Datasheet

Sensis Vibe

Hemodynamic- and Electrophysiology- Recording and Information System for Interventional Labs

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SIEMENS Healthineers

Sensis Vibe

Recording and procedure data management system

Sensis Vibe is Siemens Healthineers recording and procedure data management system for interventional cardiology, electrophysiology, interventional radiology, and surgical procedures performed in a hybrid OR.

It offers acquisition functionality for patient vital signs, invasive pressures and intracardiac ECG* and the calculation of diagnostic parameters derived from these measurements.

In addition to recording these measurements and calculations, Sensis Vibe provides an intuitive and time-efficient tool for documenting procedure data* during the case as well as in pre- and post-procedural holding areas.

The database for documentation is flexibly adaptable to the individual institution and supports consistency of procedure records with validation functionality.

Medical and administrative data documented in the Sensis Vibe database (also called SIS: Sensis Information System) is readily available for procedure reporting, which can be done either using Sensis Vibe's reporting functionality or by transferring Sensis Vibe's data to other IT systems.

Highlights

Hemodynamic Acquisition

The baseline functionality of Sensis Vibe is acquisition of patient vital signs and invasive pressures. It is delivered with a compact bedside signal input box, the HemoBox, which fulfills the hygienic requirements of a surgical environment.

The HemoBox can acquire standard vital signs as well as invasive pressures (up to four channels). From these acquired parameters, the hemodynamic software application on Sensis Vibe can derive several diagnostic parameters and compare them across conditions.

Vital signs:
- Non-invasive blood pressure
- SpO_2 oxygen saturation
- $etCO_2$ concentration*
- Surface ECG
- Body Temperature*
- Respiration rate* using Microstream™ MicroPod™ external $etCO_2$ Module

Calculated and derived hemodynamic parameters:
- Pressure calculations
- Rate of pressure change (dP/dtmax)
- Gradients
- Fractional Flow Reserve (FFR)**
- DFR™, a Boston Scientific algorithm
- Resting Pd/Pa
- Systolic area index (SAI)
- Shunts
- Cardiac output
- Valve area
- Work and power
- Cardiac index, flow and stroke volume
- Resistances
- Regurgitation

Electrophysiology Acquisition*

Sensis Vibe can be extended to a combo version featuring both hemodynamic and electrophysiology acquisition.

This version is delivered with a different signal input unit, the ComboBox, with up to 96 bipolar ICEG channels.

Vital signs:
- Non-invasive blood pressure
- SpO_2 oxygen saturation
- $etCO_2$ concentration*
- Surface ECG
- Respiration rate* using Microstream™ MicroPod™ external $etCO_2$ Module

Electrophysiology application:
- Customized display of baseline ICEG with different colors, sweep speeds and lead set-ups
- Activation of stimulation on any configured signals with up to four channels, of which two can be active simultaneously
- Ablation parameters (duration, temperature, power, impedance)
- Mapping System interface**

Calculated and derived hemodynamic parameters:
- Equal to the HemoBox

** Option; ** Option, please check combination with 3rd party systems*

Highlights

Procedure data management

Sensis Vibe's usability concept is designed around the idea that physiological measurements on the acquisition side and the documentation of the procedure need to be performed simultaneously.

FlashDoc* is a documentation and data management tool for the interventional lab.

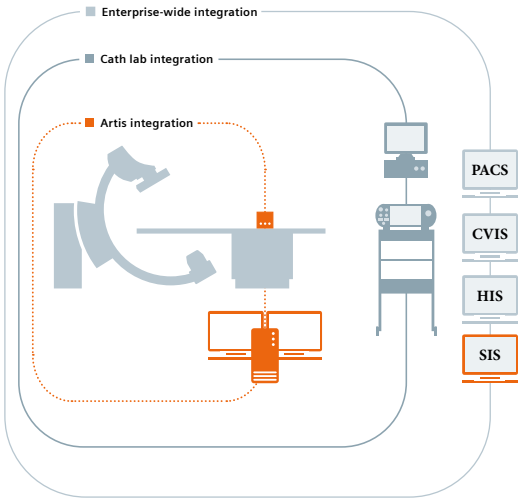
Entries to the flexibly adaptable Sensis Vibe database (Sensis Information System) are made via a single point of data entry, the QuickAdd field.

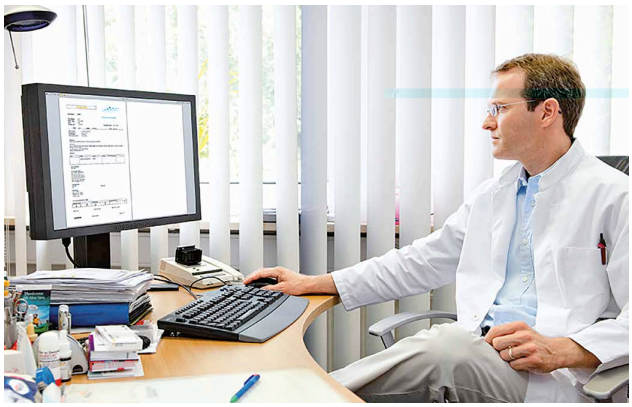
On the acquisition unit, the data is then displayed in a structured, time-stamped CaseLog where details of an event or entry can be edited.

Data can also be captured and edited on satellite Report Workstations*, for example in holding areas, inside the examination room or even in offices distant from the interventional lab. This software turns a PC into a Sensis Vibe database client.

FlashDoc-equipped acquisitions systems and report workstations are equipped with a pdf report generator.

A report template is automatically populated with procedure data at the end of a study and can then be edited with comments on Sensis Vibe systems or any office PC and sent to other stakeholders.





IT Integration

Data captured with Sensis Vibe pre-cath, during the procedure and after the case is stored in an institution-adapted Sensis Information System (SIS) database.

Integration with hospital IT infrastructure using industry standard interfaces for seamless information integration and reduce clinical and billing errors.*

- Demography integration with ADT systems
- Receives orders
- Receives LAB ACT values from POC
- Automatic documentation of consumables and devices (integration with inventory systems)
- Distribution of reports structured and non-structured
- Integration with billing systems
- Archival of acquired signal data on PACS (using DICOM)

Sensis Vibe can transfer data via following interface languages.

- ASCII flat file
- XML
- DICOM
- HL7*

** Option*

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Technical Data

Sensis computer	
Control room monitors	One for real-time waveforms, one for operator dialog
Size, resolution	19" TFT, 1280 x 1024 pixels
	21.3" TFT, 1600 x 1200 pixels
Exam room monitors	One or two for real-time waveforms and/or operator dialog. Optionally one extra examination room monitor for realtime waveforms.
Size, resolution	19" TFT, 1280 x 1024 pixels 21.3" TFT, 1600 x 1200 pixels
Minimum computer specification (used for acquisition system and postprocessing workstation)	
CPU	Intel Core i5-8500 CPU, 3,000 GHz, 6 Cores
RAM	2 x 8 GByte DDR4-2666 RAM modules 16 GByte totel, dual-channel configuration preferred
Disk drive (Hemo, Combo)	Main drive: 512 GB SATA SSD
	Service drive: 1 TB HDD
Network (Hemo, Combo)	3 x 1000 Base-T Ethernet ports Network Adapter: Intel I210-T1
Operating System	Microsoft Windows 10

Technical Data

Minimum UPS* requirements (uninterruptible power supply)		
Certified according to at least one of the following standards:	UL 1778; EN 62040–1; CSA 22.2 no. 107.3; UL listed	
Runtime	Minimum of 5 min.	
Minimum number of protected outlets	6	
The UPS must be able to output sinus curves in both power and battery modes.		
Total Power Rating	Hemo: Combo: Types:	250 VA (Minimum) 750 VA (Minimum) 100 V – 120 V, 220 V – 240 V; 50/60 Hz

Minimum printer requirements	
Print resolution (black)	≥ 600 dpi
Printer technology	Laser
Network ready	The following should be configured on the printer, at a minimum: 100 base T Ethernet standard (or faster), IP address, gateway & DNS setting
Minimum system requirements/ Compatible operating systems	Windows 10
Media sizes supported	A4, Letter
Standard memory	Black 64 MB, color 256 MB

Bar code reader*
Maximum radio-frequency band BT Class 1, 433 MHz – 910 MHz

**Option*

Technical Data

Signal input box			
Dimensions (H x D x W) approx.		Hemo	Combo
	PC	100 x 338 x 381 mm	100 x 338 x 381 mm
	Signal input box	147 x 230 x 80 mm	205 x 335 x 180 mm
	Video distribution box	n.a.	530 x 390 x 146 mm
	UPS*	260 x 337 x 171 mm	260 x 337 x 171 mm
Weight	PC	7 kg	7 kg
	Signal input box	1 kg	7 kg
	Video distribution box	n.a.	20 kg
	UPS*	16 kg	16 kg
Patient isolation	Floating inputs with defibrillation protection (isolated input), type CF or BF		
Mains power	According to IEC regulations class I		
Mains voltage	100 – 120 V; 50/60 Hz ~		
	220 – 240 V; 50/60 Hz ~		
Power consumption	Hemo: 250 VA, max.		
	Combo: 750 VA, max.		

Environment		
Operating conditions	Temperature:	+ 10 °C to + 35 °C
	Relative humidity:	non-condensing, 20 – 75 %
	Pressure:	70 – 106 kPa
Operation altitude	Less than or equal to 3000 meters	
Pollution degree	2	
Material group	IIIb	
Overvoltage category	II	
Oxygen rich environment	No	
Liquid ingress protection	IPX4 (HemoBox) and IPX1 (ComboBox)	

Signal input box and catheter input pod	
Catheter input pod cable	Catheter input pod to signal input box, 2 m
Cable signal input box to control room / Sensis PC	Max. 30 m

Mounting	
Catheter input pod	On tableside Modura rail (10 mm x 25 mm)
Signal input box	ComboBox: On tableside Modura rail (10 mm to 25 mm) or on dedicated holder with Artis installation**
	HemoBox: On tableside Modura rail (10 mm to 25 mm) or on IV Pole (diameters 19 mm to 38 mm), standard VESA 75 mounting interface available

** Option; ** see Operator Manuael*

Technical Data

ECG	
ECG	Electrodes R, L, F, N and C1 to C6 (RA, LA, LL, RL and V1 to V6) Available leads I, II, III, aVR, -aVR, aVF, aVL, V1-V6
Sampling rate	2000 samples/s
Heart rate detection range	15 – 300 beats/min
Cycle length	200 – 4000 ms
High-pass filter	0, 0.05, 0.15, 0.5 Hz
Low-pass filter settings	HemoBox 25, 35, 40, 50, 100, 120, 200, 300 Hz
	ComboBox 25, 35, 40, 50, 100, 120, 200, 300, 400, 525 [none] Hz
Notch filter	50/60 Hz
Lead-off indication	Each lead
Sensitivity	1, 2, 5, 10, 20, 50, 100, 200, 500 or 1000 mm/mV
Input signal range	HemoBox ± 600 mV
	ComboBox ± 1.2 V
Output signal range	± 30 mV
Noise	HemoBox < 20 μV_{p-p} (0.05 Hz to 200 Hz)
	ComboBox < 15 μV_{p-p} (0.05 Hz to 200 Hz)
CMRR	> 94 dB
Resolution	> 1 µV

Sweep speed	
Real-time	400, 200, 150, 100, 50, 25, 12.5, 5 mm/s
Review	400, 200, 150, 100, 50, 25, 12.5, 5 mm/s

Technical Data

ICEG (for ComboBox only)	
Catheter input pod	For IECG catheter cables with 2 mm touch-proof pins compatible with Multi-Contact sockets
Electrode inputs	64 or 96
Output AC range	± 30 mV
Output DC range	± 80 mV
Noise	< 15 µVp-p (20 - 400 Hz)
Frequency range	DC – 525 Hz
Sampling rate	2000 samples/s
Input signal range	± 600 mV, ± 1.2 V for stimulated channels
Resolution (AC)	1 µV
Resolution (DC)	6.25 µV
High-pass filter	0, 0.05, 0.15, 0.5, 1, 20, 30, 40, 50, 60, 70, 80 Hz
Low-pass filter	100, 200, 300, 400, 500, 525 [none] Hz
Notch filter	50/60 Hz
Bipolar leads	Between any 2 inputs
Unipolar leads	Referenced to Wilson central terminal or any other ICEG electrode input
Stimulator switching	To any ICEG electrode pair
CMRR	> 100 dB
Caliper measurement accuracy	± 1 ms

Sweep speed	
Beat-triggered view	400, 200, 150, 100, 50, 25 mm/s (EP only)
ES-triggered view	800, 600, 400, 200, 150, 100, 50, 25, 12.5 mm/s (EP only)

Technical Data

Invasive blood pressure	
Pressure inputs	4
Measurement range	– 50 to 400 mmHg (If IBP input is provided from an FFR pressure measurement device, the measurement range may be further limited by the FFR device. Please consult the IBP range specifications of the FFR device.)
Transducers	5 µV/V/mmHg
Filters	Low pass 10, 15, 20, 25, 30 Hz; notch filter 50/60 Hz
Zero balance	± 50 mmHg transducer offset
Range	10, 20, 40, 100, 200 or 400 mmHg
Noise	< 0.32 mmHg (DC to 30 Hz)
Frequency range	DC to 30 Hz
Accuracy	± 4mmHg or ± 4%, exclusive of transducer
Resolution	1 mmHg
Sampling rate	2000 samples/s

Technical Data

Non-invasive blood pressure (NIBP)		
Pressure range	For heart rate	40 – 200 beats/min:
	Adult Systolic:	40 – 260 mmHg
	Adult MAP:	26 – 220 mmHg
	Adult Diastolic:	20 – 200 mmHg
	Neonatal Systolic:	40 – 130 mmHg
	Neonatal MAP:	26 – 110 mmHg
	Neonatal Diastolic:	20 – 100 mmHg
Resolution	1 mmHg	
Method of measurement	Oscillometric with step deflation	
Reading accuracy	ANSI/AAMI SP10, EN1060-4, and ISO 81060-2	

SpO_2	
Oxygen saturation range	0 % – 100 % for heart rates 40 – 200 beats/min
Accuracy	70 % – 100 %: ± 2 digits, ± 3 digits (during patient motion) Note: Accuracy may depend on the sensor used. Please refer to the instructions for use provided with the Sensor to be used. Accuracy is expressed as rms, which means approximately 68 % (1 standard deviation) of the data is within the accuracy range.
Amplitude	min. 0.3 % modulation
Sensors	for use with NONIN sensors only

Technical Data

Respiration (from capnography)	
Patent references	The capnography component of this product is covered by one or more of the following US patents: 6,428,483; 6,997,880; 6,437,316, 7,488,229; 7,726,954 and their foreign equivalents. Additional patent applications pending.
Method	Microstream non-dispersive infrared (NDIR) spectroscopy to continuously measure the amount of CO_2 during every breath, the amount of CO_2 present at the end of exhalation ($etCO_2$) and during inhalation ($FiCO_2$), and the respiratory rate for neonates, pediatric and adult patients.
Respiration rate range	0 – 150 bpm (breaths/minute)
Resolution	1 mmHg
Respiration rate accuracy	0 – 70 bpm: ± 1 bpm
	71 – 120 bpm: ± 2 bpm
	121 – 150 bpm: ± 3 bpm
Respiration rate resolution	1 breath/minute
$etCO_2$ range	0 – 150 mmHg
MicroPod Accuracy	CO2 partial pressure at sea level: 0 – 38 mmHg ± 2 mmHg, 39 – 150 mmHg ± (5 % of reading + 0.08 x (reading – 39 mmHg)) Response time 9 s Note: Accuracy applies for breath rates of up to 80 bpm. For breath rates above 80 bpm, accuracy is 4 mmHg or ± 12 % of reading whichever is greater, for EtCO2 values exceeding 18 mmHg. This is tested according to and is compliant with capnography standard. To achieve the specified accuracies for breath rates above 60 breaths/minute, the Microstream® FilterLine H Set for Infant/Neonatal (p/n 006324) must be used.
Resolution	1 mmHg

Technical Data

Cardiac output (thermodilution method)	
Injectate temperature	– 5 °C to + 27 °C
Measurement range	0.1 to 25 l/min
Blood temperature	25 °C to 43 °C
Blood Measurement Accuracy	+/– 0.1 °C exclusive of Swan-Ganz catheter
Injectate Measurement Accuracy	+/– 1 °C
Vital signs alarms	Alarms on HR, NBP, SpO2, Respiration, $etCO_2$ and IBP (arterial line) Visible alarm in control and examination room, audible alarm in examination room Configurable alarm settings for Adult, Pediatric, and Neonatal mode

Technical Data

Signal outputs	
Analog output channels	2
Isolation	Analog output in signal input box: IEC 60601-1 basic, only for connection to medical devices
ECG	I, II, III, V1 – V6 only
Pressure	P1 – P4
ICEG	Any bipolar or unipolar (ComboBox only)
Scale factor	1 V/mV ± 5 % (ECG and ICEG); 10 mV/mmHg ± 6 % (pressure)
Voltage limits	± 4 V
Bandwidth	0.5 – 75 Hz (ECG) 40 – 525 Hz (ICEG) 0 – 32 Hz (Pressure)
Output impedance	< 100 ohm (max load capacity: 10k ohm/100 nF)
Noise	< 35 mVp-p
Max delay	25 ms

QRS trigger	
Level	Positive, TTL (available in the signal input box)
Isolation	IEC 60601-1 basic, only for connection to medical devices
Max delay	25 ms
QRS pulse length	50 ms +/– 0.5 ms

Serial communication interfaces (ComboBox only)	
RF ablators	Please check combination with 3rd party systems

Technical Data

Stimulator interface (for ComboBox only)

If you intend to connect a stimulator to Sensis, this stimulator must conform to the following interface specification. The user is responsible for combining medical devices.

Device classification no.	IEC Class 2b, Type CF, defibrillation-proof cardiac floating equipment

Electrical data for stimulation via Sensis

No. of channels	Four separate bipolar stimulation input channels available for connection to external stimulator. The four inputs can be individually switched by software to any ICEG patient connection.
Emergency pacing	Direct connection for emergency pacing available (Stimulation channel 1 is directly routed to emergency stim ± pins of CIP)
Pacing modes	Unipolar and bipolar pacing (for unipolar WCT cannot be used as a reference)
Physical interface to stimulator	2 mm touch-proof banana plugs (3 or 10 m cable length).
Input voltage	± 100 V
Input current	± 100 mA
Pulse width	> 0.05 ms
Repetition rate	> 0.1 ms
Impedance	Serial: < 45 ohm (each pole, < 2*45 ohm each stimulation channel) Parallel: > 1 MOhm
Pulse deformation (amplitude and width)	< 10 % (when routed through Sensis)

** Option*

Technical Data

Detection of stimulation pulse train through the ComboBox	
Signal amplitude	Constant voltage stimulation (CVS): – 10 V to – 500 mV, + 500 mV to + 10 V Constant current stimulation (CCS): 1 – 20 mA at 500 ohms load (resulting voltage must be within the constant voltage stimulation (CVS) specification).
Pulse width	0.5 – 5 ms
Pulse repetition rate	One single pulse or a sequence of pulses with: 100 ms < repetition rate < 1500 ms
Extrastimulus pulse sequence rate	Detects 1-4 extra stimulation pulses (which deviate by more than ± 5 ms from the first interval) under the condition that they are preceded by 4 – 12 pulses in the drive train (that deviate less than or equal to ± 5 ms from the first interval).
Continuous stimulation	Detects a continuous stimulation sequence if the sequence starts with at least 13 pulses with repetition rate deviation of less than ± 5 ms.
Time resolution	Intervals between pulses are reported with 5 ms resolution.

Recording and logging of pulse sequences
All pulse sequences are logged as events in the event log, all pulse sequences not identified as either extrastimulus or continuous stimulation are logged as dynamic stimulation. Waveforms during pulse sequence are automatically recorded with at least 10 s pre-storage and 30 s post-storage.

Ethernet communication interfaces	
X-ray systems	Siemens Healthineers Artis systems
Mapping systems Patient monitors Hospital network Material management system	Please check combination with 3rd party systems

** Option*

Technical Data

The Sensis Information System

The Sensis Information System assists cardiologists, cardiac nurses, technologists and cath lab managers with comprehensive data access and workflow-oriented tools in their daily reporting and administrative tasks.
Sensis Vibe new user interaction concept prominently features FlashDoc. Targeting optimal ease of use, FlashDoc includes three core components – QuickAdd, CaseLog, and smart Sensis Information System (SIS).

The Sensis Client-Server Solution

The Sensis Information System is a network-based solution capable of connecting one or several Sensis recording systems, Sensis post-processing workstations, as well as reporting workstations.
Sensis Vibe's new local cache of the acquisition system stores and moves the information onto the information system database automatically. Potential license adjustments might be required due to Windows Server licensing. We advise the customer to double-check the licensing between the server and the client(s) to ensure the licensing is correct.

Sensis Master SW Package

Includes the following software packages:

The Sensis Documentation
Supports cardiology personnel with inputting and handling administrative data (e.g., catheters and drugs) in a customized and structured way. Supports a wireless barcode reader to scan consumables.

The Sensis Report Generator
Supports cardiologists in creating pdf reports for examinations performed in the cath lab and increases the efficiency of their workflow.

The Sensis Communication Manager
Supports cath lab personnel in defining and managing data export to other systems (ASCII or HL7* format or reports in DOC/RTF/PDF format).

The Sensis Security Manager
Access to the database and the various data management and administration tools is controlled by password security levels that can be customized by an administrator.

The Sensis Backup Manager
Intuitive user interface supports cardiologists in all of today's backup tasks such as scheduled activation of backup procedures or restoring tasks for the database.

SQL Server IoT 2019
Store all measured data as well as manually entered information in the Sensis Master database.

The Sensis Configuration Manager
Supports cardiology personnel in configuring general system parameters and settings. For example, new study types can be defined and added here and also associated with a set of input clusters and/or report templates.

The Configuration Manager also contains a service logbook.

Note: The Sensis Master SW package is required only once in a multi-lab environment and can be installed on a Sensis recording system or a dedicated Sensis Information System server.

**Option*

Technical Data

Sensis Client SW Package*

This package offers Sensis Information System functionality for additional Sensis recording systems.
The Sensis Client SW package contains the Sensis Documentation and the report generator.
A client software package connects an additional Sensis recording system to the Sensis Information System.
(Prerequisite: A dedicated Sensis Information System server or a Sensis recording system with Sensis Information System Master package exists in the cath lab).

Sensis Post-Processing Workstation SW Package*

The Sensis post-processing workstation allows you to review waveforms, values, events and results after a procedure is over. It is also possible to edit, modify and recalculate different data.

Hemo+EP post-processing workstation*
The Sensis Hemo+EP post-processing workstation allows you to review completed electrophysiology and hemodynamic studies from the Sensis recording system on an additionally connected remote workstation. It is also possible to edit, modify and recalculate different electrophysiology and hemodynamic data such as interval measurements, annotations, waveforms, values, events and results.

Sensis Report Workstation SW Package*

The package offers Sensis Information System functionality for reporting workstations.
The Sensis Report Workstation SW package contains the Sensis Documentation and the report generator. The report workstation package connects a desktop PC to the Sensis Information System.
(Prerequisite: A dedicated Sensis Information System server or a Sensis recording system with Sensis Information System Master package exists in the cath lab).

Sensis Vibe Analytics*

Sensis Vibe Analytics is a SW tool which anables the customer to gain more insights into the departmental efficiencies by analyzing the data from the central Sensis Master database.

Sensis Report Editor*

Sensis Vibe Template Editor is a SW tool which enables the customer to create report templates for the Sensis Vibe system.

Sensis Information System High-end Master Server*

This package includes the Sensis Master Software package and a dedicated networked computer.
Minimum SIS High-end Server specification: Intel Xeon E5 or equivalent, 8 GB RAM, 6 x 300 GB (hot swappable, RAID 5) and 1 TByte (RAID 0) disk drive, 1 GBit Ethernet, redundant power supply, Windows Server Windows Server IoT 2019 (64-bit) (Dell T340) operating system

** Option*

Technical Data

Virtual Sensis Information System Virtual Server appliance*

The SIS Master SW package is also available as a virtual appliance for a VMware virtual machine environment.
As a precondition VMware Virtual machine version 8 (which supports VMware ESX/ESXi 5.5 and later) has to be available.
Minimum Requirement: 1 Virtual socket and 12 cores per socket, RAM min. 16 GB, 2 virtual disks (C: 100 GB, F: 100 GB). vTPM must be installed and configured to use the BitLocker data encryption option. The virtual SIS server SW is provided as an OVA archive file. To use the BitLocker option for encrypting the Virtual Machine, the VMware Virtual machine image has to be upgraded to hardware revision 14. The VMware ESX/ESXi environment must be version 6.7 or later to support vTPM.

Sensis HL7 Engine*

Workflow and communication support to an external HIS/CIS/CDMS is provided via HL7 interface.
The Sensis Information System supports charge capture, meaning that billing data, e.g. consumables, personnel, or procedures in the Sensis Information System database can be mapped to the correct billing codes and then exported to an external HIS/CIS/CDMS for processing.
With this bidirectional interface, patient demographics can be imported, and billing and clinical data can be exported.
The Sensis HL7 Engine is installed on the computer with the Sensis Master SW package.

Minimum requirements for the PC with installed Sensis Report Workstation SW packages

CPU	32 bit (x86) or 64 bit (x64) processor 1 GHz or faster
RAM	32-bit: 1 GB RAM or higher
	64-bit: 2 GB RAM or higher
Storage	32-bit: at least 16 GB available hard disk space
	64-bit: at least 20 GB available hard disk space
Video card	DirectX9 compatible graphics device with drivers supporting WDDM1.0 or higher
Network	Network connection (Ethernet or WLAN) Free USB port for license dongle
Software	Software Windows 10 (32-bit or 64-bit) Pro, Enterprise, Enterprise LTSB Editions Microsoft Office 2013, 2016 (32-bit Office only, Office 365 is not supported) Adobe Acrobat Reader Not all applications compatible with Windows 7 or Windows 10 64-bit systems Microsoft .NET Framework 3.5: Make sure Microsoft .NET Framework version 3.5 is not only installed but also enabled on the computer Microsoft Report Builder V15
Other	Dual monitor configuration supported Can run in parallel with ACOM.PC on same PC

** Option*

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In the interest of complying with legal requirements concerning the environmental compatibility of our products (protection of natural resources and waste conservation), we recycle certain components.

Using the same extensive quality assurance measures as for factory-new components, we guarantee the quality of these recycled components.

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VD15
Not for US

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