

PhysioSuite[®]

Modular System

Fully integrated touch screen control and display

User's Guide



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User's Guide

Technical Help: 860-626-1172

TABLE OF CONTENTS

Introduction

System Components	1
Navigating PhysioSuite®	2

System Customization

Custom Run Screen	3
Alarms.....	4

MouseSTAT®

Pulse Oximeter and Heart Rate Monitor

Set Up Hardware	6
Initial Set-Up	6
Procedure for Use	7
Troubleshooting	8
MouseSTAT Sensor Maintenance	8

CapnoScan®

End-Tidal CO2 Monitor

Set Up Hardware	9
Initial Set-Up	11
Procedure for Use	11
Troubleshooting	12
CapnoScan Sensor Maintenance	12

RightTemp®

Temperature Monitor and Homeothermic Warming

Set Up Hardware	13
Initial Set-Up	14
Procedure For Use	16
Troubleshooting	16
RightTemp Pad and Sensor Maintenance	17

Data Management

Connecting to a PC.....	18
History	19
Analog Output.....	20

General Information

Contact	22
Product Warranty	22
Satisfaction Guarantee	23
Specifications	23

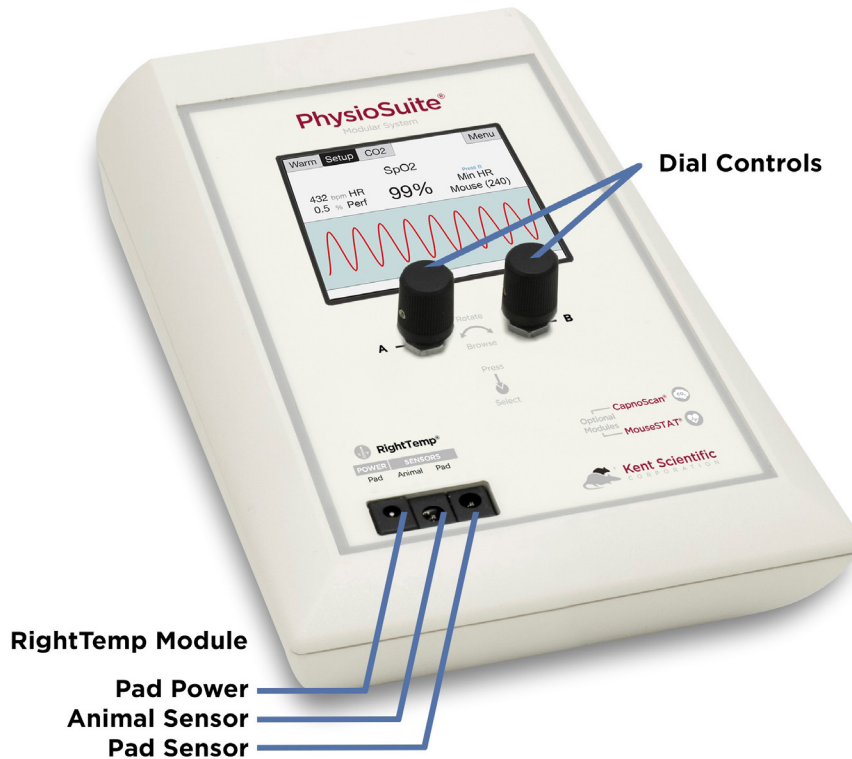
Index	26
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Introduction

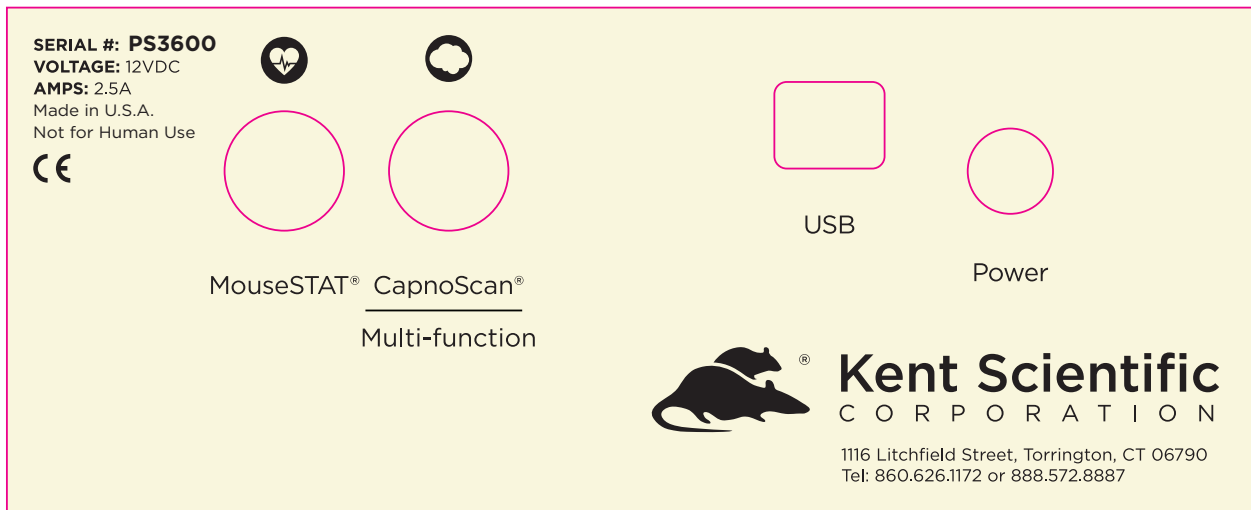
The PhysioSuite is not designed, intended or authorized for use in human applications.

System Components

Front Panel



Back Panel



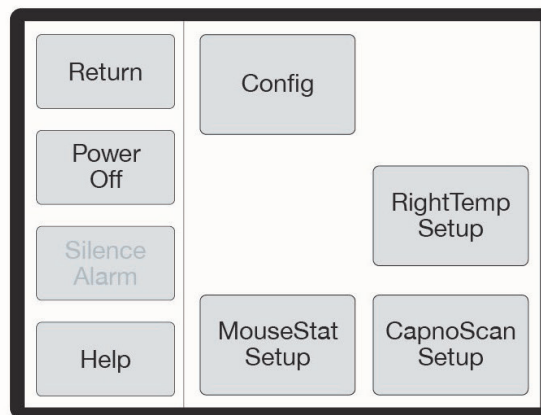
Navigating PhysioSuite®

Module Screens

The PhysioSuite Run screen has a designated screen for each installed module. Touch the tabs along the top of the screen to view the parameters and important settings for each module. Touch the tab again to open the module's extended Setup Menu.

Touch Screen

PhysioSuite Menu offers quick access to most features and settings. Touch the Menu button on the top right corner of the Run Screen.



PhysioSuite Menu

(Available menu options may differ based on module configuration)

System Customization

Custom Run Screen

PhysioSuite allows you to configure your own Run Screen, allowing a combination of parameters from any installed modules to appear on a single screen.

Tip: When using a Custom Run Screen, all settings need to be entered from the Menu or configured with Dial A and B.

To configure a Custom Run Screen:

1) From any Run Screen, touch Menu, then Config.

i **Param Locations**

Parameter locations allow you to decide where each parameter will be displayed on the screen. Turn Dial A to scroll through the list of available parameters, and turn Dial B to assign it to a location.

Press Dial A when finished.

ii **Charts**

Charts allow you to customize the graph that is displayed on the lower portion of the Custom Run Screen. You can customize two independent charts. Choose Chart Type to assign the parameter to be graphed, and Period to assign a graph time point.

Touch Back when finished.

iii **Set Ranges**

The Range setting allows you to customize the graph axis. The Ranges set here also apply to Analog Out. Turn Dial A to scroll through the list of available parameters, and then turn Dial B to adjust the range.

Press Dial A when finished.

iv **Dial Menu**

The Dial Menu allows you to assign a dial command for your Custom Run Screen. Turn Dial A to choose a setting you want to control for Dial A. Touch >> to assign a setting to Dial B.

Touch Back when finished.

To use a dial command:

1. At the Run Screen, quickly turn the Dial assigned to the setting whose value you want to change. The PhysioSuite beeps and the associated text becomes blue.
2. Turn the Dial to increase or decrease the value for the assigned setting. After 3 seconds, the PhysioSuite beeps again and the command text returns to black.

Tip: As you turn a Dial, setting changes takes place immediately.

Alarms

The PhysioSuite Alarms alert you to certain conditions that might require attention.

There are two levels of alarms:

Level	Based On	Banner	Sound (If On)	Configurable
Warning	Parameters or other operating conditions	Yellow	1-beep pattern	Yes
Serious	Parameters or other operating conditions	Red	3-beep pattern	Yes except for system alarms

To configure a new Parameter alarm:

- 1) From any Run Screen, touch Menu then Config.
- 2) Touch Data Mgmt, then Alarms.
 - i **Silence all Alarms**

If you do not wish for the PhysioSuite to make an audible tone when an alarm is triggered, you can create silent alarms. Turn Dial B to choose “Silence all Alarms” or “Allow Sound”.

Touch Back when finished.
 - ii **Parameter 1-4**

Set a custom alarm based on any measured parameter. You may choose up to 4. Press Dial A when finished configuring the following settings:

 - Parameters: Choose a parameter to monitor by alarm.
 - Action: Choose how the alarm will alert you (message and/or sound)
 - Type: Choose status to trigger alarm
 - Value: Set the threshold value
 - Delay: Choose how long the value must meet the threshold before triggering the alarm
 - Clear: Choose how the alarm needs to be cleared
 - iii **Fixed Alarms**

The PhysioSuite includes a number of fixed alarms that alert you to scenarios that require attention. The number of Fixed Alarms are dependent on the number of modules installed. You may view and configure any of the Fixed Alarms by selecting it, then pressing A to enter the Alarm Menu.

To clear a sounding alarm:

A triggered alarm produces a colored banner at the bottom of the screen describing the cause of the alarm.

To silence the alarm:

- 1) Navigate to the corresponding Screen
 - 2) Touch Setup, then Silence Alarm
- OR
- 1) Touch Menu from any Run Screen
 - 2) Touch Silence Alarm



MouseSTAT Pulse Oximeter and Heart Rate Monitor

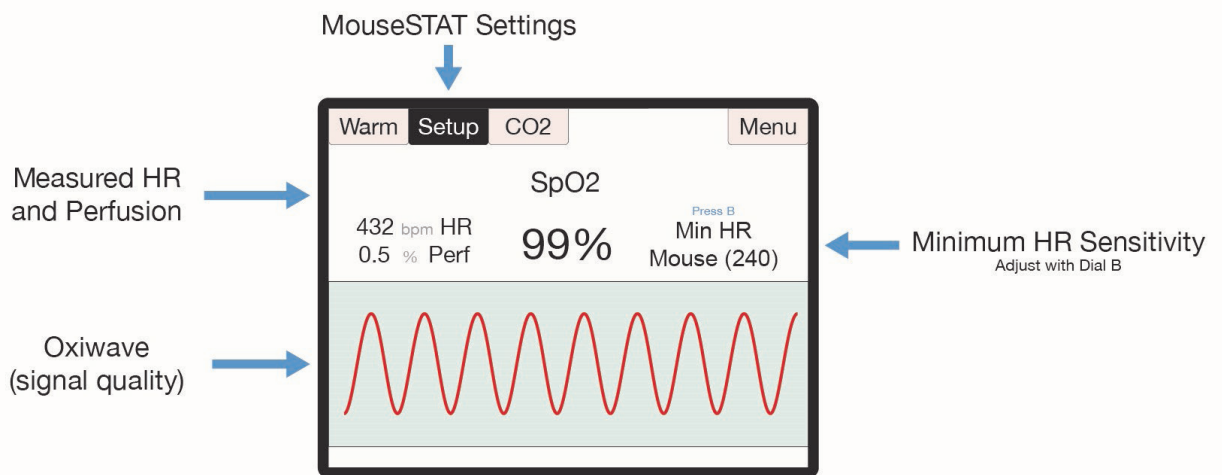


Set Up Hardware

Sensor:

1. Connect the interface cable to the MouseSTAT port on the back of the PhysioSuite.
2. Connect the sensor to the interface cable and ensure that the connection is secure.

The MouseSTAT Run Screen:



The MouseSTAT Run Screen

Initial Set Up

- 1) From the Oxi Run Screen, press then Turn Dial B to set the Minimum Heart Rate for your animal.



Procedure for Use

- 1) Anesthetize the animal and place on the RightTemp warming pad.

Tip: Kent Scientific recommends the use of inhalant anesthetics. Injectable anesthetic agents have a greater effect on circulation, making pulse oximetry challenging. Always warm the animal to support circulation in the animal's extremities.

- 2) Align the sensor over the hind paw of the animal, centering the red light over the paw pad.



MouseSTAT sensor on animal

Tip: The sensor automatically begins readings. To monitor signal quality, view the Oxiwave graph on the Oxi Run Screen.

Tip: MouseSTAT with Optional Respiratory Rate Parameter allows you to monitor RR. To obtain RR, a strong pulse oximetry signal is required.



MouseSTAT Troubleshooting

Problem	Possible Cause	Solutions
There is no red light or blinking light in the sensor.	Sensor not fully connected	<ul style="list-style-type: none">• Ensure that all connections are tight, especially at the back of the controller.
	Damaged wire in sensor or interface cable	<ul style="list-style-type: none">• Replace the damaged cable.
Readings are inconsistent. or There are no readings.	Incorrect sensor placement	<ul style="list-style-type: none">• Reposition sensor on the animal's paw.
	Poor animal circulation	<ul style="list-style-type: none">• Investigate types and dosages of anesthetic and other drugs in use; reduce where possible.• Increase animal body temperature to encourage circulation.

MouseSTAT Sensor Maintenance

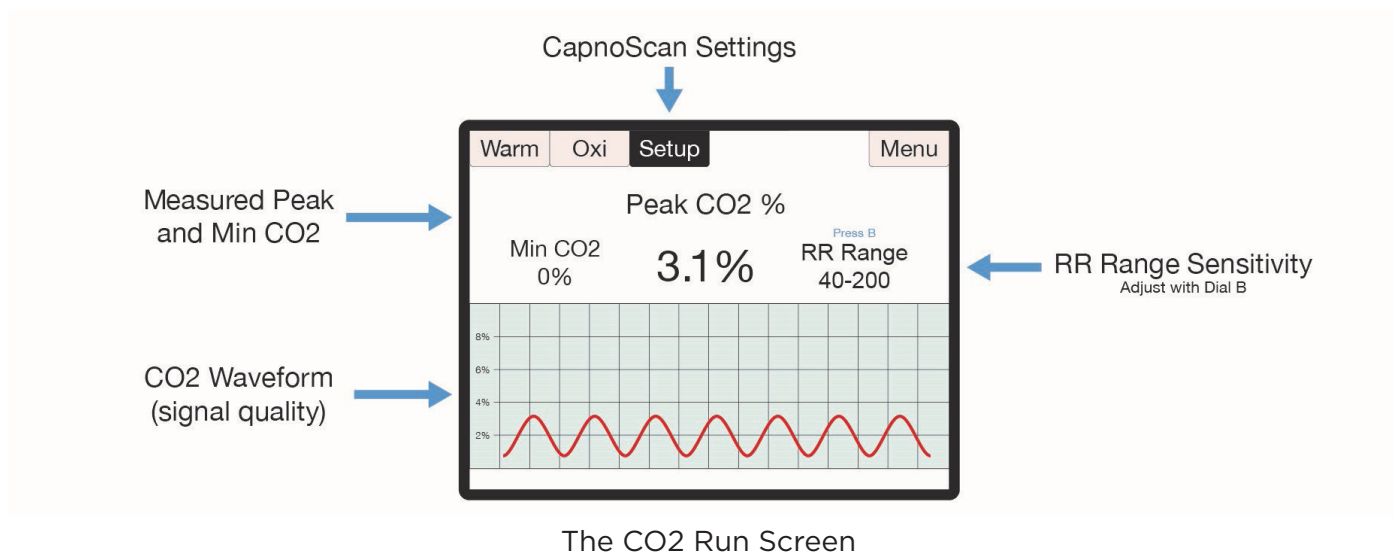
- Avoid any practice that creates tension or strain on the sensor cable or connections. MouseSTAT sensors are designed to be gentle on small paws.
- When the MouseSTAT sensor is not in use, gently coil it and store it in its package to prevent tangles or bends in the sensor wire.
- Gently wipe the sensor clean between uses.



CapnoScan End-Tidal CO₂ Monitor



The CapnoScan Run Screen:

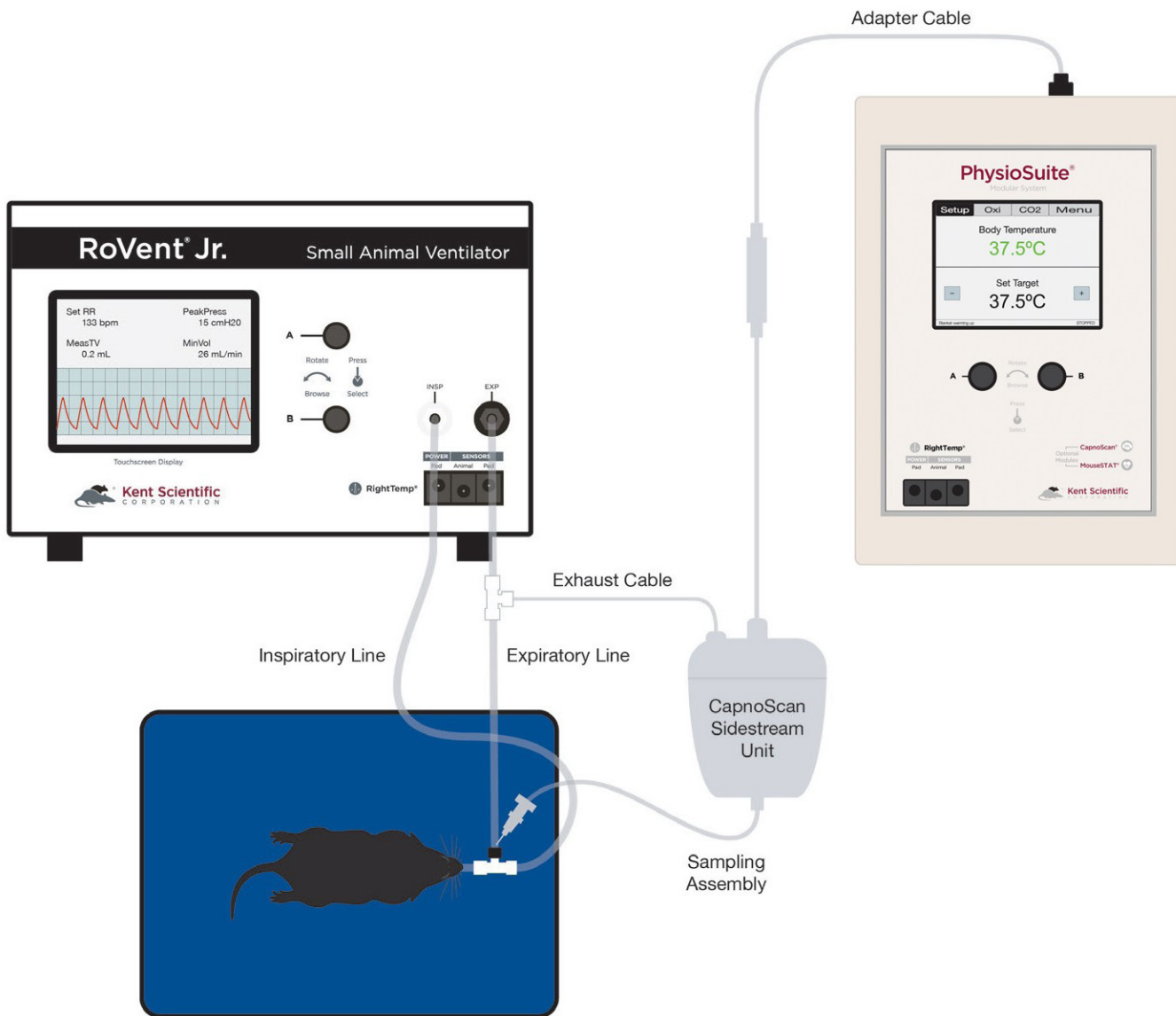


Set Up Hardware

Sensor:

1. Connect:
 - 1) the interface cable to the CapnoScan port on the back of the PhysioSuite
 - 2) the side-stream sensor to the interface cable, ensuring that the connection is secure.
2. Insert:
 - 1) the sampling assembly into the back slot of the side stream unit.
 - 2) the sampling needle into the expiratory line of the ventilator as close to the animal as possible.
3. Attach the return line to the expiratory line, close to the ventilator.

Tip: For CapnoScan to accurately measure end-tidal CO₂, the animal must be connected to a ventilator.



PhysioSuite CapnoScan with External Ventilator Setup

Initial Set-Up

CapnoScan Calibration:

1. From the Co2 Run Screen, touch Setup.
2. Touch More CO₂, then Calib CO₂ Sensor. Press Dial B to zero the sensor.

Procedure for Use:

- 1) From the CO₂ Run Screen, touch Setup.
- 2) Enter the gas parameters.
 - CO₂ units: Choose mmHg or %.
 - Measure RR: Use CapnoScan to measure the animal's respiration rate. Choosing "Yes With Priority" will allow the CapnoScan's MeasRR readings to override MouseSTAT's MeasRR readings.
 - RR range: Choose the expected respiration rate range for your animal. (This can be adjusted from the CO₂ Run Screen by pressing and turning Dial B).
 - Gas temp: Choose the temperature of the expiratory gas. When measuring an animal's ETCO₂, use the default value of 35°C.
 - Pressure: Set the current barometric pressure for the day.
 - Percent O₂: Estimate the concentration of O₂ in expired gas.
 - Gas type: Indicate the type of balance gas in use.
 - Percent NO₂: Set the concentration of NO₂ in the balance gas.

Note: Whenever these settings are changed, disconnect the CapnoScan from the PhysioSuite, then reconnect it. This will reinitialize the sensor so that the new settings take effect.

- 3) Connect the animal to the ventilator.
The sensor automatically begins readings.

Tip: To monitor the CO₂ waveform, set the type for one of the charts to “InstCO₂”. (See page 3).

CapnoScan TroubleShooting

Problem	Possible Cause	Solutions
CO ₂ readings are low or incorrect.	Poor sampling needle placement	<ul style="list-style-type: none"> Place the sampling needle into the expiratory tubing as close to the animal as possible.
	Incorrect compensation settings	<ul style="list-style-type: none"> Enter all gas compensations as accurately as possible. Zero the CapnoScan relative to the airway adapter.
There are no readings.	CapnoScan not running or not connected	<ul style="list-style-type: none"> Ensure that all connections are tight, especially at the back of the PhysioSuite. Ensure that the CapnoScan is running.
	Sampling tube dirty or damaged	<ul style="list-style-type: none"> Ensure that the sampling tube is not wet, soiled or damaged. Remove the sampling assembly from the CapnoScan sensor and clean the window gently.

CapnoScan Sensor Maintenance

- Replace the sampling assembly if wet or soiled. CapnoScan sampling assemblies are designed to be disposable.
- When the CapnoScan sensor is not in use, gently coil the cables and store them in their package to prevent any dust or debris from entering the sampling assembly port.
- Gently wipe the sensor clean between uses.



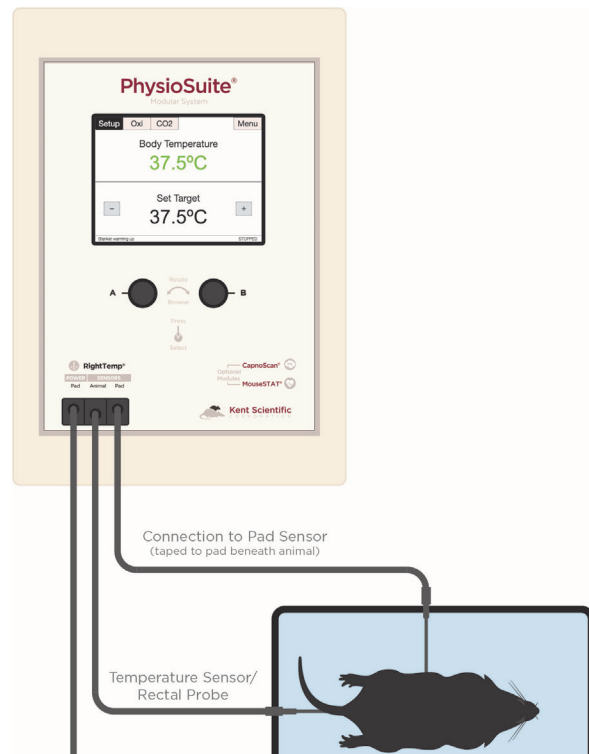
RightTemp Temperature Monitor and Homeothermic Warming



Set Up Hardware

1. Connect the warming pad to the Pad Power port on the front of the PhysioSuite.
2. Choose one probe as the body temperature sensor, and the other as the pad temperature sensor.
 - a. The probes are fully interchangeable.
3. Connect the body temperature sensor to the Animal Sensor port.
4. Connect the pad temperature sensor to the Pad Sensor port.

Pad and Body Temperature
Sensors Connected to
PhysioSuite®



Setup Diagram

5. Secure the pad temperature sensor in the center of the warming pad using tape, etc. Apply tape and other adhesives to the black portion of the cable. Taping over the white portion of the sensor may result in damage to the sensor.
6. We recommend that you secure the pad temperature sensor to the warming pad directly beneath the animal. If using the included disposable pad covers or any other covering, make sure the sensor is secured to the cover itself (not beneath the cover).



Initial Set-Up

1. From the Warm Run Screen, touch Setup.
2. Touch Control Warming, and choose the warming method.
 - a. Off: temperature monitoring, no warming
 - b. Warming Pad: temperature monitoring with power adjustment
 - c. Homeothermic: temperature monitoring and control using animal sensor control

Warming Pad:

In this warming mode, the RightTemp warms the pad, but the warming level is not controlled by animal temperature. The pad warming is controlled by setting the percentage of maximum power going to the pad, from 0% to 100%.

Tip: This warming mode does not include any temperature control. The pad can become very hot if used at high warming percentages.

Note: In this warming mode, the “Pad” temperature is not an indication of “Animal” temperature. Animal temperature can only be regulated when using both sensors in Homeothermic mode.

Homeothermic (requires use of both pad and animal sensor):

1. From the Warm Run Screen, touch Setup.
2. Touch Target BodyTemp and set the desired target body temperature.
3. The pad will automatically begin warming at 65% warming power until the animal’s body temperature is within 6°C of the target body temperature setting (default 37°C). Once the temperature is within 6°C, the system will switch to Homeothermic regulation.



Tip: If the animal's body temperature is below 6°C of the target, a message stating "Body Temp too low for regulation" will appear and the system will warm at 65%, Warming by Percent Power. Increase the warming power (up to 100%) until the animal's body temperature increases to within 6°C of the "set" temperature.

4. Use the arrows to adjust "Set" temperature. This is your desired animal temperature.

Note: The default Set temperature is 37°C; the system will revert to the default temperature upon power-cycling. In order to view or adjust the target body temperature setting from the Run Screen, the animal sensor must be connected and measuring a temperature above target temperature - 6°C. If the animal's body temperature is not within this range, adjust the Set temperature from the Setup menu.

5. When using the animal sensor, the color of the temperature indicates the warming status.
 - Blue: the "Body Temperature" is below target by at least 1°C. The warming pad will actively warm to reach "Set" temperature.
 - Green: "Body Temperature" is within the "Set" temperature by 1°C. The warming pad will maintain "Set" temperature.
 - Red: "Body Temperature" is above "Set" temperature by at least 1°C. The warming pad will decrease warming until it reaches "Set" temperature.

Procedure for Use

1. Place the anesthetized animal on the warming pad directly on top of the Pad Sensor.
2. If using Homeothermic regulation, insert the animal temperature probe into the rectum of the animal. Secure the probe if necessary.

Tip: Always secure the pad temperature probe beneath the animal.

RightTemp Troubleshooting

Problem	Possible Cause	Solutions
Pad is not heating.	Incorrect settings	<ul style="list-style-type: none"> • Ensure that all settings are properly enabled for warming and target temperatures are selected.
	Incorrect or loose connections	<ul style="list-style-type: none"> • Ensure that the connection at the back of the PhysioSuite is tight.
Pad is overheating.	Incorrect settings	<ul style="list-style-type: none"> • Ensure that all settings are properly enabled for warming and target temperatures are correctly selected. • Enable a “Maximum Pad Temp” when type of warming is “Body temp regulated” to prevent overheating.
	Incorrect sensor placement	<ul style="list-style-type: none"> • Place pad sensors directly beneath the animal. • Place animal sensor rectally only.
“Lost Sensor” alarm	The sensor has been disconnected.	<ul style="list-style-type: none"> • Reconnect the temperature sensors.
	Sensor failure	<ul style="list-style-type: none"> • Contact Kent Scientific for assistance.



RightTemp Pad and Sensor Maintenance

- Use the disposable warming pad covers to prevent soiling the warming pad.
- Wipe the warming pad clean with a damp cloth if needed. Never saturate the warming pad.
- Gently wipe the sensors clean between uses.

Data Management

For PC Connections

Kent Scientific devices can collect and monitor data using a serial over-USB connection. The data can be uploaded to a variety of programs, including ADI's data acquisition software, LabChart®.

If you do not have LabChart, please contact Kent Scientific for recommended alternatives.

Note: Kent Scientific devices are Windows® compatible only.

Driver Installation

The driver installs automatically the first time you connect your device to a PC via miniUSB cable. If the driver does not install automatically, you can install it manually from <http://www.ftdichip.com/Drivers/VCP.htm>.

COM Port Settings

Bits per second: 115200
Data Bits: 8
Parity: None
Stop bits: 1
Flow Control: DTR: green RTS: green

Upload to a PC

The Upload feature sends data at user-selectable time intervals to a PC through the USB port. The PhysioSuite can upload data for up to 20 parameters simultaneously.

To upload data in real time to a PC:

1. Connect your Kent device to a PC.

Tip: Ensure drivers are installed, COM port settings have been adjusted, and the program you plan to use is running.

-
2. From any Run Screen, Touch:
 - 1) Menu, then Data Management, then Upload
 3. Choose:
 - 1) The Parameters to upload
 - 2) The timing
 - 3.) Then touch Enable.

Tip: The “Always enabled” setting saves data as long as the controller is on. The “Enabled while running” setting is available only if your system contains a RoVent ventilator, and saves data only when the ventilator is running.

History - Internal Storage

The History feature stores parameters records in ASCII format, up to 1000 rows. You can send this data to a PC through the USB port at a later time. Each row can include up to 10 Parameters simultaneously at user-selected time intervals. You can view the data on screen or export the data to a computer after your study is complete.

Tip: Data record 1001 will overwrite data record 0001, and so on.

To save data to History:

1. From any Run Screen, Touch:
 - 1) Menu, then Data Management, then History
2. Choose:
 - 1) The Parameters to save
 - 2) The timing

Tip: Changing these settings permanently deletes any data currently saved on the system. Be sure to Export any saved data to a PC prior to making changes.

- 3) Then touch Enable.

To view saved History:

1. Touch Menu, Config, Data Management, then History. Touch View.
Or
2. From the Menu, touch Return. The PhysioSuite will give you options for your return screen. Select Hist to view history recordings.

To export History to a PC:

1. Connect your Kent device to a PC.

Tip: Ensure drivers are installed, COM port settings have been adjusted, and the program you plan to use is running. Refer to the Data Management Guide for more information.

2. From any Run Screen, Touch:
 - 1) Menu, then Data Management, then History
3. Choose:
 - 1) Send New: export only new data since the last export
 - 2) Send All: export all History saved to the device.

Analog

The Analog Output feature sends an analog signal corresponding to a single Parameter to external equipment via a remote cable.

Please contact Kent Scientific for a remote cable if you would like to use this feature.

To configure Analog Output

1. From any Run Screen, Touch:
2. Menu, then Data Management, then Analog Output.
3. Choose a Parameter to output.

Tip: The voltage output ranges from 0-3V, with 0V assigned to the low limit of the range, and 3V to the high limit.

See Custom Run Screen on page 3 to set a Range corresponding to the 0-3V output.

General Information

Thank you for purchasing a PhysioSuite. We truly appreciate your business. We strongly advise that you read and study this User's Guide to fully appreciate all the features, benefits, and capabilities of the PhysioSuite.

Contact Information

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This product is not designed, intended or authorized for use in human applications.

Product Warranty

The PhysioSuite has a one (1) year warranty including all parts and labor charges. This warranty does not cover damage by any cause including, but not limited to, any malfunction, defect or failure caused by or resulting from unauthorized service or parts, improper maintenance, operation contrary to furnished instructions, shipping or transit accidents, modifications or repair by the user, harsh environments, misuse, neglect, abuse, accident, incorrect line voltage, fire, flood, other natural disasters, or normal wear and tear. Changes or modifications not approved by Kent Scientific Corporation could void the warranty. The foregoing is in lieu of all other expressed warranties. Kent Scientific Corporation does not assume or authorize any party to assume for it any other obligation or liability.

Satisfaction Guarantee

Should you experience difficulty with the PhysioSuite, our Technical Support Group will assist you in trouble-shooting and determining if the product needs to be returned to our facility. We will issue you a Return Manufacturer Authorization (RMA) number before the product is shipped back for repair. It is at the discretion of the manufacturer to replace or repair a defective part or product. Please call Customer Service at 888-572-8887 to obtain a Return Manufacturer Authorization number. Shipments without a RMA number will not be accepted. Please note that after our 30-day return policy period ends, we will be happy to assist you with your application, but cannot issue any credit or refund for a returned PhysioSuite.

Prior to shipment, please clean and decontaminate the product of any chemical, biological, or isotopic contamination. Please include a completed Product Return Form with the shipment. This form can be obtained by contacting Kent Scientific Customer Service at 888-572-8887 or 860-626-1172.

Specifications

Controller

Voltage	12V, 2.5A
Dimensions	29cm (11.41in) x 20cm (7.87in) x 7.6cm (2.97in)
Weight	With ventilator module: 1.9kg

Power Supply

Input	100 to 240V, 50 to 60Hz, 1.0A
Output	12V, 2.5A

MouseSTAT

Heart Rate	Up to 900bpm
Resolution	1%
SpO2 Range	70% to 100%
Alarms	5, programmable
Data Export	Yes
SpO2 Sensors	Mouse: Soft Touch paw sensor Rat: Soft Touch paw sensor, or large animal sensor Pup: Annular paw or body sensor MRI compatible sensors available

RightTemp Sensors

Resistance	2,252 ohms
Tolerance	+/- 0.2°C
Accuracy	25°C to 45°C
Operating Temperature	-40°C to 80°C
Sensor Diameters	Ball Tip Diameter: 1.65mm max Shaft: 1.5mm
Time Constant	10.0 seconds
Dissipation Constant	0.75m/W (°C)

CapnoScan Sensor

Transducer type	Sidestream CO2 Sensor
Principle of operation	Non-dispersive infrared (NDIR) single beam optics, dual wavelength, no moving parts
Initialization time	Capnogram displayed in less than 15 seconds at an ambient temperature of 25°C, full specifications within 2 minutes
CO2 measurement range	0mmHg to 120mmHg, 0% to 16%, 0kPa to 20kPa (at 760mmHg); Barometric Pressure supplied by host
Rise time	Less than 60ms
CO2 resolution	0.1mmHg at 0mmHg to 69mmHg 0.25mmHg at 70mmHg to 150mmHg
CO2 accuracy	±2mmHg at 0 to 150mmHg
CO2 stability	Short term drift: Drift over four hours shall not exceed 0.8mmHg max Long term drift: Accuracy specification will be maintained over a 120-hour period
Calibration	No routine user calibration required; an airway adapter zero is required when changing to a different style adapter
Airway adapter	< 1cc dead space adapter
Conditions	Operating: 0°C to 45°C, 10% to 90% RH, non-condensing Storage: -40°C to 70°C, <90% RH, non-condensing

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Index

New Index To Come...





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