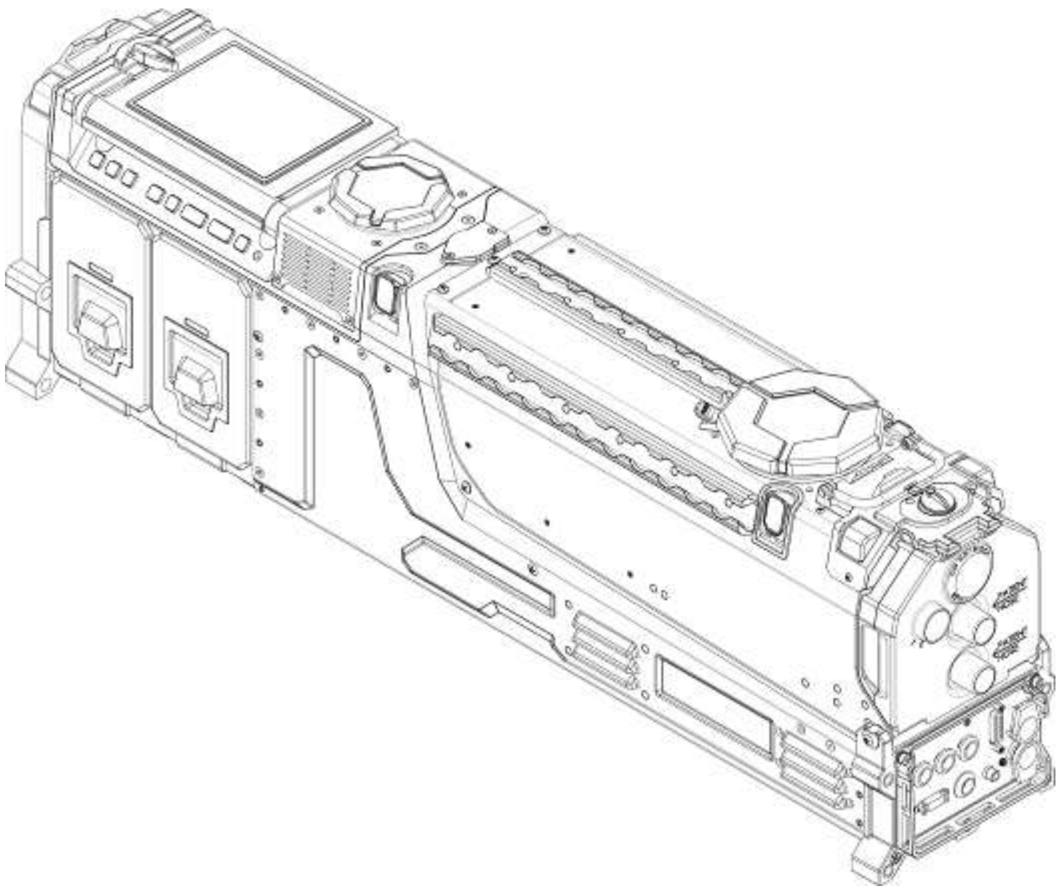
MOVES® SLC™

PORTABLE LIFE SUPPORT SYSTEM

THORNHILL RESEARCH



Operator's Manual

Caution: Federal law restricts this device to sale by or on the order of a physician.

Part Number: 124826 Rev. D 16 March 2015

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1.1 CONTACT INFORMATION

1.1.1 Manufacturer

✉ **Address:**	Thornhill Research Inc. 210 Dundas Street West, Suite 200 Toronto, Ontario Canada M5G 2E8
☎ Phone:	+1.416.597.1325 or +1.888.597.1325
☎ Fax:	+1.416.597.1330
✉ Email:	info@thornhillresearch.com
💻 Website:	http://www.thornhillresearch.com

1.1.2 Notified Body

British Standards Institute
Products Services
Maylands Avenue, Hertfordshire
HP2 4SQ United Kingdom
Phone: +44.0.1442.230442

1.1.3 Authorized Representative

EMERGO EUROPE
Molenstraat 15
2513 BH, The Hague
The Netherlands
Phone: +31.70.345.8570
Fax: +31.70.346.7299

1.2 PATENT NOTICE

MOVES® SLC™ is covered by one or more US and international patents and patents pending.

1.3 COPYRIGHT NOTICE

1.4 TRADEMARK NOTICES

MOVES® is a registered trademark of Thornhill Research Inc.

SLC™ is a trademark of Thornhill Research Inc.

All brand and product names mentioned herein are used for identification purposes only and are trademarks or registered trademarks of their respective holders.

1.5 EMC (ELECTROMAGNETIC COMPATIBILITY) NOTICE

MOVES® SLC™ generates, uses, and can radiate RF (radio frequency) energy. If it is not installed and used in accordance with the instructions in this manual, electromagnetic interference may result. MOVES® SLC™ has been tested and found to comply with the limits set forth in IEC 60601-1-2 (identical to EN 60601-1-2) for medical products. These limits provide reasonable protection against electromagnetic interference in the intended use environments described in this manual.

1.6 MRI (MAGNETIC RESONANCE IMAGING) NOTICE

MOVES® SLC™ contains electromagnetic components whose operation can be affected by intense electromagnetic fields. Do not operate MOVES® SLC™ in an MRI environment or in the vicinity of high-frequency surgical diathermy equipment. Electromagnetic interference could disrupt the operation of the ventilator.

1.7 PHTHALATES NOTICE

MOVES® SLC™ and its accessories may contain phthalates. Phthalates are classified as carcinogenic, mutagenic or toxic to reproduction.

WARNING! IN ORDER TO REDUCE THE POTENTIAL RISK FROM PHTHALATES, LONG TERM EXPOSURE SHOULD BE AVOIDED IN THE TREATMENT OF CHILDREN AND PREGNANT OR NURSING WOMEN.

1.8 REGULATORY NOTICE

Caution: Federal law restricts this device to sale by or on the order of a physician.

1.9 CLASSIFICATION

Type of Equipment:	Medical Equipment
	Electrical Classification: Class I, Type BF (unit)
	Registration Classification: Class IIb
	Type CF Defibrillation Proof (applied parts)
	Pediatric and Adult Lung Ventilator

1.10 DECLARATION OF CONFORMITY NOTICE

MOVES® SLC™ is declared to conform to the Medical Device Directive of the European community (re: Medical Device Directive 93/42/EEC). This is indicated by the CE Mark shown below.

0086

MOVES® SLC™ also conforms to the following Technical Standards:

IEC 60601-1	IEC 80601-2-30	ISO 8359
IEC 60601-1-2	IEC 60601-2-34	ASTM E1112-00
ISO 80601-2-12	IEC 60601-2-49	BS EN 794-3 (2009)
ISO 80601-2-13	ISO 80601-2-55	MIL-STD-810G
IEC 60601-2-27	ISO 80601-2-61	JECETS

For more information on these standards, see *Regulatory Standards Compliance on page 20*.

1.10.1 Trade Name

MOVES® SLC™ portable life support system

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2.0 MOVES® SLC™ Quick Start Guide for Ventilated Patients

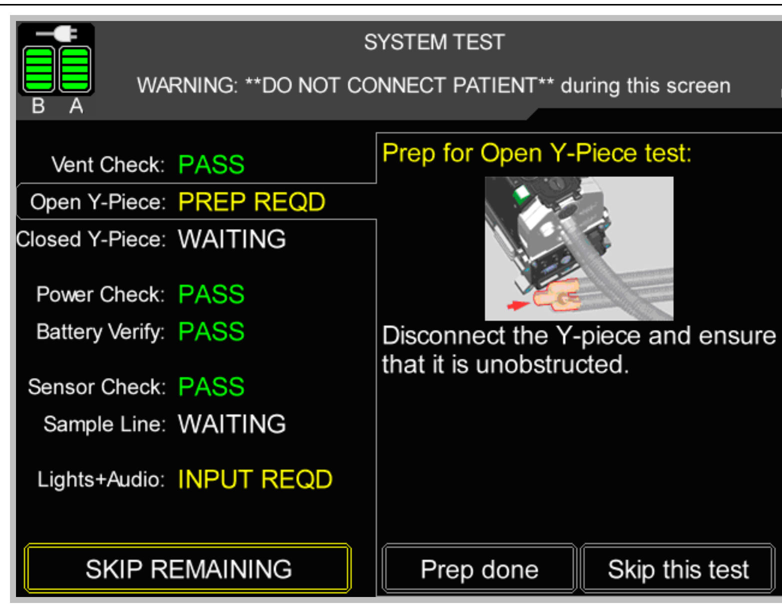
Equipment Setup Procedures

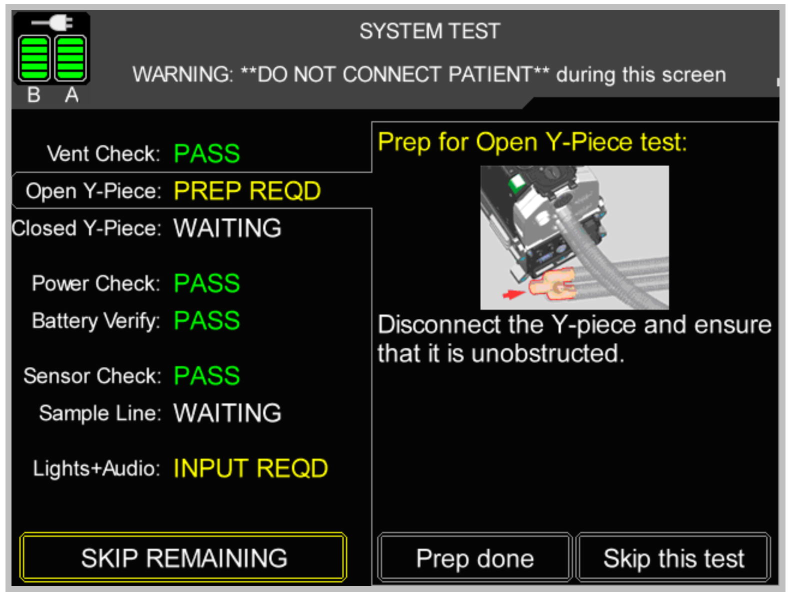
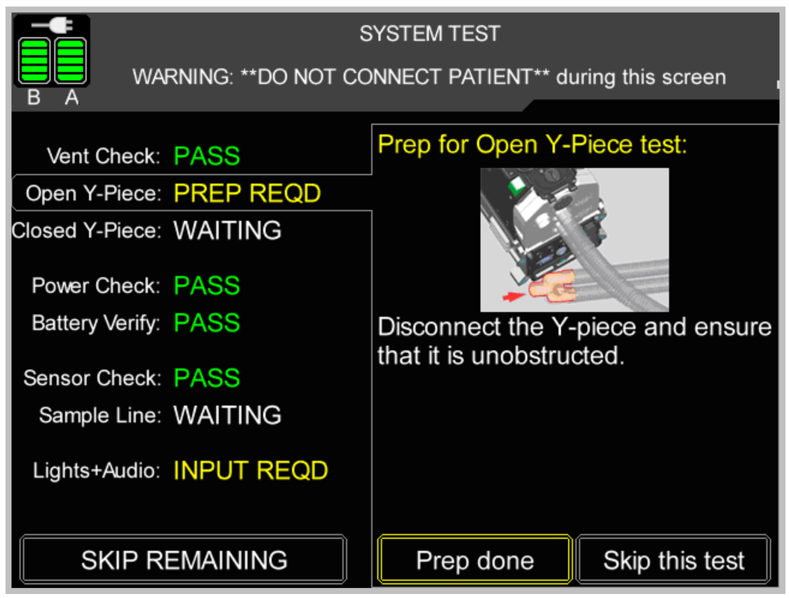
1. Open the valve block cover door inside the cartridge cavity and insert the ventilator breathing cartridge.
2. Install the hydrocarbon filter in the REAR panel.
3. Attach the ventilator breathing circuit to the cartridge. Connect the Nafion tubing to the sampling line.
4. If ventilating patients under 30kg or using tidal volumes under 150mL, replace the breathing filter with the pediatric breathing system filter.
5. Attach the suction canister and tubing to MOVES® SLC™.
6. Connect any required patient monitoring accessories to MOVES® SLC™. **DO NOT CONNECT TO THE PATIENT AT THIS TIME.**
7. Verify the battery charge levels and insert both batteries.
8. Attach the MOVES® SLC™ AC power unit (includes power supply, battery charger and cables) to the MOVES® SLC™ if required to recharge.
9. Ensure that a backup means of ventilation with a high level of oxygen is immediately available.

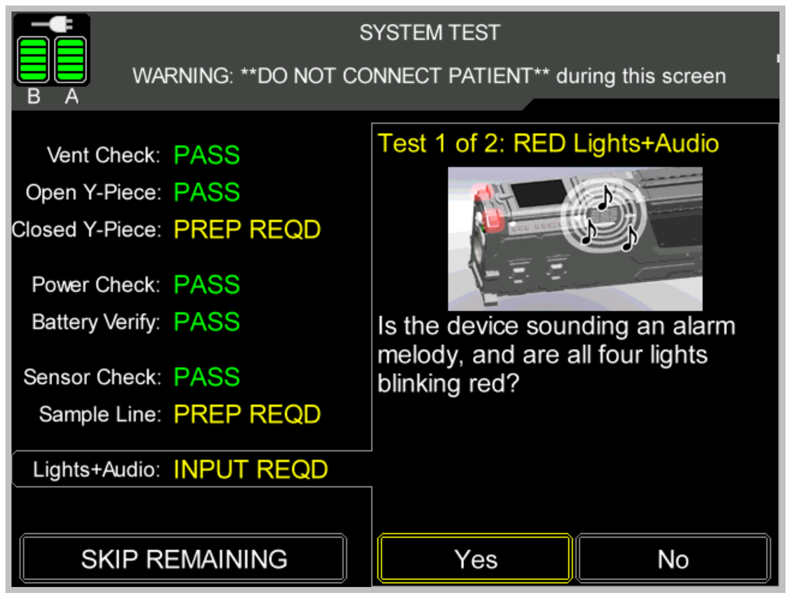
Pre-use Test Instructions

1. Turn the MOVES® SLC™ unit on by pressing the Power Control Button (on the REAR panel).

2. The System Test screen is displayed.



Pre-use Test Instructions	
3. Some tests, including RAM and firmware integrity checking, are AUTOMATIC. Others require preparation of the device into a certain configuration (i.e., PREP REQD) or require the user to give feedback (i.e., INPUT REQD). The first test selected, the Open Y-Piece test, is a PREP REQD test. ***NOTE:*** *The system should not be used until all test pass. If any test reports a failure, wait until all tests have been run. Then use the Next and / or Previous buttons to scroll to the failed test. Troubleshooting instructions will be presented on the screen.*	
4. Perform the preparation steps indicated if the test is PREP REQD (for other tests that are INPUT REQD, respond with the input requested), then choose Prep done and run the test. ***NOTE:*** *In order to save time, certain tests can be run concurrently. For example, while the Open Y-Piece test is still running, the screen may advance to the Sample Line or Lights + Audio tests.*	

<table>
<tr><th colspan="2">Pre-use Test Instructions</th></tr>
<tr><td>5. To initiate the Lights + Audio tests, user input is required. Start must be confirmed, and then the operator must continue to observe the device and answer the questions shown on the device.</td><td>
</td></tr>
<tr><td>6. The <u>first</u> Lights + Audio test requires input from the user (INPUT REQD test). This test ensures that the high-priority alarm visual and audio indicators are working properly. Respond with Yes or No.</td><td>
</td></tr>
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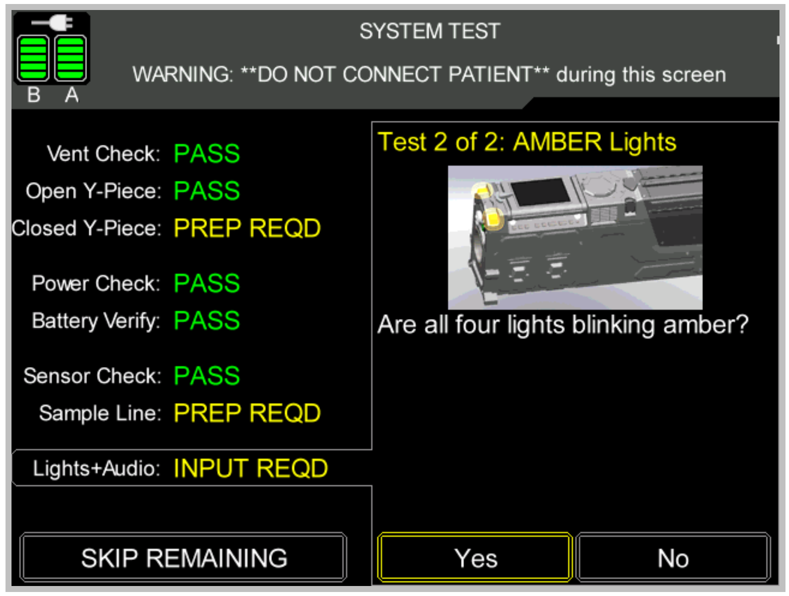
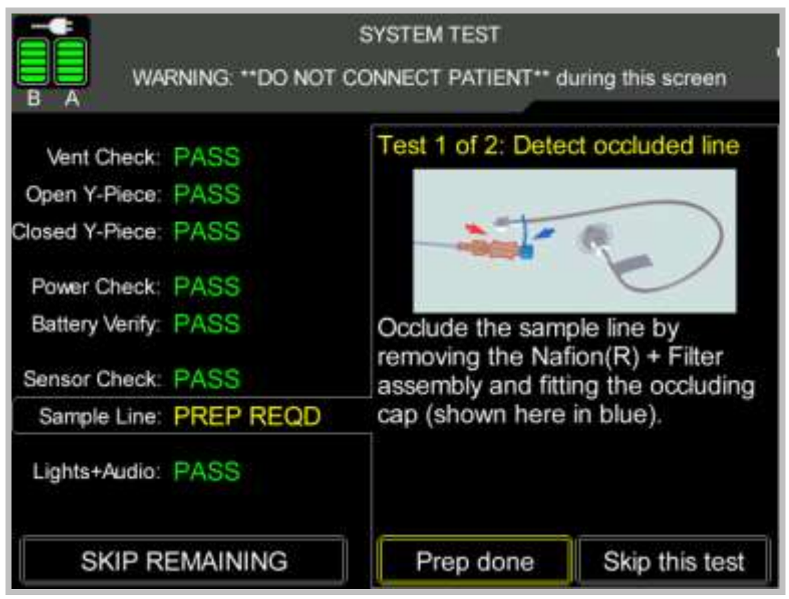
<table>
<tr><th colspan="2">Pre-use Test Instructions</th></tr>
<tr><td>7. The <u>second</u> Lights & Audio test also requires input from the user (INPUT REQD test). This test ensures that the medium-priority alarm visual indicator is working properly. Respond with Yes or No.</td><td>
</td></tr>
<tr><td>8. The Sample Line test is actually comprised of two tests. Both require user preparation (PREP REQD test). Follow the instructions on screen, perform the preparation required, and then choose Prep done to start the test.</td><td>

Test 1 of 2</td></tr>
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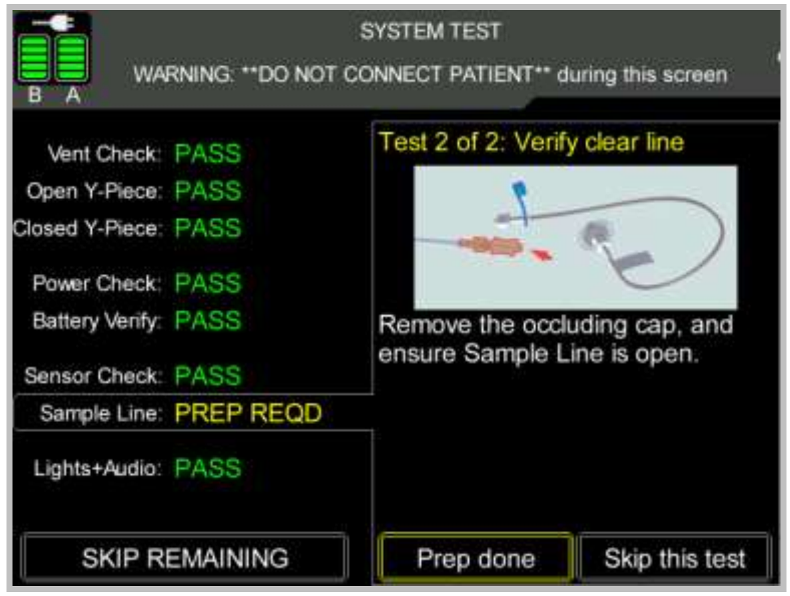
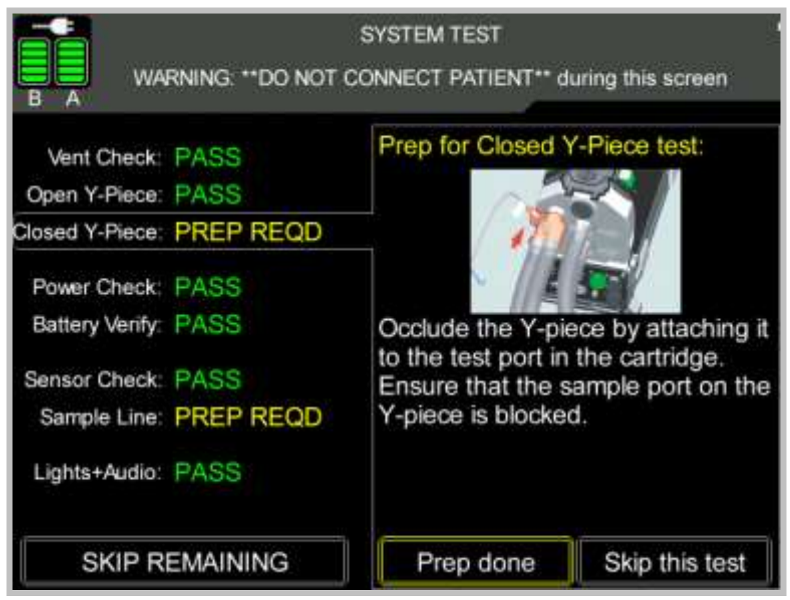
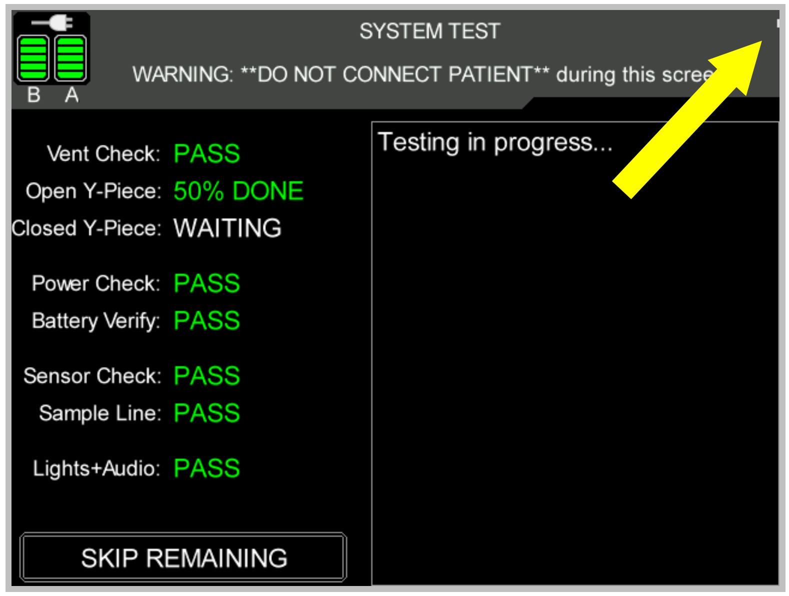
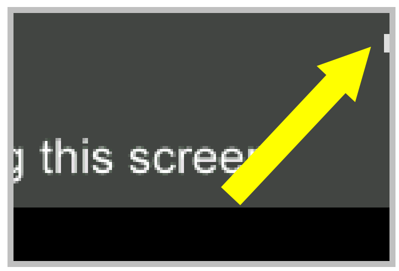
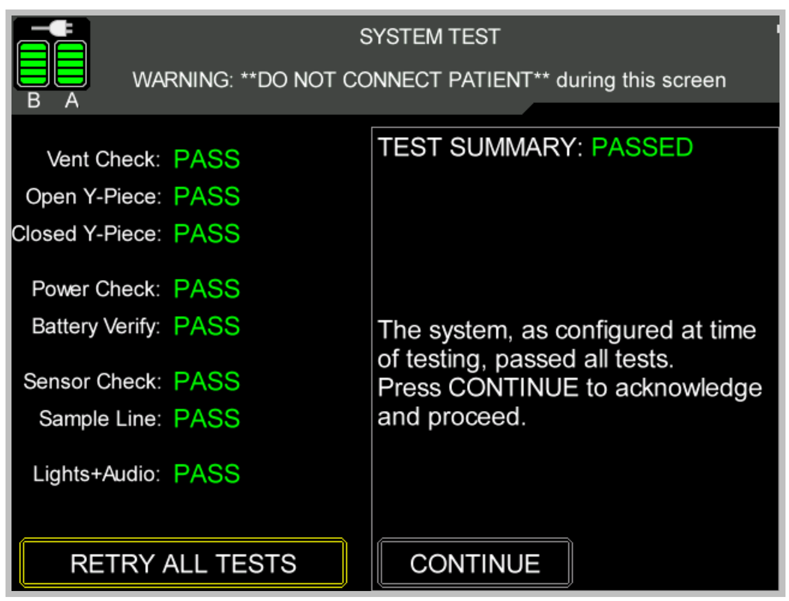
<table>
<tr><th colspan="2">Pre-use Test Instructions</th></tr>
<tr><td></td><td>


Test 2 of 2
</td></tr>
<tr><td>9. The Closed Y-Piece test requires user preparation (PREP REQD test). Follow the instructions on screen then choose Prep done to start the test.</td><td>


</td></tr>
</table>

<table>
<tr><th colspan="2">Pre-use Test Instructions</th></tr>
<tr><td>10. When testing is in progress, and the MOVES® SLC™ is running, a small white dot can be seen moving up and down at the top right of the screen to indicate that the device is not "frozen". The white "dot" is a way of knowing the device is not "frozen" <u>at any time</u>, not just during startup tests.</td><td>


</td></tr>
<tr><td>11. If all tests are successful, the System Test screen displays a Test Summary indicating all tests have passed. Choose Continue.</td><td>
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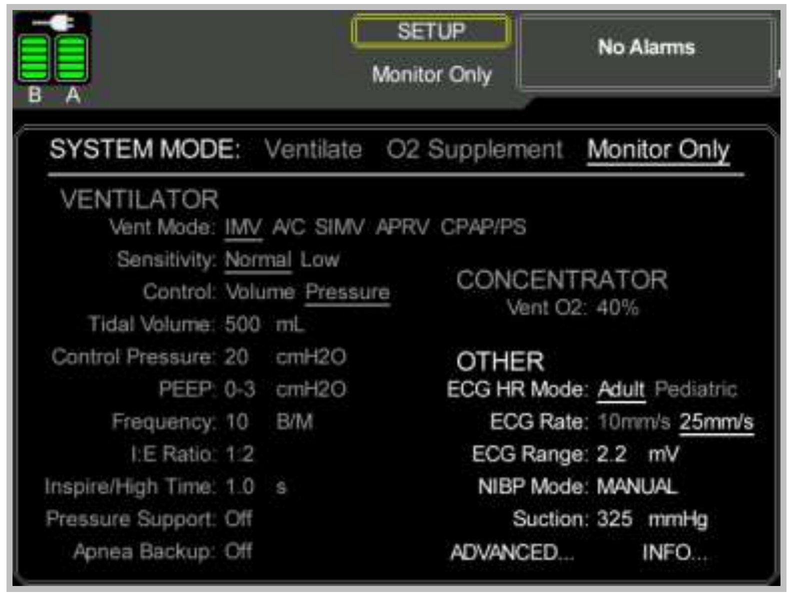
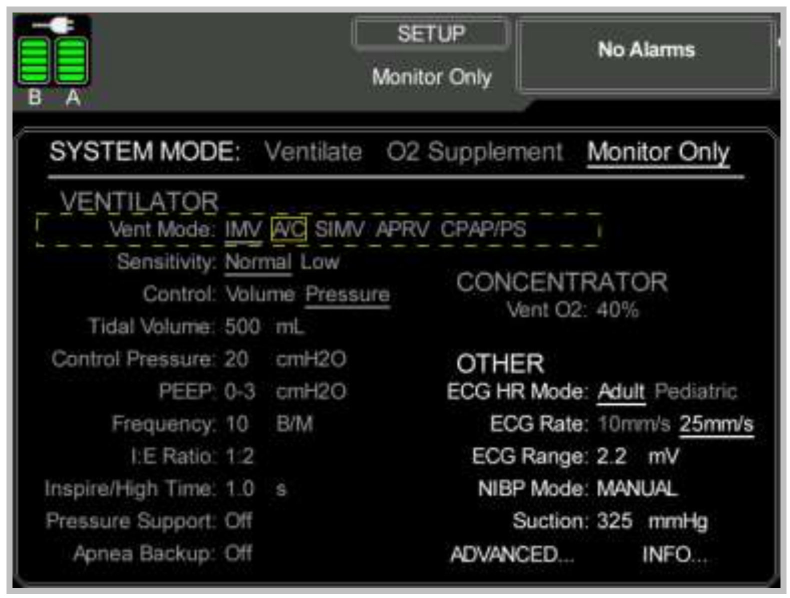
<table>
<tr><th colspan="2">Pre-use Test Instructions</th></tr>
<tr><td>12. You are taken to the Setup Screen and placed in Monitor Only mode.</td><td>
</td></tr>
<tr><td>13. Make any changes necessary to the Ventilate mode settings and configure any other settings as necessary. Also, connect any desired patient monitoring cables to the patient.

NOTE: Ventilation and other settings can be changed even though the system is Monitor Only mode.</td><td>
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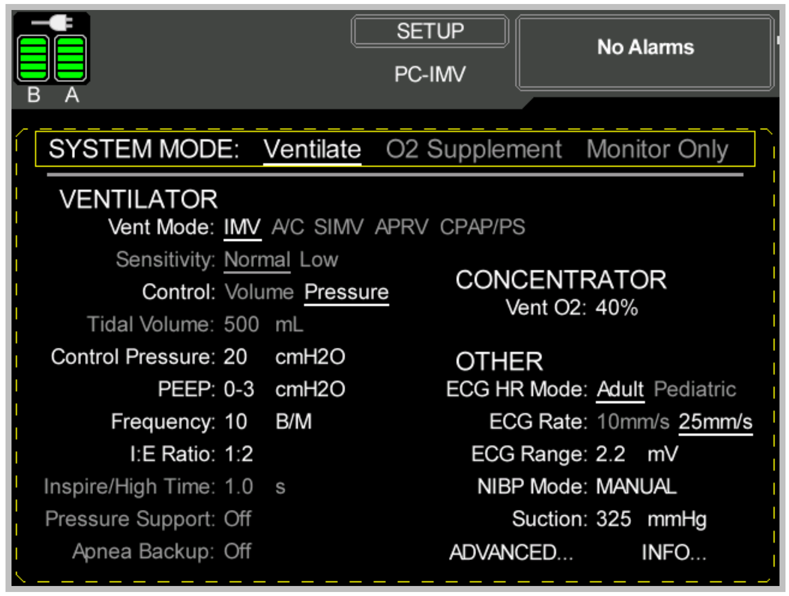
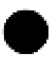
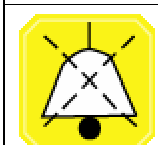
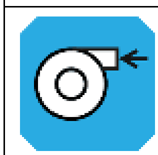
</table>

Pre-use Test Instructions	
14. Change the system to Ventilate mode. Ventilation begins using the indicated settings.	
15. Attach the patient to the breathing circuit.	

Additional Buttons		
Image	**Name**	**Use**
	**Screen Dim Button**	Use to adjust screen brightness.
	**Alarm Audio Pause Button**	Use either to silence ALL alarms permanently (if this feature is permitted) or for a temporary period (120 seconds).
	**NIBP Control Button**	Use to start or abort a Non-Invasive Blood Pressure (NIBP) reading.
	**Suction Control Button**	Use to activate MOVES® SLC™ suction functionality. All suction accessories must be connected and ready to use before activating.

2.1 FURTHER INFORMATION ON PROCEDURES

For further information on procedures, see the sections indicated in the following table.

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3.0 Introduction

This Operator's Manual is a reference guide for the MOVES® SLC™ mobile life support system (P/N 122752). This manual includes illustrations, annotated photographs and procedures designed to assist in the operation of various systems, subsystems and components that comprise the unit.

An operator of the MOVES® SLC™ system must read this manual and any accompanying accessory manuals and instructions in their entirety prior to use to safely and effectively operate the system. The operator, or a designated healthcare professional, must disclose the risks and associated mitigation steps to the subject on which the system will be used.

Keep this manual in a dry, convenient location for easy access. All information, illustrations, photographed procedures and specifications in this manual represent the most current product information available at the time of publication.

3.1 GENERAL INFORMATION

3.1.1 Manufacturer's Information

For warranty, parts, repair or customer service, please contact Thornhill Research Inc. See *Contact Information on page 1* for full contact details.

3.1.2 Glossary of Terms and Abbreviations

Table 2: Glossary of Terms and Abbreviations

TERM / ABBREVIATION	DEFINITION
AC	Alternating Current. A type of electrical current in which the direction of the electrical flow switches back and forth regularly.
A/C	Assist/Control Ventilation. In A/C mode, the system delivers a specific tidal volume or pressure at specific intervals based on a patient inspiratory trigger or time trigger.
ABP	Arterial Blood Pressure. ABP is measured in millimeters of mercury (mmHg).
APRV	Airway Pressure Release Ventilation. In APRV, the system delivers a high pressure with short, timer-controlled, lower pressure periods.
BPM	Beats per Minute
B/M	Breaths per Minute
CFM	Cubic Feet per Minute
Control Pressure	Breath target pressure over PEEP (cmH_2O)
CPAP	Continuous Positive Airway Pressure
CVP	Central Venous Pressure. CVP is measured in millimeters of mercury (mmHg).
DC	Direct Current. A type of electrical current in which the electrons always flow in the same direction.
ECG	Electrocardiogram

TERM / ABBREVIATION	DEFINITION
$EtCO_2$	End Tidal Carbon Dioxide. $EtCO_2$ is measured in millimeters of mercury (mmHg).
FiO_2	Fraction of Inspired Oxygen by Volume (%)
FRC	Functional Residual Capacity – the volume of air (about 3 liters in an adult) that is present in the lungs at the end of a normal expiration.
Fresh Gas	Gas which has a negligible concentration of CO_2.
Frequency	Machine controlled breaths in a minute
HC Filter	Hydrocarbon Filter
HR	Heart Rate
I/E ratio	Ratio of Inspiratory Time / Expiratory Time
IP	Invasive Pressure. Can refer collectively or individually to ABP, CVP or ICP (which is not a "blood" pressure).
ICP	Intracranial Pressure. ICP is measured in centimeters of water (cmH_2O).
IMV	Intermittent Mandatory Ventilation. In IMV mode, the system delivers a specific tidal volume or pressure at specific intervals based on specific time triggers.
LED	Light Emitting Diode
LPM	Liters Per Minute
NATO	North Atlantic Treaty Organization
NIBP	Non-Invasive Blood Pressure. Measured via a blood pressure cuff. NIBP is measured in millimeters of mercury (mmHg).
OEM	Original Equipment Manufacturer.
Oxygen Supplementation	The provision of gas containing a higher concentration of oxygen than ambient air.
Paw	Airway Pressure
PC	Pressure Control ventilation
pCO_2	The partial pressure of CO_2 measured in mmHg.
PEEP	Positive End-Expiratory Pressure in centimeters of water pressure (cmH_2O).
PI	Perfusion Index (Perfusion Index, or PI, is a relative assessment of the pulse strength at the monitoring site.)
PIP	Peak Inspiratory Pressure. PIP is measured in centimeters of water (cmH_2O).
PS	Pressure Support. PS assists a patient's inspiratory effort through the application of an additional set level of pressure above PEEP.

TERM / ABBREVIATION	DEFINITION
PVI	Pleth Variability Index PVI may help clinicians non-invasively assess fluid status of patients.
RR	Respiratory Rate. Breaths per minute (B/M).
SGM	Safe Gas Mode
SpCO	Saturation percentage of carbon monoxide attached to hemoglobin. CO (carbon monoxide) competes with oxygen for the oxygen-binding sites on hemoglobin. The binding of CO to hemoglobin results in the formation of a compound called Carboxyhemoglobin (COHb). This compound is unable to transport or transfer oxygen.
SpHb	Total hemoglobin concentration in arterial blood. Hemoglobin is the part of a red blood cell that carries oxygen to the body. SpHb measures total hemoglobin and indicates the oxygen carrying capacity of the blood.
SpMet	Saturation percentage of methemoglobin. (Methemoglobin [MetHb] is an oxidized form of hemoglobin that is unable to carry oxygen.)
SpOC	Total oxygen content. (SpHb and SpO_2 are used together to calculate the actual amount of oxygen in the blood.)
SpO_2	Oxygen saturation of hemoglobin. Arterial oxygen saturation of hemoglobin as read from a pulse oximeter. It is measured as a percentage (%) of oxyhemoglobin present in arterial blood in relation to total hemoglobin.
SIMV	Synchronized Intermittent Mandatory Ventilation. In SIMV mode, the system delivers breaths synchronized with the patient's and ensures that a minimum number of breaths of a specified tidal volume or PIP are delivered. Additionally, any breaths beyond the minimum set number can be supported with a specific level of pressure.
UI	User Interface
VC	Volume Control ventilation.
Vt	Breath (tidal) volume. Vt is typically measured in milliliters (mL) or liters (L). MOVES® SLC™ measures only in milliliters (mL).

3.2 MOVES® SLC™ INTENDED USE

The MOVES® SLC™ is a portable computer controlled electrically powered ventilator intended to provide continuous or intermittent ventilatory support for the care of individuals who require mechanical ventilation for periods up to 24 hours. The MOVES® SLC™ is intended to be used as both a transport and short term critical care ventilator, and as an anesthetic ventilator when used with the MADM™ inline vaporizer (K140264).

MOVES® SLC™ provides the following supplemental functions for patients that it is ventilating or supplying with supplemental oxygen:

a. Suction

The MOVES® SLC™ suction pump is intended for aspiration and removal of fluids, tissue (including bone), gases, bodily fluids or infectious materials from wounds or from a patient's airway or respiratory support system.

b. Supplementary Oxygen

The MOVES® SLC™ is intended to provide supplemental oxygen-enriched air to patients that require supplemental oxygen.

c. Patient Monitoring

MOVES® SLC™ is intended to monitor physiological parameters of patients and provide these parameters to a health care provider for interpretation in the form of physiological data and system alarms. Physiological data and system alarms will be available to the care provider from the monitor.

3.2.1 Operating Environment

MOVES® SLC™ is intended to be operated in a transport, emergency, hospital, or field hospital setting.

3.2.2 Target Population

The intended patient population is pediatric and adult patients who weigh between 10 kg and 120 kg.

NOTE: *The automated sphygmomanometer is not intended for use with pregnant patients.*

3.3 INTENDED OPERATOR

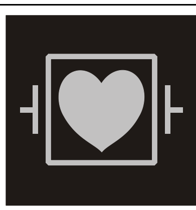
MOVES® SLC™ is intended to be used by, or under the supervision of, medically qualified and trained personnel.

4.0 Regulatory Compliance

4.1 REGULATORY SYMBOLS

Regulatory symbols have been added to the labeling on the MOVES® SLC™ unit, power supply and battery charger, and accompanying accessories to indicate regulatory compliance. These symbols, along with a brief description, are shown in the following table.

Table 3: Regulatory Symbols Used and Description

SYMBOL	DESCRIPTION
	**CSA** (Canadian Standards Association) **Mark** – This symbol appears on the MOVES® SLC™ Power Supply / Battery Charger. It indicates that approval by the Canadian Standards Association has been granted for use in Canada (C) and the United States (US) under the Certificate Number 244588.
	**CSA** (Canadian Standards Association) **Mark** – This symbol appears on the MOVES® SLC™ unit. It indicates that approval by the Canadian Standards Association has been granted for use in Canada (C) and the United States (US) under the Certificate Number 2676502.
	**"Conformité Européen" Mark** – The CE mark is a self-declaratory mark that indicates the manufacturer or the importer of record has ensured that all of the applicable European safety and conformity directives and standards have been applied to the product.
The presence of the following symbols indicates compliance with International Electrotechnical Commission (IEC) standard IEC 60601-1 for Medical Electrical Equipment.	
	**Consult Accompanying Documents** – This symbol appears on the Product Information labels for the MOVES® SLC™ unit and directs the operator to consult the accompanying documents. It also appears frequently in this operator's manual as a general warning and caution symbol.
	**Type BF Applied Part** – Indicates the device provides an intermediate degree of protection should the patient come in contact with an unintended source of voltage from an external source, but it is not approved for direct cardiac application.
	**Type CF Applied Part Defibrillator-Proof** - Indicates the applied part provides a high degree of protection should the patient come in contact with an unintended source of voltage from an external source, and that it is approved for direct cardiac application.

SYMBOL	DESCRIPTION
	**ESD** (Electrostatic Discharge) **Susceptibility Symbol** – The ESD Susceptibility Symbol indicates that handling or use of the item to which the symbol is applied may result in damage from ESD if proper grounding precautions are not taken.

4.2 REGULATORY STANDARDS COMPLIANCE

Table 4: Regulatory Standards Compliance

STANDARD #	DESCRIPTION
IEC 60601-1	Medical Electrical Equipment (Ed 3.0, 2005), General Requirements for basic safety and essential performance.
IEC 60601-1-2	Medical Electrical Equipment – Part 1-2: General requirements for safety – Collateral standard: Electromagnetic compatibility – Requirements and tests (Ed 3.0 2007)
IEC 60601-1-8	Medical Electrical Equipment – Part 1-8: General requirements for safety – Collateral standard: General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems (Ed 2.1 2012)
ISO 80601-2-12	Medical Electrical Equipment - Part 2: Particular Requirements for basic safety and essential performance of critical care ventilators (Ed. 1.0 2011)
ISO 80601-2-13	Medical Electrical Equipment - Part 2: Particular Requirements for basic safety and essential performance of an anesthetic workstation (Ed. 1.0 2011)
IEC 60601-2-27	Medical Electrical Equipment - Part 2: Particular Requirements for the Safety, including Essential Performance, of Electrocardiographic Monitoring Equipment (Ed. 3.0, 2011)
IEC 80601-2-30	Particular requirements for the safety, including essential performance, of automatic cycling non-invasive blood pressure monitoring equipment (2009)
IEC 60601-2-34	Medical Electrical Equipment - Part 2: Particular Requirements for The Safety, Including Essential Performance, of Invasive Blood Pressure Monitoring Equipment (Ed. 3.0, 2011)
IEC 60601-2-49	Medical Electrical Equipment - Part 2-49: Particular Requirements For The Safety Of Multifunction Patient Monitoring Equipment (Ed. 2.0, 2011)
ISO 80601-2-61	Medical Electrical Equipment - Particular requirements for the basic safety and essential performance of pulse oximeter equipment for medical use (2011)
ISO 80601-2-55	Medical Electrical Equipment - Particular requirements for the basic safety and essential performance of respiratory gas monitors (2011)
ISO 8359	Oxygen concentrators for medical use – Safety requirements (1996 + A1:2012)
ASTM E1112-00	Standard Specification for Electronic Thermometer for Intermittent Determination of Patient Temperature (2006)
BS EN 794-3	Lung ventilators. Particular requirements for emergency and transport ventilators (1998+A2:2009)

STANDARD #	DESCRIPTION
MIL-STD-810G	Department of Defense Test Method Standard for Environmental Engineering Considerations and Laboratory Tests
JECETS	Joint Enroute Care Equipment Test Standard

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5.0 MOVES® SLC™ System Overview

5.1 GENERAL OVERVIEW

The MOVES® SLC™ system is comprised of six main modules:

1. Oxygen Concentrator
2. Ventilator
3. Suction System
4. Patient Monitoring System
5. Disposable breathing cartridges and breathing circuits for intubated and non-intubated patients
6. Power system, comprised of removable hot swappable batteries and an AC power supply and battery charger

NOTE: *Color shown in pictures may differ from the actual system or accessories.*

5.2 SYSTEM ORIENTATION AND EXTERNAL COMPONENTS

Throughout this manual there are references to aid in orienting the caregiver with the positioning of the unit, especially when the orientation must change in order to conduct a given operating procedure. References to key external components may be given to further assist in the operator's orientation.

The following orientations should be remembered:

- **FRONT:** End of MOVES® SLC™ that contains the patient connection panel.
- **BACK** or **REAR:** End of MOVES® SLC™ that contains the power switch.
- **RIGHT** and **LEFT Sides:** As seen looking from FRONT to BACK.
- **MOVES® SLC™** should be operated in the upright position.

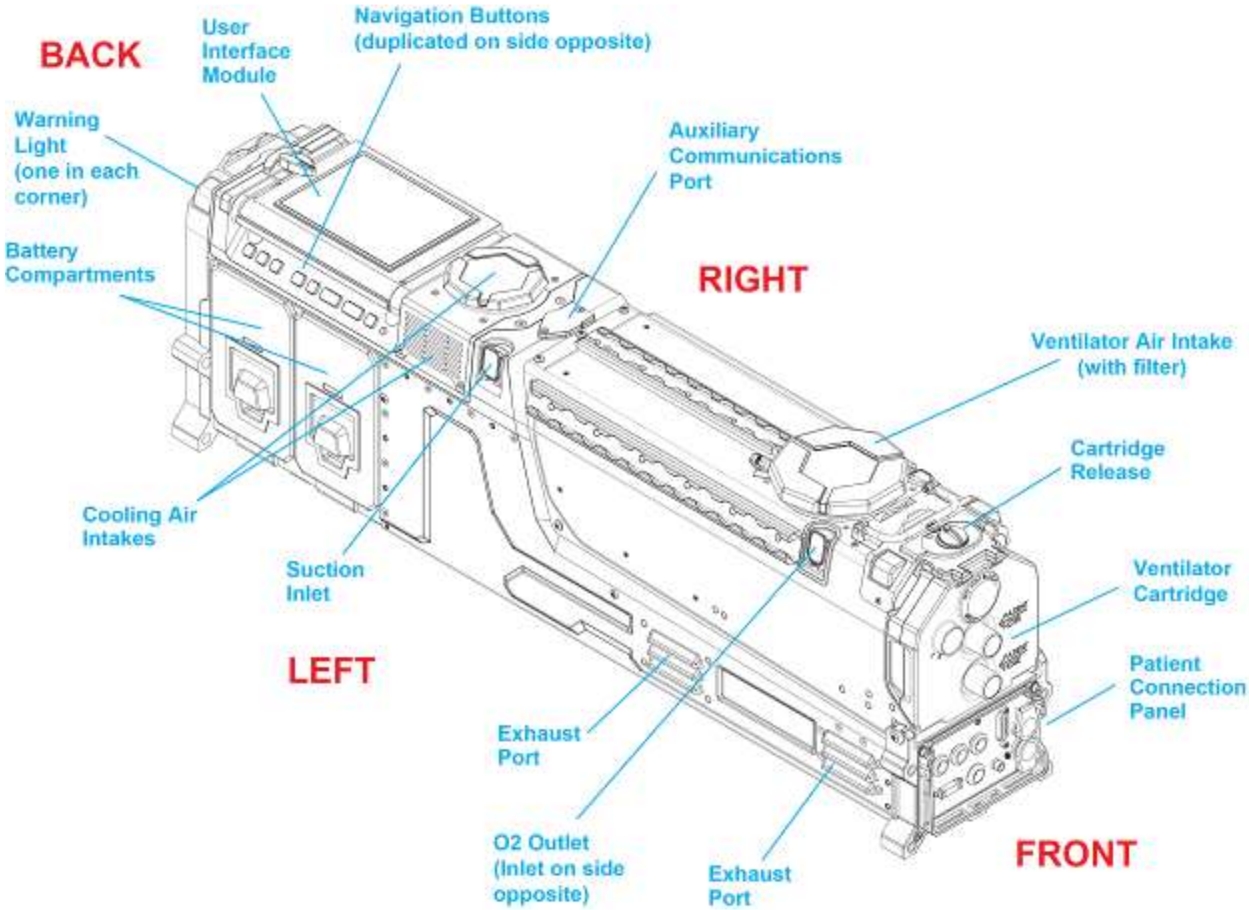

Figure 5-1: MOVES® SLC™ Upright System Orientation and Components

5.3 THEORY OF OPERATION

5.3.1 Breathing Circuit and Oxygen Supplement

Intubated patients are ventilated with a circle circuit (called a Ventilator Circuit) used with a Ventilator Cartridge. Oxygen and air enter the circuit from either the oxygen concentrator, the air pump or an external O_2 supply. The oxygen concentrator can be set to provide an intubated patient with an inspired O_2 concentration (FiO_2) between 30% and 85%. In Ventilator mode, the air pump serves as a back-up source of air flow if the system concentration of oxygen is too low or carbon dioxide is too high or either is unknown.

The ventilator cartridge is designed to remove CO_2 from the circle circuit for an approximately 2-hour period when the system operates at room temperature. The system provides a warning when the CO_2 level in inspired gas exceeds 6 mmHg, which is indicative of cartridge exhaustion, so the cartridge can be changed. If the cartridge is not changed, the system will enter a safe mode and increase oxygen production. It will also increase air supply if FiO_2 is set to ≤ 40%.

5.3.2 Oxygen Concentrator

The concentrator provides up > 87% O_2 into the ventilator breathing circuit or directly to the O_2 outlet during O2 Supplement mode.

5.3.3 Ventilator

The ventilator is comprised of a blower, a sealed ventilator chamber that houses the ventilator bag (air / oxygen reservoir), and a valve block that interfaces with the breathing cartridges and ventilator breathing circuit. The valve block includes the following components:

- Inspiratory and expiratory flow sensors
- One-way valves which are used to direct gas to and from the patient during inhalation and exhalation
- An independent high pressure relief valve ensures that the pressure in the breathing circuit will never exceed 100 cmH_2O at 60 LPM of flow. (NOTE: PEEP and PIP values are displayed from 0–70 cmH_2O. The pressure relief valve starts to trigger when the pressure exceeds 70 cmH_2O.)
- A port for measuring airway pressure
- A latch that secures the breathing cartridge to the valve block
- A ring mount for the ventilator bag

During patient inhalation, the blower pressurizes the ventilator chamber which displaces the gas from the ventilator bag into the patient's breathing circuit. The blower draws external air through an inlet filter. During exhalation, the patient's expired gas is directed to the ventilator bag. The ventilator bag also receives oxygen from the concentrator or external O_2 source and air from the air pump.

NOTE: *For additional information on ventilation, please see* *Appendix B – Pneumatic Diagram on page 303**.*

5.3.4 Respiratory Gas Monitoring

NOTE: *The system reports O_2/CO_2 gas measurements as ATPD (Ambient temperature [variable] and pressure [variable], dry [no humidity]). O_2/CO_2 readings are corrected based on water vapor pressure measurements.*

The Ventilator breathing circuit is equipped with a filter on the Y-piece plus a sampling line and filter which is attached to the GAS SAMPLE port of the patient-connection panel on the MOVES® SLC™. To prevent equipment failure, only the sampling line and filter supplied with MOVES® SLC™ should be used. The filter should be attached to the GAS SAMPLE port at all times unless the GAS SAMPLE port is capped. In addition, only the filter supplied with the Y-piece should be used with the Y-piece.

The oxygen sensor detects the concentration of oxygen – between 5 and 100% – that is being supplied to and exhaled from the patient and reports it in a plot as a percentage. The CO_2 sensor detects the concentration of CO_2 – between 0 and 10% – that is being supplied to and exhaled from the patient and then, taking into account ambient barometric pressure, reports it in a plot as a partial pressure in mmHg.

Under normal operating conditions (0°C to 40°C), the O_2 and CO_2 sensor should reach specified operating performance in less than two (2) minutes. Until the O_2 and CO_2 sensor reaches specified operating performance, the User Interface Display will display dashes and read as blank ("---") for O_2 and CO_2 values, and a message "*CO2/O2 sensors warming up*" will be displayed in the alarm queue of the UI. When values begin to be displayed, the O_2 and CO_2 sensor has reached specified operating performance.

WARNING! DO NOT REUSE SAMPLING LINES OR FILTERS. THIS COULD PRESENT A DANGER OF INFECTION.

NOTE: *Compensation for barometric pressure and temperature is performed by MOVES® SLC™ internal sensing equipment to maintain accuracy of gas calibration over the MOVES® SLC™ environmental operating range. For information on the MOVES® SLC™ environmental operating range see* **Error! Not a valid result for table.** on page 284.

ABOUT O2 AND CO2 SENSORS AND CALIBRATION

O_2 and CO_2 calibration are performed at device startup after the O_2 and CO_2 sensors have initialized and warmed up. "CAL" is displayed in each O_2 and CO_2 parameter (i.e., FiO_2, $PetCO_2$ and $PiCO_2$) during warm up and calibration. The calibration is based on measuring the air surrounding the MOVES® SLC™. If the initial attempt at O_2 calibration fails, on each subsequent O_2 calibration check, if the check is in bounds, a calibration is attempted until O_2 calibration succeeds.

A CO_2 calibration is performed every 30 minutes. O_2 calibration is only performed once, and then an O_2 calibration check is performed every 30 minutes. However, if SpO_2 is at or below 85%, the O_2 calibration check is performed every five (5) minutes until the condition clears.

NOTE: *The time between O_2 calibration checks is never less than five (5) minutes, even if SpO_2 repeatedly falls below 85%.*

NOTE: *If the O_2 calibration check fails high, the system automatically enters Safe Gas Mode (SGM).* *See System Test Failure Messages and Causes on page 265 for further information.*

The O_2 calibration check fails if the surrounding air's average O_2 reading ± one (1) standard deviation (data point taken every 90 ms over a five [5] second period) is not contained within the bounds of 19.4–22.4%. The O_2 calibration check fails *high* if the air's average O_2 reading plus one (1) standard deviation is above the upper bound; otherwise, the O_2 calibration check fails *low* if the air's average O_2 reading minus one (1) standard deviation is below the lower bound

If the O_2 calibration check fails *high*, then the MOVES® SLC™ enters Safe Gas Mode (SGM) until an O_2 calibration check does not fail *high* (when the MOVES® SLC™ O_2 calibration is next checked). While the MOVES® SLC™ is in SGM due to an O_2 calibration check failure *high*, the O_2 calibration recheck occurs every five (5) minutes. If the O_2 calibration check fails *low*, subsequent O_2 calibration checks are scheduled at ten (10) minute intervals while each subsequent O_2 calibration check continues to fail *low*.

A high priority alarm stating "*O_2 reading may be biased high*" will appear in the alarm queue when the O_2 calibration check fails *high*. A low priority alarm stating "*O_2 reading may be biased low*" alarm will appear in the alarm queue when the O_2 calibration check fails *low*.

Whenever a CO_2 calibration is scheduled, an O_2 calibration check is performed at the same time. This minimizes the time that patient gas monitoring is suspended. Whenever an O_2 calibration check is performed, and the CO_2 calibration is scheduled to occur within the next 11 minutes, then a CO_2 calibration is performed at the same time as the O_2 calibration check.

ASTERISK BESIDE SENSOR VALUES

An O_2 calibration check and/or CO_2 calibration requires 15 seconds to complete. O_2 (FiO_2), CO_2 ($PetCO_2$ and $PiCO_2$) and RR values are displayed but are "frozen" while the O_2 calibration check and/or CO_2 calibration is performed. During this time, an asterisk is displayed beside each numeric value. If a parameter has no value (i.e., dashes, "---", are displayed), then no asterisk is shown beside that parameter.

ADVERSE EFFECTS

There are no known adverse effects associated with MOVES® SLC™ respiratory gas monitoring in itself. However, sampling lines and filters are not reusable and could present a danger of infection were they to be reused. They should be disposed of in accordance with local biohazard regulations.

5.3.5 Suction

The system provides variable suction between –100 and –325 mmHg with flow rates of 20 L/min. A suction kit, consisting of a wand, two hoses, and an 800 mL suction filtration canister with a canister holder, is attached to the suction port of the MOVES® SLC™. The aspirated air is vented through the exhaust of the MOVES® SLC™ system. Overfill protection for the suction container is provided by a filter in the lid which blocks flow when canister capacity is reached. The MOVES® SLC™ system also contains a mechanical suction safety relief valve in the suction path which opens at approximately –415 mmHg.

When using a closed suction catheter, do not use patient triggered ventilator modes. Only pressure and volume controlled IMV should be used.

CAUTION! OPERATING SUCTION WITHOUT THE SUPPLIED FILTER, CANISTER, AND HOSES WILL RESULT IN PERMANENT FAILURE OF THE SUCTION SYSTEM AND THE OXYGEN CONCENTRATOR.

5.3.6 Patient Monitoring

NON-INVASIVE BLOOD PRESSURE (NIBP)

Using the appropriate cuff, NIBP measurements can be completed on either an arm or thigh. NIBP measurements made with the MOVES® SLC™ for pediatric and adult patient populations are equivalent to those obtained by trained observers using the cuff/stethoscope auscultatory method within the limits prescribed by IEC 80601-2-30:2009 (difference of ± 3 mmHg or 2% of reading, whichever is greater).

In addition, blood pressure measurements determined with the MOVES® SLC™ are equivalent to those obtained by a trained observer using the cuff / stethoscope auscultation method, within the limits prescribed by the American National Standard, electronic or automated sphygmomanometers.

Readings can be affected by the measurement site, the position of the patient, exercise, or the patient's physiologic condition.

To obtain accurate resting blood pressure measurements for conscious patients with hypertension, ensure that the patient is comfortably seated with legs uncrossed, feet flat on the floor, back and arm supported and the middle of the cuff at the level of the right atrium of the heart. Recommend that the patient relax as much as possible and not talk during the measurement procedure. It is recommended that five (5) minutes should elapse before the first reading is taken.

If unexpected readings are obtained, verify the position and integrity of the cuff, make certain that there is no compression or restriction of the connecting tubing, and ensure that the patient is lying down or sitting still during measurement.

PULSE OXIMETRY

The Masimo Rainbow SET® Pulse Co-Oximeter measures the functional oxygen saturation of arterial hemoglobin (% SpO_2). Significant levels of dysfunctional hemoglobin, such as carboxyhemoglobin or methemoglobin, may affect the accuracy of the measurement. Factors that may degrade pulse performance or affect the accuracy of the measurement include the following: excessive ambient light, excessive motion, electrosurgical interference, blood flow restrictors (arterial catheters, blood pressure cuffs, infusing lines, etc.), moisture in the sensor, improperly applied sensor, incorrect sensor type, poor pulse quality, venous pulsations, anemia or low hemoglobin concentrations, cardiogreen or other intravascular dyes, carboxyhemoglobin, methemoglobin, dysfunctional hemoglobin, artificial nails or fingernail polish, or a sensor not at heart level. The pulse oximeter is calibrated by the original manufacturer to display functional oxygen concentration.

NOTE: *For more information, see* *The Masimo Rainbow SET® Pulse CO-Oximeter beginning on page 53*.

INVASIVE PRESSURE (IP)

Data is available from three types of Invasive Pressure (IP) sensors: Arterial, Central Venous, and Intracranial. Arterial Blood Pressure (ABP) is shown with numeric systolic and diastolic readings. The display is capable of displaying a pressure range of –10 to 300 mmHg for systolic and diastolic pressure readings. Intracranial Pressure (ICP) displays pressures from –14 to 408 cmH_2O. Central Venous Pressure (CVP) display pressures from –10 to 300 mmHg. For all invasive pressures, if the reading is below the sensor range, '<–10' is shown for ABP and CVP, and '<–14' is shown for ICP. If the reading is above the sensor range, '>300' is shown for ABP and CVP, and '>408' is shown for ICP.

To minimize the performance results due to ageing, and the effects of environmental conditions on the tubing, transducer or cable, always ensure that the IP transducer and tubing are stored appropriately and have not expired.

TEMPERATURE

When the temperature probe is attached to the patient and connected to the MOVES® SLC™, the patient's body temperature is displayed on the Monitor Screen. The temperature can be displayed in degrees Fahrenheit from 82.4°F to 107.6°F or degrees Celsius from 28°C to 42°C. Changing the temperature display from Celsius to Fahrenheit (or vice versa) may only be done by a qualified MOVES® SLC™ service technician.

ELECTROCARDIOGRAM (ECG)

MOVES® SLC™ uses a standard 12-lead ECG system for monitoring the heart and produces 12 ECG channels (I, II, III, aVL, aVR, aVF, V1, V2, V3, V4, V5 and V6). ECG data can be displayed on the Graphs / Trends section of the Monitoring Screen with a vertical scale (for data) and a horizontal scale (for time). The HR (Heart Rate) area of the Monitoring Screen displays heart rate in BPM (Beats per Minute) and data can be drawn from any of the ECG channel waveforms shown on the ECG monitor. If the ECG monitor is being used, and the readings are erratic, the accuracy of the heart rate cannot be guaranteed. The ECG heart rate meter's response to irregular rhythms has not been assessed.

5.3.7 Power System

The MOVES® SLC™ operates on either rechargeable batteries (DC) or AC power. The power range of the MOVES® SLC™ power supply is as follows:

- Input: 100–240 VAC, 50–60 Hz, 5.5 A max.
- Output: 28 VDC, 14.3 A max.

The MOVES® SLC™ houses up to two lithium polymer batteries. MOVES® SLC™ will operate on a set of 2 batteries for approximately 2.5 hours minimum. Under typical clinical use (ventilator and monitors running, concentrator on for 30 seconds / off for 90 seconds, assuming no leaks), MOVES® SLC™ should operate at least 4 hours on a set of 2 batteries. Battery run time is highly dependent on the use of the oxygen concentrator or suction.

Power is connected to the MOVES® SLC™ system from an AC source via the MOVES® SLC™ power supply and battery charger. The power supply and battery charger system provides 28 VDC at up to 14.3 A. Batteries are charged by connecting AC power to the MOVES® SLC™ with the batteries installed in the system. The system's batteries should take no more than 2.5 hours to fully charge when the system is idle. Batteries can be charged while the system is running although charge times may be longer.

NOTE: *The battery charge level may not appear to increase for approximately 3 hours. This is normal for the battery's initial charge and after extended periods without use.*

5.3.8 System Auto Resume on Power Loss

If the system has been shut down for a period of time less than or equal to three (3) minutes the system will auto resume to the point it was at prior to shutdown. A temporary loss of power is assumed here.

If the system has been shut down for a period of time greater than three (3) minutes but less than 30 minutes, the system will query the user as to whether the patient is new or continuing. Selecting YES will return the system settings to default values (see *System Default Settings on page 271* for details). Selecting NO will keep the last system settings used.

NO should only be selected if the operator is aware of the last system settings configuration, or the operator should review the settings on the Setup, Alarm Limits, Alarm ON/OFF and Advanced screens.

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6.0 Safety Information

6.1 MANUAL SYMBOLS AND MESSAGES

6.1.1 Notes, Cautions and Warnings

This manual contains important messages with symbols labeled **NOTE, CAUTION** and **WARNING**. These messages have the following format and meaning:

Table 5: Symbols and Messages Used in Manual

NOTE:	*Supplies additional information that will help complete, offer an alternative to, or explain a portion of a given procedure.*
CAUTION!	**PROVIDES INFORMATION TO PREVENT ERRORS OR INDISCRETIONS THAT COULD RESULT IN EQUIPMENT, SYSTEM, OR COMPONENT DAMAGE.**
WARNING!	**INDICATES AREAS WHERE INSUFFICIENT KNOWLEDGE OF A GIVEN PROCEDURE, IMPROPER HANDLING, OR LACK OF ATTENTION COULD RESULT IN PERSONAL INJURY OR LOSS OF LIFE!**

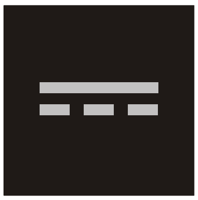
Read each labeled message carefully, and follow its instructions during operation to reduce the risk of system or component damage and/or personal injury.

WARNING! IMPROPER OPERATION OF THE MOVES® SLC™ COULD ENDANGER A PATIENT!

Since it is virtually impossible to foresee all of the possible consequences resulting from the failure to follow instructions and adhere to safety procedures, the NOTES, CAUTIONS and WARNINGS contained in this manual are not exhaustive. It is the responsibility of the individual operating MOVES® SLC™ to make safety the number one priority during operating procedures.

6.1.2 Operational Symbols

Table 6: Operational Symbols and Descriptions

SYMBOL	DESCRIPTION
	Single Phase Alternating Current
	Direct Current

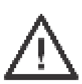
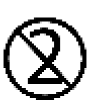
6.1.3 Label Warning Symbols

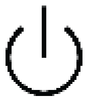
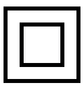
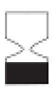
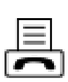
Table 7: Label Warning Symbols and Descriptions

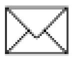
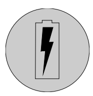
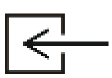
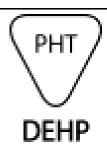
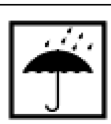
SYMBOL	DESCRIPTION
	Fire Hazard: Do not smoke near unit.
	Fire Hazard: Do not operate device near open flame.

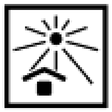
6.1.4 Product Labels Symbols

Table 8: Product Label Symbols and Descriptions

SYMBOL	DESCRIPTION
	Caution. Read accompanying documentation
	Follow instructions for use.
	Fragile item, handle carefully. Sensitive to mechanical shock.
	Do not reuse (single use only)

SYMBOL	DESCRIPTION
	No latex used in the manufacture of this product
	Power indicator
	Battery indicator
	Class II equipment
EC REP	Authorized Representative in the European Community
	Manufacturer
	Date of manufacture
 2011 -11	Date of expiration (use by)
LOT 000001	Lot number
REF	Reference or Model Number
SN	Serial Number
	Phone
	Fax

SYMBOL	DESCRIPTION
	E-mail
	The equipment shall not be disposed of as unsorted municipal waste and shall be collected as electrical and electronic equipment, as applicable, separately as specified by Waste Electrical and Electronic Equipment (WEEE).
	Battery condition indicator
	Non sterile; material cannot be guaranteed to be free of contamination.
	Temperature limitation range for usage. Both upper and lower limits are indicated adjacent to horizontal lines.
	Humidity limitation range for usage. Both upper and lower limits are indicated adjacent to horizontal lines.
	Pressure limitation range for usage. Both upper and lower limits are indicated adjacent to horizontal lines.
	Gas sample line port
	Indicates labeled item contains phthalates.
	For use by or on the order of a physician
	Locked
	Unlocked
	Protect from rain

SYMBOL	DESCRIPTION
	Do not expose to sunlight
	Read usage instructions

6.2 GENERAL WARNINGS

Table 9: General Warnings

SYMBOL	GENERAL WARNING
	WARNING! THE MOVES® SLC™ SHOULD NOT BE USED WITH INHALED ANESTHETICS OTHER THAN ISOFLURANE (UP TO 3.5%) OR SEVOFLURANE (UP TO 5.0%).
	WARNING! THE MOVES® SLC™ SHOULD NOT BE USED IN AN EXPLOSIVE GAS ENVIRONMENT.
	WARNING! THE POWER SUPPLY / CHARGER CORD IS SUPPLIED WITH A GROUNDING PRONG ON THE MALE CONNECTOR. TO REDUCE THE RISK OF ELECTRICAL SHOCK, THIS PRONG SHOULD NEVER BE REMOVED OR COMPROMISED.
	WARNING! TO AVOID BREATH STACKING WHEN RUNNING VOLUME CONTROLLED IMV, THE RELEASE PRESSURE MUST BE APPROPRIATELY SET.
	WARNING! THE OPERATOR SHOULD ALWAYS HAVE AVAILABLE AN ALTERNATE MEANS OF SUPPLYING A HIGH CONCENTRATION OF O_2 IN THE EVENT OF POWER FAILURE, MECHANICAL FAILURE, OR SERIOUS OCCLUSION IN THE CONCENTRATOR SYSTEM.
	WARNING! THE OPERATOR SHOULD ALWAYS HAVE AVAILABLE AN ALTERNATIVE MEANS OF VENTILATION CAPABLE OF SUPPLEMENTING A HIGH CONCENTRATION OF O_2 IN THE EVENT OF POWER FAILURE, MECHANICAL FAILURE, OR SERIOUS OCCLUSION IN THE VENTILATOR SYSTEM. LACK OF IMMEDIATE ACCESS TO ALTERNATE VENTILATION CAN RESULT IN PATIENT DEATH.
	WARNING! THE MOVES® SLC™ SHOULD NOT BE COVERED OR POSITIONED IN SUCH A WAY THAT THE OPERATION OR PERFORMANCE OF THE VENTILATOR IS ADVERSELY AFFECTED. (EG. DO NOT COVER WITH A BLANKET TO REDUCE SOUND OR LIGHT)
	WARNING! THE OPERATOR SHOULD USE AN ALTERNATIVE MEANS OF VENTILATION UPON EXPERIENCING A PROLONGED APNEA ALARM.
	WARNING! THE VENTILATOR SHOULD NOT BE USED WITH HELIUM OR NITROUS OXIDE.
	WARNING! THE MOVES® SLC™ SHOULD NOT BE USED IN A HYPERBARIC CHAMBER.
	WARNING! THE OPERATOR SHOULD ALWAYS HAVE AVAILABLE AN ALTERNATE MEANS OF SUCTION IN THE EVENT OF POWER FAILURE, MECHANICAL FAILURE OR SERIOUS OCCLUSION IN THE SUCTION CIRCUIT.
	WARNING! IT MAY BE NECESSARY TO USE AN ALTERNATIVE MEANS OF OXYGEN SUPPLEMENTATION SHOULD THE HYDROCARBON FILTER REQUIRE REPLACEMENT WHILE TREATING A PATIENT.

SYMBOL	GENERAL WARNING
	WARNING! THE MOVES® SLC™ SHOULD NOT BE RUN CONTINUOUSLY IN SAFE GAS MODE. SAFE GAS MODE IS INTENDED FOR <u>SHORT TERM USE ONLY</u> TO COMPLETE TRANSPORTS.
	WARNING! IF LEFT IN A HOT ENVIRONMENT OR DIRECT SUNLIGHT FOR A CONSIDERABLE LENGTH OF TIME, THE MOVES® SLC™ ACCESSORIES CASE AND THE ACCESSORIES IN IT CAN BECOME QUITE HOT. MONITORING OF CASE TEMPERATURE IS RECOMMENDED. ALWAYS MAKE SURE THAT ACCESSORIES THAT WILL BE APPLIED DIRECTLY TO THE PATIENT ARE SUITABLE FOR SKIN CONTACT AND WILL NOT CAUSE BURNS.
	WARNING! BATTERY EXPOSURE TO TEMPERATURES IN EXCESS OF 130°C (266°F) WILL RESULT IN THE BATTERY VENTING FLAMMABLE LIQUID AND GASES.
	WARNING! THE MOVES® SLC™ OXYGEN CONCENTRATOR DOES NOT FUNCTION WHILE SUCTION IS ON. AN ALTERNATIVE MEANS OF SUPPLYING O_2 WILL BE NECESSARY IF A HIGH PERCENTAGE OF O_2 IS CRITICAL WHILE SUCTIONING.
	WARNING! ONE CHARGED BATTERY MUST BE PRESENT IN THE MOVES® SLC™ UNIT WHENEVER IT IS IN OPERATION, EVEN WHEN IT IS RUNNING ON EXTERNAL POWER. THIS REDUCES THE RISK TO THE PATIENT IN THE EVENT OF A POWER FAILURE.
	WARNING! CHARGING AND DISCHARGING THE BATTERIES WITH OTHER THAN MOVES® SLC™ SYSTEM EQUIPMENT, AND/OR IMPROPER HANDLING, CAN RESULT IN FIRE, EXPLOSION, TOXIC GASES AND SMOKE.
	WARNING! BATTERY TIME SHOWN REMAINING IS APPROXIMATE AND HIGHLY DEPENDENT ON OPERATING CONDITIONS! PUT SAFETY FIRST – ALWAYS CARRY SPARE BATTERIES!
	WARNING! DO NOT OPERATE THE MOVES® SLC™ SYSTEM WITH A DEFECTIVE BATTERY.
	WARNING! DO NOT USE OR CHARGE A DAMAGED BATTERY!
	WARNING! DO NOT OPERATE THE MOVES® SLC™ SYSTEM UNTIL ALL SYSTEM TEST FAILURES HAVE BEEN RESOLVED, AND ALL TESTS HAVE BEEN REPEATED AND PASSED.
	WARNING! ONLY AUTHORIZED SERVICE AND MAINTENANCE PERSONNEL SHOULD REMOVE ANY COVERS FROM MOVES® SLC™. UNAUTHORIZED REMOVAL OF COVERS FROM MOVES® SLC™ MAY RESULT IN ELECTRIC SHOCK AND POSSIBLY DEATH, AND MAY DAMAGE THE SYSTEM COMPONENTS.
	WARNING! BECAUSE THE MOVES® SLC™ CONTAINS AN OXYGEN CONCENTRATOR, IT SHOULD ONLY BE USED IN A WELL-VENTILATED ENVIRONMENT AWAY FROM POLLUTANTS, FLAMES, SPARKS, OR FUMES.
	WARNING! LEAKS IN THE SAMPLING LINE CAN CAUSE LOW PCO_2 AND/OR LOW O_2 LEVELS.

SYMBOL	GENERAL WARNING
	WARNING! WHEN MOVES® SLC™ IS NOT IN OPERATION, BATTERIES SHOULD BE REMOVED FROM THE UNIT AND STORED IN A DRY AREA AT ROOM TEMPERATURE. LEAVING BATTERIES INSTALLED IN A NON-OPERATIONAL UNIT MAY CAUSE THEM TO DRAIN TO AN UNRECHARGEABLE LEVEL.
	WARNING! THE CLAMPS HAVE NUMEROUS MOVING PARTS THAT MAY PRESENT A PINCHING OR CRUSHING HAZARD. ALWAYS USE CAUTION WHEN HANDLING BOTH THE FRONT AND BACK CLAMPS.
	WARNING! WHEN SETTING ALARM LIMITS, DO NOT SET TO EXTREME VALUES THAT CAN RENDER THE ALARM SYSTEM USELESS.
	WARNING! DO NOT MODIFY THIS EQUIPMENT IN ANY WAY.
	WARNING! ONLY APPROVED NETWORK/DATA COUPLINGS ARE TO BE CONNECTED TO THE MOVES® SLC™ SYSTEM OR COMPONENTS.

6.3 ELECTRICAL WARNINGS

Table 10: Electrical Warnings

SYMBOL	ELECTRICAL WARNING
	WARNING! WHEN USING EXTERNAL POWER WITH THE MOVES® SLC™, THE POWER CORD MUST ALWAYS BE READILY ACCESSIBLE.
	TO AVOID THE RISK OF ELECTRIC SHOCK, THIS EQUIPMENT MUST ONLY BE CONNECTED TO A SUPPLY MAINS WITH PROTECTIVE EARTH.
	WARNING! THE MOVES® SLC™ SYSTEM IS NOT ELECTROSURGERY COMPATIBLE.
	WARNING! THE USE OF MULTIPLE (NON-) MEDICAL ELECTRICAL EQUIPMENT CONNECTED TO THE SAME PATIENT MAY POSE A SAFETY HAZARD DUE TO THE SUMMATION OF LEAKAGE CURRENTS FROM EACH INSTRUMENT. ANY COMBINATION OF (NON-) MEDICAL ELECTRICAL EQUIPMENT SHOULD BE EVALUATED BY LOCAL SAFETY PERSONNEL BEFORE BEING PUT INTO SERVICE.
	WARNING! CONDUCTIVE PARTS OF ELECTRODES AND ASSOCIATED CONNECTORS FOR APPLIED PART, INCLUDING THE NEUTRAL ELECTRODE, SHOULD NOT CONTACT OTHER CONDUCTIVE PARTS AND EARTH.

6.4 PATIENT-SPECIFIC WARNINGS

Table 11: Patient-Specific Warnings

SYMBOL	PATIENT-SPECIFIC WARNINGS
	WARNING! IN THE EVENT OF DISAGREEMENT BETWEEN THE DEVICE AND THE REMOTE SCREEN THE DEVICE SHALL BE CONSIDERED CORRECT.
	WARNING! IF THE REMOTE SCREEN BECOMES INOPERABLE, LOCKS UP OR BEHAVES ERRATICALLY, IT SHOULD NO LONGER BE USED AND BE DISCONNECTED FROM THE SYSTEM.
	WARNING! WHEN USING MOVES® SLC™ AS AN ANESTHETIC VENTILATOR, THE REQUIRED COMMUNICATION CABLE MUST BE INSTALLED BETWEEN MADM™ AND MOVES® SLC™. OTHERWISE, MOVES® SLC™ WILL GREATLY OVER-STATE THE VOLUMES DELIVERED.
	WARNING! DO NOT CONNECT MOVES® SLC™ DIAGNOSTICS SOFTWARE TO THE DEVICE WHEN THE DEVICE IS CONNECTED TO A PATIENT.
	WARNING! WHEN USING O_2 SUPPLEMENTATION, AN O_2 SAT MONITOR MUST BE USED.
	WARNING! THE AUTOMATED SPHYGMOMANOMETER IS NOT INTENDED FOR USE WITH PREGNANT PATIENTS.
	WARNING! WHEN USING O2 SUPPLEMENT MODE, THE MOVES® SLC™ GAS SAMPLING PORT MUST BE CONNECTED TO THE OXYGEN DELIVERY CIRCUIT (E.G., O_2 MASK SAMPLE PORT) AND AN OXYGEN SHUT-OFF DEVICE, SUCH AS BPR'S FIRESAFE™ CANNULA VALVE, SHOULD BE USED IN THE OXYGEN SUPPLY LINE.
	WARNING! DO NOT CONNECT A PATIENT TO MOVES® SLC™ UNTIL THE MOVES® SLC™ SYSTEM IS PROPERLY WARMED UP AND O_2 VALUES ARE DISPLAYED.
	WARNING! ACCURACY OF ANY BLOOD PRESSURE MEASUREMENT MAY BE AFFECTED BY THE POSITION OF THE SUBJECT, HIS OR HER PHYSICAL CONDITION AND USE OUTSIDE OF THE OPERATING INSTRUCTIONS DETAILED IN THIS MANUAL. INTERPRETATION OF BLOOD PRESSURE MEASUREMENTS SHOULD BE MADE ONLY BY A PHYSICIAN OR TRAINED MEDICAL STAFF.
	WARNING! DO NOT ATTACH THE BLOOD PRESSURE CUFF TO A LIMB WHERE INTRAVASCULAR ACCESS OR THERAPY OR AN ARTERIO-VENOUS SHUNT IS PRESENT. CUFF INFLATION CAN INTERFERE WITH THE BLOOD FLOW AND COULD RESULT IN INJURY TO THE PATIENT.
	WARNING! IF THE BLOOD PRESSURE CUFF IS ON THE SAME LIMB AS A PULSE OXIMETER PROBE, THE OXYGEN SATURATION RESULTS WILL BE ALTERED WHEN THE CUFF OCCLUDES THE BRACHIAL ARTERY.
	WARNING! IF THE BLOOD PRESSURE CUFF IS ON THE SAME LIMB AS ANOTHER PATIENT MONITOR, A TEMPORARY LOSS OF FUNCTION OF THE OTHER MONITOR MAY OCCUR WHEN THE CUFF IS PRESSURIZED.
	WARNING! DO NOT USE BLOOD PRESSURE CUFF ON THE ARM ON THE SIDE OF A MASTECTOMY.

SYMBOL	PATIENT-SPECIFIC WARNINGS
	WARNING! TO OBTAIN ACCURATE BLOOD PRESSURE READINGS, THE BLOOD PRESSURE CUFF MUST BE THE CORRECT SIZE, AND ALSO BE CORRECTLY FITTED TO THE PATIENT. INCORRECT SIZE OR INCORRECT FITTING MAY RESULT IN INCORRECT READINGS.
	WARNING! WHEN A BLOOD PRESSURE CUFF IS TO BE POSITIONED ON A PATIENT FOR AN EXTENDED LENGTH OF TIME, BE SURE TO OCCASIONALLY CHECK THE LIMB FOR PROPER CIRCULATION.
	WARNING! USING A BLOOD PRESSURE CUFF OVER A WOUND MAY CAUSE FURTHER INJURY.
	WARNING! USING A BLOOD PRESSURE CUFF TOO FREQUENTLY MAY CAUSE INJURY TO THE PATIENT DUE TO BLOOD FLOW INTERFERENCE.
	WARNING! IRREGULAR HEART RHYTHMS SUCH AS ATRIAL OR VENTRICULAR PREMATURE BEATS, ATRIAL FIBRILLATION, ARTERIALSCLEROSIS, POOR PERFUSION OR DIABETES MAY AFFECT BLOOD PRESSURE PERFORMANCE AND READING.
	WARNING! BEFORE VENTILATING A PATIENT, ENSURE THAT A SPARE VENTILATOR BREATHING CIRCUIT IS READILY AVAILABLE.
	WARNING! CARE SHOULD BE TAKEN WHEN MONITORING PATIENTS WITH PACEMAKERS SINCE HEART RATE METERS MAY FALSELY COUNT PACEMAKER PULSES.
	WARNING! IRREGULAR HEART RHYTHMS SUCH AS PREMATURE ATRIAL OR VENTRICULAR BEATS MAY CAUSE THE HEART RATE TO BE UNDERESTIMATED.
	WARNING! DO NOT REUSE SAMPLING LINES OR FILTERS. THIS COULD PRESENT A DANGER OF INFECTION.
	WARNING! DO NOT REUSE PARTS MARKED FOR SINGLE USE ONLY. THIS COULD PRESENT A DANGER OF INFECTION.
	WARNING! WHEN MONITORING PACEMAKER PATIENTS, HEART RATE METERS MAY CONTINUE TO COUNT THE PACEMAKER RATE DURING OCCURRENCES OF CARDIAC ARREST OR SOME ARRHYTHMIAS. DO NOT RELY ENTIRELY UPON HEART RATE METER ALARMS. KEEP PACEMAKER PATIENTS UNDER CLOSE SURVEILLANCE. SEE 17.7.1 HEART RATE MONITORING SPECIFICATIONS ON PAGE 285 FOR DISCLOSURE OF THE PACEMAKER PULSE REJECTION CAPABILITY OF MOVES® SLC™.
	WARNING! IMPROPER OPERATION OF THE MOVES® SLC™ SYSTEM COULD ENDANGER A PATIENT!
	WARNING! MOVES® SLC™ IS INTENDED FOR USE ON ONE PATIENT AT A TIME. FOR EXAMPLE, IT SHOULD NOT BE USED TO VENTILATE ONE PATIENT WHILE MONITORING ANOTHER.
	WARNING! DO NOT CONNECT ANY SENSORS, MONITORS, OR THE BREATHING CIRCUIT TO THE PATIENT WHILE PERFORMING SYSTEM TESTS! DOING SO COULD ENDANGER THE PATIENT!

SYMBOL	PATIENT-SPECIFIC WARNINGS
	WARNING! FAILURE TO CHANGE THE VENTILATOR CARTRIDGE WHEN INDICATED MAY LEAD TO THE PATIENT'S SUFFERING FROM AN INCREASE IN INSPIRED CO_2.
	WARNING! ALWAYS CARRY ALTERNATE MEANS OF VENTILATING, SUCTIONING, AND OXYGENATING THE PATIENT.
	WARNING! ALWAYS CARRY BACKUPS OF CONSUMABLES SUCH AS CARTRIDGES AND FILTERS.
	WARNING! DEFIBRILLATOR PROTECTION REQUIRES USE OF SPECIFIED ACCESSORIES, INCLUDING PATIENT CABLES AND TRANSDUCERS.
	WARNING! NEVER LEAVE A PATIENT UNATTENDED WHEN RUNNING MOVES® SLC™.
	WARNING! MOVES® SLC™ PATIENT TEMPERATURE MEASUREMENT PERFORMANCE MAY DEGRADE IF THE PATIENT TEMPERATURE IS BELOW THE AMBIENT TEMPERATURE.
	EXTREME WARNING! WHEN USING FLUID FILLED PRESSURE TRANSDUCERS TO MONITOR INTRACRANIAL PRESSURE (ICP), MAKE SURE THAT THE TRANSDUCER AND THE LINE CONNECTING TO THE PATIENT'S DRAIN ARE FREE OF ANY AIR BUBBLES!
	EXTREME WARNING! AFTER COMPLETING FILLING THE ICP TRANSDUCER AND THE LINE, DISCONNECT THE FLUID BAG FROM THE TRANSDUCER, AND CAP THE END WITH THE STERILE CAP PRIOR TO CONNECTING THE TRANSDUCER TO THE PATIENT'S BRAIN!
	EXTREME WARNING! NEVER FLUSH THE ICP TRANSDUCER WHILE CONNECTED TO THE PATIENT!
	EXTREME WARNING! FAILURE TO OBSERVE THE PREVIOUS THREE PRECAUTIONS MAY RESULT IN SERIOUS INJURY OR DEATH!

6.5 MASIMO RAINBOW SET® PULSE CO-OXIMETER WARNINGS

Table 12: Masimo Rainbow SET® Pulse CO-Oximeter Warnings

SYMBOL	MASIMO RAINBOW SET® PULSE CO-OXIMETER WARNINGS
	WARNING! THE MASIMO RAINBOW SET® PULSE CO-OXIMETER PARAMETERS ARE FOR REFERENCE ONLY, AND THERAPEUTIC DECISIONS NEED TO BE MADE IN THE CONTEXT OF CLINICAL ASSESSMENT.
	WARNING! PULSE RATE MEASUREMENT IS BASED ON THE OPTICAL DETECTION OF A PERIPHERAL FLOW PULSE AND THEREFORE MAY NOT DETECT CERTAIN ARRHYTHMIAS. THE PULSE OXIMETER SHOULD NOT BE USED AS A REPLACEMENT OR SUBSTITUTE FOR ECG-BASED ARRHYTHMIA ANALYSIS.

SYMBOL	MASIMO RAINBOW SET® PULSE CO-OXIMETER WARNINGS
	WARNING! A PULSE CO-OXIMETER SHOULD BE CONSIDERED AN EARLY WARNING DEVICE. AS A TREND TOWARDS PATIENT HYPOXEMIA IS INDICATED, BLOOD SAMPLES SHOULD BE ANALYZED BY LABORATORY INSTRUMENTS TO COMPLETELY UNDERSTAND THE PATIENT'S CONDITION.
	WARNING! FOR MEASUREMENTS OF HIGH OR LOW SPHB READINGS, BLOOD SAMPLES SHOULD BE ANALYZED BY LABORATORY INSTRUMENTS TO COMPLETELY UNDERSTAND THE PATIENT'S CONDITION.
	WARNING! SPO_2 IS EMPIRICALLY CALIBRATED TO FUNCTIONAL ARTERIAL OXYGEN SATURATION IN HEALTHY ADULT VOLUNTEERS WITH NORMAL LEVELS OF CARBOXYHEMOGLOBIN (COHB) AND METHEMOGLOBIN (METHB). A PULSE OXIMETER CAN NOT MEASURE ELEVATED LEVELS OF COHB OR METHB. INCREASES IN EITHER COHB OR METHB WILL AFFECT THE ACCURACY OF THE SPO_2 MEASUREMENT. **FOR INCREASED COHB: COHB LEVELS ABOVE NORMAL TEND TO INCREASE THE LEVEL OF SPO_2. THE LEVEL OF INCREASE IS APPROXIMATELY EQUAL TO THE AMOUNT OF COHB THAT IS PRESENT.** **NOTE: HIGH LEVELS OF COHB MAY OCCUR WITH A SEEMINGLY NORMAL SPO_2. WHEN ELEVATED LEVELS OF COHB ARE SUSPECTED, LABORATORY ANALYSIS (CO-OXIMETRY) OF A BLOOD SAMPLE SHOULD BE PERFORMED.** **FOR INCREASED METHB: THE SPO_2 MAY BE DECREASED BY LEVELS OF METHB OF UP TO APPROXIMATELY 10% TO 15%. AT HIGHER LEVELS OF METHB, THE SPO_2 MAY TEND TO READ IN THE LOW TO MID 80S. WHEN ELEVATED LEVELS OF METHB ARE SUSPECTED, LABORATORY ANALYSIS (CO-OXIMETRY) OF A BLOOD SAMPLE SHOULD BE PERFORMED.**
	WARNING! INTERFERING SUBSTANCES: DYES, OR ANY SUBSTANCE CONTAINING DYES, THAT CHANGE USUAL BLOOD PIGMENTATION MAY CAUSE ERRONEOUS READINGS.
	WARNING! HEMOGLOBIN SYNTHESIS DISORDERS MAY CAUSE ERRONEOUS SPHB READINGS.
	WARNING! ELEVATED LEVELS OF TOTAL BILIRUBIN MAY LEAD TO INACCURATE SPO_2 , SPMET, SPCO, SPHB, AND SPOC MEASUREMENTS.
	WARNING! MOTION ARTIFACT MAY LEAD TO INACCURATE SPMET, SPCO, SPHB, AND SPOC MEASUREMENTS.
	WARNING! SEVERE ANEMIA MAY CAUSE ERRONEOUS SPO_2 READINGS.
	WARNING! VERY LOW ARTERIAL OXYGEN SATURATION (SPO_2) LEVELS MAY CAUSE INACCURATE SPCO AND SPMET MEASUREMENTS.
	WARNING! WITH VERY LOW PERFUSION AT THE MONITORED SITE, THE READINGS MAY READ LOWER THAN CORE ARTERIAL OXYGEN SATURATION.
	WARNING! DO NOT USE TAPE TO SECURE THE SENSOR TO THE SITE; THIS CAN RESTRICT BLOOD FLOW AND CAUSE INACCURATE READINGS. USE OF ADDITIONAL TAPE CAN CAUSE SKIN DAMAGE OR DAMAGE THE SENSOR.

SYMBOL	MASIMO RAINBOW SET® PULSE CO-OXIMETER WARNINGS
	WARNING! IF THE SENSOR IS WRAPPED TOO TIGHTLY, OR SUPPLEMENTAL TAPE IS USED, VENOUS CONGESTION / PULSATIONS MAY OCCUR, CAUSING ERRONEOUS READINGS.
	WARNING! VENOUS CONGESTION MAY CAUSE UNDER READING OF ACTUAL ARTERIAL OXYGEN SATURATION. THEREFORE, ASSURE PROPER VENOUS OUTFLOW FROM MONITORED SITE. SENSOR SHOULD NOT BE BELOW HEART LEVEL (E.G., SENSOR ON HAND OF A PATIENT IN A BED WITH ARM DANGLING TO THE FLOOR).
	WARNING! VENOUS PULSATIONS MAY CAUSE ERRONEOUS LOW READINGS (E.G.,TRICUSPID VALVE REGURGITATION).
	WARNING! LOSS OF PULSE SIGNAL CAN OCCUR WHEN: **THE SENSOR IS TOO TIGHT.** **THE PATIENT HAS HYPOTENSION, SEVERE VASOCONSTRICTION, SEVERE ANEMIA, OR HYPOTHERMIA.** **THERE IS ARTERIAL OCCLUSION PROXIMAL TO THE SENSOR.** **THE PATIENT IS IN CARDIAC ARREST OR IS IN SHOCK.**
	WARNING! THE PULSATIONS FROM INTRA-AORTIC BALLOON SUPPORT CAN BE ADDITIVE TO THE PULSE RATE ON THE OXIMETER PULSE RATE DISPLAY. VERIFY PATIENT'S PULSE RATE AGAINST THE ECG HEART RATE.
	WARNING! MISAPPLIED SENSORS OR SENSORS THAT BECOME PARTIALLY DISLODGED MAY CAUSE EITHER OVER OR UNDER READING OF ACTUAL ARTERIAL OXYGEN SATURATION.
	WARNING! AVOID PLACING THE SENSOR ON ANY EXTREMITY WITH AN ARTERIAL CATHETER OR BLOOD PRESSURE CUFF.
	WARNING! HIGH INTENSITY EXTREME LIGHTS (INCLUDING PULSATING STROBE LIGHTS) DIRECTED ON THE SENSOR MAY NOT ALLOW THE PULSE CO-OXIMETER TO OBTAIN READINGS.
	WARNING! THE PULSE CO-OXIMETER CAN BE USED DURING DEFIBRILLATION, BUT THE READINGS MAY BE INACCURATE FOR UP TO 20 SECONDS.
	WARNING! BEFORE USE, CAREFULLY READ THE MASIMO SENSOR *DIRECTIONS FOR USE*.
	WARNING! TISSUE DAMAGE CAN BE CAUSED BY INCORRECT APPLICATION OR USE OF A SENSOR, FOR EXAMPLE BY WRAPPING THE SENSOR TOO TIGHTLY. INSPECT THE SENSOR SITE AS DIRECTED IN THE SENSOR'S *DIRECTIONS FOR USE* TO ENSURE SKIN INTEGRITY AND CORRECT POSITIONING AND ADHESION OF THE SENSOR.
	WARNING! THE PULSE CO-OXIMETER IS NOT INTENDED FOR USE AS AN APNEA MONITOR.
	WARNING! TO AVOID CROSS CONTAMINATION USE ONLY MASIMO SINGLE USE SENSORS ON THE SAME PATIENT.
	WARNING! UNLESS OTHERWISE SPECIFIED, DO NOT STERILIZE SENSORS OR PATIENT CABLES BY IRRADIATION, STEAM, AUTOCLAVE OR ETHYLENE OXIDE. SEE THE CLEANING INSTRUCTIONS IN THE *DIRECTIONS FOR USE* FOR THE MASIMO RE-USEABLE SENSORS.

SYMBOL	MASIMO RAINBOW SET® PULSE CO-OXIMETER WARNINGS
	WARNING! DO NOT USE THE PULSE CO-OXIMETER OR OXIMETRY SENSORS DURING MAGNETIC RESONANCE IMAGING (MRI) SCANNING. INDUCED CURRENT COULD POTENTIALLY CAUSE BURNS. THE PULSE CO-OXIMETER MAY AFFECT THE MRI IMAGE, AND THE MRI UNIT MAY AFFECT THE ACCURACY OF THE OXIMETRY MEASUREMENTS.
	WARNING! IF USING PULSE CO-OXIMETRY DURING FULL BODY IRRADIATION, KEEP THE SENSOR OUT OF THE IRRADIATION FIELD. IF THE SENSOR IS EXPOSED TO THE IRRADIATION, THE READING MIGHT BE INACCURATE, OR THE UNIT MIGHT READ ZERO FOR THE DURATION OF THE ACTIVE IRRADIATION PERIOD.
	WARNING! EXERCISE CAUTION WHEN APPLYING A SENSOR TO A SITE WITH COMPROMISED SKIN INTEGRITY. APPLYING TAPE OR PRESSURE TO SUCH A SITE MAY REDUCE CIRCULATION AND/OR CAUSE FURTHER SKIN DETERIORATION.
	WARNING! CIRCULATION DISTAL TO THE SENSOR SITE SHOULD BE CHECKED ROUTINELY.
	WARNING! A FUNCTIONAL TESTER CANNOT BE UTILIZED TO ASSESS THE ACCURACY OF THE PULSE CO-OXIMETER OR ANY SENSORS.
	WARNING! DO NOT MODIFY OR ALTER A PULSE CO-OXIMETER SENSOR IN ANY WAY. ALTERATIONS OR MODIFICATION MAY AFFECT PERFORMANCE AND/OR ACCURACY.
	WARNING! DO NOT USE DAMAGED SENSORS OR PATIENT CABLES. DO NOT USE A SENSOR OR PATIENT CABLE WITH EXPOSED OPTICAL OR ELECTRICAL COMPONENTS.
	WARNING! DO NOT ATTEMPT TO REPROCESS, RECONDITION OR RECYCLE ANY MASIMO SENSORS OR PATIENT CABLES AS THESE PROCESSES MAY DAMAGE THE ELECTRICAL COMPONENTS, POTENTIALLY LEADING TO HARM.
	WARNING! EXPLOSION HAZARD. DO NOT USE THE PULSE CO-OXIMETER IN THE PRESENCE OF FLAMMABLE ANESTHETICS OR OTHER FLAMMABLE SUBSTANCE IN COMBINATION WITH AIR, OXYGEN-ENRICHED ENVIRONMENTS, OR NITROUS OXIDE.
	WARNING! AS WITH ALL MEDICAL EQUIPMENT, CAREFULLY ROUTE PATIENT CABLING TO REDUCE THE POSSIBILITY OF PATIENT ENTANGLEMENT OR STRANGULATION.
	WARNING! ALWAYS REMOVE THE SENSOR FROM THE PATIENT AND COMPLETELY DISCONNECT THE PATIENT FROM THE PULSE CO-OXIMETER BEFORE BATHING THE PATIENT.
	WARNING! DO NOT IMMERSE THE SENSOR OR PATIENT CABLE IN WATER, SOLVENTS, OR CLEANING SOLUTIONS (THE SENSORS AND CONNECTORS ARE NOT WATERPROOF).
	WARNING! INTRAVASCULAR DYES OR EXTERNALLY APPLIED COLORING (SUCH AS NAIL POLISH) MAY LEAD TO INACCURATE SPO_2 MEASUREMENTS.
	WARNING! PATIENT SAFETY – IF A SENSOR IS DAMAGED IN ANY WAY, DISCONTINUE USE IMMEDIATELY.
	WARNING! FAILURE TO APPLY THE SENSOR PROPERLY MAY CAUSE INCORRECT MEASUREMENTS.

SYMBOL	MASIMO RAINBOW SET® PULSE CO-OXIMETER WARNINGS
	WARNING! USE ONLY MASIMO SENSORS FOR PULSE OXIMETRY OR PULSE CO-OXIMETRY MEASUREMENTS.
	WARNING! SPO_2 SENSOR APPLICATION SITES SHOULD BE INSPECTED AT LEAST EVERY FOUR (4) HOURS, OR AS DIRECTED IN THE SENSOR'S *DIRECTIONS FOR USE,* TO ENSURE CORRECT SENSOR ALIGNMENT AND SKIN INTEGRITY. IF CIRCULATION OR SKIN INTEGRITY IS COMPROMISED, THE SENSOR SHOULD BE APPLIED TO A DIFFERENT SITE. PATIENT SENSITIVITY MAY VARY DUE TO MEDICAL STATUS OR SKIN CONDITION. DISCONTINUE THE USE OF ADHESIVE TAPE STRIPS IF THE PATIENT EXHIBITS AN ALLERGIC REACTION TO THE ADHESIVE MATERIAL.
	WARNING! WHEN USING SPO_2 ABOVE 41°C, TAKE EXTRA CAUTION TO ENSURE SENSOR IS PLACED WITHOUT EXCESSIVE PRESSURE AND CHANGE THE APPLICATION SITE MORE FREQUENTLY.

6.6 GENERAL CAUTIONS

Table 13: General Cautions

SYMBOL	GENERAL CAUTION
	CAUTION! ALWAYS MAKE SURE THAT MOVES® SLC™ IS CLAMPED AND FULLY SECURED WHEN IN USE.
	CAUTION! OPERATION OF MOVES® SLC™ OUTSIDE OF SPECIFIED LIMITS MAY CAUSE INACCURATE RESULTS.
	CAUTION! OPERATING SUCTION WITHOUT THE SUPPLIED FILTER, CANISTER, AND HOSES WILL RESULT IN PERMANENT FAILURE OF THE SUCTION SYSTEM AND THE OXYGEN CONCENTRATOR.
	CAUTION! MOVES® SLC™ SHOULD NOT BE USED ADJACENT TO OR STACKED WITH OTHER EQUIPMENT. IF ADJACENT OR STACKED USE IS NECESSARY, MOVES® SLC™ SHOULD BE OBSERVED TO VERIFY NORMAL OPERATION IN THE CONFIGURATION IN WHICH IT WILL BE USED.
	CAUTION! THE USE OF ACCESSORIES AND CABLES OTHER THAN THOSE SPECIFIED, WITH THE EXCEPTION OF ACCESSORIES AND CABLES QUALIFIED AND SOLD BY THORNHILL RESEARCH INC., MAY RESULT IN INCREASED EMISSIONS OR DECREASED IMMUNITY OF MOVES® SLC™ AND MAY CAUSE THE SYSTEM TO BE NON-COMPLIANT WITH THE REQUIREMENTS OF IEC 60601-1-2:2007 (ED 3.0).
	CAUTION! SOME PATIENT MONITORING ACCESSORIES MAY NOT FUNCTION PROPERLY OR MAY RELAY INACCURATE READINGS IF OPERATED OUTSIDE OF THEIR NORMAL OPERATING CONDITIONS.
	CAUTION! USE ONLY THE ACCESSORIES THAT ARE PROVIDED WITH THE MOVES® SLC™ SYSTEM! OTHER ACCESSORIES MAY ADVERSELY AFFECT THE VENTILATOR PERFORMANCE.
	CAUTION! THE MOVES® SLC™ ACCESSORIES PROVIDED WITH THE MOVES® SLC™ SYSTEM ARE FOR USE ONLY WITH THE MOVES® SLC™ SYSTEM.

SYMBOL	GENERAL CAUTION
	CAUTION! BEFORE INSTALLING A HYDROCARBON FILTER, CHECK THE FOUR-DIGIT DATE CODE PRINTED ON THE CARTRIDGE. THE CARTRIDGE LABEL IS STAMPED WITH FOUR CHARACTERS "XXYY", WHERE "XX" IS THE WEEK OF THE YEAR AND "YY" IS THE YEAR. A CARTRIDGE MORE THAN ONE YEAR OLD SHOULD BE DISCARDED SINCE IT MAY DEGRADE THE PERFORMANCE OF OR CAUSE DAMAGE TO THE MOVES® SLC™ OXYGEN CONCENTRATOR.
	CAUTION! OPERATING MOVES® SLC™ WITHOUT A HYDROCARBON FILTER WILL DAMAGE THE UNIT. DO NOT OPERATE WITHOUT A HYDROCARBON FILTER!
	CAUTION! A MOVES® SLC™ UNIT SHOULD NEVER BE PUT INTO TRANSPORT SERVICE WITH LESS THAN A 95% CHARGE IN BOTH BATTERIES.
	CAUTION! NEVER CHARGE BATTERIES IN AMBIENT TEMPERATURES BELOW 32ºF (0ºC) OR ABOVE 104ºF (40ºC).
	CAUTION! IF INTENDING TO RUN ON BATTERIES, ENSURE THAT THERE IS SUFFICIENT POWER FOR THE LENGTH OF TIME REQUIRED, OR REPLACE THE BATTERIES.
	CAUTION! ONLY SELECT "SKIP TESTS" IF A SYSTEM TEST HAS PREVIOUSLY BEEN PERFORMED AND PASSED, AND THE SYSTEM HAS JUST BEEN RESTARTED DUE TO POWER FAILURE (E.G., LOSS OF BATTERY OR EXTERNAL POWER).
	CAUTION! THE SUCTION WAND SUPPLIED WITH THE MOVES® SLC™ IS DESIGNED TO MINIMIZE TOTAL OCCLUSION. IT IS STRONGLY ADVISED THAT ONLY THE WAND SUPPLIED BE USED WITH THE MOVES® SLC™ SYSTEM.
	CAUTION! ACCURACY OF ANY BLOOD PRESSURE MEASUREMENT MAY BE AFFECTED IF MOVES® SLC™ IS USED OR STORED OUTSIDE THE RELEVANT TEMPERATURE OR HUMIDITY RANGES DESCRIBED IN THE ENVIRONMENTAL SPECIFICATIONS (SEE SECTION 0 ON PAGE 284).
	CAUTION! SUBSTITUTION OF COMPONENTS DIFFERENT FROM THOSE SUPPLIED WITH THE MOVES® SLC™ MAY RESULT IN MEASUREMENT ERROR.
	CAUTION! THE SUCTION CANISTER AND SUCTION FILTER ARE INTENDED FOR SINGLE USE ONLY AND SHOULD BE DISPOSED OF IN ACCORDANCE WITH LOCAL BIOHAZARD REGULATIONS.
	CAUTION! BREATHING CIRCUITS, SAMPLE LINES (BUT NOT THE NAFION TUBE) AND FILTERS, BREATHING CARTRIDGES, ECG ADHESIVE SENSOR PADS, ABP/CVP/ICP TRANSDUCER AND SUCTION WAND AND TUBING ARE DISPOSABLE AND SHOULD BE DISPOSED OF IN ACCORDANCE WITH LOCAL BIOHAZARD REGULATIONS.
	CAUTION! ALL MOVES® SLC™ ACCESSORIES' PACKAGING AND DISPOSABLE ACCESSORIES SHOULD BE DISPOSED OF RESPONSIBLY IN ACCORDANCE WITH LOCAL WASTE DISPOSAL STANDARDS AND / OR LOCAL BIOHAZARD REGULATIONS.
	CAUTION! DO NOT SUBMERGE THE MOVES® SLC™ OR POUR CLEANING LIQUIDS OVER OR INTO THE MOVES® SLC™.

SYMBOL	GENERAL CAUTION
⚠	CAUTION! THE LABEL ON THE PACKAGE OF THE VENTILATOR CARTRIDGE CONTAINS AN EXPIRY DATE. ALWAYS CHECK THE EXPIRY DATE ON THE VENTILATOR CARTRIDGE BEFORE USING IT TO MAKE SURE THAT THE VENTILATOR CARTRIDGE HAS NOT EXPIRED. AS WELL, MONITOR SPARE CARTRIDGES WITH REGARD TO THEIR REMAINING "SHELF LIFE".
⚠	CAUTION! THE SURFACE OF THE MOVES® SLC™ SYSTEM CAN BECOME HOT, ESPECIALLY IF IT IS BEING OPERATED IN DIRECT SUNLIGHT. CARE SHOULD BE TAKEN WHEN TOUCHING OR CONTACTING THE SURFACE OF THE MOVES® SLC™ SYSTEM.
⚠	CAUTION! ECG CABLES SHOULD BE DISCARDED AND REPLACED AFTER TWO (2) YEARS OF CONTINUOUS USE. CHECK CABLE USE BY RECORDING THE DATE THE CABLE WAS FIRST USED.
⚠	CAUTION! CHECK THE EXPIRY DATE ON THE ECG ELECTRODES PACKAGE BEFORE USING. ELECTRODES ARE GOOD FOR 45 DAYS ONCE PACKAGE IS OPENED.
⚠	CAUTION! PAY SPECIAL ATTENTION TO THE TYPE OF ECG ELECTRODES USED. SOME ELECTRODES MAY BE SUBJECT TO LARGE OFFSET POTENTIALS. RECOVERY TIME AFTER DEFIBRILLATION MAY BE ESPECIALLY COMPROMISED.
⚠	CAUTION! WHEN YOU DETACH THE MOVES® SLC™ CLAMPS, AND RETURN THEM TO THE ACCESSORIES CASE, BE CAREFUL NOT TO PINCH THE WIRES ATTACHED TO THE PINS IN THE CLAMP APPARATUS AS THIS CAN CAUSE WEAR, ABRADING, AND EVENTUAL BREAKAGE OF THE WIRES.
⚠	CAUTION! WHEN BATTERIES ARE DISCHARGED AND LEFT IN MOVES® SLC™ FOR A PROLONGED PERIOD, A COMPLETELY DISCHARGED BATTERY (NO LED LIGHTS) CAN RESULT. THE BATTERY CAN STILL BE RECHARGED, BUT IT MAY TAKE MORE THAN THE NORMAL 2.5 HOURS. IT HAS BEEN OBSERVED TO TAKE ANYWHERE FROM 6 TO 48 HOURS TO FULLY CHARGE.
⚠	CAUTION! IF MOVES® SLC™ IS EXPOSED TO SIGNIFICANT AMOUNTS OF SAND OR DUST, IT SHOULD BE CLEANED BY AN AUTHORIZED TECHNICIAN IN ACCORDANCE WITH THE MAINTENANCE MANUAL.
⚠	CAUTION! THE VENTILATOR BREATHING CIRCUIT AND THE SAMPLING FILTER CONNECTED TO THE NAFION TUBING SHOULD BE INSPECTED EVERY FOUR (4) HOURS FOR CONDENSATION AND DRAINED AS REQUIRED. THE CIRCUIT AND FILTER SHOULD BE CHANGED AFTER 24 HOURS OF CONTINUOUS USE.
⚠	CAUTION! NO LUBRICANTS OTHER THAN THOSE RECOMMENDED BY THE MANUFACTURER SHALL BE USED ON THE MOVES® SLC™.

6.7 ELECTRICAL CAUTIONS

Table 14: Electrical Cautions

SYMBOL	ELECTRICAL CAUTION
⚠	CAUTION! MOVES® SLC™ IS INTENDED FOR USE BY HEALTHCARE PROFESSIONALS ONLY. MOVES® SLC™ MAY CAUSE RADIO INTERFERENCE OR MAY DISRUPT THE OPERATION OF NEARBY EQUIPMENT. IT MAY BE NECESSARY TO TAKE MITIGATION MEASURES, SUCH AS REORIENTING OR RELOCATING MOVES® SLC™ OR SHIELDING THE LOCATION.

SYMBOL	ELECTRICAL CAUTION
	**CAUTION! MEDICAL ELECTRICAL EQUIPMENT NEEDS SPECIAL PRECAUTIONS REGARDING EMC (ELECTROMAGNETIC COMPATIBILITY) AND NEEDS TO BE INSTALLED AND PUT INTO SERVICE ACCORDING TO THE EMC INFORMATION PROVIDED IN THE MOVES® SLC™ OPERATOR'S MANUAL.**
	**CAUTION! THE POWER SUPPLY/CHARGER CORD IS A SPECIAL MEDICAL-GRADE POWER CORD AND SHOULD NOT BE REPLACED WITH A NON-MOVES® SLC™ SUPPLIED PART.**
	**CAUTION! PORTABLE AND MOBILE RF (RADIO FREQUENCY) COMMUNICATIONS EQUIPMENT CAN AFFECT MEDICAL ELECTRICAL EQUIPMENT.**
	**CAUTION! INTERFERENCE MAY OCCUR IN THE VICINITY OF KNOWN RADIO FREQUENCY (RF) TRANSMITTING DEVICES AND EQUIPMENT MARKED WITH THE FOLLOWING SYMBOL:** 
	**CAUTION! OXIMETER READINGS MAY BE AFFECTED BY THE USE OF AN ELECTROSURGICAL UNIT (ESU).**

6.8 PATIENT-SPECIFIC CAUTIONS

Table 15: Patient-Specific Cautions

SYMBOL	PATIENT-SPECIFIC CAUTION
	**CAUTION! ALL COMPONENTS IN MOVES® SLC™ THAT COME IN CONTACT WITH RESPIRATORY GASES ARE NON-STERILE.**

6.9 GENERAL SAFETY

1. This equipment should be operated only by a trained medical practitioner.
2. The operator must inspect the MOVES® SLC™ unit and all accessories for visible physical damage (cracks, holes, leaks; missing components, structural hardware and protective covers; signs of tampering, etc.) prior to each use. All system tests must be completed prior to connecting the MOVES® SLC™ unit to a patient.
3. The operator must be fully familiar with the contents of this manual before operating the MOVES® SLC™ system.
4. The MOVES® SLC™ unit must be serviced only by qualified personnel. There are no user serviceable parts inside the MOVES® SLC™ unit.
5. The MOVES® SLC™ system must not be used for any purpose other than as stated in section *3.2 MOVES® SLC™ Intended Use* on *page 17* .
6. The MOVES® SLC™ unit must always be used and stored in accordance with the environmental specifications listed in the subsection *Environmental Specifications* on *page 284*. Any storage or use outside of these conditions may cause system degradation and harm to patients. After any such storage or use, the MOVES® SLC™ unit must be serviced by qualified personnel. Do not use the MOVES® SLC™ unit in contaminated environments.
7. The operator must ensure that the MOVES® SLC™ Unit and Accessories Cases contain all the necessary components for successful use. See *Section 9.1: MOVES® SLC™ System Contents on page 61 .*
8. Always ensure that system batteries are fully charged, and always maintain alternative methods of ventilation, O_2 supplementation and suction in case of failure of part or all of the MOVES® SLC™ system.
9. If the MOVES® SLC™ unit and accessories are placed in storage, they must be inspected and serviced every 12 months at a minimum.
10. The MOVES® SLC™ system must be operated using only accessories specified in this manual, and supplied by the manufacturer, or their equivalent.
11. The accessories provided with the MOVES® SLC™ system are for use only with the MOVES® SLC™ system. Use of MOVES® SLC™ accessories with another system may result in failure of the accessories and present a risk to and/or harm a patient, operator or bystander.
12. The MOVES® SLC™ system must not be connected to a patient unless the operator has thoroughly read and understood this manual, the operator is qualified or is under qualified supervision, all system tests have been performed, and all of the Safety Procedures contained within this manual have been read and adhered to.
13. The MOVES® SLC™ unit should be placed in *Monitor Only* mode when it is operating in 'Ventilator' or 'O2 Supplement' mode and filters or cartridges need to be changed or if the breathing circuit is disconnected for any reason.
14. The MOVES® SLC™ unit must not be operated without filters and cartridges present and properly installed.
15. Failure to change the ventilator cartridge when indicated will lead to hypercarbia. Alternative ventilation and/or external O_2 supplementation may be required while changing the cartridge.
16. Cartridges are for single patient use only. The Ventilator Cartridge will require replacement after at least every 2 hours of continuous use under standard temperature and pressure conditions. Different environmental and

patient conditions may reduce the life of the Ventilator Cartridge. Always have a spare cartridge and an alternative ventilation method available.

17. The Ventilator Cartridge has an expiry date listed on the package label. Before using the Ventilator Cartridge, always check the expiry date to make sure that the cartridge has not expired.
18. Always have available an alternative means of suction in the event of a power failure, mechanical failure or serious occlusion in the suction circuit.
19. The MOVES® SLC™ system is not recommended for use in treating patients with pacemakers or other implanted medical devices.
20. If the MOVES® SLC™ unit should experience ingress of any particulate matter (dirt, dust, sand, etc.) through suction, O_2 inlet, ventilator driving gas or valve block ports, the unit should be cleaned and serviced by authorized personnel.
21. Should the MOVES® SLC™ unit experience ingress of any liquids or become contaminated by bodily fluids through suction, O_2 inlet, air intake, ventilator driving gas or valve block ports, the unit should be transferred to authorized personnel for cleaning, sterilization and/or component replacement.
22. Should the MOVES® SLC™ unit experience a sudden shock (by being dropped or roughly handled), or exposed externally to high voltage, the unit should be inspected and serviced by authorized personnel.
23. The MOVES® SLC™ system outputs concentrated oxygen. No smoking or open flame is permitted near the unit.
24. Do not use oil or grease on or near the MOVES® SLC™ unit or its components.
25. The surface of the MOVES® SLC™ system can become hot, especially if it is being operated in direct sunlight. Care should be taken when touching or contacting the surface of the MOVES® SLC™ system.
26. There are no known toxic effects of any materials used in the system that can come in contact with the patient, the operator or the gas delivered to the patient.

6.10 ELECTRICAL SAFETY

1. Connect the MOVES® SLC™ power supply / charger only to an AC source from 100–240V, 50–60 Hz, 5.5 A max. Fluctuations in voltage and current can have adverse effects on the performance of the MOVES® SLC™ system.
2. Do not modify the power supply provided with the MOVES® SLC™ system with additional voltage regulators or similar equipment. The MOVES® SLC™ power supply/charger detects the supply automatically.
3. Do not route power cables immediately adjacent to patient connection cables. Power cables can produce voltage transients ("crosstalk") that seriously affect data collection cables, especially ECG sensor connections. Voltage transients can resemble ECG readings.
4. Do not operate the MOVES® SLC™ unit if the main AC cord or the power-supply cord to MOVES® SLC™ unit shows any sign of damage such as frayed insulation, or if there are cracked or damaged plugs or receptacles, or a missing grounding plug, or if the 'PWR" light on the power supply/charger does not illuminate.
5. Do not operate the MOVES® SLC™ system on battery power if:
    a. A battery shows any sign of damage such as cracks, holes, or leakage.
    b. Any battery is known to be defective.
    c. The battery discharge indicator on either battery fails to illuminate.
    d. The power source indicator on the startup screen of the MOVES® SLC™ unit fails to detect a battery when a battery is installed, or it indicates a charge that is not in agreement with the indicators on the batteries.
    e. The power source indicator on the startup screen of the MOVES® SLC™ fails to show a decrease in charge while running.
    f. The 'PWR" light on the power supply/charger does not illuminate when attempting to charge the batteries.

6. The main external AC cord is supplied with a grounding prong on the male connector to reduce the risk of electrical shock. Never remove or compromise this prong.
7. Use only the MOVES® SLC™ power supply P/N 111422, batteries P/N 122985, and supplied external power cables to operate the MOVES® SLC™ system.

6.11 PREPARING FOR EMERGENCY OPERATION

The operator must always be prepared for emergency situations such as power failure, mechanical failure or serious occlusions in the MOVES® SLC™ or its accessories that may require alternative means of treating a patient.

The following guidelines should always be adhered to:

1. The operator must always have prepared two completely charged battery packs.
2. The operator must always have prepared an alternative means of ventilating a patient.
3. The operator must always have prepared an alternative means of providing a high concentration of oxygen to a patient.
4. The operator must always have prepared an alternative means of monitoring a patient's vital signs (e.g., heart rate, blood pressure, respiratory rate, etc.).
5. The operator must always have prepared an alternative means of applying suction to a patient.
6. When treating a patient and operating the MOVES® SLC™ on external power, the operator must always have at least one charged battery installed in the MOVES® SLC™ unit. In the event of an AC power failure, the MOVES® SLC™ unit will immediately switch to battery power.

6.12 RADIO INTERFERENCE

CAUTION! INTERFERENCE MAY OCCUR IN THE VICINITY OF KNOWN RADIO FREQUENCY (RF) TRANSMITTING DEVICES AND EQUIPMENT MARKED WITH THE FOLLOWING SYMBOL:

6.13 BATTERY HANDLING

Please note the following important cautions regarding battery handling:

- The batteries should not be opened, destroyed nor incinerated since they may leak or rupture and release into the environment the ingredients they contain.
- The batteries are designed to be recharged. However, improperly charging a cell or battery may cause the cell or battery to flame.
- Use only the MOVES® SLC™ battery charger (P/N 111422) and MOVES® SLC™ battery charging procedures.
- NEVER disassemble a battery or bypass any safety device.
- Do not crush, pierce, or short battery terminals with conductive (i.e., metal) goods.
- Do not directly heat or solder.
- Do not throw into fire.

6.14 BATTERY DISPOSAL

MOVES® SLC™ batteries are based on Lithium Polymer (LiPo) chemistry. Always dispose of batteries in accordance with local municipal, state, and federal regulations.

WARNING! CHARGING AND DISCHARGING THE LITHIUM POLYMER BATTERIES WITH OTHER THAN MOVES® SLC™ SYSTEM EQUIPMENT, AND/OR IMPROPER HANDLING, CAN RESULT IN FIRE, EXPLOSION, TOXIC GASES AND SMOKE.

WARNING! DO NOT OPERATE THE MOVES® SLC™ SYSTEM WITH A DEFECTIVE BATTERY.

7.0 The Masimo Rainbow SET® Pulse CO-Oximeter

7.1 OVERVIEW

The MOVES® SLC™ uses the Masimo Rainbow SET® Pulse CO-Oximeter to provide non-invasive monitoring that measures arterial oxygen saturation (SpO_2), pulse rate (PR), and perfusion index (PI), along with optional measurements of hemoglobin (SpHb), total oxygen content (SpOC), carboxyhemoglobin (SpCO), methemoglobin (SpMet), and pleth variability index (PVI).

The Masimo Rainbow SET® Pulse CO-Oximeter and accessories have been validated and are indicated for use with pediatric and adult patients during both no motion and motion conditions, and for patients who are well or poorly perfused in hospitals, hospital-type facilities, and transport.

7.2 KEY FEATURES

- Masimo SET® is clinically proven to satisfy all sensitivity and specificity requirements for pulse oximeter technology.
- Rainbow technology uses 7+ wavelengths of light to continuously and noninvasively measure carboxyhemoglobin (SpCO), methemoglobin (SpMet), and total hemoglobin (SpHb), as well as providing a more reliable probe-off detection.
- Total oxygen content (SpOC) provides a calculated measurement of the amount of oxygen in arterial blood, which may provide useful information about oxygen both dissolved in plasma and combined with hemoglobin.
- Pleth Variability Index (PVI) may show changes that reflect physiologic factors such as vascular tone, circulating blood volume, and intrathoracic pressure excursions. [The utility of PVI is unknown at this time and requires further clinical studies. Technical factors that may affect PVI include probe malposition and patient motion.]
- Perfusion Index (PI) with trending capability indicates arterial pulse signal strength and may be used as a diagnostic tool during low perfusion.

7.3 INDICATIONS FOR USE

Masimo Rainbow SET® Pulse CO-Oximeter and accessories are indicated for the continuous noninvasive monitoring of functional oxygen saturation of arterial hemoglobin (SpO_2), pulse rate (PR), carboxyhemoglobin saturation (SpCO), methemoglobin saturation (SpMet) and total hemoglobin concentration (SpHb).

Masimo Rainbow SET® Pulse CO-Oximeter and accessories have been validated and are indicated for use with pediatric and adult patients during both no motion and motion conditions, and for patients who are well or poorly perfused in hospitals, hospital-type facilities and transport.

In addition, the Masimo Rainbow SET® Pulse CO-Oximeter and accessories are indicated to provide continuous noninvasive monitoring data of functional oxygen saturation of arterial hemoglobin (SpO_2) and pulse rate (PR) to multi-parameter devices for the display of those devices.

WARNING! THE MASIMO RAINBOW SET® PULSE CO-OXIMETER IS NOT INTENDED FOR USE AS AN APNEA MONITOR.

7.4 PULSE OXIMETER TECHNOLOGY OVERVIEW

7.4.1 Signal Extraction Technology (SET®)

Masimo Signal Extraction Technology's signal processing differs from that of conventional pulse oximeters. Conventional pulse oximeters assume that arterial blood is the only blood moving (pulsating) in the measurement site. During patient motion, however, the venous blood also moves, causing conventional pulse oximeters to read low values, because they cannot distinguish between the arterial and venous blood movement (sometimes referred to as noise).

Masimo SET® pulse oximetry utilizes parallel engines and adaptive digital filtering. Adaptive filters are powerful because they are able to adapt to the varying physiologic signals and/or noise and separate them by looking at the whole signal and breaking it down to its fundamental components. The Masimo SET signal processing algorithm, Discrete Saturation Transform® (DST®), in parallel with Fast Saturation Transform (FST®), reliably identifies the noise, isolates it and, using adaptive filters, cancels it. It then reports the true arterial oxygen saturation for display on the monitor.

7.4.2 General Description for Oxygen Saturation (SpO_2)

Pulse oximetry is governed by the following principles:

1. Oxyhemoglobin (oxygenated blood) and deoxyhemoglobin (non-oxygenated blood) differ in their absorption of red and infrared light (spectrophotometry).
2. The amount of arterial blood in tissue changes with your pulse (photoplethysmography). Therefore, the amount of light absorbed by the varying quantities of arterial blood changes as well.

7.4.3 Successful Monitoring for SpO_2, PR, and PI

Stability of the SpO_2 readings may be a good indicator of signal validity. Although stability is a relative term, experience will provide a good feeling for changes that are artifactual or physiological and the speed, timing, and behavior of each.

The stability of the readings over time is affected by the averaging mode being used. The longer the averaging time, the more stable the readings tend to become. This is due to a dampened response as the signal is averaged over a longer period of time than during shorter averaging times. However, longer averaging times delay the response of the oximeter and reduce the measured variations of SpO_2 and pulse rate.

7.4.4 Functional Oxygen Saturation

The Masimo Rainbow SET® Pulse CO-Oximeter is calibrated to measure and display functional oxygen saturation (SpO2): the amount of oxyhemoglobin expressed as a percentage of the hemoglobin that is available to transport oxygen.

Note that carboxyhemoglobin is not capable of transporting oxygen, but is recognized as oxygenated hemoglobin by conventional pulse oximetry.

7.4.5 General Description for Pulse Rate (PR)

Pulse rate (PR), measured in beats per minute (BPM), is based on the optical detection of peripheral flow pulse.

7.4.6 General Description for Perfusion Index (PI)

The Perfusion Index (PI) is the ratio of the pulsatile blood flow to the non-pulsatile or static blood in peripheral tissue. PI thus represents a noninvasive measure of peripheral perfusion that can be continuously and noninvasively obtained from a pulse oximeter.

7.4.7 General Description for Pleth Variability Index (PVI)

The pleth variability index (PVI) is a measure of the dynamic changes in the perfusion index (PI) that occur during the respiratory cycle. The calculation is accomplished by measuring changes in the PI over a time interval where one or more complete respiratory cycles have occurred. PVI is displayed as a percentage (0–100%).

The utility of PVI is unknown at this time and requires further clinical studies. Technical factors that may affect PVI include probe malposition and patient motion.

7.4.8 Rainbow Pulse CO-Oximetry Technology

Rainbow Pulse CO-Oximetry technology is governed by the following principles:

1. Oxyhemoglobin (oxygenated blood), deoxyhemoglobin (non-oxygenated blood), carboxyhemoglobin (blood with carbon monoxide content), methemoglobin (blood with oxidized hemoglobin) and blood plasma constituents differ in their absorption of visible and infrared light (using spectrophotometry).
2. The amount of arterial blood in tissue changes with pulse (photoplethysmography). Therefore, the amount of light absorbed by the varying quantities of arterial blood changes as well.

The Masimo Rainbow SET® Pulse CO-Oximeter uses a multi-wavelength sensor to distinguish between oxygenated blood, deoxygenated blood, blood with carbon monoxide, oxidized blood and blood plasma.

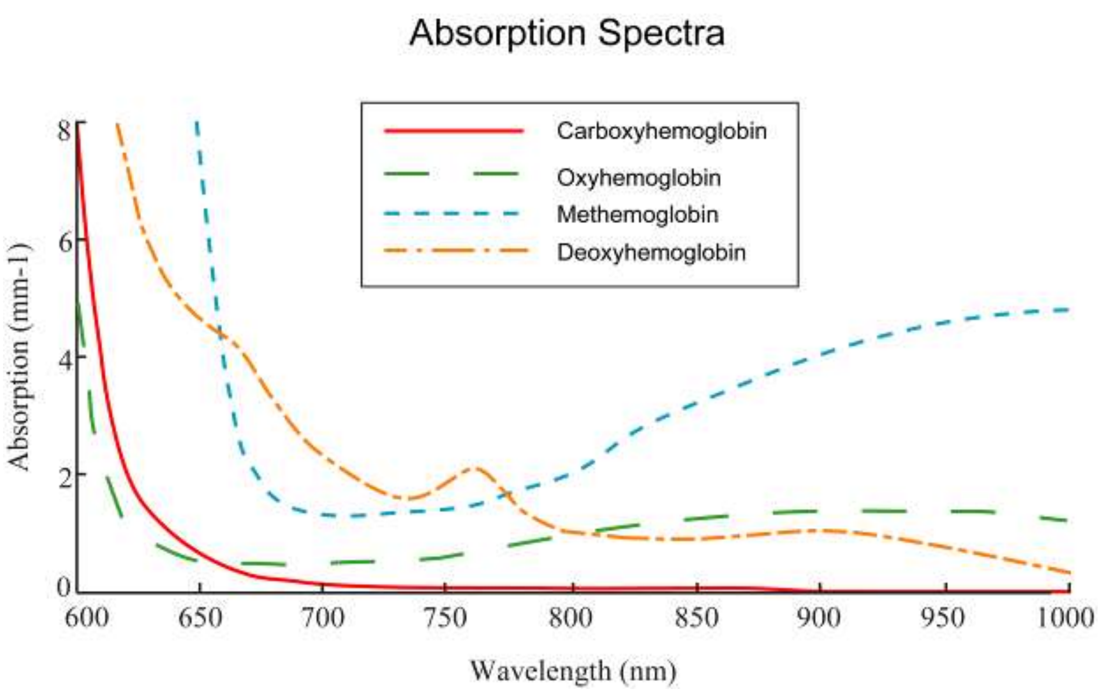
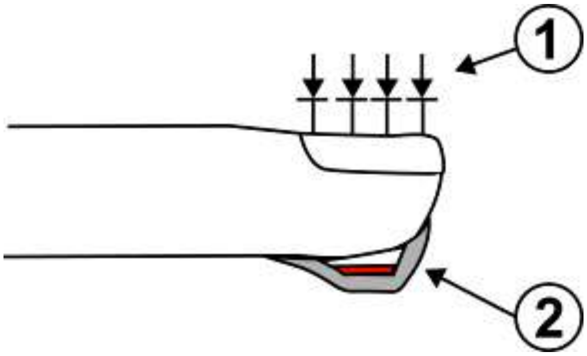


Figure 7-1: Absorption Spectra of Blood Components

NOTE: *The wavelength of blood plasma, which begins near the 1000 nm range and peaks in the 1400 nm range, is omitted from the above graph since most of its wavelength falls outside of the graph parameters.*

The Masimo Rainbow SET® Pulse CO-Oximeter utilizes a sensor with various light-emitting diodes (LEDs) that pass light through the site to a diode (detector). Signal data is obtained by passing various visible and infrared lights (LEDs, 500 to 1400 nm) through a capillary bed (for example, a fingertip, a hand, a foot) and measuring changes in light absorption during the blood pulsatile cycle. This information may be useful to clinicians. The maximum radiant power of the strongest light is rated at ≤ 25 mW. The detector receives the light, converts it into an electronic signal and sends it to the Masimo Rainbow SET® Pulse CO-Oximeter for calculation.



1. Light Emitting Diodes (LEDs) (7 + wavelengths)

2. Detector

Figure 7-2: LEDs and Detector

Once the Masimo Rainbow SET® Pulse CO-Oximeter receives the signal from the sensor, it utilizes proprietary algorithms to calculate the patient's functional oxygen saturation (SpO_2 [%]), blood levels of carboxyhemoglobin (SpCO [%]), methemoglobin (SpMet [%]), total hemoglobin concentration (SpHb [g/dL]) and pulse rate (PR). The SpCO, SpMet and SpHb measurements rely on a multi-wavelength calibration equation to quantify the percentage of carbon monoxide and methemoglobin and the concentration of total hemoglobin in arterial blood. In an ambient temperature of 35º C the maximum skin surface temperature has been measured at less than 106º F (41º C), verified by Masimo sensor skin temperature test procedure.

7.4.9 Pulse CO-Oximetry vs. Drawn Whole Blood Measurements

When SpO_2, SpCO, SpMet, and SpHb measurements obtained from the Masimo Rainbow SET® Pulse CO-Oximeter (noninvasive) are compared to drawn whole blood (invasive) measurements by blood gas and/or laboratory CO-Oximetry methods, caution should be taken when evaluating and interpreting the results.

The blood gas and/or laboratory CO-Oximetry measurements may differ from the SpO_2, SpCO, SpMet, SpHb, and SpOC measurements of the Masimo Rainbow SET® Pulse CO-Oximeter. Any comparisons should be simultaneous, meaning the measurement on the device should be noted at the exact time that blood is drawn.

In the case of SpO_2, different results are usually obtained from the arterial blood gas sample if the calculated measurement is not appropriately corrected for the effects of variables that shift the relationship between the partial pressure of oxygen (PO_2) and saturation, such as: pH, temperature, the partial pressure of carbon dioxide (PCO_2), 2,3-DPG, and fetal hemoglobin. In the case of SpCO, different results are also expected if concentration of methemoglobin in the blood gas sample is abnormal (greater than 2% for methemoglobin concentration).

High levels of bilirubin may cause erroneous SpO_2, SpMet, SpCO, and SpHb readings. As blood samples are usually taken over a period of 20 seconds (the time it takes to draw the blood) a meaningful comparison can only be achieved if the oxygen saturation, carboxyhemoglobin, and methemoglobin concentration of the patient are stable and not changing over the period of time that the blood gas sample is taken. Subsequently, blood gas and laboratory CO-Oximetry measurements of SpO_2, SpCO, SpMet, SpHb, and SpOC may vary with the rapid administration of fluids and in procedures such as dialysis. Additionally, drawn whole blood testing can be affected by sample handling methods and time elapsed between blood draw and sample testing.

Measurements with Low Signal IQ should not be compared to laboratory measurements.

7.4.10 General Description for Total Hemoglobin (SpHb)

Pulse CO-Oximetry is a continuous and noninvasive method of measuring the levels of total hemoglobin (SpHb) in arterial blood. It relies on the same principles of pulse oximetry to make its SpHb measurement. The measurement is taken by a sensor capable of measuring SpHb, usually on the fingertip for pediatric and adult patients.

The sensor connects directly to the Pulse CO-Oximeter or with a patient cable. The sensor collects signal data from the patient and sends it to the instrument. The instrument displays the calculated data as measurement of total hemoglobin concentration.

7.4.11 Successful Monitoring for SpHb

A stable SpHb reading is associated with correct sensor placement, small physiological changes during the measurement and acceptable levels of arterial perfusion at the measurement site. Physiological changes at the measurement site are mainly caused by fluctuations in the oxygen saturation, blood concentration and perfusion.

7.4.12 General Description for SpOC

The following is the equation for oxygen content via the Pulse CO-Oximeter:

$$SpOC\ (ml/dL^*) = 1.31\ (ml\ O_2/g\ Hb) \times SpHb\ (g/dL) \times SpO_2 + 0.3\ ml/dL$$

*When ml O2/g Hb is multiplied by g/dL of SpHb, the gram unit in the denominator of ml/g cancels the gram unit in the numerator of g/dL resulting in ml/dL (ml of oxygen in one dL of blood) as the unit of measure for SpOC.

7.4.13 General Description for Carboxyhemoglobin (SpCO)

Pulse CO-Oximetry is a continuous and noninvasive method of measuring the levels of carboxyhemoglobin concentration (SpCO) in arterial blood. It relies on the same basic principles of pulse oximetry (spectrophotometry) to make its SpCO measurement.

The measurement is obtained by placing a sensor on a patient, usually on the fingertip for pediatric and adult patients. The sensor connects either directly to the Pulse CO-Oximetry instrument or through an instrument patient cable.

The sensor collects signal data from the patient and sends it to the instrument. The instrument displays the calculated data as percentage value for the SpCO, which reflect blood levels of carbon monoxide bound to hemoglobin.

7.4.14 Successful Monitoring for SpCO

A stable SpCO reading is associated with correct sensor placement, small physiological changes during the measurement and acceptable levels of arterial perfusion in the patient's fingertip (measurement site). Physiological changes at the measurement site are mainly caused by fluctuations in the oxygen saturation, blood concentration and perfusion.

7.4.15 General Description for Methemoglobin (SpMet)

Pulse CO-Oximetry is a continuous and noninvasive method of measuring the levels of methemoglobin concentration (SpMet) in arterial blood. It relies on the same basic principles of pulse oximetry (spectrophotometry) to make its SpMet measurement.

The measurement is obtained by placing a sensor on a patient, usually on the fingertip for pediatric and adult patients. The sensor connects either directly to the Pulse CO-Oximetry instrument or through a patient cable. The sensor collects signal data from the patient and sends it to the instrument. The instrument displays the calculated data as percentage value for the SpMet.

7.4.16 Successful Monitoring for SpMet

A stable SpMet reading is associated with correct sensor placement, small physiological changes during the measurement and acceptable levels of arterial perfusion in the patient's fingertip (measurement site).

Physiological changes at the measurement site are mainly caused by fluctuations in the oxygen saturation, blood concentration and perfusion.

7.4.17 SpCO, SpMet, and SpHb Measurements During Patient Motion

The MOVES® SLC™ displays measurements of SpCO, SpMet, and SpHb during patient motion. However, because of the changes in the physiological parameters such as blood volume, arterial-venous coupling, etc., that occur during patient motion, the accuracy of such measurements may not be reliable during excessive motion. In this case, the measurement value for SpCO, SpMet, or SpHb displays as dashes (---) and a message displays to alert the clinician that the instrument does not have confidence in the value due to poor signal quality caused by excessive motion or other signal interference.

8.0 Troubleshooting the Masimo Pulse Oximeter

The following chapter contains information about troubleshooting the pulse oximeter.

8.1 TROUBLESHOOTING MEASUREMENTS

The operation of the Pulse Oximeter can be verified by using a function simulator such as the Fluke ProSim 8 Vital Signs Simulator with the ProSim RAINBOW test cable (#4034609).

For more information, see *Masimo Rainbow SET® Pulse CO-Oximeter Warnings beginning on page 41*.

8.2 LOW MEASUREMENT CONFIDENCE

The Pulse CO-Oximeter maintains an internal measure of the signal quality of each of the displayed parameters (i.e., SpO_2, HR, PI, SpCO, SpMet, etc). When the signal quality is low enough, the accuracy of the displayed measurement may be compromised. A low confidence alarm is generated for the parameter with low signal quality to indicate that the measurement accuracy may be compromised (e.g., for SpO2 the alarm "PulseOx: SpO2 reading confidence poor" is generated). This will also cause the parameter to be highlighted.

When parameters have associated low confidence alarms, proceed with caution and do the following:

- Assess the patient.
- Check the sensor and ensure proper sensor application. The sensor must be well secured to the site for the Pulse CO-Oximeter to maintain accurate readings. Misalignment of the sensor's emitter and detector can result in smaller signals and cause erroneous readings.
- Determine if an extreme change in the patient's physiology and blood flow at the monitoring site occurred, (e.g., an inflated blood-pressure cuff, a squeezing motion, sampling of an arterial blood specimen from the hand containing the pulse oximetry sensor, severe hypotension, peripheral vasoconstriction in response to hypothermia, medications, or an episode of Raynaud's syndrome.)
- After performing the above, if the low perfusion and/or low confidence alarm(s) occur frequently or continuously, obtaining an arterial blood specimen for CO-Oximetry analysis may be considered to verify the oxygen saturation value.

8.3 LOW PERFUSION

It has been suggested that at extremely low perfusion levels, pulse oximeters can measure peripheral saturation, which may differ from central arterial saturation This "localized hypoxemia" may result from the metabolic demands of other tissues extracting oxygen proximal to the monitoring site under conditions of sustained peripheral hypoperfusion. This may occur even with a pulse rate that correlates with the ECG heart rate.

8.4 LOW SIGNAL QUALITY

Improper sensor type or application.

Next steps: Excessive motion relative to perfusion. Sensor is damaged or not functioning. Check and see if blood flow to the site is restricted. Check the placement of the sensor. Reapply sensor or move to a different site.

8.5 SPO2 VALUES DO NOT CORRELATE WITH CLINICAL ASSESSMENT OR ARTERIAL BLOOD GAS MEASUREMENTS

Low perfusion or sensor displacement.

Next steps: Check for pulse oximeter alarm messages. See *Alarm Conditions and Causes beginning on page 230*. Check placement of sensor or if it is too tight. Reapply sensor or select a new site. Set to MAX sensitivity and confirm that the sensor is securely on the patient. See the directions for use provided with your sensor.

8.6 UNEXPECTED SPO2, SPCO, SPMET, OR SPHB READING

- Low SIQ or PI values.

Next steps: Reposition sensor to site with strong SIQ and PI. Average readings taken from three different sites to improve accuracy. Submit blood sample for laboratory CO-Oximetry test for comparison.

- Inappropriate sensor size or sensor measurement location.

Next steps: Verify proper sensor for patient size. Verify proper sensor site.

8.7 UNEXPECTEDLY HIGH SPCO READING

Possible elevated methemoglobin level.

Next steps: Submit blood sample for laboratory CO-Oximetry test.

8.8 DIFFICULTY OBTAINING A READING

- Interference from line frequency induced noise.

Next steps: Verify/set 50/60 Hz Line Filter setting. See the section *Advanced Screen on page 146*.

- Inappropriate sensor or sensor size.

Next steps: Verify proper sensor and sensor size for the patient.

- Excessive ambient or strobing light.

Next steps: Shield the sensor from excessive or strobing light. Minimize or eliminate motion at the monitoring site.

8.9 SPCO READING DISPLAYS AS DASHES

- SpO2 value below 90%

Next steps: Assess/address patient condition.

- SpMet value greater than 2%

Next steps: Laboratory analysis of a blood sample should be performed.

9.0 Getting Started

The following section provides information and instructions on installing and connecting various parts and accessories and preparing the MOVES® SLC™ for activation.

CAUTION! THESE ACTIVITIES SHOULD BE CARRIED OUT ONLY BY AUTHORIZED / TRAINED PERSONNEL.

9.1 MOVES® SLC™ SYSTEM CONTENTS

9.1.1 MOVES® SLC™ Accessories and Remote Screen Warnings and Cautions

Table 16: MOVES® SLC™ Accessories Warnings and Cautions

	WARNING! ALWAYS CARRY BACKUPS OF ACCESSORIES SUCH AS CARTRIDGES AND FILTERS.
	WARNING! IF LEFT IN A HOT ENVIRONMENT OR DIRECT SUNLIGHT FOR A CONSIDERABLE LENGTH OF TIME, THE MOVES® SLC™ ACCESSORIES CAN BECOME QUITE HOT. MONITORING OF TEMPERATURE IS RECOMMENDED. ALWAYS MAKE SURE THAT ACCESSORIES THAT WILL BE APPLIED DIRECTLY TO THE PATIENT ARE SUITABLE FOR SKIN CONTACT AND WILL NOT CAUSE BURNS.
	WARNING! IN THE EVENT OF DISAGREEMENT BETWEEN THE DEVICE AND THE REMOTE SCREEN THE DEVICE SHALL BE CONSIDERED CORRECT.
	WARNING! IF THE REMOTE SCREEN BECOMES INOPERABLE, LOCKS UP OR BEHAVES ERRATICALLY, IT SHOULD NO LONGER BE USED AND BE DISCONNECTED FROM THE SYSTEM.
	CAUTION! SOME PATIENT MONITORING ACCESSORIES MAY NOT FUNCTION PROPERLY, OR MAY RELAY INACCURATE READINGS, IF OPERATED OUTSIDE OF THEIR NORMAL OPERATING CONDITIONS.
	CAUTION! USE ONLY ACCESSORIES THAT ARE PROVIDED OR AUTHORIZED BY THORNHILL RESEARCH INC!
	CAUTION! THE MOVES® SLC™ ACCESSORIES PROVIDED BY THORNHILL RESEARCH INC. ARE FOR USE ONLY WITH THE MOVES® SLC™ SYSTEM.
	CAUTION! ALL MOVES® SLC™ ACCESSORIES' PACKAGING SHOULD BE DISPOSED OF RESPONSIBLY IN ACCORDANCE WITH LOCAL WASTE DISPOSAL STANDARDS AND / OR LOCAL BIOHAZARD REGULATIONS.

NOTE: *Where applicable, refer to accessories documentation for specific instructions for use, warnings, storage and operating guidelines.*

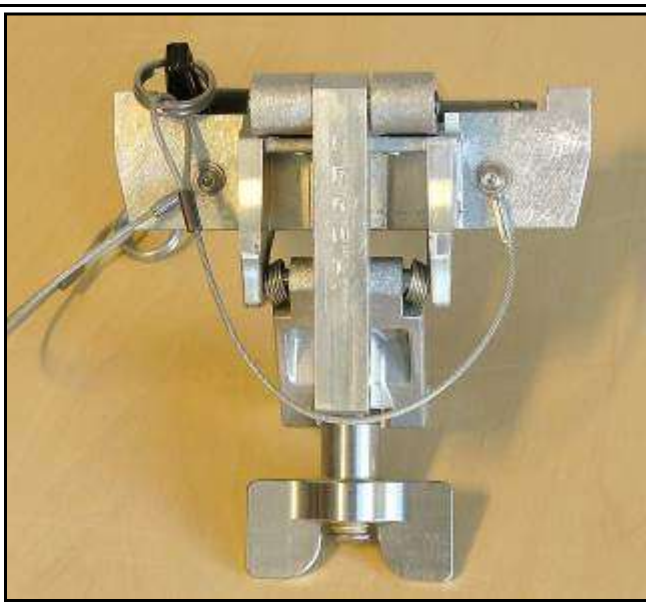
9.1.2 System Contents

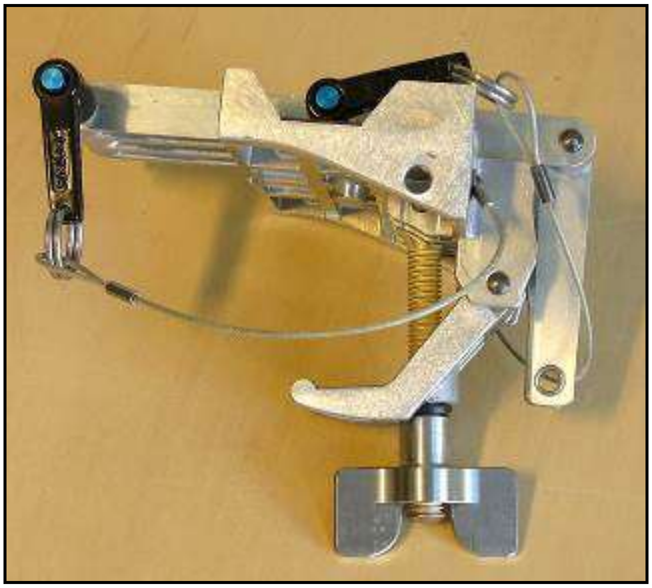
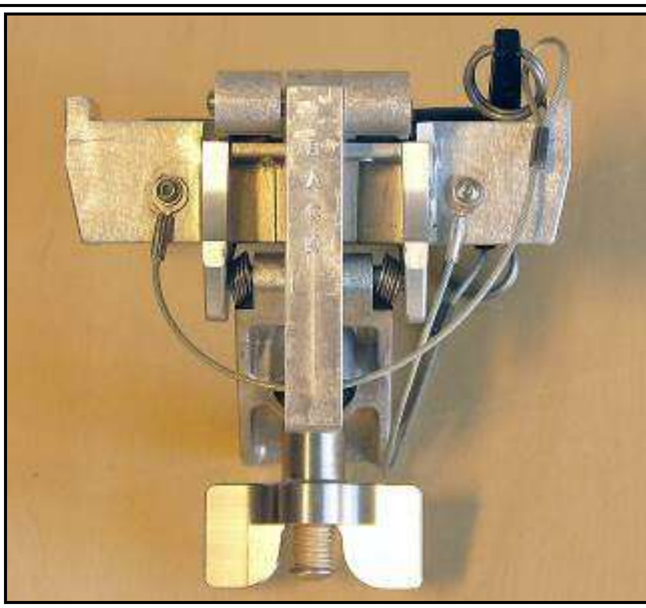
***NOTE:** All items listed in the following table are **multiple use items**. They are intended to be **reused**.*

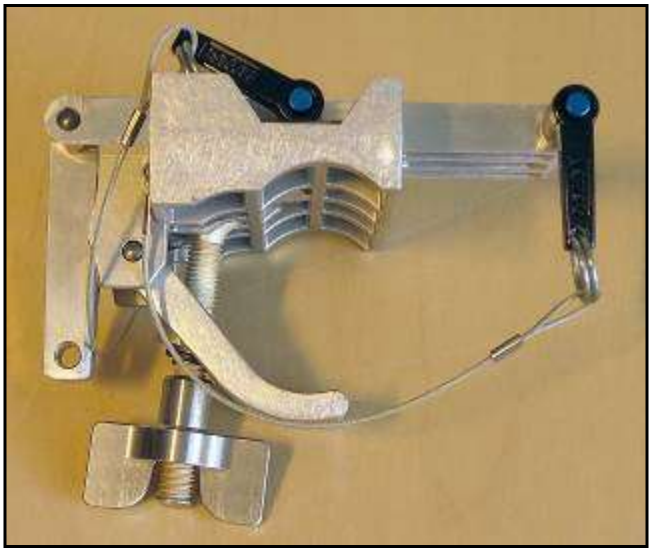
Table 17: MOVES® SLC™ System Contents

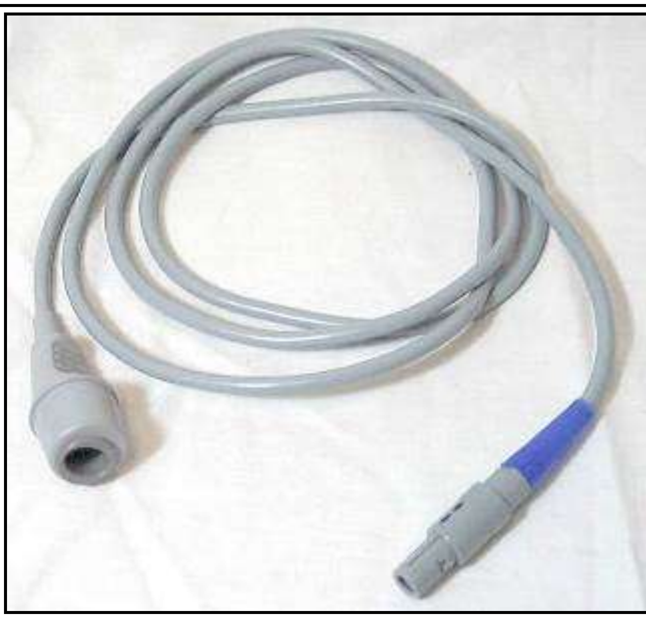
PICTURE	TRI P/N	DESCRIPTION
	122752	MOVES® SLC™ System **Manufacturer:** Thornhill Research Inc.
	111422	Power Supply / Battery Charger (both together in single unit) and AC cable. **Manufacturer:** Thornhill Research Inc.

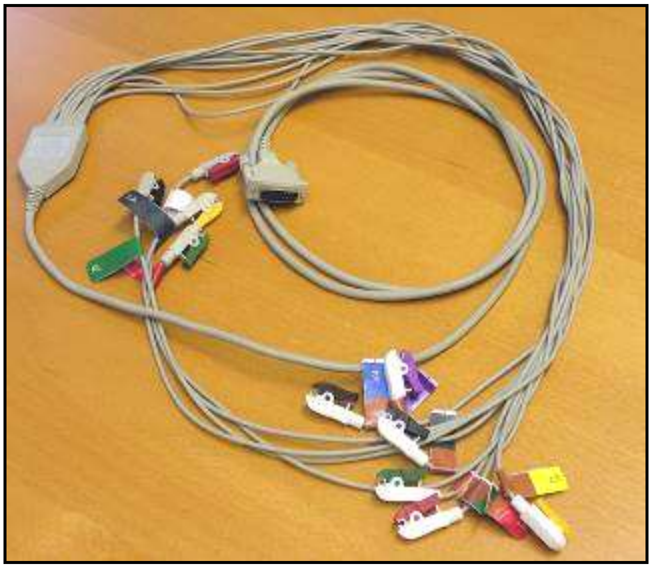
PICTURE	TRI P/N	DESCRIPTION
	122985	Battery (2) **Manufacturer:** Thornhill Research Inc.
	101238	Suction Canister Holder **Manufacturer:** Thornhill Research Inc.

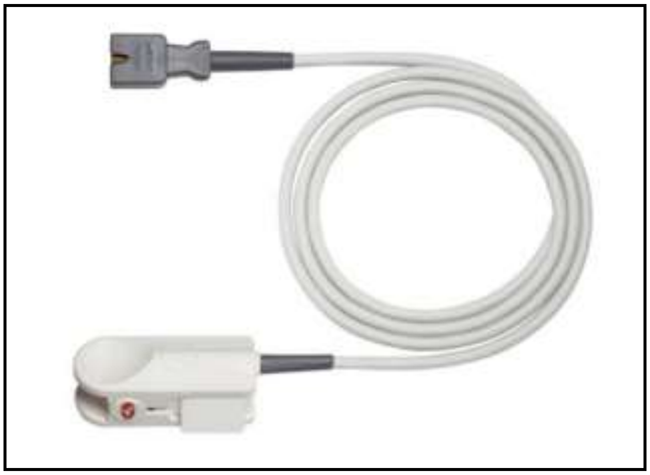
PICTURE	TRI P/N	DESCRIPTION
	111462	Shoulder Strap **Manufacturer:** Thornhill Research Inc.
 **Front Clamp – Rear View**	124566	Front Clamp **Manufacturer:** Thornhill Research Inc. ***NOTE:*** *The front clamp can be distinguished by its <u>flat</u> bottom portion near the locking mechanism. It is labeled FRONT.*

PICTURE	TRI P/N	DESCRIPTION
 Front Clamp – Side View		
 Back Clamp – Rear View	124565	Back Clamp **Manufacturer:** Thornhill Research Inc. ***NOTE:*** *The back clamp can be distinguished by its curved bottom portion near the locking mechanism. It is labeled BACK.*

PICTURE	TRI P/N	DESCRIPTION
 **Back Clamp – Side View**		
	126024	Sensor, NIBP Cuff Child: 12-19 cm **Manufacturer:** SunTech Medical, (K051904) PN # 98-0080-02
	100832	Sensor, NIBP Cuff Small Adult 17–25 cm **Manufacturer:** SunTech Medical, (K051904) PN # 98-0080-04
	100834	Sensor, NIBP Cuff Adult 23–33 cm **Manufacturer:** SunTech Medical, (K051904) PN # 98-0080-06
	100836	Sensor, NIBP Cuff Large Adult 31–40 cm **Manufacturer:** SunTech Medical, (K051904) PN # 98-0080-08
	100838	Sensor, NIBP Cuff Thigh 38-50 cm **Manufacturer:** SunTech Medical, (K051904) PN # 98-0080-10

PICTURE	TRI P/N	DESCRIPTION
	124848	NIBP Extension Cable – 3 m (with Lemo connector) **Manufacturer:** Thornhill Research Inc.
	101048	ABP/CVP/ICP Cable Set **Manufacturer:** Thornhill Research Inc.

	125350	12 Lead ECG Cable **Manufacturer:** Thornhill Research Inc.
	125352	LNCS Patient Cable Red LNC-4, 4 ft. (for SpO_2 Finger Clip, SpO_2 Ear Clip and SpO_2 Adhesive Sensors) **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: Red LNC-4 PN # 2055

	125351	Adult SpO_2 (only) Finger Clip **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: LNCS DCI, 3 ft. PN # 1863 ***NOTE:*** *Red LNC-4 adapter cable required.*
	126019	Pediatric SpO_2 (only) Finger Clip **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: LNCS DCIP, 3 ft. PN # 1864 ***NOTE:*** *Red LNC-4 adapter cable required.*
	125355	SpO_2 Ear Clip **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: LNCS TC-I, 3 ft. PN # 1895 ***NOTE:*** *Red LNC-4 adapter cable required.* ***NOTE:*** *Sensor has not been validated under motion conditions.* ***NOTE:*** *Sensor is contraindicated for patients with pierced ears at the measuring site.*

	125354	Adult SpO_2, SpCO & SpMet Finger Clip **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: Rainbow® DCI-dc3, 3 ft. PN # 2201 ***NOTE:*** *Requires activation of optional SpCO and/or SpMet parameter support on MOVES® SLC™ system before SpCO and/or SpMet measurements can be taken.* ***NOTE:*** *Can be used to measure only* SpO_2 *if optional SpCO and/or SpMet features have not been activated on MOVES® SLC™ system.*
	126020	Pediatric SpO_2, SpCO & SpMet Finger Clip **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: Rainbow® DCIP-dc3, 3 ft. PN # 2069 ***NOTE:*** *Requires activation of optional SpCO and/or SpMet parameter support on MOVES® SLC™ system before SpCO and/or SpMet measurements can be taken.* ***NOTE:*** *Can be used to measure only SpO2 if optional SpCO and/or SpMet features have not been activated on MOVES® SLC™ system.*

	125732	Rainbow® Patient Cable Rainbow® RC-4 (for Adhesive Sensors), 4 ft. **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: Rainbow® RC-4 PN # 2406
	101113	Ancra Single Stud **Manufacturer:** Thornhill Research

PICTURE	TRI P/N	DESCRIPTION
	124849	Temperature Probe **Manufacturer:** Exacon Scientific, K820153 • D-OS4A (adult with connector type A) • D-OS3A (pediatric with connector type A)
	124241	Nafion Tube **Manufacturer:** Thornhill Research Inc.

PICTURE	TRI P/N	DESCRIPTION
	125743	O_2 Outlet Sampling Adaptor **Manufacturer:** Thornhill Research Inc.
	124826	MOVES® SLC™ Operator's Manual **Manufacturer:** Thornhill Research Inc.

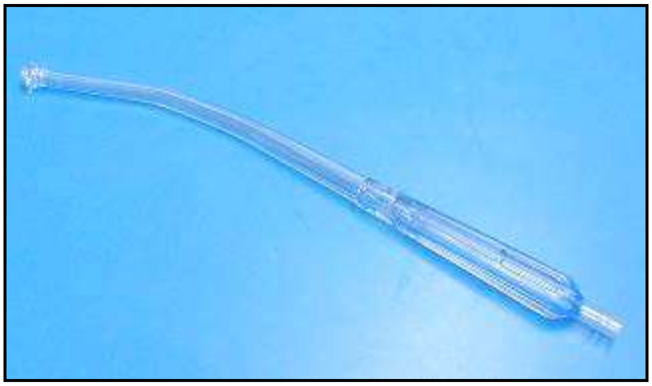
PICTURE	TRI P/N	DESCRIPTION
	126108	MOVES® SLC™ Anesthesia Kit **Manufacturer:** Thornhill Research Inc. This kit contains the following: • MADM™ / MOVES® SLC™ Communication Cable (P/N 126111) • Scavenger Port (P/N 125830) • Flush Button (P/N 126109)

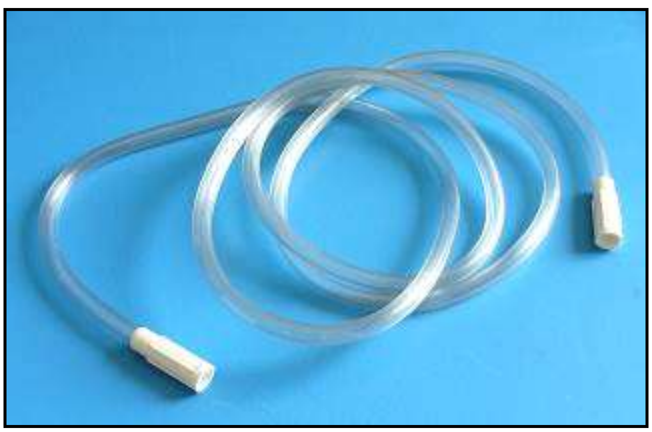
9.2 MOVES® SLC™ CONSUMABLES

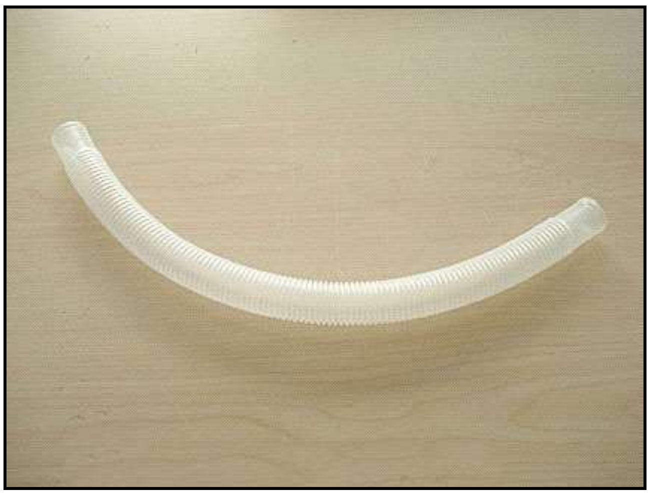
NOTE: *All consumables listed in the table below are **single patient use items**. They are **not intended** to be **reused**.*

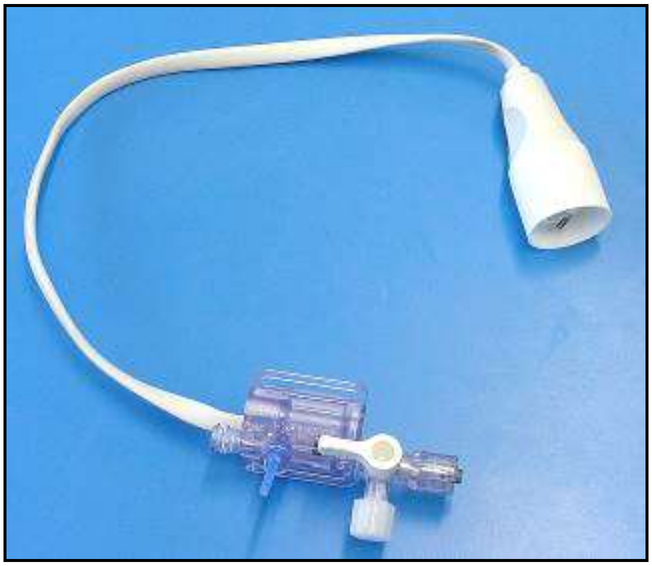
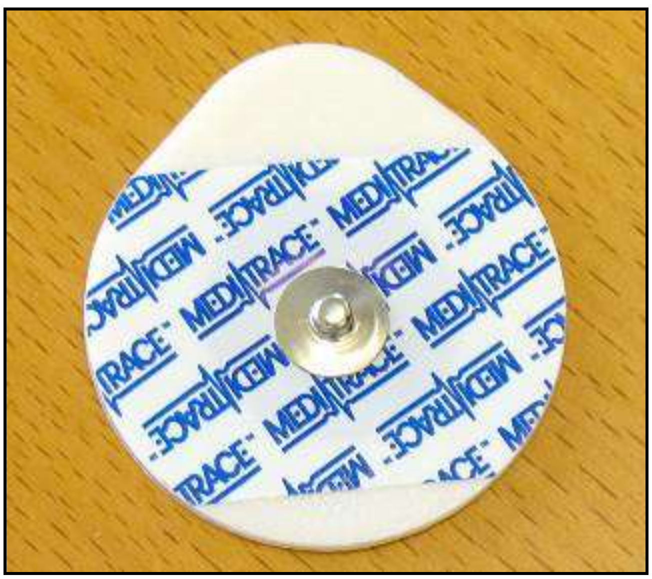
Table 18: MOVES® SLC™ Consumables

PICTURE	TRI P/N	DESCRIPTION
	124831 125979	Ventilator Cartridge, SLC **Manufacturer:** Thornhill Research Inc. Ventilator Cartridge, SLC, 6 pack
	101114 124359	Suction Canister **Manufacturer:** Bemis Health Care, K771737, PN # 424410 Suction Canister, 10 pack

	111458	Suction Wand, Yankauer – FDA
		Manufacturer: Cardinal Healthcare, PN # K82\
	124358	Suction Wand, Yankauer, 10 pack
	125168	Suction Wand, Yankauer, Yankauer – CE
		Manufacturer: Covidien PLC, 8888505024
	125171	Suction Wand, Yankauer – CE, 10 pack
	100915	Hydrocarbon Filter
		Manufacturer: Airgas Inc. PN # 815182
	124354	Hydrocarbon Filter, 6 pack

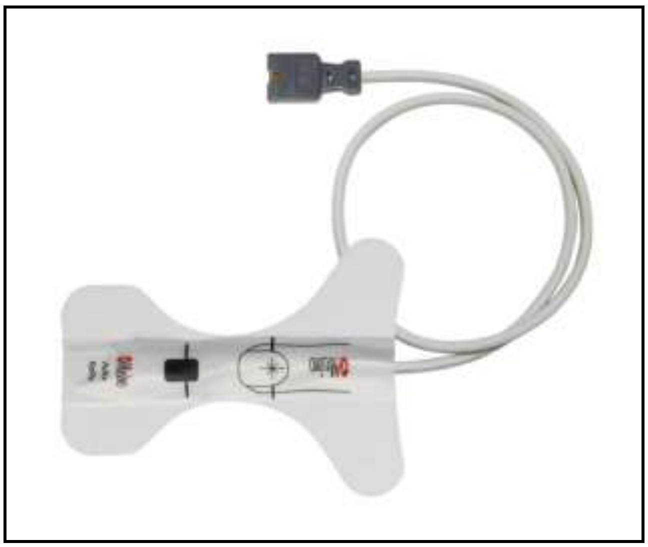
	101243 124355 125166 125169	Tube, Suction (short, canister to system) – FDA **Manufacturer:** Cardinal Health Canada, PN # 52A Tube, Suction (short, canister to system) – FDA, 10 pack Tube, Suction (short, canister to system) – CE **Manufacturer:** Covidien PLC, 8888301507 Tube, Suction (short, canister to system) – CE, 10 pack ***NOTE:*** *Only one of the above types will be included depending on customer location.*
	101244 124356 125167 125170	Tube, Suction (long, canister to patient) – FDA **Manufacturer:** Cardinal Health Canada, PN # 66A Tube, Suction (long, canister to patient) – FDA, 10 pack Tube, Suction (long canister to patient) – CE **Manufacturer:** Covidien PLC, 8888301606 Tube, Suction (long canister to patient) – CE, 10 pack ***NOTE:*** *Only one of the above types will be included depending on customer location.*

	101210 124352	Ventilator Breathing Circuit **Manufacturer:** Thornhill Research Inc. Ventilator Breathing Circuit , 12 pack ***NOTE:*** *Nafion tube is shown attached – this tube is NOT included in the breathing circuit packaging but should be attached prior to use.*
	126259	Ventilator tubing extension for use with MADM™ anesthetic delivery module. **Manufacturer:** Thornhill Research Inc.
	125245	Pediatric Breathing System Filter **Manufacturer: PALL Medical, PN # BB25** ***NOTE:*** *Use as a replacement filter in MOVES® SLC™ Ventilator Breathing Circuit (101210) when ventilating patients under 30 kg or tidal volumes under 150 mL.*

	111520 124357 125164 125172	Pressure Transducer for ABP/CVP/ICP Set – US-FDA K832907 **Manufacturer:** Edwards Lifesciences, PN # PX260 Pressure Transducer for ABP/CVP/ICP Set – US-FDA , 10 pack Pressure Transducer for ABP/CVP/ICP Set – CE **Manufacturer:** Edwards Lifesciences, PN # T100209A Pressure Transducer for ABP/CVP/ICP Set – CE, 10 pack ***NOTE:*** *Only one of the above types will be included depending on customer location.*
	124834	ECG Adhesive Pads **Manufacturer:** Kendall Medi-Trace™ 530 P/N # 31013926 Pack of 30 pads

	125739	Adult SpO_2, SpHb & SpMet Adhesive Sensor K110028 **Manufacturer:** Masimo Corporation, Prod. Ref: Rainbow® R1 25 PN # 2416 Box of 10 ***NOTE:*** *Rainbow® RC-4 adapter cable required.* ***NOTE:*** *Requires activation of optional SpHb parameter support on MOVES® SLC™ system.*
	125740	Adult SpO_2, SpCO & SpMet Adhesive Sensor (Single Patient Use) **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: Rainbow® R25 PN # 2221 Box of 10 ***NOTE:*** *Rainbow® RC-4 adapter cable required.* ***NOTE:*** *Requires activation of optional SpCO and/or SpMet parameter support on MOVES® SLC™ system before SpCO and/or SpMet measurements can be taken.* ***NOTE:*** *Can be used to only measure SpO_2 if optional SpCO and/or SpMet features have not been activated on MOVES® SLC™ system.*

	126021	Pediatric SpO_2, SpCO & SpMet Adhesive Sensor (Single Patient Use) **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: Rainbow® R20 PN # 2222 Box of 10 ***NOTE:*** *Rainbow® RC-4 adapter cable required.* ***NOTE:*** *Requires activation of optional SpCO and/or SpMet parameter support on MOVES® SLC™ system before SpCO and/or SpMet measurements can be taken with this sensor, respectively.* ***NOTE:*** *Can be used to only measure SpO_2 if optional SpCO and/or SpMet features have not been activated on MOVES® SLC™ system.*
	125739	Adult SpO_2, SpHb & SpMet Adhesive Sensor (Single Patient Use) **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: Rainbow® R1 25 PN # 2416 Box of 10 ***NOTE:*** *Rainbow® RC-4 adapter cable required.* ***NOTE:*** *Requires activation of optional SpHb parameter support on MOVES® SLC™ system in order for any SpO2, SpMet or SpHb measurements to be made with this sensor.*

	126022	Pediatric SpO_2, SpHb & SpMet Adhesive Sensor (Single Patient Use) **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: Rainbow® R1 20 PN # 2417 Box of 10 ***NOTE:*** *Rainbow® RC-4 adapter cable required.* ***NOTE:*** *Requires activation of optional SpHb parameter support on MOVES® SLC™ system in order for any SpO2, SpMet or SpHb measurements to be made with this sensor.*
	125357	Adult SpO_2 Adhesive Sensor (Single Patient Use) **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: LNCS Adtx-3, 3 ft. PN # 2317 Box of 20 ***NOTE:*** *Red LNC-4 adapter cable required.*

	126023	Pediatric SpO_2 Adhesive Sensor (Single Patient Use) **Manufacturer:** Masimo Corporation, K110028 Prod. Ref: LNCS Pdtx-3, 3 ft. PN # 2318 Box of 20 ***NOTE:*** *Red LNC-4 adapter cable required.*

9.3 LIFTING THE MOVES® SLC™

NOTE: *It is recommended that two people lift MOVES® SLC™.*

The MOVES® SLC™ has a handle at the front and a recessed slot at the back which should be used when lifting the unit. The position of these features is shown in the illustration below, and the features themselves are shown in the photos following the illustration.

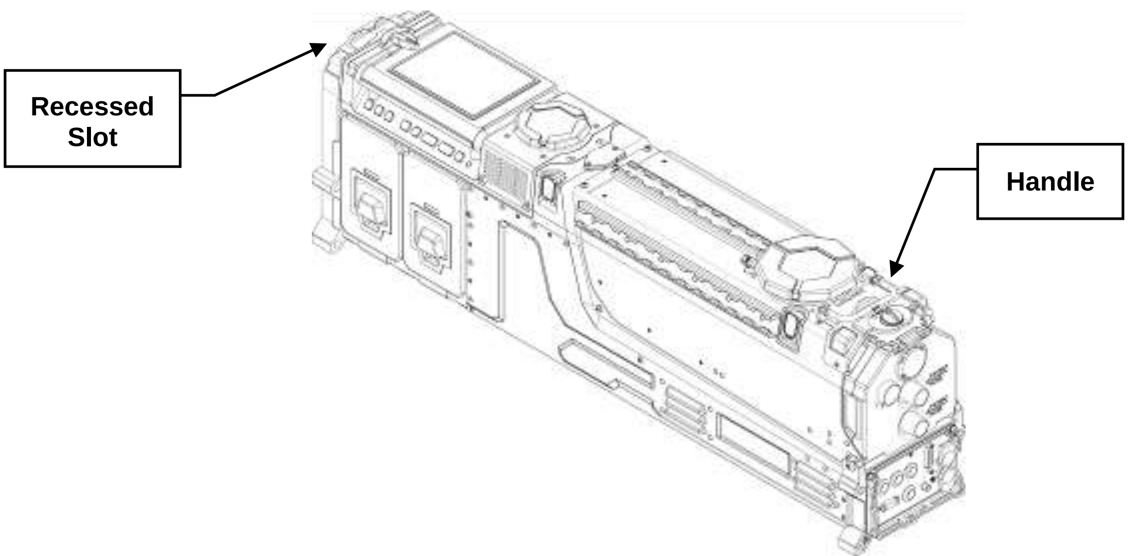


Figure 9-1: Lifting Points on MOVES® SLC™

Figure 9-2: Lifting Slot

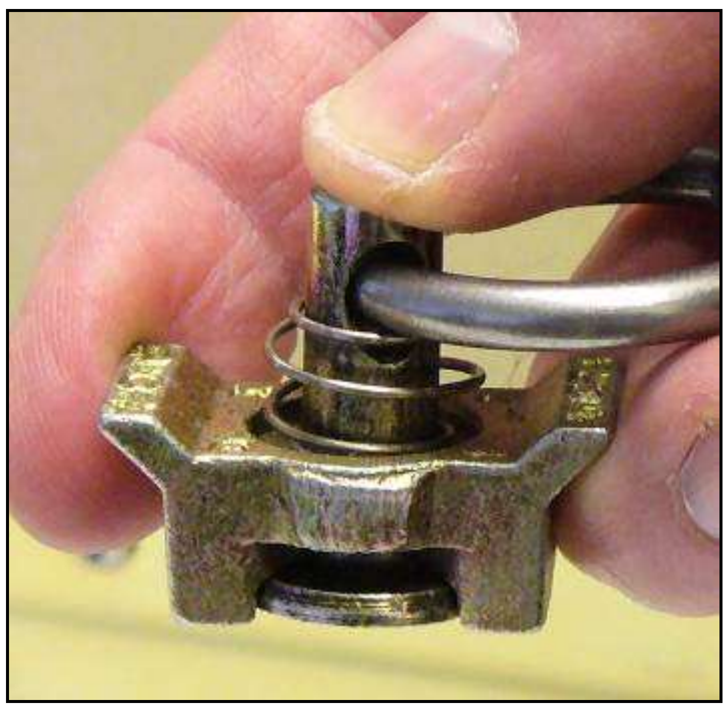
Figure 9-3: Lifting Handle

CAUTION! THE MOVES® SLC™ WEIGHS APPROXIMATELY 37.5 LBS. BE SURE TO FOLLOW PROPER LIFTING PROCEDURES WHEN LIFTING THE MOVES.

9.4 ATTACHING THE SHOULDER STRAP TO MOVES® SLC™

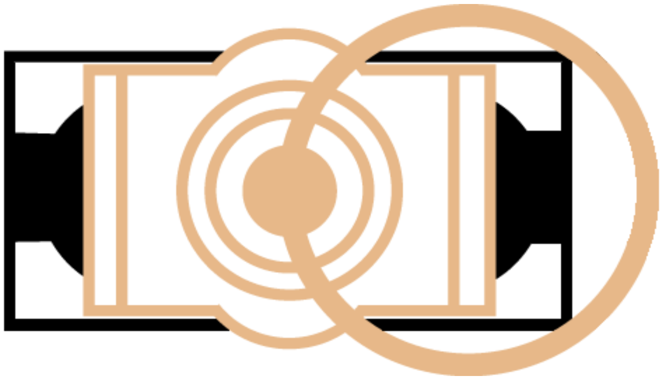
NOTE: *The shoulder strap supplied with the MOVES® SLC™ is attached using two Ancra Single Stud anchors. To attach the shoulder strap, the two stud anchors supplied with the MOVES® SLC™ must be attached first and then the shoulder strap is clipped to them.*

1. To begin, depress the pin in one of the Ancra Single Stud anchors.



2. Slide the anchor along one of the short rails at either end of MOVES® SLC™ until it is in the center position.

3. The anchor will lock into place in the space between the two circular openings in the row (as shown in the illustration at the right).



4. Repeat the above actions for a second stud at the other end of MOVES® SLC™.

5. Attach the clips on the two ends of the shoulder strap to the two anchors now fastened to MOVES® SLC™.

6. Strap attached to MOVES® SLC™.

9.5 ATTACHING CLAMPS TO THE MOVES® SLC™

Clamps can be attached to the MOVES® SLC™ which can then enable it to be clamped to a gurney, bed frame or stretcher to enable patient transport.

CAUTION! ALWAYS MAKE SURE THAT MOVES® SLC™ IS CLAMPED AND FULLY SECURED WHEN IN USE.

WARNING! THE CLAMPS HAVE NUMEROUS MOVING PARTS THAT MAY PRESENT A PINCHING OR CRUSHING HAZARD. ALWAYS USE CAUTION WHEN HANDLING BOTH THE FRONT AND BACK CLAMPS.

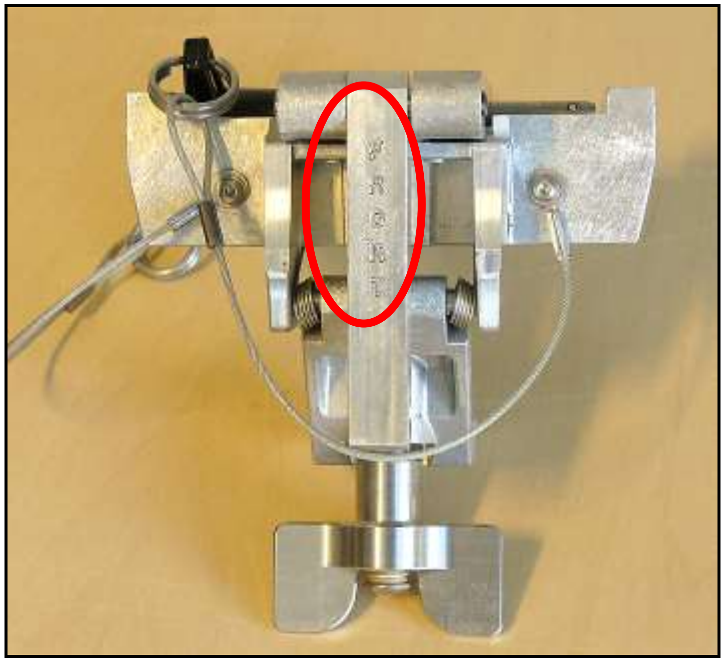
1. To begin, orient the MOVES® SLC™ with the FRONT to the operator's left.

NOTE: *The FRONT is where the ventilator cartridge is inserted and the patient connections panel is located.*

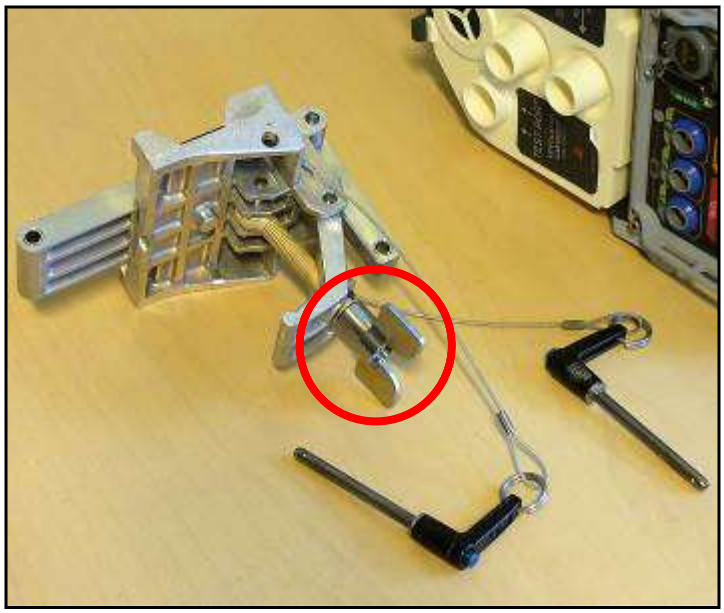
2. Next, lay the MOVES® SLC™ on its side.

3. Locate the FRONT clamp for the MOVES® SLC™.

NOTE: *The word FRONT is embossed on it.*

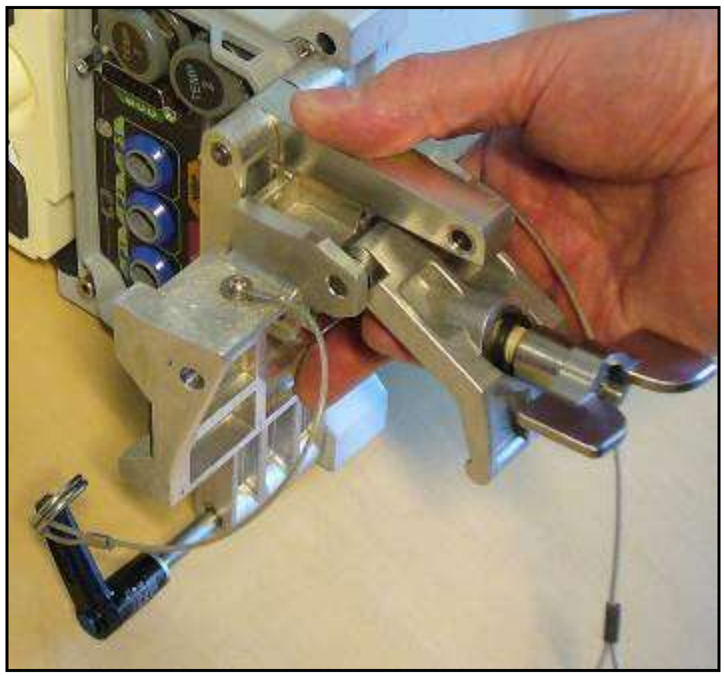


4. Undo the large wing bolt to its furthest extent (by turning it counterclockwise) to open the jaw of the clamp as wide as possible.

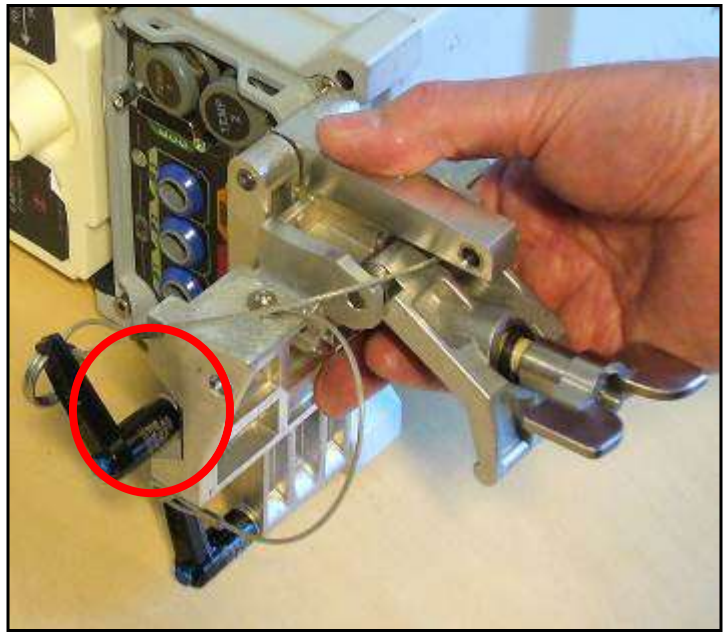


5. Orient the clamp as shown in the photo at right. It should nestle snugly against the side of the MOVES® SLC™.

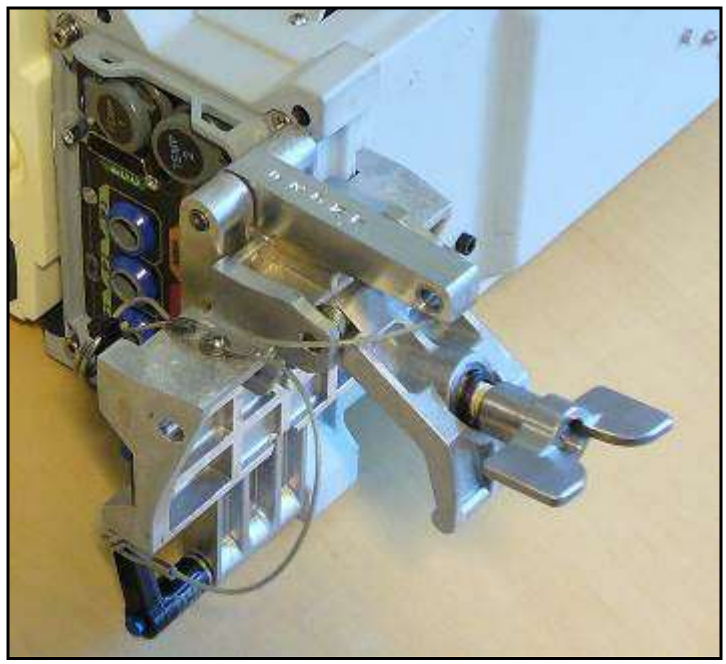
6. Insert the pin attached to the left of the clamp in the slot shown in the photo at right. Press the blue pin button while inserting the pin. Make sure the pin inserts fully into its intended slot (see photo following).



7. Now, insert the pin attached to the right of the clamp in the upper slot shown in the photo at right. Press the blue pin button while inserting the pin. Make sure the pin inserts fully into its intended slot.



8. The fully mounted FRONT clamp is shown in the photo at right. Repeat the above procedure to mount the BACK clamp at the other end of the MOVES® SLC™.



NOTE: *Do not worry if the clamps feel slightly loose. When they are clamped to a gurney, bed rail or stretcher, the lateral object to which they are clamped adds the required reinforcement.*

9.6 PATIENT MONITORING ACCESSORIES

This section briefly describes how the patient monitoring accessories are to be connected to the MOVES® SLC™ unit. The operator must thoroughly read all of the procedures contained within this manual and must fully understand the MOVES® SLC™ system operation before connecting the system to a patient. Prior to connecting the system to a patient, the operator must have alternative methods of treating the patient available should a power or mechanical failure occur.

WARNING! DO NOT CONNECT ANY MONITORS TO PATIENT WHILE PERFORMING SYSTEM TESTS! DOING SO COULD ENDANGER THE PATIENT!

CAUTION! USE ONLY ACCESSORIES PROVIDED WITH THE MOVES® SLC™ SYSTEM!

All MOVES® SLC™ patient monitors are connected to the patient connection panel (pictured below) as indicated by the labels.

Figure 9-4 : Patient Connection Panel

NOTE: *The unlabeled port between the Gas Sample port and the Temp 2 cover is the Calibration port.*

NOTE: *The unlabeled port above IP 3 is the Barometric Sensing port.*

Table 19: Patient Connector Labels and Accessories

CONNECTOR LABEL	ACCESSORY
GAS SAMPLE	Sampling line Luer connection
ECG	Electrocardiogram – 12 Lead – TRI
NIBP	Non-invasive blood pressure – SunTech
Temp 1 & Temp 2	Temperature – Exacon Scientific
IP 1–3	Ports can be interchangeably used for any of the following:

CONNECTOR LABEL	ACCESSORY
	ABP — Arterial Blood Pressure transducer (Edwards TruWave PX Series) CVP — Central Venous Pressure transducer (Edwards TruWave PX Series) ICP — Intracranial Pressure transducer (Edwards TruWave PX Series)
SpO_2	Pulse CO-Oximeter – Masimo Corporation
Barometric Sensing Port	No connectors are fitted to this port. Do Not Block.
Calibration Port	No connectors are fitted to this port. Do Not Block.

9.7 INSTALLING THE VENTILATOR CARTRIDGE AND BREATHING CIRCUIT

WARNING! LEAKS IN THE SAMPLING LINE CAN CAUSE LOW pCO_2 AND/OR LOW O_2 LEVELS.

9.7.1 About the Ventilator Cartridge

The Ventilator Cartridge is intended to be used with the MOVES® SLC™ system to provide positive pressure ventilation for patients who are *intubated*. MOVES® SLC™ recycles exhaled oxygen. This cartridge contains CO_2 absorbent material to remove CO_2 from any re-breathed gas. Because this material has a *shelf life*, there is an expiry date printed on the package label of the Ventilator Cartridge. Always check the expiry date on the Ventilator Cartridge before using it to make sure that the Ventilator Cartridge has not expired. As well, monitor your supply of spare cartridges with regard to their remaining "shelf life".

NOTE: *The Ventilator Cartridge should be kept in its packaging until use.*

The Ventilator Cartridge is:

- For use with the ventilator breathing circuit, which includes the ventilator hoses, patient filter, endotracheal tube connector, and sampling line.
- For single patient use ONLY. The cartridge should be discarded and replaced between patients, or when MOVES® SLC™ triggers an audible or visual alarm indicating that the level of CO_2 in the system is above 6 mmHg on inspiration.

WARNING! FAILURE TO CHANGE THE VENTILATOR CARTRIDGE WHEN INDICATED MAY LEAD TO THE PATIENT'S SUFFERING FROM AN INCREASE IN INSPIRED CO_2.

NOTE: *Used breathing cartridges and breathing circuits should be disposed of in accordance with local biohazard regulations.*

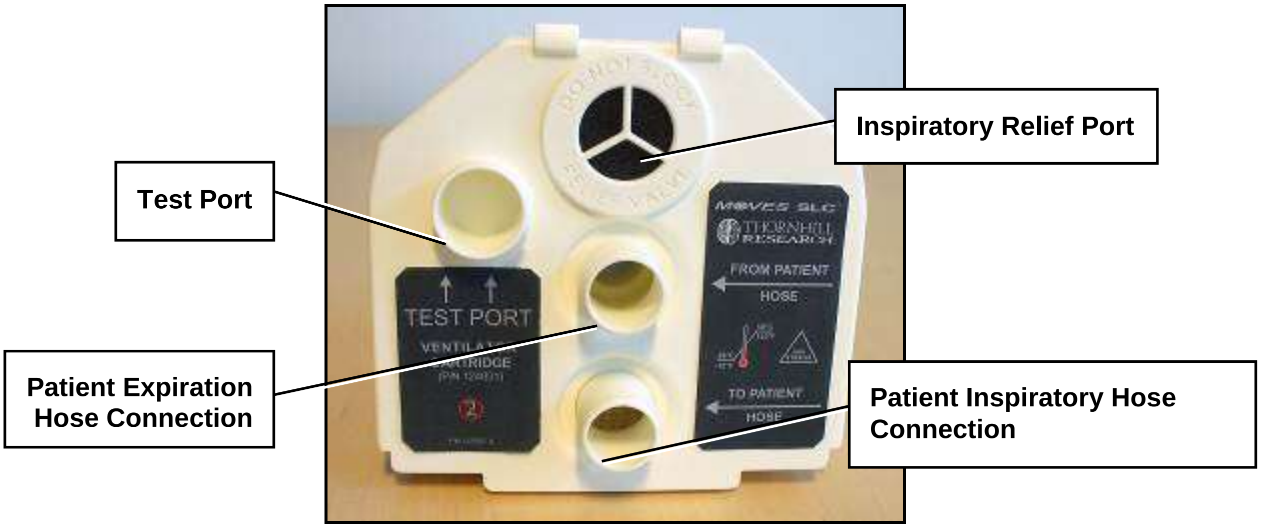
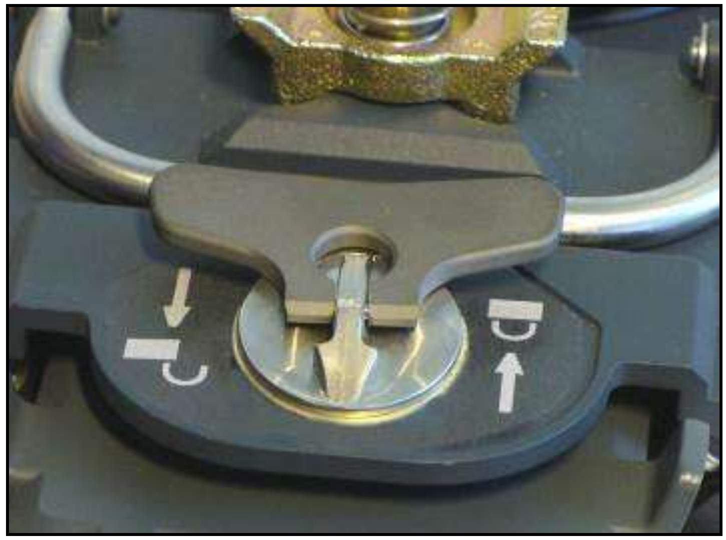


Figure 9-5: Ventilator Cartridge – Patient Connection Side (Front)

Figure 9-6: Ventilator Cartridge – MOVES® SLC™ Connection Side (Back)

9.7.2 Ventilator Cartridge Installation Instructions

1. Turn the cartridge Release / Lock knob to the unlocked position with the arrow facing toward the user.



2. Lift and open the valve block cover door inside the cartridge cavity.

3. Insert the cartridge into the cavity as shown. Press hard to ensure it is in securely.

4. Turn the cartridge Release / Lock knob to the locked position with the arrow facing away from the user.

9.7.3 Installing the Hydrocarbon Filter

CAUTION! BEFORE INSTALLING A HYDROCARBON FILTER, CHECK THE FOUR-DIGIT DATE CODE PRINTED ON THE CARTRIDGE. THE CARTRIDGE LABEL IS STAMPED WITH FOUR CHARACTERS "XXYY", WHERE "XX" IS THE WEEK OF THE YEAR AND "YY" IS THE YEAR OF MANUFACTURE. A CARTRIDGE MORE THAN THREE YEARS OLD SHOULD BE DISCARDED SINCE IT MAY DEGRADE THE PERFORMANCE OF OR CAUSE DAMAGE TO THE MOVES® SLC™ OXYGEN CONCENTRATOR.

1. Always install a hydrocarbon filter before powering up MOVES® SLC™. MOVES® SLC™ will alert you with an alarm if it becomes clogged.
2. Insert the hydrocarbon filter as shown at right into the REAR panel of the MOVES® SLC™ unit.

***NOTE:** If the hydrocarbon filter needs to be changed when MOVES® SLC™ is in operation, a replacement filter will need to be readily available for quick insertion after the old one is removed.*

CAUTION! OPERATING MOVES® SLC™ WITHOUT A FILTER WILL DAMAGE THE UNIT. DO NOT OPERATE MOVES® SLC™ WITHOUT A FILTER!

3. Rotate the hydrocarbon filter clockwise to install, counterclockwise to remove.

WARNING! IT MAY BE NECESSARY TO USE AN ALTERNATIVE MEANS OF OXYGEN SUPPLEMENTATION SHOULD THE HYDROCARBON FILTER REQUIRE REPLACEMENT WHILE A PATIENT IS BEING TREATED.

***NOTE:** Use only the filter cartridges supplied with MOVES® SLC™. These NIOSH-certified filters are specifically selected for use with MOVES® SLC™. These filter cartridges are not for use in atmospheres posing immediate danger to life or health or atmospheres containing less than 19.5% oxygen by volume.*

9.7.4 Installing the Ventilator Breathing Circuit

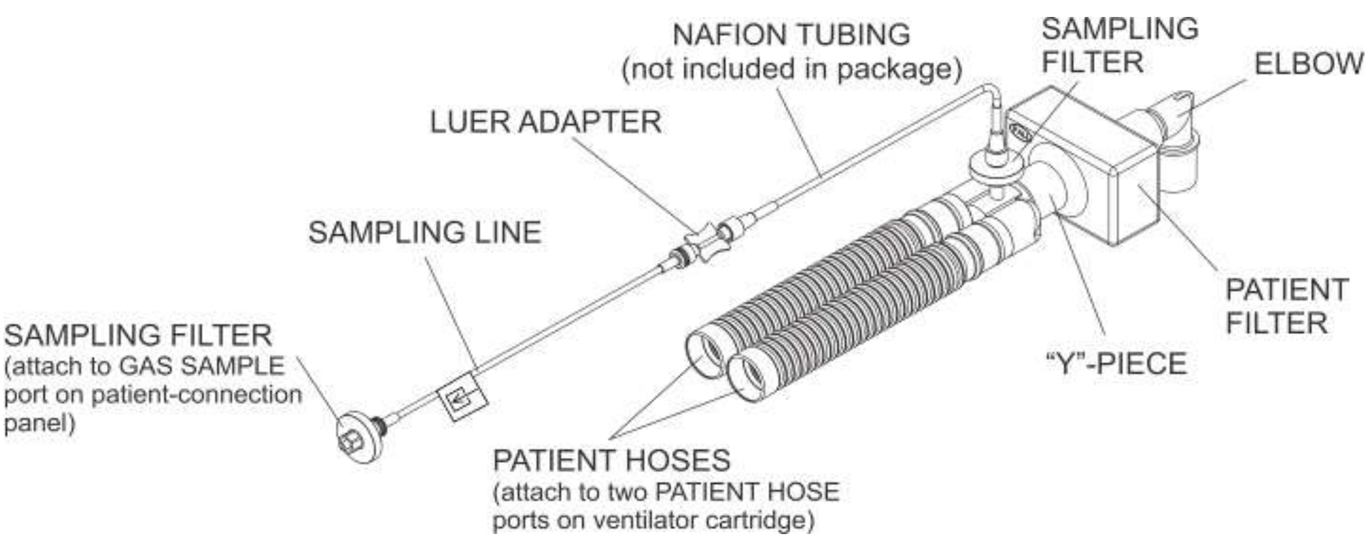


Figure 9-7: Ventilator Breathing Circuit

Refer to the figure above when assembling the Ventilator Breathing circuit. Remove the ***single use*** circuit from its sealed package.

WARNING! THE CIRCUIT FILTER SUPPLIED WITH THE VENTILATOR BREATHING CIRCUIT IS INTENDED FOR USE WHEN DELIVERING TIDAL VOLUMES OF 150ML AND OVER. IF DELIVERING TIDAL VOLUMES UNDER 150ML OR VENTILATING PATIENTS UNDER 30KG, REPLACE THE BREATHING FILTER WITH THE PEDIATRIC BREATHING SYSTEM FILTER.

CAUTION! THE VENTILATOR BREATHING CIRCUIT AND THE SAMPLING FILTER CONNECTED TO THE NAFION TUBING SHOULD BE INSPECTED EVERY FOUR (4) HOURS FOR CONDENSATION AND DRAINED AS REQUIRED. THE CIRCUIT AND FILTER SHOULD BE CHANGED AFTER 24 HOURS OF CONTINUOUS USE.

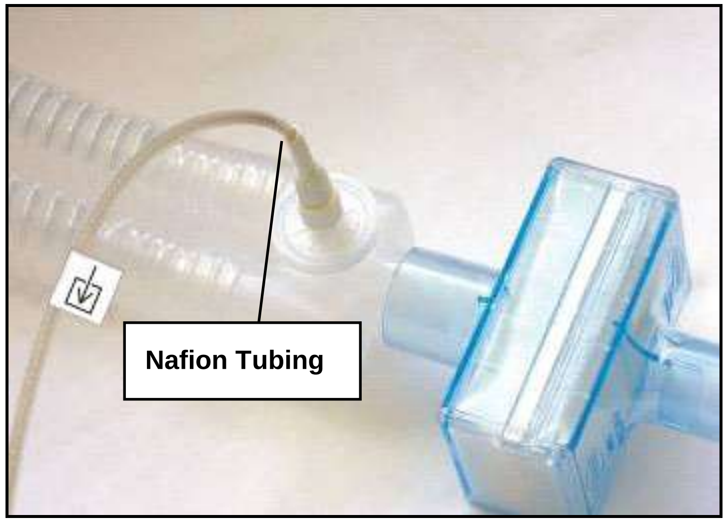
NOTE: *The Nafion tube is NOT a single use item and DOES NOT come with the circuit. It should be housed in the MOVES® SLC™ accessory case. DO NOT DISCARD THE NAFION TUBE AFTER USE. It has a sample filter to prevent contamination.*

NOTE: *Replace the Nafion tube at six (6) month intervals or as needed. The Nafion tube should be inspected prior to use for signs of physical damage including cracking and kinking. Premature failure of the Nafion tube can present as either an occluded sample line or, more commonly, as a leaky sample line that will produce a dampened PCO_2 trace and lower $PetCO_2$ readings.*

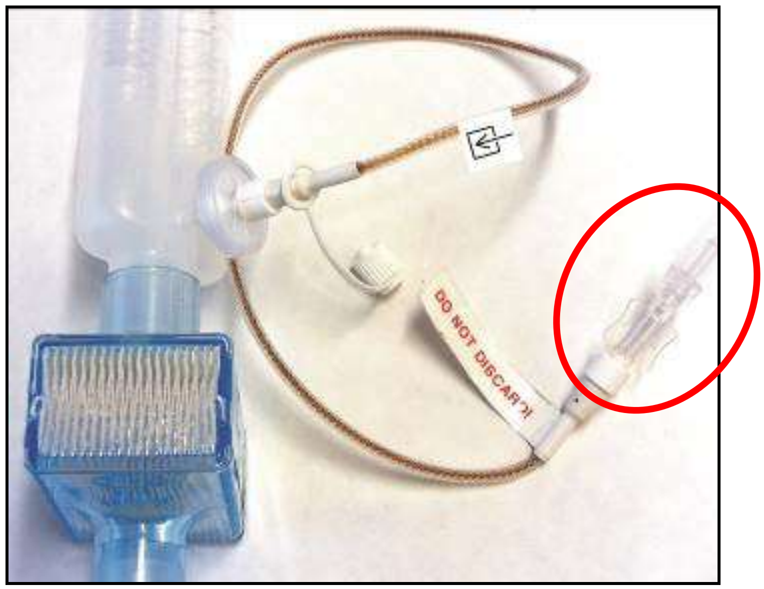
1. Make sure there is a sample filter connected to the "Y" piece. If there is not, connect one.

NOTE: *This sample filter, which is used to keep the Nafion tubing clean between uses, should be discarded after each use.*

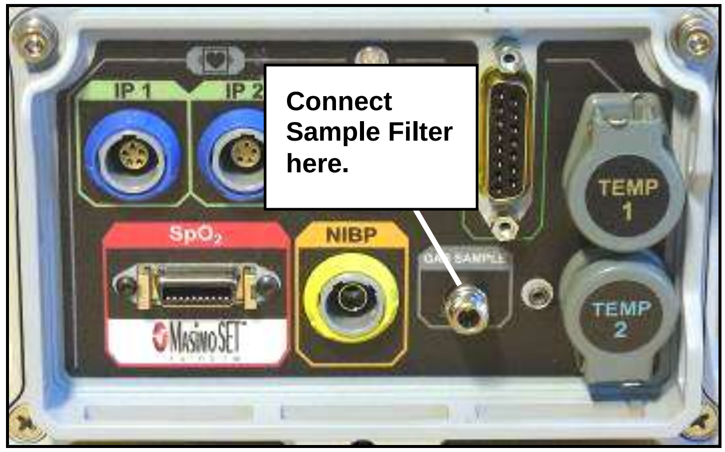
2. Connect one end of the Nafion tubing to the sample filter.



3. Connect the other end of the Nafion tubing to the Luer adapter (circled at right), and then the Luer adapter to one end of the sampling line.



4. Connect the other end of the sampling line (with another sample filter on its end) to the 'GAS SAMPLE' port on the patient connections panel. The sample filter should be connected directly to the patient connection panel.



5. Attach the patient breathing circuit hoses to the patient hose ports on the breathing cartridge.

9.8 DELIVERING SUPPLEMENTARY OXYGEN (O2)

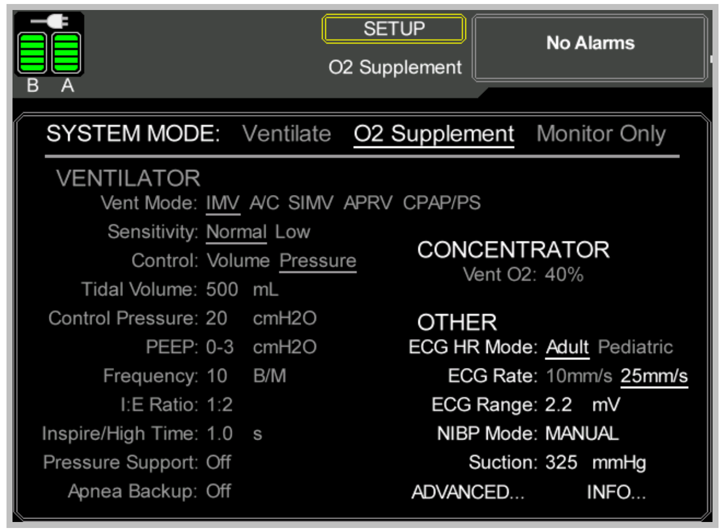
WARNING! WHEN USING O_2 SUPPLEMENTATION, AN O_2 SATURATION MONITOR MUST BE USED.

WARNING! WHEN USING OXYGEN SUPPLEMENTATION MODE, THE MOVES® SLC™ GAS SAMPLING PORT MUST BE CONNECTED TO THE OXYGEN DELIVERY CIRCUIT (E.G., O_2 MASK SAMPLE PORT) AND AN OXYGEN SHUT-OFF DEVICE, SUCH AS BPR'S FIRESAFE™ CANNULA VALVE, SHOULD BE USED IN THE OXYGEN SUPPLY LINE.

The concentrator delivers up to a nominal 90% O_2 at a nominal flow rate of 2.75 LPM directly to the patient during O2 Supplement mode. Follow these instructions to supply supplementary oxygen to the patient.

1. On the Setup screen, set the system to run in O2 Supplement mode.

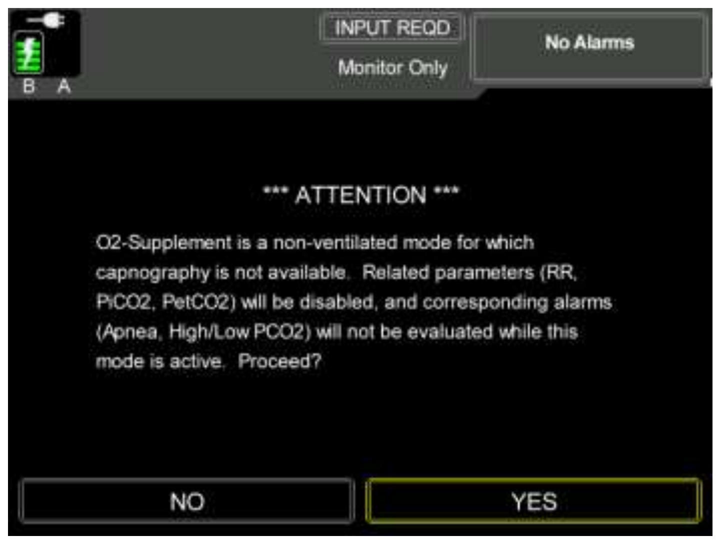
NOTE: *In O2 Supplement mode, the Vent O2 setting (under CONCENTRATOR) is grayed out, indicating that it (and its value) does not apply in O2 Supplement mode. As mentioned above, the concentrator provides 2.75 LPM of up to > 87%* O_2 *directly to the patient.*



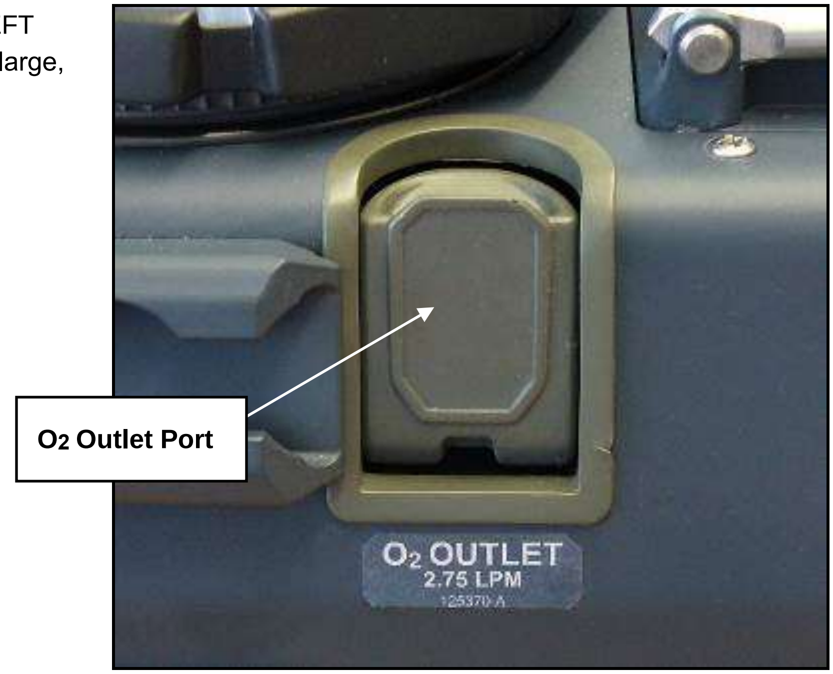
2. When you switch to O2 Supplement mode, a confirmation message is displayed to ensure that this switch is intentional. User input is required (choose NO or YES) in order to proceed.

The confirmation message states:

"O2 Supplement is a non-ventilated mode for which capnography is not available. Related parameters (RR, PiCO2, PetCo2) will be disabled, and corresponding alarms (Apnea, High/Low PCO2) will not be evaluated while this mode is active. Proceed?"



3. Locate the O_2 Outlet port located on the LEFT side of the MOVES® SLC™ unit below the large, black air intake.



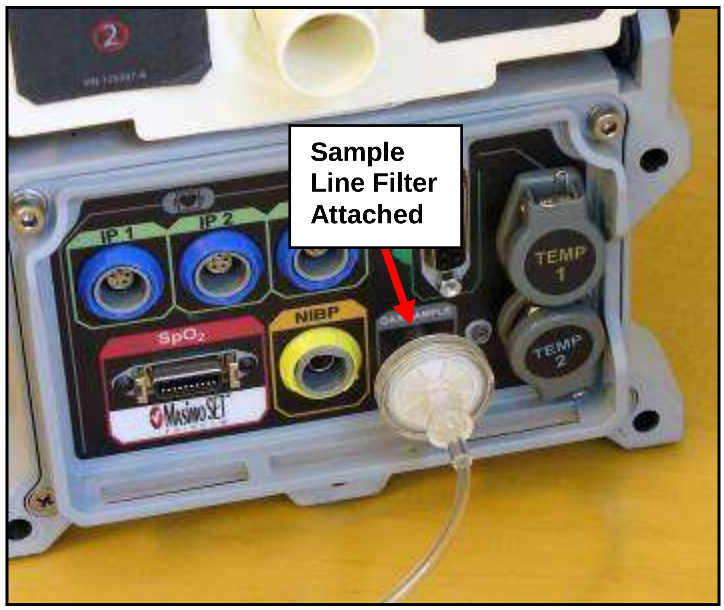
4. Open the protective cover of the O_2 Outlet port (by pulling it forward) to access the O_2 Outlet.

5. Locate the O_2 Outlet Sampling Adaptor.

6. Attach the green flexible tubing end of the O_2 Outlet Sampling Adaptor to the O_2 Outlet by placing it over the outlet and applying downward pressure until the adaptor fits snugly.

7. Attach the Sample Line Filter that is connected to the Nafion tube end of the Sampling Line to the O_2 Outlet Sampling Adaptor by fitting it onto the clear, hard-plastic port on the O_2 Outlet Sampling Adaptor and rotating it clockwise until it is snug.

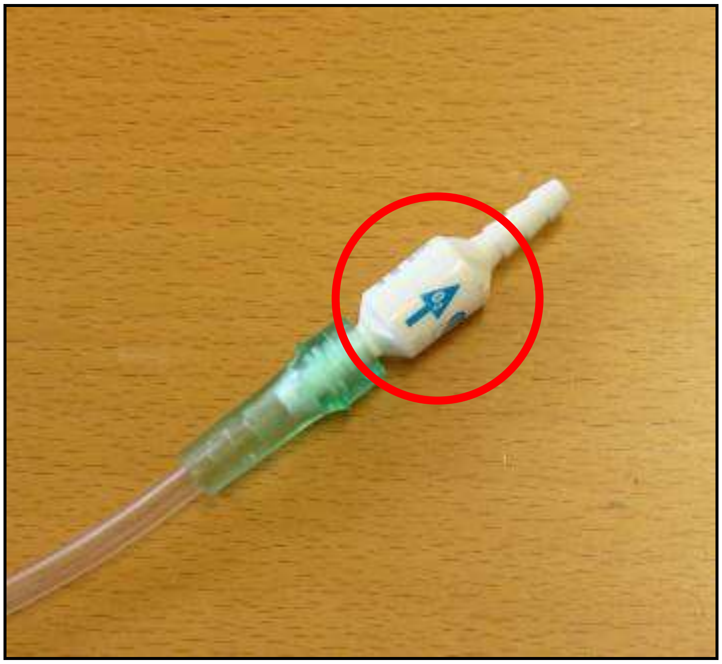
8. Attach the Sample Line Filter at the other end of the Sampling Line to the Gas Sample port in the Patient Connections Panel by placing it over the port and rotating the filter clockwise until it is snug.



NOTE: *In both O2 Supplement mode and Ventilate mode, the sample system should be connected from the sample port in the following sequence: filter, sample line, adapter, Nafion tube, filter.*

9. Attach one end of the green O_2 tube to the metallic outlet on the O_2 Outlet Sampling Adaptor by placing it over the metallic outlet and applying downward pressure until the tube end fits snugly.

10. Insert a fire suppression device (such as BPR's Firesafe™ Cannula Valve shown in the photo at the right) onto the other end of the green O_2 tube.



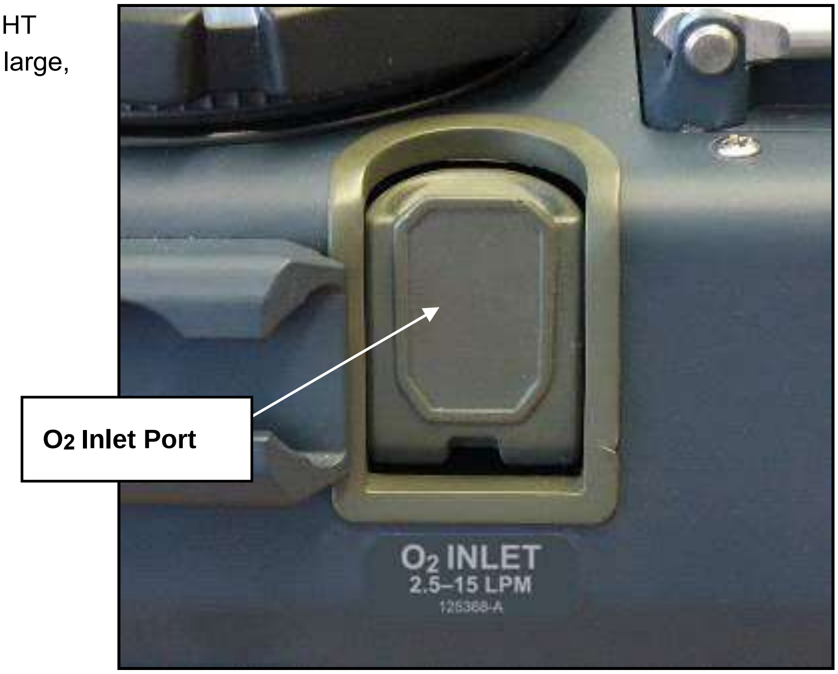
NOTE: *Make sure that any O_2 directional indicator on the fire suppression device is pointing in the direction of the patient and not back toward the O_2 outlet.*

11. Attach the O_2 Mask line or the Nasal Cannula line to remaining available end of the fire suppression device.

9.9 USING AN EXTERNAL GAS SUPPLY

WARNING! EXTERNAL OXYGEN SUPPLY IS ONLY USED FOR VENTILATE MODE. FOR O_2 SUPPLEMENTATION, USE THE OXYGEN SOURCE DIRECTLY.

1. Locate the O_2 Inlet port located on the RIGHT side of the MOVES® SLC™ unit below the large, black air intake.



2. Open the protective cover of the O_2 Inlet port (by pulling it forward) to access the O_2 Inlet.

3. Attach the External Gas Supply tube to the O_2 Inlet nipple

Note the following:

- When using the O_2 Inlet, concentrations other that 100% are controlled with an external air/oxygen mixer. No other gasses can be used.
- MOVES® SLC™ uses an oxygen conserving ventilation system that normally requires less than 1LPM of oxygen to maintain an FiO_2 of 100% to the patient. Therefore, when using the O_2 Inlet, gas flows of 1 to 2 LPM can be used to conserve external oxygen tanks, with higher flows used briefly to pre-charge or flush the circuit, or if the desired FiO_2 is not being achieved.
- When using the O_2 Inlet, the system should be set to an FiO_2 slightly under the external gas mix and NEVER set to Air or MAX. For example, setting the system to an FiO_2 of 85% while applying 100% O_2 into the external gas inlet will only run the concentrator if the FiO_2 drops to 82%, working as a backup for the external O_2 supply.

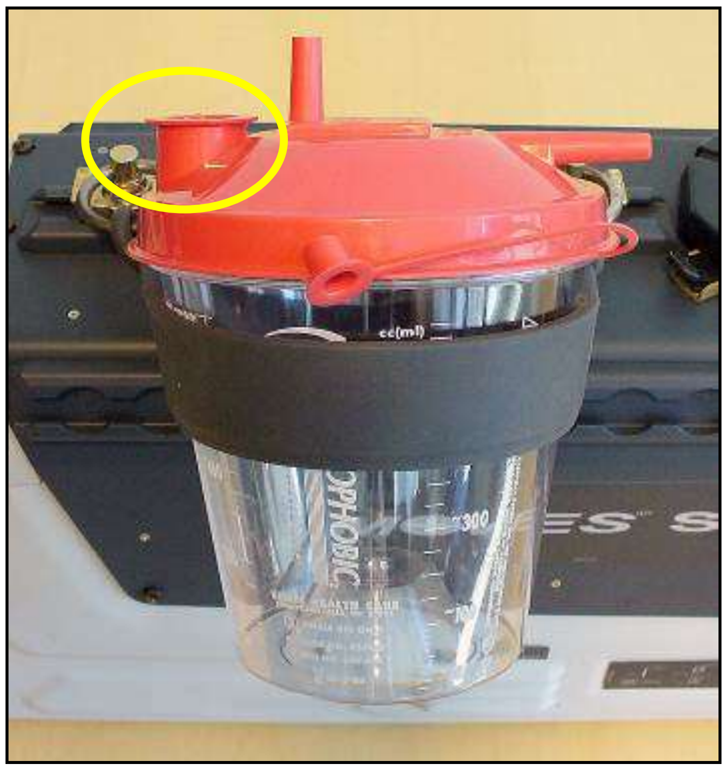
9.10 INSTALLING SUCTION ACCESSORIES

1. Attach the suction canister holder to the MOVES® SLC™ unit by depressing the clips and sliding them along the TOP rail into the desired position. Release the clips and ensure that they lock into place.

2. The anchor will lock into place in the space **between** any two of the holes in the row (as shown in the illustration at the right).

3. Suction canister holder correctly attached shown at right.

4. Insert the suction canister into the holder as shown. Make sure that the large red plug indicated at right is <u>firmly</u> in place.



5. Connect the suction hose to the 'SUCTION INLET' port of the suction canister.

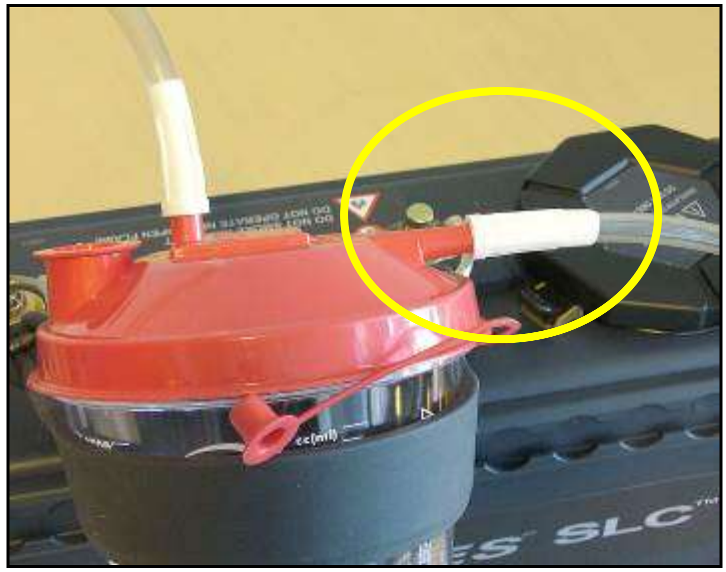
NOTE: *The <u>short</u> suction hose connects the canister to the MOVES® SLC™ unit.*

6. Open the protective cover of the 'SUCTION' port located on the RIGHT side of the MOVES® SLC™ unit. Connect the other end of the suction hose to the 'SUCTION' port.

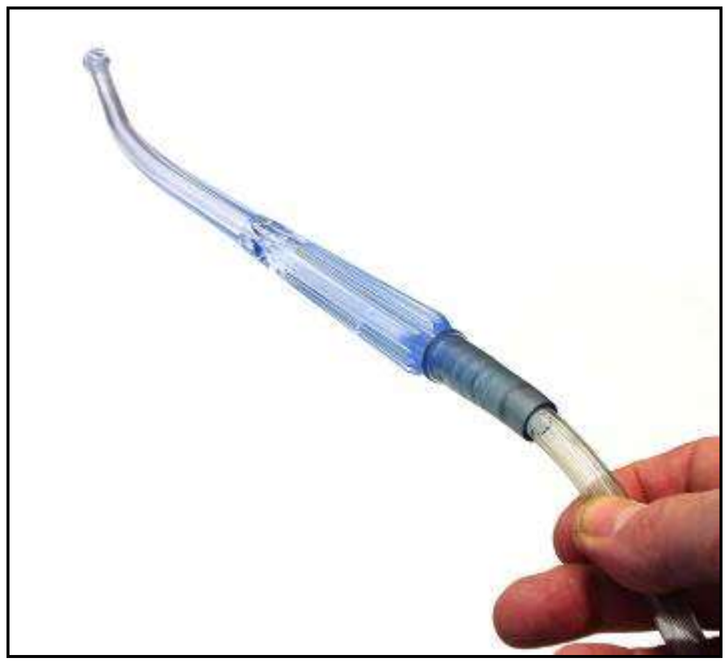
7. 'SUCTION' port shown at right.

8. Connect the other end of the suction hose to the 'SUCTION' port.

9. Connect the patient suction hose (long hose) to 'PATIENT PORT' on the suction canister.



10. Connect the patient suction wand to the other end of the patient suction hose.



CAUTION! THE SUCTION WAND AVAILABLE FROM THORNHILL RESEARCH IS DESIGNED TO MINIMIZE TOTAL OCCLUSION. ONLY THIS WAND OR EQUIVALENT SHOULD BE USED WITH THE MOVES® SLC™ SYSTEM.

WARNING! THE OPERATOR SHOULD ALWAYS HAVE AVAILABLE AN ALTERNATE MEANS OF SUCTION IN THE EVENT OF POWER FAILURE, MECHANICAL FAILURE OR SERIOUS OCCLUSION IN THE SUCTION SYSTEM.

WARNING! THE MOVES® SLC™ OXYGEN CONCENTRATOR DOES NOT FUNCTION WHILE SUCTION IS ON. AN ALTERNATIVE MEANS OF SUPPLYING O_2 WILL BE NECESSARY IF A HIGH PERCENTAGE OF O_2 IS CRITICAL.

9.11 USING AN OPTIONAL HUMIDIFIER

The MOVES® SLC™ is intended for use in short term critical care, transport and emergency situations and utilizes a circle breathing circuit. Therefore, the use of an optional humidifier is not required nor recommended.

9.12 PREPARING MOVES® SLC™ FOR ACTIVATION

9.12.1 Checking Battery Charge

There is a Battery Condition Indicator on the front of each battery.

Figure 9-8: Battery with Condition Indicator Shown

Pressing and holding the button on the Battery Condition Indicator shows the battery condition. As battery power decreases, the illuminated LEDs extinguish from furthest left (green – meaning the battery power is at a high level), through middle indicators (orange – meaning that the battery power is at an intermediate stage), to furthest right (red – meaning that the battery power is very low or exhausted).

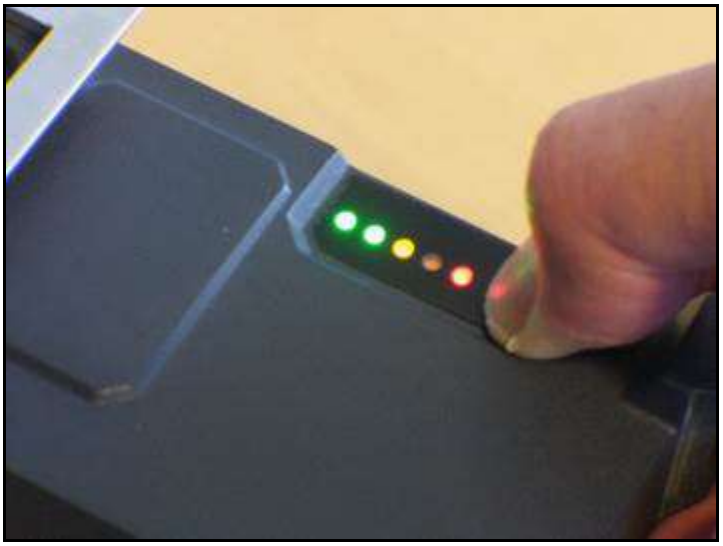


Figure 9-9: Condition Indicator Showing High Level Charge

When the power supply / battery charger is connected to a live AC power supply and to MOVES® SLC™, any installed batteries will charge.

NOTE: *The battery charge level may not appear to increase for approximately three (3) hours. This is normal for the battery's initial charge and after extended periods without use.*

NOTE: *It is possible for batteries to be exhausted beyond normal recovery. If pushing a battery's status button does not cause any LEDs to be illuminated, place the battery in a MOVES® SLC™ to charge for up to 12 hours. If this does not recover the battery's charge, the battery is non-functional and should be returned to the manufacturer.*

WARNING! TO REDUCE RISK TO THE PATIENT IN THE EVENT OF A POWER FAILURE, WHEN RUNNING ON EXTERNAL POWER, ONE CHARGED BATTERY SHOULD BE PRESENT IN THE MOVES® SLC™ UNIT. IN ADDITION, ALWAYS CARRY ALTERNATE MEANS OF VENTILATING, SUCTIONING, AND OXYGENATING THE PATIENT.

CAUTION! A MOVES® SLC™ UNIT SHOULD NEVER BE PUT INTO TRANSPORT SERVICE WITH LESS THAN A 95% CHARGE IN BOTH BATTERIES.

WARNING! BATTERY TIME SHOWN REMAINING IS APPROXIMATE AND HIGHLY DEPENDENT ON OPERATING CONDITIONS! PUT SAFETY FIRST – ALWAYS CARRY SPARE BATTERIES!

CAUTION! NEVER CHARGE BATTERIES IN AMBIENT TEMPERATURES BELOW 32ºF (0ºC) OR ABOVE 104ºF (40ºC).

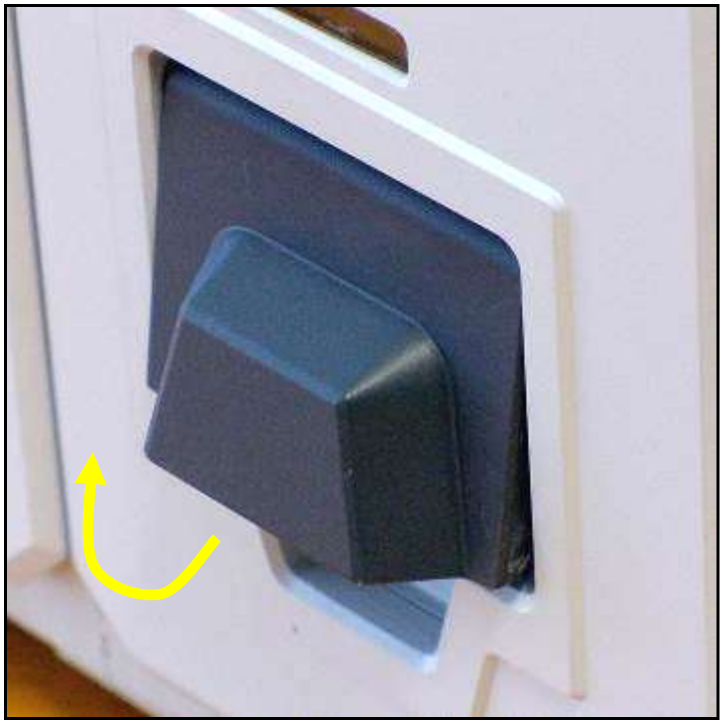
9.12.2 Inspecting the Batteries

Inspect the battery for physical damage such as cracks, holes, and leaks.

WARNING! DO NOT USE OR CHARGE A DAMAGED BATTERY!

9.12.3 Installing the Batteries

1. Lift the battery compartment latch to open it.



2. Open the battery compartment door.

CAUTION! THERE ARE BATTERY COMPARTMENT DOORS ON EITHER SIDE OF THE MOVES® SLC™. THEREFORE, A BATTERY CAN BE INSERTED FROM EITHER SIDE. HOWEVER, THE BATTERY CONNECTIONS MUST BE <u>PROPERLY ORIENTED</u> WITH THE RECEIVING CONNECTIONS INSIDE THE BATTERY COMPARTMENT (ON THE DOORS). CONNECTIONS ARE <u>NOT IDENTICAL</u> ON EITHER END OF THE BATTERY.

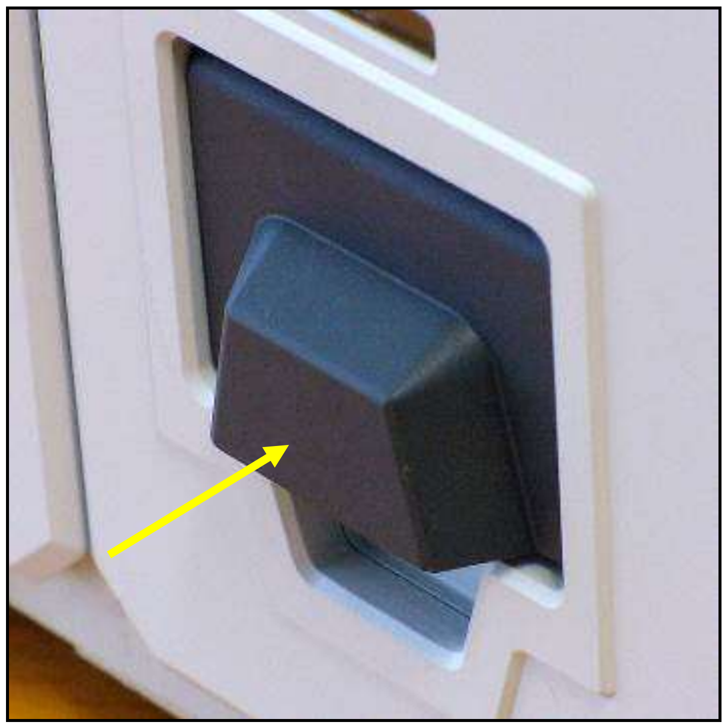
3. Push the battery into the battery compartment until it engages. You should not have to force it. If you feel resistance, the battery is probably not properly oriented. Pull the battery out, then check the location of the connections and reorient the battery if necessary.

NOTE: *The battery is keyed to be inserted in only one orientation. If you are experiencing trouble inserting the battery, check that "key" on the top of the battery matches the slots at the top of the battery cavity.*

4. Lift up and close the battery compartment door until it clicks into place.

5. Push the battery release lever in until it fully locks into place.

NOTE: *Also make sure that the battery latch on the opposite side is closed completely.*



6. Repeat procedures 1–5 for battery # 2.

NOTE: *It is recommended that both batteries be installed during all operational times. If one battery requires a charge, it can be recharged simultaneously during normal operation when the MOVES® SLC™ is connected to the power supply / charger.*

NOTE: *The MOVES® SLC™ can operate from one battery to allow uninterrupted operation during battery replacement (since the system uses only one battery at a time). When a battery reaches an exhausted state, remove the battery and replace with a charged battery.*

WARNING! WHEN MOVES® SLC™ IS NOT IN OPERATION, BATTERIES SHOULD BE UNLATCHED OR REMOVED FROM THE UNIT AND STORED IN A DRY AREA AT ROOM TEMPERATURE. LEAVING BATTERIES INSTALLED IN A NON-OPERATIONAL UNIT MAY CAUSE THEM TO DRAIN TO AN UN-RECHARGEABLE LEVEL.

9.12.4 Preparing the Power Supply / Battery Charger

1. The power supply / battery charger is shown to the right. Note, there are two cords:

- A light grey cord - this cord delivers power from a wall socket, or line supply (like a generator), to the power supply / battery charger.

CAUTION! THIS CORD COMES WITH A GROUNDING PRONG ON THE MALE CONNECTOR. TO REDUCE THE RISK OF ELECTRICAL SHOCK, THIS PRONG SHOULD NEVER BE REMOVED OR COMPROMISED.

CAUTION! THIS CORD IS A SPECIAL MEDICAL-GRADE POWER CORD AND SHOULD NOT BE REPLACED WITH A NON-MOVES® SLC™ SUPPLIED PART.

- A black cord permanently affixed at one end to the power supply/charger, and with a special nine-pin female connector on the other end. This cord delivers power from the power supply / battery charger to the MOVES® SLC™ unit. The female connector that attaches to the MOVES® SLC™ unit is keyed to ensure proper connection.

2. If it is not already inserted, insert the light grey power cord into the front of the power supply / battery charger.

9.12.5 Connecting MOVES® SLC™ to the Power Supply / Battery Charger

1. Remove the protective cap from the receptacle of the REAR (battery rack) panel of the MOVES® SLC™ by turning it counter-clockwise .

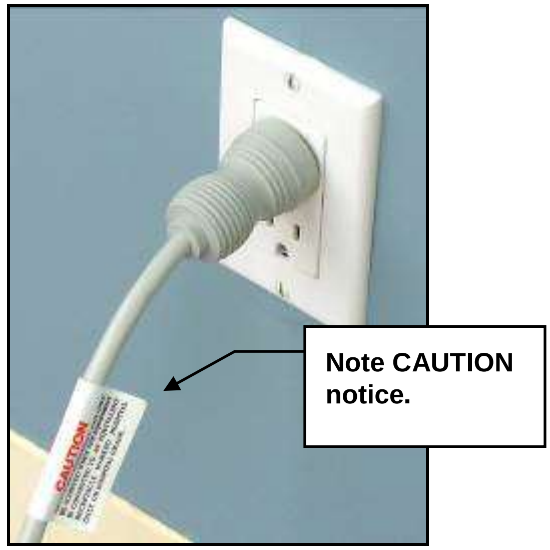
2. Insert the nine-pin connector into the receptacle. Note the chevrons which indicate the top of the connector. Make sure the chevrons face straight up when inserting the connector, which is keyed to match the connector on MOVES® SLC™.

3. Rotate the locking collar clockwise to secure the connector.

9.12.6 Connecting AC Power

1. Insert the power supply / battery charger AC connector into a wall socket or line supply.
2. Verify the connection by checking for an illuminated PWR LED on the power supply / battery charger.
3. Note the CAUTION notice attached to the cord:
4. GROUNDING RELIABILITY CAN ONLY BE ACHIEVED WHEN THE EQUIPMENT IS CONNECTED TO AN EQUIVALENT RECEPTACLE MARKED HOSPITAL ONLY OR HOSPITAL GRADE.

NOTE: *The photo at right shows a North American power connection. However, interchangeable power cords suitable for other regions are also available.*



9.12.7 Battery Storage

CAUTION! WHEN BATTERIES ARE DISCHARGED AND LEFT IN MOVES® SLC™ FOR A PROLONGED PERIOD, A COMPLETELY DISCHARGED BATTERY CAN RESULT. THE BATTERY CAN STILL BE RECHARGED, BUT IT MAY TAKE MORE THAN THE NORMAL 2.5 HOURS – AND UP TO 48 HOURS – TO FULLY CHARGE.

When MOVES® SLC™ is not in operation, its batteries should be disconnected or removed from the unit and stored in a dry area at room temperature. In the picture below, the battery compartment latch is shown as open. When the latch is in this position, the battery is disconnected.

Figure 9-10: Battery Compartment Latch Open

Conversely, make sure the battery compartment latch is fully closed (by pressing it in) to engage the battery. Even when the battery compartment door is closed, the battery will not be connected unless the latch is pressed in fully.

Figure 9-11: Battery Compartment Latch Fully Closed

Also, please note the following important cautions (and final Warning) about storing MOVES® SLC™ batteries:

- Do not store batteries above 60°C (140°F) or below –20°C (–4°F).
- Store batteries in a cool (below 30°C [86°F]), dry area that is subject to little temperature change. Elevated temperatures can result in reduced battery service life.
- Do not place batteries near heating equipment, nor expose to direct sunlight for long periods.

WARNING! BATTERY EXPOSURE TO TEMPERATURES IN EXCESS OF 130°C (266°F) WILL RESULT IN THE BATTERY VENTING FLAMMABLE LIQUID AND GASES.

10.0 Startup

CAUTION! THE SURFACE OF THE MOVES® SLC™ SYSTEM CAN BECOME HOT, ESPECIALLY IF IT IS BEING OPERATED IN DIRECT SUNLIGHT. CARE SHOULD BE TAKEN WHEN TOUCHING OR CONTACTING THE SURFACE OF THE MOVES® SLC™ SYSTEM.

10.1 ADJUSTING THE SCREEN DISPLAY ORIENTATION

The display screen can be locked or adjusted to face either the RIGHT or LEFT side of the MOVES® SLC™ to facilitate operation from either side of the unit.

1. In the picture at the right, the screen is locked. Turning the catch indicated 90 degrees to either the left or the right will unlock the screen and allow it to be raised into a working position.

2. In the picture at the right, the screen is unlocked. The arrow on the lock points to the direction of the screen that can be raised. This is shown in the following photograph.

3. In the picture at the right, the screen is unlocked. The arrow on the lock points to the direction of the screen that can be raised. This is shown in the following photograph.

NOTE: *The <u>on-screen</u> display orientation can be flipped by pressing any of the panel buttons on the side of the screen you would like the orientation to switch to.*

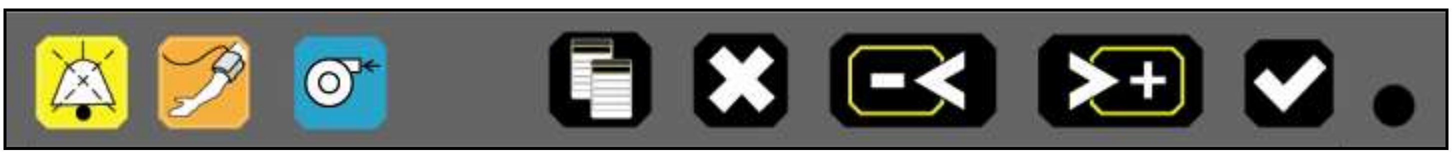


Figure 10-1: MOVES® SLC™ Panel Buttons

10.2 USER INTERFACE (UI) CONTROLS AND FUNCTIONS

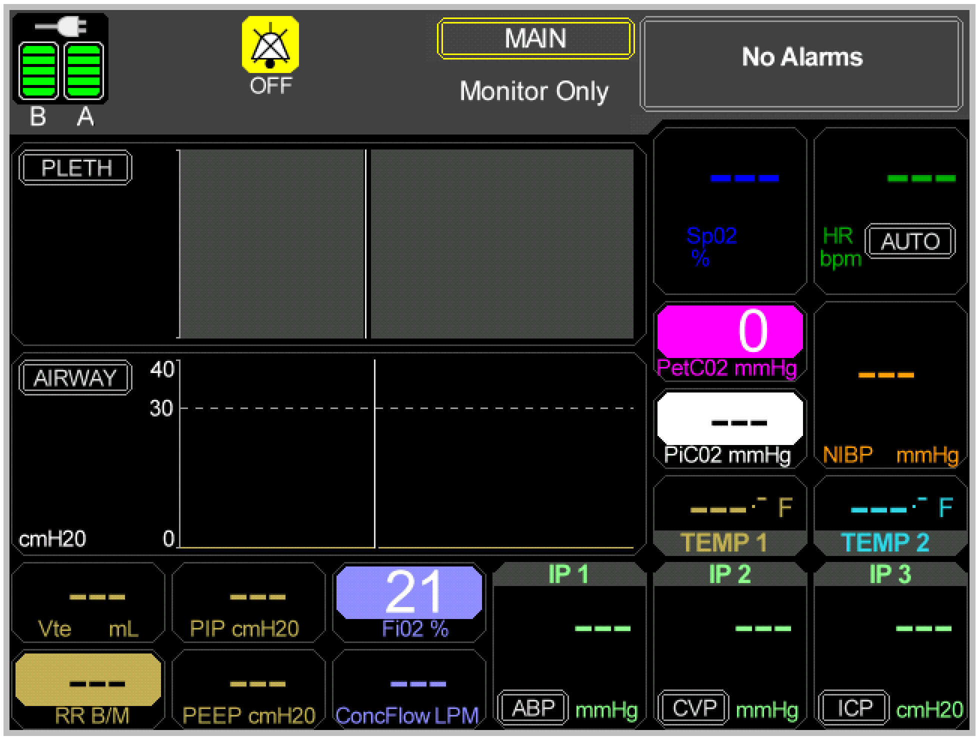
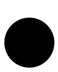
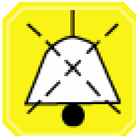


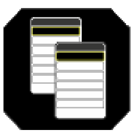
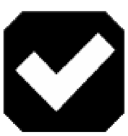
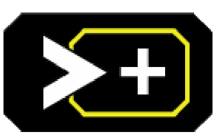
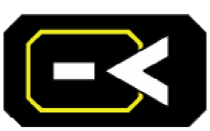
Figure 10-2: MOVES® SLC™ Main Screen

The following table describes the physical appearance, function and the effect or use of each of the components used to operate the MOVES® SLC™ unit.

Table 20: User Interface Controls and Functions

Button / Icon	Function
See Figure above.	**Main Liquid Crystal Display (LCD) Screen** This screen is the main component of the user interface display. The operator interacts with the display to operate the MOVES® SLC™ unit, getting information from the screen while selecting modes, options and numerical values for settings using the panel buttons.
	**Power Control Button** This green and white push button (which is next to the power connection on the end of the MOVES® SLC™ unit) is used to activate or deactivate the unit. When the button is initially pressed, the system activates, the UI screen illuminates and an audible indicator sounds. When pressed and held for five (5) seconds when the unit is running, the button turns the unit OFF. As well, a message appears on the UI screen indicating this functionality.
	**Screen Dim Button** This small black button at the far end of the buttons panel is used to cycle the screen display and visual alarm indicator lights through six (6) diminishing levels of brightness.

Button / Icon	Function
	**Alarm Audio Pause Button** The Alarm Audio Pause button can be used either to silence ALL alarms permanently or for a temporary period (120 seconds). Pressing the Alarm Audio Pause button for one (1) second and then releasing it will silence ALL alarms temporarily. Pressing the Alarm Audio Pause button for at least three (3) seconds and then releasing it will silence ALL alarms permanently (if allowed, see note below). Pressing the Alarm Audio Pause button for one (1) second again then releasing it will re-enable ALL alarm audio. When alarms are paused temporarily, a dashed "X" is shown through the bell image (see image at left). When alarms are paused permanently, a solid "X" is shown through the bell image. If an alarm is turned off on the Alarm On/Off screen, its alarm will not sound. ***NOTE:*** *Silencing all alarms permanently must be enabled by System Administrator.*
	**NIBP Control Button** The NIBP Control button is used to start or abort a Non-Invasive Blood Pressure (NIBP) reading. Prior to taking an NIBP reading, the NIBP cuff is fitted to the patient with the free end of the sensor cord attached to the patient-connector panel. The NIBP Control button is pressed to begin taking a reading, usually manually. The data taken from the sensor appears in numerical form on the Monitor screen (if currently shown). Pressing the button a second time aborts the reading in progress. The button icon will be shown on the Status Bar if an NIBP reading is in progress (i.e., cuff is pressurized). Otherwise, the icon will not be shown.  ***NOTE:*** *Using the Setup screen, you can set the NIBP control to manual, or to automatically update at set intervals: every 1–5 minutes, 10 minutes, 15 minutes or STAT. STAT, an abbreviation for the Latin word Statim which means "immediately", will set MOVES® SLC™ to take readings as often as is considered safe (i.e., a minimum time of 30 seconds is enforced between the end of one NIBP reading and the beginning of the next reading) for a maximum of 15 minutes. After 15 minutes in STAT mode the MOVES® SLC™ will automatically transition the update interval to 5 minutes.* *Pressing the NIBP Control Button manually to take a reading, or to abort a reading, temporarily overrides any automatic setting; however, the timer is reset to the time of the next automatic reading.*

Button / Icon	Function
	**Suction Control Button** The Suction Control button is used to activate and deactivate the suction pump. All suction accessories must be connected and ready to use before activating. When the button is pressed, the suction pump activates. When the button is pressed again, the suction pump deactivates. While suction is ON, the Suction icon and suction values (in mmHg) are displayed in the Status Bar ***NOTE:*** *When in Suction mode, the concentrator/suction pump operates at a default (maximum) intake pressure level of 325 mmHg. This value can be changed (lowered) on the Setup screen.* **WARNING! THE O_2 CONCENTRATOR DOES NOT PRODUCE OXYGEN WHEN THE SUCTION FEATURE IS IN USE. IF SUCTION USE IS PROLONGED, THE PATIENT WILL BECOME HYPOXIC UNLESS EXTERNAL O_2 IS SUPPLIED.**
	**Screen Button** Press the Screen button to move to the next screen in sequence. If there are outstanding queries or parameters that need to be satisfied, the functionality of the Screen button will be inhibited until these queries or parameters are satisfied. ***NOTE:*** *This button can also function as an Accelerator. Pressing and holding the button will take you from any screen to the Monitoring screen. If you are already on the Monitoring screen, pressing and holding the button will take you to the Setup screen.*
	**Cancel Button** Press this button to reject the current value that is being changed and return to the previous value.
	**Check Button** Press the Check button to start or end editing a currently selected item, or change the currently selected item. The Check button is also used to acknowledge messages.
	**Next Button** Selects the next item in a group or increases a numeric value. Holding down the button proceeds sequentially through items one at a time.
	**Previous Button** Selects the previous item in a group or decreases a numeric value. Holding down the button proceeds sequentially through items one at a time.

10.2.1 Tap and Hold Quick Navigation

OVERVIEW

Tap and hold quick navigation works with the Next and Previous buttons shown in the table above. A brief key press (tap) immediately followed by an arbitrarily long hold lets the user speed through items or values in a series of "hops". The "hops" can be either forward or backward depending on which of the two buttons is pressed. This contrasts with just holding either button down without the tap which would proceed through the items or values sequentially one after another. Quick navigation is particularly useful in places like the Alarm On/Off screen where more than 150 alarms are listed, or with items like Alarm Limits High SpCO where the value choices range from 2% to 98% in increments of 1.

QUICK NAVIGATION THROUGH A LIST OF ITEMS

Tap and then hold the Next and Previous buttons to quick navigate through a list of items in "hops" of a complete page at a time. Several normal individual repeats will occur before quick navigation begins.

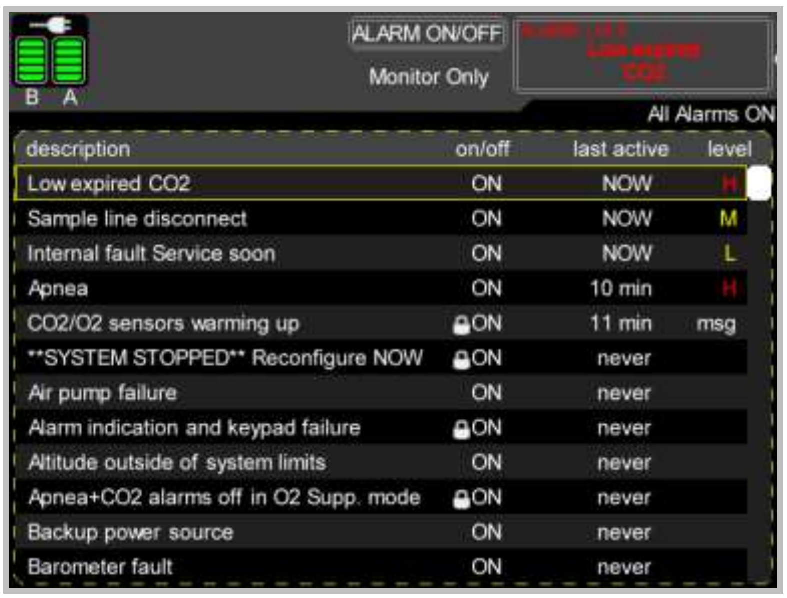


Figure 10-3: Item Choice at Top of List

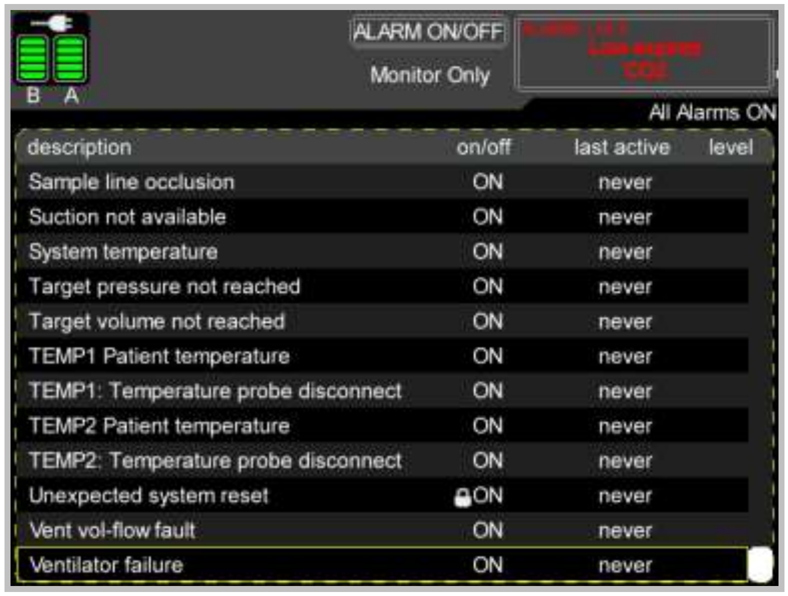


Figure 10-4: Item Choice at Bottom of List After a Series of Page "Hops"

QUICK NAVIGATION THROUGH NON-LIST ITEMS

Tap and then hold the Next and Previous buttons to quick navigate through non-list items in "hops" of five (5) items at a time. Three (3) normal individual repeats will occur before quick navigation begins.

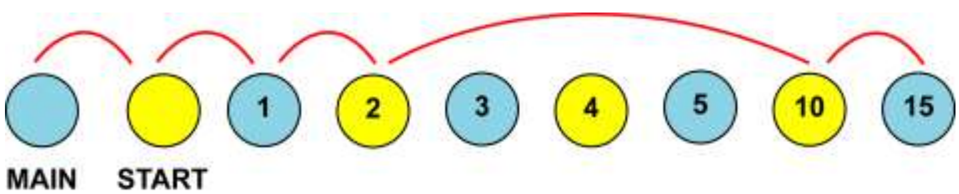


Figure 10-5: Quick Navigation Through MOVES® SLC™ NIBP Items

In the illustration above, the three (3) normal individual repeats are shown, then there is a five (5) item "hop" from value 2 to value 10 and then a final "hop" of just one to the last value (since only one value remains in the group).

In the screen shot which follows, the default Control Pressure value (20 cmH2O) has been selected on the Setup screen.

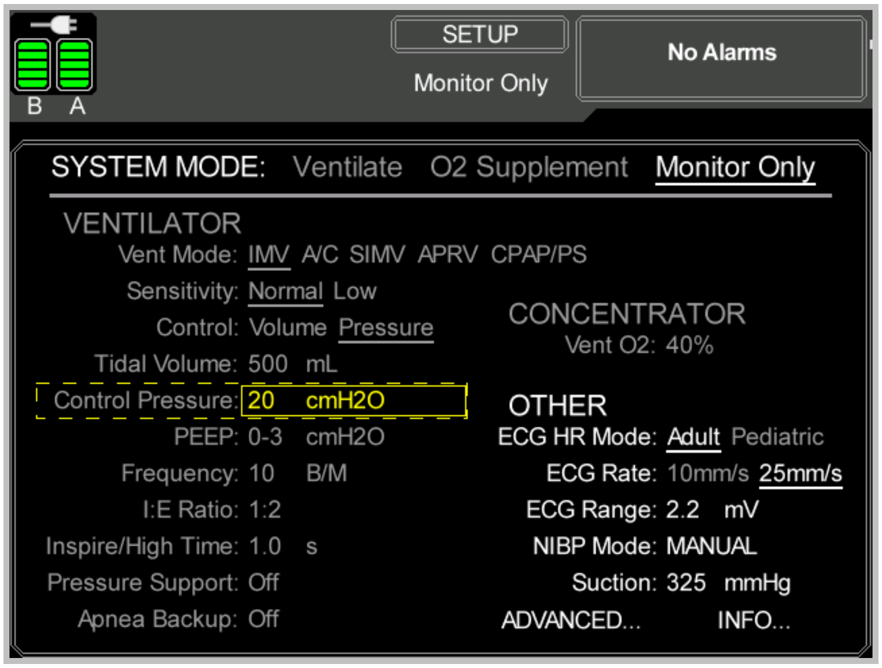


Figure 10-6: Default Control Pressure Value Selected

In the following screen shot, the default Control Pressure value has quick navigated to the final value (55 cmH_2O) in "hops" of five (5) items at a time using the <u>Next</u> button's tap and hold functionality.

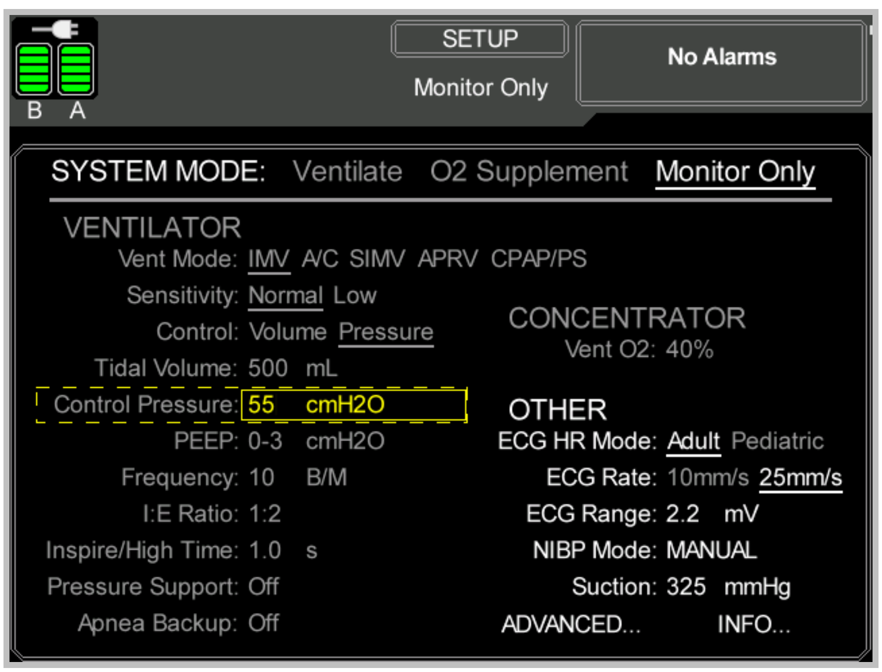


Figure 10-7: Item Choice at Final Value After a Series of Five Item "Hops"

10.3 SYSTEM VISUAL INDICATORS (ALARMS / SYSTEM STATUS)

There are four (4) System Visual Indicators, one at each top corner of the MOVES® SLCTM. These indicators display three (3) different colors: green, red and yellow. The severity of the highest active alarm is show. If an alarm is turned off, the display defaults to the severity of the next active alarm. These System Visual Indicators provide the user with the ability to see alarms, or system alarm status, from a greater distance and angle than would be possible with only screen display. The brightness of the System Visual Indicators is controlled by the front-panel brightness control.
System Visual Indicator states are explained in the following table.

Table 21: System Visual Indicator States and Explanations

System Visual Indicator State	Indicates
Off	System off or in startup testing
Solid Green	No alarms active
Solid Yellow	Low Priority Alarm active
Flashing Yellow	Medium Priority Alarm active
Flashing Red	High Priority Alarm active

NOTE: *Even when the audio of active alarms is temporarily silenced using the Alarm Audio Pause button, the System Visual Indicators continue to display the corresponding visual alarm signal. If all active alarms are turned OFF (using the Alarm ON/OFF screen), or if all alarm conditions become satisfied, the indicator returns to a steady green illumination.*

10.4 CHANGING SETTINGS AND DATA VIEWS

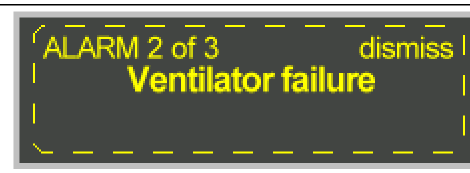
MOVES® SLC™ has settings that the user can modify, for example, O_2, Maximum Airway Pressure, etc. As well, there are customizable interactions to review data. All settings/data that can be manipulated are identified the same way, selected the same way, and are changed/viewed the same way. All modifiable settings/data views are shown on the screen as either a *screen button* or a *selectable area* with multiple elements displayed. These modifiable settings/data views can be selected and made active using three (3) of the *physical* buttons located below the screen; specifically, the Next and Previous (arrow) buttons in conjunction with the Check button.

NOTE: *The last selected screen element is remembered for each screen. When the user returns to a screen, the most recently selected element on that screen is reselected.*

10.4.1 Display of Settings and Views

Screen buttons and areas are displayed in one of three states Selectable, Selected, and Active.

Table 22: Screen Buttons and Descriptions

Screen Button / Area State	Description	Example
Selectable	Shown with a double-line white border. Identifies the button or area as something that can be selected for modification.	
Selected	Shown the same as Selectable but with yellow lines forming the double-line border. Identifies the currently selected button or area.	
Active	Shown with a single, dashed line. Identifies the currently selected button or area as active and that changing of a setting is in progress.	

10.4.2 Modifying a Setting

To modify a setting:

1. Select the desired button or area by pressing the Next or Previous button successively until the desired selection is reached.
2. Press the Check button to initiate modification of the setting.
3. Use the Next or Previous button to select/modify the setting.
4. Press the Check button again once to accept the modified setting.

NOTE: *The last selected screen element is remembered for each screen. When the user returns to a screen, the most recently selected element on that screen is reselected.*

NOTE: *In the case of the Alarm On/Off settings:*

- *Pressing the Check button toggles between the two states (i.e., on and off).*
- *To finalize and exit to the top level navigation, press the Cancel (X) button.*

10.5 CONFIRMING DISPLAY VALIDITY

Note the following in regard to the display of valid information on the MOVES® SLC™ UI Screen:

The display should NOT show any elements that are partially written.

- The display should ALWAYS show information while MOVES® SLC™ is on.

CAUTION! IF ANY OF THE ABOVE CONDITIONS ARE NOT SATISFIED, THE MOVES® SLC™ UNIT SHOULD BE DELIVERED TO AUTHORIZED PERSONNEL FOR SERVICING.

10.6 STARTUP SEQUENCE

***NOTE:** There should be **NO external oxygen** connected to the* MOVES® *SLC™ system during startup tests. Having O_2 connected creates a flow in the inspiratory limb which causes the open-circuit test to fail.*

1. Locate the (green) Power Control button on the rear of the MOVES® SLC™ unit (the end of the unit with the hydrocarbon filter and power-cord connection).

Figure 10-8: Power Control Button

2. Press the Power Control button to activate the unit – an audible alert is sounded and the user interface displays either the New Patient screen or the System Test screen

New Patient Screen

If the system has been run within the last 30 minutes, a prompt screen (New Patient Screen) will appear asking the user if the system should be configured for a new patient (i.e., begin with default values or restore previously used ones.)

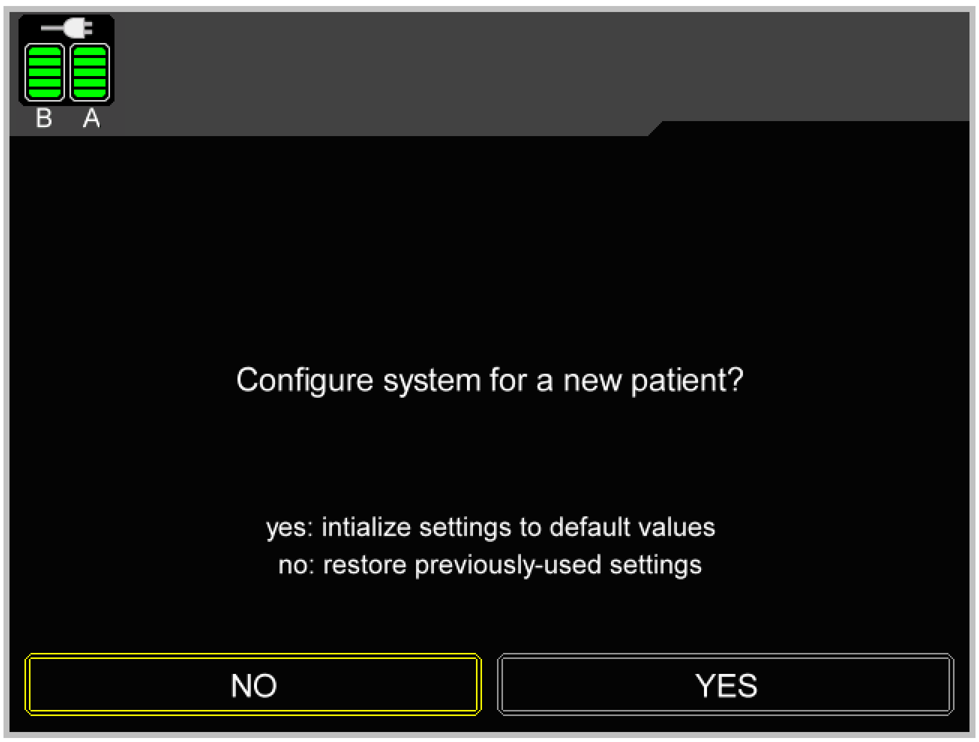


Figure 10-9: New Patient Screen

If there has been data loss and/or corruption of previous data, the user will NOT be allowed to restore previously used values. The "NO" option will be unavailable. The user will have to configure the system for a new patient.

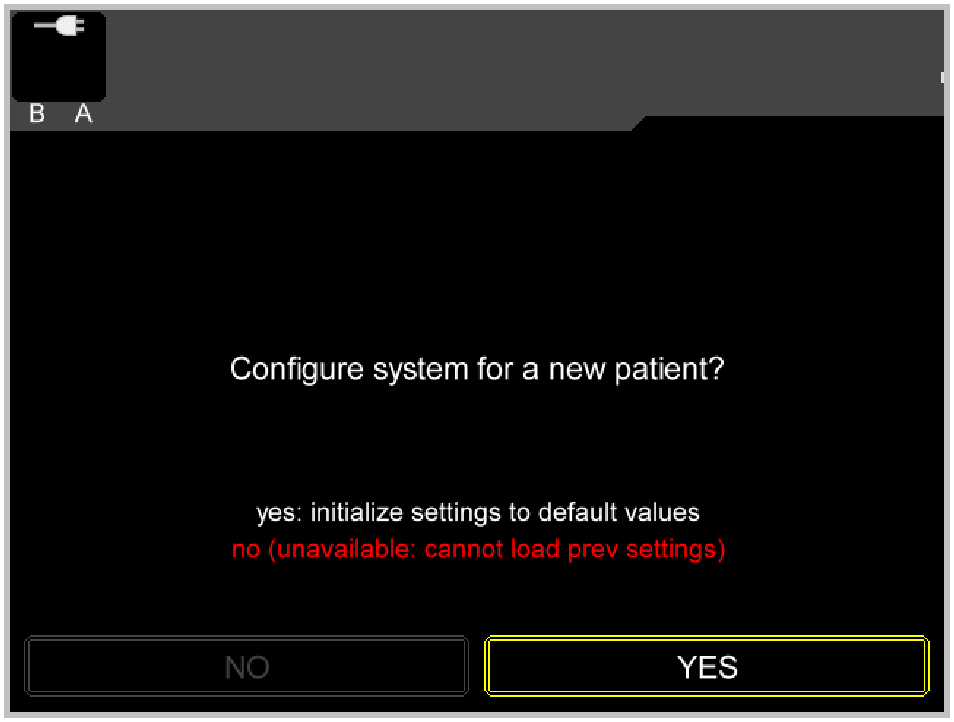


Figure 10-10: New Patient Screen – Restore Settings Unavailable

System Test Screen

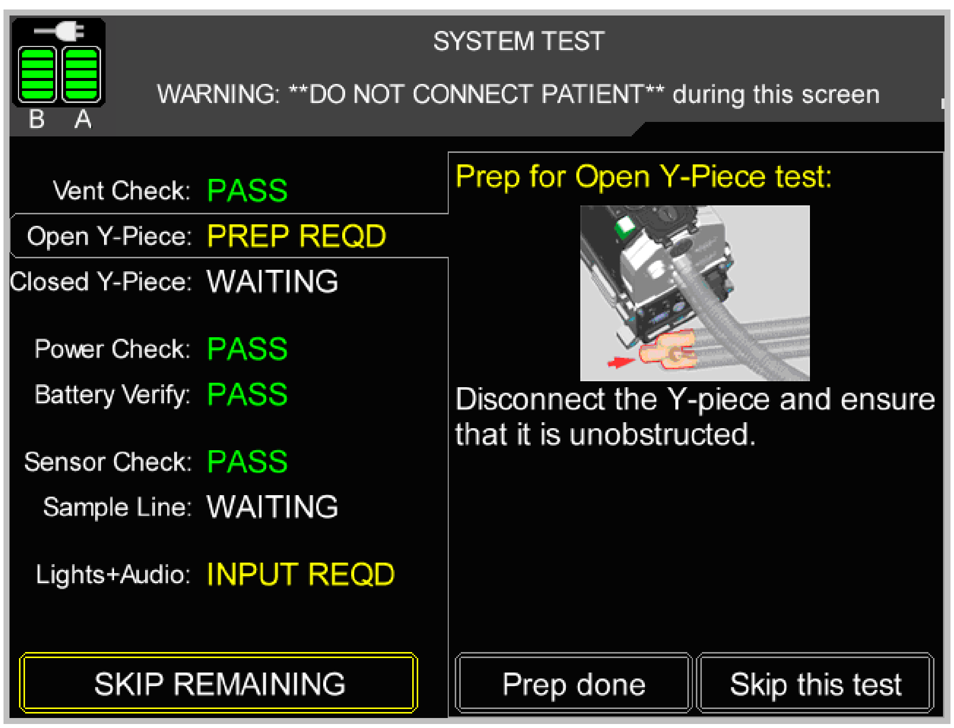
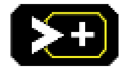
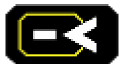


Figure 10-11: System Test Screen

3. If not all initial tests are passed, you will be offered three choices:
   - Skip remaining
   - Prep done
   - Skip this test

4. Use the Check button  to confirm a selection. Use the Next button  to move forward to the next item. Use the Previous button  to move back to an item in the list.

CAUTION! ONLY SKIP A TEST OR TESTS IF A SYSTEM TEST HAS PREVIOUSLY BEEN PERFORMED AND PASSED, AND THE SYSTEM HAS JUST BEEN RESTARTED DUE TO POWER FAILURE (E.G., LOSS OF BATTERY OR EXTERNAL POWER).

WARNING! DO NOT CONNECT ANY SENSORS, MONITORS, OR THE BREATHING CIRCUIT TO THE PATIENT WHILE PERFORMING SYSTEM TESTS! DOING SO COULD ENDANGER THE PATIENT!

WARNING! DO NOT OPERATE THE MOVES® SLC™ SYSTEM UNTIL ALL SYSTEM TEST FAILURES HAVE BEEN RESOLVED, AND ALL TESTS HAVE BEEN REPEATED AND PASSED.

Setup Screen

5. Once prerequisites have been satisfied, the user must select Continue to move to the Setup screen.

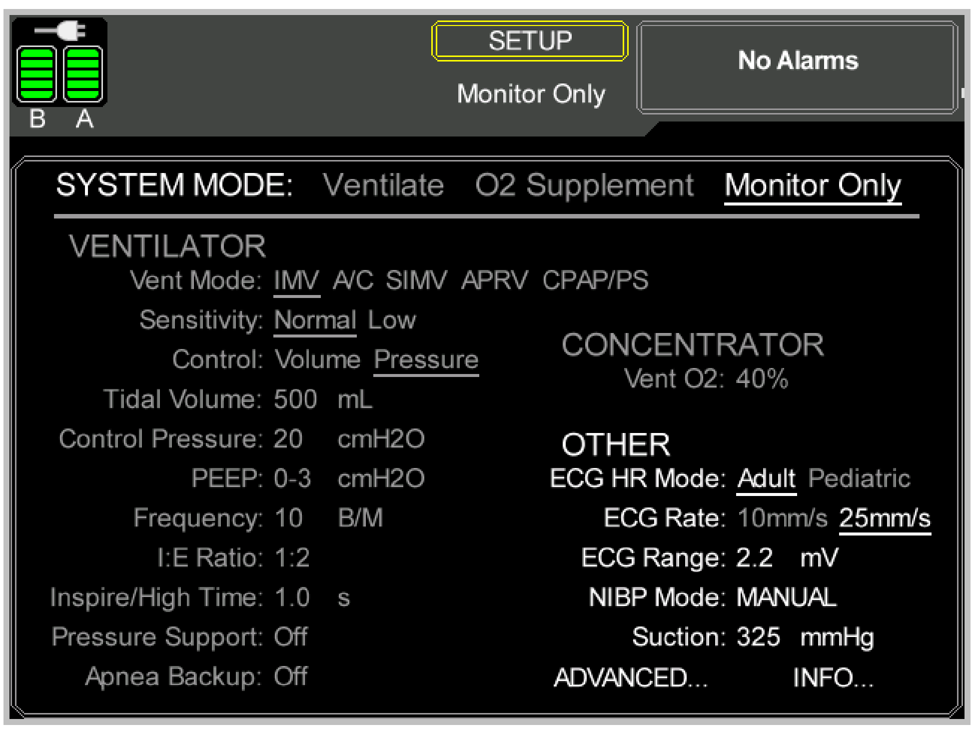


Figure 10-12: Setup Screen

6. The initial system mode will be Monitor Only. If a different system mode is desired, first configure the appropriate settings and then choose the new system mode (i.e., Ventilate or O2 Supplement).

NOTE: *If an ABP/CVP/ICP transducer is to be connected to the system, it will be necessary to reset or 'zero' the transducer. For more information, see* *Zeroing the Pressure in the IP Transducer on page 197**.*

NOTE: *All active alarms in the alarm queue should be reviewed for patient monitoring fault alarms immediately after completing the startup test procedure and before connecting to the patient.*

NOTE: *If a battery appears to be installed but is shown as missing on the display, inspect the battery and replace or reinstall. Also ensure that the battery door and latch are correct on both sides of the machine.*

CAUTION! IF INTENDING TO RUN ON BATTERIES, ENSURE THAT THERE IS SUFFICIENT POWER FOR THE LENGTH OF TIME REQUIRED, OR REPLACE THE BATTERIES.

WARNING! THE OPERATOR SHOULD ALWAYS HAVE AVAILABLE AN ALTERNATIVE MEANS OF VENTILATION CAPABLE OF SUPPLEMENTING A HIGH CONCENTRATION OF O_2 IN THE EVENT OF POWER FAILURE, MECHANICAL FAILURE, OR SERIOUS OCCLUSION IN THE VENTILATOR SYSTEM.

WARNING! THE OPERATOR SHOULD ALWAYS HAVE AVAILABLE AN ALTERNATE MEANS OF SUPPLYING A HIGH CONCENTRATION OF O_2 IN THE EVENT OF POWER FAILURE, MECHANICAL FAILURE, OR SERIOUS OCCLUSION IN THE CONCENTRATOR CIRCUIT.

WARNING! THE OPERATOR SHOULD USE AN ALTERNATIVE MEANS OF VENTILATION UPON EXPERIENCING A PROLONGED APNEA ALARM.

WARNING! ONE CHARGED BATTERY MUST BE PRESENT IN THE MOVES® SLC™ UNIT AT ALL TIMES, EVEN WHEN RUNNING ON EXTERNAL POWER. THIS REDUCES THE RISK TO THE PATIENT IN THE EVENT OF A POWER FAILURE.

11.0 MOVES® SLC™ User Screens

MOVES® SLC™ has multiple user screens.

11.1 STATUS BAR

At the top of all screens is the Status Bar. The Status Bar is used to display system status and alarms and the name of the current screen. The Status Bar contains two buttons – the Screen Select button and the Alarm View button. The Status bar shows the system power status (including battery charge and external power status), the number of alarms turned off, the number of alarm limits changed from their default value, alarm audio status, NIBP status, suction status, alarm status, and the system state.

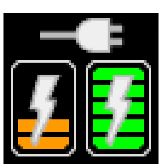
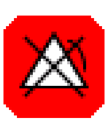
Figure 11-1: Status Bar

In addition, a small white dot can be seen moving up and down at the top right of the Status Bar to indicate that the device is not "frozen" and displayed information can be trusted to be current. If the white bar stops moving then the system display can no longer be trusted. If this occurs on the Remote Screen then discontinue use of the Remote Screen and only use the information displayed on the system screen. If the system screen is frozen, restart the MOVES® SLC™. If freezing persists, discontinue use of the MOVES® SLC™.

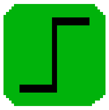
The following table explains the Status Bar items.

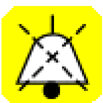
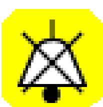
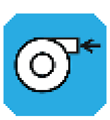
WARNING! WHEN SETTING ALARM LIMITS, DO NOT SET TO EXTREME VALUES THAT CAN RENDER THE ALARM SYSTEM USELESS.

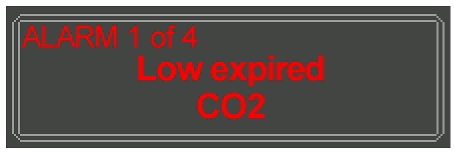
Table 23: MOVES® SLC™ Status Bar Items and Descriptions

Label/Name	Items on the Status Bar	Description
Plug icon with battery icons 	Battery charge for each battery, and charge status.	• Graphic showing charge state of each battery. Shown with red color when battery life is low and with highlight background when alarm is associated with battery. (NOTE: See the *Battery Status Icon Table* that follows for more information.) • If the state of a battery cannot be determined, its outline is shown with the fault icon. • If the entire power state cannot be determined, neither battery is shown, and a fault icon is displayed only.
Alarms OFF icon 	Icon shows that some (or all) alarms are off. Number below indicates how many alarms are off.	• The Alarm OFF icon is shown if any alarms have been turned off by the user on the Alarm ON/OFF screen. • The number of alarms 'XX OFF' is shown in text below the icon. • No icon or text is shown if all alarms are ON.

Label/Name	Items on the Status Bar	Description

Number of limits changed icon

	Icon shows that some (or all) alarm limits have changed from their default values. Number below indicates how many alarm limits have been changed.	• The Alarm Limits Changed icon is shown if any alarm limits have been changed from their default values by the user on the Alarm Limits screen.
		• The text below the icon indicates the number of alarm limits changed:
		  ○ '1 limit chgd' shown if only 1 limit is not set to its default value.
		  ○ 'X lims chgd' shown if 2-9 limits are not set to their default values.
		  ○ 'XX lim chgd' shown if 10 or more limits are not set to their default values.
		• No icon or text is shown if all alarms limits are set to their default values.

Audio PAUSE icon  **Audio OFF icon** 	Icon shows that alarm audio is PAUSED. Numbers display how many minutes and/or seconds remain for audio pause. OR Icon shows that alarm audio is OFF. Text describes that audio is OFF.	• The Audio PAUSE icon is shown if audio pause is active. This function is controlled by quickly pressing and releasing the Audio PAUSE button on the front panel. PAUSE time is 120 seconds max. • The time remaining for audio pause is shown in text below the icon as 'm:ss', for example, 1:23 (1 minute 23 seconds); or, 0:03 (3 seconds). • The Audio OFF icon is shown if audio OFF is active. This function is controlled by pressing and holding the Audio PAUSE button on the front panel for three (3) seconds. • Audio PAUSE can only be active if Audio OFF is not active. • No icon or text is shown if Audio PAUSE / OFF is not active.
NIBP icon 	Icon shows that NIBP is active. Text below indicates 'ON' status.	• The NIBP icon is shown if NIBP is obtaining a reading, which is controlled by the NIBP button on the front panel and/or by the auto NIBP setting on the Setup Screen. • Text below the ICON is simply ON. • Note that the cuff press is displayed with the NIBP reading on the main screen. • No icon or text is shown if NIBP is not active. • The NIBP fault icon is shown if the status of NIBP cannot be determined or is known to be in a fault condition.
Suction Icon 	Icon shows that Suction is active. Text below icon shows the suction pressure.	• Numerical values below the Suction icon show 1 to 999 mmHg in steps of 1 and - - - for an unknown value or value less than or equal to 0. If a value is greater than 999, the value 999 is still shown. • The Suction fault icon is shown if the status of suction cannot be determined.
Screen Select Button	Button indicates which screen is active. 	• When the Screen Select button is selected (double yellow lines), pressing the Check button makes it active (dashed single yellow line). Then pressing the Next and Previous buttons will cycle through the list of screens. Pressing the Check button a second time will confirm the screen choice and cause the chosen screen to be displayed.

Label/Name	Items on the Status Bar	Description
System State	Text indicates which mode is active. 	Text describes the system mode: • Monitor Only • O2 Supplement • When the system mode is Ventilate mode, the system state text will describe the specific ventilation configuration (e.g., VC-SIMV+PS, which indicates the system is in Volume Controlled Synchronized Intermittent Mandatory Ventilation with spontaneous breaths receiving Pressure Support).
Alarm View Button	Alarm Queue	Three (3) line alarm message queue at the top right of screen. The alarm queue shows the highest priority alarm.  To view additional alarms (if existing), use the Next or Previous buttons to select the Alarm Queue (double yellow lines). Then, press the Check button to make it active (dashed yellow line). Then, pressing the Next and Previous buttons will cycle through the alarms. Pressing the Cancel button will exit the Alarm Queue and return to top level navigation.

11.1.1 Battery Status Icon

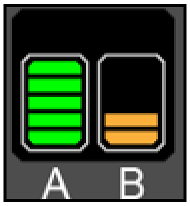
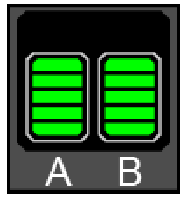
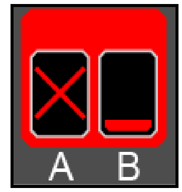
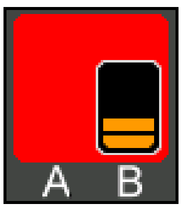
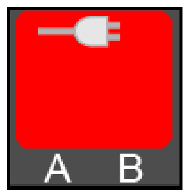
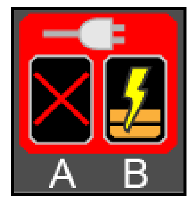
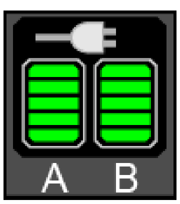
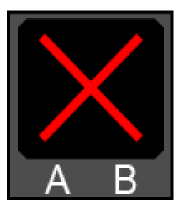
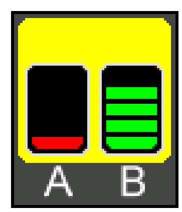
The Battery status icon shows the charge of the two system batteries individually; it also indicates if external power is connected. The batteries are drawn beside each other and labeled A and B. Charge is shown by filling in each chamber accordingly, indicated by 5 charge segments (the same number of segments as the physical battery LED status on the battery). When an alarm associated with system power is active, the area behind the battery status icons is highlighted with a red background if highest associated alarm is High priority. Otherwise, a yellow highlight is used for Medium/Low alarm priority. When the system is connected to external power, a plug icon is drawn above the battery icons.

Note the following:

- Each battery is individually hot swappable.
- If a battery has no charge, no segments will be shown.
- If a battery is not present, no segments and no battery outline will be shown.
- If MOVES® SLC™ is evaluating a battery's status, a question mark will be drawn over that battery's status area.
- If a battery's status cannot be determined, a fault icon will be drawn over the battery's status area.
- If a battery is charging, a 'lightning bolt' will be drawn over the battery icon and its segments.
- If the power status is not known, a large fault icon will be displayed.

The color of the segments for a battery depends on the number of segments shown. If one segment is shown, the color is red; if two or three, the color is orange; if more than three segments are shown, the color is green. This matches the color of the top most LED on the battery charge indicator on the battery itself.

Table 24: Battery Status Icon Table

Battery Status Icon Table		
Battery A Full Charge Battery B Half Charge  **Running on Battery No associated alarm(s)**	**Battery A Full Charge Battery B Full Charge**  **Running on Battery No associated alarm(s)**	**Battery A Unknown Battery B Near Empty**  **Running on Battery High priority alarm**
Battery A Missing Battery B Half Charge  **Running on Battery High priority alarm**	**Battery A Missing Battery B Missing**  **Running on External Power High priority alarm**	**Battery A Unknown Battery B Half Charge, Charging**  **Running on External Power High priority alarm**
Battery A Full Charge Battery B Full Charge  **Running on External Power No associated alarm(s)**	**Power Status Unknown**  **Power Status Unknown Alarm status ignored**	**Battery A Near Empty Battery B Near Full**  **Running on Battery Medium/Low priority alarm**

11.2 SYSTEM TEST SCREEN

NOTE: *The system will only operate if the power-on system memory and system firmware check was successful. The startup tests perform functional testing on components of the system that require operator intervention to validate – other parts of the system are continually tested and will show failure status in the alarm queue.*

NOTE: *The operator should wait until the O_2/CO_2 sensor has warmed up and O_2/CO_2 values are displayed before connecting a patient.*

NOTE: *All active alarms in the alarm queue should be reviewed for patient monitoring fault alarms immediately after completing the startup test procedure and before connecting to the patient.*

Upon starting MOVES® SLC™ the user, in most cases, will be presented with the System Test screen.

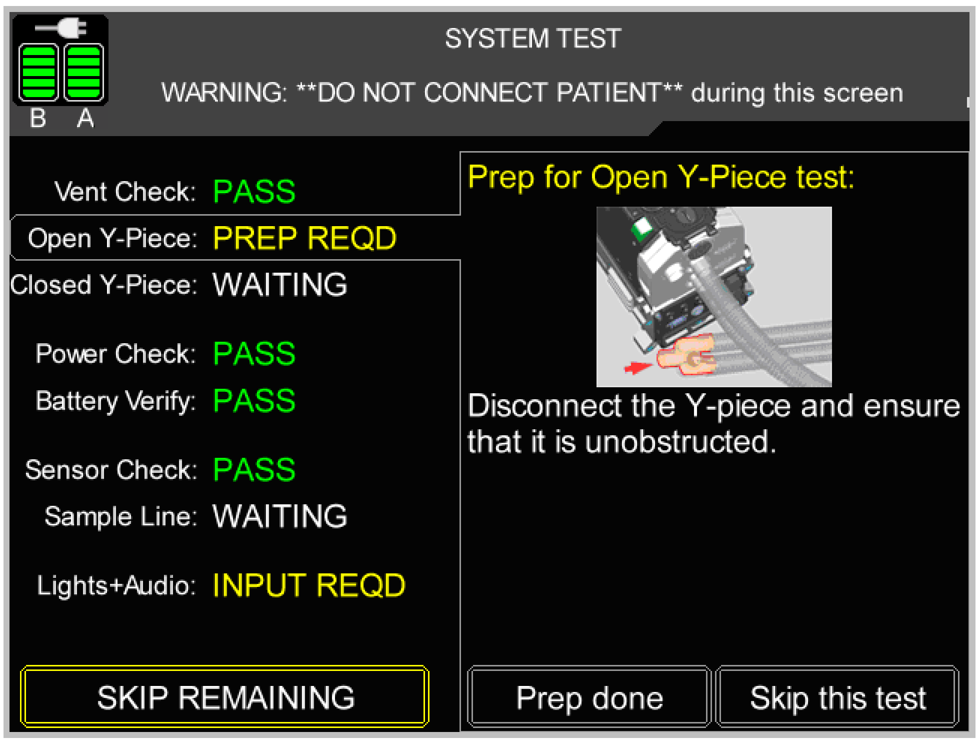
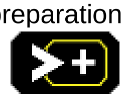


Figure 11-2: System Test Screen

The System Test screen will indicate to the user which tests have passed and which need preparation before they can be conducted. A description of the preparation required is given at the right of the screen. Once preparation has been done, the user presses the Next button  to select *Prep done* and then the Check button  to initiate the test. The user is also presented with the options of skipping a particular test or all remaining tests.

NOTE: *In order to save time, certain tests can be run concurrently. For example, while the Open Y-Piece test is still running, the screen will advance to the Battery Verify test, which can be run concurrently. After completing that test, the screen will advance to the Sample Line test, which can also be run concurrently.*

The System Test screen will not immediately appear upon startup if:

1. The system has been shut down for a period of time less than or equal to 3 minutes. In this case, the system will auto resume to the point it was at prior to shutdown. (**NOTE:** A temporary loss of power is assumed here.)
2. The system has been shut down for a period of time greater than 3 minutes but less than 30 minutes. In this case, the system will query the user as to whether the patient is new or continuing (and the following screen will be displayed).

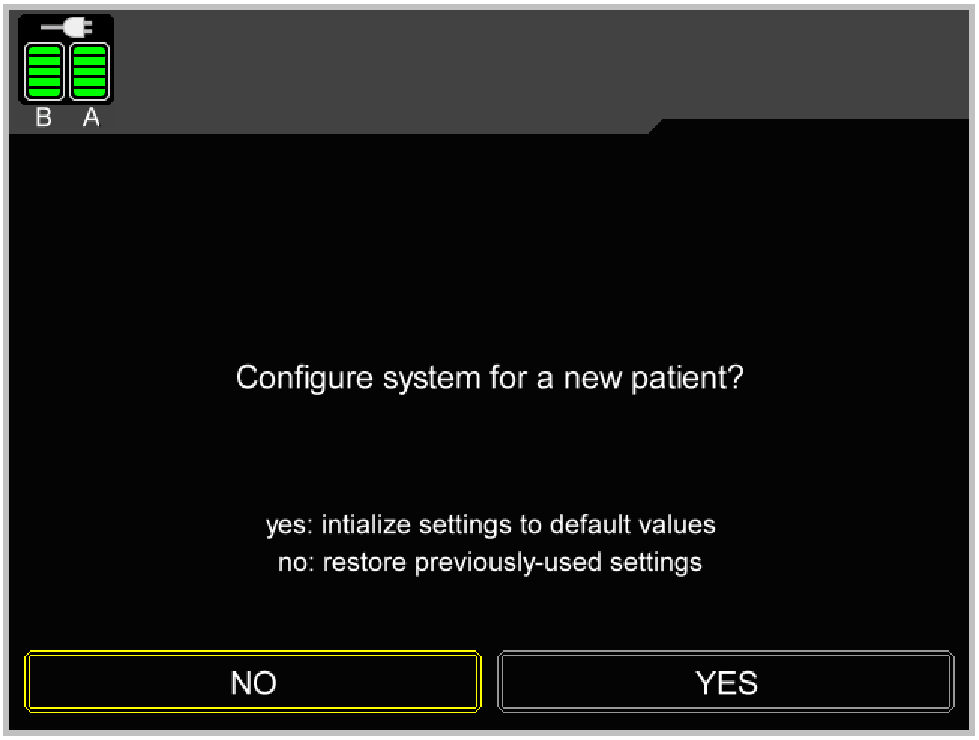


Figure 11-3: Configure for a New Patient Screen

Selecting YES will return the system settings to default values (see *Section 17.1 System Default Settings on page 271* for details). Selecting NO will keep the last system settings used. **NOTE:** NO should only be selected if the operator is aware of the last system settings configuration or the operator should review the settings on the Setup, Alarm Limits, Alarm ON/OFF and Advanced screens.

11.3 SETUP SCREEN

11.3.1 Overview

The Setup Screen is used to view and modify the primary operational settings of MOVES® SLC™. The color of a field is dependent on the mode selected. If a field is white, it is currently in use; otherwise, the field is gray. This lets the user see all the primary settings, including those that are not used by the current system mode.

11.3.2 Changing Settings

NOTE: *Settings can be changed even in a mode where the setting is not active.*

To change system settings:

1. Use the Next and /or Previous buttons to navigate to the System Mode area (it becomes surrounded by a double yellow line).
2. Press the Check button (the System Mode area becomes surrounded by a dashed yellow line).
3. Use the Next and /or Previous buttons to navigate to the setting you want to change (it becomes surrounded by a single yellow line).
4. Press the Check button (the setting becomes surrounded by a dashed yellow line).
5. Use the Next and /or Previous buttons to select a new setting.
6. Press the Check button to confirm the new setting (the setting becomes surrounded by a single yellow line).
7. Press the Cancel button to exit the System Mode area.

11.3.3 Setup Screen – Ventilate Mode

NOTE: *Because there are five (5) Vent Modes (IMV, A/C, SIMV, APRV, and CPAP/PS), certain settings will be grayed out under each. However, these settings can still be changed even though the mode they apply to* *__is not currently selected__.*

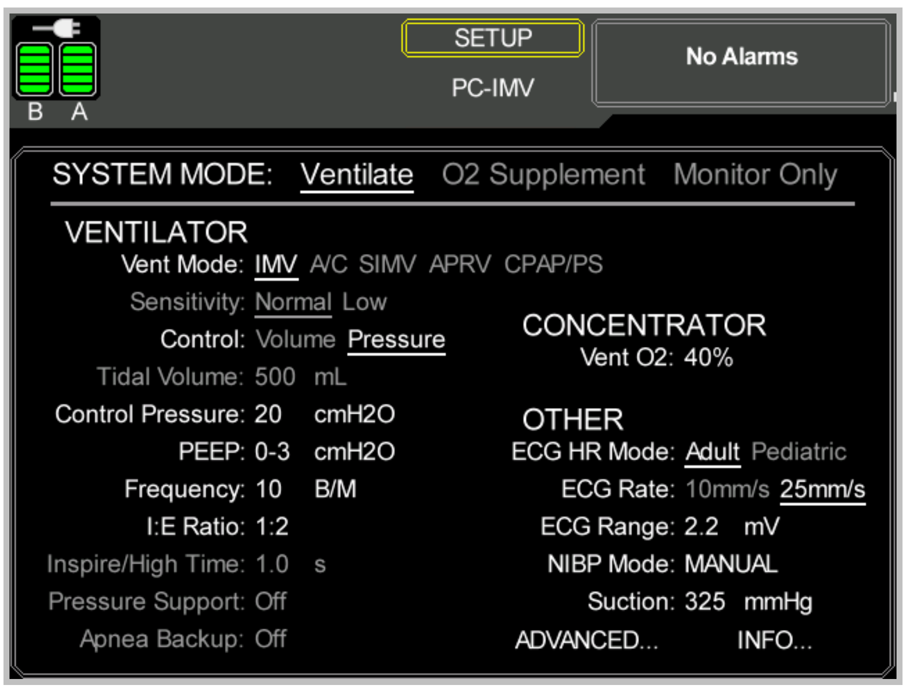


Figure 11-4: Setup Screen – Ventilate Mode

11.3.4 Setup Screen – O2 Supplement

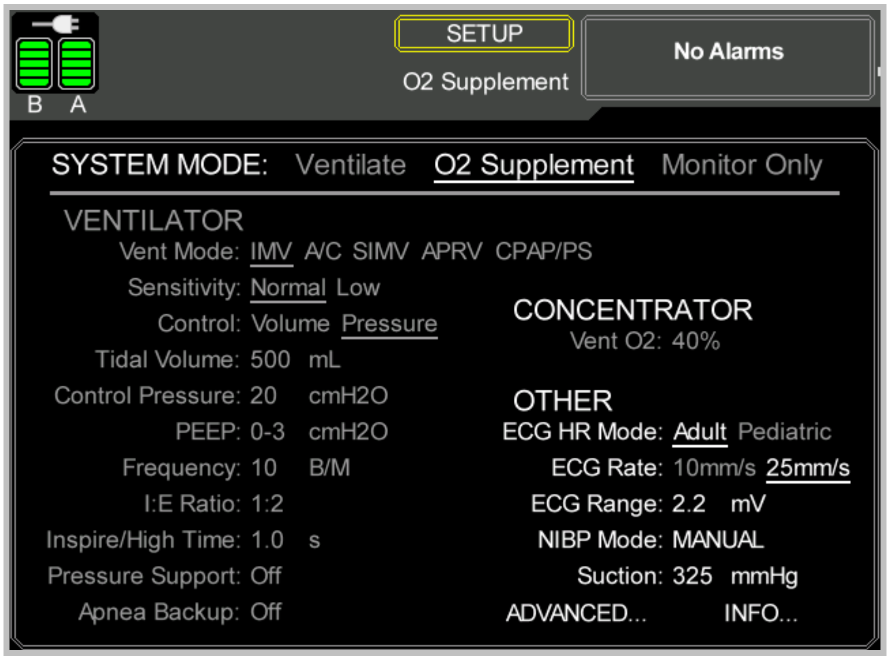


Figure 11-5: Setup Screen – O2 Supplement

11.3.5 Setup Screen – Monitor Only

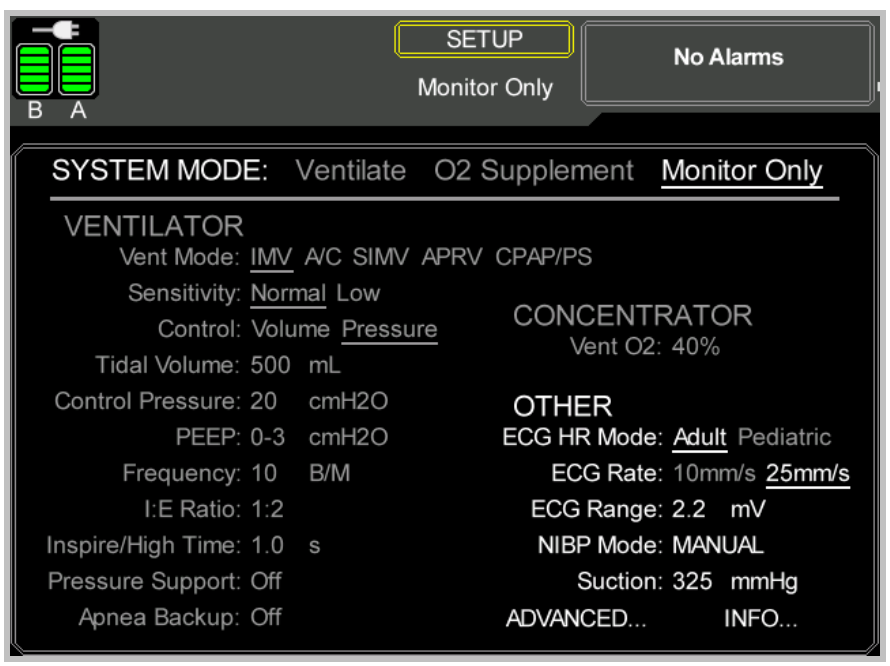


Figure 11-6: Setup Screen – Monitor Only

11.3.6 Setup Screen Options

Table 25: Setup Screen Options and Descriptions

Setup Screen Options		
Fields on the Setup Screen	**Used by System Mode**	**Description**
System Mode	All	• Ventilate Mode, O2 Supplement, Monitor Only. • Default: Monitor Only • Change immediately after change confirmed
Vent Mode	Ventilate Mode	• IMV, A/C, SIMV, APRV, CPAP/PS • Default: IMV • Change at start of next inhalation after change confirmed.
Breath Sensitivity	Ventilate Modes: A/C, SIMV, CPAP+PS	• Normal, Low. • Defaults: Normal
Control	IMV, A/C, SIMV	• Pressure, Volume. • Default: Pressure • Change at start of next inhalation after change confirmed.
Tidal Volume	Ventilate Modes: IMV, A/C, SIMV when Control is set to Volume	• 50 to 250 ml in 10 ml intervals • 250 to 750 ml in 25 ml intervals • Default: 500 ml • After a change is accepted, the option selected will be active after the patient's current breath.
Control Pressure	Ventilate Modes: IMV, A/C, SIMV when Control is set to Pressure	• Pressure Control (over PEEP) • 10 to 55 cmH_2O in intervals of 1 cmH_2O • Default: 20 cmH_2O • After a change is accepted, the option selected will be active after the patient's current breath. • ***NOTE:*** *Control Pressure = PIP (Peak Inspiratory Pressure) – PEEP (Positive End Expiratory Pressure)*

Setup Screen Options		
Fields on the Setup Screen	**Used by System Mode**	**Description**
PEEP	Ventilate Mode	• Positive End-Expiratory Pressure • 0-3, 4 to 20 cmH_2O in intervals of 1 cmH_2O • Default: 0-3 cmH_2O • ***NOTE:*** *0-3 cmH_2O represents the minimum PEEP setting for the system. When PEEP is set at: 0-3 cmH_2O, the system will maintain a slight bias PEEP pressure of 3 cmH_2O for improved trigger accuracy and system responsiveness.* • After a change is accepted, the option selected will be active after the patient's current breath. • ***NOTE:*** *When the PEEP value is increased by 10* cmH_2O *or more some additional breath triggers may be observed. This includes starting the ventilator at a PEEP setting of 10* cmH_2O *or more.*
Frequency	All Ventilate modes except CPAP/PS	• Respiratory Rate • 6 to 40 B/M in steps of 1 B/M • Default: 10 B/M • Change at start of next inhalation after change confirmed.
I/E ratio	Ventilate Modes: IMV, A/C	• Inspiratory/Expiratory Ratio • 1:1.0, 1:1.5, 1:2.0, 1:2.5, 1:3.0 • Default: 1:2.0 • Change at start of next inhalation after change confirmed.
Inspire / High Time	Ventilate Mode: SIMV, APRV	• Inspiratory Time in SIMV • High Time in APRV • 0.3 to 5.0 seconds in steps of 0.1 seconds • Default: 1.0 second • Change at start of next inhalation after change confirmed.
Pressure Support	Ventilate Modes: SIMV, CPAP/PS	• Off, 5 to 40 cmH_2O in intervals of 1 cmH_2O • Default: Off • Change at start of next inhalation after change confirmed.
Apnea Backup	CPAP+PS	• Off, On • Default: Off
Vent O2	Ventilator Mode Only	• Ventilate Mode: Air, 30%, 40%, 50%, 60%, 70%, 85%, Maximum (always on) • Default: 40% • Change immediate after change confirmed.

Setup Screen Options		
Fields on the Setup Screen	**Used by System Mode**	**Description**
ECG Rate	All	• Sweep speed of ECG. ECG is displayed on graphs on Monitor screen or dedicated ECG screen. • 10 mm/s or 25mm/s***** • Default: 25 mm/s • 10 mm/s is 60 Hz data point display • 25mm/s is 150 Hz • Change immediate after change confirmed. • **** NOTE:*** *ECG Rate listed is for MOVES® SLC™, the actual rate on the MOVES® SLC™ remote screen will be different. Refer to Section 14.2.1 for more details.*
ECG Range	All	• Maximum amplitude range of ECG. ECG is displayed on graphs. • 2.2 mV, 3.0 mV, 6 mV or 12.0 mV range • Default: 2.2 mV • Change immediately after change confirmed. • ***NOTE:*** *Range is centered about zero (e.g., 3.0 mV is +/- 1.5 mV).* • ***NOTE:*** *A dashed reference line indicating 1.0 mV is always displayed on graphs*
NIBP	All	• NIBP Measurement Period • Manual, Stat, 1, 2, 3, 4, 5, 10, 15 min • Default: Manual • In *Manual* mode no automatic NIBP measurements are taken. Press the NIBP button to start a measurement. • *Stat* mode acquires NIBP measurements as fast as possible while guaranteeing 5 seconds between the end of a measurement and the start of the next measurement. • Change immediately after change confirmed. • ***NOTE:*** *After 15 minutes of Stat mode, the mode will automatically switch to 5 minute mode. IEC 80601-2-30 201.105.2 states that Stat mode can only last for 15 minutes, and then must go to manual or long term automatic.* • ***NOTE:*** *If NIBP measurement period is set to anything other than Manual, and three automatic NIBP measurements fail to obtain a reading, then the system will automatically switch the mode to Manual and notify the operator of this change.*
Suction	All	• 100 to 325 mmHg in steps of 25 mmHg • Default: 325 mmHg

Setup Screen Options		
Fields on the Setup Screen	**Used by System Mode**	**Description**
ADVANCED…	N/A	• Conveys user to the Advanced screen where advance system settings can be viewed and modified (e.g., SpO_2 Average Time, SpO_2 Sensitivity Mode , ECG EMG Filter, etc.). • Additionally, PulseOx feature availability can be verified and system firmware versions reviewed.
INFO…	N/A	• Conveys user to the Info screen where PulseOx feature availability can be verified and system firmware versions reviewed.

11.4 ADVANCED SCREEN

11.4.1 Accessing the Advanced Screen

The Advanced Screen is accessed from the Setup Screen. The user navigates to the System Mode area and presses the Check button to make it active. The user then navigates to the Advanced option and presses the Check button again to proceed to the Advanced Screen.

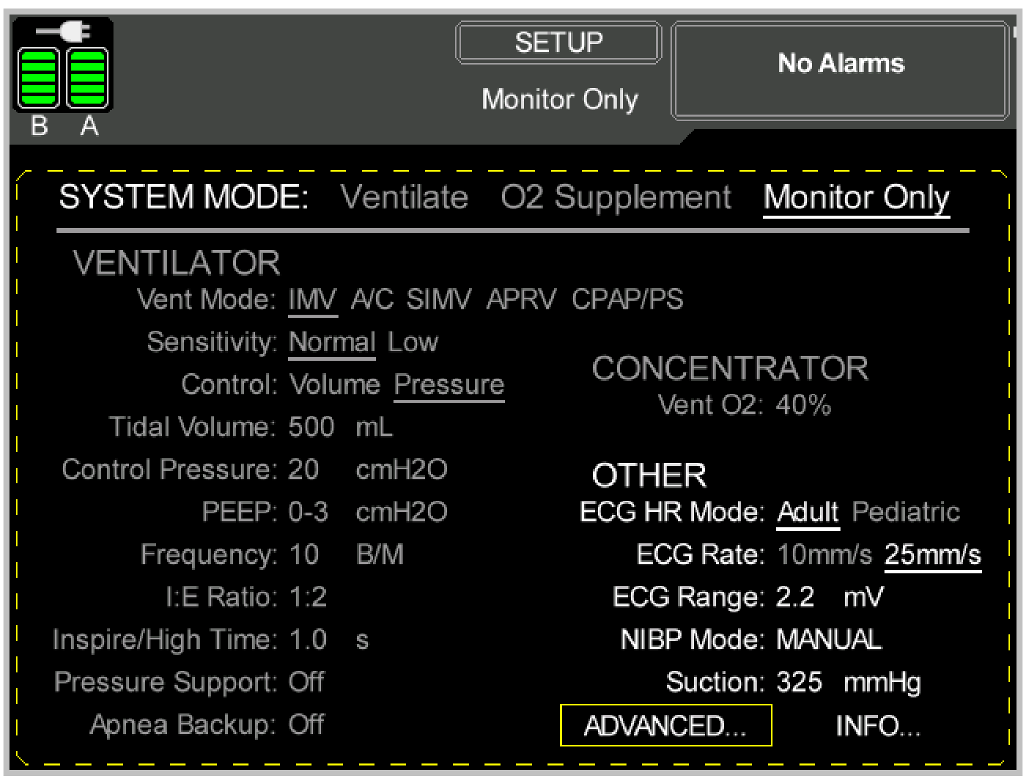


Figure 11-7: Accessing the Advanced Screen

11.4.2 The Advanced Screen Itself

The selection order for the buttons on the Advanced screen is the following: Screen Button, Alarm View Button, Options Area.

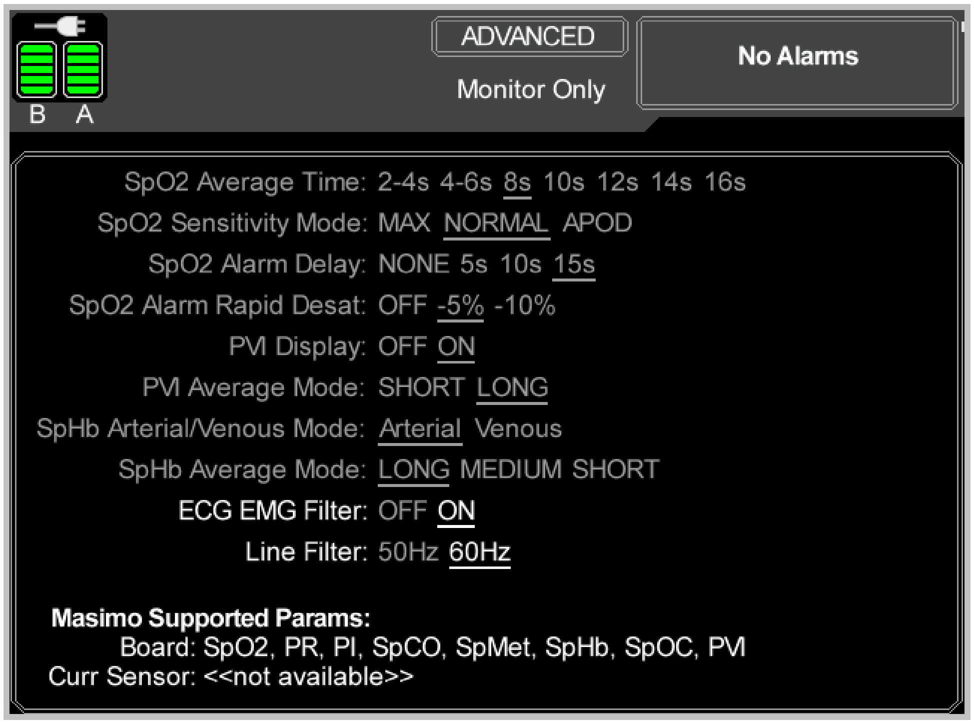


Figure 11-8: The Advanced Screen

The Options Area is selected as on other screens, by navigating to it and pressing the Check button to make it active. When this is done, the first option will be automatically selected.

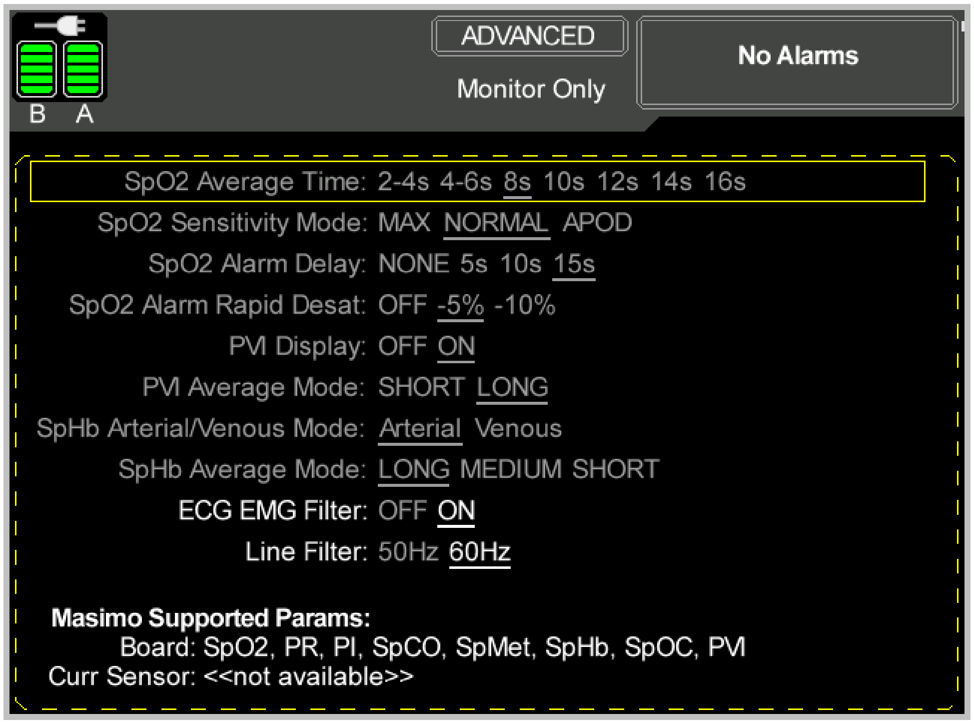


Figure 11-9: Advanced Screen – SpO2 Average Time Selected

The following table lists the options and values available on the Advanced Screen.

Table 26: Advanced Screen Options

Advanced Screen Options		
Option	**Values Available**	**Default Value**
SpO2 Average Time	2-4s, 4-6s, 8s, 10s, 12s, 14s, 16s	8s
SpO2 Sensitivity Mode	MAX, NORMAL, APOD	NORMAL
SpO2 Alarm Delay	NONE, 5s, 10s, 15s	15s
SpO2 Alarm Rapid Desat	OFF, -5%, -10%	-5%
PVI Display	OFF, ON	ON
PVI Average Mode	SHORT, LONG	LONG
SpHb Arterial/Venous Mode	Arterial, Venous	Venous
SpHb Average Mode	LONG, MEDIUM, SHORT	LONG
ECG EMG Filter	OFF, ON	ON
Line Filter:	50 Hz, 60 Hz	Initial setting is 60 Hz; however, if changed, last setting is remembered. Does not default to 60 Hz with a new patient.

11.4.3 SpO2 Average Time

The user-selectable SpO2 averaging feature allows the operator to select the desired level of visibility applied to subtle variations in the measured value. Eight (8) second averaging is generally considered the most common averaging interval, and it is recommended for most patients since it is short enough to provide visibility to subtle desaturations while also being long enough to minimize major changes in SpO2 due to quick, transitory desaturations.

11.4.4 SpO2 Sensitivity Modes

The three sensitivity settings allow the operator to adapt the SpO_2 measurement sensitivity to the patient's level of SpO_2 signal strength and quality at the measurement site.

MAX

MAX mode is used to obtain and display data even when the signal is very weak due to impaired perfusion (can be used, for example, during treatment or examination, i.e., when someone is with the patient). If the sensor becomes detached from the patient, this mode makes virtually no provision for measurements that are displayed erroneously.

NORMAL

NORMAL is the recommended mode for typical monitoring, such as intensive care units.

APOD (Adaptive Probe Off Detection)

APOD is the recommended mode when it is not possible to detect immediately if a sensor has become detached. This mode offers better protection against erroneous measurements being displayed, even though the sensor has become detached from the measurement point (e.g., as a result of the patient moving).

11.4.5 SpO2 Alarm Delay

The SpO2 alarm delay allows the user to adjust the time after which the Low SpO2 alarm will be escalated from a LOW priority alarm to a HIGH priority alarm, once a low SpO2 alarm condition has been initiated. Many desaturations are real, but transitory and, as such, may not require clinical intervention. Therefore, the priority of the desaturation alarm is escalated once the desaturation is determined not to be momentary, thus reducing the number of high priority alarm conditions.

The options available are NONE, 5 seconds, 10 seconds, and 15 seconds. If an SpO2 limit alarm occurs, and the time is less than the delay time, the SpO2 value is highlighted but the alarm is classified as LOW priority. If the alarm maintains its status for longer than the delay value, it is upgraded to HIGH priority. Selecting the option NONE removes the alarm delay and the priority of the Low SpO2 alarm will always be HIGH priority.

11.4.6 SpO2 Alarm Rapid Desat

If a very rapid desaturation occurs, a user would not want the alarm to be delayed. This is the reason for the SpO2 Alarm Rapid Desat feature. Options available are OFF, -5% and -10%. Percentages are in terms of the maximum 100% saturation possible, not a percentage of the user-set Low SpO2 Alarm Limit value. If the feature is set to OFF, the alarm delay time is always in effect.

The SpO2 Alarm Rapid Desat threshold is determined by taking the Low SpO2 Alarm Limit value and adding the value of the set point (either -5% or -10%). For example, imagine that the Alarm Delay is set to 15 seconds, the Low SpO2 Alarm Limit to 85% and Rapid Desat to -10%. Therefore, in this example, the SpO2 Alarm Rapid Desat threshold is 75%. As the SpO2 falls to 85%, the Low SpO2 alarm triggers at LOW priority and the following scenarios are possible:

- If the SpO2 remains at 85%, then after 15 seconds the Low SpO2 alarm becomes HIGH priority.

- If the SpO2 falls below 85%, continues to fall, and after only 10 seconds reaches 75%, the HIGH priority alarm is triggered.
- If the SpO2 falls to 75% but then climbs to 76% in less than 15 seconds, then the Low SpO2 alarm does not return to Low priority. Once the Low SpO2 alarm becomes HIGH priority, the alarm stays HIGH priority until the low SpO2 alarm condition is no longer present.

11.4.7 PVI Display

Allows disabling or re-enabling display of the PVI measurement value depending on whether it is needed by the operator.

11.4.8 PVI Average Mode

The PVI Average Mode allows the clinician to select the desired level of visibility to subtle variations in the PVI value. This allows a clinician to fine tune PVI responsiveness to achieve the desired level of visibility to rapid variations in PVI values.

11.4.9 SpHb Arterial/Venous Mode

While monitoring Hb levels, there are two blood sample sources from which Hb readings can be obtained: arterial and venous. Arterial Hb measurements can be expected to be slightly lower than the Hb measurement derived from venous blood.

This feature allows the clinician to tailor the SpHb measurement to their clinical practice and/or setting.

11.4.10 SpHb Average Mode

The SpHb Average Mode allows the clinician to select the desired level of visibility to subtle variations in the SpHb value. This allows a clinician to fine tune SpHb responsiveness to achieve the desired level of visibility to rapid variations in SpHb values.

11.4.11 ECG EMG Filter

When enabled (i.e., ON) this feature filters the ECG waveforms for EMG interference in the frequency range of 15-30 Hz.

11.4.12 Line Filter

Depending on the geographical region, the Line Filter setting must be configured to match the power line frequency used in that region. This setting is used by the ECG and Pulse CO-Oximeter modules to allow for cancellation of noise introduced by fluorescent lights and other sources which may improve signal quality.

11.4.13 Masimo Supported Params

Masimo parameters supported by MOVES® SLC™ are listed. More detailed Masimo information is supplied on the Info Screen.

11.5 INFO SCREEN

11.5.1 Accessing the Info Screen

The Info Screen is accessed from the Setup Screen. The user navigates to the System Mode area and presses the Check button to make it active. The user then navigates to the Info option and presses the Check button again to proceed to the Info Screen.

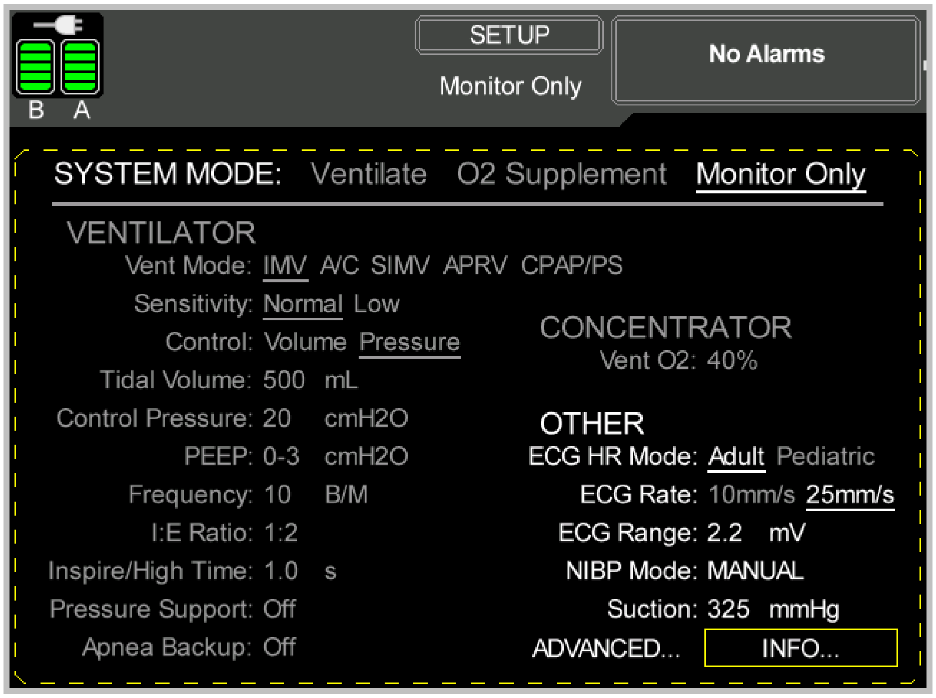


Figure 11-10: Accessing the Info Screen

11.5.2 The Info Screen Itself

The selection order for the buttons on the Info screen is the following: Screen Button, Alarm View Button, Options Area.

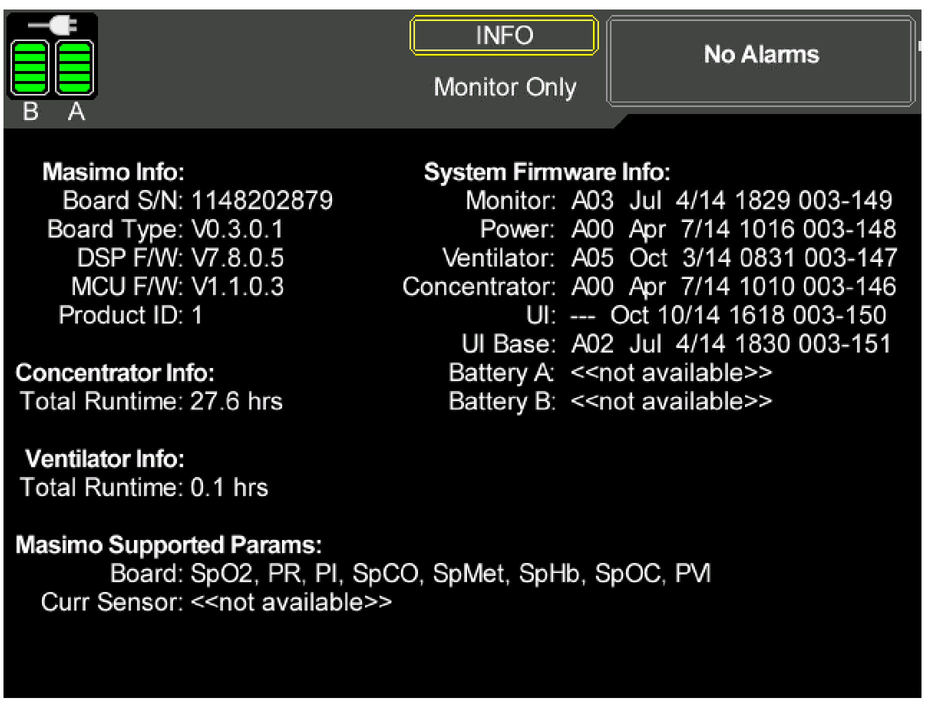


Figure 11-11: The Info Screen

11.5.3 Information Located on the Info Screen

Table 27: Info Screen Items

<table>
<tr><th>Info</th><th>Items</th></tr>
<tr><td>Masimo Info</td><td>• Board S/N (serial number)
• Board Type
• DSP F/W (digital signal processor firmware version)
• MCU F/W (microcontroller firmware version)
• Product ID (identification)</td></tr>
<tr><td rowspan="2">Masimo Supported Params (parameters):
The screen provides a list of all supported parameters for the Pulse CO-Oximeter (Board) and the currently attached sensor (Current Sensor). A parameter must be supported by the Pulse CO-Oximeter and by the sensor in order for the parameter measurement to be displayed.
Listed below are all possible parameters:
• SpO2
• PR - Pulse Rate
• PI - Perfusion Index
• PVI – Pleth Variability Index
• SpCO
• SpMet
• SpHb
• SpOC
• NOTE: See Section 7.4 Pulse Oximeter Technology Overview beginning on page 54 for a description of each of these parameters.</td><td>Board:
• SpO2, PR and PI are always supported
• The extended parameters SpCO, SpMet, SpHb and SpOC are optional features which may or may not be present depending on the requested configuration when MOVES® SLC™ was manufactured.</td></tr>
<tr><td>Current Sensor:
• All possible parameters the currently attached sensor can measure will be listed, even if the Pulse CO-Oximeter does not support the parameter.
• If no sensor is presently connected to the Pulse CO-Oximeter, then <<not available>> is shown</td></tr>
<tr><td>System Firmware Info (version date)
NOTE: Upon completing system firmware updates, the system should be power cycled before verifying that correct versions are installed.</td><td>• Monitor (Patient Monitor)
• Power (Power Manager)
• Ventilator
• Concentrator
• UI (User Interface)
• UI Base
• Battery A
• Battery B</td></tr>
<tr><td>Concentrator Info</td><td>• The cumulative number of hours of operation of the concentrator. (Note, this information is not displayed on the remote screen)</td></tr>
</table>

Info	Items
Ventilator Info	• The cumulative number of hours of operation of the ventilator. (Note, this information is not displayed on the remote screen)

NOTE: *If batteries are not inserted the << info not available >> notification is displayed.*

11.6 MAIN SCREEN

The Main Screen is used to display patient status and monitored values. It is the primary screen of MOVES® SLC™. The Main Screen is for status only. There are no functional settings to change.

NOTE: *The values displayed on the Monitoring Screen are those that are actually measured from the patient and not how the system is configured (e.g., The Monitoring Screen displays the actual volume, pressure and respiratory rate measured from the ventilator.)*

The available buttons are for the following:

- Choosing which chart to view
- Choosing the source of heart rate to view
- Zeroing the invasive pressures channels
- Labeling the invasive pressure channels

Any value that has an active alarm associated with it is drawn in reverse color (non black background).

Figure 11-12: Screen Items Drawn in Reverse

For all numeric or text display items, if no valid data is available, dashes are displayed.

Figure 11-13: Screen Items Displaying Dashes

For all numeric or text display items, if a fault prevents data display the fault icon (X) is displayed.

Figure 11-14: Screen Items Displaying the Fault Icon

For all display items, a trusted number is always shown or represented; otherwise, for values that are not possible – and therefore not trusted – dashes are displayed and the systems acts as if the data is not available. An alarm is usually generated for this untrusted number.

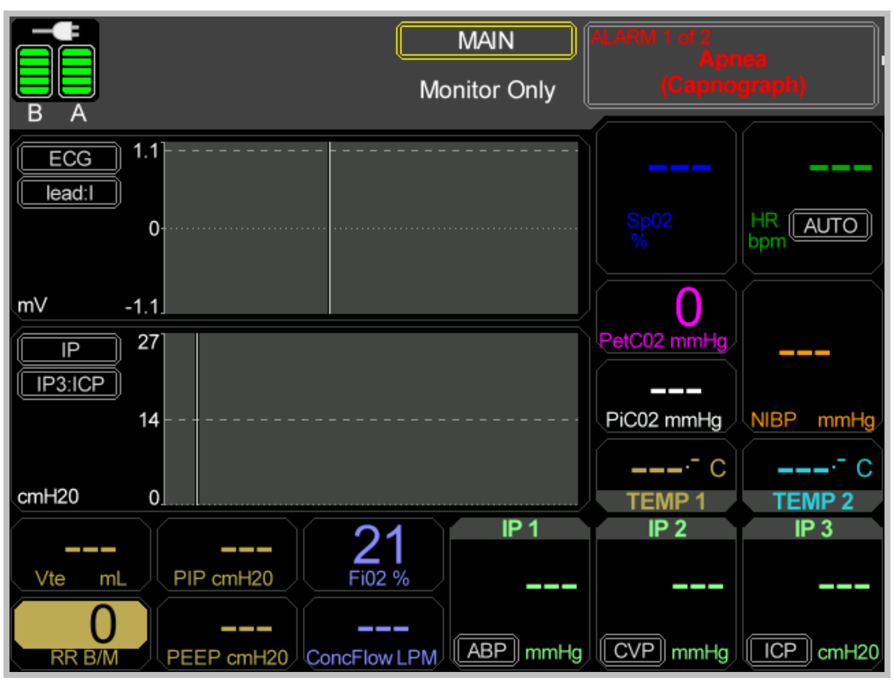


Figure 11-15: Main Screen with Dashes & Alarms

11.6.1 Selection Order for Options

The selection order for Main Screen buttons is the following:

1. Screen Button
2. Alarm View Button
3. HR Source
4. Chart 1 – Data Type

- If Trends, followed by Data Source, Data Type & Time
- If ECG, followed by Data Source
- If IP, followed by Data Source
- All others followed by Chart 2

5. Chart 2 – Data Type

- If Trends, followed by Data Source, Data Type & Time
- If ECG, followed by Data Source
- If IP, followed by Data Source
- All others followed by IP1

6. IP 1
7. IP 2
8. IP 3

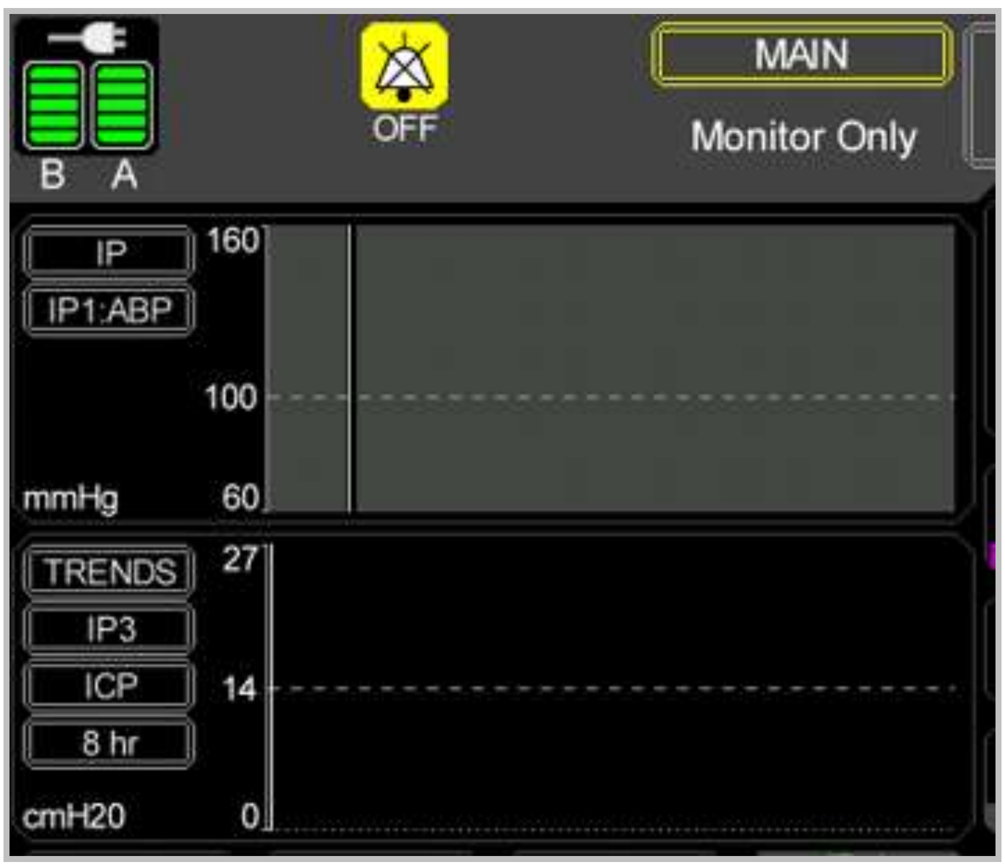


Figure 11-16: IP & Trends Graph Options & Sub-Options

11.6.2 Main Screen Items

Table 28: Main Screen Items and Descriptions

Label	Items on the Main Screen	Description
Vte	Expired Tidal volume	• Numeric 1 to 2500 ml in steps of 1 ml, or a series of dashes (- - -) for unknown. • Only displayed when ventilating; otherwise, a series of dashes (- - -) is shown. • ">2.5 L" is shown if 2501 ml or higher.
Vti	Inspired Tidal volume	• Vti is displayed in the location of Vte, alternating with Vte display every 2 seconds. This is only shown if: ○ "High expired tidal volume" alarm is active OR ○ "Leak detected" alarm is active. • Numeric 1 to 2500 ml in steps of 1 ml, or a series of dashes (- - -) for unknown. • Only displayed when ventilating; otherwise, series of dashes (- - -) is shown. • ">2.5 L" is shown if 2501 ml or higher.
RR	Respiratory Rate, calculated from the CO_2 monitor	• Numeric 0–99 B/M in steps of 1, or a series of dashes (- - -) for unknown value. • ">99" is shown if 100 B/M or higher.
PIP	Peak Inspiratory (Airway) Pressure	• Numeric 0–100 cmH20 in steps of 1, or a series of dashes (- - -) for unknown / out of range. • Only displayed when ventilating, otherwise, or a series of dashes (- - -) is shown.
PEEP	Positive End Expiratory (Airway) Pressure	• Same as PIP
FiO_2	Fraction of Inspired Oxygen (O_2)	• Numeric 0–100 % in steps of 1 or (- - -) for unknown value. • If >100 and ≤105, shows 100, if >105 shows (- - -). • If unavailable due to calibration / warming-up shows "CAL".
ConcFlow	Concentrator Flow	• Volumetric flow of oxygen from the concentrator into the ventilator or O2 Supplementation port (depending on system mode) at a nominal oxygen concentration of 90%. • Numeric 0.0 to 4.0 LPM • ">4.0 LPM" shown for any value over 4.0 LPM.
Temp1	Patient Temperature 1	• Numeric 82.4 to 108.0° F (or 28 to 42° C) in steps of 0.1 or (- - -) for unknown value. • Values outside of human body temperature range are shown as follows : ○ "<28.0" or ">42.0" (Celsius) ○ "<82.4" or ">108" (Fahrenheit)
Temp2	Patient Temperature 2	• Same as Temp1.

Label	Items on the Main Screen	Description
$PetCO_2$	Partial Pressure of End-Tidal Carbon Dioxide	• Numeric 0–99 mmHg in steps of 1, or a series of dashes (- - -) for unknown value; otherwise, ">99" is shown. • If unavailable due to calibration / warming-up, shows "CAL".
$PiCO_2$	Partial Pressure of Inspired Carbon Dioxide	• Same as $PetCO_2$
SpO_2	Saturation percentage of oxygen attached to hemoglobin. (The amount of oxygen being carried by the red blood cells in the blood.)	• Numeric 0–100% in steps of 1 or a series of dashes (- - -) for unknown value. • If >100, shows ">100". • If unavailable due to initialization or calibration shows "INIT".
NOTE: *PVI and the following four (4) "Sp" items are only conditionally displayed when the appropriate Masimo sensor is present. To display these five (5) items, the device must first have the corresponding feature unlocked. Also, the proper Masimo sensor which measures the value must be present. In addition, the values can only be found on the left of the pleth real-time graph.*		
PVI	Pleth Variability Index (PVI may help clinicians noninvasively assess fluid status of patients and predict fluid responsiveness.)	• Numeric 0–100% in steps of 1 or a series of dashes (- - -) for unknown value. • If unavailable due to initialization shows "INIT".
SpCO	Saturation percentage of carbon monoxide attached to hemoglobin (i.e., carboxyhemoglobin). (The amount of carbon monoxide being carried by the red blood cells in the blood.)	• Numeric 0–100% in steps of 1 or a series of dashes (- - -) for unknown value. • If unavailable due to initialization shows "INIT".
SpMet	Saturation percentage of methemoglobin. (Methemoglobin [MetHb] is an oxidized form of hemoglobin that is unable to carry oxygen.)	• Numeric 0.0–100.0% in steps of 0.1 or a series of dashes (- - -) for unknown value. • If unavailable due to initialization shows "INIT".
SpHb	Total hemoglobin (Hb) concentration. (Hemoglobin is the part of a red blood cell that carries oxygen to the body. SpHb, which measures total hemoglobin, indicates the oxygen carrying capacity of the blood.)	• System can be configured (by admin) to display in one of three different units: ○ g / dL (grams hemoglobin / deciliter blood) Numeric 0.0–25.0 g/dL in steps of 0.1 or a series of dashes (- - -) for unknown value. ○ mmol / L (millimoles hemoglobin / liter blood) Numeric 0.0–15.5 mmol/L in steps of 0.1 or a series of dashes (- - -) for unknown value. ○ g / L (grams hemoglobin / liter blood) Numeric 0–250 g/L in steps of 1 or a series of dashes (- - -) for unknown value.x • If unavailable due to initialization shows "INIT".
SpOC	Total oxygen content. (SpHb and SpO_2 are used together to calculate the actual amount of oxygen in the blood.)	• Shown as a ratio: mL O_2 / dL blood (milliliters oxygen / deciliter blood) • Numeric 0–35 mL/dL in steps of 1 or a series of dashes (- - -) for unknown value. • If unavailable due to initialization shows "INIT".

Label	Items on the Main Screen	Description
n/a	Perfusion Index (Perfusion Index, or PI, is a relative assessment of the pulse strength at the monitoring site.)	• 0–10.00% displayed as bar graph beside SpO2 • Values between 10.001–20.000% display as a full bar graph. • When there is no data, the graph is not drawn.
NIBP	Non-Invasive Blood Pressure The previous NIBP reading (if any), will be displayed while the new reading is being obtained. The current progress of the new reading will be displayed (if in progress) by showing the cuff pressure in a vertical bar graph beside the previous reading. The cuff pressure graph is from 0 to 260 mmHg (if over 260, 260 is displayed). If the user cancels the current NIBP reading, the previous one will be removed from the screen. If the NIBP reading is invalid and/or cannot be obtained, the previous NIBP reading will be erased.	• If either the systolic or diastolic value is over the range of the sensor, “>300” is shown for that value. • If the NIBP is one (1) or more minutes old, a message states “XXm ago” where XX is the number of minutes since the last reading. A NIBP measurement older than 15 minutes is discarded and no longer shown.  • If the NIBP reading was obtained using a cuff pressure that was close to the systolic value, which may make the reading lower than the actual systolic value of the patient, the systolic value is displayed with a series of dashes (- - -) to indicate the systolic pressure could not be obtained. The NIBP will automatically obtain another reading using a higher cuff pressure immediately after the reading. • If neither the systolic or diastolic pressure is available, a single set of dashes (- - -) is shown and no divider line is drawn. • While an NIBP reading is in progress, the current BP reading, if any, remains. As well, a bar graph representing cuff pressure from 0 to 260 mmHg is displayed to the right of the reading. • The current cuff pressure is displayed below the cuff pressure bar.

Label	Items on the Main Screen	Description
ABP, CVP, or ICP	IP Invasive Pressure There are three IP inputs on MOVES® SLC™. They can be used to measure one or more of Arterial Blood Pressure (ABP), Central Venous Pressure (CVP) or Inter-Cranial Pressure (ICP) ABP is displayed in a similar fashion to NIBP; that is, it is displayed showing systolic over diastolic in mmHg. CVP or ICP is displayed as a single number, the mean pressure with up to 3 digits. CVP is displayed in mmHg, and ICP is displayed in cmH_2O. The software will be able to detect if a port is in use via hardware. There can be none, one, two, or three IPs in use at any time.	• For ABP numeric, if either the systolic or diastolic value is over the range of the sensor, ">300" is shown for that value. If either the systolic or diastolic value is under the range of the sensor, "<–10" is shown for that value. • For CVP numeric, Numeric –10 to 300 mmHg in steps of 1 is shown. If greater than 300 mmHg, shows ">300". If less than –10 mmHg, "<–10" is shown. For an unknown value, a series of dashes (- - -) is shown. • For ICP numeric, Numeric –14 to 408 cmH_2O in steps of 1 is shown. If greater than 408 cmH_2O, shows ">408". If less than –14, "<–14" is shown. For an unknown value, a series of dashes (- - -) is shown. 

<table>
<tr><th>Label</th><th>Items on the Main Screen</th><th>Description</th></tr>
<tr><td>HR</td><td>Heart Rate</td><td>

The source of the HR is one of ECG, PulseOx, or IP in the following priority (if set to AUTO):
APB1
APB2
APB3
SPO2
ECG
HR Source: ABP or ECG
Numeric 0–250 BPM in steps of 1 or a series of dashes (- - -) for an unknown value.
“>250” is shown for values over 250 BPM
HR Source: SPO2 (Pulse Oximeter)
Numeric 0–239 BPM in steps of 1 or a series of dashes (- - -) for an unknown value.
“>239” is shown for values over 239 and below 260 BPM

The user can also set the source by pressing the source button below the HR and selecting the source from a list.

</td></tr>
<tr><td>Chart Label 1</td><td>Chart area 1</td><td>
Button to select which chart to view.
Other buttons as required by the chart.</td></tr>
<tr><td>Chart Label 2</td><td>Chart area 2</td><td>
Same as Chart 1</td></tr>
</table>

11.6.3 Additional Items Displayed with Masimo Sensors

As stated above, "PVI" and Rainbow SET® (SpMet, SpCO, etc) items are only displayed when the appropriate Masimo sensor is present. The values are found on the left of the pleth real-time graph. The following two screen captures illustrate the values obtained via two of the Masimo sensors.

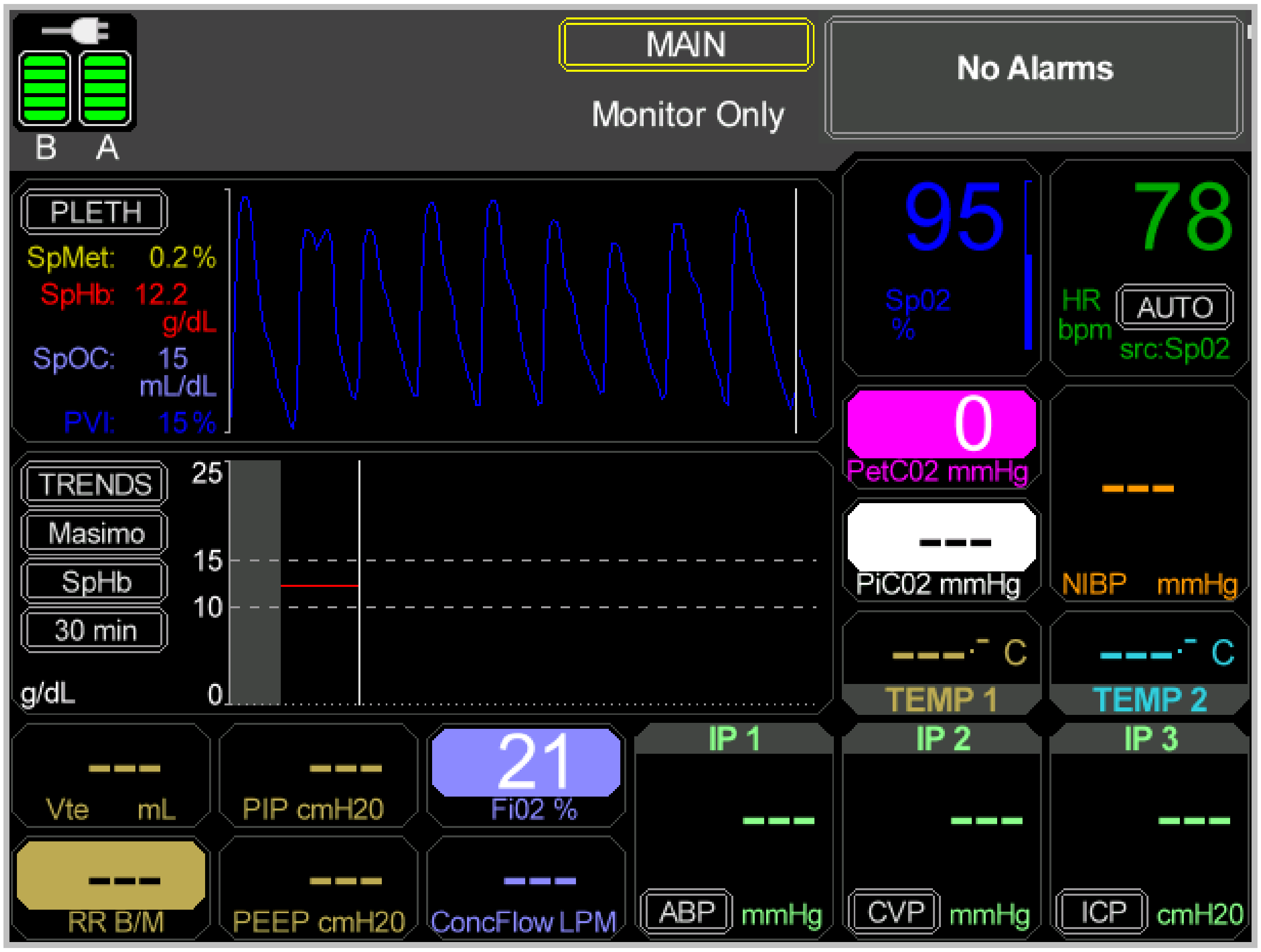


Figure 11-17: Values Obtained Via Masimo DC-3 Sensor

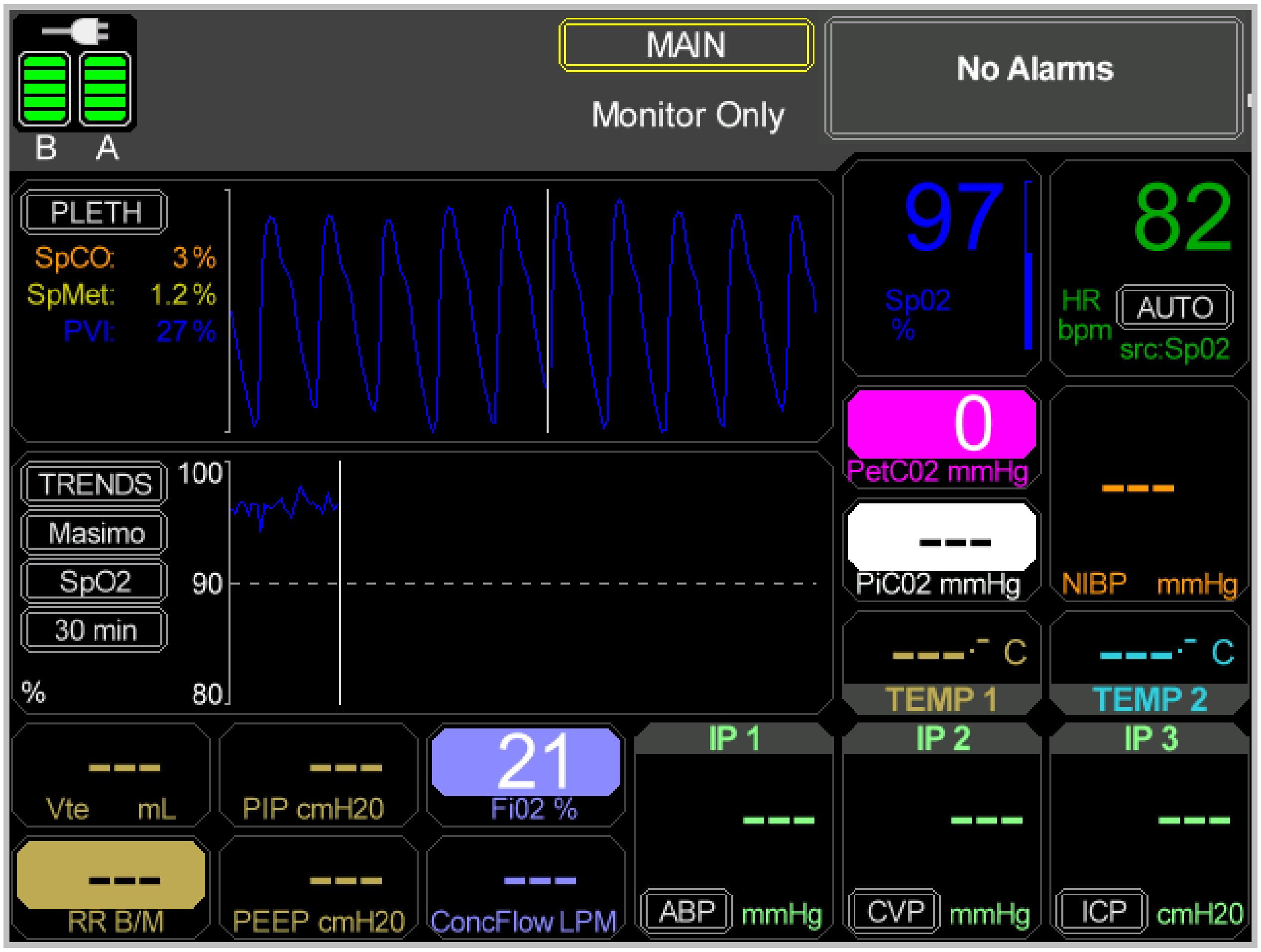


Figure 11-18: Values Obtained Via Masimo DCI-dc3 Sensor

11.6.4 Control Pressure, PEEP and PIP

It may be noticed that although an option for "Control Pressure" is present on the Setup Screen, only the items "PIP" and "PEEP" are displayed on the Main Screen.

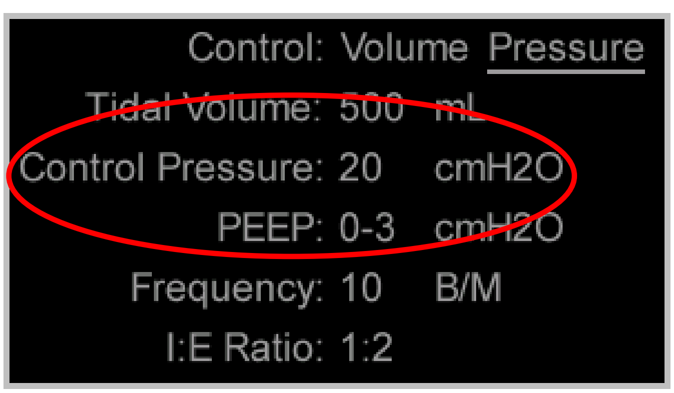


Figure 11-19: Control Pressure & PEEP on Setup Screen

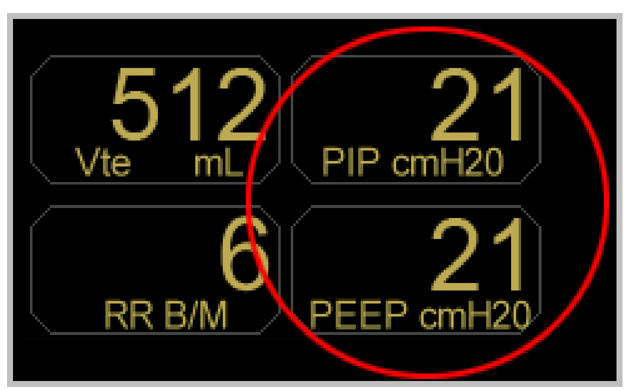


Figure 11-20: PIP & PEEP on Main Screen

On ventilators with an active PEEP (Positive End Expiratory Pressure), such as MOVES® SLC™, the user sets the Control Pressure, which is the pressure above PEEP, that the user wants maintained. If the user adjusts the PEEP value, the PIP (Peak Inspiratory Pressure) value goes up along with it.

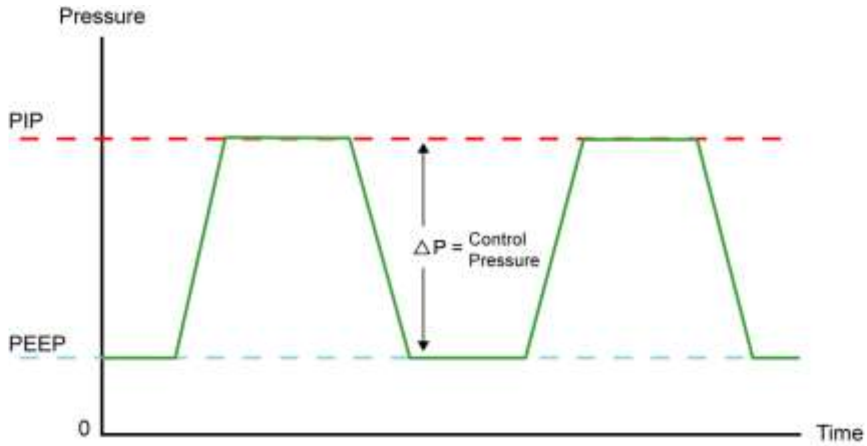


Figure 11-21: Relations of PEEP to PIP to Control Pressure

However, monitoring (as it is shown on the Main Screen) always displays the true airway pressures: PIP and PEEP.

11.6.5 Actual PEEP Higher than Set PEEP

Note that not all combinations of ventilator parameters are possible to obtain with all patients because of individual patient lung condition, resistance and compliance. If insufficient time is provided for the patient to exhale, the ventilator will delay the start of the next inhalation until the airway pressure has at least fallen to PEEP + 5 cmH_2O. It will also produce an "Expiratory obstruction" alarm. Whenever set PEEP is not being achieved due to this auto-PEEP scenario, the situation can be corrected by increasing the exhalation time, either by reducing the respiratory rate, reducing the inspire time or reducing the I:E ratio. When the ventilator is in an auto-PEEP scenario, the ventilator may under-report expired volumes.

11.6.6 Inverted Display of Patient Monitoring Values

Normally, patient monitoring values on the Main Screen are shown in their representative colors (e.g., Temp 1 in tan, Temp 2 in turquoise) against a black background (*see Figure 11-22*). However, when an active alarm is associated with monitoring value, the values are shown in either white or black against a background of their representative color (*see Figure 11-23*).

NOTE: *The active state of the alarm will be indicated by inverted display regardless of whether the alarm is on or off. For example, if the patient temperature is high, causing an alarm condition, the patient temperature is drawn in reverse color, even if the patient temperature alarm has been turned off by the user. If an alarm is latched, meaning it must be acknowledged by the user even if the alarm condition no longer active, the monitoring display is only inverted while the alarm condition is active.*

Figure 11-22: Regular Temperature Display

Figure 11-23: Inverted Display of Temperature (Alarm Condition)

11.6.7 Invasive Pressure (IP) Source Buttons

There are three (3) physical IP connections on the patient sensor panel. Each one maps to its corresponding IP channel box on the monitoring screen (labeled IP1, IP2 and IP3). Each channel is independently configurable, and can be set for ABP, ICP or CVP mode. The current mode is displayed on the config button and may be changed by selecting the button and using navigation keys. An additional option is available, "ZERO", which does not change the mode, but rather forces an immediate re-zeroing of the channel.

11.6.8 Zeroing a Channel

An IP port will auto detect the insertion of an IP probe. An inserted probe requires zeroing before data is available, and will show ZERO REQD until the channel config button – now titled "ZERO" – is clicked, zeroing the channel. The channel box will then immediately display data with format/units appropriate for the selected mode. The user can change modes without re-zeroing. The port will also detect a probe disconnect and raise an alarm to notify the operator. This alarm may be dismissed to acknowledge the condition.

11.6.9 Graphs

Changing the mode will dynamically update the configuration (axes, units) of the corresponding real-time graph, if it is currently displayed. Trend graphs are maintained for each channel and mode combination independently.

11.7 ECG SCREEN

11.7.1 Overview

The ECG Screen will display up to 12 graphs (if all 10 ECG leads are used). The number of leads displayed depends on which leads are connected. If all leads are connected, all 12 graphs will be shown. The dashed reference line indicates a 1 mV signal amplitude.

NOTE: *The timeout to the Monitoring Screen is disabled while the ECG Screen is displayed.*

Figure 11-24: ECG Screen – Pause Mode

The only user-adjustable value is Pause / Resume. Using the arrow buttons, the user navigates to it and presses the Check button to toggle between Pause / Resume. When the Check button is pressed when the button reads PAUSE then the ECG graphs will be frozen and can be examined more easily. Press the Check button when the button reads RESUME to restart normal graphing of the ECG waveform.

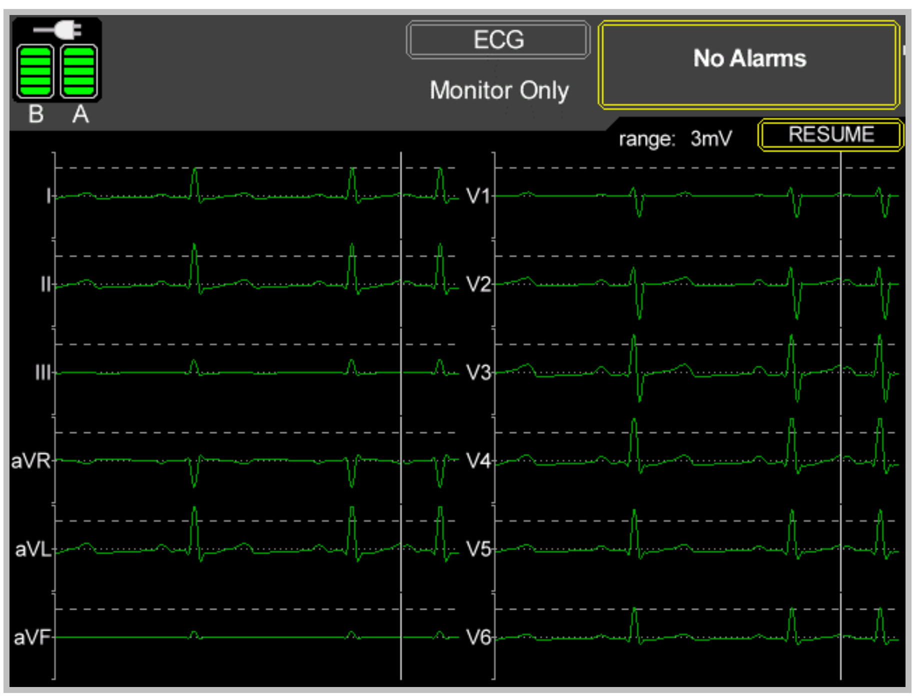


Figure 11-25: ECG Screen – Resume Mode

11.8 ALARM LIMITS SCREEN

11.8.1 Overview

The Alarm Limits Screen allows for control of alarm limit values. The selection order for the buttons on the Alarm Limits screen is the following: Screen Button, Alarm View Button, Limit List (limits are selected from top to bottom with no wrap).

A list of limits is displayed and the threshold name and value, along with the units of each limit, is shown. The list is scrollable once the Limit List part of the screen is selected.

If no limits have been changed from their default values, the phrase "All limits at default" is shown at right below the Status Bar. If any limits have been changed from their default values, an icon and a summary of the number of limits not at their default value is displayed (see *Figure 11-27: Alarm Limits Screen Active on page 167*).

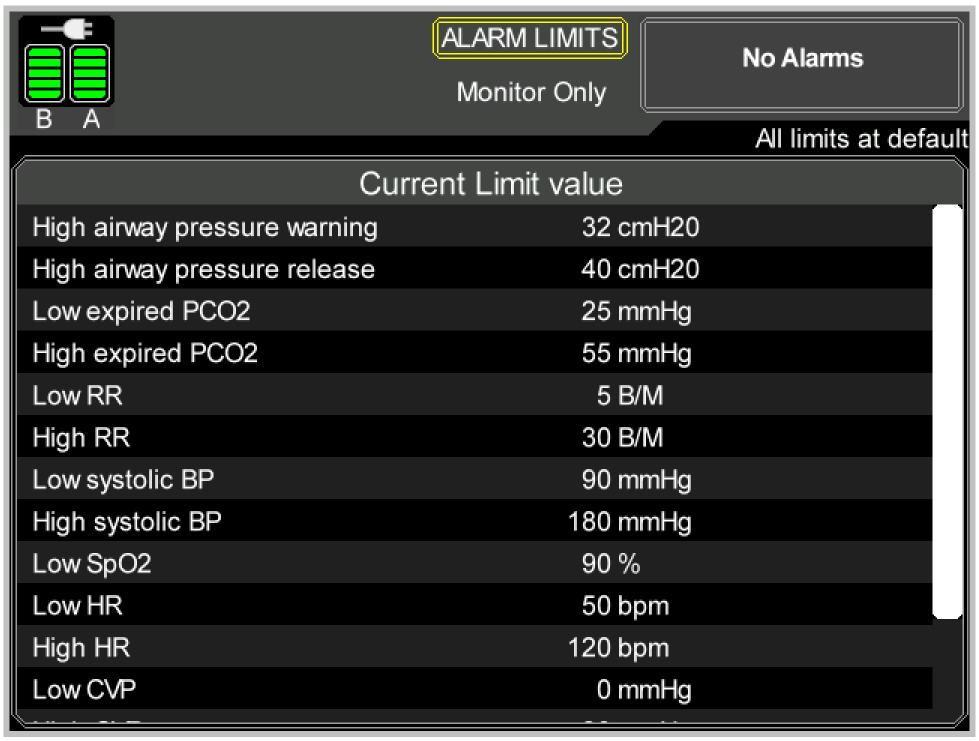


Figure 11-26: Alarm Limits Screen – All at Default

WARNING! WHEN SETTING ALARM LIMITS, DO NOT SET TO EXTREME VALUES THAT CAN RENDER THE ALARM SYSTEM USELESS.

11.8.2 Limit List Active

If the Limit List is active, a single limit is selected, as indicated by a yellow box around the limit (see Figure following). To modify the limit, the user presses the Check button to make the limit active and then uses the arrow buttons to select a value. The Check button is pressed once again to confirm the new value. The Cancel button is used to abandon an actively selected limit and its new value and return to the previously selected limit value.

Limit values that have been changed from their default are shown with an asterisk. Also, an icon in the status bar indicates that limit values have been changed and accompanying text lists how many. As well, a message at the right below the status bar show the number of limits not at their default values.

NOTE: *For more information on the number of limits changed icon, see* *Table 23: MOVES® SLCTM Status Bar Items and Descriptions on page 135**.*

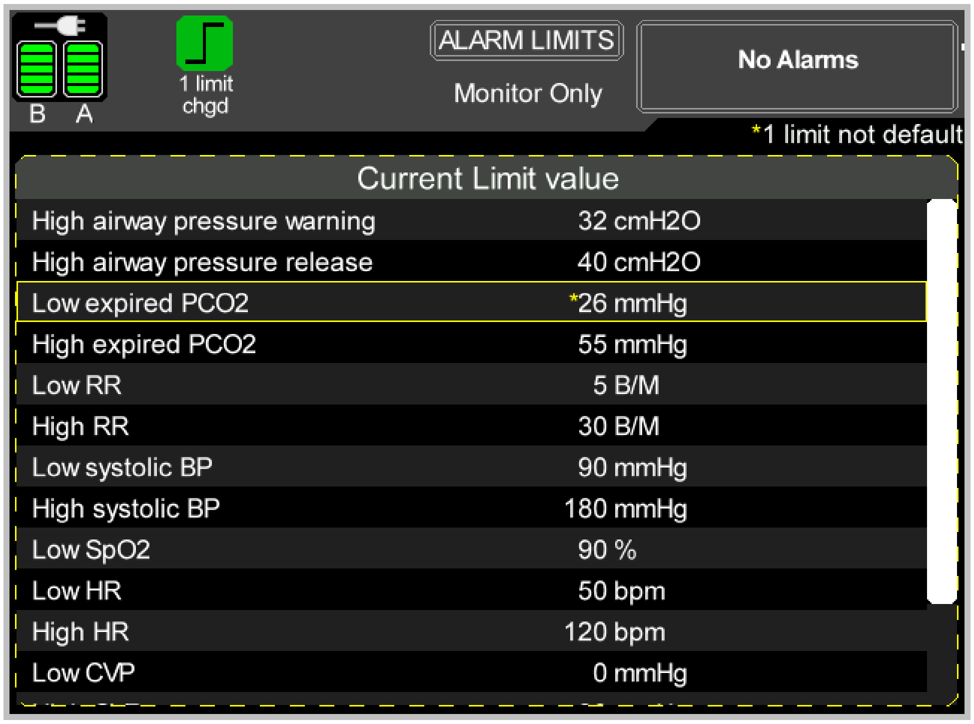


Figure 11-27: Alarm Limits Screen Active

The following table lists all the limits, their available values, and their defaults.

Table 29: Alarm Limits and Defaults

Limits	Description
1. High airway pressure warning	20 to 58 cmH_2O in steps of 2, default to 32
2. High airway pressure release	40 to 58 cmH_2O in steps of 2, default to 40
3. Low expired PCO_2	15 to 35 mmHg in steps of 1, default to 25
4. High expired PCO_2	50 to 60 mmHg in steps of 1, default to 55
5. Low RR	5 to 15 B/M in steps of 1, default to 5
6. High RR	20 to 42 B/M in steps of 1, default to 30
7. Low systolic BP	70 to 140 mmHg in steps of 1, default to 90
8. High systolic BP	140 to 200 mmHg in steps of 1, default to 180
9. Low SpO_2	85 to 95% in steps of 1, default to 90
10. Low HR	30 to 150 BPM in steps of 1, default to 50
11. High HR	100 to 250 BPM in steps of 1, default to 120

Limits	Description
12. Low CVP	-5 to 5 mmHg in steps of 1, default to 0
13. High CVP	10 to 30 mmHg in steps of 1, default to 20
14. Low ICP	-7 to 7 cmH_2O in steps of 1, default to 0
15. High ICP	13 to 40 mmHg in steps of 1, default to 27
16. Low PVI	1 to 98% in steps of 1, default to 5
17. High PVI	2 to 99% in steps of 1, default to 40
18. High SpMet	• To 2.0% in steps of 0.1 • To 99.5% in steps of 0.5 • Default to 3.0
19. High SpCO	2 to 98% in steps of 1, default to 10
20. Low SpHb	Alarm limit will be displayed in the SpHb units the system is configured to display, one of the following options: • **g / dL (grams hemoglobin / deciliter blood)** 1.0 to 23.5 g/dL in steps of 0.1, default to 8.0 • **mmol / L (millimoles hemoglobin / liter blood)** 1.0 to 14.5 mmol/L in steps of 0.1, default to 5.0 • **g / L (grams hemoglobin / liter blood)** 10 to 235 g/L in steps of 1, default to 80
21. High SpHb	Alarm limit will be displayed in the SpHb units the system is configured to display, one of the following options: • **g / dL (grams hemoglobin / deciliter blood)** 2.0 to 24.5 g/dL in steps of 0.1, default to 17.0 • **mmol / L (millimoles hemoglobin / liter blood)** 2.0 to 15.0 mmol/L in steps of 0.1, default to 11.0 • **g / L (grams hemoglobin / liter blood)** 20 to 245 g/L in steps of 1, default to 170
22. Low SpOC	1 to 33 mL O_2 / dL blood in steps of 1, default to 10
23. High SpOC	2 to 34 mL O_2 / dL blood in steps of 1, default to 25

11.9 ALARM ON / OFF SCREEN

11.9.1 Overview

The Alarm On / Off screen allows for alarm On / Off control. The selection order for Alarm ON/OFF screen buttons is Screen Button, Alarm View Button, ON/OFF list (ON/OFF list is selected from top to bottom with no wrap).

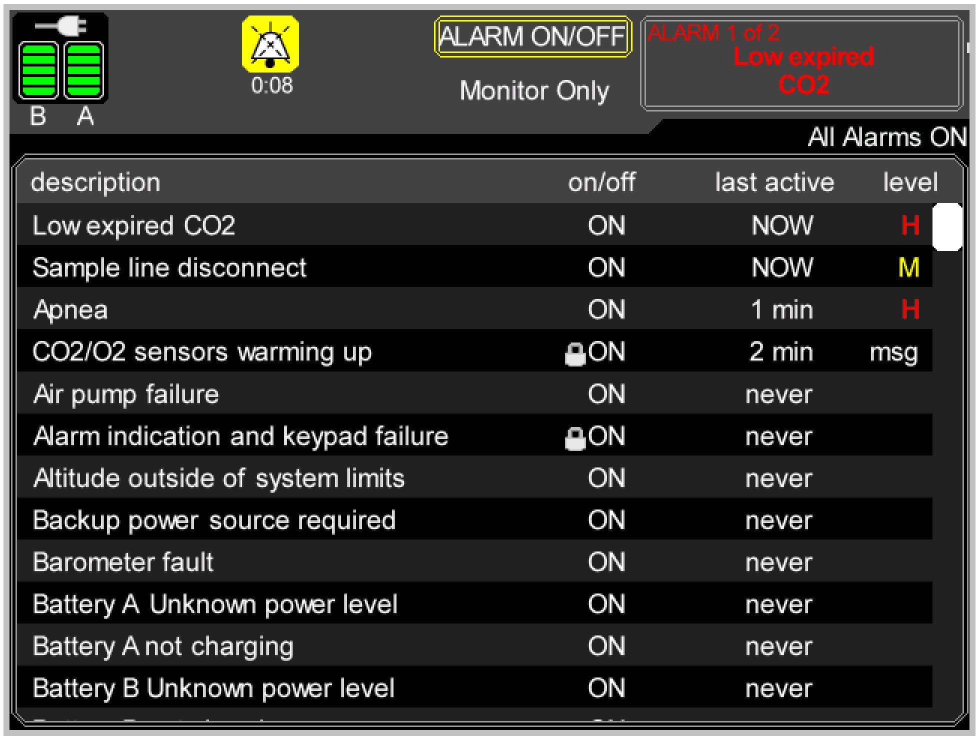


Figure 11-28: Alarm On / Off Screen

A summary of the alarms turned off is shown at top right as follows: All Alarms ON, 1 Alarm OFF, 2 Alarms OFF, etc.

The screen below presents a list of all alarms that can be turned off. The list is sorted when the user enters the screen according to the following:

1. First according to last active, with alarms that are active now at the top.
2. Alphabetically according to the alarm message.

Alarm level is indicated to the right. A red "H" indicates a HIGH priority alarm; a yellow "M" indicates a MEDIUM priority alarm; a yellow "L" indicates a LOW priority alarm. The letters "msg" denote a "MESSAGE", not an alarm.

NOTE: Alarms and messages shown with a padlock beside them in the alarm list CANNOT be turned off or altered in any way, even by someone with Administrator privileges.

11.9.2 Alarm On/Off List Active

If the list is active, one alarm in the list is selected, indicated by a yellow select box. The name of the alarm is the message associated with that alarm. Pressing the Next and Previous arrow buttons on the control panel selects the next or previous item in the list, scrolling the list as needed. Note that there is no wrap around.

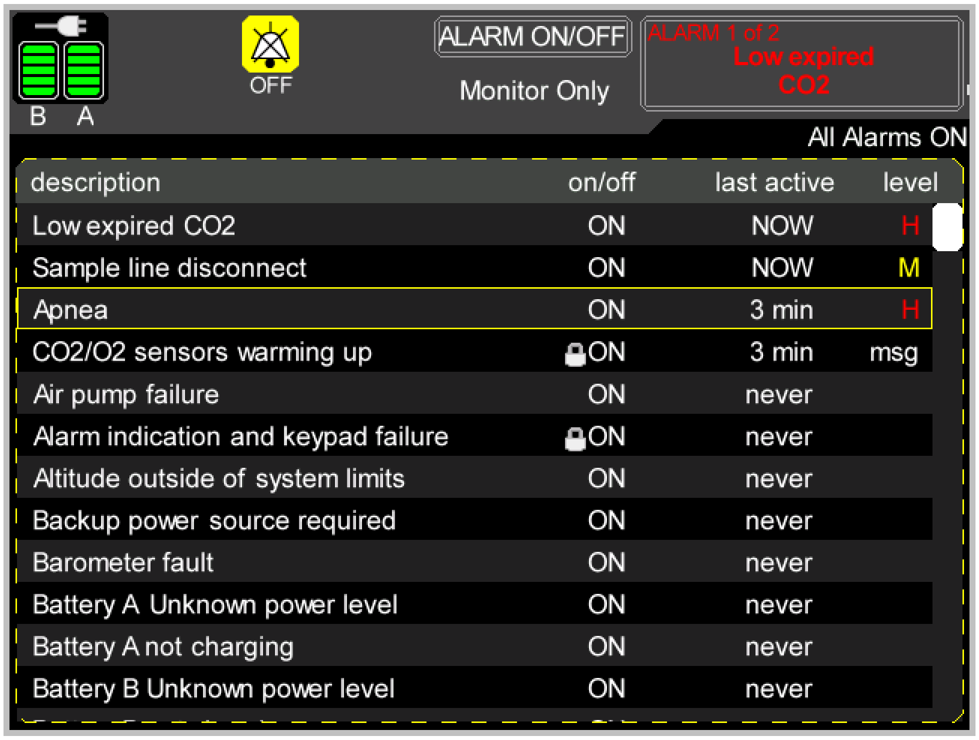


Figure 11-29: Alarm On / Off Screen Active

Pressing check toggles the ON/OFF state of the alarm and updates the alarm summary. Pressing the Cancel button exits the list active state.

12.0 Using the Remote Screen

MOVES® SLC™ can also be used with the remote screen (P/N 125725) shown below. The remote screen is an optional accessory.

Figure 12-1: MOVES® SLC™ Remote Screen

12.1 OVERVIEW

The remote screen interface displays the same program screens (except for the System Test screen) as the local user interface of MOVES® SLC™. And the physical panel buttons of the MOVES® SLC™ are replicated at the bottom of the remote screen and are activated in typical touch-screen fashion.

The remote screen offers the convenience of a secondary, and portable, monitor with a larger screen and provides the user with the ability to remotely control the settings of MOVES® SLC™.

12.2 INSTALLING THE REMOTE SCREEN BATTERIES

The MOVES® SLC™ remote screen can be run on battery or AC power. The unit contains two batteries that are hot swappable, which means one battery can be replaced at a time without the unit turning off (as long as another battery with sufficient charge is present). There are battery bays on the left and right sides of the device.

Figure 12-2: Battery Bay 1 on Left Side

Figure 12-3: Battery Bay 2 on Right Side

1. To open the battery bay door, push down on the bottom lip of the recessed section in the middle.

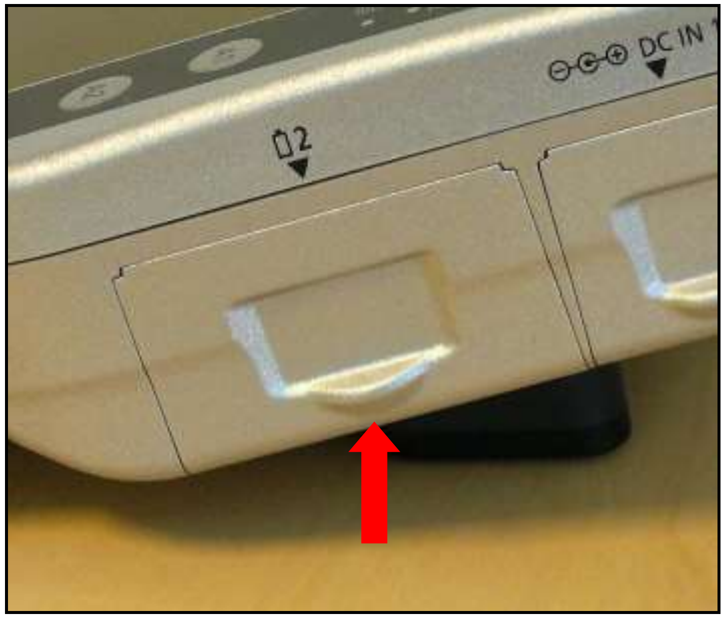
2. Door open, bay ready to receive battery.

3. Orient the battery with the short yellow tab uppermost as shown in the photo at right.

4. Insert the battery as shown in the photo at right.

5. Fully seat the battery as shown in the photo at right.

6. Close the door, and push up on the lip to lock it.



7. ***NOTE:*** *The USB port has been disabled and is non-functional.*

12.3 BATTERY INDICATOR

The battery indicator in the following figure indicates that both batteries are installed and are fully charged.

Figure 12-4: Remote Screen Battery Indicator

The following table explains the possible battery indications and the status they represent.

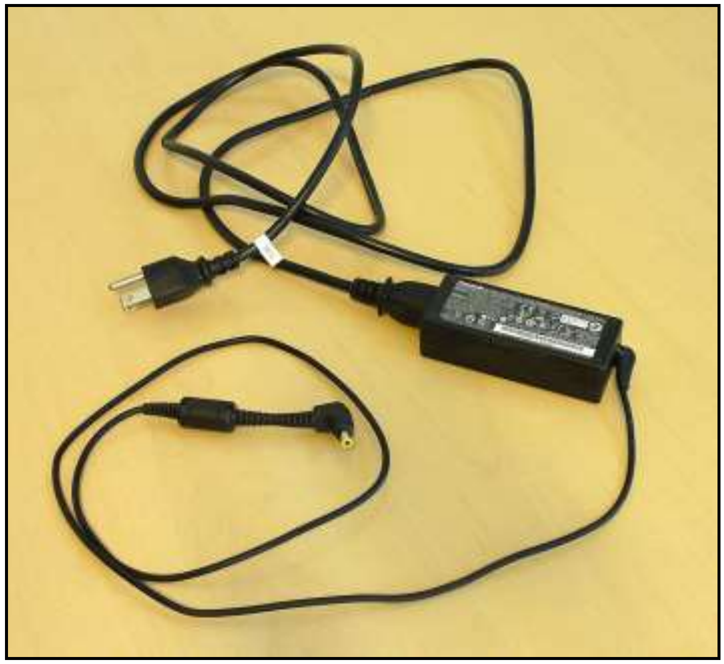
Table 30: Remote Screen Battery Status Indicators

Battery Indicator	Battery Status
Not lit	The battery pack is not inserted or not being charged.
Orange	Charging is in progress.
Green	The battery is fully-charged.
Blinking Green	When you close the battery cover with the battery pack already inserted, you can check the battery level by blinking times. Blinking times to Battery Level: • 5 times = 95 % to 100 % • 4 times = 50 % to 94% • 3 times = 25 % to 49% • 2 times = 5 % to 24% • 1 time = 0 % to 4 %
Red	The remaining battery is approximately 9% or less.
Blinking Red	When blinking approx. every 1 second: The battery pack or the charging circuit is not operating properly. When blinking approx. every 4 seconds: The battery cover is open. You can remove the battery pack in this case. When blinking approx. every 0.5 second: The battery cover is open. If you remove the battery pack in this case, the power supply is cut off and the computer is shut down. Close the battery cover immediately.
Blinking Orange	The battery cannot be charged temporarily due to the following reasons: • Its internal temperature is out of the acceptable range. • The power supply is not enough because software applications or peripheral devices are consuming a large amount of power.
Blinking Green and Orange Alternately	The temperature is low and the computer is warming up to prevent the hard disk drive or flash memory from malfunctioning. The computer will start automatically after warming-up.

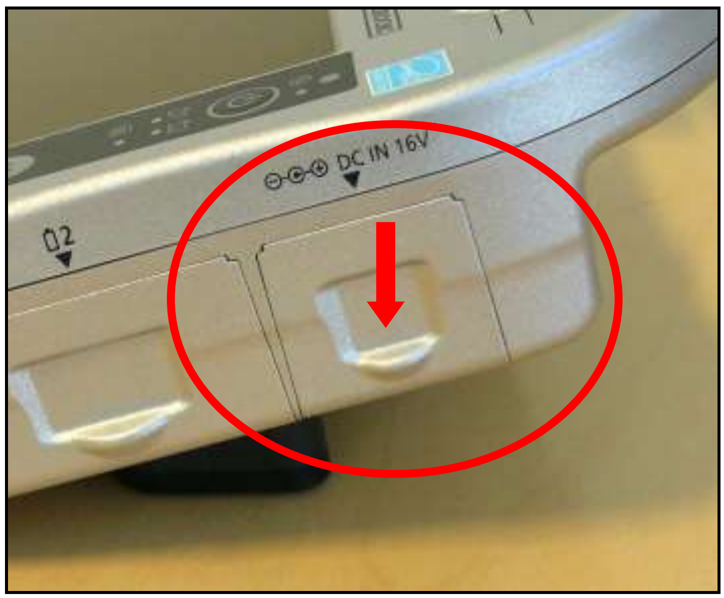
***NOTE:** Once the battery is fully charged, the computer performs recharging only when the battery level becomes less than approximately 95%, so overcharging is avoided.*

12.4 CONNECTING THE REMOTE SCREEN TO WALL POWER

1. The cord shown at right, which includes an AC to DC adaptor, is used to connect wall power to the remote screen.



2. Locate the door labeled "DC IN 16V" on the right side of the remote screen next to battery bay 2. Push down on the bottom lip of the recessed section in the middle to open the door.



3. Insert the cylindrical end of power cord into receptacle shown at right.

4. Power cord connected.

NOTE: *Installed batteries are automatically recharged if they are below a full charge when wall power is connected to the remote screen.*

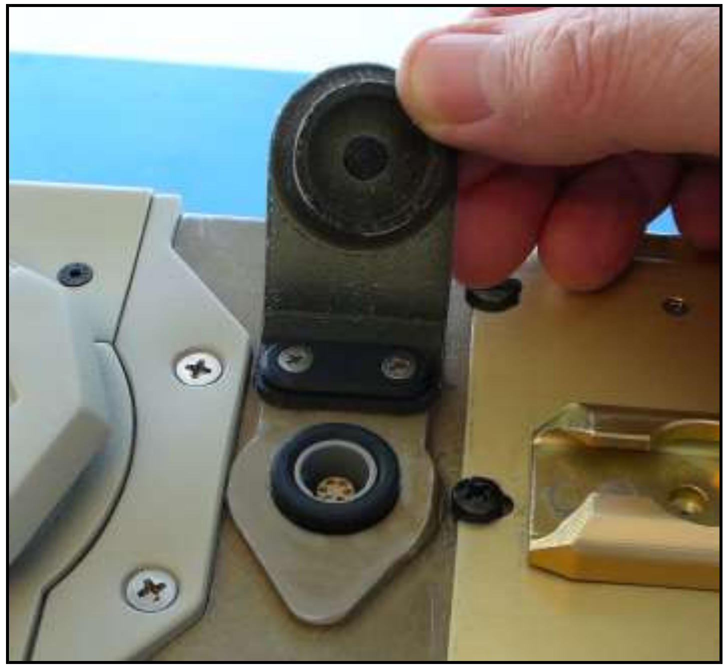
12.5 CONNECTING THE REMOTE SCREEN TO MOVES® SLC™

The remote screen comes with a cord, one end of which is permanently attached to the screen. The other cylindrical end attaches to the auxiliary communications port on MOVES® SLC™.

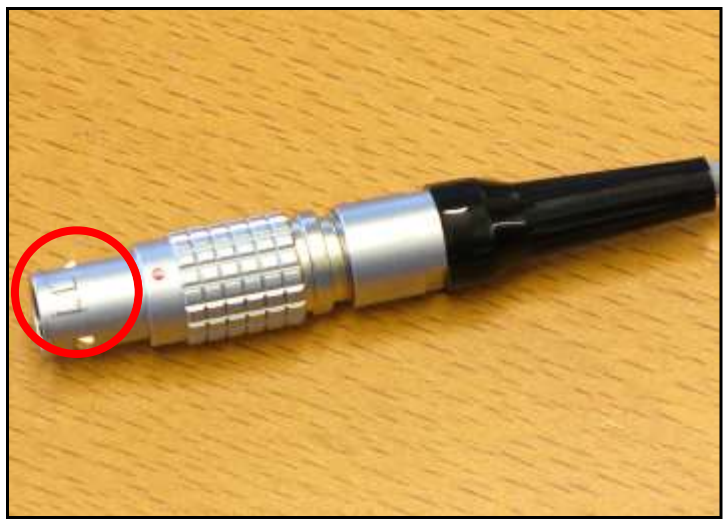
1. Remote screen cable connector used to connect to the auxiliary communications port on MOVES® SLC™.

2. Auxiliary communications port on MOVES® SLC™. To access the connection lift the rubber cover.

3. The auxiliary communications port connection.



4. Align the two slot keys on the remote screen cable connector with the two receiving channels in the auxiliary communications port connection and insert.



5. Remote screen cable connector connected to the auxiliary communications port connection on MOVES® SLC™.

12.6 THE REMOTE SCREEN USER INTERFACE (UI)

12.6.1 First Connecting

Connect the remote screen physically to the auxiliary communications port on MOVES® SLC™. Turn MOVES® SLC™ on. Turn on the remote screen. Once the remote screen is activated, it interfaces automatically with MOVES® SLC™ and begins sharing information. No software program needs to be launched by the user.

At first, the user will see a Thornhill Research Welcome screen. This is followed by an Initial screen. The information on the Initial screen may vary. What the Initial screen displays depends on whether the remote screen is starting from a total disconnect or from the hibernate/sleep state (i.e., whether software resources are loaded already or not). It also depends on whether the remote screen is connecting to MOVES® SLC™.

If the remote screen is starting from a total disconnect, and is connecting to MOVES® SLC™, the user will see the following information displayed.

Figure 12-5: Initial Screen – No Resources Loaded

A blue progress bar is shown as resources are loaded. A green progress bar is shown while connecting to MOVES® SLC™.

If the remote screen is starting from the hibernate/sleep state (i.e., software resources are already loaded), and is connecting to MOVES® SLC™, the user will see the following information displayed.

Figure 12-6: Initial Screen – Resources Already Loaded

When the remote screen starts from the hibernate/sleep state, resources are already loaded. Only the green progress bar is shown while connecting to MOVES® SLC™.

NOTE: *In this second instance, sometimes the connection is so quick the Initial screen is barely visible.*

If the remote screen is loading resources but is not connecting to MOVES® SLC™, a "spinning dial" and a "Searching for device" message are visible as shown in the following figure.

Figure 12-7: Initial Screen – Loading Resources But Unconnected to MOVES® SLC™

Once the resources are loaded, but if the remote screen is still not connecting to MOVES® SLC™, the "spinning dial" and "Searching for device" message continue to be shown as illustrated in the following figure.

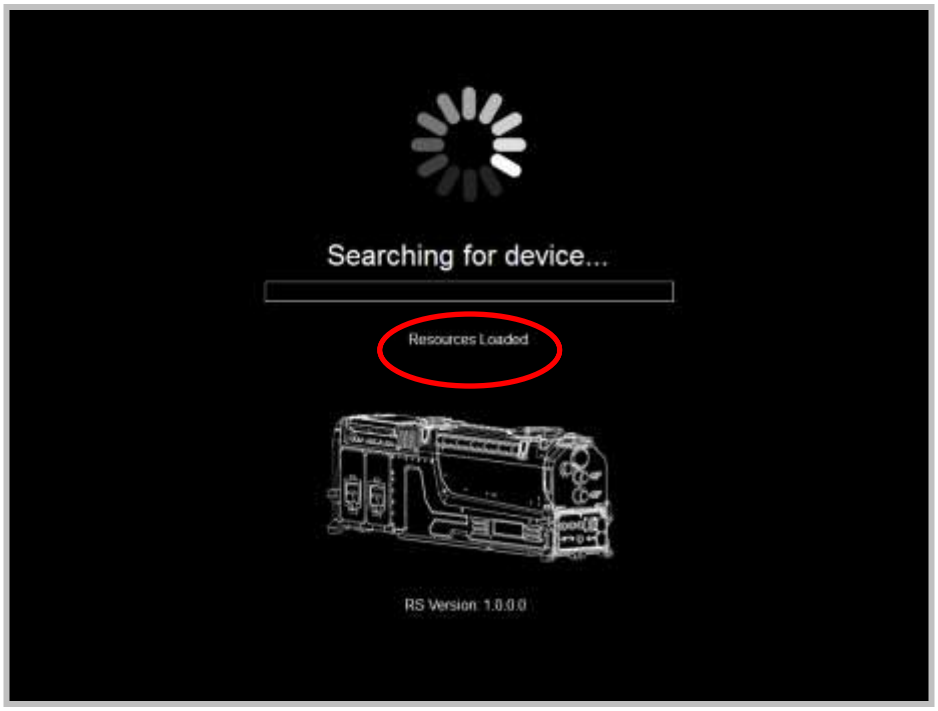


Figure 12-8: Initial Screen – Resources Loaded But Unconnected to MOVES® SLC™

12.6.2 No System Test Screen

The remote screen does not display the System Test screen. If tests have not been completed prior to connecting the remote screen, the remote screen will open on the Setup screen and display the status "Initializing". The Suction and NIBP icons will be shown at the top of the screen with the "No" symbol (circle with a diagonal line) indicating that they are not available. These two functions are not allowed until the startup tests have been passed (*see Figure 12-9: Setup Screen – Initializing* which follows).

While the system is initializing (i.e., System Tests are not yet complete), the System Mode cannot be modified on the Setup screen; however, the settings on the Setup screen can be preconfigured in preparation for use after the System Tests are complete.

Figure 12-9: Setup Screen – Initializing

Once the startup tests have been passed, the Setup screen will open in Monitor Only mode and the not-available Suction and NIBP icons will disappear from the top of the screen.

Figure 12-10: Setup Screen – Monitor Only Mode

As with the display screen physically attached to MOVES® SLC™, the Setup screen "times out" or defaults to the Main screen after <u>one minute</u> of inactivity so that patient monitoring can be maintained.

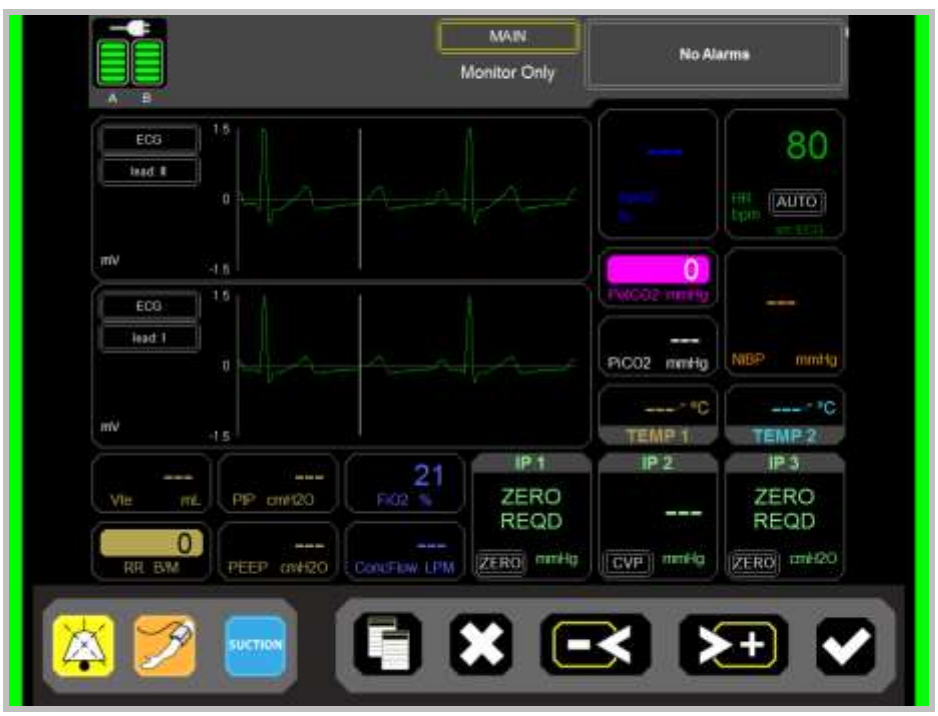


Figure 12-11: Main Screen – On Remote Screen

12.6.3 Remote Screen Panel Buttons

NAVIGATING AND SELECTING VIA PANEL BUTTONS

It will be immediately noticed that the actual physical panel buttons on MOVES® SLC™ unit have been replicated at the bottom of the remote screen.

Figure 12-12: Remote Screen – Panel Buttons at Bottom

The remote screen is a touch-sensitive screen, and the user can navigate through the displayed user interface and select options with the touch-sensitive on-screen panel buttons in the same way as with the physical ones on the actual MOVES® SLC™.

TOUCH NAVIGATING

Rather than navigating step-by-step through the screens, choices, and options as the user must do with the physical buttons, and still can do with the on-screen buttons, when using the remote screen the user can also directly select options with a finger press. However, then the Next and Previous arrow buttons and the Check button must be used to change options and confirm choices.

12.6.4 Graphs Independently Configurable

Although most of the functionality on the remote screen is linked and analogous to that on the display screen physically attached to MOVES® SLC™, the graphs are an exception. The graphs shown on the remote screen are NOT linked. Changing the graphs on the remote screen will not change the graphs on the display screen. This has been done to allow the user the option of displaying twice as much graph monitoring information.

12.6.5 Alarm Indicators

On the MOVES® SLC™ unit, there are four (4) System Visual Indicators, one at each top corner. These indicators display the alarm system status. On the remote screen, this functionality has been duplicated by Alarm Status Bars on either side of the screen (see Figures following).

The severity of the highest active alarm is shown. If an alarm is turned off, the display defaults to the severity of the next active alarm. The color-coding indicates the same alarm states.

Table 31: Alarm Side Bar States and Explanations

Status	Indicates
No bars	System off or in Initializing mode (i.e., System Tests incomplete)
Green bars	No alarms active
Yellow bars	Low or Medium Priority Alarm(s) active
Red bars	High Priority Alarm(s) active

Figure 12-13: Green Bars Indicating No Alarms Active

Figure 12-14: Red Bars Indicating High-Priority Alarm Active

Figure 12-15: Yellow Bars Indicating Low or Medium Priority Alarm Active

12.6.6 Remote Screen Software Version

The remote screen version can be determined by accessing the Info Screen. For information on accessing the Info Screen, see *Section 11.5.1 Accessing the Info Screen on page 150*.

Figure 12-16: Info Screen Showing Remote Screen Version

13.0 Connecting the Patient

13.1 CONNECTION OVERVIEW

The patient may be intubated, in which case the patient will be connected to a Ventilator Breathing Circuit. The patient may also be breathing spontaneously but be receiving supplemental oxygen via a nasal cannula (nasal prongs) or oxygen mask.

WARNING! DO NOT CONNECT A PATIENT TO MOVES® SLC™ UNTIL THE MOVES® SLC™ SYSTEM IS PROPERLY WARMED UP AND O_2 VALUES ARE DISPLAYED.

WARNING! BEFORE VENTILATING A PATIENT, ENSURE THAT A SPARE VENTILATOR BREATHING CIRCUIT IS READILY AVAILABLE.

13.2 CONNECTING AN INTUBATED PATIENT

1. Ensure that the Ventilator Cartridge and breathing circuit have been connected to MOVES® SLC™.
2. Ensure Startup Test procedures have been completed and all tests passed.
3. Configure MOVES® SLC™ to operate in Ventilate Mode.
4. Attach the elbow to the patient's endotracheal tube.

WARNING! WHEN VENTILATING PATIENTS UNDER 30KG OR WITH TIDAL VOLUMES UNDER 150ML, REPLACE THE AIRWAY FILTER WITH PEDIATRIC BREATHING SYSTEM FILTER (PART 126245) TO REDUCE DEAD SPACE VENTILATION.

13.3 CONNECTING A SPONTANEOUSLY BREATHING PATIENT

1. Ensure Startup Test procedures have been completed and all tests passed.
2. Configure MOVES® SLC™ to operate in O2 Supplement mode.
3. Attach the O_2 Sampling Adaptor to the MOVES® SLC™ O_2 Outlet port.
4. Attach the sampling line filters and tubing between the O_2 Sampling Adaptor and the Gas Sample port in the Patient Connections panel.
5. Attach one end of the O_2 tubing to the O_2 Sampling Adaptor.
6. Attach a fire suppression device (such as the BPR Firesafe™ Cannula Valve) to the other end of the O_2 tubing.
7. Attach the nasal cannula or mask tubing to the fire suppression device.
8. Attach the nasal cannula or mask to the patient.

NOTE: For full procedures with accompanying photographs see Delivering Supplementary Oxygen (O2) beginning on page 98.

13.4 ATTACHING THE EAR OR FINGER CLIP PULSE CO-OXIMETER SENSOR

NOTE: It is recommended that a pulse oximeter is always used to ensure adequate patient oxygenation.

The MOVES® SLC™ system comes with some or all of the pulse CO-oximeter sensors listed in the following table. Sensor position and whether the sensor is reusable or disposable is also indicated.

Table 32: CO-Oximeter Sensors

Sensor	Position	Reusable / Disposable
1. Adult SpO_2 (only) Finger Clip (LNCS DCI)	Any of the five (5) fingers on either hand (but not the toes)	Reusable
2. Pediatric SpO2 (only) Finger Clip (LNCS DCIP)	Any of the five (5) fingers on either hand (but not the toes)	Reusable
3. SpO_2 Ear Clip (LNCS TC-I)	Either ear lobe ***NOTE:*** *Ear lobe must NOT be pierced.*	Reusable
4. Adult SpO_2 Adhesive Sensor (LNCS Adtx-3)	Any of the five (5) fingers on either hand (but not the toes)	Disposable (i.e., single use)
5. Pediatric SpO_2 Adhesive Sensor (LNCS Pdtx-3)	Any of the five (5) fingers on either hand (but not the toes)	Disposable (i.e., single use)
6. Adult SpO_2, SpCO, & SpMet Finger Clip (Rainbow® DCI-dc3)	Any of the five (5) fingers on either hand (but not the toes)	Reusable
7. Pediatric SpO_2, SpCO, & SpMet Finger Clip (Rainbow® DCIP-dc3)	Any of the five (5) fingers on either hand (but not the toes)	Reusable
8. Adult SpO_2, SpHb and SpMet Adhesive Sensor (Rainbow® R1 25)	Any of the five (5) fingers on either hand (but not the toes)	Disposable (i.e., single use)
9. Pediatric SpO_2, SpHb and SpMet Adhesive Sensor (Rainbow® R1 20)	Any of the five (5) fingers on either hand (but not the toes)	Disposable (i.e., single use)
10. Adult SpO_2, SpCO and SpMet Adhesive Sensor (Rainbow® R25)	Any of the five (5) fingers on either hand (but not the toes)	Disposable (i.e., single use)
11. Pediatric SpO_2, SpCO and SpMet Adhesive Sensor (Rainbow® R20)	Any of the five (5) fingers on either hand (but not the toes)	Disposable (i.e., single use)

The following photographs show correct placement of the finger clip and ear clip sensors.

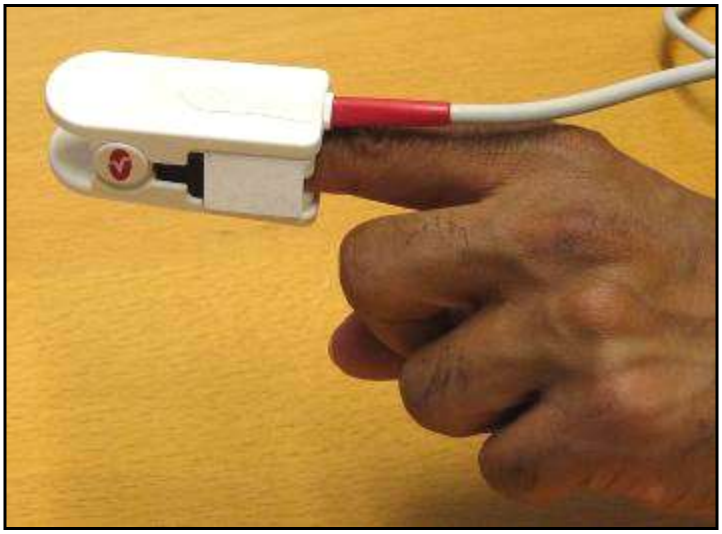


Figure 13-1: 1 of 5 Possible Sensor Finger Placements

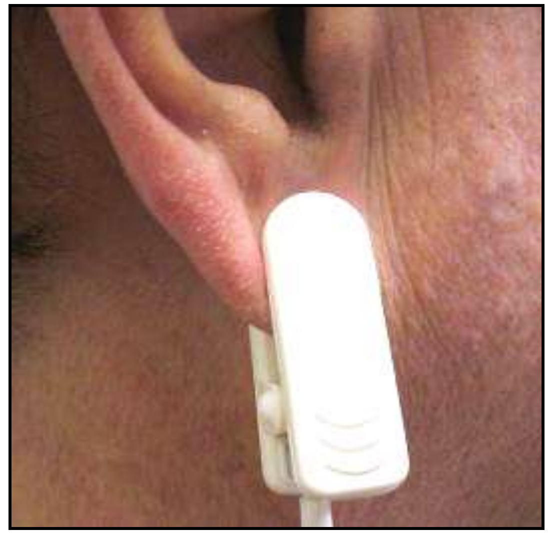


Figure 13-2: Correct Ear Lobe Sensor Placement

AVOIDING INACCURATE READINGS

Pulse oximetry sensors work by transmitting red and infrared light through body tissue. Most light is absorbed by the tissue between the transmitting probe on one side and the actual sensor on the other. The small amount of light that is not absorbed is used to calculate oxygen saturation. Therefore, anything that disturbs the light flow can cause inaccurate readings. Note the following possible problems:

- **Motion Artifact** – The most common cause of inaccurate SpO_2 readings is movement. Movement affects the ability of the light to travel from the light-emitting diode (LED) to the photo detector. Rhythmic movement such as tremors and seizure activity, as well as shivering, and vibrations caused by ground or air transport, can cause problems with detecting saturation and may measure false high pulse readings.
- **Ambient Light** – Because pulse oximeters measure the amount of light transmitted through arterial blood, bright light that shines directly on the sensor – whether from the sun or an overhead exam light – can skew the readings. To fix this problem, move the sensor, or cover it with something opaque.
- **Light Absorbent Substances** – Anything that absorbs light within the reading area may cause false-low readings (e.g., dried blood, polish, dyes [including intravenous]).

PULSE CO-OXIMETER SENSOR WARNINGS

WARNING! SPO_2 SENSOR APPLICATION SITES SHOULD BE INSPECTED AT LEAST EVERY FOUR (4) HOURS, OR AS DIRECTED IN THE SENSOR'S *DIRECTIONS FOR USE,* TO ENSURE CORRECT SENSOR ALIGNMENT AND SKIN INTEGRITY. IF CIRCULATION OR SKIN INTEGRITY IS COMPROMISED, THE SENSOR SHOULD BE APPLIED TO A DIFFERENT SITE. PATIENT SENSITIVITY MAY VARY DUE TO MEDICAL STATUS OR SKIN CONDITION. DISCONTINUE THE USE OF ADHESIVE TAPE STRIPS IF THE PATIENT EXHIBITS AN ALLERGIC REACTION TO THE ADHESIVE MATERIAL.

WARNING! OXIMETER READINGS MAY BE AFFECTED BY THE USE OF AN ELECTROSURGICAL UNIT (ESU).

WARNING! CIRCULATION DISTAL TO THE SENSOR SITE SHOULD BE CHECKED ROUTINELY.

WARNING! A FUNCTIONAL TESTER CANNOT BE USED TO ASSESS THE ACCURACY OF A PULSE OXIMETER MONITOR OR SENSOR.

WARNING! DO NOT USE DAMAGED SENSORS OR PATIENT CABLES. DO NOT USE A SENSOR OR PATIENT CABLE WITH EXPOSED OPTICAL OR ELECTRICAL COMPONENTS.

13.5 PLACEMENT OF THE HEART RATE ELECTRODES

WARNING! CONDUCTIVE PARTS OF ELECTRODES AND ASSOCIATED CONNECTORS FOR THE APPLIED PART, INCLUDING THE NEUTRAL ELECTRODE, SHOULD NOT CONTACT OTHER CONDUCTIVE PARTS AND EARTH.

CAUTION! ECG CABLES SHOULD BE DISCARDED AND REPLACED AFTER TWO (2) YEARS OF CONTINUOUS USE. CHECK CABLE USE BY RECORDING THE DATE THE CABLE WAS FIRST USED.

The snap-on ends of the MOVES® SLC™ ECG cable are color coded (see Figure following).

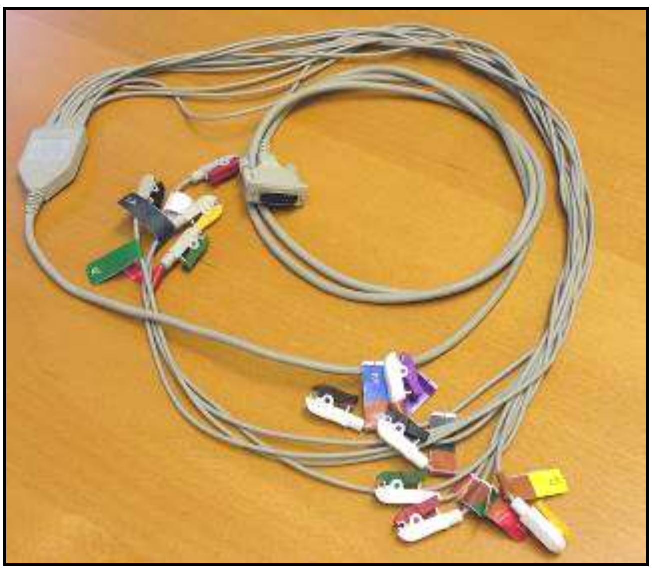


Figure 13-3: Color-Coded 12-Lead ECG Cable

The electrodes usually consist of a conducting gel, embedded in the middle of a self-adhesive pad onto which cables clip. It is important that the ECG electrodes to which the cable clips attach be placed properly to reduce motion artifact and receive the best signal possible.

13.5.1 ECG Cable Color Coding and Naming Conventions

The clamps of the ECG cables that are attached to the electrodes are color coded to ease connection for medical personnel. There are two definitions for these colors: AHA colors, used in the USA and Canada, and IEC colors used in all other countries (usually Europe). The following table explains the two systems.

Table 33: ECG Cable Color Coding and Naming

Electrode	IEC Abbreviation	IEC Color	AHA Abbreviation	AHA Color
Right Arm	R	Red	RA	White
Left Arm	L	Yellow	LA	Black
Right Leg	N	Black	RL	Green
Left Leg	F	Green	LL	Red
Chest 1	C1	White-Red	V1	Brown-Red
Chest 2	C2	White-Yellow	V2	Brown-Yellow
Chest 3	C3	White-Green	V3	Brown-Green
Chest 4	C4	White-Brown	V4	Brown-Blue
Chest 5	C5	White-Black	V5	Brown-Orange
Chest 6	C6	White Violet	V6	Brown-Violet

13.5.2 Correct Electrode Placement

The following illustrations show correct electrode placement. The first illustration shows correct limb lead placement. The second illustration and accompanying table shows and explains the proper placement of the precordial leads V1–V6 (or C1–C6 in the IEC naming convention).

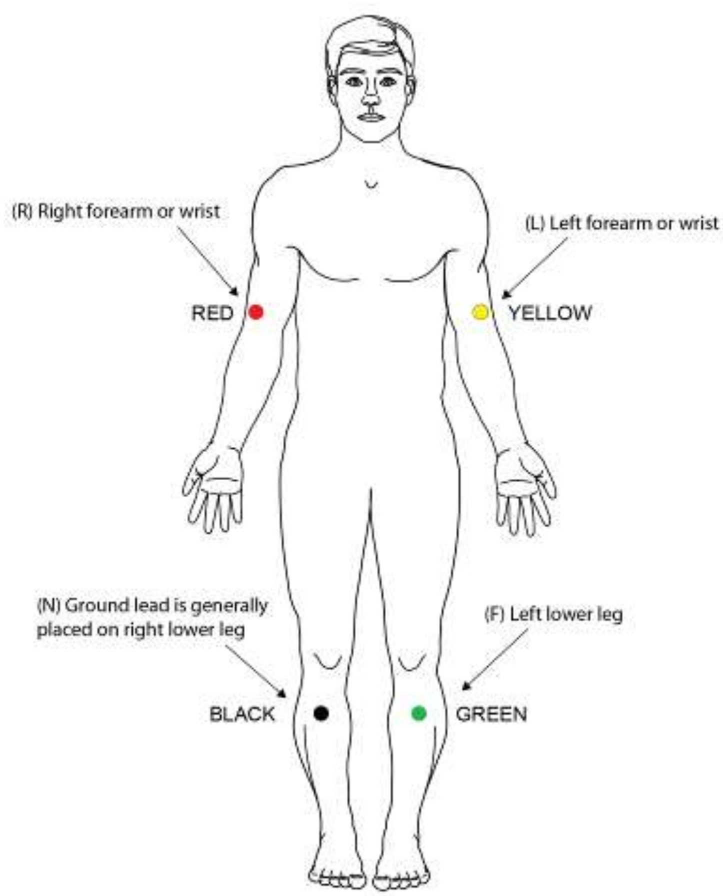


Figure 13-4: Proper Limb Lead Electrode Placement

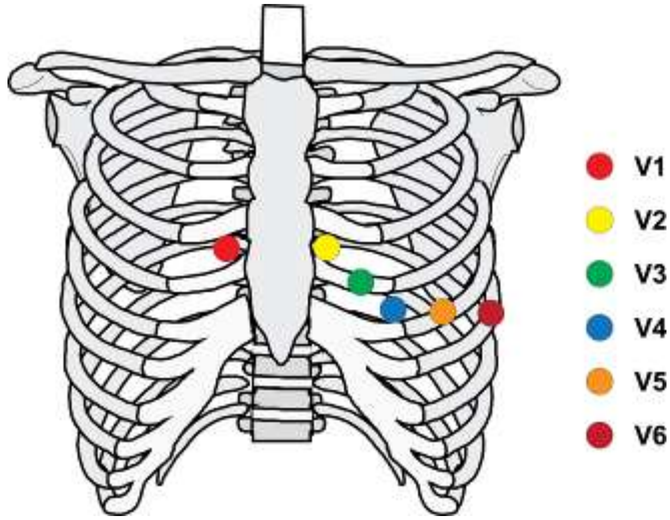


Figure 13-5: Precordial Leads: V1–V6

Table 34: Proper Placement of Precordial Leads

Electrode Identifier	Electrode Position on Body Surface
V1 / C1	Fourth intercostal space at right border of sternum
V2 / C2	Fourth intercostal space at left border of sternum
V3 / C3	Fifth rib between V2 / C2 and V4 / C4
V4 / C4	Fifth intercostal space on left mid clavicular line
V5 / C5	Left anterior axillary line at the horizontal level of V4 / C4
V6 / C6	Left midaxillary line at the horizontal level of V4 / C4

13.5.3 Reducing Artifacts

A common problem with 12-lead ECGs is that a lot of artifacts are generated if the patient is moving around and not fully relaxed. Here are a few guidelines on how to reduce artifacts and capture a good ECG:

- Place the patient in a supine or semi-Fowler's position. If the patient cannot tolerate being flat, you can do the ECG in a more upright position.
- Instruct the patient to place their arms down by their sides and to relax their shoulders.
- Make sure the patient's legs are uncrossed.
- Remove any electrical devices, such as cell phones, away from the patient as they may interfere with the machine.
- If you're getting artifacts in the limb leads, try having the patient sit on top of their hands.

13.5.4 Expiry Date of ECG Electrodes

CAUTION! CHECK THE EMBOSSED EXPIRY DATE ON THE ECG ELECTRODES PACKAGE BEFORE USING. ELECTRODES ARE GOOD FOR 45 DAYS ONCE PACKAGE IS OPENED.

Figure 13-6: Electrode Package

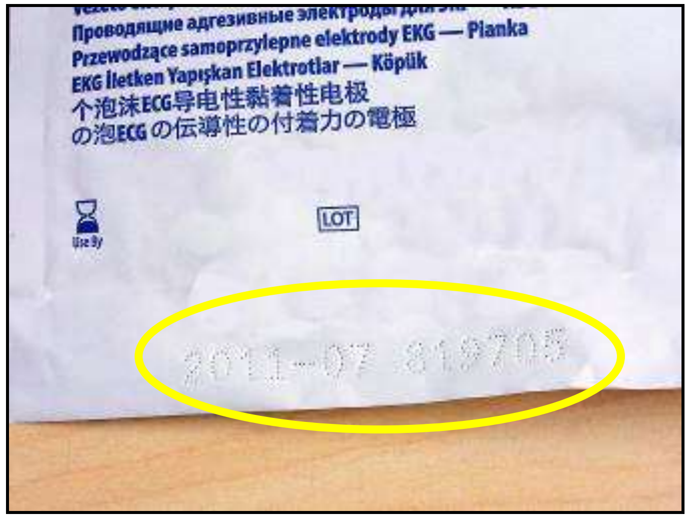


Figure 13-7: Electrode Use By Date

13.6 ZEROING THE PRESSURE IN THE IP TRANSDUCER

To zero the pressure in the invasive pressure transducer, turn the stopcock from the horizontal *running* position to the vertical *open-to-ambient-air* position.

Figure 13-8: Transducer Stopcock in Running Position (Horizontal)

Figure 13-9: Transducer Stopcock in Open-to-Ambient-Air Position (Vertical) Zero Transducer

13.6.1 Zeroing the Transducer Channel

An IP port will auto detect the insertion of an IP probe. An inserted probe requires zeroing before data is available, and will show ZERO REQD until the onscreen channel config button -- now titled "ZERO" -- is clicked, zeroing the channel. The channel box will then immediately display data with format/units appropriate for the selected mode. The user can change modes without re-zeroing.

13.6.2 Transducer Warnings

EXTREME WARNING! WHEN USING FLUID FILLED PRESSURE TRANSDUCERS TO MONITOR INTRACRANIAL PRESSURE (ICP), MAKE SURE THAT THE TRANSDUCER AND THE LINE CONNECTING TO THE PATIENT’S DRAIN ARE FREE OF ANY AIR BUBBLES!

EXTREME WARNING! AFTER COMPLETING FILLING THE TRANSDUCER AND THE LINE, DISCONNECT THE FLUID BAG FROM THE TRANSDUCER, AND CAP THE END WITH THE STERILE CAP PRIOR TO CONNECTING THE TRANSDUCER TO THE PATIENT’S BRAIN!

EXTREME WARNING! NEVER FLUSH THE ICP TRANSDUCER WHILE CONNECTED TO THE PATIENT!

EXTREME WARNING! FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN SERIOUS INJURY OR DEATH!

13.7 USING THE SUCTION FEATURE

To use the Suction feature:

1. Ensure that the suction accessories are set up as shown in *Section 9.10. Installing Suction Accessories beginning on page 105*.
2. Activate the suction by pressing the Suction Control Button .
3. Deactivate the suction at anytime by pressing the Suction Control Button a second time.

NOTE: *The suction wand supplied with MOVES® SLC™ has a control vent that must be occluded by the operator’s thumb to allow suction to occur (See Figure following).*

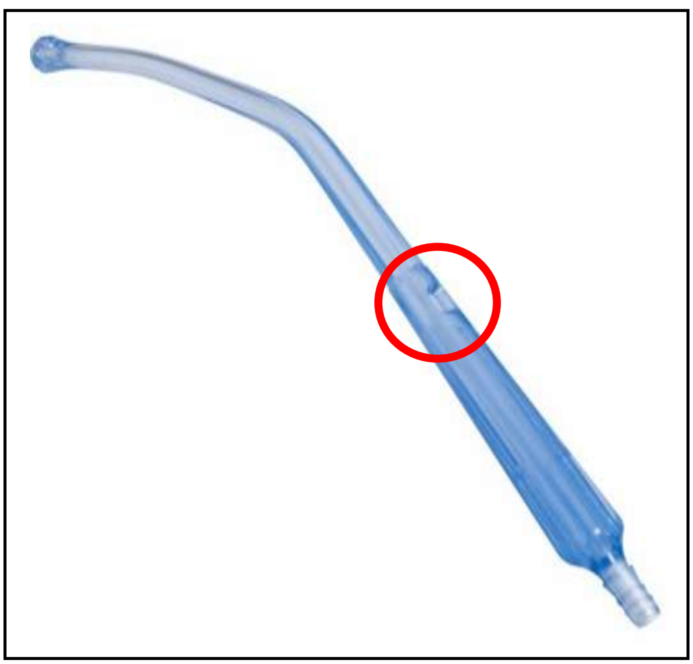


Figure 13-10: Suction Wand Showing Control Vent

NOTE: *You can adjust suction pressure between 100 and 325 mmHg in increments of 25 mmHg. (For details, see the subsection* Changing Settings in the section Setup Screen beginning on page 140.)

CAUTION! THE OPERATOR SHOULD ALWAYS HAVE AVAILABLE AN ALTERNATE MEANS OF SUCTION IN THE EVENT OF POWER FAILURE, MECHANICAL FAILURE, OR A SERIOUS OCCLUSION IN THE SUCTION SYSTEM.

WARNING! THE O_2 CONCENTRATOR DOES NOT PRODUCE O_2 WHEN THE SUCTION FEATURE IS IN USE. AN ALTERNATIVE O_2 SUPPLY WILL BE NECESSARY IF HIGH O_2 CONCENTRATION IS CRITICAL.

13.8 SHUTDOWN PROCEDURES

1. To deactivate the MOVES® SLC™ system, press and **hold** the Power Control button for five (5) seconds until the display turns OFF.
2. Detach all patient monitoring accessories from the patient connection panel.
3. Dispose of breathing circuit, sample lines (but **NOT THE NAFION TUBE**) and filters, breathing cartridge, ECG adhesive sensor pads, IP transducer, suction wand and tubing in a sanitary manner in accordance with local biohazard regulations.
4. Clean and sterilize all cables, NIBP cuffs and tubing with a disinfecting spray. Ensure that no moisture enters the tubing. Return items to storage in the accessories case.
5. Carefully remove the suction canister and suction filter and dispose of them and waste in a sanitary manner in accordance with local biohazard regulations.
6. Unlatch the MOVES® SLC™ batteries or remove them from the system and store them in a dry area at room temperature.

WARNING! LEAVING BATTERIES INSTALLED IN A NON-OPERATIONAL UNIT MAY CAUSE THEM TO DRAIN TO AN UNRECHARGEABLE LEVEL.

CAUTION! THE SUCTION CANISTER AND SUCTION FILTER ARE INTENDED FOR SINGLE USE ONLY AND SHOULD BE DISPOSED OF IN ACCORDANCE WITH LOCAL BIOHAZARD REGULATIONS.

CAUTION! BREATHING CIRCUIT, SAMPLE LINES (BUT NOT THE NAFION TUBE) AND FILTERS, BREATHING CARTRIDGES, ECG ADHESIVE SENSOR PADS, IP TRANSDUCER AND SUCTION WAND AND TUBING ARE DISPOSABLE AND SHOULD BE DISPOSED OF IN ACCORDANCE WITH LOCAL BIOHAZARD REGULATIONS.

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14.0 Using System Graphs / Trends

14.1 OVERVIEW

Plotting appears on two graphs on the Main Screen. Either graph can be set to TRENDS, which plots historical values over a user-designated time frame (30 minutes, 1, 2, 4, 8, and 16 hours).

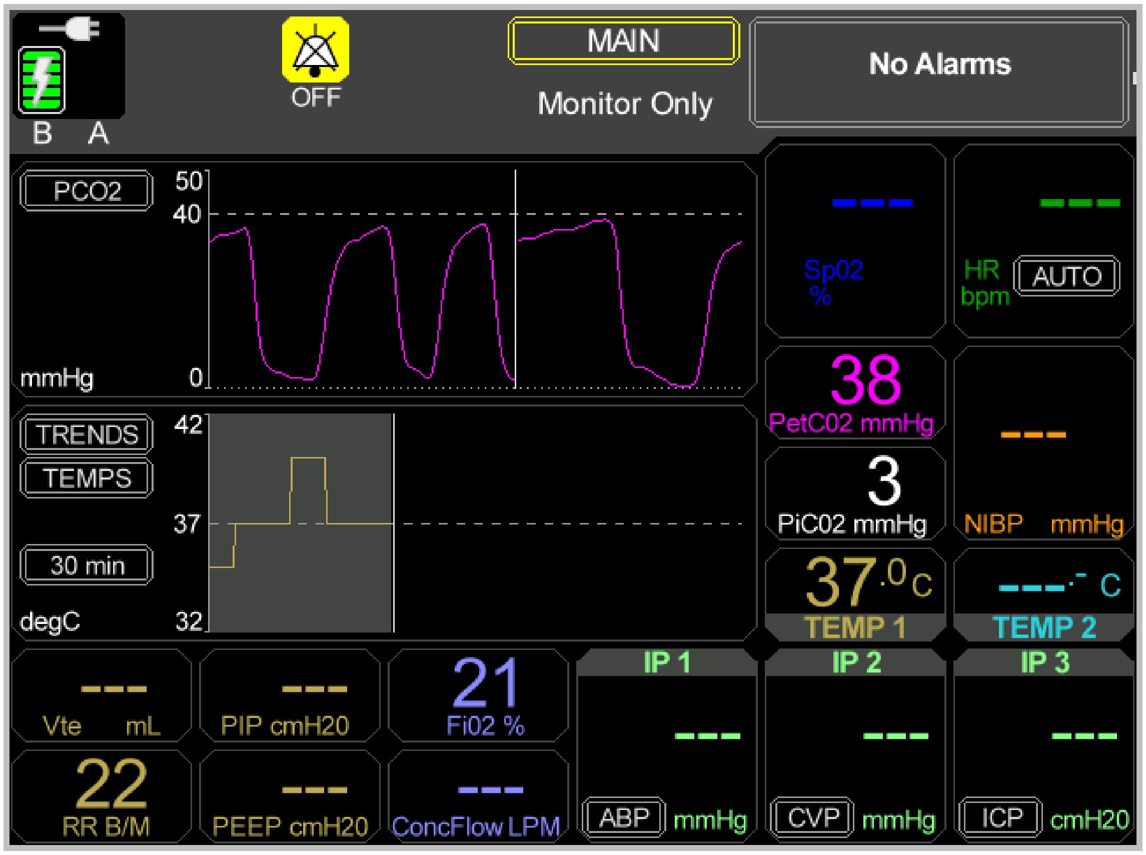


Figure 14-1: Plotting Graphs on Main Screen

The graphs have a vertical scale (from a minimum to a maximum value) for data of interest, and a horizontal time scale Because plot data is stored, changing plots (e.g., from ECG to Airway) allows the part of the plot to be displayed immediately. Normally, patient data is displayed over time from left to right; however, if there is no data, the sweep continues to erase old data and plots new data when it is available.

NOTE: *Data points above the top of the plot are plotted at the top of the plot. Data points below the bottom of the plot are plotted at the bottom of the plot. In other words, if the data is out of range, the display will only show either maximum or minimum values until the data comes back into range.*

14.2 AVAILABLE SYSTEM GRAPHS / TRENDS

14.2.1 System Graphs

The following table lists all available System Graphs.

Table 35: System Graphs and Parameters

GRAPH	PARAMETERS
1. ECG – 2.2 mV	Minimum value: -1.1 mV Maximum value: 1.1 mV Vertical sensitivity: *Display* / *MAIN Screen* / *ECG Screen* MOVES® SLC™ / 10 mm/mV / 5 mm/mV MOVES® SLC™ Remote Screen / 14 mm/mV / 7 mm/mV Plotting rates: 25 mm/sec, 10 mm/sec (MOVES® SLC™) 30 mm/sec, 15 mm/sec (MOVES® SLC™ Remote Screen) Sampling rates: 150 Hz (25/30 mm/sec); 60 Hz (10/15 mm/sec) Reference line: 0 mV, 1mV Time scale: Real time
2. ECG – 3 mV	Minimum value: -1.5 mV Maximum value: 1.5 mV Vertical sensitivity: *Display* / *MAIN Screen* / *ECG Screen* MOVES® SLC™ / 8 mm/mV / 4 mm/mV MOVES® SLC™ Remote Screen / 10 mm/mV / 5 mm/mV Plotting rates: 25 mm/sec, 10 mm/sec (MOVES® SLC™) 30 mm/sec, 15 mm/sec (MOVES® SLC™ Remote Screen) Sampling rates: 150 Hz (25/30 mm/sec); 60 Hz (10/15 mm/sec) Reference line: 0 mV, 1mV Time scale: Real time

<table>
<tr><th>GRAPH</th><th>PARAMETERS</th></tr>
<tr><td>3. ECG – 6 mV</td><td>Minimum value: -3.0 mV
Maximum value: 3.0 mV
Vertical sensitivity:
<table>
<tr><td>Display</td><td>MAIN Screen</td><td>ECG Screen</td></tr>
<tr><td>MOVES® SLC™</td><td>4 mm/mV</td><td>2 mm/mV</td></tr>
<tr><td>MOVES® SLC™ Remote Screen</td><td>5 mm/mV</td><td>3 mm/mV</td></tr>
</table>
Plotting rates:
25 mm/sec, 10 mm/sec (MOVES® SLC™)
30 mm/sec, 15 mm/sec (MOVES® SLC™ Remote Screen)
Sampling rates: 150 Hz (25/30 mm/sec); 60 Hz (10/15 mm/sec)
Reference line: 0 mV, 1mV
Time scale: Real time</td></tr>
<tr><td>4. ECG – 12 mV</td><td>Minimum value: -6.0 mV
Maximum value: 6.0 mV
Vertical Sensitivity:
<table>
<tr><td>Display</td><td>MAIN Screen</td><td>ECG Screen</td></tr>
<tr><td>MOVES® SLC™</td><td>2 mm/mV</td><td>1 mm/mV</td></tr>
<tr><td>MOVES® SLC™ Remote Screen</td><td>3 mm/mV</td><td>1 mm/mV</td></tr>
</table>
Plotting rates:
25 mm/sec, 10 mm/sec (MOVES® SLC™)
30 mm/sec, 15 mm/sec (MOVES® SLC™ Remote Screen)
Sampling rates: 150 Hz (25/30 mm/sec); 60 Hz (10/15 mm/sec)
Reference line: 0 mV, 1mV
Time scale: Real time</td></tr>
<tr><td>5. IP–ABP</td><td>Minimum value: 60 mmHg
Maximum value: 160 mmHg
Plotting rate: 7.7 mm/sec
Sampling rate: 20.8 Hz
Reference line: 100 mmHg</td></tr>
<tr><td>6. IP–CVP</td><td>Minimum value: 0 mmHg
Maximum value: 20 mmHg
Plotting rate: 7.7 mm/sec
Sampling rate: 20.8 Hz
Reference line: 10 mmHg</td></tr>
</table>

GRAPH	PARAMETERS
7. IP–ICP	Minimum value: 0 mmHg Maximum value: 27 mmHg Plotting rate: 7.7 mm/sec Sampling rate: 20.8 Hz Reference line: 14 mmHg
8. Pleth (Plethysmograph)	Plotting rate: 7.7 mm/sec Sampling rate: 20.8 Hz Reference line: None ***NOTE:*** *The pleth waveform is scaled to a fixed size for signal strengths above 10% or below 0.5% (i.e., all waveforms with a signal strength over 10% or less than 0.5% will have the same amplitude; however, the user will still see an oscillating waveform). Between the values indicated, the waveform is scaled according to signal strength.*
9. Airway	Minimum value: 0 cmH_2O Maximum value: 40 cmH_2O Plotting rate: 2.66 mm/sec Sampling rate: 7.4 Hz Reference line: 30 cmH_2O
10. PCO_2	Minimum value: 0 mmHg Maximum value: 50 mmHg Plotting rate: 4.00 mm/sec Sampling rate: 11.1 Hz Reference line: 40 mmHg Time scale: Real time

14.2.2 System Trends

There are sixteen (16) trend charts:

- FiO2 / SpO2
- PIP
- TEMPS (both TEMP1 and TEMP2)
- HR
- ABP (available under IP1, IP2, or IP3)
- CVP (available under IP1, IP2, or IP3)
- PetCO2
- SpO2
- PI
- SpCO
- SpMet
- SpHb

- ICP (available under IP1, IP2, or IP3)
- NIBP
- SpOC
- PVI

Trend plots can be set to display trend data for:

- 30 minutes
- 1 hour
- 2 hours
- 4 hours
- 8 hours
- 16 hours
- 24 hours

The following table lists all System Trends.

Table 36: System Trends and Parameters

TREND	PARAMETERS
1. Trend Plot – ABP (available under IP1, IP2 or IP3)	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 60–160 mmHg Reference line: 100 mmHg
2. Trend Plot – CVP (available under IP1, IP2 or IP3)	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–20 mmHg Reference line: 10 mmHg
3. Trend Plot – ICP (available under IP1, IP2 or IP3)	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–27 cmH_2O Reference line: 14 cmH_2O
4. Trend Plot - NIBP	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 60–160 mmHg Reference line: 100 mmHg
5. Trend Plot – PetCO2	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–50 mmHg Reference line: 40 mmHg
6. Trend Plot - FiO2 / SpO2	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–100% Reference line: 21%

TREND	PARAMETERS
7. Trend Plot - PIP	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–40 cmH_2O Reference line: 30 cmH_2O
8. Trend Plot – TEMP	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 89°F–108°F (32°C–42°C) Reference line: 98.6°F (37°C)
9. Trend Plot – HR	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–200 bpm Reference lines: 60, 100 bpm
10. Trend Plot – SpO2	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 80–100% Reference line: 90%
11. Trend Plot – PI	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–20% Reference line: None
12. Trend Plot – SpCO	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–40% Reference line: 10%
13. Trend Plot – SpMet	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–70% Reference line: 10%
14. Trend Plot – SpHb	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–25 g/dL (0–15.5 mmol/L, 0–250 g/L) Reference lines: 10, 15 g/dL (6.2, 9.3 mmol/L; 100, 150 g/L)
15. Trend Plot – SpOC	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–35 mL/dL Reference line: 13, 20 mL/dL
16. Trend Plot – PVI	Time: 30 min, 1, 2, 4, 8, 16, 24 hours Range: 0–50% Reference line: 15%

15.0 Using MOVES® SLC™ as an Anesthetic Ventilator

15.1 OVERVIEW

MOVES® SLC™ can be used as an anesthetic ventilator when paired with the MADM™ anesthetic delivery module. What follows is a brief description of the MADM™ device. Users should, however, read the MADM™ Operator's Manual thoroughly before using the MADM™ device.

15.1.1 Required Kit

To use MOVES® SLC™ as an anesthetic ventilator the MOVES® SLC™ Anesthesia Kit (P/N 126108) is required. This kit contains the following:

- MADM™ / MOVES® SLC™ Communication Cable (P/N 126111)
- Scavenger Port (P/N 125830)
- Flush Button (P/N 126109)

15.2 MADM™ INTENDED USE

MADM™ is intended to deliver volatile anesthetic to a patient when placed in either circle or open anesthetic circuits. It vaporizes isoflurane and sevoflurane and delivers a controlled concentration of the vaporized anesthetic agent into the inspiratory limb of the breathing circuit.

MADM™ is also intended to monitor respiratory rate, CO_2, and the anesthetic gases isoflurane and sevoflurane. It is intended to be connected to a patient breathing circuit for monitoring of patients to whom it is delivering volatile anesthetic gases. MADM™ is not intended for use with nitrous oxide or helium containing carrier gas.

15.3 MADM™ FUNCTIONAL DESCRIPTION

MADM™ measures the flow and composition of the gas delivered to the patient via its internal sensors and adjusts its internal liquid delivery pump to control the concentration of gas exiting the system. Fresh gas dilutes the gas exhaled from the patient, and MADM™ automatically tops up the gas in the inspiratory flow.

15.4 MADM™ DEVICE DESCRIPTION

The main components of MADM™ are shown below. The *Anesthesia and CO_2 Monitoring Sensor* and the *Power Supply* are considered accessories to the *Control and Display Unit.*

15.5 MADM™ CONTROL AND DISPLAY UNIT

Figure 15-1: MADM™ Control and Display Unit

15.5.1 Control Dial

The *Control and Display Unit* is operated by turning the control dial *counter-clockwise* until the desired concentration of inspired anesthetic is reached. The button on the dial has to be pressed in and held before the dial will move from a parked/stopped position. The same procedure must be followed when putting the dial into the parked/stopped position.

15.5.2 Inlet Sensor

The *Inlet Sensor* is used to measure the composition of all inflow gases to MADM™. The *Inlet Sensor* is automatically compensated for changes in barometric pressure within its specified operating range.

15.5.3 LCD Screen

Information from several categories is displayed in various areas of the LCD screen. In addition, the LCD screen shows the precise target inspired concentration, battery level, and details of any alarm/warning conditions. Also displayed are respiratory rate and minute ventilation.

15.6 MADM™ ANESTHESIA AND CO_2 MONITORING SENSOR

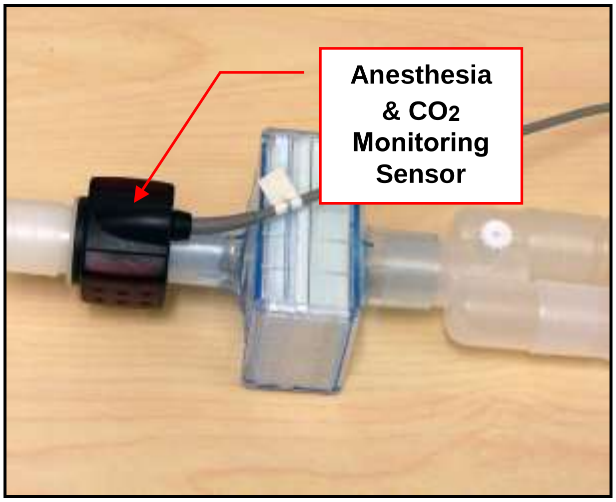


Figure 15-2: Anesthesia and CO_2 Monitoring Sensor

The *Anesthesia and CO_2 Monitoring Sensor* (a.k.a. *Patient Sensor*) is attached to the patient filter which is connected ahead of the patient circuit at the Y-piece. The sensor is used to measure inspiratory and expiratory anesthetic and carbon dioxide concentrations. These values are displayed on the LCD screen on the front of the MADM™ *Control and Display Unit*.

The *Anesthesia and CO_2 Monitoring Sensor* is automatically compensated for changes in barometric pressure within its specified operating range.

15.7 MADM™ / MOVES® SLC™ COMMUNICATION CABLE

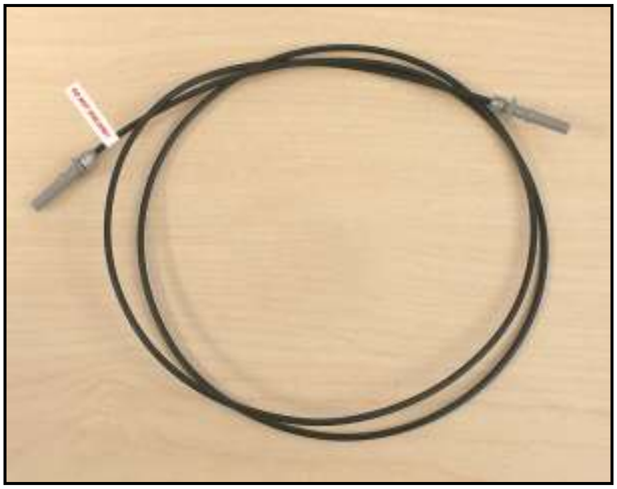


Figure 15-3: MADM™ / MOVES® SLC™ Communication Cable

The MADM™ / MOVES® SLC™ Communication Cable provides a fiber link between MADM™ and MOVES® SLC™ to correct for concentrations of isoflurane and sevoflurane in the ventilator circuit.

WARNING! WHEN USING MOVES® SLC™ AS AN ANESTHETIC VENTILATOR, THE REQUIRED COMMUNICATION CABLE MUST BE INSTALLED BETWEEN MADM™ AND MOVES® SLC™. OTHERWISE, MOVES® SLC™ WILL GREATLY OVER-STATE THE VOLUMES DELIVERED.

The cable can be verified by connecting to MADM™ then pointing other end of cable at a non-reflective surface and verifying that a RED dot is seen strobing (when MADM™ is on and has passed the startup screens).The text “MADM” must also appear in the screen status bar of the MOVES® SLC™ to ensure that communication is operating correctly.

Figure 15-4: Status Bar on MOVES® SLC™ Screen Showing Communication Is Operating

15.7.1 Change to Safe Gas Mode Indicator When MADM™ Active

The Safe Gas Mode indicator in the Status Bar becomes “SGM” when both MADM™ and Safe Gas Mode are active at the same time.

Figure 15-5: Status Bar Showing Normal Display of Safe Gas Mode Indicator

Figure 15-6: Status Bar Showing Safe Gas Mode Indicator When MADM™ Connected

15.8 MADM™ SPECIFIC ALARMS

There are two alarms specific to MADM™ which may appear in the alarm queue.

Alarm	Cause	Explanation / Additional Info
1. MADM disconnect	MADM™ had been connected, but is no longer communicating correctly.	MOVES® SLC™ will continue to use the last anesthetic levels reported by MADM™ for a period of one minute before removing any corrections.
2. Unsupported MADM	A MADM™ link has been noticed, but the required information is not being communicated over the link.	The firmware version of MADM™ and MOVES® SLC™ are incompatible.

15.9 MADM™ POWER SUPPLY

The Elpac Power System™ (model # MWA065024A), a single medical-grade power supply, powers the system.

WARNING! MADM™ SHOULD NOT BE POSITIONED SO AS TO MAKE IT DIFFICULT TO DISCONNECT IT FROM THE POWER SUPPLY.

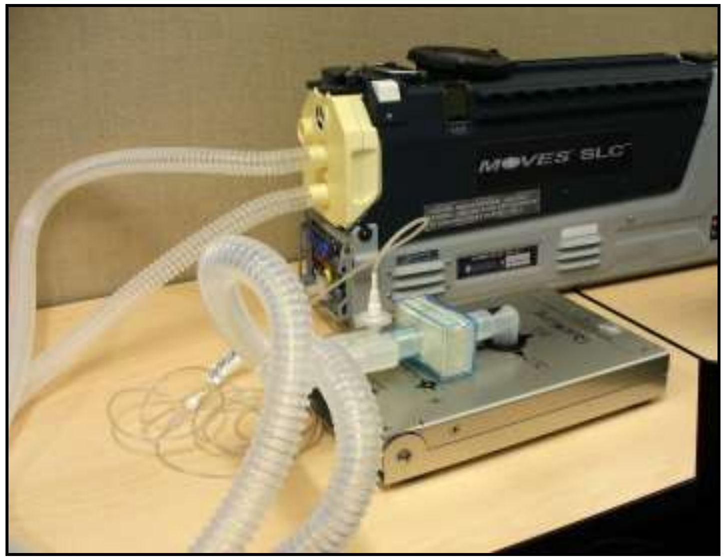
The system also contains an embedded battery to provide uninterrupted function in the event of a temporary power loss. It is recommended that the battery be used only in this situation. MADM™ can run on battery power for a maximum of 30 minutes at ambient temperature (18°C to 25°C).

A separate battery base is optionally provided which includes a hot-swappable battery capable of powering MADM™ for up to 2.5 hours of normal use.

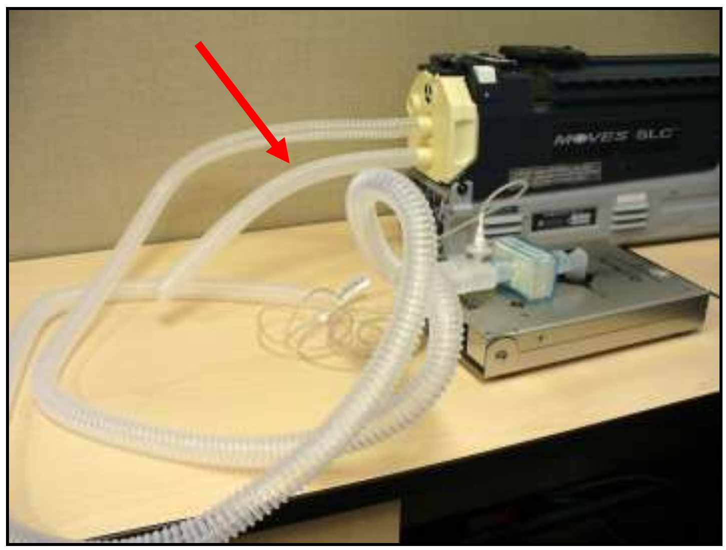
NOTE: *For additional information on ventilation with MADM, please see* *Appendix B – Pneumatic Diagram on page 303**.*

15.10 ATTACHING MADM™ TO MOVES® SLC™

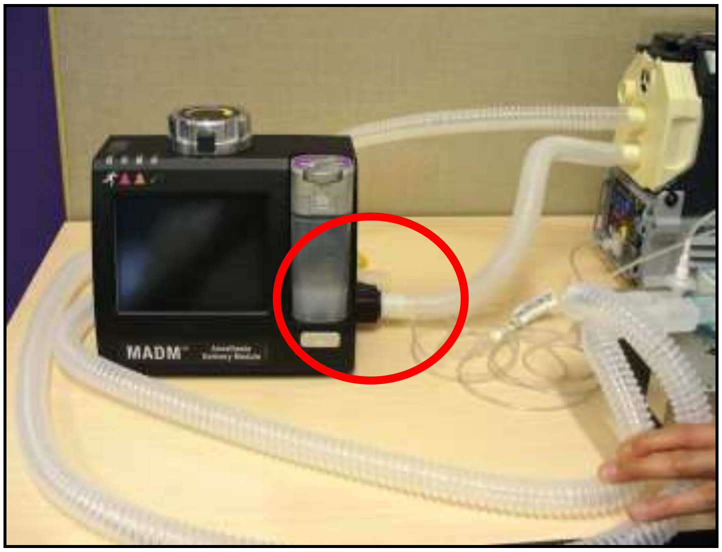
1. Shown in the photo at the right is the MOVES® SLC™ "normal" setup. A ventilator cartridge is installed and a ventilator breathing circuit is attached to it and to a patient, in this case a patient simulator (QuickLung® Test Lung).



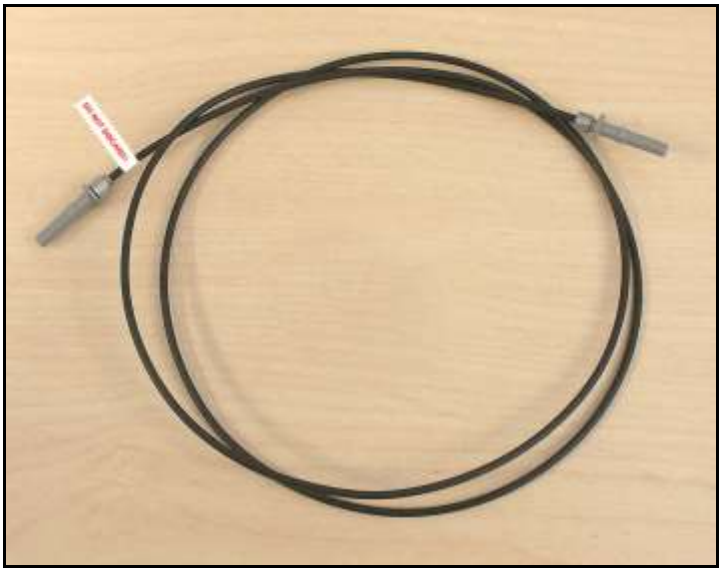
2. To modify the "normal" setup to attach MADM™, first disconnect the end of the lower breathing circuit tube (attached to the ventilator cartridge port labeled "To Patient Hose") from the cartridge. Replace it with a short 22 mm tube (P/N 126259), as indicated in the photo at the right.



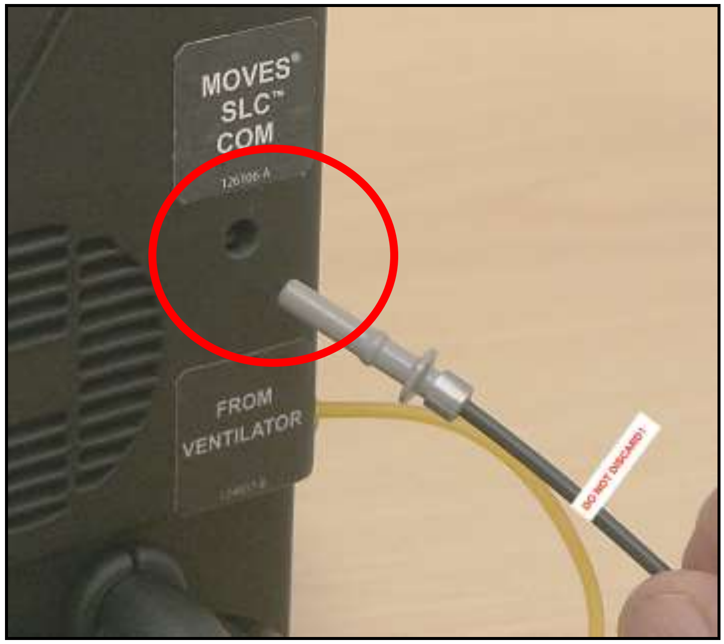
3. Next, orient the MADM™ as shown and attach the free end of the short tube to the inlet sensor of the MADM™. The port is labeled "From Ventilator".



4. Locate the MADM™ / MOVES® SLC™ Communication Cable (P/N 126111) shown in the photo on the right which is part of the MOVES® SLC™ Anesthesia Kit (P/N 126108).



5. Insert one end of the cable into the MOVES® SLC™ Communications Port on the "short tube" side of the MADM™ indicated in the photo at the right.



NOTE: *The ends of the cable are identical and either end can be inserted into MADM™ or MOVES® SLC™.*

6. Insert the cable until it clicks into position as shown in the photo at the right.

NOTE: *The cable can be verified by connecting to MADM™ then pointing the other end of cable at a non-reflective surface and verifying that a RED dot is seen strobing (when MADM™ is on and has passed the startup screens).*

7. Insert the other end of the cable into the MADM™ port on the MOVES® SLC™ Connections panel as shown in the photo at the right. Insert the cable until it clicks into position

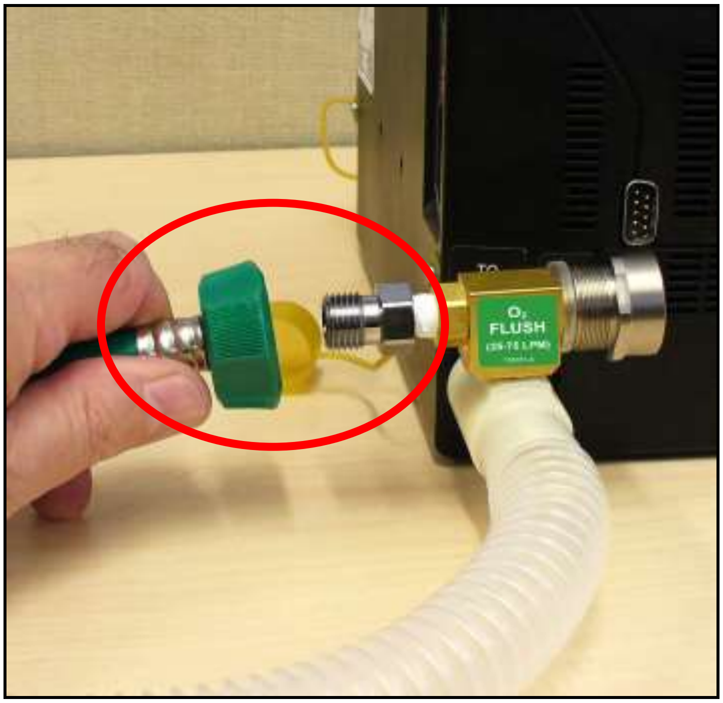
8. Locate the Flush Button Fitting (P/N 126109) shown in the photo at the right.

NOTE: *Because MOVES® SLC™, is a circle system that recirculates breathing gas, the Flush Button is used along with a regulated O_2 line or tank to quickly flush anesthetic from the system and bring the patient "down" faster.*

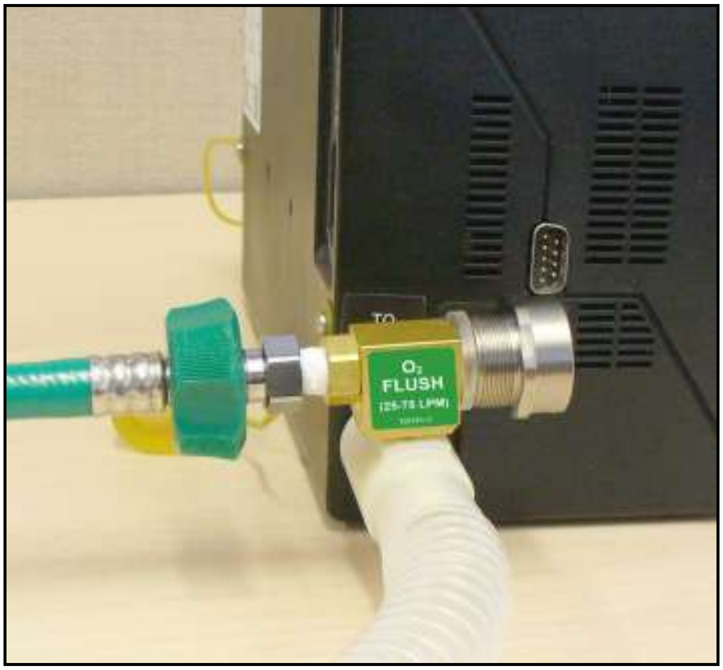
9. Attach the Flush Button Fitting (P/N 126109) to the end of the hose that was initially disconnected from the ventilator cartridge by pressing the narrow end of the fitting into the hose.

10. Now, connect the wide end of the Flush Button Fitting (P/N 126109) to the output of MADM™. This port is labeled "O_2 Flush".

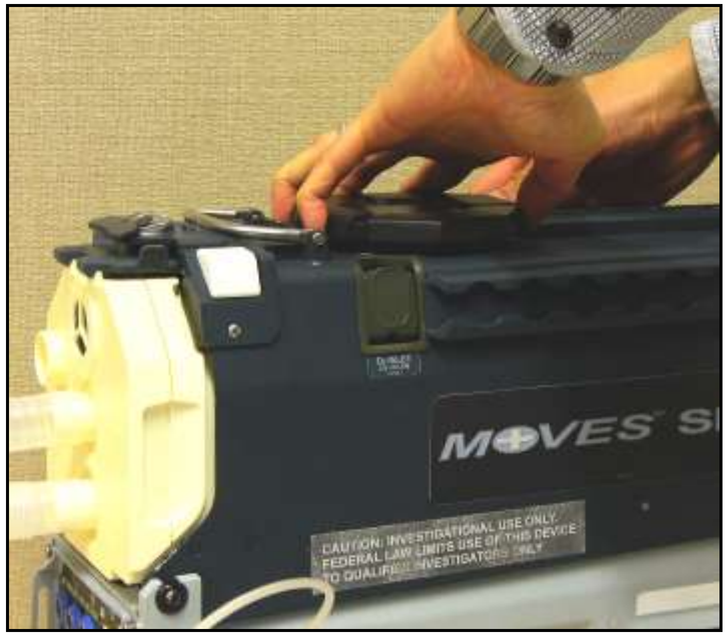
11. Attach the female DISS connector on a hose connected to a regulated O_2 tank or source supplying 25–75 LPM of O_2 at 40 PSI to the male DISS threaded connection on the Flush Button Fitting (P/N 126109) by screwing it on clockwise until it is snug.



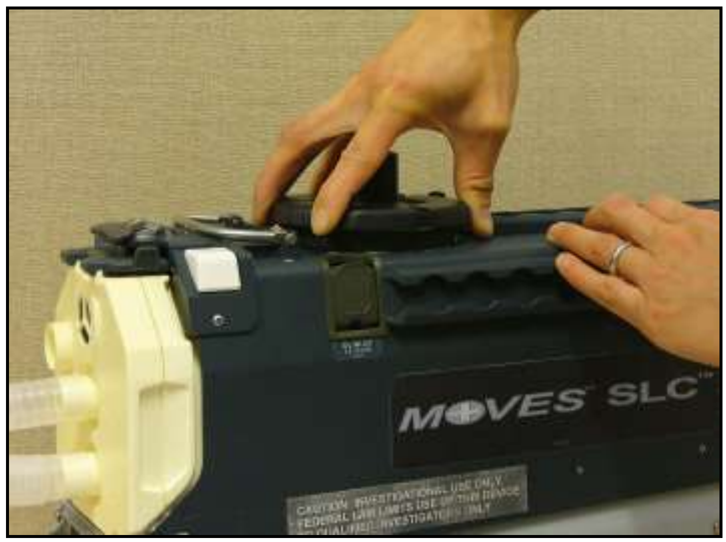
12. DISS connectors correctly attached are shown in the photo at the right.



13. Next, remove the Ventilator Air Intake cap by unscrewing it counter-clockwise.

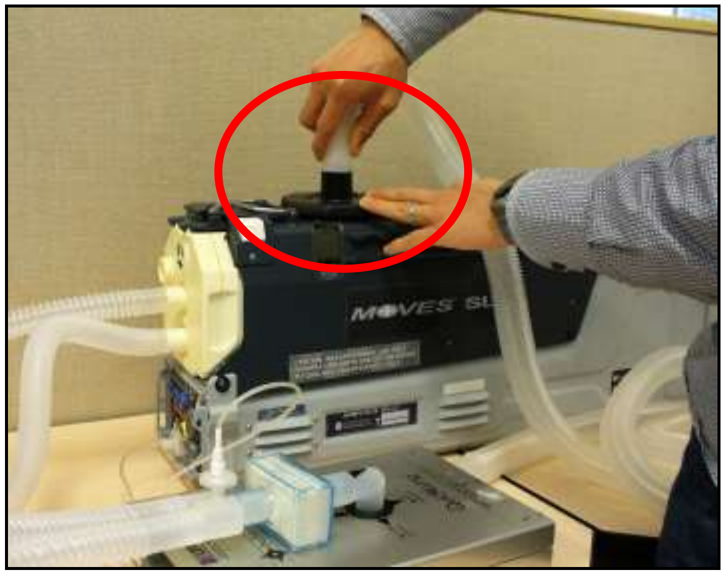


14. Replace the Ventilator Air Intake cap with the Anesthetic Scavenger Port (P/N 125830) by screwing the port in clockwise.



15. The Anesthetic Scavenger Port (P/N 125830) is shown properly attached in the photo at the right.

16. Attach the Anesthetic Scavenger Port (P/N 125830) to a scavenger system used for the removal of waste anesthetic gasses (use adapter fittings if necessary). Note that the scavenger tube used for this is identifiable by its 30 mm diameter, which is wider than that of the 22 mm breathing circuit tubes. The attached scavenger system shall comply with ISO 80601-2-13.



17. The scavenger tube is shown properly connected to the Anesthetic Scavenger Port (P/N 125830) in the photo at the right.

15.11 DIAGRAM OF MADM™ ATTACHED TO MOVES® SLC™

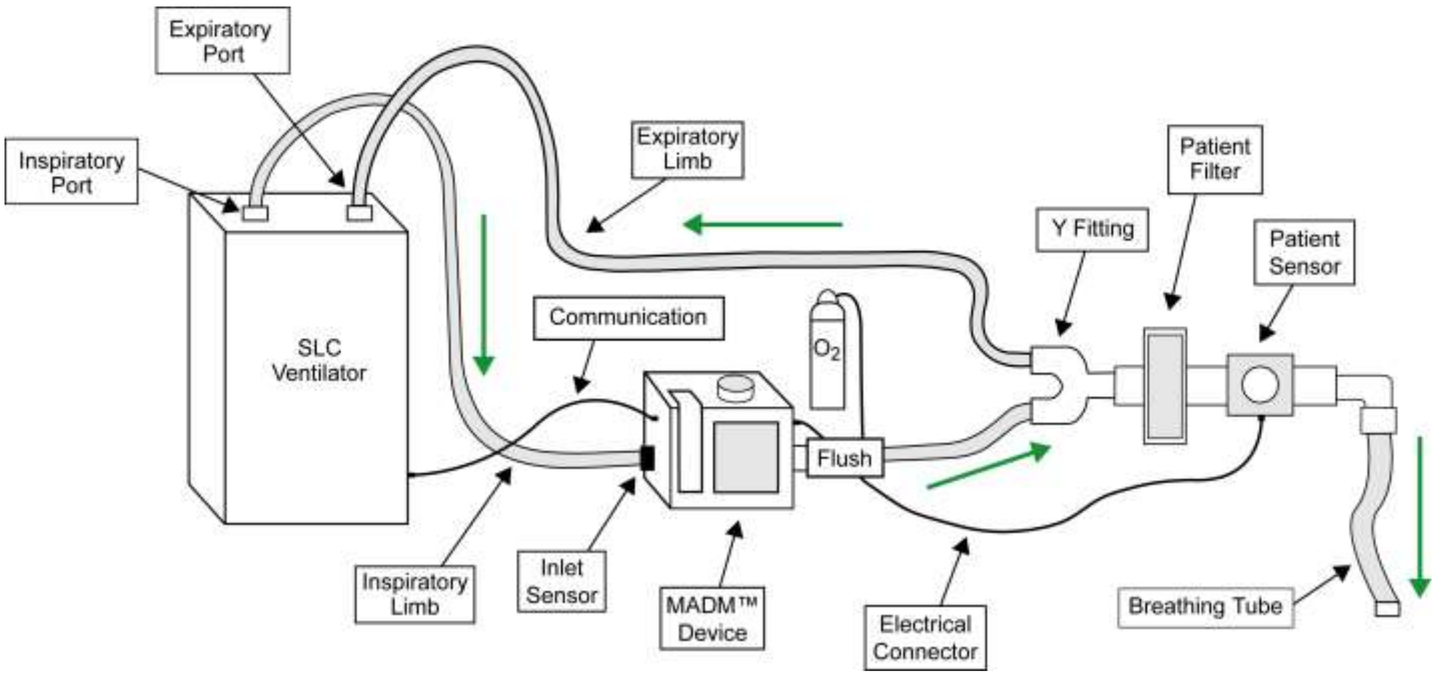


Figure 15-7: MADM™ Attached to MOVES® SLC™

NOTE: *Green arrows in diagram above indicate direction of air flow.*

16.0 Alarms

Alarm conditions which require immediate or priority user attention can be distinguished from normal status alarms at a distance via their highlighted screen colors, audible annunciation, and alarm status LEDs. If a user is too far away from MOVES® SLC™ to see the contents of the display, the user will still be informed of the alarm condition by seeing that the status LEDs are NOT green.

16.1 ABOUT STATUS LEDS

There are four (4) status LEDs, each situated on a top corner of the MOVES® SLC™. They are placed away from the display so that they can be seen when the display cannot. Note the following:

- When the system is NOT in alarm, the status LEDs are solid green.
- When the system is IN alarm, the status LEDS are solid yellow, flashing yellow, or flashing red (from low to medium to high in order of priority).
- If alarms have been silenced, the status LEDs continue to indicate alarm level.

Alarms and messages are displayed in the top right of the screen's status area. When a new alarm condition becomes active, or an existing alarm becomes inactive, the system will update the visual and audible alarm state with the highest priority active alarm. To see the text of an alarm other than that of the highest-priority alarm, the user can navigate to the Alarm Queue on the status bar, press the Check button, and then use the Next and Previous buttons to page through the alarms.

16.2 ALARM PRIORITIES AND CHARACTERISTICS

16.2.1 Standard Alarms

The following table details the MOVES® SLC™ standard alarms, their audio and visual characteristics, and their priorities.

Table 37: Alarm Types and Descriptions

ALARMS TABLE			
Alarm Priority	**Description / Response**	**Visible Alarm**	**Audible Alarm**
High	Immediate operator response required	Red LED 60% duty cycle flashing at 2.8 Hz	Three short notes of ascending pitch followed by two long notes of ascending pitch. The musical sequence is a common triad (C-E-G) followed by a perfect fourth (G-C). When measured with a microphone at a distance of one (1) meter, the sound pressure level of the High Priority alarm is 62 dB. (This was measured with an A-weighted background level of 27.2 dB which included any information signal or extraneous noise.)

ALARMS TABLE			
Alarm Priority	**Description / Response**	**Visible Alarm**	**Audible Alarm**
Medium	Prompt operator response required	Yellow LED 60% duty cycle at 0.8 Hz	Three notes of equal, medium length and ascending pitch. The musical sequence is a common triad (C-E-G). When measured with a microphone at a distance of one (1) meter, the sound pressure level of the Medium Priority alarm is 61.5 dB. (This was measured with an A-weighted background level of 27.2 dB which included any information signal or extraneous noise.)
Low	Operator awareness required	Yellow LED Constant ON	None
Information	Message	Green LED (Indicating no Alarm) Constant ON	None

***NOTE:** Low priority alarms and/or messages will not be audibly indicated.*

16.2.2 High Priority Communication Failure Alarm

The High Priority Communication Failure alarm is triggered when there is no longer communication between the MOVES® SLC™ user interface and its internal systems.

Alarm Priority	Description	Visible Alarm	Audible Alarm
High	System failure. Immediate operator response required	Red LED 60% duty cycle flashing at 2.8 Hz	A high short note followed by two short low notes an octave lower, then a high long note followed by a low long note an octave lower.

16.3 ALARM QUEUE

The Alarm Queue is displayed in the top right corner of the screen's Status Bar. Initially, only the text of the highest-priority alarm is displayed. To see the text of an alarm other than that of the highest-priority alarm, the user navigates to the Alarm Queue, presses the Check button, and then uses the Next and Previous buttons to page through the alarms. The Alarm Queue shows all active alarms, non-active latched alarms, and non-alarm messages. If there are no alarms, the message NO ALARMS is displayed.

Figure 16-1: No Alarms Message in Alarm Queue

16.4 LOCKED ALARMS AND MESSAGES

Some alarms and messages CANNOT be turned off or altered in any way, even by someone with Administrator privileges. These alarms and messages are shown with a padlock beside them in the alarm list on the Alarm ON/OFF screen. Selecting them and pressing the Check button will have no effect on their status (unlike other alarms which can be toggled ON / OFF or Dismissed).

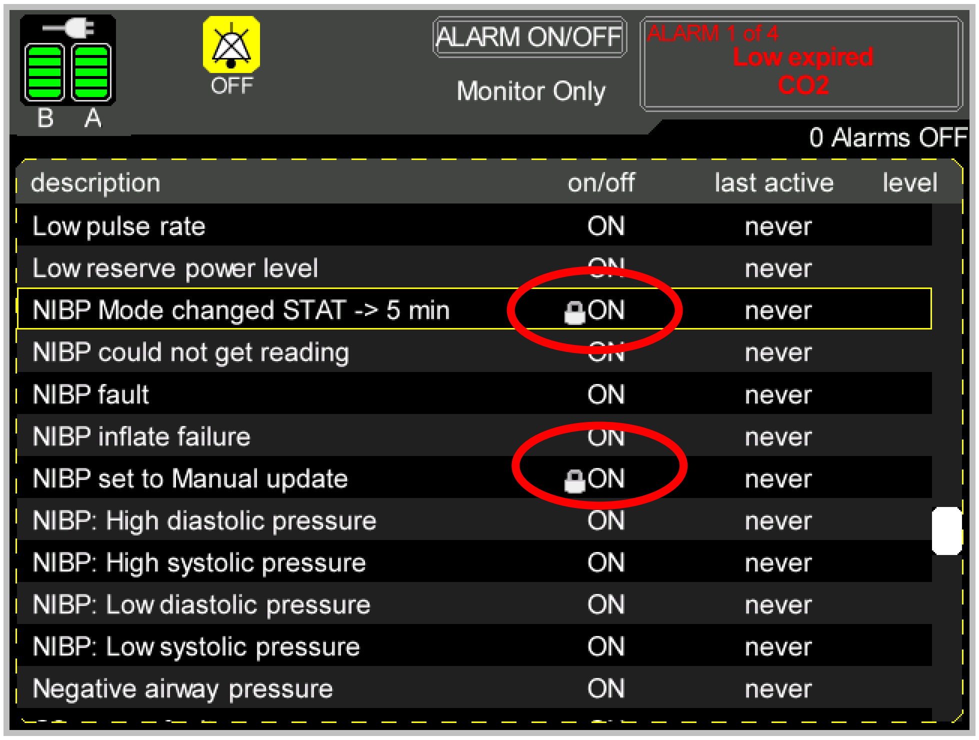


Figure 16-2: Two Locked Alarms

16.5 INHIBITABLE AND LATCHING ALARMS

Inhibitable and Latching alarms can be distinguished from General alarms by the "dismiss" option initially shown in the top right corner.

16.5.1 Inhibitable Alarms

Some, but not all, MOVES® SLC™ alarms are Inhibitable. An Inhibitable alarm can be dismissed and cleared even though the condition or event that triggered the alarm is still active.

An Inhibitable alarm is shown in two states in the images below.

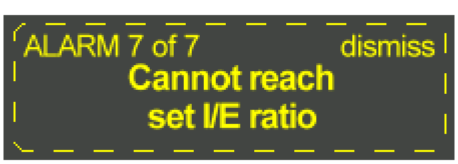


Figure 16-3: Inhibitable Alarm Able To Be Dismissed

Figure 16-4: Inhibitable Alarm Cleared

To clear the Inhibitable alarm, select it in the Alarm Queue and then press the Check button. Once an alarm is cleared, it will be removed from the Alarm Queue.

NOTE: *The alarm will, of course, also be cleared if the condition or event that triggered the alarm is addressed or corrected.*

16.5.2 Latching Alarms

Some alarms (known as latching alarms) require operator acknowledgment before they are removed from the Alarm Queue (i.e., they will persist in the Alarm Queue even if the condition or event that triggered the alarm is addressed / corrected).This guarantees that the operator is made aware that the alarm condition occurred **even if the alarm condition has since disappeared**. A latching alarm is visually identical to an Inhibitable alarm. A latching alarm is shown is shown in two states in the images below.

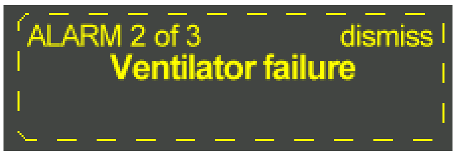


Figure 16-5: Latched Alarm Able To Be Dismissed

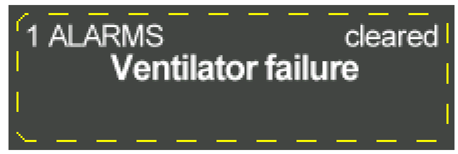


Figure 16-6: Latched Alarm Cleared

To clear the Latched alarm, select it in the Alarm Queue and then press the Check button. Once an alarm is cleared, it will be removed from the Alarm Queue. A Latched alarm will also not persist after MOVES® SLC™ is shut down.

NOTE: *All alarms are logged in the log file.*

NOTE: *See* *Alarm Conditions and Causes beginning on page 230* *for identification of which alarms are Inhibitable, which are Latched, and which are General and neither.*

16.5.3 Alarms That Have Been Turned Off

Alarms that are not Locked can be turned OFF using the Alarm ON/OFF screen. A white triangle with an "X" through it presented on a red hexagonal shape indicates that some alarms have been turned off. This icon is shown in the top left corner of the Status Bar. The number of alarms turned off is indicated below the icon.

Figure 16-7: Latched Alarm Able To Be Dismissed

16.5.4 Auto Restoration of Alarm Settings Upon Power Loss

When power is lost for less than or equal to three (3) minutes, the alarm settings prior to the power loss are restored automatically. However, the latched or inhibited state of all alarms is lost immediately upon power loss and is NOT restored.

After three (3) minutes and no more than 30 minutes, the operator will be asked: "Configure system for new patient?". If the operator responds YES, then the alarms are returned to their default values; otherwise, the old alarm settings are used. After 30 minutes all alarms return to default values.

16.6 TESTING ALARMS

16.6.1 Testing Adjustable Alarms

Table 38: Adjustable Alarms, Test Procedures and Results

Alarm	Test Procedure	Result / Observation
1. High Airway Pressure Warning	1. Setup MOVES® SLC™ breathing circuit with disposable ventilator cartridge, patient tubing, Y-piece, compliant reservoir (i.e., balloon) and sample line. 2. Go to the "Alarm Limits" screen and change the "High airway pressure warning" to 20 cmH_2O. 3. Start ventilating the reservoir in default ventilator mode, with Control Pressure = 30 cmH_2O. Wait for alarm.	Alarm queue should display "High airway pressure airway warning" within 20 seconds.
2. High Airway Pressure Release	1. Setup MOVES® SLC™ breathing circuit with disposable ventilator cartridge, patient tubing, Y-piece, compliant reservoir (i.e., balloon) and sample line. 2. Go to the "Alarm Limits" screen and change the "High airway pressure release" to 40 cmH_2O. 3. Start the ventilating reservoir in default ventilator mode, with Control Pressure = 45 cmH_2O. Wait for alarm.	Alarm queue should display "High airway pressure release" within 20 seconds.

Alarm	Test Procedure	Result / Observation
3. High Expired CO_2	1. Ensure the O_2/CO_2 sensor is warmed up (values populate "Monitor" screen). 2. Go to the "Alarm Limits" screen and change the "High expired pCO_2" to 50 mmHg. 3. Quickly expose the sample line to gas with higher than ambient CO_2 concentration (should be > 7% CO_2 at sea level or greater for higher altitudes) until pCO_2 on "Monitor" screen goes > 50 mmHg. Wait for alarm.	Alarm queue should display "High expired CO_2" within 20 seconds.
4. Low Expired CO2	1. Ensure the O_2/CO_2 sensor is warmed up (values populate "Monitor" screen). 2. Go to the "Alarm Limits" screen and change the "Low expired PCO_2" to 35 mmHg. 3. Breathe lightly on sample line until pCO_2 on "Monitor" screen goes < 35mmHg. Wait for alarm.	Alarm queue should display "Low expired CO2" within 20 seconds.
5. Low SpO2	1. Plug an SpO_2 finger clip into the MOVES® SLC™ and place the finger clip on an SpO_2 simulator. 2. Set the simulator for SpO_2 < 90%. Wait for alarm. (Note LNCS SpO_2 sensors are compatible with more simulators)	Alarm queue should display "Low SpO2" within 20 seconds.
6. Low pulse rate	1. Use one MOVES® SLC™ heart rate source (ABP, SpO_2 or ECG) cable plugged into MOVES® SLC™ and a patient simulator. 2. Set heart rate to < 50 bpm. Wait for alarm.	Alarm queue should display "Low pulse rate" within 20 seconds.
7. High pulse rate	1. Use one MOVES® SLC™ heart rate source (ABP, SpO_2 or ECG) cable plugged into MOVES® SLC™ and a patient simulator. 2. Set heart rate to > 120 bpm. Wait for alarm.	Alarm queue should display "High Pulse rate" within 20 seconds.

Alarm	Test Procedure	Result / Observation
8. IPx-ABP: High systolic pressure (where x is 1, 2 or 3)	1. Plug the IP cable into one of the 3 MOVES® SLC™ IP ports and into a clinical blood pressure transducer. 2. With the transducer open to air, select "Zero". 3. Ensure that the channel in use is configured for ABP. 3. Attach a syringe to the transducer and slowly increase the pressure on the transducer until the MOVES® SLC™ displays systolic pressure > 180 mmHg. Wait for alarm.	Alarm queue should display "IPx-ABP: High systolic pressure" within 20 seconds.
9. IPx-ABP: Low systolic pressure (where x is 1, 2 or 3)	1. Plug the IP cable into one of the 3 MOVES® SLC™ IP ports and into a clinical blood pressure transducer. 2. With the transducer open to air, select "Zero". 3. Ensure that the channel in use is configured for ABP. 4. Wait for alarm.	Alarm queue should display "IPx-ABP: Low systolic pressure" within 20 seconds.
10. IPx: Low CVP (where x is 1, 2 or 3)	1. Plug the IP cable into one of the 3 MOVES® SLC™ IP ports and into a clinical blood pressure transducer. 2. With the transducer open to air, select "Zero". 3. Ensure that the channel in use is configured for CVP. 4. Wait for alarm.	Alarm queue should display "IPx: Low CVP" within 20 seconds.
11. IPx: High CVP (where x is 1, 2 or 3)	1. Plug the IP cable into one of the 3 MOVES® SLC™ IP ports and into a clinical blood pressure transducer. 2. With the transducer open to air, select "Zero". 3. Ensure that the channel in use is configured for CVP. 4. Attach a syringe to the transducer and slowly increase the pressure on the transducer until the MOVES®SLC™ displays systolic pressure > 20 mmHg. Wait for alarm.	Alarm queue should display "IPx: High CVP" within 20 seconds.

Alarm	Test Procedure	Result / Observation
12. IPx: Low ICP (where x is 1, 2 or 3)	1. Plug the IP cable into one of the 3 MOVES® SLC™ IP ports and into a clinical blood pressure transducer. 2. With the transducer open to air, select "Zero". 3. Ensure that the channel in use is configured for ICP. 4. Wait for alarm.	Alarm queue should display "IPx: Low ICP" within 20 seconds.
13. IPx: High ICP (where x is 1, 2 or 3)	1. Plug the IP cable into one of the 3 MOVES® SLC™ IP ports and into a clinical blood pressure transducer. 2. With the transducer open to air, select "Zero". 3. Ensure that the channel in use is configured for ICP. 4. Attach a syringe to the transducer and slowly increase the pressure on the transducer until the MOVES® SLC™ displays systolic pressure > 27 cmH_2O. Wait for alarm.	Alarm queue should display "IPx: High ICP" within 20 seconds.

16.6.2 Testing Non-Adjustable Alarms

Table 39: Non-Adjustable Alarms, Test Procedures and Results

Alarm	Test Procedure	Result / Observation
1. Power Failure	1. Turn MOVES® SLC™ ON. 2. Unplug from the wall power and open both battery doors.	Alarm visual indicator lights should be solid red for at least seven seconds.
2. High Oxygen Concentration (FiO_2)	1. Setup MOVES® SLC™ breathing circuit with disposable ventilator cartridge, patient tubing, Y-piece, compliant reservoir (i.e., balloon) and sample line. 2. Start ventilating reservoir in default ventilator mode. Set O_2 = 70%. Allow to ventilate until concentrator pump stops (O_2 > 72%). 3. While still ventilating, set O_2 = 30%. Wait for alarm.	Check alarm queue for "Inspired O2 above target" alarm within 20 seconds.

Alarm	Test Procedure	Result / Observation
3. Low Oxygen Concentration (FiO_2)	1. Setup MOVES® SLC™ for oxygen supplementation 2. Redirect the sample line to ambient air.	Check alarm queue for "Inspired O2 below target" alarm within 30 seconds.
4. Breathing Circuit Integrity	1. Setup MOVES® SLC™ breathing circuit with disposable ventilator cartridge, patient tubing, Y-piece, compliant reservoir (i.e., balloon) and sample line. 2. Disconnect sample line from Y-piece. 3. Start ventilating the reservoir on default ventilator settings. Wait for alarm.	Check alarm queue for "Patient circuit disconnect" alarm within 20 seconds. May get "Leak detected" alarm within 30 seconds.

16.7 ALARM CONDITIONS AND CAUSES

NOTE: *If no values are given in the Locked / Latching or Inhibitable columns, these conditions do not apply to the listed alarm.*

Table 40: Alarm Conditions and Causes

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
1. Internal fault: Service soon	Low	Latching		Low priority fault indicating possible calibration issues with patient monitoring and/or system sensors, concentrator pump temperature sensor fault or internal memory malfunction.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
2. Low Temperature: System warming …	Low			System temperature is less than 0°C (32°F), or concentrator pump temperature is less than 0°C (32°F) while system temperature is in the range of -18°C (-0.4°F) to 70°C (158°F).	1. Wait for system to warm up or proceed to a higher temperature environment. 2. If erroneous, return MOVES® SLC™ for servicing.
3. System Temperature too high	Low			System temperature exceeds 70°C (158°F).	1. Remove any contact between the patient and the system enclosure. 2. Proceed to a lower temperature environment. 3. If erroneous, return MOVES® SLC™ for servicing.
4. System Temperature too low	Low			System temperature is less than -18°C (-0.4°F).	1. Proceed to a higher temperature environment. 2. If erroneous, return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
5. TEMP1: High patient temperature	Low			Patient temperature is over 38°C (100.4°F) and no more than 42°C (107.6°F).	1. Check integrity of interface with patient. 2. Fully disconnect then reconnect temperature patient connection. 3. Check for related alarms and follow actions if required. 4. Clinical intervention may be required.
6. TEMP1: Low patient temperature	Low			Patient temperature is no less than 28°C (82.4°F) and under 35°C (95.0°F).	1. Check integrity of interface with patient. 2. Fully disconnect then reconnect temperature probe patient connection. 3. Check for related alarms and follow actions if required. 4. Clinical intervention may be required.
7. TEMP1: Temperature probe disconnect	Low		Inhibitable	Temperature probe patient connection is disconnected from either system or patient after previously being connected.	1. Fully disconnect then reconnect temperature probe patient connection. 2. Check integrity of interface with patient. 3. Replace temperature probe patient connection. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
8. TEMP2: High patient	Low			Patient temperature is over 38°C (100.4°F) and no more than 42°C (107.6°F).	1. Check integrity of interface with patient. 2. Fully disconnect then reconnect temperature patient connection. 3. Check for related alarms and follow actions if required. 4. Clinical intervention may be required.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
9. TEMP2: Low patient	Low			Patient temperature is no less than 28°C (82.4°F) and under 35°C (95.0°F).	1. Check integrity of interface with patient. 2. Fully disconnect then reconnect temperature probe patient connection. 3. Check for related alarms and follow actions if required. 4. Clinical intervention may be required.
10. TEMP2: Temperature probe disconnect	Low		Inhibitable	Temperature probe patient connection is disconnected from either system or patient after previously being connected.	1. Fully disconnect then reconnect temperature probe patient connection. 2. Check integrity of interface with patient. 3. Replace temperature probe patient connection. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
11. Concentrator temperature sensor fault	Low			Redundant internal temperature sensor communication failure with concentrator.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
12. Concentrator failure	Medium			Concentrator communication failure with UI or concentrator reports concentrator pump fault.	1. Turn suction on and off for 2 seconds. 2. Power cycle MOVES® SLC™. 3. Return MOVES® SLC™ for servicing.
13. Concentrator in degraded mode	Medium			Concentrator reports partial failure due to unexpected data, including: product tank flow, product tank pressure and suction pressure. Oxygen flow or concentration may be reduced.	1. Monitor inspired O_2 to ensure adequate oxygenation is being maintained in the ventilation circuit. 2. Power cycle MOVES® SLC™. 3. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
14. Suction not available	Medium			Concentrator communication failure with UI or concentrator reports concentrator pump fault.	1. Turn suction on and off for 2 seconds. 2. Power cycle MOVES® SLC™. 3. Return MOVES® SLC™ for servicing.
15. Ventilator failure: Use backup vent if attempting to ventilate	HIGH, if vent problem while attempting to ventilate LOW otherwise	Latching		Communication failure between ventilator module and UI, erroneous feedback from blower to ventilator module, blower air inlet occlusion, ventilator pressure sensor fault, or low supply voltage to ventilator module while in ventilation mode (1) if ventilator not running or (2) if ventilator is running. ***NOTE:*** *In the event of a communication failure, the ventilator will continue to operate with the last user-set parameters and will operate the air pump at least 9 LPM.* ***NOTE:*** *If a "Leak alarm" and a "Ventilator failure" alarm occur simultaneously, the leak is only substantial if you see alternating Ve/Vi values displayed.*	1. Ensure that the blower inlet is not occluded. 2. Power cycle MOVES® SLC™. 3. Return MOVES® SLC™ for servicing.
16. Vent vol-flow fault: Try PC-IMV mode if venting and not already in CPAP/PS or PC-IMV	Medium			Ventilator flow sensor communication failure with ventilator detected during system start-up tests.	1. Power cycle MOVES® SLC™. 2. Repeat system start-up tests. 3. Revert to pressure control ventilation modes if necessary. 4. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
17. Air pump failure	Medium			Erroneous feedback from air pump is detected by ventilator.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
18. Leak detected	Medium			Exhaled tidal volume is more than 100 mL less than the delivered inspired tidal volume, or the internal ventilator bag has collapsed. ***NOTE:*** *A high expiratory flow rate (over 80 LPM) can be misinterpreted as being lower than actual, resulting in an incorrect leak report.* ***NOTE:*** *If a "Leak alarm" and a "Ventilator failure" alarm occur simultaneously, the leak is only substantial if you see alternating Ve/Vi values displayed.*	1. Ensure all breathing circuit connections (including patient tubing, Y-piece and sample line) are tight and no leaks are detected. 2. Ensure ventilator cartridge is properly connected to MOVES® SLC™. 3. Replace breathing circuit including ventilator cartridge. 4. Leak may be patient-related. Clinical intervention may be required. 5. Return MOVES® SLC™ for servicing.
19. Internal power monitoring fault	Medium			Internal supply voltage mismatches between any or all of the ventilator, UI, concentrator or power manager modules.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
20. Power manager fault	Medium			Communication failure between power manager and UI.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
21. Battery A: Unknown power level	Low			Power manager detects presence of battery but fails to communicate or power manager fault alarm is active.	1. Replace affected battery or batteries. 2. Power cycle MOVES® SLC™. 3. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
22. Battery B: Unknown power level	Low			Power manager detects presence of battery but fails to communicate or power manager fault alarm is active.	1. Replace affected battery or batteries. 2. Power cycle MOVES® SLC™. 3. Return MOVES® SLC™ for servicing.
23. Battery A: Not charging	Low			Battery charge level has not increased by more than 1% after one hour of charging and is less than 96%.	1. Remove and replace problematic battery. 2. Replace MOVES® SLC™ power supply/charger. 3. Power cycle MOVES® SLC™. 4. Return battery and/or power supply/charger and/or MOVES® SLC™ for servicing.
24. Battery B: Not charging	Low			Battery charge level has not increased by more than 1% after one hour of charging and is less than 96%.	1. Remove and replace problematic battery. 2. Replace MOVES® SLC™ power supply/charger. 3. Power cycle MOVES® SLC™. 4. Return battery and/or power supply/charger and/or MOVES® SLC™ for servicing.
25. Low battery	High	Locked		Running on battery power and all batteries are below 20%.	1. Connect power supply/charger to MOVES® SLC™ to allow battery or batteries to charge. 2. If running on a single battery then insert a second fully charged battery. 3. If running on two batteries then replace each battery (one at a time) with a fully charged battery.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
26. Backup power source required	High			Only one valid power source (battery A, battery B or power supply/charger) is detected and the low battery alarm is not active. Battery charge level must be greater than or equal to 10% to be considered valid.	1. Connect a second valid power source to MOVES® SLC™. 2. If second valid power source is connected and alarm persists, ensure that battery doors are fully closed and/or power supply/charger connection is secure.
27. Low backup power level	Medium		Inhibitable	Backup battery charge level is less than 40% when two valid power sources (battery A, battery B or power supply/charger) are detected and the low battery alarm is not active. ***NOTE:*** *Backup battery charge is all batteries present when connected to wall power or the battery with the lowest charge level when running on battery power.*	• Connect power supply/charger to MOVES® SLC™ to allow battery or batteries to charge if not already connected. • Replace battery with low charge level with a fully charged battery.
28. Critically low backup power	High			Backup battery charge level is less than 20% when two valid power sources (battery A, battery B or power supply/charger) are detected and the low battery alarm is not active. ***NOTE:*** *Backup battery charge is all batteries present when connected to wall power or the battery with the lowest charge level when running on battery power.*	• Connect power supply/charger to MOVES® SLC™ to allow battery or batteries to charge if not already connected. • Replace battery with critically low charge level with a fully charged battery.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
29. Patient monitor failure	Medium			Patient monitor module communication failure with MOVES® SLC™.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
30. ECG lead off	Low		Inhibitable	ECG lead is disconnected from patient after previously being connected.	1. Check integrity of interface with patient. 2. Fully disconnect then reconnect ECG patient connection. 3. Replace ECG patient connection. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
31. ECG fault	Medium			ECG module internal fault or ECG module communication failure with patient monitor.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
32. Pulse Ox: Cable disconnect	Low		Inhibitable	Pulse oximeter extension cable or patient sensor cable (if no extension cable used) is disconnected from system after previously being connected.	1. Fully disconnect then reconnect pulse oximeter extension cable or patient sensor to the system. 2. Replace pulse oximeter extension cable and/or patient sensor. 3. Power cycle MOVES® SLC™. 4. Return MOVES® SLC™ for servicing.
33. Pulse Ox: Replace cable	Low			Pulse oximeter extension cable is non-functional or the life of the cable has expired.	• Replace pulse oximeter extension cable with another that has not expired.
34. Pulse Ox: Invalid cable	Low			Pulse oximeter extension cable is not compatible with system.	• Replace pulse oximeter extension cable with another that is compatible with MOVES® SLC™.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
35. Pulse Ox: Sensor disconnect	Low		Inhibitable	Pulse oximeter patient sensor cable is disconnected from extension cable connected to system after previously being connected, or if using single-patient-use sensor the adhesive portion of the sensor has come loose after previously being connected. May be an incorrect sensor or a defective sensor or cable.	1. Fully disconnect then reconnect pulse oximeter patient connection cable to extension cable, or if using single-patient-use sensor fully disconnect and reconnect adhesive portion of the sensor. 2. Fully disconnect then reconnect pulse oximeter extension cable to system. 3. Replace pulse oximeter extension cable and/or patient sensor. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
36. Pulse Ox: Replace sensor	Low			Pulse oximeter patient sensor has expired and needs to be replaced.	• Replace pulse oximeter patient sensor with another that has not expired.
37. Pulse Ox: Invalid sensor	Low			Pulse oximeter patient sensor is not compatible with system.	• Replace pulse oximeter patient sensor with another that is compatible with MOVES® SLC™.
38. PulseOx: Patient disconnect	Low		Inhibitable	Pulse oximeter patient sensor is disconnected from patient. Sensor may not be connected to patient properly or sensor may be damaged.	1. Check placement of sensor or if it is too tight. Confirm that the sensor is securely on the patient. 2. Reapply sensor or select a new site. 3. See the directions for use provided with your sensor. 4. Reconnect the sensor to the MOVES® SLC™ or extension cable. 5. If the sensor is damaged, replace the sensor. 6. Power cycle MOVES® SLC™. 7. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
39. PulseOx: Check sensor	Low			Pulse oximeter sensor at system or patient is compromised.	1. Check integrity of interface with patient. 2. Fully disconnect then reconnect pulse oximeter patient sensor to system. 3. Replace pulse oximeter patient sensor. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
40. PulseOx: Check cable and sensor	Low			Pulse oximeter cable and/or sensor at system or patient is compromised.	1. Check integrity of interface with patient. 2. Fully disconnect then reconnect pulse oximeter patient sensor to system. 3. Replace pulse oximeter patient sensor. 4. Replace pulse oximeter extension cable. 5. Power cycle MOVES® SLC™. 6. Return MOVES® SLC™ for servicing.
41. PulseOx: Interference detected	Low			High intensity light such as pulsating strobe lights, excessive ambient light sources such as surgical lights or direct sunlight, or other monitor displays. Incorrect Line Filter frequency setting (Hz).	1. Shield the sensor from excessive or strobing light. Minimize or eliminate motion at the monitoring site. 2. Adjust the Line Filter frequency to the correct setting (See *Setup Screen on page 140* and following). 3. Replace pulse oximeter patient sensor. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
42. PulseOx: Low perfusion	Low		Inhibitable	Pulse oximeter patient signal too small (related to SpO_2 measurement).	1. Check placement of sensor or if it is too tight. Confirm that the sensor is securely on the patient. 2. Reapply sensor or select a better perfused site. 3. See the directions for use provided with your sensor. 4. Fully disconnect then reconnect pulse oximeter patient sensor to system. 5. Replace pulse oximeter patient sensor. 6. Clinical intervention may be required.
43. PulseOx: Low SpCO perfusion	Low		Inhibitable	Pulse oximeter detects low perfusion related to SpCO measurement.	1. Check placement of sensor or if it is too tight. Confirm that the sensor is securely on the patient. 2. Reapply sensor or select a better perfused site. 3. See the directions for use provided with your sensor. 4. Fully disconnect then reconnect pulse oximeter patient sensor to system. 5. Replace pulse oximeter patient sensor. 6. Clinical intervention may be required.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
44. PulseOx: Low SpMet perfusion	Low		Inhibitable	Pulse oximeter detects low perfusion related to SpMet measurement.	1. Check placement of sensor or if it is too tight. Confirm that the sensor is securely on the patient. 2. Reapply sensor or select a better perfused site. 3. See the directions for use provided with your sensor. 4. Fully disconnect then reconnect pulse oximeter patient connection to system. 5. Replace pulse oximeter patient sensor. 6. Clinical intervention may be required.
45. PulseOx: Low SpHb perfusion	Low		Inhibitable	Pulse oximeter detects low perfusion related to SpHb measurement.	1. Check placement of sensor or if it is too tight. Confirm that the sensor is securely on the patient. 2. Reapply sensor or select a better perfused site. 3. See the directions for use provided with your sensor. 4. Fully disconnect then reconnect pulse oximeter patient sensor to system. 5. Replace pulse oximeter patient sensor. 6. Clinical intervention may be required.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
46. PulseOx: Low SpOC perfusion	Low		Inhibitable	Pulse oximeter detects low perfusion related to SpOC measurement.	1. Check placement of sensor or if it is too tight. Confirm that the sensor is securely on the patient. 2. Reapply sensor or select a better perfused site. 3. See the directions for use provided with your sensor. 4. Fully disconnect then reconnect pulse oximeter patient sensor to system. 5. Replace pulse oximeter patient sensor. 6. Clinical intervention may be required.
47. PulseOx: SpO2 reading confidence poor	Low			Pulse oximeter indicating low confidence in SpO_2 measurement value due to low signal quality. Low signal quality may be a result of excessive motion relative to perfusion, or sensor is damaged or not functioning.	1. Check and see if blood flow to the monitoring site is restricted. 2. Ensure proper sensor type and application. 3. Minimize or eliminate motion at the monitoring site. 4. Reapply sensor or select a better perfused site. 5. Replace pulse oximeter patient sensor. 6. Power cycle MOVES® SLC™. 7. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
48. PulseOx: HR reading confidence poor	Low			Pulse oximeter indicating low confidence in heart rate measurement value due to low signal quality when source of heart rate displayed by the system is the pulse oximeter. Low signal quality may be a result of excessive motion relative to perfusion, or sensor is damaged or not functioning.	1. Check and see if blood flow to the monitoring site is restricted. 2. Ensure proper sensor type and application. 3. Minimize or eliminate motion at the monitoring site. 4. Reapply sensor or select a better perfused site. 5. Replace pulse oximeter patient sensor. 6. If available, use alternate heart rate source on MOVES® SLC™. 7. Power cycle MOVES® SLC™. 8. Return MOVES® SLC™ for servicing.
49. PulseOx: PI reading confidence poor	Low			Pulse oximeter indicating low confidence in perfusion index measurement value due to low signal quality. Low signal quality may be a result of excessive motion relative to perfusion, or sensor is damaged or not functioning	1. Check and see if blood flow to the monitoring site is restricted. 2. Ensure proper sensor type and application. 3. Minimize or eliminate motion at the monitoring site. 4. Reapply sensor or select a better perfused site. 5. Replace pulse oximeter patient sensor. 6. Power cycle MOVES® SLC™. 7. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
50. PulseOx: SpCO reading confidence poor	Low			Pulse oximeter indicating low confidence in SpCO measurement value due to low signal quality. Low signal quality may be a result of excessive motion relative to perfusion, or sensor is damaged or not functioning	1. Check and see if blood flow to the monitoring site is restricted. 2. Ensure proper sensor type and application. 3. Minimize or eliminate motion at the monitoring site. 4. Reapply sensor or select a better perfused site. 5. Replace pulse oximeter patient sensor. 6. Power cycle MOVES® SLC™. 7. Return MOVES® SLC™ for servicing.
51. PulseOx: SpMet reading confidence poor	Low			Pulse oximeter indicating low confidence in SpMet measurement value due to low signal quality. Low signal quality may be a result of excessive motion relative to perfusion, or sensor is damaged or not functioning	1. Check and see if blood flow to the monitoring site is restricted. 2. Ensure proper sensor type and application. 3. Minimize or eliminate motion at the monitoring site. 4. Reapply sensor or select a better perfused site. 5. Replace pulse oximeter patient sensor. 6. Power cycle MOVES® SLC™. 7. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
52. PulseOx: SpHb reading confidence poor	Low			Pulse oximeter indicating low confidence in SpHb measurement value due to low signal quality. Low signal quality may be a result of excessive motion relative to perfusion, or sensor is damaged or not functioning.	1. Check and see if blood flow to the monitoring site is restricted. 2. Ensure proper sensor type and application. 3. Minimize or eliminate motion at the monitoring site. 4. Reapply sensor or select a better perfused site. 5. Replace pulse oximeter patient sensor. 6. Power cycle MOVES® SLC™. 7. Return MOVES® SLC™ for servicing.
53. PulseOx: SpOC reading confidence poor	Low			Pulse oximeter indicating low confidence in SpOC measurement value due to low signal quality. Low signal quality may be a result of excessive motion relative to perfusion, or sensor is damaged or not functioning.	1. Check and see if blood flow to the monitoring site is restricted. 2. Ensure proper sensor type and application. 3. Minimize or eliminate motion at the monitoring site. 4. Reapply sensor or select a better perfused site. 5. Replace pulse oximeter patient sensor. 6. Power cycle MOVES® SLC™. 7. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
54. PulseOx: PVI reading confidence poor	Low			Pulse oximeter indicating low confidence in PVI measurement value due to low signal quality. Low signal quality may be a result of excessive motion relative to perfusion, or sensor is damaged or not functioning.	1. Check and see if blood flow to the monitoring site is restricted. 2. Ensure proper sensor type and application. 3. Minimize or eliminate motion at the monitoring site. 4. Reapply sensor or select a better perfused site. 5. Replace pulse oximeter patient sensor. 6. Power cycle MOVES® SLC™. 7. Return MOVES® SLC™ for servicing.
55. PulseOx: Only SpO2 available	Low		Inhibitable	SpCO, SpMet, SpHb and SpOC measurements unavailable due to failed initialization. SpO_2, HR and perfusion index (PI) measurements are still available. **NOTE:** Retry of SpCO, SpMet, SpHb and SpOC measurement initialization initiated by removing and then re-attaching patient sensor.	1. Fully disconnect and reconnect pulse oximeter patient sensor to patient. 2. Fully disconnect then reconnect pulse oximeter patient sensor to system. 3. Ensure proper sensor type and application. 4. Minimize or eliminate motion at the monitoring site. 5. Reapply sensor or select a better perfused site. 6. Replace pulse oximeter patient sensor. 7. Power cycle MOVES® SLC™. 8. Return MOVES® SLC™ for servicing.
56. PulseOx fault	Low			Pulse oximeter module communication failure or self-diagnosed failure on pulse oximeter module.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
57. PulseOx: Busy programming	Low	Locked		*Pulse oximeter has been placed in special programming mode to allow software updates or feature activation.* ***NOTE:*** *Pulse oximeter measurement and monitoring are disabled when pulse oximeter is in programming mode.*	1. If intentionally updating software or enabling new features then let programming complete. 2. If not intentionally updating software then wait 2 minutes to see if alarm clears, if it does not then power cycle MOVES® SLC™. 3. If alarm continues to persist after multiple power cycles then return MOVES® SLC™ for servicing.
58. Gas sensor pressure fault	Medium			Mismatch between O_2 and CO_2 cell pressures.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
59. CO2 sensor fault	Medium			CO_2 sensor internal fault, CO_2 sensor communication failure with patient monitor or calibration issue.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
60. O2 sensor fault	Medium			O_2 sensor internal fault, O_2 sensor communication failure with patient monitor or calibration issue.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
61. O2 reading may be biased low	Low			O2 reading determined to be less than 19.4% when sampling air (20.9% O2) during periodic O2 calibration check	1. Ensure there are no obstructions to the gas calibration port on the patient monitor panel. 2. Power cycle MOVES® SLC™ and wait for re-calibration. 3. If unsuccessful, move MOVES® SLC™ into another area, power cycle MOVES® SLC™ and wait for re-calibration. 4. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
62. O2 reading may be biased high	High			O2 reading determined to be greater than 22.4% when sampling air (20.9% O2) during periodic O2 calibration check	1. Ensure there are no obstructions to the gas calibration port on the patient monitor panel. 2. Power cycle MOVES® SLC™ and wait for re-calibration. 3. If unsuccessful, move MOVES® SLC™ into another area, power cycle MOVES® SLC™ and wait for re-calibration. 4. Return MOVES® SLC™ for servicing.
63. Barometer fault	Low			Mismatch between O_2 and CO_2 cell pressures and barometric pressure when sample pump is not running.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
64. Altitude above system limits	Medium			Barometric pressure is less than 60 kPa.	1. Proceed to a lower altitude. 2. If erroneous, return MOVES® SLC™ for servicing.
65. Altitude below system limits	Medium			Barometric pressure is greater than 110 kPa.	1. Proceed to a higher altitude. 2. If erroneous, return MOVES® SLC™ for servicing.
66. Inspired O2 low	High			Inspired O_2 is less than 19% (while running in ventilation mode) OR Inspired O_2 is less than 82% (while running in O_2 supplement mode).	1. Ensure sample line with Nafion is connected to system and circuit. 2. Completely replace both the sample line and Nafion. 3. Power cycle the system and run the sample line system tests and confirm that they pass. 4. Return for servicing.
67. Inspired O2 above target	Low			Inspired O_2 exceeds setting by 15% (ventilation mode only).	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
68. Inspired O2 below target	Low			Inspired O_2 is not reached within 5% of setting while running in ventilation mode.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required. 3. Return MOVES® SLC™ for servicing.
69. Low expired CO2	High if less than 15 mmHg Low otherwise			When the apnea alarm is not active, expired CO_2 partial pressure is (1) less than or equal to the user set low expired CO_2 alarm limit and greater than or equal to 15 mmHg or (2) less than 15 mmHg.	1. Check for related alarms and follow actions if required. 2. For patients under 30kg or with tidal volumes under 150mL, ensure that the pediatric breathing system filter is used (PN 126245). 3. Clinical intervention may be required.
70. High expired CO2	Medium			Expired CO_2 partial pressure is greater than or equal to the high expired PCO_2 alarm limit.	1. Check for related alarms and follow actions if required. 2. For patients under 30kg or with tidal volumes under 150mL, ensure that the pediatric breathing system filter is used (PN 126245). 3. Clinical intervention may be required.
71. High inspired CO2: Change cartridge	High if greater than or equal to 10 mmHg Low otherwise			While running in ventilate mode, inspired CO_2 partial pressure is (1) greater than 6 mmHg or (2) greater than or equal to 10 mmHg.	1. Replace ventilator cartridge. 2. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
72. Low SpO2	Low until SpO_2 Alarm Delay time finished or SpO_2 Alarm Rapid Desat threshold reached, then High			O_2 saturation level is less than or equal to user-set low SpO_2 alarm limit.	1. Check for related alarms and follow actions if required. 2. If in O2 supplementation mode, physically check for an oxygen flow leaving the port. 3. Clinical intervention may be required.
73. Low Pleth Variability Index	Low			Pleth Variability Index (PVI) less than or equal to the low PVI alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
74. High Pleth Variability Index	Medium			Pleth Variability Index (PVI) greater than or equal to the high PVI alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
75. High SpMet	HIGH, if SpMet reading is greater than or equal to 6.0%, LOW otherwise			SpMet greater than or equal to the high SpMet alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
76. High SpCO	High			SpCO greater than or equal to the high SpCO alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
77. Low SpHb	High			SpHb less than or equal to the low SpHb alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
78. High SpHb	Medium			SpHb greater than or equal to the high SpHb alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
79. Low SpOC	High			SpOC less than or equal to the low SpOC alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
80. High SpOC	Medium			SpOC greater than or equal to the high SpOC alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
81. Apnea (Capnograph)	High			Respiratory rate is less than or equal to 4 breaths per minute and the sample line occlusion alarm is not active.	1. Check for related alarms and follow actions if required. 2. For patients under 30kg or with tidal volumes under 150mL, ensure that the pediatric breathing system filter is used (PN 126245). 3. Clinical intervention may be required.
82. Apnea (Ventilator)	High			While running in CPAP+PS ventilator mode with Apnea Backup enabled, ventilator fails to see inspiratory efforts from patient within period defined by *Frequency* setting and is now delivering backup breaths based on the selected ventilator settings.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
83. Apnea (Ventilator and Capnograph)	High			Both *Apnea (Capnograph)* and *Apnea (Ventilator)* alarm causes are present at the same time.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
84. Low RR	Medium			Respiratory rate is less than or equal to user set low RR alarm limit when apnea alarm is not active and respiratory rate is greater than zero.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
85. High RR	Medium			Respiratory rate is greater than or equal to user set high RR alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
86. High pulse rate	Low			Heart rate is (1) greater than user set high HR alarm limit or (2) greater than or equal to 150 beats per minute and greater than user set high HR alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
87. Low pulse rate	High			Heart rate is less than user set low HR alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
88. Cannot reach set I/E ratio	Low		Inhibitable	Ventilator operational settings and/or patient parameters result in user set I:E ratio not being achieved due to inadequate inspiratory time.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
89. High Time too long for Frequency	Low	Locked		In APRV ventilation mode *High Time* setting duration is too long for the chosen *Frequency* setting (i.e. insufficient low time). *Frequency* setting takes priority and the system uses the maximum high time which allows a minimum low time of 0.3 seconds.	1. If *Frequency* setting is unintentionally set too high then reduce setting so that *High Time* setting properly fits inside cycle period while allowing a minimum low time of 0.3 seconds. 2. If the *High Time* setting is unintentionally too long then reduce to appropriate set point.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
90. Inspire Time too long for Frequency	Low	Locked		In SIMV ventilation mode *Inspire Time* setting duration is too long for the chosen *Frequency* setting (i.e. insufficient expire time). *Frequency* setting takes priority and the system uses the maximum inspire time which allows a minimum expire time of 0.3 seconds.	1. If *Frequency* setting is unintentionally set too high then reduce setting so that *Inspire Time* setting properly fits inside breath period while allowing a minimum expire time of 0.3 seconds. 2. If the *Inspire Time* setting is unintentionally too long then reduce to appropriate set point.
91. Above target volume	Medium			Exhaled tidal volume is at least 15% greater than the current user set point.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
92. Below target volume	Medium			Exhaled tidal volume is at least 15% less than the current user set point.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
93. High expired tidal volume	Medium			Exhaled tidal volume is 30% greater than the delivered inspired tidal volume.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
94. NIBP: Low systolic pressure	High		Inhibitable	Systolic pressure of NIBP measurement is less than or equal to the user set low systolic BP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
95. NIBP: High systolic pressure	Medium		Inhibitable	Systolic pressure of NIBP measurement is greater than or equal to the user set high systolic BP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
96. NIBP: Low diastolic pressure	Medium		Inhibitable	Diastolic pressure of NIBP measurement is less than or equal to 40 mmHg.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
97. NIBP: High diastolic pressure	Medium		Inhibitable	Diastolic pressure of NIBP measurement is greater than or equal to 100 mmHg.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
98. NIBP inflate failure	Low		Inhibitable	Pressure required for inflation cannot be generated in the NIBP patient arm cuff.	1. Ensure NIBP patient arm cuff is full connected to MOVES® SLC™ and has no leaks. 2. Replace NIBP patient arm cuff. 3. Power cycle MOVES® SLC™. 4. Return MOVES® SLC™ for servicing.
99. NIBP could not get reading	Low		Inhibitable	NIBP measurement was not obtained unrelated to NIBP patient arm cuff inflation failure.	1. Attempt another NIBP reading. 2. Ensure NIBP patient arm cuff is full connected to MOVES® SLC™ and has no leaks. 3. Replace NIBP patient arm cuff. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
100. NIBP set to: Manual update	Low	Locked & Latching	Inhibitable	NIBP measurement was not obtained three consecutive times when set to take automatic measurements.	1. Attempt another NIBP reading. 2. Ensure NIBP patient arm cuff is full connected to MOVES® SLC™ and has no leaks. 3. Replace NIBP patient arm cuff. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
101. NIBP fault	Low			NIBP module internal fault or NIBP module communication failure with patient monitor.	1. Power cycle MOVES® SLC™. 2. Attempt another NIBP reading. 3. Return MOVES® SLC™ for servicing.
102. NIBP Mode changed: STAT -> 5 min	Low	Locked & Latching		NIBP has been set to STAT mode for 15 minutes and has automatically changed to take readings every 5 minutes for long term monitoring.	1. No action required. NIBP mode setting can be changed back to STAT at any time if required.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
103. IP zero required	Low			At least one invasive channel has the following set of conditions: invasive channel is connected AND zero is required AND channel not currently zeroing AND zero failed is not active on the channel	1. Fully disconnect then reconnect IP patient connection and zero IP transducer as prompted. 2. Replace IP patient connection. 3. Check integrity of interface with patient. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
104. IP1: Measurement error	Low			IP measurement contains values that are outside of the measurement range of the sensor.	1. Fully disconnect then reconnect IP patient connection and zero IP transducer as prompted. 2. Replace IP patient connection. 3. Check integrity of interface with patient. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
105. IP1 disconnect	Low		Inhibitable	IP patient connection is disconnected from system after previously being connected.	1. Fully disconnect then reconnect IP patient connection. 2. Replace IP patient connection. 3. Power cycle MOVES® SLC™. 4. Return MOVES® SLC™ for servicing.
106. IP1: Zero failed	Low		Inhibitable	IP one-point zero calibration has failed.	1. Fully disconnect then reconnect IP patient connection and re-zero IP transducer as prompted. 2. Replace IP patient connection. 3. If available, use a different IP channel on the MOVES® SLC™. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
107. IP1-ABP: Low systolic pressure	High			Systolic pressure of ABP measurement is less than or equal to the user set low systolic BP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
108. IP1-ABP: High systolic pressure	Medium			Systolic pressure of ABP measurement is greater than or equal to the user set high systolic BP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
109. IP1-ABP: Low diastolic pressure	Medium			Diastolic pressure of ABP measurement is less than or equal to 40 mmHg.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
110. IP1-ABP: High diastolic pressure	Medium			Diastolic pressure of ABP measurement is greater than or equal to 100 mmHg.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
111. IP1: Low CVP	High			CVP measurement is less than or equal to the user set low CVP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
112. IP1: High CVP	Medium			CVP measurement is greater than or equal to the user set high CVP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
113. IP1: Low ICP	High			ICP measurement is less than or equal to the user set low ICP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
114. IP1: High ICP	Medium			ICP measurement is greater than or equal to the user set high ICP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
115. IP2: Measurement error	Low			IP measurement contains values that are outside of the measurement range of the sensor.	1. Fully disconnect then reconnect IP patient connection and zero IP transducer as prompted. 2. Replace IP patient connection. 3. Check integrity of interface with patient. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
116. IP2 disconnect	Low		Inhibitable	IP patient connection is disconnected from system after previously being connected.	1. Fully disconnect then reconnect IP patient connection. 2. Replace IP patient connection. 3. Power cycle MOVES® SLC™. 4. Return MOVES® SLC™ for servicing.
117. IP2: Zero failed	Low		Inhibitable	IP one-point zero calibration has failed.	1. Fully disconnect then reconnect IP patient connection and re-zero IP transducer as prompted. 2. Replace IP patient connection. 3. If available, use a different IP channel on the MOVES® SLC™. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
118. IP2-ABP: Low systolic pressure	High			Systolic pressure of ABP measurement is less than or equal to the user set low systolic BP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
119. IP2-ABP: High systolic pressure	Medium			Systolic pressure of ABP measurement is greater than or equal to the user set high systolic BP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
120. IP2-ABP: Low diastolic pressure	Medium			Diastolic pressure of ABP measurement is less than or equal to 40 mmHg.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
121. IP2-ABP: High diastolic pressure	Medium			Diastolic pressure of ABP measurement is greater than or equal to 100 mmHg.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
122. IP2: Low CVP	High			CVP measurement is less than or equal to the user set low CVP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
123. IP2: High CVP	Medium			CVP measurement is greater than or equal to the user set high CVP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
124. IP2: Low ICP	High			ICP measurement is less than or equal to the user set low ICP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
125. IP2: High ICP	Medium			ICP measurement is greater than or equal to the user set high ICP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
126. IP3: Measurement error	Low			IP measurement contains values that are outside of the measurement range of the sensor.	1. Fully disconnect then reconnect IP patient connection and zero IP transducer as prompted. 2. Replace IP patient connection. 3. Check integrity of interface with patient. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
127. IP3 disconnect	Low		Inhibitable	IP patient connection is disconnected from system after previously being connected.	1. Fully disconnect then reconnect IP patient connection. 2. Replace IP patient connection. 3. Power cycle MOVES® SLC™. 4. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
128. IP3: Zero failed	Low		Inhibitable	IP one-point zero calibration has failed.	1. Fully disconnect then reconnect IP patient connection and re-zero IP transducer as prompted. 2. Replace IP patient connection. 3. If available, use a different IP channel on the MOVES® SLC™. 4. Power cycle MOVES® SLC™. 5. Return MOVES® SLC™ for servicing.
129. IP3-ABP: Low systolic pressure	High			Systolic pressure of ABP measurement is less than or equal to the user set low systolic BP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
130. IP3-ABP: High systolic pressure	Medium			Systolic pressure of ABP measurement is greater than or equal to the user set high systolic BP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
131. IP3-ABP: Low diastolic pressure	Medium			Diastolic pressure of ABP measurement is less than or equal to 40 mmHg.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
132. IP3-ABP: High diastolic pressure	Medium			Diastolic pressure of ABP measurement is greater than or equal to 100 mmHg.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
133. IP3: Low CVP	High			CVP measurement is less than or equal to the user set low CVP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
134. IP3: High CVP	Medium			CVP measurement is greater than or equal to the user set high CVP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
135. IP3: Low ICP	High			ICP measurement is less than or equal to the user set low ICP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.

Alarm / Message		Priority	Locked / Latching	Inhibitable	Causes	Action(s)
136.	IP3: High ICP	Medium			ICP measurement is greater than or equal to the user set high ICP alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
137.	High airway pressure warning	Medium			Peak inspiratory pressure (PIP) exceeds user set high airway pressure warning alarm limit without reaching user set high airway pressure release alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
138.	High airway pressure release	Medium	Latching		Peak inspiratory pressure (PIP) exceeds user set high airway pressure release alarm limit.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
139.	Low pressure end of inspire	Medium	Latching		Peak inspiratory pressure (PIP) does not reach 10 cmH_2O.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
140.	Negative airway pressure	Low	Latching		Airway pressure is less than 0 cmH_2O when ventilating in any mode.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
141.	Target pressure not reached	Medium			Peak inspiratory pressure (PIP) is ± 5 cmH_2O or greater from target when ventilating in pressure control mode.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
142.	Expiratory obstruction	High			Positive end expiratory pressure exceeds user set positive end expiratory pressure (PEEP) by 5 cmH_2O or greater.	1. Ensure breathing circuit patient tubing is not kinked or obstructed. 2. Ensure expiratory pathway (ventilator cartridge and valve block) is not obstructed. 3. Replace breathing circuit including ventilator cartridge. 4. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
143. Insp and exp pressure similar	High			Positive end expiratory pressure is within 10 cmH_2O of peak inspiratory pressure (PIP) when ventilating in IMV, SIMV and A/C modes.	1. Check for related alarms and follow actions if required. 2. Clinical intervention may be required.
144. Sample line occlusion	Medium			Pressure at O_2/CO_2 sensor cells is below expected value compared to barometer (below normal resistance when sampling).	1. Ensure sample line has no kinks or obstructions. 2. Replace sample line. 3. Power cycle MOVES® SLC™. 4. Return MOVES® SLC™ for servicing.
145. Sample line disconnected	Medium			Pressure at O_2/CO_2 sensor cells is above expected value compared to barometer (above normal resistance when sampling).	1. Ensure sample line is fully connected to MOVES® SLC™ and has no leaks. 2. Ensure that Nafion tubing and sample line filters are installed in the sample line 3. Replace sample line and filters. 4. Replace Nafion tubing. 5. Power cycle MOVES® SLC™. 6. Return MOVES® SLC™ for servicing.
146. Patient circuit occlusion	Medium			Inspired tidal volume is at least 15% less than the current user set point and the peak inspiratory pressure (PIP) exceeds user set high airway pressure release alarm limit.	1. Ensure breathing circuit patient tubing is not kinked or obstructed. 2. Ensure inspiratory pathway (ventilator cartridge and valve block) is not obstructed. 3. Replace breathing circuit including ventilator cartridge. 4. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
147. Patient circuit disconnect	High			While ventilating, any of the following conditions occur: a) Expiratory flow never exceeds inspiratory flow for 15 seconds. b) With ventilation modes which include mandatory volume controlled breaths, the following occurs for the most recent mandatory volume controlled breath: the inspired tidal volume is greater than the target tidal volume, and the expired tidal volume is less than 25 mL, and the difference between PIP and PEEP is less than 6 cmH_2O. c) With ventilation modes which include mandatory pressure controlled breaths, the following occurs for the most recent mandatory pressure controlled breath: the PIP was less than the target pressure by at least 1 cmH_2O, and the expired tidal volume is less than 25 mL, and the difference between PIP and PEEP is less than 6 cmH_2O.	1. Ensure all breathing circuit connections (including patient tubing, Y-piece and sample line) are tight and no leaks are detected. 2. Ensure ventilator cartridge is properly connected to MOVES® SLC™. 3. Replace breathing circuit including ventilator cartridge. 4. Return MOVES® SLC™ for servicing.
148. Concentrator air intake filter blocked	High			Pressure at intake filter pressure transducer exceeds expected value (above normal resistance when concentrator in use).	1. Check for and remove any obstructions from intake filter. 2. Replace intake filter. 3. Return MOVES® SLC™ for servicing.

Alarm / Message	Priority	Locked / Latching	Inhibitable	Causes	Action(s)
149. Concentrator air intake filter missing	Low			Pressure at intake filter pressure transducer is below expected value (below normal resistance when concentrator in use).	1. Ensure intake filter is completely secured to MOVES® SLC™. 2. Replace intake filter. 3. Return MOVES® SLC™ for servicing.
150. Patient gas sampling system failure	Medium			Patient gas sampling pump flow is insufficient for proper patient gas monitoring.	1. Check for related alarms and follow actions if required. 2. Power cycle MOVES® SLC™. 3. Return MOVES® SLC™ for servicing.
151. Unexpected system reset	Medium	Locked	Inhibitable	System suffers unexpected power loss and power is restored within 3 minutes.	1. Return MOVES® SLC™ for servicing.
152. Safe Gas Mode	Low	Locked		System will revert to "Safe Gas Mode" if any of the following alarms are active while running in ventilation mode: 1. CO2/O2 sensors warming up 2. O2 sensor fault 3. CO2 sensor fault 4. Gas sensor pressure fault 5. Inspired O2 low 6. Sample line disconnect 7. Sample line occlusion 8. Patient monitor failure	1. See actions for relevant alarms.
153. Alarm indication and keypad failure	Medium	Locked		Communications fail with UI Base board, which controls keypads and alarm audio/visual indication.	1. Power cycle MOVES® SLC™. 2. Return MOVES® SLC™ for servicing.
154. CO2 / O2 sensors warming up	Message	Locked		O_2 and CO_2 sensors are warming up.	1. Wait up to 5 minutes for system to become ready for use.

Alarm / Message		Priority	Locked / Latching	Inhibitable	Causes	Action(s)
155.	**SYSTEM STOPPED** Reconfigure NOW	High	Locked	Inhibitable	System auto resumes (i.e., recovers from short power loss) and is unable to recover patient settings previously in use. Therefore, the system cannot resume patient treatment. Patient settings return to defaults and require **immediate** reconfiguration to resume patient treatment. **NOTE:** If previously ventilating, this alarm means that System Mode has become Monitor Only and ventilation has ceased. It is imperative that ventilator settings be re-configured and the System Mode set to Ventilate, or an alternative means of ventilation be utilized.	1. Reconfigure patient settings immediately and resume patient treatment. 2. Ensure adequate backup battery power is present. 3. If occurs repeatedly return MOVES® SLC™ for servicing.
156.	MADM disconnect	Medium		Inhibitable	MADM™ had been connected, but is no longer communicating correctly. **NOTE:** MOVES® SLC™ will continue to use the last anesthetic levels reported by MADM™ for a period of one minute before removing any corrections.	1. Confirm cable connection between MOVES® SLC™ and MADM™. 2. Confirm that both devices are ON. 3. Disconnect and reconnect cable connection. 4. Replace connection cable. 5. Return devices for servicing.
157.	Unsupported MADM	Medium			A MADM™ link has been noticed, but the required information is not being communicated over the link (firmware versions are incompatible).	1. Confirm firmware versions for each device to confirm compatibility status.

16.8 SYSTEM TEST FAILURE MESSAGES AND CAUSES

Table 41: System Test Failure Messages and Causes

System Prompt	Causes/Actions
The ventilator is not responding correctly.	Displayed if ventilator fails to respond appropriately during initialization for testing. 1. Power cycle and repeat tests. 2. If problem persists, return for servicing.
Refer unit for service.	Default "catch-all" for serious system malfunctions. 1. Power cycle and repeat tests. 2. If problem persists, return for servicing.
Ensure that Y-Piece is open and cartridge and tubing are not obstructed or damaged.	Failure of open Y-piece ventilator test. 1. Confirm that the breathing circuit is connected to the system correctly. 2. Confirm Y-piece is open and circuit has no leaks or occlusions, then repeat tests. 3. Confirm that the ventilator blower inlet is not occluded in any way. 4. Replace breathing circuit, then repeat tests. 5. Power cycle and repeat tests. 6. If problem persists, return for servicing.
Ensure that hydrocarbon filter is not occluded. If problem persists, refer unit for service.	Concentrator detects occluded HC filter during open Y-piece test. 1. Confirm HC filter is not occluded, then repeat tests. 2. Remove HC filter and confirm there are no occlusions to concentrator pump inlet, then repeat tests. 3. Replace HC filter and repeat tests. 4. Power cycle and repeat tests. 5. If problem persists, return for servicing.
Ensure that the hydrocarbon filter is present. If problem persists, refer unit for service.	Concentrator detects missing HC filter during open Y-piece test. 1. Confirm HC filter is installed and tightly secured, then repeat tests. 2. Replace HC filter and repeat tests. 3. Power cycle and repeat tests. 4. If problem persists, return for servicing.

System Prompt	Causes/Actions
Ensure that Y-Piece is disconnected from the patient and kept stationary during test.	Failure of open Y-piece ventilator test, specifically the flow accuracy of the air/mixing pump. 1. Confirm that the breathing circuit is connected to the system correctly. 2. Confirm Y-piece is open and circuit has no leaks or occlusions, then repeat tests ensuring that the Y-piece and breathing tubes remain stationary during the test. 3. Confirm that the air/mixing pump inlet is not occluded in any way. 4. Replace breathing circuit, then repeat tests. 5. Power cycle and repeat tests. 6. If problem persists, return for servicing.
Ensure that Y-Piece is connected to the cartridge test port and tubing is kept stationary during test.	Failure of closed Y-piece ventilator test, specifically the detection of flow when zeroing the flow meters and pressurizing the breathing circuit. 1. Confirm that the breathing circuit is connected to the system correctly. 2. Confirm Y-piece is securely connected to the test port, and that the circuit has no leaks, then repeat tests ensuring that the Y-piece and breathing tubes remain stationary during the test. 3. Replace breathing circuit, then repeat tests. 4. Power cycle and repeat tests. 5. If problem persists, return for servicing.
Ensure that Y-Piece is connected to the cartridge test port, the cartridge is seated correctly and the circuit has no leaks.	Failure of closed Y-piece ventilator test, specifically the pressurization of the ventilator and ventilator circuit. 1. Confirm that the breathing circuit is connected to the system correctly. 2. Confirm Y-piece is securely connected to the test port, and that the circuit has no leaks, then repeat tests. 3. Confirm that the ventilator blower inlet is not occluded in any way. 4. Replace breathing circuit, then repeat tests. 5. Power cycle and repeat tests. 6. If problem persists, return for servicing.
Communication problem with patient monitoring subsystem.	Displayed if there is a communications fault with patient monitoring subsystem. 1. Power cycle and repeat tests. 2. If problem persists, return for servicing.

System Prompt	Causes/Actions
Unable to verify clear sample line. Ensure sample line is not kinked or blocked, and occluding cap is removed.	Displayed if unable to establish a stable clear-line condition during Sample Line testing. 1. Check sample line for occlusions and repeat tests. 2. Replace sample line and repeat tests. 3. Remove sample line and repeat tests with sample port open. 4. Power cycle and repeat tests. 5. If problem persists, return for servicing.
Patient gas sensor fault occurred during test.	Displayed if Oxigraf suddenly becomes not-ready during the execution of the test. 1. Power cycle and repeat tests. 2. If problem persists, return for servicing.
Patient gas sample pump fault occurred during test.	Displayed if timed-out waiting for Sample Pump to enter the specific mode for occlusion-testing. 1. Power cycle and repeat tests. 2. If problem persists, return for servicing.
Patient gas sensor fault. Unable to start test.	Displayed if unable to establish stable Oxigraf-readiness during setup for Sample Line testing. 1. Power cycle and repeat tests. 2. If problem persists, return for servicing.
Ensure that the sample line is connected to the MOVES sample port and the cap on the Nafion® tubing is firmly connected to the end of the sample line.	Displayed if unable to confirm stable occlusion condition during Sample Line testing. 1. Confirm that sample line occlusion cap is in place. 2. Check sample line connection to sample port. 3. Confirm that all sample line components are tightly connected and not leaking. 4. Replace sample line and repeat tests. 5. Remove sample line and repeat tests with sample port occluded. 6. Power cycle and repeat tests. 7. If problem persists, return for servicing.

System Prompt	Causes/Actions
The system requires a backup source of power. Ensure that either wall power is present and a charged backup battery is installed or that two charged batteries are installed.	Displayed if the backup-verification test fails to verify the presence of redundant power. 1. Confirm that at least 2 power sources are connected, and that any batteries installed have charge. 2. Confirm the presence of the power sources connected on the user interface. 3. Disconnect and reconnect any connected power sources and repeat tests. 4. Power cycle and repeat tests. 5. If problem persists, return for servicing.
The power source monitoring system is not operating correctly.	Displayed if there is a communications fault with the Power Manager PCB. 1. Power cycle and repeat tests. 2. If problem persists, return for servicing.
Operator verification of alarm lights and/or audio failed.	Displayed if the lights/audio verification test fails (i.e., user responds 'No'). If alarm lights or audio is not functioning: 1. Select test and repeat. 2. Power cycle and repeat tests. 3. If problem persists, return for servicing.
The test timed-out.	Displayed if during ventilator open Y-Piece or closed Y-Piece tests, test progress stalls unexpectedly. 1. Select test and repeat. 2. Power cycle and repeat tests. 3. If problem persists, return for servicing.
You elected to skip this test, or the test cannot be performed due to other reported faults.	Displayed if the test is skipped either by the user explicitly or because of test dependency failures. 1. Select test and repeat. 2. Power cycle and repeat tests. 3. If problem persists, return for servicing.

16.9 SAFE GAS MODE

WARNING! THE MOVES® SLC™ SHOULD NOT BE RUN CONTINUOUSLY IN SAFE GAS MODE. SAFE GAS MODE IS INTENDED FOR SHORT TERM USE ONLY TO COMPLETE TRANSPORTS.

NOTE: *The MOVES® SLC™ will enter Safe Gas Mode only when in Ventilate mode.*

The system automatically enters SGM whenever the system cannot rely on the oxygen (O_2) and/or carbon dioxide (CO_2) value that it is sensing. It is also used (when ventilating) if inspired CO_2 becomes too high due to an exhausted CO_2 scrubber cartridge.

Figure 16-8: Status Bar Showing System in Safe Gas Mode

SGM can occur for several reasons (each of which generates a unique alarm message):

- Sample line is occluded or disconnected for more than 60 seconds.
- O_2 or CO_2 sensor faults and cannot get a reading for more than 60 seconds.
- Operating the system for more than 60 seconds while the O_2 or CO_2 sensor is still reporting that it is warming up.
- CO_2/O_2 pressure sensor fault for more than 60 seconds.
- Patient monitoring board fault for more than 60 seconds.
- Inspired O_2 is below 19%.
- System is ventilating, and a high $PiCO_2$ alarm is active at high priority ($PiCO_2$ >= 10 mmHg). System exits SGM when there is no high $PiCO_2$ warning ($PiCO_2$ <= 6 mmHg), and no other SGM conditions are active.
- O_2 sensor readings are suspected of being biased high.

Standard Safe Gas Mode

If the Ventilator target O_2 setting is ≤ 40%:

- Safe Gas Mode will normally deliver approximately 5.5 to 6 LPM of 40–50% O_2.

High O_2 Safe Gas Mode

If the Ventilator target O_2 setting is > 40%:

- SGM delivers 2.5 LPM of 90% O2 (nominal).

NOTE: *If the concentrator is in a degraded mode, or in a fault mode when operating in Safe Gas Mode, the system will deliver at least 9.5 LPM of air in addition to any oxygen it can produce.*

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17.0 Appendix A

17.1 SYSTEM DEFAULT SETTINGS

Table 42: System Default Settings

Setting	Default
Alarms	All alarms and audio enabled
System Mode	Ventilator Mode PC-IMV (in Monitor Only)
Vent Mode	IMV
Vent Control	Pressure
Vt (not used by default mode PC-IMV)	500 ml
Frequency	10 B/M
PEEP	0–3 cmH_2O
I/E ratio	1:2
Inspire/High Time (not used by default mode PC-IMV)	1.0 second
Control Pressure	20 cmH_2O
Pressure Support (not used by default mode PC-IMV)	Off
Apnea Backup	Off
Vent O_2	40%
NIBP Update	Manual
Suction	325 mmHg
ECG HR Mode	Adult or Pediatric depending on System Administration configuration
ECG Range	2.2 mV
ECG Sweep Speed	25 mm/sec
SpO2 Average Time	8s
SpO2 Sensitivity Mode	Normal
SpO2 Alarm Delay	15s
SpO2 Alarm Rapid Desat	-5%
PVI Display	On
PVI Average Mode	Long
SpHb Arterial/Venous Mode	Arterial
SpHb Average Mode	Long
ECG EMG Filter	On
High airway pressure warning alarm limit	32 cmH_2O
High airway pressure release alarm limit	40 cmH_2O
Low expired PCO_2 alarm limit	25 mmHg
High expired PCO_2 alarm limit	55 mmHg

Setting	Default
Low RR	5 B/M
High RR	30 B/M
Low systolic BP alarm limit	90 mmHg
High systolic BP alarm limit	180 mmHg
Low SpO_2 alarm limit	90%
Low HR alarm limit	50 BPM
High HR alarm limit	120 BPM
Low CVP alarm limit	0 mmHg
High CVP alarm limit	20 mmHg
Low ICP alarm limit	0 cmH_2O
High ICP alarm limit	27 cmH_2O
Low PVI alarm limit	5%
High PVI alarm limit	40%
High SpMet alarm limit	3.0%
High SpCO alarm limit	10%
Low SpHb alarm limit	Dependent on System Administration SpHb units, either: • g Hb / dL blood • mmol Hb / L blood • 80 g Hb / L blood
High SpHb alarm limit	Dependent on System Administration SpHb units, either: • g Hb / dL blood • 11.0 mmol Hb / L blood • 170 g Hb / L blood
Low SpOC alarm limit	10 mL O_2 / dL blood
High SpOC alarm limit	25 mL O_2 / dL blood

17.2 SYSTEM CLEANING

The MOVES® SLC™ is designed for easy maintenance. All exposed parts of MOVES® SLC™ are corrosion resistant. The MOVES® SLC™ device should be serviced after every three (3) months of use or after every twelve (12) months of storage.

CAUTION! DO NOT SUBMERGE THE MOVES® SLC™ OR POUR CLEANING LIQUIDS OVER OR INTO THE MOVES® SLC™.

The external body of the system can be cleaned using standard cleaning agents, excluding oxidizing agents. It is recommended that the external metal surfaces be wiped down with isopropyl alcohol during routine maintenance. Cables, NIBP cuffs and tubing can be cleaned with a disinfecting spray.

External surfaces of the MOVES® SLC™ can be wiped clean with one of the following:

- Isopropyl Alcohol
- Chlorine Compounds*
    - Maximum Concentration: 1:10

*****_These compounds are diluted by volume in water._

For recommended MOVES® SLC™ accessories not labeled as single use, refer to the cleaning instructions provided by the manufacturer.

17.3 SYSTEM MAINTENANCE

17.3.1 Replacing Filters

There are two user-serviceable components in the MOVES® SLC™ system:

1. Hydrocarbon Filter
2. Ventilator Filter

The hydrocarbon filter should be replaced when the system alarm indicates it is occluded. The ventilator filter should be replaced every three (3) months. For information on replacing the hydrocarbon filter see *Section 9.7.3 Installing the Hydrocarbon Filter on page 94*. For information on replacing the ventilator filter see *Section 17.3.3 Replacing the Ventilator Filter on page 273*.

17.3.2 End of Life

The MOVES® SLC™ ventilator has an expected service life in excess of 5 years and over 1000 operational hours when operated and serviced according to the manual. The minimum expected lifetime has been determined with the device at maximum oxygen concentration and default ventilation settings (Control Pressure=20 cmH_2O, Frequency=10 BPM, IE ratio of 1:2) which are considered a typical use case. Higher tidal volumes and ventilation at high pressures may reduce the service life of the device. In addition, any failure of the system self-test should result in servicing and replacement of components or determination of device end of life by manufacturer.

17.3.3 Replacing the Ventilator Filter

1. Locate the Ventilator Driving Gas Inlet.	

2. Locate the cap release.	
3. Press down on the cap release while unscrewing the cap counterclockwise.	

4. Replace the entire cap and filter and install a replacement cap and filter by pressing down on the cap release again while screwing in the replacement cap and filter clockwise.

17.3.4 General Maintenance

CAUTION! NO LUBRICANTS OTHER THAN THOSE RECOMMENDED BY THE MANUFACTURER SHALL BE USED ON THE MOVES® SLC™.

Regular maintenance and calibration should be carried out by authorized and qualified service personnel annually or after three (3) months of use. Systems should also be checked annually if not in use. In addition, if the MOVES® SLC™ system is subjected to extremely rough handling or environmental stress, or sustains damage, it should be referred to authorized and qualified service personnel for inspection and/or repair.

WARNING! ONLY AUTHORIZED SERVICE AND MAINTENANCE PERSONNEL SHOULD REMOVE ANY COVERS FROM MOVES®. UNAUTHORIZED REMOVAL OF COVERS FROM MOVES® SLC™ MAY RESULT IN ELECTRIC SHOCK AND POSSIBLY DEATH, AND MAY DAMAGE THE SYSTEM COMPONENTS.

17.4 ACCESSORIES MAINTENANCE

Reusable accessories should be regularly inspected for wear or damage. Inspect all cables and connections (especially the power cord) for signs of fraying or other damage. Keep accessories clean. Refer to original manufacturer's instructions for cleaning agents and procedures. Ensure that all gels and pastes are removed from electrode cables. Accessories that come in sanitary sealed packages should be inspected for damage to the sealed package before using. If the seal is broken, discard accessory. The label on the *package* of the Ventilator Cartridge contains an expiry date. Always check the expiry date on the Ventilator Cartridge package before using it to make sure that the cartridge has not expired. As well, monitor spare cartridges with regard to their remaining "shelf life".

17.5 CHECKING THE ACCURACY OF THE TEMPERATURE PROBE

To check the accuracy of the temperature probe:

1. Pour a glass of warm water. Using an external temperature probe, measure the temperature of the water. The water temperature needs to be between 28°C (82.4°F) and 42°C (107.6°F).
2. Place the MOVES® SLC™ temperature probe in the water. Compare the temperature displayed by the MOVES® SLC™ with temperature measured by external temperature probe (with at least 0.05°C accuracy).

3. The temperature displayed by the MOVES® SLC™ should not disagree with the temperature measured by the external probe by any more than the values listed in *Temperature Monitoring Specifications* on *page 286* .

17.6 MOVES® SLC™ SPECIFICATIONS

17.6.1 Model Number

The documentation in this manual is for MOVES® SLC™ model number 122752.

CAUTION! OPERATION OF MOVES® SLC™ OUTSIDE OF SPECIFIED LIMITS MAY CAUSE INACCURATE RESULTS.

17.6.2 Physical Properties

Table 43: Physical Properties of MOVES® SLC™

Property	Specification	Notes
Unit Weight (lbs)	37.45	Excludes batteries, accessories, options, cables, etc.
Battery Weight, ea. (lbs)	3.25	
Unit Length (in)	33	
Unit Width (in)	5.5–6.5	
Unit Height (in)	10.25	
Unit Exterior Housing Material	Aluminum	
Operating Sound Level	< 70 dB	At a distance of 1 m level

Property	Specification	Notes
Standards Compliance	IEC 60601-1 IEC 60601-1-1 IEC 60601-1-2 IEC 60601-1-8 ISO 80601-2-12 ISO 80601-2-13 IEC 60601-2-27 IEC 80601-2-30 IEC 60601-2-34 IEC 60601-2-49 ISO 80601-2-55 ISO 80601-2-61 ISO 8359 ASTM E1112-00 BS EN 794-3 (2009) MIL-STD-810G JECETS	
Device Classification	Class II, CF Defibrillation Proof	
Screen	115.2 mm (w) x 86.4 mm (h)	Resolution of 640 x 480 pixels

17.6.3 Oxygen Concentrator Specifications

Table 44: Oxygen Concentrator Specifications of MOVES® SLC™ in a Circle Circuit

Property	Specification			Notes
Time to FiO_2	Temp (°C)	FiO_2 (%)	Time (min.)	All figures measured with a 1 L test lung from cold start. FiO_2 as measured on MOVES® SLC™ UI with a patient will depend on the patient's FRC (washout time) and their oxygen consumption rate.
	22	50	2	
	22	70	4	
	22	80	6	
	22	85	10	
	0	50	3.5	
	0	70	8	
	0	80	12	
	0	85	18	
	-10	50	5	
	-10	70	11	
	-10	80	15	
	-10	85	22	
Maximum Pressure	13.5 psi ± 10%			None

Table 45: Oxygen Concentrator Specifications of MOVES® SLC™ in O2 Supplement Mode

Property	Specification			Notes
Time to FiO_2	Temp (°C)	FiO_2 (%)	Time (min.)	All figures measured with a 1 L test lung from cold start. FiO_2 as measured on MOVES® SLC™ UI with a patient will depend on the patient's FRC (washout time) and their oxygen consumption rate.
	-25C	87	36:36	
	-25C	90	39:52	
	-10C	87	10:32	
	-10C	90	13:43	
	0C	87	6:56	
	0C	90	8:13	
	21C	87	1:12	
	21C	90	1:49	
	47C	87	0:52	
	47C	90	1:09	
	54C	87	0:38	
	54C	90	0:44	
Maximum Pressure	13.5 psi ± 10%			None
Output Concentration	> 87%			None

Property	Specification	Notes
Flow	@ 1 PSI (7 kPa) backpressure, O_2 flow is measured as 2.65 LPM @ 0 PSI (0 kPa) backpressure, O_2 flow is measured as 2.75 LPM	None
Low O2 Alarm Threshold	< 82%	None

17.6.4 Ventilator Specifications and Vent Mode Definitions

IMV – INTERMITTENT MANDATORY VENTILATION

Pressure Controlled

Parameters: Frequency, I:E ratio, PEEP, Control Pressure

Triggers: Time only

Description: Produces a mandatory breath at the specified frequency, dividing the breath into an inspire and expire period as specified by the set I:E ratio. Inspiration starts at the specified PEEP pressure and linearly increases the pressure to the PEEP + Control Pressure over 90% of the inspire time. At the end of the inspire time, pressure is released down to the PEEP pressure, where it is maintained until the next start of inspiration.

Volume Controlled

Parameters: Frequency, I:E ratio, PEEP, Tidal Volume

Triggers: Time only

Description: Produces a mandatory breath at the specified frequency, dividing the breath into an inspire and expire period as specified by the set I:E ratio. Inspiration starts at the specified PEEP pressure and linearly increases the delivered volume to the specified tidal volume over the inspire time. At the end of the inspire time, pressure is released down to the PEEP pressure, where it is maintained until the next start of inspiration.

A/C – ASSIST/CONTROL

Pressure Controlled

Parameters: Frequency, I:E ratio, PEEP, Control Pressure, Trigger Sensitivity

Triggers: Time or pressure/flow

Description: Produces a mandatory breath at the specified frequency, or faster if triggered by patient pressure/flow. The breath is divided into an inspire and expire period as specified by the set I:E ratio. Inspiration starts at the specified PEEP pressure and linearly increases the pressure to the PEEP + Control Pressure over 90% of the inspire time. At the end of the inspire time, pressure is released down to the PEEP pressure, where it is maintained until the next start of inspiration, as determined by the set respiratory rate or a patient trigger.

Triggering: In normal sensitivity, a patient can trigger the start of inhalation with an inspiratory flow of at least 10 L/min or by causing a pressure drop of 3.0 cmH_20 from PEEP. In low sensitivity, the flow must exceed 15 L/min or the pressure drops 6 cmH_20 from PEEP.

Volume Controlled

Parameters: Frequency, I:E ratio, PEEP, Tidal Volume, Trigger Sensitivity

Triggers: Time or pressure/flow

Description: Produces a mandatory breath at the specified frequency, or faster if triggered by patient pressure/flow. The breath is divided into an inspire and expire period as specified by the set I:E ratio. Inspiration starts at the specified PEEP pressure and linearly increases the delivered volume to the specified tidal volume over the inspire time. At the end of the inspire time, pressure is released down to the PEEP pressure, where it is maintained until the next start of inspiration, as determined by the set respiratory rate or a patient trigger.

Triggering: In normal sensitivity, a patient can trigger the start of inspiration with an inspiratory flow of at least 10 L/min or by causing a pressure drop of 3.0 cmH_20 from PEEP. In low sensitivity, the flow must exceed 15 L/min or the pressure drops 6 cmH_20 from PEEP.

SIMV – SYNCHRONOUS INTERMITTENT MANDATORY VENTILATION

Pressure Controlled

Parameters: Frequency, Inspire Time, PEEP, Control Pressure, Trigger Sensitivity

Triggers: Time or pressure/flow

Description: Creates a timing window based on the specified frequency. The first patient trigger to occur in the time window will immediately initiate a mandatory breath, or if the timing window ends with no triggers, a mandatory breath will be taken. During a mandatory breath, inspiration starts at the specified PEEP pressure and linearly increases the pressure to the PEEP + Control Pressure over the specified inspire time. At the end of the inspire time, pressure is released down to the PEEP pressure, where it is maintained until the next start of inspiration. If additional patient triggers occur during the same timing window, the ventilator will allow the patient to breathe spontaneously, supporting the patient at the specified PEEP pressure.

Triggering: In normal sensitivity, a patient can trigger the start of inspiration with an inspiratory flow of at least 10 L/min or by causing a pressure drop of 3.0 cmH_20 from PEEP. In low sensitivity, the flow must exceed 15 L/min or the pressure drops 6 cmH_20 from PEEP.

Pressure Controlled + Pressure Support

Parameters: All the parameters of Pressure Controlled SIMV above plus Pressure Support.

Description: Operates similarly to Pressure Controlled SIMV, but additional patient triggered breaths in a time window will be supported to a pressure of PEEP + specified Pressure Support level.

Cycling (Pressure Support Breaths): In normal sensitivity, the breath will cycle back to PEEP level when the flow drops under 4 L/min. In low sensitivity, the breath will cycle to PEEP when the flow drops under 7 L/min.

Volume Controlled

Parameters: Frequency, Inspire Time, PEEP, Tidal Volume, Trigger Sensitivity

Triggers: Time or pressure/flow

Description: Creates a timing window based on the specified frequency. The first patient trigger to occur in the time window will immediately initiate a mandatory breath, or if the timing window ends with no triggers, a mandatory breath will be taken. During a mandatory breath, inspiration starts at the specified PEEP pressure and linearly increases the delivered volume to the specified tidal volume over the specified inspire time. At the end of the inspire time, pressure is released down to the PEEP pressure, where it is maintained until the next start of inspiration. If additional patient triggers occur during the same timing window, the ventilator will allow the patient to breathe spontaneously, supporting the patient at the specified PEEP pressure.

Triggering: In normal sensitivity, a patient can trigger the start of inspiration with an inspiratory flow of at least 10 L/min or by causing a pressure drop of 3.0 cmH_20 from PEEP. In low sensitivity, the flow must exceed 15 L/min or the pressure drops 6 cmH_20 from PEEP.

Volume Controlled + Pressure Support

Parameters: All the parameters of Volume Controlled SIMV above plus Pressure Support.

Description: Operates similarly to Pressure Controlled SIMV, but additional patient triggered breaths in a time window will be supported to a pressure of PEEP + specified Pressure Support level.

Cycling (Pressure Support Breaths): In normal sensitivity, the breath will cycle back to PEEP level when flow drops under 4 L/min. In low sensitivity, the breath will cycle to PEEP when flow drops under 7 L/min.

APRV – AIRWAY PRESSURE RELEASE VENTILATION

Parameters: Frequency, PEEP, Control Pressure, Inspire/High Time

Triggers: Time only

Description: Maintains a constant pressure at the specified PEEP + Control Pressure level for the specified High Time. At the end of the High Time, pressure is released down to the PEEP pressure, where it is maintained until the next start of inspiration as set by Frequency. The patient may breathe spontaneously at any time.

CPAP/PS – CONTINUOUS POSITIVE AIRWAY PRESSURE / PRESSURE SUPPORT

Parameters: PEEP, Pressure Support, Trigger Sensitivity, Apnea Backup

Description: Maintains a constant pressure at the specified PEEP level. When the patient inspiratory efforts exceed the flow trigger, increase the pressure to PEEP + Pressure Support until the inspiratory flow drops under the cycle level where the pressure will drop back to the specified PEEP level. If pressure support is set to Off, no triggering or cycling will occur.

Triggering: In normal sensitivity, a patient can trigger the start of inspiration with an inspiratory flow of at least 10 L/min or by causing a pressure drop of 3.0 cmH_20 from PEEP. In low sensitivity, the flow must exceed 15 L/min or the pressure drops 6 cmH_20 from PEEP.

Cycling (Pressure Support Breaths): In normal sensitivity, the breath will cycle back to PEEP level when flow drops under 4 L/min. In low sensitivity, the breath will cycle to PEEP when flow drops under 7 L/min.

Apnea Backup: When Pressure Support is on, the optional Apnea Backup mode will allow the additional parameters for IMV to be configured. The ventilator will take a mandatory IMV breath whenever the time period from the last trigger breath exceeds the time period as specified by 1 ÷ Frequency.

Table 46: Ventilator Specifications of MOVES® SLC™

Property	Specification
Tidal Volume	50–750 mL
Frequency	6–40 B/M
Inspiratory/Expiratory Ratio	1:1 to 1:3
Inspiratory Resistance	6 cmH_2O (at 60 LPM)
Expiratory Resistance	6 cmH_2O (at 60 LPM)

Property	Specification
Inspiratory Time	0.3–5.0 seconds
Peak Flow	60 LPM
Positive End Expiratory Pressure (PEEP)	0–20 cmH_2O
Positive Pressure Relief Valve (Mechanical)	70 cmH_2O
Control Pressure	10–55 cmH_2O (over PEEP). Control Pressure = PIP (Peak Inspiratory Pressure) – PEEP (Positive End Expiratory Pressure)
Pressure (Pw max)	Limited to 58 cmH_2O by software
Pressure Support Ventilation	Off, 5–40 cmH_2O
Apnea Backup (For CPAP+PS)	Off, On
Maximum Limited Pressure (Plim max)	100 cmH_2O (at 100 LPM)
Minimum (Sub atmospheric) Limited Pressure (Plim min)	– 6.0 cmH_2O (at 60 LPM)
Negative Pressure (Sub atmospheric) Available in the Expiratory Phase	None
Trigger Sensitivity (Normal)	10 LPM (flow) or 3 cmH_2O (pressure) below PEEP
Trigger Sensitivity (Low)	15 LPM (flow) or 6 cmH2O (pressure) below PEEP
External Oxygen Supply	15 LPM maximum (@ 2 psi minimum)
Modes	PC-IMV (default), VC-IMV, PC-A/C, VC-A/C, PC-SIMV, PC-SIMV+PS, VC-SIMV, VC-SIMV+PS, APRV, CPAP, CPAP+PS
Compressible Volume of Ventilator and Cartridge	1350 mL (NOTE: System compensates for compressible volume.)
Ventilator Circuit Compliance Including Cartridge	Approximately 0.7 mL/cmH_2O over the ventilator settable pressure range
Time to reach 90% FiO_2 using external oxygen supplied into the O2 inlet port.	Tidal volume of 500mL at 10 breaths/minute into a test lung with 5cmH2O/L/s resistance and 50mL/cmH2O compliance At oxygen flow of 5LPM = 2:04 minutes At oxygen flow of 15LPM = 1:36 minutes Tidal volume of 150mL at 20 breaths/minute into a test lung with 20cmH2O/L/s resistance and 20mL/cmH2O compliance At oxygen flow of 5LPM = 2:28 minutes At oxygen flow of 15LPM = 2:00 minutes

Property	Specification
Ventilator Breathing System Filter characteristics (standard circuit with PALL Medical BB100E)	Internal Volume of 85mL Resistance of 2.0cmH2O at 60LPM Airborne Bacterial/Viral Removal Efficiency of 99.999%
Ventilator Breathing System Filter characteristics (Pediatric filter PN 126245)	Internal Volume of 35mL Resistance of 3.6cmH2O at 60LPM Airborne Bacterial/Viral Removal Efficiency of 99.999%
Standards Compliance	ISO 80601-2-12, ISO 80601-2-13, EN 794–3

17.6.5 Suction Specifications

Table 47: Suction Specifications of MOVES® SLC™

Property	Specification
Suction Vacuum	–100 to –325 mmHg
Free Flow Rate	20 LPM

17.6.6 Electrical Characteristics

Table 48: Electrical Specifications of MOVES® SLC™

Property	Specification	Notes
External Power	100–240 VAC, 50–60 Hz, 5.5 A max.	
Max Current Output	28 VDC, 14.3 A max.	Supplied by Power Supply / Battery Charger
Battery Type	25.9 V lithium polymer	
Charge Time (per set 2 batteries)	2.5 hrs when the system is idle	
Battery Life (per set 2 batteries)	Minimum 2.5 hrs on two fully charged new batteries at 101 kPa and 21°C. Typical > 4 hours with ventilator and monitors on, running concentrator with ¼ duty cycle.	Battery run time is highly dependent on use of the oxygen concentrator and / or suction.

17.6.7 Environmental Specifications

MOVES® SLC ™ has been tested to function under the environmental conditions present during transport and battlefield use. These included mechanical testing for vibration, bump and shock as well as EMC and extreme temperature humidity and weather conditions. Details are provided in the table below:

Table 49: Environmental Specifications of MOVES® SLC™

Variable	Storage Condition	Operating Condition
Temperature	–14ºF to 140ºF (–26ºC to 60ºC) – system & batteries	–14°F to 129°F (–26°C to 54°C). Notes: 1. *MOVES® SLC™ can be taken from any operating temperature into extreme cold of -26°C without affecting operation. It can be cold started at -26°C (-14°F) on AC power. However, MOVES® SLC™ cannot be cold started below -20°C (-4°F) on batteries.* 2. *When starting up MOVES® SLC™ in cold temperatures, the system may take a longer time to reach the required oxygen concentration.* See Oxygen Concentrator Specifications on page 278. 3. *NEVER CHARGE BATTERIES IN AMBIENT TEMPERATURES BELOW 32ºF (0ºC) OR ABOVE 104ºF (40ºC).*
Relative Humidity	15% to 95% non-condensing	Same
Altitude	0–18,000 ft. (5,500m)	Same
Water Resistance	MIL-STD-810G Method 506.4 for blowing rain	Same & IPX4 (Water splashing against the device)
Blowing Sand and Dust Resistance	MIL-STD-810G Method 510.4 Procedure II	Same
Radiated Immunity	N/A	30 V/m
ESD	N/A	15 kV air discharge 8 kV contact discharge
Mechanical Strength	Composite Wheeled Transport Vibration (JECETS)	• Vibration (sinusoidal) according to IEC 60068-2-6 • Random vibration wide band – Reproducibility Medium according to IEC 60068-2-36 • Bump according to IEC 60068-2-29 • Drop Test: 1M attached to stretcher. • Rotary Wing Combined (JECETS) • Fixed Wing Jet Aircraft (JECETS) • Fixed Wing Turbo-Propeller Aircraft

17.7 PATIENT MONITORING SPECIFICATIONS

17.7.1 Heart Rate Monitoring Specifications

Table 50: Heart Rate Monitoring Specifications of MOVES® SLC™

Item	Specification
Source	Auto-detect the first available source in the priority sequence of ABP1, ABP2, ABP3, SpO_2, ECG; or manually select one of the available sources
Range	30–250 bpm for ABP and ECG, 30–239 bpm for SpO_2
Accuracy	± 1% Full Scale (under stationary operation) ±5 BPM (under continuous vibration)
Filtering	ECG: In ECG pediatric heart rate mode, the detection range of QRS amplitude is 0.5 mV to 5 mV, for durations of the QRS wave ranging from 40 ms to 120 ms, up to a signal rate of 350 BPM. Otherwise, the detection range of QRS amplitudes is 0.5 mV to 5 mV, for durations of the QRS complex ranging from 50 ms to 120 ms, up to a signal rate of 300 BPM.
Pacemaker Pulse Rejection Capability	Pacemaker pulses may be detected by the ECG heart rate monitor and included in its calculation, depending on the type and model of pacemaker detected by the heart rate monitor.
Fixed Delays Due to Signal Processing	ABP: Pulse heart rate is calculated from the previous 6 beats. SpO_2: Pulse heart rate is calculated based on the SpO_2 average time selected on the Advanced screen (2 –16 seconds, default 8 seconds). ECG: Heart rate is calculated from the previous 8 beats.
Alarm Condition Delay (onset of condition to internal realization) ***NOTE:*** *"Alarm Condition Delay" derives its value from "Fixed Delays Due To Signal Processing" + 100 ms.*	ABP: 6 beats + 100 ms SpO2: SpO_2 average time + 100 ms ECG: 8 beats + 100 ms
Alarm Signal Generation Delay (realization to display)	Less than 200 ms
Operating Mode That May Affect Alarm Generation	ECG: Incorrect setting of ECG pediatric mode.

17.7.2 Temperature Monitoring Specifications

NOTE: The thermometers conform to all of the requirements established in ASTM standard E1112.

Table 51: Temperature Monitoring Specifications of MOVES® SLC™

Item	Specification	
Range	28°C to 42°C (82.4°F to 107.6°F)	
Accuracy	**Range (Celsius)**	**Accuracy**
	Less than 35.8°C:	± 0.3°C
	35.8°C to less than 37.0°C:	± 0.2°C
	37.0°C to 39.0°C:	± 0.1°C
	Greater than 39.0°C to 41.0°C:	± 0.2°C
	Greater than 41.0°C:	± 0.3°C
	Range (Fahrenheit)	**Accuracy**
	Less than 96.4°F:	± 0.5°F
	96.4°F to less than 98.0°F:	± 0.3°F
	98.0°F to 102.0°F:	± 0.2°F
	Greater than 102.0°F to 106.0°F:	± 0.3°F
	Greater than 106.0°F:	± 0.5°F
Standards Compliance	ASTM E1112-00	

17.7.3 Airflow Monitoring Specifications

Table 52: Airflow Monitoring Specifications of MOVES® SLC™

Item	Specification
Inspiratory/Expiratory Flow Range	– 60 to 60 LPM
Repeatability of Inspiratory/Expiratory Flow Measure	± 0.5% (% of reading)
Airway Pressure (Paw) Range	– 5 to 70 cmH_2O
Accuracy of Airway Pressure Measure	± 2 cmH_2O + 4% of reading
Tidal Volume Accuracy	± (15% by Volume + 4mL)
Standards Compliance	ISO 80601-2-12, ISO 80601-2-13

17.7.4 CO_2 Monitoring Specifications

Table 53: CO_2 Monitoring Specifications of MOVES® SLC™

Item	Specification
Range	0 to 10% by Volume
Resolution	0.02%
Accuracy	± 1.0% Absolute
Rise Time	215 ms (10-90%) at 200 ml/min
Response time of gas sample readings	< 4 seconds
Flow Rate	250 ml/min ± 50 ml/min
Standards Compliance for CO_2 Analyzer Used	ISO 80601-2-55: Medical electrical equipment – Particular requirements for the basic safety and essential performance of respiratory gas monitors

17.7.5 Respiratory Rate Monitoring Specifications

Table 54: Respiratory Rate Specifications of MOVES® SLC™

Item	Specification
Source	Capnograph (CO2)
Range	0 to 99 B/M
Accuracy	0 to 60 B/M: the greater of ± 2 B/M or ± 5% of actual value
Standards Compliance	ISO 80601-2-55: Medical electrical equipment – Particular requirements for the basic safety and essential performance of respiratory gas monitors

17.7.6 O_2 Monitoring Specifications

Table 55: O_2 Monitoring Specifications of MOVES® SLC™

Item	Specification
Range	5 to 100% by Volume
Resolution	0.02%
Accuracy	± 4% Absolute
Rise Time	150 ms (10-90%) at 150 ml/min
Response time of gas sample readings	< 4 seconds
Flow Rate	250 ml/min ± 50 ml/min

Item	Specification
Operating Mode That May Affect Alarm Generation	None
Standards Compliance for O_2 Analyzer Used	ISO 80601-2-55: Medical electrical equipment – Particular requirements for the basic safety and essential performance of respiratory gas monitors

17.7.7 ECG Specifications

Table 56: ECG Specifications of MOVES® SLC™

<table>
<tr><th>Item</th><th colspan="2">Specification</th></tr>
<tr><td>Number of Leads</td><td colspan="2">12</td></tr>
<tr><td>Lead View</td><td colspan="2">Standard 12 lead with Wilson chest lead placement</td></tr>
<tr><td>Input Impedance</td><td colspan="2">> 10 MOhm</td></tr>
<tr><td>Input Range</td><td colspan="2">> 10 mVpp</td></tr>
<tr><td>Input Range (DC)</td><td colspan="2">> 300 mV</td></tr>
<tr><td>Sensitivity</td><td colspan="2">See ECG graphs of Section 14.2.1 System Graphs</td></tr>
<tr><td>Filtering</td><td colspan="2">50 Hz, 60 Hz; optional 15–30 Hz EMG filter</td></tr>
<tr><td>Frequency Response</td><td colspan="2">0.3–70 Hz</td></tr>
<tr><td>Pulse Detection</td><td colspan="2">30–250 bpm ± 1%, ± 1 Digit, 8 beat averaging

Adult detection – Will not respond to QRS amplitude of 0.15 mV or less or R-wave duration of 10 ms or less with an amplitude of 1 mV. Detection range of QRS amplitude is 0.5 mV to 5.0 mV, for duration of the QRS complex ranging from 50 ms to 120 ms, up to a signal rate of 300 BPM.

Pediatric detection – Detection range of QRS amplitude is 0.5 mV to 5.0 mV, for duration of the QRS complex ranging from 40 ms to 120 ms, up to a signal rate of 350 BPM.</td></tr>
<tr><td>Defibrillator Protection</td><td colspan="2">Yes</td></tr>
<tr><td>ST Analysis</td><td colspan="2">None</td></tr>
<tr><td>Pacer Detection</td><td colspan="2">None</td></tr>
<tr><td>Standard Complied to</td><td colspan="2">IEC 60601–2–27</td></tr>
<tr><td>Maximum T-Wave Amplitude</td><td colspan="2">0.6 mV</td></tr>
<tr><td>T-Wave Rejection</td><td colspan="2">The tall T-wave rejection is always on. The max T-wave rejection is 0.6 mV when R-wave is 1 mV.</td></tr>
<tr><td rowspan="2">Indicated Heart Rate (after a 20-second equipment stabilization period)</td><td></td><td>Rhythm</td></tr>
<tr><td>A1 (80 BPM)</td><td>78</td></tr>
</table>

Item	Specification	
	A2 (60 BPM)	58
	A3 (120 BPM)	118
	A4 (90 BPM)	88
Response Time to Heart Rate Meter	Longest Time	< 10 seconds
	80 BPM–120 BPM	
	Longest Time	< 15 seconds
	80 BPM–40 BPM	
Time to Alarm for Tachycardia	B1 – Regular Amplitude	6 seconds
	B1 – Half Amplitude	6.2 seconds
	B1 – Double Amplitude	± 6 seconds
	B2 – Regular Amplitude (max)	5 seconds
	B2 – Half Amplitude (max)	4 seconds
	B2 – Double Amplitude (max)	4.2 seconds
Pacemaker Pulse Representation	Pacemaker pulses will be displayed in the MOVES® SLC™ ECG waveform display and can affect heart rate (as an over estimation).	

17.7.8 NIBP Specifications

Table 57: NIBP Specifications of MOVES® SLC™

Item	Specification
Measurement Cycles	Stat, 1, 2, 3, 4, 5, 10, 15 minutes
Max Allowable Cuff Pressure	300 mmHg
Range	Systolic: 40–260 Diastolic: 20–200
Resolution	1 mmHg
Accuracy	± 5 mmHg Average with STD of 8 mmHg
Calibration	The cuff pressure transducer should be verified once every 12 months.

17.7.9 Invasive Pressure Specifications

Table 58: Invasive Pressure Specifications of MOVES® SLC™

Item	Specification
Channels	3
Transducer Sites	ABP, CVP or ICP
Pressure Range	ABP: –10 to 300 mmHg CVP: –10 to 300 mmHg ICP: –14 to 408 cmH_2O
Temperature: Operating Storage	 15° to 40°C (57°F to 104°F) -25° to 70°C (13°F to 158°F)
Accuracy	± 4 mmHg or 4% of reading whichever is greater

17.7.10 Pulse Oximetry Specifications

Table 59: Pulse Oximetry Specifications of MOVES® SLC™

Item	Specification
Method	Multiple visible and infrared LEDs (500 to 1400 nm)
Maximum Optical Power Output	≤ 25 mW
Fixed Delays Due to Signal Processing	Current SpO_2 is calculated from previous 2–16 seconds depending on "SpO_2 Average Time" setting in Advanced section of Setup Screen. Default: 8 seconds.
Alarm Condition Delay (onset of condition to internal realization)	Fixed delay due to signal processing + 100 ms
Alarm Signal Generation Delay (realization to display)	Less than 200 ms

17.7.11 Equipment Response Time

Table 60: Pulse Oximetry Equipment Response Time

SpO_2 Values	Average	Latency
Standard/Fast Averaged SpO_2	Choice of 2–4, 4–6, 8, 10, 12, 14, or 16 seconds. Default: 8 seconds	2 beats
Pulse Rate Values	**Average**	**Latency**
Standard/Fast Averaged Pulse Rate	Choice of 2–4, 4–6, 8, 10, 12, 14, or 16 seconds. Default: 8 seconds	2 beats

17.7.12 Drift in Sensing Accuracy

A drift of less than 0.4% in the oxygen reading can be expected over a 6 hour duration when external conditions are held constant.

A drift of less than 0.3% in the carbon dioxide reading can be expected over a 6 hour duration when external conditions are held constant.

17.7.13 Specifications of Masimo Rainbow SET® Pulse CO-Oximeter

Measurement Range

Measurement	Display Range
SpO2 (Oxygen Saturation)	0% to 100%
SpMet (Methemoglobin)	0.0% to 100.0%
SpCO (Carboxyhemoglobin)	0% to 100%
SpHb (Hemoglobin)	0.0 g/dL to 25.0 g/dL 0.0 g/L to 250 g/L 0.0 mmol/L to 15.5 mmol/L
SpOC (Oxygen Content)	0 ml of O2/dL to 35 ml of O2/dL of blood
PR (Pulse Rate)	25 bpm to 239 bpm, > 239 displayed when PR is 240–260 bpm
PI (Perfusion Index)	0% to 10% (bar graph beside SpO2)
PVI (Pleth Variability Index)	0% to 100%

Accuracy [7]

Oxygen Saturation Accuracy [1]	
No Motion	60% to 80%
Adults/Pediatrics	± 3%

No Motion [2]	70% to 100%
Adults/Pediatrics	± 2%
Motion [3]	70% to 100%
Adults/Pediatrics	± 3%
Low Perfusion [4]	70% to 100%
Adults/Pediatrics	± 2%
Pulse Rate Accuracy [5]	
Pulse rate range	25 bpm to 239 bpm
No Motion	
Adults/Pediatrics	± 3 bpm
Motion	
Adults/Pediatrics	± 5 bpm
Low Perfusion	
Adults/Pediatrics	± 5 bpm
Carboxyhemoglobin Accuracy [1]	
Adults/Pediatrics	1% to 40% ± 3%
Methemoglobin Saturation Accuracy [1]	
Adults/Pediatrics	1% to 15% ± 1%
Total Hemoglobin Accuracy [6]	
Adults/Pediatrics	8 g/dL to 17 g/dL ±1 g/dL

Notes:

1. SpO_2, SpCO, and SpMet accuracy was determined by testing on healthy adult volunteers in the range 60% to 100% SpO_2, 0% to 40% SpCO, and 0% to 15% SpMet against a laboratory CO-Oximeter. SpO_2 and SpMet accuracy was determined on 16 neonatal NICU patients ranging in age from 7 days to 135 days old and weighting between 0.5 kgs and 4.25 kgs. Seventy-nine (79) data samples were collected over a range of 70% to 100% SaO_2 and 0.5% to 2.5% HbMet with a resultant accuracy of 2.9% SpO_2 and 0.9% SpMet. Contact Masimo for testing specifications.

2. The Masimo sensors have been validated for no motion accuracy in human blood studies on healthy adult male and female volunteers with light to dark skin pigmentation in induced hypoxia studies in the range of 70-100% SpO2 against a laboratory CO-Oximeter and ECG monitor. This variation equals plus or minus one standard deviation. Plus or minus one standard deviation encompasses 68% of the population.

3. The Masimo sensors have been validated for motion accuracy in human blood studies on healthy adult male and female volunteers with light to dark skin pigmentation in induced hypoxia studies in the range of 70-100% SpO2 against a laboratory CO-oximeter and ECG monitor. This variation equals plus or minus one standard deviation which encompasses 68% of the population.

4. The Masimo SET Technology has been validated for low perfusion accuracy in bench top testing against a Biotek Index 2 simulator and Masimo's simulator with signal strengths of greater than 0.02% and transmission of greater than 5% for saturations ranging from 70 to 100%. This variation equals plus or minus one standard deviation which encompasses 68% of the population.

5. The Masimo sensors have been validated for pulse rate accuracy for the range of 25-240 bpm in bench top testing against a Biotek Index 2 simulator. This variation equals plus or minus one standard deviation which encompasses 68% of the population.

6. SpHb accuracy has been validated on healthy adult male and female volunteers and on surgical patients with light to dark skin pigmentation in the range of 8 g/dL to 17 g/dL SpHb against a laboratory CO-Oximeter. The variation equals plus or minus one standard deviation which encompasses 68% of the population. The SpHb accuracy has not been validated with motion or low perfusion.

7. The following substances may interfere with pulse CO-Oximetry measurements:

- Elevated levels of Methemoglobin (MetHb) may lead to inaccurate SpO2 and SpCO measurements.
- Elevated levels of Carboxyhemoglobin (COHb) may lead to inaccurate SpO2 measurements.
- Very low arterial Oxygen Saturation (SpO2) levels may cause inaccurate SpCO and SpMet measurements.
- Severe anemia may cause erroneous SpO2 readings.
- Dyes, or any substance containing dyes, that change usual blood pigmentation may cause erroneous readings.
- Elevated levels of total bilirubin may lead to inaccurate SpO2, SpMet, SpCO and SpHb readings.

Resolution

Parameter	Step Size
%SpO_2	1%
%SpCO	1%
%SpMet	0.1%
SpHb • g/dL • g/L • mmol/L	0.1 g/dL 1 g/L 0.1 mmol/L
SpOC mL/dL	1 mL O_2/dL blood
Pulse Rate	1 beats per minute
% PVI	1%

17.8 GENERAL ACCESSORIES SPECIFICATIONS

Table 61: General Accessories Specifications of MOVES® SLC™

Item	Category	Specification
Batteries	Operating Temperature: Storage Temperature: Charging Temperature:	–26ºC to 54ºC (–14°F to 129°F) (cold start above -20C) –26ºC to 60ºC (–14°F to 140°F) 0ºC to 40ºC (32° to 104°F)
Hydrocarbon/Particulate Filter (P/N 100915)	Effective Filtration Against:	GME Organic Vapor, Chlorine, Sulfur Dioxide, Chlorine Dioxide, Hydrogen Chloride, Hydrogen Sulfide, Ammonia, Methylamine, Formaldehyde, Hydrogen Fluoride: 99.97% effective against all particulate aerosols
NIBP Cuffs (ALL 4)	Temperature: Operating Storage	 0°C to 40°C (32°F to 104°F) –34°C to 70°C (–29.2°F to 158°F)
Temperature Probe (Reusable/Autoclavable)	Temperature:	Interchangeable ± 0.1°C, 25°C to 45°C per EN 12470 Tested to ± 0.1°C, 0°C to 70°C for laboratory use
	Autoclave:	Withstands 100 autoclave cycles to 121°C Withstands 50 autoclave cycles to 134°C
Suction Canister		800 mL capacity

17.8.1 Approved Masimo Pulse Oximeter Accessories

The following Masimo accessories may be used in conjunction with the MOVES® SLC™ pulse oximeter. See the respective sensor instructions for detailed information regarding specified sensor use.

Table 62: Approved Masimo Pulse Oximeter Accessories

Accessory	Description
Rainbow® DCI-dc3	Adult Reusable Finger Sensor for SpCO, SpO_2 & SpMet, 3 ft. ***NOTE:*** *Can be used to measure only SpO_2 if optional SpCO and/or SpMet features have not been activated on MOVES® SLC™ system.*
Rainbow® DCIP-dc3	Pediatric Reusable Finger Sensor for SpCO, SpO_2 & SpMet, 3 ft. ***NOTE:*** *Can be used to measure only SpO_2 if optional SpCO and/or SpMet features have not been activated on MOVES® SLC™ system.*

Accessory	Description
Rainbow® RC-4	Rainbow® Adhesive Sensor Patient Cable, 4 ft.
Rainbow® R1 25	Adult SpO_2, SpHb & SpMet Adhesive Sensor ***NOTE:*** *Requires Rainbow® RC-4 Patient Cable.* ***NOTE:*** *Requires optional SpHb feature to be activated on MOVES® SLC™ system in order for any SpO_2, SpMet or SpHb measurements to be made.*
Rainbow® R1 20	Pediatric SpO_2, SpHb & SpMet Adhesive Finger Sensor ***NOTE:*** *Requires Rainbow® RC-4 Patient Cable.* ***NOTE:*** *Requires optional SpHb feature to be activated on MOVES® SLC™ system in order for any SpO_2, SpMet or SpHb measurements to be made.*
Rainbow® R25	Adult SpO_2, SpCO & SpMet Adhesive Sensor ***NOTE:*** *Requires Rainbow® RC-4 Patient Cable.* ***NOTE:*** *Can be used to measure only SpO2 if optional SpCO and/or SpMet features have not been activated on MOVES® SLC™ system.*
Rainbow® R20	Pediatric SpO_2, SpCO & SpMet Adhesive Finger Sensor ***NOTE:*** *Requires Rainbow® RC-4 Patient Cable.* ***NOTE:*** *Can be used to measure only SpO2 if optional SpCO and/or SpMet features have not been activated on MOVES® SLC™ system.*
Red LNC-4	LNCS Patient Cable for SpO_2, 10 ft.
LNCS DCI®	Adult Reusable SpO_2 Finger Sensor, 3 ft. ***NOTE:*** *Requires Red LNC-4 Patient Cable.*
LNCS DCIP	Pediatric Reusable SpO_2 Finger Sensor, 3 ft. ***NOTE:*** *Requires Red LNC-4 Patient Cable.*
LNCS TC-I	Reusable SpO_2 Ear Sensor, 3 ft ***NOTE:*** *Requires Red LNC-4 Patient Cable.* ***NOTE:*** *Sensor has not been validated under motion conditions.* ***NOTE:*** *Sensor is contraindicated for patients with pierced ears at the measuring site.*
LNCS Adtx-3	Adult Adhesive Sensor, 3 ft. ***NOTE:*** *Requires Red LNC-4 Patient Cable.*
LNCS Pdtx-3	Pediatric Adhesive Sensor, 3 ft. ***NOTE:*** *Requires Red LNC-4 Patient Cable.*

17.8.2 Masimo Pulse Oximeter Accessories Specifications

Table 63: Masimo Pulse Oximeter Accessories Specifications

Sensor	Description	Preferred Application Site	Masimo P/N	Weight Range	Sp02 Accuracy		PR Accuracy		Low Perfusion Accuracy		SpCO/Hb Accuracy	SpMet Accuracy
					No Motion	Motion	No Motion	Motion	Sp02	PR	No Motion	No Motion
Rainbow DCI-dc3	Adult Reusable Finger Sensor for SpO2, SpCO, & SpMet, 3ft.	Finger	2201	>30 kg	60-80% ±3% 70-100% ±2%	±3%	±3 bpm	±5 bpm	±2%	±3 bpm	(SpCO) ±3%	± 1%
Rainbow DCIP-dc3	Pediatric Reusable Finger Sensor for SpO2, SpCO, & SpMet, 3 ft.	Finger	2069	10-50 kg	60-80% ±3% 70-100% ±2%	±3%	±3 bpm	±5 bpm	±2%	±3 bpm	(SpCO) ±3%	± 1%
LNCS DCI	Adult Reusable Finger Sensor	Finger	1863	>30 kg	±2%	±3%	±3 bpm	±5 bpm	±2%	±3 bpm	N/A.	N/A.
LNCS DCIP	Pediatric Reusable Finger Sensor	Finger	1864	10-50 kg	±2%	±3%	±3 bpm	±5 bpm	±2%	±3 bpm	N/A.	N/A.
LNCS TC-I	Reusable Ear Sensor	Ear Lobe (Contraindicated for patients with pierced ears at the measuring site)	1895	>30 kg	±3.5%	N/A	±3 bpm	N/A	±3.5%	±3 bpm	N/A.	N/A.
LNCS Adtx–3	Adult Adhesive Sensor, 3 ft.	Finger	2317	>30 kg	±2%	±3%	±3 bpm	±5 bpm	±2%	±3 bpm	N/A.	N/A.

Sensor	Description	Preferred Application Site	Masimo P/N	Weight Range	Sp02 Accuracy		PR Accuracy		Low Perfusion Accuracy		SpCO/Hb Accuracy	SpMet Accuracy
					No Motion	Motion	No Motion	Motion	Sp02	PR	No Motion	No Motion
LNCS Pdtx–3	Pediatric Adhesive Sensor, 3 ft.	Finger	2318	10-50 kg	±2%	±3%	±3 bpm	±5 bpm	±2%	±3 bpm	N/A.	N/A.
Rainbow R1 25	Adult Adhesive Sensor for SpHb, SpO2, & SpMet	Finger	2416	>30 kg	60-80% ± 3% 70-100% ± 2%	±3%	±3 bpm	± 5 bpm	± 2%	± 3 bpm	(SpHb) ± 1 g/dL	± 1%
Rainbow R1 20	Pediatric Adhesive Finger Sensor for SpHb, SpO2, & SpMet	Finger	2417	10-50 kg	60-80% ± 3% 70-100% ± 2%	±3%	±3 bpm	± 5 bpm	± 2%	± 3 bpm	(SpHb) ± 1 g/dL	± 1%
Rainbow R25	Adult Adhesive Sensor for SpO2, SpCO, & SpMet	Finger	2221	>30 kg	60-80% ± 3% 70-100% ± 2%	±3%	±3 bpm	±5 bpm	± 2%	±3 bpm	(SpCO) ±3%	±1%
Rainbow R20	Pediatric Adhesive Finger Sensor for SpO2, SpCO, & SpMet	Finger	2222	10-50 kg	60-80% ± 3% 70-100% ± 2%	±3%	±3 bpm	±5 bpm	± 2%	±3 bpm	(SpCO) ±3%	±1%

17.9 ELECTROMAGNETIC CONFORMITY INFORMATION

17.9.1 IEC 60601-1-2:2007 (Ed 3.0) Table 1 Requirements

MOVES® SLC™ is intended for use in the electromagnetic environment specified below. The customer or the user of MOVES® SLC™ should assure that it is used in such an environment.

Table 64: 5.2.2.1c IEC 60601-1-2:2007 (Ed 3.0) Table 1 Requirements

Emissions Test	Compliance	Electromagnetic Environment – Guidance
RF emissions CISPR 11	Group 1	MOVES® SLC™ uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	MOVES® SLC™ is suitable for use in all establishments other than domestic, and may be used in domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes, provided the following warning is heeded: **Warning:** MOVES® SLC™ is intended for use by healthcare professionals only. MOVES® SLC™ may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as re-orienting or relocating MOVES® SLC™ or shielding the location.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

17.9.2 IEC 60601-1-2:2007 (Ed 3.0) Table 2 Requirements

MOVES® SLC™ is intended for use in the electromagnetic environment specified below. The customer or the user of MOVES® SLC™ should assure that it is used in such an environment.

Table 65: 5.2.2.1f IEC 60601-1-2:2007 (Ed 3.0) Table 2 Requirements

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air with documented necessary	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 610004-5	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5% UT (> 95% dip in UT) for 0.5 cycle 40% UT (60% dip in UT) for 5 cycles 70 % UT (30% dip in UT) for 25 cycles < 5% UT (> 95% dip in UT) for 5 sec	< 5% UT (> 95% dip in UT) for 0,5 cycle 40 % UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles No anomalies < 5% UT (> 95% dip in UT) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. End user shall ensure charged batteries are installed in the Equipment.
Power frequency (50 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

17.9.3 IEC 60601-1-2:2007 (Ed 3.0) Table 3 Requirements

MOVES® SLC™ is intended for use in the electromagnetic environment specified below. The customer or the user of MOVES® SLC™ should assure that it is used in such an environment.

Table 66: 5.2.2.2 IEC 60601-1-2:2007 (Ed 3.0) Table 3 Requirements

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
			Portable and mobile RF communications equipment should be used no closer to any part of MOVES® SLC™, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance:**
Conducted RF IEC 61000-4-6	10 Vrms 150 kHz to 80 MHz in ISM Bands	10 V	$d = [\frac{12}{10}]\sqrt{P}$
Radiated RF IEC 61000-4-3	10 V/m 80 MHz to 2.5 GHz	10 V/m	$d = [\frac{12}{10}]\sqrt{P}$ 80 MHz to 800 MHz $d = [\frac{23}{10}]\sqrt{P}$ 800 MHz to 2,5 GHz …where *P* is the maximum output power rating of the transmitter in watts (*W*) according to the transmitter manufacturer and *d* is the recommended separation distance in meters (*m*). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of known RF transmitting devices and equipment marked with the following symbol: 

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Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
NOTE 1: *At 80 MHz and 800 MHz, the higher frequency range applies.* ***NOTE 2:*** *These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.*			
a) *Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the equipment is used exceeds the applicable RF compliance level above, the equipment should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the equipment* ***b)*** *Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 10 V/m.*			

17.9.4 IEC 60601-1-2:2007 (Ed 3.0) Table 5 Requirements

MOVES® SLC™ is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of MOVES® SLC™ can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and MOVES® SLC™ as recommended below, according to the maximum output power of the communications equipment.

Table 67: 5.2.2.2 IEC 60601-1-2:2007 (Ed 3.0) Table 5 Requirements

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and MOVES® SLC™				
Rated Maximum Output Power of Transmitter (*W*)	**Separation Distance According to Frequency of Transmitter (*m*)**			
	150 kHz to 80 MHz outside ISM bands $d = [\frac{3,5}{V_1}]\sqrt{P}$	**150 kHz to 80 MHz in ISM bands** $d = [\frac{12}{V_2}]\sqrt{P}$	**80 MHz to 800 MHz** $d = [\frac{12}{E_1}]\sqrt{P}$	**800 MHz to 2.5 GHz** $d = [\frac{23}{E_1}]\sqrt{P}$
0.01				
0.1				
1				
10				
100				
For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters *(m)* can be determined using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts *(W)* according to the transmitter manufacturer. ***NOTE 1:*** *At 80 MHz and 800 MHZ, the separation distance for the higher frequency range applies.* ***NOTE 2:*** *The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957MHz to 27.283 MHz; and 40.66 to 40.70 MHz.* ***NOTE 3:*** *An additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.5 GHz to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into the patient area.* ***NOTE 4:*** *These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.*				

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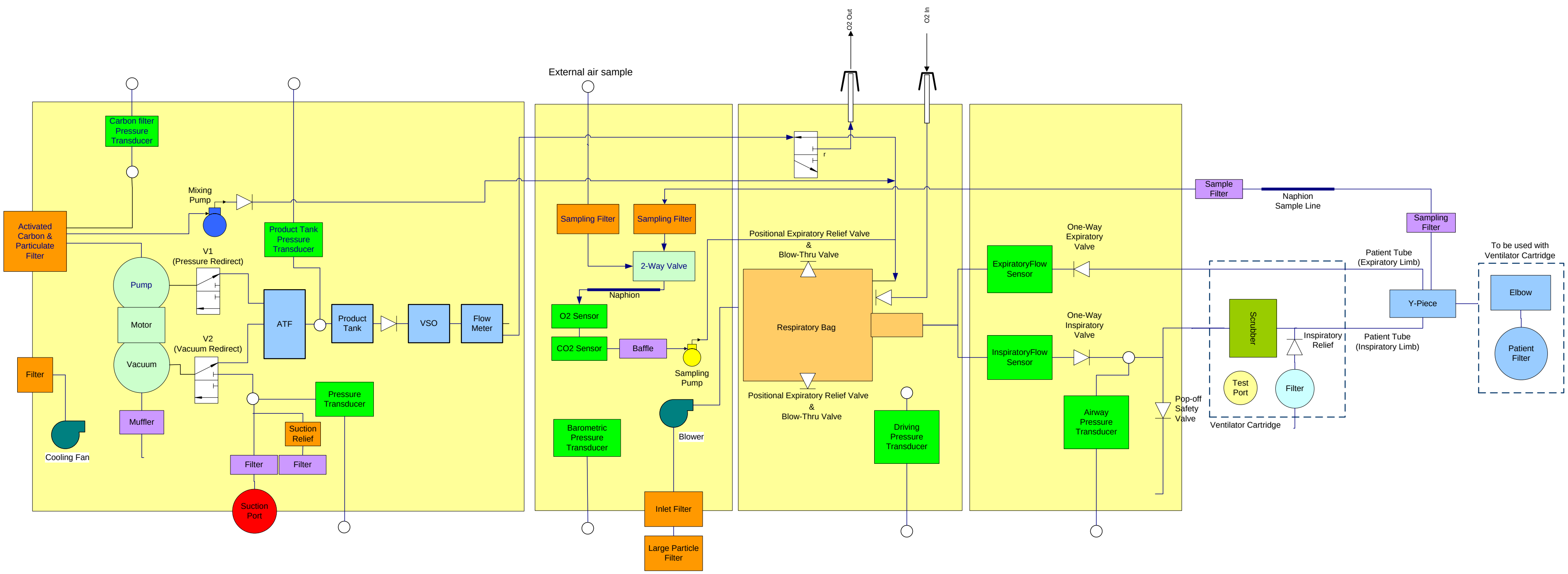
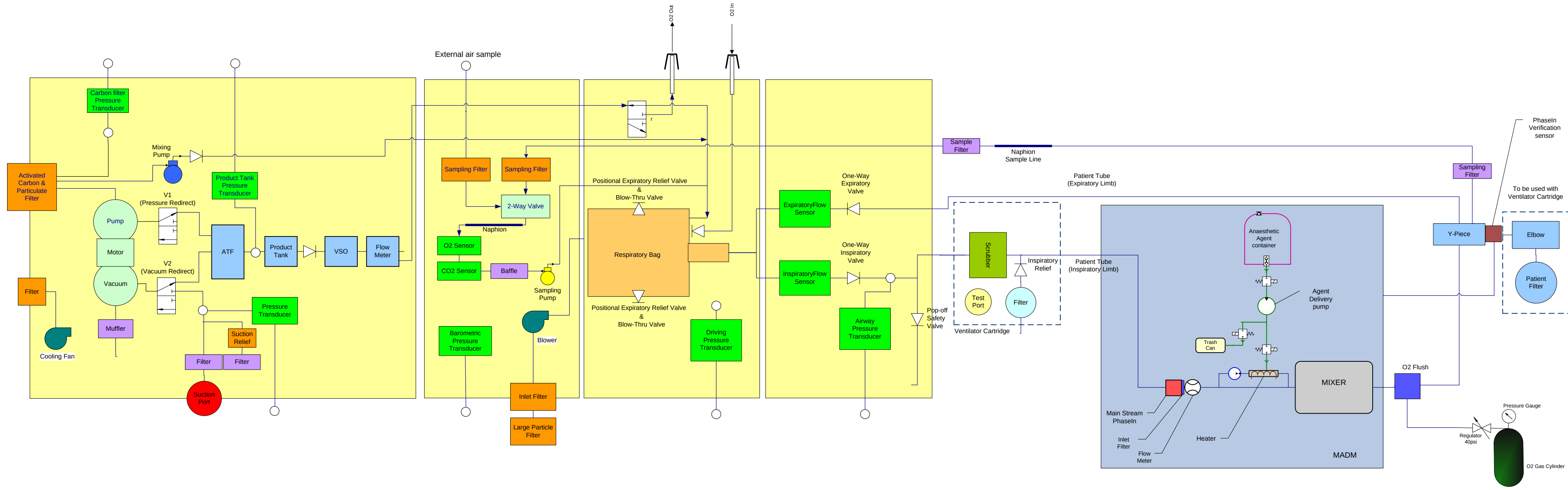
18.0 Appendix B – Pneumatic Diagram

18.1 MOVES® SLC™ PNEUMATIC DIAGRAM



18.2 MOVES® SLC™ PNEUMATIC DIAGRAM WHEN USED WITH MADM™ FOR ANESTHETIC DELIVERY



19.0 Index