This document serves as a guide on how to operate the Vega Imaging System hardware.

For additional assistance, please contact SonoVol/PerkinElmer technical support team:

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1 Introducing the Vega Imaging System

The Vega imaging system is a fully integrated ultrasound (US) imaging platform. The fully installed and calibrated device includes these components:

- Vega Imaging System
- Acquisition Control Computer & Monitor
- Anesthesia Delivery System
- Heat Lamp

1.1 Vega Imaging System Requirements

For Vega and the anesthesia system:

- **Power:**
  - 100-120VAC | 50/60Hz | 15A
  - 220-240VAC | 50/60Hz | 10A
- **Environmental:**
  - Ambient Temperature: 60 - 75°F (15 - 24°C)
  - Ambient Humidity: 50 – 80% non-condensing
  - Type of Use: Indoor Only

For Computer:

- **Power:**
  - 100-120VAC | 50/60Hz | 15A
  - 220-240VAC | 50/60Hz | 10A
- **OS:**
  - Microsoft Windows 10 (64-bit)
- **Processor:**
  - Minimum of 4 CPU logical cores.
- **Graphics:**
  - Dedicated GPU with support for OpenGL 3.2 or later (1 GB is recommended).
- **Display:**
  - Two supported resolutions of **1920 x 1080** or **1920 x 1200**.
- **Memory:**
  - Minimum RAM of **4 GB** (8 GB or more is recommended).
- **Mouse:**
  - A three-button mouse with scroll wheel is recommended.
- **Other:**
  - A PDF viewer (Adobe Acrobat Reader is recommended).
  - Internet access, and remote meeting software (eg. Zoom).
1.2 Vega Device Specifications

Table 1.1 – Ultrasound (US) Specifications

<table>
<thead>
<tr>
<th>US Transducer Description</th>
<th>Center Frequency (MHz)</th>
<th>Aperture Width (mm)</th>
<th>Lateral Field of View (mm)</th>
<th>US Imaging Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Element, High Frequency Wobbler</td>
<td>35</td>
<td>9</td>
<td>21.4</td>
<td>B-Mode US Imaging</td>
</tr>
<tr>
<td>Dual Element Annular Array, High and Low Frequency Wobbler</td>
<td>35 (high) 2 (low)</td>
<td>24.3</td>
<td>21.4</td>
<td>B-Mode US Imaging, Acoustic Angiography (AA) US Imaging</td>
</tr>
<tr>
<td>Linear Array</td>
<td>18</td>
<td>16.2</td>
<td>12.8</td>
<td>B-Mode US Imaging, Cardiac M-Mode US Imaging, Shear Wave Elastography (SWE) US Imaging</td>
</tr>
</tbody>
</table>

Table 1.2 – Vega System Specifications

<table>
<thead>
<tr>
<th>Vega Overall External Dimensions (D x W x H):</th>
<th>29 x 25 x 42 in (74 x 64 x 107 cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vega Operational Weight:</td>
<td>100 lbs (45 kg)</td>
</tr>
<tr>
<td>Number of Imaging Bays:</td>
<td>3</td>
</tr>
<tr>
<td>Imaging Bay Field of View (D x W):</td>
<td>2.0 x 4.4 in (5.0 x 11.1 cm)</td>
</tr>
</tbody>
</table>
Table 1.5 – Anesthesia System Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaporizer &amp; Multiplexer Dimensions (D x W x H)</td>
<td>6 x 15 x 13 in (15 x 38 x 33 cm)</td>
</tr>
<tr>
<td>Vaporizer &amp; Multiplexer Weight</td>
<td>15 lbs (7 kg)</td>
</tr>
<tr>
<td>Number of Anesthesia Supply Ports</td>
<td>5</td>
</tr>
<tr>
<td>Anesthesia Supply Rates</td>
<td>0 cc/min (OFF)</td>
</tr>
<tr>
<td>Oxygen Gas Supply Line Fitting</td>
<td>DISS Male</td>
</tr>
<tr>
<td>Oxygen Gas Input Pressure Rating</td>
<td>50 – 60 PSI</td>
</tr>
<tr>
<td>Active Scavenger Dimensions (D x W x H)</td>
<td>6 x 10 x 7 in (15 x 25 x 18 cm)</td>
</tr>
<tr>
<td>Active Scavenger Power Supply</td>
<td>12 VDC</td>
</tr>
<tr>
<td>Number of Active Scavenging Ports</td>
<td>2</td>
</tr>
<tr>
<td>Active Scavenging Range</td>
<td>0-10 L/min</td>
</tr>
</tbody>
</table>

1.3 Legend

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="NOTE" /></td>
<td>A NOTE indicates important information that helps you make better use of your system.</td>
</tr>
<tr>
<td><img src="image" alt="CAUTION" /></td>
<td>A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.</td>
</tr>
<tr>
<td><img src="image" alt="WARNING" /></td>
<td>A WARNING indicates a potential for property damage, personal injury, or death.</td>
</tr>
</tbody>
</table>
2 Navigating the Vega Imaging System

2.1 Overview of the Hardware Components

Figure 2.1 – Vega System Overview, Front & Rear View

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Ultrasound ROI Camera</td>
</tr>
<tr>
<td>B</td>
<td>Anesthesia Manifold</td>
</tr>
<tr>
<td>C</td>
<td>Imaging Bay (x3)</td>
</tr>
<tr>
<td>D</td>
<td>Linear Array Imaging Engine</td>
</tr>
<tr>
<td>E</td>
<td>USB Pass-Thru (x6)</td>
</tr>
<tr>
<td>F</td>
<td>Mains Power Switch / Power Cable Input</td>
</tr>
</tbody>
</table>

Figure 2.2 – Vega Internal Component
Figure 2.3 – Vega System Ancillary Components

Active Scavenger

Anesthesia vaporizer and multiplexer

Protective Membrane Covers

WARNING: Do not attempt to move the Vega after installation. Moving or altering the unit without supervision of a trained SonoVol technician may result in damage to the system or personal injury.

CAUTION: The imaging membranes are fragile and may be punctured if impacted with a sharp object. Keep protective covers on imaging membranes at all times when the system is not in use.
2.2 Powering on the Vega

Prior to powering on the system, ensure the following:

1. The power cable is properly seated in the device cable receptacle, and an appropriate wall outlet.
2. The five (5) USB connectors are properly plugged into their receptacles at the back of the Vega, and into the appropriate USB receptacles on the acquisition computer running SonoEQ.
3. The Thunderbolt 3 cable is plugged into the appropriate receptacle on the acquisition computer.

**NOTE:** *This step only applies to those systems that are configured with a linear array US transducer.*

4. The acquisition computer and monitor are plugged in, and powered on.

Once checked, flip the Mains Power Switch on the back of the Vega. The system LEDs turn blue. Be sure the device is turned on before SonoEQ is launched.

Refer to the SonoEQ User Manual for instructions on controlling and interacting with the Vega Imaging System.
2.3 Operating the Anesthesia Control System

The anesthesia delivery system uses a multiplexed delivery system that allows you to select between three flow rates for each imaging bay within the Vega. The vaporized isoflurane is mixed with oxygen gas, typically at a rate of 1.5% isoflurane as set on the cap of the vaporizer. Consult the manufacturer work instructions to load and prime the vaporizer with isoflurane.

The excess isoflurane and waste carbon dioxide from the animals are removed from the system with an active scavenger, which passes the exhaust through a charcoal filter. This charcoal filter (VaporGuard Activated Charcoal Adsorption Filter, VetEquip Item Number: 931401) must be weighed and replaced periodically according to the manufacturer specification.

The flow rates are 0 cc/min (OFF), 500 cc/min, and 1,000 cc/min. Looking left to right inside the Vega, the imaging bays correspond with outputs 1, 2, and 3 respectively on the anesthesia access panel, and the anesthesia vaporizer.

**Figure 2.4 – Anesthesia Multiplexer / Vaporizer Assembly, and Active Scavenger**

The anesthesia waste line couples directly to the input port on the active scavenger. Make sure that the scavenger is plugged in, turned on, and the charcoal filter is within its usable weight.
2.4 Cleaning the Vega

The Vega should be cleaned after every use.

Cleaning the Imaging Bays:

1. Spray a light mist of 70% ethanol solution over the three imaging bays, as well as the anesthesia manifold.
2. Using a laboratory grade paper towel, carefully wipe the sprayed surfaces, replacing the paper towel as necessary.

⚠️ CAUTION: The imaging membranes are fragile and may be punctured if impacted with a sharp object. Keep protective covers on imaging membranes at all times when the system is not in use.

⚠️ CAUTION: While cleaning, only apply light pressure to the imaging membranes. As a rule of thumb we recommend using no more pressure than you would on your eyeball.

Cleaning the Vega Exterior:

1. Do not spray the device directly.
2. Use a light mist of 70% ethanol solution on a laboratory grade paper towel, and wipe down components on the exterior of the device as needed.

⚠️ CAUTION: Only clean the device when not in use to avoid interrupting any data acquisition that may be in progress.