



 **PrismaPlus™**

**The Perfect Solution for Mass Spectrometry.**

**Modular Design. Powerful Software.  
Wide Range of Applications.**

## The Perfect Solution for Mass Spectrometry.

The combination of high sensitivity, maximum stability and intelligent operation make the PrismaPlus the perfect solution for mass spectrometry.

Its modular design offers you a variety of application options in industrial and analytical environments, in research & development, in leak detection and semiconductor production, as well as in coating technology.

The PrismaPlus is the ideal solution for applications ranging from quality assurance and residual gas analysis right through to complex, quantitative tasks.

The Quadera® software is a further plus. In addition to being especially easy to operate, it also serves as an easy-to-read platform for transferring all measured data.

Together with a wide selection of interfaces, such as digital and analog inputs and outputs or Ethernet, integration into your system is easily achieved.

Our product and service professionals around the world stand ready to provide you with application assistance on the implementation of the PrismaPlus. Long years of customer and application-specific experience make Pfeiffer Vacuum your ideal partner.

### The added plus for gas analysis!



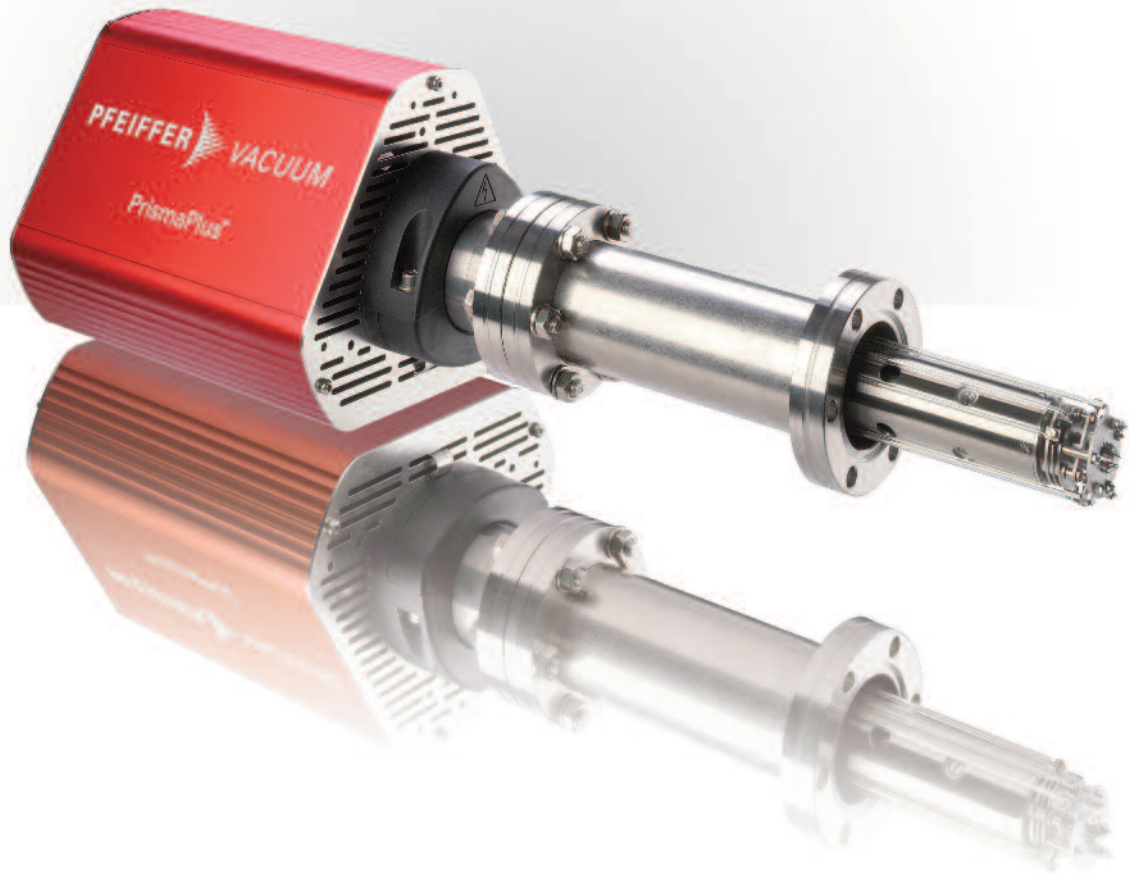
Accelerator



Coating



Research & Development



#### Advantages at a glance

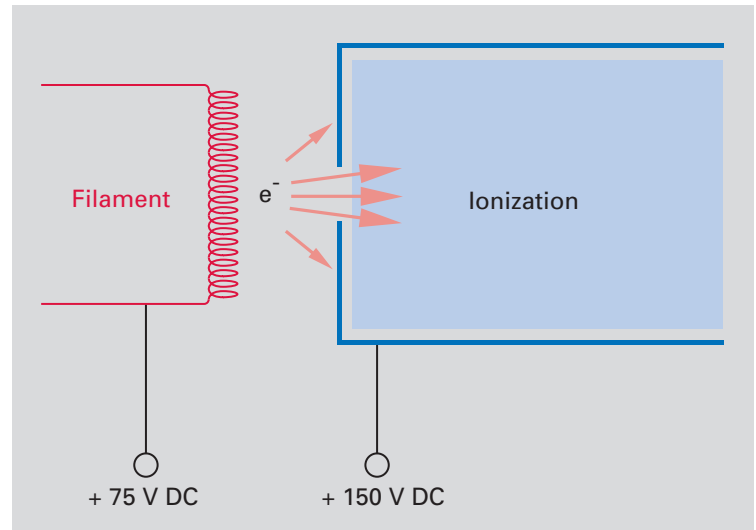
- Modular design offers optimum adaptability
- Compact size yet high performance
- A variety of interfaces make for simple systems integration
- Networkable through Ethernet
- High measurement speed, stability and resolution
- Interchangeability of analyzers and electronics
- Two filaments mean maximum up-time
- Lowest detectable partial pressure  $1 \cdot 10^{-14}$  mbar
- Connectable Pfeiffer Vacuum total pressure gauge
- Intuitive operation of the Quadera® software
- World-class support and worldwide on-site service

The Perfect Solution for Mass Spectrometry.

Overview of technologies

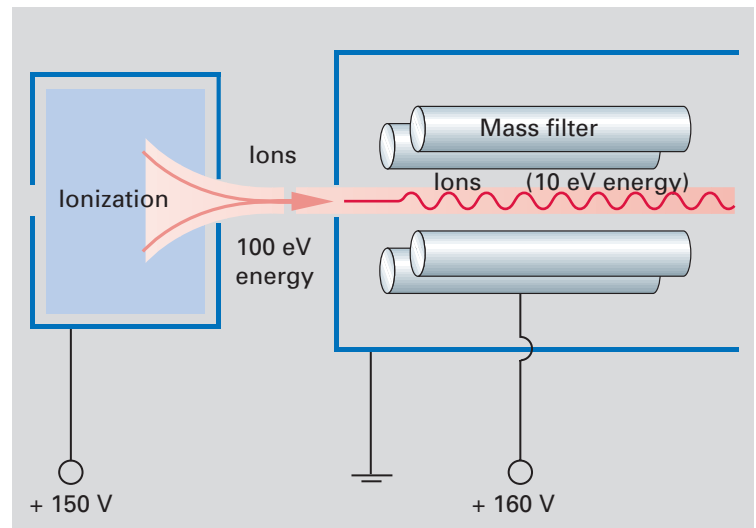
Biased ionization chamber

Biasing the ionization chamber results in an extremely low background signal. The electron-emitting filament is positively biased relative to ground. This design prevents desorption of gas particles from the chamber walls, and thus the generation of an undesired background signal by electron stimulated desorption.



Field-axis technology

One of the most important factors in the performance of a mass spectrometer is the transmission of the ions from the ion source into the mass filter. With the aid of field-axis technology, the ions are able to cross the peripheral fields of the separating system without any noteworthy interaction. This enables a high level of sensitivity (A/mbar) to be achieved without the need for pre and post filters.



## Quadera® - The PrismaPlus™ software!



The Quadera® software is a further plus. With its modular design, it offers an easy-to-read, user-friendly platform for capturing and visualizing measured data and parameter records. Complete measurement procedures can be programmed.

- User-friendly, intuitive operation
- Customer-specific user interface
- Automated measurement routines via the integral VSTA script editor
- Measured data interchange through I/O module
- With stored library: Containing definitions of unknown gases
- Simple definition of measurement recipes
- Mass spectrometer data can be linked with external signals

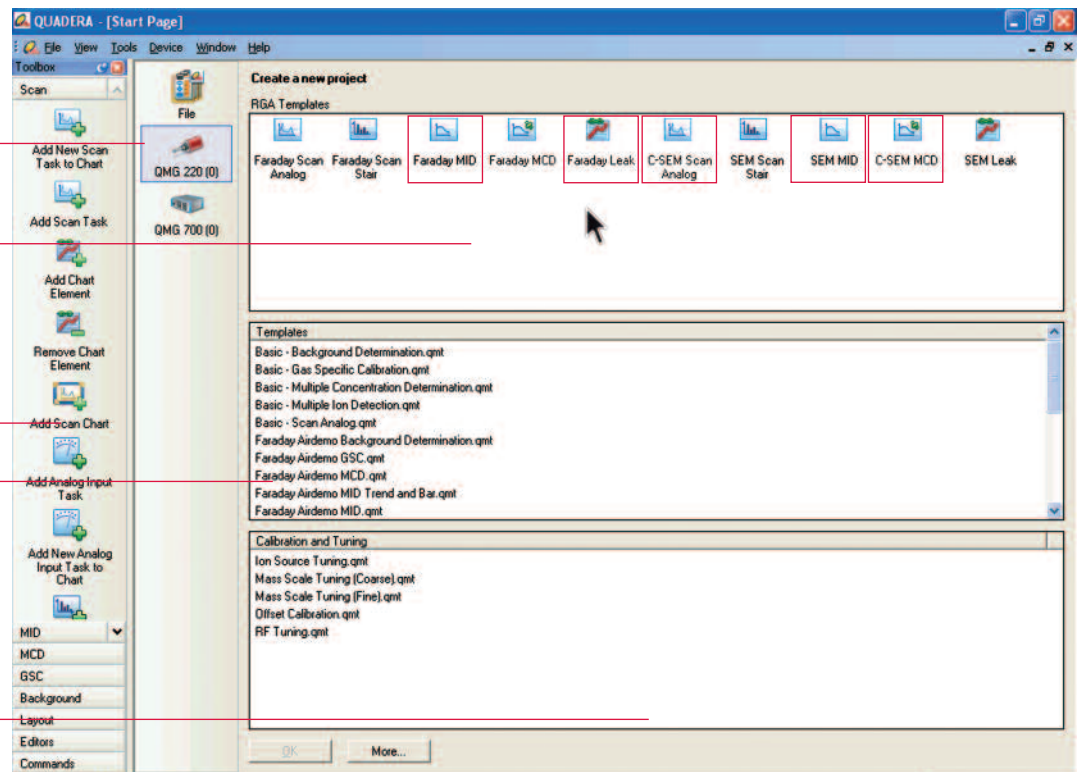
Unit selection

Selection window

Tools, aids

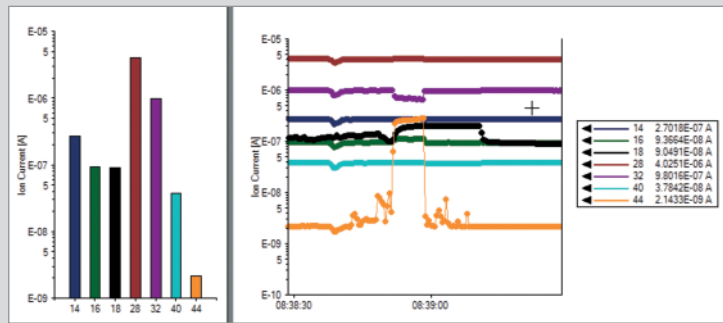
Templates

Calibration and tuning

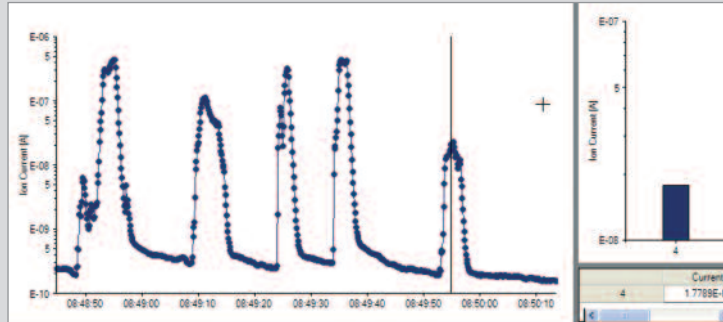
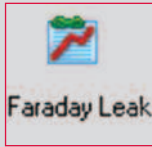


Clicking on the icons in the selection window launches the measurement task.

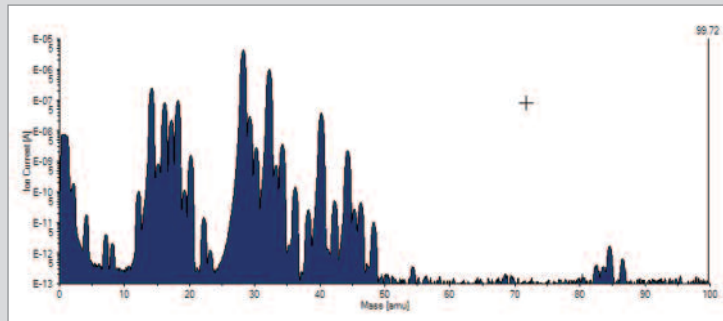
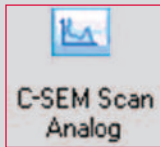
## Measurement modes



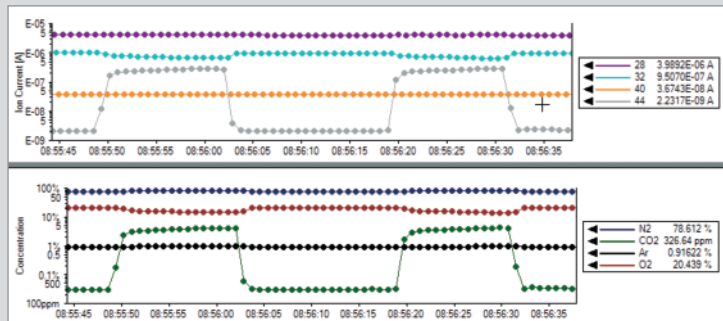
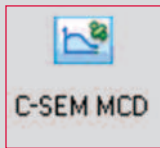
Bargraph portrayal of the ion current and its curve as a function of time



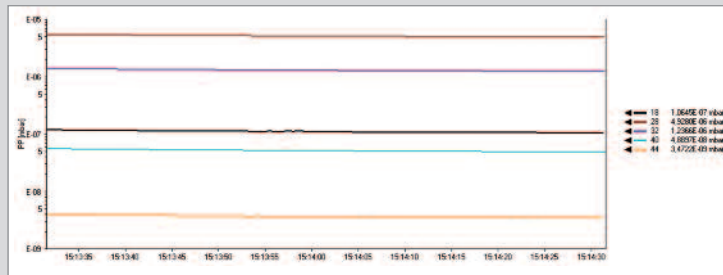
Leak detection with helium – Visualization as a function of time



Analog spectrum of air



Analysis of air as ion current and concentration as a function of time



Measurement of different masses vs. time. Display as partial pressure in mbar.

## Order matrix PrismaPlus

PT M0a bcd efg

		<b>a</b>
Detector version	Faraday <sup>1)</sup> only for leak detection and high-vacuum residual gas analysis	5
	C-SEM/Faraday C-SEM = Continuous Secondary Electron Multiplier for fast, sensitive UHV residual gas analysis, analytical applications and leak detection	6
		<b>b</b>
Mass range	1–100 amu	1
	1–200 amu	2
	1–300 amu	3
		<b>c</b>
Ion source	Open ion source for high-vacuum residual gas analysis; high sensitivity and good linearity	1
	Gas-tight ion source for use in combination with gas inlet systems; low gas consumption, high signal-to-noise ratio	2
	Crossbeam ion source <sup>2)</sup> for direct gas beam inlet, without interaction with the walls of the ion source; electron energy adjustable from 0 to 100 eV	3
	Grid ion source <sup>2)</sup> for UHV residual gas analysis; minimum outgassing and desorption rate	4
	Open ion source for high-vacuum residual gas analysis; high sensitivity and good linearity; electron energy adjustable from 0 to 100 eV	5
		<b>d</b>
Filament	Tungsten; for UHV applications	1
	Yttriated iridium; low filament temperatures, high resistance to air inrushes	2
		<b>e</b>
Bakeout temperature <sup>3)</sup>	To 200 °C	1
	To 300 °C	2
		<b>f</b>
Conne- ction <sup>4)</sup>	0° (on one axis)	1
	90° off axis	2
		<b>g</b>
I/O module <sup>5)</sup> and VSTA soft- ware extension	Without option	0
	With I/O module for control and signal interchange via analog and digital inputs/outputs	1
	With VSTA software extension for programming program sequences and for exchanging commands and data with other programs	2
	With I/O module and VSTA software extension	3

<sup>1)</sup> With open ion source only

<sup>2)</sup> Ion sources with tungsten filament only

<sup>3)</sup> Electronics removed

<sup>4)</sup> See dimensions page 11

<sup>5)</sup> See page 10



## The Perfect Solution for Mass Spectrometry.

### Technical data

PrismaPlus	QMG 220 F1	QMG 220 F2	QMG 220 F3	QMG 220 M1	QMG 220 M2	QMG 220 M3
Detector	Faraday (F)			C-SEM/Faraday (M)		
Mass range	1–100 amu	1–200 amu	1–300 amu	1–100 amu	1–200 amu	1–300 amu
Rod system, diameter/length	6 mm / 100 mm					
Min. detection limit, Faraday <sup>1)</sup>	$1 \cdot 10^{-12}$ mbar	$2 \cdot 10^{-12}$ mbar	$4 \cdot 10^{-12}$ mbar	$5 \cdot 10^{-12}$ mbar	$1 \cdot 10^{-11}$ mbar	$2 \cdot 10^{-11}$ mbar
Min. detection limit, C-SEM <sup>1)</sup>	–	–	–	$1 \cdot 10^{-14}$ mbar	$< 2 \cdot 10^{-14}$ mbar	$< 4 \cdot 10^{-14}$ mbar
Ar sensitivity, Faraday <sup>1)</sup>	$1 \cdot 10^{-3}$ A/mbar	$6 \cdot 10^{-4}$ A/mbar	$3 \cdot 10^{-4}$ A/mbar	$5 \cdot 10^{-4}$ A/mbar	$3 \cdot 10^{-4}$ A/mbar	$1.5 \cdot 10^{-4}$ A/mbar
Ar sensitivity, C-SEM <sup>1)</sup>	–	–	–	200 A/mbar	200 A/mbar	100 A/mbar
Max. operating pressure <sup>2)</sup> , Faraday operation	$1 \cdot 10^{-4}$ mbar					
Max. operating pressure, C-SEM operation	–	–	–	$1 \cdot 10^{-5}$ mbar	$1 \cdot 10^{-5}$ mbar	$1 \cdot 10^{-5}$ mbar
Contribution to adjacent mass (40/41) <sup>1)</sup>	$< 10$ ppm	$< 20$ ppm	$< 50$ ppm	$< 10$ ppm	$< 20$ ppm	$< 50$ ppm
Operating temperature, analyzer	150 °C					
Operating temperature, electronics	0–40 °C					
Bakeout temperature, analyzer <sup>3)</sup>	200 °C / 300 °C					
Connection flange	DN 40 CF-F					
Resolution at 10 % peak height	0.5–2.5 amu					
Measurement speed, analog/bargraph scan	20 ms – 60 s/amu					
Measurement speed, Stair	2 ms – 60 s/amu					
Measurement speed, MID	2 ms – 60 s/amu					
Number of measurement channels in MID	128					
Reproducibility of peak ratio <sup>3)</sup>	$\pm 0.5$ %					
Interface	Ethernet					
Input, digital	External protection					
Supply voltage	90–260 V AC, 50/60 Hz					
Weight <sup>4)</sup>	2.4 kg	2.4 kg	2.4 kg	3.8 kg	3.8 kg	3.8 kg

<sup>1)</sup> For open ion source

<sup>2)</sup> With emission current reduced to 0.2 mA:  $1 \cdot 10^{-3}$  mbar

<sup>3)</sup> Defined by order number

<sup>4)</sup> For variant with electronic and analyzer on one axis (0°)

### Accessories

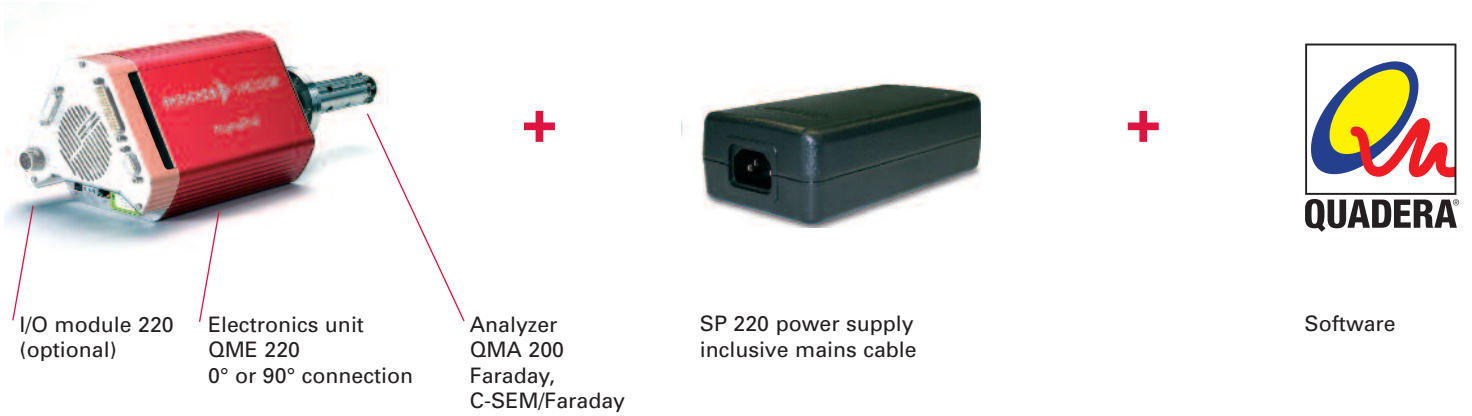
I/O module 220	PT M28 699
SP 220 power supply (inclusive mains cable)	PT 160 200
ActiveLine, PKR 251 <sup>5)</sup> , $5 \cdot 10^{-9}$ –1,000 mbar	PT R26 002
ActiveLine, PKR 261 <sup>5)</sup> , $5 \cdot 10^{-9}$ –1,000 mbar	PT R26 252
ActiveLine, PBR 260 <sup>5)6)</sup> , $5 \cdot 10^{-10}$ –1,000 mbar	PT R27 000
ActiveLine, TPR 280 <sup>5)</sup> , $5 \cdot 10^{-4}$ –1,000 mbar	PT R26 950
Connection cable, ActiveLine gauge–QMG 220, 3 m <sup>5)</sup>	PT 448 250-T
DigiLine, PPT 100 <sup>5)</sup> , $1 \cdot 10^{-4}$ –1,000 mbar	PT R33 130
DigiLine, HPT 100 <sup>5)6)</sup> , $5 \cdot 10^{-9}$ –1,000 mbar	PT R34 130
DigiLine, MPT 100 <sup>5)</sup> , $5 \cdot 10^{-9}$ –1,000 mbar	PT R35 130
Connection cable, DigiLine gauge–QMG 220, 3 m <sup>5)</sup>	PT 348 403-T

<sup>5)</sup> Can be used only in conjunction with I/O module

<sup>6)</sup> Additional SP 220 power supply necessary



## Scope of delivery



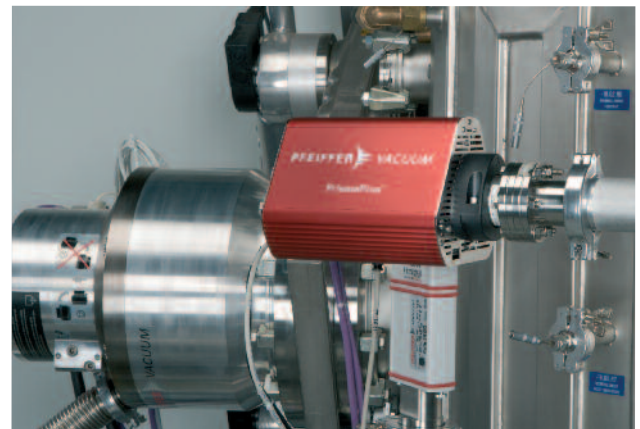
## Applications

The PrismaPlus is the perfect solution for leak detection, residual gas analysis or complex, quantitative analyses:

- Metallurgy
- Vacuum furnaces
- Accelerators
- Sputter process analysis
- Semiconductor production
- Glass coating
- Research & development
- Vacuum process systems
- Lithography plants



Differential pumped PrismaPlus for processes between  $1 \cdot 10^{-6}$  and 5 mbar



PrismaPlus on a coating system

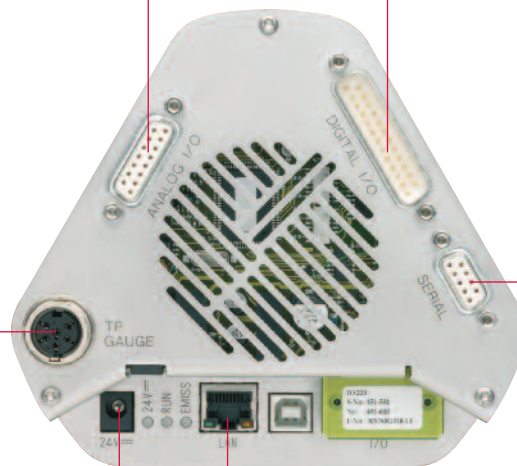
## I/O module – Connection options

	Analog outputs	Analog inputs	Digital outputs	Digital inputs
Number	4	5	16	5
Specification	0–10 V	-10 – +10 V	V <sub>out</sub> = 24 V	V <sub>in</sub> = 24 V
Resolution	12 bit	14 bit	–	–
Application examples	<ul style="list-style-type: none"> <li>• Measured values, e.g. ion currents</li> <li>• Ratios (concentrations)</li> <li>• Data transfer to higher-level systems</li> </ul>	Reading in external values, e.g. pressure, temperature, gas flow	<ul style="list-style-type: none"> <li>• Free assignment of switchpoints</li> <li>• Valve actuation</li> </ul>	Starting or stopping measurement tasks by means of external signal

Total pressure measurement with ActiveLine



Total pressure measurement with DigiLine™



Ethernet

### SP 220 power supply

L x W x H:  
145 x 75 x 40 mm  
Cable length: 3 m  
Weight: 0.7 kg

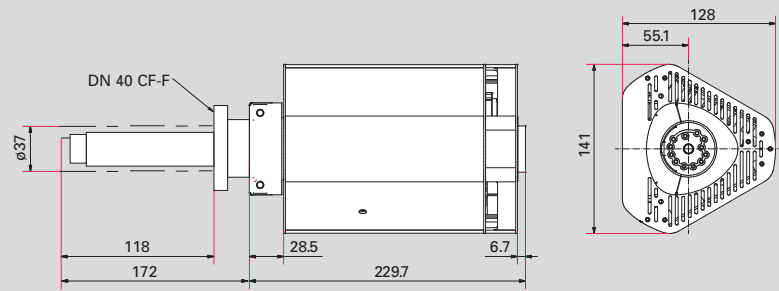


24 V DC

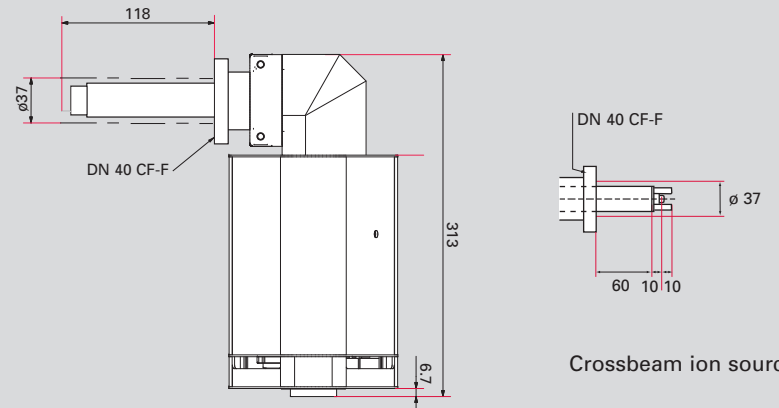
Voltage: 90 – 260 V AC  
Frequency: 50 – 60 Hz

Dimensions

QMG 220 F 0°



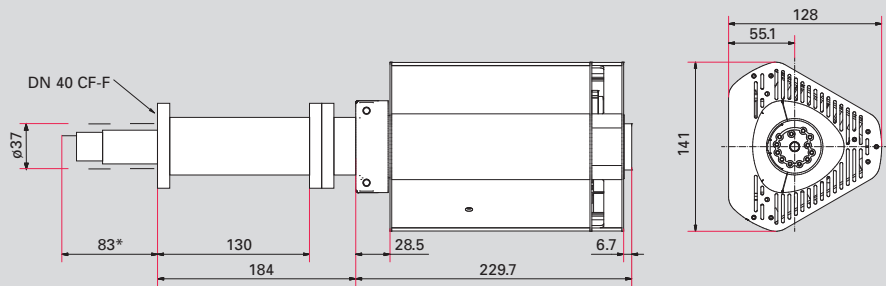
QMG 220 F 90°



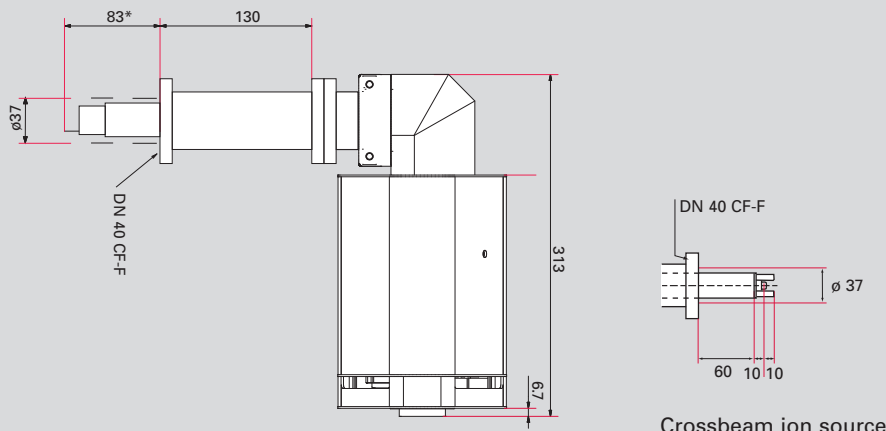
Crossbeam ion source

Dimensions in mm

QMG 220 M 0°



QMG 220 M 90°



Crossbeam ion source

\* Gas-tight ion source = 90.6  
Grid ion source = 92

Dimensions in mm

**Leading. Dependable.  
Customer Friendly.**

Pfeiffer Vacuum stands for innovative and custom vacuum solutions worldwide, for German engineering art, competent advice and reliable service.

Ever since the invention of the turbopump, we have been setting standards in our industry and this claim to leadership will continue to drive us in the future.

Are you looking for a  
perfect vacuum solution?  
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[www.pfeiffer-vacuum.com](http://www.pfeiffer-vacuum.com)