vacuubrand

Technology for Vacuum Systems

Instructions for use

CVC 3000 detect

Vacuum controller

Dear customer,

Your VACUUBRAND controllers are designed to provide you with many years of trouble-free service with optimal performance. Our many years of practical experience allow us to provide a wealth of application and safety information. Please read these instructions for use before the initial operation of your controller.
VACUUBRAND controllers combine our many years of experience in design, construction and practical operation, with the latest developments in material and manufacturing technology.

Our quality maxim is the ”zero fault principle”:
Every controller, before leaving our factory, is tested intensively, including an endurance run. Any faults, even those which occur rarely, are identified and can be eliminated immediately.
After completion of the endurance run, every controller is tested, and must achieve specifications before shipment.
We are committed to providing our customers only controllers that meet this high quality standard.
While our controllers cannot eliminate all of your work, we design, manufacture and test them to ensure that they will be an effective and trouble-free tool to assist you in that work.

Yours,
VACUUBRAND GMBH + CO KG

After sales service:
Contact your local dealer or call +49 9342 808-5500

Trademark index:
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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 požít 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.  ”Vakuumilaitteen 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 slucaju tehnicki 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 pradedant 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 byc w całości przeczytana i zrozumiana przed podjęciem pracy z urządzeniem oraz należy podjąć wszystkie niezbędne kroki związane z prawidłowym uzytkowaniem.
 ”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 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 дозволенно 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”

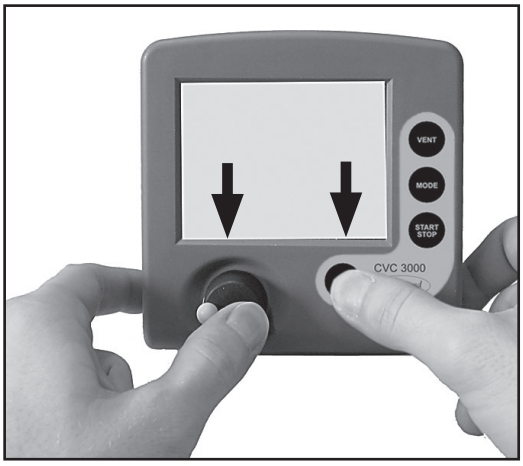
TR

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”

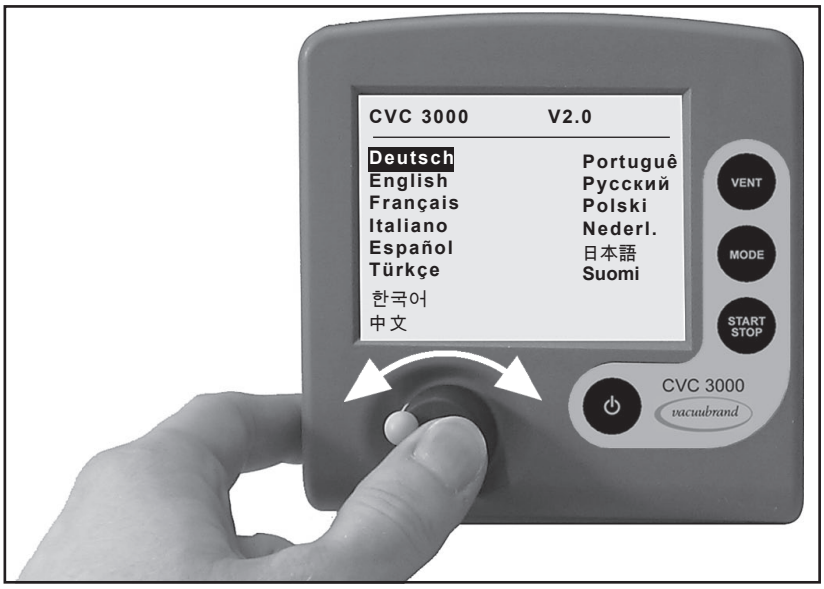
Reset / Language selection

1 switch off

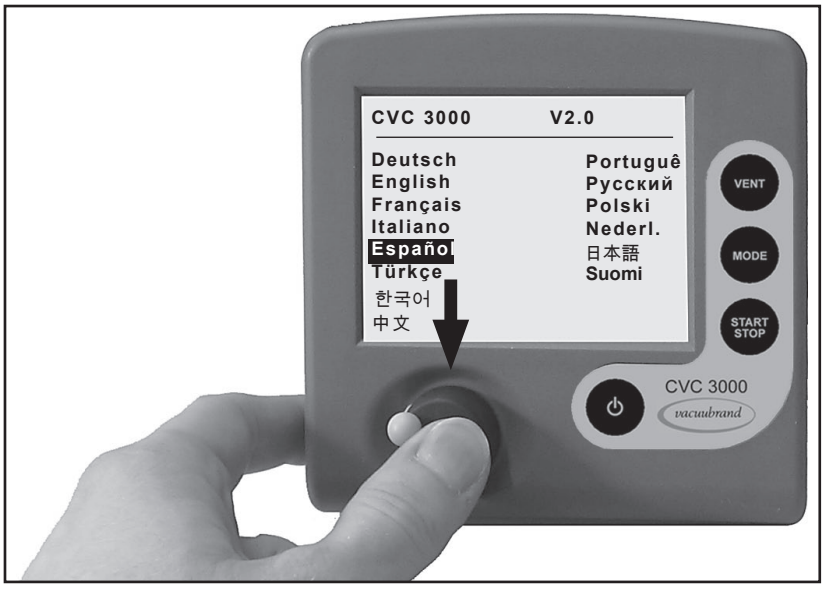
2 press both ↓ ↓



3 turn ↷



4 press ↓



Contents

Safety information!

Important information!

WARNING

- ☞ **Keep this manual complete and accessible to personnel at all times!**
- ☞ **Read this manual carefully before installing or operating the equipment. Observe the instructions contained in this manual.**
- ☞ **Do not modify the equipment without authorization.**

NOTICE

This manual is an integral part of the equipment described therein. It describes the safe and proper use of the vacuum controller.
Make operating personnel aware of dangers arising from the pump and the pumped substances.
VACUUBRAND disclaims any liability for inappropriate use of this controller and for damage from failure to follow instructions contained in this manual.

This manual is only to be used and distributed in its complete and original form. It is strictly the users' responsibility to check carefully the validity of this manual with respect to his product.
Manual-no.: 999277 / 07/03/2013

The following signal word panels and safety symbols are used throughout this manual:

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury and death.

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

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

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

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

Disconnect equipment from AC power.

Dispose off electronic equipment according to regulations.

Formatting used in this manual:
Note: The signal word panels in all sections of this manual always refer to all paragraphs of the same format (➨ / ☞ / • / plain text) following each signal word panel.

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!

General information

NOTICE

Remove all packing material from the packing box. Remove the product from its packing-box and retain all packaging until the equipment is inspected and tested. Inspect the equipment promptly and carefully.
If the equipment is damaged, notify the supplier and the carrier in writing within three days. Retain all packing material for inspection. State the item number of the product together with the order number and the supplier's invoice number. Failure to check and give notice of damage will void any and all warranty claims for those deficiencies.
Store the equipment in dry and non-corrosive conditions (see also "Technical data", pg. 21) if the equipment is not used immediately.

⚠WARNING

☞ **Do not use any damaged equipment.**

Intended use

⚠WARNING

☞ Ensure that the individual components are only connected, combined and operated according to their design and as indicated in the instructions for use.
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

☞ Comply with all notes on correct vacuum and electrical connections; see section "Use and operation", pg. 24.

☞ The controllers are designed for operation at **ambient temperatures and gas temperatures** at the pressure transducer between +50°F and +104°F (+10°C and +40°C), or for short periods up to +176°F (+80°C) at the pressure transducer (gas temperature). Periodically check maximum temperatures if installing the con-

troller in a cabinet or a housing. Make sure ventilation is adequate to maintain recommended operating temperature. Install an external automatic ventilation system if necessary. If processing hot gases, make sure that the maximum permitted gas temperature at the pressure transducer is not exceeded (see “Technical data”, pg. 21).

NOTICE

Use the equipment **only as intended**, that is, for measurement and control of vacuum in vessels designed for that purpose. Any other use will automatically invalidate all warranty and liability claims.
Remain aware of safety and risks.

Setting up and installing the equipment

⚠WARNING

☞ Do not permit any **uncontrolled pressurizing** (e.g., make sure that pipelines cannot become blocked) to avoid a **risk of bursting!**

☞ Keep the VACUU•BUS cables away from heated surfaces.

⚠CAUTION

- Comply with **maximum permissible pressures** at the pressure transducer. See section. “Technical data”, pg. 21.

- Connect hoses gas tight at the vacuum connection and at the connection to the vacuum pump.
- Secure hoses at hose nozzles (e.g., with hose clamp) to prevent their accidental slipping.

- 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.

- When working with residues, aggressive or condensable media, install a gas washing bottle if necessary.

NOTICE Assemble and lock the suitable power plug (included in shipment) to the power supply prior to use.
The controller is equipped with a short-circuit-proof, wide-range power supply with an integrated overload protection.

Position the controller and its vacuum line in such a way that condensate cannot flow towards the pressure transducer.
In case connect inert gas at the venting connection.

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 all **applicable and relevant safety requirements** (regulations and guidelines). **Implement the required actions and adopt suitable safety measures.**

Ambient conditions

⚠ DANGER ➨ Do not reach for this product if it has fallen into liquid. There is a risk of deadly electrical shock. Unplug the system immediately.

⚠ WARNING ☞ Do not use this product in an area where it can fall or be pulled into water or other liquids.

⚠ CAUTION

- Adopt suitable measures in case of differences from recommended conditions, e.g., using the equipment outdoors, conductive pollution or external condensation.
- Do not operate this product near flames.

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 the conditions under which the equipment can be operated safely (see also IP degree of protection, “Technical data”, pg. 21).

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. 19)**.**

⚠ CAUTION

• Ensure that the materials of the controller’s wetted parts are compatible with the substances in the vacuum system, see section “Technical data”, pg. 21.

Safety during operation

⚠ DANGER

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

⚠ WARNING

☞ Never operate this controller if it has a damaged cord or plug. If the controller is not working properly, has been dropped or has fallen into water, contact your service provider.

☞ Prevent any part of the human body from coming into contact with vacuum.

☞ **Attention**: At pressures above approximately 795 Torr (1060 mbar) the pressure reading becomes incorrect due to saturation of the pressure transducer. The display flashes. Release pressure immediately! **Risk of bursting!**

⚠CAUTION

- You must take suitable precautions to prevent any dangerous situation from arising if the controller switches the in-line valve or a coolant valve, switches a vacuum pump (in combination with a VMS module), or opens a venting valve.
- **Attention**: If the controller is set to **Autostart**, the process will start immediately after a power failure without pressing any further key. It is your responsibility to ensure that automatic start-up of the system will not lead to any dangerous condition. Provide appropriate safety measures. Check prior to starting the process whether the option ”*Autostart*” (menu: configuration) 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

⚠DANGER

➨ **Switch off the controller. Disconnect the power supply and wait five seconds** 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 controller 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

☞ Vent the vacuum connection before starting maintenance. Isolate the controller 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 laws (occupational, health and safety regulations, safety at work law and regulations for environmental protection) components and measuring instruments can only be returned when certain procedures (see section “Notes on return to the factory”, pg. 68) are followed.

Ex Important information: Equipment marking (ATEX)

VACUUBRAND equipment bearing mark (see rating plate)

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

and

VACUUBRAND equipment bearing mark (see rating plate)

Ex X see manual

For equipment labelled with „Ex X see manual“ the following classification according to Directive 94/9/EC (ATEX) is valid: Ex 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 to 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 pumps are 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 so that they are protected against shocks from the outside and against glass splinters in the event of breakage (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 permissible. 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 is the pump’s leak rate 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. All specified measures must be applied, or else must be replaced by equivalent measures at the user’s own risk.

Technical data

Technical data of controller

Controller	CVC 3000 detect
Pressure transducer	ceramic diaphragm (alumina), capacitive, absolute pressure, gas type independent
Display	LCD graphic display, illuminated
Pressure units / scale (selectable)	Torr, mbar or hPa
Measuring range (absolute)	810 - 0.1 Torr (1080 - 0.1 mbar)
Maximum control range (absolute)*	795 - 0.1 Torr (1060 - 0.1 mbar)
Resolution	0.07 Torr (0.1 mbar)
Maximum permissible pressure at pressure transducer (absolute)	1125 Torr (1.5 bar)
Maximum permissible temperature of gaseous media**	continuous operation: 104°F (40°C), for short periods (less than 5 minutes) up to 176°F (80°C)
Measurement uncertainty (absolute) after careful adjustment and at constant temperature	<± 0.75 Torr (1 mbar)
Temperature coefficient	<± 0.07 mbar/K (0.05 Torr/K)
Ambient temperature range (operation)	50°F to 104°F (10°C to +40°C)
Ambient temperature range (storage)	14°F to 158°F (-10°C to +70°C)
Permissible relative atmospheric moisture during operation (no condensation)	30% to 85%
Maximum permissible range of supply voltage (±25%)	24V DC
Maximum power draw	3.4W (140mA at 24V DC)
Maximum permitted current of connected valves (connected components)	4A
Degree of protection IEC 529	IP 20
Connections to vacuum pump and to application	hose nozzle for tubing I.D. 1/4” / 3/8” (hose nozzle DN 6/10 mm)
Venting connection	hose nozzle for hose I.D. 3/16” (4-5 mm)
Maximum admissible pressure at venting connection	17.4 psi (1.2 bar) absolute

Controller	CVC 3000 detect
Interface	RS-232 C
Weight (without power supply)	2.2lbs. (1.0kg) table top unit:3.3lbs. (1.5kg)
Dimensions L x W x H approx.	4.9” x 4.9” x 4.5” (124 mm x 124 mm x 114 mm) table top unit: 7.5” x 6.4” x 6.9” (181 mm x 162 mm x 174 mm)

* The actual vacuum control range in your application might be reduced due to ultimate vacuum of the pump, volume of gas present, etc.
** if pumping potentially explosive atmospheres: 50 °F to 104 °F (+10°C to +40°C)

➨ The VACUUBRAND CVC 3000 detect controller can only be operated with components compatible to the VACUUBRAND **VACUU•BUS system**, see accessories.

Technical data of power supply

Power supply (wall plug)*	
Input voltage (±10%)	100-240 V~ / 47-63 Hz
Maximum current draw	0.8 A
Ambient temperature range (operation)	32°F to 104°F (0°C to +40°C)
Ambient temperature range (storage)	-4°F to 185°F (-20°C to +85°C)
Output voltage	24V DC / short-circuit proof
Maximum output current	1.25 A
Power connection	exchangeable plug Europe / UK / US / AUS
Cable length (approx.)	6’7” (2m)
Dimensions	4¼” x 2¼” x 1⅜” 108mm x 58mm x 34mm
Weight (approx.)	0.53 lbs. (0.24 kg)

* if included in shipment

We reserve the right for technical modification without prior notice!

Technical data of solenoid operated in-line valve

Solenoid operated in-line valve	VV-B 6C
Operating cycles per minute	max. 50
Power draw	6 W
Maximum permissible range of supply voltage	24V DC ±10%
Current draw	approx. 0.22 A
Degree of protection IEC 529	IP 65
Max. permissible differential pressure, pressure gradient in direction of flow-through	1.5 bar

Wetted parts

Components	Wetted materials
Sensor	Aluminum oxide ceramic
Connection to vacuum pump / application	PVDF
Sensor housing	PPS / glass fiber
Sensor seal	Chemically resistant fluoroelastomer
Venting valve seal	FPM
Valve block	PP
O-ring	FPM
In-line valve housing	PVDF
Non-return valve seal	FFKM
Diaphragm / sealing ring	PTFE

Abbreviations

FFKM: Perfluoro elastomer
FPM: Fluoroelastomer
PP: Polypropylene
PPS: Polyphenylene sulfide
PTFE: Polytetrafluoroethylene
PVDF: Polyvinylidene fluoride

We reserve the right for technical modification without prior notice!

Use and operation

Assembling the country-specific power plug

- ☞ The wall power supply is delivered with power plugs for Europe, UK, US and Australia.
- ☞ Press the locking key at the wall power supply to remove and to replace the power plug with your country-specific plug.
- ☞ Assemble the suitable power plug to the power supply and lock.

The CVC 3000 detect VACUUBRAND controller with internal pressure transducer and integrated venting valve controls the solenoid operated in-line valve, VACUUBRAND diaphragm pumps (via VMS-B module, see “Accessories”, pg. 63), and optional coolant and venting valves.

When switching on the controller CVC 3000 detect for the very first time, a menu to select the language of the controller menu is displayed. Select the desired language (e.g., ”English”) by turning the selection knob and press to confirm. Then select the pressure unit (”mbar”, ”Torr” or ”hPa”) in the same way.
It is possible to access the language selection menu at any time by switching on the controller while keeping the selection knob pressed.

After switching on the device, the **version number of the software** is displayed, followed by the preselected function and the pressure reading.

Connected components (e.g., in-line valve, level sensor, external pressure transducer 3000 series) are automatically identified. Identical components must be configured beforehand; information upon request.

Do not use more than one controller within the same VACUU•BUS system. Several controllers in the same VACUU•BUS system will interfere with each other and result in error messages of the connected components (pumps, valves).

Attention: Do not assemble or remove plug connections off-axis! Orient the plug correctly before inserting. To connect additional components use VACUU•BUS Y-adapters and extension cables. If an external pressure transducer is connected, it is recognized automatically. Further information on how to use several sensors simultaneously is available upon request.

Keys

VENT:

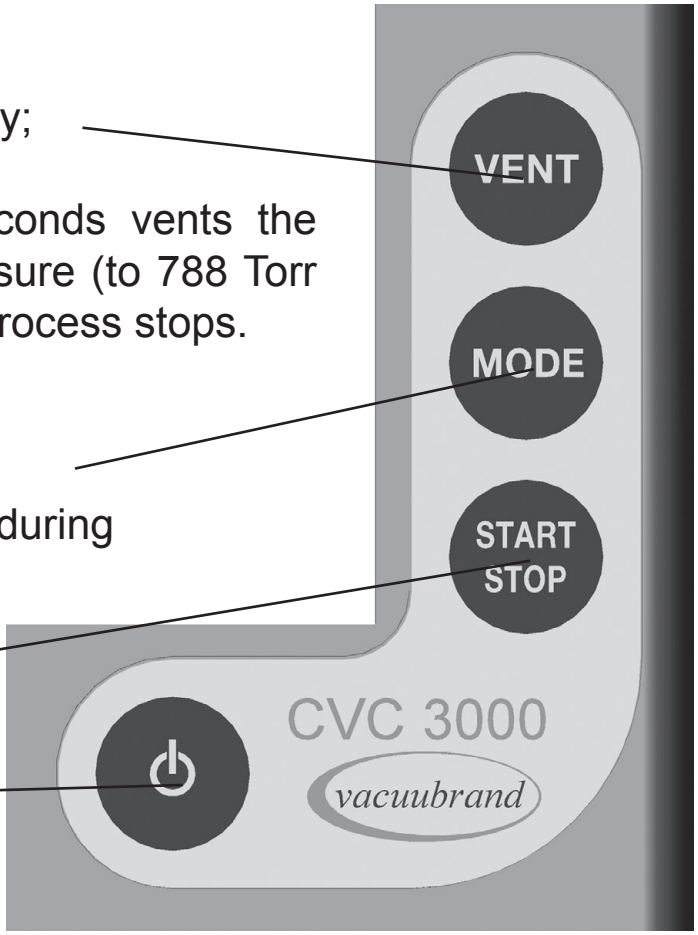
- A short tap vents momentarily; process continues.
- Pressing longer than 2 seconds vents the system to atmospheric pressure (to 788 Torr (1050 mbar) at maximum); process stops.

MODE:

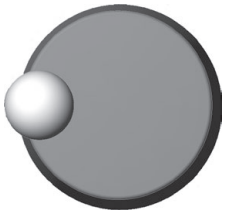
- Selects menu ”function”
- Use for temporary switching during operation to other functions

Start or Stop the process

ON/OFF switch



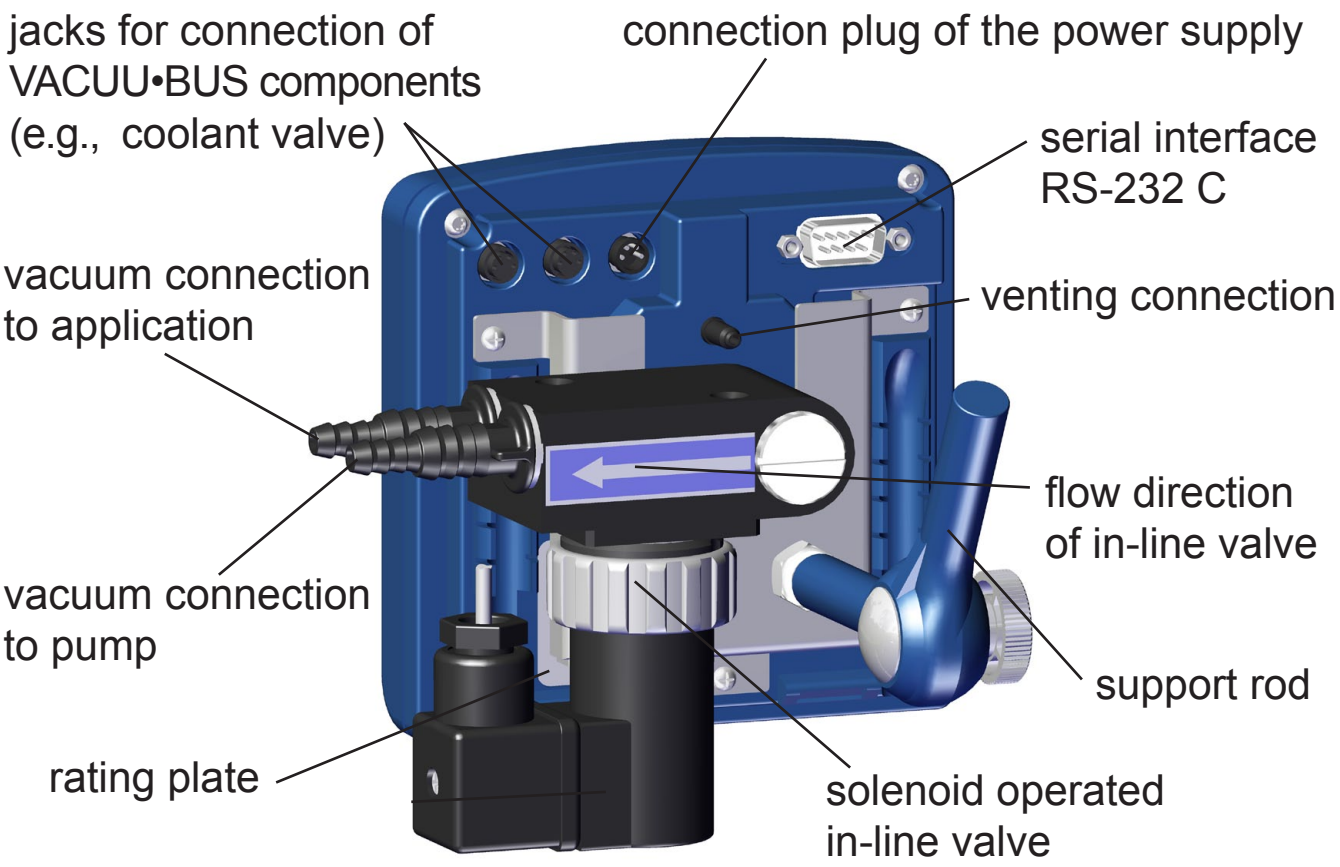
Selection knob



- Press to reach the set-up menu of the function
- Turn to choose the parameter you want to modify
- Press to select the parameter you want to modify
- Turn to change the set value of the parameter
- Press to confirm change of value and to reach further parameters, or to leave the set-up menu

CVC 3000 detect (table top unit)

CVC 3000 detect (rear side)



Notes on connecting and operating the controller

The vacuum controller CVC 3000 detect is fitted with an in-line valve VV-B 6C at its rear.

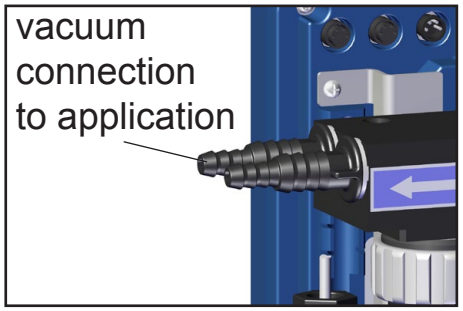
The controller can switch a possibly connected coolant and/or venting valve.

The CVC 3000 detect is equipped with an internal capacitive pressure transducer with ceramic diaphragm. It measures the actual pressure independently of the gas type, and with reference to the vacuum, i.e., absolute.

➡ Connect the vacuum connection of the controller to the vacuum application and to the vacuum pump.

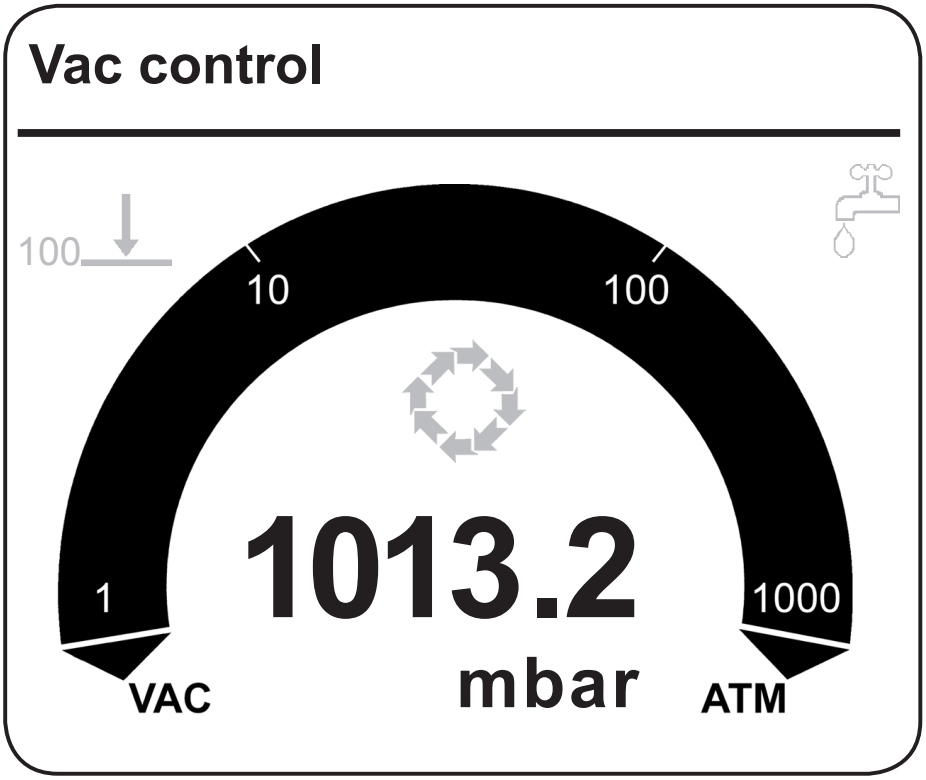
⚠WARNING

☞ Maximum permissible pressure: 21.8 psi (1.5 bar) absolute.
Attention: At pressures above approximately 795 Torr (1060 mbar) the pressure reading becomes incorrect due to saturation of the pressure transducer. The display flashes. Release pressure immediately! **Risk of bursting!**



- Position the CVC 3000 detect controller and its vacuum line in such a way that condensate cannot flow towards the pressure transducer. Condensate and deposits will affect the measurement results. Clean the pressure transducer, if necessary. See section “Cleaning the pressure transducer”, pg. 53.
- Inside a vacuum system where evaporation occurs, e.g., a rotary evaporator, the vacuum is not uniform. For example, a condenser can act as a pump, or the vacuum in the connecting tubing can be higher or lower than in the application itself. This affects the measurement results as well as the control levels. Therefore, carefully choose the position where to connect the pressure transducer.
- If residues occur or when working with aggressive or condensable substances, install a gas washing bottle in front of the pressure transducer.

Display and symbols



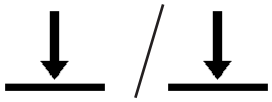
Selected function (displayed in the upper left corner):
A ”function” is one of the following operation modes of the CVC 3000 detect controller:

Pump down / Vac control / detect / Program / VACUULAN / Configuration

Other display symbols:

1013.2 Actual absolute pressure at the pressure transducer

mbar / Torr / hPa Preselected pressure unit

100  Vacuum control to a preset vacuum value (here: 100 mbar/Torr/hPa) / Actual pressure is in the range ”Set vacuum + hysteresis”

det.  Determination of boiling vacuum in program function / Determination of boiling vacuum in detect function

 Flashing: The actual pressure is greater than the preset maximum value (“*Maximum*“)

 Minimum value (“*Minimum*“) reached

00:00:00 Process runtime (only if process control is running)

 Pump down (continuous pumping)

 Pump symbol is displayed when pump is switched (only with VMS).

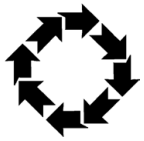
5  Time meter is running (in function ”VACUULAN”); remaining time in minutes is displayed

 In-line valve switched on

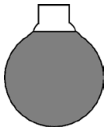
 Venting valve switched on

 Coolant valve switched on

PC symbol: controller is in remote operation

 Control is running

 Warning notice (if necessary in combination with other symbols), flashing

 Level sensor activated; catchpot needs to be emptied.

 Peltronic emission condenser connected

Notes on selecting the function

The CVC 3000 detect controller can be adapted to the specific application by choosing the appropriate function depending on the connected components and the requirements of the application.

Automatic detection of the components
When switching on the controller, the configuration of the connected components is checked automatically.
Connected components (e.g., pumps, gauge heads 3000 series, valves) are **detected automatically** and used and supervised until the controller is switched off. Switch off/on the controller to renew the configuration.
The last mode of operation and the preselected values (e.g., for pressure, speed or time for switching off) are stored.
If the preselections are chosen appropriately, it is possible to start immediately if similar operating conditions are desired.

The controller features **five functions and one configuration menu**, see section ”Menu guide”. Each of these functions involves different menu options, which are presented automatically and reflect the connected components. **The types of components connected (e.g., valves) determine the active menu items.**

Changing the function:
➨ Switch controller on.
➨ Press ”START/STOP” key to terminate control in case control is running (e.g., if ”*Autostart*” is activated).
➨ Press ”MODE” key.
➨ Select function with knob and press to confirm.

☞ Depending on the selected function and system components, the controller provides different operating control, as follows:

”Pump down”
- Switches an in-line valve or a pump or depending on preselected pressure and time settings.
- Coolant valve

”Vac control”
- With pressure preselection, switches an in-line valve and/or a pump to maintain that pressure in two-point control.

- Coolant valve

”detect”
- Provides fully automatic boiling point determination and switches an in-line valve and/or a pump to maintain that pressure in two-point control.
- Coolant valve

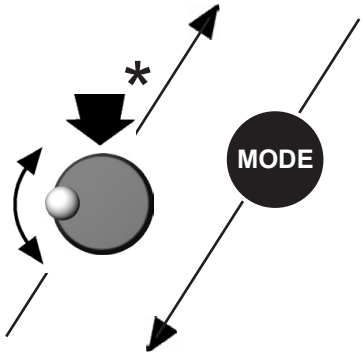
”Program”
- Control in-line valve or pump based on time and pressure preselections.
- Coolant valve
- Venting valve

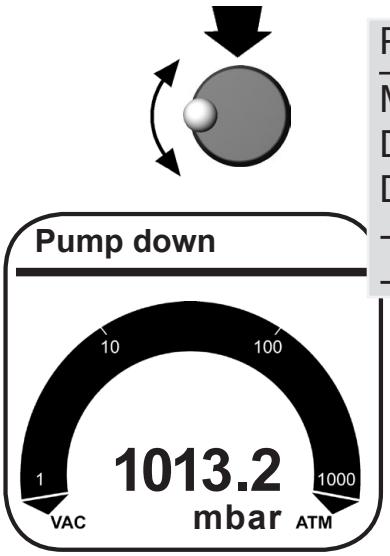
”VACUULAN”
- Switches a pump (VMS, see ”Accessories”, pg. 63, required) and an in-line valve depending on preselected pressure and time settings.
- Coolant valve

”Configuration” (also accessible by pressing the selection knob while the start display is shown)

Preselections for
- Adjustment of the pressure transducer
- Interface RS-232
- Sensors (configuration and switching between several sensors)
- Display (brightness and contrast of the display, language, sound)
- Autostart (automatic restart after power failure)
- Defaults (reset the controller to factory set values)

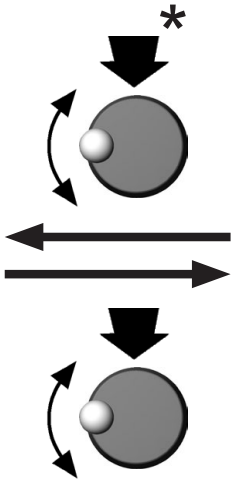
Menu guide



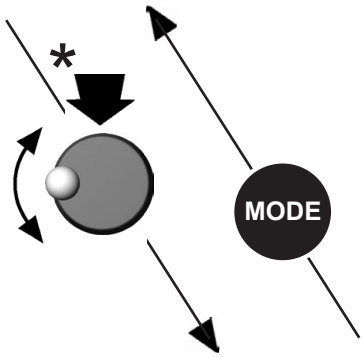


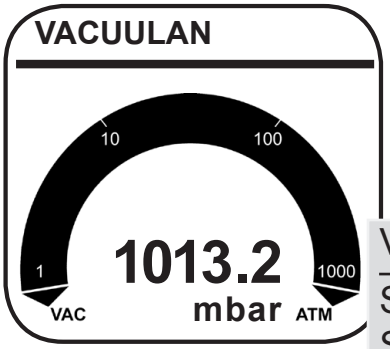
Pump down	
Minimum	Off
Delay	Off
Duration	Off
- - - - - - Graphic - - - - - -	
- - - - - - - Back - - - - - - -	

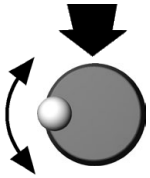
Function
Pump down
Vac control
detect
Program
VACUULAN
Configuration
- - - - - - - - Back - - - - - - -



Configuration	
Adjustment	760 Torr
RS-232...	
Sensors...	
Display...	
Autostart	Off
Defaults	Cancel
- - - - - - - Back - - - - - - -	

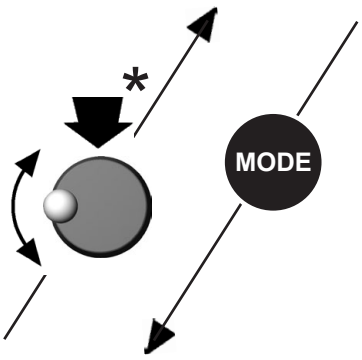






VACUULAN	
Set vacuum	19 Torr
Switch on	150 Torr
Delay	15 min
- - - - - - Graphic - - - - - -	
- - - - - - - Back - - - - - - -	

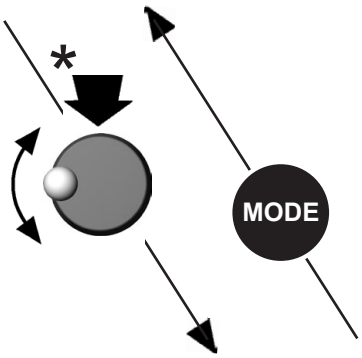
* : or automatically after 20 seconds without action

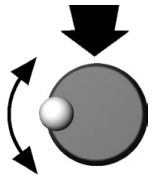


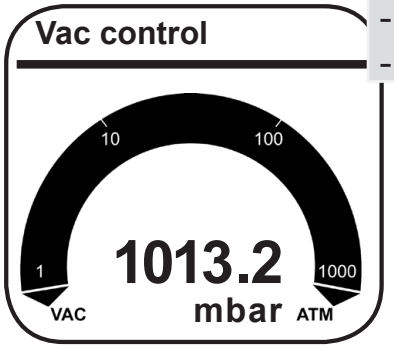
Function

Pump down
Vac control
detect
Program
VACUULAN
Configuration

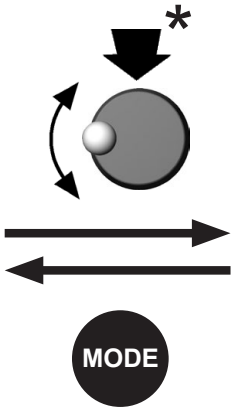
- - - - - - - - Back - - - - - - -



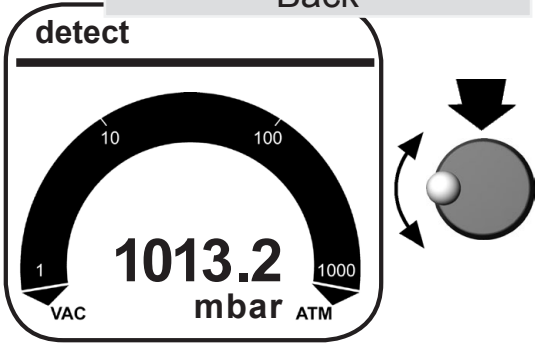


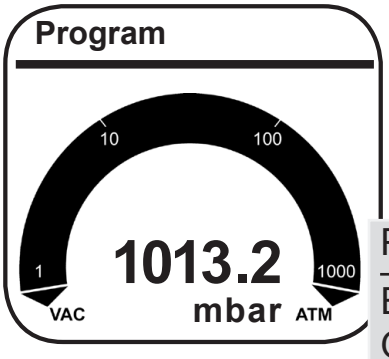


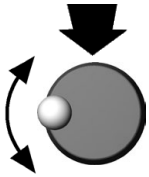
Vac control	
Set vacuum	75 Torr
Hysteresis	Auto
Maximum	Off
Delay	Off
Duration	Off
- - - - - - Graphic - - - - - -	
- - - - - - - Back - - - - - - -	



detect	
Sensitivity	normal
Hysteresis	Auto
Delay	Off
Duration	Off
- - - - - - Graphic - - - - - -	
- - - - - - - Back - - - - - - -	







Program	
Edit	
Open	0
Store	0
Hysteresis	Auto
Delay	Off
- - - - - - Graphic - - - - - -	
- - - - - - - Back - - - - - - -	

* : or automatically after
20 seconds without action

Pump down function

➡ **Continuous pumping with pressure and time settings**

- **Operation of a vacuum pump via in-line valve**
- **Operation of a vacuum pump without in-line valve with VMS (Vacuum Management System, see “Accessories”, pg. 63)**

Preselections

☞ Use the selection knob to select the parameters. All parameters can be altered even while operation control is running.

☞ ***Minimum:*** The controller switches the pump off or closes the in-line valve once the preset value for ”*Minimum*” has been reached.
”*Minimum*” is adjustable in a range of 1-795 Torr (1-1060 mbar) or can be set to ”Off”.
A preset ”*Duration*” (process time) has no effect if the process is stopped due to a preset ”*Minimum*” before ”*Duration*” is reached.

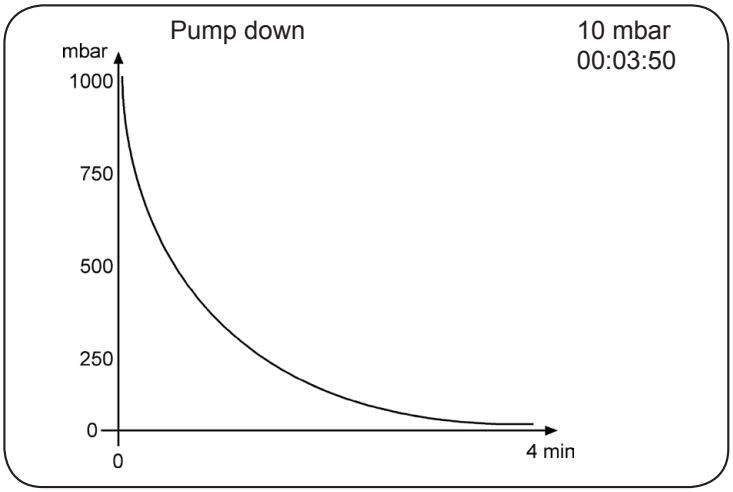
☞ ***Delay:*** ”*Delay*” determines the time the coolant valve remains open after the process has been stopped. Determines also the time the pump (only with VMS module and in-line valve) remains running after the process has been stopped.
The ”*Delay*” is adjustable in a range of 1-300 minutes or can be set to ”Off” (”Off” means that the coolant valve closes immediately - and that a pump with VMS module and in-line valve is switched off immediately - when the process stops.).

☞ ***Duration:*** ”*Duration*” determines the total process time since control start.
The process time is adjustable between 1-1440 minutes (24 h) or can be set to ”Off”. ”Off” indicates that no endpoint for pump down is determined.
If a ”*Duration*” is preset, the controller switches off the pump when the preset process time is reached, even if a preset ”*Minimum*” is still not reached.

☞ If neither ”*Minimum*” nor ”*Duration*” is preset, process control has to be stopped by pressing the ”STOP” key.

The screen-shot shows the factory-set values.

Pump down	00:00:00
Minimum	Off
Delay	Off
Duration	Off
- - - - - - Graphic - - - - - -	
- - - - - - - Back - - - - - - -	



When selecting ”*Graphic*” the display shows a pressure vs. time curve.

The timeline in the diagram adapts automatically to the process time.

☞ Press the selection knob twice to return to the standard display.

Temporary switching from ”Pump down” to ”Vac control” (only if control is running):

☞ Press ”MODE” key. The controller switches to ”Vac control” function, the current vacuum is used as set value.

☞ The preset function of the controller does not change due to this temporary switching. When pressing ”STOP” key, the controller is set again to the ”Pump down” function.

Vac Control function

➨ **Vacuum control to a preset vacuum value**

- **Operation of a vacuum pump via in-line valve**
- **Operation of a vacuum pump without in-line valve with VMS (Vacuum Management System, see ”Accessories”)**

Preselections

☞ Use the selection knob to select the parameters. All parameters can be altered even while operation control is running.

☞ ***Set vacuum**:* The ”*Set vacuum*” is the lower set point for two-point vacuum control.
The ”*Set vacuum*” is adjustable in a range of 0-795 Torr (0-1060 mbar).

☞ ***Hysteresis***: The ”*Hysteresis*” is the control bandwidth of the two-point control. A too small hysteresis will lead to frequent switching of the valve or the pump. A too large hysteresis will lead to imprecise control. Suggested ”*Hysteresis*” values (see table) are stored in the controller (setup ”Auto”) and are adapted automatically to the preset pressure. The hysteresis can be adapted at any time.
The ”*Hysteresis*” is adjustable in a range of 1-225 Torr (1-300 mbar) or can be set to ”Auto”.

Set vacuum in Torr	5	10	50	80	100	200	500	700
Hysteresis in Torr (suggested values)	2	2	5	8	9	17	40	55

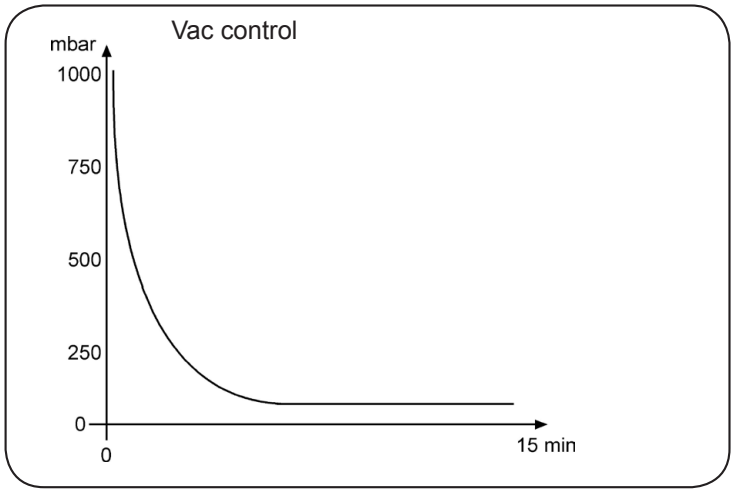
☞ ***Maximum**:* An upper pressure limit can be preselected. The pump switches off if the pressure limit is exceeded, e.g., at the end of suctions or filtrations. The pressure limit is only active once the pressure has gone below ”*Maximum*”.
The ”*Maximum*” is adjustable in a range of 794-1Torr (1059 - 1 mbar) (at the least 1 Torr (mbar) higher than the ”Set vacuum”) and to ”Off”. ”Off” means that no ”Maximum” value is preset.

☞ ***Delay:*** ”*Delay*” determines the time the coolant valve remains open after the process has been stopped. Determines also the time the pump (only with VMS module and in-line valve) remains running after the process has been stopped.
The ”*Delay*” is adjustable in a range of 1-300 minutes or can be set to ”Off” (”Off” means that the coolant valve closes immediately - and that a pump with VMS module and in-line valve is switched off immediately - when the process stops.).

☞ ***Duration:*** ”*Duration*” determines the total process time since control start.
A preset ”*Duration*” (process time) has no effect if the process is stopped due to a preset ”*Maximum*” before ”*Duration*” is reached.
The ”*Duration*” is adjustable between 1-1440 minutes (24 h) or can be set to ”Off”. ”Off” means that no endpoint of the process is defined.

The screen-shots show the factory-set values.

Vac control	00:00:00
Set vacuum	75 Torr
Hysteresis	Auto
Maximum	Off
Delay	Off
Duration	Off
- - - - - - Graphic - - - - - -	
- - - - - - - Back - - - - - - -	



When selecting ”*Graphic*” the display shows a pressure vs. time curve.

The timeline in the diagram adapts automatically to the process time.
☞ Press the selection knob twice to return to the standard display.

Adjustment of the set vacuum during vacuum control:

Dynamic, interactive adaptation:
☞ Press the selection knob and keep pressed.
☞ Turning the knob for a 1/4 turn to the left causes pump down.
☞ Turning the knob for a 1/4 turn to the right causes venting.
☞ When the knob is released, the current pressure value is used as new set value.

Alternatively:

Fine tuning:
The set vacuum can be fine-adjusted by turning the selection knob while process is running.
☞ Turn the selection knob.
☞ A full turn causes a change of the set vacuum of 9 Torr (12 mbar).
☞ Turning the knob one detent causes a change of the set vacuum of 1 Torr (mbar).

detect function

➨ **Controls a vacuum pump by switching an in-line valve.**

Automatic determination of the boiling vacuum and automatic switching to the ”Vac Control” function once the boiling vacuum has been determined.
The determined boiling vacuum is used in the ”Vac Control” function as ”*Set vacuum*”. I.e., the controller controls the vacuum to the determined boiling vacuum, see section ”Vac Control function”.

☞ Use the selection knob to select the parameters.

☞ ***Sensitivity*****:** The ”*Sensitivity*” is adjustable to ”high”, ”normal” or ”low”. Use high sensitivity e.g., for small amounts of solvents or foaming processes. Use a low sensitivity for ”non-critical” processes to reduce process time. Usually setting the ”*Sensitivity*” to ”normal” is appropriate.

☞ ***Hysteresis***: The ”*Hysteresis*” is the control bandwidth of the two-point control (after switching to the ”Vac Control” function). A too small hysteresis will lead to frequent switching of the valve or the pump. A too large hysteresis will lead to imprecise control. Suggested ”*Hysteresis*” values are stored in the controller (setup ”Auto”) and are adapted automatically to the preset pressure. The hysteresis can be adapted at any time.
The ”*Hysteresis*” is adjustable in a range of 1-225 Torr (1-300 mbar) or can be set to ”Auto”.

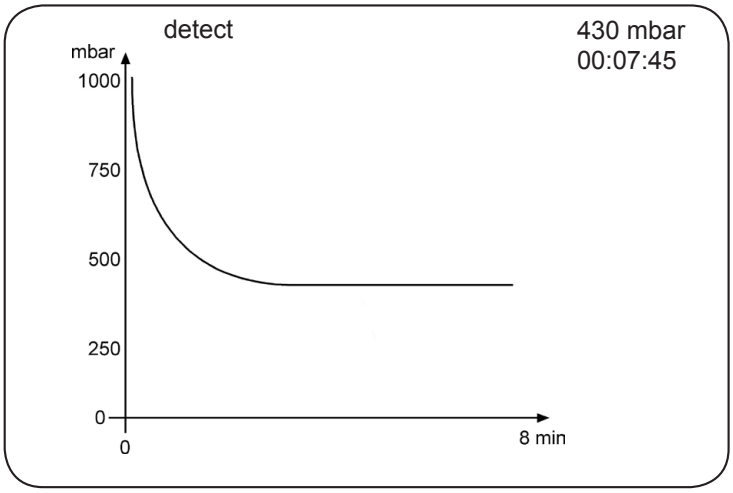
Set vacuum in Torr	5	10	50	80	100	200	500	700
Hysteresis in Torr (suggested values)	2	2	5	8	9	17	40	55

☞ ***Delay:*** ”*Delay*” specifies the time the coolant valve (if connected) remains open after process stop.
The ”*Delay*” is adjustable in a range of 1-300 minutes or can be set to ”Off” (”Off” means that the coolant valve closes immediately when the process stops.).

☞ ***Duration:*** ”*Duration*” determines the total process time since control start.
The ”*Duration*” is adjustable between 1-1440 minutes (24 h) or can be set to ”Off”. (”Off” means that no endpoint for pump down is preset.)

The screen-shot shows the factory-set values.

detect	00:00:00
Sensitivity	normal
Hysteresis	Auto
Delay	Off
Duration	Off
- - - - - - Graphic - - - - - -	
- - - - - - - Back - - - - - - -	



When selecting ”*Graphic*” the display shows a pressure vs. time curve.

The timeline in the diagram adapts automatically to the process time.
☞ Press the selection knob twice to return to the standard display.

☞ When pressing ”STOP” key, or after process stop due to elapsed ”*Duration*” (preset process time), the controller is set again to the ”detect” function.

Temporary switching from ”detect” to ”Vac control” (only if control is running):
☞ Press ”MODE” key. The controller switches to ”Vac control” function, the current vacuum is used as set value.
☞ The preset function of the controller does not change due to this temporary switching. When pressing ”STOP” key, the controller is set again to the ”detect” function.

➡ **Attention:**
The ”*detect*” function is designed for operation with a stand-alone vacuum pump. If the CVC 3000 detect is to be operated in a vacuum network you must ensure that during the determination of the boiling vacuum no disturbance due to other users will occur.

Program function

➨ **Permits ten programs to be defined and stored, each with up to ten program steps with preset values for vacuum and time.**

☞ **Edit:**
Use to define the preset values for the process run:
Time: Defines either the process runtime for each program step to reach a preset vacuum level or, if programming a ”Step”, the runtime after having achieved the vacuum level. The total process runtime is shown in the base line. Attention: A preset runtime of 99:59:59 hours in the final program step will cause the process to run endlessly. Terminate the process by pressing the ”STOP” key.
Vacuum: Vacuum level to be attained.
Venting valve: Operating a venting valve to reach a preset vacuum level.
”Step”: ”Step” causes pump down as fast as possible to the preset vacuum level. As soon as the vacuum level is reached the time meter starts running.
”det.” (detect): det. = ⭳ : indicates that the system will search for a boiling point automatically until a preselected time interval is reached. Selecting ”det.” in combination with ”Step” in one program step is not possible.

☞ **Open:** Choose program (Programs 0 - 9).

☞ **Store:** This command stores an edited program or the program of the last process to one of the storage spaces 0 - 9.

☞ ***Hysteresis***: The ”*Hysteresis*” is the control bandwidth of the two-point control. A too small hysteresis will lead to frequent switching of the valve or the pump. A too large hysteresis will lead to imprecise control. Suggested ”*Hysteresis*” values are stored in the controller (setup ”Auto”) and are adapted automatically to the preset pressure. The hysteresis can be adapted at any time.
The ”*Hysteresis*” is adjustable in a range of 1-225 Torr (1-300 mbar) or can be set to ”Auto”.

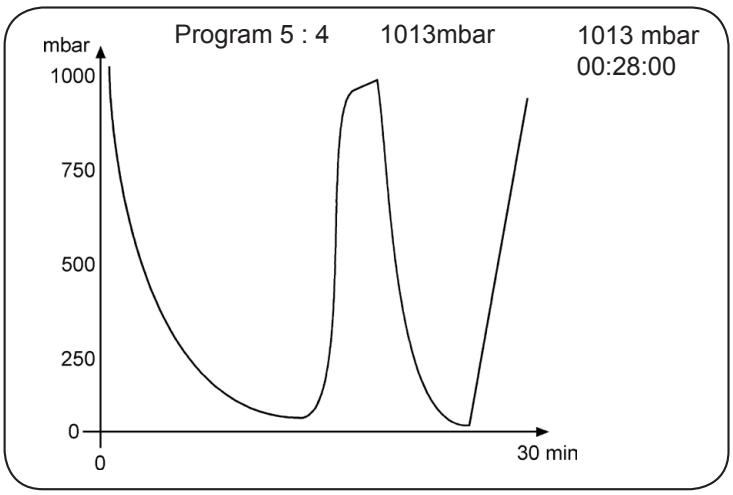
☞ ***Delay:*** ”*Delay*” determines the time the coolant valve remains open after the process has been stopped. Determines also the time the pump (only with VMS module and in-line valve) remains running after the process has been stopped.
The ”*Delay*” is adjustable in a range of 1-300 minutes or can be set to ”Off” (”Off” means that the coolant valve closes immediately - and that a pump with VMS module and in-line valve is switched off immediately - when the process stops.).

Editing:

☞ To select row: turn and press selection knob.
☞ To adjust parameter: turn the selection knob.
☞ To confirm parameter: Press selection knob. Controller will accept change and jump to the next parameter in the same row.
☞ After 5 seconds without a change, the parameter is assumed to be the current setting. Select the next row to edit or return to the Program menu.
➨ In case, store an edited program after having quit ”Edit” by storing it to one of the storage spaces 0 - 9 (select ”Store”).

The screen-shot shows the factory-set values.

Program	00:00:00
Edit	
Open	0
Store	0
Hysteresis	Auto
Delay	Off
- - - - - - Graphic - - - - - -	
- - - - - - - Back - - - - - - -	



When selecting ”*Graphic*”, the display shows a pressure vs. time curve.

Program number, and the step number in that program, along with the vacuum setting, the actual current pressure and the actual runtime are displayed across the top.
The timeline in the diagram adapts automatically to the process time.
☞ Press the selection knob twice to return to the standard display.

The most recent process (except in ”VACUULAN” function) is stored in the temporary data memory as long as the controller stays switched on.

This program can be transferred to a storage space and edited.
Once the program is finished, the clock symbol starts to flash. Confirm the end of the program by pressing START/STOP (clock symbol will disappear).

Attention: If ***"Autostart"*** is set to ***"On"***, the **program will start again (time will be reset to 00:00:00) after a power failure or after switching the controller off/on**. Only if the end of the program (clock symbol flashing) has been confirmed by pressing START/STOP, the program will not start again.

Attention: If the controller is set to "*Defaults*": "On", all stored programs will be deleted.

Application example

Program

No	hh:mm:ss	Vac	Vent.	Step	det.
01	00:00:00	ATM	✓	✓	
02	00:10:00	300		✓	
03	01:00:00	20			⬇
04	00:01:00	ATM	✓	✓	
05	00:00:00	0			
06	00:00:00	0			
07	00:00:00	0			
08	00:00:00	0			
09	00:00:00	0			
10	00:00:00	0			
- - - - - - - - - - - - -		Back			- - - - - - - - - - - - -
	01:11:00				

Example 1:
Vacuum pump with in-line valve (e.g., with a rotary evaporator):
Degassing and automatic boiling point determination with timing

Program step 1 should be always a definite initial state, here atmospheric pressure (ATM). To reach this state definitely, set a tickmark at "Vent." and "Step" by pressing the selection knob.
In step 2, pumping begins, attempting to reach 300 Torr/mbar as quickly as possible ("Step"). Vacuum holds there for 10 minutes (degassing the solvent).
In step 3, "det. ⬇ " causes an automatic search of a boiling point in the pressure interval between 300 Torr/mbar/hPa (depending on preset pres-

sure unit) and 20 Torr/mbar/hPa. The determined boiling vacuum is used in the ”Vac Control” function as ”Set vacuum”. In case no boiling vacuum is detected, the controller controls to 20 Torr/mbar/hPa. The following step starts once the cumulative process time reaches the set limit (1 hour/60 minutes), even if the preset pressure (20 Torr/mbar/hPa) has not been reached.
Step 4 vents to atmospheric pressure as fast as possible and switches off the control after one minute.

Program

No	hh:mm:ss	Vac	Vent.	Step	det.
01	00:00:00	ATM	✔	✔	
02	00:05:00	10			
03	00:15:00	10			
04	00:01:00	500	✔		
05	00:09:00	500	✔		
06	00:10:00	5			
07	00:20:00	5			
08	00:01:00	ATM	✔	✔	
09	00:00:00				
10	00:00:00				

- - - - - - - - - - - - - Back - - - - - - - - - - - - -
01:01:00

Example 2:
Vacuum pump with in-line valve and/or Vacuum-Management-System Module A: Pumping down with intermediate venting

Program step 1 should be always a definite initial state, here atmospheric pressure (ATM). To reach this state definitely, set a tickmark at ”Vent.” and ”Step” by pressing the selection knob.
In step 2, pumping down begins, reaching 10 Torr/mbar within 5 minutes (linear ramp), as ”Step” is not set.
Step 3: Vacuum holds there for 15 minutes.
Step 4: Vents to 500 Torr/mbar within 1 minute.
Step 5: Holds 500 Torr/mbar for 9 minutes.
Step 6: Pumping down, reaching 5 Torr/mbar within 10 minutes (linear ramp), as ”Step” is not set.
Step 7: Vacuum holds there for 20 minutes.
Step 8 vents to atmospheric pressure as fast as possible and switches off the control after one minute.

VACUULAN function

➡ **Optimizes vacuum control for vacuum networks (e.g., VACUUBRAND VACUU•LAN) - pump control only with VMS**

Preselections

☞ Use the selection knob to select the parameters.

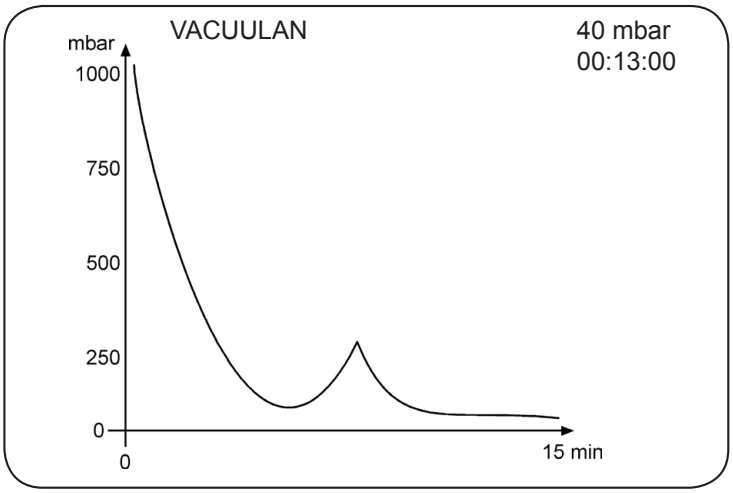
☞ ***Set vacuum*** (the lower switch-off value): If the pressure drops below the ”*Set vacuum*”, a time-meter starts to run. When the pressure exceeds the ”*Set vacuum*” pressure again, the time meter is reset. If the ”*Set vacuum*” is not reached within 100 hours, the controller signals an error.
The ”*Set vacuum*” is adjustable in the range of 1-795 Torr (1-1060 mbar).

☞ ***Switch on*** (the higher switching value): If the pressure exceeds this pressure, pumping down starts again.
The ”*Switch on*” pressure is adjustable in the range of 2-795 Torr (2-1060 mbar) (at the least 1 Torr (mbar) higher than the ”Set vacuum”).
In the event of a sudden high-pressure spike, pumping starts again even if the ”*Switch on*” pressure has not been reached (pressure increase control).

☞ ***Delay:*** If the vacuum is below ”*Set vacuum*” for longer than the ”*Delay*” time, the pump is stopped. Pumping starts again in the event of a rapid pressure increase or if the ”*Switch on*” level is exceeded.
The ”*Delay*” is adjustable in a range of 1-300 minutes or can be set to ”Off” (”Off” means that the pump stops immediately when the pressure drops below ”*Set vacuum*”.).

This screen-shot shows the factory-set values.

VACUULAN	00:00:00
Set vacuum	19 Torr
Switch on	150 Torr
Delay	15 min
- - - - - - Graphic - - - - - -	
- - - - - - - Back - - - - - - -	



When selecting ”*Graphic*” the display shows a pressure vs. time curve.

The timeline in the diagram adapts automatically to the process time.
☞ Press the selection knob twice to return to the standard display.

Application examples

Assembly of a vacuum system

☞ Assemble vacuum connection lines between controller, vacuum pump (diaphragm pump with in-line valve or Vacuum-Management-System) and vacuum application.
☞ Assemble electrical connections.
☞ Connect coolant if necessary.

Vacuum for distillation and evaporation (e.g., rotary evaporator)

1. Fully automatic determination the boiling point

☞ Select ”**detect**” function.
☞ Start process by pressing ”START/STOP” key.

☞ The ”detect” function allows an automatic determination of the solvent’s boiling vacuum. In case of solvent mixtures, the controller detects the boiling vacuum of the solvent with the highest boiling point. The controller switches automatically to the ”Vac Control” function once the boiling vacuum has been determined. The determined boiling vacuum is used in the ”Vac Control” function as ”*Set vacuum*”.

☞ By switching the in-line valve (two-point control), the determined boiling vacuum (used as ”*Set vacuum*” in the ”Vac Control” function) is kept constant within the limits of the hysteresis. If the boiling vacuum changes, e.g., due to cooling of the solvent, either turn the selection knob to adjust the ”*Set vacuum*” or press ”START/STOP” key twice to restart the ”detect” function.

☞ When setting a value for *”Duration”* the controller stops control when *”Duration”* has passed.
☞ If no *”Duration”* is preset, control has to be finished by pressing the ”START/STOP” key.

☞ When pressing ”STOP” key, or after process stop due to elapsed ”*Duration*” (preset process time), the controller is set again to the ”detect” function.
☞ If, in case of solvent mixtures, the solvent with the highest boiling point

has evaporated and the controller is set again to the ”detect” function, further components of the solvent mixture can be evaporated by re-starting the ”detect” function.

2. Semi-automatic distillation and evaporation

☞ Select ”**Pump down**” function.
☞ Start process by pressing ”START/STOP” key.
☞ Observe process. As soon as evaporation starts, press ”MODE” key (switching to ”Vac control”). The vacuum level is kept constant (at the boiling pressure). Fine tuning of the vacuum value is possible by turning the selection knob.

alternatively:

For diaphragm pump with in-line valve and/or Vacuum-Management-System

☞ Select ”**Vac control**” function.
☞ Set *”Set vacuum”* (and ”*Hysteresis*”, if necessary) depending on the solvent and the bath temperature.
☞ Considering the hysteresis and the bath temperature, set ”Set vacuum” to a value which ensures that the solvent will definitely boil.
☞ To set ”*Maximum*” is usually not necessary, unlike filtrations, because the pressure does not increase at the end of the evaporation.
☞ Set a value for *”Duration”* if the process should be terminated automatically after a definite time.
☞ Use ”*Delay*” to pump out condensate and clean the pump at the end of the process. The in-line valve is closed and so the pump is separated from the application. During ”*Delay*” the coolant valve is still open.
☞ Start process by pressing ”START/STOP” key.

Vacuum for gel dryer, drying chambers and vacuum concentrators

☞ Select ”**Pump down**” function.
☞ Set *”Minimum”* to prevent volatile components from evaporating. The process is stopped automatically as soon as ”*Minimum*” is reached.
☞ Set a process time (”*Duration*”) if necessary.
☞ Start process by pressing ”START/STOP” key.

alternatively:

- ☞ Select **”Vac control”** function to dry at a predetermined vacuum level.
- ☞ Set *”Set vacuum”* to the preferred evaporation vacuum of the solvent. Adapt ”*Hysteresis*” if necessary.
- ☞ Set a process time (”*Duration*”) if necessary.
- ☞ Start process by pressing ”START/STOP” key.

Vacuum for filtration and suction

- ☞ Select ”**Pump down**” function.
- ☞ Set ”*Minimum*” to a value which provides adequate suction but does not lead to evaporation of the solvent.
- ☞ Start process by pressing ”START/STOP” key.

alternatively:

- ☞ Select ”**Vac control”** function.
- ☞ Set ”*Set vacuum*” (and ”*Hysteresis*”, if necessary) to a value which does not lead to evaporation of the solvent.
- ☞ Set *”Maximum”* pressure setting so that pump will switch off at the end of the filtration process, or in the event that a filter cake cracks, leading to a sudden pressure increase.
- ☞ Start process by pressing ”START/STOP” key.

- ☞ **Tip for filtration:** Adjust preset pressure to a value well above the boiling pressure of the solvent (e.g., for water >>15 Torr (20 mbar)). Set the maximum pressure to e.g., 375 Torr (500 mbar). Once the filtration has finished, the pressure increases and the pump is switched off automatically.

Vacuum for VACUU•LAN networks

- ☞ Select function ”**VACUULAN**”.
- ☞ Set ”*Set vacuum*” to a pressure which can be reached reliably in the vacuum network. Take account of the ultimate vacuum of the pump and of the system’s leak rate in case of no vacuum demand.
- ☞ Set *”Switch on”* pressure appropriately to ensure sufficient vacuum for all connected applications.
- ☞ Set *”Delay”* if necessary.
- ☞ Start process by pressing ”START/STOP” key.

Configuration

In the ”Configuration” menu the device parameters are preselected.
After 20 seconds without action the function ”Configuration” and its submenus (except submenu ”Sensors”) are quit automatically without storing any possibly changed parameter.

Preselections

☞ Use the selection knob to select the parameters.

☞ ***Adjustment*****:** Adjustment of the pressure transducer under vacuum and/or at atmospheric pressure, see also section “Readjustment”, pg. 51.
Adjustment to atmospheric pressure is carried out at an absolute pressure value between 795 - 525 Torr (1060 - 700 mbar). This is especially helpful in high elevation laboratories. Adjustment under vacuum may be done at an absolute vacuum value between 0 - 15 Torr (0 - 20 mbar). In the range between 15 to 525 Torr (20 to 700 mbar) no adjustment is possible; ---- Torr is displayed.

☞ ***RS-232*****:** Configuration of the interface, setting of parameters and commands, see section ”Interface”.
Baud rate can be set to 19200, 9600, 4800 or 2400, parity on ”8-N-1”, ”7-O-1” or ”7-E-1”, Handshake on ”no”, ”Xon-Xoff” or ”RTS-CTS” and remote on ”On” or ”Off”.

☞ ***Sensors*****:** Selection of the pressure transducer to be controlled
Maximum number of pressure transducers of the same type (VSK 3000 or VSP 3000) connected to one CVC 3000: four. That is a total of eight external pressure transducers at maximum. Up to four additional pressure transducers VSK 3000 may be connected as reference if configured accordingly.

☞ ***Display*****:** Selection of the device parameters ”*Brightness*” between 0 - 100%, ”*Contrast*” between 0 - 100%, ”*Sound*” ”On” or ”Off”, ”*Units*” ”mbar”, ”hPa” or ”Torr”, ”*Language*” ”German”, ”English”, ”French”, ”Italian”, ”Spanish”, ”Turkish”, ”Korean”, ”Chinese”, ”Portuguese”, ”Russian”, ”Polish”, ”Dutch”, ”Japanese”, ”Finnish”.

☞ ***Autostart*:** If ”*Autostart*” is set to ”On” the controller restarts a running process automatically after a mains failure. If this is unwanted, set ”*Autostart*” to ”Off”.

⚠CAUTION **Attention:** If ”*Autostart*” is preselected, the process starts immediately after 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 the process** if the option ”*Autostart*” is enabled.

☞ **Defaults**: If ”*Defaults*” is set to ”Load”, the controller is reset to factory set values. All stored programs and parameters are deleted.

This screen-shot shows the factory-set values.

Configuration	
Adjustment	760 Torr
RS-232...	
Sensors...	
Display...	
Autostart	Off
Defaults	Cancel
- - - - - - - Back - - - - - - -	

Readjustment

NOTICE

The vacuum gauge was adjusted using factory standards, which are traceable through regular calibration in an accredited laboratory (DAkkS calibration laboratory) to the German national pressure standard. Depending on the process and/or accuracy requirements, check the adjustment and readjust if necessary. For readjustment, the device has to be adjusted both at atmospheric pressure as well as under vacuum but only if the reference pressures are known with certainty. The adjustment mode can be activated only if the process control is inactive. Press ”START/STOP” key, if necessary. In the range between 15 to 525 Torr (20 to 700 mbar) no adjustment is possible; ---- Torr is displayed.

Adjustment at atmospheric pressure

An adjustment at atmospheric pressure is only possible if the pressure is higher than 525 Torr (700 mbar).

- ➡ Vent the measurement connection of the controller or in case that of a connected optional external gauge head VSK 3000. Make sure that the pressure transducer is at atmospheric pressure.
- ➡ In ”*Configuration*” menu, select program ”*Adjustment*” at the controller.
- ➡ Use the selection knob to adjust the reading to the current atmospheric pressure.
- ➡ Press the selection knob to confirm.

Note: *To determine the actual atmospheric pressure, use an accurate barometer or get accurate reading from the weather service, or a nearby airport or other reliable source (taking into account the difference in altitude between the source and the laboratory).*

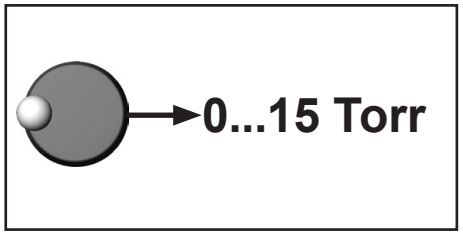
Adjustment under vacuum

An adjustment under vacuum is only possible if the pressure is lower than 15 Torr (20 mbar) absolute.

- ➨ Evacuate the measurement connection of the controller or in case that of a connected optional external gauge head VSK 3000 to a pressure < 0.1 Torr (mbar) (e.g., by applying a good two-stage rotary vane pump).
- ➨ In ”*Configuration*” menu, select program ”*Adjustment*” at the controller.
- ☞ The reading is automatically adjusted to ”zero”.
- ➨ Press the selection knob to confirm.

Note: *Adjustment under vacuum with an actual pressure higher than 0.1 Torr (mbar) reduces the accuracy of the measurement. If the pressure is significantly higher than 0.1 Torr (mbar), adjustment to a reference pressure is recommended.*

Adjustment at a reference pressure



Instead of adjustment under vacuum to a pressure < 0.1 Torr (mbar), adjustment to a precisely known reference pressure within the range of 0..... 15 Torr (20 mbar) is possible.

- ➨ Evacuate the measurement connection of the controller or in case that of a connected optional external gauge head VSK 3000 to a pressure within 0 ..... 15 Torr (0.....20 mbar).
- ➨ In ”*Configuration*” menu, select program ”*Adjustment*” at the controller.
- ☞ The reading is automatically adjusted to ”zero”.
- ➨ Use the selection knob to adjust the display to the reference pressure at the vacuum line within the range of 0 ..... 15 Torr (0.....20 mbar).
- ➨ Press the selection knob to confirm.

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 condition, failure of valves or diaphragm, leaks).*

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*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). The DAkkS is signatory to the multilateral agreements of the European cooperation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.

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).

To order **DAkkS calibration** of the CVC 3000 detect pressure transducer, order number: **900217**

Cleaning the pressure transducer

NOTICE

Attention: Never use a pointed or sharp-edged tool to clean the pressure transducer.
Never touch the ceramic diaphragm of the pressure transducer with hard objects.

➨ Fill the measurement chamber via the vacuum connection 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 measurement chamber several times with alcohol in order to remove all solvent residues.
- ➨ Allow the pressure transducer to dry.
- ➨ Readjust the pressure transducer if necessary.

Readjustment of the controller CVC 3000 detect

See section “Readjustment”, pg. 51.

Interface parameters

The CVC 3000 controller is equipped with a serial interface (RS 232C, nine-pin 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 is fully operable via the serial interface. Measuring results, preselections and the status of the controller can be read at any time.
The factory-set read and write commands are completely compatible with the VACUUBRAND CVC 2000 controller (see sections ”Read / Write commands CVC 2000”). An extended instruction set is available using the command ”CVC 3” (see sections ”Read / Write commands CVC 3000”).

Setting of the interface

Set the interface parameters directly at the CVC 3000 controller. The factory set values are underlined.
Edit and confirm the interface parameters in the ”Configuration” menu in ”RS-232” submenu using the selection knob.

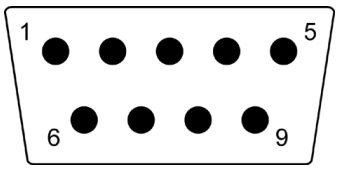
➨ Baud: 2400, 4800, 9600 or 19200
➨ Parity: 8-N-1, 7-O-1 or 7-E-1
➨ Handshake: Off, Xon-Xoff or RTS-CTS
➨ Remote: On or Off
➨ Timeout: Sending 1s, receiving 10s.

In remote mode (”Remote On”, with the ”PC symbol” in the display) all keys at the controller are inoperable.

To return to the manual operation of the controller, set the controller to ”Remote off” in menu configuration: Switch off the controller. Then switch the controller back on, and press the selection knob within 2s.

- A maximum of ten commands per second is possible.
- Read commands and commands ”REMOTE”, ”CVC”, and ”STORE” can always be sent. 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 <LF> or <CR><LF>.
- The response of the controller is always terminated with <CR><LF>.
- Numerical values and parameters can be written without leading zeros.
- The response of the controller always includes leading zeros.

Pin assignment RS-232 C



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

Read commands ”CVC 2000”

Command	Operation	Response	Description
IN_PV_1	current pressure	XXXX mbar/ Torr/hPa	unit according to preselections
IN_PV_2	current frequency	XX.X Hz	pump speed
IN_CFG	device set preselections	0XXXX 1XXXX 2XXXX 3XXXX X0XXX X1XXX XX0XX XX1XX	VACUU•LAN continuous pumping vacuum control without detect vacuum control with detect no coolant valve coolant valve no venting valve venting valve
IN_CFG	device set preselections	XXX0X XXX1X XXXX0 XXXX1	no automatic switch off automatic switch off remote operation off remote operation on

Command	Operation	Response	Description
IN_ERR	error code	1XXX X1XX XX1X XXX1	fault at pump electronics overpressure maloperation mode pressure transducer last command to interface incorrect
IN_STAT	status of process control	0XXX 1XXX X0XX X1XX XX00 XX01 XX02 XX03 XX10 XX11 XX20 XX21 XX22 XX23 XX30 XX31	coolant valve closed coolant valve open venting valve closed venting valve open VACUU•LAN: inactive VACUU•LAN: pumping down, current pressure > selected pressure VACUU•LAN: pumping down, time for automatic switching off is running VACUU•LAN: system is switched off continuous pumping: not active continuous pumping; active vacuum control: not active vacuum control: current pressure above set vacuum vacuum control: current pressure equals set vacuum (±1 Torr/mbar) vacuum control: current pressure below set vacuum detect: not active detect: determining boiling point

Write commands "CVC 2000"

Command	Operation	Parameter	Description
OUT_MODE	function	1 2 3 *30* *31* *32*	continuous pumping vacuum control without detect vacuum control with detect *optional: sensitivity: low* *optional: sensitivity: normal* *optional: sensitivity: high*
OUT_SP_1	set vacuum	XXXX	unit (mbar/Torr/hPa) according to pre-selection; see respective function for parameter range
OUT_SP_V	set vacuum with venting*	XXXX	unit (mbar/Torr/hPa) according to pre-selection; see respective function for parameter range
OUT_SP_2	set frequency	XX.X	motor speed in Hz (01.0 to 60.0 in steps of 0.5 Hz or 99.9 for "HI")

Command	Operation	Parameter	Description
OUT_SP_3	vacuum for switch on (VACUU•LAN)	XXXX	unit (mbar/Torr/hPa) according to pre-selection; see respective function for parameter range
OUT_SP_4	delay	XX:XX	hh:mm (hours:minutes)
OUT_SP_5	vacuum for automatic switching off	XXXX	unit (mbar/Torr/hPa) according to pre-selection; see respective function for parameter range
OUT_SP_6	time for automatic switching off (VACUU•LAN)	XX:XX	hh:mm (hours:minutes)
START	starting process control		
STOP	stopping process control	1 2	termination of process control termination of process control and storage of the current pressure as new set point
REMOTE	remote operation**	0 1	set controller to local operation set controller to remote operation
OUT_VENT	driving venting valve	0 1	close venting valve (not automatically) open venting valve (process control stopped)

* Pressure setting with venting is only possible in ”Vac control” function if a venting valve is connected and configured, and vacuum control is started. The venting valve opens automatically if the actual pressure is at least 7.5 Torr (10 mbar) below the preset pressure. Automatic venting becomes inactive if vacuum control is stopped (by pressing ”START/STOP” or ”VENT”), a pressure value is set using the command OUT_SP_1, or if the function 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 can occur due to the change of the mode of operation, and must take appropriate safety precautions, especially if selecting remote operation interferes with a locally operated active process.

Read commands ”CVC 3000”

Command	Operation	Response	Description
IN_PV_1	current pressure	XXXX.X mbar/Torr/hPa	unit according to preselections
IN_PV_2	current speed	XXX%	1-100% or ”HI”
IN_PV_3	time	XX:XX h:m	process runtime (hours:minutes)
IN_PV_X	pressure	XXXX.X XXXX.X ...	pressure of all connected sensors, unit (mbar/Torr/hPa) according to preselections
IN_PV_T	operation time of the controller	XXXXdXXh	operation time in days and hours
IN_CFG	device set preselections + Language: 0: German 1: English 2: French 3: Italian 4: Spanish 5: Turkish 6: Korean 7: Chinese 8: Portuguese 9: Russian A: Polish B: Dutch C: Japanese D: Finnish	0XXXXXXXXXXXXXXX 1XXXXXXXXXXXXXXX 2XXXXXXXXXXXXXXX 3XXXXXXXXXXXXXXX 4XXXXXXXXXXXXXXX 5XXXXXXXXXXXXXXX XyXXXXXXXXXXXXXX XX0XXXXXXXXXXXXX XX1XXXXXXXXXXXXX XX2XXXXXXXXXXXXX XXX0XXXXXXXXXXXX XXX1XXXXXXXXXXXX XXXX0XXXXXXXXXXX XXXX1XXXXXXXXXXX XXXXX0XXXXXXXXXX XXXXX1XXXXXXXXXX XXXXXX0XXXXXXXXX XXXXXX1XXXXXXXXX XXXXXXX0XXXXXXX XXXXXXX1XXXXXXX XXXXXXXX0XXXXXX XXXXXXXX1XXXXXX XXXXXXXXX0XXXXX XXXXXXXXX1XXXXX XXXXXXXXXX0XXXX XXXXXXXXXX1XXXX XXXXXXXXXXX0XXX XXXXXXXXXXX1XXX XXXXXXXXXXXXyXX XXXXXXXXXXXXXyX XXXXXXXXXXXXXX0 XXXXXXXXXXXXXX1	VACUU•LAN Pump down Vac control detect Program measuring device y: 0.....D: language+ (hexadecimal) pressure unit mbar pressure unit Torr pressure unit hPa autostart off autostart on acoustic signal off acoustic signal on VARIO pump not connected VARIO pump connected VMS not connected VMS connected in-line valve not connected in-line valve connected coolant valve not connected coolant valve connected venting valve not connected venting valve connected fault indicator not connected fault indicator connected level sensor not connected level sensor connected remote module not connected remote module connected y: 1.....9: sensor number y: 1.....9: sensor quantity remote operation off remote operation on

Command	Operation	Response	Description
IN_STAT	status process control	0XXXXX	pump off
		1XXXXX	pump on
		X0XXXX	in-line valve closed
		X1XXXX	in-line valve open
		XX0XXX	coolant valve closed
		XX1XXX	coolant valve open
		XXX0XX	venting valve closed
		XXX1XX	venting valve open
		XXXX0X	VACUU•LAN
		XXXX1X	Pump down
		XXXX2X	Vac control
		XXXX3X	detect
		XXXX4X	Program
		XXXX5X	measuring device
		XXXXX0	control off
		XXXXX1	pump down - determining boiling point
		XXXXX2	set vacuum reached - boiling pressure found
		XXXXX3	current pressure below set vacuum
IN_ERR	fault status	0XXXXXXXX	no fault at pump
		1XXXXXXXX	fault at pump
		X0XXXXXXX	no fault at in-line valve
		X1XXXXXXX	fault at in-line valve
		XX0XXXXXX	no fault at coolant valve
		XX1XXXXXX	fault at coolant valve
		XXX0XXXXX	no fault at venting valve
		XXX1XXXXX	fault at venting valve
		XXXX0XXXX	no overpressure
		XXXX1XXXX	overpressure
		XXXXX0XXX	no fault at pressure transducer
		XXXXX1XXX	fault at pressure transducer
		XXXXXX0XX	catchpot not full
		XXXXXX1XX	catchpot full
		XXXXXXX0X	no external fault
		XXXXXXX1X	external fault
		XXXXXXXX0	last interface command correct
		XXXXXXXX1	last interface command incorrect
IN_SP_1	set vacuum	XXXX mbar/Torr/hPa	unit according to preselections
IN_SP_2	maximum speed	XXX%	speed in % (1-100% or ”HI”)
IN_SP_3	switching pressure	XXXX mbar/Torr/hPa	switching pressure for VACUU•LAN or two point control; unit according to preselections
IN_SP_4	delay	XX:XX h:m	hours:minutes (00:00 = Off)

Command	Operation	Response	Description
IN_SP_5	switch off pressure	XXXX mbar/Torr/hPa	”Maximum” for ”Vac control”, ”Minimum” for ”Pump down”) unit according to preselections
IN_SP_6	runtime	XX:XX h:m	process runtime (hours:minutes)
IN_SP_P1y	time	XX:XX:XX h:m:s	time in program step y (0.....9) (hours:minutes:seconds)
IN_SP_P2y	pressure	XXXX mbar/Torr/hPa	pressure in program step y (0.....9) unit according to preselections
IN_SP_P3y	venting valve	0 1	no venting valve in program step y (0.....9) venting valve in program step y (0.....9)
IN_SP_P4y	Step	0 1	no ”Step” in program step y (0.....9) ”Step” in program step y (0.....9)
IN_SP_P5y	detect	0 1	no ”det.” in program step y (0.....9) ”det.” in program step y (0.....9)
IN_PV_Sx	current pressure of pressure transducer x	XXXX.X mbar/hPa/Torr	pressure of pressure transducer x (order of numbering according to display in ”*Sensors*” menu)
IN_VER	version	CVC 3000 VX.XX	software version

Write commands ”CVC 3000”

Command	Operation	Parameter	Description
OUT_MODE	function	0 1 2 3 *30* *31* *32* 4	VACUU•LAN Pump down Vac control detect *optional: sensitivity: low* *optional: sensitivity: normal* *optional: sensitivity: high* Program
OUT_CFG	configuration (bus monitoring)	yXXX X0XX X1XX X2XX XX0X XX1X XXX0 XXX1	y: 0.....D: language+ (hexadecimal), see ”Read commands CVC 3000” pressure unit mbar pressure unit Torr pressure unit hPa Autostart off Autostart on acoustic signal off acoustic signal on
OUT-SP_1	set vacuum	XXXX	unit according to preselection; see respective function for parameter range

Attention (OUT_MODE): If control is running, it is only possible to switch either from 1 to 2, or from 2 to 3, or from 3 to 2. The set vacuum is adopted in each case.

Command	Operation	Parameter	Description
OUT_SP_V	set vacuum with venting	XXXX	unit according to preselection; see respective function for parameter range
OUT_SP_2	speed	XXX	speed in % or ”HI”
OUT_SP_3	start-up pressure	XXXX	unit according to preselection; see respective function for parameter range
OUT_SP_4	delay	XX:XX	hh:mm (hours:minutes)
OUT_SP_5	switch-off pressure	XXXX	unit according to preselection; see respective function for parameter range
OUT_SP_6	switch-off time	XX:XX	hh:mm (hours:minutes)
OUT_SP_PL	open program	X	program 0.....9
OUT_SP_PS	store program	X	program 0.....9
OUT_SP_P1y	time	XX:XX:XX +XX:XX:XX	total runtime until program step y (0.....9) or time for program step y (0.....9) (additive)
OUT_SP_P2y	pressure	XXXX	pressure at program step y (0.....9) unit according to preselection
OUT_SP_P3y	venting valve	0 1	no venting valve in program step y (0...9) venting valve in program step y (0.....9)
OUT_SP_P4y	Step	0 1	no ”Step” in program step y (0.....9) ”Step” in program step y (0.....9)
OUT_SP_P5y	detect	0 1	no ”det.” in program step y (0.....9) ”det. ↓ ” in program step y (0.....9)
START		1	Start process control
STOP		0 1 2	Stop and delete fault Stop Stop and adopt the set vacuum
REMOTE*		0 1	Remote off Remote on
ECHO**		0 1	Echo off Echo on, write command with return value
CVC		2 3	CVC 2000 commands CVC 3000 commands***
OUT_VENT		0 1 2	venting valve closed venting valve open venting until atmospheric pressure (788 Torr (1050 mbar) at maximum)
STORE			store settings permanently, if ”ECHO = 1” after realization
OUT_SENSOR		1 2...9	internal sensor external sensors (if connected)

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

** With command ”ECHO 1” a return value can be activated at write commands. A return value is only given if the command is performed correctly.

*** After being switched on, the controller is in ”CVC 2” mode by default. Send ”CVC 3” and ”STORE” to permanently set the controller RS 232C commands to the extended set ”CVC 3000”.

Accessories

External pressure transducer VSK 3000, ...**636657**
capacitive, ceramic diaphragm sensor 810 - 0.1 Torr (1080 - 0.1 mbar)
Coolant valve VKW-B, VACUU•BUS.....**674220**
Venting valve VBM-B / KF 16, VACUU•BUS..... **674217**
VACUU•BUS Y-type adapter **636656**
VACUU•BUS extension cable, 6.6ft (2m).....**612552**
VACUU•BUS wall jack **636153**
Serial cable RS 232C, 9-pin, Sub-D.....**637837**
Installation set CVC 3000 (clips and screws).....**636593**
Level sensor.....**699908**
(control of liquid level in catchpots)
VACUU•BUS Digital-I/O-Module **636228**
(e.g., fault indicator / remote module)
VACUU•BUS Analog-I/O-Module **636229**
(for analog input and output of vacuum and motor speed)
VMS-B module 100-230V 50/60Hz (with connection cable) **676030**
PC-Software VACUU•CONTROL.....**692920**

Use VACUU•BUS Y-adapters and extension cables to connect further components. When connecting an external pressure transducer, it is used automatically. Further information on how to use several sensors simultaneously is available on request.

Conversion of VACUUBRAND valves with DIN plug to VACUUBRAND valves with VACUU•BUS plug:

VACUUBRAND-valve with DIN plug	Conversion kit valve cable with VACUU•BUS plug
In-line valve VV 6, 24V= (674090) In-line valve VV 6C, 24V= (674091) in-line valve VV 15, 24 V= (674110) in-line valve VV 15C; 24V= (674115)	612556 (conversion to in-line valve) 612566 (conversion to venting valve)
Coolant valve VKW, 24 V= (676013)	612567
Venting valve VBM, 24 V= (666817)	612554

Troubleshooting

Fault	Possible cause	Remedy
❑ No display.	➡ Power supply not plugged in (wall plug)?	✓ Plug in power supply.
	➡ CVC 3000 detect controller switched off?	✓ Switch on controller.
	➡ VACUU • BUS cable of power supply not plugged in at controller?	✓ Plug in VACUU • BUS cable at controller.
	➡ Other than above mentioned causes?	✓ Contact local distributor.
❑ Display disappears.	➡ Too much load (e.g., valves) connected?	✓ Check current draw of the connected devices.
	➡ Short circuit at connected valves?	✓ Replace valves.
	➡ Short circuit at the RS 232 plug?	✓ Check plug and cable.
	➡ Other than above mentioned causes?	✓ Contact local distributor.
❑ Pressure reading incorrect.	➡ Pressure transducer decalibrated?	✓ Readjust CVC 3000 detect or external gauge head.
	➡ Humidity in the pressure transducer?	✓ Let the pressure transducer dry, e.g., by pumping. Readjust if necessary. Determine and eliminate the cause for humidity.
	➡ Pressure transducer contaminated?	✓ See ”Cleaning the pressure transducer”.
	➡ Other than above mentioned causes?	✓ Contact local distributor.
❑ Digital pressure reading is flashing, display shows ”0.0”.	➡ Pressure transducer not correctly adjusted under vacuum?	✓ Adjust CVC 3000 detect or external gauge head correctly.
❑ No digital pressure reading.	➡ Pressure transducer defective?	✓ Contact local distributor.
❑ Digital pressure reading is flashing, one blip*.	➡ Overpressure at the pressure transducer pressure > 795 Torr (1060 mbar)?	✓ Release pressure immediately (risk of bursting).

Fault	Possible cause	Remedy
❑ Warning triangle and black valve symbol are flashing, two blips*.	➡ External venting valve removed or defective?	✓ Connect valve or replace with a new one or reconfigure without valve.
❑ Warning triangle and valve symbol are flashing, three blips*.	➡ In-line valve and NT VARIO / VARIO-B pump connected?	✓ Disconnect VARIO / VARIO-B pump; switch controller off/on to reconfigure.
	➡ In-line valve removed or defective?	✓ Check connection cable of the valve; or use new valve or reconfigure without valve.
❑ Warning triangle and coolant valve symbol are flashing, four blips*.	➡ Coolant valve removed or defective?	✓ Check connection cable of the valve; or use new valve or reconfigure without valve.
❑ No digital pressure reading, warning triangle is flashing, five or seven blips*.	➡ Five blips: External pressure transducer defective or removed?	✓ Plug in external pressure transducer, or use a new one, or reconfigure without external pressure transducer.
	➡ Seven blips: Internal pressure transducer defective?	✓ Contact local distributor.
❑ Warning triangle and pump symbol are flashing, six blips*.	➡ VMS** (Vacuum Management System) and NT VARIO / VARIO-B pump connected?	✓ Remove NT VARIO / VARIO-B pump. Restart controller.
	➡ Fault at the VMS?	✓ Check VMS, restart controller.
	➡ Connecting cable from VMS removed?	✓ Check cable connections.
❑ Clock symbol is flashing.	➡ Preselected process time is over?	✓ Confirm by pressing START/STOP key.
❑ Internal venting valve does not respond, valve symbol is not displayed.	➡ External pressure transducer connected and active?	✓ Select internal pressure transducer or connect external venting valve.
❑ Venting valve does not respond, valve symbol is displayed.	➡ Venting valve contaminated?	✓ Clean valve.

Fault	Possible cause	Remedy
❑ ”Vac control” function: Control stops, ”arrow up” is flashing.	➡ Preset maximum pressure exceeded?	✓ Confirm by pressing START/STOP key. Change maximum pressure value if necessary.
❑ ”Pump down” function: Control stops, ”arrow down” is flashing.	➡ Pressure below preset minimum pressure?	✓ Confirm by pressing START/STOP key. Change minimum pressure value if necessary.
❑ No function is displayed. No menu available.	➡ No controllable device is connected (valve, VMS, NT VARIO / VARIO-B pump)?	✓ Connect devices or use controller as measuring device.
❑ Controller does not respond when pressing keys (except ON/OFF). PC symbol is displayed.	➡ Controller in remote mode?	✓ Control CVC 3000 detect via interface or switch off remote mode.
❑ Controller does not respond when operating any keys. No change after switching off/on.		✓ Contact local distributor.

* only if ”*Sound*” ”On” is selected

** VMS: Vacuum management system to switch non-VARIO pumps

Note: All error messages comprising a flashing warning triangle have to be confirmed (deleted) by pressing the START/STOP key.
Solve the problem (see ”Remedy”), then press the START/STOP key to delete the error message.

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”, pg. 71, must be sent to our office fully completed and signed before any equipment is shipped to the authorized service center.

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 center**.

- 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**.

Warranty

VACUUBRAND shall be liable for insuring that this product, including any agreed installation, has been free of defects at the time of the transfer of risk.

VACUUBRAND shall not be liable for the consequences of improper handling, use, servicing or operation of this product or the consequences of normal wear and tear of wearing parts such as diaphragms, seals, valves, vanes, condensers, oil and the breakage of glass or ceramic parts, for the consequences of chemical, electrochemical or electrical influences or the failure to follow the instructions in this manual.

Claims for defects against VACUUBRAND shall be limited to one year from delivery. The same shall apply to claims for damages irrespective of legal grounds.

For further information on general terms and conditions refer to www.vacuubrand.com.

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): .....

VACUUBRAND GMBH + CO KG
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www.vacuubrand.com

CE

EG-Konformitätserklärung für Maschinen
EC Declaration of Conformity of the Machinery
Déclaration CE de conformité des machines

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.

Vakuumcontroller / Vacuum controller / Régulateur de vide
Typ / Type / Type: CVC 3000 detect
Artikelnummer / Order number / Numéro d'article: 2614120, 2614860
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 61326-1:2006, DIN EN 61010-1:2010 (Ed. 3), DIN EN 1127-1:2008, EN 13463-1:2002

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen / Person authorized 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, 03.07.2013
Ort, Datum / place, date / lieu, date

(Dr. F. Gitmans)
Managing director / Gérant

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

VACUUBRAND GMBH + CO KG
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vacuubrand

Certificate

TÜVRheinland®

Certificate no. CU 72091199 01

License Holder:
VACUUBRAND GMBH + Co. KG
Alfred-Zippe-Str. 4

97877 Wertheim
Germany

Manufacturing Plant:
VACUUBRAND GMBH + Co. KG
Alfred-Zippe-Str. 4

97877 Wertheim
Germany

Test report no.: USA-DS 30981596 001 **Client Reference:** M. von Przychowski

Tested to: UL 61010-1:2004 R10.08
CAN/CSA-C22.2 61010-1:2004

Certified Product: Measurement and Control Device for Vacuum **License Fee - Units**

Model Designation: 7
Main Unit: 1) CVC 3000, CVC 3000E, CVC 3000E ARB C3,
DCP 3000, DCP 3000E
Valves and Sensors: 2) VKW-B, 3) VB M-B,
4) Liquid level sensor (699908),
5) VV-B 6, 6) VV-B 6C,
7) VV-B 15C, 8) VSK 3000

Rated Voltage DC: 1-3) 24V; 4) 8-30V; 5-7) 24V; 8) 6-30V
Rated Current: 1) 1.25A; 4) 5mA (max.); 8) 5mA
Rated Power: 1)3.4W; 2)2W; 3)4W; 5)8W; 6)5.5W; 7)12W
Protection Class: III

7

Appendix: 1

Licensed Test mark: TÜV Rheinland of North America, Inc. C US

Signature

Dipl.-Ing. M. Glagla
QA Certification Officer

Date of Issue (day/mo/yr)
17/06/2009

TUV Rheinland of North America, Inc., 12 Commerce Road, Newtown, CT 06470, Tel (203) 426-0888 Fax (203) 426-4009

This certificate is only valid for pumps with the respective mark (Licensed Test mark) on the pump rating plate.

Disclaimer: Our technical literature is only intended to inform our customer. The validity for specific applications of general empirical values and results obtained under test conditions depends 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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- Technology for Vacuum Systems -

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