vacuubrand

Technology for Vacuum Systems

Instructions for use

DVR 2

Analog/Digital Rough Vacuum Gauge

LAB Online Exhibition

Operation Manual

knowledge

Action movie

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

Dear customer,

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

Our quality maxim is the ”zero fault principle”:

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

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

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

Yours
VACUUBRAND GMBH + CO KG

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

Contents

Attention! Important notes!

Not permitted! Misuse may cause damage.

Caution! Hot surface!

Isolate equipment from mains.

Note.

Safety information!

Remove all packing material, remove the product from its packing-box, remove the protective covers and keep them, inspect the equipment.
If the equipment is damaged, notify the supplier and the carrier in writing within three days; state the item number of the product together with the order number and the supplier's invoice number. Retain all packing material for inspection.
Do not use the equipment if it is damaged.
If the equipment is not used immediately, replace the protective covers. Store the equipment in suitable conditions.

☞ Read this manual before installing or operating the equipment.

☞ Obey all applicable regulations and realize all required measures.
☞ Position the vacuum gauge and the vacuum connection in the vacuum system in a way that no draining of condensate towards the pressure transducer inside the vacuum gauge can occur.

The current supply of the devices is realized by the incorporated 9V battery.
☞ Recommended type see section "Technical data".
☞ The battery is free from mercury and cadmium.
☞ The battery must not be charged, opened, thrown into fire, heated to more than 100°C or brought in contact with water.
☞ When replacing the battery, always insert it correctly into the battery compartment.
☞ When using a battery with a different chemical system (e. g. alkaline), lifetime may be considerably shorter.

☞ The use of an accumulator is not recommended because of its low capacity.

The devices are **not suitable** when working with **dangerous or explosive gases or explosive or flammable mixtures**. Ensure that the materials of the wetted parts are compatible (see "Technical data"). If necessary adopt suitable measures.

Max. permitted pressure at the vacuum gauge: 1.5 bar absolute.
☞ The display flashes at pressures above 1060 mbar.

Max. ambient temperature for storage and operation: 60°C.
Max. temperature of gaseous media at the pressure transducer (gas!): 80°C.

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 equipment processed by the vacuum system and that the equipment if necessary is approximately decontaminated before starting maintenance.
Use only **genuine spare parts and accessories**.
☞ Otherwise safety and performance of the equipment as well as the electromagnetic compatibility of the equipment might be reduced.

In order to comply with law (occupational, health and safety regulations and regulations for environmental protection) products returned to the manufacturer can be **repaired / DKD calibrated** only when following certain procedures (see section "**Notes on return to the factory**").

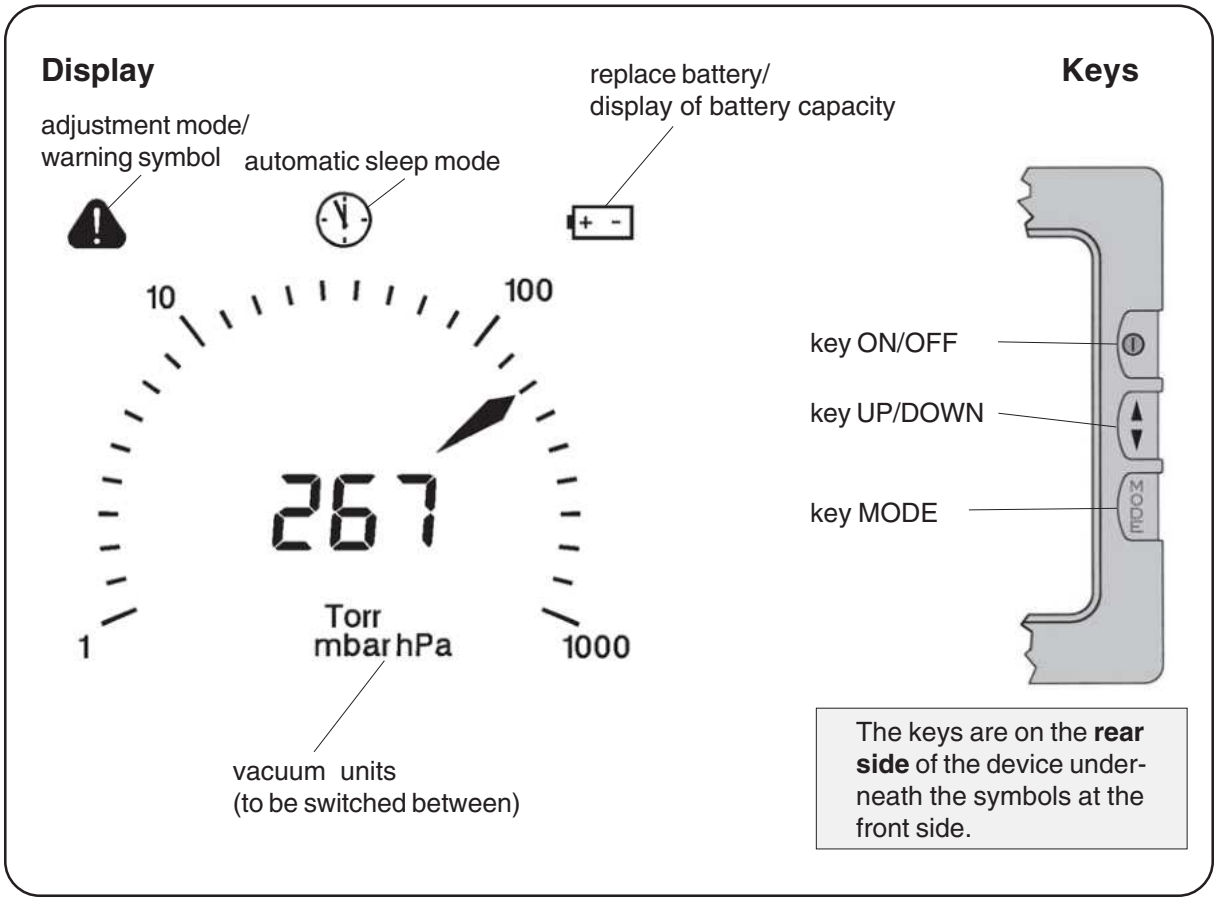
Technical data

Type	DVR 2
Pressure transducer	capacitive / ceramic
Automatic sleep mode	user selectable operation time 1-999 minutes or "On" (continuous operation) (factory-set: 15 minutes)
Pressure reading	analogue and digital LCD display mbar, Torr or hPa (to be switched between)
Measuring cycle time	selectable: automatic, 1 x within 3s, 1 x within 1s, 3 x within 1s (factory-set: automatic)
Measuring range	1 mbar - 1080 mbar (1 Torr - 810 Torr)
Max. permitted pressure at the vacuum gauge	1.5 bar absolute
Uncertainty (with transducer carefully adjusted and at constant temperature)	<+/-1 mbar (0.75 Torr) +/-1 digit
Temperature coefficient	<+/- 0.07 mbar/K (<0.05 Torr/K)
Max. temperature of gaseous media at the pressure transducer (gas!)	+80°C
Permitted ambient temperature range (operation)	+10°C to +60°C
Permitted temperature range (storage)	-10°C to +60°C
Vacuum connection	small flange NW 16 and screw-in stepped hose nozzle for vacuum hoses with 6/10 mm inside diameter
Power supply	battery 9V lithium, 1.2 Ah, Ultralife U 9VL
Mass	375 g
Dimensions of housing (L x W x H)	115 mm x 115 mm x 66 mm

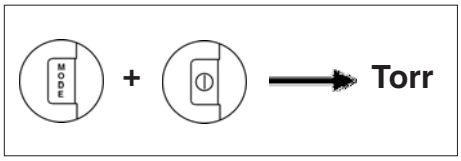
Components	Wetted parts
Vacuum connection / hose nozzle	PBT / PPS
Seals	chemically resistant fluoroelastomer
Pressure transducer housing	stainless steel
Pressure transducer	aluminiumoxide-ceramic

We reserve the right for technical modification without prior notice!

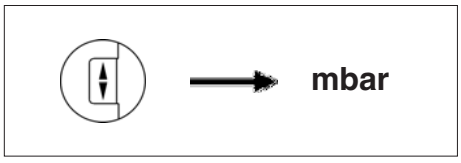
Use and operation



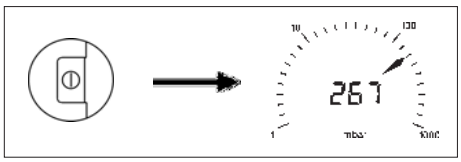
Switch between vacuum units:



➨ Switch off. Press key MODE simultaneously with key ON/OFF.
☞ The vacuum unit as from the last operation is displayed.

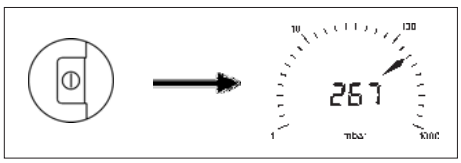


➨ Select desired vacuum unit by using key UP/DOWN.



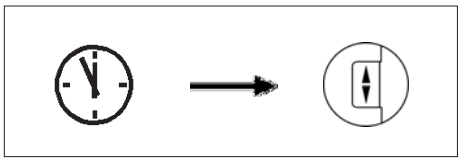
➨ Press key ON/OFF to confirm the selected vacuum unit and to terminate mode.

Pressure measurement:



Upon switching on, the absolute pressure (total pressure, independent of gas type) ranging from 1 mbar to 1080 mbar is displayed in the selected vacuum unit (Torr, mbar or hPa).
☞ The pressure transducer has been adjusted in the factory. In general, there is no need for readjustment by the user because of the excellent longtime stability (see section "Readjustment").

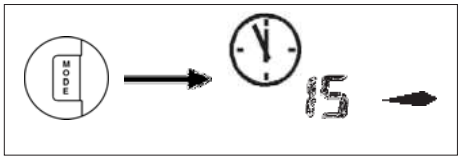
Clock symbol



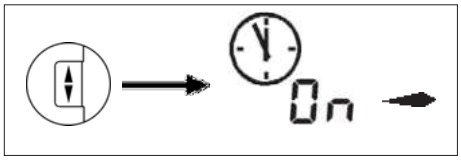
☞ The vacuum gauge is equipped with an automatic sleep mode to save battery power when the instrument is not used. When the clock symbol appears on the display, the vacuum gauge will switch off automatically after approx. 1 minute.
➨ Press key ON/OFF, the clock symbol disappears and the preselected operation time will start again.

Adjusting the operating time and measuring cycle

☞ The time until **automatic switching off (operating time)** can be set by the user within a range of 1 to 999 minutes (factory-set: 15 minutes) or **continuous operation "On"**.

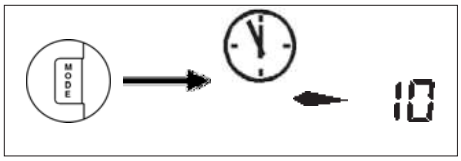


➨ Press key MODE to select the time setting mode.
☞ The clock symbol and the actually set operating time in minutes are displayed.



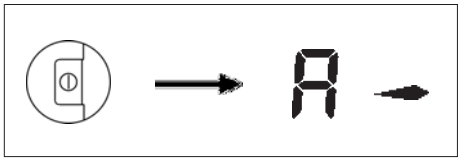
☞ The arrow in the right direction indicates that the time can be increased by using key UP/DOWN.
➨ Press key UP/DOWN to increase operating time.

To decrease operating time:

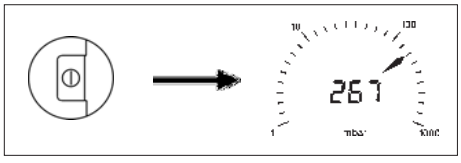


➨ Press key MODE to change arrow direction to the left.
➨ Press key UP/DOWN to decrease operating time.
➨ Press key ON/OFF to confirm.
☞ The device switches to mode "**adjustment of measuring cycle**".
☞ The **measuring cycle** can be chosen between Automatic, 1 measurement in 3s, 1 measurement in 1s and 3 measurements in 1s.

To adjust measuring cycle:

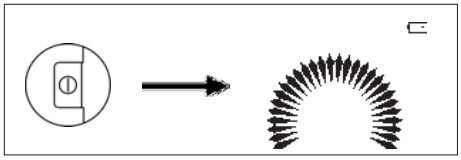


☞ The measuring cycle as from the last operation (factory-set: "A") is displayed.
➨ Press key UP/DOWN to select the measuring cycle: A = Automatic (automatic determination of the measuring cycle; frequent measurement in case of great pressure change), S1 = 1 measurement in 3s, S2 = 1 measurement in 1s, S3 = 3 measurements in 1s.
☞ The flashing of the arrow (only "S1", "S2" or "S3") symbolizes the frequency of the pressure measurement).
☞ Press key MODE to change the direction of the adjustment.



➨ Press key ON/OFF to confirm the measuring cycle and to terminate mode.

Display of the status of discharge of the battery



When switching off the device, the remaining battery capacity is displayed qualitatively by the number of arrows in the display for a few seconds.

☞ If the battery symbol appears in the display during measurement, the battery should be replaced.

☞ The correct function of the device is no longer ensured.

Troubleshooting

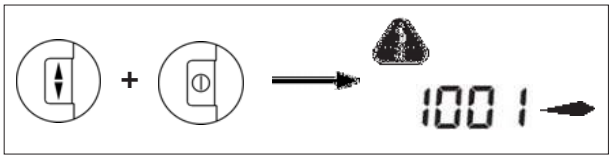
Fault	Possible cause	Remedy
❑ No display or display disappears.	➔ Battery empty?	☞ Replace battery.
	➔ Automatic sleep mode?	☞ Switch on, increase operating time if necessary.
	➔ Other cause?	☞ Contact local distributor.
❑ Incorrect display.	➔ Pressure transducer has drifted off?	☞ Readjust pressure transducer.
	➔ Moisture in the pressure transducer?	☞ Dry, respectively evacuate the transducer and readjust if necessary.
	➔ Battery empty, battery symbol is displayed?	☞ Replace battery.
❑ Display is flickering and/or battery symbol appears.	➔ Battery empty?	☞ Replace battery.
❑ Adjustment mode cannot be activated.	➔ At the current pressure, readjustment is not possible.	☞ Admit air to atmospheric pressure or evacuate to a pressure < 20 mbar.
❑ All segments of the LCD are displayed or no display although battery has been replaced.	➔ Pressure transducer or measuring electronics defective?	☞ Contact local distributor.

Readjustment of the vaccum gauge

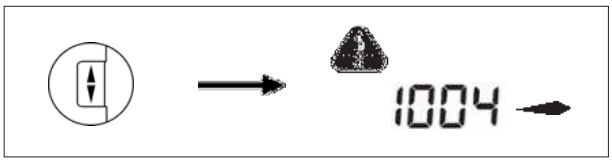
The equipment has been adjusted at the factory. In general, there is no need for adjustment by the user because of the excellent longtime stability.
Depending on operation conditions, type of application and accuracy requirements, an inspection and readjustment may become necessary.

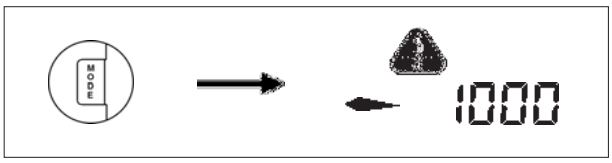
Adjustment at atmospheric pressure

Admit air to the vacuum gauge. Make sure that the vacuum connection at the vacuum gauge is at atmospheric pressure.
Attention: Determine the exact actual atmospheric pressure, e. g. by using an accurate barometer or get accurate reading from the weather service, e. g. at the next airport, etc. (take into account the difference in altitude between e. g. airport and laboratory).



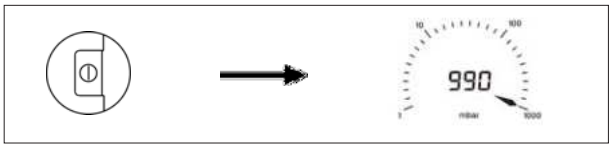
- ➨ Press key UP/DOWN simultaneously with key ON/OFF.
- ☞ The vacuum gauge switches to the adjustment mode (indicated by a warning triangle).
- ☞ The arrow in the right direction indicates that the pressure value can be increased by using key UP/DOWN.
- ➨ Press key UP/DOWN to increase the reading to actual atmospheric pressure.





To reduce the reading:

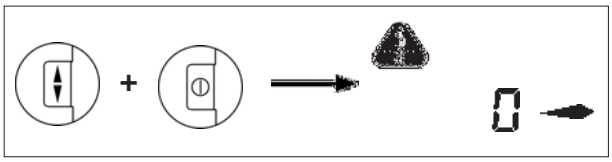
- ➨ Press key MODE to change arrow direction to the left.
- ➨ Then press key UP/DOWN to reduce the reading.



- ➨ Press key ON/OFF to confirm adjustment and to terminate mode.

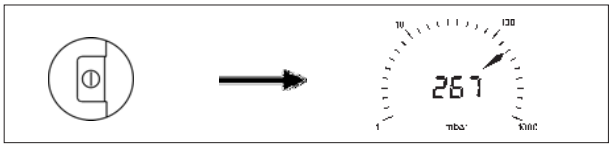
Adjustment under vacuum

Evacuate the vacuum gauge to a pressure <0.5 mbar (<0.4 Torr) e. g. by applying a good rotary vane pump.



- ➨ Press key UP/DOWN simultaneously with key ON/OFF.
- ☞ The vacuum gauge switches to the adjustment mode (indicated by a warning triangle)
- ☞ The reading is adjusted automatically to ”zero”.

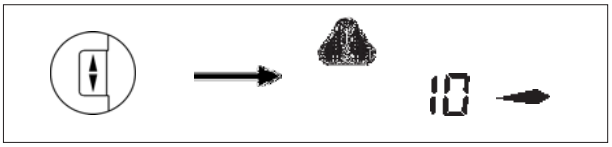
Attention: Adjustment under vacuum with a pressure higher than 0.5 mbar (0.4 Torr) reduces the accuracy of measurement. If the pressure is significantly higher than 0.5 mbar (0.4 Torr), adjustment to a reference pressure is recommended**.**



- ➨ Press key ON/OFF to confirm adjustment and to terminate mode.

Adjustment at reference pressure

Evacuate the vacuum gauge to an exact known reference pressure within the range of 0 .... 20 mbar (0 .... 15 Torr). Switch vacuum gauge to the adjustment mode (see ”Adjustment under vacuum”).



- Press key UP/DOWN to adjust the display from ”0” (”zero”) to the actual reference pressure in the vacuum line in the range of 0 to 20 mbar (0 to 15 Torr).
- Press key ON/OFF to confirm adjustment and to terminate mode.

Attention: 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 adjustment of the vacuum gauge might be doubtful. The diaphragm pump may not achieve the specified value due to condensate, poor state, failure of the valves or the diaphragm.

Calibration in the factory

Control of measuring equipment

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

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

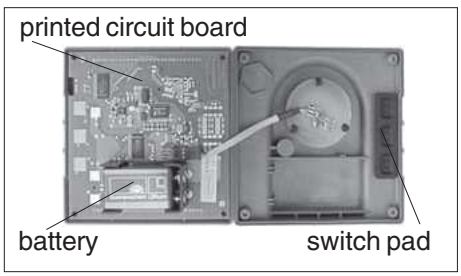
DKD recalibration 90 02 17

Replacement of the battery

Note: Some of the components on the printed circuit board are sensitive to electrostatic discharge. Do not touch components. If necessary, ground the printed circuit board and the person replacing the battery suitably.

Attention: Use only a battery of the recommended type (see ”Technical data”).
The battery must not be charged or connected to an external voltage.

- Unscrew the four countersunk head screws at the rear side of the housing by using a Phillips screw driver.
- Disassemble the housing parts carefully.



- Remove the battery.
- Insert the new battery in the battery compartment correctly matching the positive and negative polarity (as shown by the engraving inside the compartment).
- ☞ When reassembling the vacuum gauge, make sure that the switch pad and the printed circuit board are positioned correctly.
- Carefully screw both parts of the housing together.

Notes on return to the factory

Repair - return - DKD calibration

If the measures listed in section "Troubleshooting" do not work: Return the equipment to the factory for inspection and repair.
Opening or disassembly of the equipment voids all warranties and the licence if necessary.

Safety and health of our staff, laws and regulations regarding the handling of dangerous goods, occupational health and safety regulations and regulations regarding safe disposal of waste require that for all pumps and other products the **"Health and safety clearance form"** must be send to our office duly completed and signed before any equipment is dispatched to our premises.
Fax or post a completed copy of the health and safety clearance form to us in advance. The declaration must arrive before the equipment. Enclose a second completed copy with the product. If the equipment is contaminated you must notify the carrier.

No repair / DKD calibration is possible unless the correctly completed form is returned. Inevitably, there will be a delay in processing the equipment if information is missing or if this procedure is not obeyed. Eventually, acceptance of the returned equipment will be refused.

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

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

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

We replace parts due to optical aspects upon your request (at your expense).

Before returning the equipment ensure that (if applicable):

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

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

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

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

Health and safety clearance form

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

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

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

2. Serial No.: .....

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

3.1 Chemical/substance name, chemical symbol:

a) .....

b) .....

c) .....

d) .....

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

a) .....

b) .....

c) .....

d) .....

4. Declaration (please mark as applicable):

❑ **4.1 for non dangerous goods:**

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

❑ **4.2 for dangerous goods:**

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

5. Way of transport / carrier:

.....

Day of dispatch to VACUUBRAND:

.....

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

❑ yes ❑ no

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

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

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

Signature: .....

Name (print): .....

Job title (print): .....

Company´s seal: .....

Date: .....

VACUUBRAND GMBH + CO KG
-Technology for Vacuum Systems-

Alfred-Zippe-Str. 4 - 97877 Wertheim
Tel.: +49 9342 808-0 - Fax: +49 9342 808-450
E-Mail: info@vacuubrand.de
Web: www.vacuubrand.com

CE

Konformitätserklärung
Declaration of conformity
Déclaration de conformité

Vakuummeßgerät / Vacuum gauge / Vacuomètre

DVR 2 (68 29 02)

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

Richtlinie Elektromagnetische Verträglichkeit / Electromagnetic Compatibility Directive / Directive Compatibilité Electromagnétique
89/336/EWG, 92/31/EWG, 93/68/EWG
Angewandte Harmonisierte Normen / Harmonized Standards applied / Normes Harmonisées utilisées
DIN EN 61326
Managementsysteme / Management systems / Systèmes de Management
EN ISO 9001, EN ISO 14001 (1997-2006)

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Dr. Lachenmann
. . . . . .
(Dr. R. Lachenmann)
Geschäftsführer / Managing director / Gérant

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-Technology for Vacuum Systems-

Alfred-Zippe-Str. 4 - 97877 Wertheim
Tel.: +49 9342 808-0 - Fax: +49 9342 808-450
E-Mail: info@vacuubrand.de
Web: www.vacuubrand.com