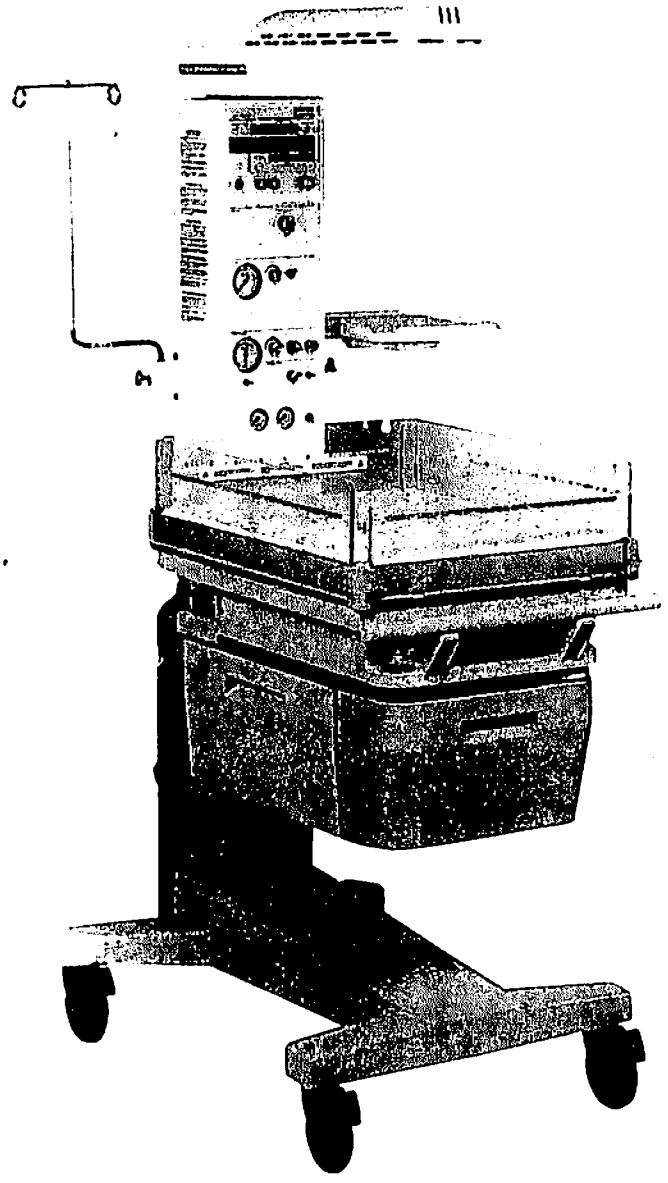
Hill-Rom Air-Shields®

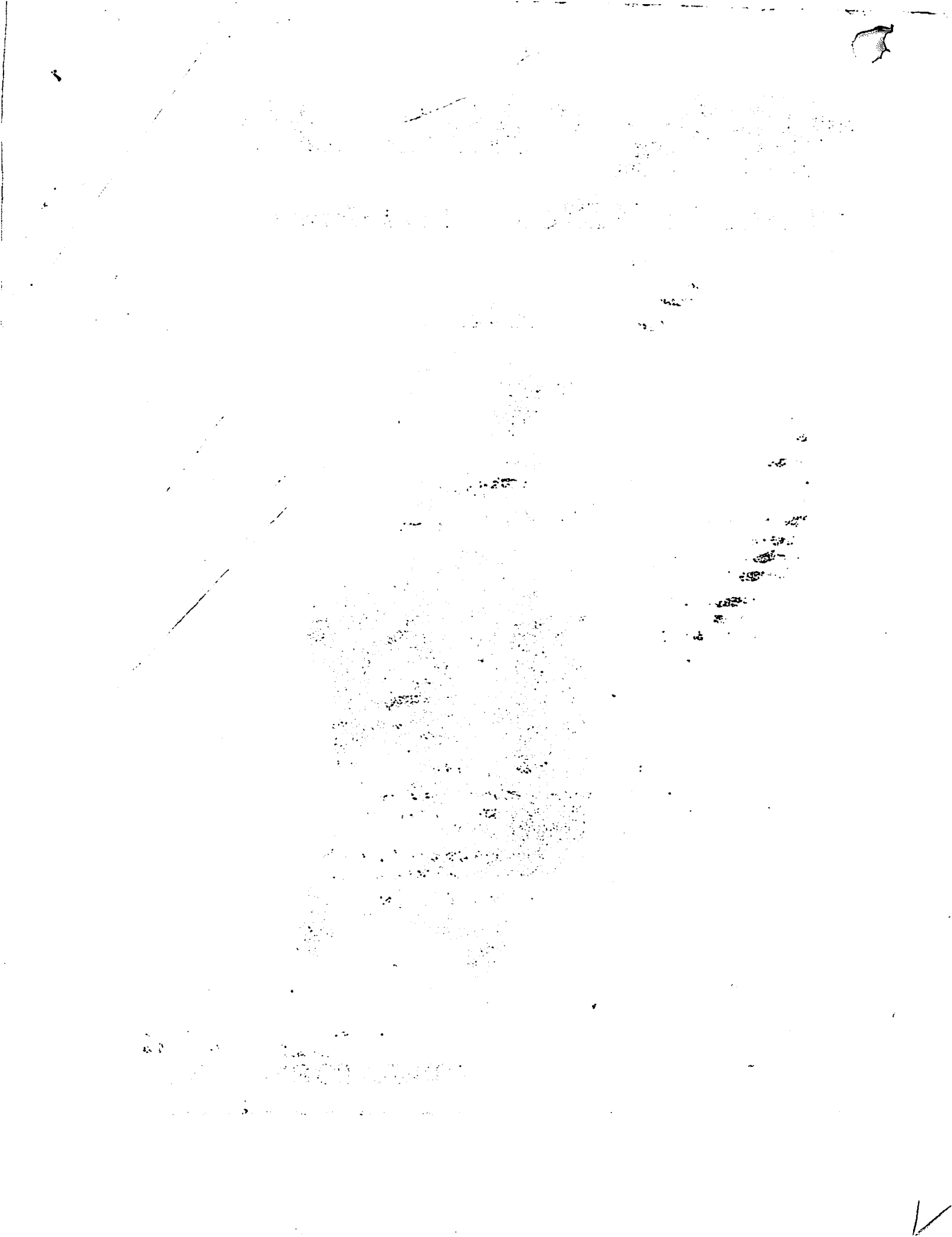
A HILLENBRAND INDUSTRY

RESUSCITAIRE® Radiant Warmer

MODEL RW82–1



OPERATOR'S MANUAL



OPERATING PRECAUTIONS

GENERAL PRECAUTIONS

- Federal Law restricts this device to sale by or on order of a physician.
- Infant radiant warmers should be used only by properly trained personnel as directed by an appropriately qualified physician aware of currently known risks and benefits.
- The functional checkout procedure should be performed before the unit is first placed into use and after disassembly for cleaning, servicing or maintenance. Refer to qualified service personnel if the unit does not perform as specified.
- The Bassinet end and side panels cannot be used for pushing or pulling the ***Resuscitaire® Radiant Warmer.***
- Do not leave the infant unattended in the Bassinet of the ***Resuscitaire® Radiant Warmer*** when the side panels or the front panel are folded down.
- To avoid overheating or underheating, skin temperature must be continuously monitored and controlled either manually or automatically. Rectal temperature should never be used to control skin temperature.
- To avoid overheating or underheating when operating in manual mode, observe the infant constantly and monitor the temperature using the temperature probe supplied with the equipment or other electronic thermometer.
- The skin temperature sensing probe must be in direct contact with the skin to provide accurate monitoring of the infant's skin temperature. Failure to maintain direct skin contact can result in overheating and possible burning. Check infant's condition at least every fifteen minutes for correct Sensor attachment, reddened skin areas, and proper skin temperature.
- The skin temperature sensing probe should be placed at least 1.5 inches from any transcutaneous monitor ($TcPO_2$ or $TcPCO_2$) probe to prevent false temperature indications. The skin temperature probe should not be placed on an area previously used by a $TcPO_2$ or $TcPCO_2$ probe.
- To avoid overheating the skin, the location of the skin temperature probe must be such that the skin around the Sensor is in direct line with the radiation from the warmer. Do not place anything between the radiant warmer and the infant that will interfere with the radiation from the warmer.
- Radiant warming increases insensible water loss. Appropriate measures to maintain proper fluid balance should be considered.
- Phototherapy units located too close to the Bassinet may affect mattress and infant temperature.
- The warmer cannot differentiate between an increase in core temperature and cold skin (fever) and low core temperature (hypothermia). It is recommended that patient core temperature be monitored with a separate calibrated electronic thermometer.
- Compressed gas cylinders, such as oxygen cylinders, can become hazardous projectiles if the gas is released rapidly due to damage or other causes. Cylinders must be securely fastened.
- To avoid overheating of the warmer, do not place objects (equipment, blankets, clothing or sterile packs) on top of the warmer.
- Air currents across the Bassinet area can affect patient thermal balance. Avoid placing the Warmer near heating or air conditioning ducts that may blow air across the Bassinet.
- Temperature uniformity (per IEC 601-2-21) across the mattress surface may not be maintained when the Bassinet is tilted in the 5- and 10-degree positions.
- During service intervals, inspect the secondary reflector directly under the warmer heater element for particles. If particles are present, replace the heater element. The life expectancy of the heater element is 1000 hours of operation.

OPERATING PRECAUTIONS (Continued)

GENERAL PRECAUTIONS (Continued)

- Should any of the control knobs on the Resuscitation Module come loose for any reason, do not attempt to refasten them. The calibration of these controls depends on the position of the knob on the shaft. If this occurs, recalibration must be performed by qualified service personnel.
- An electrical shock hazard exists within the Warmer Module and Controller. Any substitution of components within the Controller or Warmer Module may impair the intrinsic safety of the unit. Service should be performed by qualified personnel.
- Only connect the power cord to a properly grounded receptacle that is approved for hospital use and of the correct voltage. **DO NOT USE EXTENSION CORDS.**
- Use only with power cords supplied with or provided for the ***Resuscitaire® Radiant Warmer.***
- The use of ACCESSORY equipment not complying with the equivalent safety requirements of this equipment may lead to a reduced level of safety of the resulting system. Consideration relating to the choice shall include:
- Use of the accessory in the PATIENT VICINITY.
- Evidence that the safety certification of the ACCESSORY has been performed in accordance to the appropriate IEC 601-1 and/or IEC 601-1-1 harmonized national standard.
- When raising or lowering the Upper Post of the ***Resuscitaire® Radiant Warmer with VHA,*** make sure that any attached cables, tubing or hoses are not compromised.
- When lowering the Upper Post of the ***Resuscitaire® Radiant Warmer with VHA*** to its minimum height, ensure thatthe gas tanks, if installed, do not contact the floor.
- Always lower the ***Resuscitaire® Radiant Warmer VHA*** to its lowest position prior to transport for optimum stability. If installed, make sure that items placed on the shelves are properly secured.

AUTOBREATH PRECAUTIONS

- The **AutoBreath** (option) is intended for use by qualified clinical personnel only. These instructions should be read before using the equipment.
- Any humidifier used with the **AutoBreath** must be a "flow-through" type having a low pressure drop. Use of a humidifier with a bubbler tube or pressure jet will render the Safety Relief Valve ineffective. A pressure jet nebulizer or unmodified bubbler humidifier may not be used.
- When setting the **Rate (BPM)** Control for optimum repeatability, always approach the desired setting by turning the knob in a clockwise direction.
- When setting the **PEEP** control, always start with the knob fully counterclockwise to avoid setting PEEP above the maximum pressure limit.
- An airway pressure monitor must be used if the **AutoBreath** is to be used unattended.
- A one-way valve is installed at the **Patient Outlet** connection. This valve opens when pressure in the hose delivering gas to the patient falls below -4 cm H_2O. Its purpose is to allow patient inspiration in the unlikely event of failure of the gas supply.
- A humidifier, when used, must be placed between the **Patient Outlet** connection and the patient circuit. DO NOT PLACE A HUMIDIFIER IN THE SUPPLY LINE. The humidifier should have low compliance and water maintained at a high level to minimize compliance.
- Gas going to the patient should not be super-saturated as evidenced by excessive condensation in the tubing. Condensation droplets on the inner walls of the tubing are normal.
- Periodic blood gas measurements should be made to ensure proper levels of ventilation.

OPERATING PRECAUTIONS (Continued)

AUTOBREATH PRECAUTIONS (continued)

- Always confirm the airway pressure relief valve setting before patient use.
- Confirm that the oxygen/air blender control of the **Blended Gas Supply** Module is correctly set prior to use.
- Confirm that the patient circuit contains all the parts needed prior to use.
- Ensure that the patient breathing circuit connections are secure and free of obstructions.
- The **Aux Outlet** circuit does not provide adjustable pressure limiting.
- Auxiliary Gas Supply Pressure is internally limited to 160 cm H_2O. Always use a patient resuscitation circuit that includes appropriate pressure relief.
- Always monitor **Airway Pressure** and/or provide appropriate pressure relief during infant resuscitation.
- *Confirm* that the oxygen supply is turned off and that the equipment is disconnected from the oxygen supply when performing cleaning and maintenance procedures; a fire and explosion hazard exists when performing cleaning and/or maintenance procedures in an oxygen-enriched environment.
- Gas supplies (O_2 and Air) should always be clean and dry. Water/Trap Filters should be used in the supply lines if necessary.
- All hoses should be securely fastened to fittings. Hand-tighten to avoid damage to fittings.
- Wall/Pipeline gas supplies should be maintained at 40 to 75 psi.
- Flow restrictions (e.g., flowmeter, valve, etc.) must not be placed in the supply line.
- If a compressor is used as the air source, steps should be taken to filter and dehumidify the room air before introducing it into the Gas Supply Module.

EXPLOSION PRECAUTIONS

- Do not use in the presence of flammable anesthetics.

OXYGEN PRECAUTIONS

- Improper use of supplemental oxygen may be associated with serious side effects including blindness, brain damage, and death. The risks vary with each infant. All clinical practices with regard to oxygen administration should be prescribed by the attending physician.
- If it is necessary to administer oxygen in an emergency, the attending physician should be notified immediately.

NOTE: *See the current edition of "Guidelines for Perinatal Care" of the American Academy of Pediatrics/The American College of Obstetricians and Gynecologists.*

- The oxygen concentration inspired by an infant does not predictably determine the partial pressure of oxygen (PO_2) in the blood. When deemed advisable by the attending physician, blood PO_2 should be measured by accepted clinical techniques.
- Oxygen flow rates cannot be used as an accurate indication of oxygen concentrations. Oxygen concentrations should be measured with a calibrated oxygen analyzer at intervals directed by the attending physician.
- Keep matches, lighted cigarettes, and all other sources of ignition out of the room in which the equipment is located. Textiles, oils, and other combustibles are easily ignited and burn with great intensity in air enriched with oxygen.
- Although oxygen compatible materials are used in the oxygen delivery system, special care must be taken when high pressure oxygen such as found in a medical oxygen cylinder is used. Violent ignition of oil, grease, greasy substances, small particles of dust, dirt or other particulate contaminants (even small particles of metal), can occur in the presence of high pressure oxygen if their ignition temperature is reached. An instantaneous increase in temperature can occur due to friction, particle acceleration, or adiabatic compression, if the oxygen cylinder valve is opened too rapidly. **SERIOUS INJURY MAY RESULT!** Always observe the following precautions:

OPERATING PRECAUTIONS (Continued)

OXYGEN PRECAUTIONS (Continued)

- Oil, grease, greasy substances, dust, dirt and other particulate contaminants must be kept away from oxygen regulators, cylinder valves, tubing and all other oxygen equipment.
- Always open oxygen cylinder shut-off valves **very slowly** and **carefully.**
- On high pressure oxygen cylinders use only pressure regulators or reducing valves approved for oxygen service. Do not use oxygen pressure regulators or reducing valves for air or gases other than oxygen as they may be hazardous. Operate such devices in strict accordance with the manufacturer's recommendations.
- When new or replacement oxygen cylinders are to be installed, they should have their outlet ports cleared by cracking the cylinder valve momentarily before attachment to the equipment.

LOW FLOW MICROBLENDER WARNINGS

- If either the air or oxygen gas source pressure is reduced or increased creating a pressure differential of 30 psi, the microblender alarm will sound. This condition significantly alters the FiO_2 and flow output from the microblender.
- Always operate the low flow microblender with clean/dry medical grade gases.
- Air inlet water filters are recommended for use with the low flow microblender.
- The concentration of oxygen provided and the partial pressure of oxygen within the patient's blood (PaO_2) should be monitored.

TABLE OF DEFINITIONS AND SYMBOLS

NOTE, IMPORTANT, PRECAUTION, CAUTION, AND WARNING

NOTE: *A Note is inserted in text to point out procedures or conditions which may otherwise be misinterpreted or overlooked. A Note may also be used to clarify apparently contradictory or confusing situations.*

IMPORTANT: *Similar to a Note but used when greater emphasis is required.*

PRECAUTION: *A Precaution is supplemental information to assist the user in the safe and effective use of the equipment.*

CAUTION: A Caution is inserted in text to call attention to a procedure which, if not followed exactly, can lead to damage or destruction of the equipment.

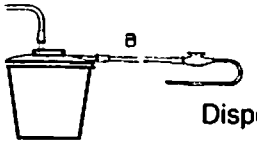
WARNING: A Warning is inserted in text to call attention to dangerous or hazardous conditions inherent to the operation, cleaning, and maintenance of the equipment which may result in personal injury or death of the operator or patient.

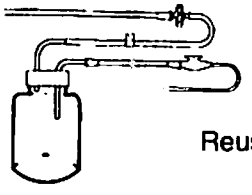
SYMBOLS


Attention: consult accompanying documents.

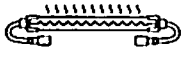

Type B equipment with an F–type isolated (floating) applied part.


Danger! High Voltage!


Disposable Suction Bottle


Reusable Suction Bottle


Patient


Heater Element


Suction Line Filter


Load Symbol


Examination Light


Examination Light Switch


Mode Control Key

Temperature Override Mode Key


Keypad Lock Key


Set Temperature Keys


Power On/Off Switch

Celsius/Fahrenheit Selection Key


Silence/Reset Key


Procedural Silence Indicator


Apgar Timer Keys

TABLE OF CONTENTS

HILL-ROM AIR-SHIELDS® PROGRAM OF PRODUCT DEVELOPMENT/IMPROVEMENT

Some specifications will vary: please refer to the following table to verify the performance specifications of your unit.

AUTOBREATH UNITS	**SERIES 00***	**SERIES 01***
Patient Supply Back-Up Pressure Relief cmH_2O (kPa)	50 (4.9)	60 (5.9)

NON-AUTOBREATH UNITS	**SERIES 00***	**SERIES 01***
Auxiliary Outlet Pressure Relief cmH_2O (kPa)	40 (3.9)	160 (15.7)
Patient Supply Back-Up Pressure Relief cmH_2O (kPa)	50 (4.9)	60 (5.9)

*Please refer to your product Data Tag positioned on the side of the lower column for the Series Number of your unit.

SERIES NO.

These specifications apply to the following Operator's Manual references Page 3, Specifications:

Fixed Pressure Relief, Factory Set ..... 60 cm H_2O (5.9 kPa) ± 20%.

OR

Fixed Pressure Relief, Factory Set ..... 50 cm H_2O (4.9 kPa) ± 20%.

Auxiliary Pressure Limit ..... 160 cm H_2O (15.7 kPa) ± 20%

OR

Auxiliary Pressure Limit ..... (40 cm H_2O (4.1 kPa) ± 20% with AutoBreath)

PAGE 10, UNDER PATIENT GAS SUPPLY DESCRIPTION, CHANGE TO:

A fixed internal safety valve is also provided and is also always operable. This valve provides redundant maximum pressure relief at 60 cm H_2O ± 20% (5.9 kPa ± 20%).

OR

A fixed internal safety valve is also provided and is also always operable. This valve provides redundant maximum pressure relief at 50 cm H_2O ± 20% (4.9 kPa ± 20%).

PAGE 10, UNDER AUX OUTLET DESCRIPTION, CHANGE TO:

An internal pre-set relief valve limits the AUX Outlet pressure to 160 cm H_2O (15.7 kPa).

OR

An internal pre-set relief valve limits the AUX Outlet pressure to 40 cm H_2O (3.9 kPa).

PAGE 12, UNDER PATIENT GAS SUPPLY DESCRIPTION, CHANGE TO:

A fixed internal safety valve is also provided and is also always operable. This valve provides redundant maximum pressure relief at 60 cm H_2O ± 20 (5.9 kPa ± 20%).

OR

A fixed internal safety valve is also provided and is also always operable. This valve provides redundant maximum pressure relief at 50 cm H_2O ± 20 (4.9 kPa ± 20%).

ADD THE FOLLOWING *NOTE* AFTER THE AUX OUTLET DESCRIPTION ON PAGES 10 AND 12.

Increasing back pressure may be developed as the length of oxygen circuit tubing increases and tubing diameter decreases. Install oxygen delivery tubing as intended in a clinical situation and verify through flow measurement that approximately 15 LPM (maximum) can be achieved.

SECTION 1
GENERAL INFORMATION

1.1 INTRODUCTION

This manual provides instructions for installation, use, operator maintenance and troubleshooting of the equipment. Hill-Rom Air-Shields cannot be responsible for the performance of the equipment if the user does not operate the equipment in accordance with the instructions, fails to follow the maintenance recommendations in Section 5 of this manual or effects any repairs with unauthorized components. Calibration and repair should be performed only by qualified service personnel. Service manuals are available from Hill-Rom Air-Shields.

This manual should be read, thoroughly understood, and be readily accessible to all personnel who will be working with the equipment. The manual should be stored with the equipment when not in use. If there is anything you do not understand, please contact your Hill-Rom Air-Shields' representative for further information.

1.2 DESCRIPTION

The ***Resuscitaire® Radiant Warmer*** is designed specifically for labor and delivery room use. The ***Resuscitaire® Radiant Warmer*** consists of a Bassinet, Warmer, and a Controller module which provides heat control, monitoring of skin temperature and Apgar timing. The ***Resuscitaire® Radiant Warmer with VHA*** provides an adjustable Mattress Height from 89.2 cm (35.4 inches) to 110.2 cm (43.3 inches).

The ***Resuscitaire® Radiant Warmer*** also includes an optional basic resuscitation package which includes suction and oxygen delivery.

1.3 SPECIFICATIONS

Specifications for the ***Resuscitaire® Radiant Warmer*** are provided in Table 1.1. All specifications are subject to change without notice.

TABLE 1.1 SPECIFICATIONS

POWER REQUIREMENTS *Resuscitaire® Radiant Warmer*

120V Models	120V, 60 Hz, 750W
100V Models (Japan)	100V, 50/60 Hz, 750W
230V Models	230V, 50/60 Hz, 750W

POWER REQUIREMENTS *Resuscitaire® Radiant Warmer with VHA*

120V Models	120V, 60 Hz, 1300W
230V Models	230V, 50/60 Hz, 1300W

OVERLOAD PROTECTION

120V Models	Dual 12A Circuit Breakers
100V Models (Japan)	Dual 12A Circuit Breakers
230V Models	Dual 6A Circuit Breakers

Resuscitaire® Radiant Warmer with VHA also has in addition:

120V Models	Dual 6A Circuit Breakers
230V Models	Dual 3A Circuit Breakers

CHASSIS LEAKAGE CURRENT (Single fault condition, loss of ground)

100V and 120V Models	Less than 300 μA
230V Models	Less than 500 μA

EXAMINATION LIGHT ..... >100 Foot Candles (0.11 lumens/cm^2)

ALARMS

High Temperature	Activates if Skin Temperature Probe is attached and the skin temperature sensor reaches 39.0 °C. Resets at 38.5 °C.
Check Patient	Activates in Manual Mode after 10 minutes. Remains on with audible alarm every 30 seconds for 5 minutes; totalling 15 minutes. Then the heater is turned *Off*.
Apgar Timer	Activates at the 1–, 5– and 10–minute Apgar Time intervals.
Power Fail	Activates when there is a loss of power.
Probe	Activates if Skin Temperature Probe fails (open or short).
System Fail	Indicates system failure, refer unit to service immediately.
Baby Temp	Activates if Baby Temperature fluctuates 1°C above or below set point.
Electrical Module Audio Alarms	Tone Frequency: 1.2 KHz maximum three–stage sound level: 15 seconds low, 15 seconds medium, then high.
Blender Module Pneumatic Audio Alarm	Vibrating Reed.

MANUAL HEAT CONTROL ..... Adjustable in 10% increments from zero to full power (100%)

DATA PORT ..... 2400 Bits/second fixed Baud Rate. RS232C Compatible.

MATTRESS TILT ..... 0, 5 and 10 degrees.

TABLE 1.1 SPECIFICATIONS (Cont.)

DISPLAYS

Skin Temperature Display

Range	18 to 40 °C (64.4 to 104°F)
Accuracy	± 0.2 °C for 31 °C to 37 °C (88 °F to 98.6°F)
Resolution	0.1°C (0.5 °F)

Apgar Timer Display

Range	0 to 59 minutes, 0 to 59 seconds
Resolution	1 second
Accuracy	0 ± 1 second

DIMENSIONS AND WEIGHT *Resuscitaire® Radiant Warmer*

Mattress Height	100 cm (39.4 – inches)
Height	188 cm (74 – inches)
Width (Side to Side)	72.4 cm (28.5 – inches)
Depth (Front to Back)	111.8 cm (44 – inches)
Weight	100 kg (220 lbs)

DIMENSIONS AND WEIGHT *Resuscitaire® Radiant Warmer with VHA*

Mattress Height	89.2 to 110.2 cm (35.4 to 43.3 inches)
Bassinet Tilt (continuously)	± 10 degrees from horizontal
Height	180.6 to 200.7 cm (71.1 to 79 inches)
Width (Side to Side)	72.4 cm (28.5 – inches)
Depth (Front to Back)	111.8 cm (44 – inches)
Weight	127 kg (280 lbs)

ENVIRONMENTAL

Operating Temperature Range	18 °C to 30 °C ambient
Storage Temperature Range	– 30 °C to +70 °C ambient
Relative Humidity Operating Range	5% RH to 95% RH, non-condensing

RESUSCITATION

Wall Supply Pressure	40 to 75 psi (2.8 to 5.2 bar)
Cylinder Pressure	2900 psi max (199.8 bar)
Cylinder Diameter	10–12 cm (4–5 inches) max

Suction Circuit

Adjustable Suction Intensity	0 to 150 mmHg

Patient Gas Supply

Airway Pressure Limit, Operator Adjustable	0 to 50 cm H_2O (4.9 kPa) ± 10%
Fixed Pressure Relief, Factory Set	60 cm H_2O (5.9 kPa) ± 10%

Auxiliary Supply

Auxiliary Pressure Limit	160 cm H_2O (16 kPa) ± 10%

AutoBreath Circuit (Factory Installed Option)

I:E Ratio	Fixed at 1:2 ± 20%
PEEP	0 to 18 ± 4 cm H_2O (1.8 ± 0.4 kPa)
Breath Rate	18 to 60 BPM ± 10% of setting
Airway Pressure Relief, Operator Adjustable	0 to 50 ± 5 cm H_2O (4.9 ± 0.5 kPa)
Fixed Maximum Pressure	60 cm H_2O ± 10%(5.9 kPa ±10%)
Oxygen Consumption	50 LPM max.

Auxiliary Flow Circuit

Auxiliary Flow Range	0 to 15 LPM
Auxiliary Pressure	160 cm H_2O ± 10% (16 kPa ± 10%) maximum

1.4 EQUIPMENT PROVIDED

- *Bassinet* – The Bassinet provides maximum visibility and access to the infant. The Bassinet tilts up in the rear 5 and 10 degrees and provides for X-ray Tray (optional) insertion.
- *Warmer Module* – The Warmer Module houses a heating element and an Examination Light for special procedures.
- *Controller* – The Controller provides Pre-Warm, Manual heat control, automatic skin temperature servo-control and contains an Apgar Timer, Skin Temperature monitor and probe connection.
- *Resuscitation Module (Optional)* – The Resuscitation Module contains a suction circuit, a patient oxygen delivery circuit with airway pressure relief and an auxiliary oxygen delivery circuit.

1.5 FACTORY INSTALLED OPTIONS

- Resuscitation Module
- Resuscitation Module with AutoBreath
- Integrated Precision Blender
- Gas Supply Module
  - O_2 Pipeline and Cylinder
  - O_2/Air Pipeline and Cylinder

1.6 FIELD INSTALLED ACCESSORIES (Refer to Section 6 for Part Numbers)

- Instrument Tray (left or right mount)
- X-ray Cassette Tray
- Pass-Through Drawer Organizer Tray
- I.V. Pole
- Monitor Shelf

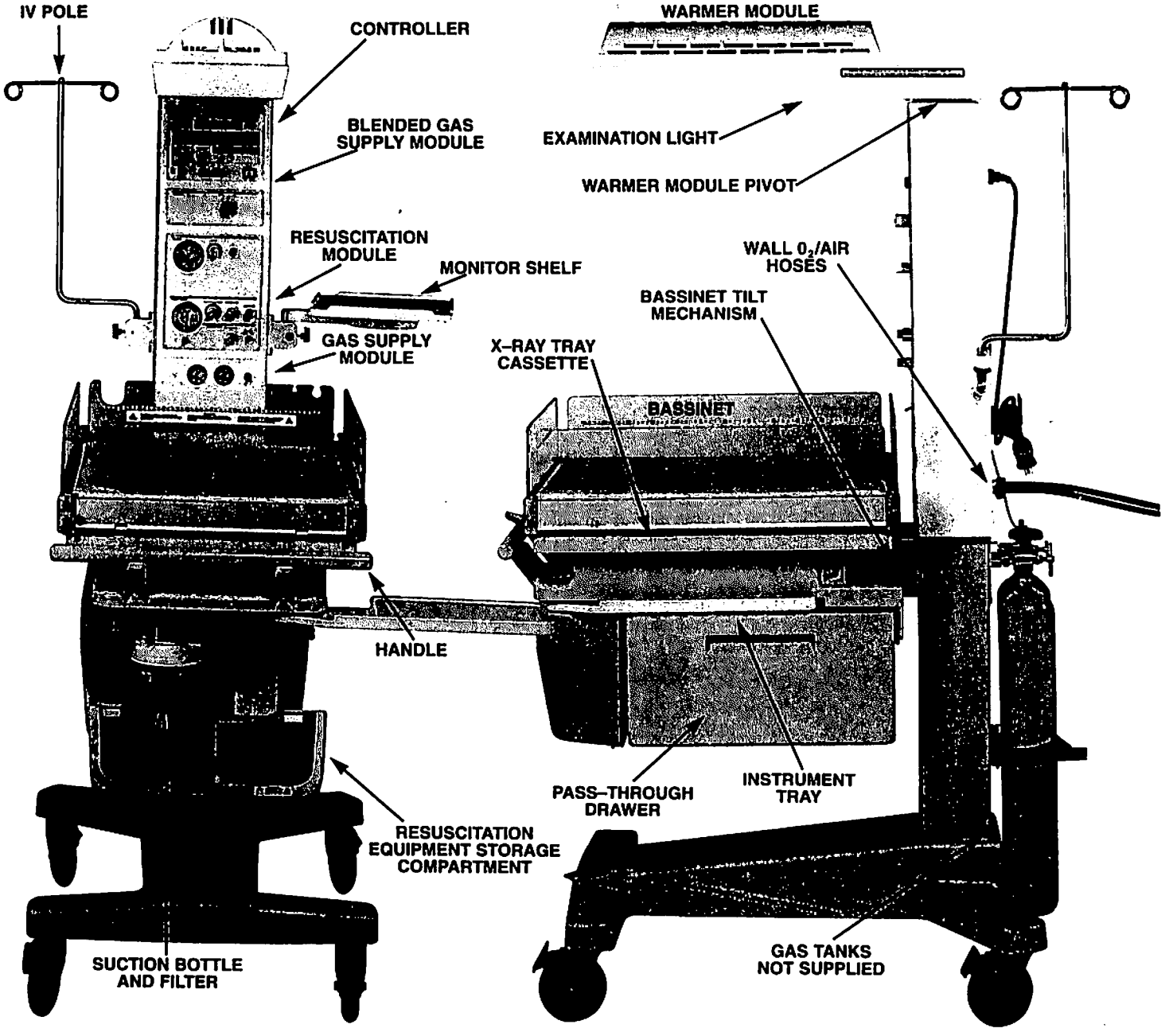


FIGURE 1.1 EQUIPMENT PROVIDED WITH FACTORY INSTALLED OPTIONS AND FIELD INSTALLED ACCESSORIES

SECTION 2
INSTALLATION

2.1 UNPACKING

The ***Resuscitaire® Radiant Warmer*** is shipped in one carton which contains the following assemblies:

- Bassinet/Cart Assembly
- Upper Post Assembly
- Warmer Module Assembly
- Any user installed Accessories that were ordered

When removing the equipment from the carton, use care not to scratch or otherwise damage unprotected surfaces; remove all packing material.

2.2 ASSEMBLY (Refer to Figure 2.1)

NOTE: The required mounting hardware is stored in a bag located in the pass-through drawer.

1. **REMOVE THE BACK COVER** (1) from the Upper Column (2).
2. **REMOVE THE CONTROLLER** (3) from the Upper Column (2).
3. **REST THE UPPER COLUMN** (2) on top of the Bassinet/Cart column opening.
4. **CONNECT THE SUCTION HOSE** (4) to the Suction Hose (11).
5. **REPOSITION AND MOUNT THE UPPER COLUMN** (2) on the Bassinet/Cart using four 10 – 32 x 3/8 inch screws (5).
6. **INSTALL TWO 10 – 32 X 3/8 INCH SCREWS (6) IN THE UPPER HOLES OF THE UPPER COLUMN** (2). Do not tighten the screws.
7. **RAISE THE WARMER** (7) above the open end of the Upper Column (2) and insert the Power Cable (10) into the open end of the column.
8. **SLOWLY LOWER THE WARMER** (7) onto the Upper Column. Align the slots of the warmer over the screws (6) on the column. Install the screws on the pivot bracket. Tighten the screws on the upper holes of the column using a nine-inch Phillips Head screwdriver.
9. **THREAD THE WARMER POWER CABLE** out through the Controller opening. Connect the Power Cable (10) to connector J4 on the Controller (3).
10. **REMOUNT THE CONTROLLER** on the Upper Column. Remount the Back Cover (1) on the Upper Column.
11. ***Resuscitaire® Radiant Warmer***

    CONNECT THE LINE CORD to the **POWER** Connector on the rear of the Controller (refer to Figure 4.2).

11A. ***Resuscitaire® Radiant Warmer with VHA***

    CONNECT THE LINE CORD to the Power Connector (Refer to Figure 4.2A) on the right side of the Lower Post. Connect the 40-inch Power Cord provided with the VHA between the AC connector on the left side of the Lower Post and the Controller Power Connector.

12. ***Resuscitaire® Radiant Warmer***

    SECURE THE LINE CORD to the Back Cover (1) using the Cable Clamp (8) and 8 – 32 x 3/8 screw (9).

12A. ***Resuscitaire® Radiant Warmer with VHA***

    SECURE THE 40-INCH POWER CORD to the Back Cover (1) using the Cable Clamp (8) and 8 – 32 x 3/8 screw (9).

CAUTION: Securing the Line Cord to the back panel is required to prevent removal of the Controller chassis with the ac power applied.

13. **INSTALL ANY ACCESSORIES** that were ordered using the installation instructions provided with the accessory.
14. **INSTALL THE END AND SIDE PANELS** on the Bassinet (refer to Paragraph 5.6 and Figures 5.1, 5.2, 5.3 and 5.4).

PARTS LIST

Screw, 10 – 32 x 3/8 TR, PH Nylok (Qty 10)	99 041 36
Screw, 8 – 32 x 3/8 TR PH SS	99 031 38
Cable Clamp	17 725 64

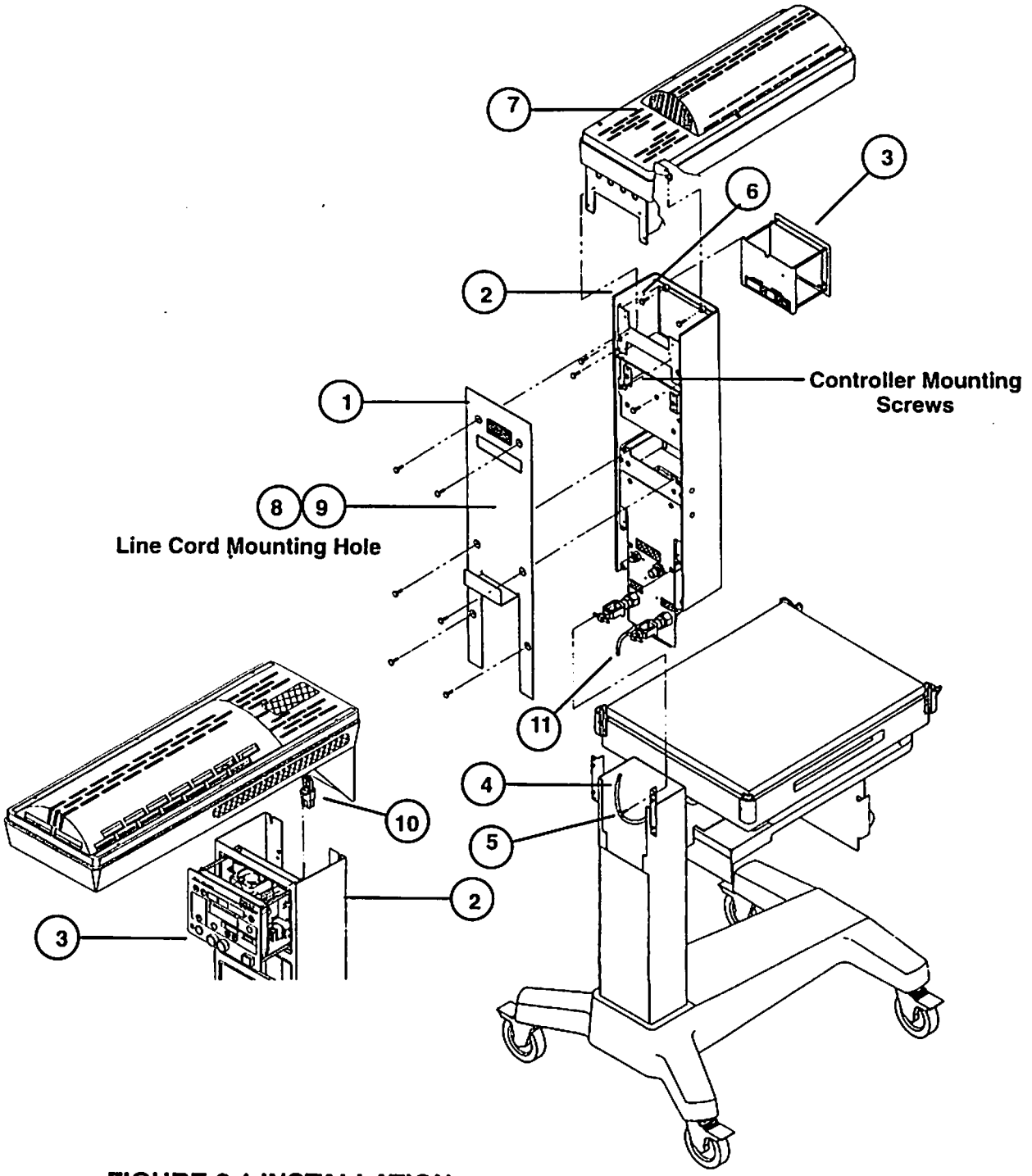


FIGURE 2.1 INSTALLATION

SECTION 3
FUNCTIONAL DESCRIPTION

3.1 GENERAL

This section provides a functional description of the equipment.

3.2 FUNCTIONAL DESCRIPTION

3.2.1 WARMER MODULE

The Warmer is controlled by a Controller which provides **Pre–Warm** Mode, **Manual** Mode heater control, or **Baby** Mode (automatic skin temperature control). An Examination Light provides added illumination of the mattress area. A Warmer Head Pivot permits the Warmer to be pivoted 90° to either side for X–ray procedures. In addition, when the Warmer is pivoted, it continues to provide heat.

3.2.2 BASSINET

The Bassinet is designed to provide maximum function and utility to aid in the care of the newborn. The side and front panels may be folded down to permit access to the infant. The mattress may be tilted up from the rear at a 5– or 10–degree angle. Openings are provided on each side of the Bassinet for the insertion of the optional X–ray Cassette Tray.

3.2.3 CONTROLLER

At power–up, the microprocessor within the Controller performs a series of diagnostic tests to confirm the proper operation of the system. During this time, all displays and indicators are lighted and an audible tone is sounded.

When powered up, the system initializes in **Pre–Warm** Mode, the Controller will start the heater at 100% power and maintain that setting for three minutes, reduce to 60% for 12 minutes and then reduce the heater power to 30%.

When operating the Controller in the **Manual** Mode, the operator can adjust the heater power from 0 to full power in 10% increments. After 10 minutes of operation in the Manual Mode, a **Chk Patient** Alarm occurs.

Failure to acknowledge the Check Patient Alarm within the next 5 minutes will cause the heater to be turned off.

When operated in the **Baby** Mode, the Controller utilizes a Skin Temperature Probe, connected between the Controller input and the infant, to automatically adjust the heater output of the Warmer Module to maintain a digitally displayed preset **Set Temperature**.

The Apgar Timer displays the elapsed time and sounds an audible dual tone to alert the operator that 1, 5, and 10 minutes have elapsed since the timer was activated.

The **Keypad Lock** Key, when pressed, renders the Up/Down Arrows and Select Mode Keys inactive or active.

A Procedural Silence Timer prevents **Baby Temp** audible Alarms during routine procedures.

3.2.4 BLENDER MODULE (Optional)

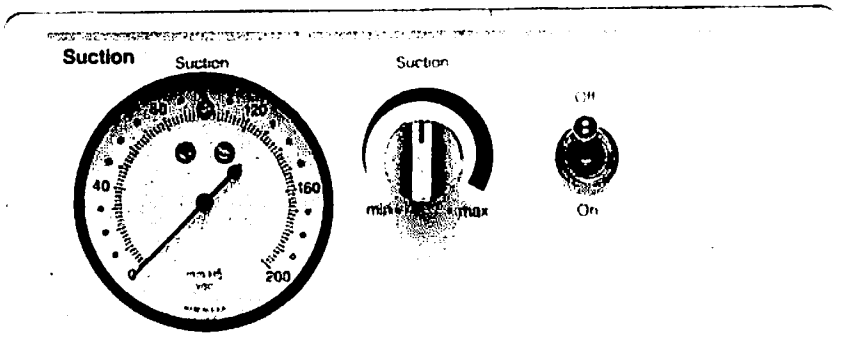
The Blender Module provides blended oxygen from 21% to 100% to the **Patient Outlet** on the Resuscitation Module.

3.2.5 RESUSCITATION MODULE (Optional)

The Resuscitation Module contains pneumatic circuitry necessary for infant resuscitation. Controls and displays for the module are located above the rear of the Bassinet.

The Resuscitation Module is provided with AutoBreath or without AutoBreath and consists of the following factory installed components:

- **Suction** – The **Suction** Circuit is driven by a gas powered venturi actuated vacuum generator which provides a negative pressure for suctioning the patient's airway. The suction pressure is indicated on the **Suction** Gauge (Figure 3.1). Suction may be adjusted using the **Suction** Control and turned on or off using the **On/Off** Switch. A fixed internal relief valve limits the maximum suction pressure to 150 mmHg.



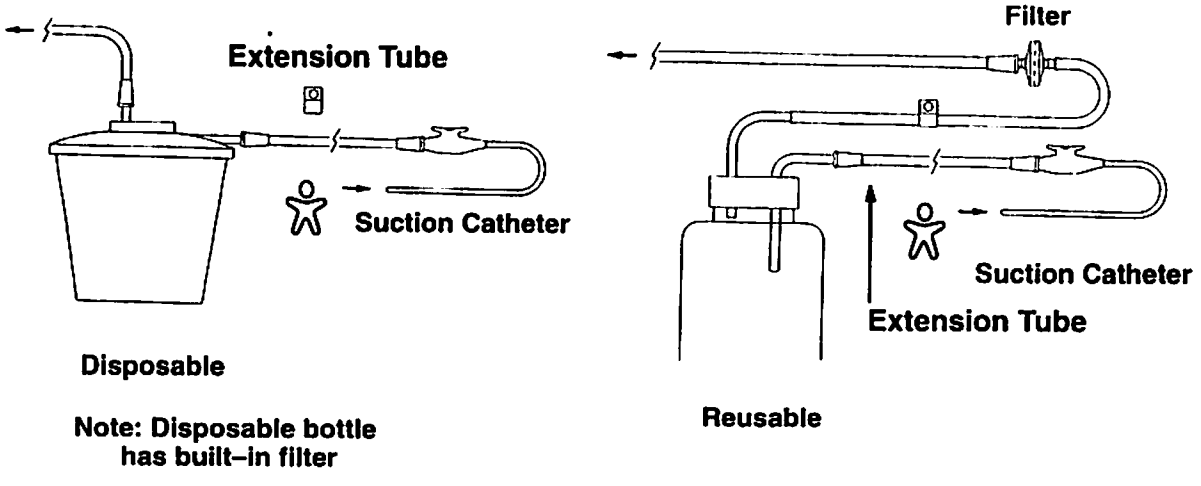


FIGURE 3.1 SUCTION FUNCTIONAL BLOCK DIAGRAM

RESUSCITATION MODULE WITH AUTO-BREATH (FACTORY INSTALLED OPTION)

- **AutoBreath**

The **AutoBreath** Circuit is a gas–powered, time–cycled, continuous flow, pressure limited resuscitator. It has a **Rate (BPM)** Control and a fixed I/E ratio of 1:2 nominal. An **On/Off** Switch allows the timing circuit to be turned on and off as needed. A **PEEP** Control adjusts the Positive End Expiratory Pressure in the patient circuit. The resuscitator is utilized in conjunction with the continuous gas flow provided by the **Patient Supply** sub–module.

WARNING: An airway pressure monitor should be used if the AutoBreath Infant Resuscitator is to be used unattended.

- **Patient Gas Supply**

The **Patient Gas Supply** Circuit may be used with the **AutoBreath** Infant Resuscitator on or off to provide continuous gas flow to the patient. Controls are provided for **Airway Pressure Relief** (maximum pressure) and **Flow Rate (LPM)** (circuit flow delivering 100% oxygen or blended gas). The adjustable **Airway Pressure Relief** Control is always operative.

A fixed internal safety relief valve is also provided and is also always operable. This valve provides redundant maximum pressure relief at 60 ± 10 cm H_2O (5.9 ± 1 kPa) and also allows the patient to inspire room air in the event of gas supply failure.

WARNING: Breathing room air through the 2–way relief valve requires extra effort. This condition, if it occurs, should be rectified as soon as possible.

- **Aux Outlet**

The **Aux Outlet** circuit supplies 100% oxygen through the **Aux Flow (LPM)** Control to the **Aux Outlet** Connector. It is intended for oxygen enrichment of a manual bag resuscitator, for supplemental delivery to the patient, the mother, or a second neonate, *i/e.*, twins. The **Aux Flow LPM** Control adjusts the flow rate from 0 to 15 lpm. An internal pre–set relief valve limits the **AUX Outlet** pressure to 160 cm H_2O (16 kPa).

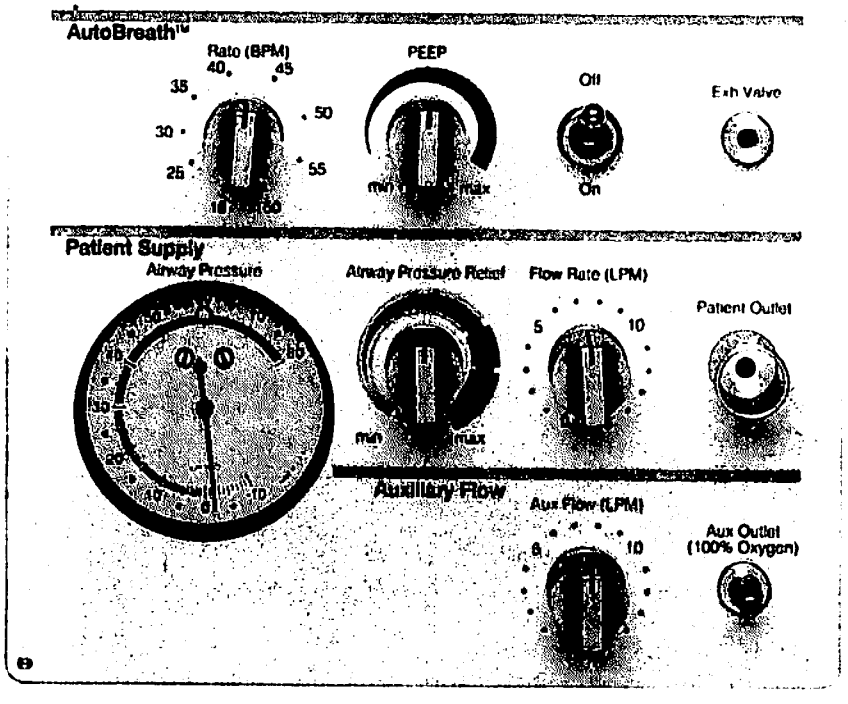


FIGURE 3.2 RESUSCITATION MODULE WITH AUTOBREATH, PATIENT GAS SUPPLY AND AUXILIARY FLOW

- **Patient Breathing Circuits**

The patient breathing circuit used in conjunction with the AutoBreath Infant Resuscitator is illustrated in Figure 3.3. In addition, a patient supply circuit for Manual Bagging (Figure 3.4) may also be used.

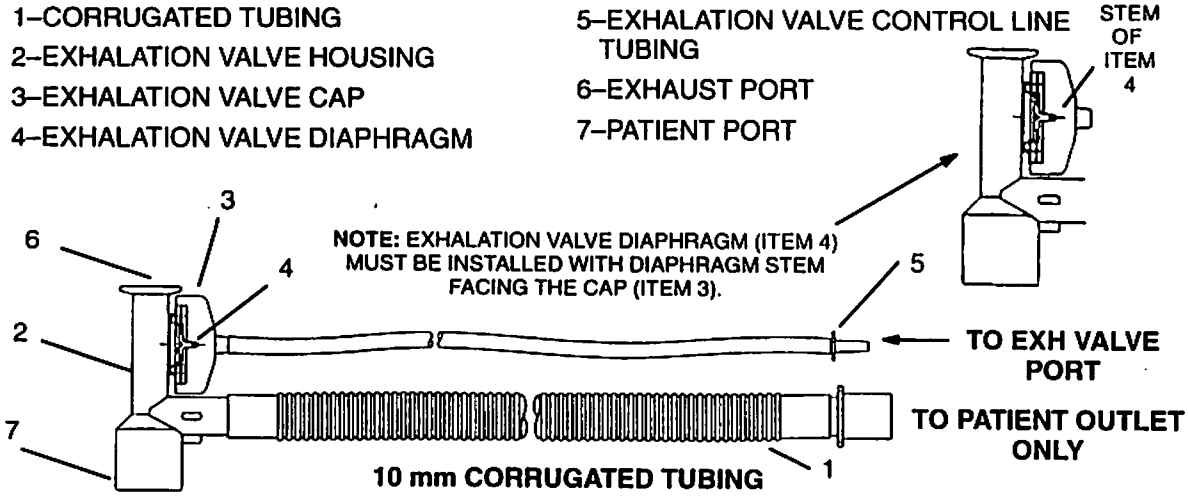


FIGURE 3.3 PATIENT BREATHING CIRCUIT FOR AUTOMATIC VENTILATION

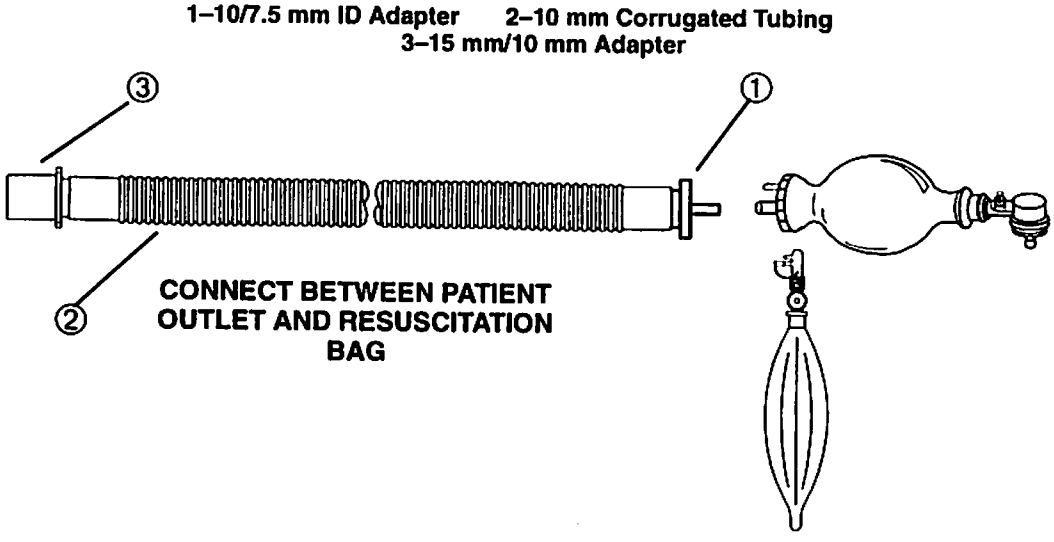


FIGURE 3.4 PATIENT BREATHING CIRCUIT FOR MANUAL BAGGING

RESUSCITATION MODULE WITHOUT AUTOBREATH (FACTORY INSTALLED OPTION)

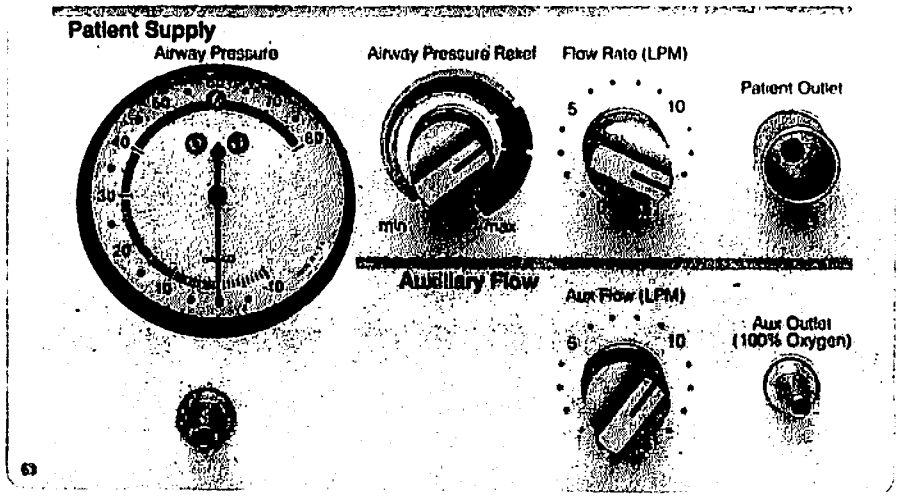


FIGURE 3.5 RESUSCITATION MODULE WITH PATIENT GAS SUPPLY AND AUXILIARY FLOW ONLY

- **Patient Gas Supply –**

The **Patient Gas Supply** Circuit may be used to provide continuous gas flow to the patient. Controls are provided for **Airway Pressure Relief** (maximum pressure) and **Flow Rate (LPM)** (circuit flow delivering 100% oxygen or blended gas). The adjustable **Airway Pressure Relief** Control is always operative.

A fixed internal safety relief valve is also provided and is also always operable. This valve provides redundant maximum pressure relief at 60 ± 10 cm H_2O (5.9 ± 1 kPa) and also allows the patient to inspire room air in the event of gas supply failure.

WARNING: Breathing room air through the 2–way relief valve requires extra effort. This condition, if it occurs, should be rectified as soon as possible.

- **Aux Outlet**

The **Aux Outlet** circuit supplies 100% oxygen through the **Aux Flow (LPM)** Control to the **Aux Outlet** Connector. It is intended for oxygen enrichment of a manual bag resuscitator, for supplemental delivery to the patient, the mother, or a second neonate, i.e., twins. The **Aux Flow LPM** Control adjusts the flow rate from 0 to 15 lpm. An internal pre–set relief valve limits the **AUX Outlet** pressure to 160 cm H_2O (16 ± 1 kPa).

- **Airway Pressure**

The Airway Pressure Gauge monitors airway pressure when connected to patient circuits via external connection.

- **Patient Breathing and Supply Circuits**

The patient breathing circuit used in conjunction with the Resuscitation Module without AutoBreath is illustrated in Figure 3.6. In addition, a patient supply circuit for Manual Bagging (Figure 3.4) may also be used.

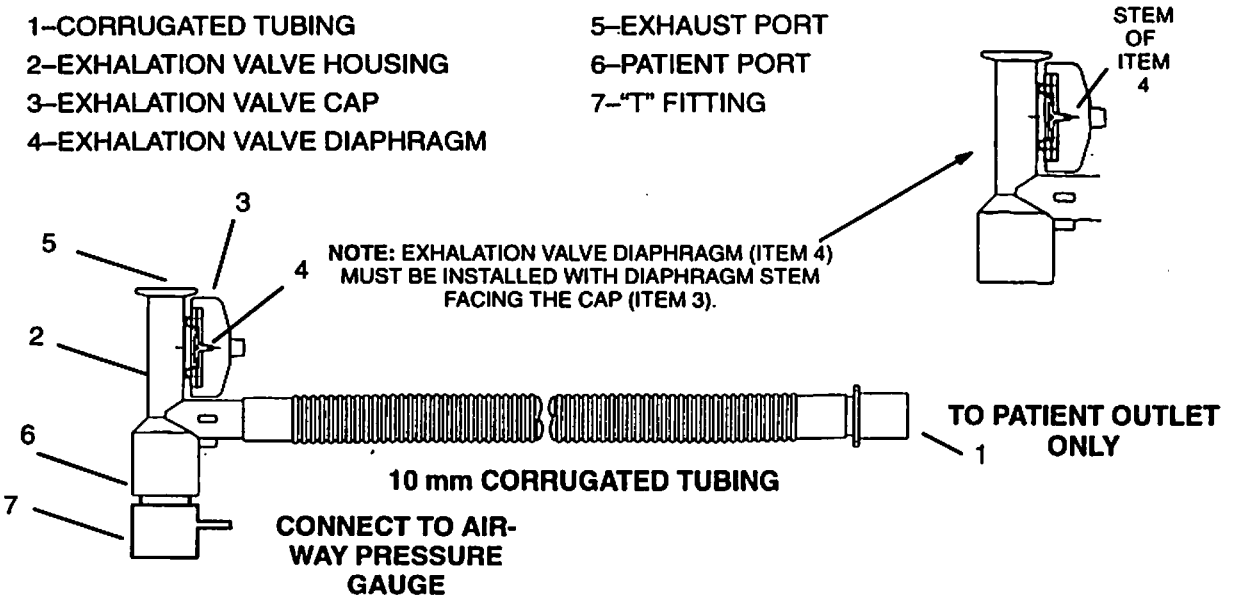


FIGURE 3.6 PATIENT BREATHING CIRCUIT FOR MANUAL VENTILATION

3.2.6 GAS SUPPLY MODULE

The **Gas Supply** Module includes an On/Off Switch which controls the pipeline and cylinder gas supply to the Resuscitation Module. An oxygen cylinder Pressure Gauge is provided if the oxygen cylinder option is included. Oxygen and Air Pressure Gauges are provided on units equipped with the Blender Module.

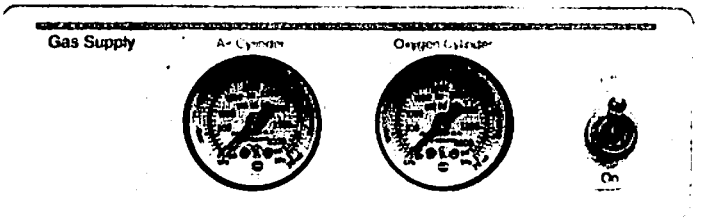


FIGURE 3.7 GAS SUPPLY MODULE

3.2.7 ALARMS

HIGH TEMPERATURE. When the Skin Temperature Probe is attached to the infant and the skin temperature exceeds 39.0 °C, the heater is automatically turned off, the **High Temp** Indicator will flash and the audible alarm will sound continuously. Press the **Silence/Reset** Key to silence the alarm for two minutes. After the alarm condition is corrected (a skin temperature of 38.5 °C or less), the alarm will automatically reset.

CHECK PATIENT. When in the **Manual** Mode the **Chk Patient** Indicator will illuminate and the alarm will sound one time after 10 minutes of operation. Thereafter, the **Chk Patient** Indicator will remain illuminated and the audible alarm will sound every 30 seconds for 5 minutes. If the alarm has not been acknowledged at the end of 5 minutes, the heater will shut down and a continuous ramping audible alarm will sound. The **Silence/Reset** Key then must be pressed to reactivate the heater.

PROBE. If the Skin Temperature Probe fails (short– or open circuited), the **Probe** Indicator will flash and a ramping audible alarm will sound. After the alarm condition is corrected (the Probe is replaced), the alarm will automatically reset.

BABY TEMPERATURE. When the temperature sensed by the Skin Temperature Probe is 1 °C above or 1°C below the selected **Set Temperature** Display setting, the **Baby Temp** Indicator will flash and a ramping audible alarm will sound. In addition, if the temperature is 0.2 °C above the selected **Set Temperature,** the heater will be turned off automatically. Press **Silence/Reset** to silence the alarm for 10 minutes.

POWER FAIL. When power to the unit is interrupted while the Controller is on, the **Power Fail** Indicator will flash and the audible alarm will beep. When power is restored to the unit, the alarm will automatically reset. The alarm may be silenced by turning off the power switch.

IMPORTANT: *Turning off the Power switch will prevent the Controller and Heater from restarting automatically when power is returned to the unit. The settings will be retained in memory until power is restored.*

SYSTEM FAIL. If an internal malfunction is detected, the **System Fail** Indicator will flash and the audible alarm will beep. In addition, an Error Code (eR00 to eR025) will be displayed in the **Baby Temperature** Display. This alarm is not resettable and the unit should be referred to qualified service personnel. A prolonged brown–out (five minutes or more with supply voltage leas than 90% of nominal) will also cause a System Fail alarm.

3.2.8 APGAR TIMER

When the **Apgar Timer** is running, the Apgar Timer Display will show elapsed minutes and seconds and the audible alarm will sound at the 1–, 5– and 10–minute Apgar time intervals.

SECTION 4
OPERATION

4.1 CONTROLS, INDICATORS AND CONNECTORS

Controls, Indicators and Connectors for the Controller are presented in Figures 4.1 and 4.2 and Tables 4.1 and 4.2. Controls, Indicators and Connectors for the Resuscitation Module are presented in Figure 4.3 and Table 4.3.

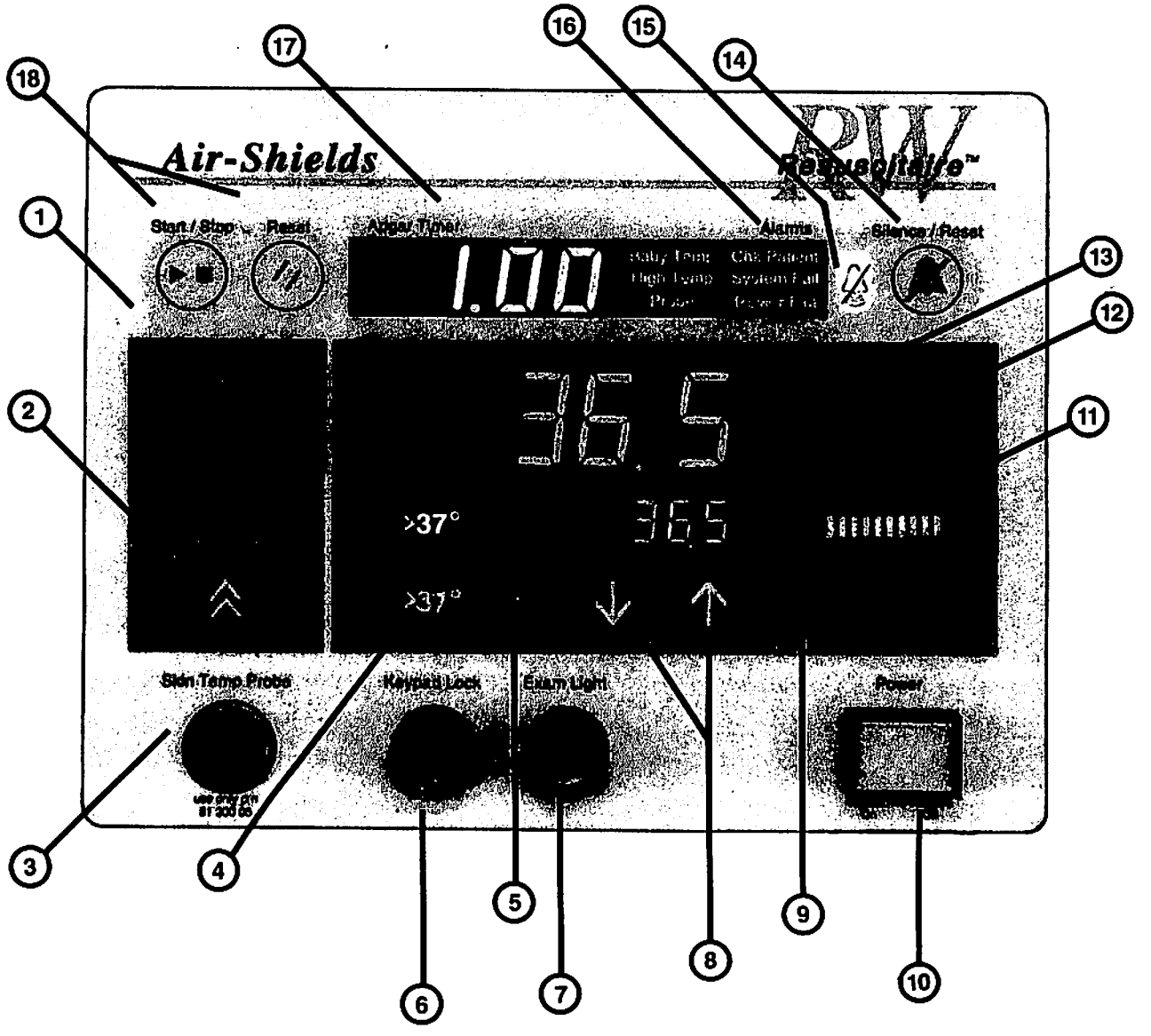


FIGURE 4.1 CONTROLLER FRONT PANEL: CONTROLS, INDICATORS AND CONNECTORS

TABLE 4.1 CONTROLLER FRONT PANEL: CONTROLS, INDICATORS AND CONNECTORS

ITEM	NAME	DESCRIPTION
1	**Mode**	
	Pre–Warm Indicator	Indicates that the Controller is operating in the **Pre–Warm Mode.**
	Manual Indicator	Indicates that the Controller is operating in the **Manual Mode.**
	Baby Indicator	Indicates that the Controller is operating in the **Baby Mode.**
2	**Mode** Select Key 	Press to select either **Pre–Warm, Manual** or **Baby Mode** of operation.
3	**Skin Temp Probe** Connector	Accepts Skin Temperature Probe for monitoring infant skin temperature. When connected, the **Baby Temperature** Display indicates the temperature sensed by the probe. When probe is disconnected, the **Baby Temperature** Display is blank. When disconnected in **Baby** Mode, a **Probe** Alarm also occurs.
4	>37 °C Key 	Press to place **Set Temperature** Display (refer to Item 9) in Temperature Override Mode, >37 °C (98.6 °F). ***NOTE:*** *This Key is inactive until the* ***Set Temperature*** *has been set to 37 °C.*
5	>37 °C Indicator	Lights to indicate that the Temperature Override Mode, >37 °C (98.6 °F), has been selected.
6	**Keypad Lock** Key 	Press to disable the **>37 °C**, Up/Down Arrow and **Mode** Select Keys (refer to Items 2, 4 and 8). Press again to enable the **>37 °C**, Up/Down Arrow and **Mode** Select Keys. Key lights to indicate that Keypad is locked.
7	**Exam Light** Key 	Press to turn on or turn off the Examination Light located in the Warmer Module.
8		**Manual Mode** Press the Up Arrow Key to raise heater power from 0% to 100% in 10% increments (refer to Item 11, **Heater Power** Display). Press the Down Arrow Key to lower relative heater power from 100% to 0% in 10% increments (refer to Item 11, **Heater Power** Display).

TABLE 4.1 CONTROLLER FRONT PANEL: CONTROLS, INDICATORS AND CONNECTORS (cont.)

ITEM	NAME	DESCRIPTION
8		**Baby Mode** Press the Up Arrow Key to raise the Set Temperature from 34.0 °C (93 °F) to 37.0 °C (98.6 °F). In the Temperature Override Mode (refer to Items 4 and 5), press to raise the Set Temperature from 37.0 °C (98.6 °F) to 38.0 °C (102.2 °F). Press one time to raise the Set Temperature in 0.1° increments. Press and hold to raise the Set Temperature rapidly. Press the Down Arrow Key to lower the Set Temperature from 37.0 °C (98.6 °F) to 34.0 °C (93 °F). In the Temperature Override Mode (refer to Items 4 and 5), press to lower the Set Temperature from 38.0 °C (102.2 °F) to 34.0 °C (93 °F). Press one time to lower the Set Temperature in 0.1° increments. Press and hold to lower the Set Temperature rapidly. ***NOTE:*** *The Up/Down Arrow Keys may be locked by pressing the Keypad Lock Key (refer to Item 6).*
9	**Set Temperature** Display	In **Baby Mode,** displays the **Set Temperature** as selected by the Up/Down Arrow Keys (refer to Item 8) and in °C or °F as selected by the **°C/°F** Key (refer to Item 12). Display is blank in **Pre–Warm** and **Manual** Modes.
10	**Power** Key 	Press to turn on or turn off the Controller and Warmer Module.
11	**Heater Power** Display	Displays relative heater power in 10% increments from 0% to 100%.
12		Press to alternately select °C or °F for the **Baby Temperature** and **Set Temperature** Displays.
13	**Baby Temperature** Display	Digital display of infant temperature in °C or °F (refer to Item 12), whether in **Manual, Pre–Warm** or **Baby Mode.** The display is blank if the Skin Temperature Probe (refer to Item 3) is disconnected from the Controller.

TABLE 4.1 CONTROLLER FRONT PANEL: CONTROLS, INDICATORS AND CONNECTORS (cont.)

ITEM	NAME	DESCRIPTION
14	**Silence/Reset** Key 	In **Manual Mode** Press to silence the **High Temp** Alarm (refer to Item 16) for 2 minutes. Resets **Chk Patient** (refer to Item 16), restores heater power and silences Audible Alarm at any time after 10 minutes of warmer operation. Resets **Chk Patient** (refer to Item 16), silences Audible Alarm and restores heater power after15-minutes of continuous operation is complete. In **Baby Mode** Press to silence the **High Temp** Alarm (refer to Item 16) for 2 minutes. Press to silence **Baby Temp** (refer to Item 16) Alarm for 10 minutes. During non-alarm conditions, press to enter Procedural Silence (refer to Item 15).
15	**Procedural Silence** Indicator 	When illuminated, indicates that the unit is in Procedural Silence. Procedural silence interval is 5 minutes. During Procedural Silence, the **Baby Temp** Alarms are blocked.
16	**Alarms** **Baby Temp**	The **Baby Temp** Indicator will flash with a three-level audible alarm to indicate that the baby's skin temperature is 1 °C above or below the selected Set Temperature (refer to Item 9). Press **Silence/Reset** Key to silence alarm for 10 minutes.
	High Temp	The **High Temp** Indicator will flash, the audible alarm will sound continuously, and the heater will be turned off when the Skin Temperature Probe is attached to the infant and the skin temperature exceeds 39.0 °C. High Temp (39.0 °C) Alarms can only be silenced for two minutes by the Silence/Reset Key. Press the **Silence/Reset** Key to silence the audible alarm for 2 minutes. When the temperature falls to 38.5 °C, the alarm will automatically reset.
	Probe	When in **Baby Mode**, if the Skin Temperature Probe fails (open probe), the **Probe** Indicator will flash and a three-level audible alarm will sound. After the Alarm condition is corrected (the Skin Temperature Probe is replaced), the alarm will automatically reset. Also refer to Table 5.1. When in **Baby Mode**, if the Skin Temperature Probe fails (shorted probe), the **System Fail** Indicator will light and an audible alarm will sound. This Alarm cannot be Silenced. The **Power MUST BE TURNED OFF then ON** to Reset the Alarm condition.

TABLE 4.1 CONTROLLER FRONT PANEL: CONTROLS INDICATORS AND CONNECTORS (cont.)

ITEM	NAME	DESCRIPTION
16	**Alarms (Cont.)**	
	Chk Patient	When in the **Manual** Mode, if the warmer is in operation for longer than 10 minutes, the **Chk Patient** Indicator will illuminate and the audible alarm will sound one time. Thereafter, the **Chk Patient** Indicator will remain on and the audible alarm will sound every 30 seconds for the next 5 minutes. If at the end of 5 minutes (15 minutes total) the alarm has not been acknowledged by pressing the **Silence/Reset** Key (refer to Item 14), the warmer will be shut down.
	System Fail	When an internal malfunction is detected, the **System Fail** Indicator will illuminate and the audible alarm will sound continuously. In addition, an Error Code (eR00 to eR025) will be displayed in the **Baby Temperature** Display. When a malfunction is detected, the Controller will automatically perform the self–test function (refer to para. 4.2 Step 3) to determine if the fault has corrected itself. If the fault has not corrected itself, the error code will be displayed until corrected. This alarm is not resettable and the unit should be referred to qualified service personnel. ***NOTE:*** *Error codes 018 and 023 may be corrected by the Operator, refer to Table 5.1.*
	Power Fail	When power to the unit is interrupted while the Controller is on, the **Power Fail** Indicator will flash and the audible alarm will beep. When power is restored to the unit, the alarm will automatically reset. Push the **Power** Key to silence the Alarm.
17	**Apgar Timer**	When the **Apgar Timer** (refer to Item 18) is running, the Apgar Timer displays elapsed minutes and seconds and the audible alarm will sound at the 1–, 5– and 10–minute Apgar Time intervals.
18	**Stop/Start** 	Press to start or stop the **Apgar Timer.**
	Reset 	When timer is running, press to reset the timer to zero and restart the Apgar count. When timer is stopped, press to turn timer off. ***NOTE:*** *The Timer can be reset any time.*

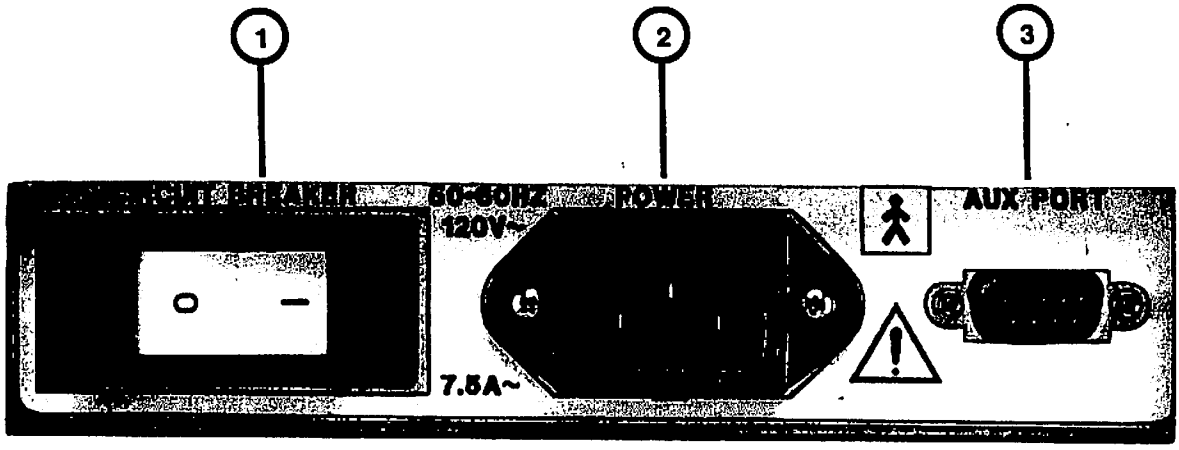


FIGURE 4.2 CONTROLLER REAR PANEL: CONTROLS AND CONNECTORS

TABLE 4.2 CONTROLLER REAR PANEL: CONTROLS AND CONNECTORS

ITEM	NAME	DESCRIPTION
1	CIRCUIT BREAKER	Turns Controller on and off when switched by operator or the presence of excessive current drain is detected.
2	POWER	Accepts ac power cord. Accepts 40–inch power cord on VHA units
3	AUX PORT	Data port for connection to printer or host system.

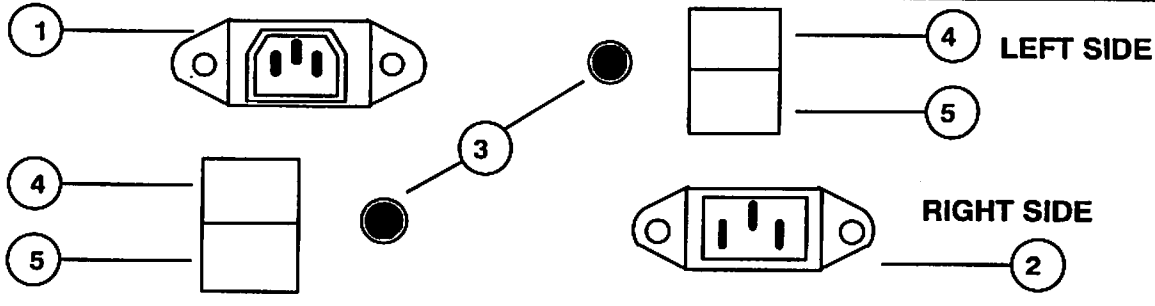


FIGURE 4.2A RESUSCITAIRE® RADIANT WARMER WITH VHA CONTROLS AND CONNECTORS LOCATED ON BOTH SIDES OF LOWER POST

TABLE 4.2A RESUSCITAIRE® RADIANT WARMER WITH VHA CONTROLS AND CONNECTORS

ITEM	NAME	DESCRIPTION
1	POWER OUT	Accepts 40–inch ac power cord.
2	POWER IN	Accepts ac power cord.
3	CIRCUIT BREAKER	Turns Actuator off when presence of excessive current drain is detected. Press to reset.
4	UP SWITCH	Press to raise Upper Post
5	DOWN SWITCH	Press to lower Upper Post

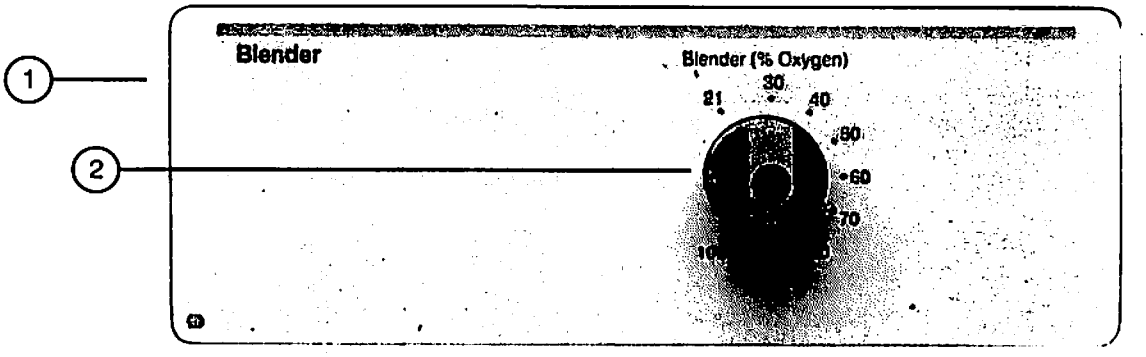
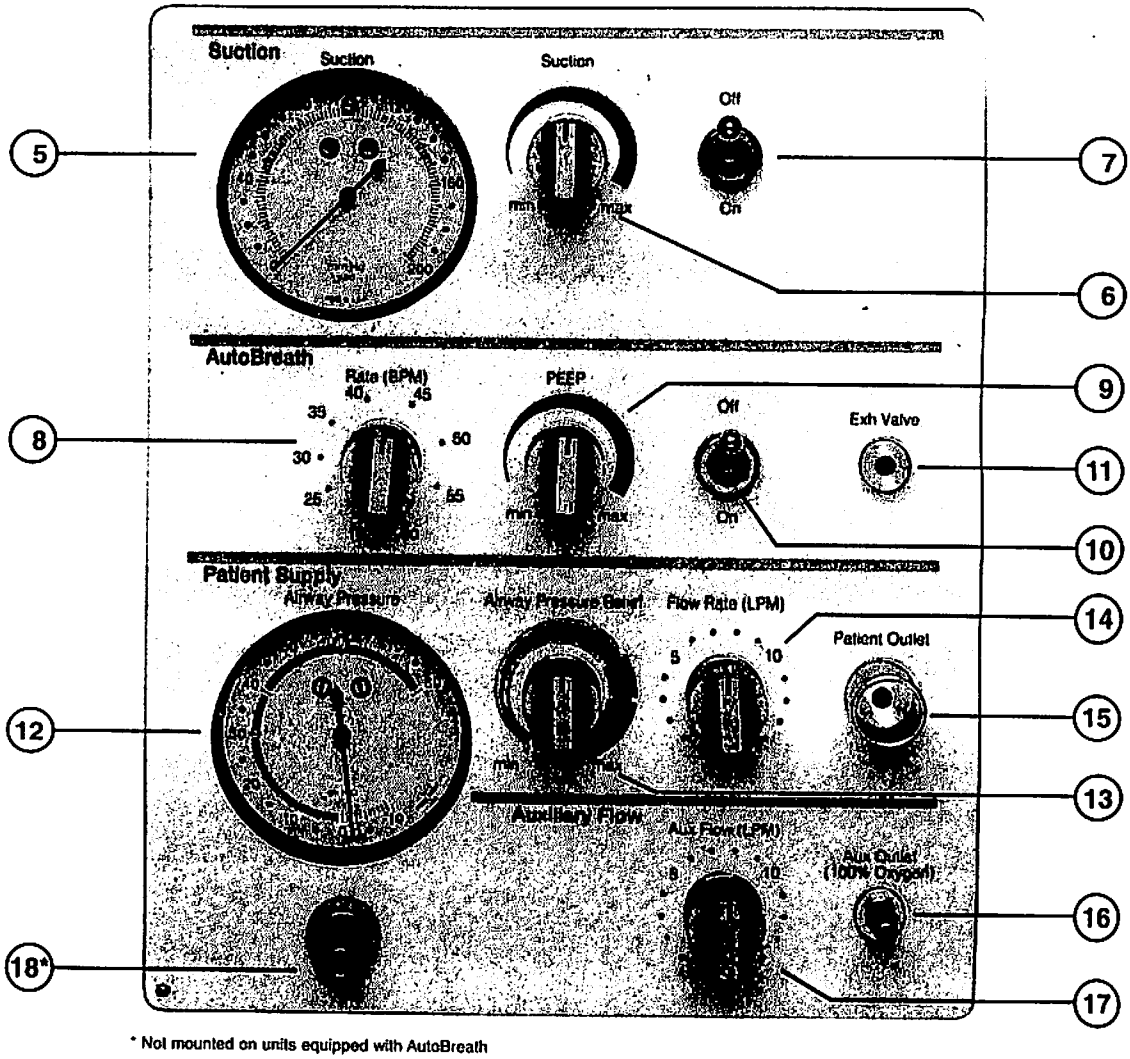


FIGURE 4.3A BLENDED GAS SUPPLY MODULE CONTROL

TABLE 4.3A BLENDED GAS SUPPLY MODULE CONTROL

ITEM	NAME	DESCRIPTION
1	**Blended Gas Supply Module (Optional)**	
2	**Blender % Oxygen** Control	Blends air and oxygen mixture from 21 to 100% O_2.



* Not mounted on units equipped with AutoBreath

FIGURE 4.3B RESUSCITATION MODULE: CONTROLS, INDICATORS AND CONNECTORS

TABLE 4.3B RESUSCITATION MODULE: CONTROLS, INDICATORS AND CONNECTORS

ITEM	NAME	DESCRIPTION
	Suction	
5	**Suction** Gauge	Displays suction level from 0 to 200 mmHg of vacuum.
6	**Suction Min Max** Control	Adjusts suction level from 0 to 150 mmHg of vacuum.
7	**On/Off** Switch	Turns **Suction** on and off.
	AutoBreath	
8	**Rate (BPM)** Control	Adjusts breath frequency from 18 to 60 breaths per minute.
9	**PEEP min max** Control	Adjusts positive end expiratory pressure from 0 to 18 cm H_2O.
10	**On/Off** Switch	Turns **AutoBreath** Infant Resuscitator on and off (including **PEEP**).
11	**Exh Valve**	Accepts exhaust valve line of patient circuit for expiratory valve control.
	Patient Supply	
12	**Airway Pressure** Gauge	Displays airway pressure from –10 to + 80 cm H_2O.
13	**Airway Pressure Relief Min Max** Control	Adjusts airway pressure relief setting from 0 to 50 cm H_2O.
14	**Flow Rate (LPM)** Control	Adjusts patient gas flow from 0 to 15 LPM. Delivers blended gas if blender option is incorporated.
15	**Patient Outlet** Connector	Accepts breathing circuit.
	Auxiliary Flow	
16	**Aux Outlet 100% Oxygen** Connector	Accepts auxiliary gas delivery line.
17	**Aux Flow (LPM)** Control	Adjusts auxiliary patient gas flow from 0 to 15 LPM.
18	**Airway Pressure Port**	Connects Airway Pressure Gauge to Patient Circuit. Not Mounted on Units equipped with AutoBreath.

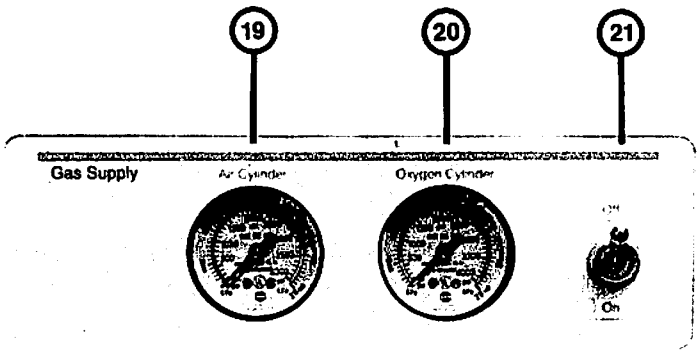


FIGURE 4.3C GAS SUPPLY MODULE: CONTROLS AND INDICATORS

TABLE 4.3C GAS SUPPLY MODULE: CONTROLS AND INDICATORS

ITEM	NAME	DESCRIPTION
	<u>Supply Pressure (Optional)</u>	
19	**Air Cylinder** Gauge	Provides indication of air cylinder supply pressure 0 to 4000 psi (275.8 bar).
20	**Oxygen Cylinder** Gauge	Provides indication of oxygen cylinder supply pressure 0 to 4000 psi (275.8 bar).
21	**Gas Supply On/Off** Switch	Turns gas supply to pneumatic system on and off.

4.2 OPERATIONAL CHECKOUT PROCEDURE – CONTROLLER

WARNING: The Warmer should not be used if the Controller fails to function as described below. Service should be referred to qualified personnel.

CAUTION: **HEAVY EQUIPMENT: To prevent injury or damage to the Warmer, two persons of sufficient strength are recommended to adequately control the Warmer during transport.**

IMPORTANT: Before attempting to perform this procedure, refer to Paragraph 4.1, Controls, Indicators and Connectors.

NOTE: The Operational checkout procedure described below should be performed before the equipment is first put into service, then at least weekly.

1. **CONNECT THE AC LINE CORD TO THE POWER CONNECTOR** on the Controller Rear Panel.

WARNING: Connect the power cord only to a properly grounded wall receptacle that is approved for hospital use and of the correct voltage. DO NOT use extension cords or an ac Receptacle Box for this device.

2. **CHECK THE POWER FAILURE ALARM.** Turn off the **CIRCUIT BREAKER** on the Rear Panel. Turn on the **Power** Switch on the Front Panel. The **Power Fail** Indicator should come on and the Audible alarm should sound. Turn off the **Power** Switch and turn on the **CIRCUIT BREAKER.**

*NOTE: The unit must be connected to the ac line for at least eight minutes before the **Power Fail** circuitry becomes active.*

3. **CHECK THE SELF–TEST FUNCTION.** Turn on the **Power** Switch, the Self–Test Function should be initiated and the following should occur:
   - **Apgar Timer, Baby Temperature** and **Set Temperature** Digital Displays show all eights
   - All **Alarms** Indicators light (except **Power Fail**)
   - All **Mode** Indicators light
   - The **> 37 °C** Indicator lights
   - All ten segments of the **Heater Power** Indicator light
   - The Procedural Silence Indicator lights
   - The **Keypad Lock** Switch lights
   - The audible alarm will sound a high pitch tone, a low pitch tone, then a beep–beep–beep

   When the Self–Test Function is complete, the Controller should begin operating in the **Pre–Warm Mode.**

4. **CHECK THE PRE–WARM MODE.** The **Pre–Warm** Indicator should be on and the **Heater Power** Indicator should display 10 segments (100%) for three minutes, reduce to 6 segments (60%) for 12 minutes, then reduce to 3 segments (30%).

5. **CHECK THE MANUAL MODE.** Select **Manual Mode** by pressing the **Mode** Select Key. The **Manual** Indicator should light.

   Press the Up Arrow Key until all the **Heater Power** Display segments are lit. Press the Down Arrow key until all the **Heater Power** Indicators are off. Connect the skin temperature probe to the **Skin Temp Probe** Connector, the **Baby Temperature** Display should come on.

   Set the **Heater Power** Indicator to 100%, all segments are lit. Wait 10 minutes. After 10 minutes have elapsed, the **Chk Patient** Indicator should come on and the audible alarm should sound one time. Wait an additional 5 minutes. During this time, the audible alarm should sound at 30–second intervals. At the end of 5 minutes (15 total), the heater should shut down, the **Heater Power** Indicators should go off and the audible alarm should sound continuously and ramp up in volume. Press the **Silence/Reset** Key, the **Chk Patient** Indicator and audible alarm should go off, the heater power should return and all ten **Heater Power** Indicators should illuminate.

6. **CHECK THE KEYPAD LOCK.** Press the **Keypad Lock** Switch. The **Keypad Lock** Switch should light up. The **Mode** Key and the Up/

Down Arrow Keys Key should be inoperative. Press the Keypad Lock Switch. The **Keypad Lock** Switch Light should go off and the Keypad should be enabled.

7. **CHECK THE BABY MODE.** Select **Baby Mode** by pressing the Mode Select Key. The **Baby** Indicator should light and the **Set Temperature** Display should activate. In addition, the **Baby Temp** Indicator should flash and the audible alarm should sound (if the temperature and set point are more than 1° C apart) Press the **Silence/Reset** Key, the audible alarm should go off, the **Baby Temp** Indicator should become steady on.

8. **CHECK TEMPERATURE OVERRIDE MODE.** Press the Up Arrow Key to raise the **Set Temperature** to 37.0 °C. Press the **>37 °C** Key, the **>37 °C** Indicator should come on. Press the Up Arrow Key to raise the **Set Temperature** to 38.0 °C.

   Press the Down Arrow Key to lower the **Set Temperature** to below 37.0 °C. When the **Set Temperature** falls below 37.0 °C, the **>37 °C** Indicator should go off.

9. **CHECK THE PROBE ALARM.** Disconnect the skin temperature probe from the **Skin Temp Probe** Connector. The **Baby Temperature** Display should go off, the **Probe** Indicator should flash and the audible alarm should sound. Replace the probe.

10. **CHECK THE APGAR TIMER.** Press the **Start /Stop** Key, the **Apgar Timer** Display should come on and begin to count up from zero seconds. Press the **Start/Stop** Key, the **Apgar Timer** count should stop. Press the **Reset** Key, the **Apgar Timer** Display should go off.

11. **CHECK THE EXAMINATION LIGHT.** Press the **Exam Light** Switch. The Examination Light should come on. Press the Exam Light Switch, the Examination Light should go off.

4.3 MECHANICAL CHECKOUT

1. **CHECK THE MATTRESS TILT CONTROL** (Figure 4.4) by pulling up on the lever located at the bottom rear of the Bassinet while supporting the rear lower edge of the Bassinet with the palm. Place the Bassinet in the 5–degree and then the 10–degree tilt position. Return the Bassinet to the level position.

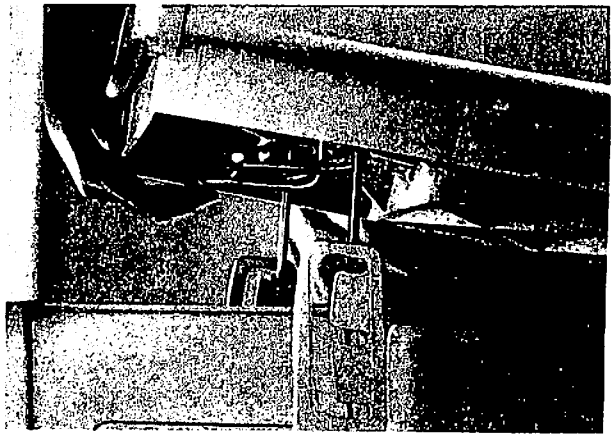


FIGURE 4.4 BASSINET TILT CONTROL

2. **CHECK THE BASSINET SIDE PANELS** (Figure 4.5) by raising each panel and pivoting it to hang straight down. Return the panel by reversing the procedure. Check that the panel is positively engaged to confine the infant.

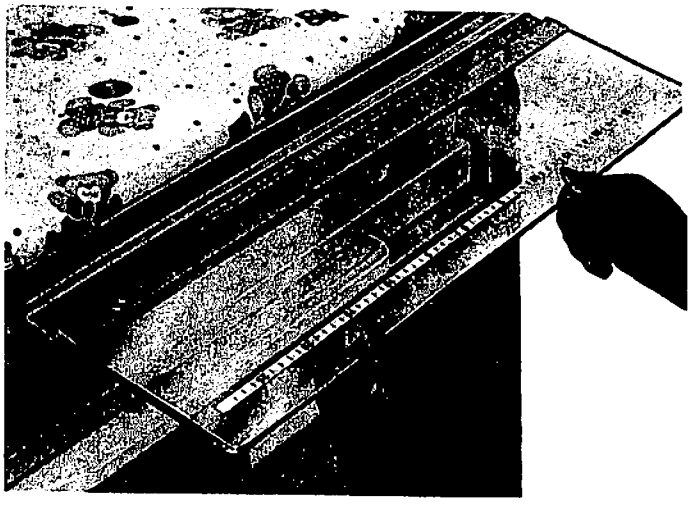


FIGURE 4.5 CHECKING THE BASSINET SIDE PANELS

3. **CHECK THE BASSINET FRONT PANEL** (Figures 4.6 and 4.7) by raising the panel and and sliding it under the mattress. Return the panel by reversing the procedure. Check that the panel is positively engaged to confine the infant.

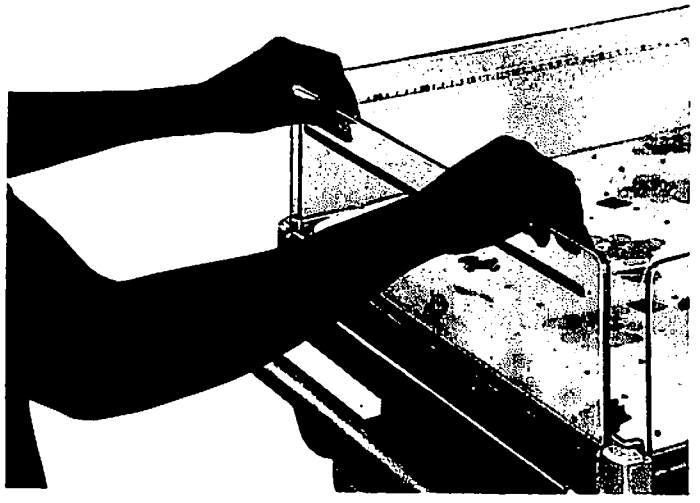


FIGURE 4.6 CHECKING THE BASSINET FRONT PANEL

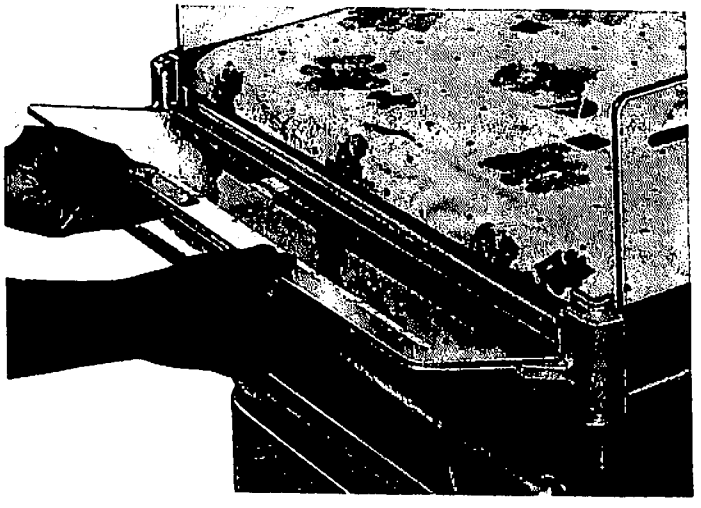


FIGURE 4.7 CHECKING THE BASSINET FRONT PANEL

4. **CHECK THE PASS–THROUGH DRAWER** (Figure 4.8) by sliding the drawer in and out on both sides of the Bassinet. Return to center position.

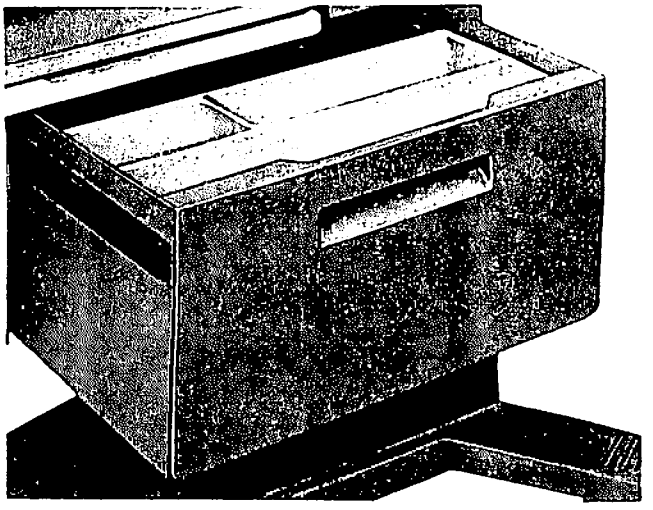


FIGURE 4.8 CHECKING THE PASS–THROUGH DRAWER

5. **CHECK THE WARMER MODULE SWIVEL OPERATION** (Figure 4.9) by rotating the Warmer Module 90 degrees to the left or right of center. Return to center position.

WARNING: When the Warmer Module is swiveled and energized, objects (Monitors etc.) located on the optional Monitor Shelf may overheat or become hot to the touch.

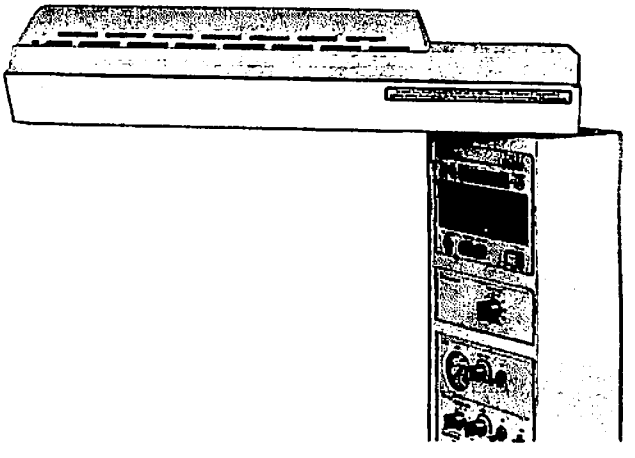


FIGURE 4.9 CHECKING THE WARMER MODULE SWIVEL

6. **CHECK THE OPERATION OF THE X-RAY CASSETTE TRAY (ACCESSORY)** (Figure 4.10) by pulling up the middle of a Side Panel and pulling the X-ray Cassette Tray out from under the Bassinet. Replace the X-ray Cassette Tray by reversing the procedure.

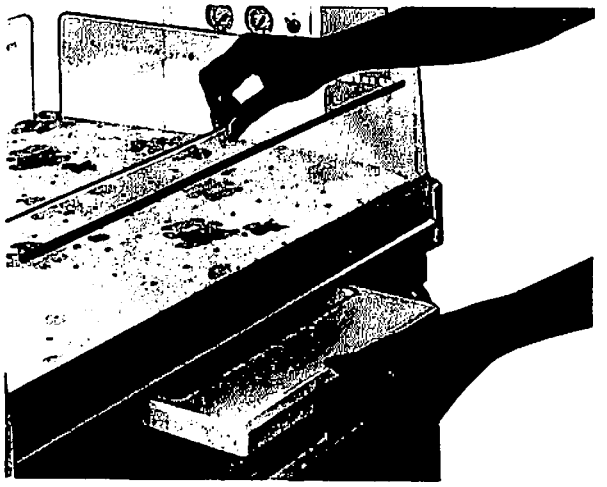


FIGURE 4.10 CHECKING THE X-RAY TRAY

7. **CHECK THE INSTRUMENT TRAY (ACCESSORY)** (Figure 4.11) by swinging it out from under the Bassinet.

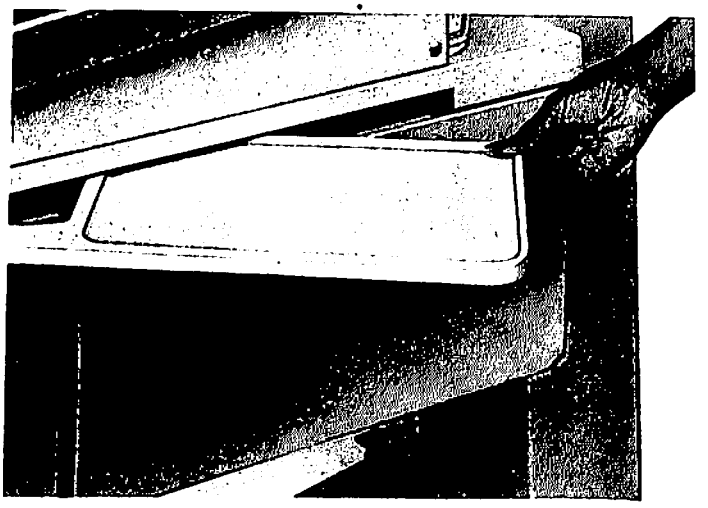


FIGURE 4.11 CHECKING THE INSTRUMENT TRAY

8. **CHECK THE VHA** by pressing the upper portion of the Switch on the right side of the Lower Post until the Upper Post raises to its maximum height. Press and hold the lower portion of the Switch until the Upper Post lowers to its minimum height. Repeat the procedure using the Switch on the left side of the Lower Post. Verify the Upper Post operates smoothly and re-adjust to desired height.

CAUTION: Always lower the Resuscitaire® Radiant Warmer VHA to its lowest position prior to transport for optimum stability. If installed, make sure that items placed on the shelves are properly secured.

9. **CHECK BASSINET TILT CONTROL Operation as follows (VHA only):**

a. Turn the Bassinet Tilt Control clockwise (Figure 4.11A) until the Bassinet Foot End is fully raised and comes to a stopl.

b. Turn the Bassinet Tilt Control counterclockwise until the Bassinet Head End is fully raised and comes to a stop.

c. Return the Bassinet to the horizontal position.

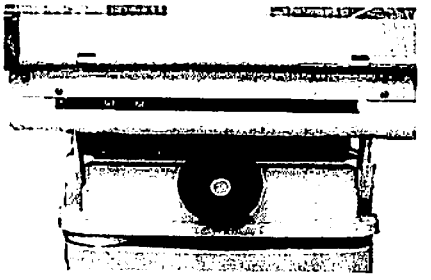


FIGURE 4.11A CHECKING THE BASSINET TILT CONTROL (VHA ONLY)

4.4 RESUSCITATION EQUIPMENT PRE-USE CHECKOUT/SET-UP

SUPPLY PRESSURE

1. Ensure that O_2 (and AIR) pipeline(s) are securely attached to appropriate fittings on the rear of the unit and that the gas supply present is 40 to 75 psi.

If using Reserve Gas Supply from cylinders:

2. Ensure that cylinder(s) are properly secured in the mounting yokes on the rear of the warmer and that the cylinder valve located on the top of the cylinder is open.
3. Examine the appropriate cylinder pressure gauges on the front of the upper column to ensure that sufficient reserve gas supply is present.

4. Set the **Gas Supply On/Off** Switch to the **On** position.

BLENDED GAS SUPPLY (Optional)

LOW FLOW MICROBLENDER WARNINGS

- **If either the air or oxygen gas source pressure is reduced or increased creating a pressure differential of 30 psi, the microblender alarm will sound. This condition significantly alters the FIO_2 and flow output from the microblender.**
- **Always operate the low flow microblender with clean/dry medical grade gases.**
- **Air inlet water filters are recommended for use with the low flow microblender.**
- **The concentration of oxygen provided and the partial pressure of oxygen within the patient's blood (PaO_2) should be monitored.**

1. If present, set the precision blender to the desired oxygen % concentration using the Blender Control Knob.

RESUSCITATION MODULE (Optional)

SUCTION

*NOTE: To obtain suction, the **Gas Supply On/Off** Switch (Figure 4.3C) must be **ON.***

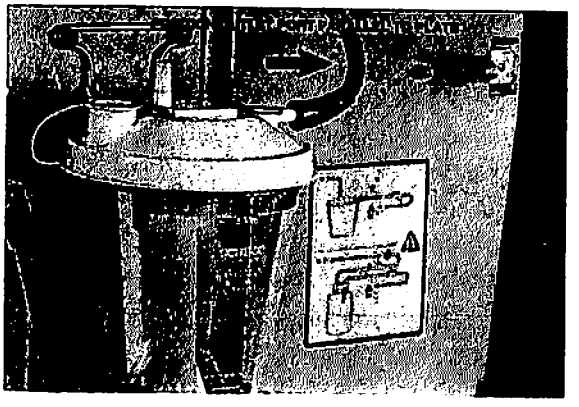
1. Check that a clean suction bottle (reusable or disposable, Figure 4.12) is installed and properly connected in the Resuscitation Equipment Storage Compartment at the front of the warmer.

CAUTION: When installing the disposable Suction Bottle: to prevent the suction tube from being blocked or damaged, position the Outlet Port parallel to the plate (Figure 4.12).

2. Ensure that a bacterial filter is connected in-line with the supply connection to the reusable suction bottle (a filter is built-in on the disposable bottle).

3. Connect the desired extension tubing to the outlet of the suction bottle outlet port (refer to Figure 3.1) and secure the free end of the extension tubing in either tubing retaining slot provided on the front panel of the Bassinet.

4. Turn on the **Suction On/Off** Switch. There may be an initial reading of up to 30 mmHg on the Suction Gauge (refer to Figure 3.1) due to flow resistance of the hydrophobic filter and suction tubing.



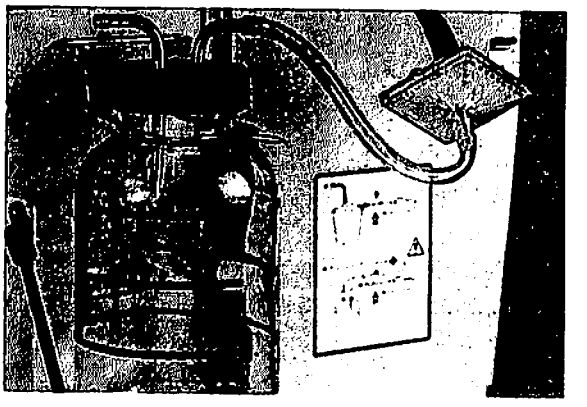


FIGURE 4.12 CHECKING THE SUCTION BOTTLE

NOTE: The filter and tubing resistance will not affect the desired maximum value that is set in Step 5 below. The pressure value on the Suction Gauge matches the actual pressure value at the end of the catheter.

5. Block the patient outlet of the suction bottle. Adjust the suction magnitude using the **Suction Min Max** Control while viewing the suction level on the **Suction** Gauge. Adjust the suction magnitude to the desired maximum suction pressure value.
6. Turn off the **Suction On/Off** Switch.

RESUSCITATION MODULE WITHOUT AUTO-BREATH (Optional)

Manual Resuscitation – Use with Patient Breathing Circuit – 10 mm tubing with thumb (finger) hole at patient end.

WARNING: Excessive airway pressure can cause damage to patient's lungs. Always monitor airway pressure and/or provide appropriate pressure relief during resuscitation.

WARNING: For prolonged ventilation, use of a heat and moisture exchanger is recommended.

There are potential hazards associated with the delivery of supplemental oxygen. If it is necessary to administer oxygen, the attending physician should be notified immediately.

1. Connect the Patient Circuit to the **Patient Outlet** (refer to Figure 3.3).
2. Adjust the flow rate to the desired fresh gas flow rate using the **Patient Supply Flow Rate (LPM)** Control.
3. Set the **Airway Pressure Relief** control to the desired pressure limit according to the color coded bands on the **Airway Pressure** Gauge and **Airway Pressure Relief** Control. Alternately, a "T" Fitting with an airway pressure monitor can be inserted into the **Patient Outlet** Port and connected to the **Airway Pressure** Port to indicate the breathing circuit pressure. Adjust the **Airway Pressure Relief** Control as necessary.

RESUSCITATION MODULE WITH AUTO-BREATH (Optional)

Automatic Resuscitation (Resuscitation Module with **AutoBreath** Infant Resuscitator Only) – Use with Automatic Patient Circuit –15 mm tubing with exhalation valve and exhalation valve control line tubing.

WARNING:
Excessive air pressure can cause damage to patient's lungs.
For prolonged ventilation, use of a heat and moisture exchanger is recommended.
For unattended auto ventilation use patient airway monitor.

There are potential hazards associated with the delivery of supplemental oxygen. If it is necessary to administer oxygen, the attending physician should be notified immediately.

1. Turn the **AutoBreath** Infant Resuscitator circuit off using the **On/Off** Control.
2. Connect the Patient Circuit for Automatic Breathing to the **Patient Outlet** Connector and the exhalation valve control line tubing to the **Exh Valve** Connector (refer to Figure 3.2).
3. Adjust the flow rate to the desired fresh gas flow rate using the **Patient Supply Flow Rate (LPM)** Control.
4. Check the fixed internal **Airway Pressure Relief** Control by setting the desired Airway Pressure Limit and blocking the exhalation valve port exhaust and the patient port of the Exhalation Valve.
5. Observe the **Airway Pressure** Gauge to check pressure limit.
6. Turn on the **AutoBreath** Infant Resuscitator circuit.
7. Adjust the **Rate (BPM)** Control to 18 breaths per minute.
8. Set the **PEEP** threshold by blocking the patient port of the Patient Breathing circuit. Do not block the exhalation valve exhaust port. Observe the Positive End Expiratory Pressure indicated on the **Airway Pressure** Gauge and adjust the desired PEEP using the **PEEP** Control.
9. Check the I:E ratio by measuring the Inspiratory and Expiratory Phase Times and dividing the Expiratory Phase Time by the Inspiratory Phase Time. The result should be approximately 2.0.
10. Check the desired Breath Rate by counting the number of breath cycles per minute.

AUXILIARY FLOW (provides 100% Oxygen only)

1. Connect the desired device to be supplied by the **Auxiliary Flow** circuit to the **Aux Outlet** Connector.
2. Adjust the desired Auxiliary Flow using the **Aux Flow (LPM)** Control and check for flow.

4.5 CONTROLLER OPERATION

WARNING: Connect the power cord only to a properly grounded wall receptacle that is approved for hospital–use and of the correct voltage. DO NOT use extension cords or an ac Receptacle Box for this device.

Connect the unit to the ac line. Turn on the **CIRCUIT BREAKER** on the Rear Panel and the **Power** Switch on the Front Panel. Observe the Functional Test.

4.5.1 PRE–WARM MODE

After the Functional Test is complete, the **Pre–Warm Mode** will activate. The **Heater Power** Indicator will be at 100% (all lights on) for three minutes, reduce to 60% (six lights on) for 12 minutes and then be reduced to 30% (three lights on).

NOTE: *Selection of **Manual** or **Baby** and then returning to **Pre–Warm** during the three minutes of 100% or 12 minutes of 60% power will automatically reduce the power to 30%.*

During **Pre–Warm** Mode, the **Chk Patient** Alarm is disabled.

4.5.2 MANUAL MODE

WARNING:

To avoid overheating or underheating, observe the infant constantly and monitor the temperature using the skin temperature probe supplied with the equipment or other electronic thermometer.

Inspect infant's skin for reddened areas which may result from heating of materials in contact with the skin (plastic diapers, pins, etc.).

Avoid placement of objects (equipment, blankets, or clothing) between the infant and Warmer Module that can block heat transfer or absorb heat. This can cause underheating or overheating.

Radiant warming increases insensible water loss. Appropriate measures to maintain fluid balance should be considered.

1. Use the Mode key to select **Manual Mode**.
2. Use only for short–term warming with nursing personnel in constant attendance.
3. Do not use warmer in **Manual Mode** if **Manual** Indicator is not on.
4. Set the **Heater Power** Indicator to the desired level. The heater power will be maintained for 10 minutes.
5. After 10 minutes, the **Chk Patient** Alarm will sound one time. Press the **Silence/Reset** Key to initiate another 10–minute warming period.
6. If the **Chk Patient** Alarm is not acknowledged, the heater will be automatically disabled after an additional 5 minutes of operation.
7. Heater power output must be adjusted manually to maintain Baby Temperature within the desired range.
8. Check infant's temperature and condition at least every 15 minutes. When initially setting or when changing heater power output, check Baby Temperature more frequently to be sure it is maintained within the desired range.

CAUTION: A change in heater power output will not result in an immediate change in Baby Temperature. Wait for results. Large changes in heater power output will cause a more rapid change in Baby Temperature.

9. Use Skin Temperature Probe to continuously monitor Baby Temperature whenever possible. Refer to paragraph 4.5.3 to attach the probe to the patient.

IMPORTANT: *In **Manual Mode**, the Skin Temperature Probe monitors only — it does not control.*

NOTE: *It is not necessary that the Skin Temperature Probe be connected to the Controller for **Manual Mode**.*

4.5.3 BABY MODE

WARNING:

To avoid hazards of overheating or underheating, the infant should not be left unattended. Use only with the Hill-Rom Air-Shields' Skin Temperature Probe supplied with the unit. Inspect the infant's skin for reddened areas which may result from heating of materials in contact with the skin (plastic diapers, pins, etc.).

Avoid placement of objects (equipment, blankets, or clothing) between the infant and Warmer Module that can block heat transfer or absorb heat. This can cause underheating or overheating.

Radiant warming increases insensible water loss. Appropriate measures to maintain fluid balance should be considered.

1. Plug Skin Temperature Probe into Controller **Skin Temp Probe** Connector.
2. Use the Mode key to select **Baby Mode**.
3. Attach the Skin Temperature Probe to the infant. The probe should be located on the infant's abdomen, halfway between the xyphoid and the umbilicus (Figure 4.13). The metal side of the probe should be placed in direct contact with the skin (when using the reusable probe).

FIGURE 4.13A ATTACHING SKIN PROBE

FIGURE 4.13B ATTACHING SKIN PROBE

WARNING:

The location of the Skin Temperature Probe must be such that the skin around the Sensor is in direct line with the heat from the Warmer Module. If the location is shadowed, for example, by the infant's body, overheating and possible burning of the infant's skin can result. Do not use a rectal probe. Use of a rectal probe can result in overheating or underheating of the infant.

The Skin Temperature Probe must be in intimate contact with the skin to provide accurate monitoring of the infant's skin temperature. Failure to maintain intimate skin contact can result in overheating and possible burning. Check infant's condition at least every fifteen minutes for correct Sensor attachment and feel infant's skin for signs of overheating.

The Skin Temperature Probe should be placed at least 1.5 inches from any transcutaneous monitor ($TcPO_2$ or $TcPCO_2$) probe to prevent false temperature indications. The Skin Temperature Probe should not be placed on an area previously used by a $TcPO_2$ or $TcPCO_2$ probe.

4. When the infant is prone, the Skin Temperature Probe should be located on the infant's back.

5. The skin area around the probe should be thoroughly cleansed and dried before the probe is placed on the skin.

6. To obtain an accurate reading of the infant's skin temperature, place the probe in position and cover with a Critter Covers® Disposable Probe Cover, Care–For–Me Cover or tape the probe into position, cover it with a small piece of cotton just large enough to cover the tip of the probe, and then place a second piece of tape over the cotton. If it is desired to reduce tape contact on the infant's skin, the cotton can be applied directly to the probe tip without the first piece of tape. To stabilize the attached probe, a third piece of tape may be placed over the probe wire approximately three to four centimeters from the probe tip.To minimize the effect of direct radiation on the Skin Temperature Probe, in order to obtain a more accurate **Baby Temperature** measurement, cover the Sensor with a Critter Covers® Disposable Probe Cover, Care–For–Me Cover or an equivalent insulating cover with a reflective surface facing the Warmer Module.

7. Baby Mode should be used for long–term warming and when attending personnel cannot be in constant attendance.

8. Set the **Set Temperature** Display to the prescribed temperature. A higher Set Temperature setting does not increase rapid warming.

9. Verify that **Baby Temperature** Display reading stabilizes within 0.2 °C of **Set Temperature** Display. Fluctuations in the **Heater Power** Indicators or the **Baby Temperature** Display reading can result from air currents, obstruction of radiation to the infant or the Skin Temperature Probe not being in intimate contact with the skin.

10. **Baby Temp** Alarms can be silenced for 10 minutes by pressing the **Silence/Reset** Key.

11. **Probe, High Temp** and **Baby Temp** (39.0 °C) Alarms are automatically reset after the alarm condition is corrected. The **High Temp** Alarm may be silenced for 2 minutes by pressing the **Silence/Reset** Key.

NOTE: *In the event of a* ***Probe*** *Alarm,* ***Manual Mode*** *can be used temporarily until a replacement Skin Temperature Probe is available and only if nursing personnel are in constant attendance.*

4.5.4 EXAMINATION LIGHT

The light is turned on and off by the **Exam Light** Switch. Turn the light on only as required for optimum bulb life.

4.6 X–RAY PROCEDURES

1. Swing the Warmer Module (Figure 4.9) to the right or left of center as required to position the X–ray machine.

2. Lift the Left or Right Bassinet Side Panel up, slide the X–ray Tray out (Figure 4.10); place the X–ray Cassette on the tray and return the tray to the Bassinet. Align the cassette as desired with the markings on the X–ray Cassette Tray and relative markings on the inside of the Bassinet panels.

3. When the X–ray is complete, remove the X–ray Cassette Tray and return the X–ray Tray. Place the Warmer Module in its normal operating position.

SECTION 5
CLEANING AND MAINTENANCE

5.1 GENERAL

This section provides cleaning and maintenance instructions. Where necessary, disassembly instructions are provided. Maintenance other than that provided in this section should be performed only by qualified Hill-Rom service personnel.

WARNING:

If oxygen is in use, make sure that the oxygen supply to the equipment is turned off and that it is disconnected from the oxygen supply when performing cleaning and maintenance procedures. A fire and explosion hazard exists when performing cleaning and/or maintenance procedures in an oxygen-enriched environment.

An electrical shock hazard exists when performing cleaning and maintenance procedures; make sure that the Power Cord is disconnected from the wall receptacle.

5.2 CLEANING

When an infant is discharged, or at least once a week, the equipment should be thoroughly cleaned and disinfected. Cleaning can most effectively be accomplished by disassembling, then grouping the parts and/or assemblies in categories according to the method of cleaning required.

5.3 DISASSEMBLY FOR CLEANING

1. Remove both Bassinet Side Panels (Figure 5.1) by pulling them straight up.

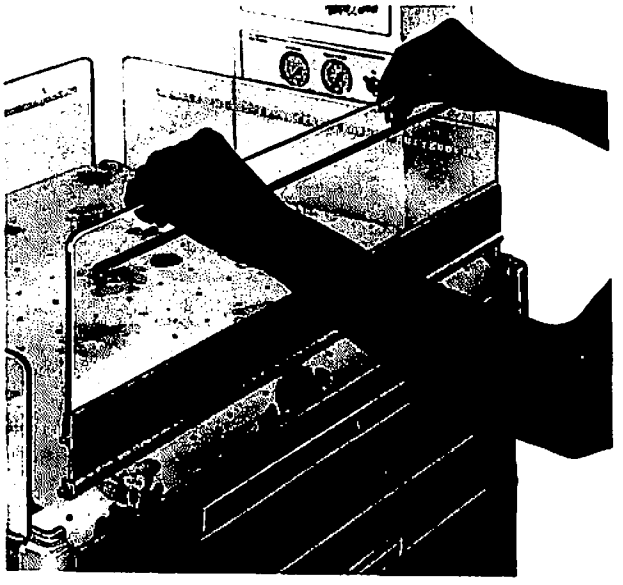


FIGURE 5.1 REMOVING BASSINET SIDE PANELS

2. Remove the Bassinet Back Panel (Figure 5.2) by raising it straight up until the bottom pins are adjacent to the slots in the corner brackets.

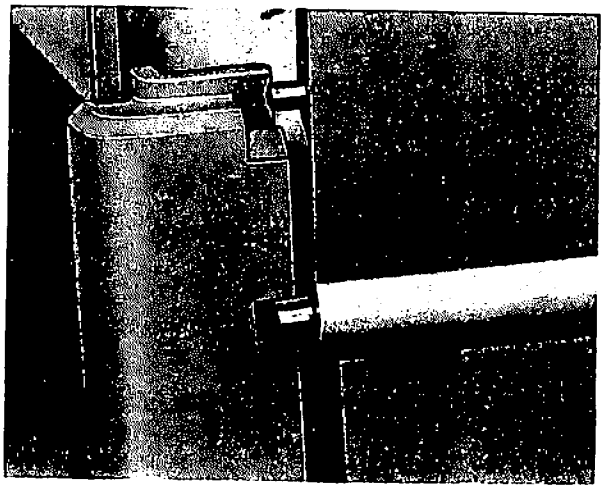


FIGURE 5.2 REMOVING BASSINET BACK PANEL

3. Remove the Bassinet Front Panel (Figure 5.3) by raising it and then swiveling it down. At the corners, press up on the release buttons and pull the panel straight out (Figure 5.4).

FIGURE 5.3 BASSINET FRONT PANEL RELEASE BUTTONS

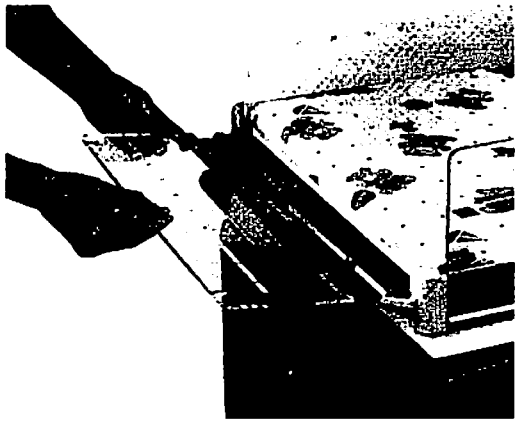


FIGURE 5.4 REMOVING BASSINET FRONT PANEL

4. Remove the Mattress from the Bassinet.

5. Remove the X-ray Cassette Tray (Figure 4.10).

6. Remove the Suction Bottle and Filter (Figure 4.12) from the side of the column.

5.4 CLEANING PROCEDURES

When an infant is discharged, or at least once a week, the equipment should be thoroughly cleaned and disinfected.

5.4.1 CLEANING AGENTS

An iodophor or quaternary disinfectant–detergent registered by the U.S. Environmental Protection Agency should be used, but only when the equipment is not in use and disassembled as described elsewhere in this section. A cleanser such as Kleen-aseptic®b Germicidal Surface Cleanser may be used. When using any cleaning agent, follow the manufacturer's directions for use. Before cleaning, remove all solid wastes and contaminants from the disassembled parts.

5.4.2 PAINTED SURFACES

Use a disinfectant–detergent to clean all surfaces thoroughly; then dry with a clean cloth or paper towel.

5.4.3 CLEAR PLASTIC AND ACRYLIC SURFACES

CAUTION: Alcohol can cause crazing of plastic and acrylic. Do not use alcohol, acetone, or any organic solvents for cleaning.

Do not expose plastic and acrylic to direct radiation from germicidal lamps. Ultraviolet radiation from these sources can cause cracking and crazing of clear plastic and acrylic.

Use a disinfectant–detergent to clean all surfaces thoroughly. Make sure to clean all holes, indentations, etc.; then dry with a clean cloth or paper towel.

5.4.4 METAL SURFACES

Use a disinfectant–detergent to thoroughly clean all surfaces; then dry with a clean cloth or paper towel.

5.4.5 WOODEN SURFACES

Use a disinfectant–detergent to thoroughly clean all surfaces; then dry with a clean cloth or paper towel.

5.4.6 SKIN TEMPERATURE PROBE, REUSABLE

CAUTION: Do not pull on the tip of the skin temperature probe when cleaning or drying; damage to the probe may result.

Use a disinfectant–detergent to thoroughly clean all surfaces; then dry with a clean soft cloth or paper towel.

IMPORTANT: After cleaning, a complete operational checkout procedure should be performed before returning the unit to service.

5.5 STERILIZATION

CAUTION: DO NOT STEAM AUTOCLAVE. Gas sterilization temperature should not exceed 54.4 °C (130 °F).

Sterilization can be accomplished with the following:

A. COLD STERILIZATION

CAUTION: Do not expose plastic and acrylic to direct radiation from germicidal lamps. Ultraviolet radiation from these sources can cause cracking of gasket surfaces, fading of paint, and ultimately, crazing of plastic and acrylic.

B. GAS STERILIZATION (ETHYLENE OXIDE). Prior to gas sterilization, the entire unit should be thoroughly cleaned as described elsewhere in this section. Remove and discard all used disposable elements. New disposable elements should be installed after sterilization.

Standard gas sterilization procedures, as programmed by automatic equipment such as made by American Sterilizers and Wilmot Castle, are satisfactory as these do not normally exceed 54.4 °C (130 °F).

IMPORTANT: After sterilization, a complete functional checkout procedure should be performed before returning the unit to service.

5.6 REASSEMBLY AFTER CLEANING

1. Replace the Mattress on the Bassinet.
2 Replace the X–ray Cassette Tray (Figure 4.10).
3. Replace the Bassinet Back Panel by inserting the pins in the Corner Brackets (Figure 5.2).
4. Replace the Bassinet Side Panels by pushing them straight down into their slots (Figure 5.1).
5. Replace the Bassinet Front Panel by sliding it into the Front of the Bassinet (Figure 5.4) until the release tabs catch. Raise the Panel into position.
6. Install a new Suction Filter if a Reusable Bottle is in use (Figure 4.12). Replace the Suction Bottle if a Disposable Suction Bottle is in use.

5.7 CALIBRATION

The equipment should be completely checked and calibrated at least once a year by qualified service personnel. Refer to the appropriate Service Manual for details.

5.8 TROUBLESHOOTING

Troubleshooting for the operator of the equipment is presented in Table 5.1. If the fault cannot be localized from the chart, the unit should be removed from use and referred to factory trained or otherwise qualified service personnel.

TABLE 5.1 TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
No Power and **Power Fail** Alarm is not activated	a. Circuit Breaker not set to On.	a. Set Circuit Breaker to On.
Power Fail Alarm activated	a. Circuit Breaker tripped.	a. Reset Circuit Breaker (Figure 4.2).
	b. Power Cord unplugged.	b. Connect Power Cord to POWER connector (Figure 4.2) or wall socket.
	c. Defective Power Cord.	c. Replace Power Cord.
System Fail Alarm activated	a. Internal malfunction.	a. Refer to service.
Probe Alarm activated.	Possible Defective Skin Probe(s).	a. Check to ensure Skin Probe is in good contact with the skin. b. Replace Skin Probe(s). If condition is not corrected, refer to service.
Error Code Er01 through Er022 Er024 and Er025	a. Internal malfunction.	a. Refer to service.
Error Code Er023	Ambient Temperature in excess of 32 °C (90 °F).	Verify ambient temperature with an external thermometer.

SECTION 6
PARTS LIST

6.1 GENERAL

This section provides a listing of Operator replacement parts. Parts other than those listed here should be replaced by qualified service personnel. For a listing of accessories, refer to Figure 1.1 of this manual.

REPLACEMENT PARTS	PART NUMBER
Bassinet Side Panel	81 900 00
Bassinet Rear Panel	81 900 01
Bassinet Front Panel	81 900 02
Power Cord	17 AZ 104
Skin Temperature Probe (Reusable)	81 300 05
Reusable Suction Bottle Kit (750 ml) (Bottle, Stopper, Tubing and Filter)	81 001 50
Reusable Suction Bottle Only	08 131 00
Filters (Box of 25)	81 001 54
Mattress/Cover (Mattress with Cover)	78 120 20

DISPOSABLES	
Premi-Probe® Skin Temperature Probe® (Box of 10)	81 300 08
Premi-Probe® Skin Temperature Probe® (10 Boxes of 10)	81 300 09
Critter Covers® Probe Cover (Box of 100)	68 209 46
Critter Covers® Probe Cover (Box of 600)	68 209 45
Care-for-Me Probe Covers, 100 Large (10% discount when you order 5)	68 209 47
Care-for-Me Probe Covers, 100 Standard (10% discount when you order 5)	68 209 48
Patient Supply Circuit (Box of 25)	81 001 27
Infant Breathing Circuit (Box of 25)	81 000 06
Neat Clips - 3/8" Diameter (Box of 100)	68 120 53
1.00" Diameter (50/Case)	68 120 54
Disposable Suction Bottle and tubing, 800 ml (Box of 100)	81 001 51
Disposable Suction Bottle and tubing, 800 ml (Box of 20)	81 001 49

OPTIONS	
Air Hose Assembly, USA (10 ft) Yellow w/Wing Nuts	78 464 10
Oxygen Hose Assembly, USA (10 ft) Green w/Wing Nuts	78 465 10
X-ray Cassette Tray	81 100 44
Monitor Shelf	82 001 54
I.V. Pole	82 001 53