

Vyntus® / SentrySuite®

Technical Specifications

- Flexible, modular software and hardware design.
- Compliant to the latest 2005 ATS/ERS standardization guidelines.
- Suitable for physician offices, specialty practices, hospitals, and for research purposes.
- Vyntus is centered around the unique SentrySuite Software Package focusing on efficiency and productivity.
- State-of-the-art hygiene concept for patient, operator and environmental safety.



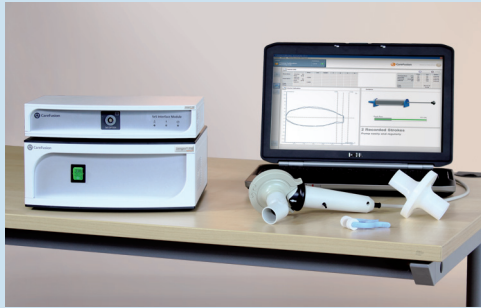
Rely on our JAEGER™ pneumotach for highly accurate and reliable measurements.

Its excellent dynamic range allows for testing a broad population, from small children to athletes.



Vyntus® PNEUMO

PC based spirometry system for the measurement, recording and assessment of Slow and Forced Spirometry, Maximum Voluntary Ventilation (MVV) and pre/post handling. The system is equipped with a heated pneumotach and can be extended with a shutter for measuring airway resistance Rocc, P0.1 and MIP/MEP.



Measuring parameters

Forced Spirometry (FVC):

FVC, FEV1, FEF25, FEF50, FEF75, PEF, PIF, FEV1 %VC, ...

Slow Spirometry (SVC):

ERV, IRV, IC, VT, VCIN, VCEX, VCMAX.

Maximum Voluntary Ventilation (MVV):

MVV, BF, VT, ...

Hardware

- JAEGER heated pneumotach
- Vyntus Interface Module with USB
- Vyntus table top Power Module
- Accessories (mouthpieces, MicroGard™ II filter, nose clips, ...)
- Calibration syringe (option)
- Validated desktop / 19" TFT monitor or notebook computer
- Colour inkjet or colour laser printer
- Shutter (option)
- Support arm with table clamp (option)
- Vyntus Ambient Module (option)
- Combination with IOS / APS (option)

Software

- SentrySuite ≥ V2.15
- Measuring program Spirometry plus
 - Airway Resistance Rocc (option)
 - P 0.1 (option)
 - MIP / MEP (option)

Vyntus® IOS

PC based Spirometry / Impulse Oscillometry system for the measurement and assessment of oscillometric diagnostics independent of patient cooperation. The Impulse Oscillometry System (IOS) does not only allow for a quick and reliable determination of pulmonary obstructions but further differentiates between central and peripheral components.



Measuring parameters

Same as Vyntus PNEUMO, plus:

Impulse Oscillometry:

R5Hz, X5Hz, Fres., AX, D5-20%, VT, ...

Hardware

- JAEGER heated IOS pneumotach
- Vyntus IOS head with impulse generator and Y-adapter
- Reference impedance
- Vyntus Interface Module with USB
- Vyntus table top Power Module
- Table clamp with pneumatic arm
- Accessories (mouthpieces, MicroGard™ II filter, nose clips, ...)
- Calibration syringe (option)
- Validated desktop / 19" TFT monitor or notebook computer
- Colour inkjet or colour laser printer
- Vyntus Ambient Module (option)
- Combination with PNEUMO / APS (option)

Software

Same as Vyntus PNEUMO, plus:

- Measuring program IOS

Vyntus® APS

Specific and unspecific provocation test can be easily performed with the Aerosol Provocation System APS.

Up-to-date and sophisticated electronics and mechanics allow for optimal use of its nebulization technology with precise dosing. For the observation measurements Vyntus APS can be combined with the Vyntus PNEUMO or IOS.



Measuring parameters

Provocation dose (PD) or provocation

concentration (PC) for freely adjustable parameters like PD/PC-20 FEV1, PD/PC+50 (Rocc), PD/PC+40 R5 (IOS), PD/PC+100 sReff (Body), PD/PC-40 sGeff (Body) ...

Hardware

- Vyntus APS nebulizer head
- MedicAid Sidestream® nebulizer
- Support arm with table clamp
- Vyntus Interface Module PRO with low sound compressor and USB
- Vyntus table top Power Module
- Accessories (mouthpieces, nose clips, aerosol filter, conclusion cap, ...)
- Calibration syringe (option)
- Validated desktop / 19" TFT monitor or notebook computer
- Colour inkjet or colour laser printer
- Vyntus Ambient Module (option)
- Combination with Vyntus PNEUMO and/or Vyntus IOS necessary (option)

Software

- SentrySuite ≥ V2.15
- Measuring program Bronchial Challenge Testing

Vyntus® CART

Trolley for Vyntus PNEUMO and IOS with up to two adjustable swivel arms and several mounting options for syringe, printer and other peripheral devices.

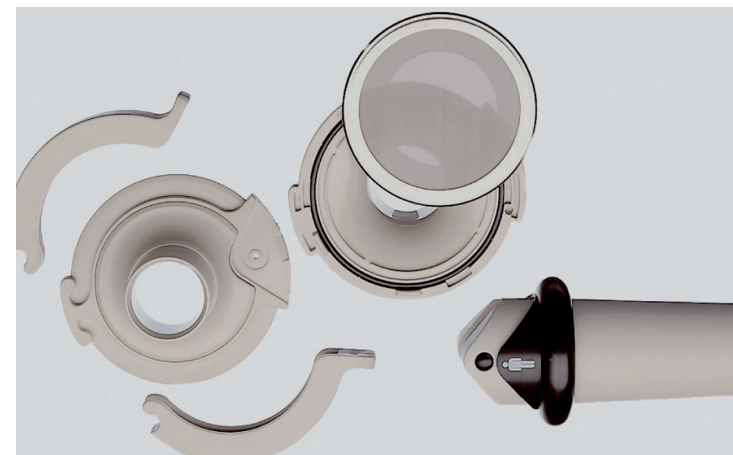


Hardware

- Base container for desktop PC, Vyntus Interface Module and further accessories
- Integrated Vyntus Power Module with isolation transformer
- Height adjustable keyboard drawer
- Height adjustable monitor mount useable for monitors 19" - 24"
- Adjustable swivel arm for IOS / APS and/or PNEUMO / APS
- 4 solid wheels with a 360° rotation and breaks
- Mount for 3 Liter syringe (option)
- Drawer for accessories (option)
- Shelf Standard for printer positioned on the front side (option)
- Shelf Long (option)
- Shelf Short (option)
- Built-in network isolator

Flow-Volume/pressure measurements

| | | |
|---------------------------------|------------|---------------------------------------------------------------------------------|
| Flow | Type | Pneumotach |
| | Range | 0 to ± 20 L/s |
| | Accuracy | 0 to 18 L/s: ± 2 % 18 to 20 L/s: ± 5 % |
| | Resolution | 1 μ L/s |
| | Resistance | < 0.05 kPa/(L/s) (0.5 cmH ₂ O/(L/s)) at 10 L/s |
| | CMRR | > 60 dB at 50 Hz |
| Volume | Type | Software Integration |
| | Range | ± 20 L |
| | Accuracy | 0 to 20 L: ± 3 % or ± 0.05 L (whichever is greater) |
| | Resolution | 1 μ L |
| Mouth pressure Vyntus PNEUMO | Type | Piezo Resistive |
| | Range | ± 20 kPa (± 150 mmHg) |
| | Accuracy | 0 to 2 kPa (0 to 15 mmHg): ± 2 % 2 to 20 kPa (15 to 150 mmHg): ± 5 % |
| | Resolution | 0.001 Pa (0.0000075 mmHg) |
| | CMRR | > 60 dB at 50 Hz |
| Mouth pressure Vyntus IOS | Type | Piezo Resistive |
| | Range | ± 2 kPa (± 15 mmHg) |
| | Accuracy | ± 2 % |
| | Resolution | 0.001 Pa (0.0000075 mmHg) |



JAEGER Pneumotach

Vyntus® APS

| | | |
|------------|--------------------|---------------------------------|
| Compressor | Flow | 8 L/min \pm 1.5 L/min |
| | Pressure | 1.4 bar \pm 0.3 bar |
| Nebulizer | Name | Philips Respironics Sidestream® |
| | Type | Compressed air nebulizer |
| | Mean mass diameter | 3.2 μ m |
| | Output power | 240 mg/min |



Vyntus APS with Spirometry and Rocc

Vyntus® IOS

| | | |
|-------------|-----------------------------------|------------------------------------|
| Test signal | Type | Impulses of alternating direction |
| | Pulse interval | 0.1 - 10 s |
| | Impulse length | 40 ms |
| | Frequency range of single impulse | 0 - 100 Hz |
| | Maximal impulse pressure | 0.3 kPa (3 cmH ₂ O) |
| | Power spectrum | Maximum at 5 Hz to -25 dB at 50 Hz |
| | System verification | Reference impedance |
| Accuracy | | < ± 2 % |

Calibration syringe

| | |
|-----------|-----------|
| Volume: | 1 L / 3 L |
| Accuracy: | +/- 12 mL |



Vyntus APS with IOS

| Power supply | | |
|-----------------------------------------------|-------------------|----------------------------------------|
| PC or notebook | Main voltage | 100 to 240V AC; 50 to 60 Hz, max 1.5 A |
| | Power input | max. 1.5 A (depending on PC/notebook) |
| Vyntus PNEUMO / IOS / APS Table version | Main voltage | 220 to 240 V, AC, 50/60 Hz |
| | Power input table | 500 VA |
| | Electrical safety | Protection class I |
| Vyntus PNEUMO / IOS / APS with Vyntus CART | Main voltage | 220 to 240 V, AC, 50/60 Hz |
| | Power input | 700 VA |
| | Electrical safety | Protection class I |
| Moisture protection | Complete system | IP 20 |

Classification of applied parts

| | | |
|---------------|--------------|--------|
| Vyntus PNEUMO | Applied Part | Type B |
| Vyntus IOS | Applied Part | Type B |
| Vyntus APS | Applied Part | Type B |

Category according to MDD 93/42/EEC (2007)

| | | |
|--|-----------------|----------------------------------|
| | Complete system | Active class IIa medical product |
|--|-----------------|----------------------------------|

Operating mode

| | | |
|--|-----------------|----------------------|
| | Complete system | Continuous operation |
|--|-----------------|----------------------|

Ambient conditions

| | | |
|-----------------|------------------|-----------------------------------|
| Complete System | Altitude | ≤ 2000m |
| | Temperature | +10°C to +34°C (+ 50°F to 93.2°F) |
| | Rel. humidity | 20 to 80 % RH, non-condensing |
| | Ambient pressure | 800 to 1060 hPa (600 to 795 mmHg) |

Transport and storage conditions

| | | |
|-----------------|------------------|-----------------------------------|
| Complete System | Temperature | - 20°C to + 50°C (- 4°F to 122°F) |
| | Rel. humidity | 15 to 95 % RH, non-condensing |
| | Ambient pressure | 600 to 1200 hPa (375 to 900 mmHg) |

Dimensions

| | | |
|-----------------------------------------------|------|---------------------------------------------------------------|
| Vyntus Interface Module for Vyntus PNEUMO/IOS | Size | 29.2 x 19.8 x 6.4 cm (11.5" x 7.8" x 2.5") (W x D x H) |
| Vyntus Interface Module PRO for Vyntus APS | Size | 29.2 x 29.2 x 12.3 cm (11.5" x 11.5" x 4.8") (W x D x H) |
| Vyntus Power Module - table top version | Size | 29.2 x 29.2 x 12.3 cm (11.5" x 11.5" x 4.8") (W x D x H) |
| Vyntus CART with arm | Size | 80 x 107-127 x 142-175 cm (32" x 42-50" x 56-69") (W x D x H) |
| Shelf Standard for Vyntus CART | Size | 51 x 37.3 cm (20" x 14.7") (W x D) |
| Shelf Long for Vyntus CART | Size | 51 x 44.3 cm (20" x 17.4") (W x D) |
| Shelf Short for Vyntus CART | Size | 51 x 25 cm (20" x 9.8") (W x D) |
| Drawer for Vyntus CART | Size | 51 x 37.3 x 14 cm (20" x 14.7" x 5.5") (W x D x H) |
| Keyboard Drawer for Vyntus CART | Size | 51 x 37.3 x 9.5 cm (20" x 14.7" x 3.7") (W x D x H) |



Vyntus PNEUMO with Shutter/Rocc



Vyntus CART for IOS and PNEUMO

MicroGard™II Bacterial/Viral Filter (1)

| | | |
|------------------------------------------------------|------------------------|---------------------------------------------|
| MicroGardIIB/IIC | Application | Single patient use |
| | Latex | Latex-free product |
| | Inspiratory Resistance | < 0.04 kPa/(L/s) (0.4cm H2O/(L/s)) at 1 L/S |
| | Expiratory Resistance | < 0.04 kPa/(L/s) (0.4cm H2O/(L/s)) at 1 L/S |
| | Filtering Efficiency | > 99.999 % (Nelson Test Lab) |
| | Filter Volume | 55 mL (effective) |
| MicroGard IIC | Connections | 30 mm ID. 30 mm OD. Tapered ports |
| MicroGard IIB (Filter with integrated mouthpiece) | Connection | 30 mm ID. Tapered port |

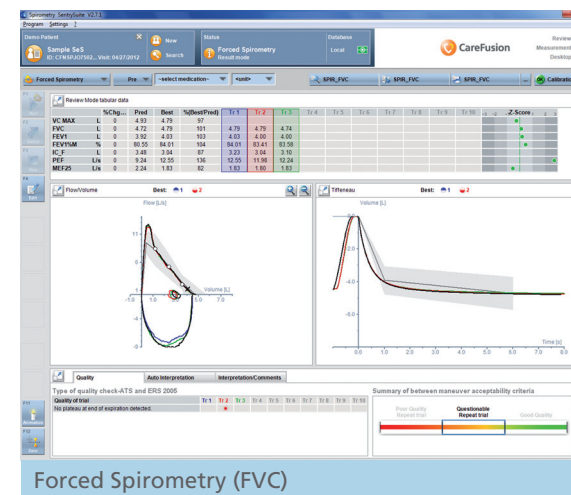
SentrySuite® software

| | |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| OS for instrument, workstation and small system server | Windows® 7 Professional/Ultimate/Enterprise 64 bit SP1 and Windows® 8.1 Pro/Enterprise 64 bit For updates: Windows® 7 Professional 32 bit SP1 |
| Data platform | Microsoft® SQL Server® 2008 R2 |
| Edition | Standard or Enterprise edition |
| Languages | English, English (US), German, French, Italian, Spanish, Portuguese, Danish, Swedish, Norwegian, Finnish, Polish, Russian, Korean |
| .NET framework | 3.5 for MS SQL Server, 4.5 for SentrySuite and Sentry.NET |

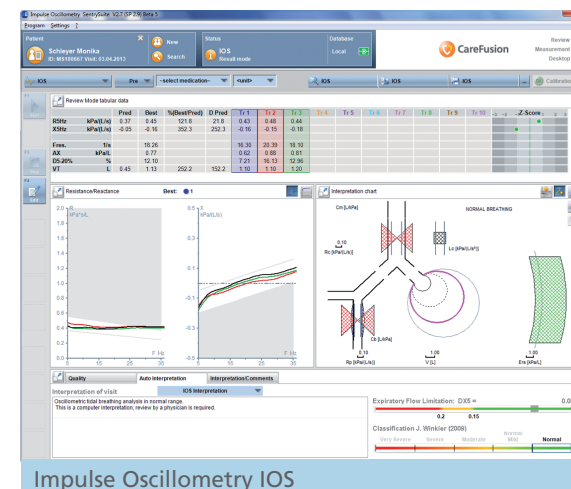
Instrument, workstation and small system server requirements

| | | |
|---------------------|-------------------------|--------------------------------------------------------------------------------------------------------------|
| Computer | Manufacturer | Dell™ |
| | Processor | Minimum Dual Core™ with 2.0 GHz Recommended Quad Core™ with 2.8 GHz or more |
| | RAM | Minimum 3 GB for 32 bit OS, 4 GB for 64 bit OS Recommended 4 GB for 32 bit OS, 8 GB or more for 64 bit OS |
| | Hard drive | Minimum 100 GB HDD, recommended 320 GB SSD, 20 GB free disc space |
| | Other drive | DVD-ROM, recommended DVD-RW |
| | Network | If networking: 100Mbit/s TCP/IP, recommended 1000Mbit/s |
| Interfaces | Vyntus Interface Module | 1 free USB 2.0 |
| Monitor | Fingerprint reader | 1 free USB 2.0; supported with Windows® 7 32 bit only |
| | Screen resolution | Minimum 1280x 900, wide or normal screen |
| Power | Display | 24 / 32 bit colour |
| | Computer | 100 to 240V AC, 4.6A |
| Small system server | Monitor | 100 to 240V AC, 4.6A |
| | Networked stations | Maximum 5 stations including server/client PC |

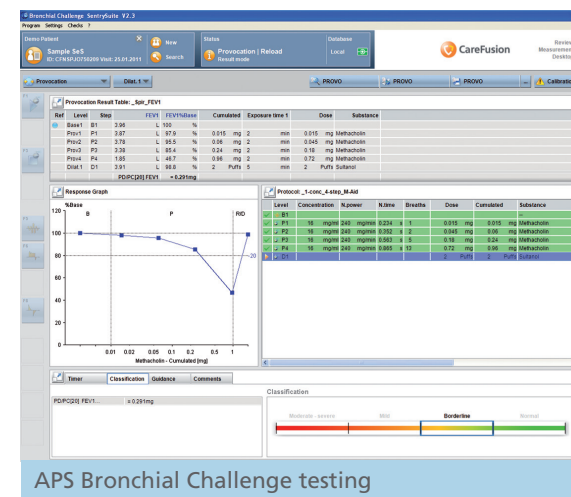
1) For more detailed technical specification please refer to the MicroGard Filter specification sheet



Forced Spirometry (FVC)



Impulse Oscillometry IOS



APS Bronchial Challenge testing

Server system requirements

| | | |
|----------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Computer | Processor | Minimum Dual Core™ with 2.0 GHz Recommended Quad Core™ with 2.8 GHz or more |
| | RAM | Minimum 3 GB for Windows® 7 32 bit, 8 GB for 64 bit OS Recommended 16 GB for all Operating Systems |
| | Hard drive | Minimum 360 GB free disc space with a performance based RAID level or SSD, recommended + 600 GB per + 100,000 patients with a performance based RAID level or SSD |
| | Other drive | DVD-ROM, recommended DVD-RW |
| | Network | 100 Mbit/s TCP/IP, recommended 1000 Mbit/s |
| | OS | Windows® 7 Professional/Ultimate/Enterprise 64 bit SP1 and Windows® 8.1 Pro/Enterprise 64 bit For updates: Windows® 7 Professional 32 bit SP1 Windows® Server 2008 R2 or 2012 For updates: Windows® Server 2003 SP2 |
| Monitor | Screen resolution | Minimum 1024 x 768, recommended 1280 x 1024 |
| Power | Server | 100 to 240V AC, 4.6A |
| | Monitor | 100 to 240V AC, 4.6A |

Network hardware

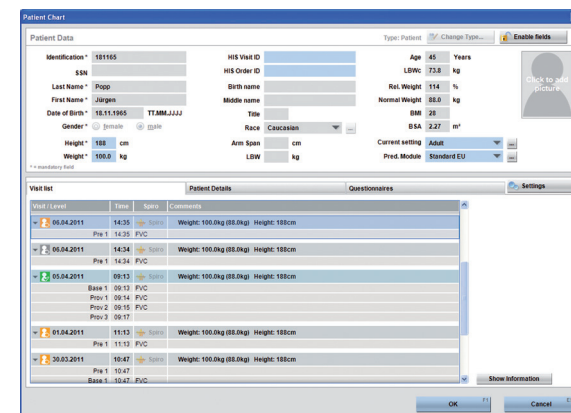
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|----------|-------|---------------------------------------------|
| Ethernet | Speed | Minimum 100 Mbit/s, recommended 1000 Mbit/s |
|----------|-------|---------------------------------------------|

Sentry.NET server requirements

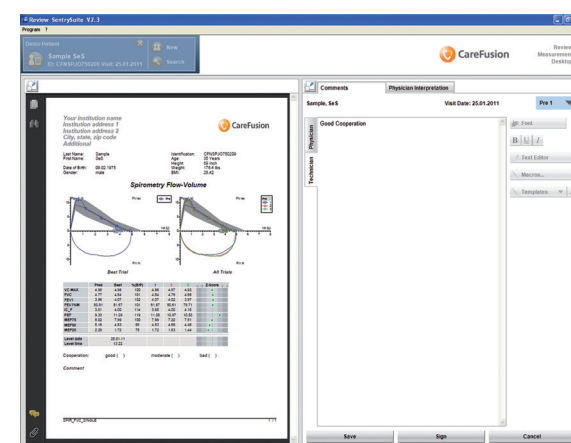
| | | |
|----------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Computer | Processor | Minimum Dual Core™ with 2.0 GHz Recommended Quad Core™ with 2.8 GHz or more |
| | RAM | Minimum 3 GB for 32 bit OS, 4 GB for 64 bit OS Recommended 4 GB for 32 bit OS, 8 GB or more for 64 bit OS |
| | Hard drive | Minimum 100 GB HDD, recommended 320 GB SSD 20 GB free disc space |
| | Other drive | DVD-ROM, recommended DVD-RW |
| | Network | 100Mbit/s TCP/IP, recommended 1000 Mbit/s |
| OS | OS | Windows® 7 Professional/Ultimate/Enterprise 64 bit SP1 with IIS 7.5 For updates: Windows® 7 Professional 32 bit SP1 with IIS 7.5 Windows® 8.1 Pro/Enterprise 64 bit with IIS 8.0 Windows® Server® 2008 R2 with IIS 7.5 or 2012 with IIS 8 For updates: Windows® Server® 2003 SP2 with IIS 6 |
| | OS | Windows® 7 Professional/Ultimate/Enterprise 64 bit SP1 with IIS 7.5 For updates: Windows® 7 Professional 32 bit SP1 with IIS 7.5 Windows® 8.1 Pro/Enterprise 64 bit with IIS 8.0 Windows® Server® 2008 R2 with IIS 7.5 or 2012 with IIS 8 For updates: Windows® Server® 2003 SP2 with IIS 6 |
| Monitor | Screen resolution | Minimum 1280 x 900, wide or normal screen |
| | Display | 32 bit colour |
| Power | Computer | 100 to 240V AC, 4.6A |
| | Monitor | 100 to 240V AC, 4.6A |

Sentry.NET clients requirements

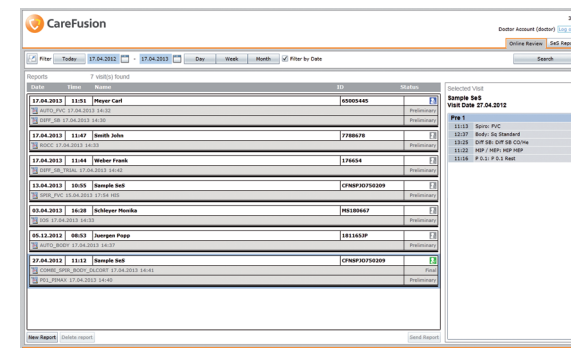
| | | |
|--|---------------------|-----------------------------------------------------------------------------------|
| | Browser | Internet Explorer 9 for Windows® 7 SP 1 and Internet Explorer 10 for Windows® 8.1 |
| | Silverlight version | Microsoft® Silverlight 5.1 |



Patient Data



Review Program for Interpretation



Sentry.NET

Features at a Glance

Vyntus® Products with SentrySuite® Software

| | Vyntus PNEUMO | Vyntus IOS | Vyntus APS | Report Station |
|----------------------------------------------------------------------------------|---------------|------------|------------|----------------|
| Measurement Programs | | | | |
| Forced Spirometry (FVC)/ Slow Spirometry (SVC) / MVV | x | x | o | x |
| Spirometry Animation Programs | x | x | o | - |
| Airways Resistance by R Occlusion | o | o | o | x |
| Impulse Oscillometry IOS | o | x | o | x |
| P O.1 | o | o | o | x |
| MIP / MEP | o | o | o | x |
| Bronchial Challenge with APS | o | o | x | x |
| Calibration Programs | | | | |
| Flow/Volume Calibration | x | x | x | - |
| Data Management Programs | | | | |
| SentrySuite Desktop (Settings, Export/Import) | x | x | x | x |
| SentrySuite Review | x | x | x | x |
| Patient Data | x | x | x | x |
| Report Output (Print, View, Quick View, Save, PDF) | x | x | x | x |
| Multiformat Output (JPG, TIFF, RTF) | x | x | x | x |
| Auto Interpretation | x | x | x | x |
| ATS/ ERS Quality Check | x | x | x | x |
| Comments/ Physician Interpretation | x | x | x | x |
| Report Designer for generating customized reports | x | x | x | x |
| Predicted Values and Reference Sets Design and Editor | x | x | x | x |
| Offline Data Input | x | x | x | x |
| SeS Quality Management | x | x | x | - |
| Log file viewer | x | x | x | x |
| Backup/Restore | x | x | x | x |
| Interconnectivity Manager for interface with JLAB / Vmax / SPCS platforms | x | x | x | x |
| MedGraphics and nSpiire Import Function (consult IFU for compatible SW versions) | x | x | x | x |
| GDT connection (German standard) | x | x | x | x |
| Questionnaire Designer | o | o | o | o |
| SeS Q Remote Tablet Questionnaire | o | o | o | o |
| Security and User Administration | o | o | o | o |
| SentryConnect for HIS integration | o | o | o | o |
| Spirometer Data Transfer (FlowScreen®, SpiroPro®, MicroLoop, MicroLab) | x | x | x | x |
| SeS SQL Database Interface Query | o | o | o | o |
| Patient Data Management | o | o | o | o |
| Networking | o | o | o | x |
| Sentry.NET Web Application | o | o | o | o |

x = Standard (depending on the existing measuring system)
o = Option
- = Not available

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