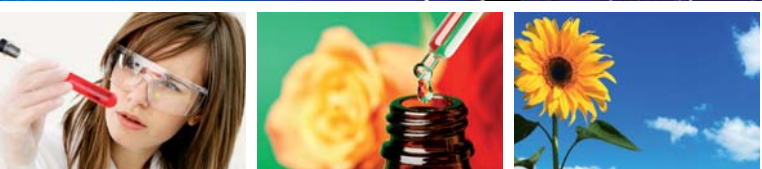


PROTON TRANSFER REACTION - MASS SPECTROMETRY

**PTR-MS**



PRODUCT PORTFOLIO



THE WORLD'S  
LEADING  
PTR-MS  
COMPANY

THE SOLUTION FOR ONLINE TRACE GAS ANALYSIS

# PTR-TOFMS SERIES



THE WORLD'S  
LEADING  
PTR-MS  
COMPANY PRESENTS



## PTR-TOF 8000

LoD < 10 pptv

Resolution up to 8000 m/ $\Delta$ m (FWHM)

The IONICON PTR-TOF 8000 instrument is an **ultra-sensitive detector** for volatile organic compounds (VOCs) that allows for **continuous VOC quantification** with a very high mass resolution.

Our new Time of Flight based product combines **very low online detection limits** in the **single-digit pptv-range** covering a **linearity range of six orders of magnitude**, with **incredible mass resolution of up to 8000**.

**Quantitative analysis** of the **whole mass range** within a **split-second** with a resolution that allows the **separation of even isobaric compounds** are remarkable features of the new PTR-TOF-MS technology.

**Direct injection** of sample gases **without preparation** contributes to the **speed and simplicity** that is common to all our instruments.

Our unique **soft ionization (PTR) technology** together with our extensive experience in gas-phase ion chemistry and engineering of scientific instruments are the basis for the **reliability, ultra low detection limit, very low mass fragmentation, fast response time and robustness** of our PTR-MS systems.

- > High resolution time of flight
- > Single-digit pptv-level sensitivity
- > Mass range up to 50.000 amu
- > Full mass range acquisition in a split-second

Find out more:

[www.PTRMS.com/products/ptrtofms](http://www.PTRMS.com/products/ptrtofms)

# PTR-TOF 8000

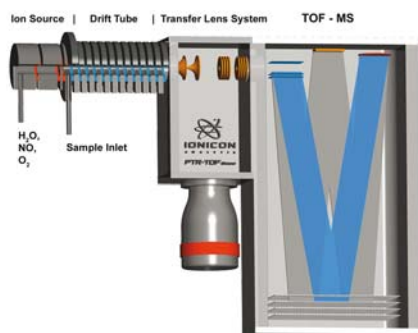


## IONICON PTR-TOF 8000 SPECIFICATIONS\*

- Mass range: 1-50.000 amu
- Resolution\*\* > 4.000 m/Δm (FWHM)
- Response time: 100 ms
- Sensitivity\*\*
  - Benzene: 20-40 cps/ppbv
  - Trichlorobenzene: 40-80 cps/ppbv
- Detection limit (Benzene)\*\*: 10 pptv averaged over 1 min  
100 pptv averaged over 1 sec
- Linearity range\*\*: 10 pptv - 5 ppmv
- Pulse frequency: up to 80 kHz
- Adjustable flow: 50 - 1000 sccm
- Inlet system (Different inlet systems available on request):
  - 1.2 m long inlet hose - with internal inert (PEEK) capillary
  - Inlet system heating: up to 180°C (356°F)
- Reaction chamber heating range: 40 - 130°C (104 - 266°F)
- Power supply and max. consumption: 100-230 V, 1000 W
- Dimensions (w x h x d): 56x130x78 cm (22x51,2x30,7 in.)
- Weight (incl. SRI): 189 kg (417 lbs)
- Interfaces:
  - 1x Touch screen display
  - 1x Ethernet 10/100 Mbit RJ45 (TCP/IP)
  - 1x RS 232
  - 5x Digital outputs
  - (digital/analog I/O package on request)

\*Specifications are subject to change without prior notice.  
Product pictures and illustrations may differ from actual configuration.  
\*\*Detection limit, linearity range and resolution are dependent on the substances measured, integration time and system set-up.

## TECHNOLOGY



The innovative technology all IONICON Analytik products are based on is Proton Transfer Reaction - Mass Spectrometry (PTR-MS).

This unique soft ionization is realized by proton transfer from  $H_3O^+$  ions to all compounds with a higher proton affinity than

water. Common constituents of air such as  $N_2$ ,  $O_2$ , Ar,  $CO_2$  etc. have lower proton affinities than  $H_2O$  and are therefore not ionized. This is one of the main reasons for our market-leading low online detection limit for trace compounds in the range of a few pptv.

For the new IONICON PTR-TOF 8000 we use a specially designed orthogonal acceleration time of flight mass spectrometer delivering a typical resolution of 4000-8000 m/Δm in V-mode. The TOF combined with our unique proton transfer reaction-ion source, drift tube and inlet system allows instantaneous quantification of the full mass range. Even isobaric species can be distinguished with virtually no instrumental mass range limitation and a linearity range over six orders of magnitude.

## ROBUST & EASY TO USE

The PTR-TOF 8000 is completely software controlled and connected to a data acquisition computer. The most important parameters can be checked and adjusted via a touch screen display directly at the instrument.

A space-saving rack mounted on wheels allows for easy transportability and variable location measurements.

## PTR-TOF 8000<sup>+SRI</sup>

The IONICON PTR-TOF 8000 is now also available as PTR-TOF 8000<sup>+SRI</sup> (Switchable Reagent Ions) featuring  $NO_2^+$  and  $O_2^+$  as additional precursor ions.

The benefits are extraordinary as not only isomeric VOC compounds can be separated and instantaneously quantified (the separation of isobaric compounds is already possible by using the IONICON PTR-TOF 8000 with its single precursor ion  $H_3O^+$ ) but also substances with a smaller proton affinity than the PA of  $H_2O$  can now be detected with the PTR-TOF 8000<sup>+SRI</sup>.

## PTR+SRI-MS SWITCHABLE REAGENT IONS

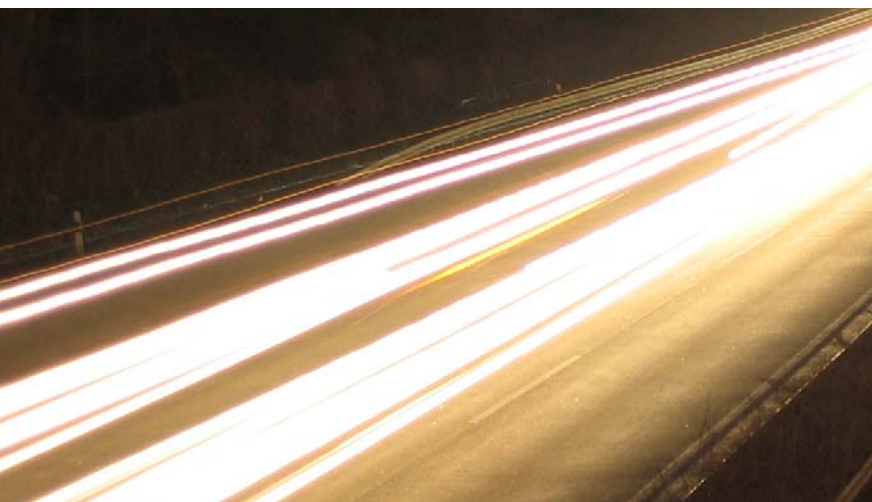
Find out more about PTR+SRI-MS:  
[www.PTRMS.com/technology](http://www.PTRMS.com/technology)



# PTR-TOFMS SERIES



THE WORLD'S  
LEADING  
PTR-MS  
COMPANY PRESENTS



## PTR-TOF 2000

**LoD < 5 pptv**

**Resolution up to 2000 m/ $\Delta$ m (FWHM)**

The IONICON PTR-TOF 2000 instrument is an **ultra-sensitive detector** for volatile organic compounds (VOCs) that allows for **continuous VOC quantification** with a **high mass resolution**.

Our new **Time of Flight** based product combines **very low online detection limits** in the **single-digit pptv-range**, **outstanding sensitivity** with a **remarkable mass resolution**.

**Quantitative analysis** of the **whole mass range** within a **split-second** with a resolution that allows the **separation** of even **isobaric compounds** are benefits of the new PTR-TOF-MS technology.

**Direct injection** of sample gases **without preparation** contributes to the **speed and simplicity** that is common to all our instruments.

Our unique **soft ionization (PTR) technology** together with our extensive experience in gas-phase ion chemistry and engineering of scientific instruments are the basis for the **reliability, ultra low detection limit, very low mass fragmentation, fast response time and robustness** of our PTR-MS systems.

- > High resolution time of flight
- > Single-digit pptv-level sensitivity
- > Mass range up to 50.000 amu
- > Full mass range acquisition in a split-second

Find out more:

[www.PTRMS.com/products/ptrtofms](http://www.PTRMS.com/products/ptrtofms)

# PTR-TOF 2000

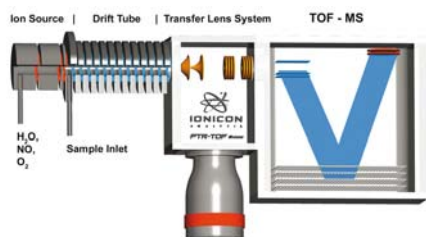


## IONICON PTR-TOF 2000 SPECIFICATIONS\*

- Mass range: 1-50.000 amu
- Resolution\*\* > 1.500 m/Δm (FWHM)
- Response time: 100 ms
- Sensitivity\*\*
  - Benzene: 80-150 cps/ppbv
  - Trichlorobenzene: 150-300 cps/ppbv
- Detection limit (Benzene)\*\*: 5 pptv averaged over 1 min
- Linearity range\*\*: 5 pptv - 1 ppmv
- Pulse frequency: up to 150 kHz
- Adjustable flow: 50 - 1000 sccm
- Inlet system (Different inlet systems available on request):
  - 1.2 m long inlet hose - with internal inert (PEEK) capillary
  - Inlet system heating: up to 180°C (356°F)
- Reaction chamber heating range: 40 - 130°C (104 - 266°F)
- Power supply and max. consumption: 100-230 V, 1000 W
- Dimensions (w x h x d): 56x130x78 cm (22x51,2x30,7 in.)
- Weight (incl. SRI): 179 kg (375 lbs)
- Interfaces:
  - 1x Touch screen display
  - 1x Ethernet 10/100 Mbit RJ45 (TCP/IP)
  - 1x RS 232
  - 2x Digital outputs
  - (digital/analog I/O package on request)

\*Specifications are subject to change without prior notice.  
 Product pictures and illustrations may differ from actual configuration.  
 \*\*Detection limit, linearity range and resolution are dependent on the substances measured, integration time and system set-up.

## TECHNOLOGY



The innovative technology all IONICON Analytik products are based on is Proton Transfer Reaction - Mass Spectrometry (PTR-MS).

This unique soft ionization is realized by proton transfer from  $H_3O^+$  ions to all compounds with a higher proton affinity than water. Common constituents of air such as  $N_2$ ,  $O_2$ , Ar,  $CO_2$  etc. have lower proton affinities than  $H_2O$  and are therefore not ionized. This is one of the main reasons for our market-leading low online detection limit for trace compounds in the range of a few pptv.

For the new IONICON PTR-TOF 2000 we use a compact orthogonal acceleration time of flight mass spectrometer delivering a typical resolution of 1500 - 2000 m/Δm.

The PTR-TOF 2000 achieves extremely high ion count rates thus fulfilling your needs of an ultra low detection limit and high sensitivity without lacking the benefits of a time of flight mass spectrometer.

This very fast IONICON PTR-TOFMS set-up allows for instantaneous quantification of the full mass range even of low concentrated VOCs with virtually no instrumental mass range limitation and a linearity range over five orders of magnitude.

## ROBUST & EASY TO USE

The PTR-TOF 2000 is completely software controlled and connected to a data acquisition computer. The most important parameters can be checked and adjusted via a touch screen display directly at the instrument.

A space-saving rack mounted on wheels allows for easy transportability and variable location measurements.

## PTR-TOF 2000<sup>+SRI</sup>

The IONICON PTR-TOF 2000 is now also available as PTR-TOF 2000<sup>+SRI</sup> (Switchable Reagent Ions) featuring  $NO^+$  and  $O_2^+$  as additional precursor ions.

The benefits are extraordinary as not only isomeric VOC compounds can be separated and instantaneously quantified (the separation of isobaric compounds is already possible by using the IONICON PTR-TOF 2000 with its single precursor ion  $H_3O^+$ ) but also substances with a smaller proton affinity than the PA of  $H_2O$  can now be detected with the PTR-TOF 2000<sup>+SRI</sup>.

## PTR+SRI-MS

SWITCHABLE REAGENT IONS

Find out more about PTR+SRI-MS:  
[www.PTRMS.com/technology](http://www.PTRMS.com/technology)

# PTR-QMS SERIES



THE WORLD'S  
LEADING  
PTR-MS  
COMPANY PRESENTS



## HIGH SENSITIVITY PTR-MS

**Detection Limit < 1 pptv**

The IONICON High-Sensitivity PTR-MS instrument is an **ultra-sensitive detector** for volatile organic compounds (VOCs) that allows for **continuous VOC quantification**.

Our **premium PTR-QMS series** product, based on quadrupole mass spectrometry, combines market-leading **low online detection limits** reaching even **ppqv-levels**, with high selectivity and a very fast response time.

**Direct injection** of sample gases **without preparation** contributes to the **speed and simplicity** that is common to all our instruments.

**Selective qualitative and quantitative analysis** of trace compounds in remarkably short measurement times combined with a system **linearity range** covering over **six orders of magnitude** satisfy the highest claims of the world's best scientists.

Our unique **soft ionization (PTR) technology** together with our extensive experience in gas-phase ion chemistry and engineering of scientific instruments accounts for the **reliability, ultra low detection limit, very low mass fragmentation, fast response time and robustness** of our PTR-MS systems.

**Mass Range 1-512 amu**

- > Market-leading low detection limit < 1 pptv
- > Real-time VOC quantification
- > Soft & efficient ionization technology
- > Fast and easy direct sample injection

Find out more:

[www.PTRMS.com/products/ptrqms](http://www.PTRMS.com/products/ptrqms)





# HIGH SENSITIVITY PTR-MS

## ONLINE VOC DETECTOR - 1 PPTV SPECIFICATIONS\*

- Mass range 1-512 amu (up to 2048 amu on request)
- Resolution < 1 amu
- Response time: 100 ms
- Measuring time: 2 ms/amu to 60 s/amu
- Detection limit\*\*: 1 pptv
- Linearity range\*\*: 1 pptv - 10 ppmv
- Sensitivity (Benzene)\*\* > 300 cps/ppbv
- Adjustable flow: 50 - 800 sccm
  - Inlet system (Dual inlet system available on request):
    - 1.2 m long inlet hose - with internal inert (PEEK) capillary
    - Inlet system heating: up to 180°C (356°F)
- Reaction chamber heating range: 40 - 130°C (104 - 266°F)
- Power supply and max. consumption: 100-230 V, 750 W
- Dimensions (w x h x d): 55x86x78 cm (21.7 x 33.9 x 30.7 in.)
- Weight: 140 kg (309 lbs)
  - Interfaces:
    - 1x Ethernet 10/100 Mbit RJ45 (TCP/IP)
    - 1x RS 232
    - 5x Digital outputs

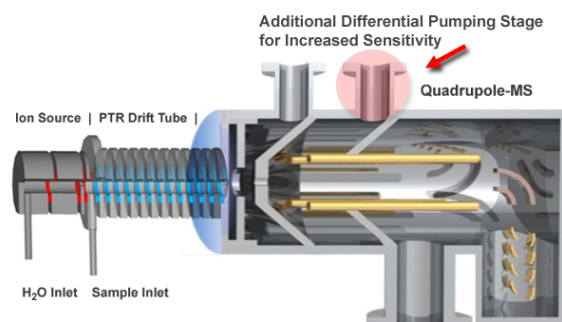
\*Specifications are subject to change without prior notice.

\*\*Actual detection limit and linearity range are dependent on the substances measured, integration time and system set-up.

## TECHNOLOGY

The innovative technology all IONICON Analytik products are based on is Proton Transfer Reaction - Mass Spectrometry (PTR-MS).

This unique soft ionization method is based on proton transfer from  $\text{H}_3\text{O}^+$  ions to all compounds with a higher proton affinity (PA) than water. Common constituents of air such as  $\text{N}_2$ ,  $\text{O}_2$ , Ar,  $\text{CO}_2$  etc. have lower proton affinities than  $\text{H}_2\text{O}$  and are therefore not ionized. This is one of the main reasons for our market-leading low online detection limit for trace compounds in the range of less than one pptv.

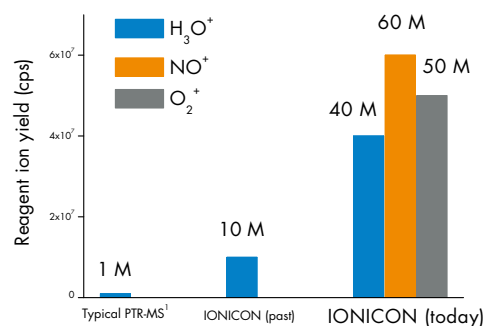


## ULTRA SENSITIVE

The High-Sensitivity PTR-MS, our PTR-QMS series' flagship product is incarnating our technological evolution of more than a decades's experience in PTR-MS.

An additional differential pumping stage along with many other small refinements of our unique PTR-MS technology accounts for the extraordinary sensitivity and detection limit this instrument achieves.

Up to 60.000.000 precursor ions are responsible for a break-through in real-time mass spectrometry: for the first time an IONICON PTR-MS instrument is capable of quantifying concentrations in the ppqv-range.



<sup>1</sup> R.S.Blake, P.S.Monks and A.M.Ellis, Chem.Rev., 109 (2009) 861.

## PTR+SRI-MS

The IONICON High-Sensitivity PTR-MS is now also available as High-Sensitivity PTR-MS<sup>+SRI</sup> (Switchable Reagent Ions) featuring  $\text{NO}^+$  and  $\text{O}_2^+$  as additional precursor ions.

The benefits are extraordinary as not only isomeric VOC compounds can be separated and instantaneously quantified but also substances with a smaller proton affinity than the PA of  $\text{H}_2\text{O}$  can now be detected with the High-Sensitivity PTR-MS<sup>+SRI</sup>.

Find out more about PTR+SRI-MS:  
[www.PTRMS.com/technology](http://www.PTRMS.com/technology)

## STANDARD PTR-MS



## Sensitive Real-Time Trace Gas Detector

>> 30 PPTV - 10 PPMV

The IONICON® Standard PTR-MS instrument is a very **sensitive detector** for volatile organic compounds (VOCs) that allows for **continuous VOC quantification**.

This PTR-Quad-MS product offers a **low online detection limit** in the **pptv-range**, even for **complex gas mixtures**, but nevertheless has an **advantageous price**.

**Direct injection** of sample gases **without preparation** contributes to the **speed and simplicity** that is common to all our instruments.

**Selective qualitative and quantitative analysis** of trace compounds in remarkably short measurement times combined with a system **linearity range** covering over **five orders of magnitude** make the Standard PTR-MS an essential tool for scientific laboratories and research groups.

Our unique **soft ionization (PTR) technology** together with our extensive experience in gas-phase ion chemistry and engineering of scientific instruments accounts for the **reliability, low detection limit, very low mass fragmentation, fast response time and robustness** of our PTR-MS systems.

- > low online detection limit (pptv-level)
- > real-time VOC quantification
- > soft ionization technology - low fragmentation
- > fast and easy direct sample injection

Find out more: [www.PTRMS.com/products](http://www.PTRMS.com/products)





# STANDARD PTR-MS



## ONLINE VOC DETECTOR - 30 PPTV SPECIFICATIONS\*

- > Mass range 1-512 amu
- > Resolution < 1 amu
- > Response time: 100 ms
- > Measuring time: 2 ms/amu to 60 s/amu
- > Detection limit\*\*: 30 pptv
- > Linearity range\*\*: 30 pptv - 10 ppmv
- > Adjustable flow: 50 - 800 sccm
  - >> Inlet system (Dual inlet system available on request):
    - > 1.2 m long inlet hose - with internal inert (PEEK) capillary
    - > Inlet system heating: up to 150°C (302°F)
- > Reaction chamber heating range: 40 - 120°C (104 - 248°F)
- > Power supply and max. consumption: 100-230 V, 750 W
- > Dimensions (w x h x d): 55x86x78 cm (21.7 x 33.9 x 30.7 in.)
- > Weight: 130 kg (287 lbs)
  - >> Interfaces:
    - 1x Ethernet 10/100 Mbit RJ45 (TCP/IP)
    - 1x RS 232
    - 5x Digital outputs

\*Specifications are subject to change without prior notice.

\*\*Actual detection limit and linearity range are dependent on the substances measured, integration time and system set-up.

## TECHNOLOGY

The innovative technology all IONICON Analytik products are based on is called PTR-MS (Proton Transfer Reaction - Mass Spectrometry).

This unique soft ionization method is based on proton transfer from  $H_3O^+$  ions to all compounds with a higher proton affinity than water. Common constituents of air such as  $N_2$ ,  $O_2$ , Ar,  $CO_2$  etc. have lower proton affinities than  $H_2O$  and are therefore not detected. This is one of the main reasons for our market-leading low online detection limit for trace compounds in the range of a few pptv.

## ROBUST & EASY TO USE

Our instruments are completely software controlled and are connected via a LAN-cable to a laptop computer. A single power button switches on the whole system. No gas supply is necessary and the instrument can be operated in nearly every environment. Light weight, space-saving and mounted on wheels our PTR-MS systems are often used for field campaigns or variable location measurements.

## SERVICE & SUPPORT

We offer service contracts on our high-end PTR-MS systems and strongly recommend you to top up your solution with one of our maintenance vouchers to ensure optimum performance.

We offer one, two, three or more years service contracts covering the regular maintenance intervals, thus giving you the chance to concentrate on the important things. Please ask us for your individual solution!

Our instruments are designed to continuously satisfy the needs of our customers, requiring little maintenance and being easy to use.

IONICON Analytik welcomes special wishes from customers and has long-standing experience in developing customized systems. Our in-house software department knows what your needs are in the lab or in the field and continuously improves our software's performance and the straight-forward experience you have with our instruments.

## APPLICATION EXAMPLES



- Environmental research
  - Atmospheric chemistry
  - Emissions monitoring
  - Biological research
- Nutrition, Food & Flavor science
  - Coffee headspace measurement
  - Aroma and fragrance analysis
  - Head- and nose-space gas analysis
  - Determination of food freshness
- Ambient air control
  - Indoor air VOC detection
  - SBS monitoring
  - Cleanroom environment monitoring
  - Passenger cabin air VOC detection
- Industrial applications
  - Waste incineration process control
  - Engine exhaust monitoring
  - Material and packaging research
  - Online VOC monitoring in factories

## COMPACT PTR-MS



## Compact Real-Time VOC Monitoring Station >> 500 PPTV - 10 PPMV

The IONICON® Compact PTR-MS instrument is a very sensitive **monitoring system** for volatile organic compounds (VOCs) that allows for **continuous online VOC quantification**.

Developed for **VOC monitoring in production processes or in the field** this PTR-Quad-MS product offers a **straight forward user interface** and is **ready to measure 15 minutes after power-on**.

The Compact PTR-MS can be **carried by hand**, is **space-saving** and nevertheless offers a **low online detection limit** even for **complex gas mixtures**.

**Direct injection** of sample gases **without preparation** combined with **selective qualitative and quantitative analysis** of trace compounds makes the Compact PTR-MS the perfect tool for online VOC monitoring.

Our unique **soft ionization (PTR) technology** together with our extensive experience in gas-phase ion chemistry and engineering of online monitoring instruments accounts for the **reliability, low detection limit, very low mass fragmentation, fast response time and robustness** of our PTR-MS systems.

- > real-time VOC quantification
- > small dimensions and low weight
- > short start-up time
- > fast and easy direct sample injection

Find out more: [www.PTRMS.com/products](http://www.PTRMS.com/products)



# COMPACT PTR-MS

## ONLINE VOC DETECTOR - 500 PPTV SPECIFICATIONS\*

- > Mass range 1-300 amu
- > Resolution < 1 amu
- > Response time: 100 ms
- > Measuring time: 2 ms/amu to 60 s/amu
- > Detection limit\*\*: 500 pptv
- > Linearity range\*\*: 500 pptv - 10 ppmv
- > Adjustable flow: 50 - 500 sccm
  - >> Inlet system (inlet system options available on request):
    - > 1.2 m long inlet hose - with internal inert (PEEK) capillary
    - > Inlet system heating: up to 150°C (302°F)
- > Reaction chamber heating range: 40 - 120°C (104 - 248°F)
- > Power supply and max. consumption: 100-230 V, 650 W
- > Dimensions (w x h x d): 63x47x63 cm (24.8 x 18.5 x 24.8 in.)
- > Weight: 55 kg (122 lbs)
  - >> Interfaces:
    - 1x Ethernet 10/100 Mbit RJ45 (TCP/IP)
    - 1x RS 232
    - 5x Digital outputs

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## TECHNOLOGY

The innovative technology all IONICON Analytik products are based on is called PTR-MS (Proton Transfer Reaction - Mass Spectrometry).

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## ROBUST & EASY TO USE

The Compact PTR-MS is completely software controlled and connected via a LAN-cable to a laptop computer. 15 minutes after power-on the system is ready to measure. No gas supply is necessary and the instrument can be operated in nearly every environment. The Compact PTR-MS can be carried by hand, is light weight, space-saving and thus often used for field campaigns or variable location measurements.



## SERVICE & SUPPORT

We offer service contracts on our high-end PTR-MS systems and strongly recommend you to top up your solution with one of our maintenance vouchers to ensure optimum performance.

We offer one, two, three or more years service contracts covering the regular maintenance intervals, thus giving you the chance to concentrate on the important things. Please ask us for your individual solution!

Our instruments are designed to continuously satisfy the needs of our customers, requiring little maintenance and being easy to use.

IONICON Analytik welcomes special wishes from customers and has long-standing experience in developing customized systems. Our in-house software department knows what your needs are in the lab or in the field and continuously improves our software's performance and the straight-forward experience you have with our instruments.

## PROCESS MONITORING

The Compact PTR-MS was developed to be a robust online VOC monitoring instrument for industrial applications.

It can be deployed as a stand-alone process mass-spectrometer and easily used in multiple locations or as a scalable and cost-efficient monitoring station with multiple sampling points and a customized software package to monitor low concentrated VOCs in real-time.

## APPLICATION EXAMPLES



- Emissions monitoring
- Food quality control
- Indoor air VOC detection (SBS monitoring)
- Cleanroom environment monitoring
- Passenger cabin air VOC detection
- Waste incineration process control
- Engine exhaust monitoring
- Online VOC monitoring in chemical plants