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Rev 24 May, 2010
SECTION 1 – INTRODUCTION

A. ABOUT THIS MANUAL

This operator’s manual has been prepared to provide information on the correct use of the CentralVue™ Veterinary Multi-Channel TeleMetry System. It contains performance specifications, installation, operation and maintenance information. It is intended for trained animal-care professionals.

B. MANUFACTURER’S RESPONSIBILITY

• The manufacturer of this equipment is responsible for the effects on safety, reliability, and performance of the equipment only if:
• The equipment is used in accordance with the instructions in this manual.
• The electrical installation complies with all applicable regulations.
• Assembly operations, extensions, re-adjustments, or repairs are carried out by person’s authorized by the manufacturer.

Incorrect operation or failure of the user to maintain the monitor in accordance with proper maintenance procedures relieves the manufacturer or his agent from all consequent non-compliance, damage or injury.

• It is up to the user to ensure that any applicable regulations respecting the installation and operation of the monitor be observed.

C. WARRANTY

All products manufactured by Digicare Biomedical Technology Inc. are warranted to be free from defects in material and workmanship and to operate within published specifications, under normal use, for a period of one year from date of original shipment. The warranty on accessories is ninety (90) days. If an examination by Digicare, discloses such products or component parts to be defective, then our obligation is limited to repair or replacement (at our option).

D. GENERAL SAFETY

1 - INDICATIONS
The CentralVue™ Veterinary Multi-Channel TeleMetry System series is a device designed for continuous operation, specifically for veterinary use. The device MUST BE connected to the external protective conductor to be operated with the external MAINS LINE. It is intended for use by person’s trained in professional animal care, in animal hospital / clinic environment. The operator must be thoroughly familiar with the instructions in this manual before using the instrument.

The unit is configured to measure and monitor the following available parameters in up to 4 channels:
• ECG Waveform (3 or 5 leads);
• Heart Rate (HR) from ECG;
• ECG arrhythmia and ST segment analysis;
• Blood oxygen saturation (SpO₂ or pulse oximetry);
Digicare Animal Health

• SpO2 waveform (Plethysmogram);
• One Temperature channel;
• Pulse rate from SpO2;
• Respiration rate and waveform;

CONFIGURATION CODE

Electrocardiogram – 5 Lead ECG.........................................................................................E
Respiration rate and waveform.................................................................................................R
Pulse Oximeter and Plethysmogram.........................................................................................S
Temperature............................................................................................................................T

2 - CAUTIONS
The CentralVue™ CV was designed and tested accordingly to the ELECTRO-MAGNETIC
COMPATIBILITY Standard IEC601-1-2. However, the operator is responsible to verify if the
monitor is being affected or affecting others electrical equipment. Equipments like electrocautery
and image scanners can generate interference and cause degradation of the CentralVue™ CV
performance. To avoid this situation, it should be installed as far as possible of those
equipment.

3- CONTRAINDICATIONS
The CentralVue™ CV series is NOT intended to be used during MRI (magnetic resonance
imaging).

The CentralVue™ CV is NOT suitable for use in the presence of a flammable anaesthetic
mixture with air or with oxygen or nitrous oxide.

E. UNPACKING AND ACCESSORIES

Carefully remove the CentralVue™ CV and its accessories form the shipping carton. Save the
packing materials in case the CentralVue™ CV must be shipped or stored. Ensure your
CentralVue™ CV has the items listed in the SHIPPING LIST inside the carton.
SECTION 2 – QUICK START

A. DESCRIPTION

1 – CENTRALVUE (Complete System)
2 – REAR PANEL

A - CentralVue™ Bluetooth access point AC mains power connection.
B - Ethernet Connection, used to connect CentralVue™ Bluetooth access point to CentralVue™ computer.
C - CentralVue™ computer AC mains on/off switch. 1 is power on and 0 is power off.
D - CentralVue™ computer AC mains power connection (outlet must include ground connect in order to plug this computer into the outlet).
E - CentralVue™ computer USB connections. Use these connections for the keyboard, mouse, wireless internet, thumb drives, and etc.
F - CentralVue™ computer audio connection, connects to speakers for sound.
G - CentralVue™ computer video connection. Use this connection to connect to the computer screen.
3 – TELEVUE™ TV (Front and Top Panel)

H – Battery Indicator LED  
I – AC Power Indicator LED  
J – ECG Bluetooth Indicator LED  
K – SpO2 Bluetooth Indicator LED  
L – SpO2 Cable Receptacle  
M – Bluetooth Antenna  
N – Temperature Cable Receptacle  
O – ECG Cable Receptacle
3 – CENTRALVUE MONITOR SCREEN

1- CentralVue™ CV Screen 1 this screen Connects to TeleVue™ CV #1 and is main screen. It includes the Main Sys menu, which in addition to containing all the functions found in the other three screens, it also contains the Shutdown button, Simulation button, Operator’s Manual button, and the about CentralVue button. This screen also contain the Alarm Silence button.

2- CentralVue™ CV Screen 2 this screen Connects to TeleVue™ #2.

3- CentralVue™ CV Screen 3 this screen Connects to TeleVue™ #3.

4- CentralVue™ CV Screen 4 this screen Connects to TeleVue™ #4.
5 – INDIVIDUAL TELEVUE MONITOR SCREEN (TeleVue 1 Shown)

5 – ECG menu selection.
6 – Respiration menu selection.
7 – SpO2 menu selection.
8 – Temperature menu selection.
9 – Traces configuration menu selection.
10 – Trends menu selection.
11 – Print menu selection.
12 – System configuration menu selection (MainSys in Screen 1, and System in all others).
13 – Patient Name and ID indicator, Date and Time indicators,
14 – TeleVue indicator
15 – Large / Small Mode selector and indicator.
16 – ECG Heart Rate (BPM) indicator and ECG settings.
17 – ST Analysis and Arrhythmia indicator. Also ST Analysis and Arrhythmia settings.
18 – Arrhythmia Count indicator. Also ST Analysis and Arrhythmia settings.
19 – SpO2 Indicator in % and SpO2 settings.
20 – Respiration Rate in RPM Indicator and settings.
21 – Print ECG button.
22 – Freeze button
23 – Alarm Silence button, silences alarm on all 4 screens (Alarm Silence button only found on screen #1).
24 – Temperature Indicators and settings.
25 – Sixth waveform user selected area, showing Resp waveform in Thin Line Style, scale (-1 to +1mV), sweep speed of 12.5mm/s.
26 – Fifth waveform user selected area, showing SpO2 waveform in Thin Line Style, with Pulse Level strength scale (1 to 8), sweep speed of 25mm/s.
27 – Fourth waveform user selected area, showing ECG Lead AVr in Thin Line Style, scale (-0.5 to +1.0 mV), sweep speed of 25mm/s.
28 – Third waveform user selected area, showing ECG Lead III in Thin Line Style, scale (-0.5 to +1.0 mV), sweep speed of 25mm/s.
29 – Second waveform user selected area, showing ECG Lead I in Thin Line Style, scale (-0.5 to +1.0 mV), sweep speed of 25mm/s.
30 – First waveform user selected area, showing ECG Lead II in Thin Line Style, scale (-0.5 to +1.0 mV), sweep speed of 25mm/s.

B. TURNING-ON

- Plug the AC power cord for the Parani MSP1000 Bluetooth adapter to the rear of the Bluetooth box (A). The box will power on immediately after being plugged in (Do this before powering up CentralVue™ computer). The Power LED will light green.

- Plug the AC power cord in AC MAINS receptacle at rear panel connector (D) and in the AC outlet. The CentralVue™ Computer accepts 110 or 220 VAC with manual selection via the red switch on the power supply.

- Plug the AC power for each individual TeleVue™.

- The electrical installation of the room must have three pin outlets with earth connection for protection of patient, users and equipment.

- On the TeleVue™ the AC-ON LED indicator will light green and the BATTERY status indicator will light orange until the battery is fully charged.

- Power on the TeleVue™ by moving the power switch from the off position to the on position (switch located on the right side, beneath the AC power connection).

- Power-on the CentralVue™ computer by pushing the power button located on the front of the CentralVue™ box.
C. ALARM

• When the unit turns-on, the Alarm Sound is disabled by 2 minutes.

• To permanently disable the Alarm Sound click the button labeled “ALARM Silence” dedicated pushbutton (23) located on TeleVue™ 1 screen. The AUDIBLE ALARMS OFF message is displayed steady on the TeleVue™ 1 screen.

• Disabling the Alarm on screen 1 will disable the Alarm on all four screens.
• The Alarm sound volume levels are set to default levels. To change the Pulse and Alarm Sound volume level, touch in System menu and Sound Volume. Select the Alarm Volume.

D. PATIENT MANAGEMENT

• After Power-On, the CentralVue™ CV starts the monitoring screen and storing all Vital Signs.
• The “Patient Management” screen can be opened at any time by clicking the “Main Sys” menu on CentralVue™ Screen 1 for TeleVue™ 1 and on “System” menu for CentralVue™ screens 2-4 for TeleVue™ 2-4.
• The “Patient Management” screen is automatically displayed when the monitor is turned-on with two options: “Admit New Patient” and “Cancel Pat Mangmt”.
• Touching “Cancel Pat Mangmt”, closes the “Patient Management” screen.
• Although the Patient can be admitted at a later time, we recommend to admit the Patient before Patient data starts to be stored to prevent losing Patient Data.
• To admit a patient, touch on the “Admit New Patient” button.
• Enter the Patient’s Name and Patient Control ID.
• Touch the “Admit Patient & Start Monitoring” button.
• If less then 5 minutes of monitoring occurred, the Patient is admitted and the screen is closed.
• If more then 5 minutes of data is available, you need to choose what to do with the patient’s data in the buffer, with three options:
  • “Keep for the new patient”. Touch to include data to new patient.
  • “Save as different patient”. Touch to save data to different patient.
  • “Discard Data”. Touch to discard.

E. DATE AND TIME

• Check if the current “Date and Time” displayed in the Indicator (13) are correct.
• To change the Date and Time, touch the “MainSys” or “SYSTEM” menu (depending on CentralVue Screen) and touch “Date/Time Settings”.
• Set current location “Date and Time”. Touch OK to finish.

F. MONITORING SCREEN

• The CentralVue™ CV monitoring screen is pre-configured accordingly to the Vital Signs parameters that are installed and turned-on. The traces are pre-configured to keep “In-line Logic” with the Indicators area in the right of the traces area.
• To turn-off any Vital Sign that is not going to be used in patient's monitoring, click the Vital Sign menu and touch ECG OFF or SPO2 OFF, etc. The monitoring screen may change some Traces settings and Indicators.
• Factory Default Settings are configured to standard applications. As the user changes Alarm Limits and other settings, the CentralVue™ CV will save the changes when turned-off. Next time the unit is turned-on, the last saved settings will remain.
• To return the unit to the Factory Defaults, touch in the “System” menu and touch in “Load Factory Default Settings”.
G. TRACES SETTING
- Each of the four channels has six traces. They are configured and cascaded accordingly to the Vital Signs parameters installed and turned-on.
- You can select any physiological waveform from one to six of the available traces. You can also cascade the traces up to 3 individual loops.
- Move the Pointer to TRACES icon and press the Select pushbutton.
- Select TRACE waveform source (ECG, SpO2 Plethysmogram, Capnogram, or No Selection).
- Select TRACE sweep speed (6.25mm/s, 12.5mm/s, 25mm/s, 50mm/s or 100mm/s).
- Select TRACE color.
- Select TRACE style (Thin line or Fill In).
- Press the Cascade Traces button if you want to cascade two or more traces.
- You can create until 3 cascade loops: Loop 1, Loop 2 and Loop 3. Select the Loop waveform Source. Select the Sweep Speed, Color and Style for each trace.
- Press the Done button to finish.
- Note: When the CentralVue™ CV is turned-off and turned back on, the traces will return to the original pre-configuration accordingly to the physiological parameters that are installed and turned-on, to keep “In-line Logic” with the Indicators area in the right of the traces area.

H. PATIENT TYPE
- Patient Type has two modes: Large, and Small. It affects the ECG and NIBP functions only. All other Vital Signs functions are not affected by the Patient Type selected.
- Selection of Patient Type shall be based on the Patient’s Heart Rate range for ECG monitoring and Cuff size to be used for NIBP monitoring.
  - Large Patient Type: ECG Heart Rate Range: 5 to 220 BPM
    NIBP Cuff Size #: 5, 7, 8, 9, 10 and 11
  - Small Patient Type: ECG Heart Rate Range: 30 to 400 BPM
    NIBP Cuff Size #: 1, 2, 3, 4 and 6

I. ECG MONITORING
- The ECG function is pre-configured with the following default settings. To change the ECG settings touch the ECG menu and change the desired setting.
  - Mode: 5 Leads
  - Heart Rate High Limit: 140 BPM
  - Heart Rate Low Limit: 60 BPM
  - ECG Scale: Auto
  - ECG Filter Notch: ON
  - ECG Filter: Monitoring 1
  - ECG Lead Selection: II
  - Arrhythmias Detection: ON
  - Arrhythmias Audio Alarm: OFF
  - ST Segment Analysis: ON
- Prepare the electrode sites. Application sites should be clean and dry. Shave or clip excess hair if necessary. Use conductive ECG gel if necessary. Alcohol can also be used in anesthetized patients to improve ECG site conductivity.
- Connect the ECG cable to the receptacle (O) in the TeleVue™ TV Top panel. Install the electrodes in the patient. More details in Section 4.
- A visual indicator (♥) indicates R wave detection and the ECG waveform and Heart Rate reading are displayed.
J. SpO2 MONITORING (Optional)

- The SpO2 function is pre-configured with the following default settings. To change the SpO2 settings touch the SpO2 menu and change the desired setting.

  - SpO2 % High Limit : OFF
  - SpO2 % Low Limit : 88%
  - SpO2 Pulse High Limit : 140 BPM
  - SpO2 Pulse Low Limit : 60 BPM

- Choose the SpO2 sensor type and prepare the SpO2 sensor and clip.
- The preferred sensor application site for canine, feline and equine animals is on the tongue. Alternatively, the sensor and clip may be applied to animal’s lip, toe, ear, prepuce, or vulva.
- Connect the sensor assembly to the SpO2 Patient Cable:
  - Plug the SpO2 Patient Cable into the SpO2 connector (L) on the top panel of the TeleVue. Push the cable in until you hear an audible “click”.
- The yellow SpO2 SENSOR message changes for the green Searching SpO2 message, the Bar-graph shows the SpO2 Pulse Level, the SpO2 waveform, SpO2 % and Pulse Rate values are displayed.

K. TEMPERATURE MONITORING

- The Temperature function is pre-configured with the following default settings. To change the Temperature settings touch the TEMPs menu and change the desired setting.

  - Temperature Channel 1 : On
  - Temperature Channel 2 : OFF
  - Temperature Unit : °F
  - Temperature 1 Upper Limit : 100.4°F (38.0 °C)
  - Temperature 1 Lower Limit : 95.9°F (35.5 °C)

- Connect the temperature patient cable to receptacle (N) Temp.
- In the Temperature menu select Temperature1.
- The temperature value is displayed when the probe temperature is in the 50 to 122 °F (10 to 50°C), range otherwise the temperature display is blanked.

L. TRENDS

- The CentralVue™ CV stores all measured parameters from patient, every minute since the monitoring screen starts until the monitor is turned-off.
- The stored values can be visualized in tabular or graphic form, for trend analysis.
- Touch the “Trends” menu.
- Touch in “Tabular” to visualize all values trends in a tabular form, with indication of values measurement time.
- Touch in “Graphical” to select display all stored physiologic values in graphic trends format.
- Touch the period of time to display the Trends: 15min, 1H, 4H, 12H, 24H, 48h e 72h.
- The Trends for all measured physiologic parameters are displayed simultaneously.
- Touch in the windows maximize button to increase the trends screen size.
- Use the cursor to move the Trends up, down, right or left.
M. DISCHARGE PATIENT AND SAVE DATA
- At the end of monitoring, click the “MainSys” or “System” menu and “Patient Management” menu. Touch
  "Discharge Patient" button. Press “Yes” to confirm. Press “Yes” to save the patient data. Make
  sure the selected directory is the desired place to save the data (default is c:\Patient Data).
- To save to a different directory in a network computer, touch the “Select Another Directory”
  button. Select the desired directory in the “Look” in field and touch the “Done” button.
- Touch the “Save Report” button to save the report to the selected directory.

N. BATTERY OPERATION
- Each TeleVue™ internal battery has autonomy to approximately 2 hours and 30 minutes of
  operation when fully charged.
- The BATTERY INDICATOR LED indicator (H) stays orange when battery is recharging and
  off when the battery is fully charged.
- In battery operation, the LOW BATTERY alarm message is triggered and TeleVue
  BATTERY INDICATOR LED indicator (H) stays red when there is charge to approximately 30
  minutes of operation.

O. TURNING-OFF THE WHOLE CENTRALVUE™ CV SYSTEM
- To Shut down go to CentralVue™ screen 1, click on the “MainSys” menu, and select
  shutdown (12) on the scroll down menu panel. A screen asking to confirm if you want to shut
  down the unit is displayed. (DO NOT RIGHT CLICK CV ICON ON TASKBAR AND CLICK
  CLOSE) this will shut down the monitor improperly and all patient data will be lost.
- If any problem occurs with the shutdown function, the user can shut-off the unit by pressing
  and holding the ON pushbutton for 15 seconds. In this option patient data is lost.

SECTION 3 – PRINT, REPORTS AND NETWORKING

A. PRINTING AND REPORTS
- The CentralVue™ CV can connect to any external windows based printer. Connect the printer
  to a USB connector (E) in the rear panel of the CentralVue™ CV Computer, or connect to a
  network printer.
- The CentralVue™ CV also prints to a PDF virtual printer creating PDF print reports.

1 – EXTERNAL PRINTER
- The Brother HL 2140 printer is pre-configured with the following default settings. To change
  the printer settings touch the Print” Menu and select “Printer and PDF”.
- To install another Local or Network printer, read Section 3 F.

  ECG Trace Settings
  Printer DPI : 600 DPI Printers
  Charting Speed : 25 mm/s
  Scales : 5 mm/mV
  Grid : Grid On
  Tabular Reports
  Interval Between Measurements (minutes) : 1
  Numbers of Pages to Print : 1
  (45 measurements / Page)

- Set the “Print DPI”. Default is set to 600 DPI (Brother). Other manufacturer uses 300 DPI.
Check your printer documentation to verify correct DPI.
• Set "Charting Speed". Options are: 6.25, 12.5, 25, 50, 100 and 200 mm/s.
• Set "Scale". Changing scale will change the amplitude of the ECG in the printout. Options are: 2.5, 5, 10, 20, 40, 80 and 160 mm/mV. As you increase the "Scale" it will increase the size of the ECG in the printout.
• Set "Grid" On (default) or Off.
• Set "Interval Between Measurements" (minutes), for "Tabular Reports" printout.
• Set "Numbers of Pages to Print". Each page has 45 measurements.
• Touch the "Print ECG to Printer" button to start printing in the installed printer. The printout will have the last 10 seconds of ECG followed by current time ECG.
• Touch the "Print ECG to PDF" button to create a PDF printout of the ECG. The printout will have the last 10 seconds of ECG followed by current time ECG.
• Touch the "Print Report to Printer" to print the “Tabular Report” in the installed printer.
• Touch the "Print Report to PDF" to create a "PDF Tabular Report".

3 – EXCEL REPORTS
• The CentralVue™ CV Excel report contains a Tabular Report and Trends Graphical Report.
• The Tabular Report stores the patient's Vital Signs every minute. The Report can be reconfigured at the moment of printing, changing the time between readings from 1 minute up to 99 minutes.
• The Graphical Trends Report has options for 2, 4 and 24 Hours graphic trends report.
• To generate a Excel Report the patient shall be admitted in the Patient Management Setup.

SAVING PATIENT VITAL SIGNS TO EXCEL REPORT.
• As soon the CentralVue™ CV start the monitoring screen, the patient' data is being stored.
• Admitting the patient, transfers these data to the patient's buffer. The patient can be admitted any time after start monitoring.
• To save the patient’s data click in the “MainSys” or “System” menu and touch in the “Save Patient Vital Signs Report”. If the current patient is not admitted at this time, an “Error – No Patient has been admitted” screen is displayed. Touch “OK” and follow the steps to “Admit Patient”.
• If the current patient is admitted the “Save Vital Signs Report” screen is displayed. The “Current Selected Directory” to save the patient data is displayed (default is c:\Patient Data), with the “Report File Name”. The “Report File Name” contains the “Patient’s ID” and the date and time of the Report generation.
• To save to a different directory in a network computer, touch the “Select Another Directory” button. Select the desired directory in the “Look in” field and touch the “Done” button.
• Touch the “Save Report” button to save the report to the selected directory.

VIEWING PATIENT’S VITAL SIGNS EXCEL REPORT.
• To view the Patient’s Vital Signs Excel Report, Click in the “MainSys” or “System” menu and touch in the “View Reports with MS Excel”.
• In the Microsoft Excel™ screen, touch in "File" and “Open”. All saved Excel reports will be listed. Touch in the desired report name to select it and touch in “Open”.
• The Excel Report has three “tabs”: Tabular, 2 Hour, 4 Hour and 24 Hour. The Tabular report default time interval is 5 minutes. To print the Tabular Report with the default time interval touch in the “Printer” icon or in “File” and “Print”. In the “Print” screen touch to select the desired printer and touch “OK”.
• To change the Excel Report time interval, touch in the “maximize” button in the top right
corner to expand the report screen. Using the right arrow button, move the Tabular Excel Report to the left. Using the “Up” and “Down” big arrows, change the “Measurement Interval in Minutes”. Touch in the “Click here to renew the interval of Measurement” button. The Excel Report will change to the selected interval.
  • To view the Graphical Trends Report, touch in the 2 Hours, 4 Hours or 24 Hours “tab” in the bottom of the Microsoft Excel™ screen.

B. NETWORKING

The CentralVue™ CV can be connected to your local network using wireless LAN as an optional feature.
Note: Digicare can supply WIFI cards for your CentralVue™ CV. Contact sales and support for more information on this at 561-689-0408.

SECTION 4 – ECG Monitoring

A. INTRODUCTION

The CentralVue™ continuously monitors the ECG waveform and Heart Rate (HR) through a 3 / 5 Leads system. The screen displays up to six electrocardiogram lead vectors simultaneously, the Mean Heart Rate, Heart Rate alarm limits, the QRS detected (♥) indicator, Filters status, ST segment readings, PVC counter readings and ECG alarm messages.
B. SAFETY CONSIDERATIONS

ECG Patient connections are electrically isolated Type CF. For ECG connections use insulated probes. Don't let patient connections contact other conductive parts, including ground. See instructions for patient connections in this manual.

This monitor is supplied with protected lead wires. Do not use cables and leads with unprotected lead wires having exposed conductors at the cable end. Unprotected lead wires and cables may pose an unreasonable risk of adverse health consequences or death.

Leakage current is limited internally by this monitor to less than 10 μA. However, always consider cumulative leakage current that can be caused by other equipment used on the patient at the same time as this monitor.
To avoid the potential of electrosurgery burns at ECG monitoring sites, ensure proper connection of the electrosurgery return circuit as described by manufacturer’s instructions. If improperly connected, some electrosurgery units might allow energy to return through the electrodes.

CAUTION: Even though the ECG patient circuit is electrically isolated, it has not been designed for direct application on a patient’s heart.

C. PATIENT CONNECTIONS

To ensure conformance with all safety and performance specifications, use only the recommended accessories. These are available from DIGICARE using the following part number:

<table>
<thead>
<tr>
<th>ECG Accessories</th>
<th>Description</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Photo" /></td>
<td>ECG patient cable (10’ length) – 3 Leads Conmed</td>
<td>EC001</td>
</tr>
<tr>
<td><img src="image2" alt="Photo" /></td>
<td>Set of 3 ECG lead-wires with snap-in (40’ length) for Conmed Patient Cable PN EC001</td>
<td>EC004</td>
</tr>
<tr>
<td><img src="image3" alt="Photo" /></td>
<td>Set of 3 ECG lead-wires with smooth clip (40’ length) for Conmed Patient Cable PN EC001</td>
<td>EC014</td>
</tr>
<tr>
<td>Image</td>
<td>Description</td>
<td>Code</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td>Set of 3 ECG lead-wires with alligator clip (40' length) for Conmed Patient Cable PN EC001</td>
<td>EC003</td>
</tr>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td>Set of 3 ECG lead-wires with alligator clip (40' length) for Conmed Patient Cable PN EC001</td>
<td>EC011</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image" /></td>
<td>Set of 5 ECG lead-wires with snap-in (40' length) for Conmed Patient Cable PN EC011</td>
<td>EC013</td>
</tr>
<tr>
<td><img src="image4.png" alt="Image" /></td>
<td>Set of 5 ECG lead-wires with smooth clip (40' length) for Conmed Patient Cable PN EC011</td>
<td>EC015</td>
</tr>
<tr>
<td><img src="image5.png" alt="Image" /></td>
<td>Set of 5 ECG lead-wires with alligator clip (40' length) for Conmed Patient Cable PN EC011</td>
<td>EC012</td>
</tr>
<tr>
<td><img src="image6.png" alt="Image" /></td>
<td>ECG esophageal with temperature 24&quot;/2&quot;</td>
<td>EC005</td>
</tr>
<tr>
<td><img src="image7.png" alt="Image" /></td>
<td>ECG esophageal with temperature 24&quot;/3&quot;</td>
<td>EC006</td>
</tr>
<tr>
<td><img src="image8.png" alt="Image" /></td>
<td>ECG esophageal with temperature 40&quot;/3&quot;</td>
<td>EC007</td>
</tr>
</tbody>
</table>
POSITIONING ANESTHETIZED PATIENTS

For ECG monitoring during anesthesia, it is most important to position patients on the table for the procedure. If standard lead placement as described below is not possible, leads should be attached to the body where they will be least subject to movement and away from the surgical site. It is preferable to view an upright QRS complex for monitoring ECG. A heart base to apex lead arrangement will be best if the negative lead is placed at the base (point of right shoulder at thoracic inlet) and the positive lead at the apex (low on caudal left thorax). Standard right forelimb lead is negative and standard left hind leg is positive in lead two; so if these leads are properly placed and the machine is set to Lead II, an upright complex should be the result.

POSITIONING CONSCIOUS PATIENTS

Standard position for recording diagnostic ECG in dogs is right lateral recumbency. Diagnostic tracings can be obtained in cats in either right lateral or sternal position. Limbs should be perpendicular to the spine and parallel with their opposite member. In awake cats and dogs, it is best to have the patient held by a veterinary technician or veterinary assistant. One lead should be applied first to determine comfort level and adjustment made as needed. Then the other clamps can be placed in position. It is important that the patient be kept still. A moving patient may cause clips to saw into skin tissue leading to discomfort and change in position of electrodes.

3-LEAD PLACEMENT

Leads should be attached as illustrated in the diagram below. The following lead sequence can be applied for a 3 lead system: Right Foreleg (RA-white); Left Foreleg (LA-black); Left Hind Leg (LL-red) or electrodes can be positioned on the chest with the orientation illustrated below. NOTE: Clips can be bent to reduce pressure on the skin.
3-Lead Color and Coding

**USA Standard**
- LA = black (Left Foreleg)
- RA = white (Right Foreleg)
- LL = red (Left Hind Leg)

**International Standard**
- L = yellow (Left Foreleg)
- R = red (Right Foreleg)
- F = green (Left Hind Leg)

5-LEAD PLACEMENT

For a 5 lead system, four limb leads can be applied (RA, LA, RL, and LL) with the exploring lead (brown) used for diagnostic purposes as needed. Otherwise, the exploring lead may be left unplugged.

![5-Lead Placement Diagram]

**5-Lead Color and Coding**

**USA Standard**
- LA = black (Left Foreleg)
- RA = white (Right Foreleg)
- RL = green (Right Hind Leg)
- LL = red (Left Hind Leg)
- V = brown (explore)

**International Standard**
- L = yellow (Left Foreleg)
- R = red (Right Foreleg)
- N = black (Right Hind Leg)
- F = green (Left Hind Leg)
- C = white (common)

**LEAD CONTACT**

Sites where leads are attached to the body must be properly prepared to optimize contact. It is recommended to use electrolyte gel for monitoring ECG. It is best to first wet the hair at the lead attachment site with alcohol; then place gel on the moistened hair and skin. It is important that the gel be in direct contact with skin. For patients with dense undercoat, rub gel with fingers to assure that it has made contact with skin. Alligator clips are supplied with this monitor and they must open wide enough to firmly but gently grasp the skin.

**D. ECG MONITORING**

Connect the leadwires to the ECG patient cable, matching the colored end of the leadwire to the corresponding color of the cable.

Connect the ECG cable to the receptacle in the patient panel.
Patient cables and leadwires must be kept away from the neck area to minimize entanglement and accidental strangulation.

The indicator (♥) indicates the QRS detection. Check that the monitor is accurately detecting the heartbeat. If the heart indicator do not correspond to the patient’s heart rate, reposition the electrode clips.

The electrode connection to the skin is extremely important to reduce noise detection from mains supply. Alcohol can be used to improve connection and ECG paste / gel.

The heartbeat detection is automatic in the mode selected. The sensitivity is 0.2mV.

E. ECG MENU

Touch the ECG menu or the ECG indicator’s area to open the ECG menu screen
F. ECG SCALE

The ECG scale default mode is “Auto”. The gain automatically changes to best possible scale based on the ECG amplitude.

To change to a fixed scale touch the ECG menu and select the desired scale in the ECG SCALES menu. The ECG scales options are:

-0.1 mV to +0.1 mV
-0.25 mV to +0.25 mV
-0.5 mV to +0.5 mV
-1 mV to +1 mV
-2 mV to +2 mV
-3 mV to +3 mV
-4 mV to +4 mV
-5 mV to +5 mV
-6 mV to +6 mV

G. 5 LEAD MODE

The CentralVue™ CV ECG function default is 5 Lead Mode. It can be changed to 3 Lead Mode in the ECG menu.

The 5 Lead Mode has two physical channels of ECG and two modes of operation:

In the 6 channels mode, Lead I, Lead II, Lead III, AVR, AVL and AVF waveforms are displayed simultaneously. In this mode Lead V can not be displayed as the two channels are selected to Leads I and II and the other leads are derived from them.

In the 2 channels mode, Lead I, Lead II, Lead III, AVR, AVL, AVF and V can be selected in each channel. The two ECG Lead selected waveforms are displayed simultaneously.

Pressing the ECG LEAD dedicated key in the front panel in the 5 Lead 6 channel Mode, changes the selected ECG Lead waveform in the first trace only, from I, II, III, AVR, AVL and AVF.

H. 3 LEAD MODE

To change the ECG function to 3 Lead Mode, touch the ECG menu and select 3 Lead Mode. On the 3 Lead Mode only one ECG channel is available and Lead selection options are Lead I, Lead II and Lead III.

Pressing the ECG LEAD dedicated key in the front panel in the 3 Lead Mode, changes the selected Lead in the sequence I, II and III. The selected Lead waveform is displayed.

I. ECG FILTER

The CentralVue™ CV has two filters to decrease mains line and other interference.

The Mains Notch filter when ON, reduces the noise interference caused by the AC mains 50 or 60 Hz in the ECG waveform.
The Mode Monitoring Filter can be set to: Diagnostic, Monitoring 1, Monitoring 2, Surgery and Strong Filter. Both Filters are applied to both ECG channels simultaneously.

Diagnostic is the mode with less filtering. This is useful to improve the ECG waveform quality for diagnostic purposes. In the diagnostic mode, the ECG electrodes good interface is more critical in order to reduce the interference and noise in the signal.

Monitoring 1 (default) and Monitoring 2 cuts more of the interference and noise, reduce the ECG waveform quality and are used for most of the monitoring applications.

Surgery and Strong Filter cuts more of the interference and noise but reduce even more the ECG quality. These modes of filtering shall be used in situations where high level of noise and interference are being detected in the ECG waveform, created by electrosurgery and other high frequency and high power equipments.

**WARNING**

In the DIAGNOSTIC mode the monitor provides non-processed real time waveforms. In the MONITORING, SURGERY and STRONG filtering mode, the ECG waveforms may have slight distortions and the result of the ST segment analysis and arrhythmia detection may be affected greatly. Hence, the DIAGNOSTIC mode is recommended when monitoring a patient in an environment with slight interference and the use of ST segment analysis and arrhythmia detection is desired.

**J. HEART RATE LIMITS**

Heart Rate Limits are set by default to:
- High Heart Rate Limit: 140 BPM.
- Low Heart Rate Limit: 60 BPM.

Change the Heart Rate Limits in the ECG menu.
- High Heart Rate Limit Range: 5 to 300 BPM – or OFF - non overlaping.
- Low Heart Rate Limit Range: 0 to 295 BPM – or OFF - non overlaping.

The values selected are stored by the unit after power-off. To return to the factory default values, go to the SYSTEM menu and select the Load Factory Default Settings.

**K. ECG SWEEP SPEED**

There are 5 sweep speeds for the ECG waveform in the display: 6.25, 12.5, 25, 50 and 100mm/sec. To change the sweep speed, touch the TRACE menu and select the sweep speed for the desired trace.

**L. ECG PULSE TEST**

An ECG Test waveform can be generated to test the functioning of the ECG module.

To generate the ECG Test, touch the ECG menu and press the Test ON-OFF button. A screen “ECG Calibration Test Waveform” will open with the message:

“This command will generate calibration test waveforms for: ECG Channel input > 1mV”.
Press “Yes” and the Square Test waveform with 1mV amplitude will be generated in the screen for 30 seconds. No Heart Rate count is generated by the Test waveform function.

M. ECG PATIENT TYPE

Patient Type has two modes: Large and Small.

Selection of Patient Type changes the ECG sensitivity.

- Large mode sensitivity : 0.4 mV QRS amplitude.
- Small mode sensitivity : 0.2 mV QRS amplitude.

Change the Patient Type direct in the main screen Patient Type Selector Indicator (49) or in the ECG menu.

N. ECG INTERPRETATION

The purpose of this manual is not to go deep in the ECG interpretation. The following information is included to give a brief discussion of the ECG waveform interpretation. The following information was extracted from the book “ECG Manual for the Veterinary Technician” from N. Joel Edwards.

When analyzing the electrocardiogram the following parts of the P-QRS-T sequence are routinely measured: P wave, P-R interval, QRS complex, S-T segment, T wave, and Q-T interval. Values are determined for the duration (width) and amplitude (height) of the P wave, QRS complex, and T wave. Values are determined for the duration (length) of the P-R interval, S-T segment, and Q-T interval. In standard practice all measurements use lead II.

![ECG waveform](image)

The P Wave
The P wave is the first component of the normal ECG and is produced by the depolarization of both right and left atria. The P wave precedes the QRS complex and is separated from the QRS complex by the P-R segment. The normal duration (width) of the P wave varies, depending on the species being recorded. There is usually no minimum normal dimension considered because of the varying effects on electrical transmission to the body surface. Instead, the emphasis is on the maximum P-wave duration that is considered normal. An increase in P-wave duration (width) beyond normal for the species is called “P mitrale” and is generally associated with left atrial enlargement in most species. An increase in
P-wave amplitude above what is considered normal for the species is called P pulmonale and is generally associated with right atrial enlargement in most species.

Maximum Normal Values for the P Wave

<table>
<thead>
<tr>
<th>Species</th>
<th>Duration (sec)</th>
<th>Amplitude (mV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog</td>
<td>0.04</td>
<td>0.4</td>
</tr>
<tr>
<td>Cat</td>
<td>0.04</td>
<td>0.2</td>
</tr>
<tr>
<td>Ferret</td>
<td>0.04</td>
<td>0.1</td>
</tr>
<tr>
<td>Horse</td>
<td>0.20</td>
<td>-</td>
</tr>
<tr>
<td>Cow</td>
<td>0.10</td>
<td>-</td>
</tr>
</tbody>
</table>

The P-R Interval

The P-R interval represents the time during which atrial depolarization, A-V nodal, His bundle, bundle branch, and Purkinge fiber transmission of electrical activity are taking place. The P-R interval represents the electrical activity from the beginning of atrial depolarization to the beginning of ventricular depolarization. The P-R interval is made up of the P wave and the P-R segment.

The duration of the P-R interval can be influenced by the duration of the P wave (width) or the duration of the P-R segment (length). The P-R interval can provide evidence for conduction delay, conduction acceleration, and continuity between atrial depolarization and ventricular depolarization. The assessment of P-R interval is extremely important in evaluating the cardiac rhythm. Its length should be the same from complex to complex, because each P wave should be consistently related to its QRS complex.

<table>
<thead>
<tr>
<th>Species</th>
<th>Duration (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog</td>
<td>0.06 – 0.13</td>
</tr>
<tr>
<td>Cat</td>
<td>0.05 – 0.09</td>
</tr>
<tr>
<td>Ferret</td>
<td>0.04 – 0.06</td>
</tr>
<tr>
<td>Horse</td>
<td>0.22 – 0.56</td>
</tr>
<tr>
<td>Cow</td>
<td>0.16 – 0.30</td>
</tr>
</tbody>
</table>

The QRS Complex

The QRS complex represents ventricular depolarization. The QRS complex follows the P-R interval and is usually the largest waveform of the ECG and may assume several different shapes. In any one lead, each QRS complex should look the same throughout the lead. If not, an abnormality is usually present. Notching of the QRS complex may also occur.

The QRS complex is comprised of three waveforms: the Q wave, which is the first negative wave following the P-R interval; the R wave, which is the first positive wave following the P-R interval; and the S wave, which is the first negative wave after the first positive wave (R wave) following the P-R interval. All three of these waves need not be present to create the QRS complex. Whatever combination is present should be considered as the QRS complex.

Normal values for the duration (width) and amplitude (height) of the QRS complex are shown in the following table

<table>
<thead>
<tr>
<th>Species</th>
<th>Duration (sec)</th>
<th>Amplitude (mV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog (Toy Breed)</td>
<td>0.05 (max)</td>
<td>2.5 (max)</td>
</tr>
<tr>
<td>Dog (Large Breed)</td>
<td>0.06 (max)</td>
<td>3.0 (max)</td>
</tr>
</tbody>
</table>
Identifying and correctly interpreting the QRS complex is crucial to the assessment of ventricular health and to the recognition of arrhythmias. All QRS complexes within any one lead should look identical, and each one should be consistently related to the preceding P wave.

**The S-T Segment**

The S-T segment represents the end of ventricular depolarization and the beginning of ventricular repolarization. This is when the heart is completing the mechanical ejection of blood and is in the very early stages of relaxation.

The S-T segment extends from the end of the QRS complex to the beginning of the T wave. The point where the S-T segment begins and the QRS complex ends is called “J point”.

Under normal circumstances, the S-T segment remains at the baseline, as little net electrical activity is detected on the body surface during this period. The S-T segment is assessed by its degree of elevation or depression from the baseline.

The S-T segment is usually isoelectric, having the same position of the ECG tracing as the baseline. The normal S-T segment may be slightly elevated above the baseline or slightly depressed below the baseline. This amount of elevation or depression should not exceed 0.2 mV in the dog or 0.1mV in the cat. Criteria for S-T segment elevation and depression in other species are not as well determined. However, any elevation or depression of the S-T segment in excess of 0.2mV should be considered abnormal.

A change in a patient's S-T segment, as S-T segment elevation or S-T segment depression of greater than 0.2mV, is almost always associated with ventricular muscle abnormalities. Evaluate the S-T segment carefully, paying particular attention to its position above or below the baseline, and watch for the presence of slurring. Think of the S-T segment as a kind of barometer of “ventricular myocardial happiness”.

**The T Wave**

The T wave represents the majority of repolarization of the ventricles and thus is an indicator of overall ventricular health. The T wave begins at the end of the S-T segment and ends when its waveform returns to the baseline.

---

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat</td>
<td>0.04</td>
<td>0.9 (max)</td>
</tr>
<tr>
<td>Ferret</td>
<td>0.04</td>
<td>2.5 (max)</td>
</tr>
<tr>
<td>Horse</td>
<td>0.08 - 0.17</td>
<td>-</td>
</tr>
<tr>
<td>Cow</td>
<td>0.08 - 0.14</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: The ST ANALYSIS shall be used with the CentralVue™ CV Mode Filter in the Diagnostic mode. The Monitoring 1 mode also can be used, however the ST readings might be distorted by excessive filtering.

To enter in the ECG ST menu screen, touch the ECG menu and touch the “ST & Arrhyt” button.
The ST Analysis and Arrhythmia Detection Setup screen displays the ECG P-QRS-T event for both channels, with indication for the Isoelectric reference point and for the ST measurement point.

The ISO point is the base point, used to indicate the baseline point of the ST analysis. The Indicator ISO displays the time in ms (milliseconds) from the selected ISO point to the R wave (default is -53.340 ms).

The ST point is the ST measurement point. The Indicator ST displays the time in ms (milliseconds) from the R wave to the ST point where it is being measured (default is 72.009 ms).

The two measurement points shall be checked by the operator and can be changed, specially if the patient's HR or ECG morphology changes significantly. To change the ISO and ST measurement point, use the mouse or touchscreen to click in the reference line (Isoelectric or ST) and drag the line to new desired point in the ECG waveform and click in Set. To return the points to its original location click in Def't (default).

As shown below, the peak of the R wave is the reference point for ST measurement. The ST measurement value for a beat complex is equal to the vertical difference between the two measurement points.
Both ECG channels display the current ST measured value and the High and Low ST alarm limits.

The ST alarm limits range is from -2.00 to +2.00 mV in 0.1mV steps.
The default High ST alarm limit is +0.2mV
The default Low ST alarm limit is -0.2mV

To change the ST High and Low alarm limits use the up or down arrow in the ST Analysis and Arrhythmia Detection Setup screen.

The ST Segment Analysis can be turned OFF and ON in the ST Analysis and Arrhythmia Detection Setup screen.
P. ECG ARRHYTMIA DETECTION

The CentralVue™ CV has an Arrhythmia Detection software that automatically interpret and detect some arrhythmia. The ECG Filter Mode shall be selected to DIAGNOSTIC mode for better Arrhythmia Detection performance.

When the ECG being detected is considered normal, the message NORMAL in green color is displayed in the Arrhythmia Messages Indicator area.

The Arrhythmia Detection software “Learn” the ECG waveform every time the monitor is turned on and the ECG waveform starts to be detected. This Learn process determine the Normal ECG waveform pattern.

The ECG waveform Normal pattern can be “Relearned” at any moment by pressing the “Relearn” button in the ST Analysis and Arrhythmia Detection Setup.

Open the ECG menu and open click on the “ST and Arrhyt”.
When an Arrhythmia is detected the corresponding Alarm message is displayed in Red and an audible alarm is triggered.

The PVC Indicator is a counter that accumulates every PVC detected. The instantaneous PVC count is displayed. Each Arrhythmia has its own counter that accumulates each individual arrhythmia totals.
To verify the arrhythmia individual counter open the ECG menu and open the ST Analysis and Arrhythmia Detection Setup screen.

Each individual ECG arrhythmia can be set to automatically trigger the ECG printing in the optional internal strip chart recorder.

The ECG Arrhythmia Audio Alarm and the ECG Arrhythmia function can be set ON or OFF in the ST Analysis and Arrhythmia Detection Setup in the ECG menu.

Q. ECG ALARM MESSAGES

“ECG LEADS OFF” – Yellow message - indicates that any of the five leadwires, LA, RA, LL, RL and Vx are disconnected from the patient.

“ECG ASYSTOLE” – Red message - indicates NO detection of R waves from ECG waveform.

“ECG LOW HR” – Red Message - indicates that HR value is lower than the selected LOW HR LIMIT.

“ECG HIGH HR” – Red Message - indicates that HR value is higher than the selected HIGH HR LIMIT.

“ECG CHANNEL 1 HIGH ST” – Red Message - indicates that ECG lead at Channel 1 ST segment value is higher than the selected ECG Channel 1 HIGH ST LIMIT.

“ECG CHANNEL 1 LOW ST” – Red Message - indicates that ECG lead at Channel 1 ST segment value is lower than the selected ECG Channel 1 LOW ST LIMIT.

“ECG CHANNEL 2 HIGH ST” – Red Message - indicates that ECG lead at Channel 2 ST segment value is higher than the selected ECG Channel 2 HIGH ST LIMIT.

“ECG CHANNEL 2 LOW ST” – Red Message - indicates that ECG lead at Channel 2 ST segment value is lower than the selected ECG Channel 2 LOW ST LIMIT.

The following arrhythmia are detected by the CentralVue:

<table>
<thead>
<tr>
<th>ARRHYTHMIA</th>
<th>ALARM MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assystole</td>
<td>Assystole</td>
</tr>
<tr>
<td>Ventricular Tachycardia</td>
<td>Vtach / Vfib</td>
</tr>
<tr>
<td>Ventricular Fibrillation</td>
<td>Vtach / Vfib</td>
</tr>
<tr>
<td>Biggeminy</td>
<td>BGM</td>
</tr>
<tr>
<td>Triggeminy</td>
<td>TGM</td>
</tr>
<tr>
<td>Premature Ventricular Contraction</td>
<td>PVC</td>
</tr>
<tr>
<td>Pair of PVC</td>
<td>Couplets</td>
</tr>
<tr>
<td>Run of 3 or 4 PVC</td>
<td>Run</td>
</tr>
<tr>
<td>R on T</td>
<td>R on T</td>
</tr>
<tr>
<td>Missed Bit</td>
<td>Mis</td>
</tr>
</tbody>
</table>
### SECTION 5 – PULSE OXIMETRY MONITORING

The CentralVue™ CV Pulse Oximetry provide continuous, non-invasive, automatically calibrated measurements of oxygen saturation.

The Pulse Oximeter (SpO2) determines arterial oxyhemoglobin saturation by measuring the absorption of red and infrared light passing through the tissue. Changes in absorption caused by pulsations of blood are used to determine Arterial Saturation (%SpO2) and Pulse Rate (PR).

#### A. PATIENT CONNECTIONS

To ensure conformance with all safety and performance, use only the recommended accessories. These are available from DIGICARE using the following part number:

<table>
<thead>
<tr>
<th>Accessory Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nellcor® OxiMax® VetSat® SpO2 Patient Cable</td>
<td>PO734</td>
</tr>
<tr>
<td>Nellcor® VetSat® SpO2 Lingual Clip Large</td>
<td>PO736</td>
</tr>
<tr>
<td>Nellcor® VetSat® SpO2 Lingual Clip Small</td>
<td>PO737</td>
</tr>
<tr>
<td>Nellcor® OxiMax® VetSat® C Sensor PN</td>
<td>PO742</td>
</tr>
<tr>
<td>C Clip for Nellcor® OxiMax® VetSat® C Sensor PN</td>
<td>PO741</td>
</tr>
<tr>
<td>Nellcor® OxiMax® VetSat® SpO2 Wrap Probe</td>
<td>PO735</td>
</tr>
</tbody>
</table>
B. SPO2 MONITORING

- There are two sizes of veterinary sensor clips model VSCS (small) and VSCL (large).
- Select the clip that is appropriate for the patient.
- Clean the sensor and clip separately before and after each use. Refer to Page 113, for more information in cleaning.
- Open the clip by pressing with the thumb and forefinger.
- Slide one of the sensor’s alignment buttons along the clip slot until the sensor pad is fully engaged in the clip.
- Slide the second sensor button along the other clip slot until the second sensor pad is fully engaged in its side of the clip.
- Check that the optical sensor pads are facing each other directly.
- The sensor is now ready to be applied to the patient. The preferred sensor application site for canine, feline and equine animals is on the tongue, with the sensor’s optical components positioned on the center of the tongue. Alternatively, the sensor and clip may be applied to the animal’s lip, toe, ear, prepuce, or vulva.
- If the sensor does not track the pulse reliably, it may be incorrectly positioned or the sensor site may be too thick, thin, or deeply pigmented to permit appropriate light transmission. If any of these situations occurs, reposition the sensor or try another sensor site. If the sensor site is one that is covered with fur, try shaving the site and reapplying the sensor.
- Be sure that the sensor cable is positioned along the side of the animal’s face and body to avoid entanglement with the animal.

**WARNING:** Do not use supplemental tape to adhere the clip and sensor directly to the site; this can restrict blood flow and cause inaccurate measurements.

- Connect the sensor assembly to the Interface Cable:
- Place the plastic hinged cover in the unlocked position (perpendicular to the connector).
- Connect the sensor assembly to the Interface Cable.
- Lock the plastic hinged cover to prevent accidental cable disconnection.
- Plug the Interface Cable into the SpO2 connector on the side panel of the monitor. Push the cable in until you hear an audible “click”.
- Before the patient cable is connected and the probe is placed in patient, the message SpO2
SENSOR is displayed on screen.
• A few seconds after the sensor is placed in the patient, the SpO2 SENSOR message changes to Searching SpO2, the Bar-graph shows the SpO2 Pulse Level and SpO2 and Pulse Rate values are displayed.
• Verify that the sensor is properly positioned by observing at least ten seconds of a continuous plethysmogram waveform being displayed.
• If the Bar-graph Pulse Level is at a low level, message of weak pulse will be displayed. Reposition the sensor or try a different sensor. If normal operation cannot be achieved, call a Digicare Animal Health representative for assistance.

NOTE:
Reusable sensors may be used on the same site for a maximum of four (4) hours, provided the site is inspected routinely to ensure skin integrity and correct positioning. Because individual skin condition affects the ability of the skin to tolerate sensor placement, it may be necessary to change the sensor site more frequently with some patients.

Loss of pulse can occur if:
• The sensor is too tight.
• There is excessive illumination (e.g., a surgical or bilirubin lamp or direct sunlight).
• The sensor is placed on an extremity with a blood pressure cuff, arterial catheter or intravascular line.
• The patient experiences shock, hypotension, severe vasoconstriction, severe anemia, hypothermia, arterial occlusion to the sensor, or cardiac arrest.

Inaccurate measurements may be caused by:
• Incorrect application of dysfunctional hemoglobin’s, such as carboxyhemoglobin or methemoglobin.
• Significant, levels of indocyanine green, ethylene blue or other intravascular dyes.
• Exposure to excessive illumination, such as surgical lamps, especially ones with a xenon light source; bilirubin lamps, fluorescent lights; infrared heating lamps; or direct sunlight.
• Excessive patient movement.
• Venous pulsation’s.
• Electrosurgical interference.
• Placement of the sensor on an extremity that has a blood pressure cuff, arterial catheter or intravascular line.

Do not attach a probe to the same limb with a blood pressure cuff. The data received will not be valid when the cuff is inflated. Attach the probe to the limb opposite the site used for the blood pressure cuff.

C. SpO2 WAVEFORM AND BAR GRAPH
• The SpO2 waveform sweep speed can be selected from: 6.25, 12.5, 25, 50 and 100 mm/sec in TRACE menu.
• The amplitude of the pulse waveform is automatically adjusted in screen.
• The Bar graph indicates the pulse signal height and varies from 1 to 8. Increasing the signal amplitude increases the Bar graph value. Bellow number 2 in bar graph, the message WEAK PULSE is displayed.
D. SpO2 ALARM LIMITS

- SpO2 Alarm Limits are set by default to:
  SpO2 Upper Limit: OFF
  SpO2 Lower Limit: 88 %
- Change the SpO2 Alarm Limits in the SpO2 menu.
  SpO2 Upper Limit Range: 1 to 100 % – or OFF - non overlapping.
  SpO2 Lower Limit Range: 0 to 99 % – or OFF - non overlapping.
- Pulse Alarm Limits are set by default to:
  Pulse Upper Limit: 140 PPM
  Pulse Lower Limit: 60 PPM
- Change the Pulse Alarm Limits in the SpO2 menu.
  Pulse Upper Limit Range: 5 to 450 PPM – or OFF - non overlapping.
  Pulse Lower Limit Range: 0 to 445 PPM – or OFF - non overlapping.
- The values selected are stored by the unit after power-off.
- To return to the factory default values, go to the SYSTEM menu and select the Load Factory Default Settings.

E. SpO2 ALARM MESSAGES

SENSOR SpO2 - Indicate that SpO2 probe is disconnected from the patient or the patient cable is disconnected from the monitor or a malfunction in sensor or in patient cable.

SpO2 LOW AND HIGH ALARM LIMITS - Indicate that SpO2 value overlap the LOW or HIGH ALARM LIMIT selected.

WEAK PULSE - Indicate the pulse signal amplitude is low causing instability in SpO2 monitoring. Check the probe installation, site perfusion and body temperature.

CHECK SITE - Indicate instability in the SpO2 readings. Verify the probe installation and change probe site.

NO PULSE - Indicate the SpO2 pulse amplitude is smaller then the minimum pulse.
**SECTION 6 - TEMPERATURE MONITORING**

- The CentralVue™ CV has one temperature channel. The temperature probes are YSI 400 series compatible.

**A. PATIENT CONNECTIONS**
- To ensure conformance with all safety and performance specifications, use only the recommended accessories. These are available from DIGICARE.

<table>
<thead>
<tr>
<th>Probe Type</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature rectal/esophageal probe – disposable</td>
<td>TP001</td>
</tr>
<tr>
<td>Temperature skin probe – disposable</td>
<td>TP002</td>
</tr>
<tr>
<td>Temperature patient cable for disposable probe</td>
<td>TP003</td>
</tr>
<tr>
<td>Temperature rectal/esophageal probe – reusable</td>
<td>TP004</td>
</tr>
<tr>
<td>Temperature skin probe – reusable</td>
<td>TP005</td>
</tr>
</tbody>
</table>
B. TEMPERATURE MONITORING
• Connect the temperature patient cable to receptacle (N) Temp.
• In the Temperature menu select Temperature1.
• Select Temperature alarm High and Low limits.
• Select Temperature measurement unit: °F or °C.
• The temperature value is displayed when the probe temperature is in the 10 to 50°C (50 to 122 °F), range otherwise the temperature display is blanked.

1 - TEMPERATURE ALARM MESSAGES
TEMP# SENSOR – Indicates the Temperature sensor is not connected to the unit or a sensor failure.
TEMP# LOW – Indicates the Temperature value is lower than the selected Temperature Lower Limit.
TEMP# HIGH – Indicates the Temperature value is higher than the selected Temperature Upper Limit.

SECTION 7 – TECHNICAL SPECIFICATIONS

A. POWER REQUIREMENTS

A. CentralVue™ CV Computer
AC voltage Input : 100-240 VAC / 50-60 Hz max 450W Universal Power Input

B. TeleVue™ TV Power Supply
AC voltage Input : 100-240 VAC / 50-60 Hz max 24W Universal Power Input

C. TeleVue™ TV
AC voltage Input : 12Vdc / 50-60 Hz max 18W Universal Power Input

D. CentralVue™ CV Display
AC voltage Input : 100-240 VAC / 50-60 Hz max 150W Universal Power Input

E. CentralVue™ CV Bluetooth Access Point
AC voltage Input : 100-240 VAC / 50-60 Hz max 15W Universal Power Input

B. ECG
Lead Selection : I, II, III, avR, avL, avF, Vx (Standard 5 lead configuration)
Input Isolation : Isolated from Ground related circuits by ≥ 4KV rms / 5.5 KV peak
Frequency Response
   Diagnostic: 0.05 - 100Hz
   Monitoring: 0.5 – 35Hz
   Surgery: 1 – 15Hz
Leakage Current : < 10 µA at 120 to 240 Vac 50 / 60 Hz
Defibrillator & ESU Protection : Max. 360J
Test Signal : 1 mV square wave
<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heart Rate</strong></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>15 to 300 BPM</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 1%</td>
</tr>
<tr>
<td>Resolution</td>
<td>1 BPM</td>
</tr>
<tr>
<td>Sensibility</td>
<td></td>
</tr>
<tr>
<td>Large Mode</td>
<td>0.3 mV peak</td>
</tr>
<tr>
<td>Small Mode</td>
<td>0.2 mV peak</td>
</tr>
<tr>
<td>Pacemaker Rejection</td>
<td>Amplitude: 2mV to 700 mV, Duration: 0.1 to 2 ms</td>
</tr>
<tr>
<td>Sweep Speed</td>
<td>6.25, 12.5, 25, 50 mm/sec</td>
</tr>
<tr>
<td>Lead Fault Alarm</td>
<td>Audible and visual</td>
</tr>
<tr>
<td>Input</td>
<td>3 / 5 Lead ECG patient cable</td>
</tr>
<tr>
<td>Gain Selection</td>
<td>Auto and Manual by operator</td>
</tr>
<tr>
<td>QRS Indicator</td>
<td>Adjustable audible, visual</td>
</tr>
<tr>
<td>Patient Cable</td>
<td>6 pin AAMI standard</td>
</tr>
<tr>
<td>CMRR</td>
<td>≥ 90 dB</td>
</tr>
<tr>
<td>Input impedance</td>
<td>≥ 5 MΩ at 10 Hz with patient cable</td>
</tr>
<tr>
<td>Electrode Offset potential</td>
<td>± 0.3 V</td>
</tr>
<tr>
<td><strong>C. SpO2 - PULSE OXIMETER</strong></td>
<td></td>
</tr>
<tr>
<td>SpO2 Range</td>
<td>35 to 100% Large/Small</td>
</tr>
<tr>
<td>SpO2 Accuracy</td>
<td>± 2% (70 - 100%), ± 3% (50 - 69%) unspecified (0 - 49%)</td>
</tr>
<tr>
<td>SpO2 Resolution</td>
<td>1%</td>
</tr>
<tr>
<td>SpO2 averaging</td>
<td>8 seconds</td>
</tr>
<tr>
<td>Pulse Rate Range</td>
<td>30 to 250 BPM</td>
</tr>
<tr>
<td>Pulse Rate Accuracy</td>
<td>± 2%</td>
</tr>
<tr>
<td>Pulse Rate Resolution</td>
<td>1 BPM</td>
</tr>
<tr>
<td>Pulse Rate Averaging</td>
<td>16 pulses</td>
</tr>
<tr>
<td>Sensor Types</td>
<td>Lingual, Wrap, Reflectance, Y</td>
</tr>
<tr>
<td><strong>D. TEMPERATURE</strong></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>50 - 130 °F (10 – 50 °C)</td>
</tr>
<tr>
<td>Probe</td>
<td>YSI™ - 400 Compatible, Skin or Rectal / esophageal and disposable</td>
</tr>
<tr>
<td>Scale</td>
<td>Degrees C (Fahrenheit optional)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.1 °F from 77 to 103 °F (: ± 0.1 °C from 25 – 45 °C)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1 °F ( 0.1 °C )</td>
</tr>
<tr>
<td><strong>E. DISPLAY</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>23&quot; TFT – Active Matrix Color Flat Panel Display</td>
</tr>
<tr>
<td>Effective Display Area</td>
<td>29(H) x 51(W) mm</td>
</tr>
<tr>
<td>Resolution</td>
<td>1600 x 1200</td>
</tr>
<tr>
<td><strong>F. ENVIRONMENT SPECIFICATIONS</strong></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Operating 5°C to 45°C</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>Operating 30 - 75% (Non-Condensing)</td>
</tr>
<tr>
<td>Atmospheric Pressure</td>
<td>Operating 700 – 1060hpa</td>
</tr>
</tbody>
</table>

Operators Manual Multi-parameter Veterinary Monitor "CentralVue" 37
G. TRENDS

GRAPHICAL TRENDS: Present all physiologic variables trend waveforms for a passed period of time selected by the operator: 15 min, 1, 4, 12, 24, 48 and 72 hours.

TABULAR TRENDS: Present all physiologic variables trend in tabular data format since the patient was admitted until the present time.

SECTION 8 – MAINTENANCE

A. THE TELEVUES

When necessary, clean the exterior surfaces of the monitor with a cloth or swab dampened with warm and a mild detergent solution. Do not allow fluids to enter the interior of the instrument.

WARNING: Electrical shock and flammability hazard - always turn the monitor off and disconnect it from AC mains power before cleaning.

CAUTION: Do not autoclave or pressure sterilize this monitor. Do not stack or immerse this monitor in any liquid. Do not gas sterilize this monitor.

Do not touch, or rub the display panel with abrasive cleaning compounds, instruments, brushes, rough surfaced materials or make contact with anything that can scratch the panel.

B. PROBES

• The probes are the only surfaces of this monitor that come in contact with the patient. Clean the probes after each patient use.
• Clean the monitor’s probes with a commercial cleaning solution before attaching a new patient. Probes should be cleaned until signs of wear or splitting occur. At this time a new probe is required.
• If disinfection is required, wipe the surfaces with Isopropyl alcohol or cider and use a water rinse. When sterilization is required, use ethylene oxide and be sure to follow hospital procedures.
• Inspect the probe for wear or splitting after every disinfecting/sterilization process is complete.
• If wearing or splitting of the probe is found upon visual inspection, a new probe should be used.

C. PATIENT CABLES

• Do not autoclave the patient cables.
• Wipe the cables using soap and water or alcohol. Never submerge the cables in any liquid or allow liquids to enter the electrical connections.

D. BATTERY

• The TeleVue™ TV series monitor has four rechargeable batteries 1.2V / 2500 mAh NiMH. To ensure long life and proper operation follow the instructions:
• Use the TeleVue™ TV powered by its internal batteries at least once time a month until the “LO BATTERY” message appears on display.
• If the TeleVue™ TV is stored for long period without use, connect the TeleVue™ TV to the AC line to recharge the batteries for at least 18 hours once for each month period.
• In case you need to replace the battery refer to the service manual.
WARRANTY TERMS & CONDITIONS

DIGICARE BIOMEDICAL TECHNOLOGY, INC. covers all of their monitors with a 1 year warranty:

**Monitors**
1 year parts and labor

**Accessories:**
90 days on accessories only

DIGICARE BIOMEDICAL TECHNOLOGY, INC. will provide the necessary parts and labor to maintain the monitor(s) listed on the Warranty Certificate in a usable condition during the covered period.

DIGICARE BIOMEDICAL TECHNOLOGY, INC. will, at its option, repair or replace any product which proves to be defective during the warranty period, if returned to the factory with prior authorization, transportation prepaid.

Not covered by this agreement are repairs necessitated by any of the following conditions:

1. Inadequate power or power failure.
2. Neglect, abuse or misuse of equipment.
3. Servicing of equipment by person’s other than DIGICARE INC.
4. Any unit opened or tampered with, without prior authorization.

When returning a monitor for extended warranty repair, you must first contact DIGICARE BIOMEDICAL TECHNOLOGY, INC. to receive a Returned Goods Authorization Number (RGA #) that is to be clearly marked on top of the shipping carton. Please make sure that your company name, shipping address, area code and telephone number and person to contact is located in and/or on the box. **ANY UNIT THAT IS RETURNED TO THE FACTORY WITHOUT AN RGA# WILL BE REFUSED.**

FOR YOUR RECORDS

Model # __________________________   Serial # _______________________
Dealer Name: ______________________________________________________

Date Equip. Purch.: ________________________   Expiration Date: ________________

DIGICARE BIOMEDICAL TECHNOLOGY INC.
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Boynton Beach, FL 33426