vacuubrand

Technology for Vacuum Systems

Instructions for use

VNC 2 (E)
VNC 2 VARIO (E)

Vacuum Controller

LAB Online Exhibition

Operation Manual

knowledge

Action movie

www.1788lab.com E-mail:info@1788lab.com

Dear customer,

Your VACUUBRAND vacuum controller shall support you at your work for a long time without any trouble and with full load output. Thanks to our large practical experience we attained much information how you could add to an efficient application and to personal safety. Please read these instructions for use prior to the initial start-up of your controller.
VACUUBRAND vacuum controllers are the result of many years of experience in construction and practical operation of these vacuum controllers combined with the latest results in material and manufacturing technology.

Our quality maxim is the ”zero fault principle”:

Every delivered vacuum controller is tested extensively including an endurance run. Due to this endurance run, also faults, which occur rarely, are reported an can be corrected. Every single vacuum controller is tested on achievement of the specification after the endurance run.

Every VACUUBRAND controller leaving our factory achieves the specification. We feel obliged to this high quality standard.

We are aware that the controller should not draw a part of the real work and we hope to contribute with our products to an effective and troublefree realisation of your work.

Yours
VACUUBRAND GMBH + CO KG

After sales service: Contact your local dealer or call (++49) 9342/808-193.

Contents

DANGER ➨ Danger! Immediate danger. Death or severe injuries as well as damage to equipment and environment can occur.

WARNING ☞ Warning! Possible danger. Severe injuries as well as damage to equipment and environment can occur.

CAUTION • Caution! Possible danger. Slight injuries as well as damage to equipment and environment can occur.

NOTICE Note. Disregarding of notes may cause damage to the product.

Isolate equipment from mains.

Safety information

General information

NOTICE

Read and comply with this manual before installing or operating the equipment.
To operate the vacuum controller, valves and/or vacuum pumps are necessary. Otherwise the controller acts as measuring device.
The vacuum controller **VNC 2 VARIO E** operates only a VACUUBRAND VARIO NT pump.
Remove all packing material, remove the product from its packing-box, remove the protective covers and keep, inspect the equipment.
If the equipment is damaged, notify the supplier and the carrier in writing within three days; state the item number of the product together with the order number and the supplier's invoice number. Retain all packing material for inspection.
Do not use the equipment if it is damaged.
If the equipment is not used immediately, replace the protective covers. Store the equipment in suitable conditions.

⚠ DANGER

Use the equipment for the intended use only, e. i. for measurement and control of vacuum.

- ➨ Operate the controller only in combination with genuine VACUUBRANDaccessories (e.g. isolation valve, vacuum management module VMS A). Make sure that the individual components are only connected, combined and operated according to their design and as indicated in the instructions for use.
- ➨ Comply with notes on correct vacuum and electrical connections, see section "Use and operation".
- ➨ The controller is designed for an **ambient temperature** of +10°C to +40°C at continuous operation. If installing the device into a cabinet or a housing check the maximum temperature. Ensure that the maximum permitted gas temperature at the pressure transducer (see "Technical data") is not exceeded.

Connecting the controller

⚠ CAUTION

- The VNC 2 is equipped with a **short circuit proof wide range power supply** with an integrated overload protection.
- Check that mains voltage and current conform with the equipment (see rating plate).

⚠ WARNING

- ☞ Comply with **max. permitted gas and ambient temperature** and make sure ventilation is adequate if the equipment is installed in a housing or if the ambient temperature is elevated.
- ☞ Avoid high heat supply (e. g. due to hot process gases).
- ☞ In case of residues, aggressive or condensable media install a gas washing bottle if necessary.
- ☞ Connect hoses at the pressure transducer gas tight.

⚠ DANGER

- ➨ **Comply with max. permitted pressure** at the pressure transducer, see section "Technical data".
- ➨ **Avoid uncontrolled overpressure** (e. g. when connecting to a locked or blocked tube system). **Risk of bursting.**

NOTICE

Position device and vacuum connection lines so that condensate can not flow towards the pressure transducer.
Use inert gas for venting if necessary.
Ensure stability of the hose connection. Comply with all relevant **safety requirements.**

NOTICE

When the controller is brought from cold environment into a warm room for operation **bedewing** may occur. Allow the device to acclimatise.

Comply with **national safety regulations and safety requirements** concerning the use of vacuum and electrical equipment. Comply with all **applicable and relevant safety requirements** (regulations and guidelines), **implement the required actions and adopt suitable safety measures**.

Ambient conditions

NOTICE

To the best of our knowledge the equipment is in compliance with the requirements of the applicable **EC-directives** and harmonized standards with regard to design, type and model, especially directive IEC 1010 (DIN EN 61010.1). This directive gives in detail conditions under which the equipment can be operated safely (see also IP degree of protection).
Adopt suitable measures in case of differences, like using the equipment outdoors, installation in altitudes of more than 1000 m above mean sea level, conductive pollution or dewiness.

Operating conditions

⚠ DANGER

➨ The devices have no approval for operation in or measurement at explosive atmospheres.

NOTICE

Ensure that the materials of the wetted parts are compatible with the substances in the vacuum system, see section “Technical data”.

Safety during operation

⚠WARNING

☞ Adopt suitable measures to prevent the release of dangerous, explosive, corrosive or polluting fluids, gases or vapours.
☞ Prevent any part of the human body from coming in contact with the vacuum.

⚠ DANGER

➨ Max. permitted pressure at the vacuum connection: 1.5 bar (absolute).
The display shows ”`p fault`” and the controller bleeps four times.
➨ **Immediate pressure relief necessary! Risk of bursting!**
➨ **Attention:** If the pressure is higher than 1100 mbar the pressure reading becomes incorrect (saturation of the pressure transducer). The display flashes.

⚠CAUTION

- Use only **genuine spare parts and accessories.** Otherwise safety and performance of the equipment as well as the electromagnetic compatibility of the equipment might be reduced.
  Possibly the CE mark or the C/US conformity (see rating plate) becomes void if not using genuine spare parts.

NOTICE

Electronic equipment is never 100% fail-safe. This may lead to an ill-defined status of the equipment or of other connected devices. Provide protective measures against malfunction and failure. Ensure that in case of failure the controller and the vacuum system always will turn into a safe status.

⚠WARNING

☞ **Attention:** If **Auto-Start** is preselected, a running process restarts immediately after a power failure without pressing any further key. It is the user’s responsibility to ensure that no dangerous status of the system due to the automatic start-up can occur and to provide appropriate safety measures. If necessary, the user has to check **prior to using the equipment** whether the option ”Auto-Start” is enabled.

Maintenance and repair

CAUTION

Before starting maintenance isolate the vacuum controller from the vacuum system and the electrical supply.
Wait two minutes after isolating the equipment from mains to allow the capacitors to discharge.

- **Attention:** Due to the operation the device might be contaminated by harmful or dangerous substances, clean or decontaminate prior to maintenance.

Before starting **maintenance** vent the system, isolate the vacuum controller from the vacuum system.

NOTICE

Ensure that maintenance is done only by suitably trained and supervised technicians.
Interior components of the controller can only be repaired at the factory.
In order to comply with law (occupational, health and safety regulations, safety at work law and regulations for environmental protection) vacuum pumps, components and measuring instruments returned to the manufacturer can be repaired only when certain procedures (see section **"Notes on return to the factory"**) are followed.

Technical data

Controller	VNC 2 (E)	VNC 2 VARIO (E) (to be connected to VACUUBRAND NT VARIO pumps or pumping units)
Pressure transducer	capacitive absolute pressure transducer made of aluminium oxide ceramic	
Display	lighted alphanumerical LCD display, 2 x 8 characters	
Pressure units / scale (to be switched between)	mbar, Torr or hPa	
Measurement range (absolute)	1100 mbar - 1 mbar (825 Torr - 1 Torr)	
Max. range of pressure control (absolute)*	1060 mbar - 1 mbar (795 Torr - 1Torr)	
Uncertainty (with transducer carefully calibrated and at constant temperature)	<+/-1 mbar (0,75 Torr) +/-1 digit	
Temperature coefficient	<+/- 0,07 mbar/K (0,05 Torr/K)	
Permitted ambient temperature at operation	+10°C to +40°C	
Permitted ambient temperature at storage	-10°C to +70°C	
Permitted relative atmospheric moisture during operation (no condensation)	30% to 85%	
Max. permitted range of voltage supply	100 V~ (-10%) to 230 V~ (+10%) 50/60 Hz	24V DC +/- 10% (VACUU•BUS)
Fuse (IEC connection)	5x20 mm, T 8 A / 250 V	
Power draw (no-load operation)	3 VA	2 VA
Power draw with VACUUBRAND VV 6C - isolation valve and coolant valve	max. 10 VA (without switch output)	-
Breaking capacity of diode socket voltage supply 110-230 V 50/60 Hz voltage supply 100-110 V 50/60 Hz designed for the simultaneous operation (parallel connection) with the following original accessories	 24 V, max. 400 mA 24 V, max. 340 mA isolation valve VV 6C coolant valve 24 V= venting valve VBM-B 24 V=	-
Breaking capacity of IEC socket** ambient temperature 30°C ambient temperature 40°C	7.2(4) A 250 V~, 7.2(7.2) A 125 V~ 6(4) A 250 V~, 6(6) A 125 V~	
Degree of protection according to IEC 529	IP 20	IP 20 (rear side) IP 54 (front side)
Vacuum connection	hose nozzle for vacuum hoses with 6 - 10 mm I.D. or hose connection for hose 10/8	hose connection for hose 10/8

* The actual available range of the vacuum control can be limited due to the ultimate vacuum of the pump, the developed amount of gas, etc.
** ohm resistive (inductive) load

We reserve the right for technical modifications without prior notice!

Controller	VNC 2 (E)	VNC 2 VARIO (E) (to be connected to VACUUBRAND NT VARIO pumps or pumping units)
Max. permitted pressure at pressure transducer (absolute)	1.5 bar (1125 Torr)	
Max. permitted temperature of gaseous media at pressure transducer	for short periods up to 80°C	
Serial interface	RS 232 C	
Weight	0.8 kg	1.0 kg
Dimensions (without hose nozzle) LxWxH	163 mm x 90 mm x 68 mm	163 mm x x90 mm x 66 mm
Installation depth (behind rear of front panel)	-	60 mm
Stand rod	thread M8	-
Mains supply housing version	integrated IEC combination	IEC plug / bush at cable 2m

Components	Wetted parts
Vacuum connection / hose nozzle	PP
Pressure transducer housing	PPS / GF
Seals	chemically resistant fluoroelastomer
Pressure transducer	aluminium oxide ceramic

We reserve the right for technical modifications without prior notice!

➨ The VACUUBRAND controllers VNC 2 and VNC 2 VARIO (E) can only be operated with components compatible to VACUUBRAND **VACUU•BUS system**, see accessories.

VNC 2 VARIO (E)
The power supply of the VNC 2 VARIO (E) occurs via the VACUU•BUS connection (24V DC) from the integrated power pack of the NT VARIO pumps and pumping units.
The on/off switch at the front side separates only the connection from IEC socket and plug. Therefore a connected VACUUBRAND NT VARIO pump or pumping unit can be operated and switched on and off from the VNC 2 VARIO (E).
Permitted voltage and current at the IEC plug: See rating plate of the NT VARIO pump or pumping unit.

Description

NOTICE

After the connection of components the controller can be operated in different basic modes, see "**Basic modes and menu structure".**
The vacuum controller **VNC 2 VARIO (E)** operates only a VACUUBRAND NT VARIO pump.
When switching on the controller, the current basic mode and the **number of version** are displayed for 2s.

Display and keys

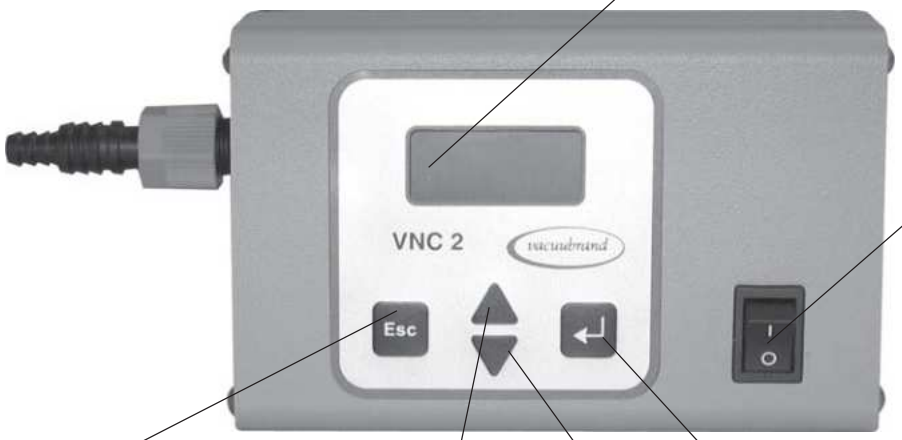
Display

In menus
line1: caption
line 2: menu item

In submenus (only setting of RS 232C)
line 1: menu item (RS 232)
line 2: submenu

After selection of menu item
line 1: menu item (or submenu)
line 2: value to be set

In program
line 1: pressure
line 2: status message



mains switch

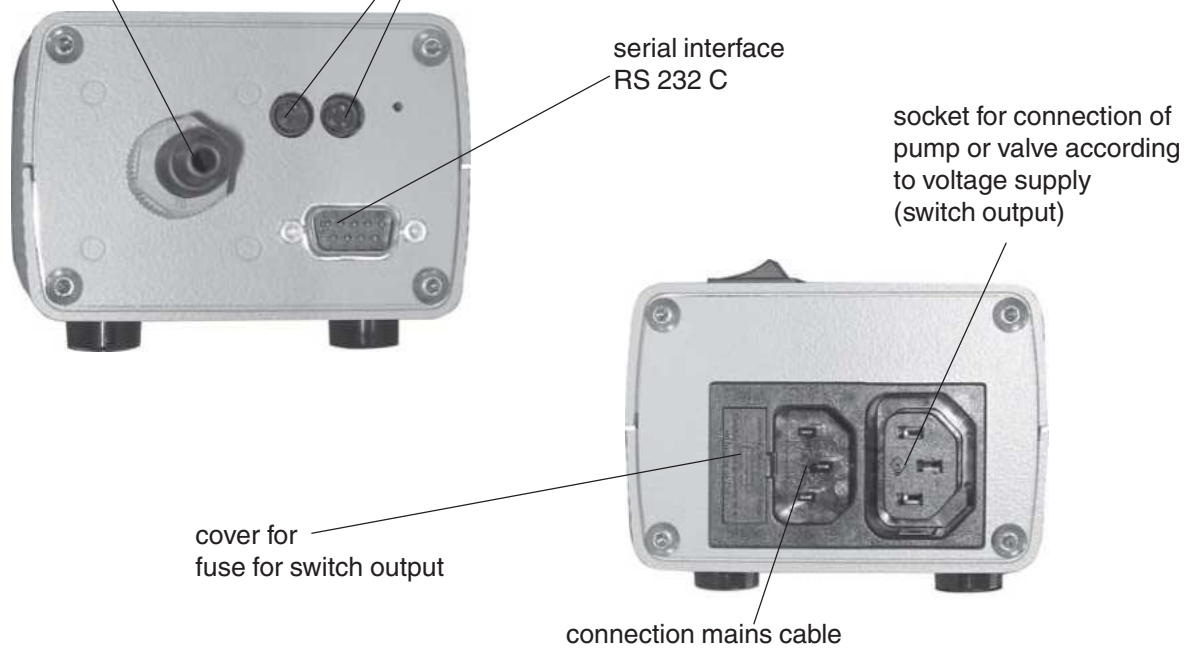
key "Esc":
- go to previous level of program (operation menu)
- interruption of operation (reset to previous settings)
- stop of control
- venting until atmospheric pressure (pressing > 2 seconds)

key "Enter"
- start of control
- next step in menu setting
- adopt set value and quit menu

key "up"
- select menu
- previous menu item
- increase value
- venting during control

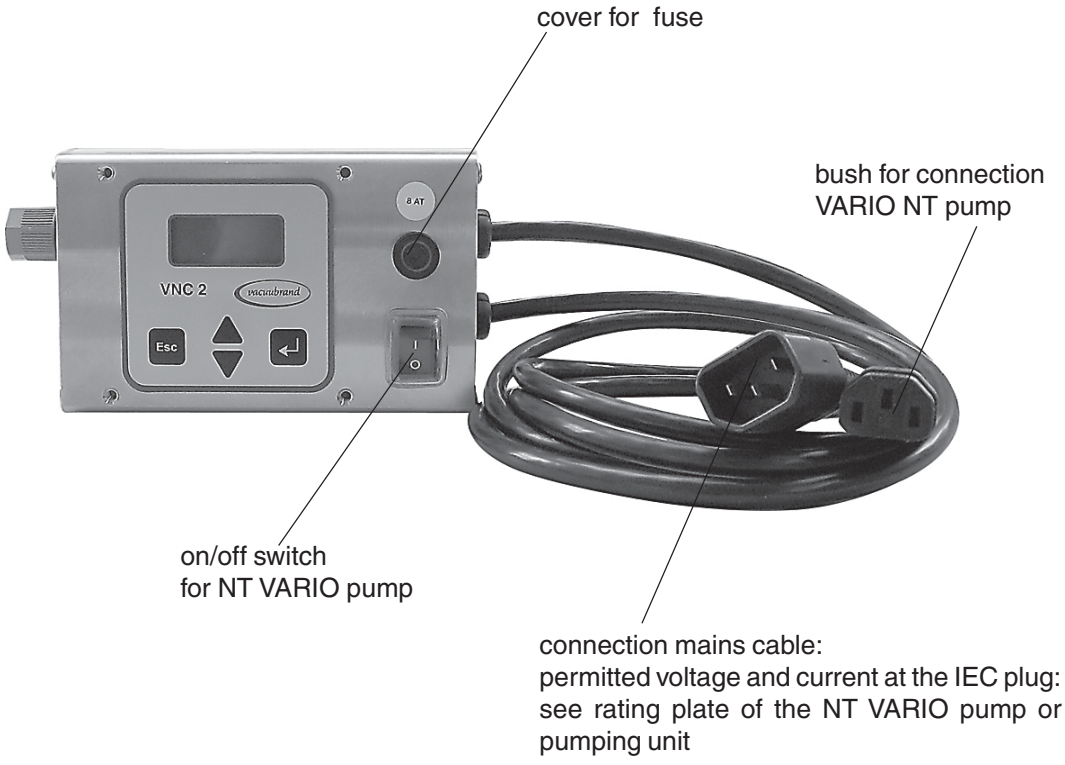
key "down"
- select menu
- next menu item
- decrease value
- drecreasing pressure during control

VNC 2 (E) connections

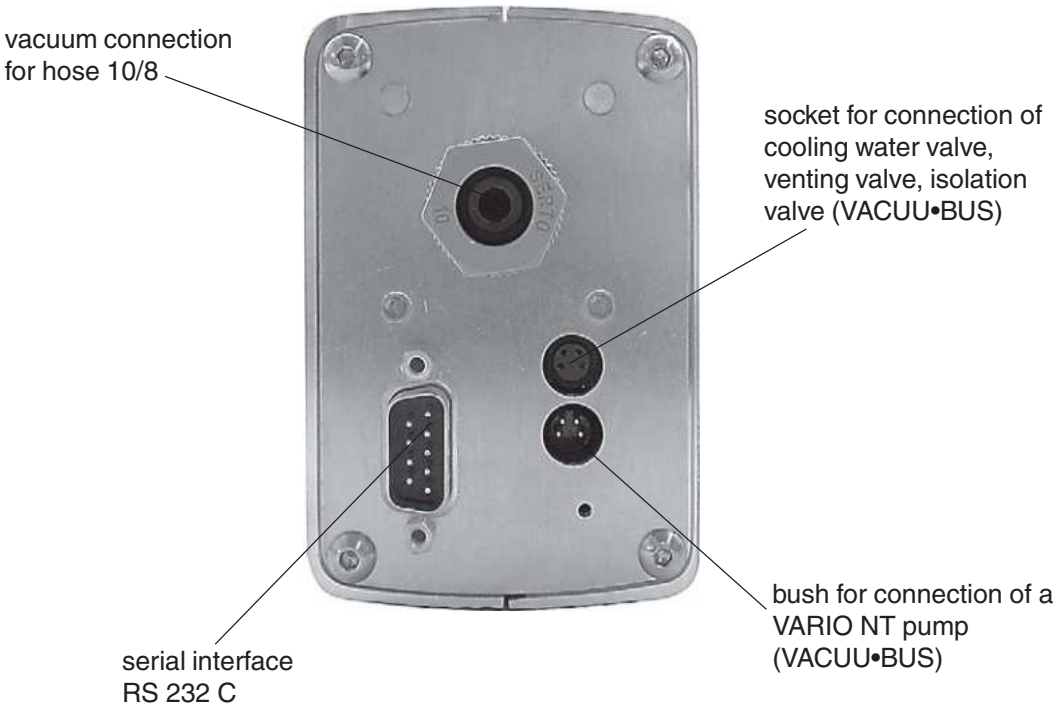


VNC 2 VARIO (E) (built-in version to be assembled at a front plate)

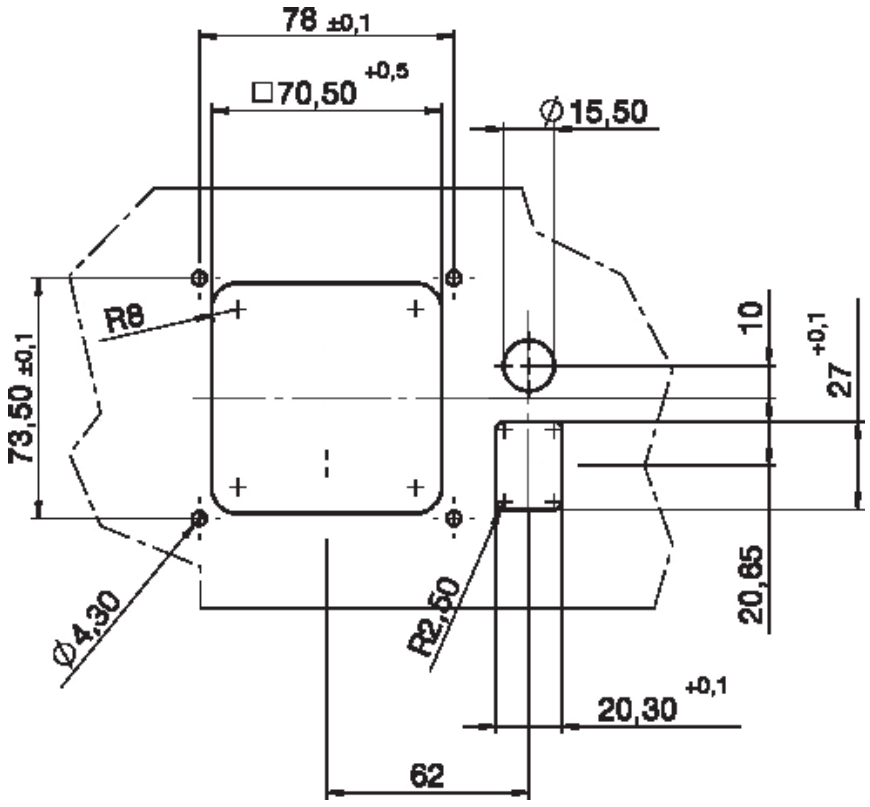
Function of keys and display see VNC 2!



VNC 2 VARIO (E) connections



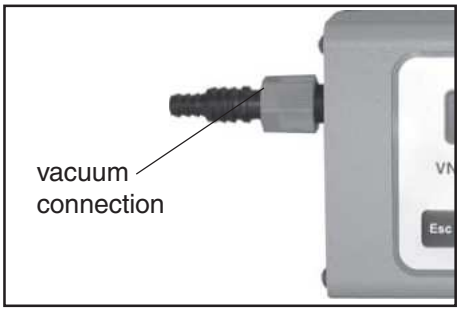
Cut-out for front assembly



Notes on operation

For operation it is necessary to install valves and/or vacuum pumps.

Note: `Texts written in Courier font` mirror the display of the LCD of the controller.



Max. permitted pressure at pressure transducer: 1.5 bar (absolute).

☞ The display flashes at a pressure higher than 1060 mbar.

☞ Inside a vacuum system where evaporation occurs, the vacuum is not uniform. This effects the value of the measured pressure and such the controlling. Therefore carefully choose the position where to connect the pressure transducer.

☞ Condensate and deposits at the pressure transducer falsify the measurement result.

☞ If residues occur or when working with aggressive or condensable substances, install a gas washing bottle in front of the pressure transducer.

☞ **Position controller in such a way, that condensate can not flow into the pressure transducer.**

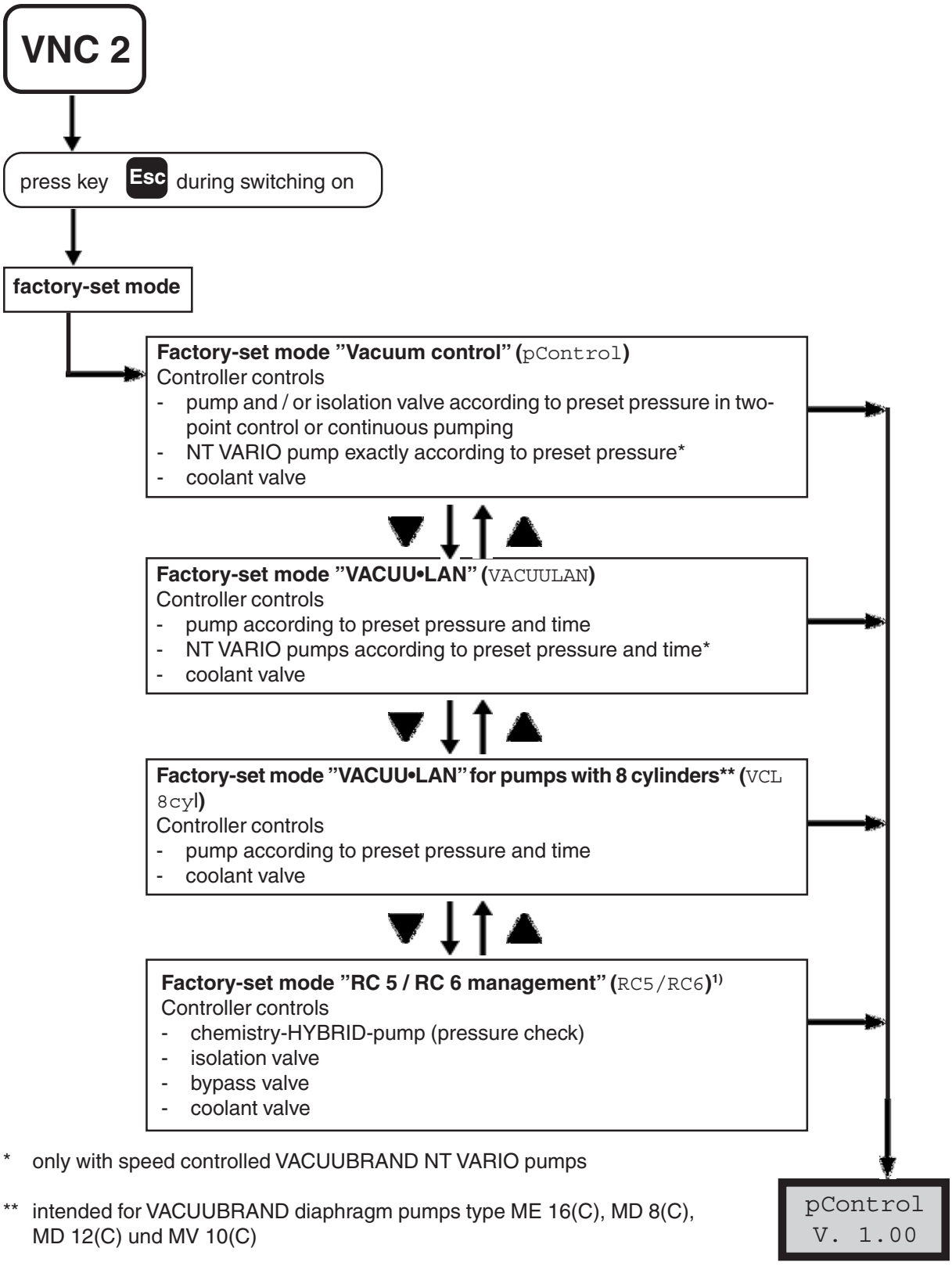
☞ If necessary, clean pressure transducer, see section ”Cleaning the pressure transducer”.

☞ Setting of interface parameters, see **”Interface parameters”.**

☞ Presettings at controller, see **”Factory-set modes and menu structure”.**

☞ Operating the controller, see **”Working with the controller”.**

General view of factory-set modes



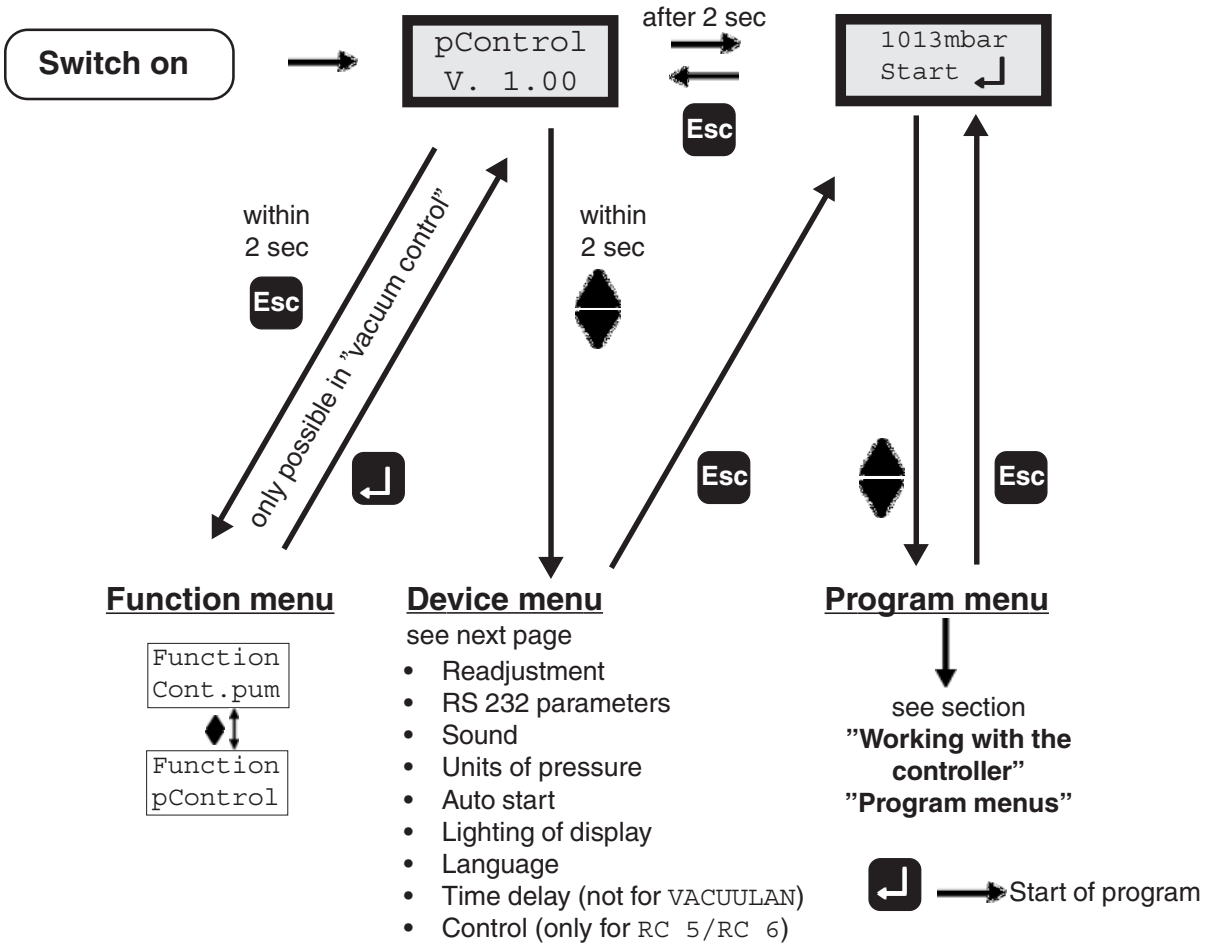
* only with speed controlled VACUUBRAND NT VARIO pumps

** intended for VACUUBRAND diaphragm pumps type ME 16(C), MD 8(C), MD 12(C) und MV 10(C)

1) **Attention: For factory-set mode "RC 5 / RC 6 management" please order separate instructions for use!**

CAUTION **Attention: When connecting pumps pay attention to the breaking capacity of the IEC socket (see "Technical Data")!**

Menu structure of controller



Notes on menu structure of the controller

Function menu:
- Setting of the basic function of the controller (only in "vacuum control" (pControl)).

Device menu:
- Setting of the device specific features and the periphery of the controller.

- Readjustment: Adjusting the pressure transducer at atmospheric pressure and under vacuum, see section "Readjustment".
- RS 232 parameters: Setting of the interface parameters, see section "Interface parameters".
- Sound: Switching on/off the function "acoustic warning signal".
- Pressure unit: Selection of the pressure unit mbar, Torr or hPa.
- Auto start: Process starts immediately after switching on the controller.
- Lighting: Setting of the lighting intensity of the display.
- Language: Selection of the language in the menus (English, German, French).
- Time delay: Delayed switching off of the coolant and the pump (not for VACUULAN)
- Control: Control of a valve or a pump via the IEC control line (only for RC5/RC6).

Program menu:
- Setting of the function specific parameters (e. g. preset pressure).

Attention: Depending on factory-set configurations some menu options are not active!

Notes on configuring the controller

Time delay

- At the end of the process the coolant continues to flow according to the preset time delay. If an isolation valve is connected, a connected pump also runs for the preset time delay for self cleaning.

Notes on selecting the factory-set configuration

NOTICE

The controller VNC 2 can be adapted optimal to the specific application by choosing the appropriate set-in-factory mode depending on the components, the application and the process.

Automatic valve detection:
When switching on, the controller checks the actual valve configuration. If a valve is connected it is supervised and operated automatically until the controller is switched off. Isolation valves and cooling water valves are supervised equally.

Automatic NT VARIO detection (only with VACUUBRAND NT VARIO pumps):
If after switching on the pump (without isolation valve) a NT VARIO-pump is detected, the controller changes automatically to configuration ”NT VARIO” and stores this configuration. After a restart the configuration ”NT VARIO“ is active directly.

The preselected values from last operation (e. g. for pressure, pumping speed or switch-off time) are stored. In case of similar operation conditions it is possible to start immediately, if the preselections are chosen appropriately.
If selecting another factory-set mode (press key ”Esc” during switching on), the configuration for this mode is taken over, the actual configuration gets replaced.

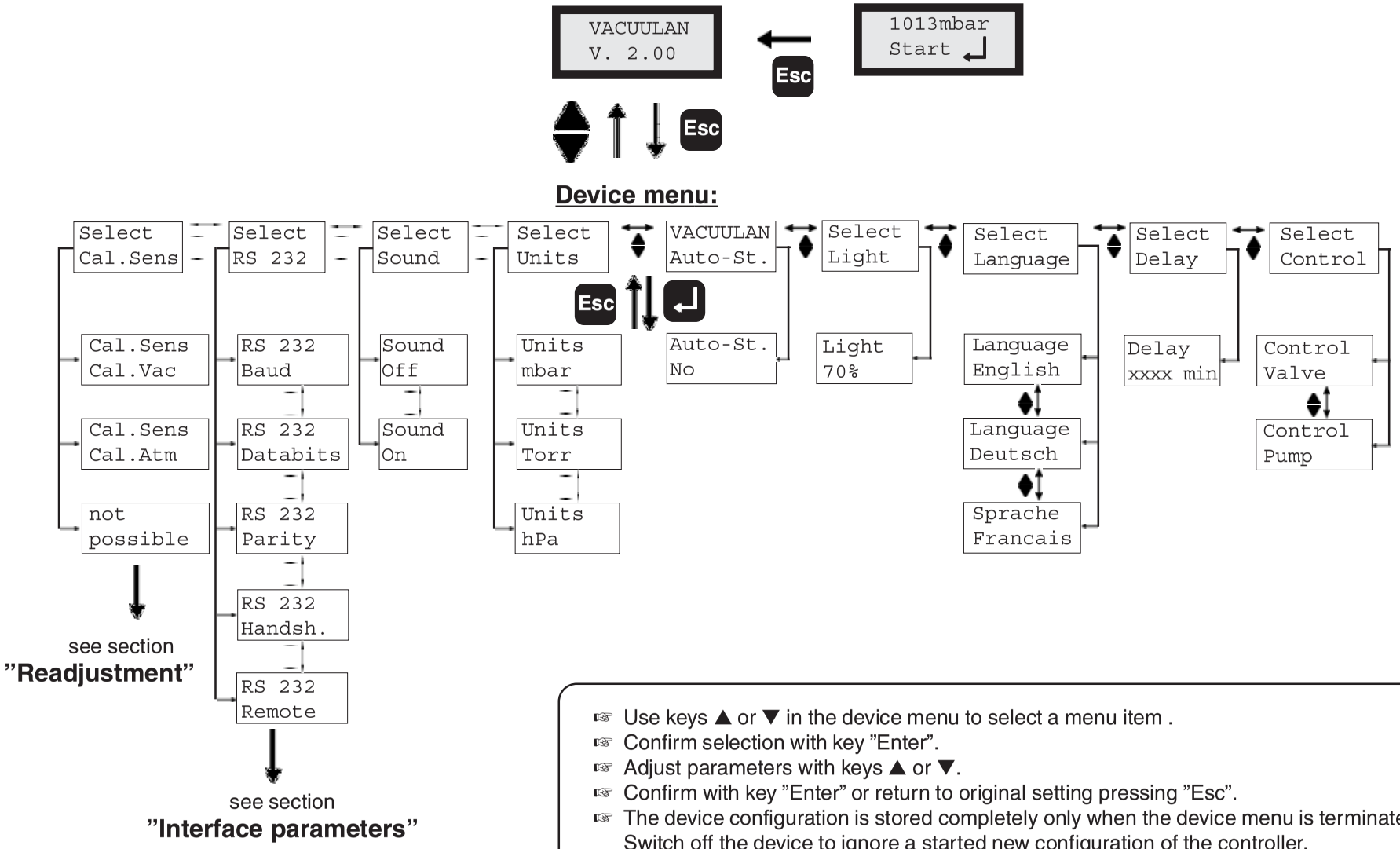
Four factory-set mode are stored in the controller (see section ”General view of factory-set modes”). The single factory-set modes contain the following function specific settings in the program menu:

Vacuum control (`pControl`): Two point control with 5 minutes time delay.
`p set`: 25 mbar, Δp: Auto, `t Off`: off, `limit`: 1060 mbar.

VACUU•LAN (`VACUULAN`):
`p set`: 25 mbar, `p On`: 150 mbar, `t Off`: 15 min

VACUU•LAN for diaphragm pumps with 8 cylinders with start-up control (3 minutes start-up delay) (`VCL 8cyl`):
`p set`: 25 mbar, `p On`: 150 mbar, `t Off`: 15 min

RC 5 / RC 6 management:
Attention: For factory-set mode ”RC 5 / RC 6 management” please order separate instructions for use!



- ☞ Use keys ▲ or ▼ in the device menu to select a menu item .
- ☞ Confirm selection with key "Enter".
- ☞ Adjust parameters with keys ▲ or ▼.
- ☞ Confirm with key "Enter" or return to original setting pressing "Esc".
- ☞ The device configuration is stored completely only when the device menu is terminated. Switch off the device to ignore a started new configuration of the controller.

Working with the controller

Factory-set mode ”Vacuum control” (pControl)

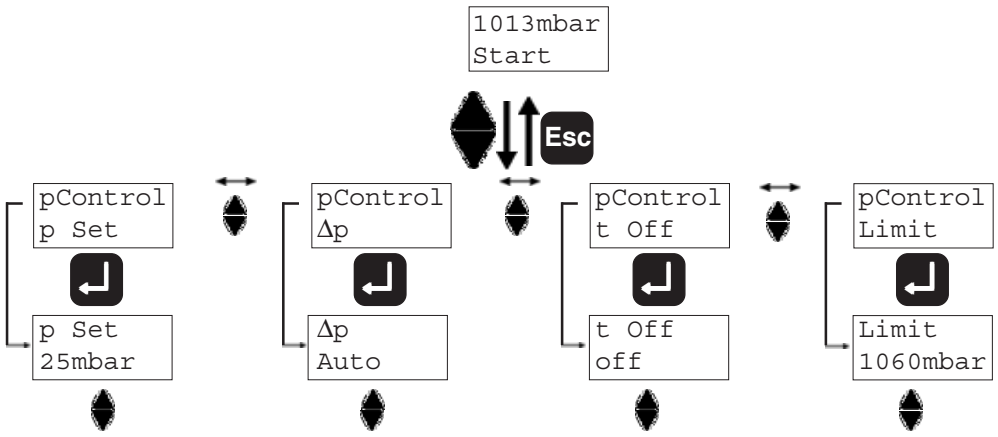
Control without isolation valve:
- Control of a vacuum pump by direct switching of the pump. Preset time delay is only valid for an optional coolant valve.

Control with isolation valve:
- Control of a vacuum pump via an isolation valve. Preset time delay is valid for the pump to reduce condensation inside the pump considerably. The coolant valve is open during vacuum control and during time delay.
- For synchronous switching of the pump and the isolation valve:
  Configure the time delay in the device menu: `Delay: off`.

Operation of a speed controlled (NT VARIO) vacuum pump:
- If after switching on the pump (without isolation valve) a NT VARIO-pump is detected, the controller changes automatically to configuration ”NT VARIO” and stores this configuration. After a restart the configuration ”NT VARIO“ is active directly.

☞ Use keys ▲ or ▼ in the program menu to select an item.
☞ Confirm selection with key ”Enter”.
☞ Adjust parameters with keys ▲ or ▼.
☞ Confirm with key ”Enter” or return to original setting pressing ”Esc”.

Program menu in basic mode `pControl`



- **Vacuum control of a vacuum pump (with isolation valve if applicable)**

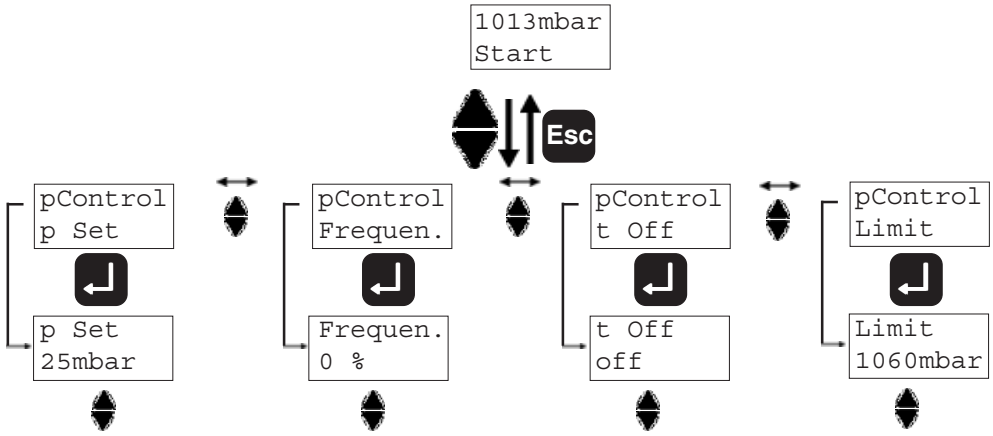
Settings in the program menu:

☞ **Preset pressure** (`p Set`): Lower pressure value for two-point control (displayed by a short tip on key ▲).
☞ **Hysteresis** (Δp): Control range of the two-point control.
☞ **Switch-off time** (`t Off`): The duration of the process (vacuum control) can be preset. If the pump is switched off due to surpassing of the pressure limit (`Limit`), the switch-off time is without function.
☞ **Maximal pressure** (`Limit`): Shut down of the pump when the "`Limit`" value is exceeded, e.g. at the end of filtrations or extractions (active only **after** the pressure did fall below the preset pressure for the first time).

Suggested values for the hysteresis Δp are stored in the controller (setting: "`Auto`") and are adapted automatically to the preset pressure values. It is possible to adjust the parameters manually.

p in mbar	5	10	50	80	100	200	500	700	900	1000
Δp in mbar (suggested values)	2	2	5	8	9	17	40	55	71	78

Program menu in basic mode `pControl` with a NT VARIO pump



- **Vacuum control with a speed controlled pump**

☞ **Preset pressure** (`p Set`): Exact vacuum control according to a preset pressure value.
☞ **Frequency** (`Frequen.`): Sets the pumping speed when the preset pressure is decreased manually. **Only valid for pumps with speed control (NT VARIO).**
☞ **Switch-off time** (`t Off`): The duration of the process (vacuum control) can be preset. If the pump is switched off due to surpassing of a pressure limit (`Limit`), the switch-off time is without function.
☞ **Maximal pressure** (`Limit`): Shut down of the pump when the "`Limit`" value is exceeded, e.g. at the end of filtrations or extractions (active only **after** the pressure did fall below the preset pressure for the first time).

Adapting parameters during the regulation:

- **Interruption:** Press key "Enter", the control stops, after releasing the key, the control is continued. During the interruption the preset pressure can be set to the actual pressure by pressing the key ▼ and by pressing the key ▲ the hysteresis is set. Performing both tasks in a row results in hysteresis 0 = Auto, because the preset pressure as well as the hysteresis are set to the same pressure value.
- **Decrease of preset pressure:** Keep key ▼ pressed for more than 2s.
- **Increase of preset pressure:** Keep key ▲ pressed for more than 2s.

Temporary switching from ”vacuum control” to ”continuous pumping”:

➨ Keep key ▼ pressed for more than 2s (decrease of preset pressure) then press key ”Enter” additionally, the controller switches to ”continuous pumping”. No change of the basic mode of the controller takes place. Once the pump down is stopped (”Esc”), the controller VNC 2 switches back to the mode ”vacuum control”.

Temporary switching from ”continuous pumping” to ”vacuum control”

➨ If the key ”Enter” is pressed while pumping down, the pumping down is interrupted. Pressing additionally the key ▼ results in switching to the mode ”vacuum control”. The actual pressure is stored as preset pressure. No change of the basic mode takes place. Once the regulation is stopped, the controller switches back to the mode ”Continuous pumping”.

☞ **Tip for distillation:** Temporary switching to continuous pumping enables an user friendly semiautomatic control of a distillation. Pumping down until the boiling point is reached, then press ”Enter” and key ▼. The controller keeps the reached pressure value constant.

☞ **Tip for filtration:** Adjust preset pressure to a value well above the boiling pressure of the solvent (e.g. water: `p Set` » 100 mbar). Set `Limit` to e.g. 500 mbar. Once the filtration has finished, the pressure increases and the pump is switched off.

Switching to ”continuous pumping” (Cont.pump) using the function menu (see section ” Menu structure of controller”)

➨ **Operation of a vacuum pump using an isolation valve, direct switching of a pump or operation of a NT VARIO pump**

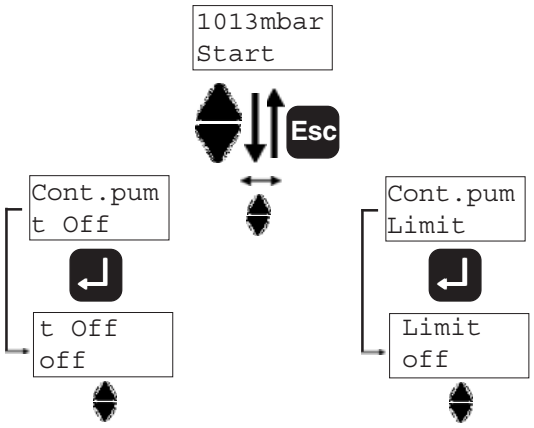
Settings in the program menu:

☞ **Switch-off time** (t Off): The duration of the process (vacuum control) can be preset.

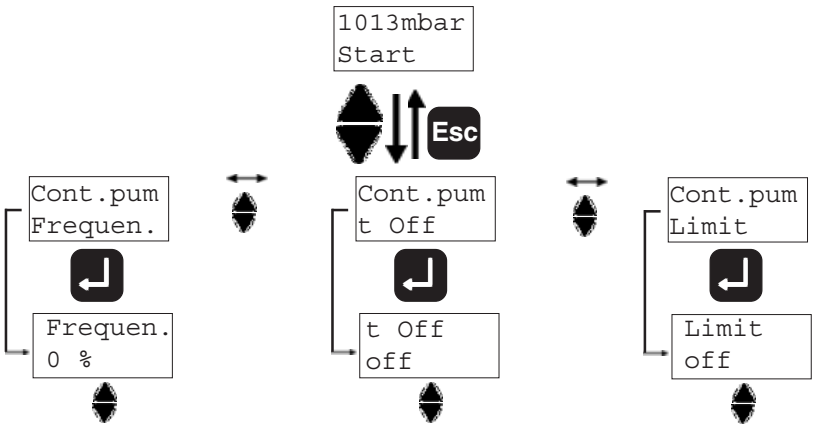
☞ **Maximal pressure** (Limit): Shut down of the pump if the actual pressure falls below a preset pressure limit ”Limit” , e.g. for drying chamber application.

☞ **Frequency** (Frequen.): Sets the pumping speed when the preset pressure is decreased manually. **Only valid for pumps with speed control (NT VARIO).**

Program menu in basic mode Cont.pum when operating a valve or non-NT VARIO pump



Program menu in basic mode Cont.pum when operating a NT VARIO pump



Factory-set mode ”VACUU•LAN” and ”VACUU•LAN for pumps with 8 cylinders” (VACUULAN and VCL 8cyl)

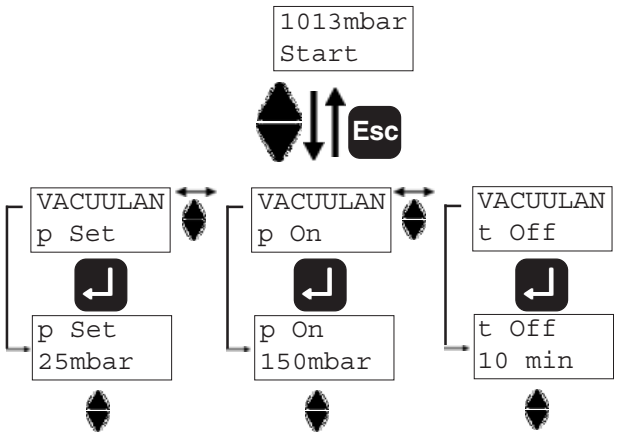
- **operation of a vacuum pump using an isolation valve**
- **operation without isolation valve: operation of a pump according to user requirements**
- **control of a speed controlled pump (NT VARIO) according to requirements**
- **VCL 8cyl: VACUU•LAN mode for diaphragm pumps with start-up control (delay of 10 minutes for start-up) for VACUUBRAND pumps type ME 16(C), MD 8(C), MD 12(C) and MV 10(C), see also ”Technical data”.**

Settings in the program menu:

☞ **Lower pressure value** (p Set) and **switch-off time** (t Off): If the pressure is below the lower set point (p Set), the time meter for automatic shut down is started; additionally the pumping speed is reduced (NT VARIO pumps only). If the pressure is higher than p set then the time meter for automatic shut down is reset. The process control stops when the switch-off time has passed. The vacuum pump is switched off if the pressure falls below p set longer than t Off. The pump starts again in case of a large pressure increase.

☞ **Upper pressure value** (p On): If the pressure is higher than p On, the pump starts again.
Only for pumps wit 8 cylinders: The pumping down does not restart before 10 minutes have elapsed since the shut down to enable a reliable restart of pumps equipped with start-up control.

Program menu in mode VACUULAN and VCL 8cyl



Status messages displayed during operation of a program

The messages are always displayed in the second line, the first line always displays the pressure value.

Displays in factory-set mode "Vacuum control"

Pressure > upper value of hysteresis:	`Pump down`
Pressure within preset limits:	`-> p <-`
After exceeding of upper pressure value:	`Stopped`
After expiry of time of process:	`Timeout`
Key "ENTER" pressed:	`Pause` (valve closed, frequency 0 Hz)
Key "ENTER" and key ▼ pressed:	`p Set` (actual pressure value is stored as preset value)
Key "ENTER" and key ▲ pressed:	`Δp` (actual pressure is stored as upper pressure value)
Key ▼ pressed for less than 2s:	`xxxxmbar` (preset pressure is displayed)
Key ▼ pressed for longer than 2s:	`Adapt p` (Pump / valve starts, preset pressure is adjusted)
Key ▼ pressed for longer than 2s and key "ENTER" pressed additionally:	`Pumpdown` (switching to mode "Continuous pumping")
Key ▲ pressed for less than 2s:	`xxxxmbar` (pumping down interrupted, pause)
Key ▲ pressed for more than 2s:	`Adapt p` (preset pressure is adjusted)

Displays in basic mode "Continuous pumping"

Operating with valve:	`Pumpdown`
Operating with NT VARIO pump:	`xxx %`
Key "ENTER" pressed:	`Pause` (valve closed, frequency 0 Hz)
Key "ENTER" and key ▼ pressed:	`p Set` (actual pressure value is stored as preset value, switching to vacuum control)

Displays in basic mode "VACUU•LAN"

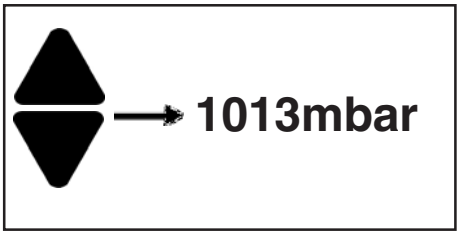
Process running, pressure above lower pressure value	`Process`
Time delay, pressure below lower pressure value:	`xxx min`
Key "ENTER" pressed:	`xxx %` (only with NT VARIO pumps during process)
After process, check of pressure:	`Monitor`
Key "ENTER" pressed after process:	`xxx/min` (increase of pressure)
VCL 8cyl:	
After restart or switching off:	`xxx min` (start-up delay)

In remote mode: P is displayed in the second line.

Readjustment

The vacuum gauge was adjusted using factory standards, which are traceable through regular calibration in an accredited laboratory (German Calibration service) to the national standard. Depending on the process and/or accuracy requirements, check the adjustment from time to time and readjust if necessary. For readjustment, the device has to be adjusted both at atmospheric pressure as well as under vacuum.

Adjustment at atmospheric pressure

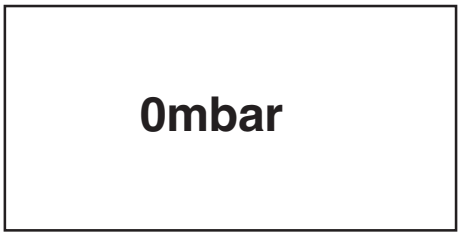


Ventilate the controller and/or the vacuum system. Make sure that the vacuum connection at the controller is at atmospheric pressure.

- ➨ Select program "`Cal.Sens`" at controller.
- ➨ Use keys ▲ and ▼ to adjust the display to the actual local atmospheric pressure.
- ➨ Confirm value with key "Enter".

Note: *To determine the actual atmospheric pressure, use an accurate barometer or get accurate reading from the weather service, the next airport.....(take into account the difference in altitude between e. g. airport and laboratory).*

Adjustment under vacuum

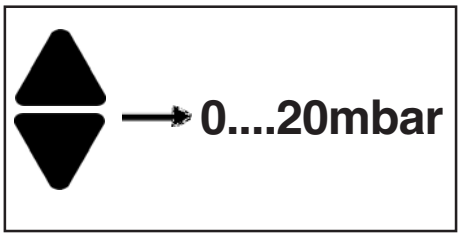


Evacuate the controller via the vacuum connection to a pressure < 0.5 mbar (e. g. by applying a good rotary vane pump).

- ➨ Select program "`Cal.Sens`" at controller.
- ☞ The display is set to zero automatically.
- ➨ Confirm value with key "Enter".

Note: *Adjustment under vacuum with an actual pressure higher than 0.5 mbar reduces the accuracy of the measurement. If the pressure is significantly higher than 0.5 mbar, adjustment to a reference pressure (0....20 mbar) is recommended.*

Adjustment at a reference pressure



Instead of adjustment under vacuum to a pressure < 0.5 mbar, adjustment to a reference pressure within the range of 0 ..... 20 mbar is possible.
Evacuate the controller via the vacuum connection to a reference pressure within the range 0 .... 20 mbar.

- ➨ Select program "`Cal.Sens`" at controller.
- ☞ The display is set to zero automatically.
- ➨ Use keys ▲ and ▼ to adjust the display to the actual reference pressure at the vacuum connection within the range of 0 .... 20 mbar.
- ➨ Confirm value with key "Enter"

Note: *The accuracy of the value of the reference pressure will directly affect the accuracy of the adjustment. If the nominal ultimate vacuum of a diaphragm pump is used as reference vacuum, the accuracy of the controller might be doubtful. The diaphragm pump may not achieve the specified value (due to condensate, poor state, failure of valves or the diaphragm).*

Calibration in the factory

Control of measuring equipment

The **VACUUBRAND DKD calibration laboratory** is accredited by the Physikalisch-Technische Bundesanstalt (PTB; German national institute for science and technology and the highest technical authority of the Federal Republic of Germany for the field of meteorology and certain sectors of safety engineering) for the measurable variable **pressure in the pressure range from 10^{-3} mbar to 1000 mbar** in accordance with the general criteria for the operation of testing laboratories defined in DIN EN/ISO/IEC 17025:2000. Calibration in the VACUUBRAND calibration laboratory:

- To meet the requirements of the DIN ISO 9000ff and 10012 series of standards regarding the calibration of inspection, measuring and test equipment at specified intervals.
- To document that the vacuum gauges calibrated are traceable to national standards of the PTB.

DKD Calibration Controller VNC 2 ..... 90 02 17

Interface parameters

The controller VNC 2 is equipped with a serial interface (RS 232C, nine-pole Sub-D-plug).

☞ Respectively plug-into or remove the cable (cable RS 232C) from the interface only if the equipment is switched off.
☞ The interface is **not** electrically isolated from the measuring circuit.
☞ For optimal electromagnetic compatibility assemble an interface filter (cat. no.: 63 82 35).

The controller can be operated via serial interface. Measuring results, preselections and the status of the controller can be read at any time.

Factory-set the read and write commands are completely compatible to the VACUUBRAND controller CVC 2000. An extended instruction set compatible with CVC 3000 is available using the command "CVC 3".

Setting of the interface

Setting of the interface parameters directly at the controller is described below. Enter the device menu "`Select RS 232`". The factory set values are underlined.

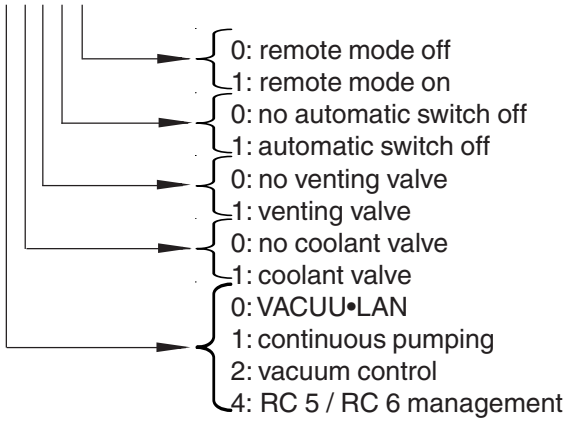
➨ `Baud 2400, 4800, 9600` or `19200`
➨ 7 data bits odd (`Databits 7, Parity Odd`); 7 data bits even (`Databits 7, Parity Even`); 8 data bits none (`Databits 8, Parity None`)
➨ no Handshake (`Handsh. None`), XON/XOFF Handshake (`Handsh. Xon-Xoff`), RTS/CTS
➨ `Remote on`, `Remote off`,
➨ Startbit = 1, Stopbit = 1 (Stopbit = 2 at 7 data bits none)
➨ Sending: timeout 1s, receiving timeout 10s

In remote mode (`Remote on`, "P" is displayed) all keys at the controller are without function. To return to the manual operation of the controller set the controller to the mode "`Remote off`" via the interface or switch off controller and enter the device menu within the first 2s after having switched on the controller again.

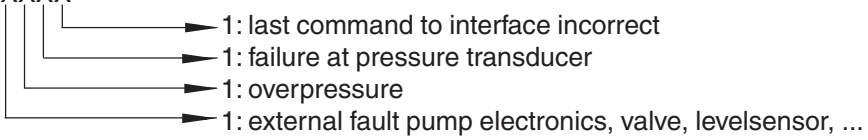
Read commands can be sent always. The sending of write commands (except of command "STORE") is only possible if the remote mode (`Remote on`) is selected.

Read commands compatible to "CVC 2000"

Function	Command	Response	Description
actual pressure	IN_PV_1	XXXX mbar or XXXX Torr or XXXX hPa	unit according to preselection
actual pumping speed	IN_PV_2	XX.X Hz	
process runtime	IN_PV_3	XX:XX h:m	
LAN pressure increase	IN_PV_4	xxx/min	
LAN process time	IN_PV_5	XX:XX h:m	
Preset vacuum	IN_SP_1	XXXX mbar or XXXX Torr or XXXX hPa	
Speed	IN_SP_2	XX.X Hz	preset speed, 99.9 Hz corresponds to "HI"
preselected at controller	IN_CFG	XXXXX	



error status IN_ERR XXXX



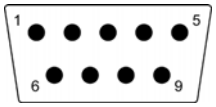
status of process control — IN_STAT — XXXX

- 00: VACUU•LAN: inactive
- 01: pumping down, actual pressure > selected pressure
- 02: pumping down, time is running
- 03: system is switched off
- 10: continuous pumping: inactive
- 11: active
- 20: vacuum control: inactive
- 21: actual pressure > selected pressure
- 22: actual pressure = selected pressure (+/- 1mbar)
- 23: actual pressure < selected pressure
- 40: RC 5/6 management inactive
- 31: pumping down
- 32: vacuum achieved
- 33: system is switched off

- 0: venting valve not driven (closed)
- 1: venting valve driven (open)

- 0: coolant valve not driven (closed)
- 1: coolant valve driven (open)

Connector assignment



2: RxD
3: TxD
4: DTR
5: Mass
7: RTS
8: CTS
9: +5V (Blue tooth)

Write commands compatible to "CVC 2000"

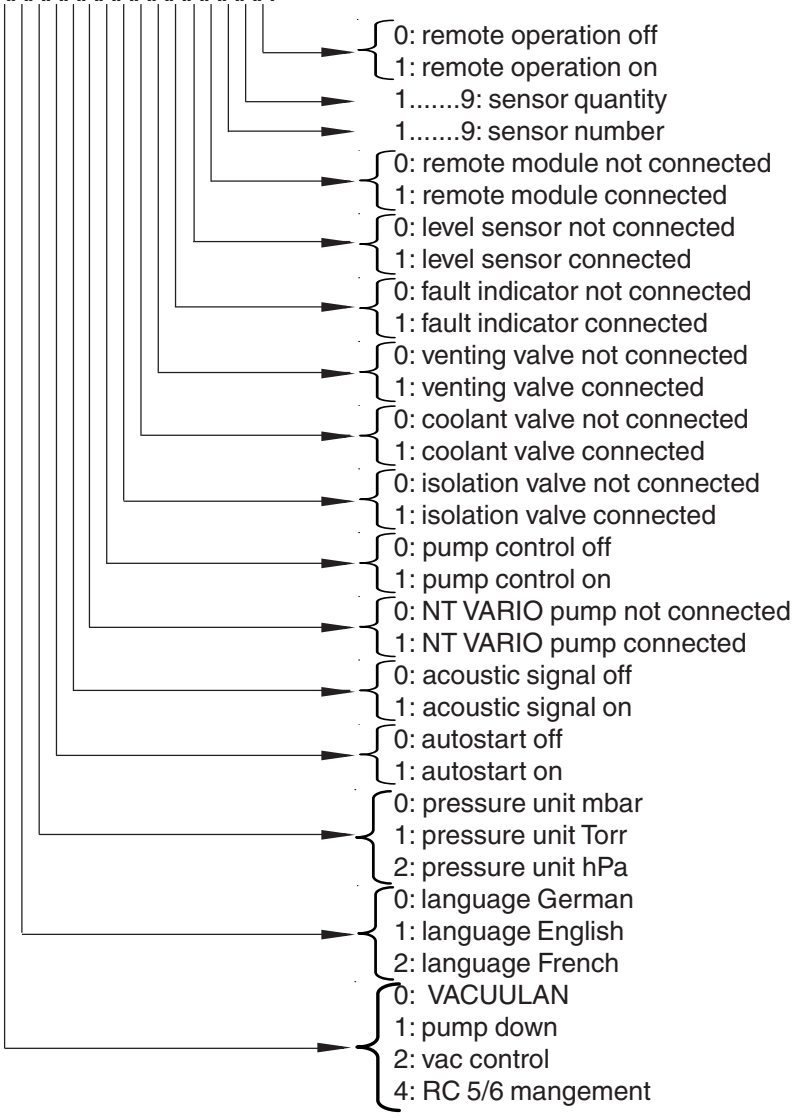
Function	Command	Parameter	Description
operation mode	OUT_MODE	X	1: continuous pumping 2: vacuum control without automatic 4: RC 5/6 management
selected pressure	OUT_SP_1	XXXX	unit according to preselection (0001 to 1060 mbar (hPa) or 0001 to 0795 Torr)
selected pressure with venting*	OUT_SP_V	XXXX	unit according to preselection (0001 to 1060 mbar (hPa) or 0001 to 0795 Torr)
selected frequency	OUT_SP_2	XX.X	Hz (01.0 to 60.0 in steps of 0.5 Hz or 99.9 for "HI")
pressure for restart	OUT_SP_3	XXXX	unit according to preselection (0001 to 1060 mbar (hPa) or 0001 to 0795 Torr)
delay	OUT_SP_4	XX:XX	hh:mm (hours:minutes)
pressure for switch off	OUT_SP_5	XXXX	unit according to preselection (0001 to 1060 mbar (hPa) or 0001 to 0795 Torr)
time for switch off	OUT_SP_6	XX:XX	hh:mm (hours:minutes)
starting process control	START		
stopping process control	STOP	X	1: termination of process control 2: termination of process control and storage of the actual pressure as new set point
remote operation**	REMOTE	X	0: remote off 1: remote on
driving venting valve	OUT_VENT	X	0: venting valve close (not automatically) 1: ventingvalve open (process control stopped)
	STORE		store settings permanently

* Pressure setting with venting is only possible in operation mode "Vacuum control" if a venting valve is connected and configurated and "Vacuum control" is started. The venting valve opens automatically if the actual pressure is 10 mbar below the preset pressure. Automatic venting becomes inactive if Vacuum control is stopped (STOP or VENT), setting a pressure value using the command OUT_SP_1 or if the operation mode is changed. Activate the command OUT_SP_V again if necessary.

** If remote operation is selected or deselected, the user has to ensure that no dangerous status of the system due to the change of the mode of operation can occur and to provide appropriate safety measures, especially if selecting remote operation interferes with a locally operated active process.

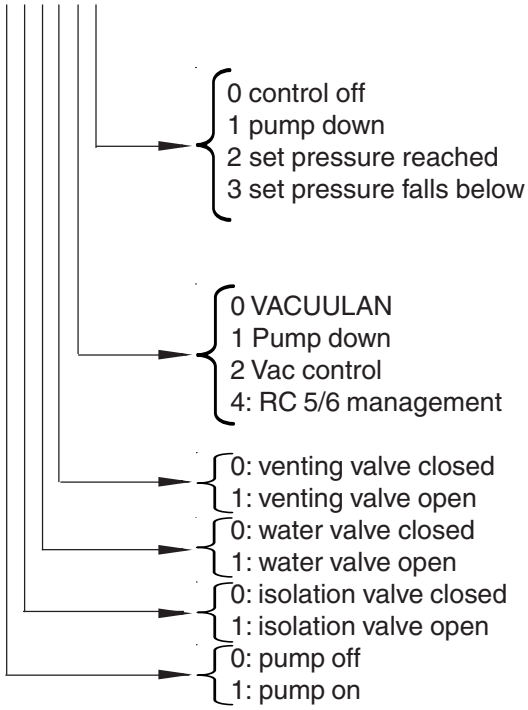
Read commands compatible to "CVC 3000"

Function	Command	Response	Description
actual pressure	IN_PV_1	XXXX.X mbar/Torr/hPa	unit according to preselections
actual speed	IN_PV_2	XXX%	1-100% or HI
time	IN_PV_3	XX:XX h:m	process runtime
LAN pressure increase	IN_PV_4	xxx/min	
LAN process time	IN_PV_5	XX:XX h:m	
preselected at the controller	IN_CFG	XXXXXXXXXXXXXXXX	

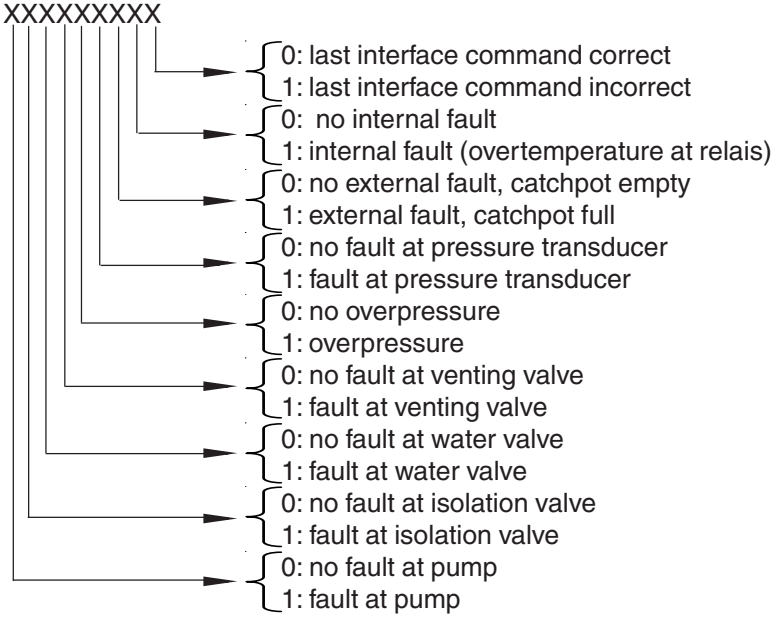


Read commands compatible to "CVC 3000"

Function	Command	Response	Description
status process control	IN_STAT	XXXXXX	



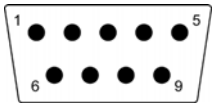
fault status	IN_ERR	XXXXXXXXX	



Read commands compatible to ”CVC 3000”

Function	Command	Response	Description
	IN_SP_1	XXXX mbar or XXXX Torr or XXXX hPa	set vacuum
	IN_SP_2	XXX%	maximum speed (100% = ”HI”)
	IN_SP_3	XXXX mbar or XXXX Torr or XXXX hPa	switching on pressure for VACUULAN or two point control
	IN_SP_4	XX:XX h:m	delay (00:00 = Off)
	IN_SP_5	XXXX mbar or XXXX Torr or XXXX hPa	switch off pressure (”Maximum” for ”Vac control”, ”Minimum” for ”Pump down”)
	IN_SP_6	XX:XX h:m	process runtime 00:00 = off

Connector assignment



2: RxD
3: TxD
4: DTR
5: Mass
7: RTS
8: CTS
9: +5V (Blue tooth)

Write commands compatible to "CVC 3000"

Function	Command	Parameter	Description
operation mode	OUT_MODE	X	0: VACUULAN 1: Pump down 2: Vac control 4: RC 5/6 management **Attention:** If control is running only switching from 1 to 2 and 2 to 1.
set vacuum	OUT_SP_1	XXXX	unit according to preselection (0001 to 1060 mbar (hPa) or 0001 to 0795 Torr)
set vacuum with venting*	OUT_SP_V	XXXX	unit according to preselection (0001 to 1060 mbar (hPa) or 0001 to 0795 Torr)
speed	OUT_SP_2	XXX	speed in %, (100% = "HI")
start-up pressure	OUT_SP_3	XXXX	unit according to preselection (0001 to 1060 mbar (hPa) or 0001 to 0795 Torr)
delay	OUT_SP_4	XX:XX	hh:mm (hours:minutes)
switch off pressure	OUT_SP_5	XXXX	unit according to preselection (0001 to 1060 mbar (hPa) or 0001 to 0795 Torr)
switch-off time delay	OUT_SP_6	XX:XX	hh:mm (hours:minutes) 00:00 = off
	START		
	STOP	X	1 stop 2 stop with overaken of the set vacuum
	REMOTE**	X	1 remote off 2 remote on
	CVC	X	2 CVC 2000 commands 3 CVC 3000 commands
	OUT_VENT	X	0 venting valve closed 1 venting valve open 2 ventil until atmospheric pressure
	STORE		store settings permanently

* Pressure setting with venting is only possible in operation mode "Vacuum control" if a venting valve is connected and configurated and Vacuum control is started. The venting valve opens automatically if the actual pressure is 10 mbar below the preset pressure. Automatic venting becomes inactive if "Vacuum control" is stopped (STOP or VENT), setting a pressure value using the command OUT_SP_1 or if the operation mode is changed. Activate the command OUT_SP_V again if necessary.

** If remote operation is selected or deselected, the user has to ensure that no dangerous status of the system due to the change of the mode of operation can occur and to provide appropriate safety measures, especially if selecting remote operation interferes with a locally operated active process.

Troubleshooting

Fault	Possible cause	Remedy
❑ No display.	➔ Mains cable not plugged in?	☞ Plug in mains cable. Switch on device. Check fuse in building.
	➔ Fuse defective?	☞ Check fuse in building and fuse at switch output of VNC 2, replace if necessary.
	➔ Other cause (device defective)?	☞ Return controller to the factory for repair.
❑ Display disappears, internal overload protection activated.	➔ Thermal overload at controller, ambient temperature too high?	☞ Ensure adequate ventilation.
	➔ Thermal overload at controller, overload?	☞ Check current draw of connected devices (pumps, valves).
	➔ Short circuit at connected valves?	☞ Replace valves.
	➔ Other cause (device defective)?	☞ Return controller to the factory for repair.
❑ Pressure reading incorrect.	➔ Device not adjusted correctly?	☞ Readjust controller.
	➔ Humidity in pressure transducer?	☞ Let dry pressure transducer, e.g. by pumping down, readjust if necessary, detect end eliminate cause.
	➔ Pressure transducer contaminated?	☞ See "Cleaning the pressure transducer".
❑ Error message "`CheckSys`", five beeps.	➔ Time of process in basic mode VACUU•LAN exceeded?	☞ Check system for leaks, select suitable pressure value.
❑ Error message "`p Error`", four beeps.	➔ Overpressure at pressure transducer, pressure >1060 mbar?	☞ Immediate pressure relief necessary (Risk of bursting)! ⚠
❑ Error message "`ErrSens.`", three beeps.	➔ Pressure transducer or connecting cable to board defective, external sensor removed?	☞ Plug in external sensor or return controller to the factory for repair.
❑ Error message "`ErrValve`", two beeps.	➔ Error at isolation valve or at coolant valve?	☞ Check valve, connect correctly.
❑ Error message "`ext. Err`", one beep.	➔ Fault indicator or level sensor?	☞ Eliminate external error (load factory set configuration).
	➔ Failure of a NT VARIO pump?	☞ Connect pump, check line.
❑ Error message "`ErrTemp.`", six beeps.	➔ Excess temperature at relay due to frequent switching?	☞ Check configuration and process parameters.
	➔ Relay circuit defective?	☞ Return controller to the factory for repair.

Fault	Possible cause	Remedy
❑ All keys without function.	➔ Controller set to remote mode, "P" is displayed?	☞ Control controller via interface or switch off remote mode (see 'Interface parameters').
❑ Controller does not react when operating keys. No change after switch off/on.		☞ Return controller to the factory for repair.

Cleaning the pressure transducer

The controller itself is maintenance-free.
Contamination of the pressure transducer or deposits will influence the accuracy of measurement.

⚠CAUTION **Attention:** Never use hard objects to clean the pressure transducer!

- ➨ Fill the chamber of the pressure transducer with a solvent (e. g. benzene) and allow sufficient cleaning time. Observe all regulations concerning usage and disposal of solvents!
- ➨ Drain the solvent and dispose of in accordance with regulations, repeat cleaning if necessary.
- ➨ Rinse the chamber of the pressure transducer several times with alcohol in order to remove all solvent residues.
- ☞ Never use a spiky or sharp-edged tool to clean the pressure transducer.
- ➨ Allow the pressure transducer to dry.
- ➨ Readjust the pressure transducer if necessary.

Accessoires

Pressure transducer VSK 3000, capacitive Al_2O_3 sensor, 1080-0,1 mbar 63 66 57
Isolation valve VV-B 6, 24 V= 67 42 90
Isolation valve VV-B 6C, 24 V= 67 42 91
Isolation valve VV-B 15C, KF 16, 24 V= 67 42 10
Isolation valve VV-B 15C, KF 25, 24 V= 67 42 15
Coolant water valve VKW-B, 24 V= 67 42 20
Venting valve VBM-B / KF 16, 24 V= 67 42 17
Y-Adapter VACUU•BUS 63 66 56
Extension cable VACUU•BUS, 2m 61 25 52
Cable RS 232C, 9-pole, Sub-D 63 78 37

Conversion of VACUUBRAND valves with diode plug to VACUUBRAND valves with VACUU•BUS plug

VACUUBRAND valve with diode plug	Conversion kit: Valve cable with VACUU•BUS plug
Isolation valve VV 6, 24 V= (67 40 90) Isolation valve VV 6C, 24 V= (67 40 91) Isolation valve VV 15, 24 V= (67 41 10) Isolation valve VV 15C, 24 V= (67 41 15)	61 25 56 (conversion to isolation valve) 61 25 66 (conversion to venting valve)
Coolant valve VKW, 24 V= (67 60 13)	61 25 67
Venting valve VBM, 24 V= (66 68 17)	61 25 54
Isolation valve water jet pump (61 06 23)	61 25 56

➨ To control a **VACUUBRAND water jet pump** (69 50 00) with solenoid operated valve with diode plug with a controller VNC 2 the valve cable has to be replaced (see table). After this the water valve is switched like an isolation valve.

Notes on return to the factory

Repair - return - DKD calibration

NOTICE

Safety and health of our staff, laws and regulations regarding the handling of dangerous goods, occupational health and safety regulations and regulations regarding safe disposal of waste require that for all pumps and other products the **"Health and safety clearance form"** must be send to our office duly completed and signed before any equipment is dispatched to our premises.
Fax or post a completed copy of the health and safety clearance form to us in advance. The declaration must arrive before the equipment. Enclose a second completed copy with the product. If the equipment is contaminated you must notify the carrier.
No repair / DKD calibration is possible unless the correctly completed form is returned. Inevitably, there will be a delay in processing the equipment if information is missing or if this procedure is not complied with.

⚠CAUTION

If the product has come in contact with chemicals, radioactive substances or other substances dangerous to health or environment, the product must be decontaminated **prior to sending it back to the factory.**

- Return the product to us **disassembled and cleaned** and accompanied by a certificate verifying decontamination or
- Contact an industrial cleaning and **decontamination service** directly or
- Authorize us to send the product to an industrial cleaning facility **at your expense.**

To expedite repair and to reduce costs, please enclose a detailed description of the problem and the product´s operating conditions with every product returned for repair. We submit **quotations** only on request and always at the customer´s expense. If an order is given, the costs incurred are offset from the costs for repair or from the purchase price, if the customer prefers to buy a new product instead of repairing the defective one.

- **If you do not wish a repair on the basis of our quotation, the equipment might be returned to you disassembled and at your charge!**

In many cases, the **components must be cleaned in the factory** prior to repair.
For cleaning we use an environmentally responsible water based process. Unfortunately the combined attack of elevated temperature, cleaning agent, ultrasonic treatment and mechanical stress (from pressurised water) may result in damage to the paint. Please mark in the health and safety clearance form if you wish a **repaint at your expense** just in case such a damage should occur.
We also replace parts due to optical aspects upon your request.

NOTICE

Before returning the equipment ensure that (if applicable):

- Equipment has been cleaned and/or decontaminated.
- All inlet and outlet ports have been sealed.
- Equipment has been properly packed, if necessary, please order an original packaging (costs will be charged), marked as appropriate and the carrier has been notified.
- Ensure that the completed health and safety declaration is enclosed.

We hope for your understanding for these measures, which are beyond our control.

Scrapping and waste disposal:
Dispose of the equipment and any components removed from it safely in accordance with all local and national safety and environmental requirements. Particular care must be taken with components and waste oil which have been contaminated with dangerous substances from the process. Do not incinerate fluoroelastomer seals and "O" rings.

- You may authorize us to dispose of the equipment **at your expense.**

Health and safety clearance form

Declaration concerning safety, potential hazards and safe disposal of waste, e. g. used oil.
Safety and health of our staff, laws and regulations regarding the handling of dangerous goods, occupational health and safety regulations, safety at work laws and regulations regarding safe disposal of waste, e. g. waste oil, require that for all pumps and other products this form must be send to our office duly completed and signed before any equipment is dispatched to our premises. **Products will not be accepted for any procedure and handling and repair / DKD calibration will not start before we have received this declaration.**

a) Fax or post a **completed copy of this form** to us in advance. The declaration must arrive before the equipment. **Enclose a second, completed copy with the product.** If the product is contaminated you must notify the carrier (**GGVE, GGVS, RID, ADR**).
b) Inevitably, the repair process will be delayed considerably, if this information is missing or this procedure is not complied with. We hope for your understanding for these measures which are beyond our control and that you will assist us in expediting the repair procedure.
c) **Make sure that you know all about the substances which have been in contact with the equipment and that all questions have been answered correctly and in detail.**

1. Product (Model): .....

2. Serial No.: .....

3. List of substances in contact with the equipment or reaction products:

3.1 Chemical/substance name, chemical symbol:

a) .....

b) .....

c) .....

d) .....

3.2 Important informations and precautions, e. g. danger classification:

a) .....

b) .....

c) .....

d) .....

4. Declaration (please mark as applicable):

❑ **4.1 for non dangerous goods:**

We assure for the returned product that
- neither toxic, corrosive, biologically active, explosive, radioactive nor contamination dangerous in any way has occurred.
- the product is free of dangerous substances.
- the oil or residues of pumped media have been drained.

❑ **4.2 for dangerous goods:**

We assure for the returned product that
- all substances, toxic, corrosive, biologically active, explosive, radioactive or dangerous in any way which have pumped or been in contact with the product are listed in 3.1, that the information is complete and that we have not withheld any information.
- the product, in accordance with regulations, has been
  ❑ cleaned ❑ decontaminated ❑ sterilized.

5. Way of transport / carrier:

.....

Day of dispatch to VACUUBRAND:

.....

If the paint is damaged, we wish a repaint or a replacement of parts due to optical aspects at our expense (see "Notes on return to the factory"):

❑ yes ❑ no

We declare that the following measures - where applicable - have been taken:
- The oil has been drained from the product.
  Important: Dispose of according to national regulations.
- The interior of the product has been cleaned.
- All inlet and outlet ports of the product have been sealed.
- The product has been properly packed, if necessary, please order an original packaging (costs will be charged) and marked as appropriate.
- The carrier has been informed about the hazardous nature of the goods (if applicable).

We assure VACUUBRAND that we accept liability for any damage caused by providing incomplete or incorrect information and that we shall indemnify VACUUBRAND from any claims as regards damages from third parties.

We are aware that as expressed in § 823 BGB (Public Law Code of Germany) we are directly liable for injuries or damages suffered by third parties, particularly VACUUBRAND employees occupied with handling/repairing the product.

Signature: .....

Name (print): .....

Job title (print): .....

Company´s seal: .....

Date: .....

VACUUBRAND GMBH + CO KG
-Technology for Vacuum Systems-

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CE

Konformitätserklärung
Declaration of conformity
Déclaration de conformité

Vakuum-Controller / Vacuum controller / Régulateur de vide

VNC 2 (68 30 70) 100-230V
VNC 2 VARIO (E) (68 30 80) 24VDC

Hiermit erklären wir, daß das oben bezeichnete Gerät in Konzeption und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den grundlegenden Anforderungen der zutreffenden, aufgeführten EU-Richtlinien entspricht.Bei einer mit uns nicht abgestimmten Änderung an dem Gerät verliert diese Erklärung ihre Gültigkeit.
We herewith declare that the product designated above is in compliance with the basic requirements of the applicable EC-directives stated below with regard to design, type and model sold by us. This certificate ceases to be valid if the product is modified without the agreement of the manufacturer.
Par la présente, nous déclarons que le dispositif désigné ci-dessus est conforme aux prescriptions de base des directives EU applicables et indiqués en ci que concerne conception, dessin et modèle vendu par nous-mêmes. Cette déclaration cesse d´être valable si des modifications sont apportées au dispositif sans notre autorisation préalable.

Niederspannungsrichtlinie / Low-Voltage Directive / Directive Basse Tension
2006/95/EG
Richtlinie Elektromagnetische Verträglichkeit / Electromagnetic Compatibility Directive / Directive Compatibilité Electromagnétique
2004/108/EG
Angewandte Harmonisierte Normen / Harmonized Standards applied / Normes Harmonisées utilisées
EN 61010-1, EN 61326
Managementsysteme / Management systems / Systèmes de Management
EN ISO 9001, EN ISO 14001 (1997-2006)

Wertheim, 26.09.2007
. . . . . .
Ort, Datum / place, date / lieu, date

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

ppa. . . . . .
(Dr. J. Dirscherl)
Technischer Leiter / Technical Director / Directeur technique

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vacuubrand

Disclaimer: Our technical literature is only intended to inform our customer. The validity of general empirical values and results obtained under test conditions for specific applications depend on a number of factors beyond our control. It is therefore strictly the users´ responsibility to very carefully check the validity of application to their specific requirements. No claims arising from the information provided in this literature will, consequently, be entertained.

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