



Technology for Vacuum Systems

Instructions for use



VNC 2 (E)
VNC 2 VARIO E

Vacuum Controller

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 and 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 trouble-free realisation of your work.

Yours

VACUUBRAND GMBH + CO KG

After sales service:


Contact your local dealer or call +49 9342 808-5500.

The document "Safety information for vacuum equipment" is part of this manual! Read the "Safety information for vacuum equipment" and observe the instructions contained therein!


Trademark index:

VACUU•LAN® (US-Reg.No 3,704,401), VACUU•BUS®, VACUU•CONTROL™, chemistry-HYBRID™, Peltronic®, TURBO•MODE™, VARIO® (US-Reg.No 3,833,788), VARIO-SP™, VACUUBRAND® (US-Reg.No 3,733,388) and also the shown company logos are trademarks of VACUUBRAND GMBH + CO KG in Germany and/or other countries.


DE

Achtung: Die vorliegende Betriebsanleitung ist nicht in allen EU-Sprachen verfügbar. Der Anwender darf die beschriebenen Geräte nur dann in Betrieb nehmen, wenn er die vorliegende Anleitung versteht oder eine fachlich korrekte Übersetzung der vollständigen Anleitung vorliegen hat. Die Betriebsanleitung muss vor Inbetriebnahme der Geräte vollständig gelesen und verstanden werden, und alle geforderten Maßnahmen müssen eingehalten werden.  "Sicherheitshinweise für Vakuumgeräte"


EN

Attention: This manual is not available in all languages of the EU. The user must not operate the device if he does not understand this manual. In this case a technically correct translation of the complete manual has to be available. The manual must be completely read and understood before operation of the device and all required measures must be applied.  "Safety instructions for vacuum equipment"


FR

Attention: Le mode d'emploi présent n'est pas disponible dans toutes les langues d'Union Européenne. L'utilisateur ne doit mettre le dispositif en marche que s'il comprend le mode d'emploi présent ou si une traduction complète et correcte du mode d'emploi est sous ses yeux. Le dispositif ne doit pas être mis en marche avant que le mode d'emploi ait été lu et compris complètement et seulement si le mode d'emploi est observé et tous les mesures demandées sont prises.  «Avis de sécurité pour des dispositifs à vide»


BG

Внимание: Тези инструкции не са преведени на всички езици от ЕО. Потребителят не бива да работи с уреда, ако не разбира инструкциите за ползване. В този случай е необходимо да бъде предоставен пълен технически превод на инструкциите за ползване. Преди работа с уреда е задължително потребителят да прочете изцяло инструкциите за работа.  "Указания за безопасност за вакуумни уреди"


CN

注意：该操作手册不提供所有的语言版本。操作者在没有理解手册之前，不能操作该设备。在这种情况下，需要有一个整个操作手册技术上正确的翻译。在操作该设备前，必须完全阅读并理解该操作手册，必须实施所有需要的测量。  真空设备的安全信息


CZ

Upozornění :Tento návod k použití není k dispozici ve všech jazycích Evropské unie. Uživatel není oprávněn požit přístroj pokud nerozumí tomuto návodu. V takovém případě je nutno zajistit technicky korektní překlad manuálu do češtiny. Návod musí být uživatelem prostudován a uživatel mu musí plně porozumět před tím než začne přístroj používat. Uživatel musí dodržet všechna příslušná a požadovaná opatření.  "Bezpečnostní upozornění pro vakuové přístroje".


DA

Bemærk: Denne manual foreligger ikke på alle EU sprog. Brugeren må ikke betjene apparatet hvis manualen ikke er forstået. I det tilfælde skal en teknisk korrekt oversættelse af hele manual stilles til rådighed. Manual skal være gennemlæst og forstået før apparatet betjenes og alle nødvendige forholdsregler skal tages.  »Sikkerhedsregler for vakuumudstyr«


EE

Tähelepanu! Käesolev kasutusjuhend ei ole kõigis EL keeltes saadaval. Kasutaja ei tohi seadet käsitseda, kui ta ei saa kasutusjuhendist aru. Sel juhul peab saadaval olema kogu kasutusjuhendi tehniliselt korrektne tõlge. Enne seadme kasutamist tuleb kogu juhend läbi lugeda, see peab olema arusaadav ning kõik nõutud meetmed peavad olema rakendatud.  "Ohutusnõuded vaakumseadmetele"


ES

Atención: Este manual no está disponible en todos los idiomas de UE. El usuario no debe manejar el instrumento si no entiende este manual. En este caso se debe disponer de una traducción técnicamente correcta del manual completo. El manual debe ser leído y entendido completamente y deben aplicarse todas las medidas de seguridad antes de manejar el instrumento.  "Notas sobre la seguridad para equipos de vacío"


FI

Huomio: Tämä käyttöohje ei ole saatavilla kaikilla EU: n kielillä. Käyttäjä ei saa käyttää laitetta, jos hän ei ymmärrä tätä ohjekirjaa. Tässä tapauksessa on saatavilla oltava teknisesti oikein tehty ja täydellinen ohjekirjan käännös. Ennen laitteen käyttöä on ohjekirja luettava ja ymmärrettävä kokonaan sekä suoritettava kaikki tarvittavat valmistelut ja muut toimenpiteet.  "Vakuumlaitteen turvallisuustiedot"


GR

Προσοχή! : Οι οδηγίες αυτές δεν είναι διαθέσιμες σε όλες τις γλώσσες της Ευρωπαϊκής Ένωσης. Ο χρήστης δεν πρέπει να θέσει σε λειτουργία την συσκευή αν δεν κατανοήσει πλήρως τις οδηγίες αυτές. Σε τέτοια περίπτωση ο χρήστης πρέπει να προμηθευτεί ακριβή μετάφραση του βιβλίου οδηγιών. Ο χρήστης πρέπει να διαβάσει και να κατανοήσει πλήρως τις οδηγίες χρήσης και να λάβει όλα τα απαραίτητα μέτρα πριν θέσει σε λειτουργία την συσκευή.  "Υποδείξεις ασφάλειας για αντλίες κενού"


HR

Pažnja: ove upute ne postoje na svim jezicima Europske Unije. Korisnik nemora raditi sa aparatom ako ne razumije ove upute. U tom slučaju tehnički ispravni prijevod cijelih uputstava mora biti na raspolaganju. Uputstva moraju biti cijela procitana i razumljiva prije rada sa aparatom i sve zahtijevane mjere moraju biti primjenjene.  "Sigurnosne napomene za vakuumske uređaje"

HU


Figyelem! Ez a kezelési utasítás nem áll rendelkezésre az EU összes nyelvén. Ha a felhasználó nem érti jelen használati utasítás szövegét, nem üzemeltetheti a készüléket. Ez esetben a teljes gépkönyv fordításáról gondoskodni kell. Üzembe helyezés előtt a kezelőnek végig kell olvasnia, meg kell értenie azt, továbbá az üzemeltetéshez szükséges összes mérést el kell végeznie.  "A vákuum-készülékekkel kapcsolatos biztonsági tudnivalók"

IT

Attenzione: Questo manuale non è disponibile in tutte le lingue della Comunità Europea (CE). L'utilizzatore non deve operare con lo strumento se non comprende questo manuale. In questo caso deve essere resa disponibile una traduzione tecnicamente corretta del manuale completo. Il manuale deve essere completamente letto e compreso prima di operare con lo strumento e devono essere applicati tutti gli accorgimenti richiesti.  "Istruzioni di sicurezza per apparecchi a vuoto"


JP

注意：この取扱説明書はすべての言語で利用可能ではありません。もしこの取扱説明書を理解できないならば、ユーザーは装置を操作してはなりません。この場合、技術的に正しい翻訳がなされた完全なマニュアルを用意しなければなりません。装置を作動する前にマニュアルを完全に読み、そして理解されなくてはなりません。そして、すべての要求される対策を講じなければなりません。


 真空装置を安全に取り扱うために

KR


주의 : 이 매뉴얼은 모든 언어로 번역되지는 않습니다. 만약 이 매뉴얼의 내용을 충분히 인지하지 못했다면 기기를 작동하지 마십시오. 매뉴얼의 내용을 기술적으로 정확하게 번역한 경우에 이용하십시오. 기기를 사용하기 전에 이 매뉴얼을 충분히 읽고 이해하고 모든 요구되는 사항들을 적용해야 합니다.

 진공 장비에 대한 안전 정보


LT

Dėmesio: šis vadovas nėra pateikiamas visomis ES kalbomis. Naudotojui draudžiama eksploatuoti įtaisą, jeigu jis nesupranta šio vadovo. Tokiu atveju reikia turėti viso vadovo techniškai taisyklingą vertimą. Vadovą būtina visą perskaityti ir suprasti pateikiamas instrukcijas prieš pradėdant eksploatuoti įtaisą, bei imtis visų reikiamų priemonių.  "Vakuuminės įrangos saugos informacija"


LV

Uzmanību: Lietotāja instrukcija nav pieejama visās ES valodās. Lietotājs nedrīkst lietot iekārtu, ja viņš nesaprot lietotāja instrukcijā rakstīto. Šādā gadījumā, ir nepieciešams nodrošināt tehniski pareizu visas lietotāja instrukcijas tulkojumu. Pirms sākt lietot iekārtu, un, lai izpildītu visas nepieciešamās prasības, iekārtas lietotāja instrukcija ir pilnībā jāizlasa un jāsaprot.  "Vakuuma iekārtu drošības noteikumi"


NL

Attentie: Deze gebruiksaanwijzing is niet in alle talen van de EU verkrijgbaar. De gebruiker moet niet met dit apparaat gaan werken als voor hem/haar de gebruiksaanwijzing niet voldoende duidelijk is. Bij gebruik van deze apparatuur is het noodzakelijk een technisch correcte vertaling van de complete gebruiksaanwijzing te hebben. Voor het in gebruik nemen van het apparaat moet de gebruiksaanwijzing volledig gelezen en duidelijk zijn en dienen alle benodigde maatregelen te zijn genomen.  "Veiligheidsvoorschriften voor vacuümapparaten"


PL

Uwaga!! Ta instrukcja nie jest dostępna we wszystkich językach Unii Europejskiej. Użytkownik nie może rozpocząć pracy z urządzeniem dopóki nie przeczytał instrukcji i nie jest pewien wszystkich informacji w niej zawartych. Instrukcja musi być w całości przeczytana i zrozumiana przed podjęciem pracy z urządzeniem oraz należy podjąć wszystkie niezbędne kroki związane z prawidłowym użytkowaniem.  "Wskazówki bezpieczeństwa do urządzeń próżniowych"


PT

Atenção: Este manual não está disponível em todas as línguas da UE. O usuário não deve utilizar o dispositivo, se não entender este manual. Neste caso, uma tradução tecnicamente correta do manual completo tem de estar disponível. O manual deve ser lido e entendido completamente antes da utilização do equipamento e todas as medidas necessárias devem ser aplicadas.  "Informação de Segurança para Equipamento que funciona a Vácuo"


RO

Atentie: Acest manual nu este disponibil in toate limbile EU. Utilizatorul nu trebuie sa lucreze cu aparatul daca nu intelege manualul. Astfel, va fi disponibile o traducere corecta si completa a manualului. Manualul trebuie citit si inteles in intregime inainte de a lucra cu aparatul si a luat toate masurile care se impun.  "Instrucțiuni de siguranță pentru aparatele de vidare"


RU

Внимание: Эта инструкция по эксплуатации не имеется на всех языках. Потребителю не дозволено эксплуатировать данный прибор, если он не понимает эту инструкцию. В этом случае нужен технически правильный перевод полной инструкции. Прежде чем использовать этот прибор, необходимо полностью прочитать и понять эту инструкцию и принять все необходимые меры.  "Указания по технике безопасности при работе с вакуумными устройствами"


SE

Varning: Denna instruktion är inte tillgänglig på alla språk inom EU. Användaren får inte starta utrustningen om hon/han inte förstår denna instruktion. Om så är fallet måste en tekniskt korrekt instruktion göras tillgänglig. Instruktionen måste läsas och förstås helt före utrustningen tas i drift och nödvändiga åtgärder göres.  "Säkerhetsinformation för vakuumutrustning"


SI

Pozor: Ta navodila niso na voljo v vseh jezikih EU. Uporabnik ne sme upravljati z napravo, če ne razume teh navodil. V primeru nerazumljivosti mora biti na voljo tehnično pravilen prevod. Navodila se morajo prebrati in razumeti pred uporaba naprave, opravljene pa moraja biti tudi vse potrebne meritve.  "Varnostni nasveti za vakuumske naprave"

SK

Upozornenie: Tento manuál nie je k dispozícii vo všetkých jazykoch EÚ. Užívateľ nesmie obsluhovať zariadenie, pokiaľ nerozumie tomuto manuálu. V takomto prípade musí byť k dispozícii technicky správny preklad celého manuálu. Pred obsluhou zariadenia je potrebné si prečítať celý manuál a porozumieť mu, a musia byť prijaté všetky opatrenia.  "Bezpečnostné pokyny pre vákuové zariadenia"

TR

Dikkat : Bu kullanım kitabı, tüm dillerde mevcut değildir. Kullanıcı, bu kullanım kitabını anlayamadıysa cihazı çalıştırmamalıdır. Bu durumda, komple kullanım kitabının, teknik olarak düzgün çevirisinin bulunması gerekir. Cihazın çalıştırılmasından önce kullanım kitabının komple okunması ve anlaşılması ve tüm gerekli ölçümlerin uygulanması gerekir.  "Vakumlu cihazlar için güvenlik uyarıları"

Contents

Safety information	7
General information	7
Intended use	7
Connecting the controller	7
Ambient conditions	8
Operating conditions	8
Safety during operation	9
Maintenance and repair	9
⚠ Important information: Equipment marking (ATEX)	11
Technical data	12
Wetted parts	13
Description	14
Notes on operation	18
General view of factory-set modes	19
Menu structure of controller	20
Working with the controller	23
Readjustment	29
Calibration in the factory	30
Interface parameters	30
Setting of the interface	30
Read commands compatible to "CVC 2000"	31
Write commands compatible to "CVC 2000"	33
Read commands compatible to "CVC 3000"	34
Write commands compatible to "CVC 3000"	37
Troubleshooting	38
Cleaning the pressure transducer	40
Accessories	41
Notes on return to the factory	42
Health and safety clearance form	43
EC Declaration of Conformity	44



➔ DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



⚠ WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



• CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE is used to address practices not related to personal injury.



Isolate equipment from mains.



Safety information

General information

WARNING

- ☞ **Read and comply with this manual before installing or operating the equipment.**
- ☞ **Do not use the equipment if it is damaged.**

NOTICE

To operate the vacuum controller, valves and/or vacuum pumps are necessary. Otherwise the controller works as measuring device.

The vacuum controller **VNC 2 VARIO E** operates only with a VACUUBRAND NT VARIO 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.

If the equipment is not used immediately, replace the protective covers. Store the equipment in suitable conditions.

Intended use

WARNING

- ☞ Ensure that the individual components are only connected, combined and operated according to their design, or with OEM parts, and as indicated in the instructions for use.
- ☞ Comply with notes on correct vacuum and electrical connections, see section „Description“, pg. 14.
- ☞ The equipment is designed for **ambient and gas temperatures** at continuous operation between +10°C and +40°C and up to 80°C for short periods at the vacuum connection. Check the maximum temperatures, especially if installing the equipment in a cabinet or a housing and make sure ventilation is adequate. Ensure that the maximum permitted gas temperature at the pressure transducer (see „Technical data“, pg. 12) is not exceeded.

NOTICE

Use the equipment and all system parts **only as intended**, that is, for control and measurement of vacuum in vessels designed for that purpose.

Connecting the controller

WARNING

- ☞ **Do not permit any uncontrolled pressurizing (e.g., make sure that pipelines cannot become blocked) to avoid a risk of bursting!**
- ☞ Check the maximum ambient and gas temperatures (see „Technical data“, pg. 12), especially if installing the equipment in a cabinet or a housing or in case of elevated ambient temperatures.

CAUTION

- **Comply with maximum permissible pressures** at the pressure transducer, see section „Technical data“, pg. 12.
- Connect hoses gas tight at the vacuum connection of the pressure transducer.
- Ensure the stability of hose connections.

- Check the power source and the equipment's rating plate to be sure that the power source and the equipment match in voltage, phase, and frequency.
- In case of residues or aggressive or condensable media install a gas washing bottle if necessary.
- Use inert gas for venting if necessary. Avoid overpressure of more than 0.2 bar in case inert gas is connected.

NOTICE

The VNC 2(E) is equipped with a **short circuit proof wide range power supply** with an integrated overload protection. The controller VNC 2 VARIO E is supplied with 24V DC by the power supply of the NT VARIO pump.

Avoid high heat supply (e.g., due to hot process gases).

Connect the equipment to the vacuum application.

Position the controller and its vacuum connection lines in such a way that condensate cannot flow towards the pressure transducer.

Allow the equipment to equilibrate to ambient temperature if you bring it from cold environment into a room prior to operation. Notice if there is water condensation on cold surfaces.

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**.

VNC 2 (E):

Do not connect to VACUUBRAND NT VARIO pump or pumping unit.

VNC 2 VARIO E:

Connect only to VACUUBRAND NT VARIO pump or pumping unit.

Ambient conditions



WARNING

☞ Pay attention to the **permissible maximum ambient and gas temperatures** (see „Technical data“, pg. 12).



CAUTION

• Adopt suitable measures in case of differences from recommended conditions, e.g., using the equipment outdoors, conductive pollution or external condensation.

NOTICE

To the best of our knowledge the equipment is in compliance with the requirements of the applicable EC-directives and harmonized standards (see "Declaration of conformity") with regard to design, type and model. Directive EN 61010-1 gives in detail conditions under which the equipment can be operated safely (see also IP degree of protection, pg.12).

Operating conditions



DANGER

- This device is not approved for operation in potentially explosive atmospheres. Do not operate the device in potentially explosive atmospheres.
- Controllers without the "**Ex**" mark on the rating plate are not approved for operation with dangerous or explosive gases or with potentially explosive or inflammable substances. Do not operate the controller with dangerous or explosive gases or with potentially explosive or inflammable substances.

- Controllers bearing the "Ex" mark on their rating plates are approved for operation with potentially explosive atmospheres according to their classification II 3G IIC T3 X according to ATEX, but they are not approved for operation in potentially explosive atmospheres (see section „Ex Important information: Equipment marking (ATEX)“, pg. 11).



- Ensure that the materials of the controller's wetted parts are compatible with the substances in the vacuum system, see section „Technical data“, pg. 12.

Safety during operation



- Adopt suitable measures to prevent the release of dangerous, toxic, explosive, corrosive, noxious or polluting fluids, vapours and gases.



- ☞ Prevent any part of the human body from coming into contact with vacuum.
- ☞ **Attention:** At pressures above approximately 1100 mbar the pressure reading becomes incorrect due to saturation of the pressure transducer.
Release pressure immediately! Risk of bursting!
At pressures above 1060 mbar the **display flashes**.
"p Error" is displayed and the controller sounds five blips.

- ☞ Use only original manufacturer's spare parts and accessories. Otherwise the safety and performance of the equipment, as well as the electromagnetic compatibility of the equipment might be reduced.
The CE mark or the cTÜVus mark may be voided if not using original manufacturer's spare parts.



- Switching of an in-line valve or a vacuum pump, or opening of a venting valve by the controller must not lead to a critical dangerous situation under any circumstances.
- **Attention: If Auto-Start "Auto-St."** is preselected, the process starts 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 starting process control**, whether the option "Auto-Start" is enabled.

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 appropriate protective measures to allow for the possibility of failure and malfunction. The protective measures must also allow for the requirements of the respective application.

Maintenance and repair



- Switch off the vacuum controller.
- Disconnect the power supply and wait two minutes before starting maintenance to allow the capacitors to discharge.
- **Note:** The equipment may be contaminated with chemicals, which have been processed during operation. Ensure that the equipment is completely decontaminated before maintenance commences. Take adequate precautions to protect

people from the effects of dangerous substances if contamination has occurred. Use appropriate protective clothing, safety goggles and protective gloves.

WARNING

ⓘ Before starting **maintenance** vent the vacuum controller and isolate the it from the vacuum system.

NOTICE

Ensure that maintenance is done only by suitably trained and supervised technicians. Ensure that the maintenance technician is familiar with the safety procedures, which relate to the products processed in the vacuum system.

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“, pg. 42) are followed.

⊕ Important information: Equipment marking (ATEX)

VACUUBRAND equipment bearing mark (see rating plate)

⊕ II 3G IIC T3 X
Internal Atm. only
Tech. File Ref.: VAC-EX01

and

VACUUBRAND equipment bearing mark (see rating plate)

⊕ X see manual

For equipment labelled with „⊕ X see manual“ the following classification according to Directive 94/9/EC (ATEX) is valid: ⊕ II 3G IIC T3 X, Internal Atm. only, Tech. File Ref.: VAC-EX01.

The classification II 3G IIC T3 X according to ATEX is only valid for the inner part (wetted part, pumped gas or vapor) of the equipment. The equipment is not suitable for use in external, potentially explosive atmospheres (environment).

The overall category of the equipment depends on the connected components. If the connected components do not comply with the classification of the VACUUBRAND equipment, the specified category of the VACUUBRAND equipment is no longer valid.

Vacuum pumps and vacuum gauges in category 3 are intended for connection at equipment in which during normal operation explosive atmospheres caused by gases, vapors or mists normally don't occur or, if they do occur, are likely to do so only infrequently and for a short period only.

Equipment in this category ensures the requisite level of protection during normal operation.

The use of gas ballast or the operation of venting valves is only permitted if thereby explosive atmospheres normally don't occur in the interior of the equipment or, if they do occur, are likely to do so only infrequently and for a short period.

The equipment is marked with "X" (according to EN 13463-1), i. e. restrictions of the operation conditions:

- The equipment is designated for a low degree of mechanical stress and has to be installed in a way so that it cannot be damaged from outside.
Pumping units have to be installed protected against shocks from the outside and against glass splinters in the event of breaking (implosion).
- The equipment is designated for an ambient and gas inlet temperature during operation of +10 to +40°C. Never exceed these ambient and gas inlet temperatures. If pumping / measuring gases which are not potentially explosive, extended gas inlet temperatures are valid, see instructions for use, section "Gas inlet temperatures" or "Technical data".

After any intervention at the equipment (e.g., repair / maintenance) the ultimate vacuum of the pump has to be checked. Only if the pump achieves its specified ultimate vacuum, the pump's leak rate is low enough to ensure that no explosive atmospheres will occur in the interior of the equipment.

After any intervention at the vacuum sensor the leak rate of the equipment has to be checked.



Attention: This manual is not available in all languages of the EU. The user must not operate the device if he does not understand this manual. In this case a technically correct translation of the complete manual has to be available. The manual must be completely read and understood before operation of the device and all required measures must be applied.

Technical data

Controller	VNC 2 (E) (not for VACUUBRAND NT VARIO pump or pumping unit)	VNC 2 VARIO E (only for connection to VACUUBRAND NT VARIO pump or pumping unit)
Pressure transducer	capacitive, absolute pressure transducer made of aluminium oxide ceramics, independent of gas type	
Display	alphanumeric LCD display, illuminated 2 x 8 characters	
Pressure units / scale (selectable)	mbar, Torr or hPa	
Measuring range (absolute)	1100 mbar - 1 mbar (825 Torr - 1 Torr)	
Maximum range of pressure control (absolute)*	1060 mbar – 1 mbar (795 Torr – 1 Torr)	
Maximum permissible pressure at pressure transducer (absolute)	1.5 bar (1125 Torr)	
Measurement uncertainty (absolute) after careful adjustment and at constant temperature	<±1 mbar (0.75 Torr) ±1 digit	
Temperature coefficient	<± 0.07 mbar/K (0.05 Torr/K)	
Ambient temperature range (operation)	10°C to +40°C	
Ambient temperature range (storage)	-10°C to +70°C	
Permitted relative atmospheric moisture during operation (no condensation)	30% to 85%	
Maximum permissible temperature of gaseous media at pressure transducer	continuous operation: 40°C** for short periods (< 5min) up to 80°C**	
Max. permitted range of supply voltage	100 V~ (-10%) to 230 V~ (+10%) 50/60 Hz	24 V DC ±10% (VACUUBUS)
Fuse (IEC connection)	5x20 mm, T 8 A / 250 V	
Power draw (no-load operation)	3 VA	2 VA
Power draw with VACUUBRAND VV-B 6C in-line valve and coolant valve VKW-B	max. 10 VA (without switch output)	-
Serial interface	RS 232 C	
Supply line VACUUBUS 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	- one in-line valve VV-B 6C 24V= one coolant valve VKW-B 24 V= one venting valve VB M-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~	

* 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.

** if pumping potentially explosive atmospheres: +10°C to +40°C

*** ohm resistive (inductive) load

Controller	VNC 2 (E) (not for VACUUBRAND NT VARIO pump or pumping unit)	VNC 2 VARIO E (only for connection to VACUUBRAND NT VARIO pump or pumping unit)
Degree of protection according to IEC 529	IP 20 IP 54 (front of VNC 2E)	IP 20 (front) IP 54 (rear)
Vacuum connection	hose connection for PTFE tubing 8/10mm VNC 2 additionally hose nozzle for vacuum hoses with I.D. 6-10 mm	
Weight	0.8 kg	
Dimensions (without vacuum connection, without cable) L x W x H	VNC 2: 163 x 90 x 68 mm VNC 2E: 138 x 90 x 60 mm	138 x 90 x 60 mm
Installation depth behind rear of front panel (version "E")	60 mm	
Stand rod (not version "E")	via thread M8	-
Mains connection	only VNC 2: integrated IEC combination	-
	IEC plug / socket at cable 1m	

- ➔ VACUUBRAND controller VNC 2(E): **Nor** for NT VARIO pumps or pumping units
VACUUBRAND Controller VNC 2 VARIO E: **Only** for NT VARIO pumps or pumping unit.
- ➔ The VACUUBRAND controllers VNC 2 (E) and VNC 2 VARIO E can only be operated with components compatible to the VACUUBRAND **VACUU•BUS system**, see accessories.

VNC 2 VARIO E

The power for the VNC 2 VARIO E is supplied via the VACUU•BUS connection (24V DC) by the integrated power pack of the NT VARIO pumps and pumping units.

The on/off switch at the front side of the controller separates only the IEC socket (connection mains cable) from the IEC plug (connection NT VARIO pump). Therefore a connected VACUUBRAND NT VARIO pump or pumping unit can be operated and switched on and off via the VNC 2 VARIO E.

Permitted voltage and current at the IEC plug: See rating plate of the NT VARIO pump or pumping unit.

Wetted parts

Components	Wetted materials
Sensor	aluminium oxide ceramics
Sensor housing	PPS / glass fibre
Sensor seal	chemically resistant fluoroelastomer
Venting valve seal	FPM

We reserve the right for technical modifications without prior notice!

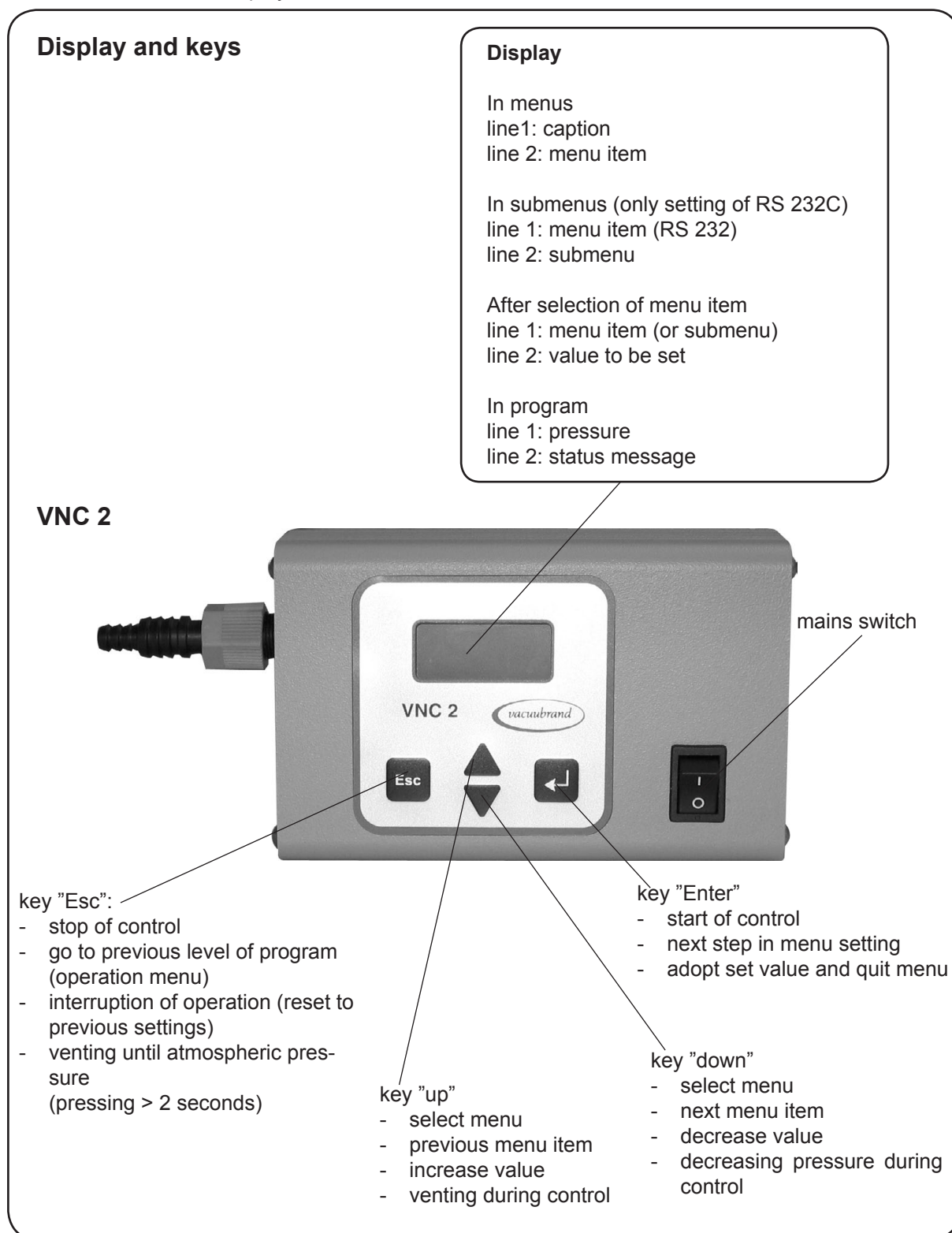
Description

NOTICE

After the connection of components, the controller can be operated in different basic modes, see „General view of factory-set modes“, pg. 19.

The vacuum controller **VNC 2 VARIO E** operates only VACUUBRAND NT VARIO pumps and pumping units.

When switching on the controller, the current basic mode and the **version number** are displayed for 2s.



VNC 2 connections

vacuum connection
hose nozzle DN 10/6 mm

sockets for connection of
coolant valve, venting valve, in-line valve,
level sensor, external pressure transducer
(VACUU•BUS)

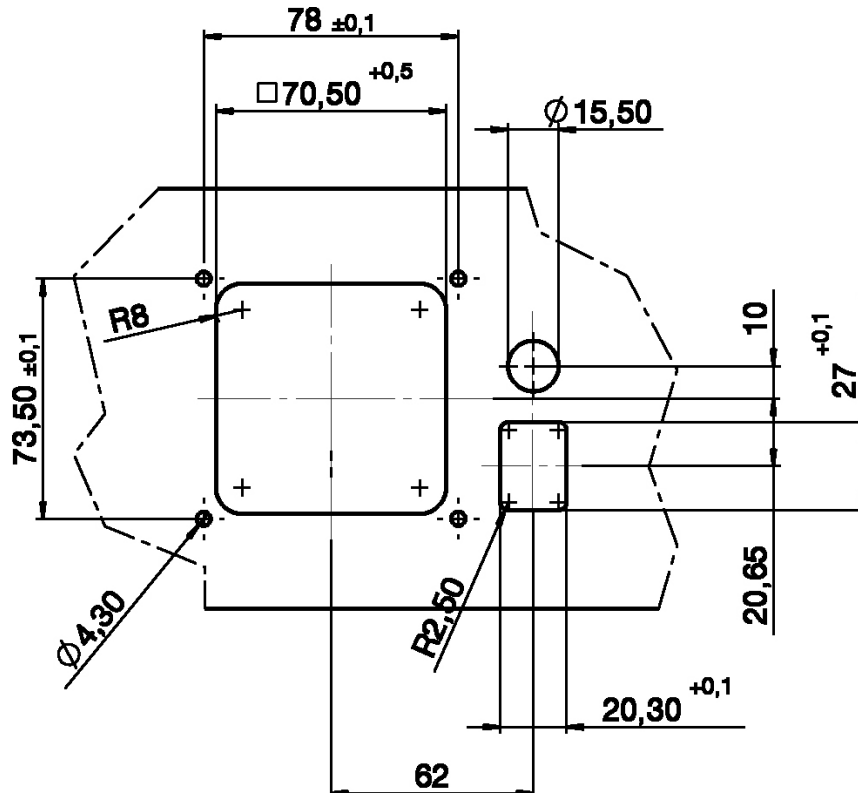
serial interface
RS 232 C

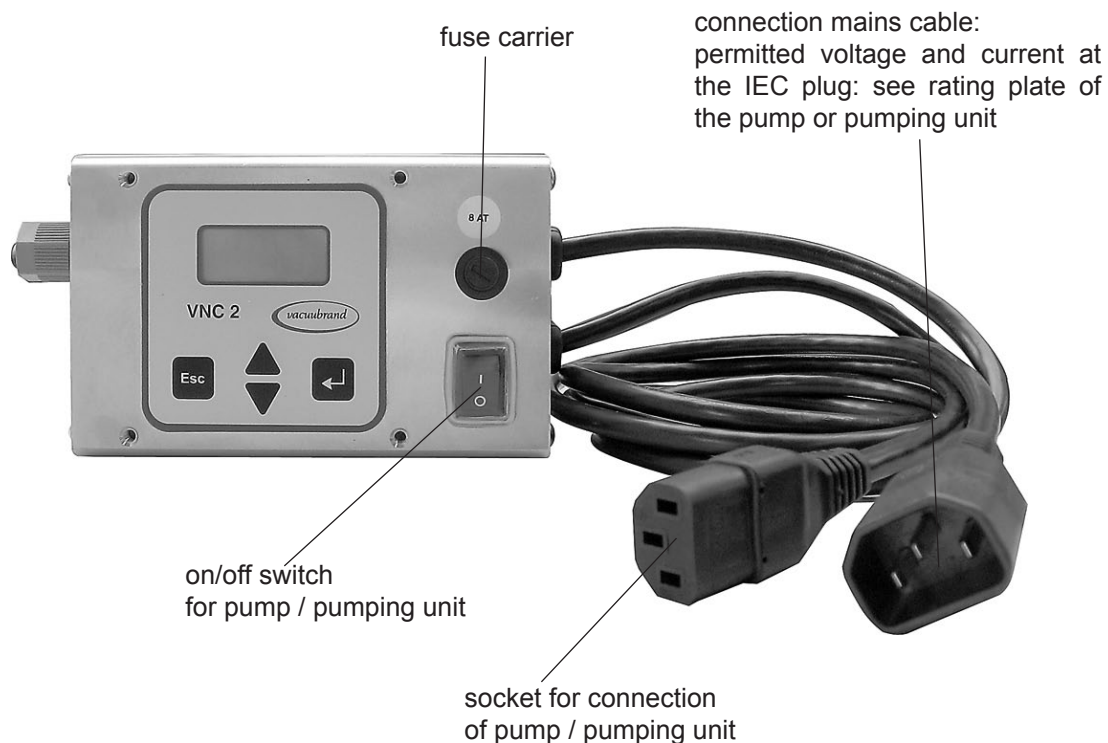
socket for connection of
pump or valve according
to voltage supply
(switch output)

fuse carrier
at switch output

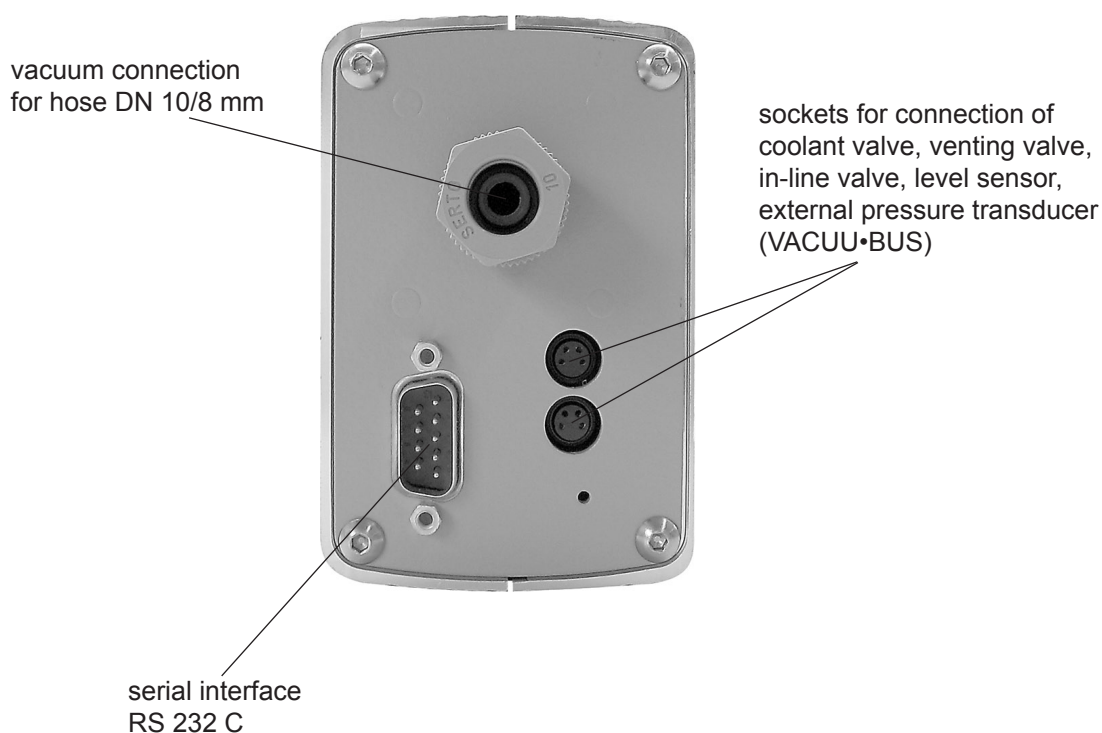
connection mains cable

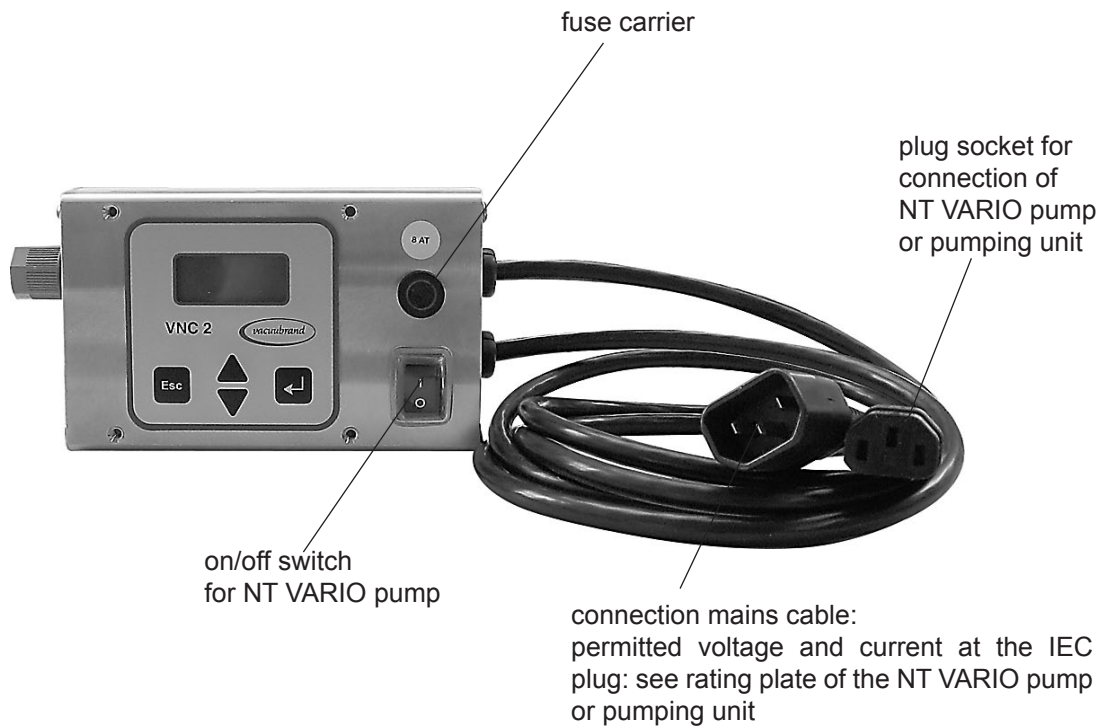
Cut-out for front assembly (versions "E")



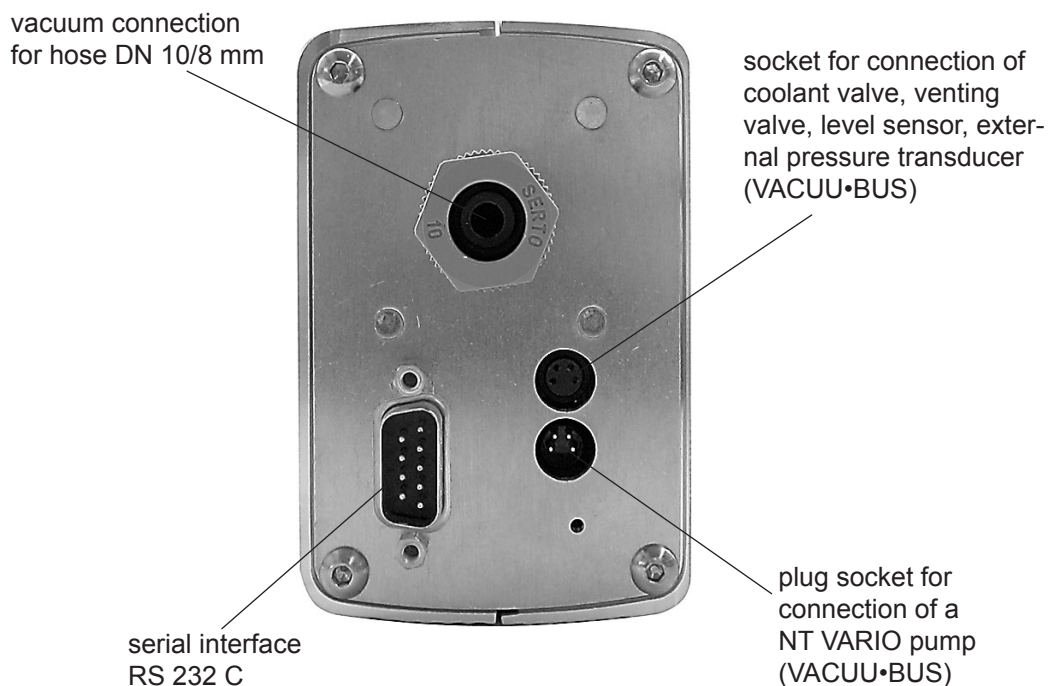
VNC 2E (built-in version to be assembled at a front plate)Function of keys and display see **VNC 2!**

Note: The second label "8 AT" fixed with adhesive tape is intended to be glued onto the front plate of the laboratory furniture.

VNC 2E connections

VNC 2 VARIO E (built-in version to be assembled at a front plate)Function of keys and display see **VNC 2!**

Note: The second label "8 AT" fixed with adhesive tape is intended to be glued on the front plate of the laboratory furniture.

VNC 2 VARIO (E) connections

Notes on operation

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

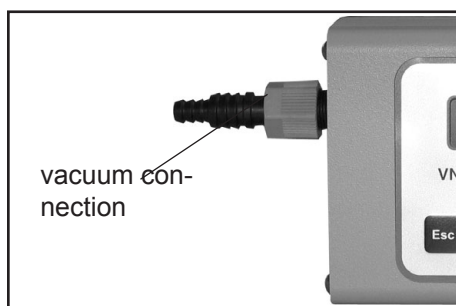
When switching on the controller VNC 2 for the very first time, a menu to select the language of the controller menu is displayed. Select the desired language ("Deutsch", "English", "Français") using the keys ▼ and ▲, and press "Enter" to confirm. Then select the pressure unit ("mbar", "Torr" or "hPa") in the same way.

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

Connecting an external pressure transducer VSK 3000 will automatically replace the internal pressure transducer as active sensor. The display will show the vacuum measured by the VSK 3000, the vacuum connection of the controller is rendered inoperable.

WARNING

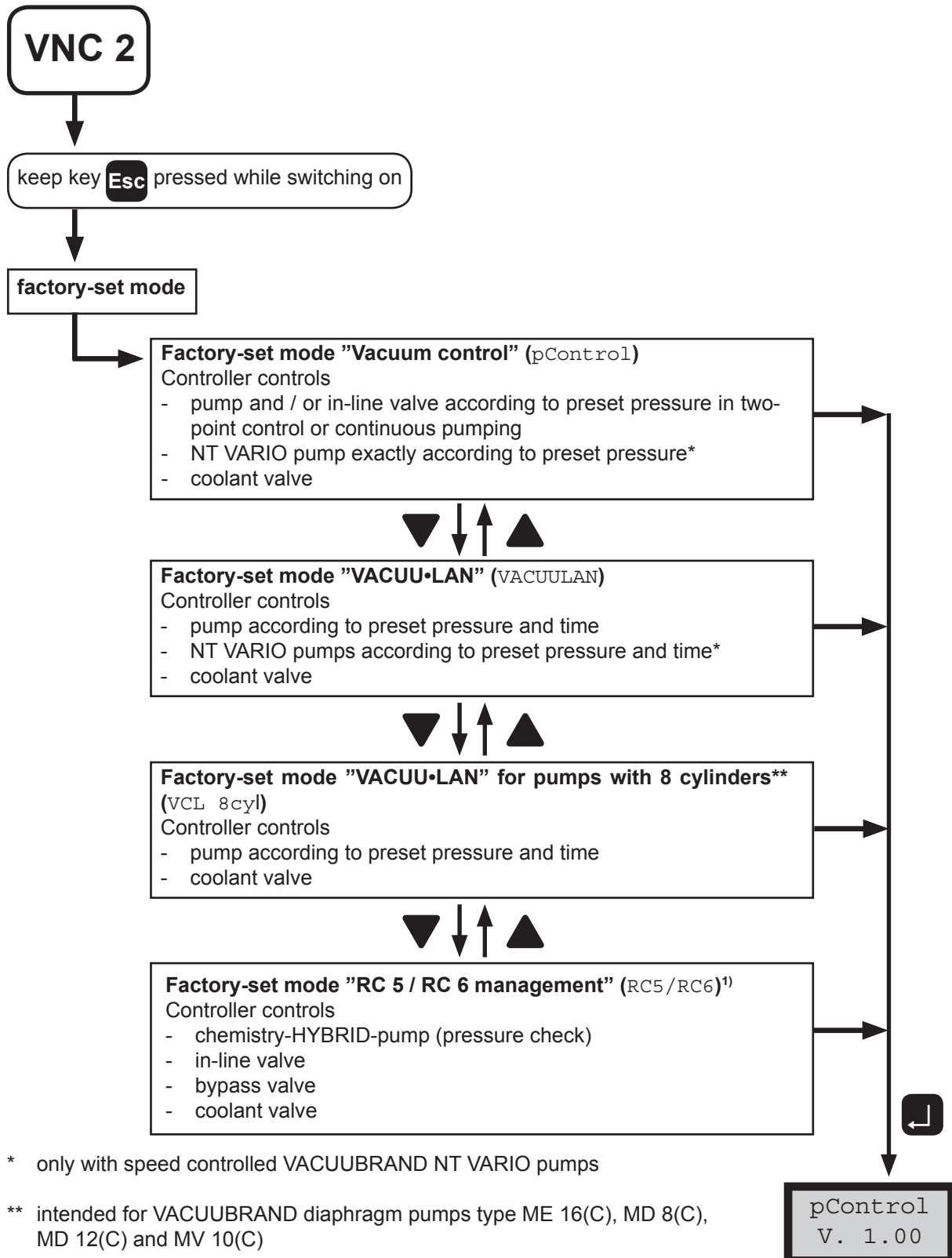
- ⓘ **Attention:** At pressures above approximately 1100 mbar the pressure reading becomes incorrect due to saturation of the pressure transducer.
Release pressure immediately! Risk of bursting!
 At pressures above 1060 mbar the **display flashes**.
 Maximum permissible pressure: 1.5 bar absolute.



- Inside a vacuum system where evaporation occurs, the vacuum is not uniform. This affects 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 the pressure transducer, see section „Cleaning the pressure transducer“, pg. 40.

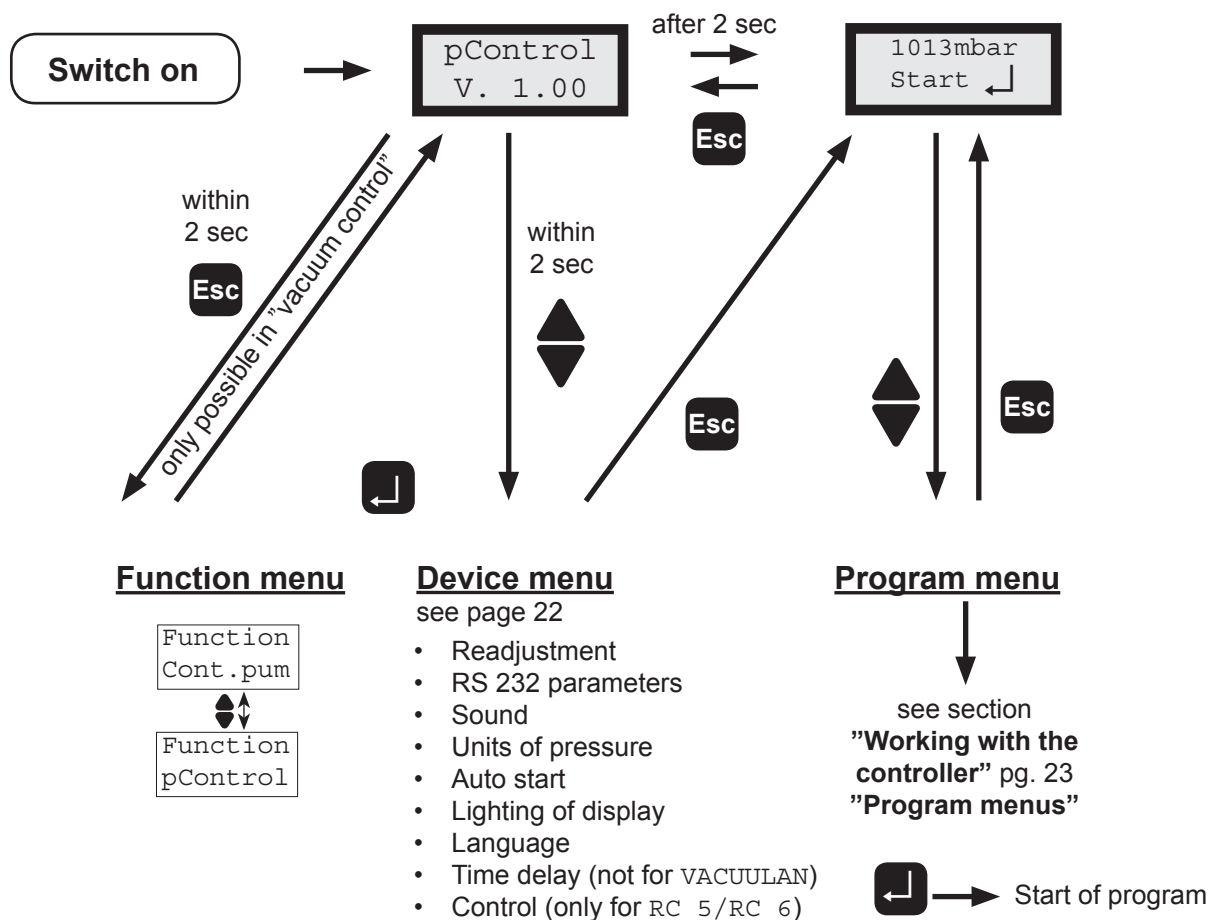
- ⓘ Setting of interface parameters, see „Interface parameters“, pg. 30.
- ⓘ Presettings at controller, see "Factory-set modes and menu structure" pg. 19 and 20.
- ⓘ Operating the controller, see „Working with the controller“, pg. 23.

General view of factory-set modes



Attention: When connecting pumps pay attention to the breaking capacity of the IEC socket (see „Technical data“, pg. 12)!

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“, pg. 29.
- RS 232 parameters: Setting of the interface parameters, see section „Interface parameters“, pg. 30.
- Sound: Switching the function "acoustic warning signal" on/off.
- 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 of 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 in-line valve is connected, a connected pump also runs for the preset time delay with in-line valve closed for self cleaning.

Notes on selecting the factory-set configuration

NOTICE

The controller VNC 2 can be adapted optimally to the specific application by choosing the appropriate factory-set 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 monitored and operated automatically until the controller is switched off. In-line valves and coolant valves are monitored equally.

Automatic NT VARIO detection (only with VACUUBRAND NT VARIO pumps and VNC 2 VARIO E):

If after switching on the pump (without in-line 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, 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 (keep key "Esc" pressed while switching on), the configuration for this mode is adopted, the actual configuration gets replaced.

Four factory-set modes are stored in the controller (see section „General view of factory-set modes“, pg. 19). The individual factory-set modes contain the following function-specific settings in the program menu:

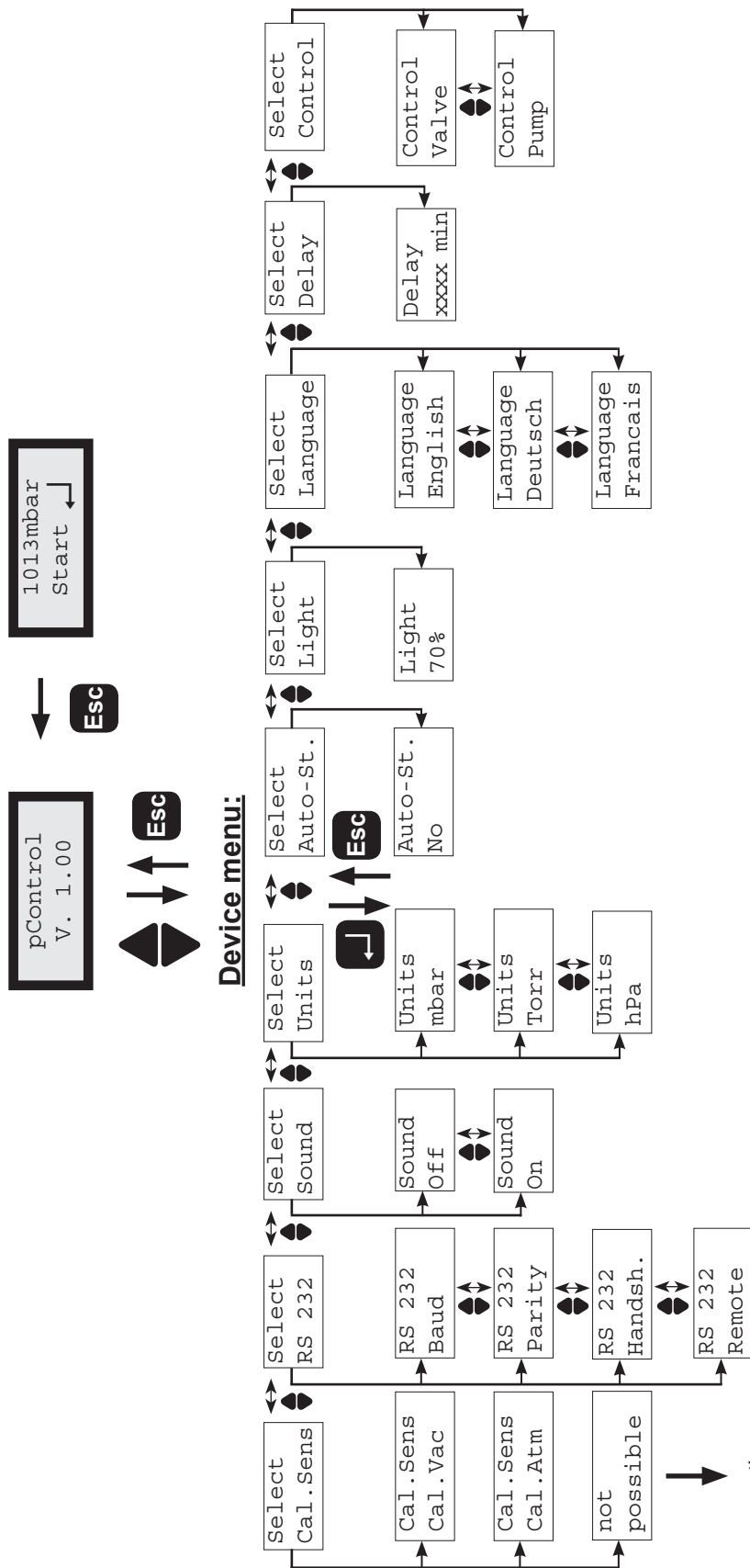
Vacuum control (pControl): Two point control with 5 minutes time delay.
p set: 25 mbar, Δp: Auto, t Off: off, limit: 1060 mbar

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!



see section
"Readjustment"
p. 29

see section
"Interface parameters"
p. 30

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 in-line valve:

- Control of a vacuum pump by direct switching of the pump. A preset time delay has an effect only on an optional coolant valve.

Control with in-line valve:

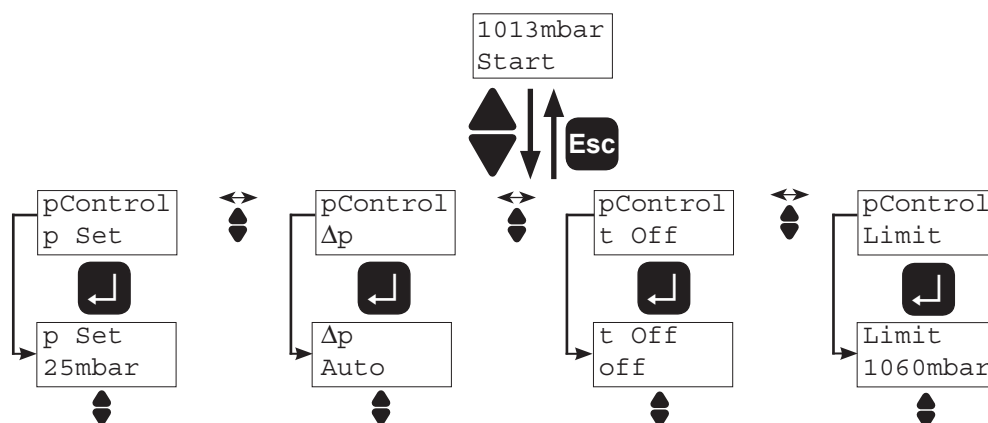
- Control of a vacuum pump via an in-line valve. The pump continues to run according to the preset time delay. This can considerably reduce possible condensation inside the pump. The coolant valve is open during vacuum control and during time delay.
- For synchronous switching of the pump and the in-line valve:
Configure the time delay in the device menu: Delay: off.

Operation of a speed controlled NT VARIO vacuum pump (only with VNC 2 VARIO E):

- If after switching on the pump (without in-line valve) a NT VARIO pump is detected, the controller changes automatically to the 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



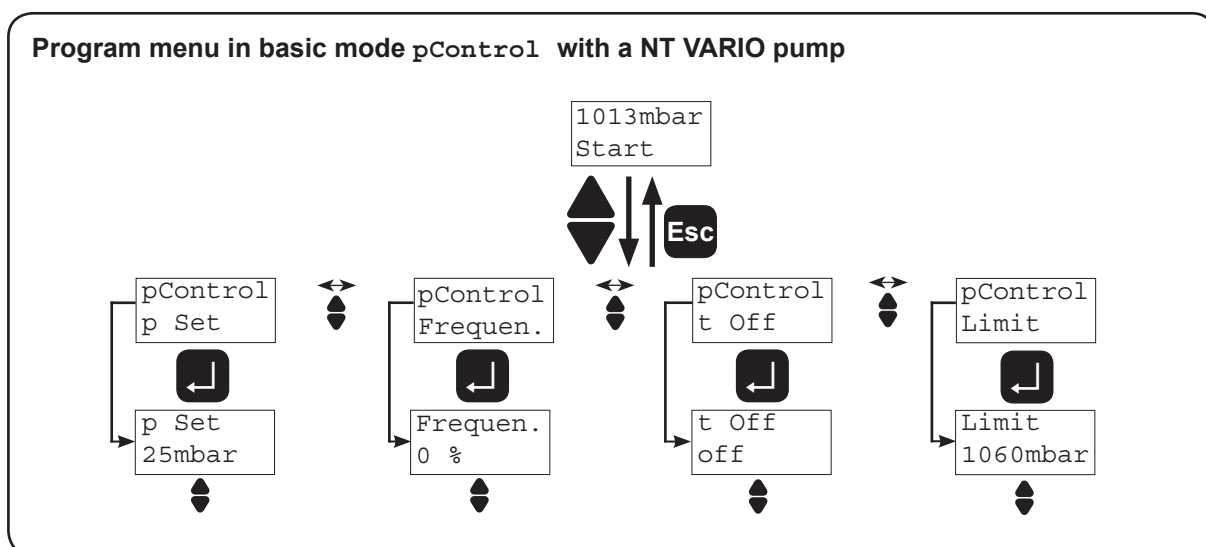
- **Vacuum control of a vacuum pump (with in-line valve if applicable)**

Settings in the program menu:

- ☞ **Preset pressure** (p_{Set}): Lower pressure value for two-point control (displayed during active control by a short tip on key \blacktriangledown).
- ☞ **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 effect.
- ☞ **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 (p_{Set}) 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 anytime.

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



- **Vacuum control with a speed controlled pump (VACUUBRAND NT VARIO)**

Settings in the program menu:

- ☞ **Preset pressure** (p_{Set}): Exact vacuum control according to a preset pressure value.
- ☞ **Frequency** ($Frequen.$): **Only in case of pumps with speed control (NT VARIO).** Sets the motor speed (and thus the pumping speed) when the preset pressure is decreased manually.
- ☞ **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 effect.
- ☞ **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 (p_{Set}) for the first time).

Adapting parameters during the regulation:

- **Interruption:** Press key "Enter", the control stops; after releasing the key, the control continues. During the interruption the preset pressure can be set to the actual pressure by pressing the key ▼. By pressing the key ▲, the hysteresis can be set to the actual pressure. 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 (pump is running at set speed).
- **Increase of preset pressure:** Keep key ▲ pressed for more than 2s (venting valve opens).

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 ("Esc"), 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. Pump down ("Continuous pumping") until the boiling point is reached, then press "Enter" and key ▼. The controller keeps the reached pressure value (boiling pressure) constant. Further pumping down by firstly pressing "Esc" (vacuum control is stopped) and then pressing either "Enter" (pump down) or key ▼.

☞ **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 will be switched off.

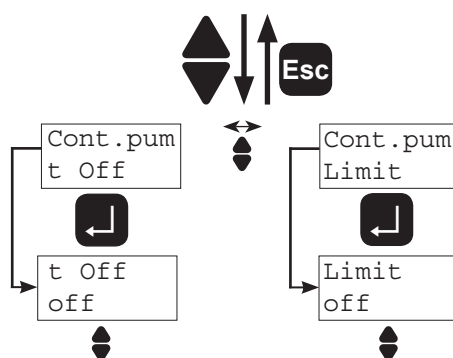
Switching to "continuous pumping" (Cont .pum) using the function menu (see section „Menu structure of controller“, pg. 20)

- ➔ Operation of a vacuum pump using an in-line valve, direct switching of a pump or operation of a NT VARIO pump

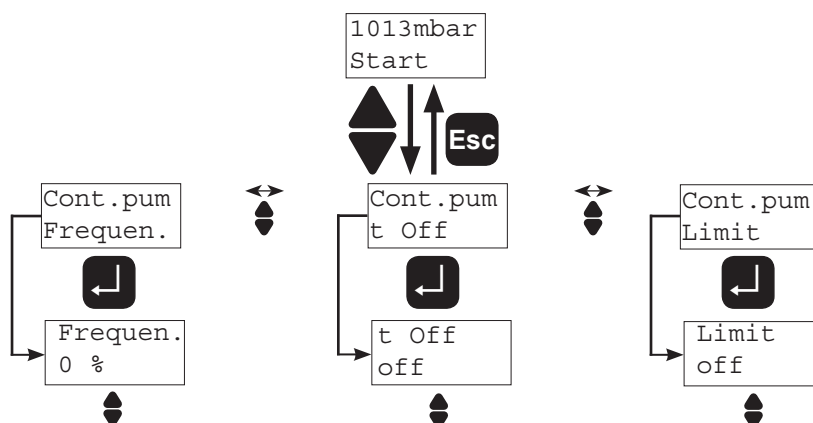
Settings in the program menu:

- ☞ **Switch-off time** (t Off): The duration of the process control (continuous pumping) can be preset.
- ☞ **Limit pressure** (Limit): Shut down of the pump, if the actual pressure has fallen below a preset pressure limit "Limit", e.g. for drying chamber applications.
- ☞ **Frequency** (Frequen.): **Only in case of pumps with speed control (NT VARIO)**. Sets the motor speed (and thus the pumping speed) when the preset pressure is decreased manually.

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

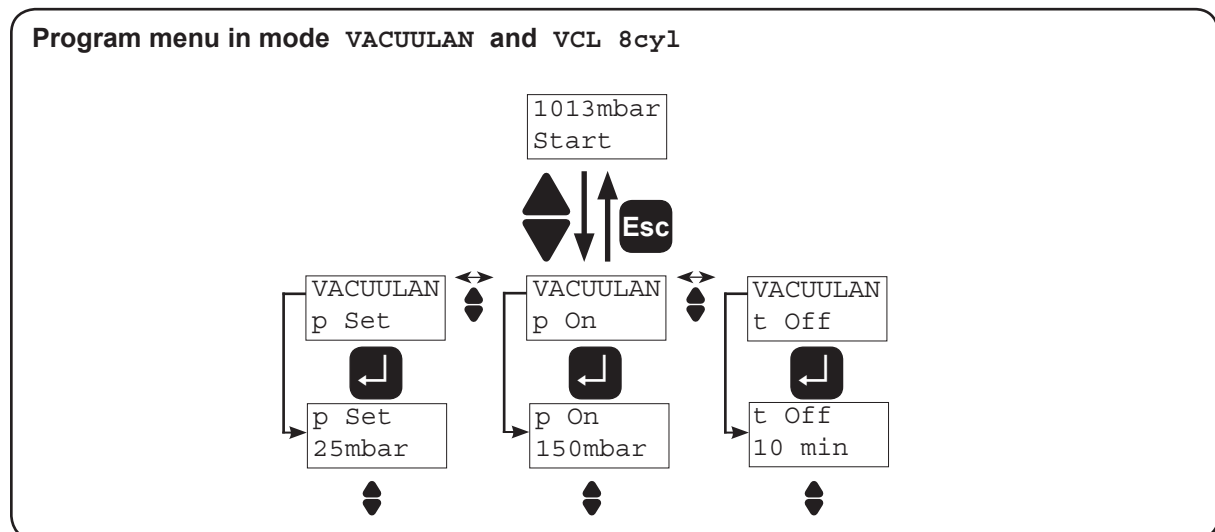


Factory-set mode "VACUU•LAN" and "VACUU•LAN for pumps with 8 cylinders" (VACUULAN and VCL 8cyl)

- operation of a vacuum pump using an in-line valve
- operation without in-line valve: switching 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 3 minutes for start-up) for VACUUBRAND pumps type ME 16(C), MD 8(C), MD 12(C) and MV 10(C)

Settings in the program menu:

- ☞ **Lower pressure value** (p Set) and **switch-off time** (t Off): If the pressure falls 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). Process control stops when the switch-off time has passed. The vacuum pump is switched off, if the pressure stays below "p set" for longer than "t Off". The pump starts again in case of a large pressure increase. If the pressure is higher than "p set", then the time meter for automatic shut down is reset.
- ☞ **Upper pressure value** (p On): If the pressure is higher than "p On" , the pump starts again. Only for pumps with 8 cylinders: Pumping down does not restart before three minutes have elapsed since the shut down. This is to enable a reliable restart of pumps equipped with start-up control.



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 basic 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 process time:	Timeout
Key "ENTER" pressed:	Pause (valve closed, speed 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"

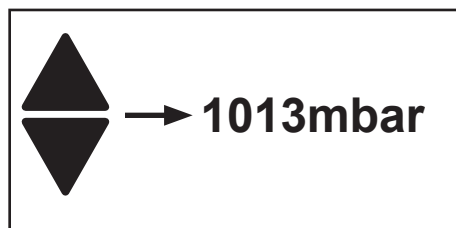
Process running, pressure above lower pressure value	Process
Time delay, pressure below lower pressure value:	xxx min
Key "ENTER" pressed:	xxx % (only with NT VARIO pumps during process)
After process, pressure check:	Monitor
Key "ENTER" pressed after process:	xxx/min (increase of pressure)
VCL 8cyl:	
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 (DAkkS calibration laboratory) 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

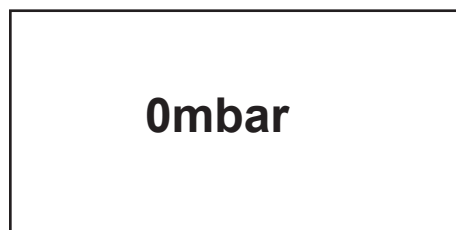


Ventilate the controller and/or the vacuum system. Make sure that the vacuum connection at the controller is at atmospheric pressure.

- ➔ 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

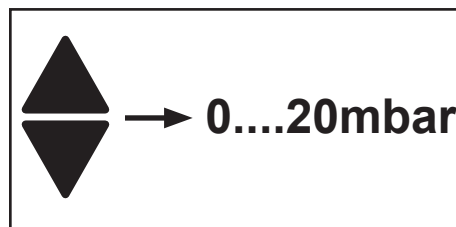


Evacuate the controller via the vacuum connection to a pressure < 0.5 mbar (e. g. by applying a good rotary vane pump).

- ➔ 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 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 DAkKS calibration laboratory is accredited by the Deutsche Akkreditierungsstelle GmbH (national accreditation body of the Federal Republic of Germany) for the measurable variable pressure in the pressure range from $7.5 \cdot 10^{-4}$ Torr to 975 Torr (10^{-3} mbar to 1300 mbar) in accordance with the general criteria for the operation of testing laboratories defined in the DIN EN ISO/IEC 17025:2000 series of standards (accreditation number D-K-15154-01).

Rely on 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 (Physikalisch-Technische Bundesanstalt; German national institute for science and technology and the highest technical authority of the Federal Republic of Germany for the field of metrology and certain sectors of safety engineering).

DAkKS Calibration Controller VNC 2900217

Interface parameters

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

- ☞ Plug-in 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.: 638235).

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. Adjust interface parameters with keys ▲ or ▼ and confirm with "Enter".

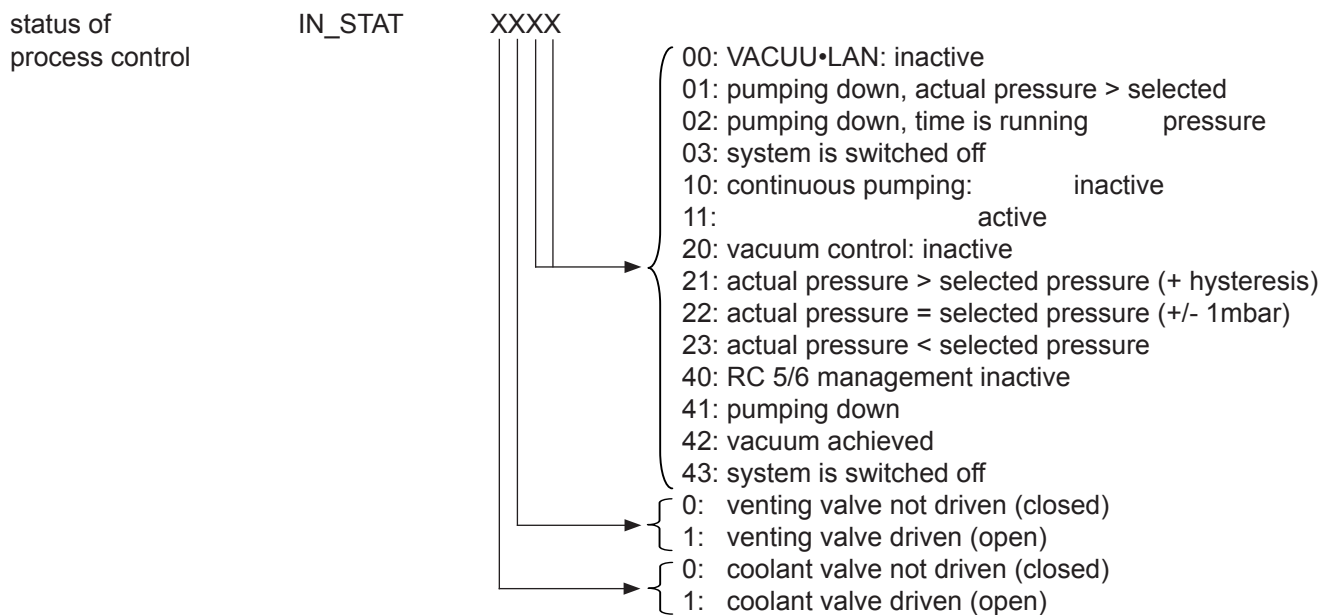
- ➔ Baud 2400, 4800, 9600 or 19200
- ➔ Parity: 7 data bits odd (Parity 7-O-1); 7 data bits even (Parity 7-E-1);
8 data bits none (Parity 8-N-1)
- ➔ Handshake (Handsh.): no Handshake (Handsh. None), XON/XOFF Handshake (Handsh. Xon-Xoff), RTS/CTS Handshake (Handsh. RTS-CTS)
- ➔ Remote On, Remote Off,
- ➔ Startbit = 1, Stopbit = 1
- ➔ 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 compatible to "CVC 2000"

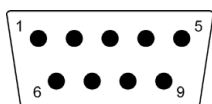
Function	Command	Response	Description
actual vacuum	IN_PV_1	XXXX mbar or XXXX Torr or XXXX hPa	unit according to preselection
actual pumping speed	IN_PV_2	XX.X Hz	
process runtime	IN_PV_3	XX:XX h:m	
LAN pressure increase	IN_PV_4	xxx/min	
LAN process time	IN_PV_5	XX:XX h:m	VACUU•LAN: runtime of pump since last switching of the pump
preset vacuum	IN_SP_1	XXXX mbar or XXXX Torr or XXXX hPa	unit according to preselection
speed	IN_SP_2	XX.X Hz	preset speed, 99.9 Hz corresponds to "HI"
preselection at controller	IN_CFG	XXXXXX	<ul style="list-style-type: none"> 0: remote mode off 1: remote mode on 0: no automatic switch off 1: automatic switch off 0: no venting valve 1: venting valve 0: no coolant valve 1: coolant valve 0: VACUU•LAN 1: continuous pumping 2: vacuum control 4: RC 5 / RC 6 management
error status	IN_ERR	XXXX	<ul style="list-style-type: none"> 1: last command to interface incorrect 1: failure at pressure transducer 1: overpressure 1: external fault pump electronics, valve, level sensor, ...

Read commands compatible to "CVC 2000"



- ➔ A maximum of ten commands per second is possible.
- ➔ Read commands and commands "REMOTE", "CVC" and "STORE" can be sent always. The sending of other write commands is only possible, if "Remote On" is selected.
- ➔ The commands have to be written in capital letters.
- ➔ Command and parameter have to be separated by a blank.
- ➔ The string is terminated with <CR> or <CR><LF>.
- ➔ The answer of the controller is always terminated with <CR><LF>.
- ➔ Numerical values and parameters can be written without leading zeros.
- ➔ The answer of the controller is always with leading zeros.

Connector assignment



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

Write commands compatible to "CVC 2000"

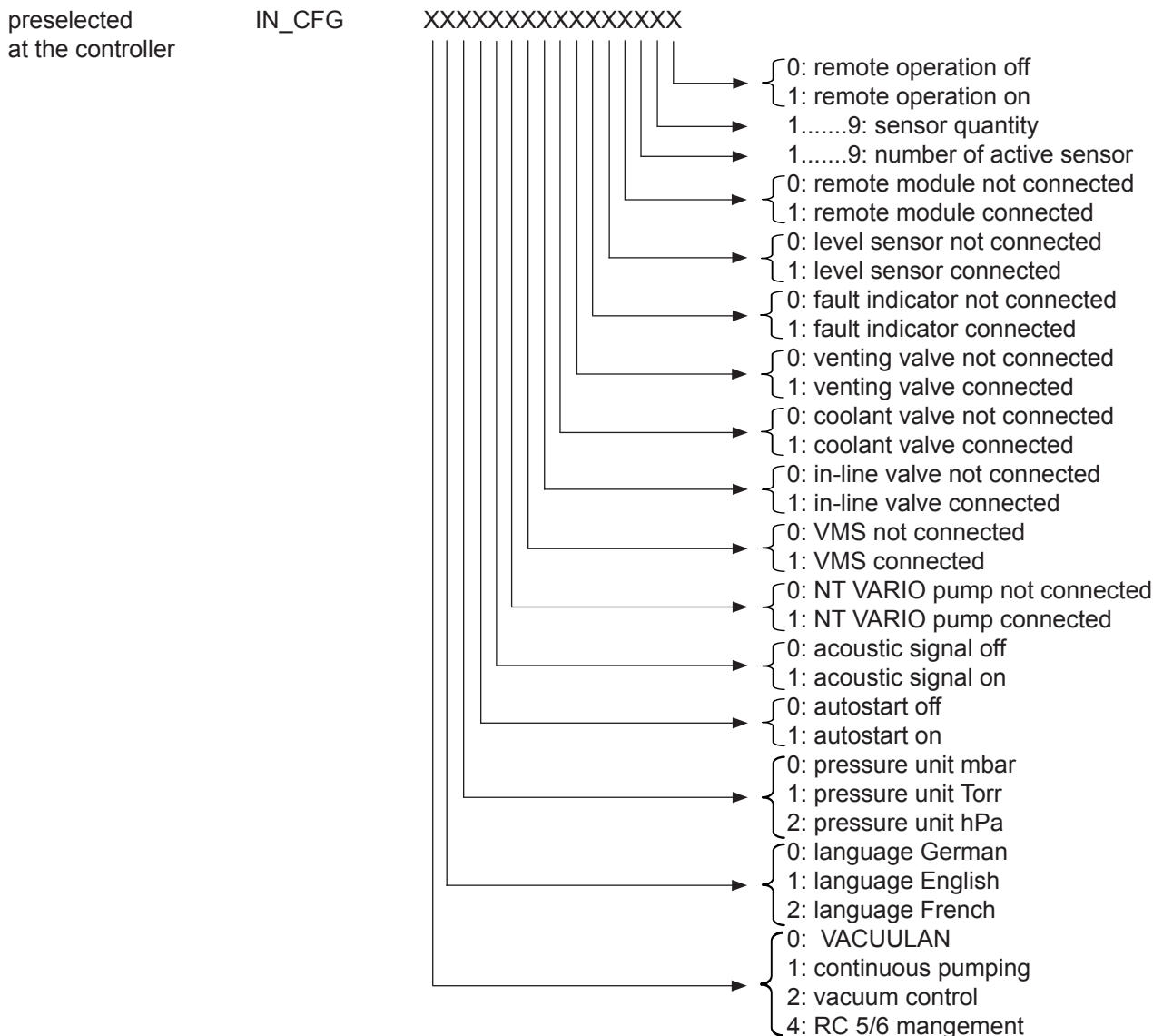
Function	Command	Parameter	Description	Attention: If control is running only switching from 1 to 2 and 2 to 1 is possible.
operation mode	OUT_MODE	X └───┬───> {	0: VACUULAN 1: continuous pumping 2: vacuum control 4: RC 5/6 management	
preset vacuum	OUT_SP_1	XXXX	unit according to preselection (0001 to 1060 mbar (hPa) or 0001 to 0795 Torr)	
preset vacuum with venting*	OUT_SP_V	XXXX	unit according to preselection (0001 to 1060 mbar (hPa) or 0001 to 0795 Torr)	
preset speed	OUT_SP_2	XX.X	speed in Hz (99.9 = "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) (00:00 = switch off)	
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: close venting valve 1: open venting valve (process control stopped) (valve does not close again automatically)	
	STORE		store settings permanently	

* Pressure setting with venting is only possible in operation mode "Vacuum control", if a venting valve is connected and configured and "Vacuum control" is started. The venting valve opens automatically, if the actual vacuum is 10 mbar below the preset vacuum. Automatic venting becomes inactive, if "Vacuum control" is stopped ("Esc"), 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 vacuum	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 hh:mm	process runtime
LAN pressure increase	IN_PV_4	xxx/min	
LAN process time	IN_PV_5	XX:XX hh:mm	VACUU•LAN: runtime of pump since last switching of the pump



Read commands compatible to "CVC 3000"

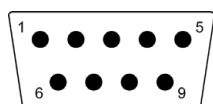
Function	Command	Response	Description
status of process control	IN_STAT	XXXXXX	<ul style="list-style-type: none"> 0: control off 1: pump down 2: set vacuum reached 3: vacuum below set vacuum 0: VACUULAN 1: Continuous pumping 2: Vacuum control 4: RC 5/6 management 0: venting valve closed 1: venting valve open 0: coolant valve closed 1: coolant valve open 0: in-line valve closed 1: in-line valve open 0: pump off 1: pump on
fault status	IN_ERR	XXXXXXXXXX	<ul style="list-style-type: none"> 0: last interface command correct 1: last interface command incorrect 0: no internal fault 1: internal fault (overtemperature at relais) 0: no external fault, catchpot empty 1: external fault, catchpot full 0: no fault at pressure transducer 1: fault at pressure transducer 0: no overpressure 1: overpressure 0: no fault at venting valve 1: fault at venting valve 0: no fault at coolant valve 1: fault at coolant valve 0: no fault at in-line valve 1: fault at in-line valve 0: no fault at pump 1: fault at pump

Read commands compatible to "CVC 3000"

Function	Command	Response	Description
set vacuum	IN_SP_1	XXXX mbar or XXXX Torr or XXXX hPa	unit according to preselections
speed	IN_SP_2	XXX%	maximum speed (100% = "HI")
start-up pressure	IN_SP_3	XXXX mbar or XXXX Torr or XXXX hPa	start-up pressure for VACUULAN or two point control
delay	IN_SP_4	XX:XX hh:mm	delay (00:00 = Off)
switch off pressure	IN_SP_5	XXXX mbar or XXXX Torr or XXXX hPa	switch off pressure ("Maximum" for "Vacuum control", "Minimum" for "Continuous pumping")
	IN_SP_6	XX:XX hh:mm	process runtime 00:00 = off

- ➔ A maximum of ten commands per second is possible.
- ➔ Read commands and commands "REMOTE", "CVC" and "STORE" can be sent always. The sending of other write commands is only possible, if "Remote On" is selected.
- ➔ The commands have to be written in capital letters.
- ➔ Command and parameter have to be separated by a blank.
- ➔ The string is terminated with <CR> or <CR><LF>.
- ➔ The answer of the controller is always terminated with <CR><LF>.
- ➔ Numerical values and parameters can be written without leading zeros.
- ➔ The answer of the controller is always with leading zeros.

Connector assignment



2: RxD
3: TxD
4: DTR
5: Mass

7: RTS
8: CTS
9: +5V (Bluetooth)

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
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 adoption of the set vacuum
	REMOTE**	X	{ 0 remote off 1 remote on
	CVC	X	{ 2 CVC 2000 commands 3 CVC 3000 commands
	OUT_VENT	X	{ 0 venting valve closed 1 venting valve open
	STORE		store settings permanently


Attention: If control is running only switching from 1 to 2 and 2 to 1 is possible.

* Pressure setting with venting is only possible in operation mode "Vacuum control", if a venting valve is connected and configured and "Vacuum control" is started. The venting valve opens automatically, if the actual vacuum is 10 mbar below the preset vacuum. Automatic venting becomes inactive, if "Vacuum control" is stopped ("Esc"), if 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
<input type="checkbox"/> No display.	<ul style="list-style-type: none"> ➔ Mains cable not plugged in or device not switched on? ➔ Fuse defective? ➔ NT VARIO pump not switched on? ➔ Other causes (device defective)? 	<ul style="list-style-type: none"> ✓ Plug in mains cable. Switch device on. Check fuse in building. ✓ Check fuse in building and fuse at switch output of VNC 2, replace if necessary. ✓ Switch on NT VARIO pump. ✓ Contact local distributor.
<input type="checkbox"/> Display disappears, internal overload protection activated.	<ul style="list-style-type: none"> ➔ Thermal overload at controller, ambient temperature too high? ➔ Short circuit at connected valves? ➔ Thermal overload at controller, overload? ➔ Other causes (device defective)? 	<ul style="list-style-type: none"> ✓ Ensure adequate ventilation. ✓ Replace valves. ✓ Check current draw of connected devices (pumps, valves). ✓ Contact local distributor.
<input type="checkbox"/> Pressure reading incorrect.	<ul style="list-style-type: none"> ➔ Device not adjusted correctly? ➔ Humidity in pressure transducer? ➔ Pressure transducer soiled? 	<ul style="list-style-type: none"> ✓ Readjust controller. ✓ Let pressure transducer dry, e.g. by pumping down. Readjust if necessary. Detect and eliminate cause. ✓ See „Cleaning the pressure transducer“, pg. 40.
<input type="checkbox"/> Controller does not respond when pressing keys.	<ul style="list-style-type: none"> ➔ Controller set to remote mode, "P" is displayed? 	<ul style="list-style-type: none"> ✓ Control controller via interface or switch off remote mode.
<input type="checkbox"/> Error message "ErrValve", two beeps.	<ul style="list-style-type: none"> ➔ External venting valve removed or defective? 	<ul style="list-style-type: none"> ✓ Connect or check venting valve. In case install a new venting valve or configure controller without venting valve. Switch controller off/on.
<input type="checkbox"/> Error message "ErrValve", three beeps.	<ul style="list-style-type: none"> ➔ In-line valve removed or defective? 	<ul style="list-style-type: none"> ✓ Connect or check in-line valve. In case install a new in-line valve or configure controller without in-line valve. Switch controller off/on.

Fault	Possible cause	Remedy
❑ Error message "ErrValve", four beeps.	➔ Coolant valve removed or defective?	✓ Connect or check coolant valve. In case install a new coolant valve or configure controller without coolant valve. Switch controller off/on.
❑ Error message "p Error", five beeps.	➔ Overpressure at pressure transducer, pressure >1060 mbar? ➔ External pressure transducer VSK 3000 removed or defective? ➔ Internal pressure transducer defective?	✓ Release pressure immediately! (Risk of bursting!)  ✓ Connect or check external pressure transducer. In case install a new external pressure transducer or configure controller without external pressure sensor. Switch controller off/on. ✓ Contact local distributor.
❑ Error message "p RC5-Er", six beeps.	➔ HYBRID pump RC 5 or RC 6: increased pressure in oil reservoir?	✓ See separate instructions for use for RC 5 / RC 6 management.
❑ Error message "ErrTemp.", seven beeps.	➔ Excess temperature? ➔ Relay circuit defective?	✓ Check configuration and process parameters. ✓ Contact local distributor.
❑ Error message "CheckSys", eight beeps.	➔ Process time in mode VACUULAN expired?	✓ Check system for leaks. Select suitable pressure valve.
❑ Error message "ext. Err", nine beeps.	➔ Level sensor has set off? ➔ Level sensor has been removed? ➔ Failure of a NT VARIO pump? ➔ External fault indicator has set off? ➔ External fault indicator has been removed. ➔ Condenser EK Peltronic has been removed? ➔ Excess temperature at condenser EK Peltronic? Process stopped?	✓ Drain catchpots. Message disappears. In case, restart process. ✓ Connect level sensor again or reload a factory-set mode. ✓ Check pump and connection cable. ✓ Eliminate external error. ✓ Connect external fault indicator again or switch controller off/on. ✓ Connect EK Peltronic again or switch controller off/on. ✓ Allow condenser EK Peltronic to cool down. In case, restart process.

Fault	Possible cause	Remedy
<input type="checkbox"/> Controller does not respond when operating any key. No change after switch off/on.		<input checked="" type="checkbox"/> Contact local distributor.

Cleaning the pressure transducer

The controller itself is maintenance-free.

Contamination of the pressure transducer or deposits will influence the accuracy of measurement.

NOTICE

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.

Accessories



Coolant valve VKW-B, 24 V= 674220

- compact design, designed for a high number of operations at short intervals
- solenoid systems with splash protection
- conductance optimised for applications with rotary evaporator and exhaust waste vapour condenser
- with integrated Y-connector to connect an in-line valve



In-line valve VV-B 6, 24 V= 674290

In-line valve VV-B 6C, 24 V= 674291

In-line valve VV-B 15C, KF 16, 24 V= 674210

In-line valve VV-B 15C, KF 25, 24 V=..... 674215

Pressure transducer VSK 3000, capacitive Al₂O₃ sensor 1080-0.1 mbar 636657

Venting valve VB M-B / KF 16, hose nozzle 6/10mm, 24 V= 674217

Level sensor (control of liquid level in catchpots) 699908

Y-type adapter VACUU•BUS 636656

Extension cable VACUU•BUS, 2m..... 612552

Cable RS 232C, 9-pole, Sub-D 637837

Serto angle for PTFE tube 637873

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
In-line valve VV 6, 24 V= (674090) In-line valve VV 6C, 24 V= (674091) In-line valve VV 15, 24 V= (674110) In-line valve VV 15C, 24 V= (674115)	612556 (conversion to in-line valve) 612566 (conversion to venting valve)
Coolant valve VKW, 24 V= (676013)	612567
Venting valve VBM, 24V= (666817)	612554
Solenoid valve for water jet pump (610623)	612556

- ➔ To control a **VACUUBRAND water jet pump** (695000) with solenoid operated valve with diode plug with a controller VNC 2, the valve cable has to be replaced (see table). After this replacement the water valve will be switched like an in-line valve.

Notes on return to the factory

Repair - return - DAkkS 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 sent to our office fully completed and signed before any equipment is shipped to the authorized service centre

Fax or mail 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 / DAkkS 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 followed.

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 service centre.

- 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 repair quotations only on request and always at the customer's expense. If an order is placed, the costs incurred for problem diagnosis 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 may be returned to you disassembled and at your expense.

In many cases, the components must be cleaned in the factory prior to repair. For cleaning we use an environmentally friendly water-based process. Unfortunately the combined attack of elevated temperature, cleaning agent, ultrasonic treatment and mechanical stress (from pressurized 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 will also replace parts for cosmetic reasons at your request and at your expense.

NOTICE

Before returning the equipment, ensure that (if applicable):

- Oil sealed pumps: Oil has been drained and an adequate quantity of fresh oil has been filled in to protect against corrosion. Dispose according to regulations.
- Equipment has been cleaned and/or decontaminated (inside and outside).
- All inlet and outlet ports have been capped.
- Equipment has been properly packed, (if necessary, please order original packaging materials at your cost), marked appropriately and the carrier has been notified of any possible contamination.
- The completed health and safety clearance form is enclosed.

We thank you in advance for your understanding of the necessity for these measures that protect our employees, and ensure that your pump is protected in shipment.

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 your processes. 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



Devices will not be accepted for any handling before we have received this declaration. Please read and comply with "Notes on return to the factory". Oil filled pumps: Drain oil prior to shipping absolutely!

1. Device (Model): 2. Serial no.:
3. Reason for return / malfunction:

4. Has the device been used in a copper process step (e.g., semiconductor production). yes no

5. Substances (gases, liquids, solids) in contact with the device / which have been pumped:
.....
.....
.....

6. Prior to return to the factory the device has been decontaminated. yes no
Description of the decontamination method and the test / verification procedure:

7. The device is free of hazardous, harmful substances. yes no

8. Protective measures required for VACUUBRAND employees:
.....

9. If the paint is damaged, we wish a repaint or a replacement of parts for reason of appearance (repaint and replacement at customer's expense). yes no

10. Legally binding declaration

We assure for the returned device that all substances, which have been in contact with the device are listed in section 5 and that the information is complete and that we have not withheld any information. We declare that all measures - where applicable - have been taken listed in section "Return to the factory". By our signature below, we acknowledge 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. Shipping of the device must take place according to regulations.

Name: Signature:

Job title: Company's seal:

Date:

Release for repair grant by VACUUBRAND (date / signature):



**EG-Konformitätserklärung
EC Declaration of Conformity
Déclaration CE de conformité**

Hersteller / Manufacturer / Fabricant:
VACUUBRAND GMBH + CO KG · Alfred-Zippe-Str. 4 · 97877 Wertheim · Germany

Hiermit erklärt der Hersteller, dass das Gerät konform ist mit den Bestimmungen der Richtlinien 2006/95/EG und 2004/108/EG.

Hereby the manufacturer declares that the device is in conformity with the directives 2006/95/EC and 2004/108/EC.

Par la présente, le fabricant déclare, que le dispositif est conforme aux directives 2006/95/CE et 2004/108/CE.

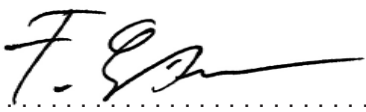
Vakuum-Controller / Vacuum controller / Régulateur de vide
Typ / Type / Type: VNC 2 / VNC 2E / VNC 2 VARIO E
Artikelnummer / Order number / Numéro d'article: 683070 / 683081, 683086 / 683080, 683085
Seriennummer / Serial number / Numéro de série: Siehe Typenschild / See rating plate / Voir plaque signalétique

Die Maschine ist konform mit weiteren Richtlinien / The machinery is in conformity with other directives / La machine est conforme à d'autres directives:
94/9/EG

Angewandte harmonisierte Normen / Harmonized standards applied / Normes harmonisées utilisées:
DIN EN 61326-1, DIN EN 61010-1, DIN EN 1127-1, EN 13463-1

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen / Person authorised to compile the technical file / Personne autorisée à constituer le dossier technique:
Dr. J. Dirscherl · VACUUBRAND GMBH + CO KG · Alfred-Zippe-Str. 4 · 97877 Wertheim · Germany

Wertheim, 23.03.2012
.....
Ort, Datum / place, date / lieu, date


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

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



VACUUBRAND GMBH + CO KG
Alfred-Zippe-Str. 4 · 97877 Wertheim
T +49 9342 808-0 · F +49 9342 808-5555
info@vacuubrand.com
www.vacuubrand.com

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.

VACUUBRAND GMBH + CO KG

-Technology for Vacuum Systems-

© 2012 VACUUBRAND GMBH + CO KG Printed in Germany

Alfred-Zippe-Str. 4 · 97877 Wertheim / Germany

T +49 9342 808-0 · F +49 9342 808-5555

info@vacuubrand.com · www.vacuubrand.com

