JEVATEC
Ideen in der Vakuumtechnik

JEVAmet® VCU

Vacuum Control Unit

Instruction Manual

BA_VCU_12.2021_EN

0. Contents

0.1 Lists of Figures

0.2 List of Tables

1. Legal Instructions

1.1 Validity

The document applies to the following products:

Part Number	Product	Version	Serial number
100001	JEVAmet® VCU-A0 Single-channel vacuum controller for 1 ATMION®	3.10 et seq.	1 et seq.
100002	JEVAmet® VCU-AM Multichannel vacuum controller for 1 ATMION® and 2 active vacuum sensors	3.10 et seq.	1 et seq.
100004	JEVAmet® VCU-B0 Single-channel vacuum controller for 1 JEVAmet® IOS or 1 BARION®	3.10 et seq.	1 et seq.
100005	JEVAmet® VCU-BM Multichannel vacuum controller for 1 JEVAmet® IOS or 1 BARION® and 2 active vacuum sensors	3.10 et seq.	1 et seq.
100003	JEVAmet® VCU-C Multichannel vacuum controller for 2 active vacuum sensors	3.10 et seq.	1 et seq.

Table 1 – Catalog 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 on the side panel of the controller.

1.2 Conforming Utilisation

The controllers of the JEVAmet® VCU series are indicating and operating devices for the passive Bayard-Alpert ionisation sensors JEVAmet® IOS by JEVATEC and BARION® by VACOM (BA sensors), the active wide-range vacuum gauge ATMION® as well as various other total pressure sensors by InstruTech, LEYBOLD, PFEIFFER VACUUM and INFICON. The vacuum sensors are to be operated in accordance with their respective manuals.

The controllers place one analog output per measuring channel to the order, as well as depending upon execution four or six programmable switching functions to the circuit floating of external safe voltage consumers. Besides the controllers make the remote control possible of certain functions over digital entrances, as well as communication with a PC over a serial interface.

NOTICE:
Operate all connected sensors in agreement with the information given in the corresponding Operating Instructions.

NOTICE:
Based on the technical data please check first whether your measuring instrument is suited to your kind of application.

NOTICE:
Before using the device for the first time or after changing the place of use, ensure that there is sufficient temperature equalisation between the unit temperature and the ambient temperature.

NOTICE:
The protection provided by the device may be impaired if the device is used in the manner not specified by the manufacturer.

1.3 Nonconforming Utilisation

The controllers of the JEVAmet® VCU series have been designed and constructed exclusively for the purpose specified in chapter 1.2 - Conforming Utilisation, page 8 and may only be used in this way.

The use for purposes not covered above is regarded as improper, in particular:

- the connection of unauthorized or inappropriate sensors and components
- the application of impermissible voltages.

Any use not in accordance with the conforming utilisation is considered inadmissible. Any resulting damage will void all liability and warranty claims. The risk for this is borne solely by the operator.

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

WARNING: Damaged Product.
Starting a damaged product can be perilously.

2. Safety

2.1 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.

2.2 Basic Safety Regulations

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

DANGER: Mains voltage
Coming into contact with components inside the instrument carrying the mains voltage can, when introducing object or liquids, cause danger to life.

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. General Description

3.1 General Functional Characteristics

VCU controller of the JEVAmet® series are indicating and operating devices for the passive Bayard-Alpert ionisation sensors JEVAmet® IOS by JEVATEC and BARION® by VACOM (BA sensors), the active wide-range vacuum gauge ATMION® as well as various other total pressure sensors by InstruTech, LEYBOLD, PFEIFFER VACUUM and INFICON. The vacuum sensors are to be operated in accordance with their respective manuals.

The controller versions differ in the compatible in each case vacuum sensors and the number of measuring channels. The measuring range depends on the attached vacuum sensors and amounts to maximally $1 \cdot 10^{-12}$ – 2000 mbar ($1 \cdot 10^{10}$ – $2 \cdot 10^{5}$ Pa or $7.5 \cdot 10^{-13}$ – 1500 Torr). Per measuring channel an analog output for order as well as two programmable switching functions stand for the circuit floating of external low-voltage units. Besides the controller have digital entrances for the remote control of certain functions, as well as a serial interface RS232 or RS485.

3.2 Controller Versions

Version	Article number	Compatible Vacuum Sensors		
		Channel 1	Channel 2	Channel 3
JEVAmet® VCU Model A	100001	At	--	--
	100002	At	Ctr, ttr, ttr1, bEE, Ptr, Ptr90 du200, du2000, durEL	Ctr, ttr, ttr1, bEE, Ptr, Ptr90 du200, du2000, durEL
JEVAmet® VCU Model B	100004	bA	--	--
	100005	bA	Ctr, ttr, ttr1, bEE, Ptr, Ptr90 du200, du2000	Ctr, ttr, ttr1, bEE, Ptr, Ptr90 du200, du2000
JEVAmet® VCU Model C	100003	Ctr, ttr, ttr1, bEE, Ptr, Ptr90 du200, du2000, durEL	Ctr, ttr, ttr1, bEE, Ptr, Ptr90 du200, du2000, durEL	--

Table 2 – Controller versions

3.3 Compatible Vacuum Sensors

Manufacturer	Sensor Type	Display
JEVATEC	ATMION® compact / standard	At
VACOM	ATMION® Compact / Standard	
JEVATEC	JEVAmet® IOS	bA
VACOM	BARION®	
JEVATEC	JEVAmet® PRM	ttr ttr E
LEYBOLD	THERMOVAC TTR81N, TTR90, TTR91, TTR91N, TTR96S, TTR96SN, TTR211, TTR216S THERMOVAC TTR911, TTR911N, TTR916, TTR916N	
PFEIFFER VACUUM	CenterLine Pirani-Transmitter TTR91, TTR96	
INFICON	Pirani Gauges PSG500, PSG502 Pirani Gauges advanced PSG550, PSG552, PSG554	
LEYBOLD	THERMOVAC TTR100, TTR100S2 THERMOVAC TTR101, TTR101N, TTR101S2, TTR101S2N	ttr 1 ttr 1E
PFEIFFER VACUUM	CenterLine Pirani/Capacitance gauge TTR101	
INFICON	Pirani Capacitive Diaphragm Gauges PCG550, PCG552, PCG554	
InstruTech	Stinger™ CVM211GBA-B-L, CVM211GEA-B-L	bEE
LEYBOLD	PENNINGVAC PTR81N, PTR225, PTR225N, PTR225S, PTR225SN, PTR237, PTR237N	Ptr
PFEIFFER VACUUM	CenterLine Penning-Transmitter PTR225, PTR237	
INFICON	Penning Gauge PEG100	
LEYBOLD	PENNINGVAC PTR82N, PTR90, PTR90N	Ptr90
PFEIFFER VACUUM	CenterLine Pirani/Cold cathode gauge PTR91	
INFICON	Cold Cathode Gauges MPG400, MPG500	
LEYBOLD	CERAVAC CTR90, CTR91, CTR100, CTR100N, CTR101, CTR101N	Ctr
PFEIFFER VACUUM	CenterLine Capacitance Gauges CCR36x, CCR37x	
INFICON	Capacitive Gauge CDG025D, 45°C Capacitive Gauge CDG045D	
LEYBOLD	DU Sensor DU200, DU201	du200
JEVATEC	JEVAmet® PZM-2000	du2000
LEYBOLD	DU Sensor DU2000, DU2001	
LEYBOLD	DU Relative Pressure Sensor DU2000 Rel.	durEL

Table 3 – Compatible vacuum sensors

4. Technical Data

4.1 General Data

4.1.1 Mechanical Data

Dimensions:	Width: 106.4 mm (1/4 19“) Height: 128.4 mm (3 HE) Depth: 164.5 mm
Weight:	1.4 kg
Build-in depth:	ca. 220 mm (including connected plug)
Application:	Rack installation Panel mounting Benchtop instrument

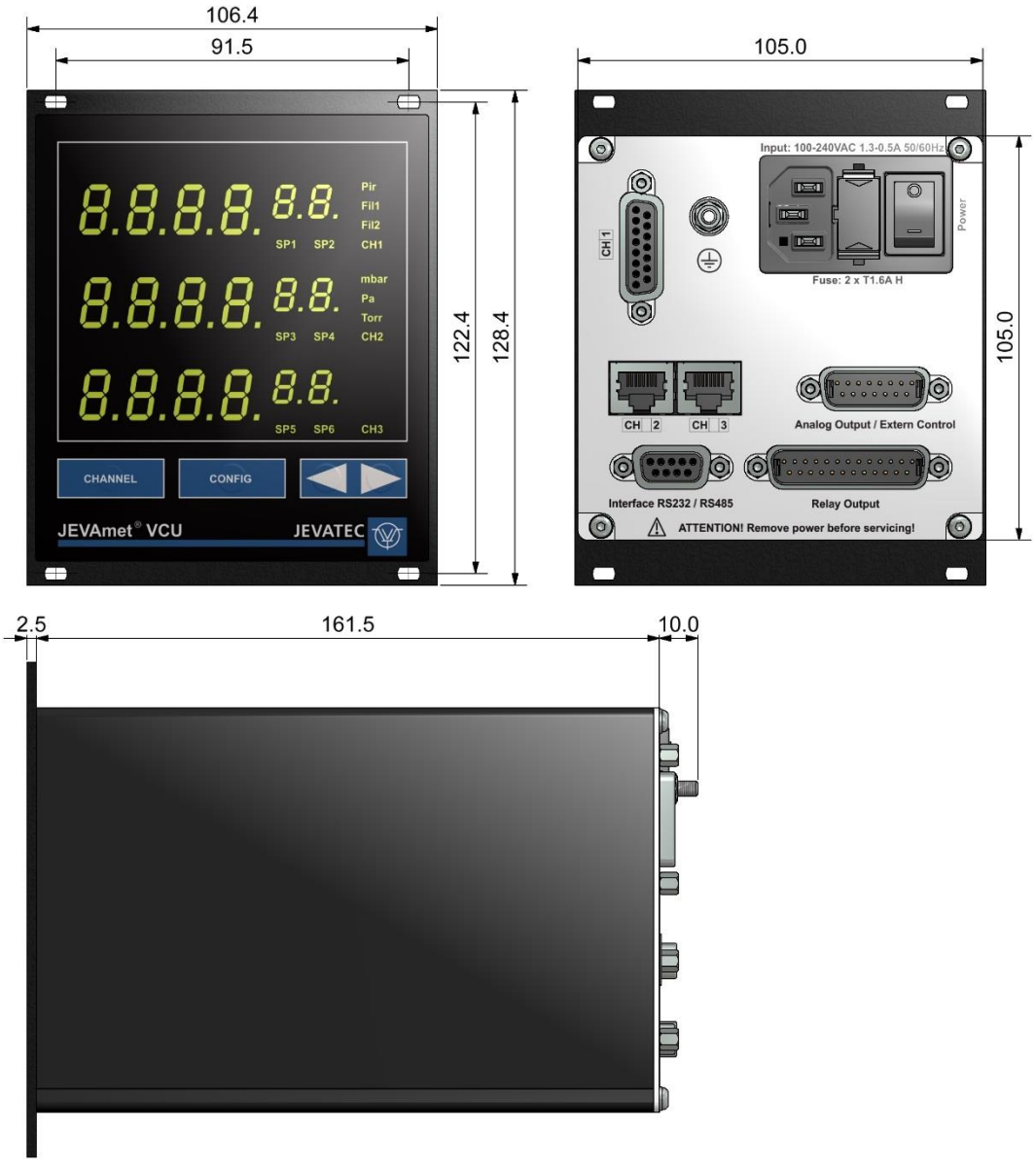


Figure 1 – Dimensions JEVAmet® VCU (mm)

4.1.2 Standard Parameters (factory settings)

Parameter	Parameter Description	Setting
SP 1 ... 6 Lo	Set point 1 – 6 - lower threshold	1.00^{-10}
SP 1 ... 6 Hi	Set point 1 – 6 - upper threshold	1.10^{-10}
FS	Full-scale for Ctr	1000
PrE	Pirani range extension mode	oFF
FiLt	Filter factor	15
GAS	Correction factor for gas type	1.00
S-on	Switch on mode for sensor	HAnd
S-oFF	Switch off mode for sensor	HAnd
FiL	Filament selection	Auto
SEnS 1	Sensitivity for filament 1	20.0
SEnS2	Sensitivity for filament 2	20.0
Unit	Display unit	bAr
diGit	Number of displayed digits	3
bri	Brightness of the display	Hi
bAUd	Baud rate	19.2
rS	Serial interface	232

Table 4 – Factory Settings

4.1.3 Environments

Usage:	indoors (altitude 2000 m above sea level)
Temperature:	Storage: -20 – +60 °C Operation: +5 – +40 °C
Relative humidity of the air:	max. 80 % (to 30 °C) decreasing to max. 50 % (over 40 °C)
Protection class:	IP40
Contamination class:	2

4.1.4 Directives and Standards

Directives:

- Conformity with the Low Voltage Directive 2014/35/EU
  (EU Low Voltage Directive, EU Office Journal, L 96/357 of 26-February-2014)
- Conformity with the EMC Directive 2014/30/EU
  (EU EMC Directive, EU Office Journal, L 96/79 of 29-March-2014)
- Conformity with RoHS Directive 2011/65/EU
  (EU RoHS Directive, EU Office Journal, L 174/88 of 1-July-2011)
  In accordance with
  - Commission Delegated Directive (EU) 2015/863 of 31-March-2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances.
  - Commission Delegated Directive (EU) 2018/740 of 1-March-2018 amending, for the purposes of adapting to scientific and technical progress, Annex III to Directive 2011/65/EU of the European Parliament and of the Council as regards an exemption for lead as an alloying element in aluminum
  - Commission Delegated Directive (EU) 2018/741 of 1-March-2018 amending, for the purposes of adapting to scientific and technical progress, Annex III to Directive 2011/65/EU of the European Parliament and of the Council as regards an exemption for lead as an alloying element in copper
- Conformity with the WEEE Directive 2012/19/EU
  (EU WEEE Directive, EU Official Journal L 197/38 of 24-July-2012)
- Conformity with the Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18-December-2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

International/national standards as well as specifications:

- DIN EN 61010-1:2020-03 (VDE 0411-1:2020-03)
  Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements (IEC 61010-1:2010 + COR:2011 + A1:2016, modified + A1:2016/COR1:2019); German version EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019
- DIN EN 61326-1:2013-07 (VDE 0843-20-1:2013-07)
  Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements (IEC 61326-1:2012); German version EN 61326-1:2013

4.2 Mains Connection

Voltage:	100 – 240 VAC
Frequency:	50/60 Hz
Device fuses:	2 x T1.6A H
Power consumption:	max. 60 W
Current consumption:	max. 1.0 A
Overvoltage category:	II
Protection class:	1
Connection:	Rubber connector IEC 60320 C14

4.3 Measuring Channels

Number:	1 – 3 (depend on the controller version)
Connection:	for ATMION®: SUB-D socket (15-pole) for BA sensors: SUB-D mixed connector (5-pole +2) for the other sensors: RJ45 (= FCC68)
Applicable sensors:	☞🕮 Chapter 3.3 Compatible Vacuum Sensors, page 12 (depend on the controller version)

4.3.1 Sensor Powering

4.3.1.1 Active Sensors

Voltage:	+24 VDC ±5 %
Current:	max. 500 mA
Fuse protection:	500 mA, self-resetting
	Powering complies with the requirements of a grounded protective low voltage (SELV-E according to EN 61010).

4.3.1.2 Passive Sensors (BA sensors)

Anode potential:	Operation:	180 V
	Degassing:	400 V
Bias potential:	27 V	
Emission current set point:	low to high:	$p = 1 \cdot 10^{-5}$ mbar
	high to low:	$p = 1 \cdot 10^{-4}$ mbar
Release degassing function:	$p < 5 \cdot 10^{-5}$ mbar	

4.3.2 Measuring Instrumentation

Measuring ranges:	Measuring channel for bA: $1 \cdot 10^{-2}$ – $1 \cdot 10^{-12}$ mbar Other channels: sensor-dependent
Measuring error:	Measuring channel for bA: ± 1% of measuring value Other channels: Gain error: ≤ 0.1 % FS Offset error: ≤ 0.02 % FS
Measuring rate:	50 s^{-1}
Display rate:	4 s^{-1}
Filter time constant:	15…7…3…1 (slow … fast)
Units of measuring:	mbar, Pa, Torr
Correction options:	bA, Ptr: 1 gas correction factor in the range 0.20 – 8.00 bA: 2 filament sensitivities in the range 1.00 – 80.0
A/D converter:	Resolution > 12 Bit

4.3.3 Switching Functions

Number of switching functions:	4 or 6 (depend on the controller version)
Assignment:	free programmable
Response time:	min. 100 ms, dependent on the filter time constant
Adjustment range:	Sensor dependent
Hysteresis:	Logarithmic-linear sensors (At, bA, ttr, ttr1, bEE, Ptr, Ptr90, du200, du2000, durEL): adjustable ≥ 10 % of measured value Linear sensors (Ctr): adjustable ≥ 1 % FS
Type of contact:	Changeover contact, potential-free
Load (resistive):	Switching current: max. 1 A Switching voltage: max. 30 VAC / 30 VDC
Service life:	Mechanical: 10^7 actuations Electrical: 10^4 actuations at maximum load
Connection:	SUB-D, 25-pole, connector

4.4 Outputs and Inputs

4.4.1 Analog Output

Number:	1 per measuring channel
Voltage range:	0 – 10 VDC
Deviation from the displayed value:	± 0.1 %
Internal resistance:	100 Ohm
Relation between voltage and pressure:	bA: logarithmic linear with 0.625 V per decade, 0 – 7 VDC, $U = 0.625 \lg (p / 10^{-12}$ mbar) respectively $U = 0.625 \lg (p / 10^{-10}$ Pa) = $0.625 \lg (p / 7{,}5 \cdot 10^{-13}$ Torr) Other sensors: sensor-dependent
Connection:	SUB-D, 15-pole, connector (used together with connection extern control)

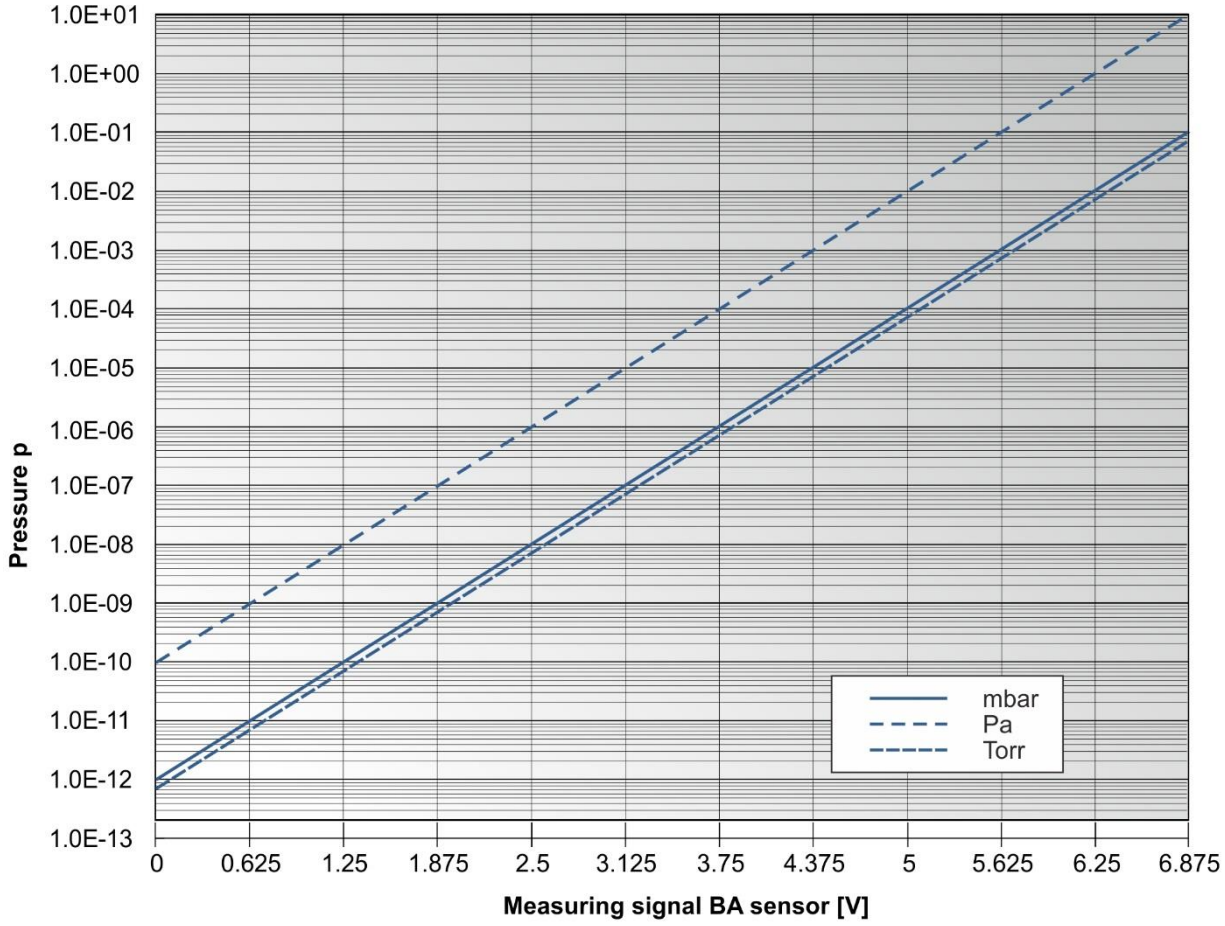


Figure 2 – JEVAmet® VCU-B and BM, BA sensor: Relation between voltage and pressure

4.4.2 Extern Control

Usage:	bA: sensor on / off; DEGAS activate At: sensor AUTOMODE on / off; DEGAS activate Ptr: sensor on / off
Logic:	digital inputs are blank on high level
Input resistance:	10 kΩ
Connection:	SUB-D, 15-pole, connector (used together with connection analog output)

4.4.3 Interface

4.4.3.1 RS232

Standard:	RS232
Parameters:	8 data bits,1 stop bit, no parity, no protocol
Signals:	RXD and TXD
Baud rate:	9600, 19200, 38400 Baud
Connection:	SUB-D, 9-pole, socket (used together with RS485)

4.4.3.2 RS485

Standard:	RS485 (half-duplex)
Parameters:	8 data bits,1 stop bit, no parity, no protocol
Signals:	A and B
Baud rate:	9600, 19200, 38400 Baud
Connection:	SUB-D, 9-pole, socket (used together with RS232)

4.5 Technical Data of the Connectable Sensors

4.5.1 Passive Hot cathode ionisation sensor JEVAmet® IOS

Model:	JEVAmet® IOS-40C identical to BARION® (BAT40C)
Measuring range:	$1 \cdot 10^{-2}$ – $3 \cdot 10^{-11}$ mbar
Measuring principle:	Hot cathode ionisation (Bayard-Alpert)
Sensitivity for N_2:	ca. 20 $mbar^{-1}$
X-ray barrier:	< 2E-11 mbar
Measuring accuracy:	± 10 % of measuring value ($1 \cdot 10^{-2}$ – $1 \cdot 10^{-8}$ mbar)
Reproducibility:	± 5 % of measuring value
Max. bakeout temperature:	250 °C (with plugs and cables)
Mounting position:	user-defined
Filaments (Cathods):	Iridium, yttria coated
Number of filaments:	2, exchangeable
Medium touched materials:	Stainless steel, W, Y2O3 on Ir, Glass ceramic, Ag-coated Cu
Shipment:	Sensor, Allen key®, set screw, Sensitivity values appropriate factory calibration

Dimensions and pin assignment:

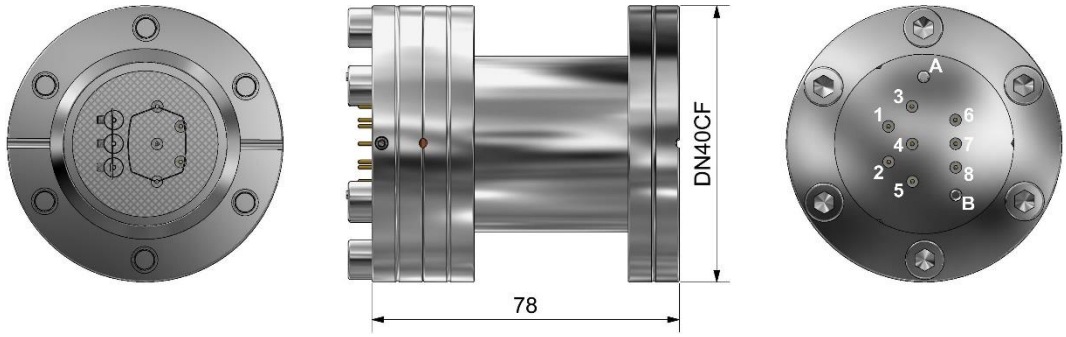


Figure 3 – Dimensions Sensor JEVAmet® IOS (mm) and Pin Assignment

1	not available	6	Filament 1
2	not available	7	Filament Com
3	Anode grid	8	Filament 2
4	Collector	A	Guide pin
5	Anode grid	B	Guide pin

Schematic construction:

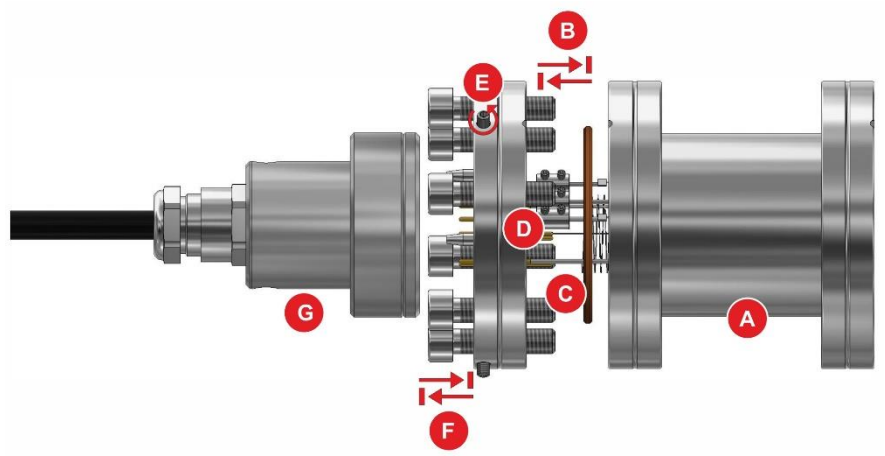


Figure 4 - Schematic construction of sensor JEVAmet® IOS

A	Sensor tube with flange connection DN40CF to vacuum chamber
B	Flange connection DN40CF
C	Copper gasket
D	Sensor JEVAmet® IOS with flange DN40CF
E	3 set screws M3 to fasten the connector on the sensor
F	Plug-in connector on the sensor
G	Connector with special cable (electrical insulation: Teflon®)

NOTICE: Dependence on the gas type
The BARION® Sensor is gas-type-dependent. The dependence on the gas type can be adjusted by the entry of a correction factor (☞🕮 Chapter 7.2.4 Gas Correction (GAS), page 49). Please see correction factors for ionisation gauges according to Bayard-Alpert in the literature for vacuum technique.

4.5.2 Other Sensors

Please find the technical data within the respective manuals.

5. Installation

5.1 Scope of Delivery

Description	Number
JEVAmet® VCU	1
Mains cord with shockproof plug (EU)	1
Instruction Manual and Short Guide	1
Spare fuses	2
Neck collar screws	4
Plastic sleeves	4
Edge protection	1
Rubber feet	2

Table 5 – Scope of Delivery

5.2 Mechanical Installation

The JEVAmet® VCU can be used as follows:

- Rack installation
- Front panel installation
- Benchtop instrument

WARNING: Power disconnection
Install the JEVAmet® VCU or place it so that you are in a position to operate the mains power switch at any time or ensure that the instrument can be deenergised at any time.

5.2.1 Rack Installation

The JEVAmet® VCU has been designed for installation within a sub-rack (19", 3 U) in accordance with DIN EN 60297 (IEC 60297) (☞🕮 Figure 5, page 22). For this purpose the supplied equipment includes four neck collar screws and four plastic sleeves.

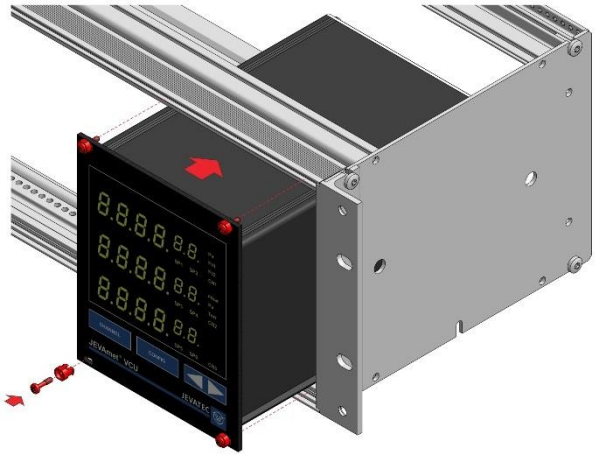


Figure 5 – Rack Installation

- Attach the sub-rack within the rack.
- Insert the JEVAmet® VCU into the sub-rack.
- Affix the instrument to the sub-rack with the neck collar screws and the plastic sleeves included in the delivery.

5.2.2 Panel Mounting

When wanting to install the instrument in a front panel, the following panel cut is required (☞🕮 Figure 6, page 22):

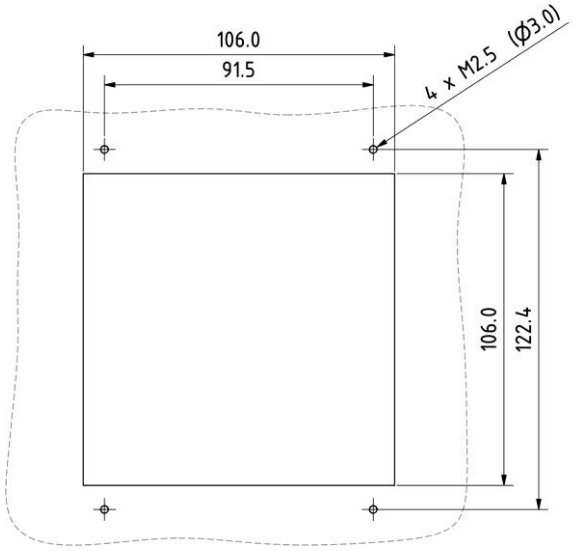


Figure 6 – Panel Cut-Out (in mm)

- Insert the JEVAmet® VCU into the cut-out,
- Affix the instrument with the neck collar screws and the plastic sleeves included in the delivery.

5.2.3 Benchtop Instrument

When intending to use the JEVAmet® VCU as a benchtop instrument, then proceed as follows:

- Push one of the two edge protection rubber pieces included in the delivery over the top edge of the front panel (☞🕮 Figure 7, page 23)
- Place the JEVAmet® VCU on its back (☞🕮 Figure 8, page 23)
- Push the second edge protection rubber piece included in the delivery onto the bottom edge of the front panel

WARNING: Risk of suffering injury.
When using the JEVAmet® VCU as a benchtop instrument fit the two edge protection rubber pieces onto the top and bottom edge of the front panel so as to avoid injury by sharp edges.

- Stick the two rubber feet included in the delivery onto the bottom of the housing.

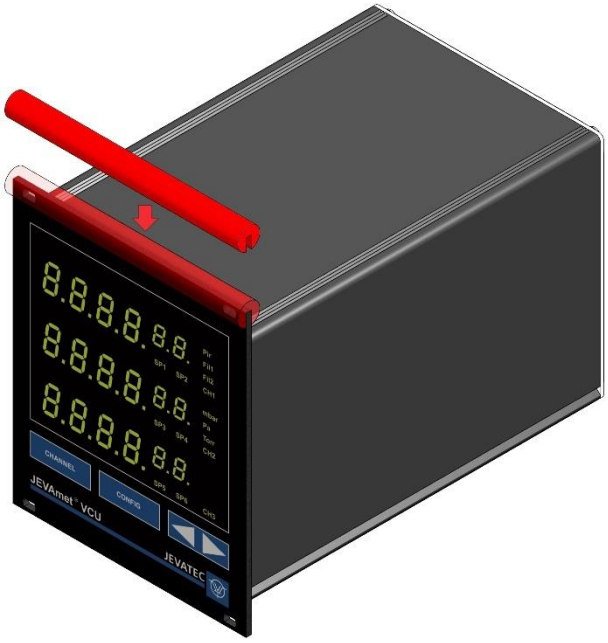


Figure 7 – Preparing the top side of the instrument for utilisation as a benchtop unit

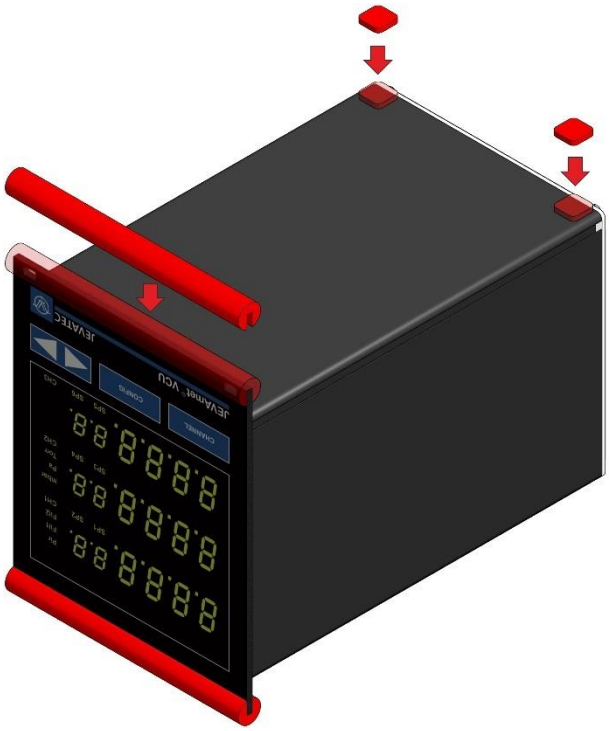


Figure 8 – Preparing the bottom side of the instrument for utilisation as a benchtop

- Turn the JEVAmet® VCU over again and move it to the desired place.

5.3 Connections of the Instrument Versions A0 and AM

5.3.1 Rear of the Instrument

Figure 9, page 24 shows the rears of the JEVAmet® VCU versions A0 (left) and B0 (right). The pin assignment of the individual connections is described in the following chapters.

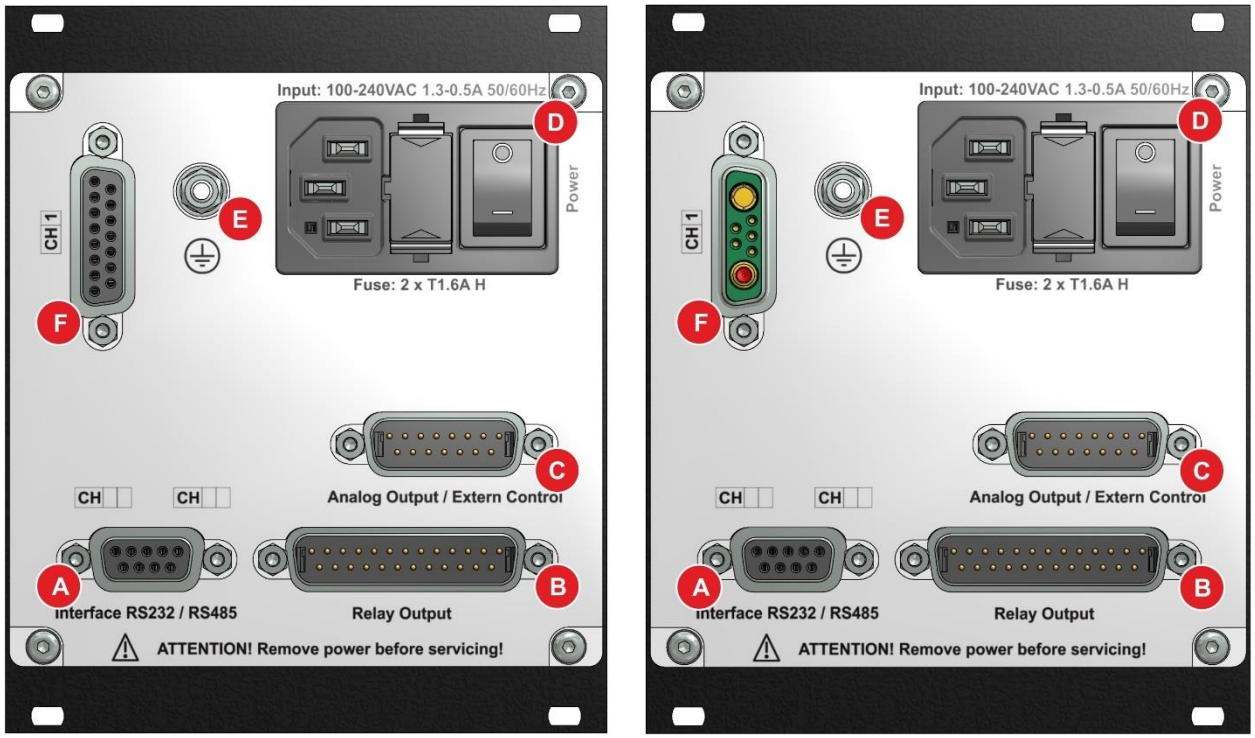


Figure 9 – Rear of the Instrument Versions A0 (left) and B0 (right)

A Connection for interface RS232 or RS485 (Interface RS232 / RS485)
B Connection for relay output (Relay Output)
C Connection for analog output and external control (Analog Output / Extern Control)
D Mains connection with mains switch and device fuses
E Ground connection
F Connection CH1 for ATMION® (left) or BA sensors (right)

Figure 10, page 25 shows the rears of the JEVAmet® VCU versions AM (left) and BM (right). The pin assignment of the individual connections is described in the following chapters.

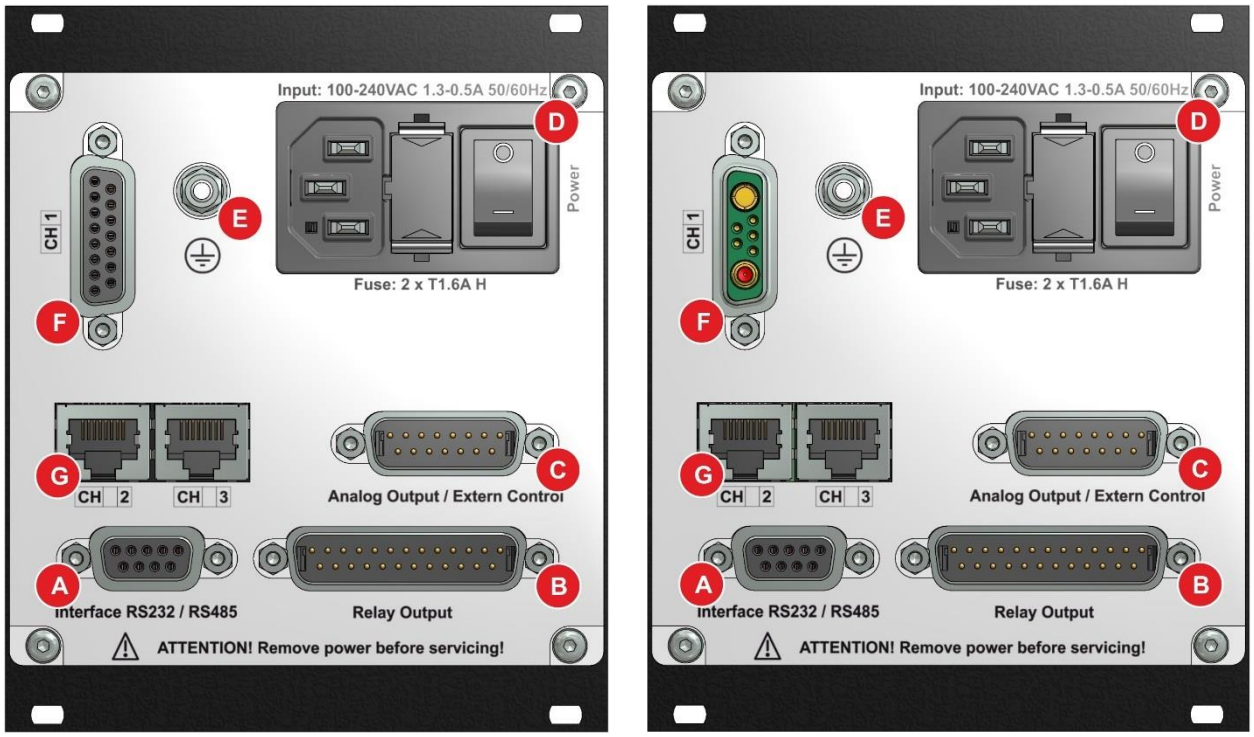


Figure 10 – Rear of the Instrument Versions AM (left) and BM (right)

A Connection for interface RS232 or RS485 (Interface RS232 / RS485)
B Connection for relay output (Relay Output)
C Connection for analog output and external control (Analog Output / Extern Control)
D Mains connection with mains switch and device fuses
E Ground connection
F Connection CH1 for ATMION® (left) or BA sensors (right)
G Connections CH2 and CH3 for two active pressure sensors (☞🕮 Chapter 3.2 Controller Versions, page 11)

5.3.2 Mains Connection

The mains connection on the rear of the instrument (☞🕮 Figure 9, D, page 24 and Figure 10, D, page 25) is intended only for a mains cord which on the instrument side is provided with a inlet connector for non-heating apparatus.

NOTICE: Mains cord
Included in the delivery of the instrument is a mains cord. If the plug on the mains power side is not compatible with your mains power outlets, you will need a mains cord which meets the following specifications:

- Three-wire cable with protective earthing.
- Conductor cross-section: 3 x 0.75 mm² or greater.
- Cable length 2.5 m maximum.

DANGER: Mains voltage
Appliances, which have not been professionally connected to Earth, can be life-threatening in the event of a malfunction. For this reason use three-wire mains cords, respectively extension cords with protective earthing only. Insert the mains plug into a mains power socket, which provides an Earth contact.

- Insert the plug of the mains cord into the mains socket provided on the instrument.
- Insert the mains plug of the mains cord into the mains outlet.

5.3.3 Earthing

With the aid of the earthing screw (☞🕮 Figure 9, E, page 24 and Figure 10, E, page 25) the JEVAmet® VCU can be connected to the protective ground of the vacuum chamber.

NOTICE: Earthing
Connect the Earth connection on the vacuum chamber by means of a protective earth conductor to the earthing screw on the instrument

5.3.4 CH1 (Channel 1) - ATMION® Gauge

The connection CH1 (☞🕮 Figure 11, page 27 as well as Figure 9, F, page 24 and Figure 10, F, page 25) serves - in case of instrument variant A0 and AM - solely the purpose of connecting the wide-range vacuum gauge ATMION® (At). It is always connected with CH1 (Channel 1).

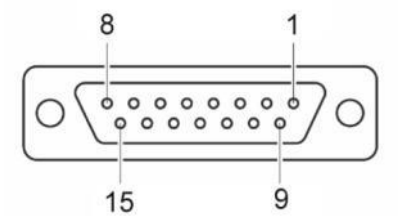


Figure 11 – Connection wide-range vacuum gauge ATMION® (D-SUB, 15-pole)

1	Not connected	9	Not connected
2	Receive RS 232	10	Not connected
3	Send RS 232	11	Ground
4	Not connected	12	Ground
5	Not connected	13	Not connected
6	Not connected	14	Analog output logarithmic
7	+ 24 VDC	15	AGND
8	+ 24 VDC		

CAUTION: Improper Measuring Instruments
Measuring instruments, which are not intended for the usage via this connector, can damage the instrument. Operate this connector of the JEVAmet® VCU only with the appropriate sensor.

Connecting:

- Connect the ATMION® gauge using the appropriate shielded 1:1-cable to the connector CH1 on the rear of the JEVAmet® VCU-A0 or VCU-AM.

The connection CH1 (☞🕮 Figure 12, page 27 as well as Figure 9, F, page 24 and Figure 10, F, page 25) serves - in case of instrument variant B0 and BM - solely the purpose of connecting a BA sensor (bA). It is always connected with CH1 (Channel 1).

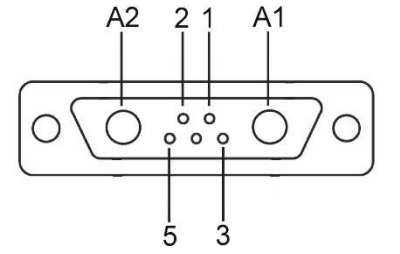


Figure 12 – Connection BA sensor (SUB-D mixed, 5-pole +2)

1	Filament 2	5	Filament return conductor
2	Filament 1	A1	Ground
3	not available	A2	Collector
4	Anode voltage		

CAUTION: Improper Measuring Instruments
Measuring instruments, which are not intended for the usage via this connector, can damage the instrument. Operate this connector of the JEVAmet® VCU only with the appropriate sensor.

Connecting:

- Connect the BA sensor using the appropriate special connecting cable to the connector BA sensor on the rear of the JEVAmet® VCU.

WARNING: Measuring Error
Avoid measuring errors. Pass the special connecting cable for the BA sensor that way, that it does not touch oscillating or vibrating parts.

5.3.5 CH2 (Channel 2) and CH3 (Channel 3) – Active Vacuum Sensors

The connectors CH2 and CH3 (☞🕮 Figure 13, page 28 as well as Figure 10, G, page 25) are designed - in case of instrument versions AM and BM - for the connection of additional sensors (☞🕮 Chapter 3.3 Compatible Vacuum Sensors, page 12). For both measuring channels an 8-pole RJ45 socket is available. Instrument versions A0 and B0 do not have these connections.

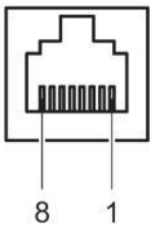


Figure 13 – Connector for Total Pressure Sensor (RJ45)

1	+24 VDC	5	Analog ground
2	Ground	6	Status (for Ptr)
3	Signal	7	HV on (for Ptr)
4	Ident resistor	8	free

CAUTION: Improper Measuring Instruments
Measuring instruments, which are not intended for the usage with the JEVAmet® VCU, can damage the device. Operate the JEVAmet® VCU only with the appropriate instruments (☞🕮 Chapter 3.3 Compatible Vacuum Sensors, page 12).

Connecting:

- Channel 2: Connect the sensor using a shielded special connecting cable to the connector CH2 on the rear of the JEVAmet® VCU.
- Channel 3: Connect the sensor using a shielded special connecting cable to the connector CH3 on the rear of the JEVAmet® VCU.

5.3.6 Analog Output and Extern Control (Analog Output / Extern Control)

The connector Analog Output / Extern Control (☞🕮 Figure 14, page 29 as well as Figure 9, C, page 24 and Figure 10, C, page 25; also cf. Annex 1 - Overview for the electrical inputs and outputs) contains the connectors of the analog outputs for the signals of each measuring channel as well as the inputs for the extern control of the measuring devices.

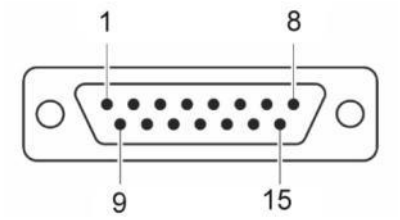


Figure 14 – Connector for Analog Output and Extern Control (D-SUB, 15-pole)

1	Analog output CH3	7	Analog ground
2	Analog output CH2	8	Analog ground
3	Analog output CH1a (ATMION®)	9	Ground
4	Analog output CH1b (bA) (0…10 V DC logarithmic linear with 0.625 V per decade, U = 0.625 · lg (p / 10^{-12} mbar); Measuring signal 0…7 V DC)	10	+24 VDC / 10 mA max.
		11	Ground potential optocoupler
		12	bA or AUTOMODE for At on
		13	Degas for ba or At on
5	Analog ground	14	CH2 on (for Ptr)
6	Analog ground	15	CH3 on (for Ptr)

Connecting:

- Connect the peripheral components using a shielded cable to the connector Analog Output / Extern Control on the rear of the JEVAmet® VCU.

5.3.7 Interface RS232 / RS485 (Interface RS232 / RS485)

The connector Interface RS232 / RS485 (☞🕮 Figure 15, page 29 as well as Figure 9, A, page 24 and Figure 10, A, page 25) enables the operation of the device by a computer or a terminal.

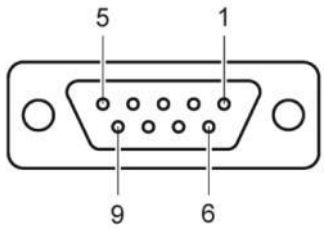


Figure 15 – Socket Interface (D-SUB, 9-pole)

1	B (RS485)	6	Bridge to 6
2	TxD (RS232)	7	Bridge to 8
3	RxD (RS232)	8	Bridge to 7
4	Bridge to 6	9	A (RS485)
5	Ground		

Connecting:

- Connect the serial interface of the computer using a shielded cable to the connector interface RS232 / RS485 on the rear of the JEVAmet® VCU.

Warning:
Apply a serial extension cable with a 9-pole connector and a 9-pole socket for use of the interface RS232. The cable must not have crossed conductors.
A special cable is required for use of the interface RS485.

5.3.8 Relay Output

Through the connector Relay Output (☞🕮 Figure 16, page 30 as well as Figure 9, B, page 24 and Figure 10, B, page 25; also cf. Annex 1 - Overview for the electrical inputs and outputs) you can use the potential-free relay contacts for switching.

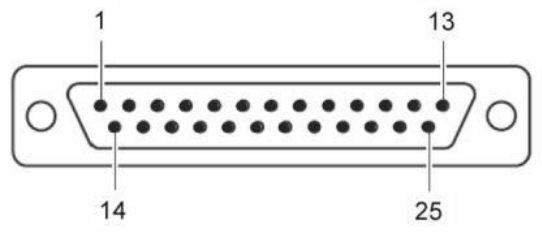


Figure 16 – Connector for Relay Output (D-SUB, 25-pole)

1	SP1 NO	11	SP4 NO	21	free
2	SP1 NC	12	SP4 NC	22	free
3	SP1 COM	13	SP4 COM	23	SP6 COM
4	SP2 NO	14	SP5 COM	24	SP6 NC
5	SP2 NC	15	SP5 NC	25	SP6 NO
6	SP2 COM	16	SP5 NO		
7	free	17	free		
8	SP3 NO	18	free		
9	SP3 NC	19	free		
10	SP3 COM	20	free		

The connections for SP5 to SP6 are not available in case of the variants A0.

DANGER: Dangerous to Touch Voltage
Voltages over 60 VDC or 30 VAC are dangerous to touch. You are allowed to switch with the connector Relay Output only voltages of 30 VDC or 30 VAC, max. 1 A. This voltage has to meet the requirements of a grounded protective low voltage (SELV-E according to EN 61010).

5.4 Connections of the Instrument Version C

5.4.1 Rear of the Instrument

Figure 17, page 31 shows the rear of the JEVAmet® VCU as model C. The assignment of the respective connections is characterised in the following chapters.

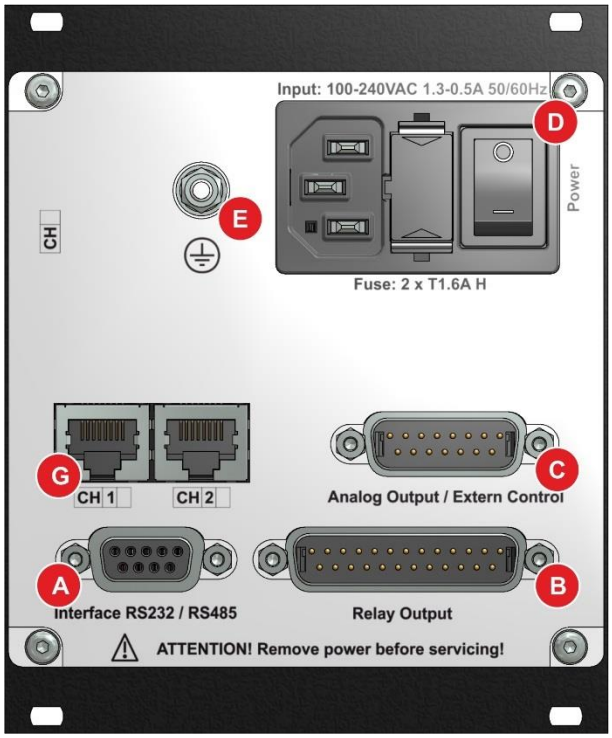


Figure 17 – Rear of the Instrument Version C

A Connection interface RS232 or RS485 (Interface RS232 / RS485)
B Connection relay output (Relay Output)
C Connection for analog output and extern control (Analog Output / Extern Control)
D Mains connection with mains connector and device fuses
E Ground connection
F Connections CH1 and CH2 for two pressure sensors (☞🕮 Chapter 3.2 Controller Versions, page 11)

5.4.2 Mains connection

The mains connection on the rear (☞🕮 Figure 17, D, page 31) is designed for a mains cord, which ends on the device side in a rubber connector.

NOTICE: Mains cord
Included in the delivery of the instrument is a mains cord. If the plug on the mains power side is not compatible with your mains power outlets, you will need a mains cord which meets the following specifications:

- Three-wire cable with protective earthing.
- Conductor cross-section: 3 x 0.75 mm² or greater.
- Cable length 2.5 m maximum.

DANGER: Mains voltage
Appliances, which have not been professionally connected to Earth, can be life-threatening in the event of a malfunction. For this reason use three-wire mains cords, respectively extension cords with protective earthing only. Insert the mains plug into a mains power socket, which provides an Earth contact.

- Insert the plug of the mains cord into the mains socket provided on the instrument.
- Insert the mains plug of the mains cord into the mains outlet.

5.4.3 Earthing

With the aid of the earthing screw ((☞🕮 Figure 17, E, page 31) the JEVAmet® VCU can be connected to the protective ground of the vacuum chamber.

NOTICE: Earthing
Connect the Earth connection on the vacuum chamber by means of a protective earth conductor to the earthing screw on the instrument

5.4.4 CH1 (Channel 1) and CH2 (Channel 2) – Active Vacuum Sensors

The connections CH1 and CH2 (☞🕮 Figure 18, page 32 as well as Figure 17, G, page 31) serve - in case of instrument version C - the purpose of connecting two total pressure sensors (☞🕮 Chapter 3.3 Compatible Vacuum Sensors, page 12). An 8-pole RJ45 device socket is available for both instruments.

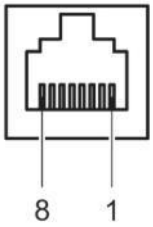


Figure 18 – Connector for Total Pressure Sensor (RJ45)

1	+24 VDC	5	Analog ground
2	Ground	6	Status (for Ptr)
3	Signal	7	HV on (for Ptr)
4	Ident resistor	8	free

CAUTION: Improper Measuring Instruments
Measuring instruments, which are not intended for the usage with the JEVAmet® VCU, can damage the device. Operate the JEVAmet® VCU only with the appropriate instruments (☞🕮 Chapter 3.3 Compatible Vacuum Sensors, page 12).

Connecting:

- Channel 1: Connect the sensor using a shielded special connecting cable to the connector CH1 on the rear of the JEVAmet® VCU.
- Channel 2: Connect the sensor using a shielded special connecting cable to the connector CH2 on the rear of the JEVAmet® VCU.

5.4.5 Analog Output and Extern Control (Analog Output / Extern Control)

The connector Analog Output / Extern Control (☞🕮 Figure 19, page 33 as well as Figure 17, C, page 31; also cf. Annex 1 - Overview for the electrical inputs and outputs) contains the connectors of the analog outputs for the signals of each measuring channel as well as the inputs for the extern control of the measuring devices.

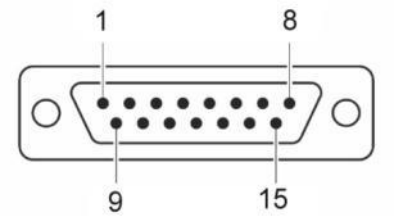


Figure 19 – Connector for Analog Output and Extern Control (D-SUB, 15-pole)

1	Analog output CH2	9	Ground
2	Analog output CH1	10	+24 VDC / 10 mA max.
3	Not connected	11	Ground potential
4	Not connected	12	Not connected
5	Analog ground	13	Not connected
6	Analog ground	14	CH1 on (for Ptr)
7	Analog ground	15	CH2 on (for Ptr)
8	Analog ground		

Connecting:

- Connect the peripheral components using a shielded cable to the connector Analog Output / Extern Control on the rear of the JEVAmet® VCU.

5.4.6 Interface RS232 / RS485 (Interface RS232 / RS485)

The connector Interface RS232 / RS485 (☞🕮 Figure 20, page 34 as well as Figure 17, A, page 31) enables the operation of the device by a computer or a terminal.

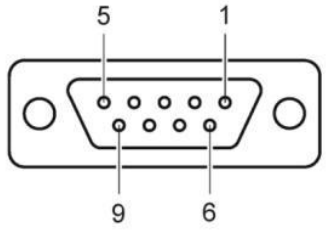


Figure 20 – Socket Interface (D-SUB, 9-pole)

1	B (RS485)	6	Bridge to 6
2	TxD (RS232)	7	Bridge to 8
3	RxD (RS232)	8	Bridge to 7
4	Bridge to 6	9	A (RS485)
5	Ground		

Connecting:

- Connect the serial interface of the computer using a shielded cable to the connector interface RS232 / RS485 on the rear of the JEVAmet® VCU.

Warning:
Apply a serial extension cable with a 9-pole connector and a 9-pole socket for use of the interface RS232. The cable must not have crossed conductors.
A special cable is required for use of the interface RS485.

5.4.7 Relay Output

Through the connector Relay Output (☞🕮 Figure 21, page 34 as well as Figure 17, page 31; also cf. Annex 1 - Overview for the electrical inputs and outputs) you can use the potential-free relay contacts for switching.

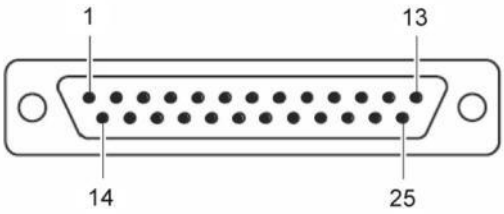


Figure 21 – Connector for Relay Output (SUB-D, 25-pole)

1	SP1 NO	11	SP4 NO	21	free
2	SP1 NC	12	SP4 NC	22	free
3	SP1 COM	13	SP4 COM	23	free
4	SP2 NO	14	free	24	free
5	SP2 NC	15	free	25	free
6	SP2 COM	16	free		
7	free	17	free		
8	SP3 NO	18	free		
9	SP3 NC	19	free		
10	SP3 COM	20	free		

DANGER: Dangerous to Touch Voltage
Voltages over 60 VDC or 30 VAC are dangerous to touch. You are allowed to switch with the connector Relay Output only voltages of 30 VDC or 30 VAC, max. 1 A. This voltage has to meet the requirements of a grounded protective low voltage (SELV-E according to EN 61010).

6. Operation

6.1 Front Panel

Figure 22, page 35 shows the front panel of the JEVAmet® VCU.

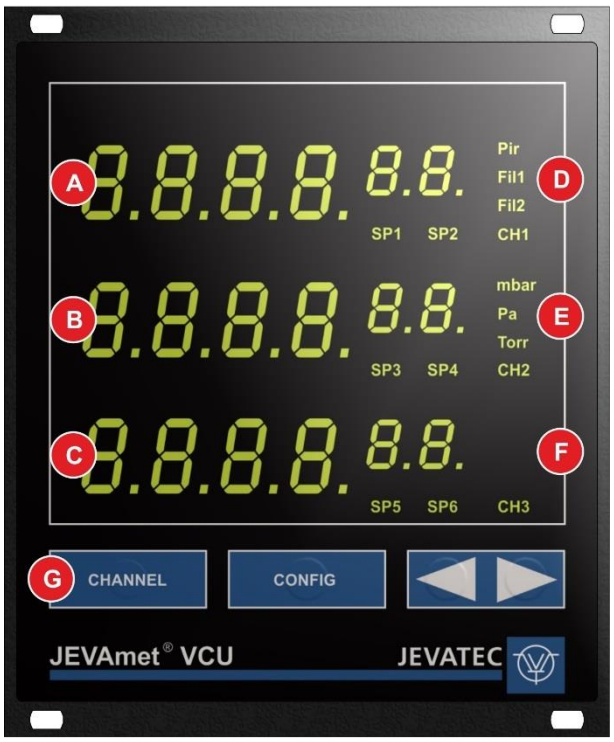


Figure 22 – Front Panel

A Display channel 1 with set points status 1 and 2
B Display channel 2 with set points status 3 and 4
C Display channel 3 with set points status 5 and 6
D Status display for ATMION® or BA sensor as well as selectable display Channel 1
E Display pressure unit and selectable display Channel 2
F Selectable display Channel 3
G Operating keys

6.1.1 Display

Display	Description
8.8.8.8.8.8	Measured value or status message
SP1, SP2, SP3, SP4, SP5, SP6	Switching function status When the icon lights up the pressure is below, the lower threshold. If the icon does not light up the pressure is above the upper threshold.
mbar, Pa, Torr	Pressure unit (valid for each channel)
CH1, CH2, CH3	Channel selection, configuration mode for channel
Pir	When the icon lights up continuing, ATMION® is active in status AUTOMODE in measuring range Pirani. When the icon is flashing, ATMION® is active in the mode PIRANI ONLY.
Fil1	When the icon lights up continuing, BA sensor or ATMION® are active in status IG with filament 1. When the icon is flashing, the degas function for BA sensor or ATMION® is active with filament 1.
Fil2	When the icon lights up continuing, BA sensor or ATMION® are active in status IG with filament 2. When the icon is flashing, the degas function for BA sensor or ATMION® is active with filament 2.

Table 6 – Display Structure and Description

6.1.2 Operating Keys

CHANNEL

With the key CHANNEL you can select a measuring channel. This is e.g. necessary to switch a sensor on or off or if you like to change the sensor parameters. The number of the selected measuring channel will be blinking for 10 seconds.

CONFIG

Operating the key CONFIG activates the configuration mode for the set point, sensor and, switching parameters. The displays CH1, CH2 or CH3 light up according to the selected channel and you can set different parameters.

Arrow Keys (<I DOWN / I> UP)

The arrow keys are needed to enter data in the configuration mode or to switch sensors on or off. By pushing the keys a standard value can be reduced or enlarged. The appropriate keys will be marked as DOWN (**<I**) and UP (**I>**) in the following.

6.2 Switching On and Switching OFF

6.2.1 Switching On

- Activate the instrument by switching-on the mains switch.

After switching on the JEVAmet® VCU will operate the following:

- Self test
- Display test
- Display of the used software version
- Re-establish the parameters set up last
- Identify the connected measuring devices
- Activate the measuring mode

6.2.2 Switching Off

- Disconnect the instrument by switching off the mains switch.

CAUTION: Waiting Time
Wait for at least 5 seconds before switching on the device again.

6.3 Operating Modes

The JEVAmet® VCU may be operated in the following modes:

Measuring Mode
The measuring mode is the standard operating mode. Here the measured values of the sensors are displayed. In case of failure a status message will be given instead.
☞🕮 Chapter 6.4 Measuring Mode, page 38

Configuration Mode
In the configuration mode you have access to different parameters. You can simply view these parameters or change them with the aid of the arrow keys. In this way you can configure the JEVAmet® VCU.
☞🕮 Chapter 6.5 Configuration Mode, page 42

6.4 Measuring Mode

6.4.1 Selection

After switching on the JEVAmet® VCU it will automatically run the measuring mode. If running the configuration mode and when no operation is executed for 10 seconds the instrument will automatically revert back to the measuring mode.

6.4.2 Description

The measuring values are displayed in the measuring mode. If the pressure value does not lie within the permissible range a status message is indicated.
Measuring channels, to which no sensor has been connected, will indicate noSEn. This status message will disappear after 30 seconds.

Display	Pressure
Err Hi	Significantly above the permissible range
8.88	Above the permissible range
8.888	Within the permissible range
c8.88	Below the permissible range (DU Sensors excluded)
Err Lo	Significantly below the permissible range
oFF	Ptr or bA have been switched off
HU on	Ptr is on (Switching-on procedure, still no valid measured value available)
c0	Lowly below the measurement range (DU Sensors only)
cc0	Middle below the measurement range (DU Sensors only)
ccc0	Large below the measurement range (DU Sensors only)

Table 7 – Display of the Measuring Mode

6.4.3 Functions of the Keys

6.4.3.1 Selecting the Measuring Channel

- Press the key marked CHANNEL.
  - The instrument selects the next measuring channel. The display CH1, CH2 or CH3 of the selected measuring channel will blink for 10 seconds.

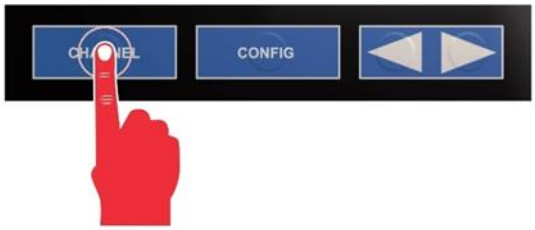


Figure 23 – Press the Key CHANNEL

6.4.3.2 Selecting the Configuration Mode

- Keep the key marked CONFIG pressed for approximately two seconds.
  The instrument will change into the configuration mode. (☞🕮 Chapter 6.5 Configuration Mode, page 42).
  - When not operating any key for 10 seconds the instrument will automatically revert back to the measuring mode.

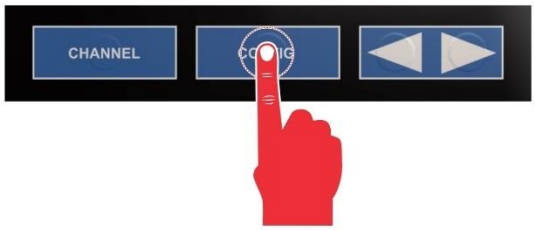


Figure 24 – Press the key CONFIG

6.4.3.3 Switching On the High Vacuum Measuring Circuit

The high vacuum measuring circuit of the following sensors can be switched on manually:

- ATMION® (At): NUR PIRANI off => AUTOMODE on
- BA sensor (Ba). Sensor on
- PENNINGVAC (Ptr): Sensor on (for Ptr90 not available)

For this the sensor control must be set to Hand (☞🕮 Chapter 7.2.5 Sensor Switch On Mode (S-on), page 50).

- Press the key CHANNEL in order to select the respective measuring channel.
- Keep the key UP pressed for approximately two seconds.
  - At will be changed from the mode NUR PIRANI to AUTOMODE. The measuring value and the status message of the active filament will be displayed (☞🕮 Table 6, page 36).
  - bA and Ptr will are switched on the selected measuring channel. Either the measuring value or a status message will be displayed (☞🕮 Table 6, page 36).

Figure 25 – Keep the key UP

6.4.3.4 Function Degas

The ATMION® sensor and the BA sensor can be cleaned by the function Degas.

For this the sensor must be switched on (☞🕮 Chapter 6.4.3.3 Switching On the High Vacuum Measuring Circuit, page 39) and the measured pressure must be $<1 \cdot 10^{-5}$ mbar.

- Press the key CHANNEL in order to select the channel 1 (CH1).
- Keep the key UP pressed for approximately two seconds.
  - The function Degas will be switched on channel 1 (CH1).
  - The LED Fil1 or Fil2 for the active filament lights up (☞🕮 Table 6, page 36).
  - The operation will be finished automatically after three minutes.
  - Afterwards the sensors will revert back to the measuring mode.

Figure 26 – Keep the key UP

6.4.3.5 Switching Off the High Vacuum Measuring Circuit

The high vacuum measuring circuit of the following sensors can be switched off manually:

- ATMION® (At): AUTOMODE off => NUR PIRANI on
- BA sensor (bA): Sensor off
- PENNINGVAC (Ptr): Sensor off (for Ptr90 not available)

For this it is necessary to set the sensor's control to HAnd (☞🕮 Chapter 7.2.7 Sensor Switch Off Mode (S-oFF), page 51).

- Press the key CHANNEL to select the respective measuring channel.
- Keep the key DOWN pressed for approximately two seconds.
  - At changes from AUTOMODE to the mode NUR PIRANI. The display Pir lights up (☞🕮 Table 6, page 36).
  - bA and Ptr will be switched off on the selected channel. The display shows the status oFF (☞🕮 Table 7, page 38).

Figure 27 – Keep the key DOWN

6.4.3.6 Sensor Identification

- Keep the keys UP and DOWN pressed for approximately one second.
  - The displays of the measuring channels show the respectively connected sensors (☞🕮 Table 8, page 41).

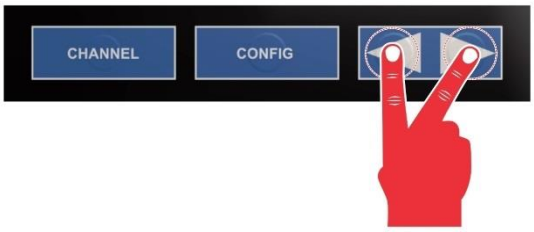


Figure 28 – Press key UP and DOWN

Display	Sensor Type
At	ATMION® (Compact, Standard)
bA	JEVAmet® IOS BARION®
ttr (ttrE)	THERMOVAC (TTR81N, TTR90, TTR91, TTR91N, TTR96S, TTR96SN, TTR211, TTR216S, TTR911, TTR911N, TTR916, TTR916N; CenterLine Pirani-Transmitter (TTR91, TTR96); Pirani Gauge (PSG500, PSG502, PSG550, PSG552, PSG554)
ttr 1 (ttr 1E)	THERMOVAC (TTR100, TTR100S2, TTR101, TTR101N, TTR101S2, TTR101S2N); CenterLine Pirani/Capacitance gauge (TTR101); Pirani Capacitive Diaphragm Gauge (PCG550, PCG552, PCG554)
bEE	Stinger™ (CVM211GBA-B-L, CVM211GEA-B-L)
Ptr	PENNINGVAC (PTR81N, PTR225, PTR225N, PTR225S, PTR225SN, PTR237, PTR237N); CenterLine Penning-Transmitter (PTR225, PTR237); Penning Gauge (PEG100)
Ptr90	PENNINGVAC (PTR82N, PTR90, PTR90N); CenterLine Pirani/Cold cathode gauge (PTR91); Cold Cathode Gauge (MPG400, MPG500)
Ctr	CERAVAC (CTR90, CTR91, CTR100, CTR100N, CTR101, CTR101N); CenterLine Capacitance gauge (CCR36x, CCR37x); Capacitive Gauge (CDG025D, CDG045D)
du200	DU Sensor (DU200, DU201)
du2000	DU Sensor (DU2000, DU2001); JEVAmet® (PZM-2000)
durEL	DU Relative Pressure Sensor (DU2001 Rel.)
no SEn	No sensor connected (no sensor)
. . . .	No sensor connected, will appear after approximately 30 seconds

Table 8 – Sensor Identification

6.5 Configuration Mode

6.5.1 Selection

By pressing the key CONFIG for approximately two seconds it is possible to change from the measuring mode to the configuration mode. The display CH1, CH2 or CH3 for the respectively selected channel will lighting up. When the instrument is operating in the configuration mode and if no key is operated for 10 seconds the instrument will automatically revert back to the measuring mode. The display CH1, CH2 or CH3 for the respectively selected channel disappears.

6.5.2 Parameter Sets

The configuration mode enables the access to different parameters. These parameters can be seen or can be changed with the aid of the arrow keys. In this way, it is possible to configure the multichannel gauge. Table 9, page 42 shows all available parameters.

Parameter Set	Parameter
PArA SP	SP 1-L SP 1-H ... SP6-L SP6-H
PArA SEn	FS (Ctr only) PrE (ttr and ttr1 only) F iLt GAS (Ptr only) S-on (Ptr only) S-oFF (Ptr only) F iL (bA and At only) SEnS 1 (bA only) SEnS2 (bA only) AdJ (At only)
PArA GEn	Un it d iG it br i bAUd rS

Table 9 – Parameter Sets and Corresponding Parameters

The available parameters have been divided into the following parameter sets:

Switching Function Parameters (PArA SP)
These parameters affect only the sensor of the selected measuring channel.
Two switching functions are available per measuring channel.
☞🕮 Chapter 7.1 Switching Function Parameters (PArA SP), page 44.

Sensor Parameters (PArA SEn)
These parameters affect only the sensor of the selected measuring channel.
A separate set of parameters is available for each measuring channel.
☞🕮 Chapter 7.2 Sensor Parameters (PArA SEn), page 47.

General Parameters (PArA GEn)
With the aid of these parameters it is possible to configure the instrument generally.
The parameters are valid for all measuring channels.
☞🕮 Chapter 7.3 General Parameters (PArA GEn), page 54.

6.5.3 Operating Concept

From the measuring menu, it is possible to select and change a certain parameter as followed:

- Press the key marked CHANNEL in order to select the desired measuring channel. (It is only necessary if a sensor parameter should be changed.)
  - The LED CH1, CH2 or CH3 for the selected channel will flash.
- Press the key MODE for approximately two seconds.
  - The instrument is now running the configuration menu.
- Use the arrow keys to select the desired parameter set.
  - The name of the parameter set will be displayed.
- Press the key CONFIG in order to select the desired parameter.
  - The name and the value of the parameter will be displayed.
- Use the arrow keys (and, if required, the key CHANNEL), to change the value of the parameter.
  - The value of the parameter will be changed.
- Repeat the last two steps to change further parameters of the parameter set.

After having run through the last parameter of the parameter set, the instrument will revert back to the measuring mode. Changes of the parameters become operative immediately and will be automatically recorded in the EEPROM.

NOTICE:
When the instrument runs the parameter mode and no change of parameters is executed for a period of 10 seconds the instrument will automatically revert back to the measuring mode. Changes of parameters will be automatically recorded in the EEPROM by the time carried out.

7. Parameters

7.1 Switching Function Parameters (PArA SP)

In this parameter group, it is possible to configure switching functions. The JEVAmet® VCU is equipped with the following switching function parameters:

- SP1-Lo … 6-Lo
- SP1-Hi … 6-Hi

7.1.1 Basic Terms

Switching functions
The JEVAmet® VCU contains for or six switching function relays depends on the concrete controller version. The switching functions are available for each measuring channel free. They switch in dependence on the measured pressure. The contacts of the relays are floating and can be used through the connection Relay Output for switching purposes (☞🕮 Chapter 5.3.8 Relay Output, page 30).

Thresholds Values
The switching behaviour of the individual relays is determined in each case by two parameters: the lower threshold value and the upper threshold value of the switching function.

Lower threshold SPx-Lo:
The lower threshold value is responsible for switching on the assigned switching function. In case of undershooting of the lower threshold value the relay is switched on. The common contact of the relay is then connected to the normally open contact.

Upper threshold SPx-Hi:
The upper threshold value is responsible for switching off the assigned switching function. In case of overshooting of the upper threshold value the relay is switched off. The common contact of the relay is then connected to the normally closed contact.

Hysteresis
In the pressure range between the threshold values the former switching status of the relay is maintained. The relay will not switch over in this range and the status of the relay will depend on the history (☞🕮 Figure 29, page 45).

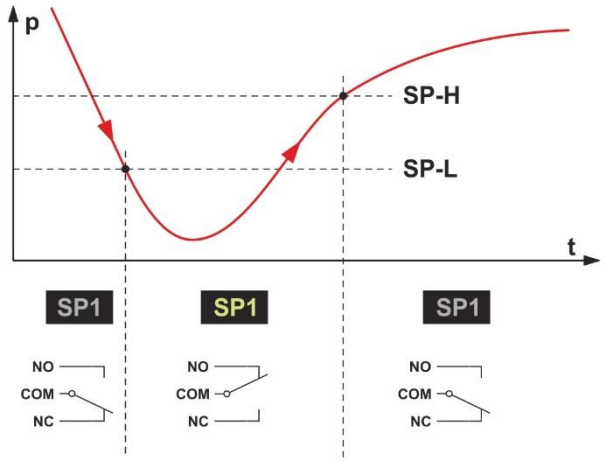


Figure 29 – Behaviour of a Switching Function in Response to Pressure Changes

p	pressure
t	time
NO	operating contact (normally open)
COM	common
NC	normally closed

The range between the lower and the upper threshold value produces a hysteresis between switching on and switching off of the relay. Hysteresis prevents that the switching function is switching rapidly when the pressure is close to a threshold value.

7.1.2 Configuring the Switching Functions

- Keep the key CONFIG pressed for approximately two seconds.
  - The instrument is now in the parameter mode within the parameter set SP.
- Press the key CONFIG to select the desired parameter.
  - The name and the value of the parameter will be displayed.
- Select the desired measuring channel by repeated pressing of the key CHANNEL
- Use the arrow keys to change the threshold value.
  - The value of the parameter will be changed.
- Repeat the steps in order to change further parameters of the parameter set.

See Figure 30, page 46 for better understanding.

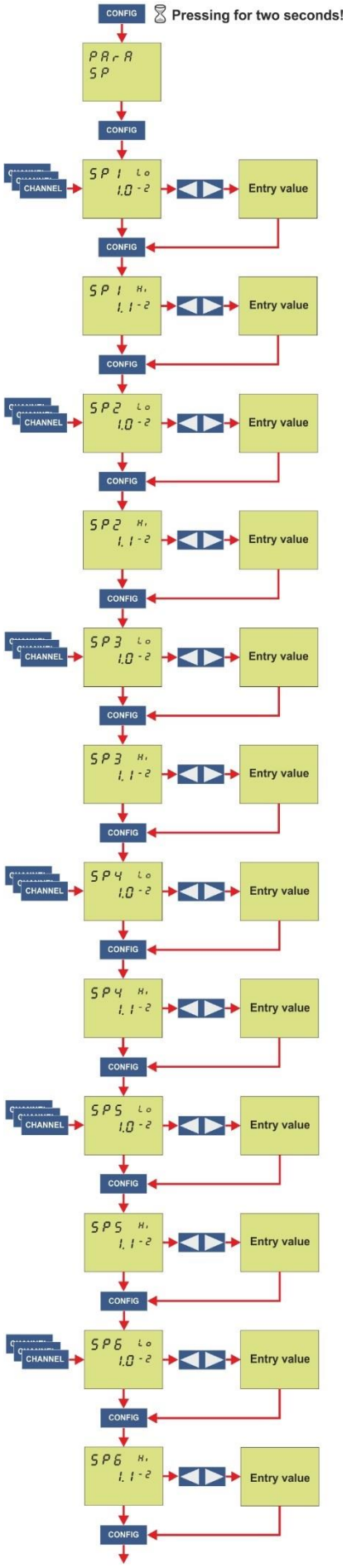


Figure 30 – Adjustment of Parameters SP

7.1.3 Adjustment Range

The upper and the lower threshold value can be selected in the range between $1 \cdot 10^{3}$ and $1 \cdot 10^{-12}$ mbar depending on the sensor.
The hysteresis is at least 10 % of the lower threshold value.

ATTENTION:
Select the threshold values only within the range of the selected sensor.

ATTENTION:
The threshold values have to be adjusted when the sensor type on a measuring channel has been changed.

7.2 Sensor Parameters (PArA SEn)

A separate set of sensor parameters is available for each measuring channel. Different parameters are available depending on which sensor is connected to the respective measuring channel (☞🕮 Table 10, page 47).

Sensoren	FS	PrE	FiLt	GAS	S-on	S-oFF	FiL	SEnS1	SEnS2	AdJ
At			✓				✓			✓
bA			✓	✓	✓	✓	✓	✓	✓	
bEE			✓							
ttr		✓	✓							
ttr1		✓	✓							
Ctr	✓		✓							
Ptr			✓	✓	✓	✓				
Ptr90			✓							
du200			✓							
du2000			✓							
durEL			✓							

Table 10 – Available Sensor Parameters

- Select the desired channel by repeated operating of the key CHANNEL
- Keep the key CONFIG pressed for approximately 2 seconds.
  - The instrument is then in the configuration mode.
- Use the arrow keys to get into the parameter group SEn.
- Press the key CONFIG to select the desired parameter.
  - The name and the value of the parameter will be displayed.
- Use the arrow keys to change the parameter setting.
- Repeat the steps to change further parameter of the parameter group.

See Figure 31, page 48 for better understanding.

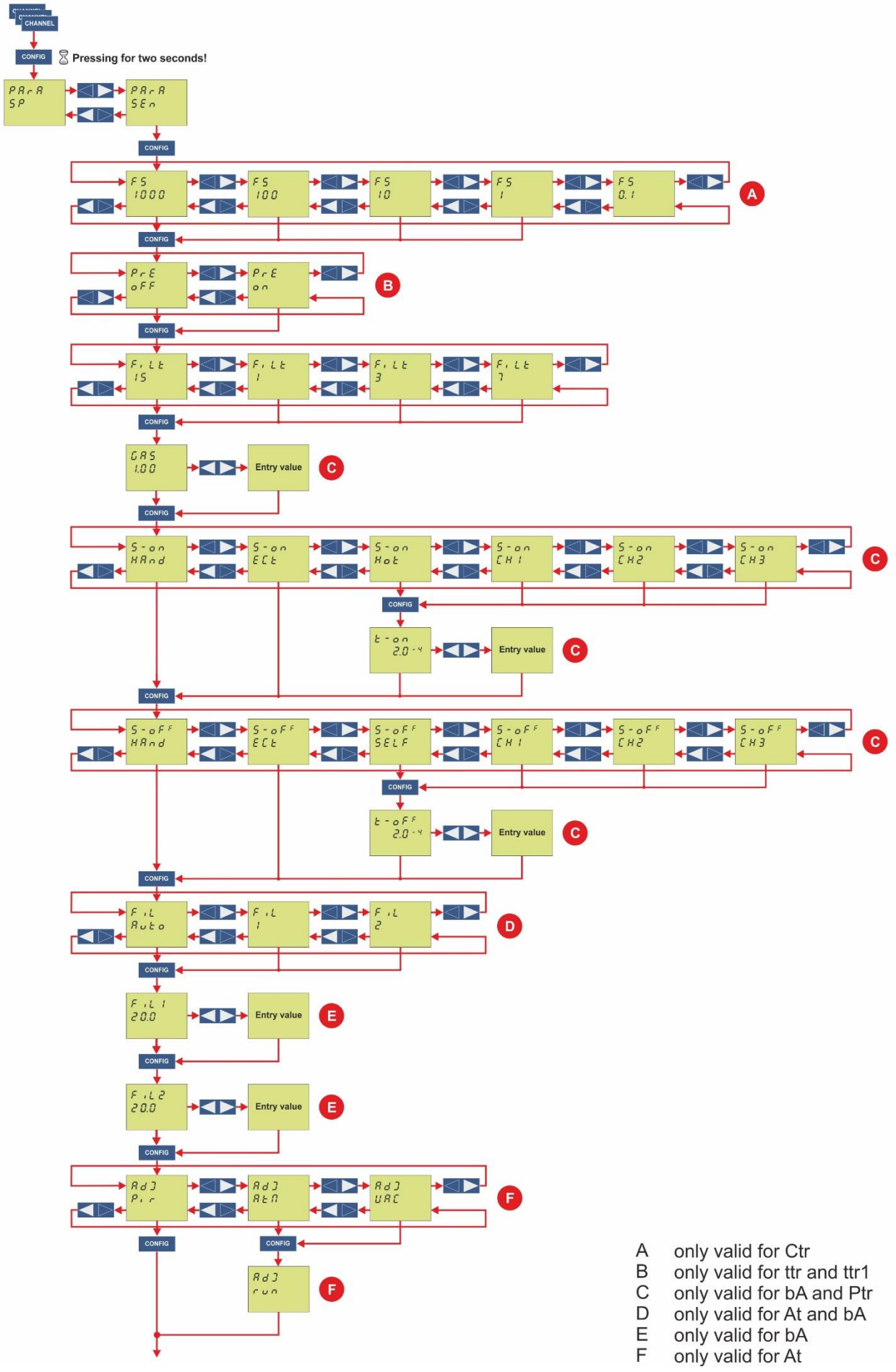


Figure 31 – Setting of the Parameters Sen

7.2.1 Measuring Range (FS)

The ultimate value of the measuring range (Full Scale) you have to enter for linear sensors (Ctr). You can adjust this value with the aid of the arrow keys. The following values are available:

- 1000 Torr
- 100 Torr
- 10 Torr
- 1 Torr
- 0.1 Torr

7.2.2 Pirani Range Extension (PrE)

Pirani range extension for sensor types ttr and ttr1.

Display	Description
oFF	Pirani range extension deactivated Sensor indicated as ttr or ttr 1
on	Pirani range extension activated Sensor indicated as ttr^{E} or ttr 1^{E}

Table 11 – Values for the parameter PrE

7.2.3 Measuring Value Filter (FiLt)

The measuring value filter improves processing of unstable signals or signals suffering from interference. The filter has an effect on the display and the switching functions. However, the analog outputs are not influenced.
The measuring value filter can be selected between the values **1**, **3**, **7** and **15**. Here **1** stands for **fast** and **15** for **slow**. The values **3** and **7** are corresponding **intermediate values**.
In case of a two-digit display the use of filter factor 3 is recommended, in case of a three-digit display filter factor 15 is to prefer.

7.2.4 Gas Correction (GAS)

The sensors have normally been calibrated for measuring in nitrogen or air. With the aid of the parameter Cor it is possible to adjust the measuring channel to other gas types (Ptr only). For this proceed as follows:

- Select the parameter GAS
- Press the key CONFIG
  - The correction factor will be displayed
- Use the arrow keys to change the correction factor
  - The value of the parameter will be changed
  - The display GAS will flash

You can adjust the correction factor for a sensor in the range of 0.2 – 1.0 – 8.0. The setting 1.0 provides the uncorrected measuring value.

7.2.5 Sensor Switch On Mode (S-on)

This parameter defines how the sensors are switched on (bA and Ptr only).

You can set the switch on mode as follows:

HAnd
Manually. The sensor can be switched on be pressing the key UP (☞🕮 Chapter 6.4.3.3 Switching On the High Vacuum Measuring Circuit, page 39).

ECt
Externally through optocoupler (static signal +12 – 24 VDC)

Hot
Warm start. The sensor is switched on automatically upon switching on the instrument. The measuring will be automatically restarted after a power failure.

CH 1
Through measuring channel 1. With the aid of the next parameter t-on a switch on threshold can be defined. In case the pressure in measuring channel 1drops below the switch on threshold, the sensor will be switched on.

CH 2
Through measuring channel 2. With the aid of the next parameter t-on a switch on threshold can be defined. In case the pressure in measuring channel 2 drops below the switch on threshold, the sensor will be switched on.

CH 3
Through measuring channel 3. With the aid of the next parameter t-on a switch on threshold can be defined. In case the pressure in measuring channel 3 drops below the switch on threshold, the sensor will be switched on.

ATTENTION:
Switching on through the measuring channel is only possible, when a total pressure sensor of the type ttr, ttr1 or bee is attached to this measuring channel. For invalid sensors the channel is not available in the Sensor Switch On Mode.

7.2.6 Sensor Switch On Value (t-on)

This parameter appears only in case that the sensor switch on mode is set on CH 1, CH 2 or CH 3 (☞🕮 Chapter 7.2.5 Sensor Switch On Mode (S-on), page 50).

With the aid of the parameter t-on it is possible to determine the switch on value. The sensor will be switched on if the pressure of the respective measuring channel drops below the switch on value.

7.2.7 Sensor Switch Off Mode (S-oFF)

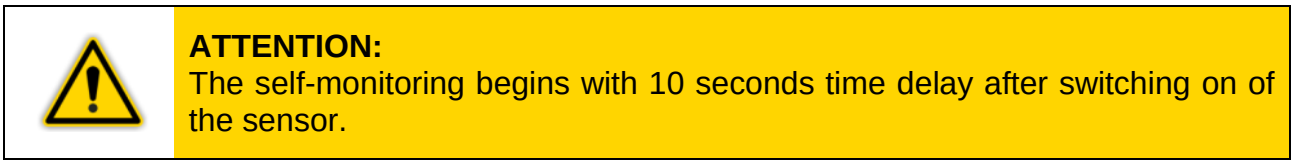
This parameter determines how the sensors are switched off (bA and Ptr only).

You can set the switch off mode to the following values:

HAnd
Manually. The sensor can be switched off by pressing the key marked DOWN
(☞🕮 Chapter 6.4.3.5 Switching Off the High Vacuum Measuring Circuit, page 40).

ECt
Externally through optocoupler (static signal +12 – 24 VDC)

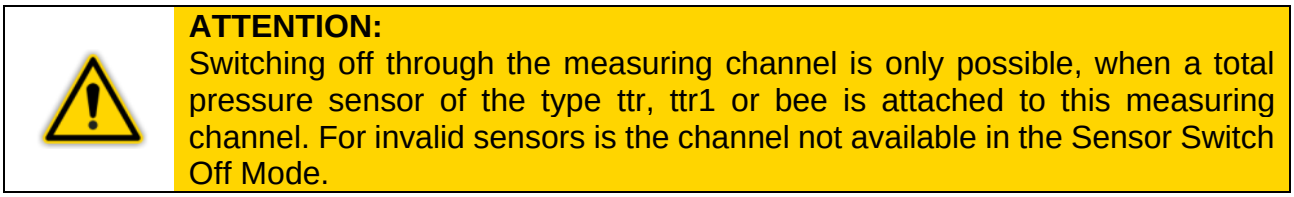
SELF
Self-monitoring. With the aid of the next parameter t-off you can determine a switch off threshold. When the pressure at the sensor exceeds the switch off threshold, the sensor will be switched off.



CH 1
Through measuring channel 1. With the aid of the following parameter t-off you can determine a switch off threshold. As soon as the pressure in measuring channel 1 exceeds the switch off threshold, the sensor will be switched off.

CH 2
Through measuring channel 2. With the aid of the following parameter t-off you can determine a switch off threshold. As soon as the pressure in measuring channel 2 exceeds the switch off threshold, the sensor will be switched off.

CH 3
Through measuring channel 3. With the aid of the following parameter t-off you can determine a switch off threshold. As soon as the pressure in measuring channel 3 exceeds the switch off threshold, the sensor will be switched off.



7.2.8 Sensor Switch Off Value (t-off)

This parameter will be displayed only if the sensor switch off mode is set for CH 1, CH 2 or CH 3 (☞🕮 Chapter 7.2.7 Sensor Switch Off Mode (S-oFF), page 51).

With the aid of the parameter t-off you can determine a switch off value. As soon as the pressure on the respective measuring channel exceeds the switch off value, the sensor is switched off.

7.2.9 Selection of the Filaments (FiL)

This parameter defines how the selection of the filaments is made (At and bA only).

Display	Description
AUto	Automatic selection of the filament; in case filament 1 is identified as defective, the switch to filament 2 will be executed automatically
1	Filament 1 only
2	Filament 2 only

Table 12 – Values for parameter FiL

The active filament will be displayed (☞🕮 Figure 22, D, page 35).

ATTENTION:
The selection of the filament becomes only after switching off (☞🕮 6.4.3.5 Switching Off the High Vacuum Measuring Circuit, page 40) and renewed switching on of the sensor (☞🕮 6.4.3.3 Switching On the High Vacuum Measuring Circuit, page 39) valid.

7.2.10 Sensitivity of the Filaments (SEnS1 and SEnS2)

The sensitivity of the filaments 1 and 2 (bA only) will be adjusted with this parameter. The JEVAmet® VCU is by the factory adjusted to a sensitivity of 20 $mbar^{-1}$. With the BA sensor you receive the values for the sensitivity of the filaments. Enter these values for sensitivity at the JEVAmet® VCU, if a sensor is attached for the first time to the instrument.

For this proceed as follows:

- Select the parameter SEnS1 for filament 1
- Press the key CONFIG
  - The sensitivity value will be displayed
- Use the arrow keys, in order in such a way to change the value for sensitivity that it corresponds to the value for the filament 1, supplied with the sensor.
  - The value of the parameter will be changed
  - The display FiL1 will light
- Select the parameter SEnS2 for filament 2
- Press the key CONFIG
  - The sensitivity value will be displayed
- Use the arrow keys, in order in such a way to change the value for sensitivity that it corresponds to the value for the filament 2, supplied with the sensor.
  - The value of the parameter will be changed
  - The display FiL2 will light

You can set the value for the sensitivity of the filaments in the range of 8.00 – 20.0 – 50.0.

7.2.11 Calibration of the Pirani Measuring Branch (AdJ)

With the aid of this function it is possible to adjust the ultimate value and the zero point of the Pirani measuring branch for a connected wide-range vacuum gauge ATMION® measuring system (At only).

Proceed as follows:

- Select the parameter AdJ Pir
- Use the arrow keys to get into the mode for the adjustment of the ultimate value AdJ AtM at a pressure of 1000 mbar or for the adjustment of the zero point AdJ VAC at a pressure < $1 \cdot 10^{-4}$ mbar
  - The mode AdJ AtM or AdJ VAC is displayed
- Press the key CONFIG to start the selected adjustment
  - The message AdJ run is displayed during the running adjustment
  - The adjustment procedure ends automatically and the instrument reverts to the measuring mode

7.3 General Parameters (PArA GEn)

With the aid of these parameters it is possible to configure the instrument in general. The parameters are valid for all measuring channels.

- Keep the key CONFIG pressed for approximately 2 seconds.
  - The instrument is now in the configuration mode.
- Use the arrow keys to get into the parameter group GEn.
- Press the key CONFIG to select the desired parameter.
  - The name and the value of the parameter will be displayed.
- Use the arrow keys to change the parameter setting.
- Repeat the steps in order to change further parameters of the parameter group.

See Figure 32, page 54 for better understanding.

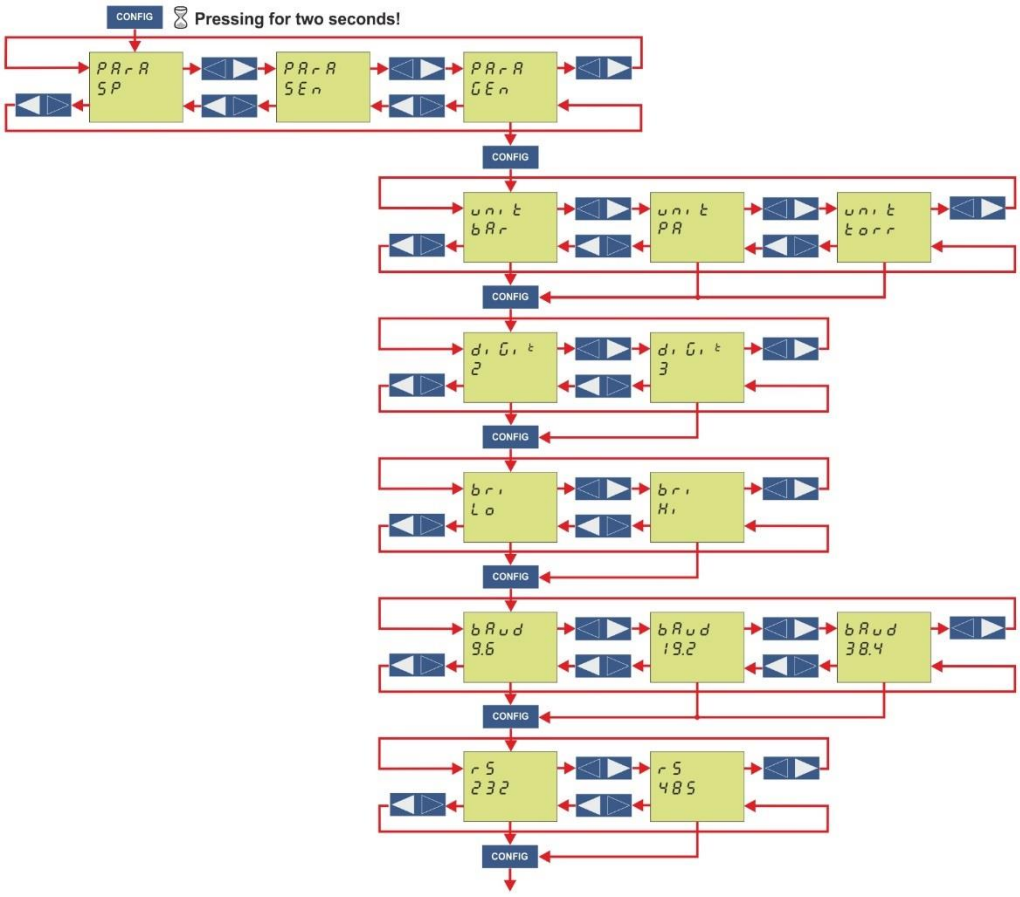


Figure 32 – Setting of the Parameter Gen

7.3.1 Measuring Unit (unit)

Measuring unit for pressure values.

Display	Description
bAr	Measuring unit mbar
torr	Measuring unit Torr
PA	Measuring unit Pascal

Table 13 – Values for the Parameter unit

7.3.2 Display Format (diGit)

Number of digits on the display.

Display	Description
2	Two digits e. g. $2,5^{-1}$ or 370
3	Three digits e. g. $2,47^{-1}$ or 373

Table 14 – Values for the Parameter diGit

7.3.3 Display Brightness (bri)

Brightness of the display.

Display	Description
Hi	High brightness
Lo	Low brightness

Table 15 – Values for the Parameter bri

7.3.4 Baud Rate (bAud)

Baud of the interface

Display	Description
9.6	Baud rate 9600 Baud
19.2	Baud rate 19200 Baud
38.4	Baud rate 38400 Baud

Table 16 – Values for the Parameter bAud

CAUTION:
The changed baud rate will only become effective after having restarted the instrument.

7.3.5 Interface (rS)

Selection of the interface

Display	Description
232	Interface RS232
485	Interface RS485

Table 17 – Values for the Parameter rS

CAUTION:
The changed interface will only become effective after having restarted the instrument.

8. Computer Interface

8.1 Basics

8.1.1 Connection

The JEVAmet® VCU can communicate with the computer through a serial interface. The interfaces RS232 or RS485 are selectively available. The selection is made through a jumper inside the instrument. The selection is made through the parameter group PArA in the configuration mode (☞🕮 Chapter 7.3 General Parameters (PArA GEn), page 54).
The respective connecting socket and the necessary connecting cable are described in Chapter 5.3.7 Interface RS232 / RS485 (Interface RS232 / RS485), page 29.

8.1.2 Nomenclature

The following terms and symbolical spellings are used in order to describe the computer interface:

Terms	Description
Send	Data transfer from the host to the instrument
receive	Data transfer from the instrument to the host
Host	Terminal (Computer)
ASCII	American Standard Code for Information Interchange

Table 18 – Terms Computer Interface

Square Brackets [...]
Square brackets mark parameters.

Sharp Brackets <...>
Abbreviations in sharp brackets mark control characters. The complete term including the sharp brackets is replaced by a numerical value.

Terms	Value	Description
<,>	0x2C	Divider
<CR>	0x0D	End identifier

Table 19 – Control Characters Computer Interface

8.2 Communication

8.2.1 Log

The following log is used for communication:

- 8 data bits
- no parity bit
- 1 stop bit

The baud rate is selectable.

- 9600
- 19200
- 38400

No hardware handshake is used. Messages are transferred as ASCII strings. Comma(0x2C) is considered as divider. Blank(0x20) and tabulator(0x09) are considered as hyphen. For the communication, the computer is always the master. The input buffer of the computer has to have a capacity of 50 bytes at least. The receive buffer of the VCU is deleted two seconds after receipt of the last indication.

8.2.2 General String Structure

Input of ***Address*** is necessary for command input via RS485 only

Write command

S: ***Address*** **Command <,> [Parameter] <CR>**
E: **OK <CR>**

Reading command

S: ***Address*** **Command <CR>**
E: **[Parameter] <CR>**

Error code

E: **? <*TAB*> X**	Incorrect command
E: **? <*TAB*> P <,> <*TAB*> z**	Incorrect parameter , Parameter number of the transmitted command
E: **? <*TAB*> C <,> <*TAB*> x**	Channel x on device not available
E: **? <*TAB*> S <,> <*TAB*> x**	No sensor or unsuitable sensor on Channel x connected
E: **? <*TAB*> K**	No divider in the command available

8.3 Command Set (Mnemonics)

8.3.1 Command Overview

Read Commands	Description
RPV	Read Pressure Value. Query of the pressure values of a measuring channel.
RVN	Read Version Number Query of the version number of the device software.
RID	Read Sensor ID Read sensor identifier for a measuring channel.
RSS	Read Setpoint Status Read status of set points.

Table 20 – Mnemonics for Read Commands

Write Commmands	Description
SHV	Set HV on/off Switch on or switch off HV for a channel.
SDG	Set Degas on/off Start or terminate the degas function.
SKL	Set Key Lock on/off Switch on or off key lock
SAC	Save Actual Configuration Save actual configuration for set point, sensor and general parameters.
SRE	Reset Error All Channel Errors for all channels acknowledge.

Table 21 – Mnemonics for Write Commands

Read and Write Commands	Description
RSA	Read Serial Address Read address for RS485.
SSA	Set Serial Address Set address for RS485.
RGP	Read General Parameter Read device settings.
SGP	Set General Parameter Set device settings.
RPE	Read Pirani Range Extension Read pirani range extension for a measuring channel.
SPE	Set Pirani Range Extension Set pirani range extension for a measuring channel.
RFF	Read Filter Factor Read filter factor for a measuring channel.
SFF	Set Filter Factor Set filter factor for a measuring channel.
RGC	Read Gas Correction Read gas type correction factor for a measuring channel.
SGC	Set Gas Correction Set gas type correction factor for a measuring channel.
RSF	Read Sensitivity Filament Read sensitivity for filament 1 and 2.
SSF	Set Sensitivity Filament Set sensitivity for filament 1 and 2.

Read and Write Commands (continued)	Description
RFM	Read Filament Mode Read filament selection.
SFM	Set Filament Mode Set filament selection.
RSC	Read Sensor Control Read type of the sensor control for a measuring channel.
SSC	Set Sensor Control Set type of the sensor control for a measuring channel.
RFS	Read Full Scale Read FS for CTR for a measuring channel.
SFS	Set Full Scale Set FS for CTR for a measuring channel.
RSP	Read Setpoint Read set points for a channel.
SSP	Set Setpoint Set set points for a channel.

Table 22 – Mnemonics for Read and Write Commands

CAUTION:
All changes to values are only permanently saved to the EEPROM after having issued the write command SAC. For this reason after having set all values, save the current configuration through the SAC write command before restarting the instrument.

8.3.2 RPV (Read Pressure Value)

Query of the pressure value of a measuring channel.

S: **RPV[a]<CR>**

E: **b[,][TAB]x.xxxxE±xx**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Status 0 = Measuring value OK 1 = Measuring value < Measuring range 2 = Measuring value > Measuring range 3 = Measuring range undershooting (Err Lo) 4 = Measuring range overstepping (Err Hi) 5 = Sensor off (oFF) 6 = HV on (HU on) 7 = Sensor error (Err S) 8 = BA error (Err bA) 9 = No Sensor (no Sen) 10 = No switch on or switch off point (notriG) 11 = Pressure value overstepping (Err P) 12 = Pirani error ATMION® (Err Pi) 13 = Breakdown of operational voltage (Err 24) 15 = Filament defectively (FiLbr)
x.xxxxE±xx	Pressure value of the selected channel in the current unit

8.3.3 RVN (Read Version Number)

Query of the version number of the device software.

S: **RVN<CR>**

E: **x.xx<CR>**

Parameter	Description
x.xx	Version number

8.3.4 RID (Read Sensor ID)

Read sensor identifier for a measuring channel.

S: **RID[a]<CR>**

E: **b<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Sensor identifier 0 = no sensor 1 = Ptr 2 = ttr1 3 = ttr 4 = Ctr 5 = bA 6 = bEE 7 = At 8 = Ptr90 9 = du200 10 = du2000 11 = durEL

8.3.5 RSS (Read Set Point Status)

Read status of the set points.

S: **RSS<CR>**

E: **b[,][TAB]b[,][TAB]b[,][TAB]b[,][TAB]b[,][TAB]b[,][TAB]<CR>**

Parameter	Description
b	Status 0 = low 1 = high

8.3.6 SHV (Set HV on/off)

Set HV on/off for a measuring channel.

S: **SHV[a, b]<CR>**

E: **OK<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	HV on/off 0 = off 1 = on

8.3.7 SDG (Set Degas on/off)

Start or terminate degas function.

S: **SDG[a, b]<CR>**

E: **OK<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1)
b	Degas on/off 0 = off 1 = on

8.3.8 SKL (Set Key Lock on/off)

Switch on or switch off keyboard lock.

S: **SKL[a]<CR>**

E: **OK<CR>**

Parameter	Description
a	Keyboard lock 0 = off 1 = on

8.3.9 SAC (Save Actual Configuration)

Safe actual configuration for set point, sensor and general parameters.

S: **SAC<CR>**

E: **OK<CR>**

8.3.10 SRE (Reset Error All Channel)

Reset errors for all channels.

S: **SRE<CR>**

E: **<CR>**

8.3.11 RSA (Read Serial Address)

Read address for RS485.

S: **RSA<CR>**

E: **a<CR>**

Parameter	Description
a	Address 1 – 126 (Output takes place in the HEX format.)

8.3.12 SSA (Set Serial Address)

Set address for RS485.

S: **SSA[a]<CR>**

E: **OK<CR>**

Parameter	Description
a	Address 1 – 126 (Input must take place in the HEX format.)

8.3.13 RGP (Read General Parameter)

Read general parameters.

S: **RGP<CR>**

E: **a[,][TAB]b[,][TAB]c[,][TAB]d[,][TAB]e[,][TAB]f <CR>**

Parameter	Description
a	Unit 0 = mbar 1 = Pa 2 = Torr
b	Digits 0 = 2 1 = 3
c	Brightness 0 = high 1 = low

Read and Write Commands (continued)	Description
d	Baud rate 0 = 9600 1 = 19200 2 = 38400
e	Serial interface 0 = RS232 1 = RS485
f	Instrument configuration (read only) 0 = no valid configuration 1 = Configuration JEVAmet® VCU-C 2 = Configuration JEVAmet® VCU-AM 3 = Configuration JEVAmet® VCU-BM 4 = Configuration JEVAmet® VCU-A0 5 = Configuration JEVAmet® VCU-B0

8.3.14 SGP (Set General Parameter)

Set general parameters.

S: **SGP[a, b, c, d, e]<CR>**

E: **OK <CR>**

Parameter	Description
a	Unit 0 = mbar 1 = Pa 2 = Torr
b	Digits 0 = 2 1 = 3
c	Brightness 0 = high 1 = low
d	Baud rate 0 = 9600 1 = 19200 2 = 38400
e	Serial interface 0 = RS232 1 = RS485

8.3.15 RPE (Read Pirani Extension)

Read pirani range extension for a measuring channel.

S: **RPE[a]<CR>**

E: **b<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Pirani range extension for channel 0 = off 1 = on

8.3.16 SPE (Set Pirani Extension)

Set pirani range extension for a measuring channel.

S: **SPE[a, b]<CR>**

E: **OK<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Pirani range extension for channel 0 = off 1 = on

8.3.17 RFF (Read Filter Factor)

Read filter factor for a measuring channel.

S: **RFF[a]<CR>**

E: **b<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Filter factor channel 0 = Filter factor=1 (fast) 1 = Filter factor=3 (medium) 2 = Filter factor=7 (slow) 3 = Filter factor=15 (very slow)

8.3.18 SFF (Set Filter Factor)

Set filter factor for a measuring channel.

S: **SFF[a, b]<CR>**

E: **OK<CR>**

Parameter	Description
a	Channel number 1 = Channel1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Filter factor channel 2 0 = Filter factor=1 (fast) 1 = Filter factor=3 (medium) 2 = Filter factor=7 (slow) 3 = Filter factor=15 (very slow)

8.3.19 RGC (Read Gas Correction)

Read the gas type correction factor for a measuring channel.

S: **RGC[a]<CR>**

E: **b<CR>**

Parameters	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Gas type correction factor channel Format X.XX with value range 0.20 – 8.00

8.3.20 SGC (Set Gas Correction)

Set gas correction factor for measuring channel.

S: **SGC[a, b]<CR>**

E: **OK<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Gas type correction factor channel Format X.XX with value range 0.20 – 8.00

8.3.21 RSF (Read Sensitivity Filament)

Read sensitivity for filaments.

S: **RSF[a]<CR>**

E: **b[,][TAB]c<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Sensitivity Filament 1 Format X.XX with value range 1.00 – 9.99 Format X.XX with value range 10.0 – 80.0
c	Sensitivity Filament 2 Format X.XX with value range 1.00 – 9.99 Format X.XX with value range 10.0 – 80.0

8.3.22 SSF (Set Sensitivity Filament)

Set sensitivity for filaments.

S: **SSF[a, b, c]<CR>**

E: **OK<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Sensitivity Filament 1 Format X.XX with value range 1.00 – 9.99 Format X.XX with value range 10.0 – 80.0
c	Sensitivity Filament 2 Format X.XX with value range 1.00 – 9.99 Format X.XX with value range 10.0 – 80.0

8.3.23 RFM (Read Filament Mode)

Read kind of the filament selection for a measuring channel.

S: **RFM[a]<CR>**

E: **b<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Kind of the filament selection 0 = automatic filament selection; if filament 1 is recognized as defective, automatically the change-over takes place on filament 2 1 = Filament 1 only 2 = Filament 2 only

8.3.24 SFM (Set Filament Mode)

Set kind of the filament selection for a measuring channel.

S: **SFM[a, b]<CR>**

E: **OK<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Kind of the filament selection 0 = automatic filament selection; if filament 1 is recognized as defective, automatically the change-over takes place on filament 2 1 = Filament 1 only 2 = Filament 2 only

8.3.25 RSC (Read Sensor Control)

Read the mode of the sensor control for measuring channel.

S: **RSC[a]<CR>**

E: **b[,][TAB]c[,][TAB]x.xxxxE±xx[,][TAB]x.xxxxE±xx<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)

Parameter (continued)	Description
b	Sensor switch on mode channel 0 = Hand 1 = Extern 2 = Hot 3 = through channel 1 4 = through channel 2 5 = through channel 3
c	Sensor switch off mode channel 0 = Hand 1 = Extern 2 = Self monitoring 3 = through channel 1 4 = through channel 2 5 = through channel 3
x.xxxxE±xx	Switch on value in the current unit
x.xxxxE±xx	Switch off value in the current unit

8.3.26 SSC (Set Sensor Control)

Set the mode of the sensor control for measuring channel.

S: **SSC[a, b, c, x.xxxxE±xx, x.xxxxE±xx]<CR>**

E: **OK<CR>**

Parameters	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Sensor switch on mode channel 0 = Hand 1 = Extern 2 = n.a. 3 = through channel 1 4 = through channel 2 5 = through channel 3
c	Sensor switch off mode channel 0 = Hand 1 = Extern 2 = Self-monitoring 3 = through channel 1 4 = through channel 2 5 = through channel 3
x.xxxxE±xx	Switch on value in the current unit
x.xxxxE±xx	Switch off value in the current unit

8.3.27 RFS (Read Full Scale)

Read FS for Ctr for a measuring channel.

S: **RFS[a]<CR>**

E: **b<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Full scale 0 = 1000 Torr 1 = 100 Torr 2 = 10 Torr 3 = 1 Torr 4 = 0.1 Torr

8.3.28 SFS (Set Full Scale)

Set FS for CTR for a measuring channel.

S: **SFS[a, b]<CR>**

E: **OK<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Full scale 0 = 1000 Torr 1 = 100 Torr 2 = 10 Torr 3 = 1 Torr 4 = 0.1 Torr

8.3.29 RSP (Read Set Point)

Read set points.

S: **RSP[b]<CR>**

E: **c[,][TAB]d[,][TAB]a<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Set point number 1 = SP1 2 = SP2 3 = SP3 4 = SP4 5 = SP5 6 = SP6
c	SP1 – 6 low (pressure value of the set point in the current measuring unit in the form x.xxxxE±xx)
d	SP1 – 6 high (pressure value of the set point in the current measuring unit in the form x.xxxxE±xx)

8.3.30 SSP (Set Set Point)

Set set points.

S: **SSP[b, c, d, a]<CR>**

E: **OK<CR>**

Parameter	Description
a	Channel number 1 = Channel 1 (CH1) 2 = Channel 2 (CH2) 3 = Channel 3 (CH3)
b	Set point number 1 = SP1 2 = SP2 3 = SP3 4 = SP4 5 = SP5 6 = SP6
c	SP1 – 6 low (pressure value of the set point in the current measuring unit in the form x.xxxxE±xx)
d	SP1 – 6 high (pressure value of the set point in the current measuring unit in the form x.xxxxE±xx)

9. Maintenance and Servicing

9.1 Maintenance

9.1.1 General Maintenance Advices

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

Warning: Mains voltage
The instrument contains inside voltage carrying components. Do not introduce any objects into the openings of the instrument. Keep the instrument dry. Do not open the instrument.

9.2 Regular Inspections

- Visual inspection of the device for damaged or deformed housings and connectors as well as damaged cable insulation
- Check of the safety equipment assembled
- Electrical safety test in accordance with the national / international standard or internal specifications
- Check the protective conductor connection to the housing

9.2.1 JEVAmet® IOS - Replacement of the Filament

After burning of both filaments of the JEVAmet® IOS it is possible to replace the filaments. You can do that yourself or send the complete sensor to JEVATEC for replacement.

NOTICE:
The sensors contain mechanically sensitive parts. An incorrect or improper filament change can damage the sensor.
JEVATEC assumes no responsibility and gives no warranty for damage to the filaments or other parts of the sensor or vacuum gauge caused by incorrect or improper replacement of the filaments by the operator or third parties.

ATTENTION: Measuring accuracy
The original measuring accuracy of the sensors of ± 10% of the measured value can only be achieved by an electronic adjustment by the manufacturer. Non-adjusted sensors achieve a measuring accuracy of ± 20% of the measured value after replacement of the filaments. If you wish to have the original measuring accuracy, have the filament replacement carried out by JEVATEC.

ATTENTION: Shipping of contaminated products
Contaminated products (e.g. radioactive, toxic, corrosive or micro-biological) can cause damage to health and the environment. Submitted products should be free of pollutants wherever possible. Observe the shipping regulations of the countries and transport companies involved. Enclose the carefully filled out contamination declaration with the shipment.

NOTICE: Declaration of contamination form
You will find the form as a copy template in Appendix 2 of these operating instructions or as a free download on the Internet.

The replacement of the sensor is described in Chapter 9.2.2 JEVAmet® IOS – Sensor Replacement, page 73.

Use the JEVAmet® Filament Kit to replace the filaments. The filament kit contains a pair of stretched, Y_2O_3 coated iridium filaments, a copper sealing ring (DN40CF) for the feed-through flange and three M2 grub screws for the filament base including Allen key. Before starting the work, have these parts, two spanners SW10, a pair of tweezers and an additional copper sealing ring (DN40CF) for the connecting flange with the vacuum chamber ready. Use lint-free gloves during the work.

The replacement of the filaments is executed according to the following steps (☞🕮 Figure 4, page 20):

- Switch-off the sensor
- Loosen the three grub screws and disconnect the connector plug from the sensor.
- Loosen the connection screws to vacuum chamber and dismount the sensor from the vacuum chamber.
- Place the sensor on an even base with the electrical connections pointing upwards.
- Loosen and remove the connecting screws (M6) between the sensor and the sensor tube.
- Pull out the sensor carefully upwards from the sensor tube centrically to the tube axis.

ATTENTION:
Keep the sensor flange exactly parallel and centrically to tube axis. An incorrect or improper dismounting may easily damage the sensor. Please be extremely carefully!

- Place the feedthrough flange with the sensor structure to the top on a flat ground.
- Unscrew the 3 upper headless screws of the filament sockets.
- Remove the used or defective filaments carefully with a tweezer.
- Take up the new filaments with tweezers at the support rod in the middle and take them out of the packaging of the JEVAmet® Filament Kit.
- Insert the rod and both filament connectors into the 3 filament sockets.
- Fasten the rod and both filament connectors by tightening the headless screws. Use the 3 new headless screws, whenever required.
- Carefully remove the bond bridge from the new filaments with a tweezer.

ATTENTION:
Not removing the bond bridge between the filaments will lead to a short circuit, which can damage the electronics.

- Check the intactness of the sensor structure visually before sealing the sensor tube.
- Take the new copper seal from the packing and place it onto the sealing surface of the sensor tube with a tweezer.
- Insert the feedthrough flange with the mounted sensor structure carefully into the sensor tube.

ATTENTION:
Keep the sensor flange exactly parallel and centered to tube axis. An incorrect or improper mounting may easily damage the sensor. Please be extremely carefully!

- Make the screw connection between sensor flange and sensor tube.

ATTENTION:
Tighten the nuts in a crosswise fashion to prevent misalignment of the sealing surfaces.

- Mount the sensor to the vacuum chamber and tighten the connection screws evenly. Use a new copper seal.
- Plug the connector onto the sensor and make the mechanical connection with the 3 grub screws.
- Setting the value 20.0 $mbar^{-1}$ for the sensitivity of both of the filaments via JEVAmet® VCU (☞🕮 Chapter 7.2.10 Sensitivity of the Filaments (SEnS1 and SEnS2), page 52).

NOTICE:
Detailed, illustrated instructions are included with the JEVAmet® Filament Kit or can be downloaded free of charge from the Internet.

9.2.2 JEVAmet® IOS – Sensor Replacement

It may be necessary to replace the complete sensor. Follow the steps as described (☞🕮 Figure 4, page 20):

- Switch-off the sensor
- Loosen the three grub screws and disconnect the connector plug from the sensor.
- Loosen the connection screws to vacuum chamber and dismount the used sensor from the vacuum chamber.
- Mount the new sensor on the vacuum chamber and tighten the connecting screws to the vacuum chamber evenly. Use a new copper sealing ring.
- Plug the connector onto the sensor and make the mechanical connection with the 3 grub screws.
- Setting the value for the sensitivity of the filaments via JEVAmet® VCU (☞🕮 Chapter 7.2.10 Sensitivity of the Filaments (SEnS1 and SEnS2), page 52). The values for sensitivity receive you with the sensor.

9.3 Troubleshooting

9.3.1 Trouble Indication

A malfunction within the JEVAmet® VCU is shown by an error message on the display (☞🕮 Chapter 9.3.2 Error Messages, page 74).

9.3.2 Error Messages

Error (Display)	Cause and Remedy
Err 5	Sensor error. Malfunction in the connection to the sensor. This message will only be displayed on the display of the respective measuring channel. Acknowledge with any key.
Err P1	Pirani error. Pirani wire of the ATMION® sensor defective. The error message continues to show until the sensor has been replaced.
Err bA	Bayard-Alpert error. Both filaments of the ATMION® sensor defective or short circuit in the BA sensor or emission current outside the permissible range or malfunction on the plug module of the BA sensor. Acknowledge with any key.
Err P	Pressure error. Switch off of the BA sensor due to significantly too high pressure value. Acknowledge with any key.
Err H1	Measuring signal of the sensor significantly above the permissible range.
Err Lo	Measuring signal of the sensor significantly below the permissible range.
Err 24	The operating voltage for the corresponding sensor failed, e.g. because of an external short circuit.
FiLbr	Filaments of BA sensor defect. Error message is indicated, if in the mode AUTO of filament selection both filaments are defective or is defective in the mode FIL1 the filament 1 or is defective in the mode FIL2 the filament 2. The error message continues to show until the sensor has been replaced.
notr 16	Error on the switch on or switch off channel. No switch on or switch off point for bA or Ptr available.

Table 23 – Error Messages

9.3.3 Help in Case of Malfunctions

If the malfunction persists even after having acknowledged and / or having replaced the sensor, please contact JEVATEC.

9.3.4 Exchange of fuses

Use for the exchange of defective device fuses exclusively the fuse type T1.6A H indicated on the rear site of controller. The both device fuses you can find in the fuse holder of mains connection (☞🕮 Figure 9, page 24 and Figure 10, page 25 as well as Figure 17, page 31), which can be pried off with a small screwdriver.

9.3.5 Repair

Defective products must be sent to JEVATEC. JEVATEC cannot assume any responsibility or warranty if the operator or third persons opens the JEVAmet® VCU.

10. Shelving and Waste Disposal

10.1 Packaging

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

10.2 Shelving

The JEVAmet® VCU must only be stored in dry room. During storage, the following ambient conditions need to be maintained:

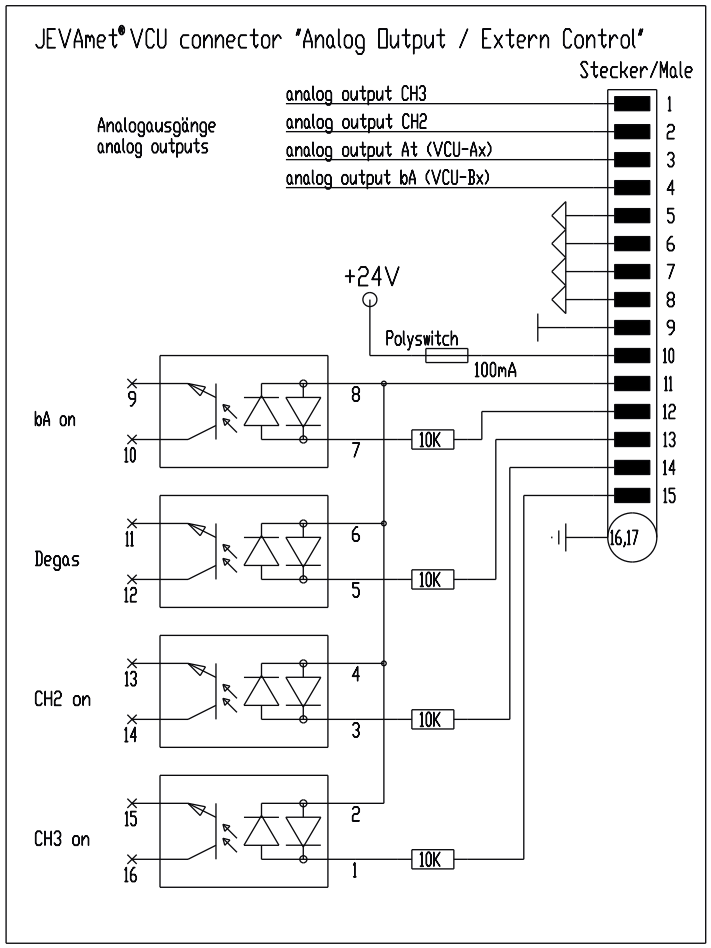
- Ambient temperature: -20 – +60 °C
- Humidity of the air: As low as possible.
  Preferably in a sealed plastic bag with desiccant.

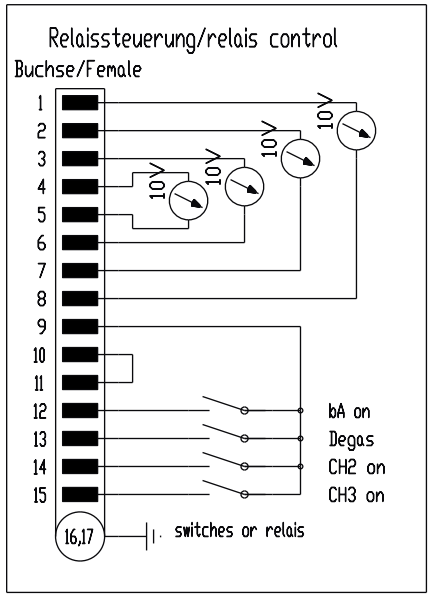
10.3 Waste Disposal

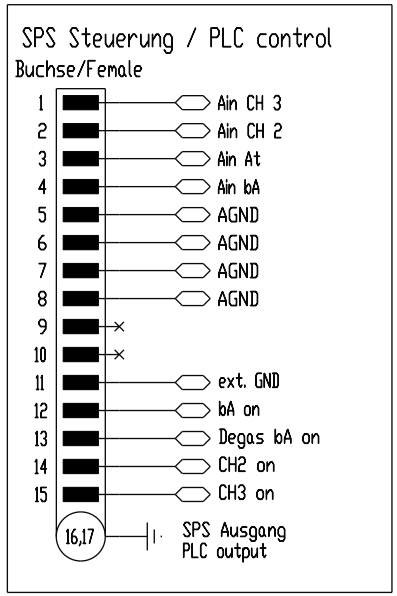
Regarding waste disposal the branch specific and local waste disposal and environment protection regulation for systems and electronics components are valid. In case of return JEVATEC will execute the professional resource separation and disposal.

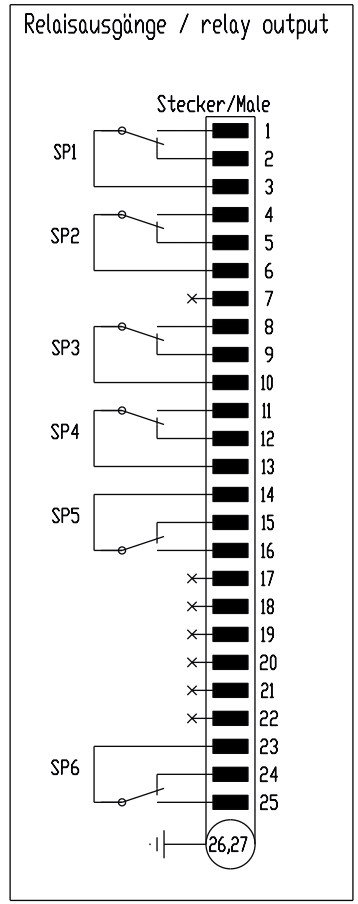
Anhang 1 - Übersicht zur Belegung der elektrischen Ein- und Ausgänge

Annex 1 - Overview for the electrical inputs and outputs









VCU-Ax : CH 1 At, analog output Pin 3; no extern control

VCU-Bx : CH 1 bA, analog output Pin 4; extern on and degas (config -> extern!)

CH 2 and CH 3 extern on only for Ptr

Example: extern control of bA:

take a Sub-D 15pin female, connect Pin 10 and 11

connect the normaly open relais to pin 9 and 12

set the JEVAmet®VCU to extern control (look at the manual)

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? ☐ yes ☐ no

What kind of oil / liquid was used?

Is the equipment free from potentially harmful substances?

☐ yes go to **5.** ☐ no go to **4.**

4. Process related Contamination of Article:

toxic	☐ yes	☐ no
corrosive	☐ yes	☐ no
microbiological*)	☐ yes	☐ no
explosive*)	☐ yes	☐ no
radioactive*)	☐ yes	☐ no
other harmful substances	☐ yes	☐ no

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

All subtances, 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:

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.

JEVATEC
Ideen in der Vakuumtechnik

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CE

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
Vacuum gauge controller

Type designation
JEVAmet® VCU

The products comply with the following European Council Directives:

- 2014/35/EU EU Low Voltage Directive, EU Office Journal, L 96/357 of 26-February-2014
- 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 in accordance with:
  - Commission Delegated Directive (EU) 2015/863 of 31-March-2015
  - Commission Delegated Directive (EU) 2018/740 of 1-March-2018
  - Commission Delegated Directive (EU) 2018/741 of 1-March-2018
- 2012/19/EU EU Directive WEEE, EU Office Journal L 197/38 of 24-July-2012

Applied harmonised, international/national standards and specifications:

- DIN EN 61010-1:2020-03 (VDE 0411-1:2020-03)
  Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements (IEC 61010-1:2010 + COR:2011 + A1:2016, modified + A1:2016/COR1:2019); German version EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019
- DIN EN 61326-1:2013-07 (VDE 0843-20-1:2013-07)
  Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements (IEC 61326-1:2012); German version EN 61326-1:2013

Jena 14-December 2021

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President
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