coding of status bar	46
Connection options	39
Connect venting valve	41
Context menu for applications	60
Context menus	79
Context menus VACUU·BUS	74
Continuous venting	55
Controller versions	21
Copyright ©	7
Country-specific Interchangeable plug	37
Create application	66
CU Certificate	98
Cut-out dimensions	35

D

Data logger	77
Data logging, switch-off	77
Datenspeicherung	43
Description of vacuum controller	21
Description of VACUU·SELECT® Sensor	26
Diagnostic data	79
Diagnostic data, minimizing and deleting	92
Display and operating elements	45
Display conventions	9
Display elements	46
Display of operating steps	11
Disposal	20
Distributors	92

E

EC Declaration of conformity	96
Edit application	67

Electrical connection	37
Error – Cause – Remedy	81
Error message pop-up	80
Ethernet connection	30
Explanation of safety symbols	10
Explanation of usage conditions X ...	20

F

Foreseeable misuse	15
Front view	23
Function enhancements	76

G

Gestures	43
Goods receipt	31

H

Handling instructions	11
Health and Safety Clearance form ...	93

I

Icons	10
Import/export	73
Improper use	15
Instruction modules	8
Interfaces, lab scaffold version	24

L

Lab scaffold device	32
Lab scaffold version	21, 32
Landscape	44
Landscape view	44
Licensing information	78, 92
Limitation of use	31

M

Main screen	45
Mandatory sign	10
Manual structure	8
Measurement chamber	90
Mount the wall bracket	33

O

ON/OFF button	42
Operating elements and symbols	48
Operating elements for control	51
Operating elements – process steps	50
Operating panel	13
Operating steps	11
Operating steps as graphics	11
Ordering information	91

P

Parameter list	56
Pivot stand holder 90°	34
Pivot valve block 90°	36
Plug-in power supply	37
Pop-up window	47
Portrait	44
Portrait view	44
Power supply	38
Power supply to controller	38
Power supply via plug-in	

power supply	37	Vacuum connection PTFE	40
Pressure display PC 520, PC 620	46	Vacuum data.....	90
Prevent explosive mixtures.....	19	VACUU·SELECT® Sensor.....	26
Process screen.....	45	VACUU·VIEW.....	91
Process step.....	64	VACUU·VIEW extended.....	91
Process step configuration	64	Vent briefly.....	55
Process step section	64	Venting connection (option).....	41
Product description.....	21	Vent with ambient air	41
Product-specific terms	13	Vent with inert gas	41
Prohibition sign.....	10	View application editor.....	62
Protective clothing	17	View applications submenu	60
Q		View main menu	59
Quality standard	17	View pressure graph.....	58
R		W	
Rating plate	26, 89	Warning symbol	10
Remove favorites.....	61	Wetted materials.....	90
Responsibility matrix.....	16		
Return (reshipment).....	93		
RS-232 connection	30		
S			
Safety	7		
Safety information.....	14		
Safety information for vacuum equip- ment.....	14		
Screen orientations.....	44		
Select application	52		
Service.....	78		
Service handling	93		
Service range	93		
Side view	23		
Sounds	46		
Sources of supply	92		
Spare parts.....	92		
Standard pressure display.....	46		
Start application.....	52		
Status bar	48		
Stop application	56		
Switch on device.....	42		
Symbols.....	10		
Symbols with operating function.....	49		
T			
Technical data.....	86, 87		
Technical support.....	80		
Term definitions	13		
Tool tips	63		
Top view.....	25		
Touchscreen operation	43		
U			
UKCA Declaration of Conformity	97		
User information	7		
V			
VACUU·BUS®.....	13		
VACUU·BUS accessories.....	91		
VACUU·BUS® connector	13		
VACUU BUS context menu	76		
VACUU·BUS simplified.....	74		
Vacuum connection	39		
Vacuum connection, hose nozzle	40		

9.6 EC Declaration of conformity

EC Declaration of
conformity

EG-Konformitätserklärung EC Declaration of Conformity Déclaration CE de conformité



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
- 2014/35/EU
- 2014/34/EU
- 2011/65/EU, 2015/863
- 2009/125/EG, (EU) 2019/2021

Vakuum- Controller/ Vacuum controller / Regulateur de vide:

Typ / Type / Type: **VACUU-SELECT complete**

Artikelnummer / Order number / Numéro d'article: 20700060, 20700070, 20700080, 22615724

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 61326 -1 :2013

DIN EN 61010-1:2020, IEC 61010-1:2010 + COR:2011 + A1:2016, modifiziert / modified / modifié + A1:2016/
COR1:2019

DIN EN 1127-1:2019, DIN EN ISO 80079-36:2016

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. Constantin Schöler · VACUUBRAND GMBH + CO KG · Germany

Ort, Datum / place, date / lieu, date: Wertheim, 09.01.2023

(Dr. Constantin Schöler)

Geschäftsführer / Managing Director / Gérant

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(Jens Kaibel)

*Technischer Leiter / Technical Director /
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Web: www.vacuubrand.com

VACUUBRAND®

9.7 UKCA Declaration of Conformity

UKCA Declaration of
Conformity

Declaration of Conformity



Manufacturer:

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

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

- Electromagnetic Compatibility Regulations 2016 (S.I. 2016 No. 1091, as amended by S.I. 2019 No. 696)
- Electrical Equipment (Safety) Regulations 2016 (S.I. 2016 No. 1101, as amended by S.I. 2019 No. 696)
- The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016 (S.I. 2016 No. 1107, as amended by S.I. 2019 No. 696)
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (S.I. 2012 No. 3032)
- The Ecodesign for Energy-Related Products and Energy Information Regulations 2021 (S.I. 2021 No. 745)

Vacuum controller:

Type: **VACUU-SELECT complete**

Order number: 20700060, 20700070, 20700080, 22615724

Serial number: See rating plate

Designated standards applied:

EN 61326 -1:2013

EN 61010-1:2010+A1:2019, EN 61010-1:2010/A1:2019/AC:2019-04

EN 1127-1:2019, EN ISO 80079-36:2016

EN IEC 63000:2018

Person authorised to compile the technical file:

Dr. Constantin Schöler · VACUUBRAND GMBH + CO KG · Germany

Place, date: Wertheim, 09.01.2023

(Dr. Constantin Schöler)

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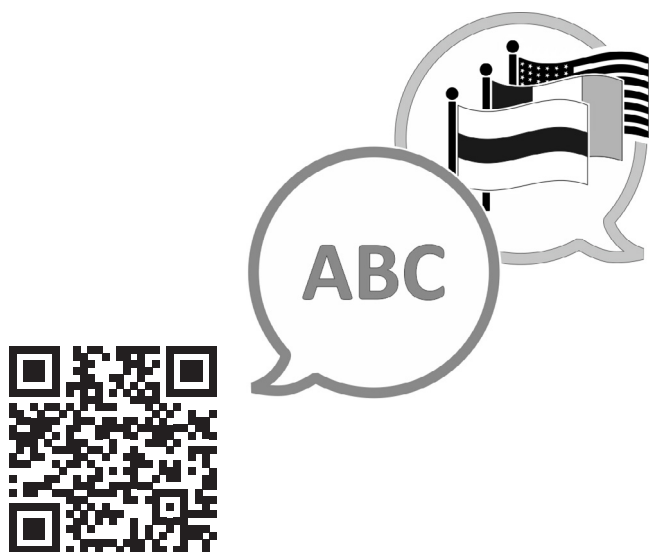
Web: www.vacuubrand.com

VACUUBRAND®

9.8 CU Certificate

CU Certificate

	
Certificate	
Certificate no.	CU 72228817 01
License Holder: VACUUBRAND GMBH + CO KG Alfred-Zippe-Str. 4 97877 Wertheim Deutschland	Manufacturing Plant: VACUUBRAND GMBH + CO KG Alfred-Zippe-Str. 4 97877 Wertheim Deutschland
Test report no.: USA- 31880183 003 Tested to: UL 61010-1:2012 R7.19 CAN/CSA-C22.2 NO. 61010-1-12 + GI1 + GI2 (R2017) + A1	Client Reference: Dr. A. Wollschläger
Certified Product: Measurement and control device for vacuum License Fee - Units	
Model : (1) VACUU VIEW; (2) VACUU VIEW extended; Designation : (3) VACUU SELECT; (4) VACUU SELECT complete; (5) VACUU SELECT Sensor; (6) VSP 3000; (7) CVC 3000; (8) VSK 3000; (9) VSK PV; (10) DCP 3000 Rated Voltage: DC 24V; class III (all devices) Rated Power : (1+2) 1.3W; (3) 5.0W; (4) 13W; (5) 1.2W; (6) 1.6W; (7+10) 3.4W; (8+9) 0.12W Degree of Protection : (7+10) IP20/Type 1 (UL50E) (3+4) IP40/Type 1 (UL50E) (5) IP41/Type 2 (UL50E) (1+2+6+8+9) IP54/Type 5 (UL50E)	7
Appendix: 1, 1-13	
Licensed Test mark: 	Date of Issue (day/mo/yr) 09/02/2023
TUV Rheinland of North America, Inc., 12 Commerce Road, Newtown, CT 06470, Tel (203) 426-0888 Fax (203) 426-4009	



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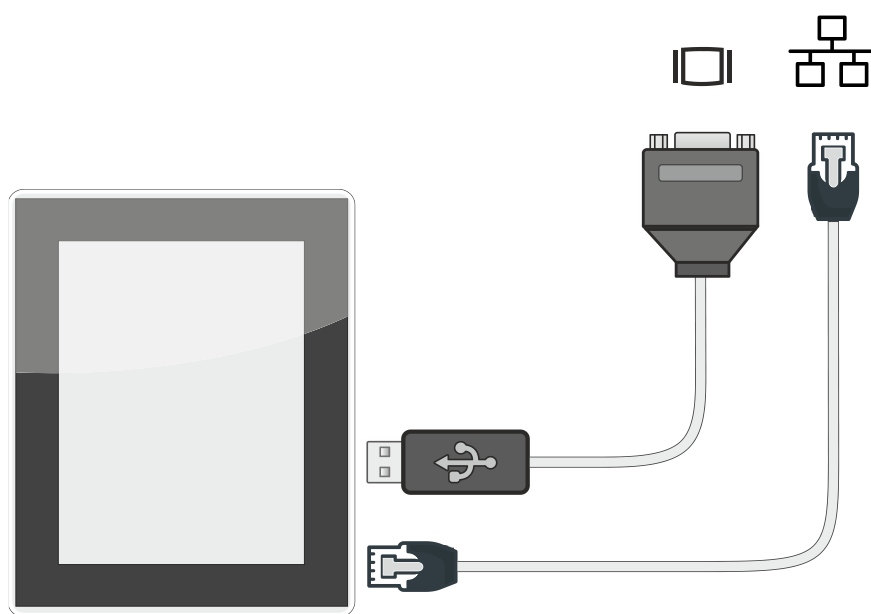


Technology for Vacuum
Systems

Interface description

INTERFACES VACUU-SELECT

Modbus TCP
RS-232



Instructions for use



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.

Manufacturer:

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Web: www.vacuubrand.com

*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	5
1.1	Remote control and interfaces	5
1.2	VACUU-SELECT supported software version	6
1.3	Abbreviations	6
1.4	Target group description	6
2	Applications	9
2.1	Select application	9
2.2	Determine the application ID	9
2.3	List of applications	10
2.4	List of process steps	11
3	Modbus TCP	13
3.1	Modbus communication	13
3.1.1	Connection examples	13
3.1.2	Settings on the controller	14
3.1.3	Supported function codes	17
3.1.4	Defined data types	17
3.1.5	Representation/setting of pressure values	18
3.1.6	Representation/setting of special values	19
3.1.7	Process parameter deactivation	19
3.1.8	Start/end remote control	20
3.1.9	VACUU-SELECT lock screen	20
3.1.10	Communication examples	21
3.2	Modbus Register Mapping	23
3.2.1	Common Model	23
3.2.2	Control Model	24
3.2.3	Process Control Model	26
3.2.4	Process Step Control Model	27
3.2.5	Service Model	28
3.2.6	SYNCHRO pumping units	28
3.3	Application example	29
4	RS-232 serial port	31
4.1	RS-232 communication	31
4.1.1	Connection example	31
4.1.2	Plug allocation (RS-232)	31
4.1.3	Settings on the controller	32
4.1.4	Representation/setting of special values	34
4.1.5	Process parameter deactivation	34
4.1.6	Start/end remote control	34
4.1.7	VACUU-SELECT lock screen	35
4.2	Interface commands	36
4.3	List of frequently used commands	37
4.3.1	Read commands	37
4.3.2	Write commands	37
4.4	List of all commands	38
4.4.1	Read commands	38
4.4.2	Write commands	41
4.5	Application example	43



5	Index	46
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1 Introduction

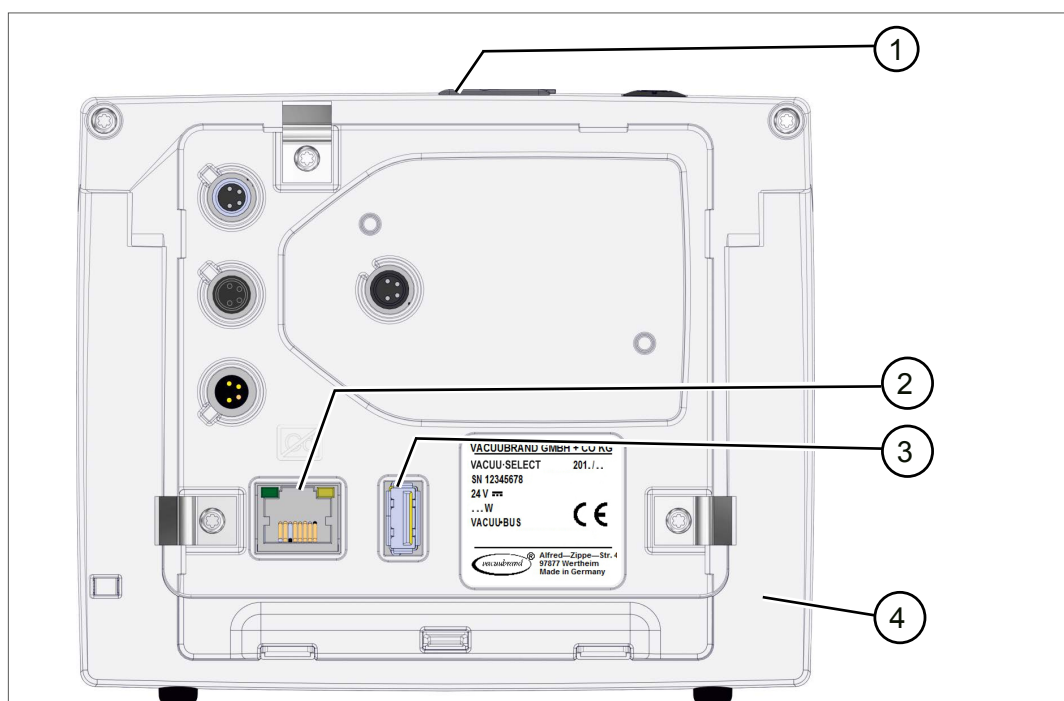
This document describes the general aspects of the communications protocols for Modbus TCP and the use of the serial port RS-232 with the VACUU·SELECT® vacuum controller.

1.1 Remote control and interfaces

As of software version V1.04 / V1.00 of the VACUU·SELECT®, communication is 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 directly with a PC or via PLC in a process control system with a host computer.

VACUU·SELECT interfaces

Figure
VACUU·SELECT
interfaces



- 1 USB port, type A
- 2 RJ45 socket – LAN connection (Ethernet)
- 3 USB port, type A
- 4 Rear view of **VACUU·SELECT®** vacuum controller

IMPORTANT!

The data link to the controller is not encrypted. The operator's IT must implement suitable measures to ensure network security.

1.2 VACUU-SELECT supported software version

Supported software
version

Version	Modbus TCP	RS-232
V1.00 / V1.00	---	---
V1.01 / V1.00	---	---
V1.02 / V1.00	---	---
V1.03 / V1.00	---	---
V1.04 / V1.00 ... or above	x	x

All information on the following pages relate to the current software version. To make use of remote access you require software version V1.04 / V1.00 or above.

⇒ If required, carry out a [software update](#) on the controller.

1.3 Abbreviations

Abbreviations

TCP	Transmission control protocol, Ethernet
RO	Read only
RW	Read / write
NA	No access
NaN	Not a number
ID	Identification number for applications or process steps
VS-C	Vacuum sensor for rough vacuum range = atmospheric pressure –1 mbar (atmospheric pressure –0.75 Torr); e.g., VACUU-SELECT sensor, VACUU-VIEW, VSK 3000
VS-P	Vacuum sensor for fine vacuum range = 1 mbar–0.001 mbar (0.75 Torr–0.00075 Torr); e.g., VACUU-VIEW extended, VSP 3000
---	---
s	Seconds
min	Minutes
h	Hours
---	---
e.g.	For example

1.4 Target group description

IMPORTANT!

It is the operator's responsibility to apportion tasks according to the areas of competence and relevant qualifications listed in the *Responsibility matrix*.

Personnel qualification

Meaning Personnel qualification

Laboratory technician	Laboratory staff with professional qualification in the use of laboratory equipment and knowledge of applications and processes, as well as possible effects of remote access.
Electrician	Person with professional qualification in electrics.
IT expert	System technician in charge of network engineering, network administration and measures for network security and maintenance on the operator's side.

Responsibility matrix

Responsibility matrix and areas of competence

Activity	Laboratory technician	Electrician	IT expert
Interface connection at controller	x	x	---
Connection to PLC	---	x	---
Connection to PC	x	x	x
Network data synchronization	x	---	x
Network configuration (systems integration of controller)	---	---	x
Implementation of IT specific measures for network security*	---	---	x
Remedy of network problems	---	---	x
Controller software update	x	---	---
Reconfiguration** following software update or loading factory settings	x	x	x
Data import/export. e.g., established applications	x	---	---
Data logger download	x	---	---
Troubleshooting	x	---	x
Operation	x	---	---
Advanced operation	x	---	---
Error report	x	x	x
Remedy	x	---	(x)
Remote control, responsibility for process security during remote access	x	---	---

* Data transfers with Modbus TCP or RS-232 are not encrypted.

** Network or interface settings

2 Applications

2.1 Select application

Select application via ID

Applications in the vacuum controller are labeled with an application identification number (application ID), also referred to as *Process Application ID*.

Using these defined application IDs, the required application can be selected via remote control, Modbus TCP or RS-232.



If the host computer issues a demand for applications that are not technically supported by the device, the transmitter receives a corresponding error message. This message can be processed into an appropriate message in the host computer.

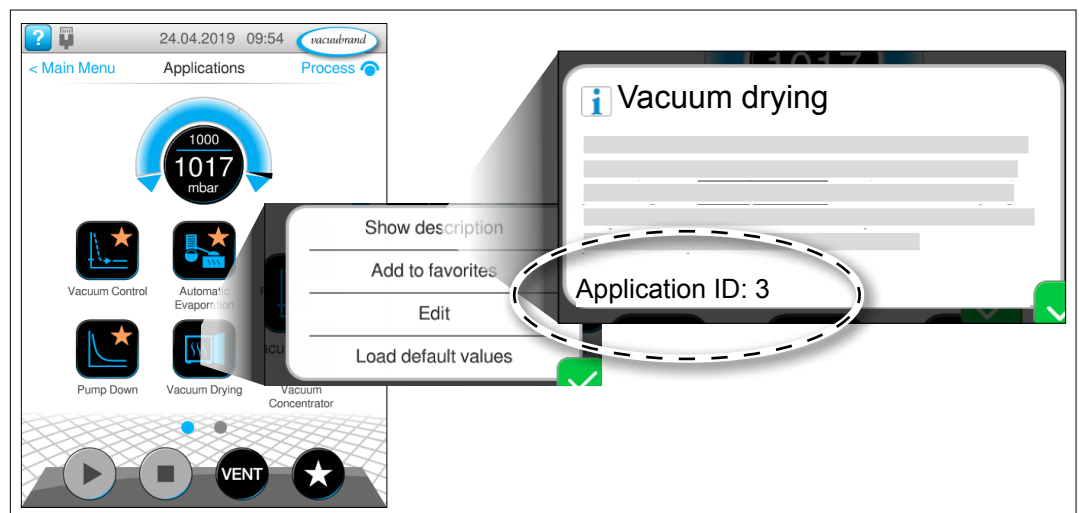
The same functions can be displayed via the interfaces as can locally on the controller.

2.2 Determine the application ID

VACUUBRAND standard applications are in the 0–99 ID range. When you create your own applications – e.g., a new application in the editor – or import an existing application they are automatically assigned a free ID from 100 upwards. Conversely, this means that the ID of an own application must be known for it to be available for selection via remote control.

Main menu / Applications / Context menu: Show description

→ Example
Show application ID on the display



2.3 List of applications

Default process application ID

Application IDs
Standard applications



ID	Standard application	2-point VS-C	2-point VS-P	VARIO VS-C	VARIO VS-P
0	Pump down	x	x	x	x
1	Automatic evaporation	---	---	x	x
2	Application example 1 (automatic evaporation)	---	---	x	x
3	Vacuum drying	x	x	x	x
4	Pump down and hold	x	x	x	x
5	Filtration	x	---	x	---
6	Vacuum control	x	x	x	x
7	Turbo backing pump	---	---	x	x
8	Vacuum concentrator	x	---	x	---
9	Gel drying	x	---	x	---
10	Freeze drying	---	x	---	x
11	Schlenk line	---	x	---	x
12	VACUU·LAN	x*	x*	x	x
13	Boiling point recognition	x	x	---	---
14	Application example 1 (boiling point detection)	x	x	---	---
...	...				

* Only with VMS-B module

The standard applications in the controller are the same on every controller and are counted from application ID 0. Depending on the component configuration certain applications may not be available (see columns in the table).

My process application ID

→ Example
Application IDs
Own applications



ID	Standard application	2-point VS-C	2-point VS-P	VARIO VS-C	VARIO VS-P
100	Application example: Pump down 60 %	x	x	x	x
101	Application example: Pump down and hold 5 min	x	x	x	x
...	...				

Your own applications created in the controller editor are automatically counted from ID number 100 → see also chapter: **2.2 Determine the application ID.**

2.4 List of process steps

Process steps in the vacuum controller are labeled with a process step identification number, also referred to as the *Process Step ID*.

All standard applications and specifically created applications use process steps from a pre-defined set of steps. Each process step consists of elementary and optional parameters. Elementary parameters must mandatorily be assigned a value, while optional parameters can be deactivated selectively.

Process step ID

Process step IDs

ID	Designation	Pressure setpoint	Set speed / maximum speed	Hysteresis / start pressure	Minimum / maximum	Duration / run-on time
0	Pump down	---	x	---	(x)	(x)
1	Vacuum control	x	x	x	(x)	(x)
2	Ramp	x	---	x	---	x
3	Vent	x	---	---	---	(x)
4	Hold vacuum	x	x	x	(x)	(x)
5	Automatic boiling point function	---	---	---	(x)	(x)
6	Boiling point recognition	---	---	---	---	(x)
7	Loop	---	---	---	(x)	(x)
8	Turbo backing pump	---	---	---	---	(x)
9	VACUU·LAN	x	---	x	---	x

x = Elementary parameter

(x) = Optional parameter

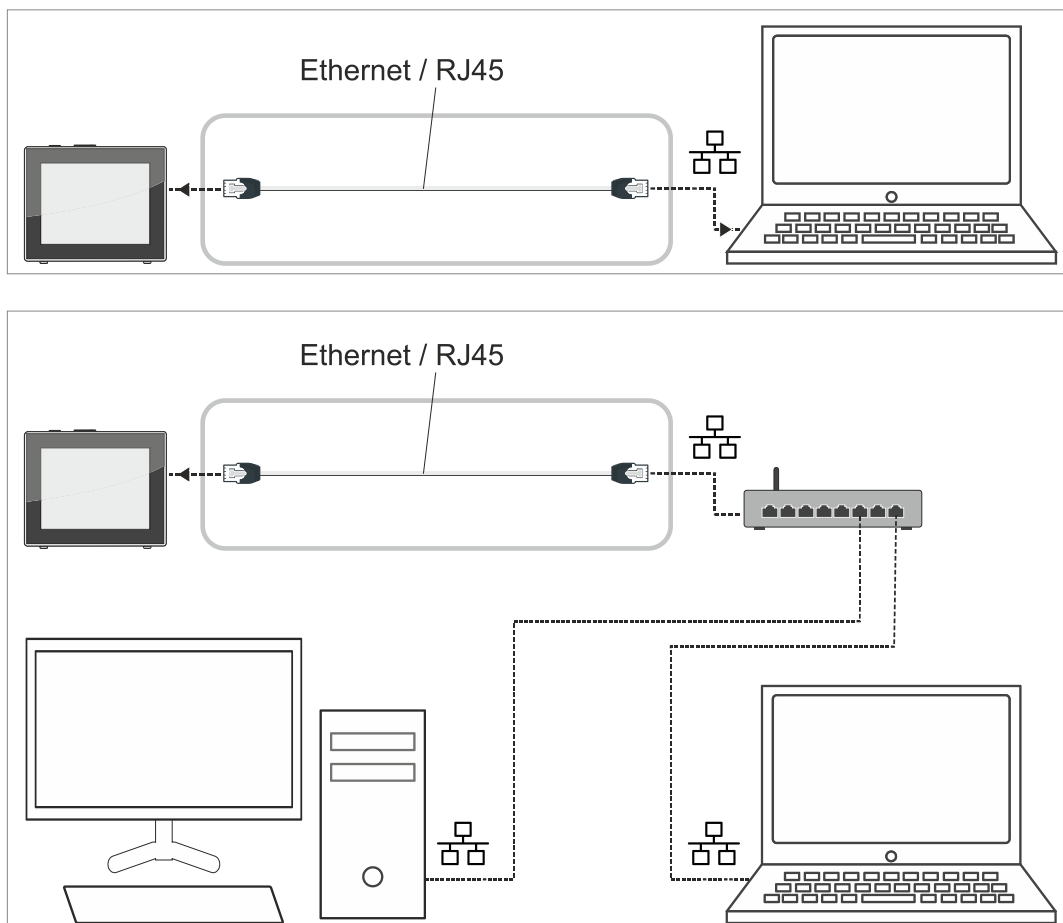
3 Modbus TCP

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

3.1 Modbus communication

3.1.1 Connection examples

→ Examples
Ethernet connection



3.1.2 Settings on the controller

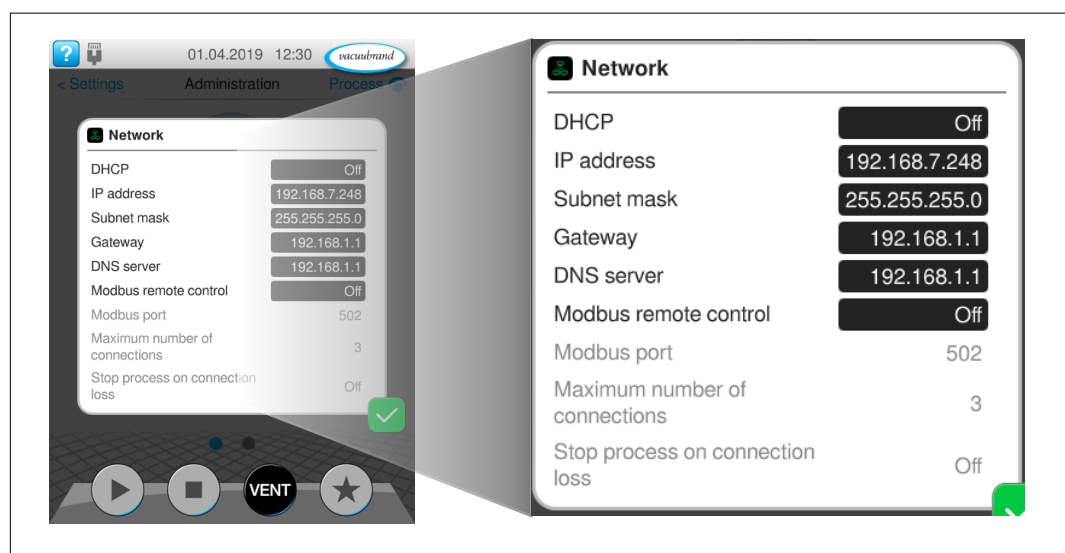
General network/IP settings

General network/IP
settings

In order to use Modbus TCP on the VACUU-SELECT, various basic settings must be carried out first.

All relevant settings are summarized in the **Network** context menu and can be found in the controller as follows: *Process screen / Main menu / Settings / Administration / Network*

Network context menu screen



- ⇒ Synchronize the data with your required network settings.
- ⇒ Tap on one of the black input fields to adjust the data; consult your IT department if required.

The VACUU-SELECT can subsequently be reached via the set IP address. If an automatic configuration of the parameters via DHCP is selected, the assigned IP data can be viewed here. In addition, a cable connection to a network is shown by means of a symbol in the status bar (see illustration).

IMPORTANT!

If the controller is reset to the factory settings, the data in this menu must be synchronized again.

Modbus TCP default settings

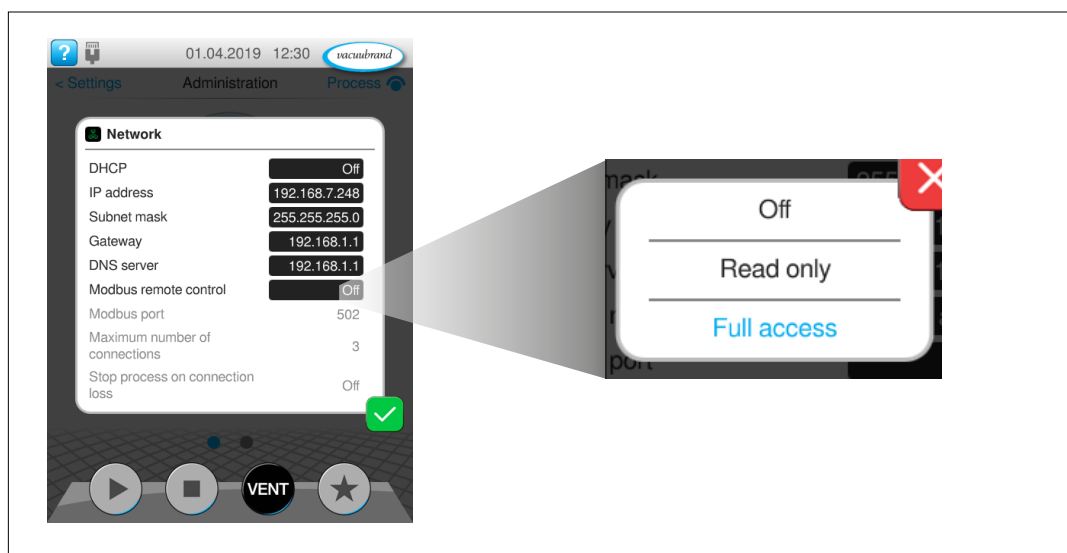
Modbus TCP default settings

The settings relevant for Modbus TCP can be found at the end of the **Network** context menu:

- Modbus remote control (default: Off)
- Modbus port (default: 502)
- Maximum number of connections (default: 3)
- Stop process on connection loss (default: Off)

Settings Modbus remote control

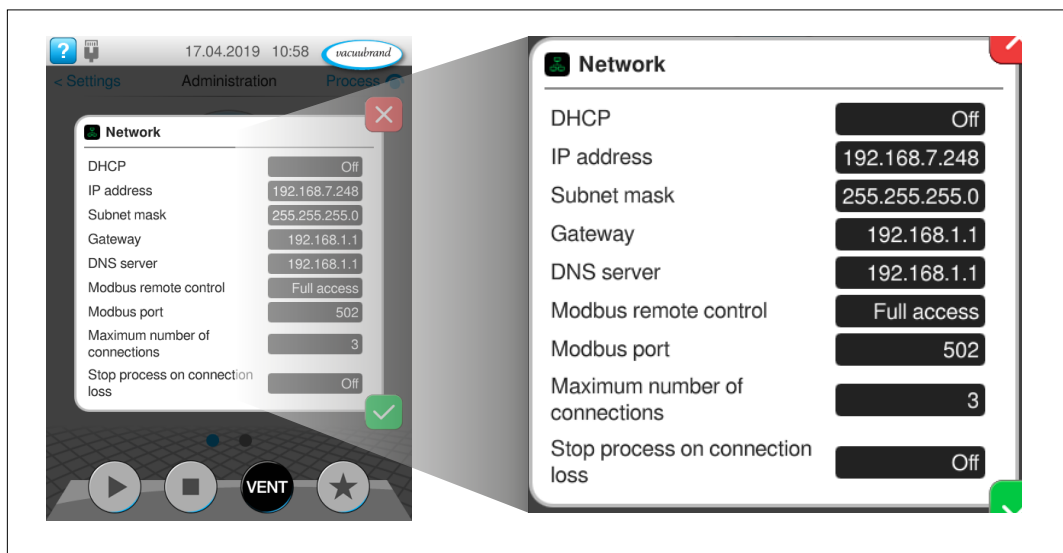
Settings Modbus remote control



Two fundamental types of access are available when using Modbus TCP: **Read only access** or **Full access**. If the aim for example is simply to read out measured values and parameters from the controller for report purposes, with no active remote control permissible, we recommend selecting the **Read only** setting.

Modbus remote control full access/read only

→ Example
Modbus remote control
with full access



Up to three parallel TCP connections to the VACUU·SELECT are supported as standard. This number can be limited by means of a setting. If the previously set **Maximum number of connections** has been reached, each additional connection attempt is rejected by the controller. A new subscriber can only connect to the VACUU·SELECT when one of the existing connections has been closed.

The option for **Stop process on connection loss** allows the behavior of the VACUU·SELECT in the event of an uncontrolled loss of the controlling connection (connection closed or timeout) to be defined. If this option is activated, the controller automatically stops a running process when an uncontrolled interruption to remote control has occurred.

3.1.3 Supported function codes

Supported
function codes

Code	Description
03 (0x03)	Read Holding Registers For reading single or multiple successive register values.
06 (0x06)	Write Single Holding Register Exclusively for writing single register values (data types int16, uint16, enum16 or sf). If several registers are merged into a larger data type (e.g., int32, uint32 or string), function code 16 must be used for writing. Overview of supported data types → <i>see chapter 3.1.4 Defined data types</i> .
16 (0x10)	Write Multiple Holding Registers For writing multiple successive registers that are merged into a larger data type or which require consistent adjustment → <i>see chapter 3.1.5 Representation/setting of pressure values</i> .

3.1.4 Defined data types

The available Modbus registers described in chapter **3.2 Modbus Register Mapping** are based on the data types listed below. If certain functions are not supported by the controller, the associated Modbus registers are assigned the relevant NaN values.

Each individual 16-bit register is represented in little endian byte order. For 32-bit data types consisting of two 16-bit registers, the lower register address represents the least significant part of the entire data type.

Data types composed of more than one Modbus register must be written with function code 16 → *see chapter 3.1.3 Supported function codes*.

Modbus data types and
NaN values

Type	Description	NaN Value
int16	Signed integer value (16 bit)	0x8000
int32	Signed integer value (32 bit)	0x80000000
uint16	Unsigned integer value (16 bit)	0xFFFF
uint32	Unsigned integer value (32 bit)	0xFFFFFFFF
float32	Floating-point, simple accuracy, IEEE-754 (32 bit)	0xFFFFFFFF
enum16	Number code (16 bit). The breakdown of the possible codes can be found directly under the designation of the according Modbus register.	0xFFFF
string	String (multiple of 2 bytes). A zero-terminating value or a value of fixed length.	0x0000
p	Representation of pressure values as a floating-point number or by means of integers; for more information → <i>see chapter 3.1.5 Representation/setting of pressure values</i> .	<i>see 3.1.5</i>

3.1.5 Representation/setting of pressure values

Representation/setting
of pressure values

Pressure values, such as set and actual pressures, can be represented either with floating point arithmetic or with integer values → *see Modbus register #40812*. In the data models → *see chapter 3.2 Modbus Register Mapping*, a pressure value always occupies three Modbus registers, which are assigned differently depending on the selected representation. It is therefore only possible to change pressure values with function code 16 → *see chapter 3.1.3 Supported function codes*.

Integer representation (factory setting)

Integer representation
(factory setting)

The values are represented with a mantissa (uint32) and a signed exponent (int16). A pressure value is obtained with the following calculation formula:

$$\text{Pressure value} = \text{mantissa} * 10^{\text{exponent}}$$

Examples: $123 * 10^{-3} = 0.123 \text{ mbar}$
 $500 * 10^0 = 500 \text{ mbar}$

Register	Assignment	Data type
0	Mantissa	uint32
1		
2	Exponent	int16

Floating-point representation

Floating-point
representation

The value is represented as float32. Only two of the three registers are used in this version. Read and write commands must be executed accordingly on the first two registers.

Register	Assignment	Data type
0	Pressure value	float32
1		
2	---	---

3.1.6 Representation/setting of special values

Representation/setting
of special values

As well as the value ranges and NaN values described in chapter 3.1.4 *Defined data types*, the following special values are additionally defined below for parameters of data type p (= pressure values), provided they are supported by the relevant process step → see chapter 2.4 *List of process steps*.

AUTO setting for parameter Hysteresis

Register	Integer value	Floating-point value
0	0xFFFFFFFFE	0xC0000000
1		
2	0x0000	0x8000

ATM setting for parameter Pressure setpoint

Register	Integer value	Floating-point value
0	0xFFFFFFFFD	0xC0400000
1		
2	0x0000	0x8000

3.1.7 Process parameter deactivation

Process parameter
deactivation

Provided the respective parameter of a process step supports deactivation, e.g., the parameter *Duration* in the process step *Pump down*, deactivation can be achieved by writing the register value 0.

If a pressure parameter is to be deactivated, e.g., parameter *Minimum* in the process step *Pump down*, it may be necessary to write several registers → see chapter 3.1.5 *Representation/setting of pressure values*.

A deactivated parameter subsequently has no influence on the controller or the process sequence → see chapter 2.4 *List of process steps*.

3.1.8 Start/end remote control

Start/end remote control

If settings or process parameters are to be changed on the VACUU·SELECT, remote control must be started first. Although several parallel connections to the device are possible in principle, only one connection can exclusively take on remote control of the device and thereby also block local operation.

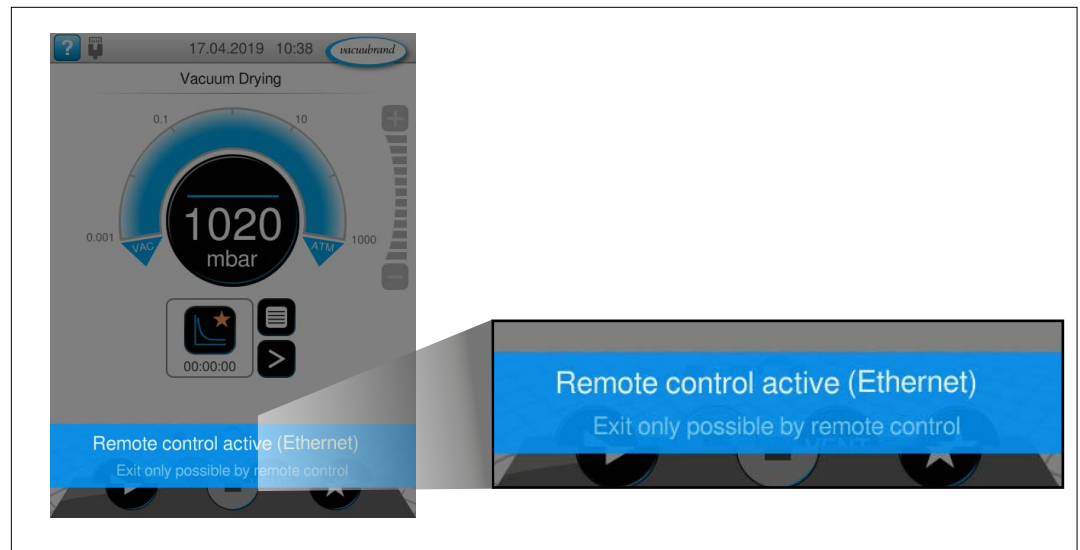
Provided no remote control is active yet – including via RS-232 – remote control can be established via Modbus register #40802 → *see chapter 3.2.2 Control Model*. For this, various modes are available which either completely block local operation, or at the least permit the connection to be terminated by activating the ON/OFF button on site. It is also possible to specify which screen is displayed in the locked state (*Process screen* or *Pressure graph*).

3.1.9 VACUU·SELECT lock screen

During remote operation via Modbus TCP the display of the VACUU·SELECT is shown locked.

Locked screen

→ Example
Locked controller



When remote control is active, the device display always jumps to the *Process screen*. Alternatively, the display can also jump to the *Pressure graph* screen.

The locked screen is shown as long as remote control is active.

3.1.10 Communication examples

The following tables show examples of Modbus TCP read and write sequences on the VACUU-SELECT.

Read

In the *Read* example, three registers are read from base register #40912 using function code 03.

Client Request ADU

MBAP Header				PDU		
Transaction ID	Protocol ID	Length	Unit ID*	Function Code	Data	
					Starting Address	Qty. of Registers
0x 00 00	0x 00 00	0x 00 06	0x 01	0x 03	0x 9F D0	0x 00 03

Server Response ADU

MBAP Header				PDU		
Transaction ID	Protocol ID	Length	Unit ID*	Function Code	Data	
					Byte Count	Register Values
0x 00 00	0x 00 00	0x 00 09	0x 01	0x 03	0x 06	0x 00 00 44 78 80 00

Write (single register)

In the *Write (single register)* example, register #40802 is assigned a new value using function code 06.

Client Request ADU

MBAP Header				PDU		
Transaction ID	Protocol ID	Length	Unit ID*	Function Code	Data	
					Register Address	Register Value
0x 00 00	0x 00 00	0x 00 06	0x 01	0x 06	0x 9F 62	0x 00 01

Server Response ADU

MBAP Header				PDU		
Transaction ID	Protocol ID	Length	Unit ID*	Function Code	Data	
					Register Address	Register Value
0x 00 00	0x 00 00	0x 00 06	0x 01	0x 06	0x 9F 62	0x 00 01

Write (multiple registers)

The *Write (multiple registers)* example shows a pressure setpoint being set using function code 16 (Modbus registers #41104 to #41106) → see chapter 3.1.3 *Supported function codes*.

Client Request ADU

MBAP Header				PDU				
Transaction ID	Protocol ID	Length	Unit ID*	Function Code	Data			
					Starting Address	Qty. of Registers	Byte Count	Register Values
0x 00 00	0x 00 00	0x 00 0D	0x 01	0x 10	0x A0 90	0x 00 03	0x 06	0x 01 4D 00 00 FF FF

Server Response ADU

MBAP Header				PDU		
Transaction ID	Protocol ID	Length	Unit ID*	Function Code	Data	
					Starting Address	Qty. of Registers
0x 00 00	0x 00 00	0x 00 06	0x 01	0x 10	0x A0 90	0x 00 03

*) The **Unit ID** of the request ADU is reused in the response ADU..

3.2 Modbus Register Mapping

3.2.1 Common Model

Address ¹⁾	Size	Name	Data Type	Description	Access
40000	4	VACUUBUS_ID	string(8)	VACUU·BUS Modbus identifier. Uniquely identifies this as a VACUU·BUS Modbus Register Map. Fixed value = "VACUUBUS" (0x5641435555425553)	RO
40004	1	VACUUBUS_MID	uint16	VACUU·BUS Modbus Model Block identifier. Uniquely identifies this as a VACUU·BUS Modbus Common Model Block. Fixed value = 0x0001	RO
40005	1	VACUUBUS_Length	uint16	Length of block in 16 Bit registers. Value = 18	RO
40006	1	Protocol Version	uint16	VACUU·BUS Modbus Protocol Version	RO
40007	1	Device Address	uint16	Unique device address or Modbus Unit ID	RO
40008	1	Manufacturer ID	enum16	Device manufacturer ID. Possible values: 1 = VACUUBRAND GMBH + CO KG	RO
40009	1	Product ID	enum16	Product ID. Possible values: 1 = VACUU·SELECT	RO
40010	10	Serial Number	string(20)	Device serial number	RO
40020	1	Software Version #1	uint16	Device software version The device's software represented as an according integer value. Examples: V1.00 = 0x0064 V2.34 = 0x00EA	RO
40021	1	Hardware Version #1	uint16	Device hardware version The MSByte points to a character of the alphabet, representing the board layout revision. The LSByte represents the assembly version. Examples: A.01 = 0x0101 D.12 = 0x040C	RO
40022	1	Software Version #2	uint16	See description of 40020	RO
40023	1	Hardware Version #2	uint16	See description of 40021	RO

1) Register address values with reference to base 0 (protocol address).

3.2.2 Control Model

Address ¹⁾	Size	Name	Data Type	Description	Access
40800	1	VACUUBUS_MID	uint16	VACUU·BUS Modbus Model Block identifier. Uniquely identifies this as a Control Model Block. Value = 0x0009.	RO
40801	1	VACUUBUS_Length	uint16	Length of block in 16 Bit registers. Value = 11	RO
40802	1	Remote Control Mode	enum16	Remote control mode. Possible values: 0 = Remote off 1 = Remote on, Process screen A ²⁾ 2 = Remote on, Process screen A ³⁾ 3 = Remote on, Chart view screen A ²⁾ 4 = Remote on, Chart view screen A ³⁾ 5 = Remote on, Process screen B ^{2) 4)} 6 = Remote on, Process screen B ^{3) 4)} 7 = Remote on, Chart view screen B ^{2) 4)} 8 = Remote on, Chart view screen B ^{3) 4)}	RW
40803	2	Operating Status	uint32	Information on the system's current operating status. This bitfield contains the following data: Bit 0 = Sensor overpressure (warning) Bit 1 = Sensor underrange (warning) Bit 2 = Sensor failure Bit 3 = Liquid level sensor triggered Bit 4 = Inlet valve failure Bit 5 = Vent valve failure Bit 6 = Water valve failure Bit 7 = Pump/VMS-B failure Bit 8 = VARIO pump failure Bit 9 = Digital I/O module failure Bit 10 = Analog I/O module failure Bit 11 = EK Peltronic failure Bit 12 = Waiting period liquid level sensor active Bit 13:31 = Reserved for future use By writing zero, all pending failures/warnings will be acknowledged	RW
40805	1	Pressure Unit	enum16	Pressure unit. Possible values: 0 = mbar 1 = Torr 2 = hPa	RW
40806	1	Autostart Mode	enum16	Autostart mode. Possible values: 0 = Autostart disabled 1 = Autostart enabled	RW
40807	1	Vent Valve in Vacuum Control Mode	enum16	Vent valve in vacuum control mode. Possible values: 0 = Vent valve disabled 1 = Vent valve enabled on setpoint change	RW

40808	2	Delay Time of Coolant Valves	uint32	Delay time of coolant valves [s]	RW
40810	2	Delay Time of Liquid Level Sensors	uint32	Delay time of liquid level sensors [s]	RW
40812	1	Data Type of Pressure Values	enum16	Pressure value data type → see chapter 3.1.5 Representation/setting of pressure values Possible values: 0 = Integer (mantissa + exponent) 1 = Floating point	RW

1) Register address values with reference to base 0 (protocol address).

2) Device locked

3) Unlocking by ON/OFF button possible

4) Only available on SYNCHRO pumping units

3.2.3 Process Control Model

Address ¹⁾	Size	Name	Data Type	Description	Access
40900	1	VACUUBUS_MID	uint16	VACUUBUS Modbus Model Block identifier. Uniquely identifies this as a Process Control Model Block. Fixed value = 0x000A (Primary) or 0x000B (Secondary)	RO
40901	1	VACUUBUS_Length	uint16	Length of block in 16 Bit registers. Value = 13	RO
40902	1	Process Application ID	uint16	Selected application's ID → <i>see chapter: 2.2 Determine the application ID</i>	RW
40903	1	Process Run Mode	enum16	Process run mode. Possible values: 0 = STOP 1 = START	RW
40904	1	Control Vent Valve	enum16	Control the process' vent valve(s). Possible values: 0 = Close 1 = Open 2 = Vent to atmospheric pressure and close automatically	RW
40905	1	Temporary Vent Valve in Vacuum Control Mode	enum16	Vent valve in vacuum control mode. This temporarily overwrites the basic settings until process stop (see 40807). Possible values: 0 = Vent valve disabled 1 = Vent valve enabled on setpoint change 2 = Vent valve enabled for vacuum control	RW
40906	1	Current Process Step	uint16	Currently active process step [1..n]. Jumping to next process step by writing the next process step's index	RW
40907	1	Number Of Process Steps	uint16	Number of steps in the selected process	RO
40908	1	Process Step Jump Enable	enum16	Possibility to jump to the next process step. Possible values: 0 = Jumping disabled 1 = Jumping enabled	RO
40909	2	Process Time Elapsed	uint32	Process time elapsed [s]	RO
40911	1	Process Vacuum Type	enum16	Process vacuum type. Possible values: 0 = Rough vacuum 1 = Fine vacuum	RO
40912	3	Sensor Value	p	Actual pressure [mbar/Torr/hPa] → <i>see chapter: 3.1.5 Representation/setting of pressure values</i>	RO

40915	1	Process State Information	uint16	Informationen zum Prozessstatus. Dieses Bitfeld enthält die folgenden Daten: Bit 0 = Pump running (motor speed > 0) Bit 1 = Inlet valve open Bit 2 = Cooling valve open Bit 3 = Vent valve open Bit 4:7 = Reserved for future use Bit 8 = Pump down / actual pressure > set pressure / boiling point detection Bit 9 = actual pressure = set pressure / VACUU·LAN delay / boiling point tracking Bit 10 = actual pressure < set pressure / VACUU·LAN monitoring / auto termination Bit 11:15 = Reserved for future use	RO
-------	---	---------------------------	--------	---	----

1) Register address values with reference to base 0 (protocol address).

3.2.4 Process Step Control Model

Address ¹⁾	Size	Name	Data Type	Description	Access
41100	1	VACUUBUS_MID	uint16	VACUU·BUS Modbus Model Block identifier. Uniquely identifies this as a Process Step Control Model Block. Fixed value = 0x000C (Primary) or 0x000D (Secondary).	RO
41101	1	VACUUBUS_Length	uint16	Length of block in 16 Bit registers. Value = 14	RO
41102	1	Process Step Selector	uint16	Select a specific process step to set/get parameters. Possible values: 0 = Active process step 1..n = Specific process step	RW
41103	1	Process Step ID	enum16	Unique process step ID. Possible values → see chapter: 2.4 List of process steps	RO
41104	3	Set-pressure Value	p	Set-pressure value [mbar/Torr/hPa]	RW
41107	1	Set-speed Value	uint16	Set-speed value or maximum speed VARIO pumps [%]	RW
41108	2	Duration	uint32	Duration of the process step or delay time VACUU·LAN [s]	RW
41110	3	Hysteresis Value	p	Hysteresis value or switch-on pressure [mbar/Torr/hPa]	RW
41113	3	Minimum/Maximum Value	p	Minimum/Maximum value [mbar/Torr/hPa]	RW

1) Register address values with reference to base 0 (protocol address).

3.2.5 Service Model

Address ¹⁾	Size	Name	Data Type	Description	Access
41300	1	VACUUBUS_MID	uint16	VACUUBUS Modbus Model Block identifier. Uniquely identifies this as a Service Model Block. Fixed value = 0x000E.	RO
41301	1	VACUUBUS_Length	uint16	Length of block in 16 Bit registers. Value = 11	RO
41302	2	Controller Operating Time	uint32	Controller Operating time [min]	RO
41304	2	VARIO Pump Operating Time	uint32	VARIO pump Operating time [min]	RO
41306	1	VARIO Pump Service Monitoring Enable	enum16	VARIO pump service assistant enable mode. Possible values: 0 = Service assistant disabled 1 = Service assistant enabled	RO
41307	2	VARIO Pump Last Service Time	uint32	VARIO pump last time serviced [min]	RO
41309	1	VARIO Pump Service Interval	uint16	VARIO pump service interval [h]	RO
41310	1	VARIO Pump Service Threshold	uint16	VARIO pump service threshold [%]	RO

1) Register address values with reference to base 0 (protocol address).

3.2.6 SYNCHRO pumping units

For pumping units that can control two processes, the Process Control Model and the Process Step Control Model are available separately for process A and B, respectively. The assignment of the individual registers is described in **3.2.3 Process Control Model on page 26** and **3.2.4 Process Step Control Model on page 27**, respectively. The base addresses are defined as follows:

Register area	Process A	Process B
Process Control Model	from 40900	from 41000
Process Step Control Model	from 41100	from 41200

3.3 Application example

Vacuum control

The following sequence shows vacuum control to a pressure setpoint of 12.3 mbar, by way of example.

Activate remote control

Address	Value	Description
40802	1	Remote Control Mode Activate remote control, device locally locked, jump to <i>Process screen</i>
<i>or</i>		
40802	2	Remote Control Mode Activate remote control, device can be locally unlocked, jump to <i>Process screen</i>
<i>or</i>		
40802	3	Remote Control Mode Activate remote control, device locally locked, jump to <i>Pressure graph</i>

Select "vacuum control" application (ID=6)

Address	Value	Description
40902	6	Process Application ID

Specify pressure setpoint

Address	Value	Description
41104	123	Set-pressure Value (mantissa)
41106	-1	Set-pressure Value (exponent)

Start process

Address	Value	Description
40903	1	Process Run Mode

Stop process

Address	Value	Description
40903	0	Process Run Mode

Deactivate remote control

Address	Value	Description
40802	0	Remote Control Mode

While the process is running, the following Modbus registers can for example serve to monitor the process flow:

Address		Description
40909		Process Time Elapsed [s]
40912		Sensor Value (mantissa)
40914		Sensor Value (exponent)

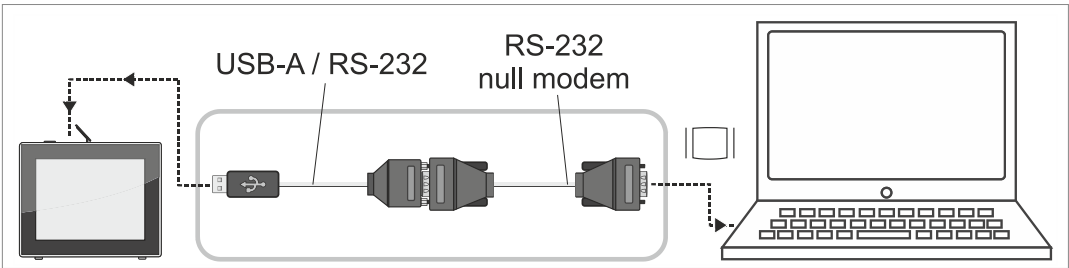
4 RS-232 serial port

Point-to-point communication to a serial device can be established from the controller via a USB adapter. In order to use the functions via RS-232, a USB adapter/RS-232 and null modem cable must be connected to one of the USB ports of the controller.

4.1 RS-232 communication

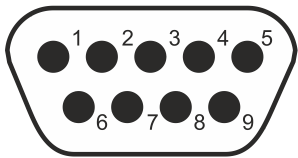
4.1.1 Connection example

→ Example
RS-232 connection



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

4.1.2 Plug allocation (RS-232)



Sub-D 9-pin

PIN	Designation	Function
1	DCD (Data Carrier Derect)	Signal received detector
2	RXD (Receive Data)	Received data
3	TXD (Transmit Data)	Transmission data
4	DTR (Data Terminal Ready)	Terminal device ready for operation
5	GND (Ground)	System ground
6	DSR (Data Set Ready)	Standby
7	RTS (Request To Send)	Switch on transmitting part
8	CTS (Clear To Send)	Ready to send
9	RI (Ring Indicator)	Incoming call

→ see also datasheet included in the adapter cable delivery

4.1.3 Settings on the controller

General communication settings

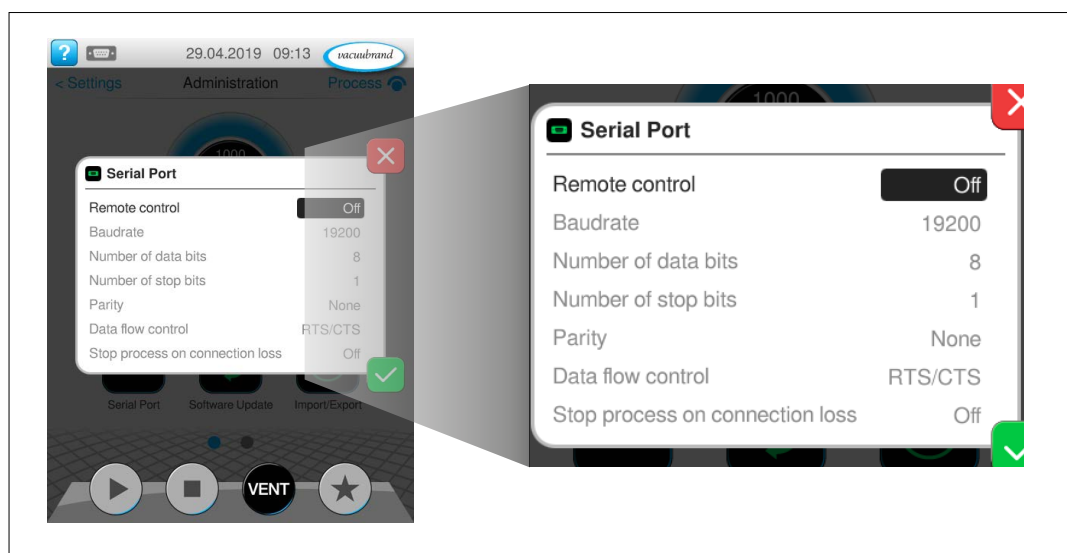
General communication settings

In order to use RS-232 on the VACUU·SELECT, various basic settings must be carried out first.

All relevant settings are summarized in the **Serial port** context menu and can be found in the controller as follows: *Process screen / Main menu / Settings / Administration / Serial port*

Serial port context menu screen

→ Example
Serial port context menu

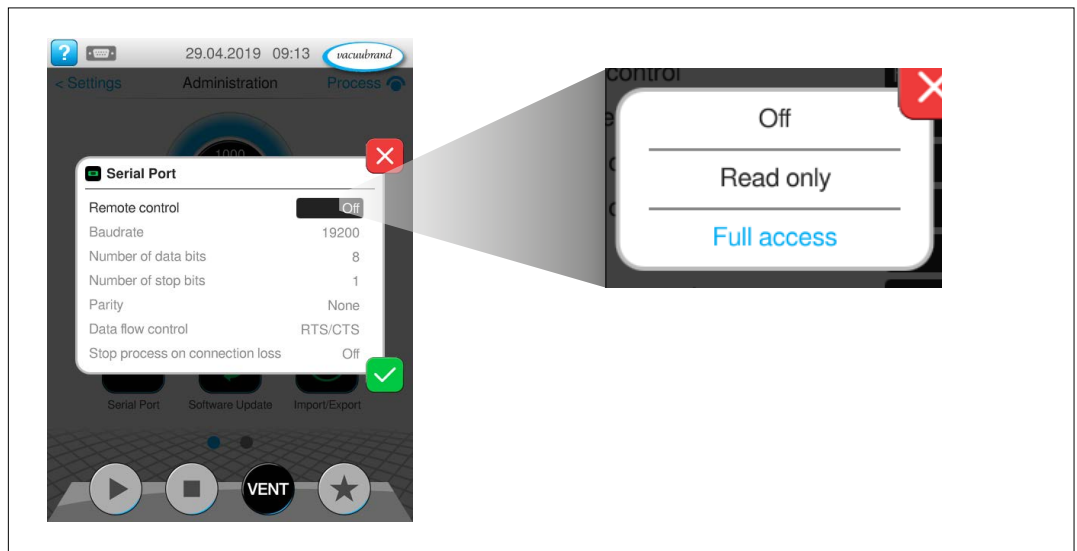


RS-232 default settings

- Remote control (default: Off)
- Baudrate (default: 19200)
- Number of data bits (default: 8)
- Number of stop bits (default: 1)
- Parity (default: None)
- Data flow control (default: RTS/CTS)
- Stop process on connection loss (default: Off)

RS-232 remote control settings

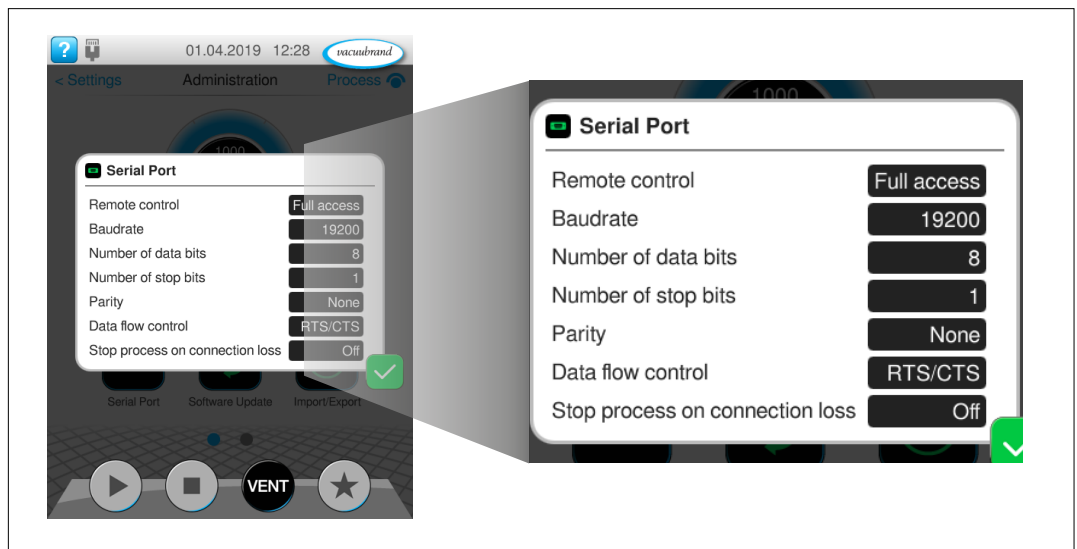
→ Example
Serial port settings



Two fundamental types of access are available when using RS-232: **Read only** access or **Full access**. If the aim for example is simply to read out measured values and parameters from the controller for report purposes, with no active remote control permissible, we recommend selecting the **Read only** setting.

Serial port full access/read only

→ Example
Serial port with full
access



- ⇒ Synchronize the data with your required communication settings.
- ⇒ Tap on one of the black input fields to adjust the data.

IMPORTANT!

If the controller is reset to the factory settings, the data in this menu must be synchronized again.

4.1.4 Representation/setting of special values

Representation/setting
of special values

In addition to decimal values, various special values are also defined and can be used with certain interface commands (e.g., **OUT_SP_1**) or process parameters:

- Parameter hysteresis **AUTO**
- Parameter pressure setpoint **ATM**

4.1.5 Process parameter deactivation

Process parameter
deactivation

Provided the respective parameter of a process step supports deactivation → see *chapter 2.4 List of process steps*, deactivation can be achieved by writing the value 0. A deactivated parameter subsequently has no influence on the controller and/or the process sequence. (e.g., the parameter *Duration* in the process step *Pump down*) → see *chapter 2.4 List of process steps*.

4.1.6 Start/end remote control

Start/end remote control

If settings or process parameters are to be changed on the VACUU-SELECT, remote control must be started first. Provided no remote control is active yet (not via Modbus TCP either), remote control can be established via the interface command **REMOTE**.

For this, various modes are available which either completely block local operation, or at the least permit the connection to be terminated by activating the ON/OFF button on site. It is also possible to specify which screen is displayed in the locked state (*Process screen* or *Pressure graph*).

4.1.7 VACUU-SELECT lock screen

During remote operation via serial port, the display of the VACUU-SELECT is shown locked.

Locked screen

→ Example
Locked controller



When remote control is active, the device display always jumps to the *Process screen*. Alternatively, the display can also jump to the *Pressure graph* screen.

The locked screen is shown as long as remote control is active.

4.2 Interface commands

Interface commands

All interface commands are written in capitals throughout and end with the respective control characters **<CR>** (Carriage Return), **<LF>** (Line Feed) or both combined **<CR><LF>**. Value entries or parameters are separated from the command by a space character and can flexibly be shortened to the relevant digits (e.g., 5, 05, 005, 0005 are identical for pressure specifications). The response format is dictated by the selected communication mode.

The command set of the VACUU·SELECT is based on NAMUR recommendations and is essentially compatible with the precursor models CVC 2000 and CVC 3000. Some commands of the CVC 2000 and CVC 3000 are no longer supported by the VACUU·SELECT or are no longer required. These are the groups of commands **IN_SP_P** and **OUT_SP_P** (for programs) as well as the command **STORE** for saving settings. In return, the command set of the VACUU·SELECT was extended by some new commands, e.g. to pick up the concept of applications.

Basically, three different communication modes are available (see command **CVC**), which dictate the interpretation of value entries and the response format of the individual commands. In this respect, the VACUU·SELECT factory settings match the factory settings of the CVC 3000 and are compatible with the command set of the CVC 2000. Control programs for the CVC 2000 or CVC 3000 can therefore communicate with the VACUU·SELECT without any changes. For full functionality we recommend switching to the VACUU·SELECT communication mode.

Interface commands that don't exist in the CVC 2000 or CVC 3000 command sets (e.g., **IN_APP** or **OUT_APP**) will also work without explicit changeover of the communication mode.

Write commands are only possible when remote control is active → *see chapter 4.1.6 Start/end remote control* and do not provide a response if the factory settings are in place. Whether a command was correctly implemented can be ascertained via a separate read command (see command **IN_ERR**). Use the **ECHO** command to activate an automatic response. If a command was correctly processed, a corresponding reply is delivered in return. The write commands **REMOTE**, **ECHO** and **CVC** are always possible and don't require active remote control.

IMPORTANT!

All settings adjusted by means of write commands are permanently saved by the controller.

To ensure reliable device operation, a pause time of at least 100 milliseconds must be observed between two consecutive commands. Individual write commands, such as selecting an application for example, require a longer pause time for the command to be fully implemented.

4.3 List of frequently used commands

4.3.1 Read commands

Command	Response by selected communication mode			Description
	CVC 2000	CVC 3000	VACUU-SELECT	
IN_PV_1 ¹⁾	XXXX mbar/hPa/Torr	XXXX.X mbar/hPa/Torr		Current sensor pressure value
	X.XXEXX mbar/hPa/Torr (on VS-P sensors)			

4.3.2 Write commands

Command	Parameter	Description
OUT_SP_1y ^{1),3),4)}	XXXX or XXXX.X X.XXEXX (on VS-P sensors)	Change the set-pressure of process step y without use the vent valve for vacuum control
OUT_SP_Xy ^{1),3),4)}		Change the set-pressure of process step y with one-time ventilation to the new set pressure, if necessary
OUT_SP_2y ³⁾	XX.X XXX	Change maximum pump speed of process step y. Values given in Hz (Communication mode CVC 2000) or % (CVC 3000 or VACUU-SELECT)
REMOTE	0	Exit remote control
	1	Enable remote control. Local operation disabled and process screen active.
	1y	Optional parameter y: 0: Go to process screen 1: Go to chart view screen
	2	Enable remote control. Local operation disabled, but exit is possible by ON/OFF button.
	2y	Optional parameter y: 0: Go to process screen 1: Go to chart view screen
START	no parameters or 1	Start process
STOP	no parameters or 0	Stop process and acknowledge failures/warnings
	1	Stop process
ECHO	0	Disable Echo
	1	Enable Echo. Write commands will be responded
CVC	2	Communication mode CVC 2000
	3	Communication mode CVC 3000
	4	Communication mode VACUU-SELECT

1) Values according to the device's pressure unit presetting.

2) Parameter y is optional. If y is not specified, the parameter value from the current process step of the selected application is used. If no application was started, the parameter from the first process step is read.

3) Parameter y is optional. If y is not specified, the parameter value is applied to the current process step of the selected application.

4) The basic settings regarding the use of the vent valve become temporary (until the end of the process) overwritten.

5) Any running process is stopped when the command is executed.

4.4 List of all commands

4.4.1 Read commands

Command	Response by selected communication mode			Description
	CVC 2000	CVC 3000	VACUU-SELECT	
IN_PV_1 ¹⁾	XXXX mbar/hPa/Torr	XXXX.X mbar/hPa/Torr		Current sensor pressure value
	X.XXEXX mbar/hPa/Torr (on VS-P sensors)			
IN_PV_Sy ¹⁾	XXXX.X mbar/hPa/Torr (X.XXEXX on VS-P sensors)			Current pressure value of sensor y Order of numbering as shown in chart view screen
IN_PV_2	XX.X Hz	XXX %		Current pump speed
IN_PV_3	XX:XX h:m	XX:XX:XX h:m:s		Process time elapsed
IN_PV_31	XX:XX:XX			Process time elapsed
	XXX.XX:XX:XX			Process time elapsed including number of days, as soon as runtime exceeds 24 hours
IN_PV_X	XXXX.X XXXX.X ... mbar/hPa/Torr (X.XXEXX on VS-P sensors)			Pressure values of all connected sensors
IN_PV_T	XXXXdXXh			VACUU-SELECT operating time in days and hours.
IN_CFG	yXXXX			Selected application 0: VACUU-LAN 1: Pump down 2: Vacuum control 3: Boiling point automatic/detection 4: Custom application or additional stan- dard application
	XyXXX			Coolant valve connected (0/1)
	XXyXX			Vent valve connected (0/1) 0: not connected 1: connected
	XXXyX			Automatic end reached (0/1)
	XXXXy			Remote control active (0/1)
		yXXXXXXXXXXXXXXXXX		Selected application 0: VACUU-LAN 1: Pump down 2: Vacuum control 3: Boiling point automatic/detection 4: Custom application or additional stan- dard application

Command	Response by selected communication mode			Description
	CVC 2000	CVC 3000	VACUU-SELECT	
IN_CFG		XyXXXXXXXXXXXXXX		0..D: Language (hexadecimal) 0: German 1: English 2: French 3: Italian 4: Spanish 5: Turkish 6: Korean 7: Chinese 8: Portugese 9: Russian A: Polish B: Dutch C: Japanese D: Suomi
		XXyXXXXXXXXXXXXXX		Pressure unit: 0: mbar 1: Torr 2: hPa
		XXXyXXXXXXXXXXXXXX		Autostart off/on (0/1)
		XXXXyXXXXXXXXXXXXXX		Beep on failure/warning (0/1)
		XXXXXyXXXXXXXXXXXXXX		VARIO pump connected (0/1)
		XXXXXXyXXXXXXXXXXXXXX		VMS-B module connected (0/1)
		XXXXXXXyXXXXXXXXXXXXXX		Inlet valve connected (0/1)
		XXXXXXXXyXXXXXXXXXXXXXX		Coolant valve connected (0/1)
		XXXXXXXXXyXXXXXXXXXXXXXX		Vent valve connected (0/1)
		XXXXXXXXXXyXXXXXXXXXXXXXX		Digital I/O module connected as fault indicator interface (0/1)
		XXXXXXXXXXXyXXXXXXXXXXXXXX		Level sensor connected (0/1)
		XXXXXXXXXXXXyXXXXXXXXXXXXXX		Digital I/O module connected as remote module interface (0/1)
		XXXXXXXXXXXXXyXXXXXXXXXXXXXX		Number of the selected sensor Order of numbering as shown on chart view screen
		XXXXXXXXXXXXXXyXXXXXXXXXXXXXX		Number of connected sensors
		XXXXXXXXXXXXXXXyXXXXXXXXXXXXXX		Remote control active (0/1)
	yXXX			Failure on VARIO pump, inlet valve or VMS-B module (0/1)
	XyXX			Sensor overpressure or underrange warning (0/1)
	XXyX			Sensor failure (0/1)
	XXXy			Last command failed (0/1)
IN_ERR		yXXXXXXXXX		VARIO pump failure (0/1)
		XyXXXXXXXXX		Inlet valve failure (0/1)
		XXyXXXXXXXXX		Coolant valve failure (0/1)
		XXXyXXXXXXXXX		Vent valve failure (0/1)

Command	Response by selected communication mode			Description
	CVC 2000	CVC 3000	VACUU-SELECT	
IN_ERR		XXXXyXXXX		Sensor overpressure or underrange warning (0/1)
		XXXXXyXXX		Sensor failure (0/1)
		XXXXXXyXX		External failure on digital I/O module operating as fault indicator interface (0/1)
		XXXXXXXyX		Level sensor limit reached on collection flask (0/1)
		XXXXXXXXXy		Last command failed (0/1)
IN_SP_1y ¹⁾²⁾	XXXX mbar/hPa/Torr		XXXX.X mbar/hPa/Torr	Set-pressure value at process step y
	X.XXEXX mbar/hPa/Torr (on VS-P sensors)			
IN_SP_2y ¹⁾²⁾	XX.X Hz	XXX %		Maximum pump speed of process step y
IN_SP_3y ¹⁾²⁾	XXXX mbar/hPa/Torr		XXXX.X mbar/hPa/Torr	Switch-on pressure for VACUU·LAN or hysteresis for vacuum control of process step y
	X.XXEXX mbar/hPa/Torr (on VS-P sensors)			
IN_SP_4y ¹⁾²⁾	XX:XX h:m		XX:XX:XX h:m:s	Delay time for VACUU·LAN of process step y
IN_SP_5y ¹⁾²⁾	XXXX mbar/hPa/Torr		XXXX.X mbar/hPa/Torr	Maximum (e.g. control or hold vacuum) or minimum value (e.g. pump down) at process step y
	X.XXEXX mbar/hPa/Torr (on VS-P sensors)			
IN_SP_6y ¹⁾²⁾	XX:XX h:m		XX:XX:XX h:m:s	Set duration of process step y
IN_APP	X			Selected application's ID → <i>see chapter: 2.2 Determine the application ID</i>
IN_PROCESS	X			Selected process (A/B) Switchover only possible on SYNCHRO pumping units.
IN_STEP	X			Currently active process step of the selected application: 0: Process stopped 1..n: Process started
IN_VER	VACUU-SELECT VX.XX / VX.XX			Software version
IN_STAT			yXXXXX	Pump running (0/1)
			XyXXXX	Inlet valve open (0/1)
	yXXX		XXyXXX	Cooling valve open (0/1)
	XyXX		XXXyXX	Vent valve open (0/1)
	XX0y		XXXX0y	VACUU·LAN 0: Inactive 1: Pump down until set pressure 2: Delay time active 3: Monitoring active
	XX1y		XXXX1y	Pump down 0: Inactive 1: Active

Command	Response by selected communication mode			Description
	CVC 2000	CVC 3000	VACUU-SELECT	
	XX2y		XXXX2y	Vacuum control 0: Inactive 1: Actual pressure > Set pressure 2: Actual pressure = Set pressure 3: Actual pressure < Set pressure
	XX3y		XXXX3y	Boiling point detection/Automatic mode 0: Inactive 1: Boiling point detection 2: Boiling tracking 3: Auto termination
	XX4y		XXXX4y	Custom application or additional standard application 0: Inactive 1: Active

4.4.2 Write commands

Command	Parameter	Description
OUT_MODE	0	VACUU·LAN
	1	Pump down
	2	Vacuum control
	3	Boiling point automatic/detection
OUT_APP	0..99	Select a default application. For the complete list of default applications → <i>see chapter: 2.3 List of applications</i>
	100..n	Select custom application. Get the application ID from its description in the controller
OUT_PROCESS	A	Select process A
	B	Select process B (only available on SYNCHRO pumping units)
OUT_STEP	<i>no parameters</i>	Go to the application's next process step. Only available, when jumping to the next step is enabled
OUT_CFG	yXXX	0..D: Select language (hexadecimal) See list from command „IN_CFG”
	XyXX	Select pressure unit See list from command „IN_CFG”
	XXyX	Switch off/on autostart (0/1)
	XXXy	Switch off/on beep on failure/warning (0/1)
OUT_SP_1y ^{(1),(3),(4)}	XXXX or XXXX.X X.XXEXX (on VS-P sensors)	Change the set-pressure of process step y without use the vent valve for vacuum control
OUT_SP_Xy ^{(1),(3),(4)}		Change the set-pressure of process step y with one-time ventilation to the new set pressure, if necessary
OUT_SP_Vy ^{(1),(3),(4)}		Change the set-pressure of process step y and permanently use the vent valve for vacuum control
OUT_SP_2y ⁽³⁾	XX.X	Change maximum pump speed of process step y. Values given in Hz (Communication mode CVC 2000) or % (CVC 3000 or VACUU-SELECT)
	XXX	
OUT_SP_3y ^{(1),(3)}	XXXX or XXXX.X X.XXEXX (on VS-P sensors)	Change switch-on pressure for VACUU·LAN or hysteresis for vacuum control of process step y
OUT_SP_4y ⁽³⁾	XX:XX or XX:XX:XX	Change delay time for VACUU·LAN of process step y

Command	Parameter	Description
OUT_SP_5y ^{1),3)}	XXXX or XXXX.X X.XXEXX (on VS-P sensors)	Change maximum (e.g. control or hold vacuum) or minimum value (e.g. pump down) of process step y
OUT_SP_6y ³⁾	XX:XX or XX:XX:XX	Change set duration of process step y
OUT_SENSOR	1..8	Select active sensor for control. Order of numbering as shown in chart view screen.
OUT_VENT ⁴⁾	0	Close vent valve
	1	Open vent valve
	2	Vent to atmospheric pressure (ATM) or max. 1060 mbar
REMOTE	0	Exit remote control
	1	Enable remote control. Local operation disabled and process screen active. Optional parameter y: 0: Go to process screen 1: Go to chart view screen
	1y	
REMOTE	2	Enable remote control. Local operation disabled, but exit is possible by ON/OFF button. Optional parameter y: 0: Go to process screen 1: Go to chart view screen
	2y	
START	<i>no parameters</i> or 1	Start process
STOP	<i>no parameters</i> or 0	Stop process and acknowledge failures/warnings
	1	Stop process
ECHO	0	Disable Echo
	1	Enable Echo. Write commands will be responded
CVC	2	Communication mode CVC 2000
	3	Communication mode CVC 3000
	4	Communication mode VACUU·SELECT

1) Details subject to device default setting for pressure unit.

2) Parameter y is optional. If y is not indicated the parameter value is selected by the current process step of the running application. If no application was started, the first process step is read from.

3) Parameter y is optional. If y is not indicated the parameter value is applied to the current process step of the selected application.

4) The basic settings regarding use of the venting valve are temporarily overwritten (until the end of the process currently running).

5) Any process that may be running is stopped when the command is implemented.

4.5 Application example

Vacuum control

The following sequence shows vacuum control to a pressure setpoint of 12.3 mbar, by way of example.

Input the basic settings

Command	Response	Description
ECHO 1<CR>	1<CR><LF>	Activate Echo mode
CVC 4<CR>	4<CR><LF>	VACUU·SELECT communication mode

Activate remote control

Command	Response	Description
REMOTE 1<CR>	1<CR><LF>	Activate remote control, device locally locked, jump to <i>Process screen</i>
<i>or</i>		
REMOTE 2<CR>	2<CR><LF>	Activate remote control, device can be locally unlocked, jump to <i>Process screen</i>
<i>or</i>		
REMOTE 11<CR>	11<CR><LF>	Activate remote control, device locally locked, jump to <i>Pressure graph</i>

Select "vacuum control" application (ID=6)

Command	Response	Description
OUT_APP 6<CR>	6<CR><LF>	Select application

Specify pressure setpoint

Command	Response	Description
OUT_SP_1 12.3<CR>	0012.3<CR><LF>	Adjust pressure setpoint to 12.3 mbar

Start process

Command	Response	Description
START<CR>	1<CR><LF>	Start process

Stop process

Command	Response	Description
STOP<CR>	0<CR><LF>	Stop process

Deactivate remote control

Command	Response	Description
REMOTE 0<CR>	0<CR><LF>	Deactivate remote control

While the process is running, the following Modbus registers can, for example, serve to monitor the process flow:

Command	Response	Description
IN_PV_1<CR>	0123.4 mbar<CR><LF>	Actual pressure of sensor
IN_PV_3<CR>	00:12:34 h:m:s<CR><LF>	Process runtime

5 Index

A		Show application ID on the display..... 9	
Abbreviations.....	6	Start/end remote control.....	20, 34
Application example, Modbus TCP	29	Supported function codes.....	17
Application example, RS-232	43	Supported software version.....	6
Application IDs Standard applications.....	10	SYNCHRO pumping units	28
C		U	
Commonly used commands, RS-232.....	37	Unlocking by ON/OFF	25
Common model Modbus register mappings...	23	USB adapter/RS-232.....	31
Communication examples	21	V	
Context menu, serial port	32	VACUUBRAND standard applications.....	9
Control model	24	View of locked controller.....	20, 35
D		W	
Device locked	22, 25	Write commands, RS-232	41
E		Write commands; RS-232	37
Ethernet.....	5		
Ethernet connection.....	13		
Example – read	21		
Example – write	21		
Example – write multiple.....	22		
F			
Floating-point representation.....	18		
G			
General communication settings	32		
I			
Integer representation	18		
Interface commands	36		
M			
Modbus data types	17		
Modbus register mapping.....	23		
Modbus remote control full access	16		
Modbus TCP default settings	15		
N			
NaN values.....	17		
Network/IP settings.....	14		
Null modem cable.....	31		
P			
Personnel qualification	7		
Plug allocation (RS-232).....	31		
Process flow	44		
Process parameter deactivation.....	19, 34		
Process step ID	11		
Process step identification number.....	11		
Process step IDs	11		
R			
Read commands, RS-232	38		
Representation/setting of pressure values	18		
Representation/setting of special values..	19, 34		
Responsibility matrix.....	7		
RS-232 connection	31		
S			
Select application via ID	9		
Serial port settings.....	33		
Serial port with full access	33		
Settings Modbus remote control.....	15		



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FUNCTION EXTENSIONS VACUU-SELECT

User Management
SYNCHRO



Instructions for use



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	5
1.1	User information	5
1.2	Display conventions	6
1.2.1	Notes	6
1.2.2	Operation gestures	6
1.2.3	Action instructions (operating steps)	7
1.2.4	Supplementary controls and symbols	7
1.3	Target group description	9
1.3.1	Personnel qualification	9
1.3.2	Responsibility matrix	9
2	Product description	10
2.1	Function extensions	10
2.1.1	Requirements	10
2.1.2	License file for unlocking function extensions	10
2.2	User Management	10
2.3	SYNCHRO	11
3	Function Extensions	12
3.1	Opening the Function Extensions menu	12
3.2	Requesting a license file	13
3.3	Unlocking function extensions	14
3.3.1	Via license code	14
3.3.2	Via USB flash drive	15
3.4	Deactivating function extensions	16
4	User Management	18
4.1	Creating an administrator password	18
4.2	User Accounts	19
4.2.1	Setting up and editing	19
4.2.2	Removing users	23
4.3	User groups	24
4.3.1	Setting up and editing	24
4.3.2	Editing a user group + context menu	27
4.3.3	Advanced Settings	29
4.4	User information	30
4.4.1	Switching users	30
4.4.2	Locking and unlocking (display)	32
4.4.3	Other context menus explained	33
4.5	Import/Export User Management	35
4.5.1	Export User Management + Applications	35
4.5.2	Import User Management + Applications	36
4.6	Login/logout	38
4.6.1	Login at start up	38
4.6.2	Auto start function	38
4.7	Password reset	39
4.7.1	User password	39
4.7.2	Administrator password	40

5	SYNCHRO	41
5.1	User interface	41
5.2	Error indication	44
6	Troubleshooting	45
6.1	Function Extensions	45
6.2	User Management	45
6.3	SYNCHRO	46
7	Appendix	47
8	Index	48

1 Introduction

This document describes the general aspects of the function extensions that you have purchased. For additional descriptions about operation, please read the user manual of your controller.

1.1 User information

Safety

- Read the user manual before using the product.
- Store the user manual where it is accessible and within reach at all times.
- Correct use of the product is essential for safe operation. Observe all safety information!
- In addition to the information in this manual, please observe the applicable national regulations on accident prevention and work safety.

General

- To improve readability, the general term ***controller*** is used in place of the product names ***VACUU-SELECT*** and ***VACUU-SELECT complete***.
- The figures and drawings are examples and are only intended to assist in comprehension.
- Products are subject to technical and design changes without notice in the context of continuous product improvement.

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1.2 Display conventions

1.2.1 Notes

NOTE

Reference to a potentially harmful situation.

Non-observance may result in material damage.

Supplementary notes

IMPORTANT!

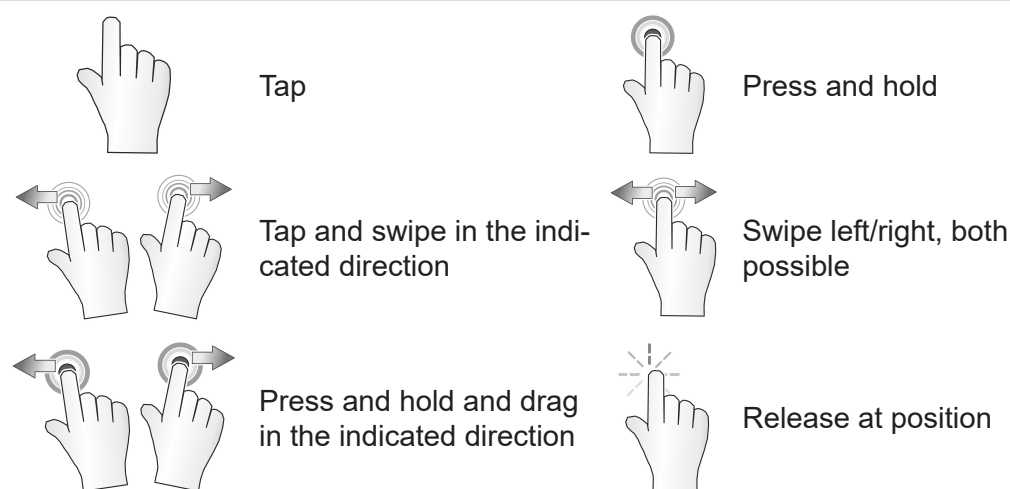
- ⇒ Description that you must adhere to when performing actions.
- ⇒ Important information for the proper operation of your product.



- ⇒ Tips + tricks
- ⇒ Helpful information

1.2.2 Operation gestures

Gesture symbols



1.2.3 Action instructions (operating steps)

Operating steps
displayed as text

Action instructions (easy)

⇒ You are prompted to perform an action.

- ☒ Result of the action

Action instructions (multiple steps)

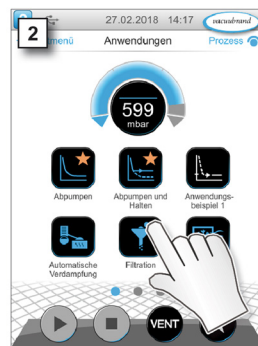
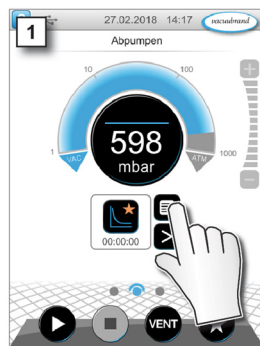
1. First action step
2. Next action step

- ☒ Result of the action

Action instructions that require several steps must be followed in the order described.

Action instructions (presented graphically)

Principle display
graphical operating steps



1. First action step
 2. Next action step
- ☒ Result of the action

1.2.4 Supplementary controls and symbols

Status bar

Meaning of new symbols
in the status bar

Symbol (icon)	Meaning
	Help ▶ Supplementary description of Function Extensions. ▶ Supplementary description of User Management.
	User Options ▶ Display user information for logged-in users. ▶ Log out user. ▶ Change password. ▶ Lock device. ▶ User Options are only shown if User Management has been unlocked and activated.
	USB connected ▶ Indicates that a USB storage device is connected.

Buttons – function extensions menu

Meaning of buttons in
Function Extensions
menu

Symbol (icon)	Meaning
	Unlock Information ▶ Procedure for acquiring a license for your controller. ▶ Serial number and manufacturing date of the controller.
	Function Unlocking ▶ Function button for assisted unlocking. ▶ License code entry or unlocking via USB flash drive.
	Function Activation ▶ Activate unlocked function extensions (for some function extensions, a password may be required after restart). ▶ Deactivate unlocked function extensions.

Buttons – administration menu

Meaning of button in
Administration menu

Symbol (icon)	Meaning
	User Management menu ▶ Create and manage users and user groups. ▶ Define login options.

Buttons – User Management menu

Meaning of buttons in
User Management

Symbol (icon)	Meaning
	User Accounts overview ▶ Predefined users: administrator, default user. Predefined users cannot be deleted. ▶ User accounts created.
	User Groups overview ▶ Predefined user groups: administrators, default group. Predefined user groups cannot be deleted. ▶ User groups created.
	Create User Account ▶ Set a user name and password. ▶ Assignment to a user group.
	Create User Group ▶ Set a group name. ▶ Assign shared applications and authorization settings.
	Advanced Settings ▶ Setting options: Set default user off/on, auto login off/on and password complexity.

1.3 Target group description

IMPORTANT!

Users of the competence areas listed in the *Responsibility matrix* must have the appropriate qualifications for the listed activity.

1.3.1 Personnel qualification

Administrator	User with extended authorizations.
Default user	User with assigned authorizations.

1.3.2 Responsibility matrix

Responsibility matrix and
competency areas

Activity	Administrator	Default user
Unlock function extensions	x	
Create users/user groups	x	
User management + export/import applications	x	(x)
Assign access rights	x	
Create passwords	x	
Reset passwords	x	
Unlocked operation		x

2 Product description

2.1 Function extensions

Product description of
function extensions in
the controller

From software version V1.06 / V1.00, the VACUU SELECT vacuum controller offers the option of unlocking additional function extensions; e.g., User Management.

Controllers with earlier software versions can be equipped for unlocking function extensions by performing a [software update](#).

A device-dependent license is required to unlock a specific function extension. The license contains an individual license file as well as a license code for the desired function extension and is created on the basis of the serial number and the manufacturing date of the controller.

The function extension can be unlocked using the provided license file on a USB flash drive or by entering the license code via the on-screen keyboard.

Unlocked function extensions can be deactivated again at any time in the **Function Extensions** menu.

2.1.1 Requirements

Supported software
version

Software from version V1.06 / V1.00 onwards is required to use function extensions.

⇒ If necessary, perform a [software update](#) of the vacuum controller.

Acquiring a license

License to unlock function extensions.

⇒ For further information on function extensions, please contact the Sales team at **VACUUBRAND**¹.

2.1.2 License file for unlocking function extensions

Unlocking with license
code

If you have a valid license, please follow the set-up assistant that appears after you insert the USB flash drive containing the license file. Alternatively, you can enter the license code using the on-screen keyboard.

→ See also Chapter: **3.3 Unlocking function extensions**

2.2 User Management

User Management
function extension

VACUU·SELECT User Management is a function extension of the VACUU·SELECT interactive vacuum controller. User authorizations can be flexibly customised to meet the requirements of the respective customer.

When creating user groups, different users can be configured with different authorizations.

Advantages of User Management: efficient multiple use, ensures consistent process parameters and minimizes operating errors.

¹ [Contact](#) – material number: **Ordering information on page 47**

2.3 SYNCHRO

The SYNCHRO function is a functional extension for the interactive vacuum controller VACUU·SELECT.

With the SYNCHRO function, it is possible to control two processes in parallel with one single vacuum controller VACUU·SELECT.

The processes can run independently of each other and at the same time. This requires two sensors and two valves.

Thus, for example, two rotary evaporators can be handled with one VACUU·SELECT. Another option is to operate two tapping points in one fume cupboard. These can be tapping points for rough vacuum and fine vacuum.

3 Function Extensions

The Function Extensions sub menu enables you to unlock additional functions and activate/deactivate functions that are already unlocked.

To unlock function extensions you need a USB flash drive with a valid license file or a license code that can be entered via the on-screen keyboard.

3.1 Opening the Function Extensions menu

Opening the Function Extensions sub menu

→ Example
Process display



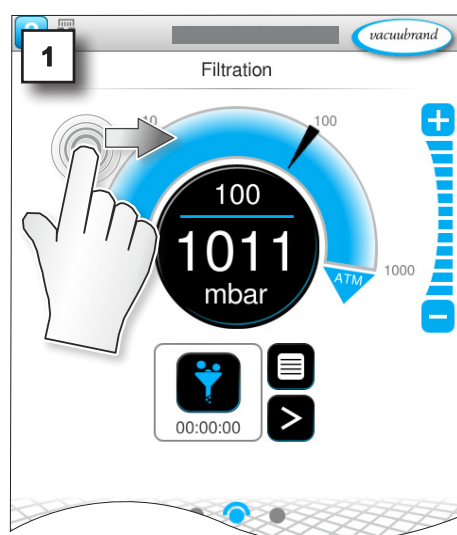
Tap

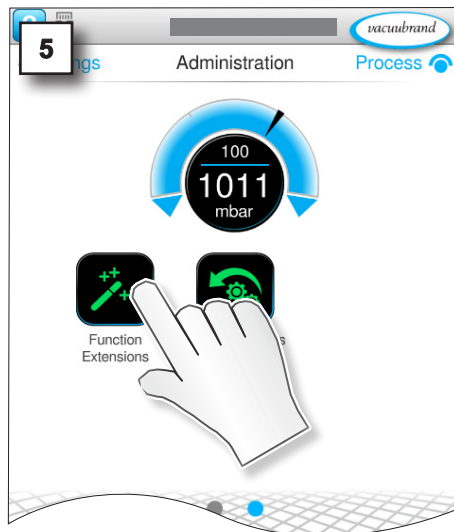


Press and
hold and drag



Press and
hold and drag



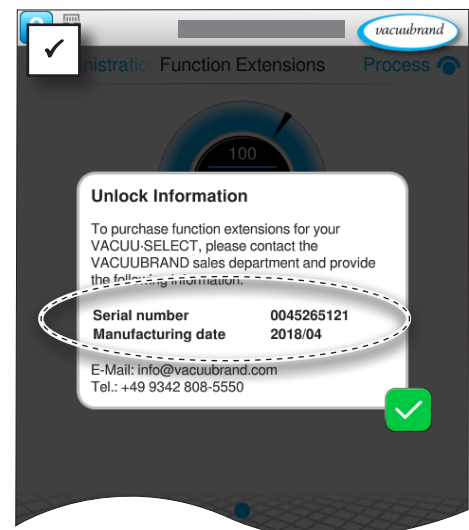
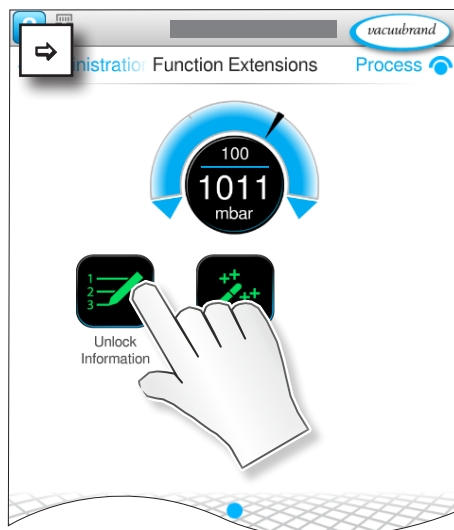


3.2 Requesting a license file

→ Example
Main Menu \ Settings \
Administration \ Function
Extensions



Tap



1. Make a note of the serial number and manufacturing date .

2. Provide this information when ordering the license .

☒ You will receive the license code and a license file via e-mail .

IMPORTANT!

The license is linked to the controller by matching serial number and manufacturing date. The license can only be used on one controller.

- ⇒ Please proceed as described above if you would like to unlock function extensions for multiple controllers.
- ⇒ Provide the controller serial number and manufacturing date for each license.

3.3 Unlocking function extensions

3.3.1 Via license code

Entering a license code

→ Example
Main Menu \ Settings \
Administration \ Function
Extensions



Tap

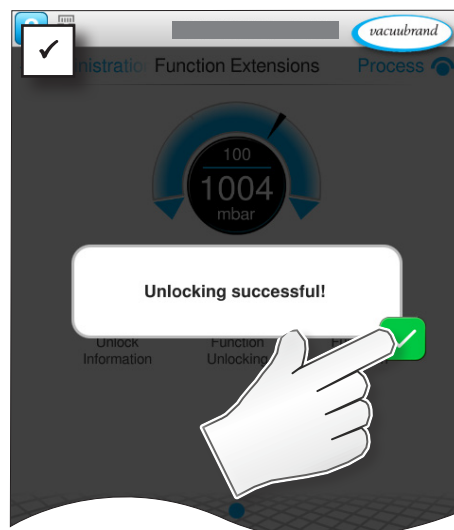
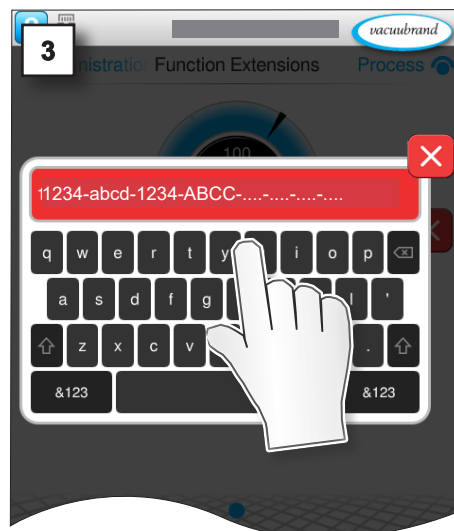
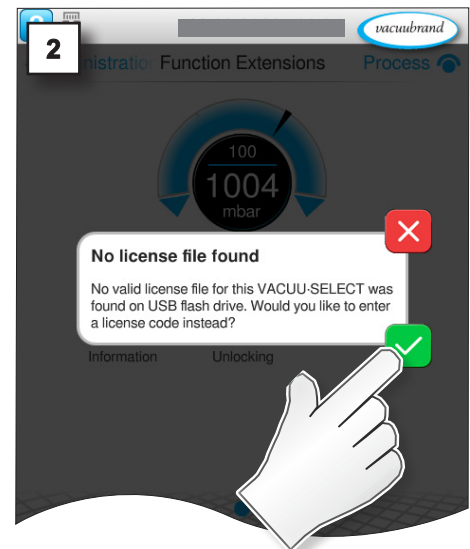
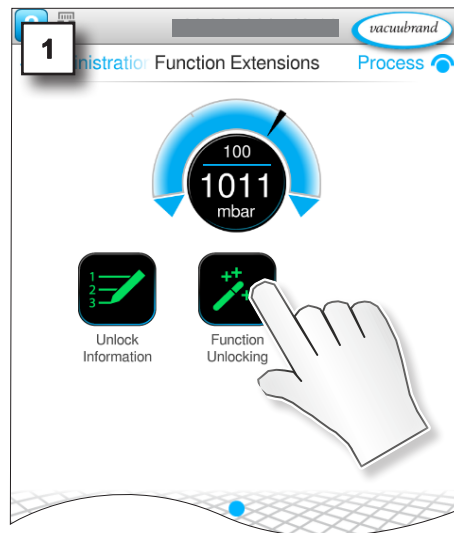


Cancel



Confirm

→ Example
Entering a license code
and confirming



3.3.2 Via USB flash drive



If you would like to add a function extension for several controllers at the same time, then you can save all the license files that you obtain from us on a USB flash drive. Go to each controller with this USB flash drive and perform function unlocking for each one. By way of the stored serial number, the controller automatically detects the matching license for unlocking the function extensions.

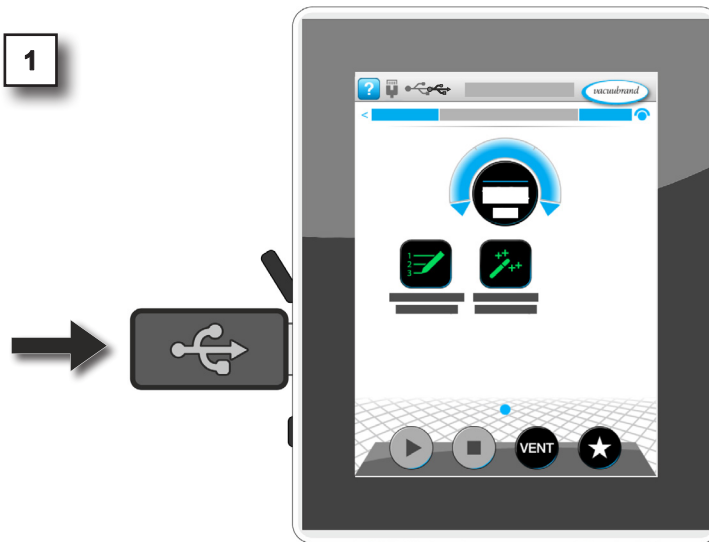
Transferring the file via USB flash drive

→ Example
Main Menu \ Settings \
Administration \ Function
Extensions



Tap

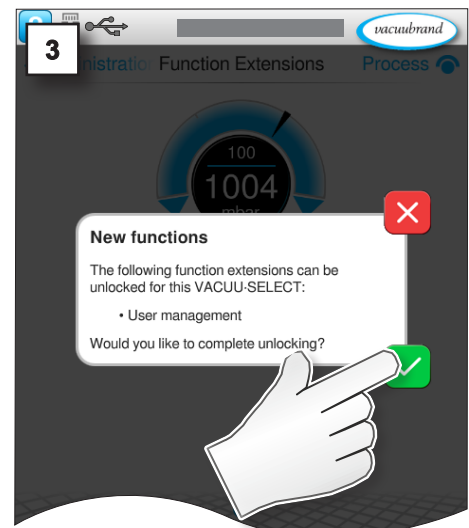
1

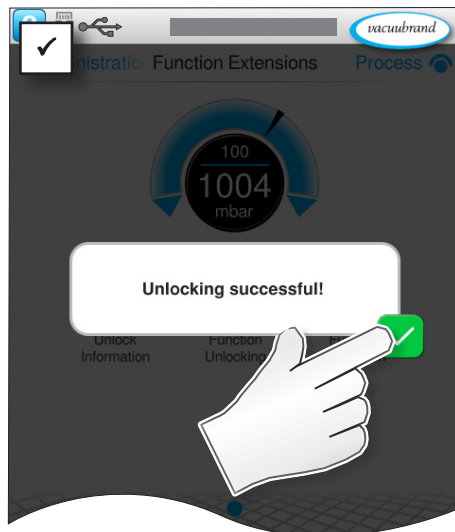


Cancel



Confirm





3.4 Deactivating function extensions

Example User Management – switching off function activation

→ Example
Main Menu \ Settings \
Administration \ Function
Extensions



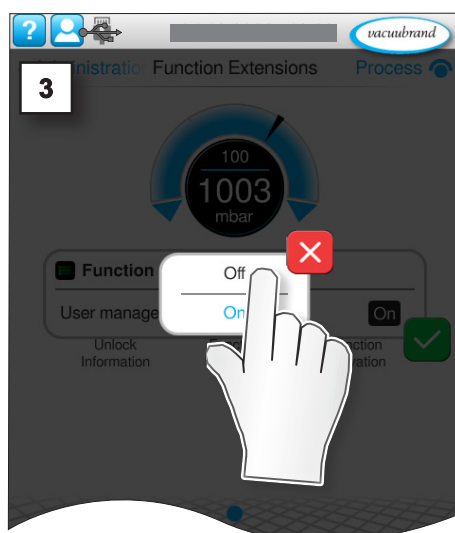
Tap



Cancel



Confirm



NOTE

Users and user groups are permanently deleted after confirming the message.

⇒ Export important user-specific settings before switching off the function extension → see Chapter: **4.5 Import/Export User Management**

→ Example
Main Menu \ Settings \
Administration \ Function
Extensions



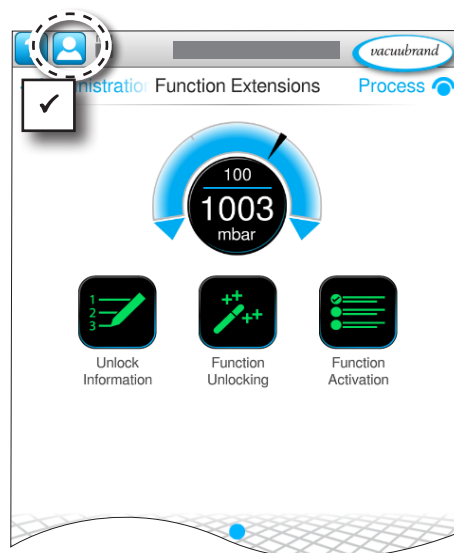
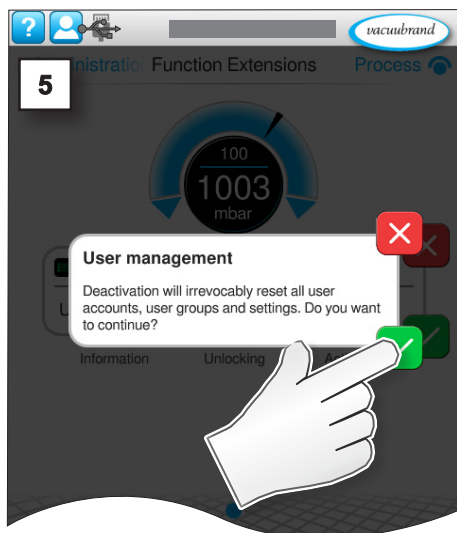
Tap



Cancel



Confirm



4 User Management

4.1 Creating an administrator password

→ Example

Creating a password
when activating User
Management



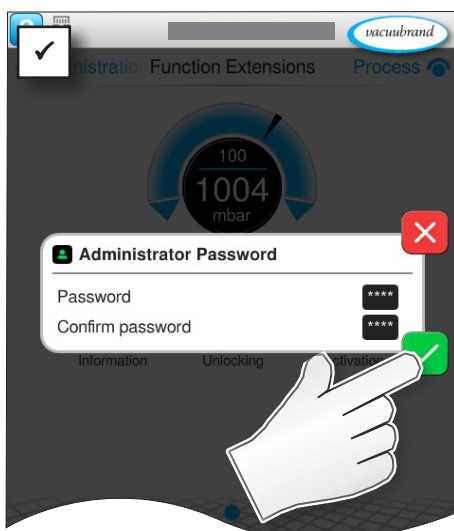
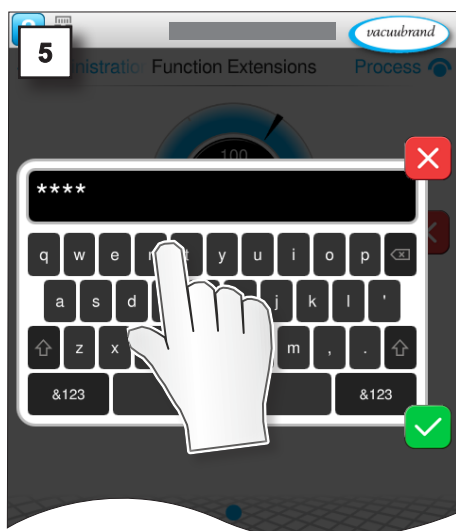
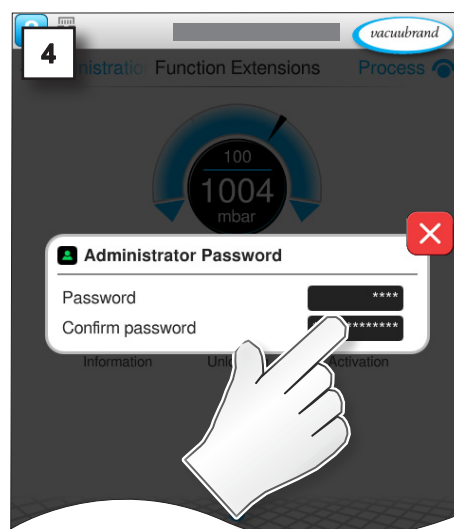
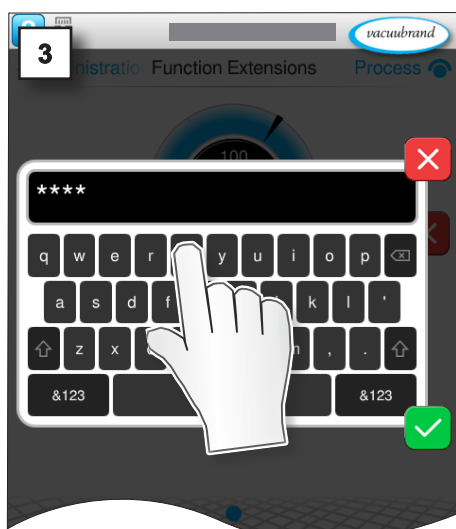
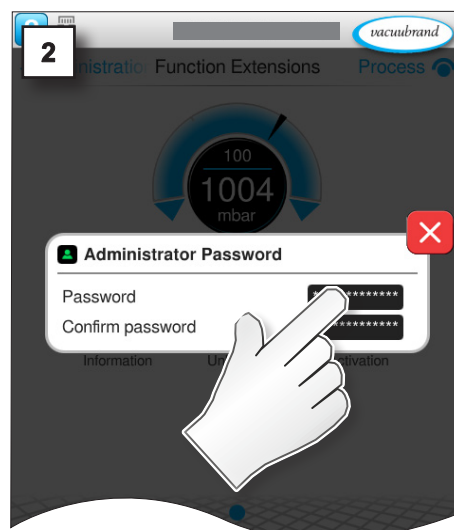
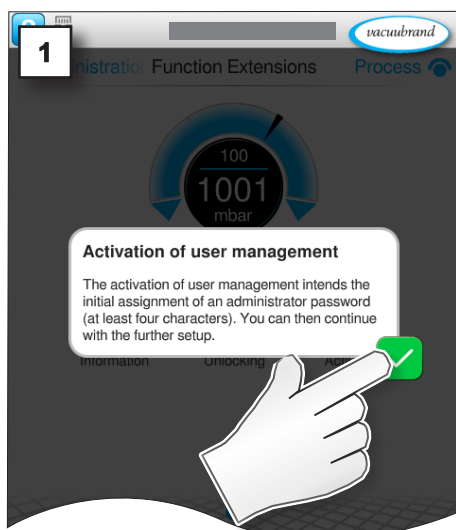
Tap



Cancel



Confirm



NOTE

- ⇒ Protect your controller from unauthorized access.
- ⇒ Store passwords and access data in a secure location.

4.2 User Accounts**4.2.1 Setting up and editing**

Only the administrator or users who are assigned to the administrators user group can create new users.

Creating a new user

→ Example
Main Menu \ Settings \
Administration



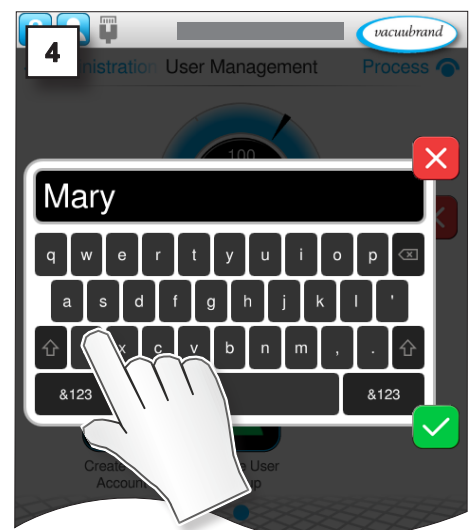
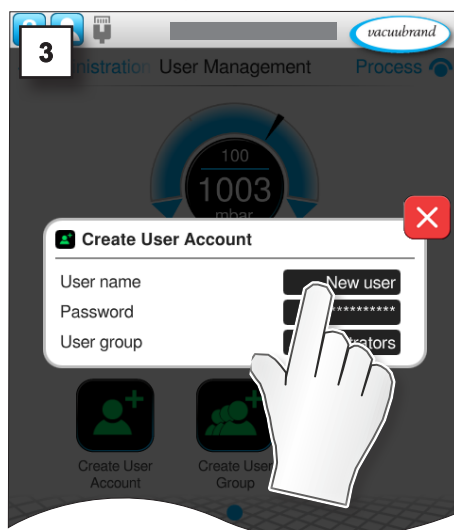
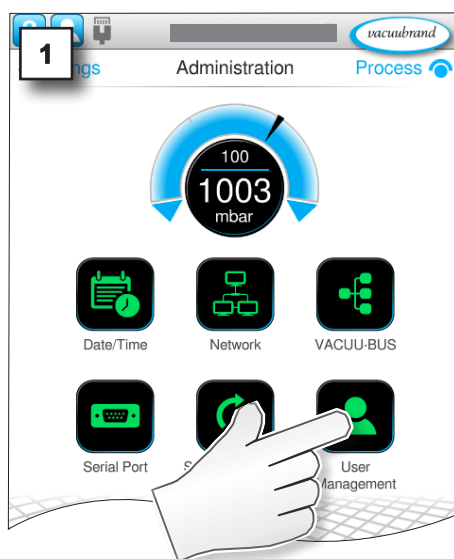
Tap



Cancel



Confirm



→ Example
Creating a new user



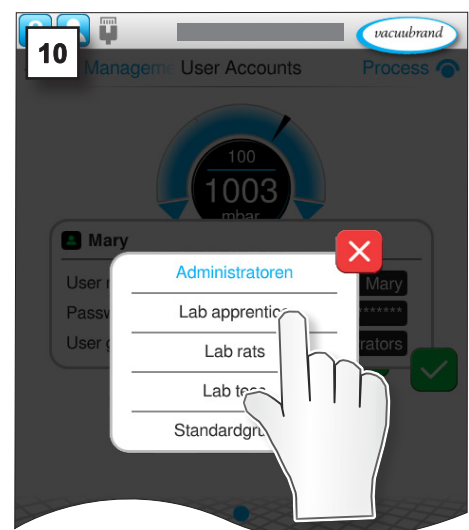
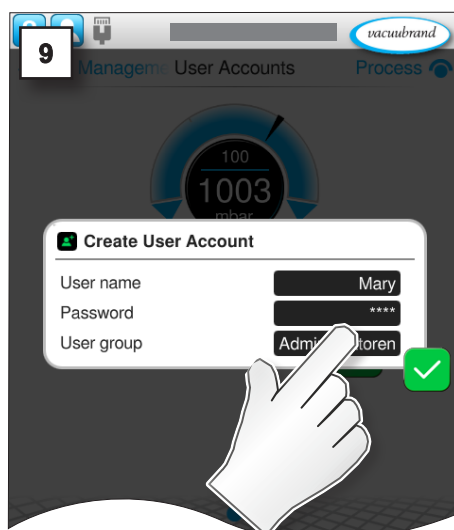
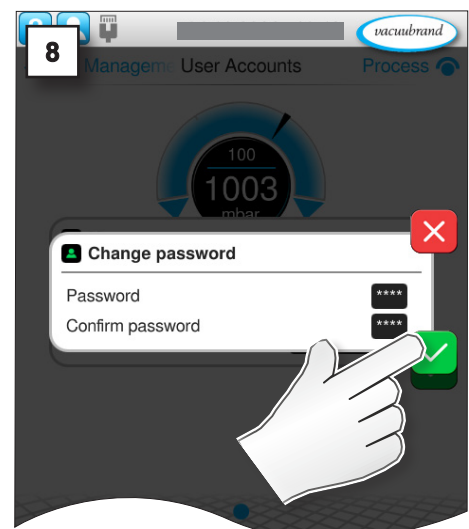
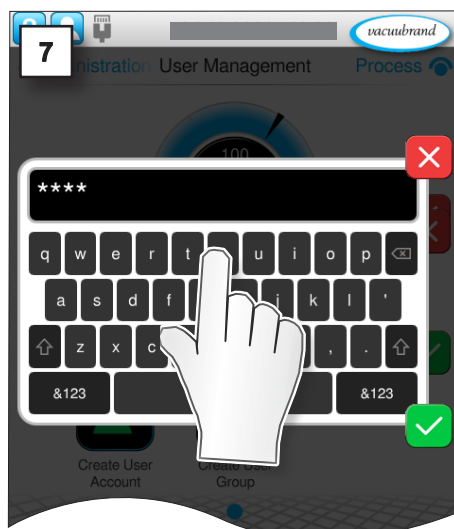
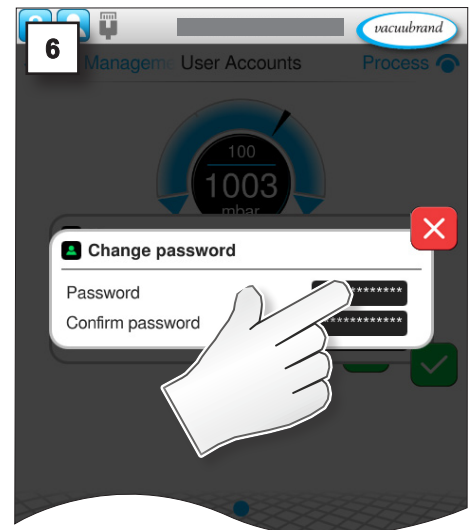
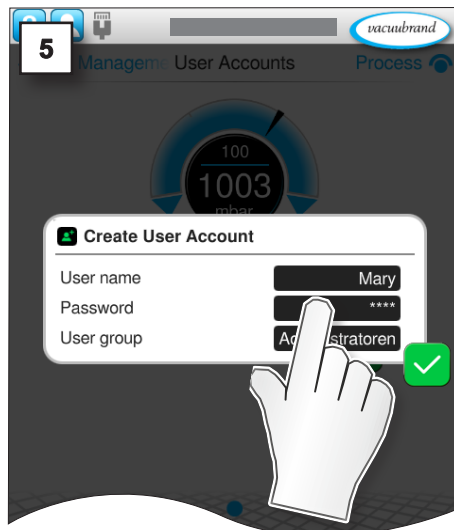
Tap



Cancel



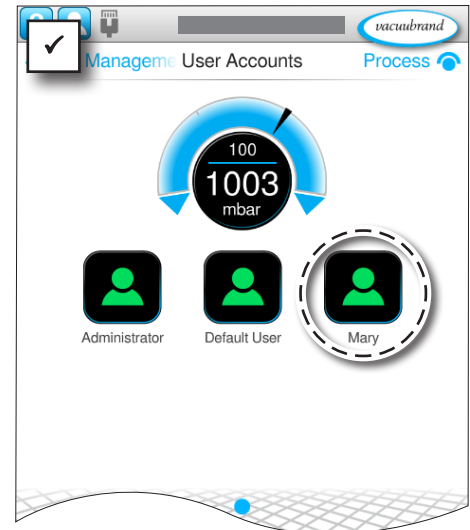
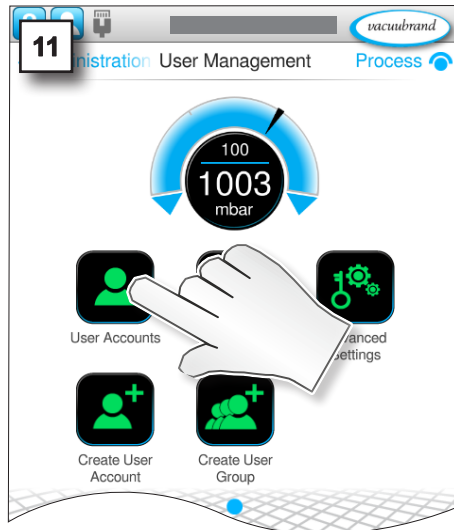
Confirm



→ Example
New user



Tap

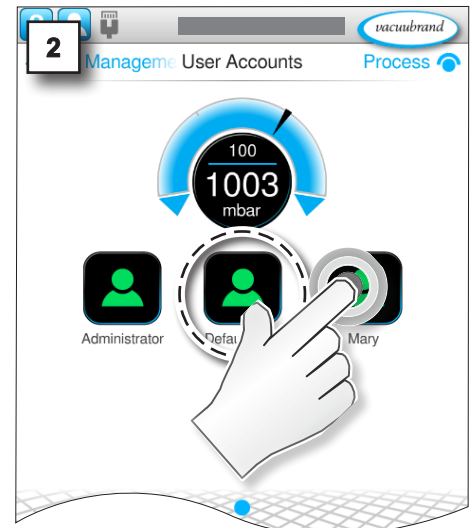


Editing users

→ Example
Main Menu \ Settings \
Administration \ User
Management \ User
Accounts



Press and
hold



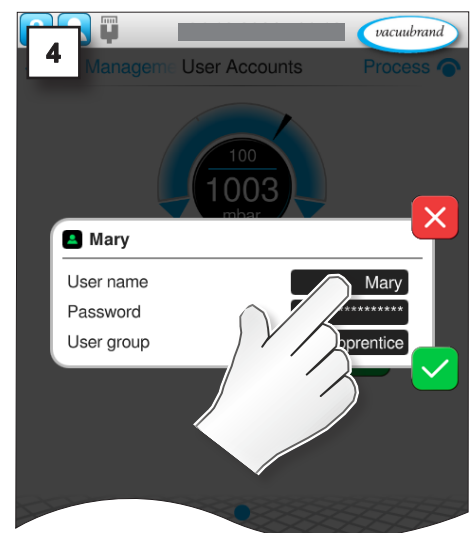
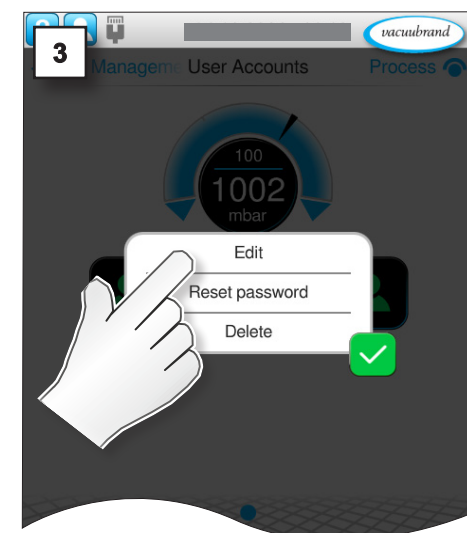
→ Example
Editing a user
Changing user data



Cancel



Confirm



→ Example
Editing a user



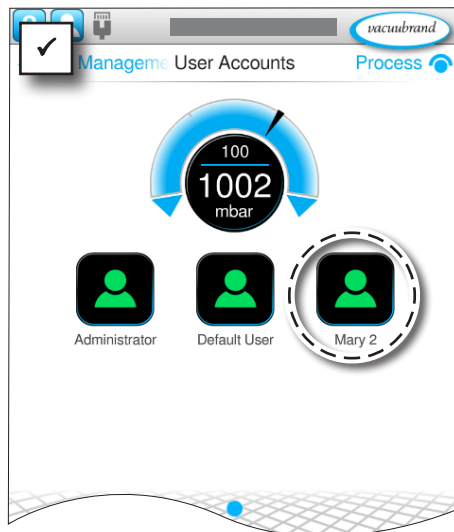
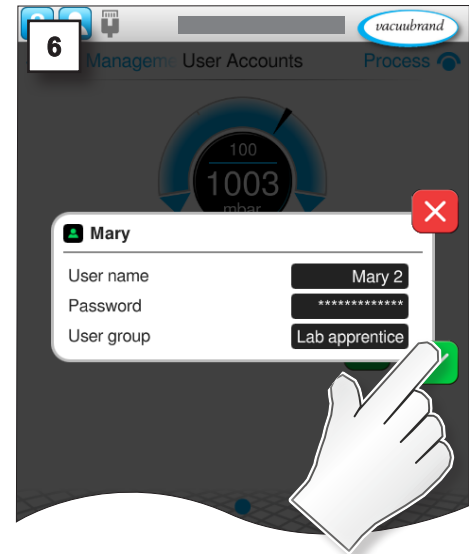
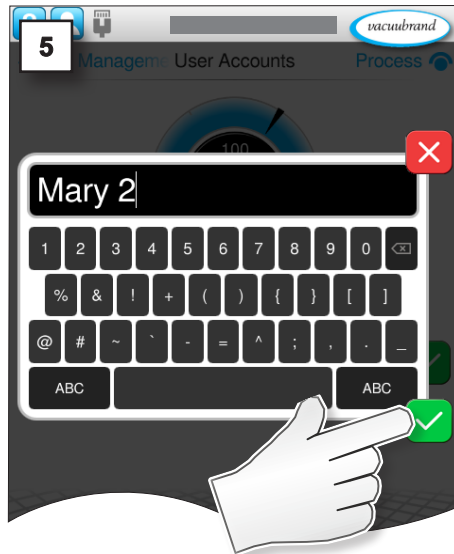
Tap



Cancel



Confirm



4.2.2 Removing users

NOTE

Users and the applications they created are permanently deleted after confirming the message.

⇒ Export important user-specific applications before deleting a user.

Deleting users

→ Example
Main Menu \ Settings \
Administration \ User
Management \ User
Accounts



Tap



Press and
hold

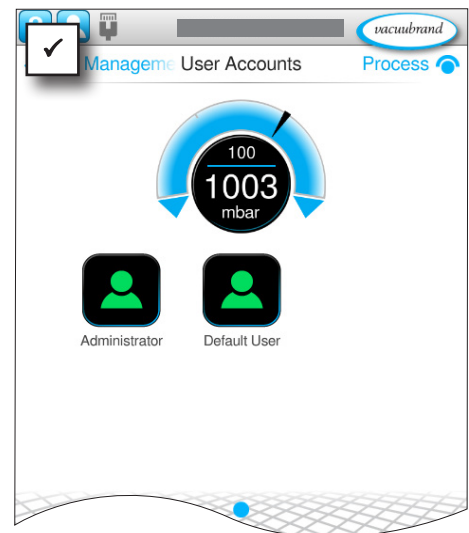
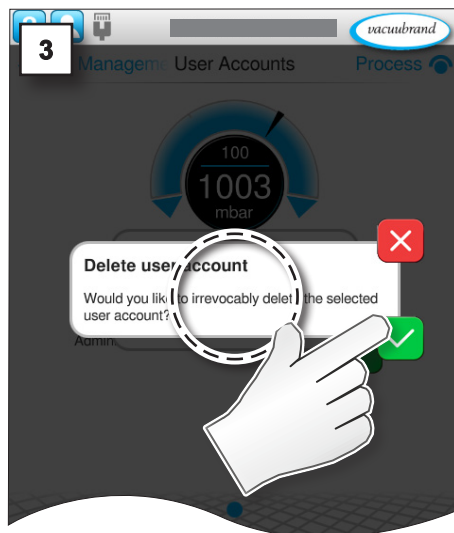
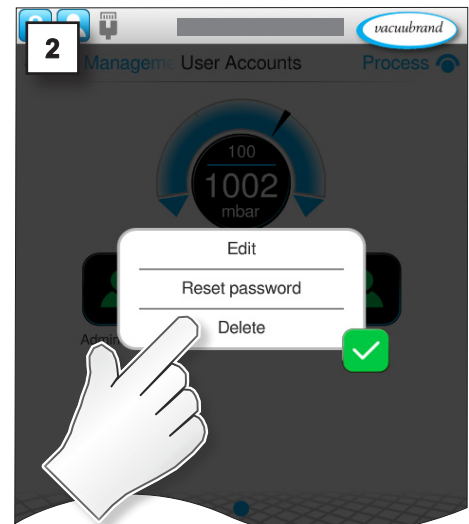
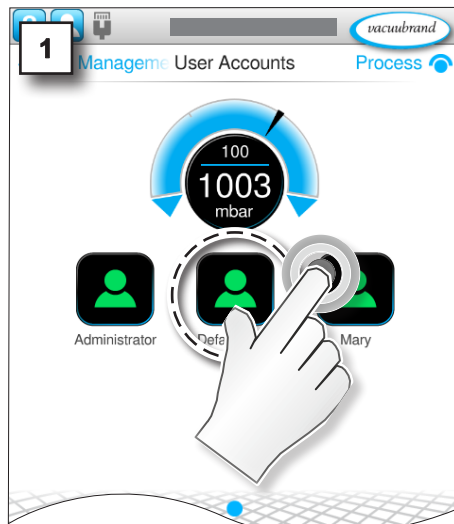


Cancel



Confirm

→ Example
Deleting a user



4.3 User groups

4.3.1 Setting up and editing

Creating a new user group

→ Example
Main Menu \ Settings \
Administration \ User
Management



Tap



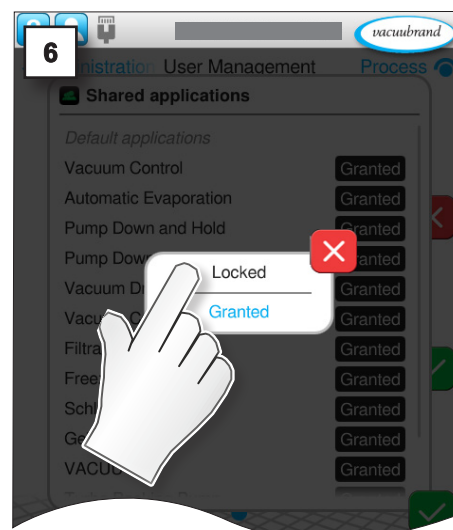
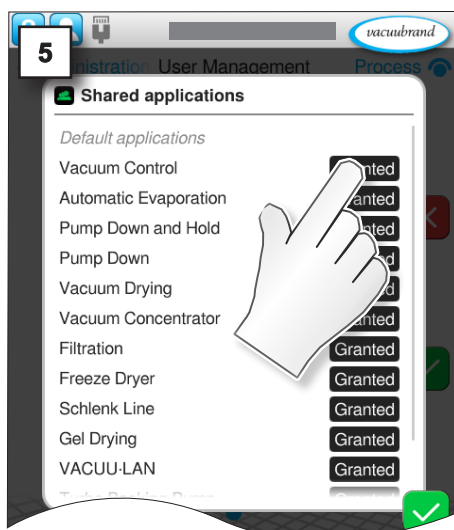
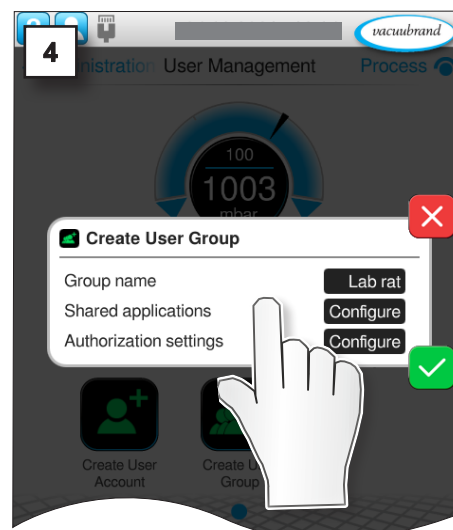
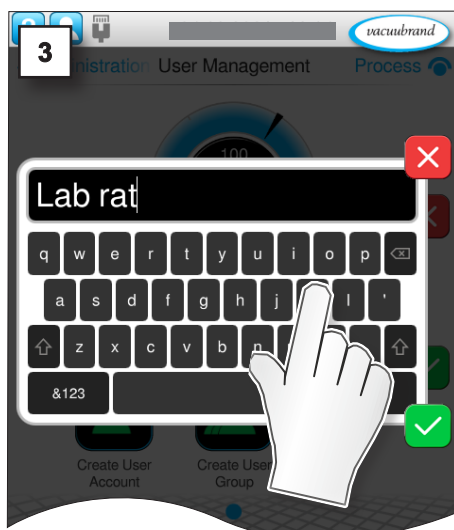
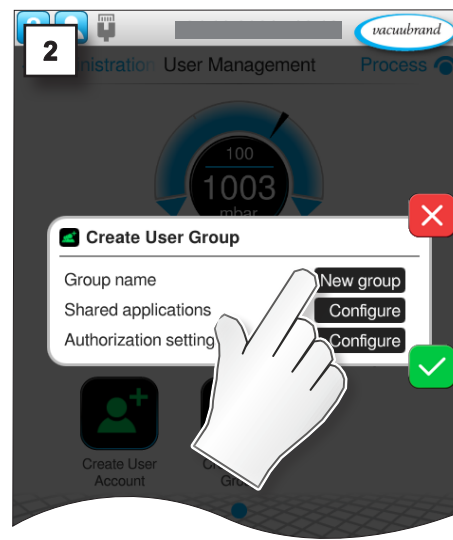
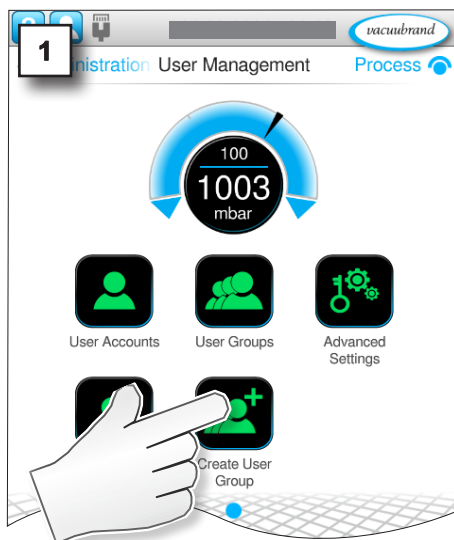
Cancel

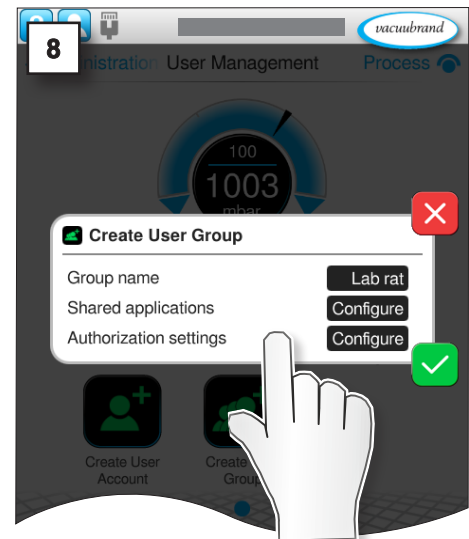
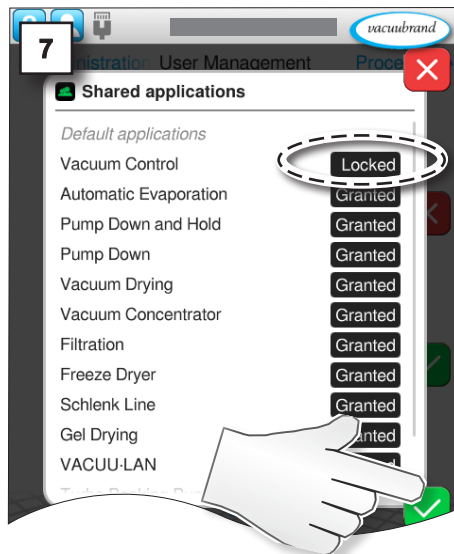


Confirm

→ Example
Entering a group name

→ Example
Configuring shared
applications

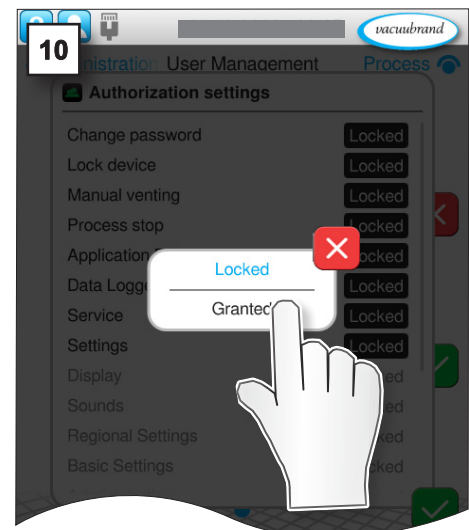
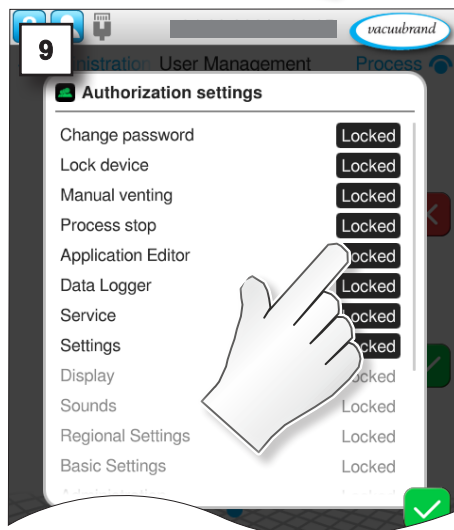




→ Example
Adjusting authorization
settings



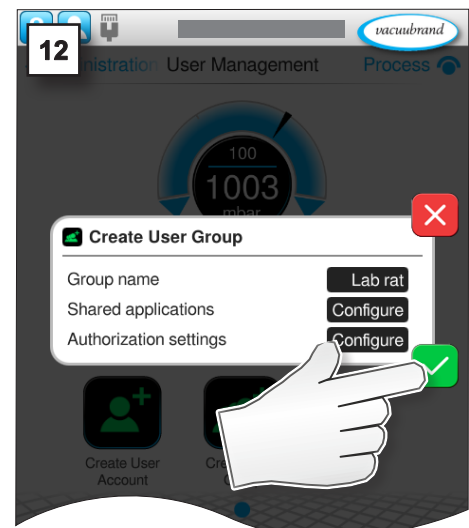
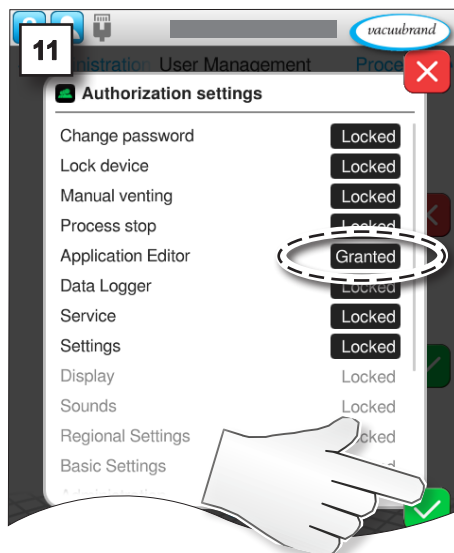
Tap



Cancel



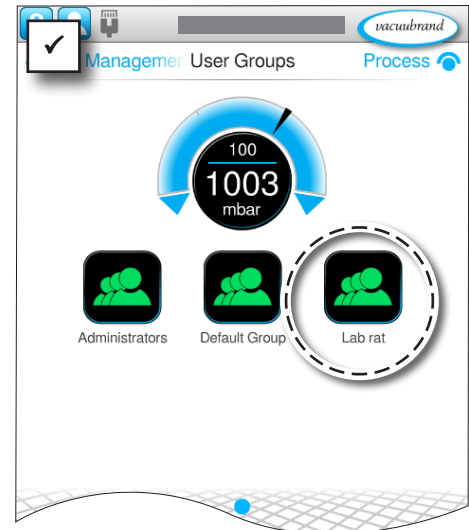
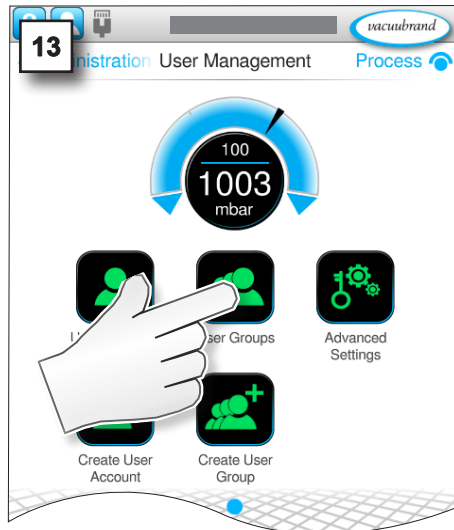
Confirm



→ Example
Main Menu \ Settings \
Administration \ User
Management

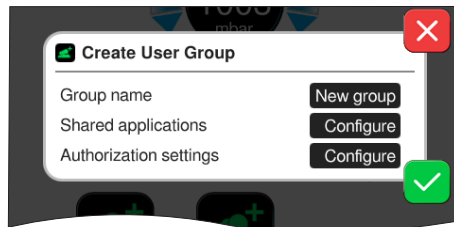


Tap



Meaning of the context menu

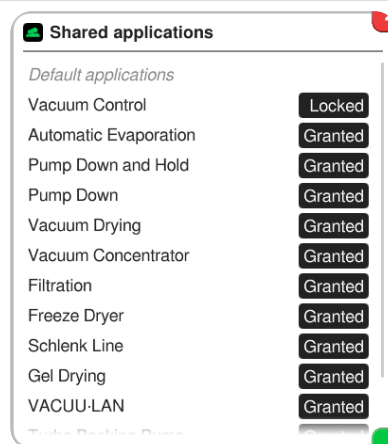
→ Example
Creating a new user
group



Context menu for creating a new user group with a suitable group name.

Shared applications

→ Example
Configuring shared
applications



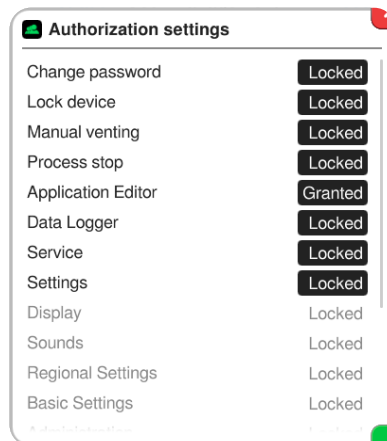
Authorization settings for using specific applications are made here.

- ▶ **Granted:** application unlocked for user group; granted applications are displayed in the application menu.
- ▶ **Locked:** application locked for user group and not listed in the application menu.
- ▶ The list contains all applications which are assigned to user accounts of the administrators group. This means that administrators can select from all default applications and the applications of other administrators when setting shared applications.

→ Example

Editing authorizations for a user group

Authorization settings



Menu for setting detailed authorizations of the user group.

- **Granted:** use of function unlocked for the user group.



- **Locked:** Use of function locked for the user group; button greyed-out.



4.3.2 Editing a user group + context menu

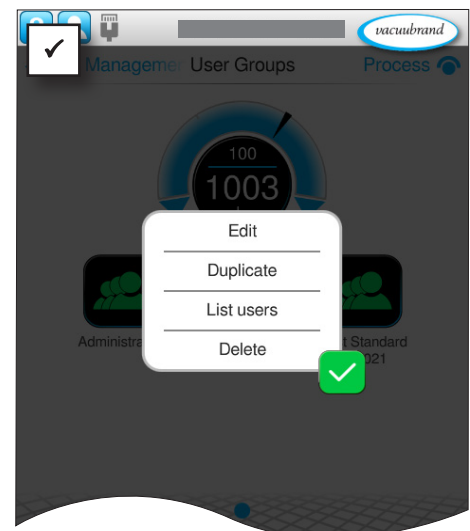
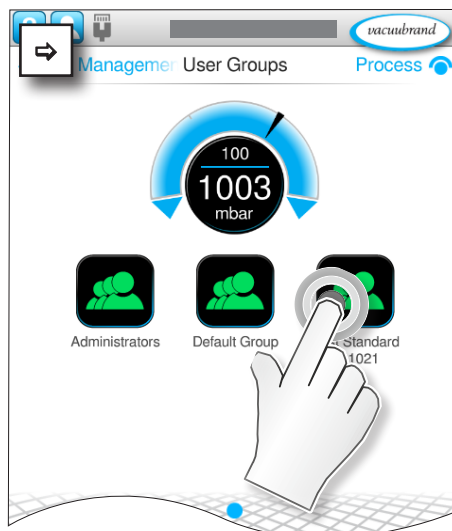
Opening the editing dialogue box

→ Example

Main Menu \ Settings \
Administration \ User
Management \ User
Groups



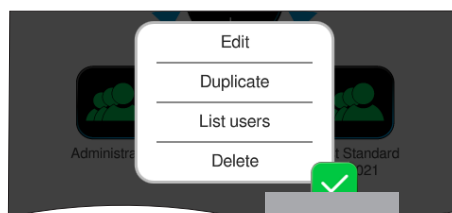
Press and hold



→ Example

Context menu for editing a user group

Meaning of the context menu



Context menu for editing existing user groups and displaying a list of assigned users.



Cancel



Confirm

→ Example

Context menu for editing
a user group

Edit

Test Standard 041021

Group name: Test Standard 041021

Shared applications: Configure

Authorization settings: Configure

Adjustments to a user group can be made in the editing dialogue box at any time.

- ▶ change names,
- ▶ grant or lock access to applications,
- ▶ limit or expand user authorizations.

Duplicate

Test Standard 041021 - Copy

Create a copy of the selected user group.

NOTE

Only the user group is duplicated along with all its settings, not the assigned user accounts.

List users

List users

The following users are assigned to this group:

New lab user

List users who are assigned to this user group.

Delete

Delete user group

Would you like to irrevocably delete the selected user group including all assigned user accounts and their applications?

Number of assigned users: 1

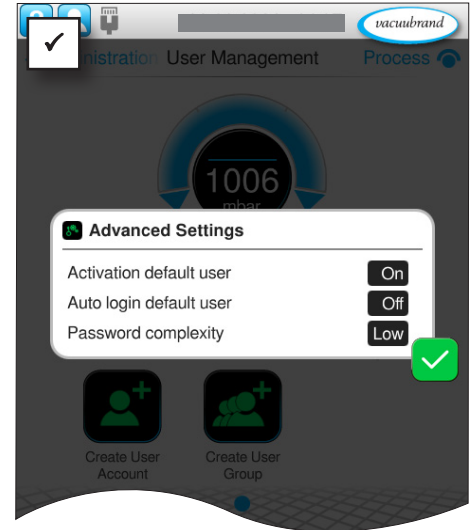
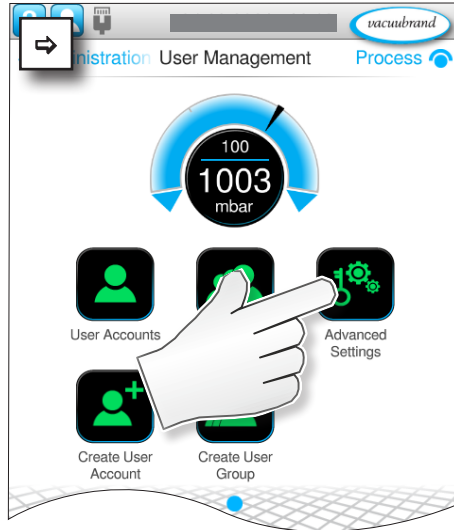
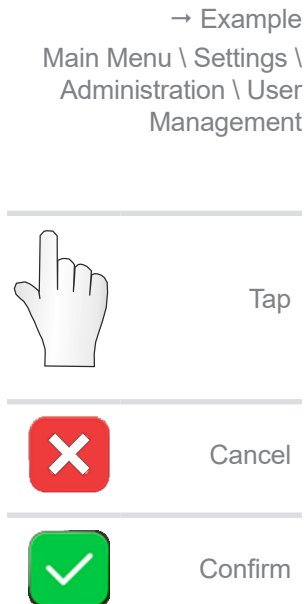
Delete a user group after confirming the security prompt.

NOTE

When user groups are deleted, the assigned user accounts are deleted; this means all user accounts and their applications are also deleted when a user group is deleted.

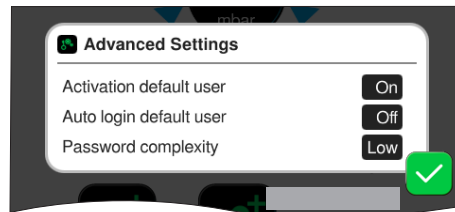
4.3.3 Advanced Settings

Opening Advanced Settings



Meaning of the context menu

→ Example
Context menu for
Advanced Settings



Menu for setting attributes for default users and user password requirements.

Activation default user

- Off
 - ▶ Default user deactivated.
 - ▶ Default user not in the login list.
- On
 - ▶ Default user activated.
 - ▶ Default user listed in the login list.

Auto login default user

- Off
 - ▶ Automatic login for default user deactivated.
 - ▶ Login of default user required after starting controller.
- On
 - ▶ Automatic login for default user activated.
 - ▶ Login of default user not required after starting controller.

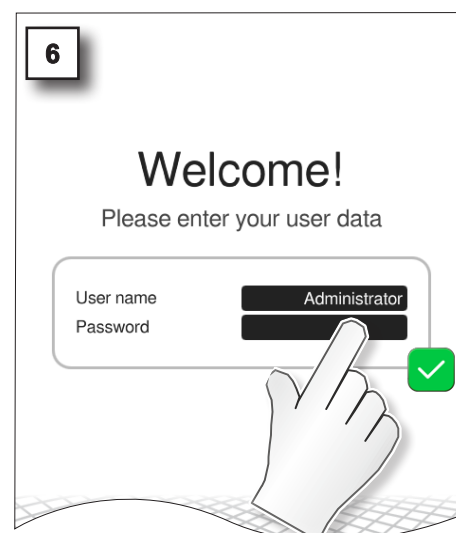
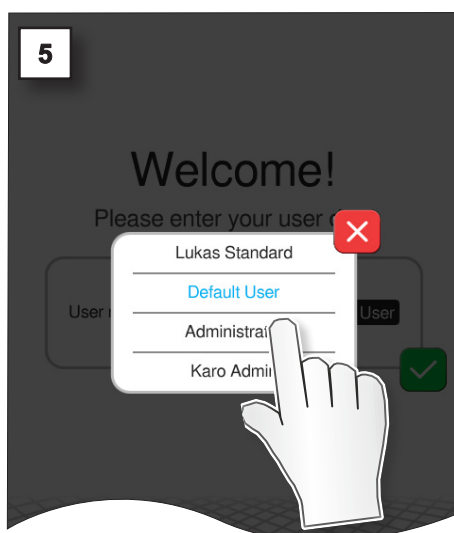
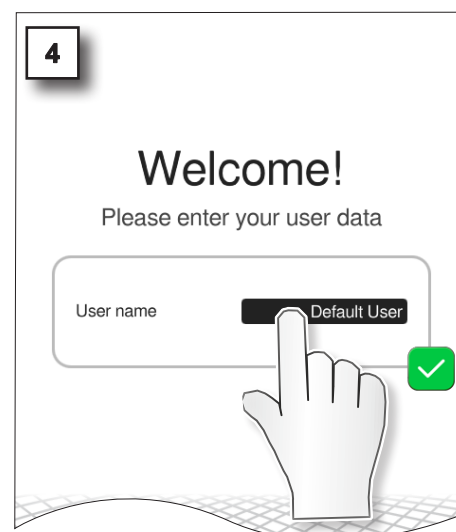
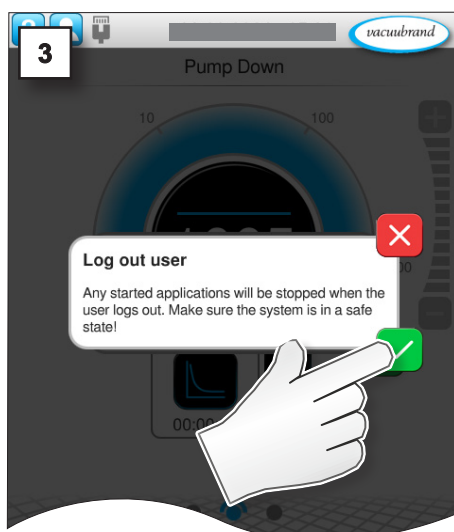
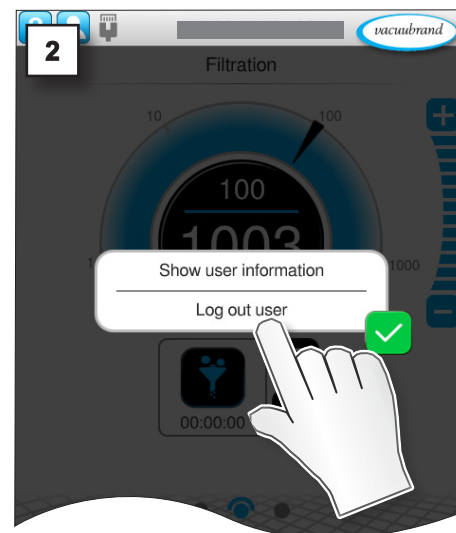
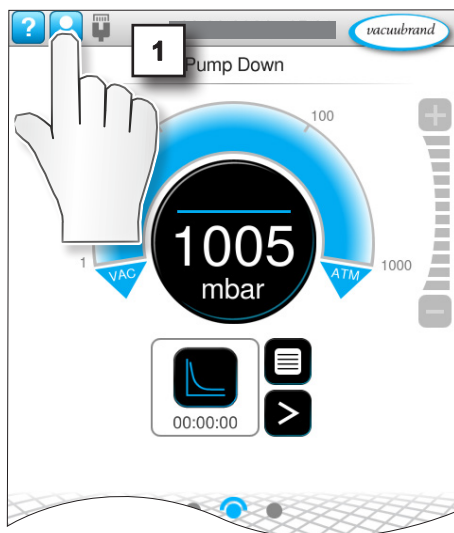
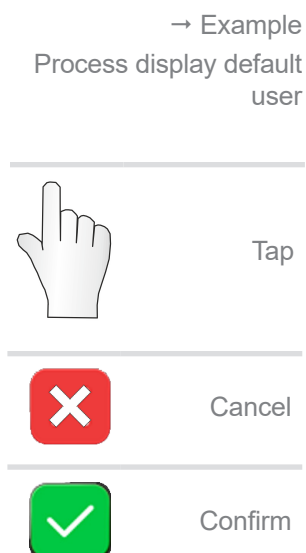
Password complexity

- Low
 - ▶ At least 4 arbitrary characters.
- Medium
 - ▶ At least 8 characters, upper and lower case.
- High
 - ▶ At least 8 characters, upper and lower case, numbers and special characters.

4.4 User information

4.4.1 Switching users

From default user to administrator





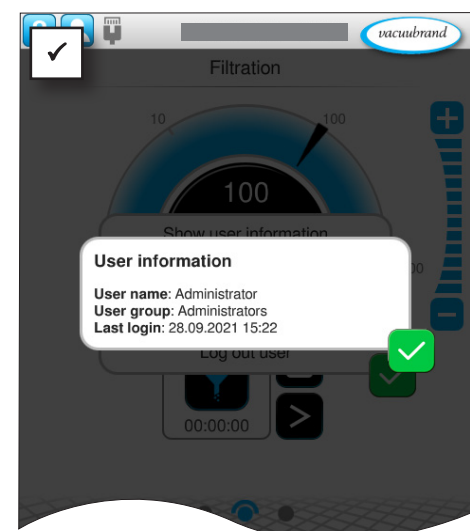
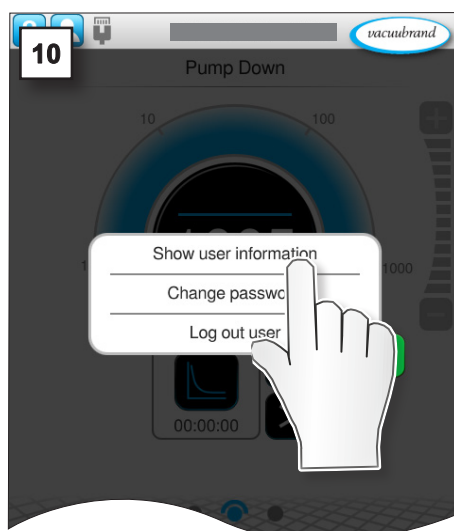
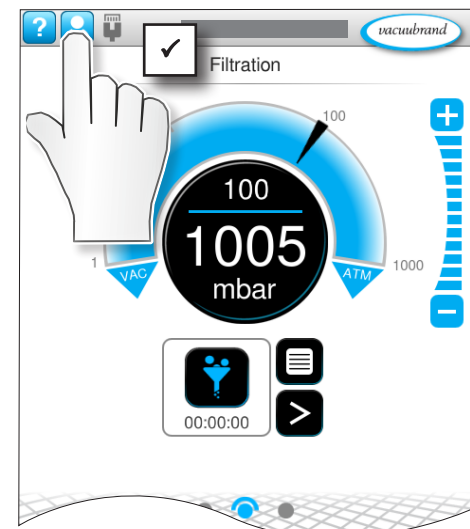
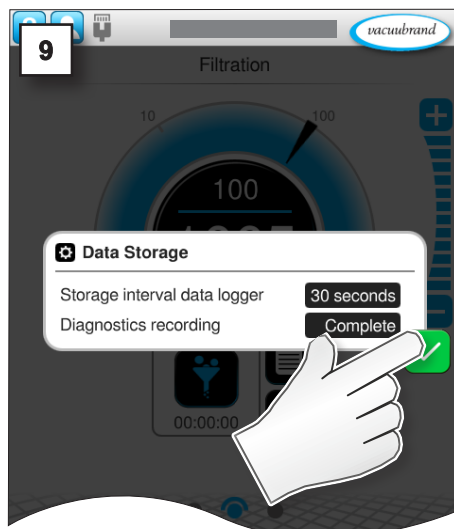
Tap



Cancel



Confirm



→ Example
User information



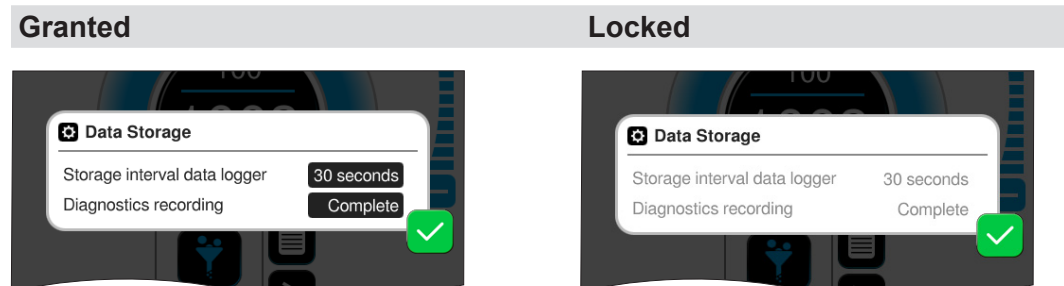
The default user has the only user account without a password.
Therefore, no password can be entered on the login screen.

4.4.2 Locking and unlocking (display)

The menus in your controller may be displayed differently, depending on the user and the authorization settings. Users see only granted applications.

Display comparison

→ Example
Unlocked and locked
views



→ Example
Main menu: unlocked
and locked views



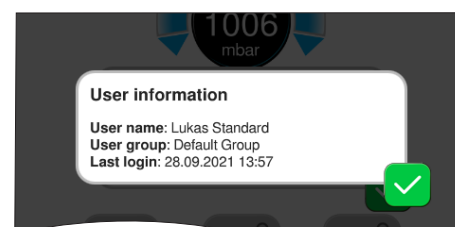
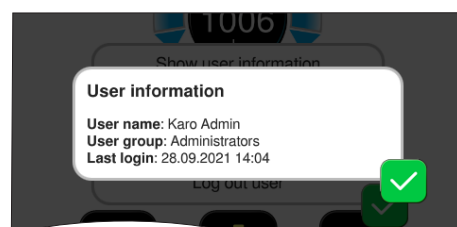
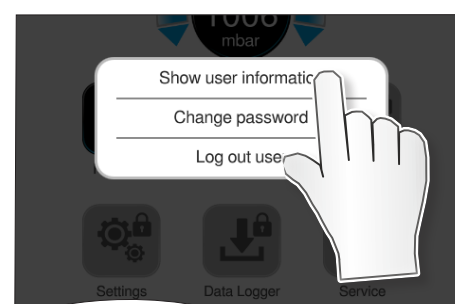
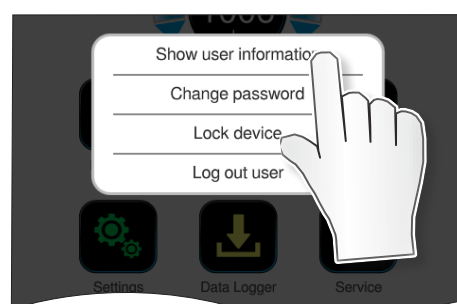
Tap



Cancel



Confirm

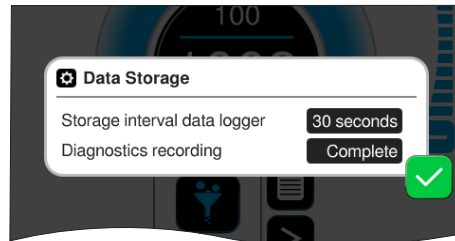


4.4.3 Other context menus explained

The following descriptions only apply in connection with the unlocked User Management function and are contingent on authorizations granted to the respective user.

Data storage

→ Example
Pop-up information on
current data storage



The data storage pop-up dialogue is shown at each restart and each time a new user logs in. Depending on the user's authorization, these settings can either be changed or not (content greyed out).

Storage interval data logger

Logging off	Data logging is switched off.
Interval in seconds	Data logging with defined time interval(s).

Recording diagnostics data

Minimal	Default setting for recording diagnostics data.
Complete	Records the following data: ▶ User name of the user who started the process, ▶ Diagnostics data (incl. time in each case), ▶ User login/logout, ▶ Locking/unlocking of the controller by a user, ▶ Reset the administrator password, ▶ Initial set-up of User Management, ▶ Deactivation of User Management.

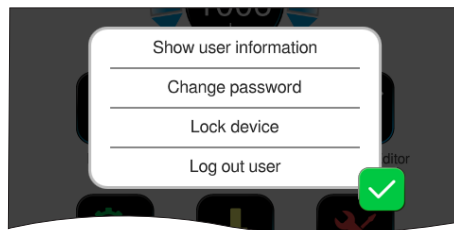
Example – recorded process data

→ Example
Display of recorded
process data

Abpumpen	Administrator	Step	VS-C 1
Timestamp	DateTime		
1632834051	Tue Sep 28 15	1	1000
1632834052	Tue Sep 28 15	1	1000
1632834053	Tue Sep 28 15	1	1000
1632834054	Tue Sep 28 15	1	1000
1632834055	Tue Sep 28 15	1	1000
1632834056	Tue Sep 28 15	1	1002
1632834057	Tue Sep 28 15	1	1008

User Options

→ Example
User Options context menu



Context menu of User Options.
The selection of functions depends on the authorization of the respective user.

Show user information

User information

User name: Karo Admin
User group: Administrators
Last login: 28.09.2021 14:04

Displays information on the user currently logged in.

Change password

Change password

Current password:
New password:
Confirm new password:

Context menu for changing the user password.

Lock device

Device locked (Administrator)

Please enter your password to unlock

Switch on screen lock to prevent unauthorized access to the controller. If an application has been started, it can continue to run in the background.
To unlock, tap the display and enter the user password. The user is displayed on the lock screen.

Log out user

Log out user

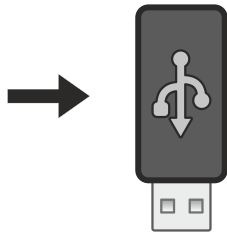
Any started applications will be stopped when the user logs out. Make sure the system is in a safe state!

Confirm the security prompt to open the login screen, and change the user. If an application has been started, logging out will stop it.

4.5 Import/Export User Management

IMPORTANT!

For import and export, the option *User Management + Applications* is only visible when User Management is unlocked and activated.



4.5.1 Export User Management + Applications

You can use the export function to transfer or save data, e.g. created users or user groups, to other controllers via a USB flash drive.

Exporting created users, user groups and applications

→ Example
Main Menu \ Settings \
Administration



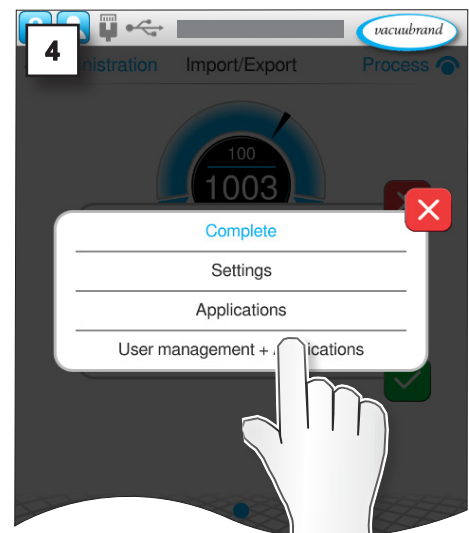
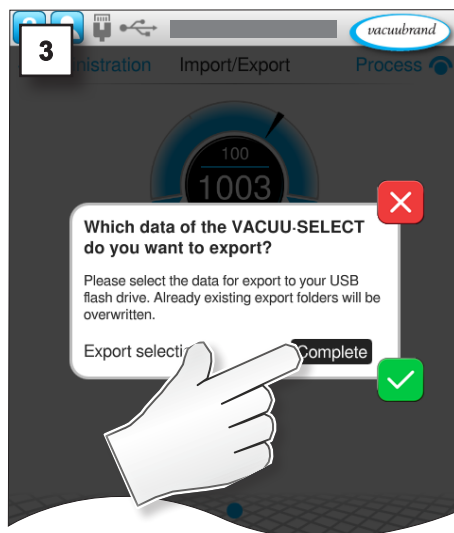
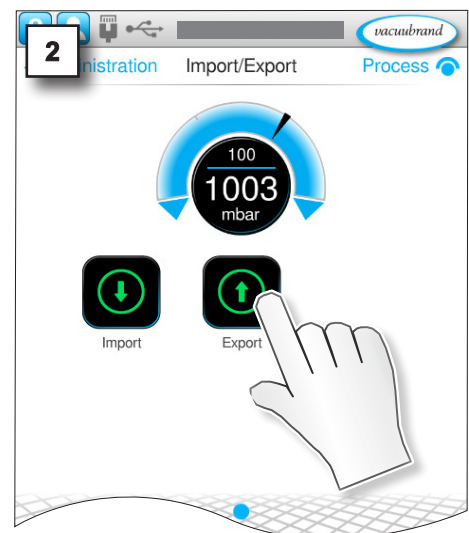
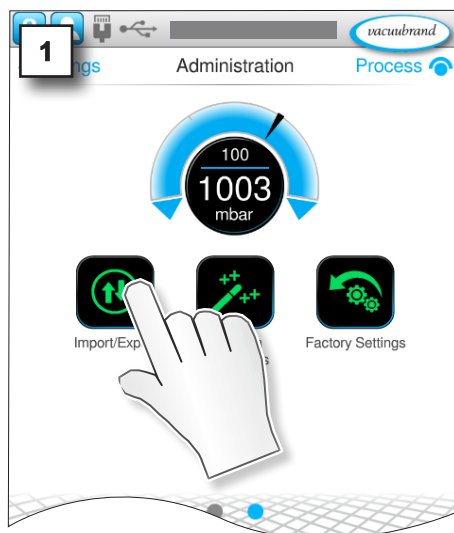
Tap

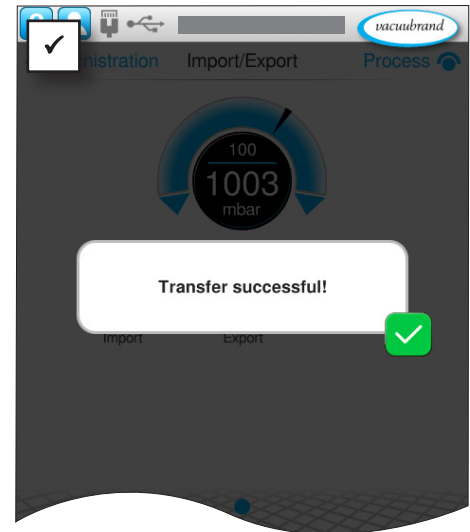
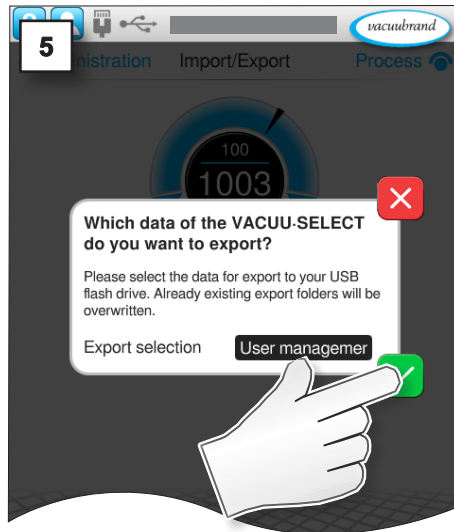


Cancel



Confirm





4.5.2 Import User Management + Applications

You can use the import function to import data, e.g. created or saved users or user groups, to your controller via a USB flash drive.

Importing created users, user groups and applications

→ Example
Main Menu \ Settings \
Administration



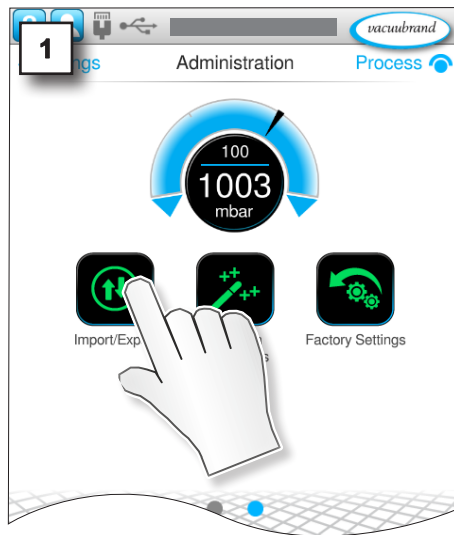
Tap



Cancel

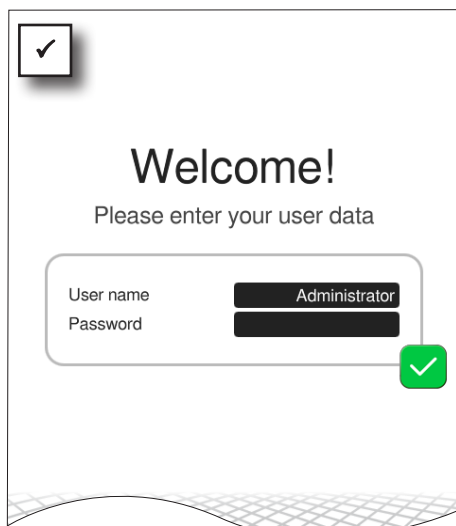
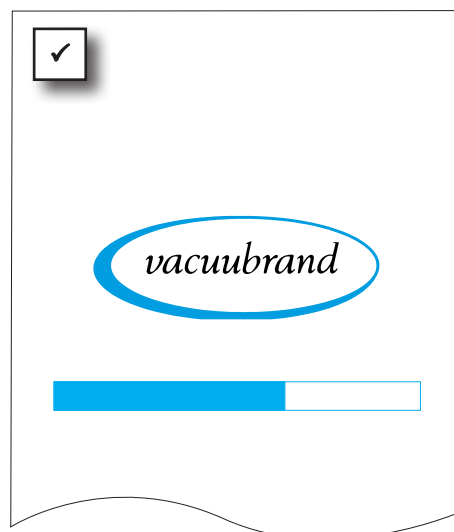
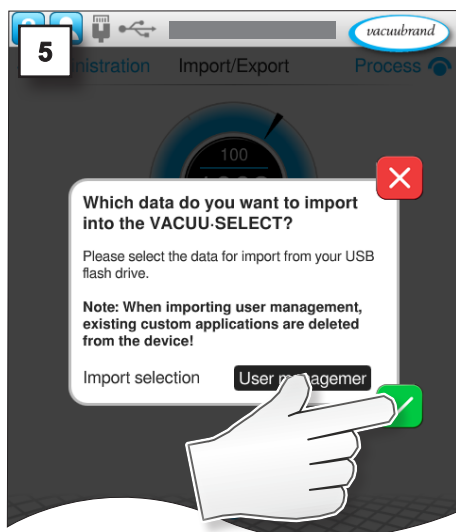
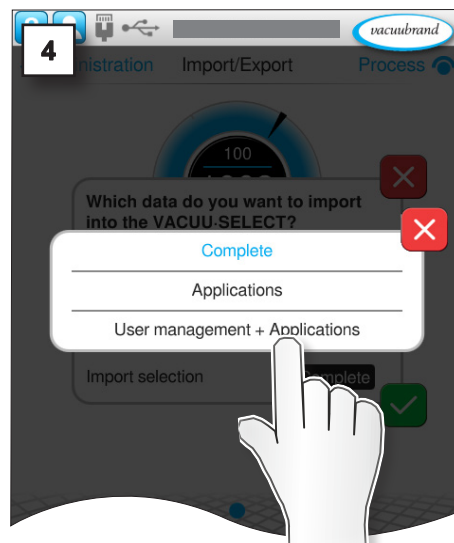
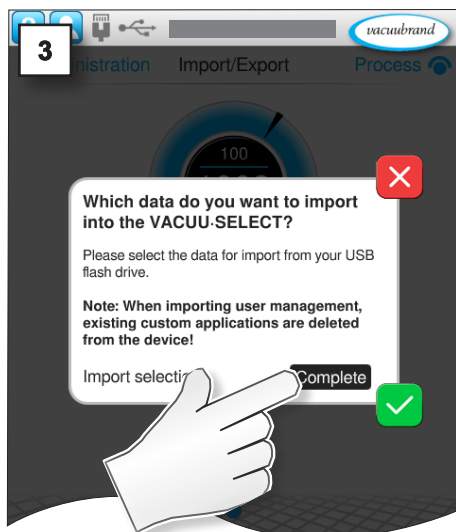


Confirm



NOTE

When importing data from User Management, existing custom applications and created users are deleted from the device.



4.6 Login/logout

IMPORTANT!

Only one user can be logged in to the controller at any given time. Simultaneous use of the controller by multiple users is not possible.

4.6.1 Login at start up

A login window appears when the controller is started.

Exception: When the default user and auto login are active, the user is automatically logged into this account; → see Chapter: **4.3.3 Advanced Settings**.

4.6.2 Auto start function

Requirement: Auto start is activated in the default settings of the controller; → refer to the user manual of your controller for more information.

After the controller is restarted, this is only activated if the default user is activated, auto login is activated and the default user was the last to log in and had started an application.

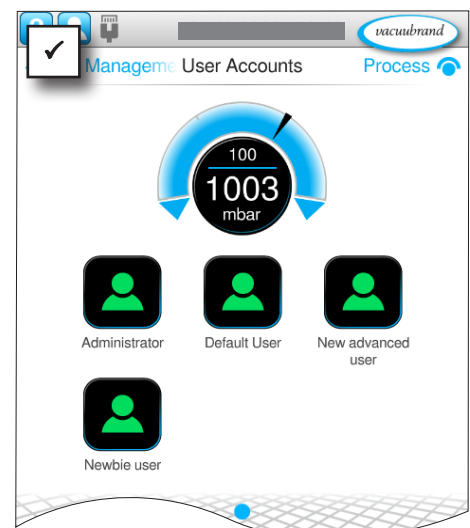
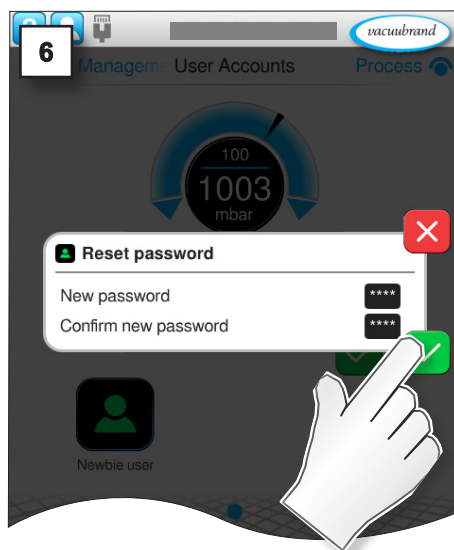
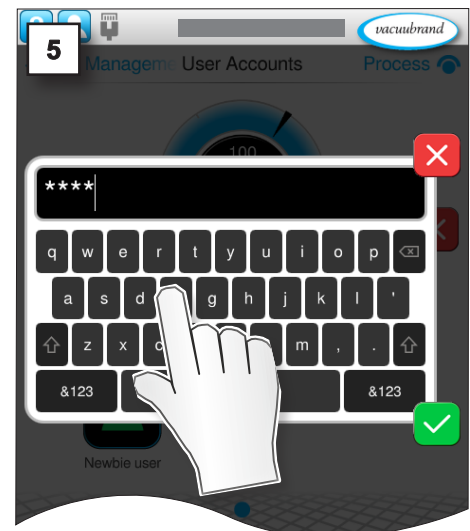
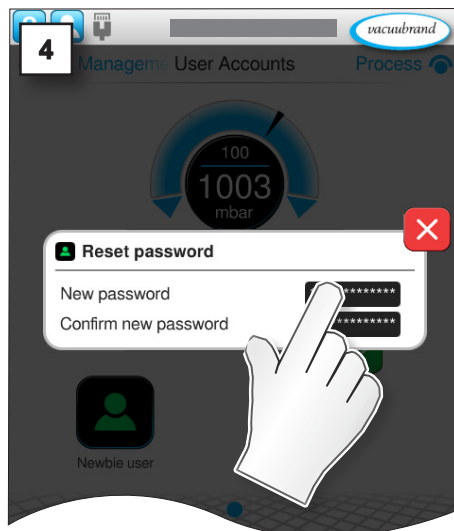
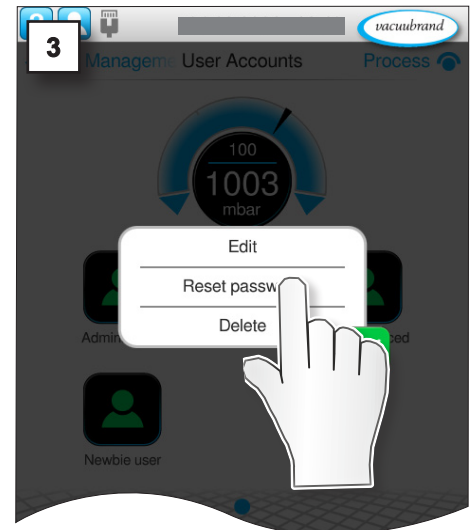
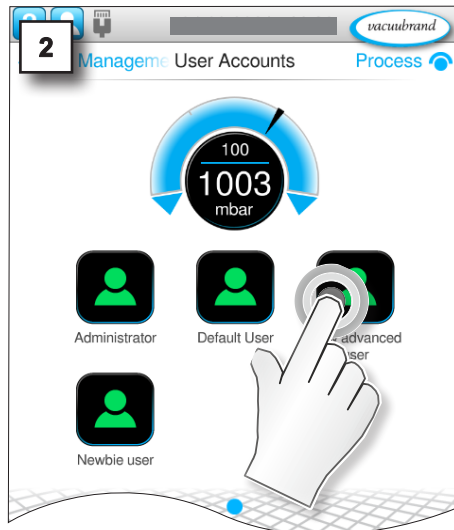
4.7 Password reset

4.7.1 User password

Resetting the user password

Assign new user
password

1. Log in as administrator.



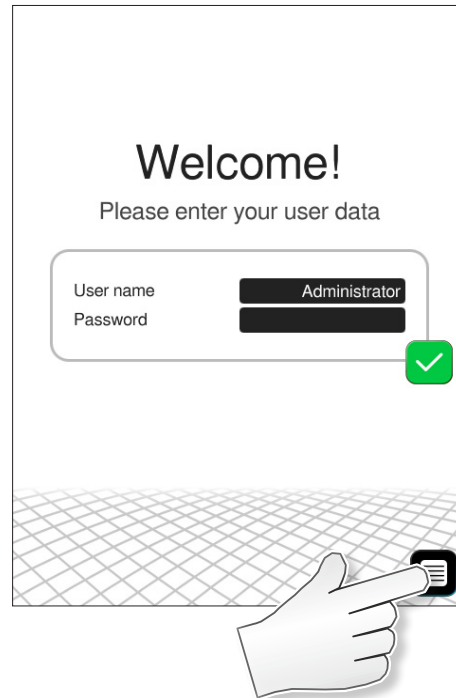
4.7.2 Administrator password

If your password is no longer available, you can assign a new password as an administrator in the login screen.

Resetting the administrator password

Assign new administrator password

1. Turn the controller off and on again.
- 2.



3. Have the license code or license file for your controller ready and proceed as follows: **3.3.1 Via license code** or **3.3.2 Via USB flash drive**

5 SYNCHRO

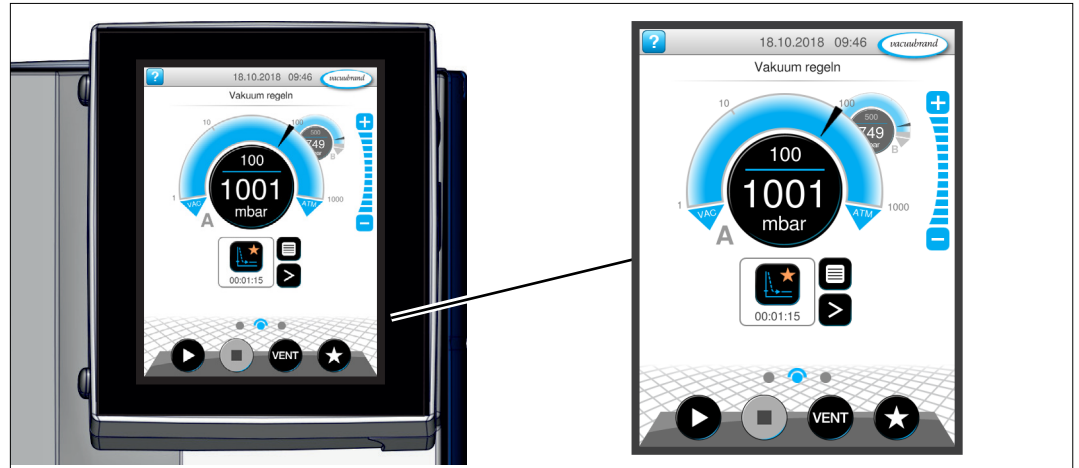
5.1 User interface

Special feature

Two pressure curves are displayed in the process screen, pressure curves **A** and **B**, corresponding to labeling of valves A and B. This enables control of two different applications. The processes will run essentially independently of each other. Operating elements and settings are always active for the selected process.

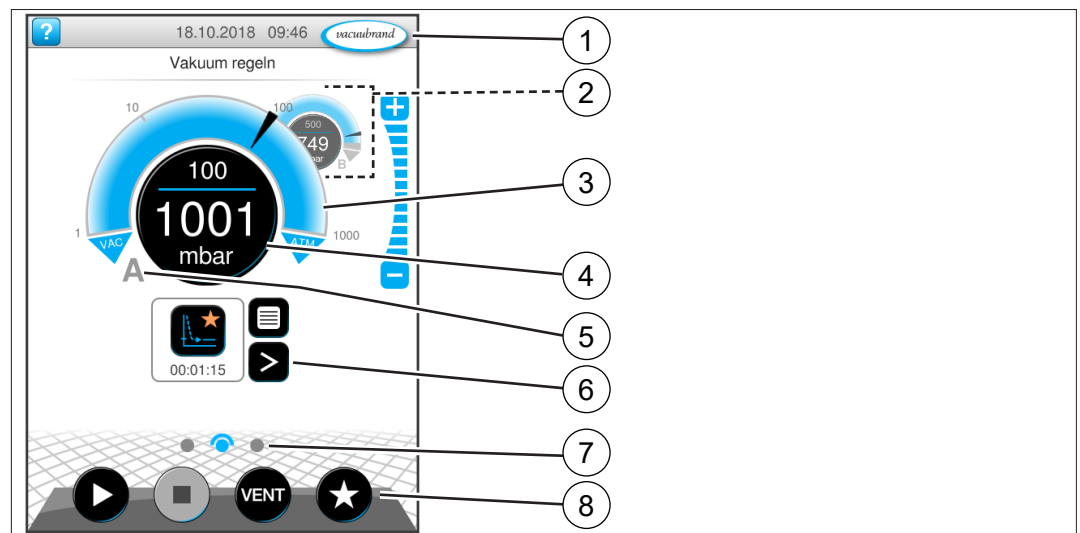
User interface

VACUU-SELECT® with
two process screens



Process screen

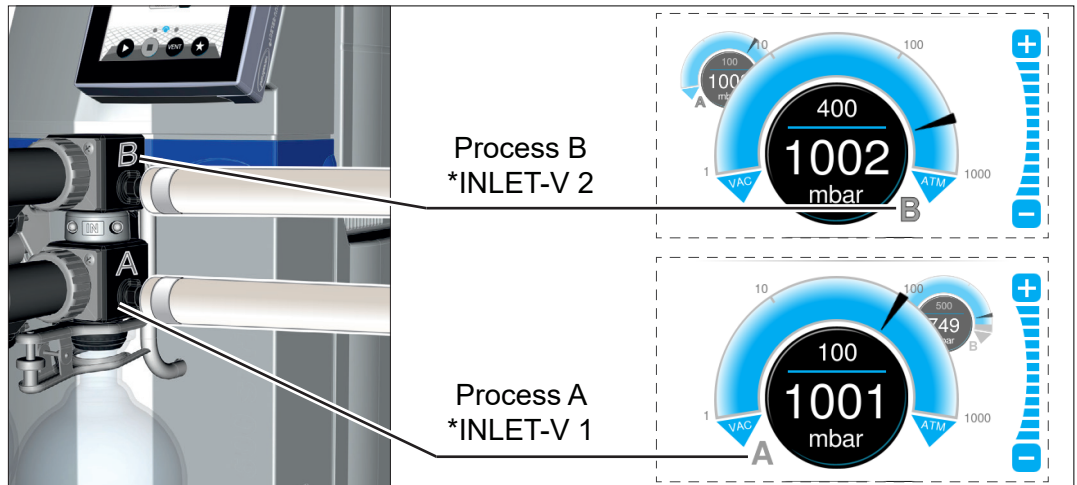
Pressure display for two
electronically controlled
processes A and B



1	Status bar
2	Process screen B – in the background
3	Analogue pressure display – pressure curve
4	Digital pressure display – pressure value (target value, actual value, pressure unit)
5	Process screen A – in the foreground
6	Process screen with context features
7	Screen navigation
8	<i>Operating elements</i> for control

Assignment of the process screen

→ Example
Assignment of process
screen and valves
(view of details)



To avoid operating errors or simultaneous operation of two processes, the process screen can be switched; see:
 ⇒ **Switch the process screen from A to B on page 43 and**
 ⇒ **Switch the process screen from B to A on page 43.**

Alignment *VACUU·BUS addresses

VACUU·BUS addresses
for processes A and B

Certain VACUU·BUS components like vacuum sensors, venting valves, and in-line solenoid valves need to be assigned exclusively to one of the two processes. The alignment takes place automatically according to the assigned address:

Component	VACUU·BUS name	Address no.	
		Process A	Process B
In-line solenoid valve	INLET-V	1, 3	2, 4
Venting valve	VENT-V	1, 3	2, 4
Vacuum sensor, capacitive	VS-C	1, 3	2, 4
Pirani vacuum sensor	VS-P	1, 3	2, 4
Reference sensor	VS-REF	1, 3	2, 4



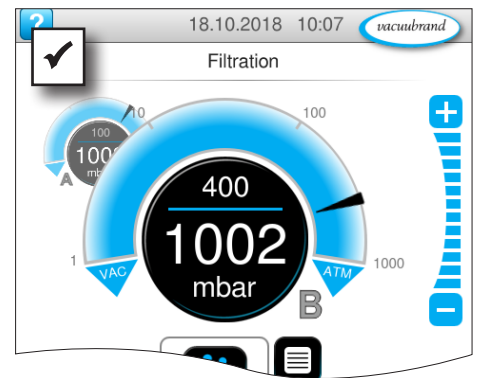
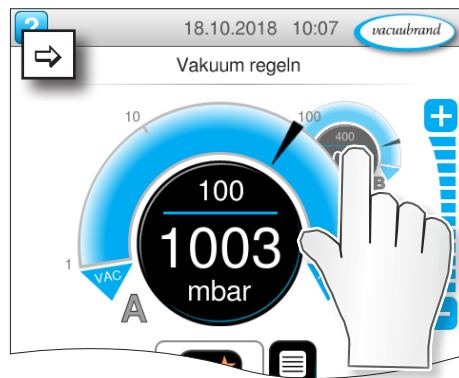
In the event of an error, only the process assigned to that component is stopped, e.g., error on VS-C 1 vacuum sensor → Process A stops → Error message process screen A.

Components not supported: I/O REMOTE, I/O VACUUM (OUT), I/O SPEED (OUT), all VARIO pumps and valve type END-V.

All other VACUU·BUS components are global and are used by both processes, e.g., WATER-V coolant valve.

Switch the process screen from A to B

→ Example
Switch from process A to process B

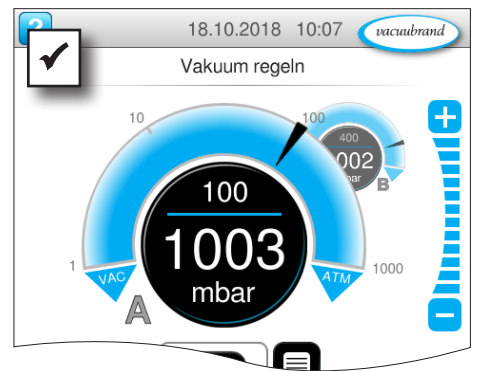
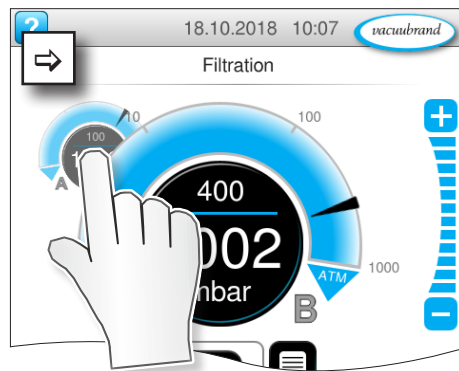


⇒ Tap on rear pressure curve.

- ☒ Process B in front.
- ☒ Operation process B enabled.
- ☒ Operation process A locked.

Switch the process screen from B to A

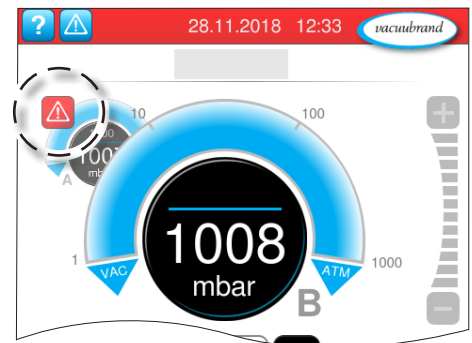
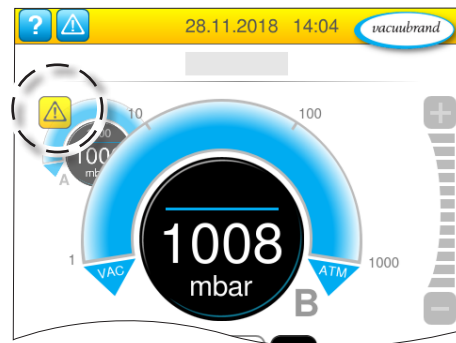
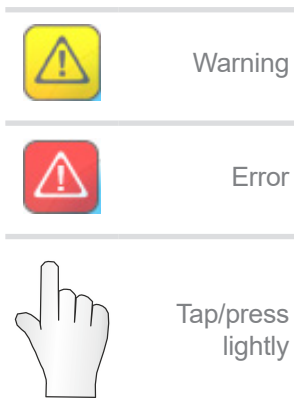
→ Example
Switch from process B to process A



⇒ Tap on rear pressure curve.

- ☒ Process A in front.
- ☒ Operation process A enabled.
- ☒ Operation process B locked.

5.2 Error indication



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.

6 Troubleshooting

6.1 Function Extensions

Problem	► Possible cause	✓ Solution	Personnel
No license file found	► No USB flash drive inserted. ► USB flash drive inserted without a valid license.	✓ Insert a USB flash drive with valid license. IMPORTANT! License files must be saved to the root directory of the USB flash drive and not to a sub-directory.	Operator, specialist

6.2 User Management

Problem	► Possible cause	✓ Solution	Personnel
Login failed	► Password not valid for selected user. ► No password entered or password entered incorrectly.	✓ Choose an appropriate user. ✓ Enter the correct password. ✓ Turn off the controller, restart it and log in.	Administrator, default user
Invalid or incorrect password	► Wrong user password entered. ► Password changed. ► Password no longer available.	✓ Enter the correct user password. ✓ On the login screen, reset the password with the aid of a valid license file. ✓ Assign a new password and store it in a secure location.	Default user, administrator
Functions in the main menu locked	► User authorizations have not been granted for the logged in user.	✓ Use authorized functions. ✓ Consult with the administrator about the functions your users need and have authorization granted for these functions.	Default user, administrator
Controller locked	► Controller was locked by user with the authorization <i>Lock Device</i>. Corresponding user is listed on the lock screen.	✓ Tap on the controller display and enter the password. ✓ Turn off the controller, restart it and log in again.	Default user, administrator

Problem	Possible cause	Solution	Personnel
User Management menu not shown	▶ User Management deactivated. ▶ Function extensions not unlocked. ▶ No valid license found.	✓ Activate menu under Main Menu \ Settings \ Administration \ Function Extensions \ Function Activation (= ON); password entry required. ✓ Unlock function extensions. ✓ Enter the matching license code for your controller or transfer the license file via USB flash drive.	Administrator
Created users or user groups missing	▶ No users or user groups created. ▶ User Management was deactivated in the Function Extensions menu, without exporting User Management beforehand. ▶ Controller was reset to its default settings.	✓ New users and user groups can be created and edited in User Management. ✓ Export and save created users and user groups to a USB flash drive before you deactivate User Management or reset the controller to its default settings.	Administrator
Button or input field grayed out	▶ User input locked.	✓ If use of a function is required, have the administrator grant authorization to use the function. ✓ Change users.	Default user, administrator

6.3 SYNCHRO

Problem	Possible cause	Solution	Personnel
Missing components	▶ Erroneous component configuration. ▶ Missing VACUU·BUS components.	✓ Check component configuration. ✓ Connect missing VACUU·BUS components and run component detection.	Operator, specialist

7 Appendix

Ordering information

Ordering information

Product	Order No.
User Management	20700900
SYNCHRO	20700910

Supply sources

Supply sources

Purchase original accessories and original replacement parts from a branch location of **VACUUBRAND GMBH + CO KG** or from your local specialist shop.

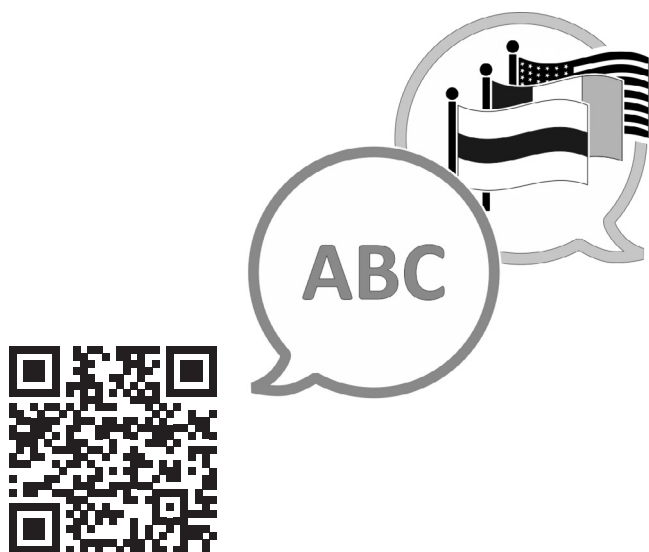


Information on the complete range of products can be found in the current [product catalogue](#).

For orders, questions about vacuum control or optimal accessories, please contact your local specialist shop or the **VACUUBRAND** [sales office](#).

8 Index

A		T	
Acquiring a license	10	Transferring the file	
Action instructions	7	via USB flash drive	15
Action step	7		
Activating function extensions	12		
Adjusting authorization settings	25		
Assigning a new administrator password	40		
Assigning a new user password	39		
B		U	
Buttons in Administration menu	8	Unlocked and locked views	32
Buttons in Function Extensions menu	8	Unlocking with license code	10
Buttons in User Management menu	8	User Management function extension	10
C			
Changing user data	21		
Configuring shared applications	24, 26		
Context menu for Advanced Settings	29		
Context menu for editing a user group	27, 28		
Context menu for User Options	34		
Creating a new user	20		
Creating a new user group	26		
Creating an User Management password	18		
D			
Deleting users	23		
Display of operating steps	7		
Display of recorded process data	33		
E			
Editing authorizations for a user group	27		
Editing user groups	27		
Editing users	21, 22		
Entering a license code	14		
Export User Management	35		
F			
Function extensions	12		
G			
Gestures	6		
Graphical operating steps	7		
I			
Import User Management	36		
Information on data storage	33		
N			
New symbol in the status bar	7		
New user	21		
O			
Opening function extensions	12		
Operating steps	7		
Ordering information	47		
P			
Product description of function extensions	10		
R			
Requesting a license file	13		
Requirements	10		
Resetting the administrator password	40		
Responsibility matrix	9		
S			
Supply sources	47		
Supported software version	10		
Switch the process screen from A to B	43		
Switch the process screen from B to A	43		



[VACUUBRAND > Support > Manuals](#)

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