vacuubrand

Technology for Vacuum Systems

DIGITAL MODULE

Digital-I/O-Module VACUU·BUS®

IN
5 - 75 VDC
5 - 50 VAC

OUT (max.)
60 VDC
40 VAC
2.5 A

vacuubrand ®

VACUUBRAND GMBH + CO KG
Alfred-Zippe-Str. 4 - 97877 Wertheim - Germany
Digital-I/O-Modul VACUU·BUS®
Best.-Nr.: 20636228

Instructions for use

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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:

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

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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

Contents

1 About this document

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 the information in 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 *I/O module* is sometimes used instead of the product name *Digital I/O module*.
- The illustrations in this manual are only intended to facilitate comprehension.
- We reserve the right to make technical changes in the course of continuous product improvement.

Contact

Contact
us

- If your manual is incomplete, you can request a replacement. Alternatively, you can use our download portal: www.vacuubrand.com
- You are welcome to contact us at any time in writing or by telephone if you would like more information, have questions about the product or wish to share feedback with us.
- When contacting our service department, have the name of the product to hand → *see label on the product.*

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.

1.2 Display conventions

Warning notice

Display conventions

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

Symbols

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

General warning symbol.

Danger: electricity.

Additional symbols and icons

Information

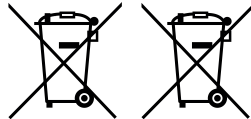✓ Positive example – **Do this!**
Result – **OK**

✗ Negative example –
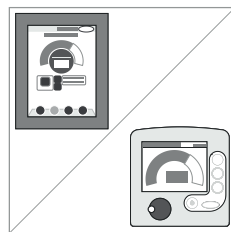**Don't do this!**

▤ Refers to content in this manual.

▥ Refers to content in other supplementary documents.

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

Symbol for VACUUBRAND vacuum controllers and vacuum gauges.

→ *For further symbols, see: Action symbols on page 30*

Prompt to perform a step or take action

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.

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1.3 Abbreviations

Abbreviations

H	Signaling device: beeper, signal indicator
K	Relay, contactor
M	Motor
PLC	Programmable logic controller
Y	Valve

The letters correspond to the equipment marking in an electrical circuit diagram.

1.4 Term definitions

Product-specific terms

... I/O module	The ... I/O module is an interface for use between peripheral devices and *VACUU·BUS*®-enabled vacuum controllers or vacuum gauges. Through connection to an I/O module, peripheral devices such as sensors, valves, data loggers, programmable logic controllers (PLC), etc. can be integrated into the VACUUBRAND *VACUU·BUS*® system as a client. **Digital I/O module operating principle** An input signal is present and comes from the control system, for example, and the output signal acts on an actuator or a process controller. Devices from other manufacturers can be operated together in a control loop with this interface.
DCP 3000	Vacuum gauge
CVC 3000	Vacuum controller, controller, vacuum regulator
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 *VACUU·BUS*® clients to be unambiguously assigned within the bus system, e.g., for connecting multiple sensors within 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, I/O modules, etc.
VACUU·BUS® **configuration**	Using a vacuum controller or vacuum gauge to assign a new *VACUU·BUS*® address to a *VACUU·BUS*® component.

VACUU·SELECT®	Vacuum controller, controller with touchscreen; consisting of operating panel and vacuum sensor.
VACUU·BUS® **connector**	4-pin round connector for the bus system from **VACUUBRAND**.
VARIO® **control**	High precision vacuum control through controlling the speed of *VARIO*® diaphragm pumps or *VARIO*® chemistry diaphragm pumps.

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2 Safety information

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

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

2.1 Intended use

Intended use

The *Digital I/O module* is a digital interface. It has been developed as an accessory for **VACUU·BUS**®-enabled vacuum controllers and vacuum gauges, and is designed for installation in a control panel or control cabinet.

By configuring it with a vacuum controller or vacuum gauge, an I/O module can be assigned a specific function → *see also table: 7.3 Functional overview on page 47*.

The I/O module may only be used indoors in a non-explosive atmosphere. Connection is only permissible for the intended components, using protective extra-low voltage.

Any other use is considered improper use.

2.2 Improper use

Improper use includes:

Improper use

- Using the product contrary to its intended use.
- Operating the product despite obvious errors.
- Connecting inadmissible equipment.
- Operating the product under inadmissible operating and ambient conditions.

2.3 General safety information

2.3.1 Safety precautions

Safety precautions

⇨ Use the device only if you have understood its function and the information in this manual.

⇨ Repairs must only be carried out by the manufacturer's service department or the local distributor.

⇨ 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.

2.3.2 Target group

Personnel and competence

Electric devices may only be assembled and installed by qualified electricians.

Changes to the configuration in the vacuum controller or vacuum gauge may only be carried out by persons authorized by the operator to perform such tasks.

2.4 Disposal

| **NOTE** |
| --- |
| **Incorrect disposal of electronic components can cause environmental pollution.** |
| Used electronic devices 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. |
| ⇨ Correctly dispose of all electronic scrap and electric components at the end of their service life. |
| ⇨ Observe the national regulations regarding disposal and environmental protection. |
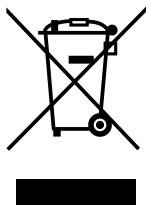
3 Product description

3.1 Product view

Digital I/O module

I/O module
(different views)
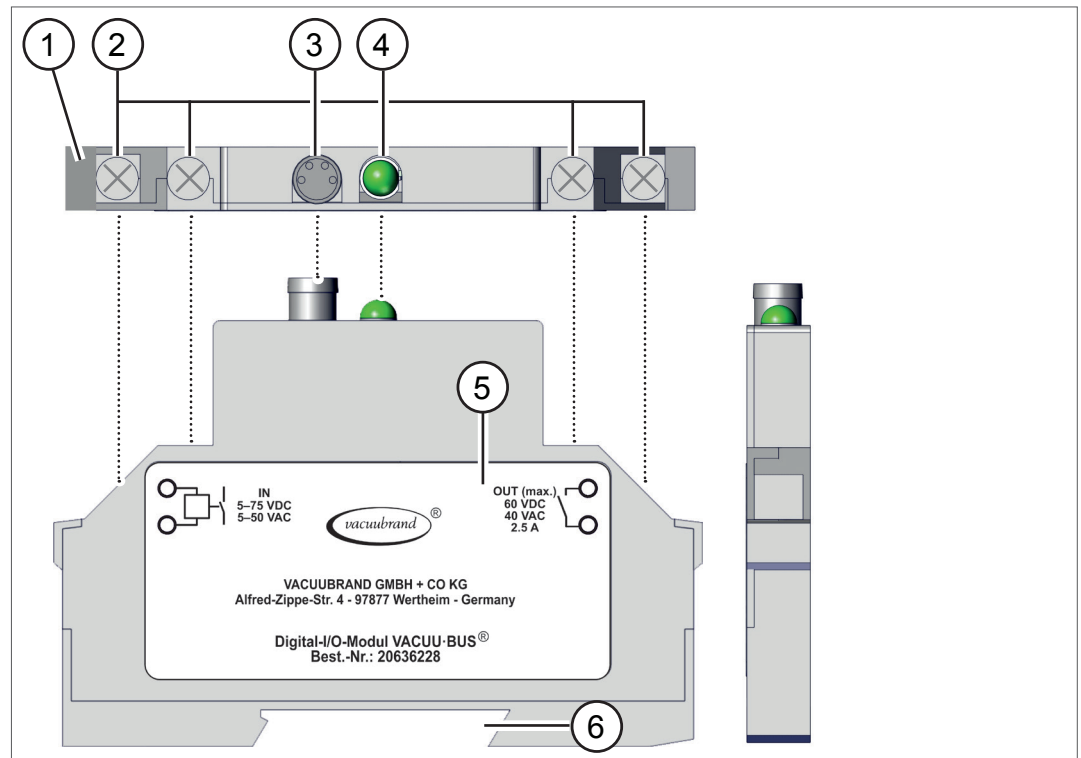
1	*VACUU·BUS*® Digital I/O module
2	Terminals, screw terminals 0.5-2.5 mm^2
	▶ IN: input signal 5-75 VDC/5-50 VAC
	▶ OUT: output signal, max. 60 VDC/40 VAC
3	Connection for *VACUU·BUS*® extension cable
4	LED – status indicator
	▶ Green: operation
	▶ Yellow: internal error or remote info
	▶ Red: error
5	Product label with connection diagram
6	Recess for installation on a mounting rail

3.2 Controller/gauge system requirements

Firmware

Firmware version

VACUUBRAND peripheral devices	from version
VACUU·SELECT vacuum controller	V1.00 /V1.00
Vacuum controller CVC 3000	1.30
Vacuum gauge DCP 3000	1.00

3.3 Operating principle

3.3.1 Digital VACUU·BUS® interface

VACUU·BUS®
interface to
controller/gauge

The digital I/O module is a digital interface for **VACUU·BUS**®-enabled vacuum gauges and controllers.

The input and output take the form of a galvanically isolated switching input and, for the switching output, a potential-free semiconductor relay.

Specification

Functions paired
with address

- With the error function, the digital I/O module can be connected as an error message interface, e.g., to a process control system. The I/O module informs the process control system of errors in the vacuum system and interrupts the process in the event of external errors.

- If configured as a start/stop module with remote control, a process can be started or stopped by a higher-level PLC.

- The digital I/O module can also be configured as a process-stop module with optional opening of a relay or valve at the end of the process.

- As a further functionality, the digital I/O module can be configured so that non-VACUU·BUS®-enabled valves from other manufacturers can also be switched with the controller or gauge.

- Switching points can be defined on the DCP 3000 gauge, which can be used with the digital I/O module to control or monitor high-vacuum pumping units, load locks, etc.

IMPORTANT! An I/O module can only ever assume one function from the specifications listed. A function can be changed by reconfiguring the **VACUU·BUS**®.

⇨ If several functions are needed simultaneously, please use additional I/O modules.

3.3.2 Possible functions of I/O module

If required, an I/O module can be assigned a different function by changing the *VACUU·BUS*® address = component configuration or configuration.

**Addresses and possible functions**

Functions paired with address

Digital I/O module address in the		Function
CVC (DCP)	VACUU·SELECT	
Error	I/O ERROR	Signal at the input or output means OK. No signal at the input or output indicates an error.
Remote	I/O REMOTE	Signal at the input starts control. No signal at the input stops control. Signal at the output shows the status of control; start or stop.
Isol.v. _	INLET-V _	Valve adapter for VACUU·BUS
Waterv. _	WATER-V _	Valve adapter for VACUU·BUS
Vent. V. _	VENT-V _	Valve adapter for VACUU·BUS
End _	END-V _	Signal at end of process switches a relay or a valve, for example.
* SP _	---	Control of a valve when the specified switching point is reached/exceeded.
Only available for DCP 3000		

3.3.3 Error function (delivered condition)

As configured at the factory, the I/O module works as an error message interface, e.g., connected between an external system and a controller or gauge. If the signal is not present at IN, the process is stopped and an error message is issued at OUT.
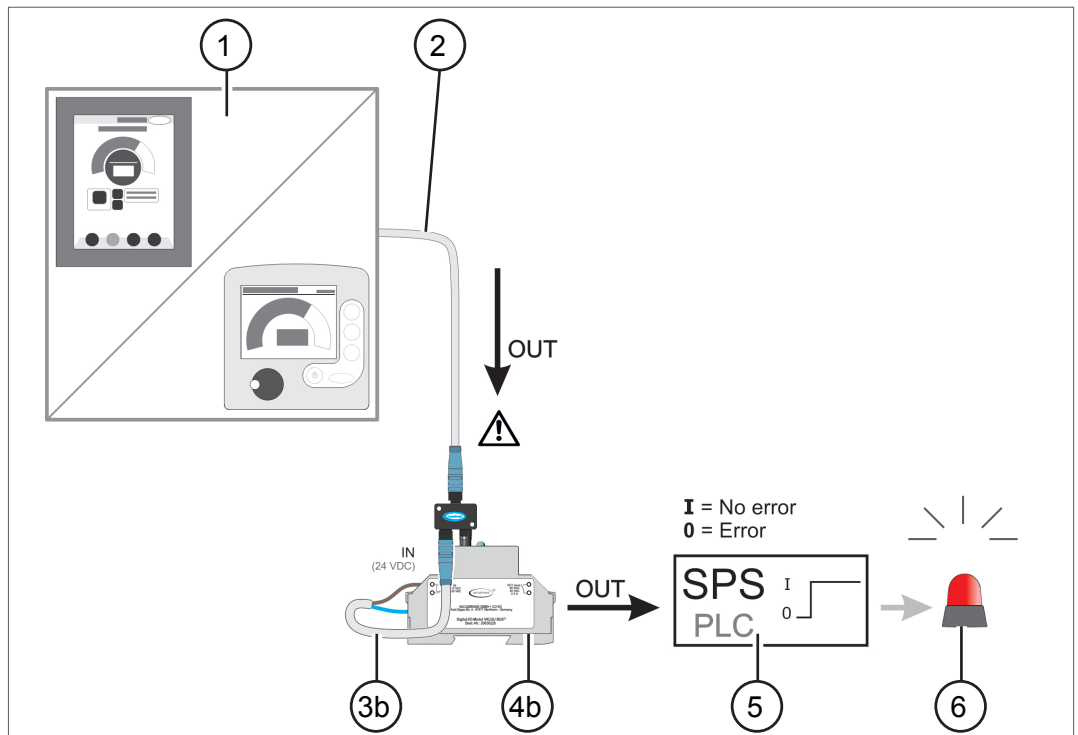
Use the I/O module as an error message interface

→ Example (a)

VACUU·BUS®
address:
VACUU·SELECT
I/O ERROR

CVC/DCP
Error
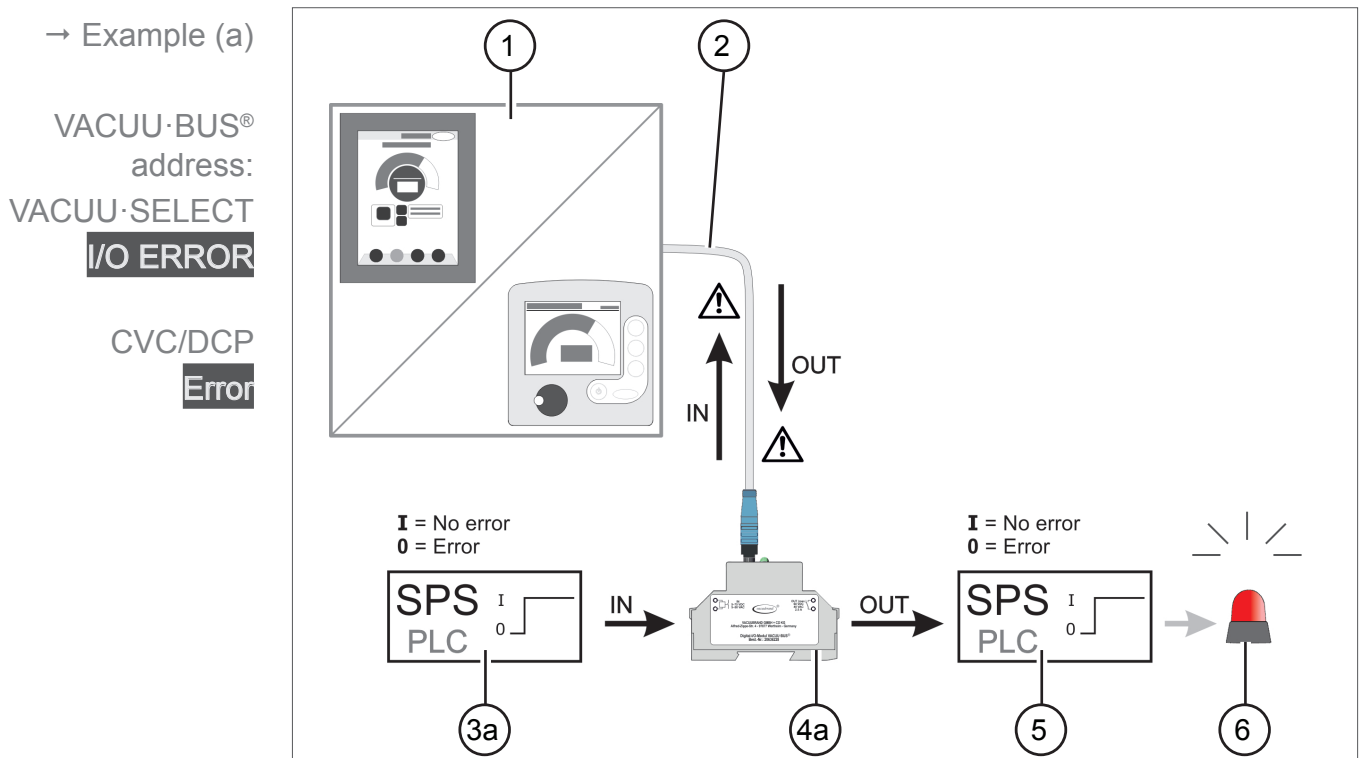
Description	**1**	Vacuum controller or vacuum gauge
		▸ Error message from/to external
		▸ Process stopped in case of error
	2	VACUU·BUS® extension cable
	3a	Signal cable from process controller e.g., PLC – error signal from external
	4a	VACUU·BUS® digital I/O module, address: I/O ERROR / Error
		▸ IN: 1 = no error → operation
		▸ IN: 0 = error → operation stopped
		▸ OUT: 1 = no error → operation
		▸ OUT: 0 = error → operation stopped
	5	Signal cable to process controller e.g., error signal to external PLC
	6	Example: PLC-controlled signal indicator for error message

Use the I/O module as an error message output[1]

Description

1	Vacuum controller or vacuum gauge ▸ Error message to external ▸ Process stopped in case of error
2	VACUU·BUS® extension cable
3b	Power supply via *VACUU·BUS®* 24 VDC (self-powered)
4b	VACUU·BUS® digital I/O module, address: I/O ERROR / Error ▸ IN: 1 = no error → operation ▸ OUT: 1 = no error → operation ▸ OUT: 0 = error → operation stopped
5	Signal cable to process controller e.g., error signal to external PLC
6	Example: PLC-controlled signal indicator for error message

IMPORTANT! Self-powered only with the function I/O ERROR / Error and only if errors are to be issued that are present at the vacuum controller or gauge.

⇨ If necessary, order the required accessories and connect the components without voltage as shown in the diagram → *see also 7.2 Ordering information on page 46*.

1 Self-powered with 24 VDC via *VACUU·BUS* from controller or gauge.

4   Installation and connection

> **NOTE**
>
> **Residual risk due to component failure in the system.**
>
> There is a residual risk of failure with all electronic components. This can leave the device in an undefined state.
>
> ⇨ Always provide a suitable safety measure to bring the equipment or system into a safe state in the event of a failure.

IMPORTANT!   ⇨ The installation and connection may only be carried out by a qualified electrician.

⇨ Establish voltage free conditions before working with power lines.

4.1 Installation

Install the I/O module

Installation
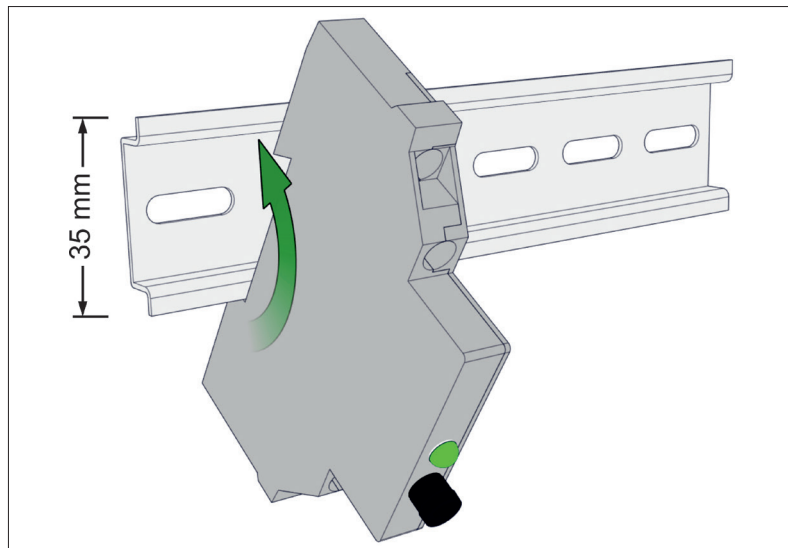
⇨ Clip the I/O module onto a 35 mm mounting rail, e.g., in a control cabinet or a distribution box.

4.2 Connection

IMPORTANT! ⇨ When connecting, take the permitted voltage ranges into account.

Connect the I/O module

Electrical connection

0,5–2,5 mm²

0,5–1,5 mm²

10 mm

⊖ 0 VDC
⊕ 10 VDC
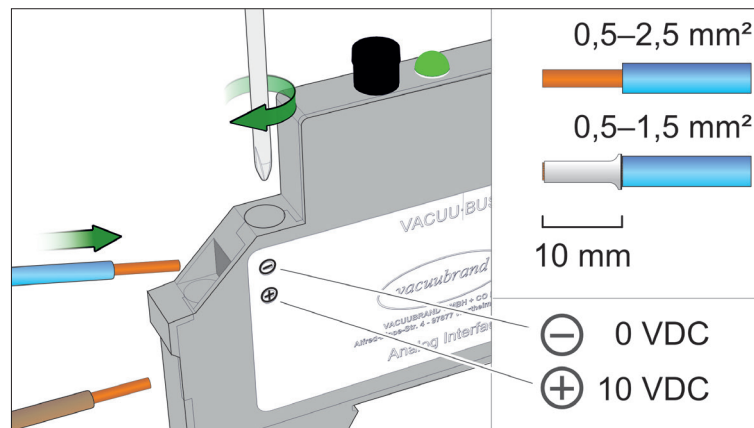
1. Strip the cable ends as depicted.
2. Secure the cable ends in the connection terminals.

Connect the I/O module to the vacuum controller

Connection to
vacuum controller or
vacuum gauge
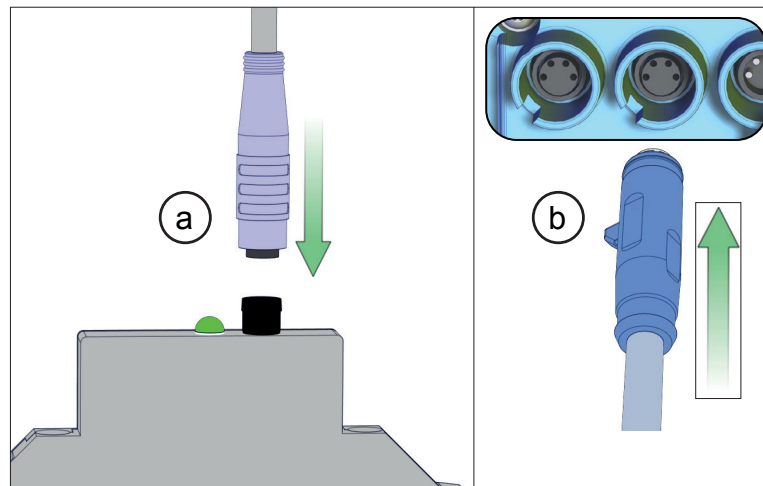
1. Switch off the vacuum controller.

2. Plug the *VACUU·BUS*® extension cable **(a)** into the connection on the I/O module.

3. Plug the other end of the extension cable **(b)** into the *VACUU·BUS*® port on the back of the vacuum controller casing.

4. Switch the vacuum controller on if you want to use the I/O module as an error warning device. No address configuration is required.

5. Only when used with VACUU·SELECT:
    Carry out *component recognition,* as described in chapter: *5.1.3 Configuration with VACUU·SELECT on page 23 to 27* .

    ☑ I/O module ready for operation.

5   Component configuration

Definition
Configuration/
address
configuration

Configuration means assigning a specific address to a *VACUU·BUS*® component, with the help of a vacuum controller or vacuum gauge.

As a *VACUU·BUS*® component, the I/O module has a range of addresses and/or functions available. This means an I/O module can be configured for a particular application by changing the *VACUU·BUS*® address.

Examples

If a different address is selected on the vacuum controller, e.g., VENT-V 2 on the VACUU·SELECT or Vent. V. 2, on the CVC 3000, a non-bus-enabled valve can be connected to OUT as a venting valve. The controller detects that a venting valve is connected. This can be controlled with the VENT button → see also: *7.3 Functional overview on page 47*

> The vacuum controller or vacuum gauge automatically recognizes the new function via the configured address.
>
> New *VACUU·BUS*® address = New function.
>
> Only one address (function) can ever be assigned to an I/O module.
>
> The address is not fixed. It can be adjusted if required, although is isn't designed for continuous changing.
>
> If additional functions are needed simultaneously, use additional I/O modules.

5.1 Configuration addresses

Depending on the type of controller, different approaches and addresses must be observed during configuration.

5.1.1 Address overview

Possible addresses

Overview of possible addresses

VACUU·BUS® address			Connection		Can be configured with	
CVC (DCP)	VACUU·SELECT	Address range, max.	IN	OUT	Controller**	DCP
Error *	I/O ERROR *	1	5-75 VDC / 5-50 VAC	60 VDC / 40 VAC	●	●
Remote	I/O REMOTE	1	5-75 VDC / 5-50 VAC	60 VDC / 40 VAC	●	-
Isol.v. _	INLET-V _	1	-	60 VDC / 40 VAC	●	-
Waterv. _	WATER-V _	1	-	60 VDC / 40 VAC	●	-
Vent. V. _	VENT-V _	1-4	-	60 VDC / 40 VAC	●	-
End _	END-V _	1-2	-	60 VDC / 40 VAC	●	-
SP _	---	1-4	-	60 VDC / 40 VAC	-	●

***** = Delivered condition (configuration ex works)

****** = VACUU·SELECT or CVC 3000

5.1.2 Prepare for configuration

An I/O module can only be assigned one individual new function.

IMPORTANT!
⇨ Switch off the vacuum controller.
⇨ Remove all *VACUU·BUS*® connectors, apart from the power plug.
⇨ Connect only the I/O module for which the address is to be changed.
⇨ If the address is to be changed on several I/O modules, this can only be done one after the other. Allocate the address to each individual I/O module separately.
⇨ It is irrelevant for address configuration whether jumper wires are connected to IN or OUT.

5.1.3 Configuration with VACUU·SELECT

Action symbols

Gesture symbols for touchscreen operation

Touch, tap

Press and hold

Tap and swipe in the indicated direction

Swipe left or right; both possible
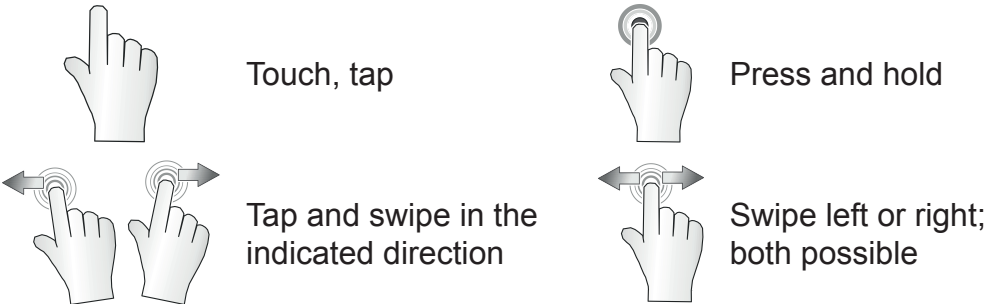
Connect the I/O module
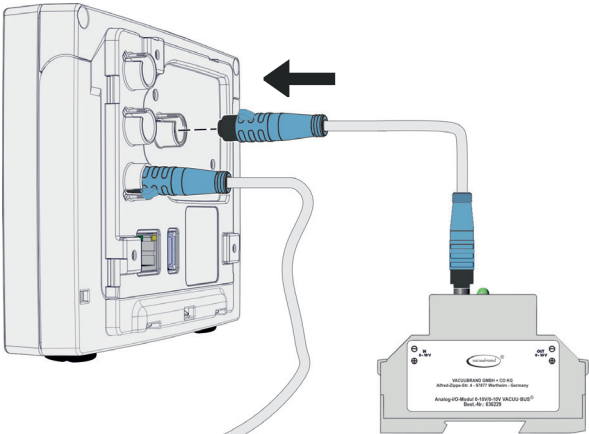
Switch on the VACUU·SELECT
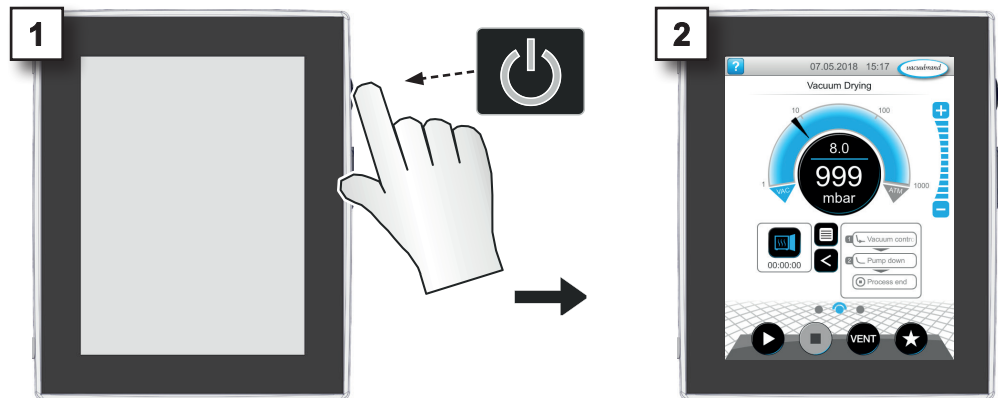
1. Briefly press the ON/OFF button on the controller.

   ☑ Device boots up

2. Confirm the *Data storage* info pop up.

   ☑ The process screen is shown

Call up the VACUU·BUS submenu

Menu path   *Process screen/Main menu/Settings/Administration/VACUU·BUS*

→ Example
Configuration with
VACUU·SELECT
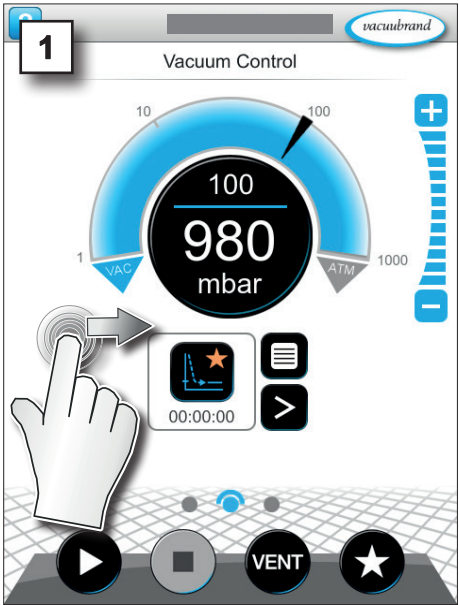
1. Swipe right on the display.
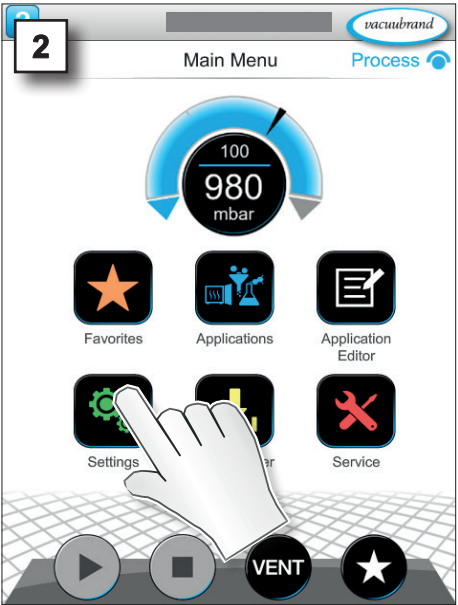
2. Tap on *Settings*.

3. Tap on *Administration*.

4. Tap on *VACUU·BUS*.

→ Example
Configuration with
VACUU·SELECT
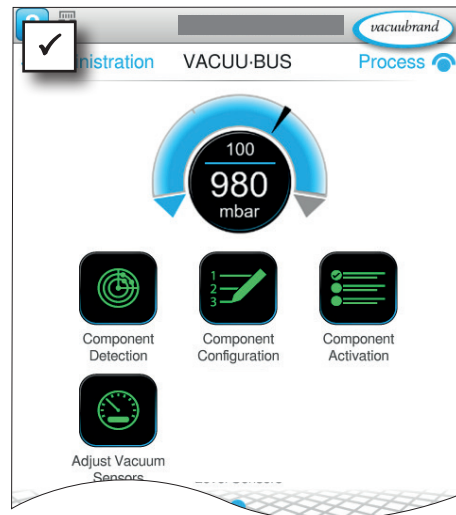
☑ *VACUU·BUS* submenu

Scan and recognize a VACUU·BUS component

How to configure an address in the VACUU·SELECT
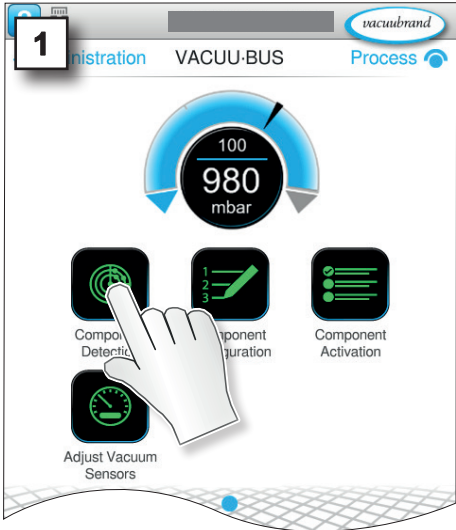
1. Tap on *Component recognition*.
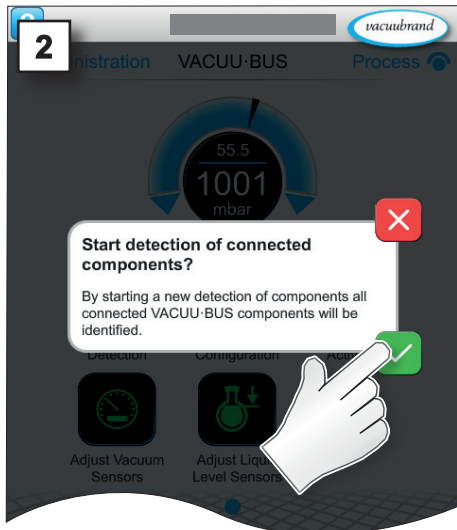
2. Tap on the tick icon.
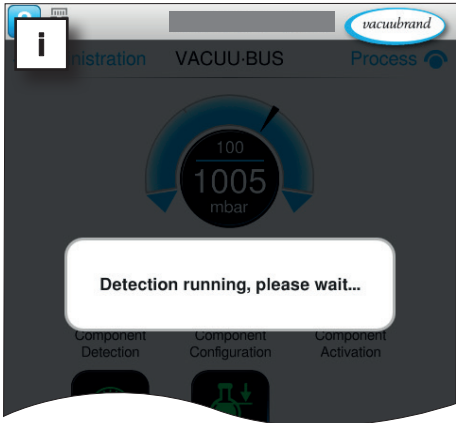
⇨ Feedback message.
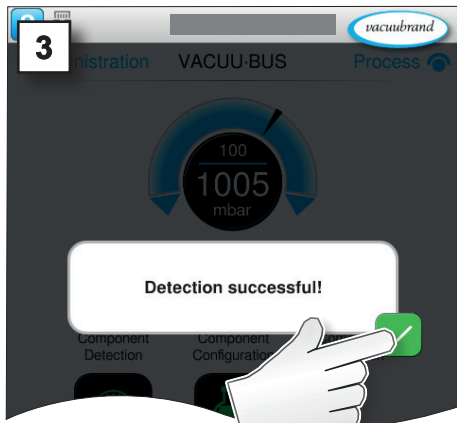
3. Tap on the tick icon.
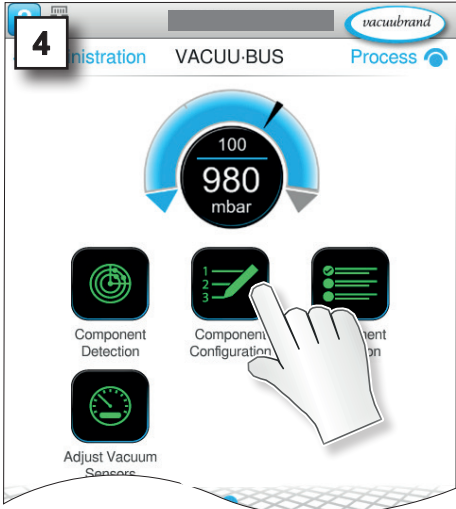
4. Tap on *Component configuration*.
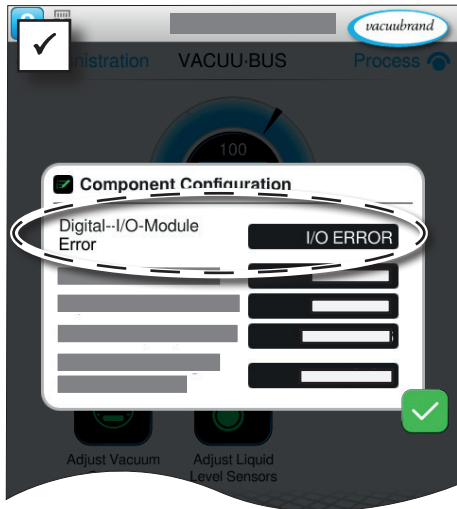
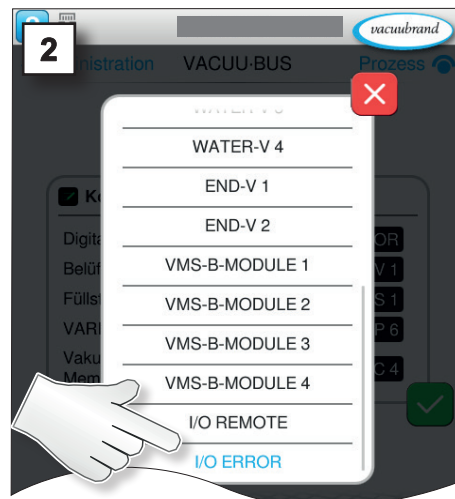☑ I/O module is listed under *Component configuration*.

Component configuration

Reconfigure the I/O module

→ Example
Assign new address
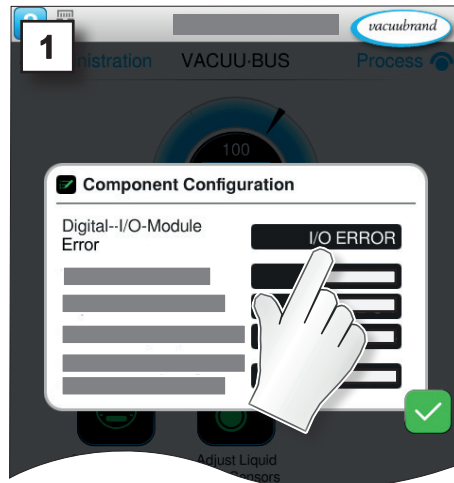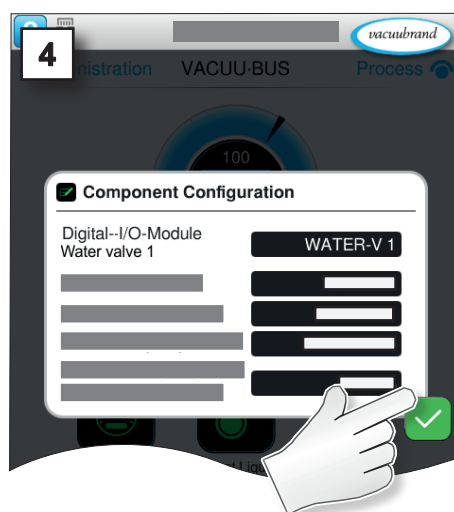
1. Tap on black text field.
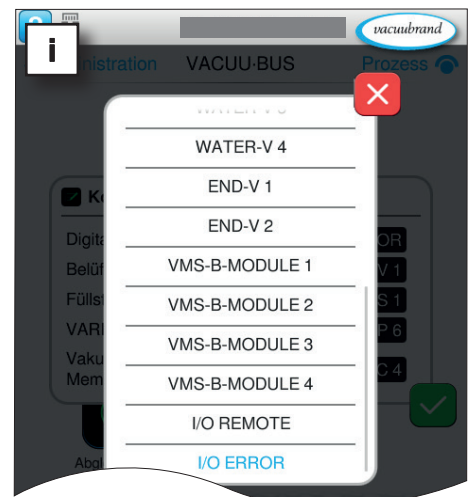
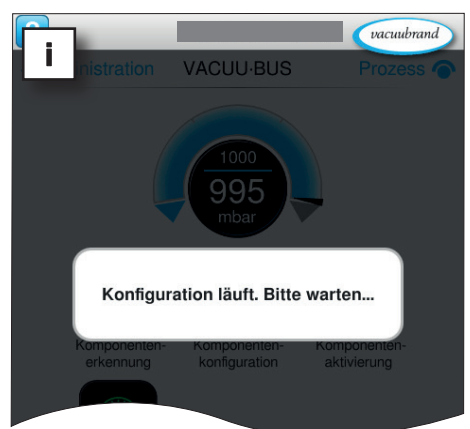⇨ List of possible VACUU·BUS addresses is shown.

2. Scroll through the list.
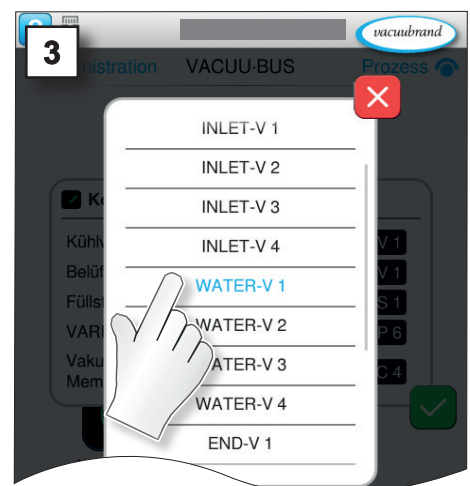
3. Select required VACUU·BUS address and tap on it.

4. Tap on the tick icon.

⇨ Feedback message.

5. Tap on the tick icon.

6. Tap on the logo = back to process screen.

☑ New *VACUU·BUS*® address for the I/O module = WATER-V 1

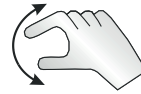☑ External valve can be used as a coolant valve in the VACUU·BUS system.

  Component configuration

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5.1.4 Configuration with CVC 3000

Action symbols

Gesture symbols for CVC operation

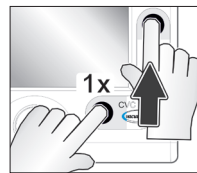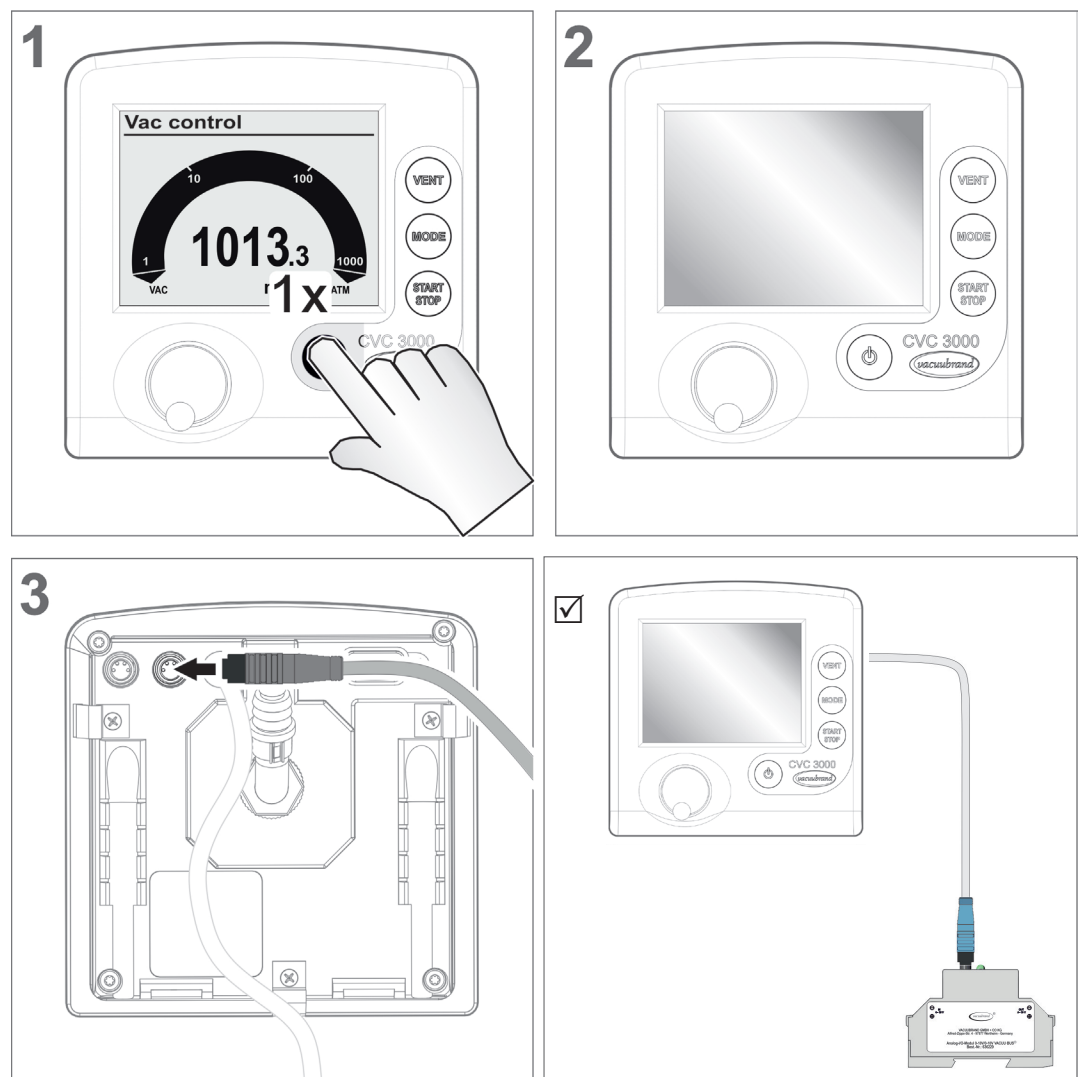 **Press** key or rotary button.

 Turn rotary button.

 * **Press and hold** key.

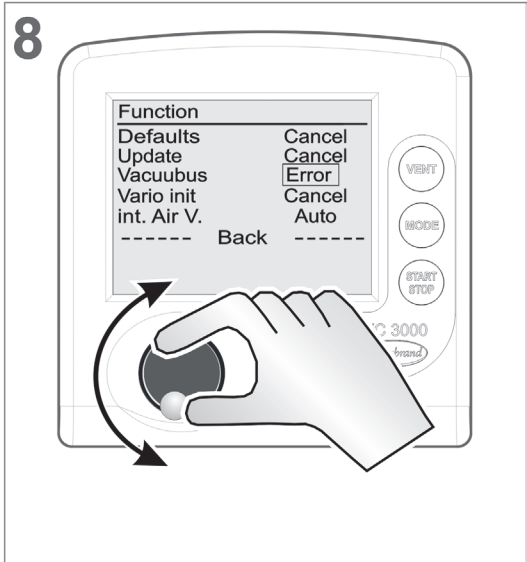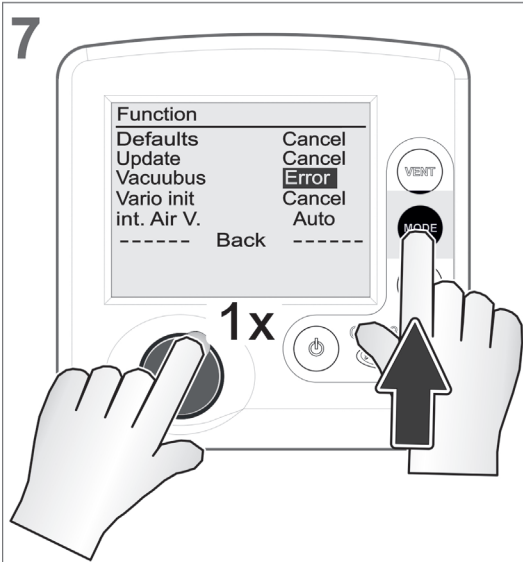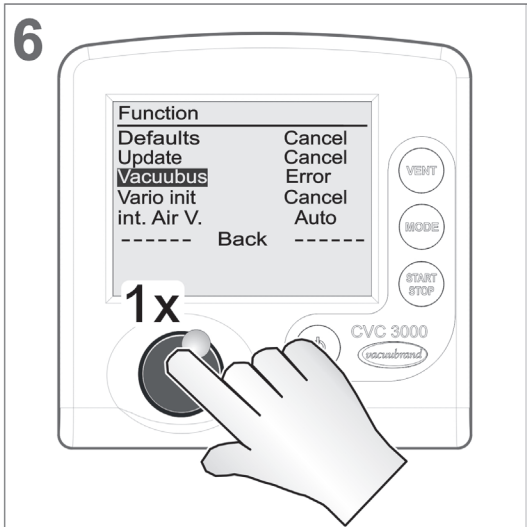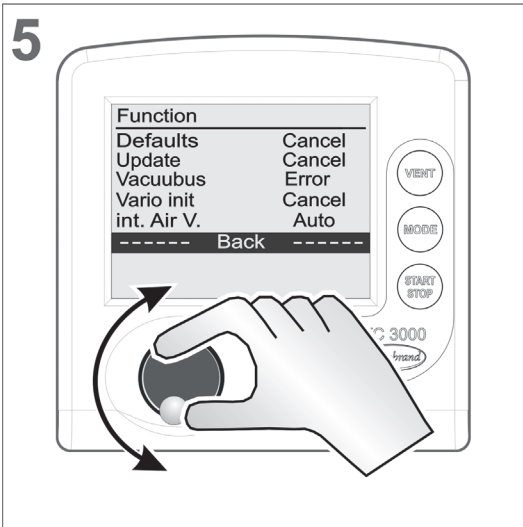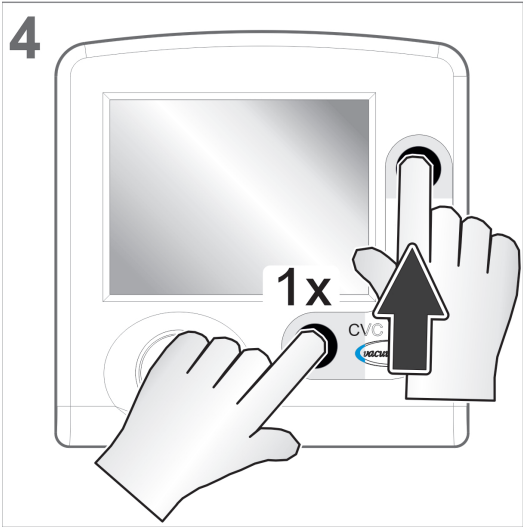 **Press and turn** rotary button.

* If shown like this in the diagram: First press and hold the key that needs to be held, and only then briefly press the combination key.

Configuration with CVC 3000

How to configure an address in the CVC 3000

→ Example
Configuration with
CVC 3000

4

1x

5

Function
Defaults   Cancel
Update   Cancel
Vacuubus   Error
Vario init   Cancel
int. Air V.   Auto
------ Back ------

VENT
MODE
START STOP

CVC 3000
vacuubrand

6

Function
Defaults   Cancel
Update   Cancel
Vacuubus   Error
Vario init   Cancel
int. Air V.   Auto
------ Back ------

VENT
MODE
START STOP

1x

CVC 3000
vacuubrand

7

Function
Defaults   Cancel
Update   Cancel
Vacuubus   Error
Vario init   Cancel
int. Air V.   Auto
------ Back ------

VENT
MODE
START STOP

1x

8

Function
Defaults   Cancel
Update   Cancel
Vacuubus   Error
Vario init   Cancel
int. Air V.   Auto
------ Back ------

VENT
MODE
START STOP

CVC 3000
vacuubrand

☑ New *VACUU·BUS*® address for the I/O module =
Remote

5.2 Explanation of assigned function
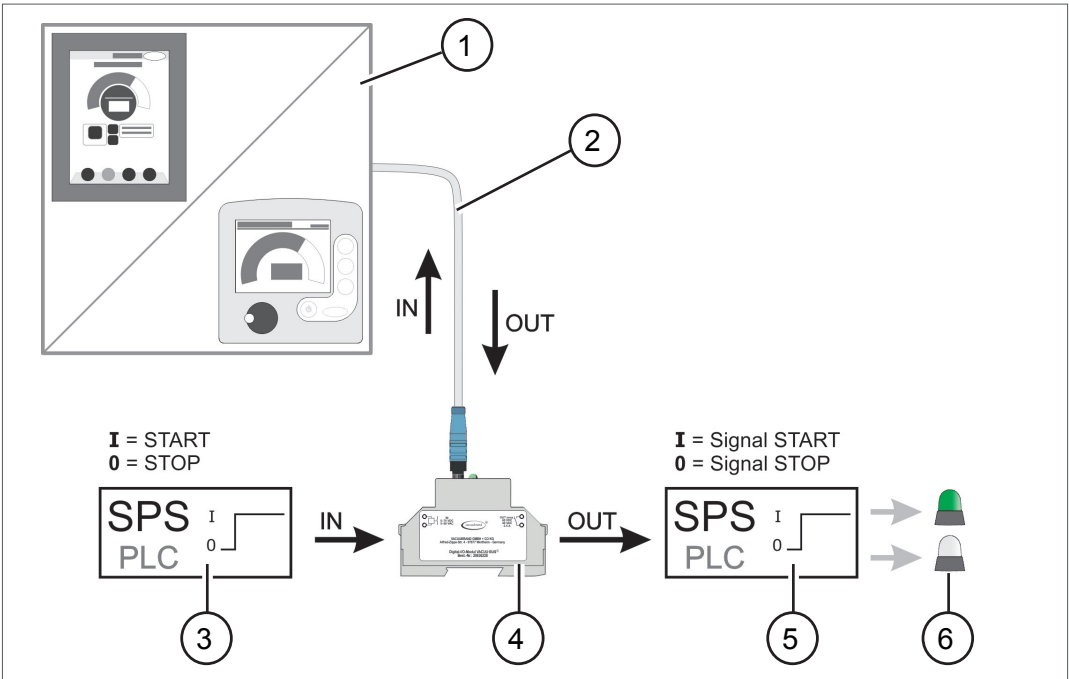
5.2.1 Remote (start/stop from external)

Vacuum control can be started and stopped by a signal at the input of the I/O module. The output contact shows the status of control. Control is stopped if no voltage signal is present at the input.

External remote control

→ Example

VACUU·BUS®
address:
VACUU·SELECT
I/O REMOTE

CVC
Remote

Description

| 1	Vacuum controller ▸ Signals for starting/stopping the process from external
2	VACUU·BUS® extension cable
3	Signals for starting/stopping the process from external, e.g., external ON/OFF switch starts the process; if the switch is turned off, the process stops
4	VACUU·BUS® digital I/O module ▸ IN: 1 = start → operation ▸ IN: 0 = stop → operation stopped ▸ OUT: 1 = start → signal indicator on ▸ OUT: 0 = stop → signal indicator off
5	Option: signal cable to process controller, e.g., PLC and signal indicator for start/stop message
6	Example: indicator light shows the signal for operation or stop.

IMPORTANT!   The vacuum controller (slave) starts and stops according to an external controller (master). The START/STOP button on the vacuum controller is locked – control parameters can still be modified.

5.2.2 End (stop at end of process)

Only the output is connected to the I/O module. For example, a valve or relay can be connected to the output and opened when the process ends. A separate power supply is required for the connected equipment.

Stop at end of process

→ Example

VACUU·BUS® address:
VACUU·SELECT
END-V _

CVC
End
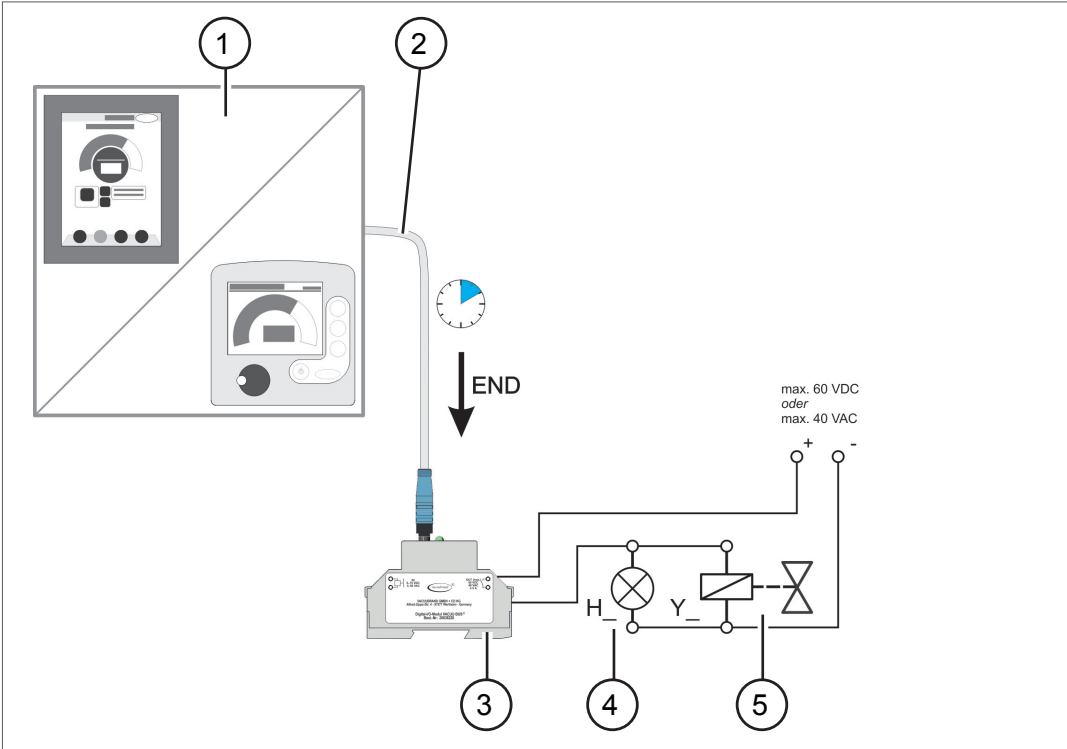
Description

1	Vacuum controller ▸ Process ended after preset time*
2	VACUU·BUS® extension cable
3	VACUU·BUS® digital I/O module ▸ OUT: 0 = switching contact open 　→ controller in operation → indicator light off → valve closed ▸ OUT: 1 = switching contact closed 　→ controller stopped → indicator light on → valve open
4	Signal cable to indicator light (H_) and valve (Y_)
5	Example: signal at process stop with an external coolant valve switched at the same time.

** The process can also be stopped manually using the vacuum controller.*

5.2.3 VACUU·BUS® adapter

With the right address,[1] the I/O module can be used as a *VACUU·BUS®* adapter for a non-bus-enabled valve, e.g., in-line solenoid valve, venting valve, coolant valve. A valve is connected to the output and, if necessary, switched via the I/O module. A separate power supply is required for the connected valve.

Use an external valve as an in-line solenoid valve

→ Example

VACUU·BUS®
address:
VACUU·SELECT
INLET-V _

CVC
Isol.v. _
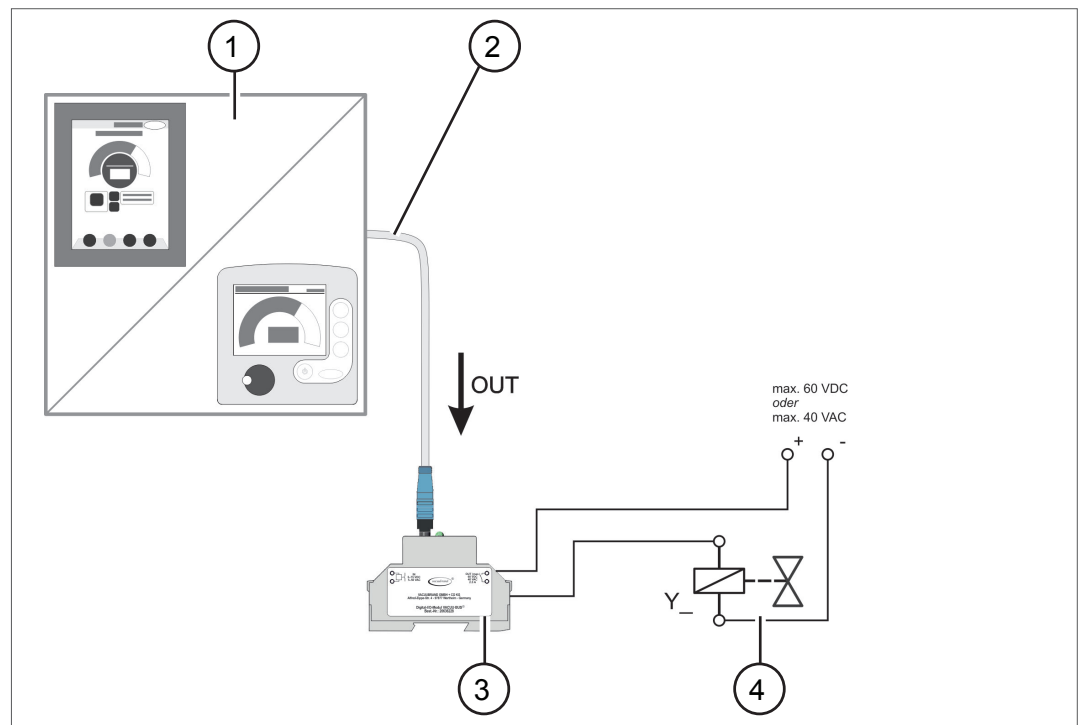
Description

1	Vacuum controller
2	VACUU·BUS® extension cable
3	VACUU·BUS® digital I/O module
4	Signal cable to valve (Y_), e.g., as an in-line solenoid valve for vacuum control

---

1   Addresses for valves → see chapter: **"Functional overview" on page 47**

5.2.4 Switching points – SP (DCP 3000 only)

With the right address[2] and as a *VACUU·BUS®* adapter with a *DCP 3000*, switching points can be defined for a valve. The valve is connected to OUT and switched via the I/O module when the switching point values are reached. A separate power supply is required for the connected valve.

Use an external valve with switching points

→ Example

VACUU·BUS®
address:
DCP 3000

SP_
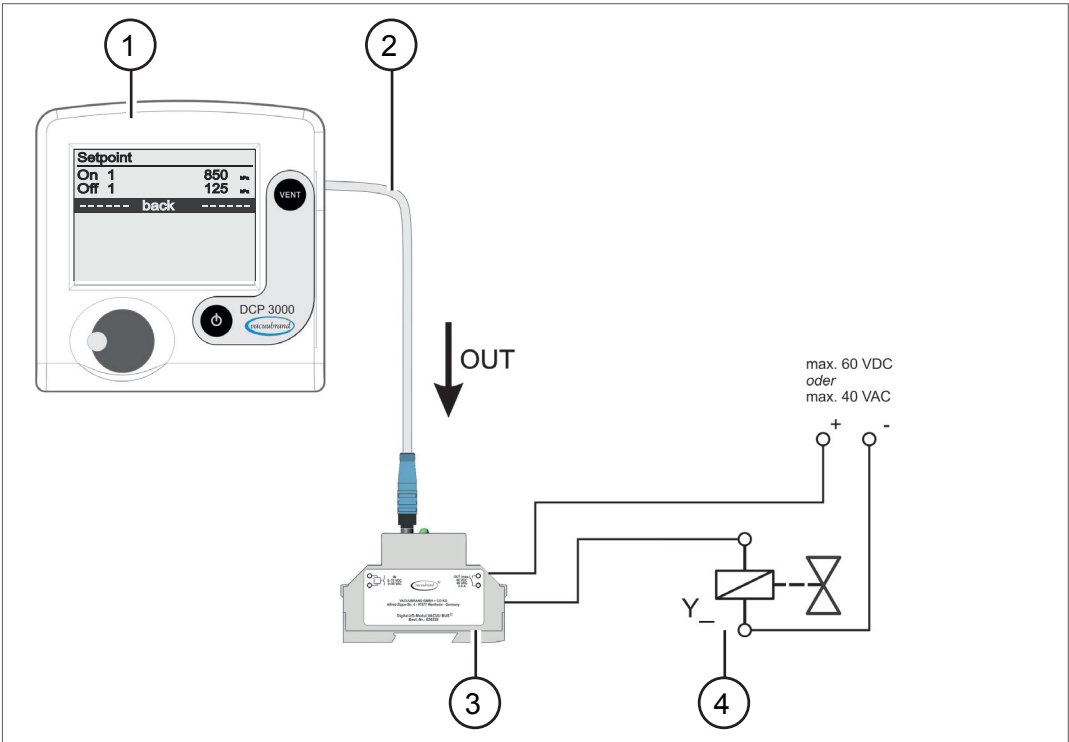
Description

1	DCP 3000
	▸ Switching point menu (VSK_/Configuration/Switching point .../Switching point)
2	VACUU·BUS® extension cable
3	VACUU·BUS® digital I/O module
4	Signal cable to valve (Y_), e.g., in-line solenoid valve which is opened when the pressure setting is reached and closed when it is exceeded (hysteresis).

---

2   *Addresses for switching point valves → see chapter: **7.3 Functional overview** on page 47*

6 Status and error signals

6.1 LED signals

The LED on the I/O module indicates the operating status. After switching on the controller or gauge, the connected peripheral devices are checked. During these checks, the LED on the I/O module lights up very briefly to show the actual status.

Meaning of the LED signals

LED status display

LED	Status	Description
Green	On	▶ No error ▶ No error message ▶ Input signal OK ▶ Output contact closed

LED	Status	Description
Yellow	On	▶ Internal error, received via *VACUU·BUS*: valve, VARIO pump, sensor error ▶ Input signal OK ▶ Output contact open ▶ Remote address: voltage is applied to IN before the CVC 3000 is switched on.

LED	Status	Description
Red	On	▶ External error: error in the customer's application ▶ Input signal OFF or outside the required voltage range ▶ Output contact open

LED	Status	Description
All	Off	No communication with digital I/O module in the *VACUU·BUS* (controller or gauge switched off, power interrupted, plug not inserted correctly, etc.)

6.2 Error

IMPORTANT! Opening or altering the component is not permitted. Repairs may only be carried out by the manufacturer.

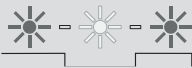### Steps to take in the event of an error

Errors: what to do

⇨ In the event of damage or recognizable malfunction, immediately take the I/O module out of operation.

⇨ Never repair the I/O module yourself. Replace it with an equivalent I/O module.

Technical support[1]

Technical support

For technical assistance or in the event of an error, please contact our [Service Department](#).

Error messages on the CVC 3000

Icon flashing		Error and meaning	Signal sound* for acoustic alert
			On
⚠	+ ⊠	▸ Venting valve	2x)))
⚠	+ ⊠	▸ In-line solenoid valve	3x)))
⚠	+ ⌇	▸ Coolant valve	4x)))
	⚠	▸ Error warning device (digital I/O module)	9x)))
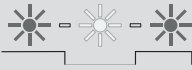
* Except in Remote configuration.
If faulty, control is stopped and the warning triangle flashes.

Error messages on the VACUU·SELECT

Error messages in the VACUU·SELECT are shown in plain text. Please read the associated manual.

Error messages on the DCP 3000

Icon flashing	Error and meaning	Signal sound* *for acoustic alert* On
⚠ + ⧖	▸ Venting valve	2x)))
⚠	▸ Error warning device (digital I/O module)	5x)))

* Except in Remote configuration.
If faulty, control is stopped and the warning triangle flashes.

Error remedy

Error	▸ Possible cause	✓ Remedy
Digital I/O module	▸ Plug pulled out ▸ Plug-in connection loose ▸ VACUU·BUS cable defective ▸ I/O module defective ▸ I/O module permanently removed	✓ Check the plug-in connection and cable ✓ Replace defective components ✓ CVC 3000/DCP 3000: Load factory settings if I/O module was permanently removed **CAUTION!** Save stored programs prior to loading the factory settings ✓ VACUU·SELECT: carry out component detection
	▸ An error has occurred in the system, I/O ERROR / Error configuration.	✓ Eliminate external error in the system ✓ Error reset by pressing the START/STOP or ON/OFF button
	▸ Voltage is applied to IN before the controller is switched on, I/O REMOTE / Remote configuration.	✓ Switch off the voltage to the external system ✓ Switch on the controller

6.3 FAQ – Frequently asked questions

FAQ **Does a reset to factory settings on the vacuum controller (or vacuum gauge) also reset the address in the I/O module?**

No, the factory settings have no influence on the address in the I/O module.

What does *VACUU·BUS* configuration mean?

Assigning a different function to the I/O module by changing the *VACUU·BUS*® address.

How many simultaneous functions does an I/O module have?

An I/O module always only has one function, which was assigned to it through configuration.

How can I use multiple functions in parallel?

Use multiple I/O modules, each with the relevant required function, e.g., error + 2x valve adapters = 3x digital I/O modules.

How many I/O modules can I connect?

You can connect as many I/O modules as there are free suitable addresses in the vacuum controller (or vacuum gauge). For example, the "Error" address allows the connection of 1 digital I/O module as a fault message contact; for connecting valves, up to 4 addresses per valve type are available.

Can the vacuum controller (or vacuum gauge) be switched on while I connect an I/O module?

CVC 3000/DCP 3000: No, the device should be switched off while an I/O module is being connected.
VACUU·SELECT: Yes, the device can be switched on.

Is it necessary for address configuration to disconnect the IN/OUT 0-10 VDC connections from the I/O module?

No, these can remain connected to the I/O module, i.e., voltage can be present.

Will the I/O module function if it is directly connected to a plug-in power supply?

No, the I/O module only functions with a vacuum controller (or vacuum gauge) with VACUU·BUS support.

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FAQ **Is it necessary for address configuration to unplug other VACUU·BUS® components from the vacuum controller (or vacuum gauge)?**

Yes, as the device shows the preset address in the relevant menu, which facilitates the configuration of the I/O module.

How do I reset an error message on the vacuum controller (or vacuum gauge) that was triggered by an I/O module?

Check the plug-in connection. If that is in good working order, the I/O module could be defective. In this event, stop using the defective I/O module and replace it.

How do I reset an error message on the vacuum controller (or vacuum gauge) if an I/O module has been permanently removed?

Reset the CVC 3000 to the factory settings.
Carry out component recognition on the VACUU·SELECT.

Do both sides IN/OUT have to be connected?

Depending on the configuration and the preset function, it may be that only IN or only OUT are connected, or both.

What can I do if the function isn't implemented or the I/O module isn't recognized?

Briefly switch the CVC 3000 (or DCP 3000) off and then back on, so that the scan for the VACUU·BUS clients is carried out once more. The function should then be recognized.
Carry out component recognition on the VACUU·SELECT.

Can voltage be applied to IN on the I/O module with the "Remote" address before the vacuum controller is switched on?

No, voltage must not be applied before the vacuum controller is switched on, otherwise vacuum control does not start and the LED lights up yellow.
Remedy: switch off vacuum controller → switch off voltage to IN → switch on vacuum controller → switch on voltage to IN

7 Appendix

7.1 Technical information

Product designation
Digital-I/O-module *VACUU·BUS®*

7.1.1 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. operating altitude	3000 m above sea level	9840 ft above sea level
Relative humidity	30-85 %, non-condensing	
Prevent condensation or contamination from dust, liquids or corrosive gases		

Electrical data	
Input voltage IN; max. (galvanically isolated)	5-75 VDC 5-50 VAC
Input impedance	1-16 kOhm
Switching voltage OUT	60 VDC 40 VAC
Switching current; max.	2.5 A
Output (galvanically isolated)	Potential-free semiconductor relay
Power consumption, max.	5 mA
Power supply via VACUU·BUS®	24 VDC
Protection class	IP 20
Interface	VACUU·BUS®
Status display	LED red/yellow/green

Housing data	
Housing material	PC GF, light gray
Housing fastening	Snap fastening on top hat rail EN 50 022
Outside dimensions	8.8 x 89 x 58 mm
Number of terminals	4 terminal screws (plus minus)
Min. connection cross-section	0.5 mm^2
Max. connection cross-section	2x 2.5 mm^2, solid 2x 1.5 mm^2, wire with sleeve

7.1.2 Product label

General product label

Description Product label

Input signal/IN	IN 5–75 VDC 5–50 VAC
Output signal/OUT	OUT (max.) 60 VDC 40 VAC 2.5 A
Manufacturer/address	VACUUBRAND GMBH + CO KG Alfred-Zippe-Str. 4 - 97877 Wertheim - Germany
Product type/Order N°	Digital-I/O-Modul VACUU·BUS® Best.-Nr.: 20636228
VACUU·BUS supported	
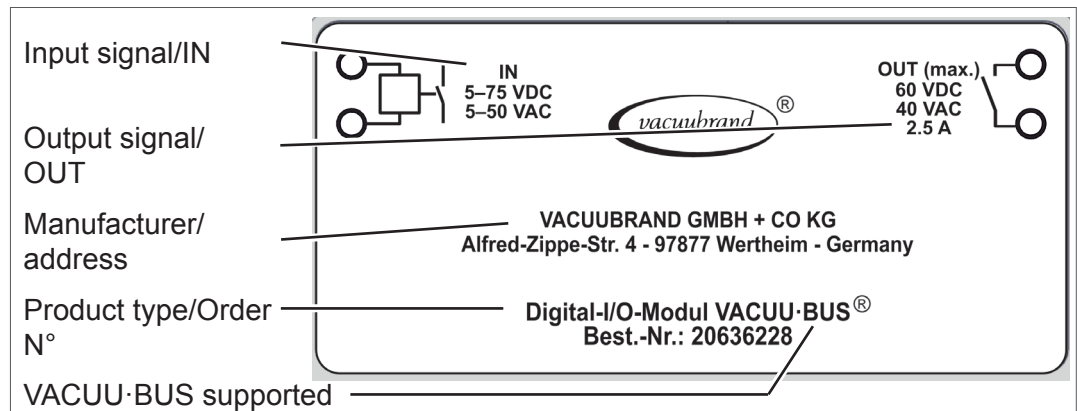
ℹ️ When contacting our service department, provide the product type together with a short error description.
This will allow us to provide you with specific support and advice for your device.

7.2 Ordering information

Ordering information

I/O module	Order no.
VACUU·BUS® digital I/O module 0-10 V/0-10 V	20636228
VACUU·BUS® extension cable, 2 m	20612552
Instructions for use	20901252

Option
24 VDC to IN
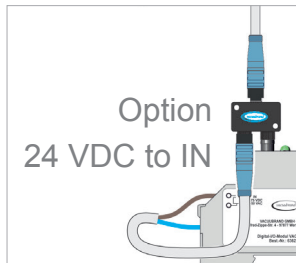
Alternative power supply to IN	Order no.
1 *VACUU·BUS*® 24 V signal cable with plug and open wires (brown = 24 VDC, blue = GND), l = 22 cm	**20612842**
2 *VACUU·BUS*® Y adapter	**20636656**

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.

7.3 Functional overview

A digital I/O module can only ever be assigned one function.

Digital I/O module address			Signals		VACUU·SELECT, CVC 3000 modes	DCP 3000
CVC (DCP)	VACUU·SELECT	Description	IN	OUT		
Error	I/O ERROR	Signal at the input or output means OK. No signal at the input or output indicates an error.	5-75 VDC / 5-50 VAC	60 VDC / 40 VAC, max. 2.5 A	●	●
Remote	I/O REMOTE	Signal at the input starts control. No signal at the input stops control. Signal at the output shows the status of control; start or stop.	5-75 VDC / 5-50 VAC	60 VDC / 40 VAC, max. 2.5 A	●	●
End_	END-V_	Signal at end of process switches a relay or a valve, for example.	---	60 VDC / 40 VAC, max. 2.5 A	●	---
Isol.v._	INLET-V_	Valve adapter for VACUU·BUS	---	60 VDC / 40 VAC, max. 2.5 A	●	---
Waterv._	WATER-V_	Valve adapter for VACUU·BUS	---	60 VDC / 40 VAC, max. 2.5 A	●	---
Vent. V._	VENT_	Valve adapter for VACUU·BUS	---	60 VDC / 40 VAC, max. 2.5 A	●	---
SP_	---	Switching point (hysteresis); control of a valve when the specified switching point is reached/exceeded.	---	60 VDC / 40 VAC, max. 2.5 A	●	●

7.4 Index

7.5 Declaration of Conformity 符合性声明 – China RoHS 2

VACUUBRAND GMBH + CO KG has made reasonable efforts to ensure that hazardous materials and substances may not be used in its products.

In order to determine the concentration of hazardous substances in all homogeneous materials of the subassemblies, a "Product Conformity Assessment" (PCA) procedure was performed. As defined in GB/T 26572 the "Maximum Concentration Value" limits (MCV) apply to these restricted substances:

- Lead (Pb):   0.1%
- Mercury (Hg):   0.1%
- Cadmium (Cd):   0.01%
- Hexavalent chromium (Cr(+VI)):   0.1%
- Polybrominated biphenlys (PBB):   0.1%
- Polybrominated diphenyl ether (PBDE):   0.1%

Environmentally Friendly Use Period (EFUP)

EFUP defines the period in years during which the hazardous substances contained in electrical and electronic products will not leak or mutate under normal operating conditions. During normal use by the user such electrical and electronic products will not result in serious environmental pollution, cause serious bodily injury or damage to the user's assets.

The Environmentally Friendly Use Period for VACUUBRAND products is 40 years.

此表格是按照SJ/T 11364-2014中规定所制定的。
This table is created according to SJ/T 11364-2014.

MATERIAL CONTENT DECLARATION FOR VACUUBRAND PRODUCTS							
	有毒有害物质或元素 Hazardous substances						
部件名称 Part name	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr(+VI)	多溴联苯 PBB	多溴二苯醚 PBDE	环保期限标识 EFUP
包装 Packaging	O	O	O	O	O	O	
塑料外壳 / 组件 Plastic housing / parts	O	O	O	O	O	O	
真空油 Vacuum oil	O	O	O	O	O	O	
电池 Battery	O	O	O	O	O	O	
玻璃 Glass	X	O	O	O	O	O	
电子电气组件 Electrical and electronic parts	X	O	O	O	O	O	
控制器 / 测量设备 Controller / measuring device	X	O	O	O	O	O	
金属外壳 / 组件 Metal housing / parts	X	O	O	O	O	O	
电机 Motor	X	O	O	O	O	O	
配件 Accessories	X	O	O	O	O	O	

Declaration of Conformity – China RoHS 2   **V4_April 2020**

Copyright 2020

注释： 此表格适用于所有产品。以上列出的元件或组件不一定都属于所附产品的组成。
Note: Table applies to all products. Some of the components or parts listed above may not be part of the enclosed product.

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。
O: Indicates that the above mentioned hazardous substance contained in all homogeneous materials of the part is below the required limit as defined in GB/T 26572.

X: 表示该有毒有害物质至少在该部件某一均质材料中的含量超出GB/T 26572规定的限量要求。
X: Indicates that the above mentioned hazardous substance contained in at least one of the homogeneous materials of this part is above the required limit as defined in GB/T 26572.

除上表所示信息外，还需声明的是，这些部件并非是有意用铅（Pb）、 汞 （Hg）、铬（Cd）、六价铬（Cr(+VI)）、多溴联苯（PBB）或多溴二苯醚（PBDE）来制造的。
Apart from the disclosures in the above table, the subassemblies are not intentionally manufactured or formulated with lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium (Cr+VI), polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE).

Products manufactured by VACUUBRAND may enter into further devices (e.g., rotary evaporator) or can be used together with other appliances (e.g., usage as booster pumps).
With these products and appliances in particular, please note the EFUP labeled on these products.
VACUUBRAND will not take responsibility for the EFUP of those products and appliances.

Place, date: Wertheim, 06/04/2020

....
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i.A. ....
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vacuubrand

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