

JEVAmet[®] IOM

Active hot cathode ionisation gauge

Instruction Manual



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1. Legal Instructions

1.1 Validity

The document applies to the following products:

Part Number	Product	Version	Serial Number
100030	JEVAmet® IOM-16K	1.00 et seq.	100 et seq.
100031	JEVAmet® IOM-25K	1.00 et seq.	100 et seq.

Table 1 – Part numbers

When communicating with the JEVATEC GmbH, stating the information of article number and serial number is necessary. This information takes you please from the name plate.

1.2 Scope of Delivery

Description	Number
JEVAmet® IOM	1
Instruction Manual (DE and EN)	1

Table 2 – Scope of Delivery

1.3 Conventional Application

The JEVAm[®]et IOM is a hot cathode ionisation gauge by Bayard-Alpert. It has been designed for vacuum measurement of gases in the pressure range of $5 \cdot 10^{-10} - 5 \cdot 10^{-2}$ mbar. It must not be used for measuring flammable or combustible gases in mixtures containing oxidants (e.g. atmospheric oxygen) within the explosion range.

The vacuum gauge has a flange connection DN16KF or DN25KF and can thus to suitable flange connections be attached.

1.4 Responsibility and 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.

The JEVATEC GmbH will not assume any responsibility or warranty in case the operator or third persons

- do not observe the information given in this document.
- do not use the product as intended.
- modify the product in any way (conversions, repair work etc).
- operate the product with accessories not listed in the corresponding product documentation.

The end-user assumes the responsibility in conjunction with the process media used. Gauge failures due to contamination or wear and tear are not covered by the warranty.

Subject to technical alterations without prior notice. The figures are not binding.

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® IOM 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® IOM.

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

- Adhere to the applicable regulations and take the necessary precautions for the process media used. Consider possible reactions between the materials and the process media. Consider possible reactions (e.g. explosion) of the process media due to the heat generated by the product.
- Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.
- Before beginning to work, find out whether any vacuum components are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

**DANGER: High Voltage**

Coming into contact with components inside the instrument carrying the high voltage can, when introducing objects or liquids, cause danger to life.

**WARNING: Improper usage**

Improper usage can damage the instrument. Use the instrument only in accordance to the manufacturer's 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 JEVAm[®]et IOM is a hot cathode ionisation gauge by Bayard-Alpert. It has been designed for vacuum measurement of gases in the pressure range of $5 \cdot 10^{-10} - 5 \cdot 10^{-2}$ mbar. The vacuum gauge has a flange connection DN16KF or DN25KF and can thus to suitable flange connections be attached.



NOTE: Field of Application

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

3.2 Measuring Principle

The Bayard-Alpert ionisation gauge utilizes the ionisation by electron impact of gas particles. The electrons are emitted from a heated cathode (filament), are then accelerated to the anode grid, ionizing the gas on their way. The ions which are being created inside the grid are accelerated to the collector and are generating the measurement current. The collector current is proportional to the gas pressure over a wide pressure range, in addition being dependent on the ionisation probability of the gas. At lower pressures the measurement range is primarily limited by the geometry of the sensor. For the JEVAm[®]et IOM sensor the low-pressure limit is in the range of $< 5 \cdot 10^{-10}$ mbar whereas the high-pressure limit is in the range of 10^{-1} mbar.

Increase and fluctuations of the pressure reading of the Bayard-Alpert ionisation vacuum gauge are being produced by contaminations (increased outgassing inside the tube). In this case it is advisable to clean the sensor by degassing at pressures $\leq 1 \cdot 10^{-4}$ mbar during which the sensor is heated by means of electron bombardment. During the degassing the pressure reading serves as an orientation about the cleaning procedure but is beyond the accuracy specifications of the JEVAm[®]et IOM. By degassing of the sensor, the contaminations are removed to a large extent.

Considerable falsifications of the measured value can occur if electrons or ions are emitted from the vacuum system. This effect is being reduced by the application of a protective adapter (baffle).

Strong magnetic fields (e.g. from ion getter pumps) cause the deflection of electron trajectories and therefore possibly induce measurement errors. In this case an increase of the distance between the JEVAm[®]et IOM and the magnet is advisable.

4. Technical Data

4.1 Vacuum Measurement

Measuring Range:	$5 \cdot 10^{-10} - 5 \cdot 10^{-2}$ mbar
Measuring Principle:	Hot Cathode Ionization (Bayard-Alpert)
Sensitivity for N ₂ :	ca. 16 mbar ⁻¹
Accuracy:	typically $\pm 20\%$ of reading
Reproducibility:	$\pm 5\%$ of reading

4.2 Sensor

Mounting Position:	Arbitrary
Filaments (Cathodes):	Ir coated with Y ₂ O ₃
Number of Filaments:	2
Filament Operation Modes:	Manual Switching via Toggle Switch
Overpressure Stability:	minimum 1.5 bar (abs.)

4.3 Emission

Activation:	by Digital Input Signal
Emission Current:	20 μ A (Low Emission Current) 2 mA (High Emission Current)
Emission Current Switch-Over:	by Digital Input Signal

4.4 Degassing

Activation:	by Digital Input Signal
Start Pressure:	$< 1 \cdot 10^{-4}$ mbar
Duration:	2 min

4.5 Automatic Overpressure Switch-Off

Switching Threshold	
for Low Emission Current:	$5 \cdot 10^{-2}$ mbar
for High Emission Current:	$1.5 \cdot 10^{-3}$ mbar
for Degassing:	$5 \cdot 10^{-4}$ mbar

4.6 Power Requirements

Operational Voltage:	24 VDC (SELV-E according to EN 61010)
Power Consumption:	12 W max.
Fuse Protection:	Self-resetting
Connection:	9 pin D-SUB, male



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 EN 61010).

4.7 Analog Output Signal

Output Voltage:	0 – 10.5 V DC
Error Signal:	> 9 V: Emission Off
Measuring Range:	0 V = $1 \cdot 10^{-10}$ mbar; 8.7 V = $5 \cdot 10^{-2}$ mbar
Relation Between Voltage and Pressure:	logarithmic, 1 V / Decade
	$p = 10^{(U-10)}$ [mbar]
	$U = 1 \cdot \lg(p/10^{-10})$ [V]

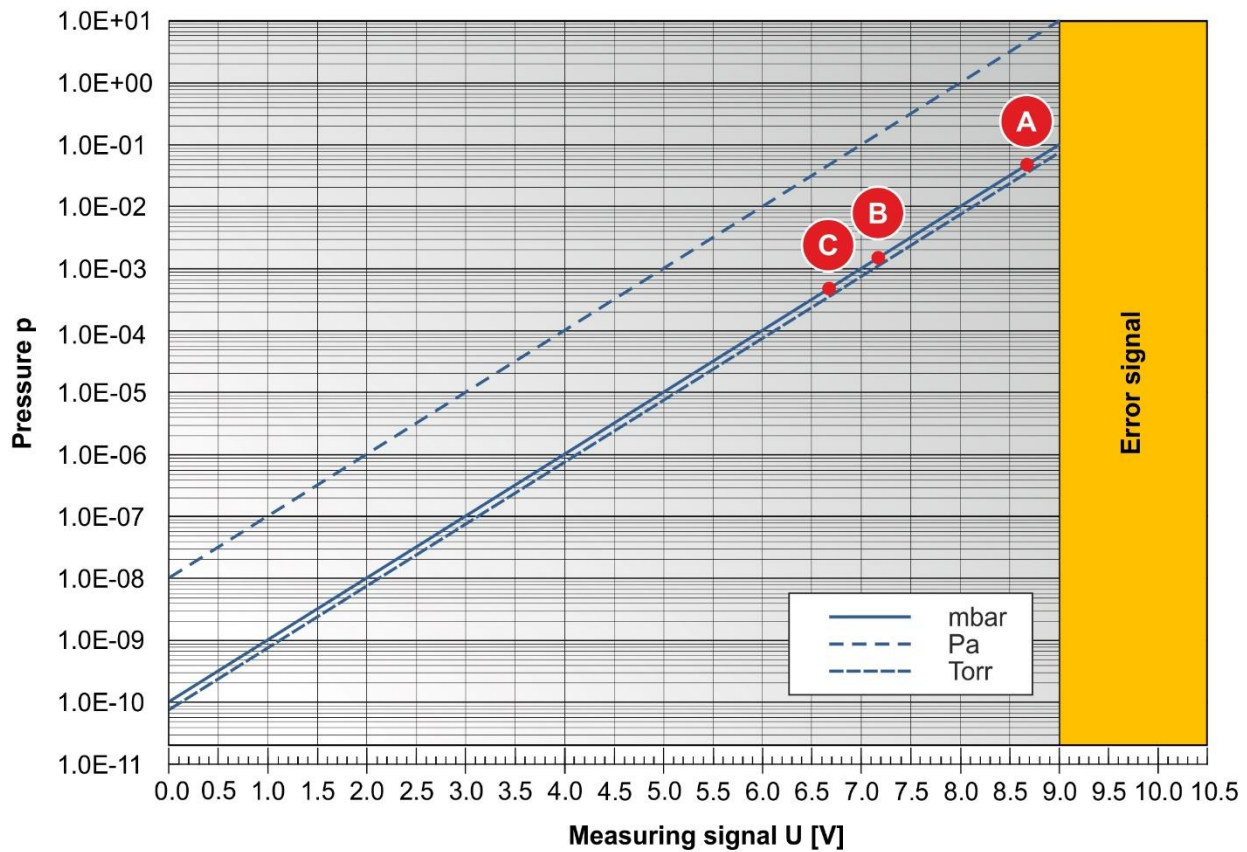


Figure 1 – Analog Output

A	Overpressure Switch-Off at Low Emission Current:	$5.0 \cdot 10^{-2}$ mbar
B	Overpressure Switch-Off at High Emission Current:	$1.5 \cdot 10^{-3}$ mbar
C	Overpressure Switch-Off at Degassing:	$5.0 \cdot 10^{-4}$ mbar

4.8 Materials

Materials in Vacuum:	St. Steel 304 and 316L, NiFe, Glass, W, Y_2O_3 on Ir
Housing:	Electronics: Aluminium
	Gauge Head: Stainless Steel

4.9 Environment

Temperature:	Storage: -20 – +60 °C Operation: +5 – +45 °C (Sea Level) +5 – +30 °C (2000 m NN)
Bakeout Temperature:	max. 80 °C at Flange
Relative Air Humidity:	max. 80 % (to 30 °C) Decreasing to max. 50 % (from 40 °C)
Usage:	Indoors (max. 2000 m NN)
Protection Class:	IP40

4.10 Dimensions and Weight

Dimensions:	Length: 96.5 mm Width: 72.7 mm Depth: 66.0 mm
Weight:	0.3 kg

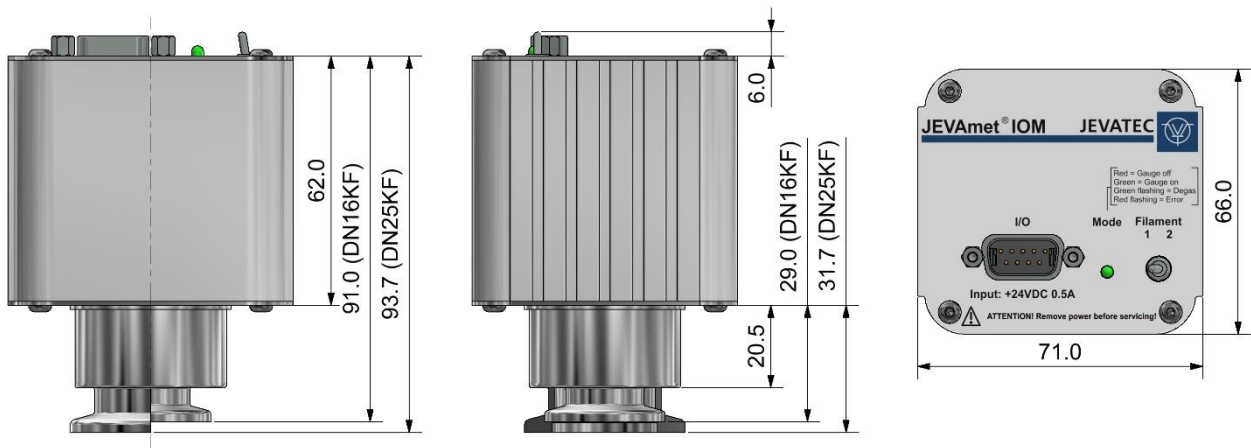


Figure 2 – Dimensions JEVAmets® IOM (in mm)

4.11 Standards

- Compliance with EMC Directive 2014/30/EU
- Compliance with RoHS Directive 2011/65/EU
- Compliance with WEEE Directive 2012/19/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 Mechanische Installation

The installation of the JEVAmet® IOM is carried out directly on the vacuum system. Basically, the JEVAmet® IOM 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® IOM 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 material or charged particles (vaporization etc.) or when there is danger of oil contamination.

If necessary the sensor 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: 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.



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. Please note the previous specified mounting instructions and warnings.

5.2 Electrical Installation

5.2.1 Rear of the Instrument

Figure 3, page 14 is showing the rear of the JEVAmet® IOM. The pin assignment of the connector as well as the operating and display elements are described in the following chapters.

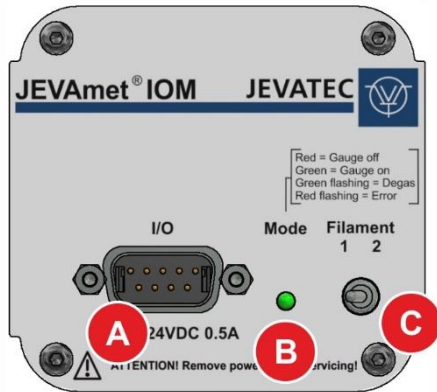


Figure 3 – Rear of the Instrument

- A Connector for Voltage Supply, Analog Output and Digital In- and Outputs
- B LED displaying the Operating Mode
- C Switch for the Selection of the Filament

5.2.2 Input / Output

The input / output connector (🔌📖 Figure 4, page 14) combines the voltage supply input, the analog output and the digital in- and outputs for the control and monitoring of the instrument.

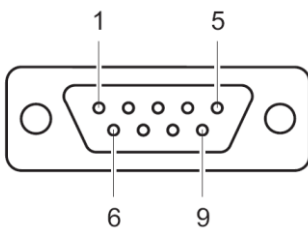


Figure 4 – Connector for Input / Output (D-SUB, 9 pin, male)

1	Control Input	Emission On
2	Input	Voltage Supply GND
3	Output	Analog Output Signal (0 – +10.5 V, $R_i = 100 \Omega$)
4	Input	Voltage Supply +24 VDC, max. 12 W
5	Status Output	Status Degas (Open Collector, max. 40 V, 50 mA)
6	Control Input	Degas On
7	Output	Analog Output GND
8	Control Input	High Emission Current On
9	Status Output	Status Emission (Open Collector, max. 40 V, 50 mA)

(All Control Inputs and Status Outputs are "low active".)

Connecting:

- Connect your system with the input / output connector on the user interface of the JEVAmet® IOM 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 Operating Modes and Error Conditions (LED “Mode”)

The LED “Mode” (🔌📖 Figure 3, B, page 14) shows the operation modes and error conditions of the instrument.

LED Status	Description
OFF	No voltage supply. Instrument is not ready for operation.
Red	Instrument is ready for operation. Emission is switched off.
Green	Instrument in operation. Emission is switched on. Measuring mode.
Green blinking	Instrument in operation. Emission is switched on. Degassing is activated.

Table 3 – Operating Modes

LED Status	Cause and Remedy
OFF	If voltage supply on: Instrument is not ready for operation. The polyswitch fuse has been activated. Disconnect the instrument from the voltage supply and reconnect. If the fuse is activated again there is a failure of the electronics. Please contact JEVATEC.
Red blinking	Emission error. Automatic deactivation of the emission. Restart the emission. If the LED is continuing to blink red there is a failure of the active filament. Switch to the other filament and restart the emission. If the LED is continuing to blink red there is a failure of both filaments. The sensor has to be replaced.

Table 4 – Error Conditions

6.2 Readiness for Operation



Establish the readiness for operation of the instrument as follows:

- Connect pin 2 of the input / output connector (🔌📖 Figure 4, page 14) with the ground (GND) of the voltage supply.
- Connect pin 4 of the input / output connector (🔌📖 Figure 4, page 14) with 24 VDC (max. 12 W) of the voltage supply.
- The LED “Mode” lights up red.



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

6.3 Measuring Mode (Emission)

Start the emission as follows:





- Apply LOW level on pin 1 of the input / output connector (  Figure 4, page 14).
- The LED "Mode" lights up green.

Stop the emission as follows:

- Disconnect pin 1 of the input / output connector (  Figure 4, page 14) from LOW level.
- The LED "Mode" lights up red.

If the switching threshold for the automatic overpressure switch-off is exceeded, the emission will be switched off automatically. The LED "Mode" lights up red. To restart the emission, you have to disconnect and reapply LOW level on pin 1 of the input / output connector.

6.4 Analog Output



The analog output (  Figure 1, page 11) is provided by the input / output connector (  Figure 4, page 14).

6.5 Emission Current


The sensor can be operated at low (20 μ A) as well as high emission current (2 mA). It is recommended to operate the sensor at high emission current for pressures $< 5 \cdot 10^{-6}$ mbar.

In the unconnected state the low emission current is preset at 20 μ A.

The switching to the high emission current (2 mA) is accomplished as follows:

- Apply LOW level on pin 8 of the input / output connector (  Figure 4, page 14).

The switching to the low emission current (20 μ A) is accomplished as follows:

- Disconnect pin 8 of the input / output connector (  Figure 4, page 14) from LOW level.

6.6 Degas Mode

Contaminations in the sensor can cause an increase and fluctuations of the pressure reading (increased outgassing inside the tube). In that case it is recommended to clean the sensor by degassing at pressures $\leq 1 \cdot 10^{-4}$ mbar during which the sensor is heated by means of electron bombardment. The pressure reading serves as an orientation about the cleaning procedure but is beyond the accuracy specifications of the JEVAm[®]et IOM. By degassing of the sensor, the contaminations are removed to a large extent.

The instrument has to be ready for operation and in measuring mode. The emission is switched on.

Start the degassing procedure as follows:

- Apply LOW level on pin 6 of the input / output connector (🔌📖 Figure 4, page 14).
- The LED “Mode” is blinking green.

The degassing procedure ends automatically after two minutes. The instrument reverts to measuring mode. The LED “Mode” lights up green.

If the switching threshold for the automatic overpressure switch-off is exceeded, the emission will be switched off automatically. The LED “Mode” lights up red. To restart the emission, you have to disconnect and reapply LOW level on pin 1 of the input / output connector.

6.7 Selection of the Filaments

The sensor of the JEVAm[®]et IOM features two filaments, whereof only one filament is active during operation. A switch on the user interface of the instrument electronics can be used to select between the two filaments.

- Select the active filament using the switch on rear of the instrument (🔌📖 Figure 3, C, page 14).



NOTE: Switching of the Filaments

It is recommended to change filaments during switched off emission current only.

6.8 Dependence on the Gas Type

Due to gas specific ionization probabilities the pressure measurement with ionization vacuum gauges is dependent on the gas type as a matter of principle. The analog signal of the JEVAm[®]et IOM is calibrated for nitrogen (N₂).

If the pressure is being measured with a gas or gas mixture other than N₂ or air, the application of a correction factor for the specific gas type is reasonable. Literature values for correction factors can be used as an orientation.

7. Maintenance and Service

7.1 Maintenance

7.1.1 General Maintenance Advices

For external cleaning normally a lightly moistened piece of cloth is sufficient. Do not use any aggressive or abrasive detergents.



DANGER: Voltage Carrying Components

The instrument contains internal voltage carrying components. Do not introduce any objects into the openings of the instrument. Keep the instrument dry.

7.1.2 Replacement Parts

Part Number	Product
100040	JEVAmet® IOM-Sensor DN16KF
100041	JEVAmet® IOM-Sensor DN25KF

Table 5 – Part numbers of the replacement parts

7.1.3 Sensor Replacement

After burning through both of filaments, it is possible to replace the sensor itself or to send the device to JEVATEC for sensor replacement.



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/category/37-miscellaneous-documents>

Follow the steps described as follows, if you want to carry out the sensor replacement yourself (🔗📖 Figure 5, page 19):

- Disconnect the instrument from the voltage supply.
- Remove the input / output connector plug.
- Demount the instrument from the vacuum chamber.
- Loosen the four screws (B) at the cover plate (C) of the sensor.
- Pull the sensor together with the cover plate out of the electronics housing (E).
- Carefully insert the new sensor into the electronics housing until the contacts are securely connected. Respect the alignment of the contact strips (D).
- Tighten all four mounting screws (B).
- Mount the instrument to the vacuum chamber.
- Connect the instrument to the input / output connector plug.
- Re-establish the readiness for operation of the instrument.

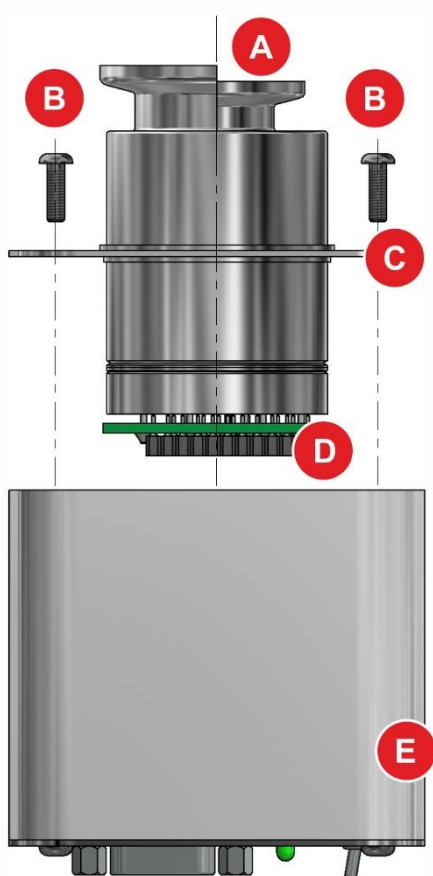


Figure 5 – Schematic design of the JEVAmets® IOM

- A Vacuum Flange for the Connection to the Vacuum Chamber
- B Mounting Screws between Sensor and Electronics Housing
- C Sensor Cover Plate
- D Contact Strips between Sensor and Electronics
- E Electronics Housing

7.2 Troubleshooting

7.2.1 Trouble Indication and Help in Case of Malfunctions

A malfunction of the JEVAmets® IOM is shown by the LED “Mode” on the rear of the instrument (🔑📖 Table 4 – Error Conditions , page 15).



CAUTION:

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

If the malfunction persists even after having switched on and off the instrument several times and/or having replaced the sensor, please contact JEVATEC.

7.2.2 Repair

Defective products must be sent to JEVATEC. JEVATEC will not assume any responsibility or warranty in case the operator or third persons repair the JEVAmets® IOM.

8. Storage and Waste Disposal

8.1 Packaging

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

8.2 Storage

The JEVAmet® IOM 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.

JEVATEC Ideen in der Vakuumtechnik	Declaration of Contamination	FB6001
	EN	Seite 1 von 2

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

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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.

Product designation

Hot cathode ionisation gauge

Type designation

JEVAmet® IOM

The products comply with the following European Council Directives:

- 2014/30/EU (EU Directive EMC, EU Office Journal, L 96/79 of 29-March-2014)
- 2011/65/EU (EU Directive RoHS, EU Office Journal, L 174/88 of 1-July-2011)
- 2012/19/EU (EU Directive WEEE, EU Office Journal L 197/30 of 24-July-2012)

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 2-February-2018

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