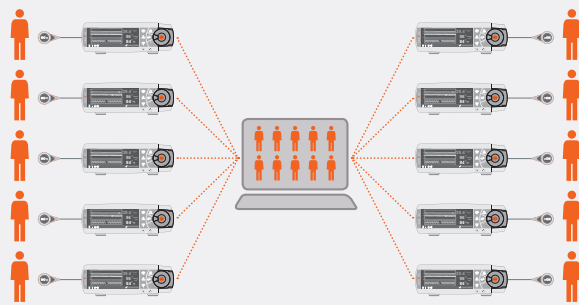# SENTEC V-CareNeT™

REMOTE MONITORING AND ALARM SURVEILLANCE SYSTEM FOR UP TO 40 SENTEC DIGITAL MONITORS (SDM)

V-CareNeT™ SYSTEM

V-CareNeT™ is a remote monitoring and alarm surveillance system for up to 40 SenTec Digital Monitors (SDM).
- TcPCO$_2$, tcPO$_2$*, SpO$_2$, PR and alarms are displayed on-line on the V-CareNeT™ central station
- For analysis and printing, trend data stored in the internal memory of SDM can be downloaded
- Setup of V-CareNeT™ is easy and only requires a conventional Ethernet or wireless LAN network, at least one SDM, a PC serving as a central station with V-STATS™ installed and V-CareNeT™ Package activated

Remote monitoring of patient's ventilation and oxygenation (tcPCO$_2$, tcPO$_2$, SpO$_2$) provides a new level of safety to patients.

On the general care floor, where nurse-to-patient ratios often preclude the level of direct surveillance, combined tcPCO$_2$/SpO$_2$ patient monitoring is of particular importance. For example, patients receiving supplemental oxygen and patient controlled analgesia (PCA) are at increased risk to undergo medication-induced respiratory depression. In such settings, tcPCO$_2$ monitoring unambiguously helps to detect hypoventilations that may be critically delayed or missed by SpO$_2$ monitoring alone. Therefore, remote monitoring of tcPCO$_2$ in addition to SpO$_2$ is important for patient safety.

For neonatal patients, continuous transcutaneous monitoring of tcPCO2 and tcPO2 supports therapy guidance to avoid risks of lung and brain damages, Retinopathy of Prematurity and increased mortality. The use of noninvasive tcPCO2/tcPO2 monitoring may lessen the need for blood gas sampling, reducing the risk of infections.

V-CareNeT™ immediately delivers important patient data and alarms to qualified caregivers who can intervene promptly.

*Remote monitoring and alarm surveillance is only supported for tcPO$_2$ if an OxiVenT™ sensor is connected and patient type is set to <<neonatal>>.

V-CareNeT™ FEATURES

V-CareNeT™ General Description
- V-CareNeT™ is a remote monitoring and alarm surveillance system for SenTec Digital Monitors
- V-CareNeT™ comprises local-area network, up to 40 connected SDMs, one PC (central station) with V STATS™ 4.10 installed and V-CareNeT™ Package activated
- Only one PC at a same time is allowed to access the SDMs connected within the V-CareNeT™ network

V-CareNeT™ Remote Monitoring Screen Components
- The remote monitoring screen comprises the «V-CareNeT™ Control Window» and several «Remote Monitoring Windows» (according to the number of SDMs with admitted patients)
- V-CareNeT™ evaluates the size/resolution of the computer's screen and calculates the number of patients that can be simultaneously admitted to V-CareNeT™ to ensure that the «V-CareNeT™ Control Window» and all active «Remote Monitoring» windows are fully visible and can be arranged without overlapping

V-CareNeT™ Control Window
The «V-CareNeT™ Control Window» is always visible (in the front). It provides the following elements:
- Software Activity Indicator
- Button to arrange all open «Remote Monitoring Windows»
- Button opening a dialog to edit the list of «SDM Device/Host Names»
- Button opening V-CareNeT™ Settings

- A list of «SDM Device/Host Names» identifying the SDMs currently in the system
- A «Connect check box» column permitting to activate/deactivate the connection to the respective SDM
- A «Connection status indicator» column: Each indicator indicates the connection status for the respective SDM in the system
- An «Admit patient check box» column permitting to admit/discharge a patient
- A Speaker Test Button
- An AUDIO Paused/OFF Button and AUDIO Message
- An Alarm indicator: If an alarm occurs for an SDM connected to a patient, the respective «SDM Device/Host Name» highlights red (high priority), yellow (medium priority) or cyan (low priority)

Remote Monitoring Windows
Individual «Remote Monitoring Window» displays:
- Device/Host Name, location (optional)
- Customized Information Field (patient name, comment, or patient ID)
- Suspend Monitoring Check Box in title bar
- Monitored data (tcPCO$_2$, tcPO$_2$, SpO$_2$, PR) in a black data field
- Status Information: «Remaining Monitoring Time», «Sensor Temperature», «Status Message» and «Alarm Status» in the status bar
Mouse click on «Customized Information Field» opens the patient data dialog where patient data can be edited and displayed.

Detail View Window
Clicking into the black data field in the «Remote Monitoring Window» opens up an additional dialog, which displays the following information:
- Pulsation Index
- Heating Power
- Status bar with patient mode/battery status/barometric pressure/remaining gas level
- SDM Alarm configuration: current high/low alarm limits for each parameter, «Alarm volume», «Auditory Alarms», «AUDIO OFF Reminder»
- SDM Temperature/Site Time configuration: «Sensor SET temperature», «Maximum operator-selectable sensor SET temperature», «Preset site time», «Maximum operator-selectable preset site time», Status of «Site Protection» and «Initial Heating»
- Various sensor and monitor status information and firmware/hardware versions
- Sensor/monitor configuration and status information

Connecting SDMs
The V-CareNeT™ Control Window provides an overview of the connected SDMs and their connection status.
- The «Connection Status Indicator» indicates the connection status color-coded
- Device discovery search functions support the easy setup of V-CareNeT™
- With an established connection between V-STATS™ and an SDM it is possible to download trend data from the SDM or to activate remote monitoring (i.e. admitting a patient)

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V-CareNeT™ FEATURES

Patient Administration
- Patient administration supports the following functions:
  - Admit patients to the V-CareNeT™ system
  - Edit patient data
  - Transfer patients to another location or station/SDM
  - Discharge patients
- If a patient is transferred with SDM, as soon as the SDM is reconnected to the same LAN subnet, the remote monitoring is automatically reestablished. In this event, only the location needs to be updated in the Patient Data dialog
- If a patient is transferred without SDM, the patient needs to be assigned to the new SDM in the Patient Data dialog, which provides a list of currently available SDMs

Note: Ensure compliance with local data protection regulations before entering personal data. Non-authorized persons must not have access to patient information.

Interrupted Remote Monitoring
When the V-CareNeT™ system stops receiving data from an SDM or connection to V-CareNeT™ is interrupted (e.g. SDM's LAN interface set to `OFF'or LAN cable is defective/removed or because of net infrastructure/software failures), an audible low priority alarm occurs at the central station, the message «Remote Monitoring Interrupted» replaces the black data field and the Status Bar of the respective remote monitoring window.
Furthermore, the respective «SDM Device/Host Name» in the «V-CareNeT™ Control Window» highlights cyan. When communication between the SDM and V-CareNeT™ is restored, monitoring automatically resumes at the central station.

Suspended Remote Monitoring
Selecting the «Suspend check box» suspends remote monitoring (without interrupting the connection between V-CareNeT™ and the respective SDM). The message «Remote Monitoring Suspended» replaces the black data field and the Status Bar. Furthermore, all alarms (including auditory alarm signals) are inhibited for the respective SDM.

Alarm System
V-CareNeT™'s alarm system is designed to meet the requirements of IEC 60601-1-8:2006, A1:2012 as well as of the applicable particular standards (ISO 80601-2-61; IEC 60601-2-23). Alarm conditions are evaluated by the SDM, and if any, transmitted to and visualized by V-CareNeT™.
If the speaker test has been confirmed by the operator, an audible alarm sounds at the central station when an alarm occurs.

Visual Alarm
- A blinking parameter indicates an alarm limit violation for $tcPCO_2$, $tcPO_2$, SpO_2, or PR
- Technical alarms of the SDM are displayed in the status bar with an «Alarm message», if the alarm is sensor temperature or site time related the respective icons will show an alarm situation
- The highest priority alarm condition is indicated by an «Alarm Status Icon» (color coded)
- If two or more alarm conditions occur at the same time, the «Alarm Status Icon» indicates the highest currently active alarm priority

Audio Alarm System
- Acoustic alarm signals are only supported if the «Speaker Test» is confirmed
- V-CareNeT™ evaluates the highest currently present alarm priority for all admitted patients/stations and activates the acoustic alarm signal corresponding to the highest currently active alarm condition
- Acoustic alarm signals are designed to be compliant with IEC 60601-1-8 (priority encoded, alarm melodies)
- Acoustic alarms can be paused for 120 seconds or switched off permanently
- The operating status of the auditory alarm system is visually indicated by the «AUDIO Paused/OFF Button», the «AUDIO Message», and acoustically indicated by the «AUDIO OFF Reminder»
- Alarm Melodies and the «AUDIO OFF Reminder» can be enabled/disabled in a password protected area

Speaker Test
After start up of V-CareNeT™, the acoustic alarm signals are not active. In order to enable auditory alarm signals it is required to perform a `Speaker Test' and to confirm proper function of the PC's speaker and audio system. The Speaker Test activates automatically when confirming the test via button or automatically when the interval for the automatic speaker test has elapsed (default 4 hours).

Data Recording
Data can be downloaded from the internal memory of the SDMs.

V-CareNeT™ SPECIFICATIONS

System Components
The V-CareNeT™ system comprises the following components:
- One PC (central station) with V-STATS™ 4.10 with activated V-CareNeT™ package, Local-area network (LAN), and up to 40 connected SDMs

Monitoring Performance
V-CareNeT™ supports simultaneous remote monitoring for up to 40 connected devices (provided the screen of the PC/laptop on which V-STATS™ runs is big enough and resolution settings are selected accordingly).
The $tcPCO_2$, $tcPO_2$, SpO_2, PR and alarms are displayed on-line in a clinical context.

Central Station
- **CPU:** multi core at 2 GHz and higher
- **Memory:** 4 GB minimum
- **HD:** min. 1 GB (free space on hard disk)
- **LAN:** 10 Base-T
- **Screen:** 2560 x 1440 for 40 beds (SDMs)
- **Audio:** integrated speaker system
- **OS:** Windows® 7, 8, 8.1, 10

Network
- Standard Ethernet (10 Base-T, preferably with DHCP router/server in subnet)
- Standard network cables (RJ-45, Cat-5)

SenTec Digital Monitor (SDM)
V-CareNeT™ requires SenTec Digital Monitors with firmware version SMB SW-V08.00 or newer with supported LAN interface. Contact your local distributor to update your SDM.

Your local distributor: