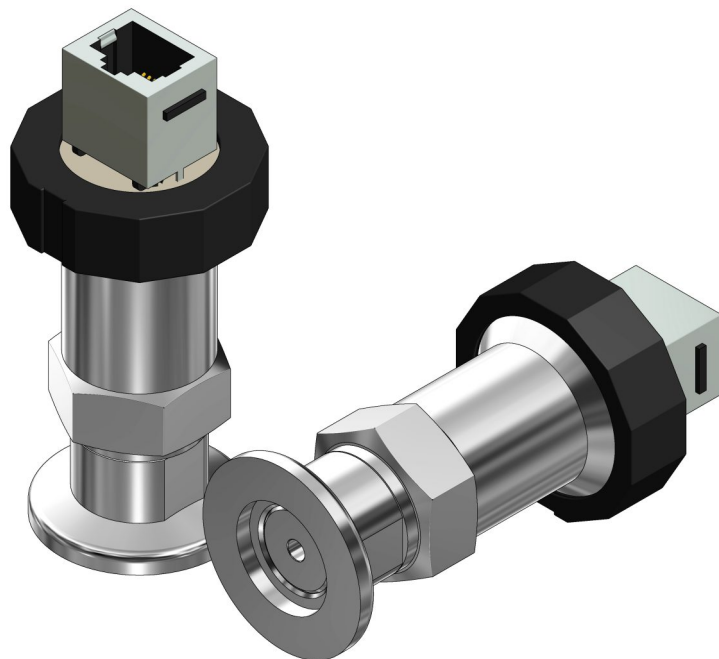




JEVAmet[®] PZM-2000

Active piezoresistive vacuum gauge

Instruction Manual



0. Contents

0.	Contents	3
0.1	List of Figures	5
0.2	List of Tables	5
1.	Legal Instructions	6
1.1	Validity	6
1.2	Scope of Delivery	6
1.3	Conforming Utilisation	6
1.4	Warranty	6
1.5	Transport Damages	7
2.	Safety	8
2.1	General Information	8
2.2	Signs and Symbols	8
2.3	Basic Safety Regulations	8
3.	Technical Product Description	9
3.1	Function	9
3.2	Measurement Principle	9
3.3	Display and Control Units	9
4.	Technical Data	10
4.1	Vacuum Measurement	10
4.2	Sensor	10
4.3	Power Requirements	10
4.4	Identification	10
4.5	Analog Output Signal	11
4.6	Environment	11
4.7	Dimensions and Weight	12
4.8	Standards	12
5.	Installation	13
5.1	Mechanical Installation	13

5.2	Electrical Installation	14
5.2.1	User Interface	14
5.2.2	Voltage Supply and Signal Output	14
6.	Operation	15
6.1	Readiness for Operation	15
6.2	Measuring Mode	15
6.3	Measuring Signal Output	15
6.4	Gas Type Dependency	15
6.5	Alignment	15
7.	Maintenance and Service	16
7.1	Maintenance	16
7.1.1	General Maintenance Advices	16
7.2	Troubleshooting	16
7.2.1	Trouble Indication and Help in Case of Malfunctions	16
7.2.2	Repair	17
8.	Storage and Waste Disposal	18
8.1	Packaging	18
8.2	Storage	18
8.3	Waste Disposal	18
Annex 1 - Declaration of the Contamination (Form for Reconsignment)		19
Safety Information for returning contaminated vacuum engineering		20
Annex 2 - EU Conformance Declaration		21

0.1 List of Figures

Figure 1 – Relationship between measuring signal and pressure	11
Figure 2 – Dimensions of JEVAmet® PZM-2000 (mm)	12
Figure 3 – User Interface of the Instrument	14
Figure 4 – Connector for Voltage Supply and Signal Output	14

0.2 List of Tables

Table 1 – Part Numbers	6
Table 2 – Scope of Delivery	6
Table 3 – Trouble Indication and Help in Case of Malfunctions	17

1. Legal Instructions

1.1 Validity

The document applies to the following products:

Part Number	Product	Version	Serial Number
100021	JEVAmet® PZM-2000	1.00 et seq.	1 et seq.

Table 1 – Part Numbers

When communicating with the JEVATEC GmbH, stating the information of article number and serial number is necessary. Please take this information from the name plate.

1.2 Scope of Delivery

Description	Number
JEVAmet® PZM-2000	1
Manual (DE and EN)	1

Table 2 – Scope of Delivery

1.3 Conforming Utilisation

The JEVAm[®]et PZM-2000 is a piezoresistive vacuum gauge for the absolute pressure measurement in the range from 0 to 2000 mbar. The vacuum gauge can be attached to a suitable display unit or be operated according to connection allocation with a user voltage supply. The measuring signal depends over the entire measuring range linear on the pressure. It has a flange connection DN16KF and can thus be attached to suitable.

1.4 Warranty

We assume the warranty for the faultless function of the device for one year. All in material and manufacturing defects will be cleared free of charge within this period.

Damages due to inappropriate use are not covered by warranty. The manufacturer will assume no warranty when the operator or third parties modify the product in any way which exceeds the operations listed in the appropriate manual. The product must be sent back in original packaging at the customers' account. We reserve the right to decide on replacement or reconditioning after inspection in our company.

1.5 Transport Damages

- Check the packaging for visible damages
- Send an advice of damage to the carrier and to the insurer in case of damage
- Retain the packaging material, because the reconsignment in the original packaging of the manufacturer is prerequisite for warranty claims
- Check the consignment for completeness
- Check the instrument for visible damages

2. Safety

2.1 General Information

The JEVAmet® PZM-2000 is delivered ready for operation. Even so, we recommend that you carefully read these Operating Instructions so as to ensure optimum operating conditions right from the start.

This manual contains important information for understanding, installing, commissioning, operating and troubleshooting the JEVAmet® PZM-2000.

2.2 Signs and Symbols



DANGER or WARNING:
Information on the prevention of injury.



DANGER:
Information on the prevention of injury by electrical impact.



REFERENCE:
General lead on further information and articles respectively.

2.3 Basic Safety Regulations

- During all work, such as installation, maintenance and repair, please comply with respective safety regulations.



WARNING: Improper usage
Improper usage can damage the instrument. Use the instrument only in accordance to the manufacturers' instructions.



WARNING: Incorrect connection and operation data
Incorrect connection and operation data can damage the instrument. Comply with all prescribed connection and operation data.

3. Technical Product Description

3.1 Function

The JEVAmet® PZM-2000 is a piezoresistive vacuum gauge for the absolute pressure measurement in the range from 0 to 2000 mbar. The vacuum gauge can be attached to a suitable display unit or be operated according to connection allocation with a user voltage supply. The measuring signal depends over the entire measuring range linear on the pressure. It has a flange connection DN16KF and can thus be attached to suitable.

**NOTE: Field of Application**

On the basis of the following information, please check whether the instrument is appropriate for your application.

3.2 Measurement Principle

A silicone filling which is in the measuring cell housing transfers the lining up measuring pressure from a flexibly ductile high-grade steel diaphragm to the sensor chip. Thus a complete chemical and electrical screen of the sensor chip is reached.

Under supply of electrical auxiliary energy, the transformation takes place into a pressure-proportional output signal. Internal ASIC linearizes the sensor characteristic and compensates temperature influences within the specified temperature range.

3.3 Display and Control Units

The JEVAmet® PZM-2000 is compatible with vacuum controllers made by JEVATEC, Oerlikon Leybold Vacuum, PFEIFFER VACUUM und INFICON (🔑📖 Chapter 4.4 Identification, page 10).

4. Technical Data

4.1 Vacuum Measurement

Measuring range:	0 – 2000 mbar (🔗📖 Mounting Instructions on page 13)
Measuring principle:	piezoresistive
Accuracy :	± 0.25% of final value
Reproducibility:	± 0.1 % FS

4.2 Sensor

Mounting position:	arbitrary
Overpressure stability:	1.5 bar abs. (🔗📖 Mounting Instructions on page 13)
Dead volume:	Sensor: 0.3 cm ³ Sensor with sealing ring: 1.5 cm ³
Materials in vacuum:	Stainless steel 304 and 316L, Viton® O-ring

4.3 Power Requirements

Supply voltage:	+15 – +30 VDC (SELV-E according to EN 61010)
Current consumption:	5 mA max.
Power consumption:	0.12 W max.
Connection:	RJ45 (FCC 68)



DANGER:

The vacuum gauge may only be connected to power supplies, instruments or control devices that conform to the requirements of a grounded protective extra-low voltage (SELV-E according to EN 61010).

4.4 Identification

Ident resistant: 8,2 kΩ

The JEVAmet® PZM-2000 is identified as DU 2000 sensor of following vacuum controllers:

- JEVATEC – JEVAmet® VCU
- Oerlikon Leybold Vacuum – DISPLAY ONE, DISPLAY TWO, DISPLAY THREE
- Oerlikon Leybold Vacuum – CENTER ONE, CENTER TWO, CENTER THREE
- Oerlikon Leybold Vacuum – GRAPHIX ONE, GRAPHIX TWO, GRAPHIX THREE
- PFEIFFER VACUUM – CenterOne, CenterTwo, CenterThree
- INFICON – VGC401, VGC402, VGC403
- INFICON – VGC501, VGC502, VGC503

4.5 Analog Output Signal

Output voltage: 2 – 10 V DC

Relationship between measuring signal and pressure:

$$p = \left(\frac{U_{\text{out}} - 2 \text{ V}}{0,004 \text{ V}} \right) \cdot \text{mbar}$$

$$U_{\text{out}} = \left(0,004 \text{ V} \cdot \frac{p}{\text{mbar}} \right) + 2 \text{ V}$$

Settling time after pressure leap: < 5 ms

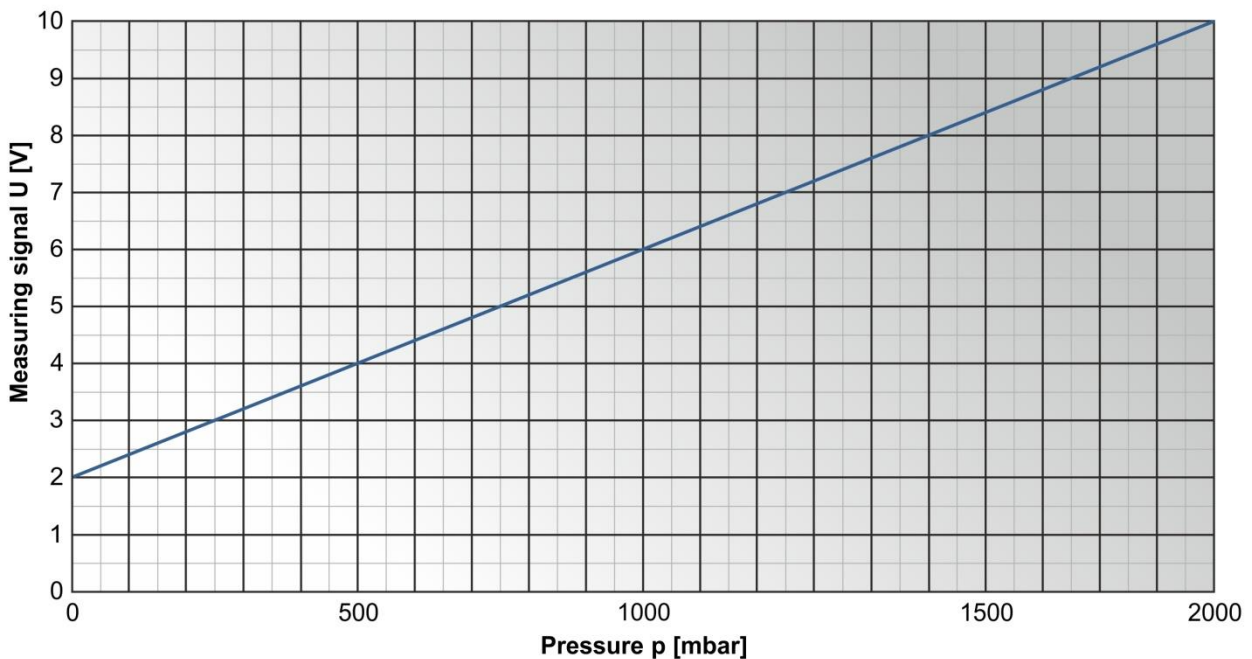


Figure 1 – Relationship between measuring signal and pressure

4.6 Environment

Temperature:	Storage: -20 – +60 °C
	Operation: +5 – +45 °C (sea level)
Bakeout temperature:	80 °C max. at flange
Relative atmospheric humidity:	80 % max. (up to 30 °C)
	decreasing to max. 50 % (over 40 °C)
Usage:	indoors (altitude 2000 m max. above sea level)
Degree of protection:	IP40

4.7 Dimensions and Weight

Dimensions:

Length: 75.0 mm

Diameter: 33.5 mm max. (coupling ring)

Weight:

0.12 kg

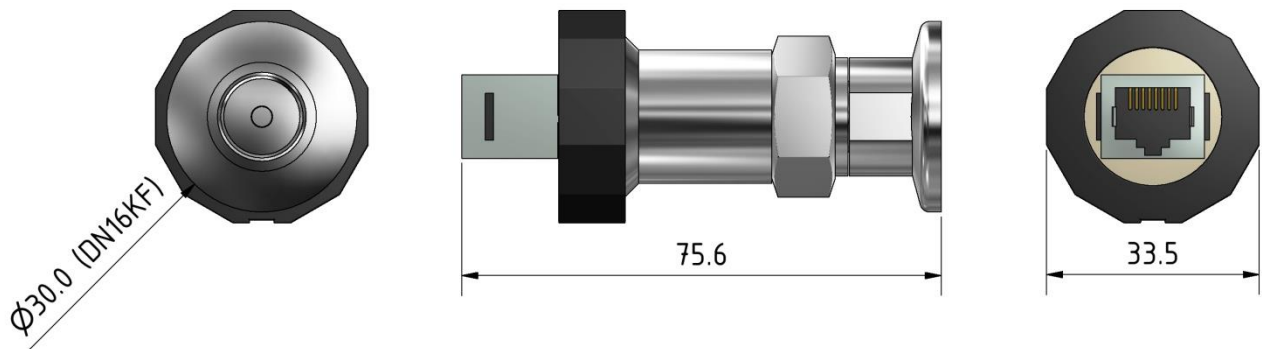


Figure 2 – Dimensions of JEVAmet® PZM-2000 (mm)

4.8 Standards

- Conformity with respect to EMC Directive 2014/30/EU

International/national standards as well as specifications:

- DIN EN 61010-1 (2011)
(Safety requirements for electrical equipment for measurement, control and laboratory use).
- DIN EN 61326-1 (2013)
(Electrical equipment for measurement, control and laboratory use – EMC requirements. Industrial interference immunity; electromagnetic emissions household sector Class B).

5. Installation

5.1 Mechanical Installation

The installation of the JEVAmet® PZM-2000 is carried out directly on the vacuum system. Basically, the JEVAmet® PZM-2000 is operational at any arbitrary mounting position. It is recommended to choose a mounting location with unimpeded airflow. During bakeout of the vacuum chamber for achieving very low pressures the JEVAmet® PZM-2000 should be mounted in a way so that the convection heat of the heated vacuum chamber does not significantly heat up the instrument. As a matter of principle, the ambient temperature must not exceed the specified temperature of +45 °C.

The most common cause for the failure of vacuum gauges is the contamination of the sensor. Contamination can occur by reactions of process gases with sensor parts, by accumulation of process material on sensor parts or by charged particles which have entered from a process in the vacuum system. Possible consequences of a contamination of the sensor are noisy or erroneous measured pressure values or even a total failure of the sensor. Instrument failures which are caused by contamination are not covered under the warranty.

A suspended mounting position (vacuum flange upside) is to be avoided especially for vacuum applications which are subject to condensation or other precipitates. Protect the sensor from contaminations especially in vacuum applications with sources of (vaporization etc.) or when there is danger of oil contamination.

If necessary, the vacuum gauge can be protected by choosing a noncritical mounting position and/or by application of a baffle, elbow pipe, gate valve etc.



NOTE:

During the installation of the vacuum gauge always proceed with the required carefulness.



WARNING: Overpressure in the vacuum system > 1 bar.

Injury caused by released parts and harm caused by escaping process gases can result if clamps are opened while the vacuum system is pressurized.

Do not open any clamps while the vacuum system is pressurized. Use the type of clamps which are suited to overpressure.



WARNING: Disconnection

Set up and install the vacuum gauge in such a way that a disconnection of the voltage supply is possible at any time.



CAUTION: Vacuum component

Dirt and damages impair the function of the vacuum component.

When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.



CAUTION: Dirt sensitive area

Touching the product or parts thereof with bare hands increases the desorption rate.

Always wear clean, lint-free gloves and use clean tools when working in this area.



DANGER: Contaminated parts

Contaminated parts can be detrimental to health and environment. Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

- Remove the protective lid. Keep the protective lid for servicing.
- Connect the vacuum gauge to the vacuum system.

5.2 Electrical Installation

5.2.1 User Interface

Figure 3, page 14 shows the user interface of the JEVAmet® PZM-2000. The pin assignment of the connector is described in the following chapters.

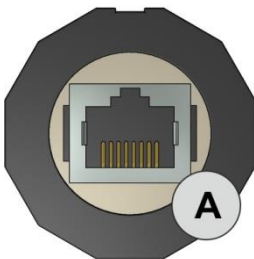


Figure 3 – User Interface of the Instrument

A Connector for Voltage Supply and Signal Output

5.2.2 Voltage Supply and Signal Output

The connector for Voltage Supply and Signal Output (🔑📖 Figure 4, page 14) combines all connections necessary for the operation of the vacuum gauge.

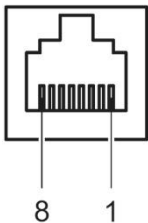


Figure 4 – Connector for Voltage Supply and Signal Output

1	+ 24 V DC	5	Signal ground
2	Ground	6	free
3	Signal output	7	free
4	Ident resistant	8	free

Connecting:

- Connect your controller with the connector for Voltage Supply and Signal Output on the user interface of the JEVAmet® PZM-2000 by means of an appropriate shielded cable.
- Connect your controller or the connections of your system to the connector I/O of the JEVAmet® PRM / PRM-S by means of an appropriate shielded cable.



ATTENTION: Grounded Protective Low Voltage

The voltage supply has to meet the requirements of a grounded protective low voltage (SELV-E) according to EN 61010.

6. Operation

6.1 Readiness for Operation

Establish the readiness for operation of the vacuum gauge as follows:

- Connect your controller or the appropriate connections of the system via a shielded cable to the connection for voltage supply and signal output (👉📖 Figure 3, page 14) at rear of the JEVAmet® PZM-2000.

To terminate the readiness for operation, disconnect the instrument from the voltage supply.

6.2 Measuring Mode

The JEVAmet® PZM-2000 is in measuring mode after switching on the controller or applying the operating voltage.

6.3 Measuring Signal Output

The measuring signal (👉📖 4.5 Analog Output Signal, page 11) is output via the connection for voltage supply and signal output (👉📖 Figure 3, page 14).

6.4 Gas Type Dependency

The pressure measurement depends on the gas composition. The measurement signal of the JEVAmet® PRM / PRM-S is calibrated for nitrogen (N₂).

6.5 Alignment

The JEVAmet® PZM-2000 is on delivery in an aligned status. A further alignment is not necessary.

7. Maintenance and Service

7.1 Maintenance

7.1.1 General Maintenance Advices

For external cleaning, please use a dry cotton cloth. Do not use any aggressive or abrasive detergents.

7.2 Troubleshooting

7.2.1 Trouble Indication and Help in Case of Malfunctions

**CAUTION:**

Dirt and damages impair the function of the vacuum gauge.
When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

**CAUTION:**

JEVATEC cannot assume any responsibility or warranty if the operator or third persons do repair work on the JEVAmet® PZM-2000.

**CAUTION:**

In case of an error, it may be helpful to just turn off the mains supply and turn it on again after 5 s.

Error	Fault Cause	Remedy
No output signal	<ul style="list-style-type: none">• No voltage supply• Sensor polarity• Line break	<ul style="list-style-type: none">• Check voltage supply• Check Sensor polarity• Check continuity
Divergent zero point	<ul style="list-style-type: none">• Diaphragm is damaged• Operating temperatures are too high/too low	<ul style="list-style-type: none">• Contact the manufacturer; replace the sensor if necessary• Keep to the permitted are too high/too low temperatures shown on the datasheet
Constant output signal with changing pressure	<ul style="list-style-type: none">• Mechanical overload due to overpressure• electrical fault	Replace the sensor; in case of repeated failure consult the manufacturer
Fluctuating signal span	There may be a source of EMC interference in the surrounding area (e.g. a frequency converter)	Remove the source of interference

Error (continued)	Fault Cause	Remedy
Signal span drops / is too small	Damage to the diaphragm, e.g. due to impacts, abrasive / aggressive medium; corrosion on the diaphragm / pressure connection; transmission medium not present	Contact the manufacturer and replace the sensor

Table 3 – Trouble indication and help in case of malfunctions

7.2.2 Repair

The JEVAmet® PZM-2000 is not intended for customer repair. Defective products must be sent to JEVATEC.



NOTICE:

JEVATEC will not assume any responsibility or warranty in case the operator or third persons repair the JEVAmet® PZM-2000.



WARNING: Forwarding contaminated products

Contaminated products (e.g. radioactive, toxic, caustic or microbiological hazard) can be detrimental to health and environment. Products returned to JEVATEC should preferably be free of harmful substances. Adhere to the forwarding regulations of all involved countries and forwarding companies and enclose a duly completed declaration of contamination^{*)}.

^{*)} You will find the copy template in the appendix 2 of this manual. The copy template is also available for download under the following address: <https://jevatec.de/index.php/en/downloads/send/37-miscellaneous-documents/39-declaration-of-contamination-jevatec-en>

8. Storage and Waste Disposal

8.1 Packaging

Please keep the original packaging. You will need this packaging in case of storing the JEVAmet® PZM-2000 or shipping to JEVATEC.

8.2 Storage

The JEVAmet® PZM-2000 must only be stored in dry rooms. During storage the following ambient conditions need to be maintained:

- Ambient temperature: -20 – +60 °C
- Humidity of the air: As low as possible.
Preferably in a sealed plastic bag with desiccant.

8.3 Waste Disposal

Regarding waste disposal the branch specific and local waste disposal and environment protection regulations for systems and electronics components are valid.

In case of return JEVATEC will execute the professional resource separation and disposal.

The repair and / or servicing of articles of the vacuum engineering (vacuum measuring instruments, vacuum pumps and vacuum components) will be carried out only if a correctly completed declaration has been submitted. Non-completion will result in delay. The manufacturer can refuse to accept any equipment without a declaration. A separate declaration has to be completed for each single article. For diagnosis and shipping by JEVATEC costs will be incurred. **Please consider also the safety information on the back of this declaration!**

This declaration may be completed and signed only by authorized and qualified staff.

1. Description of the article: Equipment type: Code No.: Serial No.: Invoice No.: Delivery Date:	2. Reason of Return:
--	---

3. Condition of the Article: Has the article been used? <input type="checkbox"/> yes <input type="checkbox"/> no What kind of oil / liquid was used? Is the equipment free from potentially harmful substances? <input type="checkbox"/> yes go to 5. <input type="checkbox"/> no go to 4.	4. Process related Contamination of Article: toxic <input type="checkbox"/> yes <input type="checkbox"/> no corrosive <input type="checkbox"/> yes <input type="checkbox"/> no microbiological*) <input type="checkbox"/> yes <input type="checkbox"/> no explosive*) <input type="checkbox"/> yes <input type="checkbox"/> no radioactive*) <input type="checkbox"/> yes <input type="checkbox"/> no other harmful substances <input type="checkbox"/> yes <input type="checkbox"/> no
---	--

*) Articles which have been contaminated by biological, explosive or radioactive substances will not accepted without written evidence of decontamination!

All substances, gases and by-products which may have come into contact with the equipment:

Trade Name Product Name Manufacturer	Chemical Name (chemical formula)	Hazard Group	Measures when harmful substances are released	First Aid for accidents
.....
.....
.....
.....

5. Legally Binding Declaration: I hereby declare that the information supplied on this form ist complete an accurate. The despatch of the contaminated articles will be accordance with the appropriate regulations covering, packaging, transportation and labeling of dangerous substances. Company: Street, No.: Phone: Zip Code, City: Fax: Name: E-mail: Date, Signature: Stamp:	
--	--

JEVATEC Ideen in der Vakuumtechnik	Declaration of Contamination	FB6001
	EN	Seite 2 von 2

**Safety information for returning contaminated vacuum engineering
(vacuum measuring instruments, vacuum pumps and vacuum components)**

General Information

According to German laws, every employer is held responsible for the health and safety of his employees. This also applies to service personnel performing maintenance and/ or repair of vacuum devices either at the premises of the user or the service company in charge. Any possible contamination of vacuum devices or components must be communicated by sending the following declaration of contamination together with the items to be repaired.

Declaration of Contamination

Any personnel repairing and/ or doing maintenance has to be informed about the condition of contaminated vacuum devices and components before the start of work. This is the purpose of the Declaration of Contamination. The declaration must be sent to the manufacturer or Service Company directly. A copy has to be attached to the dispatch papers outside (mailing bag) of the packaging. **Consignments without the declaration of contamination will not be processed and returned to the sender!**

Shipping

When shipping contaminated vacuum devices or components, all dispatch instructions laid down in the manual must be followed e.g.:

- If necessary: Shipping as „Dangerous Good“ with labeling as such
- Drain all service fluids
- Neutralize pumps by rinsing with gas
- Remove filter elements
- Seal all openings airtight
- Shrink-wrap appropriately
- Ship in appropriate containers for transport

Shipping

If you do not have any facilities to decontaminate the devices in compliance with regulations, we assist you in finding a suitable partner. Please contact us.



12 100 28902 TMS

JEVATEC GmbH
D-07743 Jena, Schreckenbachweg 8
Tel.: +49 3641 3596 -0
Fax: +49 3641 3596-39
E-mail: info@jevatec.de
Internet: www.jevatec.de



EU Declaration of Conformity

We, the JEVATEC GmbH, hereby declare that the products specified and listed below which we have placed on the market, comply with the applicable EU Council Directives. This declaration becomes invalid if modifications are made to the product without agreement with us. Compliance with the EMC Directives requires that the components are installed within a system or machine in a manner adapted to the EMC requirements.

Designation of the products

JEVAmet® PZM-2000

Type

Piezo-resistive Vacuum Measuring Instrument

The products comply with the following European Council Directives:

- 2014/30/EU (EU Directive relating to electromagnetic compatibility)

Applied harmonised, international/national standards and specifications:

- EN 61010-1 (2011) (Safety requirements for electrical equipment for measurement, control and laboratory use)
- EN 61326-1 (2013) (EMC requirements for electrical equipment for measurement, control and laboratory use; Electromagnetic Immunity industrial sector; Electromagnetic Interference domestic home sector class B)

Jena 8-December-2015

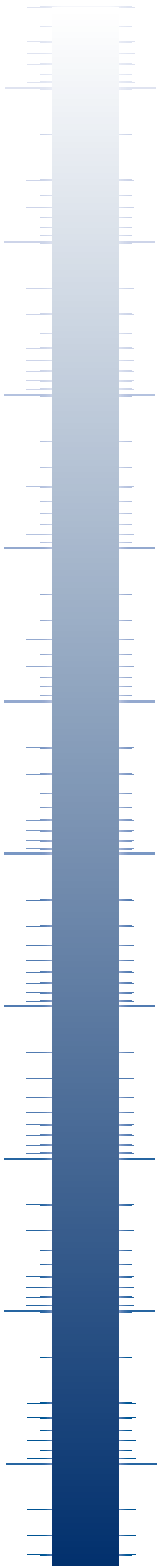
.....
President
JEVATEC GmbH

Geschäftsführer:
Ingo Stiebritz
Peter Storch

Handelsregister:
Amtsgericht Jena HRB 205 963
Steuer-Nr.: 162/111/05538
USt.-ID: DE 178 069 290

Commerzbank Jena
Konto-Nr.: 258 756 600
BLZ: 820 400 00
IBAN: DE23 8204 0000 0258 7566 00
BIC: COBA DE FF 821

Sparkasse Jena-Saale-Holzland
Konto-Nr.: 35 033
BLZ: 830 530 30
IBAN: DE06 8305 3030 0000 0350 33
BIC: HELD AE F1 JEN



JEVATEC GmbH

Schreckenbachweg 8
07743 Jena • GERMANY
Phone: +49 3641 3596-0
Fax: +49 3641 3596-39
E-mail: info@jevatec.de

JEVATEC

Ideen in der Vakuumtechnik

www.jevatec.de

