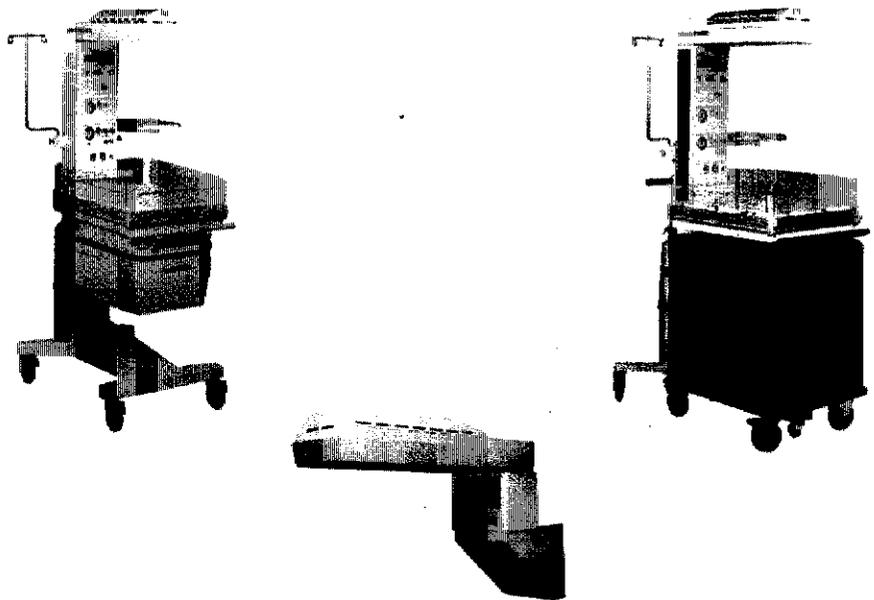


Technical Service Manual



Revision 4
6016.010
man 8299045

WARNING:
For a full understanding of the performance characteristics of this equipment, the user should carefully read this manual before operating.

1 General

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Introduction



Chapter 1: Introduction

Purpose

This manual provides requirements for the normal operation and maintenance of the Resuscitaire® Birthing Room Warmer (WBR82), the Resuscitaire® Radiant Warmer (RW82), and the Resuscitaire® Wall Mounted Radiant Warmer (WMRW82). It also includes parts lists (in chapter 5) for ordering replacement components.

Audience

This manual is intended for use by only facility-authorized personnel. Failure to observe this restriction can result in severe injury to people and serious damage to equipment.

Organization

This manual contains seven chapters.

Chapter 1: Introduction

In addition to a brief description of this service manual, chapter 1 also provides a product overview.

Chapter 2: Troubleshooting Procedures

Repair analysis procedures are contained in this chapter. Use these procedures to gather information, identify the maintenance need, and verify the effectiveness of the repair.

Chapter 3: Theory of Operation

This chapter describes the application of the mechanical, electrical, and hydraulic systems employed in this product.

Chapter 4: Removal and Replacement Procedures

Chapter 4 contains the detailed maintenance procedures determined necessary in chapter 2.

Chapter 5: Parts List

This chapter contains the part-ordering procedure and illustrated parts lists.

Chapter 6: Calibration and Maintenance Procedures

Calibration, cleaning, preventive maintenance, and other general procedures are described in this chapter.

Chapter 7: Accessories

A list of additional products that can be used in conjunction with the Resuscitaire® Radiant Warmer Products is available in chapter 7.

Document Symbol Definition

This manual contains different typefaces and icons designed to improve readability and increase understanding of its content. Note the following examples:

- Standard text—used for regular information.
- **Boldface text**—emphasizes a word or phrase.
- **NOTE:**—sets apart special information or important instruction clarification.
- The symbol below highlights a **WARNING** or **CAUTION**:

Figure 1-1. Warning and Caution



- A **WARNING** identifies situations or actions that may affect patient or user safety. Disregarding a warning may result in patient or user injury.
- A **CAUTION** points out special procedures or precautions that personnel must follow to avoid equipment damage.
- The symbol below highlights an **ELECTRICAL SHOCK HAZARD WARNING**:

Figure 1-2. Electrical Shock Hazard Warning



- The symbol below highlights an **EMC hazard**:

Figure 1-3. EMC Hazard

Introduction

Overview

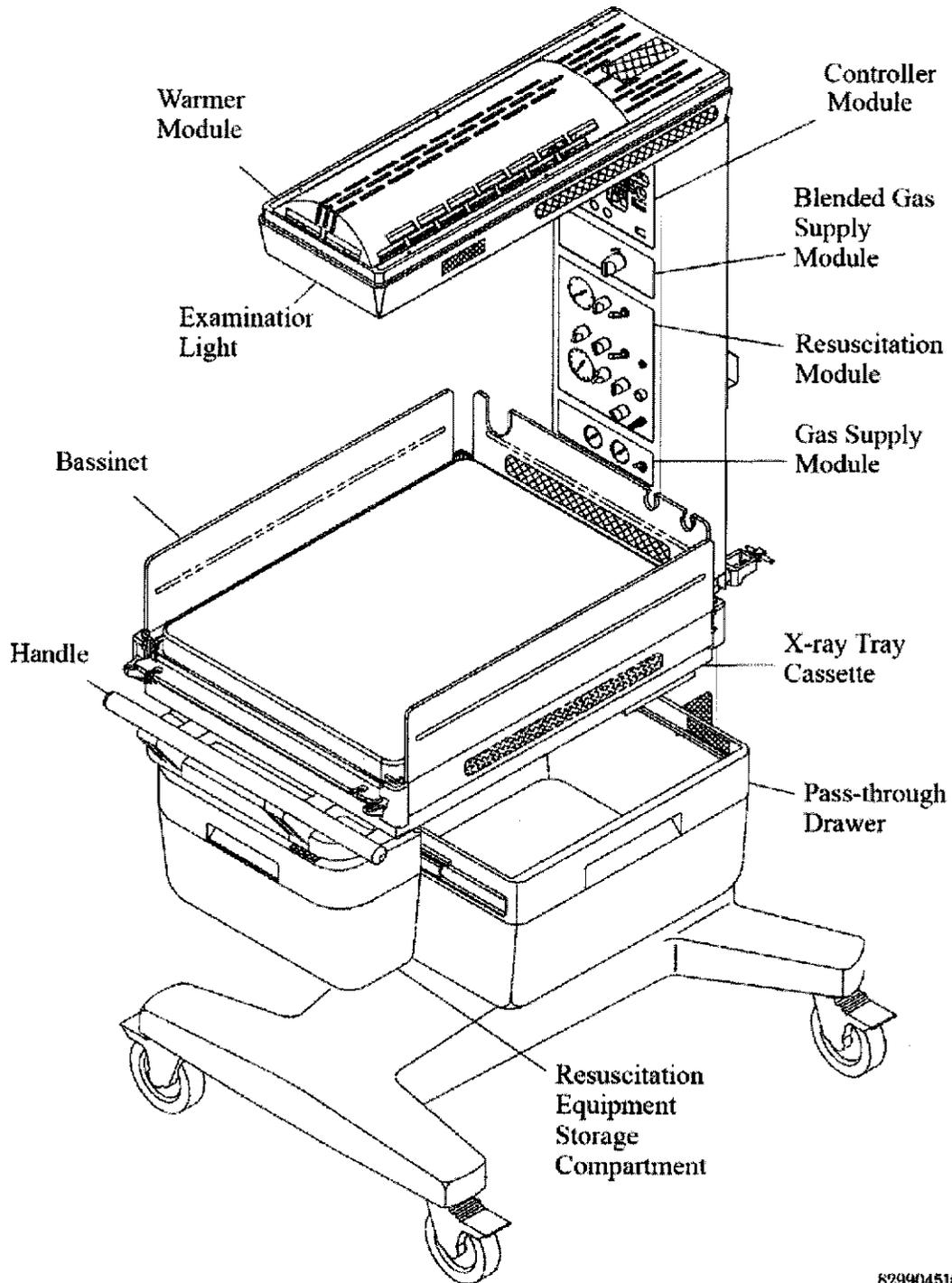
The Resuscitaire® Birthing Room Warmer (WBR82) is designed especially for labor and delivery use (see figure 1-4 on page -7). It consists of a detachable cart and bassinet and a freestanding warmer that provides heat control and monitors skin temperature and includes an Apgar timer. The Resuscitaire® Birthing Room Warmer also includes an optional resuscitation package with suction and oxygen delivery or AutoBreath™ Infant Resuscitator which is a gas-powered, time-cycled, continuous flow, pressure-limited resuscitator (not available in the U.S.). Other options include a reserve gas supply and Blender Module.

The Resuscitaire® Radiant Warmer (RW82) is designed for use during labor and delivery (see figure 1-5 on page -8). The Resuscitaire® Radiant Warmer consists of a bassinet, warmer, and a Controller Module that provides heat control, monitoring of the skin temperature, and Apgar timing. The Variable Height Adjustable (VHA) Resuscitaire® Radiant Warmer provides an adjustable mattress height from 89.9 cm (35.4") to 109.9 cm (43.3"). The Resuscitaire® Radiant Warmer also includes the same optional resuscitation package with suction and oxygen delivery or AutoBreath™ Infant Resuscitator which is a gas-powered, time-cycled, continuous flow, pressure-limited resuscitator (not available in the U.S.) that are available with the Resuscitaire® Birthing Room Warmer.

The Resuscitaire® Wall Mounted Radiant Warmer (WMRW82) is designed specifically for labor, delivery, and birthing room use (see figure 1-6 on page -9). The Resuscitaire® Wall Mounted Radiant Warmer consists of a warmer and a Controller Module that provide heat control, monitoring of the skin temperature, and an Apgar timer. The Resuscitaire® Wall Mounted Radiant Warmer is installed permanently and, therefore, is not portable. There are no resuscitation options available with this product.

For operating precautions for the Resuscitaire® Radiant Warmer Products and their accessories, refer to the *Resuscitaire® Radiant Warmer Products User Manual* (82 990 40) (MU12149).

Figure 1-4. Resuscitaire® Radiant Warmer (RW82)



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Figure 1-5. Resuscitaire® Birthing Room Warmer (WBR82)

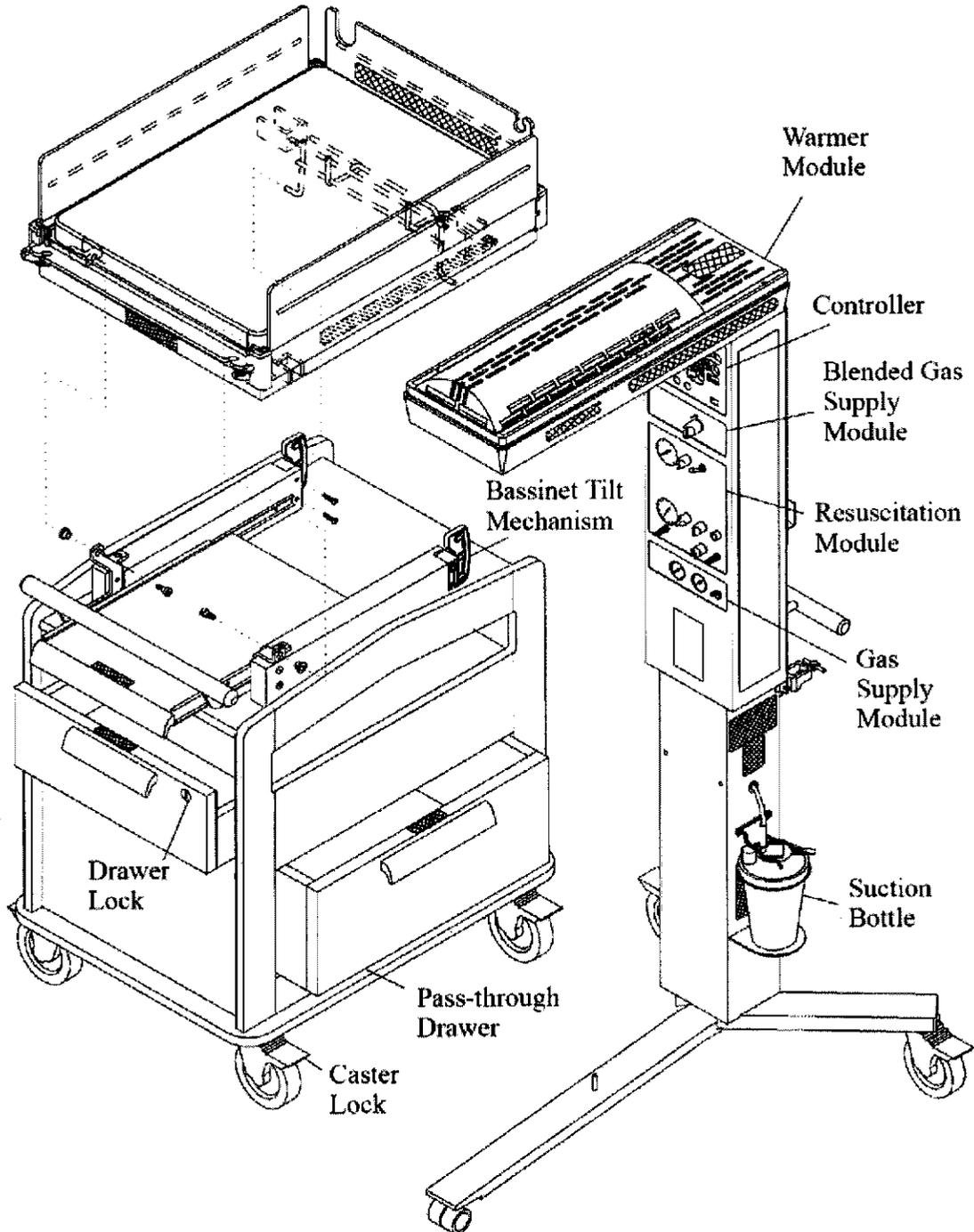
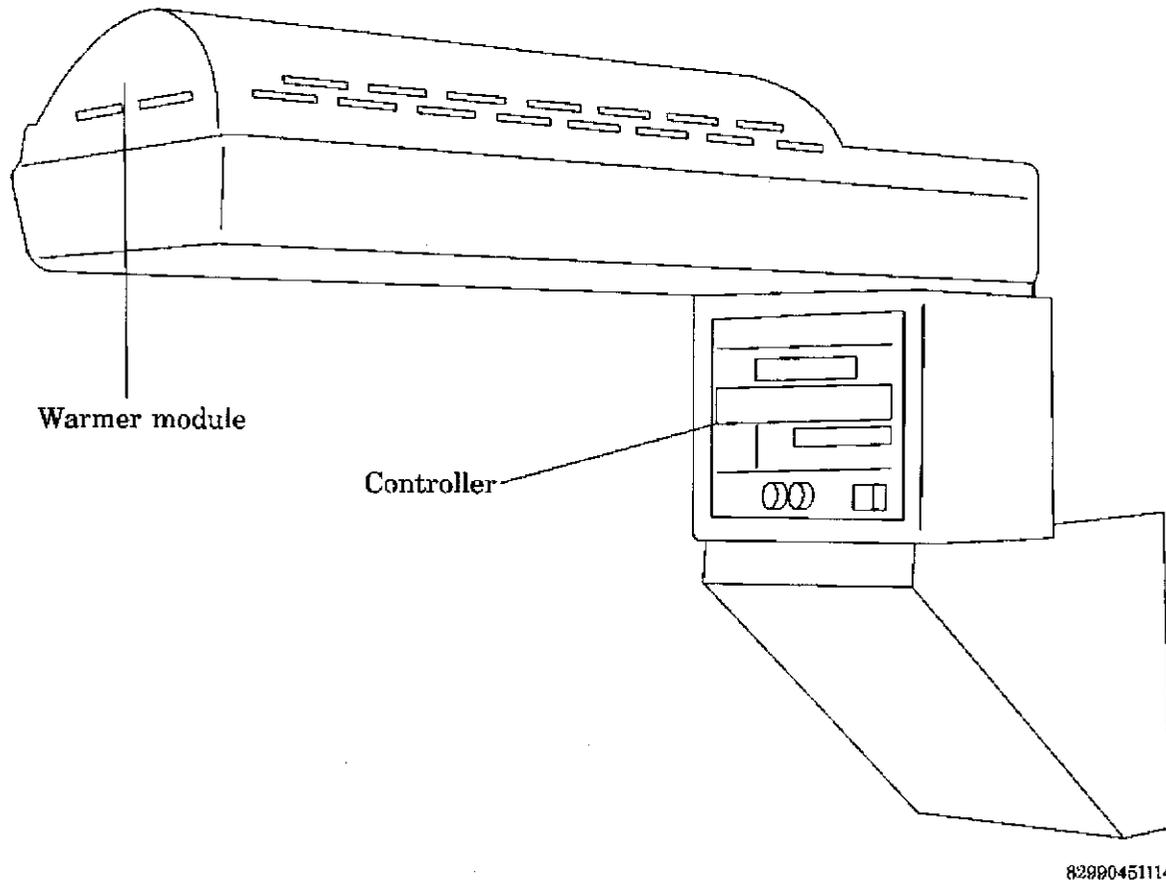


Figure 1-6. Resuscitaire® Wall Mounted Radiant Warmer (WMRW82)

Abbreviations

- Liters Per Minute (LPM)
- Standard Cubic Feet per Hour (scfh)
- Neonatal Intensive Care Unit (NICU)
- Positive End Expiratory Pressure (PEEP)
- Inspiratory/Expiratory Ratio (I/E ratio)

Features

Warmer Module

A controller in the Warmer Module provides Pre-Warm Mode, Manual Mode, or Baby Mode automatic skin temperature control. A warmer

head pivot permits the warmer to pivot 90° to either side for X-ray procedures. In addition, when the warmer is pivoted, it can be powered to provide heat.

The warmer head contains the quartz heating element and an examination light. It is mounted to the top of the upper column. The warmer head pivots to either side of the warmer to provide access for a portable X-ray machine. There is no latch required to move the warmer head. An applied force of approximately 5 kg (10 lb) is all that is required to overcome the detents of the warmer head pivot.

Heating Element

The radiant heater consists of a 600 W, quartz, tube heater.

Examination Light

An examination light provides added illumination of the mattress area. The examination light is mounted underneath the warmer head. It is located on the center line of the warmer head, directly behind the radiant heating element. The examination light is a 50 W, fixed-focus, halogen bulb, and is turned on or off by a key on the front of the Controller Module.

Cart/Bassinet (Resuscitaire® Birthing Room Warmer (WBR82) and Cart Only)

The bassinet is designed to provide maximum function and utility to aid in the care of the newborn. It is detachable so you can transport the infant to the NICU, the general nursery, or another area of the hospital. The side and front panels fold down to permit access to the infant. The mattress tilts at a 0°, 5°, or 10° angle. Vari-tilt models are continually adjustable to $\pm 10^\circ$. Openings are provided on each side of the bassinet for the insertion of the accessory x-ray cassette tray. A writing surface is available; when the writing surface is closed, it is not visible. Each cart has a pass-through drawer and a locking front access drawer. The cart locks in place when used with a warmer.

Bassinet (Resuscitaire® Radiant Warmer (RW82) Only)

The bassinet is designed to provide maximum function and utility to aid in the care of the newborn. You may fold the side and front panels down to gain access to the infant. The mattress tilts at a 0°, 5°, or 10° angle. Vari-tilt models are continually adjustable to $\pm 10^\circ$. Openings are provided on each side of the bassinet for the insertion of the accessory

x-ray cassette tray. A push-through drawer is supplied standard on every unit.

Controller Module

At power-up, the microprocessor within the Controller Module performs a series of power-up diagnostic tests to confirm the proper operation of the system. During this time, all displays and indicators light (except the **Power Fail** light) and a tone sounds.

When powered up, the system initializes in Pre-Warm Mode. In Pre-Warm Mode, the Controller Module starts the heater at 100% power, and maintains that setting for 3 minutes, reduces to 60% for 12 minutes, and then reduces the heater power to 30%. While the heater is in the lowest setting, the unit continues to provide heat without low limit alarms enabled.

When operating the Controller Module in Manual Mode, the operator can adjust the heater power from 0% to full power in 10% increments. After 10 minutes of operation in Manual Mode, a **Check Patient** alarm activates. If the **Check Patient** alarm is not acknowledged within 5 minutes the heater turns off and an alarm activates.

When operating the Controller Module in Baby Mode, the Controller Module utilizes a baby skin temperature probe connected between the Controller Module input and the infant's skin to automatically adjust the heater output of the Warmer Module maintaining a digitally-displayed preset temperature.

The Apgar Timer displays the elapsed time (up to 59:59). When the timer is activated, it sounds a tone alerting the operator after 1 minute, 5 minutes, and 10 minutes have elapsed.

When pressed, the **Keypad Lock** key enables or disables the Up/Down arrows, **Select Mode** key, and the **>37** key.

A **Procedural Silence** timer prevents the **Baby Temperature** alarm from sounding for 5 minutes during routine procedures.

The **>37 C** key enables Temperature Override Mode.

Pressing the **|| C || F** key alternately selects between the two units of temperature measurement used to display the baby and set temperature.

The operator can also turn on and off the examination light located in the Warmer Module by using the **Examination Light** key on the Controller Module.

Blender Module (Factory-Installed Option)

The Blender Module provides blended oxygen from 21% to 100% to the patient outlet on the Resuscitation Module.

Resuscitation Module (Factory-Installed Option)

The Resuscitation Modules contain the pneumatic outlets necessary for infant resuscitation (see figure 1-7 on page -14). Controls and displays for the module are located above and to the rear of the bassinet.

There are three variations of Resuscitation Modules: RM2001™ Gas Delivery Module without AutoBreath™ Infant Resuscitator (available only in the U.S.), Resuscitation Module without AutoBreath™ Infant Resuscitator, and Resuscitation Module with AutoBreath™ Infant Resuscitator (not available in the U.S.). The Resuscitation Module without AutoBreath™ Infant Resuscitator, and the Resuscitation Module with AutoBreath™ Infant Resuscitator have adjustable airway pressure relief but the RM2001™ Gas Delivery Module without AutoBreath™ Infant Resuscitator does not.

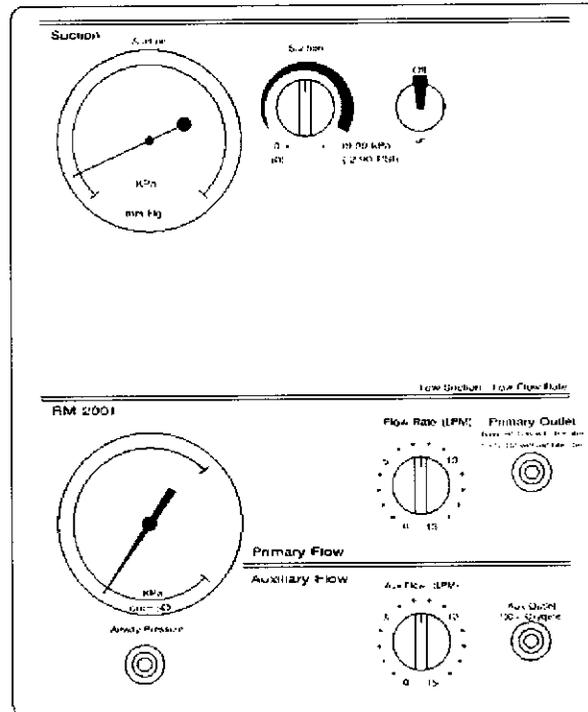
NOTE:

When pressure in the hose delivering gas to the patient falls below -4 cm H₂O (-0.4 kPa), the one-way valve installed at the Patient Outlet connection opens. In the unlikely failure of the gas supply, the one-way valve allows patient inspiration.

RM2001™ Gas Delivery Module without AutoBreath™ Infant Resuscitator

- **Primary Outlet (RM2001™ Gas Delivery Module Only)**—Use the Primary Outlet to provide continuous gas flow to a breathing circuit at a rate of 0 to 15 LPM of oxygen (as selected by the operator). The **Flow Rate** control is a calibrated dial-type flow adjustment or flow meter. A fixed internal safety relief valve is also provided and is always operable. This valve provides redundant maximum pressure relief at 160.1 cm H₂O ± 10 cm H₂O (15.7 kPa ± 1 kPa). For units equipped with a Blender Module option, the FiO₂ of the Blender Module setting is delivered to the Primary Outlet (see figure 1-7 on page -14).

Figure 1-7. RM2001™ Gas Delivery Module (Front Panel)



82E

NOTE:

The outlet 1/4" hose barb fittings of the RM2001™ Gas Delivery Module attach to commercially-available oxygen supply tubing or a self-inflating resuscitation bag (PN 67 350 50).

- **Airway Pressure**—The airway pressure gauge monitors airway pressure. Some variations are externally connected to patient circuits. (U.K. versions are connected internally.)
- **Blender Module**—The optional Blender Module supplies blended gas only to the Primary Outlet in the RM2001™ Gas Delivery Module. During operation of these outlets, the Resuscitation Module alarms unless oxygen and air are connected.
- **Auxiliary Outlet**—The Auxiliary outlet supplies 100% oxygen through the **Auxiliary Flow** control to the Auxiliary Outlet connector. It is intended for oxygen enrichment of a manual bag resuscitator, for supplemental delivery to the patient, mother or second neonate, such as a twin, or for blowby. The **Auxiliary Flow** control adjusts the flow rate from 0 to 15 LPM. An internal pre-set relief valve limits the Auxiliary Outlet pressure to 160.1 cm H₂O (15.7 kPa).

NOTE:

The airway pressure gauge is not connected to the auxiliary outlet.

NOTE:

The Auxiliary Outlet oxygen percentage is not adjustable. It always supplies 100% oxygen.

**WARNING:**

The internal adjustable airway pressure relief is not functional with a self-inflating bag because the patient supply is connected to the fresh gas reservoir on the self-inflating bag, rather than directly to the patient airway. When using a self-inflating bag, always use a suitable external airway pressure relief valve connected to the patient airway. To obtain maximum flow, turn the adjustable airway pressure relief knob to the **Max.** position. Failure to do so could result in infant injury

**WARNING:**

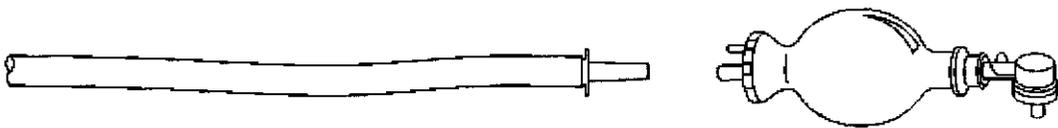
Using a breathing circuit other than the one supplied may inadvertently restrict the gas flow such that the indication of the gas flow and the adjustable airway pressure relief may be inaccurate. Infant injury could occur.

NOTE:

The RM2001™ Gas Delivery Module without AutoBreath™ Infant Resuscitator does not have adjustable airway pressure relief.

- Patient breathing and supply circuits—Use standard commercial tubing with an inner diameter of 0.64 cm (0.25") with a self-inflating bag (PN 67 350 50) on the Resuscitation Module (see figure 1-8 on page -16).

Figure 1-8. Patient Breathing Circuit for Manual Ventilation or Bagging Used with RM2001™ Gas Delivery Module



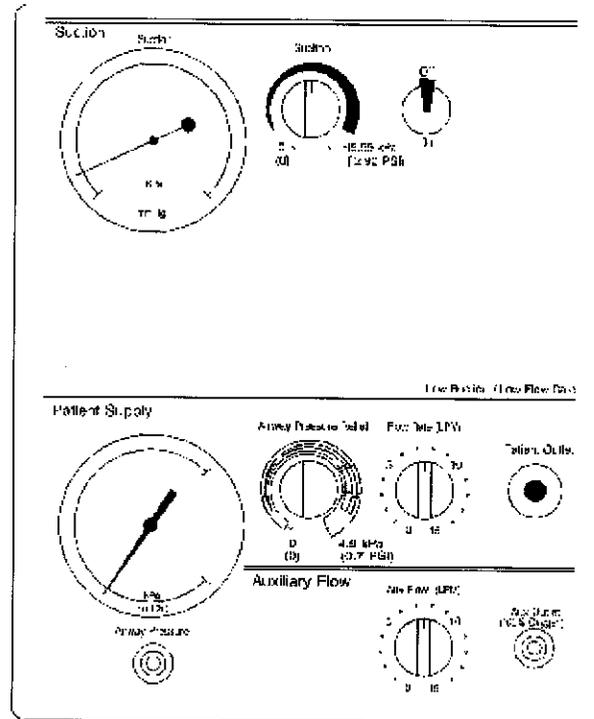
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Resuscitation Module without AutoBreath™ Infant Resuscitator

- **Patient Outlet (Resuscitation Module Only)**—Use the Patient Outlet to provide continuous gas flow to the patient. Controls are provided for **Airway Pressure Relief** (maximum pressure) and **Flow Rate** (circuit flow delivering 100% oxygen or blended gas). The adjustable **Airway Pressure Relief** control is always operative, when used with the provided 15 mm tubing. Pressure relief is adjustable and ranges from 0 to 50 cm H₂O (0 kPa to 4.9 kPa). The fixed internal safety relief valve is always operable and provides redundant maximum pressure relief at 60 cm H₂O (5.9 kPa) ± 20% and allows the patient to inspire room air in the event of gas supply failure (see figure 1-9 on page -17).

For the U.K. only: The fixed internal safety relief valve provides a maximum pressure relief at 50 cm H₂O (4.9 kPa) ± 20%.

Figure 1-9. Resuscitation Module without AutoBreath™ Infant Resuscitator (Front Panel)



82891451004

- **Airway Pressure**—The airway pressure gauge monitors the airway pressure when externally connected to patient circuits.
- **Blender Module**—The optional Blender Module provides blended oxygen from 21% to 100% to the Patient Outlet on the Resuscitation Module.
- **Auxiliary Outlet**—The Auxiliary Outlet supplies 100% oxygen through the **Auxiliary Flow** control to the Auxiliary Outlet connector. It is intended for oxygen enrichment of a manual bag resuscitator, for supplemental delivery to the patient, mother, or a second neonate, such as a twin. The **Auxiliary Flow** control adjusts the flow rate from 0 to 15 LPM. An internal pre-set relief valve limits the Auxiliary Outlet pressure to 160 cm H₂O (16 kPa).

For the U.K. only: This internal pre-set relief valve limits the **Aux Outlet** pressure to 40 cm H₂O (3.9 kPa).

NOTE:

The Auxiliary Outlet oxygen percentage is not adjustable. It always supplies 100% oxygen.



WARNING:

The internal adjustable airway pressure relief is not functional with a self-inflating bag because the patient supply is connected to the fresh gas reservoir on the self-inflating bag, rather than directly to the patient airway. When using a self-inflating bag, always use a suitable external airway pressure relief valve connected to the patient airway. To obtain maximum flow, turn the adjustable airway pressure relief knob to the **Max.** position. Failure to do so could result in infant injury

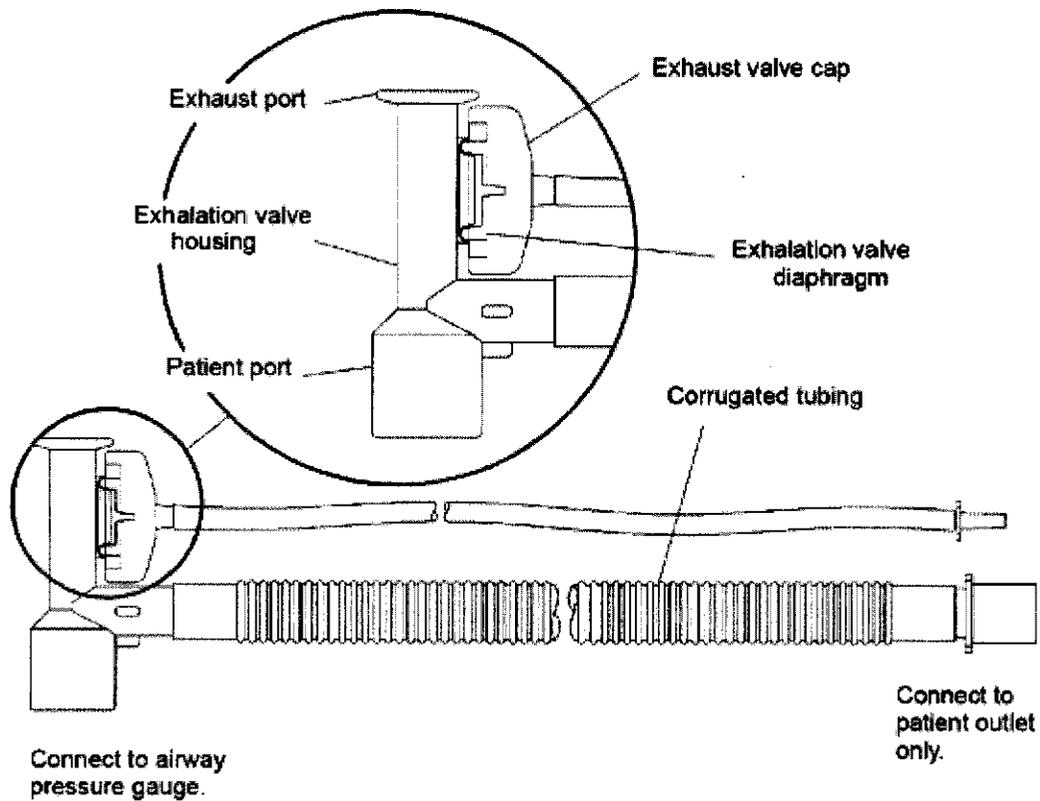


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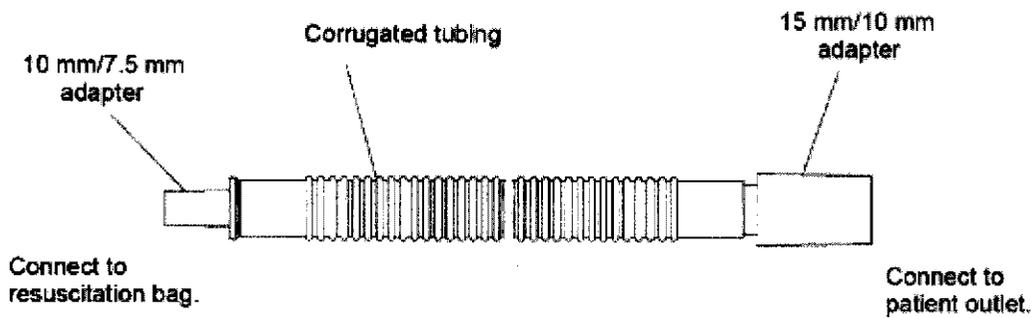
Using a breathing circuit other than the one supplied may inadvertently restrict the gas flow such that the indication of the gas flow and the adjustable airway pressure relief may be inaccurate. Infant injury could occur.

- **Patient Breathing and Supply Circuits**—Use the reusable breathing circuit (PN 81 000 06) or a disposable patient supply circuit (PN 81 001 27) for manual bagging on the Resuscitation Module (see figure 1-10 on page -19).

Figure 1-10. Patient Breathing Circuit for Manual Ventilation or Bagging Used with Resuscitation Module without AutoBreath™ Infant Resuscitator



Patient breathing circuit for manual ventilati



Patient breathing circuit for manual bagging

Resuscitation Module with AutoBreath™ Infant Resuscitator (not available in the U.S.)

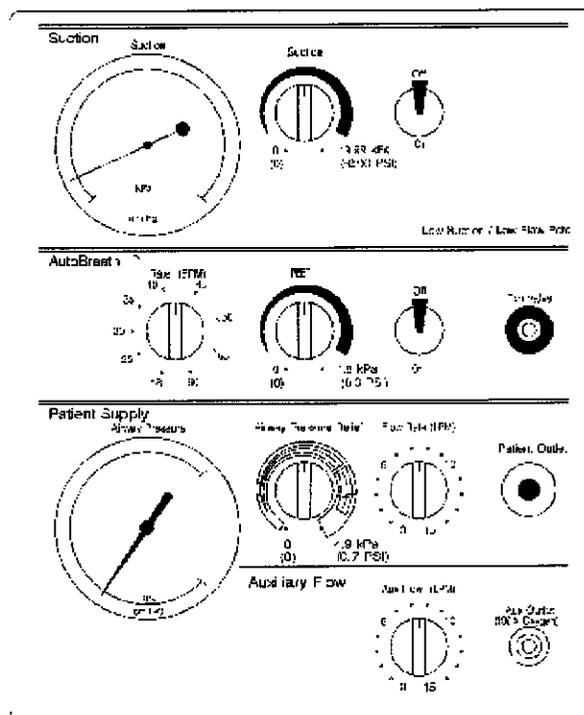


WARNING:

Always use an airway pressure monitor if the AutoBreath™ Infant Resuscitator is to be used unattended. Failure to do so could result in patient injury.

- AutoBreath™ Infant Resuscitator - Use the AutoBreath™ Infant Resuscitator in conjunction with the continuous gas flow provided by the Patient Supply sub-module. The AutoBreath™ Infant Resuscitator circuit is a gas-powered, time-cycled, continuous flow, pressure-limited resuscitator. It has a Rate (breaths-per-minute 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 (see figure 1-11 on page -20).

Figure 1-11. Resuscitation Module with AutoBreath™ Infant Resuscitator (not available in the U.S.) (Front Panel)



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- **Patient Gas Supply** - The Patient Gas Supply circuit may be used with the AutoBreath™ Infant Resuscitator turned 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 valve is also provided and is also always operable. If the resuscitation module is PN 81 400 80, it provides redundant maximum pressure relief at 50 cm H₂O (4.9 ± 0.5 kPa). If the resuscitation module is PN 81 400 81, it provides redundant maximum pressure relief at 60 cm H₂O (5.9 ± 0.5 kPa). Both fixed internal safety valves allows the patient to inspire room air in the event of gas supply failure. Negative pressure is not available in the expiratory phase.

NOTE:

Flow Rate (LPM) is equivalent to flow meter.

- **Auxiliary Outlet**—The Auxiliary Outlet supplies 100% oxygen through the **Auxiliary Flow** control to the Auxiliary Outlet connector. It is intended for oxygen enrichment of a manual bag resuscitator, for supplemental delivery to the patient, mother, or a second neonate, such as a twin. The **Auxiliary Flow** control adjusts the flow rate from 0 to 15 LPM. An internal pre-set relief valve limits the Auxiliary Outlet pressure to 160 cm H₂O (16 kPa).

For the U.K. only: This internal pre-set relief valve limits the **Aux Outlet** pressure to 40 cm H₂O (3.9 kPa).

NOTE:

Increasing back pressure may develop 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 (32 scfh) (maximum) can be achieved.

NOTE:

The Auxiliary Outlet oxygen percentage is not adjustable. It always supplies 100% oxygen.



WARNING:

The internal adjustable airway pressure relief is not functional with a self-inflating bag because the patient supply is connected to the fresh gas reservoir on the self-inflating bag, rather than directly to the patient airway. When using a self-inflating bag, always use a suitable external airway pressure relief valve connected to the patient airway. To obtain maximum flow, turn the adjustable airway pressure relief knob to the **Max.** position. Failure to do so could result in infant injury.

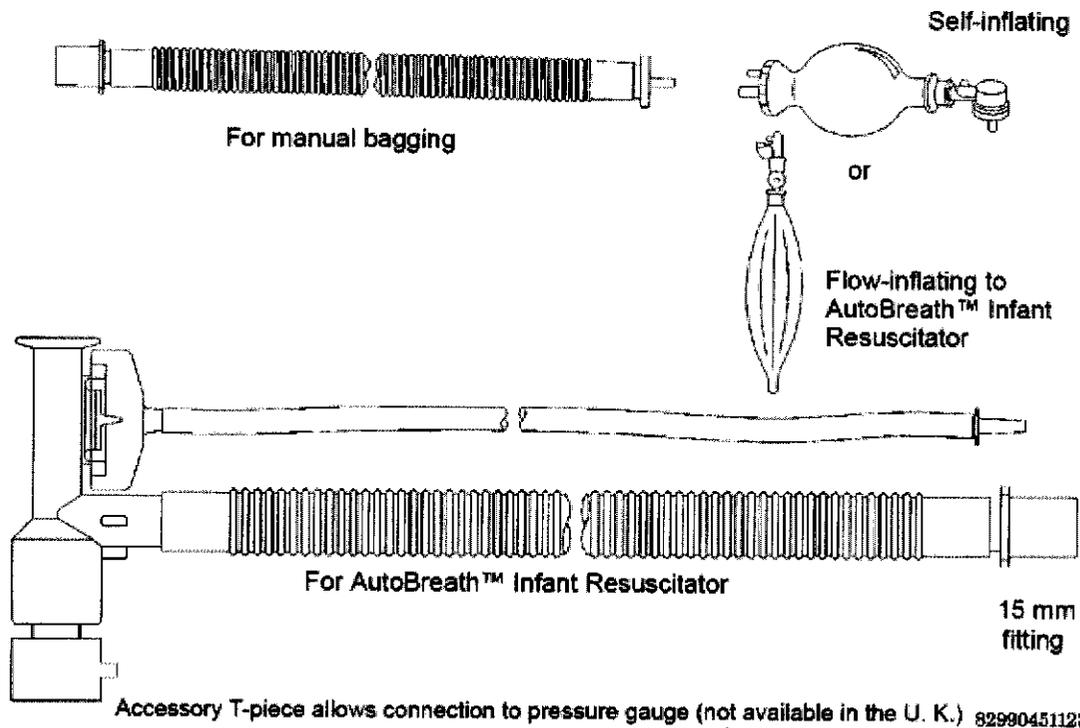


WARNING:

Using a breathing circuit other than the AutoBreath™ Infant Resuscitator Breathing Circuit (PN 81 000 19) may inadvertently restrict the gas flow such that the indication of the gas flow and the adjustable airway pressure relief may be inaccurate. Infant injury could occur.

- Patient Breathing Circuits - Use the patient breathing circuit (PN 81 000 19) in conjunction with the AutoBreath™ Infant Resuscitator. Additionally, a patient supply circuit (PN 81 001 26) for manual bagging, or blowby, may also be used (see figure 1-12 on page -23).

Figure 1-12. Patient Breathing Circuit for Manual Ventilation or Bagging Used with Resuscitation Module with AutoBreath™ Infant Resuscitator



Suction

A gas-powered, venturi-generated vacuum drives the suction circuit, which provides a negative pressure for suctioning the patient's airway. This suction device is specifically intended for removal of mucus from neonates post delivery. The suction negative pressure is indicated on the suction gauge. Adjust suction with the **Suction** control, and turn it on or off with the **On/Off** switch. A fixed relief valve limits the maximum suction pressure to 150 mm Hg (80" H₂O). This Suction Module contains an On/Off switch and a suction control knob for suction adjustment between 0 to 2.99 psi (0 to 19.99 kPa). A minimum of 16 LPM (34 scfh) is available at the maximum suction setting.

Figure 1-13. Suction Controls (Front Panel)

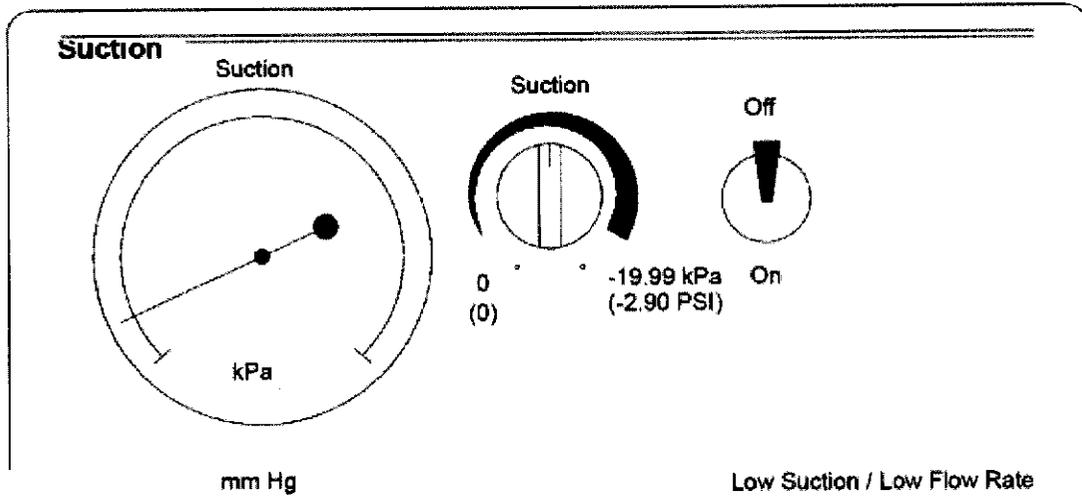
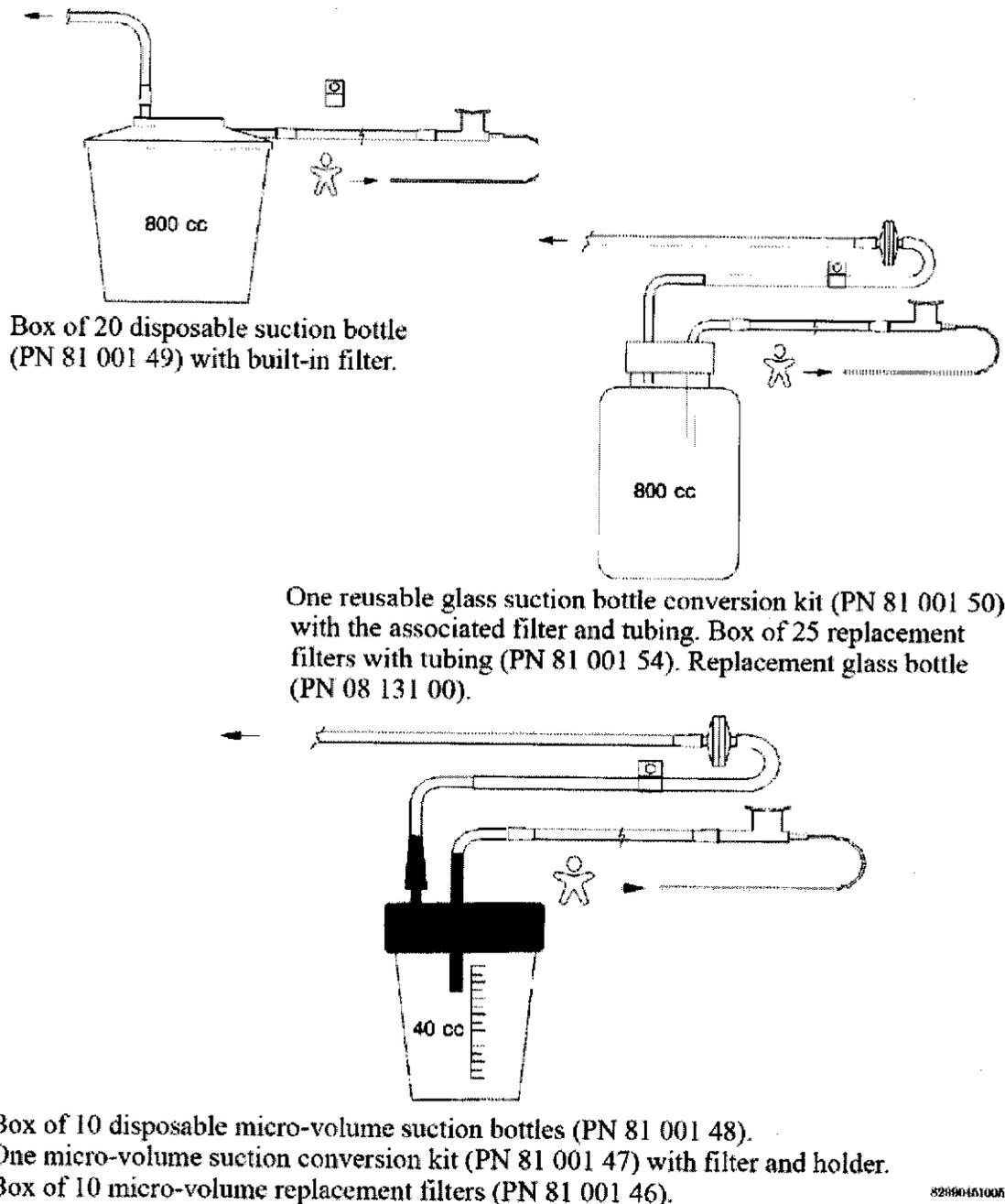


Figure 1-14. Suction Functional Block Diagram



Suction Line Filter

The Suction Line Filter is a hydrophobic bacterial filter that is connected in line with the supply connection to the suction bottle. An extension tubing connects to the suction bottle outlet port.

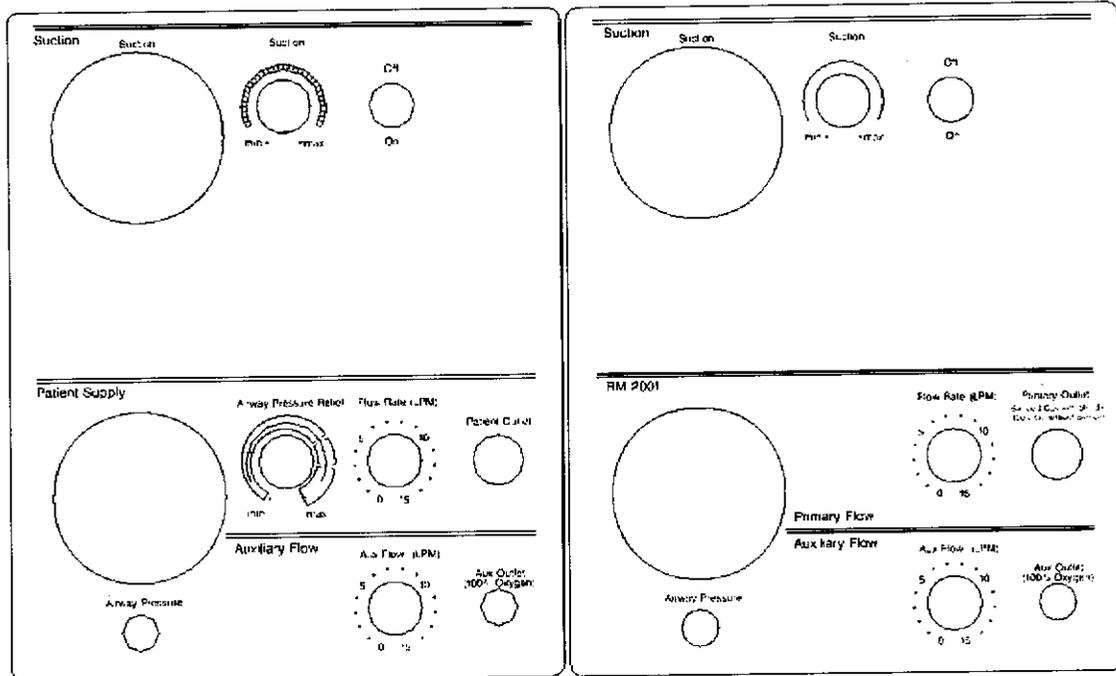
Gas Supply Module (Optional)

The Gas Supply Module includes an **On/Off** switch that controls the pipeline and cylinder gas supply to the Resuscitation Module. The basic Resuscitation Module includes an oxygen cylinder pressure gauge (see figure 1-15 on page -26).

On units equipped with the Blender Module, oxygen and air pressure gauges are provided.

The Blender Module option changes the Resuscitation Module to add the air pipeline, the tank connections, and also adds an air gauge to the Gas Supply Module.

Figure 1-15. Resuscitation Modules (Front Panels)

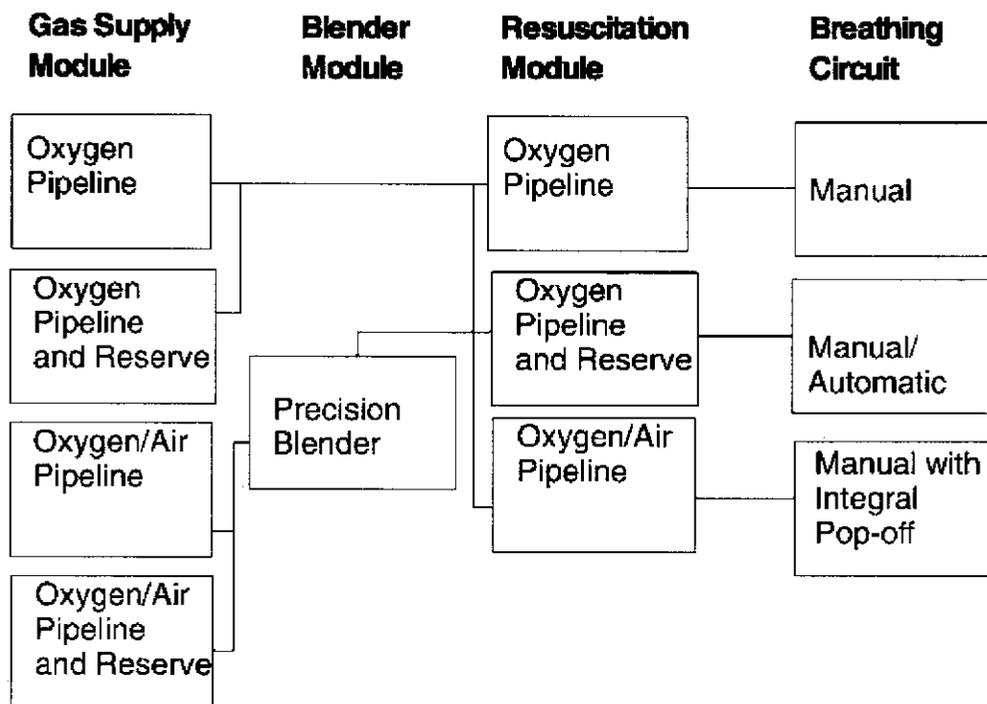


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Gas Delivery System

When the Blender Module is included in the system, the Gas Delivery Module provides 0 to 15 LPM of **oxygen/air mixture**, as selected by the user (see figure 1-16 on page -27). When **no** Blender Module is included in the system, the gas delivery module provides 0 to 15 LPM of **oxygen**, as selected by the user. The flow control is a calibrated, dial-type, flow adjustment.

Figure 1-16. Gas Delivery Flowchart



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Apgar Timer

When the Apgar timer is enabled, the **Apgar Timer** display shows the elapsed minutes and seconds up to 59:59, and an alert alarm sounds at 1, 5, and 10 minute intervals.

Weigh Scale (Optional)

The W30R scale consists of a Display Module and a Weighing Platform. A microcomputer is used to determine the weight of active infants in the Resuscitaire® Birthing Room Warmer and the

Resuscitaire® Radiant Warmer. The infant weight remains on the digital display for approximately 25 to 30 seconds. Refer to the *W30R Weigh Scale User Manual* (PN 03 990 50) that accompanies the scale for additional information.

Alarms

High Temperature

When the baby skin temperature probe is attached to the infant and the skin temperature exceeds 39 C (102 F), the heater automatically turns off, the **High Temp** indicator flashes, and the alarm sounds continuously. Pressing the **Silence/Reset** key silences the alarm for 2 minutes. After the alarm condition is corrected or the skin temperature has gone down to 38.5 C (101 F) or less, the alarm automatically resets. If the skin probe detects a temperature of 39.5 C (103.1 F), the hardware shuts down, and a **System Fail** alarm is generated.

Check Patient

After 10 minutes of operation in the Manual Mode, the **Chk Patient** indicator remains illuminated and the alarm sounds. The alarm continues to sound every 30 seconds for 5 minutes. To silence the alarm for 10 minutes, check the infant's temperature, and press the **Silence/Reset** key. If the alarm has not been acknowledged after a total of 15 minutes, the heater shuts down, and a continuous ramping alarm sounds. Pressing the **Silence/Reset** key activates the heater and silences the alarm.

Probe

If one of the following conditions occur, the **Probe** indicator flashes and a ramping alarm sounds:

- The baby skin temperature probe short circuits.
- The baby skin temperature probe open circuits.
- No baby skin temperature probe is connected to the Controller Module when the Controller Module is in **Baby Mode**.
- The word "Lo" displays in the baby temperature display due to the baby skin temperature probe reading <18 C ambient temperature.

After the alarm condition is corrected, such as the probe being replaced, the alarm automatically resets.

Baby Skin Temperature

When the temperature sensed by the baby skin temperature probe is 1.0 °C (1.3 °F) above or below the displayed **Set Temperature** setting in Baby Mode, the **Baby Temperature** indicator flashes and an alarm sounds, first at a low level, then at a medium level, and finally at a high level. In addition, if the temperature is 0.2 °C (0.4 °F) above the selected set temperature, the heater turns off automatically. Pressing the **Silence/Reset** key silences the alarm.

Power Fail

When AC power to the unit is interrupted while the Controller Module is on, the **Power Fail** indicator flashes and the alarm beeps. When power is restored to the unit, the alarm automatically resets, and all of the settings are retained. Pressing the **ON/STBY** switch silences the alarm.

NOTE:

Turning off the **Power** switch keeps the Controller Module and heater from starting automatically after power is returned to the unit. The settings are retained in memory until power is restored.

System Fail

When an internal malfunction is detected or when a brown-out lasts at least 5 minutes, the **System Fail** indicator flashes and an alarm beeps. In addition, an error code, **Er01** through **Er23**, appears in the **Baby Temperature** display. This alarm can not be reset.

Blender Module Differential Bypass Alarm (Optional)

Whenever the pressure differential between the oxygen and air supplies exceeds 30 psi ± 5 psi (207 kPa ± 34 kPa), the Blender Module sounds an alarm and becomes bypassed. When this condition occurs, the Blender Module continues to supply whichever gas is at the higher pressure: either 100% air or 100% oxygen. This is an audible alarm only; there are no visual indicators. If a Blender Module is present, both sources of air and oxygen must be connected and turned on to prevent the **Differential Bypass** alarm from activating.

NOTE:

Because this alarm is pneumatically powered, either oxygen or air must be present for the alarm to sound.

Specifications

Physical Specifications

For Resuscitaire® Radiant Warmer Products specifications, see table 1-1 on page -30.

Table 1-1. Specifications

Feature	Dimension
Skin temperature display range	18 °C to 43 °C (64.4 °F to 109.4 °F)
Skin temperature display accuracy (The skin temperature setpoint range is between 34 °C and 38 °C (93.2 °F and 100.4 °F))	± 0.2 °C for 31 °C to 38 °C (± 0.36 °F for 87.8 °F to 100.4 °F)
Skin temperature display resolution	0.01 °C (0.1 °F)
Apgar timer display range	0:00 to 59:59 (minutes:seconds)
Apgar timer display resolution	1 s
Apgar timer display accuracy	0 seconds ± 1 second
Manual heat control	Adjustable in 10% increments from 0% to 100% (full power)
Data port	2400 bits/s fixed baud rate. RS-232C compatible
Mattress tilt (WBR82 and RW82 only)	0°, 5°, and 10°
Bassinet Tilt-Vari-tilt (if so equipped) (WBR82 and RW82 only)	± 10° from horizontal
Operating temperature range	18 °C to 30 °C (64.4 °F to 86 °F) ambient
Storage temperature range	- 40 °C to 70 °C (-40 °F to 158 °F) ambient
Relative humidity operating range	5% RH to 95% RH, non-condensing
Heater element life expectancy	1000 hours of operation

For Resuscitaire® Radiant Warmer physical specifications, see table 1-2 on page -31.

Table 1-2. Resuscitaire® Radiant Warmer (RW82) Physical Specifications

Feature	Dimension
Mattress height	100 cm (39.4")
Mattress height with VHA	89.2 cm to 110.2 cm (35.1" to 43.4")
Height	190.5 cm (75.0")
Height with VHA	171 cm to 200.7 cm (67" to 79")
Height with VHA and Vari-tilt option (RW82 only)	205.7 cm (81")
Width (side to side)	74.9 cm (29.5")
Depth (front to back)	114.3 cm (45.0")
Weight	91 kg (200 lb)
Weight with VHA	100 kg (220 lb)
Warmer head rotation (right and left)	90

For Resuscitaire® Birthing Room Warmer physical specifications, see table 1-3 on page -31.

Table 1-3. Resuscitaire® Birthing Room Warmer (WBR82) Physical Specifications

Feature	Dimension
Mattress height	100 cm (39.4")
Height	188 cm (74")
Height cart/bassinet to mattress	99 cm (39")
Width (side to side)	71.1 cm (28.0")
Width cart/bassinet (to outside of bumper)	61 cm (24")
Depth (front to back)	121.9 cm (48.0")
Weight with warmer and cart	145.1 kg (320 lb)
Weight cart/bassinet (without tanks)	< 73 kg (160 lb)

Length cart/bassinet (to outside of bumper)	79 cm (31")
Total length	122 cm (48")
Warmer head rotation (right and left)	90

For Resuscitaire® Wall Mounted Warmer physical specifications, see table 1-4 on page -32.

Table 1-4. Resuscitaire® Wall Mounted Warmer (WMRW82) Physical Specifications

Feature	Dimension
Weight with bracket	18.1 kg (40 lb)
Weight without bracket	15.8 kg (35 lb)
Length	75.7 cm (29.8")
Width	25.4 cm (10.0")
Height	15.2 cm (6.0")
Warmer head rotation (right and left)	90

For Resuscitaire® Radiant Warmer (RW82) and Resuscitaire® Birthing Room Warmer (WBR82) accessory specifications, see table 1-5 on page -32.

Table 1-5. Resuscitaire® Radiant Warmer (RW82) and Resuscitaire® Birthing Room Warmer (WBR82) Accessory Specifications

Feature	Dimension
Accessory infusion pump/IV pole weight limit	2 kg (5 lb) maximum
Accessory monitor shelf weight limit	5 kg (10 lb) maximum
Accessory monitor shelf dimensions	35.6 cm x 30.5 cm (14.0" x 12.0")

Electrical Specification

For Resuscitaire® Radiant Warmer Products electrical specifications, see table 1-6 on page -33.

Table 1-6. Electrical Specifications

Feature	Dimension
120V models	120V, 60 Hz, 750 W (non-VHA), 1300 W (VHA)
100V models	100V, 50/60 Hz, 750 W (non-VHA), 1300 W (VHA)
220/240V models	220V/240V, 50/60 Hz, 750 W (non-VHA), 1300 W (VHA)
Overload protection (100V and 120V models only)	Dual circuit breakers: 6A (non-VHA), 10A (VHA)
Overload protection (220/240V model only)	Dual circuit breakers: 3A (non-VHA), 5A (VHA)
Chassis leakage current (100V and 120V models only)	Less than 300 μ A
Chassis leakage current (220V and 240V models only)	Less than 500 μ A
Examination light	> 100 foot candles (0.11 lumens/cm ²)
Electrical Module audio alarm ramping alarm (80 dBA maximum for infant)	Tone frequency: 1.2 kHz maximum three-stage sound level: 15 seconds low, 15 seconds medium and then high.

Alarm Specifications

For Resuscitaire® Radiant Warmer Products alarm specifications, see table 1-7 on page -33.

Table 1-7. Alarm Specifications

Alarm	Cause
High temperature	Activates if the baby skin temperature probe is attached and the skin sensor reaches 39.0 °C (102.2 °F). Resets at 38.5 °C (101.3 °F).
Check patient	Activates in manual mode after 10 minutes. Remains on with the audible alarm every 30 sec. for 5 minutes for a total of 15 minutes. The heater then turns off.

Alarm	Cause
Apgar timer	Activates at 1, 5, and 10 minutes. Apgar time intervals.
Power fail	Activates during a loss of power. Stays activated for >10 minutes.
Probe	Activates if the baby skin temperature probe fails (opens or shorts) or is disconnected.
System fail	Activates when there is a system failure.
Baby (skin) temperature	Activates if the baby skin temperature fluctuates 1 C above or below the setpoint.
Electrical Module, audio ramping alarms (80 dBA maximum for infant)	Tone frequency: 1.2 KHz maximum three-stage sound level: 15 seconds low, 15 seconds medium, then high until reset
Blender Module pneumatic audio alarm	Vibrating reed, pneumatically powered.

Resuscitation Modules Specifications (Resuscitaire® Birthing Room Warmer (WBR82) and Resuscitaire® Radiant Warmer (RW82) Only)

For Resuscitation Modules Specifications (Resuscitaire® Birthing Room Warmer (WBR82) and Resuscitaire® Radiant Warmer (RW82) only), see table 1-8 on page -34.

Table 1-8. Resuscitation Modules Specifications (Resuscitaire® Birthing Room Warmer (WBR82) and Resuscitaire® Radiant Warmer (RW82) Only)

Feature	Dimension
RM2001™ Gas Delivery Module	
Wall supply pressure	40 psi to 75 psi (276 kPa to 517 kPa)
Cylinder pressure	3000 psi (20684 kPa) maximum
Cylinder length (with VHA ^a)	70 cm (27.5")

Feature	Dimension
Cylinder length (with VHA and spacer)	76 cm (30")
Cylinder diameter	12 cm (5") maximum
Primary outlet flow range	0 to 15 LPM
Primary outlet supply pressure limit	160.1 cm H ₂ O (15.7 kPa) ± 20%
Redundant maximum pressure relief	160.1 cm H ₂ O ± 10 cm H ₂ O (15.7 kPa ± 1 kPa)
Auxiliary circuit flow range	0 to 15 LPM
Auxiliary outlet internal relief valve limit	160.1 cm H ₂ O (15.7 kPa) ± 10% maximum
RESUSCITATION (w/o AutoBreath™ Infant Resuscitator feature, PN 8140072 and 8140073)	
Wall supply pressure	40 psi to 75 psi (276 kPa to 517 kPa)
Cylinder pressure	3000 psi (20684 kPa) maximum
Cylinder length (with VHA)	70 cm (27.5")
Cylinder length (with VHA and spacer) ♦	76 cm (30")
Cylinder diameter	12 cm (5") maximum
Patient gas supply airway pressure limit, operator adjustable	0 to 50 cm H ₂ O (0 to 4.9 kPa) ± 10%
Patient gas supply fixed pressure relief, factory-set (8140072)	50 cm H ₂ O ± 10% (4.9 kPa)
Patient gas supply fixed pressure relief, factory-set (8140073)	60 cm H ₂ O ± 10% (5.9 kPa)
Primary outlet supply pressure limit	160.1 cm H ₂ O (15.7 kPa) ± 20%
Primary outlet flow range	0 to 15 LPM
Auxiliary supply pressure limit (w/o AutoBreath™ Infant Resuscitator feature)	160.1 cm H ₂ O (15.7 kPa) ± 10% maximum
Auxiliary flow circuit flow range	0 to 15 LPM
Patient gas supply, fixed pressure relief, factory-set (8140070)	50 cm H ₂ O (4.9 kPa) ± 20% (U.K. only)

Specifications

Chapter :

Feature	Dimension
Patient gas supply, fixed pressure relief, factory-set (8140072 and 8140073)	160.1 cm H ₂ O (15.7 kPa) ± 10%
Auxiliary supply pressure limit	40 cm H ₂ O (3.9 kPa) ± 10% (U.K. only)
RESUSCITATION (w/AutoBreath™ Infant Resuscitator feature, PN 8140080 and 8140081)	
Wall supply pressure	40 psi to 75 psi (276 kPa to 517 kPa)
Cylinder pressure	3000 psi (20684 kPa) maximum
Cylinder length (with VHA)	70 cm (27.5")
Cylinder length (with VHA and spacer)	76 cm (30")
Cylinder diameter	12 cm (5") maximum
Patient gas supply airway pressure limit, operator adjustable	0 to 50 cm H ₂ O (0 to 4.9 kPa) ± 10%
Patient gas supply fixed pressure relief, factory-set (8140080)	50 cm H ₂ O ± 20% (4.9 kPa)
Patient gas supply fixed pressure relief, factory-set (8140081)	60 cm H ₂ O ± 20% (5.9 kPa)
Primary outlet supply pressure limit	160.1 cm H ₂ O (15.7 kPa) ± 20%
Primary outlet flow range	0 to 15 LPM
Auxiliary supply pressure limit (8140081)	160.1 cm H ₂ O (15.7 kPa) ± 10% maximum
Auxiliary supply pressure limit (8140080)	40 cm H ₂ O (4 kPa) ± 10% maximum (U.K. only)
Auxiliary flow circuit flow range	0 to 15 LPM
Auxiliary flow circuit pressure	40 cm H ₂ O (4 kPa) ± 10% maximum

a. VHA is a Resuscitaire® Radiant Warmer (RW82) with a vertical height adjustment.

® Data Tag Reference RW82VHA Cart Assembly Part Numbers:

8201081 Cart Assembly, VHA, 240V, U.K.

8201170 Cart Assembly, VHA, Vari-tilt, 120V

8201171 Cart Assembly, VHA, Vari-tilt, No Resuscitation

8201180 Cart Assembly, VHA, Vari-tilt, 240V
 8201182 Cart Assembly, VHA, Vari-tilt, 240V, No Resuscitation

AutoBreath™ Infant Resuscitator Specifications

For AutoBreath™ Infant Resuscitator (factory-installed option) specifications, see table 1-9 on page -37.

Table 1-9. AutoBreath™ Infant Resuscitator Specifications

Feature	Dimension
Inspiratory:Expiratory (I:E) ratio	Fixed at 1:2 ± 20%
Positive end expiratory pressure (PEEP) ratio	0 to 18 cm H ₂ O (0 kPa to 1.8 kPa) ± 10% of setting
Breath rate	18 to 60 BPM ± 10% of setting
Adjustable airway pressure relief (range of working pressure)	0 to 50 cm H ₂ O ± 5 cm H ₂ O (0 to 4.9 kPa ± 0.5 kPa)
Fixed maximum pressure (P lim max)	50 cm H ₂ O (5.0 kPa) ± 10%
Fixed minimum pressure (P lim min)	0 cm H ₂ O (0 kPa)
System oxygen consumption	50.0 LPM (106 scfh) maximum
Logic gas oxygen consumption	5.0 LPM (10.6 scfh)

Suction Specifications

For suction specifications, see table 1-10 on page -37.

Table 1-10. Suction Specifications

Feature	Dimension
Suction circuit adjustable suction intensity	0 mm Hg to 150 mm Hg ± 3.98 mm Hg (0 kPa to 19.99 kPa ± 0.53 kPa)
Suction circuit maximum vacuum	-2.90 psi ± 0.08 psi (-19.99 kPa ± 0.53 kPa)

Feature	Dimension
Suction circuit maximum flow rate	< 20 LPM (42 scfh) (minimum of 16 LPM (34 scfh) at maximum)
Tubing	6 mm (0.25") inner diameter by 1.8 m (72") with sure-grip female molded connector
Total flow resistance (without attachments, subassemblies, or components added to the breathing system)	≤ 2 cm H ₂ O (0.2 kPa) @ 15 LPM
Total flow resistance (without attachments, subassemblies, or components added to the breathing system)	≤ 6 cm H ₂ O (0.6 kPa) @ 5 LPM
Blender Module oxygen concentration, adjustable	21 O ₂ % to 100 O ₂ %

NOTE:

Suction will be driven by a 20 psi (138 kPa) regulated 100% O₂ source.

Regulations, Standards, and Codes

The Resuscitaire® Radiant Warmer Products meet the following regulations, standards, and codes:

EN 60601-1: 1990, Medical Electrical Equipment, Part 1: General Requirements for Safety, including Amendments 1 and 2

EN 60601-1-2: 2001, Collateral Standard: Electromagnetic Compatibility, Requirements and Tests

EN 60601-2-21: 1994, Particular Requirements for the Safety of Infant Radiant Warmers, including Amendment 1

C22.2 No. 601.1.1: 1994, Medical Electrical Equipment, Safety Requirements for Medical electrical Systems

Directive 2002/96/EC of the *European Parliament and of the Council of 2003-01-27 on Waste Electrical and Electronic Equipment (WEEE) Annex IV, prEN 50419*

The Resuscitaire® Birthing Room Warmer (WBR82) and the Resuscitaire® Radiant Warmer (RW82) meet the following regulations, standards, and codes:

EN794-1:1997, Lung ventilators, Part 1: Particular requirements for critical care ventilators, including Amendment 1: 2000

EN10079-1:1996 or 1999, Medical suction equipment - Part 1: Electrically powered suction equipment - Safety requirements (ISO 10079-1:1991, including technical corrigendum 1:1992 and technical corrigendum 2:1993)

EN12342: 1998, Breathing tubes intended for use with anaesthetic apparatus and ventilators

NOTE:

These regulations, standards, and codes do not apply to the Resuscitaire® Wall Mounted Radiant Warmer (WMRW82) only because it is not equipped with resuscitation or suction equipment.

Device Classification (EN 60601 Medical Electrical Equipment Part I: General Requirements for Safety)

- Class I
- Type BF
- IPX 0 ordinary equipment
- Not AP
- Continuous operation

Model Identification

For Resuscitaire® Radiant Warmer model identification, see table 1-11 on page -39.

Table 1-11. Resuscitaire® Radiant Warmer Model Identification

Model Number	Description
RW82-1, RW82-1C, and RW82-1E Series 00	Resuscitaire® Radiant Warmer
RW82-1, RW82-1C, and RW82-1E Series 01	Resuscitaire® Radiant Warmer with AutoBreath™ Infant Resuscitator

Model Number	Description
RW82VHA-1, RW82VHA-1C, and RW82VHA-IE Series 00	Resuscitaire® Radiant Warmer with vertical height adjustable cart assembly

For Resuscitaire® Birthing Room Warmer model identification and series changes, see table 1-12 on page -40.

Table 1-12. Model Identification and Series Changes

Model Number	Description
WBR82-1 Series 00	Original Resuscitaire® Birthing Room Warmer
WBR82-1 Series 01	Resuscitaire® Birthing Room Warmer with new Resuscitation Module

For model identification of the available modules, see table 1-13 on page -40.

Table 1-13. Model Identification of the Available Modules

Model Number	Description
RM811-1 and RM812-1 Series 00	Resuscitation Module
RM811-1 and RM812-1 Series 01	Resuscitation Module with airway pressure gauge port (P/N 8140072, 8140072, and 8140081)
RM811-1 and RM812-1 Series 02	Resuscitation Module without AutoBreath™ Infant Resuscitator (P/N 8140073 and 8140073)
RM2001™	Gas Delivery Module without AutoBreath™ Infant Resuscitator
GS811-1, GS812-1, GS813-1, and GS814-1 Series 00	Gas Supply Module
BL81-1 Series 00	Blender Module
EM81-1 and EM81-1E Series 00	Controller Module

Model Number	Description
EM81-1 and EM81-1E Series 01	Controller Module without capacitor on circuit breaker
WM81-1 and WM81-1E Series 00	Warmer module
WM81-1 and WM81-1E Series 01	Warmer module with filter assembly
82VHA-1 and 82VHA-1C Series 00	Cart assembly having an adjustable vertical height (for use with Resuscitaire® Radiant Warmer)
CBB82-1	Cart assembly (for use with Resuscitaire® Birthing Room Warmer)

Safety Tips



WARNING:

Prior to reuse, confirm that the patient breathing circuit contains all necessary parts. Failure to do so could result in patient injury.



WARNING:

Ensure the patient breathing circuit connections are secure and free of obstructions. Failure to do so could result in patient injury.



CAUTION:

United States federal law restricts this device to sale on or by the order of a physician.



CAUTION:

To prevent removal of the controller chassis with the AC power on, secure the line cord to the back cover. Failure to do so could result in equipment damage.



CAUTION:

Do not kink the suction hoses. Doing so may result in equipment damage.



CAUTION:

Before transporting the unit, ensure that the power cord, hoses, and other equipment are properly stowed. Failure to do so could result in equipment damage.

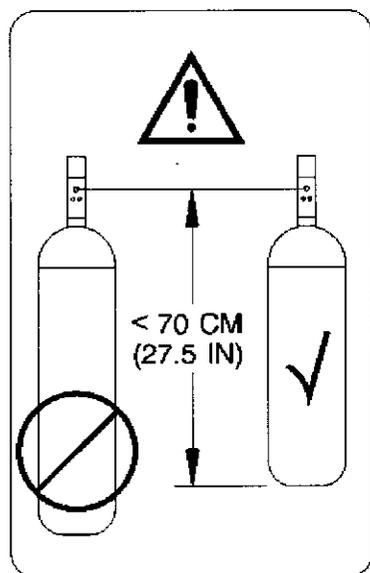
Warning and Caution Labels

Figure 1-17. Warning and Caution Labels

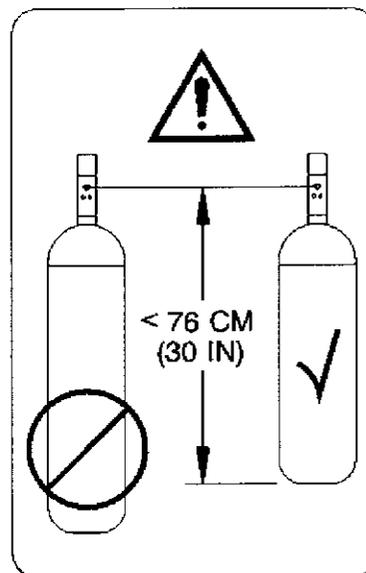
<p>CAUTION</p> <p>TO AVOID HAZARDS OF OVERHEATING OR UNDERHEATING, INFANT SHOULD NOT BE LEFT UNATTENDED</p>	<p>CAUTION</p> <p>TEMPERATURE OF INFANT'S SKIN SHOULD BE MONITORED AND CONTROLLED DURING EXTENDED WARMING</p>	<p>CAUTION</p> <p>OPEN HEAT/TEMPERATURE MEASUREMENTS MAY LEAD TO UNDESIRABLE WATER LOSS. MEASURES TO MAINTAIN DESIRED FLUID BALANCE SHOULD BE CONSIDERED</p>
<p style="text-align: center;">TEMPERATURE CONTROL USER PRECAUTIONS</p> <ul style="list-style-type: none"> Perform CONTROLLER SELF TEST before each use. To avoid overheating, attach Patient Probe only to skin surface of body exposed to the warmer. Patient Probe must be in intimate contact with skin and shielded from heater radiation with a reflective cover for proper skin temperature measurement and control. To avoid overheating or underheating, skin temperature must be continuously monitored and controlled either manually or automatically. Redundant warming increases insensible water loss; take appropriate measures to maintain proper patient fluid balance. For effective heating, make sure the Warmer Module is positioned on the center axis and locked with its center. Avoid placement of objects between the Infant and Warmer Module that can block heat transfer or absorb heat. This can cause overheating. <p style="text-align: center;">CONTROLLER SELF TEST</p> <p>When the Controller is turned on, a series of diagnostic tests are performed. During this diagnostic routine (approximately 6 to 10 seconds in duration) all indicators are turned on, and digital displays show all eights and a brief audible tone is sounded.</p> <p>If any indicator fails to light, or any segment(s) of the digital displays fails to light, or the audible tone fails to sound, DO NOT PLACE the unit into service. Refer to qualified service personnel.</p> <p>If the System Fail Alarm Indicator remains on after the test is complete, DO NOT PLACE the unit into service. Refer to qualified service personnel.</p> <p style="text-align: center;">OXYGEN PRECAUTIONS</p> <p>WARNING - Fire Hazard: Keep matches and all other sources of light out of the room in which oxygen is in use. Combustive materials are easily ignited and burn with great intensity in oxygen-enriched air.</p> <p>WARNING - Improper use of supplemental oxygen may be associated with serious side effects. Oxygen should only be administered by properly trained personnel under the direction of a qualified attending physician.</p> <p>WARNING - Excessive airway pressure can cause damage to patient's lungs.</p> <ul style="list-style-type: none"> Check adjustable airway pressure relief control by setting the gas fed airway pressure limit and occluding the patient airway tube. Always monitor airway pressure and, or provide appropriate pressure relief during infant resuscitation. Auxiliary gas supply pressure is normally limited to 160 cmH₂O (without AutoBreathe) or 40 cmH₂O (with AutoBreathe). <p>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.</p> <p style="text-align: center;">LOW FLOW MICROBLENDER WARNINGS</p> <ul style="list-style-type: none"> Whether 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 affects the F_IO₂ and flow output from the microblender. Gas input pressure must be within the specified limits. Always operate the low flow microblender with clean dry medical grade gases. Air and 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 (PaO₂) should be monitored. 	<p style="text-align: center;">TEMPERATURE CONTROL USER PRECAUTIONS</p> <ul style="list-style-type: none"> Perform CONTROLLER SELF TEST before each use. To avoid overheating, attach Patient Probe only to skin surface of body exposed to the warmer. Patient Probe must be in intimate contact with skin and shielded from heater radiation with a reflective cover for proper skin temperature measurement and control. To avoid overheating or underheating, skin temperature must be continuously monitored and controlled either manually or automatically. Redundant warming increases insensible water loss; take appropriate measures to maintain proper patient fluid balance. For effective heating, make sure the Warmer Module is positioned on the center axis and locked with its center. Avoid placement of objects between the Infant and Warmer Module that can block heat transfer or absorb heat. This can cause overheating. <p style="text-align: center;">CONTROLLER SELF TEST</p> <p>When the Controller is turned on, a series of diagnostic tests are performed. During this diagnostic routine (approximately 6 to 10 seconds in duration) all indicators are turned on, and digital displays show all eights and a brief audible tone is sounded.</p> <p>If any indicator fails to light, or any segment(s) of the digital displays fails to light, or the audible tone fails to sound, DO NOT PLACE the unit into service. Refer to qualified service personnel.</p> <p>If the System Fail Alarm Indicator remains on after the test is complete, DO NOT PLACE the unit into service. Refer to qualified service personnel.</p> <p style="text-align: center;">ATTENTION SERVICE PERSONNEL</p> <p>COVER MUST BE REPLACED AND RTV AROUND ALL TOP EDGES</p> <p style="text-align: center;">DO NOT PLACE HEATER WITH THE POWER SWITCH OFF. WHEN THE POWER IS TURNED ON, THE HEATER WILL BECOME HOT. ALWAYS WEAR PROTECTIVE GLOVES. P/N 81 202 RD 120V 35313333114</p> <p style="text-align: center;">REPLACE AND SEAL HEATER WITH THE POWER SWITCH OFF. WHEN THE POWER IS TURNED ON, THE HEATER WILL BECOME HOT. ALWAYS WEAR PROTECTIVE GLOVES. P/N 81 202 RD 120V 35313333114</p>	<p style="text-align: center;">WARNING</p> <p>TO AVOID OVERHEATING OR UNDERHEATING, THE MATTRESS MUST BE LOCATED AS SHOWN</p> <div style="text-align: center;"> </div> <p style="text-align: center;">CAUTION</p> <ul style="list-style-type: none"> DO NOT REMOVE COVER. ELECTRIC SHOCK HAZARD AND LIQUID PENETRATES SOURCE INSIDE. PAPER SERVING TO QUALIFIED PERSONNEL. <p style="text-align: center;">CAUTION</p> <p>MAXIMUM 2 LBS WEIGHT (0.91 Kg)</p> <p style="text-align: center;">CAUTION</p> <p>MAXIMUM 10 LBS WEIGHT (4.5 Kg)</p> <p style="text-align: center;">CAUTION: DO NOT PLACE OBJECTS ON TOP OF WARMER OR BLOCK VENTS.</p>

82990461009

Figure 1-18. Warning Labels



Units without actuator spacer



Units with actuator spacer

82990151010

Troubleshooting Procedures

Chapter 2: Troubleshooting Procedures

2

Getting Started



WARNING:

Only facility-authorized personnel should troubleshoot the Resuscitaire® Radiant Warmer Products. Troubleshooting by unauthorized personnel may result in personal injury or equipment damage.

Begin each procedure in this chapter with step 1. Follow the sequence outlined (each step assumes the previous step has been completed). In each step, the normal operation of the product can be confirmed by answering **Yes** or **No** to the statement. Your response will lead to another step in the procedure, a repair analysis procedure (RAP), or a component replacement. If more than one component is listed, replace them in the given order.

To begin gathering information about the problem, start with **Initial Actions**.

To isolate or identify a problem and to verify the repair after completing each corrective action (replacing or adjusting a part, seating a connector, etc.), perform the **Function Checks**.

To verify the repair, perform the **Final Actions** after the Function Checks.

If troubleshooting procedures do not isolate the problem, call Technical Support for assistance.

Initial Actions

To gather information from operators concerning problems with the Resuscitaire® Radiant Warmer Products, use Initial Actions. Note symptoms or other information concerning the problem that the operator describes. This information helps identify the probable cause.

1. Someone who can explain the problem is available.

Yes No

↓ → Go to "Function Checks" on page -48.

2. Ask that person to demonstrate or explain the problem. The problem can be duplicated.

Yes No

↓ → Go to "Function Checks" on page -48.

3. The problem is a result of improper operator action.

Yes No

↓ → Go to "Function Checks" on page -48.

4. Instruct the operator to refer to the procedures in the *Resuscitaire® Radiant Warmer Products User Manual* (82 990 40/MU12149). To make sure the warmer operates properly, perform the "Function Checks" on page -48.

Function Checks



WARNING:

Do not use the warmer if the Controller Module or other parts of the equipment fail to function properly. Personal injury or equipment damage could occur.

1. Perform "Function Checks" before each use and after disassembly for cleaning, service, or maintenance.
2. Initial Actions have been performed.

Yes No

↓ → Go to "Initial Actions" on page -48.

Controller Module



SHOCK HAZARD:

Plug the power cord only into a properly grounded wall receptacle that is approved for hospital-use and is of the correct voltage. Do **not** use extension cords or an AC receptacle box for this device. Personal injury or equipment damage could occur.

1. Perform the following:
 - a. Plug the AC line cord into the power connector on the rear panel of the controller.
 - b. Check the self-test function by turning on the power switch.

The heater comes on.

Yes	No
↓	→ Go to RAP 2.20.

2. The self-test function engages, and the following occurs:
 - All 8s show across the **Apgar Timer**, **Baby Temperature**, and **Set Temperature** displays.
 - All alarm indicators (except the **Power Fail** indicator) light.
 - 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** key lights.
 - An alarm sounds a high pitched tone, a low pitched tone, and then three beeps.

Yes	No
↓	→ Go to RAP 2.22.

3. When the self-test is complete, the controller begins operating in Pre-Warm Mode.

Yes	No
↓	→ Go to RAP 2.21.

4. Check Pre-Warm Mode. The **Pre-Warm** indicator is on and the **Heater Power** indicator displays ten segments (100%) for 3 min, reduces to six segments (60%) for 12 min, and then reduces to three segments (30%).

Yes No
↓ → Go to RAP 2.21.

5. Press the **Mode Select** key, and select Manual Mode. The **Manual** indicator lights.

Yes No
↓ → Go to RAP 2.5.

6. Perform the following:

- a. Press the up arrow key until all the **Heater Power** display segments light.
- b. Press the down arrow key until all the **Heater Power** indicators are off.
- c. **Heater Power** indicators operate as described.

Yes No
↓ → Go to RAP 2.5.

7. Connect the baby skin temperature probe to the probe connector. The **Baby Temperature** display comes on.

Yes No
↓ → Go to RAP 2.12.

8. Set the **Heater Power** indicator to 100%. All segments light.

Yes No
↓ → Go to RAP 2.6.

9. Wait 10 minute. After 10 minutes have elapsed, the **Chk Patient** indicator comes on, and the alarm sounds one time.

Yes No
↓ → Go to RAP 2.17.

10. Wait an additional 5 minutes. During this time, the alarm sounds at 30 second intervals.

Yes No
↓ → Go to RAP 2.17.

11. At the end of the 5 minutes (15 minutes total), the heater shuts down, the **Heater Power** indicators go off, and the alarm sounds continuously and ramps up in volume.

Yes No
↓ → Go to RAP 2.6.

12. Press the **Silence/Reset** key. The heater comes back on.

Yes No
↓ → Go to RAP 2.20.

13. The **Chk Patient** indicator lights and the alarm sounds.

Yes No
↓ → Go to RAP 2.5.

14. The **Heater Power** indicators come back on.

Yes No
↓ → Go to RAP 2.22.

15. Press the **Keypad Lock** switch. The **Keypad Lock** switch lights up, and the **Mode Select** and **Up** and **Down** keys are inoperative.

Yes No
↓ → Go to RAP 2.5.

16. Press the **Keypad Lock** key. Its light goes off, and the keypad is enabled.

Yes No
↓ → Go to RAP 2.5.

17. Select Baby Mode by pressing the **Mode Select** key. The **Baby** indicator lights, and the **Set Temperature** display activates and defaults to 97.7 F (36.5 C). In addition, the **Baby Temperature** indicator flashes, and the alarm sounds.

Yes No
↓ → Go to RAP 2.5.

18. Press the **Silence/Reset** key. The alarm sound stops, and the **Baby Temperature** indicator remains on.

Yes No
↓ → Go to RAP 2.17.

19. Raise the baby skin temperature probe reading until it exceeds the set temperature by at least 1 C. The **Baby Temperature** indicator flashes, and the alarm sounds.

Yes No
↓ → Go to RAP 2.17.

NOTE:

Make sure the baby skin temperature probe is reading accurate temperature by placing it on top of a calibrated thermometer while performing function checks.

20. Press the **Silence/Reset** key. The alarm sound stops for 10 minutes, and the **Baby Temperature** indicator remains on.

Yes No
↓ → Go to RAP 2.11.

21. Lower the baby skin temperature probe reading until it is below the set temperature by at least 1 °C. The **Baby Temperature** indicator flashes, and the alarm sounds.

Yes No
↓ → Go to RAP 2.17.

22. Press the **Silence/Reset** key. The alarm sound stops for 10 minutes, and the **Baby Temperature** indicator remains on.

Yes No
↓ → Go to RAP 2.11.

23. Check Temperature Override Mode:

a. Press the up arrow key to raise the set temperature to 98.6 °F (37.0 °C).

b. Press the **> 37 °C** key.

The **>37 °C** indicator comes on.

Yes No
↓ → Go to RAP 2.11.

24. Perform the following:

a. Press the up arrow key again to raise the set temperature to 100.4 °F (38.0 °C).

b. Press the down arrow key to lower the set temperature to below 98.6 °F (37.0 °C).

When the set temperature falls below 98.6 °F (37.0 °C), the **>37 °C** indicator goes off.

Yes No
↓ → Go to RAP 2.11.

25. Disconnect the baby skin temperature probe from the **Skin Temperature Probe** connector. The **Baby Temperature** display goes off, the **Probe** indicator flashes, and the alarm sounds.

Yes No
↓ → Go to RAP 2.12.

26. Connect the baby skin temperature probe to the **Skin Temperature Probe** connector, and press the **Start/Stop** key. The **Apgar Timer** display comes on and begins counting up from 0 seconds.

Yes No
↓ → Go to RAP 2.13.

27. When the **Apgar Timer** display reaches 1:00 minute, the alarm beeps once.

Yes No
↓ → Go to RAP 2.13.

28. Press the **Start/Stop** key. The Apgar timer count stops.

Yes No
↓ → Go to RAP 2.5.

29. Press the **Reset** key. The Apgar timer display goes off.

Yes No
↓ → Go to RAP 2.5.

30. Press the **Examination Light** key. The examination light comes on.

Yes No
↓ → Go to RAP 2.5.

31. Press the **Examination Light** key again. The examination light goes off.

Yes No
↓ → Go to RAP 2.5.

32. Check the **Power Fail** alarm:

a. Turn off the circuit breaker on the rear panel.

The **Power Fail** indicator comes on, and the alarm sounds.

Yes No
↓ → Go to RAP 2.4.

NOTE:

The unit must be connected to the AC line, and the power turned on for at least 8 minutes before the Power Fail circuitry becomes active.

33. Perform the following:

a. Turn on the circuit breaker.

b. Turn on the **Power** switch.

c. Raise the reading on the **Skin Temperature** display until it is ≥ 39 C (102 F).

The heater automatically shuts off, the **High Temperature** indicator flashes, and the alarm sounds continuously.

Yes No
↓ → Go to RAP 2.11.

34. Lower the skin temperature reading on the display until it is ≤ 101.3 F (38.5 C), or press the **Silence/Reset** key. The **High Temperature** indicator stops flashing, and the alarm turns off.

Yes No
↓ → Go to RAP 2.11.

Mechanical

1. Depending upon the model of the tilt mechanism, perform one of the following test Methods:
 - a. Support the rear lower edge of the bassinet assembly (A) with the palm of your hand (see figure 2-1 on page -55).
 - Pull up on the mattress tilt control lever (B) located at the bottom rear of the bassinet assembly (A).
 - Place the bassinet assembly (A) in the 5 and 10 tilt positions.
 - Return the bassinet assembly (A) to the level position.

The bassinet tilt control functions properly.

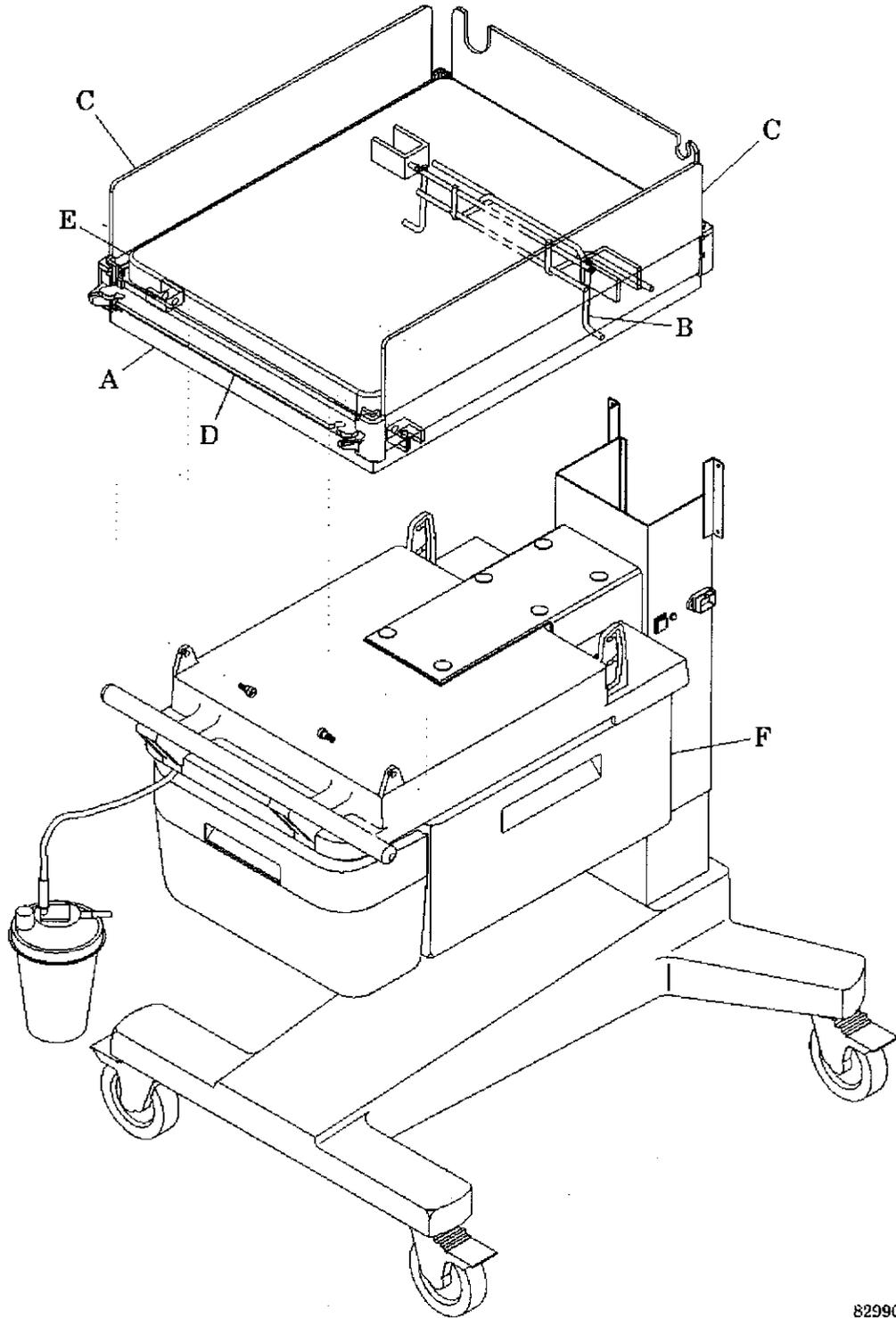
Yes No
↓ → Replace the bassinet.

- b. Check the Vari-tilt control (not available in United States):
 - Rotate the Vari-tilt knob (not shown) in the front of the bassinet clockwise through the entire range from 0 to 10 .
 - Rotate the Vari-tilt knob in the front of the bassinet counter-clockwise through the entire range from 0 to 10 .

The bassinet tilt control functions properly.

Yes No
↓ → Replace the bassinet.

Figure 2-1. Cart Assembly



2

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2. Perform the following:

- a. Raise each side panel (C), and pivot them to hang straight down.
- b. Return each side panel (C) to its upright position, and make sure that they are positively engaged to confine the infant.

The side panels are positively engaged to confine the infant.

Yes No

↓ → Replace the bassinet side panel.

- c. Raise the front panel (D), and slide it under the mattress (E).
- d. Return the front panel (D) to its upright position, and make sure that it is positively engaged to confine the infant.

The front panel is positively engaged to confine the infant.

Yes No

↓ → Replace the bassinet front panel or corner brackets.

3. With the bassinet in the level position. Slide the pass-through drawer (F) in and out on both sides of the cart assembly, and then return it to its center position.

The pass-through drawer functions properly.

Yes No

↓ → Replace the pass-through drawer.



WARNING:

For effective heating, make sure that the warmer head assembly is properly positioned on the center axis, and is locked with a detent. Failure to do so may result in personal injury or equipment damage.



WARNING:

Push on the sides of the Warmer Module. Do not touch **under** the Warmer Module. Personal injury could occur.

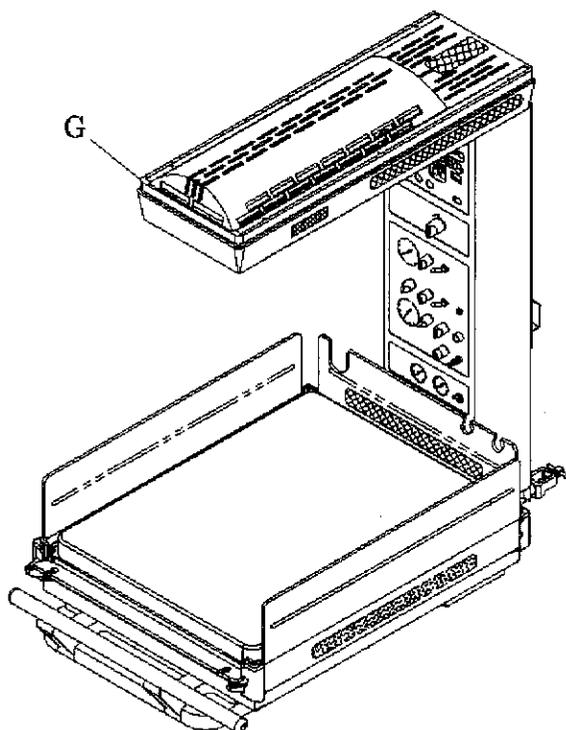
4. Rotate the warmer head assembly (G) 90° to the left and right of center, and then return it to its center position (see figure 2-2 on page -57).

The Warmer Module swivels properly.

Yes No

↓ → Replace the Warmer Module.

Figure 2-2. Warmer Head Assembly



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5. For units with an x-ray cassette tray accessory, perform the following:
 - a. Grasp the middle of a side panel (C), and pull the x-ray cassette tray out from under the bassinot assembly (A) (see figure 2-1 on page -55).
 - b. Return the x-ray cassette tray to its position under the bassinot assembly (A).

The x-ray cassette tray functions properly.

Yes No

↓ → Replace the x-ray cassette tray.

6. For units with a writing surface:
 - a. Pull the writing surface out from under the bassinot.
 - b. Return the writing surface by reversing the procedure.

The writing surface functions properly.

Yes No

↓ → Replace the writing surface.

7. For units with an instrument tray accessory, swing the instrument tray out from under the bassinet assembly (A).

The instrument tray functions properly.

Yes No

↓ → Replace the instrument tray.

8. If the unit is a Resuscitaire Birthing Room Warmer, check the cart/bassinet docking mechanism (L) and caster locks (M) (see figure 2-3 on page -59):
 - a. Undock the cart/bassinet (N).
 - b. Depress the caster locks (M), and check that they keep the cart (N) from moving.
 - c. Release the caster locks (M), and dock the cart/bassinet (N).
 - d. Pull on the cart/bassinet (N) to ensure that it is latched properly.

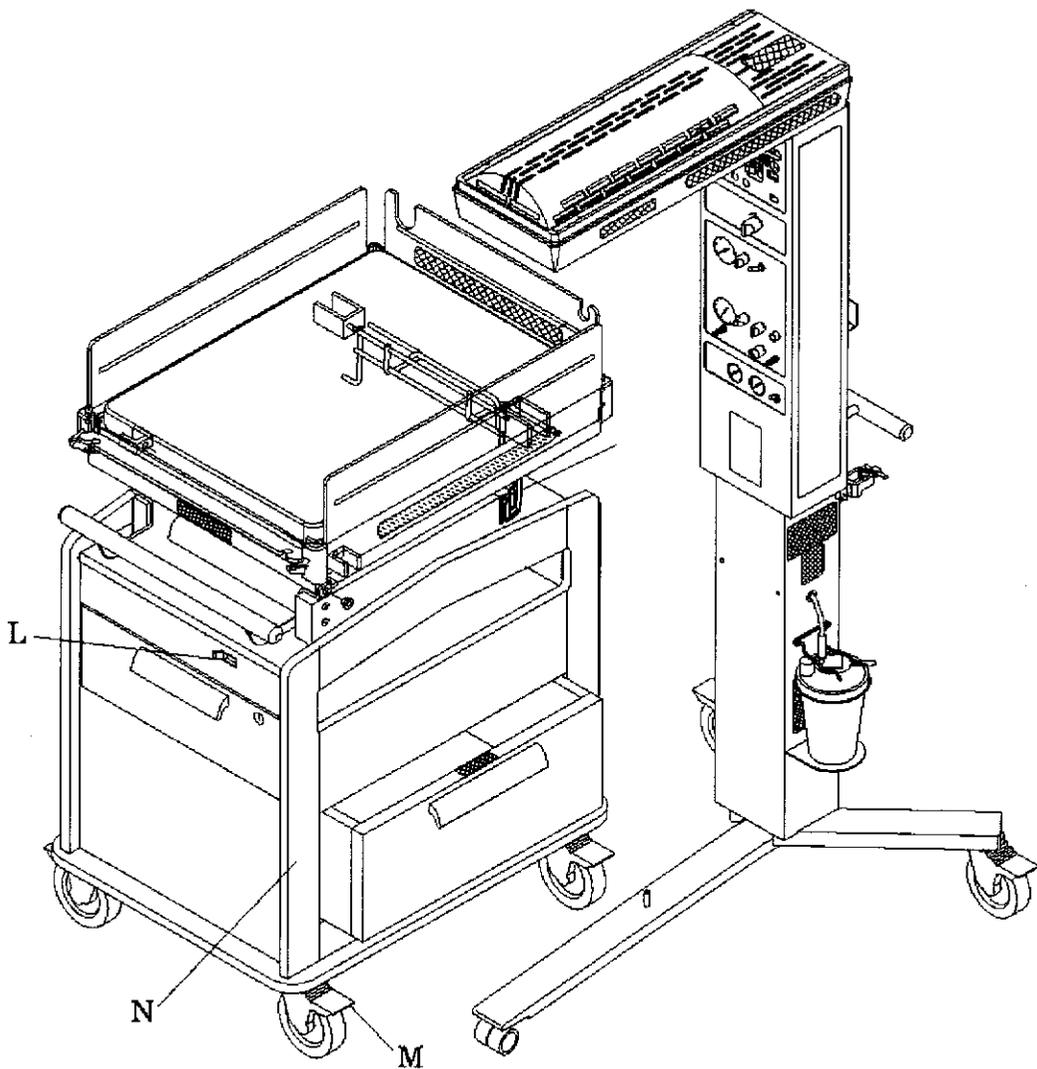
The cart/bassinet (N) docking mechanism (L) and caster locks (M) function properly.

Yes No

↓ → Replace the docking mechanism or caster.

Figure 2-3. Resuscitaire Birthing Room Warmer

2



82990451033



WARNING:

For optimum stability, always lower the variable height adjustment on the Resuscitaire® Radiant Warmer to its lowest position prior to transport. If installed, ensure that items placed on the shelves are properly secured. Failure to do so could result in infant injury, personal injury, or equipment damage.

9. Check the VHA stand (Resuscitaire® Radiant Warmer only):
 - a. Press the upper portion of the switch on the right side of the lower post until the upper post raises to its maximum height.
 - b. Press and hold the lower portion of the switch until the upper post lowers to its minimum height.
 - c. Press the upper portion of the switch on the left side of the lower post until the upper post rises to its maximum height.
 - d. Press and hold the lower portion of the switch until the upper post lowers to its minimum height.
 - e. Verify that the upper post operates smoothly, and adjust it to the desired height.

Resuscitation Equipment (Optional)



WARNING:

For prolonged ventilation, use a heat and moisture exchanger. Failure to do so could result in personal injury or equipment damage.



WARNING:

Always monitor airway pressure and provide appropriate pressure relief during resuscitation. Excessive air pressure can cause damage to the patient's lungs.

Supply Pressure

1. The oxygen (and air) pipeline(s) are securely attached to the appropriate fittings on the rear of the unit, and the gas supply present has 47 psi (324 kPa) to 60 psi (415 kPa) of pressure.

Yes No
↓ → Go to RAP 2.27.

2. If using a reserve gas supply from cylinders, perform the following:

- a. Ensure that each cylinder is properly secured on the rear of the warmer and that the cylinder valve located on the top of the cylinder is open.
- b. Examine the appropriate cylinder pressure gauges on the front of the upper column to ensure that a sufficient reserve gas supply is present.
- c. Set the handle of the gas supply on/off switch to the on position.

Each cylinder is properly secured, the cylinder valves are open, and a sufficient reserve gas supply is present.

Yes	No
↓	→ Go to RAP 2.28.

3. Set the gas supply **On/Off** switch to the on position.

Blended Gas Supply (Optional)



WARNING:

If either the air or oxygen gas source pressure is reduced or increased, creating a pressure differential of 30 psi \pm 5 psi (207 kPa \pm 34 kPa), the microblender alarm sounds. This condition significantly alters the FiO₂ and flow output from the microblender. Personal injury could occur.



WARNING:

Always operate the low flow microblender with clean and dry medical-grade gases. Failure to do so could result in personal injury or equipment damage.



WARNING:

Use air inlet filters with the low flow microblender. Failure to do so could result in personal injury or equipment damage.



WARNING:

Monitor the concentration of oxygen provided and the partial pressure of oxygen within the patient's blood (PaO₂). Failure to do so could result in personal injury or equipment damage.

1. Perform the following:

a. If present, set the precision Blender Module to the desired percentage of oxygen concentration using the Blender Module control knob.

b. Remove either the oxygen or air supply (pipeline or cylinder).

The Blender Module alarm sounds.

Yes No
↓ → Go to RAP 2.25.

2. Return the oxygen or air supply, and set the Blender Module to the desired percentage of oxygen concentration. The desired percentage of oxygen concentration is within the specified range of 20.8% to 100%.

Yes No
↓ → Go to RAP 2.26.

Suction



CAUTION:

To prevent blocking or damaging the suction hose when installing the disposable suction bottle, position the outlet port parallel to the plate. Failure to do so may result in equipment damage.

3. For units with a Resuscitation Module assembly, perform the following:

a. A clean, reusable or disposable, suction bottle (H) is installed and properly connected in the resuscitation equipment storage compartment (I) at the front of the unit (see figure 2-4 on page -64).

Yes No
↓ → Install and properly connect a clean suction bottle (H).

NOTE:

A bacterial filter is built-in on the disposable suction bottle.

b. For a reusable suction bottle (H), a bacterial filter is connected in-line with the supply connection to the reusable suction bottle (H).

Yes No
↓ → Connect a bacterial filter in-line with the supply connection to the reusable suction bottle (H).

- c. Connect the desired extension tubing (J) to the outlet of the outlet port on the suction bottle (H), and secure the free end of the extension tubing (J) in either tubing retaining slot (K) provided on the front panel (D) of the bassinets assembly (A).

NOTE:

Due to the flow resistance of the hydrophobic filter and suction tubing, there may be an initial reading of up to 30 mm Hg (16" H₂O) on the suction gauge.

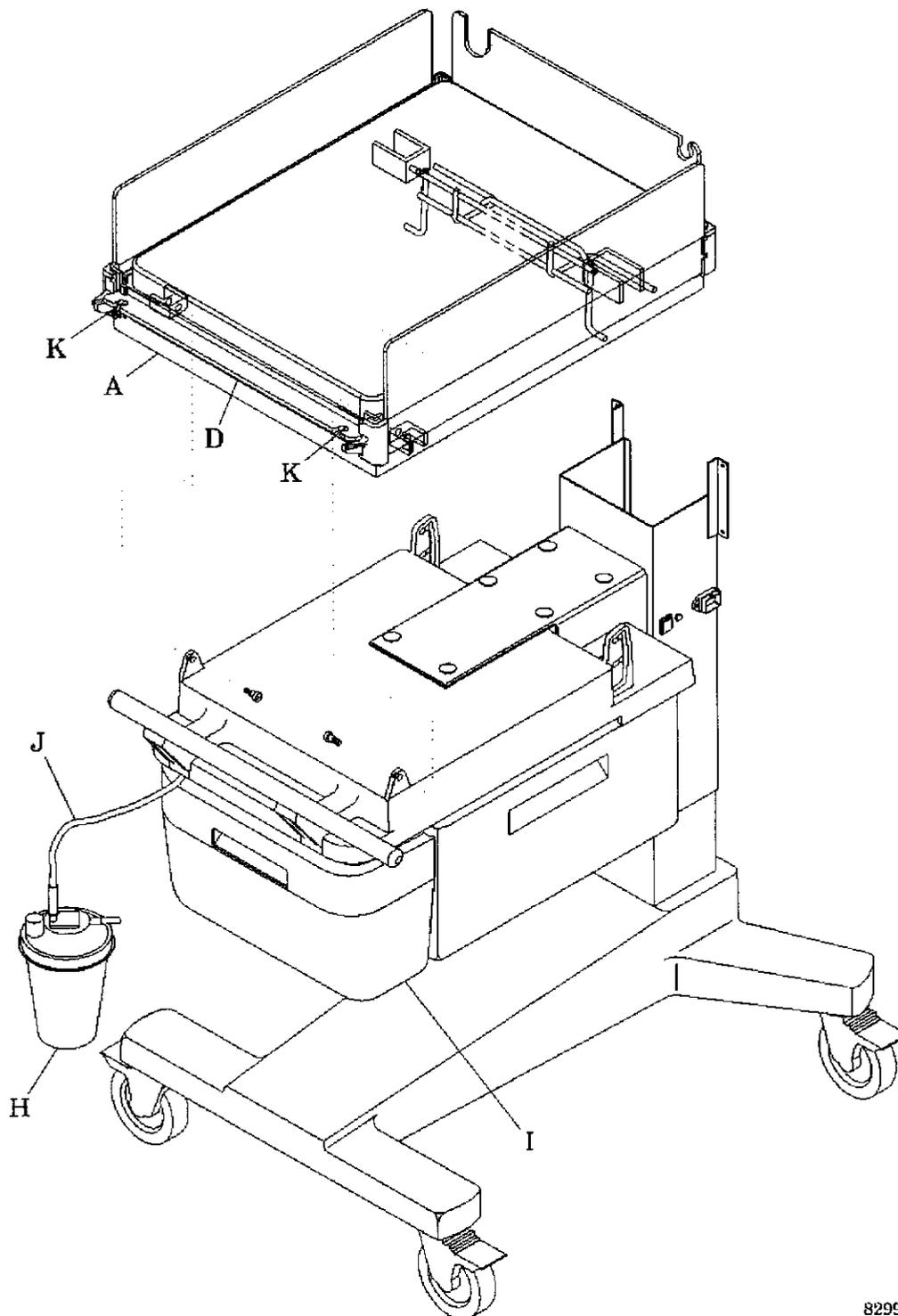
- d. Turn on the **Suction On/Off** switch.

NOTE:

The hydrophobic filter and suction tubing resistance does not affect the desired maximum pressure value. The pressure value of the suction gauge matches the actual pressure value at the end of the catheter.

- e. Block the patient outlet of the suction bottle (H).

Figure 2-4. Cart Assembly



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- f. Using the **Suction Min/Max** control, adjust the suction magnitude while viewing the suction level on the suction gauge until the desired maximum suction pressure value is achieved.

The desired maximum suction pressure value is achieved.

Yes No
↓ → Go to RAP 2.23.

- g. Turn off the **Suction On/Off** switch.

4. For units with a Resuscitation Module not having the AutoBreath™ Infant Resuscitator, perform the following using the manual resuscitation patient breathing circuit (10 mm tubing with a thumb hole at the patient's end):



WARNING:

There are potential hazards associated with the delivery of supplemental oxygen. If it is necessary to administer oxygen, notify the attending physician immediately. Failure to do so could result in personal injury or equipment damage.

- a. Connect the patient breathing circuit to the patient outlet.
b. Using the patient supply **Flow Rate** (LPM) control, adjust the flow rate to the desired fresh gas flow rate.

The measured Patient Gas Supply flow falls within the specification of $\pm 3\%$ of full scale or 10% of the setting.

Yes No
↓ → Go to RAP 2.27.

- c. Perform one of the following:
- Set the adjustable 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.
 - Insert a T-fitting with an airway pressure monitor port into the patient outlet port, and connect it to the airway pressure fitting to indicate the breathing circuit pressure.

Adjust the airway pressure relief control as necessary. (This does not apply to the RM2001 which does not have an adjustable airway pressure relief.) The pressure relief control is within the specification of $50 \text{ cm H}_2\text{O} \pm 10 \text{ cm H}_2\text{O}$ ($5 \text{ kPa} \pm 1 \text{ kPa}$).

Yes No
↓ → Go to RAP 2.28.

5. For units with a Resuscitation Module having an AutoBreath™ Infant Resuscitator, perform the following using the automatic patient circuit 10 mm tubing that is 10 mm with an exhalation valve and exhalation valve control line tubing):
 - a. Turn **Off** the AutoBreath™ Infant Resuscitator circuit.
 - b. Connect the automatic patient circuit to the patient outlet connector, and connect the exhalation valve control line tubing to the exhalation valve connector.
 - c. Using the patient supply flow rate (LPM) control, adjust the flow rate to the desired fresh gas flow rate.

The measured Patient Gas Supply flow falls within the specification of $\pm 3\%$ of full scale or 10% of the setting.

Yes No
↓ → Go to RAP 2.27.

- d. Using the **Airway Pressure Relief** control, set the desired airway pressure limit, block the exhaust and patient ports on the exhalation valve of the automatic patient circuit, and check the fixed internal airway pressure relief valve.

NOTE:

To check the pressure limit, observe the airway pressure gauge.

The **Pressure Relief** gauge meets the specification of 50 cm H₂O \pm 10 cm H₂O (5 kPa \pm 1 kPa).

Yes No
↓ → Go to RAP 2.28.

- e. Turn **On** the AutoBreath™ Infant Resuscitator circuit.
- f. Adjust the breath rate (BPM) control to 18 breaths-per-minute.
- g. Block the patient port of the automatic patient circuit, and set the positive end expiratory pressure (PEEP) threshold. Do not block the exhalation valve exhaust port, and observe the PEEP indicated on the airway pressure gauge. Using the PEEP control, adjust the desired PEEP.
- h. To check the inspiratory/expiratory (I/E) ratio, measure the inspiratory and expiratory phase times, and express as the ratio of inspiratory phase time to expiratory phase time (I:E).

The I/E ratio is approximately 1:2.

Yes No
↓ → Go to RAP 2.29.

- i. To check the desired breaths-per-minute (BPM) rate, count the number of breath cycles per minute.

The BPM rate is within the specified 10 BPM to 60 BPM.

Yes No
↓ → Go to RAP 2.30.

6. For units with the auxiliary flow providing 100% oxygen only, perform the following:
 - a. Connect the desired device to be supplied by the auxiliary flow circuit to the Auxiliary Outlet connector.
 - b. Using the auxiliary flow (LPM) control, adjust the desired auxiliary flow, and check for proper flow.

Auxiliary flow functions properly.

Yes No
↓ → Go to RAP 2.27.

7. Go to "Final Actions" on page -67.

Final Actions

1. Complete the required preventive maintenance procedures. See "Preventive Maintenance" on page -365.
2. Complete all required administrative tasks.

Troubleshooting



WARNING:

Only facility-authorized personnel should troubleshoot the Resuscitaire® Radiant Warmer products. Troubleshooting by unauthorized personnel could result in personal injury or equipment damage.

For troubleshooting of the equipment, refer to the table 2-1 on page -68. If you cannot localize the fault, remove the unit from use, and refer it to factory-trained or other qualified service personnel.

Table 2-1. Troubleshooting

Symptom	Possible Cause	Corrective Action
There is no power, and the Power Fail alarm does not activate.	The circuit breaker on the power input is not set to ON.	Set the circuit breaker to ON. Allow the warmer to run with power ON for >3 minutes to charge the supercap.
The Power Fail alarm activates.	The circuit breaker on the power input is tripped.	Reset the circuit breaker.
	The power cord is unplugged.	Plug the power cord into the POWER connector on the power input.
	The power cord is damaged.	Replace the power cord.
The System Fail alarm activates. An error code appears.	There is an internal malfunction.	Refer to "System Error Codes" on page -117.
The System Fail alarm activates. No error code appears.	There was a prolonged brown-out.	Check AC source.
	There was a prolonged brown-out.	Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10).
	The skin probe was heated too rapidly or is too close to the heater element.	Move the skin probe to the correct location.

Symptom	Possible Cause	Corrective Action
The Blender Module alarm activates	Oxygen and/or air is disconnected.	Connect the oxygen and/or air.
	Either the oxygen and/or air tank may not be opened.	Check cylinder gauge.
	Pressure differential between the oxygen and air supplies exceed 30 psi \pm 2 psi (207 kPa \pm 14 kPa).	Adjust oxygen or air pressure to correct setting.
The Probe Fail alarm activates.	The skin temperature probe has become detached from the infant.	Connect the skin temperature probe to the infant's skin. If the skin temperature probe is plugged into the probe receptacle, the tip of the probe must be in contact with the infant's skin. If not, remove the skin probe.
	The skin temperature probe is damaged.	Ensure that the skin temperature probe is in good contact with the skin. If the problem still exists, replace the skin temperature probe.
	The skin temperature probe has become disconnected.	Connect the skin temperature probe.
	The skin temperature probe connector has become damaged.	Replace the skin temperature probe connector.
"Lo" appears in the baby display.	The skin temperature probe reads $<$ 18 C.	Warm up the skin temperature probe, then recycle the warmer's power.

Symptom	Possible Cause	Corrective Action
The heater does not turn ON.	Heating element is open.	Ensure connectors are firmly attached. If problem still exists, replace the heating element.
	There is an internal malfunction.	Go to RAP 2.20.
The Pre-Warm Mode is not activated upon a system reset.	The system is in Diagnostic Mode.	Exit Diagnostic Mode by pressing the reset button.
	There is an internal malfunction.	Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10).
The heater is ON, but the indicators are OFF.	There is an internal malfunction.	Replace the Display P.C. Board (PCB1) (refer to procedure 4.10).
Cannot obtain the desired suction pressure.	Suction jar rim gasket is worn.	Go to RAP 2.23.
	Suction jar is loose or chipped.	
	Connecting hose is bent or tangled.	
	The hose is leaking between the regulator and the bottle.	
	Pressure or suction gauge is not measuring correctly.	
Blender Module O ₂ concentration setting does not match the Blender Module setting.	Blender Module knob is loose.	Go to RAP 2.24.
	Blender Module has failed.	
Blender Module output mixture is outside the specified range (20.8% to 100%)	Air inlet H ₂ O filter is missing or clogged.	Go to RAP 2.26.
	Blender Module has failed.	
Patient Gas Supply measured flow is outside of the specified $\pm 3\%$ of full scale or 10% of setting.	Dirty or clogged air/O ₂ hose.	Go to RAP 2.27.

Symptom	Possible Cause	Corrective Action
Patient Gas Supply pressure relief gauge exceeds 50cmH ₂ O ± 10cmH ₂ O (5 kPa ± 1 kPa) (Resuscitation Module without AutoBreath™ Infant Resuscitator).	Pressure relief valve has failed.	Go to RAP 2.28.
AutoBreath™ Infant Resuscitator measured breaths-per-minute (BPM) is outside of the specified range.	There is an internal malfunction.	Go to RAP 2.30.
The Inspiratory/Expiratory (I/E) Ratio is Greater Than 1:2.4 and Less Than 1.6:1, 1:1	Resuscitation Module has failed.	Go to RAP 2.29.



Chapter :

NOTES:

2.1 Off-Line Diagnostic Tests

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

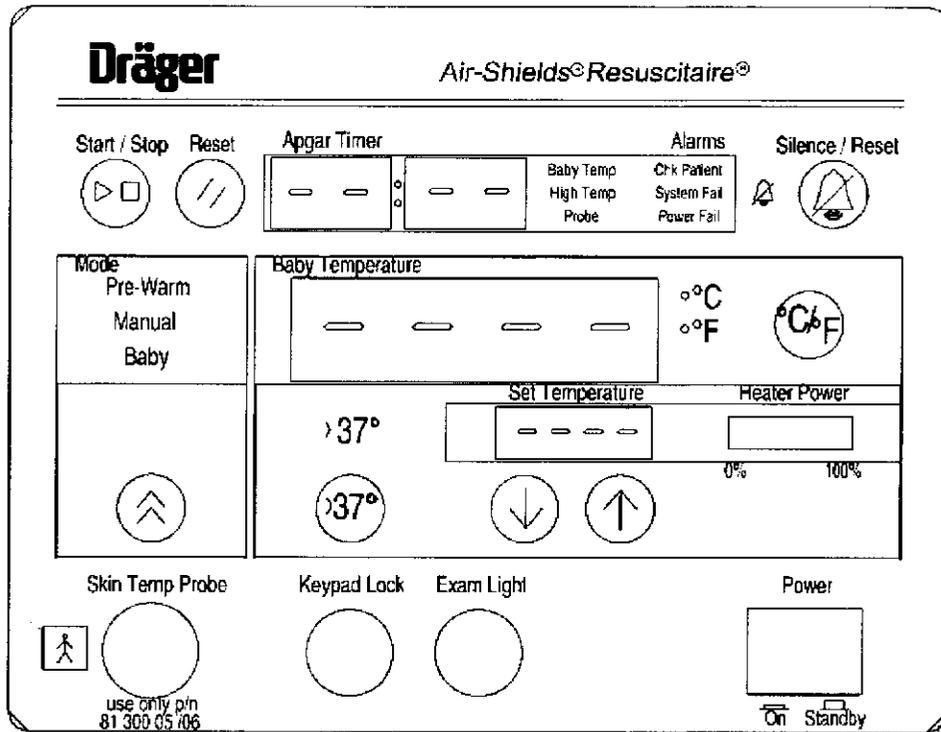
The off-line diagnostic tests are embedded in the software. When the off-line Diagnostic Mode is invoked, the user can sequence through a series of 18 tests using the Up and Down arrow keys, and view the results on the front panel.

NOTE:

The number corresponding to the active diagnostic test always appears on the **Set Temperature** display, except for test #3.

1. To access the off-line Diagnostic Mode, perform the following:
 - a. Turn the AC power on, and simultaneously press the Up and Down arrow keys.
 - b. Hold both keys until the initial phase of the Self-Test is complete.
 - c. When the off-line Diagnostic Mode is successfully accessed, the front panel LEDs change to a special default pattern (see figure 2-5 on page -74). Once this pattern appears, release the Up and Down arrow keys for the remaining phases of the Self-Test.
 - d. When all phases of the Self-Test are complete, a **1** appears in the **Set Temperature** display, indicating that the first test is active.

Figure 2-5. Diagnostic Mode Start-Up Display



2.2 Diagnostic Test #1—Software Level Display

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the version and revision level of the software.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #1, the software version and revision level appear on the **Baby Temperature** display (see figure 2-6 on page -76).

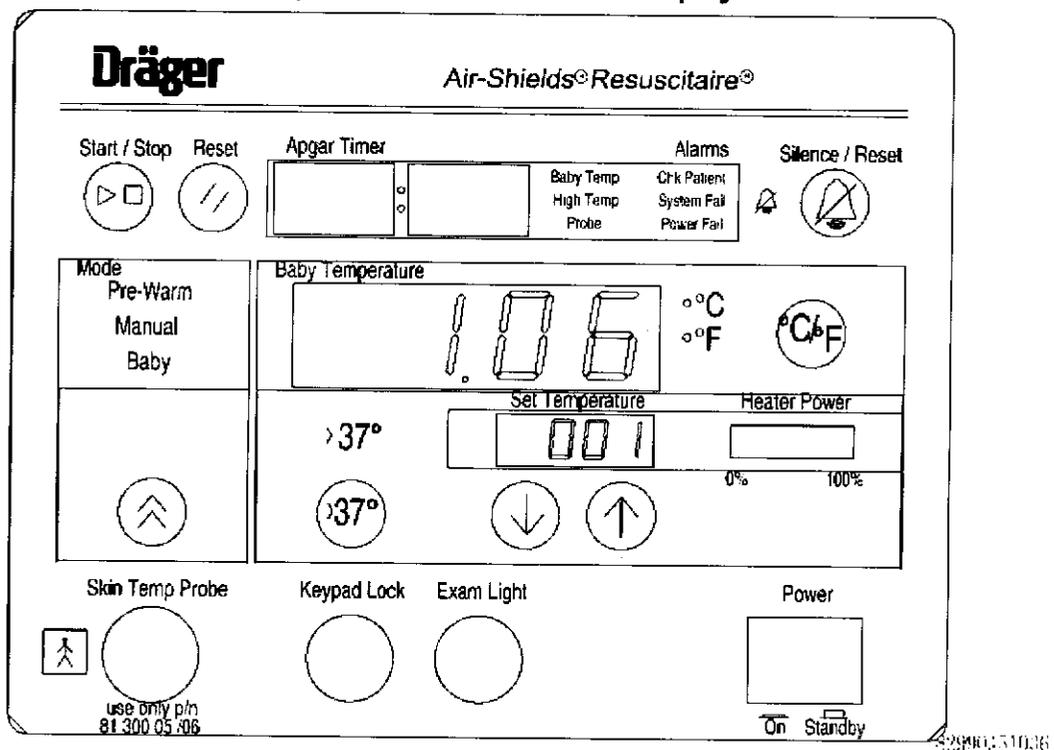
Yes No

↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to "Final Actions" on page -67. Otherwise, call Technical Support for assistance.

2. Perform one of the following:
 - To access additional diagnostic tests, press the Up or Down arrow keys.
 - To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

2

Figure 2-6. Software Level Display



or slco version 1.08

NOTES:

Actual
1.08
001



2.3 Diagnostic Test #2—ROM Device Checksum Display

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

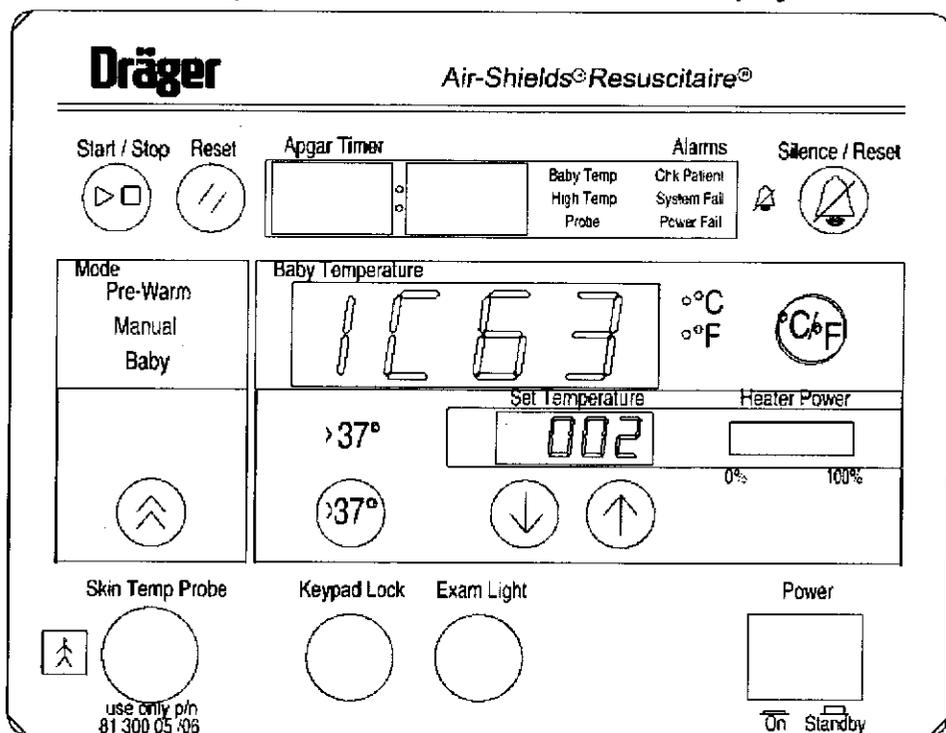
This test displays the Read Only Memory (ROM) device checksum. The checksum is shown as a hexadecimal number on the **Baby Temperature** display. It is identical to the four digits reported by the DATA I/O programmer during a verify or copy operation, and is also printed on the ROM label.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #2, the checksum appears on the **Baby Temperature** display (see figure 2-7 on page -78).

IC63 ✱

- | | | |
|-----|----|--|
| Yes | No | |
| ↓ | → | Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance. |

Figure 2-7. ROM Device Checksum Display



2. Perform one of the following:

- To access additional diagnostic tests, press the Up or Down arrow keys.
- To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

DATA I/O → 283A.

2

2.4 Diagnostic Test #3—Power Fail Test

NOTE:

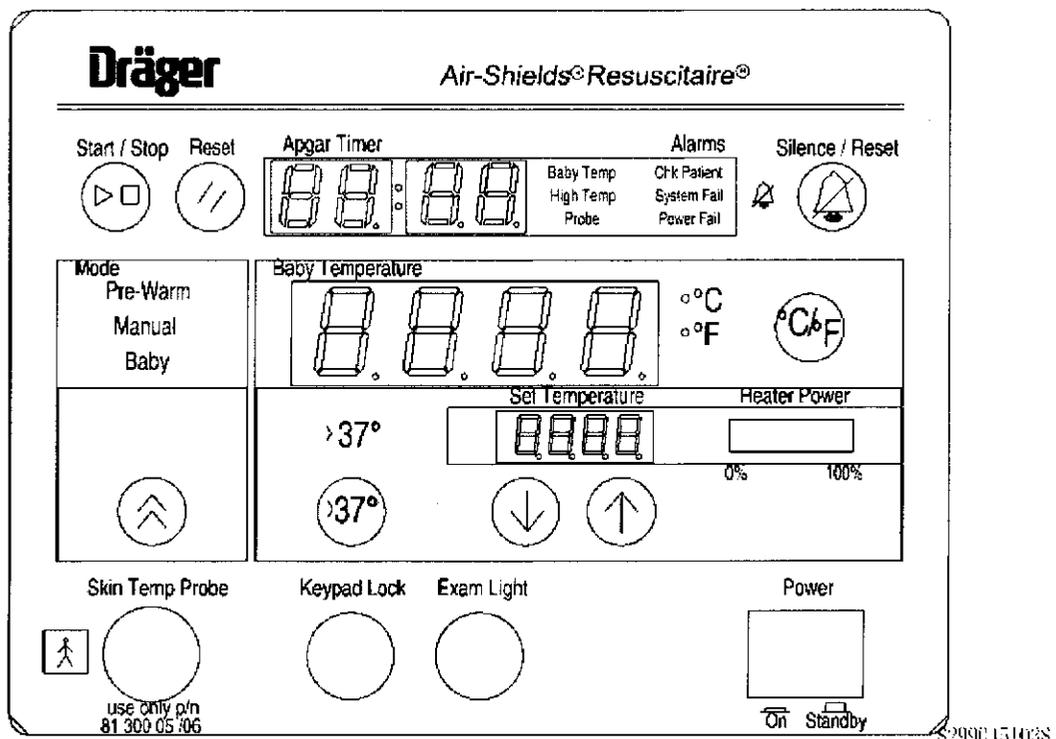
The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test verifies the operation of the **Power Fail** circuit.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #3, all of the LEDs are on (see figure 2-8 on page -80).

<p>Yes</p> <p>↓</p>	<p>No</p> <p>→</p>	<p>Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.</p>
----------------------------	---------------------------	---

Figure 2-8. Power Fail Test Display



2. The **Power Fail** LED blinks.

<p>Yes</p> <p>↓</p>	<p>No</p> <p>→</p>	<p>Perform RAP 2.15. If this solves the problem, go to step 4. Otherwise, go to step 3.</p>
----------------------------	---------------------------	---

3. The Power Fail LED blinks.

Yes	No
↓	→ Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 4. Otherwise, call Technical Support for assistance.

4. The piezo alarm sounds at 1 second intervals.

Yes	No
↓	→ Replace the piezo alarm on the fan assembly. If this solves the problem, go to step 7. Otherwise, go to step 6.

5. Go to step 7.

6. Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). This solves the problem.

Yes	No
↓	→ For assistance, call Technical Support.

7. Perform one of the following:

- To access additional diagnostic tests, press the Up or Down arrow keys.
- To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

2.5 Diagnostic Test #4—Key Check

NOTE:

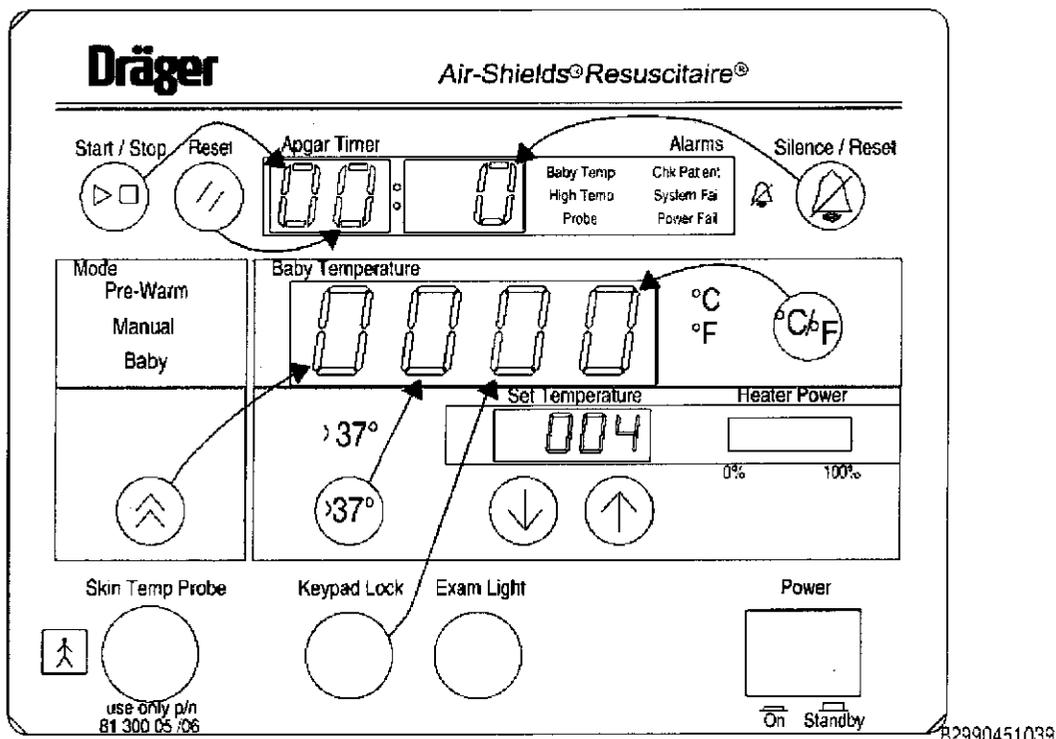
The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test checks for keypad failures. In order to prove the operation of the keys, a total of seven zeroes appear in the **Apgar Timer** and **Baby Temperature** displays. Pressing any of the keys on the front panel momentarily causes the nearest 0 to change to a 1.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #4, press the **Apgar Start/Stop** key. The corresponding segments of the display toggle between 0 and 1 (see figure 2-9 on page -82).

Yes	No	
↓	→	Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

Figure 2-9. Key Check Display



2. Press the **Silence/Reset** key. The corresponding segments of the display toggle between **0** and **1**.

Yes	No
↓	→ Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

3. Press the **Mode Select** key. The corresponding segments of the display toggle between **0** and **1**.

Yes	No
↓	→ Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 4. Otherwise, call Technical Support for assistance.

4. Press the **> 37 C** key. The corresponding segments of the display toggle between **0** and **1**.

Yes	No
↓	→ Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 5. Otherwise, call Technical Support for assistance.

5. Press the **⏏ C/⏏ F** key. The corresponding segments of the display toggle between **0** and **1**.

Yes	No
↓	→ Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 6. Otherwise, call Technical Support for assistance.

6. Press the **Keypad Lock** key. The corresponding segments of the display toggle between **0** and **1**.

Yes	No
↓	→ Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 7. Otherwise, call Technical Support for assistance.

7. Perform one of the following:

- To access additional diagnostic tests, press the Up or Down arrow keys.
- To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

2.6 Diagnostic Test #5—Heater Duty Cycle Test

66

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

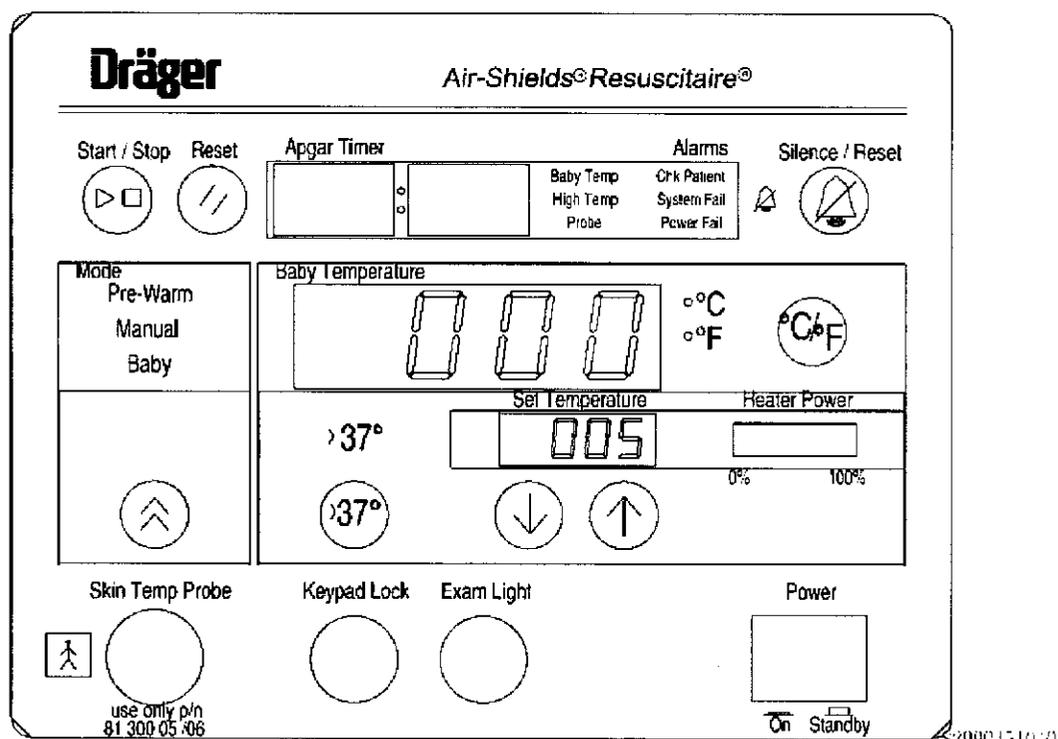
This test displays the current AC heater duty cycle percentage applied to achieve 600 Watts of power in the following power ranges (see table 2-2 on page -84).

Table 2-2. Heater Duty Cycle

Heater Voltage	Power Range
100V	90V AC to 110V AC
120V	100V AC to 135V AC
220V	190V AC to 235V AC

1. To verify the AC line voltage, go to RAP 2.7. For a list of AC line voltage correction percentage values, see table 2-3 on page -85.
2. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #5, press the **|| C/F** key. The calculated AC line voltage correction percentage appears on the **Baby Temperature** display (see figure 2-10 on page -85).
Yes No
↓ → If no value appears on the **Baby Temperature** display, replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If a value different from the value in table 2-3 on page -85 appears, go to "Diagnostic Test #6—Heater/Relays AC Line Voltage Display" on page -87. If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.
3. Perform one of the following:
 - To access additional diagnostic tests, press the Up or Down arrow keys.
 - To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

Figure 2-10. Heater Duty Cycle Test Display



2

Table 2-3. AC Line Voltage Correction Percentages

100 V Model		120 V Model		240 V Model		220 V Model	
Correction Percentage	AC Line Voltage						
67	110	66	135	56	264	75	228
68	109	67	134	57	263	76	227
69	108	68	133	57	262	77	226
71	107	69	132	58	261	77	225
72	106	71	131	58	261	77	225
73	105	72	130	58	259	79	223
75	104	73	129	59	258	80	222
76	103	74	128	59	257	80	221
78	102	75	127	60	256	81	220
79	101	76	126	60	255	82	219
81	100	77	125	61	254	82	218
83	99	79	124	61	253	83	217

2.6 Diagnostic Test #5—Heater Duty Cycle Test

Chapter :

100 V Model		120 V Model		240 V Model		220 V Model	
Correction Percentage	AC Line Voltage						
84	98	80	123	62	252	84	216
86	97	81	122	62	251	85	215
88	96	83	121	63	250	86	214
90	95	84	120	63	249	86	213
92	94	85	119	64	248	87	212
94	93	87	118	64	247	88	211
96	92	88	117	65	246	89	210
98	91	90	116	65	245	90	209
100	90	91	115	66	244	91	208
		93	114	66	243	91	207
		95	113	67	242	92	206
		96	112	67	241	93	205
		98	111	68	240	94	204
		100	110	69	239	95	203
		100	109	69	238	96	202
		100	108	70	237	97	201
		100	107	70	236	98	200
		100	105	71	235	99	199
				72	234	100	198
				72	233		
				73	232		
				73	231		
				74	230		
				75	229		

2.7 Diagnostic Test #6—Heater/Relays AC Line Voltage Display

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the calculated AC line voltage by measuring the current through the Solid State Relay #1 (K4) and Solid State Relay #2 (K3). The calculated line voltage is shown on the **Baby Temperature** display. The status of the safety relay (K1) is shown on the **Apgar Timer** display.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #6, at the **Apgar Timer** display, the status of the safety relay is initially **Off**.

Yes No

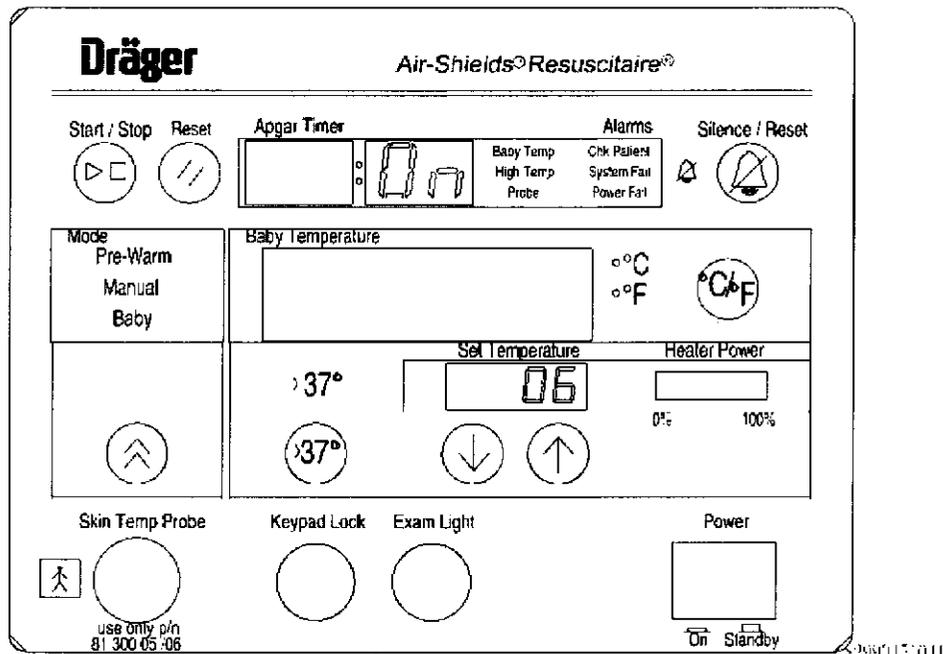
- ↓ → Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

2. Press the **[C] F** key. The status of the safety relay is On (see figure 2-11 on page -88).

Yes No

- ↓ → Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

Figure 2-11. Safety Relay AC Line Voltage Display

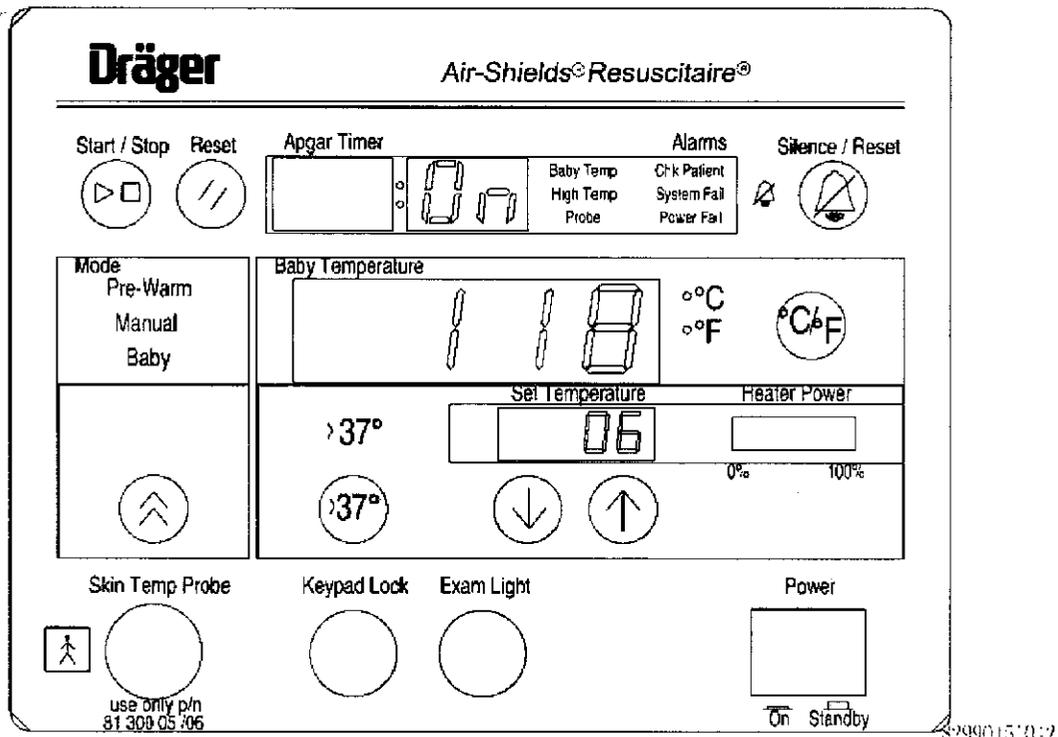


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3. Test the Solid State Relay #1 by pressing the Mode key. The calculated AC line voltage appears on the **Baby Temperature** display and the quartz heater turns on for approximately 40 seconds, then Solid State Relay #1 automatically switches off (see figure 2-12 on page -89).

 - Make a note of the displayed voltage shown for Solid State Relay #1.

Figure 2-12. Solid State Relay #1 AC Line Voltage Display



2

4. Test the Solid State Relay #2 (K3) by pressing the >37 C key. The calculated AC line voltage appears on the **Baby Temperature** display and the quartz heater turns on for approximately 40 seconds, then Solid State Relay #2 switching off, (see figure 2-13 on page -90).

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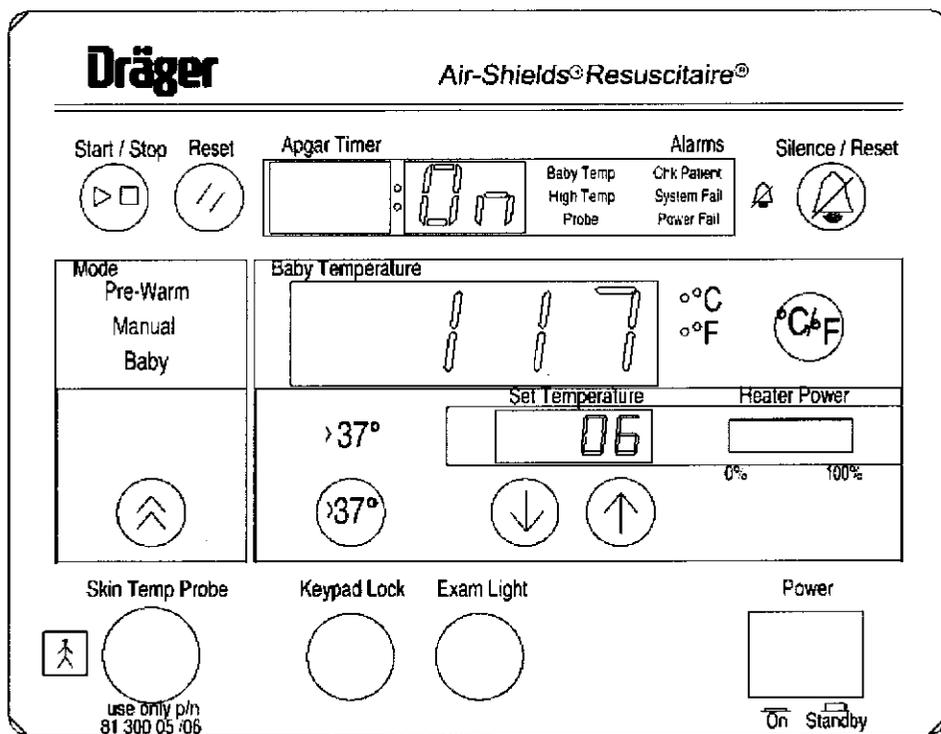
- Make a note of the displayed voltage shown for Solid State Relay #1.

Compare the voltages in step 3 and step 4. If both voltages display 000 volts, replace the quartz heater element (refer to procedure 4.10).

Both of the displayed voltages are within 2 volts of each other.

- | | | |
|-----|----|--|
| Yes | No | |
| ↓ | → | Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 5. |

Figure 2-13. Solid State Relay #2 AC Line Voltage Display



5. See whether the calculated AC line voltage in the **Baby Temperature** display is within $\pm 10\%$ of the rated line voltage shown in table 2-4 on page -90.

Table 2-4. Rated Line Voltage

Rated Line Voltage Range	Displayed Heater Voltage
110V	99V to 121V
120V	108V to 132V
230V	207V to 253V

The AC line voltage is within $\pm 10\%$ of the rated line voltage.

Yes No



→ Make sure that the power source is in compliance with the electrical specification of the system by performing the calibration procedure (refer to procedure 4.10). If this solves the problem, go to step 6. Otherwise, call Technical Support for assistance.

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6. Perform the following:
 - To access additional diagnostic tests, press the Up or Down arrow keys.
 - To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

2.8 Diagnostic Test #7—EEPROM Status Test

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays a four-bit hexadecimal number that indicates the status of the EEPROM. The status flag is shown on the **Baby Temperature** display. Under normal conditions, the status flag is **001**, indicating that the logic is functioning properly. On occasion, however, the status flag **008** appears, indicating the initialization of a new EEPROM device or a write-failure recovery. For a description of the known status flags, see table 2-5 on page -92.

001
Table 2-5. Status Flags

Status Flag	Description
000	EEPROM data block was never initialized.
001	A valid EEPROM data block was found at initialization.
002	Multiple EEPROM blocks were found at initialization.
004	An unrecoverable EEPROM write failure occurred.
008	A bulk erase operation was performed.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #7, the status of the EEPROM on the **Baby Temperature** display is either **001** or **008** (see figure 2-14 on page -93).

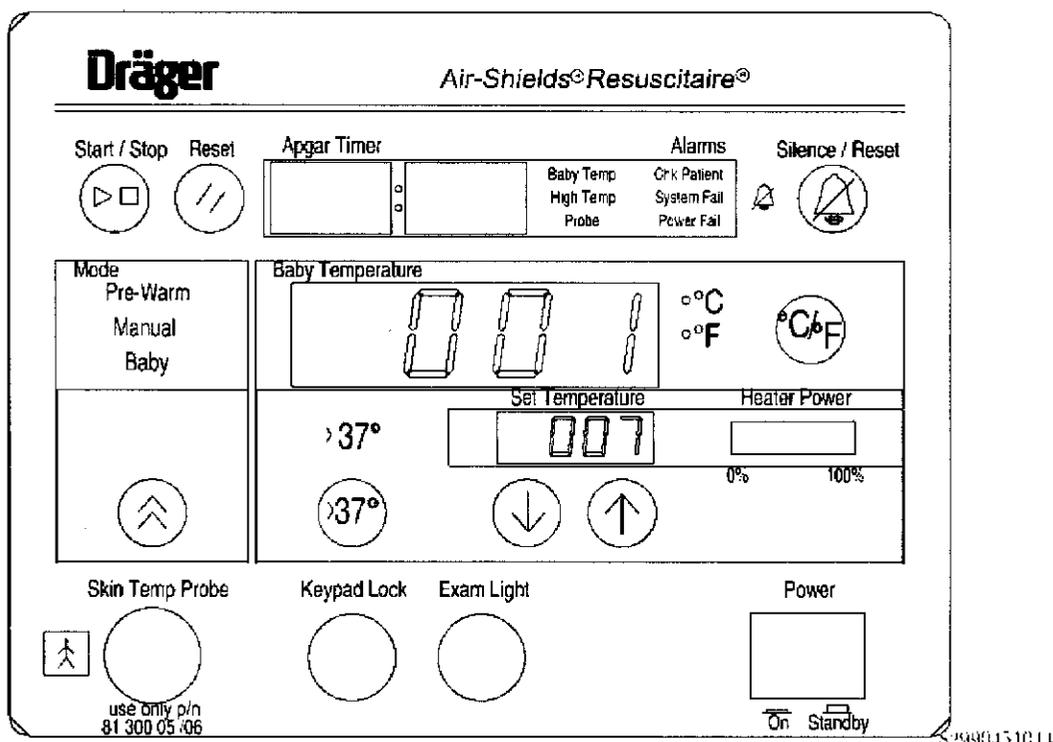
Yes No

↓

→ Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

2. Perform one of the following:
 - To access additional diagnostic tests, press the Up or Down arrow keys.
 - To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

Figure 2-14. EEPROM Status Test Display



2.9 Diagnostic Test #8—Unit Configuration Display

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the unit configuration as read from the jumpers JP5 and JP6 on the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). For a listing of the correct unit configurations, see table 2-6 on page -94.

Table 2-6. Unit Configuration

JP5	JP6	Unit Configuration	Front Panel Display
On	On	100V, 50/60 Hz	100
Off	Off	120V, 50/60 Hz	120
Off	On	220V, 50 Hz	P220
On	Off	220V, 50/60 Hz	220

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #8, the front panel display agrees with the unit's jumper configuration (see figure 2-15 on page -95).

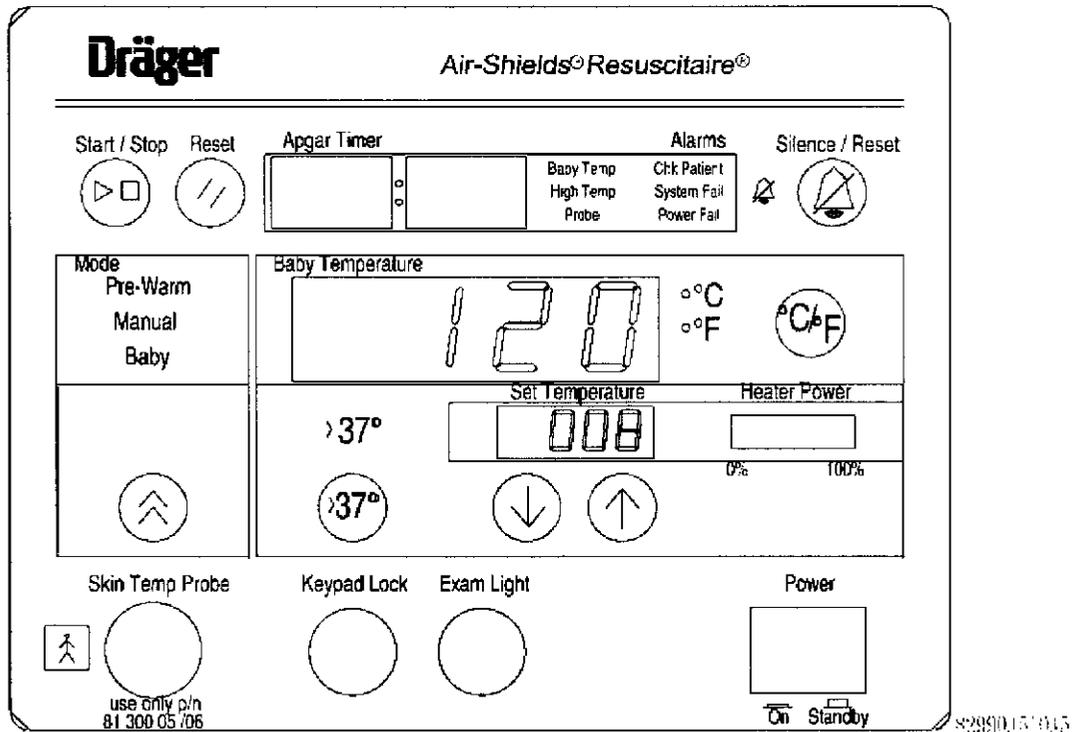
Yes No

↓

→ Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

2. Perform one of the following:
 - To access additional diagnostic tests, press the Up or Down arrow keys.
 - To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

Figure 2-15. Unit Configuration Display



2

2.10 Diagnostic Test #9—ADC Offset/Gain Display

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the ADC gain and offset on the **Apgar Timer** and **Baby Temperature** display, respectively. The external ADC reads the probe channels, the probe calibration, and the ambient temperature.

If the ADC gain is lower than **4085**, **FAIL** appears on the **Apgar Timer** display instead. If the offset is higher than **7**, **FAIL** appears on the **Baby Temperature** display.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #9, the gain is a number between **4085** and **4095** (see figure 2-16 on page -97).

Yes	No
↓	→

Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

2. The offset is a number between **0** and **7**.

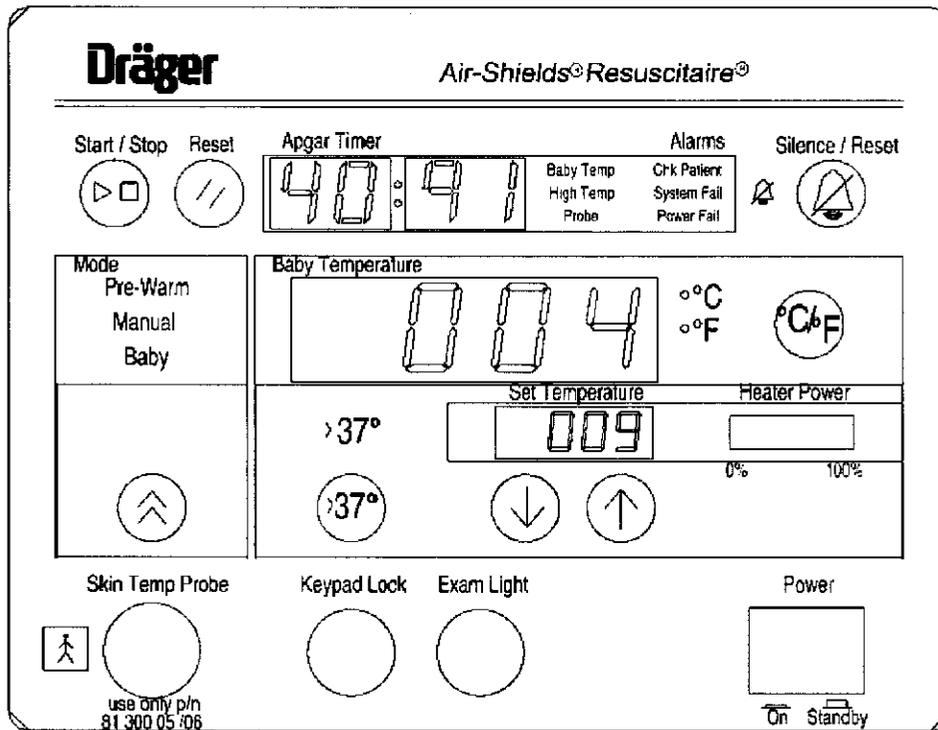
Yes	No
↓	→

Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

3. Perform one of the following:

- To access additional diagnostic tests, press the Up or Down arrow keys.
- To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

Figure 2-16. ADC Offset/Gain Display



2

2.11 Diagnostic Test #10—Ambient Temperature Probe Display

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the ambient probe temperatures. The Ambient Temperature Probe 1 is shown on the **Baby Temperature** display. The Ambient Temperature Probe 2 is shown on the **Apgar Timer** display. If there is no ambient temperature probe, the number value 17.67 ± 0.03 appears on the **Baby Temperature** or **Apgar Timer** display.

NOTE:

The number value 17.67 ± 0.03 is the rail value (no probe attached value).

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #10, the ambient temperatures for Probe 1 and Probe 2 appear on the **Baby Temperature** and **Apgar Timer** displays, respectively (see figure 2-17 on page -99).

Yes No

↓

→ If no value appears on either display, replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

2. The value **17.7** appears on the **Baby Temperature** or **Apgar Timer** displays.

Yes No

↓

→ Go to step 4.

3. Probe 1 or Probe 2 is connected.

Yes No

↓

→ Connect the disconnected probe. If this solves the problem, go to step 4. Otherwise, call Technical Support for assistance.

4. The difference in the ambient probe temperatures displayed is less than 0.4 C (0.7 F).

Yes No

↓

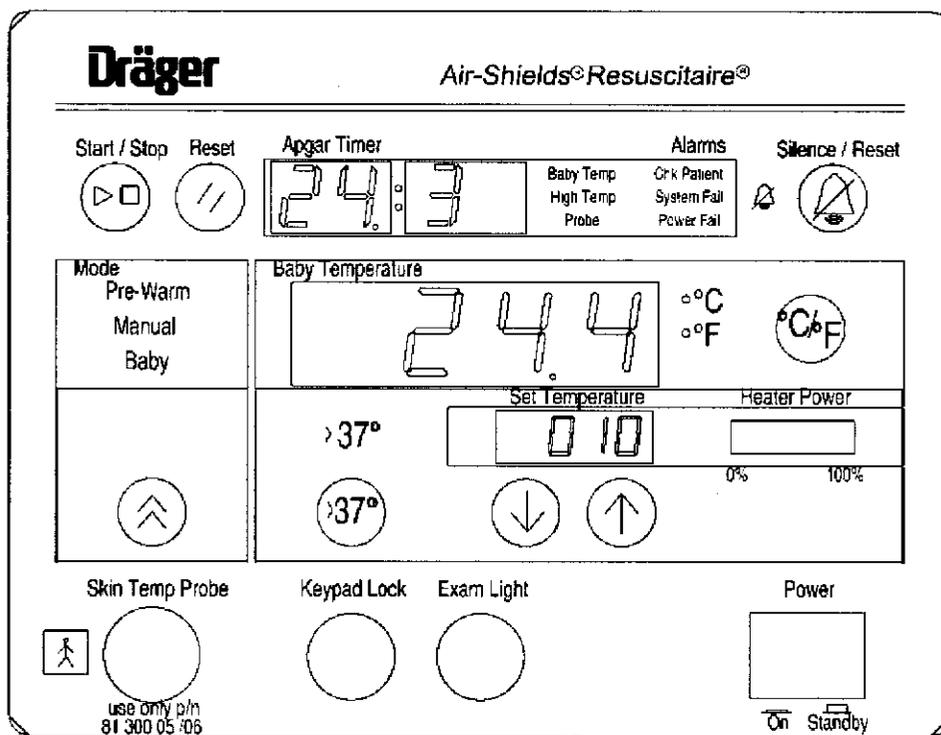
→ Inspect for damaged or loose ambient temperature probes. If necessary, replace the ambient temperature

probe. If this solves the problem, go to step 5. Otherwise, call Technical Support for assistance.

5. Perform one of the following:

- To access additional diagnostic tests, press the Up or Down arrow keys.
- To exit Diagnostic Mode, turn the unit off and then on, and go to “Final Actions” on page -67.

Figure 2-17. Ambient Temperature Probe Display



2.12 Diagnostic Test #11—Skin Probe Temperature Display

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the temperature of Skin Probe 1 on the **Baby Temperature** display and the temperature of Skin Probe 2 on the **Apgar Timer** display. If there is no skin temperature probe, the value **17.67 ± 0.03**, the rail value (no probe attached value), appears on the **Baby Temperature** or **Apgar Timer** displays. This value also appears if a problem exists.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #11, attach the skin probe to the body surface. The temperatures of Skin Probe 1 and Skin Probe 2 appear on the **Baby Temperature** and **Apgar Timer** displays, respectively (see figure 2-18 on page -101).

Yes No

- ↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

2. The value **17.67 ± 0.03** appears on the **Baby Temperature** or **Apgar Timer** display.

Yes No

- ↓ → Go to step 4.

3. Probe 1 or Probe 2 is connected.

Yes No

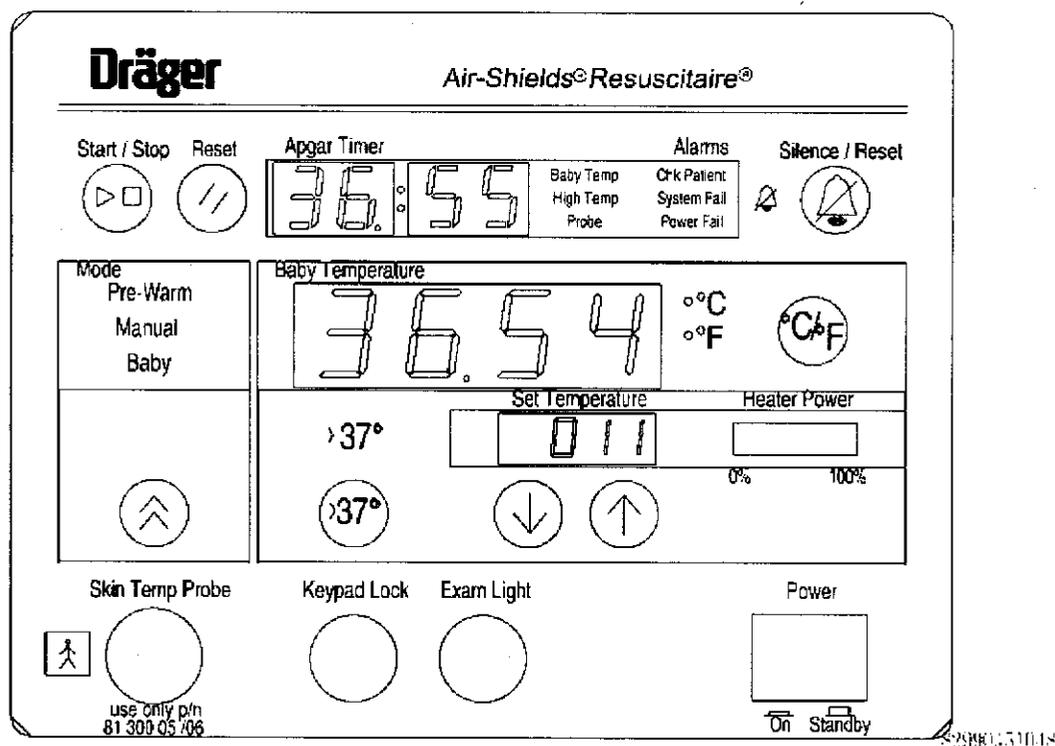
- ↓ → Connect the baby skin temperature probe. If this solves the problem, go to step 4. Otherwise, call Technical Support for assistance.

4. The difference in the skin probe temperatures displayed is less than 0.4 C (0.7 F).

Yes No

- ↓ → Inspect for damaged or loose skin temperature probe or damaged skin probe receptacle. If necessary, replace the skin temperature probe. If this solves the problem, go to step 5. Otherwise, call Technical Support for assistance.

Figure 2-18. Skin Probe Temperature Display



5. Perform one of the following:

- To access additional diagnostic tests, press the Up or Down arrow keys.
- To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

Chapter :

2.13 Diagnostic Test #12—Skin Probe Display Temperature Accuracy

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the accuracy temperature of Skin Probe 1 on the **Baby Temperature** display, and the accuracy temperature of Skin Probe 2 on the **Apgar Timer** display. Both displays should read **36.00 C ± 0.05 C**.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #12, the accuracy temperatures of Skin Probe 1 and Skin Probe 2 appear on the **Baby Temperature** and **Apgar Timer** displays, respectively (see figure 2-19 on page -103).

Yes No

↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

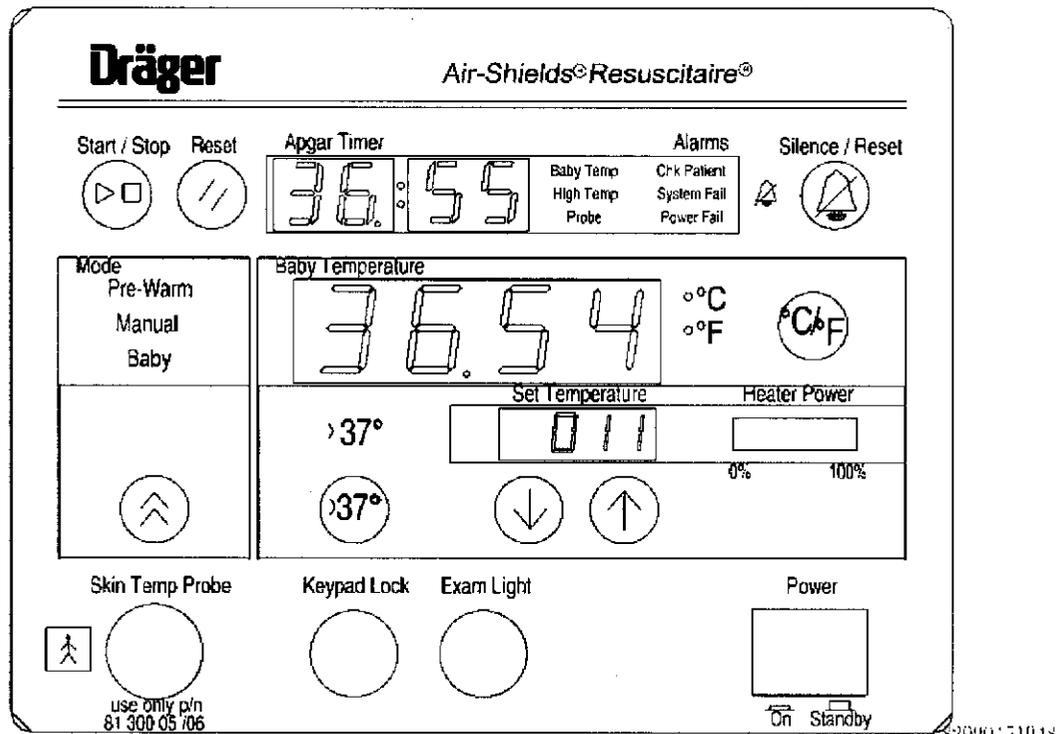
2. Both displays read **36.00 C ± 0.05 C**.

Yes No

↓ → Adjust the temperature sensor for Skin Probe 1 and Skin Probe 2 (see "Calibrating the Controller Assembly" on page -343). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

3. Perform one of the following:
 - To access additional diagnostic tests, press the Up or Down arrow keys.
 - To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

Figure 2-18. Skin Probe Temperature Display



5. Perform one of the following:

- To access additional diagnostic tests, press the Up or Down arrow keys.
- To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

Chapter :

2.13 Diagnostic Test #12—Skin Probe Display Temperature Accuracy

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the accuracy temperature of Skin Probe 1 on the **Baby Temperature** display, and the accuracy temperature of Skin Probe 2 on the **Apgar Timer** display. Both displays should read **36.00 C ± 0.05 C**.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #12, the accuracy temperatures of Skin Probe 1 and Skin Probe 2 appear on the **Baby Temperature** and **Apgar Timer** displays, respectively (see figure 2-19 on page -103).

Yes No

↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

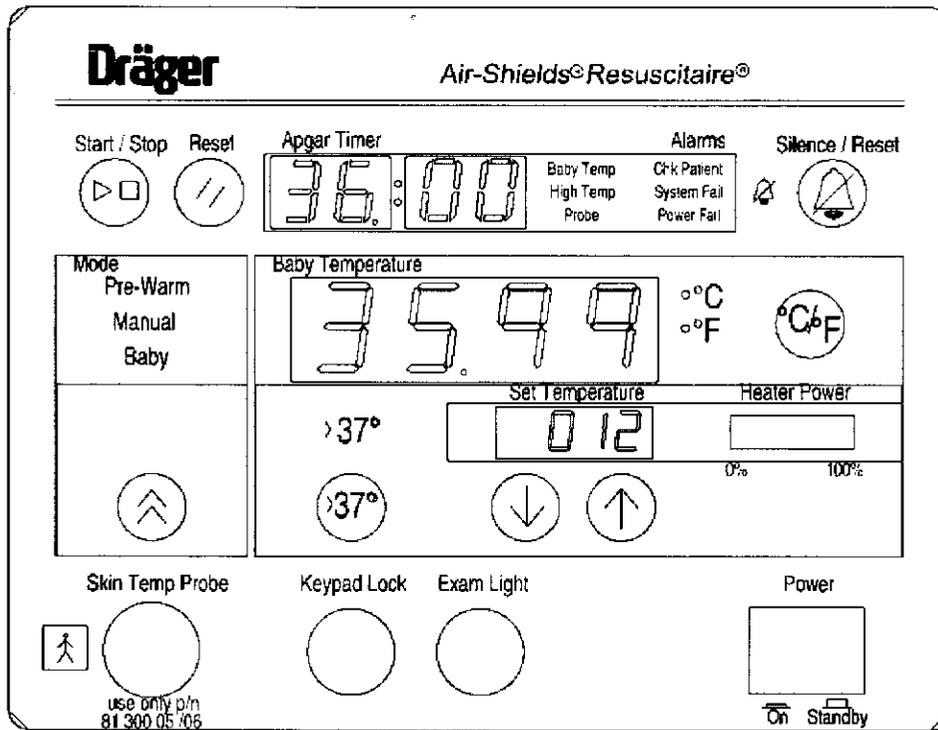
2. Both displays read **36.00 C ± 0.05 C**.

Yes No

↓ → Adjust the temperature sensor for Skin Probe 1 and Skin Probe 2 (see "Calibrating the Controller Assembly" on page -343). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

3. Perform one of the following:
 - To access additional diagnostic tests, press the Up or Down arrow keys.
 - To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

Figure 2-19. Skin Probe Display Temperature Accuracy



2

2.14 Diagnostic Test #13—Logic Voltage Display

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the CPU voltage on the **Baby Temperature** display. The displayed value should be in the range of 5.100V DC \pm 0.1V DC.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #13, the CPU voltage appears on the **Baby Temperature** display (see figure 2-20 on page -105).

Yes No

↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

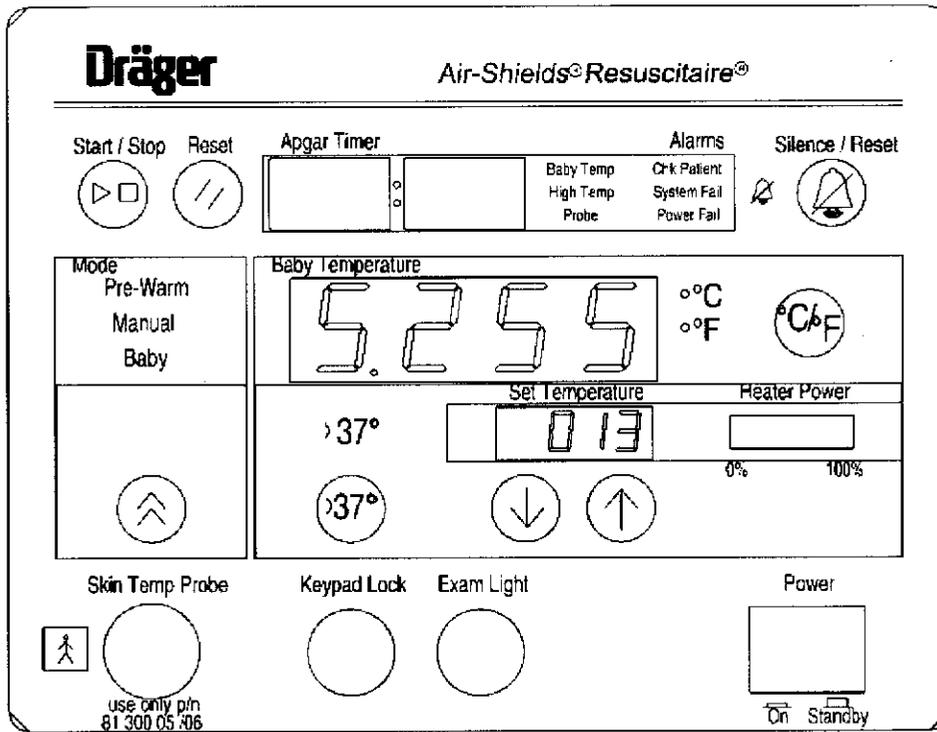
2. The CPU voltage value displayed is in the range of **5.100V DC \pm 0.1V DC**.

Yes No

↓ → Check the voltage from the DC power supply (see "Verifying the DC Power Requirements" on page -357). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

3. Perform one of the following:
 - To access additional diagnostic tests, press the Up or Down arrow keys.
 - To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

Figure 2-20. Logic Voltage Display



2

2.15 Diagnostic Test #14—Supercap Voltage Display

NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the supercap voltage of the Power Fail detection circuit on the **Baby Temperature** display. The displayed value should be in the range of **3.750V DC** to **5.300V DC**.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #14, the supercap voltage appears on the **Baby Temperature** display (see figure 2-21 on page -107).

NOTE:

It may take up to 5 minutes to charge the supercap.

Yes No

- ↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

2. The supercap charging voltage displayed is between **3.750V DC** to **5.300V DC**.

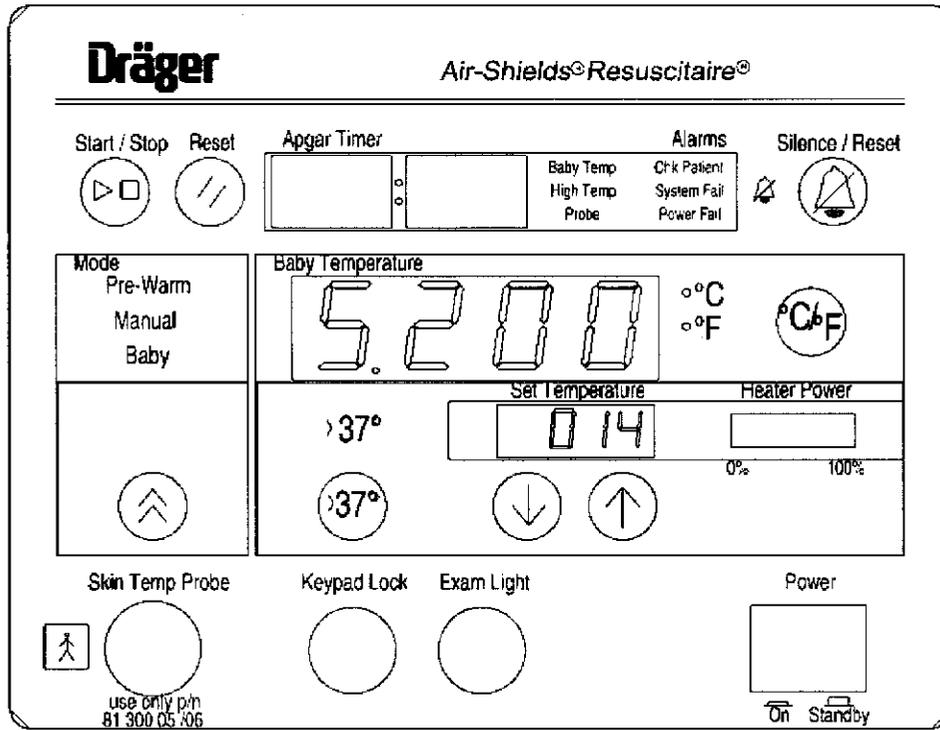
Yes No

- ↓ → Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

3. Perform one of the following:

- To access additional diagnostic tests, press the Up or Down arrow keys.
- To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

Figure 2-21. Supercap Voltage Display



2

2.16 Diagnostic Test #15—Watchdog Timer Test

NOTE:

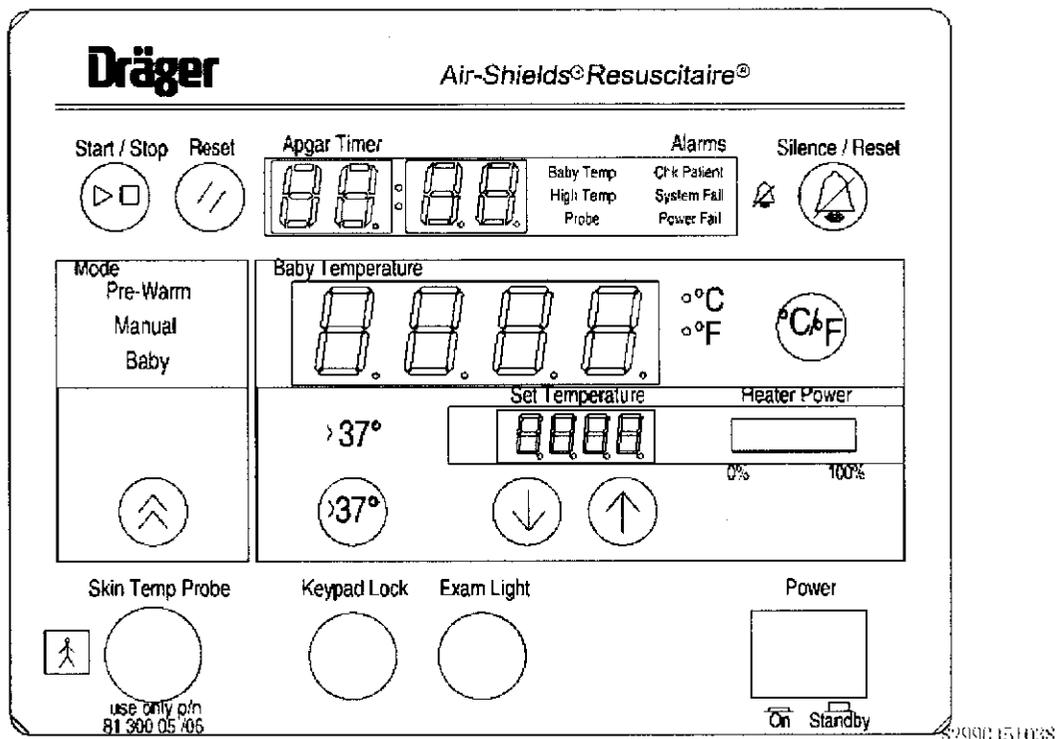
The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test initiates a watchdog timer time-out. Perform this test last since it restarts the system in normal operation.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #15, press the **⏏ C/F** key. The system resets (see figure 2-22 on page -109).

Yes	No	
↓	→	Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.
2. Turn the unit off and then on, and simultaneously press the Up and Down arrow keys.
3. Go to "Final Actions" on page -67.

Figure 2-22. Watchdog Timer Test Display



2

2.17 Diagnostic Test #16—Speaker Test

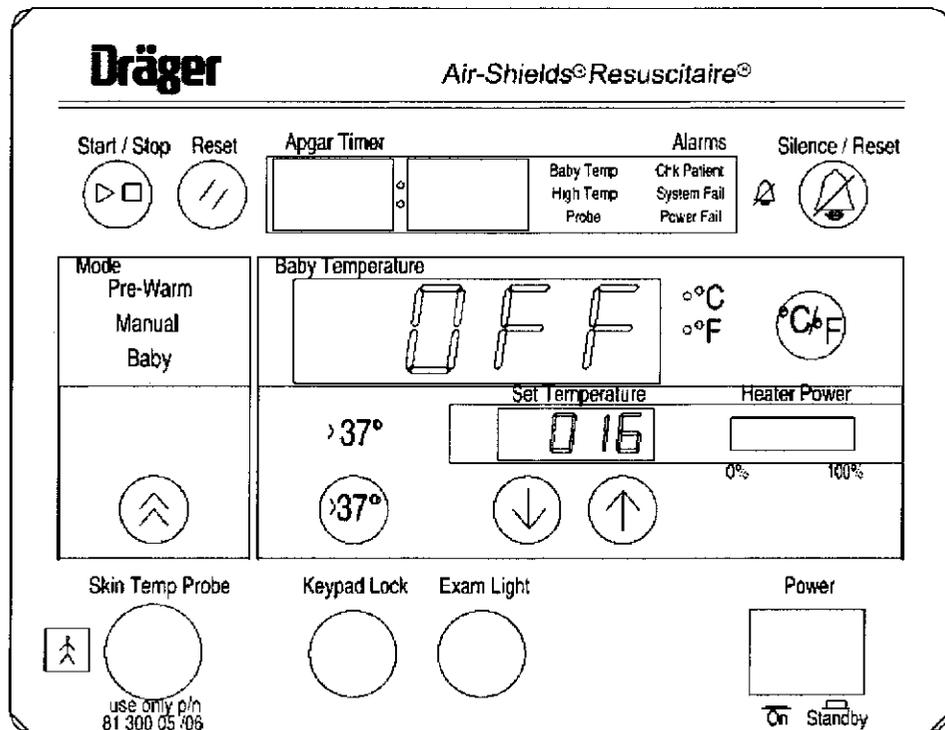
NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test activates the speaker test. Once the test is activated, test the three ranges of the speaker volume—low, mid-range, and high—by pressing the **C/F** key.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #16, **OFF** appears in the **Baby Temperature** display (see figure 2-23 on page -110).

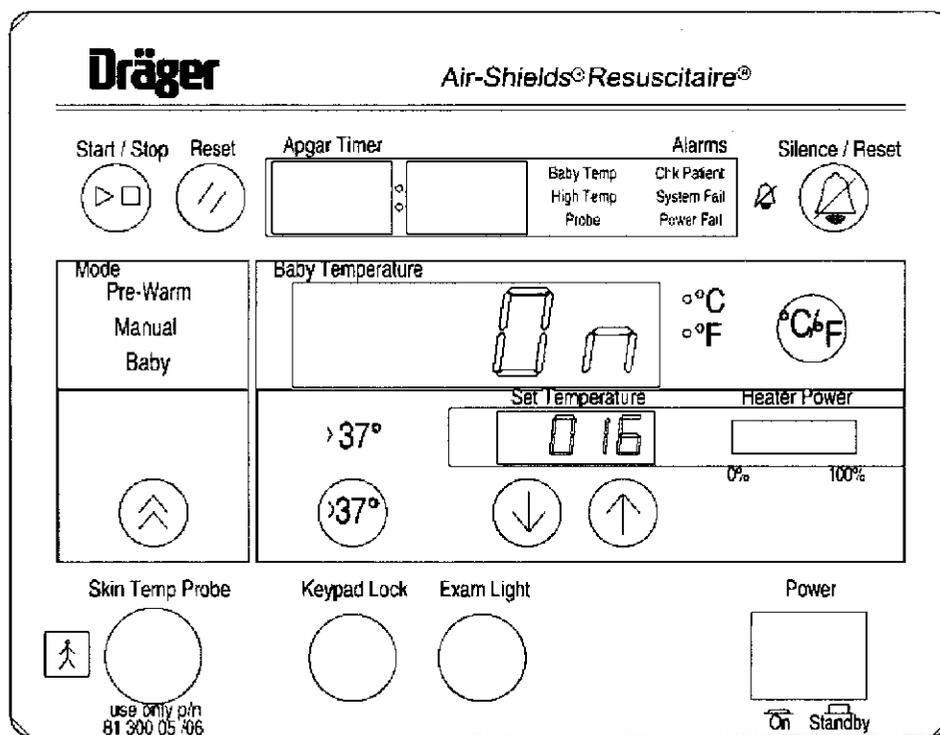
Figure 2-23. Speaker Test Off Display



- Yes No
 ↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

2. Press the **C/F** key. The Low Volume speaker test activates (see figure 2-24 on page -111).

Figure 2-24. Speaker Test On Display



Yes **No**
 ↓ → Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

3. Press the **C/F** key again. The Mid-Range Volume speaker test activates.

Yes **No**
 ↓ → Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 4. Otherwise, call Technical Support for assistance.

4. Press the **C/F** key again. The High Volume speaker test activates.

Yes **No**
 ↓ → Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 5. Otherwise, call Technical Support for assistance.

5. Press the **C/F** key again. The speaker test deactivates and displays **OFF** again (see figure 2-23 on page -110).

Chapter :

2.18 Diagnostic Test #17—Back-Up Audio Annunciation Test

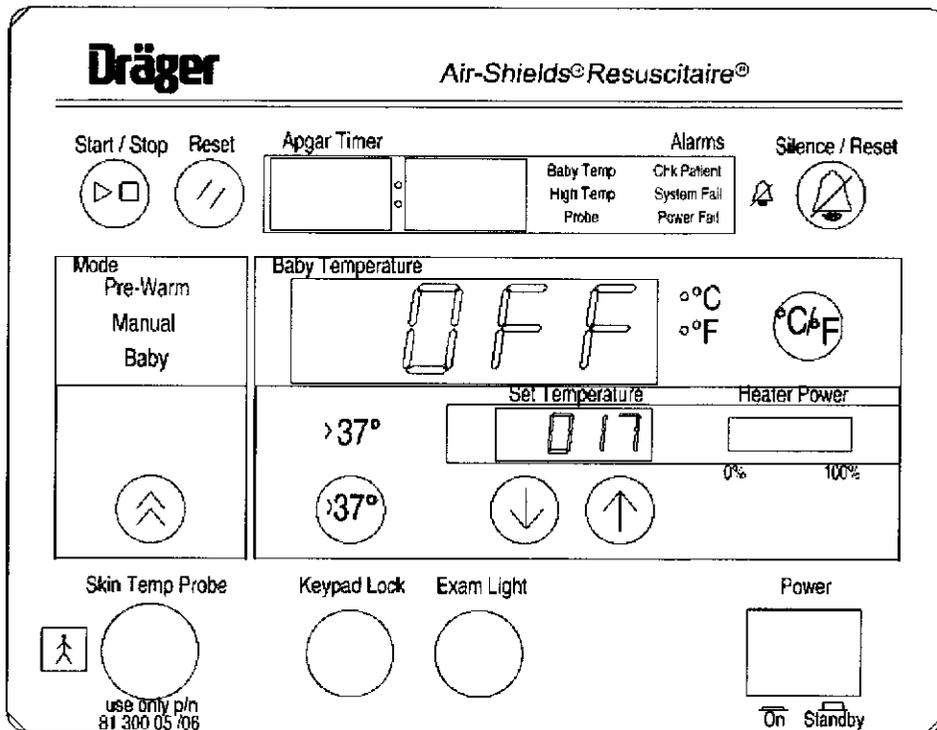
NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test activates the piezo back-up audio annunciator.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #17, **OFF** appears on the **Baby Temperature** display (see figure 2-25 on page -114).

Figure 2-25. Back-Up Audio Annunciation Test Activation Display

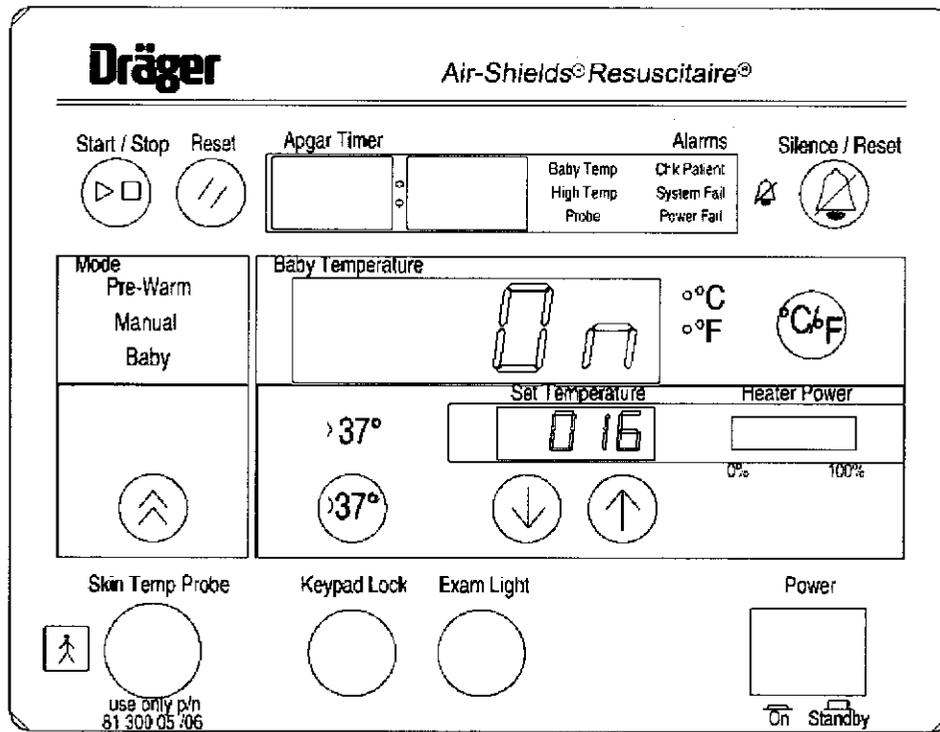


- Yes** **No**
 ↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

NOTE:

The piezo alarm sounds in 1 second intervals.

Figure 2-24. Speaker Test On Display



Yes No
↓

→ Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

3. Press the **C/F** key again. The Mid-Range Volume speaker test activates.

Yes No
↓

→ Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 4. Otherwise, call Technical Support for assistance.

4. Press the **C/F** key again. The High Volume speaker test activates.

Yes No
↓

→ Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 5. Otherwise, call Technical Support for assistance.

5. Press the **C/F** key again. The speaker test deactivates and displays **OFF** again (see figure 2-23 on page -110).

2.17 Diagnostic Test #16—Speaker Test

Chapter :

Yes	No
↓	→

Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 6. Otherwise, call Technical Support for assistance.

6. Perform one of the following:

- To access additional diagnostic tests, press the Up or Down arrow keys.
- To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

NOTES:

2

2.18 Diagnostic Test #17—Back-Up Audio Annunciation Test

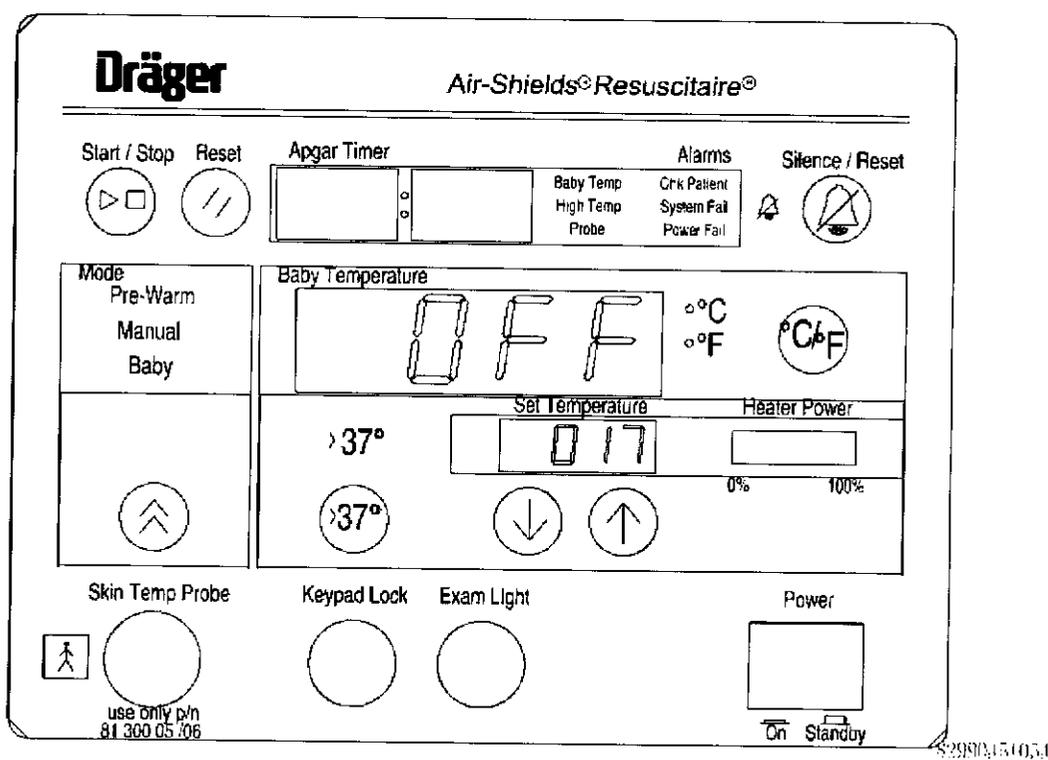
NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test activates the piezo back-up audio annunciator.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #17, **OFF** appears on the **Baby Temperature** display (see figure 2-25 on page -114).

Figure 2-25. Back-Up Audio Annunciation Test Activation Display



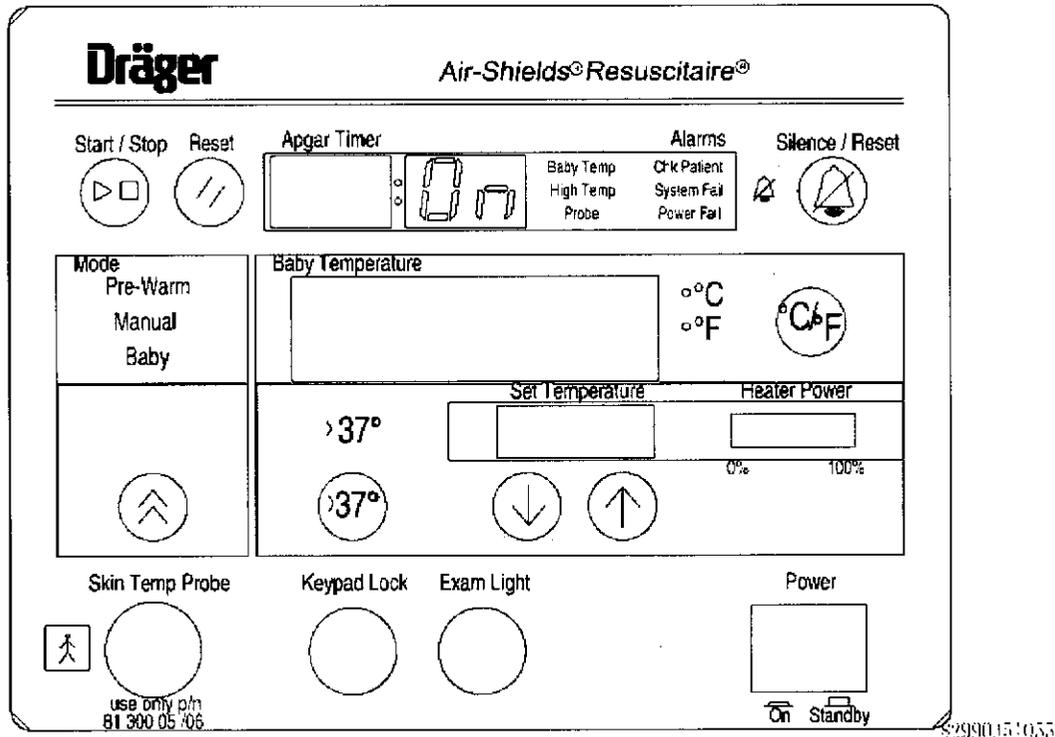
- Yes** **No**
↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

NOTE:

The piezo alarm sounds in 1 second intervals.

2. Press the **C/F** key. The piezo alarm activates then deactivates (see figure 2-26 on page -115).

Figure 2-26. Back-Up Audio Annunciation Test Deactivation Display



- Yes No
 ↓ → Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

3. Perform one of the following:
 - To access additional diagnostic tests, press the Up or Down arrow keys.
 - To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

2.19 Diagnostic Test #18—Error Log Display and Clear (Units with Firmware Version 1.05 and Higher Only)

Chapter :

2.19 Diagnostic Test #18—Error Log Display and Clear (Units with Firmware Version 1.05 and Higher Only)

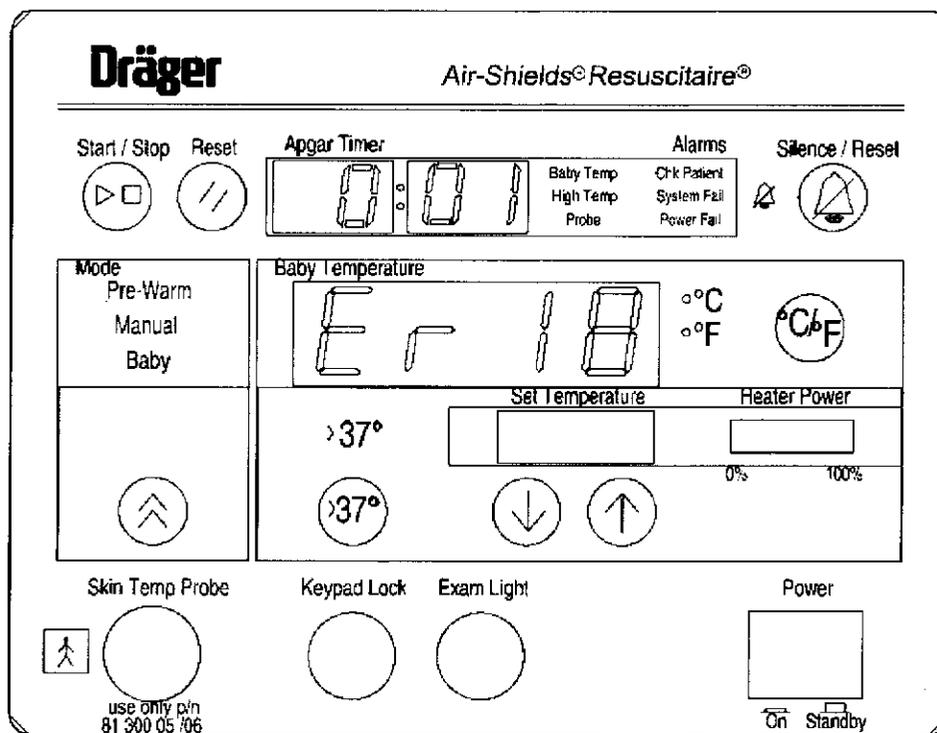
NOTE:

The Resuscitaire® Radiant Warmer front panels are shown throughout the Diagnostic Tests. All of the front panels will operate in the same manner.

This test displays the first four errors that may occur on the **Baby Temperature** display. The numbers **0:01** through **0:04** appear on the **Apgar Timer** display to indicate to the user the sequence in which the errors occurred. The **C/F** key enables the user to step through the error log entries. The **Mode** key enables the user to clear the error log.

1. Access the off-line Diagnostic Mode (refer to RAP 2.1). At Diagnostic Test #18, **0:01** appears on the **Apgar Timer** display (see figure 2-27 on page -116).

Figure 2-27. Error Log Display



- Yes No
 ↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 2. Otherwise, call Technical Support for assistance.

NOTE:

If no errors have occurred, the error reference numbers, **0:01** through **0:04**, appear on the **Apgar Timer** display after you press the **C/F** key. However, the **Baby Temperature** display remains blank.

2. Press the **C/F** key. As you step through the error reference numbers, **0:01** through **0:04**, the corresponding error codes appear on the **Apgar Timer** display and **Baby Temperature** display, respectively.

- Yes No
 ↓ → Replace the Display P.C. Board (PCB1) (refer to procedure 4.10). If this solves the problem, go to step 3. Otherwise, call Technical Support for assistance.

3. If error codes appear on the **Baby Temperature** display, make a note of the error numbers, refer to table 2-7 on page -117 for the corrective action, and then go to step 4.
4. Press the Up arrow **Mode Select** key. The error log clears, and the **Baby Temperature** display goes blank (see figure 2-28 on page -120).

System Error Codes

Table 2-7. System Error Codes

Error Number	Explanation	Corrective Action
2 ^a	AC line voltage is too high	Make sure that the power source is in compliance with the electrical specification of the system.
3	Solid state relay's (SSR) path short circuits	Do "Diagnostic Test #6—Heater/Relays AC Line Voltage Display" on page -87.
4	Heater circuit failed (short circuit)	Do "Diagnostic Test #6—Heater/Relays AC Line Voltage Display" on page -87.



2.19 Diagnostic Test #18—Error Log Display and Clear (Units with Firmware Version 1.05 and Higher Only)

Chapter :

Error Number	Explanation	Corrective Action
5	SSR #1 failed (open circuits or heater open circuits)	Do "Diagnostic Test #6—Heater/Relays AC Line Voltage Display" on page -87.
6	SSR #2 failed (open circuits or heater open circuits)	Do "Diagnostic Test #6—Heater/Relays AC Line Voltage Display" on page -87.
7	Safety Relay failed (short circuits)	Do "Diagnostic Test #6—Heater/Relays AC Line Voltage Display" on page -87.
8	AC heater current is high	Inspect the quartz tube heating element. If necessary, replace it (refer to procedure 4.7). Otherwise, do "Diagnostic Test #6—Heater/Relays AC Line Voltage Display" on page 87
9	Hardware detects a high temperature >39.5 C (103.1F)	If the heater is on but cannot be controlled, replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). Otherwise, check for an ancillary heat source.
10	Power fail circuit failure	Do "Diagnostic Test #14—Supercap Voltage Display" on page -106.
11	Central processing unit (CPU) voltage is out of specification	Do "Diagnostic Test #13—Logic Voltage Display" on page -104.
12	Keypad failed	Do "Diagnostic Test #4—Key Check" on page -82.
13	ROM test failure	Do "Diagnostic Test #2—ROM Device Checksum Display" on page -78.
14	RAM test failure	Do "Diagnostic Test #1—Software Level Display" on page -75.
15	EEPROM test failure	Do "Diagnostic Test #7—EEPROM Status Test" on page -92.
16	Analog/digital (A/D) offset is out of specification	Check the 42 pin PCB1 interconnect for damage. Otherwise, do "Diagnostic Test #9—ADC Offset/Gain Display" on page -96



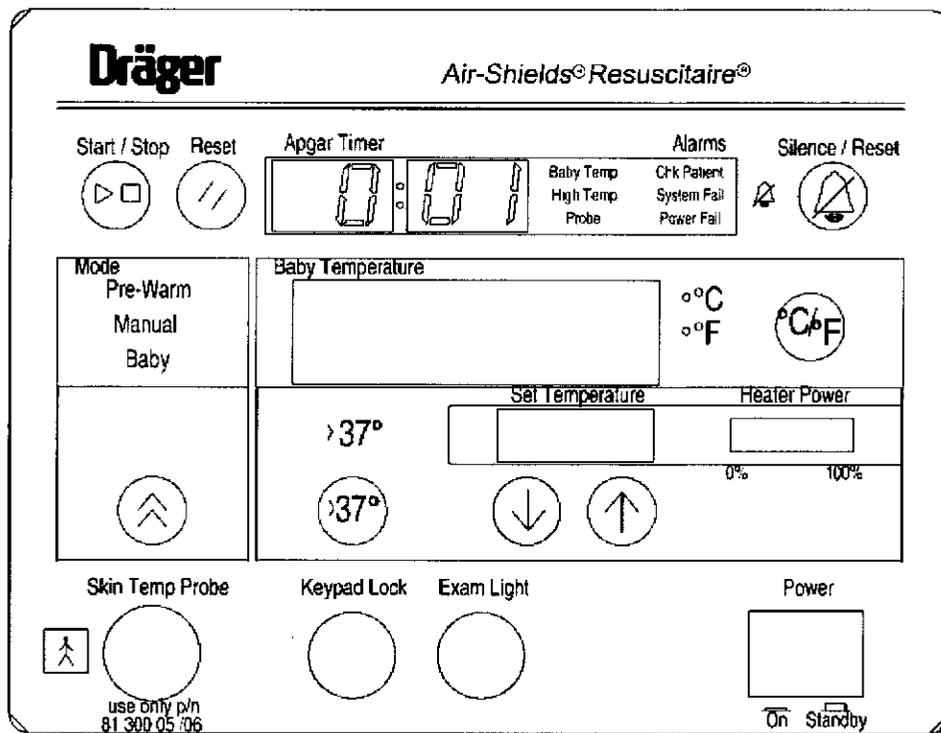
Error Number	Explanation	Corrective Action
17	A/D gain is out of specification	Check the 42 pin PCB1 interconnect for damage. Otherwise, do "Diagnostic Test #9—ADC Offset/Gain Display" on page -96
18	DELETED by software version 1.06 in 1998. Older units may still display this code.	Do "Diagnostic Test #2—ROM Device Checksum Display" on page -78. Make a note of the software revision, then call Technical Support.
20	External watchdog timer failure	Do "Diagnostic Test #15—Watchdog Timer Test" on page -108.
21	Difference between ambient temperature probe 1 and 2. Displayed temperatures exceed 0.4 C in diagnostic test # 10.	Check for damaged ambient temperature probes. The ambient temperature probe is internal, and must be attached in order for the unit to function properly. Adjust the precision 5V reference (see "Calibrating the Controller Assembly" on page -343). Replace the Display P.C. Board (PCB1) (refer to procedure 4.10).
22	36 C probe calibration error exceeds 0.2 C	Do "Diagnostic Test #12—Skin Probe Display Temperature Accuracy" on page -102.
23 ^a	Ambient temperature is above 32 C (90 F)	Using an external thermometer, verify the ambient temperature.
24	Internal malfunction.	Refer unit to service.
25	Internal malfunction.	Refer unit to service.

a. These errors are not written into the error log.

NOTE:

If error code 17 appears on the display, call Technical Support for assistance. → Change IC LTC1290 (Single Chip 12 Bit Data Acq - 81m.) if Error 17 appears.

Figure 2-28. Error Log Reset Display



Yes **No**
 ↓

→ Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 5. Otherwise, call Technical Support for assistance.

5. The corresponding reference number on the **Apgar Timer** display returns to the first error reference number, **0:01**.

Yes **No**
 ↓

→ Replace the Power and Control P.C. Board (PCB2) (refer to procedure 4.10). If this solves the problem, go to step 6. Otherwise, call Technical Support for assistance.

6. Perform one of the following:

- To access additional diagnostic tests, press the Up or Down arrow keys.
- To exit Diagnostic Mode, turn the unit off and then on, and go to "Final Actions" on page -67.

2.19 Diagnostic Test #18—Error Log Display and Clear (Units with Firmware Version 1.05 and Higher Only)

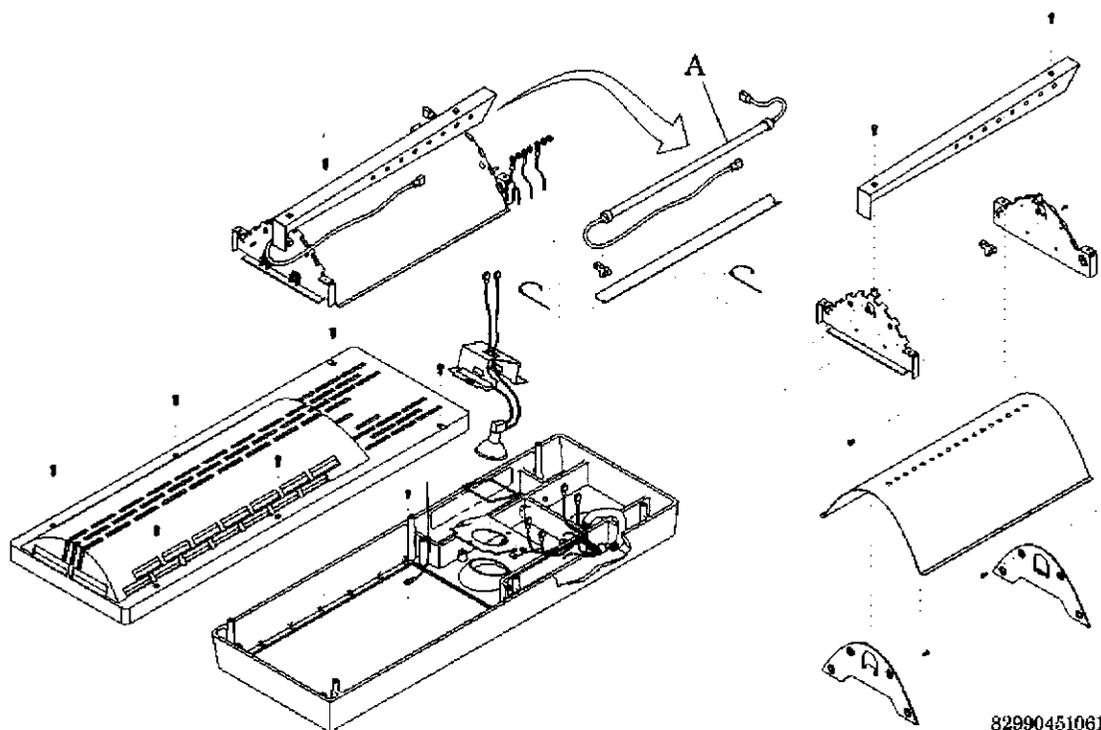
Chapter:

NOTES:

2.20 Heater Does Not Turn On

1. Remove and inspect the quartz heating element (A) (refer to procedure 4.7) (see figure 2-29 on page -122). The quartz heating element (A) is good.

Figure 2-29. Quartz Heating Element



- Yes No
↓ → Replace the quartz heating element (A) (refer to procedure 4.7). If this solves the problem, go to "Final Actions" on page -67. Otherwise, go to step 3.



CAUTION:

To prevent component damage, ensure that your hands are clean, and **only** handle the P.C. board by its edges.



CAUTION:

When handling electronic components, wear an antistatic strap. Failure to do so could result in component damage.

2. Put on an antistatic strap.

3. Inspect the connection at J4 (B) on the Power and Control P.C. Board (PCB2) (C) (see figure 2-30 on page -123). The connection at J4 (B) on the Power and Control P.C. Board (PCB2) (C) is good.

Figure 2-30. Power and Control P.C. Board (PCB 2)

B C

2

82990-151062

- | | | |
|-----|----|---|
| Yes | No | |
| ↓ | → | With your fingers on the edge of the Power and Control P.C. Board (PCB 2) (C), secure the connection at J4 (B). If this solves the problem, go to "Final Actions" on page -67. Otherwise, go to step 4. |



CAUTION:

For shipping and storage, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

4. J4 or K1 is damaged. Replace the Power and Control P.C. Board (PCB 2) (C) (refer to procedure 4.10). This solves the problem.

- | | | |
|-----|----|---|
| Yes | No | |
| ↓ | → | For assistance, call Technical Support. |

5. Go to "Final Actions" on page -67.

2.21 Pre-Warm Mode Is Not Activated Upon a Reset of the System

1. The system is out of Diagnostic Mode.

Yes No



→ Reset the system to exit the Diagnostic Mode. If this solves the problem, go to "Final Actions" on page -67. Otherwise, go to step 2.



CAUTION:

To prevent component damage, ensure that your hands are clean, and **only** handle the P.C. board by its edges.



CAUTION:

When handling electronic components, wear an antistatic strap. Failure to do so could result in component damage.



CAUTION:

For shipping and storage, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

2. The ROM Test has failed. Replace the Power and Control P.C. Board (PCB 2) located in the Controller Module (refer to procedure 4.10). This solves the problem.

Yes No



→ For assistance, call Technical Support.

3. Go to "Final Actions" on page -67.

2.22 Heater Is On, but Indicators Are Off



CAUTION:

To prevent component damage, ensure that your hands are clean, and **only** handle the P.C. board by its edges.



CAUTION:

When handling electronic components, wear an antistatic strap. Failure to do so could result in component damage.



CAUTION:

For shipping and storage, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

1. The display driver is damaged. Replace the Display P.C. Board (PCB1) located in the Controller Module (refer to procedure 4.10). This solves the problem.

Yes No

↓

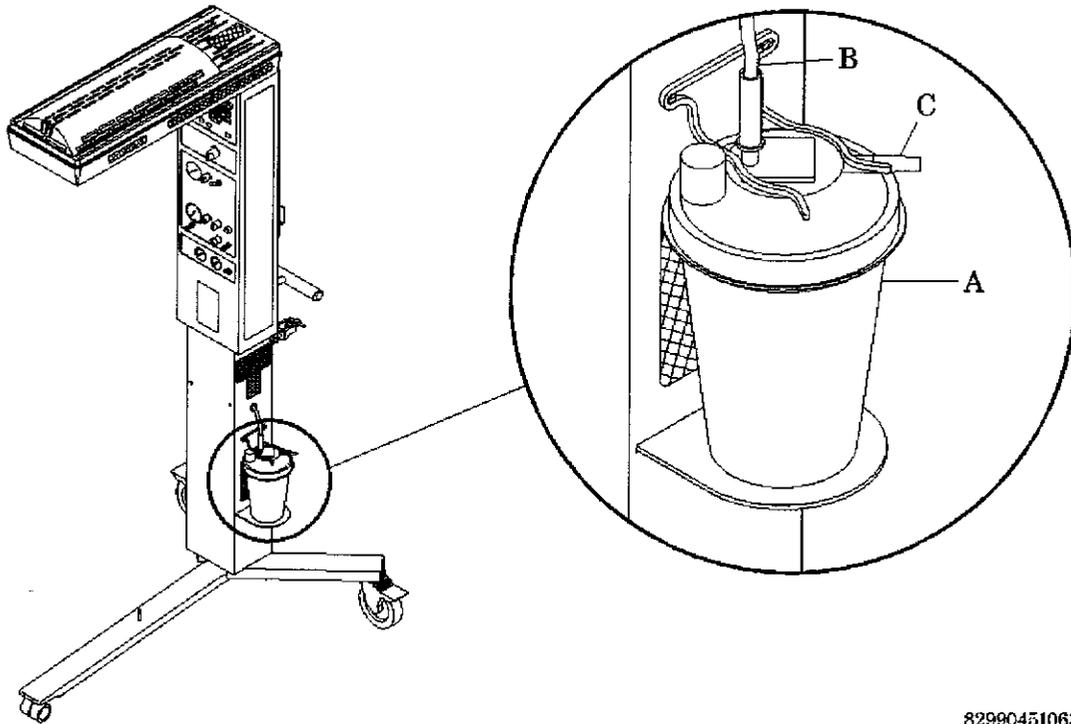
→ For assistance, call Technical Support.

2. Go to "Final Actions" on page -67.

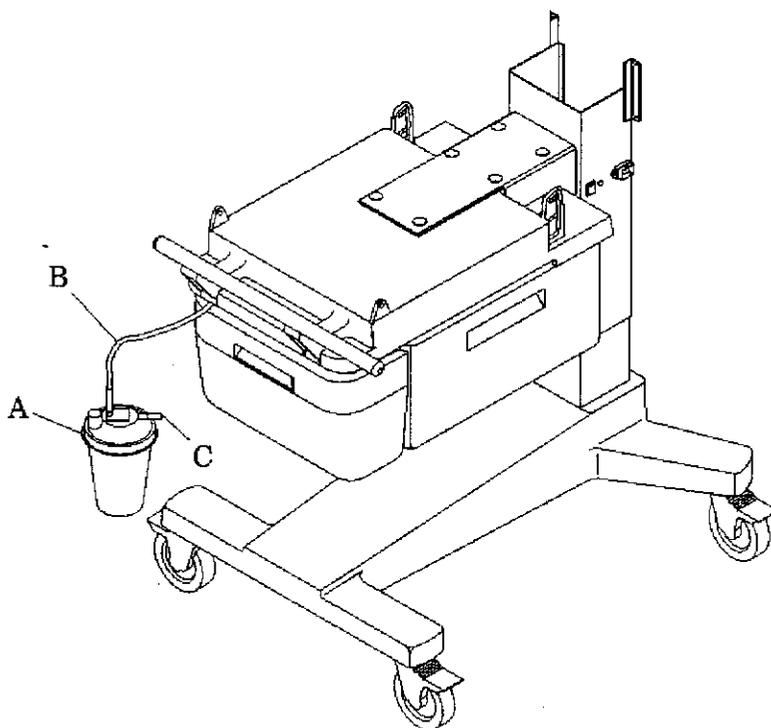
2.23 Suction Does Not Obtain Desired Pressure

1. The suction jar (A) and rim gasket show no signs of wear or damage (see figure 2-31 on page -126) and (see figure 2-32 on page -127).

Figure 2-31. Suction Jar on the Resuscitaire® Birthing Room Warmer (WBR82)



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Figure 2-32. Suction Jar on the Resuscitaire® Radiant Warmer (RW82)

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- | | | |
|-----|----|--|
| Yes | No | |
| ↓ | → | Replace the suction jar (A). If this solves the problem, go to "Final Actions" on page -67. Otherwise, go to step 2. |
2. The suction hose (B) is free of bends, tangles, and leaks between the regulator and the suction bottle (A).

Yes	No	
↓	→	Replace the suction hose (B). If this solves the problem, go to "Final Actions" on page -67. Otherwise, go to step 3.
 3. The suction filter (C) is clean.

Yes	No	
↓	→	Replace the suction filter (C). If this solves the problem, go to "Final Actions" on page -67. Otherwise, go to step 4.
 4. The pressure and suction gauges are measuring correctly.

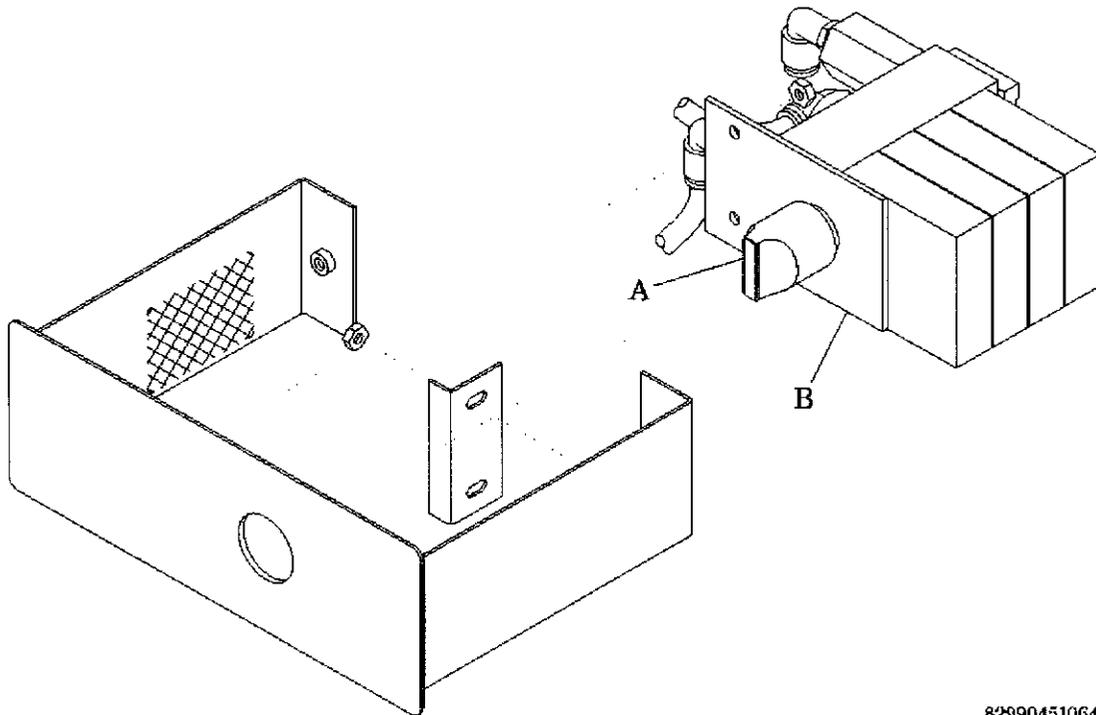
Yes	No	
↓	→	Replace the Suction Module. If this solves the problem, go to "Final Actions" on page -67. Otherwise, call Technical Support for assistance.
 5. Go to "Final Actions" on page -67.

Chapter :

2.24 Blender Module Oxygen Concentration Reading Does Not Match Blender Module Setting

1. The Blender Module knob (A) is secure (see figure 2-33 on page -128).

Figure 2-33. Blender Module



82990451064

- | | |
|-----|----|
| Yes | No |
| ↓ | → |
- With the Blender Knob (A) properly aligned, tighten the Blender Module knob (A). If this solves the problem, go to "Final Actions" on page -67. Otherwise, go to step 2.
2. Replace the Blender Module (B). This solves the problem.
- | | |
|-----|----|
| Yes | No |
| ↓ | → |
- For assistance, call Technical Support.
3. Go to "Final Actions" on page -67.

2.25 Blender Module Sets Off Alarms



WARNING:

Cylinder heights may vary. When replacing a gas cylinder, make sure that the tank does not exceed the maximum tank height specification. Also, prior to placing the cylinder, confirm that there is sufficient clearance between the bottom of the tank and the floor when the Resuscitaire® Warmer variable height adjustment is in its lowest position. After these checks have been completed, raise the variable height adjustment to its maximum height and install/remove the cylinder. Failure to do so may result in personal injury or equipment damage.

1. Verify that the pipeline and/or cylinder gas flows properly. This solves the problem.

Yes	No	
↓	→	The input gas source has increased or decreased. Operate the low flow microblender with clean and dry medical grade gases. If this solves the problem, go to "Final Actions" on page -67. Otherwise, call Technical Support for assistance.

2. Go to "Final Actions" on page -67.

2.26 Blender Module Output Mixture Is Out of Specified Range of 20.8% to 100%

1. Use air inlet water filters. This solves the problem.

Yes	No	
↓	→	The Blender Module is damaged. Replace the Blender Module (refer to procedure 4.3). If this solves the problem, go to "Final Actions" on page -67. Otherwise, call Technical Support for assistance.

2. Go to "Final Actions" on page -67.

2.27 Patient Gas Supply Measured Flow Is Out of Specified Range

The patient gas supply measured flow should be $\pm 3\%$ of full scale or 10% of setting.

1. Replace the air/oxygen hose. This solves the problem.

Chapter :

Yes **No**
↓ → For assistance, call Technical Support.

2. Go to "Final Actions" on page -67.

2.28 Patient Gas Supply Pressure Relief Gauge Exceeds 60 cm H₂O ± 20 cm H₂O

1. Replace the pressure relief valve. This solves the problem.

Yes	No
↓	→ For assistance, call Technical Support.
2. Go to "Final Actions" on page -67.

2.29 AutoBreath™ Infant Resuscitator Inhalation/Exhalation (I/E) Ratio Is Out of Specification

1. Replace the Resuscitation Module (refer to procedure 4.4). This solves the problem.

Yes	No
↓	→ For assistance, call Technical Support.
2. Go to "Final Actions" on page -67.

2.30 AutoBreath™ Infant Resuscitator Measured Breaths-Per-Minute (BPM) Is Out of Specified Range

The AutoBreath™ Infant Resuscitator measured breaths-per-minutes should be between 10 BPM to 60 BPM.

1. Replace the Resuscitation Module (refer to procedure 4.4). This solves the problem.

Yes	No
↓	→ For assistance, call Technical Support.
2. Go to "Final Actions" on page -67.





Theory of Operation



Chapter 3: Theory of Operation

Introduction

Electrical System

Display P.C. Board (PCB1)

The Display P.C. Board (PCB1) contains all of the front panel switches, display driver, and displays (see figure 3-1 on page -135). In addition, it contains the dual-analog probe circuitry and an analog/digital (A/D) converter. There are also two precision reference power supplies: one for the adjustable 5V DC, and a fixed -2.5V DC reference.

Figure 3-1. Display P.C. Board (PCB1)

3

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The following potentiometers on PCB1 require adjusting:

- The 5V, precision, reference potentiometer, R15
- The dual-analog probe, amplifier, calibrations potentiometers, R13 (Channel 1) and R28 (Channel 2).

The probe amplifier circuits are calibrated at 97 F (36 C). Dual precision-calibration resistors are provided on PCB1.

The embedded, off-line, diagnostic test software enables the user to completely test PCB1 and PCB2. Diagnostic Mode is entered from the front panel display during reset or start-up of the unit. The test results appear on the front panel displays.

Power and Control P.C. Board (PCB2)

The Power and Control P.C. Board (PCB2) contains the circuitry required to control the heater, as well as the operator interface (see figure 3-2 on page -136).

Figure 3-2. Power and Control P.C. Board (PCB 2)

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PCB2 supports the following three operating modes:

- Pre-Warm Mode
- Manual Mode
- Baby Mode

In addition, PCB2 contains the circuitry required to control the remote isolated serial port. The nine-pin connector, located at the rear of the unit, provides the hardware interface that can be used with a standard serial printer. When a serial printer is connected to this port, the user can obtain a hard copy of error messages related to system failures.

Power Supply Circuit

DC Power Supply

The DC power supply supplies $\pm 12V$ DC, +5V DC, and ground to PCB2 through the connector J2.

Circuit Breaker

The circuit breaker (CB1) is not located on the Power and Control P.C. Board (PCB2). It is located at the rear of the unit on the Electrical Module. The breaker has a rating of 12A for 100/120V AC operation, and 6A for 220/240V AC operation. The circuit breaker turns the unit on or off when switched by the operator. It also shuts the unit off when the current is drained excessively.

Fuses

The fuses (F1 and F2) are located on the Power and Control P.C. Board (PCB2). They are rated at 0.5A for 230V AC operation, and 1A for 100/120V AC operation.

Isolation Transformer

AC power is brought into PCB2 through connector J6, and then directly to the primary of current transformer, T2.

Logic Power

The 5V DC voltage is supplied through the DC power supply located on the Electrical Module. It is brought into PCB2 through connector J2, and into PCB1 through connector J1.

The 12V DC voltage is supplied through the DC power supply located on the Electrical Module. It is brought into PCB2 through connector J2, and into PCB1 through connector J1.

The -12V DC voltage is supplied through the DC power supply located on the Electrical Module. It is brought into PCB2 through connector J2, and into PCB1 through connector J1.

The +5 VREF signal is supplied through the +12V DC signal in conjunction with the regulator, U5, capacitors C12 and C13, resistor, R10, and the fine tuning potentiometer, R15.

Control Circuitry

Microcontroller

The core processing unit of the controlling circuitry is the Motorola®¹ MC68HC11ABFN microcontroller. The microcontroller is located on PCB2. The frequency is 8 MHz. The internal and external address bus is 16 bits; the internal and external data bus is 8 bits.

Display Drivers

The following display drivers are located on PCB1:

- U1
- U2
- U3
- U10

Sound Generator

Sound is generated by U5 and U4 together. They are located on PCB2, and are used to generate the system alarm sounds.

A/D Converter

The external A/D converter (U4) is located on PCB1. It interfaces with and is controlled directly by the serial peripheral interface of the microcontroller. The A/D converter reads the probe channels, probe calibration, and ambient temperature.

1. Motorola® is a registered trademark of Motorola, Inc.

System Interfaces

Baby (Skin) Temperature Probe

The baby skin temperature probe signals are brought to PCB2 through connector J3. The signals SK1 and SK2 are brought to PCB1 through connector J1 and converted to a digital signal through the A/D converter, U4.

Ambient Temperature Probe

The ambient temperature probe signals, AMB1_THIN and AMB2_THIN, are brought to PCB1 through connector J1 and converted to a digital signal through the A/D converter, U4.

Data Port

The data port signals are brought to PCB2 through connector J5. The signals present at this port are electrically isolated from the remaining circuitry through isolation transformer, T1. This data port supports a printer interface protocol. The baud rate is at 2400 baud.

System Fail Logic

When the following conditions occur, the System Fail logic produces a **System Failure** alarm:

- A **High Baby Temperature** is detected (>39.5 C).
- The watchdog timer detects a microcontroller system failure.
- A system failure, such as heater failure, is detected and prevents proper operation of the system.

The **System Fail** alarm is not self-resetting.

The watchdog timer circuitry resides on PCB2.

Power Fail Logic

The power fail circuitry resides on PCB2. When the following conditions occur, the Power Fail logic produces a **Power Fail** alarm:

- A loss of AC power supply
- The emergency AC **Power** switch is off
- A power cord disconnects

If the AC power fails, the alarm is powered by capacitor, C29. The **Power Fail** alarm is self-resetting with the resumption of power.

Probe Fail

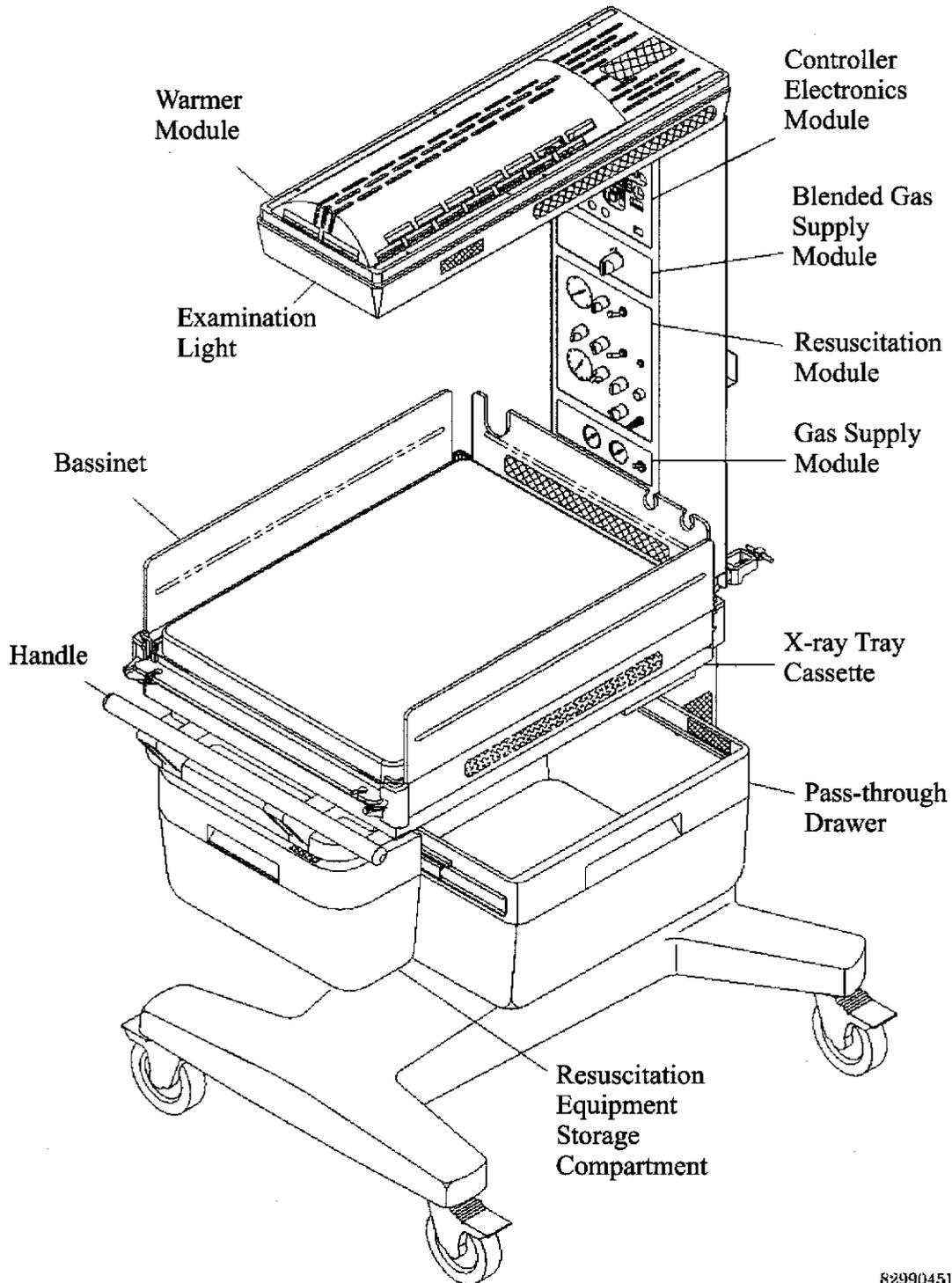
A skin temperature dual thermistor probe differential of $> \pm 0.4$ C exists.

Pneumatic System

The pneumatic system consists of the following (see figure 3-3 on page -141):

- All three modules: gas supply, resuscitation, and blender
- A patient breathing circuit
- A suction collection bottle

Figure 3-3. Resuscitaire® Radiant Warmer



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The Gas Supply Module connects the pipeline-supplied or cylinder-supplied gas to the pneumatic system. The Resuscitation Module contains the suction, oxygen delivery, and optional ventilation circuitry. An optional precision Blender Module mixes the oxygen and air supplies. The patient breathing circuit completes the system by connecting the Resuscitation Module to the patient.

Gas Supply Module

The Gas Supply Module consists of the following two basic variants, which share common components (see figure 3-4 on page -143):

- Oxygen pipeline (with cylinder supply)
- Oxygen/air pipeline (with cylinder supply)

Main Supply On/Off Switch

The main supply **On/Off** switch is a toggle-actuated on/off valve that enables the user to turn on or off all supply gases with a single control.

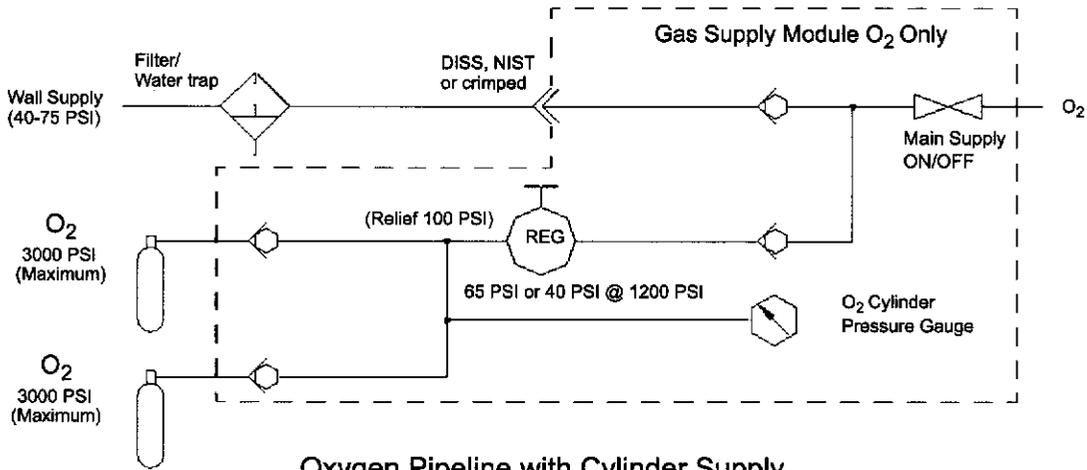
Reserve Gas Supply

In the U.S., the regulator is preset at 65 psi (448 kPa) when the cylinder pressure is 1200 psi (8274 kPa). In the U.K. and Canada, the regulator is preset at 45 psi (310 kPa) when the cylinder pressure is 1500 psi (10342 kPa). The output varies with the input pressure.

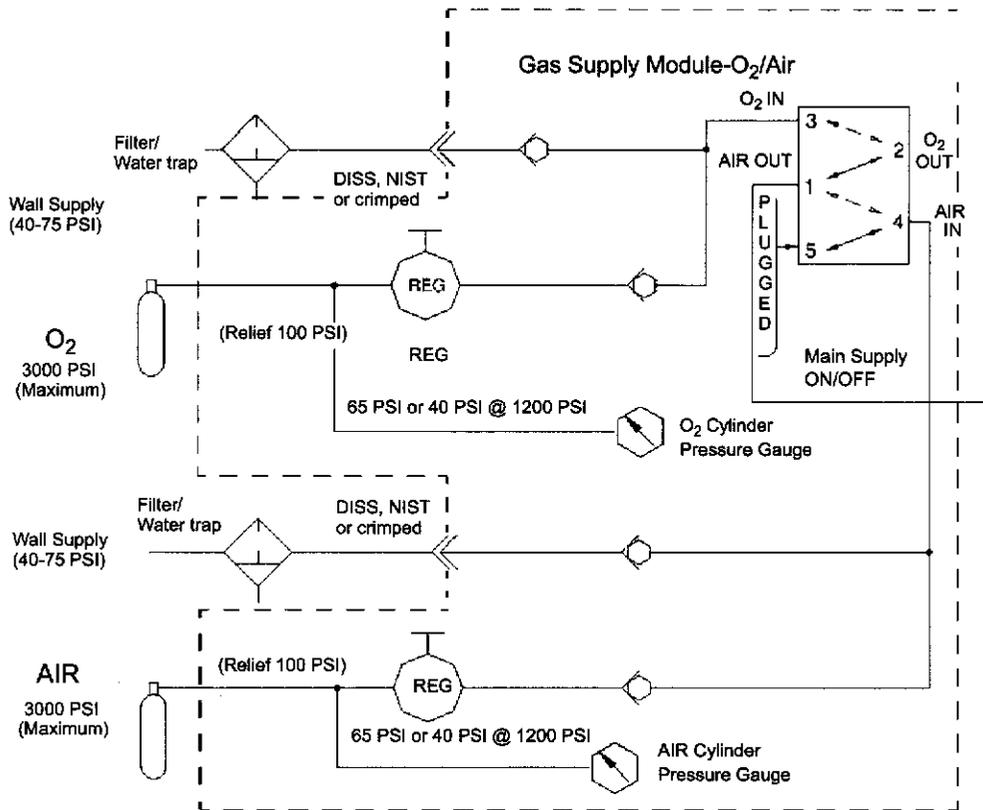
Cylinder Pressure Gauges

Each cylinder gas circuit contains a pressure gauge which enables the user to monitor the cylinder pressure.

Figure 3-4. Oxygen Pipeline and Oxygen/Air Pipeline with Cylinder Supply



Oxygen Pipeline with Cylinder Supply



Oxygen/Air Pipeline with Cylinder Supply

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Resuscitation Module

The Resuscitation Module is an integrated package that contains several pneumatic circuits for infant resuscitation. The module uses flow control valves to control the following parameters:

- Suction control
- Positive End Expiratory Pressure (PEEP)
- Airway pressure relief
- Flow rate
- Auxiliary flow rate



CAUTION:

If the flow control knob is removed, calibrate the unit. Failure to do so could result in equipment damage.

All of these valves are single-turn, calibrated-dial, or magnitude-adjustment type valves with stops at both the maximum and minimum extremes. The flow controls are calibrated by the vendor. The knob, on the shaft of the flow control, is intentionally set so that when the flow is adjusted to its minimum flow position, there is a small bleed flow through the valve. This keeps the valve seat from being damaged and the flow characteristics from changing. If the knob is removed, calibrate

5 mm (0.2") inner diameter x 152 cm (60") long tubing at the maximum suction intensity of -150 mm Hg (80"H₂O) P/N 81 400 81 and 81 400 73, respectively.

The suction gauge displays the generated suction magnitude. This value varies with the flow supplied to the venturi assembly and the resistance in the suction supply and patient connection circuits.

AutoBreath™ Infant Resuscitator (Optional)

The AutoBreath™ Infant Resuscitator is a basic gas-powered, time-cycled, continuous-flow, pressure-limited resuscitator. The AutoBreath™ Infant Resuscitator, used in combination with the patient breathing circuit, provides automatic continuous flow ventilation. A pneumatic oscillator, which pressurizes and bleeds the exhalation chamber of the exhalation valve, drives the automatic ventilation. The diaphragm in this chamber controls patient inspiration and expiration. The breath rate flow control valve, which is user-adjustable from 18 breaths-per-minute (BPM) to 60 BPM, controls the frequency of the oscillator. Throughout this range,

Hardware

The warmer head contains the quartz heating element and an examination light. It is mounted to the top of the upper post. The warmer head pivots to either side of the warmer to provide access for a portable x-ray machine. There is no latch to move the warmer head. An applied force of approximately 5 kg (10 lb) is all that is required to overcome the detents in the warmer head pivot.

Heating Element

The radiant heater consists of a 741 W (600W compensated) quartz tube heater.

Examination Light

The examination light is mounted underneath the warmer head. It is located on the centerline of the warmer head directly behind the radiant heating element. The examination light is a 50 W, fixed-focus, halogen bulb and is turned on/off by a key on the front of the Electrical Module.

Software

The embedded, off-line, diagnostic test software enables the user to completely test the Display P.C. Board (PCB1) and the Power and Control P.C. Board (PCB2). The Diagnostics Test mode is entered from the front panel display during reset or start-up of the unit. The front panel displays show the test results.

Electrical System

Figure 3-5. Display P.C. Board (PCB1) Schematic—P/N 81 307 15

Refer to fold-out FO 3-1 at the rear of this manual.

Figure 3-6. Power and Control P.C. Board (PCB2) Schematic—P/N 81 308 15

Refer to fold-out FO 3-2 at the rear of this manual.

Figure 3-7. Interconnect Diagram

Refer to fold-out FO 3-3 at the rear of this manual.

Pneumatic System

Figure 3-8. Pneumatic System with the AutoBreath™ Infant Resuscitator Schematic

Refer to fold-out FO 3-4 at the rear of this manual.

Figure 3-9. Pneumatic System without the AutoBreath™ Infant Resuscitator Schematic

Refer to fold-out FO 3-5 at the rear of this manual.

NOTES:





Removal, Replacement and Adjustment Procedures



Chapter 4: Removal and Replacement

Tool and Supply Requirements

To service the Resuscitaire® Radiant Warmer Products, the following tools and supplies are required:

- Phillips head screwdriver
- Small screwdriver
- Pressure gauge assembly
- Clamping device (hemostat) (3)
- Digital counter
- Pressure transducer
- RT200 tester or equivalent test device
- Hex key wrench set
- Relief valve cap
- Patient circuit
- Digital voltmeter (DVM) (Fluke®¹ 8080A or equivalent)
- Trim potentiometer adjustment tool
- Oxygen analyzer (Bio-Tek®² #74233 or equivalent)
- Filter/regulator, gas, manual (P/N 67 352 36)
- Nipple, DISS oxygen—1/8" (P/N 67 355 10)
- Tee, oxygen sensor, 22 mm male-female (P/N 67 356 02)
- Adapter, 15 mm male—1/4" barb, plastic (P/N 67 352 11)
- Adapter, 15 mm male—1/4" barb, plastic (P/N 67 352 10)
- Hose, corrugated, 13", ventilation circuit (P/N 67 362 00)

1. Fluke® is a registered trademark of Fluke Corporation.

2. Bio-Tek® is a registered trademark of Bio-Tek Instruments, Inc.

Tool and Supply Requirements

Chapter :

- Tubing, green polyvinyl chloride (PVC), ¼" inner diameter, 15" long (3) (P/N 67 359 01-R)
- Elbow, 90 , 3/8"-¼", brass (P/N 67 355 44)
- Adjustable wrench

NOTES:

4.1 Upper Post Covers

Tools required: Cylinder wrench (unit with cylinder gas supplies only)
Phillips head screwdriver

Removal

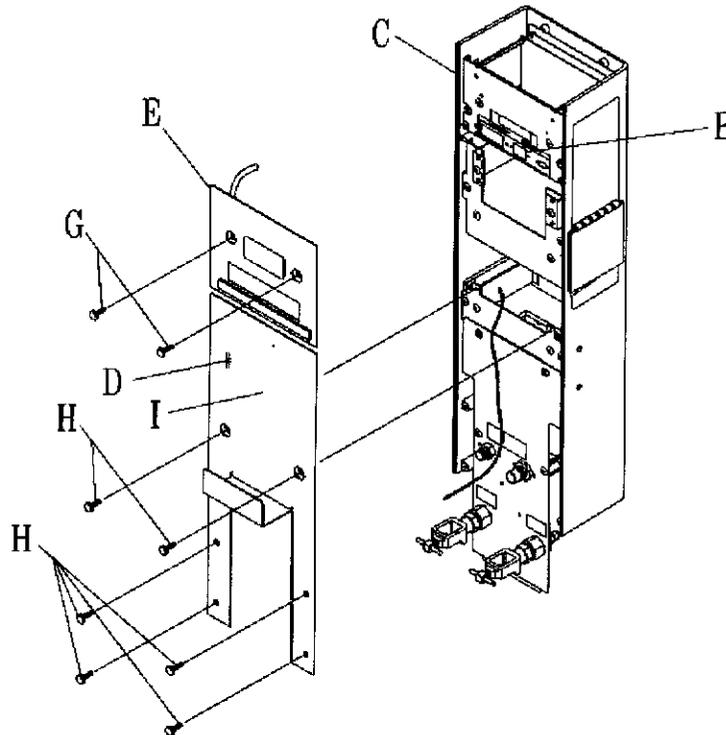


SHOCK HAZARD:

Unplug the unit from its power source during removal and replacement procedures. Failure to do so may result in personal injury or equipment damage.

1. Unplug the unit from its power source.
2. Unplug the power cord (A) from the connector (B) on the upper post (C) (see figure 4-1 on page -156).
3. Do not detach the power cord (A) from the cable clamp (D) on the top upper post cover (E).

Figure 4-1. Upper Post



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4. For pipeline gas supplies on Diameter Index Safety System (DISS) or Non-Interchangeable Screw Thread (NIST) units, disconnect the pipeline supply hoses.
5. For cylinder gas supply units, use the cylinder wrench to close the cylinder valves (F), and remove the reserve gas cylinders.
6. Remove the two screws (G) securing the top upper post cover (E) to the back of the upper post (C).
7. Remove the six screws (H) securing the bottom upper post cover (I) to the back of the upper post (C).

NOTE:

Older units only have one upper post cover.

Replacement

1. Install the eight screws (G) and (H) to secure the two upper post covers (E) and (I) to the upper post (C).

**WARNING:**

Cylinder heights may vary. When replacing a gas cylinder, make sure that the tank does not exceed the maximum tank height specification. Also, prior to placing the cylinder, confirm that there is sufficient clearance between the bottom of the tank and the floor when the Resuscitaire® Warmer variable height adjustment is in its lowest position. After these checks have been completed, raise the variable height adjustment to its maximum height and install/remove the cylinder. Failure to do so may result in personal injury or equipment damage.

2. For cylinder gas supply units, install the reserve gas cylinders, and open the cylinder valves (F).
3. For pipeline gas supplies on DISS or NIST units, connect the pipeline supply hoses.
4. Plug the power cord (A) into the connector (B) on the upper post (C).
5. Plug the unit into an appropriate power source.
6. To make sure the warmer operates properly, perform the "Function Checks" on page -48.

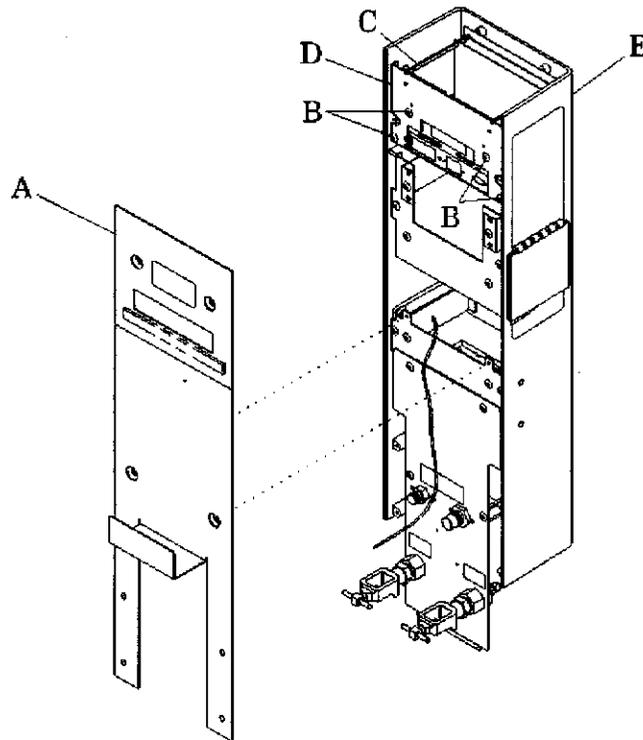
4.2 Controller Module

Tools required: Phillips head screwdriver

Removal

1. Remove the upper post cover(s) (A) (refer to procedure 4.1) (see figure 4-2 on page -158).

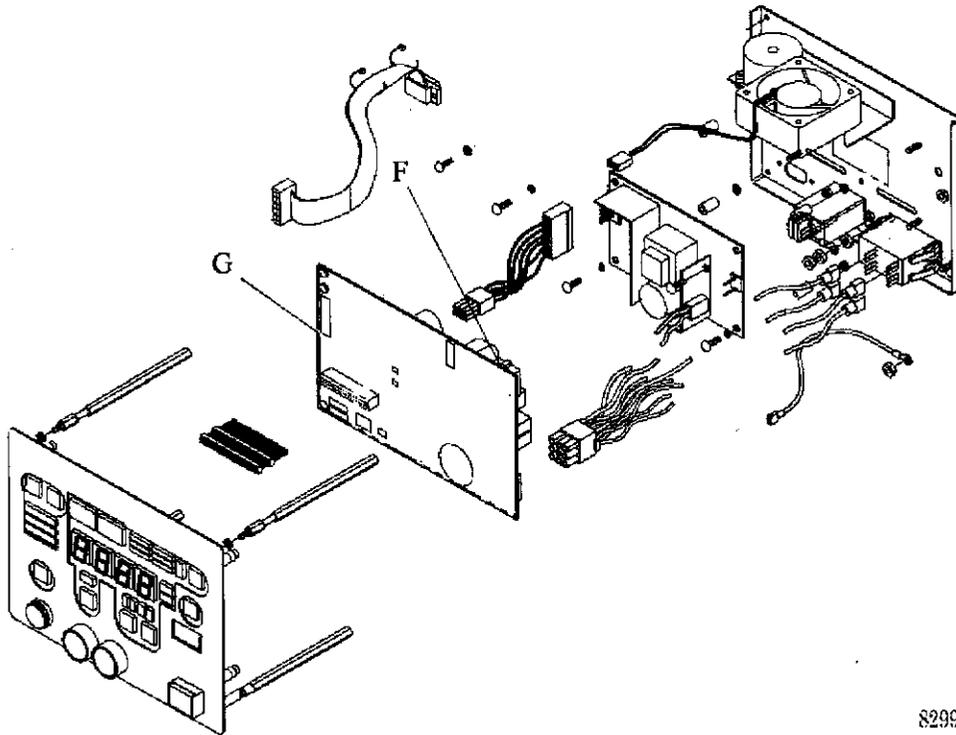
Figure 4-2. Upper Post



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2. Remove the four screws (B) securing the Controller Module (C) to the head support plate (D).
3. Slide the Controller Module (C) through the opening in the front of the upper post (E), but do not remove it.
4. Disconnect the electrical cable assembly from J4 (F) on the Power and Control P.C. Board (PCB 2) (G) (see figure 4-3 on page -159).

Figure 4-3. Controller Module



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5. Remove the Controller Module (C) from the upper post (E) (see figure 4-2 on page -158).

Replacement

1. Align the wires with the center groove in the Controller Module (C), and position the Controller Module (C) into the upper post (E).
2. Connect the electrical cable assembly to J4 (F) on the Power and Control P.C. Board (G) (PCB 2).
3. Slide the Controller Module (C) into the opening in the front panel of the upper post (E), and align the Controller Module (C) with the screw holes in the head support plate (D) (see figure 4-2 on page -158).
4. Install the four screws (B).
5. Install the upper post cover(s) (A) (refer to procedure 4.1).

4.2 Controller Module

Chapter :

6. To make sure the warmer operates properly, perform the "Function Checks" on page -48.

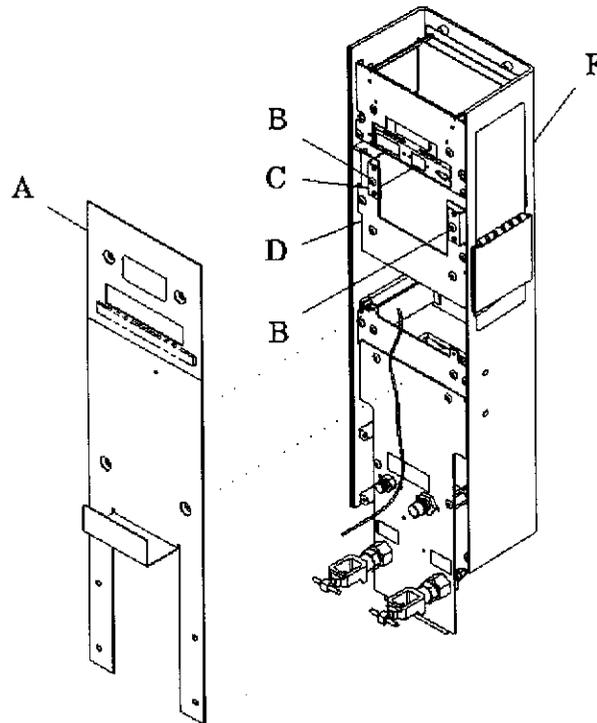
4.3 Blender Module

Tools required: Phillips head screwdriver
Mylar shim
Small piece of cellophane tape
Adjustable wrench
Black marker
Soapy water (optional)

Removal

1. Remove the upper post cover(s) (A) (refer to procedure 4.1) (see figure 4-4 on page -161).

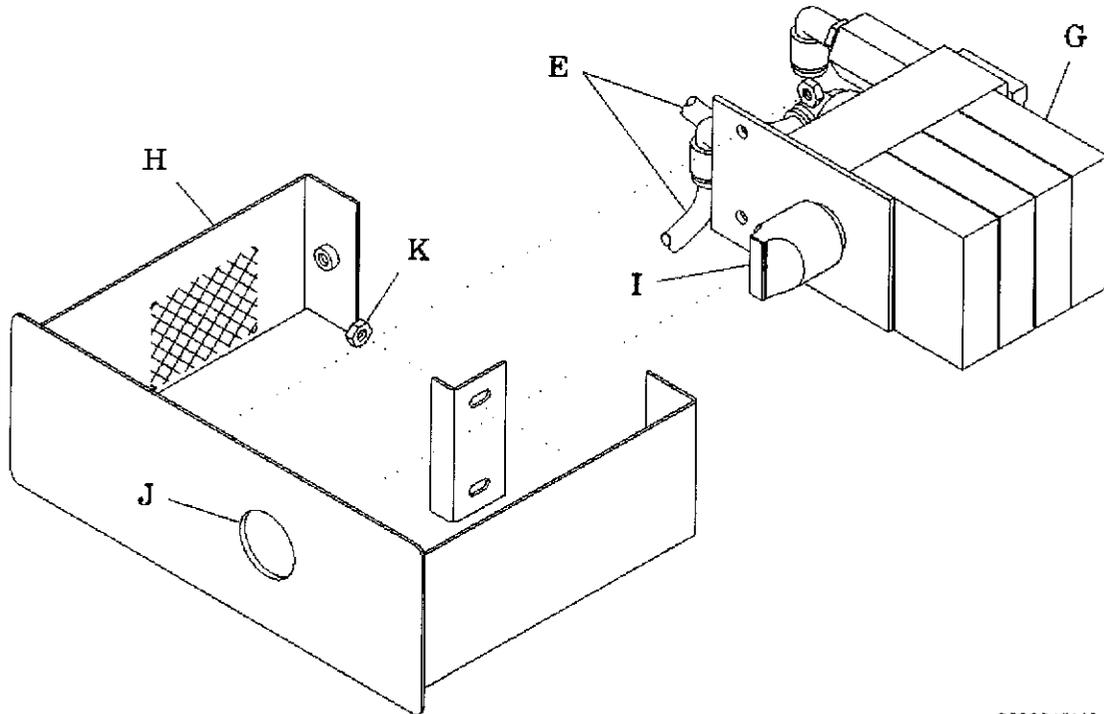
Figure 4-4. Upper Post



82990451103

2. Remove the two screws (B) securing the Blender Module (C) to the blender/resuscitation support plate (D).
3. Mark each of the three tubes (E) and their mating connectors (see figure 4-5 on page -162).

Figure 4-5. Blender Module



82990451104

4. Simultaneously push in on the red collar of the fitting and pull the tube (E) straight out from its mating connector.
5. Remove the Blender Module (C) through the opening in the front of the upper post (F) (see figure 4-4 on page -161).
6. Remove the low-flow, no-bleed microblender (G) from the microblender chassis (H) (see figure 4-5 on page -162).



CAUTION:

The blender control knob must not rub on the inside of the front panel clearance hole. This condition may result in equipment damage.

7. Make sure that the control knob (I) on the low-flow, no-bleed microblender (G) does not rub on the inside of the clearance hole (J) on the microblender chassis (H).

Replacement

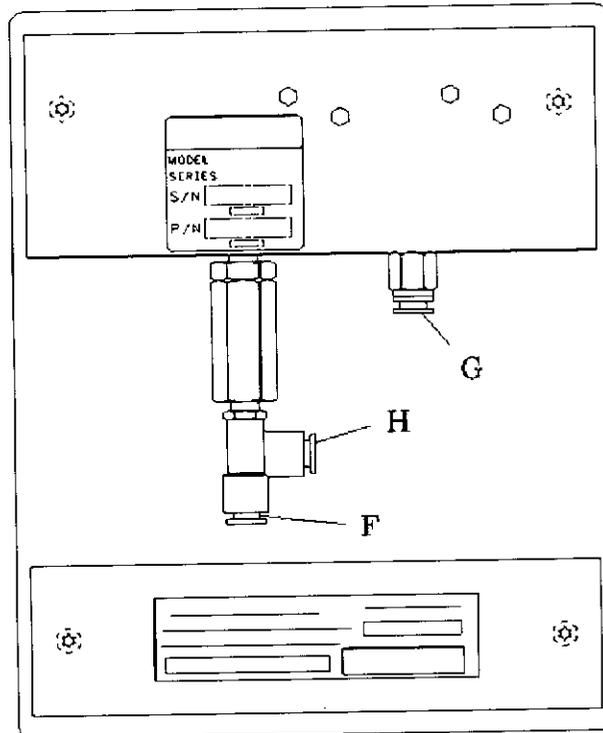
1. Turn the control knob (I) on the low-flow, no-bleed microblender (G) fully clockwise.
2. Wrap the mylar shim around the control knob (I), and use a small piece of cellophane tape to secure the mylar shim in place.
3. Install the low-flow, no-bleed microblender (G) into the microblender chassis (H).
4. Using the adjustable wrench, tighten the two hex nuts (K).
5. Make sure that the control knob (I) turns freely.
6. Remove and discard the mylar shim.
7. Slide the Blender Module (C) into the opening in the front panel of the upper post (F), and align the Blender Module (C) with the screw holes in the blender/resuscitation support plate (D) (see figure 4-4 on page -161).
8. Connect the tubes (E) (see figure 4-5 on page -162):
 - a. Firmly push each tube (E) into its fitting.
 - b. Pull on each tube (E) if it remains in its fitting, continue with the next step. Otherwise, repeat this step.
9. Pressurize the system and listen for air leaks in the Blender Module (C).

NOTE:

Alternatively, use soapy water on the Blender Module and look for air bubbles.

10. Install the upper post cover(s) (A) (refer to procedure 4.1).
11. To make sure the warmer operates properly, perform the "Function Checks" on page -48.

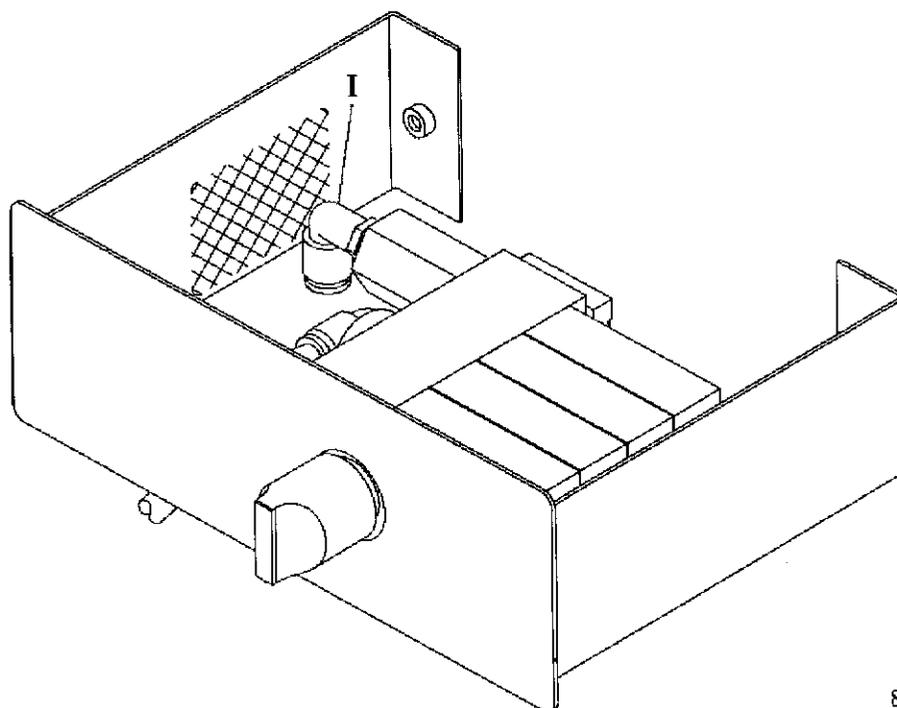
Figure 4-7. Resuscitation Module Fittings



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4. Mark the tubing with an "F."
5. For units with a Blender Module, do the following:
 - a. Disengage the tubing by pushing in on the red collar of the fitting (G) and (H) while pulling the tubing straight out (see figure 4-7 on page -166).
 - b. Mark the tubing with the appropriate letter.
 - c. Disengage the tubing by pushing in on the red collar of the blender fitting (I) while pulling the tubing straight out (see figure 4-8 on page -167).

Figure 4-8. Blender Module Fitting



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- d. Mark the tubing with an "I."
6. Remove the Resuscitation Module (C) through the opening in the front of the upper post (E) (see figure 4-6 on page -165).
7. Disconnect the suction tube (J) from the white barb fitting in the upper post (E).

Replacement

1. Connect the suction tube (J) to the white barb fitting in the upper post (E).
2. Slide the Resuscitation Module (C) into the opening in the front panel of the upper post (E), and align the Resuscitation Module (C) with the screw holes in the resuscitation/gas supply support plate (D).
3. Firmly push the tubing labeled "F" into the fitting (F) (see figure 4-7 on page -166).

4.4 Resuscitation Module

Chapter :

4. Pull on the tubing if it remains in its fitting (F), continue with the next step. Otherwise, repeat this step.
5. Firmly push the tubing labeled "G," "H," and "I" into the corresponding fittings (G), (H), and (I). then pull on the tubing (see figure 4-7 on page -166) and (see figure 4-8 on page -167).
6. Pull on each piece of tubing, if the tubing remains in the fittings (G), (H), and (I), continue with the next step. Otherwise, repeat this step.
7. Install the four screws (B) to secure the Resuscitation Module (C) to the resuscitation/gas supply support plate (D) (see figure 4-6 on page -165).
8. Install the upper post cover(s) (A) (refer to procedure 4.1).
9. To make sure the warmer operates properly, perform the "Function Checks" on page -48.

4.5 Gas Supply Module

Tools required: Adjustable wrench
Phillips head screwdriver

Removal

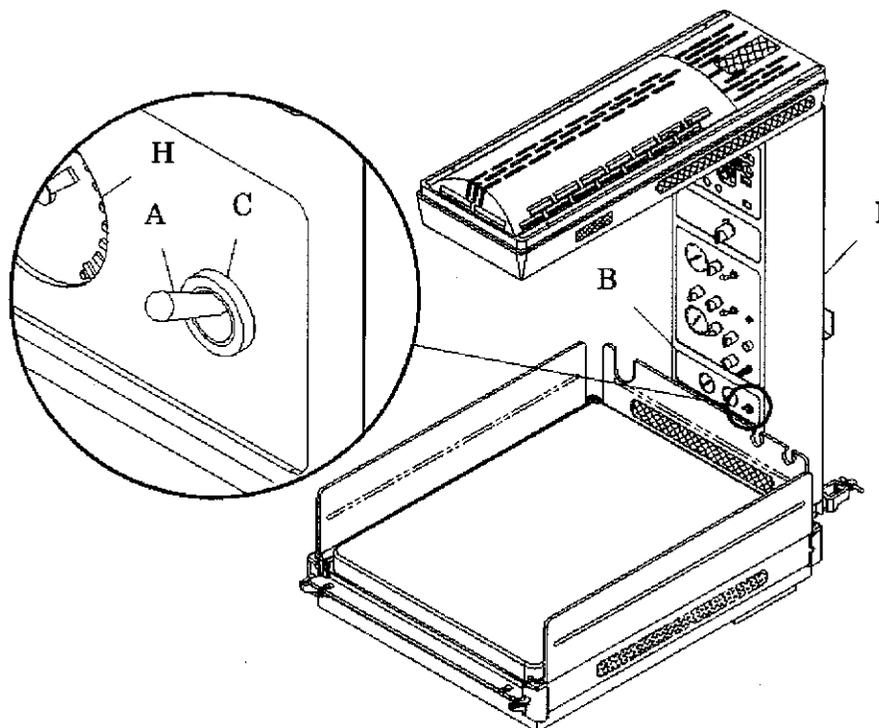


WARNING:

Disconnect the gas supplies from the unit when performing removal and replacement procedures. Failure to do so could result in personal injury or equipment damage.

1. Turn the unit off, and disconnect all gas supplies.
2. Place the **On/Off** switch (A) of the Gas Supply Module (B) to the **Off** position (see figure 4-9 on page -169).

Figure 4-9. Front Panel

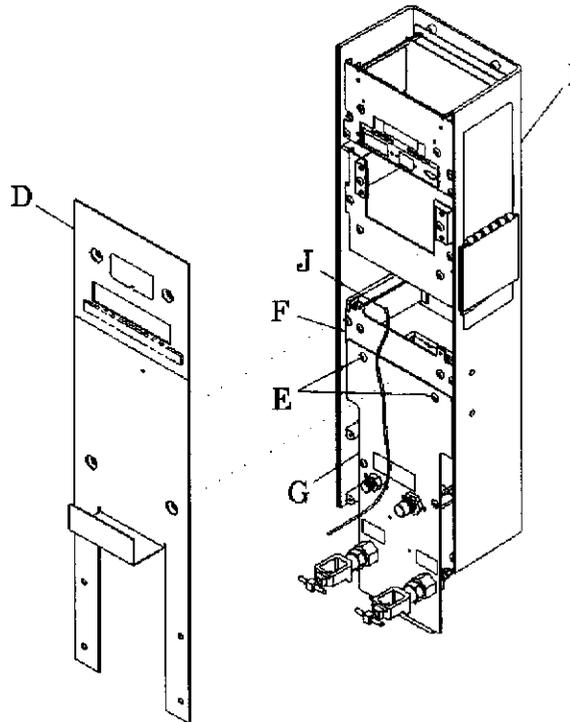


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3. Using the adjustable wrench, remove the knurled nut (C) from the **On/Off** switch (A).

4. Remove the upper post cover(s) (D) (refer to procedure 4.1) (see figure 4-10 on page -170).

Figure 4-10. Upper Post



82990451108

5. Remove the two screws (E) securing the gas supply chassis (G) to the resuscitation/gas supply support plate (F).



CAUTION:

Do not pull on the suction supply tube. Doing so may result in equipment damage.

6. Pull the gas supply chassis (G) away from the upper post (I), and then lift the gas supply chassis (G) from the upper post (I). Be careful not to pull on the suction supply tube (J).

Replacement



WARNING:

Cylinder heights may vary. When replacing a gas cylinder, make sure that the tank does not exceed the maximum tank height specification. Also, prior to placing the cylinder, confirm that there is sufficient clearance between the bottom of the tank and the floor when the Resuscitaire® Warmer variable height adjustment is in its lowest position. After these checks have been completed, raise the variable height adjustment to its maximum height and install/remove the cylinder. Failure to do so may result in personal injury or equipment damage.

1. Mount the flap on the bottom of the gas supply chassis (G) onto the upper post (I).
2. Connect the oxygen supply to the gas supply chassis (G).
3. If applicable, connect the air supply to the gas supply chassis (G).
4. Properly align the gas supply chassis (G) with the holes on the front of the upper post (I).
 - a. If necessary, remove the gas supply chassis (G) from the upper post (I), and then align with the holes on the front of the upper post (I).
 - b. Make sure that the suction supply tube (J) is not pinched.
 - c. Make sure that the **On/Off** switch (A) is pointed downward (see figure 4-9 on page -169).
5. Install the two screws (E) to secure the gas supply chassis (G) to the resuscitation/gas supply support plate (F) (see figure 4-10 on page -170).
6. Using the adjustable wrench, install the knurled nut (C) on the **On/Off** switch (A) (see figure 4-9 on page -169).
7. Align the spring-loaded gauges (H) with the cut-outs on the upper post (I).
8. Install the upper post covers (D) (refer to procedure 4.1) (see figure 4-10 on page -170).

Chapter :

9. Set the **Patient Flow Rate (LPM)** control or the **Auxiliary Flow Control (LPM)** to 10.0 LPM (21.2 scfh).
10. Turn the **On/Off** switch of the Gas Supply Module (B) to the **Off** position (see figure 4-9 on page -169).
11. See whether any gas flows in the system.
12. If gas continues to flow in the system, verify the proper switch connections.
13. To make sure the warmer operates properly, perform the "Function Checks" on page -48.

4.6 Oxygen or Air Yoke

Tools required: Phillips head screwdriver
 Pliers
 1 1/4" open end wrench
 7/8" open end wrench
 1/8" open end wrench
 Two adjustable wrenches
 Cylinder wrench

Parts required: (1 or 2) 81 900 72 Replacement kit, oxygen
 yoke/check valve
 or
 (1 or 2) 81 900 73 Replacement kit, oxygen
 yoke without check valve
 and/or
 (1) 81 900 74 Replacement kit, air yoke

NOTE:

This procedure describes removing and replacing both yoke assemblies inside a unit, however this may not always be required. It is possible to replace only one.

Removal



SHOCK HAZARD:

Unplug the unit from its power source during removal and replacement procedures. Failure to do so may result in personal injury or equipment damage.

1. Unplug the unit from its power source.



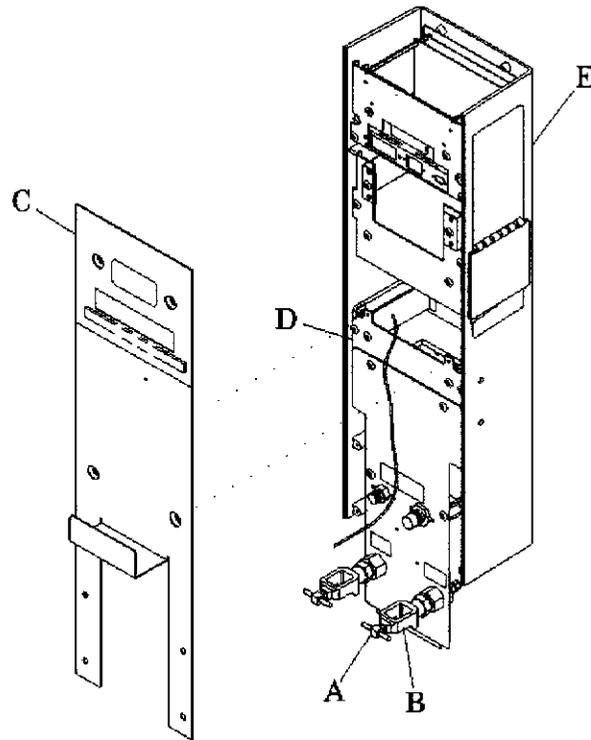
WARNING:

Disconnect the gas supplies from the unit when performing removal and replacement procedures. Failure to do so could result in personal injury or equipment damage.

2. Using a cylinder wrench, close the valves (A) on the two yoke assemblies (B) (see figure 4-11 on page -174).
3. Remove the reserve gas supplies from the two yoke assemblies (B).

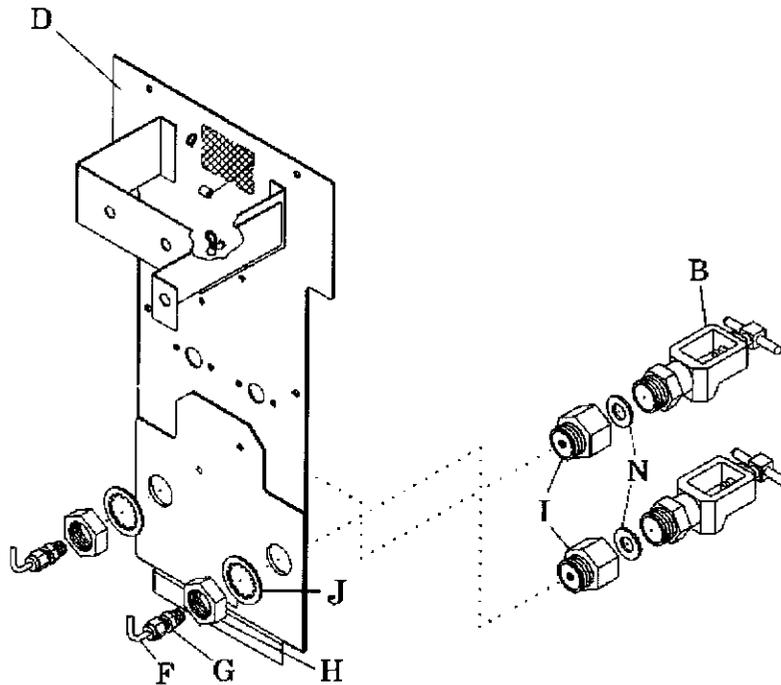
4. Remove the upper post cover(s) (C) (refer to procedure 4.1).
5. Remove the Gas Supply Module (D) (refer to procedure 4.5).

Figure 4-11. Upper Post



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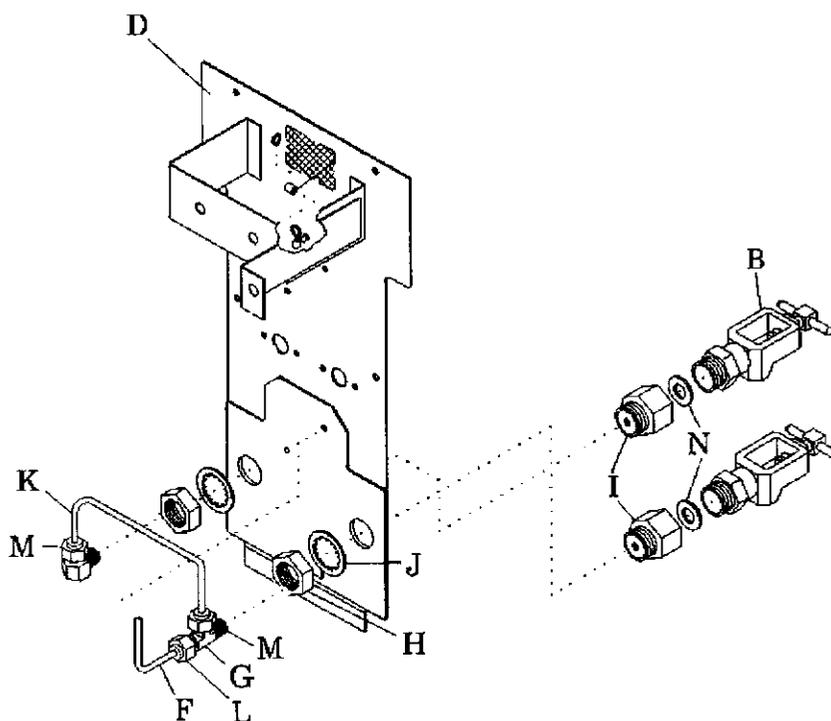
6. Grasp the two yoke assemblies (B), and carefully lift them to disengage the bottom of the Gas Supply Module (D) from the lower column.
7. Carefully pull the Gas Supply Module (D) out of the upper post (E) as far as the engaged tubing connections allow.
8. Lower the Gas Supply Module (D) until the brass connectors on the inside of the Gas Supply Module (D) rest on the edge of the lower column.
9. On a unit equipped with oxygen and air yoke assemblies (B), disconnect the tubing (F) from its fittings (G) by pulling down on the tubing (F) while simultaneously pushing up on its red flange (see figure 4-12 on page -175).

Figure 4-12. Unit Having One Oxygen and One Air Yokes

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10. On a unit equipped with two oxygen yoke assemblies (B) only, disconnect the tubing (F) from its fitting (G) (see figure 4-13 on page -176).

Figure 4-13. Unit Having Two Oxygen Yokes



82990451138

11. Remove the Gas Supply Module (D) from the unit (see figure 4-12 on page -175) and (see figure 4-13 on page -176).
12. Remove the two yoke assemblies (B) from the Gas Supply Module (D):
 - On a unit equipped with oxygen and air yoke assemblies (B), refer to "Unit Equipped with Oxygen and Air Yokes" on page 4-177.
 - On a unit equipped with two oxygen yoke assemblies (B), refer to "Unit Equipped with Two Oxygen Yokes" on page 4-177.

Unit Equipped with Oxygen and Air Yokes

1. Using two adjustable wrenches, simultaneously hold the brass connector (G) and loosen the jam nut (H) (see figure 4-12 on page -175).
2. Simultaneously perform the following:
 - Using a 1¼" open end wrench, hold the male-to-female yoke adapters (I).
 - Using a 7/8" open end wrench, remove the hex jam nut (H) and the internal lock washer (J).
3. Repeat step 1 and step 2 for the second yoke assembly (B).
4. Remove the two brass connectors (G) from the oxygen and air yokes (B).
5. Remove the oxygen and air yokes (B) and the two male-to-female yoke adapters (I) from the Gas Supply Module (D).

NOTE:

The yokes and male-to-female connectors are joined.

6. Discard the two yokes (B) and the two male-to-female yoke adapters (I).

Unit Equipped with Two Oxygen Yokes

1. Using a 1/8" open end wrench, loosen the two nuts (M) securing the formed tubing assembly (K) to the elbow and tee connectors (G) (see figure 4-13 on page -176).
2. Disconnect the formed tubing assembly (K) from the elbow and tee connectors (G).
3. Using a 1/8" open end wrench, loosen the nut (L) securing the tubing (F) to the tee connector (G).
4. Simultaneously perform the following:
 - Using a 1¼" open end wrench, hold the male-to-female yoke adapters (I).
 - Using a 7/8" open end wrench, remove the hex jam nut (H) and the internal lock washer (J).

5. Repeat step 4 for the second oxygen yoke assembly (B).
6. Remove the elbow and tee connectors (G) from the oxygen yoke assemblies (B).
7. Remove the two oxygen yoke assemblies (B) and the two male-to-female yoke adapters (I) from the Gas Supply Module (D).

NOTE:

The yokes and male-to-female connectors are joined.

8. Discard the two oxygen yoke assemblies (B) and the two male-to-female yoke adapters (I).

Replacement

1. Install two new yoke assemblies (B) to two new male-to-female yoke adapters (I) (see figure 4-12 on page -175) or (see figure 4-13 on page -176):
 - a. Assemble the two new flat washers (N) and the two male-to-female yoke adapters (I) to the two yoke assemblies (B).
 - b. Using a 1¼" open end wrench, secure the two male-to-female yoke adapters (I) to the two yoke assemblies (B).
2. When installing two oxygen yoke assemblies (B) (see figure 4-13 on page -176):
 - a. Connect the tubing (F) and the formed tubing (K).
 - b. Using a 1/8" wrench and tighten the fittings (J) and (L).
3. When installing one oxygen and one new air yoke assembly (B), connect the tubing (F) to the elbow connectors (G) (see figure 4-12 on page -175).
4. Install the Gas Supply Module (D) to the upper post (E) (refer to procedure 4.5) (see figure 4-11 on page -174).
5. Install upper post cover(s) (C) to the upper post (E) (refer to procedure 4.1).

4.7 Quartz Heater Assembly

Tools required: Clean cloth gloves
Rubbing alcohol
Clean cloth or towel
Small screwdriver or trim potentiometer adjustment tool
Digital voltmeter (DVM)
Wire tie

Removal

**SHOCK HAZARD:**

Unplug the unit from its power source during removal and replacement procedures. Failure to do so may result in personal injury or equipment damage.

1. Unplug the unit from its power source.

**WARNING:**

The heater element may be hot enough to cause burns. Before accessing the warmer head, allow 30 minutes for the unit to sufficiently cool. Failure to do so may result in personal injury.

2. Allow 30 minutes for the unit to cool.
3. Remove the top cover from the warmer head (refer to procedure 4.9).
4. Observe the routing of the leads (A) connected to the ceramic ends of the quartz heater element (B). The leads (A) of the new quartz element (B) need to be routed in the same way.
5. Disconnect the leads (A) of the quartz heater element (B) from the red and orange wire connectors (C) of the electrical module-to-warmer head cable assembly (D) (see figure 4-14 on page -180).

6. Remove the two screws (E) securing the heat shield (F) to the two end plates (G).
7. Remove the heat shield (F) from the two end plates (G).
8. If the unit is equipped with a heater grill, remove the heater grill from the unit (refer to procedure 4.8).
9. From underneath the warmer head, perform the following:
 - a. Unfasten the two retaining springs (I), and remove them and the secondary reflector (J) from the mounting brackets (K).

**CAUTION:**

Do **not** touch the quartz heater element with bare hands. Equipment damage may occur.

- b. Before touching the quartz heater element (B), put on clean cloth gloves.
- c. Slide the quartz heater element (B) through the front end plate (G) and the front parabola bracket (H).

Replacement**CAUTION:**

Do **not** touch the quartz heater element with bare hands. Equipment damage may occur.

1. Before touching the quartz heater element (B), put on clean cloth gloves.

**CAUTION:**

Do **not** pull the metal ends away from the quartz heater element. Doing so may cause equipment damage and improper heating.

2. Do **not** pull the metal ends away from the quartz heater element (B).
3. Orient the quartz heater element (B) so that its **shorter** lead (A) routes through the rear of the heater element (L), and slide it through the front end plate (G) and the front parabola bracket (H) until its ceramic ends rest on the V-notches of the two mounting brackets (K).

4. Make sure to route the leads (A) of the quartz heater element (B) in the same manner as the original quartz heater element (B).
5. Connect the leads (A) of the quartz heater element (B) to the red and orange connectors (C) of the electrical module-to-warmer head cable assembly (D).
6. Use a wire tie, to securely fasten the long lead (A) of the quartz heater element (B) to the hood (N) away from the heat shield (F).
7. Make sure that the ceramic ends of the quartz heater element (B) rest on the V-notches of the two mounting brackets (K).



WARNING:

Do **not** adjust the mounting brackets. Adjusting the mounting brackets disturbs the alignment of the quartz heater element. Personal injury or equipment damage may occur.

8. If necessary, adjust the position of the quartz heater element (B). Do **not** adjust the two mounting brackets (K).
9. Align the cut-out portions at either end of the secondary reflector (J) with the lower T-portions of the two mounting brackets (K), and rest each end on the metal flange (M) just below each mounting bracket (K) on the parabola brackets (H).
10. Lift one end of the secondary reflector (J) above the hole in the lower T-portion of the mounting bracket (K), and hold it in place.
11. Place the lower half of the retaining spring (I) through the hole in the lower T-portion of the mounting bracket (K). Do **not** adjust the mounting bracket (K).
12. Place the top half of the retaining spring (I) around the ceramic end of the quartz heater element (B), and fasten the retaining spring (I).



CAUTION:

Make sure that the retaining spring does **not** rest on the metal tip of the quartz heater element. Equipment damage may occur.

13. Make sure that the retaining spring (I) does **not** rest on the metal tip of the quartz heater element (B).

14. Lift the other end of the secondary reflector (J) above the hole in the lower T-portion of the second mounting bracket (K), and hold it in place.
15. Place the lower half of the second retaining spring (I) through the hole in the lower T-portion of the second mounting bracket (K). Do **not** adjust the mounting bracket (K).
16. Place the top half of the second retaining spring (I) around the ceramic end of the quartz heater element (B), and fasten the second retaining spring (I).
17. Make sure that the retaining spring (I) does **not** rest on the metal tip of the quartz heater element (B).

**CAUTION:**

Do not touch the quartz tube of the heater element with bare hands. If fingerprints are on the quartz tube, remove them with rubbing alcohol before activating the unit. Otherwise, equipment damage may occur.

18. Inspect the quartz heater element (B) for fingerprints.
19. If fingerprints are present on the quartz heater element (B), use rubbing alcohol and a clean cloth or towel to remove them.
20. If the unit is equipped with a heater grill, install the heater grill on the unit (refer to procedure 4.8).
21. Align the heat shield (F) with the two end plates (G), and install the two screws (E) to secure the heat shield (F) to the two end plates (G).
22. Install the top cover on the warmer head (refer to procedure 4.9).
23. Adjust the heater voltage sensor, and calibrate the controller assembly, refer to "Calibrating the Controller Assembly" on page 6-18.

4.8 Heater Grill

Tools required: Screwdriver

Removal



SHOCK HAZARD:

Unplug the unit from its power source during removal and replacement procedures. Failure to do so may result in personal injury or equipment damage.

1. Unplug the unit from its power source.



WARNING:

The heater element may be hot enough to cause burns. Before accessing the warmer head, allow 30 minutes for the unit to sufficiently cool. Failure to do so may result in personal injury.

2. Allow 30 minutes for the unit to cool.
3. Perform one of the following:

On a unit equipped with part number 81 990 65 (Retrofit kit, heater grill), perform the following:

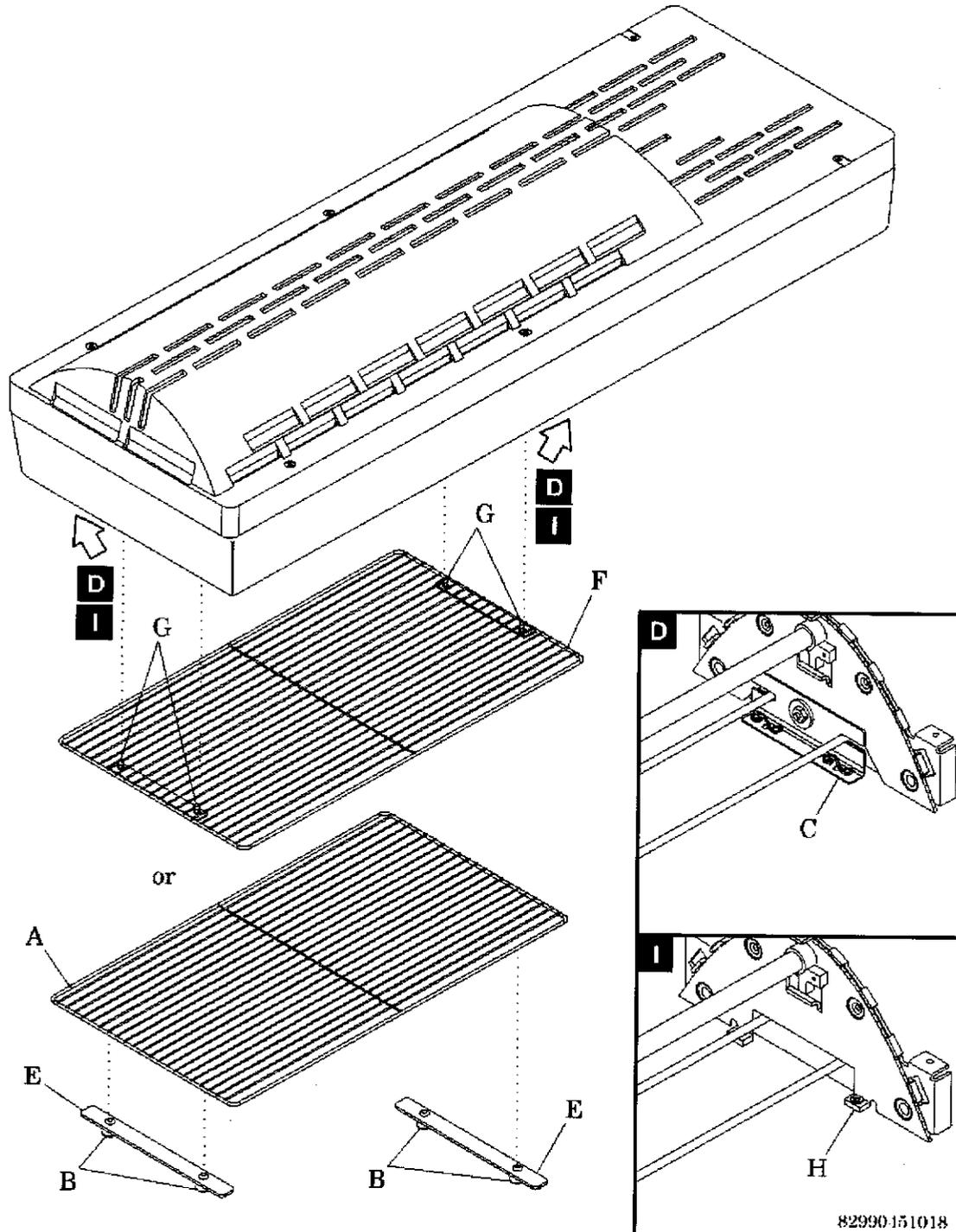
- a. Hold the grill shroud (A) in position with one hand, and loosen the four captive quarter-turn fasteners (B) securing the grill shroud (A) to the two grill brackets (C) (see figure 4-15 on page -185) (see view D).
- b. Remove the two grill straps (E) from the two grill brackets (C).
- c. Remove the grill shroud (A) from the two grill brackets (C).

or

On a unit equipped with part number 81 003 04 (Grill guard), perform the following:

- a. Hold the grill guard (F) in position with one hand, and undo the four screws (G) securing the grill guard (F) to the two parabola brackets (H) (see view I).
- b. Remove the grill guard (F) from the two parabola brackets (H).

Figure 4-15. Heater Grill



Replacement

1. Perform the removal procedure in reverse order.
2. To make sure the warmer operates properly, perform the "Function Checks" on page -48.

NOTES:

4.9 Warmer Head Top Cover

Tools required: Phillips head screwdriver

Removal



SHOCK HAZARD:

Unplug the unit from its power source during removal and replacement procedures. Failure to do so may result in personal injury or equipment damage.

1. Unplug the unit from its power source.

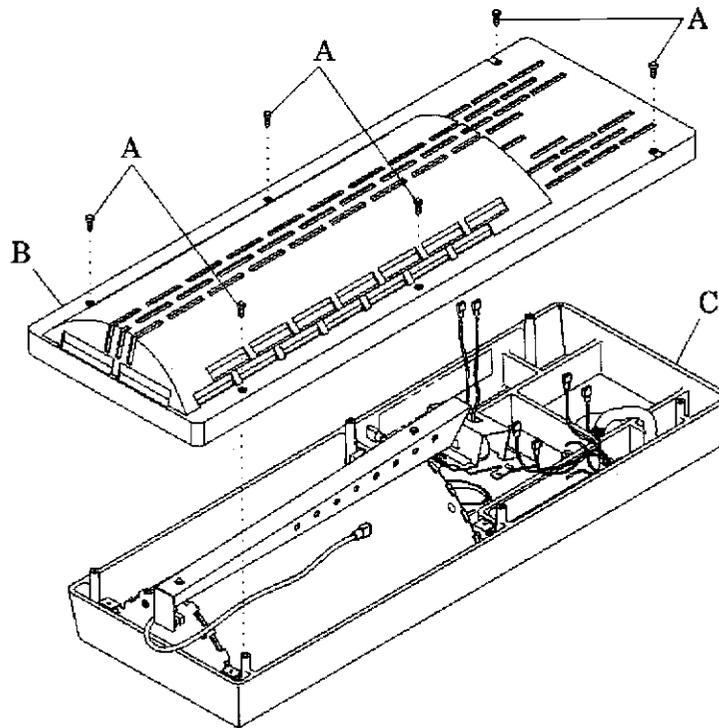


WARNING:

The heater element may be hot enough to cause burns. Before accessing the warmer head, allow 30 minutes for the unit to sufficiently cool. Failure to do so may result in personal injury.

2. Allow 30 minutes for the unit to cool.
3. Remove and save the six screws (A) securing the warmer head top cover (B) to the warmer head (C) (see figure 4-16 on page -189).

Figure 4-16. Warmer Head Top Cover



82990-151019

4. Lift the warmer head top cover (B) away from the warmer head (C).

Replacement

1. Perform the removal procedure in reverse order.
2. To make sure the warmer operates properly, perform the "Function Checks" on page -48.

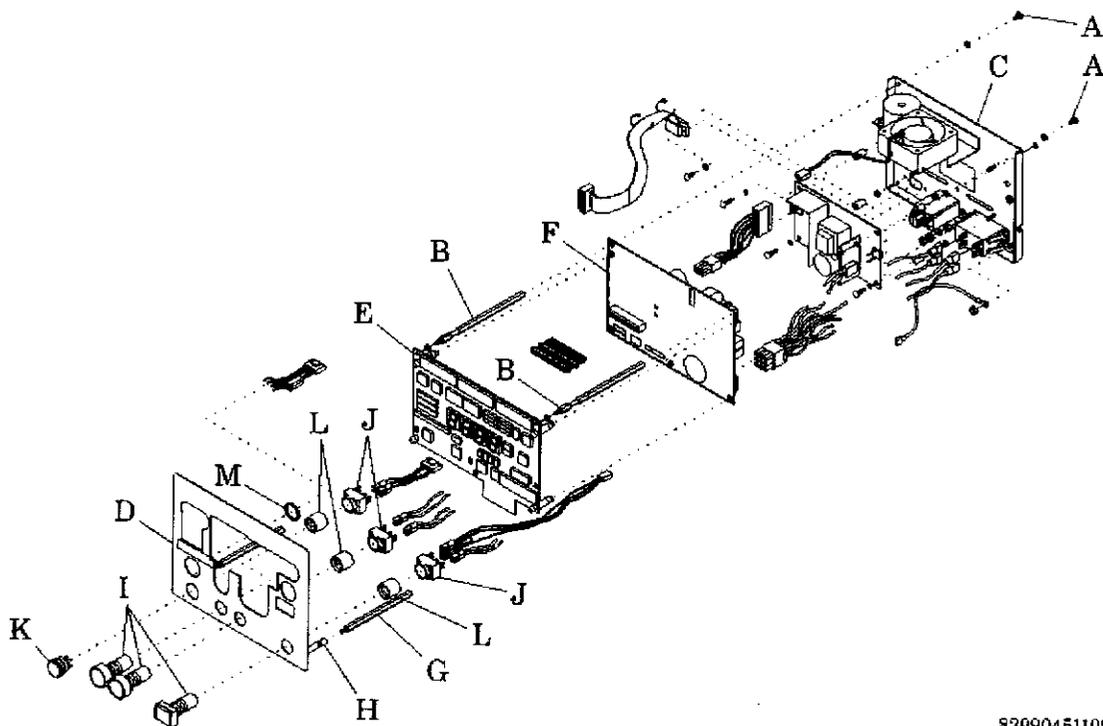
4.10 Controller Module Front Panel

Tools required: Phillips head screwdriver
AMP®¹ unlocking tool (AMP® P/N 91084-1)

Removal

1. Remove the Controller Module (refer to procedure 4.2).
2. Remove the two screws (A) securing the two hex standoffs (B) to the Electrical Module rear panel (C) (see figure 4-17 on page -190).

Figure 4-17. Controller Module



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3. Swing down the Electrical Module front panel (D), Display P.C. Board (PCB1) (E), and Power and Control P.C. Board (PCB 2) (F) from the two hex standoffs (G) and two standoffs (H).
4. Unscrew the two hex standoffs (B).

1. AMP® is a registered trademark of The Whitaker Corporation.

5. Disconnect all the connectors from the Display P.C. Board (PCB1) (E) and the Power and Control P.C. Board (PCB 2) (F).
6. Locate the three metal anchors on the Electrical Module front panel (D) securing the Display P.C. Board (PCB 1) (E) to the front panel (D).
7. Move the key slots on the Display P.C. Board (PCB 1) (E) to the unlocking position.
8. To remove the keypad lock, examination light, and power switch light switch actuator (J), perform the following:
 - a. Place the right-angle edge of the AMP®¹ unlocking tool into the two grooves of the green portion of the P.C. board switch contact blocks (I).
 - b. Press down on the AMP® unlocking tool until you hear a snap.
 - c. Pull up on the blue portions of the P.C. board switch contact blocks (I) until they separate from the light switch actuators (J).
 - d. Remove the plastic nuts (L) securing the P.C. board switch contact blocks (I) to the Electrical Module front panel (D).
9. To remove a skin probe cable assembly (K), perform the following:
 - a. Unplug the skin probe cable assembly (K) from J3 on the Power and Control P.C. Board (PCB2) (F).
 - a. Remove the metal shield (if present) from the rear of the Electrical Module front panel (D).
 - b. Remove the metal nut (M) securing the skin probe cable assembly (K) to the Electrical Module front panel (D).
10. Slide the light switch actuators (J) and the skin probe cable assembly (K) out through their respective openings on the Electrical Module front panel (D).

1. AMP® is a registered trademark of The Whitaker Corporation.



CAUTION:

Do not use the two hex standoffs as a torque to loosen the two standoffs from the Electrical Module front panel. Equipment damage or breakage of the Loctite®¹ screwlock may occur.

11. Loosen and remove the two standoffs (H) from the Electrical Module front panel (D). Do not use the two hex standoffs (G) as a torque.

Replacement



CAUTION:

Do not use the two hex standoffs as a torque to tighten the two standoffs to the Electrical Module front panel. Equipment damage or breakage of the Loctite®² screwlock may occur.

1. Install and tighten the two standoffs (H) to the Electrical Module front panel (D). Do not use the two hex standoffs (G) as a torque.
2. To replace the skin probe cable assembly (K), perform the following:
 - a. Align the skin probe cable assembly (K) with the designated opening on the Electrical Module front panel (D).
 - b. Slide the skin probe cable assembly (K) in through the opening.
 - c. Install the metal nut (M) to secure the skin probe cable assembly (K), and then install the shielded plastic housing that encases the brown, red, and orange wires.
3. To replace the keypad lock, examination light, and power switch, perform the following:
 - a. Align the light switch actuator (J) with the designated opening on the Electrical Module front panel (D).
 - b. Install the plastic nut to secure the light switch actuator (J) to the Electrical Module front panel (D).
4. Connect the P.C. board switch contact blocks (I) and cable assemblies to the light switch actuators (J).

1. Loctite® is a registered trademark of Loctite Corporation.

2. Loctite® is a registered trademark of Loctite Corporation.

NOTE:

No tool is required to connect the P.C. board switch contact blocks to the light switch actuators.

5. Locate the keyed slots on the Display P.C. Board (PCB 1) (E).
6. Slide the keyed slots of the Display P.C. Board (PCB 1) (E) to the locking position, and engage the Display P.C. Board (PCB 1) (E) to the Electrical Module front panel (D).
7. Connect all of the connectors to the display with the Display P.C. Board (PCB 1) (E) and Power and Control P.C. Board (PCB 2) (F).
8. Secure the two hex standoffs (G) to the Electrical Module front panel (D).
9. Install the two screws (A) to secure the two hex standoffs (B) to the Electrical Module rear panel (C).
10. To make sure the warmer operates properly, perform the "Function Checks" on page -48.

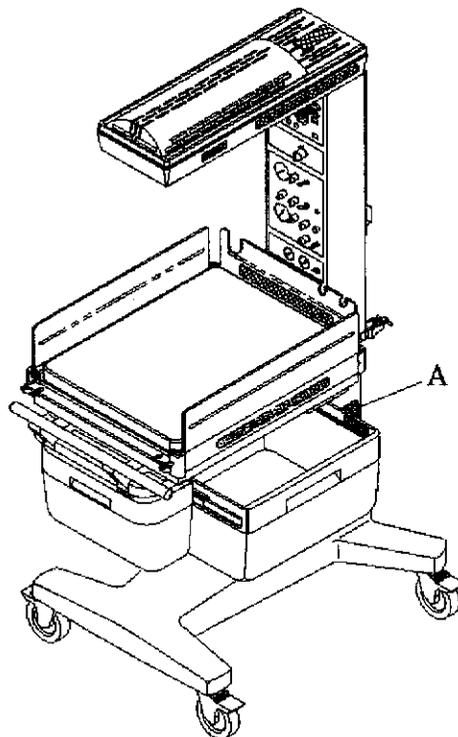
Parts List

Chapter 5: Parts List

Service Parts Ordering

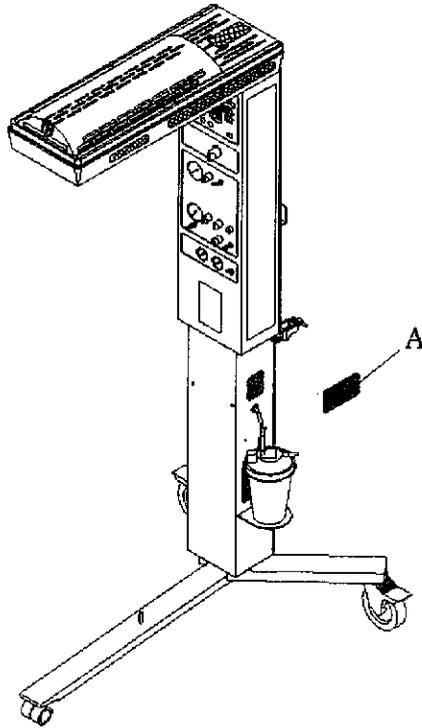
Using the parts lists in this manual, identify the part number(s) you require. Find the product number and serial number on the product identification label (A) (see figure 5-1 on page -197), (see figure 5-2 on page -198), and (see figure 5-3 on page -199).

Figure 5-1. Product Identification Label Location Resuscitaire® Radiant Warmer (RW82)



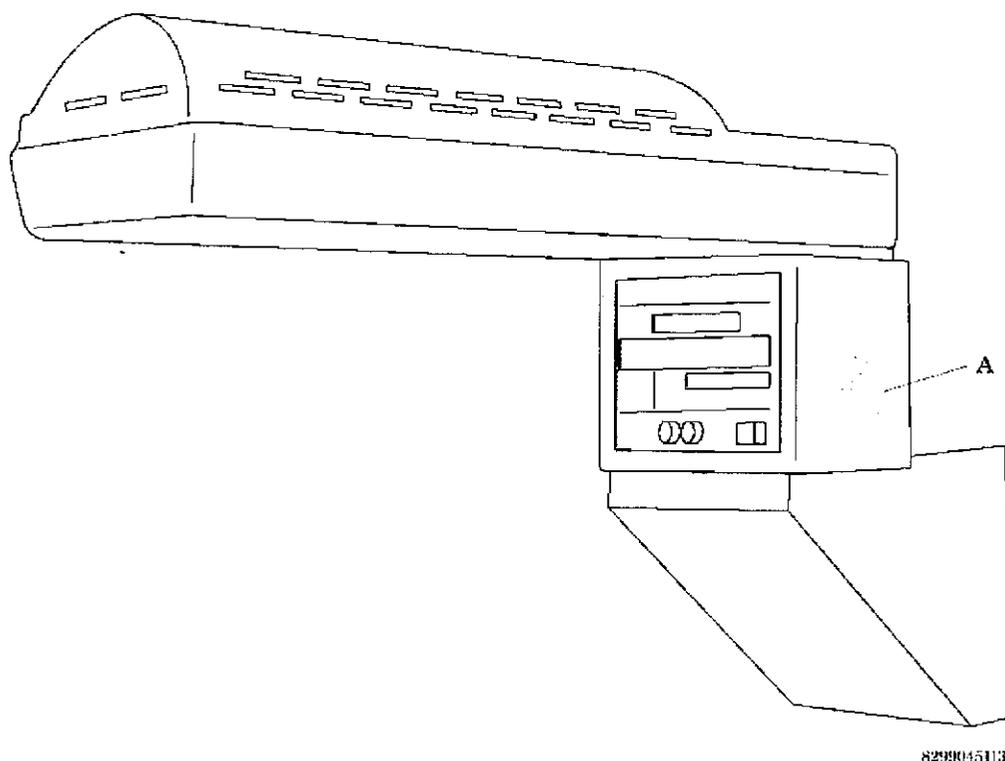
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Figure 5-2. Product Identification Label Location on the Resuscitaire® Birthing Room Warmer (WBR82)



82990451066

Figure 5-3. Product Identification Label Location on the Resuscitaire® Wall Mounted Warmer (WMRW82)



Call Technical Support with the following information:

- Customer account number
- Purchase order number
- Product number
- Serial number
- Part number(s)

To promptly order parts, request part prices and availability, or follow up on a service order, use the following fax number:

(215) 721-5782

Recommended Spare Parts

For a recommended spare parts list to service five or more units, see table 5-1 on page -200.

Table 5-1. Recommended Spare Parts

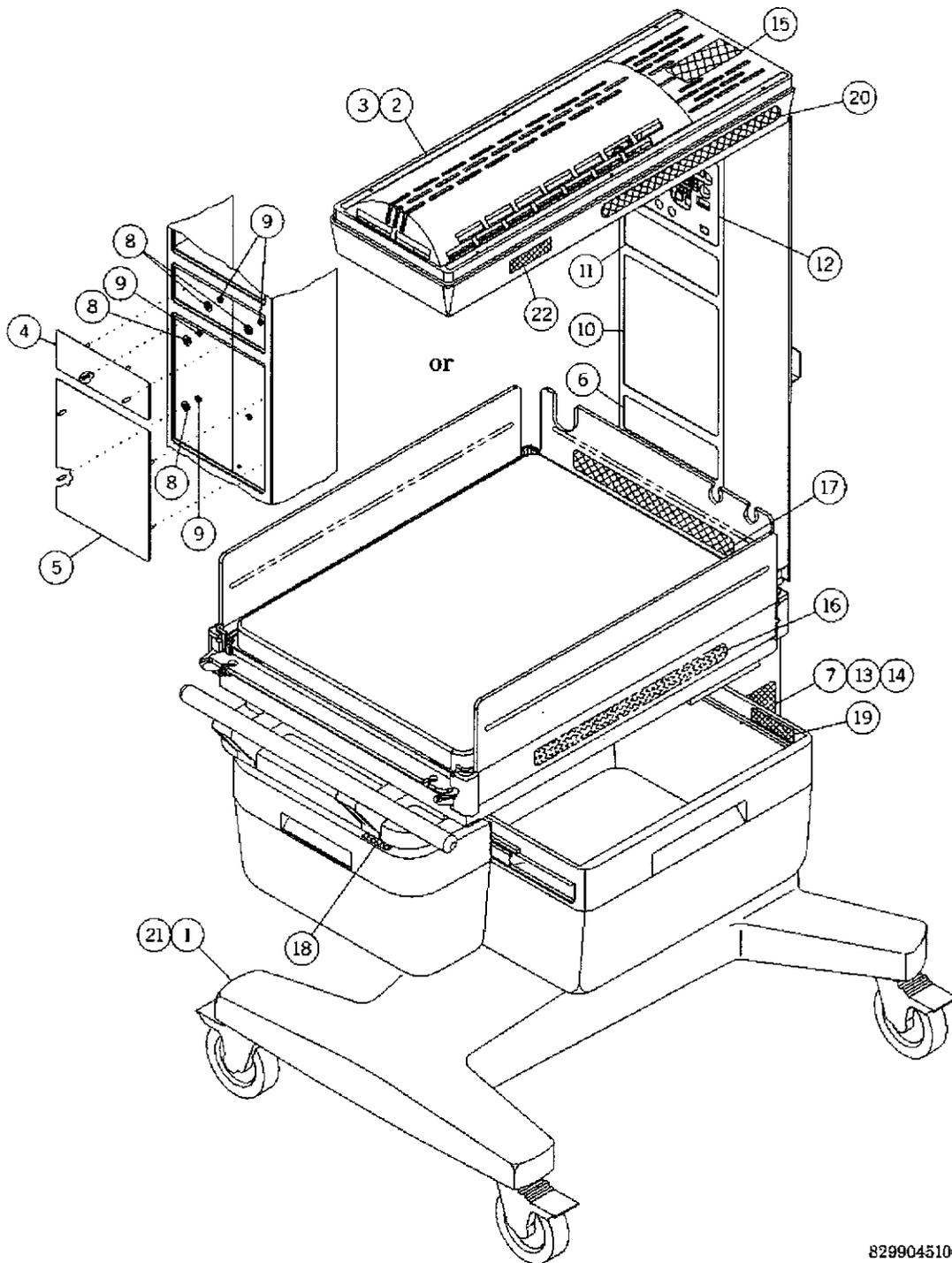
Part Number	MU	Qty	Description
17 683 11	MU03309	1	Contact block, push button, double-pole single-throw (DPST), normally open (NO)
17 683 18	MU03310	1	Contact block, push button, three-pole single-throw (3PST), two normally open/normally closed (2NO/NC)
17 683 20	MU03311	1	Lamp, incandescent, clear, T-1 $\frac{3}{4}$, 14V
68 416 16	MU07883	1	Caster, swivel, 5.00" with brake, gray urethane
81 100 63	MU11116	1	Catch, Nylatch® roller
81 990 50	MU11689	1	Heater replacement kit, 120V (120V model only)
81 990 51	MU11690	1	Heater replacement kit, 220V-240V (220V and 240V models only)
81 300 05	MU11225	1	Probe 3, skin temperature, reusable
81 300 15	MU11233	1	Power supply, switching, DC, 40 W
81 300 62	MU11253	1	Fan/transducer assembly
81 307 75	MU11298	1	P.C. board 1 (PCB 1) assembly, display, with Baby Mode
81 308 70T	MU11311	1	Tested P.C. board 2 (PCB 2) assembly, power and control (120V model only)
81 308 80T	MU11315	1	PCB2 assembly, power and control, 220V-240V, tested (240V model only)
81 500 40	MU11417	1	Valve, control, mini three-way
81 300 08	MU11228	1	Probe 3, skin temperature, dual, disposable, box of 10
81 003 04	MU10937	1	Grill, guard

Part Number	MU	Qty	Description
81 300 09	MU11229	1	Probe 3, skin temperature, dual, disposable, 100
83 620 57	MU13244	1	Filter, suction, disposable, rectangular
81 001 27	MU10900	1	Breathing circuit for bagging, disposable, 25
81 000 06	MU10841	1	Breathing circuit, disposable, box of 25
68 209 46	MU06942	1	Critter Covers® Probe Cover, box of 100
68 209 45	MU06941	1	Critter Covers® Probe Cover, carton of 600
68 120 53	MU06562	1	Neat-clips, carton of 100, 0.38" diameter
68 120 54	MU06563	1	Neat-clips, carton of 50, 1.00" diameter
81 001 51	MU10920	1	Suction bottle, disposable, box of 100, 1000 cc
81 001 49	MU10918	1	Suction bottle, disposable, box of 20, 800 cc
68 209 47	MU06943	1	Cover, probe, Care-For-Me™, large, 100
68 209 48	MU06944	1	Cover, probe, Care-For-Me™, standard, 100
81 001 29	MU10902	1	Connector, with sideport, bag of 25

a. Nylatch® is a registered trademark of Hartwell Corporation.

Resuscitaire® Radiant Warmer without Resuscitation

Figure 5-4. Resuscitaire® Radiant Warmer without Resuscitation



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Table 5-2. Resuscitaire® Radiant Warmer without Resuscitation

Item	Part Number	MU	Qty	Description
1	81 020 73-R	MU11084	1	Cart assembly, Resuscitaire® Radiant Warmer (fixed height model only)
2	81 200 71	MU11214	1	Warmer head assembly, 120V (120V model only)
3	81 200 81	MU11217	1	Warmer head assembly, 220V-240V (220V and 240V models only)
4	81 005 71	MU10994	1	Plate, blank, microblender
5	81 005 72	MU10995	1	Plate, blank, Resuscitation Module
6	81 501 24	MU11486	1	Overlay, front panel, gas supply, blank
7	Reference only		1	Label, data tag, system
8	81 005 70	MU10993	8	Washer, shoulder, 0.12" inside diameter, 0.248" x 0.16"
9	99 103 33	MU15411	8	Nut, hex, #4-40, keps, steel, zinc-plated
10	81 400 40	MU11342	1	Overlay, front panel, resuscitation module, blank
11	81 600 34	MU11571	1	Overlay, front panel, blender, blank
12	81 990 80	MU11703	1	Overlay, electrical front panel, Radiant Warmer, English
13	00 935 17	MU01547	1	Declaration, CE mark, Resuscitaire® Radiant Warmer (CE mark model only)
14	81 001 19	MU10895	1	Label, UL/CUL, classified
15	81 200 50	MU11200	1	Label, caution—shock hazard, English
16	78 162 56	MU09412	4	Label, warning, side/end panel, English
17	81 000 40	MU10858	1	Label, caution, heating hazard, English
18	82 000 15	MU11787	1	Label, load limit, 2 lb/0.91 kg
19	81 101 19	MU11138	2	Label, load limit, 10 lb/4.5 kg
20	78 265 41CC	MU09761	2	Label, explosion hazard, English
21	82 010 71	MU12011	1	Cart assembly, Radiant Warmer, no resuscitation, VHA, 120V (VHA model only)

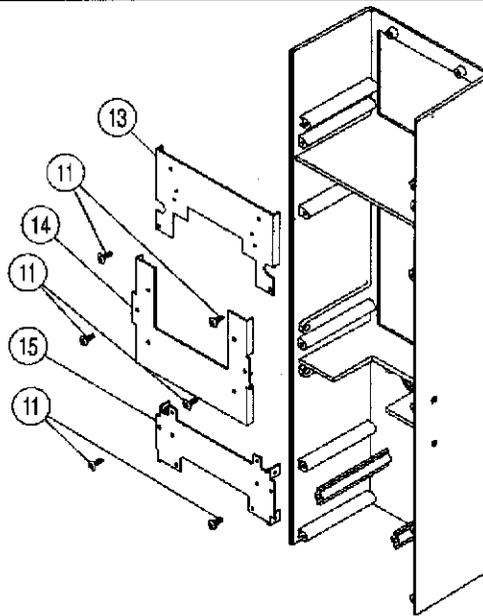
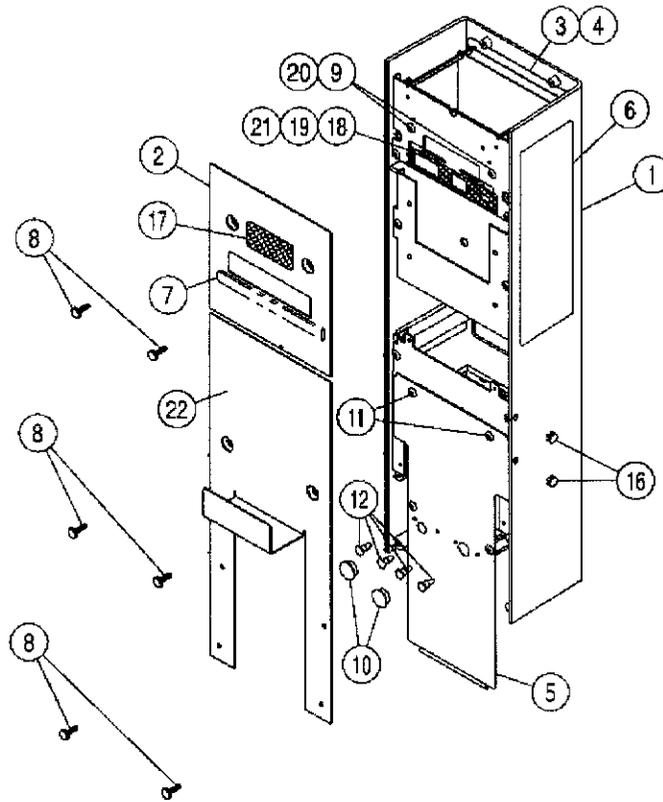
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Item	Part Number	MU	Qty	Description
22	81 000 90	MU10866	1	Label, caution: no block vents, English
23	81 300 05	MU11225	1	Probe 3, skin temperature, reusable
24	17 725 64*	MU03410	1	Clamp, cable, loop-type, nylon, 0.375" inside diameter
25	99 031 38	MU15179	1	Screw, #8-32 x 3/8", truss, phillips, stainless steel
26	17 AZ 104*	MU02496	1	Cable assembly, AC power/link, domestic, 10' (120V model only)
27	17 AZ 203*	MU02500	1	Cable assembly, AC power/link, European, 10' (220V and 240V models only)

NOTES:

Upper Post Assembly for the Resuscitare® Radiant Warmer (Models without Resuscitation Only)

Figure 5-5. Upper Post Assembly for the Resuscitare® Radiant Warmer (Models without Resuscitation Only)



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Table 5-3. Upper Post Assembly for the Resuscitaire® Radiant Warmer (Models without Resuscitation Only)

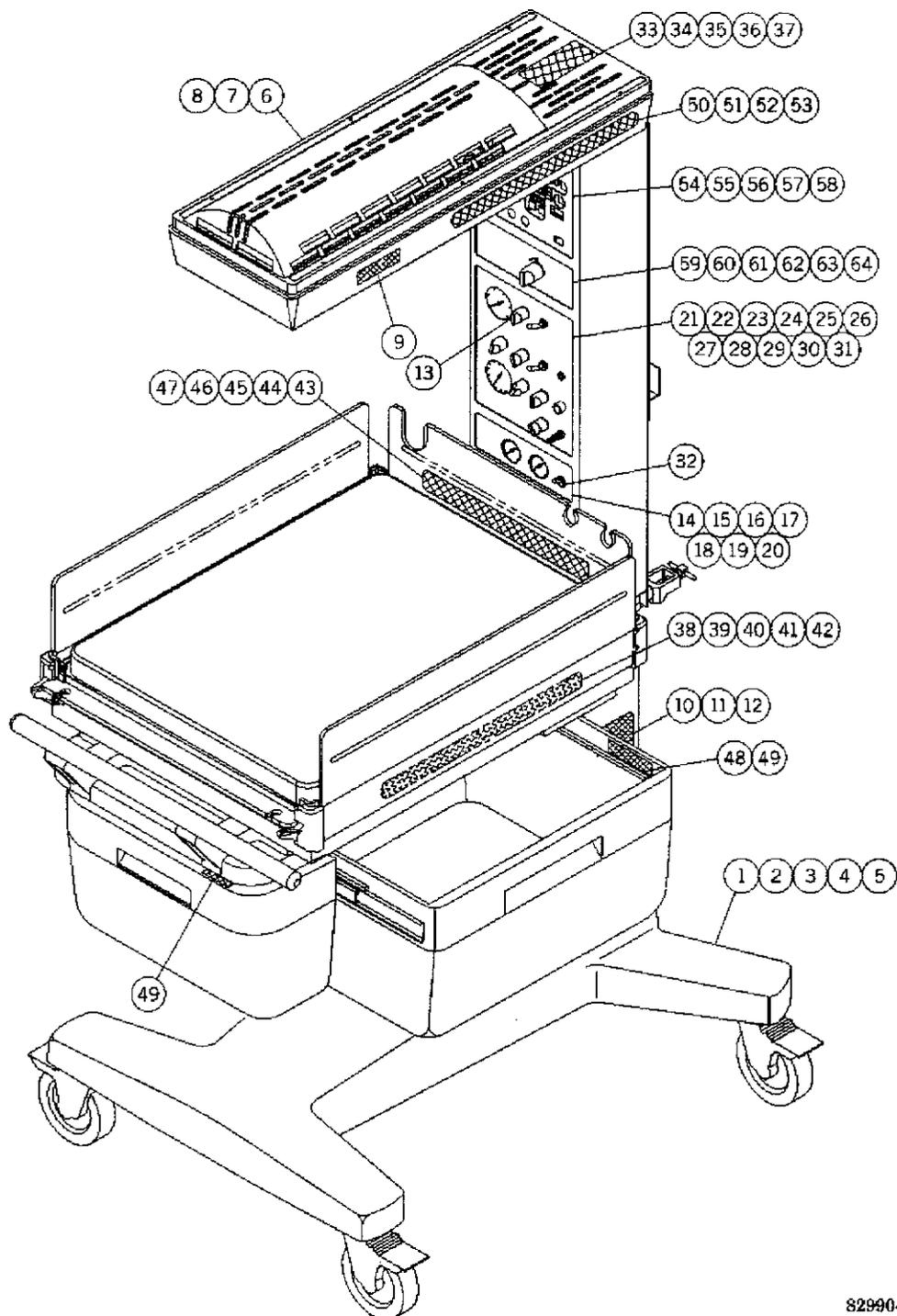
Item	Part Number	MU	Qty	Description
1	81 020 02	MU11043	1	Post, upper
2	81 003 11	MU10939	1	Cover, upper rear
3	81 300 70T	MU11259	1	Tested controller assembly, 120V (120V model only)
4	81 300 80T	MU11260	1	Tested controller assembly, 230V (230V models only)
5	81 500 00	MU11392	1	Chassis, gas supply, without cylinder holes
6	81 101 35	MU11150	1	Label, user precaution, English
7	81 020 32	MU11071	1	Gasket, rear cover
8	99 042 93	MU15255	6	Screw, #10-32 x 3/4", pan, phillips/washer, white
9	99 032 94	MU15203	2	Screw, #8-32 x 3/4", pan, phillips, stainless steel, sems internal (fixed height model only)
10	81 500 42	MU11419	2	Plug button, nylon, 0.62" hole
11	99 041 36	MU15229	10	Screw, #10-32 x 3/8", truss, phillips, stainless steel, Nylok®
12	68 602 02	MU08414	4	Plug, panel fastening, 0.183"-0.192", Canoe™ ^b
13	81 020 03	MU11044	1	Plate, head support
14	81 020 04	MU11045	1	Plate, blender/resuscitation support
15	81 020 05	MU11046	1	Plate, resuscitation/gas supply support
16	78 306 31	MU10015	4	Plug button, plastic, 0.38" hole
17	81 000 30	MU10851	1	Label, caution—shock hazard/high pressure, English
18	81 301 32	MU11274	1	Label, rear panel, 120V, English (fixed height 120V model only)
19	81 301 35	MU11277	1	Label, rear panel, 220V-240V, English (fixed height 220V and 240V models only)
20	99 032 85	MU15201	2	Screw, #8-32 x 3/4", truss, phillips, stainless steel (VHA model only)
21	81 301 32	MU11274	1	Label, rear panel, 120V, English (VHA model only)
22	81 003 10	MU10938	1	Cover, lower rear
23	81 200 50	MU11200	1	Label, caution, shock hazard, English

Chapter :

- a. Nylok® is a registered trademark of Nylok Fastener Corporation.
- b. Canoe™ is a trademark of Illinois Tool Works, Inc.

Resuscitaire® Radiant Warmer with Resuscitation

Figure 5-6. Resuscitaire® Radiant Warmer with Resuscitation



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Table 5-4. Resuscitaire® Radiant Warmer with Resuscitation

Item	Part Number	MU	Qty	Description
1	81 020 71	MU11081	1	Cart assembly, Resuscitaire® Radiant Warmer (fixed height model only)
2	82 010 70	MU12010	1	Cart assembly, Resuscitaire® Radiant Warmer, VHA, 120V (VHA 120V model only)
3	82 010 80	MU12013	1	Cart assembly, Resuscitaire® Radiant Warmer, VHA, 230V (VHA 230V model only)
4	82 010 81	MU12014	1	Cart assembly VHA, 240V United Kingdom (VHA 240V U.K. model only)
5	82 011 75	MU12040	1	Cart assembly fixed height, variable, no resuscitation
6	81 200 71	MU11214	1	Warmer head assembly, 120V (120V model only)
7	81 200 81	MU11217	1	Warmer head assembly, 220V-240V (220V and 240V models only)
8	81 200 84	MU11219	1	Warmer head assembly, 230V (230V model only)
9	81 000 90	MU10866	2	Label, caution: no block vents, English
10	81 000 37	MU10856	1	Label, data tag, system
11	81 001 37	MU10908	1	Label, data tag, system, electromagnetic compatibility (EMC)
12	81 001 19	MU10895	1	Label, UL and CUL, classified
13	BM1445	MU00606	1	Plastic knob with setscrew
14	81 500 63	MU11433	1	Overlay, oxygen/air gas front panel, Radiant Warmer, German
15	81 500 64	MU11434	1	Overlay, oxygen/air gas front panel, Radiant Warmer, Italian
16	81 500 50	MU11425	1	Overlay, oxygen gas front panel, Radiant Warmer, English
17	81 500 52	MU11427	1	Overlay, oxygen gas front panel, Radiant Warmer, French
18	81 500 60	MU11430	1	Overlay, oxygen/air gas front panel, Radiant Warmer, English
19	81 500 61	MU11431	1	Overlay, oxygen/air gas front panel, Radiant Warmer, Spanish
20	81 500 62	MU11432	1	Overlay, oxygen/air gas front panel, Radiant Warmer, French

Item	Part Number	MU	Qty	Description
21	81 400 31	MU11338	1	Overlay, without AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, Italian
22	81 400 40	MU11342	1	Overlay, front panel, resuscitation module, blank
23	81 400 20	MU11329	1	Overlay, AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, English
24	81 400 21	MU11330	1	Overlay, AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, Spanish
25	81 400 22	MU11331	1	Overlay, AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, French
26	81 400 23	MU11332	1	Overlay, AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, German
27	81 400 24	MU11333	1	Overlay, AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, Italian
28	81 400 27	MU11334	1	Overlay, without AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, English
29	81 400 28	MU11335	1	Overlay, without AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, Spanish
30	81 400 29	MU11336	1	Overlay, without AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, French
31	81 400 30	MU11337	1	Overlay, without AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, German
32	99 112 96	MU15461	1	Nut, round, knurled, 15/32-32", brass, nickel-plated
33	81 200 50	MU11200	1	Label, caution—shock hazard, English
34	81 200 51	MU11201	1	Label, caution—shock hazard, Spanish
35	81 200 52	MU11202	1	Label, caution—shock hazard, French
36	81 200 53	MU11203	1	Label, caution—shock hazard, German
37	81 200 54	MU11204	1	Label, caution—shock hazard, Italian
38	78 162 56	MU09412	1	Label, warning, side/end panel, English
39	78 162 57	MU09413	1	Label, warning, side/end panel, Spanish
40	78 162 58	MU09414	1	Label, warning, side/end panel, French
41	78 162 59	MU09415	1	Label, warning, side/end panel, German

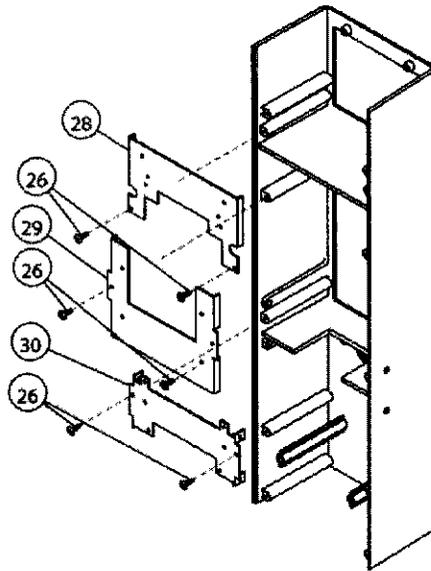
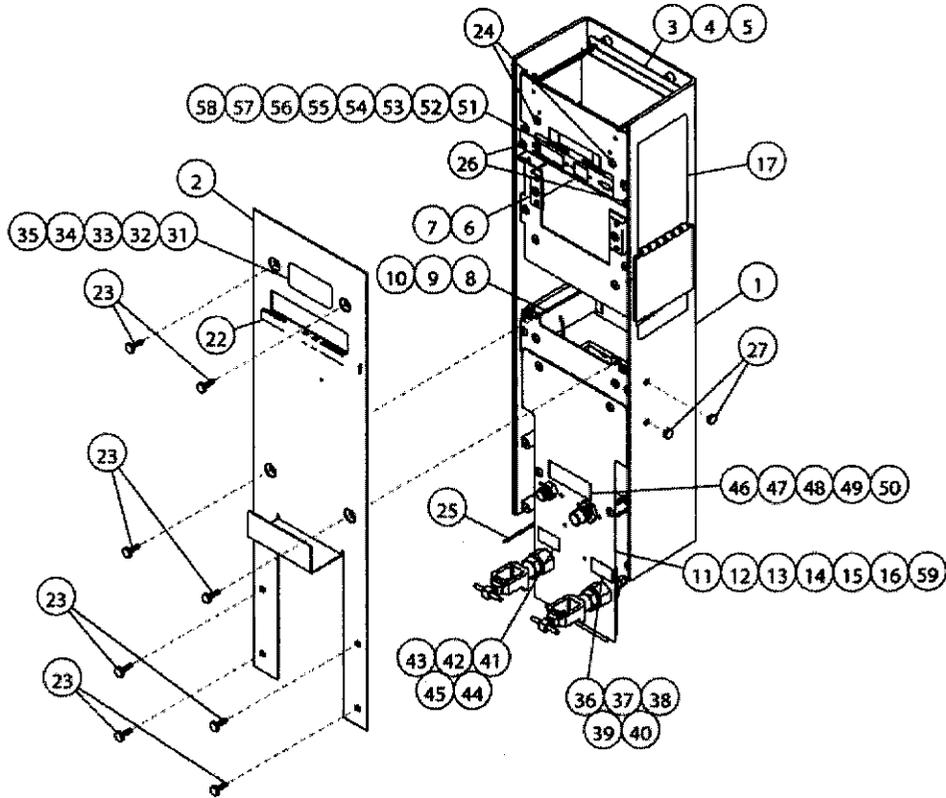
Resuscitaire® Radiant Warmer with Resuscitation

Chapter :

NOTES:

Upper Post Assembly (Units with Resuscitation Only) for the Resuscitaire® Radiant Warmer

Figure 5-7. Upper Post Assembly (Units with Resuscitation Only) for the Resuscitaire® Radiant Warmer



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Table 5-5. Upper Post Assembly (Units with Resuscitation Only) for the Resuscitaire® Radiant Warmer

Item	Part Number	MU	Qty	Description
1	81 020 02	MU11043	1	Post, upper
2	81 005 74	MU11018	1	Cover, upper post
3	81 300 70T	MU11259	1	Tested controller assembly, 120V (120V model only)
4	81 300 80T	MU11260	1	Tested controller assembly, 230V (230V models only)
5	81 300 83	MU11262	1	Controller assembly, 220V (220V model only)
6	81 600 70-R	MU11582	1	Blender blank assembly, Resuscitaire® Radiant Warmer
7	81 600 80-R	MU11583	1	Blender assembly, Resuscitaire® Radiant Warmer
8	81 400 73T	MU11369	1	Tested Resuscitation Module without AutoBreath™ Infant Resuscitator
9	81 400 80T	MU11372	1	Tested Resuscitation Module with AutoBreath™ Infant Resuscitator
10	81 400 81T	MU11374	1	Tested Resuscitation Module with AutoBreath™ Infant Resuscitator
11	81 500 80-R	MU11441	1	Gas supply, oxygen with reserve, Diameter Index Safety System (DISS)
12	81 500 81-R	MU11443	1	Gas supply, oxygen with reserve, non-interchangeable screw thread (NIST)
13	81 500 83-R	MU11446	1	Gas supply, oxygen reserve, Deutsche Industrie Norm (DIN), white
14	81 500 86-R	MU11453	1	Gas supply, oxygen/air with reserve, NIST
15	81 500 88-R	MU11455	1	Gas supply, oxygen/air, DIN, blue/yellow
16	81 500 90-R	MU11458	1	Gas supply, oxygen/air, DIN, green/yellow
17	81 101 35	MU11150	1	Label, user precaution, English
18	Not used			
19	81 101 37	MU11151	1	Label, user precaution, French
20	Not used			
21	99 032 85	MU15201	2	Screw, #8-32 x 3/4", truss, phillips, stainless steel (VHA model only)

Item	Part Number	MU	Qty	Description
22	81 020 32	MU11071	1	Gasket, rear cover
23	99 042 93	MU15255	8	Screw, #10-32 x 3/4", pan, phillips/washer, white
24	99 032 94	MU15203	2	Screw, #8-32 x 3/4", pan, phillips, stainless steel, sems internal (fixed height model only)
25	08 136 07-R	MU01917	1	Tubing, clear polyvinyl chloride (PVC), 1/4" inside diameter x 27.00" long
26	99 041 36	MU15229	16	Screw, #10-32 x 3/8", truss, phillips, stainless steel, Nylok®
27	78 306 31	MU10015	4	Plug button, plastic, 0.38" hole
28	81 020 03	MU11044	1	Plate, head support
29	81 020 04	MU11045	1	Plate, blender/resuscitation support
30	81 020 05	MU11046	1	Plate, resuscitation/gas supply support
31	81 000 30	MU10851	1	Label, caution—shock hazard/high pressure, English
32	81 000 31	MU10852	1	Label, caution—shock hazard/high pressure, Spanish
33	81 000 32	MU10853	1	Label, caution—shock hazard/high pressure, French
34	81 000 33	MU10854	1	Label, caution—shock hazard/high pressure, German
35	81 000 34	MU10855	1	Label, caution—shock hazard/high pressure, Italian
36	81 400 10	MU11321	1	Label, air cylinder inlet, English
37	81 400 11	MU11322	1	Label, air cylinder inlet, Spanish
38	81 400 12	MU11323	1	Label, air cylinder inlet, French
39	81 400 13	MU11324	1	Label, air cylinder inlet, German
40	81 400 14	MU11325	1	Label, air cylinder inlet, Italian
41	81 400 17	MU11326	1	Label, oxygen cylinder inlet, English
42	81 400 18	MU11329	1	Label, oxygen cylinder inlet, Spanish
43	81 400 19	MU11330	1	Label, oxygen cylinder inlet, French
44	81 400 35	MU11340	1	Label, oxygen cylinder inlet, Italian
45	81 400 36	MU11341	1	Label, oxygen cylinder inlet, German
46	82 001 00	MU11852	1	Label, pipeline inlet water trap, English
47	81 500 92	MU11460	1	Label, pipeline inlet water trap, Spanish
48	81 500 93	MU11461	1	Label, pipeline inlet water trap, French

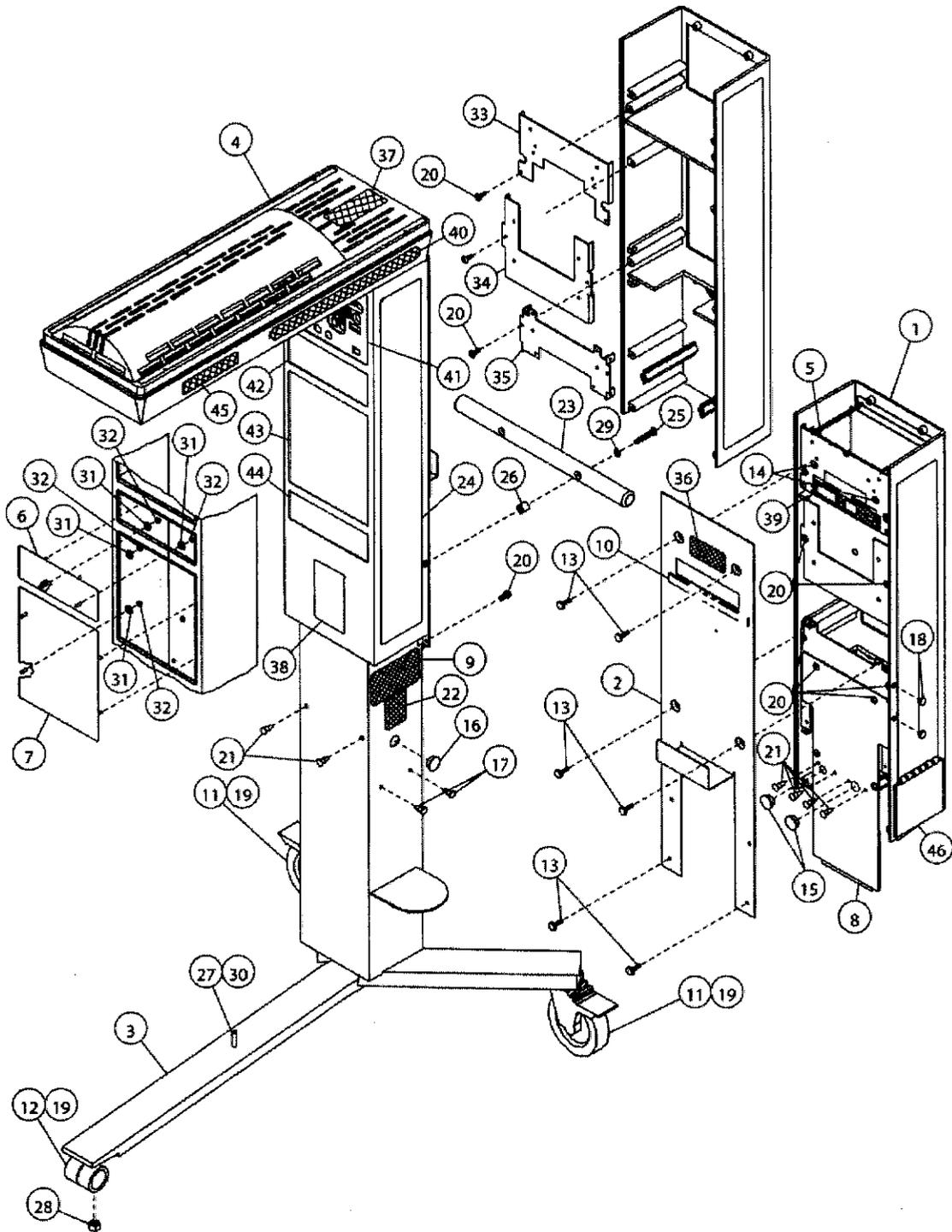
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Item	Part Number	MU	Qty	Description
49	81 500 94	MU11462	1	Label, pipeline inlet water trap, German
50	81 500 95	MU11463	1	Label, pipeline inlet water trap, Italian
51	81 301 32	MU11274	1	Label, rear panel, 120V, English (120V model only)
52	81 301 33	MU11275	1	Label, rear panel, 120V, Spanish (120V model only)
53	81 301 34	MU11276	1	Label, rear panel, 120V, French (120V model only)
54	81 301 35	MU11277	1	Label, rear panel, 220V-240V, English (220V and 240V models only)
55	81 301 36	MU11278	1	Label, rear panel, 220V-240V, Spanish (220V and 240V models only)
56	81 301 37	MU11279	1	Label, rear panel, 220V-240V, French (220V and 240V models only)
57	81 301 38	MU11280	1	Label, rear panel, 220V-240V, German (220V and 240V models only)
58	81 301 39	MU11281	1	Label, rear panel, 220V-240V, Italian (220V and 240V models only)
59	81 500 85-R	MU11451	1	Gas supply, oxygen/air, with reserve Diameter Index Safety System (DISS) (VHA model only)

a. Nylok® is a registered trademark of Nylok Fastener Corporation.

Resuscitaire® Birthing Room Warmer—82 3E2 70

Figure 5-8. Resuscitaire® Birthing Room Warmer—82 3E2 70



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Table 5-6. Resuscitaire® Birthing Room Warmer—82 3E2 70

Item	Part Number	MU	Qty	Description
1	81 020 02	MU11043	1	Bracket, heater head (pivot)
2	81 005 74	MU11018	1	Cover, upper post
3	81 005 67	MU10990	1	Base weldment, Birthing Room Warmer
4	81 200 71	MU11214	1	Warmer head assembly, 120V
5	81 300 70T	MU11259	1	Tested controller assembly, 120V
6	81 005 71	MU10994	1	Plate, blank, microblender
7	81 005 72	MU10995	1	Plate, blank, Resuscitation Module
8	81 500 00	MU11392	1	Chassis, gas supply, without cylinder holes
9	81 000 37	MU10856	1	Label, data tag, system
10	81 020 32	MU11071	1	Gasket, rear cover
11	81 005 07	MU10955	2	Caster, swivel, 5", with brake, gray urethane
12	78 285 28	MU09879	1	Caster, swivel, 1.97", no brake, gray plastic
13	99 042 93	MU15255	6	Screw, #10-32 x ¾" pan, phillips/washer, white
14	99 032 85	MU15201	2	Screw, #8-32 x ¾", truss phillips, stainless steel
15	81 500 42	MU11419	2	Plug button, nylon, 0.62" hole
16	81 005 17	MU10963	1	Plug button, nylon, ½" hole
17	78 275 10	MU09854	2	Plug, panel fastening, 0.16" diameter (arrow clip)
18	78 306 31	MU10015	4	Plug button, plastic, 0.38" hole
19	99 901 77	MU15779	A/R	Loctite® adhesive #242
20	99 041 36	MU15229	18	Screw, #10-32 x 3/8", truss, phillips, Nylok®, stainless
21	68 602 02	MU08414	6	Plug, panel fastening, 0.182"-0.192", Canoe®
22	81 001 19	MU10895	1	Label, UL/CUL, classified
23	81 005 73	MU10996	1	Handle, rear, Birthing Room Warmer
24	82 005 00	MU11933	2	Trim strip, upper post, Birthing Room Warmer
25	99 045 30	MU15271	2	Screw, #10-32 x 2.62", truss, phillips, stainless steel

Item	Part Number	MU	Qty	Description
26	99 125 61	MU15590	2	Spacer, 0.257" inner diameter, 0.38" outer diameter, 1" long, nylon
27	81 005 58	MU10983	1	Screw, shoulder, 0.38" diameter ¾" long
28	99 110 04	MU15451	1	Nut, hex, 5/16"-18, keps, steel, zinc-plated
29	99 124 16	MU15569	2	Washer, lock, #10, split, steel, cadmium-plated
30	99 901 40	MU15773	A/R	Adhesive, thread locker, Loctite® #271, 50 ml
31	81 005 70	MU10993	8	Washer, shoulder, 0.12" inner diameter, 0.248 DS, 0.16 LS
32	99 103 33	MU15411	8	Nut, hex, #4-40 keps, steel, zinc-plated
33	81 020 03	MU11044	1	Plate, head support
34	81 020 04	MU11045	1	Plate, blender/resuscitation support
35	81 020 05	MU11046	1	Plate, resuscitation/gas supply support
36	81 000 30	MU10851	1	Label, caution—shock hazard/high pressure, English
37	81 200 50	MU11200	1	Label, caution—shock hazard, English
38	81 005 15	MU10962	1	Label, warmer height, Birthing Room Warmer, English
39	81 301 32	MU11274	1	Label, rear panel, 120V, English
40	78 265 41CC	MU09761	2	Label, explosion hazard, English
41	81 300 35	MU11238	1	Overlay, electric front panel, Birthing Room Warmer, English
42	81 600 34	MU11571	1	Overlay, front panel, blender, blank
43	81 400 40	MU11342	1	Overlay, front panel, Resuscitation Module, blank
44	81 501 24	MU11486	1	Overlay, front panel, gas supply, blank
45	81 000 90	MU10866	2	Label, caution: no block vents, English
46	81 990 36	MU11678	1	Placard, operating instructions, Birthing Room Warmer

a. Loctite® is a registered trademark of Loctite Corporation.

b. Nylok® is a registered trademark of Nylok Fastener Corporation.

c. Canoe™ is a trademark of Illinois Tool Works, Inc.

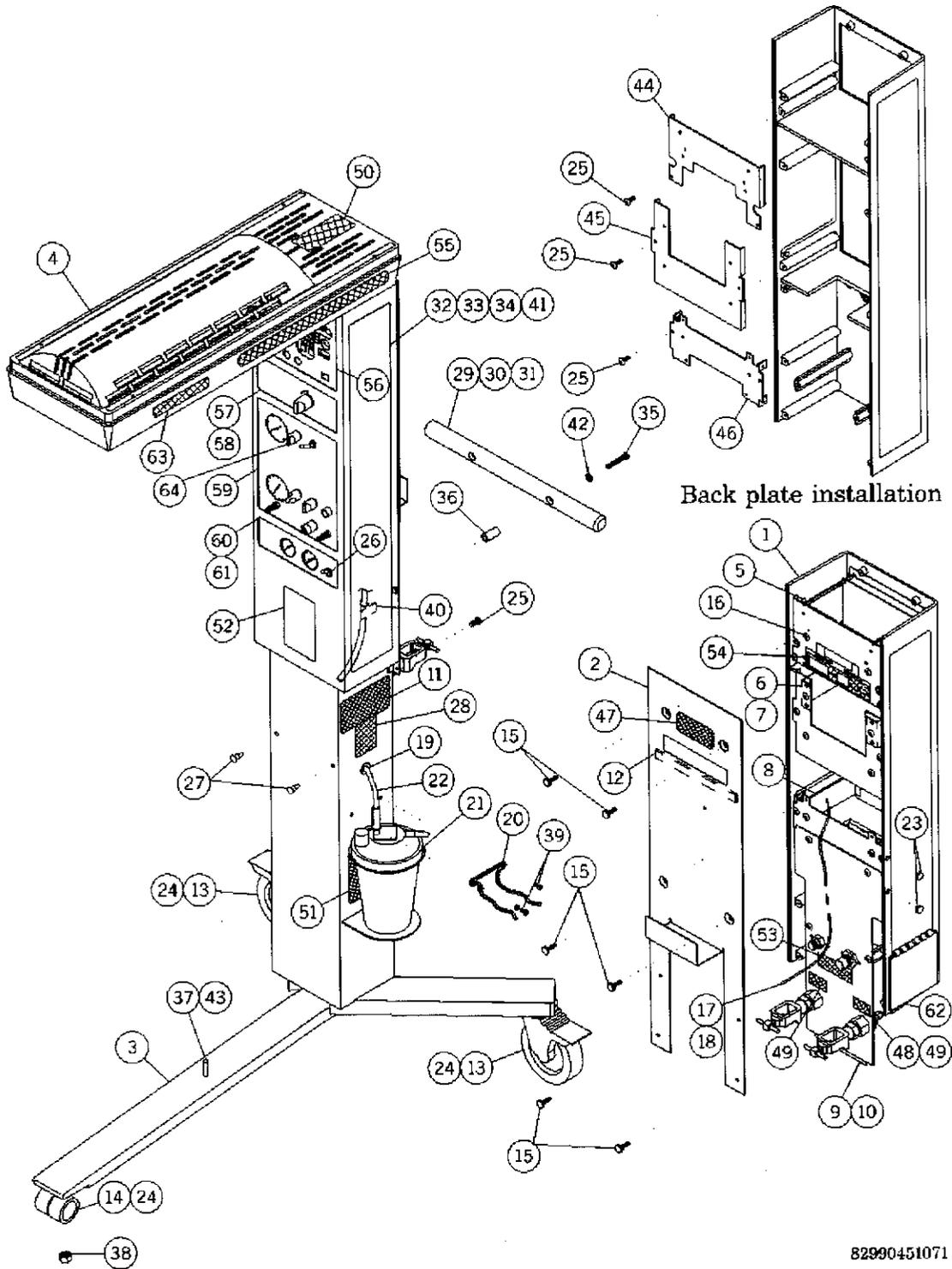
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Chapter :

NOTES:

Resuscitaire® Birthing Room Warmer—82 1A1 70 and 82 1B1 70

Figure 5-9. Resuscitaire® Birthing Room Warmer—82 1A1 70 and 82 1B1 70



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Table 5-7. Resuscitaire® Birthing Room Warmer—82 1A1 70 and 82 1B1 70

Item	Part Number	MU	Qty	Description
1	81 020 02	MU11043	1	Bracket, heater head (pivot)
2	81 005 74	MU11018	1	Cover, upper post
3	81 005 67	MU10990	1	Base weldment, Birthing Room Warmer
4	81 200 71	MU11214	1	Warmer head assembly, 120V
5	81 300 70T	MU11259	1	Tested controller assembly, 120V
6	81 600 80-R	MU11584	1	Blender Module, Resuscitaire® Radiant Warmer (82 1B1 70 model only)
7	81 600 70-R	MU11582	1	Blender blank assembly Resuscitaire® Radiant Warmer (82 1A1 70 model only)
8	81 400 73T	MU11369	1	Tested Resuscitation Module without AutoBreath™ Infant Resuscitator
9	81 500 80-R	MU11442	1	Gas supply, oxygen with reserves, Diameter Index Safety System (DISS) (82 1A1 70 model only)
10	81 500 85-R	MU11451	1	Gas supply oxygen/air with reserves, DISS (82 1B1 70 model only)
11	81 000 37	MU10856	1	Label, data tag, system, Birthing Room Warmer
12	81 020 32	MU11071	1	Gasket, rear cover
13	81 005 07	MU10955	2	Caster, swivel, 5", with brake, gray urethane
14	78 285 28	MU09879	1	Caster, swivel, 1.97", no brake, gray plastic
15	99 042 93	MU15255	6	Screw, #10-32 x 3/4", pan, phillips/washer, white
16	99 032 85	MU15201	2	Screw, #8-32 x 3/4", truss, phillips, stainless steel
17	08 136 07-R	MU01917	1	Tubing, polyvinyl chloride (PVC), 1/4" inner diameter x 27" long
18	81 000 13	MU10845	1	Nipple, nylon, 3/16" x 3/16" tube
19	17 062 42	MU02895	1	Bushing, snap-in, 0.38" inner diameter, 1/2" hole
20	81 000 03	MU10839	1	Holder, suction bottle

Item	Part Number	MU	Qty	Description
21	81 001 15	MU10890	1	Bottle, suction, 800 cc, marked
22	81 001 16	MU10891	1	Tubing, suction with end, ¼" inner diameter, 6' long
23	78 306 31	MU10015	4	Plug button, plastic, 0.38" hole
24	99 901 77	MU15779	A/R	Loctite® adhesive #242
25	99 041 36	MU15229	20	Screw, #10-32 x 3/8" truss, phillips, Nylok®, stainless steel
26	99 112 96	MU15461	1	Nut, round, knurled, 15/32"-32, brass, nickel-plated
27	68 602 02	MU08414	2	Plug, panel fastening, 0.182" - 0.192", Canoe®
28	81 001 19	MU10895	1	Label, UL/CUL, classified
29	81 005 73	MU10996	1	Handle, rear, Birthing Room Warmer
30	81 005 73NOK	MU11005	1	Handle, rear, Birthing Room Warmer, natural oak
31	81 005 73TLC	MU11013	1	Handle, rear, Birthing Room Warmer, traditional cherry
32	82 005 00	MU11933	2	Trim strip, upper post, Birthing Room Warmer
33	82 005 00NOK	MU11944	2	Trim strip, upper post, Birthing Room Warmer, natural oak
34	82 005 00TLC	MU11957	2	Trim strip, upper post, Birthing Room Warmer, traditional cherry
35	99 045 30	MU15271	2	Screw, #10-32 x 2.62", truss, phillips, stainless steel
36	99 125 61	MU15590	2	Spacer, 0.257" inner diameter, 0.38" outer diameter, 1" long, nylon
37	81 005 58	MU10983	1	Screw, stud, 0.375" outer diameter, 1.38" long, 5/16"-18
38	99 110 04	MU15451	1	Nut, hex, 5/16"-18 keps, steel, zinc-plated
39	99 042 05	MU15238	2	Screw, #10-32 x ½", truss, phillips, stainless steel, Nylok®
40	78 163 40	MU09480	1	Clip, plastic, snap, self-adhesive, 0.38" inner diameter
41	99 902 74	MU15809	2	Tape, adhesive transfer, 0.01" thick x ½" wide
42	99 124 16	MU15569	2	Washer, lock, #10, spring, cadmium-plated

Chapter :

Item	Part Number	MU	Qty	Description
43	99 901 40	MU15773	A/R	Adhesive, thread locker, Loctite® #271, 50 ml
44	81 020 03	MU11044	1	Plate, head support
45	81 020 04	MU11045	1	Plate, blender/resuscitation support
46	81 020 05	MU11046	1	Plate, resuscitation/gas supply support
47	81 000 30	MU10851	1	Label, caution—shock hazard/high pressure, English
48	81 400 10	MU11321	1	Label, air cylinder inlet, English
49	81 400 17	MU11326	1 or 2	Label, oxygen cylinder inlet, English
50	81 200 50	MU11200	1	Label, caution—shock hazard, English
51	81 101 23	MU11139	1	Label, suction flow
52	81 005 15	MU10962	1	Label, warmer height, Birthing Room Warmer, English
53	82 001 00	MU11852	1	Label, pipeline inlet water trap, English
54	81 301 32	MU11274	1	Label, rear panel, 120V, English
55	78 265 41CC	MU09761	2	Label, explosion hazard, English
56	81 300 25	MU11238	1	Overlay, electric front panel, Birthing Room Warmer, English
57	81 600 27	MU11566	1	Overlay, blender front panel, Radiant Warmer English
58	81 600 34	MU11571	1	Overlay, front panel, blender, blank
59	81 400 27	MU11334	1	Overlay, without AutoBreath™ Infant Resuscitator front panel, Radiant Warmer, English
60	81 500 50	MU11425	1	Overlay, oxygen gas front panel, Radiant Warmer English
61	81 500 60	MU11430	1	Overlay, oxygen/air gas front panel, Radiant Warmer, English
62	81 990 36	MU11678	1	Placard, operating instructions, Birthing Room Warmer
63	81 000 90	MU10866	2	Label, caution: no block vents, English
64	BM1445	MU00606	1	Plastic knob with setscrew

a. Loctite® is a registered trademark of Loctite Corporation.

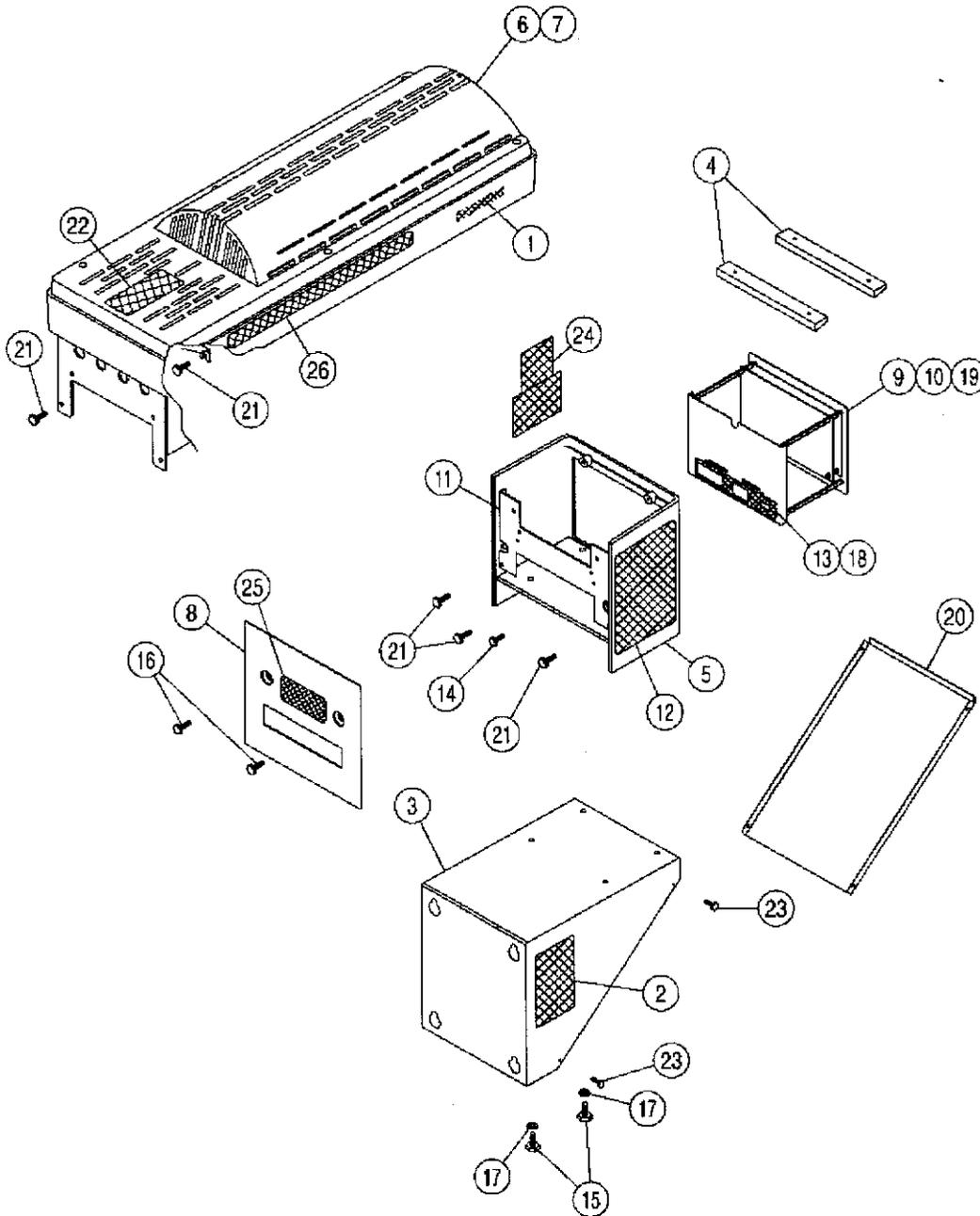
b. Nylok® is a registered trademark of Nylok Fastener Corporation.

c. Canoe® is a registered trademark of Illinois Tool Works, Inc.

A/R As required

Wall Mounted Resuscitaire® Radiant Warmer Assembly—82 000 70/80

Figure 5-10. Wall Mounted Resuscitaire® Radiant Warmer Assembly—82 000 70/80



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Chapter :

Table 5-8. Wall-Mounted Resuscitaire® Radiant Warmer Assembly—82 000 70/80

Item	Part Number	MU	Qty	Description
1	81 000 90	MU10866	2	Label, caution: no block vents, English
2	82 000 16	MU11788	1	Label, mattress height, wall-mounted
3	82 000 11	MU11783	1	Bracket, wall mount
4	82 000 12	MU11784	2	Plate, wall mount
5	82 000 13	MU11785	1	Post modification
6	81 200 71	MU11214	1	Warmer head assembly, 120V (120V model only)
7	81 200 81	MU11217	1	Warmer head assembly, 230V (230V model only)
8	82 000 14	MU11786	1	Cover, upper post
9	81 300 70T	MU11259	1	Tested controller assembly, 120V (120V model only)
10	81 300 80T	MU11261	1	Tested controller assembly, 220V-240V (220V and 240V models only)
11	81 020 03	MU11044	1	Plate, head support
12	82 000 17	MU11789	1	Label, user precaution, wall-mounted
13	81 301 35	MU11277	1	Label, rear panel, 220V-240V, English (220V and 240V models only)
14	99 032 94	MU15203	2	Screw, #8-32 x 3/4", pan, phillips, stainless steel, sems internal
15	99 056 96	MU15306	4	Screw, 1/4"-20 x 3/4", cap, hex, stainless steel
16	99 042 93	MU15255	2	Screw, #10-32 x 3/4", pan, phillips/washer, white
17	99 125 53	MU15586	4	Washer, lock, split, 1/4", stainless steel
18	81 301 32	MU11274	1	Label, rear panel, 120V, English (120V model only)
19	81 300 25	MU11238	1	Overlay, electric front panel, Birthing Room Warmer, English
20	82 000 18	MU11790	1	Cover plate, wall mount
21	99 041 36	MU15229	8	Screw, #10-32 x 3/8", truss, phillips, stainless steel, Nylok®
22	81 200 50	MU11200	1	Label, caution—shock hazard, English
23	99 022 83	MU15105	4	Screw, #6-32 x 1/4", pan, phillips, stainless steel, sems external

Item	Part Number	MU	Qty	Description
24	81 001 19	MU10895	1	Label, UL/CUL, classified
25	81 000 30	MU10851	1	Label, caution—shock hazard/high pressure, English
26	78 265 41CC	MU09761	2	Label, explosion hazard, English

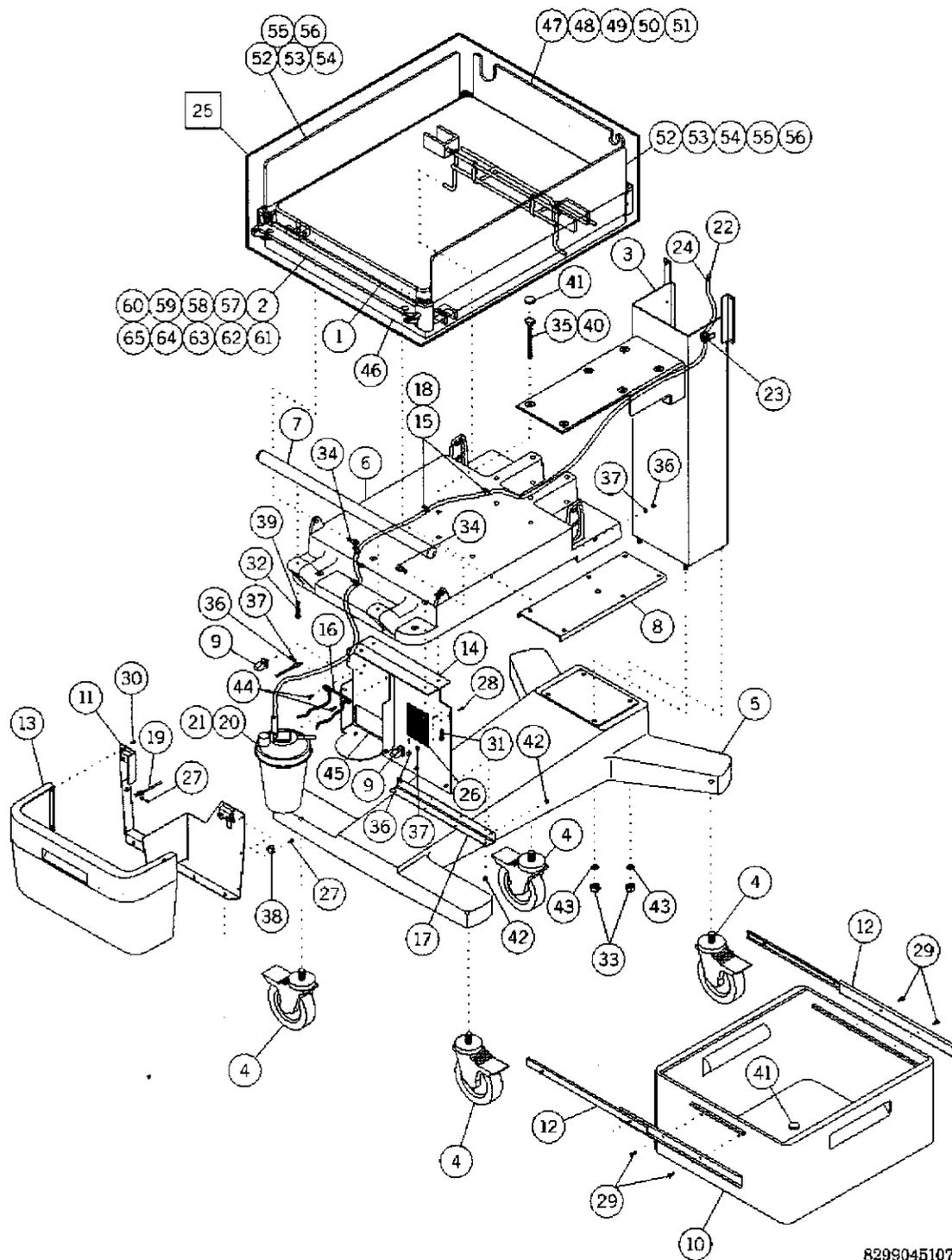
a. Nylok® is a registered trademark of Nylok Fastener Corporation.

Chapter :

NOTES:

Cart Assembly (Bassinet) for the Resuscitaire® Radiant Warmer

Figure 5-11. Cart Assembly (Bassinet) for the Resuscitaire® Radiant Warmer



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Table 5-9. Cart Assembly (Bassinet) for the Resuscitaire® Radiant Warmer

Item	Part Number	MU	Qty	Description
1	78 170 20	MU09577	1	Mattress assembly, 20½" x 25¾"
2	81 900 42	MU11613	1	Replacement front panel, Italian (old style)
3	81 020 12	MU11053	1	Column, lower
4	81 005 07	MU10955	4	Caster, swivel, 5.00", with brake, gray urethane
5	81 020 01	MU11042	1	Base casting, machined
6	81 020 14	MU11055	1	Frame support
7	81 020 16	MU11057	1	Handle, front
8	81 020 13	MU11054	1	Plate, mounting, frame support
9	81 020 17	MU11058	2	Block, latch
10	81 020 08	MU11048	1	Drawer, pass-thru
11	81 020 24	MU11064	1	Plate, rear, resuscitation compartment
12	81 101 12	MU11133	2	Slide, pass-thru drawer
13	81 020 18	MU11059	1	Cover, resuscitation compartment
14	81 020 19	MU11060	1	Plate, resuscitation compartment, weldment
15	81 020 20	MU11061	4	Clamp, cable, spring-type, nylon, 0.38" inside diameter (model with suction only)
16	81 000 03	MU10839	1	Holder, suction bottle (model with suction only)
17	81 020 22	MU11062	1	Hinge, resuscitation compartment
18	99 084 84	MU15390	4	Screw, self-tapping, #6-32 x 5/16", flat, pan, phillips, stainless steel (model with suction only)
19	81 020 23	MU11063	1	Cord, ¼" outside diameter, 5.00" long with nylon eyelets
20	81 001 15	MU10890	1	Bottle, suction, 800 cc, marked (plastic and disposable) (model with suction only)
21	08 131 00	MU01905	1	Bottle, 1000 cc, marked "suction" (glass and reusable) (model with suction only)
22	81 000 13	MU10845	1	Nipple, nylon, 3/16" x 3/16" tube (model with suction only)

\$26.71 each →

\$108.31 in stock

Item	Part Number	MU	Qty	Description
23	78 163 40	MU09840	1	Clip, plastic, snap, self-adhesive, 0.38" inside diameter (model with suction only)
24	81 001 16	MU10891	1	Tubing, suction with ends, ¼" inside diameter, 6' long (model with suction only)
25	81 100 81-R	MU11128	1	Bassinet assembly
26	81 101 23	MU11139	1	Label, suction flow (model with suction only)
27	99 010 67	MU15073	5	Screw, #4-40 x ¼", truss, phillips, stainless steel, Nylok®
28	99 031 54	MU15187	1	Screw, #8-32 x 3/8", flat, phillips, stainless steel, 100 , Nylok®
29	99 031 52	MU15185	4	Screw, #8-32 x 3/8", truss, phillips, stainless steel, Nylok®
30	99 022 84	MU15106	6	Screw, #6-32 x ¼", pan, phillips, steel, zinc-plated, sems
31	99 042 05	MU15238	4	Screw, #10-32 x ½", truss, phillips, stainless steel, Nylok®
32	99 056 66	MU15304	2	Screw, ¼"-20 x 5/8", cap, socket, button, stainless steel
33	99 111 25	MU15454	4	Nut, hex, 3/8"-16, elastic stop, steel, zinc-plated
34	99 195 22	MU15734	2	Screw, shoulder, 0.38" diameter, 0.38" long, 5/16"-18, stainless steel
35	99 068 61	MU15374	6	Screw, 3/8"-16 x 3½", cap, hex, stainless steel
36	99 106 21	MU15432	5	Nut, acorn, #8-32, stainless steel
37	99 122 92	MU15553	5	Washer, lock, internal, #8, stainless steel
38	81 100 63	MU11116	2	Catch, Nylatch® roller
39	99 125 54	MU15587	2	Washer, lock, internal, ¼", stainless steel
40	99 901 77	MU15779	A/R	Loctite® adhesive #242
41	78 161 20	MU09367	7	Plug button, nylon, 0.88" hole
42	99 106 32	MU15433	8	Nut, hex, #8-32, keps, steel, zinc-plated

Chapter :

Item	Part Number	MU	Qty	Description
43	99 126 71	MU15613	4	Washer, flat, 3/8" inside diameter, 3/4" outside diameter, 0.065" thick, stainless steel
44	99 041 36	MU15229	2	Screw, #10-32 x 3/8", truss, phillips, stainless steel, Nylok®
45	81 101 24	MU11140	1	Label, suction jar placement (model with suction only)
46	81 100 72-R	MU11124	1	Bassinet subassembly
47	81 900 01	MU11586	1	Replacement rear panel, English
48	81 900 11	MU11595	1	Replacement rear panel, Spanish
49	81 900 21	MU11604	1	Replacement rear panel, French
50	81 900 31	MU11608	1	Replacement rear panel, German
51	81 900 41	MU11612	1	Replacement rear panel, Italian
52	81 900 00	MU11585	2	Replacement side panel, English
53	81 900 10	MU11594	2	Replacement side panel, Spanish
54	81 900 20	MU11603	2	Replacement side panel, French
55	81 900 30	MU11607	2	Replacement side panel, German
56	81 900 40	MU11611	2	Replacement side panel, Italian
57	81 900 02	MU11587	1	Replacement front panel, English (old style)
58	81 900 12	MU11596	1	Replacement front panel, Spanish (old style)
59	81 900 22	MU11605	1	Replacement front panel, French (old style)
60	81 900 32	MU11609	1	Replacement front panel, German (old style)
61	81 900 07	MU11592	1	Replacement front panel, with bassinet release, English (new style)
62	81 900 13	MU11597	1	Replacement front panel, with bassinet release, Spanish (new style)
63	81 900 23	MU11606	1	Replacement front panel with bassinet release, French (new style)
64	81 900 33	MU11610	1	Replacement front panel with bassinet release, German (new style)
65	81 900 43	MU11614	1	Replacement front panel with bassinet release, Italian (new style)

a. Nylok® is a registered trademark of Nylok Fastener Corporation.

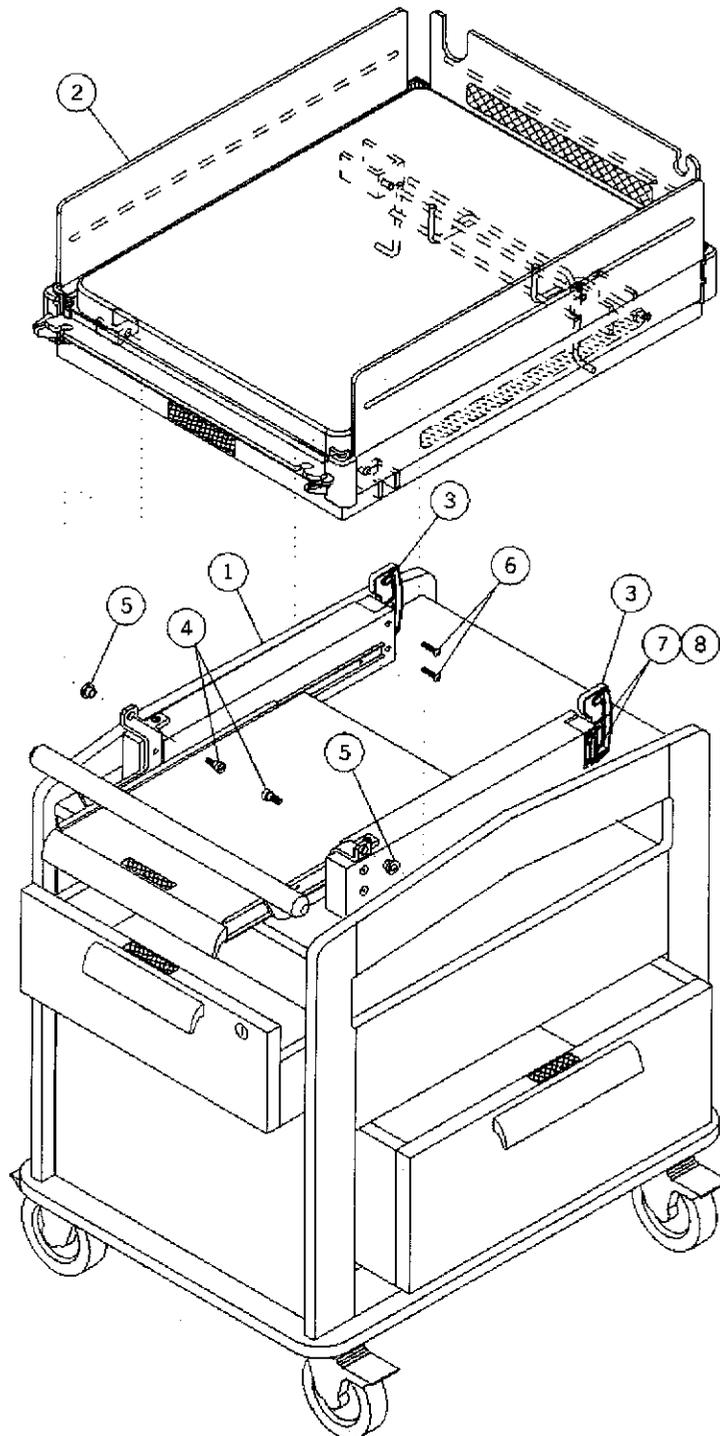
b. Nylatch® is a registered trademark of Hartwell Corporation.

c. Loctite® is a registered trademark of Loctite Corporation.

A/R As required

Cart Assembly for the Resuscitaire® Birthing Room Warmer—82 005 50, 82 005 50NOK, and 82 005 50TLC

Figure 5-12. Cart Assembly for the Resuscitaire® Birthing Room Warmer—82 005 50, 82 005 50NOK, and 82 005 50TLC



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**Table 5-10. Cart Assembly for the Resuscitaire® Birthing Room Warmer—
82 005 50, 82 005 50NOK, and 82 005 50TLC**

Item	Part Number	MU	Qty	Description
1	Reference only		1	Cart base assembly
2	81 100 81-R	MU11128	1	Bassinet assembly
3	78 160 05	MU09350	2	Bracket, tilt adjust, plastic, machined
4	81 100 58	MU11112	2	Screw, shoulder, 0.38" diameter, 0.3" long, 5/16"-18, stainless steel
5	81 100 57	MU11113	2	Bushing, flange, 0.375" inner diameter, 0.495" outer diameter, 0.56 long
6	99 044 64	MU15267	4	Screw, #10-32 x 1¼", truss, phillips, stainless steel
7	99 107 38	MU15440	4	Nut, hex, #10-32, flexlock, steel, zinc-plated
8	99 125 65	MU15592	4	Spacer, 0.257" inner diameter, 0.38" outer diameter, 0.38" long, nylon

Cart Base Assembly for the Resuscitaire® Birthing Room Warmer—81 005 75

Figure 5-13. Cart Base Assembly for the Resuscitaire® Birthing Room Warmer—81 005 75

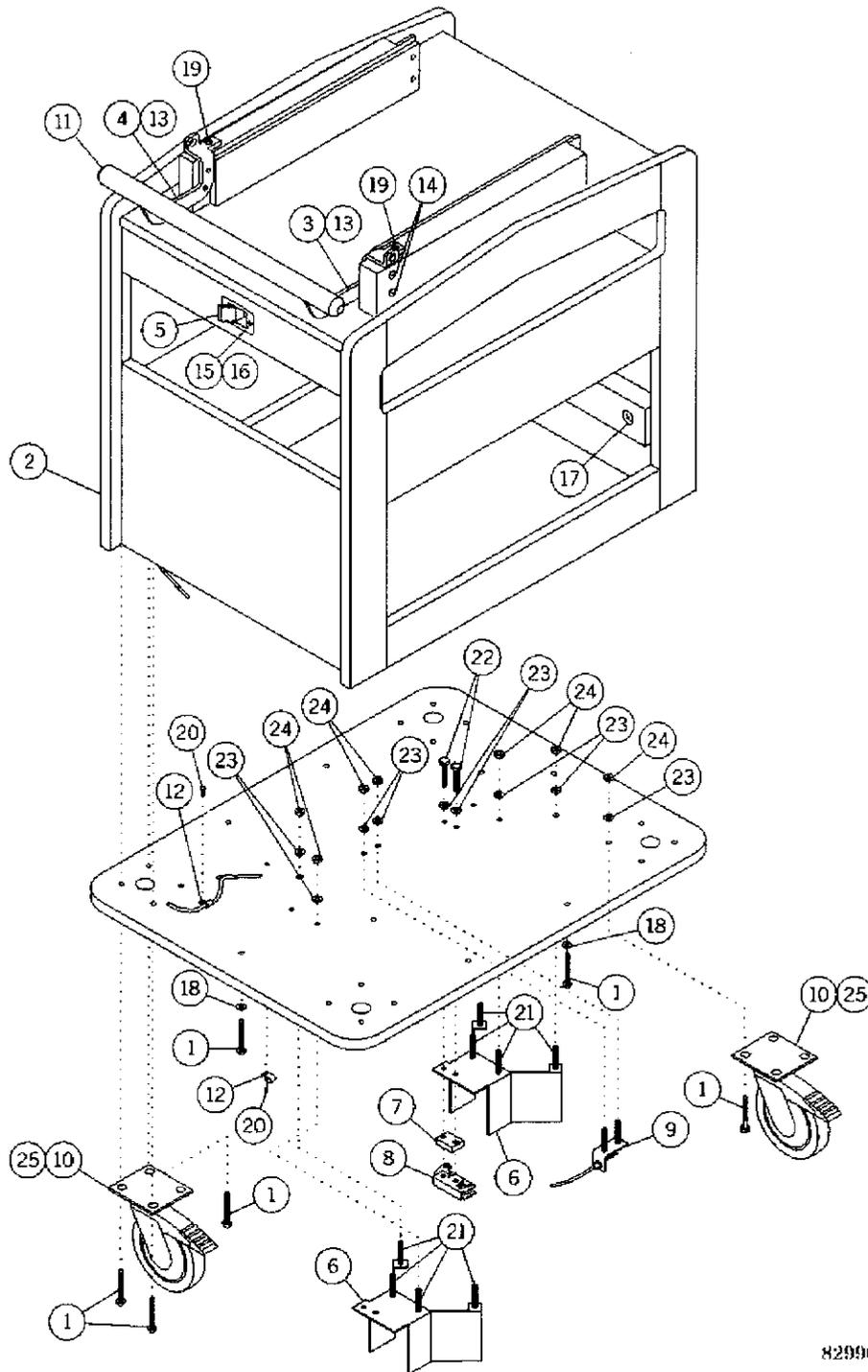
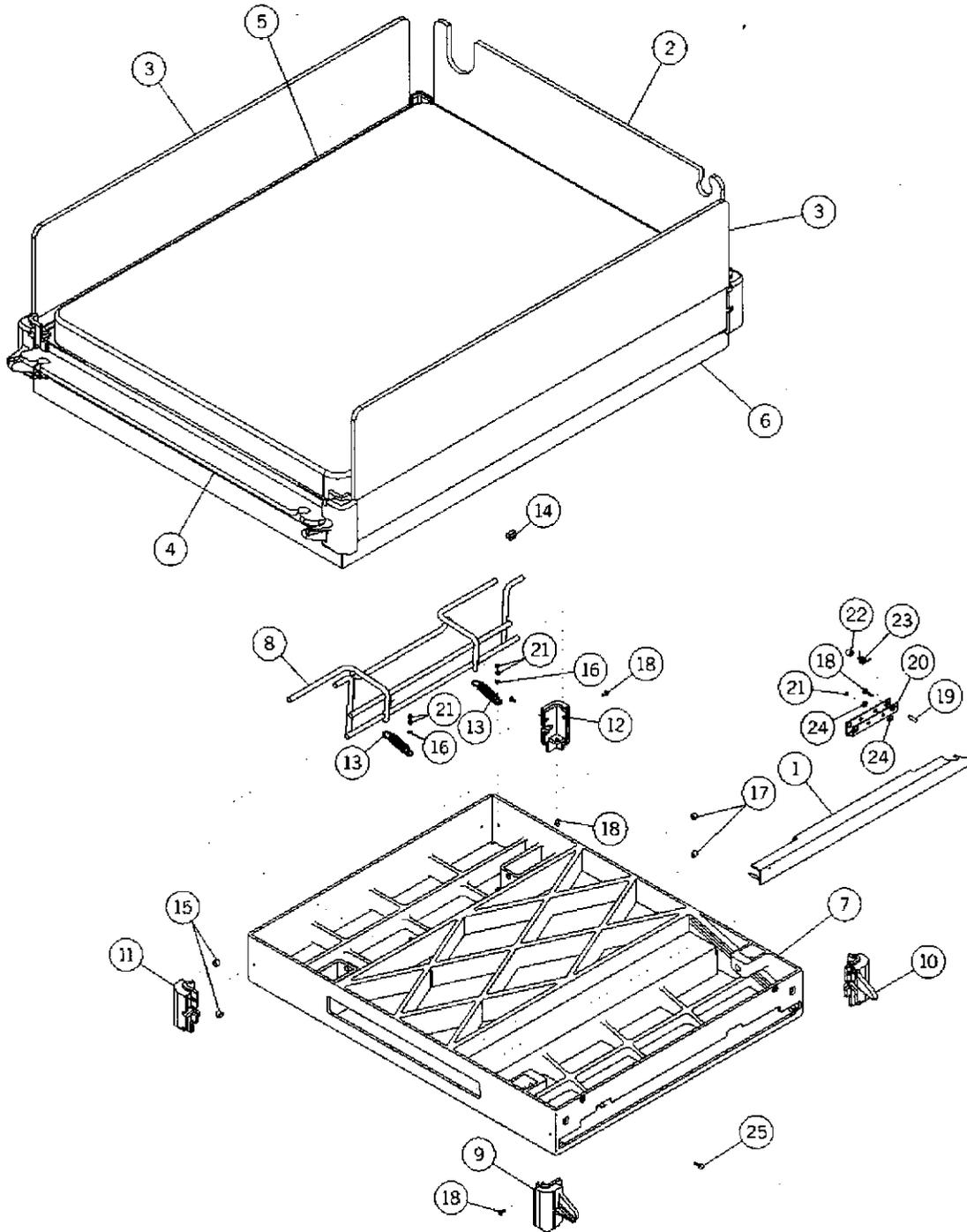


Table 5-11. Cart Base Assembly for the Resuscitaire® Birthing Room Warmer—81 005 75

Item	Part Number	MU	Qty	Description
1	Reference only		10	Screw, #10 x 2", pan, phillips, zinc-plated
2	81 005 75G	MU11021	1	Cart base, Birthing Room Warmer, generic, unfinished
3	81 005 68	MU10991	1	Handle, support, right
4	81 005 69	MU10992	1	Handle, support, left
5	81 005 12	MU10959	1	Cable assembly, latch, Birthing Room Warmer
6	81 005 01	MU10945	2	Bracket, docking
7	81 005 09	MU10957	1	Plate, mounting, latch assembly
8	81 005 10	MU10958	1	Latch, miniature rotary
9	81 005 13	MU10960	1	Bracket, mounting, cable assembly
10	81 005 07	MU10955	4	Caster, swivel, 5", with brake, gray urethane (metal housing)
11	81 900 53	MU11629	1	Front drawer handle, replacement, Birthing Room Warmer
12	17 062 52	MU02896	2	Clamp, cable, loop-type, nylon, 0.19" inside diameter
13	Reference only		2	Cap screw, ¼"-20 x ½", button, socket
14	Reference only		4	Cap screw, ¼"-20 x 1¾", button, socket
15	Reference only		1	Flat washer, #8 x ½", black
16	Reference only		1	Flat washer, #8 x ¾", black
17	Reference only		8	Screw, #10 x 1¾", pan, phillips, zinc-plated
18	Reference only		6	Flat washer, #8 x 1¾", black
19	Reference only		2	Screw, #10 x 1¼", pan, phillips, zinc-plated
20	Reference only		2	Screw, #8 x ½", pan, phillips, black
21	Reference only		10	Screw, ¼"-20 x 1½", carriage, zinc-plated
22	Reference only		2	Screw, ¼"-20 x 1¾", hex, zinc-plated
23	Reference only		16	Flat washer, 5/16" x ¾", zinc-plated
24	Reference only		14	Hanger bolt, ¼"-20 x 2", steel
25	81 005 55	MU10982	4	Caster, swivel, 5.00", with brake, gray polypropylene (plastic housing)

Bassinet Assembly for the Resuscitaire® Birthing Room Warmer

Figure 5-14. Bassinet Assembly for the Resuscitaire® Birthing Room Warmer



Bassinet subassembly exploded view

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Table 5-12. Bassinet Assembly for the Resuscitaire® Birthing Room Warmer

Item	Part Number	MU	Qty	Description
1	81 020 31	MU11070	1	Bassinet support
2	81 900 01	MU11586	1	Replacement rear panel, English
3	81 900 00	MU11585	2	Replacement side panel, English
4	81 900 07	MU11592	1	Replacement front panel, with bassinet release, English
5	78 170 20	MU09577	1	Mattress assembly, 20½" x 25¾"
6	81 100 72-R	MU11124	1	Bassinet subassembly
7	81 020 07	MU11047	1	Support, mattress
8	82 000 10	MU11782	1	Handle, bassinet tilt
9	81 100 03	MU11085	1	Corner block, panel mounting, right front
10	81 100 04	MU11086	1	Corner block, panel mounting, left front
11	81 100 46	MU11103	1	Corner block, panel mounting, right rear
12	81 100 47	MU11104	1	Corner block, panel mounting, left rear
13	81 100 34	MU11095	2	Spring, external, ½" outer diameter, 0.55" wide, 1¾" long
14	78 162 65	MU09421	1	Clip, spring, ¼"-0.31" diameter x ½" long
15	08 136 03	MU01912	8	Tubing, polyvinyl chloride (PVC), ¼" inner diameter x 0.27" long
16	99 123 32	MU15556	2	Washer, flat, 0.19" inner diameter, ¾" outer diameter, 0.06" thick, steel, zinc-plated
17	22 025 49	MU03754	2	Tubing, PVC, 3/16" inner diameter, 0.27" long
18	99 023 54	MU15128	14	Screw, #6-32 x 3/8", pan, phillips, stainless steel, Nylok®
19	81 100 68	MU11120	2	Cap, tubing, vinyl, 0.172" inner diameter, ½" long
20	81 100 67	MU11121	2	Bracket, aluminum channel, front wall, released
21	99 105 35	MU15423	6	Nut, hex, #6-32, Nylok®
22	99 124 41	MU15574	2	Spacer, 0.2" inner diameter, 0.38" outer diameter, ¼" long, PVC

Item	Part Number	MU	Qty	Description
23	81 100 69	MU11121	2	Spring, torsion, 0.357" outer diameter, 0.45" wide, stainless steel
24	99 122 46	MU15543	2	Washer, shoulder, 0.14" inner diameter, .22 DS, 0.05LS, N
25	99 023 64	MU15131	2	Screw, #6-32 x 7/16", truss, phillips, stainless steel, Nylok®

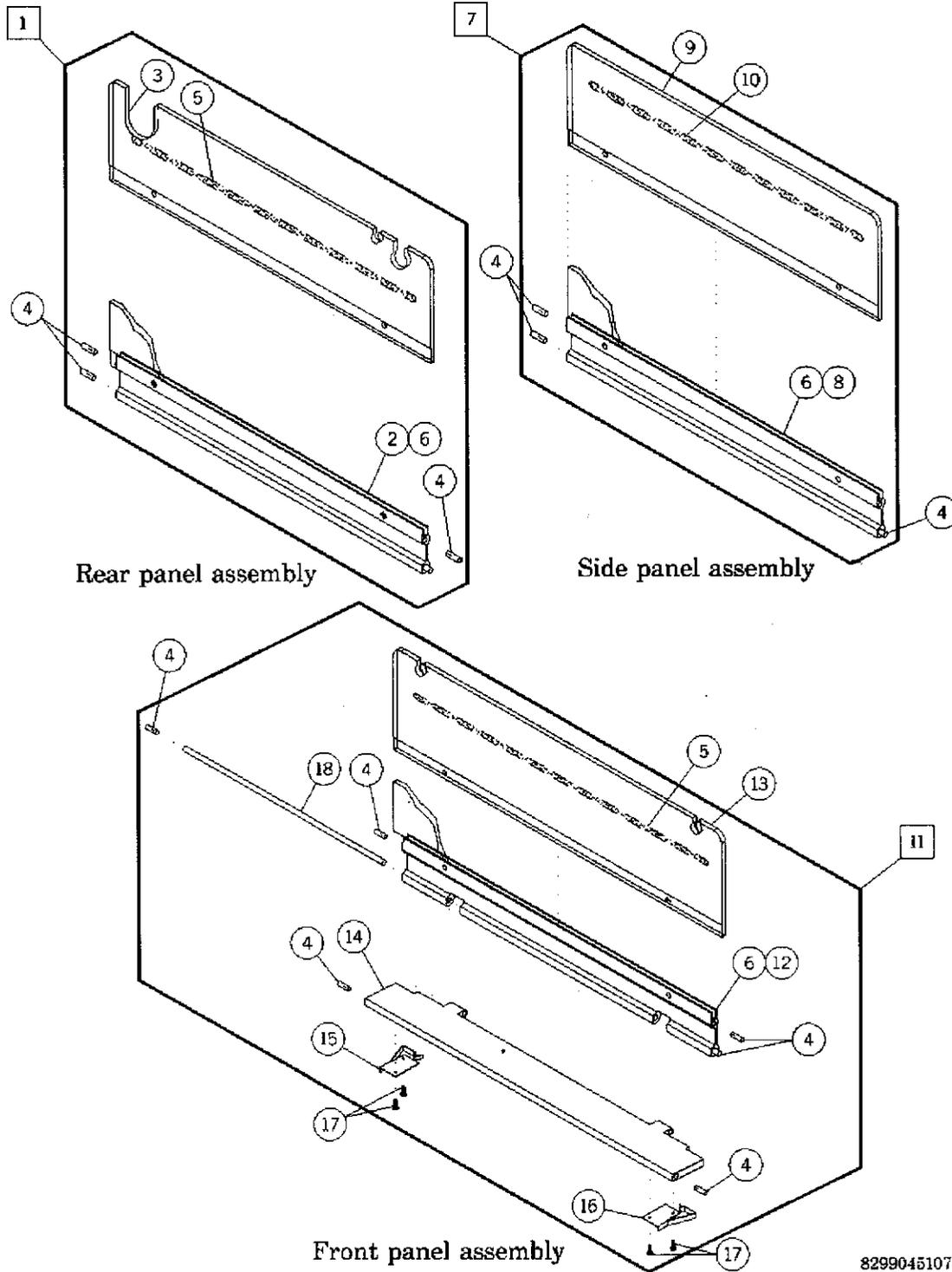
a. Nylok® is a registered trademark of Nylock Fastener Corporation.

Chapter :

NOTES:

Front, Side, and Rear Panel Assemblies for the Resuscitaire® Birthing Room Warmer Bassinet Assembly

Figure 5-15. Front, Side, and Rear Panel Assemblies for the Resuscitaire® Birthing Room Warmer Bassinet Assembly



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Table 5-13. Front, Side, and Rear Panel Assemblies for the Resuscitaire® Birthing Room Warmer Bassinet Assembly

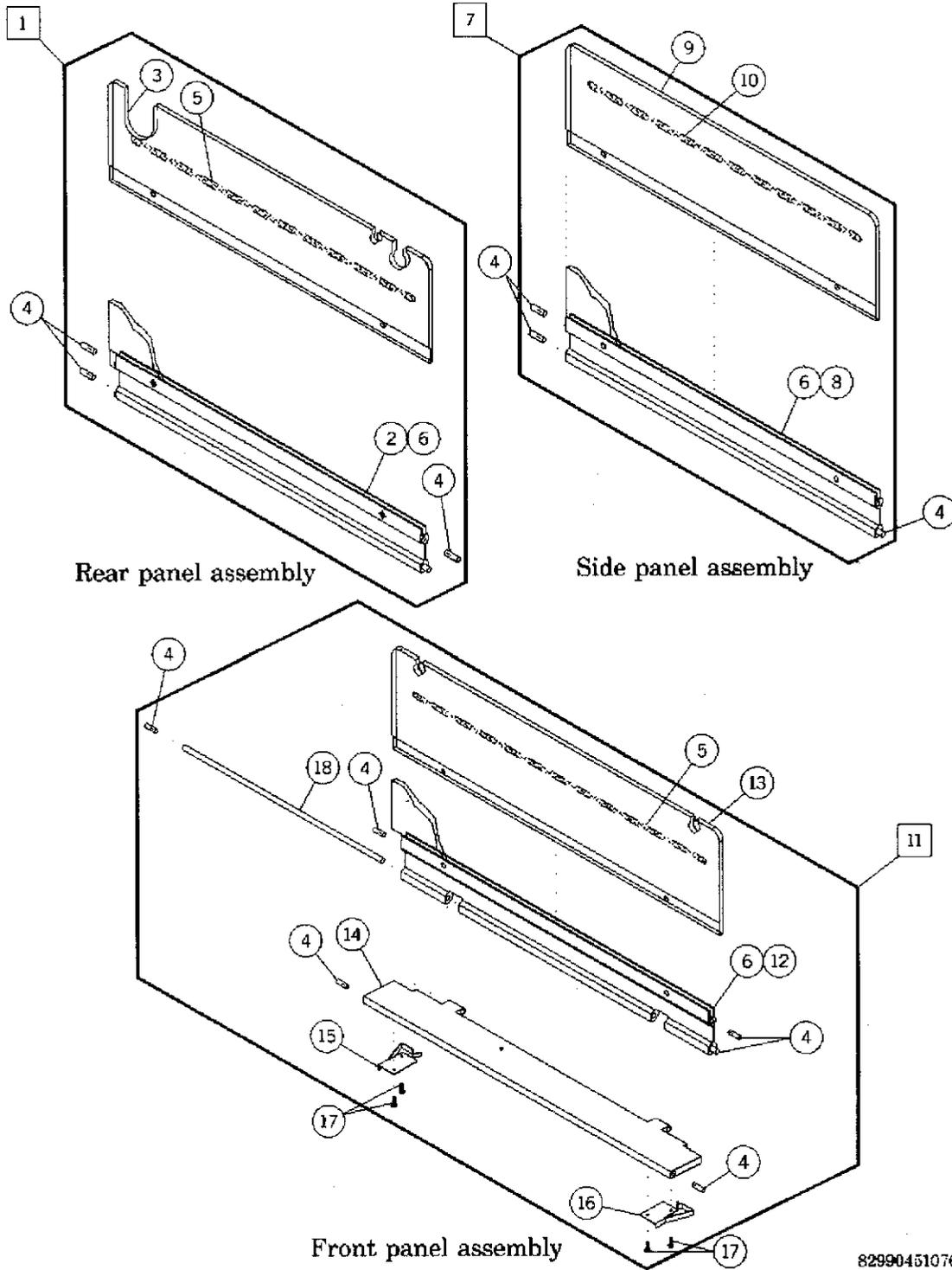
Item	Part Number	MU	Qty	Description
1	81 900 01	MU11586	1	Replacement rear panel, English
2	81 100 06	MU11088	1	Channel, rear, panel mounting
3	81 100 65-R	MU11118	1	Panel, rear, clear acrylic, 20.21" long
4	99 146 34	MU15684	18	Pin, groove, type, ¼" diameter, 0.62" long, stainless steel, zinc-plated
5	78 162 00CC	MU09375	2	Tape, vinyl, blue/pink, 18.12" long
6	99 902 59	MU15804	A/R	Compound, room temperature vulcanization (RTV), silicon rubber, clear, DC732
7	81 900 00	MU11585	2	Replacement side panel, English
8	81 100 07	MU11089	2	Channel, side, panel mounting
9	81 100 38	MU11097	2	Panel, side, clear acrylic, 25.65" long
10	78 162 01CC	MU09376	2	Tape, vinyl, blue/pink, 23½" long
11	81 900 07	MU11592	1	Replacement front panel, with bassinet release, English
12	81 100 49	MU11106	1	Channel, panel mounting, front
13	81 100 37	MU11096	1	Panel, front, clear acrylic, 20.21" long
14	81 100 50	MU11107	1	Panel, front wall, anti-racking
15	81 100 54	MU11108	1	Clip, front panel retention, right
16	81 100 55	MU11109	1	Clip, front panel retention, left
17	81 100 59	MU11113	4	Pin, hinge, 0.234" diameter, 17.63" long, aluminum

Table 5-14. Variable Height Adjustable Cart Base and Column Assembly for the Resuscitaire Radiant Warmer

Item	Part Number	MU	Qty	Description
1	82 010 03	MU11987	1	Lower column, outer, VHA
2	81 005 07	MU10955	4	Caster, swivel, 5", with brake, gray urethane
3	81 020 01	MU11042	1	Base casting, machined
4	82 010 00	MU11984	1	Plate, dress, base, VHA
5	82 010 01	MU11985	1	Plate, mounting, actuator/fixed column
6	83 401 30	MU12808	1	Actuator, 120V (120V model only)
7	83 401 31	MU12809	1	Actuator, 220V (220V and 240V models only)

Front, Side, and Rear Panel Assemblies for the Resuscitaire® Birthing Room Warmer Bassinet Assembly

Figure 5-15. Front, Side, and Rear Panel Assemblies for the Resuscitaire® Birthing Room Warmer Bassinet Assembly



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Table 5-13. Front, Side, and Rear Panel Assemblies for the Resuscitaire® Birthing Room Warmer Bassinet Assembly

Item	Part Number	MU	Qty	Description
1	81 900 01	MU11586	1	Replacement rear panel, English
2	81 100 06	MU11088	1	Channel, rear, panel mounting
3	81 100 65-R	MU11118	1	Panel, rear, clear acrylic, 20.21" long
4	99 146 34	MU15684	18	Pin, groove, type, ¼" diameter, 0.62" long, stainless steel, zinc-plated
5	78 162 00CC	MU09375	2	Tape, vinyl, blue/pink, 18.12" long
6	99 902 59	MU15804	A/R	Compound, room temperature vulcanization (RTV), silicon rubber, clear, DC732
7	81 900 00	MU11585	2	Replacement side panel, English
8	81 100 07	MU11089	2	Channel, side, panel mounting
9	81 100 38	MU11097	2	Panel, side, clear acrylic, 25.65" long
10	78 162 01CC	MU09376	2	Tape, vinyl, blue/pink, 23½" long
11	81 900 07	MU11592	1	Replacement front panel, with bassinet release, English
12	81 100 49	MU11106	1	Channel, panel mounting, front
13	81 100 37	MU11096	1	Panel, front, clear acrylic, 20.21" long
14	81 100 50	MU11107	1	Panel, front wall, anti-racking
15	81 100 54	MU11108	1	Clip, front panel retention, right
16	81 100 55	MU11109	1	Clip, front panel retention, left
17	81 100 59	MU11113	4	Pin, hinge, 0.234" diameter, 17.63" long, aluminum

A/R As required

Variable Height Adjustable Cart Base and Column Assembly for the Resuscitaire® Radiant Warmer

Figure 5-16. Variable Height Adjustable Cart Base and Column Assembly for the Resuscitaire Radiant Warmer

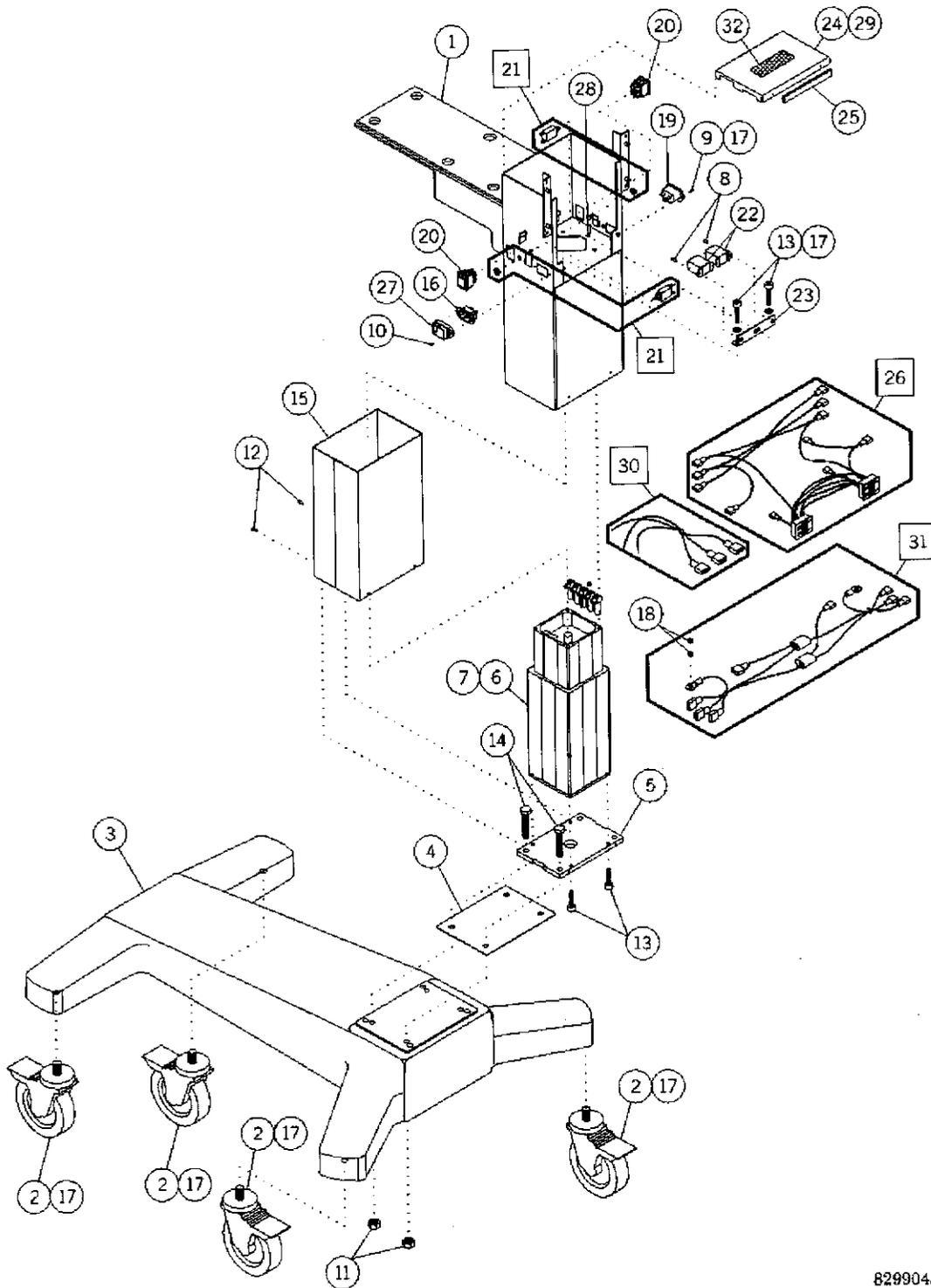


Table 5-14. Variable Height Adjustable Cart Base and Column Assembly for the Resuscitaire Radiant Warmer

Item	Part Number	MU	Qty	Description
1	82 010 03	MU11987	1	Lower column, outer, VHA
2	81 005 07	MU10955	4	Caster, swivel, 5", with brake, gray urethane
3	81 020 01	MU11042	1	Base casting, machined
4	82 010 00	MU11984	1	Plate, dress, base, VHA
5	82 010 01	MU11985	1	Plate, mounting, actuator/fixed column
6	83 401 30	MU12808	1	Actuator, 120V (120V model only)
7	83 401 31	MU12809	1	Actuator, 220V (220V and 240V models only)
8	99 010 67	MU15073	4	Screw, #4-40 x ¼", truss, phillips, stainless steel, Nylok®
9	99 010 62	MU15068	2	Screw, #4-40 x ¼", flat, phillips, stainless steel
10	99 011 14	MU15084	2	Screw, #4-40 x 3/8", round, phillips, stainless steel, Nylok®
11	99 111 25	MU15454	4	Nut, hex, 3/8"-16, elastic stop, steel, zinc-plated
12	99 022 86	MU15108	4	Screw, #6-32 x ¼", round, phillips, stainless steel, Nylok®
13	99 998 76	MU15896	8	Screw, M6 x 1.0" x ¼" long, cap, socket, stainless steel
14	99 068 91	MU15377	2	Screw, 3/8"-16 x 1¾", cap, hex, steel, zinc-plated
15	82 010 02	MU11986	1	Lower column, inner, VHA
16	17 735 63	MU03627	1	Connector, receptacle, male, AC power, 10A, 250V
17	99 901 77	MU15779	A/R	Loctite® (adhesive) #242
18	99 106 32	MU15433	4	Nut, hex, #8-32, keps, steel, zinc-plated
19	17 735 64	MU03628	1	Connector, receptacle, female, AC power, 10A, 250V
20	17 683 52	MU03320	2	Switch, rocker, double-pole double-throw (DPDT), 10A/250V AC
21	17 BH 236	MU02613	2	Circuit breaker, special thermal, 6.0A
22	17 653 09	MU03265	2	Relay, DPDT, 10A, 250V AC, UL/CSA®

Item	Part Number	MU	Qty	Description
23	82 010 06	MU11990	1	Bracket, relay mounting
24	82 010 04	MU11988	1	Plate, separator, outer, lower column
25	82 010 07	MU11991	1	Gasket, separator plate
26	82 010 05	MU11989	1	Wire harness, Radiant Warmer, VHA
27	17 734 12	MU03546	1	Cord lock adapter
28	68 212 00	MU06964	1	Label, ground symbol, protective
29	Reference only		A/R	RTV compound, clear, DC732
30	82 010 11	MU11994	1	Wire harness, actuator, Radiant Warmer, VHA
31	82 010 12	MU11995	1	Wire harness, power in—power out, Radiant Warmer
32	82 010 14	MU11997	1	Label, cover must be replaced

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Table 5-15. Resuscitation Variable Height Adjustable Cart, 240V Base and Column Assembly for the Resuscitaire® Radiant Warmer (U.K. Model)

Item	Part Number	MU	Qty	Description
1	82 010 03	MU11987	1	Lower column, outer, VHA, U.K.
2	81 005 07	MU10955	4	Caster, swivel, 5", with brake, gray urethane
3	81 020 01	MU11042	1	Base casting, machined
4	82 010 00	MU11984	1	Plate, dress, base, VHA
5	83 401 31	MU12809	1	Actuator, 220V
6	99 010 67	MU15073	4	Screw, #4-40 x 1/4", truss, phillips, stainless steel, Nylok®
7	99 010 62	MU15068	2	Screw, #4-40 x 1/4", flat, phillips, stainless steel
8	99 011 14	MU15084	2	Screw, #4-40 x 3/8", round, phillips, stainless steel, Nylok®
9	99 111 25	MU15454	4	Nut, hex, 3/8"-16, elastic stop, steel, zinc-plated
10	99 022 86	MU15108	2	Screw, #6-32 x 1/4", round, phillips, stainless steel, Nylok®
11	99 998 76	MU15896	8	Screw, M6 x 1 x 25 long, cap, socket, stainless steel
12	99 068 72	MU15376	4	Screw, 3/8"-16 x 4.50", cap, hex, steel, zinc-plated, groove pin 5
13	82 010 13	MU11996	1	Lower column, inner, VHA, U.K.
14	17 735 63	MU03627	1	Connector, receptacle, male, AC power, 10A 250V
15	99 901 77	MU15779	A/R	Loctite® (adhesive) #242
16	99 106 32	MU15433	4	Nut, hex, #8-32, keps, steel, zinc-plated
17	17 735 64	MU03628	1	Connector, receptacle, female, AC power, 10A 250V
18	17 683 52	MU03320	2	Switch, rocker, double-pole double-throw (DPDT), 10A/250V AC
19	82 010 30	MU12007	2	Spacer, actuator mounting
20	17 653 10	MU03266	2	Relay, DPDT, 10A 250V AC, VDE
21	82 010 06	MU11990	1	Bracket, relay mounting
22	82 010 04	MU11988	1	Plate, separator, outer lower column
23	82 010 07	MU11991	1	Gasket separator plate

Item	Part Number	MU	Qty	Description
24	82 010 05	MU11989	1	Wire harness, Radiant Warmer, VHA
25	17 734 12	MU03546	1	Cord lock adapter
26	68 212 00	MU06964	1	Label, ground symbol, protective
27	Reference only		A/R	RTV compound, clear, DC732
28	82 010 11	MU11994	1	Wire harness, actuator, Radiant Warmer, VHA
29	82 010 12	MU11995	1	Wire harness, power in—power out, Radiant Warmer
30	82 010 14	MU11997	1	Label, cover must be replaced
31	99 998 77	MU15897	4	Screw, M6 x 1 x 60 mm long, cap, socket, stainless steel

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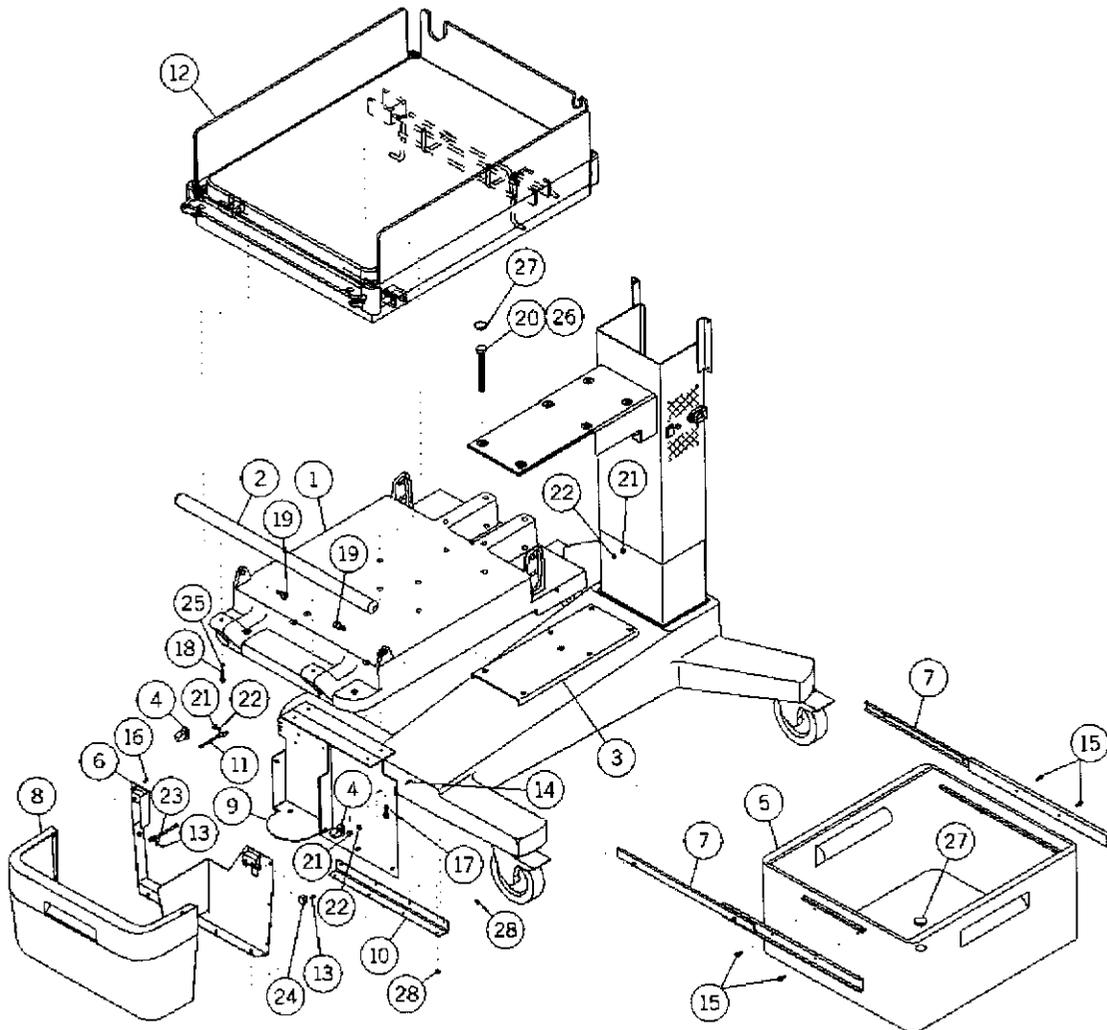
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Variable Height Adjustable Cart Assembly, without Resuscitation, for the Resuscitaire® Radiant Warmer

Figure 5-18. Variable Height Adjustable Cart Assembly, without Resuscitation, for the Resuscitaire® Radiant Warmer



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Table 5-16. Variable Height Adjustable Cart Assembly, without Resuscitation, for the Resuscitaire® Radiant Warmer

Item	Part Number	MU	Qty	Description
1	81 020 14	MU11055	1	Frame support
2	81 020 16	MU11057	1	Handle, front
3	81 020 13	MU11054	1	Plate, mounting, frame support
4	81 020 17	MU11058	2	Block, latch
5	81 020 08	MU11048	1	Drawer, pass-through
6	81 020 24	MU11064	1	Plate, rear, resuscitation compartment
7	81 101 12	MU11133	2	Slide, pass-thru drawer
8	81 020 18	MU11059	1	Cover, resuscitation compartment
9	81 020 19	MU11060	1	Plate, resuscitation compartment, weldment
10	81 020 22	MU11062	1	Hinge, resuscitation compartment
11	81 020 23	MU11063	1	Cord, ¼" outside diameter, 5.00" long, with nylon eyelets
12	81 100 81	MU11128	1	Bassinet assembly
13	99 010 67	MU15073	5	Screw, #4-40 x ¼", truss, phillips, stainless steel, Nylok®
14	99 031 54	MU15187	2	Screw, #8-32 x 3/8", flat, phillips, stainless steel, 100 , Nylok®
15	99 031 52	MU15185	4	Screw, #8-32 x 3/8", truss, phillips, stainless steel, Nylok®
16	99 022 84	MU15106	6	Screw, #6-32 x ¼", pan, phillips, steel, zinc-plated, SEMS
17	99 042 05	MU15238	4	Screw, #10-32 x ½", truss, phillips, stainless steel, Nylok®
18	99 056 66	MU15304	2	Screw, ¼"-20 x 5/8", cap, socket, button, stainless steel
19	99 195 22	MU15734	2	Screw, shoulder, 0.38" diameter, 0.38" long, 5/16"-18, stainless steel
20	99 068 61	MU15374	6	Screw, 3/8"-16 x 3½", cap, hex, stainless steel
21	99 106 21	MU15432	5	Nut, acorn, #8-32, stainless steel
22	99 122 92	MU15553	5	Washer, lock, internal, #8, stainless steel
23	99 123 62	MU15559	1	Washer, flat, #10, stainless steel (0.062" thick)

Item	Part Number	MU	Qty	Description
24	81 100 63	MU11116	2	Catch, Nylatch® ^b roller
25	99 125 54	MU15587	2	Washer, lock, internal, ¼", stainless steel
26	99 901 77	MU15779	A/R	Loctite® ^c (adhesive) #242
27	78 161 20	MU09367	7	Plug button, nylon, 0.88" hole
28	99 106 32	MU15433	8	Nut, hex, #8-32, keps, steel, zinc-plated

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Table 5-17. Resuscitation Variable Height Adjustable Cart Assembly, 120V/220V/240V for the Resuscitaire® Radiant Warmer

Item	Part Number	MU	Qty	Description
1	81 020 14	MU11055	1	Frame support
2	81 020 16	MU11057	1	Handle, front
3	81 020 13	MU11054	1	Plate, mounting, frame support
4	81 020 17	MU11058	2	Block, latch
5	81 020 08	MU11048	1	Drawer, pass-thru
6	81 020 24	MU11064	1	Plate, rear, resuscitation compartment
7	81 101 12	MU11133	2	Slide, pass-through drawer
8	81 020 18	MU11059	1	Cover, resuscitation compartment
9	81 020 19	MU11060	1	Plate, resuscitation compartment, weldment
10	81 020 20	MU11061	4	Clamp, cable, spring-type, nylon, 0.38" inside diameter
11	81 000 03	MU10839	1	Holder, suction bottle
12	81 020 22	MU11062	1	Hinge, resuscitation compartment
13	99 084 84	MU15390	4	Screw, self-tapping, #6-32 x 5/16", flat, pan, phillips, stainless steel
14	81 020 23	MU11063	1	Cord, 1/4" outside diameter, 5.00" long, with nylon eyelets
15	81 001 15	MU10890	1	Bottle, suction, 800 cc, marked
16	81 000 13	MU10845	1	Nipple, nylon, 3/16" x 3/16" tube
17	78 163 40	MU09480	1	Clip, plastic, snap, self-adhesive, 0.38" inside diameter
18	82 010 10-R	MU11993	1	Tubing, suction with end, 1/4" inside diameter, 42.0" long
19	81 100 81-R	MU11128	1	Bassinet assembly
20	81 101 23	MU11139	1	Label, suction flow
21	99 010 67	MU15073	5	Screw, #4-40 x 1/4", truss, phillips, stainless steel, Nylok®
22	99 031 54	MU15187	2	Screw, #8-32 x 3/8", flat, phillips, stainless steel, 100 , Nylok®
23	99 031 52	MU15185	4	Screw, #8-32 x 3/8", truss, phillips, stainless steel, Nylok®
24	99 022 84	MU15106	6	Screw, #6-32 x 1/4", pan, phillips, steel, zinc-plated, sems

Item	Part Number	MU	Qty	Description
25	99 042 05	MU15238	4	Screw, #10-32 x 1/2", truss, phillips, stainless steel, Nylok®
26	99 056 66	MU15304	2	Screw, 1/4"-20 x 5/8", cap, socket, button, stainless steel
27	99 195 22	MU15734	2	Screw, shoulder, 0.38" diameter, 0.38" long, 5/16"-18, stainless steel
28	99 068 61	MU15374	6	Screw, 3/8"-16 x 3 1/2", cap, hex, stainless steel
29	99 106 21	MU15432	5	Nut, acorn, #8-32, stainless steel
30	81 001 16	MU10891	1	Tubing, suction with ends, 1/4" inside diameter, 6' long
31	99 122 92	MU15553	5	Washer, lock, internal, #8, stainless steel
32	81 100 63	MU11116	2	Catch, Nylatch® ^b roller
33	99 125 54	MU15587	2	Washer, lock, internal, 1/4", stainless steel
34	99 901 77	MU15779	A/R	Loctite® ^c (adhesive) #242
35	78 161 20	MU09367	7	Plug button, nylon, 0.88" hole
36	99 106 32	MU15433	8	Nut, hex, #8-32, keps, steel, zinc-plated
37	81 101 24	MU11140	1	Label, suction jar placement

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b. Nylatch® is a registered trademark of Hartwell Corporation.
c. Loctite® is a registered trademark of Loctite Corporation.

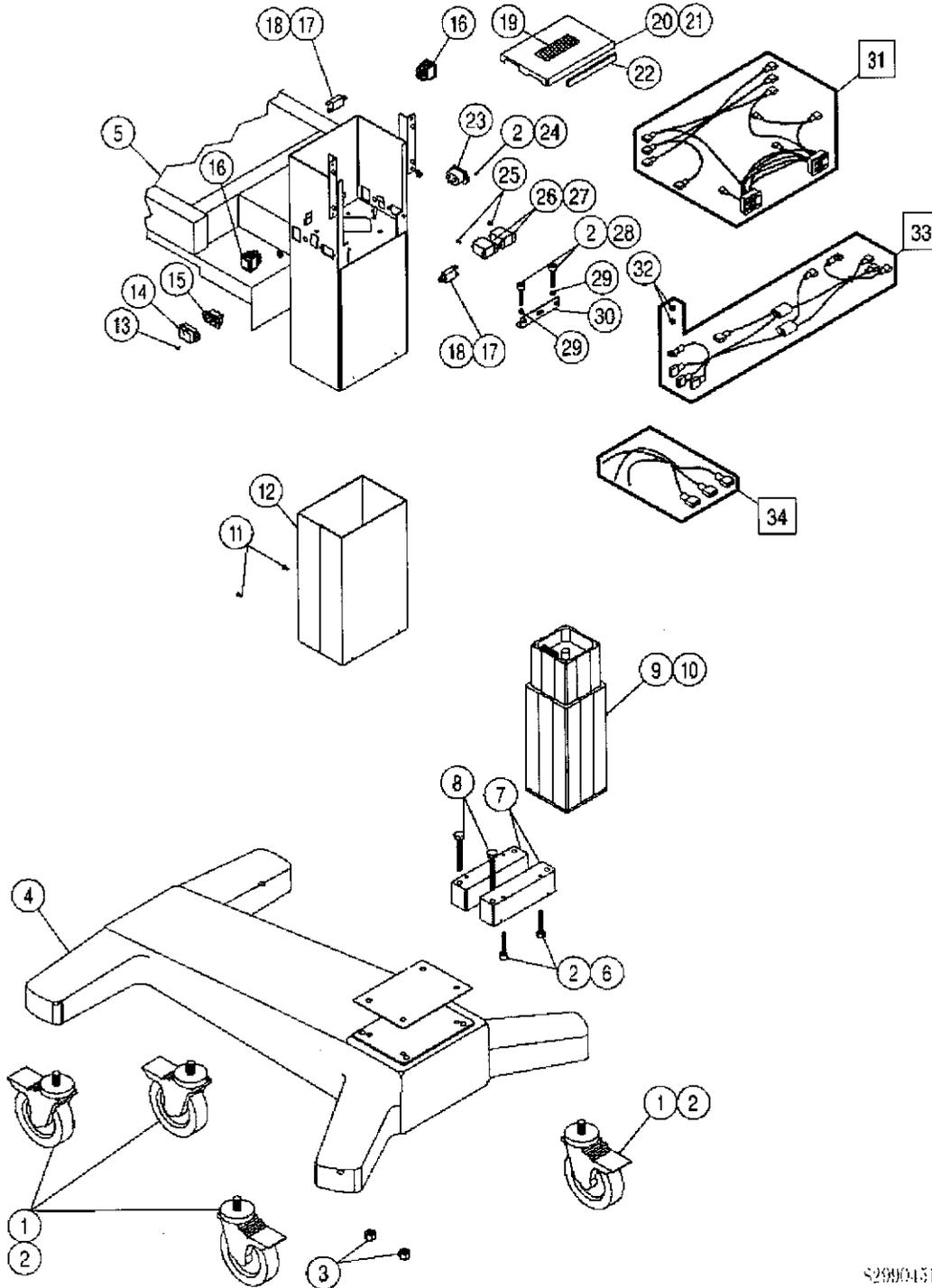
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Variable Height Adjustable Cart, 120V/240V Base and Column Assembly (Models with Variable Tilt Bassinet) for the Resuscitaire® Radiant Warmer

Figure 5-20. Variable Height Adjustable Cart, 120V/240V Base and Column Assembly (Models with Variable Tilt Bassinet) for the Resuscitaire® Radiant Warmer



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Table 5-18. Variable Height Adjustable Cart, 120V/240V Base and Column Assembly (Models with Variable Tilt Bassinet) for the Resuscitaire® Radiant Warmer

Item	Part Number	MU	Qty	Description
1	81 005 07	MU10955	4	Caster, swivel, 5.00", with brake, gray urethane
2	99 901 77	MU15779	A/R	Loctite® (adhesive) #242
3	99 111 25	MU15454	4	Nut, hex, 3/8"-16, elastic stop, steel, zinc-plated
4	81 020 01	MU11042	1	Base casting, machined
5	82 011 00	MU12023	1	Frame/column outer, VHA, variable tilt
6	99 998 77	MU15897	4	Screw, M6 x 1 x 6 long, cap, socket, stainless steel
7	82 010 30	MU12007	2	Spacer, actuator mounting
8	99 068 72	MU15376	4	Screw, 3/8"-16 x 4.50", cap, hex, steel, zinc-plated, groove pin 5
9	82 010 40	MU12008	1	Actuator, 120V (120V model only)
10	82 010 41	MU12009	1	Actuator, 220V (230V model only)
11	99 022 86	MU15108	4	Screw, #6-32 x 1/4", round, phillips, stainless steel, Nylok®
12	82 010 13	MU11996	1	Lower column, inner, VHA, U.K.
13	99 011 14	MU15084	2	Screw, #4-40 x 3/8", round, phillips, stainless steel, Nylok®
14	17 734 12	MU03546	1	Cord lock adapter
15	17 735 63	MU03627	1	Connector, receptacle, male, AC power, 10A 250V
16	17 683 52	MU03320	2	Switch, rocker, double-pole double-throw (DPDT), 10A/250V AC
17	17 BH 236	MU02613	2	Circuit breaker, special thermal, 6.0A
19	82 010 14	MU11997	1	Label, cover must be replaced
20	82 010 04	MU11988	1	Plate, separator, outer lower column
21	Reference only		A/R	RTV compound, clear
22	82 010 07	MU11991	1	Gasket separator plate
23	17 735 64	MU03628	1	Connector, receptacle, female, AC power, 10A/250V
24	99 010 62	MU15068	2	Screw, #4-40 x 1/4", flat, phillips, stainless steel

Item	Part Number	MU	Qty	Description
25	99 010 67	MU15073	4	Screw, #4-40 x 1/4", truss, phillips, stainless steel, Nylok®
26	17 653 09	MU03265	2	Relay, double-pole double-throw (DPDT), 10A/250V AC, UL/CSA®
27	17 653 10	MU03266	2	Relay, DPDT, 10A/250V AC, VDE
28	99 998 76	MU15896	8	Screw, M6 x 1 x 25 long, cap, socket, stainless steel
29	68 121 35	MU06588	8	Bearing, flange, non-metallic, 0.38" inside diameter
30	82 010 06	MU11990	1	Bracket, relay mounting
31	82 010 05	MU11989	1	Wire harness, Radiant Warmer, VHA
32	99 106 32	MU15433	8	Nut, hex, #8-32 keps, steel, zinc-plated
33	82 010 12	MU11995	1	Wire harness, power in—power out, Radiant Warmer
34	82 010 11	MU11994	1	Wire harness, actuator, Radiant Warmer, VHA

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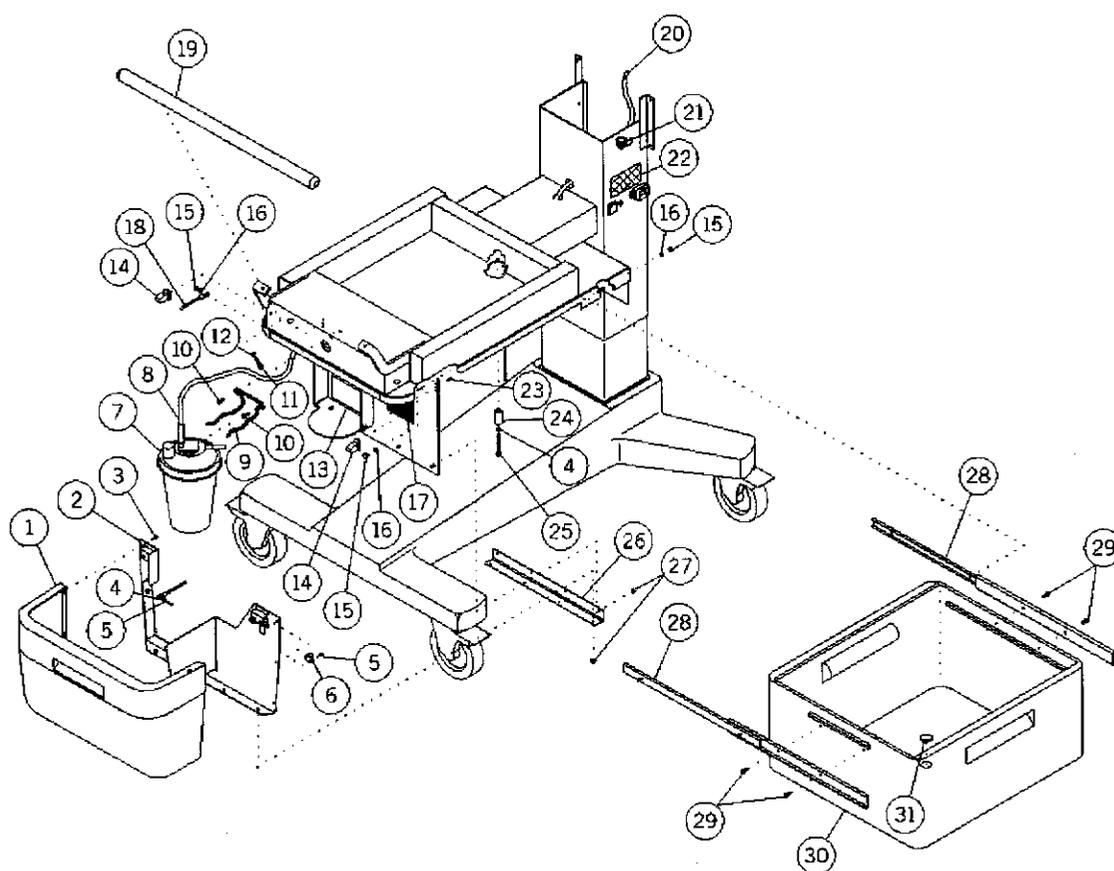
Variable Height Adjustable Cart, 120V/240V Base and Column Assembly (Models with Variable Tilt Bassinet) for the Resuscitaire® Radiant Warmer

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Resuscitation Variable Height Adjustable Cart Assembly, 120V/240V for the Resuscitaire® Radiant Warmer (Models with Variable Tilt Bassinet)

Figure 5-21. Resuscitation Variable Height Adjustable Cart Assembly, 120V/240V for
the Resuscitaire® Radiant Warmer (Models with Variable Tilt Bassinet)



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Table 5-19. Resuscitation Variable Height Adjustable Cart Assembly, 120V/240V for the Resuscitaire® Radiant Warmer (Models with Variable Tilt Bassinet)

Item	Part Number	MU	Qty	Description
1	81 020 18	MU11059	1	Cover, resuscitation compartment
2	81 020 24	MU11064	1	Plate, rear, resuscitation compartment
3	99 022 84	MU15106	6	Screw, #6-32 x ¼", pan, phillips, steel, zinc-plated, SEMS
4	99 123 62	MU15559	2	Washer, flat, #10, stainless steel (0.062" thick)
5	99 010 67	MU15073	5	Screw, #4-40 x ¼", truss, phillips, stainless steel, Nylok®
6	81 100 63	MU11116	2	Catch, Nylatch® roller
7	81 001 15	MU10890	1	Bottle, suction, 800 cc, marked
8	82 010 10-R	MU11993	1	Tubing, suction with end, ¼" inside diameter, 42.0" long
9	81 000 03	MU10839	1	Holder, suction bottle
10	99 041 36	MU15229	2	Screw, #10-32 x 3/8", truss, phillips, stainless steel, Nylok®
11	99 056 66	MU15304	2	Screw, ¼"-20 x 5/8", cap, socket, button, stainless steel
12	99 125 54	MU15587	2	Washer, lock, internal, ¼", stainless steel
13	81 101 24	MU11140	1	Label, suction jar placement
14	81 020 17	MU11058	2	Block, latch
15	99 106 21	MU15432	4	Nut, acorn, #8-32, stainless steel
16	99 122 92	MU15553	4	Washer, lock, internal, #8, stainless steel
17	81 101 23	MU11139	1	Label, suction flow
18	81 020 23	MU11063	1	Cord, ¼" outside diameter, 5.00" long, with nylon eyelets
19	81 020 16	MU11057	1	Handle, front
20	81 000 13	MU10845	1	Nipple, nylon, 3/16" x 3/16" tube
21	78 163 40	MU09480	1	Clip, plastic, snap, self-adhesive, 0.38" inside diameter
22	82 000 19	MU11791	1	Label, warning, transport height
23	99 031 54	MU15187	2	Screw, #8-32 x 3/8", flat, phillips, stainless steel, 100 , Nylok®

Item	Part Number	MU	Qty	Description
24	81 101 16	MU11136	1	Bumper, neoprene, ¼" inside diameter, 0.62" outside diameter, 1.00" long
25	99 045 24	MU15269	1	Screw, #10-32 x 2.00", cap, hex, stainless steel
26	81 020 22	MU11062	1	Hinge, resuscitation compartment
27	99 106 32	MU15433	8	Nut, hex, #8-32, keps, steel, zinc-plated
28	81 101 12	MU11133	2	Slide, pass-through drawer
29	99 031 52	MU15185	4	Screw, #8-32 x 3/8", truss, phillips, stainless steel, Nylok®
30	81 020 08	MU11048	1	Drawer, pass-through
31	78 161 20	MU09367	1	Plug button, nylon, 0.88" hole

a. Nylok® is a registered trademark of Nylok Fastener Corporation.

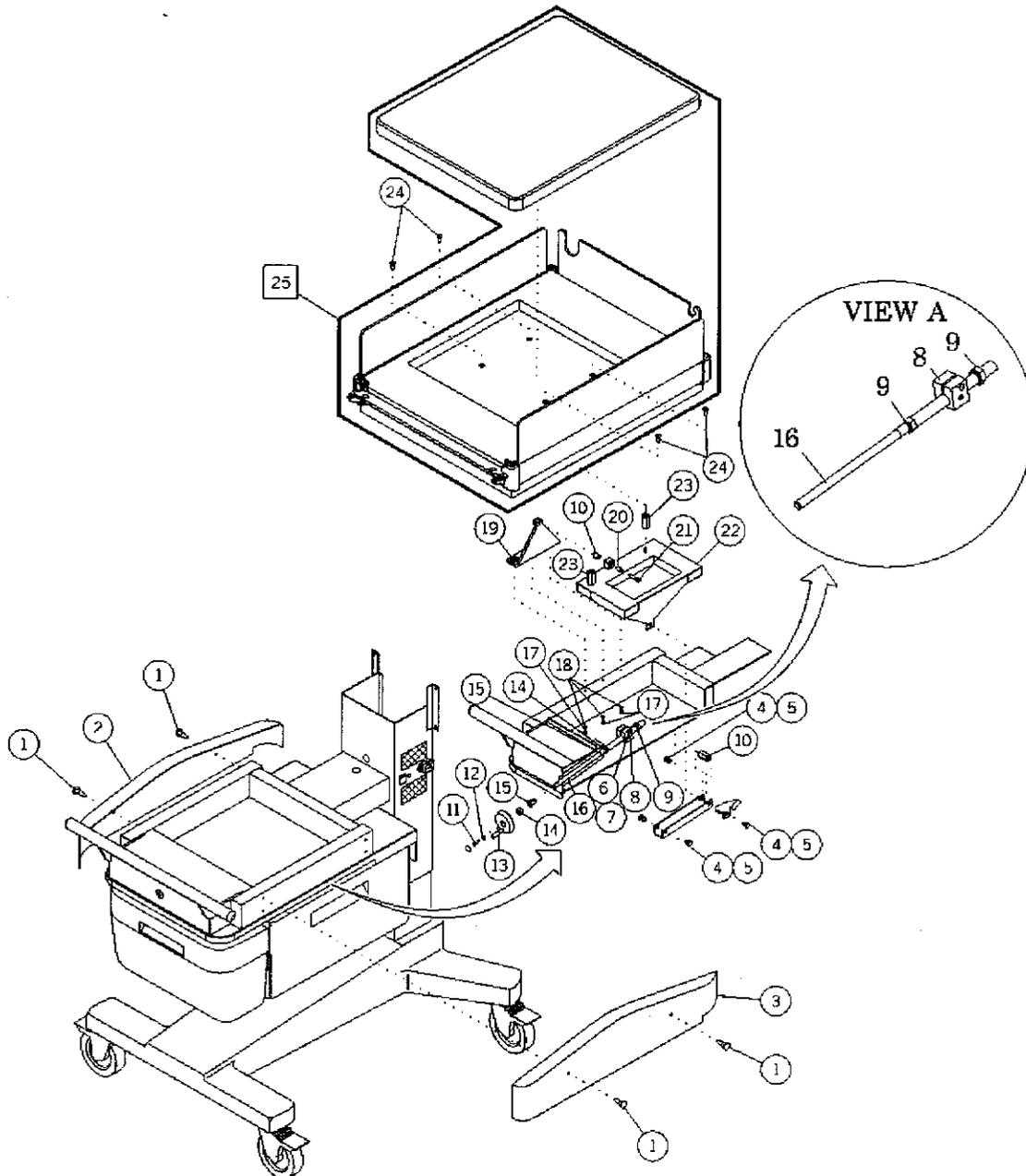
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Variable Height Adjustable Cart Assembly, 120V/240V with Variable Tilt Bassinet for the Resuscitaire® Radiant Warmer

Figure 5-22. Variable Height Adjustable Cart Assembly, 120V/240V with Variable Tilt Bassinet for the Resuscitaire® Radiant Warmer



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Table 5-20. Variable Height Adjustable Cart Assembly, 120V/240V with Variable Tilt Bassinet for the Resuscitaire® Radiant Warmer

Item	Part Number	MU	Qty	Description
1	99 042 05	MU15238	4	Screw, #10-32
2	82 011 09	MU12031	1	Shroud, bassinet, left
3	82 011 11	MU12033	1	Shroud, bassinet, right
4	82 011 30	MU12037	4	Shoulder screw, special— $\frac{1}{4}$ "-20
5	Reference only		A/R	Loctite® adhesive #411
6	99 042 05	MU15238	1	Screw, #10-32 x $\frac{1}{2}$ ", truss, phillips, stainless steel, Nylok®
7	99 122 93	MU15554	1	Washer, lock, external, #8, stainless steel
8	78 156 20	MU09337	1	Split nut, special, $\frac{1}{2}$ "-13 (see view A)
9	99 113 01	MU15462	2	Nut, hex, self-locking, $\frac{1}{2}$ "-13, steel, zinc-plated (see view A)
10	78 156 30	MU09339	3	Standoff, hex, $\frac{1}{4}$ "-20 inside diameter, 1.12" long, steel, zinc-plated
11	99 042 91	MU15253	1	Screw, #10-32 x $\frac{3}{4}$ ", cap, socket, stainless steel, Nylok®
12	99 123 62	MU15559	1	Washer, flat, #10, stainless steel (0.062" thick)
13	82 011 10	MU12032	1	Crank knob assembly
14	99 126 75	MU15614	2	Spacer, 0.386" inside diameter, 0.62" hex, 0.38" long, stainless steel
15	68 121 35	MU06588	2	Bearing, flange, non-metallic, 0.38" inside diameter
16	82 011 03	MU12025	1	Lead screw (see view A)
17	99 042 55	MU15243	6	Screw, #10-32 x $\frac{5}{8}$ ", cap, socket, stainless steel
18	99 124 16	MU15569	6	Washer, lock, spiral, #10, steel, cadmium-plated
19	82 011 07	MU12029	2	Pivot support
20	99 125 68	MU15594	2	Spacer, 0.257" inside diameter, 0.38" outside diameter, 0.62" long, stainless steel
21	99 058 02	MU15319	2	Screw, $\frac{1}{4}$ "-20 x 1.12", cap, socket, stainless steel
22	82 011 01	MU12024	1	Cradle/bassinet, weldment, Radiant Warmer

Item	Part Number	MU	Qty	Description
23	82 011 04	MU12026	4	Standoff, 5/8" hex, #10-32 inside diameter, 1¼" long, steel
24	99 042 02	MU15236	4	Screw, #10-32 x ½", flat, phillips, stainless steel
25	82 011 20	MU12036	1	Bassinet assembly

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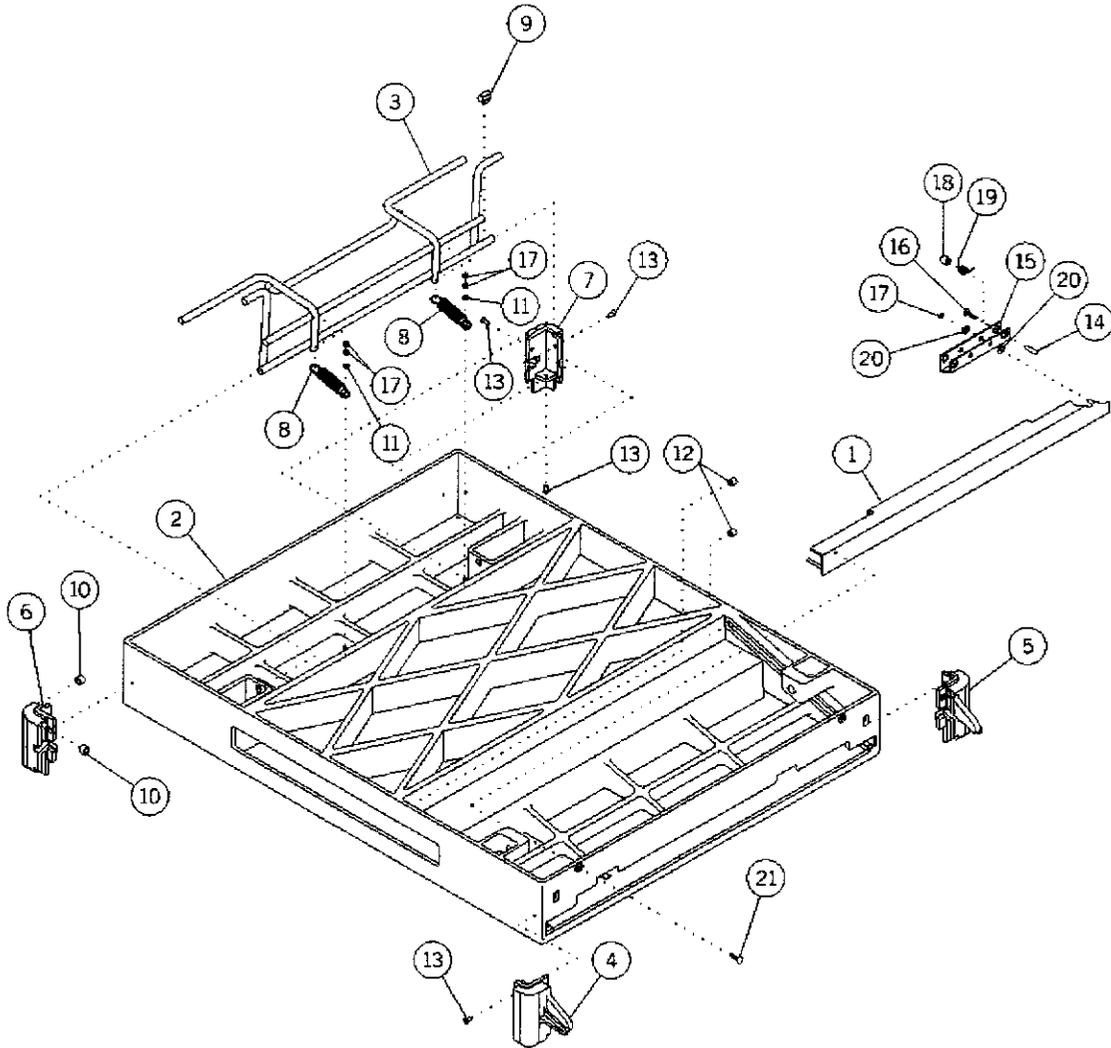
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Bassinet Subassembly for the Resuscitaire® Radiant Warmer

Figure 5-23. Bassinet Subassembly for the Resuscitaire® Radiant Warmer



NOTE:

Bottom view shown.

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Table 5-21. Bassinet Subassembly for the Resuscitaire® Radiant Warmer

Item	Part Number	MU	Qty	Description
1	81 020 31	MU11070	1	Bassinet support
2	81 020 07	MU11047	1	Support, mattress
3	82 000 10	MU11782	1	Handle, bassinet tilt
4	81 100 03	MU11085	1	Corner block, panel mounting, right front
5	81 100 04	MU11086	1	Corner block, panel mounting, left front
6	81 100 46	MU11103	1	Corner block, panel mounting, right rear
7	81 100 47	MU11104	1	Corner block, panel mounting, left rear
8	81 100 34	MU11095	2	Spring, external, ½" outside diameter, 0.055" wide, 1¾" long
9	78 162 65	MU09421	1	Clip, spring, ¼"-0.31" diameter x ½" long
10	08 136 03	MU01912	8	Tubing, polyvinyl chloride (PVC), ¼" inside diameter x 0.27" long
11	99 123 32	MU15556	2	Washer, flat, 0.19" inside diameter, ¾" outside diameter, 0.06" thick, steel, zinc-plated
12	22 025 49	MU03754	2	Tubing, PVC, 3/16" inside diameter, 0.27" long
13	99 023 54	MU15128	12	Screw, #6-32 x 3/8", pan, phillips, stainless steel, Nylok®
14	81 100 68	MU11120	2	Cap, tubing, vinyl, 0.172" inside diameter, ½" long
15	81 100 67	MU11121	2	Bracket, aluminum channel, front wall, release
16	99 042 91	MU15253	2	Screw, #10-32 x ¾", cap, socket, stainless steel, Nylok®
17	99 105 35	MU15423	6	Nut, hex, #6-32, stainless steel, Nylok®
18	99 124 41	MU15574	2	Spacer, 0.200" inside diameter, 0.38" outside diameter, ¼" long, PVC
19	81 100 69	MU11121	2	Spring, torsion, 0.357" outside diameter, 0.045" wide, stainless steel
20	99 122 46	MU15543	4	Washer, shoulder, 0.14" inside diameter, 0.22" diameter, 0.05" long, neoprene

Item	Part Number	MU	Qty	Description
21	99 023 64	MU15131	2	Screw, #6-32 x 7/16", truss, phillips, stainless steel, Nylok®

a. Nylok® is a registered trademark of Nylok Fastener Corporation.

Warmer Head Assembly

Figure 5-24. Warmer Head Assembly

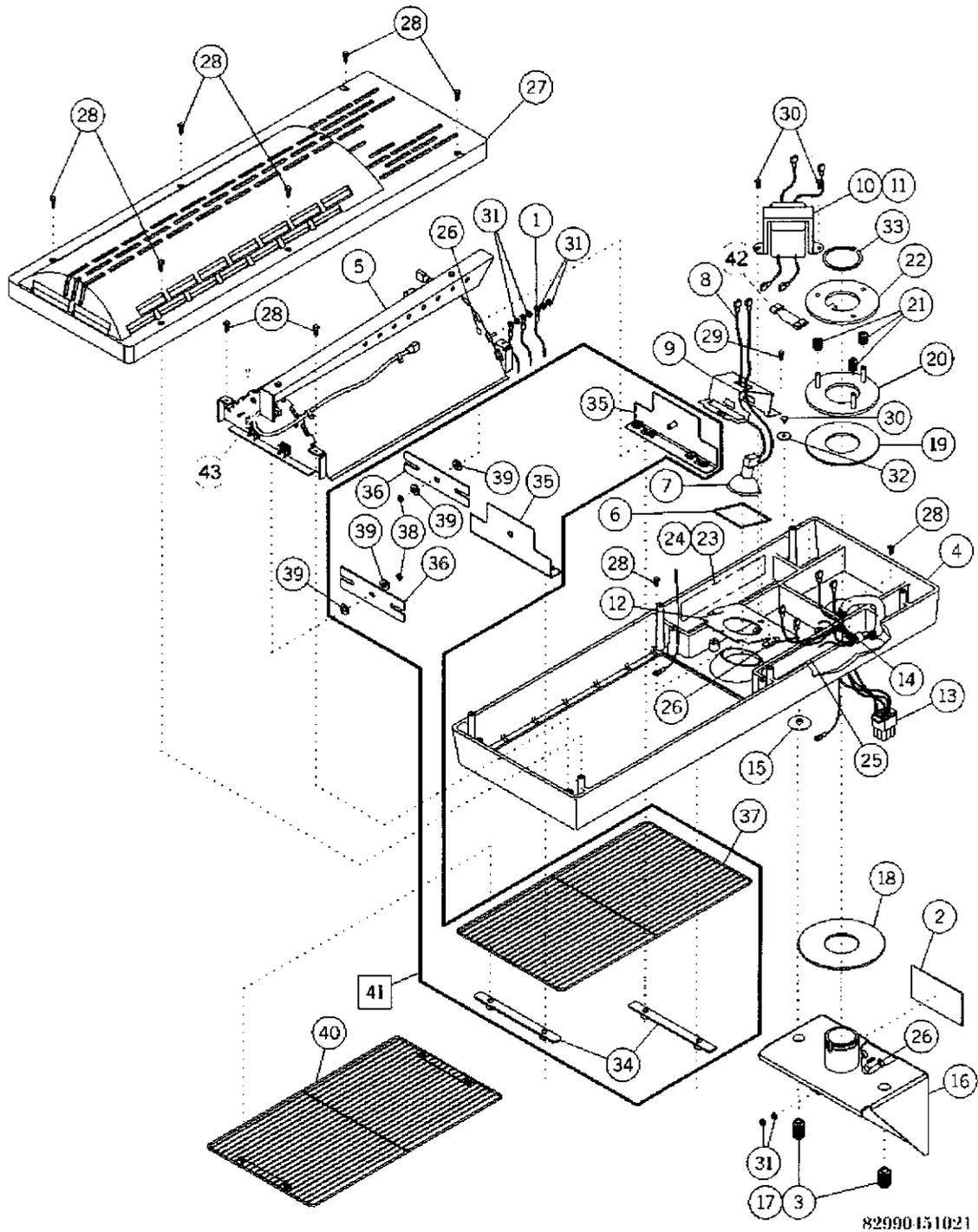


Table 5-22. Warmer Head Assembly

Item	Part Number	MU	Qty	Description
1	81 020 41	MU11077	1	Wire, ground, #6 ring, 4.00" long
2	Reference only		1	Label, data tag, 1.63" x 3.00"
3	99 901 77	MU15779	A/R	Loctite® adhesive #242
4	81 020 10	MU11051	1	Chassis, shroud
5	Reference only		1	Heater subassembly
6	78 260 36	MU09709	1	Window, glass, square
7	17 807 41	MU03690	1	Lamp, incandescent, quartz-halogen, 12V, 50 W
8	78 258 70	MU09702	1	Connector assembly, examination light
9	78 260 25	MU09707	1	Bracket, lamp mounting
10	78 265 95	MU09798	1	Transformer assembly, examination light, 120V
11	78 265 96	MU09799	1	Transformer assembly, examination light, 240V
12	81 020 28	MU11067	1	Bracket, lamp
13	81 020 30	MU11069	1	Cable assembly, electrical module to warmer head
14	17 725 64	MU03410	2	Clamp, cable, loop-type, nylon, 0.375" inside diameter
15	81 200 19	MU11180	2	Keeper, ball plunger
16	81 020 11	MU11052	1	Bracket, heater head pivot
17	81 200 17	MU11178	2	Ball plunger, 5/8"-11 thread
18	81 020 40	MU11076	1	Washer, flat, 2.02" inside diameter, 4¾" outside diameter, 0.19" polyethylene
19	81 200 15	MU11176	1	Washer, thrust, 2.02" inside diameter, 4¾" outside diameter
20	81 200 22	MU11182	1	Washer, flat, bottom, with studs, 4¾" outside diameter
21	81 200 13	MU11174	3	Spring, compression, 0.48" outside diameter, 0.06" x 0.09" wide, 1" long
22	81 200 18	MU11179	1	Washer, flat, top, 2.001" inside diameter, 4¾" outside diameter
23	81 200 34	MU11188	1	Label, heater replacement, 120V
24	81 200 35	MU11189	1	Label, heater replacement, 220V-240V

Item	Part Number	MU	Qty	Description
25	81 200 33	MU11187	1	Label, lamp replacement, English/Spanish/French/German/Italian
26	68 212 00	MU06964	3	Label, ground symbol, protective
27	81 020 26	MU11065	1	Cover, top
28	99 023 51	MU15127	14	Screw, #6-32 x 3/8", truss, phillips, stainless steel, Nylok®
29	99 022 83	MU15105	2	Screw, #6-32 x 1/4", pan, phillips, stainless steel, sems, external
30	99 030 76	MU15171	4	Screw, #8-32 x 1/4", truss, phillips, stainless steel, Nylok®
31	99 105 34	MU15422	6	Nut, hex, #6-32, keps, steel, zinc-plated
32	99 123 32	MU15556	2	Washer, flat, 0.19" inside diameter, 3/4" outside diameter, 0.06" thick, steel, zinc-plated
33	99 187 51	MU15725	1	Ring, retaining, external, steel (WAL 5100-200-ZD)
34	81 003 03	MU10936	2	Strap, grill (for use with units equipped with P/N 81 990 65 (Retrofit kit, heater grill only)
35	81 003 01	MU10934	2	Bracket, grill (for use with units equipped with P/N 81 990 65 (Retrofit kit, heater grill only)
36	81 003 02	MU10935	2	Plate, grill (for use with units equipped with P/N 81 990 65 (Retrofit kit, heater grill only)
37	81 003 00	MU10933	1	Grill, shroud (for use with units equipped with P/N 81 990 65 (Retrofit kit, heater grill only)
38	99 106 32	MU15433	2	Nut, hex, #8-32, keps, steel, zinc-plated (for use with units equipped with P/N 81 990 65 (Retrofit kit, heater grill only)
39	99 123 69	MU15562	4	Washer, flat, 0.200" inside diameter, 0.751" outside diameter, 0.062" thick, stainless steel (for use with units equipped with P/N 81 990 65 (Retrofit kit, heater grill only)
40	81 003 04	MU10937	1	Grill, guard

Item	Part Number	MU	Qty	Description
41	81 990 65	MU11699	1	Retrofit kit, heater grill
42	81 900 18	MU11601	1	Filter assembly
43	17 063 22	MU02923	2	Clamp, cable, loop, tefzel, 0.12 inside diameter

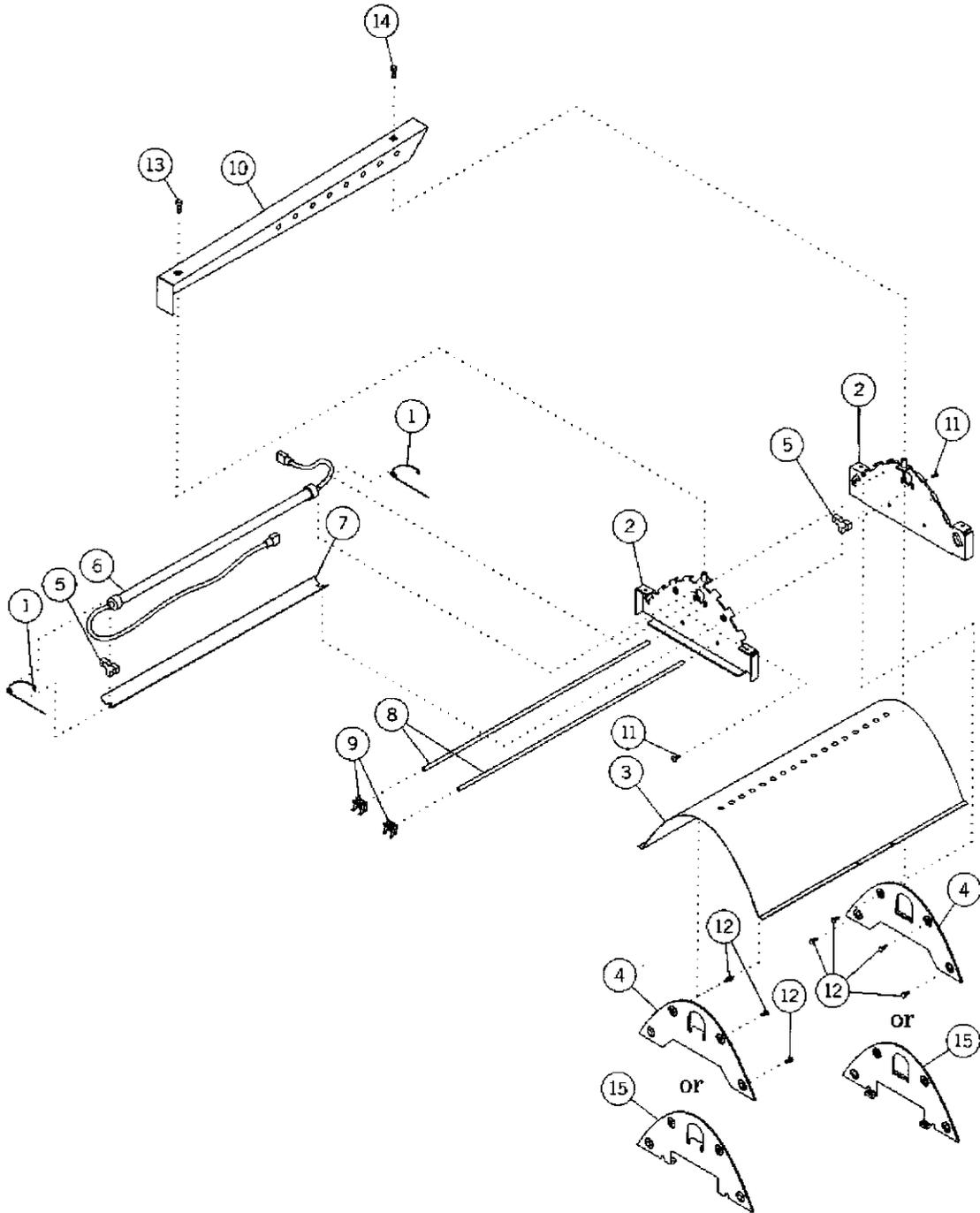
a. Loctite® is a registered trademark of Loctite Corporation.

b. Nylok® is a registered trademark of Nylok Fastener Corporation.

A/R As required

Heater Subassembly

Figure 5-25. Heater Subassembly



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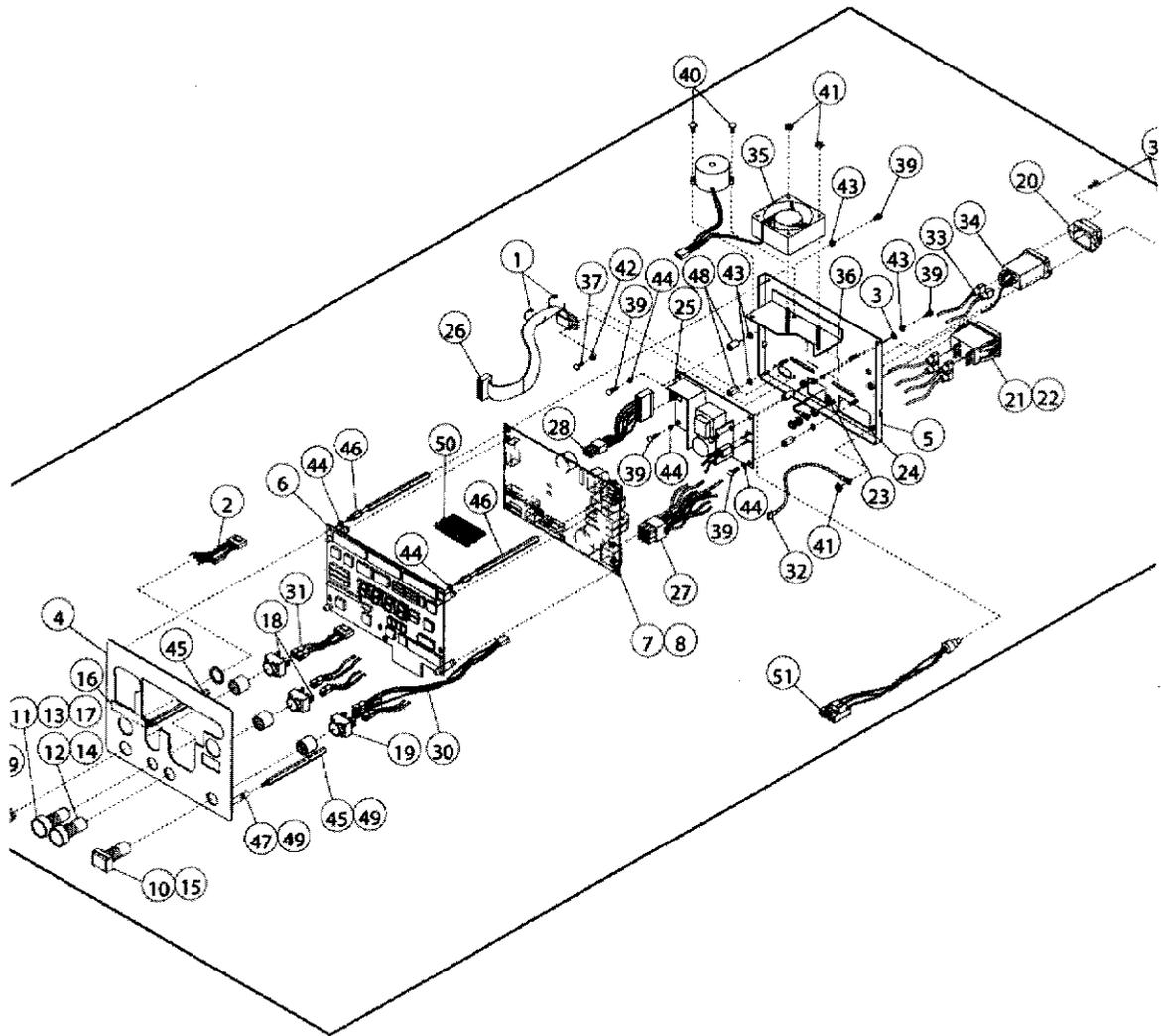
Table 5-23. Heater Subassembly

Item	Part Number	MU	Qty	Description
1	81 200 43	MU11195	2	Spring, retaining
2	81 020 27	MU11066	2	End plate, main reflector
3	81 200 08	MU11173	1	Reflector, main
4	Reference only		2	Bracket, parabola (for use with units equipped with P/N 81 990 65 (Retrofit kit, heater grill) only)
5	81 200 42	MU11194	2	Bracket, heater mounting
6	81 990 50	MU11689	1	Heater replacement kit, 120V
7	81 900 70	MU11637	1	Secondary reflector replacement kit
8	81 200 07	MU11172	2	Rod, heater guard
9	81 200 29	MU11185	4	Clip, retaining, 3/16" shaft
10	81 020 29	MU11068	1	Heat shield
11	99 022 83	MU15105	4	Screw, #6-32 x 1/4", pan, phillips, stainless steel, sems external
12	99 023 31	MU15119	8	Screw, #6-32 x 3/8", truss, phillips, stainless steel
13	99 023 51	MU15127	1	Screw, #6-32 x 3/8", truss, phillips, stainless steel, Nylok®
14	99 025 23	MU15155	1	Screw, #6-32 x 1.00", truss, phillips, stainless steel, Nylok®
15	Reference only		2	Bracket, parabola (for use with units equipped with P/N 81 003 04 (Grill, guard) only)

a. Nylok® is a registered trademark of Nylok Fastener Corporation.

Controller Assembly

Figure 5-26. Controller Assembly



829904510

Table 5-24. Controller Assembly

Item	Part Number	MU	Qty	Description
1	12 995 00	MU01975	2	Wire tie (4½" long)
2	17 585 58	MU03067	1	Suppressor, ferrite, 120 ohms
3	99 182 06	MU15714	1	Ring, retaining, Nat 6100-37-ST-ZD
4	81 990 80	MU11703	1	Replacement kit, electrical front panel, RW, English
	81 990 81	MU11704	1	Replacement kit, electrical front panel, RW, Spanish
	81 990 82	MU11705	1	Replacement kit, electrical front panel, RW, French
	81 990 83	MU11706	1	Replacement kit, electrical front panel, RW, German
	81 990 84	MU11707	1	Replacement kit, electrical front panel, RW, Italian
	81 990 85	MU11708	1	Replacement kit, electrical front panel, RW, Swedish
	81 990 86	MU11709	1	Replacement kit, electrical front panel, RW, Dutch
	81 990 87	MU11710	1	Replacement kit, electrical front panel, RW, Danish
	81 990 88	MU11711	1	Replacement kit, electrical front panel, RW, Flemish
	81 990 89	MU11712	1	Replacement kit, electrical front panel, RW, Finnish
	81 990 90	MU11713	1	Replacement kit, electrical front panel, RW, Norwegian
	81 990 91	MU11714	1	Replacement kit, electrical front panel, RW, Portuguese
	81 990 92	MU11715	1	Replacement kit, electrical front panel, RW, Greek
5	81 300 13	MU11231	1	Panel, rear, Electrical Module
6	81 307 75	MU11298	1	P.C. board 1 assembly, display, with Baby Mode
7	81 308 70T	MU11311	1	Tested P.C. board 2 assembly, power and control (120V model only)
8	81 308 80T	MU11315	1	Tested P.C. board 2 assembly, power and control, 220V-240V, (220V and 240V models only)
9	Not used			

Table 5-24. Controller Assembly

Item	Part Number	MU	Qty	Description
1	12 995 00	MU01975	2	Wire tie (4½" long)
2	17 585 58	MU03067	1	Suppressor, ferrite, 120 ohms
3	99 182 06	MU15714	1	Ring, retaining, Nat 6100-37-ST-ZD
4	81 990 80	MU11703	1	Replacement kit, electrical front panel, RW, English
	81 990 81	MU11704	1	Replacement kit, electrical front panel, RW, Spanish
	81 990 82	MU11705	1	Replacement kit, electrical front panel, RW, French
	81 990 83	MU11706	1	Replacement kit, electrical front panel, RW, German
	81 990 84	MU11707	1	Replacement kit, electrical front panel, RW, Italian
	81 990 85	MU11708	1	Replacement kit, electrical front panel, RW, Swedish
	81 990 86	MU11709	1	Replacement kit, electrical front panel, RW, Dutch
	81 990 87	MU11710	1	Replacement kit, electrical front panel, RW, Danish
	81 990 88	MU11711	1	Replacement kit, electrical front panel, RW, Flemish
	81 990 89	MU11712	1	Replacement kit, electrical front panel, RW, Finnish
	81 990 90	MU11713	1	Replacement kit, electrical front panel, RW, Norwegian
	81 990 91	MU11714	1	Replacement kit, electrical front panel, RW, Portuguese
	81 990 92	MU11715	1	Replacement kit, electrical front panel, RW, Greek
5	81 300 13	MU11231	1	Panel, rear, Electrical Module
6	81 307 75	MU11298	1	P.C. board 1 assembly, display, with Baby Mode
7	81 308 70T	MU11311	1	Tested P.C. board 2 assembly, power and control (120V model only)
8	81 308 80T	MU11315	1	Tested P.C. board 2 assembly, power and control, 220V-240V, (220V and 240V models only)
9	Not used			

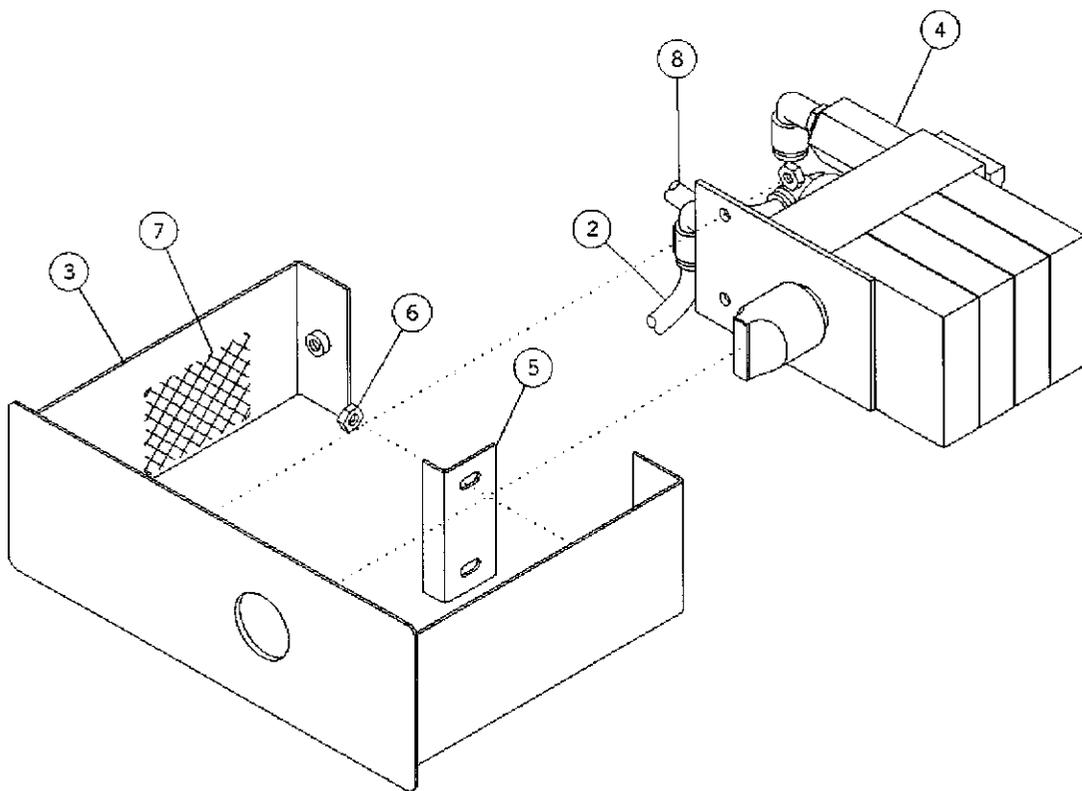
Item	Part Number	MU	Qty	Description
34	81 300 60	MU11252	1	Connector assembly, AC receptacle, male, 10A, Independent Electrical Contractors
35	81 300 62	MU11253	1	Fan/transducer assembly
36	81 001 01	MU10876	1	Label, data tag, 1.63" x 3.00"
37	99 010 56	MU15067	2	Screw, #4-40 x 1/4", truss, phillips, stainless steel
38	99 011 35	MU15086	2	Screw, #4-40 x 7/16", truss, phillips, stainless steel
39	99 022 72	MU15101	8	Screw, #6-32 x 1/4", truss, phillips, stainless steel
40	99 023 26	MU15117	2	Screw, #6-32 x 3/8", round, phillips, stainless steel
41	99 105 70	MU15426	6	Nut, hex, #6-32, conical washer, keps, steel
42	99 121 35	MU15512	2	Washer, lock, internal, #4, stainless steel
43	99 122 20	MU15530	8	Washer, lock, external, #6, stainless steel
44	99 999 72	MU15917	6	Washer, rib spring, S3, steel, zinc-plated
45	99 116 87	MU15488	2	Standoff, hex, #6-32 male and female, 4.13" long, stainless steel
46	99 116 95	MU15495	2	Standoff, hex, #6-32 male and female, 4.785" long, stainless steel
47	99 116 89	MU15489	2	Standoff, hinge, #6-32 inside diameter, 1/4" outside diameter, 1.00" long, stainless steel
48	99 116 90	MU15490	4	Standoff, #6-32 inside diameter, 1/4" hex, 0.56" long, nylon
49	99 901 38	MU15772	A/R	Loctite® screwlock #222
50	17 BS 462	MU02808	1	Connector, board spacer, male double row, 42-position
51	81 300 69	MU11256	1	Probe, ambient temperature

a. Loctite® is a registered trademark of Loctite Corporation.

A/R As required

Blender—81 600 80 and Blender Blank—81 600 70

Figure 5-27. Blender—81 600 80 and Blender Blank—81 600 70



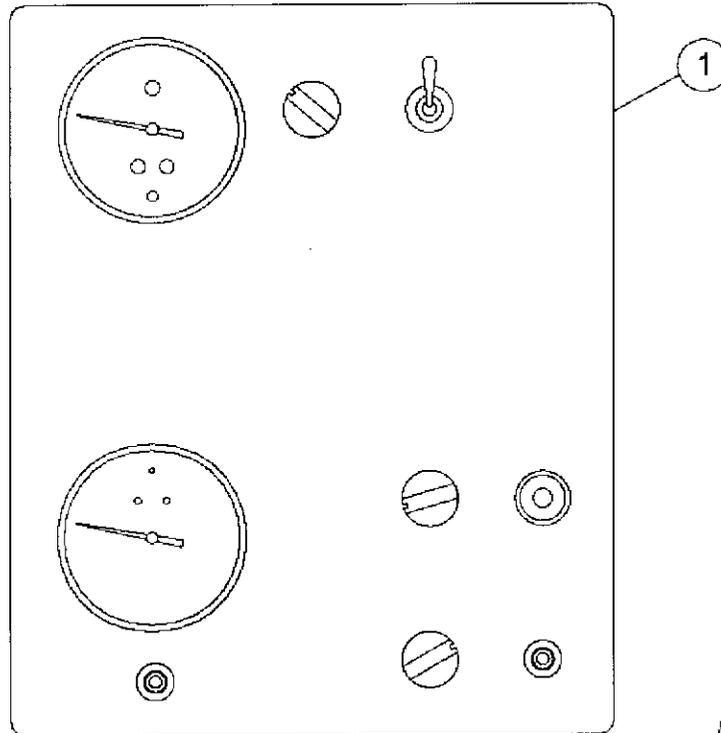
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Table 5-25. Blender—81 600 80 and Blender Blank—81 600 70

Item	Part Number	MU	Qty	Description
1	81 501 36	MU11498	1	Tubing, polyethylene, 0.187" inside diameter, 0.312" outside diameter, 4½" long (blank model only) (not shown)
2	81 501 39	MU11501	1	Tubing, polyethylene, 0.187" inside diameter, 0.312" outside diameter, 14" long (blender only)
3	81 600 00	MU11563	1	Chassis, microblender
4	81 600 40	MU11572	1	Microblender, low-flow, no bleed (blender only)
5	81 600 06	MU11564	1	Clip, support, microblender (blender only)
6	99 106 32	MU15433	4	Nut, hex, #8-32 keps, steel, zinc-plated (blender only)
7	81 000 38	MU10857	1	Label, data tag, 1.81" square (blender only)
8	81 501 38	MU11500	1	Tubing, polyethylene, 0.187" inside diameter, 0.312" outside diameter, 11.00" long (blender only)

RM2001™ Gas Delivery Module Assembly

Figure 5-28. RM2001™ Gas Delivery Module Assembly



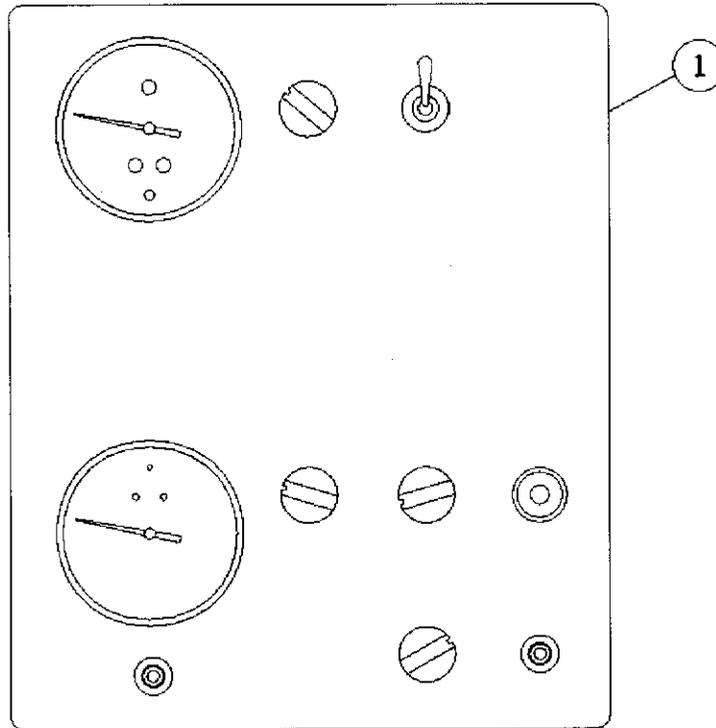
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Table 5-26. RM2001™ Gas Delivery Module Assembly

Item	Part Number	MU	Qty	Description
1	81 400 74T	MU11371		Tested RM2001™ Gas Delivery Module Assembly

Resuscitation Module Assembly (Models without AutoBreath™ Infant Resuscitator)

Figure 5-29. Resuscitation Module Assembly (Models without AutoBreath™ Infant Resuscitator)



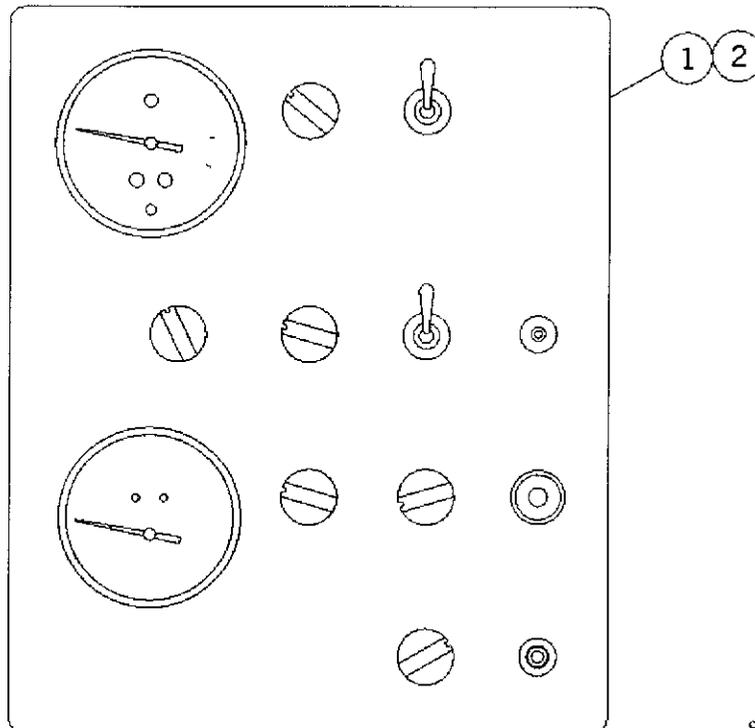
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Table 5-27. Resuscitation Module Assembly (Models without AutoBreath™ Infant Resuscitator)

Item	Part Number	MU	Qty	Description
1	81 400 73T	MU11369		Tested Resuscitation Module without AutoBreath™ Infant Resuscitator

Resuscitation Module Assembly (Models with AutoBreath™ Infant Resuscitator)

Figure 5-30. Resuscitation Module Assembly (Models with AutoBreath™ Infant Resuscitator)



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Table 5-28. Resuscitation Module Assembly (Models with AutoBreath™ Infant Resuscitator)

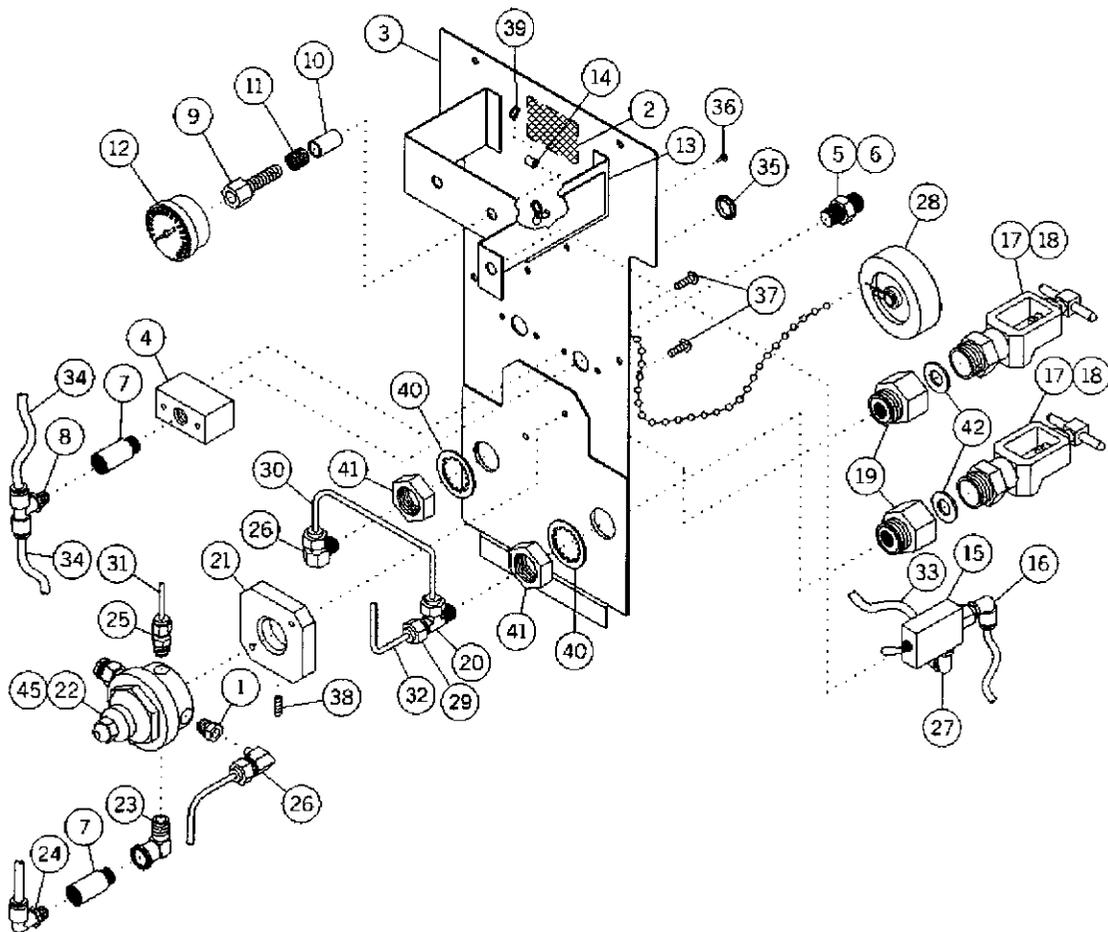
Item	Part Number	MU	Qty	Description
1	81 400 80T	MU11373		Tested Resuscitation Module with AutoBreath™ Infant Resuscitator
2	81 400 81T	MU11375		Tested Resuscitation Module with AutoBreath™ Infant Resuscitator

NOTES:

Chapter :

Oxygen Pipeline with Oxygen Cylinder (Pin-Index) Gas Supply Module—Diameter Index Safety System (DISS), Non-Interchangeable Screw Thread (NIST), and Low-Pressure

Figure 5-31. Oxygen Pipeline with Oxygen Cylinder (Pin-Index) Gas Supply Module—DISS, NIST, and Low-Pressure



NOTE:

Apply item number 43 to all pipe fittings.
Apply item number 44 to all threaded fasteners.

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Table 5-29. Oxygen Pipeline with Oxygen Cylinder (Pin-Index) Gas Supply Module—Diameter Index Safety System (DISS), Non-Interchangeable Screw Thread (NIST), and Low-Pressure

Item	Part Number	MU	Qty	Description
1	68 504 09	MU08095	1	Bushing, 1/4" National Pipe Thread (NPT)—1/8" NPT, brass, high pressure oxygen (HpO2)
2	81 000 38	MU10857	1	Label, data tag, 1.81" square
3	81 500 01	MU11393	1	Chassis, gas supply, with cylinder holes
4	81 500 06	MU11398	1	Manifold, pipeline
5	68 239 27	MU07237	4	Connector, male, 1/4" NPT—oxygen DISS (81 500 80-R only)
6	68 239 36	MU07243	4	Adapter, 1/4" NPT—oxygen NIST female (81 500 81-R only)
7	81 500 43	MU11420	2	Check valve, 1/4" NPT, male in, female out
8	81 500 21	MU11402	1	Tee, 1/4" outside diameter tubing, 1/4" NPT, male branch
9	81 500 32	MU11411	1	Connector, bulkhead, 0.12" tube swage—1/8" NPT, female, HpO2
10	81 500 03	MU11395	1	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.48" long, stainless steel
11	81 500 08	MU11400	1	Spring, compression, 0.48" outside diameter, 0.045" wide, 0.875" long
12	81 500 36	MU11414	1	Gauge, pressure, 0 psi-4000 psi, HpO2
13	81 500 02	MU11394	1	Bracket, pneumatic valve
14	99 116 91	MU15491	2	Standoff, #6-32 inside diameter, 1/4" outside diameter, 1/4" long, brass
15	81 500 40	MU11417	1	Valve, control, mini three-way
16	81 500 22	MU11403	1	Elbow, 1/4" outside diameter tubing—1/8" NPT, male
17	81 501 17	MU11479	2	Yoke, oxygen, for check valve, HpO2
18	78 422 41	MU10188	2	Check valve, HpO2
19	78 440 15	MU10216	2	Adapter, yoke, male to female, HpO2
20	81 500 33	MU11412	1	Tee, 0.19" base—1/8" NPT, male—0.19" tube, HpO2
21	81 500 05	MU11397	1	Block, mounting, pressure regulator

5

Chapter :

Item	Part Number	MU	Qty	Description
22	81 501 69	MU11520	1	Regulator, 65 psi/pressure relief, HpO2
23	81 500 37	MU11415	1	Elbow, street, 90°, ¼", male/female
24	81 500 23	MU11404	1	Elbow, ¼" outside diameter tubing—¼" National Pipe Thread (NPT), male
25	81 500 27	MU11408	1	Connector, 0.12" tubing swage—¼" NPT, male, brass, high pressure oxygen (HpO2)
26	81 500 30	MU11410	2	Elbow, 0.19" tube swage—1/8" NPT, male, brass, HpO2
27	81 500 24	MU11405	1	Elbow, 0.312" outside diameter tubing—1/8" NPT, male
28	75 407 38	MU09042	1	Handle, valve, removable with chain
29	81 501 08	MU11472	1	Tubing, formed, 3/16" outside diameter, HpO2
30	81 501 05	MU11469	1	Tubing, formed, 3/16" outside diameter, HpO2
31	81 501 33	MU11495	1	Tubing, copper, 0.12" outside diameter, 12" long, HpO2
32	81 501 11	MU11474	1	Tubing, polyethylene, ¼" outside diameter, 0.17" inside diameter, 7" long
33	81 501 38	MU11500	1	Tubing, polyethylene, 0.187" inside diameter, 0.312" outside diameter, 11" long
34	81 501 14	MU11477	1	Tubing, polyethylene, ¼" outside diameter, 0.17" inside diameter, 7¾" long
35	81 500 42	MU11419	1	Plug button, nylon, 0.62" hole
36	68 602 02	MU08414	4	Plug, panel fastening, 0.182"-0.192", Canoe®
37	99 031 99	MU15193	4	Screw, #8-32 x ½", truss, phillips, Nylok®, stainless steel
38	99 042 00	MU15234	1	Screw, #10-32 x ½", sems external, socket, stainless steel, cap
39	99 181 48 *	MU15708	2	Ring, retaining, push-on, stainless steel, 0.010" thick
40	99 129 85	MU15644	2	Washer, lock, internal, 7/8", steel, cadmium-plated
41	99 114 50	MU15471	2	Nut, hex, jam, 7/8"-14, zinc-plated, steel

Item	Part Number	MU	Qty	Description
42	78 423 30	MU10197	2	Washer, flat, 0.25" inside diameter, 0.81" outside diameter, HpO ₂ , 0.12", nylon
43	99 900 26	MU15740	A/R	Tape, pipe joint seal, Teflon®, ½"
44	99 901 38	MU15772	A/R	Loctite® ^d screwlock #222
45	81 501 77	MU11526	1	Regulator, 45 psi/pressure relief, high pressure oxygen (HpO ₂) (81 501 94-R only)

a. Canoe® is a trademark of Illinois Tool Works, Inc.

b. Nylok® is a registered trademark of Nylok Fastener Corporation.

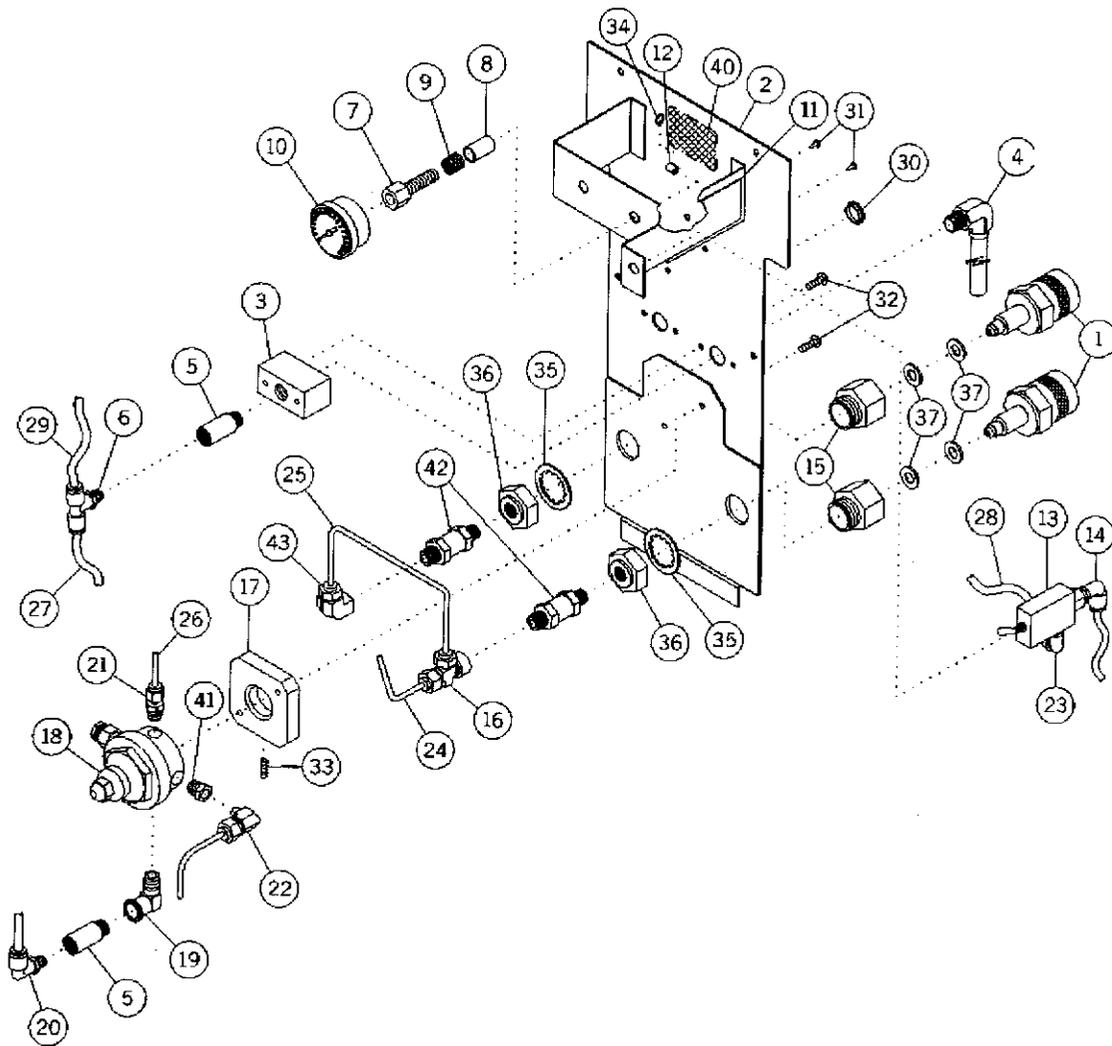
c. Teflon® is a registered trademark of E. I. du Pont and de Nemours and Company.

d. Loctite® is a registered trademark of Loctite Corporation.

A/R As required

Gas Supply Module with Oxygen Reserve, Deutsche Industrie Norm (DIN) Cylinder Fittings—White Hose or Green Hose

Figure 5-32. Gas Supply Module with Oxygen Reserve, DIN Cylinder Fittings—White Hose or Green Hose



NOTE:

Apply item number 38 to all pipe fittings.

Apply item number 39 to all threaded fasteners.

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Table 5-30. Gas Supply Module with Oxygen Reserve, DIN Cylinder Fittings—White Hose or Green Hose

Item	Part Number	MU	Qty	Description
1	81 501 22	MU11484	2	Connector, Deutsche Industrie Norm (DIN), oxygen cylinder, high pressure oxygen (HpO ₂)
2	81 500 01	MU11393	1	Chassis, gas supply, with cylinder holes
3	81 500 06	MU11398	1	Manifold, pipeline
4	81 501 53	MU11514	1	Hose assembly, oxygen, white, 10' (81 500 83-R only)
5	81 500 43	MU11420	2	Check valve, ¼" National Pipe Thread (NPT), male in, female out
6	81 500 21	MU11402	1	Tee, ¼" outside diameter tubing, ¼" NPT, male branch
7	81 500 32	MU11411	1	Connector, bulkhead, 0.12" tubing swage—1/8" NPT, female, HpO ₂
8	81 500 03	MU11395	1	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.48" long, stainless steel
9	81 500 08	MU11400	1	Spring, compression, 0.480" outside diameter, 0.045" wide, 0.875" long
10	81 500 36	MU11414	1	Gauge, pressure, 0 psi-4000 psi, HpO ₂
11	81 500 02	MU11394	1	Bracket, pneumatic valve
12	99 116 91	MU15491	2	Standoff, #6-32 inside diameter, ¼" outside diameter, ¼" long, brass
13	81 500 40	MU11417	1	Valve, control, mini three-way
14	81 500 22	MU11403	1	Elbow, ¼" outside diameter tubing—1/8" NPT, male
15	81 500 34	MU11413	2	Adapter, high pressure cylinder, HpO ₂
16	81 501 72	MU11523	1	Tee, 0.19" tubing swage—1/8" NPT, female—0.19" tube HpO ₂
17	81 500 05	MU11397	1	Block, mounting, pressure regulator
18	81 501 69	MU11520	1	Regulator, 65 psi/pressure relief, HpO ₂
19	81 500 37	MU11415	1	Elbow, street, 90°, ¼" NPT, brass
20	81 500 23	MU11404	1	Elbow, ¼" outside diameter tubing—¼" NPT, male
21	81 500 27	MU11408	1	Connector, 0.12" tubing swage—¼" NPT, male, brass, HpO ₂

Chapter :

Item	Part Number	MU	Qty	Description
22	81 500 30	MU11410	1	Elbow, 0.19" tube swage—1/8" NPT, male, brass, HpO2
23	81 500 24	MU11405	1	Elbow, 0.312" outside diameter tubing—1/8" National Pipe Thread (NPT), male
24	81 501 08	MU11472	1	Tubing, formed, 3/16" outside diameter, high pressure oxygen (HpO2)
25	81 501 05	MU11469	1	Tubing, formed, 3/16" outside diameter, HpO2
26	81 501 33	MU11495	1	Tubing, copper, 0.12" outside diameter, 12.00" long, HpO2
27	81 501 11	MU11474	1	Tubing, polyethylene, 1/4" outside diameter, 0.170" inside diameter, 7.00" long
28	81 501 38	MU11500	1	Tubing, polyethylene, 0.187" inside diameter, 0.312" outside diameter, 11.00" long
29	81 501 14	MU11477	11	Tubing polyethylene, 1/4" outside diameter, 0.17" inside diameter, 7 3/4" long
30	81 500 42	MU11419	1	Plug button, nylon, 0.62" hole
31	68 602 02	MU08414	10	Plug, panel fastening, 0.182"-0.192", Canoe®
32	99 031 99	MU15193	4	Screw, #8-32 x 1/2", truss, phillips, stainless steel, Nylok®
33	99 042 00	MU15234	1	Screw, #10-32 x 1/2", sems external, socket, stainless steel, cap
34	99 181 48	MU15708	2	Ring, retaining, push-on, stainless steel, 0.01" thick
35	99 129 85	MU15644	2	Washer, lock, internal, 7/8", steel, cadmium-plated
36	99 114 50	MU15471	2	Nut, hex, jam, 7/8"-14, steel, zinc-plated
37	99 123 70	MU15563	4	Washer, flat, 0.19" inside diameter, 0.56" outside diameter, 0.06" nylon, HpO2
38	99 900 26	MU15740	A/R	Tape, pipe joint seal, Teflon®, 1/2"
39	99 901 38	MU15772	A/R	Loctite® screwlock #222

Item	Part Number	MU	Qty	Description
40	Reference only		1	Label, data tag, 1.81" square
41	68 504 09	MU08095	1	Bushing, 1/4" NPT—1/8" NPT, brass, HpO2
42	78 422 41	MU10188	2	Check valve, HpO2
43	81 501 71	MU11522	1	Elbow, 90 , 0.19" tubing—1/8" NPT, female, brass, HpO2

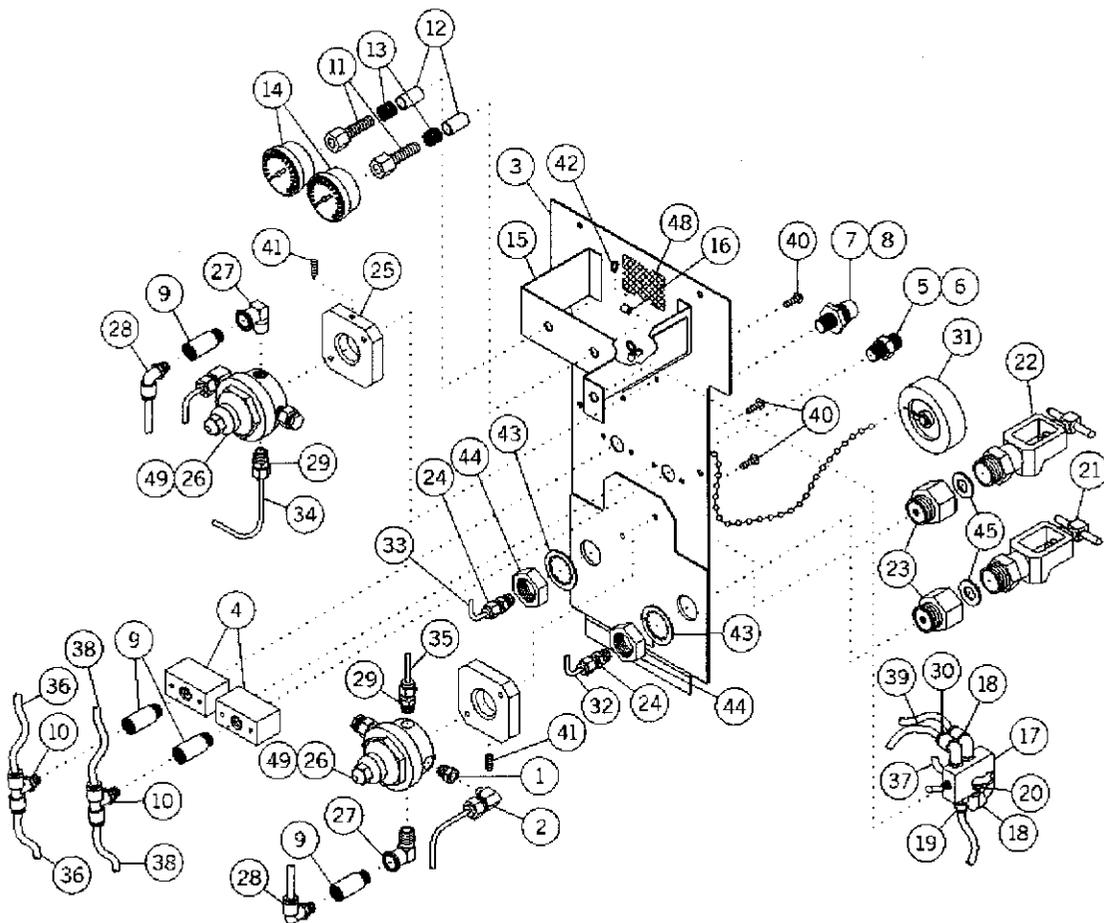
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A/R As required

Chapter :

Oxygen/Air Pipeline with Pin-Indexed Oxygen/Air Cylinder Gas Supply Module—Diameter Index Safety System (DISS), Non-Interchangeable Screw thread (NIST), and Low-Pressure

Figure 5-33. Oxygen/Air Pipeline with Pin-Indexed Oxygen/Air Cylinder Gas Supply Module—DISS, NIST, and Low-Pressure



NOTE:

Apply item number 46 to all pipe fittings.
Apply item number 47 to all threaded fasteners.

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Table 5-31. Oxygen/Air Pipeline with Pin-Indexed Oxygen/Air Cylinder Gas Supply Module—Diameter Index Safety System (DISS), Non-Interchangeable Screw Thread (NIST), and Low-Pressure

Item	Part Number	MU	Qty	Description
1	68 504 09	MU08095	2	Bushing, 1/4" National Pipe Thread (NPT)—1/8" NPT, brass, high pressure oxygen (HpO2)
2	81 500 30	MU11410	2	Elbow, 0.19" tube swage—1/8" NPT, male, brass, HpO2
3	81 500 01	MU11393	1	Chassis, gas supply, with cylinder holes
4	81 500 06	MU11398	2	Manifold, pipeline
5	68 239 27	MU07237	1	Connector, male, 1/4" NPT—oxygen DISS (81 500 85-R only)
6	68 239 36	MU07243	1	Adapter, 1/4" NPT, male—oxygen NIST, female (81 500 86-R only)
7	81 500 38	MU11416	1	Connector, medical air male—1/4" NPT, male (81 500 85-R only)
8	81 500 47	MU11422	1	Adapter, 1/4" NPT, male—air NIST, female (81 500 86-R only)
9	81 500 43	MU11420	4	Check valve, 1/4" NPT, male in, female out
10	81 500 21	MU11402	2	Tee, 1/4" outside diameter tubing, 1/4" NPT, male branch
11	81 500 32	MU11411	2	Connector, bulkhead, 0.12" tube swage—1/8" NPT, female, HpO2
12	81 500 03	MU11395	2	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.48" long, stainless steel
13	81 500 08	MU11400	2	Spring, compression, 0.48" outside diameter, 0.045" wide, 0.875" long
14	81 500 36	MU11414	2	Gauge, pressure, 0 psi-4000 psi, HpO2
15	81 500 02	MU11394	1	Bracket, pneumatic valve
16	99 116,91	MU15491	2	Standoff #6-32 inside diameter, 1/4" outside diameter, 1/4" long, brass
17	81 500 41	MU11418	1	Valve, control, mini five-way
18	81 500 22	MU11403	2	Elbow, 1/4" outside diameter tubing—1/8" NPT, male
19	81 500 25	MU11406	1	Connector, 1/4" tubing—1/8" NPT, male

Oxygen/Air Pipeline with Pin-Indexed Oxygen/Air Cylinder Gas Supply Module—Diameter Index Safety System (DISS), Non-Interchangeable Screw thread (NIST), and Low-Pressure

Chapter :

Item	Part Number	MU	Qty	Description
20	78 456 08	MU10448	1	Pipe plug, 1/8" NPT, hex socket head, brass
21	81 900 73	MU11640	1	Replacement kit, oxygen yoke without check valve
22	81 900 74	MU11641	1	Replacement kit, air yoke
23	78 440 15	MU10216	2	Adapter, yoke, male to female, high pressure oxygen (HpO2)
24	81 500 28	MU11409	2	Connector, 0.19" tubing swage—1/4" National Pipe Thread (NPT), male, brass, HpO2
25	81 500 05	MU11397	2	Block, mounting, pressure regulator
26	81 501 69	MU11520	2	Regulator, 65 psi/pressure relief, HpO2
27	81 500 37	MU11415	2	Elbow, street, 90°, 1/4" NPT, brass
28	81 500 23	MU11404	2	Elbow, 1/4" outside diameter tubing—1/4" NPT, male
29	81 500 27	MU11408	2	Connector, 0.12" tubing swage—1/4" NPT, male, brass, HpO2
30	81 500 24	MU11405	1	Elbow, 0.312" outside diameter tubing—1/8" NPT, male
31	75 407 38	MU09042	1	Handle, valve, removable with chain
32	81 501 06	MU11470	1	Tubing, formed, 3/16" outside diameter, HpO2
33	81 501 07	MU11471	1	Tubing, formed, 3/16" outside diameter, HpO2
34	81 501 34	MU11496	1	Tubing, copper, 0.12" outside diameter, 14" long, HpO2
35	81 501 33	MU11495	1	Tubing, copper, 0.12" outside diameter, 12" long, HpO2
36	81 501 12	MU11475	2	Tubing polyethylene, 1/4" outside diameter, 0.17" inside diameter, 12" long
37	81 501 13	MU11476	1	Tubing, 1/4" outside diameter, 0.17" inside diameter, 21" long
38	81 501 14	MU11477	2	Tubing polyethylene, 1/4" outside diameter, 0.17" inside diameter, 7 3/4" long
39	81 501 37	MU11499	1	Tubing polyethylene, 0.187" inside diameter, 0.312" outside diameter, 7 1/2" long

Item	Part Number	MU	Qty	Description
40	99 031 99	MU15193	8	Screw, #8-32 x 1/2", truss, phillips, stainless steel, Nylok®
41	99 042 00	MU15234	2	Screw, #10-32 x 1/2", sems external, socket, stainless steel, cap
42	99 181 48	MU15708	2	Ring, retaining, push-on, stainless steel, 0.01" thick
43	99 129 85	MU15644	2	Washer, lock, internal, 7/8", steel, cadmium-plated
44	99 114 50	MU15471	2	Nut, hex, jam, 7/8"-14, zinc-plated
45	78 423 30	MU10197	2	Washer, flat, 0.25" inside diameter, 0.81" outside diameter, high pressure oxygen (HpO2), 0.12" nylon
46	99 900 26	MU15740	A/R	Tape, pipe joint seal, Teflon®, 1/2"
47	99 901 38	MU15772	A/R	Loctite® screwlock #222
48	81 000 38	MU10857	1	Label, data tag, 1.81" square
49	81 501 77	MU11526	2	Regulator, 45 psi/pressure relief, HpO2 (81 501 95-R only)

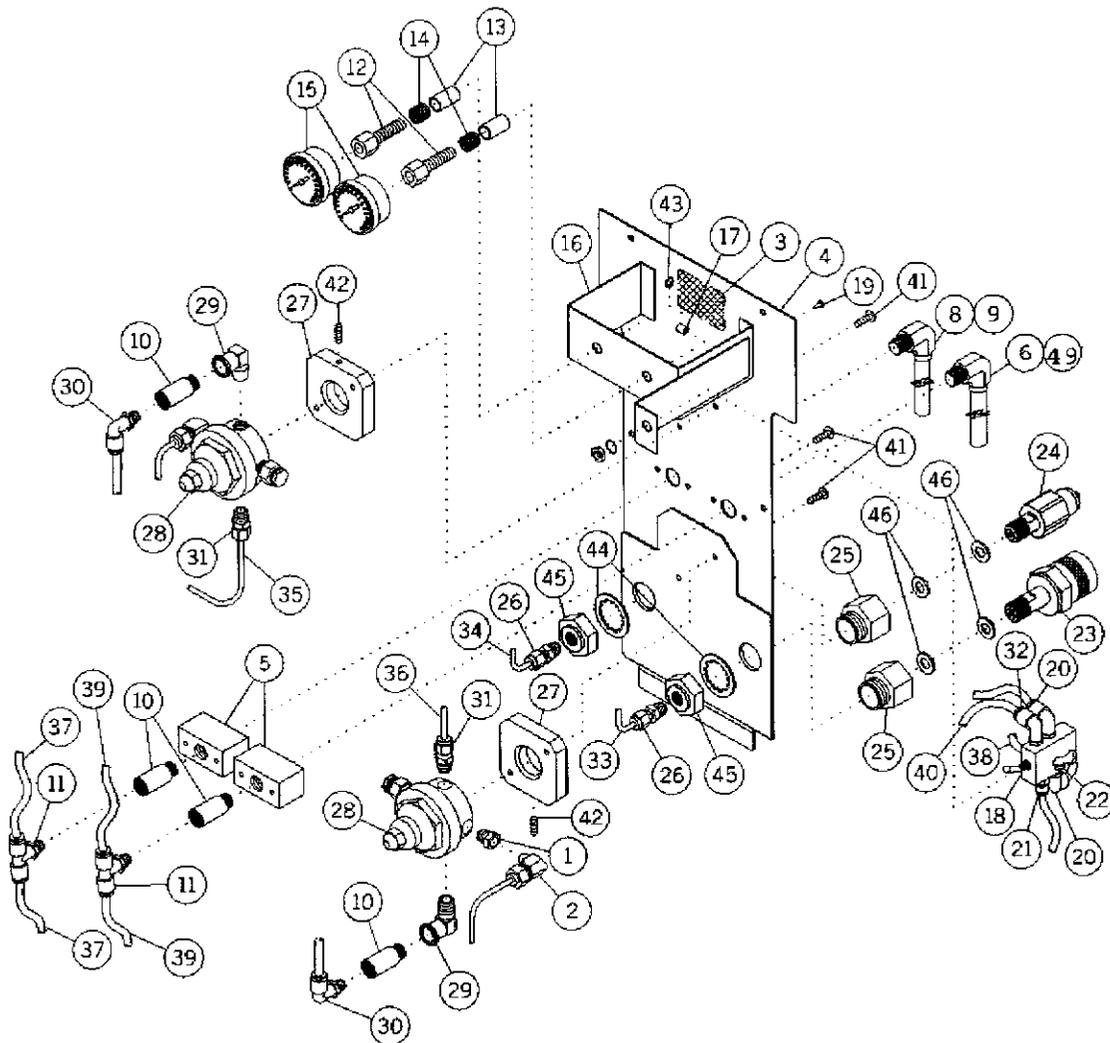
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A/R As required

Chapter :

Gas Supply Module with Oxygen/Air Reserves and Deutsche Industrie Norm (DIN) Cylinder Fittings—Blue/Green and Yellow Hoses or Blue/White and Black Hoses

Figure 5-34. Gas Supply Module with Oxygen/Air Reserves and DIN Cylinder Fittings—Blue/Green and Yellow Hoses or Blue/White and Black Hoses



NOTE:

Apply item number 47 to all pipe fittings.
Apply item number 48 to all threaded fasteners.

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Table 5-32. Gas Supply Module with Oxygen/Air Reserves and DIN Cylinder Fittings—Blue/Green and Yellow Hoses or Blue/White and Black Hoses

Item	Part Number	MU	Qty	Description
1	68 504 09	MU08095	2	Bushing, 1/4" National Pipe Thread (NPT)—1/8" NPT, brass, HpO2
2	81 500 30	MU11410	2	Elbow, 0.19" tubing swage—1/8" NPT, male, brass, HpO2
3	Reference only		1	Label, data tag, 1.81" square
4	81 500 01	MU11393	1	Chassis, gas supply, with cylinder holes
5	81 500 06	MU11398	2	Manifold, pipeline
6	81 501 52	MU11513	1	Hose assembly, oxygen, blue, 10' (81 500 88-R and 81 501 91-R only)
7	Not used			
8	81 501 54	MU11515	1	Hose assembly, medical air, yellow, 10' (81 500 88-R/90-R only)
9	81 501 51	MU11512	1	Hose assembly, medical air, black, 10' (81 501 91-R/92-R only)
10	81 500 43	MU11420	4	Check valve, 1/4" NPT, male in, female out
11	81 500 21	MU11402	2	Tee, 1/4" outside diameter tubing, 1/4" NPT, male branch
12	81 500 32	MU11411	2	Connector, bulkhead, 0.12" tubing swage—1/8" NPT, female, HpO2
13	81 500 03	MU11395	2	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.48" long, stainless steel
14	81 500 08	MU11400	2	Spring, compression, 0.480" outside diameter, 0.045" wide, 0.875" long
15	81 500 36	MU11414	2	Gauge, pressure, 0 psi-4000 psi, HpO2
16	81 500 02	MU11394	1	Bracket, pneumatic valve
17	99 116 91	MU15491	2	Standoff #6-32 inside diameter, 1/4" outside diameter, 1/4" long, brass
18	81 500 41	MU11418	1	Valve, control, miniature five-way
19	68 602 02	MU08414	1	Plug, panel fastening, 0.182"-0.192", Canoe®
20	81 500 22	MU11403	2	Elbow, 1/4" outside diameter tubing—1/8" NPT, male

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Chapter :

Item	Part Number	MU	Qty	Description
21	81 500 25	MU11406	1	Connector, ¼" outside diameter tubing—1/8" NPT, male
22	78 456 08	MU10448	1	Pipe plug, 1/8" National Pipe Thread (NPT), hex, socket head, brass
23	81 501 22	MU11484	1	Connector, Deutsche Industrie Norm (DIN), oxygen cylinder, HpO2
24	81 501 23	MU11485	1	Connector, DIN, air cylinder
25	81 500 34	MU11413	2	Adapter, high pressure cylinder, HpO2
26	81 500 28	MU11409	2	Connector, 0.19" tubing swage—¼" NPT, male, brass, HpO2
27	81 500 05	MU11397	2	Block, mounting, pressure regulator
28	81 501 69	MU11520	2	Regulator, 65 psi/pressure relief, HpO2
29	81 500 37	MU11415	2	Elbow, street, 90°, ¼" NPT, brass
30	81 500 23	MU11404	2	Elbow, ¼" outside diameter tubing—¼" NPT, male
31	81 500 27	MU11408	2	Connector, 0.12" tubing swage—¼" NPT, male, brass, HpO2
32	81 500 24	MU11405	1	Elbow, 0.312" outside diameter tubing—1/8" NPT, male
33	81 501 06	MU11470	1	Tubing, formed, 3/16" outside diameter, HpO2
34	81 501 07	MU11471	1	Tubing, formed, 3/16" outside diameter, HpO2
35	81 501 34	MU11496	1	Tubing, copper, 0.12" outside diameter, 14.00" long, HpO2
36	81 501 33	MU11495	1	Tubing, copper, 0.12" outside diameter, 12.00" long, HpO2
37	81 501 12	MU11475	2	Tubing, polyethylene, ¼" outside diameter, 0.170" inside diameter, 12.00" long
38	81 501 13	MU11476	1	Tubing, polyethylene, ¼" outside diameter, 0.170" inside diameter, 21.00" long
39	81 501 14	MU11477	2	Tubing, polyethylene, ¼" outside diameter, 0.17" inside diameter, 7¾" long
40	81 501 37	MU11499	1	Tubing, polyethylene, 0.187" inside diameter, 0.312" outside diameter, 7½" long

Item	Part Number	MU	Qty	Description
41	99 031 99	MU15193	8	Screw, #8-32 x 1/2", truss, phillips, stainless steel, Nylok®
42	99 042 00	MU15234	2	Screw, #10-32 x 1/2", sems external, socket, stainless steel, cap
43	99 181 48	MU15708	2	Ring, retaining, push-on, stainless steel, 0.010" thick
44	99 129 85	MU15644	2	Washer, lock, internal, 7/8", steel, cadmium-plated
45	99 114 50	MU15471	2	Nut, hex, jam, 7/8"-14, steel, zinc-plated
46	99 123 70	MU15563	4	Washer, flat, 0.19" inside diameter, 0.56" outside diameter, 0.06" nylon, HpO2
47	99 900 26	MU15740	A/R	Tape, pipe joint seal, Teflon®, 1/2"
48	99 901 38	MU15772	A/R	Loctite® screwlock #222
49	81 501 53	MU11514	1	Hose assembly, oxygen, white, 10' (81 501 92 only)

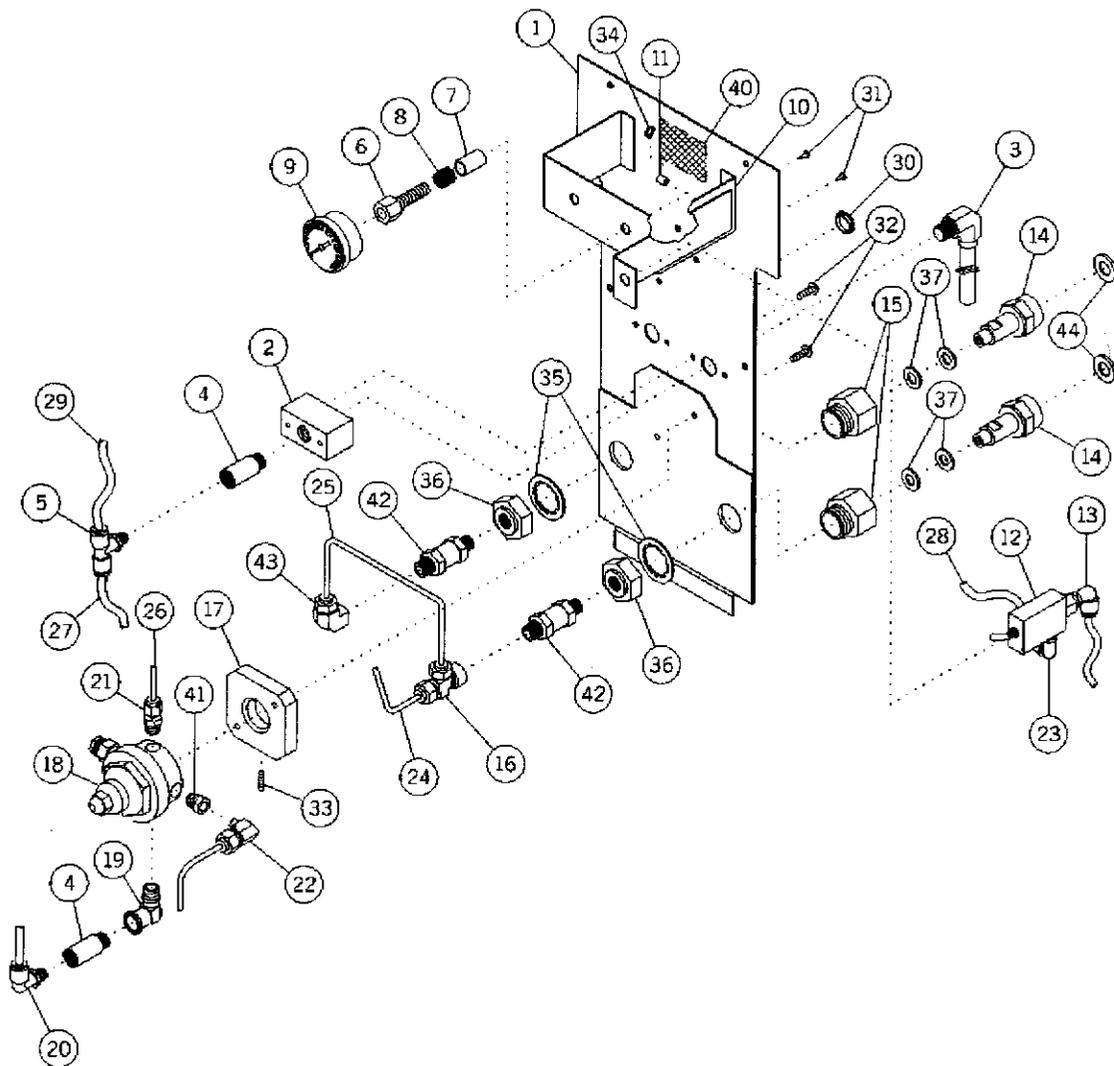
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A/R As required



Gas Supply Module with Ente Nazionale Italiano di Unificazione (UNI) Cylinder Fittings, Oxygen Reserve, and White Hoses

Figure 5-35. Gas Supply Module with Ente Nazionale Italiano di UNI Cylinder Fittings, Oxygen Reserve, and White Hoses



NOTE:

Apply item number 38 to all pipe fittings.

Apply item number 39 to all threaded fasteners.

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Table 5-33. Gas Supply Module with Ente Nazionale Italiano di Unificazione (UNI) Cylinder Fittings, Oxygen Reserve, and White Hoses

Item	Part Number	MU	Qty	Description
1	81 500 01	MU11393	1	Chassis, gas supply, with cylinder holes
2	81 500 06	MU11398	1	Manifold, pipeline
3	81 501 53	MU11514	1	Hose assembly, oxygen, white, 10'
4	81 500 43	MU11420	2	Check valve, 1/4" National Pipe Thread (NPT), male in, female out
5	81 500 21	MU11402	1	Tee, 1/4" outside diameter tubing, 1/4" NPT, male branch
6	81 500 32	MU11411	1	Connector, bulkhead, 0.12" tube swage—1/8" NPT, female, HpO2
7	81 500 03	MU11395	1	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.480" long, stainless steel
8	81 500 08	MU11400	1	Spring, compression, 0.480" outside diameter, 0.045" wide, 0.875" long
9	81 500 36	MU11414	1	Gauge, pressure, 0 psi-4000 psi, HpO2
10	81 500 02	MU11394	1	Bracket, pneumatic valve
11	99 116 91	MU15491	2	Standoff #6-32 inside diameter, 1/4" outside diameter, 1/4" long, brass
12	81 500 40	MU11417	1	Valve, control, mini three-way
13	81 500 22	MU11403	1	Elbow, 1/4" outside diameter tubing—1/8" NPT, male
14	81 501 75	MU11524	2	Connector, UNI, oxygen cylinder, HpO2
15	81 500 34	MU11413	2	Adapter, high pressure cylinder, HpO2
16	81 501 72	MU11523	1	Tee, 0.19" tube swage—1/8" NPT, female—0.19" tube, HpO2
17	81 500 05	MU11397	1	Block, mounting, pressure regulator
18	81 501 69	MU11520	1	Regulator, 65 psi/pressure relief, HpO2
19	81 500 37	MU11415	1	Elbow, street, 90°, 1/4" NPT, brass
20	81 500 23	MU11404	1	Elbow, 1/4" outside diameter tubing—1/4" NPT, male
21	81 500 27	MU11408	1	Connector, 0.12" tubing swage—1/4" NPT, male, brass, HpO2
22	81 500 30	MU11410	1	Elbow, 0.19" tube swage—1/8" NPT, male, brass, HpO2
23	81 500 24	MU11405	1	Elbow, 0.312" outside diameter tubing—1/8" NPT, male

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Chapter :

Item	Part Number	MU	Qty	Description	
24	81 501 08	MU11472	1	Tubing, formed, 3/16" outside diameter, HpO2	
27.63 ✓	25	81 501 05	MU11469	1	Tubing, formed, 3/16" outside diameter, HpO2
26	81 501 33	MU11495	1	Tubing, copper, 0.12" outside diameter, 12.00" long, HpO2	
27	81 501 11	MU11474	1	Tubing, polyethylene, 0.25" outside diameter, 0.170" inside diameter, 7.00" long	
28	81 501 38	MU11500	1	Tubing, polyethylene, 0.187" inside diameter, 0.312" outside diameter, 11.00" long	
29	81 501 14	MU11477	1	Tubing, polyethylene, 1/4" outside diameter, 0.17" inside diameter, 7 3/4" long	
30	81 500 42	MU11419	1	Plug button, nylon, 0.62" hole	
31	68 602 02	MU08414	5	Plug, panel fastening, 0.182"-0.192", Canoe®	
32	99 031 99	MU15193	4	Screw, #8-32 x 1/2", truss, phillips, stainless steel, Nylok®	
33	99 042 00	MU15234	1	Screw, #10-32 x 1/2", sems external, socket, stainless steel, cap	
34	99 181 48	MU15708	2	Ring, retaining, push-on, stainless steel, 0.010" thick	
35	99 129 85	MU15644	2	Washer, lock, internal, 7/8", steel, cadmium-plated	
36	99 114 50	MU15471	2	Nut, hex, jam, 7/8"-14, steel, zinc-plated	
37	99 123 70	MU15563	4	Washer, flat, 0.19" inside diameter, 0.56" outside diameter, 0.06", nylon, HpO2	
38	99 900 26	MU15740	A/R	Tape, pipe joint sealant, Teflon®, 1/2"	
39	99 901 38	MU15772	A/R	Loctite® screwlock #222	
40	Reference only		1	Label, data tag, 1.81" square	
41	68 504 09	MU08095	1	Bushing, 1/4" National Pipe Thread (NPT)—1/8" NPT, brass, HpO2	
42	67 353 14	MU04881	2	Check valve, gas, 1/8" NPT, male, HpO2	
27.56 ✓	43	81 501 71	MU11522	1	Elbow, 90°, 0.19" tube—1/8" NPT, female, brass, HpO2
44	81 501 49	MU11510	2	Washer, 0.728" outside diameter x 0.39" inside diameter x 0.078" thick, nylon	

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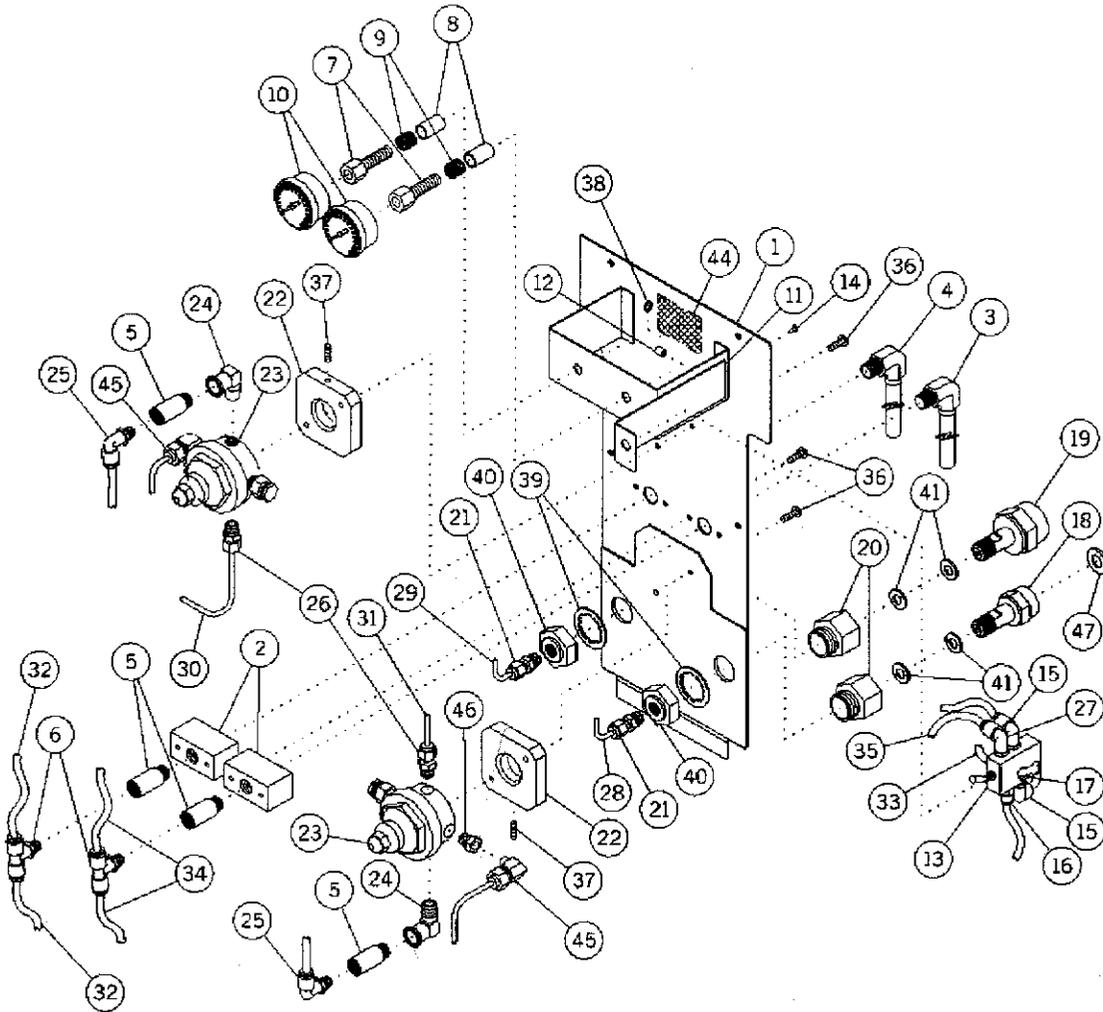
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Chapter :

NOTES:

Gas Supply Module with Oxygen/Air Reserve, Ente Nazionale Italiano di Unificazione (UNI) Cylinder Fittings, and White/Black Hoses

Figure 5-36. Gas Supply Module with Oxygen/Air Reserve, Ente Nazionale Italiano di UNI Cylinder Fittings, and White/Black Hoses



NOTE:

Apply item number 42 to all pipe fittings.
Apply item number 43 to all threaded fasteners.

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Chapter :

Table 5-34. Gas Supply Module with Oxygen/Air Reserve, Ente Nazionale Italiano di Unificazione (UNI) Cylinder Fittings, and White/Black Hoses

Item	Part Number	MU	Qty	Description
1	81 500 01	MU11393	1	Chassis, gas supply, with cylinder holes
2	81 500 06	MU11398	2	Manifold, pipeline
3	81 501 53	MU11514	1	Hose assembly, oxygen, white, 10'
4	81 501 51	MU11512	1	Hose assembly, medical air, black, 10'
5	81 500 43	MU11420	4	Check valve, 1/4" National Pipe Thread (NPT), male in, female out
6	81 500 21	MU11402	2	Tee, 1/4" outside diameter tubing, 1/4" NPT, male branch
7	81 500 32	MU11411	2	Connector, bulkhead, 0.12" tube swage—1/8" NPT, female, HpO2
8	81 500 03	MU11395	2	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.480" long, stainless steel
9	81 500 08	MU11400	2	Spring, compression, 0.480" outside diameter, 0.045" wide, 0.875" long
10	81 500 36	MU11414	2	Gauge, pressure, 0 psi-4000 psi, HpO2
11	81 500 02	MU11394	1	Bracket, pneumatic valve
12	99 116 91	MU15491	2	Standoff #6-32 inside diameter, 1/4" outside diameter, 1/4" long, brass
13	81 500 41	MU11418	1	Valve, control, mini five-way
14	68 602 02	MU08414	1	Plug, panel fastening, 0.182"-0.192", Canoe®
15	81 500 22	MU11403	2	Elbow, 1/4" outside diameter tubing—1/8" NPT, male
16	81 500 25	MU11406	1	Connector, 1/4" outside diameter tubing—1/8" NPT, male
17	78 456 08	MU10448	1	Pipe plug, 1/8" NPT, hex socket head, brass
18	81 501 75	MU11524	1	Connector, UNI, oxygen cylinder, HpO2
19	81 501 76	MU11525	1	Connector, UNI, air cylinder
20	81 500 34	MU11413	2	Adapter, high pressure cylinder, HpO2
21	81 500 28	MU11409	2	Connector, 0.19" tubing swage—1/4" NPT, male, brass, HpO2
22	81 500 05	MU11397	2	Block, mounting, pressure regulator
23	81 501 69	MU11520	2	Regulator, 65 psi/pressure relief, HpO2

Item	Part Number	MU	Qty	Description
24	81 500 37	MU11415	2	Elbow, street, 90°, ¼" National Pipe Thread (NPT), brass
25	81 500 23	MU11404	2	Elbow, ¼" outside diameter tubing—¼" NPT, male
26	81 500 27	MU11408	2	Connector, 0.19" tubing swage—¼" NPT, male, brass, HpO2
27	81 500 24	MU11405	1	Elbow, 0.312" outside diameter tubing—1/8" NPT, male
28	81 501 06	MU11470	1	Tubing, formed, 3/16" outside diameter, HpO2
29	81 501 07	MU11471	1	Tubing, formed, 3/16" outside diameter, HpO2
30	81 501 34	MU11496	1	Tubing, copper, 0.12" outside diameter, 14.00" long, HpO2
31	81 501 33	MU11495	1	Tubing, copper, 0.12" outside diameter, 12.00" long, HpO2
32	81 501 12	MU11475	2	Tubing, polyethylene, ¼" outside diameter, 0.170" inside diameter, 12.00" long
33	81 501 13	MU11476	1	Tubing, polyethylene, ¼" outside diameter, 0.170" inside diameter, 21.00" long
34	81 501 14	MU11477	2	Tubing, polyethylene, ¼" outside diameter, 0.17" inside diameter, 7¾" long
35	81 501 37	MU11499	1	Tubing, polyethylene, 0.187" inside diameter, 0.312" outside diameter, 7½" long
36	99 031 99	MU15193	8	Screw, #8-32 x ½", truss, phillips, stainless steel, Nylok®
37	99 042 00	MU15234	2	Screw, #10-32 x ½", sems external, socket, stainless steel, cap
38	99 181 48	MU15708	2	Ring, retaining, push-on, stainless steel, 0.010" thick
39	99 129 85	MU15644	2	Washer, lock, internal, 7/8", steel, cadmium-plated
40	99 114 50	MU15471	2	Nut, hex, jam, 7/8"-14, steel, zinc-plated
41	99 123 70	MU15563	4	Washer, flat, 0.19" inside diameter, 0.56" outside diameter, 0.06", nylon, HpO2

Chapter :

Item	Part Number	MU	Qty	Description
42	99 900 26	MU15740	A/R	Tape, pipe joint sealant, Teflon [®] , 1/2"
43	99 901 38	MU15772	A/R	Loctite [®] screwlock #222
44	Reference only		1	Label, data tag, 1.81" square
45	81 500 30	MU11410	2	Elbow, 0.19" tube swage—1/8" National Pipe Thread (NPT), male, brass, HpO2
46	68 504 09	MU08095	2	Bushing, 1/4" NPT—1/8" NPT, brass, HpO2
47	81 501 49	MU11510	1	Washer, 0.728" outside diameter x 0.390" inside diameter x 0.078" thick, nylon

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A/R As required

Display P.C. Board (PCB 1) Assembly

Figure 5-37. Display P.C. Board (PCB 1) Assembly

1



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Table 5-35. Display P.C. Board (PCB 1) Assembly

Item	Part Number	MU	Qty	Description
1	81 307 75	MU11298	A/R	P.C. board 1 assembly, display, with Baby Mode

A/R As required

Power and Control P.C. Board (PCB 2) Assembly

Figure 5-38. Power and Control P.C. Board (PCB 2) Assembly

1,2,3

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Table 5-36. Power and Control P.C. Board (PCB 2) Assembly

Item	Part Number	MU	Qty	Description
1	81 308 70T	MU11311	A/R	Tested P.C. board 2 assembly, power and control (120V model only)
2	81 308 80T	MU11315	A/R	P.C. board 2 assembly, power and control, 220V-240V, tested (220V and 240V models only)

A/R As required

NOTES:

Annex

Preventive Maintenance Checklist

Chapter 6: Calibration and Maintenance Procedures

Calibrating the Resuscitation Module

Tools required: Phillips head screwdriver
Pressure gauge assembly
Clamping device (hemostat) (3)
Digital counter
Pressure transducer
RT200 tester or equivalent test device
Hex key wrench set
Extension tubing
Digital voltmeter (DVM) (Fluke® 8080A or equivalent)
Small screwdriver or trim potentiometer adjustment tool

Completely check and calibrate the equipment prior to initial use, and at least annually thereafter.

1. Remove the Blender Module (refer to procedure 4.3).
2. Remove the Resuscitation Module (refer to procedure 4.4).
3. Place the Blender Module and Resuscitation Module assembly on the cart assembly, and connect the tubing between the Blender Module, the Resuscitation Module, and the Gas Supply Module. If necessary, use the extension tubing.
4. If the Gas Supply Module is used, make sure that the tubing is connected to the Resuscitation Module, and that the connections to the Gas Supply Module are secure.
5. Secure the air and oxygen pipeline fittings to their respective connectors on the back of the Gas Supply Module.
6. For the U.S., verify that both supplies are regulated at 50 psi (345 kPa).

1. Fluke® is a registered trademark of Fluke Corporation.

7. For the U.K., verify that both supplies are regulated at 65 psi (448 kPa).

Calibrating the Oxygen and Air Regulators

1. Remove the white hoses from the output of the Oxygen Tank Regulator.
2. Attach the RT200 Tester (or equivalent) to the white hose.
3. Turn on the oxygen tank.
4. For the U.S., the regulator output should be 65 psi \pm 3 psi (448 kPa \pm 21 kPa) with a tank pressure of 1200 psi (8274 kPa).
5. For the U.K., the regulators output should be at 45 psi \pm 3 psi (310 kPa \pm 21 kPa) with a tank pressure of 1500 psi (10342 kPa).

NOTE:

Very low or very high tank pressures may have readings outside of the \pm 3 psi (\pm 21 kPa) tolerance.

6. Repeat the process for the Air Tank Regulator.

Calibrating the Auxiliary Flow

Adjusting the Pressure Regulator

1. At the front panel, place the **Suction On/Off** switch to the **Off** position.
2. Set the auxiliary flow valve to **0**.
3. Connect the pressure gauge to the test port, and measure the pressure setting of the auxiliary pressure regulator. The regulator should be set at 20 psi (138 kPa).
4. If necessary, adjust the auxiliary pressure regulator:
 - a. Remove the wire tie, press up on the red ring, and unlock the auxiliary pressure regulator.
 - b. Adjust the knob until the pressure on the pressure gauge reads 20 psi (138 kPa).

- c. Press down on the red ring, and lock the auxiliary pressure regulator.
 - d. Just above the red ring, secure the wire tie.
5. Remove the pressure gauge assembly from the test port.

Adjusting the Auxiliary Flow and Flow Valve to Zero

1. Connect the Auxiliary Outlet to the connector corresponding to a high flow measurement on the RT200 tester or equivalent test device.
2. At the RT200 tester or equivalent test device, select the test corresponding to a high flow range of 180 LPM (381 scfh).
3. At the front panel, set the **Auxiliary Flow** control knob to obtain a reading of 1.0 LPM (2.1 scfh) on the RT200 tester or equivalent test device.
4. If the reading on the **Auxiliary Flow** control knob does not correspond to the reading on the RT200 tester or equivalent test device, perform the following:
 - a. Loosen the setscrews securing the auxiliary flow valve.
 - b. Position the **Auxiliary Flow** control knob to 1.0 LPM (2.1 scfh).
 - c. Tighten the setscrews to secure the auxiliary flow valve.
5. Set the **Auxiliary Flow** control knob to obtain a reading of 15.0 LPM (31.8 scfh) on the RT200 tester or equivalent test device.
6. If the reading on the **Auxiliary Flow** control knob does not correspond to the reading on the RT200 tester or equivalent test device, perform the following:
 - a. Loosen the setscrews securing the auxiliary flow valve.
 - b. Position the **Auxiliary Flow** control knob to 15.0 LPM (31.8 scfh).
 - c. Tighten the setscrews to secure the auxiliary flow valve.
7. Return the **Auxiliary Flow** control knob to 1.0 LPM (2.1 scfh).
8. Make sure that the regulator pressure remains between 20 psi \pm 2 psi (138 kPa \pm 14 kPa).

9. If the readings on the **Auxiliary Flow** control knob and the RT200 tester or equivalent test device are not in agreement, adjust the auxiliary pressure regulator.
10. Return the **Auxiliary Flow** control knob to **0**. Make sure that the reading on the RT200 tester or equivalent test device does not exceed 0.2 LPM (0.4 scfh).
11. Detach the hose connections.

Adjusting the Auxiliary Flow Relief Valve

1. Connect the Auxiliary Outlet to the connector corresponding to a low pressure measurement on the RT200 tester or equivalent test device.
2. At the RT200 tester or equivalent test device, select the test corresponding to a low pressure range of 250 cm H₂O (25 kPa).
3. Verify the reading on the RT200 tester or equivalent test device:
 - a. For the Resuscitation Module without AutoBreath™ Infant Resuscitator (PN 81 400 72 or PN 81 400 73), verify a reading on the RT200 tester or equivalent test device of 160 cm H₂O (16 kPa) ± 10%. If necessary, adjust the spring in the auxiliary relief valve to obtain 160 cm H₂O (16 kPa) ± 10%.
 - b. For the Resuscitation Module with AutoBreath™ Infant Resuscitator (PN 81 400 80), verify a reading on the RT200 tester or equivalent test device of 40 cm H₂O (4 kPa) ± 10%. If necessary, adjust the spring in the auxiliary relief valve to obtain 40 cm H₂O (4 kPa) ± 10%.
 - c. For the Resuscitation Module with AutoBreath™ Infant Resuscitator (PN 81 400 81), verify a reading on the RT200 tester or equivalent test device of 160 cm H₂O (16 kPa) ± 10%. If necessary, adjust the spring in the auxiliary relief valve to obtain 160 cm H₂O (16 kPa) ± 10%.
4. Detach the hose connections.
5. Lock the auxiliary regulator:
 - a. Press down on the red ring.
 - b. Secure the wire tie just above the red ring.

6. Remove the pressure gauge assembly.
7. Install the orange plug line.

Calibrating the Suction

Adjusting the Suction Valve to Zero Flow

1. At the front panel, place the suction **On/Off** switch in the **Off** position.
2. Connect the suction hose to the connector corresponding to a low flow measurement on the RT200 tester or equivalent test device.
3. At the RT200 tester or equivalent test device, select the test:
 - a. For the new Resuscitation Module without AutoBreath™ Infant Resuscitator (PN 81 400 81) or the old Resuscitation Module with AutoBreath™ Infant Resuscitator (PN 81 400 73), select the test corresponding to a low flow range of 5.0 LPM (10.6 scfh).
 - b. For the old Resuscitation Module without AutoBreath™ Infant Resuscitator (PN 81 400 72), or the Resuscitation Module with AutoBreath™ Infant Resuscitator (PN 81 400 80), select the test corresponding to a high flow range of 180 LPM (381 scfh).
4. At the junction, use a clamping device to clamp off the suction gauge line.
5. Block the vacuum generator exhaust.
6. Place the suction **On/Off** switch in the **On** position.
7. At the front panel, turn the **Suction** control knob counterclockwise until the flow rate on the RT200 tester or equivalent test device reads **0**.
8. If the **0** reading does not correspond to a **Min** reading on the **Suction** control knob, perform the following:
 - a. Loosen the setscrews securing the suction control valve.
 - b. Position the **Suction** control knob to the **Min** position.
 - c. Tighten the setscrews.

9. Remove the clamping device from the suction gauge line.
10. Remove the blockage from the vacuum generator exhaust.
11. Remove the hose connections.

Adjusting the Maximum Suction Relief Gauge for Accuracy and to Zero

1. Connect the suction hose to the connection corresponding to a low pressure measurement on the RT200 tester or equivalent test device.
2. Select a low pressure range of 185 mm Hg (99"H₂O) on the RT200 tester or equivalent test device.
3. Slowly turn the **Suction** control knob clockwise:
 - a. While turning the **Suction** control knob, compare the accuracy of the readings on the **Suction** gauge to the readings on the RT200 tester or equivalent test device.
 - b. See whether the readings are within 3% of full scale.
4. If the readings are not within 3%, remove the **Suction** gauge from the front panel, and adjust the zero adjusting screw on the top of the faceplate of the **Suction** gauge.
5. Turn the **Suction** control knob fully clockwise to the **Max** position.
6. See whether the reading on the RT200 tester or equivalent test device is -150 mm Hg \pm 6 mm Hg (80"H₂O \pm 3"H₂O).
7. If the reading on the RT200 tester or equivalent test device is not -150 mm Hg \pm 6 mm Hg (80"H₂O \pm 3"H₂O), adjust the spring tensioner in the vacuum relief valve to obtain -150 mm Hg \pm 6 mm Hg (80"H₂O \pm 3"H₂O).
8. Turn the **Suction On/Off** switch off. Make sure that the needle on the **Suction** gauge reads \pm 1.0 mm Hg (\pm 0.5"H₂O).
9. Return the **Suction** control knob to the **Min** position.
10. Detach the hose connections.

Calibrating the Patient Gas Supply

Adjusting the Pressure Regulator

1. At the front panel, set the **Airway Pressure Relief** control knob to the **Min** position.
2. Set the **Flow Rate** control knob to **0**.
3. Remove the orange plug line (TP7A), and connect a pressure gauge assembly in its place.
4. Using the pressure gauge assembly, measure the patient regulator pressure.
5. Make sure that the patient regulator is set at 20 psi (138 kPa).
6. If necessary, adjust the patient regulator:
 - a. Remove the wire tie, and press up on the red ring.
 - b. Adjust the knob until the pressure on the gauge reads **20 psi (138 kPa)**.
 - c. Press down on the red ring, and secure the wire tie just above the red ring.
7. Remove the pressure gauge assembly.
8. Replace the orange plug line.

Assessing the Accuracy of the Airway Pressure Gauge and Adjusting Airway Pressure

1. Remove the airway pressure relief valve.
2. Using the relief valve cap, block the opening in the manifold.
3. Connect the patient outlet to the connector corresponding to a low pressure measurement on the RT200 tester or equivalent test device.
4. If the unit is equipped with an airway pressure gauge port, tee the patient outlet and airway pressure gauge port.
5. At the RT200 tester or equivalent test device, select the test corresponding to a low pressure range of 250 cm H₂O (25 kPa).

6. At the front panel, set the **Flow Rate** control knob to 5.0 LPM (10.6 scfh).
7. Set the **Airway Pressure Relief** control knob to the **Max** position.
8. If the reading on the RT200 tester or equivalent test device is not 80 cm H₂O (8 kPa), adjust the airway pressure resistor until the reading on the RT200 tester or equivalent test device is 80 cm H₂O (8 kPa):
 - a. Slowly turn the **Airway Pressure Relief** control knob counterclockwise.
 - b. Compare the readings on the RT200 tester or equivalent test device with the readings on the airway pressure gauge.
 - c. Make sure that the accuracy is within $\pm 3\%$ of full scale.
9. If necessary, remove the **Airway Pressure** gauge from the front panel, and adjust the zero adjusting screw at the top of the faceplate of the **Airway Pressure** gauge for the greatest accuracy below 50 cm H₂O (5 kPa).
10. Adjust the **Airway Pressure Relief** control knob until a reading of 50 cm H₂O (5 kPa) is obtained on the **Airway Pressure** gauge.
11. If the reading on the RT200 tester or equivalent test device is not 50 cm H₂O (5 kPa), adjust the airway pressure resistor until the reading on the RT200 tester or equivalent device is 50 cm H₂O (5 kPa):
 - a. Slowly turn the **Airway Pressure Relief** control knob counterclockwise.
 - b. Compare the readings on the RT200 tester or equivalent test device with the readings on the airway pressure gauge.
 - c. Make sure that accuracy is within $\pm 3\%$ of full scale.
12. If necessary, remove the **Airway Pressure** gauge from the front panel, and adjust the zero adjusting screw at the top of the faceplate:
 - a. For the Resuscitation Module without AutoBreath™ Infant Resuscitator, P/N 81 400 72 or the Resuscitation Module with AutoBreath™ Infant Resuscitator, P/N 81 400 80, adjust for the greatest accuracy below 50 cm H₂O (5 kPa).

- b. For the Resuscitation Module without AutoBreath™ Infant Resuscitator, P/N 81 400 73 or the Resuscitation Module with AutoBreath™ Infant Resuscitator, P/N 81 400 81, adjust for the greatest accuracy below 60 cm H₂O (5.9 kPa).
13. Remove the relief valve cap.
14. Install the airway pressure relief valve.
15. Set the **Flow Rate** control knob to 0.
16. Set the **Airway Pressure Relief** control knob to the **Min** position.
17. Detach the hose connections.

Adjusting the Airway Pressure Valve to Zero

1. Remove the orange plug line from the test port tee on the yellow airway pressure resistor line.
2. In place of the orange plug, connect a hose from the airway pressure resistor line to the connector corresponding to a low flow measurement on the RT200 tester or equivalent test device.
3. Select a low flow range of 5.0 LPM (10.6 scfh) on the RT200 tester or equivalent test device.
4. Place a clamping device between the test port tee and the airway pressure resistor on the purple tee.
5. Place a clamping device on the yellow bleed resistor.
6. At the front panel, turn the **Airway Pressure Relief** control knob counterclockwise until no flow is indicated on the RT200 tester or equivalent test device.
7. If necessary, adjust the **Airway Pressure Relief** control knob:
 - a. Loosen the setscrews securing the **Airway Pressure Relief** control valve.
 - b. Position the **Airway Pressure Relief** control knob to the **Min** position.
 - c. Tighten the setscrews.
8. Remove the clamping devices.

9. Detach the hose connections.
10. Install the orange plug line.

Checking Zero on the Airway Pressure Gauge

1. Set the **Airway Pressure Relief** control knob to the **Min** position.
2. Set the patient flow valve to 0.
3. Verify that the **Airway Pressure** gauge reads ± 1.0 cm (0.4").

Adjusting the Patient Flow and Airway Flow Valve to Zero (Model with Blender Module Only)

1. At the front panel, set the **Blender** control knob to **60**.
2. Connect the patient outlet to the connector corresponding to a high flow measurement on the RT200 tester or equivalent test device.
3. If the unit is equipped with an airway pressure gauge port, tee the patient outlet and the airway pressure gauge port.
4. At the RT200 tester or equivalent test device, select the test corresponding to a high flow range of 180 LPM (381 scfh).
5. Set the **Airway Pressure Relief** control knob to **1**.
6. If the position on the **Flow Rate** control knob does not correspond to the reading on the RT200 tester or equivalent test device, perform the following:
 - a. Loosen the setscrews securing the **Flow Rate** control valve.
 - b. Position the **Flow Rate** control knob to the **1** position.
 - c. Tighten the setscrews.
7. Set the **Flow Rate** control knob to obtain a reading of 15.0 LPM (31.8 scfh).
8. If the position on the **Flow Rate** control knob does not correspond to the reading on the RT200 tester or equivalent test device, perform the following:
 - a. Connect the pressure gauge assembly to TP7A.

- b. Remove the wire tie, and press up on the red ring to unlock the patient regulator.
 - c. Adjust the knob until the pressure on the gauge reads **20 psi (138 kPa)**.
 - d. Press down on the red ring, and secure the wire tie just above the red ring.
 - e. Remove the pressure gauge assembly.
9. Return the **Flow Rate** control knob from the **1** position.
10. If necessary, adjust the **Flow Rate** control knob:
- a. Loosen the setscrews securing the patient flow control valve.
 - b. Position the **Flow Rate** control knob to the **1.0 LPM (2.1 scfh)** position in accordance with the reading on the RT200 tester or equivalent test device.
 - c. Tighten the setscrews.
11. Check the flow calibration on all settings of the **Flow Rate** control knob.
12. Return the **Flow Rate** control knob to the **0** position. Make sure that the reading on the RT200 tester or equivalent test device does not exceed **0.2 LPM (0.4 scfh)**.
13. Return the **Blender** control knob setting to **21%**.
14. Return the **Airway Pressure Relief** control knob setting to the **Min** position.
15. Remove the hose connections.

Adjusting the Patient Airway Relief Valve

1. Remove the auxiliary relief valve, and install the airway pressure relief valve in its place.
2. Connect the Auxiliary Outlet to the connector corresponding to a low pressure measurement on the RT200 tester or equivalent test device.

3. At the RT200 tester or equivalent test device, select the test corresponding to a low pressure range of 250 cm H₂O (25 kPa).
4. At the front panel, slowly turn the **Flow Rate** control knob counterclockwise.
5. For the Resuscitation Module without AutoBreath™ Infant Resuscitator (PN 81 400 72), or the Resuscitation Module with AutoBreath™ Infant Resuscitator (PN 81 400 80), verify that a pressure of 50 cm H₂O (5 kPa) ± 20% is obtained over the full range of the flow. If necessary, adjust the spring in the airway pressure relief valve to obtain 50 cm H₂O (5 kPa) ± 20% over the full range of the flow.
6. For the Resuscitation Module without AutoBreath™ Infant Resuscitator (PN 81 400 81), or the Resuscitation Module with AutoBreath™ Infant Resuscitator (PN 81 400 73), verify that a pressure of 60 cm H₂O (5.9 kPa) ± 20% is obtained over the full range of the flow. If necessary, adjust the spring in the airway pressure relief valve to obtain 60 cm H₂O (5.9 kPa) ± 20% over the full range of the flow.
7. Return the **Flow Rate** control knob to 0.
8. Remove the airway pressure relief valve, and place it in its proper manifold location.
9. Place the auxiliary relief valve in its proper manifold location.
10. Detach the hose connections.

Calibrating the AutoBreath™ Infant Resuscitator

Adjusting the Pressure of the Regulator

1. At the front panel, remove the orange plug (TP11A) from the elbow on the back of the AutoBreath™ Infant Resuscitator **On/Off** switch, and connect a pressure gauge assembly in its place.
2. Measure the pressure of the AutoBreath™ Infant Resuscitator regulator. See whether the pressure reads **30 psi (207 kPa)**.
3. If necessary, adjust the AutoBreath™ Infant Resuscitator:

- a. Remove the wire tie, and press up on the red ring to unlock the regulator.
 - b. Adjust the knob until the pressure on the gauge reads **30 psi (207 kPa)**.
 - c. Press down on the red ring, and secure the wire tie just above the red ring.
4. Remove the pressure gauge assembly.
 5. Install the orange plug line.

Adjusting the Switch Point

Perform the following only if the timing variable resistor on the blue line has been replaced, or if its setting has been disturbed.

1. Remove the orange plug line from the test port tee on the blue capacitor line, and connect the pressure gauge assembly in its place.
2. Using the clamping device, clamp off the inspiratory check valve.
3. At the front panel, place the AutoBreath™ Infant Resuscitator **On/Off** switch in the **On** position.
4. Slightly turn the **Breath Rate** control knob clockwise, and observe the pressure gauge assembly.
 - a. During inspiration, make sure that the pressure rises.
 - b. During expiration, make sure that the pressure falls.
 - c. If necessary, adjust the **Breath Rate** control knob to read the high (inspiratory) and low (expiratory) points.

NOTE:

The low point is fixed and cannot be adjusted.

- d. If the highest pressure point does not correspond to a 22 psi (152 kPa) switch point, adjust the timing variable resistor.
5. Install the orange plug assembly.
 6. Remove the clamping device from the inspiratory check valve.

7. Place the AutoBreath™ Infant Resuscitator **On/Off** switch in the **Off** position.
8. Return the **Breath Rate** control knob to **18**.

Adjusting the Pilot Pressure

1. Connect a patient circuit from the exhalation valve port, Auxiliary Outlet to the connector corresponding to the low pressure measurement on the RT200 tester or equivalent test device.
2. At the RT200 tester or equivalent test device, select the test corresponding to a low pressure range of 250 cm H₂O (25 kPa).
3. Remove the auxiliary relief valve, and use the relief valve cap to block the manifold.
4. At the front panel, set the **Auxiliary Flow** control knob to 15.0 LPM (31.8 scfh).
5. Place the AutoBreath™ Infant Resuscitator **On/Off** switch to the **On** position.
6. Using the clamping device, clamp the blue capacitor line just ahead of the test port tee to lock the unit in Inspiratory Mode.
7. See whether the RT200 tester or equivalent test device shows a reading of 60 cm H₂O (5.9 kPa).
8. To change the circuit pressure to obtain a reading of 60 cm H₂O (5.9 kPa), adjust the pilot pressure variable resistor on the violet line.
9. Place the AutoBreath™ Infant Resuscitator **On/Off** switch in the **Off** position.
10. Set the **Auxiliary Flow** control knob to **0**.
11. Remove the relief valve cap from the manifold.
12. Install the auxiliary relief valve.
13. Remove the clamping device from the blue capacitor line.
14. Detach the patient circuit.

Adjusting the Positive End Expiratory Pressure (PEEP) Valve to Zero

1. Connect the exhalation valve port to the connector corresponding to a low flow measurement on the RT200 tester or equivalent test device.
2. At the RT200 tester or equivalent test device, select the test corresponding to a low flow range of 5.0 LPM (10.6 scfh).
3. Using clamping devices, clamp off the PEEP variable resistor and the fixed resistor bleed on the yellow resistor bleed line.
4. Place the AutoBreath™ Infant Resuscitator **On/Off** switch to the **On** position.
5. Place a clamping device on the blue capacitor line just ahead of the test port tee to lock the unit in Expiratory Mode.
6. Turn the **PEEP** control knob counterclockwise until no flow is indicated on the RT200 tester or equivalent test device.
7. If necessary, adjust the **PEEP** control knob:
 - a. Loosen the setscrews securing the PEEP control valve.
 - b. Position the **PEEP** control knob to the **Min** position.
 - c. Tighten the setscrews.
8. Place the AutoBreath™ Infant Resuscitator **On/Off** switch in the **Off** position.
9. Remove the clamping devices.
10. Detach the hose connections.

Adjusting the PEEP Pressure

1. Connect a patient circuit between the patient outlet connector and the exhalation valve port.
2. Turn the **Flow Rate** control knob, **Airway Pressure Relief** control knob, and **PEEP** control knob to their maximum settings.
3. Place the AutoBreath™ Infant Resuscitator **On/Off** switch in the **On** position.

4. As the unit cycles, observe the patient pressure gauge.
5. If necessary, adjust the PEEP variable resistor for a pressure of 21 cm H₂O (2 kPa) of PEEP.
6. Turn the AutoBreath™ Infant Resuscitator off.
7. Turn the **Flow Rate** control knob, **Airway Pressure Relief** control knob, and **PEEP** control knob to their minimum settings.
8. Remove the patient circuits.

Adjusting the Breath Rate

1. Connect the exhalation valve port to the transducer set-up.
2. Connect the transducer set-up to the digital counter.
3. Using the clamping device, clamp off the inspiratory check valve.
4. Place the AutoBreath™ Infant Resuscitator **On/Off** switch in the **On** position.

NOTE:

The trigger level for the digital counter is ½-peak voltage.

5. Monitor the pressure signal voltage to the digital counter created by the pressure signal from the exhalation valve port.

NOTE:

Triggering on the rising voltage measures inspiratory time, and on the falling voltage measures expiratory time.

6. If required, set ½-peak voltage as the trigger level for the digital counter.
7. At the front panel, adjust the **Breath Rate** control knob for an expiratory time of **2.222** seconds as indicated by the digital counter.
8. Make sure that the **Breath Rate** control knob is set to **18 BPM**.
9. If necessary, adjust the **Breath Rate** control knob:
 - a. Loosen the setscrews securing the breath rate control valve.
 - b. Position the **Breath Rate** control knob to **18 BPM**.

- c. Tighten the setscrews.
10. Set the **Breath Rate** control knob to **60 BPM**, and verify that the inspiratory time is **0.333** seconds. If necessary, adjust the timing variable resistor.
11. Verify that the expiratory time is **0.666** seconds. If necessary, adjust the expiratory resistor.
12. Return the **Breath Rate** control knob to **18 BPM**.
13. Check the expiratory time. If necessary, adjust the **Breath Rate** control knob.
14. Remove the clamping device from the inspiratory check valve, and adjust the check valve resistor for an inspiratory time of **1.111** seconds.

NOTE:

The times mentioned are for perfect rates without tolerance allowances.

15. For best results throughout the full range of the rate setting when calibrating the AutoBreath™ Infant Resuscitator times, reduce the times for 18 BPM and 60 BPM by approximately 5%.

NOTE:

The reduction varies from unit to unit.

NOTE:

The **Breath Rate** control knob has a greater effect at longer rates.

NOTE:

The expiratory resistor has a greater effect on shorter expiratory times.

NOTE:

The inspiratory check valve resistor has a greater effect on longer inspiratory times.

16. To adjust for short inspiratory times, use the timing resistor.
17. Work with the **Breath Rate** knob positions until all rates and inspiratory/expiratory (I/E) ratios are within specification.
18. Place the AutoBreath™ Infant Resuscitator **On/Off** switch in the **Off** position.

19. Return the **Breath Rate** control knob to **18 BPM**.

20. Disconnect the transducer set-up and the digital counter.

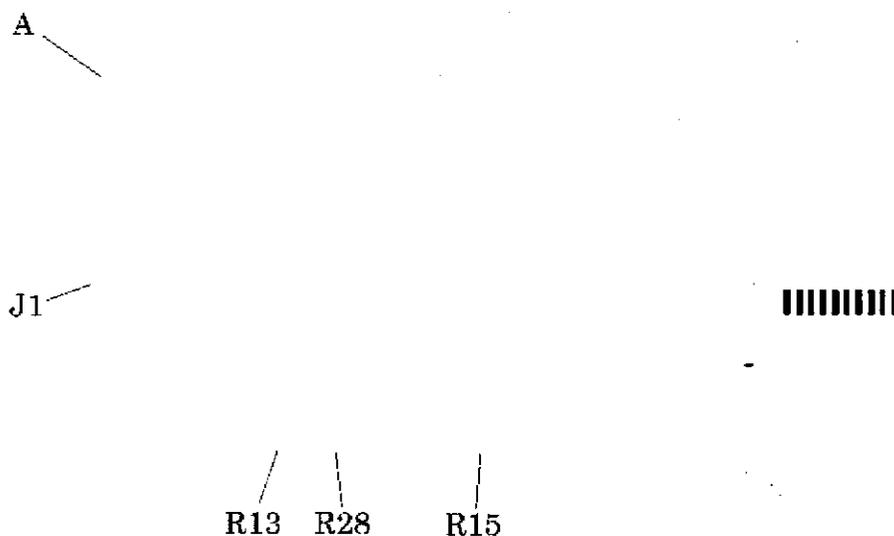
Calibrating the Controller Assembly

Tools required: Digital voltmeter (DVM)
Small screwdriver or trim potentiometer adjustment tool

Adjusting the Precision 5V Reference

1. At the Display P.C. Board (PCB1) (A), perform the following (see figure 6-1 on page 6-343):

Figure 6-1. Display P.C. Board (PCB1)



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- a. Place the leads of the DVM across pin 11 (**GND**) and pin 37 (**Voltage Out**) of the connector (J1).
- b. Using a small screwdriver or trim potentiometer adjustment tool, adjust the precision 5V reference resistor (R15) until the value on the DVM reads **5V ± 5 millivolt (mV)**.

Adjusting the Skin Probe 1 Temperature Sensor

1. Perform "Diagnostic Test #12—Skin Probe Display Temperature Accuracy" on page 2-102.
2. At the Display P.C. Board (PCB1) (A), use a small screwdriver or trim potentiometer adjustment tool to adjust the channel 1 temperature sensor circuit resistor (R13) until the value on the **Baby Temperature** display reads **96.8 F (36 C) ± 0.05 C**.

Adjusting the Skin Probe 2 Temperature Sensor

1. Perform "Diagnostic Test #12—Skin Probe Display Temperature Accuracy" on page 2-102.
2. At the Display P.C. Board (PCB1) (A), use a small screwdriver or trim potentiometer adjustment tool to adjust the channel 2 temperature sensor circuit resistor (R28) until the value on the **APGAR Timer** display reads **96.8 F (36 C) ± 0.05 C**.

Adjusting the Heater Voltage Sensor

1. Perform "Diagnostic Test #6—Heater/Relays AC Line Voltage Display" on page 2-87.
2. At the Power and Control P.C. Board (PCB 2) (B), perform the following (see figure 6-2 on page 6-345):

Figure 6-2. Power and Control P.C. Board (PCB 2)

R9

B

J

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- a. Measure the input AC line voltage between pins 1 and 6 of the connector J6 (C).
 - b. Using a small screwdriver or a trim potentiometer adjustment tool, adjust R9 until the value shown on the **Baby Temperature** display equals the measured value on the DVM.
3. To make sure the warmer operates properly, perform the "Function Checks" on page -48.

Cleaning



WARNING:

Follow the product manufacturer's instructions. Failure to do so may result in personal injury or equipment damage.



WARNING:

When performing cleaning and maintenance procedures and 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. A fire and explosion hazard exists when performing cleaning and maintenance procedures in an oxygen-enriched environment. Personal injury or equipment damage may occur.



SHOCK HAZARD:

Unplug the unit from its power source. Failure to do so may result in personal injury or equipment damage.



SHOCK HAZARD:

Do not expose the unit to excessive moisture that would allow for liquid pooling. Personal injury or equipment damage may occur.



CAUTION:

Do not use harsh cleansers/detergents, such as scouring pads and heavy duty grease removers, or solvents, such as toluene, xylene, and acetone. Equipment damage may occur.



CAUTION:

Alcohol can cause crazing of plastic and acrylic. Do not use alcohol, acetone, or any organic solvents for cleaning. Equipment damage may occur.



CAUTION:

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. Equipment damage may occur.

When an infant is discharged, or at least once a week, thoroughly clean and disinfect the equipment. Before cleaning, disassemble, and then group the parts and assemblies in categories according to the method of cleaning required.

If there is no visible soilage with possible body fluids, we recommend that you clean the unit with a mild detergent and warm water. If disinfection is desired, you may use a combination cleanser/disinfectant as explained in "Disinfecting" on page -347.

Before cleaning, remove all solid wastes and contaminants from the disassembled parts. After cleaning, perform the "Function Checks" on page -48 before returning the unit to service.

Steam Cleaning

Do not use any steam cleaning device on the unit. Excessive moisture can damage mechanisms in this unit.

Cleaning Difficult to Access Areas

To remove difficult spots or stains, we recommend that you use standard household cleansers and a soft-bristled brush. To loosen heavy, dried-on soil, you may first need to saturate the spot.

Disinfecting

When there is visible soilage and between patients, we recommend that you disinfect the unit with a tuberculocidal disinfectant. (For customers in the U.S., the disinfectant should be registered with the Environmental Protection Agency.)

Dilute the disinfectant according to the manufacturer's instructions.

Cleaning Painted Surfaces

Use a detergent/disinfectant to clean all surfaces thoroughly, and then dry with a clean cloth or paper towel.

Cleaning Clear Plastic and Acrylic Surfaces

Use a detergent/disinfectant to clean all surfaces thoroughly. Clean all holes, indentations, baffles, etc., and then dry with a clean cloth or paper towel.

Cleaning Metal Surfaces



WARNING:

The heater element may be hot enough to cause burns. Before cleaning the warmer head, allow 30 minutes for the unit to sufficiently cool. Failure to do so may result in personal injury.

Use a detergent/disinfectant to thoroughly clean all surfaces, and then dry with a clean cloth or paper towel.

Cleaning the Reusable Baby Skin Temperature Probe



CAUTION:

Do not pull the tip of the baby skin temperature probe when cleaning or drying. Equipment damage may occur.

Use a detergent/disinfectant to thoroughly clean all surfaces, and then dry with a clean soft cloth or paper towel.

Sterilizing Equipment



CAUTION:

Do not steam autoclave. Equipment damage may occur.

NOTE:

Prior to gas sterilization, thoroughly clean the entire unit. Remove and discard all used disposable elements. After sterilization, install new disposable elements.

Sterilize by the following methods:

- Cold (liquid) sterilization
- Gas (ethylene oxide) sterilization—Standard gas sterilization procedures are satisfactory as these do not normally exceed 54.4 C (130 F).

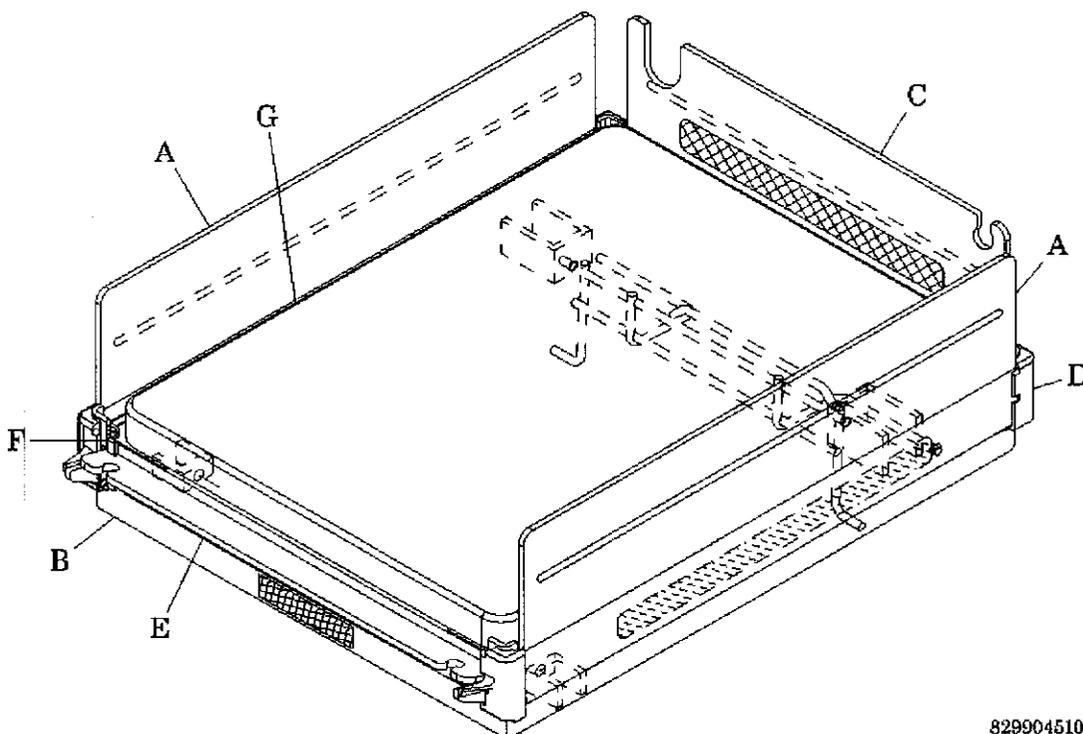
Cleaning Method

Tools required: None

Disassembling the Warmer

1. Remove both bassinet side panels (A) from the bassinet (B) by pulling them straight up (see figure 6-3 on page 6-349).

Figure 6-3. Bassinet

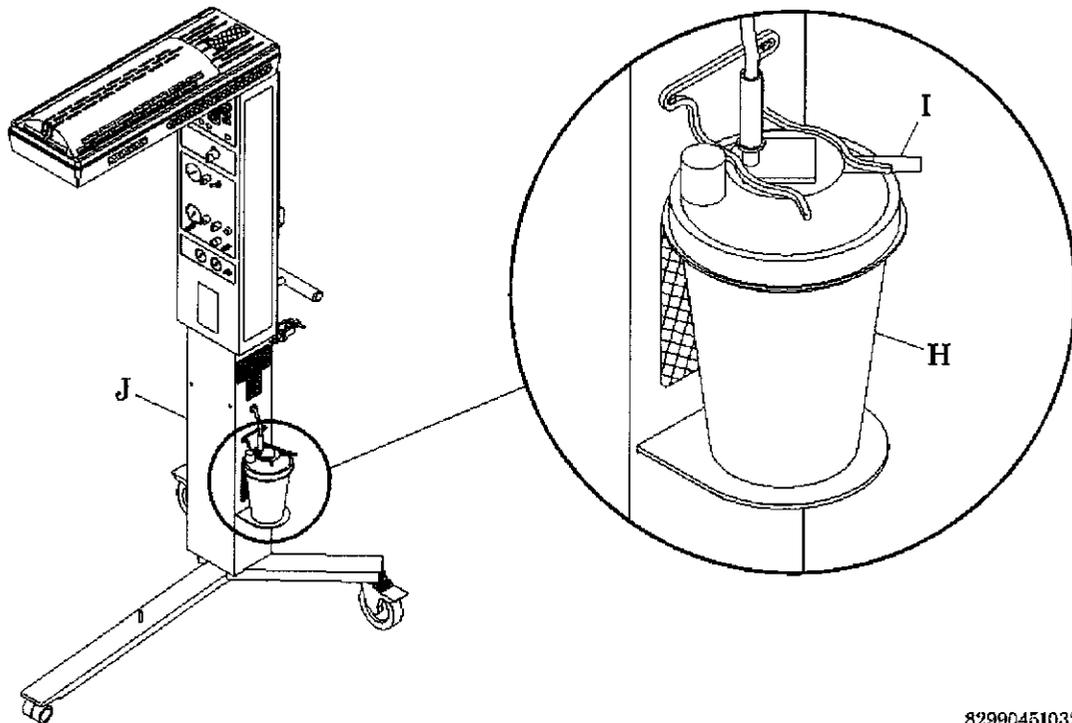


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2. Remove the bassinet back panel (C) from the bassinet (B) by raising it straight up until the bottom pins are adjacent to the slots in the corner brackets (D).
3. Remove the bassinet front panel (E) from the bassinet (B):
 - a. Raise the bassinet front panel (E), and then swivel it down.
 - b. At the corners, press up on the release buttons (F), and pull the bassinet front panel (E) straight out.
4. Remove the mattress (G) from the bassinet (B).

5. Remove the x-ray cassette tray.
6. Remove the suction bottle (H) and suction filter (I) from the side of the post (J) (or the front of the bassinet) (see figure 6-4 on page 6-350).

Figure 6-4. Suction Bottle (Resuscitaire® Birthing Room Warmer Shown)



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Assembling the Warmer

1. Place the mattress (G) on the bassinet (B) (see figure 6-3 on page 6-349).
2. Install the x-ray cassette tray.
3. Install the bassinet back panel (C) by inserting the bottom pins in the corner brackets.
4. Install the bassinet side panels (A) by pushing them straight down into their slots.

5. Install the bassinet front panel (E) by sliding it into the front of the bassinet until the release buttons catch, and then raise the bassinet front panel (E) into position.
6. If a reusable suction bottle (H) is in use, install a new suction filter (I) (see figure 6-4 on page 6-350).
7. If a disposable suction bottle (H) is in use, replace the suction bottle (H).
8. To make sure the warmer operates properly, perform the "Function Checks" on page -48.

Cleaning the Reusable Breathing Circuit

Tools required: Cold sterilization solution (2% Glutaraldehyde or equivalent)

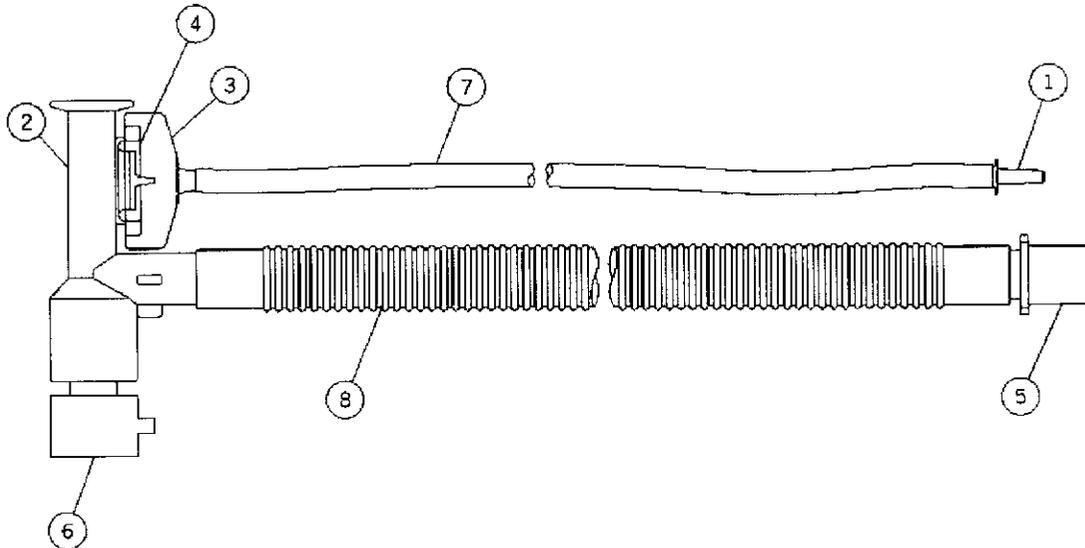
Parts required:

(1)	81 000 15	Breathing circuit, reusable
(1)	81 000 07	Diaphragm, box, 25
(1)	Reference only	Tubing, standard, 0.125" inner diameter
(1)	81 000 07	Diaphragm, box, 25,
	includes	the following parts:
(25)	81 000 18	Diaphragm, exhalation valve
(1)	81 000 15	Breathing circuit, reusable,
		includes the following parts: (see table 6-1 on page -352) and (see figure 6-5 on page 6-353).

Table 6-1. Reusable Breathing Circuit Parts

Item Number	Part Number	Quantity	Description
1	67 355 26	1	Adapter, 4.5 mm male—1/8" barb
2	81 000 16	1	Housing, exhalation valve
3	81 000 17	1	Cap, exhalation valve
4	81 000 18	1	Diaphragm, exhalation valve
5	81 001 04	1	Connector, 15 mm x 9 mm, reusable
6	81 001 28	1	Connector, 15 mm, 10 mm with sideport
7	81 001 32	1	Tubing, polyvinyl chloride (PVC), 1/8" inner diameter, 37" (94 cm) length
8	81 001 41	1	Hose, corrugated, 10 mm (0.394") inner diameter x 36" length

Figure 6-5. Reusable Breathing Circuit Components



82990451125

**CAUTION:**

Do not pull or twist tubing. Attach and detach tubing from equipment using the silicone cuffs. Failure to do so could result in equipment damage.

**CAUTION:**

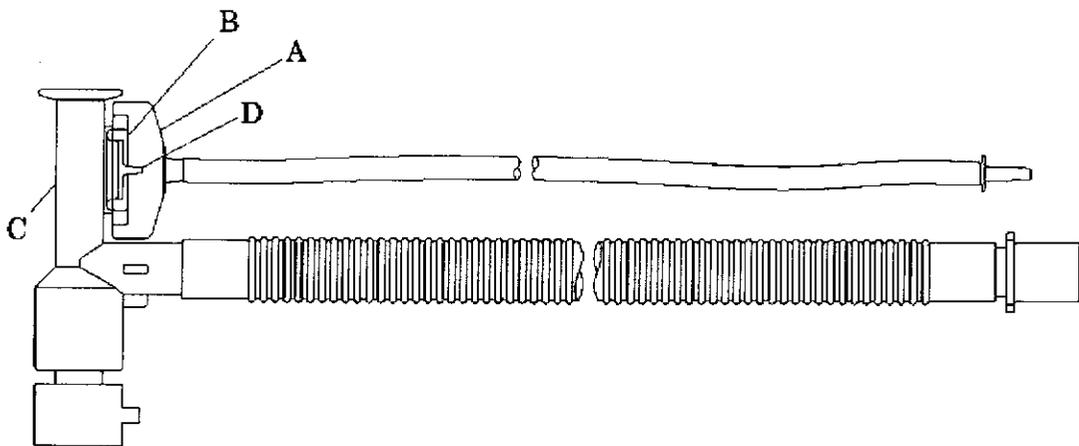
Avoid prolonged exposure to UV light. Failure to do so could result in equipment damage.

**CAUTION:**

Do not autoclave the breathing circuit. Failure to follow this instruction could result in equipment damage.

1. Disconnect the breathing circuit from all patient apparatus and from the Resuscitation Module.
2. Remove the exhalation valve cap (A) and discard the exhalation valve diaphragm (B) (see figure 6-6 on page 6-354).

Figure 6-6. Cleaning the Reusable Breathing Circuit



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CAUTION:

Do not use the following solutions to sterilize the breathing circuit: Hypochlorite, Phenol (>5%), Formaldehyde, Chlorinated Hydrocarbons, Aromatic Hydrocarbons, and inorganic acids. Failure to follow this instruction could result in equipment damage.

3. Immerse the breathing circuit in cold sterilization solution (2% Glutaraldehyde or equivalent). Follow the manufacturer's instructions for cleaning, disinfecting, sterilizing, and removing solution from the breathing circuit.
4. After rinsing all solution from the breathing circuit, allow to dry completely.
5. Inspect tubing for deterioration after sterilization. If the tubing shows any signs of wear, replace it.



CAUTION:

Ensure that the blue exhalation valve diaphragm is inserted with the stem facing the cap prior to connecting the exhalation valve cap to the exhalation valve housing. Failure to do so may cause equipment to malfunction.

6. Position the new exhalation valve diaphragm (B) so that the stem (D) faces towards the exhalation valve cap (A).
7. Install the new exhalation valve diaphragm (B) on the exhalation valve housing (C).
8. Install the exhalation valve cap (A) over the exhalation valve diaphragm (B).

NOTE:

Air Flow resistance ≤ 2 cm H₂O (0.2 kPa) @ 15 LPM (32 scfh).

General Maintenance



WARNING:

Only facility-authorized personnel should perform maintenance on the Resuscitaire® Radiant Warmer Products. Maintenance performed by unauthorized personnel may result in personal injury or equipment damage.

For disposal of consummable materials, see "Disposal" on page -368.

P.C. Board Handling



CAUTION:

To help prevent component damage, make sure that your hands are clean, and **only** handle the P.C. board by its edges.



CAUTION:

When handling electronic components, wear an antistatic strap. Failure to do so may result in component damage.



CAUTION:

For shipping and storage, place the removed P.C. board in an antistatic protective bag. Equipment damage can occur.

When servicing the P.C. board, follow good handling practices. Mishandling a P.C. board can cause the following:

- P.C. board damage
- Shortened P.C. board life
- Unit malfunctions

Observe the following P.C. board handling rules:

- Make sure that hands are clean and free of moisture, oily liquids, etc.
- **Only** handle the P.C. board by its outer edges.
- Do not touch the P.C. board components. Finger contact with the board surface or with its components can leave a deposit that will result in board (and component) deterioration.
- When working with electronics, wear an appropriate antistatic strap, and make sure that it is properly grounded.
- Service the removed P.C. board at a static-free workstation that is properly grounded.
- For shipping and storage, place the removed P.C. board in an antistatic protective bag.

Verifying the DC Power Requirements

Tools required: Digital voltmeter (DVM) (Fluke® 8080A or equivalent)

At the specified AC input voltage, verify that the following DC voltages exist on the Power and Control P.C. Board (PCB 2) (see table 6-2 on page -357).

Table 6-2. DC Power Requirements

DC Output Voltage	Connector and Pin
+5.1V ± 0.05V	J2-2 or J2-3
+12V ± 0.5V	J2-1
-12V ± 0.5V	J2-6
Ground	J2-4

+5.05 to 5.15

+12.95 to 12.5

-12.95 to -12.5

1. Fluke® is a registered trademark of Fluke Corporation.

Testing the Leakage Current

Tools required: Leakage current detector

Setup

1. Plug the connector into an appropriate power source through an ungrounded adapter plug so that the unit is ungrounded.
2. Turn the **Power** switch on.

NOTE:

The leakage current standards assume leakage through a resistance of 1000W.

3. If the leakage current detector used does not provide a resistance of 1000W, adjust the setup to provide it.
4. Turn the **Power** switch off.

Procedure

NOTE:

Test 220/240V AC units at 264V, in accordance with the recommended standards.

1. Using the leakage current detector, measure between the chassis of the unit and a known ground, such as the ground connection of a wall receptacle. The leakage current must not exceed 300mA for 100/120V AC units, or 500mA for 220/240V AC units.
2. Reverse the plug.

NOTE:

Test 220/240V AC units at 264V, in accordance with the recommended standards.

3. Using the leakage current detector, measure between the chassis of the unit and a known ground, such as the ground connection of a wall receptacle. The leakage current must not exceed 300mA for 100/120V AC units, or 500mA for 220/240V AC units.

Verifying the Heater Head Electrical Requirements

Tools required: Digital voltmeter (DVM) (Fluke® 8080A or equivalent)

1. Measure the resistance of the heater element (see table 6-3 on page -359).

Table 6-3. Heater Head Electrical Requirements

Unit Voltage	Heater Voltage	Heater Cold Resistance
100V AC	100V	12Ω to 15Ω
120V AC	120V	17Ω to 21Ω
220V AC	220V	59Ω to 69Ω

2. At the specified AC input voltage, verify that the heater illuminates.
3. Perform a leakage current test (refer to "Testing the Leakage Current" on page -358).

1. Fluke® is a registered trademark of Fluke Corporation.

Checking the Pneumatic System

Tools required: Oxygen analyzer (Bio-Tek® #74233 or equivalent)
Filter/regulator, gas manual (P/N 67 352 36)
Nipple, DISS oxygen—1/8" (P/N 67 355 10)
Tee, oxygen sensor, 22 mm male-female (P/N 67 356 02)
Tubing, green polyvinyl chloride (PVC) 1/4" inner diameter,
15" long (P/N 67 359 01-R) (3)
Elbow, 90°, 3/8"-1/4", brass (P/N 67 355 44)

1. Visually inspect the system. Check for marks or scratches.
2. Make sure that all of the control knobs turn smoothly.
3. Make sure that all of the gauges read zero (± 1 unit of measurement) when the system is off.
4. Remove the upper post covers, and inspect for the following (refer to procedure 4.1):
 - Loose tubes
 - Pinched tubes
 - Improper seating of the modules

Testing for Leakage

1. Turn the **Gas Supply** switch on.
2. Pressurize the system with the oxygen between 35 psi (241 kPa) and 75 psi (517 kPa).
3. Turn the **Gas Supply** switch off.
4. Block the patient and Auxiliary Outlets.
5. Verify that the drop in system pressure is less than 2 psi (14 kPa) in 30 seconds.

1. Bio-Tek® is a registered trademark of Bio-Tek Instruments, Inc.

Checking for Pneumatic Leaks



WARNING:

Disconnect the gas supplies from the unit. Failure to do so could result in personal injury or equipment damage.

Checking the Gas Supply Module and Tank Yokes (Models Equipped with Reserve Gas Supply Only)

1. With the **Gas Supply** switch in the **Off** position, securely fasten the tanks to the cylinder connections.
2. Slowly open the tanks, and verify that there are no leaks in the Gas Supply Module, and that the gauges display the tank pressure.
3. Toggle the **Gas Supply** switch to the **On** position, and verify that there are no leaks throughout the pneumatic system, except for the normal bleed from the Blender Module and the patient/Auxiliary Outlet.
4. Briefly operate the Resuscitation Module, and verify that the tank gases are delivered to the system with no blender alarm.
5. Close the tank valves, and let the air or oxygen bleed from the Resuscitation Module.
6. Toggle the **Gas Supply** switch to the **Off** position.
7. Remove the tanks from the cylinder connections.

Checking the Pipeline Supply to the Blender Module (Models Equipped with Blender Module Only)

1. Connect 50 psi (345 kPa) to the air fitting, the oxygen hose to the manual gas filter/regulator, the manual gas filter/regulator to the oxygen fitting, and the oxygen supply to the oxygen hose.

NOTE:

For the U.K., connect 60 psi (415 kPa) to the air fitting.

2. Set the manual gas filter/regulator to 50 psi (345 kPa), and set the Blender Module to 60%.
3. Toggle the **Gas Supply** switch to the **On** position, and verify that there are no leaks throughout the pneumatic system, except for the

normal bleed from the Blender Module and the patient/Auxiliary Outlet.

4. Slowly reduce the oxygen regulator to the 50 psi (345 kPa) supply until the Blender Module pressure differential alarm sounds. Verify that the alarm sounds when the oxygen supply pressure is 30 psi \pm 5 psi (207 kPa \pm 34 kPa) below the air supply pressure.
5. For the U.S., adjust the oxygen supply back to 50 psi (345 kPa), and verify that the alarm ceases.
6. For the U.K., adjust the oxygen supply back to 60 psi (415 kPa), and verify that the alarm ceases.

Checking the Performance of the Resuscitation Module

Tools required: Oxygen analyzer (Bio-Tek® #74233 or equivalent)

Parts required:	(1)	67 352 11	Adapter, 15 mm male— $\frac{1}{4}$ " barb, plastic
	(1)	67 352 10	Adapter, 15 mm male— $\frac{1}{4}$ " barb, plastic
	(1)	67 362 00	Hose, corrugated, 13", ventilation circuit

Checking the Oxygen Concentration (Models Equipped with the Blender Module Only)

1. Connect the oxygen analyzer to the patient outlet.
2. When the **Blender** control is set to **60%**, verify that the oxygen concentration level at the patient outlet is 60%.
3. Using the **Blender** control, verify that the output mixture range of the Blender Module is adjustable between 20.8% oxygen to 100% oxygen.
4. Set the Resuscitation Module **Airway Pressure Relief** control knob to the **Max** position and the **Flow Rate** (LPM) control to 5.0 LPM (10.6 scfh).
5. Connect the oxygen analyzer to the patient outlet.
6. Calibrate the analyzer at 100% oxygen.
7. Verify the blender accuracy at the following settings:
 - 100% \pm 4
 - 60% \pm 4
 - 40% \pm 4
 - 21% \pm 4

1. Bio-Tek® is a registered trademark of Bio-Tek Instruments, Inc.

Checking the Airway Pressure Gauge (Models without AutoBreath™ Infant Resuscitator Only)

1. Using the 33 cm (13") corrugated hose and the 15 mm male adapter, connect the patient outlet to the airway pressure gauge input.
2. Adjust the **Airway Pressure Relief** control knob to the **Max** position, and the **Flow Rate** (LPM) control to 5.0 LPM (10.6 scfh). Verify that the airway pressure gauge reads 50 cm H₂O (5 kPa) ± 8.0 cm H₂O (0.8 kPa).

Checking the Suction

With the **Suction** control set to **Max** and the suction output blocked at the suction jar located in the front of the bassinets assembly, verify that the **Suction** gauge reads -150 mm Hg ± 15 mm Hg (-80"H₂O ± 8"H₂O).

Checking the Supply Switch

Verify that the **Supply** switch turns the suction completely off and completely on.

Preventive Maintenance



WARNING:

Only facility-authorized personnel should perform preventive maintenance on the Resuscitaire® Radiant Warmer Products. Preventive maintenance performed by unauthorized personnel may result in personal injury or equipment damage.

The Resuscitaire® Radiant Warmer Products require an effective maintenance program. We recommend that you perform quarterly preventive maintenance (PM) and testing for Joint Commission on Accreditation of Healthcare Organizations (JCAHO). PM and testing not only meet JCAHO requirements but will help ensure a long, operative life for the Resuscitaire® Radiant Warmer Products. PM will minimize downtime due to excessive wear.

The following PM schedule guides you through a normal PM procedure on the Resuscitaire® Radiant Warmer Products. During this PM process, check each item on the schedule, and make the necessary adjustments.

Follow the PM schedule with the corresponding PM checklist. This checklist is designed to keep a running maintenance history and subsequent repair costs for one Resuscitaire® Radiant Warmer Product. However, your facility can modify this checklist or design another to fit your needs. Two effective ways to reduce downtime and ensure the patient remains comfortable are keeping close records and maintaining the Resuscitaire® Radiant Warmer Product.

Preventive Maintenance Schedule

Table 6-4. Preventive Maintenance Schedule

Function	Procedure
Overall appearance	Visually inspect for signs of damage or deterioration to all outer surfaces, Controller Module, warmer head, Resuscitation Module, casters, mattress, crib sides and all other features where applicable.
Internal visual inspection	Check the condition and security of all components and no fluid ingress.
Control knobs	Make sure that all control knobs turn smoothly.
Gauges	Make sure that all gauges read 0 (zero) when the system is off.
Tubes	Remove the back cover (refer to procedure 4.1), and inspect for loose or pinched tubes.
Hoses	Inspect all hoses for wear and tear every 6 months. Replace as needed or after 6 years.
Modules	Inspect for improper seating of the modules.
AC power cord	Examine for damage and check terminations, polarity, strain relief and correct mains fuse rating.
P.C. boards	Examine the condition of components fitted to the PC boards.
Skin probe	Check that the skin probe is available, the sensor head is undamaged, and that the plug and cable are in order.
System calibration	<p>Calibrate the unit:</p> <ol style="list-style-type: none"> 1. Calibrate the controller assembly (refer to procedure). 2. Check the DC power requirements (refer to procedure). 3. Check the leakage current (refer to procedure). 4. Check the heater head electrical requirements (refer to procedure). 5. Test and inspect the unit for leaks on the gas supply (refer to procedure).
Blender Module (option)	Test every 6 months, refer to "Blended Gas Supply (Optional)" on page 2-61. Have the factory calibrate every 2 years.

Function	Procedure
Function check	To make sure the warmer operates properly, perform the "Function Checks" on page -48.

Preventive Maintenance Checklist

Table 6-5. Preventive Maintenance Checklist

Date											Function
Manufacturer											Overall appearance
											Internal visual
											Control knobs
											Gauges
											Tubes
											Hoses
											Modules
Model Number											AC power cord
											P.C. boards
											Skin probe
											System calibration
											Blender Module
											Function check
Serial Number											
Total Cost for this Page											Labor Time:
											Repair Cost:
											Inspected by:



NOTES:

Disposal

Chapter :

Accessories

Chapter 7: Accessories

Resuscitaire® Radiant Warmer Products Accessories

For Resuscitaire® Radiant Warmer Products accessories, see table 7-1 on page -373.

Table 7-1. Accessories List

Part Number	MU	Description
81 900 00	MU11585	Replacement side panel, English
81 900 01	MU11586	Replacement rear panel, English
81 900 07	MU11592	Replacement front panel with bassinet, release, English
17 AZ 104	MU02496	Cable assembly, AC power/lock, domestic 10'
17 AZ 204	MU02501	Cable assembly, AC power/lock, VDE 10'
17 AZ 211	MU02507	Cable assembly, AC power/lock, gray, IEC, 40"
81 001 50	MU10919	Reusable suction bottle kit (750 ml)
08 131 00	MU01905	Bottle, 1000 cc, marked "suction," reusable
81 001 51	MU10920	Suction bottle, disposable, box of 100, 800 cc
81 001 49	MU10918	Suction bottle, disposable, box of 20, 800 cc
81 001 48	MU10917	Suction bottle, micro-volume, disposable, box of 10
81 001 47	MU10916	Kit, reusable micro-volume suction
81 001 54	MU10923	Replacement filters and tubing for reusable suction bottle, box of 25
81 001 46	MU10915	Replacement filter for disposable suction bottle
78 170 20	MU09577	Mattress assembly, 20.50" x 25.75"
81 300 05	MU11225	Probe, skin temperature, dual, reusable
81 300 08	MU11228	Probe 3, skin temperature, dual, disposable, box of 10
81 300 09	MU11229	Probe 3, skin temperature, dual, disposable, box of 100
68 209 46	MU06942	Critter Covers® Probe Cover, box of 100

Chapter :

Part Number	MU	Description
68 209 45	MU06941	Critter Covers® Probe Cover, carton of 600
68 209 47	MU06943	Cover, probe, Care-For-Me™, large, 100
68 209 48	MU06944	Cover, probe, Care-For-Me™, standard, 100
81 001 29	MU10902	Connector, with side port, bag of 25
81 001 27	MU10900	Breathing circuit for manual bagging, disposable, 25
81 000 06	MU10841	Breathing circuit, reusable, box of 25
81 001 19	MU10895	Breathing circuit for use with AutoBreath™ Infant Resuscitator
81 001 26	MU10899	Breathing circuit for manual bagging or blowby
67 350 50	MU04776	Self-inflating resuscitation bag
68 120 53	MU06562	Neat-Clips, carton of 100, 0.38" diameter
68 120 54	MU06563	Neat-Clips, carton of 50, 1.00" diameter
81 502 02	MU11536	Washer, sealing, oxygen/air
81 100 44	MU11101	Tray, x-ray cassette
82 001 53	MU11873	IV pole assembly
81 101 70R	MU11164	Instrument tray kit, plastic, right (for RW82 only)
81 101 70L	MU11163	Instrument tray kit, plastic, left (for RW82 only)
81 101 11	MU11132	Tray, pass-through drawer (for RW82 only)
82 001 54	MU11874	Monitor shelf assembly, Birthing Room Warmer (for WBR82 only)
82 001 52	MU11872	Monitor shelf assembly (for RW82 only)

- ① Radiant warmer w/o Res. (202)
 ② " " with " (209)
 ③ BRW (219)
 ④ " (223)