

UK

# USER MANUAL



## LLG DVR2pro Vakuum Gauge





#### Original instructions Keep for further use!

This manual is only to be used and distributed in its complete and original form. It is strictly the users' responsibility to check carefully the validity of this manual with respect to his product.



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Thank you for purchasing this product from Lab Logistics Group GmbH. You have chosen a modern and technically high quality product.

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### **1 INTRODUCTION**

This manual is part of your product.

### **1.1 USER INFORMATION**

#### Safety

Instructions for use and safety

- Read this manual thoroughly and completely before using the produkt.
- Keep this manual in an easily accessible location.
- Proper use of the product is essential for safe operation. Comply with all safety instructions provided!
- In addition to this manual, adhere to any relevant local accident prevention regulations and comply with industrial safety regulations.

#### General

General information

- Instead of the term *DVR 2pro* mostly the term *Gauge* or *Vacuum* gauge is used in this manual, in order to make the text more readable.
  - The illustrations in this manual are provided as examples in order for a better understanding.
  - They are intended to aid in your understanding of the proper use of the product.

#### Contact

- Contact us Please ask for replacement in case of an incomplete manual or download the manual on our website: <u>www.vacuubrand.com</u>
  - Contact us regarding any questions about this product, if you need further information, or to provide us with feedback.
  - When contacting our Customer Service Department, please be sure to have the correct type and serial number of your product at call → device data on the product, see chapter 8.1.3 Device data on page 44



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### **1.2 ABOUT THIS DOCUMENT**

### 1.2.1 Display conventions

#### Warning levels

Warning levels

	WARNING
<u> </u>	Indicates a potentially hazardous situation.
	Disregarding the situation could result in serious, even fatal injury or massive damage to property.
	⇒ Take appropriate action to avoid dangerous situation!
	CAUTION
<u> </u>	Indicates a potentially hazardous situation.
	Disregarding the situation could result in slight or minor injury or damage to property.
	⇒ Take appropriate action to avoid dangerous situation!
ΝΟΤΙ	CE

Notice for a potentially harmful situation.

Disregarding the notice could lead to material damage.

#### Additional notes

- IMPORTANT! 
  ➡ Information or specific use recommendation, which must be observed.
  - ⇒ Important information for proper operation.



Additional information

#### 1.2.2 Symbols and icons

This manual includes symbols and icons. Safety symbols indicate special danger in handling the product. Icons shall help to identify the danger directly and easier.

#### Safety symbols





### **1.2.3 Handling instructions (action steps)**

Presentation convention operating steps Action step (single step)

 $\Rightarrow$  Do the described step.

☑ Result of action

#### Handling instructions (multiple steps)

- 1. first step
- 2. next step
  - ☑ Result of action

Follow steps in the described order.

abs.	absolute
ATM	Atmospheric pressure
d (di)	Interior diameter
DAkkS	accreditation institute:
	Deutsche Akkreditierungsstelle GmbH
DN	Nominal diameter
GF	Glass fiber reinforced
GK	Glass pellets
Gr.	Size
hPa	Pressure unit, Hectopascal (1 hPa = 1 mbar =
	0.75 Torr)
KF	Small flange
max	Maximum value
mbar	Pressure unit, millibar (1 mbar = 1 hPa = 0.75 Torr)
min	Minimum value
PA	Polyamide
PBT	Polybutylene terephthalate
PP	Polypropylene
PPS	Polyphenylene sulphide
PTFE	Polytetrafluorethylene
RMA-N°	Return Merchandise Authorization number
Sec.	Second(s)
Torr	Pressure unit (1 Torr = 1.33 mbar = 1.33 hPa)
	abs. ATM d, (di) DAkkS DN GF GK Gr. hPa GR hPa KF max mbar mbar PA PBT PBT PP PPS PPS PTFE RMA-N° Sec. Torr

### 1.2.4 Abbreviations

### 1.2.5 Term definition

Product specific terms

DVR 2pro	Fully electronic vacuum gauge for measurement within the measuring range of atmospheric pres- sure and 1 mbar, with digital and analogue pres- sure reading.
DVR 3pro	Functions like DVR 2pro, including ATEX approval
Rough vacuum	Pressure measuring range in vacuum technology, from: atmospheric pressure–1 mbar (atmospheric pressure–0.75 Torr)



### 2 SAFETY INSTRUCTIONS

The complete information of this chapter must be observed by all persons working with the herein described product. The safety instructions are valid for the complete life cycle of the product.

### 2.1 USAGE

Use the product only when it is in proper working condition.

#### 2.1.1 Intended use

Intended use A vacuum gauge **DVR 2pro** is a laboratory instrument for the measurement of absolute pressure in the range of rough vacuum and intended for connection to a vacuum apparatus. The gauge may only be installed and used in non-explosive areas. The gauge is intended for continuous operation.

Any other use is considered to be improper use.

#### Intended use also includes the following:



- observing safety information of document Safety Information for Vacuum Equipment.
- observing the safety information inside this manual

#### 2.1.2 Improper use

Incorrect use or any application which does not correspond to the technical data may result in injury or damage to the property.

#### Improper use includes:

Improper use • Using the product contrary to its intended use.

Operation despite obvious malfunctions or damages.

Improper use • Operation at inadmissible operating conditions.

inadmissible modifications or repairs by customer.

# **IMPORTANT!** The penetration of foreign objects, hot gases and flames from the application, must be excluded.

#### 2.1.3 Foreseeable misuse

Foreseeable misuse

The measuring of media which are liquid, hot, instable or explosive.



- Installation and operation in explosive environments,
- to switch the gauge on/off with tools,
- to use a tool for battery replacement, which could cause a short circuit,
- to expose the gauge completely to vacuum,
- to operate the controller with sharp stylus or objects.
- to immerse the gauge into liquid or to clean it with steam.



### 2.2 GENERAL SAFETY INSTRUCTIONS

#### 2.2.1 Safety precautions

⇒ Use the gauge only if you have understood its function and this manual.

- ⇒ Please note that adhering process media can pose danger to humans and the environment.
- ⇒ When handling with contaminated parts, follow the relevant regulations and safety precautions.
- $\Rightarrow$  Repairs are only allowed by the Service Department or your local supplier.

For all service works hazardous substances need to be **IMPORTANT!** excluded.

> ⇒ Fill in the form <u>Health and Safety Clearance</u> thoroughly and completely and confirm with your signature.

#### 2.2.2 Personnel

#### **IMPORTANT!** It is the owner's responsibility to observe the proper use of the device.

- Always be conscious of safety, and work in a safe manner.
- ⇒ Observe the owners' directives at work, the national accident prevention regulations and occupational safety provisions.

### **2.3 CORRECT BATTERY HANDLING**

Correct battery handling



#### CAUTION

Risk of personal injury or damage to property if batteries are used improperly.

- ⇒ Do not short-circuit the battery or touch both poles at the same time.
- $\Rightarrow$  Never charge the battery (= non-rechargeable).
- ⇒ Never use damaged batteries.
- $\Rightarrow$  Do not expose the battery to high temperatures.
- ⇒ If the battery leaks and you come into contact with the leaked fluids, rinse thoroughly with water and seek medical attention immediately!

### 2.4 PROPER DISPOSAL

### NOTICE

# Electronic components and batteries must not be disposed of in the domestic waste at the end of their service life.

Used electronic devices and batteries contain harmful substances that can cause damage to the environment or human health. Disused electrical devices also contain valuable raw materials, which can be recovered for reuse if the device is disposed of correctly within the recycling process.

End users are legally obliged to take used electric and electronic devices to a licensed collection point and to return spent batteries.

- ⇒ It is your responsibility to save and delete any data before disposing of your electronic device.
- ⇒ If the device contains batteries: Remove spent batteries before disposal.



- ⇒ Correctly dispose of all electronic scrap and electric components at the end of their service life.
- ⇒ Observe the national regulations regarding disposal and environmental protection.



### **3 PRODUCT DESCRIPTION**

#### Goods arrival

Goods arrival

Check the shipment for transport damage and completeness.

⇒ Report any transit damage immediately to the supplier.

### NOTICE

#### Condensate could damage the gauge.

A large difference in temperature between storage location and installation location can cause condensation.

⇒ Let the product acclimatise for 3-4 hours before using it.

#### Included materials

#### Included materials

Gauge	
DVR 2pro	6.263 582
Support rod	
Knurled nut M14x1 (union nut)	
Hose nozzle DN 6/10	
Locking ring for knurled nut	
Small flange KF 16 PP	
Protective cap DN 10/16	
O-ring	
9 V Block-type battery, enclosed	
Instructions for use	
Safety Information for Vacuum Equipment	
Original packaging	

#### 3.1 VACUUM GAUGE DVR 2PRO

Gauge description **DVR 2pro** is a fully electronic battery operated vacuum gauge for measurement<sup>1</sup> within the measuring range of atmospheric pressure and 1 mbar.

The **DVR 2pro** has an integrated ceramic diaphragm vacuum sensor and is exceptionally resistant to chemicals.

The gauge has a large LC-display for analog and digital pressure reading. The pressure unit is selectable between mbar, hPa or Torr.

The **DVR 2pro** is operated by keys placed on the rear.

#### 3.1.1 Various views

#### Front and side view

Front and side view



Meaning

- 1 Chemically resistant plastic housing
- 2 LC display (LCD)
- **3** Operating keys
- 4 Device name
- 5 Vacuum screw connection



#### **Rear side**

Rear view



Meaning

#### 3 Operating keys

#### 5 Vacuum screw connection, support for

- Hose nozzle with locking ring and knurled nut or
- Hose directly connected with locking ring and knurled nut or
- ▶ Small flange KF 16
- 6 Serial number + CE symbol
- 7 Blind hole with thread M8 for support rod
- 8 Manufacturer + address (rating plate)
- 9 Battery compartment lid with screw (captive screw)
  - ▶ Block-type battery 9 V

#### 3.1.2 Support rod

An adjustable support rod for stand mounting operation is enclosed to the **DVR 2pro**. The gauge can be properly positioned by the counter nut at the support rod.



#### Side view



### **3.2 APPLICATION EXAMPLE**



Please observe the following points to get an optimal measuring result:

- ⇒ Connect the gauge as close as possible to the apparatus, not to the vacuum pump.
- $\Rightarrow$  If possible use the small flange for connection.
- ⇒ Connect the vacuum line as short as possible with a crosssection as wide as possible.

### **4** ASSEMBLY AND CONNECTION

The gauge is provided to be used directly at the application.

- ⇒ Observe all specifications for installation, connection and operation according to technical data,
   → see chapter Technical information on page 42.
- Also observe rating plate data.
- Compare the permitted limits which are described in this manual, with your actual application regarding operating media, pressures, forces, moments, temperatures and voltage.

#### NOTICE

Permanent vibrations which are transmitted from the apparatus to the gauge could loosen screw connections.

- $\Rightarrow$  Mount the gauge to a vibration-free apparatus.
- $\Rightarrow$  Please use buffers, if constant vibration is unavoidable.

#### **4.1 INSTALLATION CONDITIONS**

#### **Consider installation conditions**

- The gauge has acclimatized.
- Ambient conditions are observed and are within the limitation of use.

Limitation of use	Limitation of use		(US)
	Ambient temperature	10–40 °C	50–104 °F
	Altitude, max.	3000 m über NHN	9840 ft above sea level
	Relative humidity	30–85 %, non condensing	
	Protection type / Impact energy	IP 40 / 5 J	
	Avoid condensation or contamination by dust or liquids.		



### 4.2 INSERT (REPLACE) BATTERY

Insert battery

The battery is enclosed to the delivery and must be inserted into the gauge before installation.

#### Insert (replace)<sup>1</sup> battery

Required tool Phillips screwdriver size 1.

**1.** Use a Phillips screwdriver to unscrew the screw of the battery compartment lid.



**2.** Remove battery compartment lid with captive screw. If changing the battery, please remove the discharged battery.

**IMPORTANT!** Tools for battery replacement must not cause a short-circuit.



**3.** Put in the new battery in correct position (compare to figure inside the housing).



- **4.** Put the battery compartment lid in correct position onto the gauge and fix it stress-free by the captive screw. When tight-ening, observe the maximum torque of 0.4 Nm.
- 1 approved batteries  $\rightarrow$  see chapter: 8.2 Ordering information on page 44



### 4.3 INSTALL ADJUSTABLE SUPPORT

The support rod is provided as additional mounting option for the gauge.

#### Install and fix support rod

**1.** Screw in the support rod into the blind hole on the rear side.



**2.** Turn the gauge into a suitable position and fix it with the counter nut of the support rod.



**3.** Fix the vacuum gauge close to your apparatus, e. g., to your lab stand system.



### 4.4 VACUUM CONNECTION



### WARNING

### **Risk of bursting**

⇒ Prevent uncontrolled overpressure, e. g., when connecting to a locked or blocked tubing system.

#### **IMPORTANT!** ⇒ Maximum admissable pressure at vacuum sensor: 1,5 bar/1126 Torr (abs.).

⇒ Pollution and damages, especially at the flange, could affect the measurement.

### **Connection options**



#### Connection via hose nozzle



**Required connection material:** Hose nozzle DN 6/10 mm, kurled nut M14x1, locking ring; optionally: Vacuum hose and compatible hose clamp (tool: fork wrench size 17).



- **1.** If installed, unscrew the small flange from the vacuum connection of the gauge.
- (a) (b) (c)
- 2. Connect hose nozzle (a), kurled nut (b) and locking ring (c) as shown in the figure.



- **3.** Push the PTFE-hose into the vacuum connection connection of the gauge and fasten it with the kurled nut.
- **4.** Push the vacuum hose **(d)** of the apparatus onto the hose nozzle and fasten the hose, e. g., with a hose clamp **(e)**.
- **5.** Fix the vacuum gauge close to your apparatus, e. g., by using the support rod.

#### **Connection via PTFE hose**

**Required connection material:** Kurled nut M14x1, locking ring; optionally: PTFE Hose DN 8/10.

- **1.** If installed, unscrew the small flange from the vacuum connection of the gauge.
- 2. Connect locking ring (b), kurled nut (c) and PTFE hose (f) as shown in the figure.



**3.** Push the PTFE-hose into the vacuum connection connection of the gauge and fasten it with the kurled nut.

☑ PTFE Hose fixed.

#### **IMPORTANT!**

- ⇒ Use a stable vacuum hose that is suitable for the required vacuum range.
- $\Rightarrow$  Connect hose tubes as short as possible.





#### **Connection via small flange**

**Required connection material:** Clamping ring with centering or centering ring for KF DN16 (tool: fork wrenche size 17).



**1.** Place the small flange KF DN16 on top of vacuum connection of the gauge.



2. Screw in the small flange KF DN16 hand tight.



**3.** Remove the protection cap **(g)** from the small flange KF DN16 **(h)**.



- **4.** Put the gauge with the centering onto the connection of the apparatus → small flange KF DN16.
- 5. Fix the vacuum gauge with a clamping ring (i).

### **5 OPERATION**

#### **5.1 OPERATING AND DISPLAY ELEMENTS**

#### 5.1.1 Operating elements

The operation keys are on the rear. They correspond to the respective symbol on the front frame.



#### **Operating elements**



### 5.1.2 Key combinations

Certain functions, such as selecting the pressure unit and calling up the adjustment mode, can only be called up via key combinations. For that the gauge needs to be switched off.

#### NOTICE

Wrong key combinations can lead to faulty settings.

⇒ First push and hold the key which must be hold and pressed, only then push the combination key shortly.

Key combination	Combination	Meaning
		<ul> <li>Press and hold MODE + press ON/OFF =</li> <li>Display of the adjusted <b>Pressure unit</b>.</li> </ul>
	Å <b>v</b> + ①	<ul><li><i>Press and hold UP/DOWN</i> + Press <i>ON/OFF</i> =</li><li>Call-up adjustment mode</li></ul>

#### 5.1.3 Automatic jump-back times

Without any action, the display switches automatically back to pressure display – settings will not be stored.

Jump-back times	From menu	Jump-back time (Sec.)
	Power-on time	20
	Measuring cycle	20
	Unit (pressure unit)	20
	Adjustment mode	20

#### 5.1.4 Display elements

Directly after switching on the pressure reading will be displayed.





- 1 Display icons
- 2 Pointer (clock-hand)
- 3 Analog pressure reading, display scale with current pressure
- 4 Digital pressure reading, current pressure as numeral value
- 5 Pressure unit referring to pre-setting (mbar, Torr, hPa)





### 5.1.5 Display icons

With switched-on gauge additional symbols appear on the display, depending on state.

### Meaning of display icons

Display icons	lcon	Meaning
υνκ 2μιο		<ul><li>Warning triangle</li><li>Warning</li><li>Adjustment mode active</li></ul>
		<ul> <li>Clock</li> <li>Automatic switch-off activated</li> <li>The display of the gauge swichtes off after approx. 30 Seconds ⇒ to stop switch-off press any key shortly</li> </ul>
	•••	<ul><li>Battery</li><li>Battery low</li><li>Battery replacement required</li></ul>
		<ul> <li>Pointer</li> <li>Display measurement value</li> <li>Display pointer direction (left/right)</li> </ul>
		L H = automatic adaption of the measuring cycle; more frequent readings for large pressure vari- ation
		Pointer – Adjust measuring cycle
		► <b>C I</b> = 1x measuring per 3 Seconds = blinking cycle 3 Sec.
		<b>C 2</b> = 1x measuring per 1 Second = blinking cycle 1 Sec.
		C 3 = 3x measuring per 1 Second = blinking cycle 0.3 Sec.

### 5.2 DVR 2PRO HANDLING

#### 5.2.1 Select pressure unit

#### Set pressure unit



**1.** Press and hold the *MODE* key at the switched-off gauge and then press *ON/OFF* key.



 $\boxdot$  Displays the selected pressure unit, e. g., hPa.



- 2. Press key UP/DOWN as often as the required pressure unit is displayed.
  - Switchable: mbar, Torr, hPa



 $\square$  Displays the selected pressure unit, e. g., mbar.



- **3.** Press key *ON/OFF* to confirm the selection.
  - $\boxdot$  Switch to pressure reading.
  - $\square$  Pressure unit adjusted on **mbar**.





### 5.2.2 Adjust switch on time and measuring cycle

#### Adjust power-on time

- **1.** Switch on the gauge and press *MODE* key.
- 5 LLG DVR 2pro

MODE



- ☑ On the display: Adjust power-on time.
- ☑ Display of the new pre-set power-on time, e. g., 5 Minutes (= delivery state).
- 2. Press the UP/DOWN key repeatedly or hold it until the required power-on time is displayed, e.g., 20 Minutes.
  - Power-on time min. 1 600 Minutes; On = permanent ON
  - Changing pointer direction with MODE key
  - ☑ Display of the new pre-set power-on time.
  - ☑ This setting switches off the gauge automatically after 20 minutes.



3. Press key ON/OFF to confirm the adjustment.



☑ On the display: Pre-select measuring cycle.





#### Adjust measuring cycle



- 4. Press *UP/DOWN* key repeatedly until the required measuring cycle is displayed, e. g., **C** 3.
  - Selection  $\mathbf{L} \mathbf{L} \mathbf{B}$ ;  $\mathbf{L} \mathbf{R} (\mathbf{L} \mathbf{R} = \text{delivery state})$
  - $\boxdot$  Display of the new pre-set measuring cycle.
  - ☑ 3x measuring per 1 Second = arrow with blinking cycle 0.3 Sec.





**5.** Press key *ON/OFF* to confirm the adjustment.



 $\boxdot$  Switch to pressure reading.



#### 5.2.3 Pressure measurement

#### Switch-on vacuum measurement

**1.** Press *ON/OFF* key at the switched-off gauge.



☑ Display of actual pressure.

#### Switch-off vacuum measurement

1. Press and hold ON/OFF key shortly (approx. 1–2 Sec.) to switch off the gauge.



- ☑ Briefly displayed battery's discharge status. Amount of pointers displays battery state,
- ☑ and indicates system data for our service department.



☑ Display switched off,



### 6 CLEANING AND ADJUSTMENT

#### 6.1 CLEANING

Clean the sensor to remove malfunctions that are caused by a polluted sensor. We recommend to clean the sensor before adjustment.

 $\Rightarrow$  Clean polluted surface with a clean, slightly wetted cloth. To

moisten the cloth we recommend water or mild soap.

**IMPORTANT!** This chapter does not contain descriptions for the decontamination of the product. This chapter describes only simple cleaning and care measures.

#### 6.1.1 Housing surface

#### **Clean surface**

Clean surface



#### 6.1.2 Sensor

#### **Clean sensor**

- Clean sensor **1.** Fill a small amount of solvent via flange into the gauge, e. g., cleaning solvent.
  - **2.** Let the solvent react for a few minutes.
  - **3.** Pour the solvent.
    - ☑ Dissolved substances or discolorations in the solvent are possible.
  - **4.** Repeat this procedure until no more pollutants are in the solvent.
  - **5.** Air the gauge until the internal chamber has dried.
  - **6.** Re-adjust the sensor.



### 6.2 SENSOR ADJUSTMENT, IN GENERAL

The gauge is intended for continuous operation.

Adjustment is not part of the everyday operation. Perform adjustment only when the measured values differ from reference normal or when irregularities in pressure reading emerge.

Mostly the adjustment under vacuum will do  $\rightarrow$  see 6.2.3 Adjustment under vacuum on page 38

### 6.2.1 Adjustment at atmospheric pressure

For correct adjustment the exact atmospheric pressure at your location is important. Exact data are provided, for example, by the weather service or an airport in your area. A precise counter barometer if available also displays the current atmospheric pressure.

#### Sensor adjustment at atmospheric pressure

- **1.** Remove gauge from vacuum port and make sure that atmospheric pressure is present.
- **2.** Press and hold the *UP/DOWN* key at the switched-off gauge and then press *ON/OFF*.



Display adjustment mode - only active for approx.
 20 seconds, as long as no further key is pressed.

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- **3.** Press the *UP/DOWN* key repeatedly or hold it until the current atmospheric pressure is displayed, e. g., 1005 mbar.
  - Adjustment range 700–1060 mbar (525–795 Torr)
  - Changing pointer direction with MODE key
     = decrease value / = increase value
  - ☑ Value corresponds to current atmospheric pressure.





- 4. Press key ON/OFF to confirm the value.
  - $\boxdot$  Switch to pressure reading.
  - ☑ Display atmospheric pressure.
  - ☑ Sensor adjusted to atmospheric pressure.





#### 6.2.2 Adjustment to reference pressure

#### For adjustment, the vacuum gauge must be evacuated to a **IMPORTANT!** precisely known reference pressure.

- ⇒ Check the accuracy of the ultimate vacuum with a calibrated reference vacuum gauge.
- ⇒ A faulty reference pressure measurement is transmitted directly to the gauge.

#### Sensor adjustment at reference pressure

- **1.** Connect the gauge to a vacuum pump which pumps to a precise vacuum, e. g., down to 2 mbar.
- 2. Press and hold the UP/DOWN key at the switched-off gauge and then press ON/OFF.
- mba LLG DVR 2pro
- ☑ Display adjustment mode only active for approx. 20 seconds. Display only at vacuum less than < 20 mbar (15 Torr).



- **3.** Press key UP/DOWN as often as the required pressure unit is displayed, e. g., 2 mbar.
  - Adjustment range 0–20 mbar (0–15 Torr)
  - Changing pointer direction with MODE key



 $\square$  Value corresponds to current reference pressure.







**4.** Press key *ON/OFF* to confirm the value.



- $\boxdot$  Switch to pressure reading.
- $\boxdot$  Display of current pressure.
- ☑ Sensor adjusted to reference pressure.



The adjustment to a reference pressure is an alternative method, if present vacuum pumps are not capable of providing an adequate vacuum (<1 mbar).



### 6.2.3 Adjustment under vacuum

#### NOTICE

#### The adjustment at vacuum always occurs to the final measured value with 0 mbar.

- $\Rightarrow$  Pump down to an ultimate vacuum as low as possible.
- ⇒ Check the accuracy of the ultimate vacuum with a calibrated reference vacuum gauge.

#### Adjustment under vacuum

- 1. Connect the gauge to a vacuum pump which pumps to a precise vacuum, e. g., a rotary vane pump down to < 0.5 mbar.
- 2. Press and hold the UP/DOWN key at the switched-off gauge and then press ON/OFF.



Display adjustment mode - only active for approx. 20 seconds. Display only at vacuum less than < 20 mbar (15 Torr).



- 3. Press key UP/DOWN repeatedly until 0 mbar is displayed.
  - Changing pointer direction with MODE key
  - $\square$  Value for vacuum < 0,5 mbar.





**4.** Press key *ON/OFF* to confirm the value.



- $\boxdot$  Switch to pressure reading.
- $\boxdot$  Display of current pressure.
- ☑ Sensor adjusted under vacuum.



### 7 RESOLVING PROBLEMS

#### CAUTION

- Malfunction because of incorrect repair by the customer.
  - The gauge is not intended for the repair by customer.
  - ⇒ Open the vacuum gauge only for battery replacement.
  - ⇒ If the gauge is defective, please send it to our Service Department or your local supplier.

#### **Technical support**

Technical support

➡ To identify errors and potential remedies, please refer to the troubleshooting table: *Fault – Cause – Remedy* 

For technical help or in case of errors, please contact our **Service department.** 

### 7.1 ERROR DISPLAY

In case of malfunction a warning triangle appears on the display.

### Example error display

### 7.2 FAULT – CAUSE – REMEDY

Fault	Possible cause	✓ Remedy
over pressure Blinking cycle pressure reading and warning tri- angle	<ul> <li>▶ Pressure too high.</li> <li>▶ Measuring range exceeded.</li> <li>▲ WARNING!</li> <li>Risk of bursting.</li> <li>⇒ Discharge the system immediately by <i>Venting</i>.</li> </ul>	<ul> <li>✓ Vent the system or apparatus.</li> <li>✓ Reduce pressure.</li> <li>✓ Perform sensor adjustment.</li> </ul>
Under range Blinking cycle pressure reading and warning tri- angle	<ul> <li>Measuring range fallen below.</li> </ul>	<ul> <li>✓ Pressure reading until 0 mbar (0 Torr).</li> <li>✓ Perform sensor adjustment.</li> </ul>
Front glass broken	<ul> <li>Wrong cleaning agent used.</li> <li>Mechanically damaged.</li> </ul>	✓ Send in gauge.
Wrong pressure read- ings displayed	<ul> <li>Sensor measures incorrectly.</li> <li>Vacuum sensor polluted.</li> <li>Defective sensor.</li> </ul>	<ul> <li>✓ Clean sensor</li> <li>✓ Perform sensor adjustment.</li> <li>✓ Send in gauge.</li> </ul>
Battery icon and/or dis- play blinks	Battery low.	✓ Replace battery.
No display	<ul> <li>Device switched off</li> <li>Power-on time elapsed.</li> <li>No voltage, battery empty or defective or wrong poled.</li> </ul>	<ul> <li>✓ Switch on device</li> <li>✓ Extend power-on time.</li> <li>✓ Check battery fastening.</li> <li>✓ Replace battery.</li> </ul>
Adjustment mode can- not be called-up <i>Blinking warning triangle,</i> <i>pressure reading =</i>	<ul> <li>A for sensor adjustment inadmissible pressure is reached (no adjustment possible in between pressure range 21 – 699 mbar).</li> </ul>	<ul> <li>✓ Perform adjustment at min. &gt; 700 mbar atmo- spheric pressure or vacuum</li> <li>&lt; 20 mbar.</li> <li>✓ For adjustment connect a vacuum pump with pre- cise vacuum and then move pump down to the possible pressure range.</li> </ul>
Display of all LCD icons or no display despite of battery replacment.	<ul> <li>Defective sensor.</li> <li>Defecitve measuring equipment</li> </ul>	✓ Send in gauge.



**8 APPENDIX** 

### **8.1 TECHNICAL INFORMATION**

#### Туре

Absolute pressure gauge – *rough vacuum* 

DVR 2pro

### 8.1.1 Technical data

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Vacuum data							
DVR 2pro		(US)					
Measuring range, absolute	1060–1 mbar	(795–1 Torr)					
Max. admissible pressure, absolute	1,5 bar	1125 Torr					
Temperature coefficient	< ±0.15 mbar (hPa)/K	< ±0.11 Torr/K					
Vacuum sensor (pressure transducer)	internal	internal					
Resolution	1 mbar	1 Torr					
Accuracy of measure- ment	< ±1 mbar/hPa/Torr, ±1 c (after adjustment, consta	digit ant temperature)					
Measuring principle	Ceramic diaphragm (alu capacitive, gas type inde pressure	mina), gold-coated, ependent, absolute					
Measuring cycle	State of delivery <b>C R</b> automatically; Selectable measuring cycle: <b>C I</b> = 1x per 3s, <b>C 2</b> = 1x per 1s, <b>C 3</b> = 3x per 1s, <b>C R</b>						
	Selectable measuring cy $\mathbf{C} = 1x \text{ per } 1s, \mathbf{C} = 3$	vcle: <b>C I</b> = 1x per 3s, ex per 1s, <b>C R</b>					
Max. admissible media tempe	Selectable measuring cy <b>C 2</b> = 1x per 1s, <b>C 3</b> = 3 erature (gas) non-explosi	vcle: <b>C I</b> = 1x per 3s, ex per 1s, <b>C R</b> ve atmosphere:					
Max. admissible media tempo momentarily (< 5 Minutes)	Selectable measuring cy <b>C 2</b> = 1x per 1s, <b>C 3</b> = 3 erature (gas) non-explosi 80 °C	vcle: <b>C I</b> = 1x per 3s, ex per 1s, <b>C R</b> ve atmosphere: 176 °F					
Max. admissible media tempo momentarily (< 5 Minutes) Continuous operation	Selectable measuring cy <b>C 2</b> = 1x per 1s, <b>C 3</b> = 3 erature (gas) non-explosi 80 °C 40 °C	vcle: <b>C I</b> = 1x per 3s, ex per 1s, <b>C R</b> ve atmosphere: 176 °F 104 °F					
Max. admissible media tempo momentarily (< 5 Minutes) Continuous operation	Selectable measuring cy <b>C 2</b> = 1x per 1s, <b>C 3</b> = 3 erature (gas) non-explosi 80 °C 40 °C	vcle: <b>C I</b> = 1x per 3s, ex per 1s, <b>C R</b> ve atmosphere: 176 °F 104 °F					
Max. admissible media tempo momentarily (< 5 Minutes) Continuous operation Ambient conditions	Selectable measuring cy <b>C 2</b> = 1x per 1s, <b>C 3</b> = 3 erature (gas) non-explosi 80 °C 40 °C	vcle: <b>C I</b> = 1x per 3s, ex per 1s, <b>C R</b> ve atmosphere: 176 °F 104 °F (US)					
Max. admissible media tempor momentarily (< 5 Minutes) Continuous operation Ambient conditions Working temperature	Selectable measuring cy <b>C 2</b> = 1x per 1s, <b>C 3</b> = 3 erature (gas) non-explosition 80 °C 40 °C 10–40 °C	vcle: <b>C I</b> = 1x per 3s, ex per 1s, <b>C R</b> ve atmosphere: 176 °F 104 °F (US) 50–104 °F					
Max. admissible media tempor momentarily (< 5 Minutes) Continuous operation Ambient conditions Working temperature Storage and transport temperature	Selectable measuring cy $\mathbf{C} = 1x \text{ per 1s}, \mathbf{C} = 3$ erature (gas) non-explosi $80 \degree C$ $40 \degree C$ $10-40 \degree C$ $-10-60 \degree C$	<pre>/// // // // // // // // // // // // //</pre>					
Max. admissible media tempor momentarily (< 5 Minutes) Continuous operation Ambient conditions Working temperature Storage and transport temperature Altitude, max.	Selectable measuring cy <b>C</b> $= 1x$ per 1s, <b>C</b> $= 3$ erature (gas) non-explosition 80 °C 40 °C 10–40 °C -10–60 °C 3000 m über NHN	vcle: <b>C I</b> = 1x per 3s, ex per 1s, <b>C R</b> ve atmosphere: 176 °F 104 °F (US) 50–104 °F 14–140°F 9840 ft above sea level					
Max. admissible media tempor momentarily (< 5 Minutes) Continuous operation Ambient conditions Working temperature Storage and transport temperature Altitude, max. Relative humidity	Selectable measuring cy <b>C</b> $= 1x$ per 1s, <b>C</b> $= 3$ erature (gas) non-explosition $80 \degree C$ $40 \degree C$ $10-40 \degree C$ $-10-60 \degree C$ 3000  m über NHN 30-85 %, non condense	vcle: $C I = 1x \text{ per } 3s$ , ex per $1s$ , $C R$ ve atmosphere: $176 \degree F$ $104 \degree F$ (US) $50-104 \degree F$ $14-140 \degree F$ 9840  ft above sea level sing					
Max. admissible media tempor momentarily (< 5 Minutes) Continuous operation Ambient conditions Working temperature Storage and transport temperature Altitude, max. Relative humidity Pollution degree	Selectable measuring cy <b>C</b> $2 = 1x$ per 1s, <b>C</b> $3 = 3$ erature (gas) non-explosition $80 \degree C$ $40 \degree C$ $10-40 \degree C$ $-10-60 \degree C$ 3000  m über NHN 30-85 %, non condensition 2	vcle: $C I = 1x \text{ per } 3s$ , ex per $1s$ , $C R$ ve atmosphere: $176 \degree F$ $104 \degree F$ (US) $50-104 \degree F$ $14-140 \degree F$ 9840  ft above sea level sing					

#### Technical data

#### Connections

Vacuum connection

Small flange KF DN 16 Hose nozzle DN 6/10

Electrical data vacuum ga	auge
Power supply Alkaline battery	9 VDC
Battery lifetime at Measuring cycle <b>C2</b> , approx.	4000 h
Protection type / Impact energy	IP 40 / 5 J

Display	
Туре	LC display (LCD)
Pressure reading	switchable: mbar, Torr, hPa
Automatic switch-off	State of delivery 5 minutes Power-on time selectable 1–600 Minutes or
	UI = Continuous operation

Weight and dimension	S	(US)
Weight, approx.	400 g	0.88 lb
Dimension with small flange KF	115 mm x 115 mm x 56 5 in. x 5 in. x 2.2 in.	mm
Measurement chamber inner volume (without hose nozzle)	4,23 cm <sup>3</sup>	0.26 in <sup>3</sup>

#### 8.1.2 Wetted materials

#### Wetted materials

Component	Wetted materials
Vacuum sensor	Aluminium oxide ceramics, gold-coated
Sensor housing	PBT GK 30
Sealings	chemically resistant fluorelastomer
Connection flange KF	PP GF 30
Hose nozzle	PP



### 8.1.3 Device data

- In case of malfunction, please note type and serial number on the rating plate.
  - When contacting our service department, name us product type and serial number. With this information we can offer selective support and advice for your product.

#### Device data on rear side of the gauge



### **8.2 ORDERING INFORMATION**

-	M	
	vacuum gauge	Order N°
	DVR 2pro	6.263 582
Ordering information	Accessories	Order N°
accessories	PTFE hose KF DN 16 (I = 1000 mm)	9.882 618
	Vacuum rubber hose DN 6 mm	9.881 930
	Clamping ring KF DN 16	9.882 401
	Centering ring KF DN 16	9.882 419
	DAkkS recalibration	7.088 492
Ordering information	Spare parts	Order N°
spare parts	Support rod	7.101 678
	Knurled nut M14x1 (union nut)	7.671 280
	Hose nozzle DN 6/10	6.252 252
	Locking ring for knurled nut	6.252 253

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### 8.4 EC DECLARATION OF CONFORMITY

#### EU-Konformitätserklärung EC Declaration of Conformity Déclaration CE de conformité

CE

Hersteller / Manufacturer / Fabricant:

Lab Logistics Group GmbH Am Hambuch 1 D-53340 Meckenheim Fon + 49 2225 9211- 0 Fax + 49 2225 9211-11 www.llg-labware.com info@llg-labware.com

Hiermit erklärt der Hersteller, dass das Gerät konform ist mit den Bestimmungen der Richtlinien:

Hereby the manufacturer declares that the device is in conformity with the directives:

Par la présente, le fabricant déclare, que le dispositif est conforme aux directives:

2014/30/EU (EMV-RL), 2011/65/EU, 2015/863 (RoHS-RL)

Vakuummessgerät / Vacuum gauge / Vacuomètre

Typ / Type / Type: LLG Vakuum Gauge DVR 2 pro

Artikelnummer / Order number / Numéro d'article: 6.263 582

Seriennummer / Serial number / Numéro de série: Siehe Typenschild / See rating plate / Voir plaque signalétique

Angewandte harmonisierte Normen / Harmonized standards applied / Normes harmonisées utilisées: DIN EN 12100:2011; DIN EN 61326-1:2013; DIN EN 61010-1:2011, IEC 61010-1:2010 (Ed. 3); DIN EN 63000:2019

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen / Person authorised to compile the technical file / Personne autorisée à constituer le dossier technique: Dr. F. Gitmans · VACUUBRAND GMBH + CO KG · Germany

Ort, Datum / place, date / lieu, date: Wertheim, 13.01.2020

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