OPERATING INSTRUCTIONS

EN

Translation of the Original

QMG 800 HIQUAD® NEO

Quadrupole mass spectrometer system

PFEIFFER VACUUM

Dear Customer,

Thank you for choosing a Pfeiffer Vacuum product. Your new mass spectrometer system is designed to support you in your individual application with full performance and without malfunctions. The name Pfeiffer Vacuum represents high-quality vacuum technology, a comprehensive and complete range of top-quality products and first-class service. From this extensive, practical experience we have gained a large volume of information that can contribute to efficient deployment and to your personal safety.

In the knowledge that our product must avoid consuming work output, we trust that our product can offer you a solution that supports you in the effective and trouble-free implementation of your individual application.

Please read these operating instructions before putting your product into operation for the first time. If you have any questions or suggestions, please feel free to contact info@pfeiffer-vacuum.de.

Further operating instructions from Pfeiffer Vacuum can be found in the Download Center on our website.

Disclaimer of liability

These operating instructions describe all models and variants of your product. Note that your product may not be equipped with all features described in this document. Pfeiffer Vacuum constantly adapts its products to the latest state of the art without prior notice. Please take into account that online operating instructions can deviate from the printed operating instructions supplied with your product.

Furthermore, Pfeiffer Vacuum assumes no responsibility or liability for damage resulting from the use of the product that contradicts its proper use or is explicitly defined as foreseeable misuse.

Copyright

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1 About this manual

IMPORTANT
Read carefully before use.
Keep the manual for future consultation.

1.1 Validity

This document describes the function of the products listed in the following and provides the most important information for safe use. The description is written in accordance with the valid directives. The information in this document refers to the current development status of the products. The document retains its validity assuming that the customer does not make any changes to the product.

1.1.1 Applicable documents

Designation	Document
Operating instructions for QMH 800-x "high-frequency generator"	BG 6016
"Quadrupole mass spectrometer" QMG 800 communication instructions	BG 6017
Operating instructions for QMA 4x0 analyzer	BG 6018
PV MassSpec Software Documentation	A component of the software
Declaration of conformity	A component of these instructions

Tbl. 1: Applicable documents

You can find these documents in the Pfeiffer Vacuum Download Center.

1.1.2 Variants

This document applies to products with the following article numbers:

Article number	Designation
PT Q25 112 xxx	QMG 800 HiQuad Neo incl. SEM 217 and EP 822
PT Q25 121 xxx	
PT Q25 132 xxx	
PT Q25 312 xxx	
PT 168 011	Input/output module IO 820

Pfeiffer Vacuum reserves the right to make technical changes without prior notification.

The figures in this document are not to scale.

Dimensions are in mm unless stated otherwise.

1.2 Target group

These operating instructions are aimed at all persons performing the following activities on the product:

- Transportation
- Setup (Installation)
- Usage and operation
- Decommissioning
- Maintenance and cleaning
- Storage or disposal

The work described in this document is only permitted to be performed by persons with the appropriate technical qualifications (expert personnel) or who have received the relevant training from Pfeiffer Vacuum.

1.3 Conventions

1.3.1 Instructions in the text

Usage instructions in the document follow a general structure that is complete in itself. The required action is indicated by an individual step or multi-part action steps.

Individual action step

A horizontal, solid triangle indicates the only step in an action.

► This is an individual action step.

Sequence of multi-part action steps

The numerical list indicates an action with multiple necessary steps.

1. Step 1
2. Step 2
3. ...

1.3.2 Pictographs

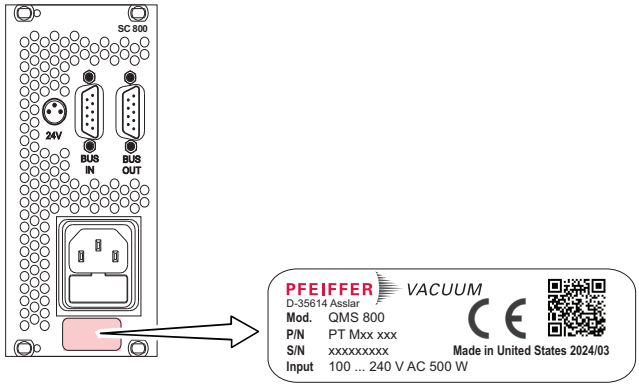
Pictographs used in the document indicate useful information.

Note

Tip

1.3.3 Labels on product

This section describes all the labels on the product along with their meanings.



Rating plate

Example for control unit QMS 800: The rating plates of the individual HiQuad Neo system components are to be found on the respective components.

1.3.4 Abbreviations

Abbreviation	Explanation
AC	Alternating current
AI	Analog input
AO	Analog output
API	Application programming interface
AUX	Auxiliary
CD	Conversion dynode (operating mode)
CTRL	Control
DC	Direct current
DI	Digital input
DIP	Dual in-line package

Abbreviation	Explanation
DO	Digital output
ECL	Emitter-coupled logic
ELM	Low-pass filter output
EMC	Electromagnetic compatibility
ESD	Electrostatic discharge
EP	Electrometer pre-amplifier
EXT	External
FA	Field axis
FB	Field bus
FIR	Finite impulse response
FS	Full scale
GND	Ground
HF	High frequency
HV	High voltage
IO, I/O	Input/Output
IS	Ion supply
MID	Multiple ion detection
MSL	Mean sea level
OPC-UA	Communications protocol (Open Platform Communications - Unified Architecture)
PZ	Pozidriv
QC	Quadrupole controller
QMA	Quadrupole mass spectrometer analyzer
QMH	Quadrupole mass spectrometer high-frequency generator
QMS	Quadrupole mass spectrometer control unit
SC	System chassis
SEM	Secondary electron multiplier
SEM	Secondary electron multiplier
HP	Horizontal pitch
TP	Total pressure
TTL	Transistor-transistor logic
USB	Universal Serial Bus

Tbl. 2: Abbreviations used

1.4 Trademark proof

- HiQuad® is a registered trademark of Pfeiffer Vacuum GmbH.

2 Safety

2.1 General safety information

The following 4 risk levels and 1 information level are taken into account in this document.

⚠ DANGER

Immediately pending danger

Indicates an immediately pending danger that will result in death or serious injury if not observed.

► Instructions to avoid the danger situation

⚠ WARNING

Potential pending danger

Indicates a pending danger that could result in death or serious injury if not observed.

► Instructions to avoid the danger situation

⚠ CAUTION

Potential pending danger

Indicates a pending danger that could result in minor injuries if not observed.

► Instructions to avoid the danger situation

NOTICE

Danger of damage to property

Is used to highlight actions that are not associated with personal injury.

► Instructions to avoid damage to property

Notes, tips or examples indicate important information about the product or about this document.

2.2 Safety instructions

Safety instructions according to product life stages

All safety instructions in this document are based on the results of a risk assessment. Pfeiffer Vacuum has taken into account all the relevant life stages of the product.

Risks during installation

⚠ DANGER

Danger to life caused by electric voltage on the analyzer

During operation, dangerous voltage is present on the electrode system of the QMA analyzer. Components in the vacuum system are dangerous to touch under certain conditions. There is danger to life due to electric voltage.

► Protect installed parts, connected units and lines against galvanic connections, flashover or charge carrier flow.
► Make sure that the QMA, vacuum chamber, and entire apparatus always have a proper connection to protective ground.
► Provide additional protection if the user can touch the analyzer when the vacuum system is open.
► Ensure mechanical protection against contact of the analyzer and the parts installed.
► Ensure compulsory separation of the current supply when opening the system (using a door contact, for example).

⚠ DANGER

Danger to life from electric shock

Inadequate or incorrect grounding of the unit leads to contact-sensitive voltage on the housing. When making contact, increased leakage currents will cause a life-threatening electric shock.

- ► Before the installation, check that the connection leads are voltage-free.
- ► Conduct the electrical connection in accordance with locally applicable regulations.
- ► Make sure that the local mains voltage and frequency match rating plate specifications.
- ► Make sure that the mains cable and extension cable meet the requirements for double isolation between input voltage and output voltage, in accordance with IEC 61010 and IEC 60950.
- ► Use only a 3-pin mains cable and extension cable with properly connected protective earthing (earthed conductor).
- ► Plug the mains plug into a socket with earthing contact only.
- ► Always connect the mains cable prior to all other cables, to ensure continuous protective earthing.

⚠ DANGER

Danger to life due to dangerous contact voltage

Voltages above 30 V (AC) or 60 V (DC) are considered dangerous in accordance with EN 61010. If you come into contact with dangerous contact voltage, this can result in injury through electric shocks or even death.

- ► Only connect the gauge to professionally grounded devices.
- ► Take additional safety measures on the system-side if processes in the vacuum system (e.g. flashovers) can result in dangerous voltages at the gauge connections.
- ► Secure the line to the gauge.

Risks during operation

⚠ DANGER

Danger to life from electric shock caused by moisture ingress

Water that has entered the unit will result in personal injury through electric shocks.

- ► Only operate the unit in a dry environment.
- ► Operate the unit away from fluids and sources of moisture.
- ► Do not switch on the unit if fluid has entered it. Instead contact Pfeiffer Vacuum Service.
- ► Always disconnect the power supply before cleaning the unit.

Risks during maintenance

⚠ DANGER

Danger to life due to electric voltage

High voltages exist inside the device. When touching parts that are live, there is a risk of death. If there is visible damage, there is a risk of fatal injury when commissioning the device.

- ► Always disconnect the unit before opening the power supply.
- ► Work on the open device must only be carried out by trained specialist personnel.
- ► Before carrying out any installation and maintenance work, switch the device off and disconnect it from the current supply.
  - – After switching off, wait for 60 seconds and then disconnect all cables (power cable last).
- ► Secure the current supply against unauthorized or unintentional reactivation.
- ► Do not insert any objects into the vent openings.
- ► Never open an external power supply pack.
- ► Never operate an open or defective device.
- ► Secure a defective device against accidental operation.
- ► Protect the device against moisture.

⚠ WARNING

Health hazards due to cleaning agent

The cleaning agent being used causes health hazards which could include, for example, poisoning, allergies, skin irritations, chemical burns or damage to the airways.

- ► When handling cleaning agents, observe the applicable regulations.
- ► Adhere to safety measures regarding handling and disposal of cleaning agents.
- ► Be aware of potential reactions with product materials.

⚠ WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ► Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ► Decontaminate affected parts before carrying out maintenance work.
- ► Wear protective equipment.

Risks when shipping

⚠ WARNING

Risk of poisoning from contaminated products

Where products that contain harmful substances are shipped for maintenance or repair purposes, the health and safety of service personnel is at risk.

- ► Comply with the notices for safe shipment.

Risks during disposal

⚠ WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ► Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ► Decontaminate affected parts before carrying out maintenance work.
- ► Wear protective equipment.

2.3 Safety precautions

The product is designed according to the latest technology and recognized safety engineering rules. Nevertheless, improper use can result in danger to operator all third party life and limb, and product damage and additional property damage.

Duty to provide information on potential dangers

The product holder or user is obliged to make all operating personnel aware of dangers posed by this product.

Every person who is involved in the installation, operation or maintenance of the product must read, understand and adhere to the safety-related parts of this document.

Infringement of conformity due to modifications to the product

The Declaration of Conformity from the manufacturer is no longer valid if the operator changes the original product or installs additional equipment.

- Following the installation into a system, the operator is required to check and re-evaluate the conformity of the overall system in the context of the relevant European Directives, before commissioning that system.

General safety precautions when handling the product

- ► Observe all applicable safety and accident prevention regulations.
- ► Check that all safety measures are observed at regular intervals.
- ► Pass on safety instructions to all other users.
- ► Do not expose body parts to the vacuum.
- ► Always ensure a secure connection to the earthed conductor (PE).
- ► Never disconnect plug connections during operation.
- ► Observe the above shutdown procedures.
- ► Keep lines and cables away from hot surfaces (> 70 °C).
- ► Do not carry out your own conversions or modifications on the device.
- ► Observe the unit protection degree prior to installation or operation in other environments.
- ► Provide suitable touch protection, if the surface temperature exceeds 70 °C.
- ► Inform yourself about any contamination before starting work.

2.4 Proper use

The QMG 800 HiQuad quadrupole mass spectrometer system is used for gas analysis in the high vacuum range. The IO 820 input/output module is a digital and analog input and output module for the QMS 800 control unit of the QMG 800 HiQuad Neo mass spectrometer.

Use the product according to its intended purpose

- ► Install, operate and maintain the product only in accordance with these operating instructions.
- ► Only switch on QMS 800 with the QMA cable properly connected.
- ► Comply with the limits of use.
- ► Observe the technical data.

2.5 Foreseeable improper use

Improper use of the product invalidates all warranty and liability claims. Any use that is counter to the purpose of the product, whether intentional or unintentional, is regarded as improper use; in particular:

- Use outside the limits of use in accordance with the technical data
- Use for measurements whose results determine the safety of persons or large values
- Use with corrosive or explosive media
- Use outdoors
- Use after technical changes (inside or outside on the product)
- Use with replacement or accessory parts that are not suitable or not approved

2.6 Responsibilities and warranty

Pfeiffer Vacuum shall assume no responsibilities and warranty if the operating company or a third party:

- disregards this document
- does not use the product for its intended purpose
- carries out any modifications to the product (conversions, changes, etc.) that are not listed in the corresponding product documentation
- operates the product with accessories that are not listed in the corresponding product documentation

The operator is responsible for the process media used.

2.7 Operator requirements

Safety-conscious work

1. Only operate the product in a technically flawless state.
2. Operate the product in line with its intended purpose, safety and hazard-conscious as well as when observing the operating instructions.
3. Fulfill the following guidelines and monitor their observation of the following guidelines:
   – Proper use
   – Generally applicable safety instructions and accident prevention regulations
   – International, national and locally applicable standards and guidelines
   – Additional product-related guidelines and regulations
4. Only use original parts or parts approved by Pfeiffer Vacuum.
5. Keep the operating instructions available at the place of installation.
6. Ensure personnel qualification.

2.8 Personnel qualification

The work described in this document may only be carried out by persons who have appropriate professional qualifications and the necessary experience or who have completed the necessary training as provided by Pfeiffer Vacuum.

Training people

1. Train the technical personnel on the product.
2. Only let personnel to be trained work with and on the product when under the supervision of trained personnel.
3. Only allow trained technical personnel to work with the product.
4. Before starting work, make sure that the commissioned personnel have read and understood these operating instructions and all applicable documents, in particular the safety, maintenance and repair information.

2.8.1 Ensuring personnel qualification

Specialist for mechanical work

Only a trained specialist may carry out mechanical work. Within the meaning of this document, specialists are people responsible for construction, mechanical installation, troubleshooting and maintenance of the product, and who have the following qualifications:

- Qualification in the mechanical field in accordance with nationally applicable regulations
- Knowledge of this documentation

Specialist for electrotechnical work

Only a trained electrician may carry out electrical engineering work. Within the meaning of this document, electricians are people responsible for electrical installation, commissioning, troubleshooting, and maintenance of the product, and who have the following qualifications:

- Qualification in the electrical engineering field in accordance with nationally applicable regulations
- Knowledge of this documentation

In addition, these individuals must be familiar with applicable safety regulations and laws, as well as the other standards, guidelines, and laws referred to in this documentation. The above individuals must have an explicitly granted operational authorization to commission, program, configure, mark, and earth devices, systems, and circuits in accordance with safety technology standards.

Trained individuals

Only adequately trained individuals may carry out all works in other transport, storage, operation and disposal fields. Such training must ensure that individuals are capable of carrying out the required activities and work steps safely and properly.

2.8.2 Personnel qualification for maintenance and repair

Advanced training courses

Pfeiffer Vacuum offers advanced training courses to maintenance levels 2 and 3.

Adequately trained individuals are:

- **Maintenance level 1**
  - Customer (trained specialist)
- **Maintenance level 2**
  - Customer with technical education
  - Pfeiffer Vacuum service technician
- **Maintenance level 3**
  - Customer with Pfeiffer Vacuum service training
  - Pfeiffer Vacuum service technician

2.8.3 Advanced training with Pfeiffer Vacuum

For optimal and trouble-free use of this product, Pfeiffer Vacuum offers a comprehensive range of courses and technical trainings.

For more information, please contact Pfeiffer Vacuum technical training.

2.9 Operator requirements

Observing relevant documents and data

1. Read, observe and follow this operating instruction and the work instructions prepared by the operating company, in particular the safety and warning instructions.
2. Install, operate and maintain the product only in accordance with these operating instructions.
3. Carry out all work only on the basis of the complete operating instructions and applicable documents.
4. Comply with the limits of use.
5. Observe the technical data.
6. Please contact the Pfeiffer Vacuum Service Center if your questions on operation or maintenance of the product are not answered in these operating instructions.
   - You can find information in the Pfeiffer Vacuum service area.

3 Product description

3.1 System design

The QMG 800 consists of the following components:

- Control unit QMS 800 with 4 plastic feet[1)]
- HF generator QMH 800-x
- Analyzer QMA 4x0
- Electrometer pre-amplifier EP 822

The following block diagram shows the basic QMG 800 system design and the designations of the individual modules. Numerous configurations are possible depending on the application.

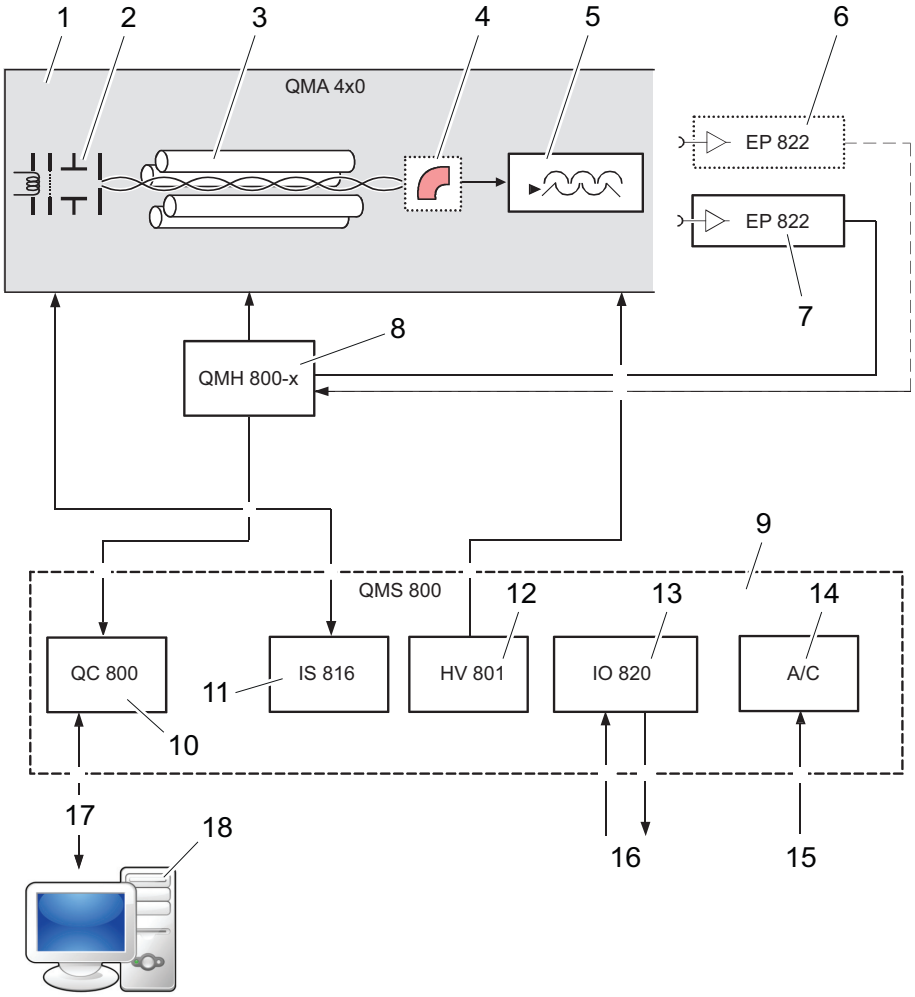


Fig. 1: Configuration example of QMG 800

1 Analyzer QMA 4x0
2 Ion source
3 Mass filter
4 90° deflection unit
5 SEM 217
6 Electrometer pre-amplifier EP 822 (2)
7 Electrometer pre-amplifier EP 822 (1)
8 HF generator QMH 800-x
9 Control unit QMS 800
10 Quadrupole controller board QC 800
11 Ion source supply IS 816
12 High voltage supply HV 801
13 Input/output module IO 820
14 Power supply pack
15 Mains connection (AC)
16 Analog and digital inputs and outputs
17 Connection to the PC (Ethernet)
18 PC

1) for use as a tabletop unit

3.2 Control unit QMS 800

Control unit QMS 800 consists of system chassis SC 800 and quadrupole controller board QC 800. Plug-in modules are mounted in the system chassis, depending on the configuration. QMS 800 does not have any manual control elements of its own.

Fig. 2: Control unit QMS 800

3.2.1 System chassis SC 800

System chassis SC 800 contains the power supply pack, the internal system bus and the unit ventilation. It provides plug-in positions for the QC 800, IS 816, HV 801 and IO 820 plug-in modules.

Fig. 3: System chassis SC 800

Fig. 4: Front and back panels of SC 800

1	Fan cover	4	Module plug-in positions
2	Mains unit plug	5	"Power" mains switch
3	Fuse holder	6	"DC" LED

3.2.2 Quadrupole controller board QC 800

Quadrupole controller board QC 800 contains:

- QMG 800 system controller and LAN/USB interfaces to the PC
- Control of the HF stage
- Measurement signal processing

Fig. 5: Quadrupole controller board QC 800

3.2.3 IS 816 ion source supply

The IS 816 ion source supply provides the ion source with the required operating voltage and has the following properties:

- Short-circuit proof, programmable potentials
- Reversible polarity for positive and negative ions
- Normal operation / degas operation
- Suitable for all ion source types of analyzer QMA 4x0

Fig. 6: Ion source supply IS 816

3.2.4 High voltage supply HV 801

The high voltage supply HV 801 supplies SEM 217 of analyzer QMA 4x0 with the required high voltage for detecting positive ions.

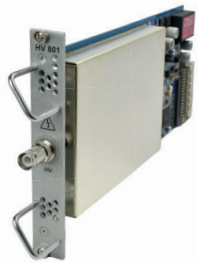


Fig. 7: High voltage supply HV 801

3.2.5 Input/output module IO 820

The IO 820 input/output module is a digital and analog input and output module for the QMS 800 controller. It provides programmable logic inputs and outputs and a connection option for an ActiveLine or DigiLine total pressure gauge.

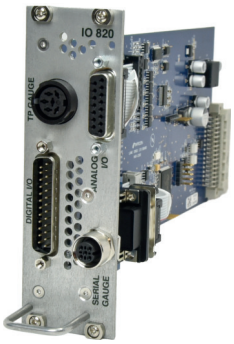


Fig. 8: Input/output module IO 820

1 Handle
2 <SERIAL GAUGE> connector for DigiLine total pressure gauge
3 <DIGITAL IO> connection
4 <ANALOG IO> connection
5 <TP GAUGE> connection for ActiveLine total pressure gauge
6 Front panel
7 Circuit board

3.3 HF generator QMH 800-x

The QMH 800-x HF generator generates the high-frequency voltage required for mass separation. QMH 800-x always refers to all types in the following, unless otherwise specified.

Fig. 9: HF generator QMH 800-x

3.4 Analyzer QMA 4x0

The analyzer QMA 4x0 consists of an ion source, mass filter, ion collector and housing. QMA 4x0 always refers to all types in the following, unless otherwise specified. As an ion collector, the QMA 4x0 analyzer has a SEM 217, 90° off-axis with an integrated Faraday collector

Fig. 10: Analyzer QMA 4x0

3.5 Electrometer pre-amplifier EP 822

The electrometer pre-amplifier EP 822 amplifies the very small ion current or electron current signals from analyzer QMA 4x0 to voltage levels suitable for further processing. The electrometer pre-amplifier EP 822 is mounted directly on QMA 4x0 analyzer to minimize applicative interference.

Properties of the electrometer pre-amplifier for EP 822

- Compact
- Minimum vibration sensitivity, low noise, low drift

- Simple mounting on analyzer QMA 4x0
- Rapid response and recovery in the case of overmodulation

Fig. 11: Electrometer pre-amplifier EP 822

3.6 Connections

3.6.1 ANALOG I/O connector to IO 820

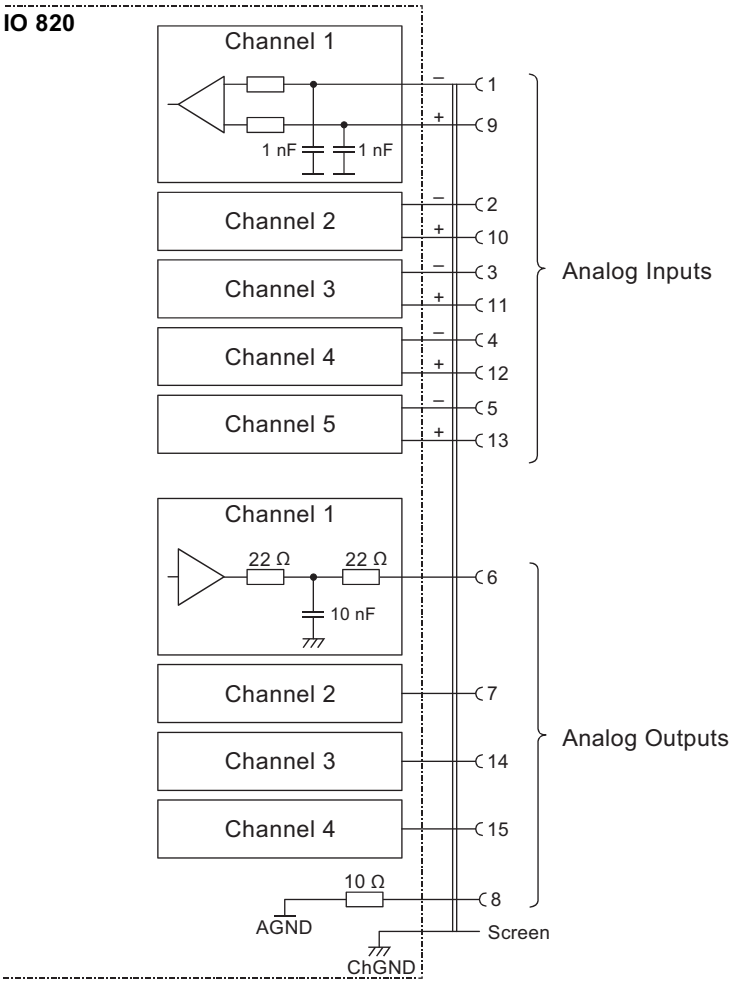


Fig. 12: ANALOG IO connection diagram

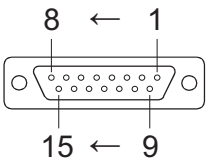


Fig. 13: ANALOG I/O pin assignment

1	Analog input, channel 1 (-)	9	Analog input, channel 1 (+)
2	Analog input, channel 2 (-)	10	Analog input, channel 2 (+)
3	Analog input, channel 3 (-)	11	Analog input, channel 3 (+)
4	Analog input, channel 4 (-)	12	Analog input, channel 4 (+)
5	Analog input, channel 5 (-)	13	Analog input, channel 5 (+)
6	Analog output, channel 1	14	Analog output, channel 3
7	Analog output, channel 2	15	Analog output, channel 4
8	Reference ground of the analog outputs		

3.6.2 DIGITAL I/O connector to IO 820

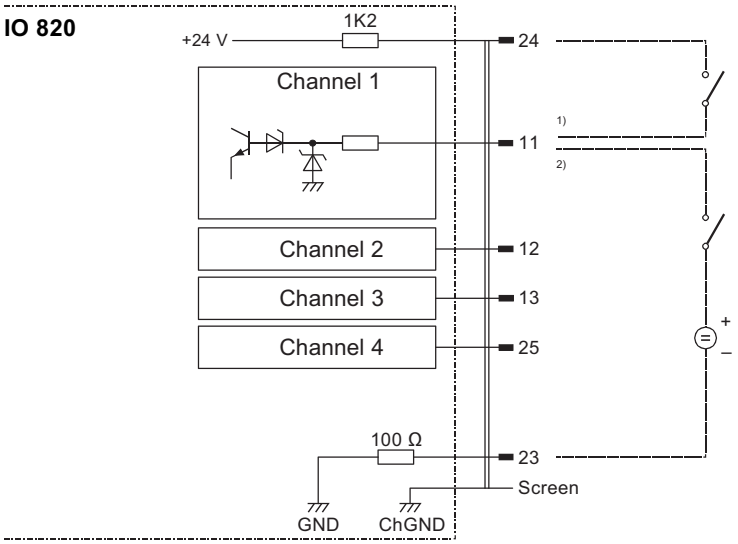


Fig. 14: Connection diagram for digital inputs

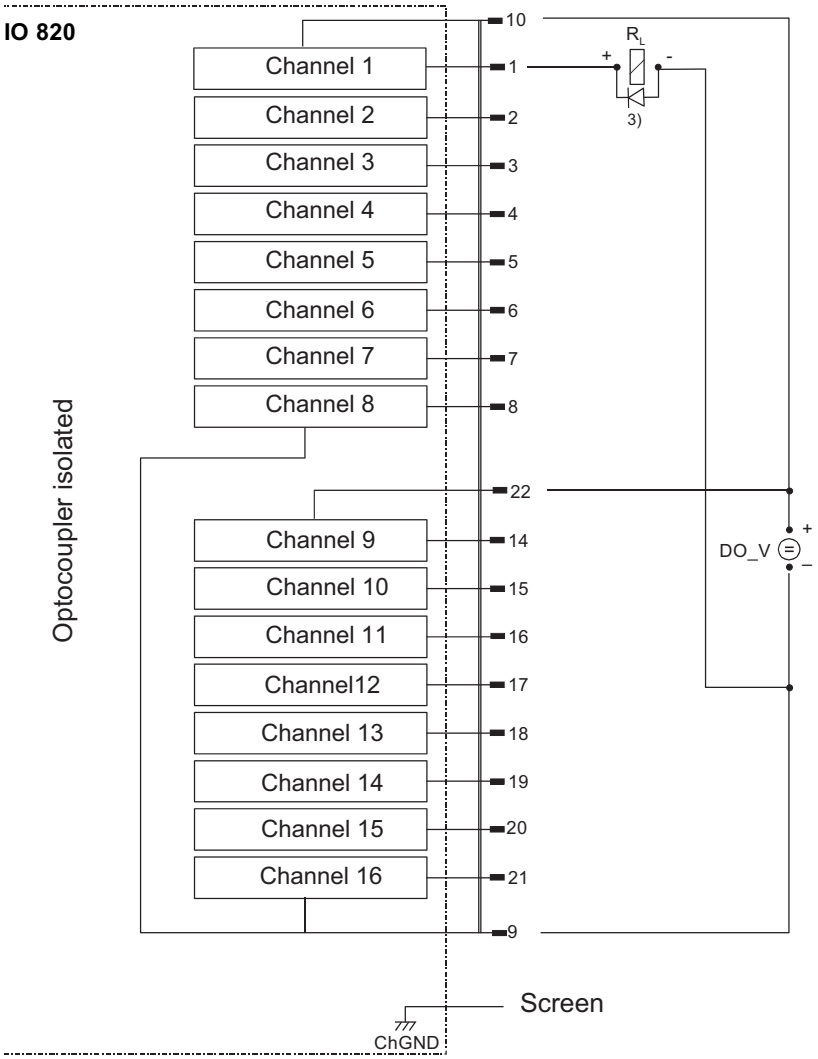


Fig. 15: Connection diagram for digital outputs

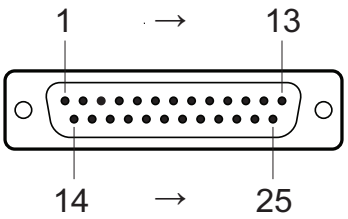


Fig. 16: DIGITAL I/O pin assignment

1	Digital output, channel 1 [2]
2	Digital output, channel 2
3	Digital output, channel 3
4	Digital output, channel 4
5	Digital output, channel 5
6	Digital output, channel 6
7	Digital output, channel 7
8	Digital output, channel 8
9	Ground for digital outputs 1 to 16 (DO_0V)
10	Power supply for digital outputs 1 to 8 (DO_V+, external)
11	Digital input, channel 1 [3][4]
12	Digital input, channel 2
13	Digital input, channel 3
14	Digital output, channel 9
15	Digital output, channel 10
16	Digital output, channel 11
17	Digital output, channel 12
18	Digital output, channel 13
19	Digital output, channel 14
20	Digital output, channel 15
21	Digital output, channel 16
22	Power supply for digital outputs 9 to 16 (DO_V+, external)
23	Reference ground of the logic inputs (0 V)
24	+24 V for digital input
25	Digital input, channel 4

3.6.3 Connectors for total pressure gauge on IO 820

Connecting gauges

The IO 820 has one connector each for an ActiveLine or DigiLine gauge. The DigiLine gauge takes priority when connected. Connecting multiple gauges is not possible.

Transmitter change

When it is switched on, I/O module IO 820 automatically recognizes the transmitter type.

- After replacing, switch off the power supply plug of control unit QMS 800 for 10 seconds and then switch it back on again.

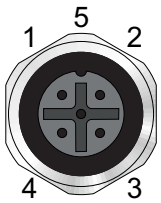


Fig. 17: Pin assignment SERIAL GAUGE for DigiLine gauge

1	RS-485 D+
2	+24 V DC
3	GND
4	RS-485 D-
5	not connected

2) The R_L load can e.g. be a relay, a solenoid valve or an indicator light.

3) Control of the input with potential-free contact

4) Control of the input with external voltage (e.g., PLC output)

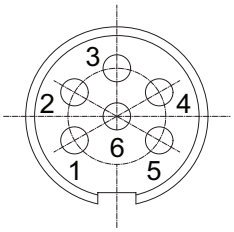


Fig. 18: Pin assignment TP GAUGE for ActiveLine gauge

1 Identification
2 Ground (GND)
3 Signal input (measurement signal 0 – +10 V DC)
4 Analog ground (measurement signal -)
5 Shielding
6 Supply voltage (+24 V DC)

3.6.4 Connections on QC 800

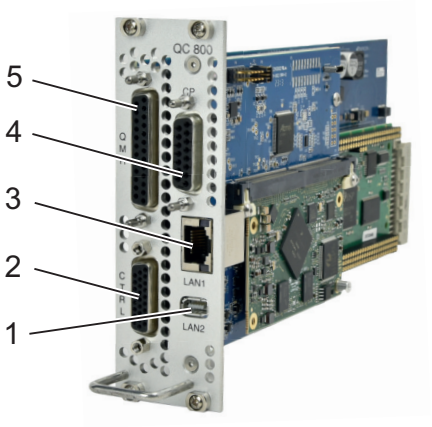


Fig. 19: Connections on QC 800

1 LAN connector 2 (RJ-45 socket, 8-pin)
2 CTRL connection (HD-D-Sub, 26-pin, pins)
3 LAN connector 1 (for internal use only)
4 CP connector (not used)
5 QMH connection (D-Sub, 25-pin, bushings)

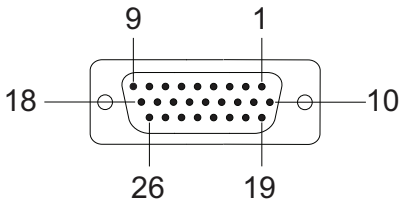


Fig. 20: CTRL pin assignment

Pin	Signal word	Signal type	Description
1	GND	GND	via 100 Ω to GND
10	GND	GND	
26	GND	GND	
2	RUN IN	TTL input	Input for external measuring cycle start, low correct, internal pull-up 5.6 kΩ to +5 V
14	SYNC IN	TTL input	Reserved for future applications, low correct, internal pull-up 5.6 kΩ to +5 V
15	IN 0	TTL input	Internal pull-up 5.6 kΩ to +5 V (can only be used if jumper J2 is plugged in)
3	IN 1	TTL input	Internal pull-up 5.6 kΩ to +5 V (can only be used if jumper J4 is plugged in)
16	IN 2	TTL input	Internal pull-up 5.6 kΩ to +5 V
23	OUT 0	TTL output	

Pin	Signal word	Signal type	Description
11	OUT 1	TTL output	
25	SYNC OUT+	TTL output	Positive edge marks the start of the measurement, trigger for oscilloscope
13	SYNC OUT-	GND	Reference signal for SYNC OUT+, via 200 Ω to GND
4	EXT IN 1+	Analog input	Connector for external measurement signal, differential, max. ±10 V, with low pass filter/amplifier
17	EXT IN 1-	Analog input	
5	EXT IN 2+	Analog input	Connector for external measurement signal, differential, max. ±10 V, optionally with or without low pass filter/amplifier
18	EXT IN 2-	Analog input	
6	ELM OUT+	Analog output	Low pass filter/amplifier output, ±10 V, max 0.1 mA, via 200 Ω
19	ELM OUT-	GND	Reference signal for ELM OUT+, via 200 Ω to GND
7	AO MON 0+	Analog output	Freely applicable output [5], ±10 V, 12-bit, max. 0.1 mA, via 200 Ω
20	AO MON 0-	GND	Reference signal for AO MON 0+, via 200 Ω to GND
8	AO MON 1+	Analog output	Freely applicable output [6], ±10 V, 12-bit, max. 0.1 mA, via 200 Ω
21	AO MON 1-	GND	Reference signal for AO MON 1+ via 200 Ω to GND
9	SCO+	Analog output	Mass number output, 0 to +10 V, 16-bit, max. 0.1 mA, via 200 Ω
22	SCO-	GND	Reference signal for SCO+, via 200 Ω to GND
12	EP OUT+	Analog output	Electrometer signal, max. 0.1 mA, via 200 Ω
24	EP OUT-	GND	Reference signal for EP OUT+, via 200 Ω to GND

Tbl. 3: CTRL pin assignment

Detector range (A)	Output voltage (V)
1×10^{-5}	8
1×10^{-6}	7
1×10^{-7}	6
1×10^{-8}	5
1×10^{-9}	4
1×10^{-10}	3
1×10^{-11}	2
1×10^{-12}	1
In the operating mode with ion counter, the output voltage is 0 V.	

Tbl. 4: Range code of the detector

Possible configurations of the intensity signal:

- Linear (±10 V/decade)
- Logarithmic (±10 V FS, 1–10 decades)

5) In monitor mode reserved for range code of the detector

6) In monitor mode reserved for intensity signal

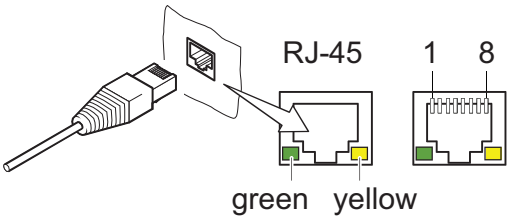


Fig. 21: LAN 2 pin assignment

1	Transmission data (TD+)	4, 5, 7, 8	Not used
2	Transmission data (TD-)	6	Reception data (RD-)
3	Reception data (RD+)		

3.6.5 Connections on IS 816

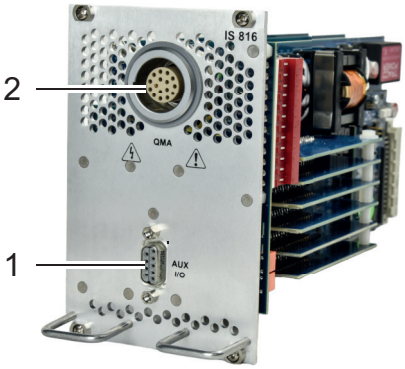


Fig. 22: Connections on IS 816

1 AUX I/O connection for filament protection

2 Connection for analyzer QMA

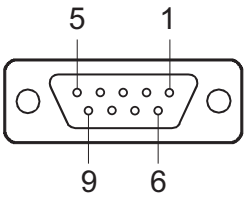


Fig. 23: AUX I/O pin assignment

Pin	Signal word	Signal type	Description
1	EXT PROT	24 V logic input	Filament protection input If Extern_Protection is enabled, use a potential-free contact to GND (internal pull-up resistor 5.6 kΩ to +24 V) to hold the pin, otherwise the emission will be switched off.
2	GND	GND	
3	DI RES 1	TTL input	Reserved for future applications.
4	DI RES 3	TTL input	
5	DO RES 1	TTL output	
6	DO RES 2	TTL output	
7	DO RES 3	TTL output	
8	DO RES 4	TTL output	
9	n.c.	-	

Tbl. 5: AUX I/O pin assignment

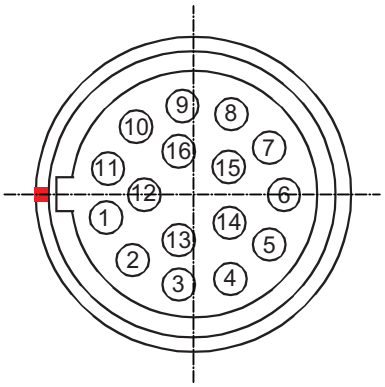


Fig. 24: QMA pin assignment

1	QMA GND	9	Filament Common
2	SPEC SRC RET [7]	10	V4, field axis
3	V6, inner deflection	11	V0, Ref GND
4	V3, focus	12	Screen
5	V9, Wehnelt	13	V8, reserve
6	V5, extraction	14	V1, Ion Ref
7	Filament +	15	SPEC SRC ON [8]
8	Filament - / cathode	16	V7, outer deflection

QMA connection (potentials)

QMA cable
Only switch on QMS 800 with the QMA cable properly connected.

External voltage source
You must reliably limit the external voltage source for V0 to ≤2 mA.

- V1 related to V0
- V2 to V8 related to V1
- V9 related to V2

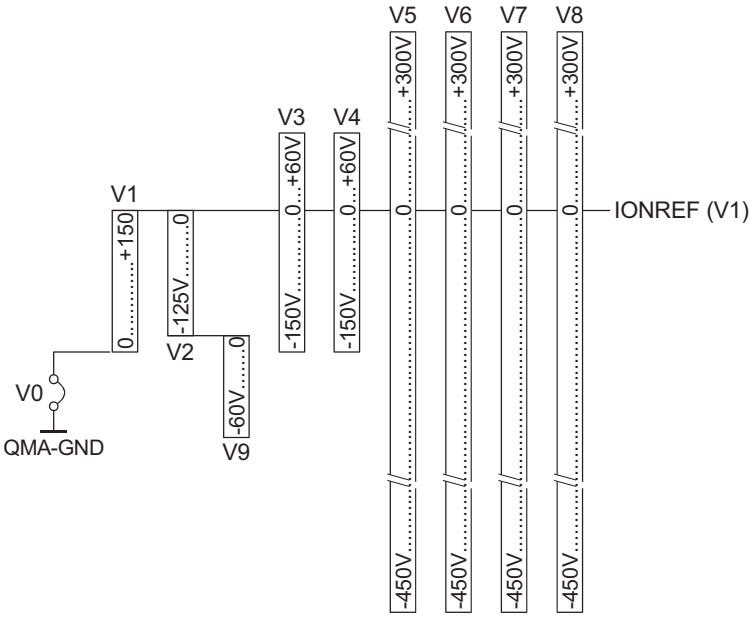


Fig. 25: Ion potentials at max. pos. IONREF (+150 V), positive polarity

7) Reference signal for SPEC SRC ON

8) +24 V if activated, max. 200 mA

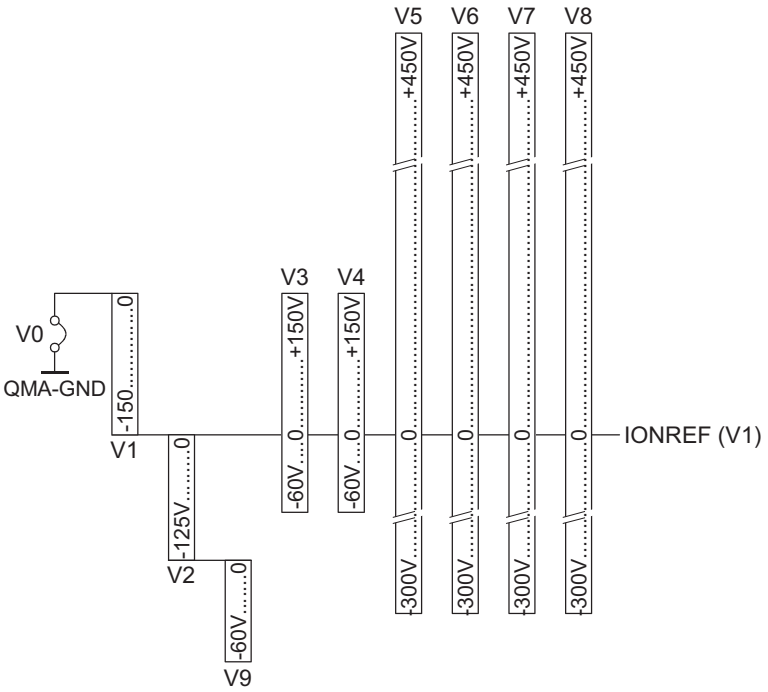


Fig. 26: Ion potentials at max. neg. IONREF (-150 V), negative polarity

Electrode designation		Domain, range	Rated current	Resolution	Offset	Gain error	Potential for degas [9]
V0		[10]					
V1	IONREF	-150 – +150 V	± 2.5 mA	20 mV	±120 mV	1.6%	+550 V
V2	CATH	0 – -125 V	-10 mA	10 mV	±60 mV	1.6%	+7 V
V3	FOCUS		± 3 mA	20 mV	±120 mV	1.6%	0 V
V4	F-AXIS		± 3 mA	20 mV	±120 mV	1.6%	0 V
V5	EXTRACT		±100 µA	58.82 mV	±240 mV	1.6%	0 V
V6	DEF-I	[11]	±100 µA	58.82 mV	±240 mV	1.6%	0 V
V7	DEF-O	[12]	±100 µA	58.82 mV	±240 mV	1.6%	0 V
V8	RES		±100 µA	58.82 mV	±240 mV	1.6%	0 V
V9	WEHNELT	0 – -60 V	-500 µA	3.92 mV	±30 mV	1.6%	0 V

Tbl. 6: Electrodes

9) Related to V0

10) Normally, V0 in the analyzer is connected to QMA GND (system GND). For special applications you may set V0 to max ±200 V to QMA GND.

11) In Faraday operating mode, V6 and V7 are connected to QMA GND.

12) In Faraday operating mode, V6 and V7 are connected to QMA GND.

3.6.6 Connections on HV 801

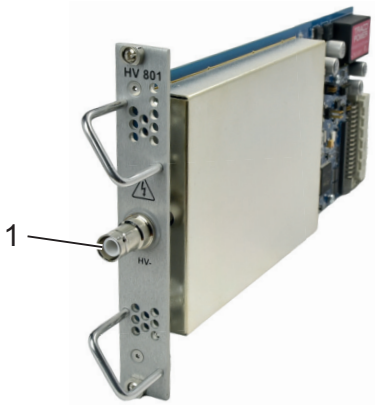


Fig. 27: Connections on HV 801

1 High voltage connection HV-

3.6.7 Connections on EP 822

Using EP 422
You can use an EP 422 with a slide-locking plug. Contact Pfeiffer Vacuum Service.

Fig. 28: Connections on EP 822

1 Connection for analyzer QMA

2 Connection cable to HF generator QMH (permanently mounted)

3.7 System wiring

The system wiring is dependent on the operating mode.

3.7.1 Basic wiring for Faraday operating mode

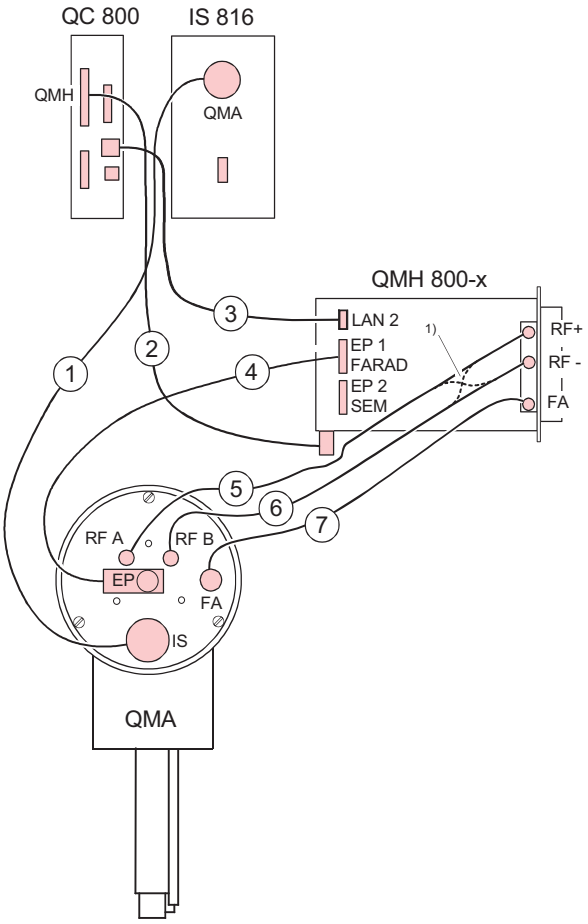


Fig. 29: Basic wiring for Faraday operating mode

Position	Cable	Length (m)	Order number
1	Connection IS 816 – QMA 4x0	1.5 3 10	PT 168 511 -T PT 168 512 -T PT 168 513 -T
2	Connection QC 800 – QMH 800-x	1.5 3 10	PT 168 521 -T PT 168 522 -T PT 168 523 -T
3	LAN 2 connection QC 800 – QMH 800-x	1.5 3 10	PT 168 541 -T PT 168 542 -T PT 168 543 -T
4	Connection EP 822 (1) – QMH 800-x	0.85	- (mounted on EP 822)
5 [13]	HF connection QMH 800-x – QMA 4x0	0.7	PT 168 560 -T
6 [14]			
7	FA connection QMH 800-x – QMA 4x0	0.7	BG541962 -T

Tbl. 7: Basic wiring for Faraday operating mode

13) Cross cables 5 and 6 if required according to the test report.

14) Cross cables 5 and 6 if required according to the test report.

3.7.2 Cabling for 90° SEM operating mode

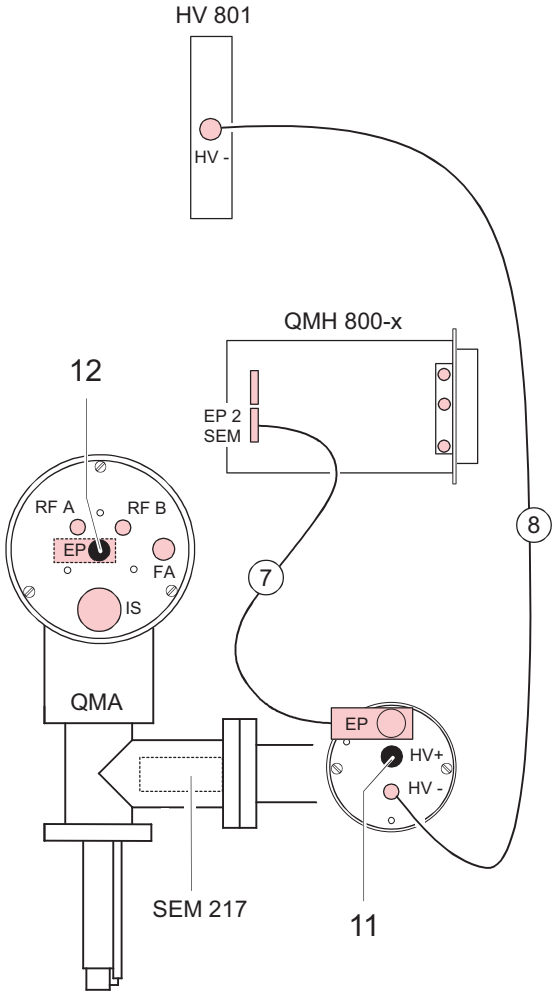


Fig. 30: Cabling for 90° SEM operating mode

Position	Cable / jump plug	Length (m)	Order number
7	Connection EP 822 (2) – QMH 800-x	0.85	- (mounted on EP 822)
8	HV connection HV 801 – QMA 4x0 (HV–)	1.5 3 10	PT 168 521 -T PT 168 522 -T PT 168 523 -T
11	HV jump plug (SHV type)	-	
12	EP jump plug (TNC type)	-	

Tbl. 8: Cabling for 90° SEM operating mode

3.8 Identifying the product

You will need all the data from the rating plate to safely identify the product when communicating with Pfeiffer Vacuum.

► To ensure clear identification of the product when communicating with Pfeiffer Vacuum, always keep all of the information on the rating plate to hand.

3.9 Scope of delivery

- QMG 800 HiQuad (individual components, dependent on configuration)
- Operating instructions

Unpacking and checking product

1. Unpack the product.
2. Remove the transport fasteners, transport protection etc.
3. Store the transport fasteners, transport protection etc. in a safe place.
4. Ensure that no parts are damaged.

4 Transport and storage

4.1 Transporting product

NOTICE

Damage caused by incorrect transport

Transport in unsuitable packaging or failure to install all transport locks can result in damage to the product.

► Comply with the instructions for safe transport.

Packing

We recommend keeping the transport packaging and original protective cover.

Safe transport of the product

- ► Observe the weight specified on the transport packaging.
- ► Where possible, always transport or ship the product in the original transport packaging.
- ► Always use dense and impact-proof transport packaging for the product.
- ► Remove the existing protective cap and transport protections only immediately prior to installation.
- ► Reattach transport locks and transport protections prior to each transport.

4.2 Storing product

NOTICE

Damage caused by improper storage

Improper storage will lead to damage to the product.

Static charging, moisture, etc. will lead to defects on the electronic components.

► Comply with the instructions for safe storage.

Packing

We recommend storing the product in its original packaging.

Safe storage of the product

- ► Store the product in a cool, dry, dust-free place, where it is protected against impacts and mechanical vibration.
- ► Always use dense and impact-proof packaging for the product.
- ► Where possible, store the product in its original packaging.
- ► Store electronic components in antistatic packaging.
- ► Maintain the permissible storage temperature.
- ► Avoid extreme fluctuations of the ambient temperature.
- ► Avoid high air humidity.
- ► Seal connections with the original protective caps.
- ► Protect the product with the original transport protection (where available).

5 Installation

⚠ DANGER

Danger to life due to electric voltage

High voltages exist inside the device. When touching parts that are live, there is a risk of death. If there is visible damage, there is a risk of fatal injury when commissioning the device.

- ► Always disconnect the unit before opening the power supply.
- ► Work on the open device must only be carried out by trained specialist personnel.
- ► Before carrying out any installation and maintenance work, switch the device off and disconnect it from the current supply.
  - – After switching off, wait for 60 seconds and then disconnect all cables (power cable last).
- ► Secure the current supply against unauthorized or unintentional reactivation.
- ► Do not insert any objects into the vent openings.
- ► Never open an external power supply pack.
- ► Never operate an open or defective device.
- ► Secure a defective device against accidental operation.
- ► Protect the device against moisture.

⚠ DANGER

Danger to life from electric shock

Inadequate or incorrect grounding of the unit leads to contact-sensitive voltage on the housing. When making contact, increased leakage currents will cause a life-threatening electric shock.

- ► Before the installation, check that the connection leads are voltage-free.
- ► Conduct the electrical connection in accordance with locally applicable regulations.
- ► Make sure that the local mains voltage and frequency match rating plate specifications.
- ► Make sure that the mains cable and extension cable meet the requirements for double isolation between input voltage and output voltage, in accordance with IEC 61010 and IEC 60950.
- ► Use only a 3-pin mains cable and extension cable with properly connected protective earthing (earthed conductor).
- ► Plug the mains plug into a socket with earthing contact only.
- ► Always connect the mains cable prior to all other cables, to ensure continuous protective earthing.

NOTICE

Impairment from contamination and damage

Touching the devices or components with bare hands increases the desorption rate and leads to incorrect measurements. Dirt (e.g. dust, fingerprints, etc.) and damage impair the function.

- ► During assembly and maintenance work on high or ultra high vacuum systems, always wear clean, lint-free and powder-free laboratory gloves.
- ► Only use clean tools.
- ► Make sure that the connection flanges are free of grease.
- ► Remove protective caps and protective covers from flanges and connections only when necessary.
- ► Remove the analyzer's transport protection only when necessary.
- ► Carry out all work in a well lit area.

5.1 Installing QMG 800 overall system

⚠ DANGER

Danger to life caused by electric voltage on the analyzer

During operation, dangerous voltage is present on the electrode system of the QMA analyzer. Components in the vacuum system are dangerous to touch under certain conditions. There is danger to life due to electric voltage.

- ► Protect installed parts, connected units and lines against galvanic connections, flashover or charge carrier flow.
- ► Make sure that the QMA, vacuum chamber, and entire apparatus always have a proper connection to protective ground.
- ► Provide additional protection if the user can touch the analyzer when the vacuum system is open.
- ► Ensure mechanical protection against contact of the analyzer and the parts installed.
- ► Ensure compulsory separation of the current supply when opening the system (using a door contact, for example).

NOTICE

Damage to the analyzer caused by external voltages and magnetic fields

Never expose the analyzer electrode system to external voltages that are hazardous in the event of contact, as a result of galvanic connections, contact, flashover, plasma, ion or electron beams, etc. If such danger sources exist in the vacuum chamber, you must provide protective measures that safely rule out such influences. Even smaller external voltages acting on the analyzer will lead to damage to the electronics and unreliable measuring results.

- ► Meet appropriate protective measures against external voltages (for example, better arrangement, shielding, earthing, etc.).
- ► Do not mount the analyzer near to magnetic fields with > 0.2 mT.
- ► Ensure mechanical protection against contact of the analyzer and the parts installed.
- ► Ensure compulsory separation of the current supply when opening the system (using a door contact, for example).
- ► Observe the standards applicable for the vacuum system.

Prerequisite

- Mains switch of QMS 800 set to OFF

Installing overall system

1. Mount peripheral assembly groups such as analyzer, HF stage, etc. according to the specifications in the respective operating instructions.
2. Ground all equipment involved to a single point according to the regulations.
   – The only exception is the connected PC.
3. It is best to use a single mains distributor.

5.2 Installing system chassis

NOTICE

Damage caused by overheating

The ambient temperature must not exceed the permissible operating temperature of the unit.

- ► Make sure there is unobstructed air circulation when installing the unit.
- ► Periodically check and clean installed air filters where applicable.

NOTICE

Loss of control cabinet protection degree

As a built-in unit, the device can negate the required protection degree (protection against foreign matter and water) of control cabinets according to IEC 60204-1, for example.

- ► Take suitable measures to reestablish the required protection degree.

5.2.1 Installing system chassis as 19" rack module

Procedure

1. Push the unit into the control cabinet according to DIN 41 494.
2. Fasten the unit using the corresponding screws.
3. Always tighten all screws and strain reliefs to ensure reliable contact making and prevent plugs from falling out.

5.2.2 Installing system chassis as tabletop unit

Required tools

- Screwdriver

Required material

- 4 plastic feet

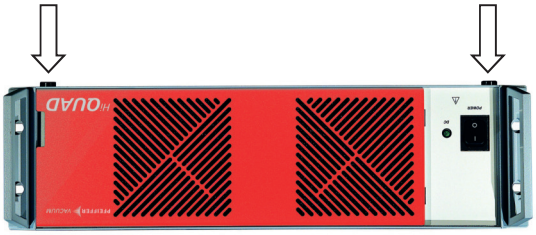


Fig. 31: Insert plastic feet in the bores

Fig. 32: Press in locking pins

Procedure

1. Turn over the unit.
2. Insert the plastic feet into the bores provided in the bottom plate.
3. Push the protruding locking pins in the plastic feet all the way in using a screwdriver handle part.
4. Turn over the unit again.

5.3 Installing or replacing plug-in modules in system chassis

NOTICE

Damage to unit from electrostatic discharge

Electrostatic discharge damages electronic components. Defects resulting from failure to comply with this warning shall result in loss of any warranty claim entitlement.

- ► Carry out all work on ESD-protected workstations only, in compliance with the appropriate working methods.
- ► When the unit is open, take suitable precautions against electrostatic charges.
- ► Always store electronic units and components in anti-static packaging.
- ► Observe EN 61340, Parts 5-1 and 5-2 – Protection of electronic devices from electrostatic phenomena.

Required tools

- Screwdriver "PZ" type, size 1

Required material

- Dummy plates (4TE, 8TE), depending on configuration

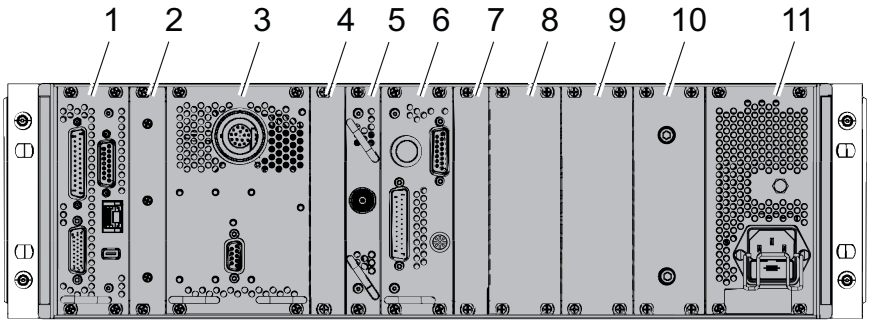


Fig. 33: Standard positions of the plug-in modules in the chassis

1	QC 800	5	HV 801
2, 4, 7, 8, 9, 10	Dummy plate	6	IO 820
3	IS 816	11	SC 800

Procedure

- ► Seal empty plug-in positions with appropriate dummy plates to ensure safety and ventilation.
- ► Firmly tighten all fixing screws for a good hold and good contact making.

5.4 Installing electrometer pre-amplifier EP 822 on analyzer

Signal stability of EP 822

Keep EP 822 away from vibrations, temperature fluctuations, high temperature, moisture and strong alternating magnetic fields for best signal stability.

Procedure

1. Attach EP 822 to the corresponding plug on the QMA.
2. Position EP 822 so that it does not touch surrounding plugs.
3. Tighten the knurled nuts.
4. Connect the control cable to plug EP1 (Faraday) or EP2 (SEM) on QMH 800-x.
5. Lock the plug.

5.5 Installing HF generator QMH 800-x

You will find information on installing the QMH 800-x HF generator in the operating instructions for the QMH 800-x.

5.6 Installing analyzer QMA 4x0

You can find information on how to install and mount analyzer QMA 4x0 in the corresponding operating instructions for QMA 4x0.

5.7 Connecting IO 820 input/output module

⚠ DANGER

Danger to life due to dangerous contact voltage

Voltages above 30 V (AC) or 60 V (DC) are considered dangerous in accordance with EN 61010. If you come into contact with dangerous contact voltage, this can result in injury through electric shocks or even death.

- ► Only connect the gauge to professionally grounded devices.
- ► Take additional safety measures on the system-side if processes in the vacuum system (e.g. flashovers) can result in dangerous voltages at the gauge connections.
- ► Secure the line to the gauge.

NOTICE

Damage to unit from electrostatic discharge

Electrostatic discharge damages electronic components. Defects resulting from failure to comply with this warning shall result in loss of any warranty claim entitlement.

- ► Carry out all work on ESD-protected workstations only, in compliance with the appropriate working methods.
- ► When the unit is open, take suitable precautions against electrostatic charges.
- ► Always store electronic units and components in anti-static packaging.
- ► Observe EN 61340, Parts 5-1 and 5-2 – Protection of electronic devices from electrostatic phenomena.

Pfeiffer Vacuum installs options ex factory if you have ordered them with the overall system. Subsequent installation is possible.

5.7.1 Making cable for ANALOG I/O connection

Cable type

The number of wires depends on the functions used.

Screened cable

Use a screened cable (EMC, external disruptive influences). Connect the screening with the connector housing. Leave the screening open on at the other end or ground it to prevent damaging equalizing currents from occurring.

Recommendation: For the (+) and (-) of the analog inputs, use twisted wire pairs.

Procedure

1. Open the D-Sub socket.
2. Prepare the cable ends and solder or crimp them into the cable socket in accordance with the connection diagram.
3. Install the cable socket.
4. Prepare the other cable end as appropriate for the application and assemble it.
5. Insert the cable socket on the I/O module and secure the socket with the appropriate screws.

5.7.2 Making cable for DIGITAL I/O connection

Cable type

The number of wires depends on the functions used.

Screened cable

Use a screened cable (EMC, external disruptive influences). Connect the screening with the connector housing. Leave the screening open on at the other end or ground it to prevent damaging equalizing currents from occurring.

Procedure

1. Open the D-Sub socket.
2. Prepare the cable ends and solder or crimp them into the cable socket in accordance with the connection diagram.
3. Install the cable socket.
4. Prepare the other cable end as appropriate for the application and assemble it.
5. Insert the cable socket on the I/O module and secure the socket with the appropriate screws.

6 Commissioning

⚠ DANGER

Danger to life due to electric voltage

High voltages exist inside the device. When touching parts that are live, there is a risk of death. If there is visible damage, there is a risk of fatal injury when commissioning the device.

- ► Always disconnect the unit before opening the power supply.
- ► Work on the open device must only be carried out by trained specialist personnel.
- ► Before carrying out any installation and maintenance work, switch the device off and disconnect it from the current supply.
  - – After switching off, wait for 60 seconds and then disconnect all cables (power cable last).
- ► Secure the current supply against unauthorized or unintentional reactivation.
- ► Do not insert any objects into the vent openings.
- ► Never open an external power supply pack.
- ► Never operate an open or defective device.
- ► Secure a defective device against accidental operation.
- ► Protect the device against moisture.

QMA cable

Only switch on QMS 800 with the QMA cable properly connected.

Factory setting

Pfeiffer Vacuum configures complete systems optimally at the factory. Therefore, do not change anything without good reason.

Data transmission

If the yellow LED of the Ethernet connection remains dark, a problem has occurred during data transmission. Check the cable and components in the connection path, as well as the correct PC configuration (software, firewall status etc.).

6.1 Installing PV MassSpec

Access credentials

Scan the QR code or click here and download latest version of PV MassSpec software. Password: PrismaPro.

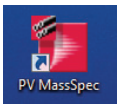


Fig. 34: Desktop shortcut

Procedure

1. Open the directory in the Pfeiffer Vacuum Cloud.
2. Download the software.
3. Start the software installation by double-clicking " PVMassSpec_Installer.exe".
4. If necessary, acknowledge the User Account Control prompt with "Yes".
5. Follow the installation in the wizard.
6. Accept the license with "Yes".

7. Enter your name and company name in the Customer Information window.
8. Confirm your entries with "Next".
   – The software performs and completes the installation, and stores the program data on the C drive in the newly created "Pfeiffer Vacuum" folder.

Following successful installation, a link PV MassSpec is created on the desktop.

6.2 Switching on system

Prerequisites

- Mains switch of QMS 800 set to OFF
- All system components installed according to operating instructions
- Vacuum conditions and system conditions tested and fulfilled
- Wiring of system components established according to operating instructions
- LAN connection to the PC (directly or via a network) established
- Mains connection of QMS 800 established
- PC ready for operation and prepared according to software documentation
- Limits of use complied with
- Relevant operating instructions of other system components observed

Procedure

1. Set the mains switch on the front panel of QMS 800 to ON (I).
   – "DC" LED lights up and QMS 800 is ready for operation.
2. Switch on the PC.
3. Carry out the further steps of commissioning in PV MassSpec.

6.3 Commissioning system with PV MassSpec

Prerequisites

- LAN connection to the PC (directly or via a network) established with a static IP address
- Ethernet connection established between PC and QMS 800
- PV MassSpec software installed
- PC ready for operation and prepared according to software documentation

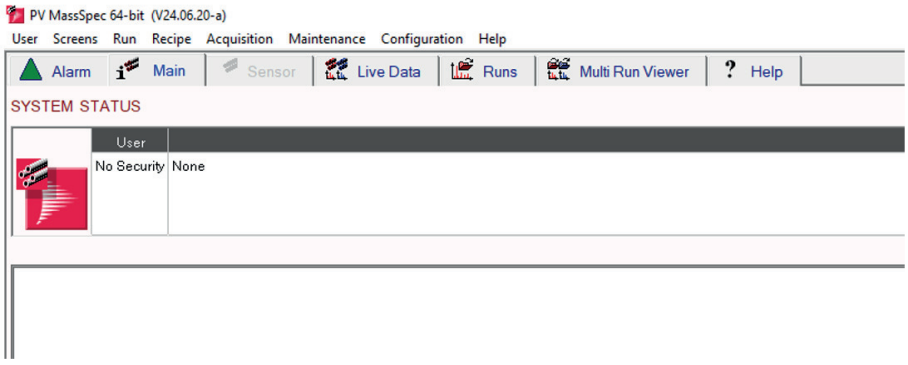


Fig. 35: Starting PV MassSpec software

Starting PV MassSpec software

► Start the PV MassSpec software.
   – Flickering of the yellow LED at the Ethernet connection of QC 800 indicates that data exchange is in progress.
   – After starting PV MassSpec for the first time, a QMG 800 is not displayed as yet.

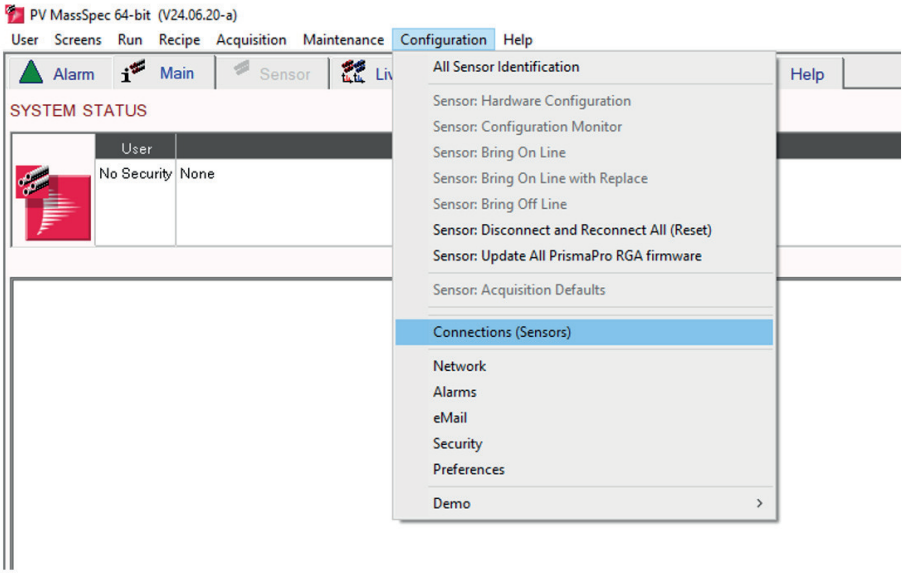


Fig. 36: Adding QMG 800 via Hardware Configuration

Adding QMG 800 via Hardware Configuration

► Click on "Configuration" and "Connections (Sensors)".

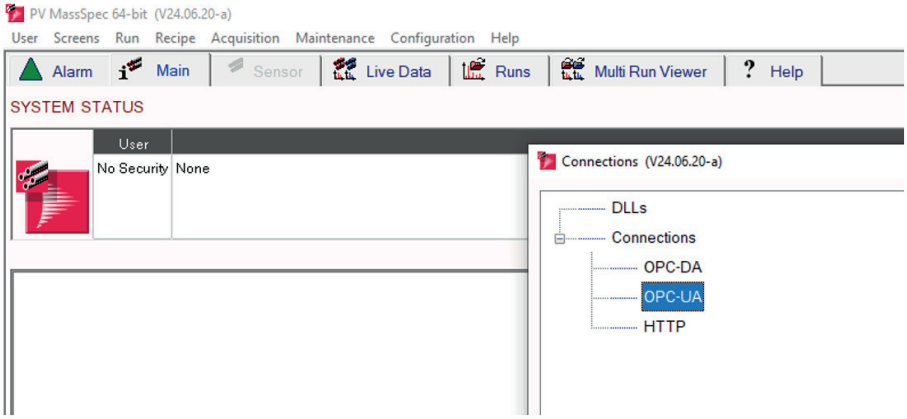


Fig. 37: Adding QMG 800 via OPC

Adding QMG 800 via OPC

1. In Connections, select "OPC-UA".
2. Click on "Edit".
3. Confirm the "Continue?" prompt in the pop-up by pressing "Yes".

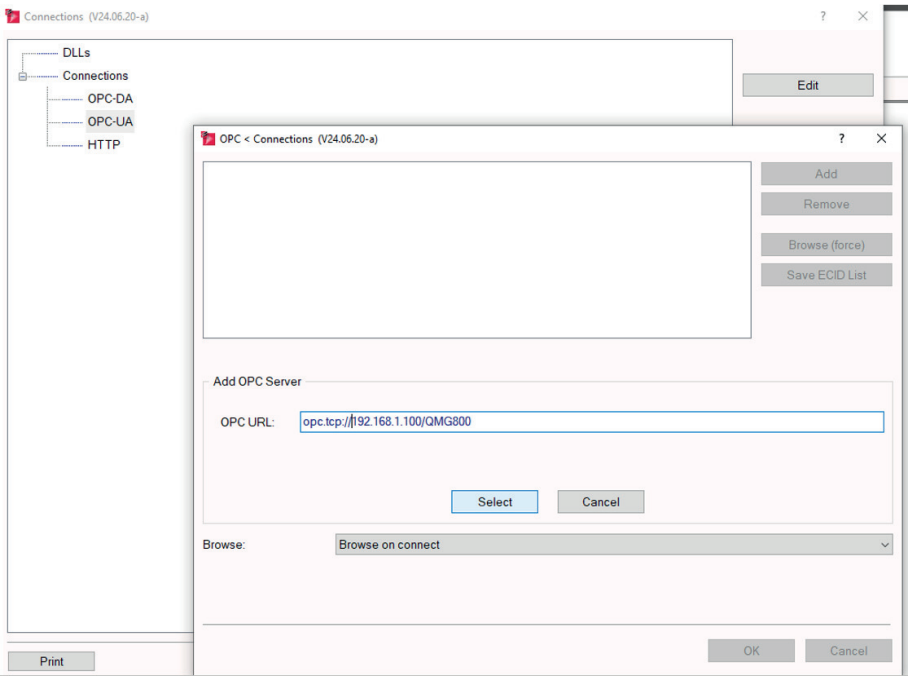


Fig. 38: Entering IP address

Entering IP address

1. Click "Add" in the "OPC - Connections" window.
2. Type the device's IP address for "Add OPC Server".
   - Input template: **opc.tcp://<IP address>/QMG800**
   - Ex factory: **192.168.1.100**
3. Click "Select".

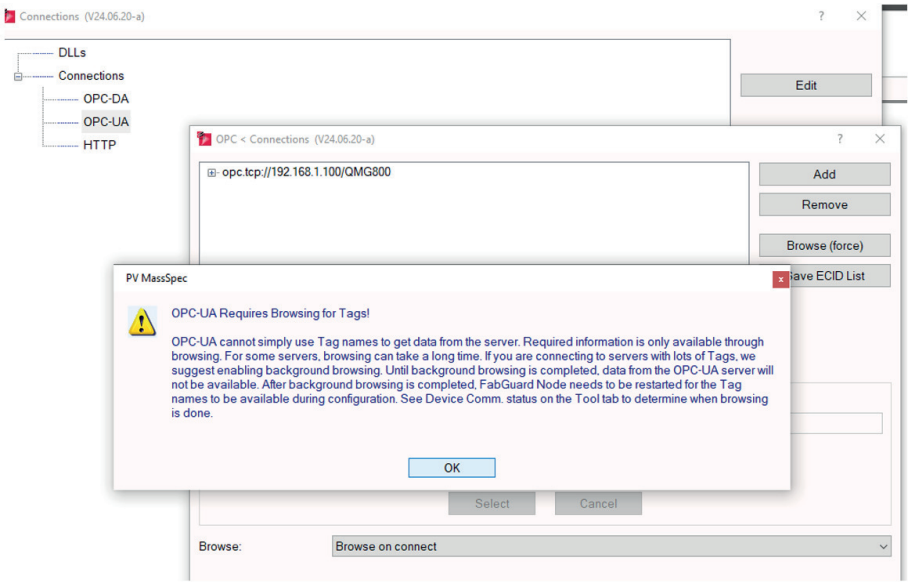


Fig. 39: Confirming IP address

Confirming IP address

1. Press "OK" to confirm your IP address entry.
2. Press "OK" to confirm the "OPC-UA Requires Browsing for Tags" pop-up prompt.

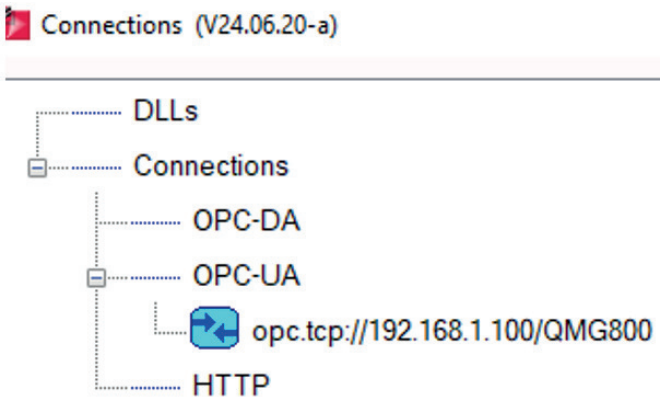


Fig. 40: Completing commissioning

Completing commissioning

1. Click "Close".
   – A light-blue symbol shows the active, valid connection.

PV MassSpec returns to the main screen with the connected QMG 800.

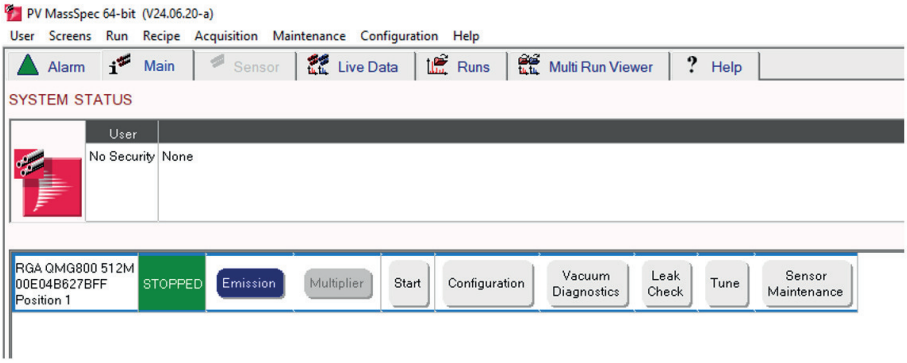


Fig. 41: Main screen with connected QMG 800

6.4 Using PV MassSpec search tool

You can use the program to view or modify important device data of the QMG 800.

Prerequisites

- LAN connection to the PC (directly or via a network) established with a static IP address
- Ethernet connection established between PC and QMS 800
- PV MassSpec software installed
- PC ready for operation and prepared according to software documentation

Launching PV MassSpec search tool software

► Launch the PV MassSpec search tool software (Windows-Taste -> Pfeiffer Vacuum -> PV Mass Spec Search).
   – The program automatically searches for all Pfeiffer Vacuum mass spectrometers.

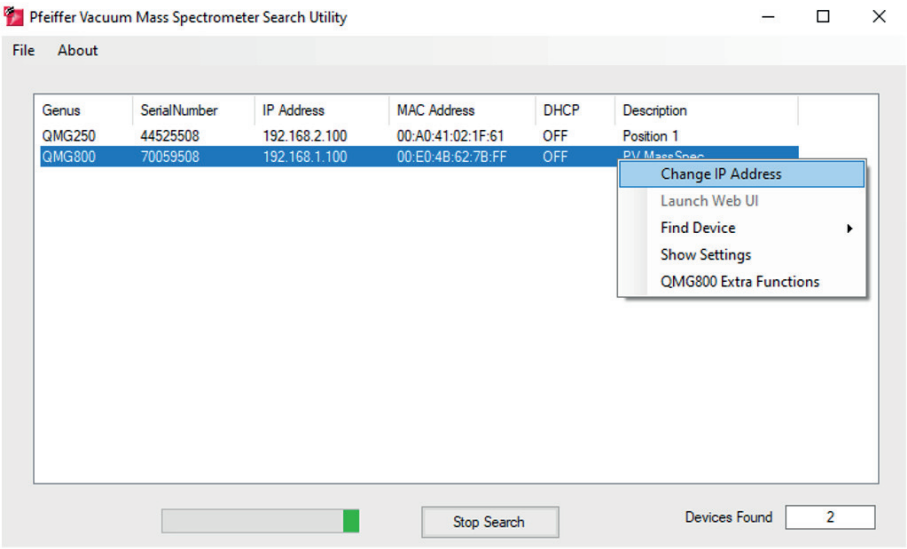


Fig. 42: Changing IP address of device with PV MassSpec search tool

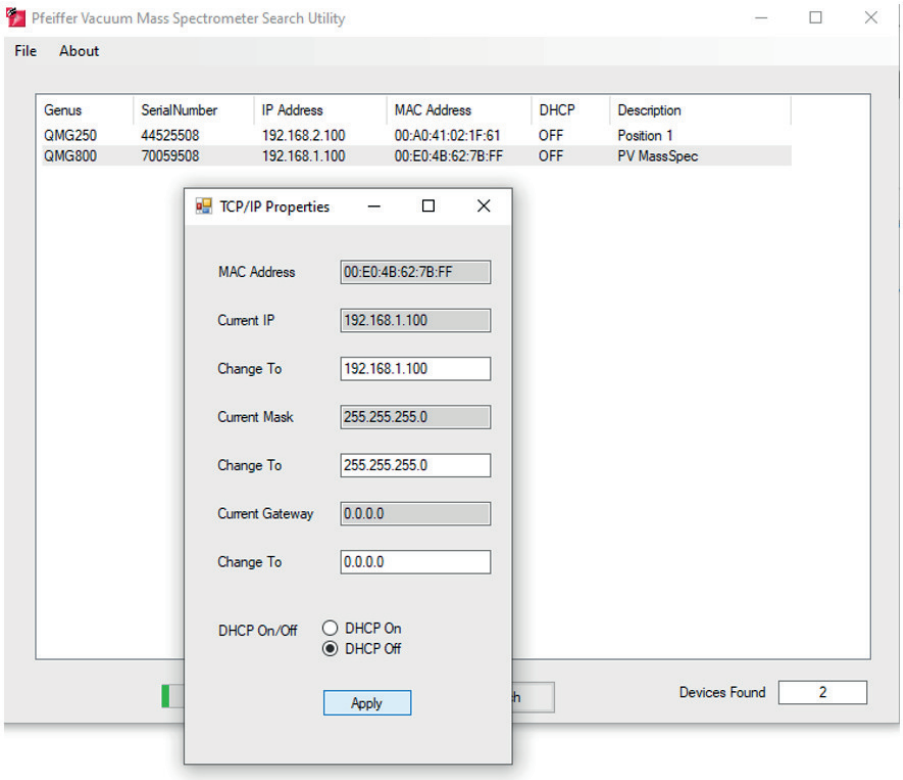


Fig. 43: Entering IP address, subnet mask, and gateway

Changing IP address, subnet mask, and gateway of device

1. Right click on the QMG 800.
2. Click on "Change IP Address".
3. Enter the desired data: IP address, subnet mask and gateway.
   – Keep the "DHCP off" setting.
4. Click "OK" to confirm your changes.
5. Physically restart the device to apply the IP address.

7 Operation

The QMG 800 is operated using the PV MassSpec software. You will find information on the PV MassSpec software in the software documentation as part of the software.

Operating QMG 800 with PV MassSpec

- ▶ Use PV MassSpec to
  - – Set unit parameters
  - – Optimize unit parameters
  - – Perform measurements
  - – Save and evaluate measured data

8 Decommissioning

Data loss

Switching the mains voltage off too early can lead to data loss.

- After disconnecting, wait at least 1 min before switching off the mains voltage.

Switching off system

1. Switch off the SEM and, if necessary, the filament.
2. Terminate the connection between QMG 800 HiQuad Neo and the PC in PV MassSpec.
3. Set the mains switch on the front panel of QMS 800 to OFF (0).

The "DC" LED goes out and QMS 800 is switched off.

9 Maintenance

Warranty claim

Opening the device during the warranty period or damaging/removing the warranty seal will void the warranty.

Contact the Pfeiffer Vacuum Service Center in the event of process-related shorter maintenance intervals.

Warranty

Malfunctioning of the equipment as a direct result of contamination or wear, as well as wear parts, is not covered by the warranty.

First read through the sections completely

Read the section with the work instructions through completely first before you commence with work.

Maintenance in the Pfeiffer Vacuum Service Center

Pfeiffer Vacuum offers a complete maintenance service for all products.

Pfeiffer Vacuum recommends: Contact your Pfeiffer Vacuum Service Center to arrange the maintenance of defective products and components.

Cleaning in the Pfeiffer Vacuum Service Center

Pfeiffer Vacuum recommends: Contact your nearest Pfeiffer Vacuum Service Center to arrange the cleaning of heavily-soiled products and components.

9.1 Cleaning the control unit and system chassis

⚠ DANGER

Danger to life from electric shock caused by moisture ingress

Water that has entered the unit will result in personal injury through electric shocks.

- ► Only operate the unit in a dry environment.
- ► Operate the unit away from fluids and sources of moisture.
- ► Do not switch on the unit if fluid has entered it. Instead contact Pfeiffer Vacuum Service.
- ► Always disconnect the power supply before cleaning the unit.

⚠ WARNING

Health hazards due to cleaning agent

The cleaning agent being used causes health hazards which could include, for example, poisoning, allergies, skin irritations, chemical burns or damage to the airways.

- ► When handling cleaning agents, observe the applicable regulations.
- ► Adhere to safety measures regarding handling and disposal of cleaning agents.
- ► Be aware of potential reactions with product materials.

NOTICE

Damage caused by penetrating moisture

Penetrating moisture, e.g. through condensation or dripping water, damages the unit.

- ► Protect the unit against penetration of moisture.
- ► Only operate the unit in a clean and dry environment.
- ► Operate the unit away from fluids and sources of moisture.
- ► Take special precautions if there is a risk of dripping water.
- ► Do not switch on the unit if fluid has penetrated into it, instead contact the Pfeiffer Vacuum Service Center.

NOTICE

Damage caused by unsuitable cleaning agents

Unsuitable cleaning agents damage the product.

► Do not use solvents as they attack the surface.
► Do not use any aggressive or abrasive cleaning agents.

Prerequisites

- Device is switched off
- Mains plug is removed

Required consumables

- Common cleaning agent (e.g. mild household detergent).
- Clean, soft cloth

External cleaning of the device

1. Use a soft, damp cloth to clean the surfaces.
2. Allow the surfaces to dry thoroughly after cleaning.

9.2 Cleaning fan

Cleaning interval

Define the cleaning interval by visual inspections and as a function of the local dust incidence.

Instrument required

- Vacuum cleaner

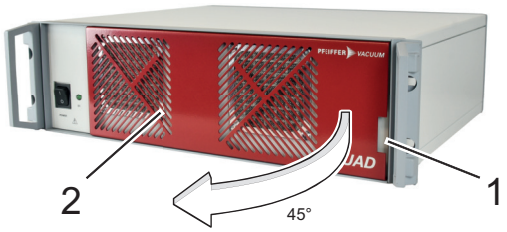


Fig. 44: Cleaning fan

1 Recess 2 Cover plate

Procedure

1. Clean the fans as soon as clearly visible deposits occur, and before the air circulation drops below the required level.
2. Grip the filter cover by the recess provided for this purpose and swivel the filter out by approx. 45°.
3. Use a vacuum cleaner to remove the dust.

9.3 Changing mains fuse

⚠ DANGER

Danger to life due to electric voltage

High voltages exist inside the device. When touching parts that are live, there is a risk of death. If there is visible damage, there is a risk of fatal injury when commissioning the device.

- ► Always disconnect the unit before opening the power supply.
- ► Work on the open device must only be carried out by trained specialist personnel.
- ► Before carrying out any installation and maintenance work, switch the device off and disconnect it from the current supply.
  - – After switching off, wait for 60 seconds and then disconnect all cables (power cable last).
- ► Secure the current supply against unauthorized or unintentional reactivation.
- ► Do not insert any objects into the vent openings.
- ► Never open an external power supply pack.
- ► Never operate an open or defective device.
- ► Secure a defective device against accidental operation.
- ► Protect the device against moisture.

Device defect

Generally, a faulty fuse is an indication of a problem in the device or system.

- If the new fuse is again faulty after replacement, contact your nearest Pfeiffer Vacuum Service Center.

Spare part required

- Mains fuse

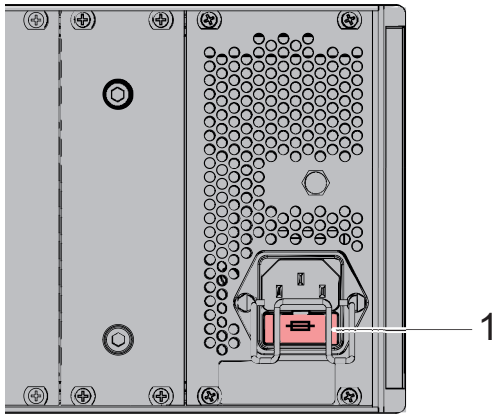


Fig. 45: View of the SC 800 back panel

1 Support for mains fuse

Procedure

1. Turn off the unit.
2. Disconnect the mains cable.
3. Open the support for the mains fuse.
4. Replace the defective mains fuse.
5. Connect the support for the mains fuse.
6. Plug in the mains cable.

10 Malfunctions

Error	Possible cause	Remedy
The "DC" LED on the front panel of the unit remains dark when the mains voltage is applied and the mains switch is switched on.	Mains fuse defective	• Replace the mains fuse.

Tbl. 9: Malfunctions

11 Shipping

⚠ WARNING

Risk of poisoning from contaminated products

Where products that contain harmful substances are shipped for maintenance or repair purposes, the health and safety of service personnel is at risk.

► Comply with the notices for safe shipment.

Decontamination subject to charge

Pfeiffer Vacuum decontaminates products not clearly declared "Free of contamination" at your expense.

Safe shipping of the product

► Do not ship microbiological, explosive or radioactively contaminated products.
► Observe the shipping guidelines for the participating countries and transport companies.
► Highlight any potential dangers on the outside of the packaging.
► Download the explanation for contamination at Pfeiffer Vacuum Service.
► Always enclose a completed declaration of contamination.

12 Recycling and disposal

⚠ WARNING

Health hazard through poisoning from toxic contaminated components or devices

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ► Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ► Decontaminate affected parts before carrying out maintenance work.
- ► Wear protective equipment.

Environmental protection

You **must** dispose of the product and its components in accordance with all applicable regulations for protecting people, the environment and nature.

- Help to reduce the wastage of natural resources.
- Prevent contamination.

12.1 General disposal information

Pfeiffer Vacuum products contain materials that you must recycle.

- ► Dispose of our products according to the following:
  - – Iron
  - – Aluminium
  - – Copper
  - – Synthetic
  - – Electronic components
  - – Oil and fat, solvent-free
- ► Observe the special precautionary measures when disposing of:
  - – Fluoroelastomers (FKM)
  - – Potentially contaminated components that come into contact with media

12.2 Dispose of a mass spectrometer system

Pfeiffer Vacuum mass spectrometer systems contain materials that you must recycle.

1. Dismantle the housing parts.
2. Dismantle all individual components.
3. Dismantle the electronic components.
4. Decontaminate the components that come into contact with process gases.
5. Separate the components into recyclable materials.
6. Recycle the non-contaminated components.
7. Dispose of the product or components in a safe manner according to locally applicable regulations.

13 Service solutions by Pfeiffer Vacuum

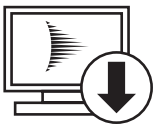
We offer first-class service
High vacuum component service life, in combination with low downtime, are clear expectations that you place on us. We meet your needs with efficient products and outstanding service.

We are always focused on perfecting our core competence – servicing of vacuum components. Once you have purchased a product from Pfeiffer Vacuum, our service is far from over. This is often exactly where service begins. Obviously, in proven Pfeiffer Vacuum quality.

Our professional sales and service employees are available to provide you with reliable assistance, worldwide. Pfeiffer Vacuum offers an entire range of services, from original replacement parts to service contracts.

Make use of Pfeiffer Vacuum service
Whether preventive, on-site service carried out by our field service, fast replacement with mint condition replacement products, or repair carried out in a Service Center near you – you have various options for maintaining your equipment availability. You can find more detailed information and addresses on our homepage, in the section.

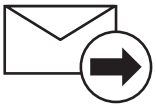
You can obtain advice on the optimal solution for you, from your Pfeiffer Vacuum representative.
For fast and smooth service process handling, we recommend the following:



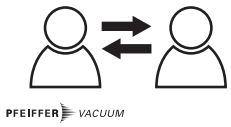
1. Download the up-to-date form templates.
   - Explanations of service requests
   - Service requests
   - Contamination declaration

a) Remove and store all accessories (all external parts, such as valves, protective screens, etc.).
b) If necessary, drain operating fluid/lubricant.
c) If necessary, drain coolant.

2. Complete the service request and contamination declaration.

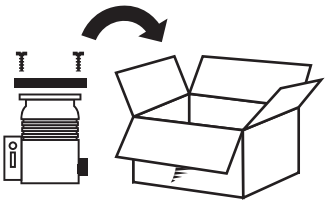


3. Send the forms by email, fax, or post to your local Service Center.

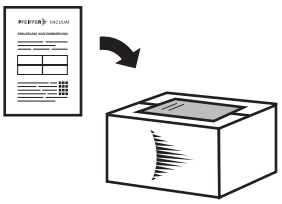


4. You will receive an acknowledgment from Pfeiffer Vacuum.

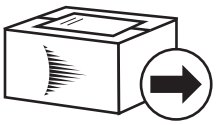
Submission of contaminated products
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree of pollution, **additional decontamination costs** may be incurred.



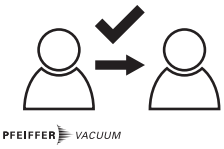
5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
a) Neutralize the product with nitrogen or dry air.
b) Seal all openings with blind flanges, so that they are airtight.
c) Shrink-wrap the product in suitable protective foil.
d) Package the product in suitable, stable transport containers only.
e) Maintain applicable transport conditions.



6. Attach the contamination declaration to the **outside** of the packaging.



7. Now send your product to your local Service Center.



8. You will receive an acknowledgment/quotation, from Pfeiffer Vacuum.

Our sales and delivery conditions and repair and maintenance conditions for vacuum devices and components apply to all service orders.

14 Ordering information

14.1 Ordering parts

Ordering spare parts, accessories or optional components

► Always specify the following details when ordering spare parts, accessories or optional components:
- all details according to the rating plate
- description and order number according to the parts list

14.2 Spare parts and accessories

Installation and operation of accessories

Pfeiffer Vacuum offers a series of special, compatible accessories for its products.
- Information and ordering options for analysis equipment accessories can be found online.

Description	Order number
QC 800	PT 168 000
SC 800	PT 168 008
IS 816	PT 168 001
HV 801	PT 168 004
IO 820	PT 168 011
Filter mat for QMS 800	BN846231-T

Tbl. 10: Spare parts and accessories for QMS 800

Description	Order number
Axial ion source	
Filament kit with tungsten filaments (5 items)	PT 168 111
Filament kit with iridium filament, Y_2O_3-coated	PT 168 112
Ion source with tungsten filament	PT 168 211
Ion source with iridium filament, Y_2O_3-coated	PT 168 212
Crossbeam ion source	
Filament kit with tungsten filaments (2 items)	PT 168 121
Filament kit with iridium filament, Y_2O_3-coated) (2 items)	PT 168 122
Ion source with tungsten filament	PT 168 221
Ion source with iridium filament, Y_2O_3-coated	PT 168 222
Ion source with tungsten filament and magnets	PT 168 231
Ion source with iridium filament, Y_2O_3-coated, and magnets	PT 168 232
Cross beam ion source (gas tight)	
Filament kit with tungsten filaments (2 items)	PT 168 121
Filament kit with iridium filament, Y_2O_3-coated) (2 items)	PT 168 122
Ion source with tungsten filament	PT 168 241
Ion source with iridium filament, Y_2O_3-coated	PT 168 242
Ion source with tungsten filament and magnets	PT 168 251
Ion source with iridium filament, Y_2O_3-coated, and magnets	PT 168 252
Grid ion source	

Description	Order number
Filament kit with tungsten filaments (2 items)	PT 168 161
Ion source with tungsten filament	PT 168 261

Tbl. 11: Spare parts for QMA 4x0

14.3 Cables and jump plugs

(see chapter “System wiring”, page 29)

14.4 System components

Description	Order number
EP 822	PT 168 500
QMH 800-3, 1 – 300 u	PT M22 001
QMH 800-5, 1 – 512 u	PT M22 000
QMS 800 with SC 800 and QC 800	PT 168 010
QMS 800 with SC 800, QC 800 and IO 820	PT 168 020

Tbl. 12: System components

15 Technical data and dimensions

15.1 Control unit QMS 800

QMS modules
The information applies to all QMS 800 modules unless otherwise specified.

Parameter	Value
Temperature (storage)	-40 – +65°C
Temperature (operation)	+5 – +40°C
Relative humidity	≤ 80% – +31°C, decreasing linearly to 50% at +40°C
Usage	Indoors
Height	≤2000 m above sea level
Protection degree	IP30
Overvoltage category	II
Degree of pollution	2

Tbl. 13: Limits of use QMS 800

15.1.1 System chassis SC 800

Parameter	Value
Mains voltage	100 – 240 V AC, 50 – 60 Hz
Power consumption	≤500 W
Mains connection	Unit plug with integrated mains fuse holder at the rear of the unit
Mains fuse	Fuse 6.3 AT HBC, 5 × 20 mm
Mains cable	country-specific
Weight	7.5 kg (without plug-in modules)
Plug-in positions	18 (per 4 DUs)

Tbl. 14: Technical data, SC 800

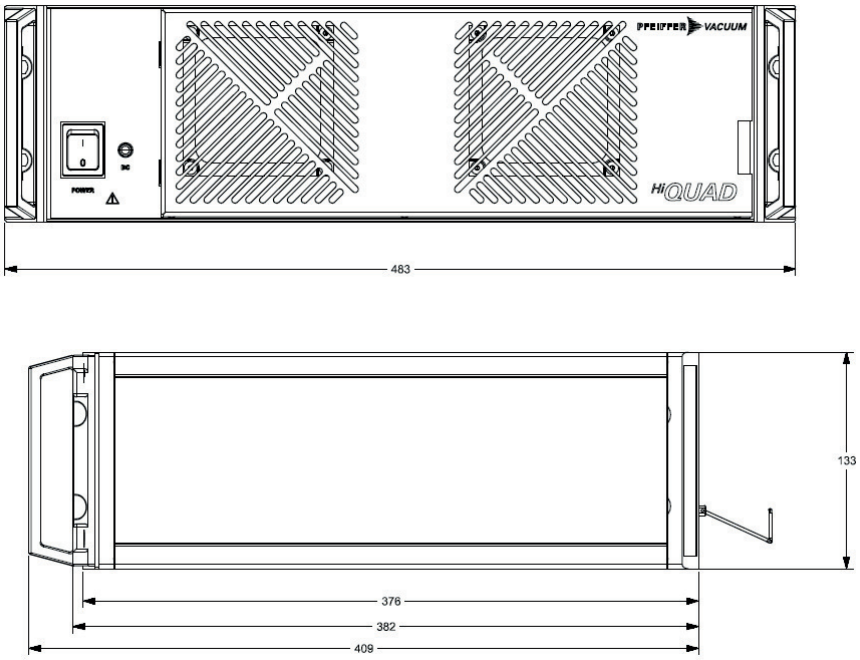


Fig. 46: Dimensions SC 800
Dimensions in mm

15.1.2 Quadrupole controller QC 800

Application programming interface (API)
You require the mass flow rate operating modes, mass scale resolution, measurement speeds, and detector types when using the API. When using PV MassSpec, the points cannot be modified in part. Observe the BG6017 communication instructions.

Parameter	Value
Suitable for	System chassis SC 800
Required plug-in positions	2
Quantity per system	1
Plug-in positions	Plug-in positions no. 1 and 2 (on the very left in system chassis SC 800)
Weight	0.4 kg

Tbl. 15: Technical data, QC 800

Parameter	Value
Number of measurement channels	128
Operating modes	MONO / MULTI channel
Measurement cycles	1 – 10,000 or REPEAT
Channel change time	100 – 200 µs (with min. PAUSE in the cycle)

Tbl. 16: Operating modes and parameters QC 800

Mass MODE	Measuring method
SCAN-N	Analog scan, normal
SCAN-F	Analog scan with FIR filter for the measured value
STAIR	Scan bargraph
SAMPLE	Single ground and MID

Mass MODE	Measuring method
PEAK-L	Peak search with level criterion
PEAK-F	Peak search with FIR filter
ADJUST-C	Rough search
ADJUST-F	Fine search

Tbl. 17: Mass flow rate operating modes QC 800

Scan SPEED	STEPS per ground	
	FIX Range	AUTO Range
125 µs/u	8/u	---
250 µs/u	16/u	---
0.5 – 1 ms/u	32/u	---
2 – 20 ms/u	64/u	32/u
50 ms/u – 60 s/u	64/u	64/u

Tbl. 18: Mass scale resolution QC 800

Mass MODE	EP 822 or external inputs	
	FIX Range	AUTO Range
SAMPLE	125 µs – 60 s	0.5 ms – 60 s
STAIR	125 µs/u – 60 s/u	2 ms/u – 60 s/u
SCAN	125 µs/u – 60 s/u	5 ms/u – 60 s/u
PEAK	125 µs/u – 60 s/u	5 ms/u – 60 s/u

Tbl. 19: Measurement speeds QC 800

Detect TYPE	Detector type
FARAD	Faraday collector, EP 822
SEM	SEV (design configurable), EP 822
EXTERN 1	External analog input of QC 800 (EXT IN 1)
EXTERN 2	External analog input of QC 800 (EXT IN 2)
A-INPUT (1–n)	Analog signals via IO 820 (analog channels 1 – n)

Tbl. 20: Detector types QC 800

Detector type	Measuring ranges	Operating modes	Resolution
FARAD, SEM	10^{-12} – 10^{-5} A fsd	FIX and AUTO ranges	16 bit [15] (per range)
EXTERNAL	GAIN 1: ±10.240 V GAIN 10: ±1.024 V	FIX Range	16 bit [16]

Tbl. 21: Measuring ranges and resolution QC 800

15) is additionally increased through averaging

16) is additionally increased through averaging

Parameter	Value
Filter type	Low-pass, two-stage, effective for pre-amplifier and external inputs
Filter time constants	can be selected automatically or in 9 stages: 5, 18, 85, 400 µs; 1,7, 8, 40, 180, 800 ms
Step response	τ_{63}: Filter time constant Settling time to ± 1 ‰: $t_s \approx 4 \times \tau_{63}$

Tbl. 22: Analog filter QC 800

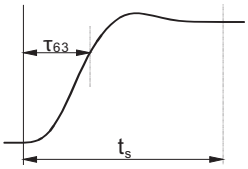


Fig. 47: Filter time constant QC 800

Parameter	Value
NORMAL (N)	Low pass (mean value)
FIR (F)	Finite impulse response

Tbl. 23: Digital filter QC 800

15.1.3 Ion source supply IS 816

Parameter	Value
Suitable for	System chassis SC 800
Required plug-in positions	4
Quantity per system	max. 2
Plug-in position	(see chapter “Installing or replacing plug-in modules in system chassis”, page 36)
Weight	1 kg

Tbl. 24: Technical data, IS 816

Parameter	Value
Voltage	0 – +10 V
Current	max. 5 A
Power	max. 50 W
Operating modes	Fil 1, Fil 2
Filament protection	0 – 5 A

Tbl. 25: Filament supply IS 816

Parameter	Value
Normal	0 – 10 mA
Degas	0 – 20 mA

Tbl. 26: Emission IS 816

15.1.4 High voltage supply HV 801

Parameter	Value
Suitable for	System chassis SC 800
Required plug-in positions	1
Quantity per system	max. 4
Plug-in position	(see chapter “Installing or replacing plug-in modules in system chassis”, page 36)
Weight	0.3 kg

Tbl. 27: Technical data, HV 801

Parameter	Value
SEM voltage HV-	-30 – -3500 V (ripple 10 mV typically)
Resolution	219 mV
Load	≥ 15 MΩ
Current limiting	≤ 1 mA
Internal resistance	≈0 Ω
Setting time	0.3 s (0.1%, switch on, R_L = 15 MΩ)
Potential separation (between chassis and QMA GND)	≤ 0.5 V

Tbl. 28: High voltage part, HV 801

15.1.5 Input/output module IO 820

ANALOG I/O	Quantity	Configuration	Input/output voltage	Digital resolution
Input	5	Differential	±10 V DC	14 bit
output	4	Single-ended	0 – +10 V DC	14 bit

Tbl. 29: Analog interfaces IO 820

Digital I/O	Quantity	Voltage/current	Current supply
Input	4	24 V DC ±20%, typically 2 mA	Internal or external
output	16	24 V DC ±20%, max 3 A for a group of 8 outputs	External

Tbl. 30: Logic interfaces IO 820

Parameter	Value
Protocol	ASCII, addressable (RS-485), Pfeiffer Vacuum protocol
Data format	Unidirectional data traffic, data word length 8 bits, 1 stop bit, no parity bit
Baud rate	9600
Connection	Binder M12 connector, 5-pole, A-coded

Tbl. 31: RS-485 interface IO 820

Connecting gauges

The IO 820 has one connector each for an ActiveLine or DigiLine gauge. The DigiLine gauge takes priority when connected. Connecting multiple gauges is not possible.

Gauge	Interface	Plug	Degas
PKR 2x1/36x	Analog	<TP GAUGE>, 6-pin	no
PBR 360	Analog	<TP GAUGE>, 6-pin	yes
TPR 2xx	Analog	<TP GAUGE>, 6-pin	no

Gauge	Interface	Plug	Degas
HPT 200	RS485	<SERIAL GAUGE>	yes
PPT 200	RS485	<SERIAL GAUGE>	no
RPT 20x	RS485	<SERIAL GAUGE>	no
MPT 200	RS485	<SERIAL GAUGE>	no

Tbl. 32: Connector for total pressure gauge IO 820

15.2 HF generator QMH 800-x

You will find the technical data for the QMH 800-x in the corresponding operating instructions.

QMH type	Mass range [u]	QMA type	Rod diameter [mm]
QMH 800-3	300	QMA 430	8
QMH 800-5	512	QMA 400	8

Tbl. 33: QMH and QMA types

15.3 Analyzer QMA 4x0

You will find the technical data for the QMA 4x0 in the corresponding operating instructions.

15.4 Electrometer pre-amplifier EP 822

Parameter	Value
Installation location	screwed directly on analyzer QMA
Interfaces to	QMH, QMA
Connection (input)	TNC coaxial plug type
Connection (output)	D-Sub, 9-pin, pins
Input voltage	± 16 V(± 0.2 V, ≤ 10 mV ripple) (by QMS 800)
Input current	± 10 mA (by QMS 800)
Quantity per system	max. 2
Storage temperature	-40 – +70°C
Operating temperature	0 – +50°C
Weight	0.15 kg

Tbl. 34: Technical data, EP 822

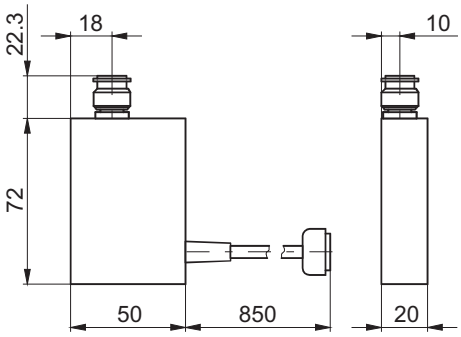


Fig. 48: Dimensions EP 822

Dimensions in mm

Parameter	Value
Input current	± 10 mA
Input impedance	100 kΩ
Output voltage	-10 – +10 V
Output current	≤ 2 mA
Drift	Offset doubling per 10°C temperature increase
Noise	typically 2 × 10^{-13} A_{pp} unfiltered

Tbl. 35: Amplifier data EP 822

Measuring range	Sensitivity	Tolerance at 25°C	Rise time from 10 to 90%	Offset at 25°C
± 10^{-5} A	10^{-6} A/V	± 1%	50 µs	± 0.5 mV
± 10^{-7} A	10^{-8} A/V	± 1%	90 µs	± 0.5 mV
± 10^{-9} A	10^{-10} A/V	± 2%	1.9 ms	± 2 mV
± 10^{-11} A	10^{-12} A/V	± 2%	2.6 ms	-50 – +150 mV

Tbl. 36: Offset EP 822

EU Declaration of conformity

This declaration of conformity has been issued under the sole responsibility of the manufacturer.

Declaration for product(s) of the type:

Quadrupole mass spectrometer system

QMG 800 HiQuad® Neo

We hereby declare that the listed product satisfies all relevant provisions of the following **European Directives**.

Low voltage 2014/35/EU

Electromagnetic compatibility 2014/30/EU

Restriction of the use of certain hazardous substances 2011/65/EU

Restriction of the use of certain hazardous substances, delegated directive 2015/863/EU

Harmonized standards and applied national standards and specifications:

IEC 61010-1:2010/AMD1:2016 3rd Edition

EN 61326-1:2020

EN 55011:2016/A11:2020

Signature:

Pfeiffer Vacuum GmbH
Berliner Straße 43
35614 Asslar
Germany

(Daniel Sälzer)
Managing Director

Asslar, 2024-04-04

CE

PFEIFFER VACUUM

EU Declaration of conformity

This declaration of conformity has been issued under the sole responsibility of the manufacturer.

Declaration for product(s) of the type:

Input/output module

IO 820

We hereby declare that the listed product satisfies all relevant provisions of the following **European Directives**.

Low voltage 2014/35/EU

Electromagnetic compatibility 2014/30/EU

Restriction of the use of certain hazardous substances 2011/65/EU

Restriction of the use of certain hazardous substances, delegated directive 2015/863/EU

Harmonized standards and applied national standards and specifications:

IEC 61010-1:2010/AMD1:2016 3rd Edition

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EN 55011:2016/A11:2020

Signature:

Pfeiffer Vacuum GmbH
Berliner Straße 43
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(Daniel Sälzer)
Managing Director

Asslar, 2024-11-12

CE

PFEIFFER VACUUM

UK Declaration of Conformity

This declaration of conformity has been issued under the sole responsibility of the manufacturer.

Declaration for product(s) of the type:

Quadrupole mass spectrometer system

QMG 800 HiQuad® Neo

We hereby declare that the listed product satisfies all relevant provisions of the following **British Directives**.

Electrical Equipment (Safety) Regulations 2016

Electromagnetic Compatibility Regulations 2016

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Applied standards and specifications:

IEC 61010-1:2010/AMD1:2016 3rd Edition

EN 61326-1:2020

EN 55011:2016/A11:2020

The manufacturer's authorized representative in the United Kingdom and the authorized agent for compiling the technical documentation is Pfeiffer Vacuum Ltd, 16 Plover Close, Interchange Park, MK169PS Newport Pagnell.

Signature:

Pfeiffer Vacuum GmbH
Berliner Straße 43
35614 Asslar
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(Daniel Sälzer)
Managing Director

Asslar, 2024-04-04

UK CA

PFEIFFER VACUUM

UK Declaration of Conformity

This declaration of conformity has been issued under the sole responsibility of the manufacturer.

Declaration for product(s) of the type:

Input/output module

IO 820

We hereby declare that the listed product satisfies all relevant provisions of the following **British Directives**.

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Signature:

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Managing Director

Asslar, 2024-04-08

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